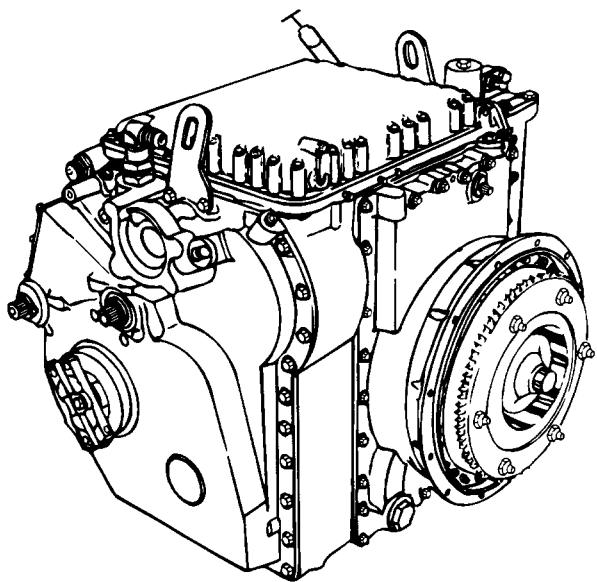


**TECHNICAL MANUAL****INTERMEDIATE, DIRECT, AND  
GENERAL SUPPORT  
MAINTENANCE MANUAL  
(INCLUDING REPAIR PARTS  
AND SPECIAL TOOLS LIST)****CROSS DRIVE TRANSMISSION  
W/CONTAINER  
MODEL X200-4 & 4A  
NSN 2520-01-201-4784  
NSN 2520-01-397-1074  
ALLISON TRANSMISSION  
DIVISION, GMC****HOW TO USE THIS MANUAL****IV****INTRODUCTION****1-1****TROUBLESHOOTING  
PROCEDURES****2-1****GENERAL MAINTENANCE  
INSTRUCTIONS****3-1****TRANSMISSION MAINTENANCE  
PROCEDURES****4-1****FINAL ADJUSTMENTS AND  
PREPARATION FOR  
STORAGE AND SHIPMENT****5-1****REFERENCES****A-1****REPAIR PARTS AND  
SPECIAL TOOLS LIST****B-1****EXPENDABLE SUPPLIES  
AND MATERIALS LIST****C-1****ILLUSTRATED LIST OF  
MANUFACTURED ITEMS****D-1****GLOSSARY****GLOSSARY-1****ALPHABETICAL INDEX****INDEX-1**

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HEADQUARTERS, DEPARTMENT OF THE ARMY

Change 2 JUNE 1987

## **LIST OF WARNINGS**

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 (380C), and for Type II is 138°F (500C). 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 975 pounds (442 kg). Transmission and container weigh about 1565 pounds (710 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.

Change 1

CHANGE

NO. 2

HEADQUARTERS  
DEPARTMENT OF THE ARMY  
Washington, D.C., 15 February 1997

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  
MODEL X200-4A NSN 2520-01-397-1074  
ALLISON TRANSMISSION DIVISION, GMC

TM 9-2520-272-34&P, 3 June 1987 is changed as follows:

1. Remove old pages and insert new pages as indicated below.
2. New or changed maintenance material is indicated by a vertical bar in the margin of the page.
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Remove Pages

a and b  
i to iv  
xi to 1-2  
1-5 to 1-8  
1-13 and 1-14  
4-3 to 4-8  
4-21 and 4-22  
4-25 to 4-34  
4-43 to 4-46  
4-55 to 4-68  
4-71 and 4-72  
4-97 and 4-98  
4-111 to 4-120  
4-123 to 4-128  
4-145 to 4-158  
4-195 to 4-198  
4-217 and 4-218  
4-221 and 4-222  
4-225 and 4-226

Insert Pages

a and b  
1 to IV  
xi to 1-2  
1-5 to 1-8  
1-13 and 1-14  
4-3 to 4-8  
4-21 and 4-22  
4-25 to 4-34  
4-43 to 4-46  
4-56 and 4-68  
4-71 and 4-72  
4-97 and 4-98  
4-111 to 4-120  
4-123 to 4-128  
4-145 to 4-158  
4-195 to 4-198  
4-217 and 4-218  
4-221 and 4-222  
4-225 and 4-226

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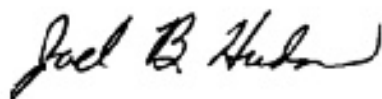
Change 2

4-235 and 4-236  
5-7 and 5-8  
B-9 to Fig. 12-2  
Fig. 13-1 to Fig. 15-2  
Fig. 16-1 to Fig. 17-2  
Fig. 18-1 to Fig. 22-2  
Fig. 23-1 to Fig. 32-2  
Fig. 33-1 to Fig. 38-1  
I-1 to I-51 (I-52 Blank)  
D-1 to D-3 (D-4 Blank)  
Cover and Warnings

4-235 and 4-236  
5-7 and 5-8  
B-9 to Fig. 12-2  
Fig. 13-1 to Fig. 15-2  
Fig. 16-1 to Fig. 17-2  
Fig. 18-1 to Fig. 22-2  
Fig. 23-1 to Fig. 32-2  
Fig. 33-1 to Fig. 38-1  
I-1 to I-31 (I-32 Blank)  
D-1 to D-3 (D-4 Blank)  
Cover and Warnings

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*Official: Chief of Staff*

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Change 2



CHANGE

NO. 1

HEADQUARTERS  
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Washington D.C., 11 February 1991

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

CROSS DRIVE TRANSMISSION W/CONTAINER  
MODEL X200-4  
NSN 2520-01-201-4784  
ALLISON TRANSMISSION DIVISION, GMC

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Remove Pages

Cover and Warnings  
iii and iv  
1-3 thru 1-10  
1-13 and 1-14  
4-3 and 4-4  
4-21 and 4-22  
4-29 and 4-30  
4-45 thru 4-48  
4-55 and 4-56  
4-81 and 4-82  
4-95 thru 4-98  
4-115 and 4-116  
4-119 and 4-120  
4-145 thru 4-148  
4-157 and 4-158  
4-165 and 4-166  
4-169 and 4-170  
4-181 and 4-182  
4-191 and 4-192  
4-205 and 4-206  
4-211 thru 4-220  
4-235 and 4-236  
4-249 and 4-250  
5-5 thru 5-10

Insert Pages

Cover and Warnings  
iii and iv  
1-3 thru 1-10  
1-13 and 1-14  
4-3 and 4-4  
4-21 and 4-22  
4-29 and 4-30  
4-45 thru 4-48  
4-55 and 4-56  
4-81 and 4-82  
4-95 thru 4-98  
4-115 and 4-116  
4-119 and 4-120  
4-145 thru 4-148  
4-157 and 4-158  
4-165 and 4-166  
4-169 and 4-170  
4-181 and 4-182  
4-191 and 4-192  
4-205 and 4-206  
4-211 thru 4-220  
4-235 and 4-236  
4-249 and 4-250  
5-5 thru 5-10

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Remove Pages

Appendix B, fig. 1 thru end of Appendix B  
C-1 thru C-4  
D-1 and D-2  
D-3/D-4  
Glossary 1

Insert Pages

Appendix B, fig. 1 thru end of Appendix B  
C-1 thru C-4  
D-1 and D-2  
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Glossary 1

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### **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 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.

A X2004 and X200-4A Transmission weighs about 975 pounds (442 kg). Transmission and container weigh about 1565 pounds (710 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.

## **TM 9-2520-272-34 & P**

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.

### **b Change 2**

DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE MANUAL

CROSS DRIVE TRANSMISSION WITH CONTAINER

X2004 (NSN 2520-01-2014784)

X200-4A (NSN 2520-01-397-1074)

**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:

COMMANDER  
US ARMY TANK-AUTOMOTIVE & ARMAMENTS COMMAND  
ATTN: AMSTA-IM-OPIT  
WARREN, MI 48397-5000

A reply will be furnished to you.

TABLE OF CONTENTS

		Page
	<b><u>HOW TO USE THIS MANUAL</u></b>	iv
<b>CHAPTER 1</b>	<b><u>INTRODUCTION</u></b>	1-1
Section I	General Information	1-1
Section II	Location and Description of Major Transmission Assemblies	1-4
Section III	Location of Major Assemblies	1-6
Section IV	Equipment Data	1-13
Section V	Container	1-14
<b>CHAPTER 2</b>	<b><u>TROUBLESHOOTING PROCEDURES</u></b>	2-1
<b>CHAPTER 3</b>	<b><u>GENERAL MAINTENANCE INSTRUCTIONS</u></b>	3-1
<b>CHAPTER 4</b>	<b><u>TRANSMISSION MAINTENANCE PROCEDURES</u></b>	4-1
Section I	Organization and Scope	4-1
Section II	Transmission Disassembly into Major Assemblies	4-2
Section III	Transmission Assembly from Major Assemblies	4-44
Section IV	Disassembly, Repair and Assembly of Major Assemblies	4-96
<b>CHAPTER 5</b>	<b><u>FINAL ADJUSTMENTS AND PREPARATION FOR STORAGE OR SHIPMENT</u></b>	5-1
Section I	Introduction	5-1
Section II	Checks and Adjustments	5-1
Section III	Preservation and Storage	5-9

## TABLE OF CONTENTS (Continued)

			Page	Illus./ Figure
<b>APPENDIX A</b>	<b><u>REFERENCES</u></b>		A-1	
<b>APPENDIX B</b>	<b><u>REPAIR PARTS AND SPECIAL TOOLS LIST</u></b>		B-1	
Section I	Introduction	B-1		
Section II	Repair Parts List	1-1		
Group 07	Transmission	1-1		
	0710	Transmission Assembly	1-1	
		Transmission Assembly	1-1	1
		Right Hand Cover and Center Housing	2-1	2
		Output Driven Gear and Steer Shaft		
		Drive Gear	3-1	3
		Range Input Driven Gear and Drive Gear	4-1	4
		Left Hand Cover	5-1	5
		Bevel Gear and Input Housing	6-1	6
		Converter Pump and Cover	7-1	7
		Top Cover	8-1	8
		Converter Pump Cover and Lockup Piston	9-1	9
		Input Housing	10-1	10
		Center Housing and Hydrostatic Pump and Motor	11-1	11
		Bevel Gear and Bevel Gear Carrier	12-1	12
		Oil Transfer Diaphragm and Input Pump		
		Drive Gear	13-1	13
		Left Hand End Cover and Output Shaft	14-1	14
		Right Hand End Cover and Brake		
		Apply Cam	15-1	15
	0713	Intermediate Clutch	16-1	
		Forward Clutch	16-1	16
		1 st Clutch, Center Carrier and		
		Rear Carrier	17-1	17
		2nd and 3rd Clutch, Front Carrier, 4th and Reverse Clutch	18-1	18
	0714	Servo Unit	19-1	
		Governor and Governor Body	19-1	19
		G2 Backup, Priority Valve	20-1	20
		Lockup Valve	21-1	21
		Control Valve	22-1	22
		Push Start Valve	23-1	23
	0721	Coolers, Pumps, Motors	24-1	
		Output Oil Pump	24-1	24
		Scavenge and Input Pump	25-1	25
		Filter Cover Assembly and Filter Element	26-1	26
		Steer Control Assembly	27-1	27
		Motor Component Parts	28-1	28
		Manifold Component Parts	29-1	29
		Pump Component Parts	30-1	30

**TABLE OF CONTENTS (Continued)**

**Illus./  
Page Figure**

**APPENDIX B****REPAIR PARTS AND SPECIAL TOOLS LIST (Continued)**

Section II	Repair Parts List (Continued)		
Group 07	Transmission (Continued)		
	0726 Brakes	31-1	
	Left Hand Brake and Output Carrier	31-1	31
	Right Hand Brake and Output Carrier	32-1	32
	Right Hand Brake Apply Valve Body and Brake Coolant Valve Body	33-1	33
Group 33	Special Purpose Kits	34-1	
	3301 Reuseable Shipping Containers	34-1	
	Transmission Shipping and Storage Container	34-1	34
Group 94	Special Purpose Kits	Kits-1	
	9401 Repair Kits	Kits-1	
Section III	Special Tools List 35-1		
Group 26	Tools and Test Equipment	35-1	
	2604 Special Tools	35-1	
	Special Tools	35-1	35
	Special Tools	36-1	36
	Special Tools	37-1	37
	Special Tools	38-1	38
Section IV	National Stock Number and Part Number Index- 1		

**APPENDIX C****EXPENDABLE SUPPLIES AND MATERIALS LIST**

C-1

Section I	Introduction	C-1
Section II	Expendable Supplies and Materials List	C-2

**APPENDIX D****ILLUSTRATED LIST OF MANUFACTURED ITEMS**

D-1

**GLOSSARY**

Glossary-1

Section I	Abbreviations	Glossary-1
Section II	Words and Terms	Glossary-5

**ALPHABETICAL INDEX**

Index-i

## HOW TO USE THIS MANUAL

### OVERVIEW

This manual has been prepared to tell you how to perform Direct and General Support maintenance on the Allison Transmission 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.

- o You must make yourself familiar with every part of the manual before beginning any troubleshooting or maintenance assignments.
- o 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.
- o 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 III).

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 1L. 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.

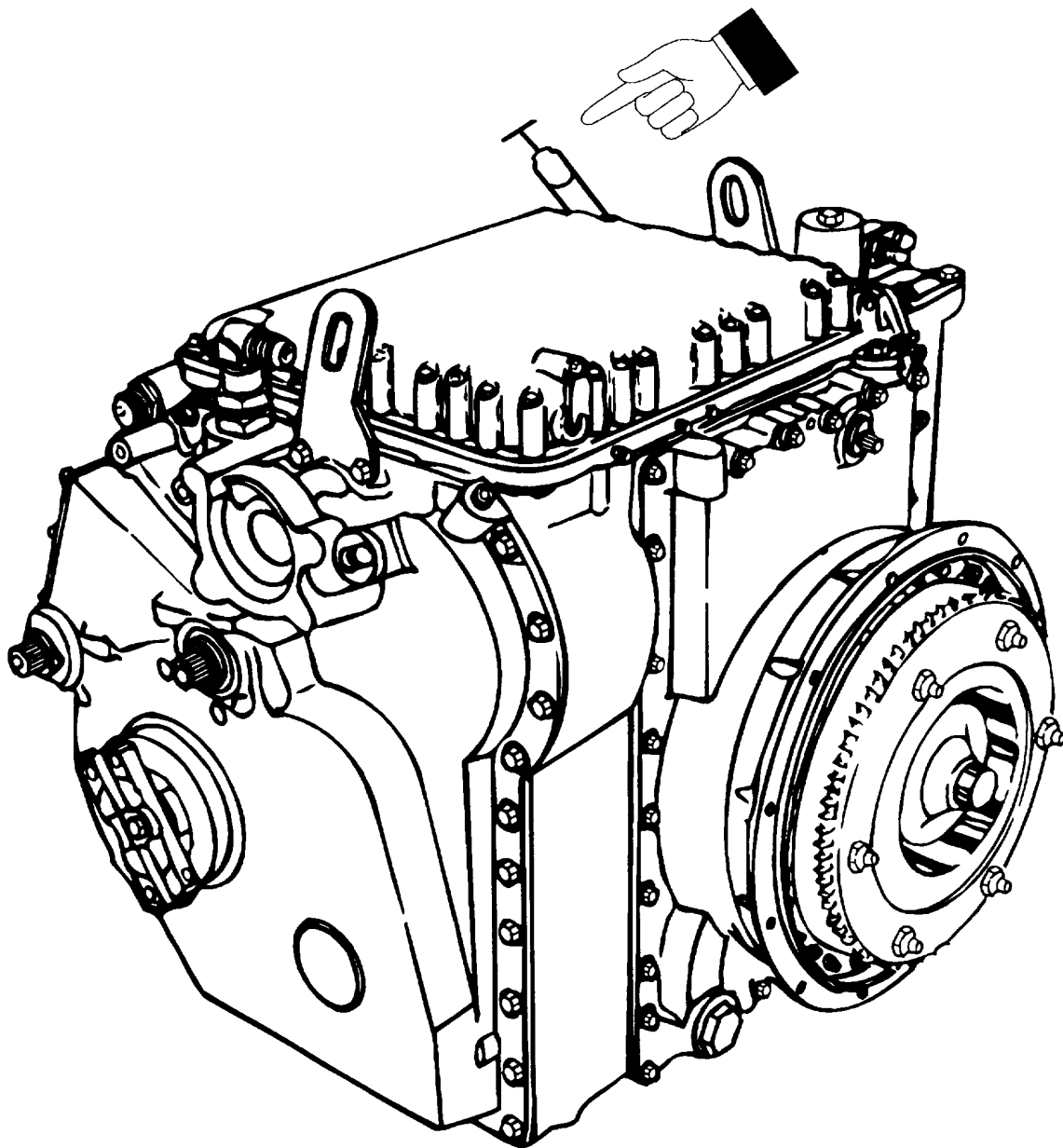
## HOW TO USE THIS MANUAL (Continued)

### 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.



*Fig. 1-1. Hydromechanical Cross Drive Transmission, Model X200-4A Right Front External View*

1-0 Change 2

Para. 1-0



## CHAPTER 1

## INTRODUCTION

## Section I. GENERAL INFORMATION

Paragraph	Title	Page
1-1	Scope	1-1
1-2	Maintenance Forms, Records and Reports	1-1
1-3	Preparation for Storage or Shipment	1-1
1-4	Nomenclature Cross-Reference List	1-2
1-5	Reporting Equipment Improvement Recommendations (EIR)	1-2
1-6	Functions of the Transmission	1-2
1-7	Transmission Operation	1-3
1-8	Transmission Removal and Installation	1-3
1-9	Identification Plate, MWO/Overhaul Data Plate	1-3

**1-1. SCOPE**

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

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

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

Equipment Applications. Transmission Model X200-4 & X200-4A 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.
- M 113A3 Family of Vehicles

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

Department of the Army forms and procedures used for equipment maintenance will be those prescribed by DAPAM 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.

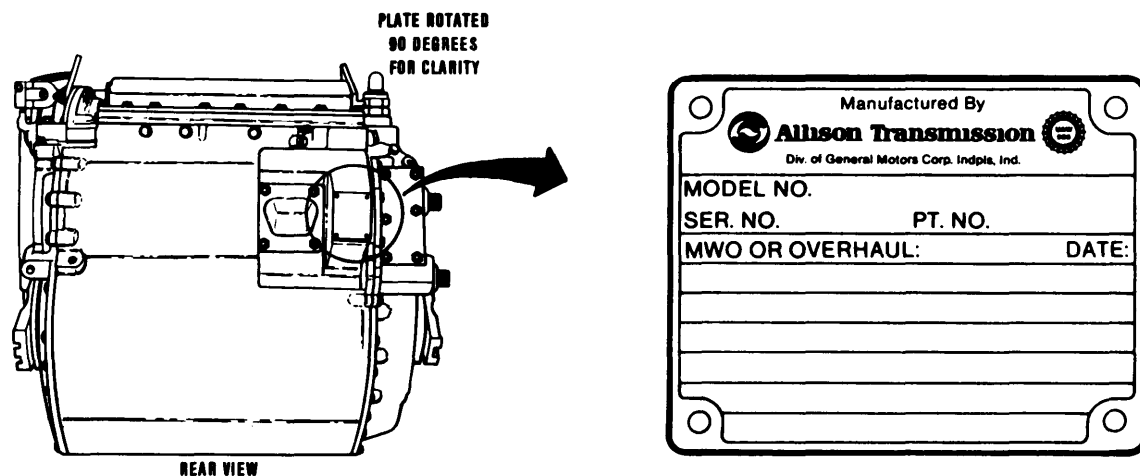


Fig. 1-2. Location and View of Identification Plate

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

Paragraph	Title	Page
1-10	Major Assemblies of the Transmission	1-4

**1-10. 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)

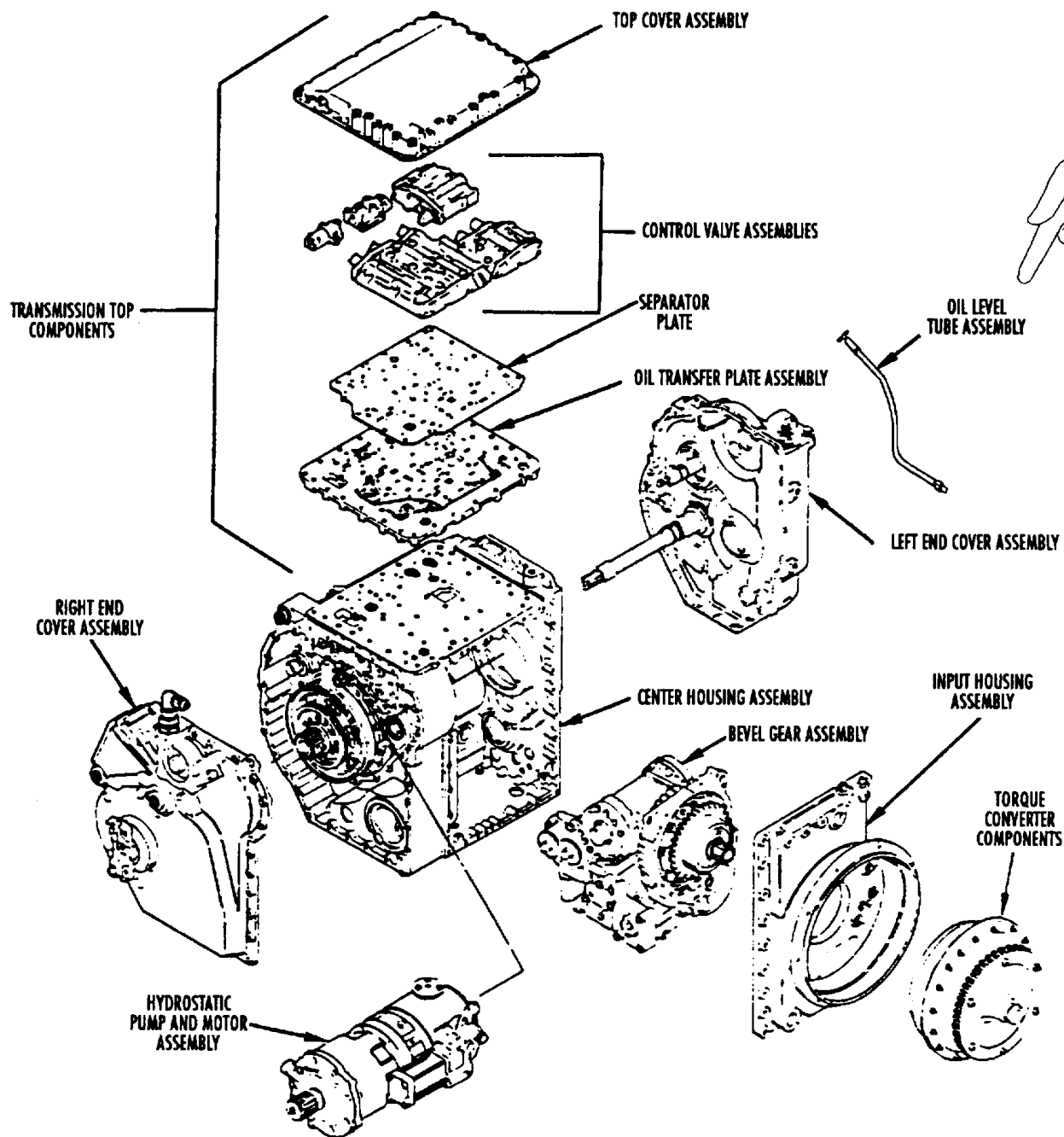


Fig. 1-3. Major Assemblies of the Transmission

## 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	
1-17	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.

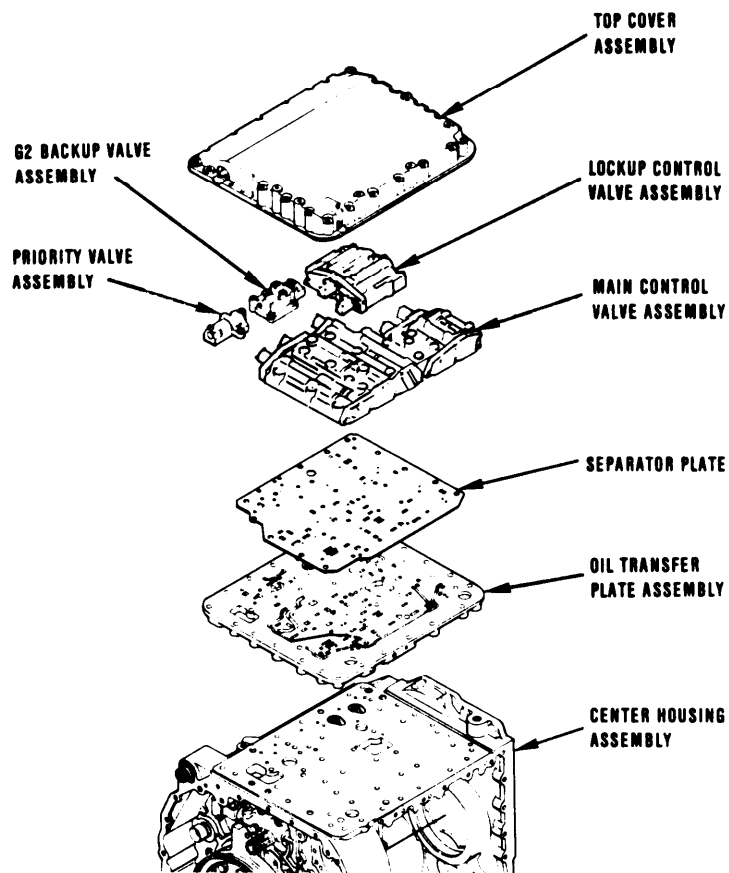


Fig. 1-4. Exploded View of Major Top Components

## 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.

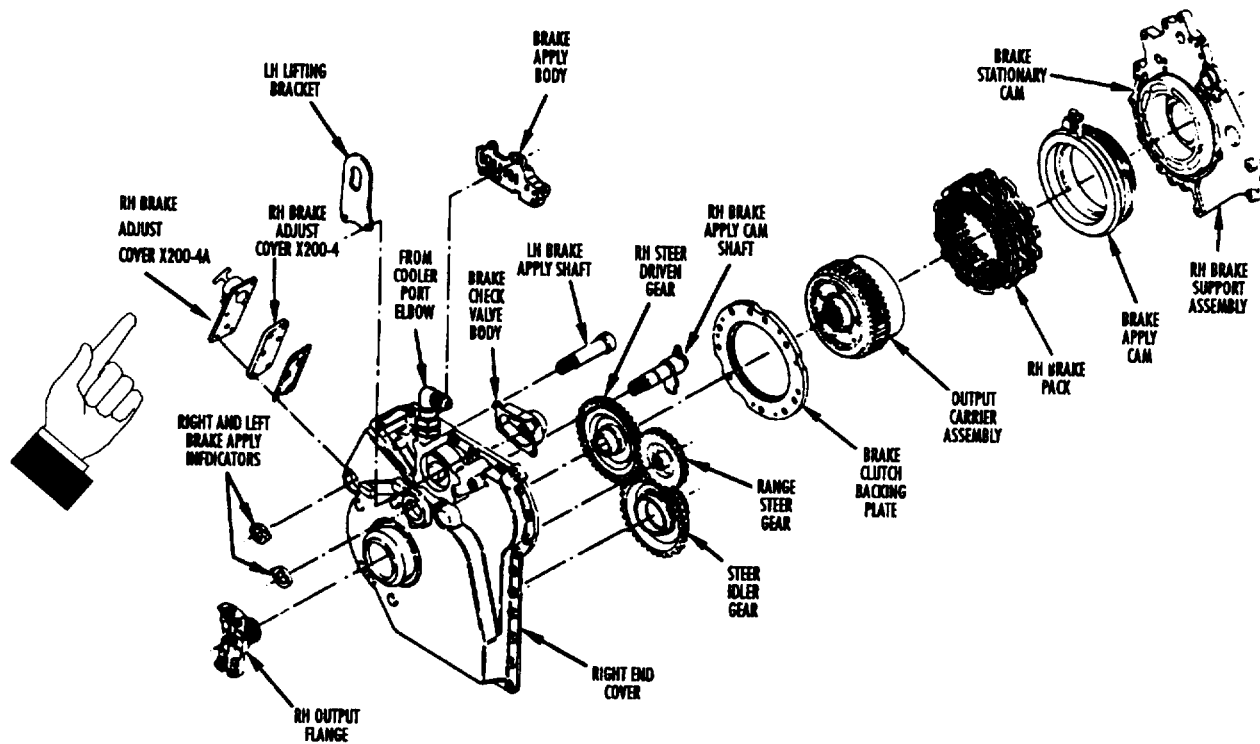


Fig. 1-5. Exploded View of Major Components Right End Cover Assembly

Para. 1-12

Change 2 1-7

### 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.

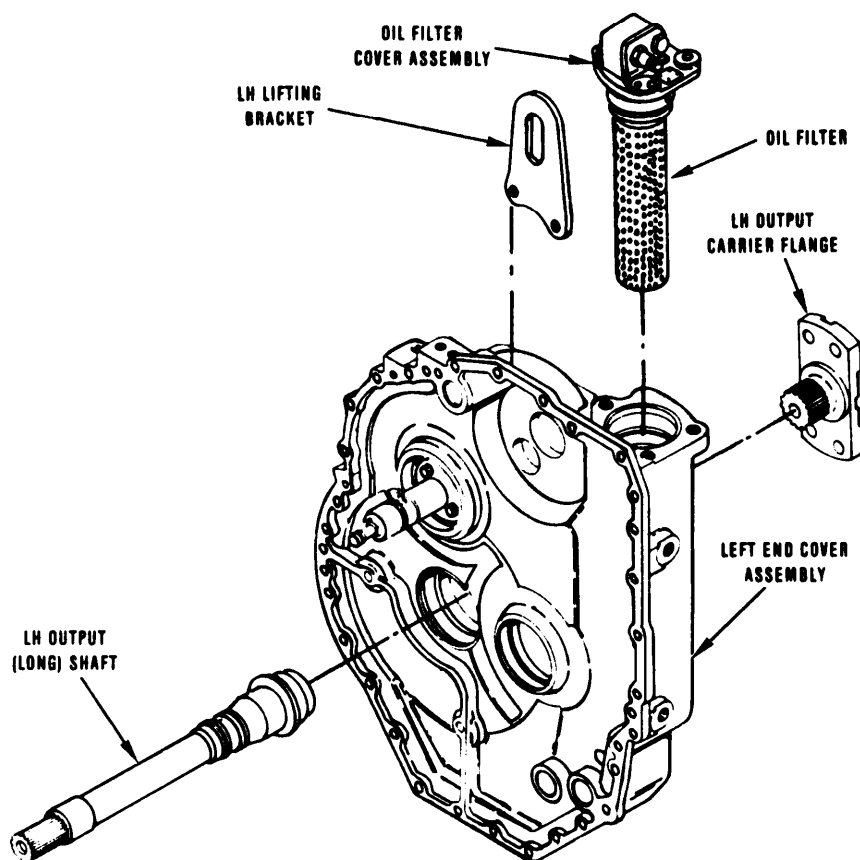


Fig. 1-6. Exploded View of Major Components  
Left End Cover Assembly



# 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.

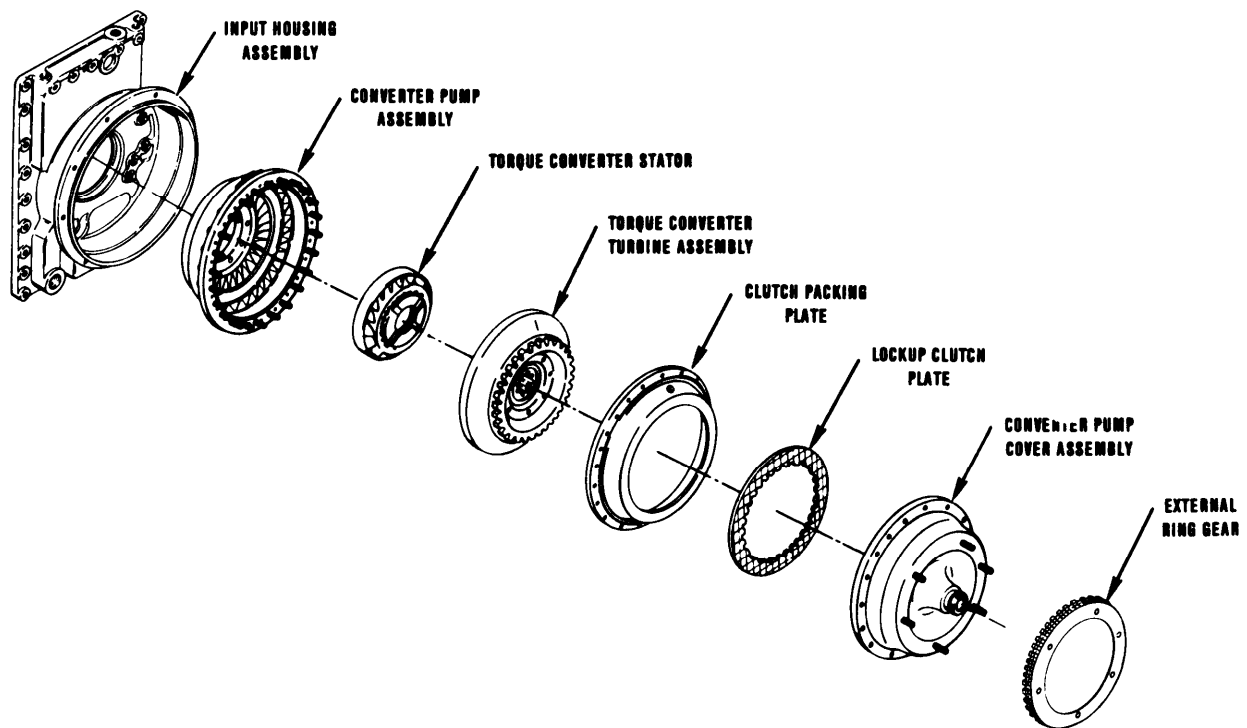


Fig. 1-7. Input Housing and Exploded View of the Torque Converter

## 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.

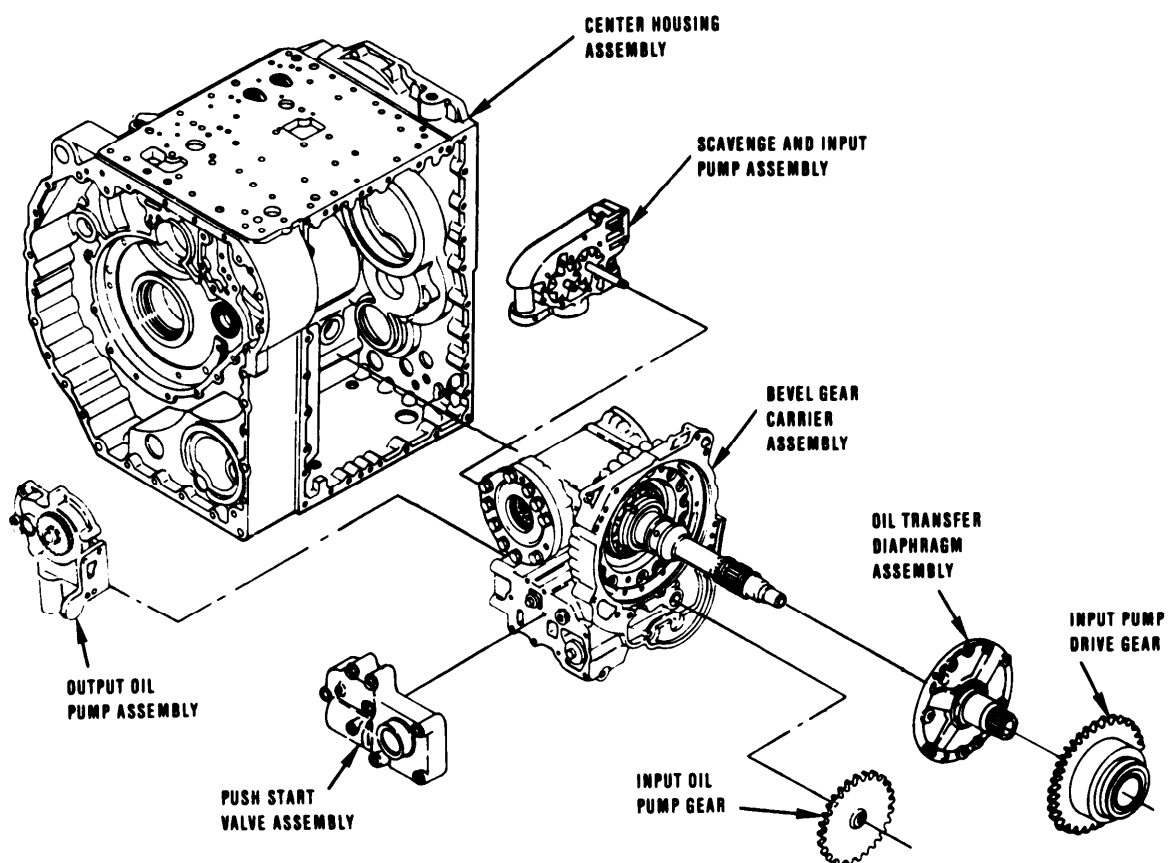


Fig. 1-8. Exploded View of Bevel Gear Assembly Components

## 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.

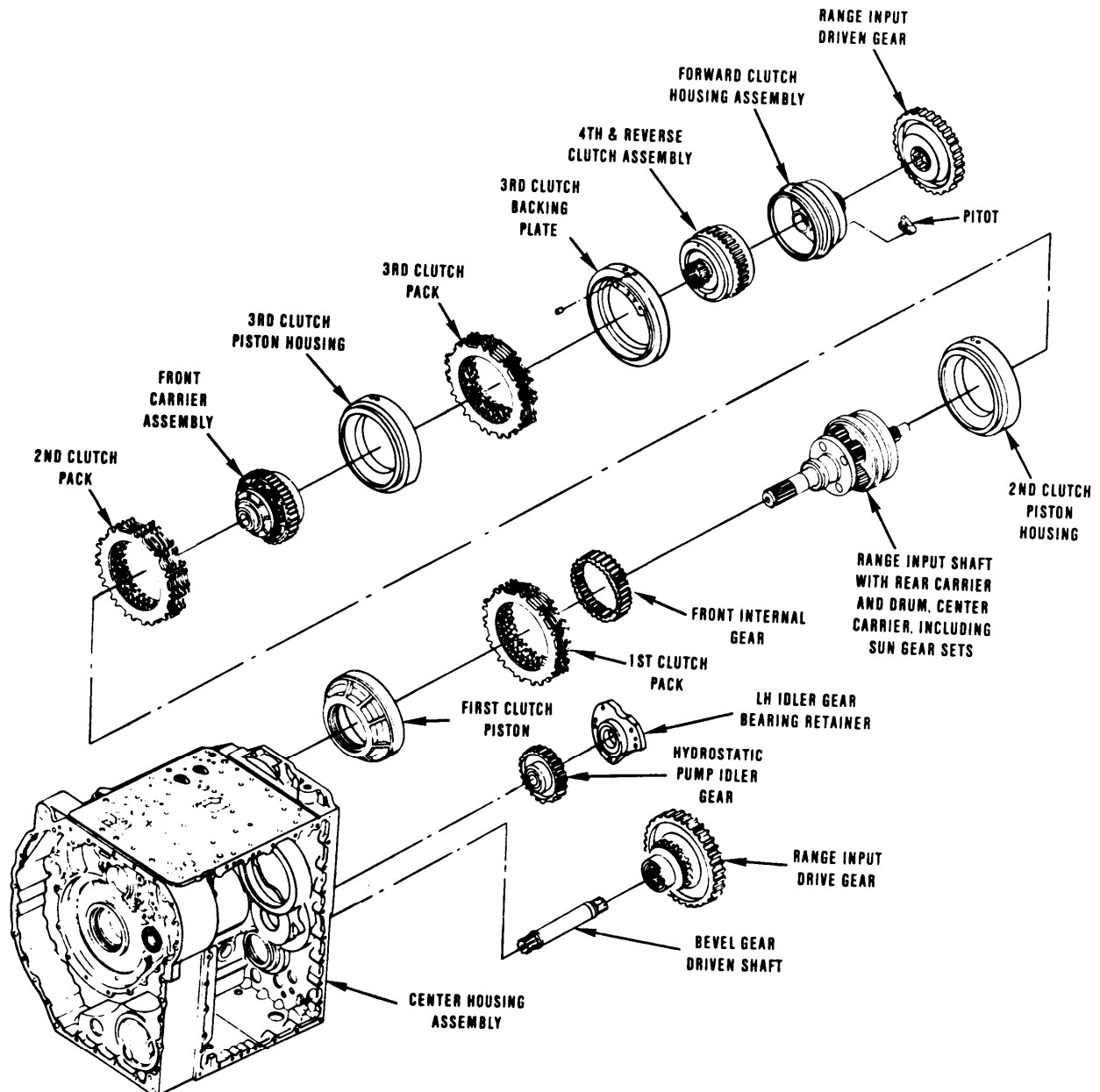
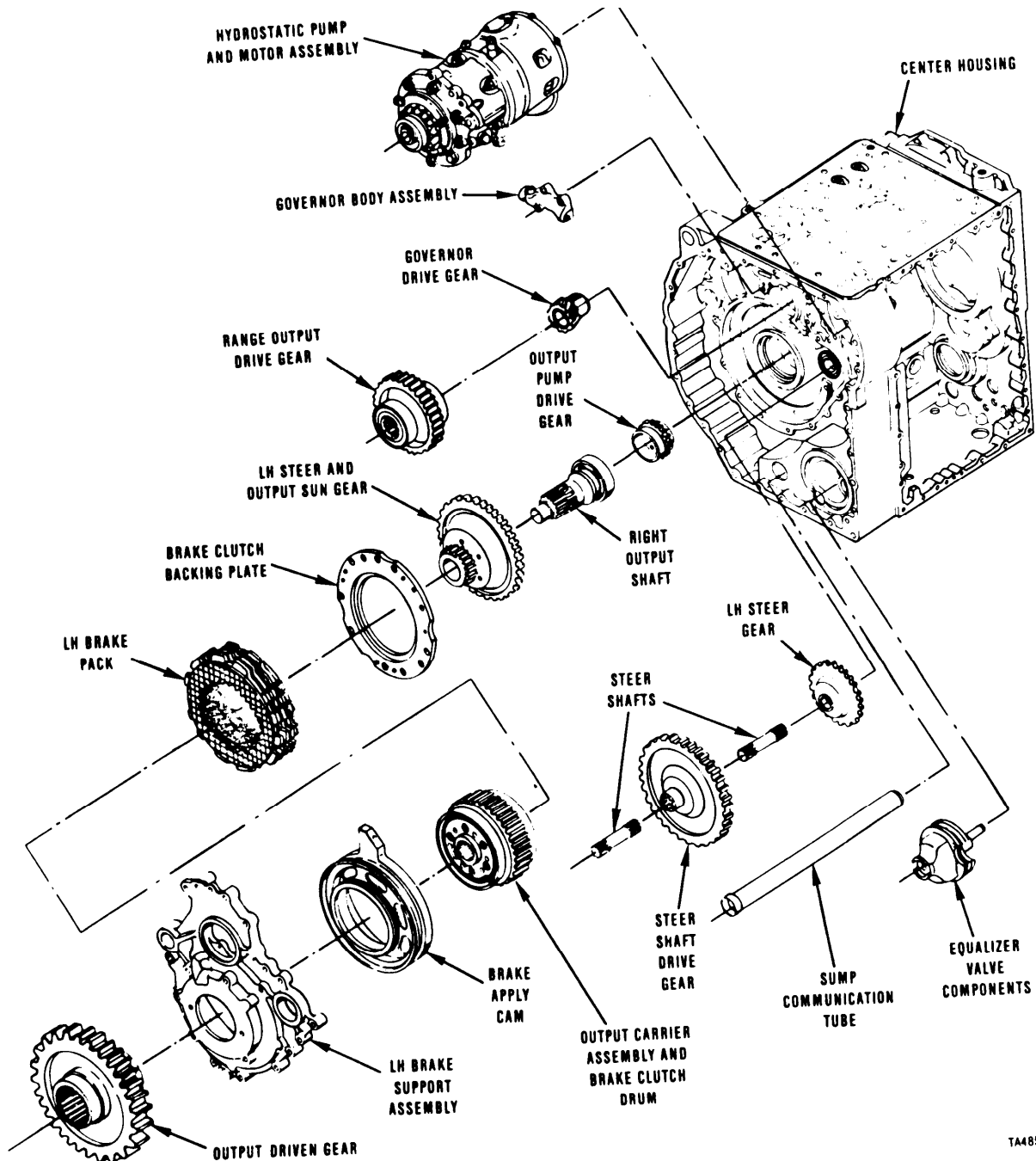


Fig. 1-9. Exploded View of Major Components--  
Left Side of Center Housing Assembly

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### 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.



TA485309

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	Allison Transmission Division, GMC	
MODEL	X200-4	X200-4A
RATINGS:		
Input horsepower, net (max.)	265	350
Input speed	2800 rpm	
Gross vehicle weight	30,000 pounds at 40 mph	36,000 pounds at 40 mph
CONVERTER:		
Type	Single stage, three element, polyphase	
Stall torque ratio	3.32:1	2.70:1
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)

BRAKES	
Type	Multiple wet plate
Service apply	Hydraulic with mechanical actuation
Parking/emergency apply	Mechanical back-up service brakes
DECELERATION RATE	16 feet/second/second
OIL SYSTEM:	
Capacity	12 gallons
Sump	Integral
Filter	Integral, two stage with differential pressure warning switch and automatic bypass
WEIGHT (DRY)	975 pounds max
with container	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

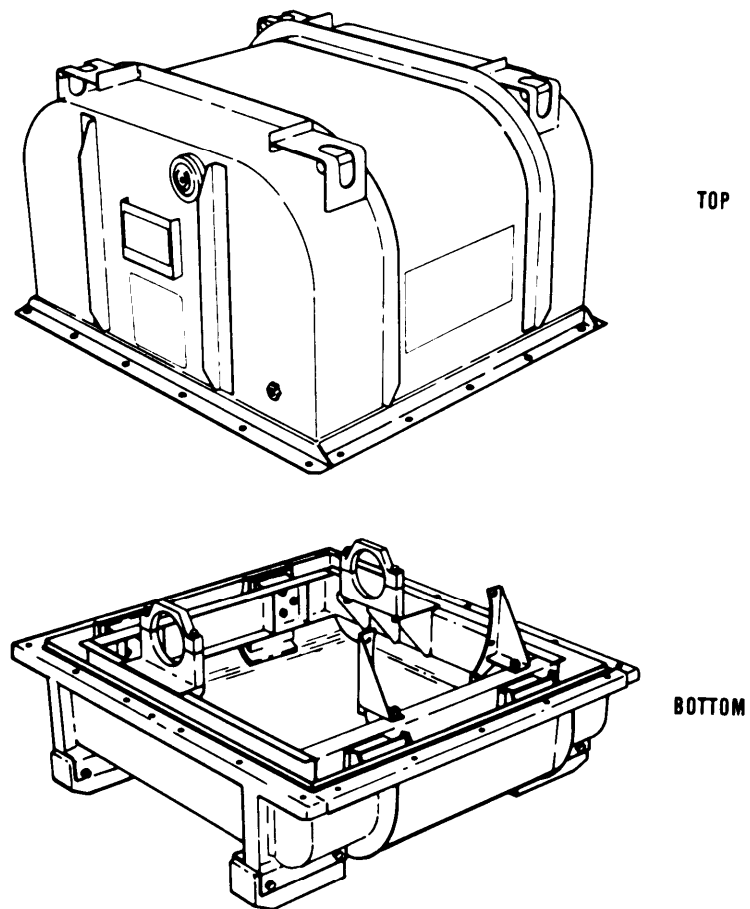
The transmission is installed in a protective container for storage or shipment. Desiccant (Item 7, Appendix C) is placed within the container to absorb moisture. The container has a humidity indicator, an air release valve, and a desiccant receptacle. It is equipped for handling by forklift.

Basic container data:

DIMENSIONS:	
Height	42.64 inches
Width	48.56 inches
Depth	44.75 inches
WEIGHT:	
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.



TM485310

**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 Procedure	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, TM9-1450-300-10 (M730A2 vehicle) or TM9-2350-277-10 (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 TM9-1450-300-20 (M730A2 vehicle) or TM9-2350-277-20 (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 Arty 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

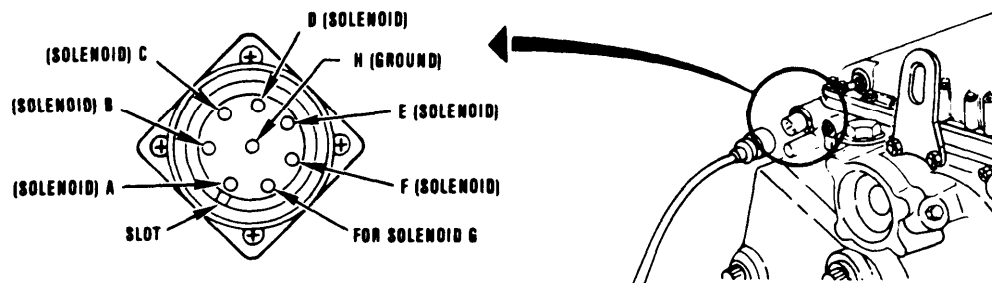
## CORRECTIVE ACTION

## 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.



TA485311

- 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)**

---

<b>MALFUNCTION</b>
<b>TEST OR INSPECTION</b>
<b>CORRECTIVE ACTION</b>

---

**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 TM9-1450-300-34 or TM9-2350-277-34 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)

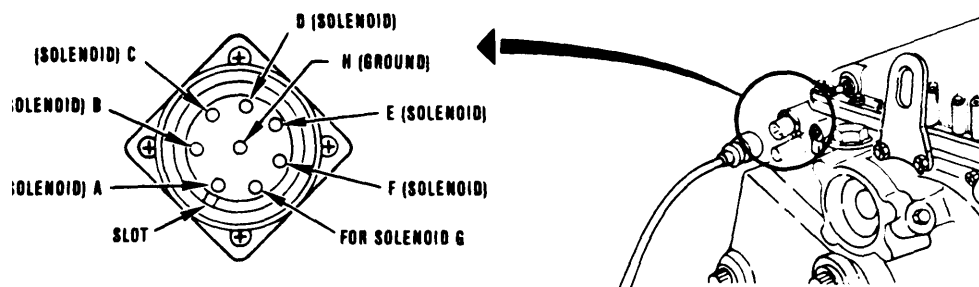
MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
-------------	--------------------	-------------------

### 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.



TA485311

- 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)

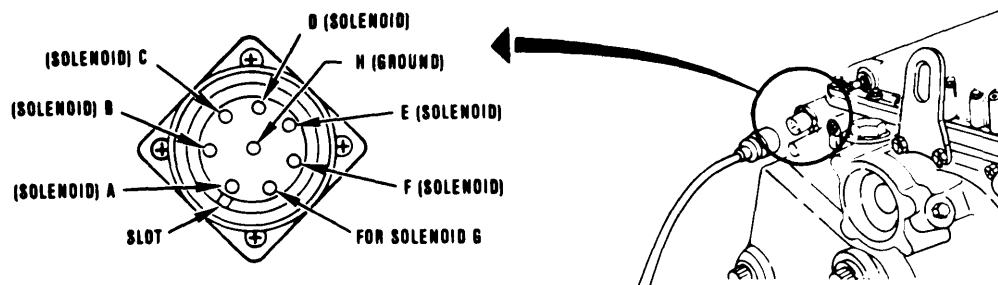
MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
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### 3. VEHICLE DOES NOT MOVE FORWARD IN ANY SHIFT LEVER FORWARD POSITION, NORMAL OPERATION IN ALL OTHER SHIFT LEVER POSITIONS

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.



TA485311

- If solenoid resistance is normal, replace control valve assembly in accordance with para. 4-5 and go to Step 3.
- 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.

- Check resistance of solenoid A in accordance with para. 2-5. Resistance reading must be 60-80 ohms
- If solenoid assembly is defective, replace solenoid assembly in accordance with para. 4-31 and go to Step 3.
- 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

### 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.

- a. If operation is normal return vehicle to service.
- b. 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:

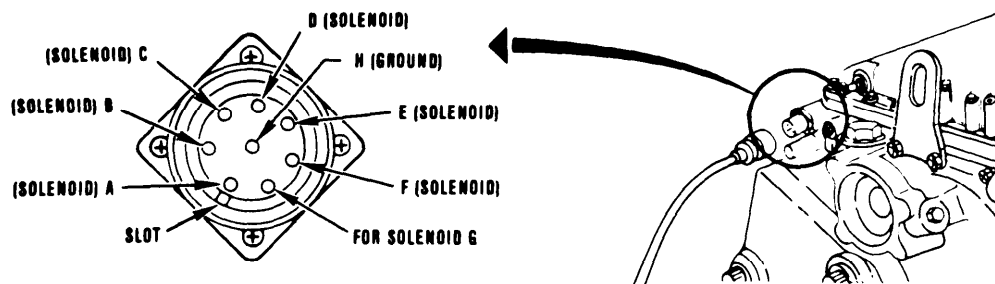
Refer to para.4-28 for fourth-reverse (C-2) clutch maintenance tasks.

### 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.



TA485311

## 24. 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)

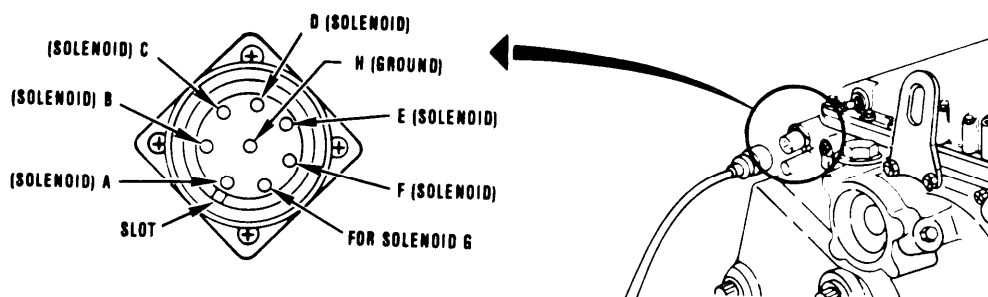
### MALFUNCTION

### TEST OR INSPECTION

### CORRECTIVE ACTION

#### 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,



TA485311

- 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)

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MALFUNCTION	
TEST OR INSPECTION	
CORRECTIVE ACTION	

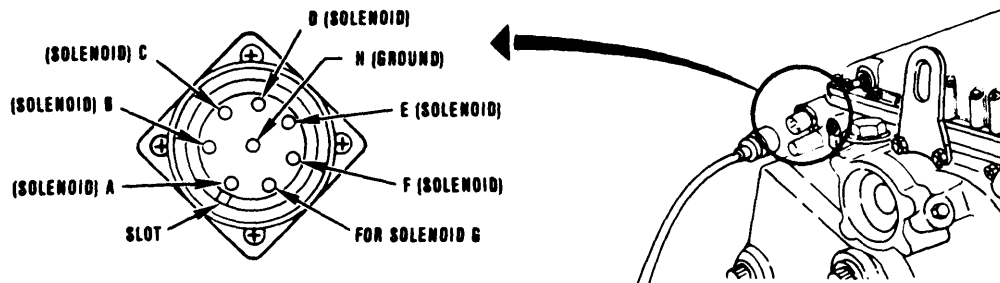
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### 6. TRANSMISSION DOES NOT HOLD IN 2ND RANGE WITH SHIFT LEVER AT 1-2

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



TM485311

- a. If solenoid resistances are 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 solenoids E and G (Hold 2nd) in accordance with para. 2-5. Resistance reading must be 60-80 ohms.
- b. If solenoid assembly(ies) is defective, replace solenoid(s) in accordance with para. 4-31 and go to Step 3.
- c. 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	

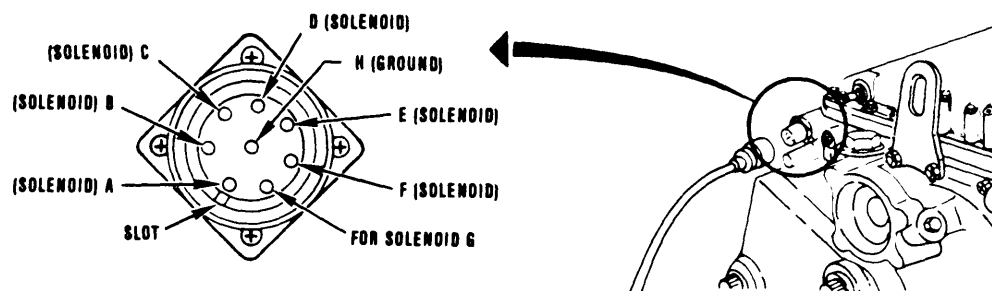
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### 7. TRANSMISSION DOES NOT HOLD IN 3RD RANGE WITH SHIFT LEVER AT 1-3

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.



TA485311

- a. If solenoid resistances are normal, replace 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 to determine defect location. Remove top cover in accordance with para. 4-5.

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

## 24. 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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<b>MALFUNCTION</b>	<b>TEST OR INSPECTION</b>	<b>CORRECTIVE ACTION</b>
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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
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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.)
- a. If lockup pressure is normal, go to Step 5.
  - b. 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.
- a. If vehicle operation is normal, return vehicle to service.
  - b. 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.
- a. 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)

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MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

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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

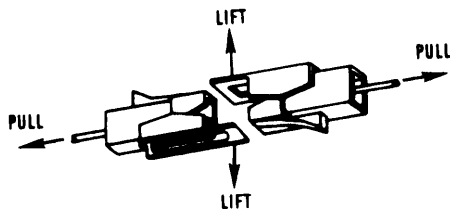
- Malfunction 1, Step 2
- Malfunction 2, Step 2
- Malfunction 3, Step 2
- Malfunction 4, Step 2
- Malfunction 5, Step 2
- Malfunction 6, Step 2
- Malfunction 7, Step 2

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

2-5. SOLENOID TESTING PROCEDURES (Continued)

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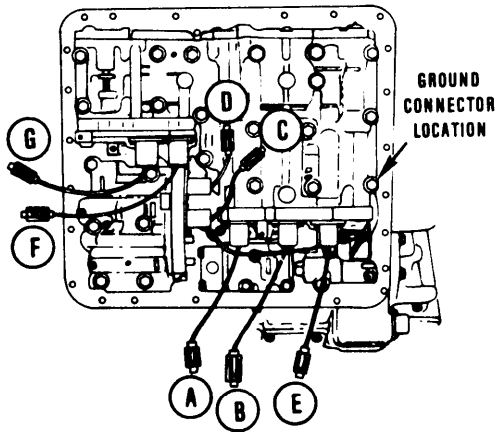
1. Disconnect solenoid wire leads of solenoid(s) to be checked from subject symptom. Solenoid identification is stamped on the harness lead connector.



TM85312

- 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.



TM85313

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**

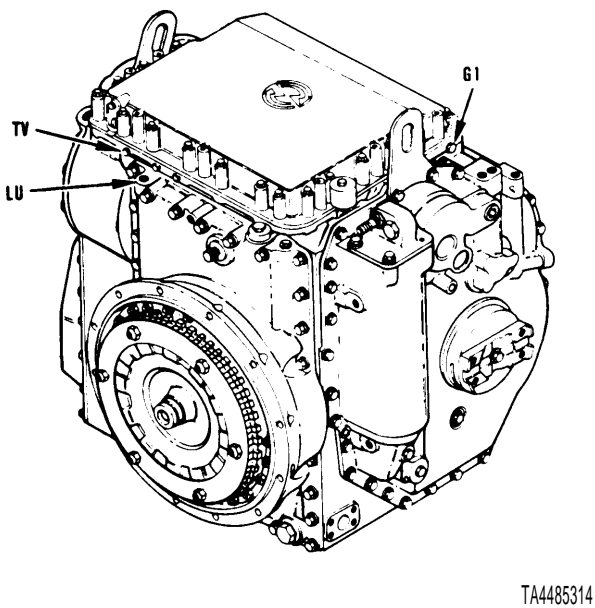
Perform all pressure checks in accordance with instructions in subject malfunction.



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.



Port Name	Plug Size (inch)
TV	7/16 hex
LU	9/16 hex
G1	7/16 ex

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
3-9	Parts Requirements for Preliminary Procedures	3-8
3-10	Locally Fabricated Shop Aids	3-8
3-11	Repair Parts	3-8
3-12	Common Tools	3-9
3-13	Special Tools	3-9
3-14	Oil Analysis Program for Transmission	3-9
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)

## 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).

#### 4-40 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 (680kg). 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

#### 44. 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.

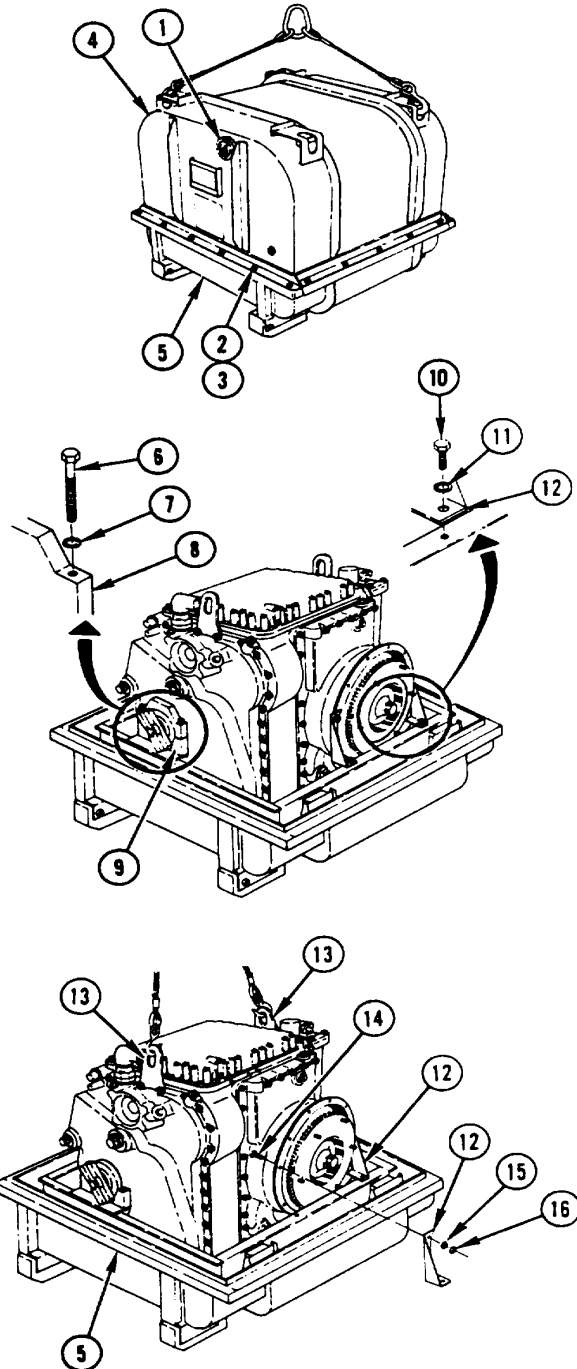
#### NOTE

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

On early model transmissions, the installation instructions tag states to remove and discard six nuts and six support brackets that secure the torque converter to the transmission for shipment. This tag is in



error, the six support brackets and six nuts must be retained for re-use, however only three brackets and three nuts need be installed for shipping.

Some later models of the transmission utilize three shipping brackets, three nuts, three bolts and 15 washers for retaining the torque convertor for shipping.

Late model transmissions utilize three shipping brackets and three nuts for retaining the torque convertor for shipping. These brackets and nuts are identical to those used on early six bracket configurations.

Do not re-use used nuts for transmission installation. Use used nuts only for reinstallation of shipping brackets.

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

End of Task 1

Para. 4-4, Task 1

Change 2 4-5

# 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.

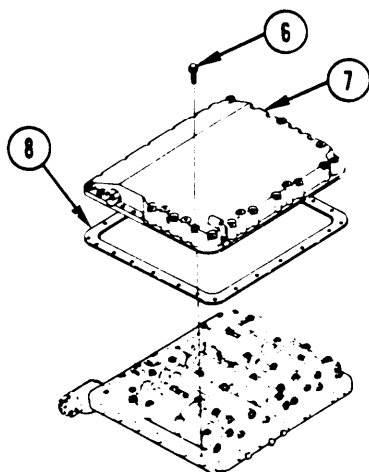
## **NOTE**

Transmission upright on floor or work table.

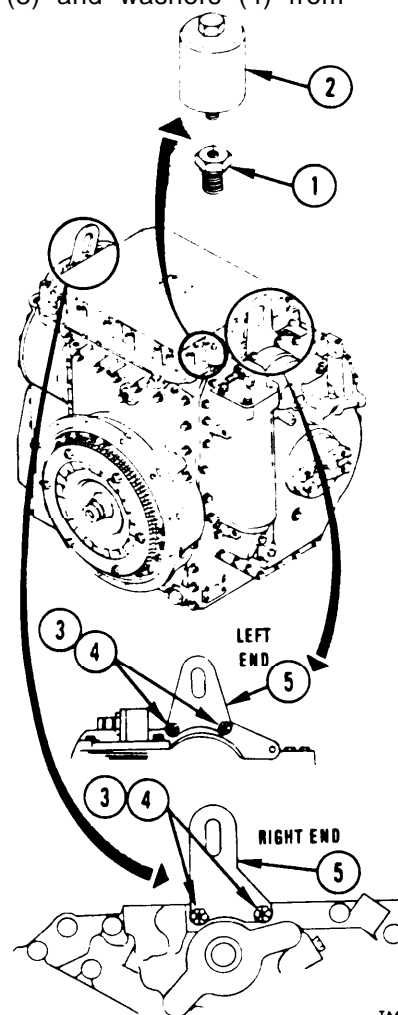
- 1 Using open end of 3/4 inch combination wrench hold reducer (1) located under breather (2).
- 2 Using 5/8 inch socket on nut at top of breather (2), unscrew breather from reducer (1).
- 3 using combination wrench, remove reducer (1) from transmission.
- 4 Using open end of 9/16 inch combination wrench, 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.



TA485319



TA485318

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:

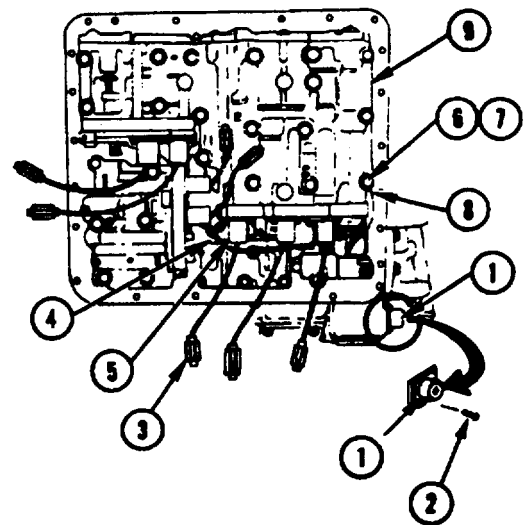
Cloth, lint-free (Item 6, Appendix C)  
 Twine, cotton, 16 ply, 30 inches (Item 21, Appendix C)

###### NOTE

- cover assembly is removed from transmission.
- harness can be removed without removal of solenoids or control valve assemblies.
- 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



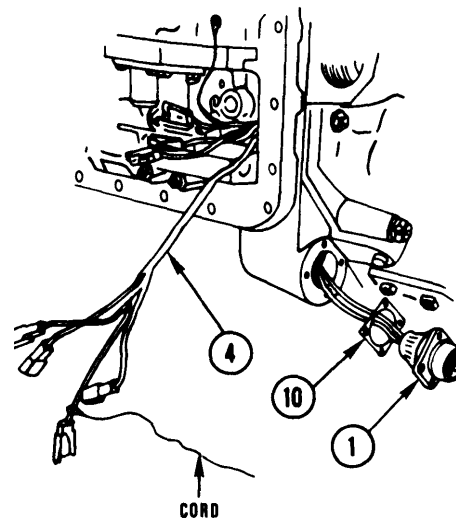


#### 4-5. REMOVE TRANSMISSION TOP COMPONENTS (SHEET 4 OF 8)

##### 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



TA485321

**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.

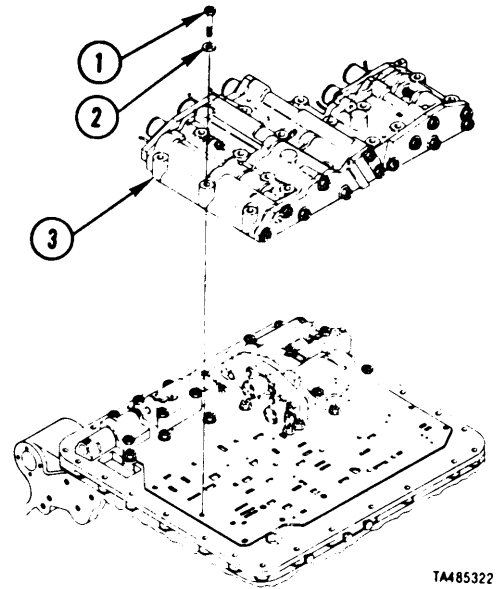
Go to Sheet 5

#### 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.



TA485322

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

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

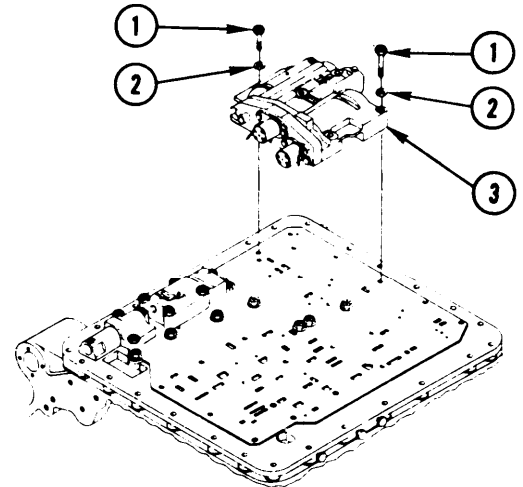
##### COMMON TOOLS:

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).



TA485323

##### 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**

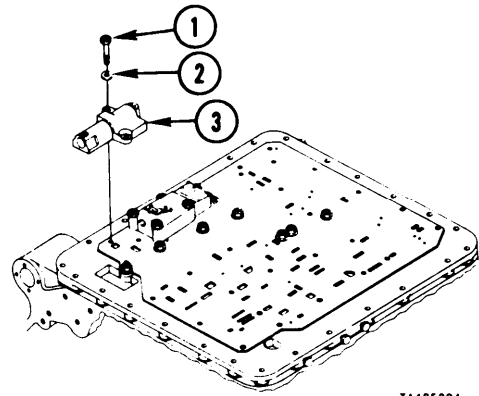
- Transmission top cover is removed.
- Wiring harness does not have to be removed to remove control valve assemblies

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



TA485324

**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.

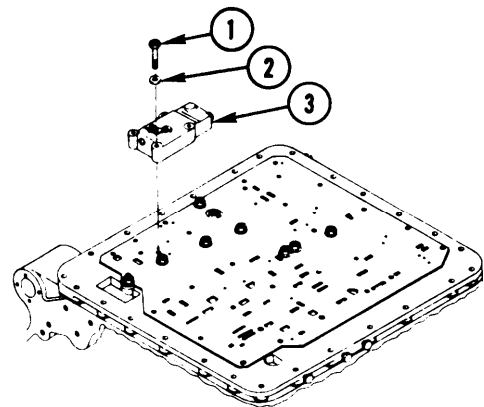
1 Using socket, remove four bolts (1) and washers (2) from G2 backup valve assembly (3).

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



TA485325

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

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

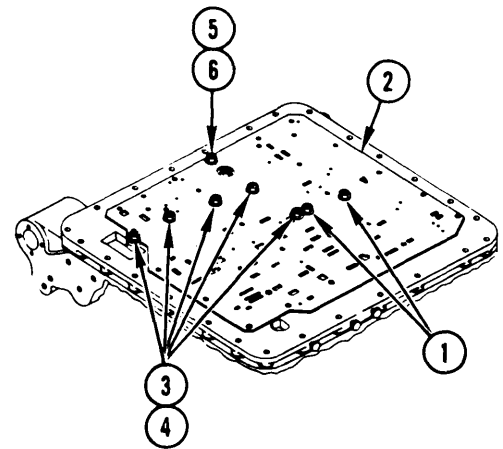
#### COMMON TOOLS:

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).



TA485326

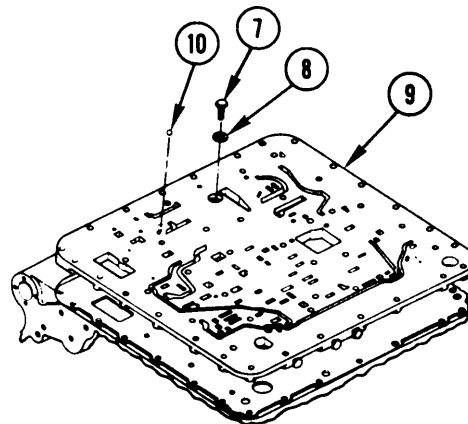
Go to Sheet 8

#### 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.



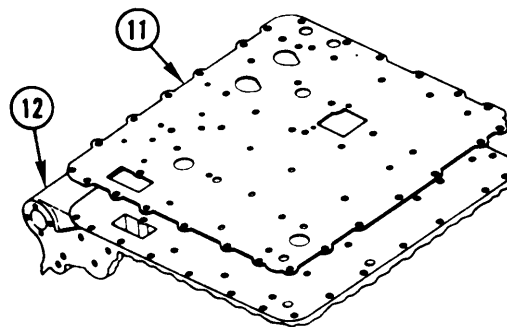
TA485327

- 6 Remove oil transfer plate assembly (9).

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

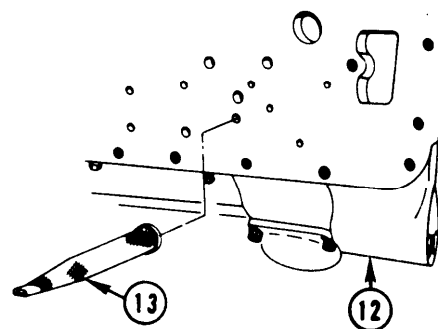
- 7 After oil transfer plate (9) has been moved away from transmission, remove check ball (10) from transfer plate and put ball in a secure location.

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



TA485328

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



**SCREEN ENLARGED  
FOR CLARITY**

TA485329

**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

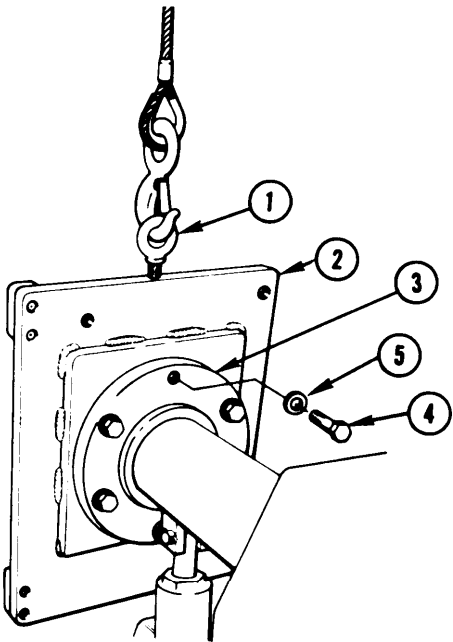
PERSONNEL REQUIRER: Two

- 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.



TM485330

- 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.

FOLLOWN-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

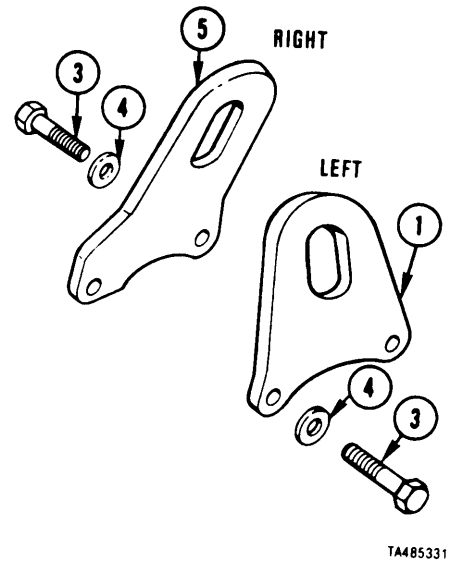
#### 4-6. INSTALL TRANSMISSION ON MAINTENANCE STAND (SHEET 3 OF 7)

##### NOTE

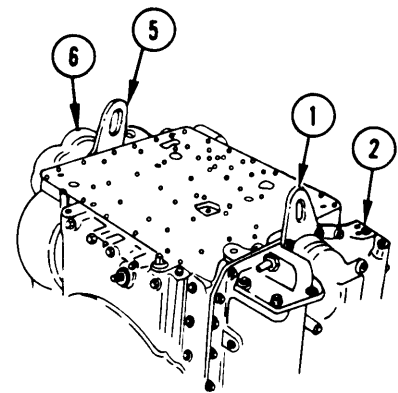
- If lifting brackets must be reinstalled on transmission, go to Step 1.

Ž 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).

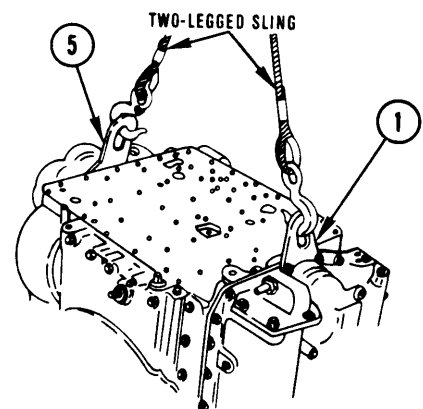


TA485331



TA485332

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



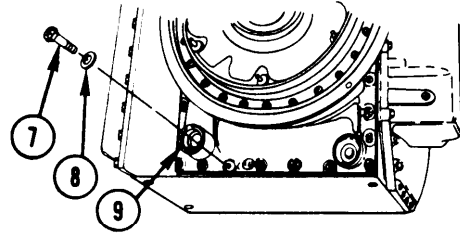
TA485333

Go to Sheet 4



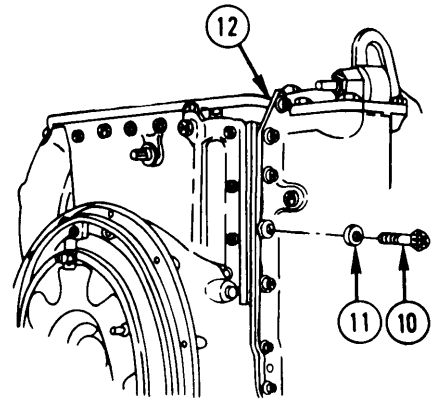
**4-6. INSTALL TRANSMISSION ON MAINTENANCE STAND  
(SHEET 4 OF 7)**

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



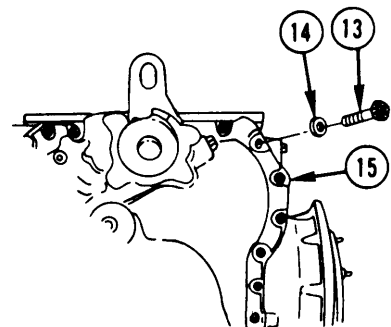
TA485334

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



TA485335

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



TA485336

Go to Sheet 5

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

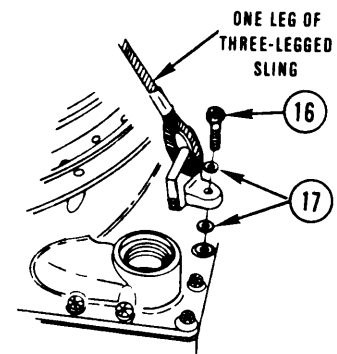
- 8 Using 9/16 inch socket, attach three-legged sling to transmission where bolts were removed in Steps 5, 6 and 7. Install 3/8-16 x 1-3/4 inch bolt (16) through each sling lug, with one washer (17) under each bolt head and one washer (17) under each lug. Tighten bolts until snug.

**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.

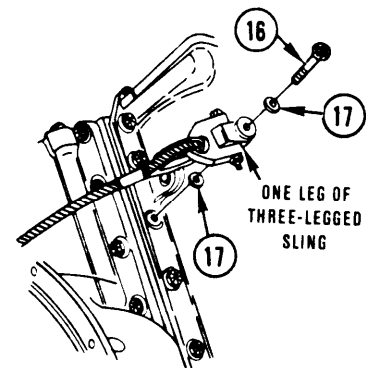
- 9 Raise two-legged sling attached to lifting brackets until bottom of transmission is approximately one foot (0.305 m) above floor.

Go to Sheet 6



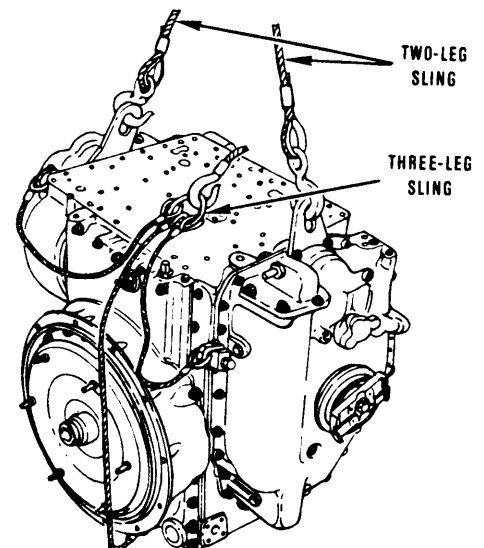
**INSTALLATION OF SLING  
AT INPUT HOUSING**

TA485337



**TYPICAL INSTALLATION OF  
SLING AT LEFT AND  
RIGHT END COVERS**

TA485338



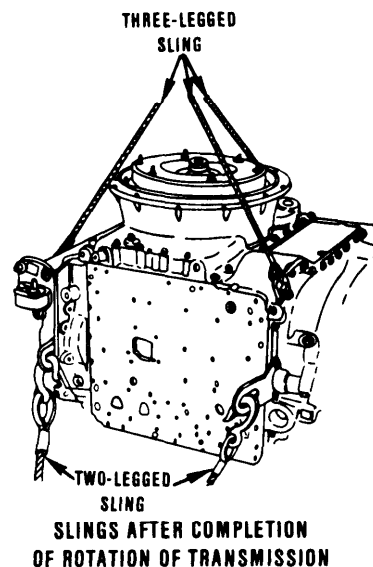
**SLINGS AT BEGINNING  
OF ROTATION OF  
TRANSMISSION**

TA485339

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

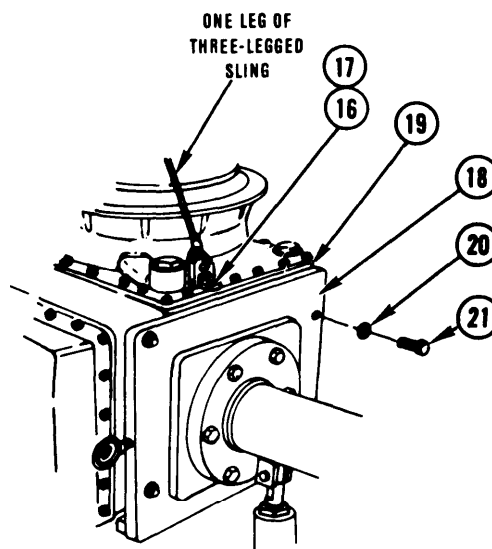
##### **WARNING**

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.



TA485340

- 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.

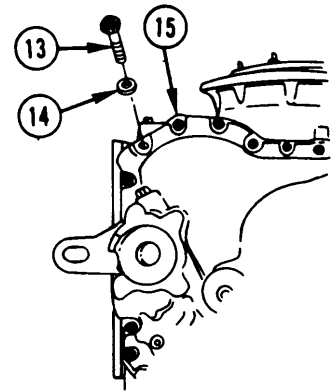


TA485341

Go to Sheet 7

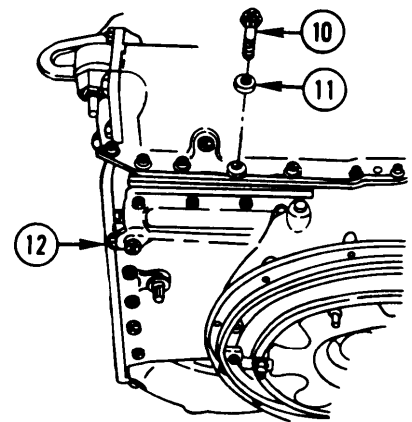
#### 4-6. INSTALL TRANSMISSION ON MAINTENANCE STAND (SHEET 7 OF 7)

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



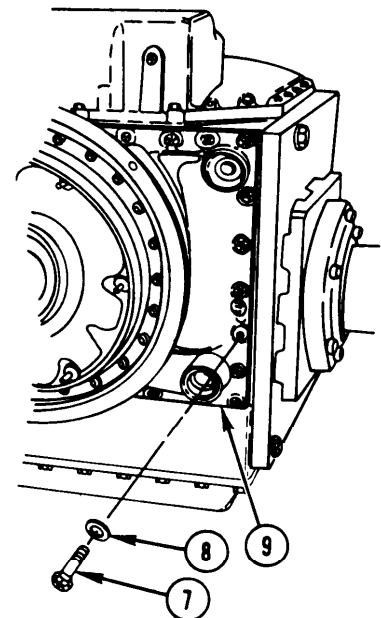
TA485342

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



TA485343

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



TA485344

**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) 12268036

**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.

**NOTE:**

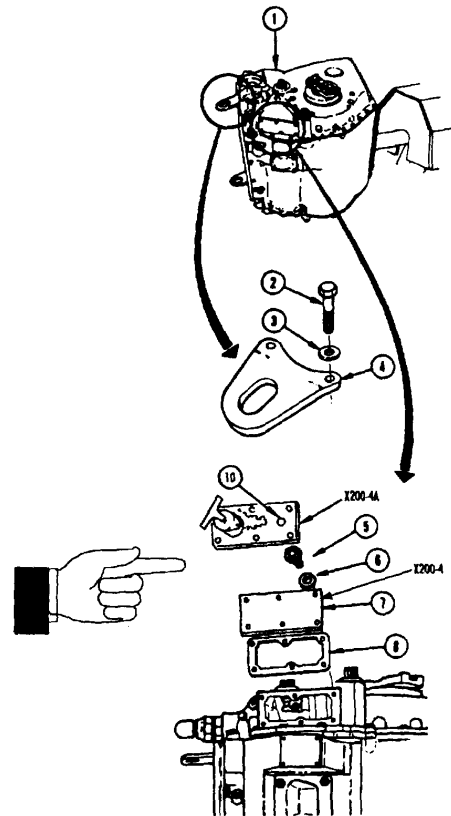
X200-4A Prior to removal of right adjusting cover, note location of chain in relation to bolt.

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



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

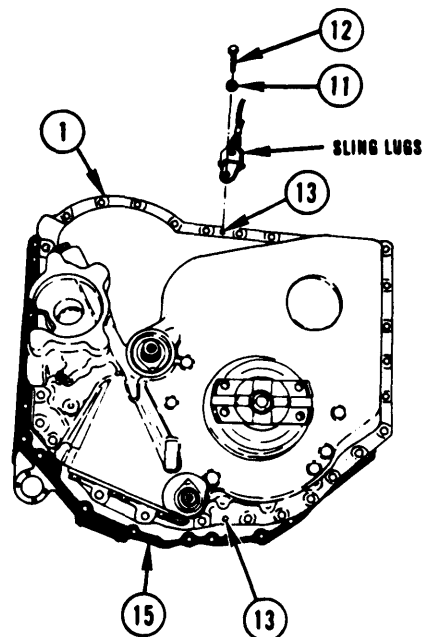
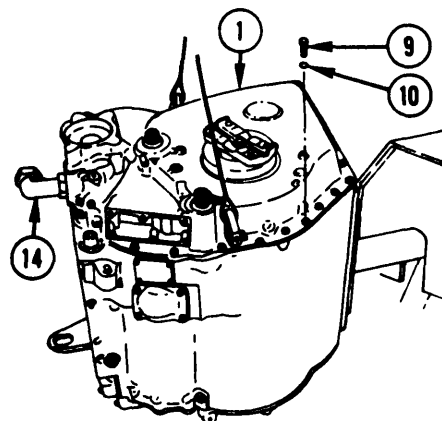
##### NOTE

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.



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:

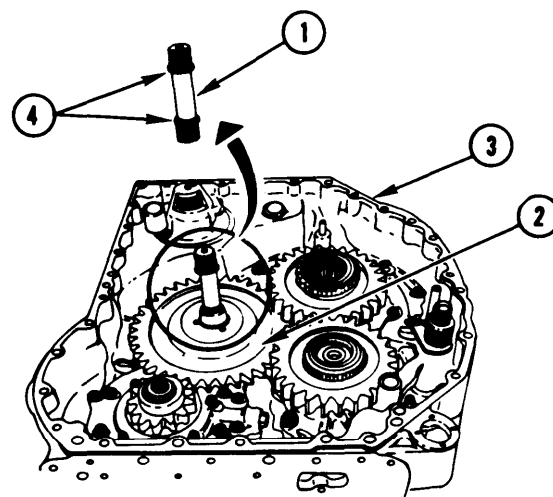
Rag, wiping (Item 15, Appendix C)

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.



TM85348

Go to Sheet 5

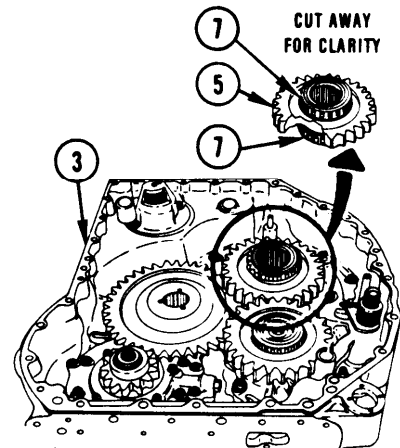


#### 4-7. REMOVE RIGHT END COVER ASSEMBLY (SHEET 5 OF 7)

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

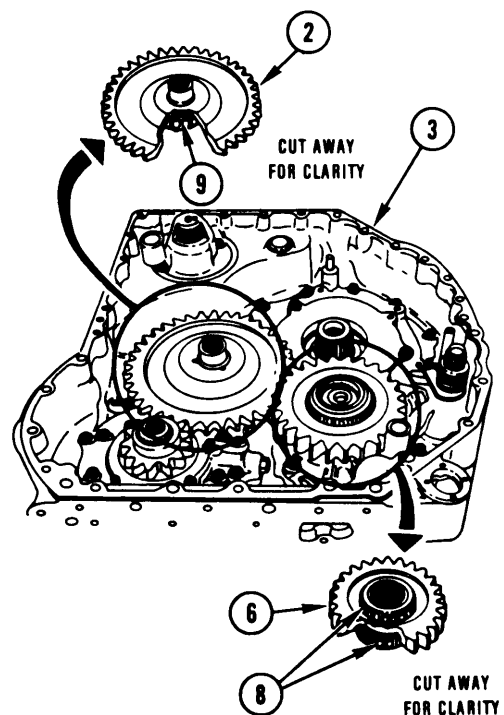


TM85349

- 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

TM85350

#### 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) round, bent, or if tension is lost.
- 11 Remove range output gear spacer (12)
- 12 Remove lube tube (13) and two packings (14).
13. packings (14)

##### NOTE

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

On X200-4 Brake apply tube and 2 packings are loose between Right End Cover and Center Housing.

On X200-4A Brake apply tube is pressed into Right Hand Brake support and uses only 1 Packing.

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)

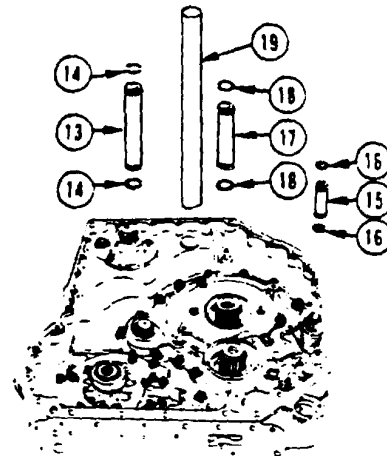
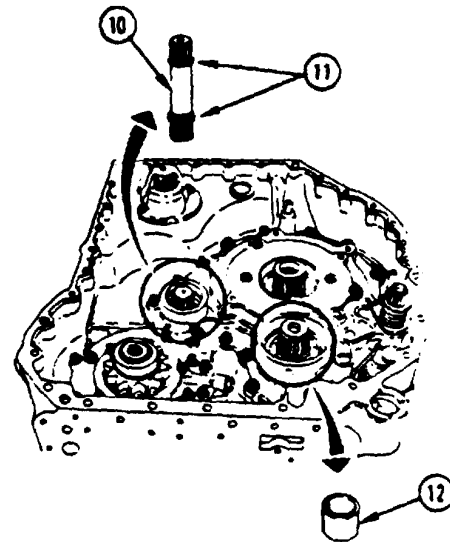
##### NOTE

On X200-4A remove one packing (18) from tube (17) which is pressed into Right Hand Brake support.

19. Using slip-joint pliers, remove sump communication tube (19)

##### NOTE

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



#### 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).

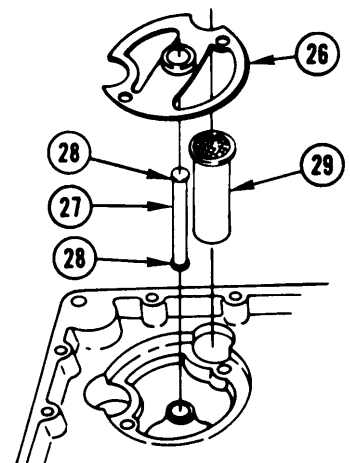
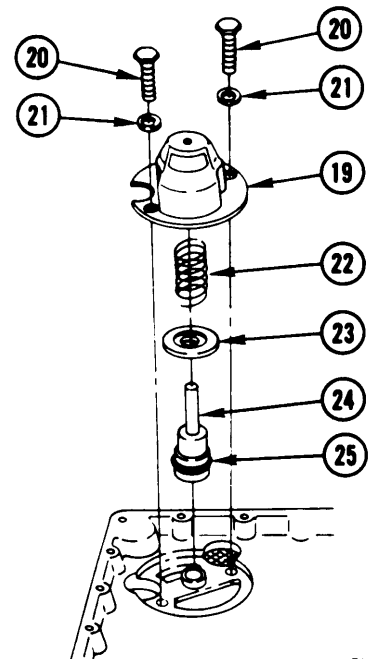
### **NOTE**

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 10)

### OVERVIEW

Oil filter cover prevents access to two bolts holding left end cover to transmission. X200-4A Oil Level Fill Tube Assembly must be removed prior to removal of Left End Cover.

Task	Title	Page
1	Remove Oil Level Tube Assembly (X200-4A)	4-27
2	Remove Oil Filter Head Assembly	4-28
3	Remove Left End Cover Assembly	4-28
4	Remove Loose Components, Left End of Transmission	4-30

### TASK 1 REMOVE OIL LEVEL TUBE ASSEMBLY (X200-4A)

#### COMMON TOOLS:

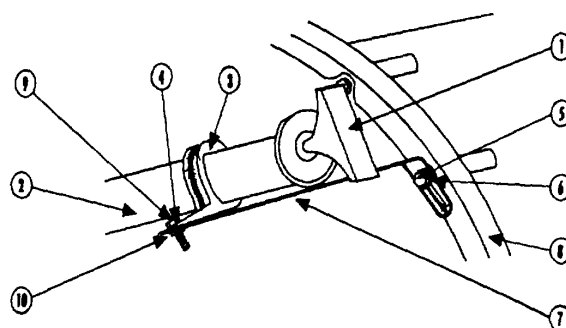
Wrench, 1-1/4 inch  
 Socket, socket wrench, 3/8 inch square drive,  
 9/16 inch  
 Extension, socket wrench, 1/2 inch square drive,  
 10 inch  
 Handle, socket wrench, 3/8 inch square drive  
 Wrench, 5/16 inch  
 Extension, 3/8 inch square drive  
 Wrench, Key 1/4

- 1 Remove oil level indicator (dipstick) (1) by turning ccw.
- 2 Pull out dipstick (1) from oil tube (2).
- 3 Using a 1-1/4 wrench, loosen nut (12) retaining oil tube assembly to elbow (11).
- 4 Using a 9/16 socket extension and handle remove bolt (5) and washer (6) retaining bracket (7) to LH End Cover Assembly (8).
- 5 Remove oil tube assembly (2), bolt (9), nut (10), washer (4), clamp (3), bracket (7) and set aside.

#### NOTE

Elbow (part of oil tube assembly) and o-ring, remain in LH End Cover Assembly.

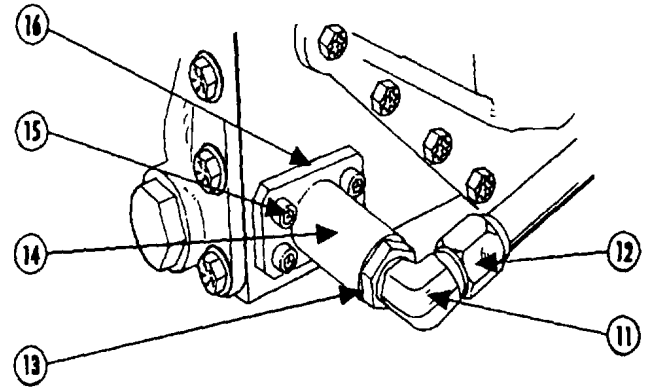
- 6 Observe position of clamp (3) in relation to oil level tube assembly (2) and mark location.
- 7 Using a 5/16 wrench hold bolt (9) that retains the clamp (3) to the bracket (7).



Go to Sheet 2

#### 4-8. REMOVE LEFT END COVER ASSEMBLY (SHEET 2 OF 10)

8. a 3/8 socket and handle to remove the nut (10) that retains the clamp (3) to the bracket (7).
9. Remove bolt (9) washer (4), nut (10) and clamp (3) from bracket.
10. Using a 1-1/4 wrench remove the elbow (11) and o-ring
- (13) from the adapter.
11. Remove o-ring (13) from elbow (11) and throw away o-ring (13).
12. Remove adapter (14) from LH End Cover Assembly (8). 13 Using a 1/4 socket, socket (Allen), extension and handle remove 4 bolts (15) that retain the adapter (14) and gasket (16) to the LH End Cover Assembly (8).
14. Remove gasket (16) and throw away gasket (16).
15. Inspect parts for damage and replace as necessary.



**FOLLOW-ON PROCEDURE:** Install Oil Level Tube Assembly. Refer to paragraph 4-15.

End of Task 1

#### TASK 2. 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

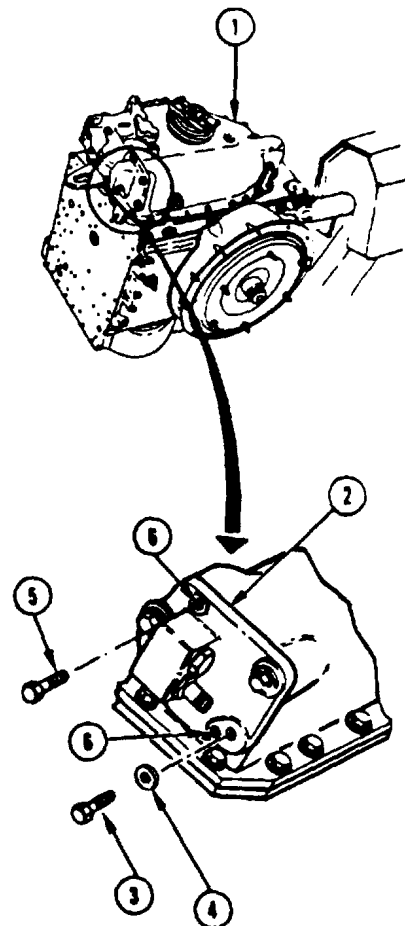
Socket, socket wrench, 1/2 inch square drive, 9/16 inch

##### SUPPLIES:

Bolt, 3/8-16 x 1-1/4 inch (2 required)

Rag, wiping (Item 15, Appendix C)

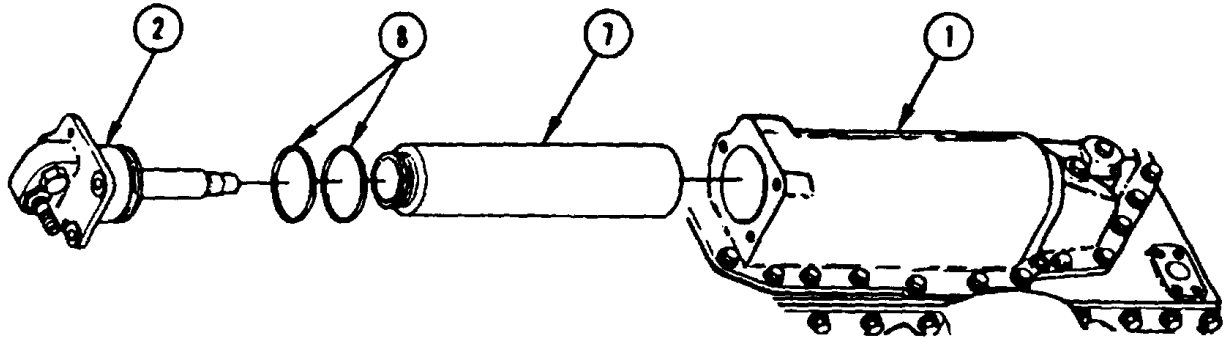
1. Using rotary control handle on maintenance stand, rotate transmission so that left end cover assembly (1) is up.
2. Using wiping rag, clean oil filter head (2).
3. Using socket, remove three bolts (3) and washers (4) from filter head (2).
4. Using socket, install two 3/8-16 x 1-1/4 inch bolts (5)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



Go to Sheet 3

**4-8. REMOVE LEFT END COVER ASSEMBLY (SHEET 3 OF 10)**

5. Equally tighten bolts (5) until oil filter head (2) becomes loose.
6. Remove two bolts (5) from filter head (2).
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 2

**TASK 3. 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

Go to Sheet 4

#### 4-8. REMOVE LEFT END COVER ASSEMBLY (SHEET 4 OF 10)

##### 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 5

Change 2 4-28.2

Para. 4-8 Task 3

**4-8. REMOVE LEFT END COVER ASSEMBLY (SHEET 5 OF 10)**

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.**

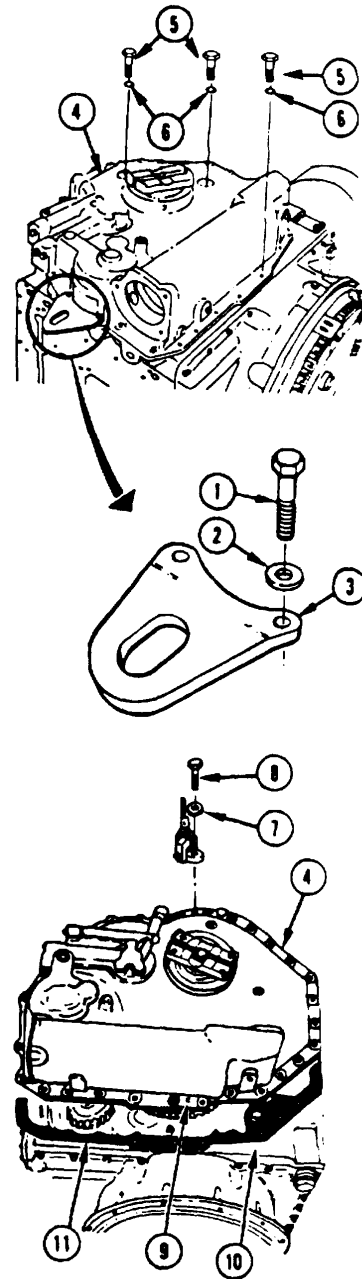
3. Install washers (7) on two 3/8-16 x 2 inch bolts (8) and install bolts through sling lugs.
4. Using socket, install two bolts (8) in jack holes (9) on left end cover assembly (4).
5. Alternately tighten two bolts (8) until end cover (4) loosens.
6. Using screwdriver, insert tip in crack between end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

**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 3

Go to Sheet 6





**4-8. REMOVE LEFT END COVER ASSEMBLY (SHEET 6 OF 10)****OVERVIEW**

This task includes removal of loose components remaining in the center housing after the left end cover has been removed.

