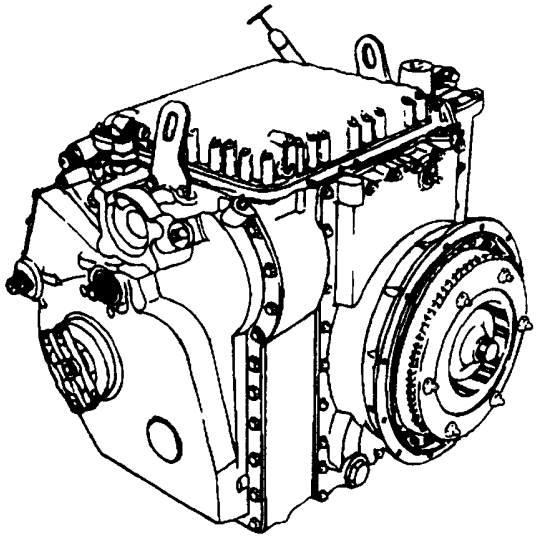
*TM 9-2520-272-34&P

*Supersedes TM 9-2520-272-34&P dated June 1987

TECHNICAL MANUAL

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



CROSS DRIVE TRANSMISSION W/CONTAINER

TRANSMISSION MODEL X200-4 (19207) 5703337 (NSN 2520-01-201-4784) (EIC: N/A)

TRANSMISSION MODEL X200-4A (19207) 12371043 (NSN 2520-01-397-1074) (EIC: N/A)

HEADQUARTERS, DEPARTMENT OF THE ARMY

FEBRUARY 2006

WARNING SUMMARY

This warning summary contains general safety warnings and hazardous materials warnings that must be understood and applied during operations and maintenance of this equipment. Failure to observe these precautions could result in serious injury or death to personnel. Also included are explanations of safety and hazardous materials icons used within the technical manual.

EXPLANATION OF GENERAL SAFETY WARNING ICONS


HEAVY PARTS - Heavy object pinning human figure against wall shows that heavy, moving parts or press, present a danger to life or limb. Object falling on a human figure shows components are heavy can fall and present danger to life and limb.


FLYING PARTICLES - Arrows bouncing off face or face shield shows that particles flying through the air will harm face.

HOT AREA - Hand over object radiating heat shows that part is hot and can burn.

ELECTRICAL - Electrical wire to hand with electricity symbol running through hand shows that shock hazard is present.

MOVING PARTS - Human figure with an arm caught between gears shows that the moving parts of the equipment present a danger to life or limb.

FALLING PARTS - Falling object on foot shows danger of possibility of parts falling.

WARNING SUMMARY – Cont.

EXPLANATION OF GENERAL SAFETY WARNING ICONS – Cont.

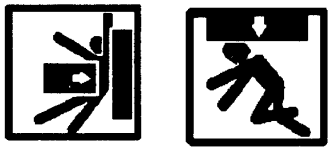
FIRE - Flame shows that a material may ignite and cause burns.

EXPLANATION OF HAZARDOUS MATERIALS ICONS

POISON - Skull and crossbones shows that a material is poisonous or is a danger to life.

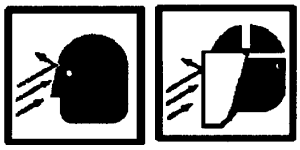
VAPOR - Human figure in a cloud shows that material vapors present a danger to life or health.

GENERAL SAFETY WARNING DESCRIPTION



Heavy Components

Transmission and transmission components are heavy and can crush you. 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. To avoid injury, do not stand under transmission or components when lifting them. The X200-4 Transmission weights 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.



Compressed Air

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

WARNING SUMMARY – Cont.

GENERAL SAFETY WARNING DESCRIPTION – Cont.

Steam

Pressurized steam is specified in cleaning operations that may cause injury to personnel if safety precautions are not followed. Use rubberized gloves, boots, suit, hood, and face shield for protection against burns and scalding.

Heated and Cooled Parts

Procedures specify the heating and cooling of parts to aid in assembly. The heated and cooled parts may cause injury to personnel if hand protection is not worn when handling. Wear protective gloves for maximum protection.

Drill

Use caution when using a drill. Keep hands clear of drill bit. Do not wear loose fitting clothing. Wear safety goggles. Injury to personnel could occur from improper use of drill.

Spring Tension

Parts under spring tension cause injury to personnel. To avoid injury during disassembly, release spring tension slowly. To avoid injury during assembly, apply spring tension slowly. Wear adequate eye protection.

Press

Use caution when using a press. Improper tools or tools not properly aligned may cause injury or death to personnel.

High Voltage

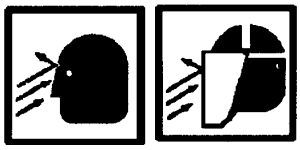
High voltage is used in the operation of test stands. Death on contact may result if personnel fail to observe safety precautions. Do not be misled by the term low voltage. Potentials lower than 50 volts may cause death under certain conditions.

WARNING SUMMARY – Cont.

GENERAL SAFETY WARNING DESCRIPTION – Cont.

Welding

Welding produces fumes and gases that are hazardous and can cause injury. Avoid breathing fumes and gases. Ensure adequate ventilation. Use protective clothing, welding helmet, and eye filter lens. Electrical shock can kill. Do not touch live electrical parts. (Refer to American National Standard Z49.1, Safety in Welding and Cutting).



Container Under Pressure

Air under pressure in the shipping container must be relieved before the container is opened. Serious injury may result if pressure is not safely relieved by opening the air valve before the container is opened.

Bearings

Never dry bearings by spinning them with compressed air. A spinning bearing can disintegrate, allowing balls or rollers to become lethal flying projectiles. Also, spinning bearings while they are not lubricated can damage them.

Rotating Output Flanges

Rotating thrust washer bearings (transmission output flanges) can strike and injure persons too close. Warn personnel to stand clear before starting the engine. Keep all personnel away when the engine/test stand is running. Personal injury or damage to equipment can occur if personnel get in the way of the rotating flanges.

WARNING SUMMARY – Cont.

HAZARDOUS MATERIALS DESCRIPTION

White and Red Lead

White and Red lead is toxic. To avoid injury, do not use white or red lead as a gear marking compound.

Teflon ®

Fumes from burning Teflon can cause serious injury or death. Clutch piston seal rings and step-joint seal rings contain Teflon, do not dispose of them by burning.

Alkaline Solution

Alkaline solution is used in cleaning operations. Avoid contact of alkaline solution with eyes or skin. Contact with skin can cause rash or blisters; scrub with soap and water. Contact with eyes can cause blindness; flush with clean water and get medical attention immediately.

Toxic/Flammable Vapors

Adhesives, solvents, and sealing compounds can burn easily, give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in a well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

Ethyl Alcohol

Ethyl alcohol is poisonous if taken internally. Blindness or death can occur from drinking ethyl alcohol. Get medical attention immediately if taken internally.

Cryogenic

Hand in a block of ice shows that the material is extremely cold and can injure human skin or tissue.

WARNING SUMMARY – Cont.

HAZARDOUS MATERIALS DESCRIPTION – Cont.

Chemical

Drops of liquid on hand shows that material will cause burns or irritation to human skin or tissue.

First Aid

For first aid information, see DA PAM 40-13.

END ITEM LIST

NOMENCLATURE	NSN	TM NUMBER
(M548A3) Carrier, Cargo, Full Tracked	2350-01-369-6081	TM 9-2350-247
(M113A3) Carrier, Personnel, Full Tracked	2350-01-219-7577	TM 9-2350-277
(M577A3) Carrier, Command Post, Light Tracked	2350-01-369-6085	TM 9-2350-277
(M1059A3) Carrier, Smoke Generator, Full Tracked	2350-01-369-6083	TM 9-2350-277
(M1064A3) Carrier, Mortar, 120 MM, Self-Propelled	2350-01-369-6082	TM 9-2350-277
(M58) Carrier, Personnel, Full Tracked	2350-01-418-6654	TM 9-2350-277
(M1068A3) Carrier, Standardized Integrated Command Post System	2350-01-369-6086	TM 9-2350-277
(BMP-2 OSV) Carrier, Personnel, Full Tracked	2350-01-420-4716	TM 9-2350-366

INSERT LATEST CHANGED PAGES / WORK PACKAGES. DESTROY SUPERSEDED DATA.

LIST OF EFFECTIVE PAGES / WORK PACKAGES

NOTE: The portion of text affected by the changes is indicated by a vertical line in the outer margins of the page. Changes to illustrations are indicated by miniature pointing hands. Changes to text are indicated by shaded areas/bars.

Dates of issue for original and changes pages / work packages are:

Original .. 0 .. 14 February 2006

TOTAL NUMBER OF PAGES FOR FRONT AND REAR MATTER IS 50 AND TOTAL NUMBER OF WORK PACKAGES IS 28 CONSISTING OF THE FOLLOWING:

Page / WP No.	*Change No.
Front Cover (2 pgs)	0
Warnings	
End item list (6 pgs)	0
Change transmittal (2 pgs)	0
List of effective pages (2 pgs)	0
Title block	
Table of contents	
How to use this manual (10 pgs)	0
Chap 1 title page (2 pgs)	0
WP 0001 00 (12 pgs)	0
WP 0002 00 (2 pgs)	0
WP 0003 00 (8 pgs)	0
WP 0004 00 (2 pgs)	0
WP 0005 00 (2 pgs)	0
Chap 2 title page (2 pgs)	0
WP 0006 00 (12 pgs)	0
Chap 3 title page (2 pgs)..	0
WP 0007 00 (2 pgs)	0
WP 0008 00 (2 pgs)	0
WP 0009 00 (16 pgs)	0
WP 0010 00 (6 pgs)	0
WP 0011 00 (148 pgs)	0
WP 0012 00 (100 pgs)	0
WP 0013 00 (24 pgs)	0
WP 0014 00 (6 pgs)	0
WP 0015 00 (16 pgs)	0
WP 0016 00 (118 pgs)	0
WP 0017 00 (12 pgs)	0
WP 0018 00 (8 pgs)	0
Chap 4 title page (2 pgs)..	0
WP 0019 00 (12 pgs)	0
WP 0020 00 (2 pgs)	0
WP 0021 00 (116 pgs)	0
WP 0022 00 (10 pgs)	0
WP 0023 00 (10 pgs)	0
WP 0024 00 (4 pgs)	0
WP 0025 00 (4 pgs)	0
WP 0026 00 (4 pgs)	0
WP 0027 00 (4 pgs)	0
WP 0028 00 (4 pgs)	0
Glossary 1 – Glossary 8	0
Index (10 pgs)	0
2028 (8 pgs)	0
Authentication page (2 pgs)	0

* Zero in this column indicates an original page or Work Package.

*TM 9-2520-272-34&P

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 14 FEBRUARY 2006

TECHNICAL MANUAL

CROSS DRIVE TRANSMISSION
W/CONTAINER

TRANSMISSION MODEL X200-4
(19207) 5703337
NSN 2520-01-201-4784 (EIC: N/A)

TRANSMISSION MODEL X200-4A
(19207) 12371043
NSN 2520-01-397-1074 (EIC: N/A)

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS
You can help improve this manual. If you find mistakes or if you know of a way to improve the procedures, please let us know. Submit your DA Form 2028 (Recommended Changes to Equipment Technical Publications), through the Internet, on the Army Electronic Product Support (AEPS) website. The Internet address is http://aeps.ria.army.mil. If you need a password, scroll down and click on "ACCESS REQUEST FORM". The DA Form 2028 is located in the ONLINE FORMS PROCESSING section of the AEPS. Fill out the form and click on SUBMIT. Using this form on the AEPS will enable us to respond quicker to your comments and better manage the DA Form 2028 program. You may also mail, fax or E-mail your letter, or DA Form 2028-2 direct to: Technical Publication Information Office, TACOM-RI, 1 Rock Island Arsenal, Rock Island, IL 61299-7630. The email address is TACOM-TECH-PUBS@ria.army.mil. The fax number is DSN 793-0726 or Commercial (309) 782-0726.

***SUPERCEDURE NOTICE** — Supersedes TM 9-2520-272-34&P 3 June 1987 included all changes**.**

TABLE OF CONTENTS

WP Sequence No.

TABLE OF CONTENTS – Cont.

TABLE OF CONTENTS – Cont.

HOW TO USE THIS MANUAL

SCOPE

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

- You must make yourself familiar with every part of the manual before beginning any troubleshooting or maintenance assignments.
- It is particularly important for you to understand and remember the contents of Chapter 2, General Maintenance Instructions, before doing any work on the transmission.
- You must familiarize yourself with the entire maintenance procedures before beginning the maintenance task.

FOLLOWING 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 following 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 Work Package number where each begins. These main subjects are made up of Chapters, 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 Work Package numbers. For example, the Table of Contents shows Chapter 1, INTRODUCTORY INFORMATION FOR X200-4/4A TRANSMISSION. When you go to the beginning of Chapter 2 (WP 0006), you will find an index guiding you to all of the topics within the Work Package.

INTRODUCTION

The introduction (WP 0001) to the manual provides you with general information about the transmission. WP 0002 and WP 0003 pictorially identify 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 will usually provide the formal name for the part as shown in the RPSTL.

HOW TO USE THIS MANUAL – Cont.

INTRODUCTION – Cont.

For example, the name used by the 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 (WP 0001) 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 (WP 0004) provides particulars about the transmission such as input horsepower, ratios of forward and reverse ranges, oil capacity and transmission weight, and Useable on Codes (UOC).

GENERAL MAINTENANCE INSTRUCTIONS

Chapter 2. General Maintenance Instructions (GMI), provides general instructions which are applicable to all areas of transmission maintenance.

Maintenance instructions, in the GMI, are used repeatedly throughout all of your work on the transmission. Most of the instructions in the GMI are not repeated in Chapter 3, 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 3. The difference is that procedures in Chapter 3 are provided for you where needed. You will have to apply Chapter 2 procedures to Chapter 3 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 3 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 3.

HOW TO USE THIS MANUAL – Cont.

TRANSMISSION MAINTENANCE PROCEDURES

Maintenance procedures in Chapter 3 begin with WP 0007. The Work Packages 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.
- Assembling the transmission from major assemblies.
- Disassembling, repairing and assembling the major assemblies.

The Table of Contents will guide you to the Work Package for each procedure. Procedural Work Packages are numbered in sequence throughout Chapter 3. A Work Package number and the name of a major maintenance procedure identify each Work Package.

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

COMMON TOOLS

The initial setup of each task provides a list of COMMON TOOLS you will need to perform the task. These common tools are listed by description or by tool set in which they may be found.

SPECIAL TOOLS

When required, special tools are listed by noun, manufacturer's code (Commercial and Government Entity Code), (CAGE)), and manufacturer's part number.

FABRICATED TOOLS

When locally manufactured fabricated tools are required, they are listed by noun and referenced to WP 0027 of the manual where instructions, for making the tools, are provided.

REPAIR PARTS

All repair parts are listed in Chapter 4, Supporting Information, Repair Parts and Special Tools List, (RPSTL). In addition, mandatory replacement parts are listed under Mandatory Replacement Parts in Table 1, within each Work Package, when required. A complete list of Mandatory Replacement Parts can be found in Mandatory Replacement Parts List, WP 0026.

EXPENDABLE AND DURABLE ITEMS

Expendable and durable items are listed in the Expendable and Durable Items List, WP 0024. Each supply item is referenced to the Expendable and Durable Items List, where all expendables are listed. For example, the notation "(WP 0024, Item 8)" following the name of a supply item means that the description of the item is located on the list of expendable items, WP 0024, under Item 8.

HOW TO USE THIS MANUAL – Cont.

SPECIAL CONDITIONS

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 step. When you go back to the Work Package shown in PRELIMINARY PROCEDURES, you will find another preliminary procedure in that Work Package. This arrangement of cross-referencing Work Package with preliminary steps continues in sequence until you get back to the very first Work Package required.

Additional procedures, which must be accomplished after your assigned Work Package has been completed, are shown under FOLLOW-ON PROCEDURES. For example, after each “remove” step, the equivalent “install” step will be shown on FOLLOW-ON PROCEDURES, identified by Work Package.

When repairable parts are removed, a REPAIR reference is entered beneath the removal procedure directing you to the Work Package where repair instructions are provided.

FINAL ADJUSTMENTS AND PREPARATION FOR STORAGE AND 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 4 (WP 0019). (Final brake adjustment and steering adjustment are performed by Organization maintenance after the transmission has been installed in the vehicle).

Chapter 3 (WP 0009) contains procedures to enable you to remove and install the transmission from and into the container in preparation for maintenance, storage or shipment.

REFERENCES TO OTHER PUBLICATIONS

Chapter 4 (WP 0020), provides a reference list of other manuals or publications, which may provide additional information for your maintenance tasks.

REPAIR PARTS AND SPECIAL TOOLS LIST

Chapter 4 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 in INTRODUCTION (WP 0021) 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 Cross Reference Lists, NSN Index (WP 0022), locate the NSN and obtain the Figure and Item Numbers shown for that NSN. Next, go to the figure in the RPSTL. Parts are grouped by function and they are illustrated in consecutively numbered figures.

HOW TO USE THIS MANUAL – Cont.

REPAIR PARTS AND SPECIAL TOOLS LIST – Cont.

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 Source Maintenance and Recovery Code (SMR code), CAGE code, manufacturer's part number, name of the part, and quantity used.

For example, suppose that you know the NSN of a part is 5325-00-079-2212 and you need more information about that part.

Go to WP 0022 and find 5325-00-079-2212 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 Stock Number 5325-00-079-2212 and see 15 in the FIG. column and 5 in the ITEM column.

Go back to Chapter 4 where parts are illustrated and locate the illustration with "Figure 15. Right Hand End Cover and Brake Apply Cam Shaft" under the picture. Find Item 5 in the illustration and see if it looks like the part you want. If Item 5 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 5325-00-079-2212.

If the part shown for Item 5 looks like the part you want, go to column (2) for SMR Code. The SMR Code is to the right of item number 5. To the right of PAHZZ (in column (4)) is CAGE code 73342. To the right of 73342 is part number 6751633. To the right of 6751633 is the part name: Ring, Retaining. 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, (6751633), locate the manufacturer's part number in the Part Number Index (WP 0064). Look to the right of your Part Number and see 15 in the FIG. column and 5 in the ITEM column. You now need to locate in Chapter 4, Figure 15, and Item 5 in the illustrated parts list.

Usable On Code. The X200-4 and X200-4A Transmissions are identified by a Usable On Code (UOC) in the RPSTL. XTZ is the UOC for the X200-4 Transmission. X4A is the UOC for the X200-4A Transmission. On each RPSTL text page, under (6) Description and Usable on Codes (UOC), you will find the UOC for the part, if applicable. If no UOC is listed, the part is used in both the X200-4 and X200-4A Transmissions.

EXPENDABLE SUPPLIES AND MATERIALS LIST

WP 0024, Expendable and Durable Items List, lists petroleum, 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 WP 0024. For example, "(WP 0024, Item 8)."

HOW TO USE THIS MANUAL – Cont.

ILLUSTRATED LIST OF MANUFACTURED ITEMS

WP 0027, Illustrated List of Manufactured Items, 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 Work Package, such as “(WP 0027 Item 1)”.

WP 0027 contains procedures and illustrations to manufacture the required part. A reference is provided to show the maintenance procedures where the tool will be used.

STANDARD TORQUE SPECIFICATIONS

This work package provides a reference of standard torque specifications used for standard bolts used in the maintenance and repair of the X200-4/4A Transmission and it’s metal storage and shipping container. These values are provided as a reference and are not to override or change specific torque values given in the maintenance work packages. In some applications a non-standard torque may be specified in the maintenance work package.

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.

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.

END OF WORK PACKAGE

CHAPTER 1

INTRODUCTORY INFORMATION FOR X200-4/4A TRANSMISSION

GENERAL INFORMATION 0001 00

THIS WORK PACKAGE COVERS:

This Work Package provides general information about the X200-4/4A Transmission and Container.

SCOPE

This manual addresses Direct Support and General Support Maintenance and Repair Parts and Special Tools List (RPSTL). Organizational Maintenance tasks are addressed as necessary. This manual is provided for the Allison, X200-4 and X200-4A Hydromechanical Cross Drive Transmission. The purpose of this equipment is to transmit power from the engine to the final drive. The transmission provides steering and braking for the vehicle. The X200-4/4A Transmission is part of the vehicle drive system for the M113 Family of Vehicles.

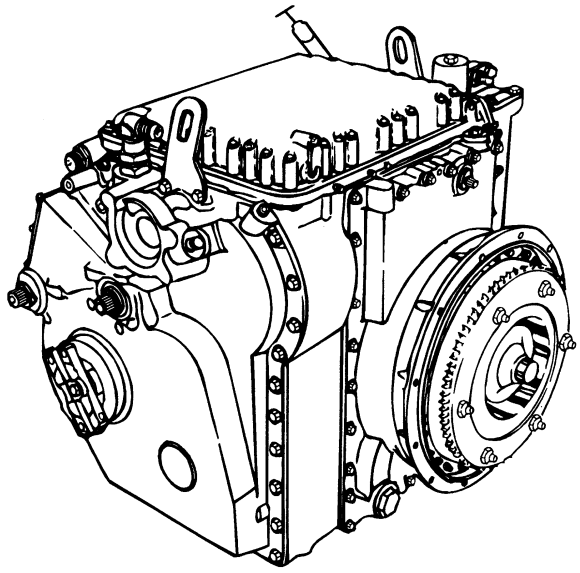


Figure 1. Hydromechanical Cross Drive Transmission, Model X200-4A, Right Front External View.

ITEMS COVERED IN THIS WORK PACKAGE **PAGE**

MAINTENANCE FORMS, RECORDS, AND REPORTS

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

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 and Armaments Command
6501 E. 11 Mile Rd.
Attn: AMSTA-IM-ACA
Warren, Michigan 48397-5000

We'll send you a reply.

PREPARATION FOR STORAGE OR SHIPMENT

Prepare the transmission for storage or shipment per instructions in WP 0009 of this manual.

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).

Common Name	Official Nomenclature
Cam shaft	Control cam
Clutch backing plate	Clutch disk
Dipstick	Oil Level Indicator
External-tanged clutch plate	Clutch disk
Filter-in tube	Metallic tube
Filter-out tube	Metallic tube
Friction-faced clutch plate	Clutch disk
Helical coil insert	Screw thread insert
Hydrostat	Hydrostatic pump and motor assembly
Internal-splined clutch plate	Clutch disk
Lube tube	Metallic tube
Petroleum jelly	Petrolatum
Range input shaft	Shouldered shaft
Reaction plate	Clutch disk
Scavenge tube	Metallic tube
Sump communication tube	Metallic tube
Thrust washer	Thrust washer bearing

LIST OF ABBREVIATIONS/ACRONYMS

This list provides common Abbreviations and Acronyms used in this manual.

Abbreviation/Acronym	Definition
	A
A	Anode
ACLDB	Army Central Logistics Data Bank
AG	Adjutant General
AMC	Army Materiel Command
AMSTA	Army Materiel Sub Command Tank Automotive
AOAP	Army Oil Analysis Program
App	Appendix
AQL	Acceptable Quality Level
AR	Army Regulation
ASSY	Assembly
ASTM	American Society for Testing and Materials
AT	Allison Transmission, General Motors
	B
BK	Brake

LIST OF ABBREVIATIONS/ACRONYMS – Cont.

Abbreviation/Acronym	Definition
	C
°C	Degrees Celsius, Centigrade
C	Cleaning
C	Compound
C	Container
CAGE	Commercial and Government Entity Code
CARC	Chemical Agent Resistant Coating
CC	Cubic Centimeters
CCW	Counterclockwise
CD	Cross Drive
CM	Centimeter
CM	Commodity Manager
COMP	Compression
CON	Converter
CONT.	Continued
Cont.	Continued
CONV	Converter
CPC	Corrosion Prevention Control
CSK	Countersunk
CT	Closed Throttle
CTA	Common Table of Allowances
CW	Clockwise
CYL	Cylinder
CYLIN	Cylindrical
C1	Forward Clutch
C2	Fourth and reverse clutch
C3	Third Clutch
C4	Second Clutch
C5	First Clutch
	D
D	Dehydrating
DA	Department of the Army
DA PAM	Department of the Army Pamphlet
Deg	Degree
Delta P (Δ P)	Differential Pressure
DESCOM	Depot System Command
DESCOM-R	Depot System Command-Regulation
DIA	Diameter
DMWR	Depot Maintenance Work Requirement
DOD	Department of Defense
DoDISS	Department of Defense Index of Specifications and Standards
DSN	Defense Switched Network
	E
ENAM	Enamel

LIST OF ABBREVIATIONS/ACRONYMS – Cont.

Abbreviation/Acronym	Definition
ET	Ethyl
EA	Each
ECP	Equipment Change Proposal
E.G.	For Example
EIC	End Item Code
EIR	Equipment Improvement Recommendation
E-MAIL	Electronic Mail Transmittal
ETC.	Et Cetera
	F
°F	Degrees Fahrenheit
F	Fluorescent
FAI	First Article Inspection
FAX	Facsimile Transmittal
Fig	Figure
FIR	Final Inspection Record
FPM	Ferrous Parent Material
FT	Foot
	G
G	Grease
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
I	Inhibitor
I	Inspection
ID	Inside Diameter
IN	Inch
INSP	Inspection
	J-K
KG	Kilogram
KM	Kilometers
KM/H	Kilometers per Hour

LIST OF ABBREVIATIONS/ACRONYMS – Cont.

Abbreviation/Acronym	Definition
KN	Kilonewton
kPa	Kilopascals
KW	Kilowatt
	L
L	Left, Counterclockwise
L	Lubricating
L	Lumber
LB	Pound
LB-FT	Pound Feet
LB-IN	Pound Inch
LH	Left Hand
LPM	Liters per Minute
LTR	Letter
LU	Lockup
Lube	Lubrication
	M
M	Magnetic
MAX	Maximum
MEL	Maintenance Expenditure Limit
MI	Michigan
MIL	Military
MIL	Military (specification)
MIL-STD	Military Standard
MIN	Minimum
MM	Millimeter
MPH	Miles per Hour
MS	Military Standard
MTOE	Modified Table of Organization and Equipment
MWO	Modification Work Order
	N
N	Newton
NFPM	Non Ferrous Parent Material
N·m	Newton-Meter
NO.	Number
NSN	National Stock Number
	O
OD	Outside Diameter
OIP	Overhaul Inspection Procedure
ORD	Ordnance

LIST OF ABBREVIATIONS/ACRONYMS – Cont.

Abbreviation/Acronym	Definition
	P
&P	(Including Repair Parts and Special Tools Lists)
P	Packaging
P	Paint
P	Phosphate
P	Preservation
P	Primer
PA	Procuring Activity
PA/CM	Procuring Activity/Commodity Manager
PAM	Pamphlet
PARA.	Paragraph
PG	Page
P/N	Part Number
P.O.	Post Office
PPM	Parts per Million
PRF	Performance
PSA	Preshop Analysis
PSI	Pounds per Square Inch
PSID	Pounds per Square Inch Differential
PSIG	Pounds per Square Inch Gauge
	Q
QA	Quality Assurance
QA/QC	Quality Assurance/Quality Control
QAR	Quality Assurance Requirements
QA REQ	Quality Assurance Requirements
QC	Quality Control
QDR	Quality Deficiency Report
QT	Quart
QTY	Quantity
	R
Ref	Reference
REF LTR	Reference Letter
Reg	Regulation
REV	Reverse
RFD/W	Request for Deviation/Waiver
RH	Right Hand
RISE	Reliability Improvement of Select Equipment
RMS	Root Mean Square
RPM	Revolutions per Minute
RPSTL	Repair Part and Special Tools List
R1C	First Range Reverse Converter
R1L	First Range Reverse Lockup
R2C	Second Range Reverse Converter
R2L	Second Range Reverse Lockup

Abbreviation/Acronym	Definition
	S
S	Sealing
S	Silicone
SAE	Society of Automotive Engineers
Sec	Second
SEQ	Sequence
SF	Standard Form
SPEC	Specification
STD	Standard
	T
TACOM	Tank-automotive and Armaments Command
TAMMS	The Army Maintenance Management System
TB	Technical Bulletin
TC	Torque Converter
TEMP	Temperature
THR	Thrust
TM	Technical Manual
TMDE	Test, Measurement, and Diagnostic Equipment
TRANS	Transmission
TT	Federal Specification
TV	Throttle Valve
Typ	Typical
	U
UNC	Unified National Coarse Thread
UNF	Unified National Fine Thread
U.S.	United States
U.S.C.	United States Code
	V
VIA	By way of
	W
W/	With
WOT	Wide Open Throttle
WP	Work Package
	X
X (X200)	Cross Drive Transmission

LIST OF ABBREVIATIONS/ACRONYMS – Cont.

Abbreviation/Acronym	Definition
	Y-Z
	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

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.

TRANSMISSION OPERATION

Transmission operating procedures are included in vehicle operation manuals. Refer to TM 9-2350-247-10 or TM 9-2350-277-10.

TRANSMISSION TROUBLESHOOTING

Transmission troubleshooting procedures are included in vehicle operation manuals. Refer to TM 9-2350-247-20 or TM 9-2350-277-20.

TRANSMISSION REMOVAL AND INSTALLATION

Procedures to remove and install the transmission are included in vehicle maintenance manuals. Refer to TM 9-2350-247-34 or TM 9-2350-277-34.

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 PLATE, MWO/OVERHAUL DATA PLATE.

Replace Identification, MWO/Overhaul Data Plate. Refer to Repair Center Housing Components, WP 0016, for instructions on how to remove or install the identification plate.

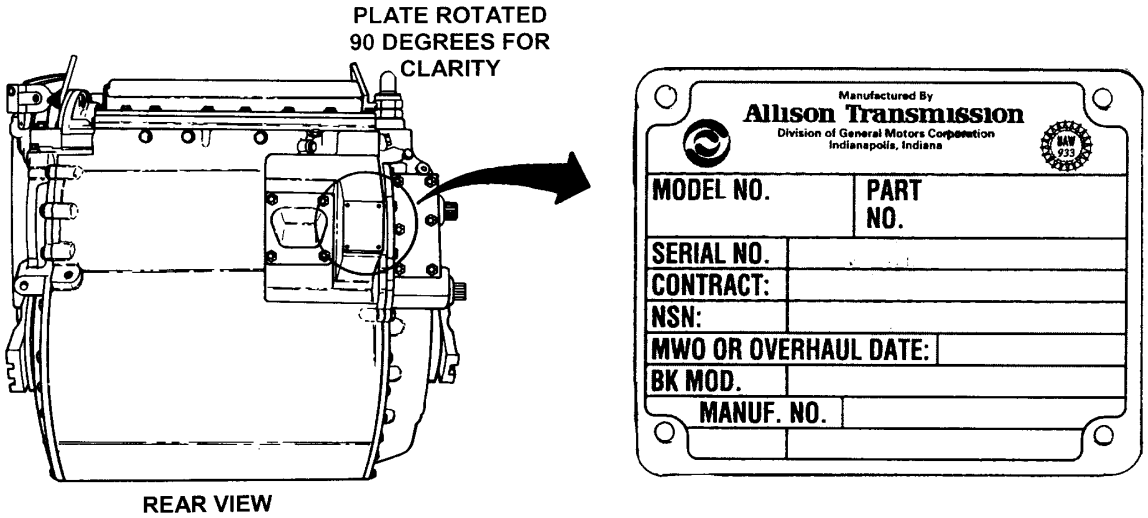


Figure 2. Location and View of Identification Plate.

GENERAL INFORMATION - Cont. 0001 00

USABLE ON CODE

Usable On Code. The X200-4 and X200-4A Transmissions are identified by a Usable On Code (UOC) in the RPSTL. XTZ is the UOC for the X200-4 Transmission. X4A is the UOC for the X200-4A Transmission. On each RPSTL text page, under (6) Description and Usable on Codes (UOC), you will find the UOC for the part, if applicable. If no UOC is listed, the part is used in both the X200-4 and X200-4A Transmissions.

END OF WORK PACKAGE

LOCATION AND DESCRIPTION OF MAJOR TRANSMISSION ASSEMBLIES 0002 00

THIS WORK PACKAGE COVERS:

This Work Package provides general information about the location and description of the transmission major assemblies.

SCOPE

General knowledge of the description, location, interaction, and function of the transmission major assemblies is imperative in the performance maintenance functions. General knowledge of the major assemblies will also assist in the ability to identify repair parts.

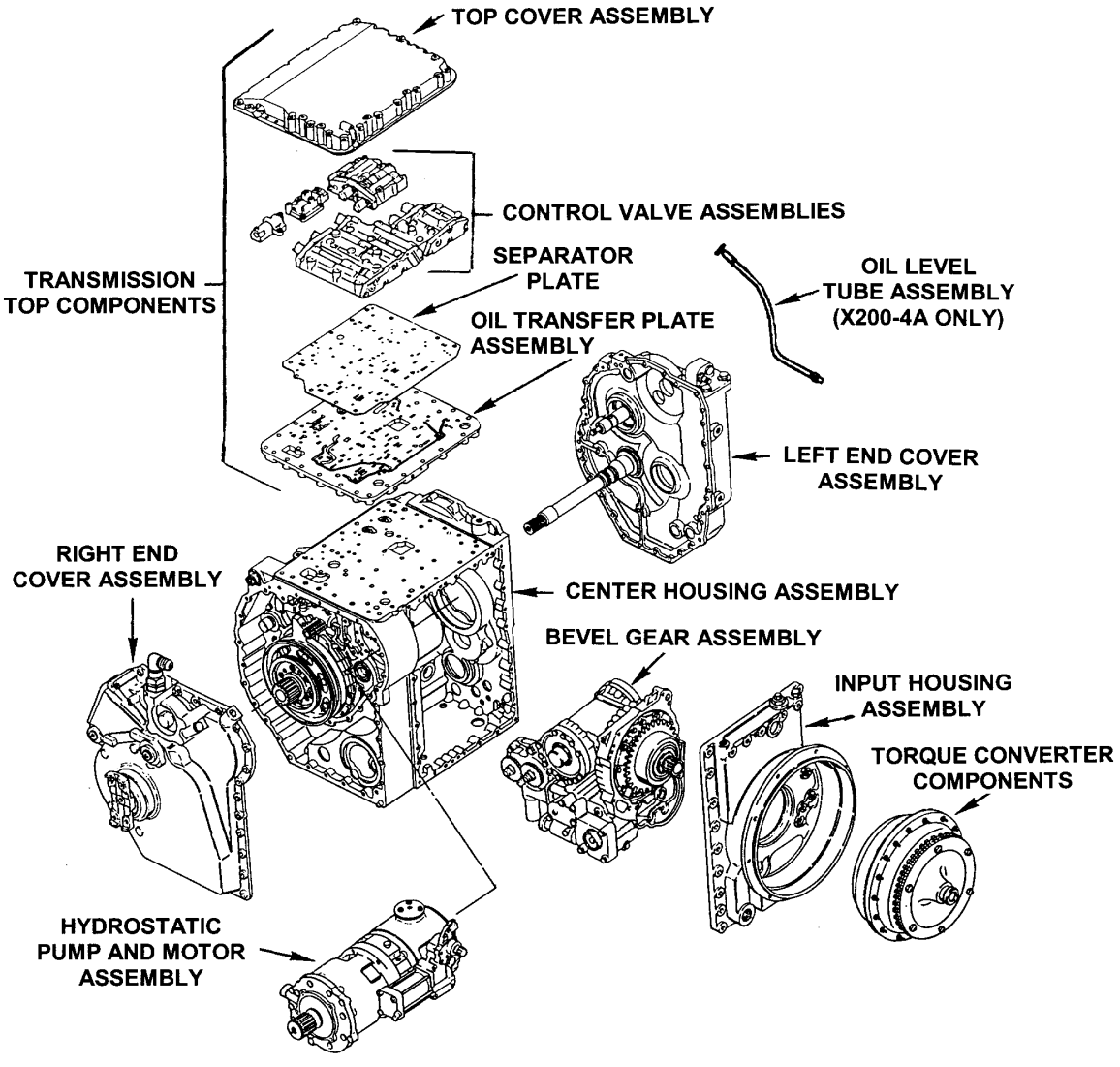


Figure 1. Major Assemblies of the Transmission.

LOCATION AND DESCRIPTION OF MAJOR TRANSMISSION ASSEMBLIES – Cont. 0002 00

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. Includes 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. Channels 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 Trubine Assembly. The engine through the flywheel drives the Pump Assembly. The Trubine 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.

END OF WORK PACKAGE

LOCATION OF MAJOR ASSEMBLIES 0003 00

THIS WORK PACKAGE COVERS:

This Work Package provides general information about the location and description of major assemblies.

SCOPE

General knowledge of the description, location, interaction, and function of the major assemblies is imperative in the performance maintenance functions. General knowledge of the major assemblies will also assist in the ability to identify repair parts. This Work Package addresses; Transmission Top Components, major components of the Right End Cover Assembly, major components of the Left End Cover Assembly, major components of the Torque Converter and Input Housing Assembly, major components of the Bevel Gear Assembly, major components of the Center Housing Assembly, left side, and major components of the Center Housing Assembly, right side.

LOCATION OF MAJOR ASSEMBLIES – Cont. 0003 00

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 Center Housing Assembly, beneath transmission Top Components.

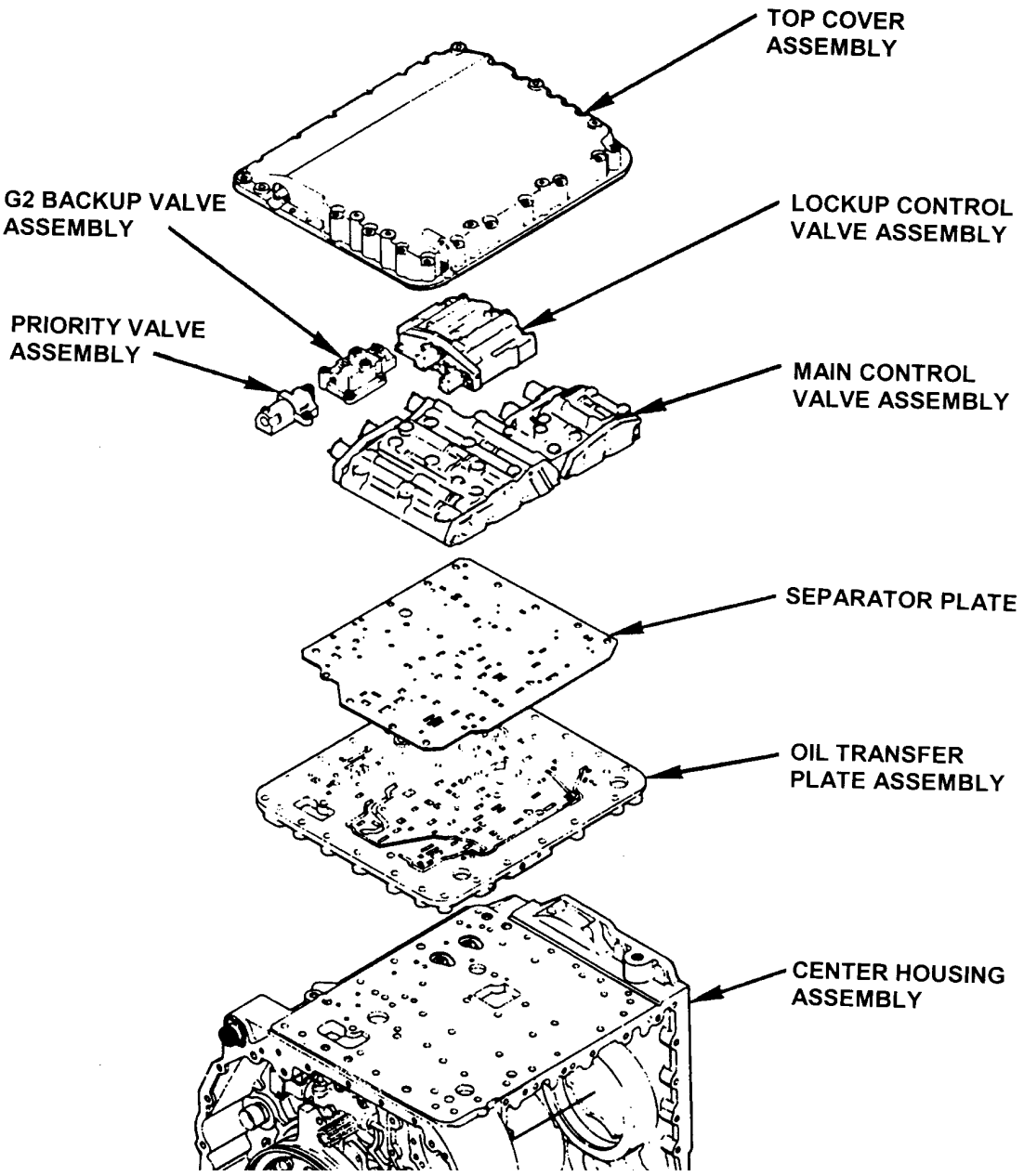


Figure 1. Exploded View of Major Top Components.

LOCATION OF MAJOR ASSEMBLIES – Cont. 0003 00

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.

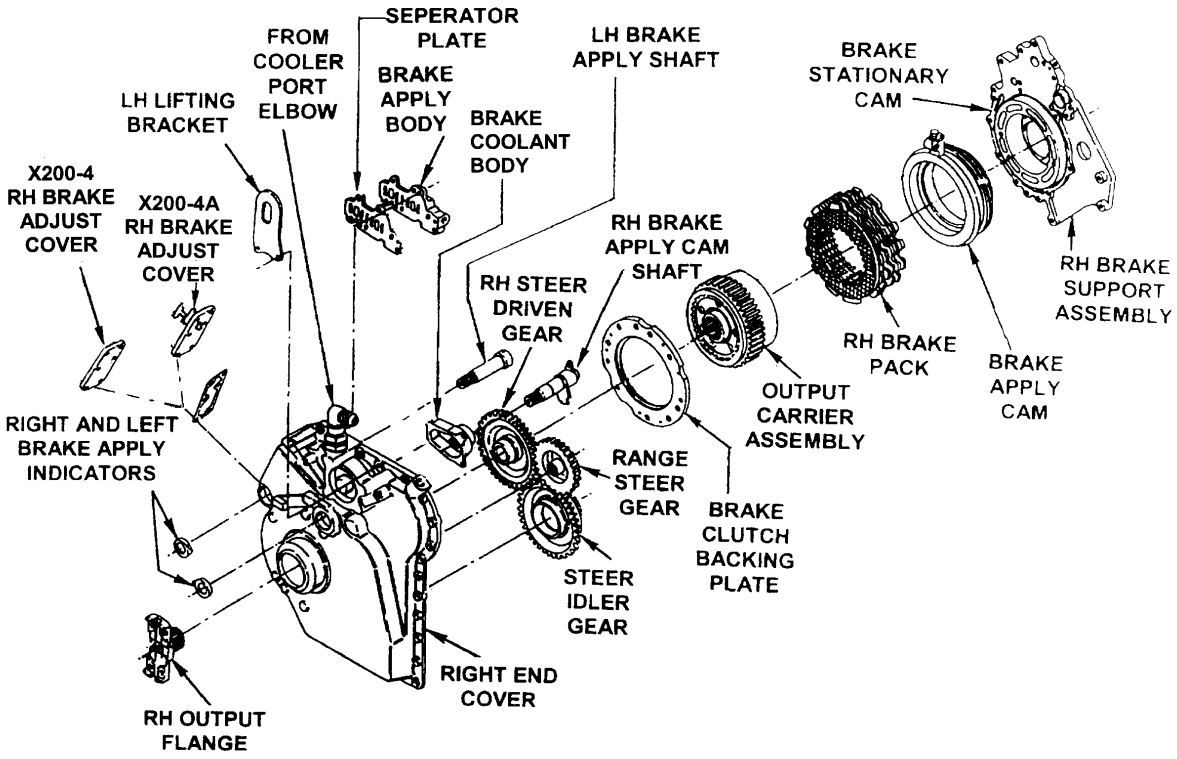


Figure 2. Exploded View of Major Components Right End Cover Assembly.

LOCATION OF MAJOR ASSEMBLIES – Cont. 0003 00

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.

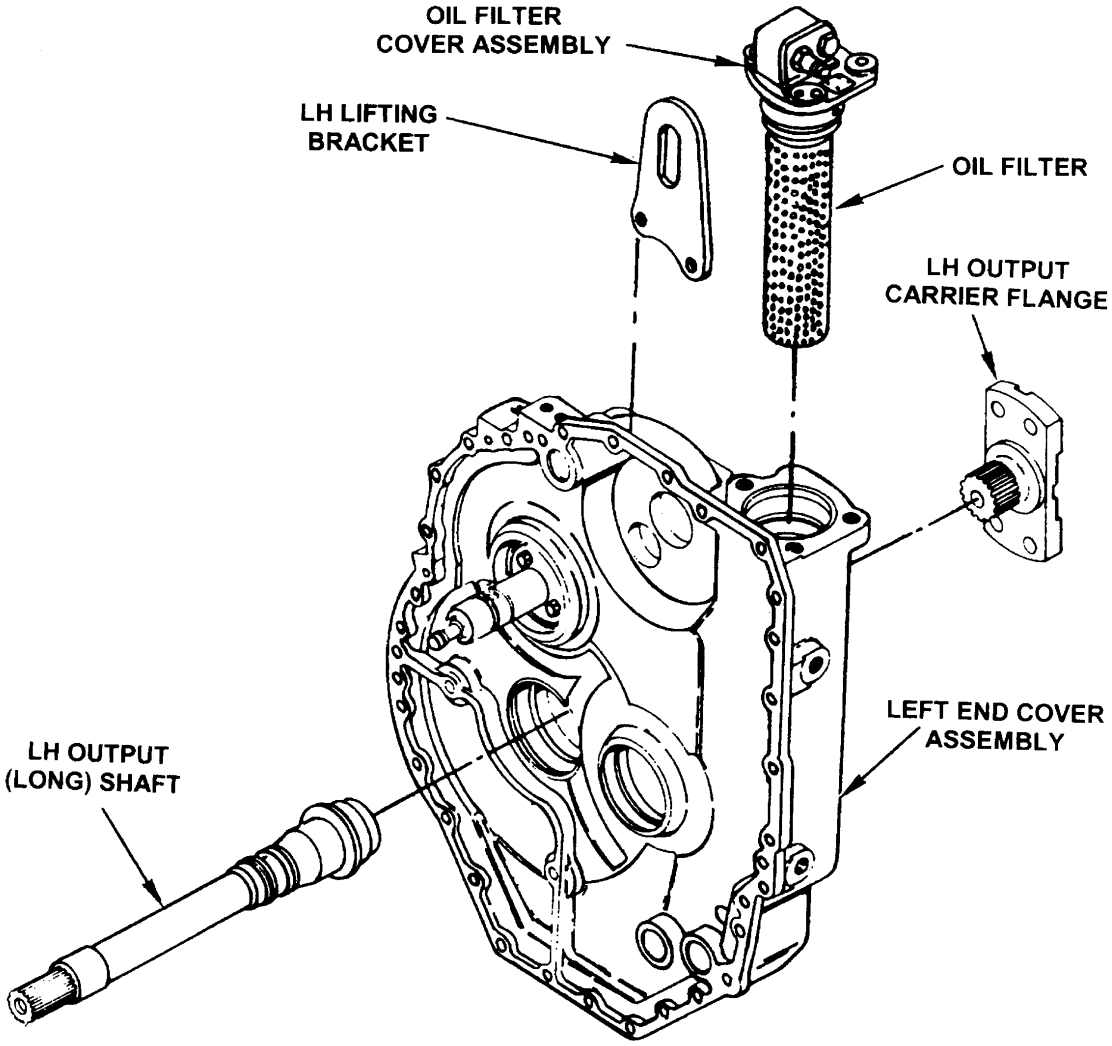


Figure 3. Exploded View of Major Components Left End Cover Assembly.

LOCATION OF MAJOR ASSEMBLIES – Cont. 0003 00

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 Turbine Shaft extends from the Bevel Gear Assembly through the Input Housing and into the Torque Converter. This Turbine Shaft transmits power from the Torque Converter to the Bevel Gear Assembly.

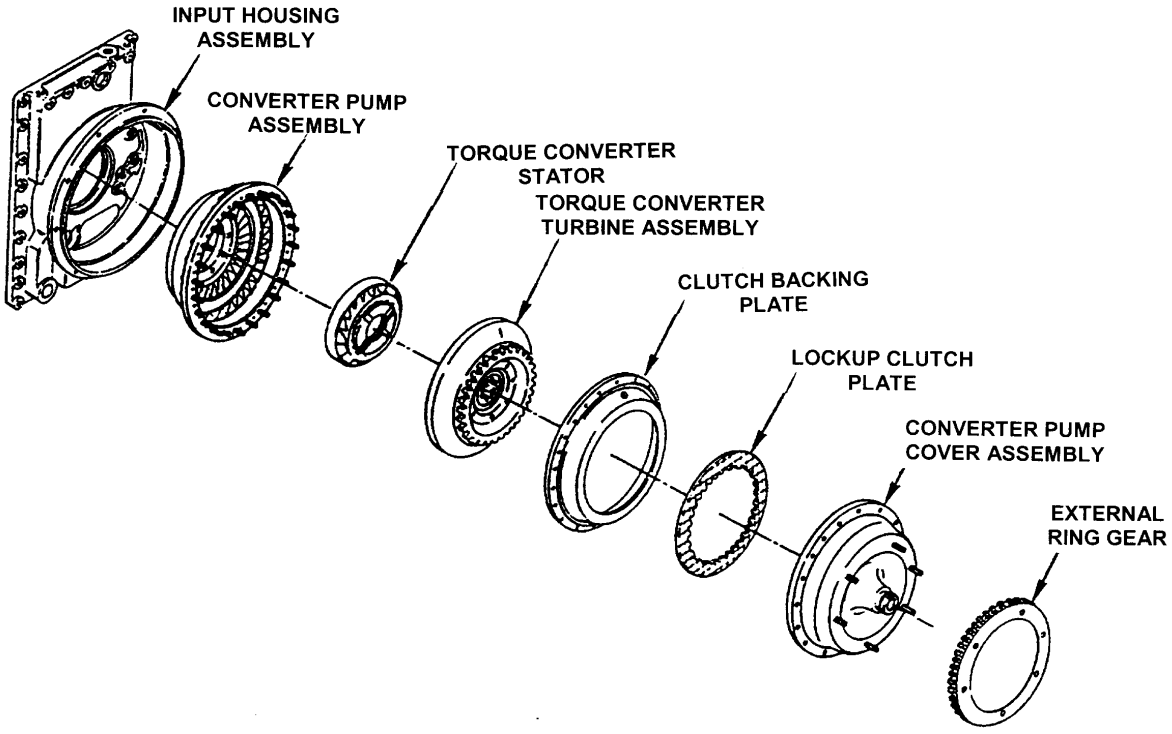


Figure 4. Input Housing and Exploded View of Major Components of the Torque Converter.

LOCATION OF MAJOR ASSEMBLIES – Cont. 0003 00

MAJOR COMPONENTS OF THE BEVEL GEAR ASSEMBLY

Figure 5., shows most of the Bevel Gear Assembly components, which are removed and installed at the Direct and General Support level of maintenance.

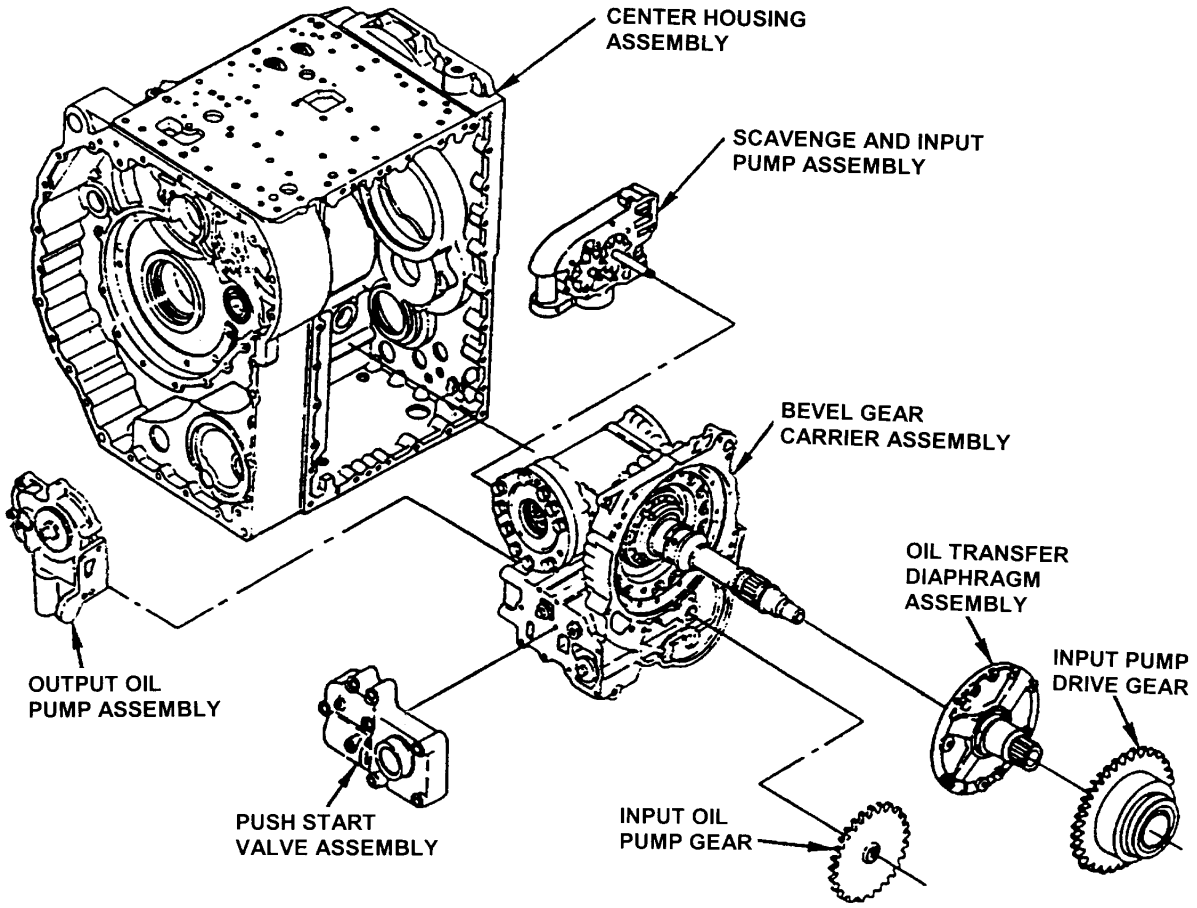


Figure 5. Exploded View of Bevel Gear Assembly.

LOCATION OF MAJOR ASSEMBLIES – Cont. 0003 00

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 that enable transmission speed and power output to be changed. The Range Pack also enables the vehicle to move in forward or reverse direction.

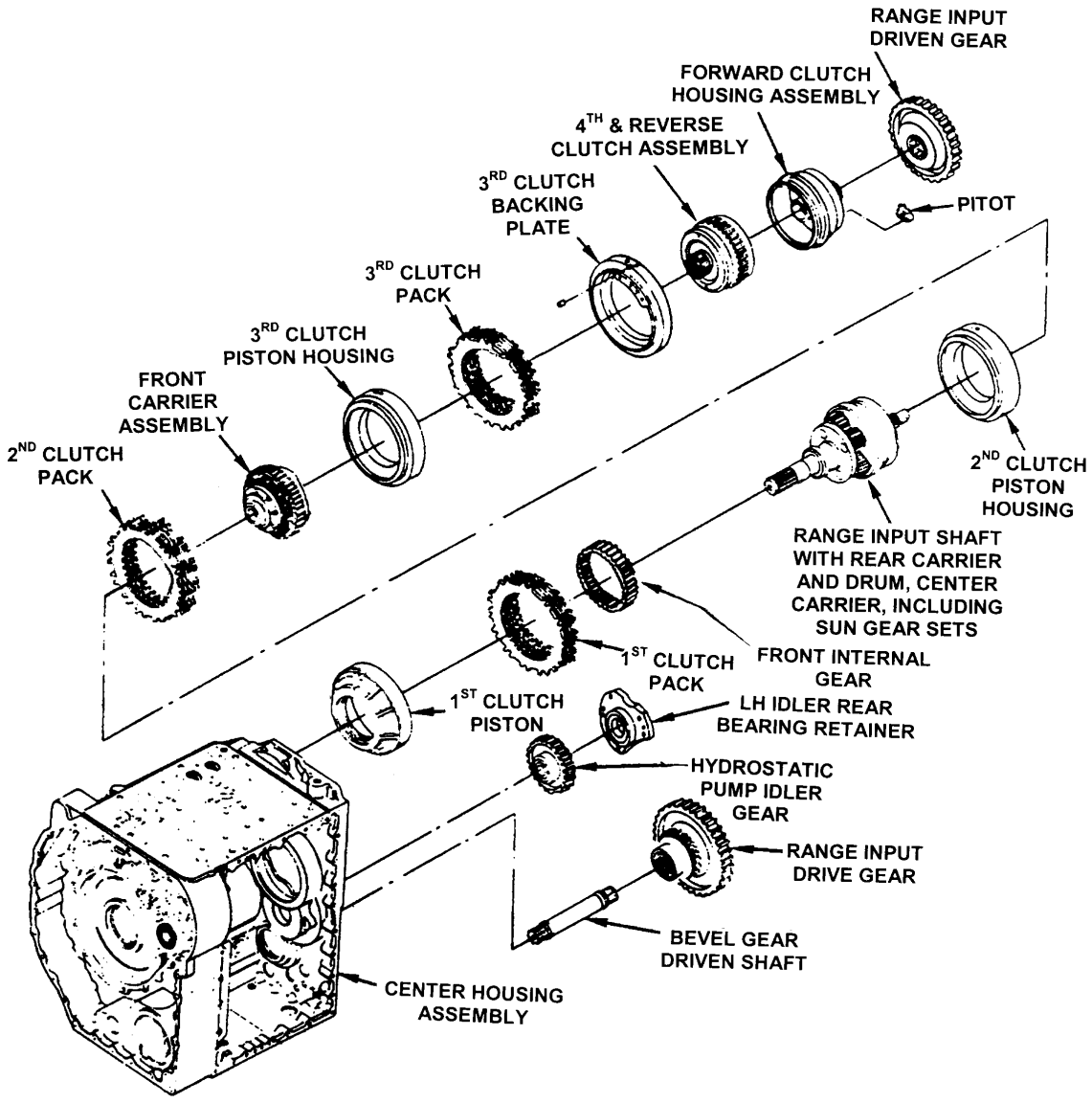


Figure 6. Exploded View of Major Components, Left Side of Center Housing Assembly.

LOCATION OF MAJOR ASSEMBLIES – Cont. 0003 00

MAJOR COMPONENTS OF THE CENTER HOUSING, RIGHT SIDE

The main item in the right side of the Center Housing Assembly is the Left Brake Assembly. The Governor is housed on the right side. The Hydrostat, Right Output Shaft, and Sump Communication Tube are removed from this side of the Center Housing Assembly.

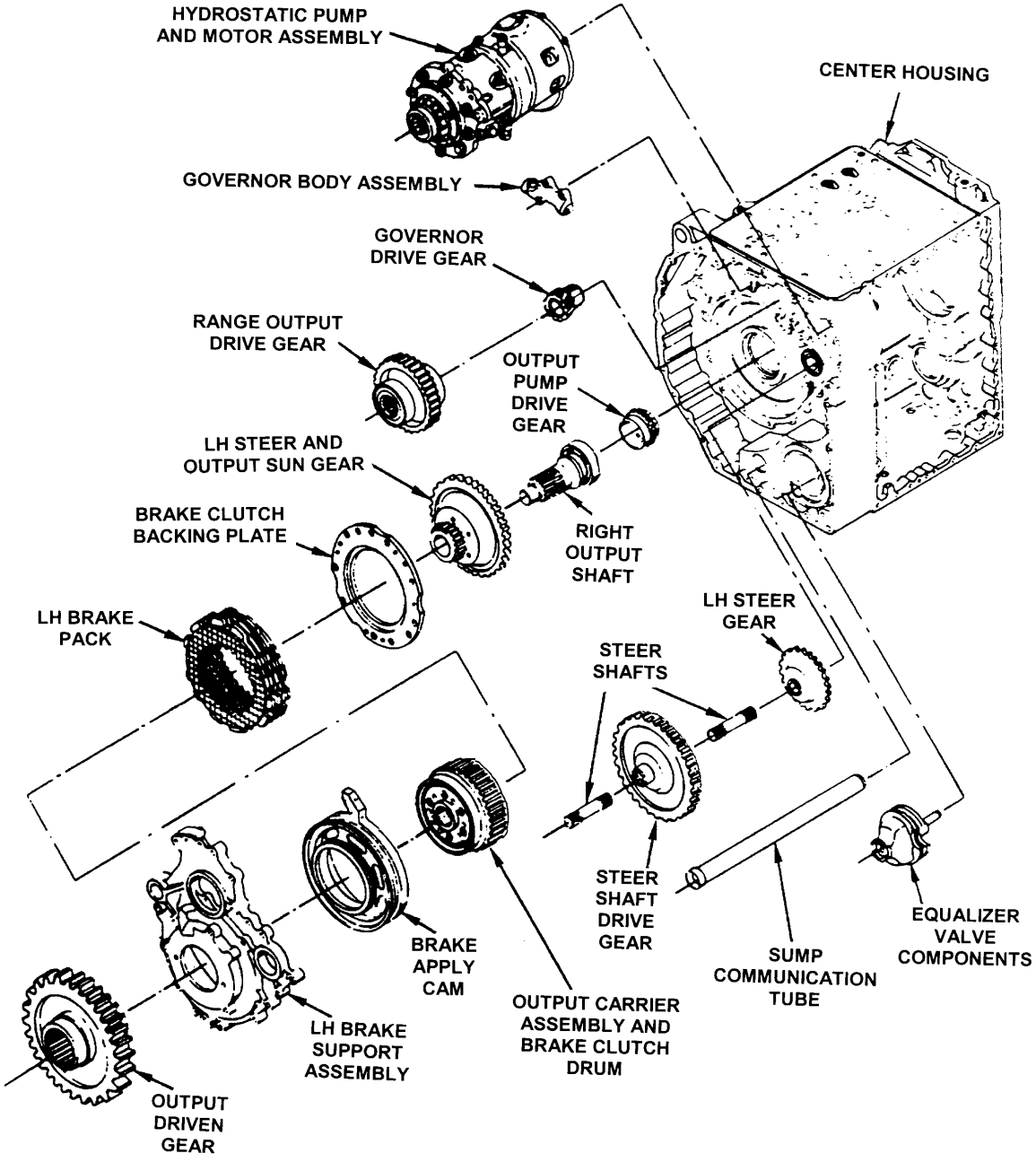


Figure 7. Exploded View of Major Components, Right Side of Center Housing Assembly.

END OF WORK PACKAGE

EQUIPMENT DATA 0004 00

THIS WORK PACKAGE COVERS:

This Work Package provides general data pertaining to the X200-4/4A Transmissions.

SCOPE

General knowledge of the data pertaining to the X200-4/4A Transmissions is necessary to insure proper maintenance procedures and repair parts are utilized.

TRANSMISSION DATA

Operator's instructions are located in vehicle operation manuals.

MANUFACTURER	**ALLISON TRANSMISSION DIVISION, GMC**	**ALLISON TRANSMISSION DIVISION, GMC**
MODEL	**X200-4**	**X200-4A**
Usable On Code (UOC)	XTZ	X4A
RATINGS		
Input horsepower, net (max)	265	350
Input RPM	2800 rpm	2800 rpm
Gross vehicle weight	30,000 pounds at 40 mph	36,000 pounds at 40 mph
CONVERTER		
Type	Single stage, three element, polyphase	Single stage, three element, polyphase
Stall torque ratio	3.32:1	2.70:1
Lockup clutch	Automatic second through fourth range	Automatic second through fourth range
GEARING TYPE	Constant mesh, spur type, planetary	Constant mesh, spur type, planetary
RANGES		
Ratios:		
First	4.16:1	4.16:1
Second	2.34:1	2.34:1
Third	1.46:1	1.46:1
Fourth	1.04:1	1.04:1
Reverse	6.62:1	6.62:1

TRANSMISSION DATA - Cont.

EQUIPMENT DATA – Cont. 0004 00

MODEL	X200-4	X200-4A
STEERING TYPE	Infinitely variable, hydrostatically controlled differential	Infinitely variable, hydrostatically controlled differential
Range	**Minimum Steer Ratio**	**Minimum Steer Ratio**
First	2.31:1	2.31:1
Second	1.58:1	1.58:1
Third	1.32:1	1.32:1
Fourth	1.22:1	1.22:1
Neutral	Pivot	Pivot
BRAKES		
Type	Multiple wet plate	Multiple wet plate
Service apply	Hydraulic with mechanical actuation	Hydraulic with mechanical actuation
Parking/emergency apply	Mechanical back-up service brakes	Mechanical back-up service brakes
DECELERATION RATE	16 feet/ second/second	16 feet/ second/second
OIL SYSTEM		
Capacity	12 gallons	12 gallons
Sump	Integral	Integral
Filter	Integral, two stage with differential pressure warning switch and automatic bypass	Integral, two stage with differential pressure warning switch and automatic bypass
WEIGHT (DRY)		
Transmission	955 pounds (433 kg) max	975 pounds (442 kg) max
Transmission with container	1545 pounds (680 kg) appx.	1565 pounds (710 kg) appx.

END OF WORK PACKAGE

CONTAINER 0005 00

THIS WORK PACKAGE COVERS:

The purpose and description of the Reusable Storage and Shipping Container.

INITIAL SETUP

Reference
TB 9-289

Personnel Required
Track Vehicle Repairer 63H20 (1)

Common Tools
Shop Equipment, Automotive Maintenance and Repair: Field Maintenance, Basic, Less Power (WP 0025, Item 20)
Tool Kit, General Mechanic's Automotive (WP 0025, Item 27)

Special Tools
Sling, Engine and Transmission, Motor Vehicle (WP 0025, Item 21)

SCOPE

The Transmission is installed in a protective container for storage or shipment. Dependent upon the condition of the transmission, transmissions are installed and removed at the Direct Support, General Support, and Depot levels of maintenance.

CONTAINER

PURPOSE AND DESCRIPTION OF CONTAINER

The transmission is installed in a protective container for storage or shipment. Desiccant 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:	**X200-4**	**X200-4A**
Height	42.64 inches	42.64 inches
Width	48.56 inches	48.56 inches
Depth	44.75 inches	44.75 inches
WEIGHT:		
Empty	590 pounds	590 pounds
With transmission	1545 pounds	1565 pounds

The transmissions are installed in the container and removed from the container by Direct Support, General Support, and Depot maintenance personnel. Installation and removal of the transmission by various levels of maintenance personnel is dependent upon the condition of the transmission and purpose of installation or removal.

PURPOSE AND DESCRIPTION OF CONTAINER – Cont.

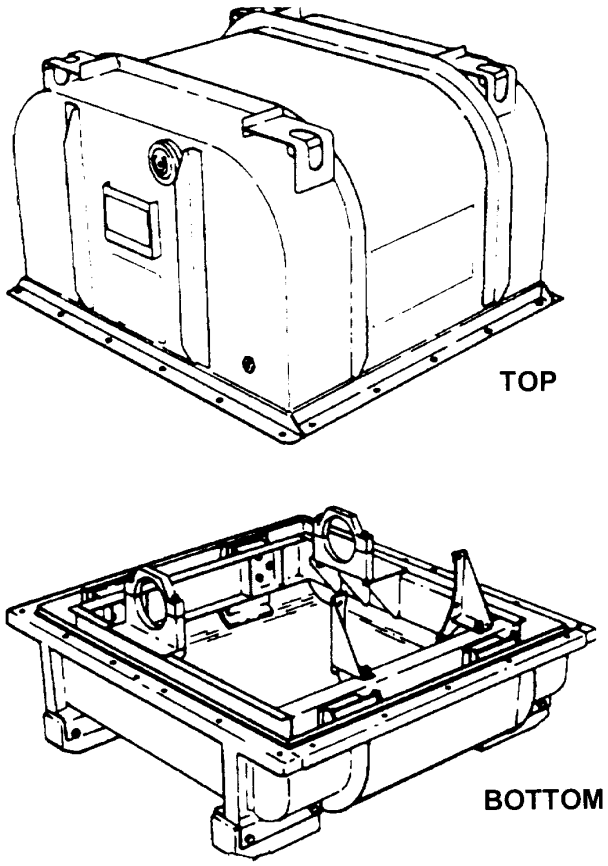


Figure 1. External View of Container Top, Internal View of Container Bottom.

REPAIR

Repair Reusable Shipping and Storage Container in accordance with TB 9-289.

END OF WORK PACKAGE

CHAPTER 2

GENERAL MAINTENANCE INSTRUCTIONS

GENERAL MAINTENANCE INSTRUCTIONS 0006 00

THIS WORK PACKAGE COVERS:

This Work Package provides general maintenance practices to be followed when working on the transmission. This Work Package addresses: scope, general maintenance instructions, overview, care in handling, cleaning, inspection, lubrication, torque specifications and tightening sequence, removing or installing connectors, removing or installing bearings, mandatory replacement parts, parts requirements for preliminary procedures, locally fabricated shop aids, repair parts, common tools, special tools, oil analysis program for transmission, and supplemental maintenance instructions.

INITIAL SETUP

References
- DA PAM 738-750
- FM 38-700
- FM 38-701
- LO 9-2350-277-12
- TB 43-0210
- TB 43-0211
- TM 9-214
- TM 9-243

Personnel Required
- Track Vehicle Repairer 63H20 (1)

Maintenance Level
- All levels

Common Tools
- Shop Equipment, Automotive Maintenance and Repair: Field Maintenance, Basic, Less Power (WP 0025, Item 20)
- Tool Kit, General Mechanic's Automotive WP 0025, Item 27)

Supplies
- Cloth, Abrasive, Crocus (WP 0024, Item 6)
- Grease, High Temperature (WP 0024, Item 10)
- Lubricating Oil, Engine (WP 0024, Item 12)
- Petrolatum, Technical (Petroleum Jelly) (WP 0024, Item 14)
- Rag, Wiping (WP 0024, Item 15)
- Sodium Phosphate, Tribasic Anhydrous (WP 0024, Item 19)
- Solvent, Cleaning (WP 0024, Item 20)

SCOPE

This Work Package provides general maintenance practices that must be followed when working on the transmission. This Work Package is provided to eliminate the need to repeat common maintenance practices throughout this manual.

GENERAL MAINTENANCE INSTRUCTIONS

OVERVIEW

Follow the maintenance practices in this chapter 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.

General Maintenance Procedures Provided in this Work Package

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 tolerance 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.

CLEANING

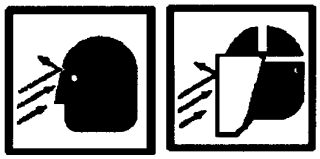
WARNING

Some dry cleaning solvents are 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 an eye is made, wash your eyes with water and get medical aid immediately.

CLEANING – Cont.

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.

WARNING

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.

WARNING

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.

CLEANING – Cont.

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.

Removing Dirt, Grease, or Oil

All parts must be thoroughly cleaned with dry cleaning solvent, 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 – Cont.

Cleaning Transmission Exterior

The exterior of the transmission must be thoroughly cleaned before disassembly is started. Use 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 per 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.

INSPECTION

General Inspection

NOTE

Mandatory replacement parts need not be inspected.

All other 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.

INSPECTION – Cont.

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 side tap or by replacing threaded insert. Screw new inserts 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.

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 of 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.

INSPECTION – Cont.

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.

Friction Plates and Reaction Plates

Look at friction-faced, internal-splined friction plates for cracks, burrs, chipped or broken spline teeth, or severely pitted faces. Remove burrs with whetstone. If any one plate is cracked, severely pitted, or has chipped or broken spline teeth, GET RID OF COMPLETE PACK OF CLUTCH PLATES.

Look at steel external-tanged reaction 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 plate is cracked, severely pitted or scored, or has chipped or broken tangs, DISCARD COMPLETE PACK OF CLUTCH PLATES.

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

Springs

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

Retaining Rings (Snap rings)

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. Snap rings 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 have damage that cannot be repaired by chasing the threads with a tap or die of the proper size, or by installing threaded inserts.

GENERAL MAINTENANCE INSTRUCTIONS – Cont. 0006 00

LUBRICATION

Refer to Vehicle Lubrication Order, LO 9-2350-277-12 (M113), 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. This oil will protect parts during the first few moments after engine start-up.

Put lubricating oil, 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 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 on the inside lip of all plain encased seals.

Use petrolatum when required to hold gaskets, thrust washers, bushings, or other parts in place during assembly.

The combined application of petrolatum and lubrication oil on journals makes bearings or races slide on and off the journals more easily.

Immerse all plates in clean lubricating oil one at a time before assembly. Keep all plates in the same order and facing the same way as when disassembled. Soak plates for a minimum of two minutes.

Soak each new friction-faced friction plate for a minimum of two minutes in clean lubricating oil.

Put lubricating oil on walls and hubs that seal rings will contact.

NOTE

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

Put a small amount of nonhardening sealing compound on the first three threads of all reused or uncoated external pipe plugs and hydraulic fittings.

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 value 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 parenthesis only when the torque wrench is marked for Newton meters.

TORQUE SPECIFICATIONS AND TIGHTENING SEQUENCE – Cont.

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 specific torque.

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.

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.

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
- Lock washers
- 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.

Mandatory Replacement Parts in Event of Metal Contamination – Cont.

Replace the control valve assemblies.

Replace the Bevel Gear Assembly, including oil pumps.

CLEAN AND INSPECT ALL PARTS; replace parts as necessary.

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.

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 Illustrated List of Manufactured Items, WP 0027, including instructions for manufacturing the item.

REPAIR PARTS

Repair parts are listed and illustrated in Chapter 4 of this manual.

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.

COMMON TOOLS – Cont.

GENERAL MAINTENANCE INSTRUCTIONS – Cont. 0006 00

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.

SPECIAL TOOLS

Special tools are illustrated in WP 0021 and listed in WP 0025 of this manual.

OIL ANALYSIS PROGRAM FOR TRANSMISSION

Refer to the appropriate Lube Order LO 9-2350-277-12 (M113) 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.

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:

DA PAM 738-750	Functional User's Manual for the Army Maintenance Management System (TAMMS)
FM 38-700	Packaging of Material - Preservation
FM 38-701	Packaging of Material - Packing
TM 9-214	Inspection, Care and Maintenance of Antifriction Bearings
TM 9-243	Use and Care of Hand Tools and Measuring Tools

END OF WORK PACKAGE

CHAPTER 3

TRANSMISSION MAINTENANCE PROCEDURES

TRANSMISSION MAINTENANCE PROCEDURES 0007 00

THIS WORK PACKAGE COVERS:

This Work Package provides general information about the organization of Work Packages for removing, assembling and repairing X200-4/4A Transmission major assemblies.

SCOPE

This manual addresses Direct Support and General Support Maintenance and Repair Parts and Special Tools List (RPSTL). This Work Package provides general information as to the organization of work packages for removing, assembling, repairing, and installing, X200-4/4A Transmission major assemblies. Organizational Maintenance steps are addressed as necessary. Organization of maintenance procedures and equipment items covered are also addressed. Prior to maintenance actions, preliminary procedures, if listed, must be accomplished.

ORGANIZATION OF MAINTENANCE PROCEDURES

This chapter tells you how to remove, disassemble, repair, assemble and install the transmission major assemblies.

These sections are divided into Work Packages that cover specific assemblies or groups of parts.

All parts will be inspected as they are removed according to inspection instructions in Chapter 2, General Maintenance Instructions. When a part needs to be inspected by a special method, that inspection method is explained in the maintenance procedures. Reuse good parts and replace bad parts.

Mandatory replacement parts are discarded and are replaced by new parts every time the transmission is disassembled.

EQUIPMENT ITEMS COVERED

Each Work Package lists steps that take parts off the transmission, repair parts, or put them back on the transmission.

SUGGESTED DISASSEMBLY/ASSEMBLY ORDER OF TRANSMISSION INTO/FROM MAJOR ASSEMBLIES

The following is a suggested order for disassembly and assembly of the transmission into and from major assemblies. Assembly is in reverse order from disassembly.

Remove Transmission Oil Fill Tube
Remove Transmission Top Components
Install Transmission On/From Maintenance Stand
Remove Right End Cover Assembly
Remove Left End Cover Assembly
Remove Converter Element Components
Remove Input Housing Assembly
Remove Bevel Gear Assembly
Remove Hydrostatic Pump and Motor Assembly
Install Transmission Oil Fill Tube

SUGGESTED DISASSEMBLY/ASSEMBLY ORDER OF TRANSMISSION INTO /FROM MAJOR ASSEMBLIES – Cont.

Install Transmission Top Components
Remove Transmission On/From Maintenance Stand
Install Right End Cover Assembly
Install Left End Cover Assembly
Install Converter Element Components
Install Input Housing Assembly
Install Bevel Gear Assembly
Install Hydrostatic Pump and Motor Assembly

END OF WORK PACKAGE

SERVICE UPON RECEIPT 0008 00

THIS WORK PACKAGE COVERS:

This Work Package provides general information on service of repairable transmissions upon receipt.

SCOPE

Repairable transmissions received at Direct or General Support Maintenance are required to be inspected and handled in a manner so as not to cause conditions that would require additional repairs.

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. Work Package 0009 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 SF Form 364, Report Of Discrepancy (ROD).

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. Reference (TM 9-2350-277-34).

END OF WORK PACKAGE

REMOVE AND INSTALL TRANSMISSION ASSEMBLY FROM/INTO CONTAINER

0009 00

THIS WORK PACKAGE COVERS:

Removal and installation of Transmission Assembly from/into Reusable Shipping and Storage Container.

INITIAL SETUP

References
WP 0011

Personnel Required
Track Vehicle Repairer 63H20 (2)

Common Tools
Shop Equipment, Automotive Maintenance and Repair: Field Maintenance, Basic, Less Power (WP 0025, Item 20)
Tool Kit, General Mechanic's Automotive (WP 0025, Item 27)

Special Tools
Hoist, Lifting1 Ton Capacity (WP 0025, Item 10)
Sling, Engine and Transmission, Motor Vehicle (WP 0025, Item 21)

Supplies
Desiccant, Activated (WP 0024, Item 8)
Rag Wiping (WP 0024, Item 15)
Solvent, Cleaning (WP 0024, Item 20)
Strap, Tie Down (WP 0024, Item 21) (X200-4A only)

Repair Parts
Cap Protective FC-16 (X200-4A) (Shipping Part)
Cap Protective TC-18 (X200-4A) (Shipping Part)
Strap, Tie Down (X200-4A) (WP 0024, Item 21)

Maintenance Level

Direct Support:	Remove and replace Transmission Assembly from Reusable Shipping and Storage Container before and after replacement.
General Support:	Remove and replace Transmission Assembly from Reusable Shipping and Storage Container before and after overhaul.

Preliminary Procedure (Install Unserviceable Transmission Assembly into Reusable Shipping and Storage Container)

Unserviceable Transmission Assembly removed from vehicle, drained, accessories removed and Transmission Assembly cleaned. Unserviceable Transmission Assembly installed into Reusable Shipping and Storage Container.

SCOPE

This Work Package contains the information for removing and installing the X200-4/4A Transmission Assembly from/into a Reusable Shipping and Storage Container. References to Oil Fill Tube and Oil Level Indicator (Dipstick) pertain to X200-4A Transmission Assembly only.

REMOVE AND INSTALL TRANSMISSION ASSEMBLY FROM/INTO CONTAINER – Cont. 0009 00

OVERVIEW

The Transmission Assembly is installed in the Reusable Shipping and Storage Container and removed from the Reusable Shipping and Storage Container by Direct Support maintenance personnel at time of replacement of the Transmission Assembly in a vehicle. Unserviceable Transmission Assemblies in Reusable Shipping and Storage Containers are returned to General Support Maintenance.

Transmission Assemblies repaired at General Support level of maintenance are usually reinstalled in the vehicle. Sometimes a repaired Transmission Assembly in a Reusable Shipping and Storage Container is to be returned to Direct Support maintenance or retained in long-term storage. Unserviceable Transmission Assemblies are often sent in a Reusable Shipping and Storage Container to Depot maintenance. Proper preparation for packing the Transmission Assembly in a Reusable Shipping and Storage Container is important. The Transmission Assembly should be clean and drained of fluid. All appropriate plugs and covers should be installed on all inlets and outlets.

REMOVAL OF TRANSMISSION ASSEMBLY FROM REUSABLE SHIPPING AND STORAGE CONTAINER

WARNING

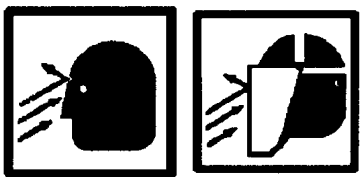
Check slings and lifting devices for cuts, breaks, or wear before and during hoisting. Slings and lifting devices can break and cause injury or death.

The X200-4 Transmission Assembly and Reusable Shipping and Storage Container weighs about 1545 pounds (680 kg). The X200-4A Transmission Assembly and Reusable Shipping and Storage Container weighs about 1565 pounds (710 kg). To avoid injury or death, keep out from under and clear of Transmission Assembly and Reusable Shipping and Storage Container at all times. Do not let Transmission Assembly swing freely during hoisting.

REMOVE AND INSTALL TRANSMISSION ASSEMBLY FROM/INTO CONTAINER – Cont. 0009 00

REMOVAL OF TRANSMISSION ASSEMBLY FROM REUSABLE SHIPPING AND STORAGE CONTAINER – CONT.

WARNING



Reusable Shipping and Storage 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 Reusable Shipping and Storage Container may cause bodily injury. To avoid injury, be sure internal and external pressures have been equalized. Push in and hold air release button until air flow stops.

1. Push in and hold air release button (1) until air flow stops.
2. Remove 22 nuts (2) and bolts (3) holding Container Top (4) and Container Bottom (5) together.
3. Using Hoist (WP 0025, Item 10), and Sling, Engine and Transmission (WP 0025, Item 21), attach sling hooks to two brackets located diagonally opposite each other on Container Top (4).
4. Remove Container Top (4) from Container Bottom (5). Set Container Top on hard surface.
5. Remove sling from Container Top (4).

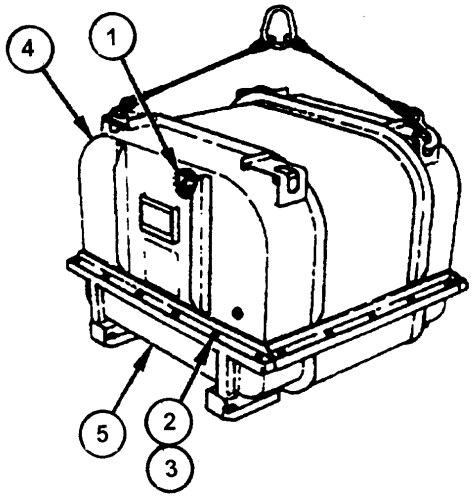


Figure 1. Reusable Shipping and Storage Container.

REMOVE AND INSTALL TRANSMISSION ASSEMBLY FROM/INTO CONTAINER – Cont. 0009 00

REMOVAL OF TRANSMISSION ASSEMBLY FROM REUSABLE SHIPPING AND STORAGE CONTAINER – CONT.

6. Remove four bolts (6) and four washers (7) holding two caps (8) to pillow blocks (9).
7. Remove two caps (8) from pillow blocks (9).
8. Remove two bolts (10) and two washers (11) from mounting brackets (12).

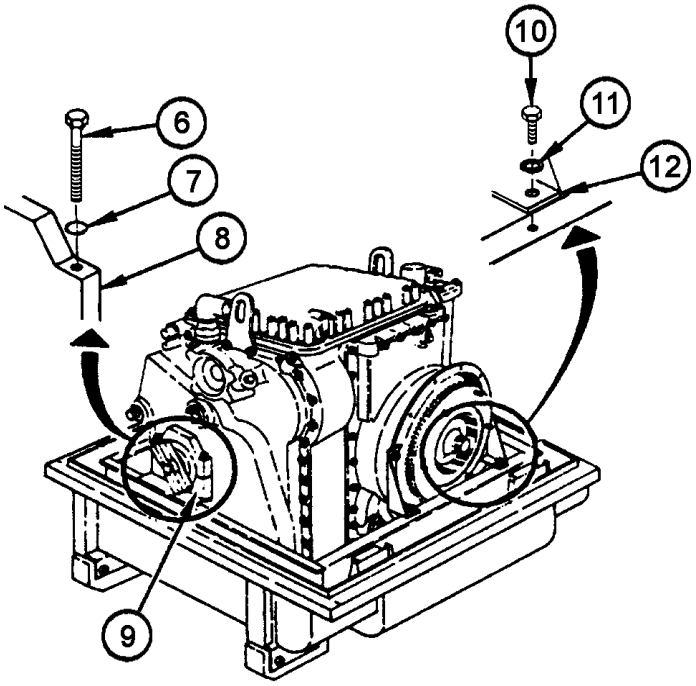


Figure 2. Pillow Blocks.

REMOVE AND INSTALL TRANSMISSION ASSEMBLY FROM/INTO CONTAINER – Cont. 0009 00

REMOVAL OF TRANSMISSION ASSEMBLY FROM REUSABLE SHIPPING AND STORAGE CONTAINER – CONT.

NOTE

Mounting brackets (12) will come out of Reusable Shipping and Storage Container attached to Transmission Assembly.

9. Using Hoist (WP 0025, Item 10), and Sling, Engine and Transmission (WP 0025, Item 21), attach sling hooks to two lifting brackets (13) located on top of Transmission Assembly.
10. Remove Transmission Assembly from Container Bottom (5) and place on a hard surface.
11. Remove six bolts (14), six washers (15), and six nuts (16) from mounting brackets (12).
12. Remove mounting brackets (12) from Transmission Input Housing.
13. Remove sling hooks from Transmission Assembly and remove sling.
14. Remove sack, containing hardware for installing transmission to engine. This sack may be tied to the Transmission Assembly or Reusable Shipping and Storage Container.

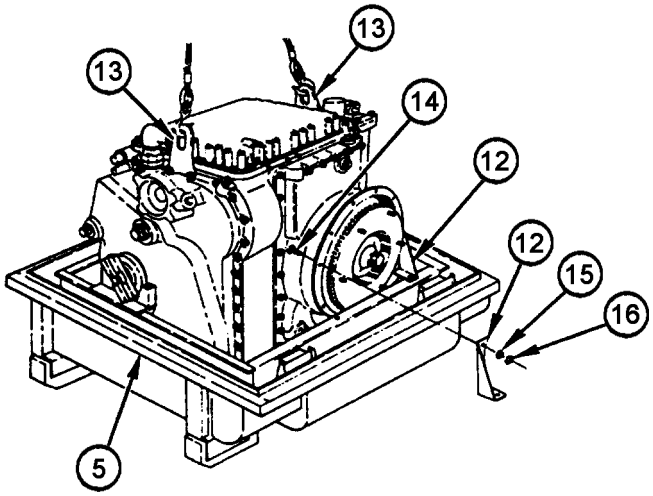


Figure 3. Mounting Brackets.

REMOVE AND INSTALL TRANSMISSION ASSEMBLY FROM/INTO CONTAINER – Cont. 0009 00

REMOVAL OF TRANSMISSION ASSEMBLY FROM REUSABLE SHIPPING AND STORAGE CONTAINER – CONT.

15. Remove cap (FC-16) (17), from oil fill tube nut (18), which is part of Tube Assembly (19). Retain cap (17) for future use.

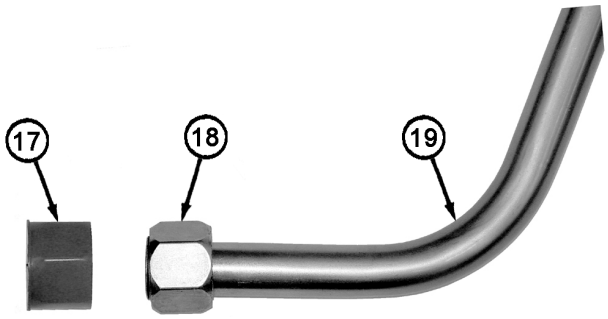


Figure 4. Oil Fill Tube Assembly. (X200-4A Only)

16. Remove oil fill tube (19) and dipstick (20) from Transmission Assembly, Input Housing (21) by cutting two strap tie downs (22). Discard two strap tie downs (22).

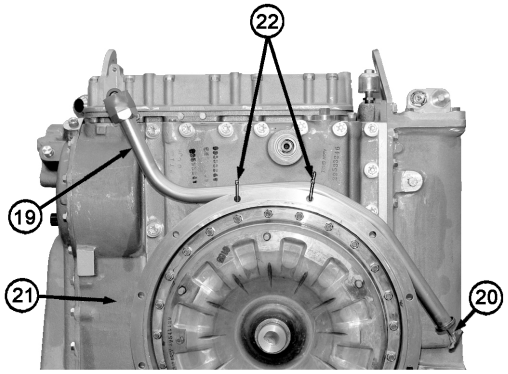


Figure 5. Oil Fill Tube Assembly. (X200-4A Only)

17. Remove cap (TC-18) (23) from fill tube elbow (24) located on Left End Cover Assembly. Retain cap (23) for future use.

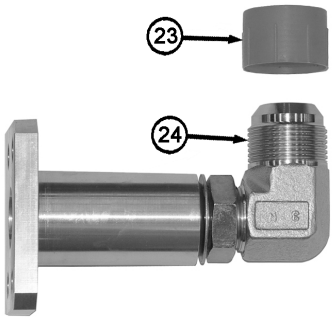


Figure 6. Elbow and Cap.

REMOVE AND INSTALL TRANSMISSION ASSEMBLY FROM/INTO CONTAINER – Cont. 0009 00

REMOVAL OF TRANSMISSION ASSEMBLY FROM REUSABLE SHIPPING AND STORAGE CONTAINER – CONT.

18. Install Oil Level Fill Tube and Dipstick on Transmission Assembly Input Housing. (Refer to WP 0010).

19. Remove three nuts (25) and three brackets (26) that retain the Torque Converter and Ring (27) for shipping. Retain the three nuts and three brackets for future use.

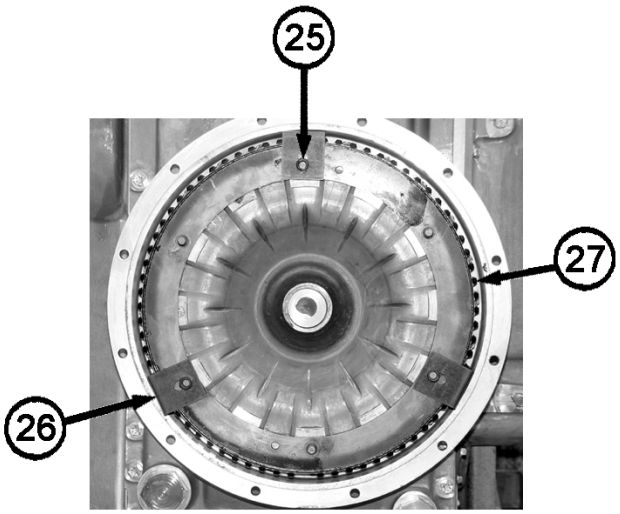


Figure 7. Shipping Brackets.