**CAUTION**

If not removed, most of these components will drop out of the transmission when the uncovered left side is rotated down.

**TASK 4. REMOVE LOOSE COMPONENTS, LEFT END OF TRANSMISSION****COMMON TOOLS:**

Gloves, leather  
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  
Rotary Tool Kit, electric (grinder)  
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 7

4-30 Change 2

Para. 4-8, Task 3

#### 4-8. REMOVE LEFT END COVER ASSEMBLY (SHEET 7 OF 10)

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

##### NOTE

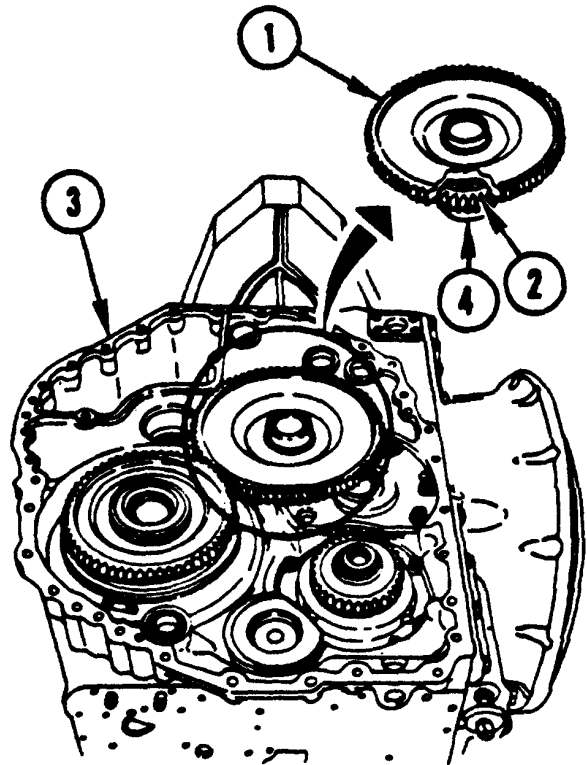
Bearings are not to be replaced unless defective.  
Refer to TM 9-214 for inspection of bearings.

- 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 8

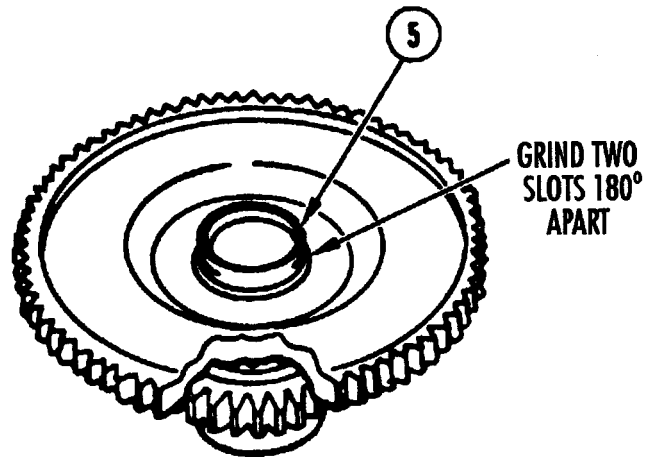
#### 4-8. REMOVE LEFT END COVER ASSEMBLY (SHEET 8 OF 10)

##### **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.



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 9

#### 4-8. REMOVE LEFT END COVER ASSEMBLY (SHEET 9 OF 10)

##### 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 8.
8. Using machinist's hammer and punch, remove bearing (7) from gear (6).

##### NOTE

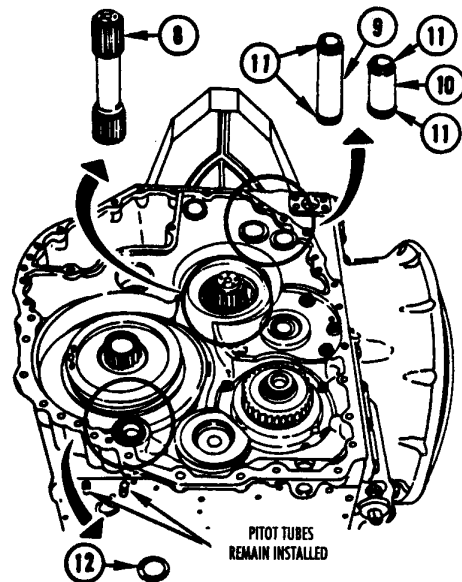
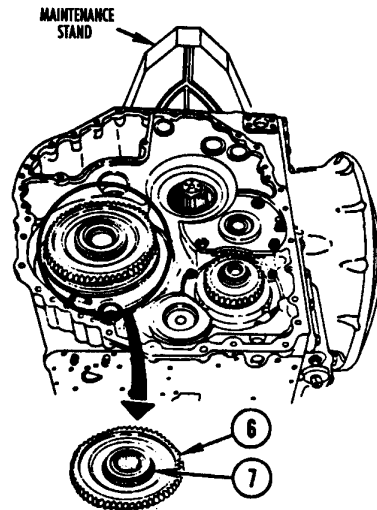
It may be necessary to wiggle bevel gear drive shaft to remove it from transmission.

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.



Go to Sheet 10

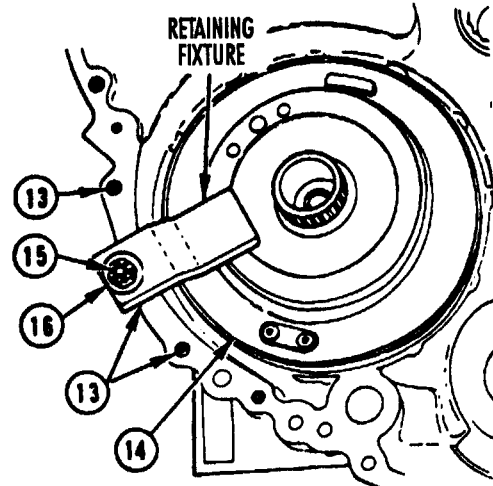
#### 4-8. REMOVE LEFT END COVER ASSEMBLY (SHEET 10 OF 10)

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 (3743 N•m).

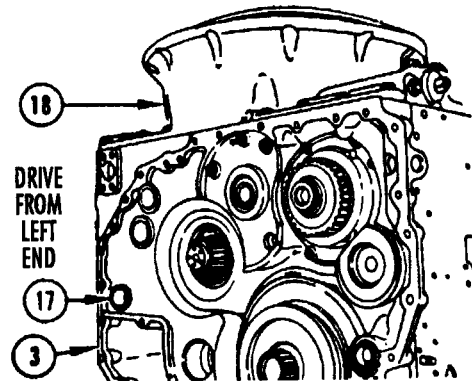


Remove Sump Communication Tube

**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.

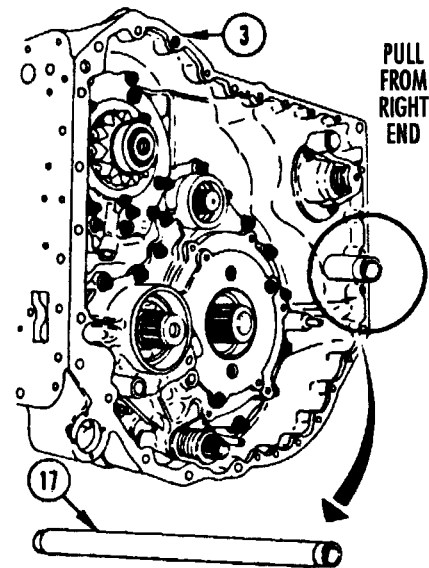
16. Using rotary control handle on maintenance stand, rotate transmission so that input housing (18) is in up position.
17. Using plastic faced hammer, tap end of sump communication tube (17) at left end of center housing (3) until tube moves into center housing.
18. Using pliers, pull tube (17) from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



**FOLLOW-ON PROCEDURE:**

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

End of Task 4



# **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 10. 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).

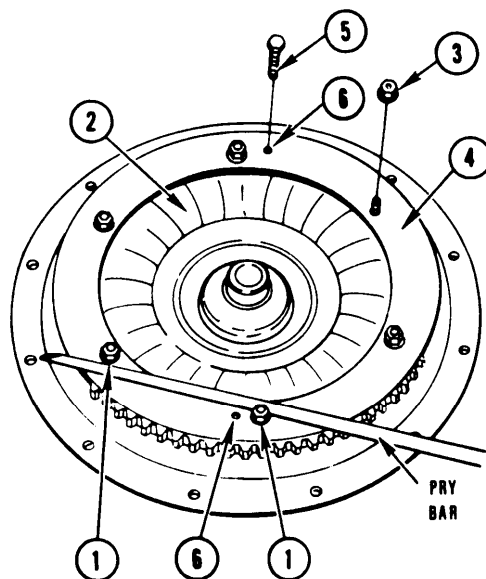
## NOTE

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

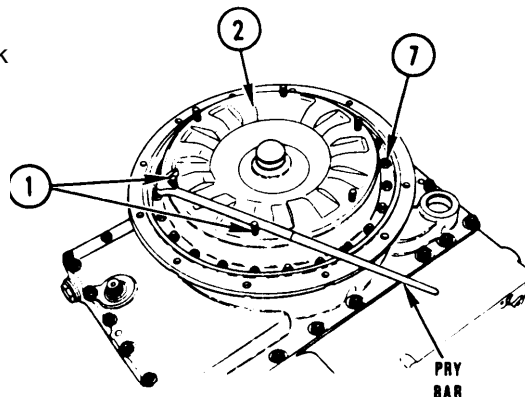
- 7 Using fingers, pull up on two studs (1) located opposite each other and pull converter pump cover (2) from transmission.

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

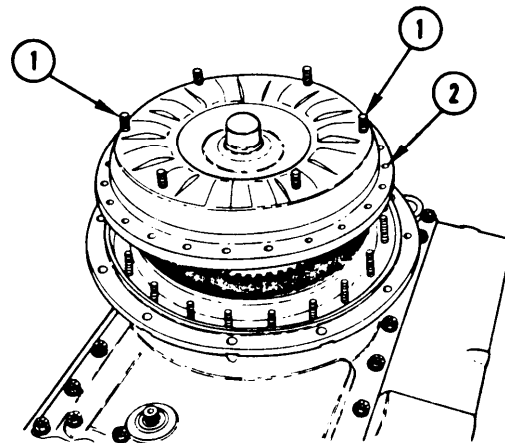
Go to Sheet 3



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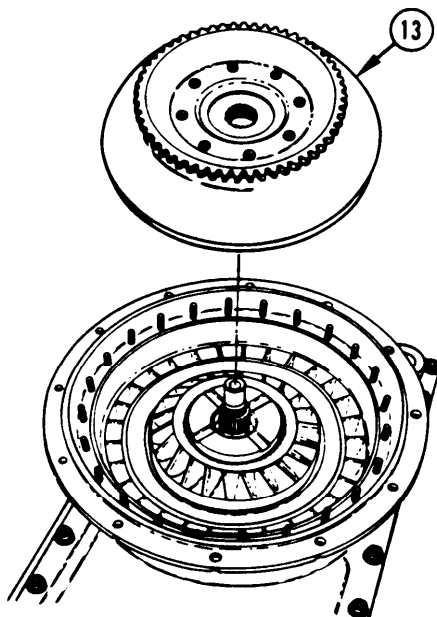
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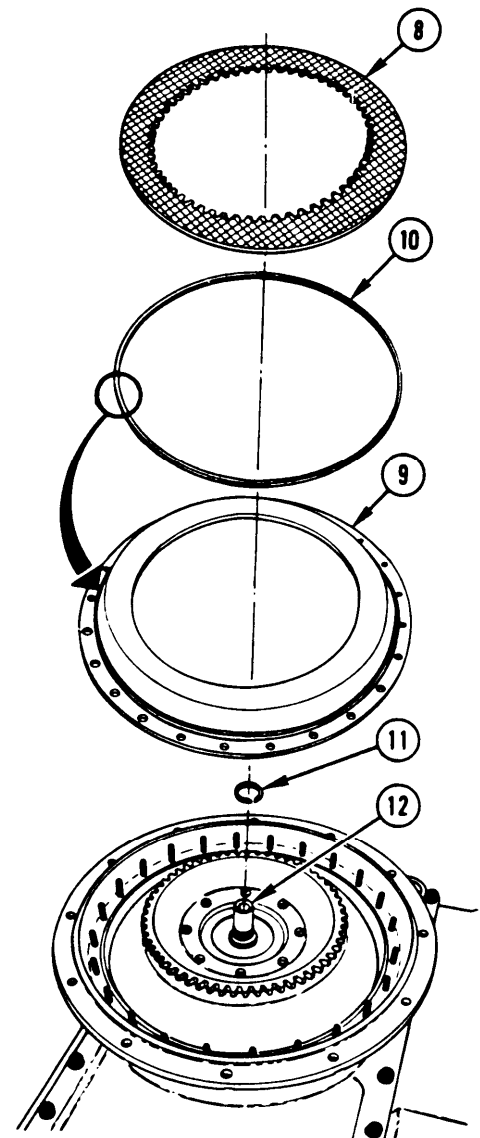
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#### 4-9. REMOVE CONVERTER ELEMENT COMPONENTS (SHEET 3 OF 5)

- 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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TA485369

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.

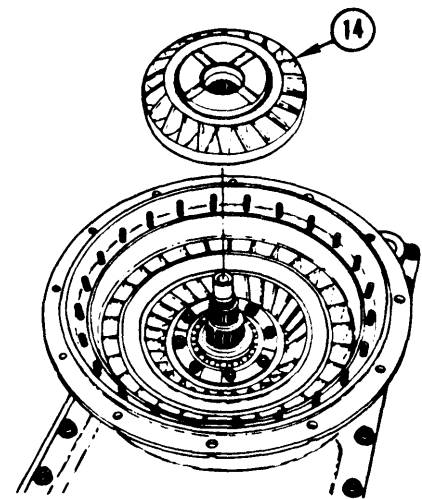
- 14 Remove seal ring (15) from converter pump assembly (16).

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

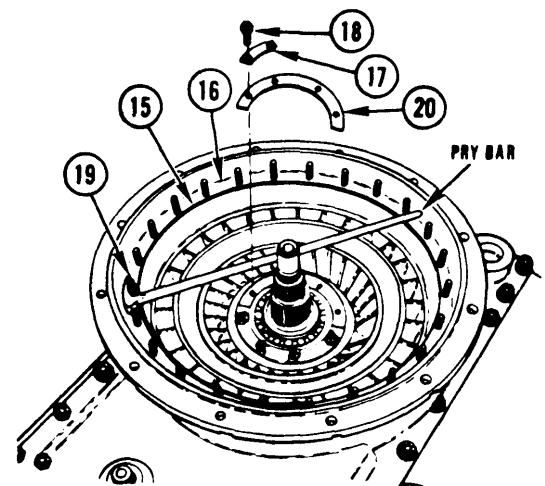
**CAUTION**

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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TA485372

Go to Sheet 5

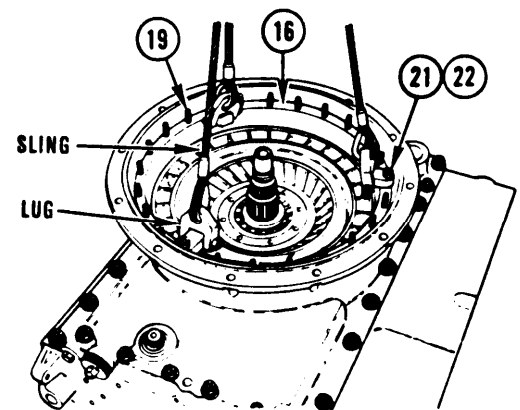
#### 4-9. REMOVE CONVERTER ELEMENT COMPONENTS (SHEET 5 OF 5)

##### NOTE

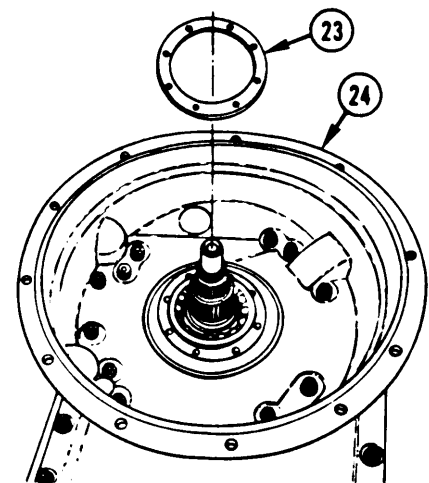
When sling is attached to three studs at approximately equal distances apart, there will be seven studs between sling lugs in two places and eight studs between sling lugs in one place.

- 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 pullin 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.



TA485373



TA485374

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

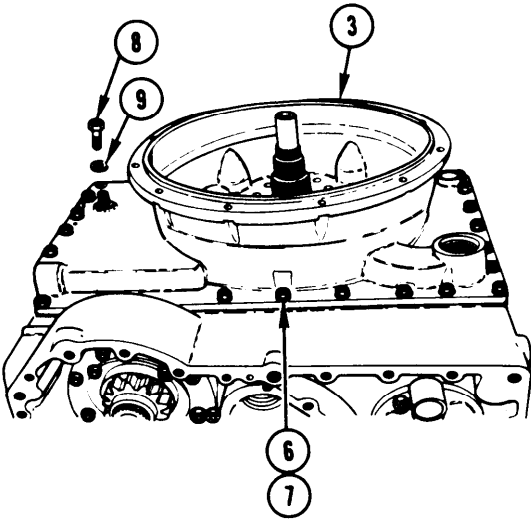
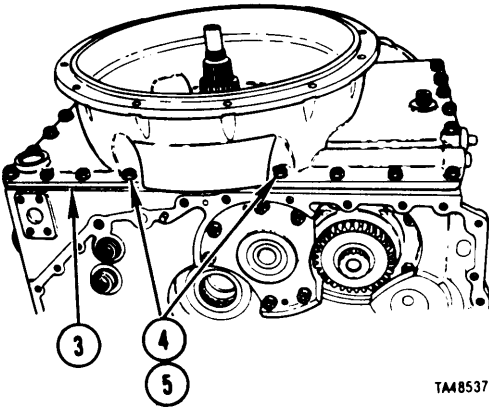
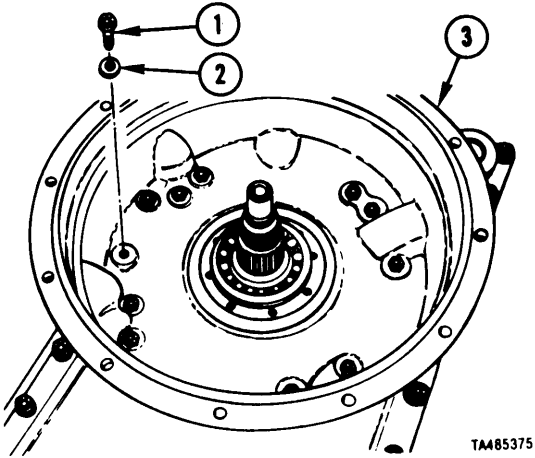
SUPPLIES:

- 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.

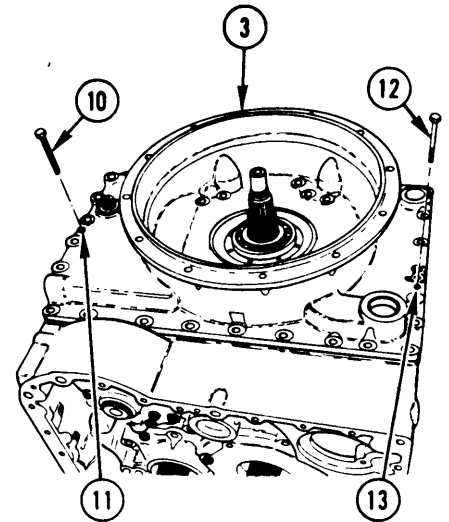
- 1 using socket, remove 11 bolts (1) and washers (2) from inside the input housing (3).
- 2 Using socket, extension, and universal joint, remove two bolts (4) and washers (5) from left side of input housing (3).
- 3 Using socket, extension, and universal joint, remove bolt (6) and washer (7).
- 4 Using 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.

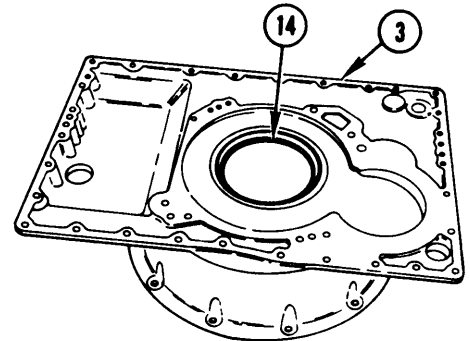


TA485378

#### 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.

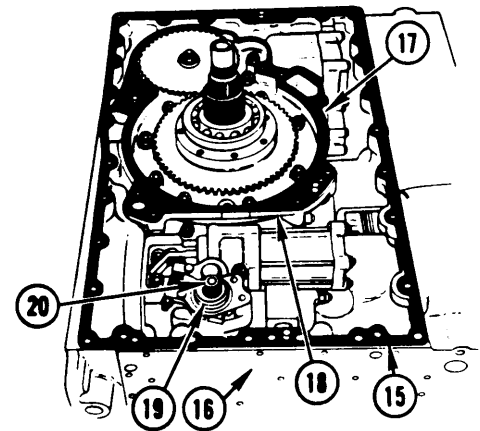
- 10 Turn input housing (3) over, bell housing down.
- 11 Using hammer and center punch drive against wall of seal (14) two places about 180 degrees apart; drive seal down into bell housing area.



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).



TA485380

**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 x1-1/4 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**

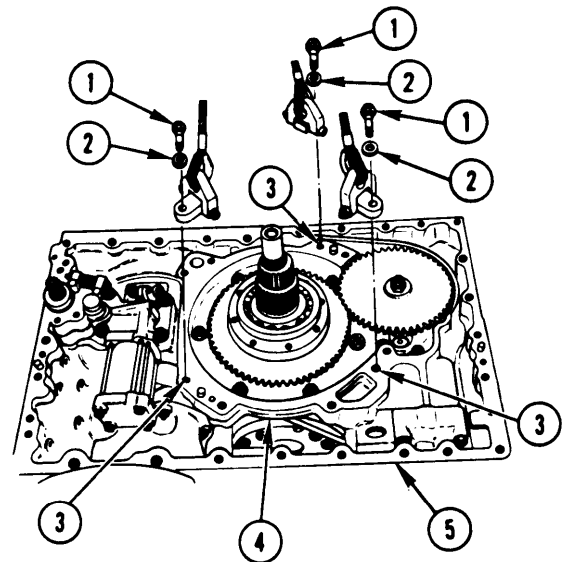
When lowering bevel gear assembly onto work table, be careful not to bend or break tubes. Bent or broken tubes must be replaced because:

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

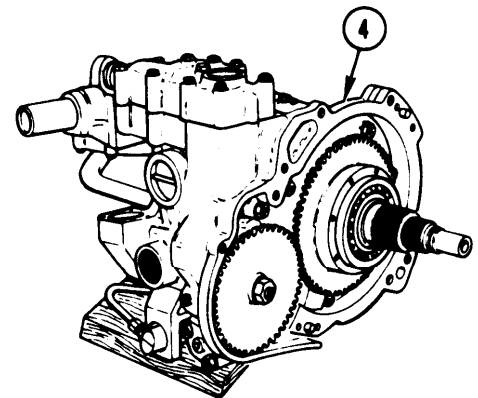
- 3 Using sling, carefully lower bevel gear assembly (4) over work table. While lowering, turn assembly so that it is supported by 2 x 4 x 16 inch wood blocks
- 4 Remove sling.

**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.



TA485381



TA485382

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
4-15.1	Install Oil Fill Tube Assembly	4-63.1
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:

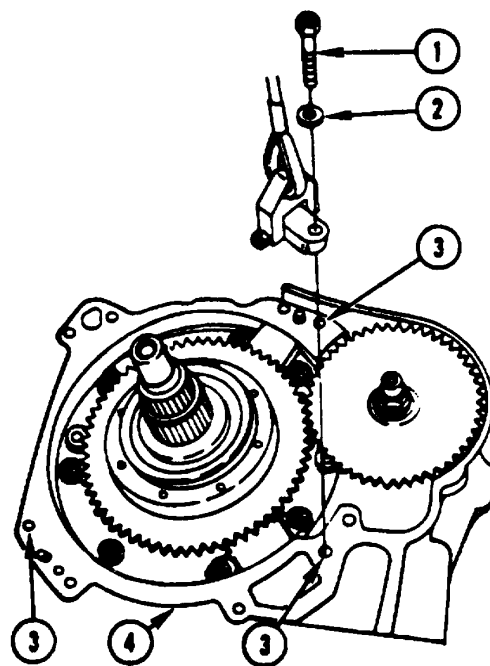
Bolt, hex head, 3/8-16 x 1-1/4 inch (3 required)

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 housing (4).



Go to Sheet 2

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

### **WARNING**

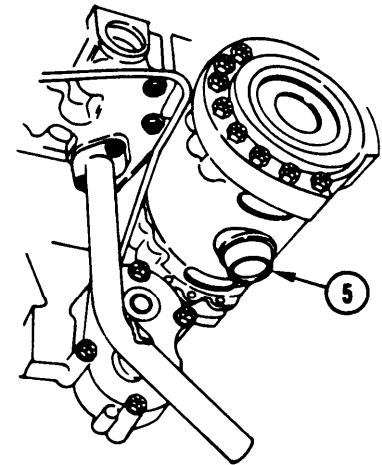
- Check slings and lifting devices for cuts, breaks, or wear before and during hoisting. Slings and lifting devices can break and cause injury or death.
- Bevel gear assembly must be lifted using sling and hoist. To avoid injury, keep out from under and clear of bevel gear assembly at all times. Do not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

### **CAUTION**

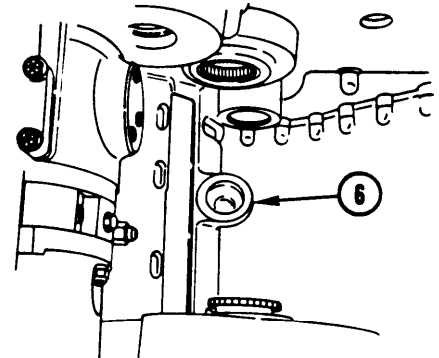
Do not bend or mash tubes when lifting bevel gear assembly. Closed tube will cause transmission malfunction.

### **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.



DOWN SIDE OF BEVEL  
GEAR ASSEMBLY WHEN  
ON HOIST

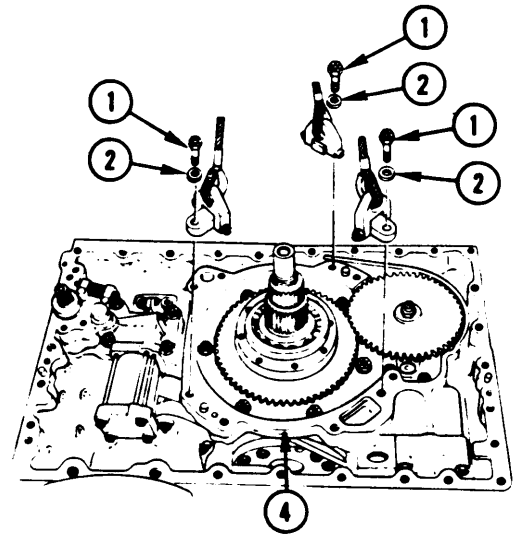


LOOKING INTO BEVEL GEAR  
OPENING IN CENTER HOUSING

- 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



# 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 used with Housing PN 23018026  
Seal, V-ring (steer shaft) (73342) 23048292 used with Housing PN 23048310

### SUPPLIES:

Adhesive-sealant, RTV, Type I (Item 1A, Appendix C)  
Petrolatum (Item 14, Appendix C)

### NOTE

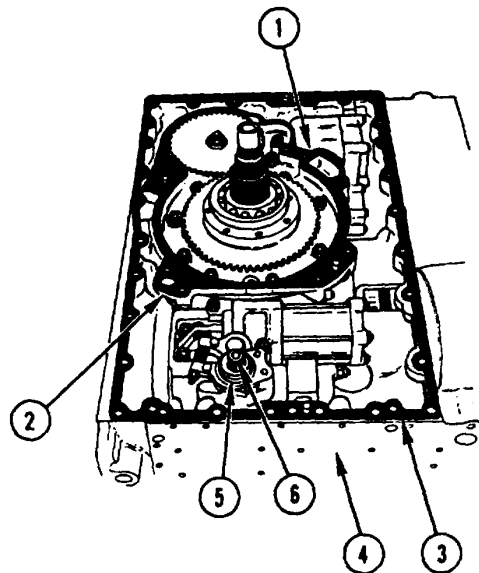
**Transmission on maintenance stand,  
input side turned up.**

- 1 Install bevel gear gasket (1) on bevel gear assembly (2).
- 2 Install input housing gasket (3) on center housing (4).

### CAUTION

**RTV adhesive-sealant begins to set up very quickly. Therefore, it is necessary for the input housing to be installed onto the transmission main housing within 30 minutes of applying RTV to steer shaft seal.**

- 3 Install new seal (5) on steer shaft (6) with thin lip of seal out.
- 4 Apply an 0.25 inch (6.3 mm) maximum width bead RTV adhesive-sealant around the OD of seal (5).



Go to Sheet 2

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

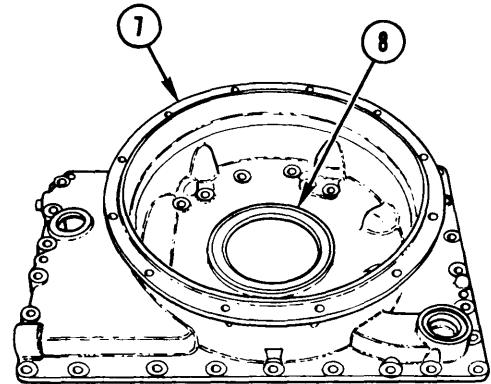
##### NOTE

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.

##### **CAUTION**

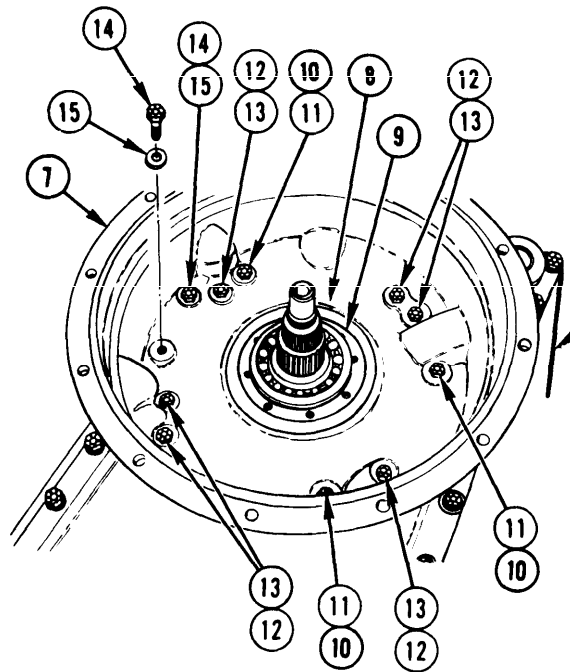
Do not overpress seal (8) as to crush metal part of seal. Overpress can damage seal (8) or cause damage to shoulder of input housing (7).



- 7 Check to see if rubber nose of seal (8) is seated against shoulder of input housing (7). If not, continue to press seal (8) 0.002-0.004 inches (0.06-0.10 mm) at a time until rubber nose of seal (8) seats against shoulder of input housing (7).
- 8 Apply petrolatum to seal (8).
- 9 Install input housing (7) onto center housing (4).
- 10 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.



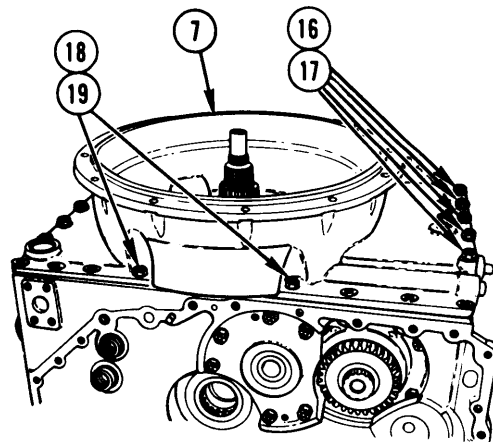
- 11 Using aligning punch, align one bolt (10) hole. Using fingers, start one plain 3/8-16 x 1-1/4 inch bolt (10) and washer (11). Start two other bolts (10) and washers (11), aligning holes as necessary.
- 12 Using fingers, start six remaining plain 3/8-16 x 1-1/4 inch bolts (12) and washers (13) in input housing (7).
- 13 Using socket, screw nine bolts (10, 12) into input housing (7) until snug.

Go to Sheet 3

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

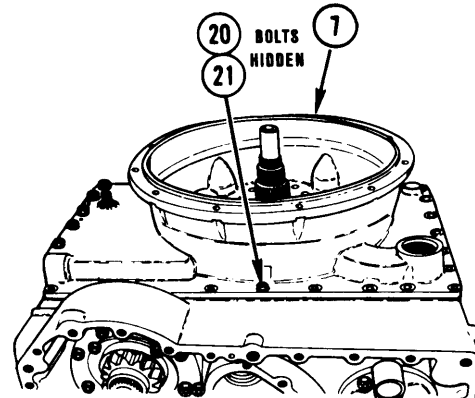
14 Using torque wrench and adapter, tighten bolts (10, 12) to 36-43 lb-ft (48-58 N•m).

15 Using socket, install two zinc-plated 3/8-16 x 1-1/4 inch bolts (14) and washers (15) in input housing (7).

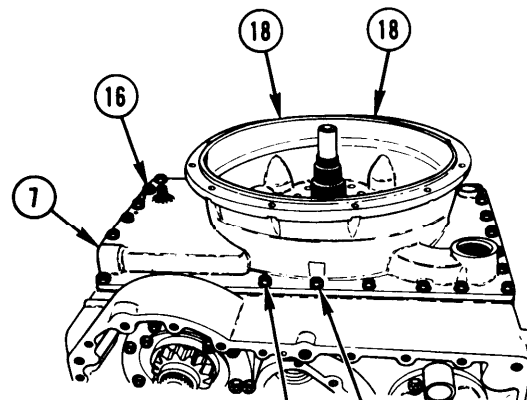


16 Using socket, install five zinc-plated 3/8-16 x 2-3/4 inch bolts (16) and washers (17) in input housing (7).

17 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).

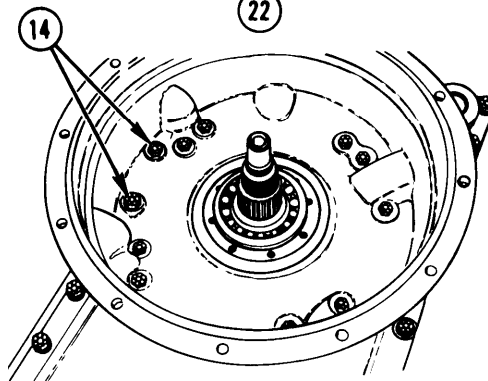


18 Using socket, extension and universal joint, install zinc-plated 3/8-16 x 1-1/4 inch bolt (20) and washer (21) in input housing (7).



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

20 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).



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

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

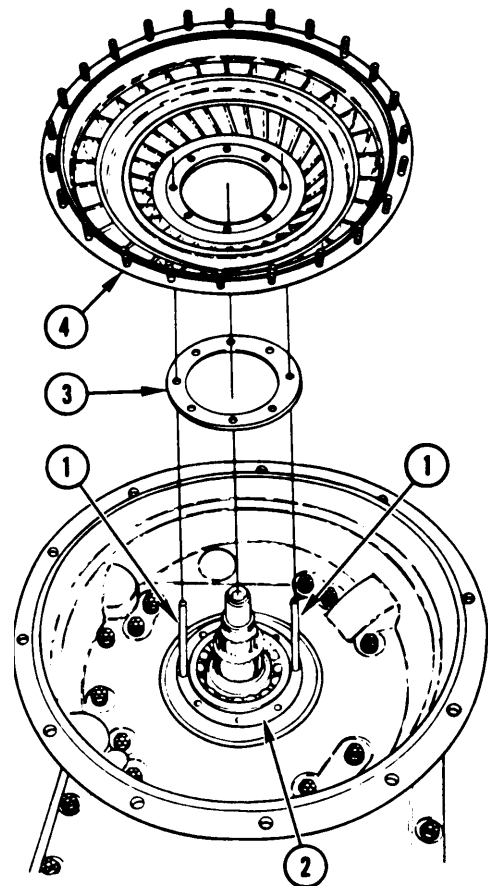
Be sure pump (4) is down far enough to allow inner lips on retainers (5) to seat in groove on bearing (6).

- 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).

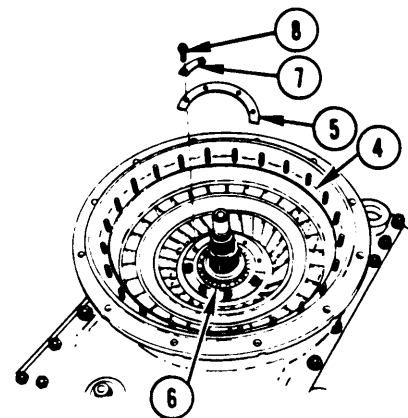
##### NOTE

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.



TA485394



TA485395

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.

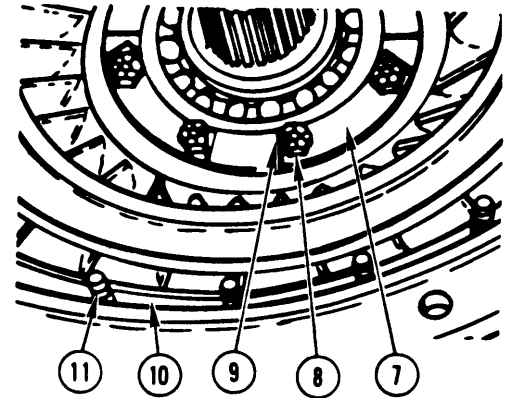
- 12 Install stator (12) over turbine shaft (13) with clutch disk (14) side of stator up.

##### NOTE

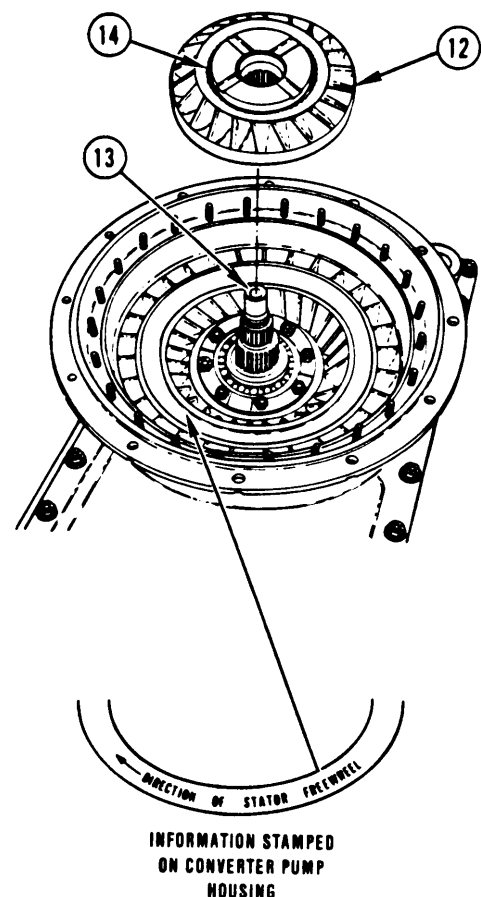
- The following procedure is a check on assembly of stator components. If stator rotates when turned to the right (clockwise), but locks up when turned to the left (counterclockwise), rollers and springs were properly installed in stator group.
- If stator locks up when turned to the right (clockwise),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

Go to Sheet 4

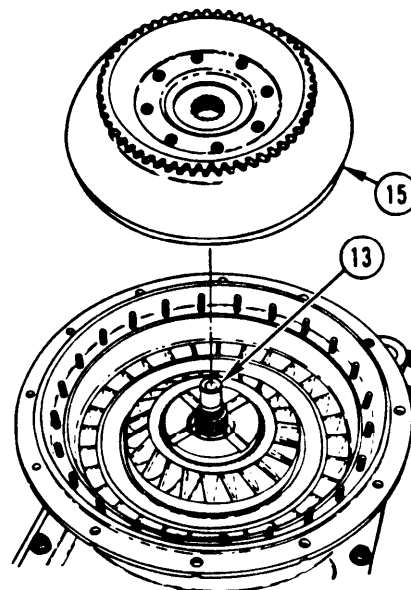


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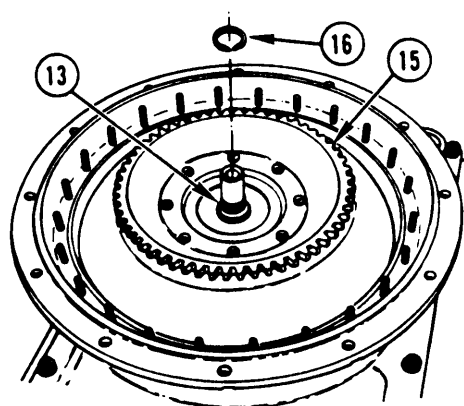
**4-14. INSTALL CONVERTER ELEMENT COMPONENTS  
(SHEET 4 OF 7)**

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



TA485398

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

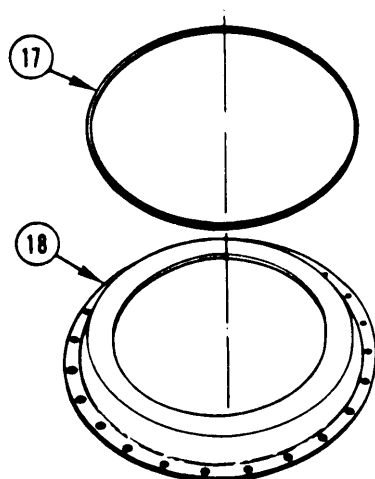


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**NOTE**

Gasket (17) is not to be lubricated.

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



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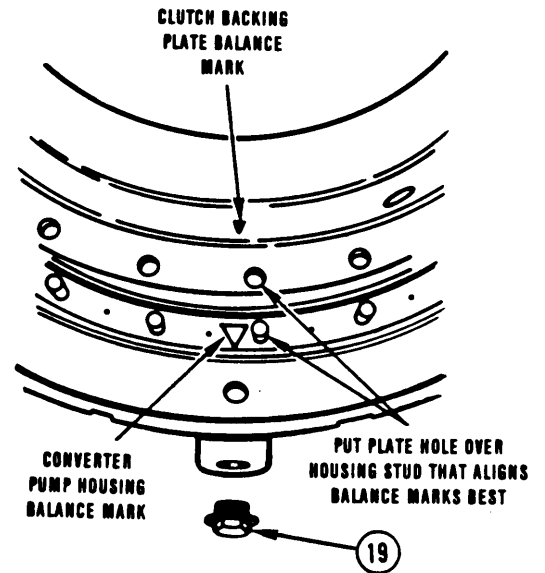
Go to Sheet 5

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

## NOTE

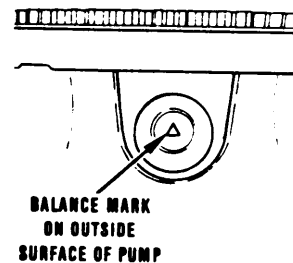
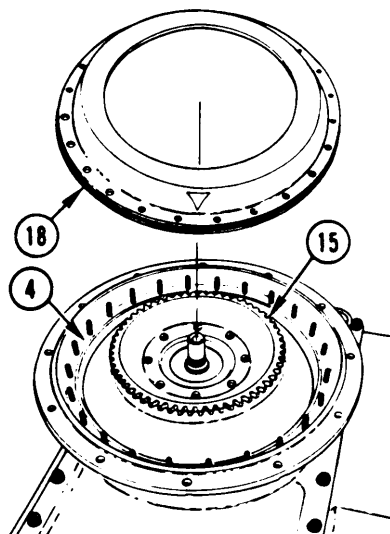
Balance marks are used on the clutch lockup plate and on the converter pump housing. The clutch lockup plate must be mounted so that these two balance marks are aligned as shown at the right.

- 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.



TA485401

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



TA485402

Go to Sheet 6

TM85403



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.

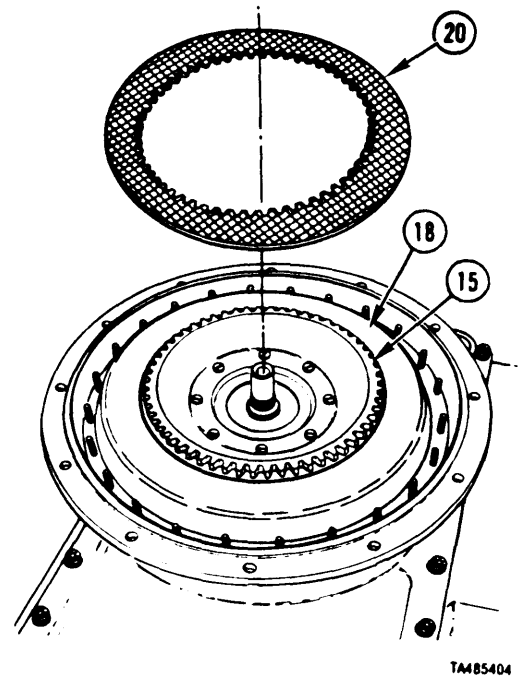
- 19 Soak clutch disk (20) in lubricating oil.
- 20 Install clutch disk (20) on clutch lockup plate (18) so that inside of clutch disk engages splined area of turbine (15).

**NOTE**

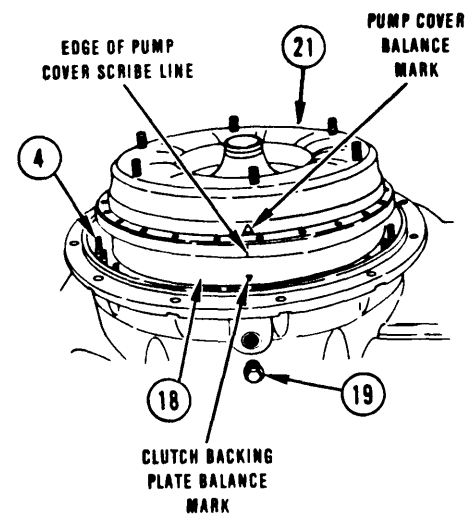
Converter pump cover assembly has a balance mark. This balance mark must line up with the balance mark on the clutch lockup plate. Align pump cover holes with pump housing studs so that clutch lockup plate balance mark will be at nearest point under pump cover balance mark.

- 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



TA485404



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).

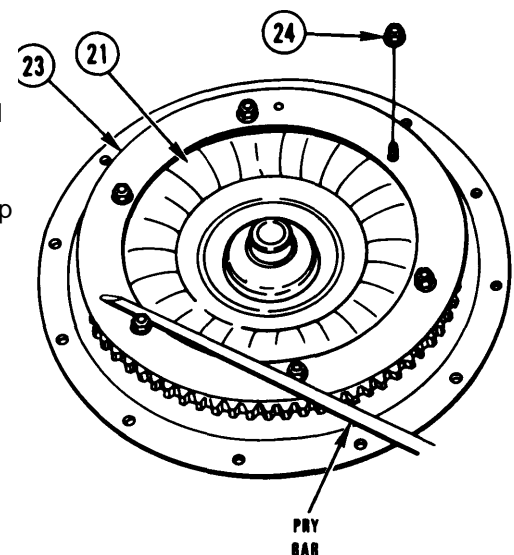
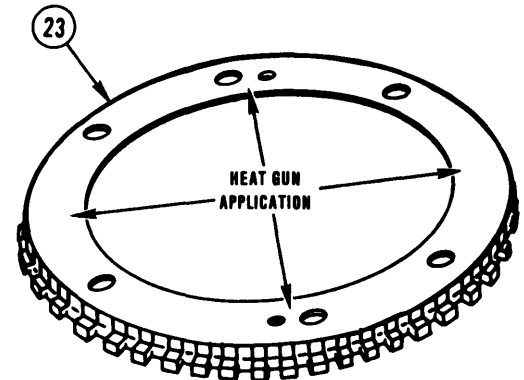
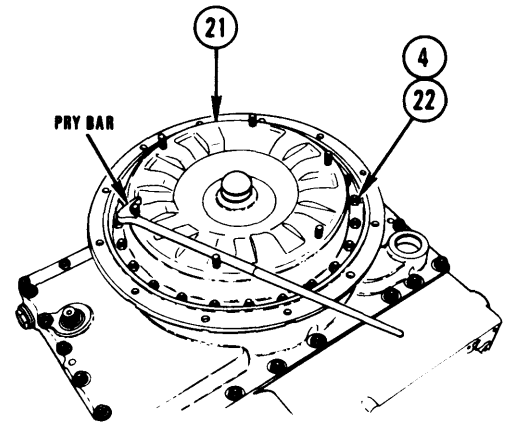
#### **WARNING**

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 41-44 lb-ft (56-60 N•m).



End of Task 1

**4-15. INSTALL LEFT END COVER ASSEMBLY  
(SHEET 1 OF 11)**

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
4	Install Oil Level Tube Assembly	4-63.1

**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

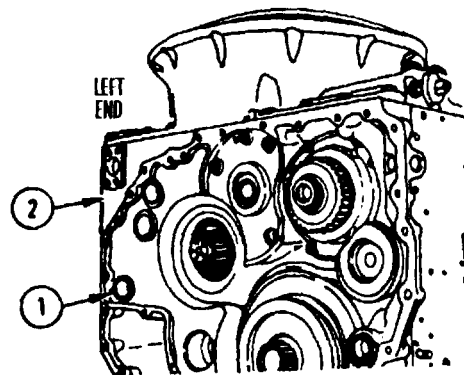
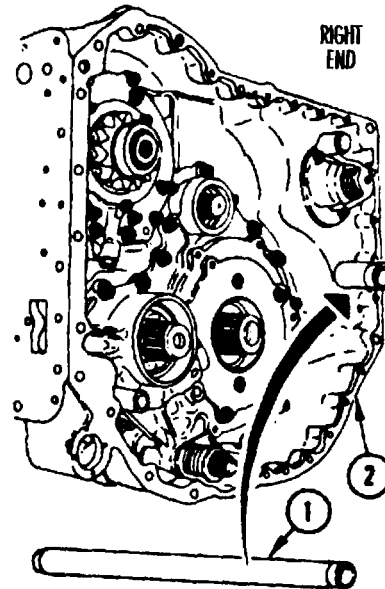
#### 4-15. INSTALL LEFT END COVER ASSEMBLY (SHEET 2 OF 11)

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.



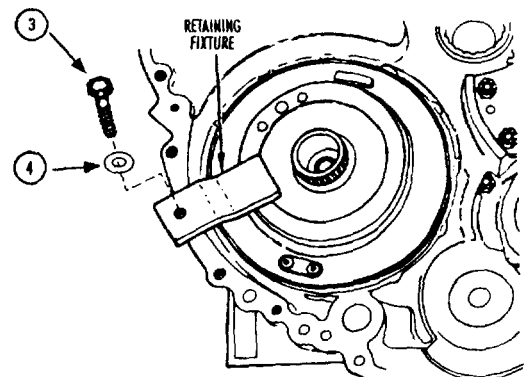
Remove Fabricated Range Pack Retaining Fixture

- 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

#### 4-15. INSTALL LEFT END COVER ASSEMBLY (SHEET 3 OF 11)

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.

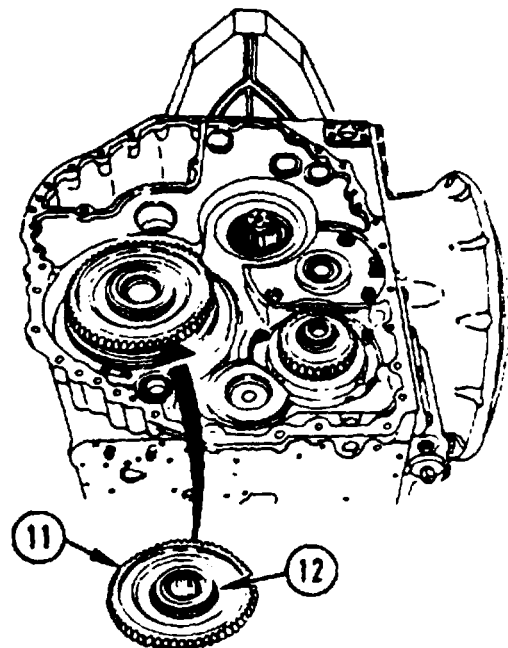
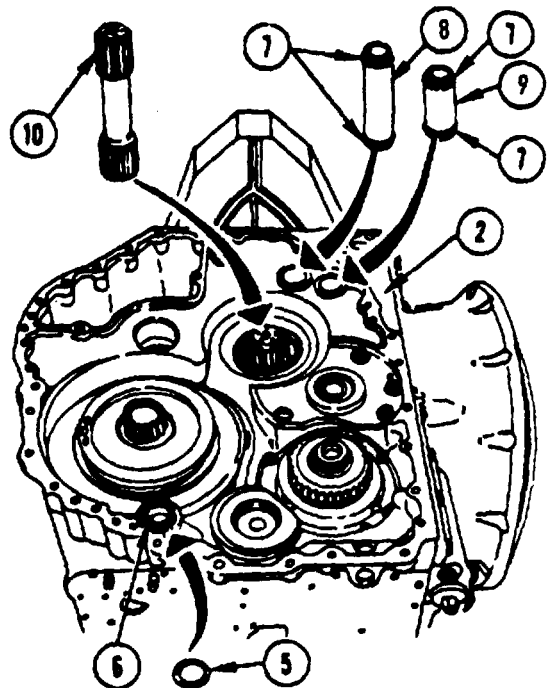
- 11 Install filter-out tube (9) in center housing (2), either end of tube in first.
- 12 Install filter-in tube (8) in center housing (2), either end of tube in first.
- 13 Install bevel gear driven shaft (10) in center housing (2), either end of shaft first.
- 14 Apply lubricating oil and petrolatum 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.

Go to Sheet 4



#### 4-15. INSTALL LEFT END COVER ASSEMBLY (SHEET 4 OF 11)

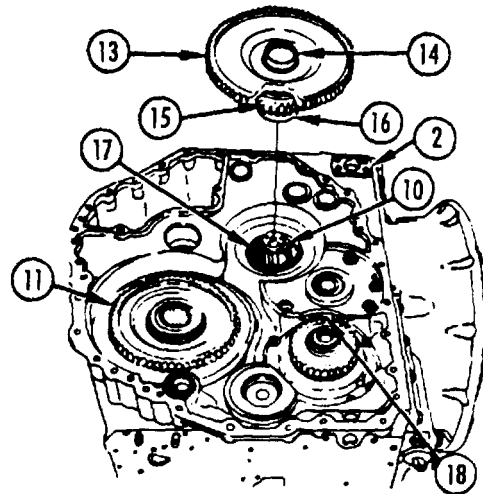
18. Check bearing journal on range input drive gear (13) hub for damage. Smooth out scratches with crocus cloth. If grinding damage is present, replace gear (13).
19. Apply lubricating oil and petrolatum to bearing journals on each side of gear (13) if old bearings were removed.
20. Using arbor press,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

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 11)

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.

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

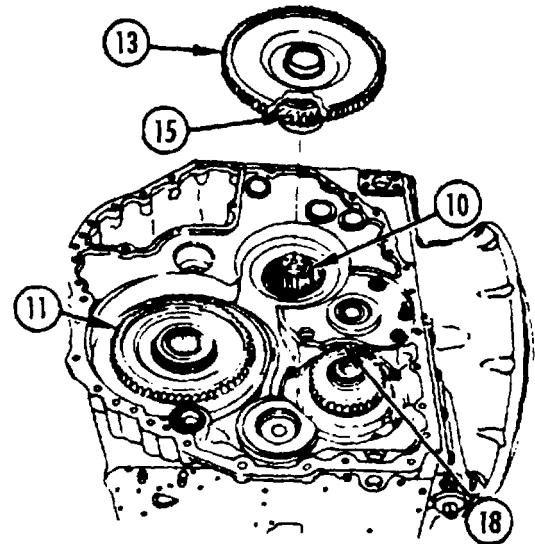
##### FABRICATED TOOLS:

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 GUIDE BOLTS (SHEET 6 OF 11)

- 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.

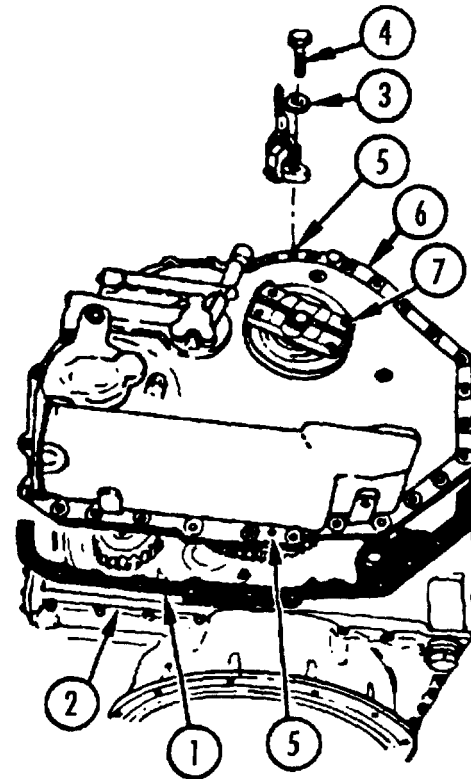
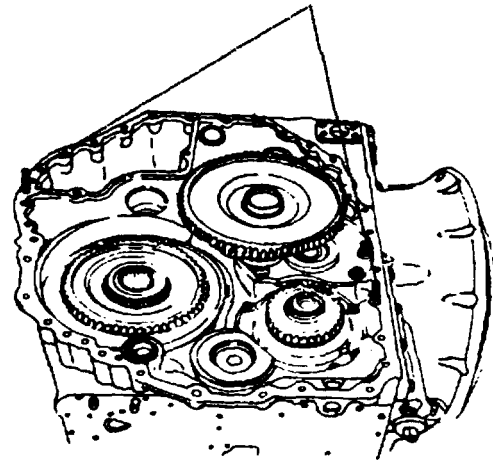
- 5 Hoist left end cover assembly (6) over transmission (2).

- 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

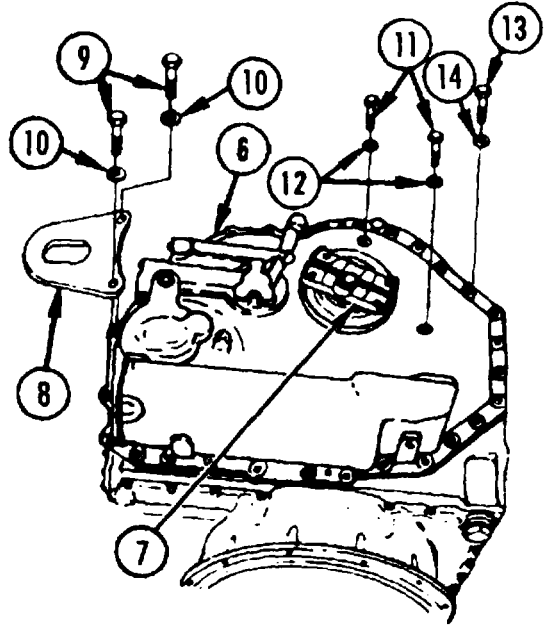


**4-15. INSTALL LEFT END COVER ASSEMBLY  
(SHEET 7 OF 11)**

- 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 11/4 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 (8, 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.



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 11)

##### 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.

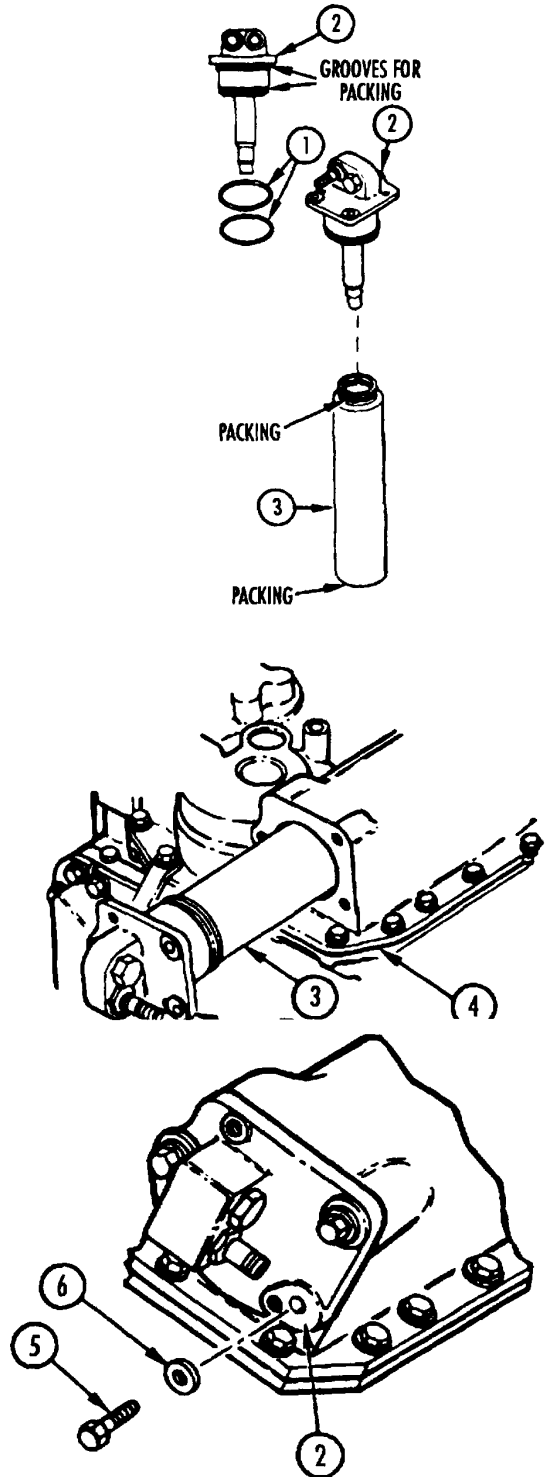
- 4 Install filter head (2) with new filter element (3) in filter cavity on left end cover assembly (4).

- 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

Go to Sheet 9



**4-15. INSTALL LEFT END COVER ASSEMBLY  
(SHEET 9 OF 11)**

**TASK 4 INSTALL OIL LEVEL TUBE  
ASSEMBLY**

**NOTE:**

**This task is for the X200-4A Transmission only. Oil fill tube must be installed after the Left Hand End Cover Assembly is installed.**

**COMMON TOOLS:**

Socket, socket wrench, 3/8 inch square drive, 1/4 inch  
Extension, 3/8 inch square drive  
Torque Wrench 3/8 inch square drive  
Crowfoot, 1-1/4 inch  
Wrench, 1-1/16 inch  
Wrench, 1-1/4 inch  
Socket, socket wrench, 3/8 inch square drive, 9/16 inch  
Handle, socket wrench, 3/8 inch square drive  
Wrench, 5/16 inch

**REPAIR PARTS:**

Packing, O-ring (1 required) (73342) (29510253)  
Gasket (1 required) (73342) (29510236)

- 1 Install new gasket (16) on adapter (14).
- 2 Using a 1/4 socket, socket (Allen) extension and torque wrench install 4 bolts (15) that retain the gasket (16) and adapter (14) to the LH End Cover Assembly (8). Torque 4 bolts to 27 - 32 lb ft (37 - 43 Nm).
- 3 Install clamp (3) on oil level tube assembly (2) at the mark previously made.

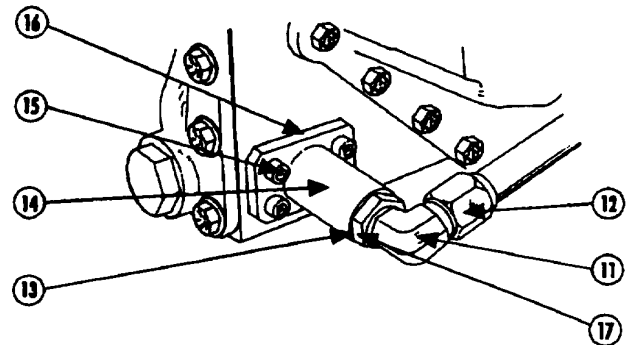
**NOTE:**

Part of clamp with bolt holes should be down and out in relation to oil level tube assembly.

**NOTE:**

Bolt and washer should be installed in top position and nut in bottom position, in relation to clamp.

- 4 Install bracket (7) on clamp (3) by installing bolt (9), washer (4) and nut (10). Do not tighten bolt (9) and nut (10).



Go to Sheet 2.

#### 4-15 INSTALL OIL FILL TUBE ASSEMBLY (SHEET 10 OF 11)

- 5 Coat o-ring (13) with transmission oil.
- 6 Install new o-ring (13) on elbow (11). Install o-ring (13) until it seats on back up washer on elbow (11).
- 7 Using your hands, in the direction of the bend in the elbow (11), back off lock-nut (17), on the elbow (11), as far as possible.
- 8 Inspect back up washer and o-ring (13) to insure the back up washer is not loose and the o-ring (13) and back up washer are pushed up, in the direction of the bend in the elbow (11) as far as possible.
- 9 Using your hands, screw elbow (11) and o-ring (13) into the adapter (14) until the back up washer makes contact with the adapter (14). Light wrenching may be necessary to obtain seating of the backup washer. If necessary use a 1-1/16 wrench for this purpose.

#### **CAUTION:**

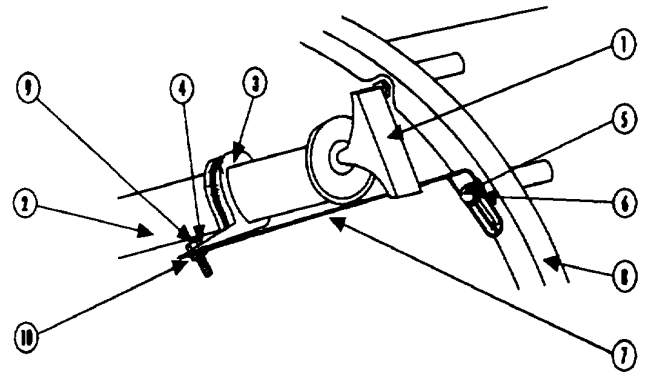
For alignment of oil level tube assembly and elbow, elbow is to be unscrewed by the required amount. Do not align by turning elbow in a

- 10 To align the elbow (11) with the oil level tube assembly (2), unscrew elbow (11) by the required amount, but not by more than one full turn. Light wrenching may be necessary to obtain seating of the backup washer. If necessary use a 1-1/16 wrench for this purpose.

#### **NOTE:**

Should repair not include installation of oil level fill tube, position the elbow pointing towards center of the LH Output Shaft. Using a 1-1/16 wrench to hold elbow and a 1-1/4 crowfoot and torque wrench, torque nut on elbow to 79 87 lb ft( 107118 N•m).

- 11 Using hands, install oil level fill tube (2) on elbow (11).
- 12 Using a 1-1/16 wrench to hold elbow (11) and a 1-1/4 crowfoot and torque wrench, torque nut on elbow to 79 87 lb ft(107 118 N•m).



Go to Sheet 3.

**4-15 INSTALL OIL FILL TUBE ASSEMBLY  
(SHEET 11 OF 11)**

- 13 Using a 9/16 socket, extension and torque wrench, install bolt (5) and washer (6) that retain the bracket (7) to the LH End Cover Assembly (8). Torque bolt to 27 32 lb ft (36 43 Nm).
- 14 Using a 1-1/16 wrench to hold elbow (11) and 1-1/4 crowfoot and torque wrench, torque nut (17) on elbow (11) to 79 87 lb ft (107 -118 Nm).
- 15 Using a 5/16 wrench hold bolt (9) that retains clamp (3) to bracket (7).
- 16 Using a 3/8 in socket and torque wrench, torque nut (10) that retains the clamp (3) to the bracket (7) to 10 15 lb ft (15 23 Nm).
- 17 Install oil level indicator (1) (dipstick) in oil tube (2).
- 18 Turn oil level indicator (1) (dipstick), clockwise, in oil tube (2) until tight.

**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**

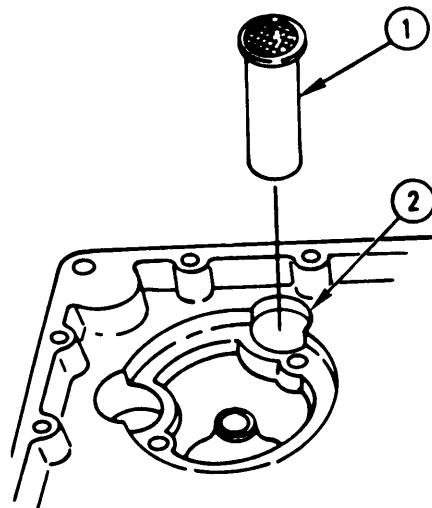
Transmission on maintenance stand, right end turned up.

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).

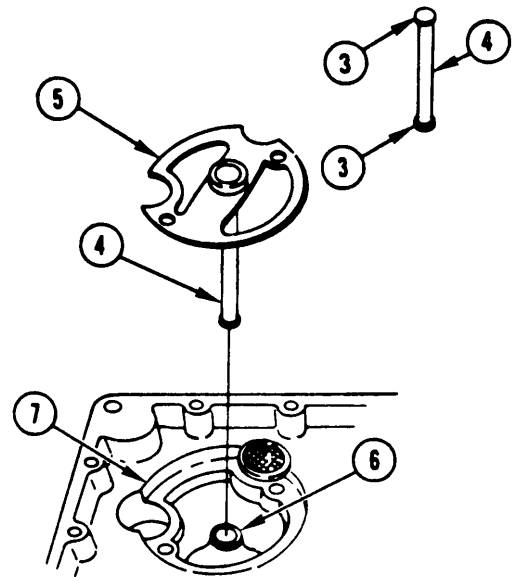


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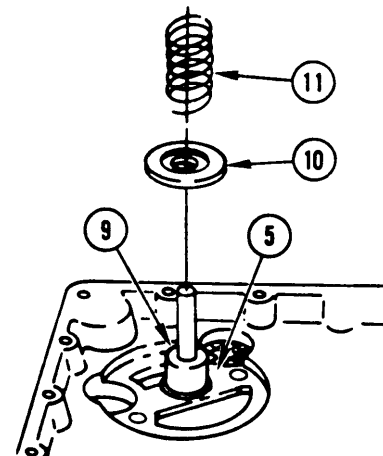
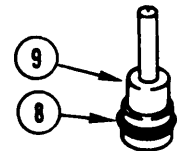
Go to Sheet 2

#### 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).



TA485422



TA485423

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 Nm).

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.

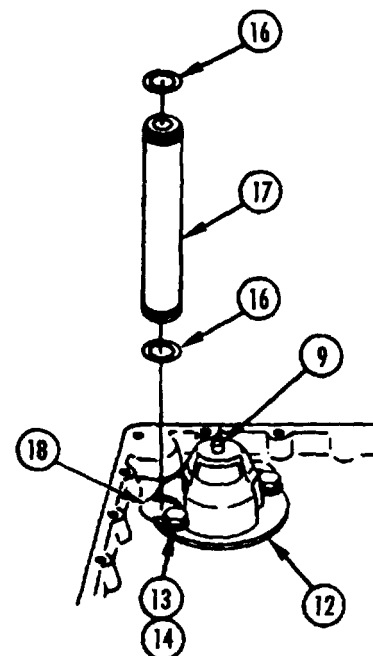
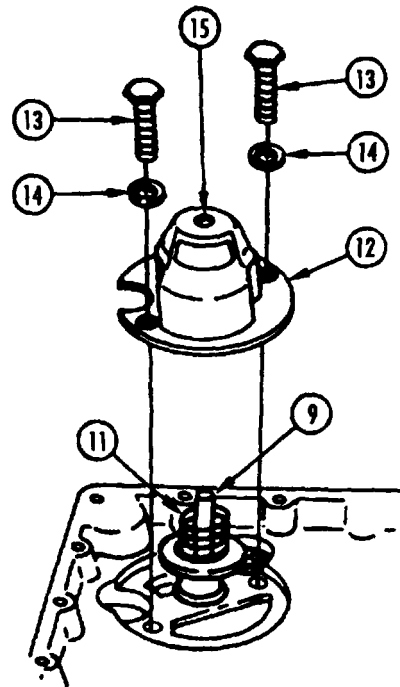
- 17 Install lube tube (17) either end first, in center housing bore (18) adjacent to equalizer housing (12).

**NOTE**

X200-4 Brake apply tube and 2 packings are loose between Right End Cover and Center Housing.

X200-4A Brake apply tube is pressed into Right Hand Brake support and uses only 1 Packing.

Go to Sheet 4





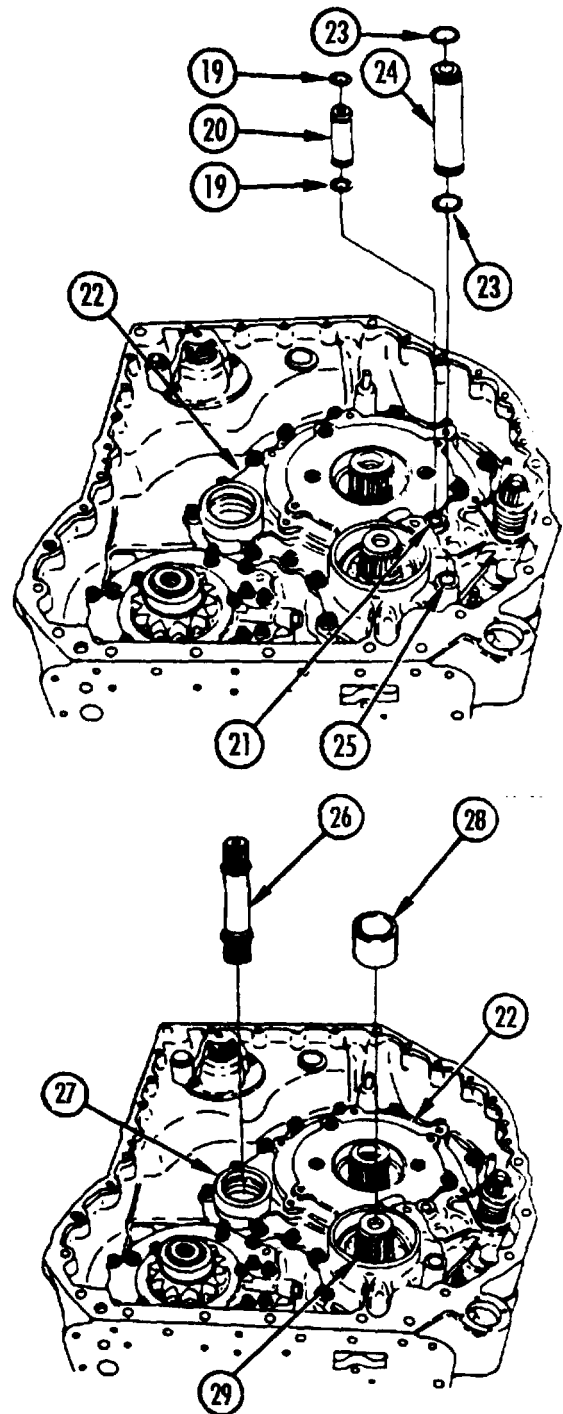
#### 4-16. INSTALL RIGHT END COVER ASSEMBLY (SHEET 4 OF 9)

- 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 right brake support (22).
- 21 On X200-4A install one new packing (19) on brake apply tube, which is pressed into the right hand brake support. Coat packing (19) with petrolatum.
- 22 Install two new packings (23) on brake coolant tube (24).
- 23 Apply petrolatum to packings (23).
- 24 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.

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



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.

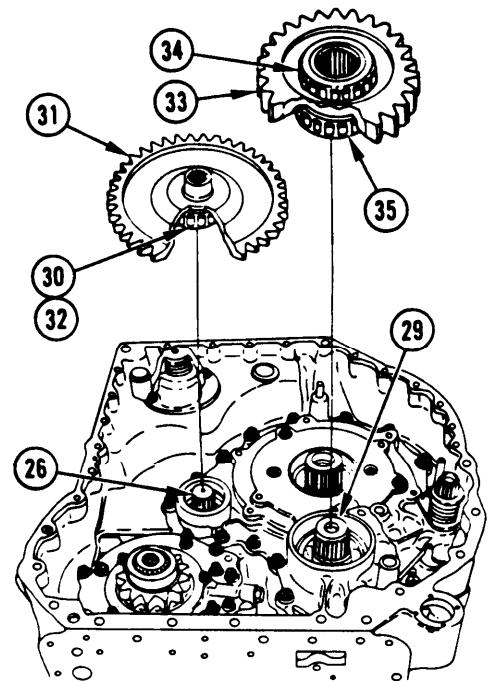
**NOTE**

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.



TA485428

- 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.

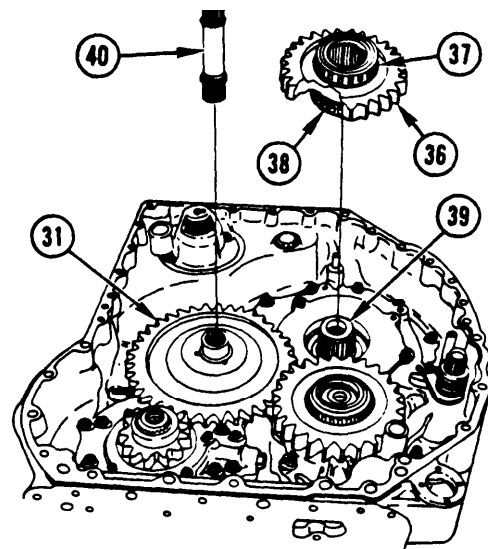
#### NOTE

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.



TA485429

- 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 rewired)  
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.

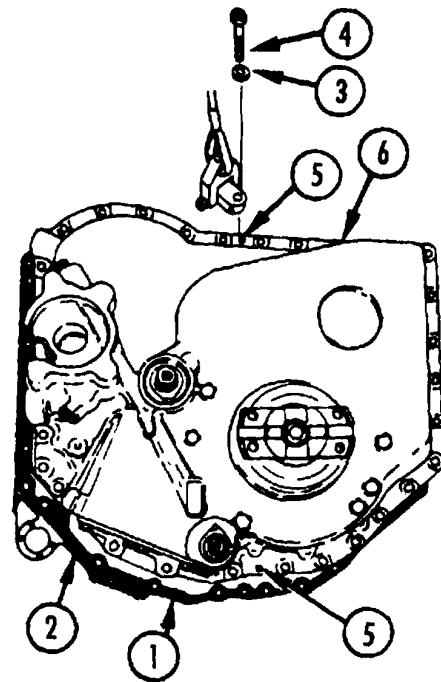
##### NOTE

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

- o 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.
- o 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.



- 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

Para. 4-16, Task 2

Change 2 4-71

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

**WARNING**

Do not tighten end cover bolts unless Right End Cover is fully seated. Damage to Right End Cover could result.

- 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 Nm).
- 12 Install right brake adjusting cover gasket (16) and brake adjusting cover (17) on right end cover (6).

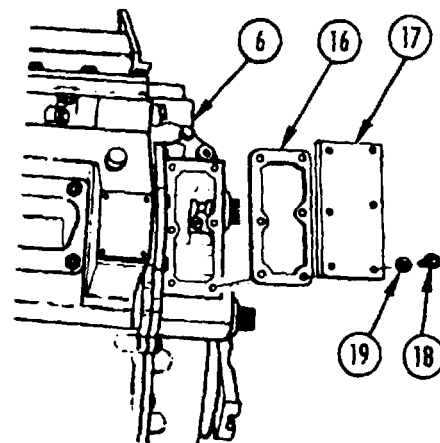
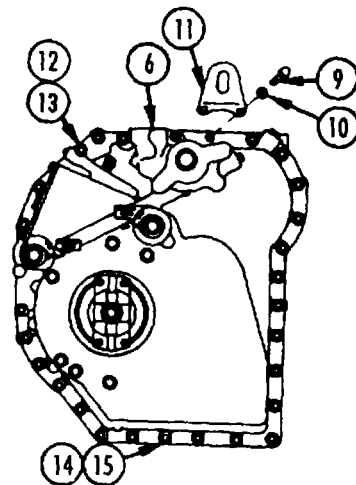
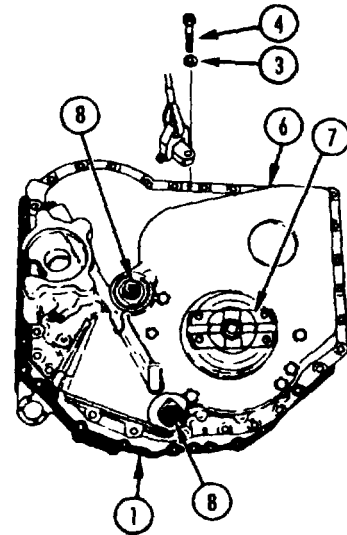
**NOTE**

X200-4 Oil filler chain cap is bolted under the top, outside bolt and washer of 6 bolts and washers which retain the plate to the end cover.

- 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).
- 15 X200-4A right adjusting brake cover should have a pipe plug (20) installed at oil drain line location (shipping). If plug (20) is missing, using a 9/16 socket and extension, install plug (20). Using a torque wrench, torque plug (20) to 18 22 lb ft (24 30 Nm).

**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**

#### 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.

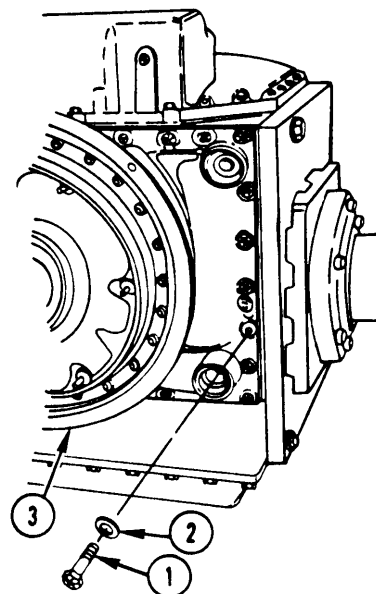
Go to Sheet 2

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

**NOTE**

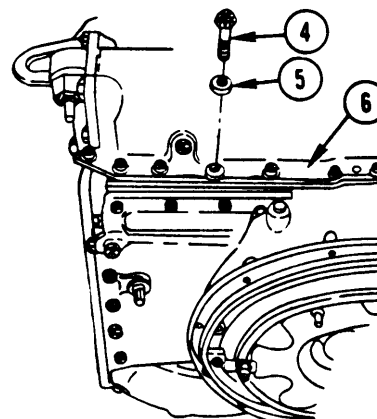
Left and right lifting brackets are installed.

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



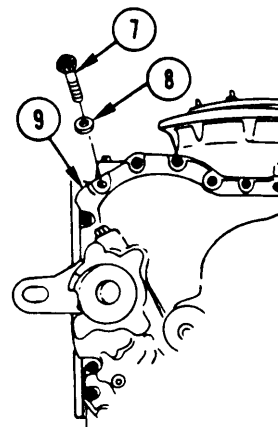
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- 2 Using 9/16 inch socket, remove bolt (4) and washer (5) from left end cover (6). Save bolt and washer.



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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.



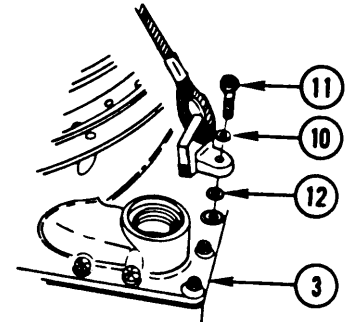
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Go to Sheet 3



#### 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.

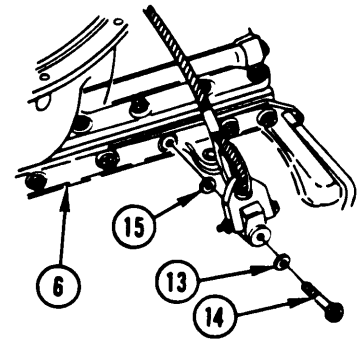


- 5 Using 9/16 inch socket, install bolt (11) attaching three-leg sling to input housing (3). Tighten bolt to snug.

- 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.

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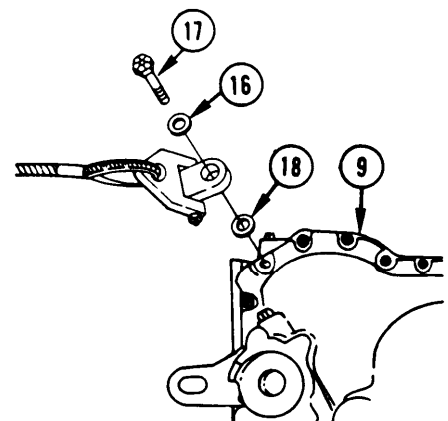
- 7 Using 9/16 inch socket, install bolt (14) attaching three-leg sling to left end cover (6). Tighten bolt to snug.



- 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.

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- 9 Using 9/16 inch socket, install bolt (17) attaching three-leg sling to right end cover (9). Tighten bolt to snug.

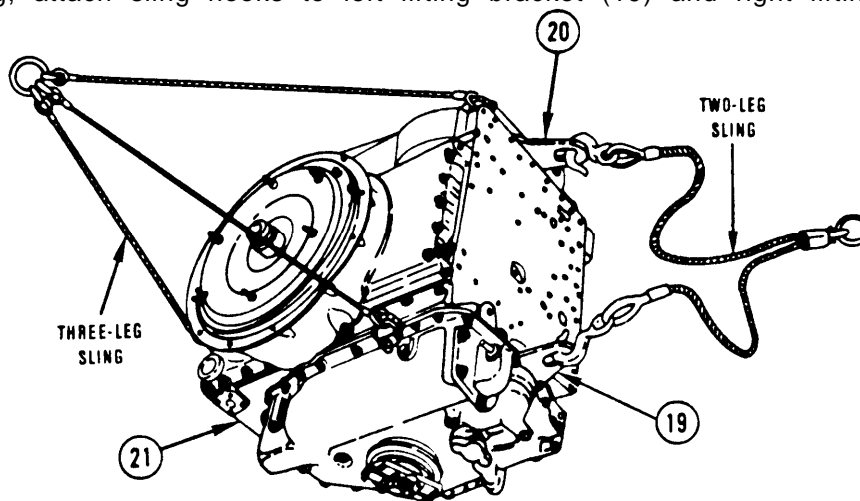


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Go to Sheet 4

**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).



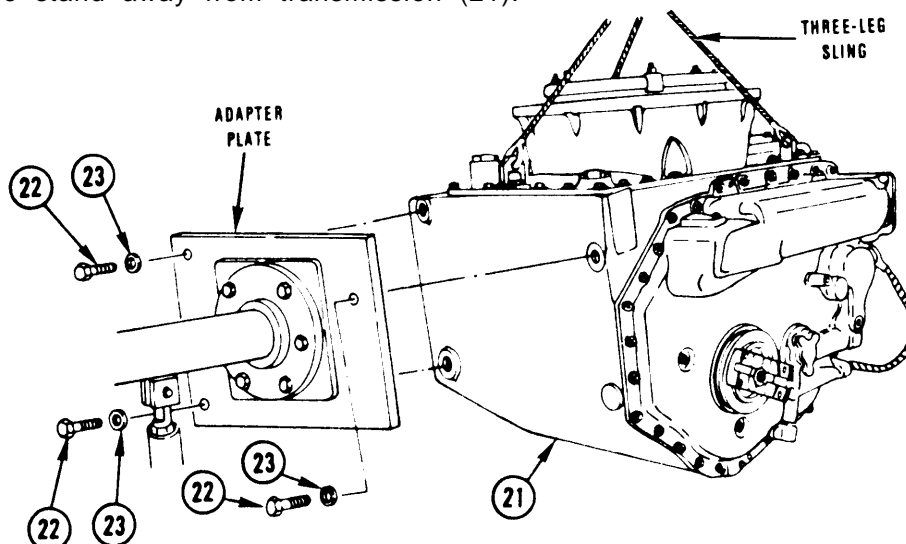
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- 11 Rotate transmission, input housing upward.
- 12 using hoist, one soldier raise three-leg sling until cables are tight. Maneuver hoist and maintenance stand until all three cables are uniformly tight, ready to receive full weight of transmission (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).



TA485441

Go to Sheet 5

#### 4-17. REMOVE TRANSMISSION FROM MAINTENANCE STAND (SHEET 5 OF 7)

##### WARNING

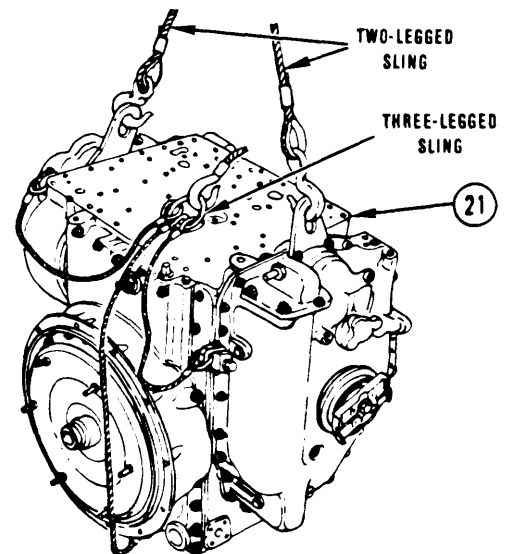
When rotating transmission from horizontal to vertical position, weight of transmission is transferred from three-leg sling to two-leg sling. When transmission center of gravity shifts, transmission may suddenly tilt, thrusting heavy momentary stress on two-leg sling and hoist. To avoid bodily injury 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.

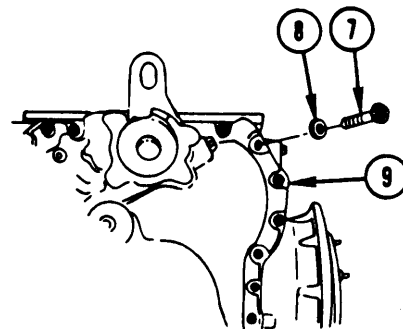


Go to Sheet 6

TAM85442

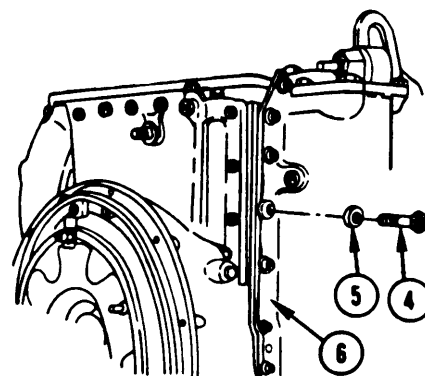
**4-17. REMOVE TRANSMISSION FROM MAINTENANCE STAND  
(SHEET 6 OF 7)**

- 19 Using 9/16 inch socket, reinstall bolt (7) and washer (8) in right end cover (9).



TA485443

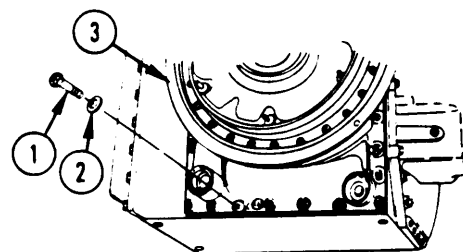
- 20 Using 9/16 inch socket, reinstall bolt (4) and washer (5) in left end cover (6).



TA485444

- 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).



TA485445

**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) MS51937-5, 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

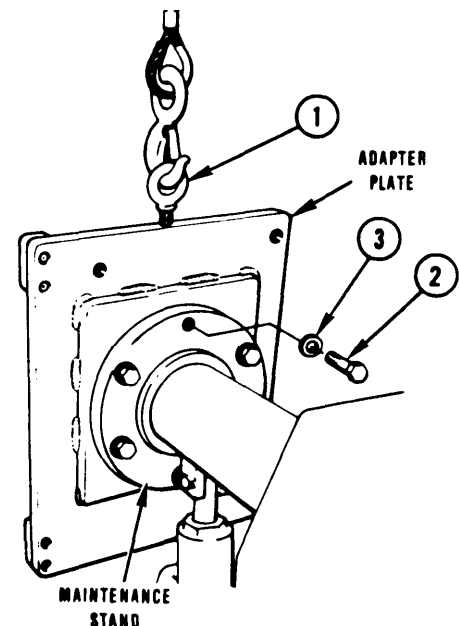
- Check slings and lifting devices for cuts, breaks, or wear before hoisting adapter plate and during hoisting. Slings and lifting devices can break and cause injury or death
- Adapter plate weighs 127 pounds. Lift adapter plate with hoist to avoid bodily injury.

- 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).



End of Task 2

TM95446

# 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) 23047805

**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.

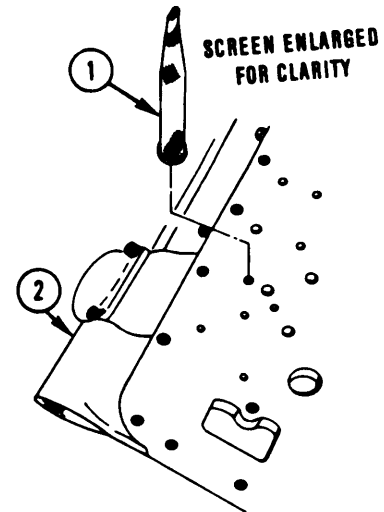
Go to Sheet 3

4-18. INSTALL TRANSMISSION TOP COMPONENTS  
(SHEET 3 OF 16)

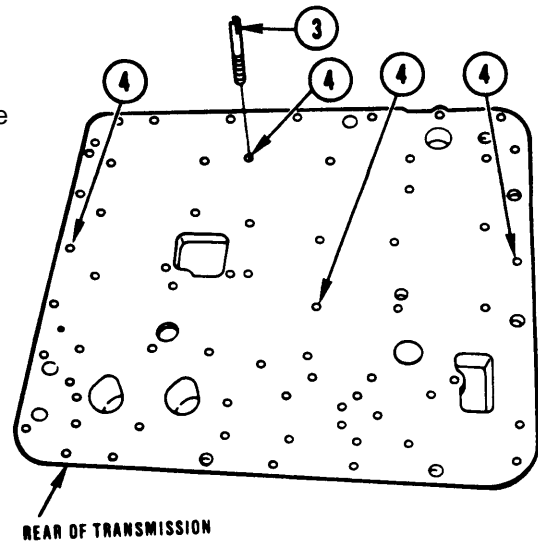
NOTE

Lifting brackets must be removed from transmission.

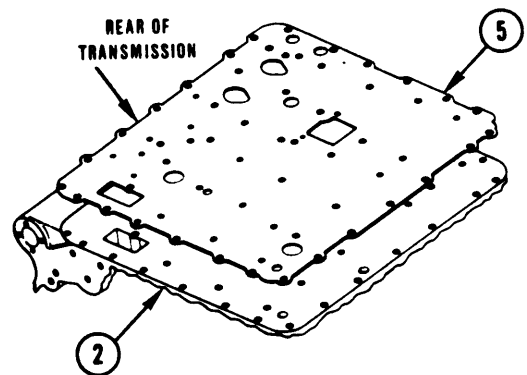
- 1 Install clean governor screen assembly (1), open end first, into bore in top of center housing (2).



- 2 Using screwdriver, install four 5/16-18 x 3 inch guide pins (3) in four bolt holes (4).



- 3 Install oil transfer plate gasket (5) on center housing (2) over four guide pins (3).

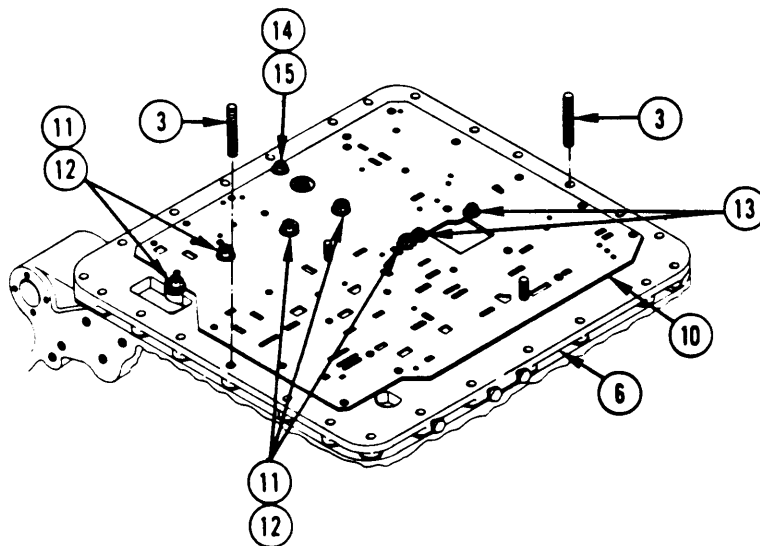
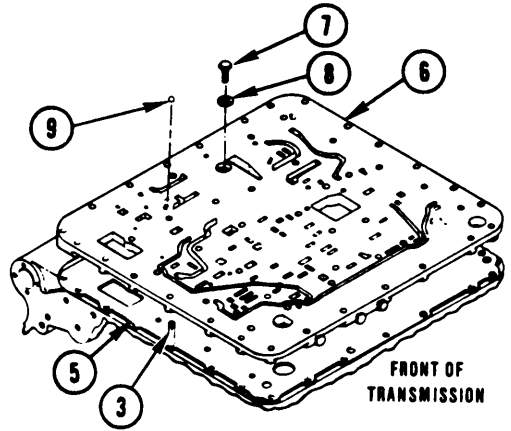


Go to Sheet 4



**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).



End of Task 1

Go to Sheet 5

TA485451

**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:**

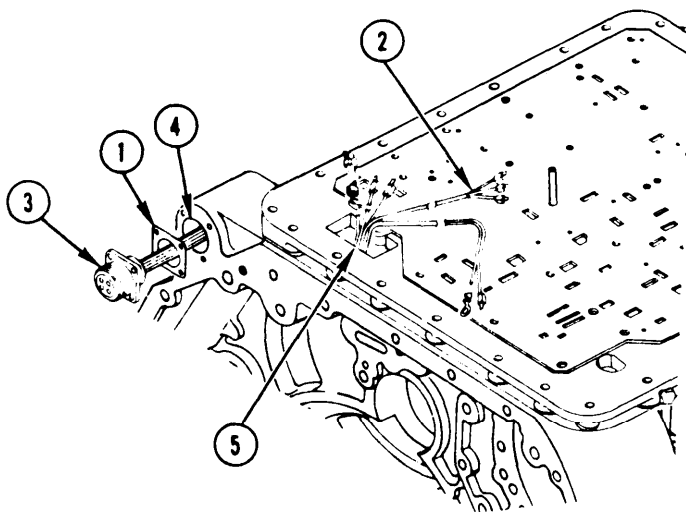
Gasket (harness connector) (73342) 6832550  
Screws, No. 4-40 x 7/16 inch (4 required) (24617) 159184

**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).

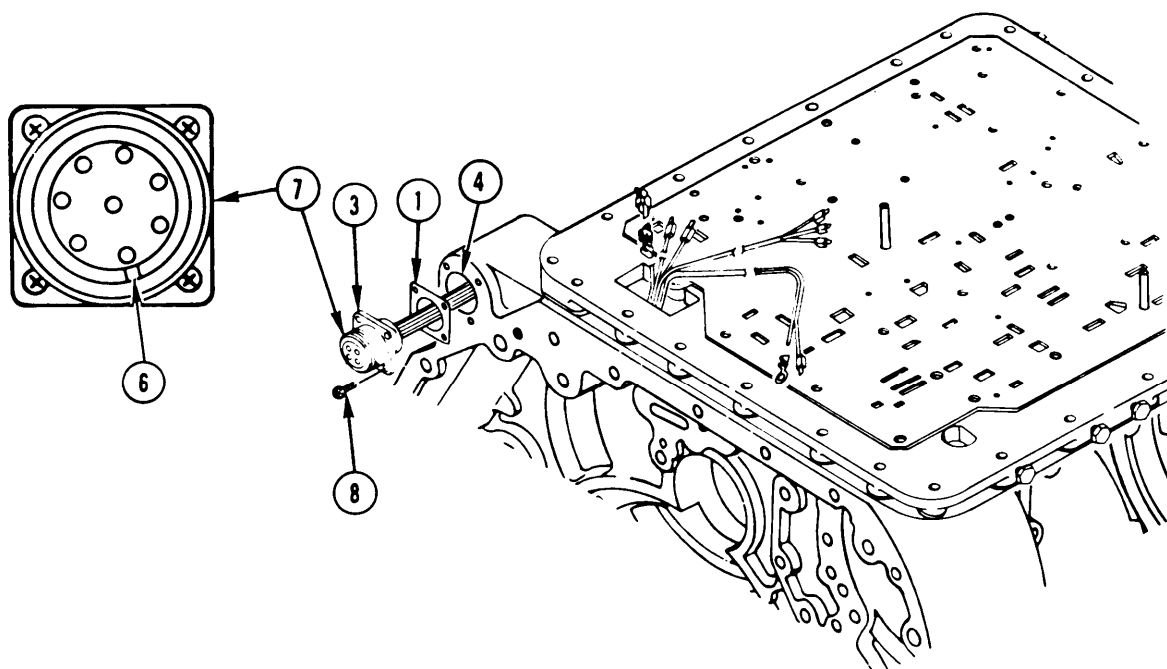


TA485452

Go to Sheet 6

**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).



TA485453

**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:**

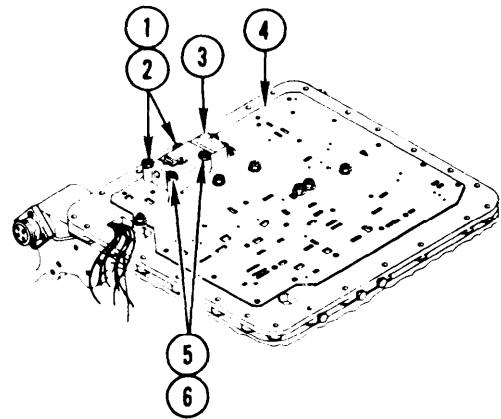
Cloth, batiste, lint-free (Item 6, Appendix C)

**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).



TA485454

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:

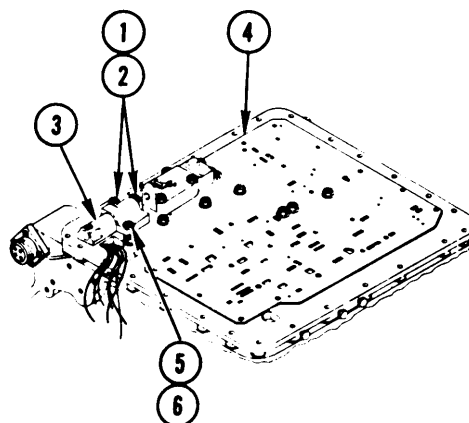
Cloth, batiste, lint-free (Item 6, Appendix C)

**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

TA485455

**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)

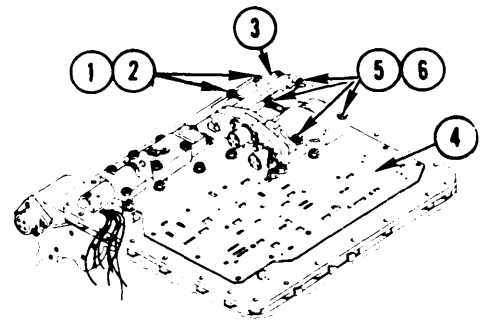
**PRELIMINARY PROCEDURE:**

- 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).



TA485456

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.

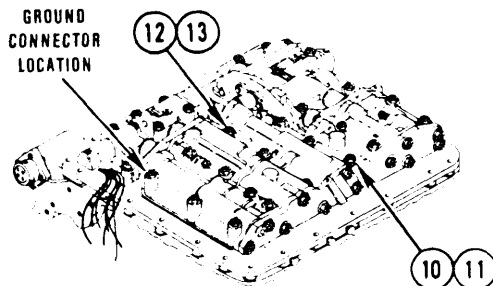
**NOTE**

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.)

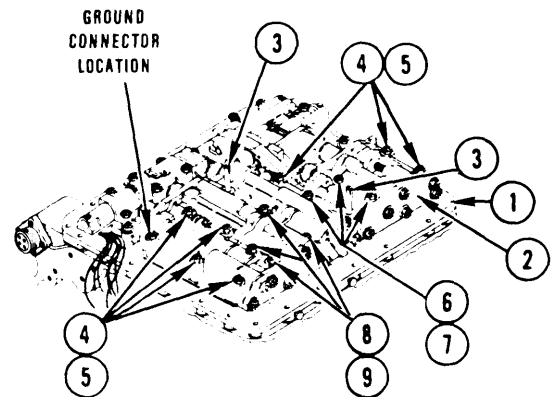
Go to Sheet 11

# 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).



TA485458



TA485457

**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**

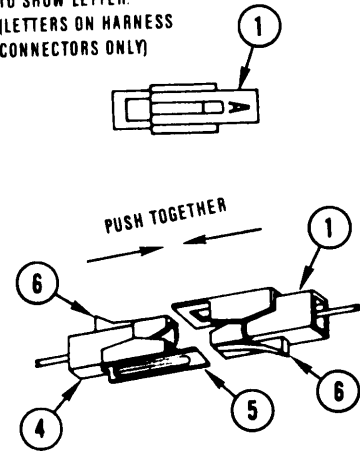
- Connectors on solenoids and connectors on wiring harness look the same except for color. Connectors are mated by pushing them together with connector loops over bayonets Connectors are locked in place when ends of loops are down behind bayonets.
- All solenoids are the same and they are interchangeable; 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

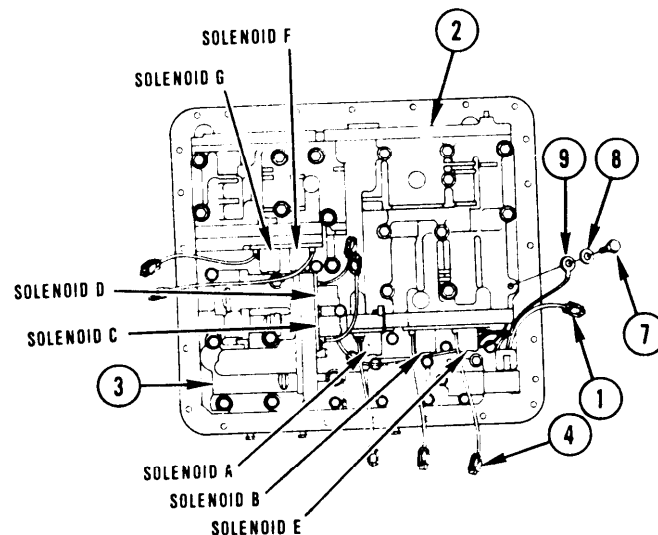
#### 4-18. INSTALL TRANSMISSION TOP COMPONENTS (SHEET 13 OF 16)

- 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 (s) 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)



TA485459



TA485460

- 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).

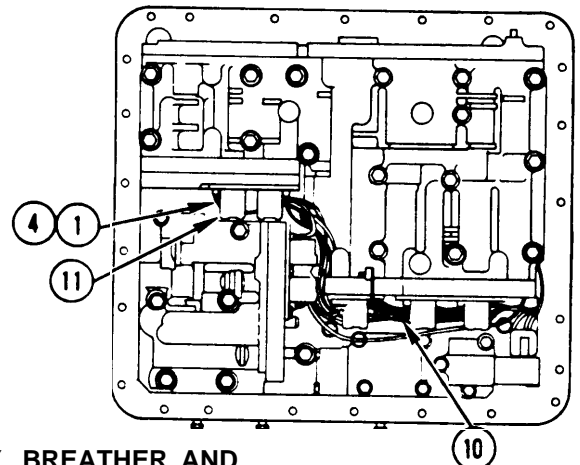
Go to Sheet 14

**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 PROCEDURES:** Install transmission top cover assembly. Refer to this paragraph, TASK 8.

End of Task 7



TM 85461

**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:**

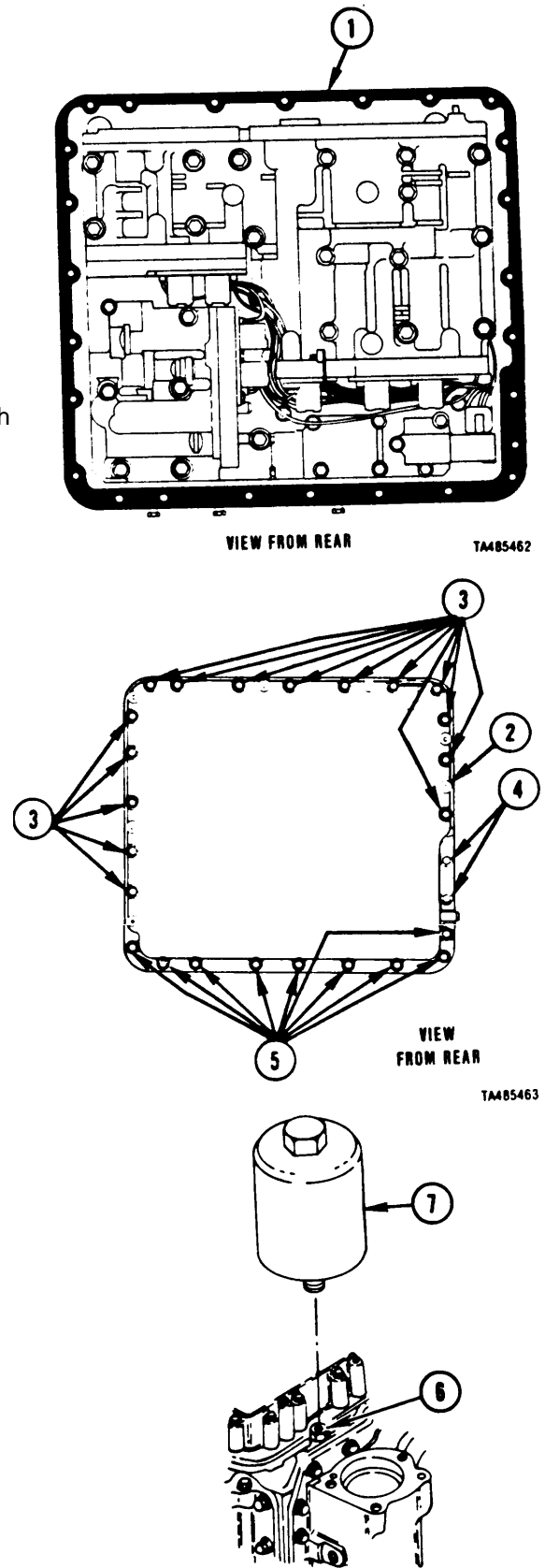
- Control valve assemblies are installed. Refer to this paragraph, TASKS 3, 4, 5 and 6.
- Wiring harness assembly is installed. Refer to this paragraph, TASK 2 and 7.

Go to Sheet 15

# **4-18 INSTALL Transmission TOP COMPONENTS (SHEET 15 OF 16)**

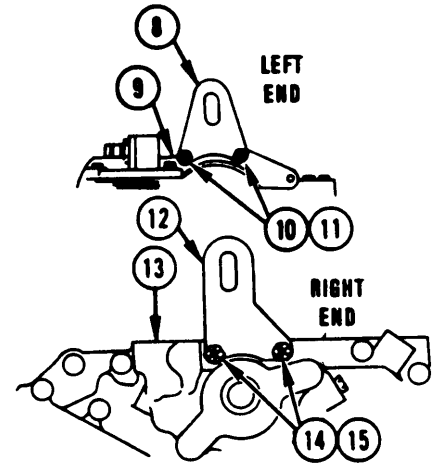
- 1 Install new transmission top cover gasket (1) on transmission
- 2 Put transmission top cover (2) on transmission.
- 3 Using 1/2 inch socket, install fifteen 5/16-18 x 3-1/2 inch flanged-head bolts (3) holding top cover (2) to transmission
- 4 Using 1/2 inch socket, install two 5/16-18 x 1-3/4 inch flanged-head bolts (4) holdin9 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



#### 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).



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 Cooler Line Elbow, Connector, and 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**

- o 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.
- o 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 COOLER LINE ELBOW, CONNECTOR, AND RH OUTPUT FLANGE**

##### **COMMON TOOLS:**

Bar, pry  
Chisel, cold  
Crowfoot, 1/2 inch square drive, 2 inches  
Hammer, hand, ball peen  
Handle, socket wrench, 1/2 inch square drive  
Handle, socket wrench, 3/4 inch square drive  
Socket, socket wrench, 1/2 inch square drive, 3/4 inch  
Socket, socket wrench, 3/4 inch square drive, 1-7/8 inches  
Wrench, combination, 1-7/8 inches  
Wrench, combination, 15/8 inches

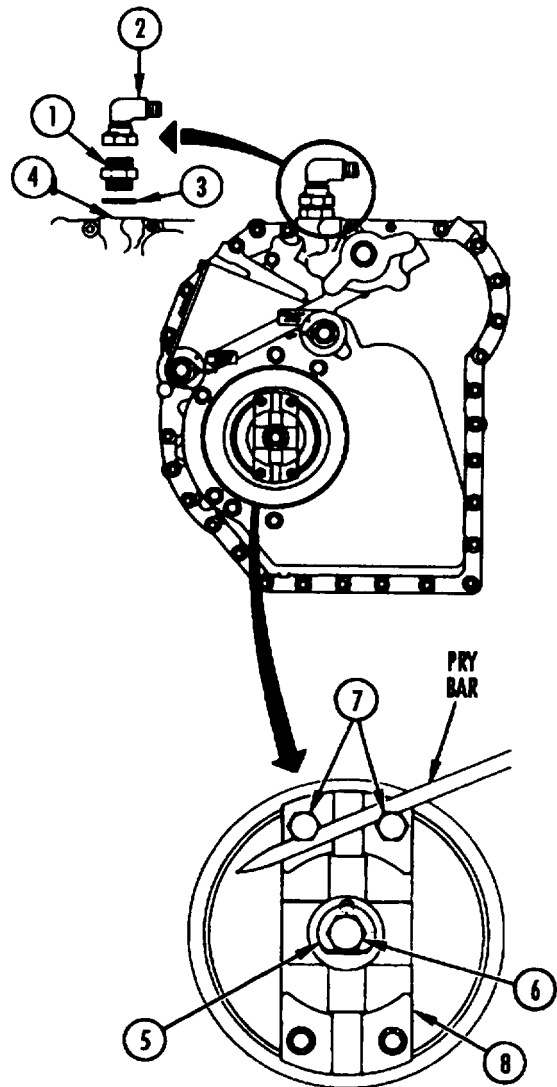
##### **SUPPLIES:**

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 17/8 inch combination wrench to hold connector (adapter) (1), use 2 inch crowfoot and handle to remove elbow (2) from connector (adapter) (1).
- 2 Using 1-7/8 inch socket and handle, remove connector (adapter) (1) and packing (3) from right end cover assembly (4). Remove o-ring (3) from elbow (adapter) (1). Throw away o-ring.
- 3 Using chisel and hammer, straighten bent tab of washer (5) Bend tab away from bolt (6).
- 4 Using 3/4 inch socket, install two 1/2-20 x 3 inch bolts (7) in tapped holes at either end of output flange (8).
- 5 Using one hand, hold pry bar between two bolts (7) to prevent flange (8) from turning.



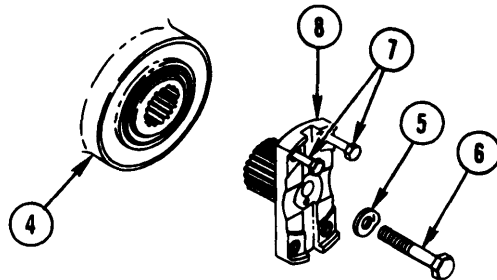
Go to Sheet 3

Para 4-19, Task 1

Change 2 4-97

**4-19. DISASSEMBLE RIGHT END COVER ASSEMBLY  
(SHEET 3 OF 16)**

- 6 Using 3/4 inch socket, with other hand, remove bolt (6) and washer (5) from output flange (8).
- 7 Remove output flange (8) from right end cover assembly (4).
- 8 Using 3/4 inch socket, remove two bolts (7) from output flange (8).



**FOLLOW-ON PROCEDURE:** Install output flange, cooler line elbow and connector. 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



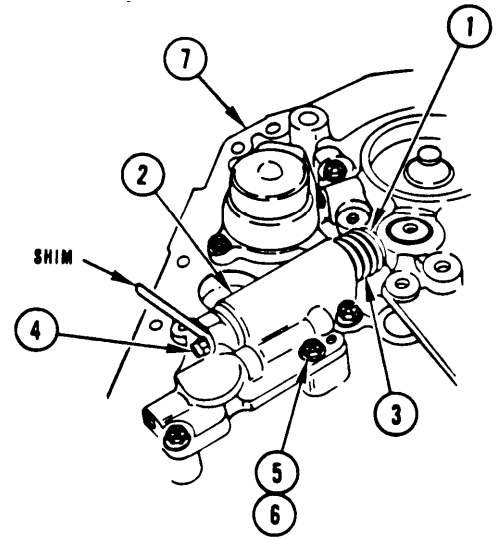
#### 4-19. DISASSEMBLE RIGHT END COVER ASSEMBLY (SHEET 4 OF 16)

- 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.

End of Task 2



TA485468

#### TASK 3. REMOVE BRAKE COOLANT VALVE COMPONENTS

##### COMMON TOOLS:

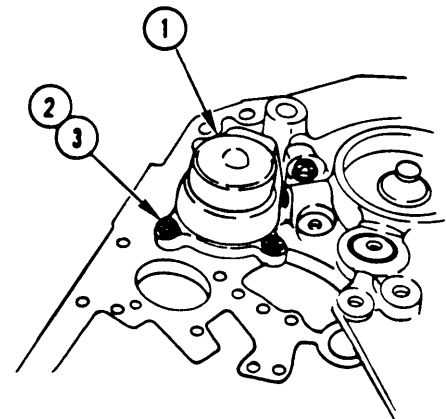
Extension, socket wrench, 1/2 inch square drive, 2 inch  
Handle, socket wrench 1/2 inch square drive  
Socket, socket wrench, 1/2 inch square drive, 1/2 inch

##### **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.

Go to Sheet 5



TA485469

**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:**

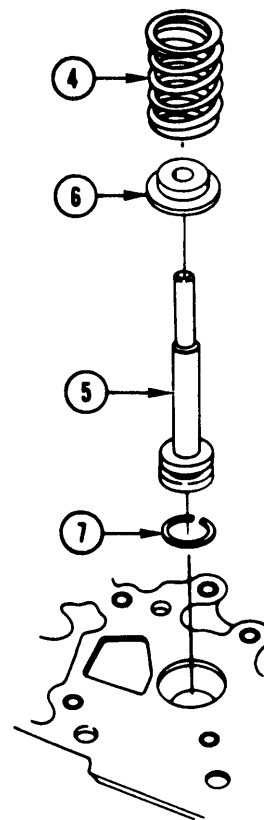
Petrolatum (Item 149 Appendix C).  
Rig, wiping (Item 15, Appendix C)  
Tape, masking (Item 20, Appendix C)  
Wooden Blocks, 2 x 4 x 18 inches (2 required) (Item 2 Appendix C)

**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 retainin9 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 indicators



TA485470

Go to Sheet 6

#### 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).

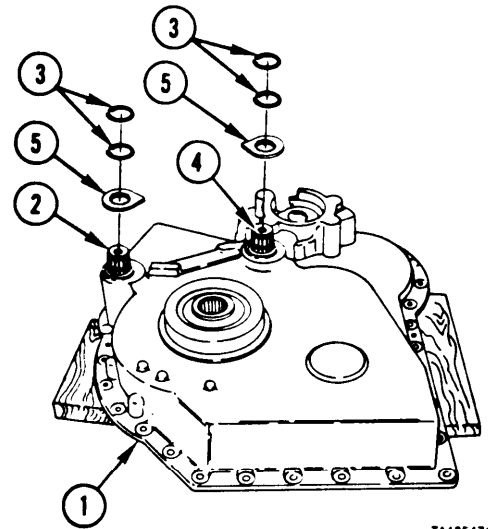
REPAIR: Refer to paragraph 4-20 for repair of left brake apply shaft assembly.

- 10 Turn end cover (1) over, inside up, on wood blocks.

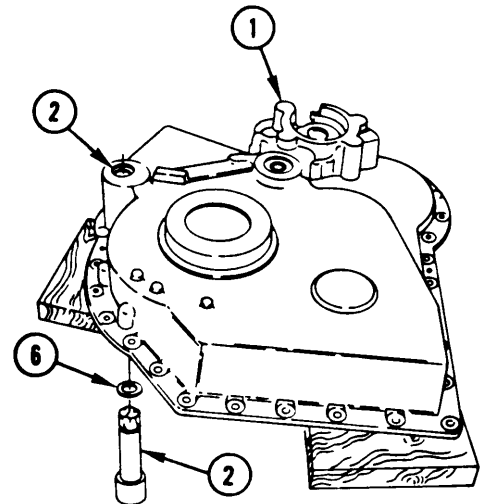
FOLLOW-ON PROCEDURE: Install brake apply indicators and left brake apply shaft. Refer to paragraph 4-21.

End of Task 4

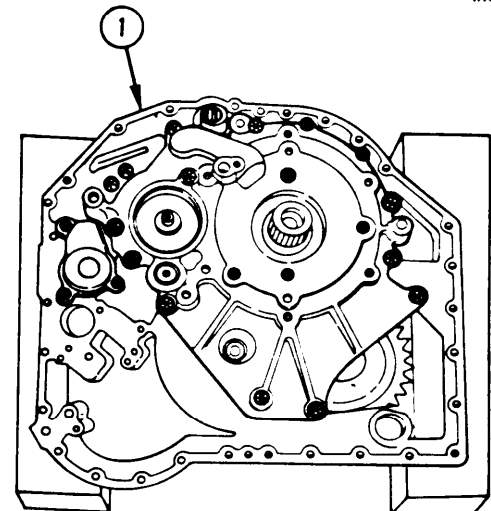
Go to Sheet 7



TA485471



TA485472



TA485473

**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

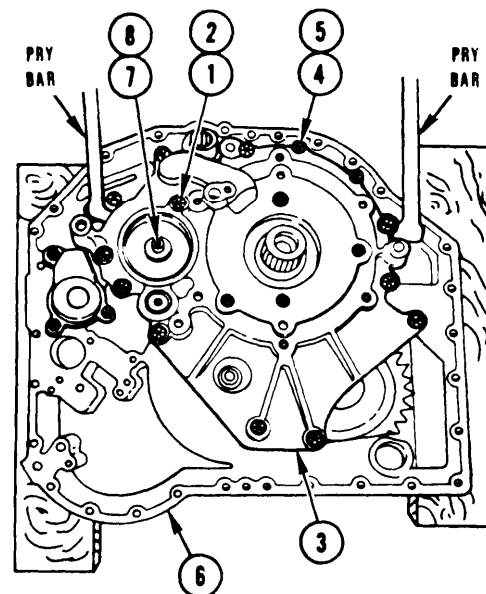
**SUPPLIES:**

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

TA485474

#### 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).

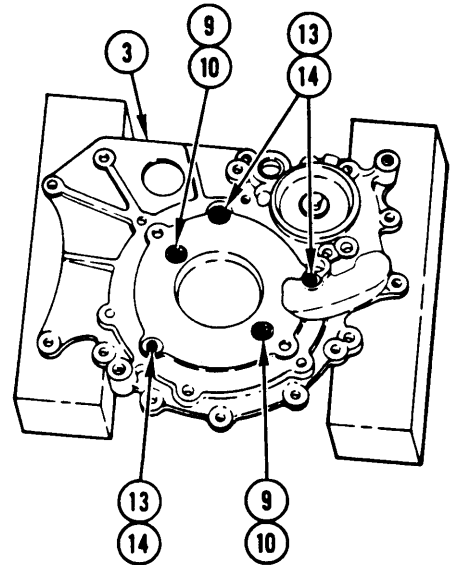
#### NOTE

Stationary cam is not to be removed unless:

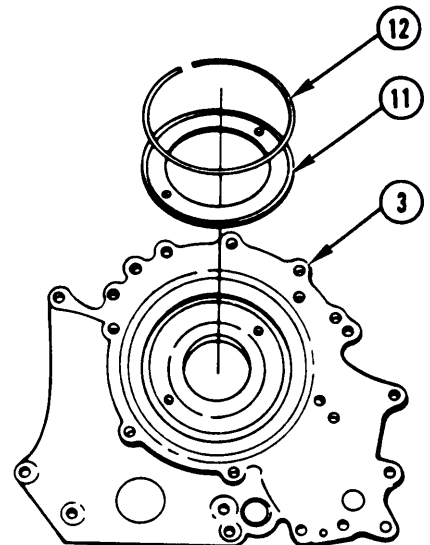
- Cam or support is to be replaced.
- Support is to be repaired.

If stationary cam is to be removed, go to Step 13.

- 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).



TM485475



TM485476

Go to Sheet 9

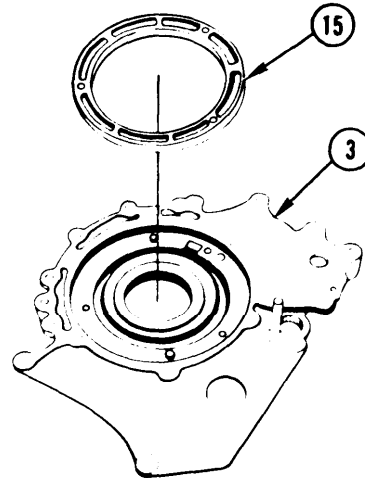
**4-19. DISASSEMBLE RIGHT END COVER ASSEMBLY  
(SHEET 9 OF 16)**

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.



TA485477

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 (Rem 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)

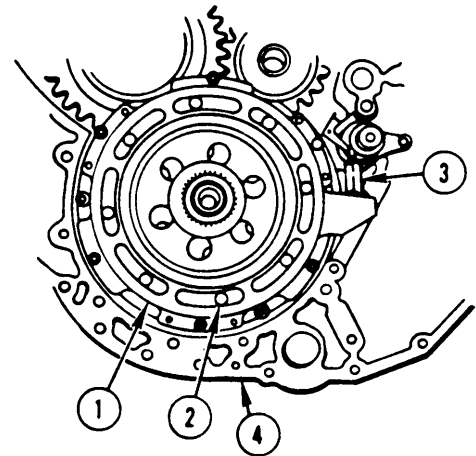
- 1 Remove brake apply cam (1), eight balls (2) and brake adjusting linkage (3) from right end cover (4). Place balls (2) in a container.
- 2 Using screwdriver, remove seals (5, 6) from brake cam (1).
- 3 Using screwdriver, remove preformed packings (7, 8) from face of brake cam (1).
- 4 Using 7/16 inch 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).

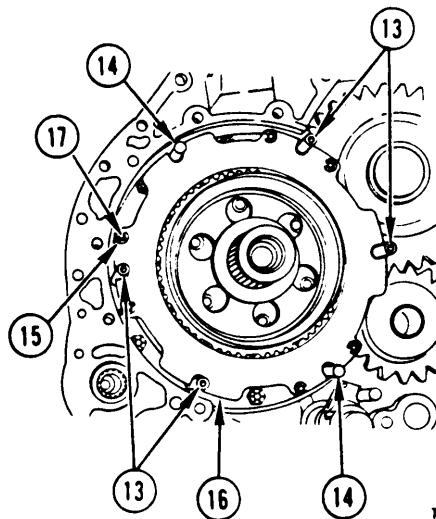
#### NOTE

Four brake reaction pins (13) can be removed at this time. Pins (14) cannot be removed.

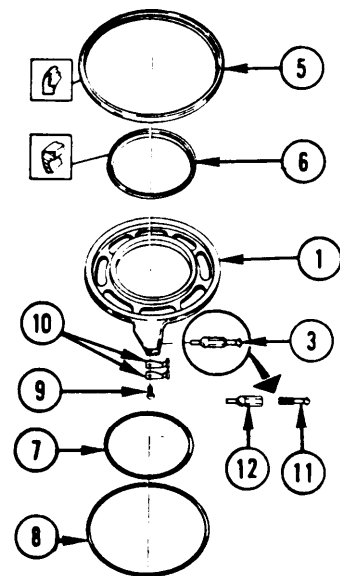
- 7 Remove four brake reaction pins (13).
- 8 Using finger of one hand, trap retaining ring (15) against clutch reaction plate (16).
- 9 Using screwdriver in other hand, pry six retaining rings (15) away from spring guide pins (17).



TA485478



TA485480



TA485479

Go to Sheet 11

# 4-19. DISASSEMBLE RIGHT END COVER ASSEMBLY (SHEET 11 OF 16)

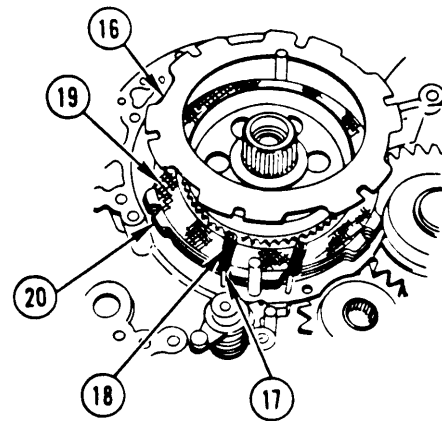
10 Remove clutch reaction plate (16) from spring guide pins (17).

11 Remove six springs (16) 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.



TA485481

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).

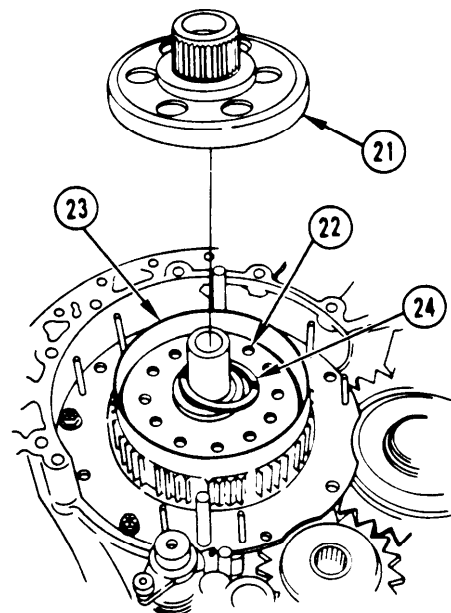
## **NOTE**

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.



TA485482

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 snapping (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).

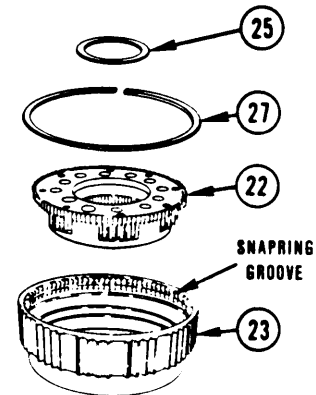
23 Remove six spring guide pins (16) from backing plate (29) or from right end cover (4).

##### FOLLOW-ON PROCEDURE:

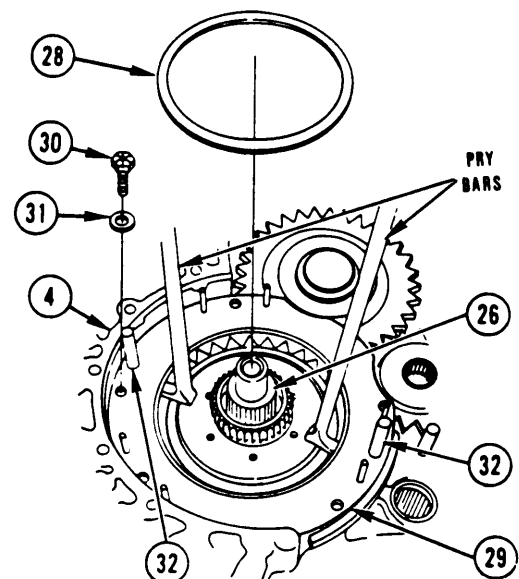
- Install right brake assembly. Refer to paragraph 4-21.
- Install brake apply cam and brake adjust linkage. Refer to paragraph 4-21.

End of Task 6

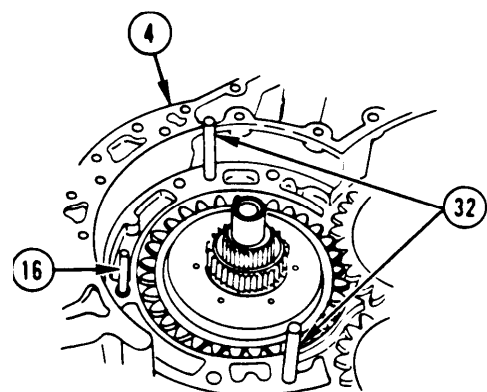
Go to Sheet 13



TA485483



TA485484



TA485485

**4-19. DISASSEMBLE RIGHT END COVER ASSEMBLY  
(SHEET 13 OF 16)**

**TASK 7, REMOVE STEER GEARS**

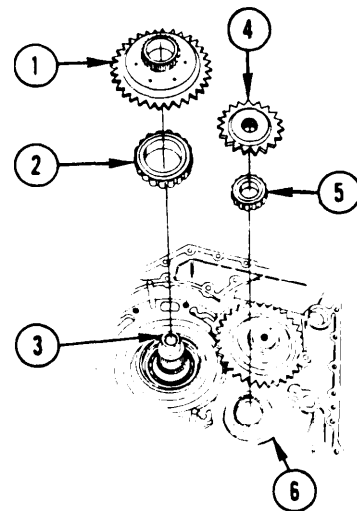
**COMMON TOOLS:**

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.



TA485486

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

#### 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

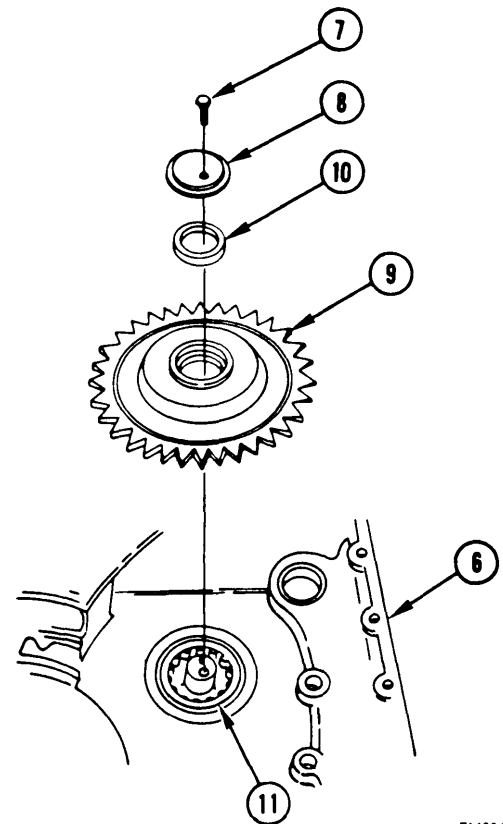
##### SUPPLIES:

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



TM485487

# 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).

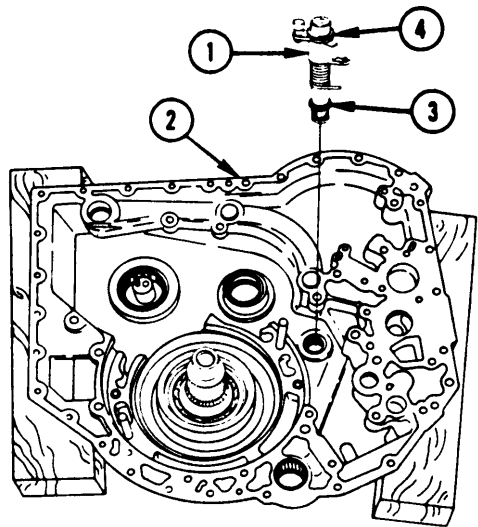
- 2 Remove washer (3) from shaft (1) or end cover (2).

- 3 Remove thrust washer (4) from shaft (1), if present.

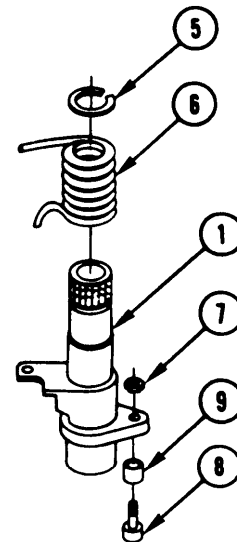
## Remove Right Brake Apply Cam Shaft Components

- 4 Using retaining ring plier, 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).

**FOLLOW-ON PROCEDURE:** Install right brake apply cam shaft. Refer to paragraph 4-21.



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TA485489

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).

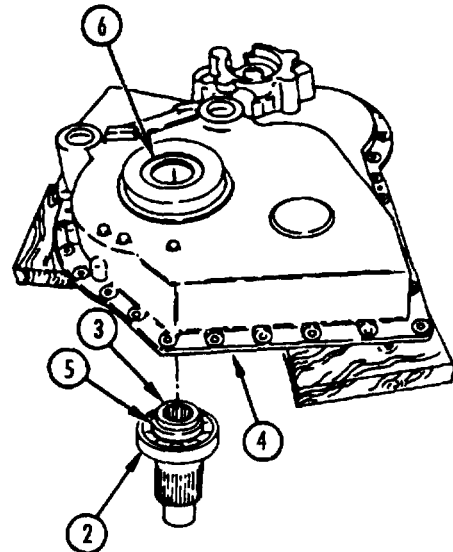
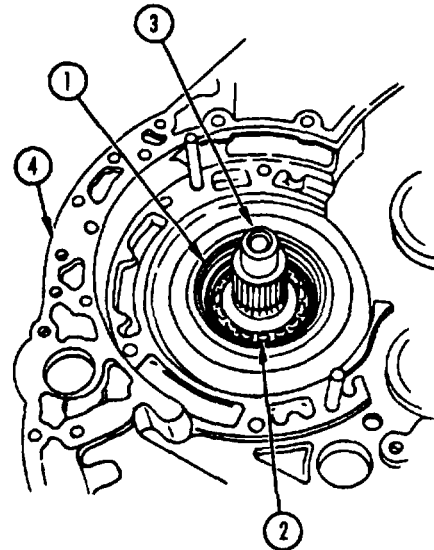
## **NOTE**

When bearing is removed from output shaft, sleeve is forced off ahead of bearing.

- 5 Inspect bearing (2) and sleeve (5) for serviceability. If bearing or sleeve 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**



## 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 (X200-4 Only)

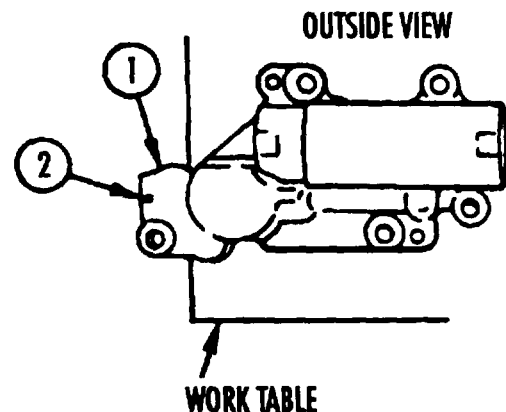
1. Move valve body (1) to edge of table so that pin (2) is over edge of table.

#### 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).

Go to Sheet 2



#### 4-20. REPAIR RIGHT END COVER COMPONENTS TM 9-2520-272-34&P (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).

Assemble Brake Apply Regulator Valve Body (X200-4 Only)

- 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.

#### 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.

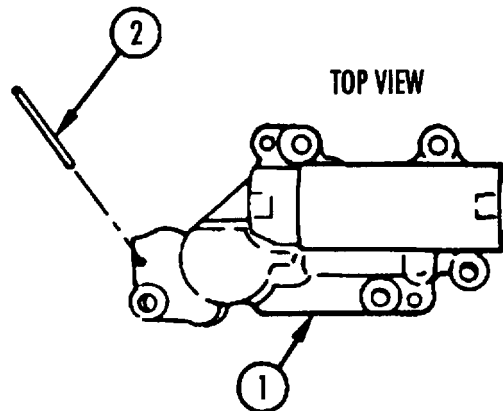
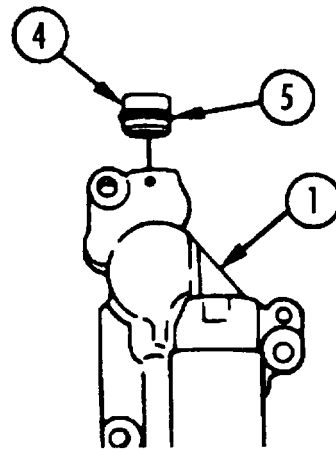
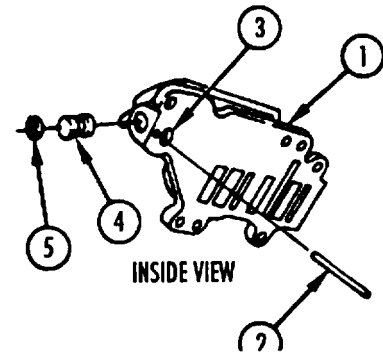
##### COMMON TOOLS:

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)

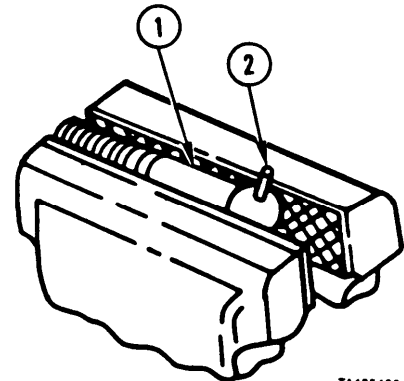
**PRELIMINARY PROCEDURE:** Inner brake adjusting link is removed. Refer to paragraph 4-19.

Remove Pin

- 1 Place inner brake adjusting link (1) in vise.
- 2 Using hammer and punch, drive pin (2) from link (1).

Install Pin

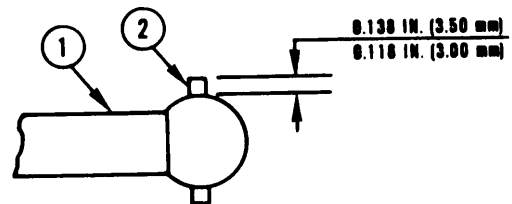
- 3 Using hammer and punch install new pin (2) to a height of 0.118-0.138 inch (3.00-3.50 mm) above surface of link (1).
- 4 Remove link (1) from vise.



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**FOLLOW-ON PROCEDURE:** Install inner brake adjusting link. Refer to paragraph 4-21.

End of Task 2



## TASK. 3. REPAIR LEFT BRAKE APPLY SHAFT ASSEMBLY

TA485497

### COMMON TOOLS:

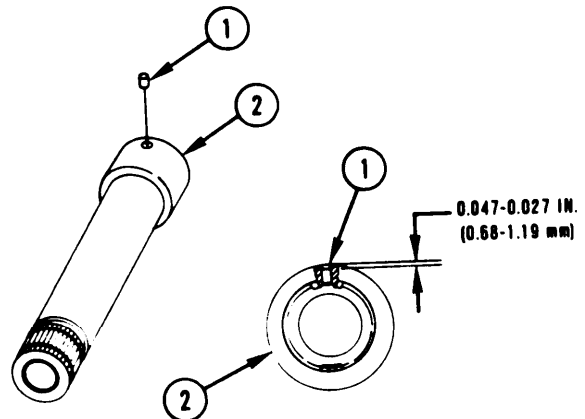
Gage, vernier caliper  
Hammer, hand, ball peen  
Punch drive pin, 1/16 inch point

### 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.



TA485498

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  
Gloves, leather  
Gun, heat (2 required)  
Hammer, hand, ball peen  
Handle, socket wrench, 3/8 inch square drive  
Press, arbor, hand operated  
Pry Bar, roller head (2 required)  
Puller, mechanical, slide hammer type  
Rotary Tool Kit, electric (grinder)  
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**

- o Right brake support assembly is mounted on two wooden blocks, outside up.
- o 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**

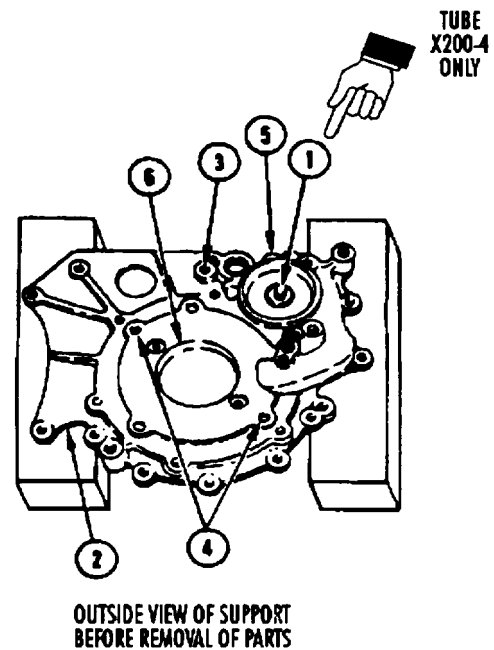
- 1 If removal of tube coupling (1) is necessary, tap the center hole with 3/8-16 tap to a depth of about 6-8 threads.
- 2 Install slide hammer into coupling (1) and knock upward to remove coupling (1).
- 3 Thoroughly clean out all metal shavings.
- 4 Using arbor press, remove long brake reaction pin (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**

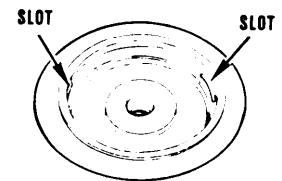
Use care not to cut into support (2) when using grinder to cut slots in bearing race.



**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).

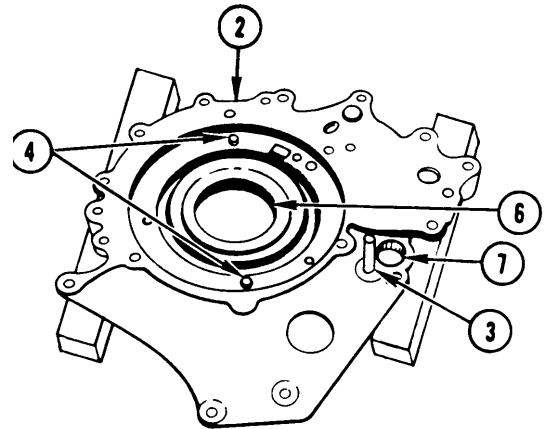


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### CAUTION

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



INSIDE VIEW OF SUPPORT  
BEFORE REMOVAL OF PARTS

TA485501

### CAUTION

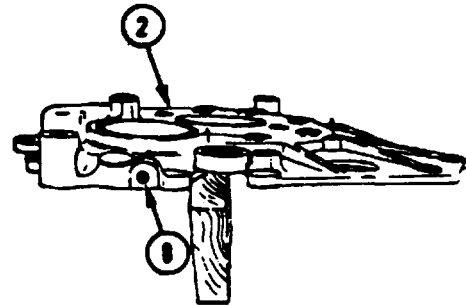
Use care not to damage support when using hammer and chisel to remove race.

- 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

#### 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.



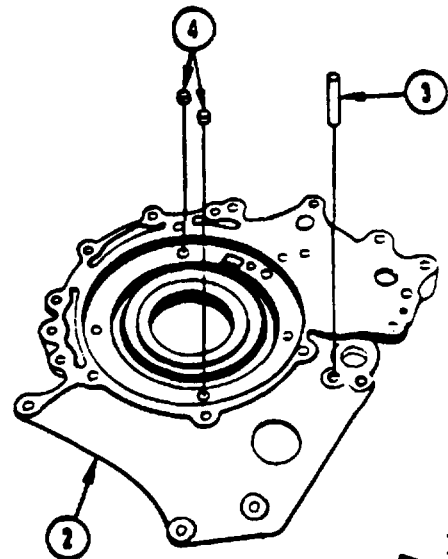
#### Assemble Right Brake Support Assembly

- 17 Apply thread locking compound to threads of pipe plug (8).

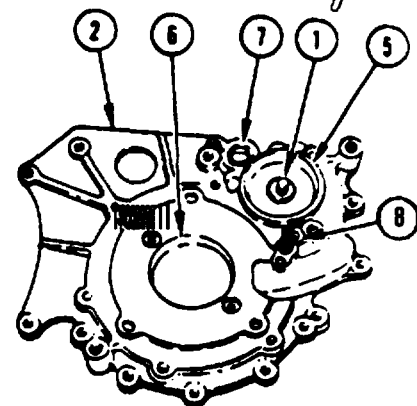
#### NOTE

**On X200-4A, if tube (8) is damaged, replace support assembly.**

- 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 Nm).
- 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 (1.521-1.78 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).



**X200-4  
ONLY**



**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  
 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  
 Rotary Tool Kit, electric (grinder)  
 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  
 Hammer, Machinists, 1lb  
 Chisel

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

Sleeve, (73342) 23018036

##### 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.

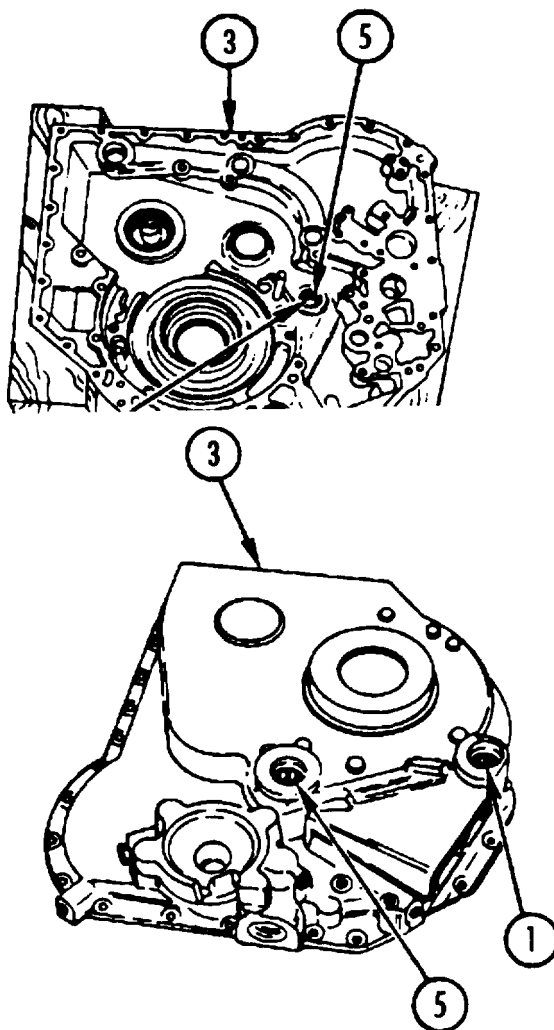
##### NOTE

Right end cover is mounted on two wooden blocks, inside up.

##### 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



#### 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.

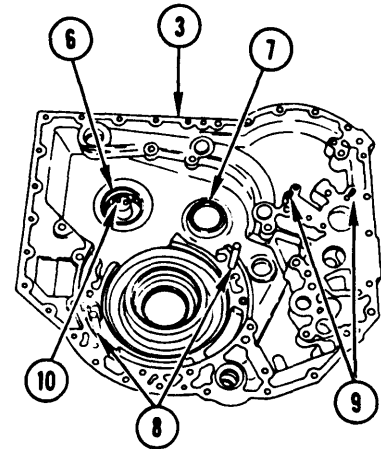
##### **NOTE**

Steer idler gear bearing (6) consists of cage and outer race. Inner race remained on gear.

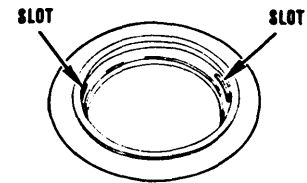
- 7 Using two heat guns, heat end cover (3) around bearing (6). Heat for one hour to approximately 300°F (149°C).  
8 Using bearing puller, remove bearing (6).

##### **CAUTION**

Use care not to cut into end cover when using grinder to cut slots into bearing race.



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- 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.

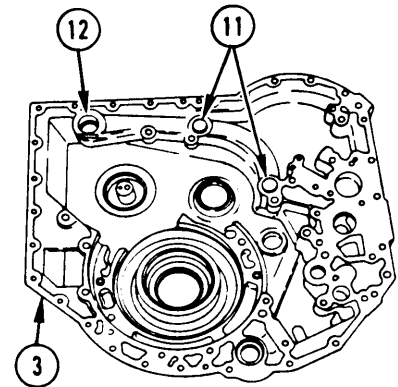
Go to Sheet 11

#### 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

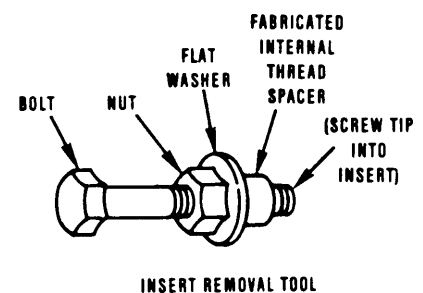


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- 17 Using 1/4 inch drill, put hole through center of plugs (11).
- 18 Using 3/4 inch drill, widen hole in center of plugs (11).
- 19 Using slide hammer, remove plugs (11) from end cover 3.
- 20 Tilt end cover (3) on edge with plugs (11) holes down.

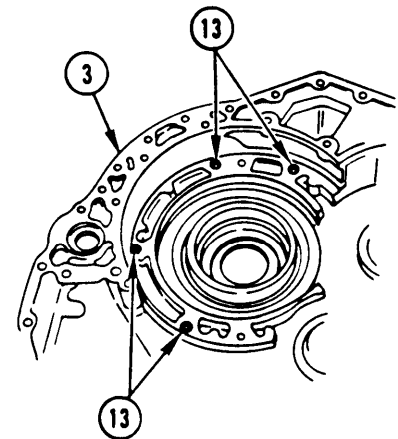
#### WARNING

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.



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- 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).



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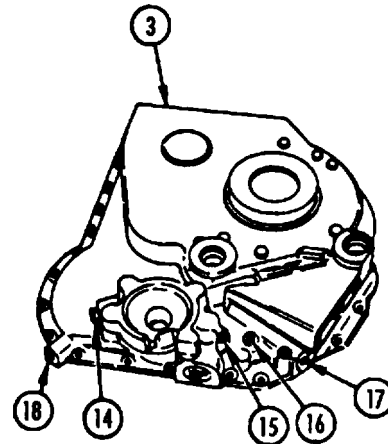
- 24 Screw tip of bolt into one insert (13) in end cover (3).
- 25 Using one 9/16 inch combination wrench lock nut against washer and hold nut so that insert (13) will turn with bolt.
- 26 using other 9/16 inch combination wrench, turn bolt to the left (counterclockwise) and remove insert (13).
- 27 Remove three remaining inserts (13).

Go to Sheet 12



#### 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.



#### **CAUTION**

When using grinder, use care as to not damage housing.

#### **NOTE**

Remove sleeve (19) only if necessary.

- 34 Using a grinder, cut two slots 180 degrees apart in sleeve (19).
- 35 Using a chisel and hammer, break sleeve (19) at slots. Throw away sleeve (19).

#### Assemble Right End Cover Assembly

- 36 Apply thread locking sealant to pipe plugs (14, 15, 16, 17, 18).
- 37 Using 5/16 inch hex plug socket attachment, install 3/8 inch pipe plug (18) in end cover (3).
- 38 Using torque wrench, tighten plug (18) to 12-16 lb ft (16-22 Nm).
- 39 Using 1/4 inch hex plug socket attachment, install 1/4 inch pipe plug (17).
- 40 Using torque wrench, tighten plug (17) to 96-120 lb in. (11-13 Nm).
- 41 Using 3/16 inch hex plug socket attachment, install pipe plugs (15, 16) in end cover (3).
- 42 Using torque wrench, tighten plugs (15, 16) to 50-60 lb in. (6-7 Nm).
- 43 Using 11/16 inch socket, install 3/8 inch pipe plugs (14) in end cover (3).
- 44 Using torque wrench, tighten plug (14) to 12-16 lb ft (16-22 Nm).

Go to Sheet 13

- 45 Turn end cover (3) over, inside up.
- 46 Using 3/8-16 x 3 inch bolt and 3/8-16 nut, assemble tool to install four inserts (13) in end cover (3).

- 47 Screw one insert (13) onto bolt until insert is against nut.

- 48 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.

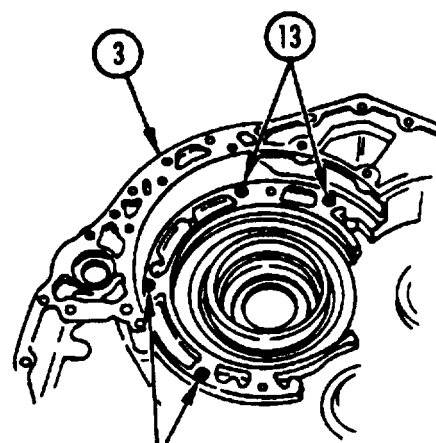
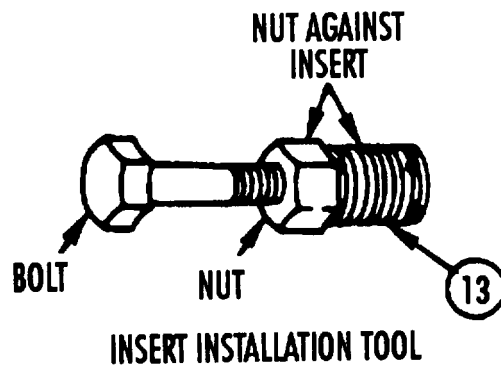
- 49 Using 9/16 inch combination wrench, install three remaining inserts (13) in end cover (3).

- 50 Using arbor press, install aluminum plugs (11) flush to 0.010 inch (0.254 mm) below surface of end cover (3).

- 51 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.

- 52 Using arbor press, install two dowel pins (9) in end cover (3). Press to height of 0.340 inch (8.636 mm) above surface.

- 53 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.

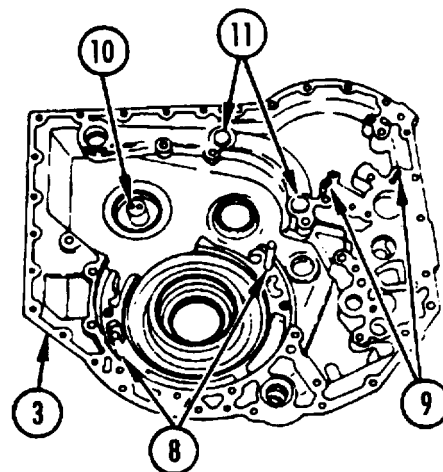


### **WARNING**

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

- 54 Using dry ice, freeze bearing (6) and race (7).

Go to Sheet 14



#### 4-20. REPAIR RIGHT END COVER COMPONENTS (SHEET 14 OF 14)

- 55 Apply petrolatum and lubricating oil to bearing (6) housing in end cover (3).
- 56 Using arbor press, install bearing (6) in end cover (3). Press bearing to shoulder.
- 57 Apply petrolatum and lubricating oil to race (7) housing in end cover (3).
- 58 Using arbor press, install race (7) in end cover (3). Press race until seated in end cover.
- 59 Turn end cover (3) over, outside up.
- 60 Apply petrolatum and lubricating oil to outer diameter of two bearings (1, 5).

#### NOTE

Press bearings with driver against numbered side of bearings.

- 61 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.

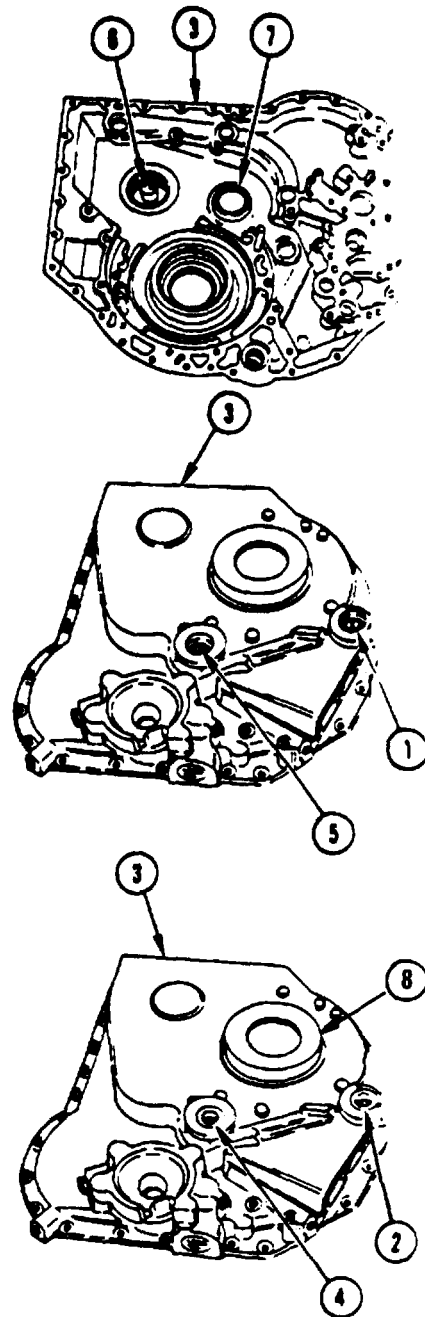
#### NOTE

- 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.

- 62 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.

#### **WARNING**

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



- 63 Using two heat guns, heat new sleeve (8) to 300 degrees. Heat for 15 minutes.
- 64 Using an arbor press, press new sleeve (8) on housing (3). Install chamfered I.D. of sleeve to shoulder of housing.

**FOLLOW-ON PROCEDURE:** Assemble right end cover. Refer to paragraph 4-21.

End of Task 5

Para. 4-20, Task 5

Change 2 4-125

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:**

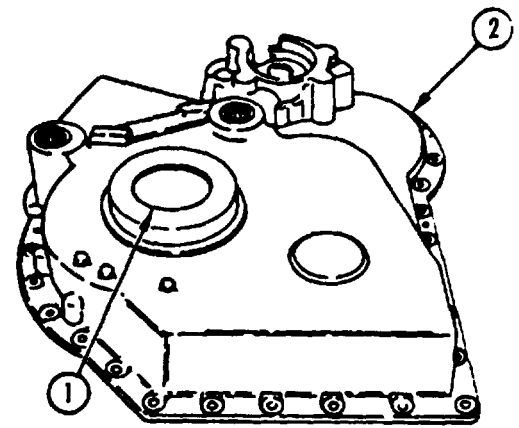
Oil, lubricating (Item 10, Appendix C)  
Petrolatum (Item 14, Appendix C)  
Wooden Blocks, 2 x 4 inches x 16 inches long (2 required) (Item 2, Appendix C)  
Rag, wiping (Item 15, Appendix C)  
Solvent, dry cleaning (Item 8, Appendix C)  
Carbon Dioxide, Technical (Dry Ice) (Item 4, Appendix C)

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.



##### Install Output Shaft Seal

- 1 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.

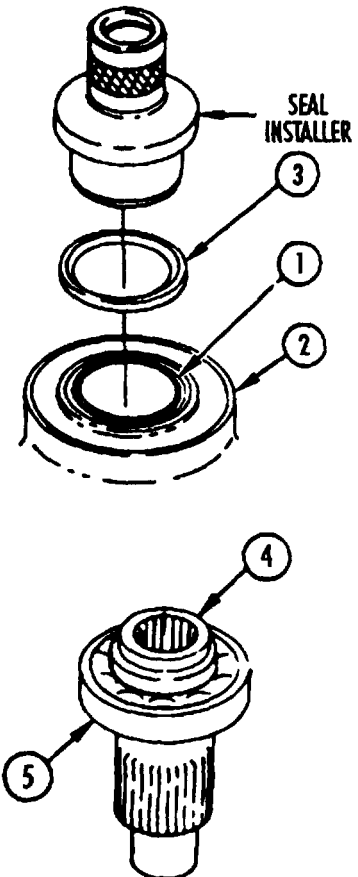
##### **NOTE**

- \* Seal installed numbered side out.
- \* No lubricant to be added to outer edge of seal.

- 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 RH Output Shaft

##### **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.



- 3 Apply petrolatum and lubricating oil to bearing journal of RH output shaft (4).
- 4 Using arbor press, install bearing (5), numbered end out, on output shaft (4). Press bearing to shoulder.

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**

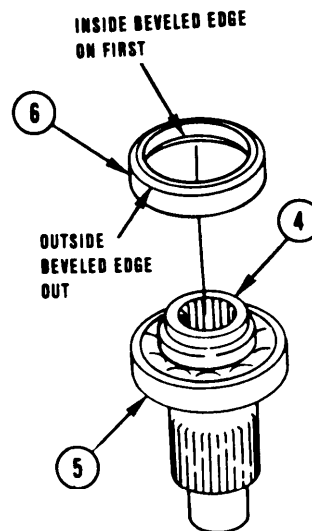
When output shaft and bearing are seated, retaining ring groove will be accessible in sleeve at outer edge of bearing.

- 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).

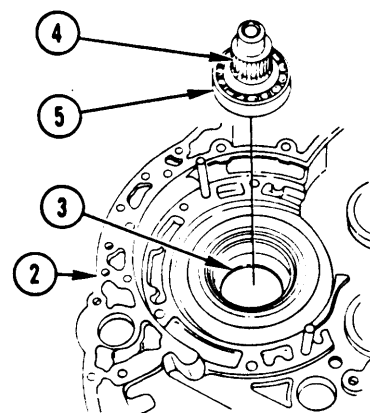
**FOLLOW-ON PROCEDURE:** Install steer gears. Refer to this paragraph TASK 2.

End of Task 1

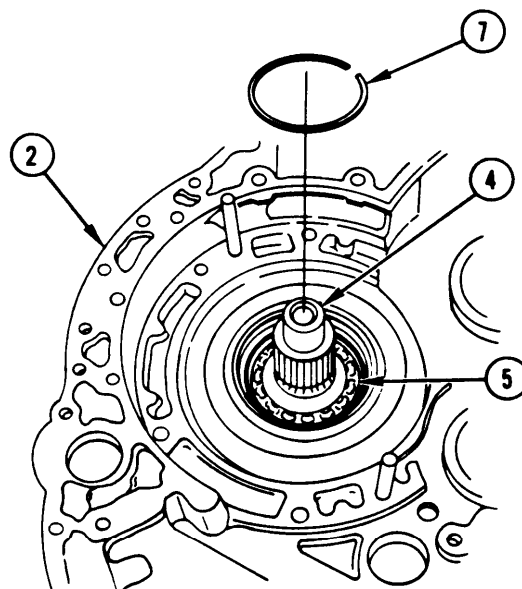
Go to Sheet 4



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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

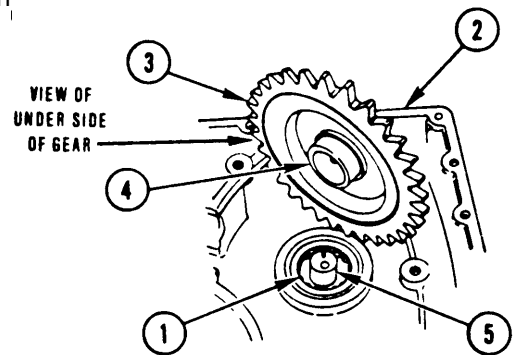
**SUPPLIES:**

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.

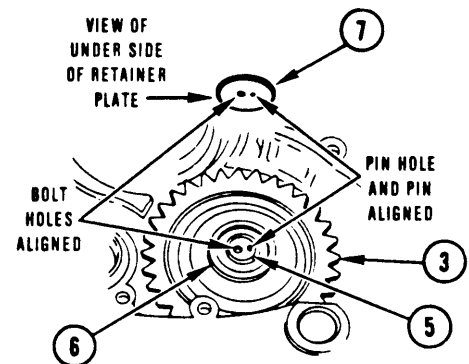


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- 2 Install gear (3) with journal (4) around boss (5) and in bearing (1).
- 3 Install bronze thrust washer (6) in top center recess in gear (3).

**NOTE**

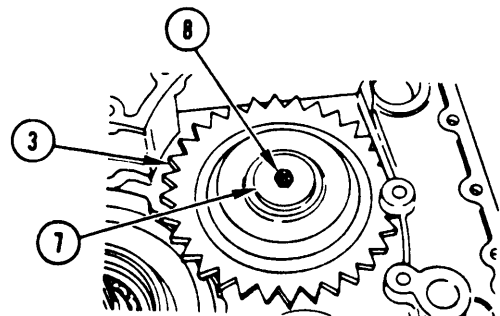
Bolt hole and pin hole in steer idler retainer plate are off center. Rotate plate to seat pin in pin hole before installing bolt.



TA485526

- 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).

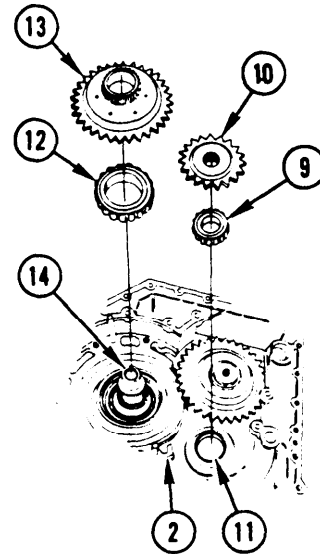
Go to Sheet 5



TA485527

**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



TA485528

**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.

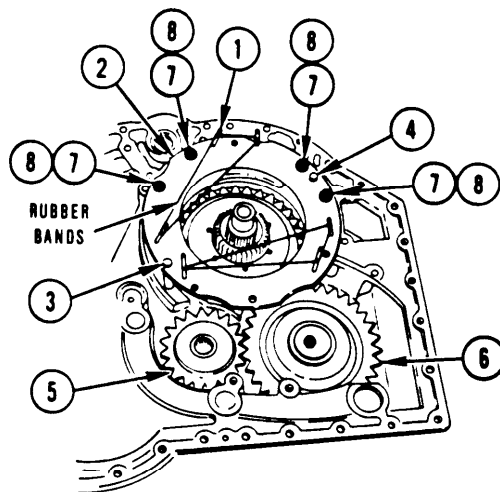
- 1 Install six spring retaining pins (1) in brake clutch backing plate (a).
- 2 Using rubber bands, fix pins (1) in position on plate (2).

##### NOTE

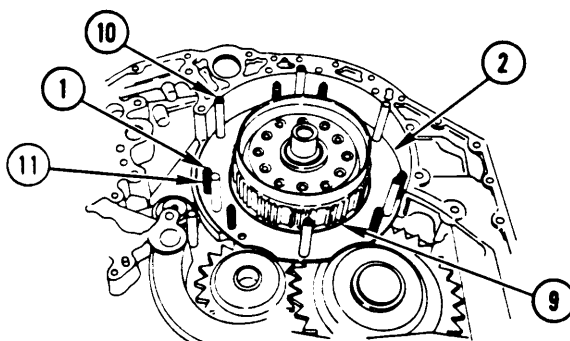
Plate (2) may be wiggled as necessary to move it down on pins (3, 4). Plate may be tapped with plastic faced hammer near pins to seat plate

- 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



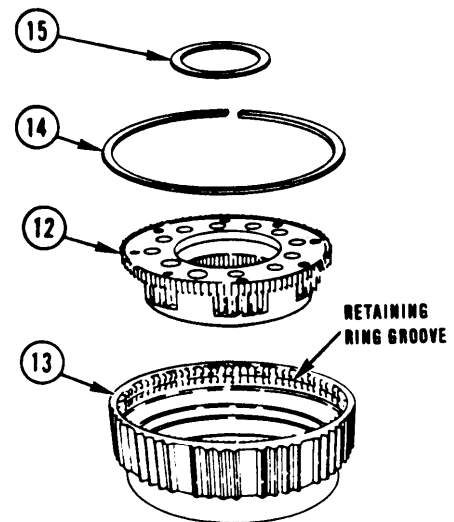
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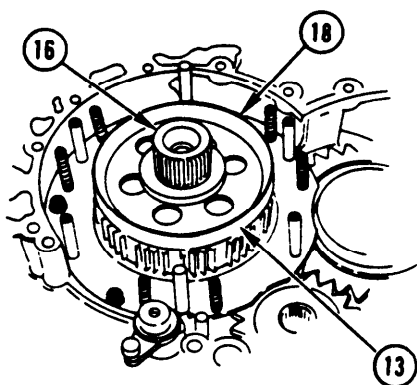
TA485530

**4-21. ASSEMBLE RIGHT END COVER ASSEMBLY  
(SHEET 7 OF 22)**

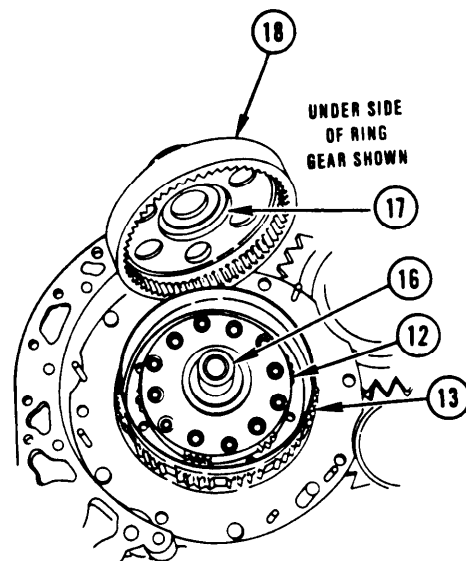
- 9 Install output carrier assembly (12) in brake clutch drum (13).
- 10 Using screwdriver, install retaining ring (14) in inside groove of drum (13) to hold carrier (12) in drum.
- 11 Apply petrolatum to thrust washer (15).
- 12 Install thrust washer (15) in center of carrier assembly (12).
- 13 Install 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).



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Go to Sheet 8

#### 4-21. ASSEMBLE RIGHT END COVER ASSEMBLY (SHEET 8 OF 22)

##### CAUTION

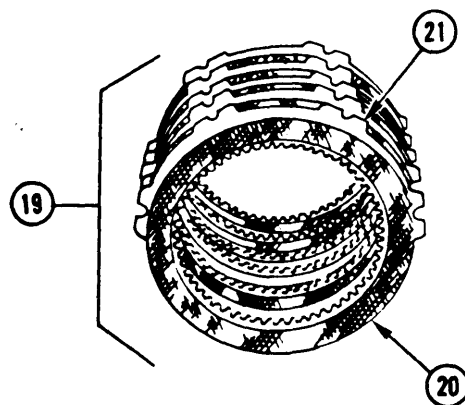
Unless the brake clutch pack is new, keep all clutch and reaction disks in the same order and facing the same way. When one disk is to be replaced, replace the entire clutch pack. Each used disk has established its own contour and wear pattern. The clutch assembly may not operate effectively because 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.

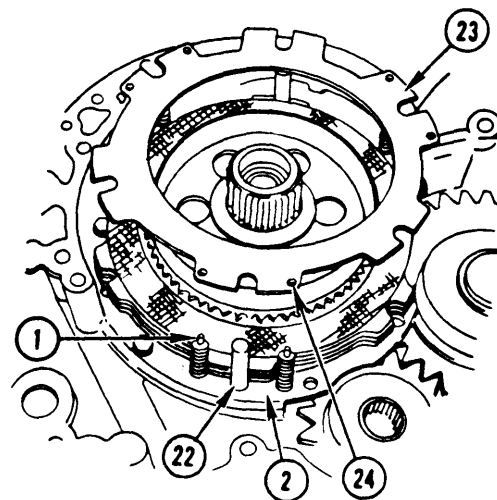
##### NOTE

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.



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TA485535

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 TOOL:**

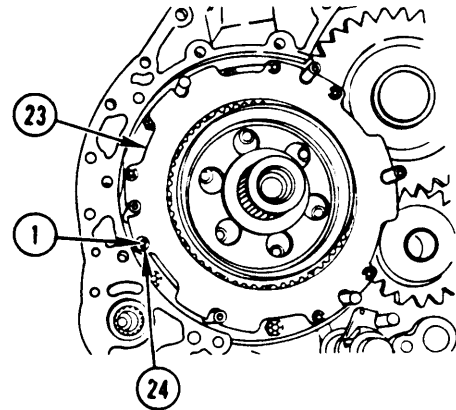
Extension, socket wrench, 1/2 inch square drive, 6 inch  
 Hammer, hand, plastic faced  
 Handle, socket wrench, 1/2 inch square drive  
 Pliers, retaining ring, external  
 Screwdriver, flat tip  
 Socket, socket wrench, 1/2 inch square drive, 1/2 inch  
 Socket, socket wrench 1/2 inch square drive, 5/8 inch  
 Socket, socket wrench, 1/2 inch square drive, 7/16 inch  
 Vise, machinist's  
 Wrench torque, 0-175 ft-lb

**SUPPLIES:**

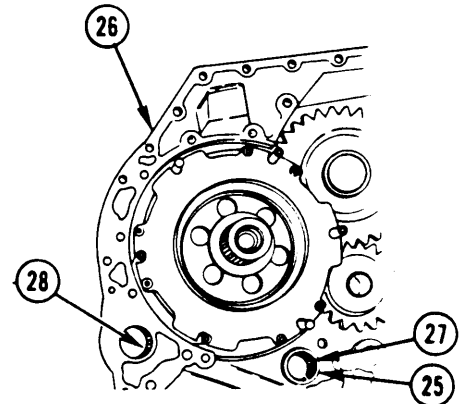
Petrolatum (Item 14, Appendix C).  
 Rag, wiping (Item 15, Appendix C)  
 Oil, lubricating (Item 10, Appendix C)  
 Wooden Blocks, 2 x 4 inches x 16 inches long (2 required) (Item 2, Appendix C)  
 Tape, masking (Item 20, Appendix C)

**PRELIMINARY PROCEDURE:** Right brake assembly is installed. Refer to this Paragraph, TASK 3.

Go to Sheet 10



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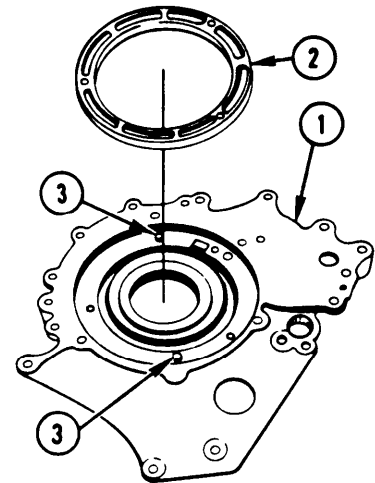


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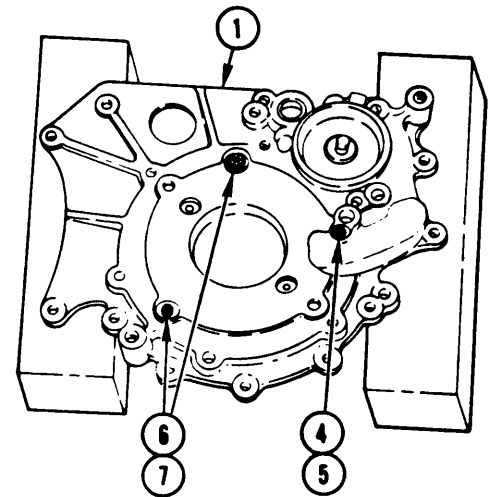
#### 4-21. ASSEMBLE RIGHT END COVER ASSEMBLY (SHEET 10 OF 22)

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.
- 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).



TM485538



TM485539

Go to Sheet 11

4-21. ASSEMBLY 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.

10 Coat seal ring (8) with petrolatum.

11 Tip support (1) on edge.

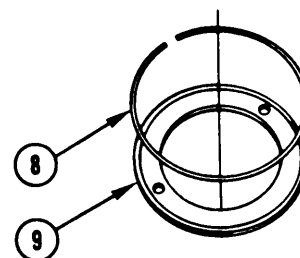
12 Install retainer (9), flat side toward support (1) with retainer bolt holes (10) and support bolt holes (11) aligned.

13 Using fingers, start two washers (12) and bolts (13) into support (1).

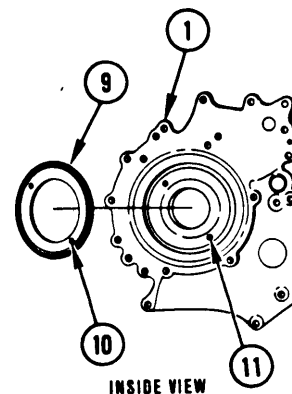
14 Using 7/16 inch socket and torque wrench tighten bolts (13) to 10-12 lb-ft (14-16 N•m).

15 Turn support (1) over and place on wooden blocks.

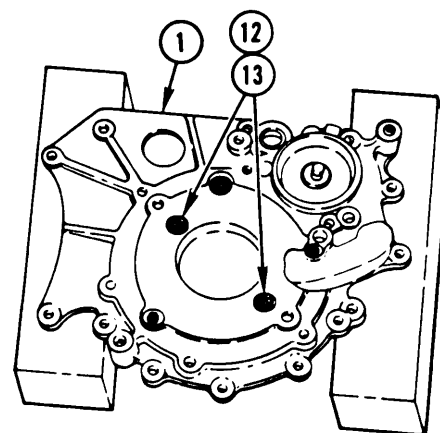
Go to Sheet 12



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TA485541



TA485542

#### 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**

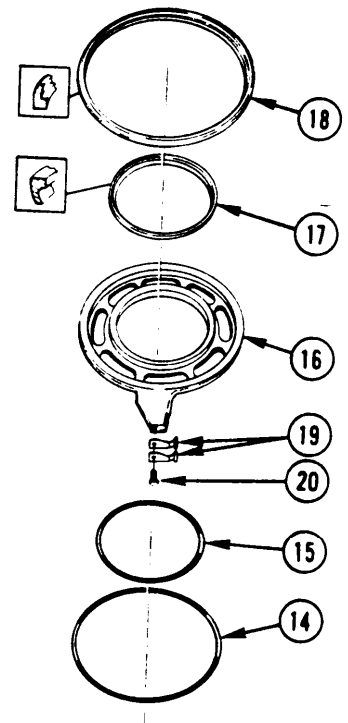
Be sure packings (17, 18) are installed with seal lips in direction shown in illustration. If packings are not installed properly, components will not function properly.

- 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 Mm).

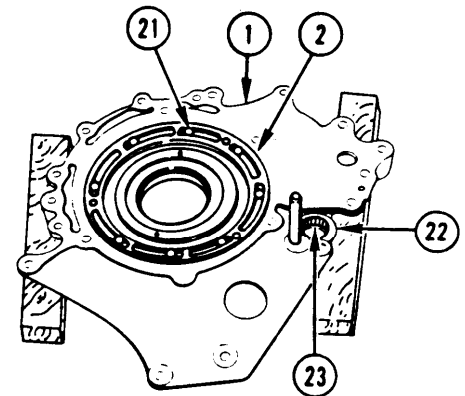
##### Assemble Brake Apply Cam on Support

- 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



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#### 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.

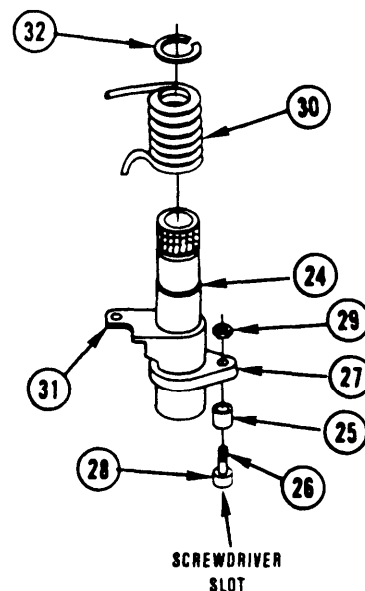
- 33 Using torque wrench install locknut (29) on cam follower shaft (26). Determine torque.

#### 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 Nero) 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



TA485545



#### 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).

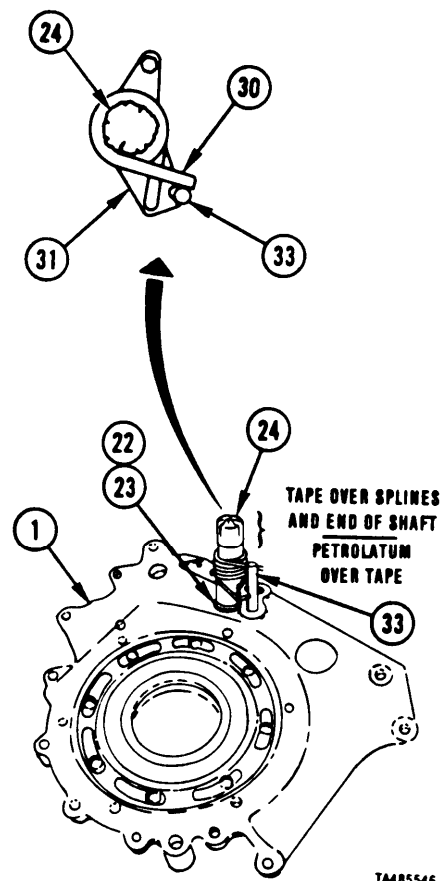
- 40 Install right brake apply cam shaft (24) through beveled thrust washer (22) and into needle bearing (23) so that straight end of spring (30) and cam arm (31) are on opposite sides of long brake reaction pin (33).
- 41 Using plastic faced hammer, tap end of shaft (24) as necessary to seat shaft in support (1).
- 42 Clean slined end of right brake apply cam shaft (24).

##### CAUTION

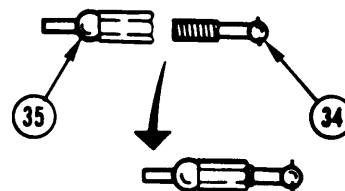
Protective material, such as masking tape, must cover splines when shaft (24) goes through right end cover. If shaft goes through seal without protection, splines on shaft will damage seal.

- 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).

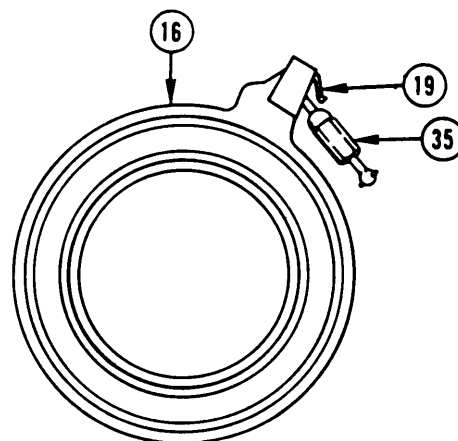
Go to Sheet 15



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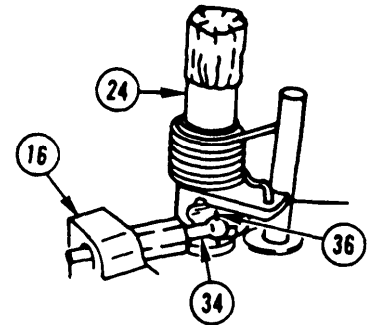
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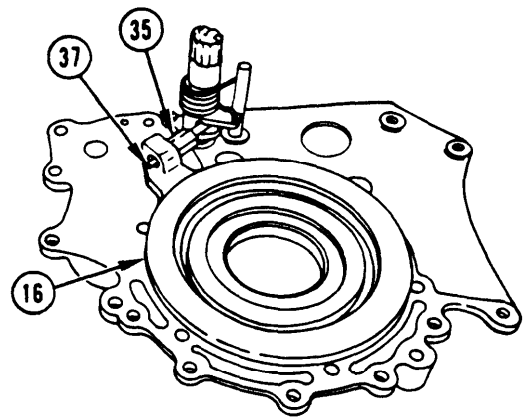
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**4-21. ASSEMBLE RIGHT END COVER ASSEMBLY  
(SHEET 15 OF 22)**

- 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.

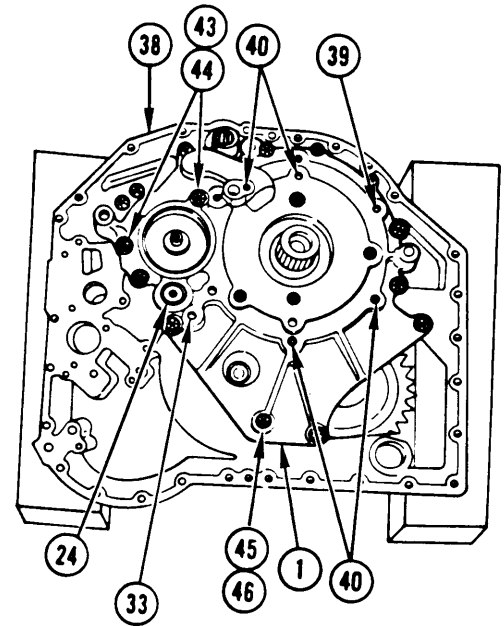
Three long brake reaction pins go into pin holes in support.

Four short brake reaction pins go into pin holes in support.

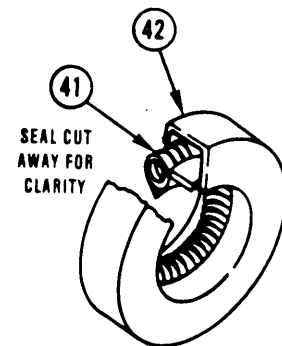
Go to Sheet 16

**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).



TA485551



TA485552

**FOLLOW-ON PROCEDURE:** Install brake coolant valve components. Refer to this paragraph TASK 5.

End of Task 4

Go to Sheet 17

**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).

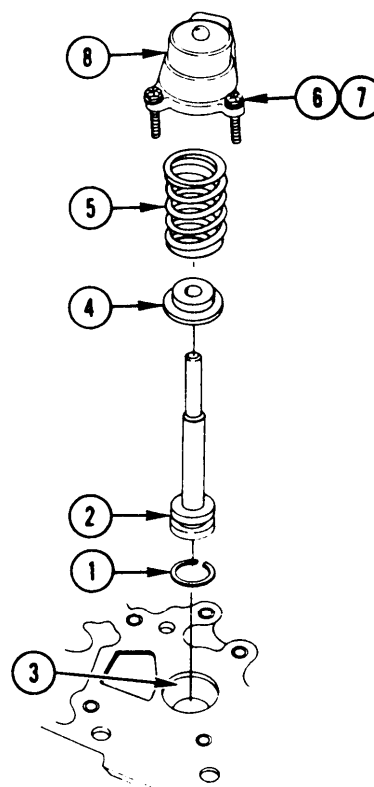
**WARNING**

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

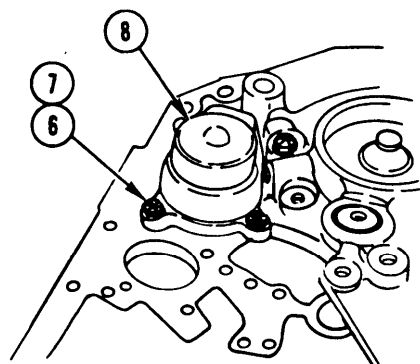
- 6 Install three bolts (6) and washers (7) on valve body (8).
- 7 Install body (8) on spring (5) and hold body firmly down while starting bolts (6) with fingers.
- 8 Using socket, tighten bolts (6) and washers (7) on body (8).
- 9 Using torque wrench, tighten bolts (6) to 17-20 lb-ft (23-27 N·m).

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

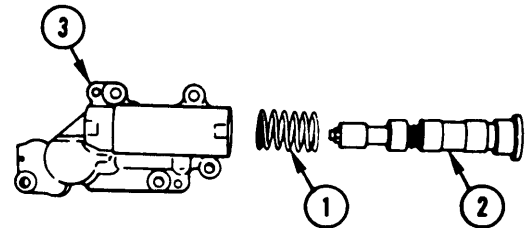
**Spring-loaded parts can fly and injure you. Always follow specified instructions when installing covers to valve assemblies.**

- 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).

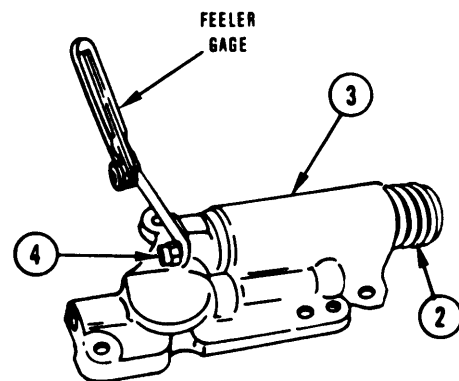
**FOLLOW-ON PROCEDURE:** Install left brake apply shaft. Refer to this paragraph, TASK 7.

End of Task 6

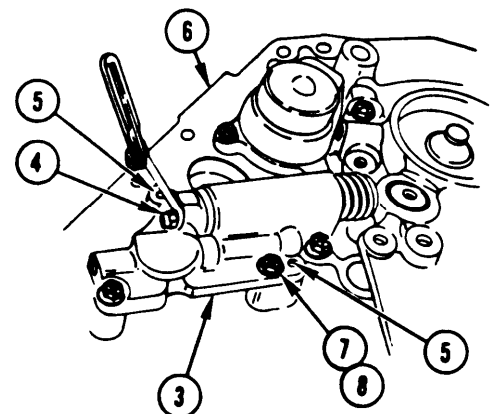
Go to Sheet 19



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**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**

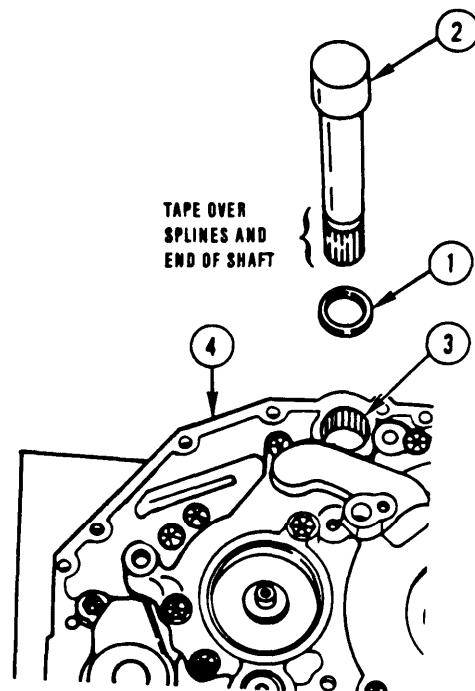
Protective material, such as masking tape, must cover splines. If shaft goes through seal without such protection, splines on shaft will damage seal.

**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



TA485558

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.

- 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.

- 11 Install indicators (8) on shafts (2, 7) so that indicators are beyond inner retaining ring groove (9).

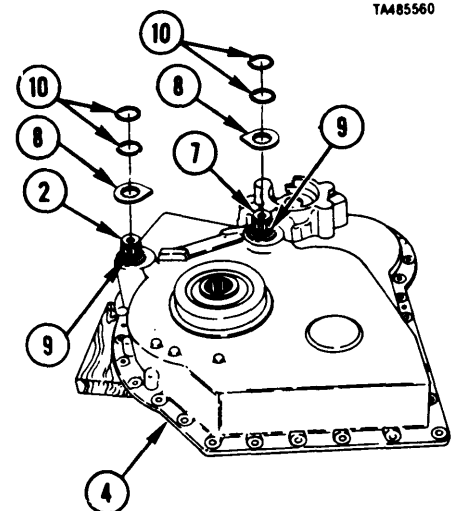
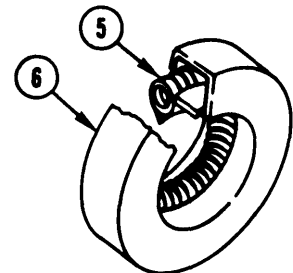
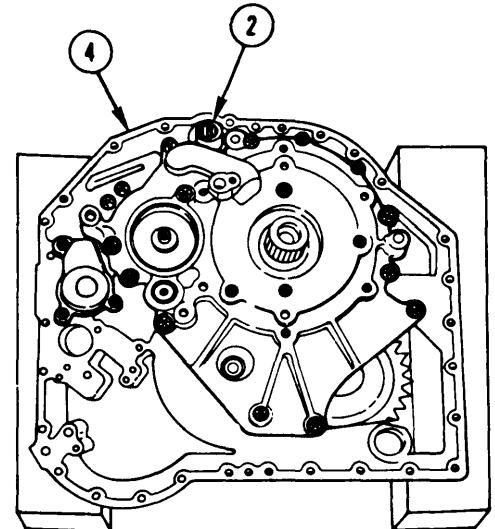
**NOTE**

Outer retaining rings may or may not be present. They are furnished to retain external brake linkage.

- 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:

Adapter, 3/4 to 1/2 inch  
 Bar, pry  
 Crowfoot, 1/2 inch square drive, 2 inches  
 Extension, socket wrench, 1/2 inch square drive, 10 inch  
 Hammer, hand, ball penn  
 Handle, socket wrench, 1/2 inch square drive  
 Handle, socket wrench, 3/4 inch square drive  
 Punch, center, tapered  
 Socket, socket wrench, 1/2 inch square drive, 3/4 inch  
 Socket, socket wrench, 3/4 inch square drive, 1-7/8 inches  
 Wrench, combination, 1-7/8 inches  
 Wrench, torque, 0-175 ft-lb  
 Wrench, Combination 1-5/8 inches

### REPAIR PARTS:

Packing, preformed (96906) MS28778-20  
 Washer, tab type (73342) 6752556

### SUPPLIES:

Bolt, 1/2-20 x 3 inch (2 required)  
 Petrolatum (Item 14, Appendix C)  
 Rag, wiping (Item 15, Appendix C)

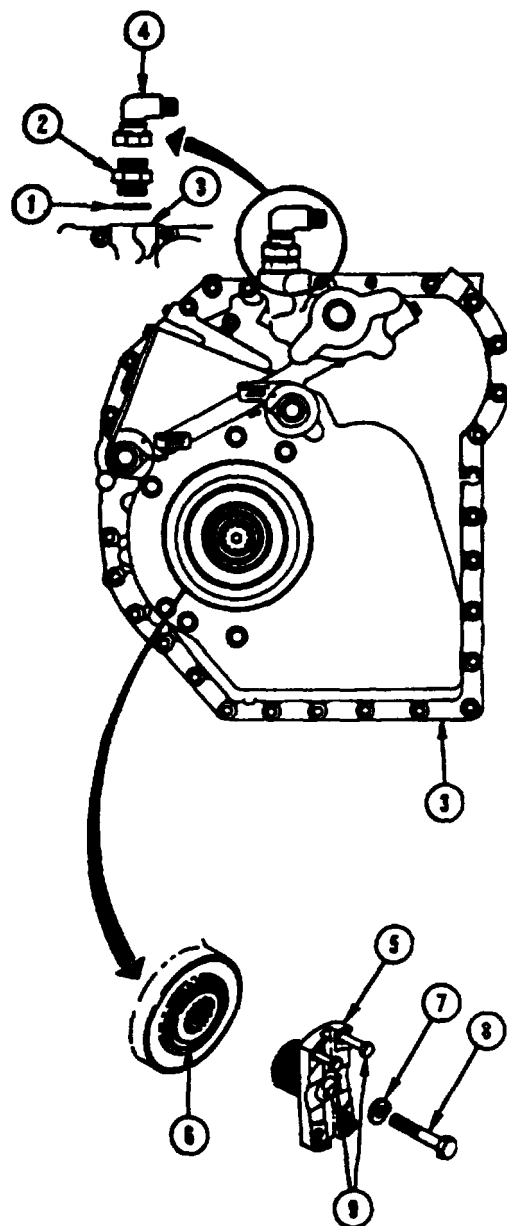
**PRELIMINARY PROCEDURE:** RH output shaft and seal installed. Refer to this paragraph, TASK 1.

### NOTE

Right end cover assembly turned outside up.

- 1 X200-4 Install new packing (1) onto elbow (adapter) (2). Lubricate packing (1) with petrolatum.
- 2 X200-4 Using 1-7/8 inch socket, install elbow (adapter) (2) into right end cover assembly (3).
- 3 X200-4 Using 3/4 to 1/2 inch adapter and torque wrench, tighten elbow (adapter) (2) to 127 - 140 lb-ft (172 - 190 Nm).
- 4 X200-4 Using combination wrench, install elbow (4) into elbow (adapter) (2).

Go to Sheet 22





#### 4-21. ASSEMBLE RIGHT END COVER ASSEMBLY (SHEET 22 OF 22)

- 5 X200-4 Using crowfoot and torque wrench, tighten elbow (4) to 127 - 140 lb-ft (172 - 190 Nm) in the position shown in illustration. (When oil line is installed, elbow (4) may be repositioned to accommodate oil line.)
- 6 Install output flange (5) in output shaft (6) located in right end cover (3).
- 7 Install new tab washer (7) on 1/2-20 x 3-1/4 inch bolt (8) with bent tab on washer toward head of bolt.
- 8 Install bolt (8) through center of flange (5) and into center of output shaft (6). Install bolt finger tight.
- 9 Using 3/4 inch socket, install two 1/2-20 x 3 inch bolts (9) in tapped holes at either end of output flange (5) until bolts are flush with inner surface of flange.
- 10 Using one hand, hold pry bar between two bolts (9) to prevent flange (5) 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.

- 11 Using 3/4 inch socket and torque wrench, tighten bolt (8) to 72-86 lb-ft (98-117 Nm).
- 12 Using 3/4 inch socket, remove two bolts (9) from flange (5).

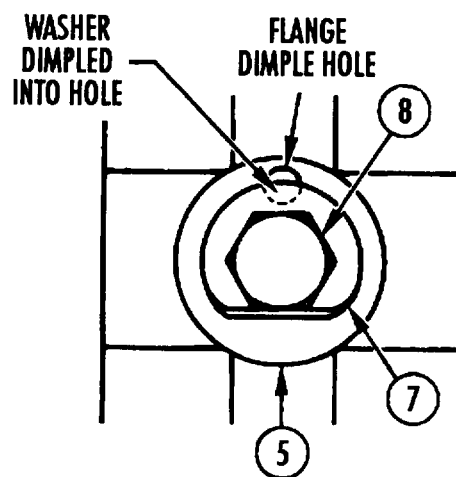
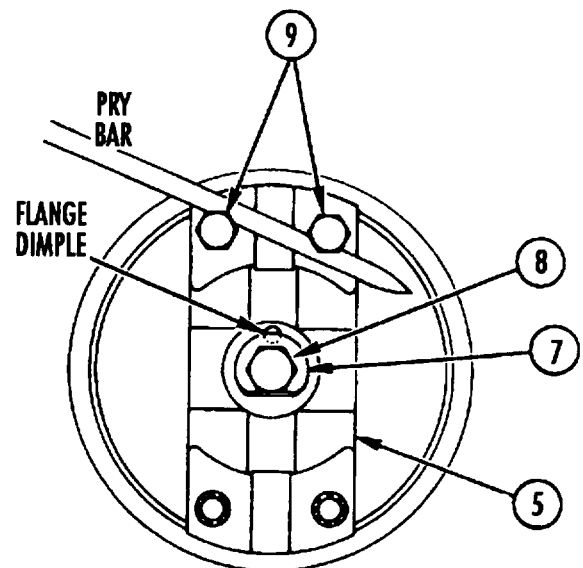
#### **NOTE**

Do not bend the tab of washer (7) against flat of bolt (8) at this time.

- 13 Using punch and hammer, punch dimple in washer (7). Dimple must depress washer into dimple hole in flange (5).

**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**

Ž 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)

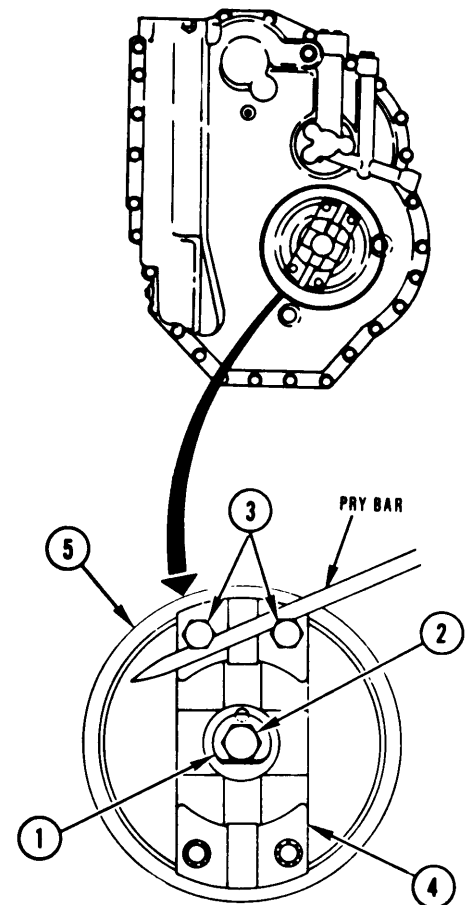
##### SUPPLIES:

Rag, wiping (Item 15, Appendix C)  
Wooden Block, 2 x 4 inches x 16 inches long (2 required)  
(Item 2, Appendix C)

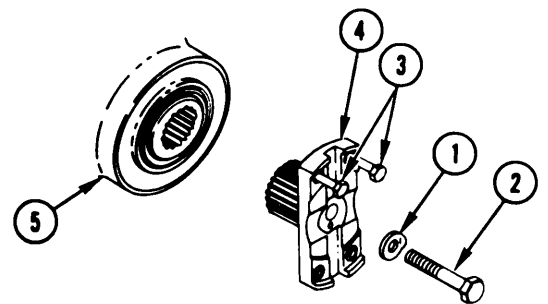
**PRELIMINARY PROCEDURE:** Left end cover is removed. Refer to paragraph 4-8.

##### 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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TA485566

Go to Sheet 3

- 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

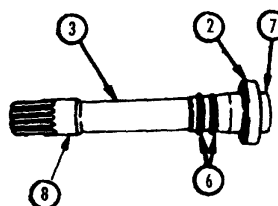
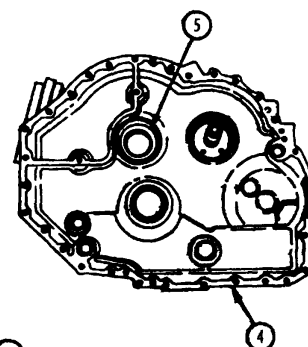
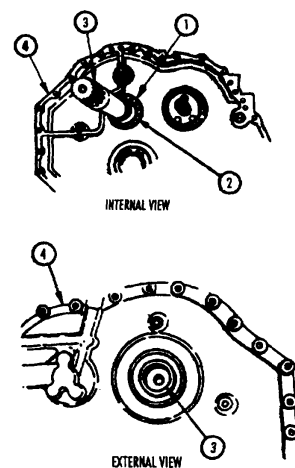
When bearing is removed from shaft, sleeve is forced off ahead of bearing.

- 7 If bearing (2) and sleeve (7) is to be replaced, press bearing (2) and sleeve (7) from output shaft (3) using an arbor press.
- 8 X200-4A Remove preformed packing (9) from end of shaft. Throw away packing.

**FOLLOW-ON PROCEDURE:** Install output shaft packing and seal. Refer to paragraph 4-24.

End of Task 2

Go to Sheet 4



Para. 4-22, Task 2

## 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 Z, 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.

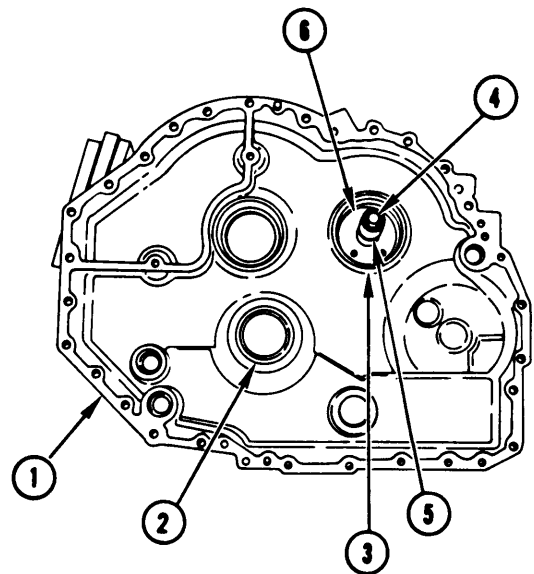
Wooden blocks on edge under corner nearest output shaft bore.

- 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.

- 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).