NOTE

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

All bolts, nuts, washers, and brackets should be stored with Reusable Shipping and Storage Container for use when installing Transmission Assembly in Reusable Shipping and Storage Container.

20. Install unserviceable Transmission Assembly into Reusable Shipping and Storage Container.

REMOVE AND INSTALL TRANSMISSION ASSEMBLY FROM/INTO CONTAINER – Cont. 0009 00

REMOVAL OF TRANSMISSION ASSEMBLY FROM REUSABLE SHIPPING AND STORAGE CONTAINER – CONT.

21. If unserviceable Transmission Assembly is not to be installed into Reusable Shipping and Storage Container:

    a. Using Hoist (WP 0025, Item 10), and Sling, Engine and Transmission (WP 0025, Item 21), attach sling hooks to two brackets located diagonally opposite each other on Container Top (4).

    b. Install Container Top (4) on Container Bottom (5).

    c. Remove sling hooks and sling from Container Top (4).

    d. Install 22 nuts (2) and 22 bolts (3) holding Container Top (4) and Container Bottom (5) together. Install snug. It is not necessary to torque nuts and bolts at this time.

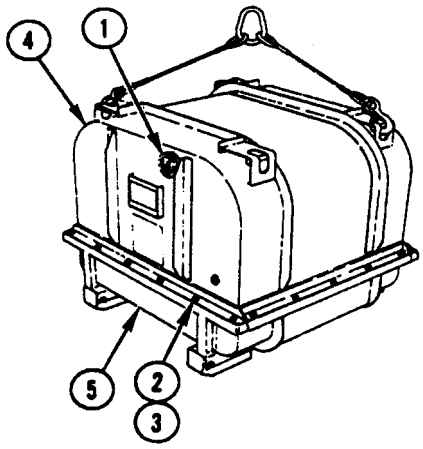


Figure 1. Reusable Shipping and Storage Container. (Repeated).

SHIPPING.

1. Direct Support maintenance: ship unserviceable Transmission Assemblies and Reusable Shipping and Storage Containers to General Support maintenance.

2. General Support maintenance: ship unserviceable Transmission Assemblies and Reusable Shipping and Storage Containers to Depot maintenance. General Support maintenance may also return to supply or return to unit, repaired Transmission Assemblies as necessary.

3. Empty Reusable Shipping and Storage Containers are to be shipped or stored in accordance with local directives.

REMOVE AND INSTALL TRANSMISSION ASSEMBLY FROM/INTO CONTAINER – Cont. 0009 00

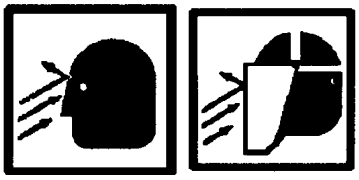
INSTALL TRANSMISSION ASSEMBLY IN REUSABLE SHIPPING AND STORAGE CONTAINER

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.

The X200-4 Transmission Assembly and Reusable Shipping and Storage Container weighs about 1545 pounds (680 kg). The X200-4A Transmission Assembly and Reusable Shipping and Storage Container weighs about 1565 pounds (710 kg). To avoid injury or death, keep out from under and clear of Transmission Assembly and Reusable Shipping and Storage Container at all times. Do not let Transmission Assembly swing freely during hoisting.

WARNING



Reusable Shipping and Storage 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 Reusable Shipping and Storage Container. Opening a pressurized Reusable Shipping and Storage Container may cause bodily injury. To avoid injury, be sure internal and external pressures have been equalized. Push in and hold air release button until air flow stops.

REMOVE AND INSTALL TRANSMISSION ASSEMBLY FROM/INTO CONTAINER – Cont. 0009 00

INSTALL TRANSMISSION ASSEMBLY IN REUSABLE SHIPPING AND STORAGE CONTAINER – Cont.

NOTE

The Oil Level Fill Tube Assembly must be removed prior to installing the Transmission Assembly into a Reusable Shipping and Storage Container. When the Transmission Assembly is removed from the vehicle, the Transmission Assembly will have an Oil Level Fill Tube Assembly and related parts attached. The Oil Level Fill Tube Assembly and related parts are part of the X200-4A Transmission Assembly, however, are furnished as a vehicle kit for the X200-4 Transmission Assembly.

NOTE
(X200-4A Only)

Transmission Assembly must have the Oil Level Fill Tube Assembly and Dipstick removed prior to installing Transmission Assembly into a Reusable Shipping and Storage Container.

Remove only, Oil Level Fill Tube Assembly and Dipstick from the Transmission Assembly. Reinstall bolt, nut and washer onto clamp. Tighten nut and bolt. Refer to WP 0010. Oil Level Fill Tube and Dipstick must be mounted onto the Transmission Assembly Input Housing for shipment.

1. Install cap (FC-16) (17) into Oil Level Fill Tube Assembly nut (18) at end of Oil Level Fill Tube Assembly (19).

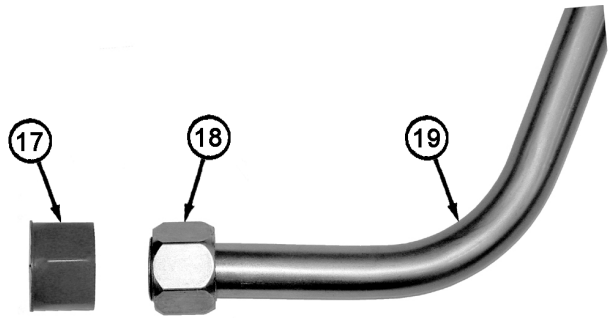


Figure 4. Oil Fill Tube Assembly. (X200-4A Only) (Repeated).

REMOVE AND INSTALL TRANSMISSION ASSEMBLY FROM/INTO CONTAINER – Cont. 0009 00

INSTALL TRANSMISSION ASSEMBLY IN REUSABLE SHIPPING AND STORAGE CONTAINER – Cont.

2. Install three brackets (26) on Torque Converter and Ring (27) studs. Install brackets (26) equidistant from each other.

3. Install 3 nuts (25) to retain the three brackets (26). Torque three nuts (25) to 41-49 lb-ft (56-66 N·m).

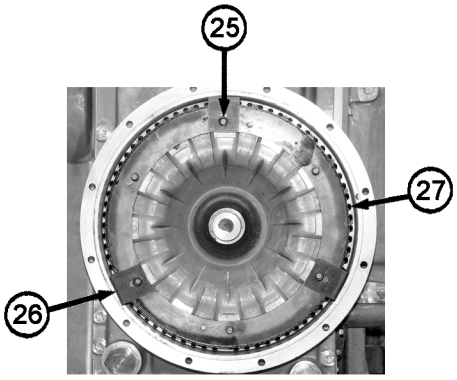


Figure 7. Shipping Brackets. (Repeated).

4. Install cap (TC-18) (23) over Oil Level Fill Tube Assembly, elbow (24).

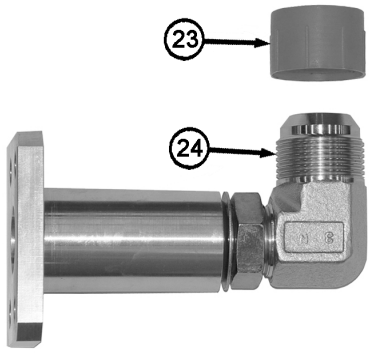


Figure 6. Elbow and Cap. (Repeated).

REMOVE AND INSTALL TRANSMISSION ASSEMBLY FROM/INTO CONTAINER – Cont. 0009 00

INSTALL TRANSMISSION ASSEMBLY IN REUSABLE SHIPPING AND STORAGE CONTAINER – Cont.

5. Install Dipstick (20) into Oil Level Fill Tube Assembly (19).

6. Place Oil Level Fill Tube Assembly (19) and Dipstick (20) over and on top of Transmission Assembly, Input Housing (21). Place Oil Level Fill Tube Assembly, with nut end up and to the left, and Dipstick down and to the right, facing the front of the Transmission Torque Converter.

7. Place two, new Strap Tie Down (WP 0024, Item 21) (22), through the top two holes in the Transmission Assembly, Input Housing (21) and around the Oil Level Fill Tube Assembly (19). Tighten two strap tie downs by inserting the running end of the strap through the locking device. Pull to tighten. Trim end of strap tie down, if necessary.

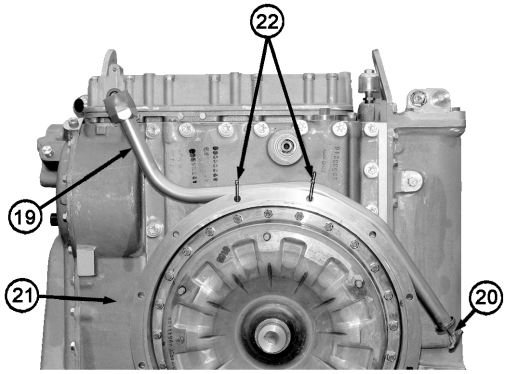


Figure 5. Oil Fill Tube Assembly. (X200-4A Only) (Repeated).

8. Inspect closure gasket (28) for bends, breaks or distortion. Replace closure gasket if necessary.

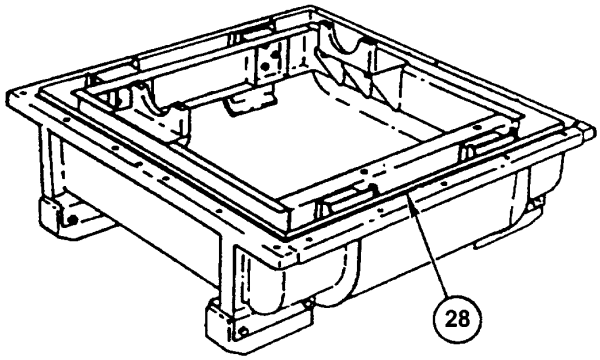


Figure 8. Container Bottom.

REMOVE AND INSTALL TRANSMISSION ASSEMBLY FROM/INTO CONTAINER – Cont. 0009 00

INSTALL TRANSMISSION ASSEMBLY IN REUSABLE SHIPPING AND STORAGE CONTAINER – Cont.

9. Install six bolts (14), six washers (15) and six nuts (16) that hold two mounting brackets (12) to the Transmission Assembly, Input Housing.

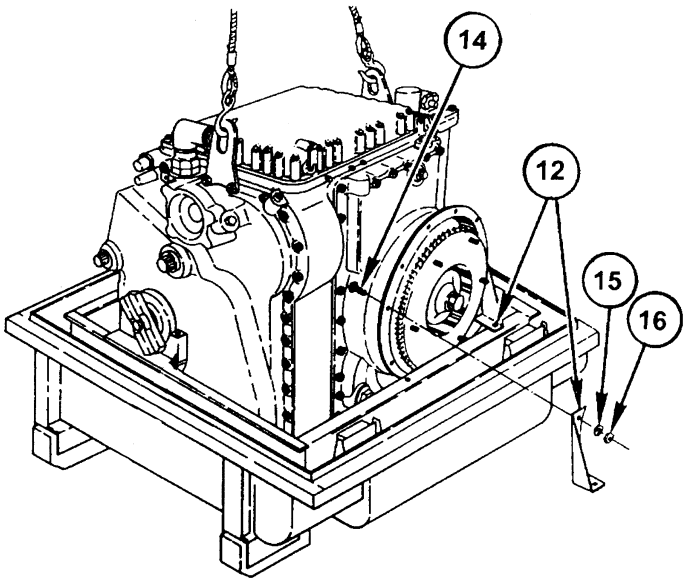


Figure 9. Mounting Brackets.

REMOVE AND INSTALL TRANSMISSION ASSEMBLY FROM/INTO CONTAINER – Cont. 0009 00

INSTALL TRANSMISSION ASSEMBLY IN REUSABLE SHIPPING AND STORAGE CONTAINER – Cont.

10. Using a Hoist (WP 0025, Item 10), and Sling, Engine and Transmission (WP 0025, Item 21), install Transmission Assembly into Container Bottom. Place Transmission Assembly, Outputs on Pillow Blocks (9). Remove sling.

11. Install two bolts (10) and two washers (11) holding mounting brackets (12).

12. Install two caps (8). Install four bolts (6) and four washers (7) holding two caps (8).

13. Torque bolts (6) and (10) to 58-66 lb-ft (79-89 N·m).

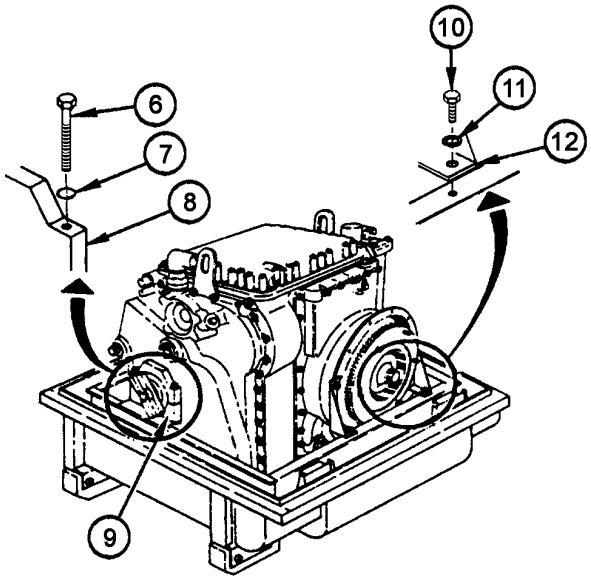


Figure 2. Pillow Blocks. (Repeated).

REMOVE AND INSTALL TRANSMISSION ASSEMBLY FROM/INTO CONTAINER – Cont. 0009 00

INSTALL TRANSMISSION ASSEMBLY IN REUSABLE SHIPPING AND STORAGE CONTAINER – Cont.

14. Attach sling to opposite and diagonal ends of Container Top (4).
15. Install Container Top (4) on Container Bottom (5). Line up bolt holes of top and bottom.
16. Install 22 bolts (3) and 22 nuts (2). Remove sling.
17. Torque nuts (2) to 58-66 lb-ft (79-89 N·m).
18. Remove Desiccant Access Cover (29).
19. Place 42 units of Desiccant (WP 0024, Item 8) in Desiccant Access Hole.
20. Install Desiccant Access Cover (29). Tighten, hand tight.

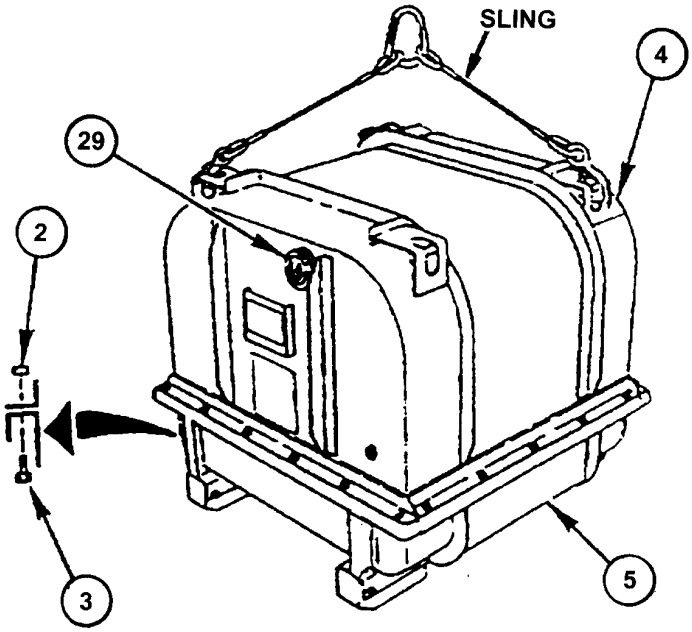


Figure 10. Reusable Shipping and Storage Container.

REMOVE AND INSTALL TRANSMISSION ASSEMBLY FROM/INTO CONTAINER – Cont. 0009 00

SHIPPING

1. Direct Support maintenance ship unserviceable Transmission Assemblies and Reusable Shipping and Storage Containers to General Support maintenance.

2. General Support maintenance, ship unserviceable Transmission Assemblies and Reusable Shipping and Storage Containers to Depot maintenance. General Support maintenance may also return to supply or return to unit-repaired Transmission Assemblies as necessary.

NOTE

On early model Transmission Assemblies, the installation tag states to remove and discard six nuts and six support brackets that secure the torque converter to the Transmission Assemblies 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 Assemblies utilize three shipping brackets, three nuts, three bolts and fifteen washers for retaining the torque converter for shipping.

Latest model Transmission Assemblies utilize three shipping brackets and three nuts for retaining the torque converter for shipping. These brackets and nuts are identical to those used on early six bracket configurations.

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

All bolts, washers, nuts and brackets will be stored with Reusable Shipping and Storage Container for use when installing Transmission Assemblies in Reusable Shipping and Storage Containers.

Dependent upon where Transmission Assembly in Reusable Shipping and Storage Container originated from, shipping plugs and caps may or may not be present.

END OF WORK PACKAGE

REMOVE AND INSTALL OIL FILL TUBE ASSEMBLY 0010 00

THIS WORK PACKAGE COVERS:

Removing and Installing the Oil Fill Tube Assembly and related parts.

INITIAL SETUP

Personnel Required
Track Vehicle Repairer 63H20 (1)

Common Tools
Shop Equipment, Automotive Maintenance and Repair: Field Maintenance, Basic, Less Power (WP 0025, Item 20)
Tool Kit, General Mechanic's Automotive (WP 0025, Item 27)

Supplies
Lubricating Oil, Engine (WP 0024, Item 12)
Marker, Tube Type, Black (WP 0024, Item 13)

Repair Parts
Mandatory Replacement Parts, Table 1.

Preliminary Procedure
Transmission removed from vehicle or Reusable Storage and Shipping Container.

Maintenance Level
All Levels

SCOPE

This Work Package contains the information for Removing and Installing the Oil Fill Tube Assembly and related parts. The Oil Fill Tube Assembly must be removed prior to removing the Left Hand End Cover Assembly or installing the transmission into a Reusable Storage and Shipping Container. When the transmission is removed from the vehicle, the transmission will have an Oil Fill Tube Assembly and related parts attached. The Oil Fill Tube Assembly and related parts are part of the X200-4A Transmission; however, these parts are furnished as a vehicle kit for the X200-4 Transmission.

NOTE

Figure 1. is provided as information to depict the elbow and how it is composed of non-removable components. Dependent upon the manufacture, the O-Ring may or may not be provided.

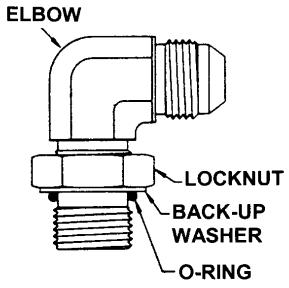


Figure 1. Elbow.

REMOVE AND INSTALL OIL FILL TUBE ASSEMBLY – Cont. 0010 00

REMOVAL

1. Remove oil level indicator (dipstick) (1) from Oil Fill Tube Assembly (2) by turning counterclockwise.
2. Pull out oil level indicator (dipstick) (1) from Oil Fill Tube Assembly (2).
3. Loosen nut (12) retaining the Oil Fill Tube Assembly (2) to elbow (11), until nut (12) is free from elbow (11).
4. Remove bolt (5) and washer (6) retaining bracket (7) to LH End Cover Assembly (8).
5. Remove oil fill tube (2), bolt (9), nut (10), washer (4), clamp (3), bracket (7) from LH End Cover Assembly (8) and set aside.

NOTE

Elbow (11) and O-ring (13), remain on LH End Cover Assembly.

6. Observe position of clamp (3) in relation to oil fill tube (2) and mark (Marker, Tube Type, Black, WP 0024, Item 13) location of clamp (3).
7. Remove nut (10) and washer (4) that retain bracket (7) to clamp (3). Discard washer (4).
8. Remove bolt (9) that retains clamp (3) to bracket (7).
9. Remove bracket (7) from clamp (3).
10. Remove clamp (3) from Oil Fill Tube Assembly (2).
11. Remove elbow (11) and O-ring (13) from adapter (14).
12. Remove O-ring (13) from elbow (11) and discard O-ring (13).
13. Remove four bolts (15) and four washers (16) that retain adapter (14) and gasket (17) to the LH End Cover Assembly (8).
14. Remove adapter (14) from LH End Cover Assembly (8).
15. Remove gasket (17) and discard gasket (17).
16. Inspect parts for damage and replace as necessary.

REMOVE AND INSTALL OIL FILL TUBE ASSEMBLY – Cont. 0010 00

REMOVAL – Cont.

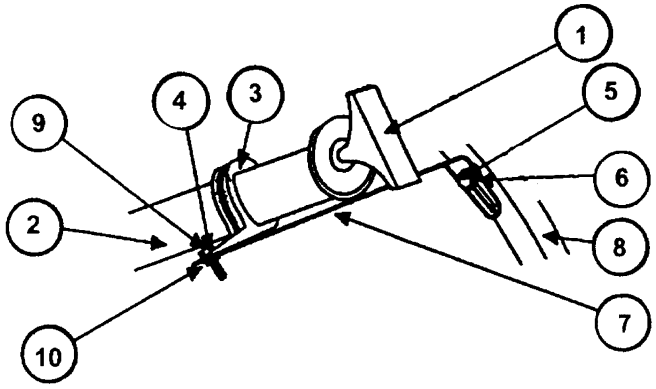


Figure 2. Oil Fill Tube Assembly and Oil Level Indicator (Dipstick).

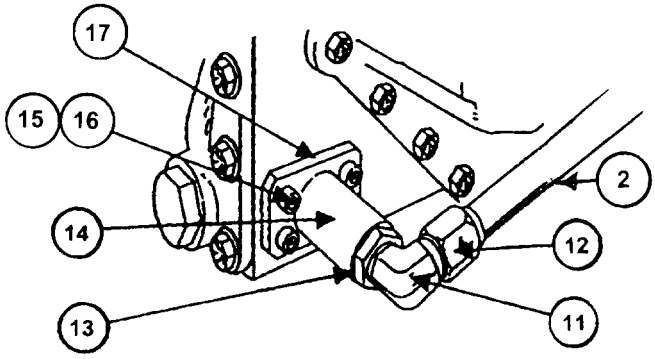


Figure 3. Adapter and Elbow.

Mandatory Replacement Parts.

Refer to Table 1. Mandatory Replacement Parts for Oil Fill Tube Assembly. WP 0026 contains a complete list of all mandatory replacement parts necessary for maintenance of the X200-4 and X200-4A Transmissions.

Table 1. Mandatory Replacement Parts for Oil Fill Tube Assembly.

WP 0026 ITEM NO.	NOMENCLATURE	QTY
3	Washer, Lock	1
29	O-Ring	1
60	Gasket	1

REMOVE AND INSTALL OIL FILL TUBE ASSEMBLY – Cont. 0010 00

INSTALL

1. Install new gasket (17) and adapter (14) onto LH End Cover Assembly (8).
2. Install four bolts (15) and four washers (16) that retain the gasket (17) and adapter (14) to the LH End Cover Assembly (8). Torque four bolts to 27-32 lb-ft (37-43 N·m).
3. Install clamp (3) on Oil Fill Tube Assembly (2) at the mark previously made.

NOTE

Part of clamp with bolt holes should be down and out in relation to Oil Fill Tube Assembly.

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

Back-up washer (18) is an integral part of elbow (11) and located below nut (19). Back-up washer cannot be removed from elbow.

4. Install bracket (7) on clamp (3) by installing bolt (9), washer (4) and nut (10). Do not tighten bolt (9) and nut (10).
5. Coat new O-ring (13) with lubricating oil, engine (WP 0024, Item 12).
6. Install new O-ring (13) on elbow (11). Install O-ring (13) until it seats on back-up washer (18) on elbow (11).
7. Using your hands, in the direction of the bend in the elbow (11), back off nut (19), on the elbow (11), as far as possible.
8. Inspect back-up washer (18) and O-ring (13) to ensure the back-up washer is not loose and the O-ring 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 back-up washer (18) and O-ring (13) makes contact with the adapter (14). Light wrenching may be necessary to obtain seating of the back-up washer.

CAUTION

For alignment of Oil Fill Tube Assembly and elbow, elbow is to be unscrewed by the required amount. Do not align by turning elbow in a tightening direction.

10. To align the elbow (11) with the Oil Fill Tube Assembly (2), unscrew elbow (11) by the required amount necessary for alignment of the elbow (11) and the Oil Fill Tube Assembly (2) but do not unscrew elbow (11) more than one full turn. Light wrenching may be necessary to obtain seating of the back-up washer.

INSTALL – Cont.

11. Torque nut (19) on elbow (11) to 79-87 lb-ft (107-118 N·m).

NOTE

Should repair not include installation of Oil Fill Tube Assembly, position the elbow pointing towards center of the LH Output Shaft

12. Install Oil Fill Tube Assembly (2) on elbow (11).

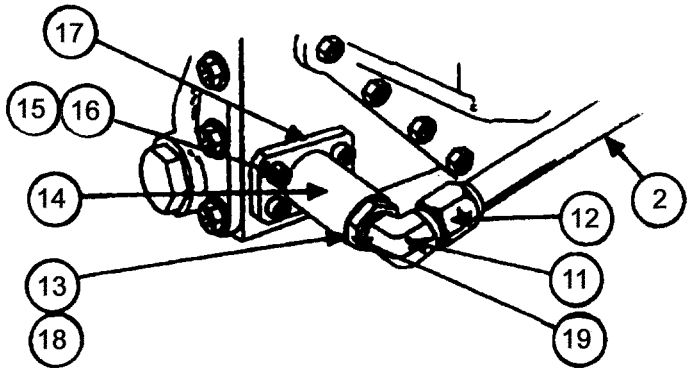


Figure 4. Adapter, Elbow and Oil Fill Tube Assembly.

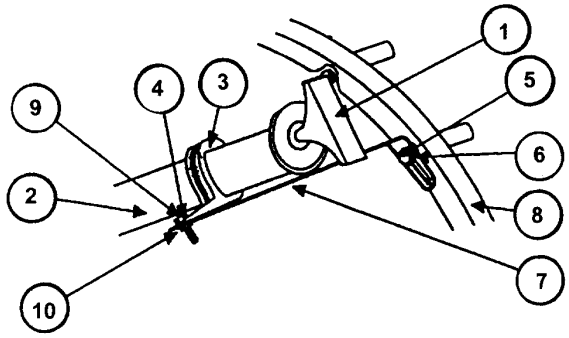


Figure 2. Oil Fill Tube Assembly and Oil Level Indicator (Dipstick). (Repeated).

REMOVE AND INSTALL OIL FILL TUBE ASSEMBLY – Cont. 0010 00

INSTALL – Cont.

13. Install bolt (5) and washer (6) that retain the bracket (7) to the LH End Cover Assembly (8). Torque bolt (5) to 27-32 lb-ft (36-43 N·m).

14. Hold elbow (11) and torque nut (12) on Oil Fill Tube Assembly (2) to 79-87 lb-ft (107-118 N·m).

15. Torque nut (10) that retains the clamp (3) to the bracket (7). Torque nut (10) to 10-15 in lb (1-3 N·m).

16. Install oil level indicator (dipstick) (1) in Oil Fill Tube Assembly (2).

17. Turn oil level indicator (dipstick) (1) in Oil Fill Tube Assembly (2) until tight.

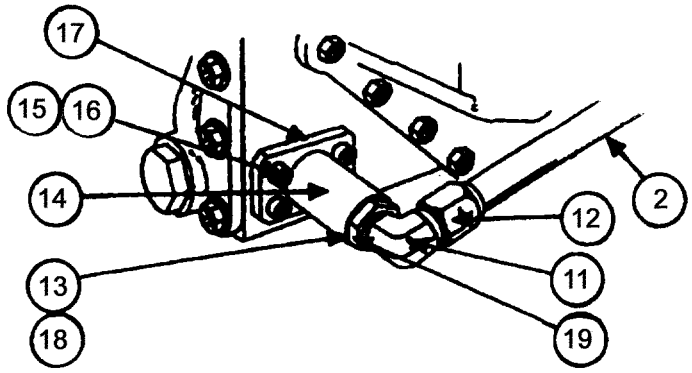


Figure 4. Adapter, Elbow and Oil Fill Tube Assembly. (Repeated).

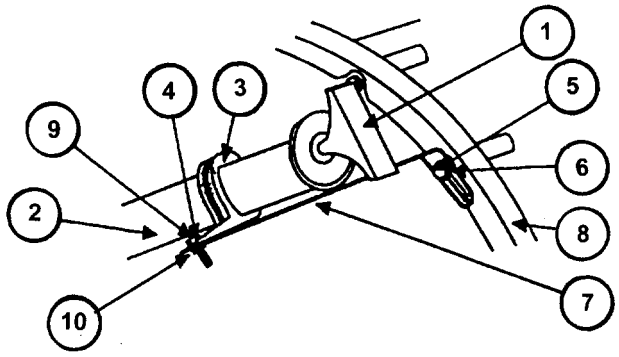


Figure 2. Oil Fill Tube Assembly and Oil Level Indicator (Dipstick). (Repeated).

END OF WORK PACKAGE

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS 0011 00

THIS WORK PACKAGE COVERS:

Disassembly and Assembly of the Transmission into and from Major Assemblies.

INITIAL SETUP

References

WP 0007
WP 0009
WP 0010
WP 0012
WP 0013
WP 0014
WP 0015
WP 0016
WP 0017
WP 0018
WP 0019
TM 9-214

Personnel Required

Track Vehicle Repairer 63H20 (two required)

Common Tools

Heater Gun Type, Electric (two required) (WP 0025, Item 9)
Hoist, Lifting 1 Ton Capacity (WP 0025, Item 10)
Maintenance Stand, Turnover, Transmission/Engine
Shop Equipment, Automotive Maintenance and Repair: Field Maintenance, Basic, Less Power (WP 0025, Item 20)
Tool Kit, General Mechanic's Automotive (WP 0025, Item 27)

Special Tools

Adapter, Socket Wrench, 1/2 inch to 3/8 inch Square Drive (WP 0025, Item 1)
Adapter Kit, Container (WP 0025, Item 2)
Sling, Engine and Transmission, Motor Vehicle (WP 0025, Item 21)
Sling, Multiple Leg (WP 0025, Item 22)
Socket, Socket Wrench (WP 0025, Item 23)

Fabricated Tools

Guide Pin, 3/8-16 x 4 Inch (2 Required) (WP 0027, Item 3)
Guide Pin, 5/16-18 x 3 Inch (4 required) (WP 0027, Item 2)
Guide Pin, 5/16-24 x 3 Inch (2 required) (WP 0027, Item 4)
Retaining Fixture (WP 0027, Item 1)

Repair Parts

Ball, Bearing (73342) 23045386
Mandatory Replacement Parts, Table 1
Strainer, Element (73342) 23045247

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

Supplies

Adhesive, sealant, silicone ,RTV, Type 1 (WP 0024, Item 1)
Block, Wood, Lumber, Soft Wood, 2 x 4 Inches x 16 Inches Long (WP 0024, Item 3)
Bolt, 3/8-16 x 3/4 Inch
Bolt, 3/8-16 x 1-1/4 Inch (2 required)
Bolt, 3/8-16 x 1-1/2 Inch (4 required)
Bolt, 3/8-16 x 1-3/4 Inch (3 required)
Bolt, 3/8-16 x 2 Inch (2 required)
Bolt, 3/8-16 x 2-3/4 Inch
Bolt, 3/8-16 x 3-1/2 Inch (2 required)
Bolt, 7/16-14 x 1-1/4 Inch (3 required)
Cloth, Abrasive, Crocus (WP 0024, Item 6)
Cloth, batiste, lint-free, white (WP 0024, Item 7)
Eyebolt, 7/8-9
Lubricating Oil, Engine, (WP 0024, Item 12)
Marker, Tube Type, Black (WP 0024, Item 13)
Nut, Hex, 5/16-24 (3 required)
Petrolatum, Technical (Petroleum Jelly) (WP 0024, Item 14)
Rag, wiping, 50 lb bale (WP 0024, Item 15)
Twine, Cotton, 16 Ply, 30 Inches (WP 0024, Item 23)
Washer, Flat 3/8 Inch (6 required)
Washer, Flat 7/16 Inch (3 required)
Washer, Flat 5/16 Inch (3 required)

Preliminary Procedure

Transmission removed from vehicle or container.
Oil Level Tube Removed. Reference WP 0010.

SCOPE

This work package addresses disassembly and assembly of the transmission into and from major assemblies.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

ITEMS COVERED IN THIS WORK PACKAGE **PAGE**

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

ITEMS COVERED IN THIS WORK PACKAGE Cont. **PAGE**

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

DISASSEMBLY OF TRANSMISSION INTO MAJOR ASSEMBLIES

REMOVE BREATHER, RIGHT AND LEFT LIFTING BRACKETS AND TOP COVER

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 is upright on floor or work table.

Remove Breather

1. Hold reducer (1) located under breather (2).
2. Unscrew breather (2) from reducer (1).
3. Remove reducer (1) from transmission.

Remove Right and Left Lifting Brackets

1. Remove two bolts (3) and two washers (4) from left lifting bracket (5) and right lifting bracket (6).
2. Remove left lifting bracket (5) and right lifting bracket (6).

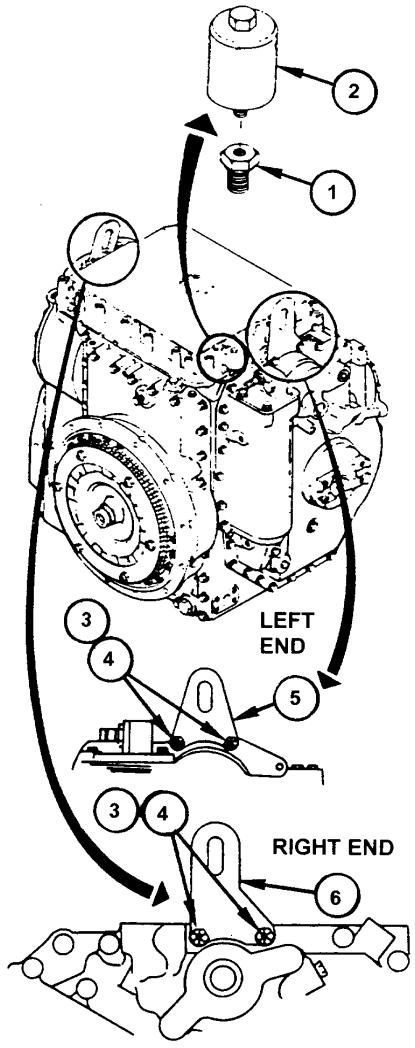


Figure 1. Breather, Right and Left Lifting Brackets.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

REMOVE BREATHER, RIGHT AND LEFT LIFTING BRACKETS AND TOP COVER - Cont.

Remove Top Cover

1. Remove 15 flanged-head bolts (7), 9 flanged-head bolts (8), 2 flanged-head bolts (9) from transmission top cover (10).

2. Remove transmission top cover (10) and transmission top cover gasket (11) from transmission. If necessary, tap cover (10) with plastic faced hammer to loosen. Discard transmission top cover gasket (11).

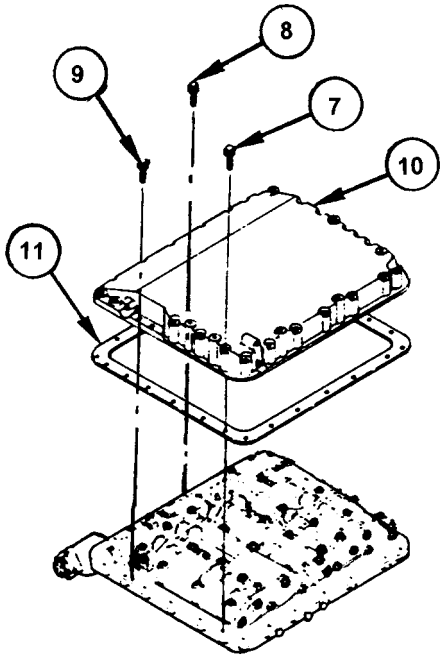


Figure 2. Top Cover Assembly.

REPAIR: Refer to Replacing Top Cover Components, Oil Transfer Plate, WP 0017 00-7 for repair of transmission top cover.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

REMOVE WIRING HARNESS ASSEMBLY

NOTE

Top Cover Assembly is removed from transmission.

Wiring harness can be removed without removal of solenoids or Control Valve Assemblies.

Wiring harness does not have to be removed to remove Control Valve Assemblies.

Transmission is upright on floor or work table.

1. Clean wiring harness connector body (12) and transmission area around connector.
2. Remove four screws (13) holding wiring harness connector body (12) to transmission. Discard screws (13).
3. Unfasten seven plastic connectors (14) that attach wiring harness (15) to solenoids (16).
4. Remove bolt (17) and washer (18) holding harness ground connector (19) to Main Control Valve Assembly (20).

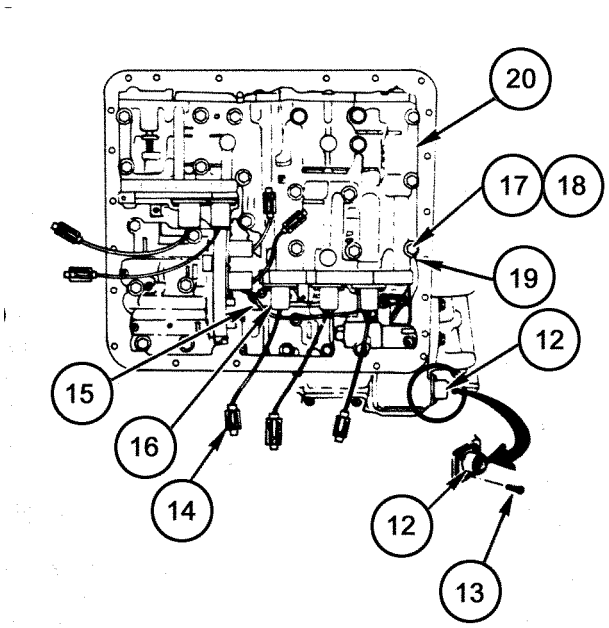


Figure 3. Wiring Harness Assembly.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

REMOVE WIRING HARNESS ASSEMBLY – Cont.

NOTE

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

Twine is not necessary if transmission top components are to be completely removed.

5. Tie a piece of Twine, 30 Inches (WP 0024, Item 23) to harness connector F or G. Remove harness (15). When the harness is out of the transmission, cut the piece of Twine, 30 Inches (WP 0024, Item 23) off the connector, leaving the twine installed through the harness bore. When installing or replacing the harness, tie the outside end of the twine to connector F or G and use inside end of twine to pull harness through.

6. Pulling on wiring harness connector body (12) with one hand and feeding wiring harness (15) through transmission with other hand, remove wiring harness and gasket (21) from transmission. Discard gasket (21).

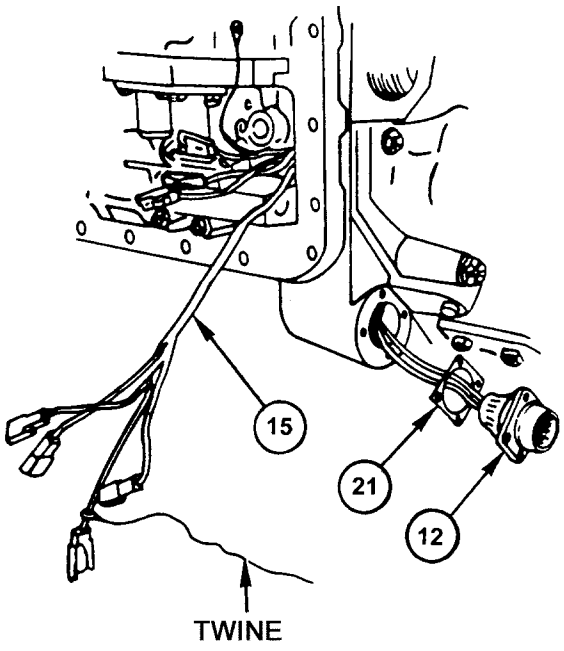


Figure 4. Twine on Wiring Harness Assembly.

REPAIR: Refer to Repair: Replace Insulators, Terminals on Solenoids, Wiring Harness, WP 00017 00-3 for repair of Wiring Harness Assembly.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

REMOVE MAIN CONTROL VALVE ASSEMBLY

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, except for wiring harness ground connector.

One bolt (17) and washer (18) is removed from control valve assembly when harness ground connector is removed.

Transmission is upright on floor or work table.

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 Repair Transmission Top Components, WP 00017 00-1.

1. If necessary, remove the one bolt (17) and one washer (18) that retains the wiring harness ground connector to the Main Control Valve Assembly (20).
2. Remove the remaining 16 bolts (22) and washers (23) from Main Control Valve Assembly (20).
3. Remove Main Control Valve Assembly (20).

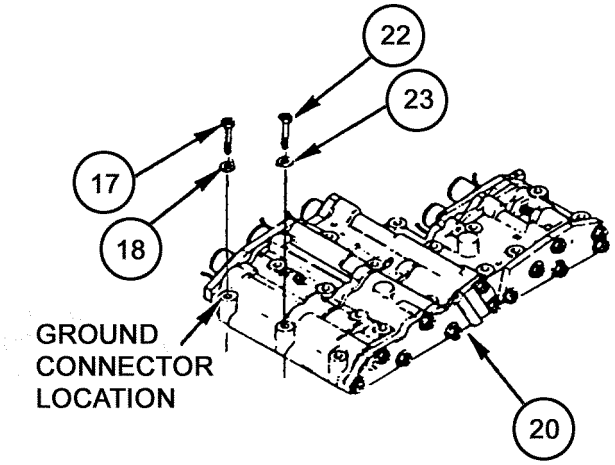


Figure 5. Main Control Valve Assembly.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

REMOVE LOCKUP CONTROL VALVE ASSEMBLY

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 Lockup Control Valve Assembly.

Transmission is upright on floor or work table.

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 Repair Transmission Top Components, WP 00017 00-1.

1. Remove the six bolts (24) and six washers (25) from Lockup Control Valve Assembly (26).
2. Remove Lockup Control Valve Assembly (26).

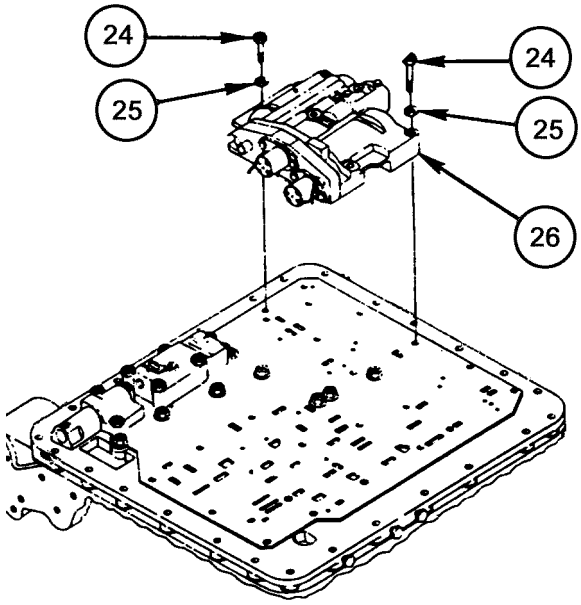


Figure 6. Lockup Control Valve Assembly.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

REMOVE PRIORITY VALVE ASSEMBLY

NOTE

Top Cover Assembly is removed from transmission.

Wiring harness does not have to be removed to remove Priority Valve Assembly.

Transmission is upright on floor or work table.

1. Remove three bolts (27) and three washers (28) from Priority Valve Assembly (29).
2. Remove Priority Valve Assembly (29).

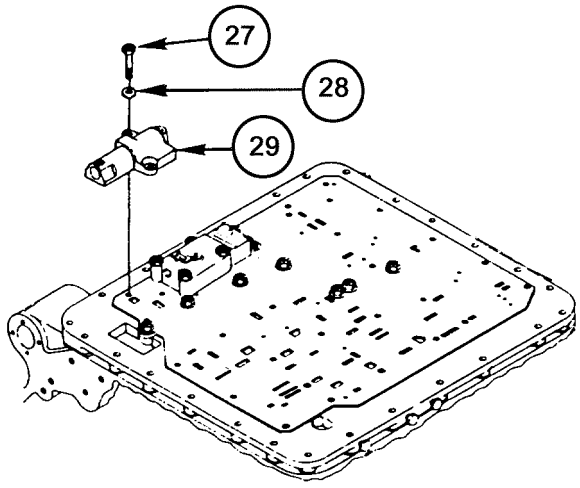


Figure 7. Priority Valve Assembly.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

REMOVE G2 BACKUP VALVE ASSEMBLY

NOTE

Top Cover Assembly is removed from transmission.

Wiring harness does not have to be removed to remove G2 Backup Valve Assembly.

Transmission is upright on floor or work table.

1. Remove the four bolts (30) and four washers (31) from G2 Backup Valve Assembly (32).
2. Remove G2 Backup Valve Assembly (32).

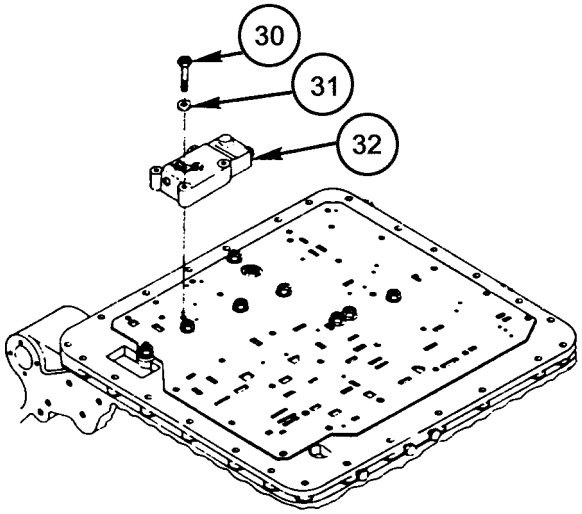


Figure 8. G2 Backup Valve Assembly.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

REMOVE SEPARATOR PLATE

NOTE

Transmission is upright on floor or work table.

1. Remove two flanged-head bolts (33) from separator plate (34).
2. Remove five bolts (35) and five washers (36) from separator plate (34).
3. Remove bolt (37) and washer (38) from separator plate (34).
4. Remove separator plate (34).

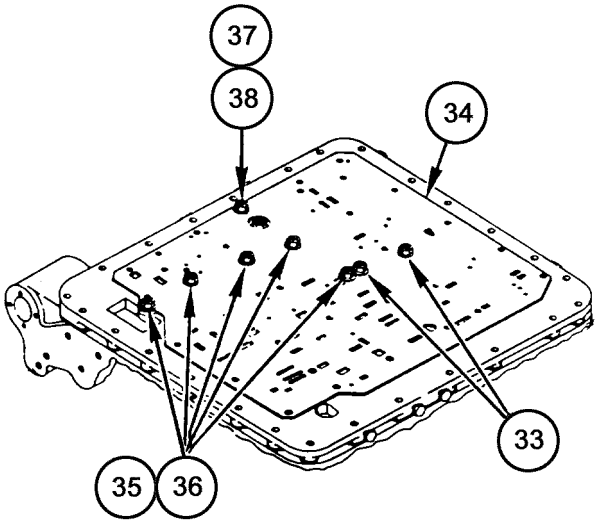


Figure 9. Separator Plate.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

REMOVE OIL TRANSFER PLATE

1. Remove bolt (39) and washer (40) from Oil Transfer Plate Assembly (41).

CAUTION

A 5/16-inch diameter ball bearing (nylon check ball) (42) is located in a bore on the top side of the Oil Transfer Plate Assembly, beneath the location of the G2 Backup Valve Assembly. Care should be taken not to turn the Oil Transfer Plate Assembly over and drop the ball into the transmission. The ball could damage the transmission if it drops into transmission and is not removed.

2. Remove Oil Transfer Plate Assembly (41).

3. After Oil Transfer Plate Assembly (41) has been moved away from transmission, remove Ball, Bearing (73342) 23045386 (nylon check ball) (42) from Oil Transfer Plate Assembly (41).

4. Inspect Ball, Bearing (73342) 23045386 (nylon check ball) (42) and replace if damaged. Put ball (42) in a secure location.

5. Remove oil transfer plate gasket (43) from top of Center Housing Assembly (44). Discard gasket (43).

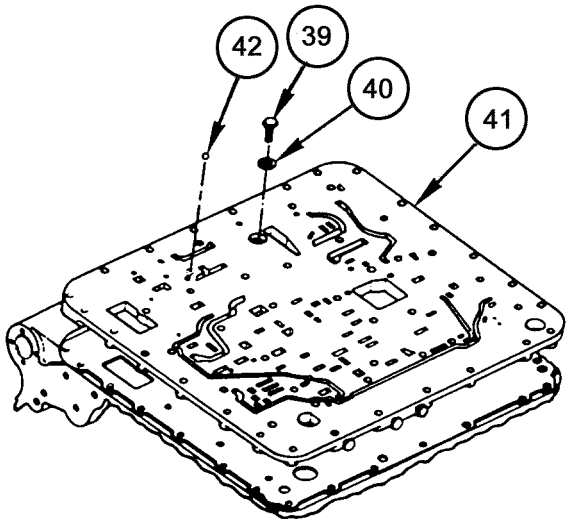


Figure 10. Oil Transfer Plate.

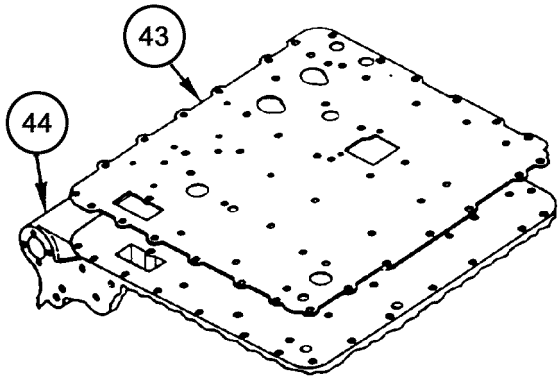


Figure 11. Oil Transfer Plate Gasket.

REPAIR: Refer to Replace Oil Transfer Plate Plugs, WP 0017 00-12 for repair of the Oil Transfer Plate Assembly.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

REMOVE GOVERNOR FILTER SCREEN

1. Remove Strainer, Element, Se (73342) 23045247 (governor filter screen) (45) from port in top of Center Housing Assembly (44).

2. Inspect Strainer, Element, Se (73342) 23045247 (governor filter screen) (45) for tears and holes. Replace if damaged.

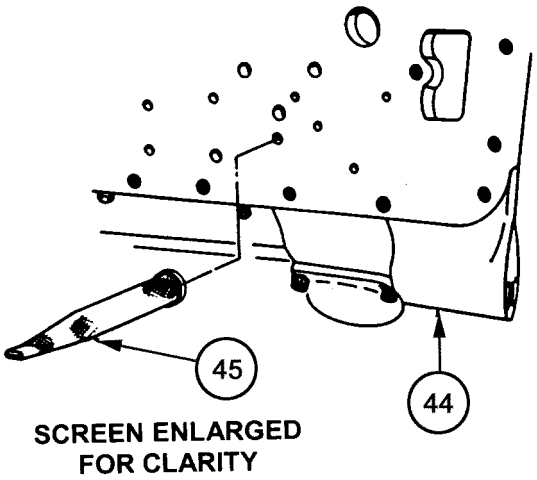


Figure 12. Governor Filter Screen.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

INSTALL ADAPTER PLATE ON MAINTENANCE STAND

WARNING

Adapter plate weighs 127 pounds (57.6 kilograms). Lift plate with hoist to avoid injury.

NOTE

An adapter plate must be mounted on the maintenance turnover stand in order to accept the transmission.

1. Install and securely tighten eyebolt (46) (Part of Adapter Kit, Container (WP 0025, Item 2)) in end of adapter plate (47) (Part of Adapter Kit, Container (WP 0025, Item 2)).
2. Using Sling, Engine and Transmission (WP 0025, Item 21) position adapter plate (47) (Part of Adapter Kit, Container (WP 0025, Item 2)) so that six holes in adapter plate are aligned with six holes in head of maintenance stand (48).
3. Install two 5/8-11 x 3 inch bolts (49) (Part of Adapter Kit (WP 0025, Item 2)) and two washers (50) (Part of Adapter Kit, Container (WP 0025, Item 2)) through opposite sides of maintenance stand head (48) and into adapter plate (47) to hold alignment.
4. Install the four remaining bolts (49) and four washers (50) holding adapter plate (47) to maintenance stand (48). Tighten all six bolts (49).
5. Torque six bolts (49) to 160-175 lb-ft. (217-237 N·m).
6. Remove Sling, Engine and Transmission (WP 0025, Item 21) .

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

INSTALL ADAPTER PLATE ON MAINTENANCE STAND - Cont.

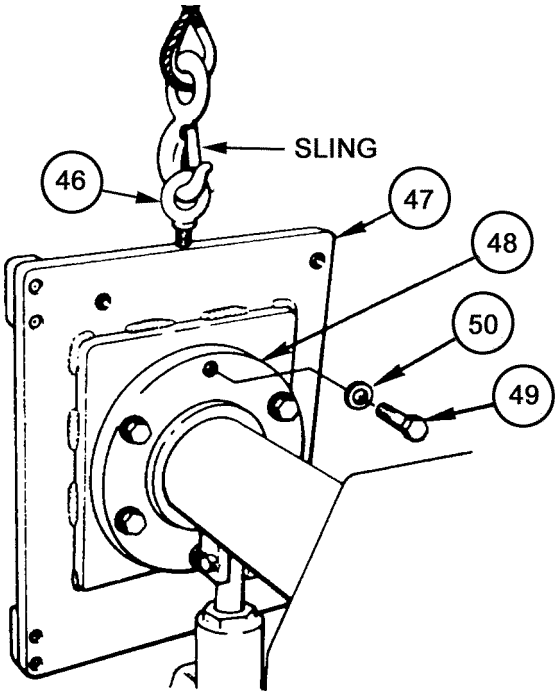


Figure 13. Adapter Plate.

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 lbs (442 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.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

INSTALL TRANSMISSION ON ADAPTER PLATE

NOTE

An adapter plate must be mounted on the maintenance turnover stand in order to accept the transmission. The transmission must be mounted on the adapter plate.

If lifting brackets must be reinstalled on transmission, go to WP 0011 00-18, Step 1, located within this subheading.

If lifting brackets have not been removed from transmission, go to this WP 0011 00-19, Step 4, located within this subheading.

1. Hold left lifting bracket (5) over bracket holes in Left Hand Cover Assembly (51), with bracket leaning toward center of transmission.
2. Install two 3/8-16 x 1-1/2 inch bolts (3) and two 3/8 inch washers (4), to attach bracket (5) to Left Hand Cover Assembly (51).
3. Repeat above Steps 1 through 2 to install right lifting bracket (6) onto Right Hand Cover Assembly (52).

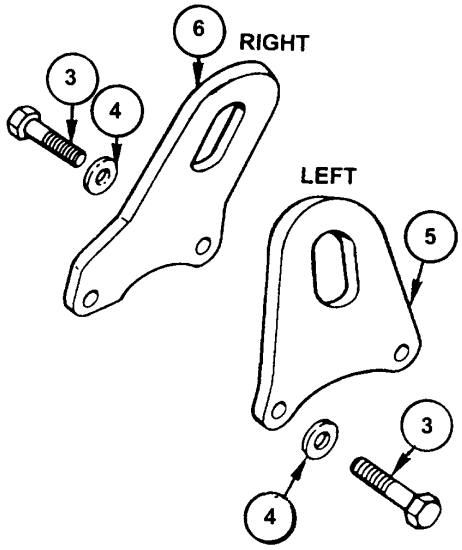


Figure 14. Right and Left Lifting Brackets.

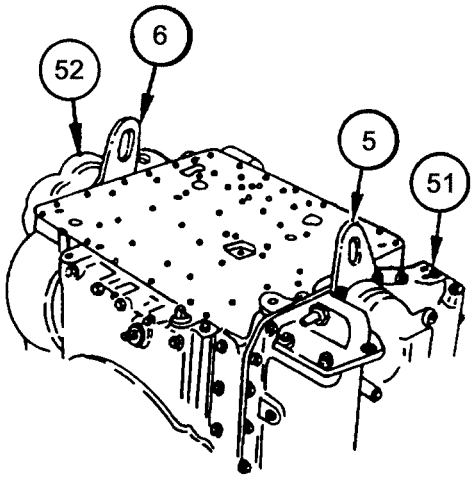


Figure 15. Right and Left Lifting Brackets Mounted on Transmission.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

INSTALL TRANSMISSION ON ADAPTER PLATE – Cont.

4. Attach hooks of Sling, Engine and Transmission (WP 0025, Item 21) into left lifting bracket (5) and right lifting bracket (6).

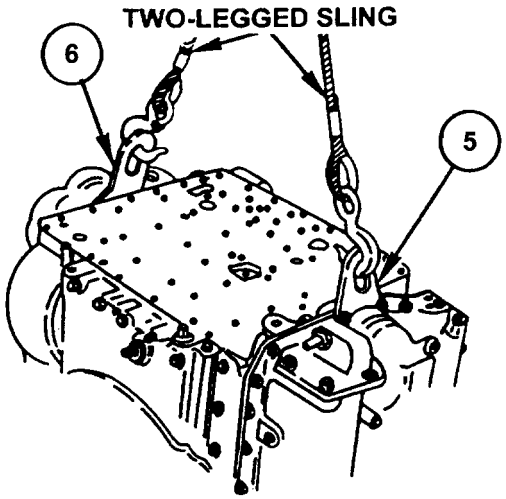


Figure 16. Sling Hooks on Right and Left Lifting Brackets.

5. Remove bolt (53) and washer (54) from input housing (55).

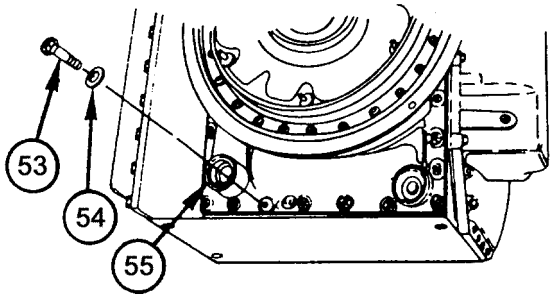


Figure 17. Input Housing Bolt Removal.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

INSTALL TRANSMISSION ON ADAPTER PLATE – Cont.

6. Remove bolt (56) and washer (57) from Left Hand Cover Assembly (51).

7. Remove bolt (58) and washer (59) from Right Hand Cover Assembly (52).

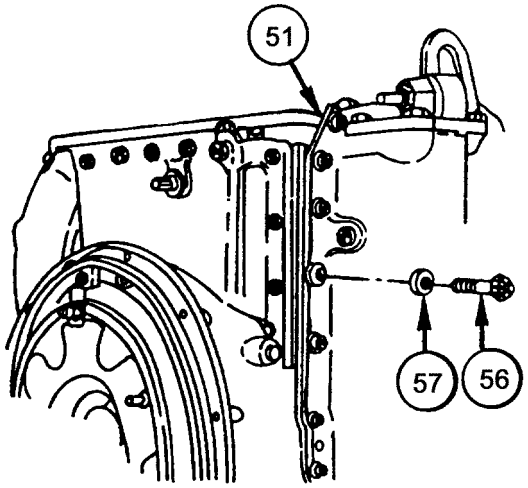


Figure 18. Left End Cover Bolt.

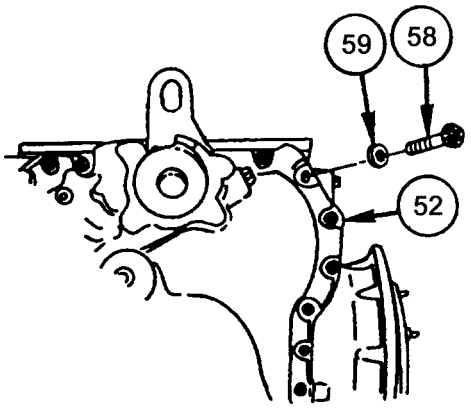


Figure 19. Right End Cover Bolt.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

INSTALL TRANSMISSION ON ADAPTER PLATE – Cont.

8. Attach Sling, Multiple Leg (WP 0025, Item 22) to transmission where bolts were removed in Steps 5, 6 and 7 this section. Install 3/8-16 x 1-3/4 inch bolt (60) through each sling lug with one 3/8 inch washer (61) under each bolt head and one 3/8 inch washer (61) under each lug. Tighten bolts until snug.

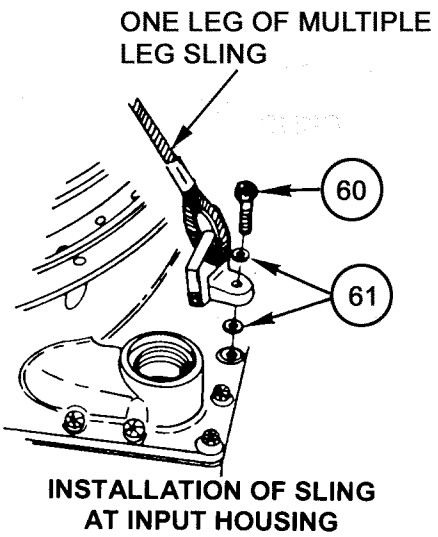


Figure 20. Attachment of Multiple Leg Sling.

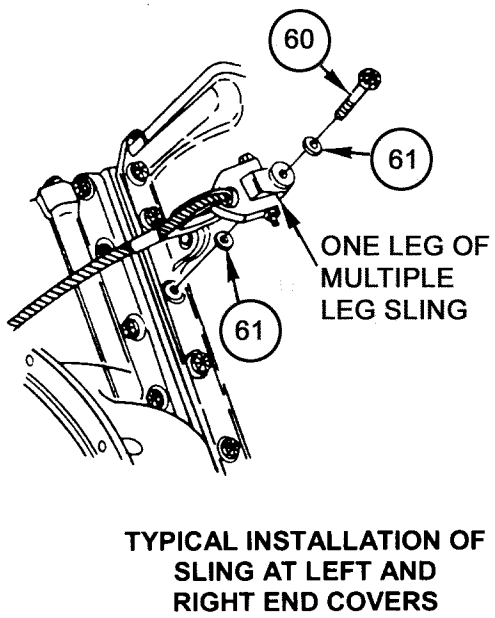


Figure 21. Attachment of Multiple Leg Sling

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

INSTALL TRANSMISSION ON ADAPTER PLATE – Cont.

CAUTION

When raising Sling, Multiple Leg (WP 0025, Item 22), also raise Sling, Engine and Transmission (WP 0025, Item 21) 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 Sling, Engine and Transmission (WP 0025, Item 21) attached to lifting brackets until bottom of transmission is approximately one foot (0.305 m) above floor.

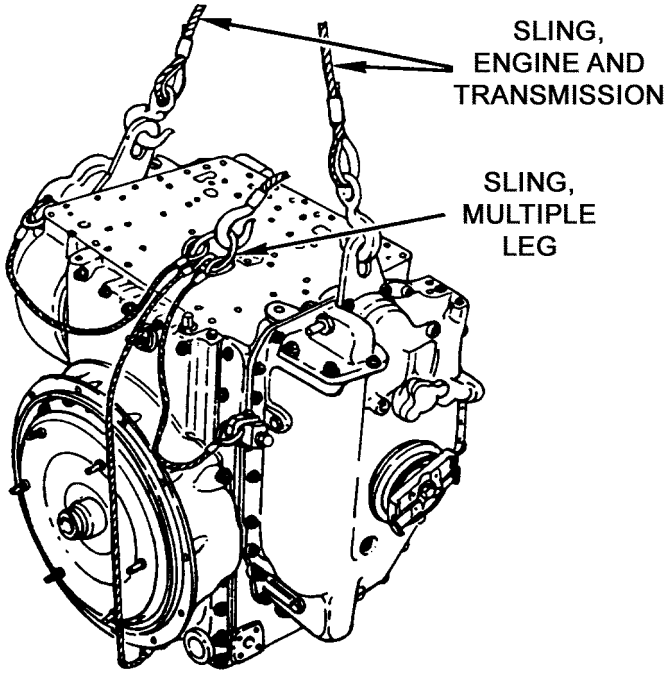


Figure 22. Slings (Beginning Rotation).

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

INSTALL TRANSMISSION ON ADAPTER PLATE – Cont.

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.

10. Raise Sling, Engine and Transmission (WP 0025, Item 21) as necessary to maintain proper clearance between transmission and floor.

11. Slowly raise Sling, Multiple Leg (WP 0025, Item 22) until weight of transmission is entirely on Sling, Multiple Leg (WP 0025, Item 22).

12. Remove Sling, Engine and Transmission (WP 0025, Item 21).

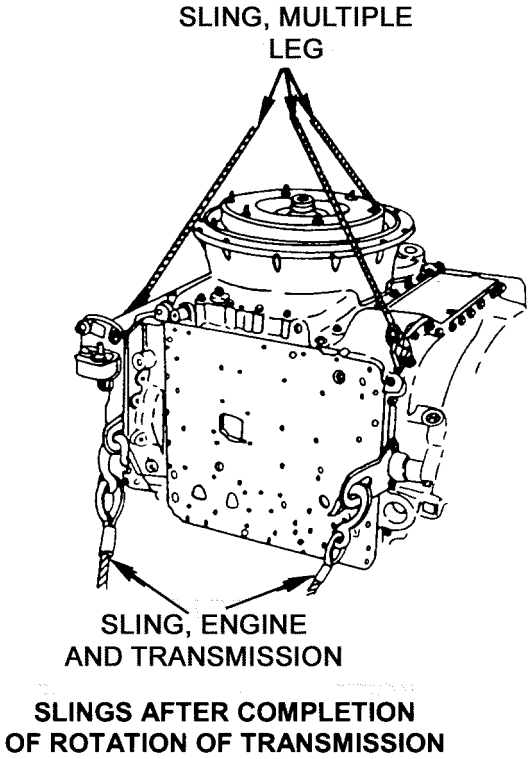


Figure 23. Slings (Completion Rotation).

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

INSTALL TRANSMISSION ON ADAPTER PLATE – Cont.

13. Rotate adapter plate (47) on maintenance stand to match hole pattern in plate with holes on bottom of transmission (62).

14. Align holes in bottom of transmission (62) with holes in adapter plate (47).

15. Install washers (63) (part of Adapter Kit, Container (WP 0025, Item 1) under heads of three 1/2-13 x 2 inch bolts (64) (part of Adapter Kit, Container (WP 0025, Item 1). Install bolts (64) through three holes in adapter plate (47). Screw bolts (64) into holes in bottom of transmission (62).

16. Torque three bolts (64) to 80-95 lb-ft (108-129 N·m).

17. Remove three 3/8 -16 x 1-3/4 inch bolts (60) and six 3/8 inch washers (61) holding Sling, Multiple Leg (WP 0025, Item 22).

18. Remove Sling, Multiple Leg (WP 0025, Item 22).

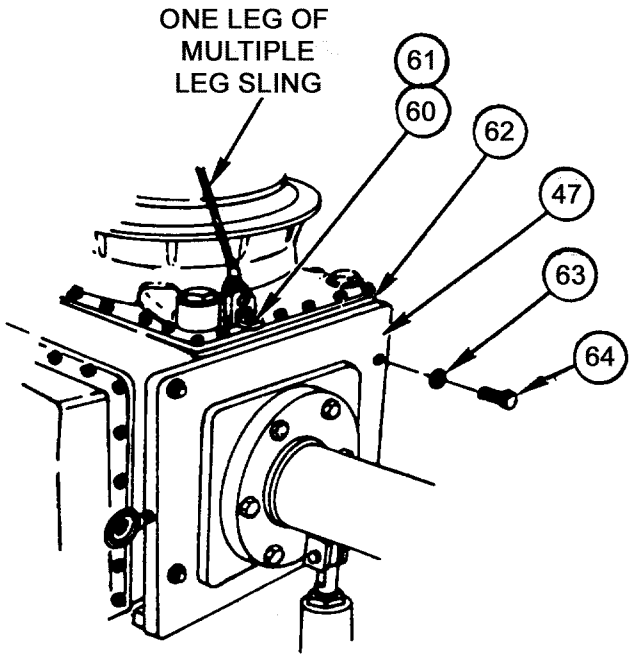


Figure 24. Adapter Attaching Bolts.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

INSTALL TRANSMISSION ON ADAPTER PLATE – Cont.

NOTE

Bolts (56 and 58) were removed in Steps 6 and 7.

19. Install bolt (58) and washer (59) in Right Hand Cover Assembly (52).

20. Install bolt (56) and washer (57) in Left Hand Cover Assembly (51).

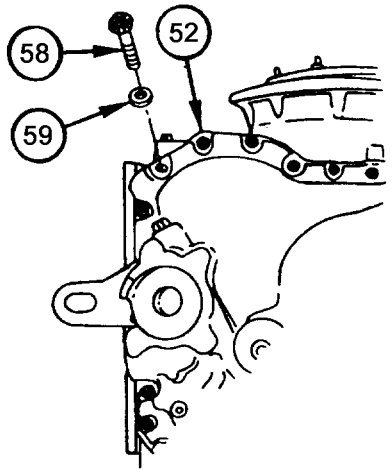


Figure 25. Right End Cover Bolt Install.

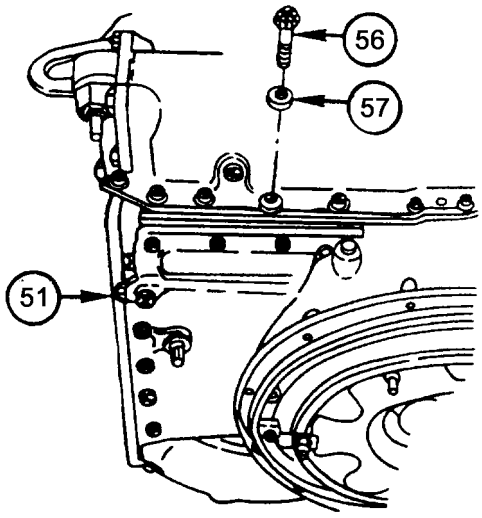


Figure 26. Left End Cover Bolt Install.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

INSTALL TRANSMISSION ON ADAPTER PLATE – Cont.

NOTE

Bolt (53) was removed in Step 5.

21. Install bolt (53) and washer (54) in input housing (55).

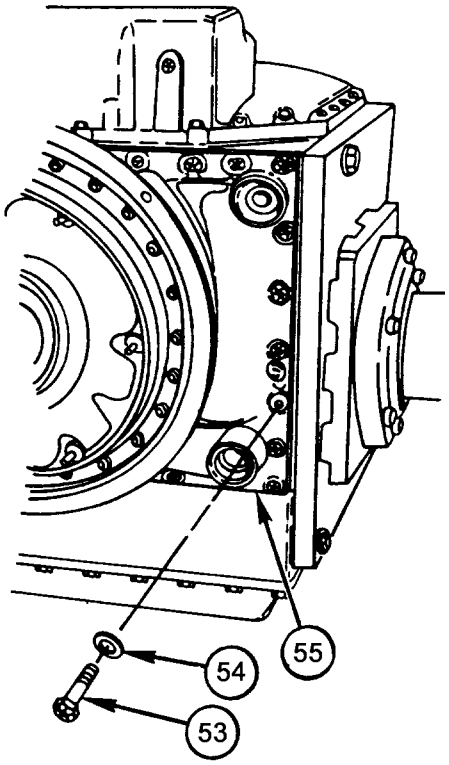


Figure 27. Input Housing Bolt Install.

REMOVE RIGHT HAND COVER ASSEMBLY

OVERVIEW

It is necessary to remove the Right Hand Cover Assembly to perform the following maintenance:

Remove components from under the Right Hand Cover Assembly.

Remove components from within the Right Hand 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 Hand Cover Assembly. (The Left Hand Cover Assembly 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 Hand Cover Assembly) 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 Hand Cover Assembly.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

REMOVE RIGHT HAND COVER ASSEMBLY – Cont.

NOTE

Transmission is mounted on maintenance stand, right end turned up.

1. Clean Right Hand Cover Assembly (52).
2. Remove two bolts (3) and washers (4) from right lifting bracket (6). Remove bracket.

NOTE

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

3. Remove six bolts (65) and washers (66) from right brake adjusting cover (67).
4. Remove right brake adjusting cover (67).
5. Remove right brake adjusting cover gasket (68). Discard gasket.

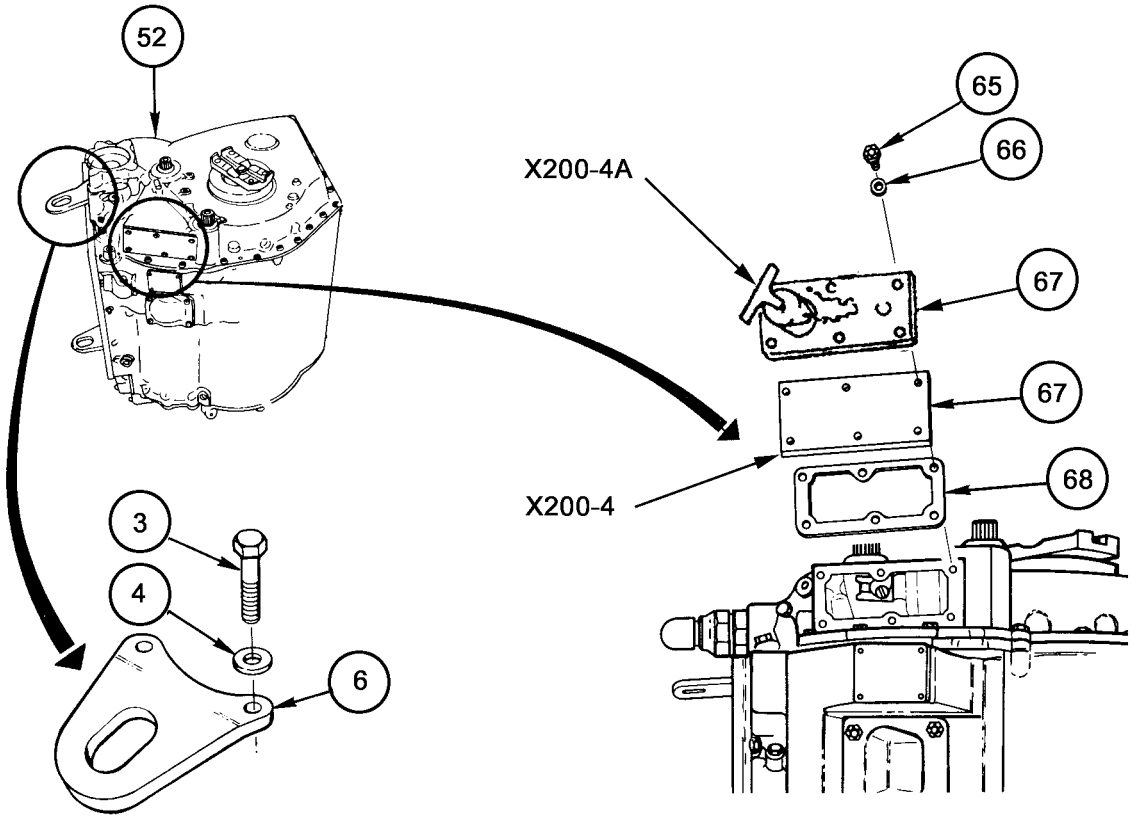


Figure 28. Right Hand Cover Assembly.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

REMOVE RIGHT HAND COVER ASSEMBLY – Cont.

6. Remove 26 remaining bolts (69) and 26 washers (70), and one bolt (71) and one washer (72) from Right Hand Cover Assembly (52).

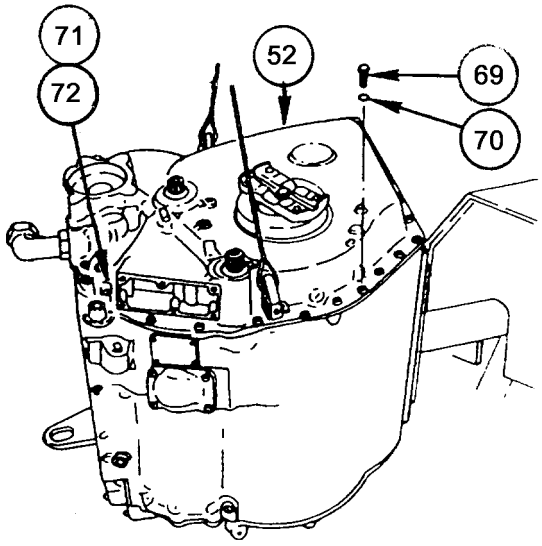


Figure 29. Right Hand Cover Assembly.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

REMOVE RIGHT HAND COVER ASSEMBLY – Cont.

NOTE

Two legs of Sling, Multiple Leg (WP 0025, Item 22) are used in this task. When sling bolts are tightened, they loosen end cover from transmission.

7. Install one 3/8 inch washer (73) on each of two 3/8-16 x 2 inch bolts (74) and install bolts (74) through lugs of Sling, Multiple Leg (WP 0025, Item 22).
8. Install one bolt (74), protruding from sling lug, into each hole (75) on Right Hand Cover Assembly (52).
9. Alternately tighten two bolts (74) until Right Hand Cover Assembly (52) loosens.
10. Gently strike elbow (76) to loosen Right Hand Cover Assembly (52).

WARNING

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

Right Hand Cover Assembly must be lifted using sling and hoist. To avoid injury, keep clear of end cover at all times. Do not let Right Hand Cover Assembly swing freely during hoisting.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

REMOVE RIGHT HAND COVER ASSEMBLY – Cont.

11. Using hoist and Sling, Multiple Leg (WP 0025, Item 22), remove Right Hand Cover Assembly (52).

NOTE

Outer steer shaft, lube tube and brake coolant tube, may be lifted out when Right Hand Cover Assembly is removed.

12. Remove two bolts (74), two washers (73) and Sling, Multiple Leg (WP 0025, Item 22) from Right Hand Cover Assembly (52).

13. Remove right end cover gasket (77). Discard gasket (77).

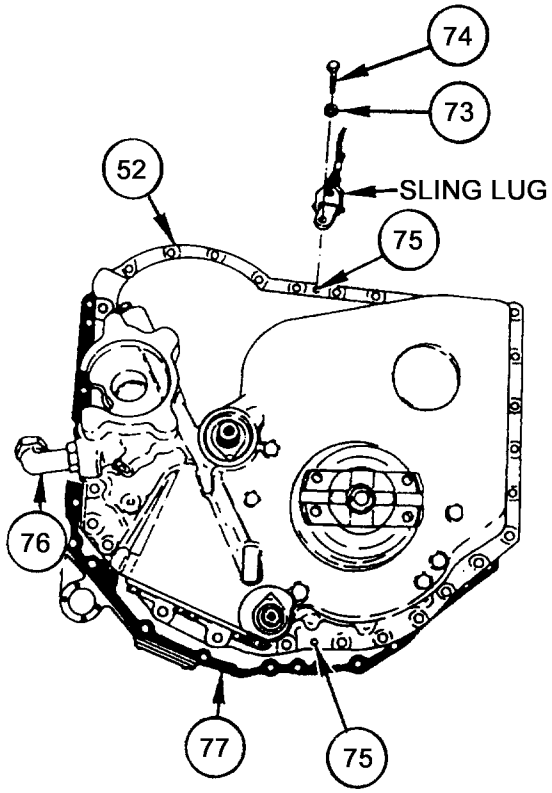


Figure 30. Right Hand Cover Assembly.

REPAIR: Refer to Disassembly, Repair and Assembly of the Right Hand Cover Assembly, WP 0012 00-1 to repair Right Hand Cover Assembly.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

REMOVE LOOSE COMPONENTS, RIGHT END OF TRANSMISSION

REMOVE OUTER (RIGHT) STEER SHAFT

CAUTION

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

NOTE

Outer (Right) steer shaft may have come out when Right Hand Cover Assembly was removed.

Wiggle shaft to remove, if necessary.

Retaining rings on steer shafts function as stops. They should not be removed unless defective.

1. Remove outer (right) steer shaft (78) from steer shaft drive gear (79) in transmission (62).
2. Remove two retaining rings (80) from shaft (78) if out of round, bent, or if tension is lost.

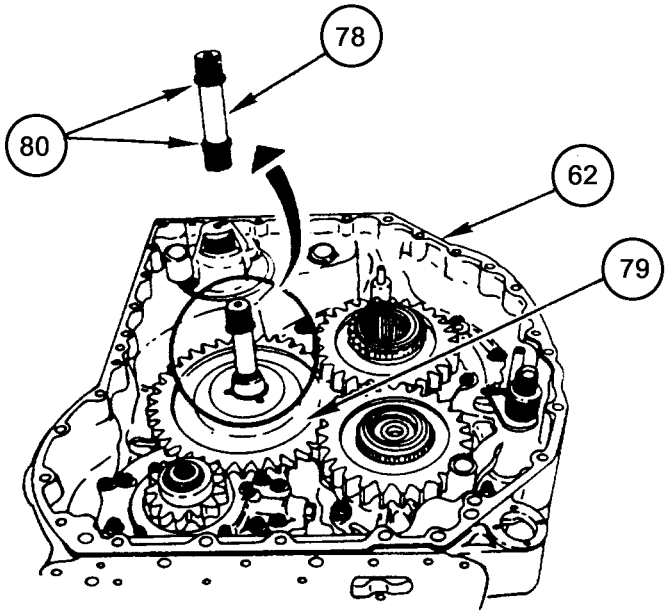


Figure 31. Outer (Right) Steer Shaft.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

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.

When either bearing on gears (81, 82) is defective, both top and bottom bearings on the gear must be replaced.

When the inner race and rollers is replaced, the outer race must also be replaced.

The outer races for bearings on top of gears (81, 82) remain in the Right Hand Cover Assembly. Refer to Disassembly, Repair and Assembly of the Right Hand Cover Assembly, WP 0012 00-1, to replace these races.

Outer races for bearings under gears (79, 81, and 82) remain in the Center Housing Assembly. Refer to Repair of Center Housing Assembly, WP 0016 00-1 to replace these races.

1. Remove range output driven gear (81) from transmission (62).
2. Remove range output drive gear (82) from transmission (62).
3. Remove steer shaft drive gear (79) from transmission (62).

NOTE

If bearings (83) require replacement go to Step 4. If bearings are serviceable, go to the Note just before Step 5.

4. Remove two bearings (83) from range output driven gear (81).

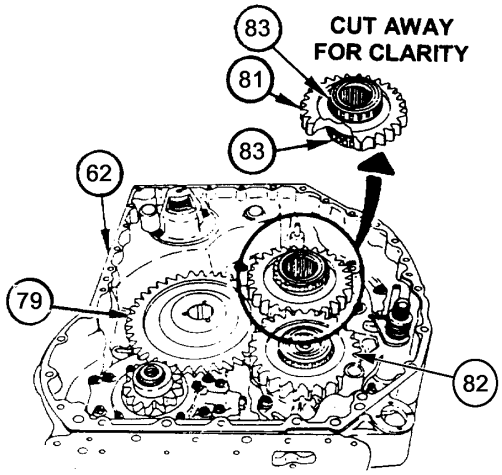


Figure 32. Range Output Gears, Steer Shaft Drive Gear and Replacement Bearings.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

REMOVE RANGE OUTPUT GEARS, STEER SHAFT DRIVE GEAR AND REPLACE BEARINGS – Cont.

NOTE

If bearings (84) require replacement go to Step 5. If bearings are serviceable, go to the Note just before Step 6.

5. Remove two bearings (84) from range output drive gear (82).

NOTE

If bearings (85) require replacement go to Step 6. If bearings are serviceable, continue to Remove Inner (Left) Steer Shaft, Range Output Gear Spacer, Tubes, WP 0011 00-35.

6. Remove bearing (85) from steer shaft drive gear (79).

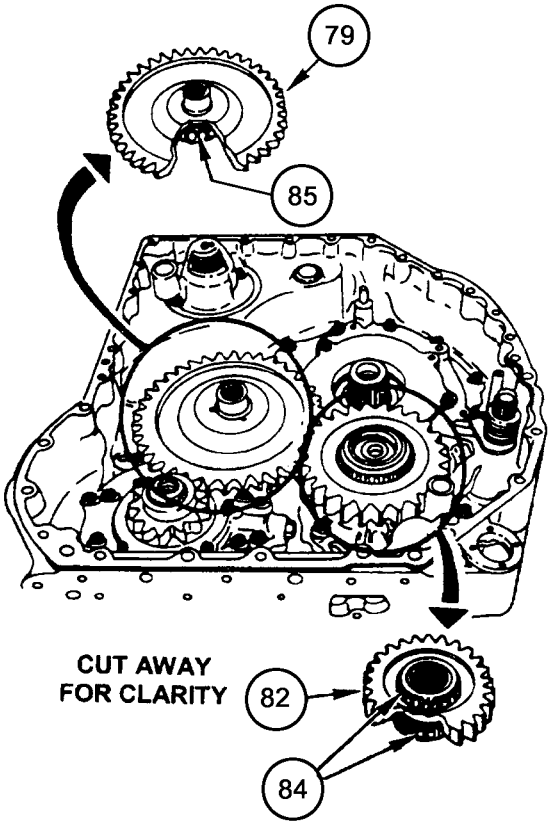


Figure 33. Range Output Gears, Steer Shaft Drive Gear and Replacement Bearings.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

REMOVE INNER (LEFT) STEER SHAFT, RANGE OUTPUT GEAR SPACER, TUBES

NOTE

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

1. Remove inner (left) steer shaft (86).
2. Remove two retaining rings (87) if out of round, bent, or if tension is lost.

NOTE

X200-4 and early models of the X200-4A Transmission have a sleeve (range output gear spacer) (88) installed. This sleeve is used when Carrier P/N (73342) 23018136 and Shaft Shouldered P/N (73342) 23018096 are installed. This sleeve is not installed in later models of the X200-4A Transmission.

3. If installed, remove sleeve (88) from Shaft and Bushing Assembly (89).

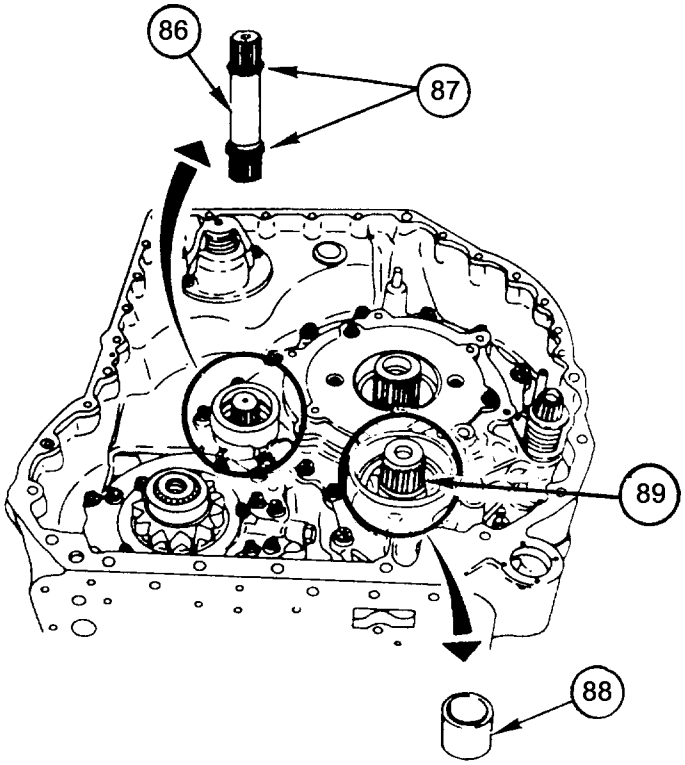


Figure 34. Inner (Left) Steer Shaft, Retaining Rings, and Spacer.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

REMOVE INNER (LEFT) STEER SHAFT, RANGE OUTPUT GEAR SPACER, TUBES – Cont.

4. Remove lube tube (90) and two packings (91). Discard packings (91).

NOTE

On X200-4 brake apply tube (92) may remain in Right Hand Cover Assembly, or it may remain in Center Housing Assembly.

On X200-4A brake apply tube (92) is pressed into Right Hand Brake Support and uses only one packing.

5. X200-4, remove brake apply tube (92) and two packings (93) from brake apply tube (92). Discard two packings (93).

6. X200-4A, remove packing (93) from brake apply tube (92). Discard one packing (93).

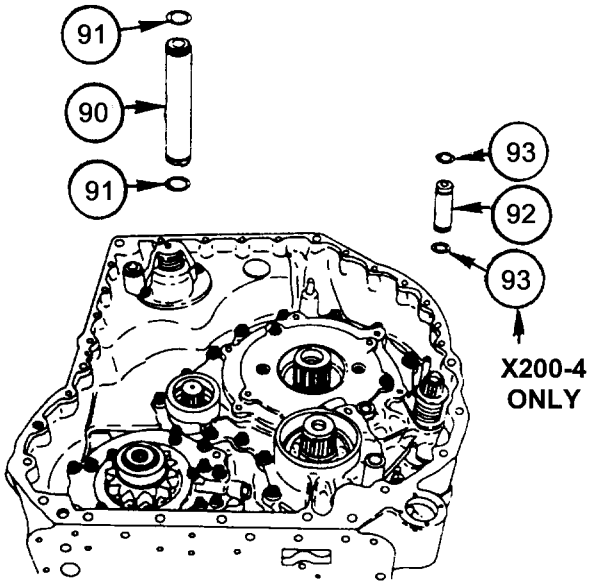


Figure 35. Tubes and Packings.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

REMOVE INNER (LEFT) STEER SHAFT, RANGE OUTPUT GEAR SPACER, TUBES – Cont.

NOTE

Brake coolant tube (94) is pressed into right hand brake support and should remain in the right hand brake support. Only one packing (95) should be removed. The brake coolant tube utilizes two packings (95). The second packing is removed in repair of the right hand brake support.

7. Remove one packing (95) from brake coolant tube (94). Discard packing (95).

NOTE

If tube (96) does not lift out easily, leave it in place.

8. Remove sump communication tube (96).

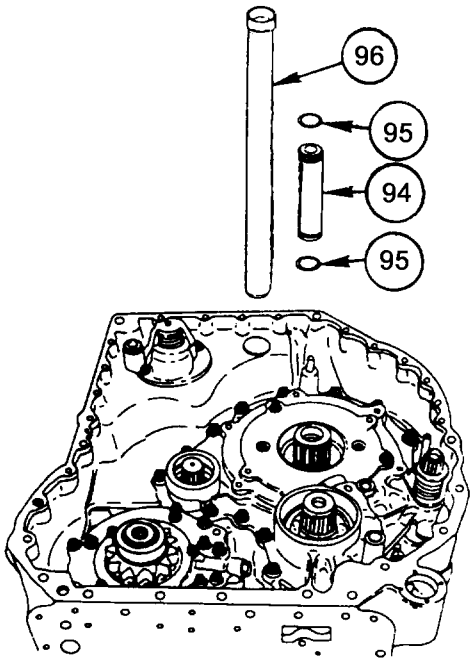
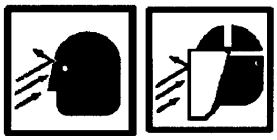


Figure 36. Tubes and Packings.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

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 (97) has been removed.