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**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  
 Socket, socket wrench, 1/2 inch square drive, 1 inch

##### **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  
 Packing, preformed (Use with Plug, Machine Thread) (96906) MS28778-10

##### **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.

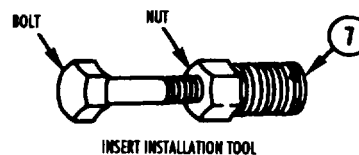
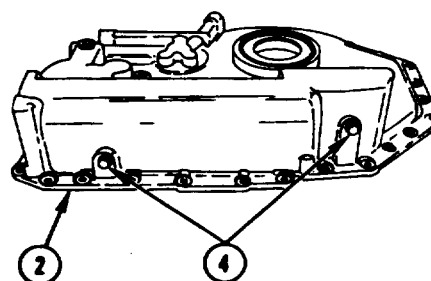
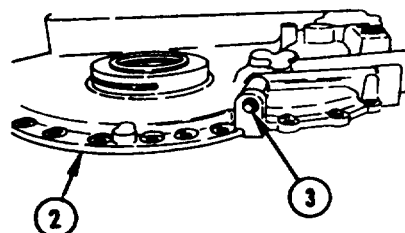
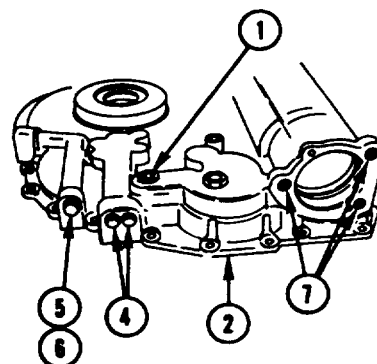
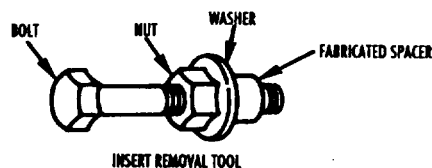
#### **NOTE**

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).



##### NOTE

Early model end covers have a fan drive oil return line port which has a plug and packing installed in it.

##### Assemble Left End Cover Assembly

- 9 Using a 1 inch socket, remove packing (8) and plug (9) from end cover (2). Throw away packing.
- 10 If any of inserts (7) were removed, assemble 3/8-16 x 3 inch bolt and 3/8-16 nut.
- 11 Screw one insert (7) onto bolt. Screw nut against insert.
- 12 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)

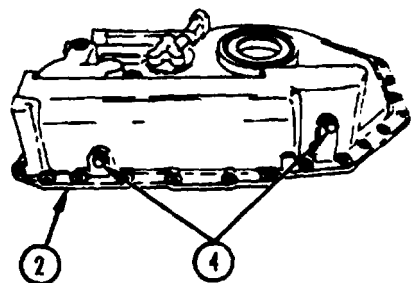
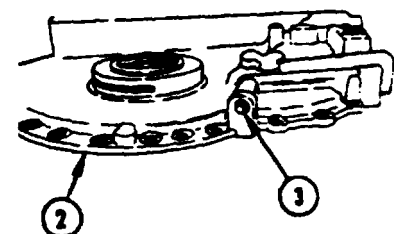
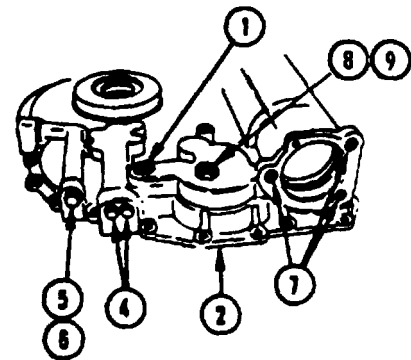
## NOTE

Thread locking compound is not applied to pipe plug that has a preformed packing.

- 13 Install new packing (6) on pipe plug (5).
- 14 Apply petrolatum to packing (6).
- 15 Using 11/16 inch socket, install plug (5) in end cover (2).
- 16 Using torque wrench, tighten plug (5) to 72-96 lb-in. (8-1 Nm).
- 17 Apply pipe thread locking compound to threads of six pipe plugs (1, 3, 4).
- 18 Using 9/16 inch socket, install four pipe plugs (4) in end cover (2).
- 19 Using torque wrench, tighten plugs (4) to 96-120 lb-in. (11-14 Nm).
- 20 Using 7/16 inch socket, install pipe plug (3) in end cover (2).
- 21 Using torque wrench, tighten plug (3) to 50-60 lb-in. (6-7 Nm).
- 22 Using 11/16 hex plug attachment, install pipe plug (1) in end cover (2).
- 23 Using torque wrench and attachment, tighten plug (1) to 21-28 lb-ft (28-38 Nm).
- 24 Using a 1 inch socket, install new packing (8) and plug (9) in end cover (2).
- 25 Using a torque wrench, tighten plug (9) to 16 - 18 lb ft (22 -24 Nm).

**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:**

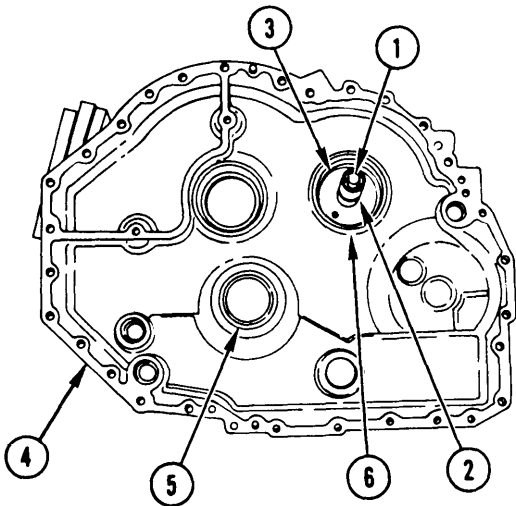
Dry ice (Item 4, Appendix C)  
Oil, lubricating (Item IQ Appendix C)  
Petrolatum (Item 14, Appendix C)  
Wooden Blocks, 2 x 4 inches x 16 inches long  
(2 required) (Item 2, Appendix C)

**NOTE**

Ž Left end cover turned inside up.

Ž Wooden blocks on edge under corner nearest to output shaft bore.

- 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**

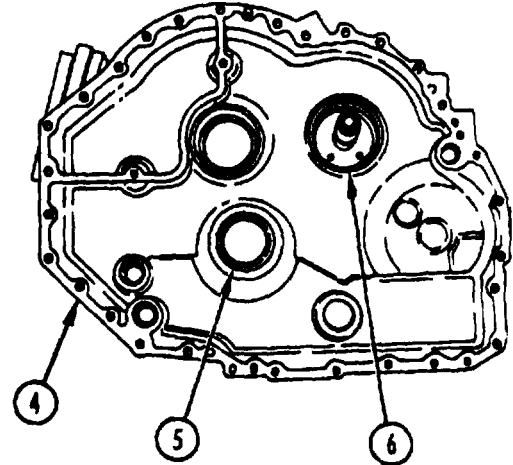
Frozen parts can stick to your fingers and cause serious injury. Always wear leather gloves when working with parts that have been frozen in dry ice.

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).



**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)  
Packing, Preformed (73342) 23018234  
Carbon Dioxide, Technical (Dry Ice) (Item 4, 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

**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).

Go to Sheet 3

#### 4-24. ASSEMBLE LEFT END COVER ASSEMBLY (SHEET 3 OF 5)

##### 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).

##### 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.

- 3 Place shaft (4), bearing end in dry ice for 1 hour.

##### Install Bearing and Sleeve on LH Output Shaft

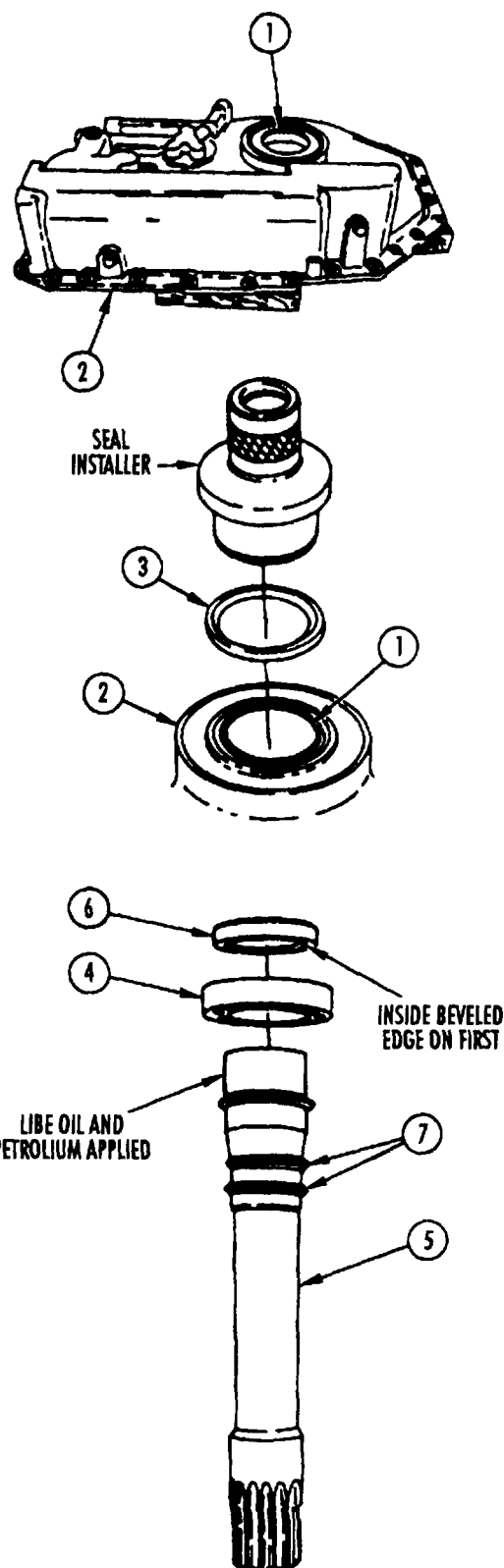
- 4 If output shaft bearing (4) was removed, apply petrolatum and lubricating oil to bearing end of LH output shaft (5).
- 5 Using arbor press, install new bearing (4), numbered end out, on output shaft (5). Press bearing to shoulder.

##### WARNING

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

- 6 If sleeve (6) was removed, heat sleeve for 30 minutes to approximately 250°F (121°C) using heat gun.
- 7 Using arbor press, install sleeve (6) on output shaft (5) with inside beveled edge on first. Press sleeve to bearing (4).
- 8 Install two seal rings (7) on output shaft (5). Coat two seal rings (7) with petrolatum.
- 9 Position left end cover, inside upward. Block cover so that it is level.
- 10 Apply petrolatum to inner surface of seal (3).

Go to Sheet 4



#### 4-24. ASSEMBLE LEFT END COVER ASSEMBLY (SHEET 4 OF 5)

- 11 Carefully rotate shaft (5) and push end of shaft through seal.
- 12 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.
- 13 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.

- 14 Using screwdriver, install snapping (8) in groove in sleeve above bearing (4).
- 15 Apply lubricating oil to bearing (4).
- 16 On X200-4A install new preformed packing (9) on end of shaft (5).
- 17 Coat new packing with petrolatum.

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

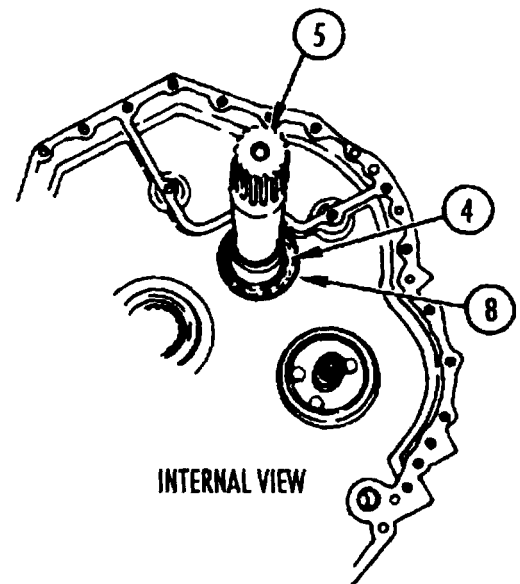
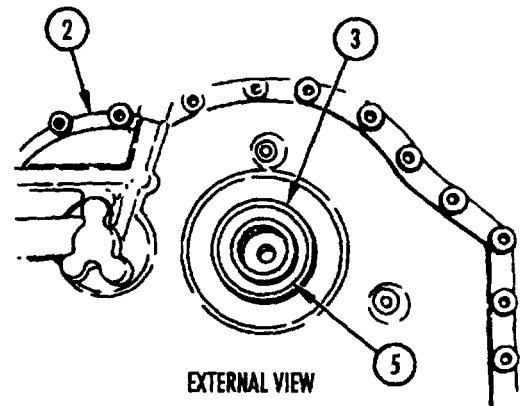
##### REPAIR PARTS:

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



#### 4-24. 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).

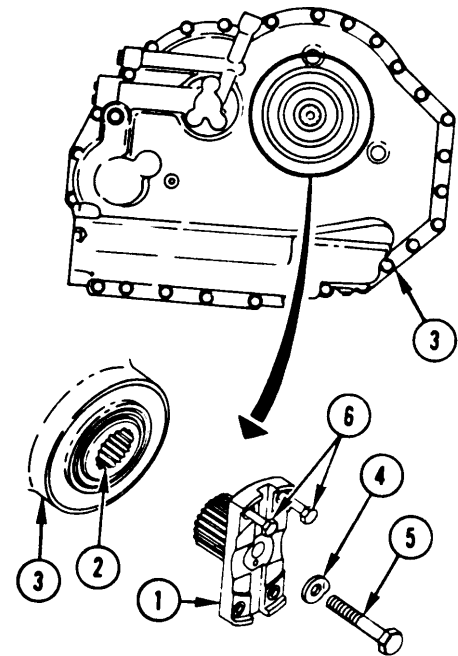
#### NOTE

Do not bend the tab of washer (4) against flat of bolt (5) at this time.

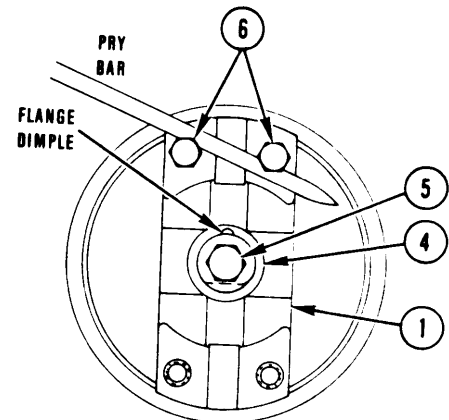
- 9 Using punch and hammer, punch dimple in washer (4). Dimple must depress washer into dimple hole in flange (1).

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

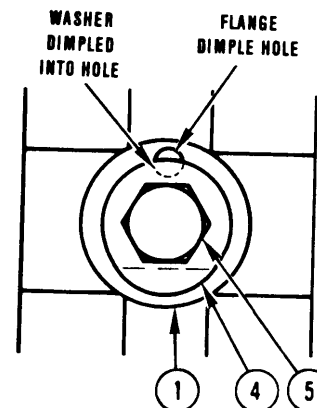
End of Task 3



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**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 ware 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**

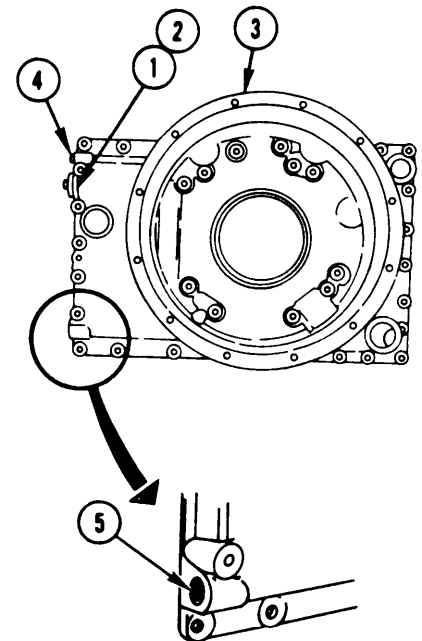
Input housing is turned outside up.

Go to Sheet 2

#### 4-25. 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).

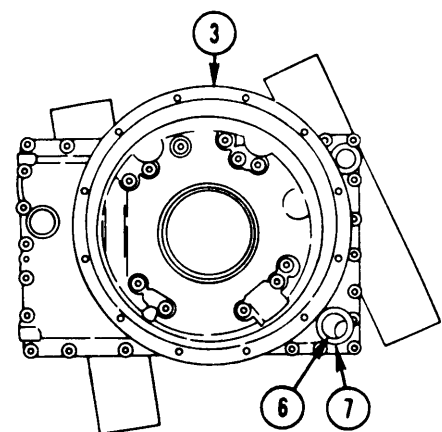


- 3 Using 1/4 inch hex plug socket attachment and adapter, remove pipe plug (5) from input housing (3)..
- 4 Place two wooden blocks under input housing (3).

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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).



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Go to Sheet 3

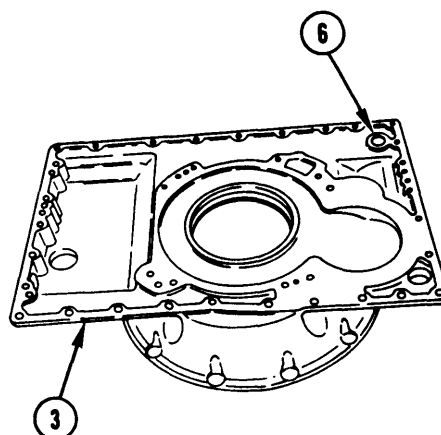
# 4-25. REPAIR INPUT HOUSING ASSEMBLY (SHEET 3 OF 3)

Assemble Input Housing Assembly

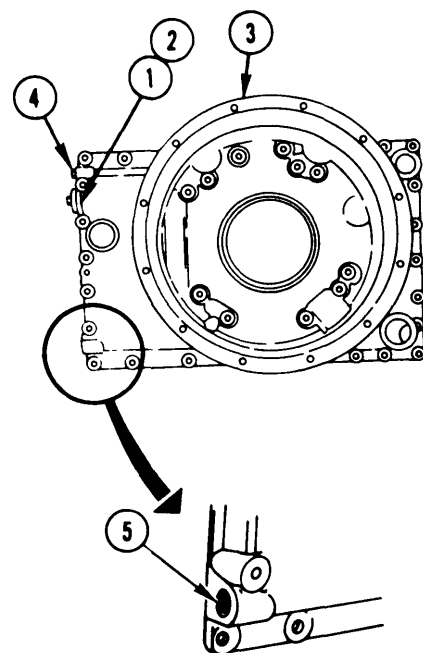
- 7 Turn input housing (3) over, inside up.
- 8 If aluminum plug (6) was removed, install new plug (6) in input housing (3) using arbor press Press plug flush to 0.010 inch (0.2540 mm) below surface of input housing.
- 9 Turn housing (3) over, outside up.
- 10 Apply thread locking compound to threads 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.

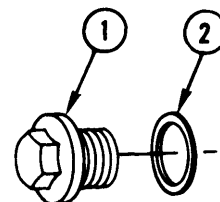
End of Task 1



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## 4-26. 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 )**

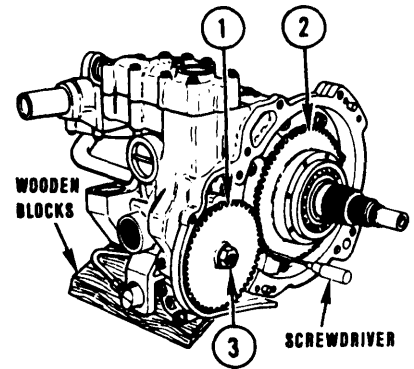
- 1 Position bevel gear assembly on wooden blocks as shown.
- 2 Wedge screwdriver between input oil pump driven gear (1) and input oil pump drive gear (2) to prevent gears from turning.
- 3 Using 3/4 inch socket, remove nut (3) that retains gear (1).
- 4 Using pry bar, remove gear (1).
- 5 Using diagonal 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**

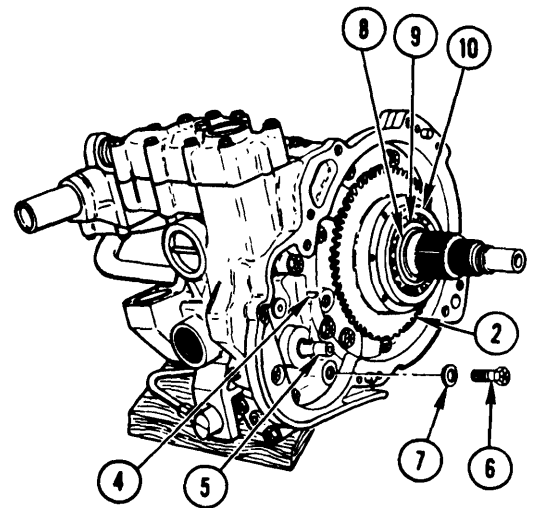
If output pump assembly (16) is to be sent to depot for overhaul, do Step 13. If not, go to Step 14.

- 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).

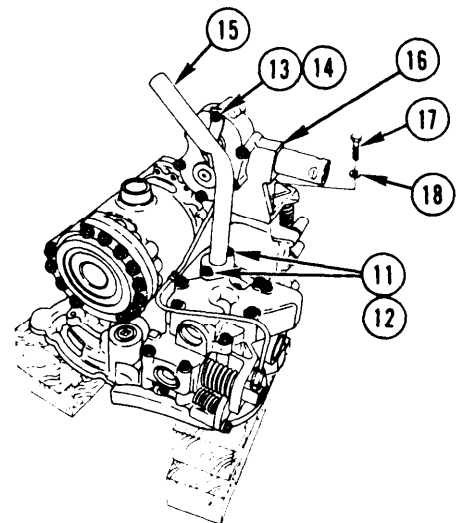
Go to Sheet 3



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#### 4-26. 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).

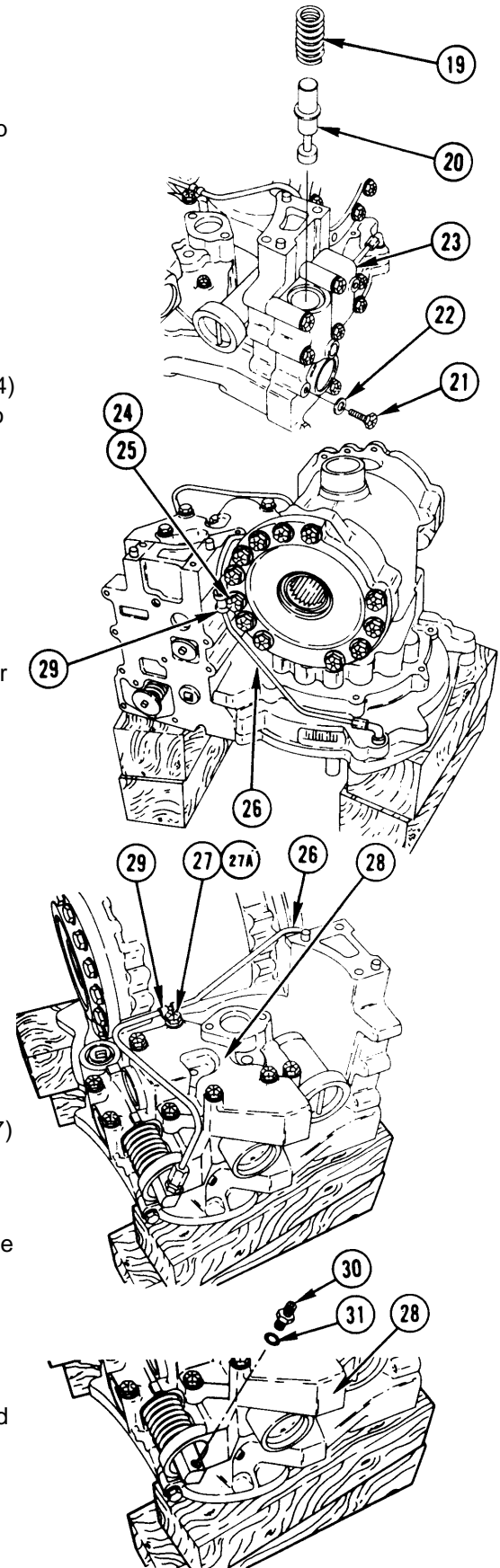
- 18 Using 9/16 inch socket and extension, reinstall washer (25) and bolt (24). Using torque wrench, tighten bolt (24) to 36-43 lb-ft (49-58 N•m).
- 19 Using 1/2 inch socket and extension, remove bolt (27) and washer (27A) that retains reverse signal tube (26) to input and scavenge pump assembly (28).

#### 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.

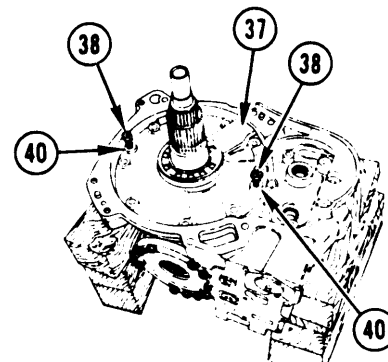
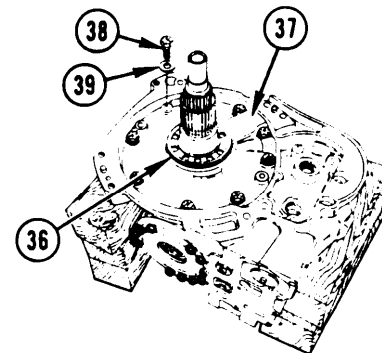
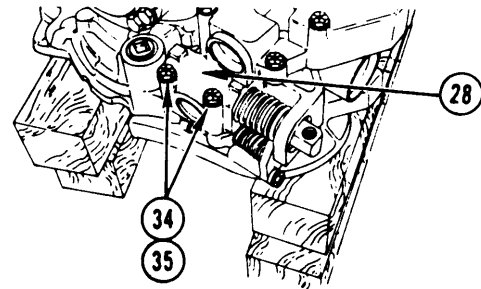
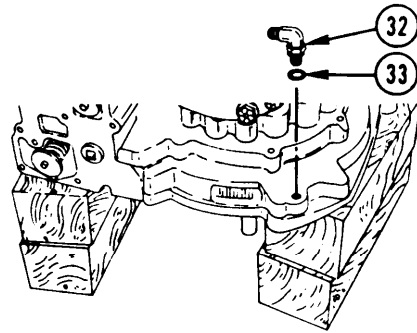
- 20 Using 1/2 inch socket and extension, reinstall bolt (27) and washer (27A) in pump assembly (28). Torque bolt (27) to 13-16 lb-ft (18-22 N•m).
- 21 Using combination wrench, remove reverse signal tube (26) from bevel gear assembly.
- 22 Remove two clamps (29) from tube (26).
- 23 Using combination 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).



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)

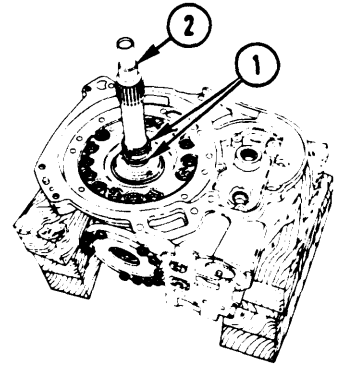
#### PERSONNEL REQUIRED: Two

- One soldier helps to lift and turn bevel gear assembly.
- One soldier disassembles bevel gear assembly.

Go to Sheet 2

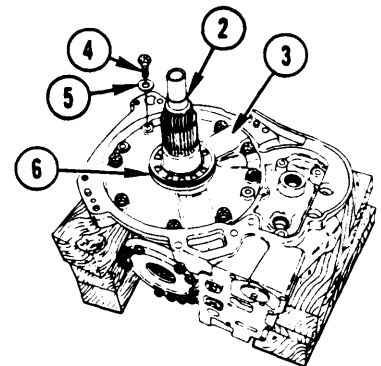
**4-27. ASSEMBLE BEVEL GEAR ASSEMBLY  
(SHEET 2 OF 5)**

- 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.



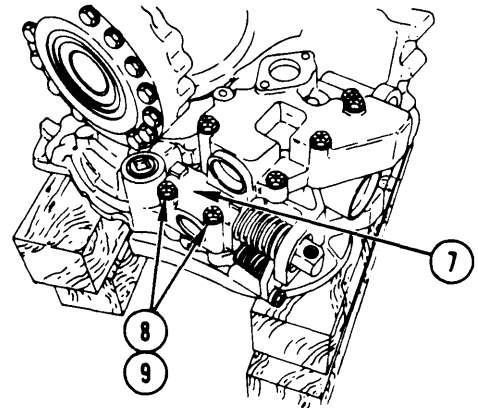
TA485607

- 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).



TA485608

- 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).

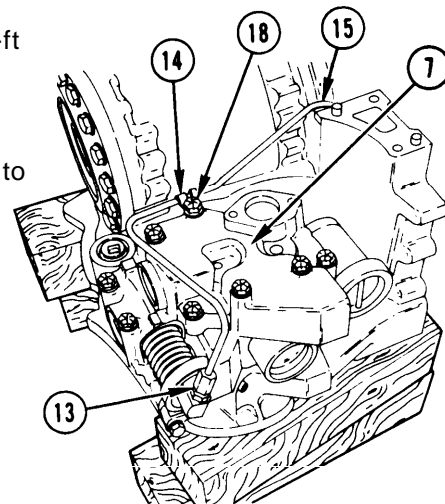
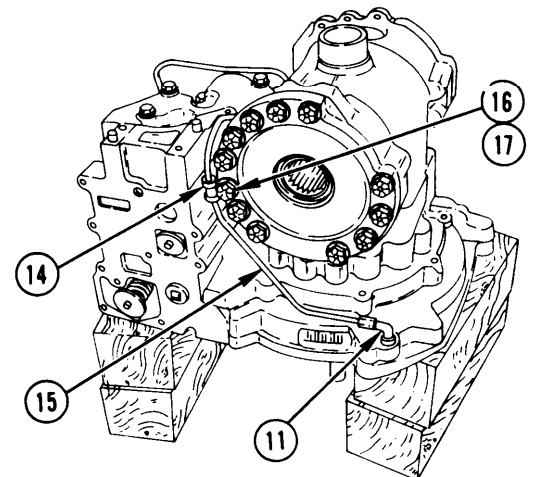
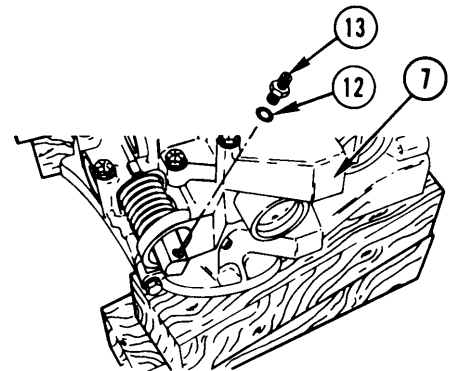
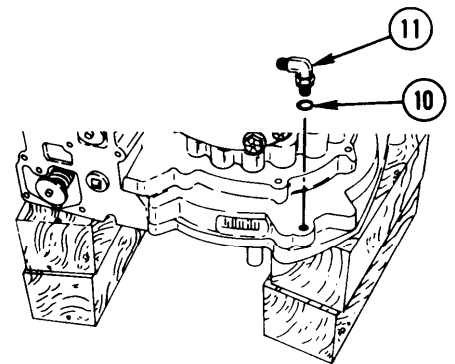


TA485609

Go to Sheet 3

#### 4-27. 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.
- 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.
- 15 Using 1/2 inch socket and extension, remove bolt (18) (if present) from input and scavenge pump assembly (7).
- 16 Using combination wrench, install reverse signal tube (15) onto elbow (11) and connector (13). After ferrule is seated, torque the two nuts to 10-12 lb-ft (13-16 N•m).
- 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).

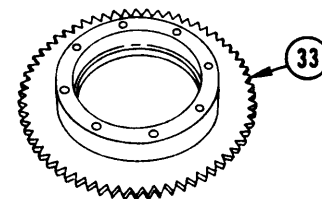
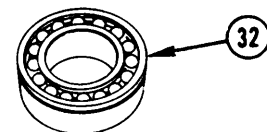
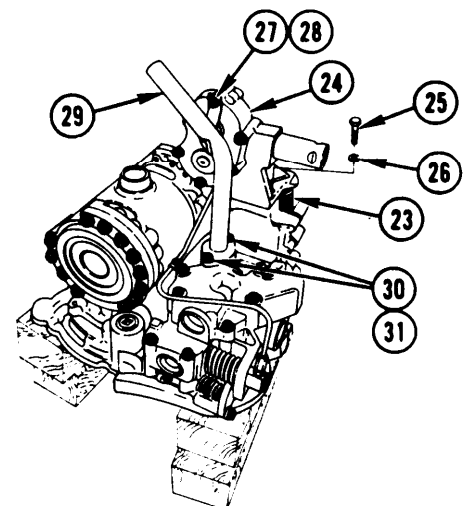
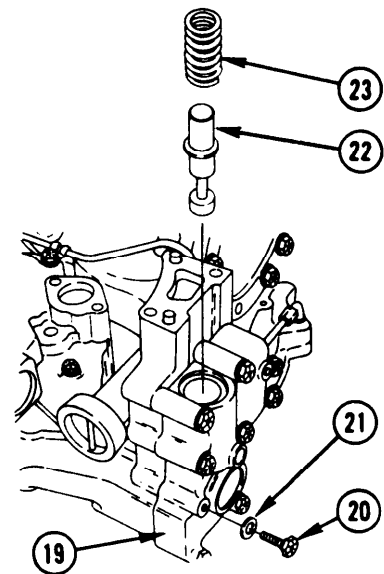


Go to Sheet 4

**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 downwards 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.

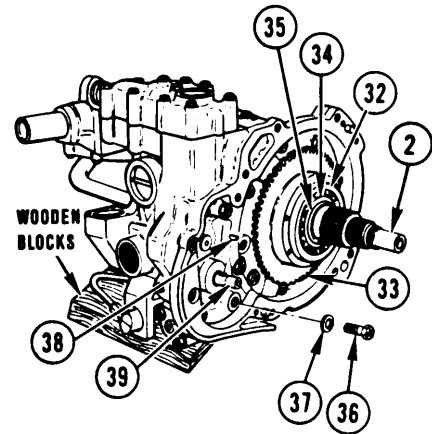
Go to Sheet 5





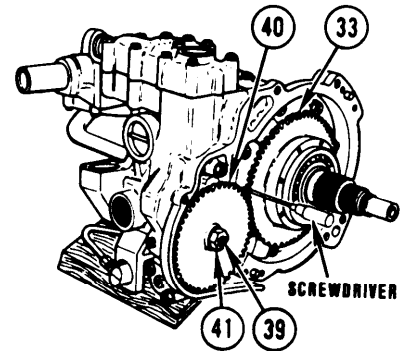
#### 4-27. ASSEMBLE BEVEL GEAR ASSEMBLY (SHEET 5 OF 5)

- 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).



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- 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.



TA485618

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.

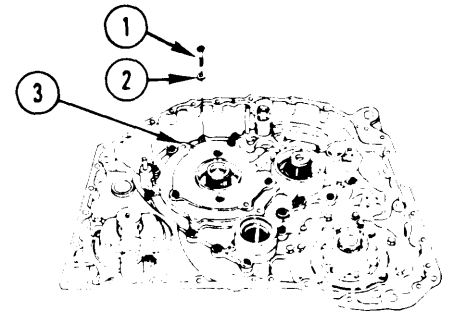
Go to Sheet 2

#### 4-28. 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).

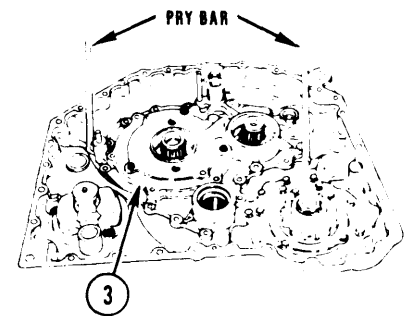
#### NOTE

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.



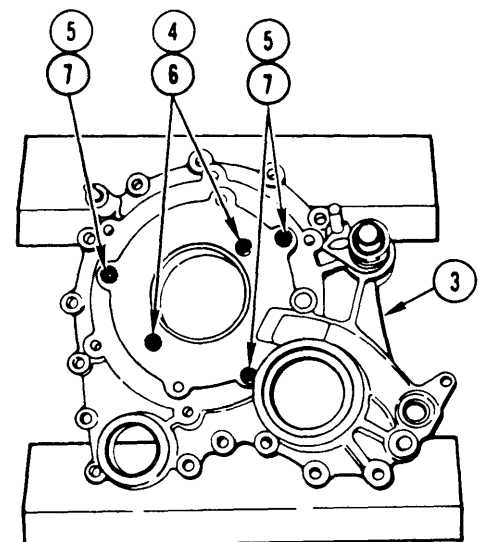
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- 2 Using two pry bars, pry under opposite ends of brake support (3) and loosen support. Remove brake support (3).



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- 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).

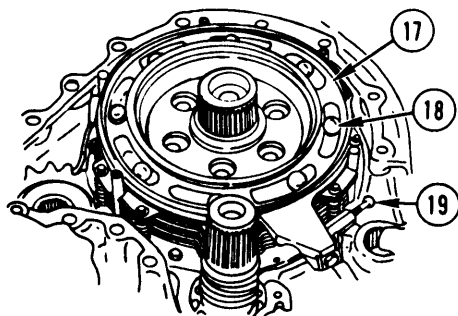


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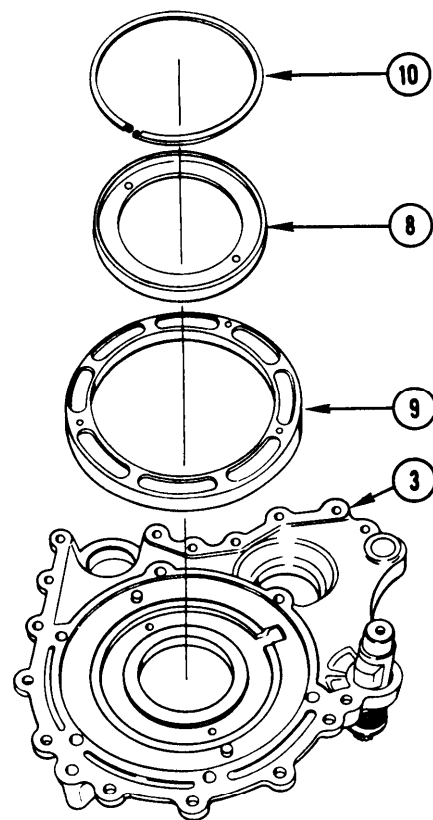
Go to Sheet 3

# 4-28. DISASSEMBLE CENTER HOUSING (SHEET 3 OF 19)

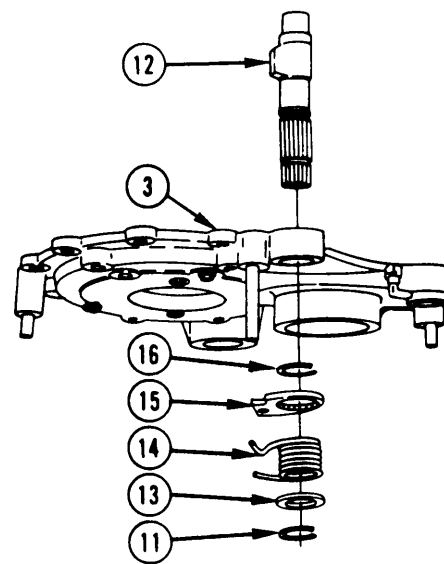
- 7 Turn support (3) over as shown.
  - 8 Remove packing retainer (8) and stationary cam (9) from support (3).
  - 9 Remove seal ring (10) from retainer (8).
  - 10 Using retaining ring pliers, remove retaining ring (11) from end of control cam (12).
  - 11 Remove washer (13) from cam (12).
  - 12 Using 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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Go to Sheet 4

#### 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).

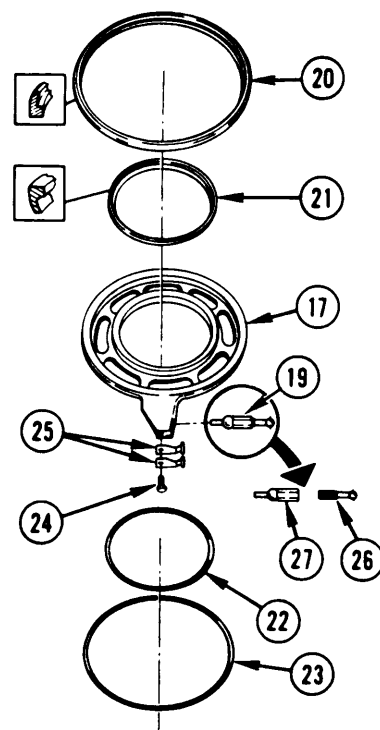
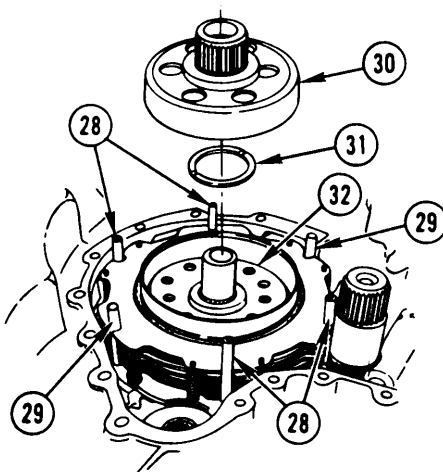
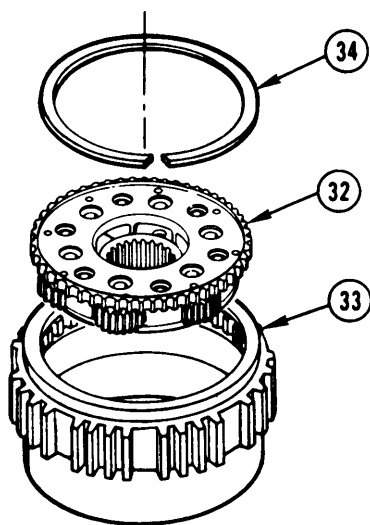
**REPAIR:** Refer to paragraph 4-29 for replacement of pin in inner brake adjusting link (26).

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.

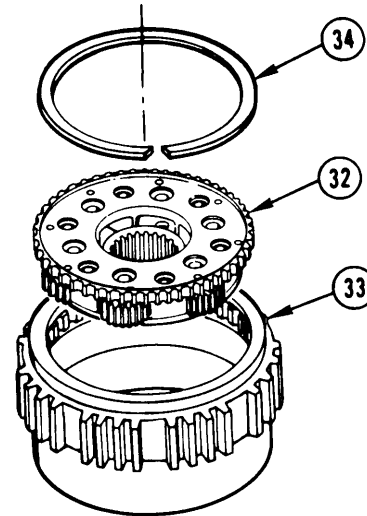


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Go to Sheet 5

#### 4-28. DISASSEMBLE CENTER HOUSING (SHEET 5 OF 19)

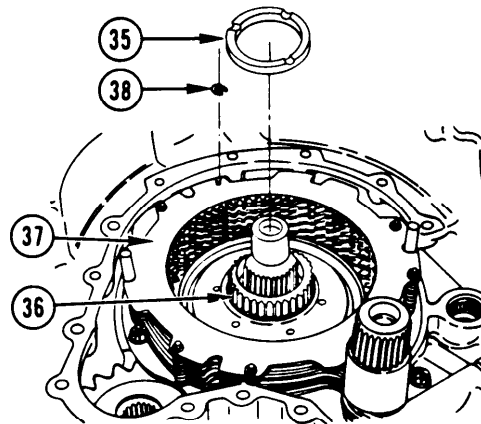
- 28 Remove thrust washer bearing (35) from underside of assembly removed in Step 27 or from left steer and output sun gear (36).
- 29 Using screwdriver, remove retaining ring (34) from brake clutch drum (33).
- 30 Remove output planetary (32) from drum (33).
- 31 With one hand, press downward on clutch 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).



TA485628

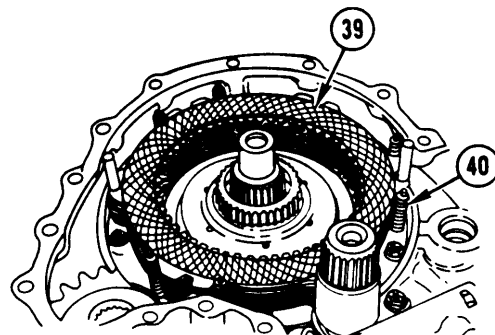
#### CAUTION

- 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).



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Go to Sheet 6

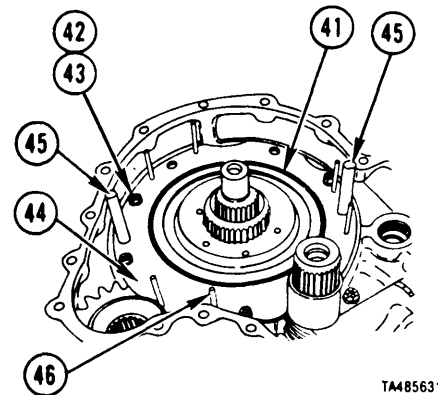
#### 4-28. DISASSEMBLE CENTER HOUSING (SHEET 6 OF 19)

- 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).



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**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

**4-20. 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 upwad.

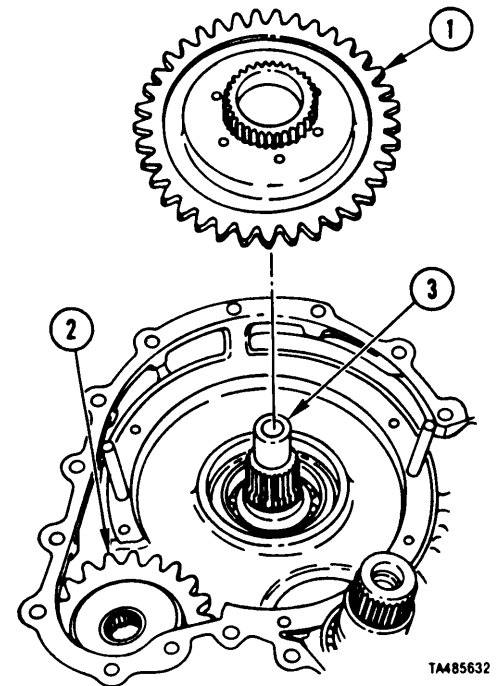
**REPAIR:** Refer to paragraph 4-29 for replacement of bearing on left output shaft (3).

- 9 Remove output pump drive gear (4) from right side of transmission.

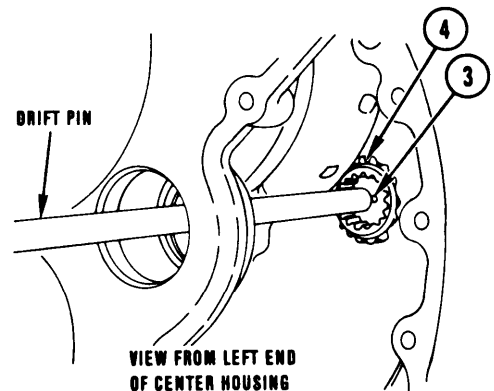
**FOLLOW-ON PROCEDURE:** Install output pump drive gear, left output shaft, left steer and output sun gear, and left steer gear. Refer to paragraph 4-30.

End of Task 2

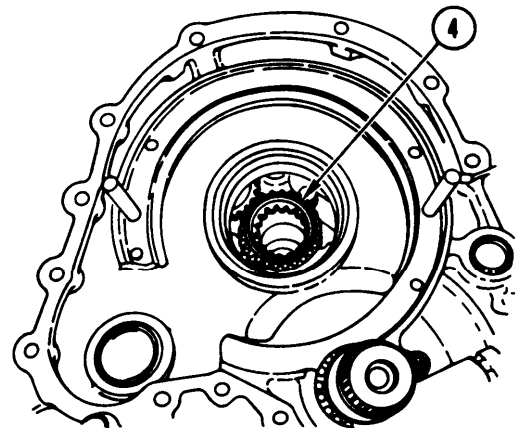
Go to Sheet 8



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#### 4-28. DISASSEMBLE CENTER HOUSING (SHEET 8 OF 19)

##### TASK 3. REMOVE STEER CONTROL ASSEMBLY

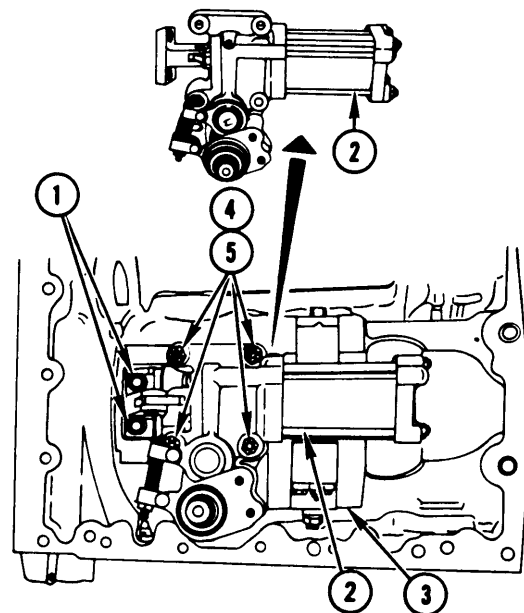
###### COMMON TOOLS:

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.

End of Task 3



TA485635

##### TASK 4. REMOVE HYDROSTATIC PUMP AND MOTOR ASSEMBLY (HYDROSTAT)

###### COMMON TOOLS:

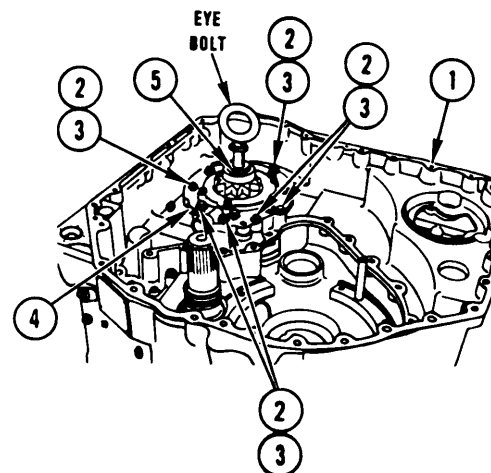
Extension, socket wrench, 3/8 inch square drive, 12 inch  
Handle, socket wrench, 3/8 inch square drive  
Hoist, 100 pound minimum capacity  
Pliers, retaining ring, external  
Socket, socket wrench, 3/8 inch square drive, 9/16 inch

###### 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).

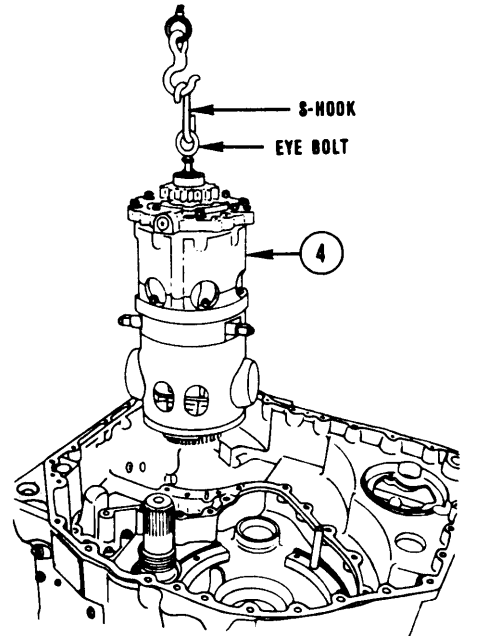
Go to Sheet 9

#### 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.

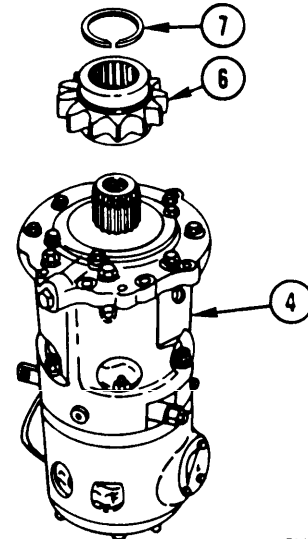
#### NOTE

- 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.



TA485637

- 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).

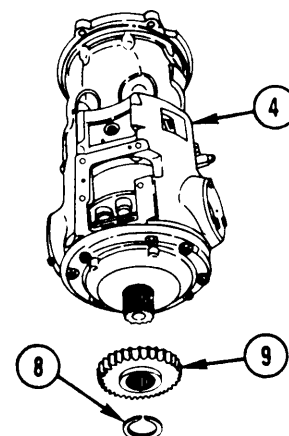


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**FOLLOW-ON PROCEDURE:** Install hydrostatic pump and motor assembly. Refer to paragraph 4-30.

End of Task 4

Go to Sheet 10



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# **4-28. DISASSEMBLE CENTER HOUSING** (SHEET 10 OF 19)

## **TASK 5. REMOVE GOVERNOR ASSEMBLY, GOVERNOR BODY ASSEMBLY, AND GOVERNOR DRIVE GEAR**

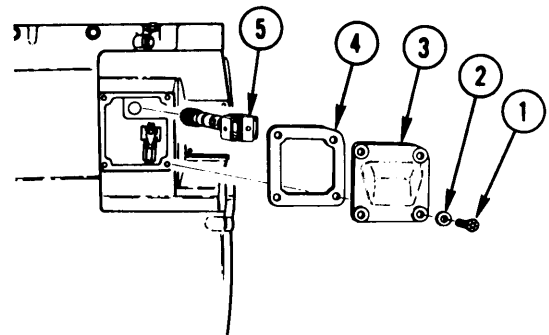
### **TOOLS:**

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**

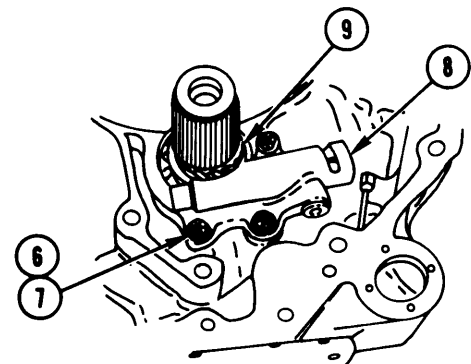
Transmission is on maintenance stand, right end up.

- 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.



- 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.



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  
Screw, 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.

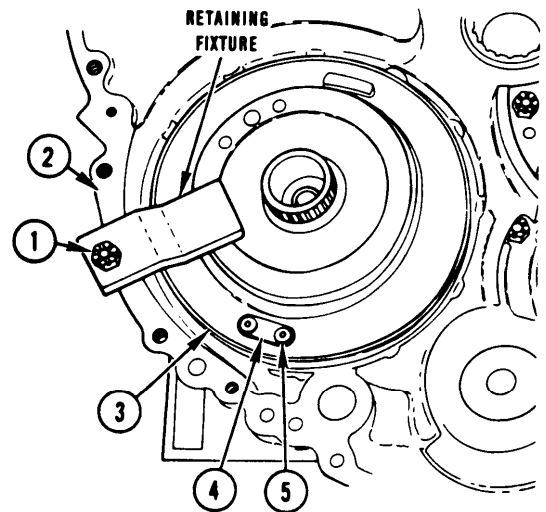
Go to Sheet 12

#### 4-28. 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).

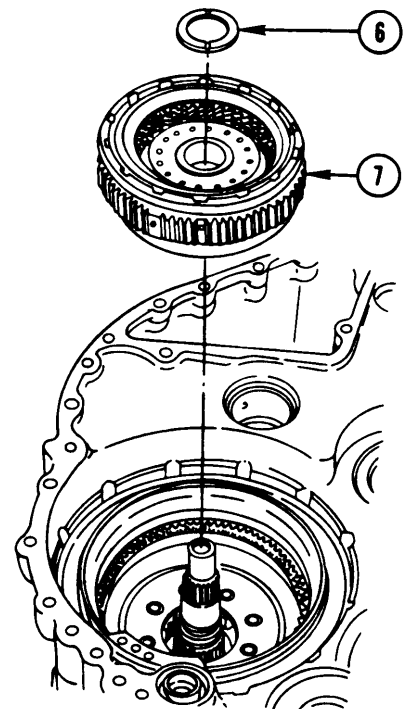
- 6 Remove thrust washer bearing (6).



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- 7 Remove fourth and reverse clutch assembly (7).

**REPAIR:** Refer to paragraph 4-29 for repair of fourth and reverse clutch assembly (7).

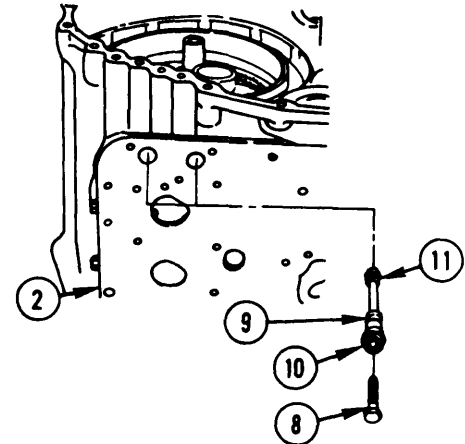


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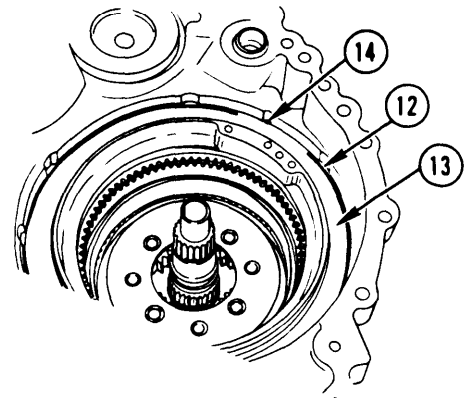
Go to Sheet 13

**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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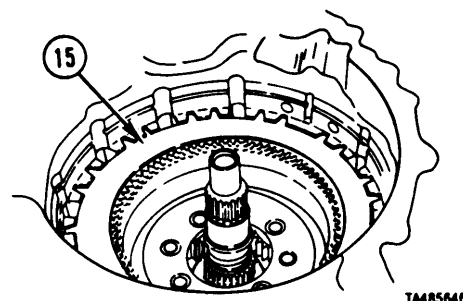
**CAUTION**

- 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

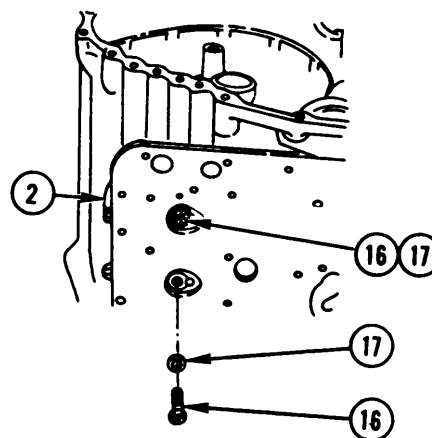
#### 4-28. DISASSEMBLE CENTER HOUSING (SHEET 14 OF 19)

- 15 Remove third clutch pack (15) consisting of three friction disks and four steel reaction disks.



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- 16 Using 9/16 inch socket and extension, remove two bolts (16) and washers (17) that retain clutch housings in center housing (2).

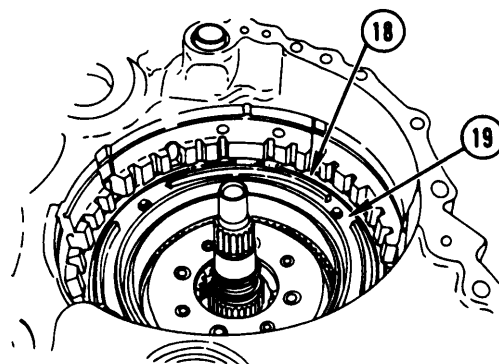


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- 17 Using two screwdrivers, remove retaining ring (18) that retains third clutch piston housing (19).

- 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).

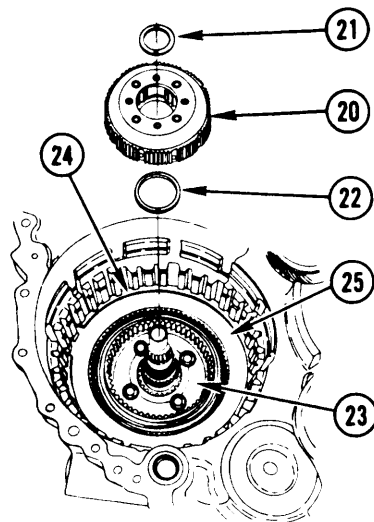


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Go to Sheet 15

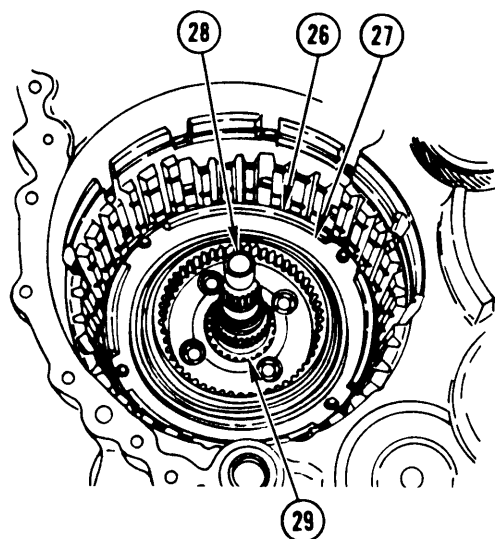
**4-28. DISASSEMBLE CENTER HOUSING  
(SHEET 15 OF 19)**

- 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).



TA485649

- 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.



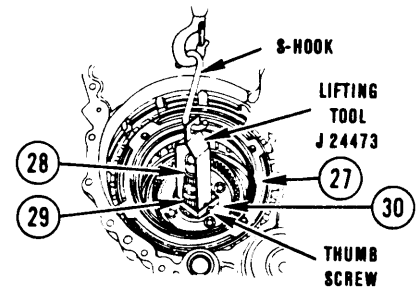
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Go to Sheet 16



#### 4-28. 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.



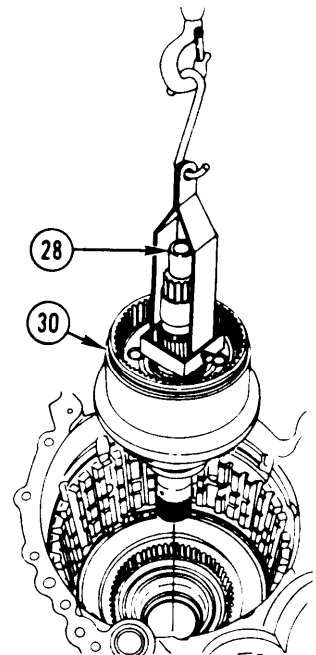
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#### NOTE

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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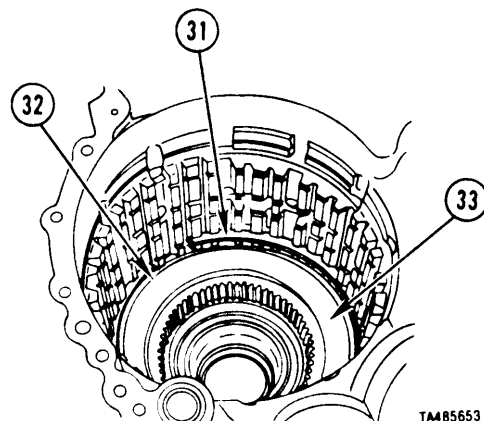
Go to Sheet 17

# 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.



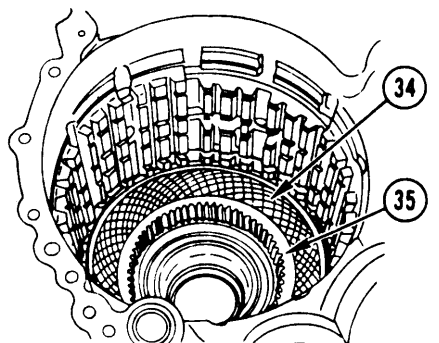
- 35 Remove backing plate (33) and first clutch pack (34) consisting of nine disks, along with internal gear (35).

- 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.

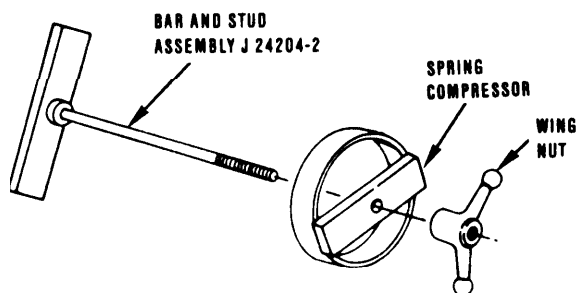
- 38 With other hand, install spring compressor tool J 24452 over stud, then install wing nut.

- 39 Turn wing nut on spring compressor until piston spring retainer ring (37) is compressed enough to take force from retaining ring (38).



## NOTE

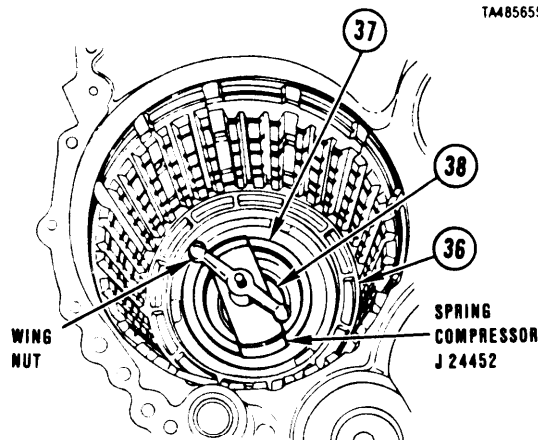
When removed from groove, retaining ring (38) will remain under spring compressor tool until tool is removed.



- 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).

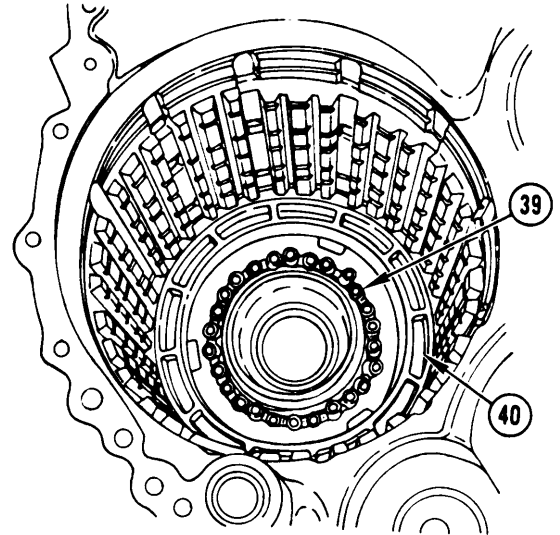


Go to Sheet 18

**4-28. 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.

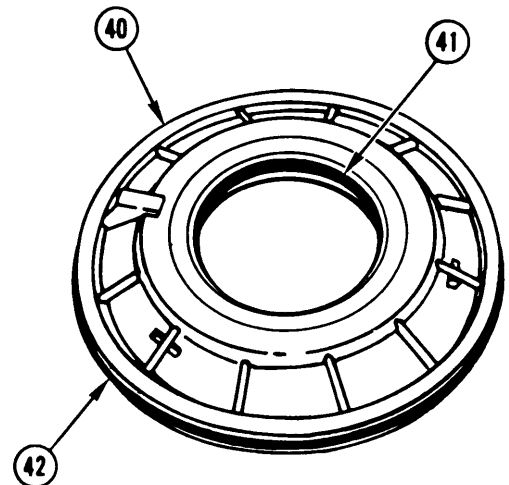


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45 Turn first clutch piston (40) over.

46 Remove preformed packings (41, 42) from first clutch piston (40).

**FOLLOW-ON PROCEDURE:** Install range pack. Refer to paragraph 4-30.



TA485658

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.

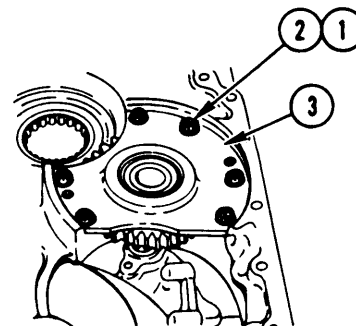
- 5 Remove hydrostatic pump idler gear (6).

### REPAIRS:

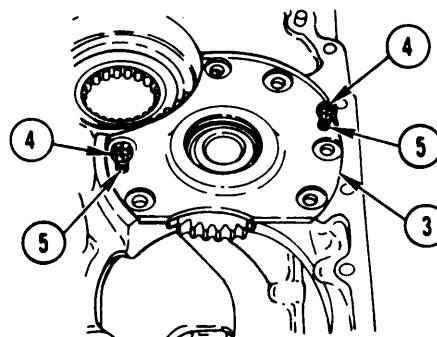
- Refer to paragraph 4-29 for replacement of bearings on idler gear (6).
- Refer to paragraph 4-29 for repair of center housing.

**FOLLOW-ON PROCEDURE:** Install left idler gear assembly. Refer to paragraph 4-30.

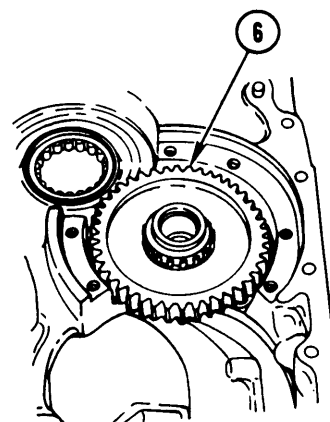
End of Task 7



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#### 4-29. 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 (grinder)

##### 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

- o One soldier holds housing steady.
- o 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**

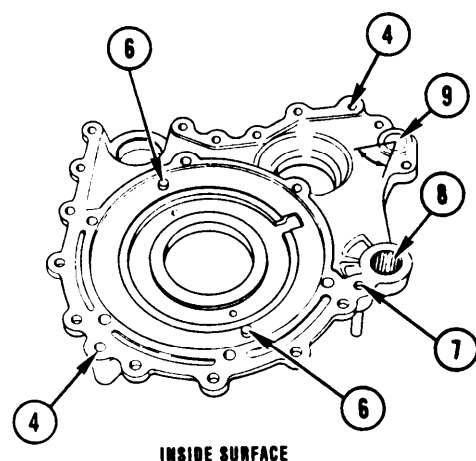
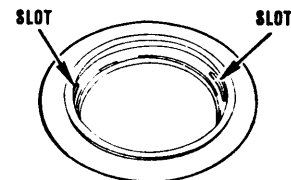
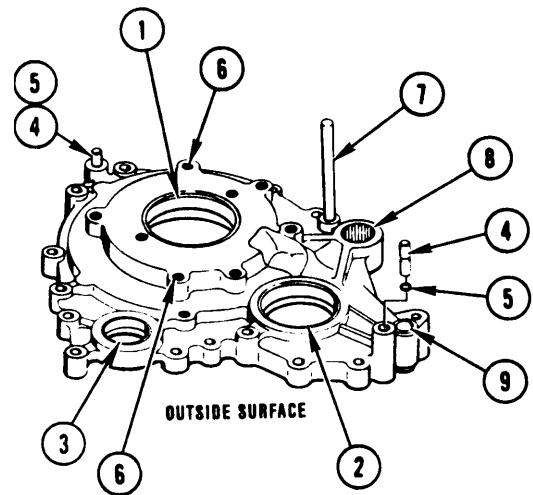
Use care not to cut into brake support when using grinder to cut slots in bearing race.

- 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 minute.

**CAUTION**

Use care not to damage brake support when using hammer and chisel to remove races.

- 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 plier, 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).



Go to Sheet 3

**4-29. 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

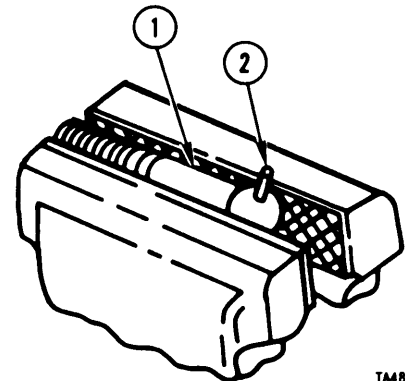
SUPPLIES:

Rag, wiping (Item 15, Appendix C)

**PRELIMINARY PROCEDURE:** Inner brake adjusting link is removed. Refer to paragraph 4-28.

Remove Pin

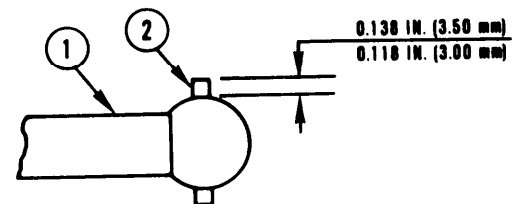
- 1 Place inner brake adjusting link (1) in vise.
- 2 (Using hammer and punch, drive pin (2) from link (1).



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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.



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**FOLLOW-ON PROCEDURE:** Install inner brake adjusting link. Refer to paragraph 4-30.

End of Task 2

Go to Sheet 5



#### 4-29. 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.

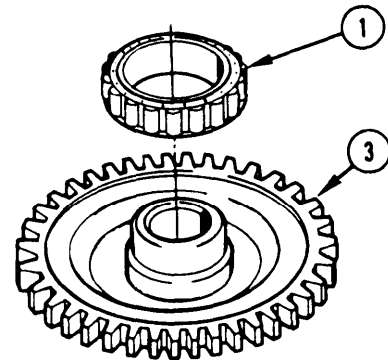
#### NOTE

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

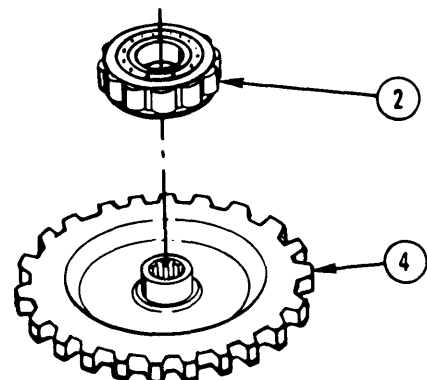
#### Remove Bearings

- 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



TA485667



TA485668

# 4-29. REPAIR CENTER HOUSING COMPONENTS (SHEET 6 OF 31)

- 3 Using arbor press, remove bearing (5) from output shaft (6).

## **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).

## **NOTE**

Early configurations of X200-4 utilize 2 retaining rings (11) with early configurations of Hydrostatic Idler Gear (10). Later Configurations of X200-4 do not utilize retaining rings (11) with later configuration of Hydrostatic Idler Gear (10).

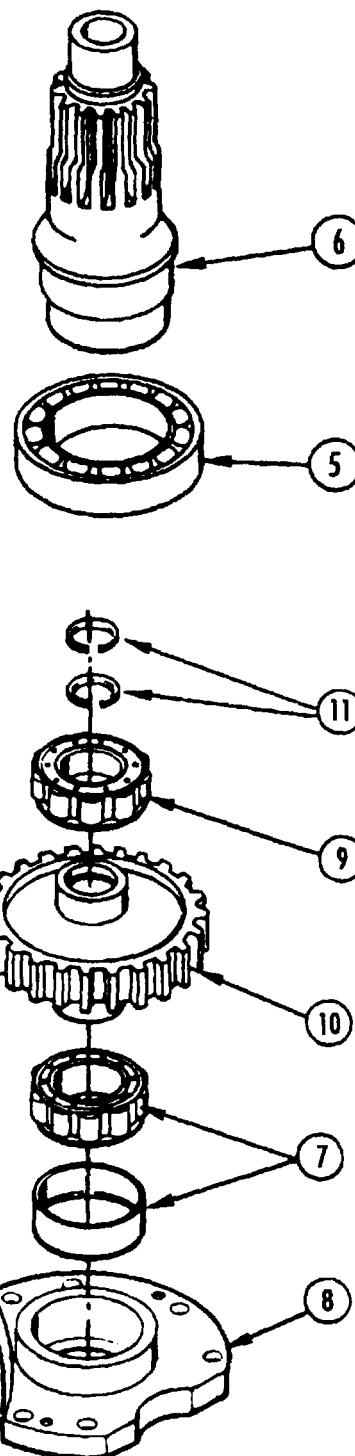
- 4 Using screwdriver, remove two retaining rings (11) when present.
- 5 Using bearing puller, remove inner race and rollers of bearings (7, 9) from idler gear (10).

## **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).

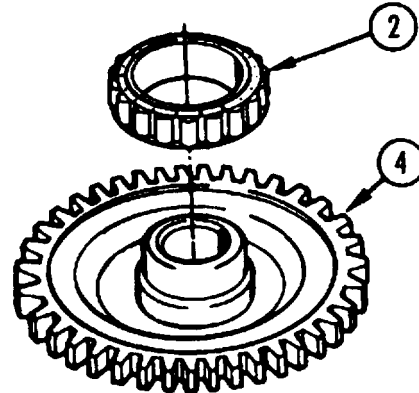
Go to Sheet 7



#### 4-29. REPAIR CENTER HOUSING COMPONENTS (SHEET 7 OF 31)

##### Install Bearings

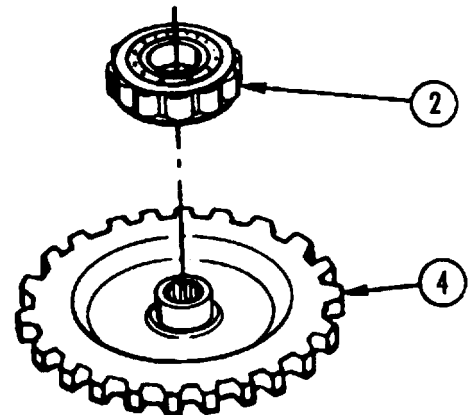
- 8 Using two heat guns, heat retaining plate (8) for one hour.
- 9 Using arbor press, press new outer race of bearing (7) to a seat in shoulder of retaining plate (8).
- 10 Using arbor press, press against the numbered end of bearing (7) to install inner race and rollers of bearing (7) to a seat against 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).



##### NOTE

Retaining rings (11) have been removed from later configurations. If removed it is optional to replace them regardless if early configuration Hydrostatic Idler Gear (10) is used.

- 12 Using screwdriver, install two retaining rings (11).
- 13 Using arbor press, install bearing (5) to a seat against shoulder on output shaft (6).
- 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.

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**

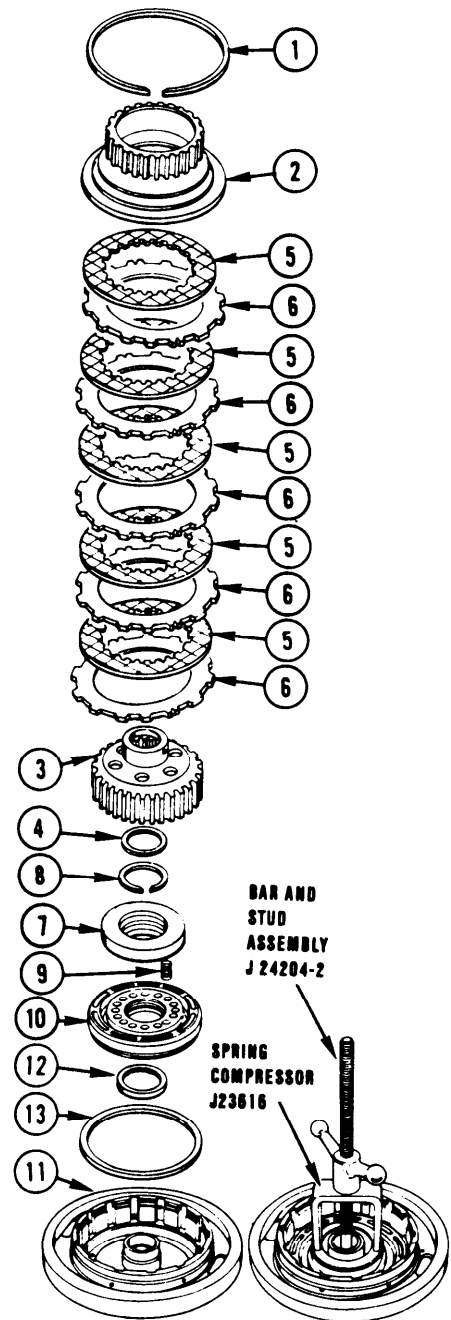
- When removing, handling, or installing clutch pack, keep all clutch disks and plates in the same order and facing the same way. Waler heat and pressure, clutch plates can take on a conical shape, called coning. Each plate will differ in degree of coning. When coned plates are mixed or turned over, 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 screwdriver, 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).



TM485673

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).

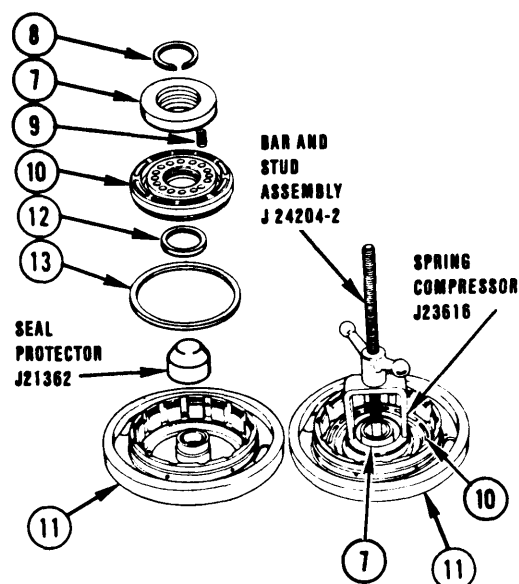
20 by retaining ring (8) in place on retaining Plate (7).

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



TA485674

#### 4-29. 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

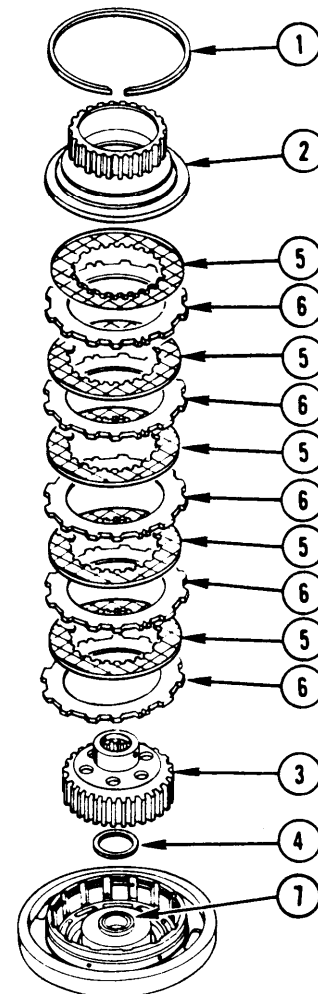
Compressed air used for testing purposes must not exceed 30 pounds of pressure per square inch. Use only with effective chip guards and protective personal equipment including goggles or face shield and glove. Never blow compressed air toward another person.

- 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.

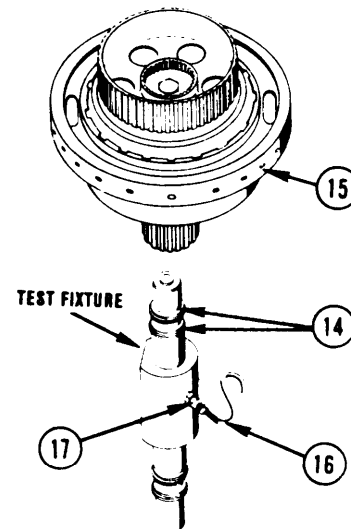
**FOLLOW-ON PROCEDURE:** Install forward clutch housing assembly. Refer to paragraph 4-30.

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. Waler 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. hdividual 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

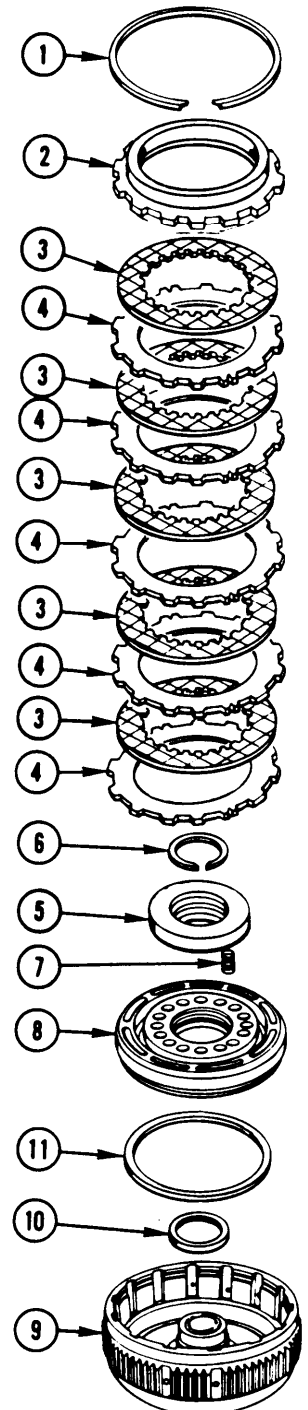
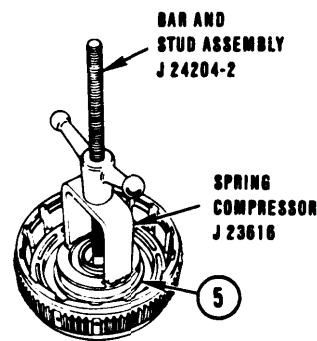


#### 4-29. REPAIR CENTER HOUSING COMPONENTS (SHEET 13 OF 31)

##### 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

Go to Sheet 14



TA485677

# 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).

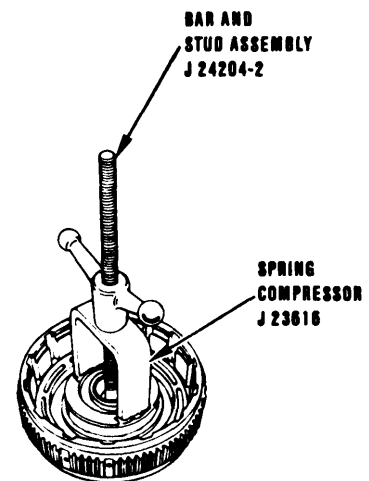
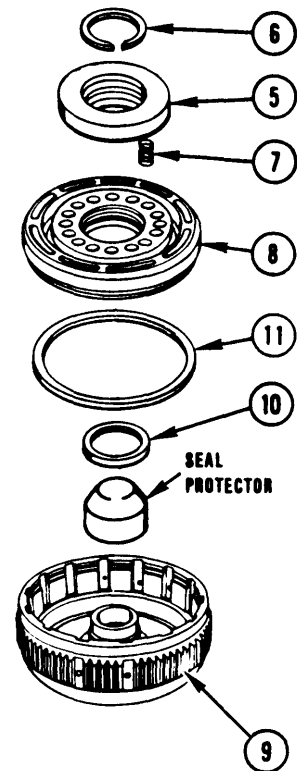
18 Lay retaining ring (6) in place on retaining Plate (5).

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.

Go to Sheet 15



TA485678

#### 4-29. 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

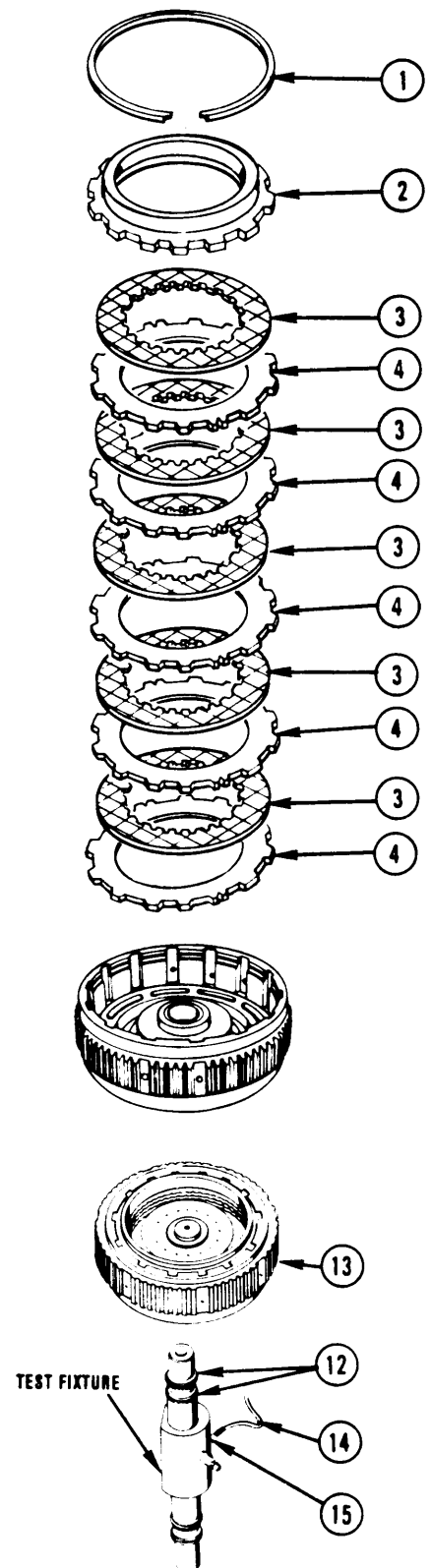
Compressed air used for testing purposes must not exceed 30 pounds of pressure per square inch. Use only with effective chip guards and protective personal equipment including goggles or face shield and gloves. Never blow compressed air toward another person.

- 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



**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) 3909063 (4 required for each piston)  
Seal (77342) 23011475 (1 required for each piston)

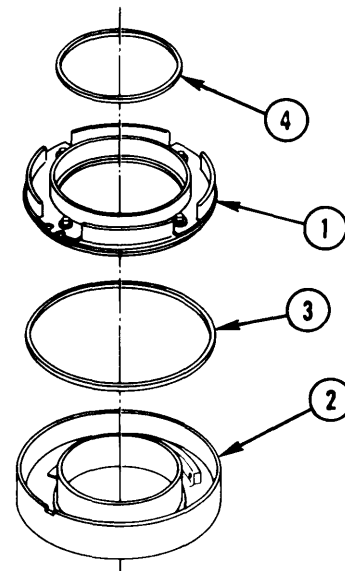
**NOTE**

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).

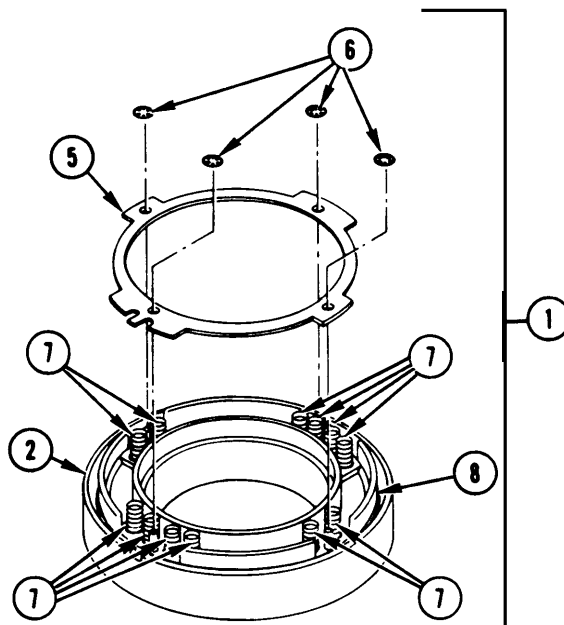
Go to Sheet 17



#### 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.

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  
Plier, wrench  
Press, arbor, hand operated  
Screwdriver, flat tip (2 required)

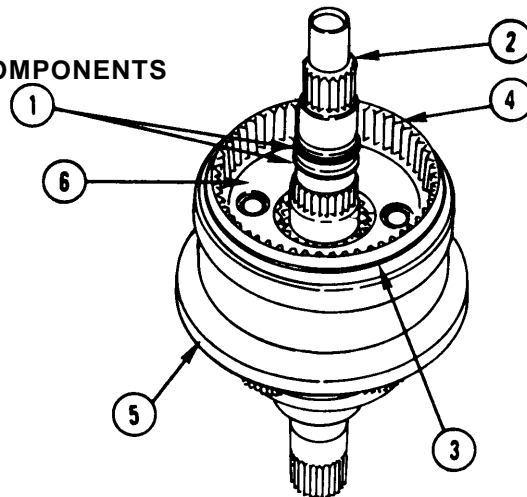
### SUPPLIES:

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

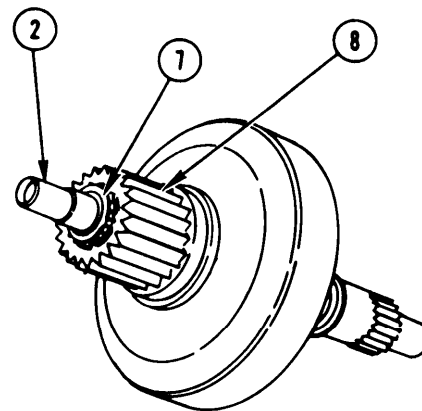
**PRELIMINARY PROCEDURE:** Input shaft components are removed. Refer to paragraph 4-28.

### Disassemble Input Shaft Components

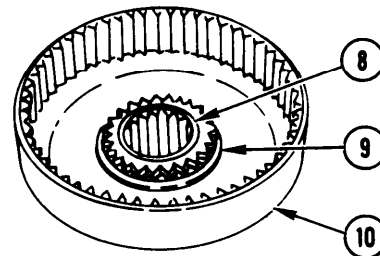
- 1 Remove two seal rings (1) from shouldered shaft (range input shaft) (2).
- 2 Using screwdriver, remove retaining ring (3).
- 3 Remove front internal gear (4) from range input shaft (2).
- 4 Remove range input shaft (2) with its attached parts from rear carrier drum (5).
- 5 Remove center carrier (6) from input shaft (2).
- 6 Using retaining ring plier, 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).



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Go to Sheet 19

#### 4-29. 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

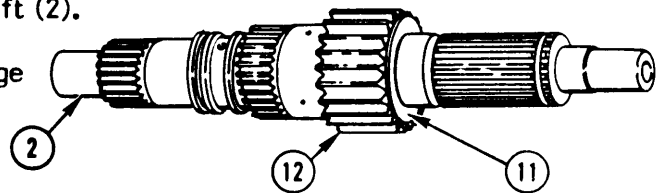
Do not remove retaining ring (19) unless parts require replacement.

14 Using plastic faced hammer, drive shaft (16) into rear carrier assembly (18) so that access to retaining ring (19) is obtained.

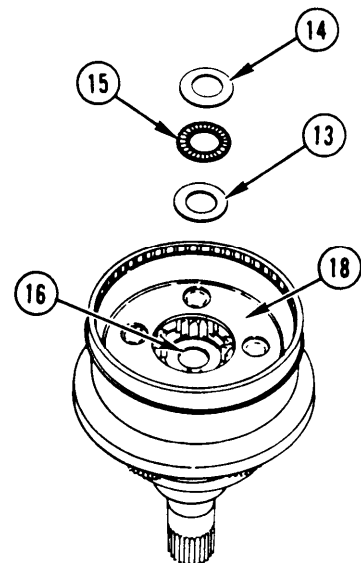
#### NOTE

Opening of retaining ring (19) must be rotated so that it is between gears of rear carrier assembly (18).

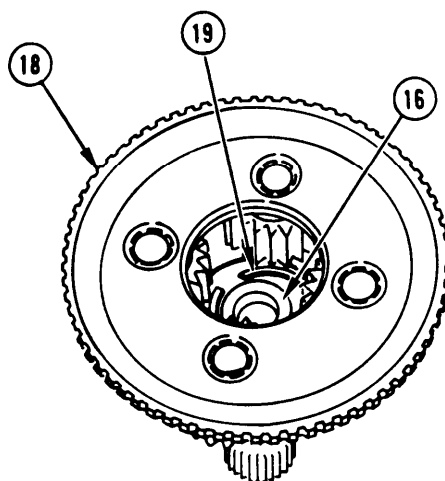
15 Using screwdrivers and retaining ring pliers, remove retaining ring (19) that holds shaft (16) to rear carrier assembly (18). When retaining ring (19) is spread, drive downward on shaft (16) with brass drift and ball peen hammer.



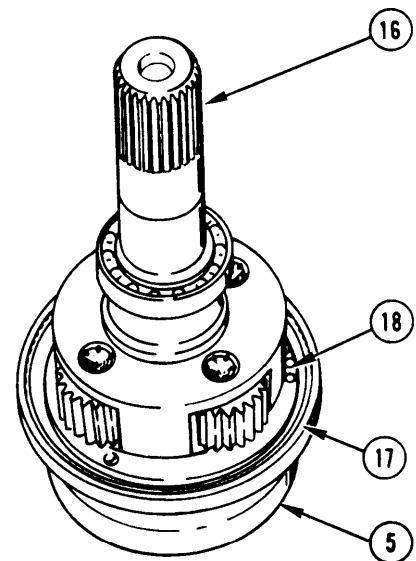
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Go to Sheet 20

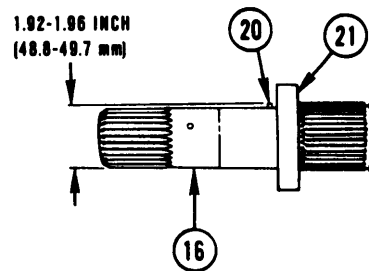
#### 4-29. REPAIR CENTER HOUSING COMPONENTS (SHEET 20 OF 31)

##### 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).



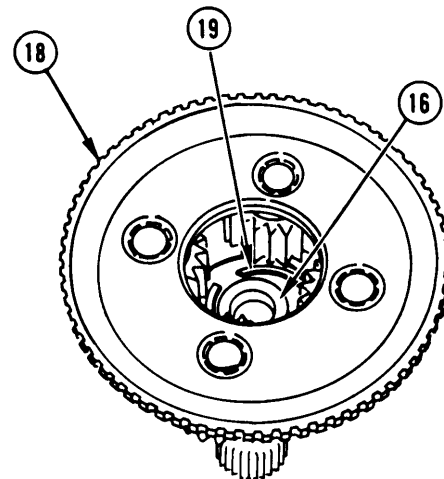
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##### Assemble Input Shaft Components

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).



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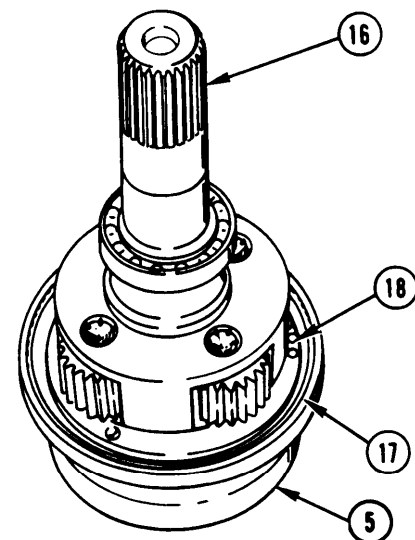
##### NOTE

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).



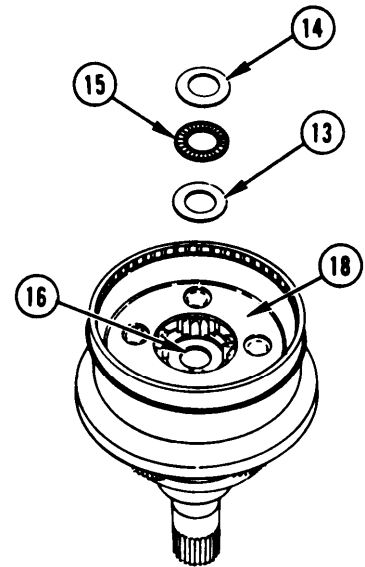
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Go to Sheet 21

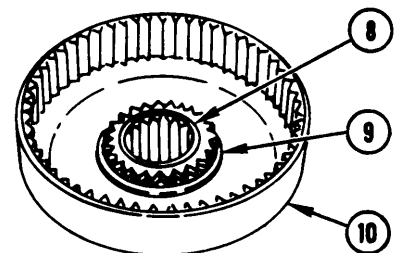
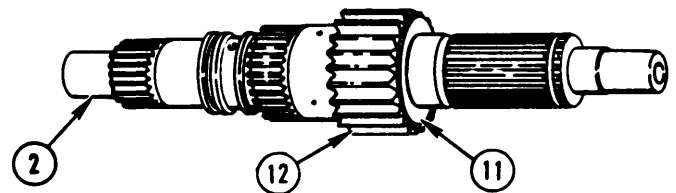
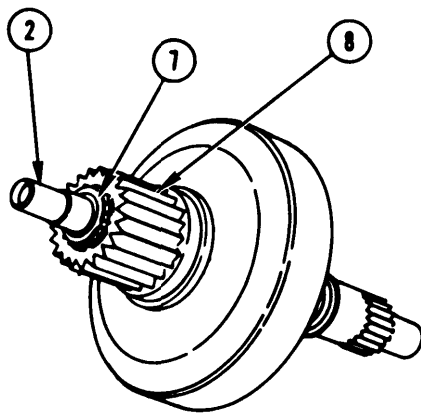


#### 4-29. REPAIR CENTER HOUSING COMPONENTS (SHEET 21 OF 31)

- 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).

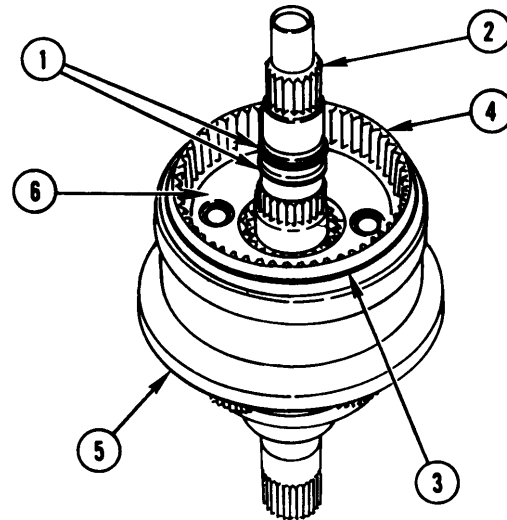


Go to Sheet 22



**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).



**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  
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

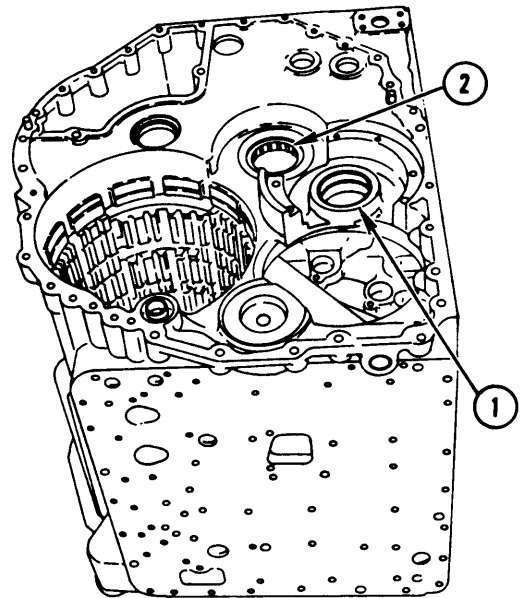
#### 4-29. REPAIR CENTER HOUSING COMPONENTS (SHEET 23 OF 31)

##### 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



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

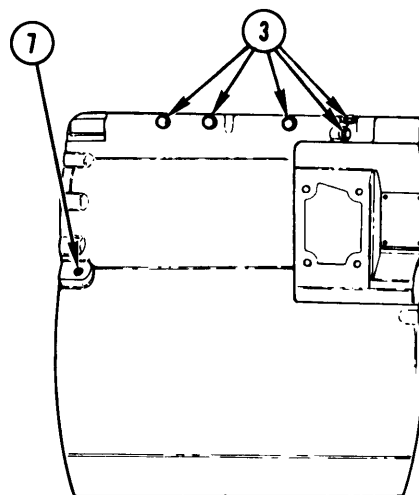
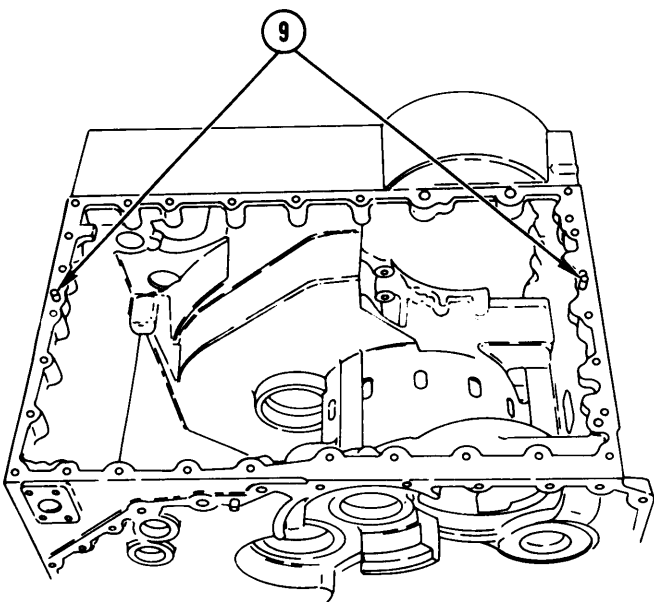
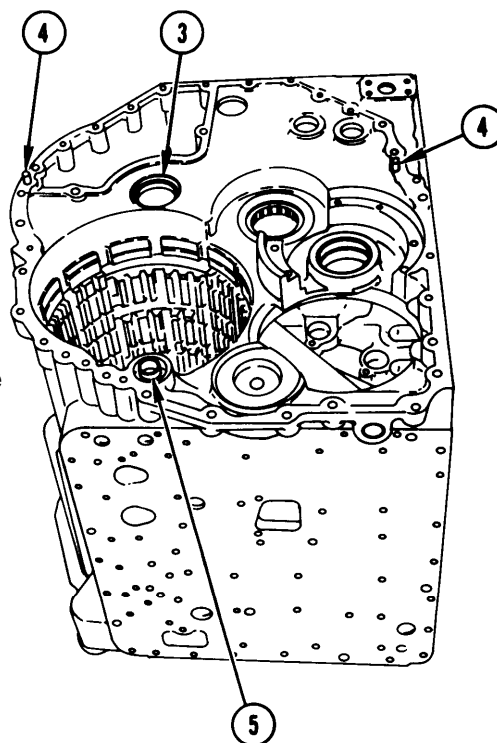
Left side of center housing has outer race and rollers (2) in place. This is for bearing on range input drive gear. This separable bearing is a matched set consisting of an inner race and an outer race and rollers. Do not replace this outer race and rollers unless the inner race of the respective bearing 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 Step 8 deleted.
- 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.



Go to Sheet 25

#### 4-29. 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**

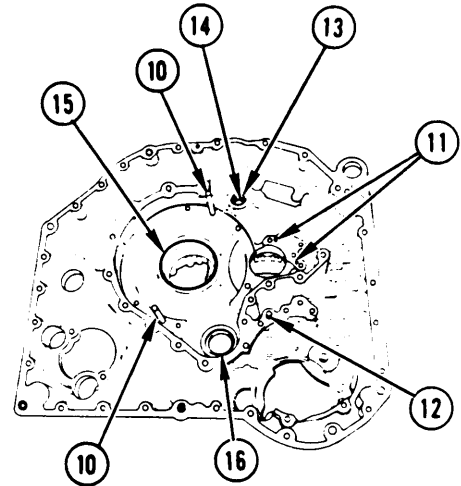
Hot parts can burn you Always wear leather gloves when working with parts that are or might be hot.

#### **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.

- 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)

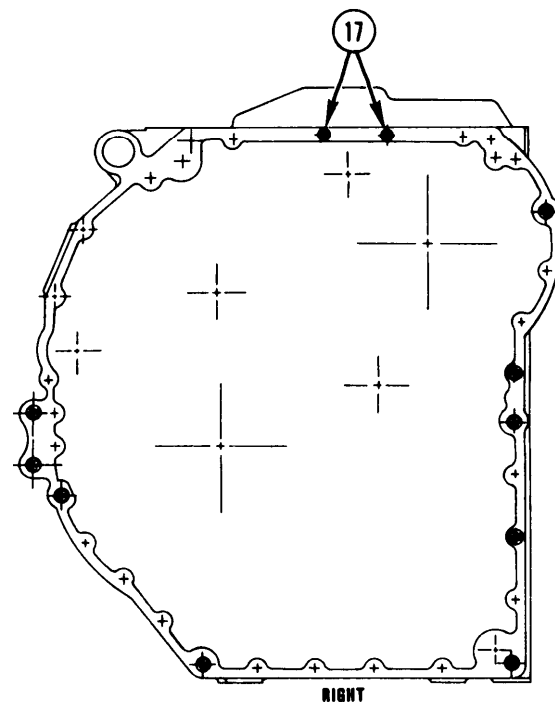
Replace Helical Coil Inserts

## 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).



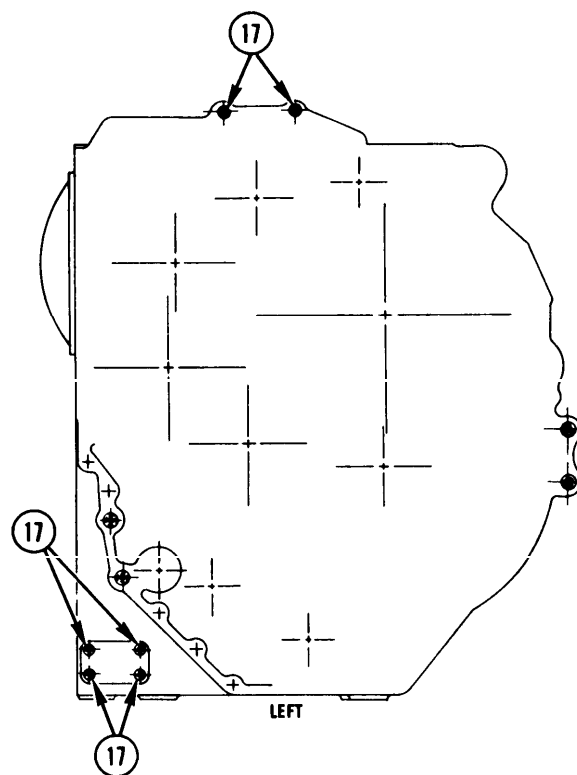
20 Clean out threads.

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 coil thread insert kit.

24 Using insertion tool, screw new insert (17) 1 to 2 turns below surface of center housing.

Drive locking keys in place using a hammer.

Remove insertion tool. Remove tang.

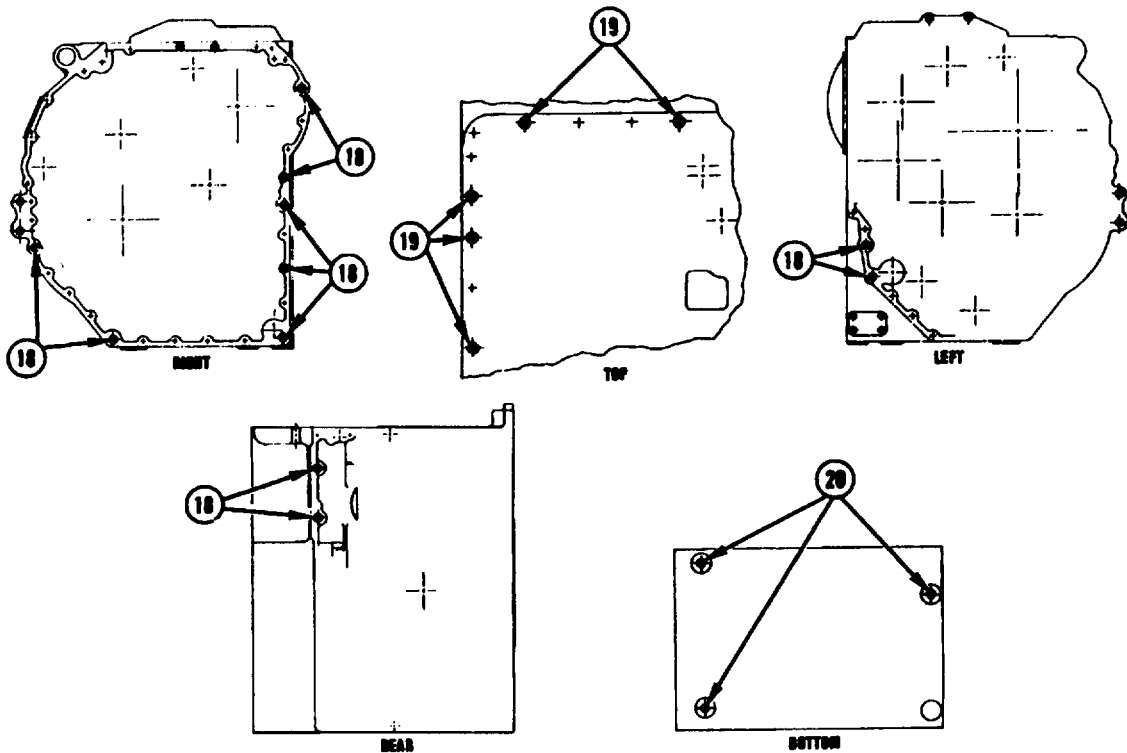
Go to Sheet 27

4-29 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)	23049119	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)	23049118	5/16-18 x 2 inch	5/16-18	5/16 inch	1/2 inch	0.005-0.057 inch (0.13-1.57 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

# 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.

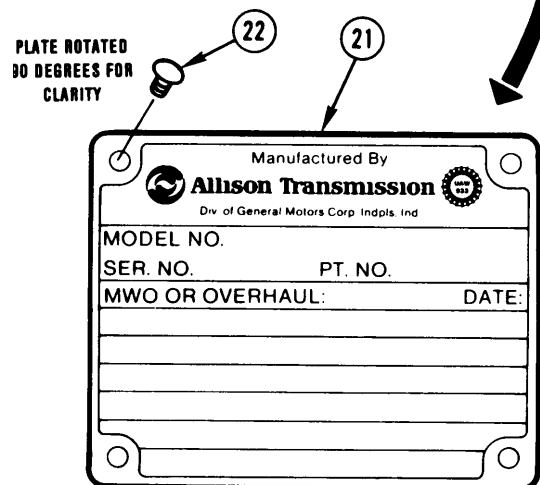
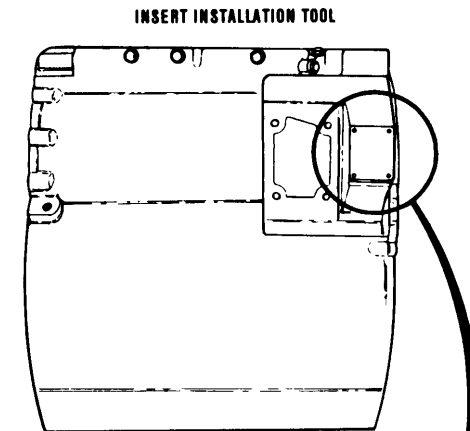
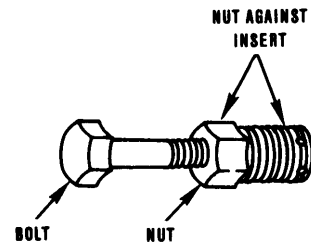
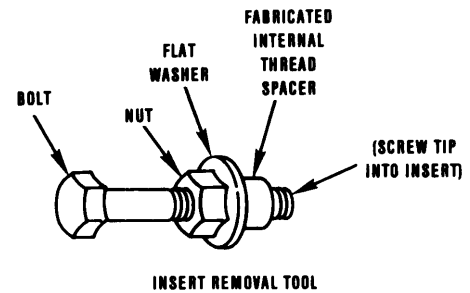
Replace Identification Plate

## 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





#### 4-29. REPAIR CENTER HOUSING COMPONENTS (SHEET 29 OF 31)

Install Center Housing Components

##### **WARNING**

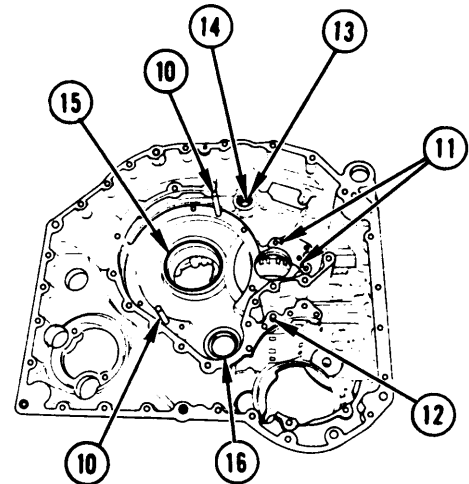
Hot parts can burn you. Always wear leather gloves when working with parts that are or might be hot.

- 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.
- 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)**

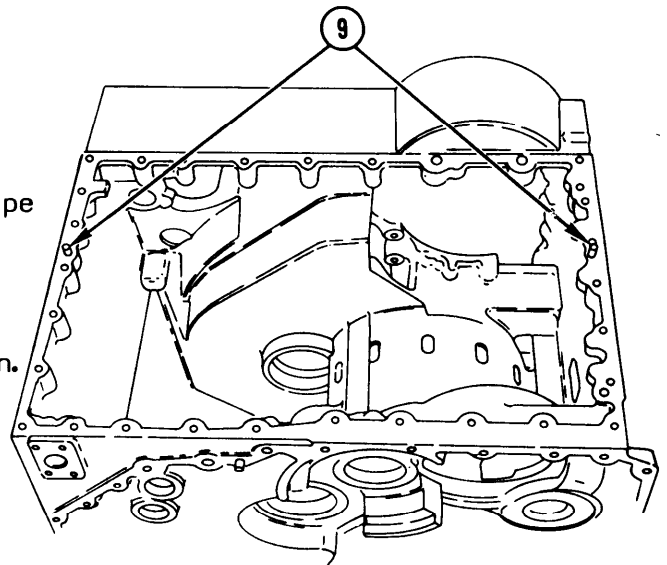
43 Using arbor press, install two pin (9) to a height of 0.38 inch (9.7 mm) above the front side of center housing.

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).

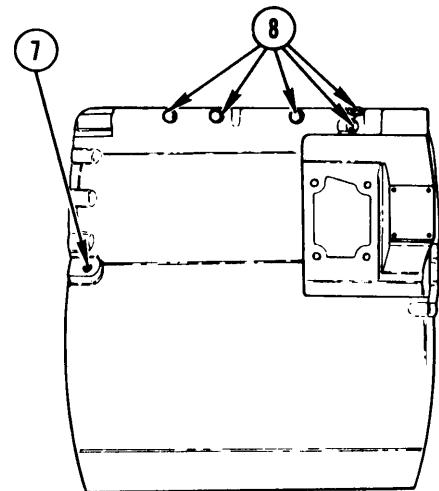
46 Using a 3/16 inch hex socket, install pipe plug (7) in back side of center housing.

47 Using torque wrench, tighten plug (7) to 50-60 lb-in. (6-7 N•m).



48 Step 48 deleted.

49 Step 49 deleted.



Go to Sheet 31

#### 4-29 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.

##### **WARNING**

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

- 52 Using arbor press, install oil transfer sleeve (3) to a seat in its bore in left side of center housing.
- 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.

- 54 Freeze new outer race and rollers (2) in dry ice for one hour.

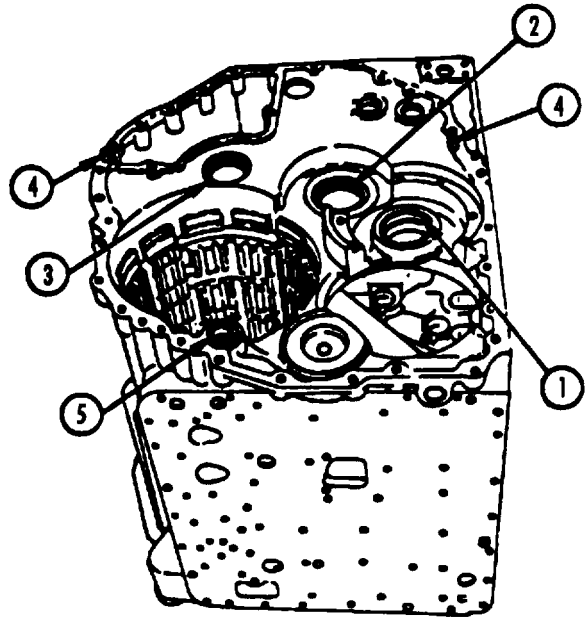
##### **NOTE**

Later manufactured housing assembly center (machined) will have a plug installed in #42 hole, installed flush to 0.100 below housing surface.

This plug is not maintenance significant. If plug is missing, do not attempt to install one.

- 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.

TA485713

- 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).

End of Task 1

Go to Sheet 2

TA485714

## 4-30. 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)

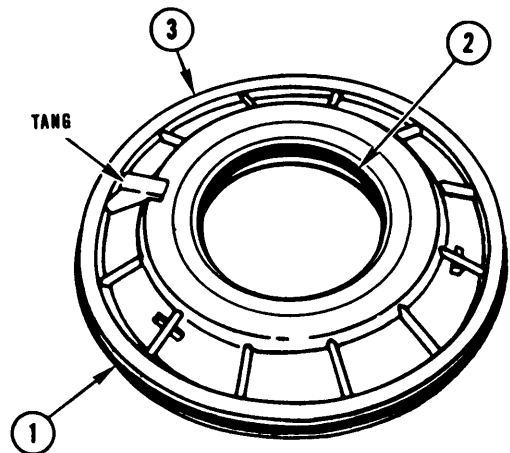
#### PERSONNEL REQUIRED: Two

- One soldier holds shim and tool J 24204-2 in place.
- Other soldier compresses first clutch piston spring retainer.

Go to Sheet 3

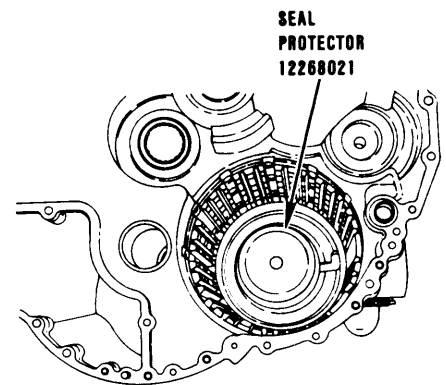
**4-30. ASSEMBLE CENTER HOUSING  
(SHEET 3 OF 20)**

- 1 Install new packings (1, 2) onto first clutch Piston (3).  
Coat packings (1, 2) with petrolatum.



- 2 Install piston and sea 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.

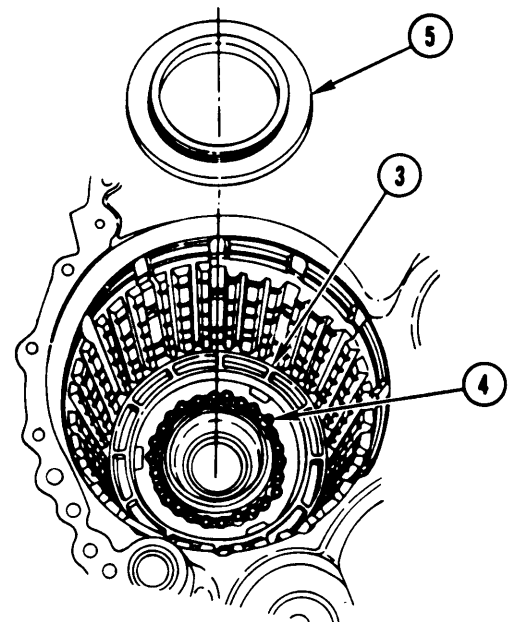


- 4 Using two pairs of slip joint pliers, grasp cross members on first clutch piston (3) at two points, 180 degrees apart and install piston (3) into center housing. Index the tang on piston with the slot in center housing.

- 5 Remove sleeve 12268021.

- 6 Install twenty-six springs (4) into spring pockets in piston (3).

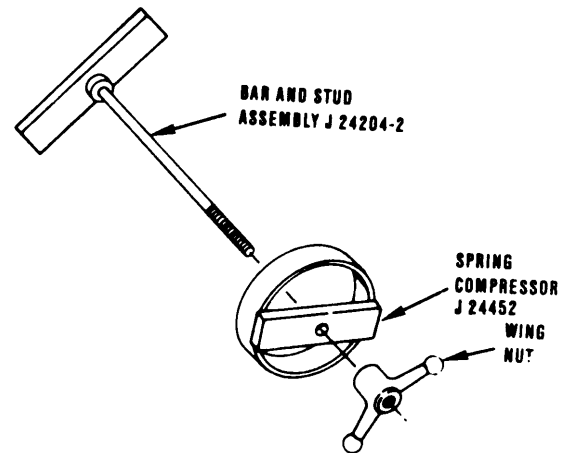
- 7 Install spring retainer (5) over springs (4). Be sure twenty-six springs (4) are seated in retainer (5).



Go to Sheet 4

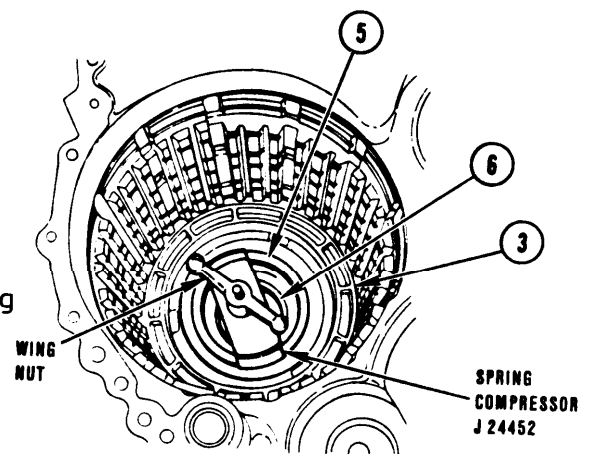
# **4-30 ASSEMBLE CENTER HOUSING** **(SHEET 4 OF 21)**

- 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.



Go to Sheet 5

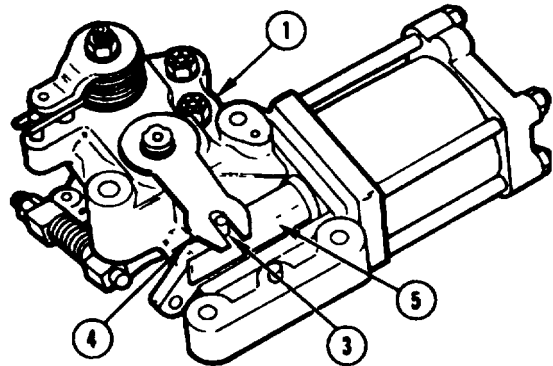
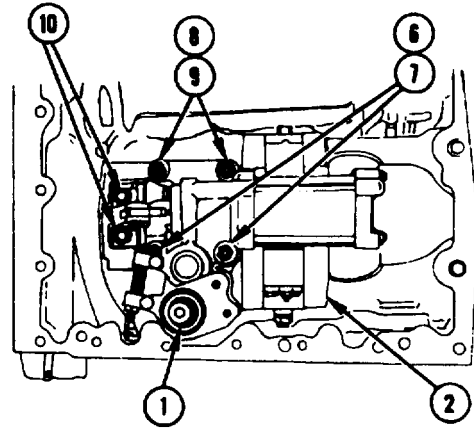
**4-30. ASSEMBLE CENTER HOUSING (SHEET 15 OF 21)**

- 1 Using rotary control on transmission maintenance stand, turn transmission to input side up.

**WARNING**

Prior to placind steer control assembly (1) on hydrostat (2), check to make sure control rod pin (3) is engaged into geedback lever (4). If control rod pin (3) is not engaged into feedback lever (4), rotate control rod (5) until engaged. Non-engagement will cause vehicle failure of full steer during start-up.

- 2 Place steer control assembly (1) on hydrostat (2).
- 3 Using scoker, install two 5/16-18 x 2-1/4 inch bolts (6) and washers (7) in steer control assembly (1).
- 4 Using coker, install two 5/16-18 x 1-1/2 inch bolts (8) and washers (9) in steer control assembly (1).
- 5 Apply sealing lube on threads of two socker head screws (10).
- 6 Using 3/8 inch socket head screw attachment, install two socket head screws (10) in cam lever of steer control assembly (1).
- 7 Using torque wrench and socket, tighten four bolts (6,8) to 17-20 lb-ft (23-27)Nm).
- 8 Using torque wrench and socket head screw attachment, tighten two socket head screws (10) to 87-88 lb-ft (117-119Nm).



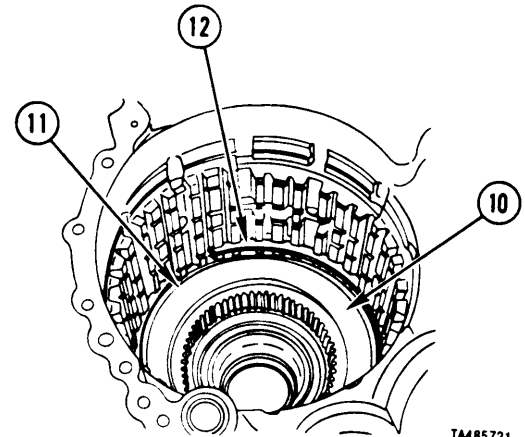
End Of Task 5

Go to Sheet 16

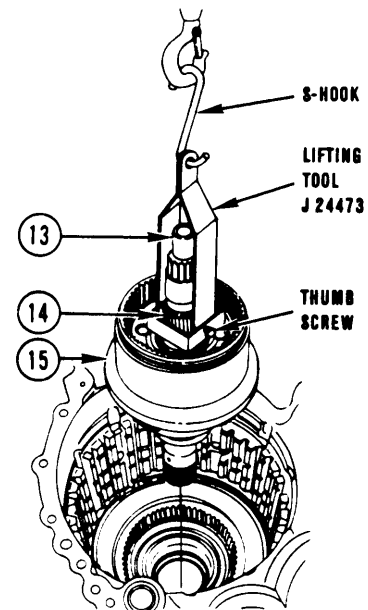


#### 4-30. ASSEMBLE CENTER HOUSING (SHEET 6 OF 21)

- 18 Install clutch disk (backing plate) (10) onto reaction plate (7).
- 19 Using screwdriver, install retaining ring (11) to retain backing plate (10).



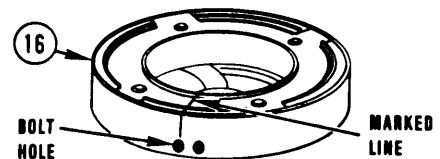
- 20 Using screwdriver, install retaining ring (12) into range pack bore.
- 21 Put front support assembly lifter tool J 24473 over end of shouldered shaft (range input shaft) (13) and put lower end of tool in groove below splined area of center sun gear (14).



- 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).

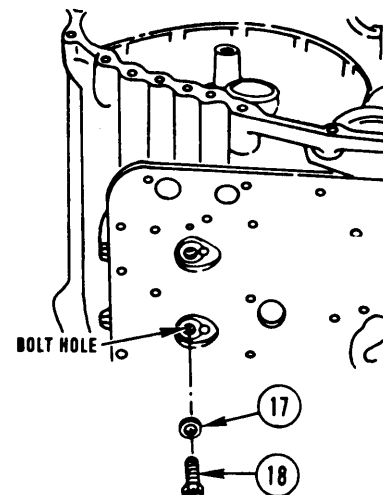
- 25 Remove S-hook and lifting tool.

- 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.



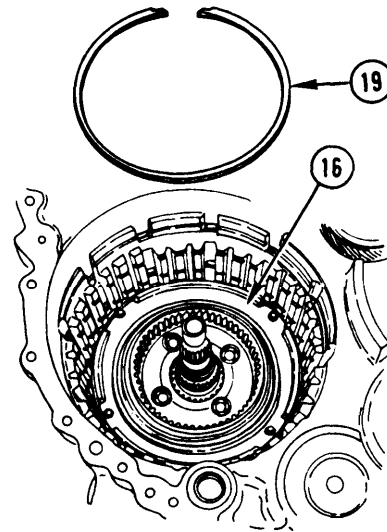
Go to Sheet 7

# 4-30 ASSEMBLE CENTER HOUSING (SHEET 7 OF 21)

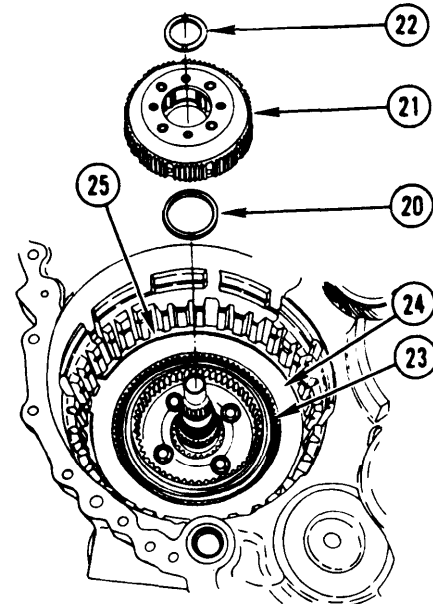
- 29 Using feeler gage, measure space between piston housing assembly (16) and top of retaining ring groove in range pack bore of center housing. Select retaining ring (19) from table.

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

- 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).



TA485724



TA485725

Go to Sheet 8

#### 4-30. 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.

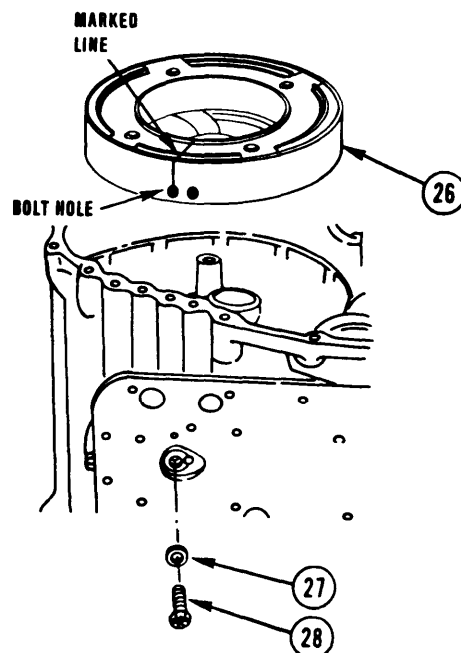
40 Using 9/16 inch socket and extension, install washer (27) and bolt (28) through center housing and into piston housing assembly (26) finger tight.

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.

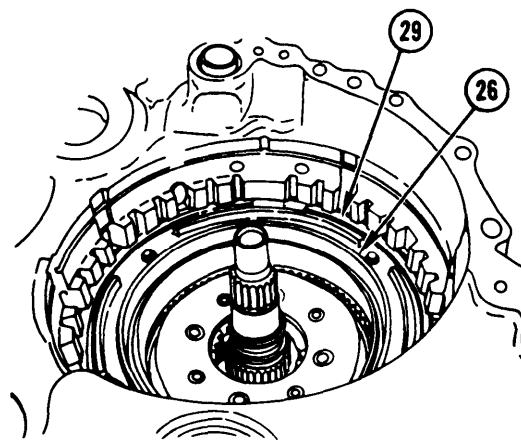
For Measured Distance	Select Ring
0.149-0.152 inch (3.79-3.88 mm)	6884274
0.153-0.155 inch (3.89-3.96 mm)	6884273
0.156-0.158 inch (3.97-4.03 mm)	6884275
0.159-0.161 inch (4.04408 mm)	6884276

42 Using screwdriver, install selected retaining ring (29).

43 Using torque wrench, tighten bolt (28) to 36-43 lb-ft (49-68 N•m).



TA485726

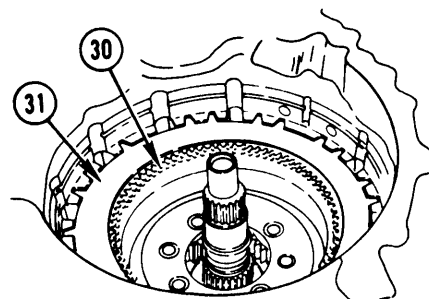


TA485727

Go to Sheet 9

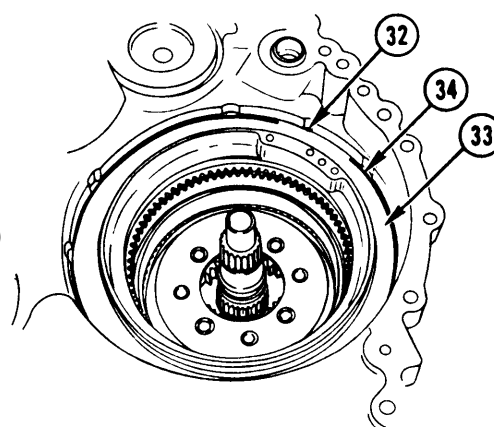
# 4-30. ASSEMBLE CENTER HOUSING (SHEET 9 OF 21)

- 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.



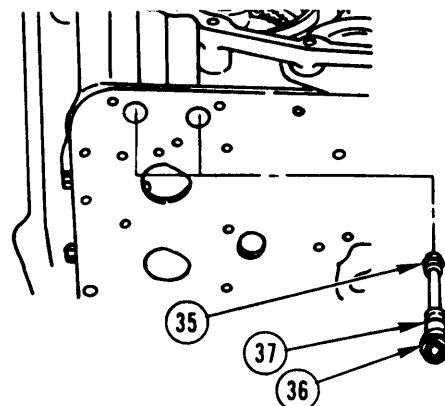
TA485728

- 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) 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

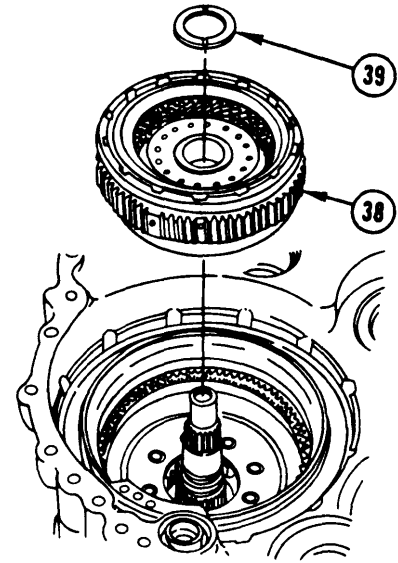
Go to Sheet 10

#### 4-30. 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).

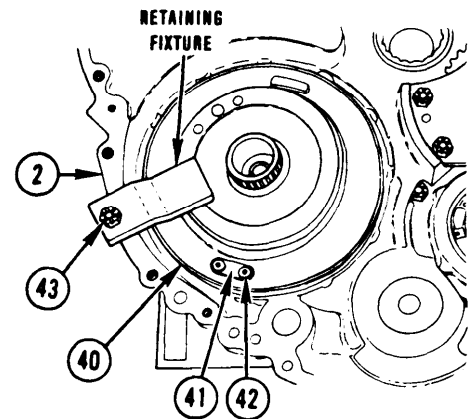
#### NOTE

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.



TA485731

- 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.



TA485732

End of Task 2

Go to Sheet 11

**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)

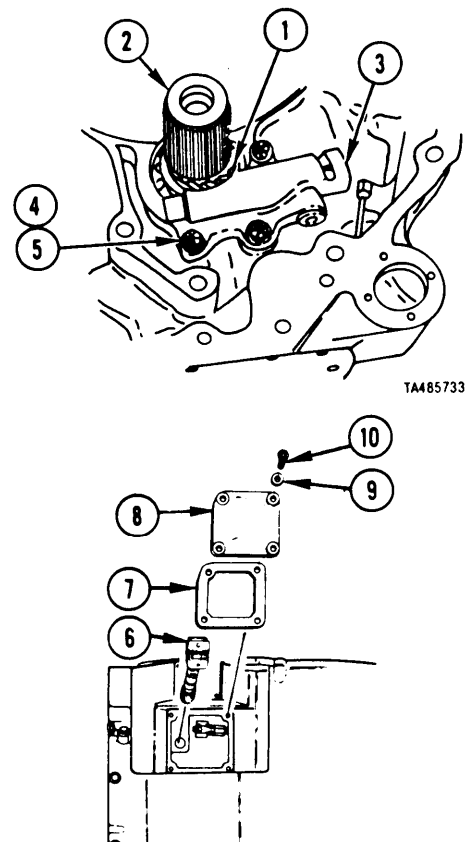
**NOTE**

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).

End of Task 3

Go to Sheet 12



# **4-30. 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

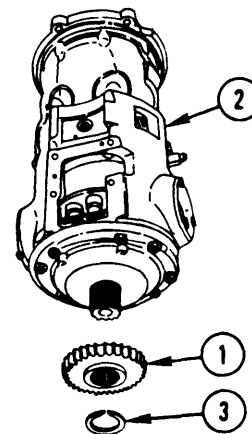
### **SUPPLIES:**

Eyebolt, 7/8-9

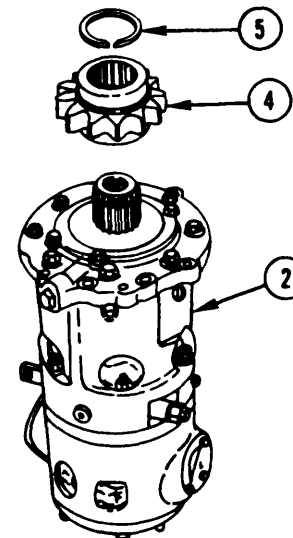
### **NOTE**

Transmission installed on maintenance stand with input housing and right end cover assemblies removed, right end of transmission turned up.

- 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).



TA485735



TA485736

Go to Sheet 13

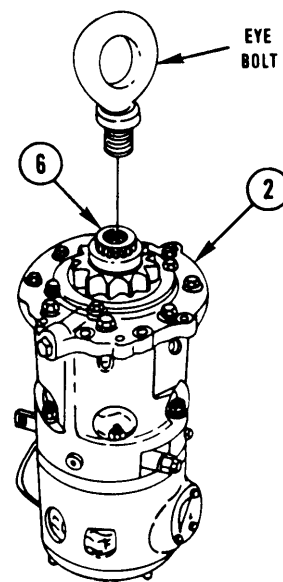
# 4-30. ASSEMBLE CENTER HOUSING (SHEET 13 OF 21)

- 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).

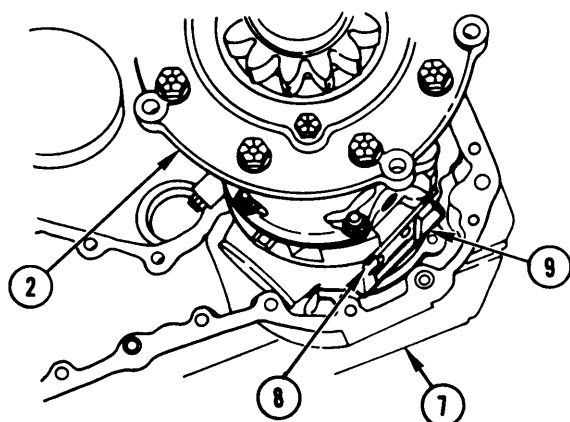
## NOTE

Center housing is cut away to receive the raised part of the hydrostat housing where the steer control assembly will be installed (TASK 5).

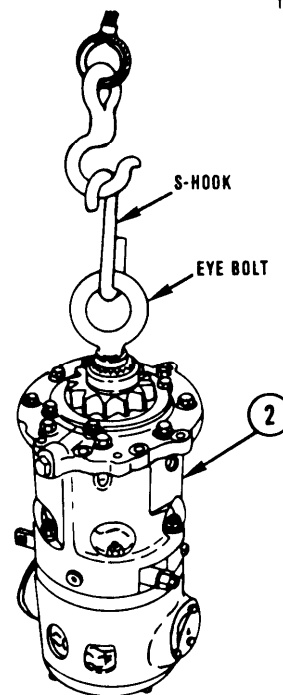
- 7 Turn hydrostat (2) so that Platform (8) for steer control assembly lines up with recess (9) in center housing. Lower hydrostat into transmission, aligning gear at base of hydrostat with gear in center housing.



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TA485739



TA485738

Go to Sheet 14



#### 4-30. ASSEMBLE CENTER HOUSING (SHEET 14 OF 20)

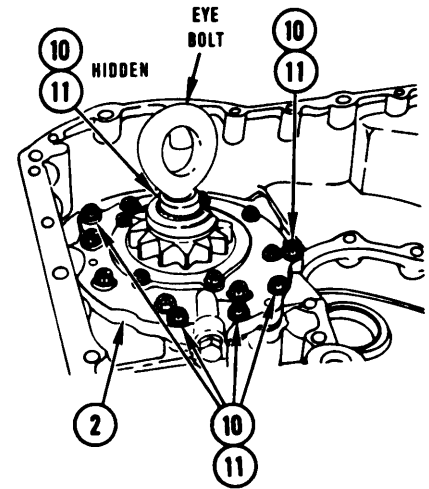
##### NOTE

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 (49-69 N•m).



**FOLLOW-UN 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.

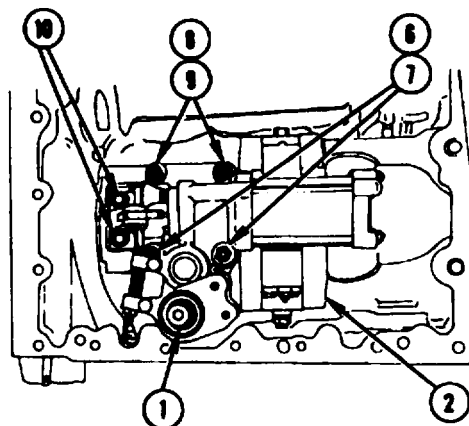
Go to Sheet 15

#### 4-30. ASSEMBLE CENTER HOUSING (SHEET 15 OF 21)

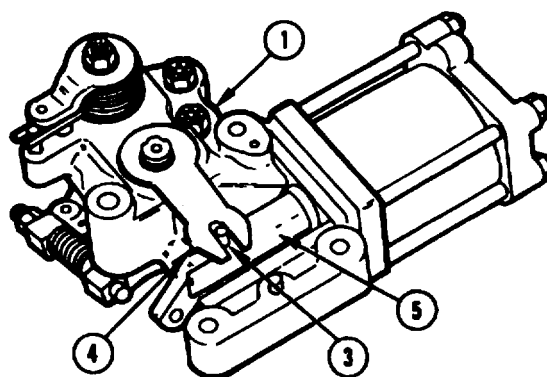
- 1 Using rotary control on transmission maintenance stand, turn transmission to input side up.

##### **WARNING**

Prior to placing steer control assembly (1) on hydrostat (2), check to make sure control rod pin (3) is engaged into feedback lever (4). If control rod pin (3) is not engaged into feedback lever (4), rotate control rod (5) until engaged. Non-engagement will cause vehicle failure of full steer during start-up.



- 2 Place steer control assembly (1) on hydrostat (2).
- 3 Using socket, install two 5/16-18x 2-1/4 inch bolts (6) and washers (7) in steer control assembly (1).
4. Using socket, install two 5/16-18 x 1-1/2 inch bolts (8) and washers (9) in steer control assembly (1).
5. Apply sealing tube on threads of two socket head screws (10).
6. Using 3/8 inch socket head screw attachment, install two socket head screws (10) in cam lever of steer control assembly (1).
7. Using torque wrench and socket, tighten four bolts (6,8) to 17-20 lb-ft (23-27 Nm).
8. Using torque wrench and socket head screw attachment, tighten two socket head screws (10) to 87-88 lb-ft (117-119 Nm).



**End Of Task 5**

**Go to Sheet 16**

#### 4-30. 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)

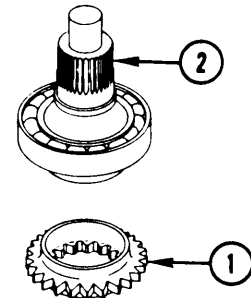
Rag, wiping (Item 15, Appendix C)

##### 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).

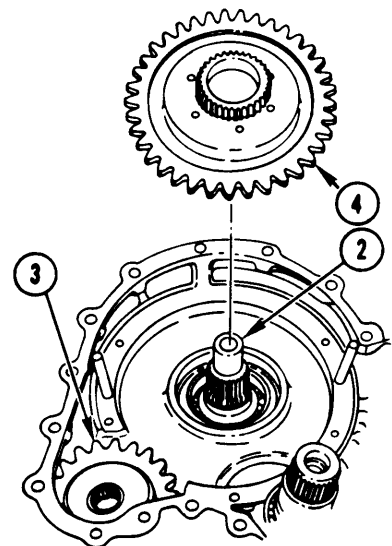


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- 2 Using plastic faced hammer, install left output shaft (2), with gear (1) in place, into center housing.
- 3 Install left steer gear (3).
- 4 Install left steer and output sun gear (4).

End of Task 6

Go to Sheet 17



TA485743

# 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:

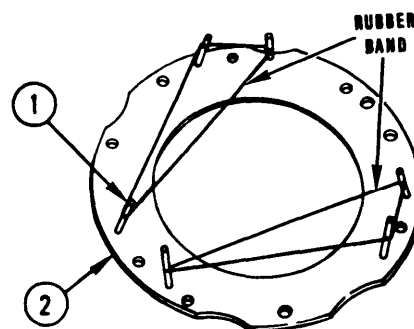
Packing, preformed (left brake cam) (73342) 23046647  
 Packing, preformed (left brake cam) (73342) 23046648  
 Seal, lip-type (left brake cam) (73342) 6836128  
 Seal, lip-type (left brake cam) (73342) 6836127

### SPECIAL TOOLS:

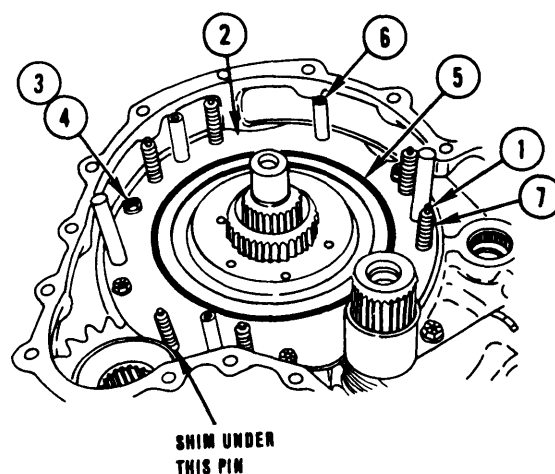
Socket, socket wrench (19207) 8355955

### SUPPLIES:

Band, rubber (2 required) (Item 1, Appendix C)  
 Lubricating Oil (Item IQ 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)



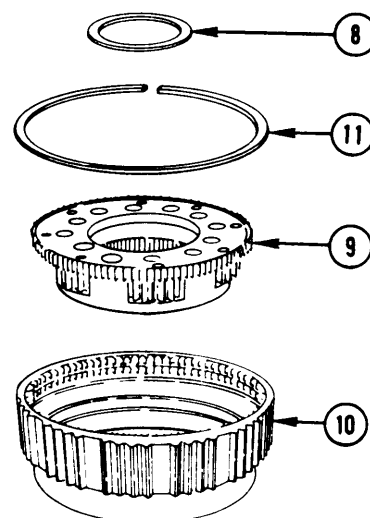
- 1 Install six headless straight pins (1) in brake backing plate (2). Wrap with rubber bands to hold pins (1) in place
- 2 Install brake backing plate (2), along with pins (1). Remove rubber bands Place feeler gage blade under one pin (1) to hold it upward until assembly is complete.
- 3 Using 9/16 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).



Go to Sheet 18

#### 4-30. ASSEMBLE CENTER HOUSING (SHEET 18 OF 21)

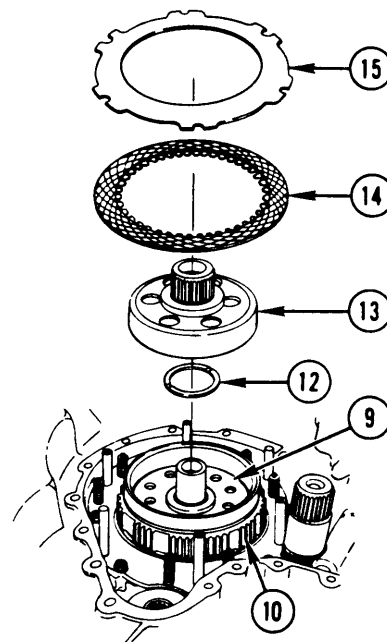
- 6 Install four brake reaction pins (6).
- 7 Install six springs (7) over six pins (1).
- 8 Coat thrust washer (8) with petrolatum and install it on output carrier (9).
- 9 Install output carrier (9) and thrust washer (8) into brake clutch drum (10).
- 10 Using screwdriver, install retaining ring (11) 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).



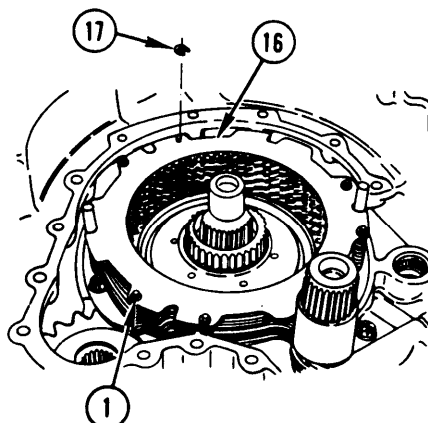
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Soak friction-faced plates (14) in lubricating oil for two minutes prior to installation. Install one clutch disk (friction-faced plate) (14), then one clutch disk (reaction plate) (15).

- 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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TA485748

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.

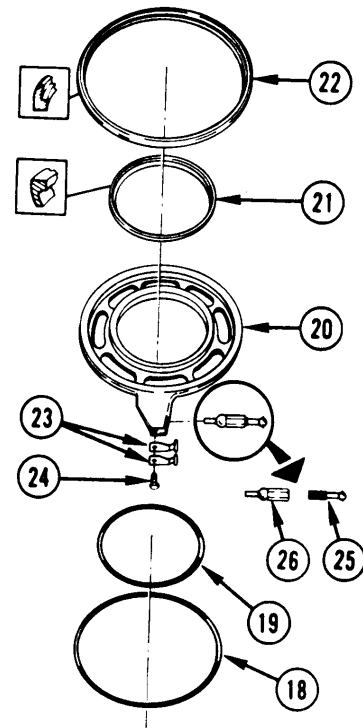
26 Install slotted end of outer link (26) into brake cam (20) so that flat on link (26) is against free ends of spring tension clips (23).

27 Place support (27), inside surface upward, on wooden blocks

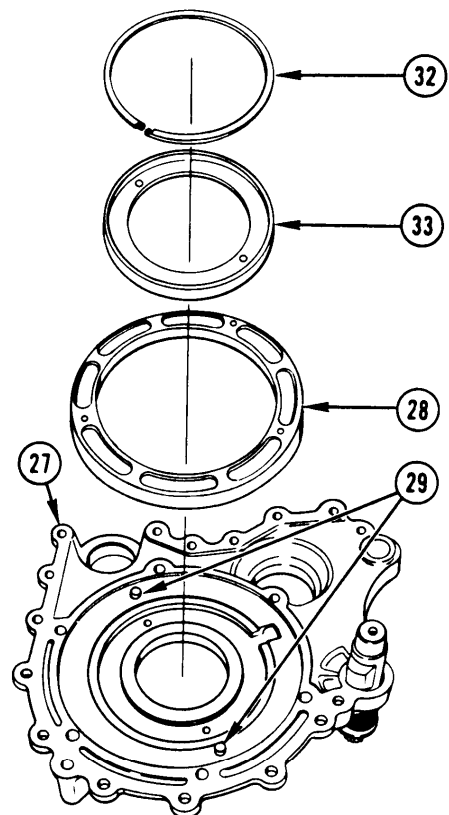
28 Install stationary cam (28) onto two pins (29) in support (27). Ensure bolt holes are aligned.

29 Using plastic faced hammer, tap stationary cam (28) onto pins (29) until cam is seated.

Go to Sheet 20



TA485749

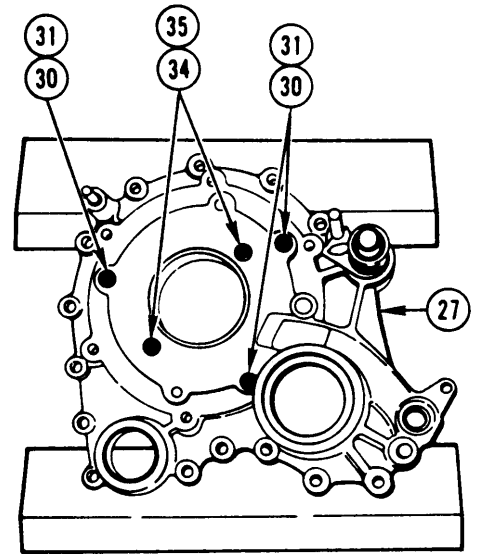


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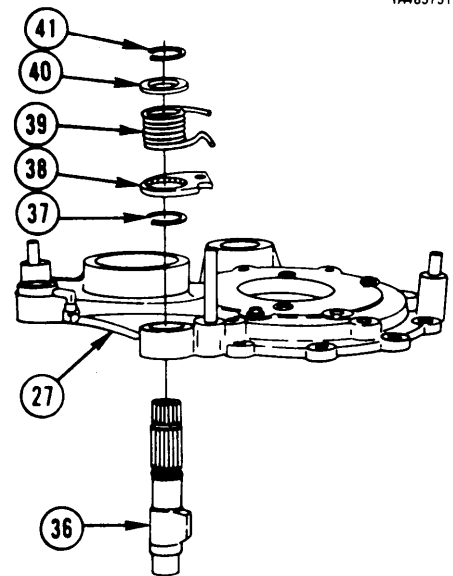
#### 4-30. ASSEMBLE CENTER HOUSING (SHEET 20 OF 21)

- 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 scmdriver, 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).

Go to Sheet 21



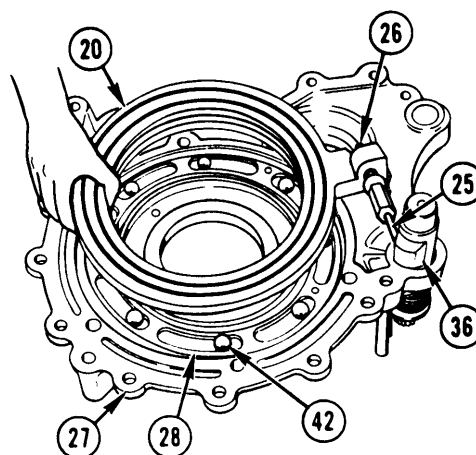
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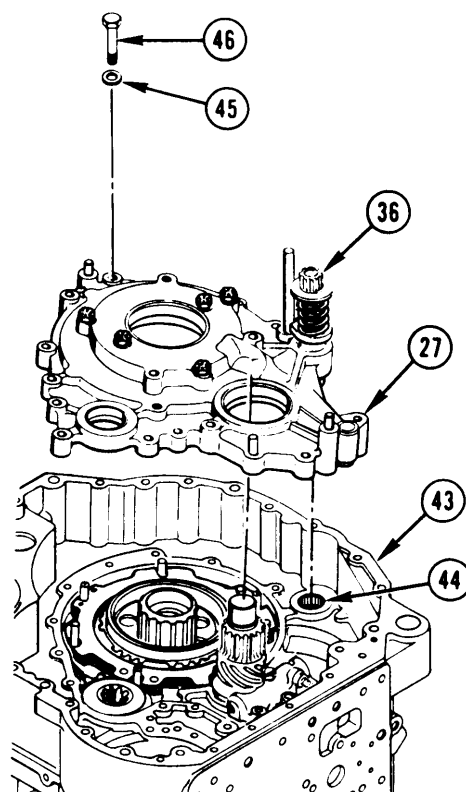
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#### 4-30. ASSEMBLE CENTER HOUSING (SHEET 21 OF 21)

- 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



**4-31. REPAIR TRANSMISSION TOP COMPONENTS  
(SHEET 1 OF 7)**

<b>Task</b>	<b>Title</b>	<b>Page</b>
1	Replace Solenoids	4-243
2	Replace Insulators, Terminals on Solenoids, Wire Harness	4-246
3	Replace Top Cover Component, 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**

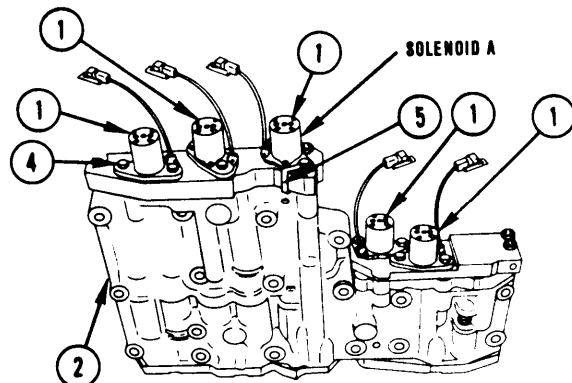
For solenoid A, one bolt (4) is 1/4 inch longer than the other bolts (4). This is to allow for the thickness of spring retainer (5).

- 2 For solenoid A, remove spring retainer (5).

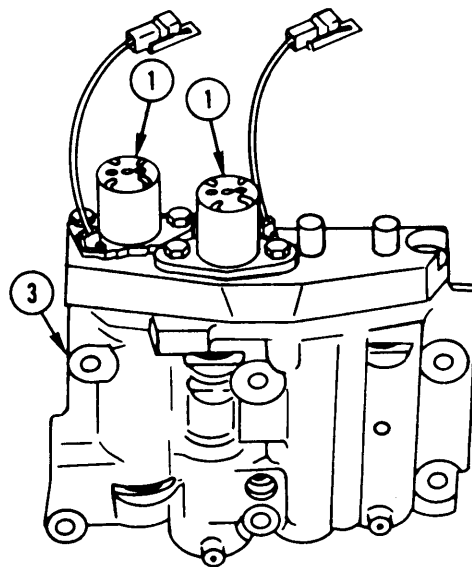
- 3 Remove any of seven solenoids (1).

**REPAIR:** For replacement of solenoid insulators and terminals, refer to this paragraph, TASK 2.

Go to Sheet 3



TA485755



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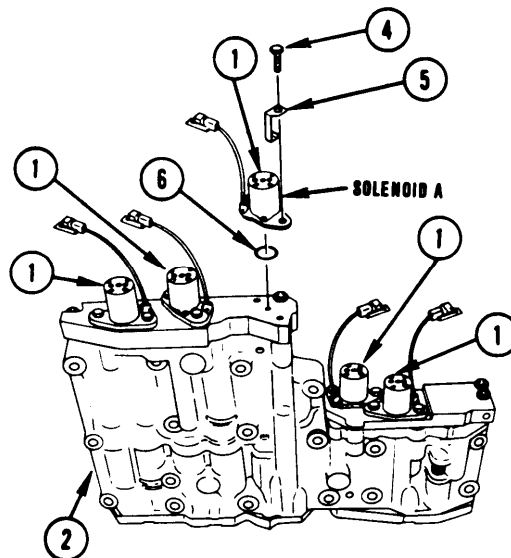
#### 4-31. REPAIR TRANSMISSION TOP COMPONENTS (SHEET 3 OF 7)

##### 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



TA485757

# 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

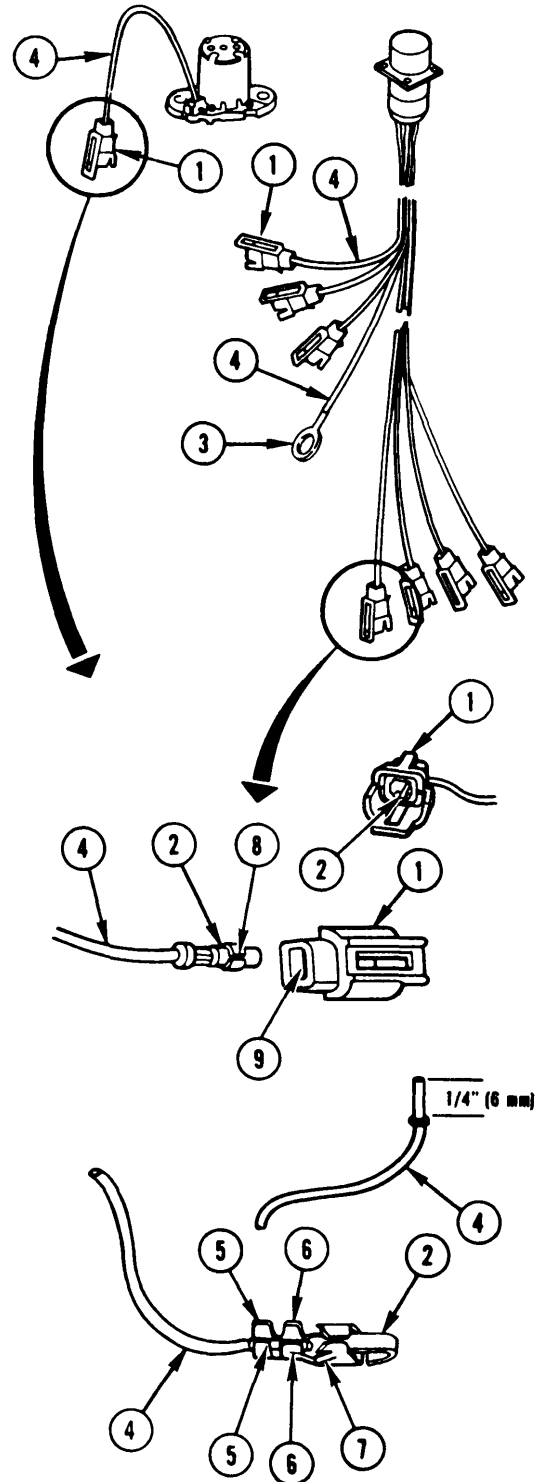
- 3 Using cutting pliers, cut quick disconnect terminal (2) or straight ring (ground) terminal (3) off lead (4) as close to terminal (2, 3) as possible.
- 4 Using wire stripper, strip 1/4 inch (6 mm) of insulation from end of lead (4).
- 5 Put new terminal (2, 3) on stripped end of lead (4). Using round 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



TA485758

# **4-31. 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:**

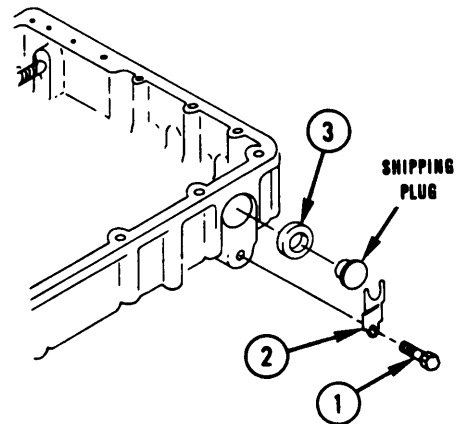
Packing Assembly (80201) 544306  
 Seal, plain encased (80201) 504260

### **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 (sea 1) (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)

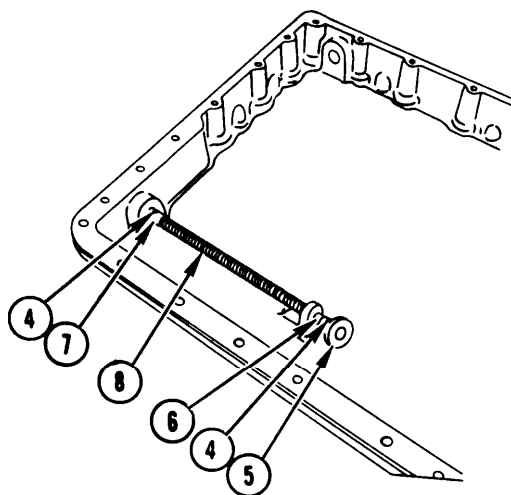
Replace Push Rod Components

## **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.

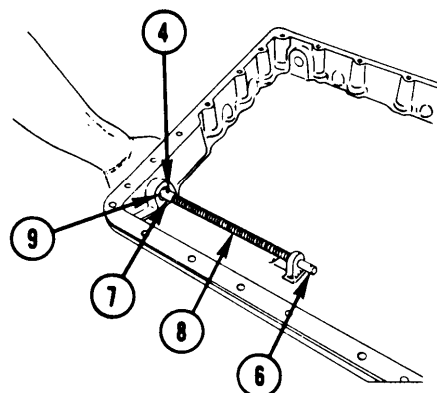
## **CAUTION**

When using cutting pliers to remove pins (4), be careful not to cut pins (4).

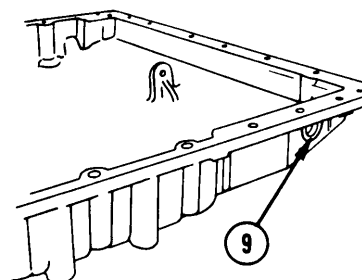


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- 5 Using ball peen hammer and punch tap two pins (4) flush with push rod.
- 6 Using cutting pliers, remove two pins (4).
- 7 Pull linear actuator cap (5) from headless straight pin (push rod) (6).
- 8 From inside of top cover, push to remove push 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.



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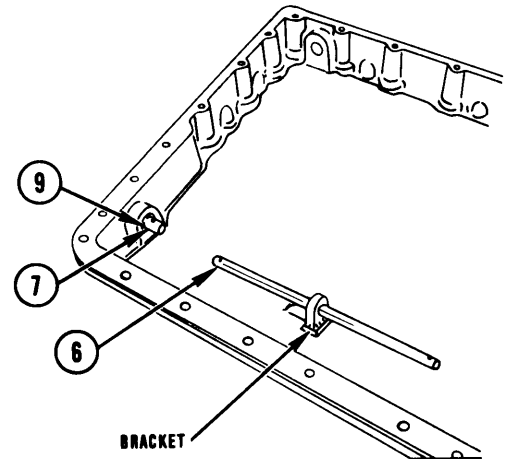


TA485762

Go to Sheet 7

#### 4-31. 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).

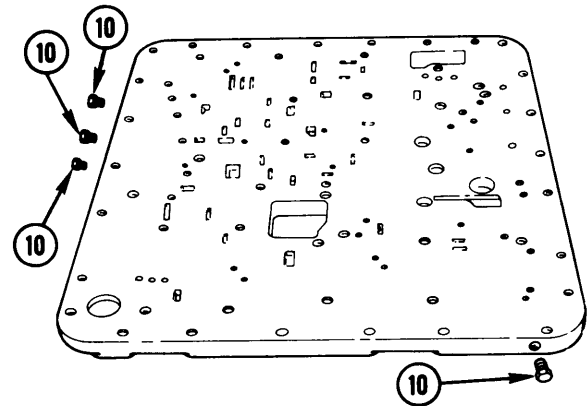


Replace Oil Transfer Plate Plugs

#### 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).



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

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:

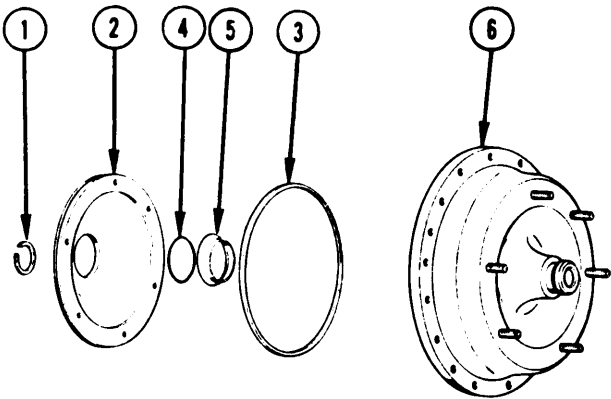
- Chisel, cold
- Hammer, hand, ball peen
- Pliers, retaining ring, external
- Press, arbor, hand operated
- Screwdriver, flat tip

SUPPLIES:

- Lubricating Oil (Item 10, Appendix C)

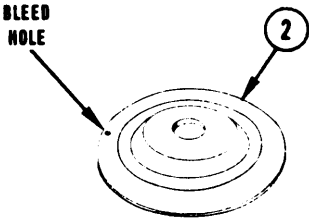
REPAIR PARTS:

- Packing, preformed (73342) 6770820
- Seal Ring, transmission (73342) 6758036



Disassemble Converter Pump Cover Assembly

- Using retaining ring pliers, remove retaining ring (1).
- Turn assembly over and drop assembly on work bend to bump piston (2) out.
- Using screwdriver, remove seal ring (3) from piston (2) and preformed packing (4) from retainer (5).
- If replacement is necessary, using hammer and chisel, remove retainer (5).



Assemble Converter Pump Cover Assembly

- Using arbor press, install retainer to a seat in pump cover (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).
- Install piston (2) into pump cover, aligning bleed hole in piston (2) with stud in cover (6).
- 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



# 4-32. REPAIR CONVERTER ELEMENT COMPONENTS (SHEET 2 OF 3)

## TASK 2. REPAIR STATOR GROUP

### COMMON TOOLS:

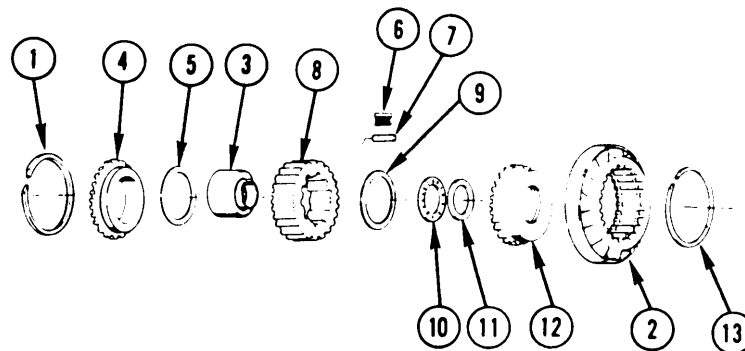
Screwdriver, flat tip (2 required)

### 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).



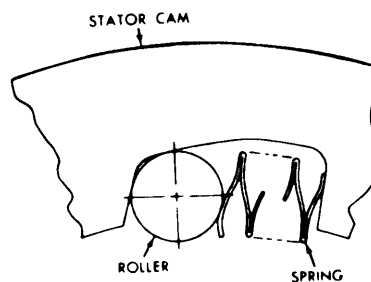
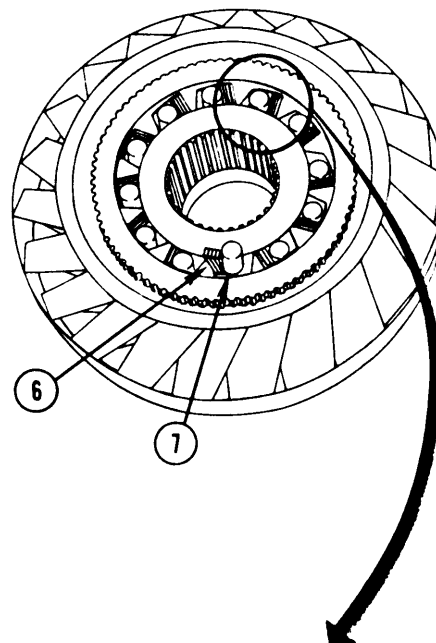
TA485767

Go to Sheet 3

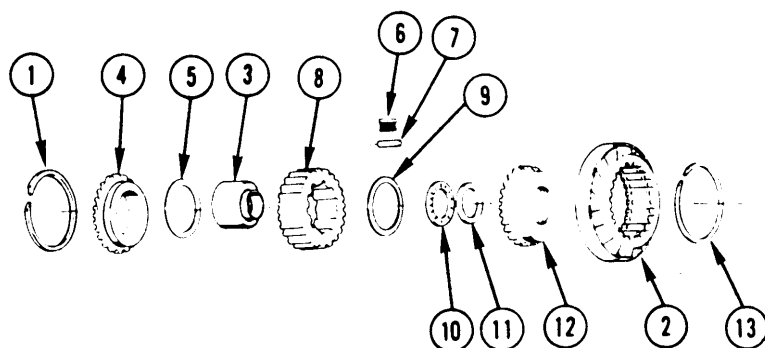
# 4-32. REPAIR CONVERTER ELEMENT COMPONENTS (SHEET 3 OF 3)

## 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).



TA485768



TM85769

**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**

<b>Section</b>	<b>Paragraph</b>	<b>Title</b>	<b>Page</b>
<b>I</b>		Introduction	5-1
<b>II</b>		Checks and Adjustments	5-1
	5-2	Output Shaft Drag Check	5-1
	5-3	Brake Adjustment	5-4
<b>III</b>		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**

## 5-20 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 Nero) 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 the 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

## 5-2. 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).

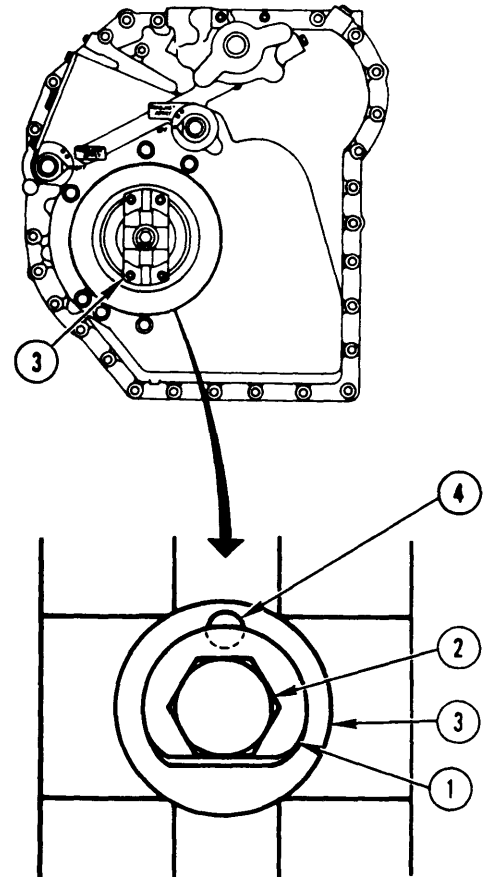
### NOTE

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.
- l 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.



End of Task 1

TM 85770

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

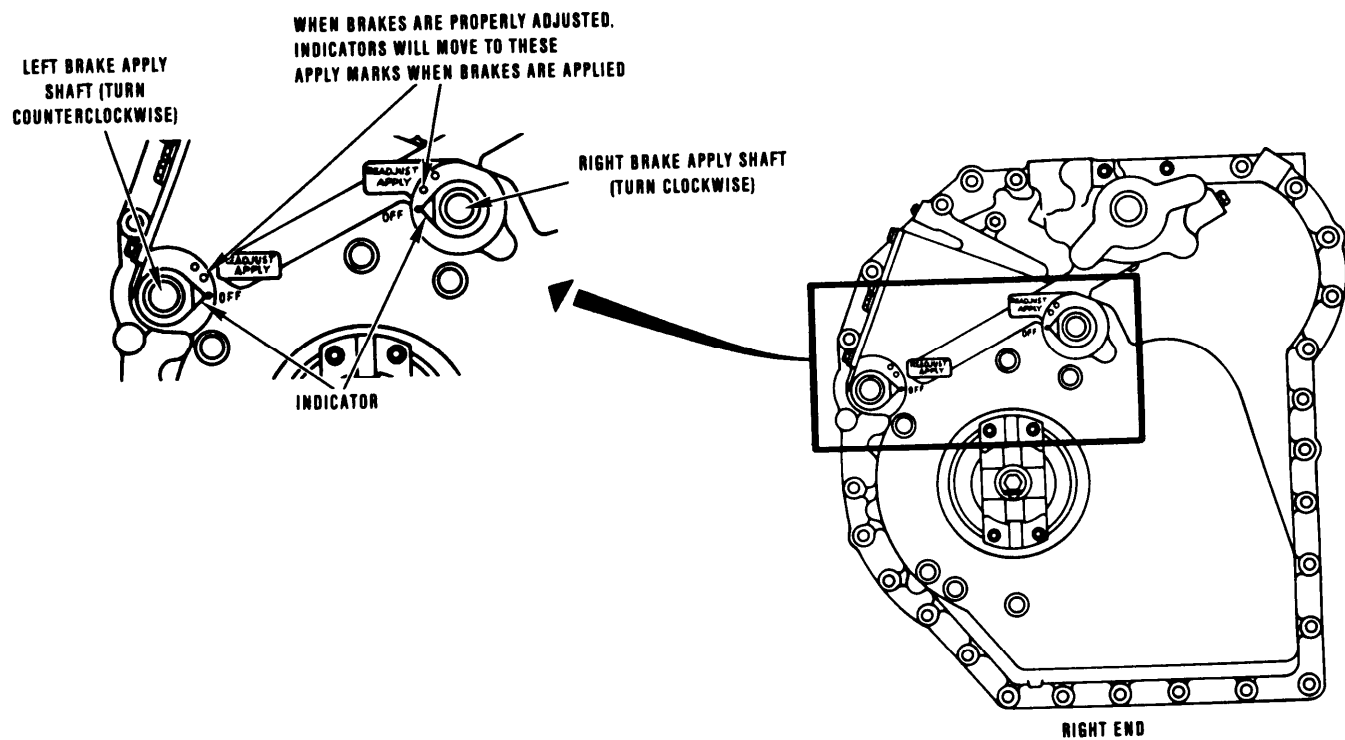
TASK 1. TORQUE WRENCH CHECK

COMMON TOOL:

Wrench torque, 0-175 ft-lb

SPECIAL TOOLS:

Adapter, splined, brake adjustment (73342) 8355955



TA485771

Go to Sheet 2

### 5-3. BRAKE ADJUSTMENT (SHEET 2 OF 5)

#### NOTE

- 0 The torque wrench check provides an accurate method to check brakes.
  - o 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, 30°-60° angle-head, open end, 11/16 inch  
 Wrench, torque, 0-175 ft-lb

##### 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

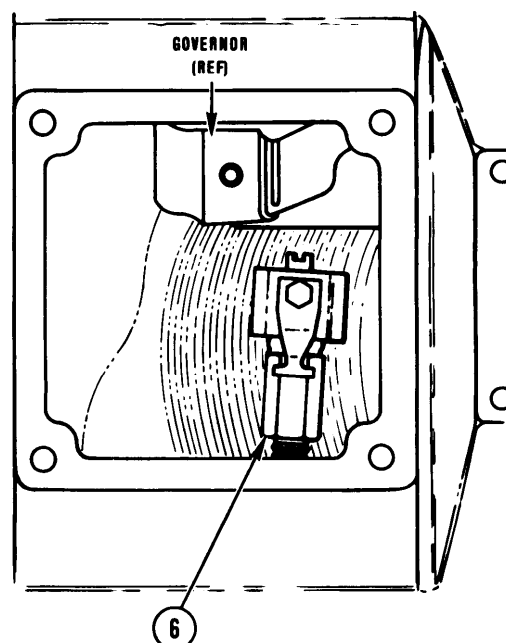
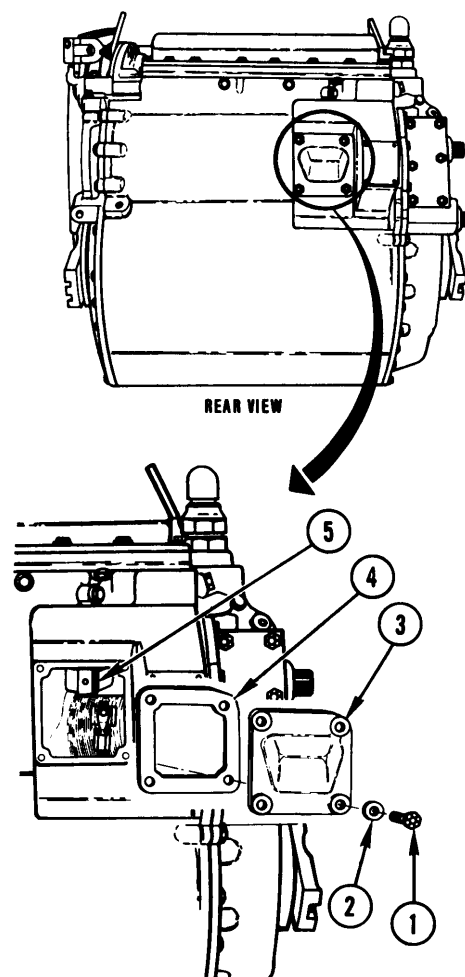
- Combination wrench turned to right (counterclockwise rotation of adjusting link) tightens brake.
- Combination wrench turned to left (clockwise rotation of adjusting link) loosens brake.

- 4 Using 11/16 inch 60° angle-head wrench, turn brake adjusting link (6).
- 5 Alternately turn adjusting link (6) with angle-head 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 counter-clockwise.
- 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).

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.

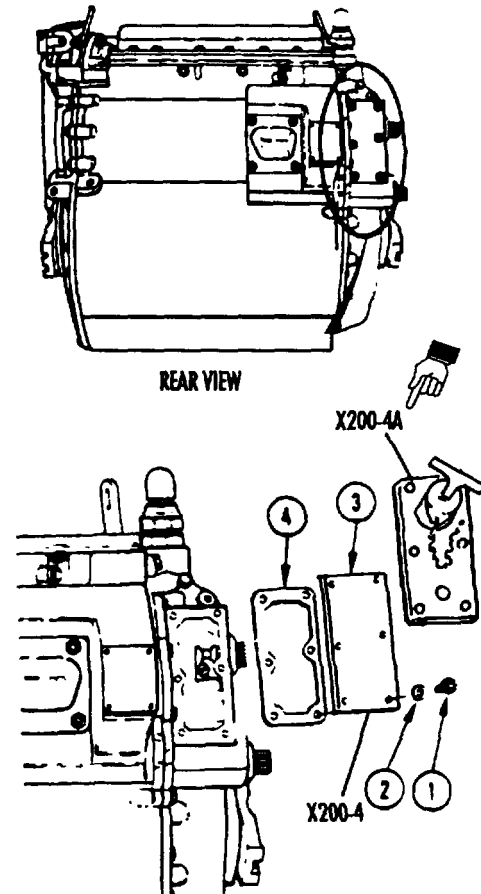
- Brake needs loosening if indicator does not get to APPLY mark when 40 lb-ft (54 N-m) is applied with torque wrench.

- Brake adjusting link should be turned only 1/6 turn (60°) at a time until proper brake adjustment is achieved.

- X200-4A Prior to removal of right adjusting cover, note location of chain in relation to bolt.

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).

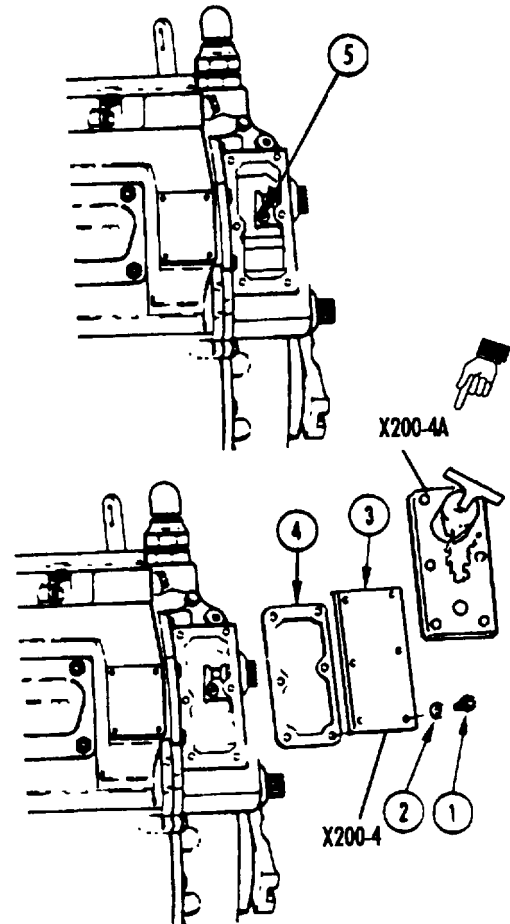
Go to Sheet 5



### 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.



- 4 Install cover (3) with new gasket (4).
- 5 Using 1/2 inch socket, install six bolts (1) and washers (2) retaining cover (3).

#### NOTE

X200-4A Oil filler cap chain is bolted under the top, outside bolt and washer of 6 bolts and washers which retain the plate to the end cover.

6. Using torque wrench, tighten six bolts (1) to 13-15 lb ft (17-20 N•m).

End of Task 3

## Section III. PRESERVATION AND STORAGE

5-4. INSTALL TRANSMISSION IN CONTAINER  
(SHEET 1 OF 2)

## OVERVIEW

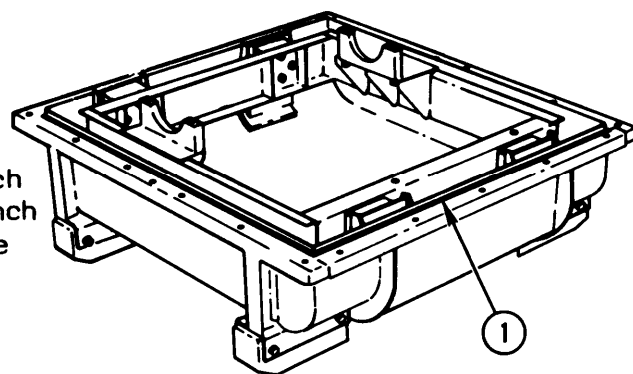
Transmissions repaired at General Support level are usually reinstalled in the vehicle. Sometimes a repaired transmission is to be returned to a depot or retained in long term storage. Proper preparation for packing the transmission in a container is important. The transmission should be clean and drained 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



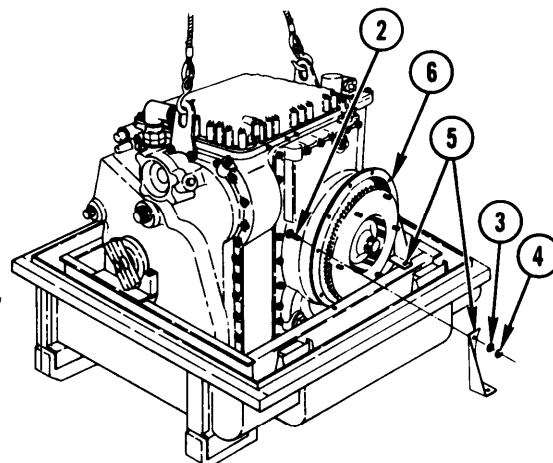
## SPECIAL TOOLS:

Lifting Sling, 2 leg (19207) 12268037

## SUPPLIES:

Dehydrating agent (Item 7, Appendix C)

- 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).



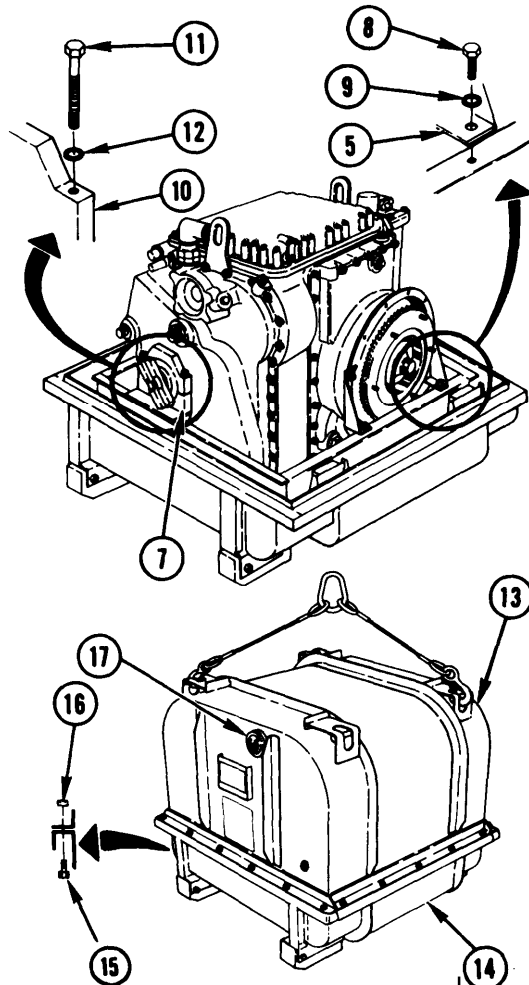
Go to Sheet 2

#### 5.4. INSTALL TRANSMISSION IN CONTAINER (SHEET 2 OF 2)

##### **CAUTION**

Ensure six support brackets securing the torque converter to the transmission are installed, or damage to the torque converter/transmission can occur during shipment.

- 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.



##### **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 weight 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

Para. 5-4, 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   |

**TM 9-2520-272-34&P**

**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 M730A2 Guided Missile Equipment Carrier                     |
| (4) TM 9-1450-300-10 | Operator's Manual for M730A2 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 M730A2 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 L 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.

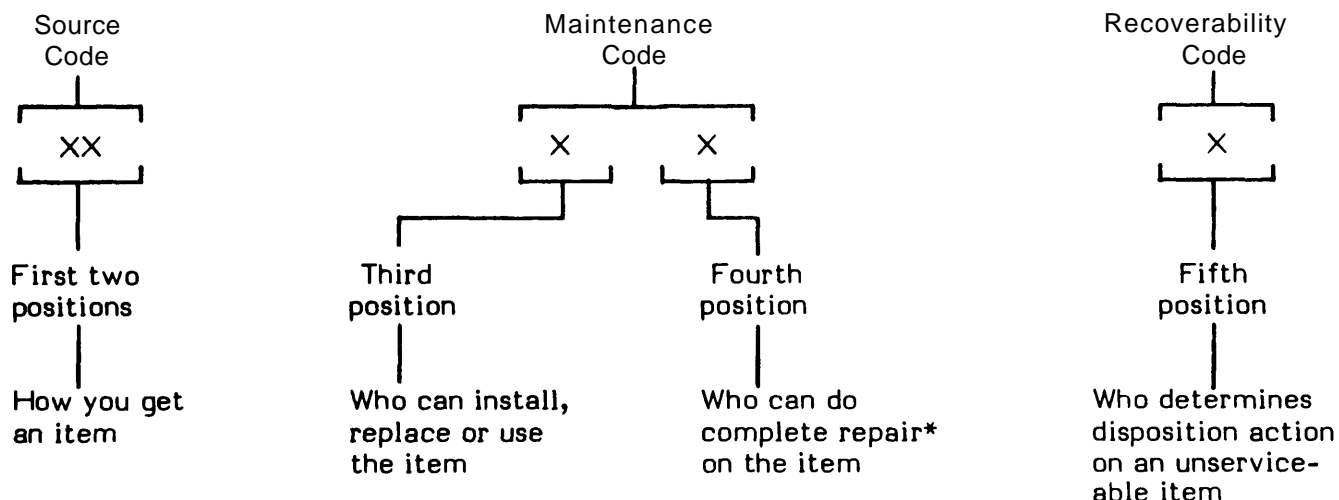
**b. Section III- Special Tools List.** A list of special tools, special TMDE, and other special support equipment authorized by this RPSTL (as indicated by Basis of Issue (BOI) information in DESCRIPTION AND USABLE ON CODE (UOC) column) for the performance of maintenance.

**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 maybe 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 reparable, condemn and dispose of the item at organizational level.
F	Reparable item. When uneconomically reparable, condemn and dispose of the item at the direct support level.
H	Reparable item. When uneconomically reparable, 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 C1 (C) - Confidential, Phy Sec C1 (S) - Secret, Phy Sec C1 (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).

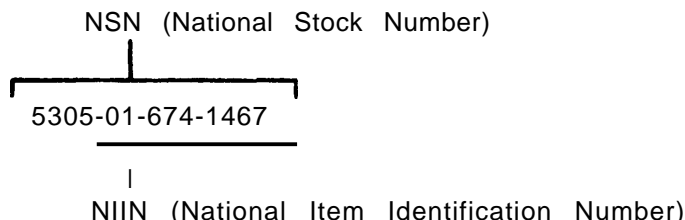
(8) In the Special Tools List section, the basis of issue (BOI) appears as the last line(s) in the entry for each special tool, special TMDE, and other special support equipment. When density of equipments supported exceeds density spread indicated in the basis of issue, the total authorization is increased 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.