1. Use one hand to hold spring loaded equalizer valve housing (97) down when housing is being removed.
2. Remove two bolts (98) and washers (99) holding equalizer valve housing (97) to transmission. Carefully release housing, easing spring pressure before lifting housing completely off.
3. Remove spring (100).
4. Remove reverse equalizer valve (101).
5. Remove Reverse Equalizer Piston Assembly (102) with seal ring (103).
6. Remove seal ring (103). Discard seal ring (103).

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

REMOVE REVERSE EQUALIZER VALVE COMPONENTS – Cont.

NOTE

Oil transfer tube (104) may remain in transmission (Bevel Gear Assembly), or it may come out attached to underside of diaphragm (105).

7. Remove equalizer valve diaphragm (105).
8. Remove equalizer valve oil transfer tube (104) with two packings (106).
9. Remove two packings (106). Discard two packings (106).
10. Remove Scavenge Tube Assembly (107).

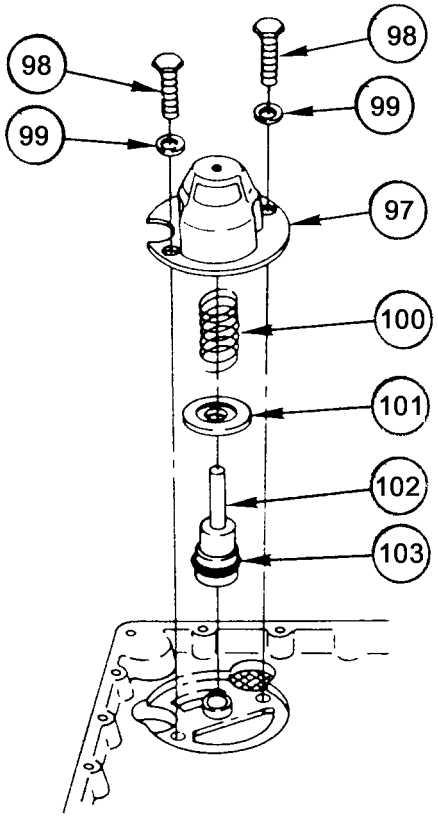


Figure 37. Equalizer Valve Components.

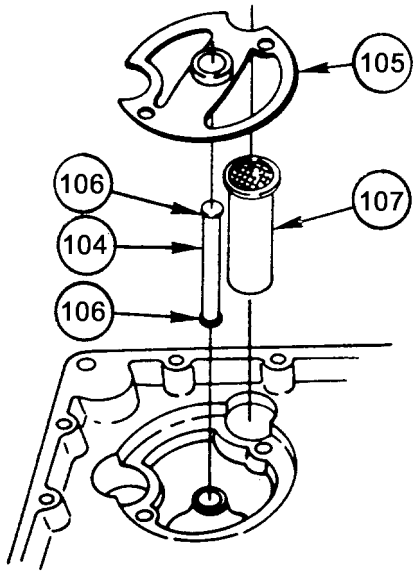


Figure 38. Equalizer Valve Components.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

REMOVE OIL FILTER HEAD ASSEMBLY

NOTE

The oil filter head prevents access to two bolts holding the Left Hand Cover Assembly to the transmission. The Oil Fill Tube Assembly must be removed prior to removal of the Left Hand Cover Assembly. Refer to Remove and Install Oil Fill Tube Assembly, WP 0010 00-1 for oil fill tube removal procedure.

1. Using rotary control handle on maintenance stand, rotate transmission so that Left Hand Cover Assembly (51) is up.
2. Clean oil filter head (108).
3. Remove three bolts (109) and washers (110) from oil filter head (108).
4. Install two 3/8-16 x 1-1/4 inch jack bolts (111) into filter head jack bolt holes (112).
5. Equally tighten jack bolts (111) until oil filter head (108) becomes loose.
6. Remove two jack bolts (111) from filter head jack bolt holes (112).

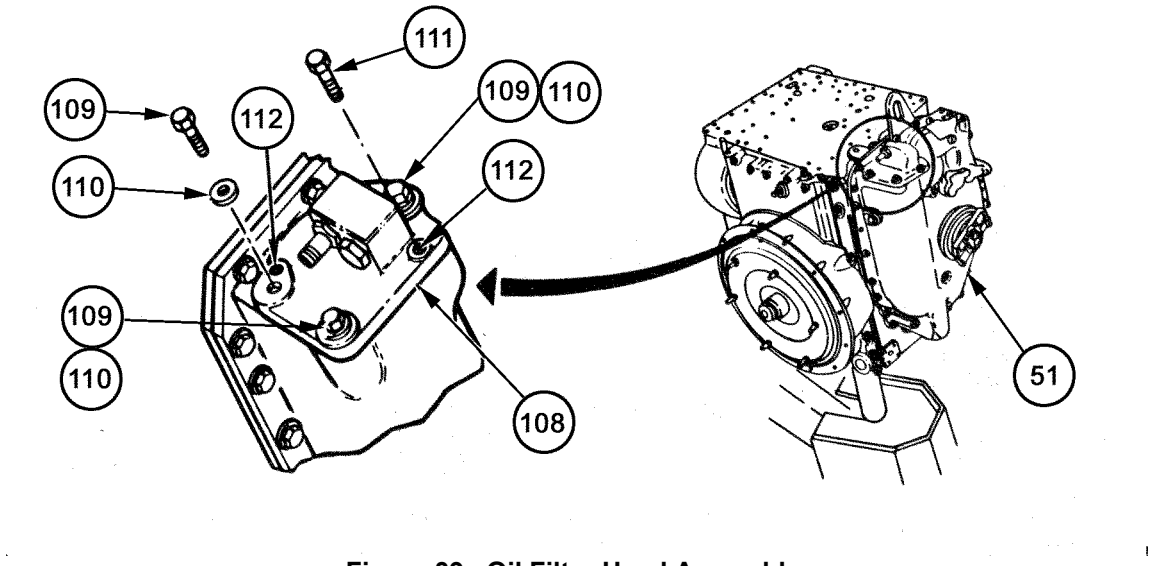


Figure 39. Oil Filter Head Assembly.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

REMOVE OIL FILTER HEAD ASSEMBLY – Cont.

7. Pull oil filter head (108) and filter element (113) from filter cavity on Left Hand Cover Assembly (51).
8. Pull oil filter head (108) and filter element (113) apart.
9. Remove two packings (114) from oil filter head (108).
10. Discard two packings (114) and filter element (113).

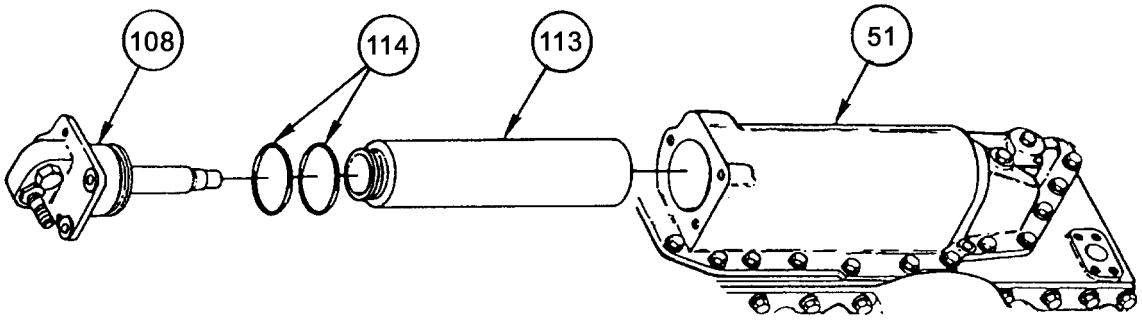


Figure 40. Oil Filter Head and Oil Filter Assembly.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

REMOVE LEFT HAND COVER ASSEMBLY

WARNING

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

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

1. Remove two bolts (3) and washers (4) from left lifting bracket (5). Remove left lifting bracket from Left Hand Cover Assembly (51).
2. Remove the remaining 29 bolts (115) and washers (116) from Left Hand Cover Assembly (51).

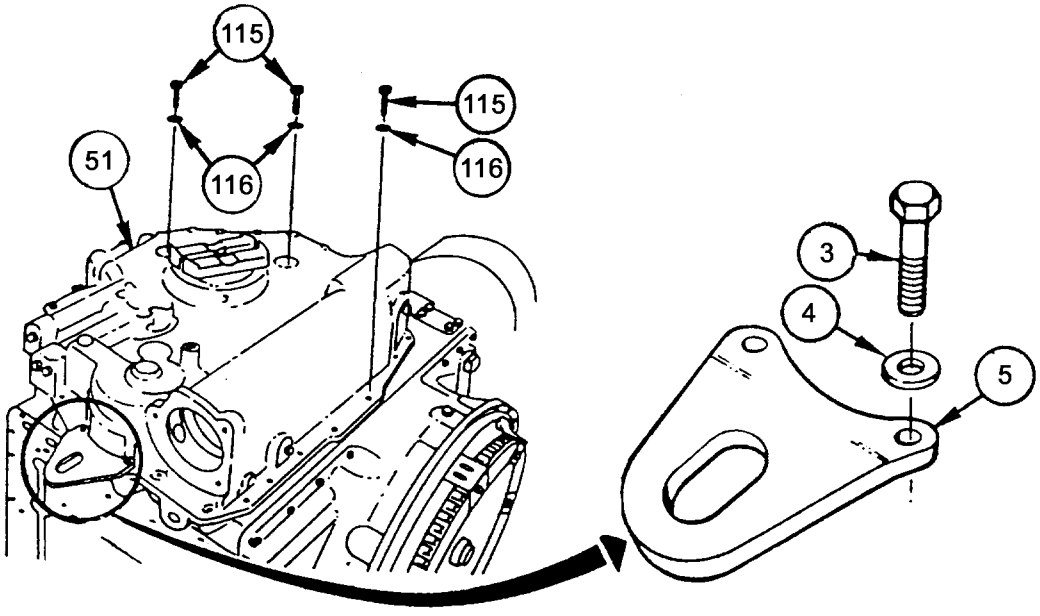


Figure 41. Left Hand Cover Assembly.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

REMOVE LEFT HAND COVER ASSEMBLY – Cont.

NOTE

Two legs of Sling, Multiple Leg (WP 0025, Item 22) are used in this task. When sling bolts are tightened, they lift Left Hand Cover Assembly from transmission.

3. Install two 3/8 inch washers (117) on two 3/8-16 x 2 inch bolts (118) and install bolts through two lugs of Sling, Multiple Leg (WP 0025, Item 22).
4. Install two bolts (118) in holes (119) on Left Hand Cover Assembly (51).
5. Alternately tighten two bolts (118) until Left Hand Cover Assembly (51) loosens.
6. Pry between Left Hand Cover Assembly (51), and Center Housing Assembly (44) to pry Left Hand Cover Assembly (51) loose.
7. Remove Left Hand Cover Assembly (51).
8. Remove bolts (118), washers (117) and Sling, Multiple Leg (WP 0025, Item 22) from Left Hand Cover Assembly (51).
9. Remove left end cover gasket (120). Discard gasket (120).

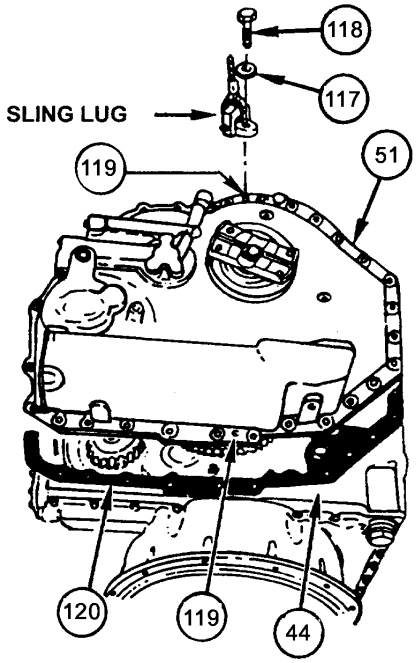


Figure 42. Left Hand Cover Assembly.

REPAIR: Refer to Disassembly, Repair, and Assembly of the Left Hand Cover Assembly, WP 0013 00-1 to repair Left Hand Cover Assembly.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

REMOVE LOOSE COMPONENTS, LEFT END OF TRANSMISSION

REMOVE RANGE INPUT GEARS AND HYDROSTATIC DRIVE GEAR

CAUTION

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

After Left Hand Cover Assembly 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 Assembly 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.

NOTE

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

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

REMOVE RANGE INPUT GEARS, HYDROSTATIC DRIVE GEAR – Cont.

1. Remove range input drive gear (121) and hydrostatic drive gear (122), together, from Center Housing Assembly (44).

NOTE

Range input drive gear and hydrostatic drive gear should not be separated unless one of these gears or inner race (123) must be replaced.

When hydrostatic drive gear is removed, inner race (123) is also removed.

Bearing outer race and rollers that match race (123) remain in the Center Housing Assembly. Refer to Repair Center Housing Components, WP 0016 00-72, to replace outer race and rollers.

2. Remove race (123) and hydrostatic drive gear (122) from range input drive gear (121).

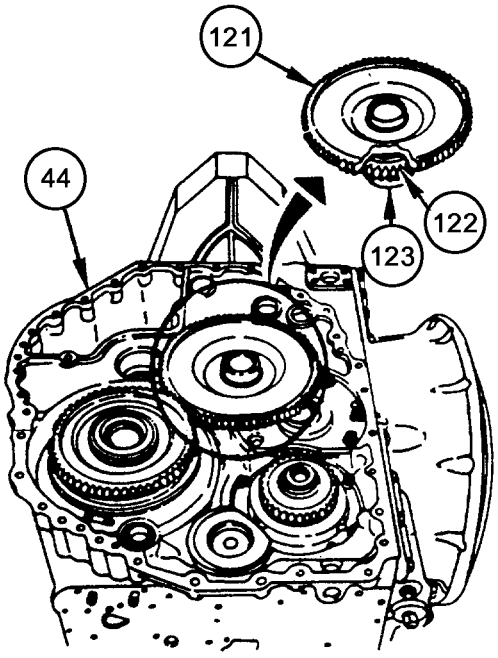


Figure 43. Range Input Gear, Hydrostatic Drive Gear.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

REMOVE RANGE INPUT GEARS, HYDROSTATIC DRIVE GEAR – Cont.

CAUTION

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

3. Cut two slots 180° apart at base of inner bearing race (124). Cut slots deep enough to catch the lip of the pry bar, but not deep enough to cut through bearing race into gear hub.

WARNING

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

4. Heat inner bearing race (124) for 15 minutes.

5. Pry up inner bearing race (124).

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

REMOVE RANGE INPUT GEARS, HYDROSTATIC DRIVE GEAR – Cont.

CAUTION

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

6. After prying up bearing race, reposition tools under bearing race (124) and remove race from gear (121).

NOTE

Bearing outer race and rollers that match race (124) remain in the Left Hand Cover Assembly. Refer to Remove Range input Driven gear Race, Range Input Drive Gear Bearing and Oil Transfer Tube Seal Ring, WP 0013 00-8 to replace the outer race and rollers.

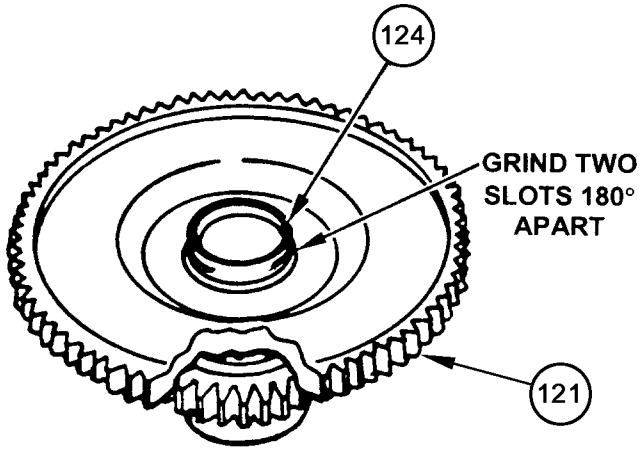


Figure 44. Hydrostatic Drive Gear Hub.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

REMOVE RANGE INPUT GEARS, HYDROSTATIC DRIVE GEAR – Cont.

NOTE

Range input driven gear (125) has bearing rollers and inner race on top. Outer race remains in Left Hand Cover Assembly. Refer to Remove Range Input Driven Gear Race, Range Input Drive Gear Bearing, and Oil Transfer Tube Seal Ring, WP 0013 00-8, to replace the outer race.

7. Remove range input driven gear (125). If bearing (126) is defective, go to Step 8. If bearing is not defective, go to Remove Bevel Gear Driven Shaft and Filter Tubes, WP 0011 00-49.

8. Remove bearing (126) from range input driven gear (125).

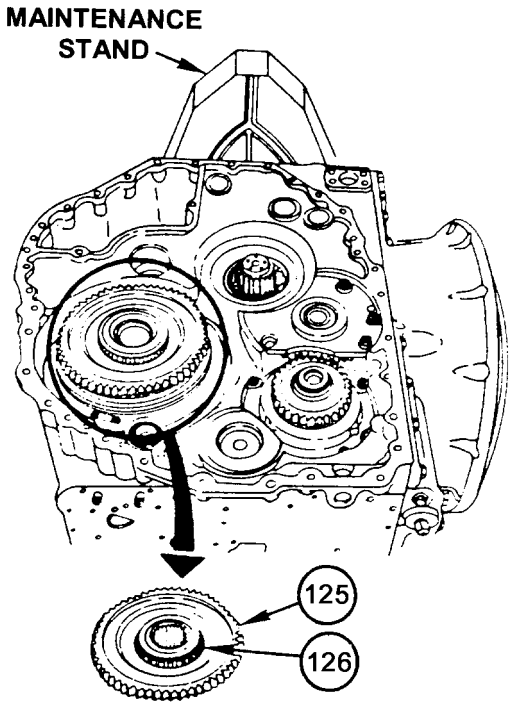


Figure 45. Range Input Driven Gear.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

REMOVE BEVEL GEAR DRIVEN SHAFT AND FILTER TUBES

CAUTION

Damage to Left Hand Cover Assembly can occur if incorrect bevel gear driven gear shaft (127) is installed. Record Part Number of bevel gear driven shaft when removed.

NOTE

It may be necessary to wiggle bevel gear driven shaft (127) to remove it from transmission.

1. Remove bevel gear driven shaft (127) and record part number.

NOTE

The filter-in tube (128) is 3.60 inches (91.44 mm) long. The filter-out tube (129) is 2.25 inches (57.15 mm) long. The filter-out tube (shorter tube) is located closest to the input housing.

2. Remove filter-in tube (128) and filter-out tube (129) from Center Housing Assembly or from end cover.
3. Remove four packings (130) from tubes (128, 129). Discard four packings (130).
4. Remove packing (131) from end of jumper tube. Discard packing (131).

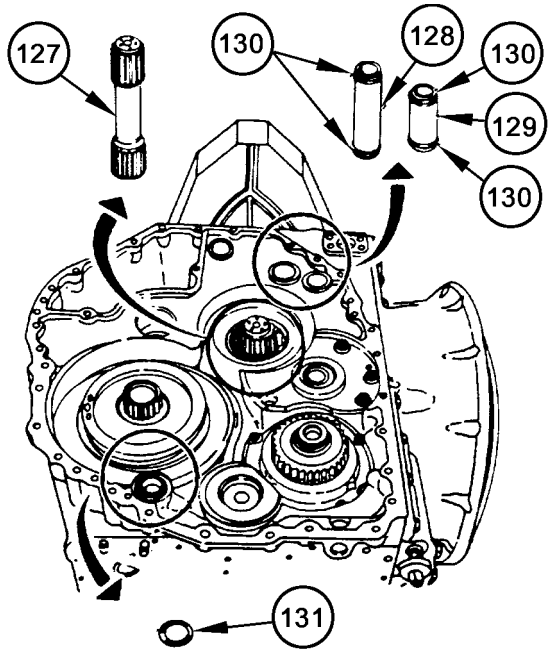


Figure 46. Center Housing Components.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

INSTALL FABRICATED RANGE PACK RETAINING FIXTURE

NOTE

Retaining Fixture (WP 0027, Item 1) is installed to prevent range pack from shifting when transmission is rotated.

1. Align hole in Retaining Fixture (WP 0027, Item 1) with one of three left end cover bolt holes (132) located nearest to Forward Clutch Housing Assembly (133).
2. Install 3/8-16 x 3/4 inch bolt (134) and 3/8 inch washer (135) in selected bolt hole (132).
3. Torque bolt (134) to 27-32 lb-ft (37-43 N·m).

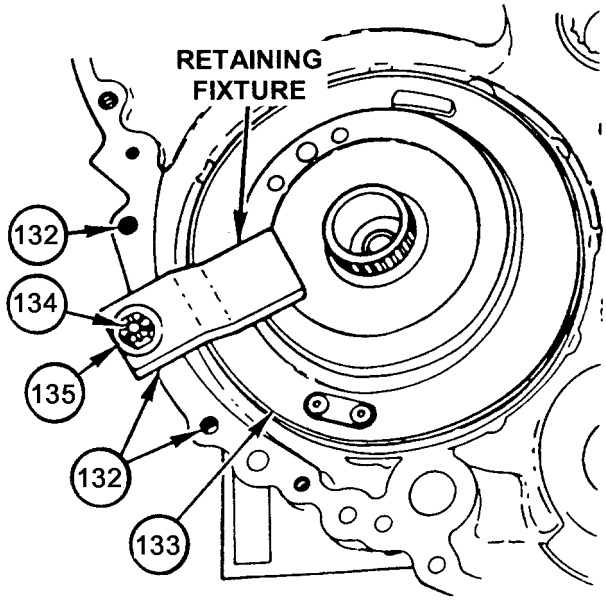


Figure 47. Range Pack Retaining Fixture.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

REMOVE SUMP COMMUNICATION TUBE

NOTE

If sump communication tube (96) is in place, tube (96) does not need to be removed unless Bevel Gear Assembly is to be removed, or tube is defective. If tube (96) must be removed, proceed with Steps 1, 2 and 3.

1. Using rotary control handle on maintenance stand, rotate transmission so that input housing (55) is in up position.
2. Tap end of sump communication tube (96) at left end of Center Housing Assembly (44) until tube moves into Center Housing Assembly.
3. Pull sump communication tube (96) from right end of Center Housing Assembly (44).

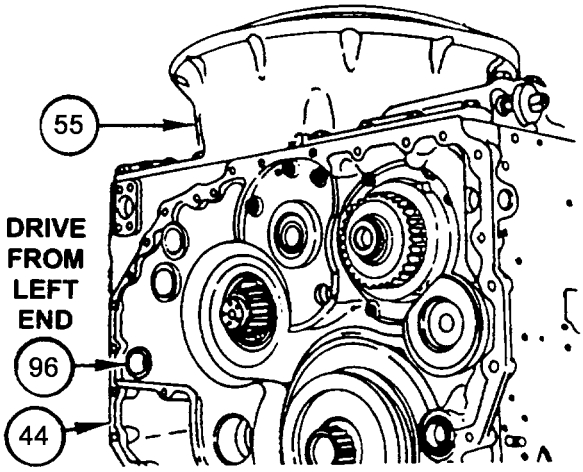


Figure 48. Sump Communication Tube.

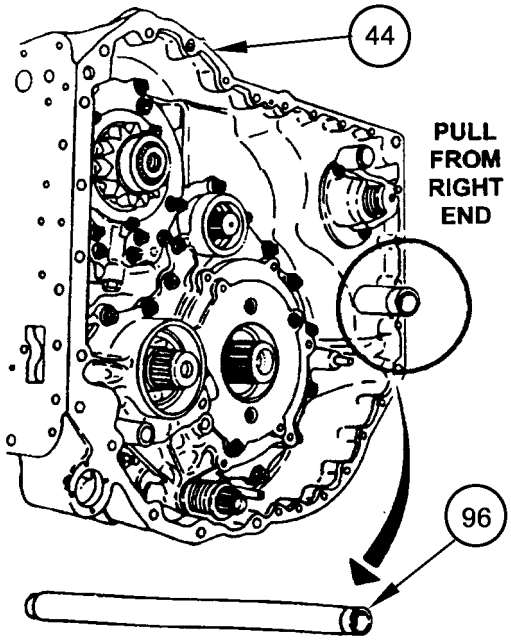


Figure 49. Sump Communication Tube.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

REMOVE CONVERTER ELEMENT COMPONENTS

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 Assembly is to be replaced, ring gear should not be removed. If ring gear is to be removed, go to Step 1. If ring gear is not to be removed, go to Step 5.

1. If shipping brackets are not in place, place pry bar between two studs (136) to keep Converter Pump Cover Assembly (137) from rotating when removing flex disk nuts (138), if necessary.
2. Remove six flex disk nuts (138) from external-splined ring gear (139). If present, remove shipping brackets.
3. Install two 3/8-16 x 2 inch jack bolts (140) in jack bolt holes (141) in ring gear (139).
4. Equally turn jack bolts (140) until external-splined ring gear (139) loosens from Converter Pump Cover Assembly (137). Remove external-splined ring gear (139).

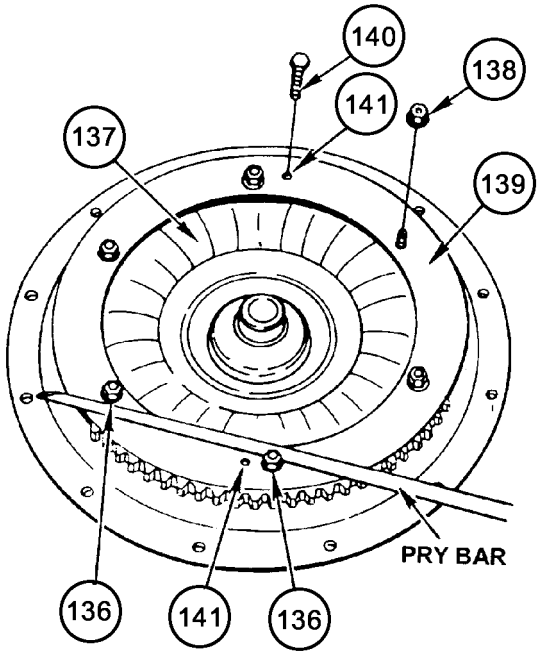


Figure 50. External-Splined Ring Gear.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

REMOVE CONVERTER ELEMENT COMPONENTS – Cont.

5. Place pry bar between two studs (136) to keep Converter Pump Cover Assembly (137) from rotating when unscrewing nuts (142).

6. Remove 24 nuts (142) holding Converter Pump Cover Assembly (137). Discard nuts (142).

NOTE

Tap Converter Pump Cover Assembly with plastic-faced hammer to loosen, if necessary.

7. Using fingers, pull up on two studs (136) located opposite each other and remove Converter Pump Cover Assembly (137) from transmission.

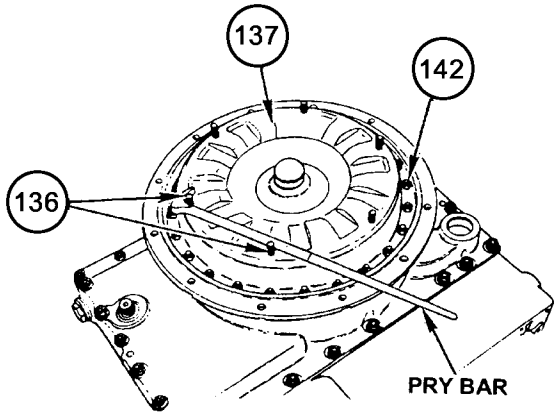


Figure 51. Converter Pump.

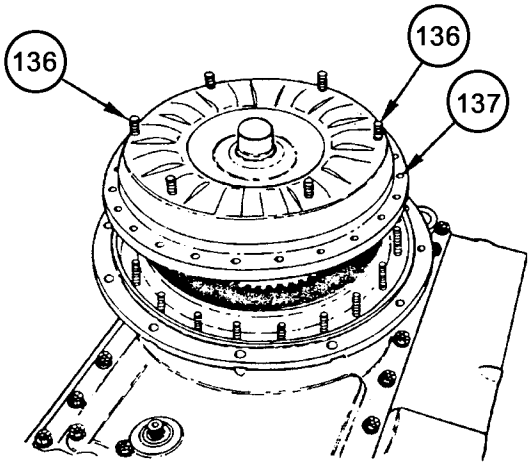


Figure 52. Converter Pump.

REPAIR: Refer to Repair Converter Element Components, WP 0018 00-1, for repair of Converter Pump Cover Assembly.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

REMOVE CONVERTER ELEMENT COMPONENTS – Cont.

8. Lift clutch plate (143) from Converter Assembly.
9. Pry clutch backing plate (144) off Converter Assembly.
10. Remove seal ring (145) from clutch backing plate (144) and check for sections missing or stretching out of shape. Discard seal ring (145).
11. Remove retaining ring (146) from turbine shaft (147).

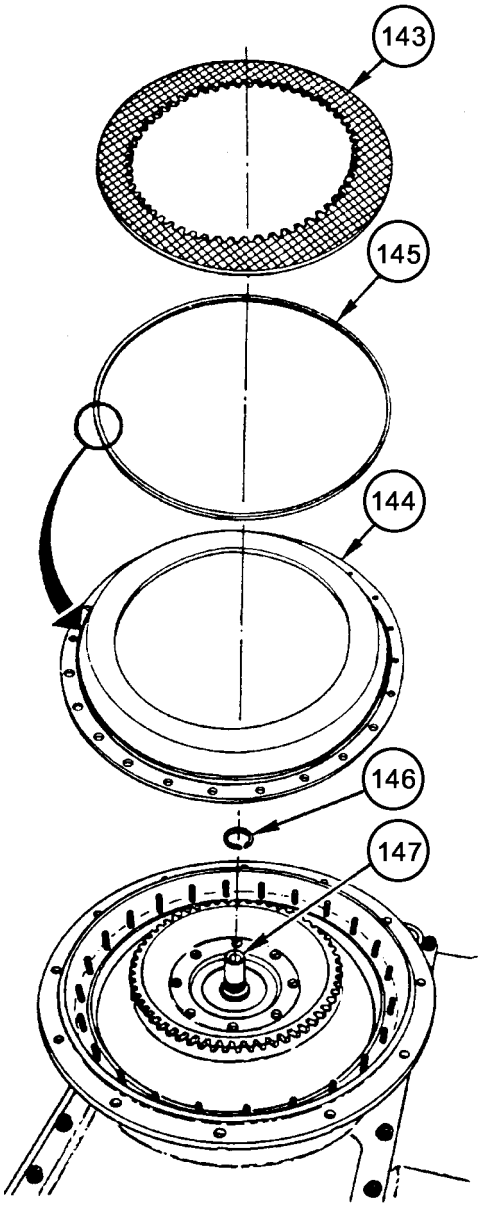


Figure 53. Lockup Clutch Elements.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

REMOVE CONVERTER ELEMENT COMPONENTS – Cont.

12. Remove Torque Converter Turbine Assembly (148) from transmission.

NOTE

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

13. Remove stator (149) from transmission.

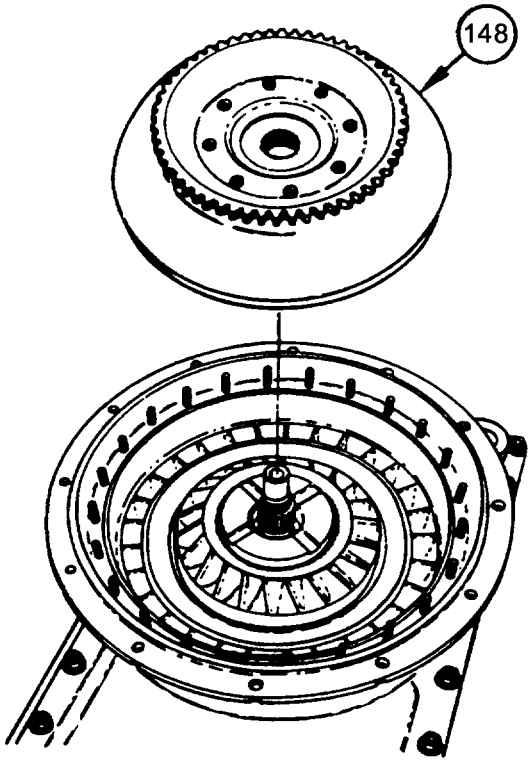


Figure 54. Converter Turbine Assembly.

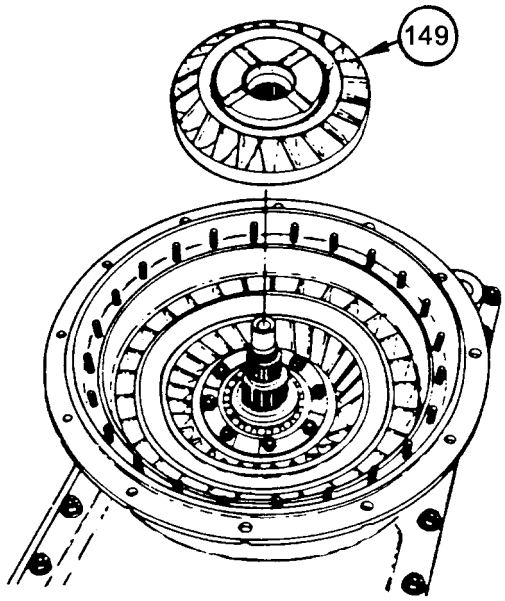


Figure 55. Stator.

REPAIR: Refer to Disassemble Stator Group, WP 0018 00-5 to disassemble the stator group of components.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

REMOVE CONVERTER ELEMENT COMPONENTS – Cont.

14. Remove gasket (150) from Converter Pump Assembly (151). Discard gasket (150).

15. Bend tabs on ends of four locking strips (152) away from heads of eight cap screws (153).

CAUTION

When holding pry bar between stud 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 (154) and the input housing wall, hold Converter Pump Assembly (151) so that it cannot turn.

17. Remove eight cap screws (153) that hold locking strips (152) and converter bearing retainer plates (155) to Converter Pump Assembly (151).

18. Remove four locking strips (152) and two converter bearing retainer plates (155). Discard four locking strips (152).

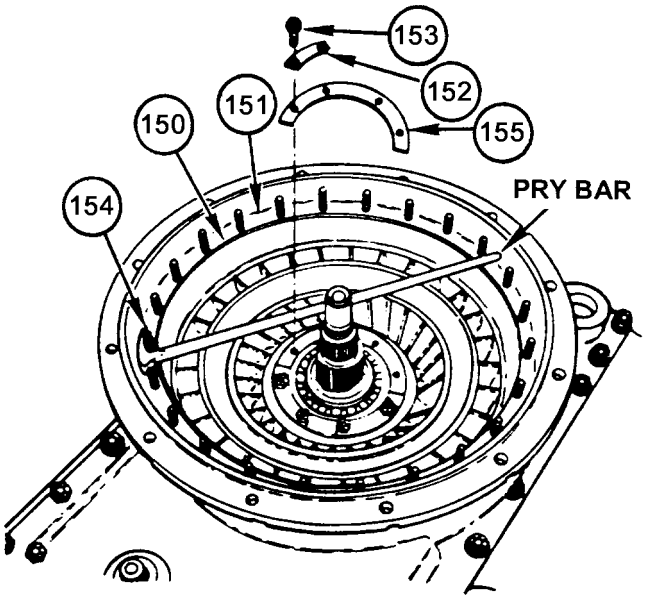


Figure 56. Converter Pump Assembly.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

REMOVE CONVERTER ELEMENT COMPONENTS – Cont.

NOTE

When Sling, Multiple Leg (WP 0025, Item 22) 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 lugs of Sling, Multiple Leg (WP 0025, Item 22) over studs (154) located equal distances apart on the Converter Pump Assembly (151) and install three 5/16-24 inch hex nuts (156) and three 5/16 inch washers (157) finger tight.

20. Tap on Converter Pump Assembly (151) while pulling up on pump with Sling, Multiple Leg (WP 0025, Item 22). Remove Converter Pump Assembly (151).

21. Remove three 5/16-24 inch hex nuts (156) and three 5/16 inch washers (157) and Sling, Multiple Leg (WP 0025, Item 22) from Converter Pump Assembly (151).

22. Remove converter pump gasket (158) from inside input housing (55). Discard gasket (158).

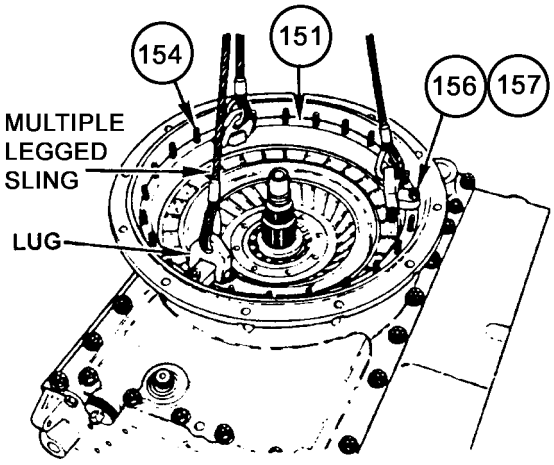


Figure 57. Converter Pump Assembly.

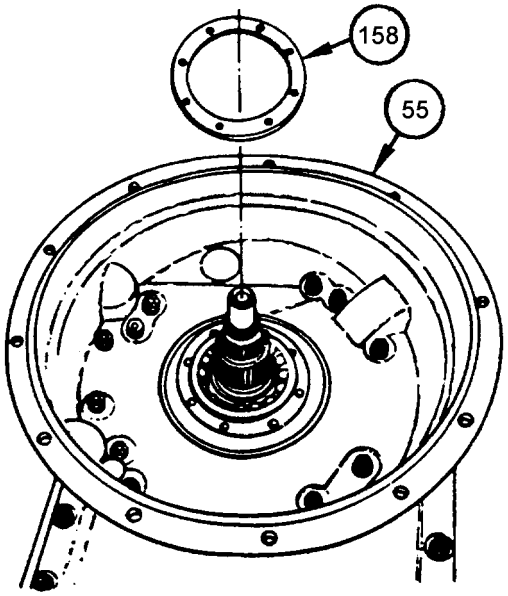


Figure 58. Converter Pump Gasket.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

REMOVE INPUT HOUSING ASSEMBLY

NOTE

Transmission is on maintenance stand, input housing turned up.

1. Remove eleven bolts (159) and washers (160) from inside the input housing (55).
2. Remove two bolts (161) and washers (162) from left side of input housing (55).

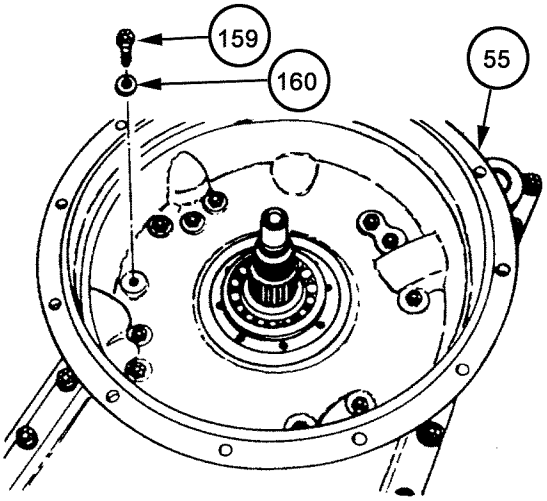


Figure 59. Input Housing.

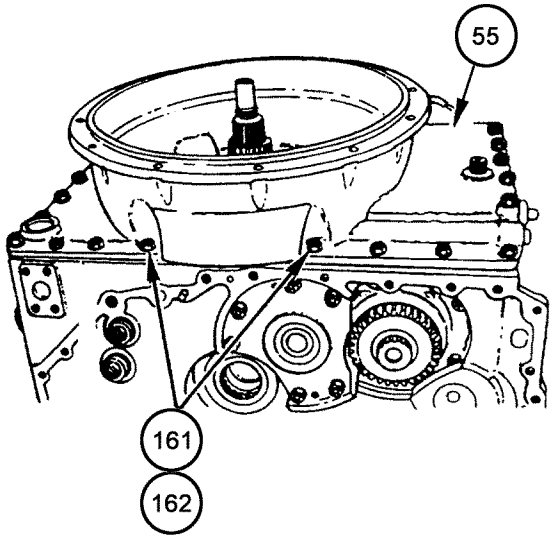


Figure 60. Input Housing.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

REMOVE INPUT HOUSING ASSEMBLY – Cont.

3. Remove bolt (163) and washer (164).
4. Remove the remaining 24 bolts (165) and washers (166) that hold the input housing (55) to the transmission (62).
5. Install 3/8-16 x 2-3/4 inch jack bolt (167) in jack bolt hole (168) located near center at top end of input housing (55).
6. Install 3/8-16 x 1-1/4 inch jack bolt (169) In jack bolt hole (170) located near center at bottom end of input housing (55).
7. Equally tighten jack bolts (167, 169) until input housing (55) loosens from transmission (62).
8. Remove jack bolts (167, 169) from input housing (55).
9. Remove input housing (55) from transmission (62).

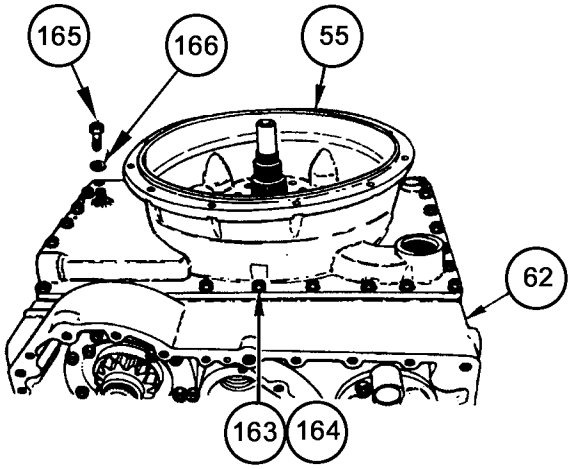


Figure 61. Input Housing.

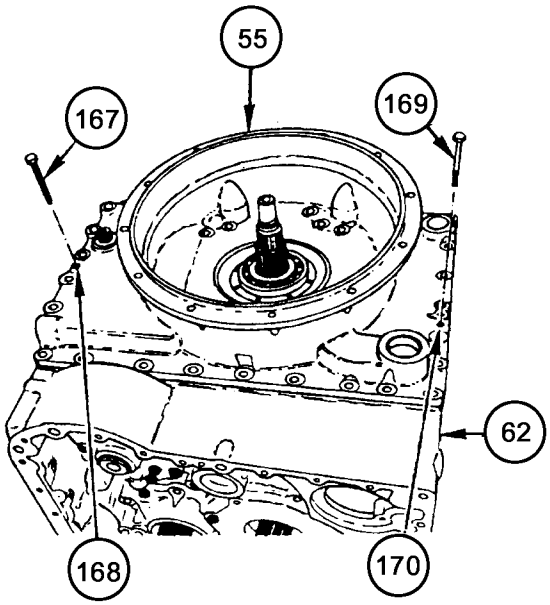


Figure 62. Input Housing.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

REMOVE INPUT HOUSING ASSEMBLY – Cont.

NOTE

Check input housing seal (171). It is not necessary to remove seal unless defective. If seal is defective, go to Step 10 and 11. If seal is serviceable, go to Step 12.

10. Turn input housing (55) over, bell housing down.
11. Drive against wall of input housing seal (171) in two places about 180 degrees apart. Drive seal (171) down into bell housing area.
12. Remove input housing gasket (172) from transmission Center Housing Assembly (44). Discard gasket (172).
13. Remove bevel gear gasket (173) from Bevel Gear Assembly (174). Discard gasket (173).
14. Remove seal (175) from steer shaft (176) on transmission Center Housing Assembly (44). Discard seal (175).

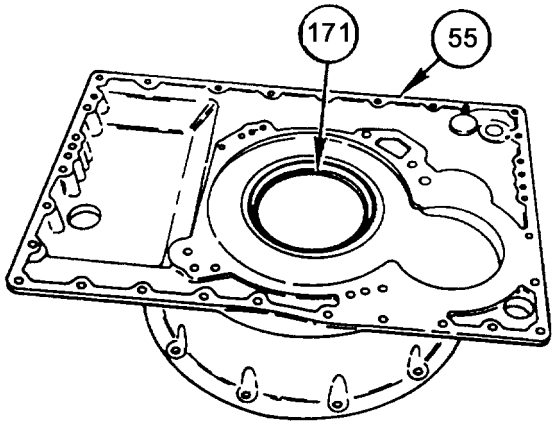


Figure 63. Input Housing.

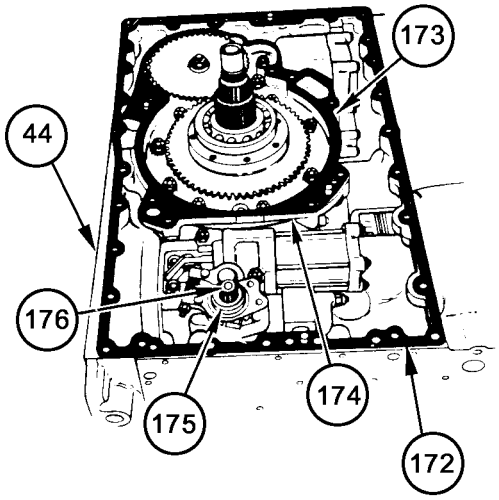


Figure 64. Center Housing.

REPAIR: Refer to Repair of the Input Housing Assembly, WP 0014 00-1, for repair of Input Housing Assembly.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

REMOVE BEVEL GEAR ASSEMBLY

WARNING

Check slings and lifting devices for cuts, breaks, or wear before hoisting transmissions 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.

1. Attach three 7/16-14 x 1-1/4 inch bolts (177) and three 7/16 inch washers (178) until snug through lugs of Sling, Multiple Leg (WP 0025, Item 22) and into holes (179) in Bevel Gear Assembly (174).

2. Using Sling, Multiple Leg (WP 0025, Item 22) , lift Bevel Gear Assembly (174) out of transmission Center Housing Assembly (44).

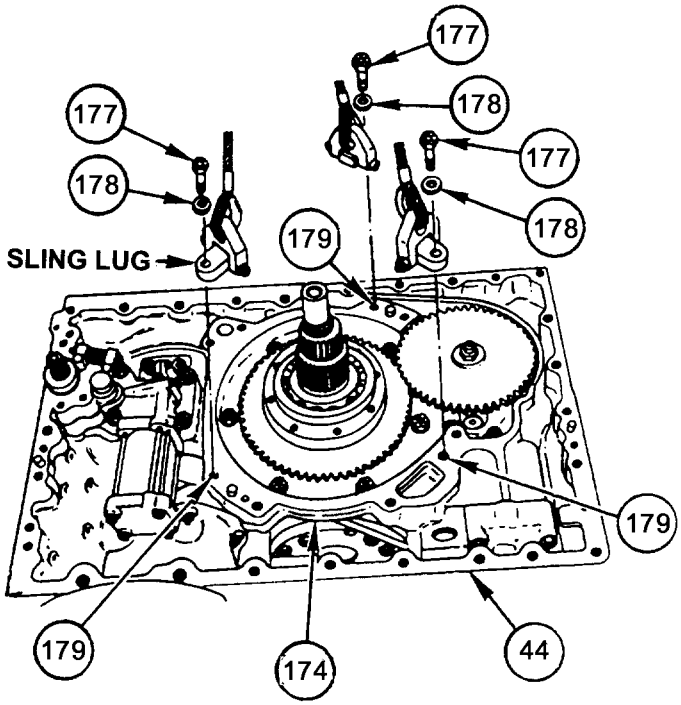


Figure 65. Bevel Gear Assembly.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

REMOVE BEVEL GEAR ASSEMBLY – Cont.

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. Carefully lower Bevel Gear Assembly (174) over work table. While lowering, turn assembly so that it is supported by Block, Wood, Lumber (WP 0024, Item 3).

4. Remove Sling, Multiple Leg (WP 0025, Item 22) from Bevel Gear Assembly (174).

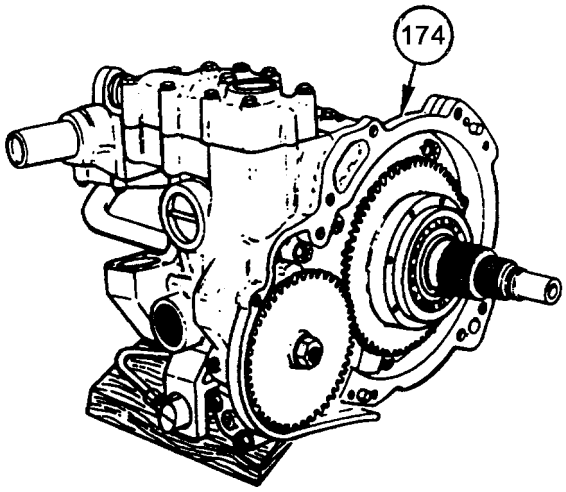


Figure 66. Bevel Gear Assembly.

REPAIR: Refer to Repair of the Bevel Gear Assembly, WP 0015 00-1 for repair of the Bevel Gear Assembly.

REMOVE CENTER HOUSING ASSEMBLY

NOTE

Remaining on the maintenance stand is the Center Housing Assembly (44). To remove the Center Housing Assembly (44) from maintenance stand adapter, refer to WP 0011 00-117, Remove Transmission from Adaptor Plate.

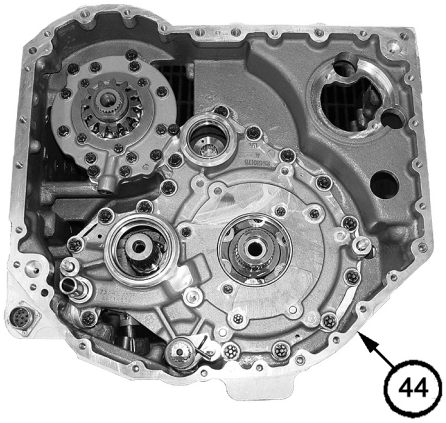


Figure 67. Center Housing Assembly.

REPAIR: Refer to Repair of the Center Housing Assembly, WP 0016 00-1, for repair of the Center Housing Assembly.

INSPECT: Inspect major assemblies for damage and replace as necessary in accordance with General Maintenance Instructions, WP 0006 00-1.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

ASSEMBLY OF TRANSMISSION FROM MAJOR ASSEMBLIES

MANDATORY REPLACEMENT PARTS

Refer to Table 1. Mandatory Replacement Parts for Assembly of the Transmission from Major Assemblies. WP 0026 contains a complete list of all mandatory replacement parts necessary for maintenance of the X200-4 and X200-4A Transmissions.

Table 1. Mandatory Replacement Parts for Assembly of the Transmission from Major Assemblies.

WP 0026 ITEM NO.	NOMENCLATURE	QTY
4	Screw, Machine	4
5	Nut, Self-Locking, Hex	24
9	Parts Kit, Fluid Pressure Filter	1
13	O-Ring	1
14	Gasket	1
30	O-Ring	2
32	Gasket	1
33	Gasket	1
34	Gasket	1
36	Seal, Brake Coolant	1
37	Gasket	1
39	Locking Plate, Nut and Bolt	4
40	Plug, Pipe	1
42	Retainer, Packing	1
44	O-Ring	1
45	O-Ring	2
46	O-Ring	2
47	O-Ring	4
48	O-Ring	2
50	O-Ring	1
55	O-Ring	1
57	Retainer, Packing	1

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

INSTALL CENTER HOUSING ASSEMBLY

INSTALL BEVEL GEAR ASSEMBLY

NOTE

The Center Housing Assembly (44) may have been removed from the maintenance stand adapter or may still be mounted on the maintenance stand adaptor dependent upon previous maintenance actions. If Center Housing Assembly has been removed from the maintenance stand adaptor, refer to WP 0011 00-16 to install the transmission on the maintenance stand adaptor.

Transmission Center Housing Assembly is on maintenance stand, with input side turned up.

1. Attach three 7/16-14 x 1-1/4 bolts (177) and three 7/16 inch washers (178) through lugs of Sling, Multiple Leg (WP 0025, Item 22) and into three bolt holes (179) in Bevel Gear Assembly (174).

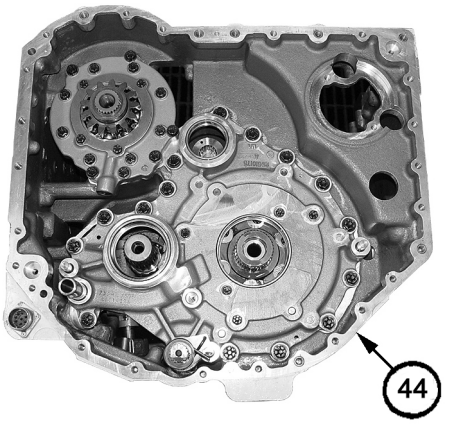


Figure 67. Center Housing Assembly. (Repeated)

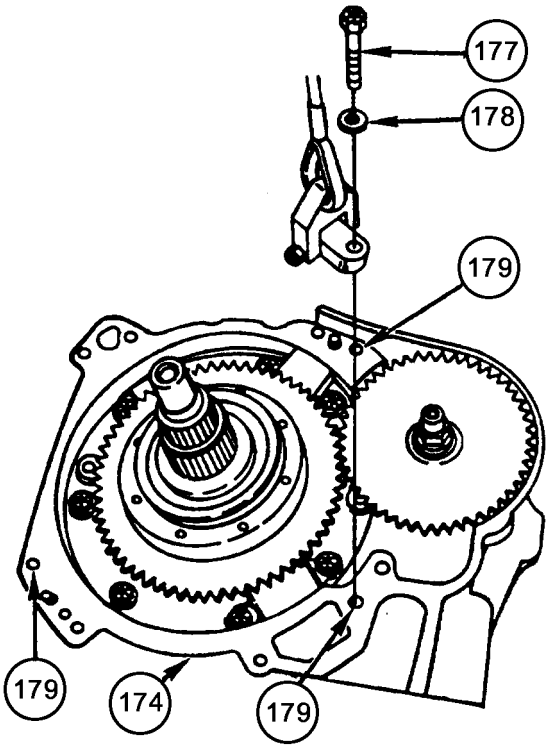


Figure 68. Bevel Gear Assembly.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

INSTALL BEVEL GEAR ASSEMBLY – Cont.

WARNING

Check slings and lifting devices for cuts, breaks, or wear before hoisting transmissions 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.

CAUTION

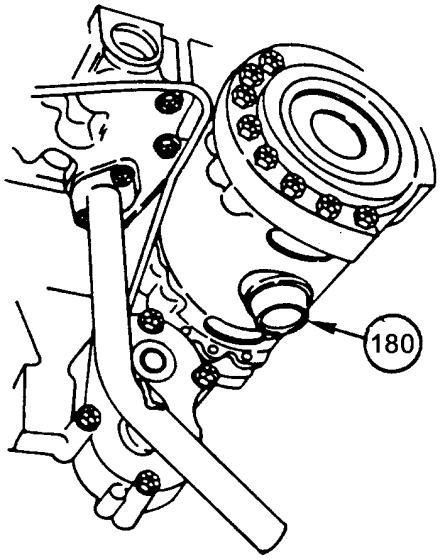
Do not bend or mash tubes when lifting Bevel Gear Assembly. Closed tube will cause transmission malfunction.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

INSTALL BEVEL GEAR ASSEMBLY – Cont.

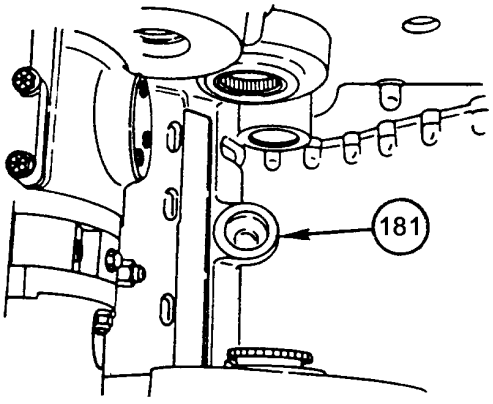
NOTE

Machined boss (180) on down side of Bevel Gear Assembly must seat in pedestal (181) on Center Housing Assembly before Bevel Gear Assembly will go all the way into transmission.



DOWN SIDE OF BEVEL GEAR ASSEMBLY WHEN ON HOIST

Figure 69. Bevel Gear Machined Boss.



LOOKING INTO BEVEL GEAR OPENING IN CENTER HOUSING

Figure 70. Pedestal On Center Housing.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

INSTALL BEVEL GEAR ASSEMBLY – Cont.

2. Hoist Bevel Gear Assembly (174) into transmission (62).
3. Remove three bolts (177) and washers (178) from lugs of Sling, Multiple Leg (WP 0025, Item 22).
4. Remove Sling, Multiple Leg (WP 0025, Item 22).

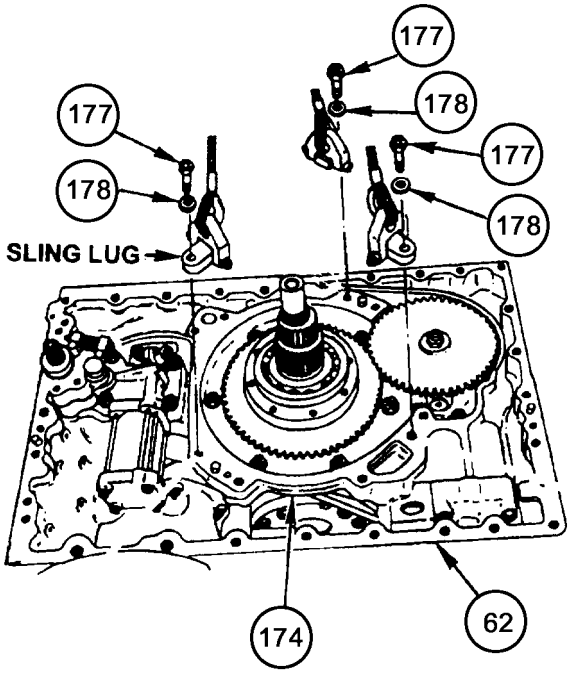


Figure 71. Bevel Gear Assembly In Center Housing.

WARNING

Do not turn transmission over. If transmission is rotated on maintenance stand before input housing is installed, Bevel Gear Assembly will fall out and cause injury.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

INSTALL INPUT HOUSING ASSEMBLY

NOTE

Transmission is on maintenance stand, input side turned up.

1. Install new bevel gear gasket (173) on Bevel Gear Assembly (174).
2. Install new input housing gasket (172) on Center Housing Assembly (44).

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 (175) on steer shaft (176) with thin lip of seal out.
4. Apply an 0.25 inch (6.3 mm) maximum width bead of Adhesive, sealant, RTV, (WP 0024, Item 1) around the outside diameter (OD) of seal (175).

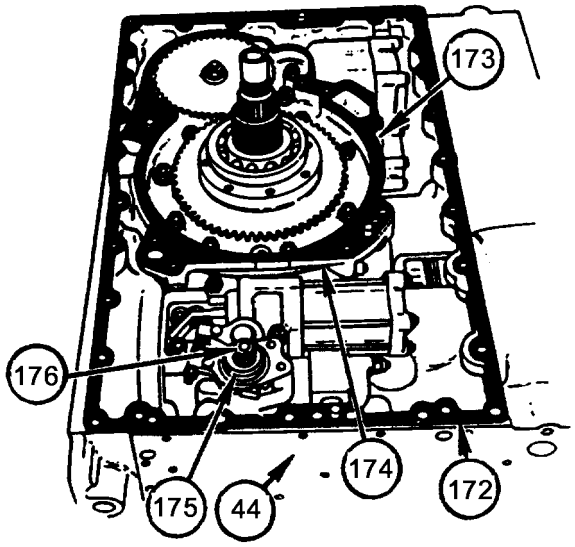


Figure 72. Center Housing.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

INSTALL INPUT HOUSING ASSEMBLY – Cont.

NOTE

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

5. Turn input housing (55) over, bell housing up.

CAUTION

Do not over press seal (171) as to crush metal part of seal. Over press can damage seal (171) or cause damage to shoulder of input housing (55).

6. Install new seal (171) in input housing (55). Press numbered side of seal out, until rubber nose of seal (171) seats against shoulder of input housing (55).
7. Check to see if rubber nose of seal (171) is sealed against shoulder of input housing (55). If not, continue to press seal (171) 0.002-0.004 inches (0.06-0.10 mm) at a time until rubber nose of seal (171) seats against shoulder of input housing (55).
8. Apply Petrolatum (WP 0024, Item 14) to lip of seal (171).

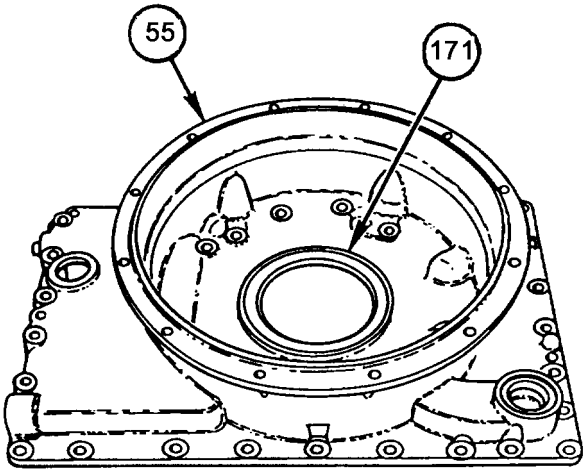


Figure 73. Input Housing.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

INSTALL INPUT HOUSING ASSEMBLY – Cont.

9. Install input housing (55) onto Center Housing Assembly (44).

10. Run tip of small screwdriver between seal (171) and shoulder of input pump drive gear (182) 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. Align one bolt (183) with hole. Start one 7/16-14 x 1-1/4 inch bolt (183) and washer (184). Start two remaining bolts (183) and two washers (184), aligning holes as necessary.

12. Start six 7/16-14 x 1-1/4 bolts (185) and six washers (186) in input housing (55).

13. Screw nine bolts (183, 185) into input housing (55) until snug.

14. Torque nine bolts (183, 185) to 54-65 lb-ft (73-88 N·m).

15. Install two zinc-plated 3/8-16 x 1-1/4 inch bolts (187) and two washers (188) in input housing (55).

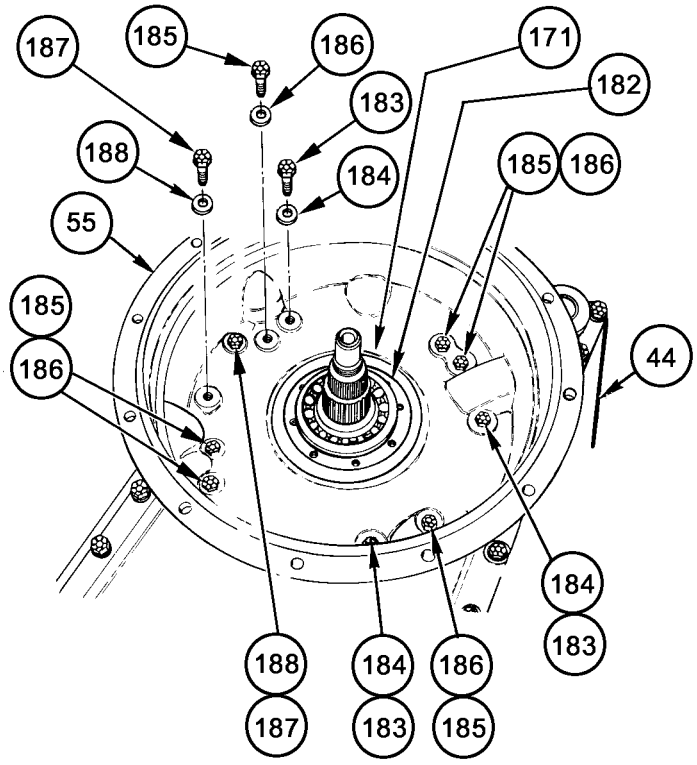


Figure 74. Input Housing.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

INSTALL INPUT HOUSING ASSEMBLY – Cont.

16. Install five zinc-plated 3/8-16 x 2-3/4 inch bolts (189) and five washers (190) in input housing (55).

17. Install two zinc-plated 3/8-16 x 1-1/4 inch bolts (161) and two washers (162) in input housing (55).

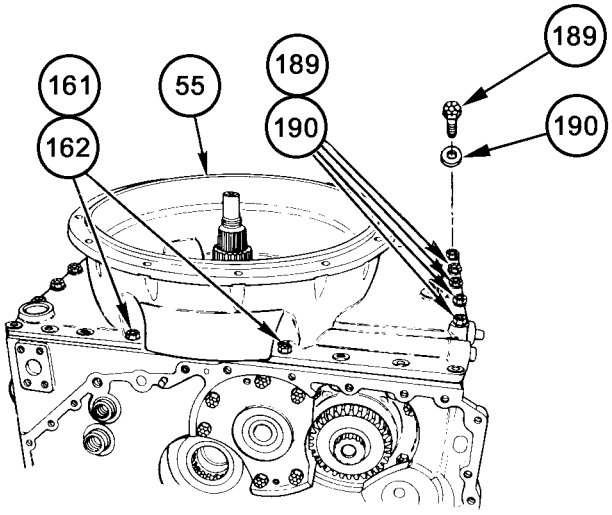


Figure 75. Input Housing.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

INSTALL INPUT HOUSING ASSEMBLY – Cont.

18. Install zinc-plated 3/8-16 x 1-1/4 inch bolt (163) and washer (164) in input housing (55).

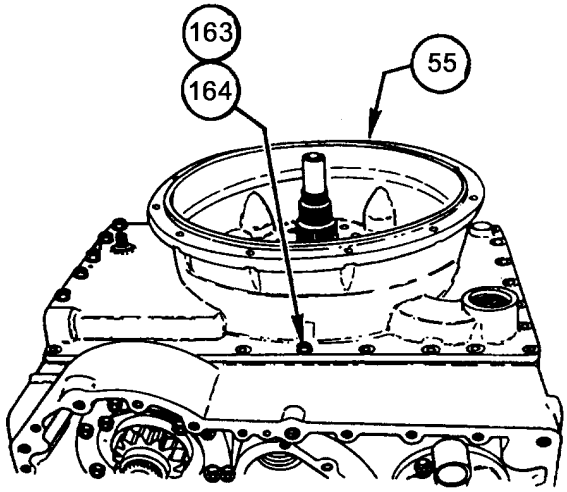


Figure 76. Input Housing.

19. Install 19 remaining zinc-plated 3/8-16 x 1-1/4 inch bolts (191) and washers (192) in input housing (55).

20. Torque 27 bolts (161, 163, 189, 191) all around perimeter of input housing (55) to 27-32 lb-ft (37-43 N·m).

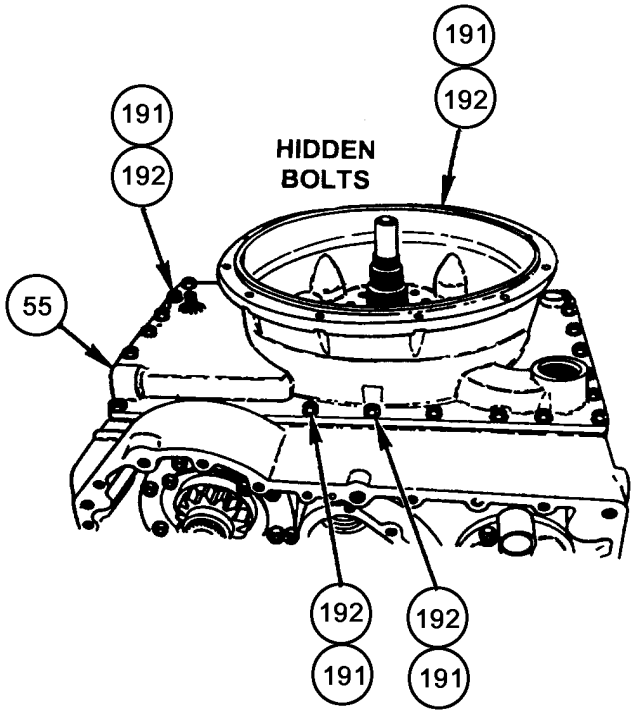


Figure 77. Input Housing.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

INSTALL INPUT HOUSING ASSEMBLY – Cont.

21. Torque two bolts (187) to 27-32 lb-ft (37-43 N·m).

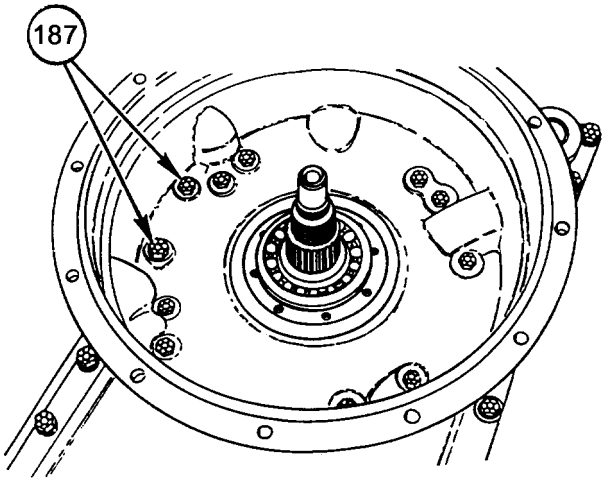


Figure 78. Input Housing.

INSTALL CONVERTER ELEMENT COMPONENTS

NOTE

Transmission is on maintenance stand, Input Housing up.

1. Install two Guide Pin, 5/16-24 x 3 inch (WP 0027, Item 4) (193) 180 degrees apart in shoulder of input pump drive gear (182).

2. Install converter pump gasket (158) over guide pins (193) and onto shoulder of input pump drive gear (182).

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

INSTALL CONVERTER ELEMENT COMPONENTS – Cont.

NOTE

The manufacturers balance mark will not be visible after the converter pump is installed. Mark using Marker, Black (WP 0024, Item 13) the location of the balance mark near a stud, so it is visible from top view of the converter pump.

3. Install Converter Pump Assembly (151) over guide pins (193).

NOTE

Be sure Converter Pump Assembly (151) is down far enough to allow inner lips on converter bearing retainer plate (155) to seat in groove on bearing (194).

4. Tap Converter Pump Assembly (151) to seat pump on gasket (158).

5. Remove two guide pins (193).

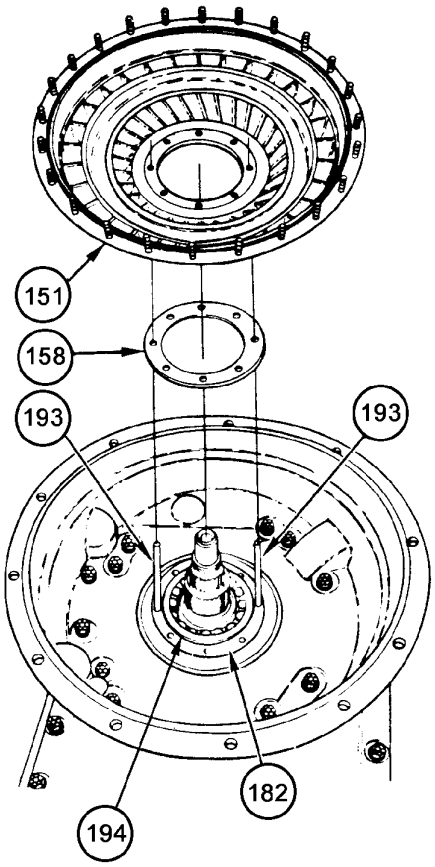


Figure 79. Converter Pump Assembly.

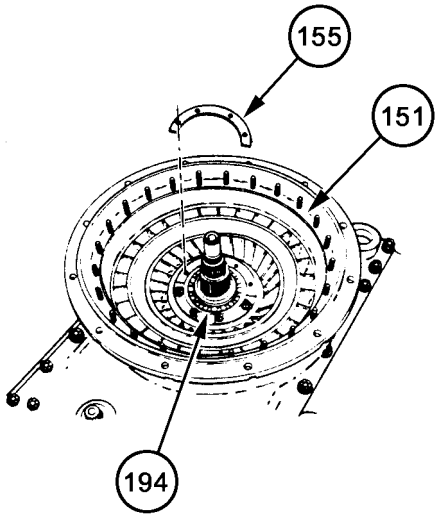


Figure 80. Converter Pump Assembly.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

INSTALL CONVERTER ELEMENT COMPONENTS – Cont.

6. Put two converter bearing retainer plates (155) over eight bolt holes in Converter Pump Assembly (151) and into groove in bearing (194).

NOTE

Each locking plate goes over two bolt holes on retainers.

7. Place four new locking strips (152) on converter bearing retainer plates (155), bent tabs up.
8. Install eight cap screws (153) in locking strips (152) and converter bearing retainer plates (155).
9. Use pry bar to prevent rotation of Converter Pump Assembly (151). Torque eight cap screws (153) to 19-23 lb-ft (25-31 N·m). Remove pry bar.
10. Bend all eight tabs of locking strips (152) at ends of four converter bearing retainer plates (155) so that tabs are up against flats of cap screws (153).

NOTE

No lubricant is used on the 13.750 inch inside diameter (ID) gasket (150) installed in the next Step.

11. Install new gasket (150) in groove near pump studs (154).

INSTALL CONVERTER ELEMENT COMPONENTS – Cont.

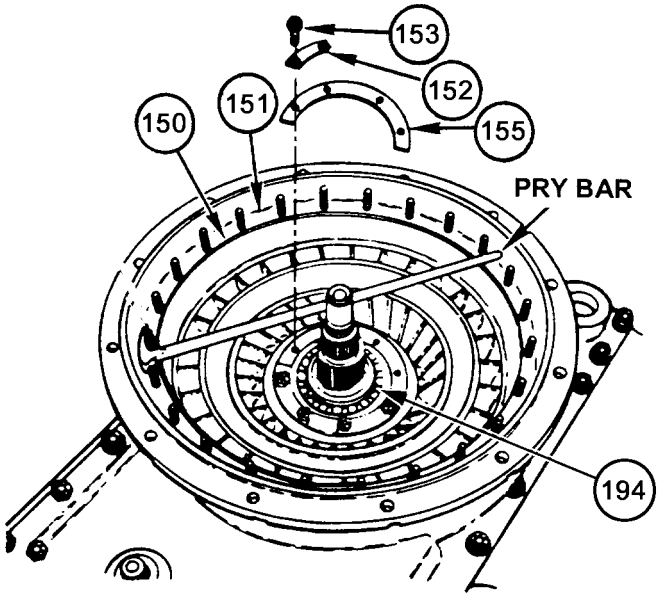


Figure 81. Converter Pump Assembly.

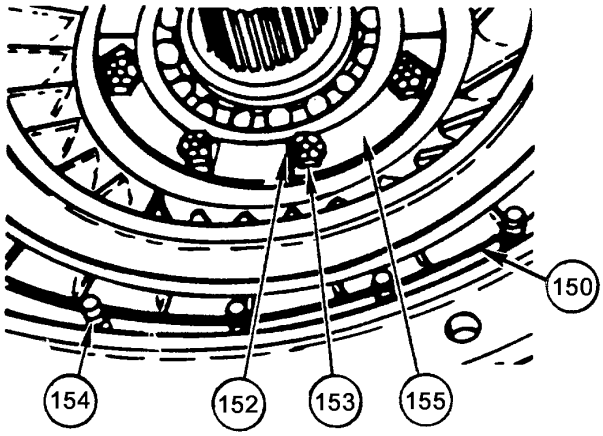


Figure 82. Converter Pump Assembly.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

INSTALL CONVERTER ELEMENT COMPONENTS – Cont.

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 Repair Converter Element Components, WP 0018 00-1.

12. Install stator (149) over turbine shaft (147) with clutch plate (195) side of stator up.

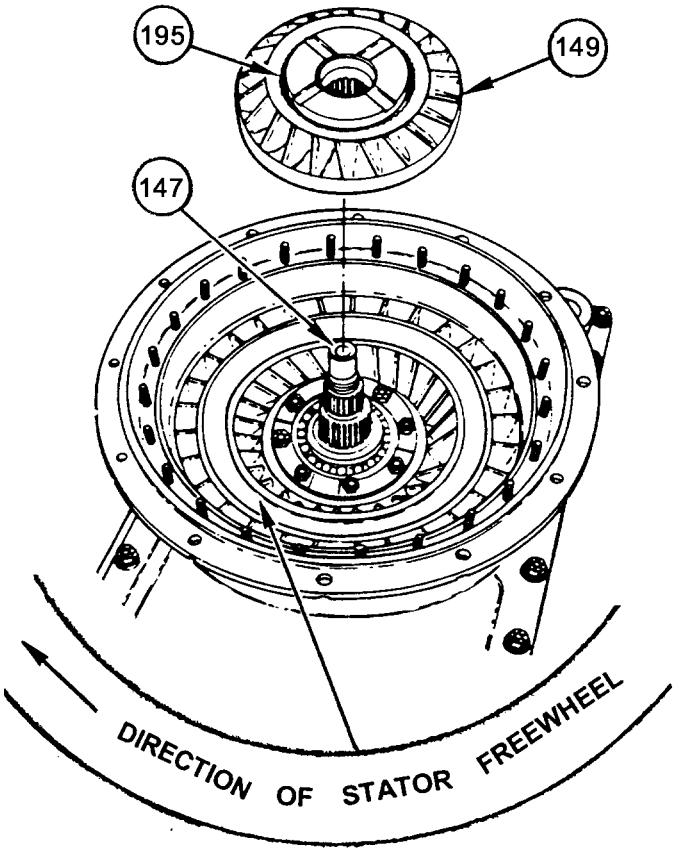


Figure 83. Stator.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

INSTALL CONVERTER ELEMENT COMPONENTS – Cont.

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 Repair Converter Element Components, WP 0018 00-1.

13. With stator (149) on turbine shaft (147), turn stator to the right (clockwise), the stator will not turn to the left (counterclockwise).

14. Install Torque Converter Turbine Assembly (148) on turbine shaft (147).

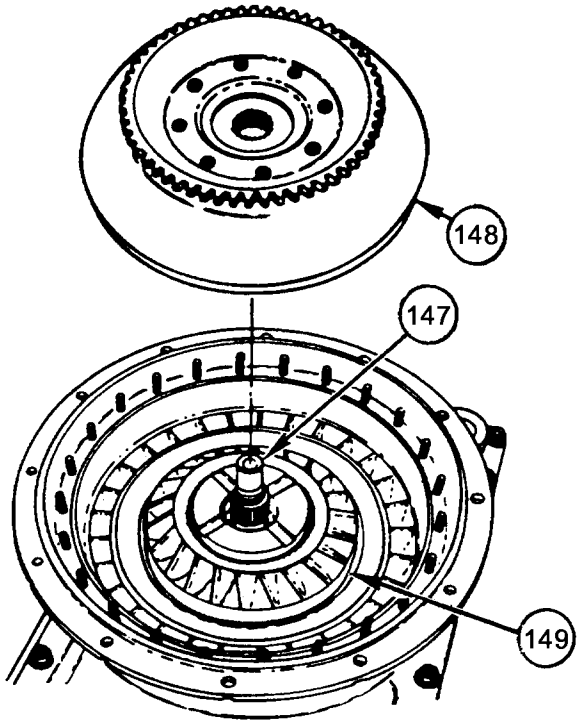


Figure 84. Converter Turbine Assembly.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

INSTALL CONVERTER ELEMENT COMPONENTS – Cont.

15. Install retaining ring (146) on turbine shaft (147) to retain Torque Converter Turbine Assembly (148).

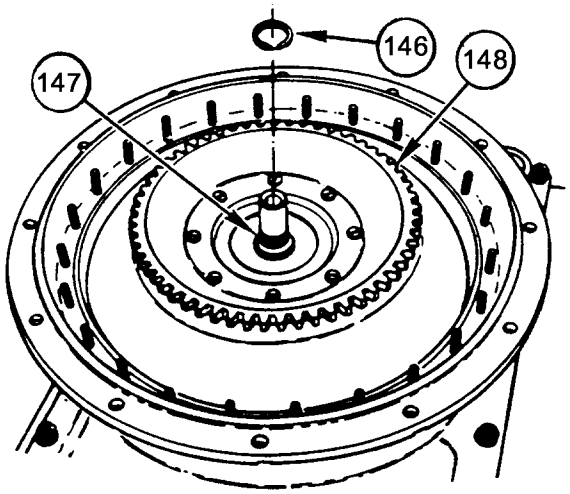


Figure 85. Converter Turbine Assembly.

NOTE

Seal Ring (145) is not to be lubricated.

16. Install new seal ring (145) in clutch backing plate (144).

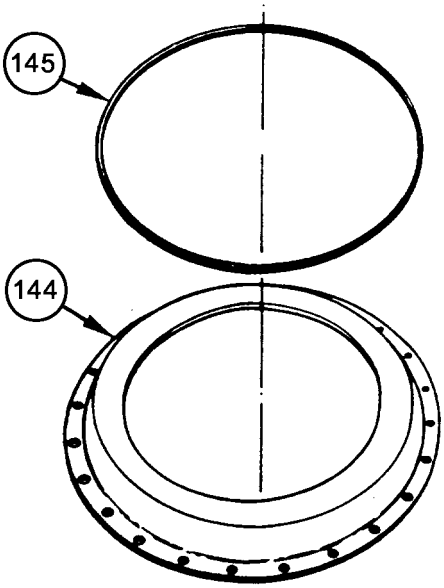


Figure 86. Lockup Plate.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

INSTALL CONVERTER ELEMENT COMPONENTS – Cont.

NOTE

Balance marks are used on the clutch backing plate and on the converter pump housing. The clutch backing plate must be mounted so that these two balance marks are aligned as shown in Figure 88 and 89.

Early models of X200 Transmissions had a hole and plug (196) in the side of the converter housing making the balance mark visible through the hole. Plug and hole have since been removed, however, the boss still remains on the converter housing.

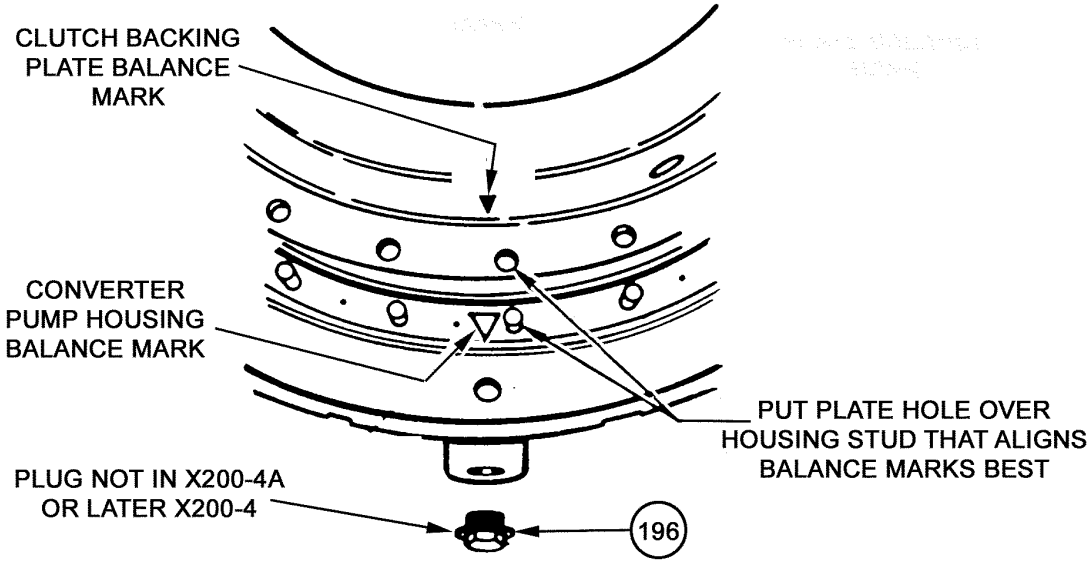


Figure 87. Balance Marks.

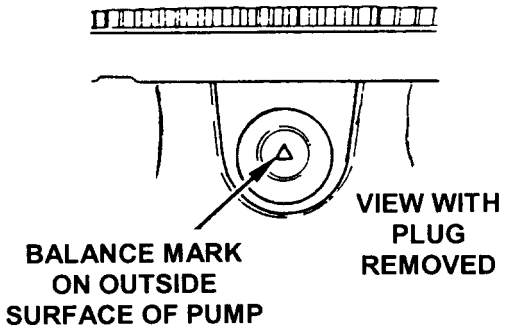


Figure 88. Balance Marks.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

INSTALL CONVERTER ELEMENT COMPONENTS – Cont.

17. Install clutch backing plate (144) on Torque Converter Turbine Assembly (148) and on Converter Pump Assembly (151) studs so that balance marks are aligned.

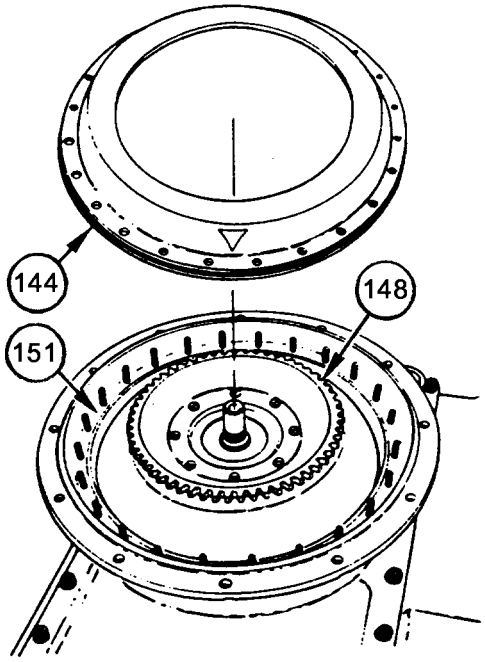


Figure 89. Lockup Plate.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

INSTALL CONVERTER ELEMENT COMPONENTS – Cont.

NOTE

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

18. Soak clutch plate (143) in Lubricating Oil (WP 0024, Item 12).

19. Install clutch plate (143) on clutch backing plate (144) so that inside of clutch plate engages splined area of Torque Converter Turbine Assembly (148).

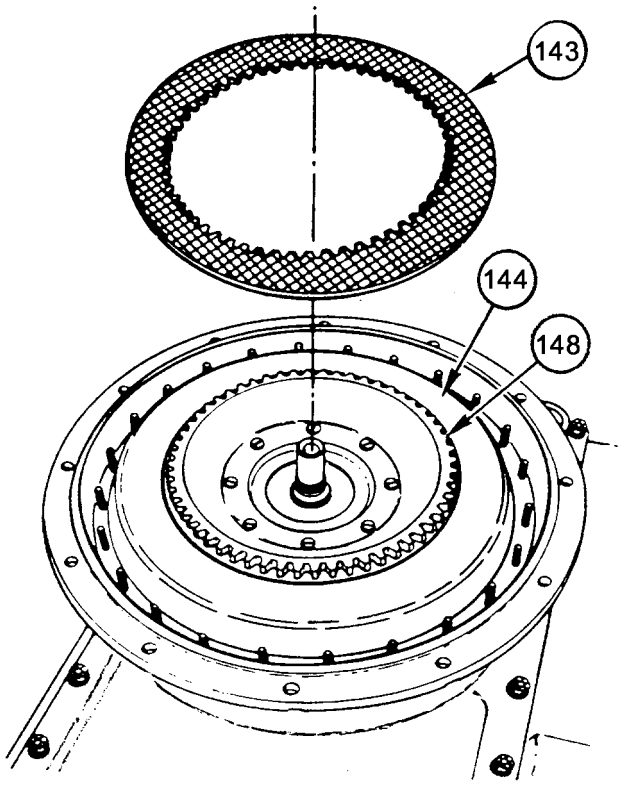


Figure 90. Lockup Clutch Plate.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

INSTALL CONVERTER ELEMENT COMPONENTS – Cont.

NOTE

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

Early models of X200 Transmissions had a hole and plug in the side of the converter housing making the balance mark visible through the hole. Plug and hole have since been removed, however, the boss still remains on the converter housing.

20. Wipe edge of Converter Pump Cover Assembly (137) nearest balance mark until edge is dry.

21. Scribe a line across edge of Converter Pump Cover Assembly (137) at point nearest pump cover balance mark.

22. Lifting Converter Pump Cover Assembly (137) by two studs on top, hold pump cover over clutch backing plate (144) so that scribed line on edge of pump cover lines up with balance mark on clutch backing plate.

23. Put Converter Pump Cover Assembly (137) on Converter Pump Assembly (151) studs so that balance mark and scribe line on Converter Pump Cover Assembly (137) are at nearest point to balance mark on clutch backing plate (144).

24. Tap Converter Pump Cover Assembly (137) to seat cover on Converter Pump Assembly (151) studs.

25. If hole is present, install plug (196) and torque plug to 16-20 lb-ft (22-27 N·m).

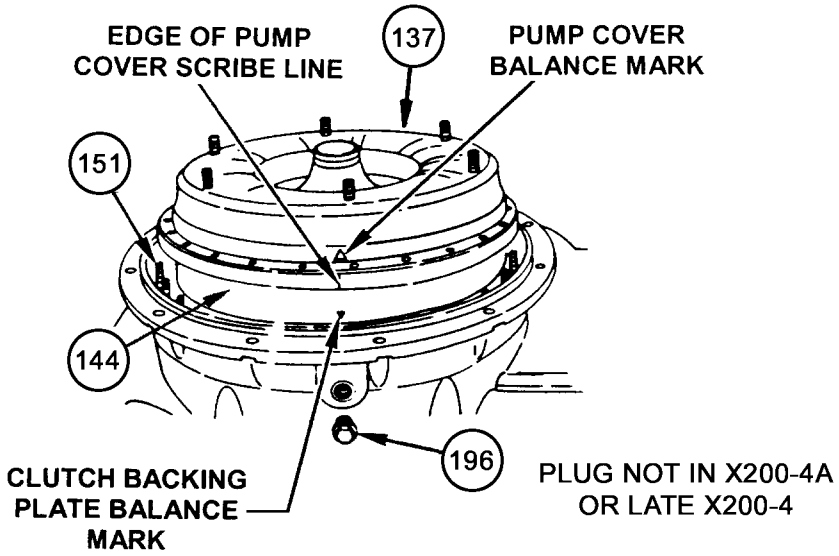


Figure 91. Converter Pump Cover.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

INSTALL CONVERTER ELEMENT COMPONENTS – Cont.

26. Install pry bar between two studs on top of Converter Pump Cover Assembly (137) to keep cover from turning when installing self-locking nuts (142), if necessary.

27. Install 24 new self-locking nuts (142) on converter pump housing studs (154) holding Converter Pump Cover Assembly (137).

28. Torque 24 nuts (142) to 19-23 lb-ft (26-31 N·m).

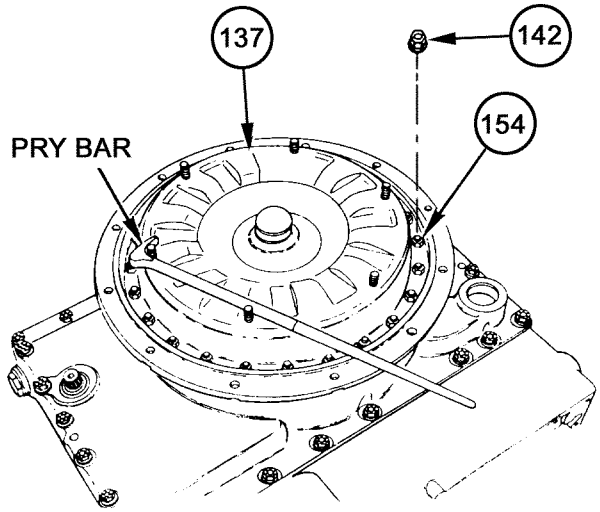


Figure 92. Converter Pump Cover Assembly.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

INSTALL CONVERTER ELEMENT COMPONENTS – Cont.