49 **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 11 (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 4a(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.****Abbreviations**

bk  
cl  
gr  
LH  
reach  
Phy Sec Cl  
rev  
RH  
rvs  
scav  
SRA  
UOC  
V

**Explanation**

brake  
clutch  
gear  
left-hand  
machining  
physical security classification  
reverse  
right-hand  
reverse  
scavenge  
specialized repair activity  
usable on code  
variable

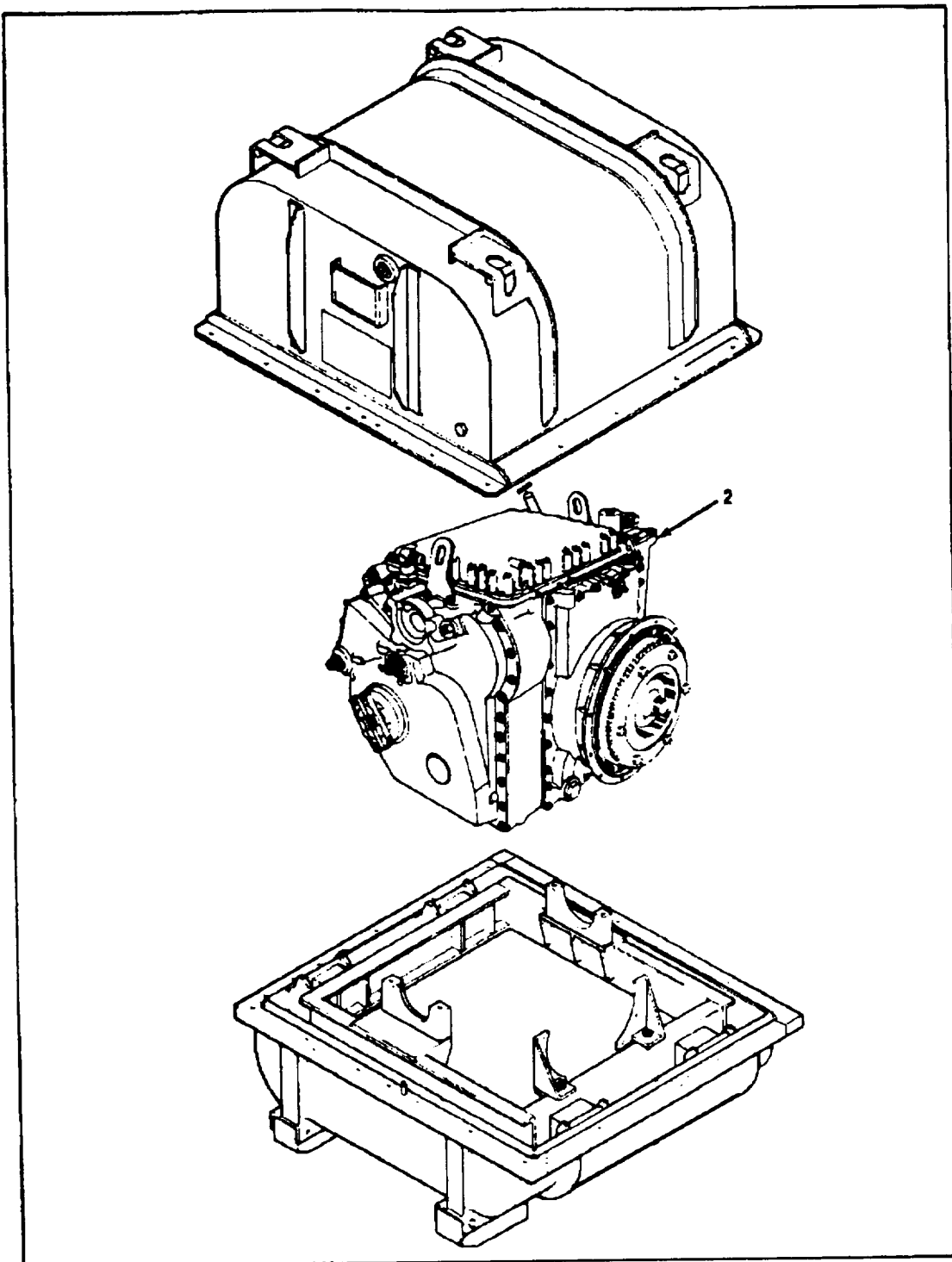


Figure 1. Transmission Assembly

Change 2



SECTION II				TM9-2520-272-34&P	
(1)	(2)	(3)	(4)	(5)	(6)
ITEM	SMR		PART		
NO	CODE	CAGEC	NUMBER	DESCRIPTION AND USABLE ON CODES(UOC)	QTY
GROUP 07 TRANSMISSION					
GROUP 0710 TRANSMISSION ASSEMBLY					
FIG. 1 TRANSMISSION WITH CONTAINER					
1	PAFFD	19207	5703227	TRANSMISSION W/CONT	1
2	XAFHD	73342	23017800	TRANSMISSION X200-4 (SEE FIGS2 THRU 8 FOR COMPONENT PARTS)	1
END OF FIGURE					

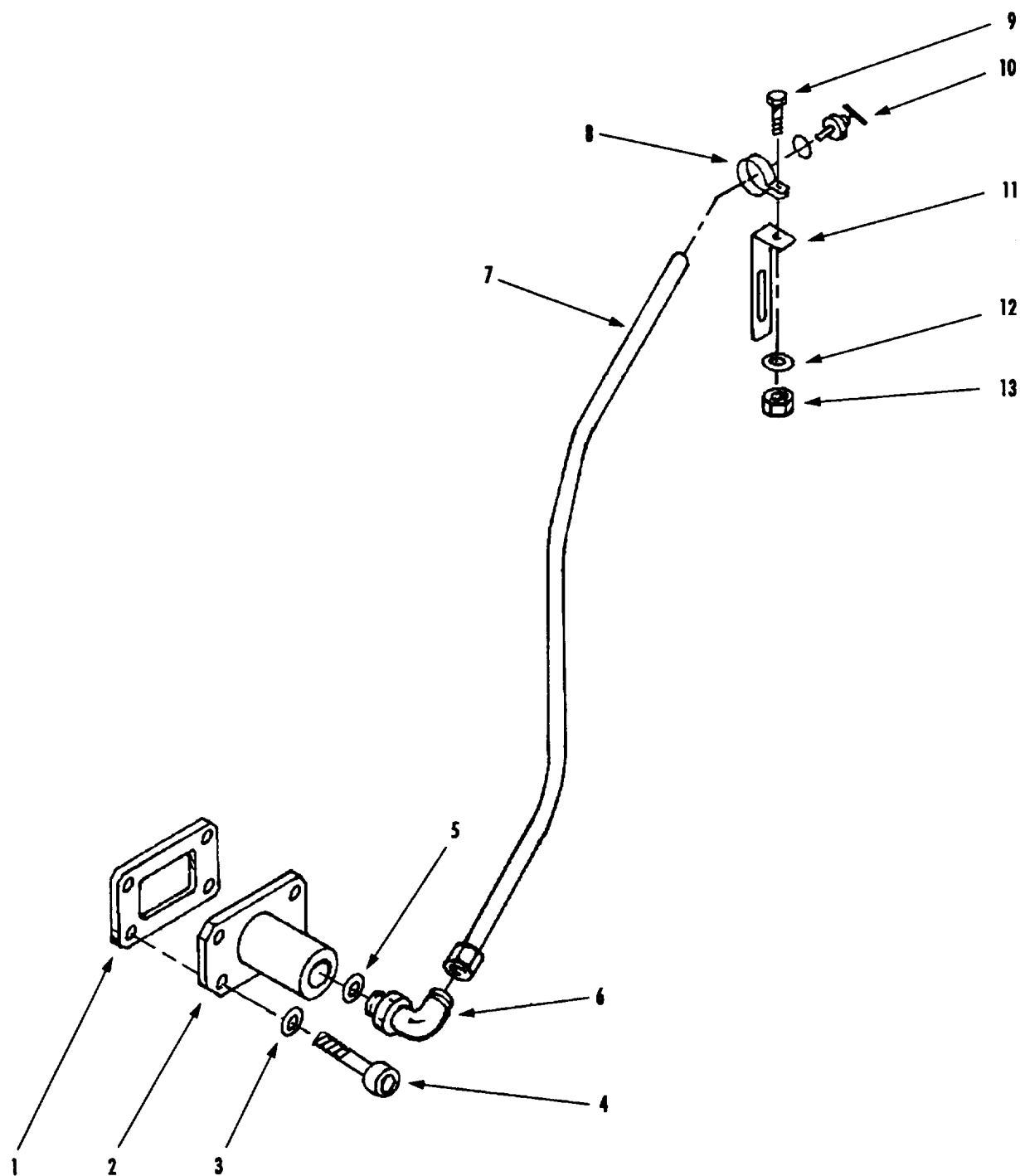


Figure 1A. Fill Tube Assembly

Change 2

SECTION II

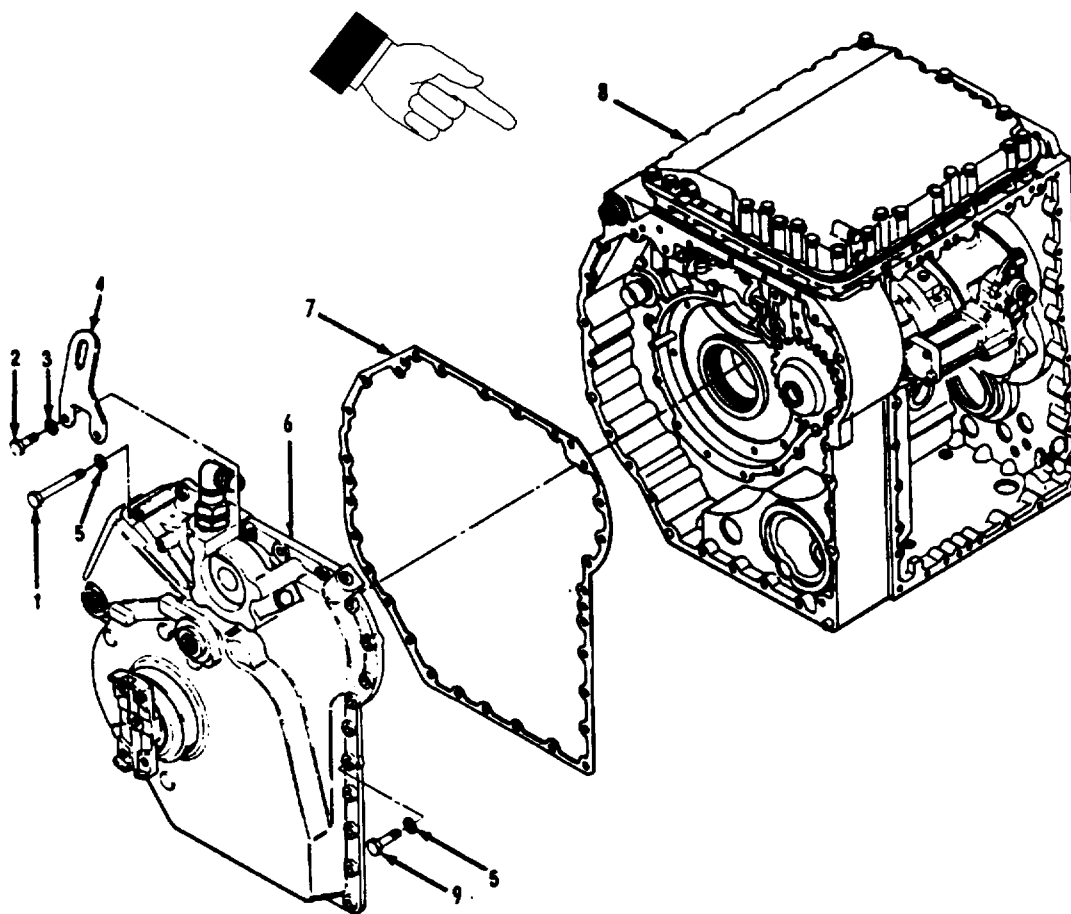


Figure 2. Right Hand Cover and Center Housing

2-0 Change 2

SECTION II			TM9-2520-272-34&P		
(1)	(2)	(3)	(4)	(5)	(6)
ITEM	SMR		PART		
NO	CODE	CAGEC	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	24617	9425091	BOLT,SELF-LOCKING	2
3	PAOZZ	73342	23048061	WASHER,FLAT	2
4	PAOZZ	73342	23047394	BRACKET,ANGLE	1
5	PAHZZ	73342	23048061	WASHER,FLAT	27
6	AHHDD	73342	23045131	COVER ASSY,RH COMP (SEE FIGS 15, 32, AND 33 FOR COMPONENT PARTS)	1
7	PAHZZ	73342	23018072	GASKET	1
8	AHHHD	73342	23045130	HSG ASSY,CTR COMP (SEE FIGS 11, 17 THRU 22, AND 31 FOR COMPONENT PARTS.	1
9	PAHZZ	24617	9409082	BOLT,SELF-LOCKING	26
END OF FIGURE					

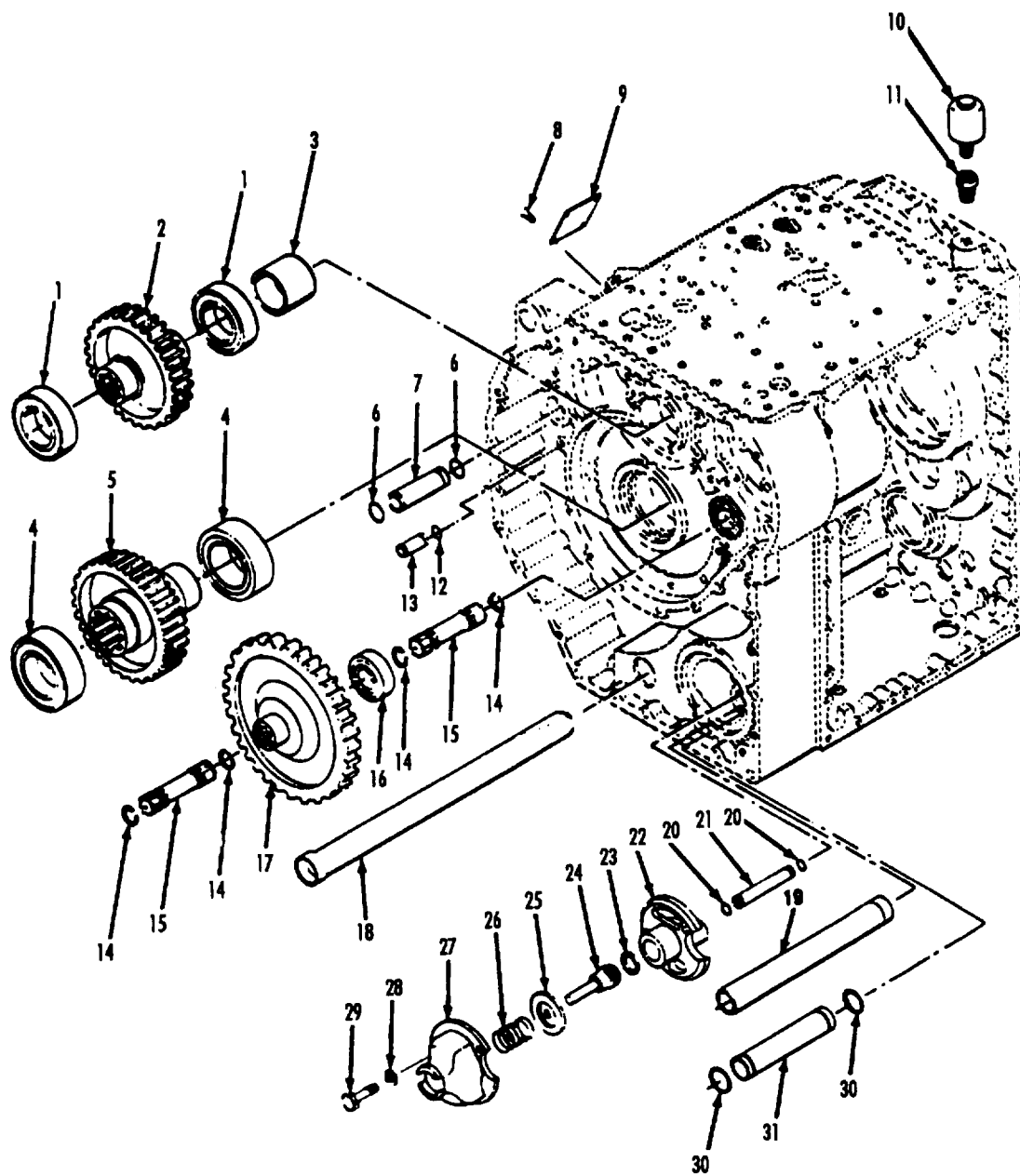


Figure 3. Output Drive Gear and Steer Shaft Drive Gear

Change 2

SECTION II				TM9-2330-372-14&P	
(1)	(2)	(3)	(4)	(5)	(6)
ITEM	SMR		PART		
NO	CODE	CAGEC	NUMBER	DESCRIPTION AND USABLE ON CODES (UOC)	QTY
GROUP 0710 TRANSMISSION ASSEMBLY					
FIG. 3 OUTPUT DRIVEN GEAR AND STEER SHAFT DRIVE GEAR					
1	PAHZZ	82994	BS226345	BEARING,ROLLER,CYLI.....	2
2	PAHZZ	73342	23018104	GEAR,SPUR UOC:XTZ .....	1
2	PAHZZ	73342	29511850	GEAR,SPUR UOC:X4A .....	1
3	PAHZZ	73342	23018103	SPACER,SLEEVE.....	1
4	PAHZZ	82994	BS226344	BEARING,ROLLER,CYLI.....	2
5	PAHZZ	73342	23018106	GEAR,SPUR UOC:XTZ .....	1
5	PAHZZ	73342	29511851	GEAR,SPUR UOC:X4A .....	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	23046541	PLATE,IDENTIFICATIO(-4) UOC:XTZ .....	2
9	PBOZZ	73342	29513282	PLATE,IDENTIFICATIO(-4A) UOC:X4A .....	1
10	PAOZZ	73342	6774565	BREATHER.....	1
11	PAOZZ	72582	444335	REDUCER,PIPE .....	1
12	PAHZZ	73342	23018753	PACKING,PREFORMED NOTE:QTY 1 USEDWITH TUBEMETALLICP/N23045408,QTY1 USED WITHTUBEMETALLICP/N29510216 (PART OFASSEMBLYP/N29510214).....	2
13	PAHZZ	73342	23045408	TUBE,METALLICNOTE:USEWITHRIGHT HANDBRAKESUPPORTP/N23018037 UOC:XTZ.....	1
14	PAHZZ	73342	6756606	RING,SNAP.....	4
15	PAHZZ	73342	23018111	SHAFT,SHOULDERED UOC:XTZ.....	2
15	PAHZZ	73342	29510181	SHAFT,SHOULDERED UOC:X4A.....	2
16	PAHZZ	82994	BS226348	BEARING,ROLLER,CYLI.....	1
17	PAHZZ	73342	23018116	GEAR,SPUR UOC:XTZ .....	1
17	PAHZZ	73342	29510240	GEAR,SPUR UOC:X4A .....	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,EQUAL .....	1
23	PAHZZ	73342	23018234	RETAINER,PACKING .....	1
24	PAHZZ	73342	23017857	PISTONANDPINASSE.....	1
25	PAHZZ	73342	23018025	VALVE,EQUALIZER .....	1
26	PAHZZ	73342	23018049	SPRING,HELICAL,COMP.....	1
27	PAHZZ	73342	23018086	HOUSING,SPRING-EQUA .....	1
28	PAHZZ	90407	12084P11	WASHER,FLAT.....	2
29	PAHZZ	63005	9409030	SCREW,CAP,HEXAGONH.....	2
30	PAHZZ	73342	23040582	PACKING,PREFORMED .....	2
31	PAHZZ	73342	23045407	TUBE,METALLIC .....	1

END OF FIGURE

SECTION II

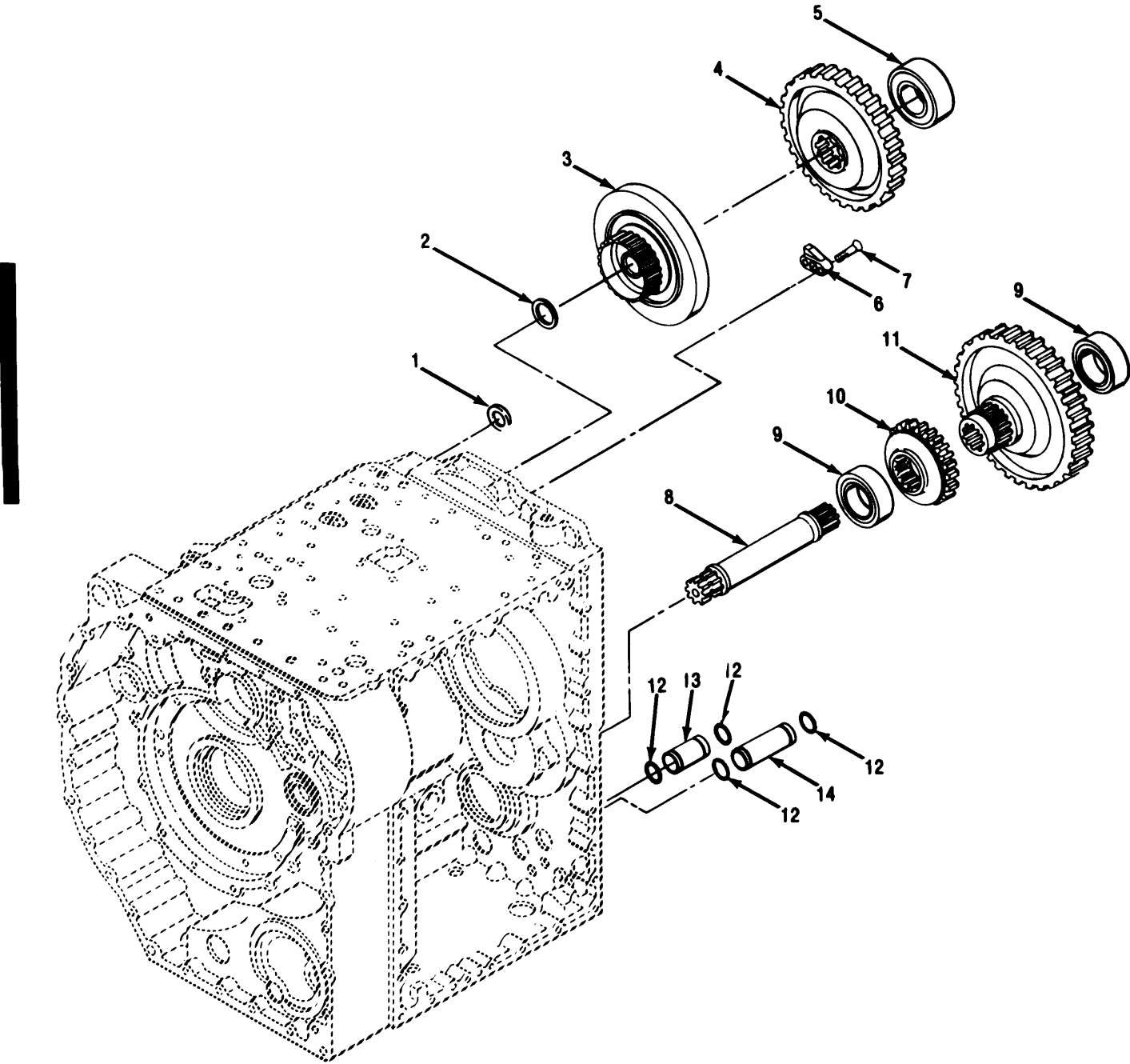


Figure 4. Range Input Driven Gear and Drive Gear

SECTION II				TM9-2330-372-14&P	
(1)	(2)	(3)	(4)	(5)	(6)
ITEM	SMR		PART		
NO	CODE	CAGEC	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	AHHH	73342	23045116	CLUTCHASSY,FWD(SEEFIG16 FOR COMPONENTPARTS).....	1
4	PAHZZ	73342	23018092	GEAR,SPUR. ....	1
5	PAHZZ	43334	BU1012L-18	BEARING,ROLLER,CYLI.....	1
6	PAHZZ	73342	23018044	PITOT,TRANSMISSION. ....	1
7	PAHZZ	24617	455531	SCREW,CAP,SOCKETHE.....	2
8	PAHZZ	73342	23018157	GEAR,BEVEL(BEVELGEARDRIVENSHAFT).....	1
9	PAHZZ	82994	BS226346	BEARING,ROLLER,CYLI.....	2
10	PAHZZ	73342	23018159	GEAR,SPUR .....	1
11	PAHZZ	73342	23018158	GEAR,SPUR .....	1
12	PAHZZ	73342	23040581	PACKING,PREFORMED. ....	4
13	PAHZZ	73342	23046064	TUBE.....	1
14	PAHZZ	73342	23045374	COUPLING,TUBE.....	1
END OF FIGURE					



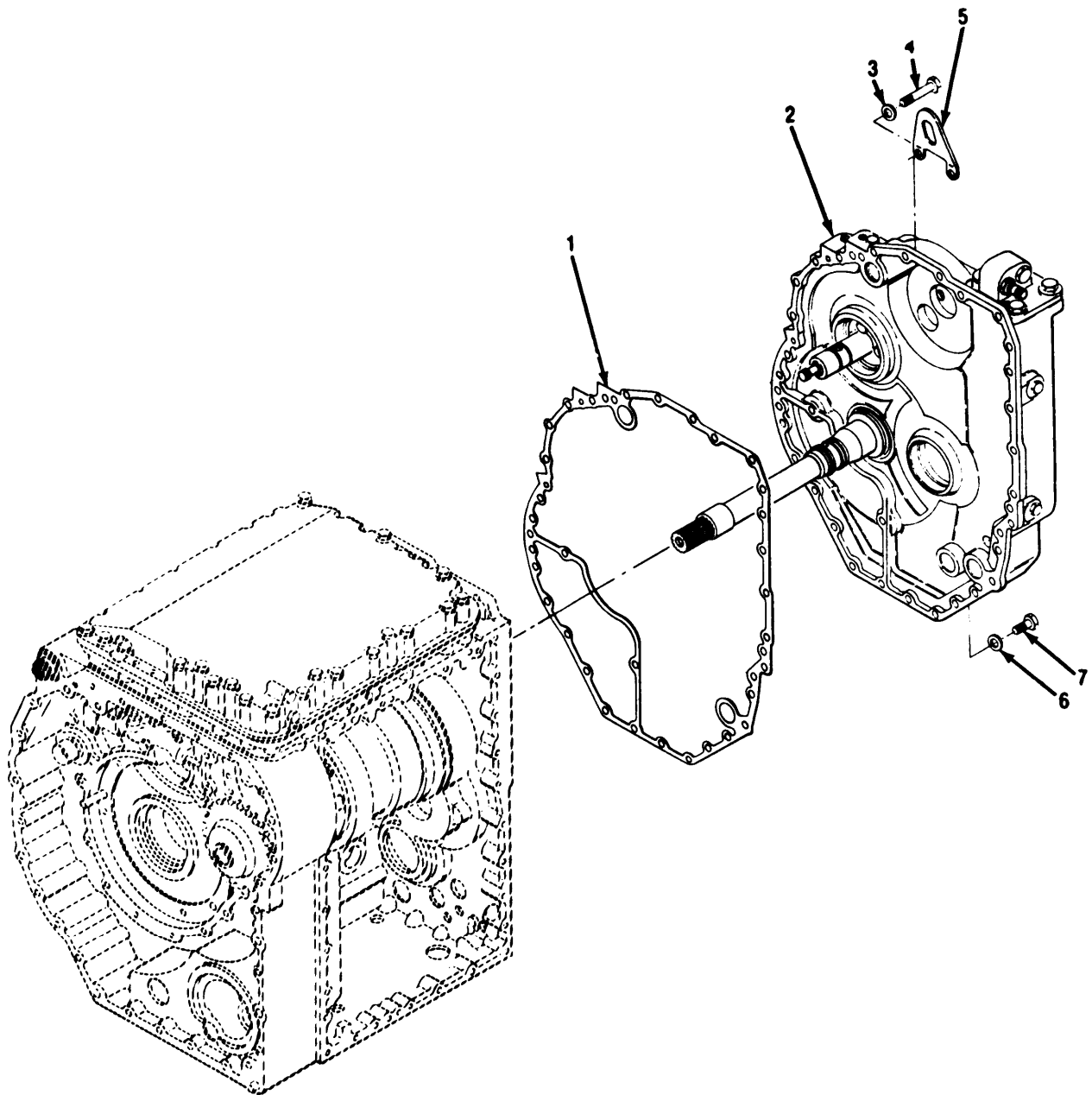


Figure 5. Left Hand Cover

SECTION II				TM 9-2520-272-34&P	
(1)	(2)	(3)	(4)	(5)	(6)
ITEM	SMR		PART		
NO	CODE	CAGEC	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	
				26 FOR COMPONENT PARTS) UOC:XTZ .....	1
2	AHHDD	73342	29511630	COVER,ASSY,LH,COMP (SEE FIG 14 AND	
				26 FOR COMPONENT PARTS) UOC:X4A .....	1
3	PAOZZ	73342	23048061	WASHER,FLAT.....	2
4	PAOZZ	24617	9425091	BOLT,SELF-LOCKING .....	2
5	PAOZZ	73342	23047393	BRACKET,ANGLE .....	1
6	PAHZZ	73342	23048061	WASHER,FLAT.....	29
7	PAHZZ	24617	9409082	BOLT,SELF-LOCKING .....	29
END OF FIGURE					

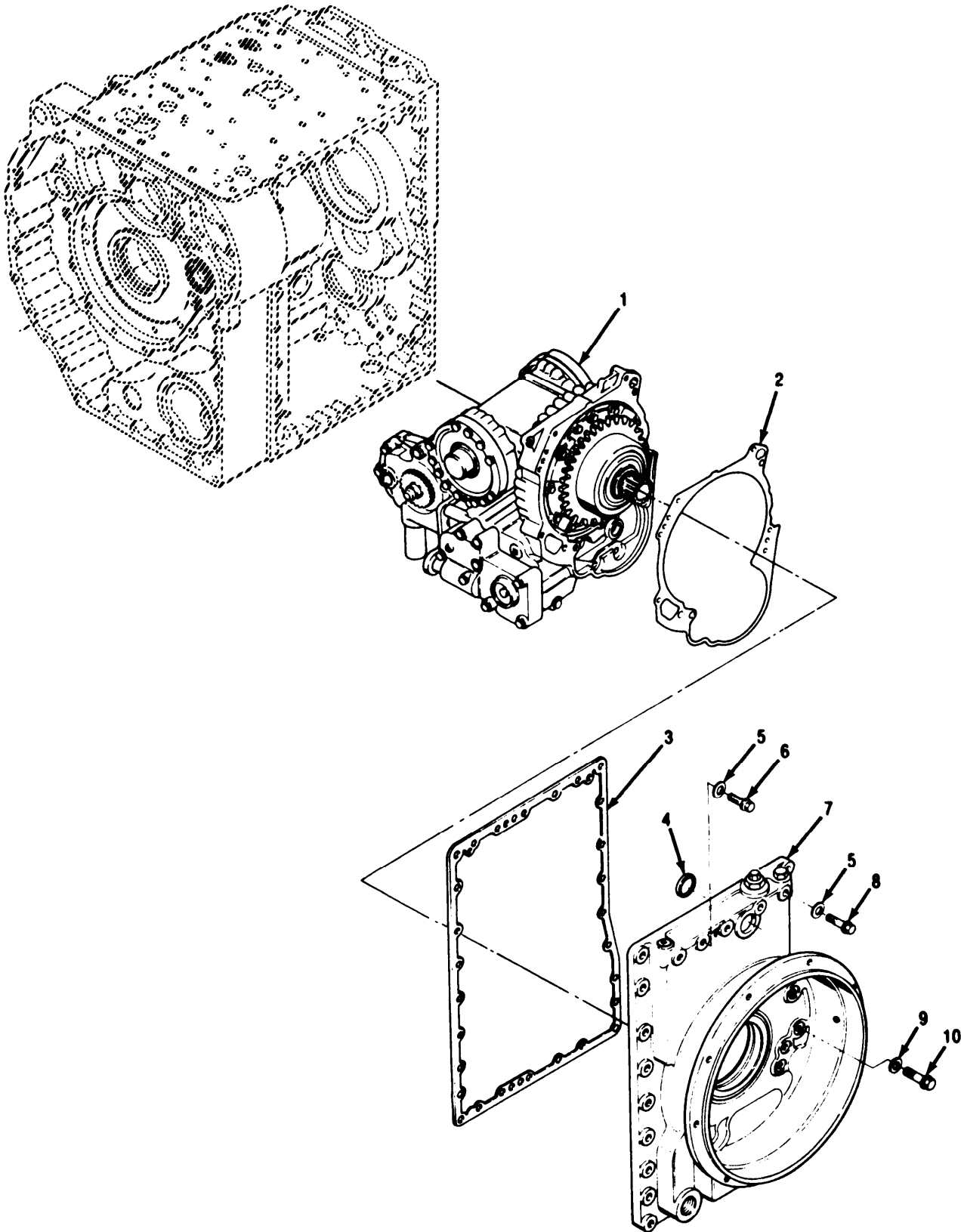


Figure 6. Bevel Gear and Input Housing

SECTION II				TM 9-2520-272-34&P	
(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) 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 (USE WITH HOUSING, MECHANICAL P/N 23018026 UOC:XTZ . . . . .	1
4	PAHZZ	73342	23048292	PACKING,PREFORMED (USE WITH HOUSING, MECHANICAL P/N 23048310). . . . .	1
5	PAHZZ	73342	23048061	WASHER,FLAT . . . . .	29
6	PAHZZ	24617	9408993	BOLT,SELF-LOCKING. . . . .	5
7	PAHHH	73342	23018026	HOUSING, MECHANICAL (SEE FIG 10 FOR COMPONENT PARTS) UOC:XTZ . . . . .	1
7	PAHZZ	73342	23048310	HOUSING MECHANICAL (SEE FIG 10 FOR COMPONENT PARTS). . . . .	1
8	PAHZZ	24617	9409082	BOLT,SELF-LOCKING . . . . .	24
9	PAHZZ	90407	12084P11	WASHER,FLAT . . . . .	9
10	PAHZZ	63005	9409030	SCREW,CAP,HEXAGON H . . . . .	9

END OF FIGURE

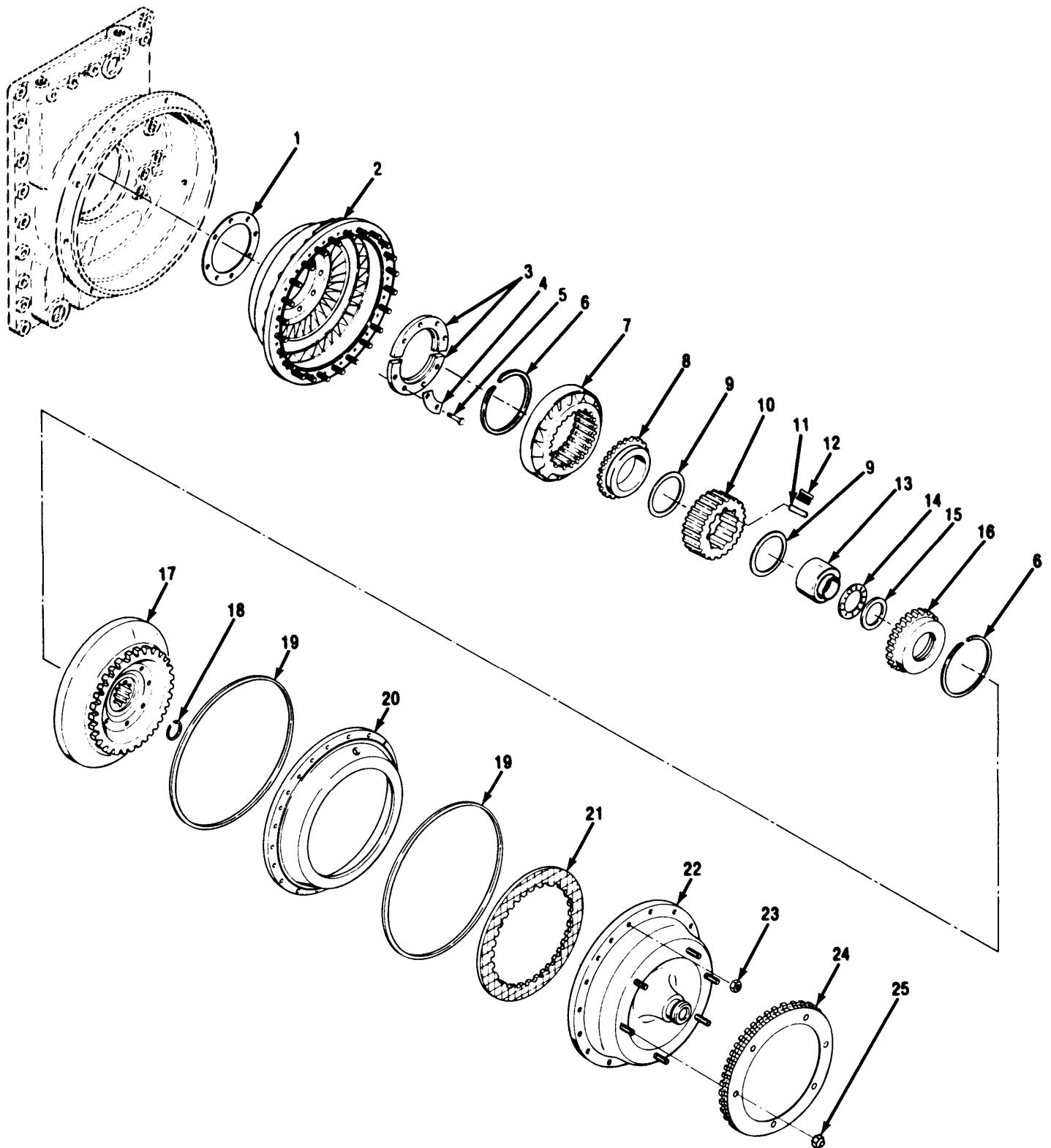


Figure 7. Converter Pump and Cover

SECTION II				TM 9-2520-272-34&P	
(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
GROUP 0710. TRANSMISSION ASSEMBLY FIG. 7 CONVERTER PUMP AND COVER					
1	PAHZZ	73342	23018191	GASKET.....	1
2	PAHZZ	73342	23017981	PUMP,ROTARY UOC:XTZ.....	1
2	PAHZZ	73342	29505983	PUMP,ROTARY UOC:X4A.....	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	19207	7709185	RING,RETAINING.....	2
7	PAHZZ	73342	29505981	STATOR TORQUE CONVERTER UOC:X4A.....	1
7	PAHZZ	73342	23018075	STATOR,TORQUE CONVE UOC:XTZ.....	1
8	PAHZZ	19207	8351717	WASHER,STATOR,REAR.....	1
9	PAHZZ	19207	8351718	BEARING,WASHER,THRU.....	2
10	PAHZZ	19207	8351725	AM,TRANSMISSION ST.....	1
11	PAHZZ	73342	6765648	ROLLER,BEARING.....	12
12	PAHZZ	19207	8351366	SPRING,TRANSMISSION.....	12
13	PAHZZ	73342	23018190	ROLLER,LINEAR ROTAR (TORQ CONV STATOR RACE ASSY).....	1
14	PAHZZ	60380	NTA-3650	RETAINER AND ROLLER.....	1
15	PAHZZ	60380	TRD-3648	SEAT,BEARING.....	1
16	PAHZZ	73342	23018117	DISK,CLUTCH (FRONT STATOR WASHER).....	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	RETAINER,CLUTCH PLA (LU CLUTCH BACKING PLATE).....	1
21	PAHZZ	73342	23046108	CLUTCH HALF,POSITIV (LU CLUTCH DISK).....	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

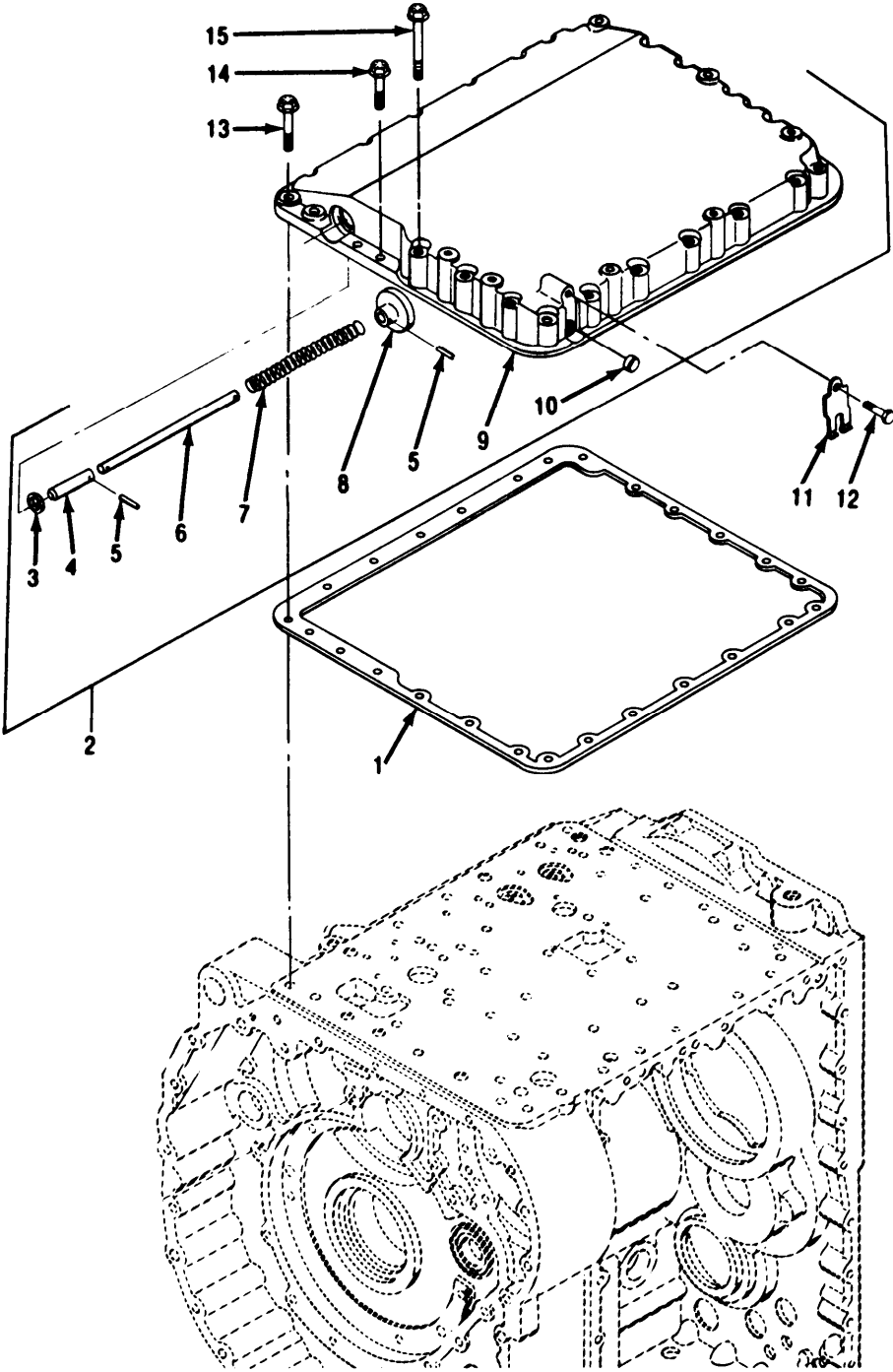


Figure 8. Top Cover

SECTION II				TM 9-2520-272-34&P	
(1)	(2)	(3)	(4)	(5)	(6)
ITEM	SMR		PART		
NO	CODE	CAGEC	NUMBER	DESCRIPTION AND USABLE ON CODES (UOC)	QTY
GROUP 0710 TRANSMISSION ASSEMBLY					
FIG. 8 TOP COVER					
1	PAOZZ	73342	23045129	GASKET.....	1
2	PAOZZ	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	XBFZZ	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	8627650	REATINER,MODULATOR .....	1
12	PAOZZ	24617	9409000	BOLT,SELF-LOCKING .....	1
13	PAOZZ	24617	9441598	BOLT,MACHINE .....	9
14	PAOZZ	24617	9427637	BOLT,MACHINE .....	2
15	PAOZZ	24617	9441599	BOLT,MACHINE .....	15
END OF FIGURE					



SECTION II

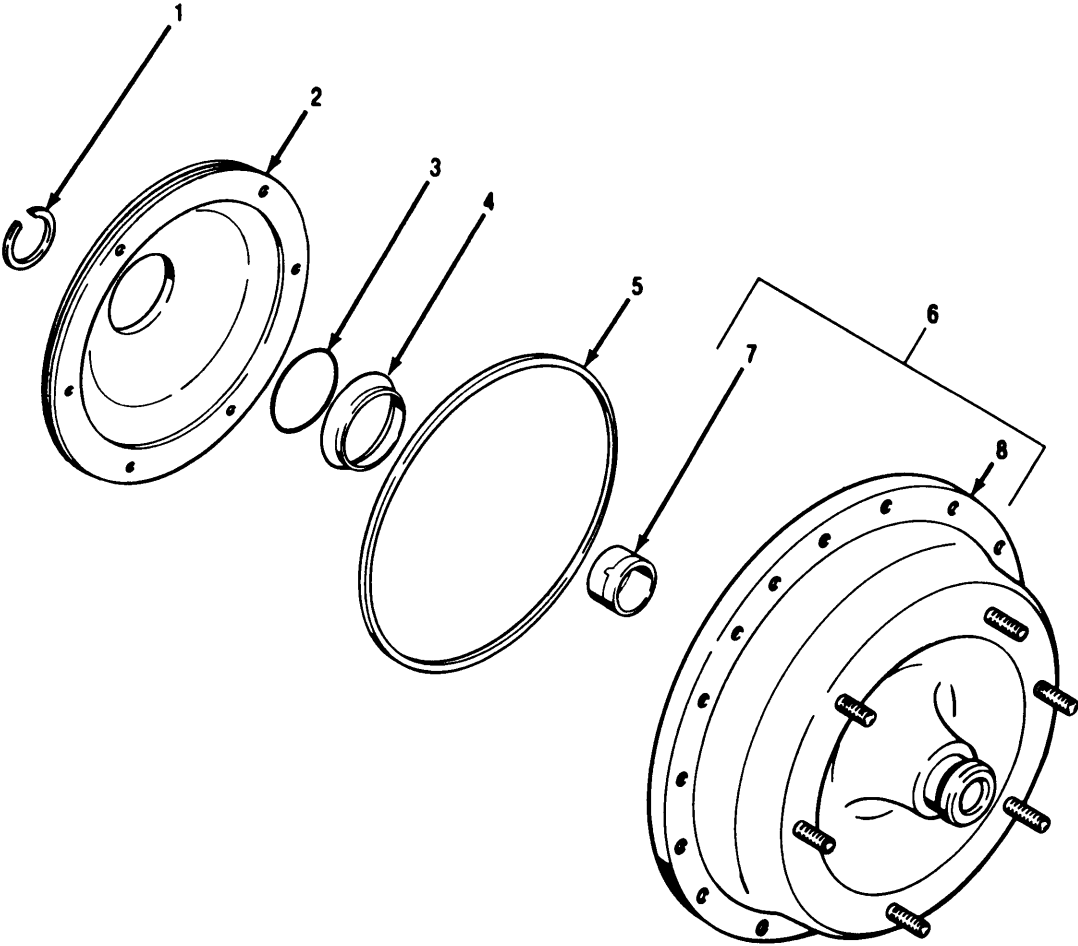


Figure 9. Converter Pump Cover and Lockup Piston

SECTION II			TM 9-2520-272-34&P		
(1)	(2)	(3)	(4)	(5)	(6)
ITEM	SMR		PART		
NO	CODE	CAGEC	NUMBER	DESCRIPTION AND USABLE ON CODES (UOC)	QTY
GROUP 0710 TRANSMISSION ASSEMBLY					
FIG. 9. CONVERTER PUMP COVER AND					
LOCKUP SYSTEM					
1	PAHZZ	73342	6836676	RING,RETAINING.....	1
2	PAHZZ	73342	6770845	PISTON ASSEMBLY,LOC .....	1
3	PAHZZ	73342	6770820	PACKING,PERFORMED .....	1
4	PAHZZ	73342	6770822	RETAINER,PACKING .....	1
5	PAHZZ	73342	6758036	SEAL,RING,TRANSMISSION.....	1
6	PAHDD	73342	23046165	OVER ASSEMBLY,PUMP .....	1
7	PADZZ	73342	6756782	BEARING,SLEEVE .....	1
8	XAHZZ	73342	23046166	COVER ASY,MACH.....	1
END OF FIGURE					

SECTION II

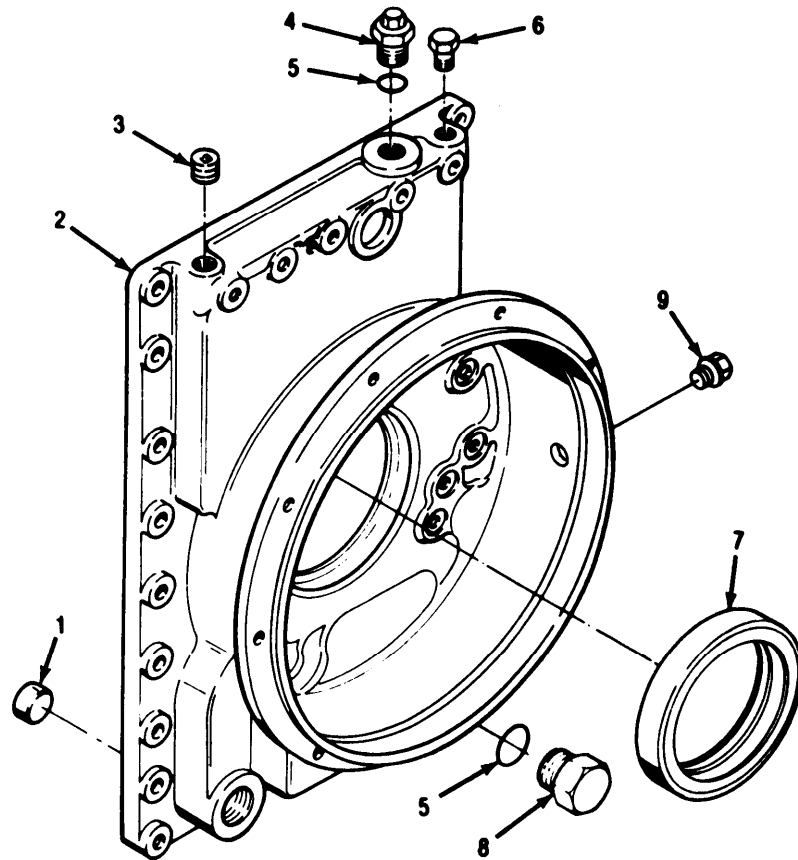


Figure 10. Input Housing

SECTION II				TM 9-2520-272-34&P	
(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(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 (USE WITH HOUSING ....., MECHANICAL P/N 23018026;FOR REPLACEMENT USE P/N 23048455; SEE FIG 6 FOR NEXT HIGHER ASSY) UOC:XTZ .....	1
2	XAHZZ	73342	23048455	HOUSING, INPUT (USE WITH HOUSING, MECHANICAL P/N 23048310; SEE FIG 6 FOR NEXT HIGHER ASSY) .....	1
3	PAHZZ	73342	23018209	PLUG,PIPE .....	1
4	PAOZZ	73342	23018085	PLUG,MACHINE THREAD .....	1
5	PAOZZ	73342	23016014	PACKING,PREFORMED .....	2
6	PAOZZ	89619	6432-35788-1	PLUG,PIPE (LU PRESSURE PORT) . ....	1
7	PAHZZ	73342	23046430	GASKET (OIL SEAL). ....	1
8	PAOZZ	73342	23018179	PLUG, MACHINE THREAD .....	1
9	PAFZZ	73342	23046813	PLUG,MACHINE THREAD (USE WITH HOUSING, MECHANICAL P/N 23018026) UOC:XTZ .....	1
END OF FIGURE					

SECTION II

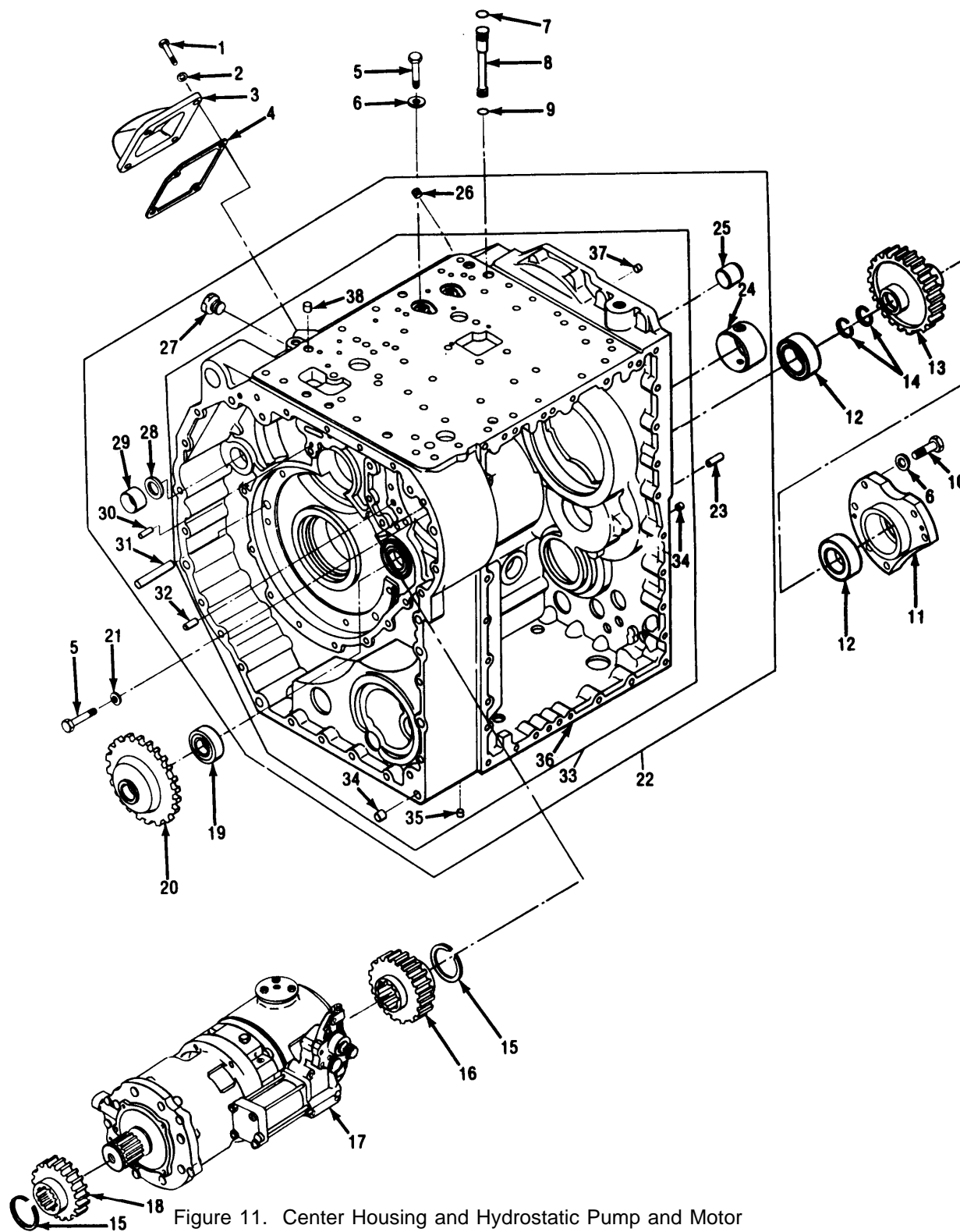


Figure 11. Center Housing and Hydrostatic Pump and Motor

SECTION II				TM 9-2520-272-34&P	
(1)	(2)	(3)	(4)	(5)	(6)
ITEM	SMR		PART		
NO	CODE	CAGEC	NUMBER	DESCRIPTION AND USABLE ON CODES (UOC)	QTY
GROUP 0710 TRANSMISSION ASSEMBLY					
FIG. 11 CENTER HOUSING AND					
HYDROSTATIC PUMP AND MOTOR					
1	PAOZZ	73342	9440903	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	PACKIN, PREFORMED .....	2
10	PAHZZ	72582	9409028	BOLT, SELF-LOCKING .....	6
11	PAHZZ	73342	23017878	PLATE, RETAINING, BEA .....	1
12	PAHZZ	82994	BS226348	BEARING, ROLLER, CYLI .....	2
13	PAHZZ	73342	23018074	GEAR SPUR (NOTE: SUPERCEDED BY P/N 29512613) .....	1
14	PAHZZ	73342	6836111	RING, RETAINING (NOTE: QTY 2 USED WITH PN 23018160 QTY 0 USED WITH PN 29512613 .....	2
15	PAHZZ	73342	6832579	RING, RETAINING .....	2
16	PAHZZ	73342	23018074	GEAR, SPUR .....	1
17	PAHDD	90166	893025	PUMP AND MOTOR ASSE (NOTE: SUPERCEDED BY PUMP & MOTOR ASSY P/N 893038) UOC:XTZ .....	1
17	PAHDD	90166	893038	PUMP & MOTOR ASSY (SEE FIGS 27 THRU 30) .....	1
18	PAHZZ	73342	23018115	GEAR, SPUR .....	1
19	PAHZZ	82994	BS226347	BEARING, ROLLER, CYLI .....	1
20	PAHZZ	73042	29510171	GEAR, SPUR UOC:X4A .....	1
20	PAHZZ	73042	23018113	GEAR, SPUR UOC:XTZ .....	1
21	PAHZZ	90407	12084P11	WASHER, FLAT .....	6
22	PFHHH	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	6832310	.BEARING, WASHER, THRU .....	1
29	PAHZZ	60380	81880H	.BEARING, ROLLER, NEED .....	1
30	PAHZZ	24617	443767	.PIN, STRAIGHT, HEADLE .....	2
31	PAHZZ	73342	23018031	.PIN, STRAIGHT, HEADLE .....	2
32	PAHZZ	24617	141262	.PIN, STRAIGHT, HEADLE .....	1
33	XAHDD	73342	23045027	.HOUSING CENTER MACH .....	1
34	PAHZZ	73342	23049119	..INSERT, SCREW THREAD .....	11
35	PAHZZ	73342	23018271	..INSERT, SCREW THREAD .....	3
36	XAHZZ	73342	23045028	..HOUSING CENTER .....	1
37	PAHZZ	24617	452692	..INSERT, SCREW THREAD .....	8
38	PAHZZ	73342	23049118	..INSERT, SCREW THREAD .....	5

END OF FIGURE

SECTION II

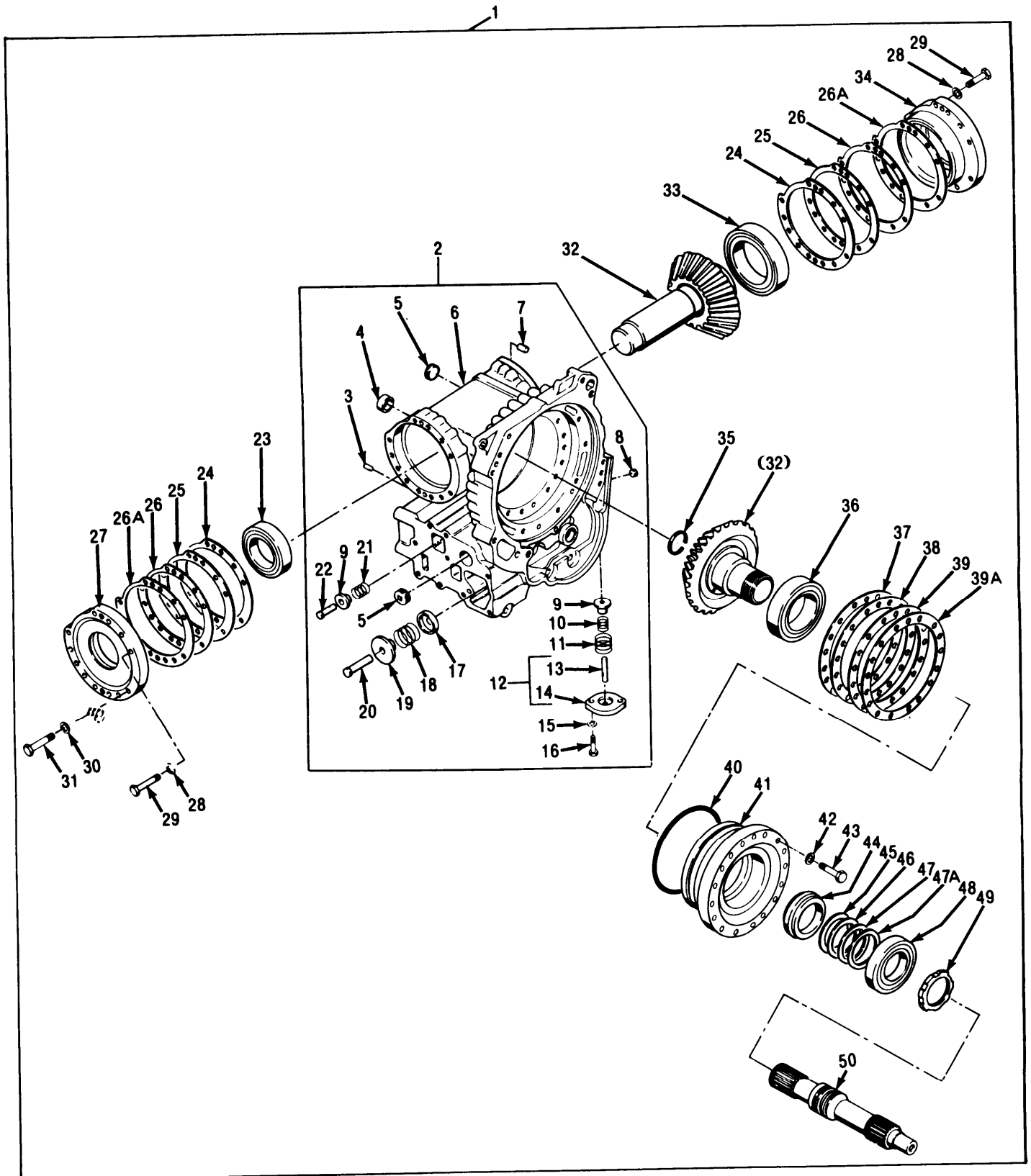


Figure 12. Bevel Gear and Bevel Gear Carrier

## SECTION II

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

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
GROUP 0710 TRANSMISSION ASSEMBLY FIG. 12 BEVEL GEAR AND BEVEL GEAR CARRIER					
1	PAHDD	73342	23018045	CARRIER ASSY (FOR REPLACEMENT, SUPERCEDED BY P/N 23048301) (USE WITH TRANS P/N 12291400-1) UOC:XTZ .....	1
1	PAHDD	73342	23048301	ASSEMBLY HOUSING,ME (CARRIER ASSY) (USE WITH TRANS P/N 12291400-1) UOC:XTZ .....	1
1	PADDD	73342	29511029	CARRIER ASSEMBLY BEVEL GEAR (USE WITH TRANS ASSY P/N 12371041-1) UOC:X4A .....	1
2	PADDD	73342	23045120	.CARRIER ASSEMBLY (USE WITH CARRIER ASSY P/N 23018045) UOC:XTZ .....	1
2	PADDD	73342	23048300	.HOUSING MECHANICAL (CARRIER ASSY) (USE WITH CARRIER ASSY P/N 23048301)UOC:XTZ .....	1
2	PADDD	73342	29511028	.CARRIER ASSEMBLY (USE WITH CARRIER ASSY P/N 29511029) UOC:X4A .....	1
3	PADZZ	24617	141195	..PIN,STRAIGHT,HEADLE .....	2
4	PADZZ	60380	B1210XOH	..BEARING,ROLLER,NEED .....	2
5	PADZZ	96906	MS14314-5Z	..PLUG,PIPE .....	2
6	XADZZ	73342	23018046	..CARRIER,BEVEL GEAR (USE WITH CARRIER ASSY P/N 23045120) UOC:XTZ .....	1
6	XADZZ	73342	23048299	..CARRIER,BEVEL GEAR (USE WITH CARRIER ASSY P/N 23048300) UOC:XTZ .....	1
6	XADZZ	73342	29511027	CARRIER ASSEMBLY (USE WITH CARRIER ASSY PN 29511028) UOC:X4A .....	1
7	PADZZ	24617	141240	..PIN,STRAIGHT,HEADLE .....	4
8	PADZZ	81348	WW-P-471ACABCA	..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	PAHHH	73342	29520292	..COVER,ASSEMBLY,VAL .....	1
13	XDDZZ	24617	141210	..PIN,STRAIGHT,HEADLE .....	1
14	XADZZ	73342	23018054	..COVER,CHECK VALVE .....	1
15	PADZZ	24617	9422846	..WASHER,FLAT .....	2
16	PADZZ	24617	9409076	..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	XDDZZ	73342	23018048	..PIN,STRAIGHT,HEADED .....	1
23	PADZZ	60038	LM603049LM603011	.BEARING,ROLLER,TAPE .....	1
24	PADZZ	73342	23018128	.SHIM .....	V
25	PADZZ	73342	23018129	.SHIM. ....	V
26	PADZZ	73342	23018130	.SHIM .....	V
26A	PADZZ	73342	23048640	.SHIM .....	V
27	PADZZ	73342	23018132	.PLATE,RETAINING,BEA .....	1
28	PADZZ	90407	12084P11	.WASHER,FLAT .....	23
29	PADZZ	96906	MS35764-236	.BOLT,SELF-LOCKING .....	23
30	PAHZZ	90407	12084P11	.WASHER,FLAT .....	1
31	PAHZZ	96906	MS35764-236	.BOLT,SELF-LOCKING .....	1
32	PADZZ	73342	23018000	.GEAR,SET,BEVEL,MATC .....	1



SECTION II						TM 9-2520-272-34&P
(1)	(2)	(3)	(4)	(5)	(6)	
ITEM	SMR		PART			
NO	CODE	CAGEC	NUMBER	DESCRIPTION AND USABLE ON CODES (UOC)	QTY	
33	PADZZ	60038	JM612949JM612910	.BEARING,ROLLER,TAPE .....	1	
34	PADZZ	73342	23018131	.PLATE,RETAINING,BEA .....	1	
35	PADZZ	73342	23018254	.RING,RETAINING .....	1	
36	PADZZ	60038	JM511946JM511910	.BEARING,ROLLER,TAPE .....	1	
37	PADZZ	73342	23018122	.SHIM.....	V	
38	PADZZ	73342	23018123	.SHIM.....	V	
39	PADZZ	73342	23018124	.SHIM.....	V	
39A	PADZZ	73342	23048638	.SHIM.....	V	
40	PADZZ	73342	23018245	.PACKING,PREFORMED .....	1	
41	PADZZ	73342	23018119	.PLATE,RETAINING,BEA (USE WITH CARRIER ASSY P/N 23018045) UOC:XTZ.....	1	
41	PADZZ	73342	23048298	.PLATE,RETAINING,BEA (USE WITH CARRIER ASSY P/N 23048301).....	1	
41	PADZZ	73342	23048298	.PLATE,RETAINING,BEA (USE WITH CARRIER ASSY P/N 29511029).....	1	
42	PADZZ	24617	9422848	.WASHER,FLAT (QTY 15 USED WITH P/N..... 23018045; QTY 14 USED WITH P/N 23048301 QTY 13 USED WITH P/N 29511029) .....	15	
43	PADZZ	24617	9416011	.BOLT,SELF-LOCKING (QTY 15 USED WITH P/N 23018045; QTY 14 USED WITH P/N 23048301 QTY 13 USED WITH P/N 29511029) 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	
47A	PADZZ	73342	23048639	.SHIM.....	V	
48	PADZZ	60038	JM207049JM207010	.BEARING,ROLLER,TAPE .....	1	
49	PADZZ	73342	23018120	.NUT,PLATE,ROUND .....	1	
50	PADZZ	73342	23045917	.SHAFT,SHOULDERED CIIC ( ) .....	1	

END OF FIGURE



SECTION II

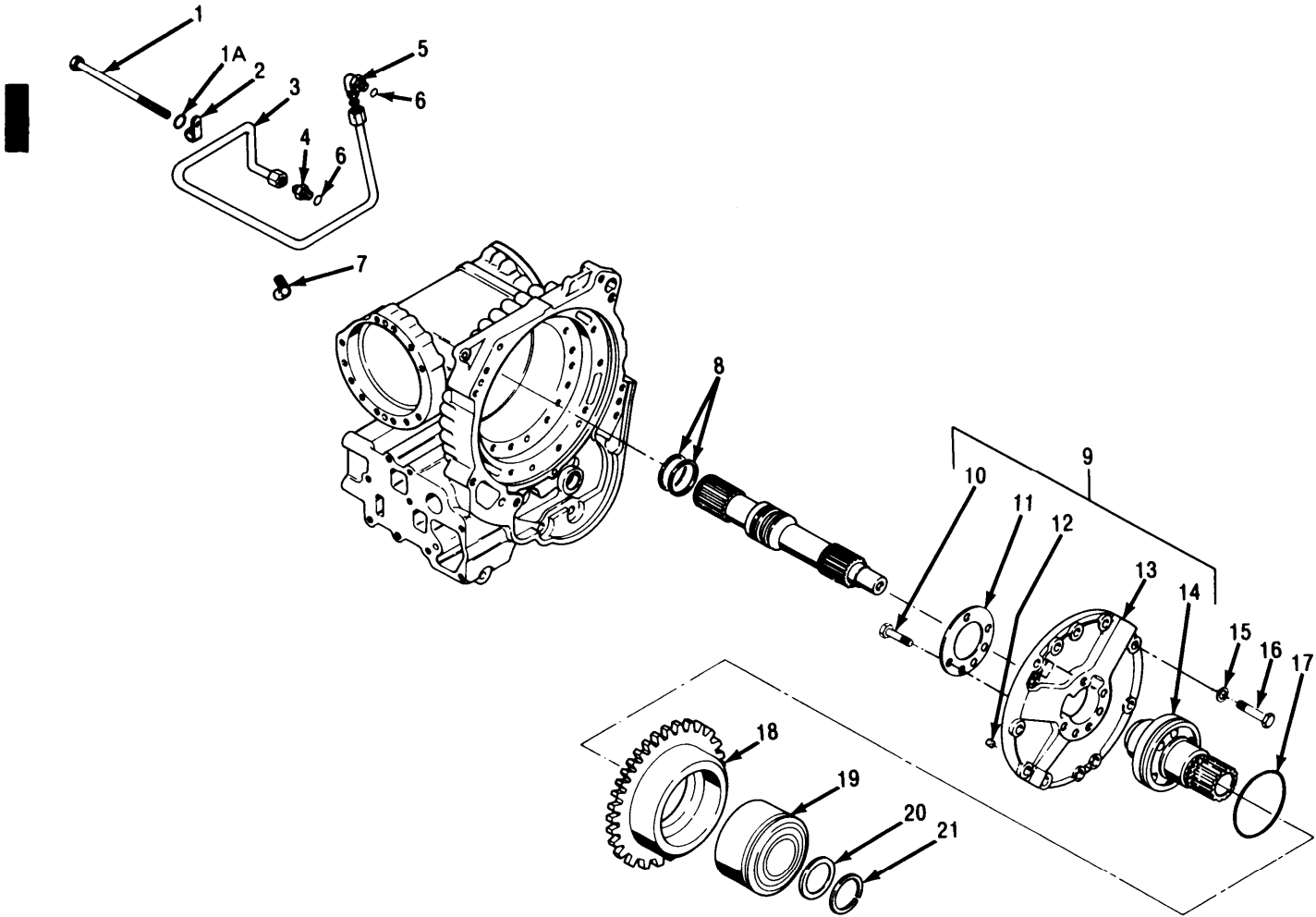


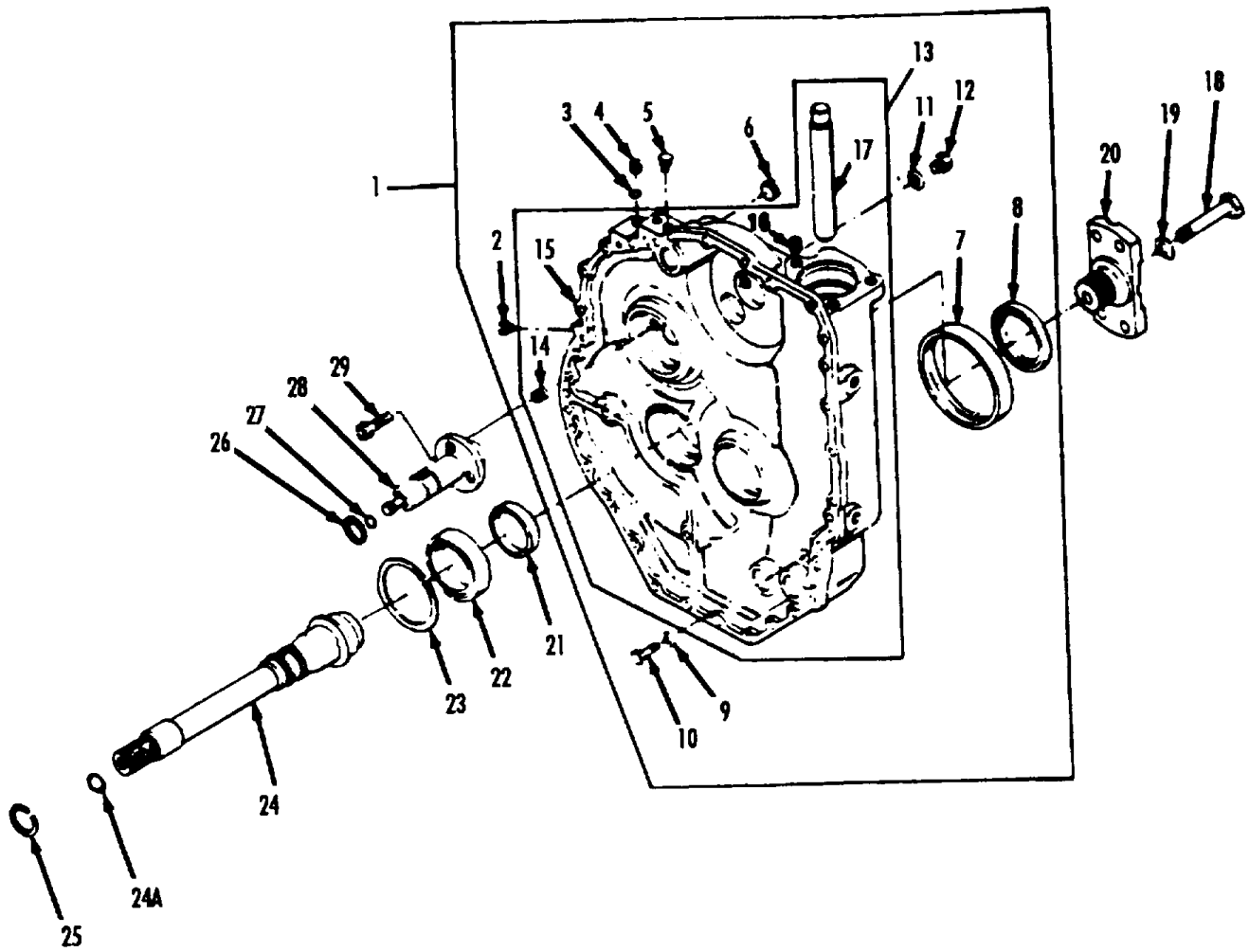
Figure 13. Oil Transfer Diaphragm and Input Pump Drive Gear

## SECTION II

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

(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. 13 OIL TRANSFER DIAPHRAGM AND INPUT PUMP DRIVE GEAR					
1	PAHZZ	24617	9442435	BOLT .....	1
1A	PAHZZ	24617	9422846	WASHER, FLAT .....	1
2	PAHZZ	73342	23018186	CLAMP, LOOP .....	1
3	PAHZZ	73342	23046057	TUBE ASSEMBLY, METAL .....	1
4	PAHZZ	24617	9410714	NIPPLE, TUBE .....	1
5	XBHZZ	24617	9411180	ELBOW, TUBE TO BOSS .....	1
6	PAHZZ	73342	23018247	PACKING, PREFORMED.....	2
7	PAHZZ	73342	23018185	CLAMP, LOOP .....	1
8	PAHZZ	73342	6836115	SEAL RING, METAL.....	2
9	PAHDD	73342	23018020	DIAPHRAGM ASSEMBLY.....	1
10	PADZZ	72582	9409060	.SCREW, MACHINE .....	6
11	PADZZ	73342	23018188	.SPACER, PLATE.....	1
12	XDDZZ	24617	141255	.PIN, STRAIGHT, HE.....	2
13	PADZZ	73342	23018021	.DIAPHRAGM, OIL TRANS .....	1
14	PADZZ	73342	23018022	.GEAR SHAFT, SPUR.....	1
15	PAHZZ	90407	12084P11	WASHER, FLAT .....	9
16	PAHZZ	96906	MS35764-236	BOLT, SELF-LOCKING .....	9
17	PAHZZ	73342	23018235	PACKING, PREFORMED.....	1
18	PAHZZ	73342	23017980	GEAR, SPUR.....	1
19	PAHZZ	3L092	5212WLAB	BEARING, BALL, ANNULA .....	1
20	PAHZZ	73342	23018256	SPACER, PLATE.....	1
21	PAHZZ	73342	23018255	RING, RETAINING .....	1

END OF FIGURE



Change 2

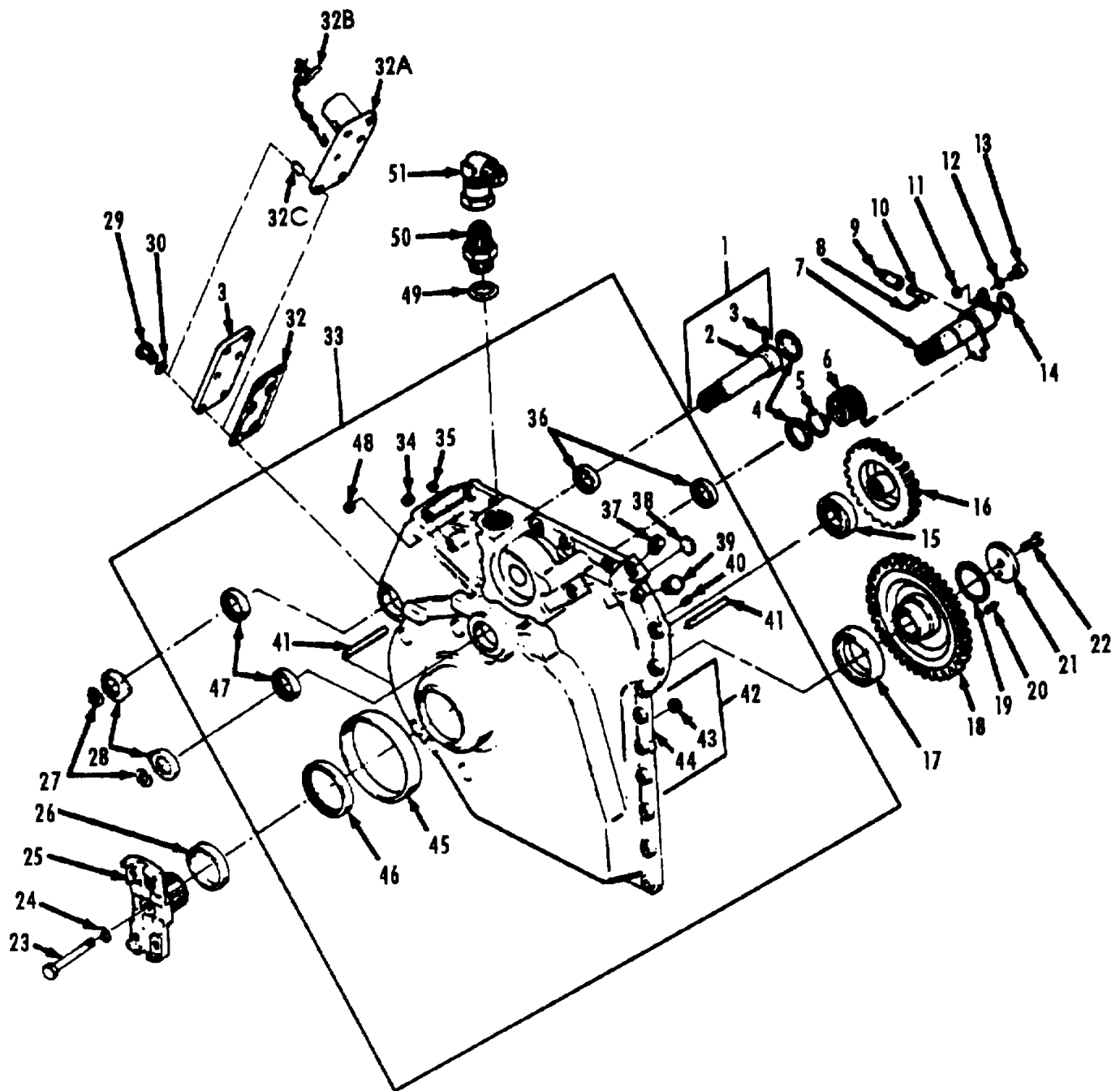
Figure 14. Left Hand End Cover and Output Shaft

## SECTION II

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

(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. 14 LEFT HAND END COVER AND OUTPUT SHAFT					
1	PADDD	73342	23018292	COVER, ACCESS .....	1
2	PAHZZ	73342	23018206	.PLUG, PIPE .....	1
3	PADZZ	73342	23045477	.PACKING, PREFORMED .....	1
4	PADZZ	73342	23045447	.PLUG, MACHINE THREAD .....	1
5	PADZZ	89619	6432-35788-1	.PLUG, PIPE .....	4
6	PAHZZ	73342	23018208	.PLUG, PIPE .....	1
7	PADZZ	73342	23018042	.COVER SLEEVE .....	1
8	PADZZ	73342	6883697	.SEAL, PLAIN ENCASED .....	1
9	PADZZ	24617	9422845	.WASHER, FLAT .....	1
10	PADZZ	73342	23018279	.BOLT, SELF-LOCKING .....	1
11	PAFZZ	96906	MS28778-10	.PACKING, PERFORMED (USE WITH PLUG P/N MS51840-27) UOC:XTZ .....	1
12	PAFZZ	96906	MS51840-27	.PLUG, MACHINE THREAD (NOT USED IN ALL TRANSMISSION MODELS) UOC:XTZ .....	1
13	XADDD	73342	23018289	.COVER ASSY, END MACH .....	1
14	PADZZ	73342	23049118	..INSERT, SCREW THREAD .....	3
15	XADZZ	73342	23018288	..COVER, LH END .....	1
16	PAHZZ	73342	23049119	..INSERT, SCREW THREAD .....	3
17	PADZZ	73342	23018198	..REDUCER, TUBE .....	1
18	PADZZ	24617	454465	SCREW, CAP, HEXAGON H .....	1
19	PADZZ	73342	6752556	WASHER, SPRING TENS .....	1
20	PADZZ	73342	23017998	FLANGE, OUTPUT .....	1
21	PAHZZ	73342	23045191	LINER, BEARING HOUS .....	1
22	PAHZZ	3L092	113A3	BEARING, BALL, ANNULA .....	1
23	PAHZZ	73342	23045232	RING, RETAINING .....	1
24	PAHZZ	73342	23017954	SHAFT, SHOULDERED UOC:XTZ .....	1
24	PAHZZ	73342	29510209	SHAFT, SHOULDERED UOC:X4A .....	1
24A	PAHZZ	73342	23018234	PACKING, PREFORMED UOC:X4A .....	1
25	PAHZZ	73342	23048171	SEAL RING, METAL .....	2
26	PAHZZ	73342	23049059	RING, METAL .....	2
27	PAHZZ	73342	23018233	SEAL RING, METAL .....	1
28	PADZZ	73342	23018087	TUBE ASSEMBLY, METAL .....	1
29	PADZZ	73342	23015337	BOLT .....	3

END OF FIGURE



Change 2

Figure 15. Right Hand End Cover and Brake Apply Cam Shaft

SECTION II				TM 9-2520-272-34&P	
(1)	(2)	(3)	(4)	(5)	(6)
ITEM	SMR		PART	DESCRIPTION AND USABLE ON CODES (UOC)	QTY
NO	CODE	FSCM	NUMBER		
				GROUP 0710 TRANSMISSION ASSEMBLY	
				FIG. 15 RIGHT HAND END COVER AND	
				BRAKE APPLY CAM SHAFT	
1	PAHHH	73342	23018232	SHAFT, SHOULDERED .....	1
2	XAHZZ	73342	23018147	SHAFT, BRK APLY LH .....	1
3	XDHZZ	24617	9421003	PIN, SPRING .....	1
4	PAHZZ	73342	6836102	WASHER, FLAT .....	2
5	PAHZZ	73342	6751633	RING, RETAINING .....	1
6	PAHZZ	73342	23018151	SPRING, HELICAL, TORS .....	1
7	PAHZZ	73342	23018024	CAM, CONTROL .....	1
8	XDHZZ	24617	455675	PIN, SPRING .....	1
9	PAHZZ	73342	23018143	LINK, BRAKE ADJUSTIN .....	1
10	PAHZZ	73342	23018142	LINK, BRAKE ADJUSTIN .....	1
11	PAHZZ	24617	443318	NUT, SELF-LOCKING, HE .....	1
12	PAHZZ	73342	23018150	SPACER, SLEEVE .....	1
13	PAHZZ	73342	23018149	CAM FOLLOWER, NEEDLE .....	1
14	PAHZZ	73342	23018262	WASHER, FLAT .....	1
15	PAHZZ	83994	BS226347	BEARING, ROLLER, CYLI .....	1
16	PAHZZ	73342	29510213	GEAR, SPUR UOC:X4A .....	1
16	PAHZZ	73342	23018112	GEAR, SPUR UOC:XTZ .....	1
17	PAHZZ	82994	BS226349	BEARING, ROLLER, CYLI .....	1
18	PAHZZ	73342	29510212	GEAR, SPUR UOC:X4A .....	1
18	PAHZZ	73342	23018152	GEAR, SPUR UOC:XTZ .....	1
19	PAHZZ	73342	23018154	BEARING, WASHER, THUR .....	1
20	PAHZZ	24617	455160	PIN .....	1
21	PAHZZ	73342	29515106	PLATE, RETAINING, SHA UOC:X4A .....	1
21	PAHZZ	73342	23018153	PLATE, RETAINING, SHA UOC:XTZ .....	1
22	PAHZZ	72582	9409028	BOLT, SELF-LOCKING .....	1
23	PAOZZ	24617	454465	SCREW, CAP, HEXAGON H .....	1
24	PAOZZ	73342	6752556	WASHER, SPRING TENS .....	1
25	PAOZZ	73342	23017998	FLANGE, OUTPUT .....	1
26	PAHZZ	73342	23045191	LINER, BEARING HOUSI .....	1
27	PAOZZ	19207	7707326	RING, RETAINING .....	2
28	PAOZZ	73342	23017999	CAM, CONTROL .....	2
29	PAOZZ	24617	9425094	BOLT, SELF-LOCKING .....	6
30	PAOZZ	73342	23018199	WASHER, FLAT .....	6
31	PAOZZ	73342	23017881	COVER, ACCESS UOC:XTZ .....	1
32	PADZZ	73342	23017882	GASKET .....	1
32A	PAOZZ	73342	29510242	PLATE, OIL FILLER TUBE UOC:X4A .....	1
32B	PAOZZ	73342	29510241	CAP, FILLER W/CHAIN UOC:X4A .....	1
32C	PAOZZ	73342	23018210	LUG, PIPE UOC:X4A .....	1
33	PAHHH	73342	23018291	COVER ASSEMBLY, END (SEE FIG 2 FOR NEXT HIGHER ASSEMBLY .....	1
34	PAHZZ	73342	23018209	PLUG, PIPE (LUBE PRESSURE PORT) .....	1
35	PAHZZ	73342	23018205	PLUG, PIPE .....	1
36	PAHZZ	60380	B1880H	BEARING, ROLLER, NEED .....	2
37	PAHZZ	73342	23018211	PLUG, PIPE (MAIN PRESSURE PORT) .....	1
38	PAHZZ	73342	23018028	BUSHING BLANK .....	2
39	PAOZZ	30780	3/8	HP-SS PLUG, PIPE (BRK APPLY PRESSURE PORT) .....	1
40	PAHZZ	72750	141217	PIN, STRAIGHT, HEADLE .....	2
41	PAHZZ	73342	23018031	PIN, STRAIGHT, HEADLE .....	2
42	XAHDD	73342	23018285	COVER, ASSY, RH MACH .....	1
43	PAHZZ	73342	23049119	INSERT, SCREW THREAD .....	4
44	XAHZZ	73342	23018284	COVER, RH END .....	1
45	PAHZZ	73342	23018036	SLEEVE, COVER .....	1
46	PAOZZ	73342	6883697	SEAL, PLAIN ENCASED .....	1
47	PAOZZ	73342	6836137	SEAL, PLAIN .....	2



## SECTION II

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

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
48	PAOZZ	73342	23018205	PLUG, PIPE (BK SIG PRESSURE PORT) .....	1
49	PAOZZ	96906	MS28778-20	PACKING, PREFORMED .....	1
50	PAOZZ	96906	MS51525A20	ADAPTER, STRAIGHT, TU (USE W/ ELBOW, TUBE P/N MS51521A20) .....	1
51	PAOZZ	73342	29516442	ELBOW, TUBE .....	1

END OF FIGURE

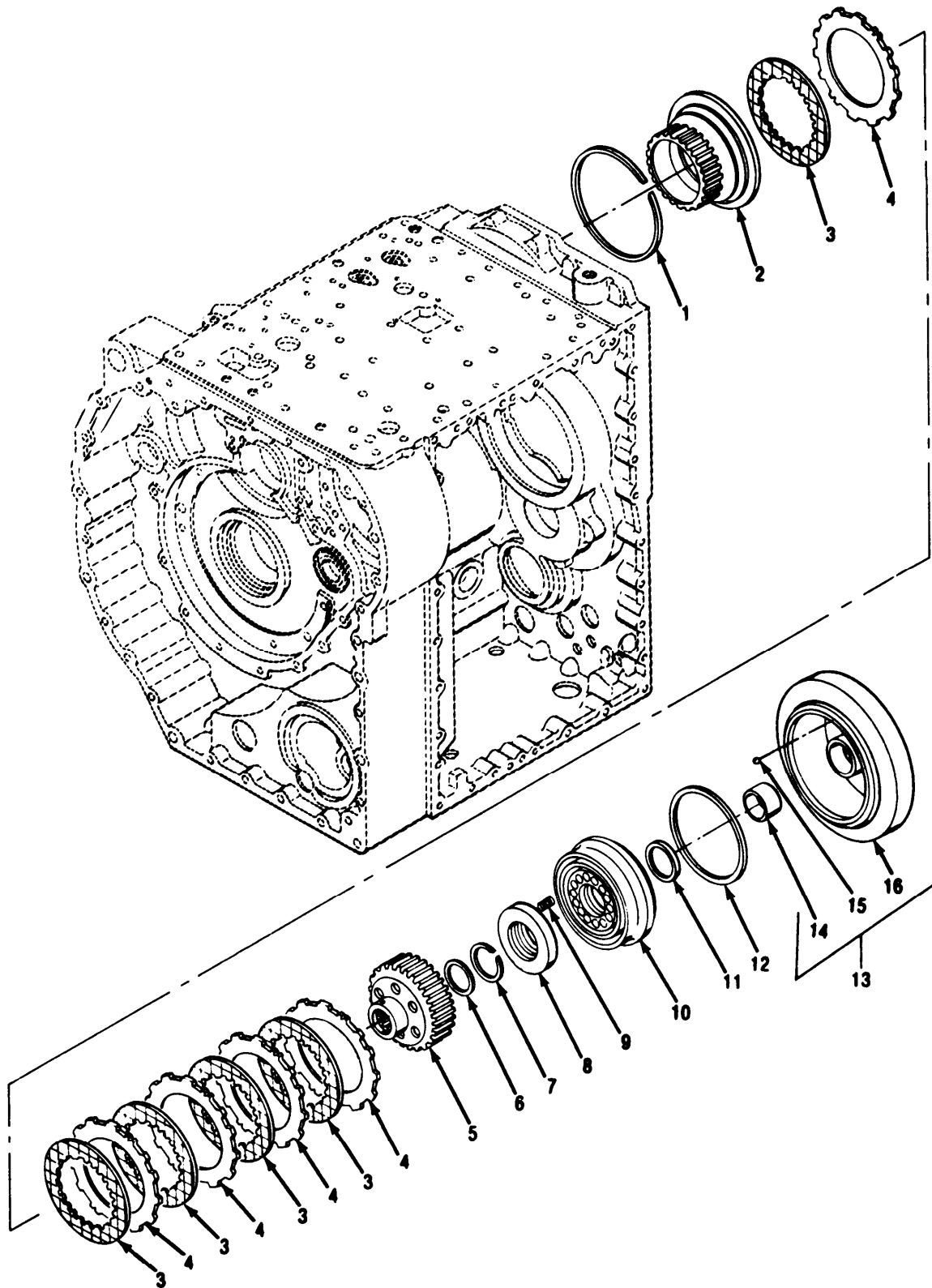


Figure 16. Forward Clutch

SECTION II				TM 9-2520-272-34&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. 16 FORWARD CLUTCH					
1	PAHZZ	73342	23015985	RING, RETAINING .....	1
2	PAHZZ	73342	2301823	CLUTCH ASSEMBLY, FWD (FWD CLUTCH BACKING PLATE) .....	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, BEA .....	1
9	PAHZZ	73342	23045233	SPRING, HELICAL COMP .....	16
10	PAHZZ	73342	23048456	CLUTCH, POSITIVE (FWD CLUTCH POSITION) .....	1
11	PAHZZ	73342	29520291	SEAL, INNER .....	1
12	PAHZZ	73342	8623101	SEAL, OUTER .....	1
13	PAHZZ	73342	23018011	HOUSING, MECHANICAL .....	1
14	PADZZ	73342	23018008	BEARING, SLEEVE .....	1
15	XADZZ	73342	8622757	BALL .....	2
16	XAHZZ	73342	23018192	HOUSING & RING ASSY .....	1

END OF FIGURE

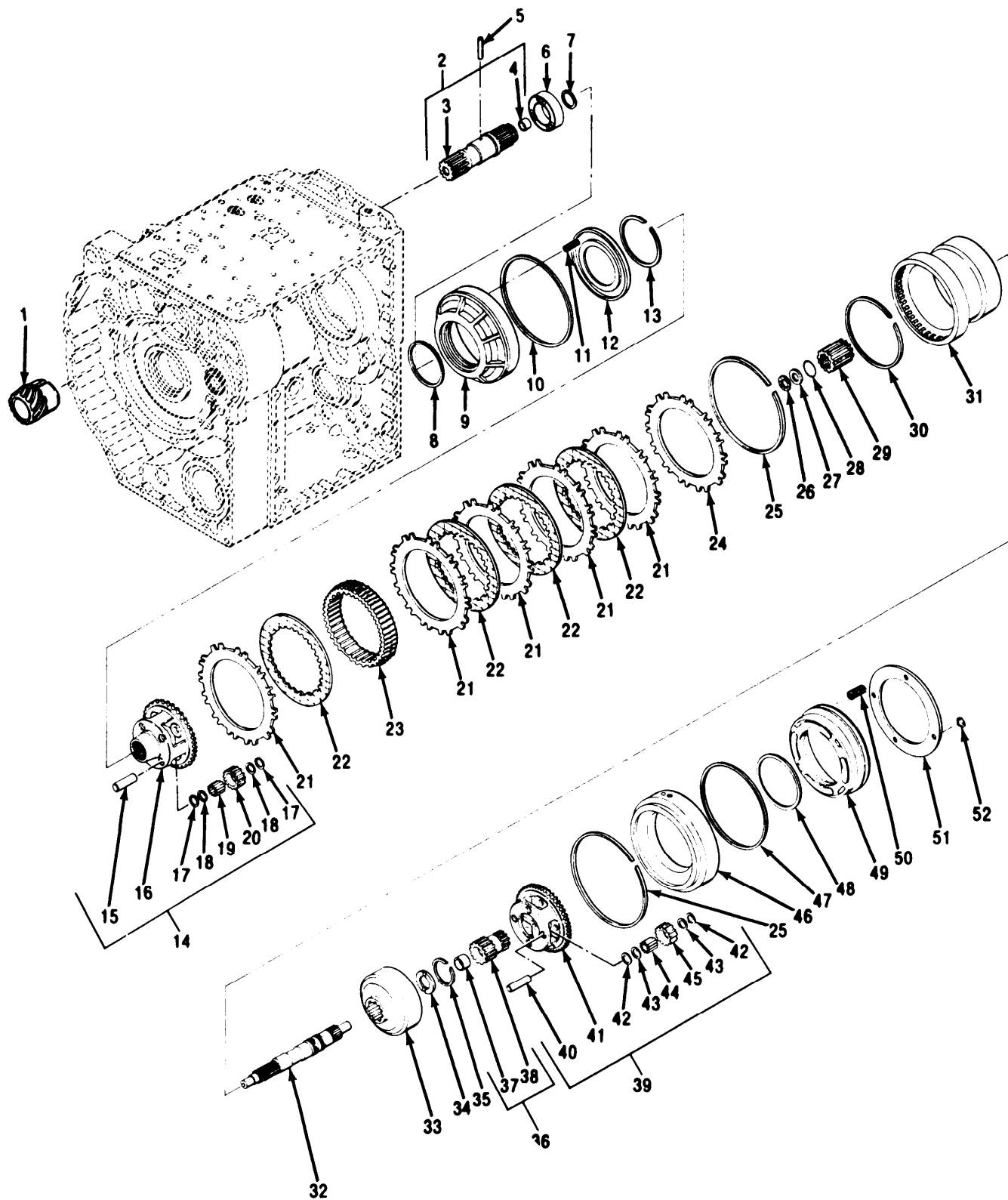


Figure 17. 1st Clutch, Center Carrier and Rear Carrier

SECTION II				TM 9-2520-272-34&P		
(1)	(2)	(3)	(4)	(5)	(6)	
ITEM	SMR	FSCM	PART	DESCRIPTION AND USABLE ON CODES (UOC)	QTY	
NO	CODE		NUMBER			
				GROUP 0713 INTERMEDIATE CLUTCH		
				FIG. 17 1ST CLUTCH, CENTER CARRIER		
				AND REAR CARRIER		
1	PAHZZ	73342	23018257	GEAR, HELICAL.....	1	
2	PAHDD	73342	23018096	SHAFT, SHOULDERED.....	1	
3	XAHZZ	73342	23018097	.SHAFT, RANGE OUTPUT.....	1	
4	PADZZ	73342	23018168	.BUSHING, SLEEVE.....	1	
5	XDHZZ	24617	456641	PIN, SPRING.....	1	
6	PAHZZ	3L092	110X4	BEARING, BALL, ANNULA.....	1	
7	PAHZZ	73342	23018274	RING, RETAINING.....	1	
8	PAHZZ	73342	6883031	SEAL, PLAIN.....	1	
9	PAHZZ	73342	23011665	PISTON, CLUTCH TRANS (1ST CLUTCH PISTON).....	1	
10	PAHZZ	73342	6883033	SEAL, SPECIAL.....	1	
11	PAHZZ	73342	6880251	SPRING, PISTON RELEA.....	26	
12	PAHZZ	73342	6834339	RETAINER, PISTON SPR.....	1	
13	PAHZZ	73342	6833993	RING, RETAINING.....	1	
14	PAHDD	73342	23018136	CARRIER ASSEMBLY.....	1	
15	KDDZZ	73342	6835567	.SHAFT, STRAIGHT PART OF KIT P/N		
				5703229.....	4	
16	XADZZ	73342	23018137	.CARRIER, REAR.....	1	
17	KDDZZ	73342	6839375	.SEAT, BEARING (BRONZE THRUST WASHER;		
				PLACE NEXT TO CARRIER) PART OF KIT P/N		
				5703229.....	8	
18	KDDZZ	73342	23018960	.WASHER, THRUST (STEEL THRUST		
				WASHER) PART OF KIT P/N 5703229.....	8	
19	KDDZZ	73342	6834915	.BEARING, ROLLER, NEED PART OF KIT		
				P/N 5703229.....	72	
20	KDDZZ	73342	23045482	.PINION ASSY, MATCHED SET OF FOUR		
				PART OF KIT P/N 5703229.....	1	
21	PAHZZ	73342	23018099	DISK, CLUTCH.....	5	
22	PAHZZ	73342	23018225	DISK, CLUTCH (QTY 4 USED WITH P/N		
				23045130 QTY 5 USED WITH P/N 29510162).....	4	
23	PAHZZ	73342	23018135	GEAR, SPUR, INTERNAL UOC:XTZ.....	1	
23	PAHZZ	73342	29510166	GEAR, SPUR, INTERNAL UOC:X4A.....	1	
24	PAHZZ	73342	23018167	DISK, CLUTCH (1ST CLUTCH BACKING		
				PLATE) UOC:XTZ.....	1	
24	PAHZZ	73342	29510157	DISK, CLUTCH UOC:X4A.....	1	
25	PAHZZ	73342	6884275	RING, RETAINING.....	2	
26	PAHZZ	60380	NTA1220	RETAINER AND ROLLER.....	1	
27	PAHZZ	60380	TRC1220	SEAT, BEARING.....	2	
28	PAHZZ	73342	6836117	RING, RETAINING.....	1	
29	PAHZZ	73342	23018102	GEAR, SPUR UOC:XTZ.....	1	
29	PAHZZ	73342	29510169	GEAR, SPUR UOC:X4A.....	1	
30	PAHZZ	73342	6834512	RING, RETAINING.....	1	
31	PAHZZ	73342	23018101	DRUM, CARRIER, TRANSM.....	1	
32	PAHZZ	73342	23018095	SHAFT, SHOULDERED UOC:XTZ.....	1	
32	PAHZZ	73342	29510168	SHAFT, SHOULDERED UOC:X4A.....	1	
33	PAHZZ	73342	23018139	GEAR, INTERNAL.....	1	
34	PAHZZ	73342	23018282	BEARING, WASHER, THRU.....	1	
35	PAHZZ	73342	23018178	RING, RETAINING.....	1	
36	PAHDD	73342	23018010	GEAR CLUSTER.....	1	
37	PADZZ	73342	23018008	.BEARING, SLEEVE.....	2	
38	XADZZ	73342	23018009	.GEAR, CTR SUN.....	1	
39	PAHDD	73342	6831676	CARRIER ASSEMBLY (CENTER CARRIER ASSY).....	1	
40	KDDZZ	73342	6831679	.PIN PART OF KIT P/N 5703230.....	4	
41	XAHZZ	73342	6831677	.CARRIER, CENTER.....	1	

## SECTION II

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

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
42	KDDZZ	73342	6839376	.BEARING, WASHER THRU (BRONZE THRUST WASHER; PLACE NEXT TO CARRIER) PART OF KIT P/N 5703230 .....	4
43	KDDZZ	73342	681680	.SEAT, BEARING (STEEL THRUST WASHER) PART OF KIT P/N 5703230 .....	8
44	KDDZZ	60380	Q8308	.ROLLER, BEARING PART OF KIT P/N 5703230 .....	76
45	KDDZZ	73342	23045483	.PINION ASSY, MATCHED SET OF FOUR PART OF KIT P/N 5703230 .....	1
46	PAHZZ	73342	23018100	HOUSING, PISTON .....	1
47	PAHZZ	73342	23011456	SEAL, PLAIN .....	1
48	PAHZZ	73342	23011475	SEAL .....	1
49	PAHZZ	73342	6834817	PISTON (2ND CLUTCH PISTON) .....	1
50	PAHZZ	73342	23018299	SPRING, HELICAL, COMP .....	12
51	XDHZZ	73342	6834129	RING, SPRING RETAINE .....	1
52	PAHZZ	73342	3909063	RING, RETAINING .....	4

END OF FIGURE

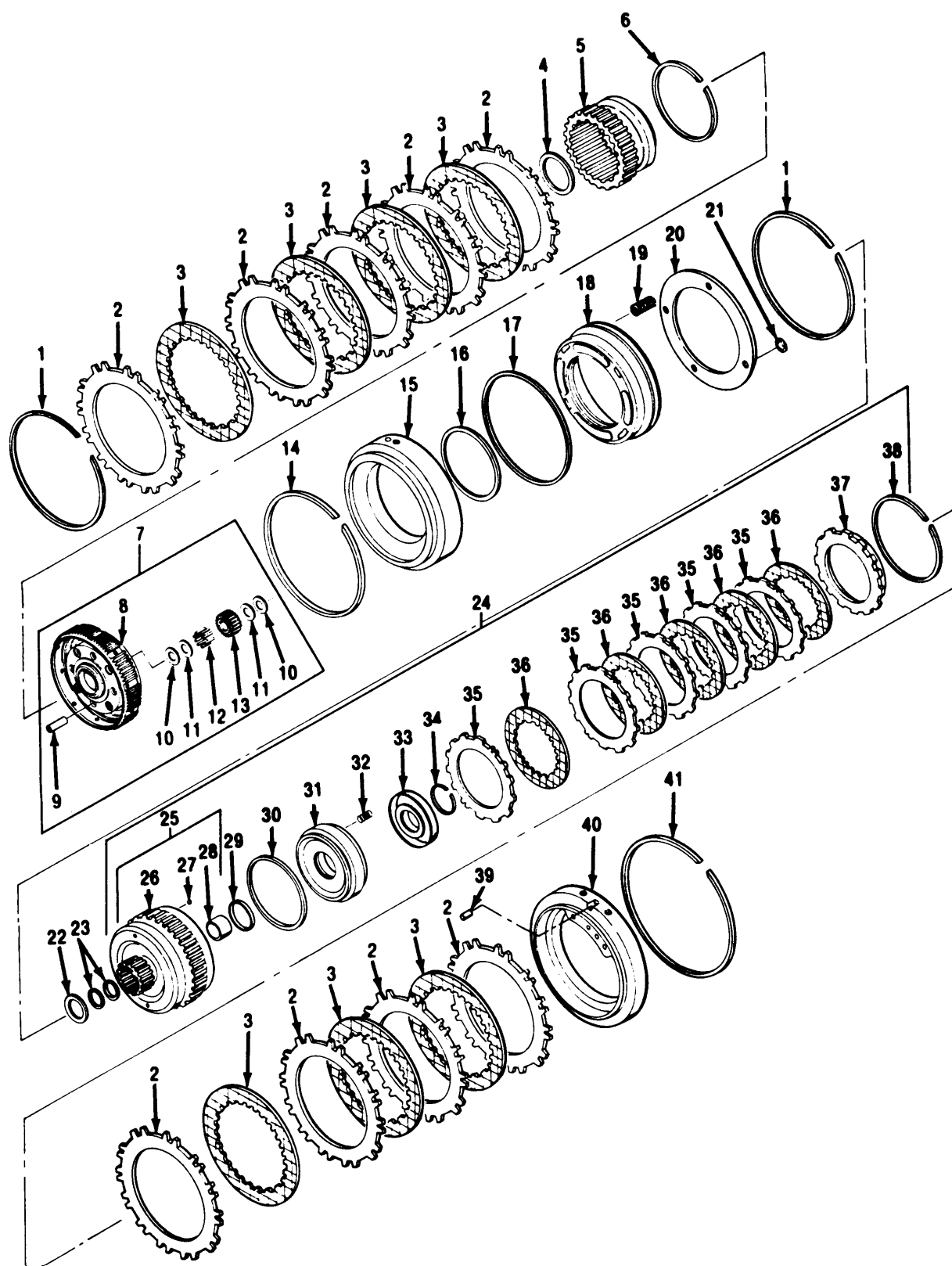


Figure 18. 2nd and 3rd Clutch, Front Carrier, 4th and Reverse Clutch

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SECTION II				TM 9-2520-272-34&P		
(1)	(2)	(3)	(4)	(5)	(6)	
ITEM	SMR	FSCM	PART	DESCRIPTION AND USABLE ON CODES (UOC)	QTY	
NO	CODE		NUMBER			
				GROUP 0713 INTERMEDIATE CLUTCH		
				FIG. 18 2ND AND 3RD CLUTCH, FRONT		
				CARRIER, 4TH AND REVERSE CLUTCH		
1	PAHZZ	73342	6884273	RING, RETAINING .....	V	
1	PAHZZ	73342	6884274	RING, RETAINING .....	V	
1	PAHZZ	73342	6884275	RING, RETAINING .....	V	
1	PAHZZ	73342	6884276	RING, RETAINING .....	V	
2	PAHZZ	73342	23018099	DISK, CLUTCH.....	9	
3	PAHZZ	73342	23018225	DISK, CLUTCH.....	7	
4	PAHZZ	73342	6831673	BEARING, WASHER, THRU.....	1	
5	PAHZZ	73342	6831675	GEAR, INTERNAL SUPERCEDED BY P/N		
				29503503 UOC:XTZ .....	1	
5	PAHZZ	73342	29503503	GEAR, INTERNAL UOC:X4A .....	1	
6	PAHZZ	73342	6755007	RING, RETAINING .....	1	
7	PAHDD	73342	23046074	CARRIER ASSEMBLY, FR.....	1	
8	XADZZ	73342	23046075	.FLANGE AND CARRIER.....	1	
9	KDDZZ	73342	6834309	.SHAFT, STRAIGHT PART OF KIT P/N 5703228 .....	4	
10	KDDZZ	73342	6839514	.BEARING, WASHER, THRU (BRONZE THRUST		
				WASHER; PLACED NEXT TO CARRIER) PART OF		
				KIT P/N5703328 .....	8	
11	KDDZZ	73342	6833991	.WASHER, PIN THRUST (STEEL THRUST		
				WASHER) PART OF KIT P/N 5703228 .....	8	
12	KDDZZ	60380	Q8036	.ROLLER, BEARING PART OF KIT P/N 5703228 .....	80	
13	KDDZZ	73342	23045481	.PINION ASSY, MATCHED SET OF FOUR		
				PART OF KIT P/N 5703228.....	1	
14	PAHZZ	73342	6884275	RING, RETAINING .....	1	
15	PAHZZ	73342	23018100	HOUSING, PISTON, (3RD CLUTCH PISTON		
				HSNG; ALSO SERVES AS 2ND CLUTCH		
				BACKING PLATE) .....	1	
16	PAHZZ	73342	23011475	SEAL .....	1	
17	PAHZZ	73342	23011456	SEAL, PLAIN .....	1	
18	PAHZZ	73342	6834817	PISTON (3RD CLUTCH PISTON) .....	1	
19	PAHZZ	73342	23018299	SPRING, HELICAL, COMP .....	12	
20	XDHZZ	73342	6834129	RING, SPRING RETAINE.....	1	
21	PAHZZ	73342	3909063	PUSH ON NUT .....	4	
22	PAHZZ	73342	23013453	WASHER, THRUST .....	1	
23	PAHZZ	73342	6836264	SEAL RING, METAL.....	2	
24	AHHHH	73342	23045115	CL ASSY, 4TH & REV .....	1	
25	PAHDD	73342	23018006	.HOUSING, MECHANICAL.....	1	
26	XAHZZ	73342	23018007	..HOUSING, 4TH CL.....	1	
27	XADZZ	73342	8622757	..BALL.....	2	
28	PADZZ	73342	23018008	..BEARING, SLEEVE.....	1	
29	PAHZZ	73342	29520291	.SEAL, INNER .....	1	
30	PAHZZ	73342	29520292	.SEAL, OUTER .....	1	
31	PAHZZ	73342	23048456	.CLUTCH, POSITIVE (4TH & REV CLUTCH		
				PISTON .....	1	
32	PAHZZ	73342	23045233	.SPRING, HELICAL COMP .....	16	
33	PAHZZ	73342	23047191	.PLATE, RETAINING, BEA.....	1	
34	PAHZZ	73342	6884730	.RING, SNAP .....	1	
35	PAHZZ	73342	6836518	.DISK, CLUTCH.....	5	
36	PAHZZ	73342	23046713	.DISK, CLUTCH.....	5	
37	PAHZZ	73342	23018084	.DISK, CLUTCH (4TH & REV CLUTCH BACKING		
				PLATE)SUPERCEDED BY P/N 23017763		
				UOC:XTZ .....	1	
37	PAHZZ	73342	23017763	.DISK, CLUTCH UOC:X4A .....	1	
38	PAHZZ	73342	23015985	.RING, RETAINING .....	1	
39	PAHZZ	24617	141190	PIN, STRAIGHT, HEADLE .....	1	
40	PAHZZ	73342	23018098	DISK, CLUTCH (3RD CLUTCH BACKING PLATE).....	1	
41	PAHZZ	73342	6836108	RING, RETAINING .....	1	
				END OF FIGURE 18		



SECTION II			TM9-2520-272-34&P		
(1)	(2)	(3)	(4)	(5)	(6)
ITEM	SMR		PART		
NO	CODE	CAGEC	NUMBER	DESCRIPTION AND USABLE ON CODES(UOC)	QTY
35	PAHZZ	73342	6836518	DISK,CLUTCH	5
36	PAHZZ	73342	23046713	DISK,CLUTCH	5
37	PAHZZ	73342	23018084	DISK,CLUTCH (4TH & REV CLUTCH BACKING PLATE)	1
38	PAHZZ	73342	23015985	RING,RETAINING	1
39	PAHZZ	24617	141190	PIN,STRAIGHT,HEADLE	1
40	PAHZZ	73342	23018098	DISK,CLUTCH (3RD CLUTCH BACKING PLATE)	1
41	PAHZZ	73342	6836108	RING,RETAINING	1
END OF FIGURE					



SECTION II

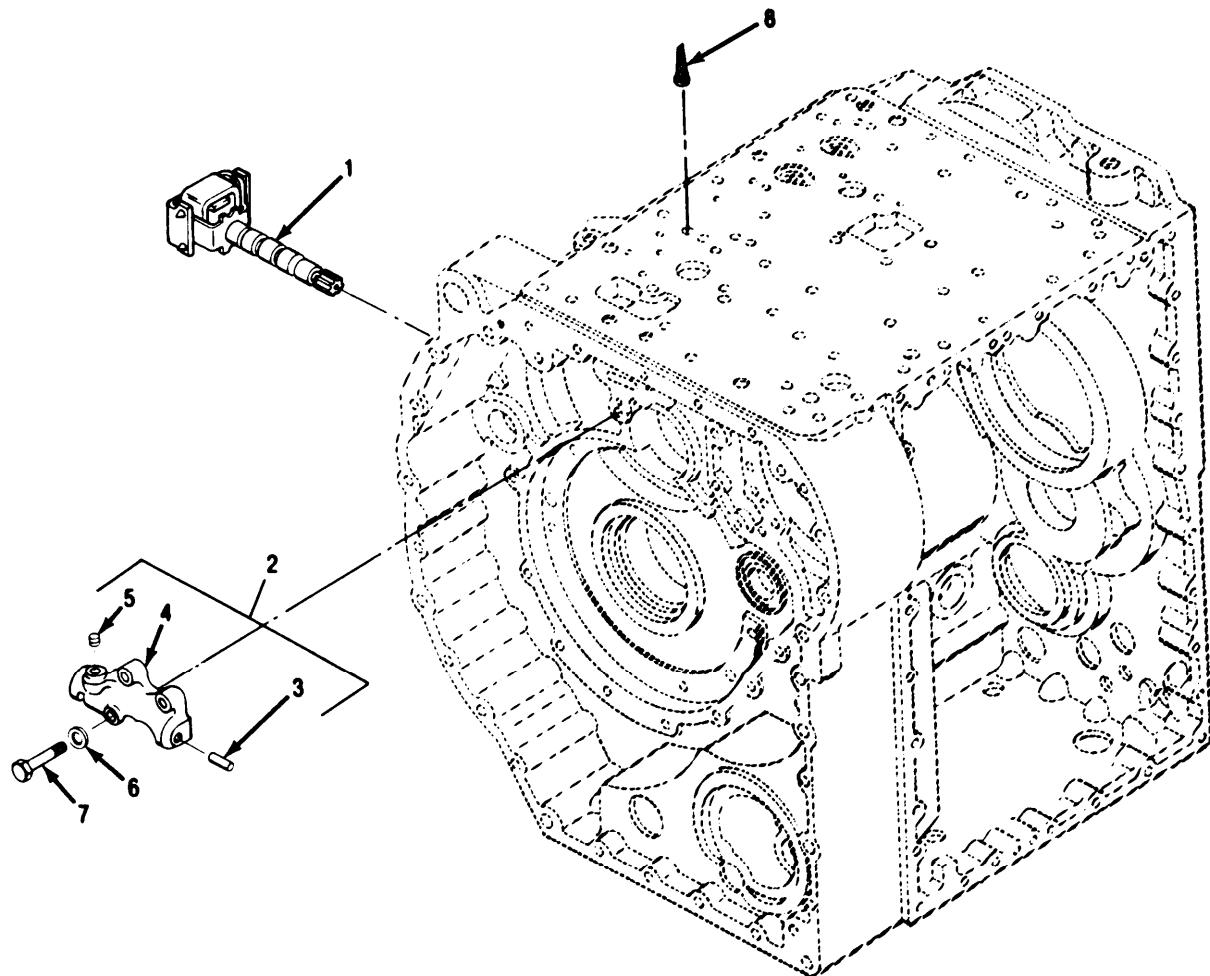


Figure 19. Governor and Governor Body

SECTION II				TM 9-2520-272-34&P	
(1)	(2)	(3)	(4)	(5)	(6)
ITEM	SMR		PART		
NO	CODE	FSCM	NUMBER	DESCRIPTION AND USABLE ON CODES (UOC)	QTY
GROUP 0714 SERVO UNIT					
FIG. 19 GOVERNOR AND GOVERNOR BODY					
1	PADZZ	73342	23017861	GOVERNOR ASSEMBLY, T.....	1
2	PAHDD	73342	23017859	BODY ASSEMBLY, GOVER.....	1
3	XDDZZ	24617	141223	PIN, STRAIGHT, HE .....	1
4	XAHZZ	73342	23018222	BODY, GOVERNOR.....	1
5	XDDZZ	73342	23018251	PLUG, PUMP RECIPROCA .....	1
6	PAHZZ	90407	12084P11	WASHER, FLAT .....	3
7	PAHZZ	73342	9409239	BOLT, SELF-LOCKING .....	3
8	PAFZZ	73342	23045247	STRAINER ELEMENT, SE .....	1