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 gear (139) should be removed and installed only when external-splined ring gear fails, or when Converter Pump Cover Assembly is to be replaced.

29. If necessary, heat in a circular motion all around inside area of external-splined ring gear (139) for approximately 30 minutes or until ring reaches a temperature of 150-200°F (66-93°C).

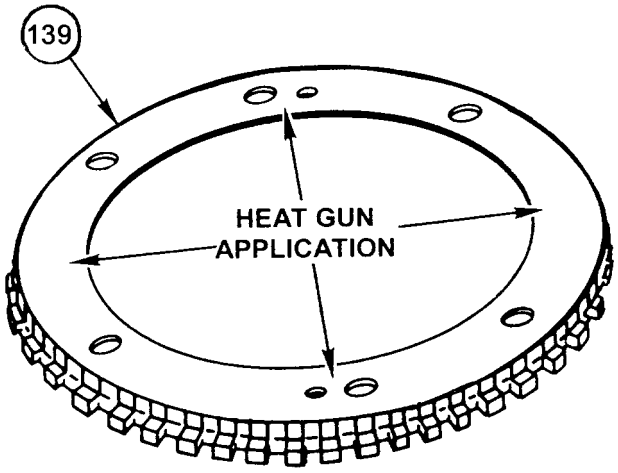


Figure 93. External Splined Ring Gear.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

INSTALL CONVERTER ELEMENT COMPONENTS – Cont.

30. Install ring gear (139) over six studs (136) located on top of Converter Pump Cover Assembly (137).

31. Exert force on ring gear (139) until seated on Converter Pump Cover Assembly (137).

32. Use pry bar between two studs (136) on top of Converter Pump Cover Assembly (137) to keep cover and ring gear (139) from turning.

33. Install six new flex disk nuts (138) on studs (136) holding ring gear (139) to Converter Pump Cover Assembly (137).

34. Torque six nuts (138) to 41-44 lb-ft (56-60 N·m).

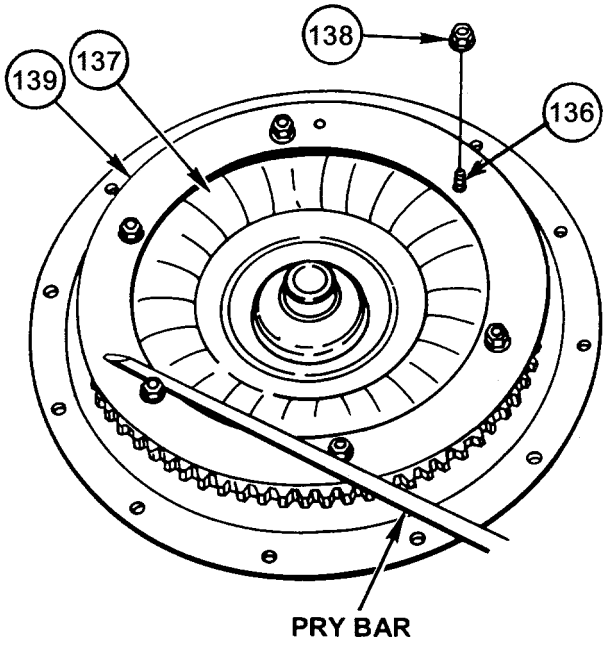


Figure 94. Converter Pump Cover Assembly.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

INSTALL LOOSE COMPONENTS, LEFT END OF TRANSMISSION

INSTALL SUMP COMMUNICATION TUBE

NOTE

Transmission is mounted on maintenance stand, input end turned up.

When sump communication tube has been removed, Right Hand Cover Assembly must remain off transmission until sump communication tube has been installed.

Sump communication tube is not installed until after Bevel Gear Assembly has been installed.

1. Apply Petrolatum (WP 0024, Item 14) to machined end (smaller end) of sump communication tube (96).
2. Install sump communication tube (96), small end first, through tube bore in right end of transmission Center Housing Assembly (44).

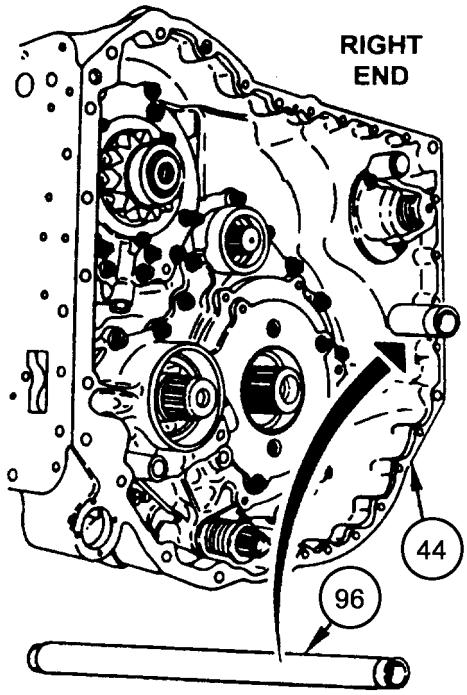


Figure 95. Right End of Transmission.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

INSTALL SUMP COMMUNICATION TUBE – Cont.

3. Looking through sump communication tube (96) sight tube bore in left end of Center Housing Assembly (44). Push small end of tube into left end bore.

4. Tap end of sump communication tube (96) 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.

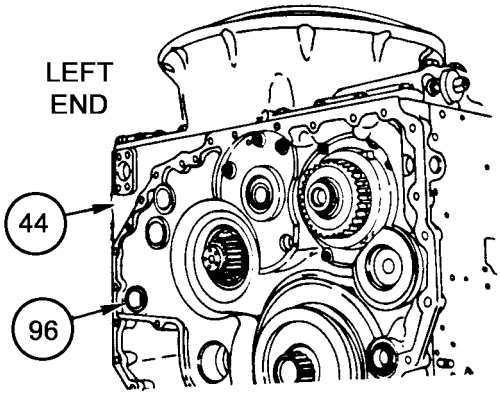


Figure 96. Left End of Transmission.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

REMOVE FABRICATED RANGE PACK RETAINING FIXTURE

1. Turn transmission to left end up.

NOTE

Retaining fixture was installed on WP 0011 00-50. Retaining fixture was installed to prevent range pack from shifting when transmission was rotated.

2. Remove bolt (134) and washer (135) from Retaining Fixture (WP 0027, Item 1). Remove retaining fixture. Retain bolt (134), washer (135), and retaining fixture.

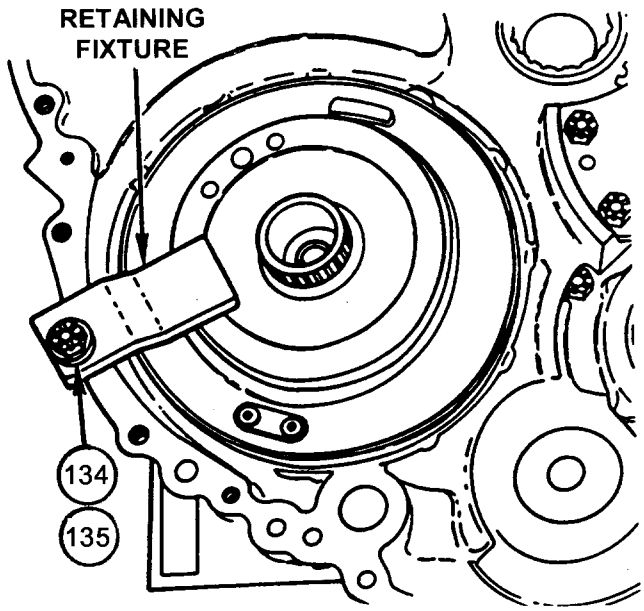


Figure 97. Range Pack Retaining Fixture.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

INSTALL FILTER TUBES

1. Install new packing (131) on end of jumper tube (197).
2. Apply Petrolatum (WP 0024, Item 14) to new packing (131).
3. Install four new packings (130), two packings on filter-in tube (128) and two packings on filter-out tube (129).
4. Apply Petrolatum (WP 0024, Item 14) to four new packings (130).

NOTE

The filter-in tube (128) is 3.60 inches (91.44 mm) long.

The filter-out tube (129) is 2.25 inches (57.15 mm) long.

The filter-out tube (129) (shorter tube) is installed closest to the input housing.

5. Install filter-out tube (129) in Center Housing Assembly (44), either end of tube in first.
6. Install filter-in tube (128) in Center Housing Assembly (44), either end of tube in first.

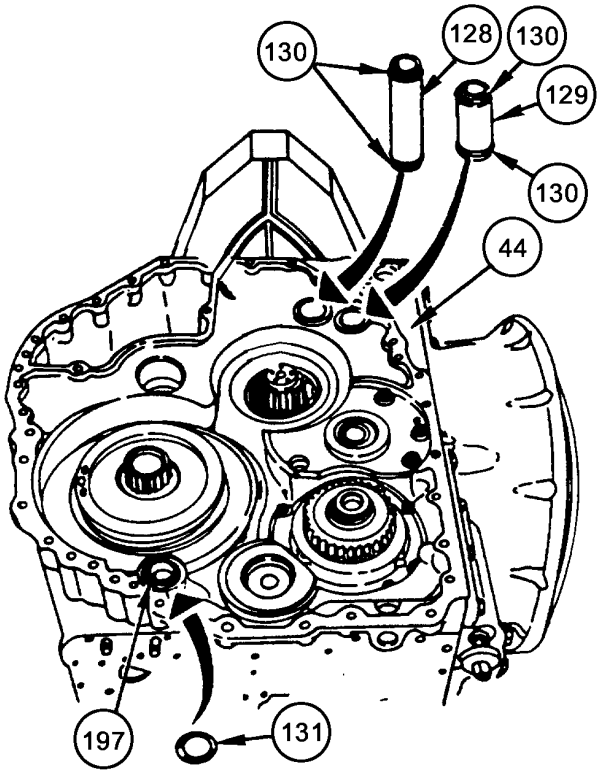


Figure 98. Center Housing Components

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

INSTALL BEVEL GEAR DRIVEN SHAFT

CAUTION

Damage to Left Hand Cover Assembly can occur if incorrect bevel gear driven shaft (127) is installed. Confirm part identification and length of shaft before installation.

Shaft P/N	Length	
23018157	10.22 inch (25.96 cm)	Used with Carrier Assembly, Rear P/N 23018136.
29533537	10.65 inch (27.05 cm)	Used with Carrier Assembly, Rear P/N 29533535.

1. Install bevel gear driven shaft (127) in Center Housing Assembly (44), either end of shaft first.

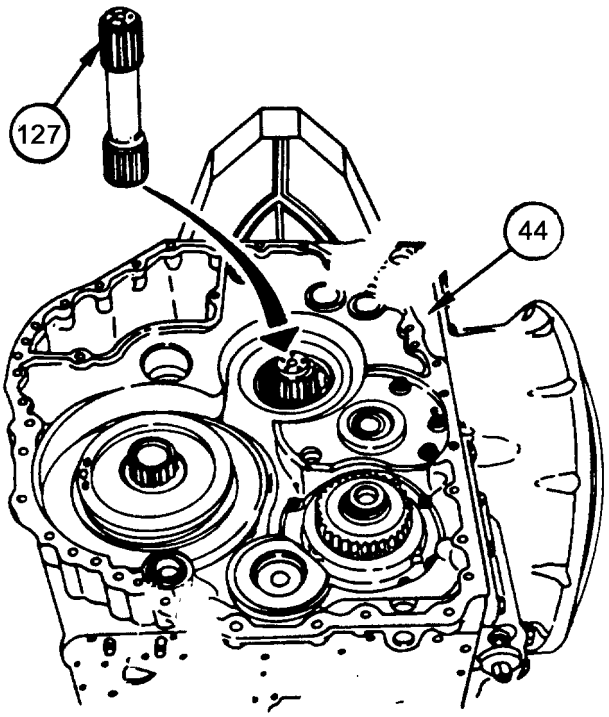


Figure 99. Center Housing Components.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

INSTALL RANGE INPUT GEARS

1. Apply Lubricating Oil (WP 0024, Item 12), and Petrolatum (WP 0024, Item 14) to bearing journal of range input driven gear (125) if old bearing (126) was removed.

NOTE

Bearing (126) consists of cage and inner race. Check that outer race is in Left Hand Cover Assembly. Reference Disassembly, Repair and Assembly of the Left Hand Cover Assembly, WP 0013 00-1

2. Install new bearing (126) on range input driven gear (125). Press bearing to shoulder.
3. Apply Lubricating Oil (WP 0024, Item 12) to bearing (126).
4. Install range input driven gear (125) over range input shaft on forward clutch housing, with bearing (126) up.
5. Check bearing journal on range input drive gear (121) hub for damage. Smooth out scratches with Crocus Cloth (WP 0024, Item 6). If grinding damage is present due to bearing removal, replace range input drive gear (121).
6. Apply Lubricating Oil (WP 0024, Item 12), and Petrolatum (WP 0024, Item 14) to bearing journals on each side of range input drive gear (121) if old bearings were removed.
7. Install new inner bearing race (124). Press to shoulder.

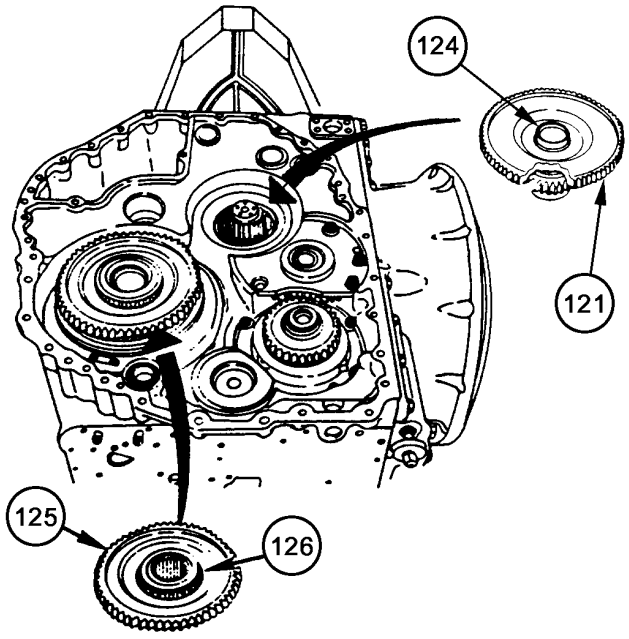


Figure 100. Range Input Driven Gear.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

INSTALL HYDROSTATIC DRIVE GEAR

NOTE

Hydrostatic drive gear (122) may be installed either side first.

1. Install hydrostatic drive gear (122) on shaft of range input drive gear (121) if gears were separated. Press to shoulder.
2. Install new inner race (123) on journal adjacent to hydrostatic drive gear (122) if old bearing was removed.
3. Check that cage and outer race (198) for inner race (123) is in the left end of Center Housing Assembly (44). Also check that cage and outer race for inner bearing race (124) is in the Left Hand Cover Assembly.
4. Install range input drive gear (121) and hydrostatic drive gear (122) on bevel gear driven shaft (127) with hydrostatic drive gear (122) down.
5. Work gears (121 and 122) left and right until inner splines on hydrostatic drive gear (122) mate with splines on bevel gear driven shaft (127), and teeth on hydrostatic drive gear (122) mate with teeth on hydrostatic idler gear (199).
6. Continue to work gears (121 and 122) left and right until teeth on range input drive gear (121) mate with teeth on range input driven gear (125).
7. Push down on range input drive gear (121) to seat gears (121 and 122) in operating position.

NOTE

Range input drive gear (121) and hydrostatic drive gear (122) will not mate properly with range input driven gear (125) and hydrostatic idler gear (199) if the incorrect bevel gear driven shaft (127) was installed.

8. Check that teeth on range input drive gear (121) and teeth on range input driven gear (125) fully mesh, and that outer surfaces of gears are on the same plane. If gears are not even, continue to work gears (121 and 122) until bevel gear driven shaft (127) and gears (121, 122, 125 and 199) are all synchronized.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

INSTALL HYDROSTATIC DRIVE GEAR – Cont.

CAUTION

Damage to Left Hand Cover Assembly can occur if incorrect bevel gear driven shaft (127) is installed. Confirm part identification as recorded when bevel gear shaft was removed, as well as the length of shaft before installation.

Shaft P/N	Length	
23018157	10.22 inch (25.96 cm)	Used with Carrier Assembly, Rear P/N 23018136.
29533537	10.65 inch (27.05 cm)	Used with Carrier Assembly, Rear P/N 29533535.

9. If range input drive gear (121) and hydrostatic drive gear (122) will not seat properly, remove gears (121, 122, and 125), and bevel gear driven shaft (127). If the gears seat properly go to Install Left Hand Cover Assembly, WP 0011 00-96.

10. Reconfirm part identification of bevel gear driven shaft (127). After the correct bevel gear driven shaft (127) is obtained, install the correct bevel gear driven shaft (127) and repeat Steps 4 thru 8.

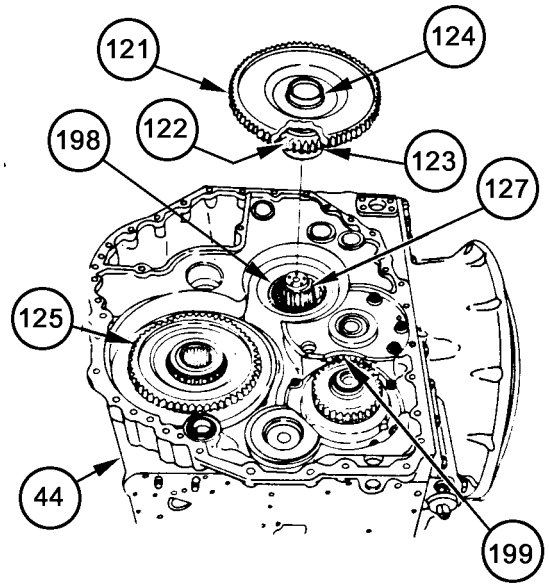


Figure 101. Center Housing Components.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

INSTALL LEFT HAND COVER ASSEMBLY

NOTE

Transmission is on maintenance stand, left end turned up.

1. Install two 3/8-16 x 4 inch guide pins (200) into Center Housing Assembly (44).
2. Install new left end cover gasket (120) on Center Housing Assembly (44), over guide pins (200).
3. Install 3/8 inch flat washer (117) on each of two 3/8-16 x 2 inch bolts (118) and install bolts through two lugs of Sling, Multiple Leg (WP 0025, Item 22).

NOTE

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

INSTALL LEFT HAND COVER ASSEMBLY – Cont.

4. Install two bolts (118) in two holes (119) in Left Hand Cover Assembly (51).

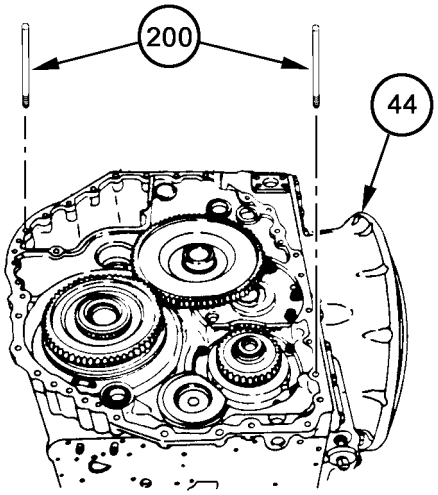


Figure 102. Guide Pins.

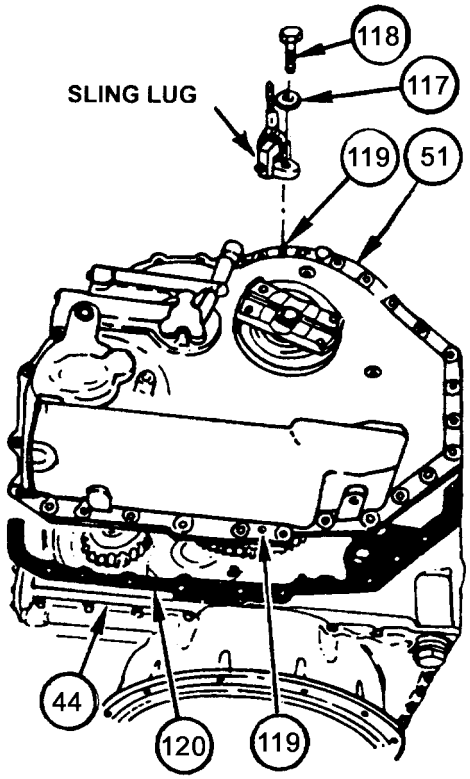


Figure 103. Left Hand Cover Assembly.

WARNING

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

Weight of Left Hand Cover Assembly exceeds safe limits for lifting without a sling and hoist. Lift end cover with sling and hoist to avoid bodily injury.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

INSTALL LEFT HAND COVER ASSEMBLY – Cont.

5. Hoist Left Hand Cover Assembly (51) over Center Housing Assembly (44).

6. Lower Left Hand Cover Assembly (51) so that it is resting lightly on Center Housing Assembly (44).

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 (201), rotate flange back and forth while lowering Left Hand Cover Assembly (51).

8. Remove bolts (118) and washers (117) and sling from Left Hand Cover Assembly (51). Remove two guide pins (200).

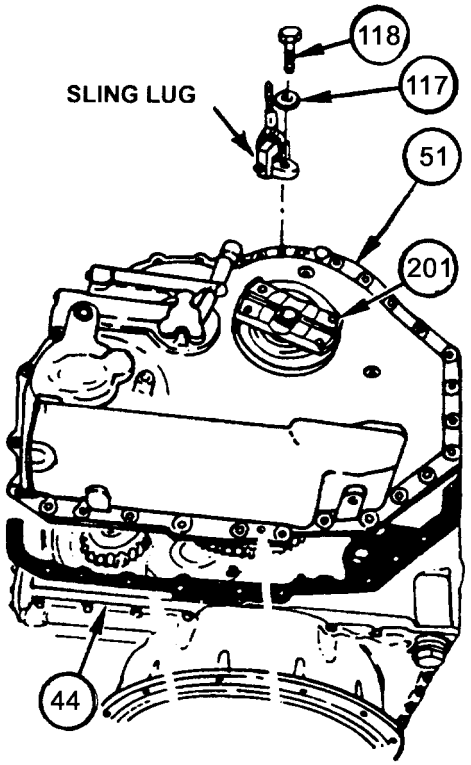


Figure 104. Left Hand Cover Assembly.

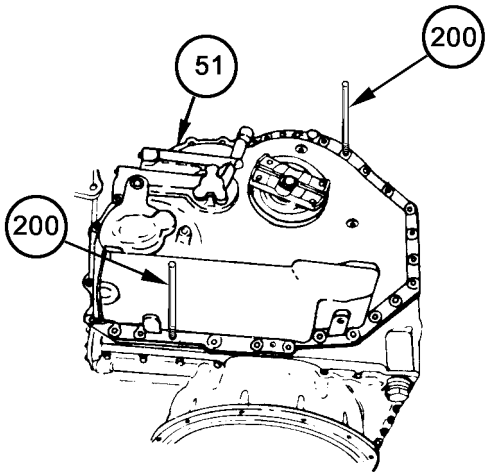


Figure 105. Guide Pins.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

INSTALL LEFT HAND COVER ASSEMBLY – Cont.

9. Install left lifting bracket (5), angled inward, and two 3/8-16 x 1-1/2 inch bolts (3) and two washers (4) on Left Hand Cover Assembly (51). Do not tighten bolts (3).

10. Loosely install two 3/8-16 x 1-1/4 inch bolts (115) and two washers (116) in body of Left Hand Cover Assembly (51).

11. Loosely install the 27 remaining 3/8-16 x 1-1/4 inch bolts (115) and washers (116) around perimeter of Left Hand Cover Assembly (51).

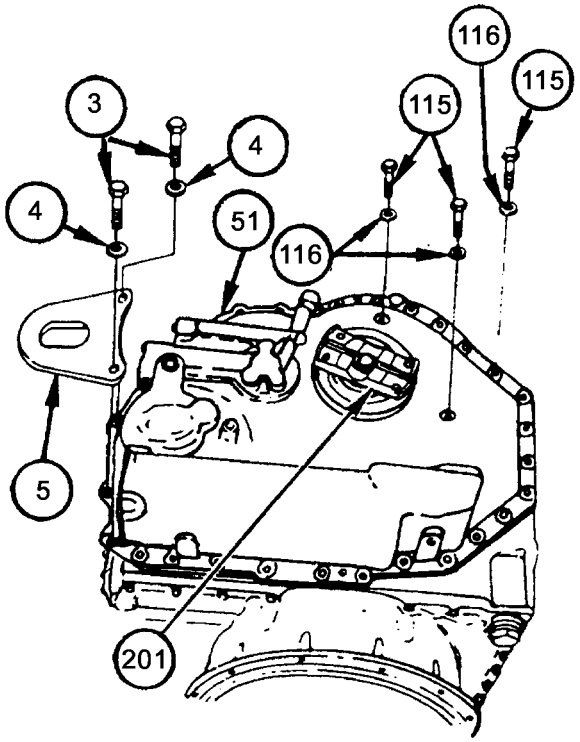


Figure 106. Left Hand Cover Assembly.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

INSTALL LEFT HAND COVER ASSEMBLY – Cont.

CAUTION

Damage to Left Hand Cover Assembly (51) can occur if excessive force is used. Do not force the end cover to seat on the transmission. Do not beat on it with a hammer or use the splitline bolts to pull it into position. If the end cover seems to be hung up and will not properly install, remove the end cover assembly from the transmission and verify that the correct bevel gear driven shaft is installed. Confirm that the part identification and length of bevel gear driven shaft matches that which you have previously recorded on WP 0011 00-49.

Shaft P/N	Length	
23018157	10.22 inch (25.96 cm)	Used with Carrier Assembly, Rear P/N 23018136.
29533537	10.65 inch (27.05 cm)	Used with Carrier Assembly, Rear P/N 29533535.

12. Tap Left Hand Cover Assembly (51) to seat cover against gasket on Center Housing Assembly.
13. Torque two bolts (3) and 29 bolts (115) to 27-32 lb-ft (37-43 N·m).

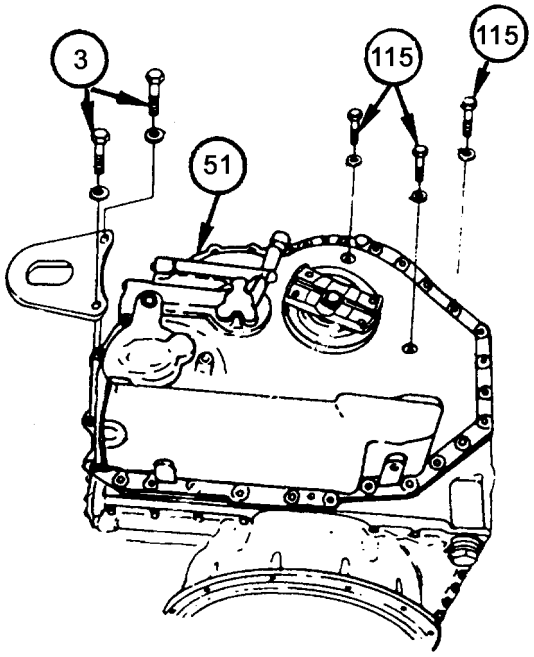


Figure 107. Left Hand Cover Assembly.

NOTE

Output shaft drag check is performed after transmission has been assembled. Refer to Final Adjustments, WP 0019 00-1.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

INSTALL OIL FILTER HEAD ASSEMBLY

NOTE

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

1. Install two new packings (114) on oil filter head (108).
2. Put Petrolatum (WP 0024, Item 14) on new packings (114).

NOTE

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

3. Install new oil filter element (113) on oil filter head (108). Push filter element into recess until filter element locks to filter head.

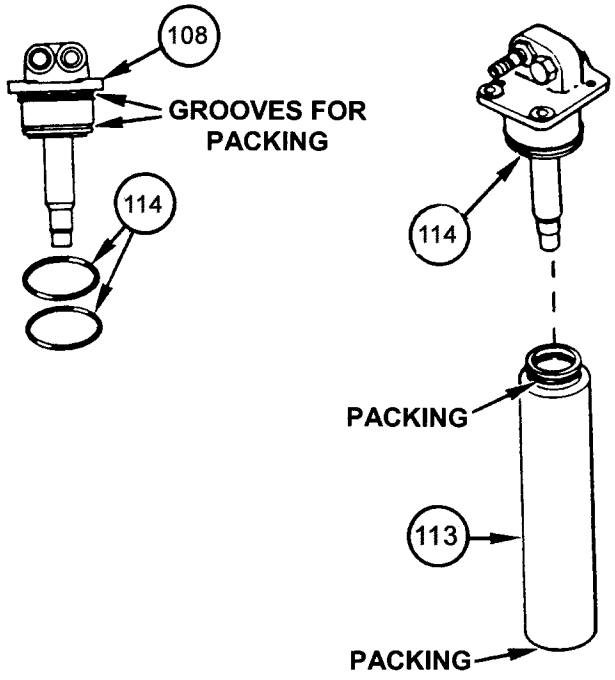


Figure 108. Oil Filter Head Assembly and Oil Filter Element.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

INSTALL OIL FILTER HEAD ASSEMBLY – Cont.

NOTE

Hole in bottom of filter element goes over an oil tube rising up from the bottom of the filter cavity in the Left Hand Cover Assembly.

4. Install oil filter head (108) with new filter element (113) in filter cavity on Left Hand Cover Assembly (51).
5. Install three bolts (109) and three washers (110) in oil filter head (108).
6. Torque three bolts (109) to 27-32 lb-ft (37-43 N•m).

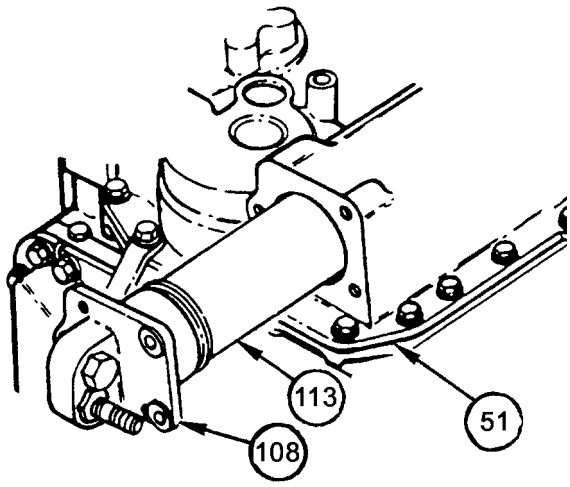


Figure 109. Oil Filter Head Assembly and Oil Filter Element

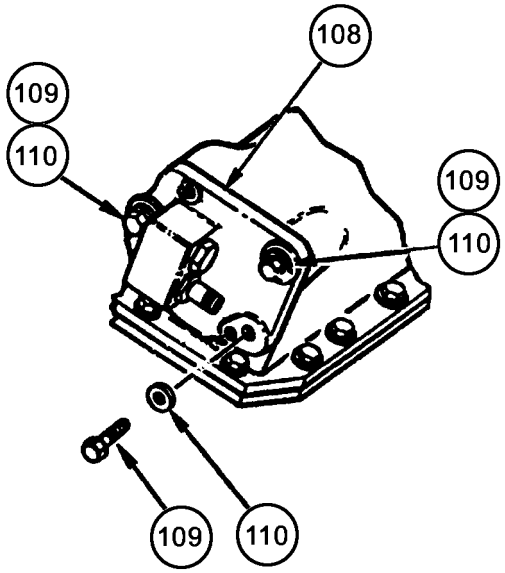


Figure 110. Oil Filter Head Assembly.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

INSTALL LOOSE COMPONENTS, RIGHT END OF TRANSMISSION

INSTALL REVERSE EQUALIZER VALVE COMPONENTS

NOTE

Transmission is on maintenance stand, right end turned up.

End of scavenge tube opposite screened end seats in Bevel Gear Assembly.

1. Install Scavenge Tube Assembly (107), screen end out, in center housing bore (202).
2. Install two new packings (106) on oil transfer tube (104).
3. Apply Petrolatum (WP 0024, Item 14) to packings (106).
4. Push oil transfer tube (104), either end, into center hole in bottom of equalizer valve diaphragm (105).
5. Install equalizer valve diaphragm (105) so that end of oil transfer tube (104) enters hole (203) in Bevel Gear Assembly.
6. Push on diaphragm (105) to seat oil transfer tube (104) in Bevel Gear Assembly and allow diaphragm (105) to seat in center housing bore (204).

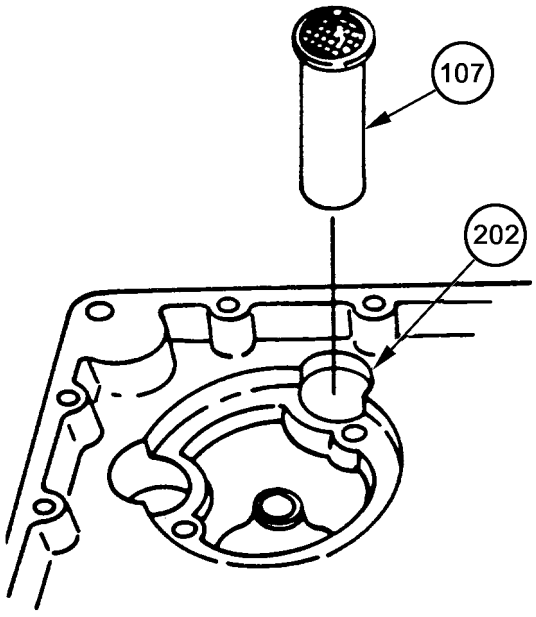


Figure 111. Scavenge Tube Assembly.

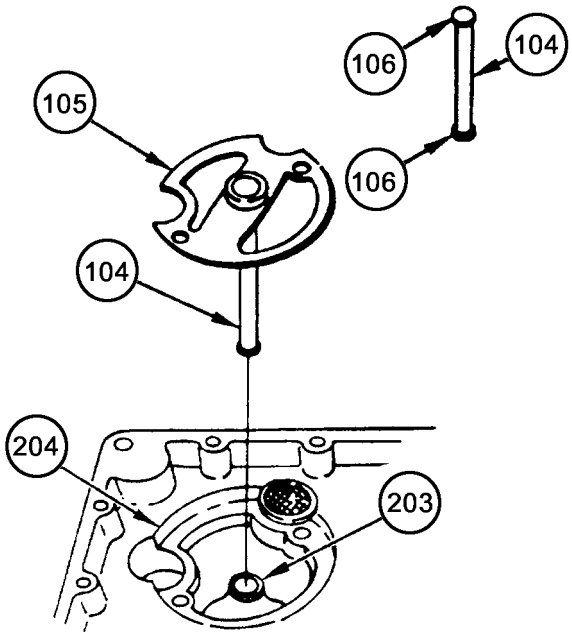


Figure 112. Oil Transfer Tube and Diaphragm.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

INSTALL REVERSE EQUALIZER VALVE COMPONENTS – Cont.

7. Install new seal ring (103) on large end of Reverse Equalizer Piston Assembly (102).
8. Push large end of Reverse Equalizer Piston Assembly (102) into center hole on top of equalizer valve diaphragm (105).
9. Install reverse equalizer valve (101), cutaway side out, over Reverse Equalizer Piston Assembly (102).
10. Install spring (100) on reverse equalizer valve (101).

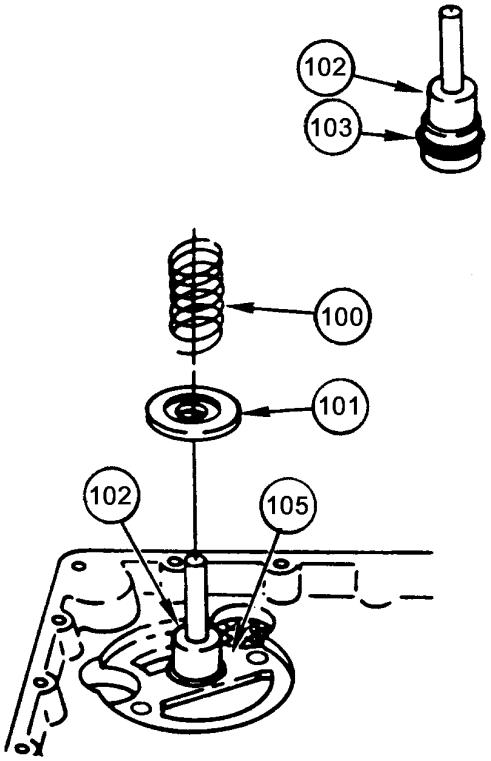
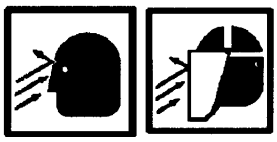


Figure 113. Reverse Equalizer Valve.

WARNING



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

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

INSTALL REVERSE EQUALIZER VALVE COMPONENTS – Cont.

11. Install Reverse Equalizer Valve housing (97) over spring (100) so that bolt holes and recesses for tubes are aligned.

12. Use one hand to push Reverse Equalizer Valve housing (97) down on spring (100), and use other hand to install two bolts (98) and washers (99). Turn bolts a few turns to hold housing.

NOTE

If end of Reverse Equalizer Piston Assembly (102) does not go through housing hole (205), bolts (98) may be loosened and piston moved by screwdriver through side of housing.

13. Carefully tighten bolts (98). End of Reverse Equalizer Piston Assembly (102) must come through hole (205) in top center of equalizer valve housing (97) when bolts are tightened.

14. Torque two bolts (98) to 36-43 lb-ft (48-58 N·m).

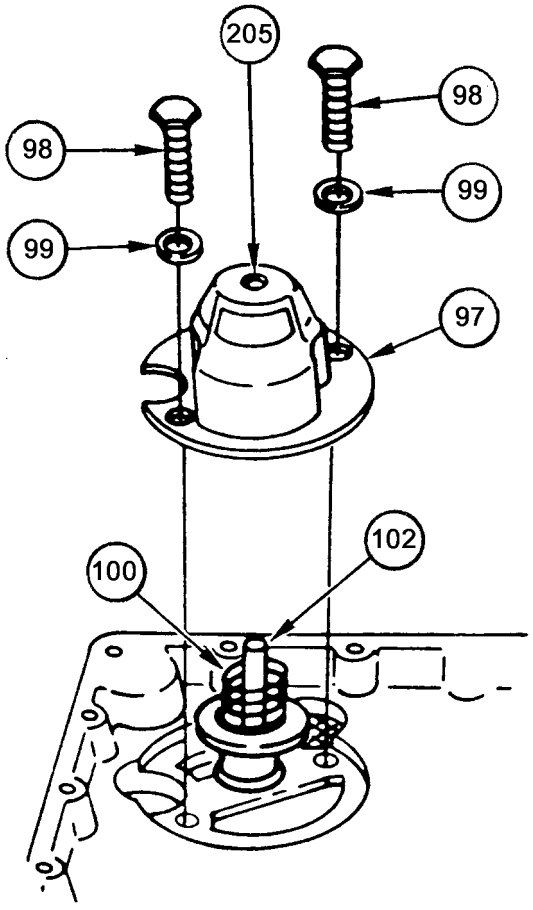


Figure 114. Reverse Equalizer Valve.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

INSTALL TUBES, RANGE OUTPUT GEAR SPACER, INNER (LEFT) STEER SHAFT

1. Install two new packings (91) on lube tube (90).
2. Apply Petrolatum (WP 0024, Item 14) to packings (91).

NOTE

End of lube tube inserted into Center Housing Assembly, seats in Bevel Gear Assembly. Outer end of tube does not go down flush with surface of Center Housing Assembly.

3. Install lube tube (90), either end first, in center housing bore (206) adjacent to equalizer valve housing (97).

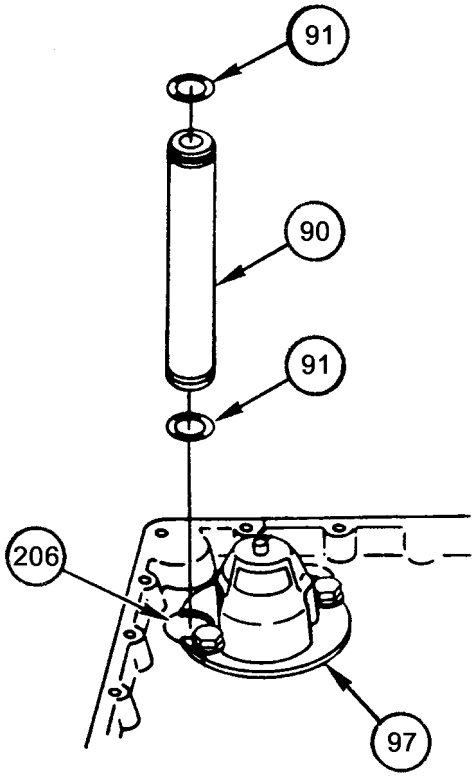


Figure 115. Lube Tube.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

INSTALL TUBES, RANGE OUTPUT GEAR SPACER, INNER (LEFT) STEER SHAFT – Cont.

NOTE

X200-4 brake apply tube and two packings are loose between the Right Hand Cover Assembly and Center Housing Assembly. X200-4A brake apply tube is pressed into Right Hand Brake support and uses only one packing.

4. X200-4, install two new packings (93) on brake apply tube (92).
5. Apply Petrolatum (WP 0024, Item 14) to packings (93).
6. Install brake apply tube (92), either end first, in bore (207) in right brake support (208).
7. X200-4A, install one new packing (93) on brake apply tube (92), which is pressed into the right brake support (208). Coat packing (93) with Petrolatum (WP 0024, Item 14).
8. Install two new packings (95) on brake coolant tube (94). Coat packings (95) with Petrolatum (WP 0024, Item 14).
9. Install brake coolant tube (94), either end first, in bore (209) in right brake support (208).

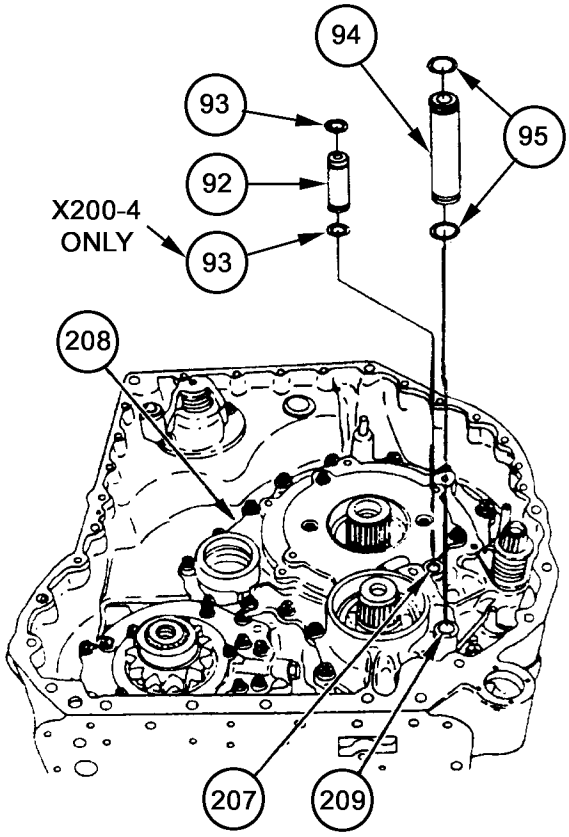


Figure 116. Brake Apply and Brake Coolant Tubes.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

INSTALL TUBES, RANGE OUTPUT GEAR SPACER, INNER (LEFT) STEER SHAFT – Cont.

NOTE

Retaining ring (87) on each end of steer shaft (86) serves as a stop. It is not necessary to replace retaining rings that are in good condition.

Retaining rings (87) may be removed with flat tip screwdriver.

Inner (left) steer shaft (86) may be installed either end first. Steer shaft is interchangeable.

10. Install inner (left) steer shaft (86) in bore (210) in right brake support (208).

NOTE

X200-4 and early models of the X200-4A Transmission have a sleeve (range output gear spacer) (88) installed. This sleeve (88) is used when Carrier P/N (73342) 23018136 and Shaft Shouldered P/N (73342) 23018096 are installed. This sleeve (88) is not installed in later models of the X200-4A Transmission.

11. If removed, install sleeve (88) on shaft and Bushing Assembly (89).

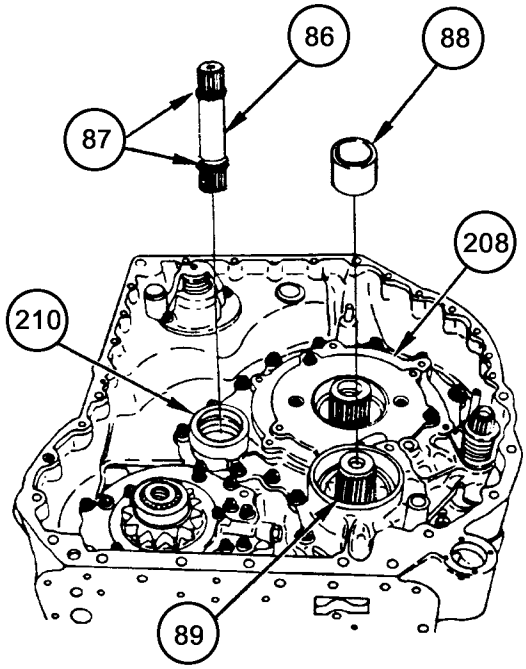


Figure 117. Steer Shaft.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

INSTALL TUBES, RANGE OUTPUT GEAR SPACER, INNER (LEFT) STEER SHAFT – Cont.

12. If old bearing (85) was removed from steer shaft drive gear (79), lubricate journal (211) located under steer shaft drive gear (79) with Petrolatum (WP 0024, Item 14), and Lubricating Oil (WP 0024, Item 12).

NOTE

Bearing (85) consists of cage and inner race. Check that outer race is in left brake support assembly. Refer to Repair Left Brake Support, WP 0016 00-38.

13. Install new bearing (85) on journal (211) of steer shaft drive gear (79). Press bearing to shoulder.

14. Apply Lubricating Oil (WP 0024, Item 12) to bearing (85).

15. Install steer shaft drive gear (79) on end of inner (left) steer shaft (86) with bearing side of gear down.

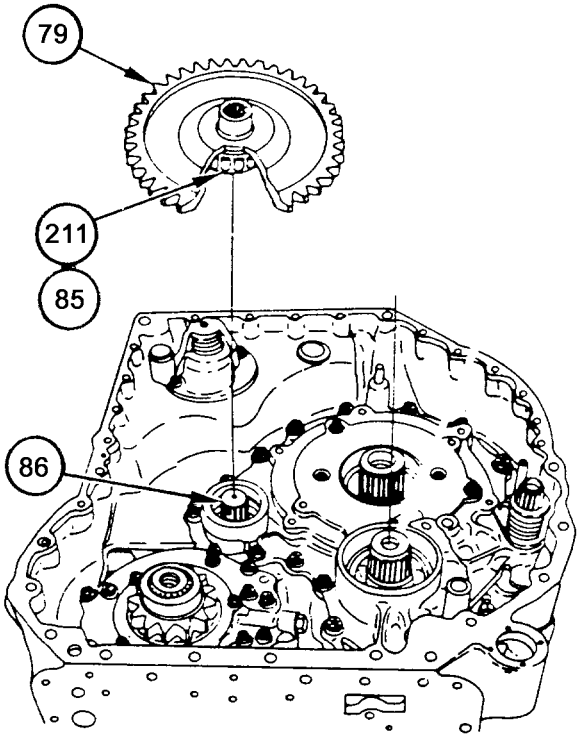


Figure 118. Steer Shaft Drive and Range Output Drive Gears.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

INSTALL TUBES, RANGE OUTPUT GEAR SPACER, INNER (LEFT) STEER SHAFT – Cont.

16. If old bearings (84) were removed from range output drive gear (82), lubricate journals on both sides of range output drive gear (82) with Lubricating Oil (WP 0024, Item 12), and Petrolatum (WP 0024, Item 14).

NOTE

Bearings (84) consist of inner race with rollers and outer races. Check that outer race beneath gear (82) is in Left Brake Support Assembly (refer to Repair Left Brake Support, WP 0016 00-38) and outer race above gear (82) is in Right Hand Cover Assembly (refer to WP 0012 00-01, Disassembly, Repair, and Assembly of the Right Hand Cover Assembly).

17. Install two new bearings (84) on range output drive gear (82). Press bearings to shoulder.

18. Apply Lubricating Oil (WP 0024, Item 12) to bearings (84).

19. Install range output drive gear (82) on shaft and Bushing Assembly (89), with either side of gear (82) down.

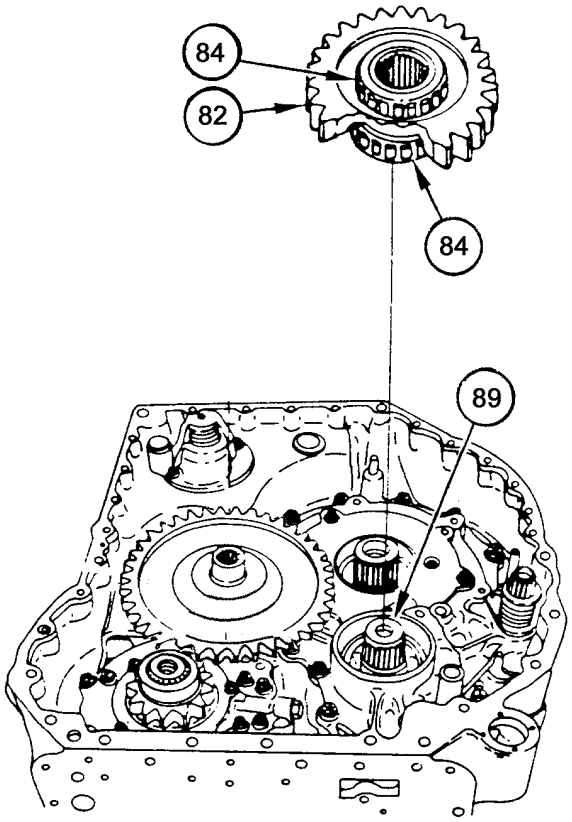


Figure 119. Steer Shaft Drive and Range Output Drive Gears.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

INSTALL TUBES, RANGE OUTPUT GEAR SPACER, INNER (LEFT) STEER SHAFT – Cont.

20. If old bearings (83) were removed from range output driven gear (81), lubricate journals on both sides of range output driven gear (81) with Lubricating Oil (WP 0024, Item 12), and Petrolatum (WP 0024, Item 14).

NOTE

Bearings (83) consist of inner race with rollers and outer races. Check that outer race beneath output driven gear (81) is in Left Brake Support Assembly (refer to Repair Left Brake Support, WP 0016 00-38) and outer race above gear (82) is in Right Hand Cover Assembly (refer to WP 0012 00-01, Disassembly, Repair and Assembly of the Right Hand Cover Assembly).

21. Install two new bearings (83) on range output driven gear (81). Press bearings to shoulder.

22. Apply Lubricating Oil (WP 0024, Item 12) to two bearings (83).

23. Install range output driven gear (81) on Steer Ring Gear Assembly (212) (located on LH output shaft), with longer internal spline on gear (81) down.

NOTE

Retaining rings (80) on each end of outer (right) steer shaft (78) serve as stops. It is not necessary to replace retaining rings that are in good condition.

Outer (right) steer shaft may be installed either end first.

24. Install outer (right) steer shaft (78) in steer shaft drive gear (79).

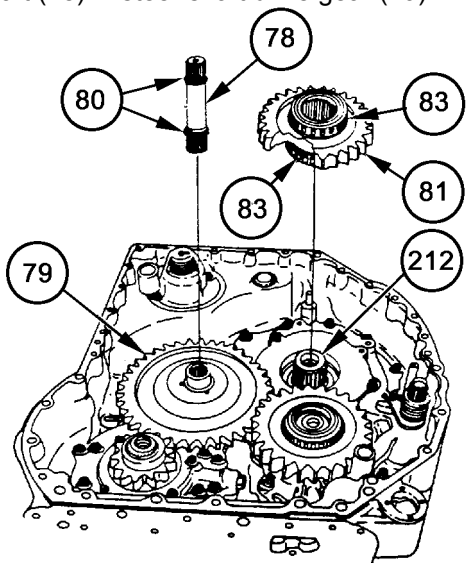


Figure 120. Steer Shaft and Output Driven Gear.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

INSTALL RIGHT HAND COVER ASSEMBLY

NOTE

Right brake adjusting cover removed. Brake adjusting cover restricts access to right end cover bolt when removing/installing end cover.

1. Install right end cover gasket (77) on transmission (62).
2. Install 3/8 inch flat washers (73) on each of two 3/8-16 x 3-1/2 bolts (74) and put bolts through lugs of Sling, Multiple Leg (WP 0025, Item 22).

NOTE

Bolts (74) 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. Install two bolts (74) in two threaded holes (75) in Right Hand Cover Assembly (52).

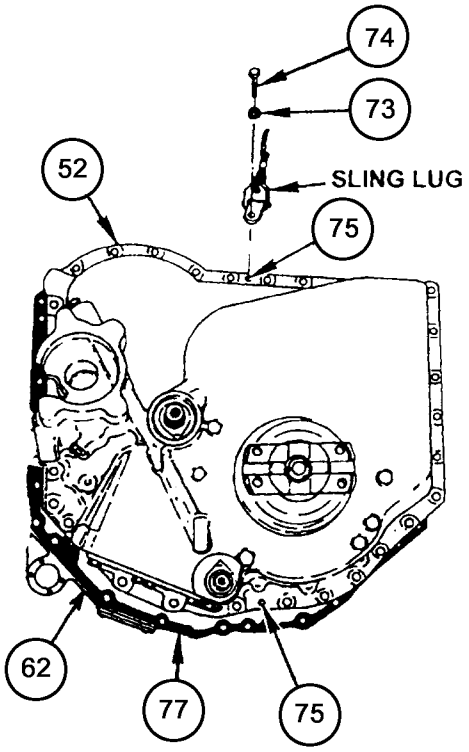


Figure 121. Right Hand Cover Assembly.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

INSTALL RIGHT HAND COVER ASSEMBLY – Cont.

WARNING

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

Weight of end cover assembly exceeds safe limits without sling and hoist. Lift end cover with sling and hoist to avoid bodily injury.

Right Hand Cover Assembly must be lifted using sling and hoist. To avoid injury, keep clear of end cover at all times. Do not let Right Hand Cover Assembly swing freely during hoisting.

4. Hoist Right Hand Cover Assembly (52) over transmission (62).

5. Lower Right Hand Cover Assembly (52) so that it is resting lightly on transmission (62).

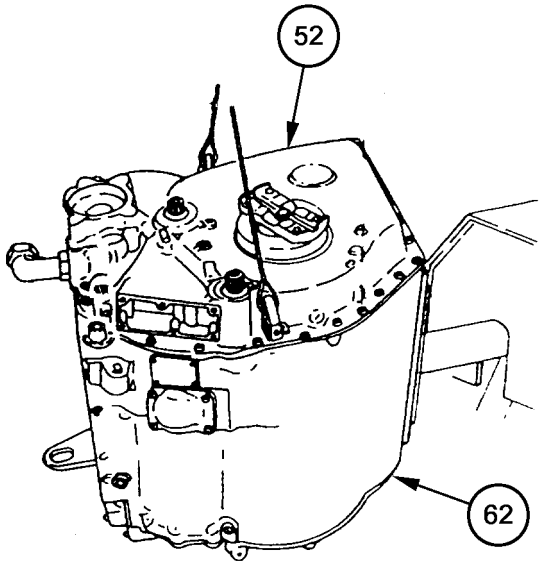


Figure 122. Right Hand Cover Assembly.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

INSTALL RIGHT HAND COVER ASSEMBLY – Cont.

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.

WARNING

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

6. Lower Right Hand Cover Assembly (52) while rotating output flange (201), using Socket, Socket Wrench (WP 0025, Item 23) on brake shafts (213), lower Right Hand Cover Assembly (52) until it is seated on right end cover gasket (77).

7. Remove two bolts (74), two washers (73) and Sling, Multiple Leg (WP 0025, Item 22) from Right Hand Cover Assembly (52).

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

INSTALL RIGHT HAND COVER ASSEMBLY – Cont.

8. Use two 3/8-16 x 1-1/2 inch bolts (3) and washers (4), install right lifting bracket (6) on Right Hand Cover Assembly (52).

9. Install 3/8-16 x 3-1/2 inch bolt (71) and washer (72) in Right Hand Cover Assembly (52).

10. Install the 26 remaining 3/8-16 x 1-1/4 inch bolts (69) and 26 washers (70) around perimeter of Right Hand Cover Assembly (52).

11. Torque all 29 bolts (3, 69, 71) to 27-32 lb-ft (37-43 N·m).

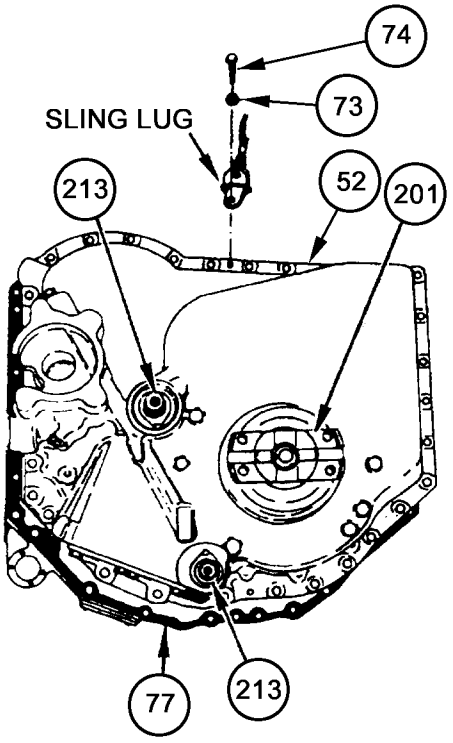


Figure 123. Right Hand Cover Assembly.

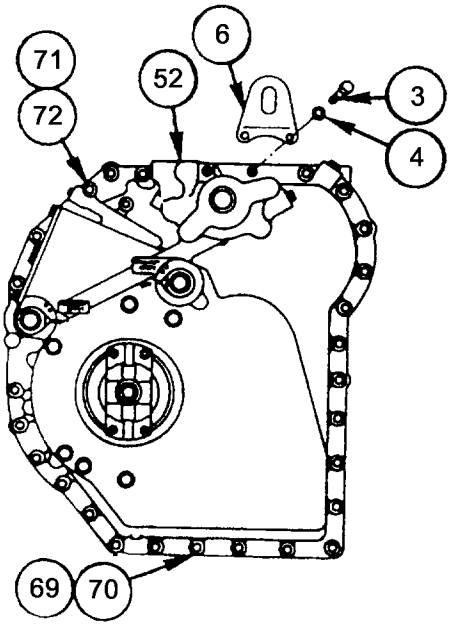


Figure 124. Right Hand Cover Assembly.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

INSTALL RIGHT HAND COVER ASSEMBLY – Cont.

12. Install right brake adjusting cover gasket (68) and right brake adjusting cover (67) on Right Hand Cover Assembly (52).

NOTE

X200-4A, the chain for oil filler cap is bolted under the top, outside bolt (65) and washer (66) of six bolts and washers, which retain the brake adjusting cover to the end cover. The bolt is installed at hole (214).

13. Install six bolts (65) and six washers (66) in right brake adjusting cover (67).

14. Torque six bolts (65) to 13-15 lb-ft (17-20 N·m).

15. The X200-4A right adjusting brake cover should have a pipe plug (215) installed at oil drain line location (shipping). If pipe plug (215) is missing, and transmission is to be put in storage, install pipe plug (215). Torque pipe plug (215) to 18-22 lb-ft (24-30 N·m). Reference P/N (73342) 23018210.

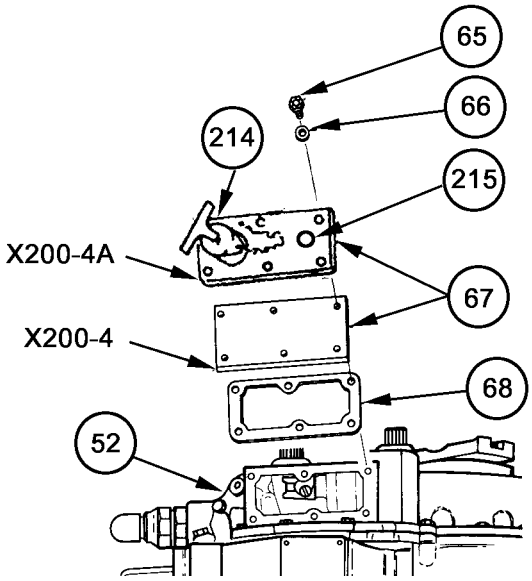


Figure 125. Right Hand Cover Assembly.

NOTE

Output shaft drag check is performed after transmission has been assembled. Refer to Final Adjustment, WP 0019 00-1.

Brake adjustment is performed after transmission has been assembled. Refer to Final Adjustments, WP 0019 00-1.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

REMOVE TRANSMISSION FROM ADAPTER PLATE

NOTE

An adapter plate must be mounted on the maintenance turnover stand in order to accept the transmission. The transmission must be mounted on the adapter plate.

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 lbs (442 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.

NOTE

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

If lifting brackets have not been removed from transmission, go to Step 4, this section.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

REMOVE TRANSMISSION FROM ADAPTER PLATE – Cont.

1. Hold left lifting bracket (5) over bracket holes in Left Hand Cover Assembly (51), with bracket leaning toward center of transmission.

2. Install two 3/8-16 x 1-1/2 inch bolts (3) and two washers (4), to attach left lifting bracket (5) to Left Hand Cover Assembly (51).

3. Repeat above Steps 1 through 2 to install right lifting bracket (6) onto Right Hand Cover Assembly (52).

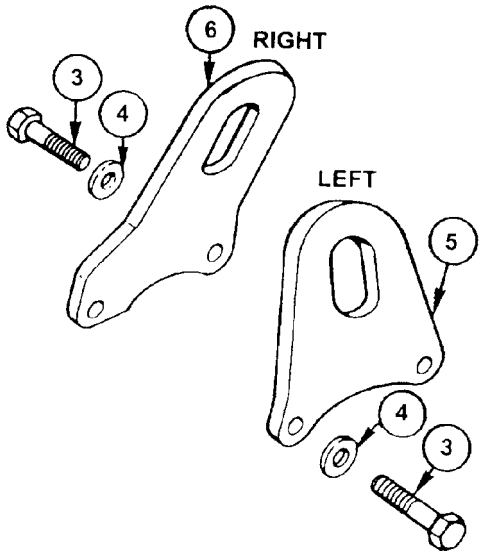


Figure 14. Right and Left Lifting Brackets. (Repeated)

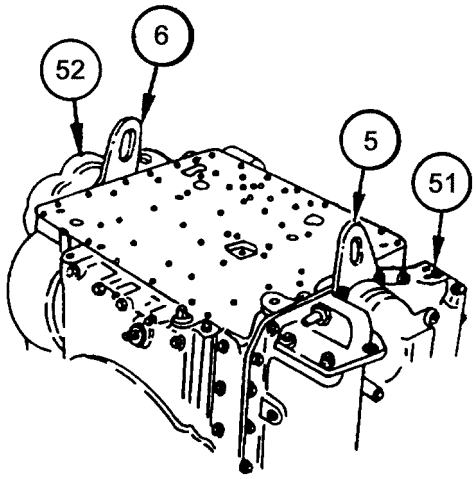


Figure 15. Right and Left Lifting Brackets Mounted on Transmission. (Repeated)

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

REMOVE TRANSMISSION FROM ADAPTER PLATE – Cont.

4. Remove bolt (53) and washer (54) from input housing (55). Save bolt and washer.

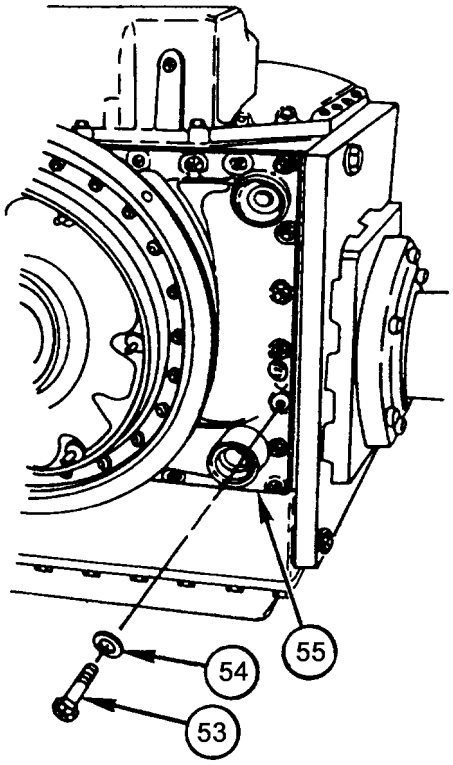


Figure 126. Input Housing Bolt Remove.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

REMOVE TRANSMISSION FROM ADAPTER PLATE – Cont.

5. Remove bolt (56) and washer (57) from Left Hand Cover Assembly (51). Save bolt and washer.

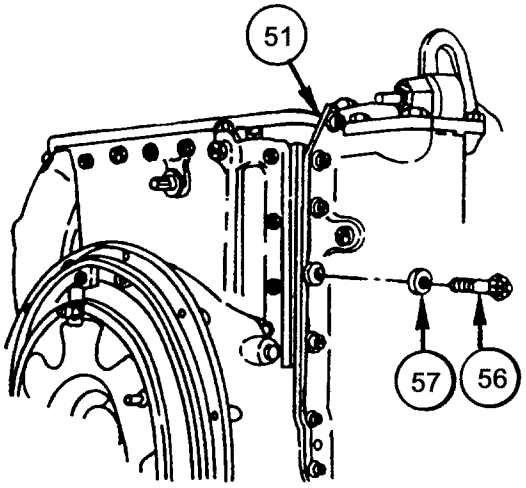


Figure 18. Left End Cover Bolt Removal. (Repeated)

6. Remove bolt (58) and washer (59) from Right Hand Cover Assembly (52). Save bolt and washer.

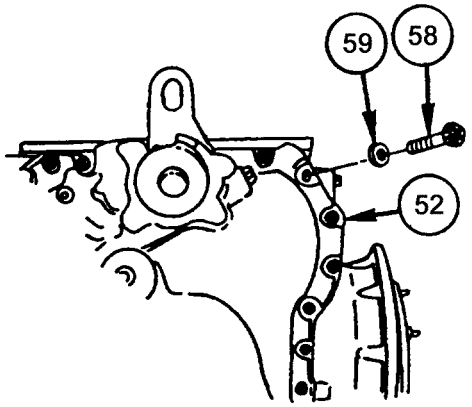


Figure 19. Right End Cover Bolt Removal. (Repeated)

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

REMOVE TRANSMISSION FROM ADAPTER PLATE – Cont.

7. Install 3/8 inch washer (61) under head of 3/8-16 x 1-3/4 inch bolt (60), put bolt through lug of Sling, Multiple Leg (WP 0025, Item 22) and install another 3/8 inch washer (61) on bolt (60).

8. Install bolt (60) attaching the Sling, Multiple Leg (WP 0025, Item 22) to input housing (55). Tighten bolt to snug.

9. Install 3/8 inch washer (61) under head of 3/8-16 x 1-3/4 inch bolt (60). Put bolt through lug of Sling, Multiple Leg (WP 0025, Item 22) and install another 3/8 inch washer (61) on bolt (60).

10. Install bolt (60) attaching Sling, Multiple Leg (WP 0025, Item 22) to Left Hand Cover Assembly (51). Tighten bolt to snug.

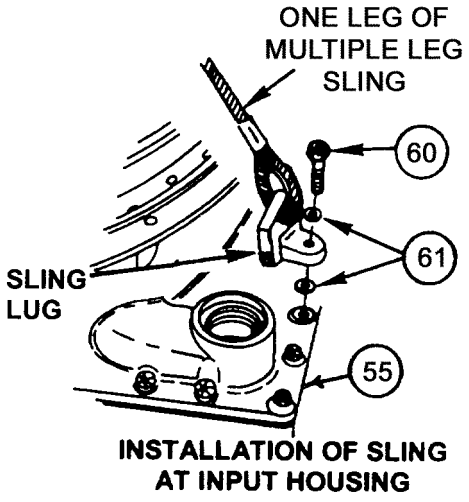


Figure 127. Attachment of Multiple Leg Sling.

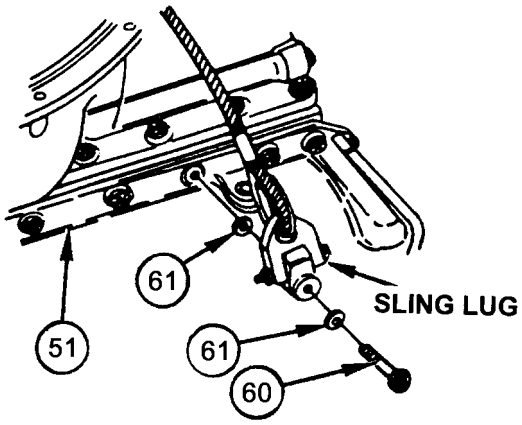


Figure 128. Attachment of Multiple Leg Sling.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

REMOVE TRANSMISSION FROM ADAPTER PLATE – Cont.

11. Install 3/8 inch washer (61) under head of 3/8-16 x 1-3/4 inch bolt (60), put bolt through lug of Sling, Multiple Leg (WP 0025, Item 22) and install another 3/8 inch washer (61) on bolt (60).

12. Install bolt (60) attaching Sling, Multiple Leg (WP 0025, Item 22) to Right Hand Cover Assembly (52). Tighten bolt to snug.

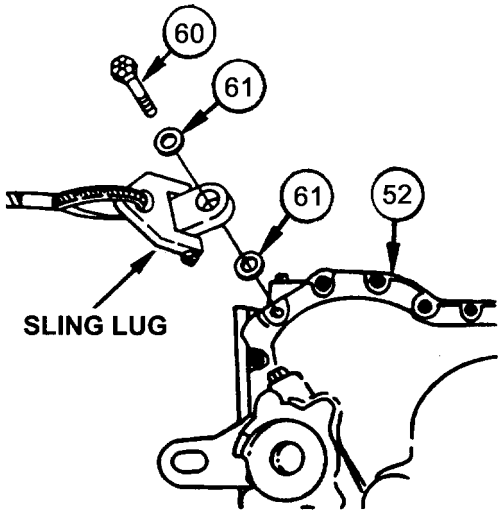


Figure 129. Attachment of Multiple Legged Sling.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

REMOVE TRANSMISSION FROM ADAPTER PLATE – Cont.

13. Using Sling, Engine and Transmission (WP 0025, Item 21), attach sling hooks to left lifting bracket (5) and right lifting bracket (6).

14. Rotate transmission input housing upward on maintenance stand.

15. Using hoist, one soldier raise Sling, Multiple Leg (WP 0025, Item 22) until cables are tight. Maneuver hoist and maintenance stand until all three cables are uniformly tight, ready to receive full weight of transmission (62).

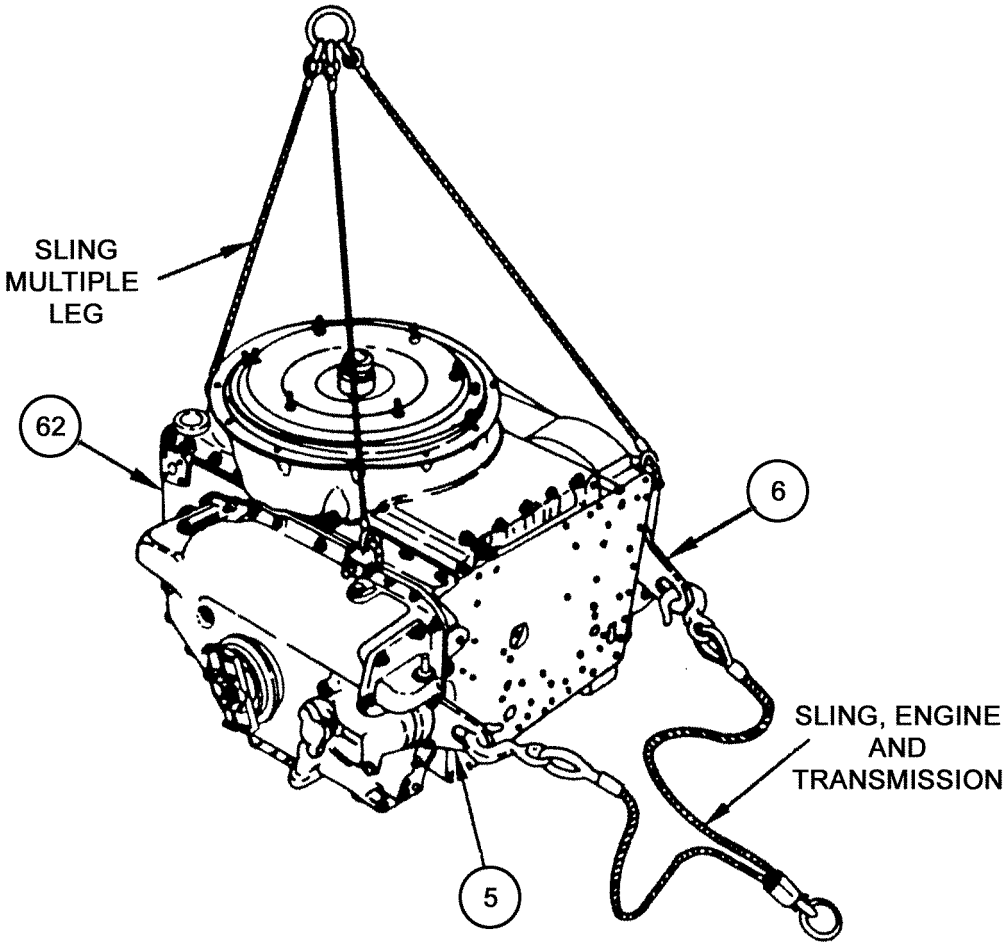


Figure 130. Attachment of Slings.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

REMOVE TRANSMISSION FROM ADAPTER PLATE – Cont.

NOTE

When removing bolts (64), use hoist as necessary to take tension off bolts.

16. Other soldier remove three 1/2-13 x 2 inch bolts (64) and washers (63) holding bottom of transmission (62) to adapter plate (part of Adapter Kit, Container (WP 0025, Item 2)).

17. Move transmission (62) away from maintenance stand.

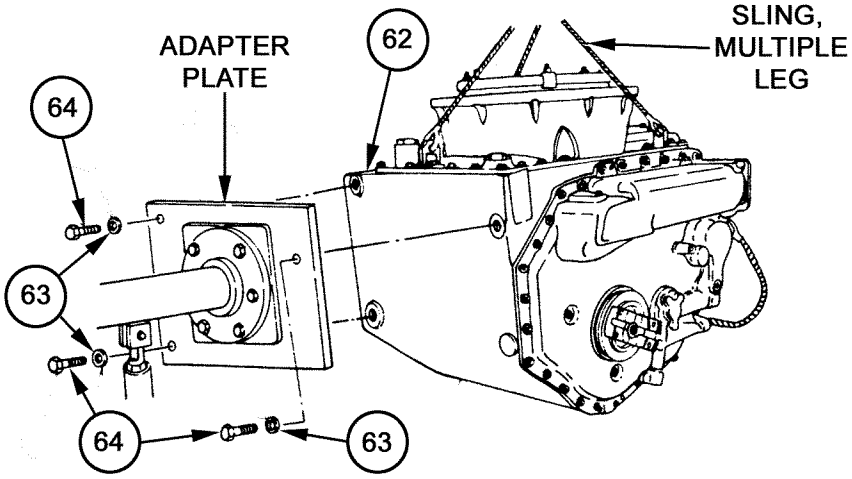


Figure 131. Center Housing Attaching Bolts.

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.

Check condition of slings; replace as necessary.

Stay clear of slings.

Do not get under transmission.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

REMOVE TRANSMISSION FROM ADAPTER PLATE – Cont.

CAUTION

Either sling, of both slings, should be raised as necessary to maintain at least one foot clearance between transmission and floor. The transmission will be damaged if it hits the floor when weight shifts from one sling to the other.

18. One soldier slowly raise Sling, Engine and Transmission (WP 0025, Item 21). Other soldier raise Sling, Multiple Leg (WP 0025, Item 22) as necessary to maintain proper clearance between transmission (62) and floor.

19. Slowly raise Sling, Engine and Transmission (WP 0025, Item 21) until entire weight of transmission (62) is on Sling, Engine and Transmission (WP 0025, Item 21).

20. Remove Sling, Multiple Leg (WP 0025, Item 22) from transmission (62).

21. Slowly lower transmission (62) to work table or floor. Remove hooks of Sling, Engine and Transmission (WP 0025, Item 21) from transmission.

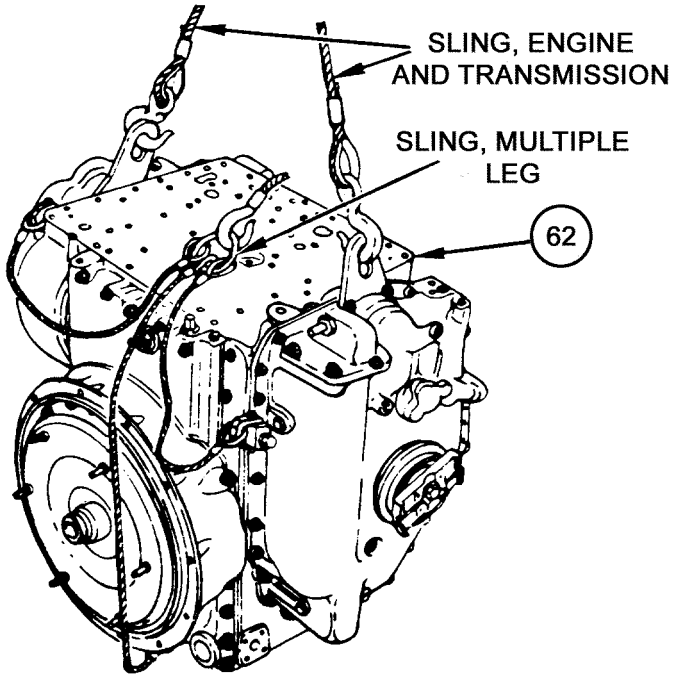


Figure 132. Slings.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

REMOVE TRANSMISSION FROM ADAPTER PLATE – Cont.

22. Reinstall bolt (58) and washer (59) in Right Hand Cover Assembly (52).

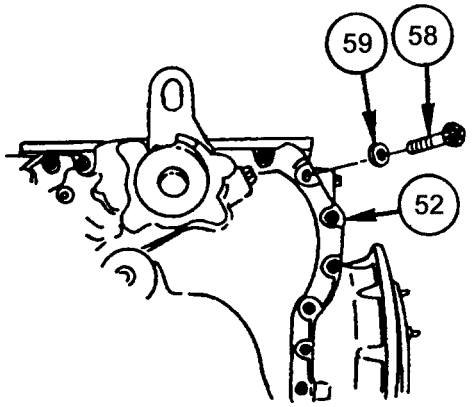


Figure 19. Right End Cover Bolt. (Repeated)

23. Reinstall bolt (56) and washer (57) in Left Hand Cover Assembly (51).

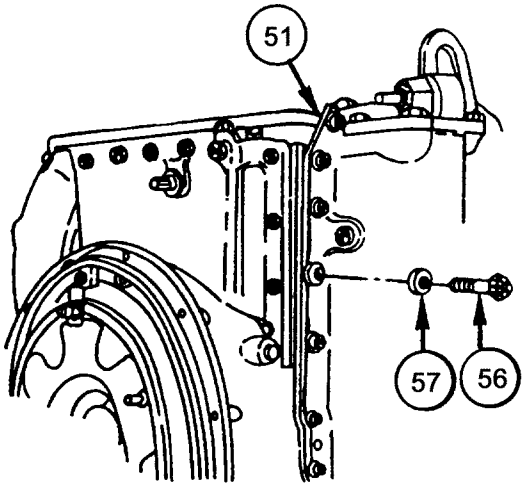


Figure 18. Left End Cover Bolt. (Repeated)

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

REMOVE TRANSMISSION FROM ADAPTER PLATE – Cont.

24. Reinstall bolt (53) and washer (54) in input housing (55).

25. Torque three bolts (53, 56, 58) to 27-32 lb-ft (37-43 N·m).

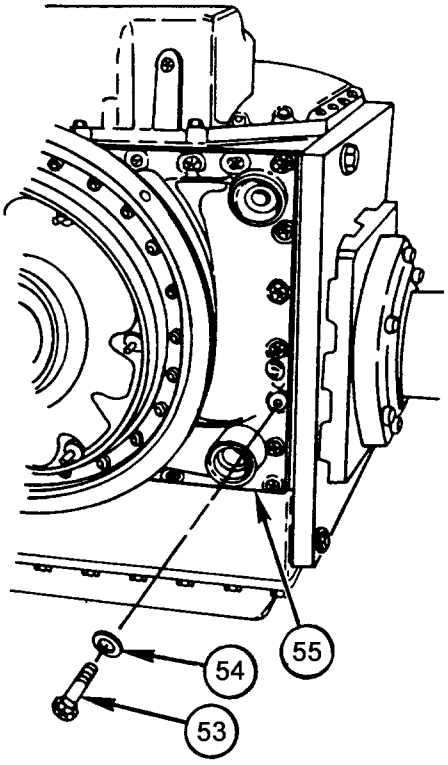


Figure 27. Input Housing Bolt Removal. (Repeated)

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

REMOVE ADAPTER PLATE FROM 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.

Adapter plate weighs 127 pounds (57.6 kilograms). Lift plate with hoist to avoid injury.

1. Install eyebolt (46) (part of Adapter Kit, Container (WP 0025, Item 2)) in threaded hole at end of adapter plate (47).
2. Attach sling hook of Sling, Engine and Transmission (WP 0025, Item 21) in eyebolt (46) and raise sling until cable is tight.
3. Remove six 5/8-11 x 3 inch bolts (49) and six washers (50) from maintenance stand (48).
4. Remove adapter plate (47) (part of Adapter Kit, Container (WP 0025, Item 2)).
5. Remove Sling, Engine and Transmission (WP 0025, Item 21).
6. Remove eyebolt (46).

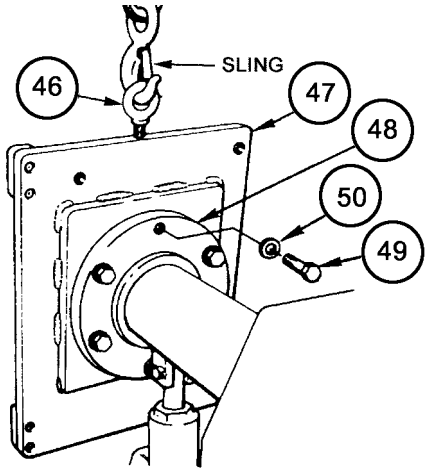


Figure 13. Adapter Plate. (Repeated)

INSTALL TRANSMISSION TOP COMPONENTS

OVERVIEW

Components cannot be installed on top of the transmission until the following parts have been installed in the top of the Center Housing Assembly:

Bolts holding second and third clutch housings (in the range pack) to the Center Housing Assembly. These bolts are installed in Install Range Pack, WP 0016 00-89.

Pitot signal tubes extending into the third clutch backing plate (in the range pack) from top of Center Housing Assembly. Installed in Install Range Pack, WP 0016 00-89.

Governor Screen Assembly. Installed in WP 0011 00-130.

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, installed on WP 0011 00-141, is required to hook up harness and solenoid connectors after Control Valve Assemblies have been installed.

INSTALL GOVERNOR SCREEN ASSEMBLY, OIL TRANSFER PLATE ASSEMBLY, AND SEPARATOR PLATE

CAUTION

Transmission must be in upright position when oil transfer gasket, Oil Transfer Plate Assembly, 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 Assembly clean. Keep all parts clean. Wipe with lint-free cloth. Contamination of control valves can cause transmission failure.

Before installing Oil Transfer Plate Assembly 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, WP 0011 00-129. These parts cannot be installed after top components are on the transmission.

NOTE

Lifting brackets must be removed from transmission.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

INSTALL GOVERNOR SCREEN ASSEMBLY, OIL TRANSFER PLATE ASSEMBLY, AND SEPARATOR PLATE – Cont.

1. Install clean Governor Screen Assembly (45), open end first, into bore in top of Center Housing Assembly (44).

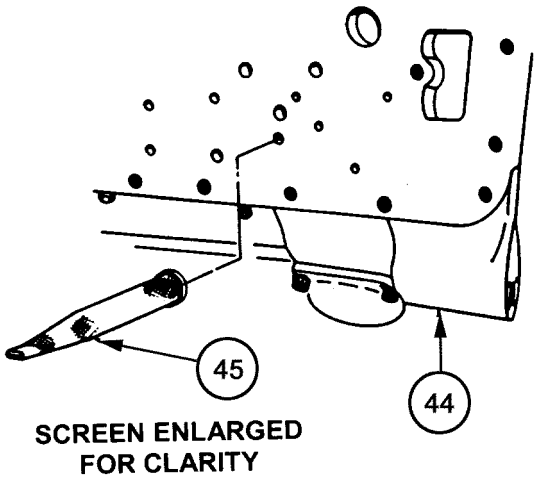


Figure 12. Governor Filter Screen. (Repeated)

2. Install four Guide Pin, 5/16-18 x 3 Inch (WP 0027, Item 2) (216) in four bolt holes (217).

3. Install new oil transfer plate gasket (43) on Center Housing Assembly (44) over four guide pins (216).

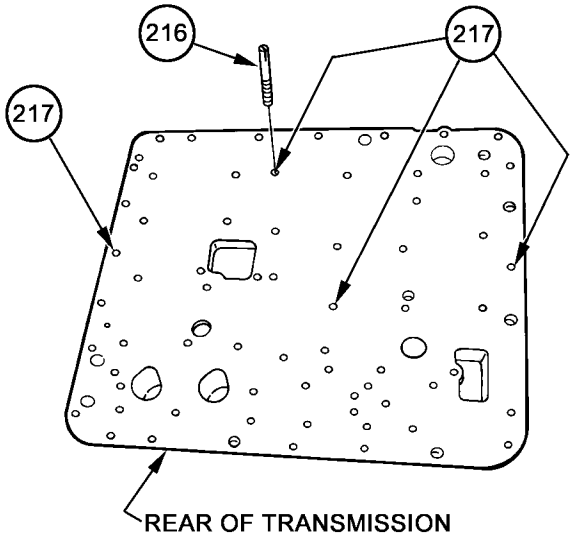


Figure 133. Guide Pins.

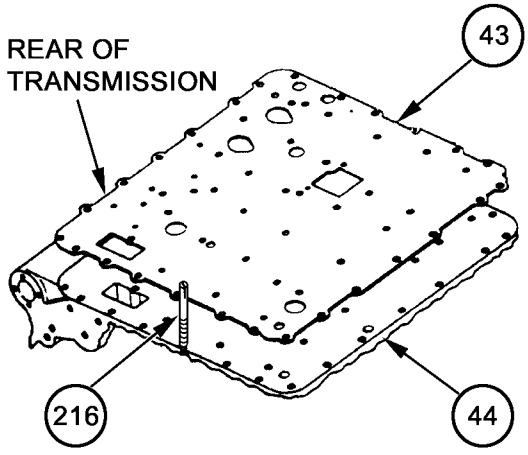


Figure 134. Oil Transfer Plate Gasket.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

INSTALL GOVERNOR SCREEN ASSEMBLY, OIL TRANSFER PLATE ASSEMBLY, AND SEPARATOR PLATE – Cont.

4. Align Oil Transfer Plate Assembly (41) with four guide pins (216) and install Oil Transfer Plate Assembly (41) on oil transfer plate gasket (43).

5. Install 5/16-18 x 1-1/4 inch bolt (39) and washer (40) in Oil Transfer Plate Assembly (41).

6. Torque bolt (39) to 17-20 lb-ft (23-27 N·m).

7. Install nylon check ball (42) in check ball hole on Oil Transfer Plate Assembly (41).

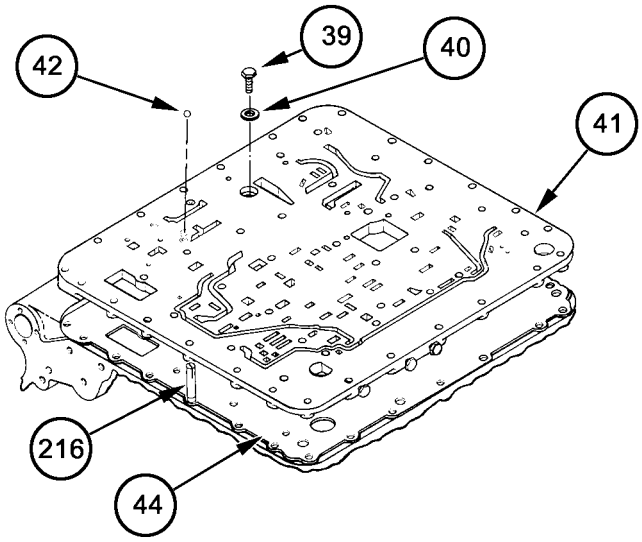


Figure 135. Oil Transfer Plate.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

INSTALL GOVERNOR SCREEN ASSEMBLY, OIL TRANSFER PLATE ASSEMBLY, AND SEPARATOR PLATE – Cont.

8. Install separator plate (34) over four guide pins (216) and on Oil Transfer Plate Assembly (41).
9. Install five 5/16-18 x 1-1/2 inch bolts (35) and five washers (36) holding separator plate (34), Oil Transfer Plate Assembly (41), and gasket (43) to transmission.
10. Torque five bolts (35) to 17-20 lb-ft (23-27 N·m).
11. Install two 1/4-18 x 1-1/4 inch flanged-head bolts (33) holding separator plate (34), Oil Transfer Plate Assembly (41) and gasket (43) to transmission.
12. Torque two flanged-head bolts (33) to 9-11 lb-ft (12-15 N·m).
13. Install 1/4-18 x 1-1/2 inch bolt (37) and washer (38) holding separator plate (34), Oil Transfer Plate Assembly (41), and gasket (43) to transmission.
14. Torque bolt (37) to 9-11 lb-ft (12-15 N·m).
15. Remove two 5/16-18 x 3 inch guide pins (216) located at edge of separator plate (34). Two guide pins (216) remain.

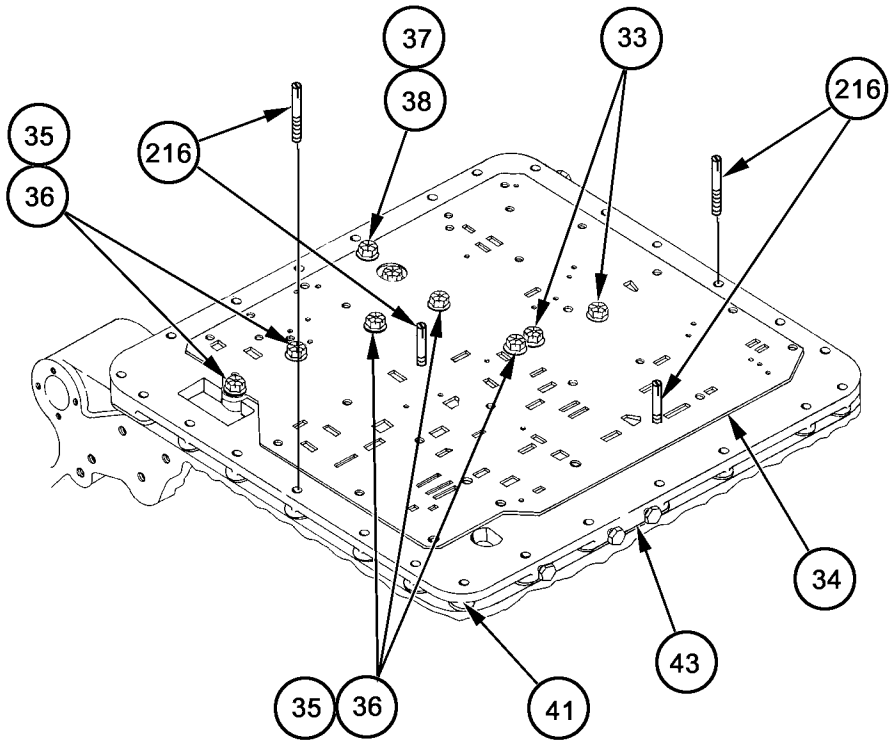


Figure 136. Oil Transfer Plate Bolts.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

INSTALL WIRING HARNESS ASSEMBLY

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.

1. Install new gasket (21) on wiring harness (15). Pull wiring through gasket until gasket is under wiring harness connector body (12).

NOTE

A cord was installed as an aid to installation, when wiring harness was removed. If cord is still remaining, tied to connector F or G, pull cord and feed wiring harness through Oil Transfer Plate Assembly. If cord is not present, go to Step 2.

2. Feed wiring harness (15) into center housing opening (218) and pull wiring harness (15) through oil transfer plate opening (219).

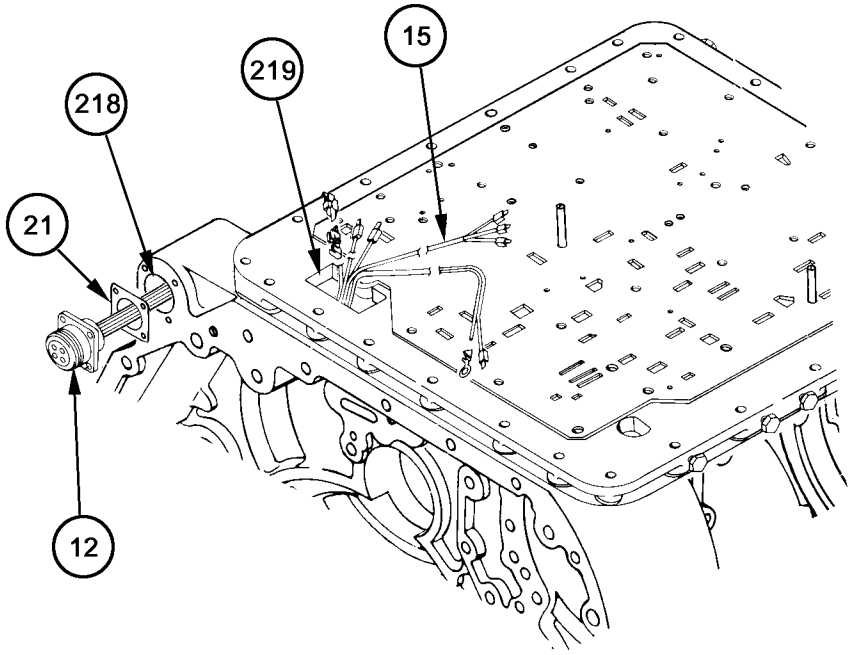


Figure 137. Install Wiring Harness.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

INSTALL WIRING HARNESS ASSEMBLY – Cont.

3. Install wiring harness connector body (12) into transmission center housing opening (218) with key (220) in receptacle (221) located at bottom.

4. Install four new No. 4-40 x 7/16 inch screws (13) holding wiring harness connector body (12) and new gasket (21) to transmission. Do not tighten screws.

5. Torque four screws (13) to 3-5 lb-in (0.3-0.6 N·m).

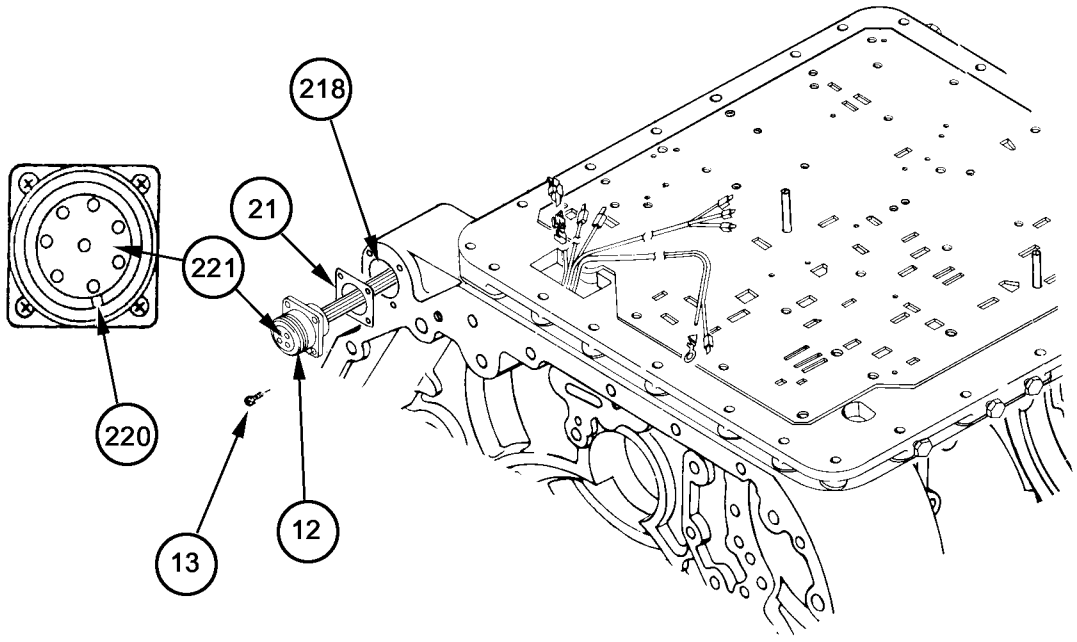


Figure 138. Install Wiring Harness.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

INSTALL G2 BACKUP VALVE ASSEMBLY

CAUTION

Transmission must be in upright position when oil transfer gasket, Oil Transfer Plate Assembly, 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 Assembly clean. Keep all parts clean. Wipe with Cloth, batiste, (WP 0024, Item 7). Contamination of control valves can cause transmission failure.

1. Install two 1/4-18 x 2-1/4 inch bolts (222) and two washers (31) holding G2 Backup Valve Assembly (32) to separator plate (34).
2. Install two 1/4-18 x 1-3/4 inch bolts (223) and two washers (31) holding G2 Backup Valve Assembly (32) to separator plate (34).
3. Torque four bolts (222, 223) to 9-11 lb-ft (12-15 N·m).

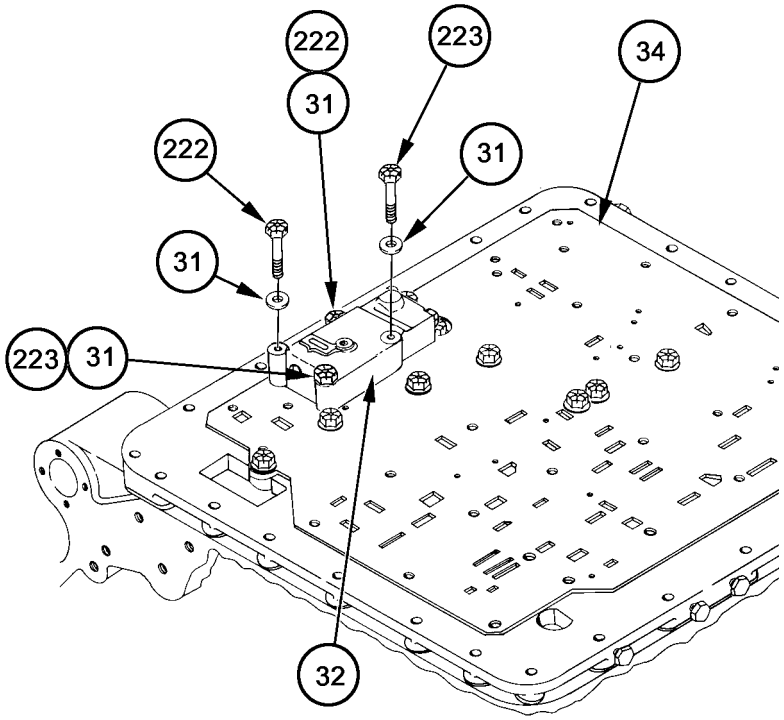


Figure 139. G2 Backup Valve Assembly.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

INSTALL PRIORITY VALVE ASSEMBLY

CAUTION

Transmission must be in upright position when oil transfer gasket, Oil Transfer Plate Assembly, 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 Assembly clean. Keep all parts clean. Wipe with Cloth, batiste (WP 0024, Item 7). Contamination of control valves can cause transmission failure.

1. Install two 1/4-18 x 2-1/8 inch bolts (224) and two washers (28) holding Priority Valve Assembly (29) to separator plate (34).
2. Install 1/4-18 x 1-3/4 inch bolt (225) and washer (28) holding priority valve (29) to separator plate (34).
3. Torque three bolts (224, 225) to 9-11 lb-ft (12-15 N·m).

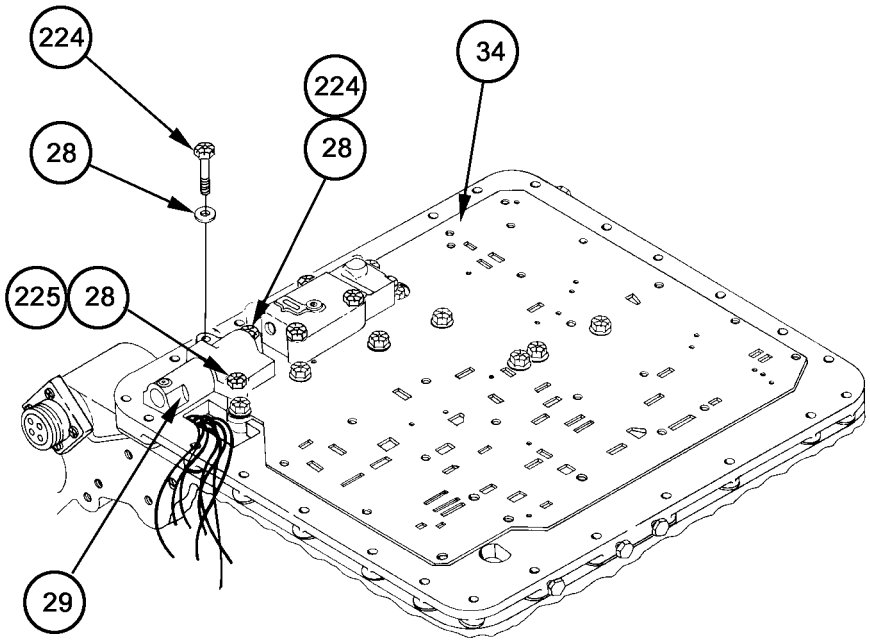


Figure 140. Priority Valve Assembly.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

INSTALL LOCKUP VALVE CONTROL ASSEMBLY

CAUTION

Transmission must be in upright position when oil transfer gasket, Oil Transfer Plate Assembly, 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 Assembly clean. Keep all parts clean. Wipe with Cloth, batiste (WP 0024, Item 7). Contamination of control valves can cause transmission failure.

1. Install two 5/16-20 x 2-1/4 inch bolts (226) and washers (25) holding Lockup Control Valve Assembly (26) to separator plate (34).
2. Install four 5/16-18 x 2-3/4 inch bolts (227) and washers (25) holding Lockup Control Valve Assembly (26) to separator plate (34).
3. Torque six bolts (226, 227) to 17-20 lb-ft (23-27 N·m).

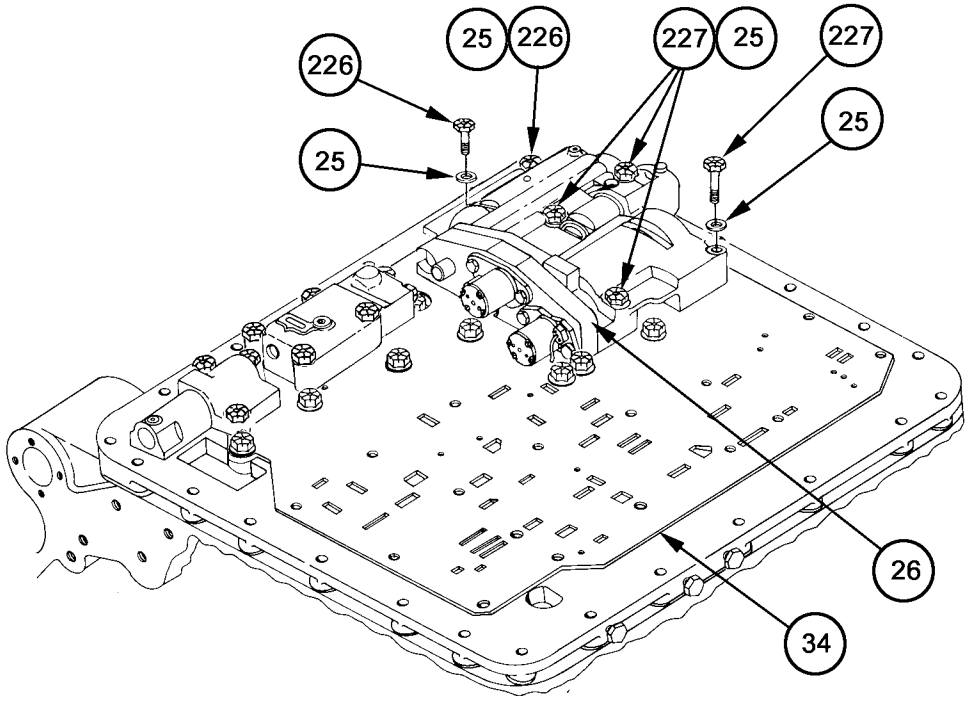


Figure 141. Lockup Control Valve Assembly.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

INSTALL MAIN CONTROL VALVE ASSEMBLY

CAUTION

Transmission must be in upright position when oil transfer gasket, Oil Transfer Plate Assembly, 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 Assembly clean. Keep all parts clean. Wipe with Cloth, batiste (WP 0024, Item 7). Contamination of control valves can cause transmission failure.

1. Using Cloth, batiste (WP 0024, Item 7), clean separator plate (34) and Main Control Valve Assembly (20) as necessary.

NOTE

Guide pins were installed at time of installation of separator plate.

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.

2. Install Main Control Valve Assembly (20) over two guide pins (216) and onto separator plate (34).
3. Install seven 5/16-18 x 2-3/4 inch bolts (228) and washers (23) holding Main Control Valve Assembly (20) to transmission.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

INSTALL MAIN CONTROL VALVE ASSEMBLY – Cont.

4. Install three 5/16-18 x 3 inch bolts (229) and washers (23) holding Main Control Valve Assembly (20) to transmission.

5. Install four 5/16-18 x 3-1/4 inch bolts (230) and washers (23) holding Main Control Valve Assembly (20) to transmission.

6. Torque all 14 bolts (228, 229, 230) to 17-20 lb-ft (23-27 N·m).

7. Remove two guide pins (216).

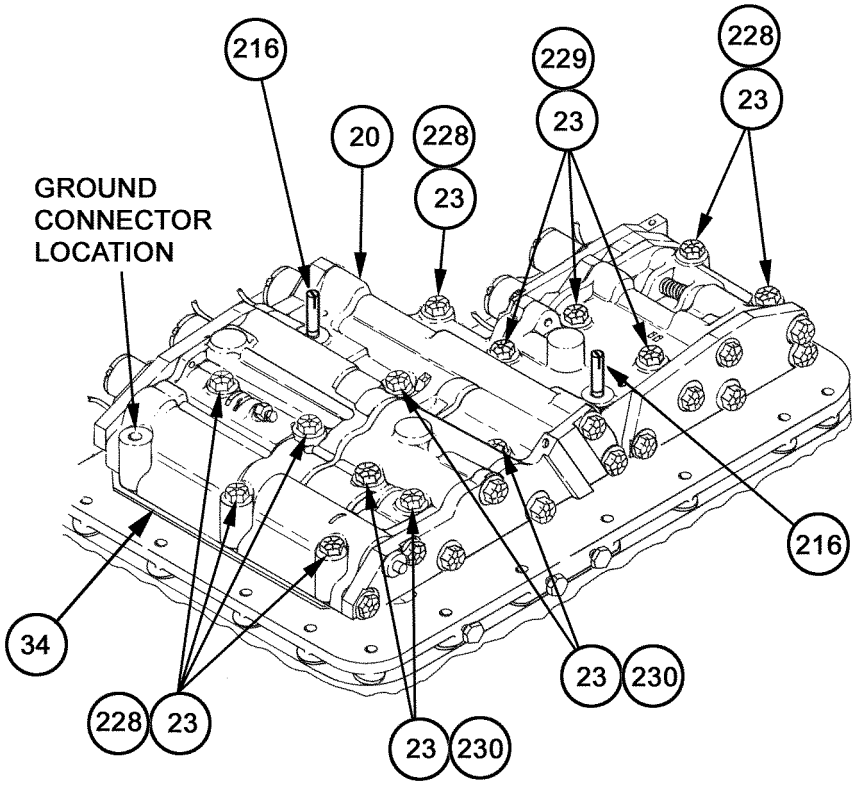


Figure 142. Main Control Valve Assembly.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

INSTALL MAIN CONTROL VALVE ASSEMBLY – Cont.

8. Install 5/16-18 x 3 inch bolt (231) and washer (23).

9. Install 5/16-18 x 3-1/4 inch bolt (232) and washer (23).

NOTE

The last retaining 5/16-18 x 2 3/4 inch bolt and washer for the Main Control Valve Assembly is installed later with wiring harness ground connector.

10. Torque two bolts (231, 232) to 17-20 lb-ft (23-27 N·m).

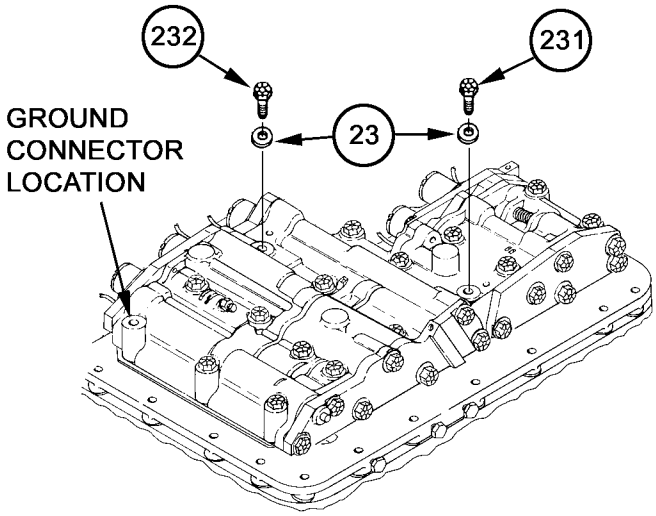


Figure 143. Main Control Valve Assembly.

CONNECT WIRING HARNESS TO SOLENOIDS AND GROUND

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.

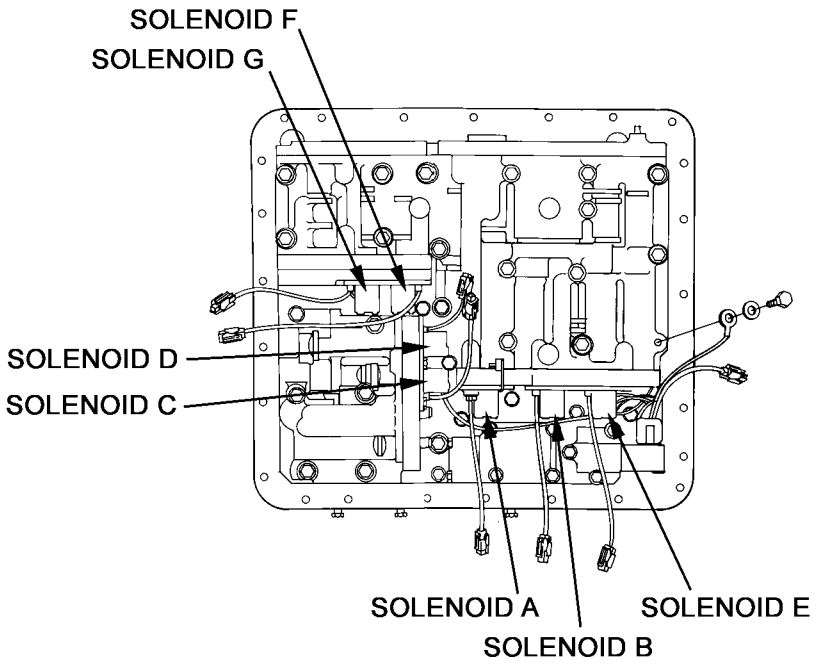


Fig 144. Solenoids

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

CONNECT WIRING HARNESS TO SOLENOIDS AND GROUND – Cont.

1. Look for letters A, B, C, D, E, F and G stamped on wiring harness connectors (14).
2. Locate solenoids A, B, E, F and G on Main Control Valve Assembly (20) and locate solenoids C and D on Lockup Control Valve Assembly (26).
3. Match wiring harness connectors (14) with solenoid connectors (233).
4. Hold wiring harness connector (14) and solenoid connector (233) with ends of connectors facing each other.
5. Align connectors (14, 233) so that connector loops (234) will fit over bayonets (235).
6. Push connectors (14, 233) together until ends of connector loops (234) are down behind ends of bayonets (235).
7. Install 5/16-18 x 2-3/4 inch bolt (17) through washer (18) and through eye of harness ground connector (19).
8. Install bolt (17) and washer (18) through Main Control Valve Assembly (20).
9. Torque bolt (17) to 17-20 lb-ft (23-27 N·m).

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

CONNECT WIRING HARNESS TO SOLENOIDS AND GROUND – Cont.

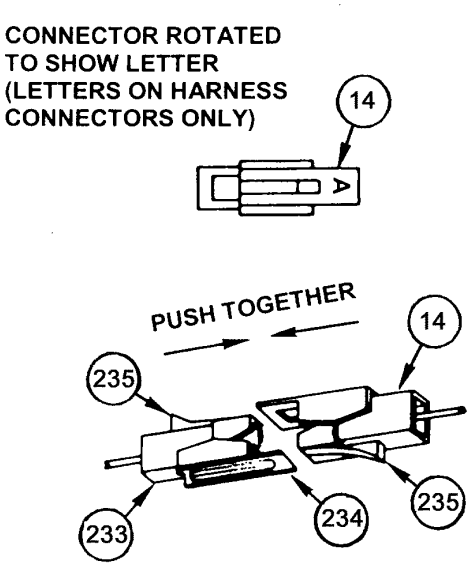


Figure 145. Harness Connectors.

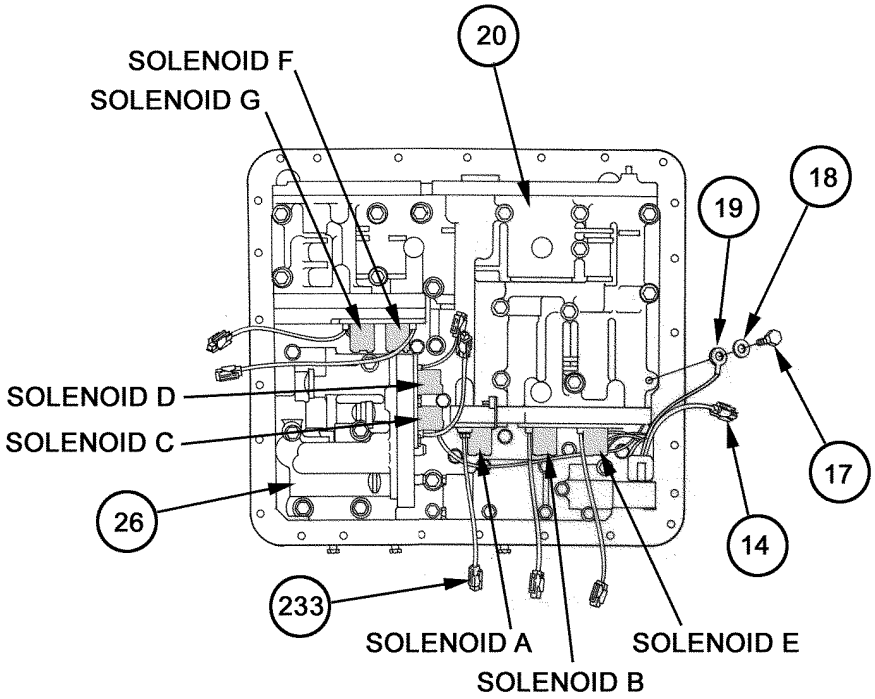


Figure 146. Harness Connectors.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

CONNECT WIRING HARNESS TO SOLENOIDS AND GROUND – Cont.

10. Arrange wiring harness (15), and solenoid (236) wires so that all wiring is tucked neatly under or between solenoids (236).

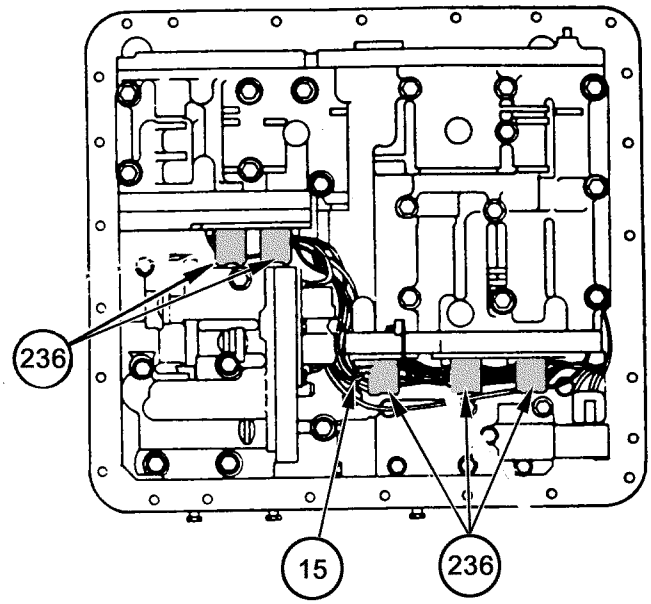


Figure 147. Wiring Harness.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

INSTALL TRANSMISSION TOP COVER ASSEMBLY, BREATHER, AND RIGHT AND LEFT LIFTING BRACKETS.

Install Transmissions Top Cover Assembly

1. Install new transmission top cover gasket (11) on transmission.

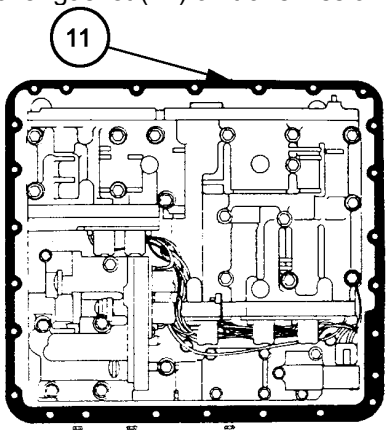


Figure 148. Transmission Top Cover Gasket.

2. Put top cover (10) on transmission.
3. Install fifteen 5/16-18 x 3-1/2 inch flanged-head bolts (7) holding top cover (10) to transmission.
4. Install two 5/16-18 x 1-3/4 inch flanged-head bolts (9) holding top cover (10) to transmission.
5. Install nine 5/16-18 x 2 inch flanged-head bolts (8) holding top cover (10) to transmission.
6. Torque bolts (7, 8, 9) to 13-15 lb-ft (18-20 N·m).

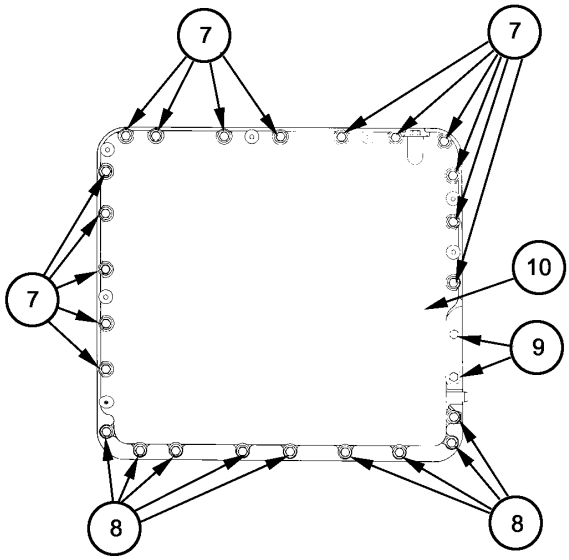


Figure 149. Transmission Top Cover.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

INSTALL TRANSMISSION TOP COVER ASSEMBLY, BREATHER, AND RIGHT AND LEFT LIFTING BRACKETS - Cont.

7. Install reducer (1) in transmission breather port.

8. Torque reducer (1) to 12-16 lb-ft (16-22 N·m).

Install Breather

1. Screw bottom of breather (2) into reducer (1).

2. Torque breather (2) to 14-16 lb-ft (19-22 N·m).

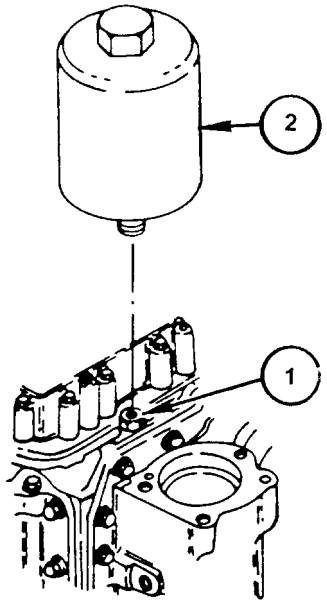


Figure 150. Breather.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

INSTALL TRANSMISSION TOP COVER ASSEMBLY, BREATHER, AND RIGHT AND LEFT LIFTING BRACKETS - Cont.

Install Right and Left Lifting Brackets

1. Hold left lifting bracket (5) on Left Hand Cover Assembly (51) with top of bracket leaning toward center of transmission.

2. Install two 3/8-16 x 1-1/2 inch bolts (3) and washers (4) holding left lifting bracket (5) to Left Hand Cover Assembly (51).

3. Hold right lifting bracket (6) on Right Hand Cover Assembly (52) with top of bracket leaning toward center of transmission.

4. Install two 3/8-16 x 1-1/2 inch bolts (3) and washers (4) holding right lifting bracket (6) to Right Hand Cover Assembly (52).

5. Torque four bolts (3) to 13-15 lb-ft (18-20 N·m).

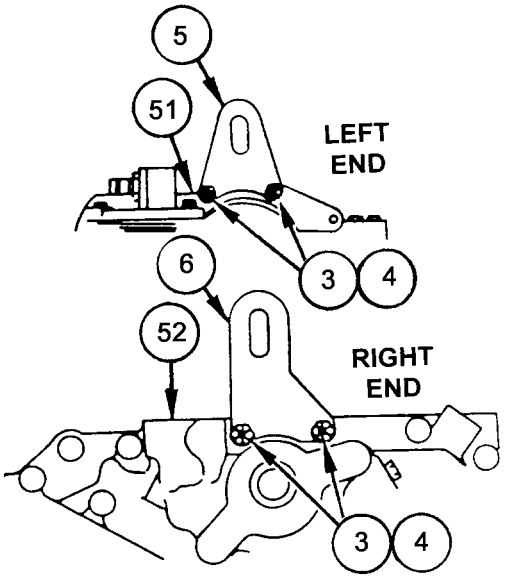


Figure 151. Lifting Brackets.

TRANSMISSION, DISASSEMBLY INTO AND ASSEMBLY FROM MAJOR COMPONENTS – Cont. 0011 00

FOLLOW-ON PROCEDURE:

1. If transmission is to be installed in a vehicle, install Oil Fill Tube Assembly. Reference Remove and Install Oil Fill Tube Assembly, WP 0010 00-1.

2. If transmission is to be installed in shipping container, attach Oil Fill Tube Assembly to input housing. Reference Remove and Install Transmission Assembly From/Into Container, WP 0009 00-1.

END OF WORK PACKAGE

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY 0012 00

THIS WORK PACKAGE COVERS:

Disassembly, Repair, and Assembly of the Right Hand Cover Assembly.

INITIAL SETUP

References
TM 9-214

Personnel Required
Track Vehicle Repairer 63H20 (2)

Common Tools
Adapter, Socket Wrench,1/2 Inch to 3/8 Inch Square Drive (WP 0025, Item 1)
Heater Gun Type, Electric (WP 0025, Item 9)
Rotary Tool Kit, Electric (grinder) (WP 0025, Item 19)
Shop Equipment, Automotive Maintenance and Repair: Field Maintenance, Basic, Less Power (WP 0025, Item 20)
Socket Wrench Attachment, Socket Head Screw 1/8 inch (Allen) (WP 0025, Item 24)
Tool Kit, General Mechanic's Automotive (WP 0025, Item 27)

Special Tools
Inserter, Seal (WP 0025, Item 13)

Supplies
Bands, Rubber No. 19 (2 required) (WP 0024, Item 2)
Bolt, 1/2-20 x 3 inch (2 required)
Bolt, 3/8-16 x 3 inch
Carbon Dioxide, Technical (Dry Ice) (WP 0024, Item 5)
Cloth, Abrasive, Crocus (WP 0024, Item 6)
Lubricating Oil, Engine, MIL-L-2104, Grade 15W-40 (WP 0024, Item 12)
Nut, 3/8-16
Petrolatum, Technical (Petroleum Jelly) (WP 0024, Item 14)
Rag, Wiping (WP 0024, Item 15)
Sealant, Lubricating, Thread Locking (WP 0024, Item 17)
Shim Stock, 1/32 inch thick by 1/2 inch wide by 4 inches long (WP 0024, Item 18)
Solvent, Cleaning (WP 0024, Item 20)
Tape, Masking (WP 0024, Item 22)
Washer, 3/8
Wooden Blocks, 2 x 4 x 16 inches (2 required) (WP 0024, Item 3)
Wooden Blocks, 4 x 4 x 16 inches (2 required) (WP 0024, Item 3)

Repair Parts
Mandatory Replacement Parts, Table 1.
Body Assembly, Brake (73342) 29503140
Pin, spring (24627) 455675
Pin, spring (24627) 9421003
Plate, Separator (73342) 29536577
Sleeve (73342) 23018036

SCOPE
This Work Package addresses disassembly, repair, and assembly of the Right Hand Cover Assembly.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

ITEMS COVERED IN THIS WORK PACKAGE **PAGE**

REMOVE COOLER LINE ELBOW AND RH OUTPUT FLANGE

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 Hand Cover Assembly weighs approximately 125 pounds (57.1 kg). When lifting Right Hand Cover Assembly, a hoist must be used to avoid bodily injury.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

REMOVE COOLER LINE ELBOW AND RH OUTPUT FLANGE – Cont.

NOTE

X200-4 and early model X200-4A Transmissions have an elbow configuration which includes an elbow (2) and a connector (adapter)(1). Late model X200-4A Transmissions have a one-piece elbow configuration and no connector (adapter).

To remove or install latest configuration elbow on an assembled transmission it is necessary to first remove the RH Lifting Bracket and Top Cover Assembly. Reference Work Package 0011.

Right Hand Cover Assembly is turned outside up.

1. X200-4, remove elbow (2) and connector (1).

2. X200-4, remove connector (1) and O-ring (3) from Right Hand Cover Assembly (4). Discard O-ring (3).

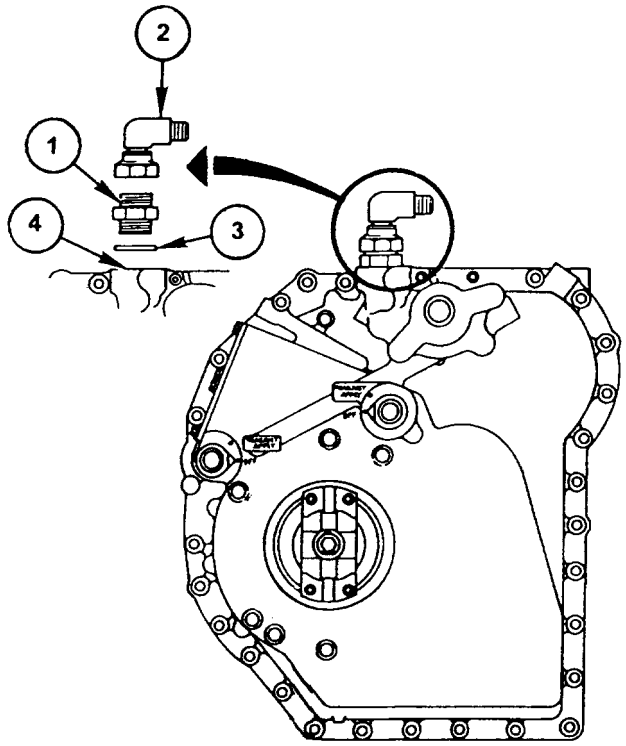


Figure 1. Cooler Line Elbow.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

REMOVE COOLER LINE ELBOW AND RH OUTPUT FLANGE – Cont.

3. X200-4A, remove elbow (2) and O-ring (3) from Right Hand Cover Assembly (4)
4. X200-4A, remove O-ring (3) from elbow (2). Discard O-ring (3).
5. Straighten bent tab of washer (5). Bend tab away from bolt (6).
6. Install two 1/2-20 x 3 inch bolts (7) in tapped holes at either end of output flange (8).
7. Hold pry bar between two bolts (7) to prevent flange (8) from turning.

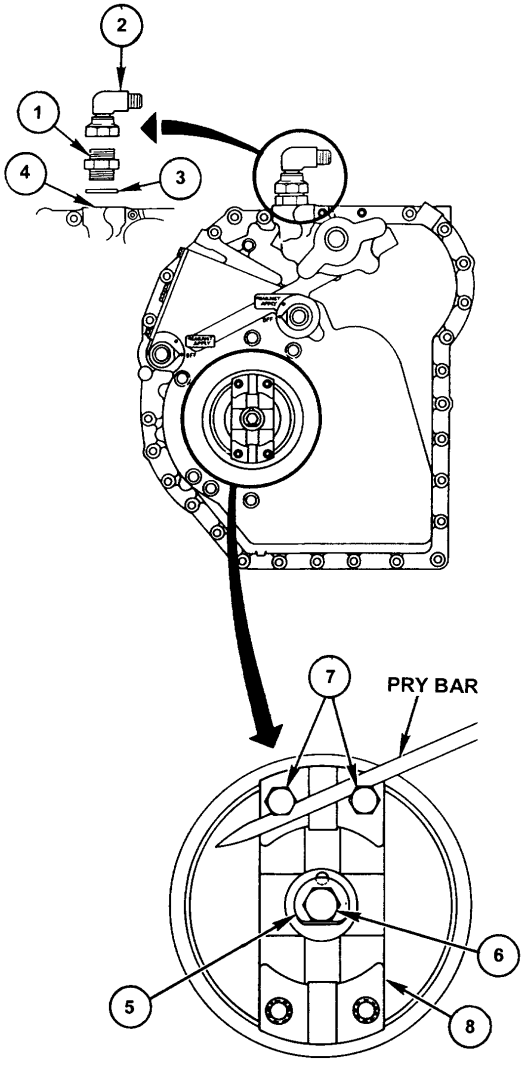


Figure 2. Cooler Line Elbow and RH Output Flange.

REMOVE COOLER LINE ELBOW AND RH OUTPUT FLANGE – Cont.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

8. Remove bolt (6) and tab washer (5) from output flange (8). Discard tab washer (5).

9. Remove output flange (8) from Right Hand Cover Assembly (4).

10. Remove two 1/2-20 x 3 inch bolts (7) from output flange (8).

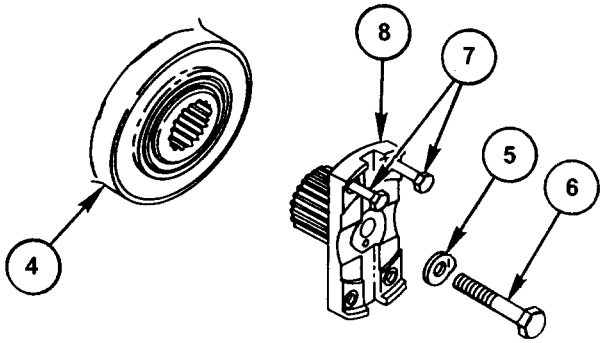


Figure 3. RH Output Flange.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

REMOVE BRAKE APPLY REGULATOR 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

Right Hand Cover Assembly is turned inside up.

1. Pushing on Brake Apply Regulator Valve Assembly (9) head, move Brake Apply Regulator Valve Assembly toward brake apply valve body (10) to compress spring (11) and use one hand to hold valve in.
2. Using other hand, insert 1/32 inch shim stock (WP 0024, Item 18) behind nut (12) to retain Brake Apply Regulator Valve Assembly (9). Release Brake Apply Regulator Valve Assembly.
3. Remove five bolts (13) and washers (14) from valve body (10).
4. Remove valve body (10) and separator plate (15) from Right Hand Cover Assembly (4).
5. Push on Brake Apply Regulator Valve Assembly (9) head to compress spring (11) and remove shim stock from behind nut (12). Release valve slowly.
6. Remove Brake Apply Regulator Valve Assembly (9) and spring (11) from valve body (10).

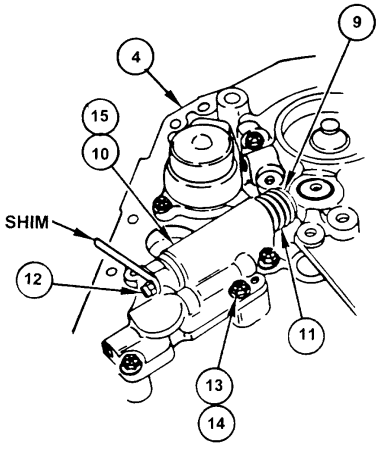


Figure 4. Brake Apply Regulator Valve.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

REMOVE BRAKE APPLY REGULATOR VALVE COMPONENTS – Cont.

NOTE

Product improvement added a separator plate under the Brake Apply Body Assembly. Not all transmissions have this plate. A plate must be installed if the Brake Apply Valve Body Assembly is removed.

7. If separator plate (15) is present, remove separator plate (15) from Right Hand Cover Assembly (4).

8. If separator plate (15) was not present, discard entire Brake Apply Valve Body Assembly [valve body (10), Brake Apply Regulator Valve Assembly (9), and spring (11)], and replace it with a new assembly and separator plate.

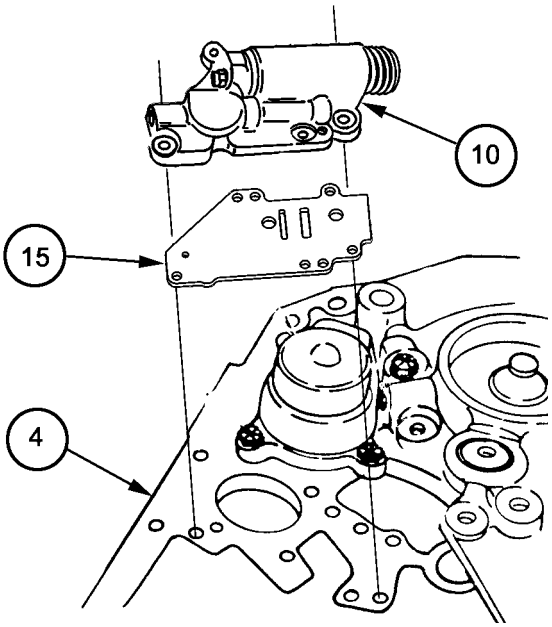


Figure 5. Separator Plate.

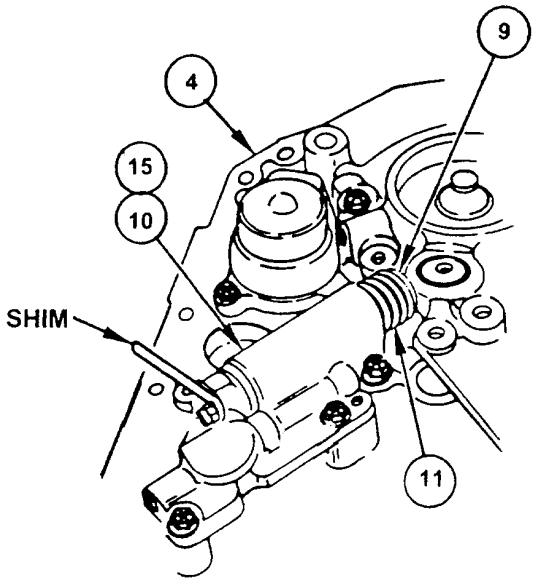


Figure 6. Brake Apply Regulator Valve.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

REMOVE BRAKE COOLANT 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

Right Hand Cover Assembly is turned inside up.

1. Using one hand, push firmly down on brake coolant valve body (16).
2. Remove three bolts (17) and three washers (18) from brake coolant valve body (16).
3. Release valve body (16) slowly. Remove valve body (16).

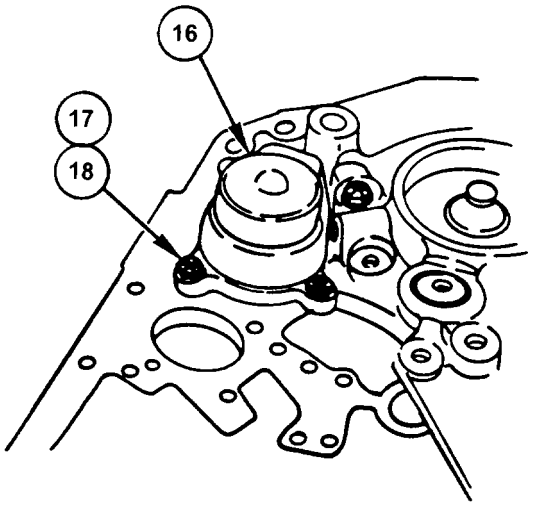


Figure 7. Brake Coolant Valve Assembly.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

REMOVE BRAKE COOLANT VALVE COMPONENTS – Cont.

4. Remove large spring (19).

NOTE

Early models of the transmission have a two-piece brake coolant valve consisting of a brake coolant valve stem (20), and a coolant valve (21). Later models of the transmission have a product improved, one-piece brake coolant valve (23). Each time a two-piece configuration is found, (20) and (21), it must be replaced by a one-piece brake coolant valve configuration (23).

Two-piece Configuration

5. Remove brake coolant valve stem (20) with coolant valve (21) and seal ring (22) attached. Discard brake coolant valve stem (20) with coolant valve (21) and seal ring (22).

One-piece Configuration

6. Remove brake coolant valve (23) with seal ring (22) attached.

7. Remove seal ring (22) from brake coolant valve (23). Discard seal ring (22).

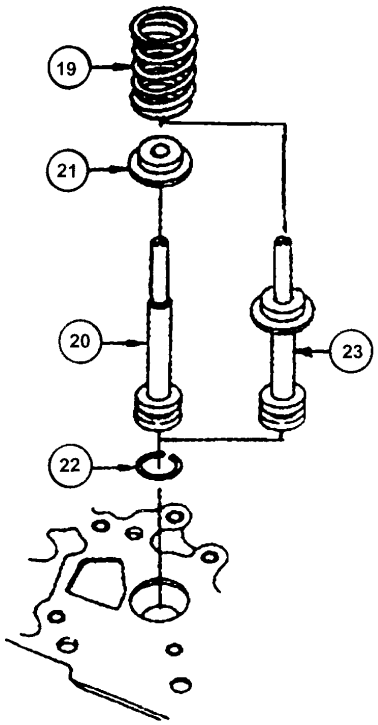


Figure 8. Brake Coolant Valve Components.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

REMOVE BRAKE APPLY INDICATORS AND LEFT BRAKE APPLY SHAFT

NOTE

Right Hand Cover Assembly is turned upside down.

Outer retaining ring may or may not be on left brake apply shaft and right brake apply cam shaft. These retaining rings are supplied to retain external brake linkage.

Left brake apply shaft must be held in place by a wood block or by hand to keep it from falling out of the end cover after removal of retaining rings and indicator.

1. Put a wood block (WP 0024, Item 3) under Right Hand Cover Assembly (4) and under left brake apply shaft (24).
2. Remove four retaining rings (25); two from left brake apply shaft (24) and two from right brake apply cam shaft (26). (See Note Above)
3. Remove two indicators (27); one from left brake apply shaft (24) and one from right brake apply shaft (26).

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.

4. Clean left brake apply shaft and right brake apply shaft (24, 26).
5. Install Tape (WP 0024, Item 22) over splines and end of left brake apply shaft and right brake apply shaft (24, 26).
6. Put Petrolatum (WP 0024, Item 14) over tape on left brake apply shaft and right brake apply shaft (24, 26).

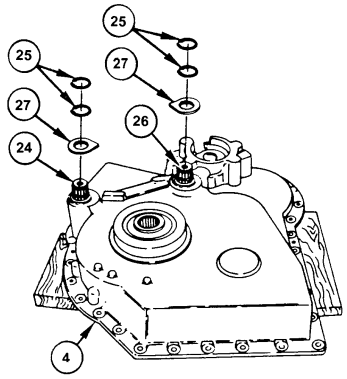


Figure 9. Right Hand Cover Assembly.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

REMOVE BRAKE APPLY INDICATORS AND LEFT BRAKE APPLY SHAFT – Cont.

7. Using one hand, raise Right Hand Cover Assembly (4) at left brake apply shaft location (29).

8. Using other hand, reach under Right Hand Cover Assembly (4); turn left brake apply shaft (24) to left or right while pulling on it.

9. Remove left brake apply shaft (24) from Right Hand Cover Assembly (4).

10. Remove washer (28) from left brake apply shaft (24) or Right Hand Cover Assembly (4).

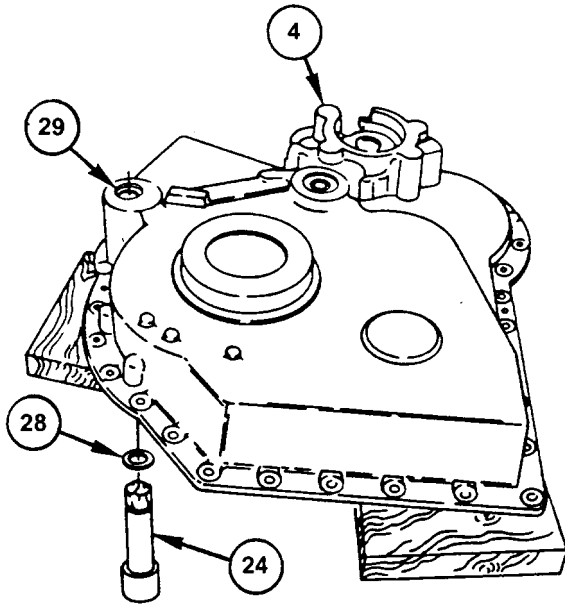


Figure 10. Right Hand Cover Assembly.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

REMOVE BRAKE APPLY INDICATORS AND LEFT BRAKE APPLY SHAFT – Cont.

11. Turn Right Hand Cover Assembly (4) over, inside up, on wood blocks (WP 0024, Item 3).

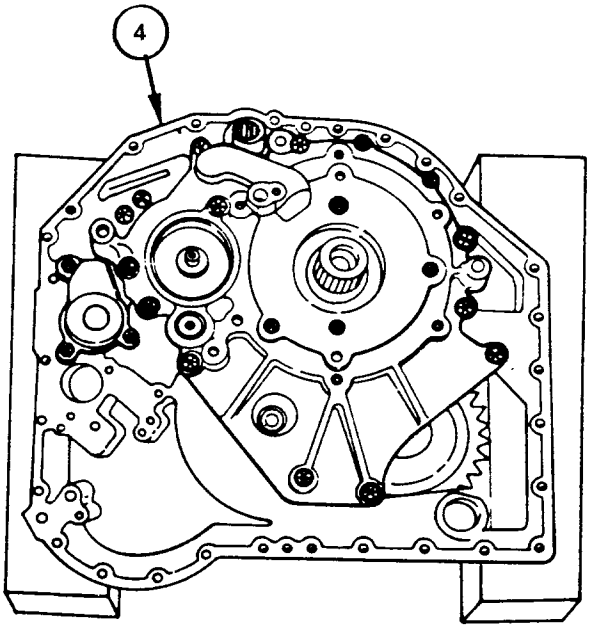


Figure 11. Right Hand Cover Assembly.

REPAIR

Refer to Repair Left Brake Apply Shaft Assembly, WP 0012 00-34.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

REMOVE RIGHT BRAKE SUPPORT ASSEMBLY

NOTE

Right Hand Cover Assembly is turned upside down.

When Right Brake Support Assembly is removed, the following parts may come out with the support, or they may remain in the Right Hand Cover Assembly: 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 Right Brake Support Assembly after completion of this task. The races require application of heat for removal. Refer to Repair Right Brake Support Assembly, WP 0012 00-35, for removal of races and needle bearings.

1. Remove two bolts (30) and two washers (31) from Right Brake Support Assembly (32).
2. Remove 12 remaining bolts (33) and 12 washers (34) from around perimeter of Right Brake Support Assembly (32).
3. Using two pry bars positioned approximately 180° apart, pry Right Brake Support Assembly (32) off Right Hand Cover Assembly (4).
4. Remove Right Brake Support Assembly (32) from Right Hand Cover Assembly (4).
5. Remove O-ring (35) from oil transfer (lube) tube (36). Discard O-ring (35).

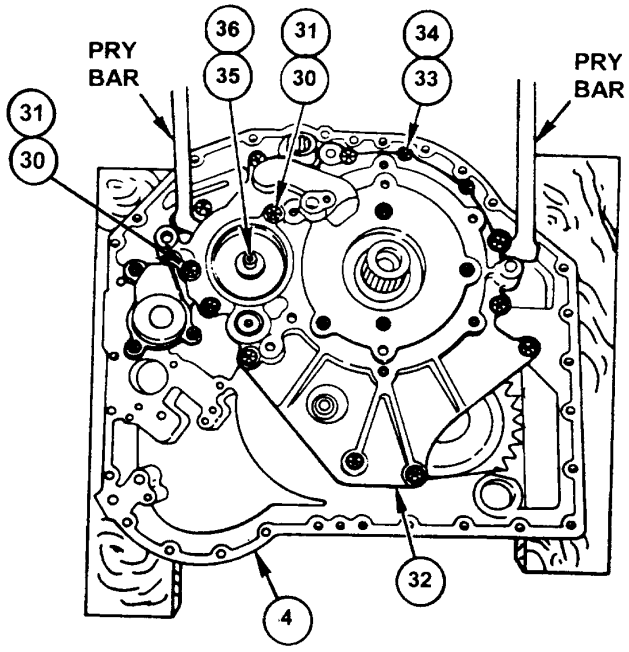


Figure 12. Right Brake Support Assembly.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

REMOVE RIGHT BRAKE SUPPORT ASSEMBLY – Cont.

6. Place Right Brake Support Assembly (32) on two wooden blocks (WP 0024, Item 3) with outside of support up.

7. Unscrew two bolts (37) until bolt heads are approximately 1/4 inch above surface of Right Brake Support Assembly (32).

8. Tap bolt heads (37) down to touch surface of Right Brake Support Assembly (32).

9. Using 7/16 inch socket, remove two bolts (37) and two washers (38) from Right Brake Support Assembly (32).

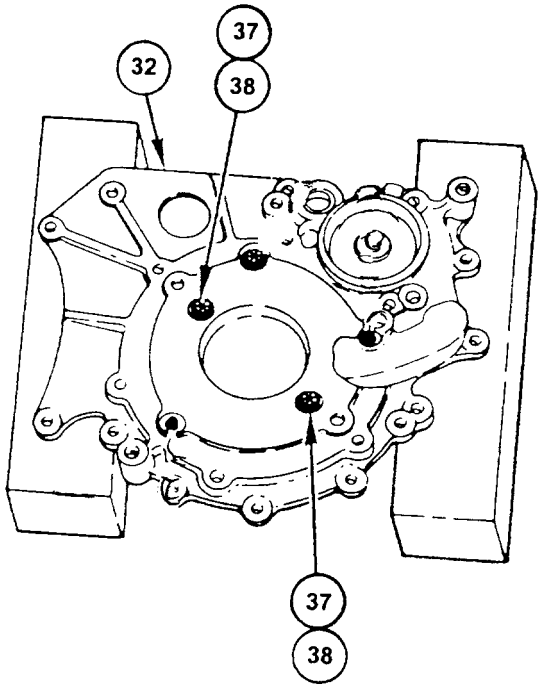


Figure 13. Right Brake Support Assembly.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

REMOVE RIGHT BRAKE SUPPORT ASSEMBLY – Cont.

10. Turn Right Brake Support Assembly (32) over, inside up.
11. Remove seal retainer (39) and seal ring (40) from Right Brake Support Assembly (32).
12. Remove seal ring (40) from seal retainer (39).

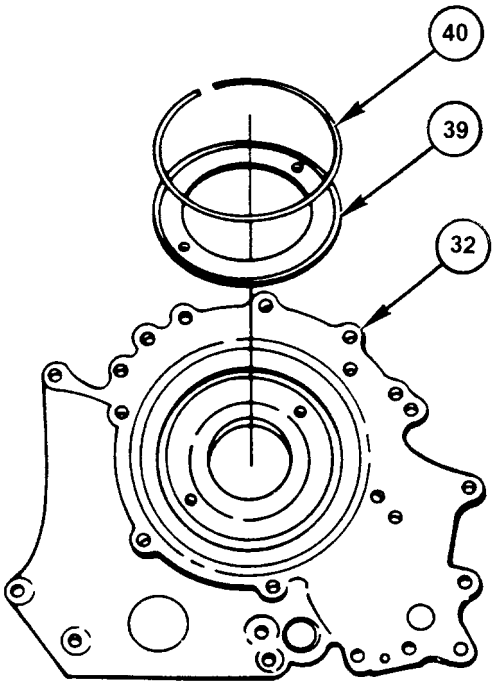


Figure 14. Right Brake Support Assembly.

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 replaced, refer to Remove Right Brake Support Assembly, WP 0012 00-17.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

REMOVE RIGHT BRAKE SUPPORT ASSEMBLY – Cont.

13. Turn Right Brake Support Assembly (32) over, outside up, on wooden blocks (WP 0024, Item 3).

14. Unscrew three bolts (41) until bolt heads are approximately 1/4 inch above surface of Right Brake Support Assembly (32).

15. Tap bolt heads (41) down to touch surface of Right Brake Support Assembly (32).

16. Remove three bolts (41) and three washers (42) from Right Brake Support Assembly (32).

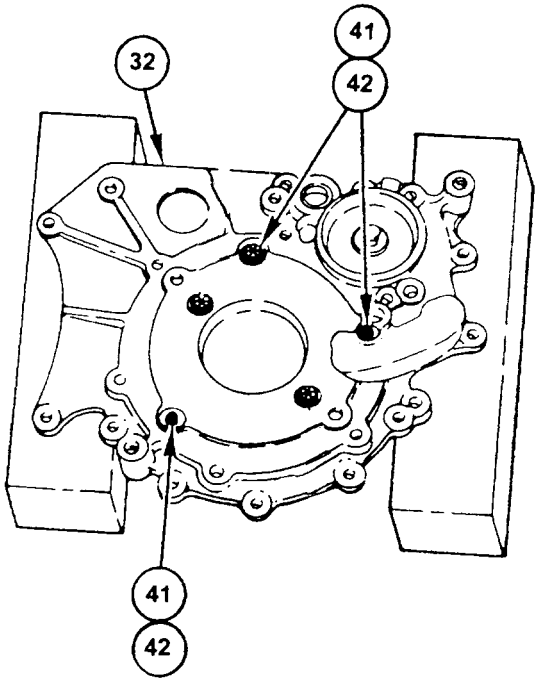


Figure 15. Right Brake Support Assembly.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

REMOVE RIGHT BRAKE SUPPORT ASSEMBLY – Cont.

17. Turn Right Brake Support Assembly (32) over, inside up.

18. Remove stationary cam (43) from Right Brake Support Assembly (32).

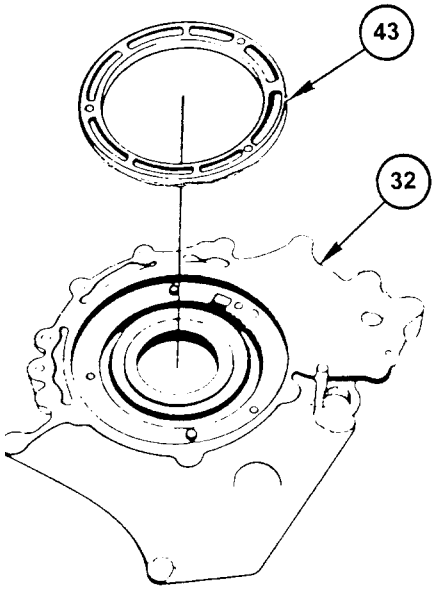


Figure 16. Right Brake Support Assembly.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

REMOVE BRAKE APPLY CAM, BRAKE ADJUSTING LINKS, AND RIGHT BRAKE ASSEMBLY

NOTE

Right Hand Cover Assembly on work table is turned inside up.

Brake apply (rotating) cam, eight balls, and brake adjusting linkage may come out with Right Brake Support Assembly, or these parts may remain with the Right Hand 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 this task are based upon above components remaining with Right Hand Cover Assembly.

1. Remove brake apply cam (44), eight balls (45), and brake adjusting linkage (46) from Right Hand Cover Assembly (4). Place balls (45) in a container.

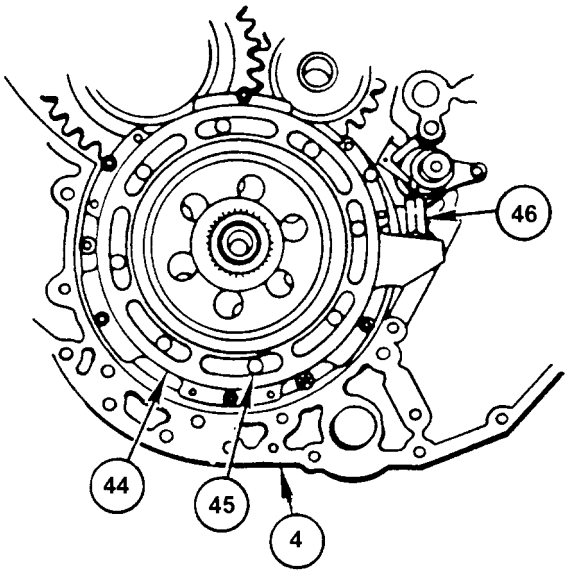


Figure 17. Right Hand Cover Assembly.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

REMOVE BRAKE APPLY CAM, BRAKE ADJUSTING LINKS, AND RIGHT BRAKE ASSEMBLY – Cont.

2. Remove seals (47, 48) from brake apply cam (44). Discard seals (47, 48).

3. Remove O-rings (49, 50) from face of brake apply cam (44). Discard O-rings (49, 50).

4. Remove bolt (51) and two spring tension clips (52) from brake apply cam (44).

5. Remove brake adjusting linkage (46) from brake apply cam (44).

6. Unscrew inner brake adjusting link (53) from outer brake adjusting link (54).

REPAIR

Refer to Repair Inner Brake Adjusting Link, WP 0012 00-32, for replacement of pin in inner brake adjusting link (53).

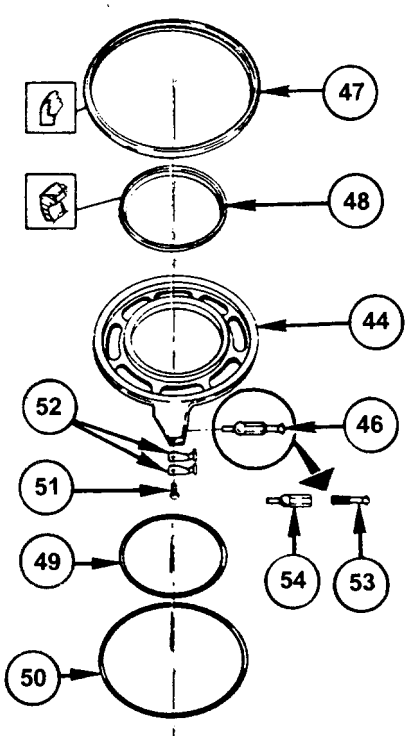


Figure 18. Brake Apply Cam and Components.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

REMOVE BRAKE APPLY CAM, BRAKE ADJUSTING LINKS, AND RIGHT BRAKE ASSEMBLY – Cont.

NOTE

Four brake reaction pins (55) can be removed at this time. Pins (56) cannot be removed.

7. Remove four brake reaction pins (55).
8. Using finger of one hand, trap retaining ring (57) against clutch reaction plate (58).
9. Pry six retaining rings (57) away from spring guide pins (59).

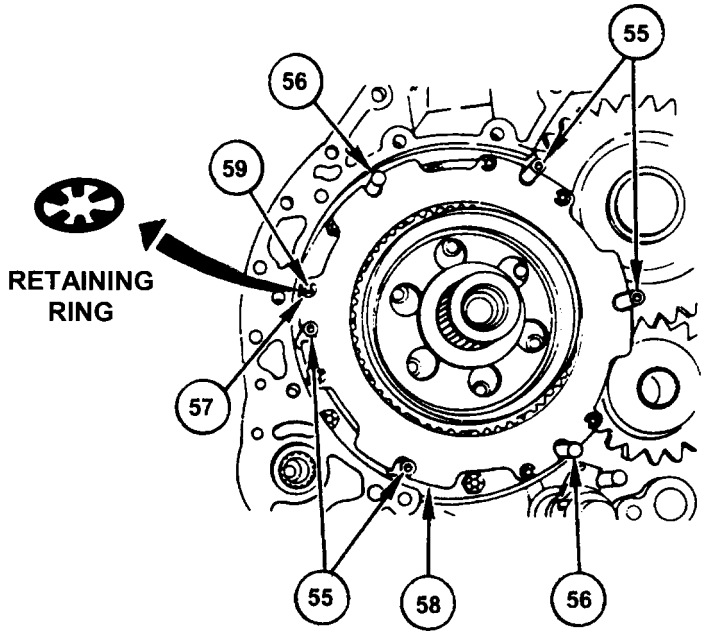


Figure 19. Right Hand Cover Assembly.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

REMOVE BRAKE APPLY CAM, BRAKE ADJUSTING LINKS, AND RIGHT BRAKE ASSEMBLY – Cont.

10. Remove clutch reaction plate (58) from spring guide pins (59).

11. Remove six springs (60) from spring guide pins (59).

CAUTION

Keep all clutch 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.

12. Remove right brake pack consisting of six internal splined clutch (friction) plates (61) and five clutch reaction (steel) plates (62).

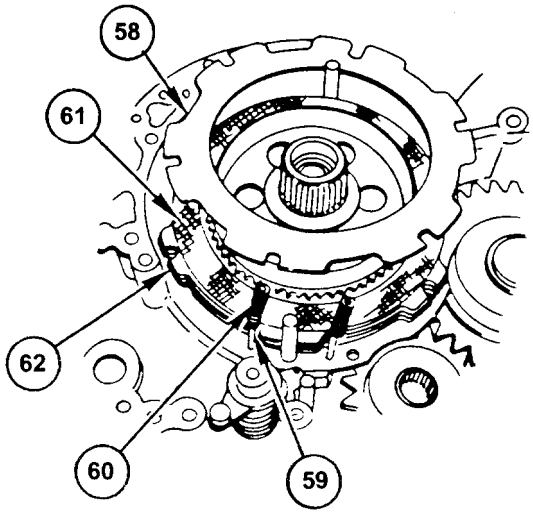


Figure 20. Clutch Reaction Plate and Pins.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

REMOVE BRAKE APPLY CAM, BRAKE ADJUSTING LINKS, AND RIGHT BRAKE ASSEMBLY – Cont.

13. Remove Steer Ring Gear Assembly (63) from Output Carrier Assembly (64) and brake clutch drum (65).

NOTE

Thrust washer may come out with Steer Ring Gear Assembly, or it may remain on Output Carrier Assembly.

14. Remove thrust washer (66) from Output Carrier Assembly (64).

NOTE

Output Carrier Assembly and brake clutch drum are removed as one unit, held together by retaining ring.

15. Remove Output Carrier Assembly (64) and brake clutch drum (65).

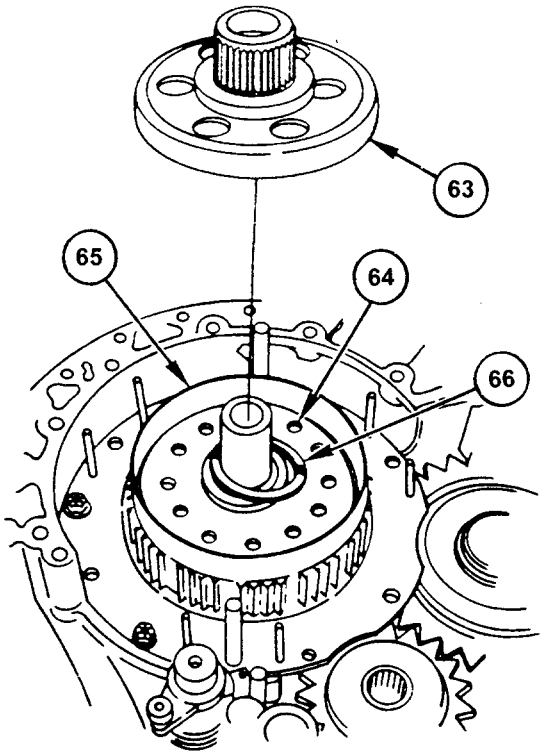


Figure 21. Steer Ring Gear, Output Carrier Assembly, Brake Clutch Drum.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

REMOVE BRAKE APPLY CAM, BRAKE ADJUSTING LINKS, AND RIGHT BRAKE ASSEMBLY – Cont.

16. Turn Output Carrier Assembly (64) and brake clutch drum (65) upside down.

NOTE

Thrust washer (67) usually comes off with Right Hand Cover Assembly inside Output Carrier Assembly (64), but it may remain on RH steer driven gear (68).

17. Remove thrust washer (67) from Output Carrier Assembly (64).

18. Remove snap ring (69) from brake clutch drum (65).

19. Remove Output Carrier Assembly (64) from brake clutch drum (65).

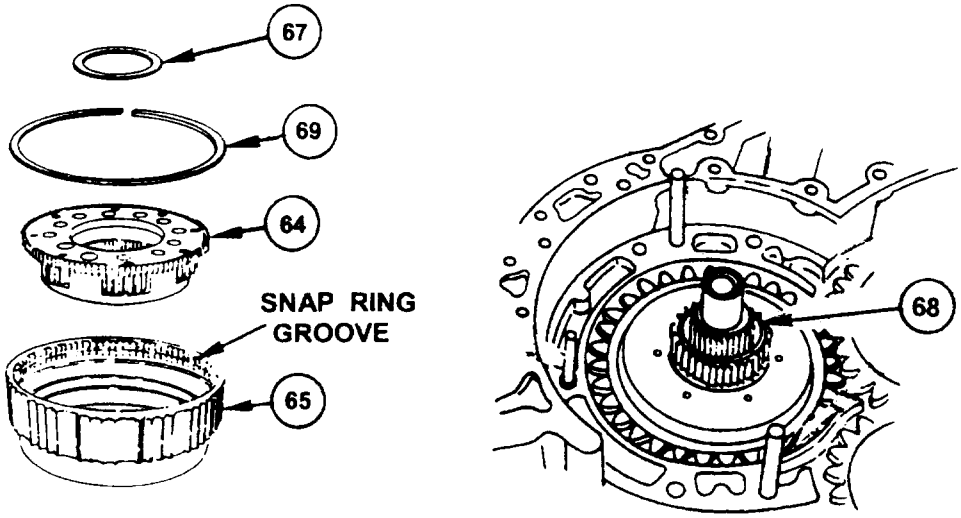


Figure 22. Output Carrier Assembly, Brake Clutch Drum, and RH Steer Driven Gear.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

REMOVE BRAKE APPLY CAM, BRAKE ADJUSTING LINKS, AND RIGHT BRAKE ASSEMBLY – Cont.

20. Remove brake coolant seal ring (70) from brake clutch backing plate (71).

21. Remove four bolts (72) and four washers (73) from brake clutch backing plate (71).

NOTE

Brake Clutch Backing Plate (71) may bind on two brake reaction pins (74) during removal. It may be necessary to tap brake clutch backing plate near pin to help release brake clutch backing plate.

Six spring guide pins (59) may come with brake clutch backing plate (71), or pins may remain in Right Hand Cover Assembly (4).

22. Using two pry bars under inside edge of brake clutch backing plate (71), remove brake clutch backing plate.

23. Remove six spring guide pins (59) from brake clutch backing plate (71) or from Right Hand Cover Assembly (4).

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

REMOVE BRAKE APPLY CAM, BRAKE ADJUSTING LINKS, AND RIGHT BRAKE ASSEMBLY – Cont.

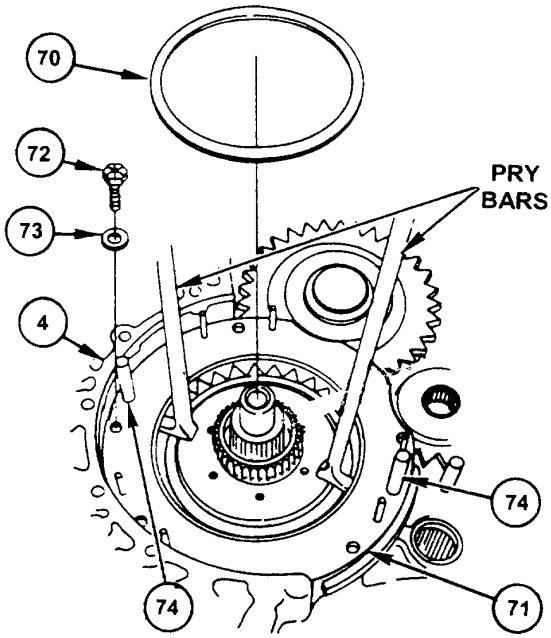


Figure 23. Clutch Backing Plate and Related Parts.

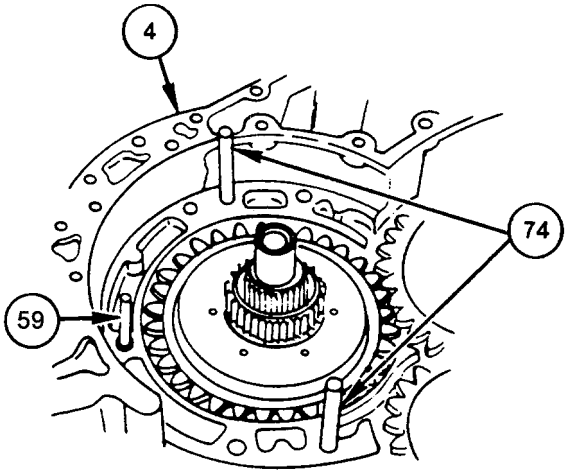


Figure 24. Pins.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

REMOVE STEER GEARS

NOTE

It is not necessary to remove bearings during disassembly for inspection. Refer to TM 9-214.

Bearings on underside of RH steer driven gear and range steer gear consist of cages and inner races. Outer races remain in Right Hand Cover Assembly housing.

Bearings and races remaining in the Right Hand Cover Assembly, after gears have been removed in this task, require application of heat for removal. Refer to Repair Right Brake Support Assembly, WP 0012 00-35, for removal of these bearings and races.

1. Remove RH Steer driven gear (68) and bearing (75) from RH output shaft (76).
2. Inspect bearing (75) for serviceability. If bearing requires replacement, remove bearing (75) from RH steer driven gear (68).
3. Remove range steer gear (77) and bearing (78) from Right Hand Cover Assembly (4).
4. Inspect bearing (78) for serviceability. If bearing requires replacement, remove bearing (78) from range steer gear (77).

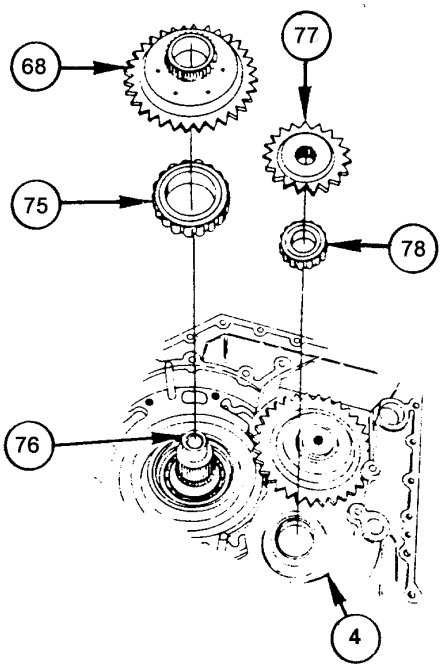


Figure 25. Steer Gears.

REMOVE STEER GEARS – Cont.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

5. Remove bolt (79) from steer idler retainer plate (80).
6. Remove steer idler retainer plate (80) from steer idler gear (81).
7. Remove bronze thrust washer (82) from steer idler gear (81).

NOTE

Journal on bottom of steer idler gear (81) rides in Cylindrical Roller Bearing Assembly (83) which remains in Right Hand Cover Assembly (4).

8. Remove steer idler gear (81) from Right Hand Cover Assembly (4).

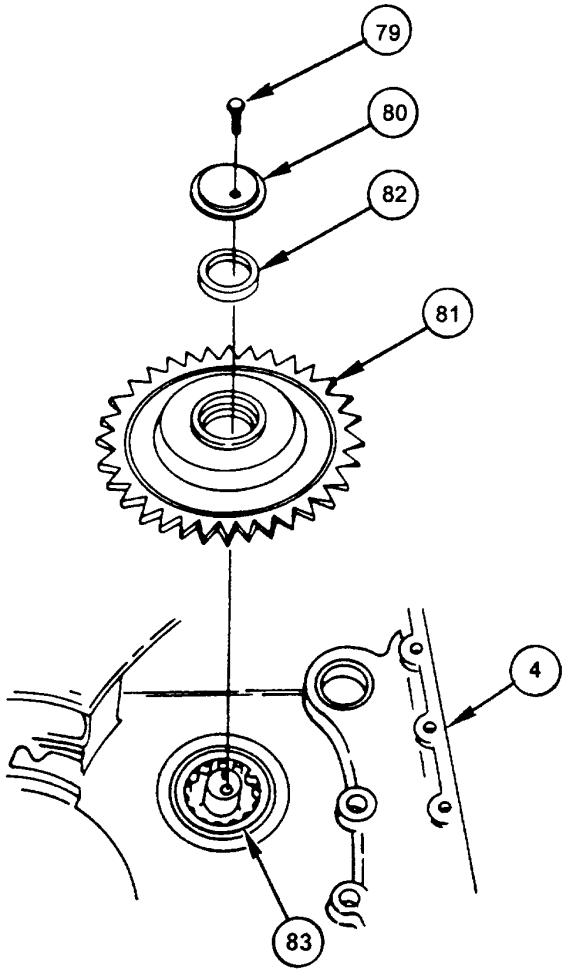


Figure 26. Steer Idler Gear.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

REMOVE RIGHT BRAKE APPLY CAM SHAFT

NOTE

Right Hand Cover Assembly on two wooden blocks (WP 0024, Item 3), inside turned up.

Right brake apply cam shaft may have come out with right brake support, or it may be in Right Hand Cover Assembly. Tension between right brake apply cam shaft and seal usually causes shaft to remain in end cover.

Right brake apply cam shaft should come out of the Right Hand Cover Assembly when right brake apply cam shaft is pulled. If right brake apply cam shaft hangs up on seal, turn Right Hand Cover Assembly over and tap on taped end of right brake apply cam shaft.

1. Remove right brake apply cam shaft (84) from Right Hand Cover Assembly (4).

NOTE

Washer (85) may remain with Right Hand Cover Assembly (4) or it may come out with right brake apply cam shaft (84).

Thrust washer (86) may have remained with right brake support, or it may be on right brake apply cam shaft (84).

2. Remove washer (85) from right brake apply cam shaft (84) or Right Hand Cover Assembly (4).

3. Remove thrust washer (86) from right brake apply cam shaft (84), if present.

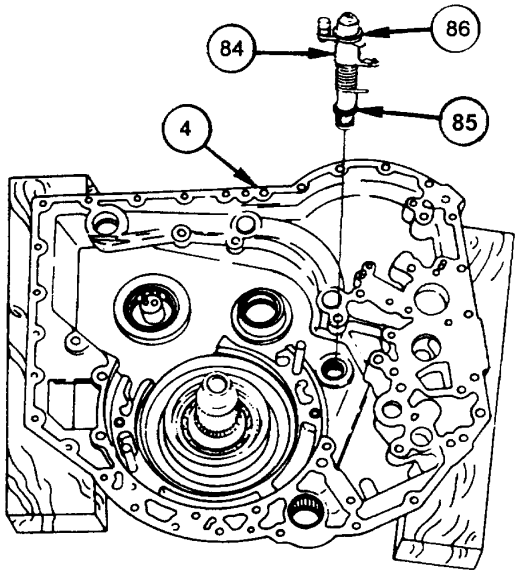


Figure 27. Right Brake Apply Cam Shaft.

REMOVE RIGHT BRAKE APPLY CAM SHAFT – Cont.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

4. Remove retaining ring (87) from right brake apply cam shaft (84).
5. Remove spring (88) from right brake apply cam shaft (84).
6. Remove lock nut (89) from threaded end of cam follower (90). Discard lock nut (89).
7. Remove cam follower (90) from right brake apply cam shaft (84).
8. Remove spacer (91) from cam follower (90).

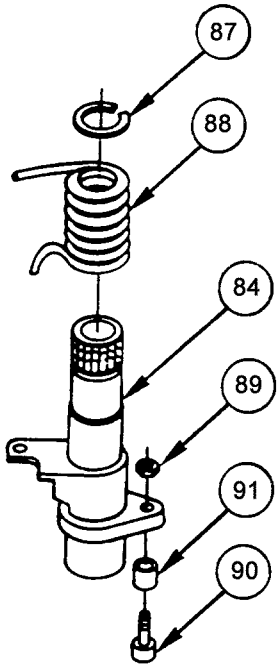


Figure 28. Right Brake Apply Cam Shaft Components.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

REMOVE RIGHT HAND OUTPUT SHAFT AND SEAL

NOTE

Right Hand Cover (4) on two wooden blocks (WP 0024, Item 3), inside turned up.

1. Remove retaining ring (92) retaining Bearing Assembly (93) on RH output shaft (76).

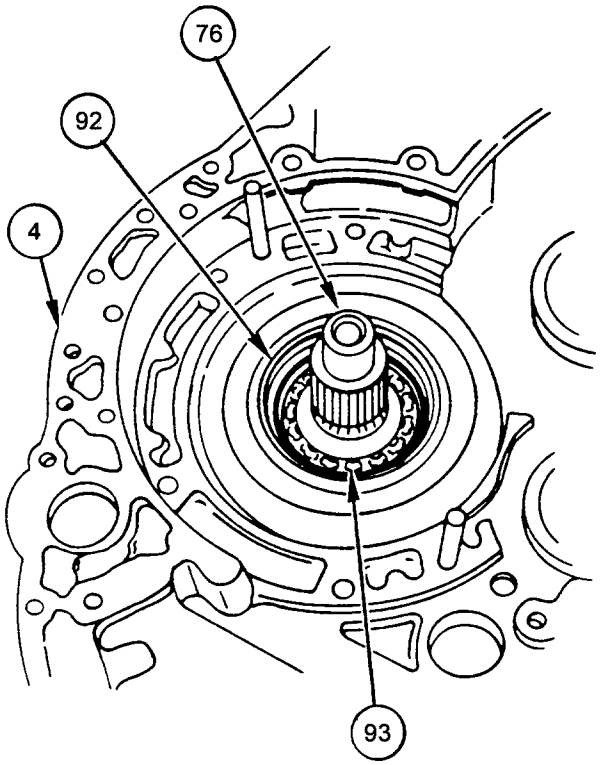


Figure 29. Right Hand Output Shaft and Seal.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

REMOVE RIGHT HAND OUTPUT SHAFT AND SEAL – Cont.

2. Turn Right Hand Cover Assembly (4) over, outside up, on two wooden blocks (WP 0024, Item 3).

3. Drive RH output shaft (76), retaining Bearing Assembly (93) and sleeve (94) from output shaft seal (95).

4. Drive out output shaft seal (95) from Right Hand Cover Assembly (4).

NOTE

When retaining Bearing Assembly is removed from RH output shaft, sleeve is forced off ahead of retaining Bearing Assembly.

5. Inspect retaining Bearing Assembly (93) and sleeve (94) for serviceability. If retaining Bearing Assembly or sleeve requires replacement, press retaining Bearing Assembly (93) and sleeve (94) from RH output shaft (76).

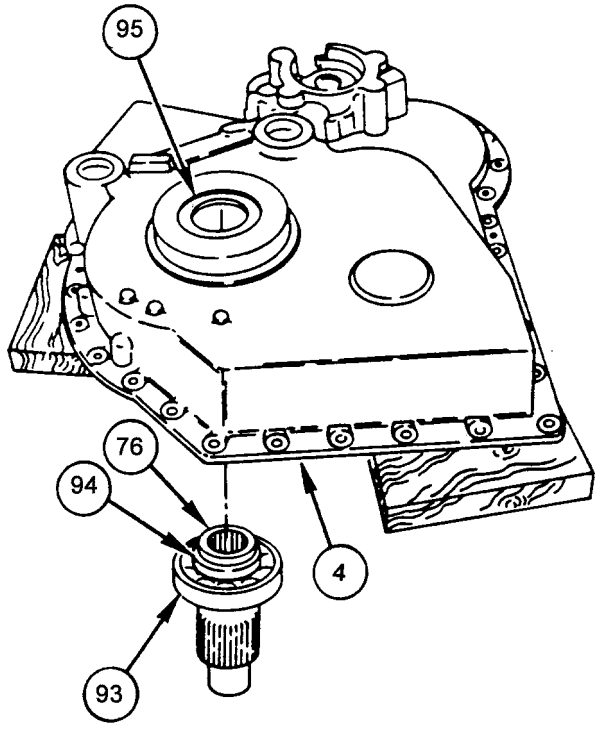


Figure 30. Right Hand Output Shaft and Seal.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

MANDATORY REPLACEMENT PARTS

Refer to Table 1. Mandatory Replacement Parts for Repairing Right Hand Cover Assembly. Work Package 0026 contains a complete list of all mandatory replacement parts necessary for maintenance of the X200-4 and X200-4A Transmissions.

Table 1. Mandatory Replacement Parts for Repairing Right Hand Cover Assembly.

WP 0026 ITEM NO.	NOMENCLATURE	QTY
2	O-Ring	1
6	Nut, Self-Locking, Hex	1
10	Washer, Spring Tension	1
21	Seal, Plain Encased	2
25	Seal, Plain Encased	1
36	Seal, Brake Coolant	1
54	Gasket	1
55	O-Ring	1

REPAIR INNER BRAKE ADJUSTING LINK ASSEMBLY

Remove Pin

1. Place inner brake adjusting link (53) in vise.
2. Drive pin (96) from inner brake adjusting link (53). Discard pin (96).

Install Pin

1. Install new pin (96) to a height of 0.118-0.138 inch (3.00-3.50 mm) above surface of inner brake adjusting link (53).
2. Remove inner brake adjusting link (53) from vise.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

REPAIR INNER BRAKE ADJUSTING LINK ASSEMBLY – Cont.

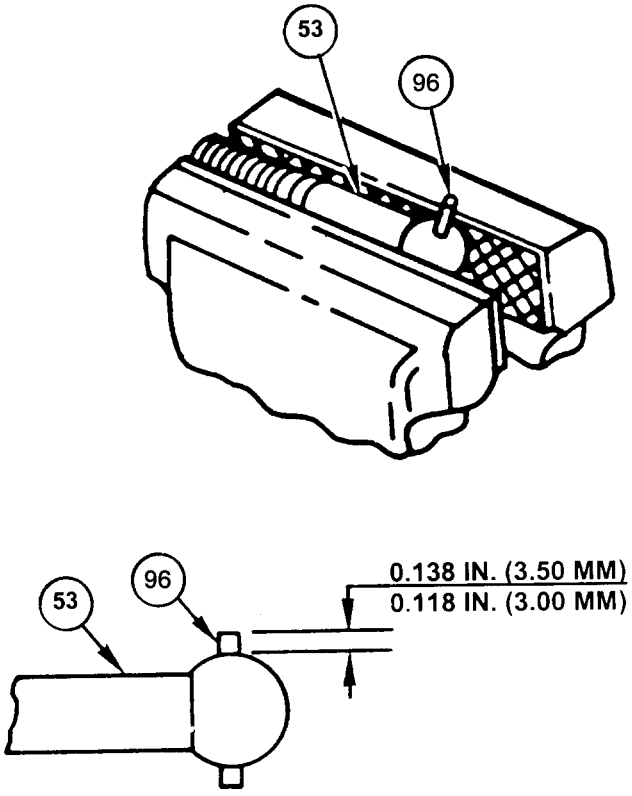


Figure 31. Inner Brake Adjusting Link.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

REPAIR LEFT BRAKE APPLY SHAFT ASSEMBLY

Remove Pin

1. Remove pin (97) from left brake apply shaft (24). Discard pin (97).

Install Pin

1. Install new pin (97) in left brake apply shaft (24) to a depth of 0.027-0.047 inch (0.68-1.19 mm) below outside surface of left brake apply shaft (24).

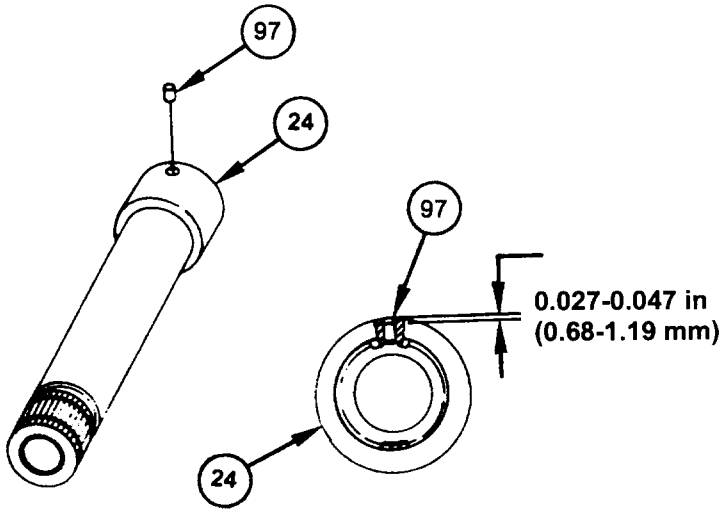


Figure 32. Left Brake Apply Shaft Assembly.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

REPAIR RIGHT BRAKE SUPPORT ASSEMBLY

NOTE

Right Brake Support Assembly (32) is mounted on two wooden blocks (WP 0024, Item 3).

Inspect Right Brake Support Assembly for serviceability. Replace defective pins, tubes, plugs, bearings, or races. DO NOT REMOVE SERVICEABLE COMPONENTS.