END OF FIGURE

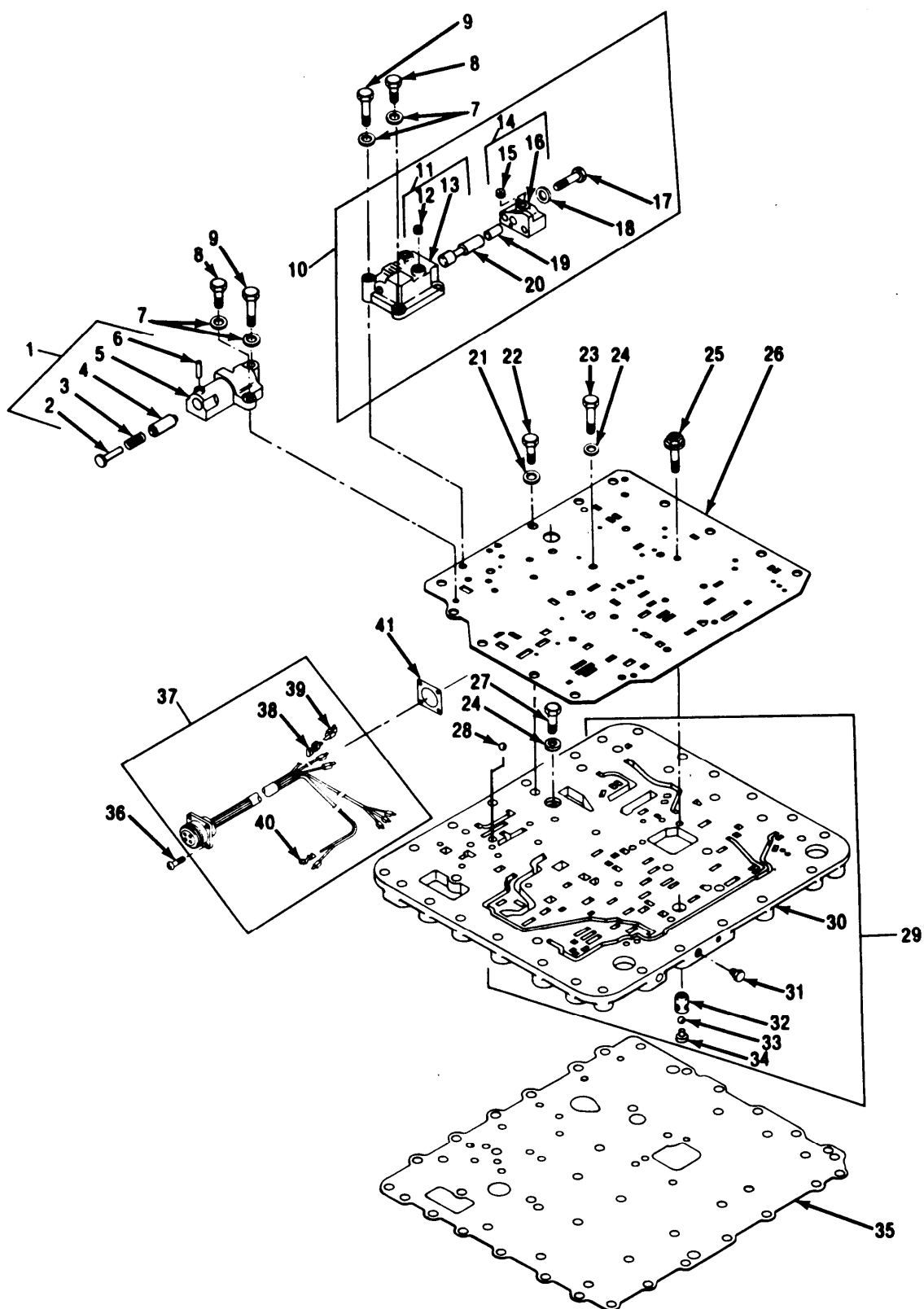


Figure 20. G2 Backup, Priority Valve and Oil Transfer Plate

SECTION II				TM 9-2520-272-34&P	
(1)	(2)	(3)	(4)	(5)	(6)
ITEM	SMR		PART		
NO	CODE	FSCM	NUMBER	DESCRIPTION AND USABLE ON CODES (UOC)	QTY
GROUP 0714 SERVO UNIT					
FIG. 20 G2 BACKUP, PRIORITY VALVE					
1	PAFDD	73342	23018623	VALVE, LINEAR, DIRECT .....	1
2	PADZZ	73342	23017894	SEAT, HELICAL COMPRE .....	1
3	PADZZ	73342	23045269	SPRING, HELICAL, COMP .....	1
4	PADZZ	73342	6837389	VALVE, PRIORITY .....	1
5	XADZZ	73342	23018622	BODY, PRIORTY VAL .....	1
6	PADZZ	72582	455862	PIN .....	1
7	PAFZZ	24617	2436161	WASHER, FLAT .....	7
8	PAFZZ	24617	9432105	BOLT, SELF-LOCKING .....	3
9	PAFZZ	63005	445568	BOLT, MACHINE .....	4
10	PAFDD	73342	23018615	VALVE BODY ASSEMBLY .....	1
11	XADDD	73342	23018618	BODY ASSY, BACKUP (G2) .....	1
12	PADZZ	92555	PLEA2501220	PLUG .....	2
13	XADZZ	73342	23018611	BODY .....	1
14	PBDDD	73342	23018613	COVER, ACCESS .....	1
15	PADZZ	92555	PLEA2501220	PLUG .....	1
16	XADZZ	73342	23018612	COVER, ACCESS .....	1
17	PADZZ	73342	445567	BOLT, MACHINE .....	2
18	PADZZ	24617	2436161	WASHER, FLAT .....	2
19	PADZZ	73342	23018624	VALVE, OVERRIDE .....	1
20	PADZZ	73342	23018614	SLIDE, DIRECTIONAL C .....	1
21	PAFZZ	24617	9422845	WASHER, FLAT .....	1
22	PAFZZ	24617	9415972	BOLT, SELF-LOCKING .....	1
23	PAFZZ	24617	9409014	BOLT, TRANSMISSION .....	5
24	PAFZZ	24617	9422846	WASHER, FLAT .....	6
25	PAFZZ	24617	9440986	BOLT, MACHINE .....	2
26	PAFZZ	73342	23018619	PLATE, SEPARATOR .....	1
27	XDFZZ	24617	9409076	BOLT, SELF-LOCKING .....	1
28	PAFZZ	73342	23045386	BALL, BEARING (CHECK BALL) .....	1
29	PAFHH	73342	23018617	PLATE ASSEMBLY, OIL . .....	1
30	XAFZZ	73342	23018616	PLATE, OIL .....	1
31	PAOZZ	73342	23018206	PLUG, PIPE .....	4
32	PAHZZ	73342	23017901	COVER, ACCESS (HOUSING) .....	1
33	PAHZZ	73342	23045388	BALL, BEARING, ANNULA (CHECK BALL) .....	1
34	PAHZZ	73342	23017902	VALVE, STOP-CHECK (STOP) .....	1
35	PAFZZ	73342	23047805	GASKET .....	1
36	XDFZZ	24617	159184	SCREW, MACHINE .....	4
37	PAFFF	73342	23017899	WIRING HARNESS, BRAN .....	1
38	PAFZZ	77060	2973915	THERMAL, QUICK DISC .....	7
39	PAFZZ	77060	2984568	NYLON INSULATOR .....	7
40	PAFZZ	77060	2989521	TERMINAL, LUG .....	1
41	PAFZZ	73342	6832550	GASKET .....	1

END OF FIGURE

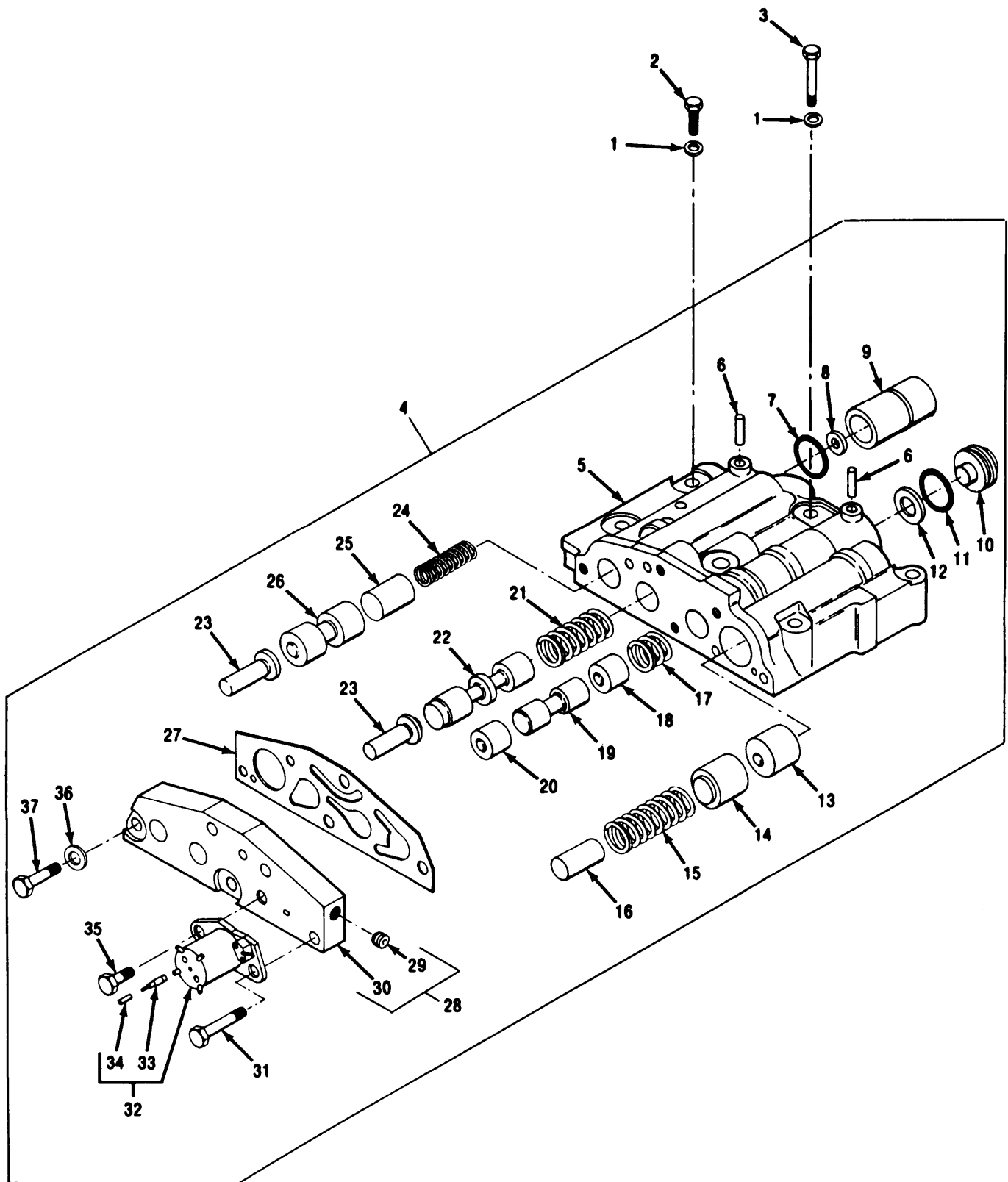


Figure 21. Lockup Valve

SECTION II				TM 9-2520-272-34&P	
(1)	(2)	(3)	(4)	(5)	(6)
ITEM	SMR		PART		
NO	CODE	CAGEC	NUMBER	DESCRIPTION AND USABLE ON CODES (UOC)	QTY
GROUP 0714 SERVO UNIT					
FIG. 21 LOCKUP VALVE					
1	PAFZZ	24617	9422846	WASHER, FLAT .....	6
2	PAFZZ	73342	9409621	BOLT, SELF-LOCKING .....	2
3	PAFZZ	73342	9431456	BOLT, SELF-LOCKING .....	4
4	PAFDD	73342	23017931	CONTROL, LOCKUP VALV .....	1
5	PADZZ	73342	23017932	. BODY, LOCK-UP CONTRO .....	1
6	PADZZ	24617	456826	. PIN, SPRING .....	2
7	PADZZ	73342	6771005	. SEAL, NONMETALLIC RO .....	1
8	PADZZ	81487	23601-00160	. WASHER, FLAT .....	V
9	PADZZ	73342	23017943	. SLEEVE, LOCKOUT-CONT .....	1
10	PADZZ	73342	23017938	. SLIDE, DIRECTIONAL C .....	1
11	PADZZ	73342	6835307	. PACKING, PREFORMED .....	1
12	PADZZ	73342	23017937	. WAHER, FLAT. ....	V
13	PADZZ	73342	23017911	. PISTON, VALVE .....	1
14	PADZZ	73342	23017912	. TRIMMER PLUG, TRANSM .....	1
15	PADZZ	73342	6833945	. SPRING .....	1
16	PADZZ	73342	6835734	. STOP, VALVE .....	1
17	PADZZ	73342	23017936	. SPRING, HELICAL, COMP (OPTIONAL) .....	V
17	PADZZ	73342	29503594	. SPRING, HELICAL, COMP (OPTIONAL) .....	V
18	PADZZ	73342	23017935	. PLUG, VALVE .....	1
19	PADZZ	73342	23017934	. VALVE, SIGNAL CONTRO .....	1
20	PADZZ	73342	23017933	. VALVE, SIGNAL PLUG .....	1
21	PADZZ	73342	6778016	. SPRING, HELICAL, COMP .....	1
22	PADZZ	73342	23017944	. SLIDE, DIRECTIONAL C .....	1
23	PADZZ	73342	23017939	. PLUNGER, DETENT .....	2
24	PADZZ	73342	23017942	. SPRING, HELICAL, COMP (OPTIONAL) .....	V
24	PADZZ	73342	29505538	. SPRINT, HELICAL, COMP (OPTIONAL) .....	V
25	PADZZ	73342	23017941	. PLUG, VALVE, TRANSMIS .....	1
26	PADZZ	73342	23017940	. SLIDE, DIRECTIONAL C .....	1
27	PADZZ	73342	23017945	. GASKET .....	1
28	PADDD	73342	23017946	. COVER ASSEMBLY .....	1
29	PADZZ	92555	PLEA2501220	. . PLUG .....	1
30	XADZZ	73342	23017947	. . COVER, LOCKUP VAL .....	1
31	PAFZZ	24617	9440987	. BOLT, MACHINE .....	3
32	PAFZZ	54906	40900	. SOLENOID, ELECTRICAL .....	2
33	PAFZZ	77060	2973915	. . TERMINAL, QUICK DISC .....	1
34	PAFZZ	77060	12020381	. . NYLON INSULATOR .....	1
35	PAFZZ	24617	9440984	. BOLT, MACHINE .....	1
36	PADZZ	24617	9422845	. WASHER, FLAT .....	2
37	PADZZ	24617	9409062	. BOLT, SELF-LOCKING .....	2

END OF FIGURE



SECTION II

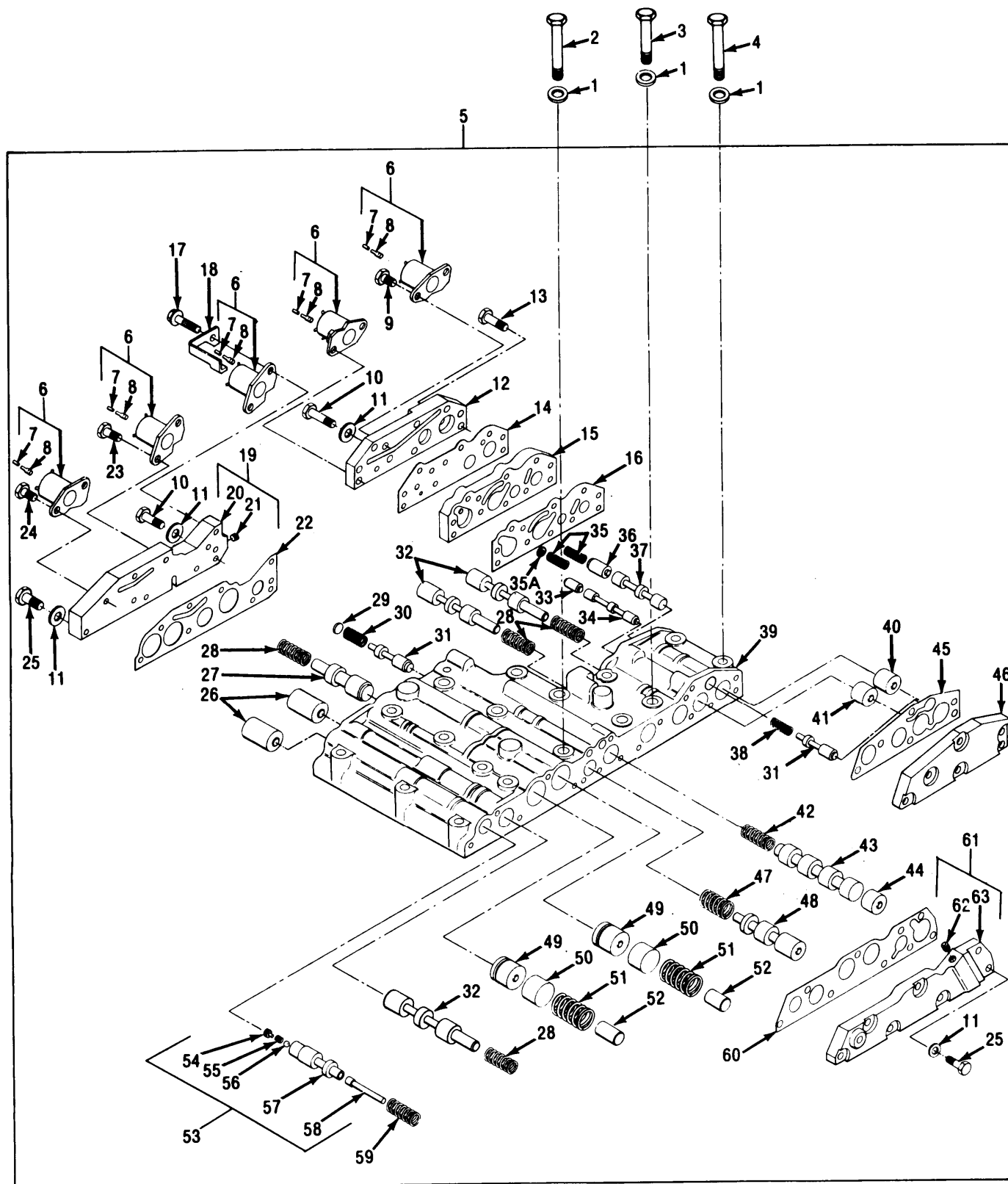


Figure 22. Control Valve

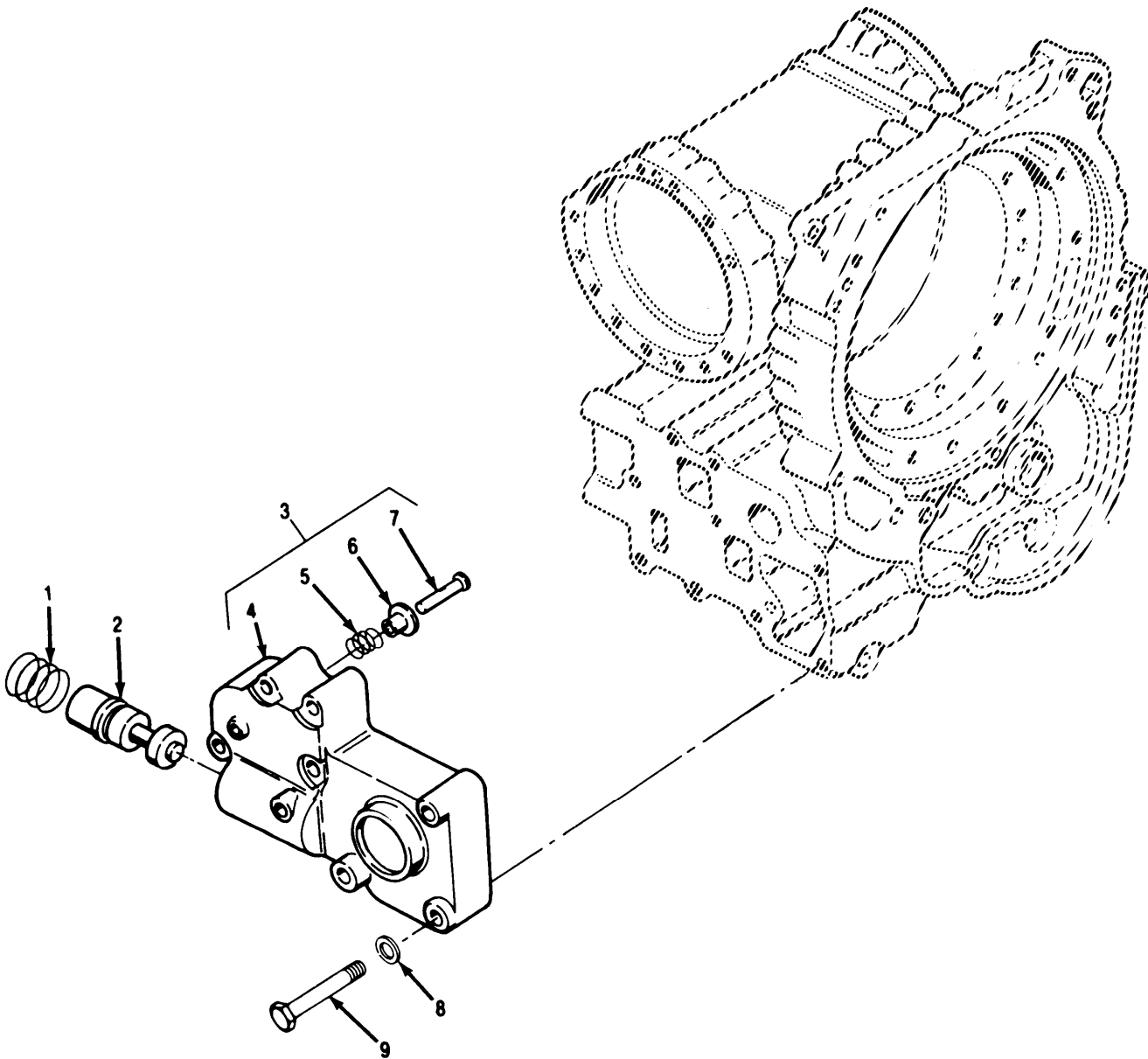
Change 1

SECTION II				TM 9-2520-272-34&P	
(1)	(2)	(3)	(4)	(5)	(6)
ITEM	SMR		PART		
NO	CODE	CAGEC	NUMBER	DESCRIPTION AND USABLE ON CODES (UOC)	QTY
GROUP 0714 SERVO UNIT					
FIG. 22 CONTROL VALVE					
1	PAFZZ	24617	9422846	WASHER, FLAT .....	17
2	PAFZZ	24617	9419287	BOLT, MACHINE .....	5
3	PAFZZ	24617	9409015	BOLT, SELF-LOCKING .....	4
4	PAFZZ	73342	9431456	BOLT, SELF-LOCKING .....	8
5	PAFDD	73342	23048196	VALVE ASSEMBLY, CONT .....	1
6	PAFFF	54906	40900	. SOLENOID, ELECTRICAL .....	5
7	PAFZZ	77060	12020381	. NYLON INSULATOR .....	1
8	PAFZZ	77060	2973915	. TERMINAL, QUICK DISC .....	1
9	PAFZZ	24617	9440986	. BOLT, MACHINE .....	2
10	PADZZ	24617	9409253	. BOLT, SELF-LOCKING .....	4
11	PADZZ	24617	9422845	WASHER, FLAT .....	18
12	PADZZ	73342	23017886	COVER, REAR-SHIFT VA .....	1
13	PADZZ	24617	9432105	. BOLT, SELF-LOCKING .....	2
14	PADZZ	73342	23017884	. PLATE, INTERMEDIATE .....	1
15	PADZZ	73342	23048193	. VALVE PLATE, HYDRAUL .....	1
16	PADZZ	73342	23017888	. GASKET .....	1
17	PAFZZ	24617	9440988	. BOLT, MACHINE .....	3
18	PAFZZ	73342	23047359	. SPRING, RETAINER .....	1
19	PADDD	73342	23017929	. COVER ASSEMBLY, CONT .....	1
20	XADZZ	73342	23017930	. . COVER, CONT VALVE .....	1
21	PADZZ	92555	PLEA2501220	. . PLUG .....	1
22	PADZZ	73342	23017928	. GASKET .....	1
23	PAFZZ	24617	9440984	. BOLT, MACHINE .....	1
24	PAFZZ	24617	9440987	. BOLT, MACHINE .....	4
25	PADZZ	24617	9409062	. BOLT, SELF-LOCKING .....	15
26	PADZZ	73342	23017927	. PLUG, VALVE, LOCKUP T .....	2
27	PADZZ	73342	23017926	. SLIDE, DIRECTIONAL C .....	1
28	PADZZ	73342	6778016	. SPRING, HELICAL, COMP .....	4
29	PADZZ	73342	23045303	. SPACER, PLATE .....	V
29	PADZZ	73342	23048641	. SPACER, PLATE .....	V
29	PADZZ	73342	23048642	. SPACER, PLATE .....	V
30	PADZZ	73342	6836140	. SPRING, HELICAL, COMP .....	1
31	PADZZ	73342	23017924	. SLIDE, DIRECTIONAL, C .....	2
32	PADZZ	73342	23017910	. SLIDE, DIRECTIONAL C .....	3
33	PADZZ	73342	23048194	. COCK, PLUG .....	1
34	PADZZ	73342	23017920	. SLIDE, DIRECTIONAL C .....	1
35	PADZZ	73342	23017919	. SPRING, HELICAL, COMP (OPTIONAL) .....	V
35	PADZZ	73342	23048260	. SPRING, HELICAL, COMP (OPTIONAL) .....	V
35A	PADZZ	24617	221431	. WASHER, FLAT (OPTIONAL; QTY 0-5 USED WITH SPRING P/N 23048260) .....	V
36	PADZZ	73342	23048645	. VALVE, PLUG .....	1
37	PADZZ	73342	23017922	. SLIDE, DIRECTIONAL C .....	1
38	PADZZ	73342	23017923	. SPRING, HELICAL, COMP .....	1
39	PADZZ	73342	23017905	. BODY, VALVE .....	1
40	PADZZ	73342	23017921	. PLUG, SIGNAL, VALVE .....	1
41	PADZZ	73342	23017890	. 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	23017889	. GASKET .....	1
46	PBDZZ	73342	23017887	. HOUSING, SHIFT, VALVE .....	1
47	PADZZ	73342	6833944	. SPRING, HELICAL, COMP .....	1
48	PADZZ	73342	23017913	. SLIDE, DIRECTIONAL C .....	1

SECTION II					
(1)	(2)	(3)	(4)	(5)	(6)
ITEM	SMR		PART		
NO	CODE	CAGEC	NUMBER	DESCRIPTION AND USABLE ON CODES (UOC)	QTY
49	PADZZ	73342	23017911	. PISTON, VALVE.....	2
50	PADZZ	73342	23017912	. TRIMMER PLUG, TRANSM .....	2
51	PADZZ	73342	6833940	. SPRING, HELICAL, COMP .....	2
52	PADZZ	73342	6835734	. 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, THROTTLE .....	1
58	PADZZ	73342	23017908	. . STOP, THROTTLE VALVE.....	1
59	PADZZ	73342	23017909	. SPRING, HELICAL, COMP .....	1
60	PADZZ	73342	23017916	. GASKET .....	1
61	PADDD	73345	23017917	. CAP, VALVE (COVER).....	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			TM 9-2520-272-34&P		
(1)	(2)	(3)	(4)	(5)	(6)
ITEM	SMR		PART		
NO	CODE	CAGEC	NUMBER	DESCRIPTION AND USABLE ON 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, SIRECTIONAL 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	XDDZZ	73342	23078048	. PIN, STRAIGHT, HEADED.....	1
8	PAHZZ	24617	9422846	WASHER, FLAT .....	9
9	PAHZZ	73342	9409621	BOLT, SELF-LOCKING .....	9
END OF FIGURE					

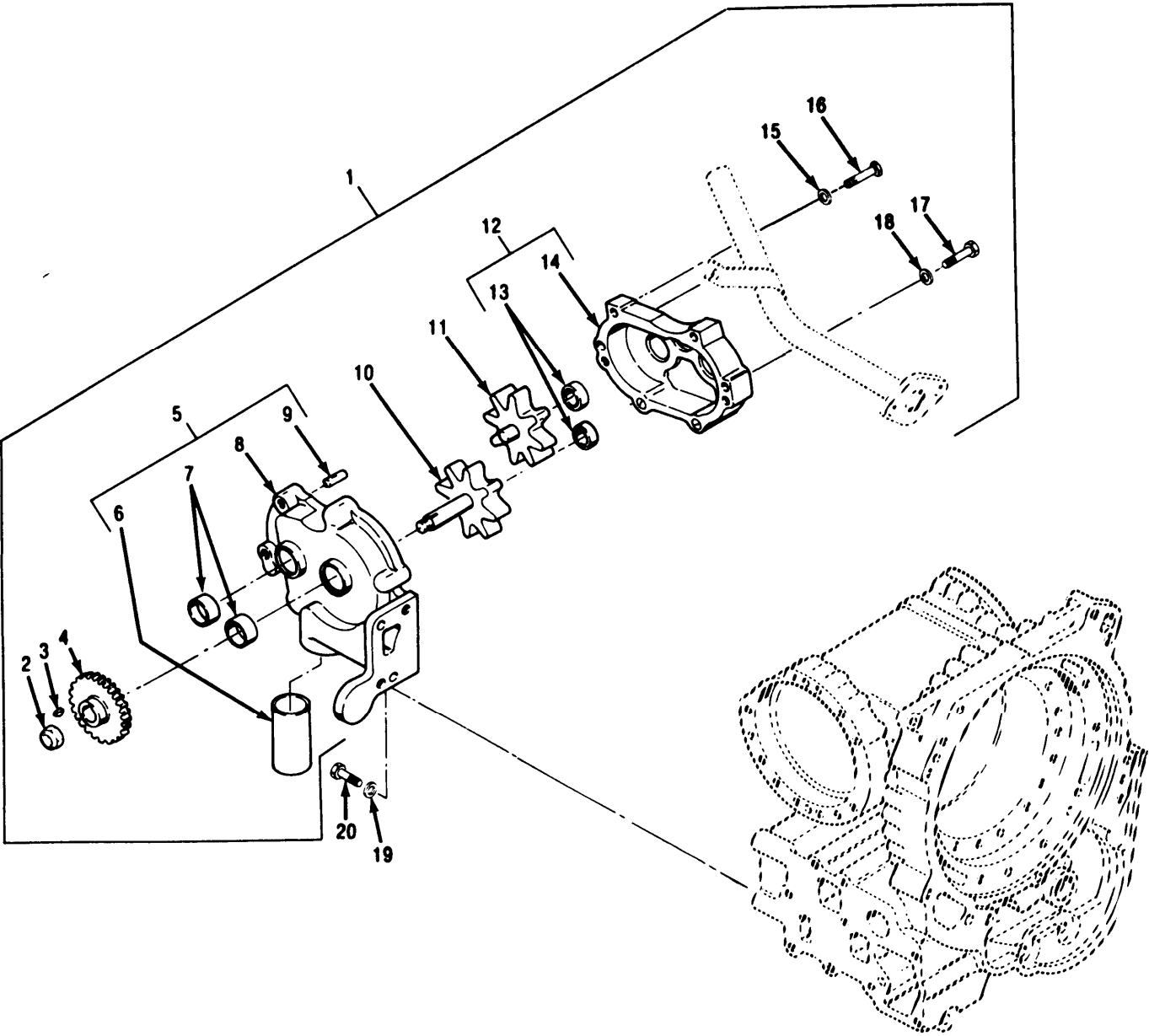


Figure 24. Output Oil Pump

SECTION II				TM 9-2520-272-34&P	
(1)	(2)	(3)	(4)	(5)	(6)
ITEM	SMR		PART		
NO	CODE	CAGEC	NUMBER	DESCRIPTION AND USABLE ON CODES (UOC)	QTY
GROUP 0721 COOLERS, PUMPS, MOTORS					
FIG. 24 OUTPUT OIL PUMP					
1	PAHDD	73342	23018062	PUMP, OUTPUT OIL .....	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 OIL PU.....	1
6	PBDZZ	73342	23018068	. . STRAINER ELEMENT SE .....	1
7	PADZZ	24617	457249	. . BEARING, ROLLER, NEED .....	2
8	XADZZ	73342	23018069	, , COVER, OUT PUMP .....	1
9	PADZZ	24617	141195	. . PIN, STRAIGHT, HEADLE .....	2
10	PADZZ	73342	23018065	. GEAR, SHAFT, SPUR .....	1
11	PADZZ	73342	23018066	. GEAR, SPUR.....	1
12	PADDD	73342	23018063	. BODY, OIL PUMO, OUTPUT.....	1
13	PADZZ	24617	457249	. . BEARINF, ROLLER, NEED .....	2
14	XADZZ	73342	23018064	. . BODY, OUTPUT OIL .....	1
15	PAHZZ	24617	9422846	. WAHSER, 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, HEXAGON H .....	2

END OF FIGURE



SECTION II

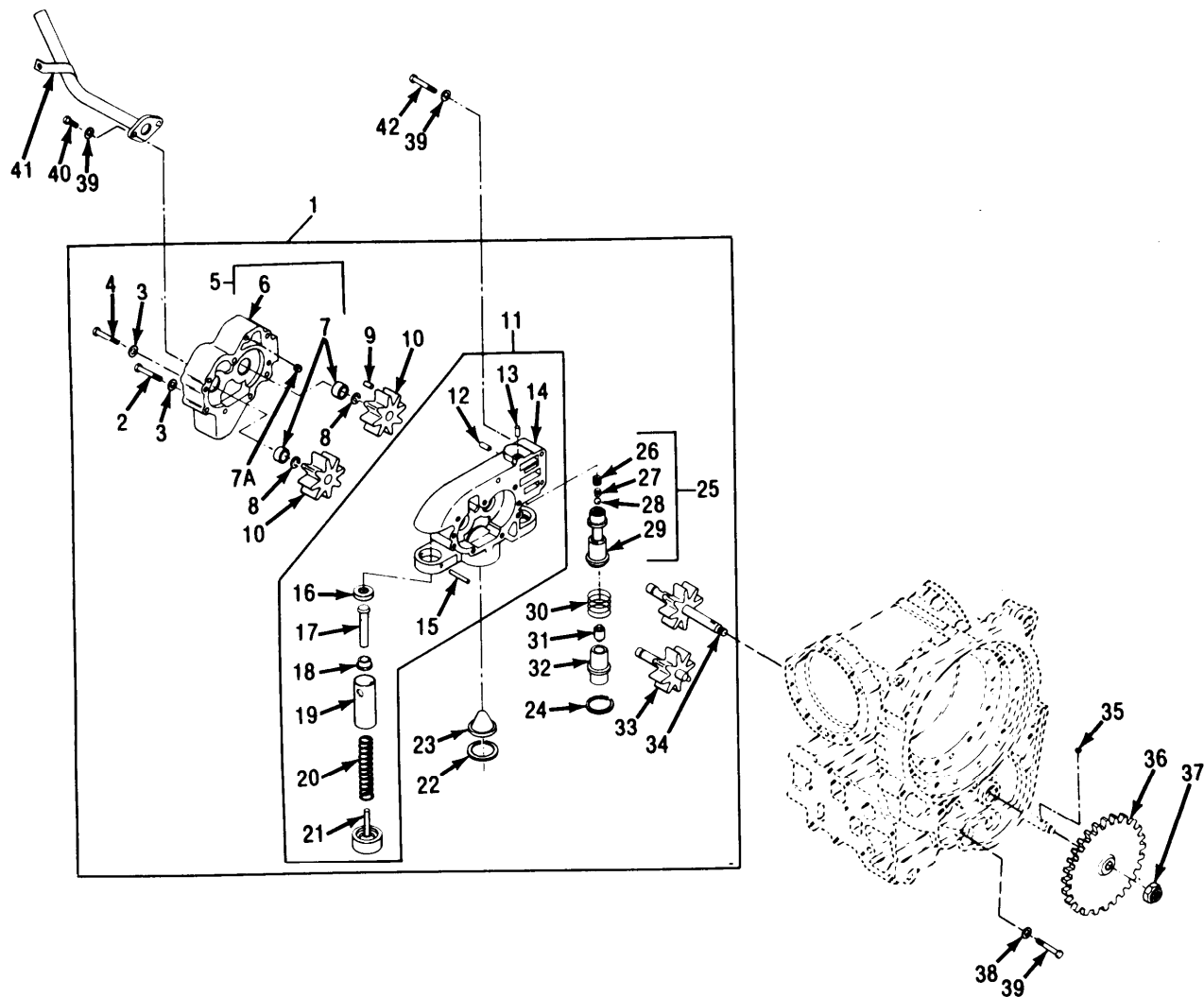


Figure 25. Scavenge and Input Pump

SECTION II				TM 9-2520-272-34&P	
(1)	(2)	(3)	(4)	(5)	(6)
ITEM	SMR		PART		
NO	CODE	CAGEC	NUMBER	DESCRIPTION AND USABLE ON CODES (UOC)	QTY
GROUP 0721 COOLERS, PUMPS, MOTORS					
FIG. 25 SCAVENGE AND INPUT PUMP					
1	PAHDD	73342	23047907	PUMP ASSEMBLY, SCAVE .....	1
2	PADZZ	83326	9409224	. BOLT .....	2
3	PADZZ	24617	9422846	. WASHER, FLAT .....	5
4	PADZZ	24617	9419287	. BOLT, MACHINE .....	3
5	PADDD	24617	23047906	. COVER ASSEMBLY, PUMP .....	1
6	XADDD	73342	23047905	. COVER, SCAVENGE .....	1
7	PADZZ	60380	B1210XDH	. BEARING, ROLLER, NEED .....	2
7A	PADZZ	73342	23047877	. RING, TOLERANCE .....	1
8	PADZZ	73342	23046127	. RING, RETAINING .....	2
9	PADZZ	73342	23048680	. 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 (RELIEF 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	PADZZ	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	. . RETAINER, HELICAL CC .....	1
27	XDDZZ	19207	8351525	. . SPRING, HELICAL, COMP .....	1
28	PADZZ	96906	MS19059-2414	. . BALL, BEARING .....	1
29	XDAZZ	73342	23017976	. . VALVE, MAIN RGLTR .....	1
30	PADZZ	73342	6836136	. SPRING, HELICAL, CO .....	1
30	PADZZ	73342	23049120	. SPRING, HELICAL, COMP .....	1
31	PADZZ	73342	23017978	. SLIDE, DIRECTIONAL C .....	1
32	PADZZ	73342	23017977	. HOUSING, REVERSE BOC .....	1
33	PADZZ	73342	23046121	. GEAR SHAFT, SPUR .....	1
34	PADZZ	73342	23046120	. GEAR SHAFT, SPUR .....	1
35	PAHZZ	96906	MS35756-3	KEY, WOODRUFF .....	1
36	PAHZZ	73342	23017877	GEAR, SPUR .....	1
37	PAHZZ	19207	11649930	NUT, SELF-LOCKING, HE .....	1
38	PAHZZ	73342	9431456	BOLT, SELF-LOCKING .....	7
39	PAHZZ	24617	9422846	WASHER, FLAT .....	11
40	PAHZZ	24617	9425096	BOLT .....	2
41	PAHZZ	73342	23046133	TUBE ASSEMBLY, METAL .....	1
42	PAHZZ	72582	9409126	BOLT, SELF-LOCKING .....	2

END OF FIGURE

SECTION II

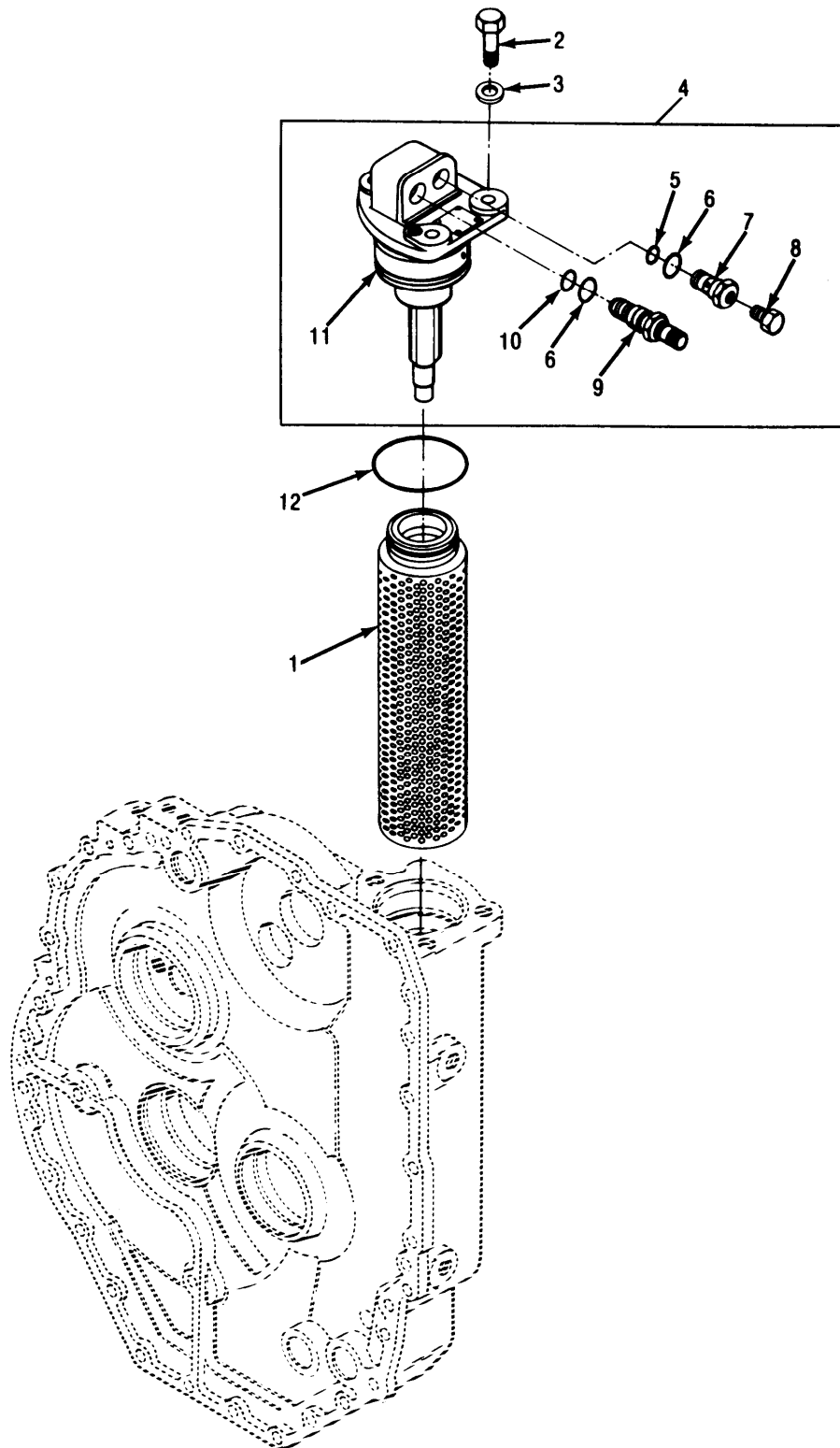


Figure 26. Filter Cover Assy and Filter Element

SECTION II				TM 9-2520-272-34&P	
(1)	(2)	(3)	(4)	(5)	(6)
ITEM	SMR		PART		
NO	CODE	CAGEC	NUMBER	DESCRIPTION AND USABLE ON CODES (UOC)	QTY

GROUP 0721 COOLERS, PUMPS, MOTORS

FIG. 26 FILTER COVER ASSEMBLY AND  
FILTER ELEMENT

1	KFDZZ	73342	23017868	ELEMENT ASSY, FILTER PART OF KIT P/N 5703232.....	1
2	PADZZ	24617	9409082	BOLT, SELF-LOCKING .....	3
3	PADZZ	73342	23048061	WASHER, FLAT .....	3
4	PAOOO	73342	23045145	COVER ASSEMBLY, FILT .....	1
5	PADZZ	73342	6836134	. PACKING, PREFORMED .....	1
6	PADZZ	73342	6882689	. PACKING, PREFORMED.....	2
7	PADZZ	73342	23046415	. BOLT, FLUID PASSAGE .....	1
8	PADZZ	73342	23018206	. PLUG, PIPE.....	1
9	PADZZ	98087	1500PT129	. SWITCH, PRESSURE-THE .....	1
10	PADZZ	81349	M83248/1-016	. PACKING, PREFORMED.....	1
11	PADZZ	73342	23017875	. HEAD, FLUID FILTER .....	1
12	KFDZZ	73342	23018260	PACKING, PREFORMED PART OF KIT P/N 5703232.....	2

END OF FIGURE

SECTION II

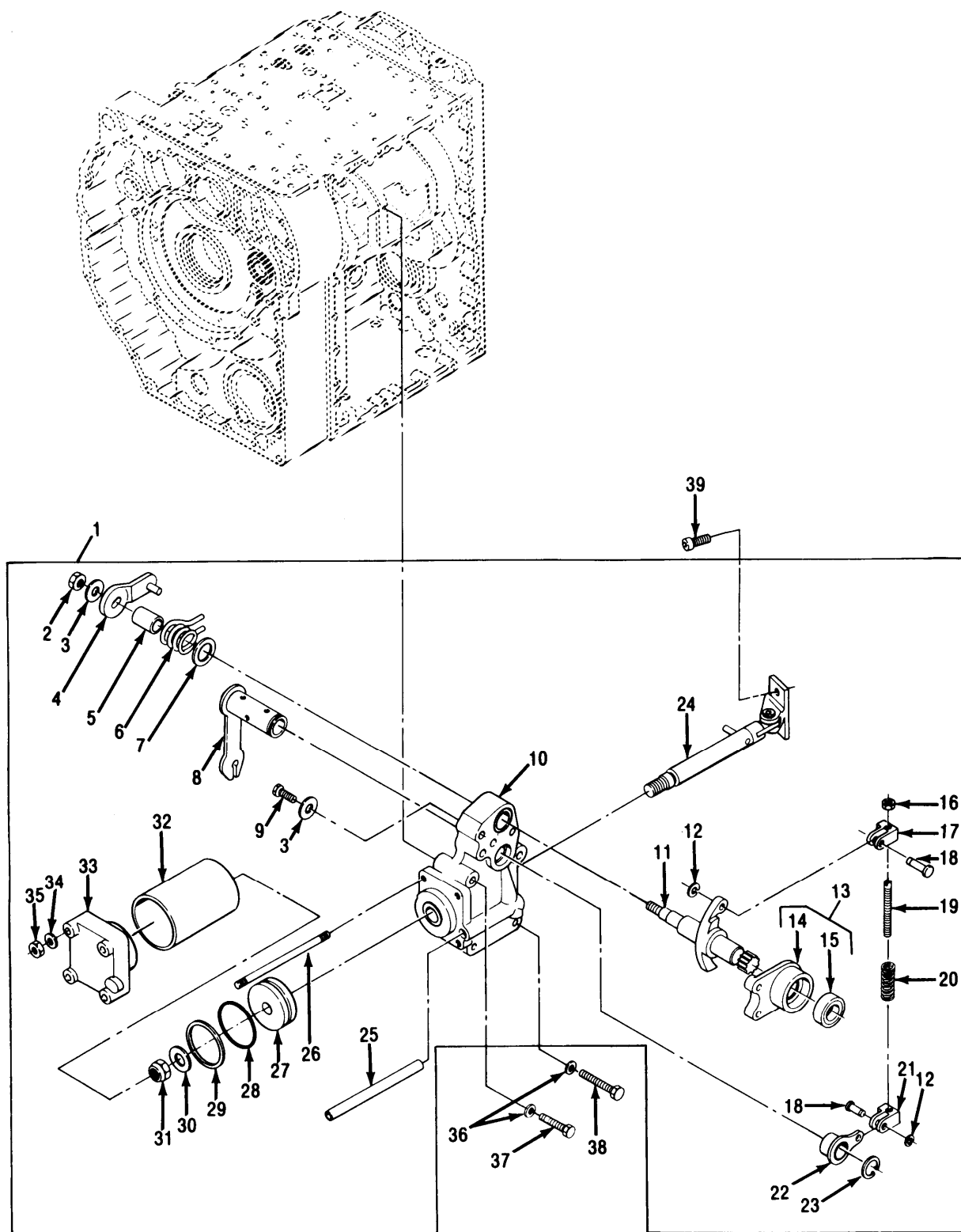


Figure 27. Steer Control Assembly

Change 1

SECTION II				TM 9-2520-272-34&P		
(1)	(2)	(3)	(4)	(5)	(6)	
ITEM	SMR		PART			
NO	CODE	CAGEC	NUMBER	DESCRIPTION AND USABLE ON CODES (UOC)	QTY	
GROUP 0721 COOLERS, PUMPS, MOTORS						
FIG. 27 STEER CONTROL ASSEMBLY						
1	ADHDD	90166	830710	CONTROL ASSY, STEER.....	1	
2	PADZZ	02892	870705	. NUT, SELF-LOCKING, HE .....	1	
3	PADZZ	90166	842894	. WASHER, FLAT .....	3	
4	PADZZ	90166	830665	. 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	830661	. VALVE ASSY, SERV .....	1	
9	PADZZ	24617	9409225	. BOLT, SELF-LOCKING .....	2	
10	PADZZ	90166	842690	. HOUSING, CONTROL .....	1	
11	PADZZ	90166	842885	. SHAFT, SHOULDERED .....	1	
12	PADZZ	90166	871941	. RING, RETAINING .....	2	
13	PADDD	90166	830666	. RETAINER ASSEMBLY, S .....	1	
14	XADZZ	90166	842683	. . RETAINER, SEAL(MACH).....	1	
15	PADZZ	02892	870115	. . SEAL, LIP, PLATE ASSY .....	1	
16	PADZZ	90166	870561	. NUT, PLAIN, HEXAGON .....	1	
17	PADZZ	90166	842449	. CLEVIS, ROD END .....	1	
18	PADZZ	90166	842451	. PIN, STRAIGHT HEADED .....	2	
19	PADZZ	90166	842638	. STUD, STEPPED .....	1	
20	PADZZ	90166	842639	. SPRING, INPUT ADJUST .....	1	
21	PADZZ	90166	842448	. CLEVIS, ROD END .....	1	
22	PADZZ	90166	830713	. SLEEVE ASSEMBLY, VAL .....	1	
23	PADZZ	79136	5108-87H	. RING, RETAINING .....	1	
24	PADZZ	90166	830663	. CONNECTOR, ROD END .....	1	
25	PADZZ	90166	842632	. TUBE, TRANSFER .....	1	
26	PADZZ	90166	842637	. STUD, PLAIN .....	4	
27	PADZZ	90166	840297	. PISTON ASSY, PUMP .....	1	
28	PADZZ	96906	MS28775-129	. PACKING, PREFORMED .....	1	
29	PADZZ	90166	871294	. RING, PISTON .....	1	
30	PADZZ	90166	870539	. WASHER, FLAT .....	1	
31	PADZZ	90166	870709	. NUT, SELF-LOCKING, HE .....	1	
32	PADZZ	90166	842634	. TUBE, CYLINDER .....	1	
33	PBDZZ	90166	842666	. COVER, ACCESS .....	1	
34	PADZZ	90166	842461	. WASHER, FLAT .....	4	
35	PADZZ	90166	870703	. NUT, SELF-LOCKING, HE .....	4	
36	PAHZZ	90166	842894	WASHER, FLAT .....	4	
37	PAHZZ	24617	9409621	BOLT, SELF-LOCKING .....	2	
38	PAHZZ	24617	9409014	BOLT, SELF-LOCKING .....	2	
39	PAHZZ	90166	870888	SCREW, SELF-LOCKING .....	2	

END OF FIGURE

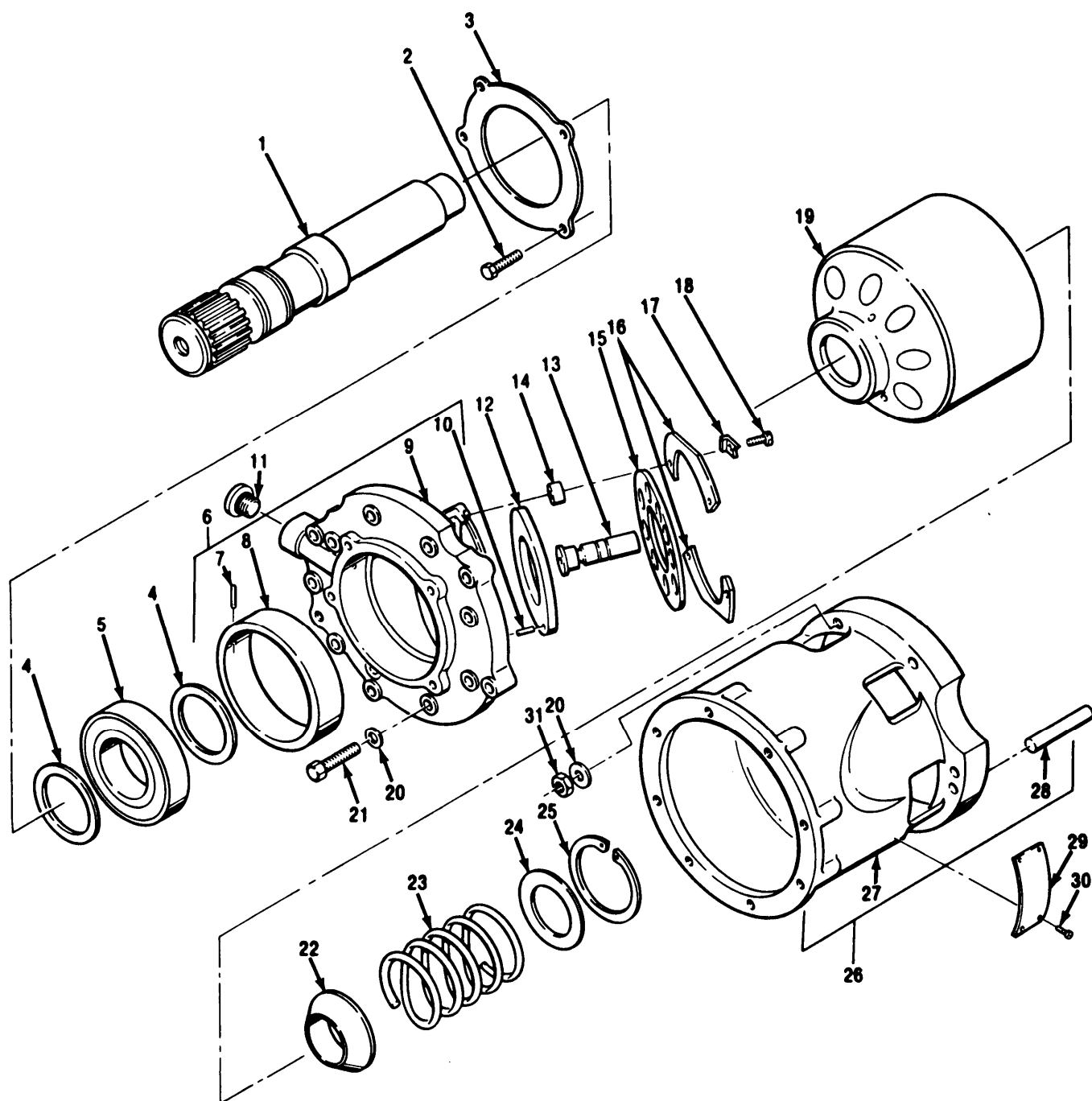


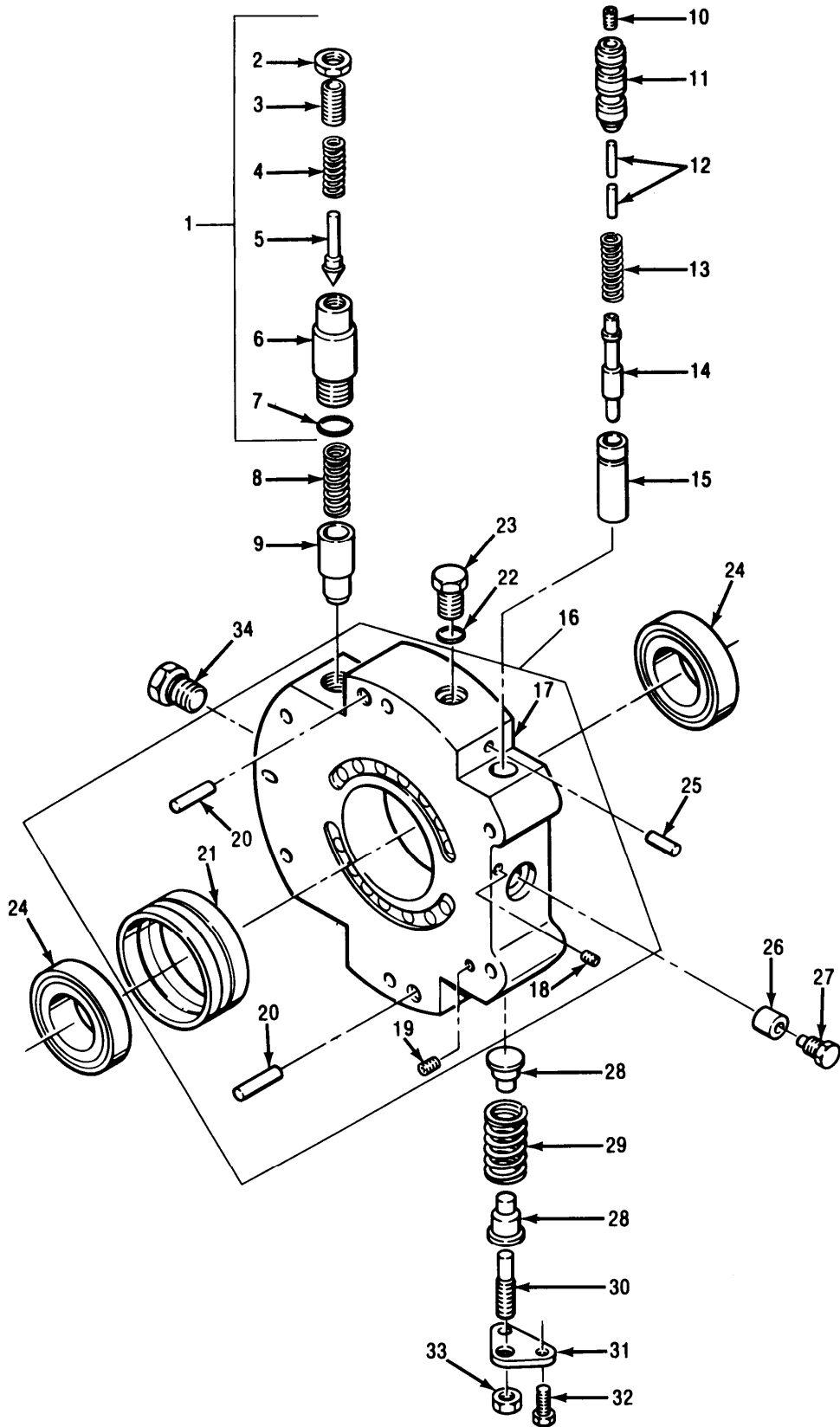
Figure 28. Motor Components Parts

SECTION II					
(1)	(2)	(3)	(4)	(5)	(6)
ITEM	SMR		PART		
NO	CODE	CAGEC	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	9409011	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 MOTO.....	1
7	XADZZ	90166	870068	. PIN, SPRING .....	1
8	XADZZ	90166	842642	. BUSHING, SLEEVE .....	1
9	XADZZ	90166	850236	. FLANGE, MOUNTING .....	1
10	PADZZ	90166	873173	. PIN, ROLL .....	1
11	PADZZ	90166	873017	PLUG, MACHINE THREAD .....	1
12	PADZZ	90166	843095	PLATE, CAM WEAR.....	1
13	PADZZ	90166	830692	PISTON ASSEMBLY .....	9
14	PADZZ	90166	842626	SPACER, GUIDE.....	4
15	PADZZ	02892	840898	PLATE, PISTON, PUMP.....	1
16	PADZZ	90166	843090	CLIP.....	2
17	PADZZ	02892	841163	WASHER, KEY (USE W/ PUMP AND MOTOR ASSY P/N 893025) .....	4
18	PADZZ	90166	870151	BOLT .....	4
19	PADZZ	90166	841665	CYLINDER, ACTUATING .....	1
20	PADZZ	90166	843003	WASHER, FLAT .....	14
21	PADZZ	96906	MS35764-236	BOLT, SELF-LOCKING .....	8
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, MO.....	1
27	XADZZ	90166	842689	HOUSING, MOTOR (MACH).....	1
28	PADZZ	96906	MS16555-61	PIN, STRAIGHT, HEADLE .....	2
29	XADZZ	90166	842702	NAMEPLATE .....	1
30	XADZZ	90166	872885	SCREW, DRIVE (PROVIDED W/ NAMEPLATE .....	4
31	PADZZ	90166	842627	NUT, SELF-LOCKING, HE .....	6

END OF FIGURE



SECTION II



Change 1

Figure 29. Manifold Components Parts

SECTION II				TM 9-2520-272-34&P	
(1)	(2)	(3)	(4)	(5)	(6)
ITEM	SMR		PART		
NO	CODE	CAGEC	NUMBER	DESCRIPTION AND USABLE ON CODES (UOC)	QTY
GROUP 0721 COOLERS, PUMPS, MOTORS					
FIG. 29MANIFOLD COMPONENT PARTS					
1	PADDD	90166	830659	BODY, VALVE (USE W/PUMP AND MOTOR ASSY P/N 893025 UOC:XTZ .....	2
1	PADZZ	90166	840037	PLUG (USE W/PUMP AND MOTOR ASSY P/N 893038) .....	2
1	PADZZ	90166	871908	PACKING, PREFORMED (USE W/PUMP AND MOTOR ASSY P/N 893038 .....	2
2	XADZZ	90166	871298	.NUT, PLAIN, HEXAGON UOC:XTZ.....	2
3	XADZZ	90166	842705	.SETSCREW UOC:XTZ.....	2
4	XADZZ	90166	841233	.SPRING, HELICAL, COMP UOC:XTZ.....	2
5	XADZZ	90166	842430	.VALVE, PILOT UOC:XTZ .....	2
6	XADZZ	90166	842650	.PLUG, CHECK VALVE UOC:XTZ .....	1
7	PADZZ	02892	871908	.PACKING UOC:XTZ.....	2
8	PADZZ	02892	840036	SPRING, SPECIAL.....	2
9	PADZZ	90166	842649	PLUNGER, DETENT (USE W/PUMP AND MOTOR ASSY P/N 893025) UOC:XTZ .....	2
9	PADZZ	90166	840035	PLUNGER, VALVE (USE W/PUMP AND MOTOR ASSY P/N 893038) .....	2
10	PADZZ	02892	872492	PLUG, PIPE.....	1
11	PADZZ	90166	842651	BODY, PRESSURE SENSE.....	1
12	PADZZ	90166	871049	PIN, STRAIGHT, HEADLE .....	2
13	PADZZ	90166	840687	SPRING, VALVE BLOCK . .....	1
14	PADZZ	90166	842063	SPOOL, VALVE.....	1
15	PADZZ	90166	842171	SLEEVE, VALVE .....	1
16	PADDD	90166	842697	MANIFOLD ASSEMBLY (USE W/PUMP AND MOTOR ASSY P/N 893025) .....	1
16	PADDD	90166	843247	MANIFOLD ASSY (USE W/PUMP AND MOTOR..... ASSY P/N 893038) .....	1
17	XADZZ	90166	850231	.MANIFOLD .....	1
18	PADZZ	90166	872994	.SETSCREW .....	2
19	PADZZ	90166	872992	.SETSCREW .....	2
20	XADZZ	90166	842704	.BUSHING, SLUG . .....	2
21	XADZZ	90166	842684	.DISTRIBUTOR, CHARGE .....	1
22	PADZZ	90166	871904	PACKING, PREFORMED.....	2
23	PADZZ	02892	840146	PLUG.....	2
24	PADZZ	90166	872821	BEARING, ROLLER, CYLI .....	2
25	PFDZZ	96906	MS9390-440	PIN, STRAIGHT, HEADLE .....	1
26	PADZZ	90166	871902	PACKING, PREFORMED .....	1
27	PADZZ	90166	842653	STOP, PLUG . .....	1
28	PBDZZ	90166	840206	SEAT, HELICAL, COMPRE .....	2
29	PADZZ	90166	840726	SPRING, HORSEPOWER.....	1
30	PADZZ	90166	843142	SET SCREW . .....	1
31	PADZZ	90166	842625	CAP, PRESSURE ADJUST.....	1
32	PADZZ	24617	9409088	SCREW, SELF-LOCKING .....	2
33	PADZZ	90166	870861	NUT, PLAIN, HEXAGON .....	1
34	PADZZ	90166	873017	PLUG, MACHINE THREAD.....	1

END OF FIGURE

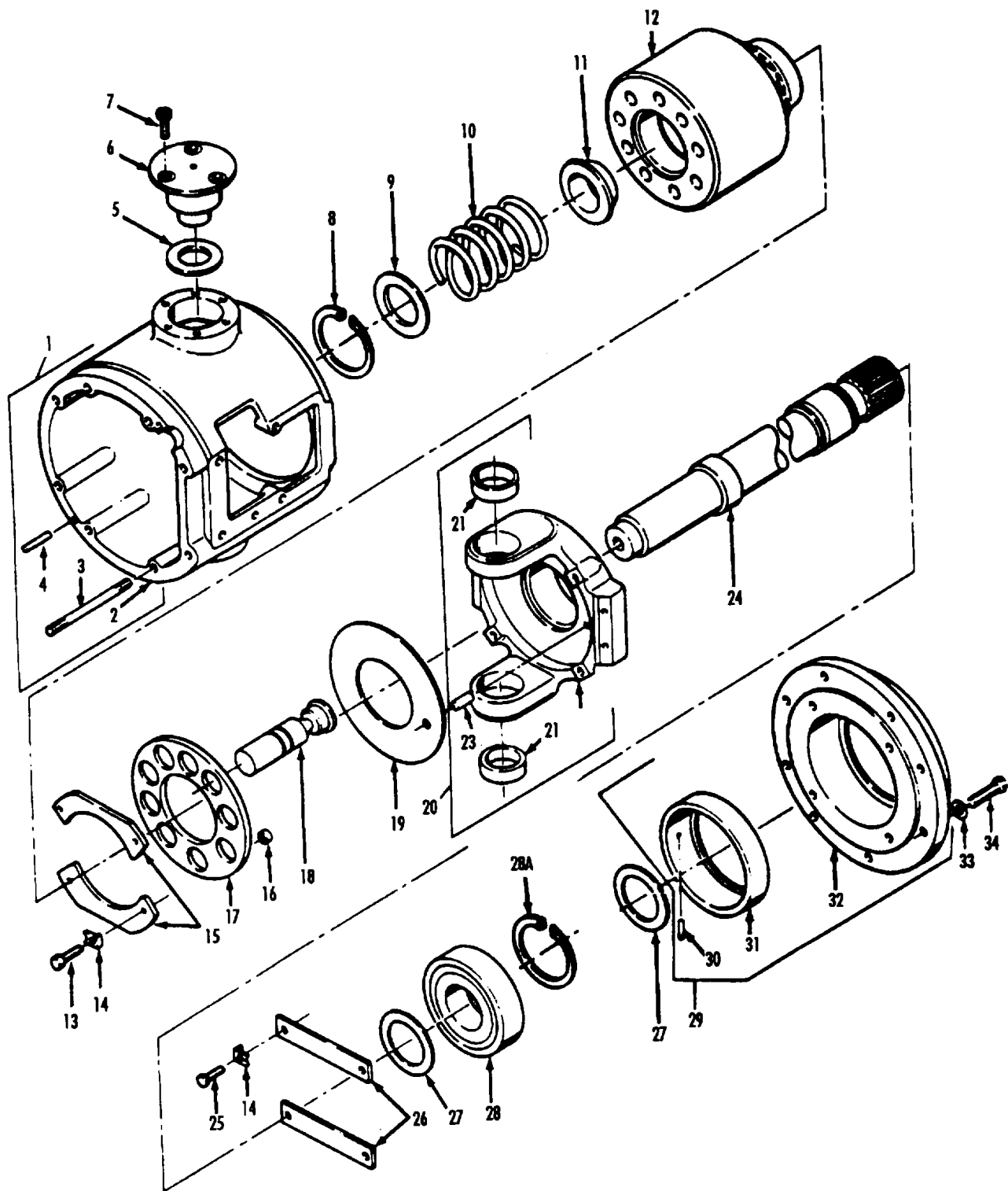


Figure 30. Pump Component Parts.

SECTION II				TM 9-2520-272-34&P	
(1)	(2)	(3)	(4)	(5)	(6)
ITEM	SMR		PART		
NO	CODE	CAGEC	NUMBER	DESCRIPTION AND USABLE ON CODES (UOC)	QTY
GROUP 0721 COOLERS, PUMPS, MOTORS					
FIG. 30 PUMP COMPONENT PARTS					
1	PADDD	90166	830824	HOUSING ASSEMBLY, PU .....	1
2	XADZZ	90166	843088	HOUSING (MACH) .....	1
3	PADZZ	90166	842623	STUD, PLAIN .....	6
4	PADZZ	96906	MS16555-61	PIN, STRAIGHT, HEADLE .....	2
5	PADZZ	90166	840029	BEARING, WASHER, THRU .....	2
6	PADZZ	90166	842678	TRUNNION, CAM . .....	2
7	XDDZZ	24617	9409067	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	841665	CYLINDER, ACTUATING . .....	1
13	PADZZ	90166	870181	BOLT .....	4
14	PADZZ	02892	841163	WASHER, KEY .....	8
15	PADZZ	90166	843090	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	843095	PLATE, CAM WEAR .....	1
20	PADDD	90166	830724	CAM ASSEMBLY .....	1
21	PADZZ	90166	870647	BEARING, ROLLER, CYLI .....	2
22	XADZZ	90166	842999	CAM (MACH) .....	1
23	PADZZ	90166	873173	PIN, ROLL .....	1
24	PADZZ	90166	842675	SHAFT, PUMP .....	1
25	PADZZ	02892	870140	SCREW, CAP, HEXAGON H (USE W/PUMP AND .....	
				MOTOR ASSY P/N 893025) UOC:XTZ .....	1
26	PADZZ	90166	842618	PLATE, CAM STOP (USE W/PUMP AND MOTOR .....	
				ASSY P/N 893025) UOC:XTZ .....	2
27	PADZZ	90166	870102	RING, RETAINING . .....	2
28	PADZZ	90166	870642	BEARING, BALL, ANNULA . .....	1
28A	PADZZ	90166	870104	SPRING, RETAINING (USE W/PUMP AND .....	
				MOTOR ASSY P/N 893038) .....	1
29	PADDD	90166	842684	HEAD, HYDRAULIC MOTO (USE W/PUMP AND .....	
				MOTOR ASSY P/N 893025) UOC:XTZ .....	1
29	PADZZ	90166	843211	FLANGE, MOUNT(MACH) (USE W/PUMP AND .....	
				MOTOR ASSY P/N 893038) .....	1
30	PADZZ	90166	870068	.PIN, SPRING (USE W/FLANGE AND MOTOR .....	
				ASSY P/N 842684) .....	UOC:XTZ 1
31	PADZZ	90166	842642	.BEARING, SLEEVE (USE W/FLANGE AND MOTOR .....	
				ASSY P/N 842684) UOC:XTZ .....	1
32	XADZZ	90166	850233	.FLANGE, MOUNTING (USE W/FLANGE AND .....	
				MOTOR ASSY P/N 842684) UOC:XTZ .....	1
33	PADZZ	90166	843003	WASHER, FLAT .....	8
34	PADZZ	24617	9409030	SCREW, CAP, HEXAGON H .....	8

END OF FIGURE

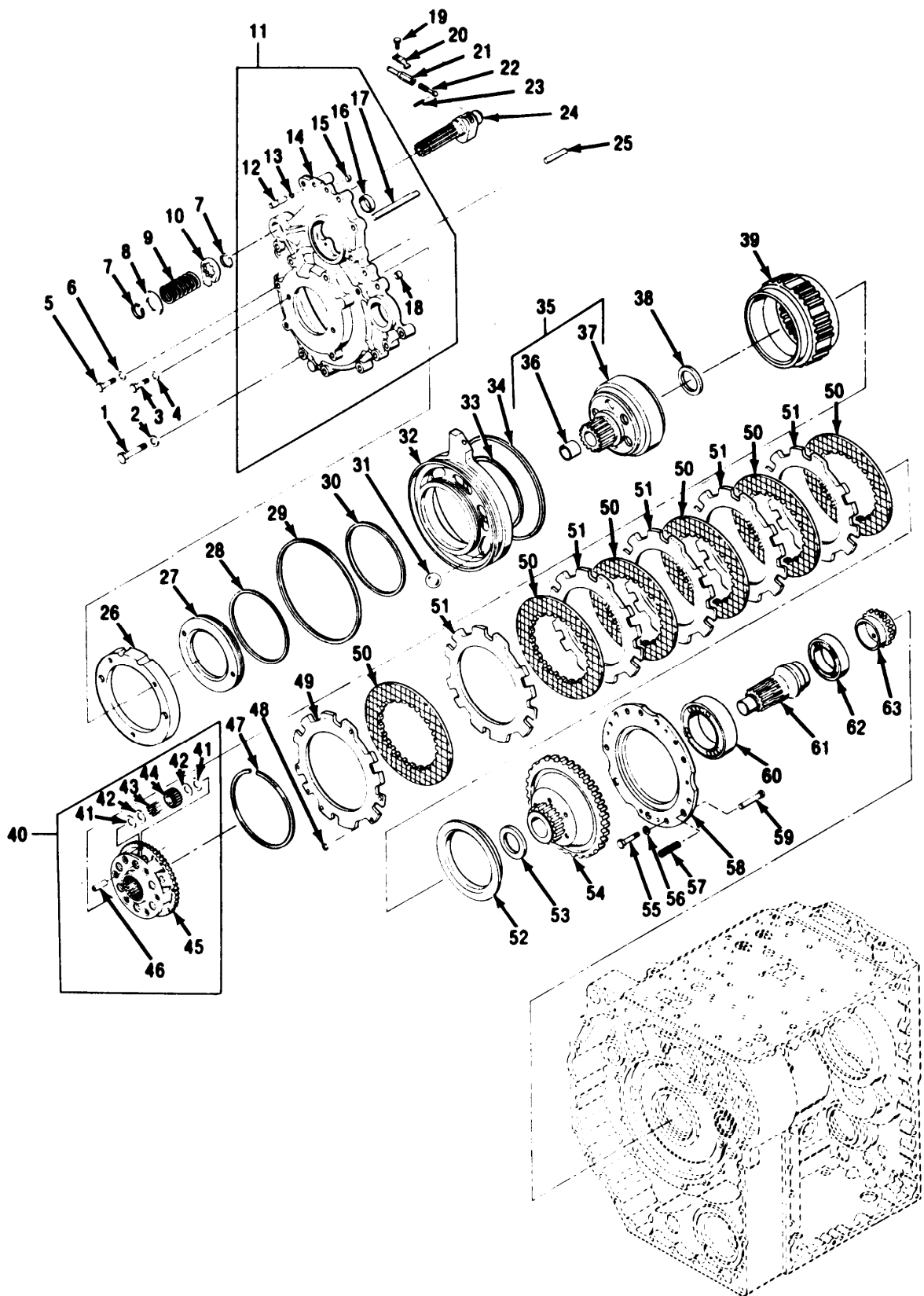


Figure 31. Left Hand Brake and Output Carrier

SECTION II				TM 9-2520-272-34&P	
(1)	(2)	(3)	(4)	(5)	(6)
ITEM	SMR		PART		
NO	CODE	CAGEC	NUMBER	DESCRIPTION AND USABLE ON CODES (UOC)	QTY
GROUP 0726 BRAKES					
FIG. 31 LEFT HAND BRAKE AND OUTPUT CARRIER					
1	PAHDD 24617		9416011	BOLT-SELF-LOCKING .....	15
2	PAHZZ 24617		9422848	WASHER, FLAT .....	15
3	PAHZZ 24617		9409074	BOLT, SELF-LOCKING .....	2
4	PAHZZ 24617		9422845	WASHER, FLAT .....	2
5	PAHZZ 24617		9409012	SCREW, SELF-LOCKING .....	3
6	PAHZZ 24617		9422846	WASHER, FLAT .....	3
7	PAHZZ 19207		7707326	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 (SUPERCEDED BY P/N.....	1
				29510174) UOC:XTZ.....	1
11	PAHHH 73342		29510174	SPIDER, BRAKE .....	1
12	XDHZZ 73342		23018280	.PIN, STRAIGHT, HE.....	2
13	PAHZZ 73342		23018281	.RING, RETAINING .....	2
14	XAHZZ 73342		23018030	.SUPPORT, LH BRAKE (USE W/SPIDER BRAKE	
				P/N 23018029) .....	1
14	XAHZZ 73342		29510175	.SUPPORT, LH BRAKE (USE W P/N 29510174).....	1
15	PAHZZ 73342		23045348	.PLUG, VALVE .....	1
16	PAHZZ 60380		B1880H	.BEARING, ROLLER, NEED .....	1
17	PAHZZ 73342		23018031	.PIN, STRAIGHT, HEADLE .....	1
18	PAHZZ 24617		141275	PIN, STRAIGHT, HEADLE .....	2
19	PAHZZ 24617		9409072	BOLT, SELF-LOCKING .....	1
20	PAHZZ 73342		23018144	CLIP, SPRING, TENSION .....	2
21	PAHZZ 73342		23018143	LINK, BRAKE ADJUSTIN .....	1
22	PAHZZ 73342		23018142	LINK, BRAKE ADJUSTIN .....	1
23	XDHZZ 24617		455675	PIN, SPRING .....	1
24	XDHZZ 73342		23018023	CAM, CONTROL .....	1
25	PAHZZ 73342		23018114	PIN, STRAIGHT, HEADLE .....	4
26	PAHZZ 73342		23018110	CAM, BRAKE APPLY-STA .....	1
27	PAHZZ 73342		23018109	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		23018083	CAM, BRAKE, TRANSMISS .....	1
33	PAHZZ 73342		23046647	PACKING, PREFORMED.....	1
34	PAHZZ 73342		23046648	PACKING, PREFORMED.....	1
35	PAHDD 73342		23018014	GEAR CLUSTER .....	1
36	PADZZ 73342		23018008	.BEARING, SLEEVE .....	1
37	XAHZZ 73342		23018015	.GEAR, STR RING .....	1
38	PAHZZ 73342		23018237	BEARING, WASHER, THRU .....	1
39	PAHZZ 73342		23018078	DRUM, BRAKE, CLUTCH .....	1
40	PAHDD 73342		23018275	CARRIER ASSEMBLY UOC:XTZ.....	1
40	PAHDD 73342		29510172	CARRIER ASSY UOC:X4A .....	1
41	KDDZZ 73342		6839514	.BEARING, WASHER, THRU (BRONZE .....	
				THRUST WASHER PLACED NEXT TO	
				CARRIER) PART OF KIT P/N 5703231 .....	12
41	KDDZZ 73342		2951073	BEARING, WASHER, THRU PART OF KITS P/N.....	
				12371042 AND 12371042UOC:X4A .....	12

SECTION II				TM 9-2520-272-34&P	
(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
42	KDDZZ	73342	6833991	WASHER, PIN THRUST (STEEL THRUST WASHER) PART OF KITS P/N 5703231 AND 12371042.....	12
43	KDDZZ	60380	Q8036	.ROLLER, BEARING PART OF KIT ..... P/N 5703231.....	120
44	KDDZZ	73342	23045484	.PINION ASSY, MATCHED SET OF SIX PART OF KITS P/N 5703231 AND 12371042) .....	1
45	XADZZ	73342	23018276	.FLANGE AND CARRIER (PART OF KIT..... P/N 12371042) .....	1
46	KDDZZ	73342	6834309	.SHAFT, STRAIGHT PART OF KITS..... P/N 5703231 AND 12371042 .....	6
47	PAHZZ	73342	6836110	RING, RETAINING .....	1
48	PAHZZ	24617	274612	RING, RETAINING .....	6
49	PAHZZ	73342	23018082	DISK, CLUTCH.....	1
50	PAHZZ	73342	23046537	DISK, CLUTCH.....	6
51	PAHZZ	73342	23046681	PLATE, CLUTCH REACTI.....	5
52	PAHZZ	73342	23018080	SEAL, BRAKE COOLANT .....	1
53	PAHZZ	73342	23018236	BEARING, WASHER, THRU .....	1
54	PAHZZ	73342	23018108	GEAR CLUSTER .....	1
55	PAHZZ	24617	9409028	BOLT, SELF-LOCKING .....	5
56	PAHZZ	73342	6769636	WASHER, FLAT .....	5
57	PAHZZ	73342	23018081	SPRING, HELICAL COMP .....	6
58	PAHZZ	73342	23018079	PLATE, BACKING, BRAKE .....	1
59	XDHZZ	73342	23018156	PIN, STRAIGHT, HEADLE .....	6
60	PAHZZ	82994	BS226350	BEARING, ROLLER, CYLI .....	1
61	PAHZZ	73342	23018105	SHAFT, SHOULDERED UOC:XTZ.....	1
61	PAHZZ	73342	29510170	SHAFT, SHOULDERED UOC:X4A.....	1
62	PAHZZ	52676	114K3	BEARING, BALL, ANNULA .....	1
63	PAHZZ	73342	23018071	GEAR, SPUR .....	1

END OF FIGURE

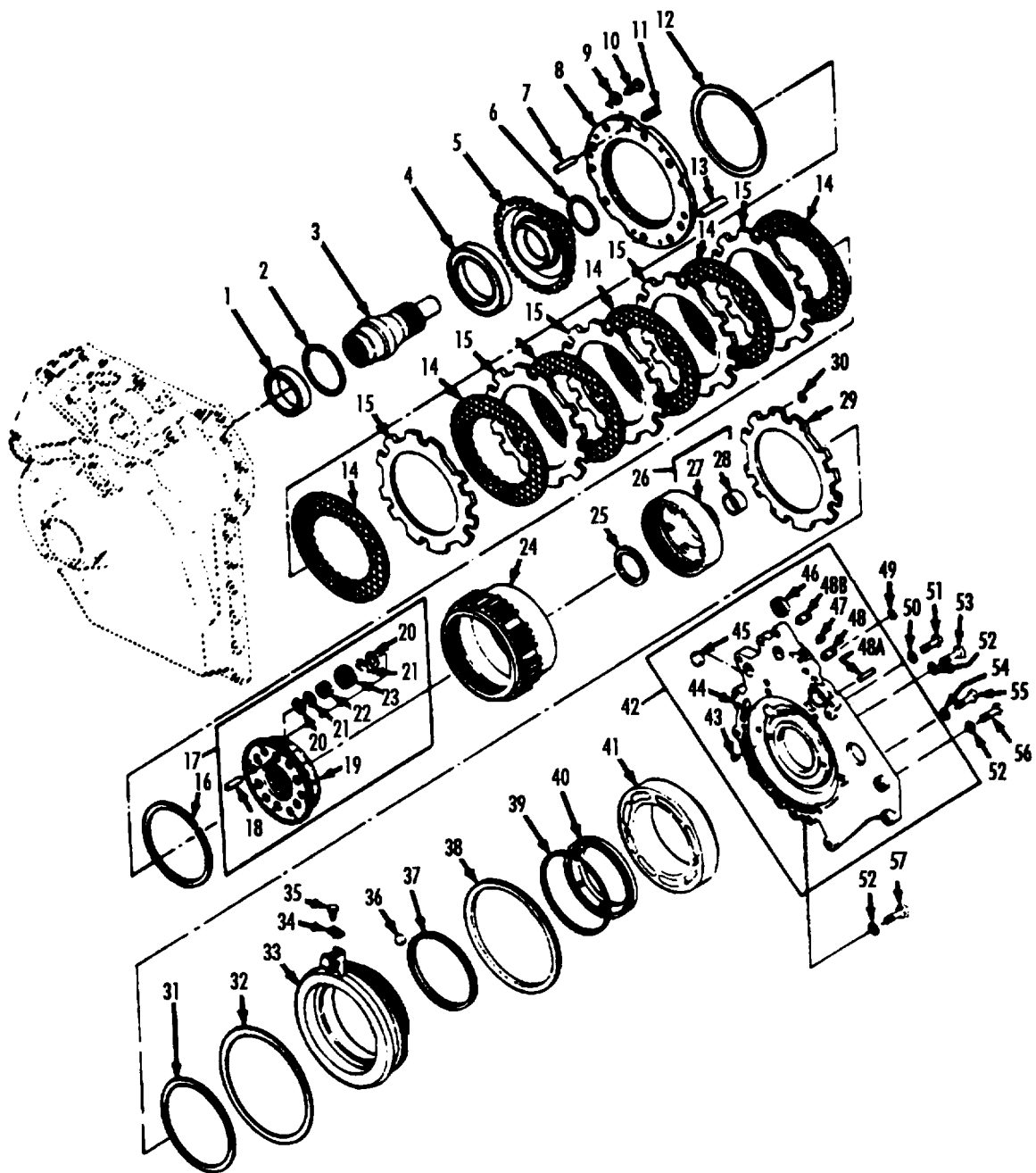


Figure 32. Right Hand Brake and Output Carrier

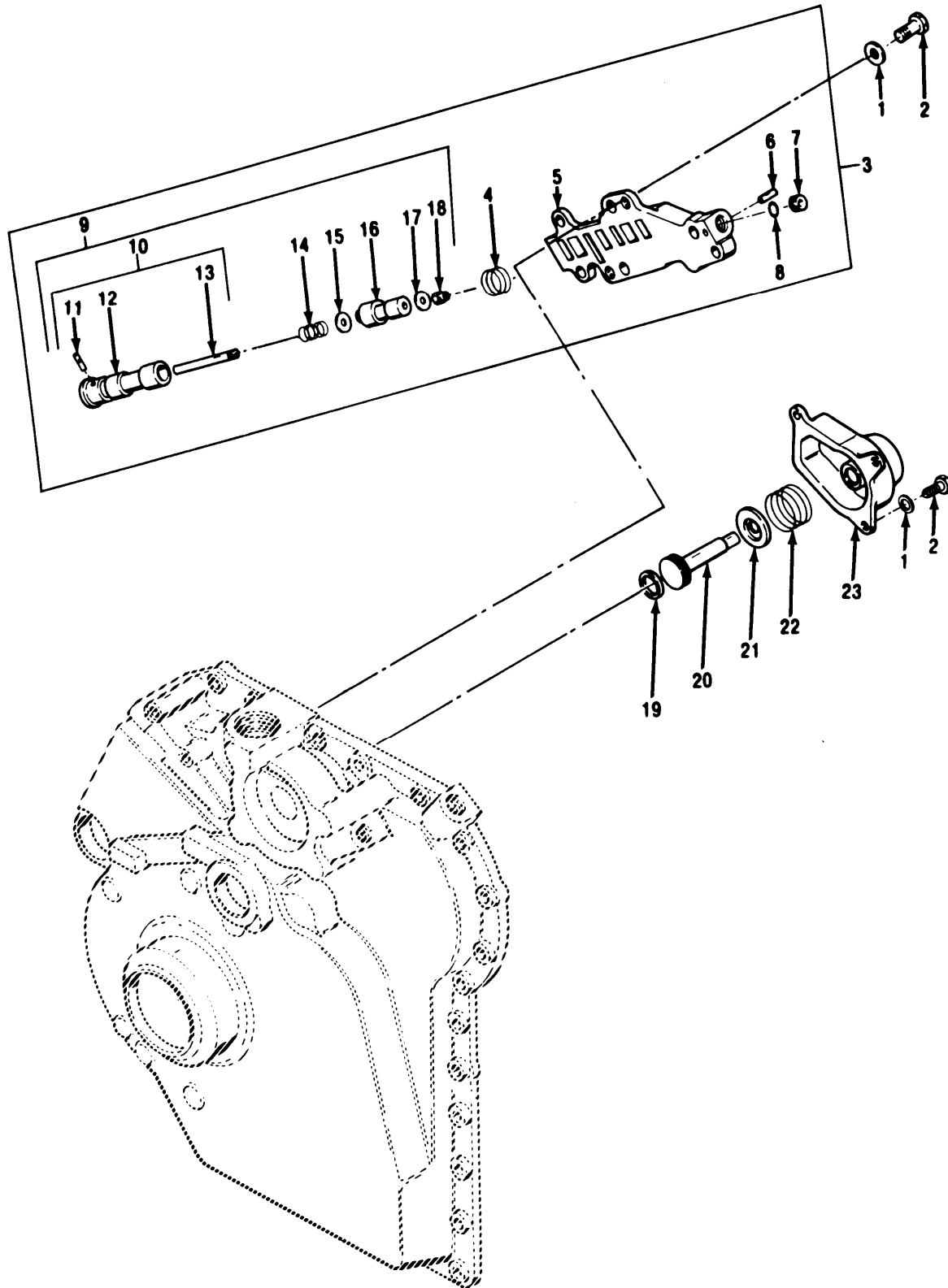


SECTION II				TM 9-2520-272-34&P		
(1)	(2)	(3)	(4)	(5)	(6)	
ITEM	SMR		PART			
NO	CODE	CAGEC	NUMBER	DESCRIPTION AND USABLE ON CODES (UOC)	QTY	
GROUP 0726 BRAKES						
FIG. 32 RIGHT HAND BRAKE AND OUTPUT CARRIER						
1	PAHZZ	3L092	113A3	BEARING, BALL, ANNULA .....	1	
2	PAHZZ	73342	23045232	RING, RETAINING .....	1	
3	PAHZZ	73342	23017955	SHAFT, SHOULDERED .....	1	
4	PAHZZ	82994	BS226350	BEARING, ROLLER, CYLI .....	1	
5	PAHZZ	73342	23018107	GEAR CLUSTER. ....	1	
6	PAHZZ	73342	23018236	BEARING, WASHER, THRU.....	1	
7	XDHZZ	73342	23018156	PIN, STRAIGHT, HEADLE .....	6	
8	PAHZZ	73342	23018079	PLATE, BACKING, BRAKE .....	1	
9	PAHZZ	73342	6769636	WASHER, FLAT .....	4	
10	PAHZZ	24617	9409028	BOLT, SELF-LOCKING .....	4	
11	PAHZZ	73342	23018081	SPRING, HELICAL, COMP .....	6	
12	PAHZZ	73342	23018080	SEAL, BRAKE COOLANT .....	1	
13	PAHZZ	73342	23018114	PIN, STRAIGHT, HEADLE .....	4	
14	PAHZZ	73342	23046537	DISK, CLUTCH .....	6	
15	PAHZZ	73342	23046681	PLATE, CLUTCH, REACTI .....	5	
16	PAHZZ	73342	6836110	RING, RETAINING .....	1	
17	PAHDD	73342	23018275	CARRIER ASSEMBLY UOC:XTZ.....	1	
17	PAHDD	73342	29510172	CARRIER ASSEMBLY UOC:X4A.....	1	
18	KDDZZ	73342	6834309	.SHAFT, STRAIGHT PART OF KITS		
				P/N 5703231 AND 12371042 UOC:XTZ.....	6	
19	XADZZ	73342	23018276	.FLANGE AND CARRIER.....	1	
20	KDDZZ	73342	6839514	.BEARING, WASHER, THRU (BRONZE THRUST		
				WASHER; PLACE NEXT TO CARRIER) PART OF		
				KITS P/N 5703231 AND 12371042 ..... UOC:XTZ	12	
20	KDDZZ	73342	29510173	.BEARING, WASHER, THRU (POLYAMIDE) PLACE		
				NEXT TO CARRIER PART OF KIT P/N .....		
				12371042 UOC:X4A .....	12	
21	KDDZZ	73342	6833991	.WASHER, PIN, THRUST (STEEL THRUST		
				WASHER) PART OF KITS P/N 5703231		
				AND 12371042 .....	12	
22	KDDZZ	60380	Q8036	.ROLLER, BEARING PART OF KITS P/N		
			5703231	AND 12371042 .....	120	
23	KDDZZ	73342	23045484	.PINION ASSY, MATCHED SET OF SIX		
				PART OF KITS P/N 5703231 AND 12371042 .....	1	
24	PAHZZ	73342	23018078	DRUM, BRAKE, CLUTCH .....	1	
25	PAHZZ	73342	23018237	BEARING, WASHER, THRU .....	1	
26	PAHDD	73342	23018014	GEAR CLUSTER .....	1	
27	XAHHZ	73342	23018015	GEAR, STR RING .....	1	
28	PADZZ	73342	23018008	BEARING, SLEEVE .....	1	
29	PAHZZ	73342	23018082	DISK, CLUTCH .....	1	
30	PAHZZ	24617	274612	RING, RETAINING .....	6	
31	PAHZZ	73342	23046647	PACKING, PREFORMED.....	1	
32	PAHZZ	73342	23046648	PACKING, PREFORMED.....	1	
33	PAHZZ	73342	23018083	CAM, BRAKE, TRANSMISS.....	1	
34	PAHZZ	73342	23018144	CLIP, SPRING TENSION .....	2	
35	PAHZZ	24617	9409072	BOLT, SELF-LOCKING .....	1	
36	PAHZZ	24617	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	23018109	RETAINER, PACKAGING .....	1	
41	PAHZZ	73342	23018110	CAM, BRAKE APPLY-STA .....	1	

SECTION II				TM 9-2520-272-34&P	
(1)	(2)	(3)	(4)	(5)	(6)
ITEM	SMR		PART		
NO	CODE	CAGEC	NUMBER	DESCRIPTION AND USABLE ON CODES (UOC)	QTY
42	PAHHH 73342		23018037	SUPPORT ASSEMBLY, BR SUPERCEDED BY P/N 29510214 UOC:XTZ .....	1
42	PAHHH 73342		29510214	SUPPORT ASSEMBLY, BR .....	1
43	PAHZZ 24617		141275	PIN, STRAIGHT, HEADLE .....	2
44	XAHZZ 73342		23018038	SUPPORT, RH BRK (USE WITH P/N 23018037) UOC:XTZ .....	1
44	XAHZZ 73342		29510215	.SUPPORT, RH BRK (USE WITH P/N 29510214) .....	1
45	XAHZZ 73342		23018028	.BUSHING BLANK .....	1
46	PAHZZ 60380		B188OH	.BEARING, ROLLER, NEED .....	1
47	PAHZZ 24617		444687	.PLUG, PIPE .....	1
48	PBHZZ 73342		23018039	.COUPLING TUBE .....	1
48A	PAHZZ 73342		23018031	.PIN, STRAIGHT, HEADLE .....	1
48B	XAHZZ 73342		29510216	.TUBE (USE WITH P/N 29510214) ..... UOC:X4A	1
49	PAHZZ 73342		23018233	SEAL RING, METAL .....	1
50	PAHZZ 24617		9422848	WASHER, FLAT .....	14
51	PAHZZ 24617		9409513	BOLT, SELF-LOCKING .....	2
52	PAHZZ 24617		9422846	WASHER, FLAT .....	3
53	PAHZZ 24617		9409224	BOLT .....	1
54	PAHZZ 24617		9422845	WASHER, FLAT .....	2
55	PAHZZ 24617		9409074	BOLT, SELF-LOCKING .....	2
56	PAHZZ 24617		9416011	BOLT, SELF-LOCKING .....	12
57	PAHZZ 24617		9409012	SCREW, YSELF-LOCKING .....	2

END OF FIGURE





TM85813

Figure 33. Right Brake Apply and Brake Coolant Valve Body

SECTION II				TM 9-2520-272-34&P	
(1)	(2)	(3)	(4)	(5)	(6)
ITEM	SMR		PART		
NO	CODE	CAGEC	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	9422846	WASHER, FLAT .....	8
2	PAHZZ	24617	9409012	SCREW, SELF-LOCKING .....	8
3	PAHHH	73342	23048087	BODY ASSY, BRAKE (FOR REPLACEMENT USE	
				ASSY P/N 29503140) UOC:XTZ .....	1
3	PAHHH	73342	29501427	BODY ASSY, BRAKE (FOR REPLACEMENT USE	
				ASSY P/N 29503140) SUPERCEDED BY P/N	
				29503140.....	1
3	PAHHH	73342	29503140	BODY ASSY, BRAKE.....	1
4	PAHZZ	73342	23017996	.SPRING, HELICAL, COMP .....	1
5	XAHZZ	73342	23048059	.BODY, BRK APPLY REG USE WI 29501427 ..... (FOR	
				REPLACEMENT USE ASSY P/N 29503136).....	1
5	XAHZZ	73342	29503136	.BODY, BRK APPLY REG UOC:XTZ .....	1
6	XDHZZ	24617	455675	.PIN, SPRING USE W/ 23048087 & 23048059	
				UOC:XTZ.....	1
7	PAHZZ	73342	23045125	.PLUG USE W/ 23048087 & 23048059 ..... UOC:XTZ	1
8	PAHZZ	73342	23045126	.PACKING, PREFORMED USE W/ 23048087&... 23048059	
				UOC:XTZ.....	1
9	PAHDD	73342	23017989	.VALVE, BRAKE REG (FOR REPLACEMENT USE	
				ASSY P/N 29501428) UOC:XTZ .....	1
9	PAHDD	73342	29501428	.VALVE, BRAKE REG USE W/ 29501427 &	
				29503140.....	1
10	ADDDD	73342	23017990	..VALVE ASSY, BRAKE RG .....	1
11	PADZZ	24617	455141	..PIN, SPRING.....	1
12	PADZZ	73342	23017991	..VALVE, REGULATING.....	1
13	PADZZ	73342	23017992	..PIN, GROOVED, HEADLES.....	1
14	PADZZ	73342	23017993	..SPRING, HELICAL, COMP (FOR REPLACEMENT	
				USE P/N 29501219) UOC:XTZ.....	1
14	PADZZ	73342	29501219	..SPRING, HELICAL, COMP USE W/29501428.....	1
15	PADZZ	73342	23017994	..SHIM .....	V
16	PADZZ	73342	23017995	..SLIDE, DIRECTIONAL C.....	1
17	PADZZ	24617	9422845	..WASHER, FLAT .....	1
18	PADZZ	19207	7708035	..NUT, SLEEVE .....	1
19	PAHZZ	73342	23018234	RETAINER, PACKING.....	1
20	PAHZZ	73342	23017982	STEM, TRANSMISSION SUPERCEDED	
				BY P/N 23047496.....	1
20	PAHZZ	73342	23017982	STEM, TRANSMISSION (SUPERCEDED BY P/N	
				23047496 UOC:XTZ .....	1
20	PAHZZ	73342	23047496	STEM, TRANSMISSION .....	1
21	PAHZZ	73342	23017983	VALVE, COOLANT .....	1
22	PAHZZ	73342	6836252	SPRING, HELICAL, COMP .....	1
23	PAHZZ	73342	23018155	BODY, BRAKE COOLANT .....	1

END OF FIGURE

SECTION II

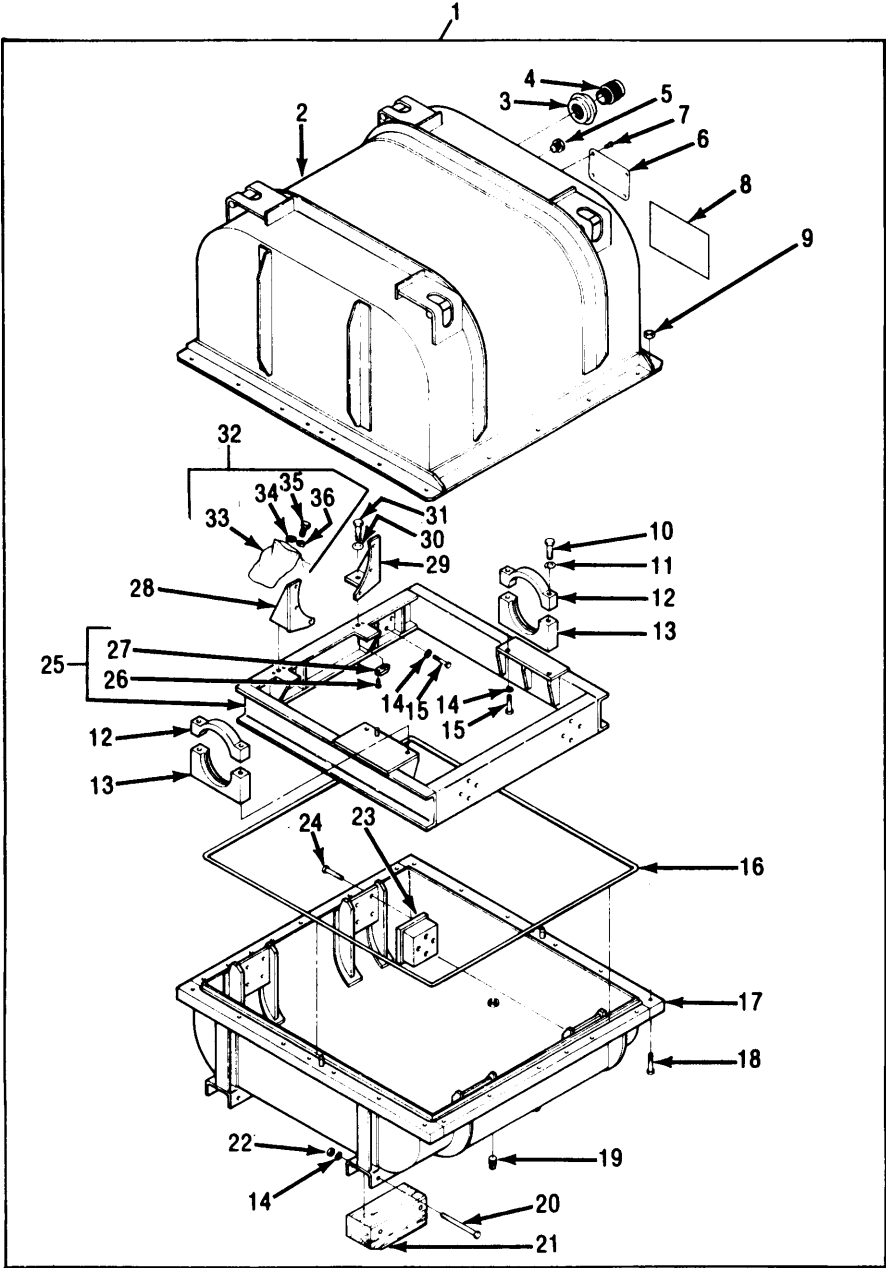


Figure 34. Transmission Shipping and Storage Container

SECTION II			TM 9-2520-272-34&P		
(1)	(2)	(3)	(4)	(5)	(6)
ITEM	SMR		PART		
NO	CODE	CAGEC	NUMBER	DESCRIPTION AND USABLE ON CODES (UOC)	QTY
GROUP 33 SPECIAL PURPOSE KITS					
FIG. 34 TRANSMISSION SHIPPING AND					
STORAGE CONTAINER					
1	PAFHH 19207		11650169	CONTAINER, X200 TRAN .....	1
2	PBFZZ 19207		11650252	.TOP WELDMENT .....	1
3	PAHZZ 19207		12344383	.PORT, DESICCANT .....	1
4	PAHZZ 19207		12302146	.VALVE, VACUUM REGULA .....	1
5	PAHZZ 00334		SK2155	.INDICATOR, HUMIDITY .....	1
6	PBHZZ 19207		7973325	.PLATE, IDENTIFICATIO .....	4
7	PAHZZ 96906		MS21318-46	.SCREW, DRIVE .....	4
8	PBHZZ 19207		11650193	.MARKER, IDENTIFICATI .....	1
9	PAFZZ 96906		MS51967-14	.NUT, PLAIN, HEXAGON .....	22
10	PAFZZ 96906		MS90727-117	.SCREW, CAP, HEXAGON H .....	4
11	PAFZZ 96906		MS35338-48	.WASHER, LOCK .....	4
12	PAFZZ 19207		11650188	.CAP, PILLOW BLOCK .....	2
13	PAFZZ 19207		11650186	.BASE, SUPPORT CRADLE .....	2
14	PAHZZ 96906		MS35338-48	.WASHER, LOCK .....	28
15	PAHZZ 96906		MS90726-108	.SCREW, CAP, HEXAGON H .....	20
16	PAFZZ 19207		11650251	.RUBBER, SHEET, SOLID .....	1
17	PBFZZ 19207		11650183	.BOTTOM WELDMENT .....	1
18	PAFZZ 96906		MS90725-111	.SCREW, CAP, HEXAGON H .....	22
19	PAFZZ 96906		MS20913-6S	.PLUG, PIPE .....	1
20	PAHZZ 96906		MS90725-128	.SCREW, CAP, HEXAGON H .....	8
21	PAHZZ 19207		12302107-4	.SKID WOOD .....	4
22	PAHZZ 96906		MS51967-14	.NUT, PLAIN, HEXAGON .....	8
23	PAHZZ 19207		11650184	.MOUNT, RESILIENT .....	4
24	PAHZZ 96906		MS51095-410	.SCREW, CAP, HEXAGON H .....	16
25	PBHHH 19207		11650185	.FRAME, MOUNTING.....	1
26	PAHZZ 96906		MS20427-5C10	.RIVET, SOLID .....	4
27	PAHZZ 80205		NAS1031AX8	..NUT, SELF-LOCKING, PL.....	2
28	XBFZZ 19207		11650187-2	.BRACKET, MOUNTING.....	1
29	XBFZZ 19207		11650187-1	.BRACKET, MOUNTING.....	1
30	PAFZZ 96906		MS27183-18	.WASHER, FLAT .....	2
31	PAFZZ 96906		MS90726-112	.SCREW, CAP, HEXAGON H .....	2
32	AFFFF 19207		11650190	.SACKED ITEM .....	1
33	PAFZZ 19207		10890481	..BAG, MAIL.....	1
34	PAFZZ 96906		MS51922-21	..NUT, SELF-LOCKING E.....	6
35	PAFZZ 96906		MS90726-64	..SCREW, CAP, HEXAGON H .....	6
36	PAFZZ 96906		MS27183-14	..WASHER, FLAT .....	6