1. If removal of tube coupling (98) is necessary, tap the center hole of tube coupling with 3/8-16 tap to a depth of about 6-8 threads.
2. Install slide hammer into tube coupling (98) and knock upward to remove tube coupling (98).
3. Thoroughly clean out all metal shavings.
4. Press long brake reaction pin (99) from Right Brake Support Assembly (32).
5. Press two dowel pins (100) from Right Brake Support Assembly (32).
6. X200-4A, if removal of tube coupling (101) is necessary, tap the center hole of tube coupling with 1/2-13 tap to a depth of about 6-8 threads.
7. X200-4A, install slide hammer into tube coupling (101) and knock upward to remove tube coupling (101).
8. X200-4A, thoroughly clean out all metal shavings.

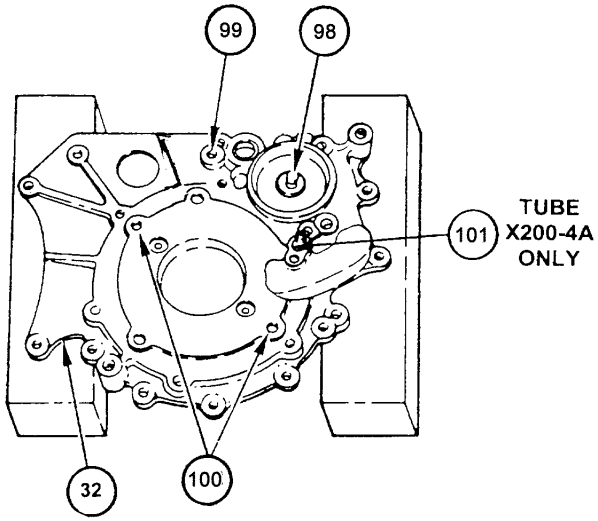


Figure 33. Right Brake Support Assembly.

REPAIR RIGHT BRAKE SUPPORT ASSEMBLY – Cont.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

CAUTION

Use care not to cut into Right Brake Support Assembly (32) when cutting slots in bearing race.

9. Cut two slots 180° apart at base of bearing race (102). 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 Right Brake Support Assembly (32).

WARNING

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

10. Heat Right Brake Support Assembly (32) around bearing race (102) for 15 minutes.

CAUTION

Use care not to damage Right Brake Support Assembly (32) when using pry bars to remove race.

11. Using two pry bars in slots, lift up bearing race (102).

12. After lifting up bearing race, reposition two pry bars under bearing race (102) and remove bearing race.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

REPAIR RIGHT BRAKE SUPPORT ASSEMBLY – Cont.

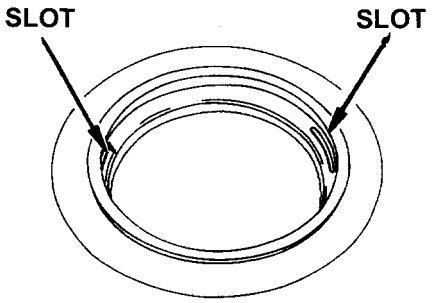
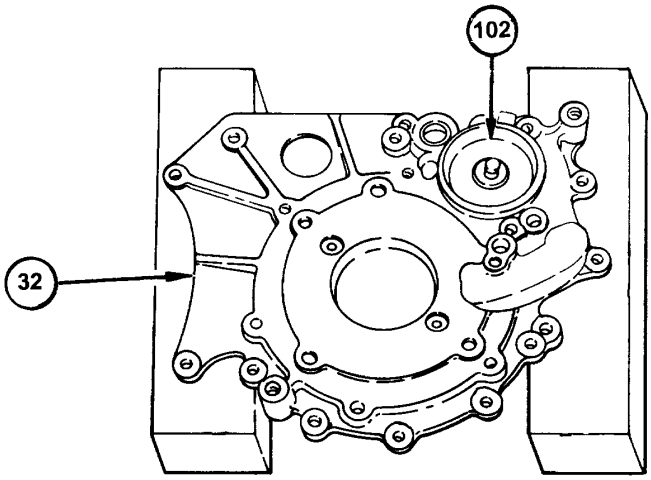


Figure 34. Bearing Race Slots.



OUTSIDE VIEW OF RIGHT BRAKE SUPPORT BEFORE REMOVAL OF PARTS

Figure 35. Right Brake Support Assembly.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

REPAIR RIGHT BRAKE SUPPORT ASSEMBLY – Cont.

13. Cut two slots 180° apart at base of bearing race (103). Cut slots deep enough to catch the end of the chisel, but not deep enough to cut into Right Brake Support Assembly (32).

WARNING

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

14. Heat Right Brake Support Assembly around bearing race (103) for 15 minutes.

CAUTION

Use care not to damage Right Brake Support Assembly (32) when removing race.

15. Turn Right Brake Support Assembly (32) over and drive out bearing race (103).

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

REPAIR RIGHT BRAKE SUPPORT ASSEMBLY – Cont.

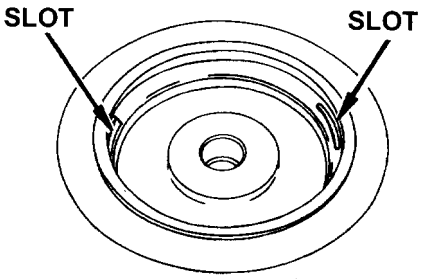


Figure 36. Bearing Race Slots.

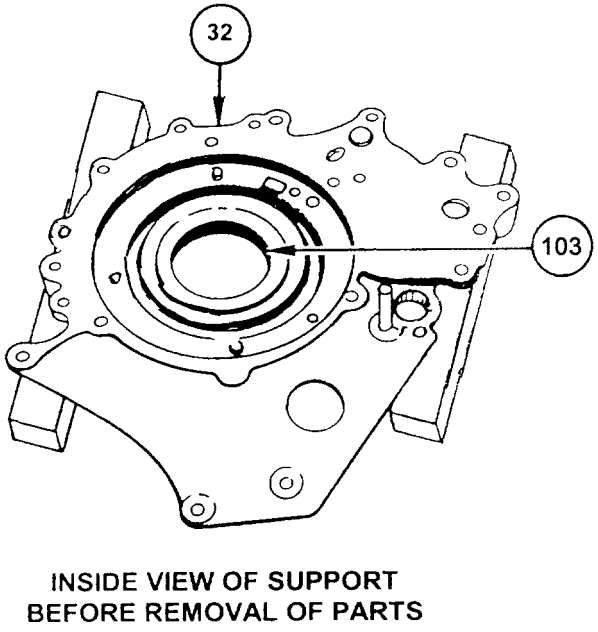


Figure 37. Right Brake Support Assembly.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

REPAIR RIGHT BRAKE SUPPORT ASSEMBLY – Cont.

16. Remove needle bearing (104) from Right Brake Support Assembly (32).

17. Turn Right Brake Support Assembly (32) over, outside up, and prop Right Brake Support Assembly with wooden block (WP 0024, Item 3) placed near pipe plug (105).

18. Remove pipe plug (105) from Right Brake Support Assembly (32).

19. Check bearing bores in support for damage. Smooth out scratches with crocus cloth (WP 0024, Item 6). If grinding damage is present, replace support.

NOTE

Some pipe plugs are pre-coated and do not require Sealant, Lubricating, Thread Locking Compound.

20. Apply Sealant(WP 0024, Item 17) to threads of pipe plug (105) if necessary.

21. Install plug (105) in Right Brake Support Assembly (32). Torque plug (105) to 5 lb-ft (6-7 N·m).

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

REPAIR RIGHT BRAKE SUPPORT ASSEMBLY – Cont.

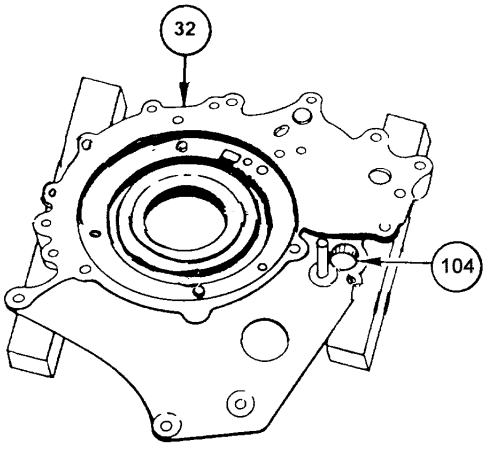


Figure 38. Right Brake Support Assembly.

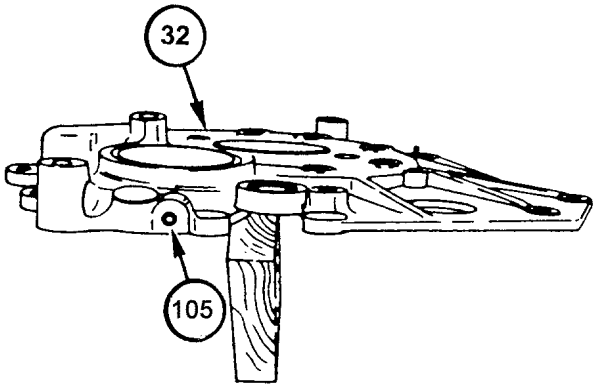


Figure 39. Right Brake Support Assembly.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

REPAIR RIGHT BRAKE SUPPORT ASSEMBLY – Cont.

22. Turn Right Brake Support Assembly (32) over, inside up.

23. Install long brake reaction pin (99) in Right Brake Support Assembly (32). Press long brake reaction pin to a height of 3.511-3.531 inches (89.18-89.69 mm) above inner surface of Right Brake Support Assembly.

24. Install two dowel pins (100) in Right Brake Support Assembly (32). Press pins to a height of 0.230-0.250 inch (5.84-6.35 mm) from shoulder.

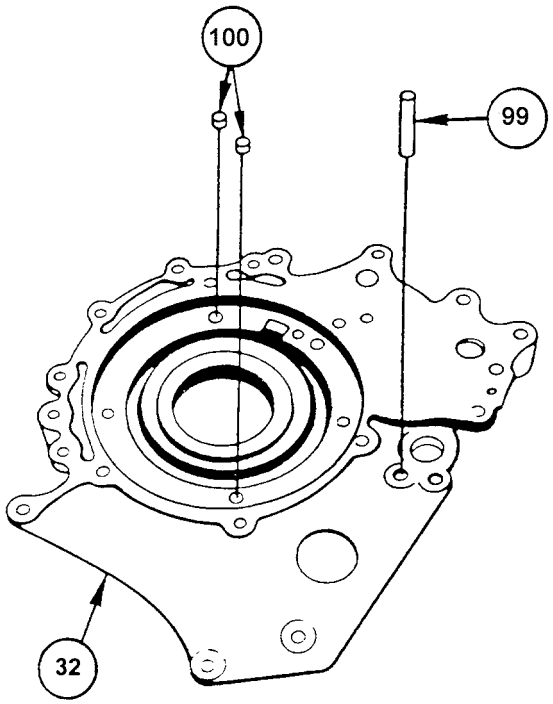


Figure 40. Right Brake Support Assembly.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

REPAIR RIGHT BRAKE SUPPORT ASSEMBLY – Cont.

25. Turn Right Brake Support Assembly (32) over, outside up.

26. Install needle bearing (104) with driver against numbered end of bearing case. Press needle bearing to 0.060-0.070 inch (1.52-1.78 mm) below surface of Right Brake Support Assembly 32).

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. X200-4A, place tube coupling (101) in Carbon Dioxide, Technical (Dry Ice) (WP 0024, Item 5) for 1 hour.

28. X200-4A, install tube coupling (101), grooved end out, into Right Brake Support Assembly (32). Press tube coupling flush to stop.

29. Install tube coupling (98), grooved end out, into Right Brake Support Assembly (32). Press tube coupling to a height of 0.620-0.660 inch (14.75-16.76 mm) above shoulder.

30. Place bearing races (102, 103) in Carbon Dioxide, Technical (Dry Ice) (WP 0024, Item 5) for 1 hour.

31. Install races (102, 103) in Right Brake Support Assembly (32). Press races to shoulder.

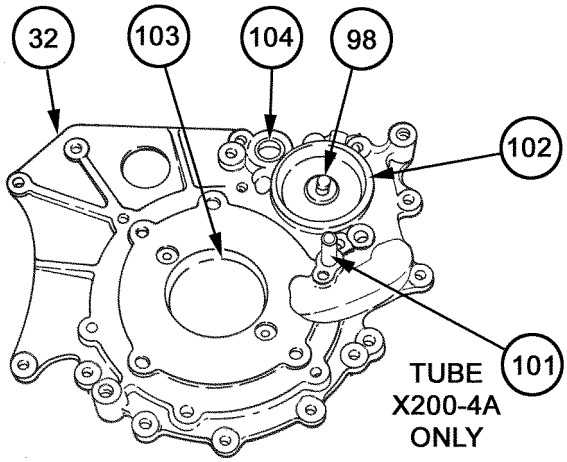


Figure 41. Right Brake Support Assembly.

REPAIR RIGHT HAND COVER ASSEMBLY

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

DISASSEMBLE RIGHT HAND COVER ASSEMBLY

NOTE

Right Hand Cover Assembly is mounted on two wooden blocks (WP 0024, Item 3), inside up.

1. Insert pin punch in left brake apply bore beyond bearing (106) so that edge of punch is seated behind edge of seal (107).
2. Drive seal (107) from bore in Right Hand Cover Assembly (4).
3. Drive seal (108) from beyond bearing (109) in right brake apply cam shaft bore.
4. Turn Right Hand Cover Assembly (4) over, outside up.
5. Remove bearings (106, 109) from Right Hand Cover Assembly (4).

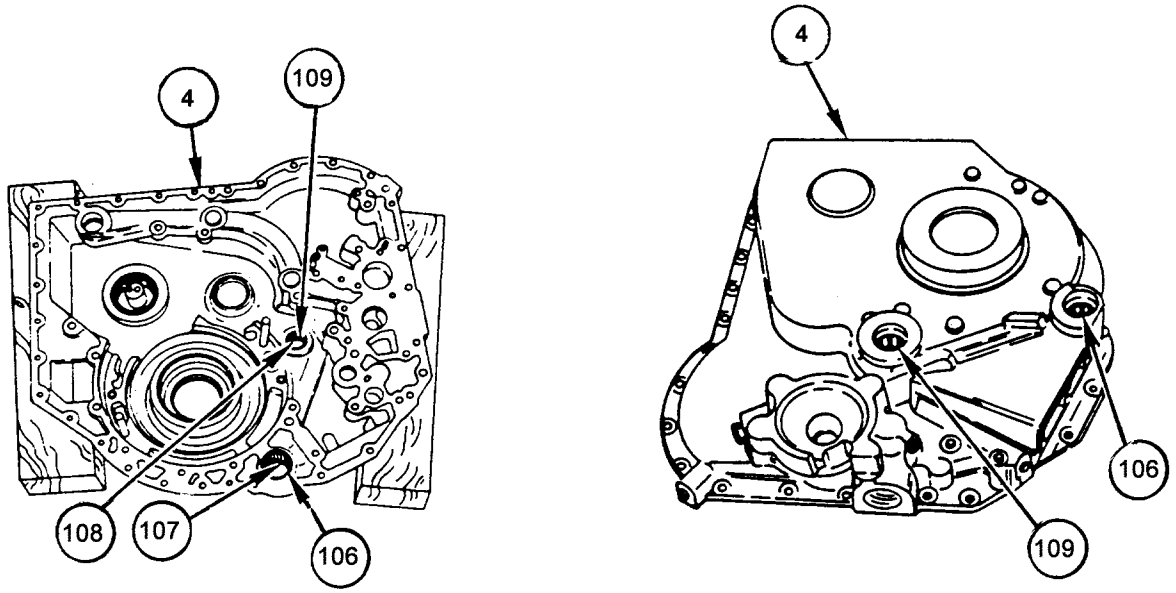


Figure 42. Right Hand Cover Assembly.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

REPAIR RIGHT HAND COVER ASSEMBLY – Cont.

6. Turn Right Hand Cover Assembly (4) over, 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 (110) consists of cage and outer race. Inner race remained on gear.

7. Heat Right Hand Cover Assembly (4) around steer idler bearing (110). Heat for one hour to approximately 300°F (149°C).

8. Remove bearing (110).

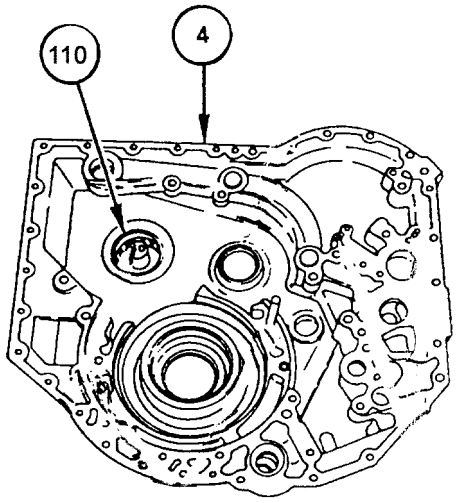


Figure 43. Right Hand Cover Assembly.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

REPAIR RIGHT HAND COVER ASSEMBLY – Cont.

CAUTION

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

9. Cut two slots 180° apart at base of bearing race (111). 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.

WARNING

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

10. Heat Right Hand Cover Assembly around bearing race (111) for 15 minutes.
11. Using two pry bars in slots, loosen bearing race (111).

CAUTION

Use care not to damage end cover when using pry bars to remove race.

12. Reposition two pry bars under bearing race (111) and remove bearing race.
13. Remove two long brake reaction pins (112) from Right Hand Cover Assembly (4).
14. Remove two dowel pins (113) from Right Hand Cover Assembly (4).
15. Pinch spring pin (114) just enough to hold onto spring pin. Tilt tip of pliers onto boss and use leverage to extract spring pin (114).

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

REPAIR RIGHT HAND COVER ASSEMBLY – Cont.

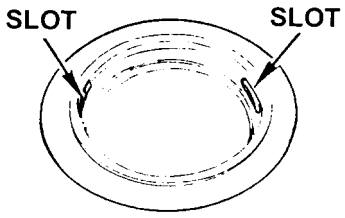


Figure 44. Bearing Race Slots.

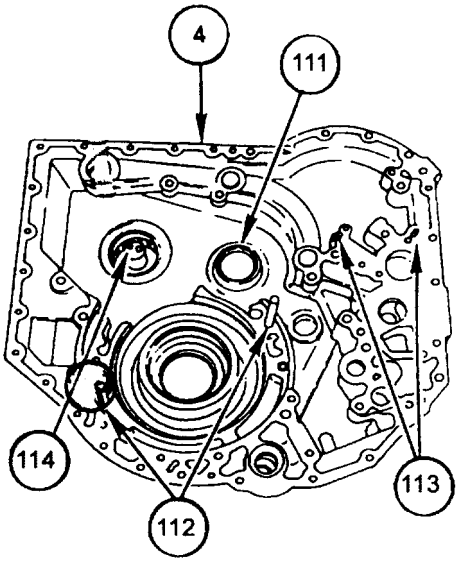


Figure 45. Right Hand Cover Assembly.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

REPAIR RIGHT HAND COVER ASSEMBLY – Cont.

16. Punch a dimple in center of two plugs (115) in Right Hand Cover Assembly (4).

CAUTION

Carefully drill through plugs (115) and stop drilling when drill pierces plug. Clearance between bottom of plug and housing is approximately one inch.

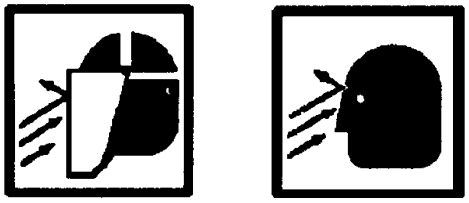
17. Drill a 1/4 inch hole through center of plugs (115).

18. Widen hole in center of plugs (115) to 3/4 inch.

19. Remove plugs (115) from Right Hand Cover Assembly (4).

20. Tilt Right Hand Cover Assembly (4) on edge with plugs (115) holes down.

WARNING



Compressed air used for cleaning purposes will not exceed 30 pounds per square inch in pressure. To avoid injury, use with effective chip-guarding and personal protective equipment (goggles, face shield, gloves, etc.). Never point a compressed air hose toward another person.

21. Using compressed air, put air hose at port (116) and then at plug (115) holes to blow out all particles.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

REPAIR RIGHT HAND COVER ASSEMBLY – Cont.

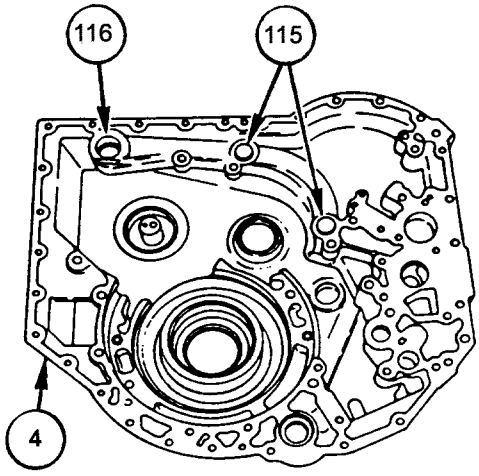


Figure 46. Right Hand Cover Assembly.

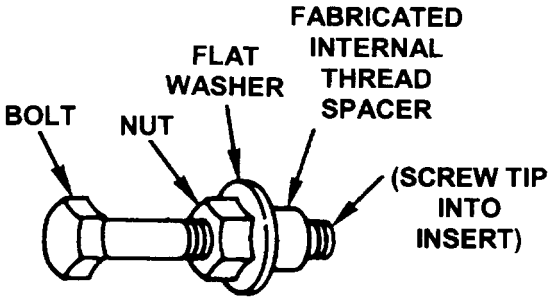
DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

REPAIR RIGHT HAND COVER ASSEMBLY – Cont.

NOTE

Position Right Hand Cover Assembly (4) on wooden blocks (WP 0024, Item 3) inside up.

22. Using Insert Installer, Remover (WP 0027, Item 6), assemble tool to remove four inserts (117) from Right Hand Cover Assembly (4).



INSERT INSTALLER, REMOVER

Figure 47. Insert Installer Remover.

23. Screw tip of bolt into one insert (117) in Right Hand Cover Assembly (4).

24. Lock nut against washer and hold nut so that insert (117) will turn with bolt.

25. Turn bolt to the left (counterclockwise) and remove insert (117).

26. Remove three remaining inserts (117).

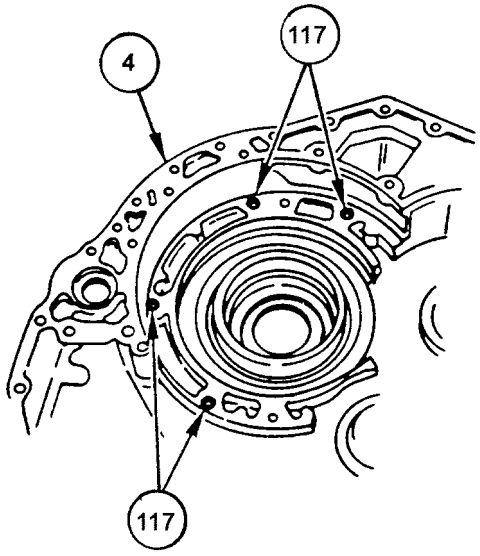


Figure 48. Right Hand Cover Assembly.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

REPAIR RIGHT HAND COVER ASSEMBLY – Cont.

27. Turn Right Hand Cover Assembly (4) over, outside up.

28. Remove 3/8 inch pipe plug (118).

29. Remove two 1/8 inch pipe plugs (119, 120).

30. Remove 1/4 inch pipe plug (121).

31. Remove 3/8 inch pipe plug (122).

32. Check Right Hand Cover Assembly bearing bore for damage. Smooth out scratches with crocus cloth (WP 0024, Item 6). If grinding damage is present, replace Right Hand Cover Assembly.

CAUTION

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

NOTE

Remove sleeve (123) only if necessary.

33. Cut two slots 180° apart in sleeve (123).

34. Break sleeve (123) at slots. Discard sleeve (123).

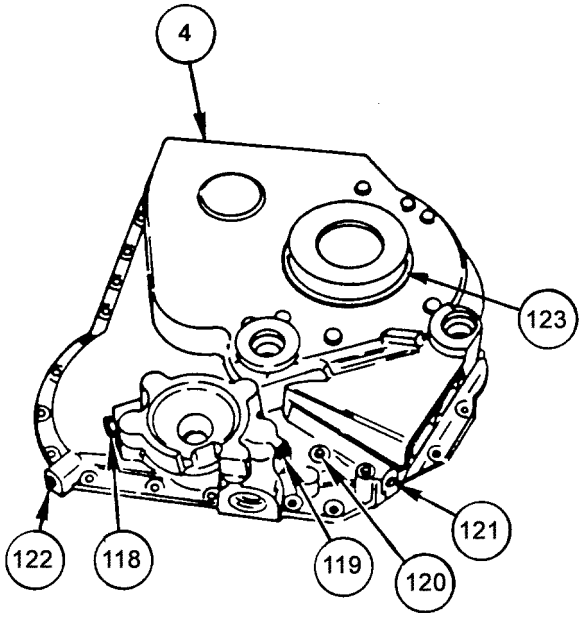


Figure 49. Right Hand Cover Assembly.

REPAIR RIGHT HAND COVER ASSEMBLY – Cont.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

ASSEMBLE RIGHT HAND COVER ASSEMBLY

NOTE

Some pipe plugs are pre-coated and do not require Sealant, Lubricating, Thread Locking Compound.

1. Apply Sealant (WP 0024, Item 17) to pipe plugs (118, 119, 120, 121, 122).
2. Install 3/8 inch pipe plug (122) in Right Hand Cover Assembly (4).
3. Torque plug (122) to 12-16 lb-ft (16-22 N·m).
4. Install 1/4 inch pipe plug (121) in Right Hand Cover Assembly (4).
5. Torque plug (121) to 96-120 lb-in (11-13 N·m).
6. Install 1/8 inch pipe plugs (119, 120) in Right Hand Cover Assembly (4).
7. Torque plugs (119, 120) to 50-60 lb-in (6-7 N·m).
8. Install 3/8 inch pipe plug (118) in Right Hand Cover Assembly (4).
9. Torque plug (118) to 12-16 lb-ft (16-22 N·m).
10. Turn Right Hand Cover Assembly (4) over, inside up.

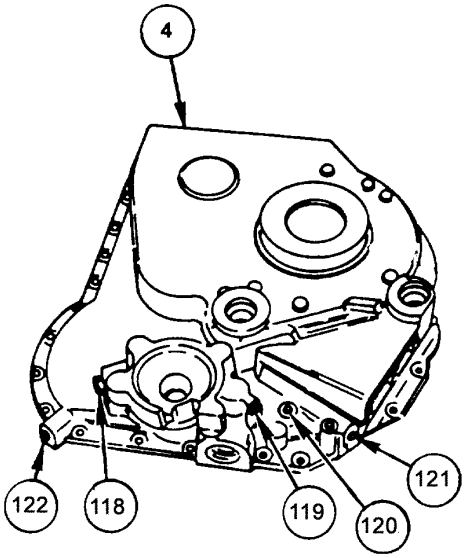


Figure 50. Right Hand Cover Assembly.

REPAIR RIGHT HAND COVER ASSEMBLY – Cont.

11. Install four inserts (117) in Right Hand Cover Assembly (4).

12. Using Insert Installer, Remover (WP 0027, Item 6), screw on insert (117) onto bolt until insert is against nut.

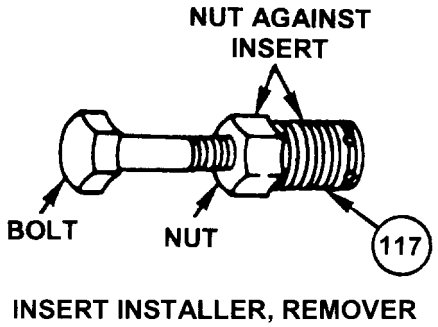


Figure 51. Insert Installer Remover.

13. Install insert (117) in Right Hand Cover Assembly (4) to 0.005-0.062 inch (0.127-0.157 mm) below surface of housing.

14. Install three remaining inserts (117) in Right Hand Cover Assembly (4).

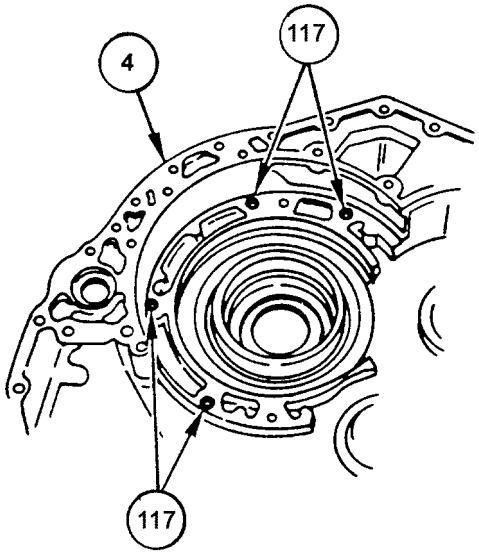


Figure 52. Right Hand Cover Assembly.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

REPAIR RIGHT HAND COVER ASSEMBLY – Cont.

15. Install two aluminum plugs (115) flush to 0.010 inch (0.254 mm) below surface of Right Hand Cover Assembly (4).

16. Install spring pin (114) in boss on Right Hand Cover Assembly (4). Press to height of 0.100-0.140 inch (2.540-3.556 mm) above surface.

17. Install two dowel pins (113) in Right Hand Cover Assembly (4). Press to height of 0.340 inch (8.636 mm) above surface.

18. Install two long brake reaction pins (112) in Right Hand Cover Assembly (4). Press to height of 3.100-3.140 inches (78.740-79.756 mm) above surface.

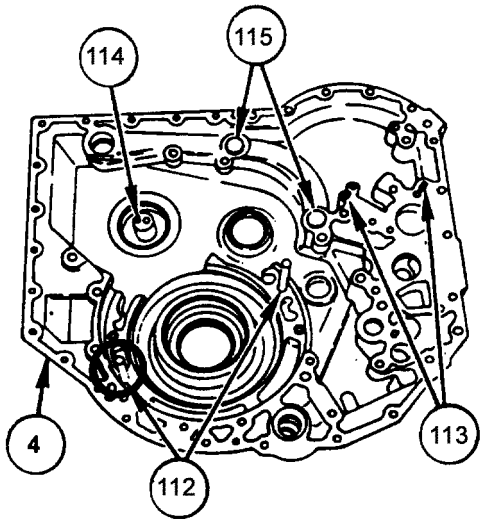


Figure 53. Right Hand Cover Assembly.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

REPAIR RIGHT HAND COVER ASSEMBLY – Cont.

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.

19. Freeze steer idler bearing (110) and bearing race (111).

20. Apply Petrolatum (WP 0024, Item 14), and Lubricating Oil (WP 0024, Item 12) to steer idler bearing (110) housing in Right Hand Cover Assembly (4).

21. Install steer idler bearing (110) in Right Hand Cover Assembly (4). Press steer idler bearing to shoulder.

22. Apply Petrolatum (WP 0024, Item 14), and Lubricating Oil (WP 0024, Item 12) to bearing race (111) housing in Right Hand Cover Assembly (4).

23. Install bearing race (111) in Right Hand Cover Assembly (4). Press bearing race until seated in Right Hand Cover Assembly.

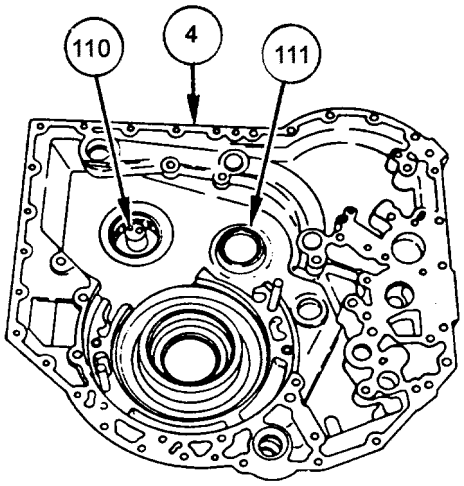


Figure 54. Right Hand Cover Assembly.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

REPAIR RIGHT HAND COVER ASSEMBLY – Cont.

24. Turn Right Hand Cover Assembly (4) over, outside up.

25. Apply Petrolatum (WP 0024, Item 14), and Lubricating Oil (WP 0024, Item 12) to outer diameter of two brake apply shaft bearings (106, 109).

NOTE

Press brake apply shaft bearings with driver against numbered side of bearings.

26. Install two brake apply shaft bearings (106, 109) in Right Hand Cover Assembly (4). Press brake apply shaft bearings 0.030-0.040 inch (0.762-1.016 mm) in from brake apply shaft seal (107, 108) shoulders.

NOTE

Install brake apply shaft seal with numbered side of seal against Inserter Seal.

Small end of Installer Seal tool is used for brake apply shaft seals.

Brake apply shaft seal contains dry-type sealer on outer edge.

27. Using Inserter, Seal (WP 0025, Item 13), install brake apply shaft seals (107, 108) in Right Hand Cover Assembly (4). Drive brake apply shaft seals to 0.080 inch (2.032 mm) below surface of Right Hand Cover Assembly.

WARNING

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

28. Heat new sleeve (123) to 300°. Heat for 15 minutes.

29. Install new sleeve (123) on Right Hand Cover Assembly (4). Install chamfered I.D. of sleeve to shoulder of Right Hand Cover Assembly.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

REPAIR RIGHT HAND COVER ASSEMBLY – Cont.

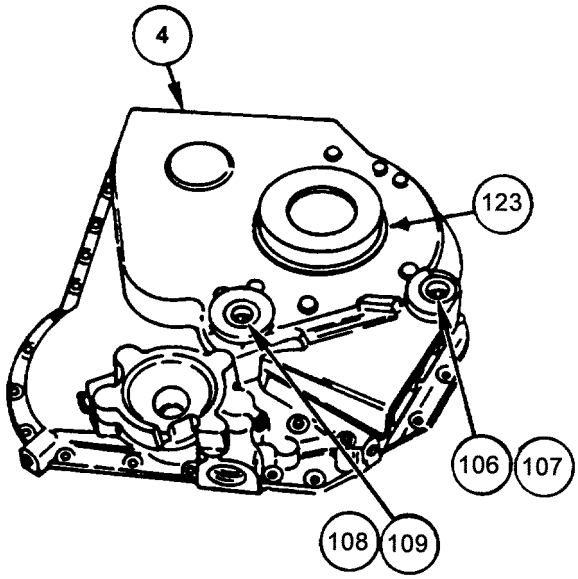


Figure 55. Right Hand Cover Assembly.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

INSTALL RH OUTPUT SHAFT AND SEAL

WARNING

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

Right Hand Cover Assembly weighs approximately 125 pounds (57.1 kg). When lifting Right Hand Cover Assembly, a hoist must be used to avoid bodily injury.

1. Using Rag, Wiping (WP 0024, Item 15) and Solvent (WP 0024, Item 20) clean output shaft bore (124) in Right Hand Cover Assembly (4).

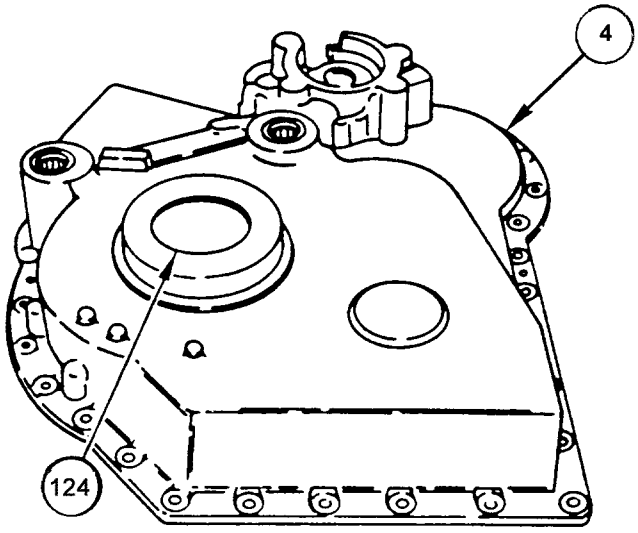


Figure 56. RH Output Shaft Seal.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

INSTALL RH OUTPUT SHAFT AND SEAL – Cont.

CAUTION

Do not reuse output shaft seal after it has been removed. Removal of seal destroys sealant on outer edge of seal.

NOTE

Seal installed numbered side out.

No lubrication to be added to outer edge of seal.

2. Using Inserter, Seal (WP 0025, Item 13) install seal (95) in bore (124). Seat seal flush to 0.010 inch (0.254 mm) below surface of Right Hand Cover Assembly (4).

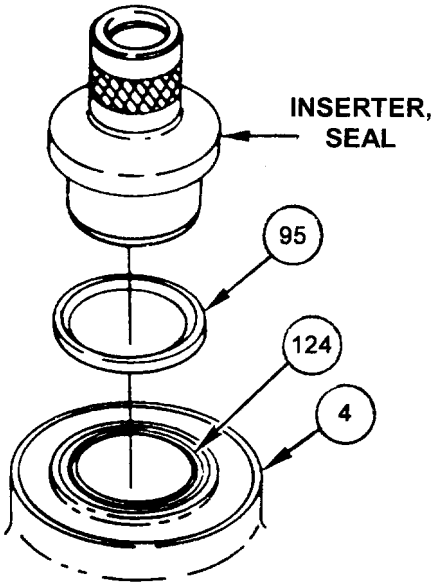


Figure 57. RH Output Shaft Seal.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

INSTALL RH OUTPUT SHAFT AND SEAL – Cont.

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 (WP 0024, Item 14), and Lubricating Oil (WP 0024, Item 12) to retaining Bearing Assembly journal of RH output shaft (76).

4. Install retaining Bearing Assembly (93), numbered end out, on output shaft (76). Press retaining Bearing Assembly to shoulder.

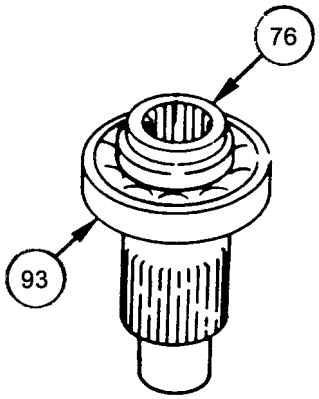


Figure 58. Seal and Seal Installer.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

INSTALL RH OUTPUT SHAFT AND SEAL – Cont.

WARNING

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

5. Heat sleeve (94) for 30 minutes to approximately 250°F (121°C).

6. Install sleeve (94) on RH output shaft (76) with inside beveled edge on first. Press sleeve onto retainer Bearing Assembly (93).

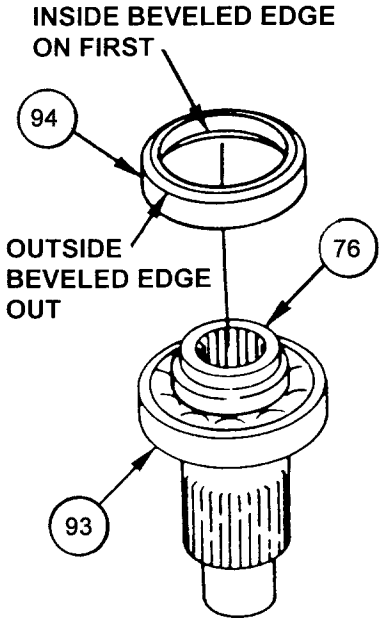


Figure 59. RH Output Shaft and Sleeve.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

INSTALL RH OUTPUT SHAFT AND SEAL – Cont.

7. Turn Right Hand Cover Assembly (4) over, inside up, on wood blocks (WP 0024, Item 3).

8. Apply a thin coat of Petrolatum (WP 0024, Item 14) to inner surface of output shaft seal (95).

9. Start short end of RH output shaft (76) and retainer Bearing Assembly (93) into output shaft seal (95). Rotate shaft while pushing end of shaft through seal.

10. Turn Right Hand Cover Assembly over and check that output seal (95) remains in position in Right Hand Cover Assembly (4), and that lip on seal is not distorted when RH output shaft (76) passes through output shaft seal (95).

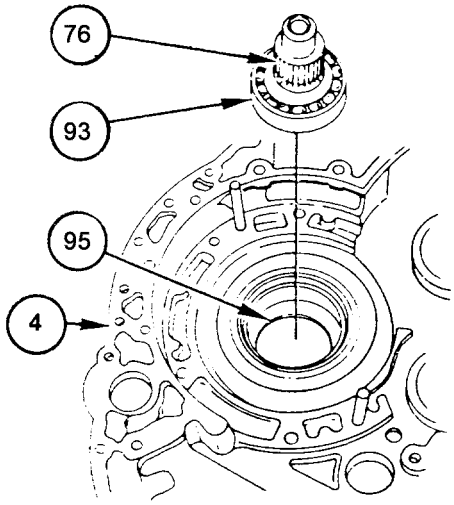


Figure 60. RH Output Shaft and Seal.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

INSTALL RH OUTPUT SHAFT AND SEAL – Cont.

NOTE

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

11. Tap on end of RH output shaft (76) to seat retaining Bearing Assembly (93) in shoulder on Right Hand Cover Assembly (4).

12. Install retaining ring (92) in groove in sleeve above retaining Bearing Assembly (93).

13. Apply Lubricating Oil (WP 0024, Item 12) to retaining Bearing Assembly (93).

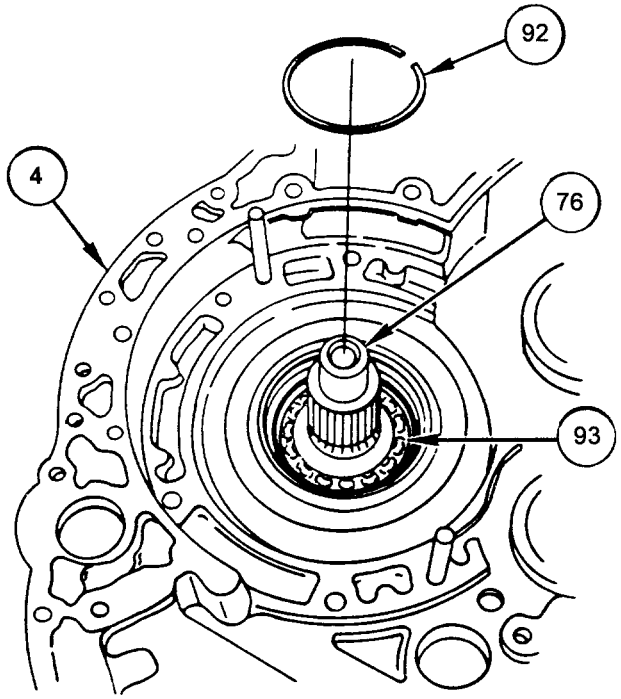


Figure 61. Right Hand Cover.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

INSTALL STEER GEARS

NOTE

Right Hand Cover Assembly turned inside up.

1. Apply Lubricating Oil (WP 0024, Item 12) to Cylindrical Roller Bearing Assembly (83) located in Right Hand Cover Assembly (4) beneath steer idler gear (81).

2. Install steer idler gear (81) with journal (125) around boss (126) and in Cylindrical Roller Bearing Assembly (83).

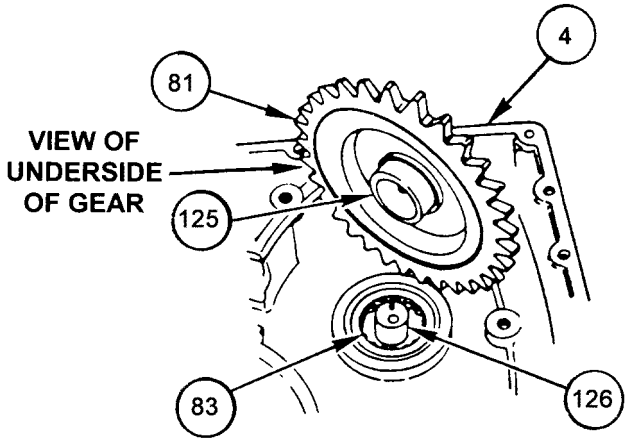


Figure 62. Steer Idler Gear.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

INSTALL STEER GEARS – Cont.

3. Install bronze thrust washer (82) in top center recess in steer idler gear (81).

NOTE

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

4. Install steer idler retainer plate (80) on boss (126) in center of steer idler gear (81).
5. Install bolt (79) in steer idler retainer plate (80).
6. Torque bolt (79) to 36-43 lb-ft (49-58 N·m).

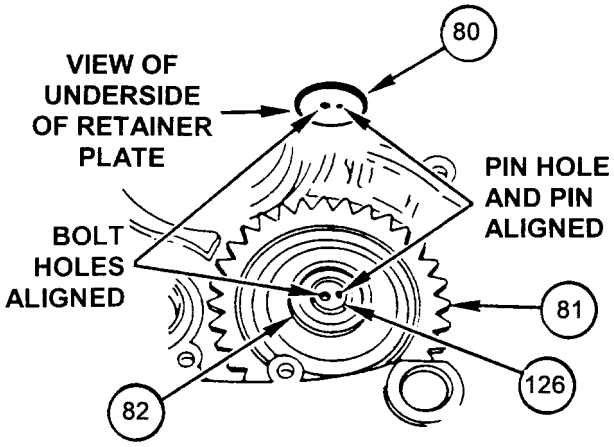


Figure 63. Bronze Washer.

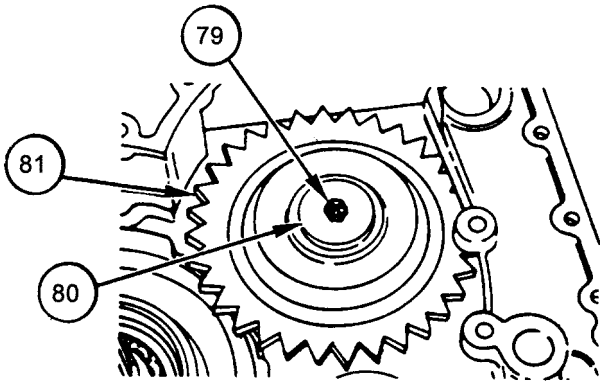


Figure 64. Steer Idler Retainer Washer and Bolt.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

INSTALL STEER GEARS – Cont.

7. If bearing (78) was removed, apply Petrolatum (WP 0024, Item 14), and Lubricating Oil (WP 0024, Item 12) to bearing journal located on underside of range steer gear (77).

8. If bearing (78) was removed, install new bearing (78) on range steer gear (77). Press bearing to shoulder.

9. Apply Lubricating Oil (WP 0024, Item 12) to bearing (78).

10. Install range steer gear (77) in Right Hand Cover Assembly (4) with bearing (78) in bearing race (111).

11. If bearing (75) was removed, apply Petrolatum (WP 0024, Item 14), and Lubricating Oil (WP 0024, Item 12) to bearing journal located on underside of RH steer driven gear (68).

12. If bearing (75) was removed, install new bearing (75) on RH steer driven gear (68). Press bearing to shoulder.

13. Apply Lubricating Oil (WP 0024, Item 12) to bearing (75).

14. Install RH steer driven gear (68) on RH output shaft (76), bearing (75) down.

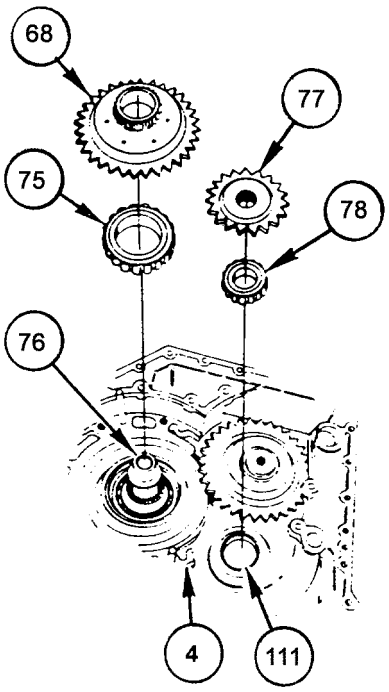


Figure 65. Steer Gears.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

INSTALL RIGHT BRAKE ASSEMBLY

NOTE

Right Hand Cover Assembly turned inside up.

Brake clutch backing plate is to be installed with part number, surface downward.

1. Install six spring guide pins (59) in brake clutch backing plate (71).
2. Using Bands, Rubber (WP 0024, Item 2), fix spring guide pins (59) in position on brake clutch backing plate (71).

NOTE

Brake clutch backing plate (71) may be wiggled as necessary to move it down on brake reaction pins (74). Brake clutch backing plate may be tapped near brake reaction pins to seat brake clutch backing plate.

3. Install brake clutch backing plate (71) on two brake reaction pins (74) so that recesses in edge of brake clutch backing plate accommodate range steer gear (77) and steer idler gear (81).
4. Install four bolts (72) and four washers (73) on brake clutch backing plate (71).
5. Torque bolts (72) to 36-43 lb-ft (49-58 N·m).

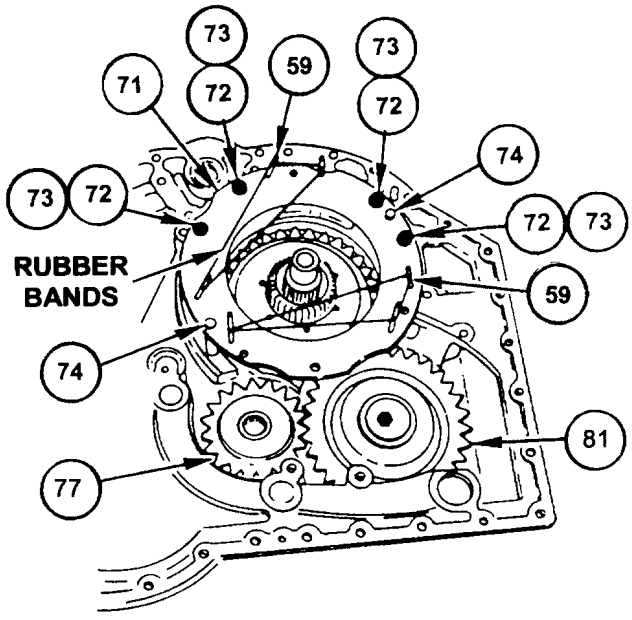


Figure 66. Right Hand Cover Assembly.

INSTALL RIGHT BRAKE ASSEMBLY – Cont.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

6. Install brake coolant seal ring (70) on inside edge on brake clutch backing plate (71).

7. Install four short brake reaction pins (55) in holes in brake clutch backing plate (71).

8. Install six springs (60) on spring guide pins (59).

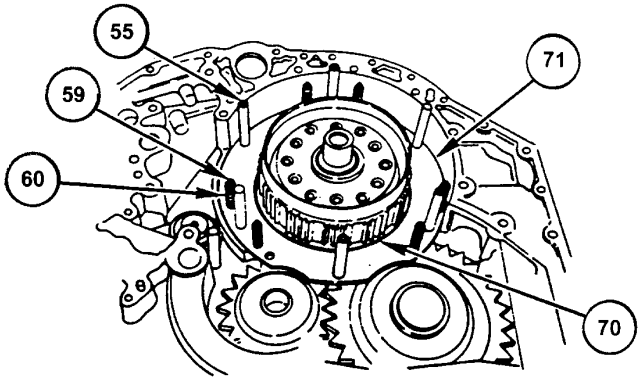


Figure 67. Right Hand Cover Assembly.

9. Install Output Carrier Assembly (64) in brake clutch drum (65).

10. Install snap ring (69) in inside groove of brake clutch drum (65) to hold Output Carrier Assembly (64) in brake clutch drum (65).

11. Apply Petrolatum (WP 0024, Item 14) to thrust washer (67).

12. Install thrust washer (67) in center of Output Carrier Assembly (64).

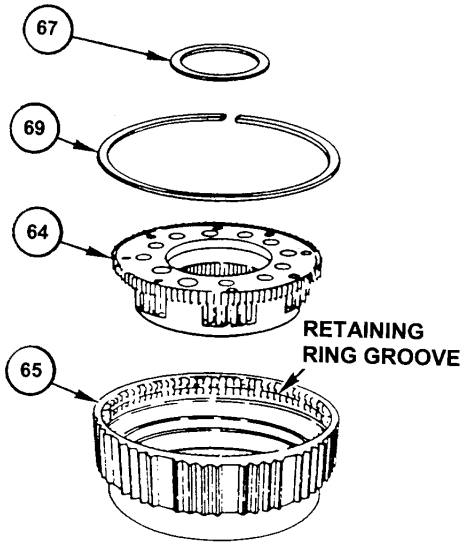


Figure 68. Right Output Carrier and Brake Clutch Drum.

INSTALL RIGHT BRAKE ASSEMBLY – Cont.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

13. Install Output Carrier Assembly (64) and brake clutch drum (65) on RH output shaft (76).

14. Apply Petrolatum (WP 0024, Item 14) to thrust washer (66).

15. Install thrust washer (66) in underside of Steer Ring Gear Assembly (63).

16. Install Steer Ring Gear Assembly (63) in brake clutch drum (65) and over RH output shaft (76).

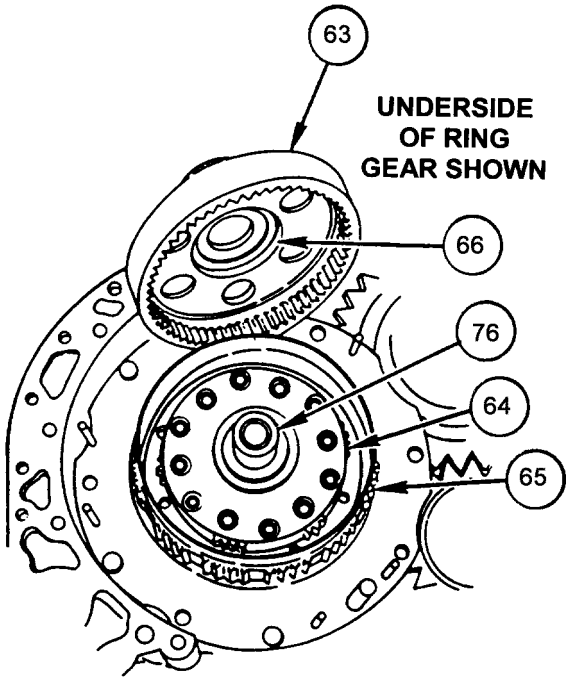


Figure 69. Right Hand Cover Assembly.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

INSTALL RIGHT BRAKE ASSEMBLY – Cont.

CAUTION

Unless the brake clutch pack is new, keep all friction 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 turned over.
- Plate positions in the pack are changed.
- A new Plate is inserted.

NOTE

Brake clutch pack (127) consists of six internally splined friction plates (61) and five reaction (steel) plates (62) should be immersed in lubricating oil for a minimum of two minutes before installing the pack.

17. Soak brake clutch pack (127) in Lubricating Oil (WP 0024, Item 12).

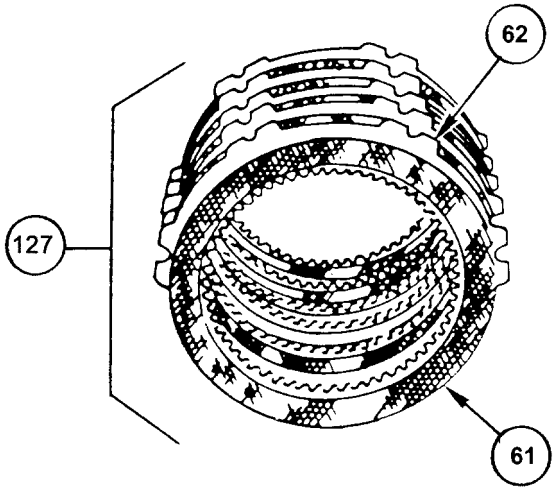


Figure 70. Brake Pack.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

INSTALL RIGHT BRAKE ASSEMBLY – Cont.

18. Install one internally splined (friction) plate (61) on brake clutch backing plate (71).

19. Install one clutch reaction (steel) plate (62) with six notched external projections around four brake reaction pins (55) and two pins (56).

20. Alternately install splined (friction) plate (61) and clutch reaction (steel) plates (62) until six splined (friction) plates and five clutch reaction (steel) plates have been installed.

21. Install end clutch reaction (steel) plate (62) so that ends of six spring guide pins (59) are through pin holes (128) in clutch reaction (steel) plate (62).

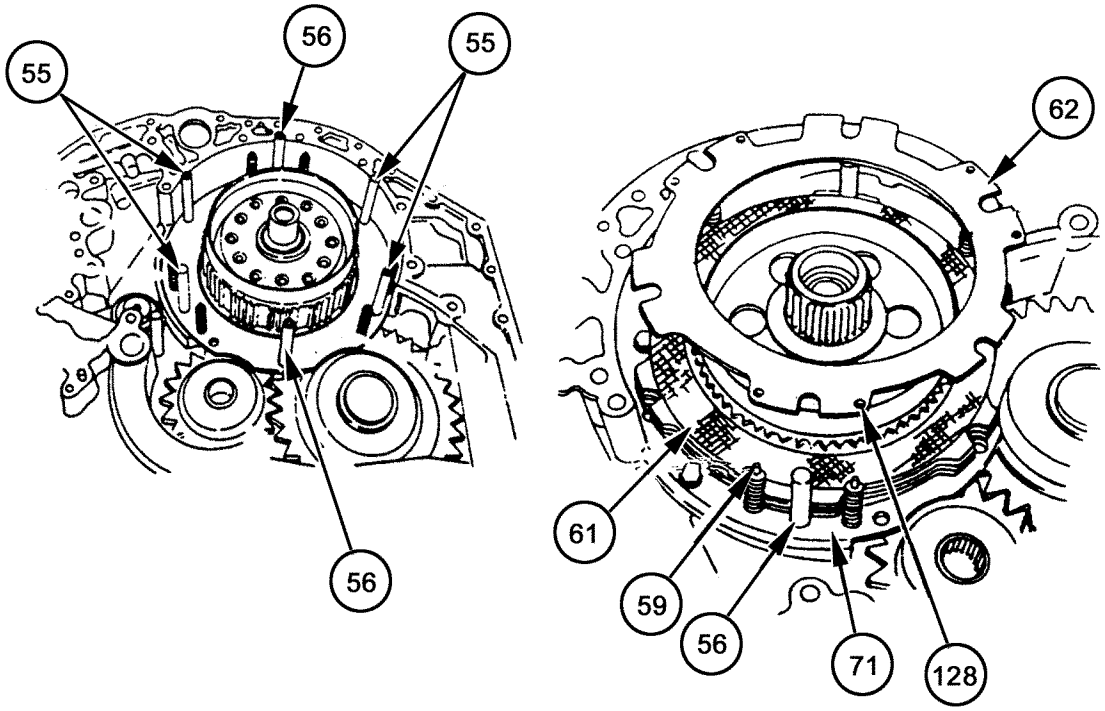


Figure 71. Right Hand Cover Assembly.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

INSTALL RIGHT BRAKE ASSEMBLY – Cont.

22. Using one hand, press down on end of clutch reaction (steel) plate (62) near one of six spring guide pins (59) so that grooved end of spring guide pin is above clutch reaction (steel) plate.

23. Install a retaining ring (57) on end of spring guide pin (59). Install five retaining rings (57) on five remaining spring guide pins (59).

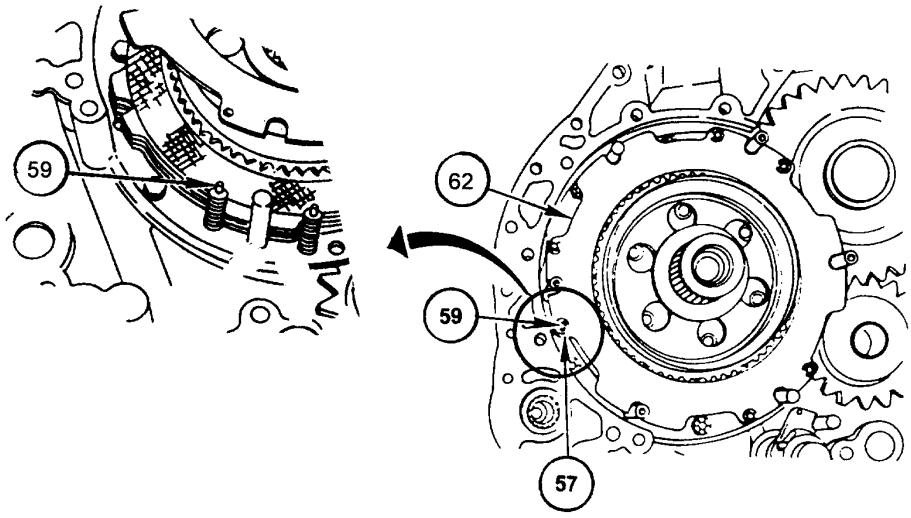


Figure 72. Right Hand Cover Assembly.

24. Apply Petrolatum (WP 0024, Item 14) to washer (85).

25. Install washer (85) on Right Hand Cover Assembly (4) over bearing (106).

26. Apply Lubricating Oil (WP 0024, Item 12) to bearings (106, 109).

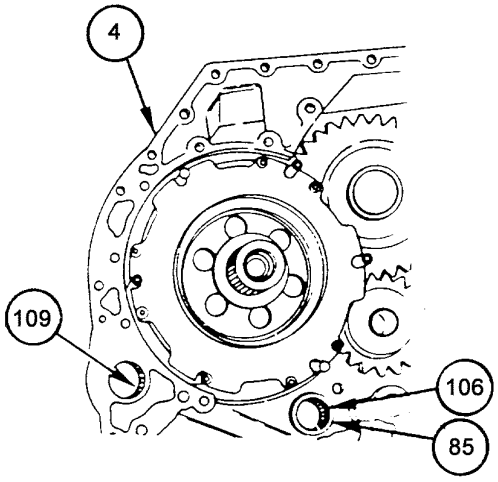


Figure 73. Right Hand Cover Assembly.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

INSTALL RIGHT BRAKE SUPPORT ASSEMBLY, BRAKE APPLY CAM, AND BRAKE ADJUSTING LINKS

NOTE

Turn Right Brake Support Assembly (32), inside upward.

1. Install stationary cam (43) on two dowel pins (100) in Right Brake Support Assembly (32).
2. Tap stationary cam (43) onto dowel pins (100) until stationary cam is seated.

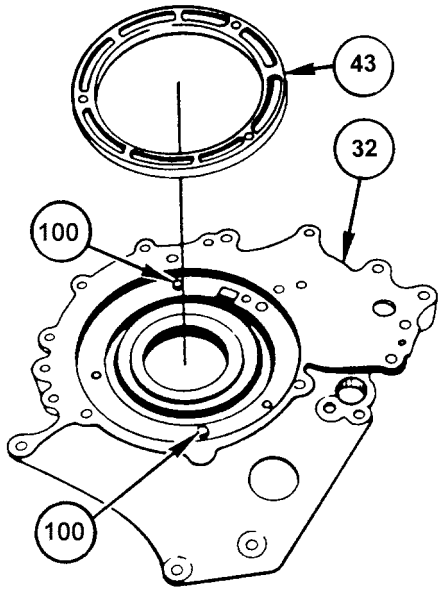


Figure 74. Right Brake Support and Stationary Cam.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

INSTALL RIGHT BRAKE SUPPORT ASSEMBLY, BRAKE APPLY CAM, AND BRAKE ADJUSTING LINKS – Cont.

3. Turn Right Brake Support Assembly (32) over, outside up, and place on wooden blocks (WP 0024, Item 3).

4. Install one 5/16-18 x 2 inch bolt (129) and one washer (42).

5. Install two 5/16-18 x 1 inch bolts (130) and two washers (42).

6. Torque three bolts (129, 130) to 17-20 lb-ft (23-27 N·m).

7. Turn Right Brake Support Assembly (32) over.

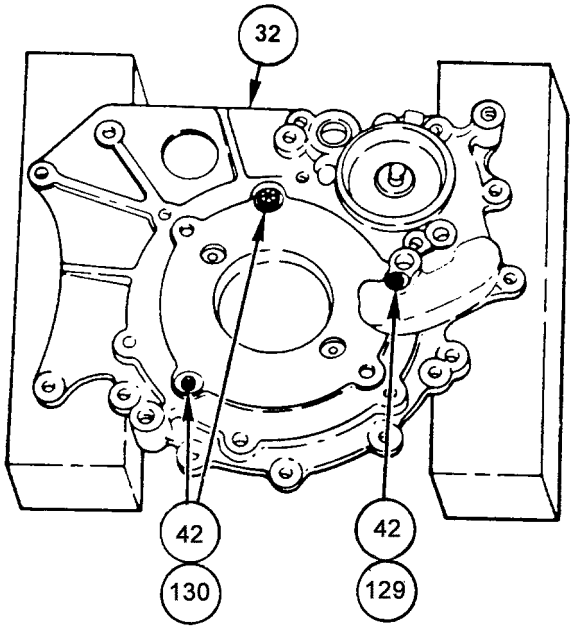


Figure 75. Right Brake Support Assembly.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

INSTALL RIGHT BRAKE SUPPORT ASSEMBLY, BRAKE APPLY CAM, AND BRAKE ADJUSTING LINKS – Cont.

8. Install hook-type metal seal ring (40) onto retainer (39).

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.

9. Coat seal ring (40) with Petrolatum (WP 0024, Item 14).

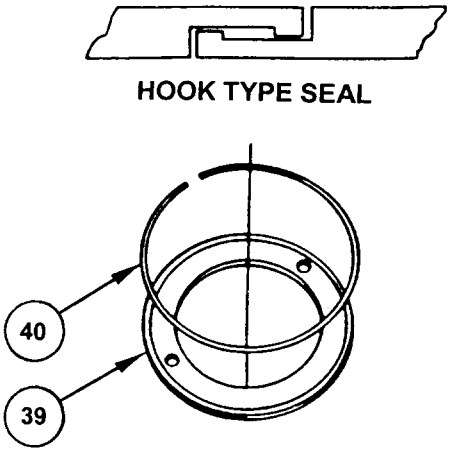


Figure 71. Seal Ring and Retainer.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

INSTALL RIGHT BRAKE SUPPORT ASSEMBLY, BRAKE APPLY CAM, AND BRAKE ADJUSTING LINKS – Cont.

10. Tip Right Brake Support Assembly (32) on edge.

11. Install seal retainer (39), flat side toward Right Brake Support Assembly (32) with seal retainer (39), bolt holes (131), and Right Brake Support Assembly (32) bolt holes (132) aligned.

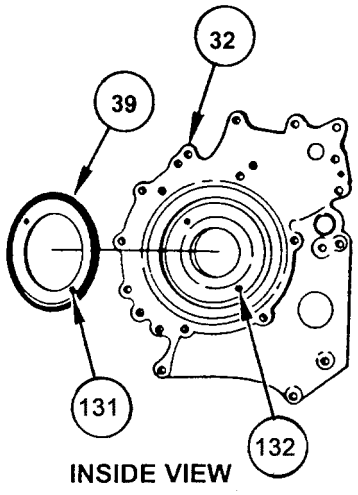


Figure 77. Right Brake Support Assembly.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

INSTALL RIGHT BRAKE SUPPORT ASSEMBLY, BRAKE APPLY CAM, AND BRAKE ADJUSTING LINKS – Cont.

12. Using fingers, start two washers (38) and two bolts (37) into Right Brake Support Assembly (32).

13. Torque bolts (37) to 10-12 lb-ft (14-16 N·m).

14. Turn Right Brake Support Assembly (32) over and place on wooden blocks (WP 0024, Item 3).

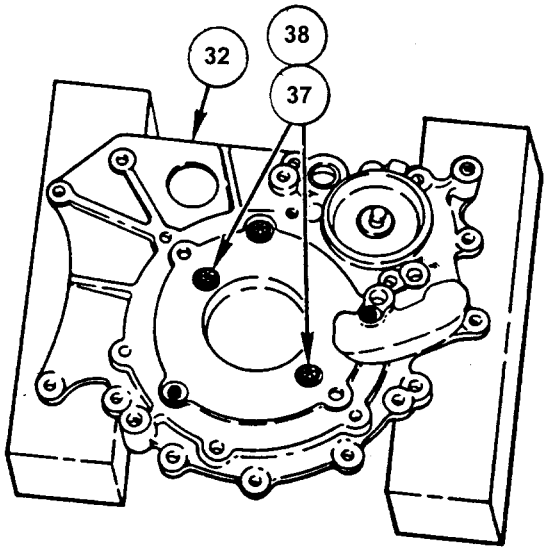


Figure 78. Right Brake Support Assembly.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

INSTALL RIGHT BRAKE SUPPORT ASSEMBLY, BRAKE APPLY CAM, AND BRAKE ADJUSTING LINKS – Cont.

15. Install O-Rings (49, 50) into face of brake apply cam (44).

CAUTION

Be sure seals (47, 48) are installed with seal lips in direction shown in illustration. If seals are not installed properly, components will not function properly.

16. Install seal (48), seal lip downward, in brake apply cam (44).
17. Install seal (47), seal lip upward, in brake apply cam (44).
18. Coat seals and O-rings (47, 48, 49, 50) with Petrolatum (WP 0024, Item 14).
19. Hold two spring tension clips (52) in place on brake apply cam (44) in position shown in Figure 79.
20. Install bolt (51) to retain clips (52).
21. Torque bolt (51) to 108-132 lb-in (12-15 N·m).

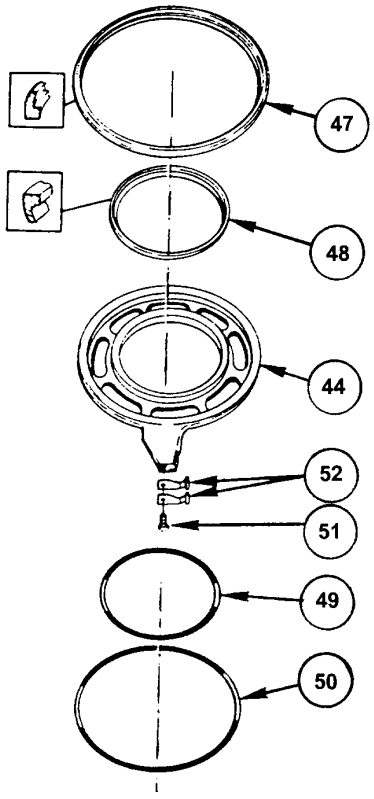


Figure 79. Brake Apply Cam Components.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

INSTALL RIGHT BRAKE SUPPORT ASSEMBLY, BRAKE APPLY CAM, AND BRAKE ADJUSTING LINKS – Cont.

22. Place Right Brake Support Assembly (32), inside surface upward, on wooden blocks (WP 0024, Item 3).

23. Install eight balls (45) in lowest areas of ramps on stationary cam (43).

24. Apply Petrolatum (WP 0024, Item 14) on eight balls (45) and in ramps around balls.

25. Apply Petrolatum (WP 0024, Item 14) on beveled thrust washer (86) and install thrust washer (86) on Right Brake Support Assembly (32) over needle bearing (104).

26. Apply Lubricating Oil (WP 0024, Item 12) to needle bearing (104) and run finger over needle bearing until all rollers are wet.

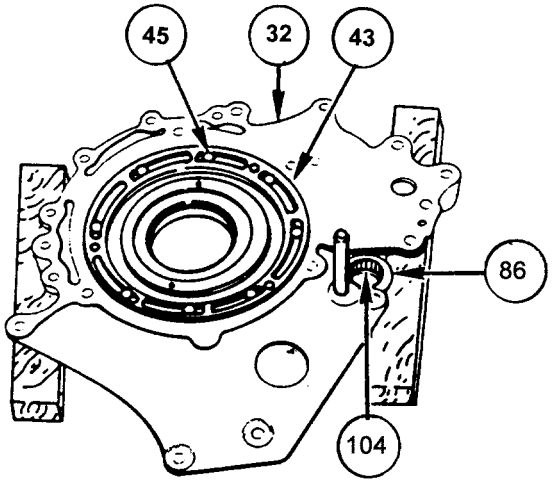


Figure 80. Brake Apply Cam and Support.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

INSTALL RIGHT BRAKE SUPPORT ASSEMBLY, BRAKE APPLY CAM, AND BRAKE ADJUSTING LINKS – Cont.

27. Install right brake apply cam shaft (84) in soft jaw vise.
28. Install spacer (91) on cam follower (90).
29. Place threaded end (133) of cam follower (90) through lobe (134) with cam follower (90) on side of lobe opposite splined end of right brake apply cam shaft (84).
30. Using fingers, install new locknut (89) on cam follower (90).
31. Hold screwdriver tip or key, hex head 1/8 inch, in slot center on cam follower (90) to prevent cam follower (90) from turning.

NOTE

When installing nut (89) using torque wrench, look at prevailing torque (run-in torque) reading on torque wrench as nut turns.

32. Using torque wrench install locknut (89) on cam follower (90). Determine torque.

CAUTION

Cam follower (90) must turn after final tightening of locknut (89). If cam follower locks, parts will wear rapidly and brake apply valve/brake apply cam shaft action may be impaired.

33. Torque nut (89) to 8-10 lb-ft (11-14 N·m) plus prevailing torque (run-in torque).
34. Check cam follower (90) to be sure it turns.
35. Remove brake apply cam shaft (84) from vise.
36. Install spring (88) on brake apply cam shaft (84) with curved end of spring on first.
37. Install curved end of spring (88) in cam arm (135).
38. Install retaining ring (87) on brake apply cam shaft (84) to retain spring (88).

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

INSTALL RIGHT BRAKE SUPPORT ASSEMBLY, BRAKE APPLY CAM, AND BRAKE ADJUSTING LINKS – Cont.

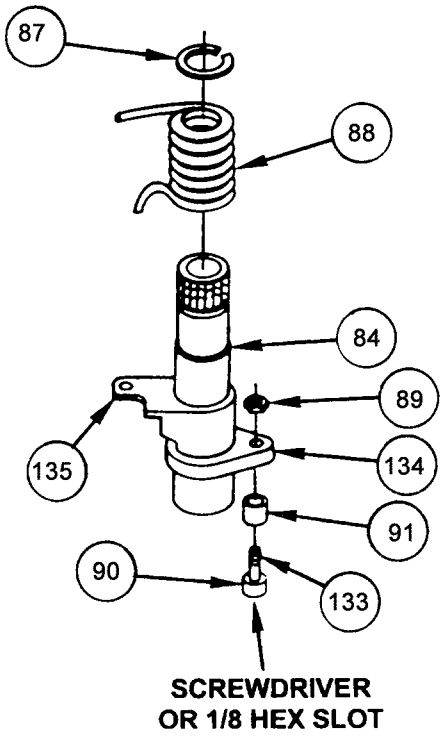


Figure 81. Brake Apply Cam Shaft Components.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

INSTALL RIGHT BRAKE SUPPORT ASSEMBLY, BRAKE APPLY CAM, AND BRAKE ADJUSTING LINKS – Cont.

NOTE

End of brake apply cam shaft (84) opposite splined end goes into Right Brake Support Assembly (32).

39. Install brake apply cam shaft (84) through thrust washer (86) and into needle bearing (104) so that straight end of spring (88) and cam arm (135) are on opposite sides of long brake reaction pin (99).

40. Tap end of brake apply cam shaft (84) as necessary to seat brake apply cam shaft in Right Brake Support Assembly (32).

41. Clean splined end of brake apply cam shaft (84).

CAUTION

Protective material, such as masking tape, must cover splines when brake apply cam shaft (84) goes through Right Hand Cover Assembly. If brake apply cam shaft goes through seal without protection, splines on brake apply cam shaft will damage seal.

42. Wrap Tape (WP 0024, Item 22) over splines and end of brake apply cam shaft (84).

43. Apply Petrolatum (WP 0024, Item 14) over tape on brake apply camshaft (84).

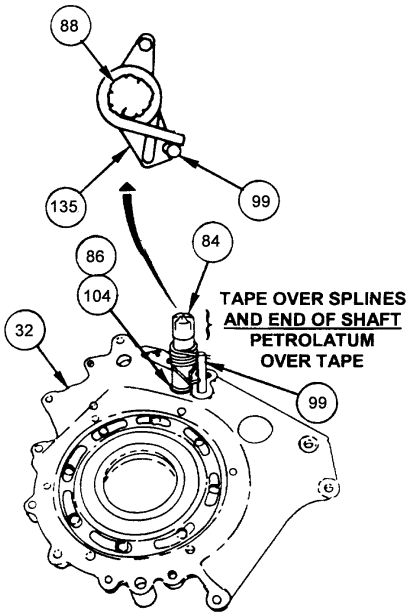


Figure 82. Right Brake Apply Cam Shaft and Support.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

INSTALL RIGHT BRAKE SUPPORT ASSEMBLY, BRAKE APPLY CAM, AND BRAKE ADJUSTING LINKS – Cont.

44. Install inner brake adjusting link (53) into outer brake adjusting link (54). Turn links until threads on inner link cannot be seen.

45. Install small end of outer brake adjusting link (54) in brake apply cam (44) so that flat on link body (54) is against free end of spring tension clip (52).

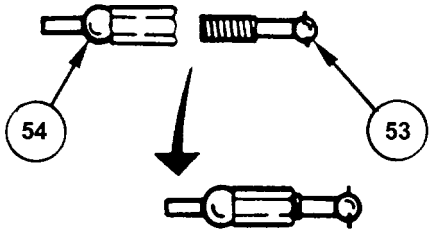


Figure 83. Right Adjusting Links.

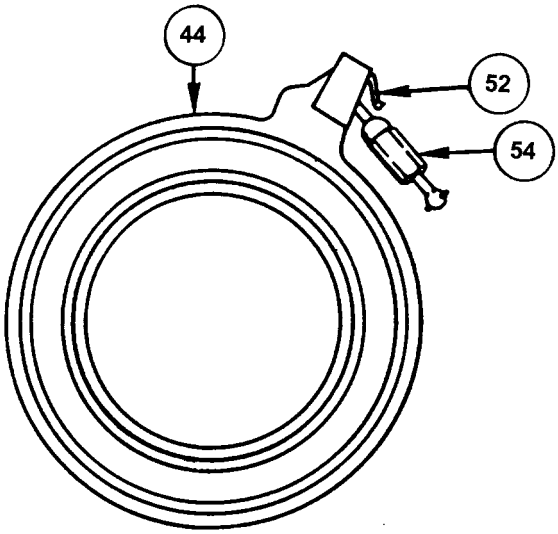


Figure 84. Right Brake Apply Cam.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

INSTALL RIGHT BRAKE SUPPORT ASSEMBLY, BRAKE APPLY CAM, AND BRAKE ADJUSTING LINKS – Cont.

46. Install brake apply cam (44) while installing ball end of inner brake adjusting link (53) in pocket of right brake apply cam shaft (84) so that pin (96) is in the retaining slot.

47. Push ball end of link (53) into cam shaft (84) pocket as far as ball will go.

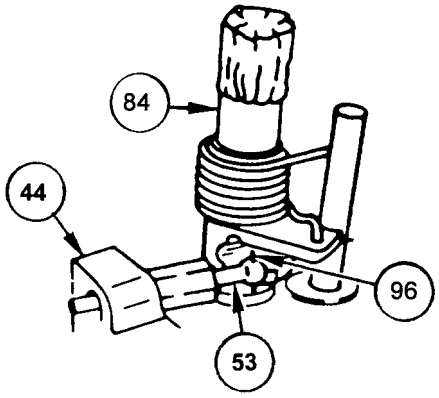


Figure 85. Right Brake Apply Cam, Link, and Brake Apply Shaft.

48. Turn brake apply cam (44) to right (clockwise) until the projection on the cam bottoms against the outer brake adjust link (54) and the cam will turn no further.

49. Place one hand on brake apply cam (44) and apply a small amount of downward force.

50. Using a screwdriver in other hand, turn slotted tip (136) of outer brake adjust link (54) to the left (counterclockwise) until tension is felt on the screwdriver, then continue to turn screwdriver 1/2 to 3/4 of a turn.

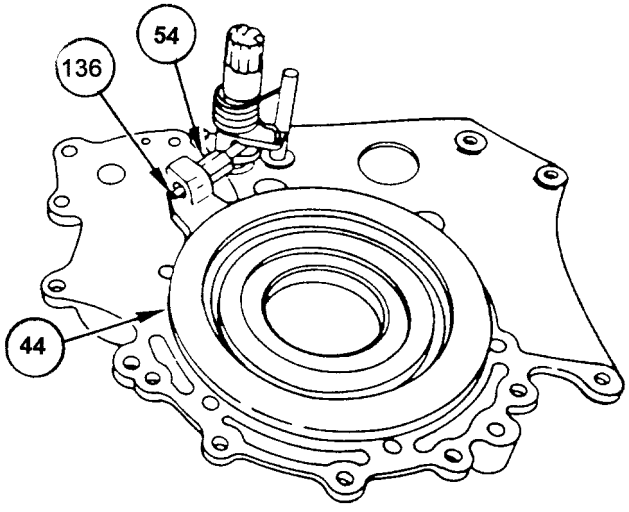


Figure 86. Right Brake Apply Cam.

INSTALL RIGHT BRAKE SUPPORT ASSEMBLY, BRAKE APPLY CAM, AND BRAKE ADJUSTING LINKS – Cont.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

51. Place Right Hand Cover Assembly (4) on wooden blocks (WP 0024, Item 3) inside of Right Hand Cover Assembly up.

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 Right Brake Support Assembly on Right Hand Cover Assembly, the following alignments should be checked:

- Splined (taped) end of right brake apply cam shaft goes through thrust washer on Right Hand Cover Assembly and into needle bearing.
- Two long brake reaction pins go into pin holes in Right Hand Brake Support Assembly.
- Four short brake reaction pins go into pin holes in Right Hand Brake Support Assembly.

52. Turn Right Brake Support Assembly (32) over, outside up, and position Right Brake Support Assembly on Right Hand Cover Assembly (4).

53. Check that the two long brake reaction pins (99) and four short reaction pins (55) are at pin holes in Right Brake Support Assembly (32).

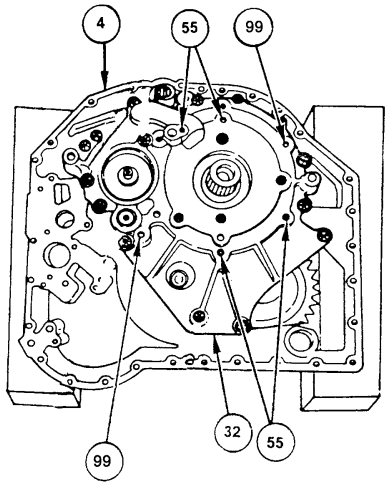


Figure 87. Right Hand Cover Assembly.

INSTALL RIGHT BRAKE SUPPORT ASSEMBLY, BRAKE APPLY CAM, AND BRAKE ADJUSTING LINKS – Cont.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

54. Place one hand on outside of Right Hand Cover Assembly (4) over right brake apply cam shaft (84) bore and run finger around and over spring (137) in seal (108) until taped end of right brake apply cam shaft (84) comes through seal.

55. While pushing down on Right Brake Support Assembly (32), gently rock Right Brake Support Assembly until it slides down over pins (55, 99). Right Brake Support Assembly (32) is properly installed when there is about 1/8 inch gap between Right Brake Support Assembly (32) and Right Hand Cover Assembly (4).

56. Install two 7/16-14 x 1-3/4 inch bolts (30) and washers (31) in Right Brake Support Assembly (32).

57. Install twelve 7/16-14 x 1-1/2 inch bolts (33) and washers (34) around perimeter of Right Brake Support Assembly (32).

58. Torque bolts (30, 33) evenly to 54-65 lb-ft (73-88 N·m).

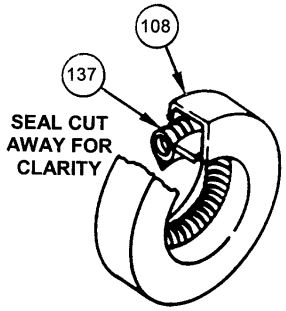


Figure 88. Seal and Spring.

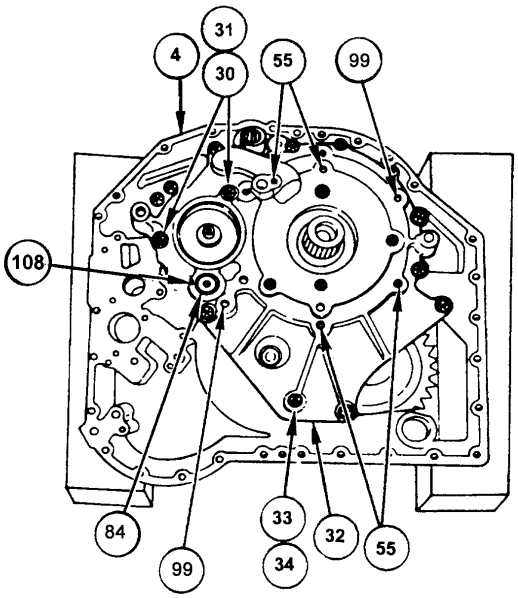


Figure 89. Right Hand Cover Assembly.

INSTALL BRAKE COOLANT VALVE COMPONENTS

NOTE

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

Right Hand Cover Assembly turned inside up.

Early models of the transmission have a two-piece brake coolant valve consisting of brake coolant valve stem (20) and coolant valve (21). Later models of the transmission have a product improved one-piece brake coolant valve (23). Each time a two-piece configuration is found (20, 21), it will be replaced by a one-piece configuration (23).

1. Install new seal ring (22) on brake coolant valve (23).
2. Apply Petrolatum (WP 0024, Item 14) on seal ring (22).
3. Install brake coolant valve (23) in bore (138) of end cover housing, seal ring end first. Push until it bottoms in bore.
4. Install large spring (19) on valve stem (23).

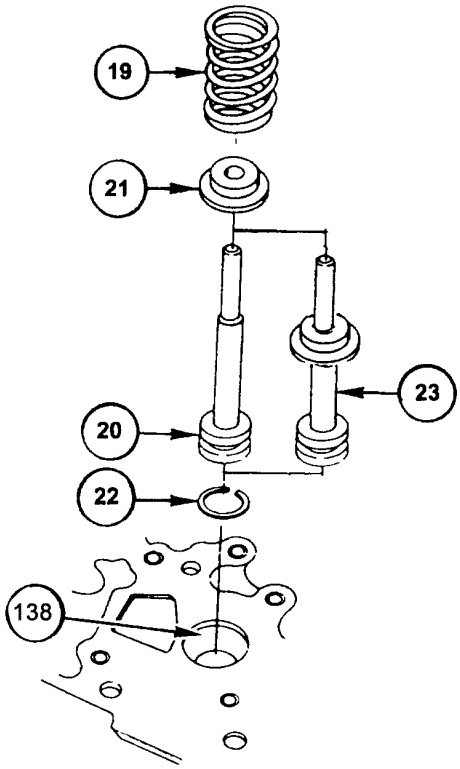


Figure 90. Brake Coolant Valve Components.

INSTALL BRAKE COOLANT VALVE COMPONENTS – Cont.

WARNING

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

5. Install three bolts (17) and three washers (18) on brake coolant valve body (16).
6. Install brake coolant valve body (16) with three bolts (17) and three washers (18) on spring (19) and hold brake coolant valve body firmly down while starting bolts (17) with fingers.
7. Tighten three bolts (17) and three washers (18) on brake coolant valve body (16).
8. Torque three bolts (17) to 17-20 lb-ft (23-27 N·m).

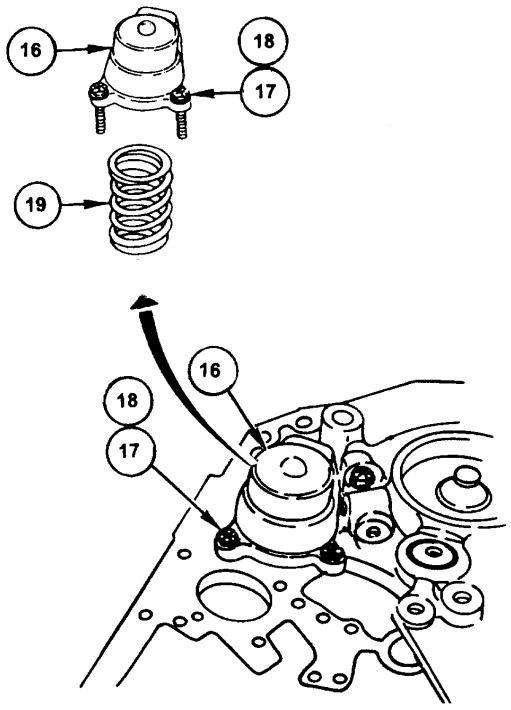


Figure 91. Brake Coolant Valve Body.

INSTALL BRAKE APPLY REGULATOR VALVE COMPONENTS

NOTE

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

Right Hand Cover Assembly turned inside up.

1. Install spring (11) on brake apply valve body (10).

NOTE

Brake Apply Regulator Valve Assembly must move freely in body by its own weight.

2. Apply Lubricating Oil (WP 0024, Item 12) to Brake Apply Regulator Valve Assembly (9).
3. Install spring (11) and Brake Apply Regulator Valve Assembly (9) in brake apply valve body (10).

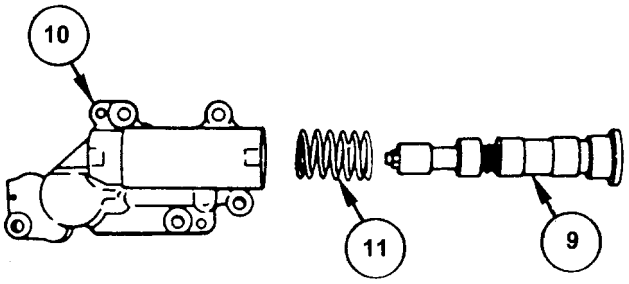


Figure 92. Brake Apply Regulator Valve Components.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

INSTALL BRAKE APPLY REGULATOR VALVE COMPONENTS – Cont.

WARNING

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

4. Push Brake Apply Regulator Valve Assembly (9) through brake apply valve body (10) so that nut (12) on end of Valve Assembly extends out of body.

5. Install 0.025 inch feeler gauge behind nut (12) to retain Brake Apply Regulator Valve Assembly (9) and spring (11) in brake apply valve body (10).

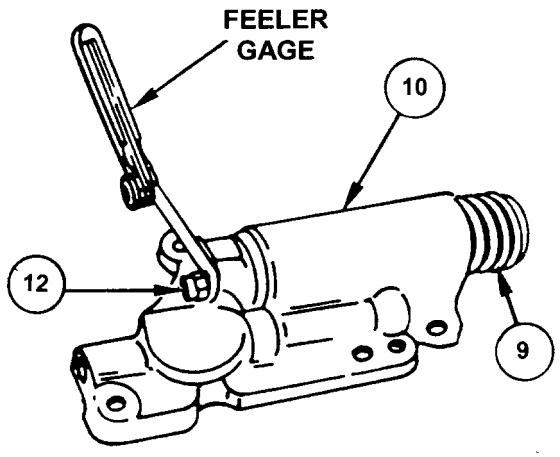


Figure 93. Brake Apply Regulator Valve.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

INSTALL BRAKE APPLY REGULATOR VALVE COMPONENTS – Cont.

6. Install separator plate (15) on two dowel pins (139) located on Right Hand Cover Assembly (4).
7. Install brake apply valve body (10) on separator plate (15) and two dowel pins (137) located on Right Hand Cover Assembly (4).
8. Install five bolts (13) and five washers (14) in brake apply valve body (10).
9. Torque bolts (13) to 17-20 lb-ft (23-27 N·m).
10. Remove feeler gauge from nut (12).

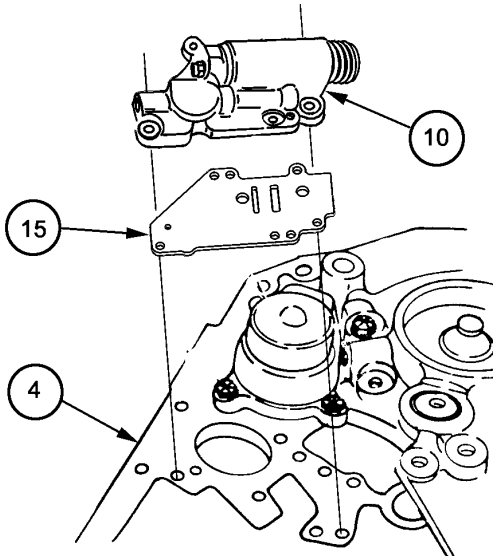


Figure 94. Separator Plate.

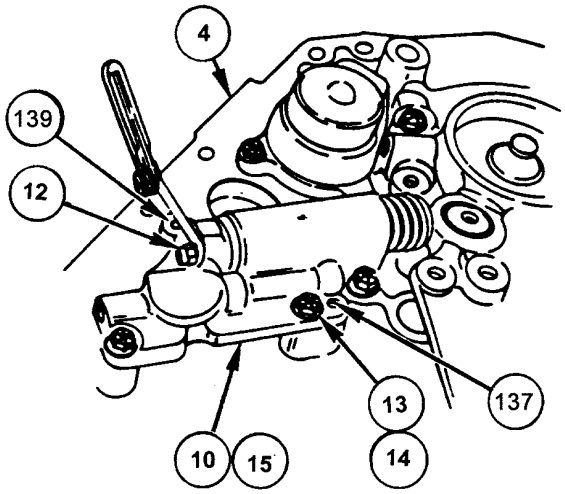


Figure 95. Brake Apply Regulator Valve.

INSTALL LEFT BRAKE APPLY SHAFT AND RIGHT BRAKE APPLY CAM SHAFT

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

CAUTION

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

NOTE

Right Hand Cover Assembly on wooden blocks, Right Hand Cover Assembly turned inside up.

If splines were taped during shaft removal, petrolatum should be put on tape before installing shafts.

1. Apply Petrolatum (WP 0024, Item 14) to washer (28).
2. Install washer (28) on left brake apply shaft (24).
3. Clean splined end of left brake apply shaft (24).
4. Wrap Tape (WP 0024, Item 22) over spline and end of left brake apply shaft (24).
5. Apply Petrolatum (WP 0024, Item 14) over tape on left brake apply shaft (24).
6. Position taped end of left brake apply shaft (24) over bearing (106) in Right Hand Cover Assembly (4).

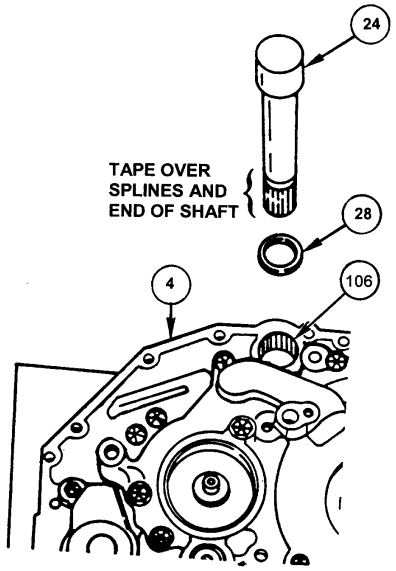


Figure 96. Left Brake Apply Shaft.

INSTALL LEFT BRAKE APPLY SHAFT AND RIGHT BRAKE APPLY CAM SHAFT – Cont.

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 finger around spring in 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 Hand Cover Assembly (4) over left brake apply shaft (24) bore and run finger around spring (140) in seal (107) until taped end of left brake apply shaft (24) comes through.

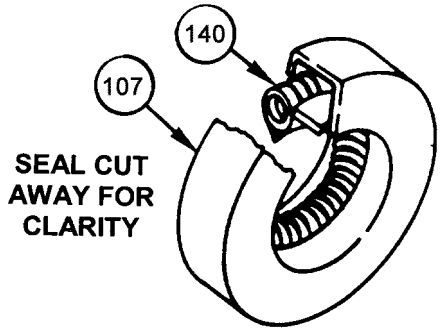


Figure 97. Seal and Spring.

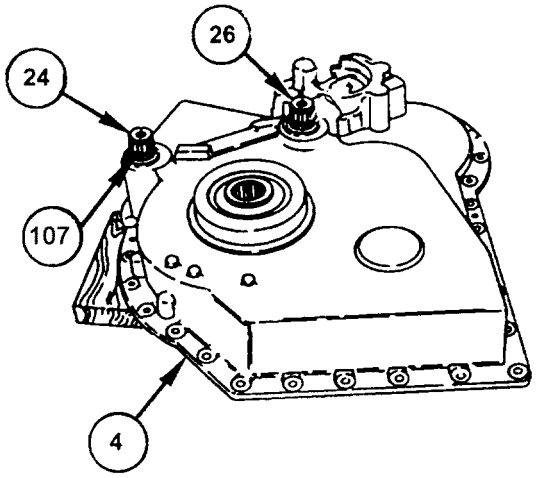


Figure 98. Right Hand Cover Assembly.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

INSTALL LEFT BRAKE APPLY SHAFT AND RIGHT BRAKE APPLY CAM SHAFT – Cont.

8. Turning left brake apply shaft (24) to left or right while inserting it, carefully push shaft into bore until left brake apply shaft is seated in Right Hand Cover Assembly (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 left brake apply shaft (24) in place, turn Right Hand Cover Assembly (4) over, outside up, then put a wooden block (WP 0024, Item 3) under Right Hand Cover Assembly so that wooden block retains left brake apply shaft.

10. Remove protective tape from end of left brake apply shaft (24) and right brake apply cam shaft (26).

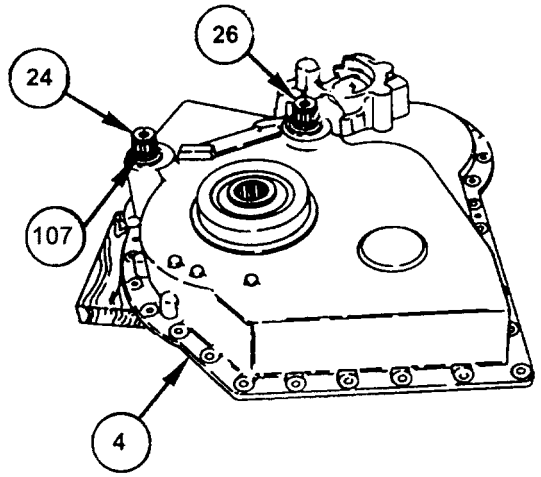


Figure 98. Right Hand Cover Assembly. (Repeated)

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

INSTALL RIGHT AND LEFT BRAKE APPLY INDICATORS

NOTE

Indicator and shaft have one tooth missing from spline, providing point for alignment.

Indicator is installed beveled side of pointer out.

1. Install indicators (27) on left brake apply shaft (24) and right brake apply cam shaft (26), located in the Right Hand Cover Assembly (4), so that indicators (27) are beyond inner retaining ring groove (141) in each of the brake apply shafts.

NOTE

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

2. Install four retaining rings (25).

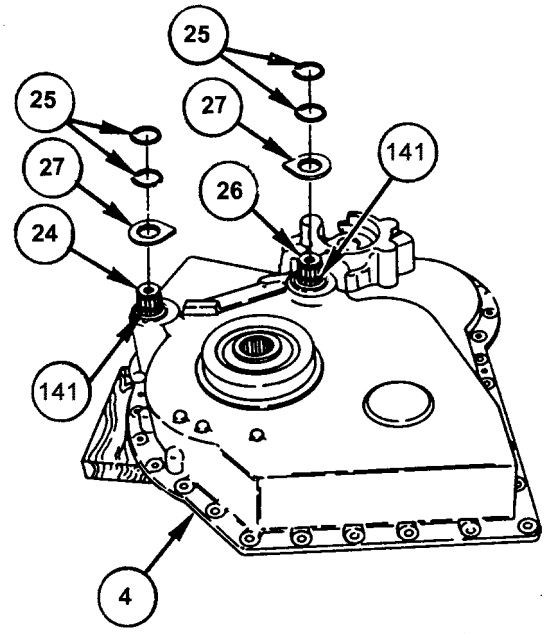


Figure 99. Right Hand Cover Assembly.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

INSTALL COOLER LINE ELBOW AND RH OUTPUT FLANGE

NOTE

X200-4 and early model X200-4A Transmissions have an elbow configuration which includes an elbow (1) and a connector (adapter) (2). Late model X200-4A Transmissions have a one-piece elbow configuration and no connector (adapter).

To remove or install elbow on a assembled transmission it is necessary to first remove the RH lifting bracket and Top Cover Assembly.

Right Hand Cover Assembly turned outside up.

X200-4 Elbow

1. Install new o-ring (3) onto connector (1). Lubricate o-ring (3) with Petrolatum (WP 0024, Item 14).
2. Install connector (1) into Right Hand Cover Assembly (4).
3. Torque connector (1) to 127-140 lb-ft (172-190 N·m).
4. Install elbow (2) into connector (1).
5. Torque elbow (2) to 127-140 lb-ft (172-190 N·m). Index elbow to 30° of position shown in Figure 100, this Work Package. (When oil line (vehicle part) is installed, elbow (2) may be repositioned to accommodate oil line).

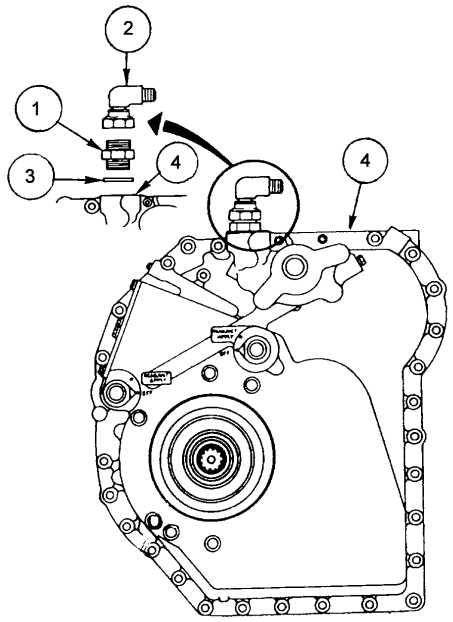


Figure 100. X200-4 Cooler Line Elbow.

INSTALL COOLER LINE ELBOW AND RH OUTPUT FLANGE – Cont.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

X200-4A Elbow

6. Using your hands, in the direction of the bend in the elbow (2), back off locknut on elbow. Back off locknut as far as possible.

7. Inspect backup washer on elbow (2). Replace elbow if backup washer is damaged, loose or bent.

8. Install new o-ring (3) onto elbow (2). Install o-ring (3) until it seats on backup washer on elbow (1).

9. Lubricate o-ring (3) with Petrolatum (WP 0024, Item 14).

10. Inspect elbow (2) to insure that backup washer and o-ring are pushed up, in the direction of the bend in the elbow, as far as possible.

11. Using your hands, screw elbow (2) and o-ring (3) into the Right Hand Cover Assembly (4) until the backup washer and o-ring make contact with the Right Hand Cover Assembly. Light wrenching may be necessary to obtain seating of the backup washer and o-ring.

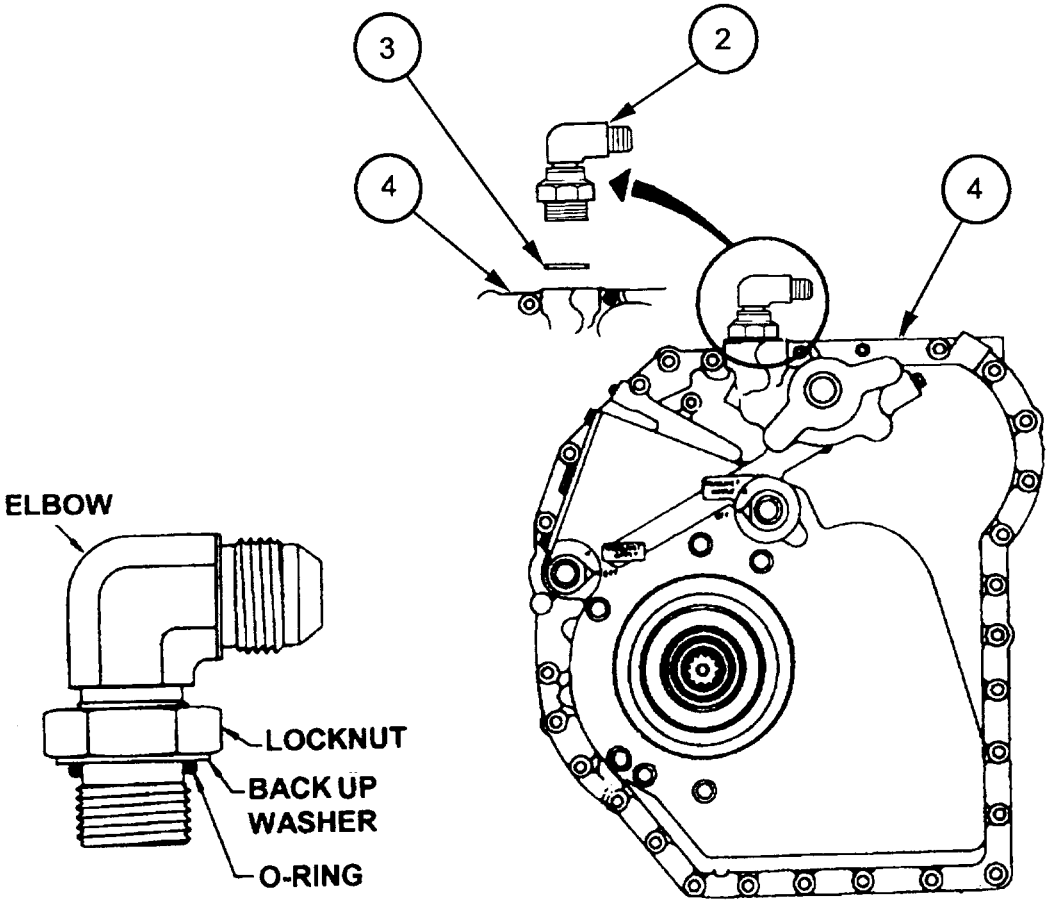


Figure 101. X200-4A Cooler Line Elbow.

INSTALL COOLER LINE ELBOW AND RH OUTPUT FLANGE – Cont.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

12. Tighten nut on elbow (2) against Right Hand Cover Assembly (4).

13. X200-4 and X200-4A, torque elbow (2) to 50-60 lb-ft (68-81 N·m). Index elbow to 30° of position shown in Figure 103, this Work Package.

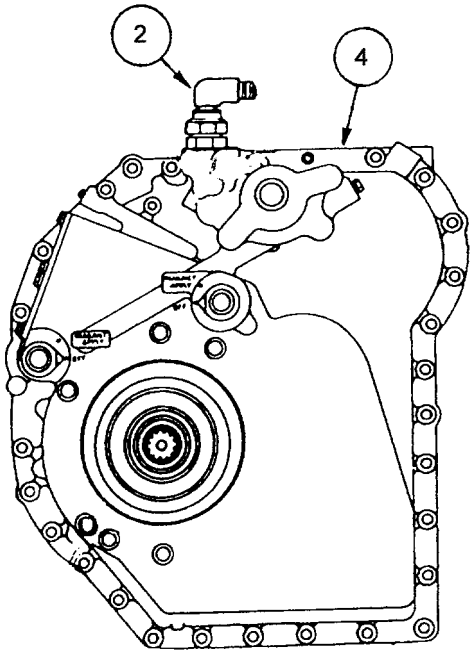


Figure 102. Cooler Line Elbow.

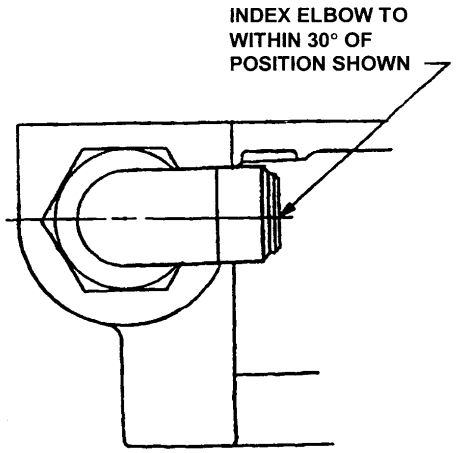


Figure 103. Cooler Line Elbow Index.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

INSTALL COOLER LINE ELBOW AND RH OUTPUT FLANGE – Cont.

Install RH Output Flange. (X200-4/X200-4A)

14. Install output flange (8) in output shaft (76), located in Right Hand Cover Assembly (4).

15. Install new tab washer (5) on 1/2-20 x 3-1/4 inch bolt (6) with bent tab on washer toward head of bolt.

16. Install bolt (6) through center of output flange (8) and into center of output shaft (76). Install finger tight.

17. Install two 1/2-20 x 3 inch bolts (7) in tapped holes at either end of output flange (8) until bolts are flush with inner surface of flange.

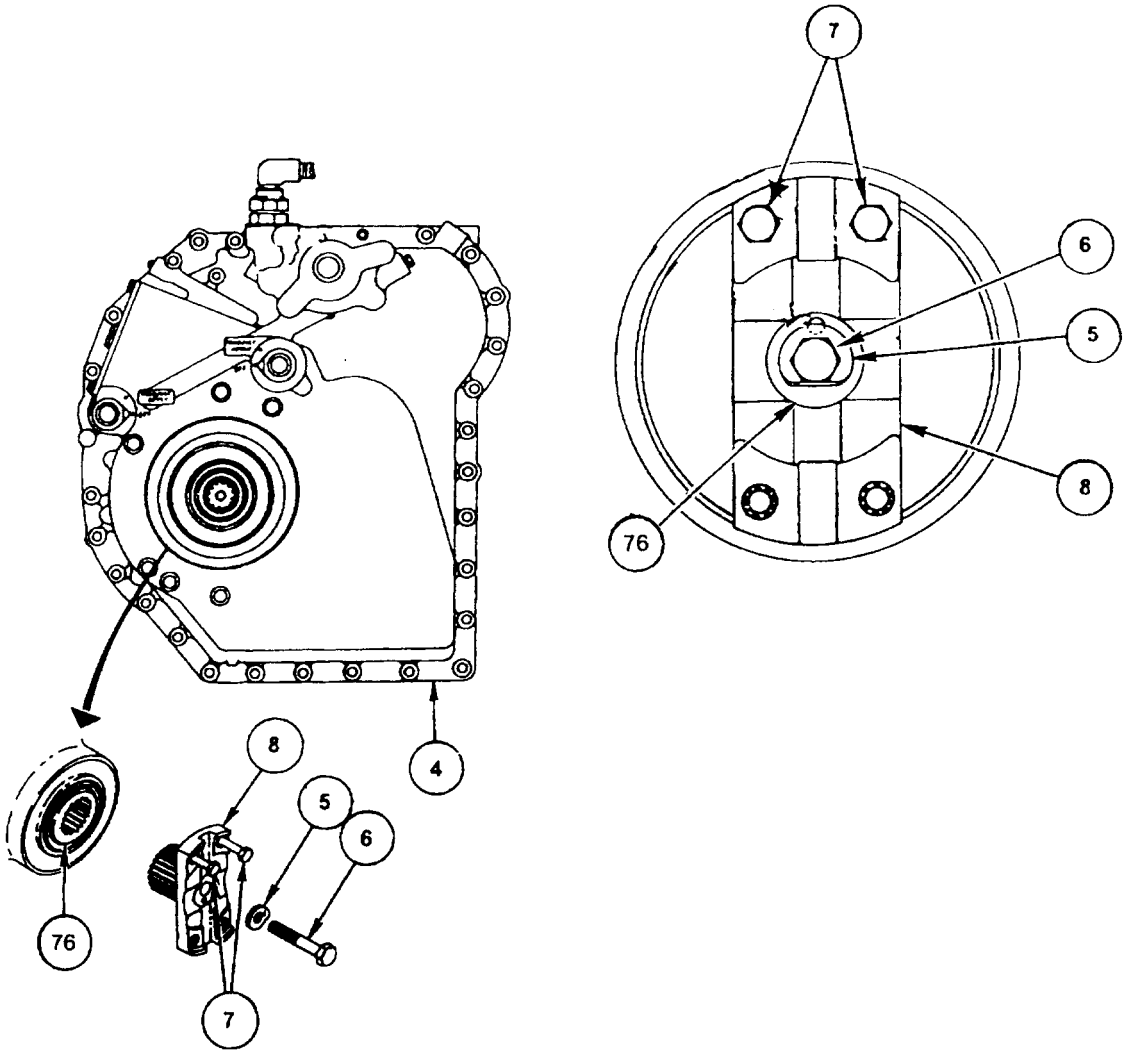


Figure 104. Output Flange.

DISASSEMBLEY, REPAIR, AND ASSEMBLY OF THE RIGHT HAND COVER ASSEMBLY – Cont. 0012 00

INSTALL COOLER LINE ELBOW AND RH OUTPUT FLANGE – Cont.

18. Using one hand, hold pry bar between two bolts (7) to prevent output flange (8) 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.

19. Torque bolt (6) to 72-86 lb-ft (98-117 N·m).

20. Remove two bolts (7) from flange (8).

NOTE

Do not bend tab of washer (5) against flat of bolt (6) at this time. Tab will be bent after successful completion of drag test.

21. Punch dimple in washer (5). Dimple must depress washer into dimple hole in flange (8).

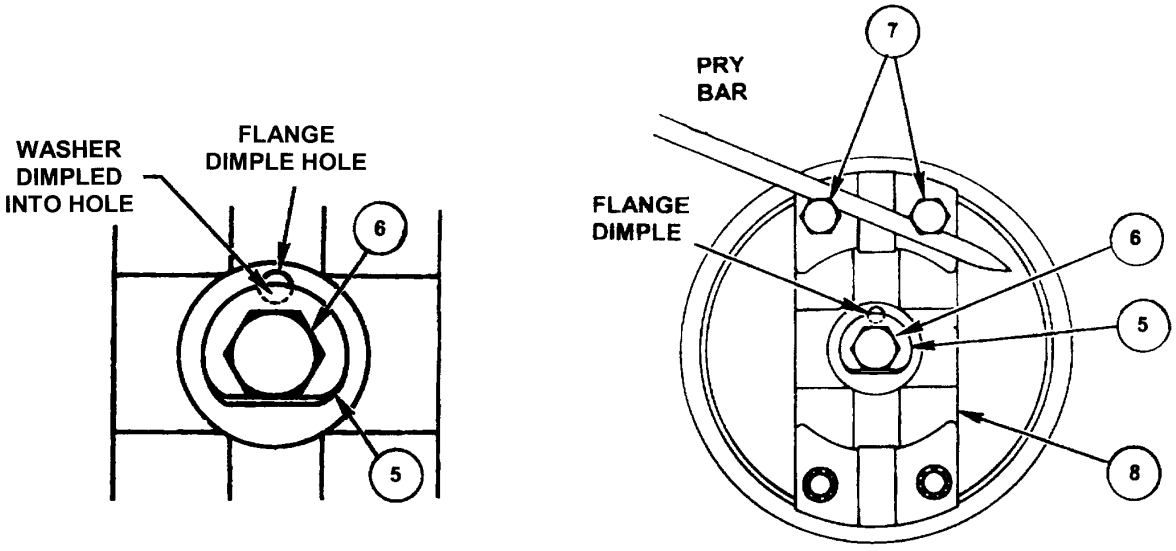


Figure 105. Output Flange.

END OF WORK PACKAGE

DISASSEMBLY, REPAIR, AND ASSEMBLY OF THE LEFT HAND COVER ASSEMBLY 0013 00

THIS WORK PACKAGE COVERS:

Disassembly, Repair, and Assembly of the Left Hand Cover Assembly.

INITIAL SETUP

References
TM 9-214
WP 0019

Personnel Required
Track Vehicle Repairer 63H20 (2)

Common Tools
Adapter, Socket Wrench, 1/2 Inch to 3/8 Inch Square Drive (WP 0025, Item 1)
Heater Gun Type, Electric (2 required) (WP 0025, Item 9)
Shop Equipment, Automotive Maintenance and Repair: Field Maintenance, Basic, Less Power (WP 0025, Item 20)
Socket , Socket Wrench 11/16 inch (Allen) (WP 0025, Item 26)
Tool Kit, General Mechanic's Automotive (WP 0025, Item 27)

Special Tools
Inserter, Seal (WP 0025, Item 13)

Fabricated Tools
Insert Installer, Remover (WP 0027, Item 6)

Repair Parts
Mandatory Replacement Parts, Table 1.

Supplies
Bolt, 1/2-20 x 3 inch (2 required)
Bolt, 3/8-16 x 3 inch
Carbon Dioxide, Technical (Dry Ice) (WP 0024, Item 5)
Lubricating Oil, Engine Grade 15W-40 (WP 0024, Item 12)
Nut, 3/8-16
Petrolatum, Technical (Petroleum Jelly) (WP 0024, Item 14)
Rag, Wiping, 50 lb Bale (WP 0024, Item 15)
Sealant, Lubricating, Thread Locking (WP 0024, Item 17)
Solvent, Cleaning (WP 0024, Item 20)
Washer, 3/8
Wooden Blocks, (2 required) (WP 0024, Item 3)

SCOPE

This Work Package addresses disassembly, repair, and assembly of the Left Hand Cover Assembly.

DISASSEMBLY, REPAIR, AND ASSEMBLY OF THE LEFT HAND COVER ASSEMBLY – Cont. 0013 00

ITEMS COVERED IN THIS WORK PACKAGE **PAGE**

REMOVE LEFT HAND OUTPUT FLANGE

WARNING

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

Left Hand Cover Assembly weighs approximately 90 pounds (41 kg). When lifting Left Hand Cover Assembly, a hoist must be used to avoid bodily injury.

NOTE

One person hold Left Hand Cover Assembly on edge.

DISASSEMBLY, REPAIR, AND ASSEMBLY OF THE LEFT HAND COVER ASSEMBLY – Cont. 0013 00

REMOVE LEFT HAND OUTPUT FLANGE – Cont.

1. Straighten bent tab of washer (1). Bend tab away from bolt (2).
2. Install two 1/2-20 x 3 inch bolts (3) in tapped holes at either end of Left Hand Output Flange (4).
3. Hold pry bar between two bolts (3) to prevent Left Hand Output Flange (4) from turning.
4. Remove bolt (2) and washer (1) from Left Hand Output Flange (4). Discard washer (1).
5. Remove Left Hand Output Flange (4) from Left Hand Cover Assembly (5).
6. Remove two bolts (3) from Left Hand Output Flange (4).

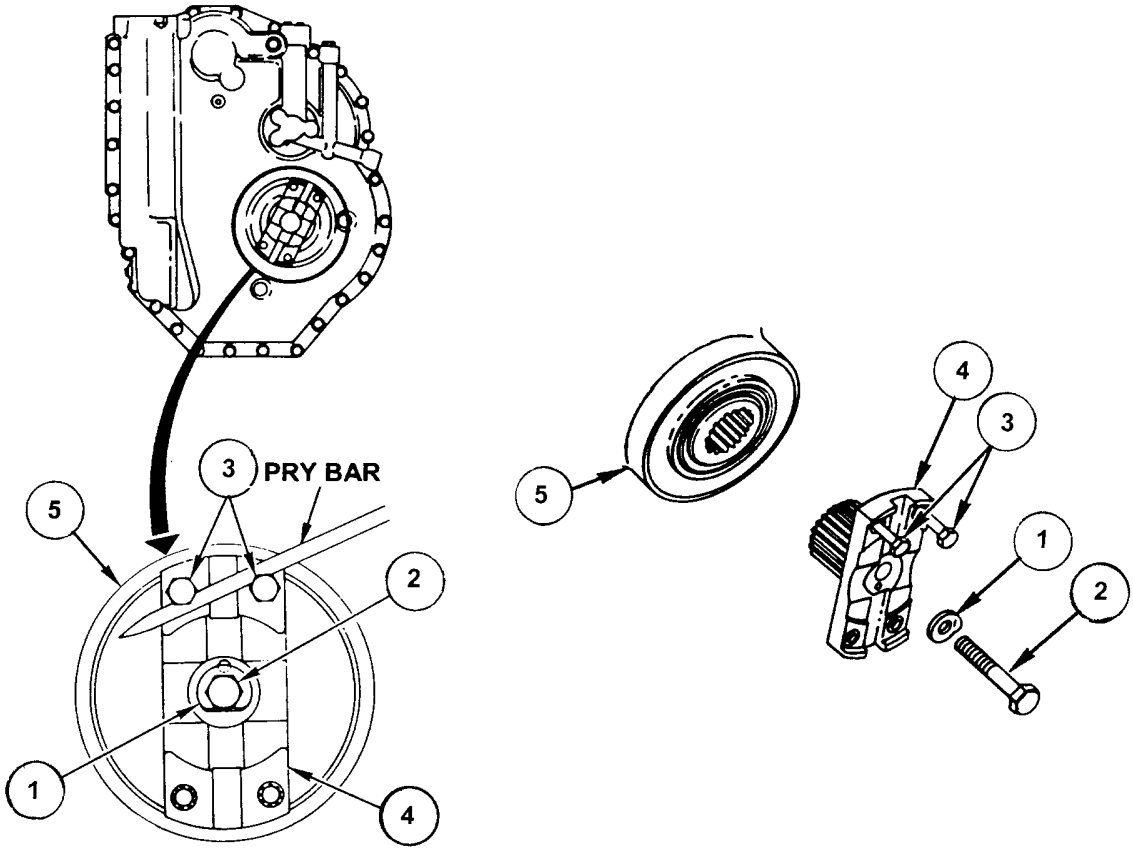


Figure 1. Left Hand Output Flange.

DISASSEMBLY, REPAIR, AND ASSEMBLY OF THE LEFT HAND COVER ASSEMBLY – Cont. 0013 00

REMOVE LEFT HAND OUTPUT SHAFT AND SEAL

NOTE

Left Hand Cover Assembly is turned inside up when not on edge.

Left Hand Cover Assembly leveled by two wooden blocks (WP 0024, Item 3) on edge position under corner nearest to Left Hand Output Shaft.

1. Remove retaining ring (6) Retaining Bearing Assembly (7) and Left Hand Output Shaft (8) from Left
Hand Cover Assembly (5).

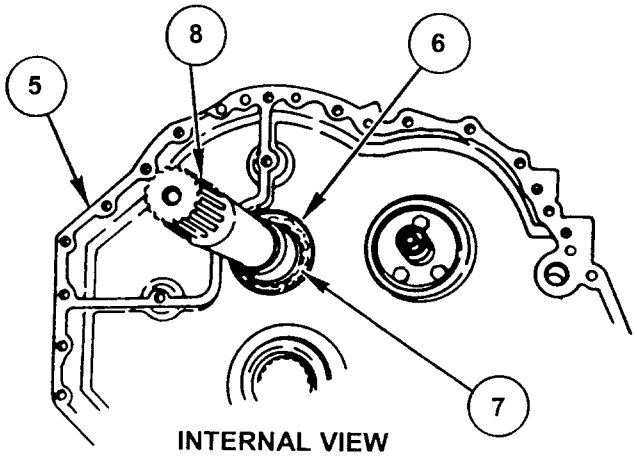


Figure 2. Left Hand Cover Assembly Internal View.

DISASSEMBLY, REPAIR, AND ASSEMBLY OF THE LEFT HAND COVER ASSEMBLY – Cont. 0013 00

REMOVE LEFT HAND OUTPUT SHAFT AND SEAL – Cont.

2. Hold Left Hand Cover Assembly (5) on edge to allow access to exterior.

3. From inside of Left Hand Cover Assembly (5), drive Left Hand Output Shaft (8) from Left Hand Cover Assembly (5).

NOTE

Second person may be dismissed.

4. Place Left Hand Cover Assembly (5) on wooden blocks, inside up.

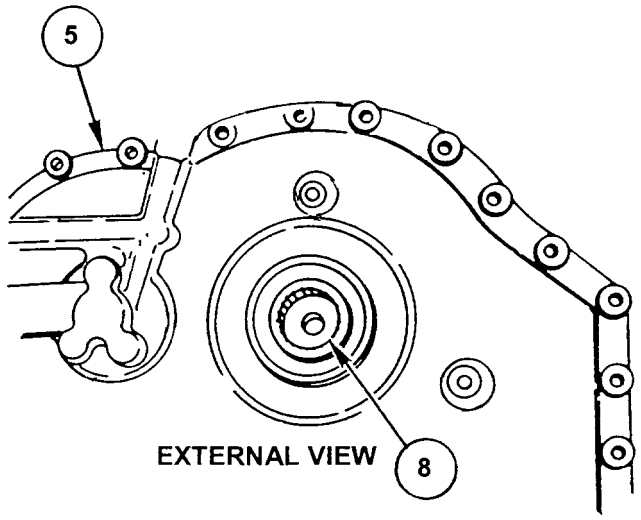


Figure 3. Left Hand Cover Assembly External View.

DISASSEMBLY, REPAIR, AND ASSEMBLY OF THE LEFT HAND COVER ASSEMBLY – Cont. 0013 00

REMOVE LEFT HAND OUTPUT SHAFT AND SEAL – Cont.

5. Drive Left Hand Output Shaft seal (9) from Left Hand Cover Assembly (5). Discard seal (9).

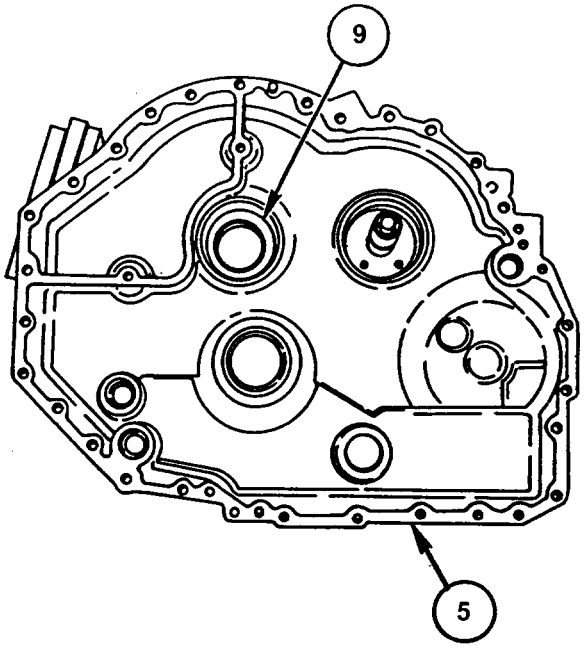


Figure 4. Left Hand Output Shaft Seal.

DISASSEMBLY, REPAIR, AND ASSEMBLY OF THE LEFT HAND COVER ASSEMBLY – Cont. 0013 00

REMOVE LEFT HAND OUTPUT SHAFT AND SEAL – Cont.

6. Remove two packings (10) from Left Hand Output Shaft (8). Discard two packings (10).

NOTE

When bearing is removed from Left Hand Output Shaft, sleeve is forced off ahead of bearing.

7. If Retaining Bearing Assembly (7) and sleeve (11) are to be replaced, press Retaining Bearing Assembly (7) and sleeve (11) from Left Hand Output Shaft (8).

8. X200-4A only. Remove packing (12) from end of Left Hand Output Shaft (8). Discard packing (12).

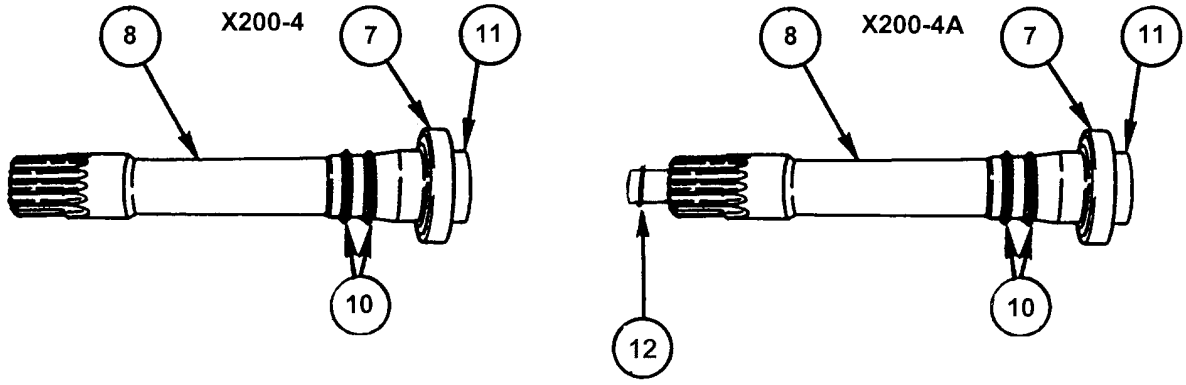


Figure 5. Left Hand Output Shaft Seal Rings and Sleeve.

DISASSEMBLY, REPAIR, AND ASSEMBLY OF THE LEFT HAND COVER ASSEMBLY – Cont. 0013 00

REMOVE RANGE INPUT DRIVEN GEAR RACE, RANGE INPUT DRIVE GEAR BEARING, AND OIL TRANSFER TUBE SEAL RING.

WARNING

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

NOTE

Left Hand Cover Assembly turned inside up.

Wooden blocks on edge under corner nearest Left Hand Output Shaft bore.

1. Heat Left Hand Cover Assembly (5) around bearing (13) and race (14) for one hour to approximately 300ºF (149ºC).

NOTE

Left Hand Cover Housing is cut away in two places 180 degrees apart under bearing to provide puller access to bearing.

2. Remove bearing (13) and race (14).

3. Remove small seal (15) and two large O-Rings (16) from Oil Transfer Tube Assembly (17). Discard small seal (15) and two large O-Rings (16).

DISASSEMBLY, REPAIR, AND ASSEMBLY OF THE LEFT HAND COVER ASSEMBLY – Cont. 0013 00

REMOVE RANGE INPUT DRIVEN GEAR RACE, RANGE INPUT DRIVE GEAR BEARING, AND OIL TRANSFER TUBE SEAL RING – Cont.

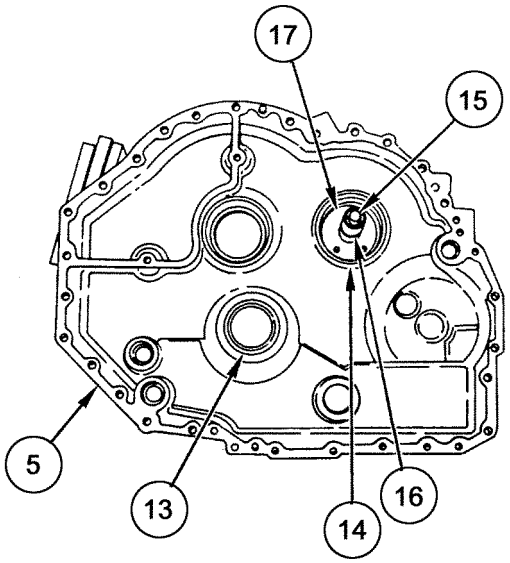


Figure 6. Left Hand Cover Assembly.

DISASSEMBLY, REPAIR, AND ASSEMBLY OF THE LEFT HAND COVER ASSEMBLY – Cont. 0013 00

DISASSEMBLY LEFT HAND COVER ASSEMBLY

WARNING

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

Left Hand Cover Assembly weighs approximately 90 pounds (41 kg). When lifting Left Hand Cover Assembly, a hoist must be used to avoid bodily injury.

NOTE

Left Hand Cover Assembly is turned outside up.

1. Remove pipe plugs (18), (19), (20), and (21) from Left Hand Cover Assembly (5).
2. Remove O-Ring (22) from Left Hand Cover Assembly (5). Discard O-Ring (22).
3. If insert(s) (23) must be replaced, assemble 3/8-16 x 3 inch bolt, 3/8-16 inch flat washer, and fabricated spacer (Insert Installer, Remover (WP 0027, Item 6)).
4. Screw tip of bolt into one insert (23) in one end of Left Hand Cover Assembly (5).
5. Lock nut against washer and hold nut to force insert (23) to turn with bolt.
6. Turn bolt to the left (counterclockwise) and remove insert (23).

NOTE

Early model X200-4 Left Hand Cover Assemblies have a fan drive oil return line port which has a plug and O-Ring installed in it.

7. X200-4 only. Remove plug (25) and O-Ring (24) from Left Hand Cover Assembly (5). Discard O-Ring (24).

DISASSEMBLY, REPAIR, AND ASSEMBLY OF THE LEFT HAND COVER ASSEMBLY – Cont. 0013 00

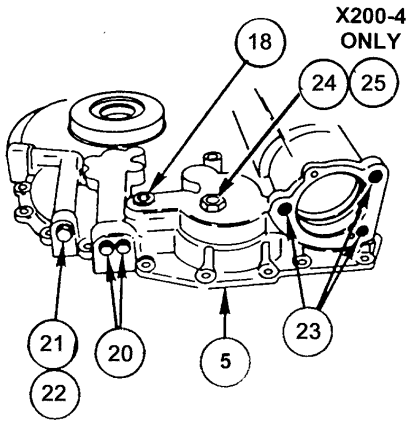


Figure 7. Left Hand Cover Assembly.

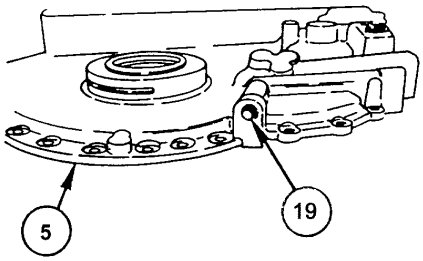


Figure 8. Left Hand Cover Assembly.

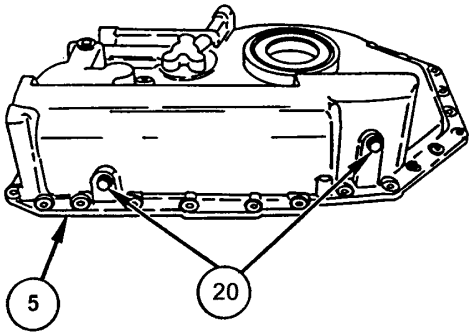


Figure 9. Left Hand Cover Assembly.

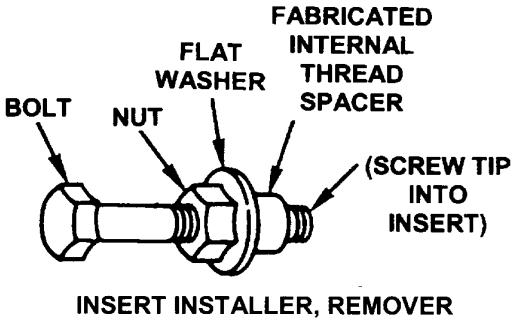


Figure 10. Insert Installer, Remover.

MANDATORY REPLACEMENT PARTS

Refer to Table 1. Mandatory Replacement Parts for Assembly of the Left Hand Cover Assembly. Work Package 0026 contains a complete list of all mandatory replacement parts necessary for maintenance of the X200-4 and X200-4A Transmissions.

Table 1. Mandatory Replacement Parts for Assembly of the Left Hand Cover Assembly.

WP 0026 ITEM NO.	NOMENCLATURE	QTY
1	O-Ring	1
10	Washer, Spring, Tension	1
25	Seal, Plain Encased	1
41	Seal, Nonmetallic	1
42	Retainer, Packing	1
53	O-Ring	1
57	Retainer, Packing	2
59	Retainer, Packing	2

ASSEMBLE LEFT HAND COVER ASSEMBLY

DISASSEMBLY, REPAIR, AND ASSEMBLY OF THE LEFT HAND COVER ASSEMBLY – Cont. 0013 00

1. If any of inserts (23) were removed, assemble 3/8-16 x 3 inch bolt and 3/8-16 nut (Insert Installer, (WP 0027, Item 6)).
2. Screw one insert (23) onto bolt. Screw nut against insert.
3. Install insert (23) in Left Hand Cover Assembly (5) to 0.005 - 0.062 inch (0.127 – 0.157 mm) below surface of Left Hand Cover Assembly (5). Install two other inserts (23) if removed.

NOTE

Sealant is not applied to pipe plug that has an O-Ring.

4. Install new O-Ring (22) on pipe plug (21).
5. Apply Petrolatum (WP 0024, Item 14) to O-Ring (22).
6. Install plug (21) in Left Hand Cover Assembly (5).
7. Torque plug (21) to 72-96 lb-in. (8-11 N·m).

NOTE

Some pipe plugs are pre-coated and do not require Sealant, Lubricating, Thread Locking Compound.

8. Apply Sealant (WP 0024, Item 17) to threads of six pipe plugs (18, 19, 20).
9. Install four pipe plugs (20) in Left Hand Cover Assembly (5).
10. Torque plugs (20) to 96-120 lb-in. (11-14 N·m).
11. Install pipe plug (19) in end of Left Hand Cover Assembly (5).
12. Torque plug (19) to 50-60 lb-in. (6-7 N·m).
13. Install pipe plug (18) in end of Left Hand Cover Assembly (5).
14. Torque plug (18) to 21-28 lb-ft (28-38 N·m).
15. X200-4 Only. Install new O-Ring (24) on plug (25).
16. X200-4 Only. Install plug (25) in Left Hand Cover Assembly (5).
17. X200-4 Only. Torque plug (25) to 16-18 lb ft (22-24 N·m).

DISASSEMBLY, REPAIR, AND ASSEMBLY OF THE LEFT HAND COVER ASSEMBLY – Cont. 0013 00

ASSEMBLE LEFT HAND COVER ASSEMBLY – Cont.

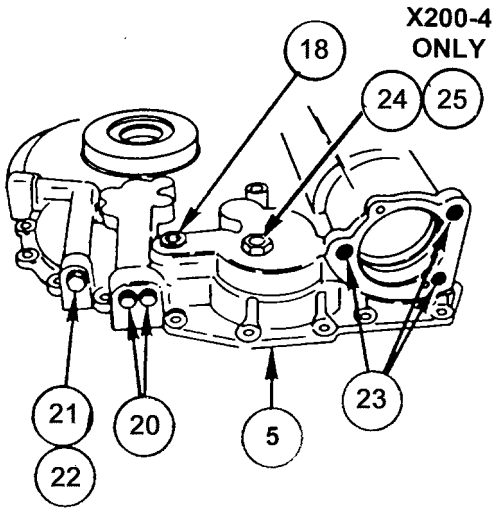


Figure 7. Left Hand Cover Assembly. (Repeated)

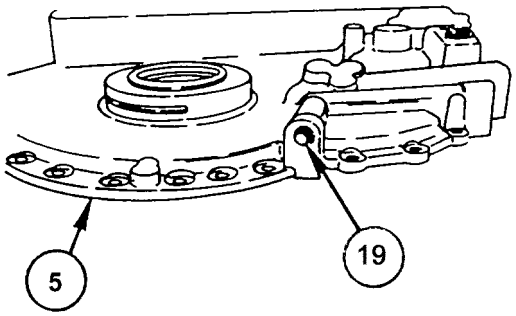


Figure 8. Left Hand Cover Assembly. (Repeated)

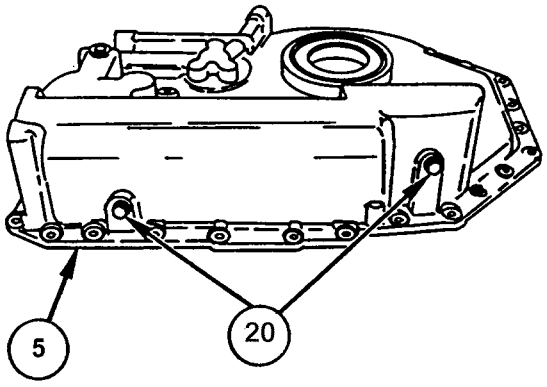
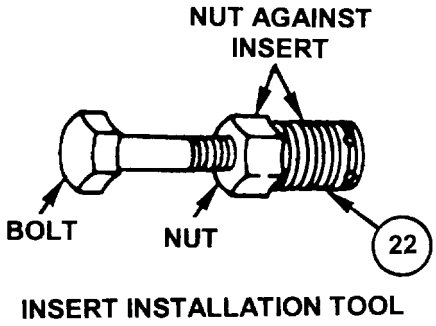


Figure 9. Left Hand Cover Assembly. (Repeated)



INSERT INSTALLATION TOOL

Figure 11. Insert Installation Tool.

DISASSEMBLY, REPAIR, AND ASSEMBLY OF THE LEFT HAND COVER ASSEMBLY – Cont. 0013 00

INSTALLATION OIL TRANSFER TUBE SEAL RINGS, RANGE INPUT DRIVE GEAR BEARING, AND INPUT DRIVEN GEAR RACE

NOTE

Left Hand Cover Assembly turned inside up.

Wooden blocks on edge under corner nearest to Left Hand Output Shaft bore.

1. Install new small seal (15) and two new large O-Rings (16) on Oil Transfer Tube Assembly (17).
2. If bearing (13) and race (14) were removed, apply Petrolatum (WP 0024, Item 14) and Lubricating oil (WP 0024, Item 12) to the bores in Left Hand Cover Assembly (5).

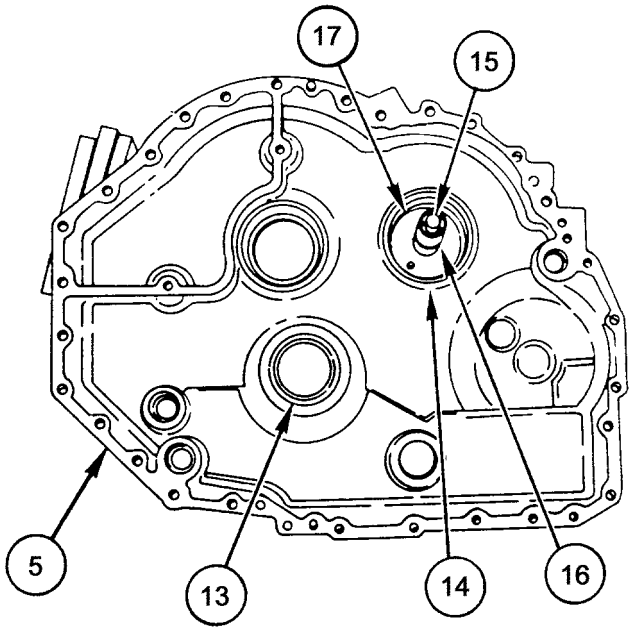


Figure 6. Left Hand Cover Assembly. (Repeated)

DISASSEMBLY, REPAIR, AND ASSEMBLY OF THE LEFT HAND COVER ASSEMBLY – Cont. 0013 00

INSTALLATION OIL TRANSFER TUBE SEAL RINGS, RANGE INPUT DRIVE GEAR BEARING, AND INPUT DRIVEN GEAR RACE – Cont.

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 Carbon Dioxide (WP 0024, Item 5).

3. If race (14) was removed, freeze the race with Carbon Dioxide (WP 0024, Item 5).
4. Install new race (14) with numbered side down. Press race (14) to shoulder.
5. If bearing (13) was removed, install new bearing (13) in Left Hand Cover Assembly (5). Press bearing (13) to shoulder.
6. Apply Lubricating oil (WP 0024, Item 12) to bearing (13) and race (14).

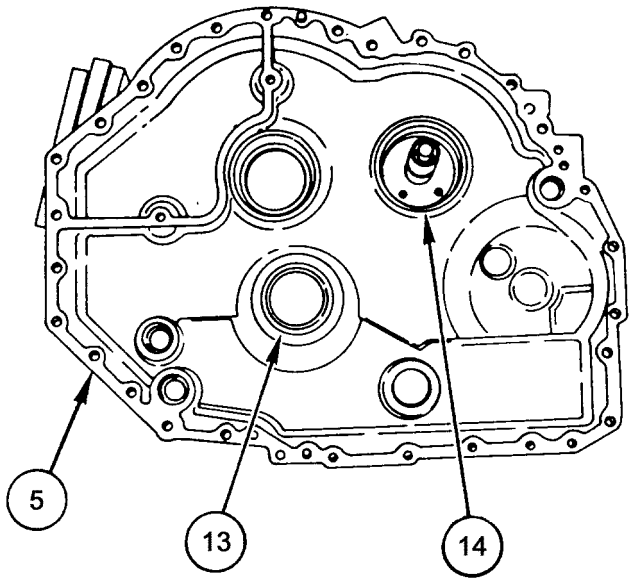


Figure 12. Left Hand Cover Assembly.

DISASSEMBLY, REPAIR, AND ASSEMBLY OF THE LEFT HAND COVER ASSEMBLY – Cont. 0013 00

INSTALLATION OF THE LEFT HAND OUTPUT SHAFT AND SEAL

NOTE

Left Hand Cover Assembly turned inside up on wooden blocks, Wooden Blocks, 2 x 4 x 16 inches (2 required) (WP 0024, Item 3).

Install Left Hand Output Shaft Seal

1. Using wiping Rag (WP 0024, Item 15) and Solvent (WP 0024, Item 20), clean Left Hand Output Shaft bore (26) in Left Hand Cover Assembly (5).

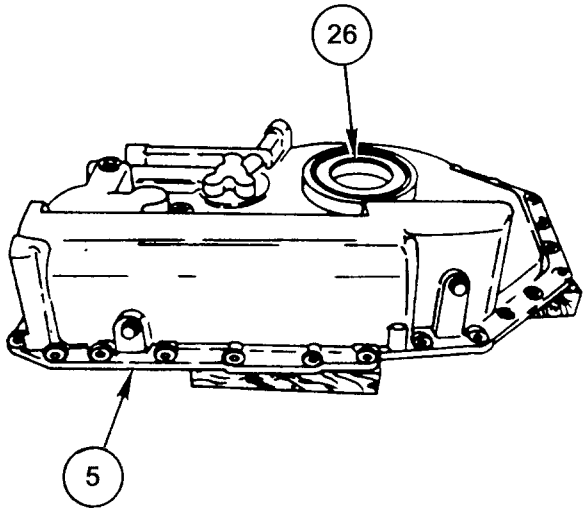


Figure 13. Left Hand Cover Assembly.

DISASSEMBLY, REPAIR, AND ASSEMBLY OF THE LEFT HAND COVER ASSEMBLY – Cont. 0013 00

INSTALLATION OF THE LEFT HAND OUTPUT SHAFT AND SEAL – Cont.

CAUTION

Do not reuse Left Hand 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 Inserter Seal (WP 0025, Item 13) install new left hand output seal (9) in bore (26). Seat left hand output seal flush to 0.010 inch (0.254 mm) below surface of Left Hand Cover Assembly (5).

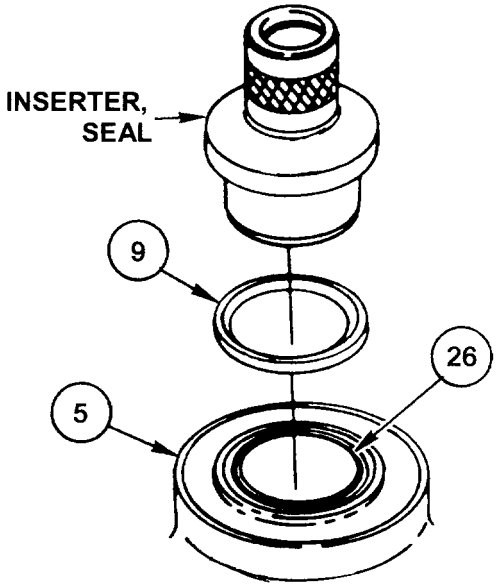


Figure 14. Left Hand Output Shaft Seal.

DISASSEMBLY, REPAIR, AND ASSEMBLY OF THE LEFT HAND COVER ASSEMBLY – Cont. 0013 00

INSTALL BEARING AND SLEEVE ON LEFT HAND 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. Place Left Hand Output Shaft (8) bearing end in Carbon Dioxide (WP0024, Item 5) for 1 hour.
4. If Left Hand Output Shaft Bearing Assembly (7) was removed, apply Petrolatum (WP 0024, Item 14) and Lubricating oil (WP 0024, Item 12) to bearing end of Left Hand output shaft (8).
5. Install new Bearing Assembly (7), numbered end out, on output shaft (8). 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 (11) was removed, heat sleeve for 30 minutes to approximately 250ºF (121ºC).
7. Install sleeve (11) on Left Hand Output Shaft (8) with inside beveled edge on first. Press sleeve to Bearing Assembly (7).
8. Install two new packings (10) on Left Hand Output Shaft (8). Coat two packings (10) with petrolatum (WP 0024, Item 14).

DISASSEMBLY, REPAIR, AND ASSEMBLY OF THE LEFT HAND COVER ASSEMBLY – Cont. 0013 00

INSTALL BEARING AND SLEEVE ON LEFT HAND OUTPUT SHAFT – Cont.

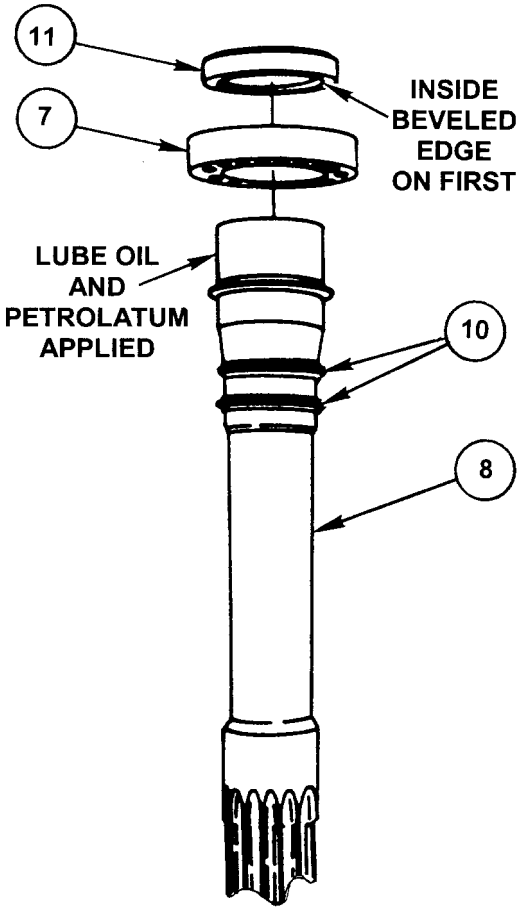


Figure 15. Left Hand Output Shaft Bearing and Seals.

DISASSEMBLY, REPAIR, AND ASSEMBLY OF THE LEFT HAND COVER ASSEMBLY – Cont. 0013 00

INSTALL BEARING AND SLEEVE ON LEFT HAND OUTPUT SHAFT – Cont.

NOTE

Position Left Hand Cover Assembly, inside upward. Block (Wooden Blocks, 2 x 4 x 16 inches (2 required) (WP 0024, Item 3) Left Hand Cover Assembly so that it is level.

9. Apply Petrolatum (WP 0024, Item 14) to inner surface of seal (9).

10. Carefully rotate Left Hand Output Shaft (8) and push end of Left Hand Output Shaft (8) through left hand output seal (9).

11. Keeping Left Hand Output Shaft very straight, tap on splined end of shaft (8) to seat Bearing Assembly (7) in shoulder on Left Hand Cover Assembly (5). If necessary, heat Left Hand Cover Assembly with heat gun around bearing journal if bearing does not easily seat.

12. Check that left hand output seal (9) remains in position in Left Hand Cover Assembly (5) and that lip on seal is not distorted when Left Hand Output Shaft (8) passes through left hand output seal (9).

NOTE

When Left Hand Output Shaft and bearing are seated, snap ring groove will be accessible in sleeve at outer edge of bearing.

13. Install retaining ring (6) in groove in sleeve (11) above Bearing Assembly (7).

14. Apply Lubricating oil (WP 0024, Item 12) to Bearing Assembly (7).

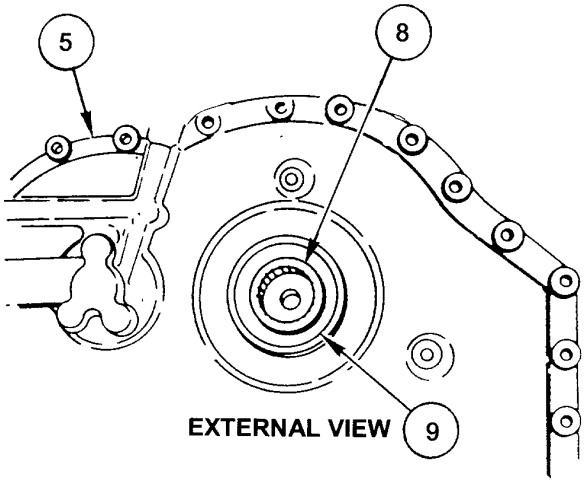


Figure 16. Left Hand Cover Assembly.

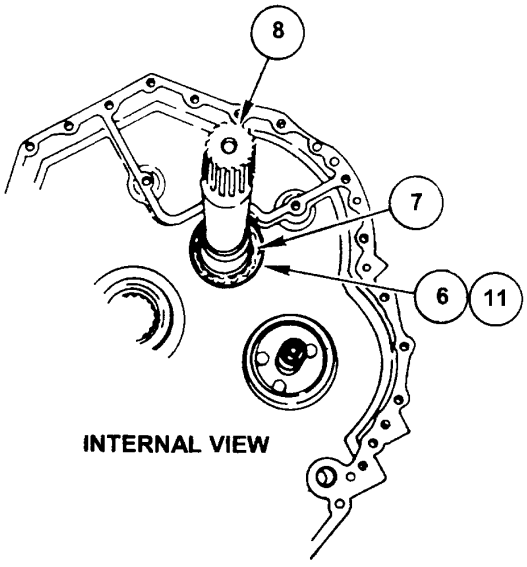


Figure 17. Left Hand Cover Assembly.

DISASSEMBLY, REPAIR, AND ASSEMBLY OF THE LEFT HAND COVER ASSEMBLY – Cont. 0013 00

INSTALL BEARING AND SLEEVE ON LEFT HAND OUTPUT SHAFT – Cont.

15. On X200-4A install new packing (12) on end of Left Hand Output Shaft (8).

16. Coat new packing (12) with Petrolatum (WP 0024, Item 14).

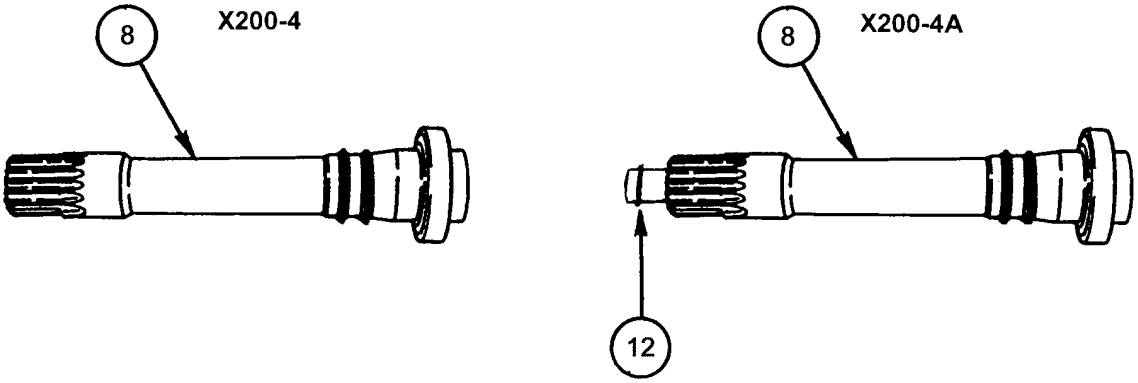


Figure 18. Left Hand Output Shaft.

DISASSEMBLY, REPAIR, AND ASSEMBLY OF THE LEFT HAND COVER ASSEMBLY – Cont. 0013 00

INSTALLATION OF THE LEFT HAND OUTPUT FLANGE

1. Install Left Hand Output Flange (4) in Left Hand Output Shaft (8) located in Left Hand Cover Assembly (5).
2. Install new tab washer (1) on 1/2 -20 x 3-1/4 inch bolt (2) with bent tab on washer toward head of bolt (2).
3. Install bolt (2) through center of Left Hand Output Flange (4) and into center of Left Hand Output Shaft (8). Install bolt (2) finger tight.
4. Install two 1/2-20 x 3 inch bolts (3) in tapped holes at either end of Left Hand Output Flange until bolts are flush with inner surface of Left Hand Output Flange.
5. Hold pry bar between two bolts (3) to prevent Left Hand Output Flange (4) from turning.

CAUTION

Do not install washer so that tab is over dimple in Left Hand Output Flange. To prevent bolt from turning, tab must be against flat of bolt and washer must be dimpled into Left Hand Output Flange dimple hole. When tab of washer is at dimple hole, washer cannot be dimpled. Bolt retaining Left Hand Output Flange to Left Hand Output Shaft may then loosen.

6. Tighten bolt (2). Torque bolt (2) to 72-86 lb-ft (98-117 N·m).
7. Remove two bolts (3) from Left Hand Output Flange (4).

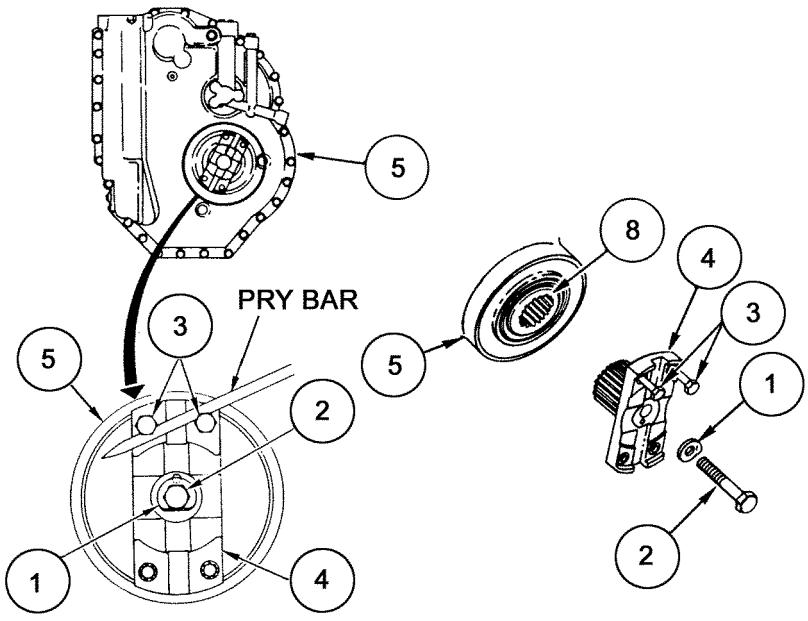


Figure 19. Left Hand Cover and Output Flange.

INSTALLATION OF THE LEFT HAND OUTPUT FLANGE – Cont.

NOTE

Do not bend tab of washer (1) against flat of bolt (2) at this time. Tab will be bent after successful completion of drag test (WP 0019).

8. Punch dimple in washer (1). Dimple must depress washer into dimple hole in Left Hand Output Flange (4).

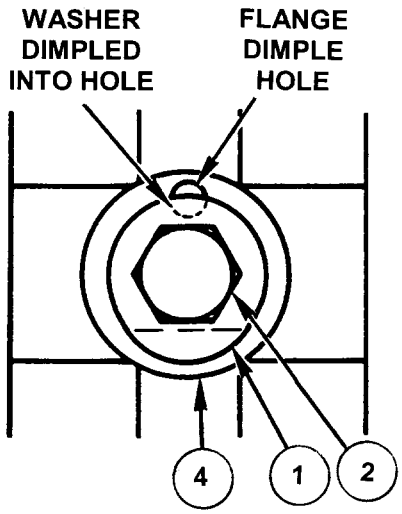


Figure 20. Output Flange.

END OF WORK PACKAGE

REPAIR OF THE INPUT HOUSING ASSEMBLY 0014 00

THIS WORK PACKAGE COVERS:

Repair of Input Housing Assembly.

INITIAL SETUP

Personnel Required

Track Vehicle Repairer 63H20 (1)

Common Tools

Shop Equipment, Automotive Maintenance and Repair: Field Maintenance, Basic, Less Power (WP 0024, Item 20)
Tool Kit, General Mechanic's Automotive (WP 0024, Item 27)

Repair Parts

Mandatory Replacement Parts, Table 1.
Plug (73342) 23018028

Supplies

Block, Wooden (2 required) (WP 0024, Item 3)
Petrolatum, Technical (Petroleum Jelly) (WP 0024, Item 14)
Rag, Wiping, 50 lb Bale (WP 0024, Item 15)
Sealant, Lubricating, Thread Locking (WP 0024, Item 17)

Overview

Input Housing Assembly does not have to be removed from the transmission to perform maintenance procedures provided in this Work Package, except for removal and installation of flat aluminum plug (73342) 23018028. However, text and illustrations are based upon the Input Housing Assembly being removed from the transmission.

SCOPE

This Work Package addresses disassembly, repair and assembly of the Input Housing Assembly.

ITEMS COVERED IN THIS WORK PACKAGE **PAGE**

REPAIR OF THE INPUT HOUSING ASSEMBLY - Cont. 0014 00

REPAIR INPUT HOUSING ASSEMBLY

NOTE

Input Housing Assembly is turned outside up.

DISASSEMBLE INPUT HOUSING ASSEMBLY

1. Remove steering adjustment access plug (1) and O-Ring (2) from Input Housing Assembly (3). Discard O-Ring (2).
2. Remove pipe plug (4) from Input Housing Assembly (3).
3. Remove pipe plug (5) from Input Housing Assembly (3).
4. Remove pipe plug (8) and O-Ring (2) from Input Housing Assembly (3). Discard O-Ring (2).

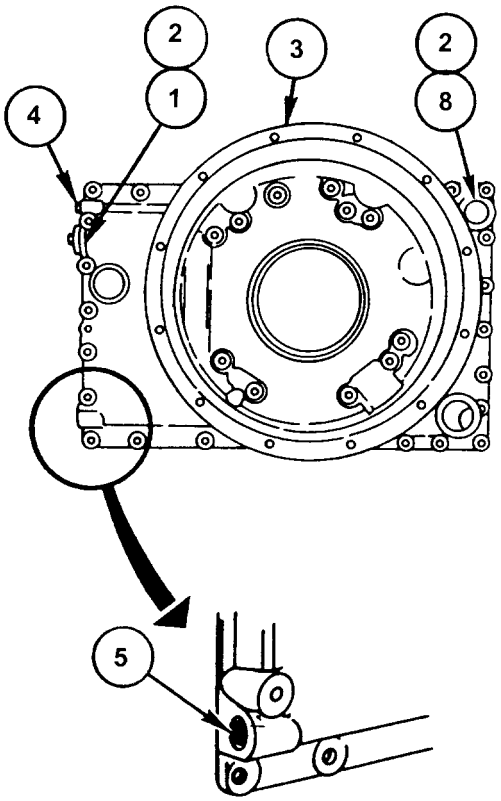


Figure 1. Input Housing Assembly.

REPAIR OF THE INPUT HOUSING ASSEMBLY - Cont. 0014 00

DISASSEMBLE INPUT HOUSING ASSEMBLY – Cont.

5. Place two wooden blocks (WP 0024, Item 3) under Input Housing Assembly (3).

6. 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).

7. Punch plug (6) from Input Housing Assembly (3).

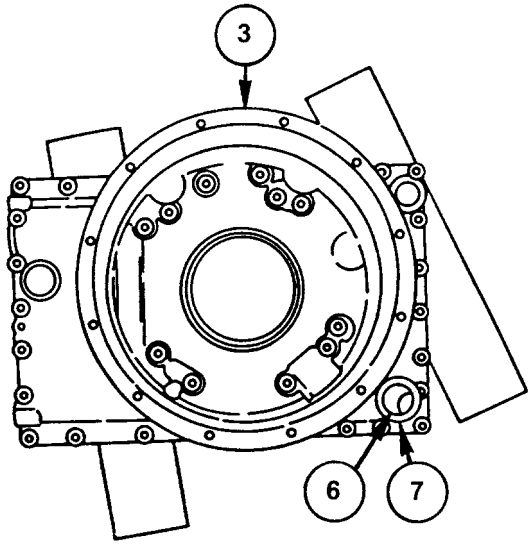


Figure 2. Input Housing.

MANDATORY REPLACEMENT PARTS

Table 1. Mandatory Replacement Parts for Assembly, Input Housing Assembly.
Work Package 0026 contains a complete list of all mandatory replacement parts necessary for maintenance of the X200-4 and X200-4A Transmissions.

WP 0026 ITEM NO.	NOMENCLATURE	QTY
30	O-Ring	2

REPAIR OF THE INPUT HOUSING ASSEMBLY - Cont. 0014 00

ASSEMBLE INPUT HOUSING ASSEMBLY

1. Turn Input Housing Assembly (3) over, inside up.

2. If aluminum plug (6) was removed, install new plug (6) in Input Housing Assembly (3). Press plug flush to 0.010 inch (0.2540 mm) below surface of input housing.

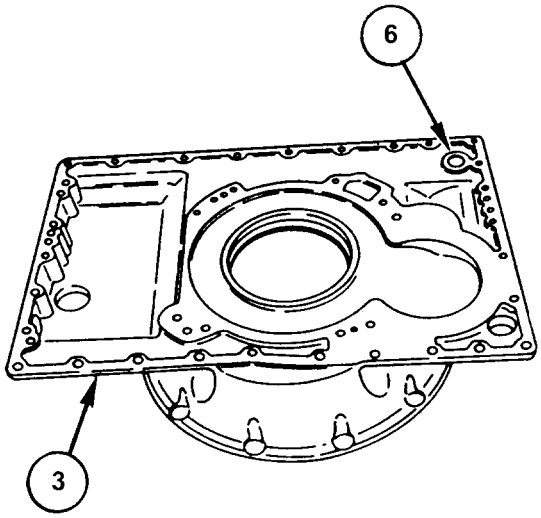


Figure 3. Input Housing.

REPAIR OF THE INPUT HOUSING ASSEMBLY - Cont. 0014 00

ASSEMBLE INPUT HOUSING ASSEMBLY – Cont.

3. Turn Input Housing Assembly (3) over, outside up.
4. Install new O-Ring (2) on plug (8).
5. Apply Petrolatum (WP 0024, Item 14) to O-Ring (2).
6. Install plug (8) into Input Housing Assembly (3).
7. Torque plug (8) to 40-50 lb-ft (54-68 N·m).
8. Apply Sealant (WP 0024, Item 17) to threads of two pipe plugs (4, 5).
9. Install pipe plugs (4, 5) in Input Housing Assembly (3).
10. Torque plugs (4, 5) to 8-10 lb-ft (11-14 N·m).
11. Install new O-Ring (2) on steering adjustment access plug (1).
12. Apply Petrolatum (WP 0024, Item 14) to O-Ring (2).
13. Install plug (1) in Input Housing Assembly (3).
14. Torque plug (1) to 50-60 lb-ft (68-81 N·m).

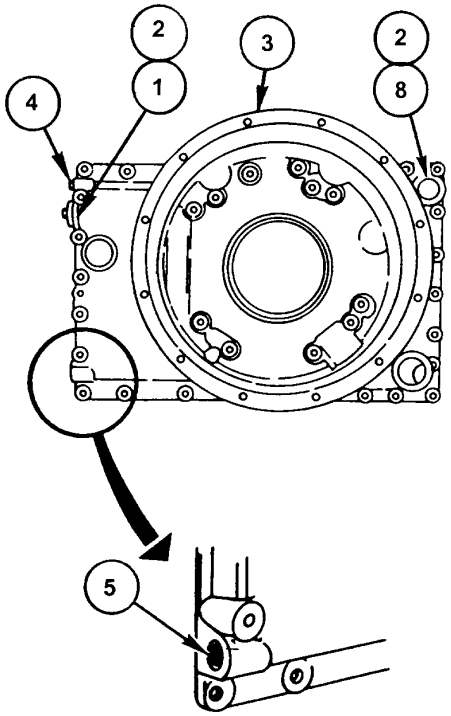
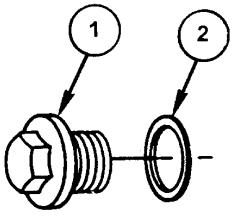


Figure 1. Input Housing Assembly. (Repeated)



PLUG ENLARGED FOR CLARITY

Figure 4. Steer Adjustment Access Plug.

END OF WORK PACKAGE

REPAIR OF THE BEVEL GEAR ASSEMBLY 0015 00

THIS WORK PACKAGE COVERS:

Disassembly, Repair, and Assembly of the Bevel Gear Assembly. (Removal and installation of the exterior components).

INITIAL SETUP

Personnel Required

Track Vehicle Repairer 63H20 (2)

Common Tools

Shop Equipment, Automotive Maintenance and Repair: Field Maintenance, Basic, Less Power (WP 0025, Item 20)
Tool Kit, General Mechanic's Automotive (WP 0025, Item 27)

Repair Parts

Mandatory Replacement Parts, Table 1.

Supplies

Block, Wooden (WP 0024, Item 3)
Petrolatum, Technical (Petroleum Jelly) (WP 0024, Item 14)
Rag, Wiping, 50 lb Bale (WP 0024, Item 15)

SCOPE

This Work Package addresses disassembly, repair and assembly of the Bevel Gear Assembly. (Removal and installation of the exterior components).

ITEMS COVERED IN THIS WORK PACKAGE **PAGE**

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.

REPAIR OF THE BEVEL GEAR ASSEMBLY – Cont. 0015 00

REMOVE EXTERIOR COMPONENTS.

1. Position Bevel Gear Assembly on wooden blocks (WP 0024, Item 3) as shown in Figure 1.
2. Wedge screwdriver between input oil pump driven gear (1) and input oil pump drive gear (2) to prevent gears from turning.
3. Remove nut (3) that retains input oil pump driven gear (1). Discard nut (3).
4. Remove input oil pump driven gear (1).
5. Remove woodruff key (4) from input oil pump shaft (5).
6. Remove seven bolts (6) and seven washers (7).
7. Remove retaining ring (8).
8. Remove spacer (9).
9. Remove input oil pump drive gear (2) and bearing (10).
10. Remove bearing (10) from input oil pump drive gear (2).

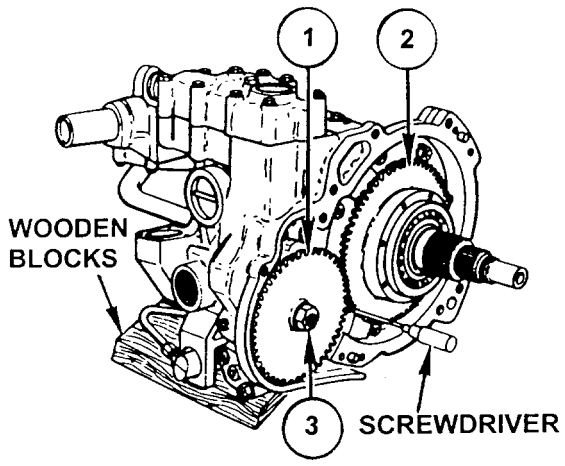


Figure 1. Bevel Gear Assembly.

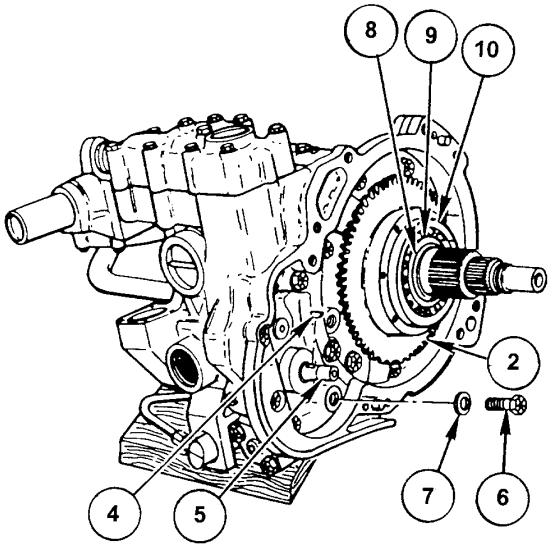


Figure 2. Bevel Gear Assembly.

REPAIR OF THE BEVEL GEAR ASSEMBLY – Cont. 0015 00

REMOVE EXTERIOR COMPONENTS – Cont.

11. Position Bevel Gear Assembly on wooden blocks (WP 0024, Item 3) as shown in Figure 3.

12. Remove two bolts (11) and two washers (12) and one bolt (13) and one washer (14) that retain Scavenge Tube Assembly (15). Remove the Scavenge Tube Assembly (15).

NOTE

If Output Oil Pump Assembly (16) is to be sent to depot for overhaul, do step 13. If not, go to step 14.

13. Reinstall washer (14) and bolt (13). Torque bolt (13) to 17-20 lb-ft (23-27 N·m).

14. Remove two bolts (17) and two washers (18) that retain Output Oil Pump Assembly (16). Remove the Output Oil Pump Assembly (16).

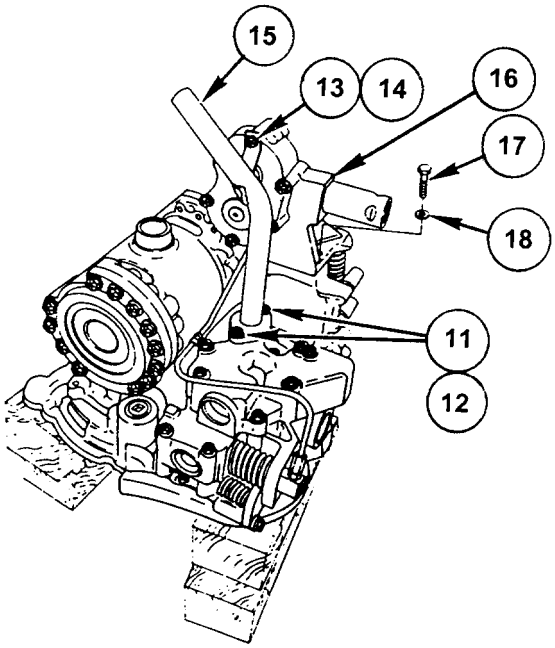


Figure 3. Bevel Gear Assembly.

REPAIR OF THE BEVEL GEAR ASSEMBLY – Cont. 0015 00

REMOVE EXTERIOR COMPONENTS – Cont.

15. Remove spring (19) and valve (20) exposed when Output Oil Pump Assembly was removed.

16. Remove nine bolts (21) and nine washers (22). Remove check valve (push-start) valve body (23).

17. Remove bolt (24) and washer (25) that retain reverse signal tube (26) to Bevel Gear Carrier Assembly.

18. Remove clamp (27) from reverse signal tube (26).

NOTE

If Bevel Gear Carrier Assembly is to be sent to depot for overhaul, do Step (19). If not, go to Step (20).

19. Reinstall washer (25) and bolt (24). Torque bolt (24) to 36-43 lb-ft (49-58 N·m).

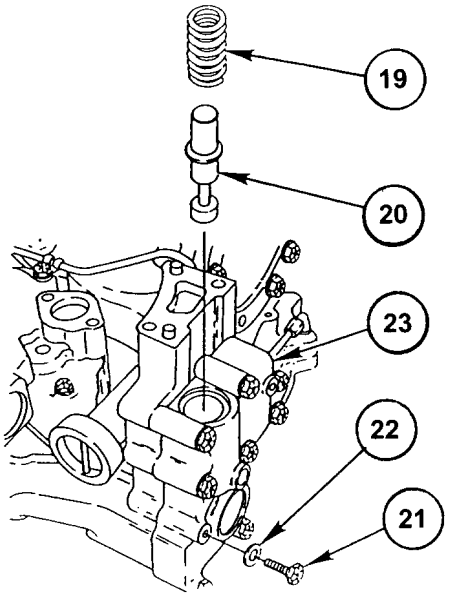


Figure 4. Spring and Valve.

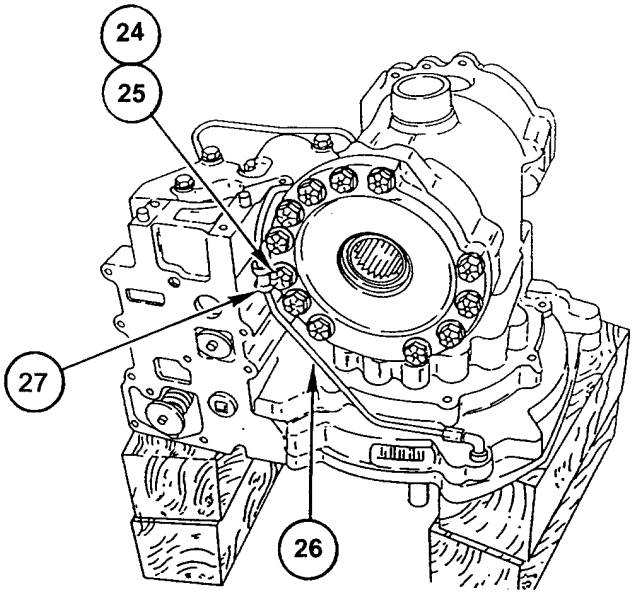


Figure 5. Bevel Gear Assembly.

REPAIR OF THE BEVEL GEAR ASSEMBLY – Cont. 0015 00

REMOVE EXTERIOR COMPONENTS – Cont.

20. Remove bolt (28) and washer (29) that retains reverse signal tube (26) to Input and Scavenge Pump Assembly (30).

NOTE

If Input and Scavenge Pump Assembly (30) is to be sent to depot for overhaul, do Step 21. If not, go to Step 22.

21. Reinstall bolt (28) and washer (29) in Input and Scavenge Pump Assembly (30). Torque bolt (28) to 13-16 lb-ft (18-22 N·m).

22. Remove reverse signal tube (26) from Bevel Gear Assembly.

23. Remove clamp (27) from reverse signal tube (26).

24. Remove connector (31) and O-Ring (32) from Input and Scavenge Pump Assembly (30). Remove O-Ring (32) from connector (31). Discard O-Ring (32).

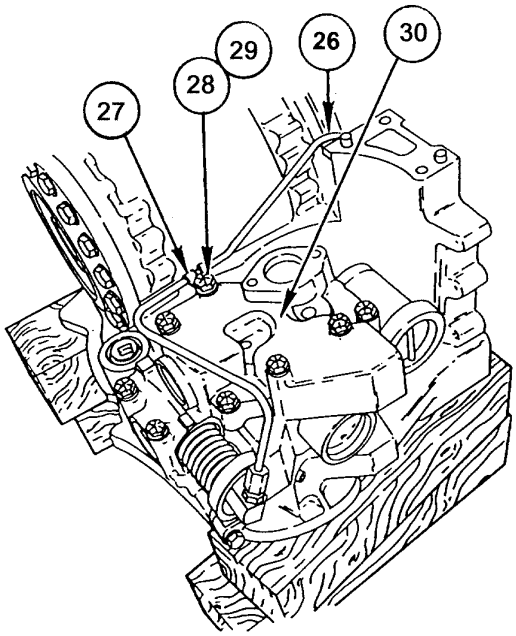


Figure 6. Bevel Gear Assembly.

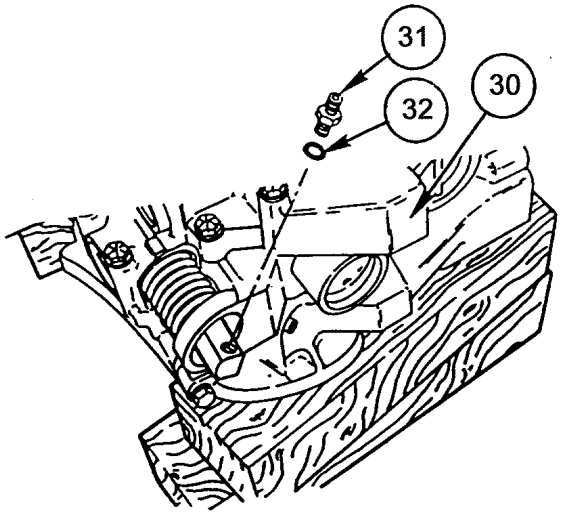


Figure 7. Bevel Gear Assembly.

REPAIR OF THE BEVEL GEAR ASSEMBLY – Cont. 0015 00

REMOVE EXTERIOR COMPONENTS – Cont.

25. Remove elbow (33) and O-Ring (34) from bevel gear housing. Remove O-Ring (34) from elbow (33). Discard O-Ring (34).

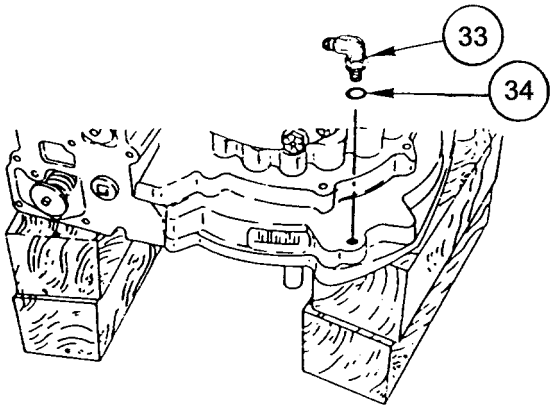


Figure 8. Elbow and Packing.

26. Remove two bolts (35) and two washers (36) that retain Input and Scavenge Pump Assembly (30). Remove Input and Scavenge Pump Assembly (30).

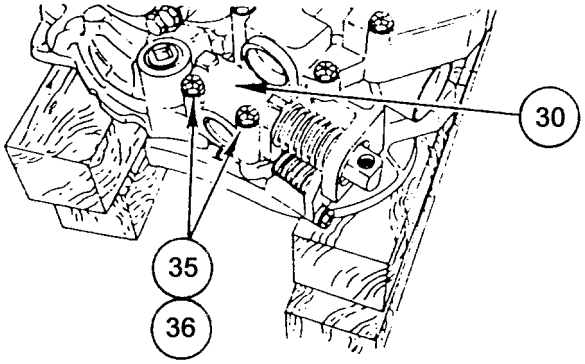


Figure 9. Bevel Gear Assembly.

REPAIR OF THE BEVEL GEAR ASSEMBLY – Cont. 0015 00

REMOVE EXTERIOR COMPONENTS – Cont.

27. Position Bevel Gear Assembly on wooden blocks (WP 0024, Item 3) as shown in Figure 10.
28. Remove packing (37) from sleeve of Diaphragm Assembly (38). Discard packing (37).
29. Remove nine bolts (39) and nine washers (40) that retain Diaphragm Assembly (38).

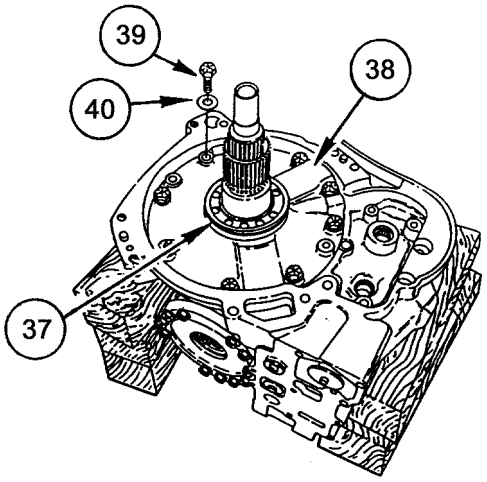


Figure 10. Bevel Gear Assembly.