END OF FIGURE





SECTION II				TM 9-2520-272-34&P	
(1)	(2)	(3)	(4)	(5)	(6)
ITEM	SMR		PART		
NO	CODE	CAGEC	NUMBER	DESCRIPTION AND USABLE ON CODES (UOC)	QTY

GROUP 94 SPECIAL PURPOSE KITS  
GROUP 9401 REPAIR PARTS

FIG KITS

1	PADZZ	19207	5703228	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	73342	5703229	PARTS KIT, DRIVING A .....	V
				BEARING, WASHER, THRU ( 72) 17-19	
				PINION, ASSY, MATCHED ( 1) 17-20	
				ROLLER, BEARING ( 8) 17-17	
				SHAFT, STRAIGHT ( 4) 17-15	
				WASHER, PIN THRUST ( 8) 17-18	
3	PADZZ	73342	5703230	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	73342	5703231	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	
				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	
5	PAOZZ	19207	5703232	PARTSKIT, FLUID PREV	
				ELEMENT ASSY, FILTER ( 1) 26-1	
				PACKING, PREFORMED ( 2) 26-16	
6	PADZZ	73342	12371042	PARTS KIT, DRIVING A .....	V
				BEARING, WASHER, THRU ( 12)	
				WASHER (STEEL) ( 12)	
				ROLLER, BEARING ( 120)	
				PINION MATCHED SET ( 1)	
				SHAFT STRAIGHT ( 6)	

END OF FIGURE

KIT-1

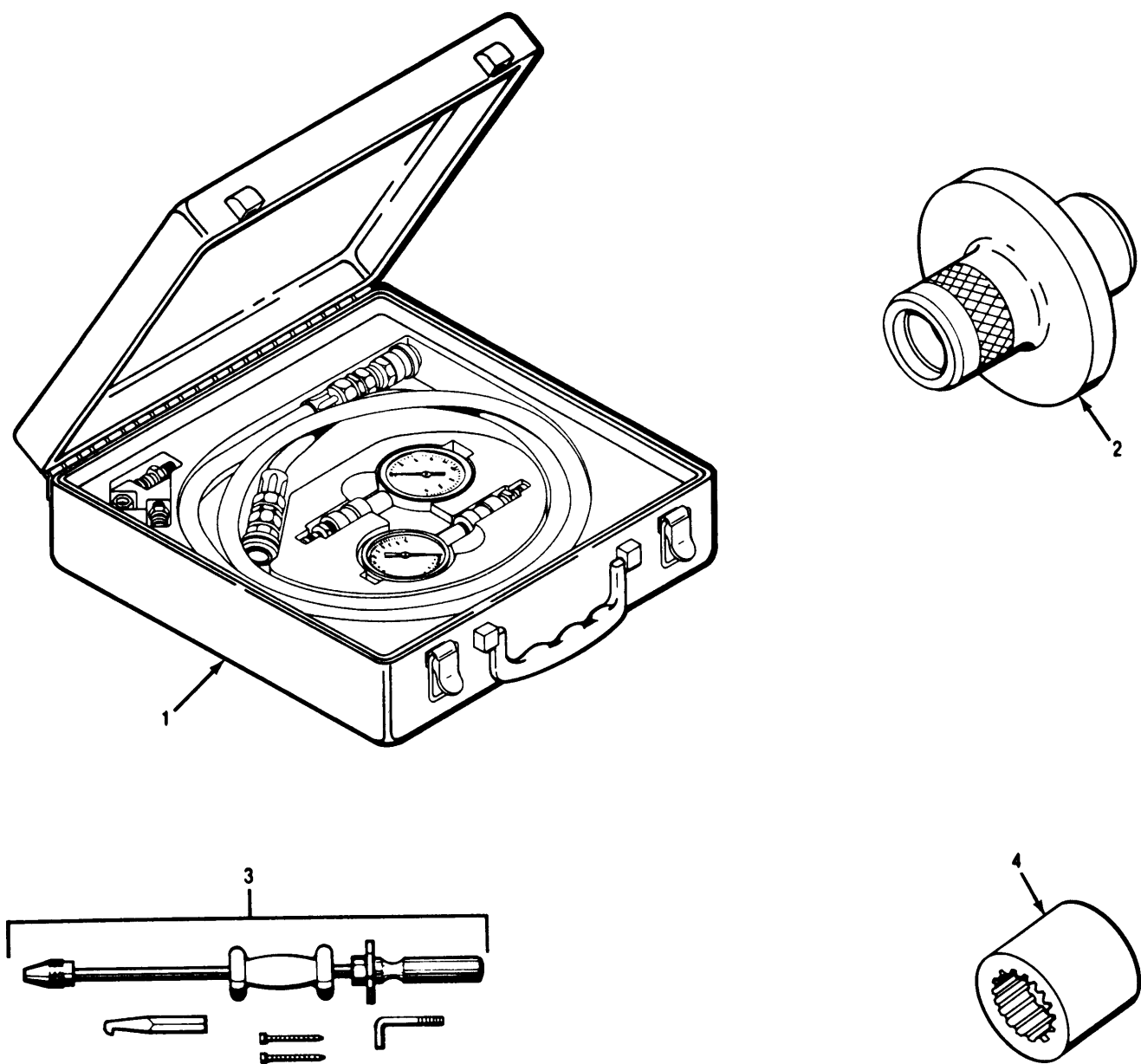


Figure 35. Special Tools

SECTION II				TM 9-2520-272-34&P	
(1)	(2)	(3)	(4)	(5)	(6)
ITEM	SMR		PART		
NO	CODE	CAGEC	NUMBER	DESCRIPTION AND USABLE ON CODES (UOC)	QTY
				GROUP 26 SPECIAL TOOLS	
				GROUP 2604 SPECIAL TOOLS	
				FIG. 35 TOOLS	
1	PEOZZ	19207	11650182	PRESSURE GAGE KIT .....	1
2	PEOZZ	19207	11650176	INSERTER, SEAL .....	1
3	PEOZZ	33287	024171	PULLER KIT, UNIVERSA.....	1
4	PEOZZ	19207	8355955	SOCKET, SOCKET WRENCH .....	1

END OF FIGURE

SECTION III

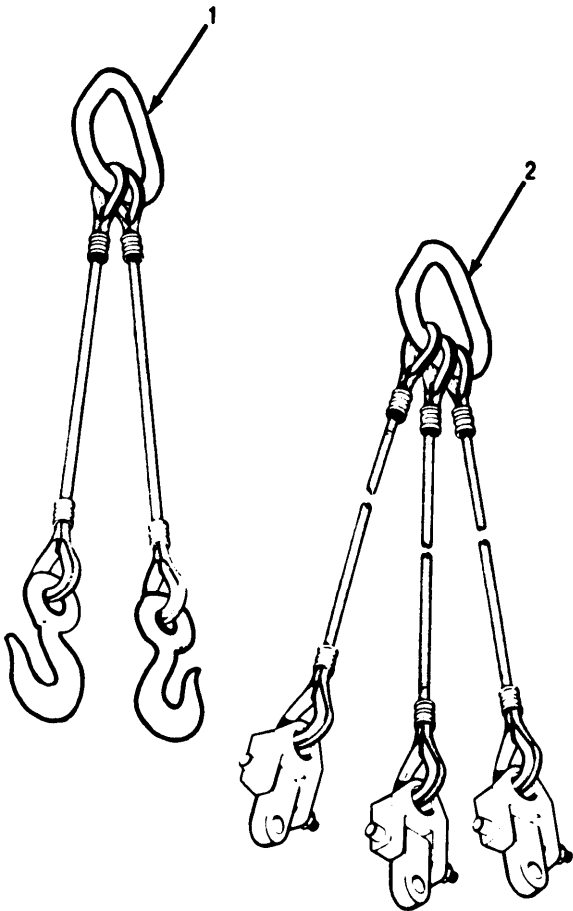


Figure 36. Special Tools

SECTION II				TM 9-2520-272-34&P	
(1)	(2)	(3)	(4)	(5)	(6)
ITEM	SMR		PART		
NO	CODE	CAGEC	NUMBER	DESCRIPTION AND USABLE ON CODES (UOC)	QTY
				GROUP 2604 SPECIAL TOOLS	
				FIG. 36 SPECIAL TOOLS	
1	PEFZZ	19207	12268037	SLING, ENGINE AND TR.....	1
2	PEFZZ	19207	12268036	SLING, MULTIPLE LEG .....	1

END OF FIGURE

36-1

SECTION III

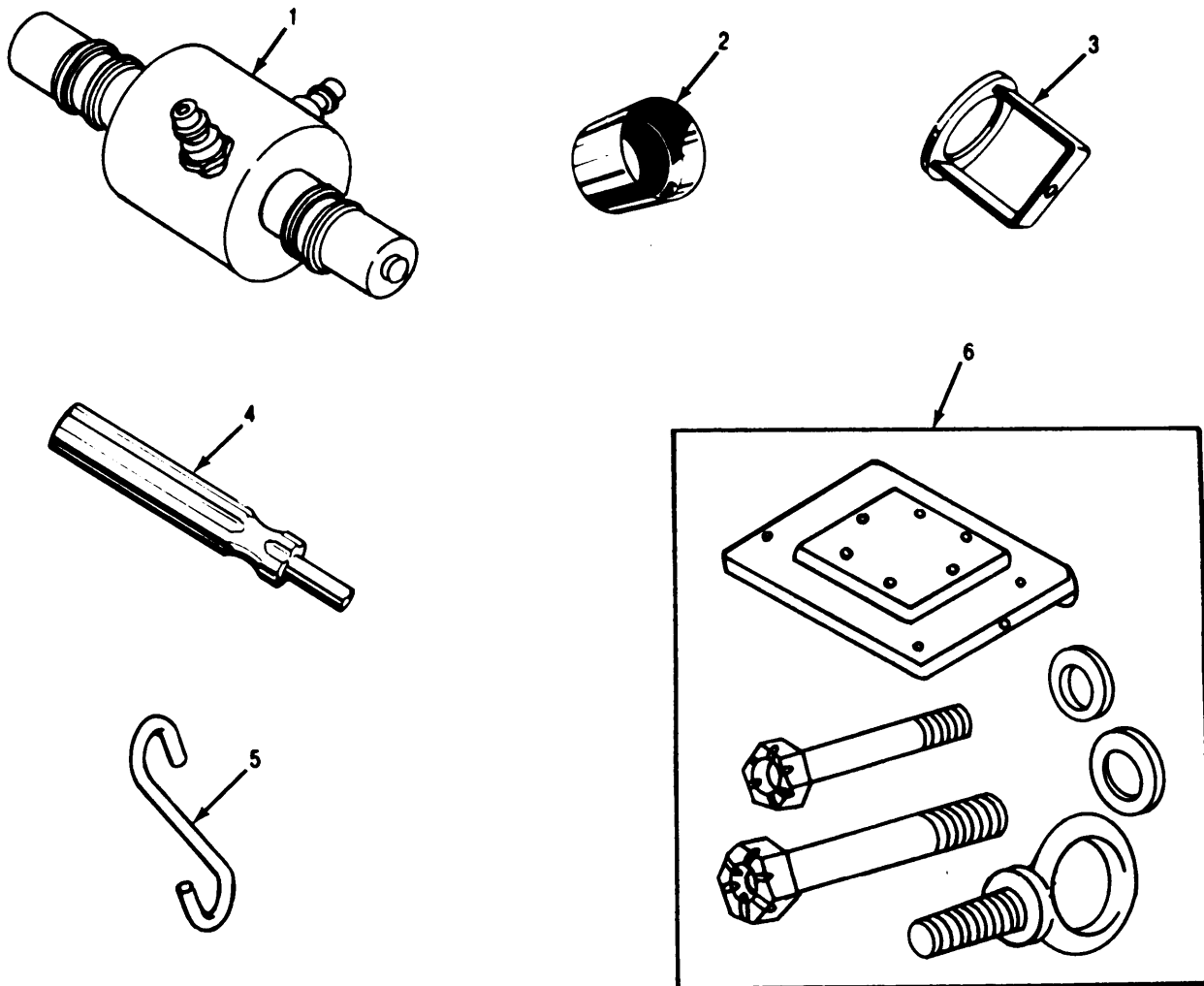


Figure 37. Special Tools

SECTION II				TM 9-2520-272-34&P	
(1)	(2)	(3)	(4)	(5)	(6)
ITEM	SMR		PART		
NO	CODE	CAGEC	NUMBER	DESCRIPTION AND USABLE ON CODES (UOC)	QTY
				GROUP 2604 SPECIAL TOOLS	
				FIG. 37 SPECIAL TOOLS	
1	PEHZZ	19207	11650178	FIXTURE ASSEMBLY, LE.....	1
2	PEHZZ	33287	J21362	PROTECTOR, INNER SEA.....	1
3	PEHZZ	33287	J23616	CLUTCH SPRING COMPR.....	1
4	PEHZZ	33287	J24453	INSTALLER, LOCK RING.....	1
5	PEHZZ	19207	11650102	HOOK, CHAIN, S.....	2
6	PEHZZ	19207	11650180	ADAPTER KIT, CONTAIN.....	1
				END OF FIGURE	

SECTION III

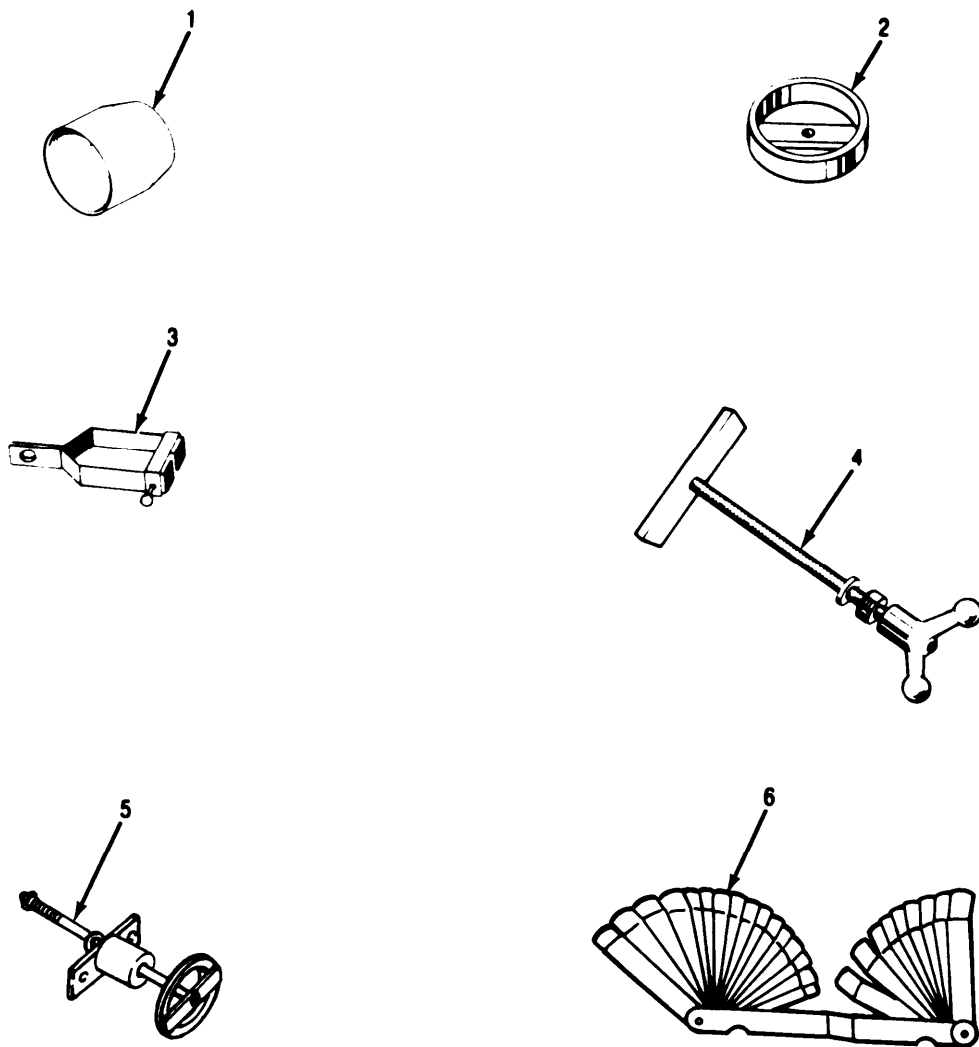


Figure 38. Special Tools



SECTION II				TM 9-2520-272-34&P	
(1)	(2)	(3)	(4)	(5)	(6)
ITEM	SMR		PART		
NO	CODE	CAGEC	NUMBER	DESCRIPTION AND USABLE ON CODES (UOC)	QTY
				GROUP 2604 SPECIAL TOOLS	
				FIG. 38 SPECIAL TOOLS	
1	PEHZZ	19207	12268021	INSERTER AND REMOVE.....	1
2	PEHZZ	33287	J24452	COMPRESSOR, SPRING, C.....	1
3	PEHZZ	33287	J24473	LIFTER, PU, P SUPPORT.....	1
4	PEHZZ	33287	J24204-2	BAR AND STUD ASSEMB.....	1
5	PEHZZ	33287	J23630-02	SPRING COMPRESSOR.....	1
6	PAHZZ	55719	FB300A	GAGE, THICKNESS(BENT BLADES).....	1

END OF FIGURE



## SECTION IV

TM9-2520-272-24&P  
CROSS- REFERENCE-INDEXES

STOCK NUMBER		NATIONAL STOCK NUMBER INDEX			
		FIG.	ITEM	STOCK NUMBER	FIG. ITEM
2840-00-001-4903		16	11	2520-00-172-1951	17 39
		18	29	5360-00-200-6365	12 11
5330-00-001-4904		16	12	5305-00-206-1533	31 19
		18	30		32 35
5305-00-001-5017		27	39	4730-00-221-2140	34 19
5330-00-003-0887		27	15	5305-00-253-5615	3 8
3120-00-005-5880		18	4	5305-00-253-5625	34 7
5365-00-007-2969		17	25	5305-00-269-3240	34 35
		18	1	5310-00-274-8041	3 28
		18	14		6 9
5315-00-014-1105		25	13		11 21
5315-00-014-1195		12	3		12 28
		24	9		12 30
		25	12		13 15
5315-00-014-1240		12	7		19 6
5315-00-014-1262		11	32		24 19
5315-00-014-1275		31	18	3110-00-277-0559	11 29
		32	43		15 36
5306-00-024-6580		21	2		31 16
		23	9		32 46
		27	37	5365-00-282-7017	7 6
5315-00-044-3767		11	30	5330-00-285-9842	14 11
5360-00-044-3945		12	21	5340-00-290-4518	11 37
5305-00-051-4078		7	5	5320-00-291-0925	34 26
5305-00-071-1781		34	20	5305-00-400-5542	20 17
5305-00-071-2067		34	18	5310-00-402-5220	24 2
5365-00-079-2212		15	5		25 37
5310-00-080-6004		34	36	9905-00-409-8948	34 6
5365-00-080-9091		27	23	3110-00-427-6591	12 33
5310-00-088-0553		7	23	3020-00-432-1255	18 5
3110-00-100-6151		25	28	5330-00-450-1942	9 4
3110-00-100-6170		31	31	8105-00-477-3716	34 33
		32	36	5315-00-480-4453	11 23
3120-00-104-0635		30	5	3110-00-488-3879	12 36
5305-00-125-9966		31	5	5365-00-498-2864	28 4
		32	57		30 27
		33	2	5306-00-543-5696	25 42
3110-00-138-6426		12	48	3110-00-554-3248	28 5
3110-00-144-8571		31	62		30 28
5365-00-152-0311		28	25	5365-00-557-5794	17 13
		30	8	5365-00-557-5835	17 30
5330-00-152-3049 29		1A		2520-00-557-6619	8 11
		29	7	5310-00-562-3932	30 14
5330-00-165-1943		4	1	5330-00-580-4394	27 28
5330-00-166-0992		26	10	5310-00-584-5272	34 11
5330-00-166-1030		26	12		34 14
5330-00-167-5110		4	12	5306-00-589-8167	20 9
5310-00-168-6412		21	8	5365-00-610-6325	29 23
5360-00-169-8367		29	8	6685-00-618-1822	34 5
5306-00-169-8389		30	13	5330-00-631-8125	7 19

## SECTION IV

TM9-2520-272-24&P  
CROSS- REFERENCE-INDEXES

STOCK NUMBER		NATIONAL STOCK NUMBER INDEX		STOCK NUMBER	
	FIG.	ITEM		FIG.	ITEM
5305-00-638-2362	24	17	4730-00-890-2377	10	6
	27	9		14	5
2520-00-679-6972	7	20	5306-00-896-7228	32	51
2520-00-679-6974	9	5	3110-00-902-1657	12	4
3120-00-679-7068	9	7		25	7
5340-00-679-9787	3	14	5305-00-903-7794	34	24
3110-00-684-5541	17	27	5360-00-909-0313	28	23
5315-00-687-5218	24	3		30	10
	25	35	3110-00-913-8113	15	17
3110-00-690-8987	30	21	2520-00-914-4680	3	10
5305-00-719-5240	34	10	5310-00-922-2017	1A	12
5305-00-725-0154	34	31	5315-00-926-5866	29	25
3040-00-733-4742	7	8	5310-00-935-9041	28	24
2520-00-736-0268	7	10		30	9
5360-00-736-0271	7	12	3110-00-939-6843	7	14
2520-00-767-5417	9	2	5306-00-940-9011	28	2
5310-00-768-0318	34	9	5306-00-940-9028	11	10
	34	22		15	22
3110-00-770-6097	24	7		31	55
	24	13		32	10
5365-00-770-7326	15	27	5306-00-940-9062	21	37
	31	7		22	25
3110-00-770-7842	7	11	5306-00-944-6812	20	23
5310-00-770-8035	33	18		27	38
5310-00-776-7670	11	6	5310-00-959-1488	34	34
	31	56	5305-00-978-9395	1A	4
	32	9	5305-00-990-0695	34	15
3110-00-788-1406	17	26	4820-01-006-9636	21	16
3110-00-789-1842	12	23		22	52
5365-00-792-0809	29	1	5365-01-014-4453	14	4
5310-00-799-4910	14	19	5365-01-017-2652	10	8
	15	24	5306-01-017-9962	28	18
5365-00-804-2782	25	22	5365-01-028-8203	9	1
4730-00-808-6814	11	26	4730-01-040-1798	15	39
	12	8	5306-01-045-6594	22	3
	15	35	5180-01-048-2153	35	3
	15	48	5120-01-048-2158	38	4
	32	47	4730-01-048-9371	12	5
5310-00-809-5998	34	30	5120-01-054-4050	37	4
5305-00-813-4495	29	32	5120-01-054-4056	38	3
5330-00-816-3546	15	49	5120-01-054-7221	38	2
5315-00-819-6282	28	28	5310-01-057-3111	2	3
	30	4		2	5
5330-00-821-4490	9	3		5	3
5365-00-838-8049	18	6		5	6
3110-00-839-9149	7	15		6	5
3120-00-841-0271	7	9		26	3
5306-00-843-6398	12	43	5365-01-057-3309	14	12
	31	1	5305-01-057-4264	3	29
	32	56		6	10

## SECTION IV

TM9-2520-272-24&P  
CROSS- REFERENCE-INDEXES

STOCK NUMBER		NATIONAL STOCK NUMBER INDEX			
	FIG.	ITEM	STOCK NUMBER	FIG.	ITEM
5305-01-057-4264	24	20	5315-01-095-3110	20	6
	30	34	5120-01-096-3493	38	1
5305-01-058-4612	13	10	5305-01-097-7827	30	25
2520-01-064-8849	17	12	5310-01-097-7957	27	16
4730-01-066-1282	15	50		29	33
5360-01-079-3097	17	11	5310-01-097-7994	27	2
2840-01-079-6700	17	10	5310-01-102-3270	20	7
5970-01-080-3153	20	39		20	18
	21	34	5310-01-112-7932	15	11
	22	7	5315-01-113-0985	15	20
5330-01-080-3253	21	7	8145-01-115-0442	34	21
5330-01-080-3254	26	6	4820-01-115-6463	34	4
5940-01-082-6615	20	38	5305-01-126-4076	24	16
	21	33		25	2
	22	8		32	53
5330-01-083-3065	17	8	5945-01-132-4189	21	32
5360-01-083-5500	22	42		22	6
5306-01-083-6443	11	5	5330-01-135-3789	10	7
	12	29	5310-01-143-0542	17	52
	12	31		18	21
	13	16	5330-01-145-0697	18	17
	28	21	2520-01-146-1034	17	9
5310-01-084-1197	12	15	5306-01-147-1202	21	3
	13	1A		22	4
	20	24		25	38
	21	1	2520-01-160-5655	17	49
	22	1		18	18
	23	8	5310-01-162-7707	18	22
	24	15	5365-01-171-3392	16	7
	24	18		18	34
	25	3	5120-01-176-3890	37	3
	25	39	5120-01-176-3891	38	5
	31	6	4910-01-178-6551	37	2
	32	52	4030-01-178-7310	37	5
	33	1	2840-01-185-0146	17	48
5306-01-085-3876	19	7		18	16
4910-01-086-1681	36	1	4730-01-188-3183	3	11
3940-01-087-0155	36	2	5365-01-196-5636	31	48
5310-01-092-5495	12	42		32	30
	31	2	2520-01-198-0492	12	2
	32	50	2520-01-198-0495	24	1
5310-01-092-5496	14	9	4320-01-198-0496	24	12
	20	21	4320-01-198-0497	24	5
	21	36	2520-01-198-0498	13	9
	22	11	2520-01-198-0499	17	14
	31	4	3040-01-198-0501	18	25
	32	54	2520-01-198-0502	31	40
	33	17		32	17
5315-01-093-0059	15	40	4810-01-198-0504	21	4
5315-01-095-3110	8	5	3040-01-198-0506	16	13

## SECTION IV

TM9-2520-272-24&P  
CROSS- REFERENCE-INDEXES

STOCK NUMBER		NATIONAL STOCK NUMBER INDEX		STOCK NUMBER	
	FIG.	ITEM		FIG.	ITEM
3020-01-198-0689	17	36	2520-01-214-3157	3	25
3020-01-198-0690	31	35	3040-01-214-3175	13	14
	32	26	3040-01-214-3176	24	10
3040-01-198-0713	11	22	3040-01-214-3184	8	8
2520-01-201-4784	1	1	2520-01-214-3190	23	2
2520-01-203-9885	12	12	4820-01-214-3193	20	20
3120-01-203-9887	17	4	2520-01-214-3238	17	21
4820-01-204-9941	22	61		18	2
4820-01-204-9942	22	19	2520-01-214-3239	17	22
4820-01-205-0034	22	53		18	3
4820-01-205-0035	23	3	2520-01-214-3240	17	24
5315-01-205-5572	25	15	4710-01-214-3241	11	8
5340-01-207-3481	21	28	3040-01-214-3841	31	61
5930-01-207-6350	26	9		31	61
5315-01-211-6485	18	39	3020-01-214-3845	12	32
4820-01-213-0035	31	15	2520-01-214-3846	KIT	
2530-01-213-1625	33	3	2520-01-214-3847	KIT	
2530-01-213-1626	32	42	2520-01-214-3854	7	17
	32	42	2520-01-214-3855	13	13
2520-01-213-7763	19	1	3020-01-214-3859	17	23
4730-01-213-7794	19	8	3040-01-214-3860	17	31
4820-01-213-7959	20	34	3040-01-214-3861	17	46
5340-01-213-8017	20	32		18	15
4320-01-213-8028	7	2	2520-01-214-3863	31	39
4730-01-213-8030	10	3		32	24
	15	34	3040-01-214-3864	31	26
4730-01-213-8049	22	40		32	41
4730-01-213-8051	22	26	2520-01-214-3865	31	32
4820-01-213-8098	22	27		32	33
2520-01-213-8599	21	19	2520-01-214-3866	15	10
5330-01-214-1479	18	23		31	22
4730-01-214-1502	14	6	2520-01-214-3867	15	9
4730-01-214-1507	15	37		31	21
2520-01-214-1558	12	19	4730-01-214-3868	22	41
2520-01-214-1559	12	17	4820-01-214-3869	20	10
4730-01-214-1560	11	24	3040-01-214-3915	25	34
2590-01-214-1563	22	18	3040-01-214-3916	25	33
3040-01-214-1604	31	24	3020-01-214-3935	25	10
3040-01-214-1605	15	7	2520-01-214-3944	18	40
3040-01-214-1606	31	10	4810-01-214-4014	22	39
3040-01-214-1607	15	28	4810-01-214-4015	20	1
2520-01-214-1614	25	31	2520-01-214-4317	19	2
2520-01-214-1615	22	32	2520-01-214-4318	25	32
4730-01-214-2366	32	48	2520-01-214-4408	22	48
4730-01-214-2369	14	17	2520-01-214-4409	22	43
4730-01-214-3112	13	4	2520-01-214-4410	22	34
3040-01-214-3145	17	2	5995-01-214-5783	20	37
2520-01-214-3150	22	14	3020-01-214-5786	17	1
2520-01-214-3154	20	4	3020-01-214-5787	13	18
3040-01-214-3155	20	19	3040-01-214-5792	31	58

## SECTION IV

**TM9-2520-272-24&P**  
**CROSS- REFERENCE-INDEXES**

NATIONAL STOCK NUMBER INDEX			
STOCK NUMBER	FIG.	ITEM	STOCK NUMBER
3040-01-214-5792	32	8	5360-01-215-7688
2520-01-214-5793	7	16	5360-01-215-7689
4710-01-214-6839	3	18	5360-01-215-7690
2520-01-214-7116	KIT		3020-01-215-8825
2520-01-214-7117	KIT		3020-01-215-8826
		KIT	5306-01-215-9129
2520-01-214-7166	25	25	5330-01-215-9503
3020-01-214-7352	24	4	
3020-01-214-7353	11	20	5365-01-215-9687
3020-01-214-7354	11	18	
3020-01-214-8864	11	13	3120-01-215-9776
3040-01-214-8969	17	32	5365-01-215-9831
2520-01-214-9042	33	16	5360-01-215-9935
3040-01-214-9300	15	1	5306-01-216-0230
3040-01-214-9301	14	24	
4330-01-214-9303	KIT		5360-01-216-0828
2520-01-214-9333	7	7	5360-01-216-0829
2520-01-214-9334	20	26	5360-01-216-0830
2520-01-214-9336	22	12	5360-01-216-0831
3010-01-214-9337	14	20	4710-01-216-1159
	15	25	5306-01-216-1322
2520-01-214-9338	26	4	
2520-01-214-9339	33	23	5306-01-216-1333
2520-01-214-9340	3	24	
2520-01-214-9341	3	27	
2520-01-214-9385	31	50	
	32	14	5306-01-216-1334
2520-01-214-9388	22	37	5310-01-216-1354
2520-01-214-9389	22	31	5310-01-216-1366
4730-01-214-9392	3	19	5310-01-216-1367
3020-01-214-9394	17	33	
3020-01-214-9396	24	11	5310-01-216-1368
3020-01-214-9397	17	29	5310-01-216-1369
3020-01-214-9398	15	18	5310-01-216-1370
3020-01-214-9399	15	16	3120-01-216-1423
3020-01-214-9400	32	5	
2520-01-214-9408	31	49	
	32	29	
2520-01-214-9409	16	4	
	18	35	3120-01-216-1439
2520-01-214-9417	16	5	
3040-01-215-0645	15	21	3120-01-216-1440
3020-01-215-3344	11	16	
3020-01-215-3345	31	54	5340-01-216-1465
4730-01-215-4323	22	44	5315-01-216-1504
5365-01-215-7400	25	18	5315-01-216-1505
5315-01-215-7514	11	31	5365-01-216-1705
	15	41	5340-01-216-1737
	31	17	
	32	48A	

## SECTION IV

TM9-2520-272-24&P  
CROSS- REFERENCE-INDEXES

STOCK NUMBER		NATIONAL STOCK NUMBER INDEX		STOCK NUMBER	
	FIG.	ITEM		FIG.	ITEM
5330-01-216-2809	6	4	5365-01-216-5750	10	1
5330-01-216-2815	14	3		15	38
5330-01-216-2816	26	5	5360-01-216-5972	22	47
5365-01-216-2824	12	24	4710-01-216-6623	3	31
5365-01-216-2825	12	25	4710-01-216-6624	3	21
5365-01-216-2826	12	26	4710-01-216-6625	3	7
3120-01-216-2869	11	28	4710-01-216-6626	3	13
5360-01-216-3265	3	26	5330-01-216-6654	15	32
	12	18	5330-01-216-6657	7	1
5360-01-216-3266	12	10	5330-01-216-6765	13	8
5360-01-216-3267	17	50	5340-01-216-6785	13	2
	18	19	5360-01-216-6995	33	4
5360-01-216-3269 31	57		5360-01-216-7059	22	51
	32	11	5306-01-216-7364	20	25
5360-01-216-3270	33	22		22	9
5360-01-216-3271	15	6	5306-01-216-7365	22	17
5340-01-216-3299	31	20	5306-01-216-7375	11	1
	32	34	5305-01-216-7378	14	18
5330-01-216-3701	5	1		15	23
3110-01-216-3718	20	28	5330-01-216-7424	31	52
3120-01-216-3726	25	19	5360-01-216-7437	22	38
5340-01-216-3810	20	2	3020-01-216-7603	4	11
3040-01-216-3952	4	8	3020-01-216-7604	4	10
5306-01-216-3992	15	29	3020-01-216-7605	3	2
5306-01-216-3993	2	1	5340-01-216-7640	14	1
5330-01-216-4005	8	3	2520-01-216-7648	16	2
5330-01-216-4006	14	8	5360-01-216-8210	22	59
	15	46	3120-01-216-8283	4	2
5330-01-216-4009	33	8		16	6
5330-01-216-4012	11	4		17	34
5330-01-216-4013	22	45	5340-01-216-8479	8	2
5330-01-216-4014	22	22	2520-01-216-8564	20	29
5330-01-216-4015	2	7	2520-01-216-8565	14	7
3110-01-216-4031	3	16	2520-01-216-8566	4	6
	11	12	3020-01-216-8591	4	4
3110-01-216-4032	31	60	3020-01-216-8592	3	17
	32	4	3020-01-216-8593	3	5
3110-01-216-4033	11	19	5306-01-216-9849	21	31
	15	15		22	24
3110-01-216-4086	12	34	5365-01-217-0856	11	25
5360-01-216-4462	21	17	5365-01-217-0857	15	12
5360-01-216-4463	21	24	5365-01-217-0858	3	3
5330-01-216-5698	8	10	5340-01-217-0960	33	7
5330-01-216-5702	12	40	5360-01-217-1017	8	7
5330-01-216-5703	13	6	5365-01-217-1021	7	18
5330-01-216-5704	11	9		12	35
5330-01-216-5705	11	7	5365-01-217-1022	16	1
5330-01-216-5711	3	23		18	38
	33	19	5365-01-217-1023	11	14
3110-01-216-5737	3	4	3040-01-217-1122	32	3



## SECTION IV

**TM9-2520-272-24&P**  
**CROSS- REFERENCE-INDEXES**

STOCK NUMBER		NATIONAL STOCK NUMBER INDEX		STOCK NUMBER	
	FIG.	ITEM		FIG.	ITEM
5365-01-217-2069	14	23	5330-01-217-7014	21	27
	32	2	2530-01-217-8136	31	11
5340-01-217-2162	20	14	5306-01-218-0700	6	6
5330-01-217-2201	6	2	5360-01-218-0793	21	21
5330-01-217-2202	22	16		22	28
5365-01-217-2208	12	37	5365-01-218-0796	18	1
5365-01-217-2209	12	38	5330-01-218-1565	31	28
5365-01-217-2210	12	39		32	39
3110-01-217-2235	3	1	3110-01-218-1566	12	27
	4	5	3110-01-218-3395	11	11
3120-01-217-2250	15	19	5330-01-218-7143	20	41
3110-01-217-2262	7	3	5330-01-219-2545	3	30
5315-01-217-2270	12	20	5330-01-219-2546	3	20
3130-01-217-2284	14	21	5330-01-219-2547	3	6
	15	26	5330-01-219-2548	3	12
5365-01-217-2303	31	47	2520-01-220-0119	3	22
	32	16	5315-01-220-5201	33	13
5340-01-217-2305	7	4	2520-01-220-6737	8	4
5306-01-217-2908	8	14	4730-01-220-9163	4	14
5306-01-217-2909	8	15	5340-01-220-9246	20	12
5306-01-217-2915	8	12		20	15
5365-01-217-2966	12	45		21	29
5365-01-217-2967	12	46		22	21
5365-01-217-2968	12	47		22	62
5315-01-217-3032	31	25	3110-01-221-3077	15	13
	32	13	4730-01-221-7138	11	27
5365-01-217-3072	18	1		14	2
5365-01-217-3075	13	21		20	31
5365-01-217-3076	17	35		26	8
5365-01-217-3077	11	15	5330-01-221-9177	14	27
5306-01-217-3992	8	13		32	49
5305-01-217-4004	4	7	3040-01-222-0265	12	50
5330-01-217-4041	8	1	3110-01-222-3354	12	41
5330-01-217-4043	22	60		12	41
5330-01-217-4047	12	44	4730-01-223-2518	26	7
5330-01-217-4048	31	27	5365-01-223-3673	10	4
	32	40	3040-01-225-9023	3	15
5365-01-217-4051	13	11	5360-01-231-0481	25	30
5365-01-217-4052	13	20	5365-01-231-9152	15	45
5365-01-217-4079	12	9	2510-01-232-7727	34	25
	23	6	2520-01-234-1898	27	10
5340-01-217-4179	21	23	2520-01-235-9590	9	6
5365-01-217-4262	17	28	2520-01-235-9591	34	1
5365-01-217-4263	18	1	2520-01-235-9594	25	11
5365-01-217-4264	18	41	2520-01-235-9597	28	26
5365-01-217-4661	22	29	2520-01-235-9598	27	8
5365-01-217-5032	17	7	2520-01-235-9599	27	13
5340-01-217-5074	11	35	2520-01-235-9600	18	7
5306-01-217-6970	14	10	3040-01-235-9644	28	6
5330-01-217-7013	6	3	5340-01-237-2414	25	26

## SECTION IV

TM9-2520-272-24&P  
CROSS- REFERENCE-INDEXES

STOCK NUMBER		NATIONAL STOCK NUMBER INDEX			
		FIG.	ITEM	STOCK NUMBER	FIG. ITEM
3110-01-237-2758		20	33	3040-01-241-6851	30 12
2520-01-237-2872		16	3	2520-01-241-7029	29 11
		18	36	5365-01-242-0827	30 16
5330-01-237-2967	31	34		5365-01-242-0828	28 14
		32	32	5340-01-242-2796	27 33
5330-01-238-4613		13	17	2520-01-242-6794	34 13
5330-01-238-5879		31	33	6695-01-242-6795	35 1
		32	31	5120-01-242-6796	35 2
4730-01-238-6443		15	51	2520-01-242-6797	37 1
4730-01-238-6996		4	13	5340-01-242-6798	37 6
4710-01-238-7100		13	3	5340-01-242-7146	27 21
4820-01-238-7961		29	1	3110-01-243-3798	17 6
5340-01-238-8759		22	46	3130-01-243-3876	34 12
2520-01-238-8767		27	29	5365-01-243-5289	27 12
3040-01-238-8773		28	1	5340-01-244-1473	27 17
4710-01-238-8783		27	25	5315-01-245-3673	27 18
2520-01-238-8784		29	15	5365-01-245-4124	30 26
2520-01-238-8826		27	4	5330-01-245-7162	15 47
2990-01-238-8831		27	32	5305-01-245-8750	29 18
2520-01-238-9843		28	13	5940-01-246-2086	20 40
		30	18	2520-01-246-2952	31 51
4810-01-238-9855		29	14		32 15
4710-01-239-2199		25	41	5310-01-246-5785	27 30
7690-01-239-2312		34	8	2520-01-246-6418	27 22
2520-01-239-6835		29	16	2520-01-247-2974	34 17
3040-01-239-6930		30	29	5365-01-247-6952	28 11
3040-01-240-3080		27	11		29 34
5310-01-241-2675		27	31	5310-01-247-8212	27 7
5310-01-241-2676		27	35	5360-01-248-1587	16 9
5310-01-241-2677		28	31		18 32
5310-01-241-2687		27	34	5360-01-249-0611	29 13
3120-01-241-2850		28	8	5330-01-249-3091	34 16
		30	31	5365-01-249-4343	10 9
3120-01-241-2851		27	5	2530-01-249-6439	35 4
3110-01-241-2943		28	3	5330-01-250-0651	29 22
5360-01-241-3246		27	20	2520-01-250-1909	16 10
5360-01-241-3247		29	29		18 31
5360-01-241-3264		27	6	5340-01-250-5545	29 9
5365-01-241-3265		25	8	5330-01-251-1931	20 35
5340-01-241-4282		27	24	2520-01-251-4395	7 24
3040-01-241-4695		30	24	2520-01-251-5490	25 1
5306-01-241-5072		25	40	2520-01-251-5491	25 5
5307-01-241-5171		30	3	2520-01-252-8014	11 17
5307-01-241-5172		27	26	9905-01-253-1276	3 9
5307-01-241-5173		27	19	5310-01-253-5930	27 3
3040-01-241-5567		30	6		27 36
2520-01-241-5636		28	22	5340-01-254-6471	16 8
		30	11		18 33
5310-01-241-6355		34	27	2520-01-255-3350	30 1
3040-01-241-6851		28	19	5306-01-256-6811	2 2

## SECTION IV

TM9-2520-272-24&P  
CROSS- REFERENCE-INDEXES

STOCK NUMBER		NATIONAL STOCK NUMBER INDEX		STOCK NUMBER	
	FIG.	ITEM		FIG.	ITEM
5306-01-256-6811	5	4	5310-01-372-3517	28	17
5330-01-256-6894	29	26	5340-01-372-3558	28	16
2520-01-257-3881	22	5		30	15
5340-01-257-4369	5	5	3040-01-372-5309	30	20
5315-01-258-1497	30	30	4320-01-372-7368	28	12
5340-01-258-6164	34	23		30	19
5340-01-258-8531	2	4	4820-01-372-8138	33	9
5330-01-258-9151	21	11	2530-01-373-5524	33	3
5305-01-259-2442	29	19	4730-01-375-7411	29	16
5365-01-259-9642	25	7A	4320-01-375-8130	30	29
4820-01-261-1692	22	33	5340-01-376-4633	29	9
2520-01-261-1715	7	21	2530-01-389-7353	31	11
2520-01-261-4017	22	15	3020-01-389-7784	18	5
5306-01-263-2018	22	2	2520-01-397-1074	1	1
	25	4	4730-01-420-5913	1A	2
5360-01-265-6742	22	35	3020-01-420-8039	15	16
8145-01-266-1104	34	3	5330-01-420-8736	1A	1
5330-01-266-3312	14	25	3020-01-421-0127	3	5
2520-01-268-7206	12	1	3020-01-421-0129	3	17
3040-01-268-7211	12	2	5340-01-421-2817	15	32B
5365-01-269-2676	29	27	5340-01-421-2819	1A	11
3110-01-269-6368	4	9	3020-01-422-1970	17	29
5365-01-272-1258	12	26A	3020-01-422-1971	11	20
5365-01-272-3346	22	29	3020-01-422-1972	15	18
5365-01-272-7479	12	39A	5310-01-422-2147	1A	13
5365-01-273-2320	22	29	3020-01-422-3966	17	23
3110-01-273-2329	13	19	2520-01-422-4101	14	24A
3110-01-273-2330	14	22	3040-01-422-4102	3	15
	32	1	3020-01-422-4103	3	2
5306-01-274-6483	31	3	9905-01-423-1611	3	9
				32	55
4820-01-276-3528	22	36			
5310-01-280-5798	28	20			
	30	33			
5330-01-280-5809	17	47			
3040-01-286-0318	6	7			
5330-01-286-5468	14	26			
4820-01-286-5644	33	20			
5330-01-287-5798	6	4			
2520-01-288-1959	29	31			
5340-01-291-2181	11	38			
	14	14			
5330-01-291-5078	10	5			
5360-01-291-5626	25	30			
5310-01-329-8189	29	33			
5210-01-355-2126	38	6			
5315-01-371-8568	28	10			
	30	23			
5360-01-371-9313	21	17			
5360-01-372-3133	33	14			

## SECTION IV

**TM9-2520-272-24&P**  
**CROSS-REFERENCE INDEXES**  
**PART NUMBER INDEX**

CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
82994	BS226344	3110-01-216-5737	3	4
82994	BS226345	3110-01-217-2235	3	1
82994	BS226346	3110-01-269-6368	4	9
82994	BS226347	3110-01-216-4033	11	19
			15	15
82994	B226348	3110-01-216-4031	3	16
			11	12
82994	BS226349	3110-00-913-8113	15	17
82994	BS226350	3110-01-216-4032	31	60
			32	4
43334	BU1012L-18	3110-01-217-2235	4	5
60380	B121OXOH	3110-00-902-1657	12	4
			25	7
80204	B1821BH038F150N	5305-00-269-3240	34	35
80204	B1821BH050C125N	5305-00-071-2067	34	18
60380	B1880H	3110-00-277-0559	11	29
			15	36
			31	16
			32	46
15434	C0505027400	4730-00-808-6814	12	8
			32	47
55719	FB300A	5210-01-355-2126	38	6
78229	H-117-C	5310-01-057-3111	2	3
			2	5
			5	3
			5	6
			6	5
			26	3
60038	JM207049JM207010	3110-00-138-6426	12	48
60038	JM511946JM511910	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	J23630-02	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
25341	J35223	2530-01-249-6439	35	4
60038	LM603049LM603011	3110-00-789-1842	12	23
96906	MS14314-5Z	4730-01-048-9371	12	5
96906	MS16555-61	5315-00-819-6282	28	28
			30	4
96906	MS16625-1162	5365-00-804-2782	25	22
96906	MS16997-100	5305-00-978-9395	1A	4
96906	MS19059-2414	3110-00-100-6151	25	28
96906	MS20427-5C10	5320-00-291-0925	34	26
96906	MS20913-65	4730-00-221-2140	34	19
96906	MS21318-21	5305-00-253-5615	3	8
96906	MS21318-46	5305-00-253-5625	34	7

## SECTION IV

**TM9-2520-272-24&P**  
**CROSS-REFERENCE INDEXES**  
**PART NUMBER INDEX**

CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
96906	NS27183-14	5310-00-080-6004	34	36
96906	NS27183-18	5310-00-809-5998	34	30
96906	NS28775-129	5330-00-580-4394	27	28
96906	NS28778-10	5330-00-285-9842	14	11
96906	MS28778-20	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	NS51095-410	5305-00-903-7794	34	24
96906	MSS51521A20	4730-01-238-6443	15	51
96906	SS51525A20	4730-01-066-1282	15	50
96906	NS51840-27	5365-01-057-3309	14	12
96906	NS51922-21	5310-00-959-1488	34	34
96906	NS51967-14	5310-00-768-0318	34	9
			34	22
96906	NS90725-128	5305-00-071-1781	34	20
96906	MS90726-108	5305-00-990-0695	34	15
96906	MS90727-112	5305-00-725-0154	34	31
96906	MS90727-117	5305-00-719-5240	34	10
96906	NS90727-36	5305-00-051-4078	7	5
96906	NS9390-440	5315-00-926-5866	29	25
81349	N83248/1-016	5330-00-166-0992	26	10
81349	M83248/1-028	5330-00-166-1030	26	12
80205	NAS1031AX8	5310-01-241-6355	34	27
60380	NTA-3650	3110-00-939-6843	7	14
60380	NTA1220	3110-00-788-1406	17	26
92555	PLEA2501220	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
00334	SK2155	6685-00-618-1822	34	5
11649	SS-6-P	4730-01-040-1798	15	39
60380	TRC1220	3110-00-684-5541	17	27
60380	TRD-3648	3110-00-839-9149	7	15
19207	10890481	8105-00-477-3716	34	33
3L092	110X4	3110-01-243-3798	17	6
3L092	113A3	3110-01-273-2330	14	22
			32	1
38443	114KS	3110-00-144-8571	31	62
24617	116003	5310-01-422-2147	1A	13

## SECTION IV

**TM9-2520-272-24&P**  
**CROSS-REFERENCE INDEXES**  
**PART NUMBER INDEX**

CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
19207	11649930	5310-00-402-5220	24	2
			25	37
19207	11650102	4030-01-178-7310	37	5
19207	11650169	2520-01-235-9591	34	1
19207	11650176	5120-01-242-6796	35	2
19207	11650178	2520-01-242-6797	37	1
19207	11650180	5340-01-242-6798	37	6
19207	11650182	6695-01-242-6795	35	1
19207	11650183	2520-01-247-2974	34	17
19207	11650184	5340-01-258-6164	34	23
19207	11650185	2510-01-232-7727	34	25
19207	11650186	2520-01-242-6794	34	13
19207	11650187-1		34	29
19207	11650187-2		34	28
19207	11650188	3130-01-243-3876	34	12
19207	11650190		34	32
19207	11650193	7690-01-239-2312	34	8
19207	11650251	5330-01-249-3091	34	16
19207	11650252		34	2
19207	11650255	2520-01-251-4395	7	24
77060	12020381	5970-01-080-3153	20	39
			21	34
			22	7
72582	120217	5310-00-922-2017	1A	12
90407	12084P11I	5310-00-274-8041	3	28
			6	9
			11	21
			12	28
			12	30
			13	15
			19	6
			24	19
19207	12268021	5120-01-096-3493	38	1
19207	12268036	3940-01-087-0155	36	2
19207	12268037	4910-01-086-1681	36	1
19207	12302107-4	8145-01-115-0442	34	21
19207	12302146	4820-01-115-6463	34	4
19207	12344383	8145-01-266-1104	34	3
19207	12371043	2520-01-397-1074	1	1
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		12	13
72750	141217	5315-01-093-0059	15	40
24617	141223		19	3
24617	141240	5315-00-014-1240	12	7
72582	141242	5315-00-480-4453	11	23
24617	141255		13	12
24617	141262	5315-00-014-1262	11	32

## SECTION IV

**TM9-2520-272-24&P**  
**CROSS-REFERENCE INDEXES**  
**PART NUMBER INDEX**

CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
24617	141275	5315-00-014-1275	31	18
			32	43
24617	145639		22	56
98087	1500PT129	5930-01-207-6350	26	9
24617	159184		20	36
24617	190139	5310-00-088-0553	7	23
24617	221431		22	35A
73342	2222688		22	55
73342	23011456	5330-01-280-5809	17	47
73342	23011475	2840-01-185-0146	17	48
			18	16
73342	23011665	2520-01-146-1034	17	9
73342	23013453	5310-01-162-7707	18	22
73342	23015337		14	29
73342	23015806		1A	5
73342	23015985	5365-01-217-1022	16	1
			18	38
73342	23016014	5330-01-291-5078	10	5
73342	23016564	5330-00-631-8125	7	19
19207	23017800		1	2
73342	23017853	5365-01-217-0856	11	25
73342	23017854	4730-01-214-1560	11	24
73342	23017855	4710-01-214-6839	3	18
73342	23017856	2520-01-220-0119	3	22
73342	23017857	2520-01-214-9340	3	24
73342	23017859	2520-01-214-4317	19	2
73342	23017861	2520-01-213-7763	19	1
73342	23017868		26	1
73342	23017877	3020-01-215-8825	25	36
73342	23017878	3110-01-218-3395	11	11
73342	23017880	5330-01-216-4012	11	4
73342	23017882	5330-01-216-6654	15	32
73342	23017884	2520-01-214-3150	22	14
73342	23017886	2520-01-214-9336	22	12
73342	23017887	5340-01-238-8759	22	46
73342	23017888	5330-01-217-2202	22	16
73342	23017889	5330-01-216-4013	22	45
73342	23017890	4730-01-214-3868	22	41
73342	23017894	5340-01-216-3810	20	2
73342	23017899	5995-01-214-5783	20	37
73342	23017901	5340-01-213-8017	20	32
73342	23017902	4820-01-213-7959	20	34
73342	23017905	4810-01-214-4014	22	39
73342	23017906	4820-01-205-0034	22	53
73342	23017907		22	57
73342	23017908		22	58
73342	23017909	5360-01-216-8210	22	59
73342	23017910	2520-01-214-1615	22	32
73342	23017911		21	13
			22	49
73342	23017912		21	14

## SECTION IV

**TM9-2520-272-24&P**  
**CROSS-REFERENCE INDEXES**  
**PART NUMBER INDEX**

CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
73342	23017912		22	50
73342	23017913	2520-01-214-4408	22	48
73342	23017914	2520-01-214-4409	22	43
73342	23017915	4730-01-215-4323	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	23017920	2520-01-214-4410	22	34
73342	23017921	4730-01-213-8049	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	4820-01-213-8098	22	27
73342	23017927	4730-01-213-8051	22	26
73342	23017928	5330-01-216-4014	22	22
73342	23017929	4820-01-204-9942	22	19
73342	23017930		22	20
73342	23017931	4810-01-198-0504	21	4
73342	23017932		21	5
73342	23017933		21	20
73342	23017934	2520-01-213-8599	21	19
73342	23017935		21	18
73342	23017936	5360-01-216-4462	21	17
73342	23017937	5310-01-216-1368	21	12
73342	23017938		21	10
73342	23017939	5340-01-217-4179	21	23
73342	23017940		21	26
73342	23017941		21	25
73342	23017942	5360-01-216-4463	21	24
73342	23017943		21	9
73342	23017944		21	22
73342	23017945	5330-01-217-7014	21	27
73342	23017946	5340-01-207-3481	21	28
73342	23017947		21	30
73342	23017949	2520-01-220-6737	8	4
73342	23017951		8	6
73342	23017952	3040-01-214-3184	8	8
73342	23017953	5360-01-217-1017	8	7
73342	23017954	3040-01-214-9301	14	24
73342	23017955	3040-01-217-1122	32	3
73342	23017974		25	23
73342	23017975	2520-01-214-7166	25	25
73342	23017976		25	29
73342	23017977	2520-01-214-4318	25	32
73342	23017978	2520-01-214-1614	25	31
73342	23017980	3020-01-214-5787	13	18
73342	23017981	4320-01-213-8028	7	2
73342	23017986	2530-01-213-1625	33	3
73342	23017992	5315-01-220-5201	33	13
73342	23017993	5360-01-216-0830	33	14



## SECTION IV

**TM9-2520-272-24&P**  
**CROSS-REFERENCE INDEXES**  
**PART NUMBER INDEX**

CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
73342	23017994	5365-01-215-9831	33	15
73342	23017995	2520-01-214-9042	33	16
73342	23017996	5360-01-216-6995	33	4
73342	23017998	3010-01-214-9337	14	20
			15	25
73342	23017999	3040-01-214-1607	15	28
73342	23018000	3020-01-214-3845	12	32
73342	23018006	3040-01-198-0501	18	25
73342	23018007		18	26
73342	23018008	3120-01-216-1423	16	14
			17	37
			18	28
			31	36
			32	28
73342	23018009		17	38
73342	23018010	3020-01-198-0689	17	36
73342	23018011	3040-01-198-0506	16	13
73342	23018014	3020-01-198-0690	31	35
			32	26
73342	23018015		31	37
			32	27
73342	23018020	2520-01-198-0498	13	9
73342	23018021	2520-01-214-3855	13	13
73342	23018022	3040-01-214-3175	13	14
73342	23018023	3040-01-214-1604	31	24
73342	23018024	3040-01-214-1605	15	7
73342	23018025	2520-01-214-3157	3	25
73342	23018026		6	7
73342	23018027		10	2
73342	23018028	5365-01-216-5750	10	1
			15	38
			32	45
73342	23018029	2530-01-217-8136	31	11
73342	23018030		31	14
73342	23018031	5315-01-215-7514	11	31
			15	41
			31	17
			32	48A
73342	23018034	5330-01-216-2809	6	4
73342	23018036	5365-01-231-9152	15	45
73342	23018037	2530-01-213-1626	32	42
73342	23018038		32	44
73342	23018039	4730-01-214-2366	32	48
73342	23018042	2520-01-216-8565	14	7
73342	23018044	2520-01-216-8566	4	6
73342	23018046		12	6
73342	23018047	5365-01-217-4079	12	9
			23	6
73342	23018048		12	22
			23	7
73342	23018049	5360-01-216-3265	3	26

## SECTION IV

**TM9-2520-272-24&P**  
**CROSS-REFERENCE INDEXES**  
**PART NUMBER INDEX**

CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
73342	23018049	5360-01-216-3265	12	18
73342	23018050	2520-01-214-1558	12	19
73342	23018051	2520-01-214-1559	12	17
73342	23018052	5315-01-217-2270	12	20
73342	23018053	2520-01-203-9885	12	12
73342	23018054		12	14
73342	23018055	4820-01-205-0035	23	3
73342	23018056		23	4
73342	23018057	5360-01-215-7689	23	5
73342	23018058	2520-01-214-3190	23	2
73342	23018059	5360-01-215-7690	23	1
73342	23018062	2520-01-198-0495	24	1
73342	23018063	4320-01-198-0496	24	12
73342	23018064		24	14
73342	23018065	3040-01-214-3176	24	10
73342	23018066	3020-01-214-9396	24	11
73342	23018067	4320-01-198-0497	24	5
73342	23018068		24	6
73342	23018069		24	8
73342	23018070	3020-01-214-7352	24	4
73342	23018071	3020-01-215-8826	31	63
73342	23018072	5330-01-216-4015	2	7
73342	23018073	5330-01-217-7013	6	3
73342	23018074	3020-01-215-3344	11	16
73342	23018075	2520-01-214-9333	7	7
73342	23018076	5330-01-216-3701	5	1
73342	23018078	2520-01-214-3863	31	39
			32	24
73342	23018079	3040-01-214-5792	31	58
			32	8
73342	23018080	5330-01-216-7424	31	52
73342	23018081	5360-01-216-3269	31	57
			32	11
73342	23018082	2520-01-214-9408	31	49
			32	29
73342	23018083	2520-01-214-3865	31	32
			32	33
73342	23018084		18	37
73342	23018085	5365-01-223-3673	10	4
73342	23018086	2520-01-214-9341	3	27
73342	23018087	4710-01-216-1159	14	28
73342	23018092	3020-01-216-8591	4	4
73342	23018094	2520-01-214-9417	16	5
73342	23018095	3040-01-214-8969	17	32
73342	23018096	3040-01-214-3145	17	2
73342	23018097		17	3
73342	23018098	2520-01-214-3944	18	40
73342	23018099	2520-01-214-3238	17	21
			18	2
73342	23018100	3040-01-214-3861	17	46
			18	15

## SECTION IV

**TM9-2520-272-24&P**  
**CROSS-REFERENCE INDEXES**  
**PART NUMBER INDEX**

CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
73342	23018101	3040-01-214-3860	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
			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	3040-01-214-1606	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

## SECTION IV

**TM9-2520-272-24&P**  
**CROSS-REFERENCE INDEXES**  
**PART NUMBER INDEX**

CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
73342	23018152	3020-01-214-9398	15	18
73342	23018153	3040-01-215-06415	21	
73342	23018154	3120-01-217-2250	15	19
73342	23018155	2520-01-214-9339	33	23
73342	23018156		31	59
			32	7
73342	23018157	3040-01-216-3952	4	8
73342	23018158	3020-01-216-7603	4	11
73342	23018159	3020-01-216-7604	4	10
73342	23018160	3020-01-214-8864	11	13
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	4710-01-214-3241	11	8
73342	23018178	5365-01-217-3076	17	35
73342	23018179	5365-01-017-2652	10	8
73342	23018185		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	23018198	4730-01-214-2369	14	17
73342	23018199	5310-01-216-1367	11	2
			15	30
73342	23018205	4730-00-808-6814	11	26
			15	35
			15	48
73342	23018206	4730-01-221-7138	11	27
			14	2
			20	31
			26	8
73342	23018208	4730-01-214-1502	14	6
73342	23018209	4730-01-213-8030	10	3
			15	34
73342	23018210		15	32C
73342	23018211	4730-01-214-1507	15	37
73342	23018221	5340-01-216-1465	11	3
73342	23018222		19	4
73342	23018225	2520-01-214-3239	17	22
			18	3
73342	23018231	2520-01-216-7648	16	2
73342	23018232	3040-01-214-9300	15	1
73342	23018233	5330-01-221-9177	14	27
			32	49
73342	23018234	5330-01-216-5711	3	23
			33	19

## SECTION IV

**TM9-2520-272-24&P**  
**CROSS-REFERENCE INDEXES**  
**PART NUMBER INDEX**

CAGEC	PART NUMBER	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	23018245	5330-01-216-5702	12	40
73342	23018247	5330-01-216-5703	13	6
73342	23018251		19	5
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	12
73342	23018262	5310-01-216-1370	15	14
73342	23018270		8	9
73342	23018271	5340-01-217-5074	11	35
73342	23018274	5365-01-217-5032	17	7
73342	23018275	2520-01-198-0502	31	40
			32	17
73342	23018276		31	45
			32	19
73342	23018279	5306-01-217-6970	14	10
73342	23018280		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		15	33
73342	23018292	5340-01-216-7640	14	1
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	4820-01-214-3193	20	20
73342	23018615	4820-01-214-3869	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	3040-01-214-3155	20	19
73342	23018753	5330-01-219-2548	3	12
73342	23018960		17	18
73342	23040579	5330-01-219-2546	3	20

## SECTION IV

**TM9-2520-272-24&P**  
**CROSS-REFERENCE INDEXES**  
**PART NUMBER INDEX**

CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
73342	23040580	5330-01-219-2547	3	6
73342	23040581	5330-00-167-5110	4	12
73342	23040582	5330-01-219-2545	3	30
73342	23045026	3040-01-198-0713	11	22
73342	23045027		11	33
73342	23045028		11	36
73342	23045114	5340-01-216-8479	8	2
73342	23045115		18	24
73342	23045116		4	3
73342	23045119		6	1
73342	23045120	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	23045130		2	8
73342	23045131		2	6
73342	23045132		5	2
73342	23045145	2520-01-214-9338	26	4
73342	23045191	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	4730-01-213-7794	19	8
73342	23045269	5360-01-216-0829	20	3
73342	23045303	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	23045405	4710-01-216-6624	3	21
73342	23045406	4710-01-216-6625	3	7
73342	23045407	4710-01-216-6623	3	31
73342	23045408	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		25	16
73342	23045680	5365-01-215-7400	25	18
73342	23045681		25	17
73342	23045682	3120-01-216-3726	25	19
73342	23045683		25	21
73342	23045684	5360-01-216-0831	25	20
73342	23045917	3040-01-222-0265	12	50
73342	23046057	4710-01-238-7100	13	3
73342	23046064	4730-01-238-6996	4	13

## SECTION IV

**TM9-2520-272-24&P**  
**CROSS-REFERENCE INDEXES**  
**PART NUMBER INDEX**

CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
73342	23046074	2520-01-235-9600	18	7
73342	23046075		18	8
73342	23046108	2520-01-261-1715	7	21
73342	23046119	3020-01-214-3935	25	10
73342	23046120	3040-01-214-3915	25	34
73342	23046121	3040-01-214-3916	25	33
73342	23046124		25	14
73342	23046125	2520-01-235-9594	25	11
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	23046430	5330-01-135-3789	10	7
73342	23046537	2520-01-214-9385	31	50
			32	14
73342	23046541	9905-01-253-1276	3	9
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	5365-01-249-4343	10	9
73342	23047191	5340-01-254-6471	16	8
			18	33
73342	23047359	2590-01-214-1563	22	18
73342	23047393	5340-01-257-4369	S	5
73342	23047394	5340-01-258-8531	2	4
73342	23047496	4820-01-286-5644	33	20
73342	23047805	5330-01-251-1931	20	35
73342	23047877	5365-01-259-9642	25	7A
73342	23047905		25	5
73342	23047906	2520-01-251-5491	25	5
73342	23047907	2520-01-251-5490	25	1
73342	23048059		33	5
73342	23048171	5330-01-266-3312	14	25
73342	23048193	2520-01-261-4017	22	15
73342	23048194	4820-01-261-1692	22	33
73342	23048196	2520-01-257-3881	22	5
73342	23048260	5360-01-265-6742	22	35
73342	23048292	5330-01-287-5798	6	4
73342	23048298	3110-01-222-3354	12	41
73342	23048299		12	6
73342	23048300	3040-01-268-7211	12	2
73342	23048301	2520-01-268-7206	12	1
73342	23048310	3040-01-286-0318	6	7
73342	23048455		10	2

## SECTION IV

**TM9-2520-272-24&P**  
**CROSS-REFERENCE INDEXES**  
**PART NUMBER INDEX**

CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
73342	23048456	2520-01-250-1909	16	10
			18	31
73342	23048638	5365-01-272-7479	12	39A
73342	23048639		12	47A
73342	23048640	5365-01-272-1258	12	26A
73342	23048641	5365-01-273-2320	22	29
73342	23048642	5365-01-272-3346	22	29
73342	23048645	4820-01-276-3528	22	36
73342	23049059	5330-01-286-5468	14	26
73342	23049118	5340-01-291-2181	11	38
			14	14
73342	23049119	5340-01-216-1737	11	34
			14	16
			15	43
73342	23049120	5360-01-291-5626	25	30
81487	23601-00160	5310-00-168-6412	21	8
24617	2436161	5310-01-102-3270	20	7
			20	18
24617	273541	5315-01-205-5572	25	15
25617	274517		1A	3
11862	274612	5365-01-196-5636	31	48
			32	30
73342	29501219	5360-01-372-3133	33	14
73342	29501428	4820-01-372-8138	33	9
73342	29502318		1A	6
73342	29503140	2530-01-373-5524	33	3
73342	29503503	3020-01-389-7784	18	5
73342	29503594	5360-01-371-9313	21	17
73342	29505981		7	7
73342	29505983		7	2
73342	29510162		2	8
73342	29510166	3020-01-422-3966	17	23
73342	29510169	3020-01-422-1970	17	29
73342	29510170	3040-01-214-3841	31	61
73342	29510171	3020-01-422-1971	11	20
73342	29510172		31	40
			32	17
73342	29510173		31	41
			32	20
73342	29510174	2530-01-389-7353	31	11
73342	29510175		31	14
73342	29510181	3040-01-422-4102	3	15
73342	29510209	2520-01-422-4101	14	24A
73342	29510211		2	6
73342	29510212	3020-01-422-1972	15	18
73342	29510213	3020-01-420-8039	15	16
73342	29510214	2530-01-213-1626	32	42
73342	29510215		32	44
73342	29510216		32	48B
73342	29510235	4730-01-420-5913	1A	2
73342	29510236	5330-01-420-8736	1A	1



## SECTION IV

**TM9-2520-272-24&P**  
**CROSS-REFERENCE INDEXES**  
**PART NUMBER INDEX**

CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
73342	29510240	3020-01-421-0129	3	17
73342	29510241	5340-01-421-2817	15	32B
73342	29511027		12	6
73342	29511028		12	2
73342	29511029		12	1
73342	29511630		5	2
			5	4
73342	29511850	3020-01-422-4103	3	2
73342	29511851	3020-01-421-0127	3	5
73342	29512607		1	2
73342	29513282	9905-01-423-1611	3	9
73342	29513283	5340-01-421-2819	1A	11
73342	29515106		15	21
73342	29525171		15	32A
73342	29528638		1A	7
73342	29528639		1A	10
73342	29528640		1A	8
77060	2973915	5940-01-082-6615	20	38
			21	33
			22	8
77060	2989521	5940-01-246-2086	20	40
73342	3829139	5306-00-024-6580	21	2
			23	9
			27	37
73342	3909063	5310-01-143-0542	17	52
			18	21
73342	3947086	5330-00-001-4904	16	12
			18	30
54906	40900	5945-01-132-4189	21	32
			22	6
24617	443318	5310-01-112-7932	15	11
24617	443767	5315-00-044-3767	11	30
72582	444335	4730-01-188-3183	3	11
73342	445567	5305-00-400-5542	20	17
63005	445568	5306-00-589-8167	20	9
24617	452692	5340-00-290-4518	11	37
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	455160	5315-01-113-0985	15	20
24617	455531	5305-01-217-4004	4	7
24617	455675		15	8
			31	23
			33	6
72582	455862	5315-01-095-3110	8	5
			20	6
24617	456641		17	5
			17	5
24617	456826	5315-01-216-1504	21	6
24617	457249	3110-00-770-6097	24	7

## SECTION IV

**TM9-2520-272-24&P**  
**CROSS-REFERENCE INDEXES**  
**PART NUMBER INDEX**

CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
24617	457249	3110-00-770-6097	24	13
80201	504260	5330-01-216-4005	8	3
79136	5108-87H	5365-00-080-9091	27	23
3L092	5212WLAB	3110-01-Z73-2329	13	19
80201	544306	5330-01-216-5698	8	10
19207	5703227	2520-01-201-4784	1	1
19207	5703228	2520-01-214-7116	KIT	
73342	5703229	2520-01-214-3846	KIT	
73342	5703230	2520-01-214-3847	KIT	
19207	5703231	2520-01-214-7117	KIT	
			KIT	
19207	5703232	4330-01-214-9303	KIT	
89619	6432-35788-1	4730-00-890-2377	10	6
			14	5
73342	6750199	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	6755007	5365-00-838-8049	18	6
73342	6756606	5340-00-679-9787	3	14
73342	6756778	2520-00-679-6972	7	20
73342	6756782	3120-00-679-7068	9	7
73342	6757428	5340-01-237-2414	25	26
73342	6758036	2520-00-679-6974	9	5
73342	6769636	5310-00-776-7670	11	6
			31	56
			32	9
73342	6769825	5360-00-044-3945	12	21
73342	6770820	5330-00-821-4490	9	3
73342	6770822	5330-00-450-1942	9	4
73342	6770845	2520-00-767-5417	9	2
73342	6771005	5330-01-080-3253	21	7
73342	6774565	2520-00-914-4680	3	10
73342	6778016	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	6831676	2520-00-172-1951	17	39
73342	6831677		17	41
73342	6831679		17	40
73342	6831680		17	43
73342	6832310	3120-01-216-2869	11	28
73342	6832517	5330-00-165-1943	4	1
73342	6832550	5330-01-218-7143	20	41
73342	6832579	5365-01-217-3077	11	15
73342	6833940	5360-01-216-7059	22	51
73342	6833944	5360-01-216-5972	22	47
73342	6833945		21	15
73342	6833991		18	11
			31	42
			32	21

## SECTION IV

**TM9-2520-272-24&P**  
**CROSS-REFERENCE INDEXES**  
**PART NUMBER INDEX**

CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
73342	6833993	5365-00-557-5794	17	13
73342	6834129		17	51
			18	20
73342	6834309		18	9
			31	46
			32	18
73342	6834339	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	6835307	5330-01-258-9151	21	11
73342	6835567		17	15
73342	6836102	5310-01-216-1369	15	4
73342	6836108	5365-01-217-4264	18	41
73342	6836110	5365-01-217-2303	31	47
			32	16
73342	6836111	5365-01-217-1023	11	14
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	5330-01-214-1479	18	23
73342	6836518	2520-01-214-9409	16	4
			18	35
73342	6836547	5365-00-007-2969	17	25
			18	1
			18	14
73342	6836676	5365-01-028-8203	9	1
73342	6836799	5330-01-145-0697	18	17
73342	6837122	4820-01-006-9636	21	16
			22	52
73342	6837389	2520-01-214-3154	20	4
73342	6839375		17	17
73342	6839376		17	42
73342	6839514		18	10
			31	41
			32	20

## SECTION IV

**TM9-2520-272-24&P**  
**CROSS-REFERENCE INDEXES**  
**PART NUMBER INDEX**

CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
73342	6880251	5360-01-079-3097	17	11
73342	6882689	5330-01-080-3254	26	6
73342	6883031	5330-01-083-3065	17	8
73342	6883033	2840-01-079-6700	17	10
73342	6883697	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	6884276	5365-01-217-4263	18	1
73342	6884730	5365-01-171-3392	16	7
			18	34
19207	7707326	5365-00-770-7326	15	27
			31	7
19207	7707842	3110-00-770-7842	7	11
19207	7708035	5310-00-770-8035	33	18
19207	7709601	5360-00-200-6365	12	11
19207	7973325	9905-00-409-8948	34	6
90166	830659	4820-01-238-7961	29	1
90166	830661	2520-01-235-9598	27	8
90166	830663	5340-01-241-4282	27	24
90166	830664	2520-01-235-9597	28	26
90166	830665	2520-01-238-8826	27	4
90166	830666	2520-01-235-9599	27	13
90166	830692	2520-01-238-9843	28	13
			30	18
90166	830710		27	1
90166	830713	2520-01-246-6418	27	22
90166	830724	3040-01-372-5309	30	20
90166	830824	2520-01-255-3350	30	1
19207	8351366	5360-00-736-0271	7	12
19207	8351525		25	27
19207	8351717	3040-00-733-4742	7	8
19207	8351718	3120-00-841-0271	7	9
19207	8351725	2520-00-736-0268	7	10
19207	8355864		22	54
90166	840022	5360-00-909-0313	28	23
			30	10
90166	840023	5310-00-935-9041	28	24
			30	9
90166	840029	3120-00-104-0635	30	5
90166	840035	5340-01-376-4633	29	9
02892	840036	5360-00-169-8367	29	8
90166	840037	5365-00-792-0809	29	1
02892	840146	5365-00-610-6325	29	23
90166	840206		29	28
90166	840297		27	27
90166	840687	5360-01-249-0611	29	13
90166	840726	5360-01-241-3247	29	29
02892	841163	5310-00-562-3932	30	14
90166	841233		29	4
90166	841665	3040-01-241-6851	28	19

## SECTION IV

**TM9-2520-272-24&P**  
**CROSS-REFERENCE INDEXES**  
**PART NUMBER INDEX**

CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
90166	841665	3040-01-241-6851	30	12
90166	842063	4810-01-238-9855	29	14
90166	842171	2520-01-238-8784	29	15
90166	842430		29	5
90166	842448	5340-01-242-7146	27	21
90166	842449	5340-01-244-1473	27	17
90166	842451	5315-01-245-3673	27	18
90166	842461	5310-01-241-2687	27	34
90166	842618	5365-01-245-4124	30	26
90166	842621	5365-01-242-0827	30	16
90166	842623	5307-01-241-5171	30	3
90166	842626	5365-01-242-0828	28	14
90166	842627	5310-01-241-2677	28	31
90166	842632	4710-01-238-8783	27	25
90166	842633	3120-01-241-2851	27	5
90166	842634	2990-01-238-8831	27	32
90166	842635	5310-01-247-8212	27	7
90166	842637	5307-01-241-5172	27	26
90166	842638	5307-01-241-5173	27	19
90166	842639	5360-01-241-3246	27	20
90166	842642	3120-01-241-2850	28	8
			30	31
90166	842648		29	21
90166	842649	5340-01-250-5545	29	9
90166	842650		29	6
90166	842651	2520-01-241-7029	29	11
90166	842653	5365-01-269-2676	29	27
90166	842657	3110-01-241-2943	28	3
90166	842666	5340-01-242-2796	27	33
90166	842669	5360-01-241-3264	27	6
90166	842675	3040-01-241-4695	30	24
90166	842678	3040-01-241-5567	30	6
90166	842679	3040-01-238-8773	28	1
90166	842683		27	14
90166	842684	3040-01-239-6930	30	29
90166	842688	3040-01-235-9644	28	6
90166	842689		28	27
90166	842690	2520-01-234-1898	27	10
90166	842697	2520-01-239-6835	29	16
90166	842702		28	29
90166	842704		29	20
90166	842705		29	3
90166	842742	2520-01-241-5636	28	22
			30	11
90166	842885	3040-01-240-3080	27	11
90166	842894	5310-01-253-5930	27	3
			27	36
90166	842999		30	22
90166	843003	5310-01-280-5798	28	20
			30	33
90166	843009	5310-01-372-3517	28	17

## SECTION IV

**TM9-2520-272-24&P**  
**CROSS-REFERENCE INDEXES**  
**PART NUMBER INDEX**

CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
90166	843088		30	2
90166	843090	5340-01-372-3558	28	16
			30	15
90166	843095	4320-01-372-7368	28	12
			30	19
90166	843141	2520-01-288-1959	29	31
90166	843142		29	30
90166	843211	4320-01-375-8130	30	29
90166	843247	4730-01-375-7411	29	16
90166	850231		29	17
90166	850233		30	32
90166	850236		28	9
73342	8622757		16	15
			18	27
73342	8623102	2840-00-001-4903	16	11
			18	29
73342	8627650	2520-00-557-6619	8	11
90166	870068		28	7
		5315-01-258-1497	30	30
90166	870102	5365-00-498-2864	28	4
			30	27
02892	870103	5365-00-152-0311	28	25
			30	8
90166	870104		30	28A
02892	870115	5330-00-003-0887	27	15
02892	870140	5305-01-097-7827	30	25
90166	870151	5306-01-017-9962	28	18
90166	870181	5306-00-169-8389	30	13
90166	870539	5310-01-246-5785	27	30
90166	870560	5310-01-097-7957	27	16
			29	33
90166	870642	3110-00-554-3248	28	5
			30	28
90166	870647	3110-00-690-8987	30	21
90166	870703	5310-01-241-2676	27	35
02892	870705	5310-01-097-7994	27	2
90166	870709	5310-01-241-2675	27	31
90166	870861	5310-01-329-8189	29	33
90166	870888	5305-00-001-5017	27	39
90166	871049		29	12
90166	871294	2520-01-238-8767	27	29
90166	871298		29	2
90166	871902	5330-01-256-6894	29	26
90166	871904	5330-01-250-0651	29	22
02892	871908	5330-00-152-3049	29	1A
			29	7
90166	871941	5365-01-243-5289	27	12
02892	872492		29	10
90166	872821		29	24
90166	872885		28	30
90166	872992	5305-01-259-2442	29	19

## SECTION IV

**TM9-2520-272-24&P**  
**CROSS-REFERENCE INDEXES**  
**PART NUMBER INDEX**

CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
90166	872994	5305-01-245-8750	29	18
90166	873017	5365-01-247-6952	28	11
			29	34
90166	873173	5315-01-371-8568	28	10
			30	23
90166	893025	2520-01-252-8014	11	17
90166	893038		11	17
02892	940735		28	15
			30	17
24617	9408993	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	38
24617	9409015	5306-01-045-6594	22	3
72582	9409028	5306-00-940-9028	11	10
			15	22
			31	55
			32	10
63005	9409030	5305-01-057-4264	3	29
			6	10
			24	20
			30	34
72582	9409060	5305-01-058-4612	13	10
24617	9409062	5306-00-940-9062	21	37
			22	25
24617	9409067		30	7
24617	9409072	5305-00-206-1533	31	19
			32	35
24617	9409074	5306-01-274-6483	31	3
			32	55
24617	9409076		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	32
72582	9409126	5306-00-543-5696	25	42
83386	9409224	5305-01-126-4076	24	16
			25	2
			32	53
24617	9409225	5305-00-638-2362	24	17
			27	9
73342	9409239	5306-01-085-3876	19	7
24617	9409253	5306-01-216-1334	22	10
24617	9409513	5306-00-896-7228	32	51
24617	9410714	4730-01-214-3112	13	4

## SECTION IV

**TM9-2520-272-24&P**  
**CROSS-REFERENCE INDEXES**  
**PART NUMBER INDEX**

CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
24617	9411180		13	5
24617	9415972	5306-01-215-9129	20	22
24617	9416011	5306-00-843-6398	12	43
			31	1
			32	56
24627	9416484		7	25
24617	9416754		1A	9
24617	9419287	5306-01-263-2018	22	2
			25	4
24617	9421003		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
			13	1A
			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	9425091	5306-01-256-6811	2	2
			5	4
24617	9425094	5306-01-216-3992	15	29
24617	9425096	5306-01-241-5072	25	40
24617	9427637	5306-01-217-2908	8	14
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
24617	9440986	5306-01-216-7364	20	25
			22	9
24617	9440987	5306-01-216-9849	21	31
			22	24



**SECTION IV****TM9-2520-272-24&P  
CROSS-REFERENCE INDEXES  
PART NUMBER INDEX**

<b>CAGEC</b>	<b>PART NUMBER</b>	<b>STOCK NUMBER</b>	<b>FIG.</b>	<b>ITEM</b>
24617	9440988	5306-01-216-7365	22	17
24617	9441598	5306-01-217-3992	8	13
24617	9441599	5306-01-217-2909	8	15
24617	9442435		13	1

**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)	(2)	(4)	(5)
ITEM NUMBER	LEVEL	STOCK NUMBER	DESCRIPTION  U/M
1A	H	8040-00-118-2695	ADHESIVE, SEALANT, SILICONE RTV, NON-CORROSIVE (FOR USE WITH SENSITIVE METALS AND EQUIPMENT), TYPE I, SOFT SPREADABLE THIXOTROPIC PASTE (01139), MIL-A-46146A  OZ
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 (83149), 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

(1)	(2)	(4)	(5)
ITEM NUMBER	LEVEL NUMBER	DESCRIPTION	U/M
13	F	7520-00-973-1059 MARKER, TUBE TYPE, BLACK	DZ
14	F	9150-00-250-0926 PETROLATUM, TECHNICAL (PETROLEUM JELLY) (81348), VV-P-236	LB
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

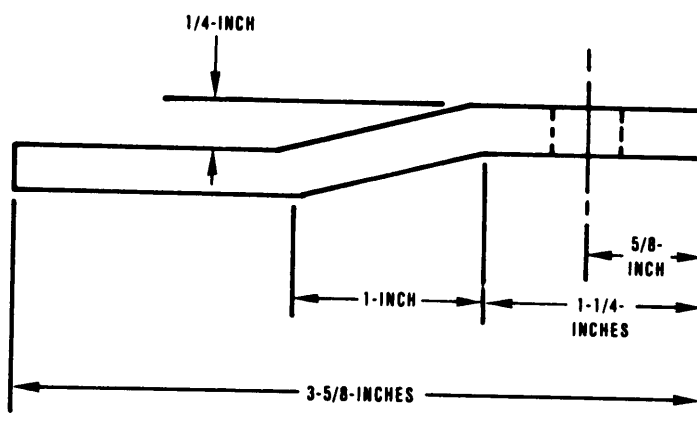
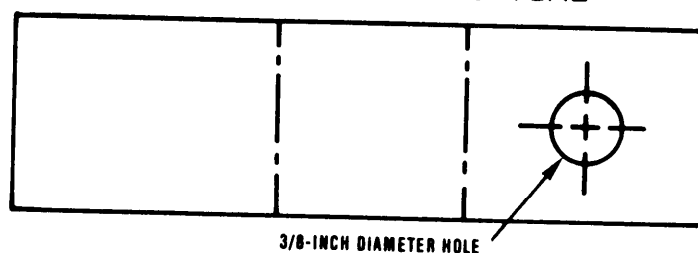
This appendix contains the instructions for making the simple tools used in some maintenance tasks. The tasks requiring the use of these tools have the tool listed under the heading FABRICATED TOOLS. The tools shown in this appendix are listed in paragraph number order.

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

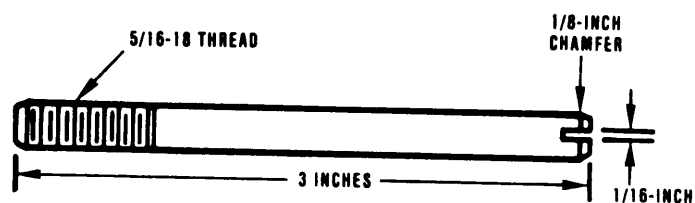


4-14	Install Converter Element Components	
------	--------------------------------------	--

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

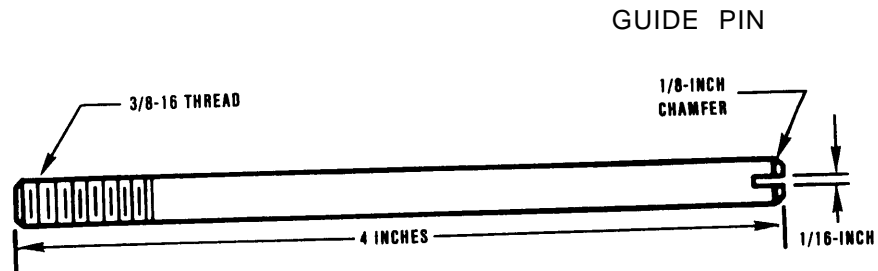


Para. No.	Title	Fabricated Tool
-----------	-------	-----------------

4-15	Install Left End Cover Assembly	
------	---------------------------------	--

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.

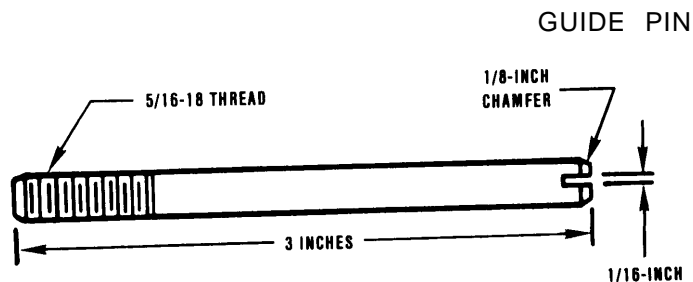
Material: Steel



4-18	Install Transmission Top 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



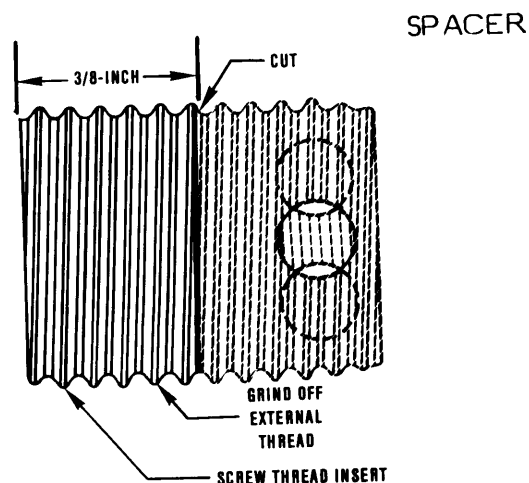
4-23	Repair Center Housing Components	
------	----------------------------------	--

Make spacer from same part number insert as the one to be removed:

9425029	5/16-18 thread
9425031	3/8-16 thread
23018271	1/1-13 thread

Cut a 3/8 inch (10 mm) long section from the undrilled end of the insert. Screw the cut off section onto a bolt and grind off the external threads.

Material: Steel



## GLOSSARY

## Section I. ABBREVIATIONS

## A

ACLDB  
AOAP  
app  
AR  
ATD

Army Central Logistics Data Bank  
Army Oil Analysis Program  
appendix  
Army Regulation, as required  
Allison Transmission Division GMC

## C

C  
CAGEC  
cc  
CCW  
CM  
cont  
CSK  
CT  
CW  
C1  
C2  
C3  
C4  
C5

Celsius  
Commercial and Government Entity Code  
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  
deg  
delta P ( $\Delta P$ )  
dia  
DMWR  
DoD

Department of the Army Pamphlet  
degree  
differential in pressures  
diameter  
Depot Maintenance Work Requirements  
Department of Defense

## E

EA  
ECP  
EIR

each  
Engineering Change Proposal  
Equipment Improvement Recommendations

## F

F  
F AI  
fig  
FISTV  
ft

Fahrenheit  
First Article Inspection  
figure  
Fire Support Team Vehicle  
foot

**G**

GMC	General Motors Corporation
GMI	General Maintenance Instructions
gpm	gallon per minute
GVW	gross vehicle weight
G1	governor 1
G2	governor 2

**H**

h	hour
Hg	Mercury
hp	horsepower

**I**

ID	inside diameter
in.	inch

**K**

kg	kilo gram
km	kilometers
km/h	kilometers per hour
kN	kilonewton
kPa	kilopascals
kW	kilowatt

**L**

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

**M**

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	Newton, neutral
N·m	Newton meter
NSN	National Stock Number

## O

OD	outside diameter
OIP	Overhaul Inspection Procedure

## P

PA	Procuring Activity
PA/CM	Procuring Activity/Commodity Manager
PN (P/N)	part number
P.O.	Post Office
ppm	parts per million
PSA	Preshop Analysis
psi	pounds per square inch
psid	pounds per square inch differential

## Q

QA	Quality Assurance
QA/QC	Quality Assurance/Quality Control
QAR	Quality Assurance Representative
QC	Quality Control
QDR	Quality Deficiency Report
qty	quantity

## R

R	reverse, right, clockwise
ref	reference
REV	reverse
RFD/W	Request for Deviation/Waiver
RH	right hand
RISE	Reliability Improvement of Selected Equipment
rms	root mean square
rpm	revolutions per minute
RPSTL	Repair Parts and Special Tools List
R1C	first range reverse converter
R1L	first range reverse lockup
R2C	second range reverse converter
R2L	second range reverse lockup

## S

SAE	Society of Automotive Engineers
sec	second

**T**

TACOM	U.S. Army Tank-Automotive Command
TAMMS	The Army Maintenance Management System
TB	Technical Bulletin
TC	torque converter
TM	technical manual
TV	throttle valve
typ	typical

**U**

UNF	Unified National Fine Thread
-----	------------------------------

**W**

WOT	wide open throttle
-----	--------------------

**X**

X (X200-4)	Cross-Drive (transmission)
------------	----------------------------

**1**

1C	first range converter
1L	first range lockup

**2**

2C	second range converter
2L	second range lockup

**3**

3C	third range converter
3L	third range lockup

**4**

4C	fourth range converter
4L	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
0	Degree, Temperature or Angular
%	Percent
*	Footnote
* *	Footnote

## INDEX

## A

Adapter Plate/Maintenance Stand	
install	4-13
remove	4-79
Adjusting Link Pin, inner, replace	
left brake	4-194
right brake	4-114
Adjustment, brakes	5-4
Administration Publications	A-1
Analysis Program, oil	3-10
Assemblies, Location and Description of Major	1-4

## B

Bearings	
on spur gears and shafts, left, replace	4-195
removing or installing	3-7
range input drive gear	
install	4-155
remove	4-151
Bevel Gear Assembly	
assemble	4-167
disassemble	4-163
install	4-44
install exterior components	4-167
location of	1-10
remove	4-42
remove exterior components	4-163
Brake Adjustment	5-4
Brake Apply Cam Shaft	
left, install	4-238
left, remove	4-172
right, install	4-134
right, remove	4-109
Brake Apply Cam	
left, install	4-238
left, remove	4-172
right, install	4-134
right, remove	4-104
Brake Apply Indicators	
install	4-144
remove	4-100
Brake Apply Regulator Valve	
body assembly, repair	4-112
components, install	4-143
components, remove	4-99
Brake Apply Shaft	
assembly, left, repair	4-114
left, install	4-144
left, remove	4-101

**B (continued)**

Brake Assembly	
left, install	4-238
left, remove	4-172
right, install	4-130
right, remove	4-104
Brake Coolant Valve Components	
install	4-142
remove	4-99
Brake Support Assembly	
right, install	4-134
right, remove	4-102
right, repair	4-115
left, install	4-238
left, remove	4-172
left, repair	4-191

**C**

Care in Handling Transmission	3-1
Center Housing	
assemble	4-222
disassemble	4-172
left side, location of	1-11
repair	4-212
right side, location	1-12
Checks and Adjustments, final	5-1
Cleaning Transmission and Components	3-2
Clutch Housing Assembly	
forward, repair	4-198
fourth and reverse, repair	4-202
Clutch Piston Housing Assembly, third, second, repair	4-206
Common Tools	3-9
Connectors, electrical, removing or installing	3-7
Container	
transmission	1-14
install transmission	5-9
purpose and description	1-14
remove transmission	4-3
Converter Element Components/Group	
install	4-49
remove	4-35
repair	4-250
Converter Pump Cover Assembly, repair	4-250
Converter Stator, repair	4-251
Cover Assembly, Converter pump, repair	4-250
Cross-reference, nomenclature	1-2

**D**

Data Plate	1-3
Data Transmission	1-13
Disassembly of Transmission into Major Assemblies	4-2
Disassembly, Repair and Assembly of Major Assemblies	4-96
Drag Check, Output Shaft	5-1

**E**

EIR	1-2
End Cover Assembly	
left, assemble	4-155
left, disassemble	4-148
left, install	4-60
left, remove	4-28
left, repair	4-152
right, assemble	4-126
right, disassemble	4-96
right, install	4-70
right, remove	4-20
right, repair	4-119
End Cover Components	
left, repair	4-152
right, repair	4-112
Equalizer Valve Components	
install	4-64
remove	4-26
Equipment Data	1-13
Equipment Improvement Recommendations (EIR)	1-2
Equipment Items Covered	4-1
Errors, reporting	i
Expendable Supplies and Materials List	C-1

**F**

Fabricated Shop Aids, Tools	3-8, D-1
Filter head Assembly, oil	
install	4-62
remove	4-27
Final Adjustments and Preparation for Storage or Shipment	5-1
Forward Clutch Housing Assembly, repair	4-198
Fourth and Reverse Clutch Housing Assembly, repair	4-202
Functions of the Transmission	1-2

**G**

G2 Backup Valve Assembly	
install	4-86
remove	4-10
Gear Assembly, Bevel	
install	4-44
remove	4-42
General Information	1-1
General Maintenance Instructions (GMI)	3-1
Glossary	Glossary-1
GMI	3-1
Governor Body Assembly	
install	4-232
remove	4-181
Governor Drive Gear	
install	4-232
remove	4-181
Governor Screen Assembly	
install	4-81
remove	4-11

**H**

Handling, care in	3-1
Housing Assembly	
Input, install	4-46
Input, remove	4-40
Input, repair	4-160
Center, assemble	4-222
Center, disassemble	4-172
Center, repair	4-212
How to Use This Manual	iv
Hydrostatic Pump and Motor Assembly	
install	4-233
remove	4-179
Hydrostat	
install	4-233
remove	4-179

**I**

Identification Plate, MWO/Overhaul Data Plate	1-3
Idler Gear Assembly	
install	4-222
remove	4-190
replace bearings	4-195
Illustrated list of Manufactured Items	D-1
Indicators, Brake Apply	
install	4-144
remove	4-100



**I (continued)**

Inner Brake Adjusting Link Pin	
replace	4-114, 4-194
Input Housing Assembly	
install	4-46
remove	4-40
repair	4-160
Inspection	3-4
Install Transmission in Container	5-9
Installation of Transmission into Vehicle	1-3
Installing Bearings	3-7
Installing Connectors	3-7
Insulators on Solenoids, Wiring Harness, replace	4-246
Items Covered, Equipment	4-1

**J, K, L**

Left End Cover Assembly	
install	4-60
location of	1-8
remove	4-28
repair	4-152
Left Output Flange	
install	4-158
remove	4-148
Left Side Of Center Housing, location of	1-11
Locally Fabricated Shop Tools, Shop Aids	3-8
Location and Description of Major Transmission Assemblies	1-4
Lockup Control Valve Assembly	
install	4-88
remove	4-9
Loose Components	
left end of center housing, install	4-56
left end of center housing, remove	4-30
right end of center housing, install	4-64
right end of center housing, remove	4-23
Lubrication	3-6

**M**

Main Control Valve Assembly	
install	4-89
remove	4-8
Maintenance	
Forms, Records, Reports	1-1
Instructions, general	3-1
Instructions, supplemental	3-9
Procedures, Organization of	4-1
Stand, Install Transmission on	4-13
Stand, Remove Transmission from	4-73

## **TM 9-2520-272-34&P**

### **M (continued)**

Major Assemblies of the Transmission	1-4
Malfunction, Test or Inspection and Corrective Action	2-2
Mandatory Replacement Parts	3-8
Manufactured Items, illustrated list	D-1
Materials List, expendable	C-1
MWO/Overhaul Data Plate	1-3

### **N**

Nomenclature Cross-reference List	1-2
-----------------------------------	-----

### **O**

Oil Analysis Program for Transmission	3-9
Oil Filter Head Assembly	
install	4-62
remove	4-27
Oil Transfer Plate Assembly	
install	4-81
remove	4-11
replace components	4-247
Operation of the Transmission	1-3
Organization of Maintenance Procedures	4-1
Output Flange	
left, install	4-158
left, remove	4-148
right, install	4-146
right, remove	4-97
Output Pump Drive Gear	
install	4-237
remove	4-177
Output Seal	
left, install	4-156
left, remove	4-149
right, install	4-126
right, remove	4-111
Output Shaft and Seal	
drag check	5-1
left, install	4-156
left, remove	4-149
right, install	4-126
right, remove	4-111

## P

Parts Requirements of Preliminary Procedures	3-8
Parts	
mandatory replacement	3-8
repair	3-8
Piston Housing Assembly, second, third clutches, repair	4-206
Plate Assembly, Oil Transfer	
install	4-81
remove	4-11
Plate, separator	
install	4-81
remove	4-11
Preliminary Inspection, troubleshooting	2-1
Preliminary Procedures, parts requirements	3-8
Preparation for Storage or Shipment	1-1, 5-1
Preservation and Storage	5-9
Pressure Checking Procedures	2-17
Priority Valve Assembly	
install	4-87
remove	4-10
Procedures, maintenance, organization of	4-1
Publications	
administrative	A-1
technical	A-1
Pump Cover Assembly, converter, repair	4-250
Purpose and Description of Container	1-14

## Q,R

Range Input Shaft Components, replace	4-208
Range Pack	
install	4-223
remove	4-182
Receipt of Transmission, service upon	4-2
Records and Reports maintenance	1-1
References	A-1
Regulator Valve, brake apply	
Body Assembly, repair	4-112
Components, install	4-143
Components, remove	4-98
Removal of Transmission	1-3
Removing or Installing Bearings	3-7
Removing or Installing Connectors	3-7
Repair Parts	3-8
Repair Parts and Special Tools List (RPSTL)	B-1
Replacement Parts, mandatory	3-8
Reporting Errors	i
Reverse Clutch Housing Assembly, repair	4-202

**R (continued)**

Right End Cover Assembly	
assemble	4-126
disassemble	4-96
install	4-64
location of	1-7
remove	4-20
Right End Tubes and Loose Components	
install	4-64
remove	4-23
Right Output Flange	
install	4-146
remove	4-97
Right Side of Center Housing, location of	1-12
RPSTL	B-1

**S**

Screen Assembly, Governor	
install	4-81
remove	4-11
Second Clutch Piston Housing Assembly, repair	4-206
Separator Plate	
install	4-81
remove	4-11
Service Upon Receipt	4-2
Shaft Assembly, brake apply, left, repair	4-114
Shaft Components, range input, replace	4-208
Shop Aids and Tools, locally fabricated	3-8
Solenoid Testing Procedures	2-15
Solenoids, replace	4-243
Spare Parts	3-8
Special Tools	3-9
Specifications and Standards	A-1
Specifications, torque	3-7
Standards	A-1
Stator, converter, repair	4-251
Steer and Output Sun Gear, left	
install	4-237
remove	4-177
Steer Control Assembly	
install	4-235
remove	4-179
Steer Gears	
install	4-129
remove	4-108
left, install	4-237
left, remove	4-177

**S (continued)**

Storage of Transmission	5-9
Storage, Shipment, preparation for	1-1
Supplemental Maintenance Instructions	3-9
Supplies List, expendable	1-1
Support Assembly, brake, repair	
left	4-191
right	4-115
Symptom Index, troubleshooting	2-2

**T**

Table of Contents	i
Technical Publications	A-1
Terminals on Solenoids, Wiring Harness, replace	4-246
Test Procedures	
pressure checking	2-17
Solenoid	2-15
Third Clutch Piston Housing Assembly, repair	4-206
Tightening Sequence	3-7
Tools	
common	3-9
special	3-9
Top Components	
install	4-80
remove	4-5
repair	4-243
Top Cover Components, replace	4-247
Torque Converter and Input Housing Assembly, location of	1-9
Torque Specifications and Tightening Sequence	3-7
Transmission	
assembly from Major Assemblies	4-44
data	1-13
disassembly into Major Assemblies	4-2
from Adapter Plate, remove	4-73
from Container, remove	4-3
from Maintenance Stand, remove	4-73
functions	1-2
on adapter plate, install	4-14
on maintenance stand, install	4-13
Operation	1-3
Removal and Installation	1-3
Top Components	
install	4-80
location of	1-6
remove	4-5
repair	4-243

## **TM 9-2520-272-34&P**

### **T (continued)**

Troubleshooting Procedures	2-1
Tubes and Loose Components, right end	
install	4-64
remove	4-23
Turnover Stand	
install transmission on	4-13
remove transmission from	4-73

### **U , V**

Valve Assembly	
G2 backup	
install	4-86
remove	4-10
lockup control	
install	4-88
remove	4-9
main control	
install	4-89
remove	4-8
priority	
install	4-87
remove	4-10
Valve Components	
Brake Apply Regulator	
install	4-143
remove	4-98
Brake Coolant	
install	4-142
remove	4-99
Equalizer	
install	4-64
remove	4-23

### **W , X , Y , Z**

Wiring Harness	
install	4-84
remove	4-7

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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

${}^{\circ}\text{F} - 32 = {}^{\circ}\text{C}$   
 212° Fahrenheit is equivalent to 100° Celsius  
 90° Fahrenheit is equivalent to 32.2° Celsius  
 32° Fahrenheit is equivalent to 0° Celsius  
 ${}^{\circ}\text{C} + 32 = {}^{\circ}\text{F}$

## 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