30. Install two bolts (39) (removed in Step 29) in two jacking bolt holes (41).
31. Evenly tighten two jack bolts (39) until Diaphragm Assembly (38) is loose. Remove Diaphragm Assembly (38). Remove two jack bolts (39).

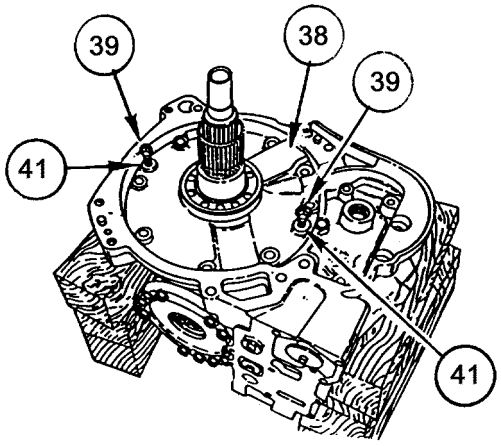


Figure 11. Bevel Gear Assembly.

REPAIR OF THE BEVEL GEAR ASSEMBLY – Cont. 0015 00

REMOVE EXTERIOR COMPONENTS – Cont.

32. Remove two metal seal rings (42) from shaft (43). Discard two seal rings (42).

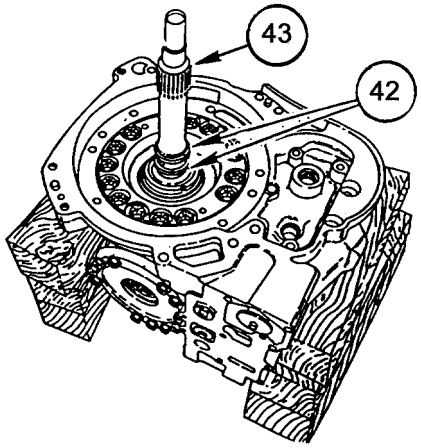


Figure 12. Bevel Gear Assembly.

MANDATORY REPLACEMENT PARTS

Refer to Table 1. Mandatory Replacement Parts for Bevel Gear Assembly.
Work Package 0026 contains a complete list of all mandatory replacement parts necessary for maintenance of the X200-4 and X200-4A Transmissions.

Table 1. Mandatory Replacement Parts for Bevel Gear Assembly.

WP 0026 ITEM NO.	NOMENCLATURE	QTY
16	Seal Ring, Metal	2
26	Nut, Self-Locking	1
43	Packing, Preformed	1
44	O-Ring	2

REPAIR OF THE BEVEL GEAR ASSEMBLY – Cont. 0015 00

INSTALL EXTERIOR COMPONENTS

1. Position Bevel Gear Assembly, shaft upward, on wooden blocks (WP 0024, Item 3) as shown in Figure 13.

2. Install two new metal seal rings (42) onto shaft (43). Coat seal rings (42) with Petrolatum (WP 0024, Item 14).

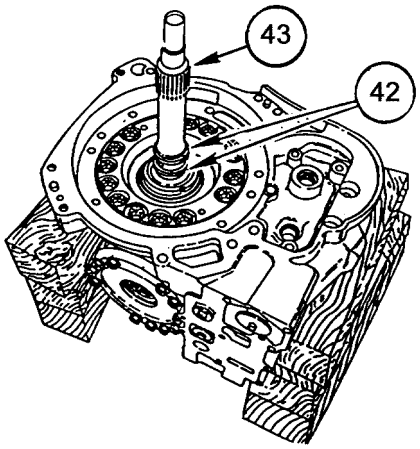


Figure 12. Bevel Gear Assembly. (Repeated)

3. Install Diaphragm Assembly (38) onto shaft (43).

4. Install nine bolts (39) and nine washers (40) that retain Diaphragm Assembly (38).

5. Torque nine bolts (39) to 36-43 lb-ft (49-58 N·m).

6. Install new packing (37) onto sleeve of Diaphragm Assembly (38).

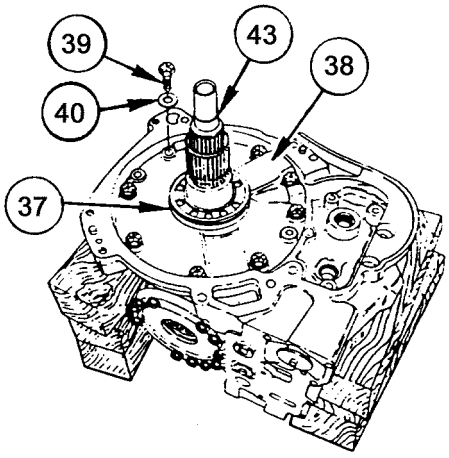


Figure 13. Bevel Gear Assembly.

REPAIR OF THE BEVEL GEAR ASSEMBLY – Cont. 0015 00

INSTALL EXTERIOR COMPONENTS – Cont.

7. Position Bevel Gear Assembly, shaft downward, on wooden blocks (WP 0024, Item 3) as shown in Figure 14.

8. Install Input and Scavenge Pump Assembly (30). Install two bolts (35) and two washers (36) that retain Input and Scavenge Pump Assembly (30).

9. Torque two bolts (35) to 17-20 lb-ft (23-27 N·m).

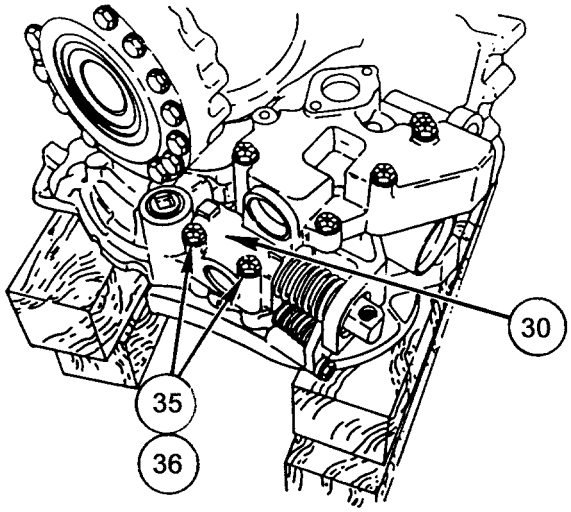


Figure 14. Bevel Gear Assembly.

10. Install new O-ring (34) onto elbow (33). Install elbow (33) and O-ring (34) into bevel gear housing.

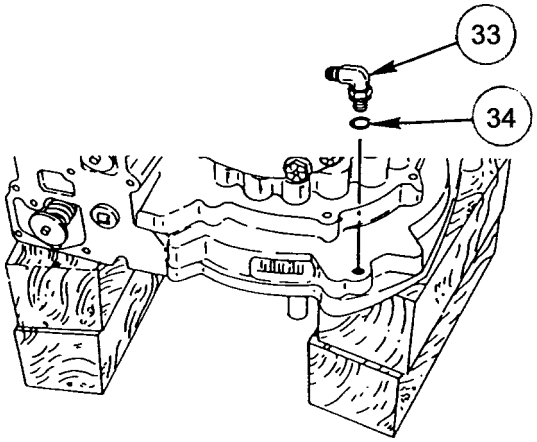


Figure 8. Elbow and Packing. (Repeated)

REPAIR OF THE BEVEL GEAR ASSEMBLY – Cont. 0015 00

INSTALL EXTERIOR COMPONENTS – Cont.

11. Install new O-Ring (32) onto connector (31). Install connector (31) and O-ring (32) into Input and Scavenge Pump Assembly (30).

12. Torque connector (31) to 5-7 lb-ft (7-9 N·m).

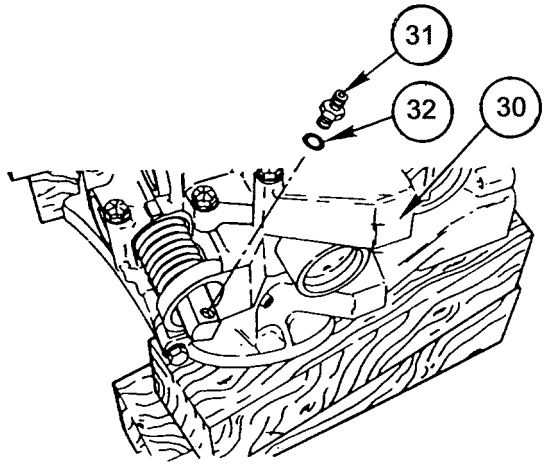


Figure 7. Bevel Gear Assembly. (Repeated)

REPAIR OF THE BEVEL GEAR ASSEMBLY – Cont. 0015 00

INSTALL EXTERIOR COMPONENTS – Cont.

13. Install two clamps (27) onto reverse signal tube (26).

14. Remove bolt (24) and washer (25) (if present) from bevel gear carrier.

15. Remove bolt (28) and washer (29) (if present) from Input and Scavenge Pump Assembly (30).

16. Install reverse signal tube (26) onto elbow (33) and connector (31). After ferrule is seated, torque
the two nuts on the reverse signal tube (26) to 10-12 lb-ft (13-16 N·m).

17. Install washer (25) and bolt (24) that retain reverse signal tube (26) to Bevel Gear Assembly.

18. Torque bolt (24) to 36-43 lb-ft (49-58 N·m).

19. Install washer (29) and bolt (28) that retains reverse signal tube (26) to Input and Scavenge Pump
Assembly (30).

20. Torque bolt (28) to 17-20 lb-ft (23-27 N·m).

21. Torque nut that retains elbow (33) to 5-7 lb-ft (18-22 N·m).

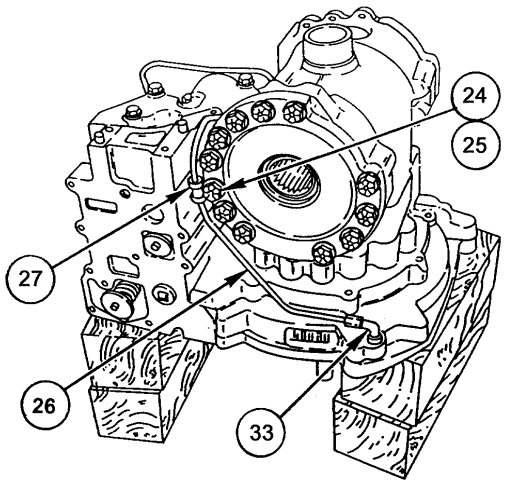


Figure 15. Bevel Gear Assembly.

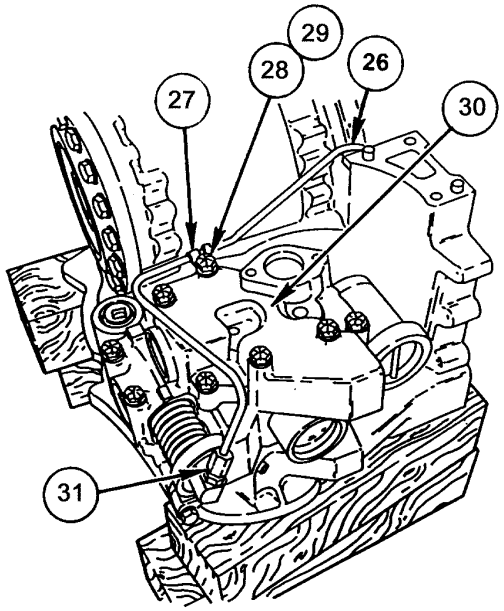


Figure 16. Bevel Gear Assembly.

REPAIR OF THE BEVEL GEAR ASSEMBLY – Cont. 0015 00

INSTALL EXTERIOR COMPONENTS – Cont.

22. Install check valve (push-start) valve body (23) onto Bevel Gear Assembly. Install nine bolts (21) and nine washers (22) that retain check valve (23).

23. Torque bolts (21) to 17-20 lb-ft (23-27 N·m).

24. Install valve (20), stem downward, and spring (19) into check valve (23).

25. Install Output Oil Pump Assembly (16) over spring (19) and valve (20) and onto Bevel Gear Assembly.

26. Install two bolts (17) and two washers (18) that retain Output Oil Pump Assembly (16).

27. Torque bolts (17) to 36-43 lb-ft (49-58 N·m).

28. Remove one bolt (13) and one washer (14) (if present) from Output Oil Pump Assembly (16).

29. Install Scavenge Tube Assembly (15). Retain Scavenge Tube Assembly (15) with one bolt (13) and one washer (14) and two bolts (11) and two washers (12).

30. Torque bolts (13, 11) to 17-20 lb-ft (23-27 N·m).

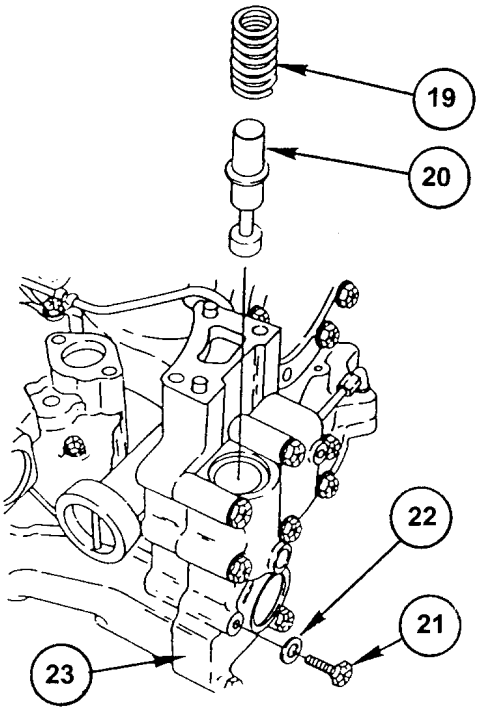


Figure 17. Bevel Gear Assembly.

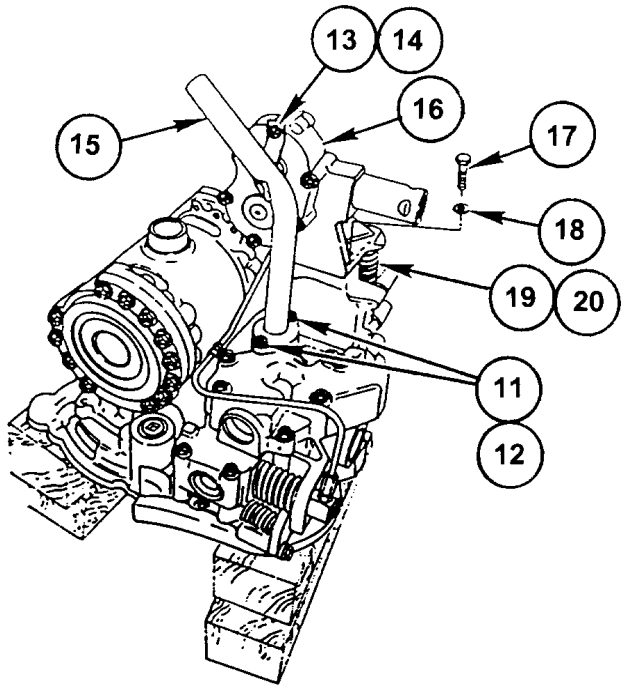


Figure 18. Bevel Gear Assembly.

REPAIR OF THE BEVEL GEAR ASSEMBLY – Cont. 0015 00

INSTALL EXTERIOR COMPONENTS – Cont.

31. Press bearing (10) onto input oil pump drive gear (2). Press to shoulder.
32. Position Bevel Gear Assembly, Output Oil Pump Assembly upward as shown on Figure 23.
33. Install input oil pump drive gear (2) and bearing (10) onto shaft (43).
34. Install spacer (9) onto shaft (43).
35. Install retaining ring (8).
36. Install seven bolts (6) and seven washers (7).
37. Torque bolts (6) to 17-20 lb-ft (23-27 N·m).
38. Install woodruff key (4) into slot in input oil pump shaft (5).

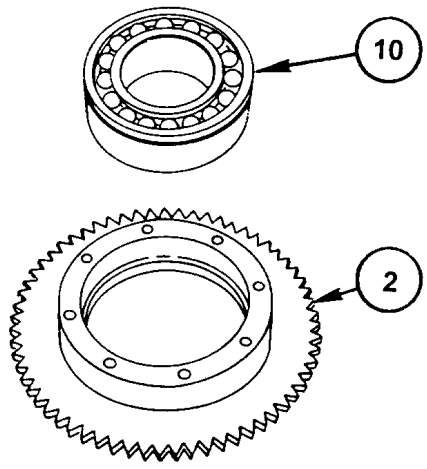


Figure 19. Input Oil Pump Drive Gear.

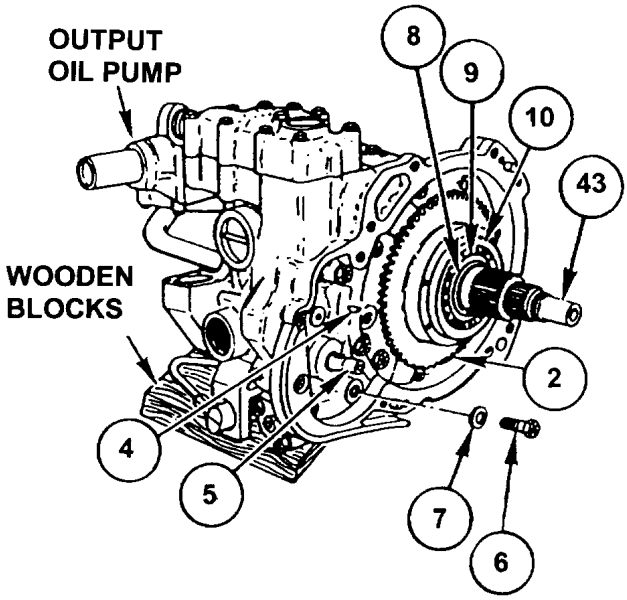


Figure 20. Bevel Gear Assembly.

REPAIR OF THE BEVEL GEAR ASSEMBLY – Cont. 0015 00

INSTALL EXTERIOR COMPONENTS – Cont.

39. Install input oil pump driven gear (1) over input oil pump shaft (5) and woodruff key (4).

40. Wedge screwdriver between input oil pump driven gear (1) and input oil pump drive gear (2) to prevent gears from turning.

41. Install new nut (3) that retains input oil pump driven gear (1). Check prevailing torque by measuring the torque required to turn nut (3). Record the prevailing torque.

42. Torque nut (3) to 30 lb-ft (40 N·m) plus prevailing torque.

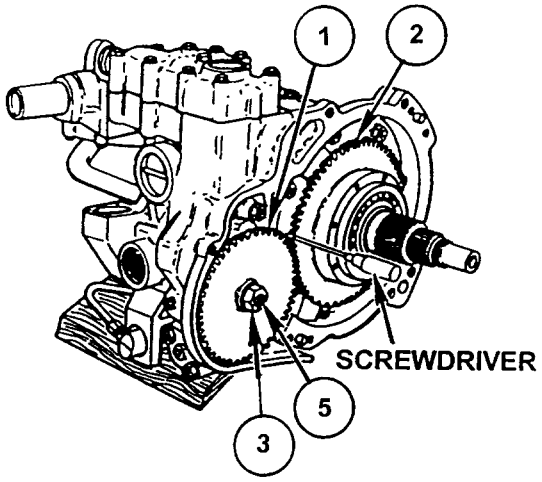


Figure 21. Bevel Gear Assembly.

END OF WORK PACKAGE

REPAIR OF THE CENTER HOUSING ASSEMBLY 0016 00

THIS WORK PACKAGE COVERS:

Disassembly, Repair, and Assembly of the Center Housing

INITIAL SETUP

Reference
TM 9-214
WP 0011

Personnel Required
Track Vehicle Repairer 63H20 (2)

Common Tools
Heater Gun, (two required) (WP 0025, Item 9)
Hoist, Lifting 1 Ton Capacity (WP 0025, Item 10)
Shop Equipment, Automotive Maintenance and Repair: Field Maintenance, Basic, Less Power (WP 0025, Item 20)
Tool Kit, General Mechanic's Automotive (WP 0025, Item 27)

Special Tools
Bar and Stud Assembly (WP 0025, Item 3)
Compressor, Clutch Spring (WP 0025, Item 4)
Compressor, Clutch Spring (WP 0025, Item 6)
Fixture Assembly, Leak Test (WP 0025, Item 7)
Gauge, Thickness (WP 0025, Item 8)
Hook, Chain, S (WP 0025, Item 11)
Inserter and Remover Seal (WP 0025, Item 12)
Installer, Lock Ring (WP 0025, Item 14)
Lifter, Pump Support (WP 0025, Item 15)
Protector, Inner Seal (WP 0025, Item 17)
Sling, Engine and Transmission (WP 0025, Item 21)

Fabricated Tools
Insert Installer, Remover (WP 0027, Item 6)
Retaining, Fixture (WP 0027, Item 1)
Shim (WP 0027, Item 5)

Repair Parts
Mandatory Replacement Parts, Table 1

REPAIR OF THE CENTER HOUSING ASSEMBLY – Cont. 0016 00

Supplies

Bands, Rubber No. 19 (two required) (WP 0024, Item 2)
Block, Wood, Lumber, Soft Wood (two required) (WP 0024, Item 3)
Bolt, 5/16-18 x 1-1/2 inch (two required)
Bolt, 5/16-18 x 1 inch (two required)
Bolt, 3/8-16 X 1 inch (two required)
Carbon Dioxide, Technical (Dry Ice) (WP 0024, Item 5)
Cloth, Abrasive, Crocus (WP 0024, Item 6)
Eyebolt, 7/8-9
Gloves, Leather (WP 0024, Item 9)
Lubricating Oil, Engine (WP 0024, Item 12)
Marker, Tube Type, Black (WP 0024, Item 13)
Petrolatum, Technical (Petroleum Jelly) (WP 0024, Item 14)
Rag, wiping, 50 lb bale (WP 0024, Item 15)
Sealant, Lubrication, Thread Locking (WP 0024, Item 17)

SCOPE

This work package addresses disassembly, repair, and assembly of the Center Housing Assembly.

ITEMS COVERED IN THIS WORK PACKAGE **PAGE**

REPAIR OF THE CENTER HOUSING ASSEMBLY – Cont. 0016 00

ITEMS COVERED IN THIS WORK PACKAGE – Cont. **PAGE**

REPAIR OF THE CENTER HOUSING ASSEMBLY – Cont. 0016 00

REMOVE LEFT BRAKE ASSEMBLY

NOTE

Transmission is on maintenance stand, right end turned up.

1. Remove 15 bolts (1) and 15 washers (2) from left brake support (3).

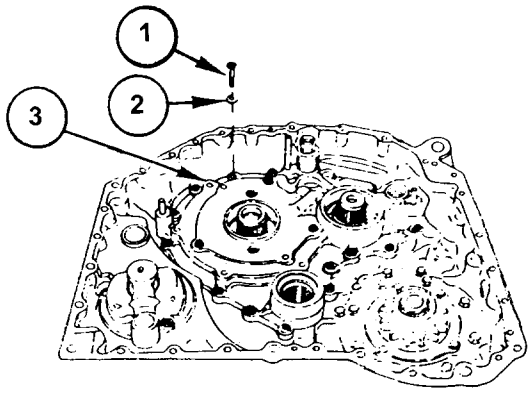


Figure 1. Center Housing Assembly.

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.

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

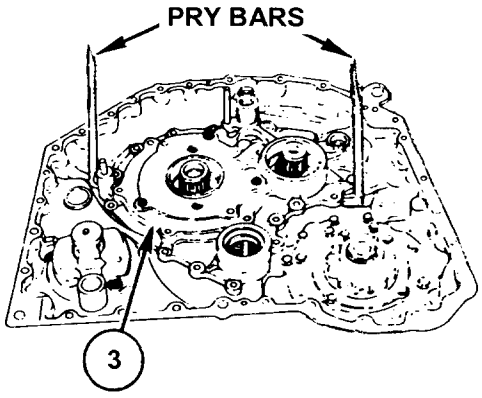


Figure 2. Center Housing Assembly.

REMOVE LEFT BRAKE ASSEMBLY – Cont.

3. Position left brake support (3) on wooden blocks as shown in Figure 3.

4. Loosen two retainer bolts (4). 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 left brake support (3).

5. Tap bolt heads (4, 5) to loosen retainer and stationary cam located under left brake support (3).

6. Remove two bolts (4) and two washers (6) from left brake support (3). Remove three bolts (5) and three washers (7) from left brake support (3).

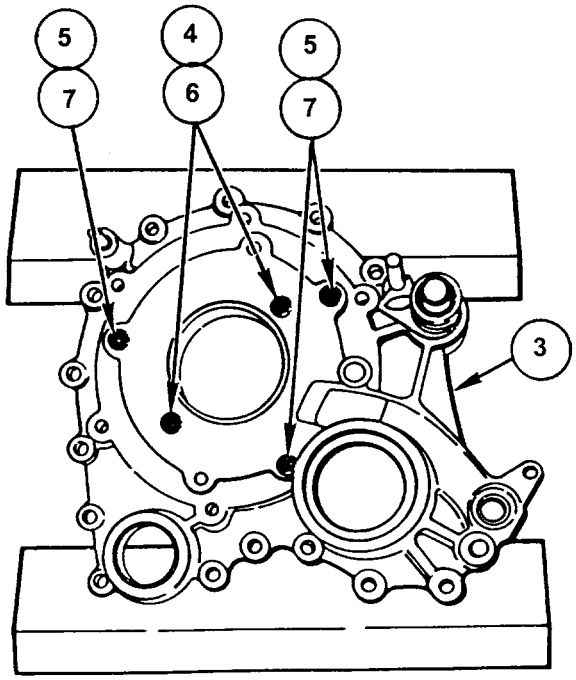


Figure 3. Left Brake Support.

REPAIR OF THE CENTER HOUSING ASSEMBLY – Cont. 0016 00

REMOVE LEFT BRAKE ASSEMBLY – Cont.

7. Turn left brake support (3) over as shown in Figure 4.
8. Remove packing retainer (8) and stationary cam (9) from left brake support (3).
9. Remove seal ring (10) from retainer (8). Discard seal ring (10).

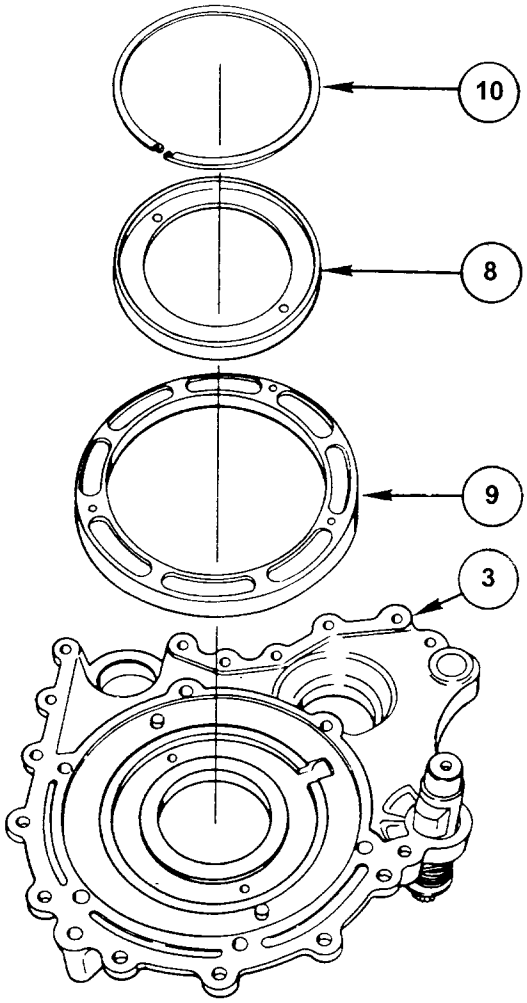


Figure 4. Left Brake Support.

REMOVE LEFT BRAKE ASSEMBLY – Cont.

10. Remove retaining ring (11) from end of control cam (12).
11. Remove washer (13) from control cam (12).
12. Remove torsion helical spring (14) from control cam (12).
13. Remove control cam (15) from control cam (12).
14. Remove retaining ring (16) from control cam (12).
15. Remove control cam (12) from left brake support (3).

NOTE

The Left Brake Support contains the bearing races for the output driven gear, output drive gear and steer gear.

Refer to WP 0016 00-38 for Repair of Left Brake Support.

16. Check left brake support (3), including bearing races, (Reference TM 9 –214), for serviceability.

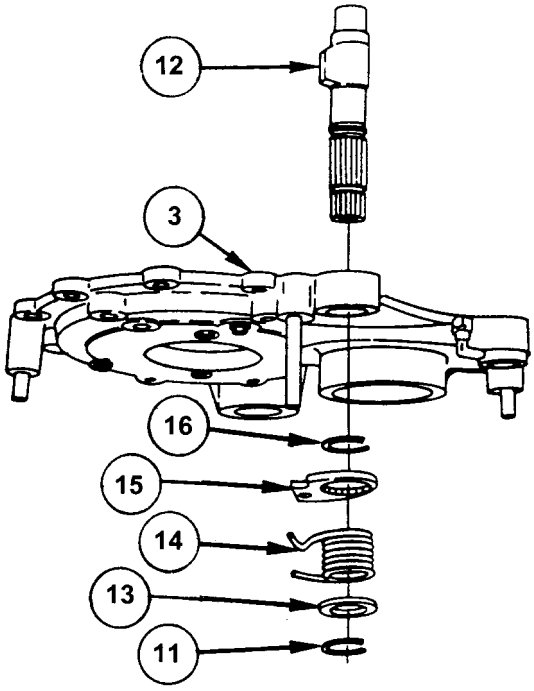


Figure 5. Left Brake Components.

REPAIR OF THE CENTER HOUSING ASSEMBLY – Cont. 0016 00

REMOVE LEFT BRAKE ASSEMBLY – Cont.

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.

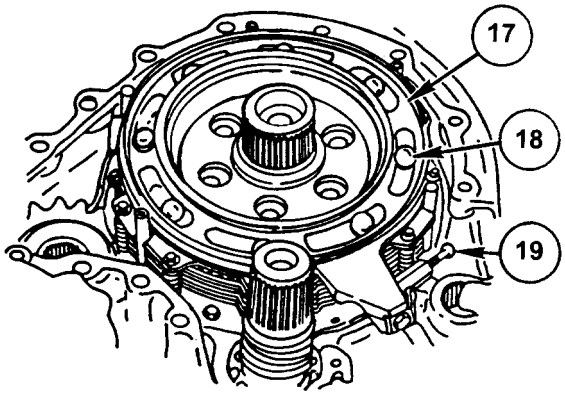


Figure 6. Brake Cam.

REMOVE LEFT BRAKE ASSEMBLY – Cont.

19. Remove seals (20, 21) from brake cam (17). Discard seals (20, 21).
20. Remove preformed packings (22, 23) from face of brake cam (17). Discard seals (22, 23).
21. 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 linkage (26) from outer brake adjusting link (27).

NOTE

Refer to WP 0016 00-44 for Repair of Inner Brake Adjusting Link Pin (26).

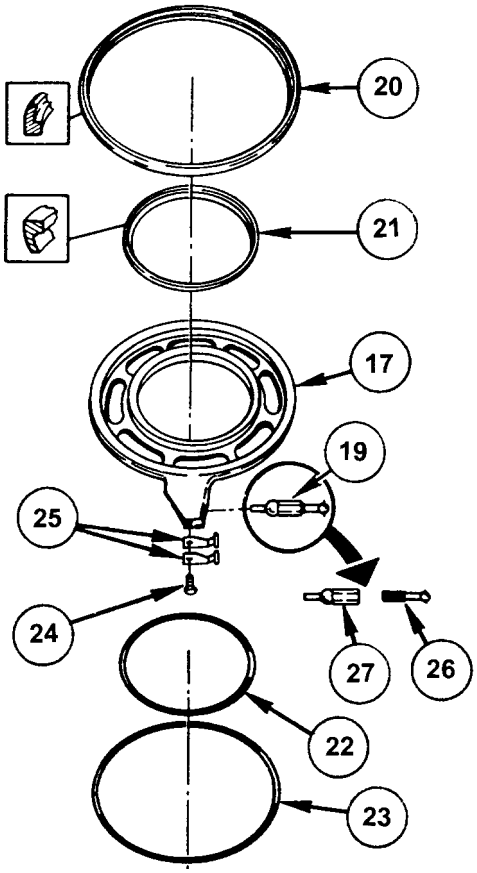


Figure 7. Brake Cam and Components.

REMOVE LEFT BRAKE ASSEMBLY – Cont.

24. Remove four brake reaction pins (28).

NOTE

Two pins (29) are part of center housing and not removed.

25. Remove spur gear cluster (30).

26. Remove thrust washer bearing (31) from Outer Carrier Assembly (32) or from underside of spur gear cluster (30).

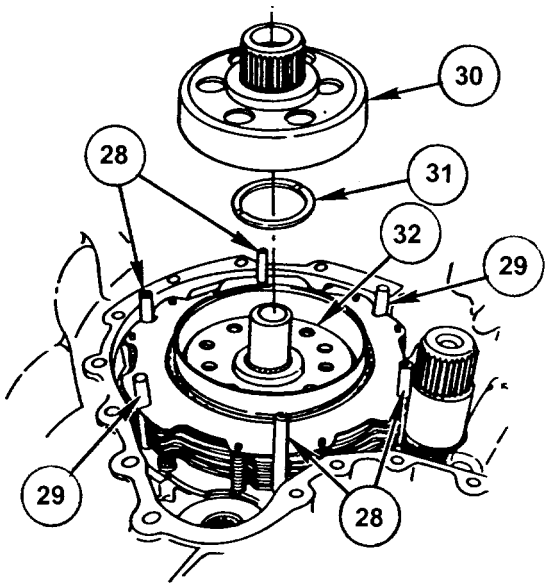


Figure 8. Output Carrier Assembly.

REMOVE LEFT BRAKE ASSEMBLY – Cont.

27. Remove outer carrier (32), brake clutch drum (33) and retaining ring (34), as an assembly and turn it over for disassembly.

NOTE

Thrust washer bearing (35) may remain on the underside of the Outer Carrier Assembly (32) or left steer and output sun gear (36)

28. Remove thrust washer bearing (35) from underside of assembly removed in Step 27 or from left steer and output sun gear (36).

29. Remove retaining ring (34) from brake clutch drum (33).

30. Remove output planetary (32) from brake clutch drum (33).

31. With one hand, press downward on clutch plate (37), against spring force, near retaining ring (38). Remove retaining ring (38). Using same method, remove five more retaining rings (38).

32. Remove clutch plate (37).

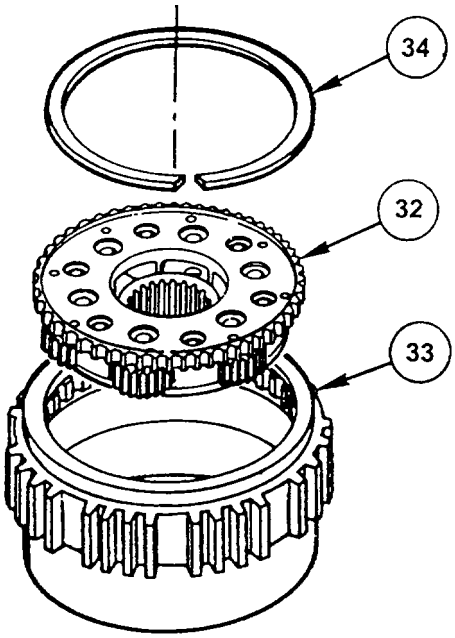


Figure 9. Output Carrier Assembly.

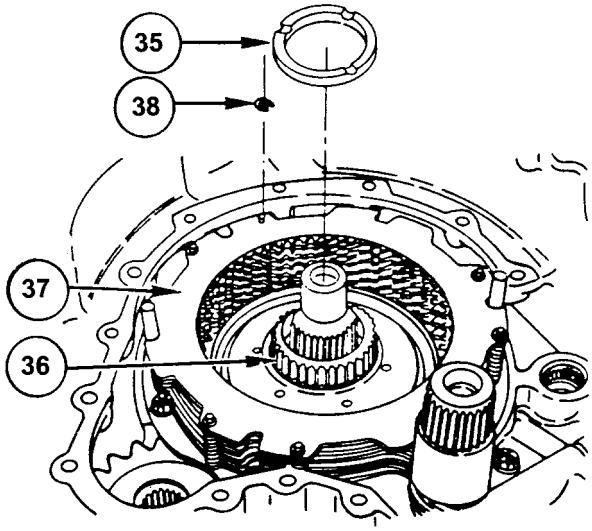


Figure 10. Center Housing Components and Brake Clutch Drum.

REMOVE LEFT BRAKE ASSEMBLY – Cont.

CAUTION

When removing, handling, or installing clutch packs, keep all clutch 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 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.

33. Remove left brake clutch pack (39) consisting of eleven plates.

34. Remove six helical compression springs (40).

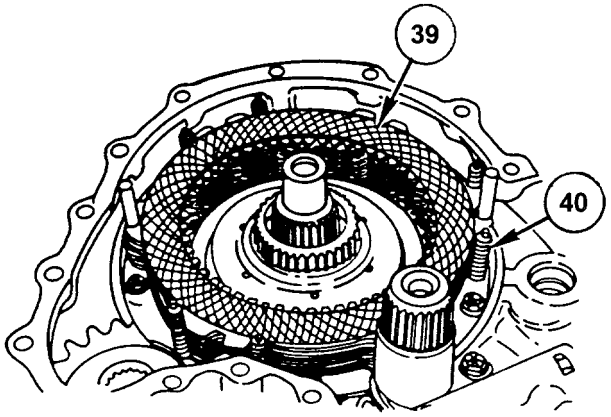


Figure 11. Left Brake Clutch Pack.

REPAIR OF THE CENTER HOUSING ASSEMBLY – Cont. 0016 00

REMOVE LEFT BRAKE ASSEMBLY – Cont.

35. Remove brake coolant seal (41). Discard seal (41).

36. Remove five bolts (42) and five washers (43) which hold brake backing plate (44) to center housing.

CAUTION

When using pry pars, use care to not damage inner lip on brake backing plate (44).

37. Using two pry bars (if necessary) remove brake backing plate (44) from large pins (29).

38. Remove six headless straight pins (45).

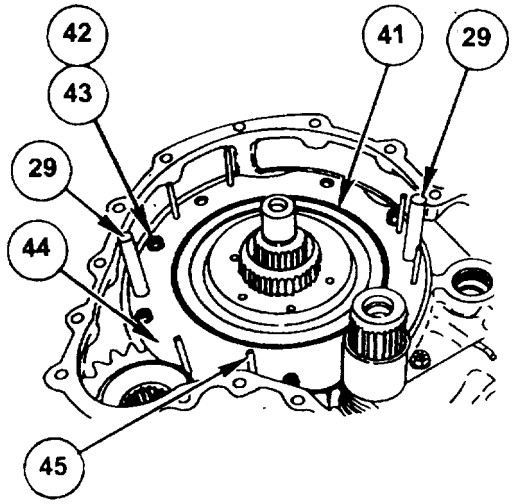


Figure 12. Center Housing Assembly.

REMOVE LEFT STEER GEAR, LEFT STEER AND OUTPUT SUN GEAR, LEFT OUTPUT SHAFT, AND OUTPUT PUMP DRIVE GEAR

NOTE

Transmission is on maintenance stand, right end up.

1. Remove left steer and output sun gear (36).
2. Remove left steer gear (46).

NOTE

Refer to WP 0016 00-45 for replacement of bearings on spur gears (36, 46).

3. If possible, lift left output shaft (47) from its bores. If shaft (47) does not lift out, do Step 4. If shaft (47) is removed, go to Step 10.

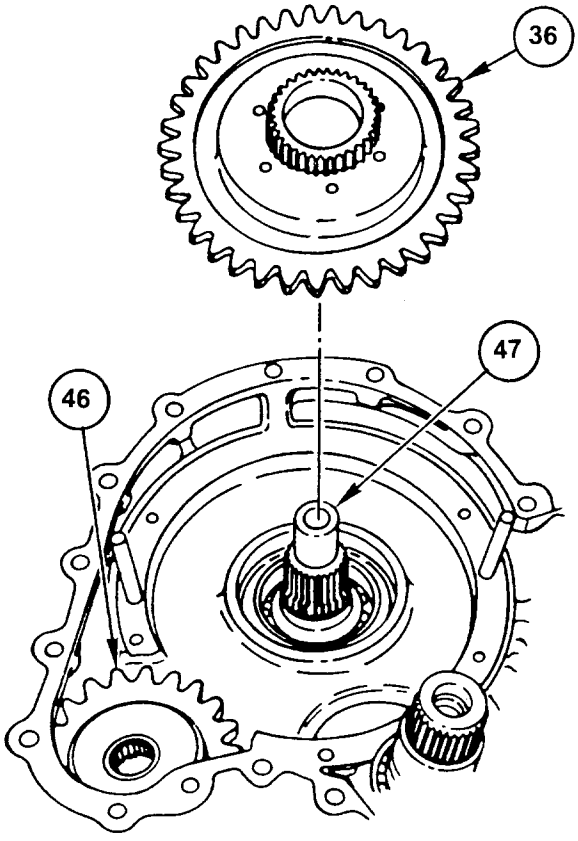


Figure 13. Left Steer and Output Sun Gears.

REPAIR OF THE CENTER HOUSING ASSEMBLY – Cont. 0016 00

REMOVE LEFT STEER GEAR, LEFT STEER AND OUTPUT SUN GEAR, LEFT OUTPUT SHAFT, AND OUTPUT PUMP DRIVE GEAR – Cont.

4. If left end cover has not been removed, go to Step 5. If left end cover has been removed, go to Step 6.
5. Using puller remove left output shaft (47). Go to Step 10.
6. Turn transmission front upward.
7. Insert drift pin through output shaft hole in left side of transmission and through output pump drive gear (48) to bottom of left output shaft (47) in right side of transmission.
8. Using hammer, tap drift pin to drive left output shaft (47) from transmission.
9. Turn transmission right end upward.
10. Remove output pump drive gear (48) from right side of transmission.

NOTE

Refer to WP 0016 00-46 for replacement of bearing on left output shaft (47).

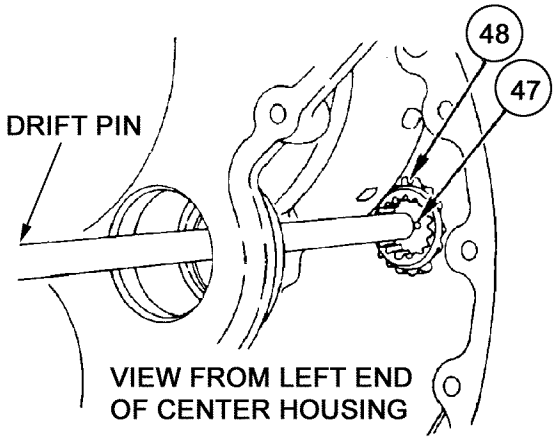


Figure 14. Left End View.

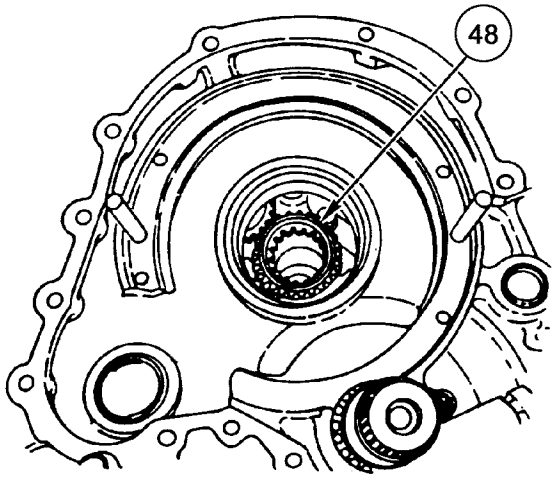


Figure 15. Output Pump Drive Gear.

REPAIR OF THE CENTER HOUSING ASSEMBLY – Cont. 0016 00

REMOVE STEER CONTROL ASSEMBLY

1. Remove two socket head screws (49) holding Steer Control Assembly (50) to Hydrostatic Pump and Motor Assembly (51).
2. Remove four bolts (52) and four washers (53) holding Steer Control Assembly (50) to Hydrostatic Pump and Motor Assembly (51).
3. Remove Steer Control Assembly (50) from Hydrostatic Pump and Motor Assembly (51).

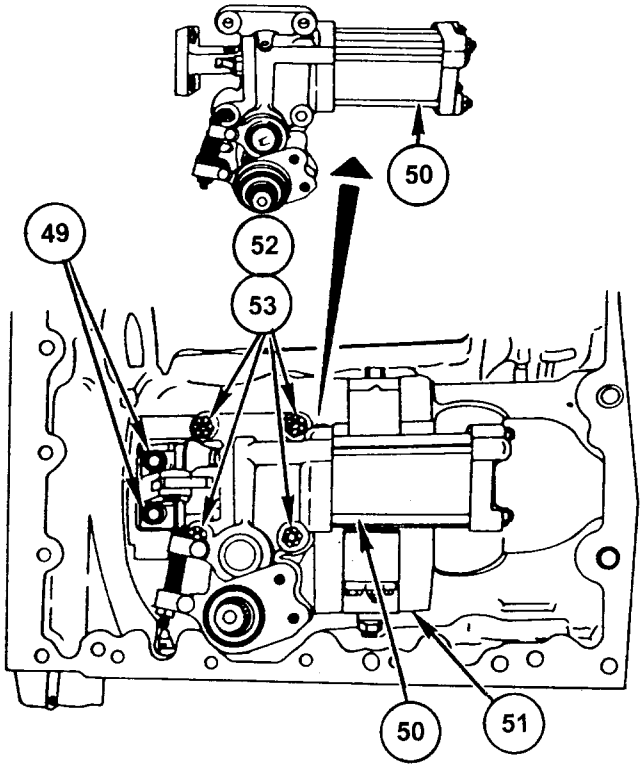


Figure 16. Steer Control Assembly.

REPAIR OF THE CENTER HOUSING ASSEMBLY – Cont. 0016 00

REMOVE HYDROSTATIC PUMP AND MOTOR ASSEMBLY (HYDROSTAT)

NOTE

Transmission is right end up.

1. Remove six bolts (55) and six washers (56) holding Hydrostatic Pump and Motor Assembly (51) to transmission (54).

2. Install 7/8-9 eyebolt in threaded hole (57) located in center of shaft on Hydrostatic Pump and Motor Assembly (51).

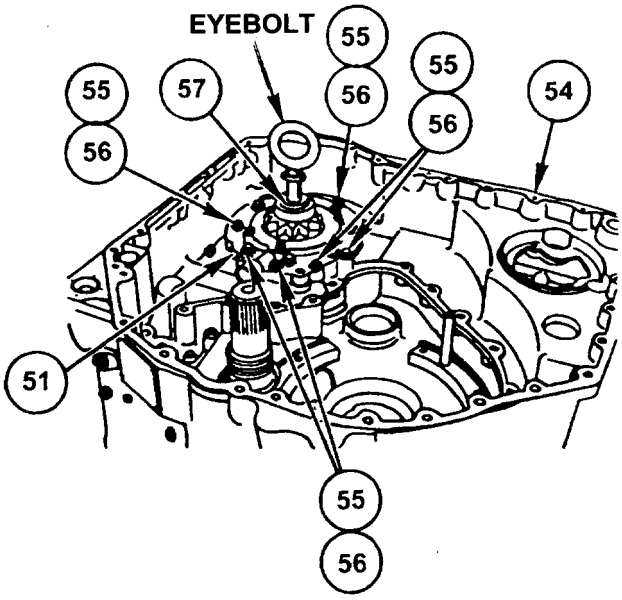


Figure 17. Center Housing Assembly.

REPAIR OF THE CENTER HOUSING ASSEMBLY – Cont. 0016 00

REMOVE HYDROSTATIC PUMP AND MOTOR ASSEMBLY (HYDROSTAT) – Cont.

3. Install tool Hook, Chain, S (WP 0025, Item 11) in eyebolt.

4 Attach tool Sling, Engine and Transmission (WP 0025, Item 21), to tool Hook, Chain, S (WP 0025, Item 11) and raise Hydrostatic Pump and Motor Assembly (51) out of transmission (54).

5. Lay Hydrostatic Pump and Motor Assembly (51) on table and remove tool Sling, Engine and Transmission (WP 0025, Item 21), and Hook, Chain, S (WP 0025, Item 11), and eyebolt.

NOTE

Gears located on each end of the Hydrostatic Pump and Motor Assembly may be removed when Hydrostatic Pump and Motor Assembly is in the transmission, or gears may be removed after Hydrostatic Pump and Motor Assembly has been removed from transmission.

Hydrostatic drive gear (13-tooth) (58) in Step 7 below is located on the end of the Hydrostatic Pump and Motor Assembly where the eyebolt was attached.

6. Using external retaining ring pliers, remove retaining ring (59) that holds 13-tooth hydrostatic drive gear (58) on Hydrostatic Pump and Motor Assembly (51).

7. Remove 13-tooth hydrostatic drive gear (58) from Hydrostatic Pump and Motor Assembly (51).

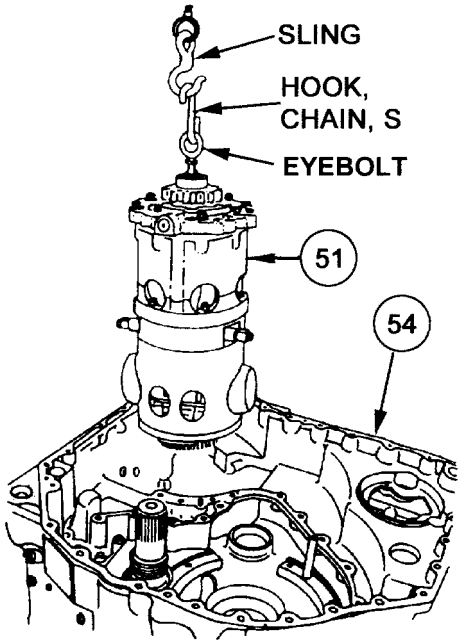


Figure 18. Hydrostat Removal.

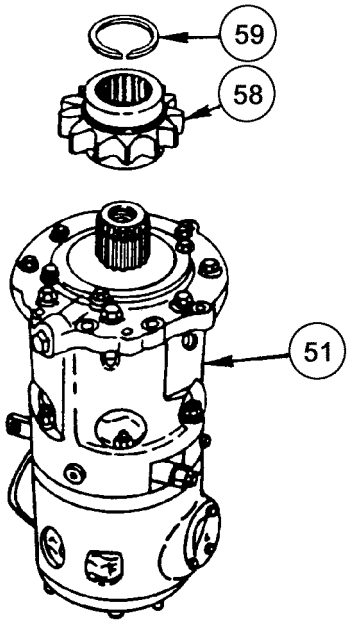


Figure 19. 13 Tooth Hydrostatic Drive Gear.

REMOVE HYDROSTATIC PUMP AND MOTOR ASSEMBLY (HYDROSTAT) – Cont.

8. Remove retaining ring (60) that holds 32-tooth hydrostatic gear (61) on Hydrostatic Pump and Motor Assembly (51).

9. Remove 32-tooth hydrostatic gear (61) from Hydrostatic Pump and Motor Assembly (51).

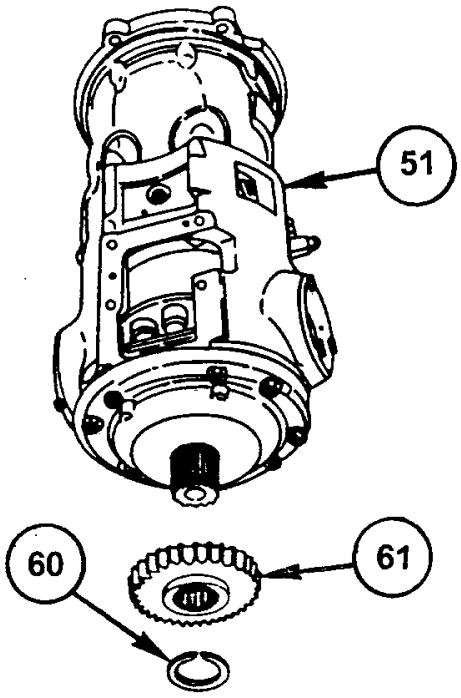


Figure 20. 32-Tooth Hydrostatic Gear.

REPAIR OF THE CENTER HOUSING ASSEMBLY – Cont. 0016 00

REMOVE GOVERNOR ASSEMBLY, GOVERNOR BODY ASSEMBLY, AND GOVERNOR DRIVE GEAR

NOTE

Transmission is on maintenance stand, right end up.

1. Remove four bolts (62) and four washers (63) that retain access cover (64) to center housing (65).
2. Remove access cover (64) and gasket (66). Discard gasket (66).
3. Turn Governor Assembly (67) slightly to the left (counter clockwise) and pull it from center housing (65).
4. Remove three bolts (68) and three washers (69). Remove Governor Body Assembly (70).
5. X200-4A only, with Rear Carrier Assembly P/N 29533535. Remove retaining ring (71).
6. Remove governor drive gear (72).

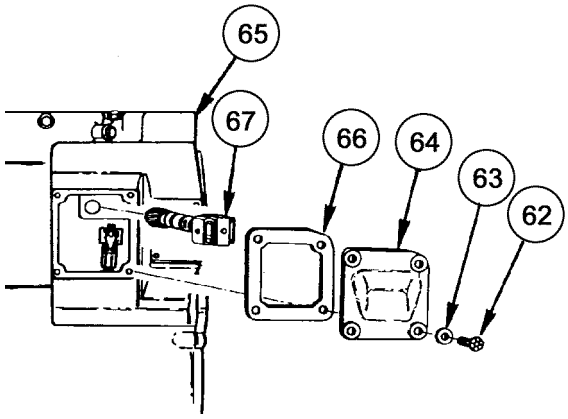


Figure 21. Governor Access Cover.

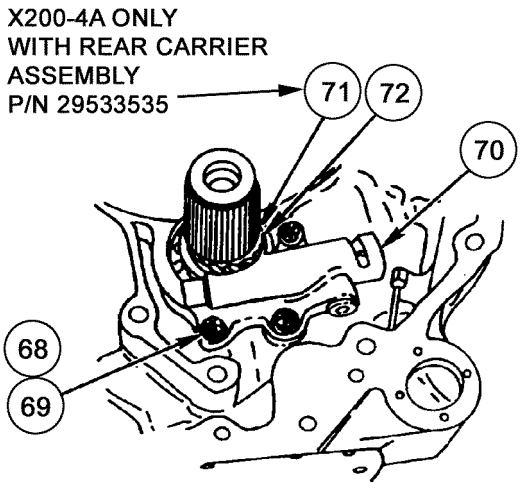


Figure 22. Governor Drive Gear.

REMOVE RANGE PACK

NOTE

Transmission is on maintenance stand, left end up.

Fabricated retaining fixture (WP 0027, Item 1) was installed in WP 0011 00-50, Disassembly of Transmission into Major Assemblies - Cont. Remove Loose Components, Left End of Transmission.

1. Remove bolt (73) that holds previously installed fabricated retaining fixture (WP 0027, Item 1) to center housing (65).
2. Rotate Forward Clutch Housing Assembly (74) so that one of the slotted openings (75) is located over pitot (76).
3. Remove two screws (77).
4. Remove pitot (76).
5. Remove Forward Clutch Housing Assembly (74), wiggling Forward Clutch Housing Assembly (74) to free it, if necessary.

NOTE

Refer to WP 0016 00-50 for repair of Forward Clutch Housing Assembly (74).

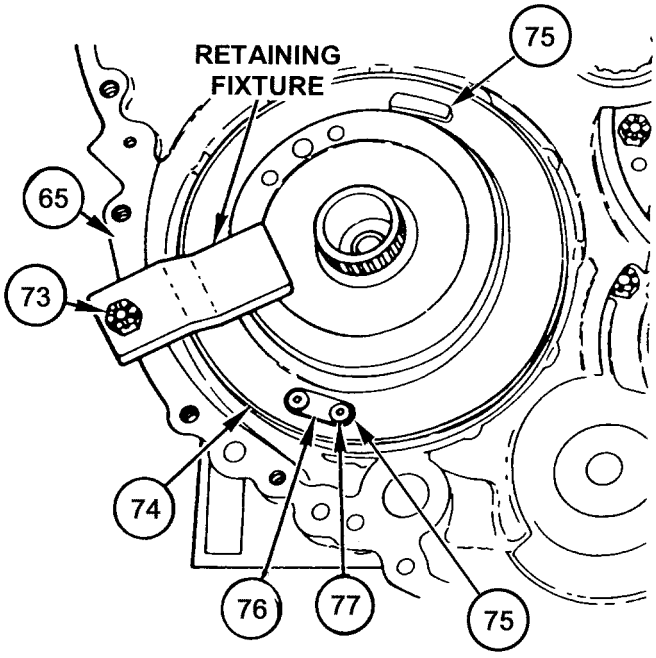


Figure 23. Retaining Fixture.

REMOVE RANGE PACK – Cont.

6. Remove thrust washer bearing (78).

7. Remove Fourth and Reverse Clutch Assembly (79).

NOTE

Refer to WP 0016 00-54 for repair of Fourth and Reverse Clutch Assembly (79).

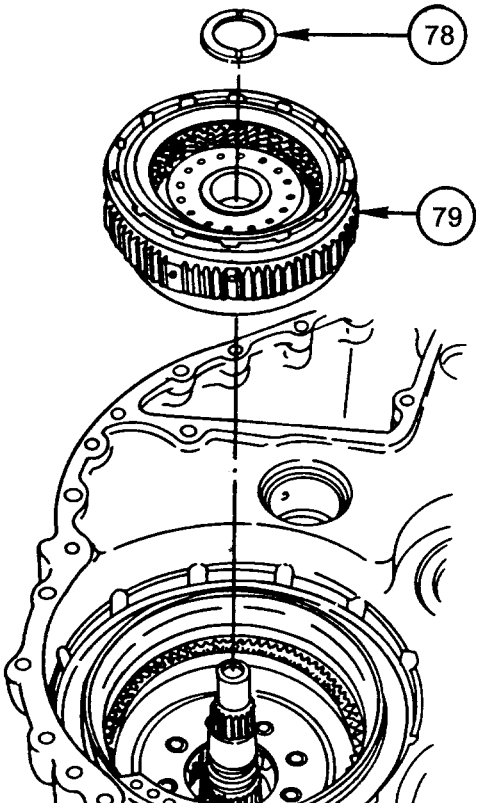


Figure 24. Fourth and Reverse Clutch Assembly.

REPAIR OF THE CENTER HOUSING ASSEMBLY – Cont. 0016 00

REMOVE RANGE PACK – Cont.

8. Install 5/16-18 x 1-1/2 inch bolt (80) two or three turns into one pitot tube (81).
9. Pull pitot tube (81) out of center housing (65).
10. Remove O-Rings (82, 83) from pitot tube (81). Discard O-Rings (82, 83).
11. Repeat Steps 8, 9 and 10 for other pitot tube (81), then go to Step 12.

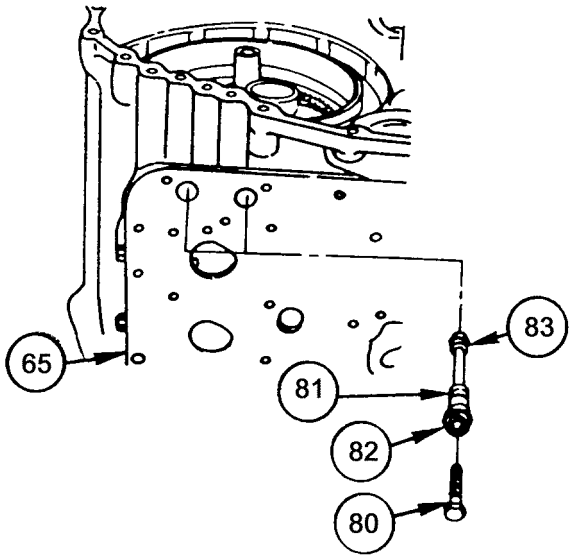


Figure 25. Pitot Tubes.

REPAIR OF THE CENTER HOUSING ASSEMBLY – Cont. 0016 00

REMOVE RANGE PACK – Cont.

12. Remove retaining ring (84) that retains clutch plate (third clutch backing plate) (85).

13. Using two pry bars, gently wiggle third clutch backing plate (85) to loosen it. Remove third clutch backing plate (85).

14. Remove pin (86) which was freed when third clutch backing plate (85) was removed.

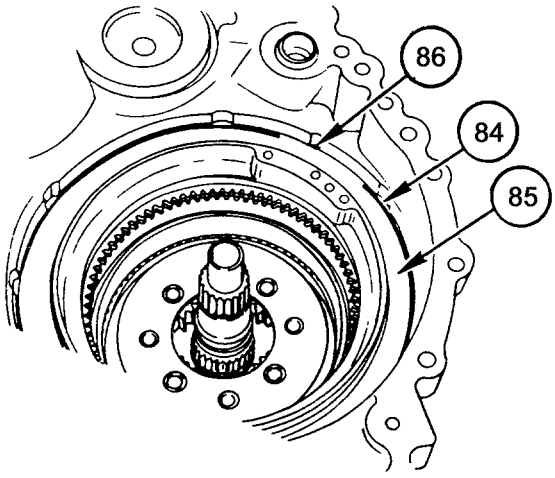


Figure 26. Third Clutch Backing Plate.

REMOVE RANGE PACK – Cont.

CAUTION

When removing, handling, or installing clutch packs, keep all clutch 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 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.

15. Remove third clutch pack (87) consisting of three friction plates and four steel reaction plates.

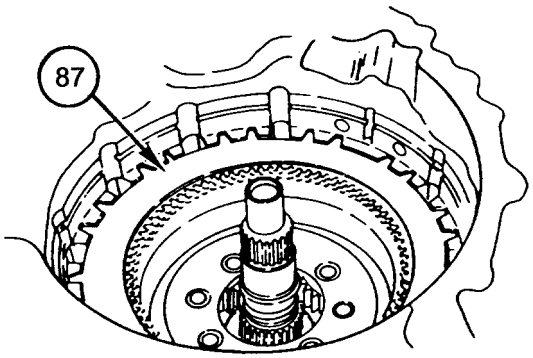


Figure 27. Third Clutch Pack.

REMOVE RANGE PACK – Cont.

16. Remove two bolts (88) and two washers (89) that retain second and third clutch housings in center housing (65).

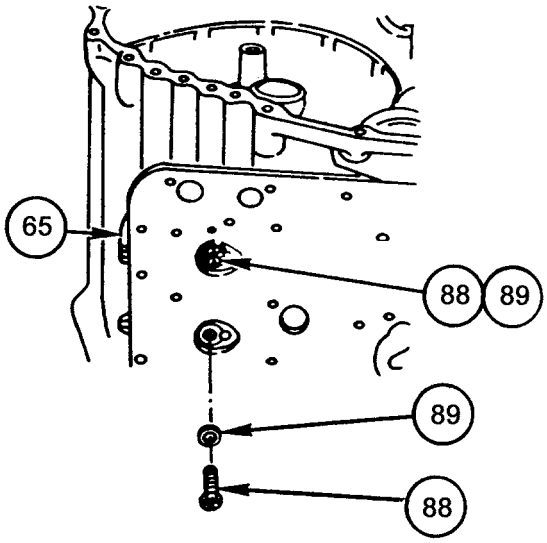


Figure 28. Center Housing.

17. Remove retaining ring (90) that retains third clutch piston housing (91).

18. Using two pry bars, gently wiggle third clutch piston housing (91) to loosen it. Remove third clutch piston housing (91).

NOTE

Refer to WP 0016 00-58 for repair of third clutch piston housing (91).

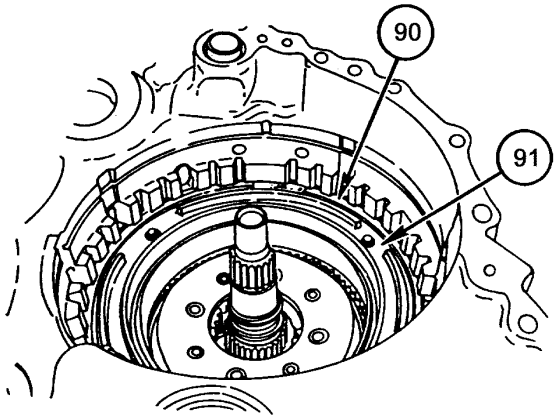


Figure 29. Third Clutch Piston Housing Assembly and Retaining Ring.

REPAIR OF THE CENTER HOUSING ASSEMBLY – Cont. 0016 00

REMOVE RANGE PACK – Cont.

19. Remove Front Carrier Assembly (92).

20. Remove thrust washer (93) from inside Front Carrier Assembly (92).

21. Remove thrust washer (94) from underside of Front Carrier Assembly (92) or from top of Center Carrier Assembly (95).

22. Remove retaining ring (96) that retains second clutch pack (97).

23. Remove second clutch pack (97) consisting of four friction plates and five steel reaction plates.

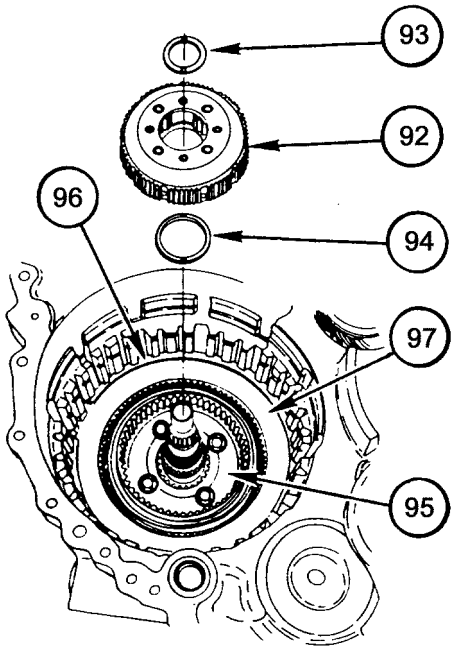


Figure 30. Front Carrier Assembly.

REMOVE RANGE PACK – Cont.

24. Remove retaining ring (98) that retains Second Clutch Piston Housing Assembly (99).

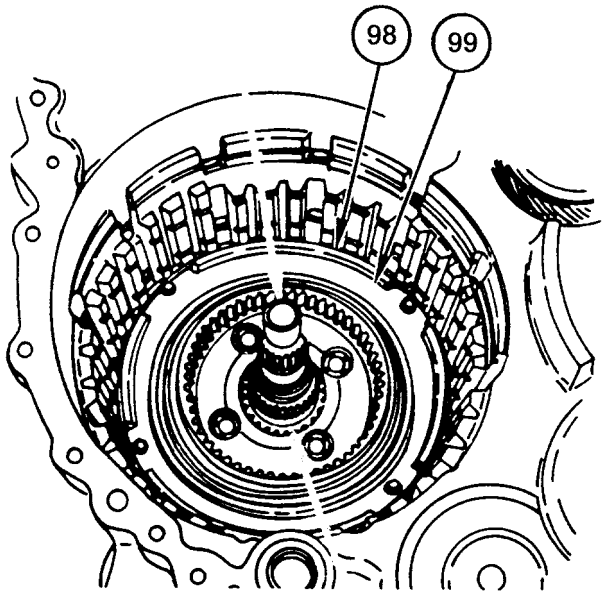


Figure 31. Second Clutch Piston Housing Assembly.

25. Put Lifter (WP 0025, Item 15) over end of shouldered shaft (range input shaft) (100) and put lower end of Lifter (WP 0025, Item 15) in groove below splined area of center sun gear (101).

26. Using thumb screw on Lifter (WP 0025, Item 15), tighten bottom of Lifter (WP 0025, Item 15) in groove.

REPAIR OF THE CENTER HOUSING ASSEMBLY – Cont. 0016 00

REMOVE RANGE PACK – Cont.

27. Install tool Hook (WP 0025, Item 11) in top of tool Lifter (WP 0025, Item 15).

28. Using hoist, tool Hook (WP 0025, Item 11) and tool Lifter (WP 0025, Item 15), raise range input shaft (100) and attached Center Carrier Assembly (95) until Second Clutch Piston Housing Assembly (99) is high enough to get hands under it.

29. Lower range input shaft (100) and Center Carrier Assembly (95) back into center housing (65).

30. Remove hoist and tool Hook (WP 0025, Item 11) from tool Lifter, (WP 0025, Item 15).

NOTE

Second Clutch Piston Housing Assembly (99) has to be pulled upward (one side, then the other) using two hands, to get it free.

31. Remove Second Clutch Piston Housing Assembly (99).

NOTE

Refer to WP 0016 00-58 for repair of Second Clutch Piston Housing Assembly (99).

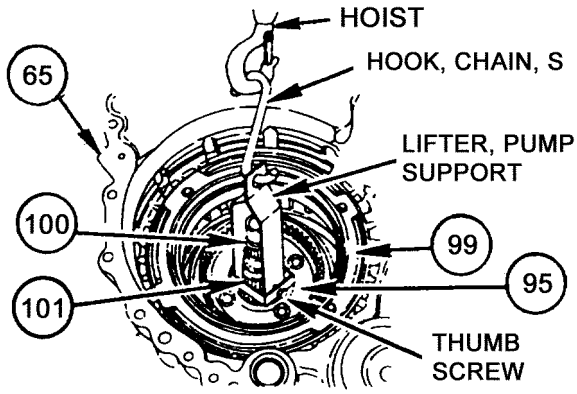


Figure 32. Chain, Hook, S and Lifter, Pump Support.

REMOVE RANGE PACK – Cont.

32. Reattach tool Hook (WP 0025, Item 11) and hoist to tool Lifter (WP 0025, Item 15) and remove range input shaft (100) and Center Carrier Assembly (95).

33. Remove tool Hook (WP 0025, Item 11) and tool Lifter (WP 0025, Item 15) from range input shaft (100).

NOTE

Refer to WP 0016 00-61 for replacement of range input shaft (100) components.

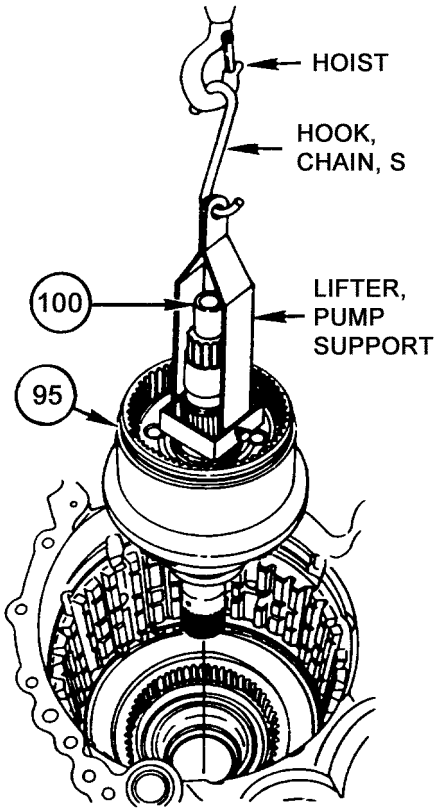


Figure 33. Range Input Shaft and Center Carrier Assembly.

REPAIR OF THE CENTER HOUSING ASSEMBLY – Cont. 0016 00

REMOVE RANGE PACK – Cont.

34. Remove two retaining rings (102, 103).

NOTE

To keep all of clutch pack (104) together and in proper order, reach inside internal gear (105) and back under entire clutch pack (104). If gear (105) only is pulled out, three clutch plates will remain in center housing.

35. Remove backing plate (106) and first clutch pack (104) consisting of nine plates, along with internal gear (105).

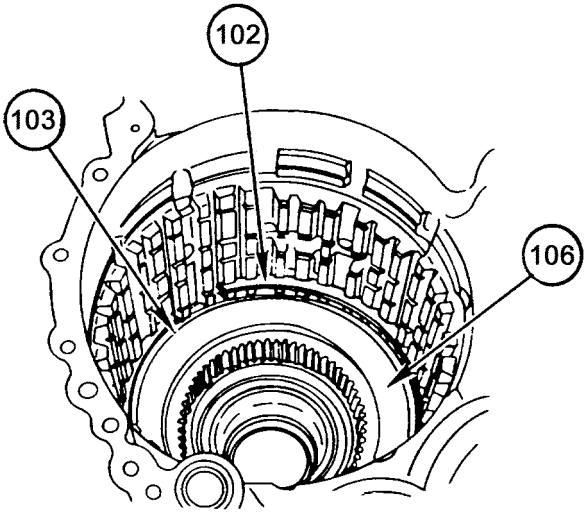


Figure 34. Center Housing.

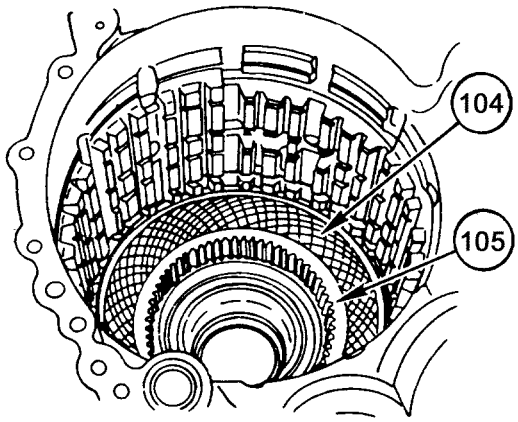


Figure 35. Center Housing.

REMOVE RANGE PACK – Cont.

36. Remove wing nut from tool Bar and Stud Assembly (WP 0025, Item 3) and tool Clutch Compressor (WP 0025, Item 6).

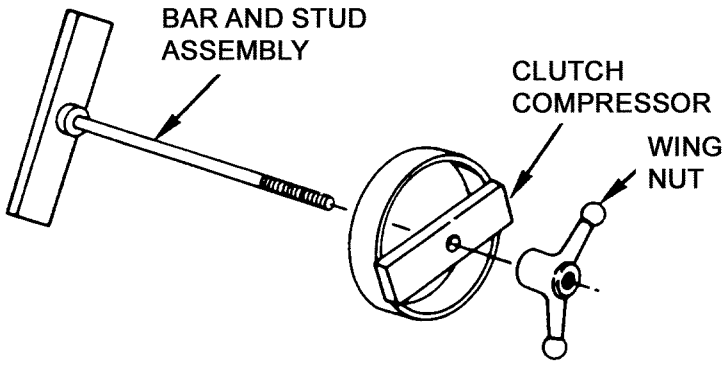


Figure 36. Special Tools.

37. Put tool Bar and Stud Assembly (WP 0025, Item 3) inside center housing through First Clutch Piston Assembly (107) in range pack bore and hold with one hand.

38. With other hand, install tool Clutch Compressor (WP 0025, Item 6) over stud of tool Bar and Stud Assembly (WP 0025, Item 3), then install wing nut on stud.

REPAIR OF THE CENTER HOUSING ASSEMBLY – Cont. 0016 00

REMOVE RANGE PACK – Cont.

39. Turn wing nut onto tool Clutch Compressor (WP 0025, Item 6) until piston spring retainer ring (108) is compressed enough to take force from retaining ring (109).

NOTE

When removed from groove, retaining ring (109) will remain under tool Clutch Compressor (WP 0025, Item 6) until tool is removed.

40. Reach through opening in tool Clutch Compressor (WP 0025, Item 6) and remove retaining ring (109) from its groove.

41. Remove wing nut and tool Clutch Compressor (WP 0025, Item 6) and tool Bar and Stud Assembly (WP 0025, Item 3) from inside range pack bore.

42. Remove retaining ring (109) and piston spring retainer (108).

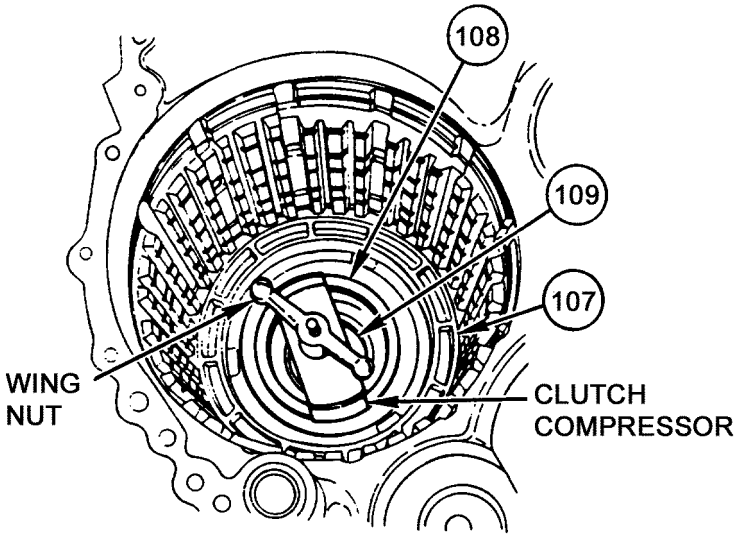


Figure 37. Bar and Stud Assembly and Compressor Installed.

REPAIR OF THE CENTER HOUSING ASSEMBLY – Cont. 0016 00

REMOVE RANGE PACK – Cont.

43. Remove 26 springs (110).

44. Grasp cross members on first clutch piston (111) at two points, 180 degrees apart, and remove first clutch piston.

45. Turn first clutch piston (111) over.

46. Remove seals (112, 113) from first clutch piston (111). Discard seals.

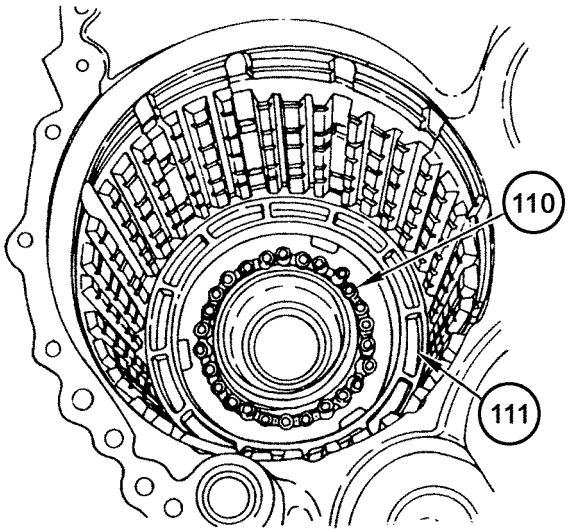


Figure 38. Center Housing.

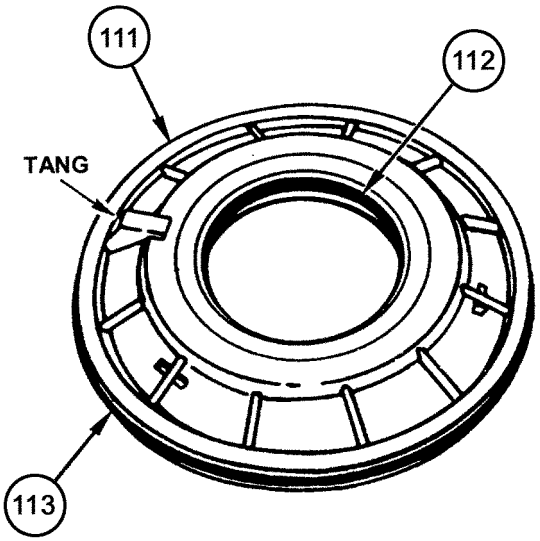


Figure 39. First Clutch Piston.

REPAIR OF THE CENTER HOUSING ASSEMBLY – Cont. 0016 00

REMOVE IDLER GEAR ASSEMBLY

NOTE

Transmission is on maintenance stand, left end up.

1. Remove six bolts (114) and six washers (115) that retain bearing retaining plate (116) to center housing (65).
2. Install two 3/8-16 x 1 inch jack bolts (117) in jack bolt holes (118) in bearing retainer plate (116). Tighten two jack bolts (117) evenly until bearing retainer plate loosens.

NOTE

Outer race of bearing, located on top of hydrostatic pump idler gear, will come off with bearing retainer plate.

3. Remove retaining plate (116).
4. Remove two jack bolts (117).

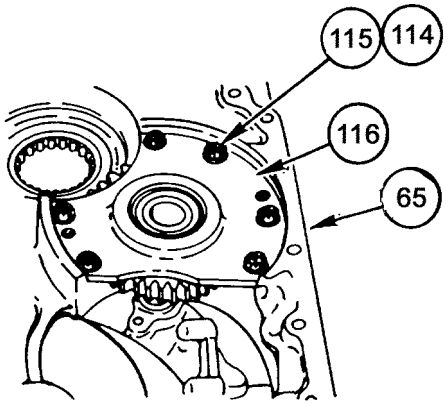


Figure 40. Bearing Retaining Plate.

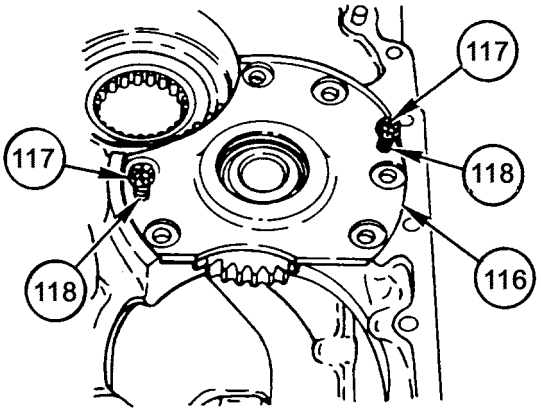


Figure 41. Bearing Retaining Plate.

REPAIR OF THE CENTER HOUSING ASSEMBLY – Cont. 0016 00

REMOVE IDLER GEAR ASSEMBLY – Cont.

NOTE

Outer race of bearing, located under hydrostatic pump idler gear, remains in center housing.

5. Remove hydrostatic pump idler gear (119).
6. Refer to WP 0016 00-45 for replacement of bearings on hydrostatic pump idler gear (119).
7. Refer to WP 0016 00-72 for repair of center housing (65) (Replacement of outer races).

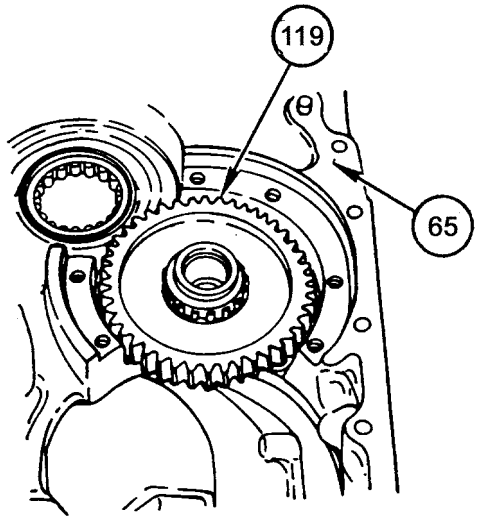


Figure 42. Hydrostatic Pump Idler Gear.

Mandatory Replacement Parts

Table 1. Mandatory Replacement Parts for Center Housing Assembly.

WP 0026 contains a complete list of all mandatory replacement parts necessary for maintenance of the X200-4 and X200-4A Transmissions.

WP 0026 ITEM NO.	NOMENCLATURE	QTY
8	Push-on Nut	8
15	Seal Ring, Metal	1
17	Ring Retaining (Seal Ring, Metal)	1
18	Seal Ring, Metal	1
19	O-Ring	2
20	O-Ring	2
22	Seal Ring, Metal	2
23	Seal, Plain	1
24	Seal, Transmission	1
27	Seal, Plain	2
28	Seal Ring	2
31	Gasket	1
53	O-Ring	1
54	Gasket	1

REPAIR LEFT BRAKE SUPPORT

NOTE

Do not remove left brake support components unless repair is necessary.

Left brake support (3) has bearing races (120, 121, 122) 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 outer races unless the inner races and rollers of the respective bearings are also being replaced. Refer to WP 0016 00-45 for removal of the inner races and rollers from output driven gear, output drive gear, and steer gear.

CAUTION

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

1. Cut two slots 180 degrees apart at base of bearing races (120, 121, 122). Cut slots deep enough to catch the end of the chisel, but not deep enough to cut into left brake support (3).

WARNING

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

REPAIR OF THE CENTER HOUSING ASSEMBLY – Cont. 0016 00

REPAIR LEFT BRAKE SUPPORT – Cont.

2. Heat left brake support (3) around bearing races (120, 121, 122) for 15 minutes.

CAUTION

Use care not to damage left brake support when removing races.

3. Turn left brake support (3) over. Drive out races (120, 121, 122).

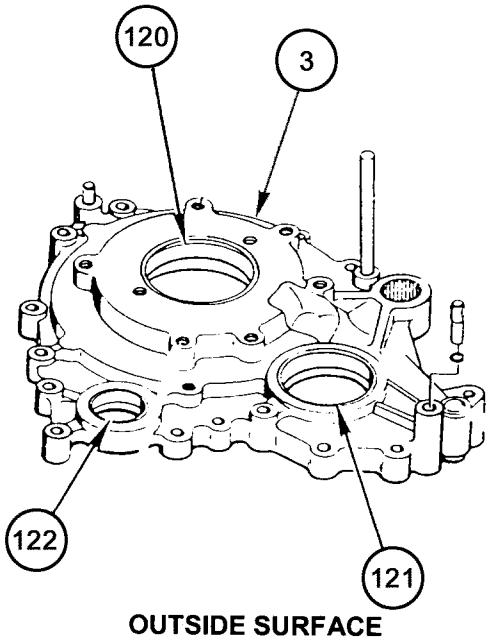


Figure 43. Left Brake Support.

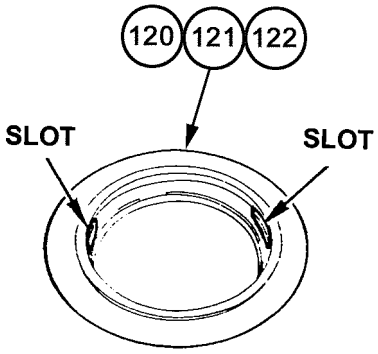


Figure 44. Bearing Race.

REPAIR OF THE CENTER HOUSING ASSEMBLY – Cont. 0016 00

REPAIR LEFT BRAKE SUPPORT – Cont.

4. Remove two headless straight pins (123). Remove two retaining rings (124) from pins (123).
5. Remove two headless straight pins (125).
6. Remove headless straight pin (126).
7. Remove needle roller bearing (127).
8. Using arbor press, remove valve, plug (128).

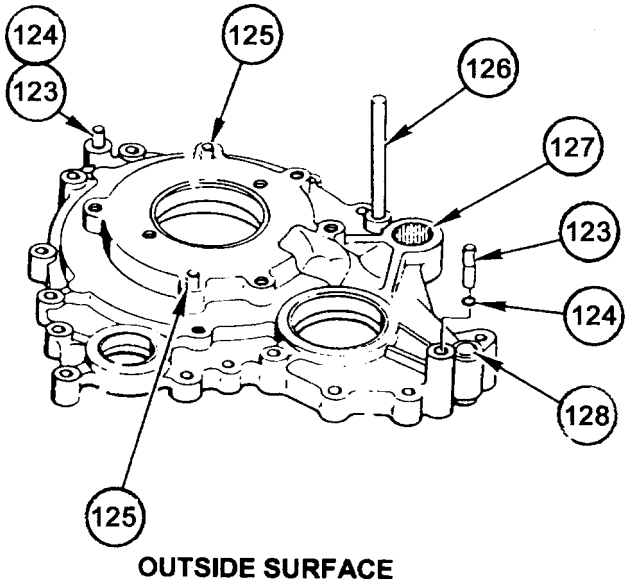


Figure 45. Left Brake Support.

REPAIR OF THE CENTER HOUSING ASSEMBLY – Cont. 0016 00

REPAIR LEFT BRAKE SUPPORT – Cont.

9. Check left brake support (3) for damage. Smooth out scratches with Cloth, Abrasive, Crocus (WP 0024, Item 6). If grinding damage is present, replace left brake support (3).

CAUTION

When installed, valve, plug (128) scribe line must lie within 60-degree sector between raised lines in left brake support casting.

10. Install valve, plug (128) flush to 0.010 inch (0.25 mm) below inside surface of left brake support (3).

11. Install needle roller bearing (127). Press needle roller bearing (127) to a depth of 0.310-0.320 inch (7.88-8.12 mm) below inside surface of left brake support (3).

12. Install pin (126) to a height of 2.88 – 2.92 inches (73.2-74.1 mm) above outside surface of left brake support (3).

13. Install two pins (125) to a height of 0.240 inches (6.10 mm) above inside surface of left brake support (3).

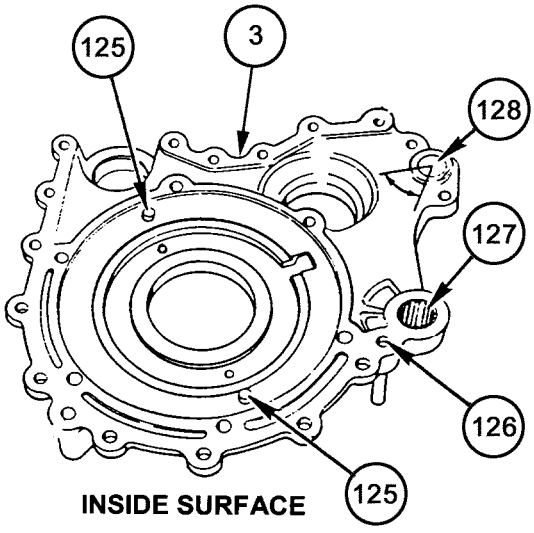


Figure 46. Left Brake Support.

REPAIR OF THE CENTER HOUSING ASSEMBLY – Cont. 0016 00

REPAIR LEFT BRAKE SUPPORT – Cont.

14. Install two retaining rings (124) onto two pins (123).

15. Install two pins (123) to a height of 1.01 – 1.05 inches (25.7 – 26.6 mm) above outside surface of left brake support (3).

WARNING

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

16. Heat left brake support (3) near locations for bearing races (120, 121, 122) for one hour.

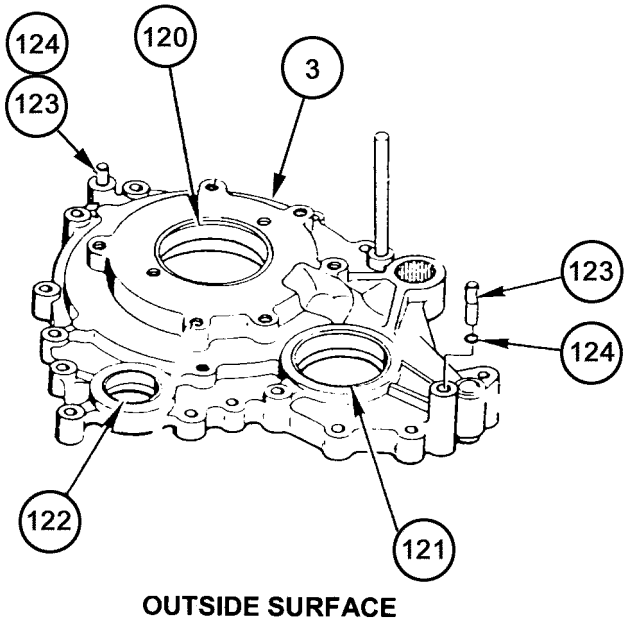


Figure 47. Left Brake Support.

REPAIR LEFT BRAKE SUPPORT – Cont.

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 (120, 121,122) in Carbon Dioxide (WP 0024, Item 5) for one hour.

18. Install new bearing races (120, 121, 122) into outside bores in left brake support (3) to a firm seat against the shoulders in the bores.

19. Allow left brake support to return to room temperature.

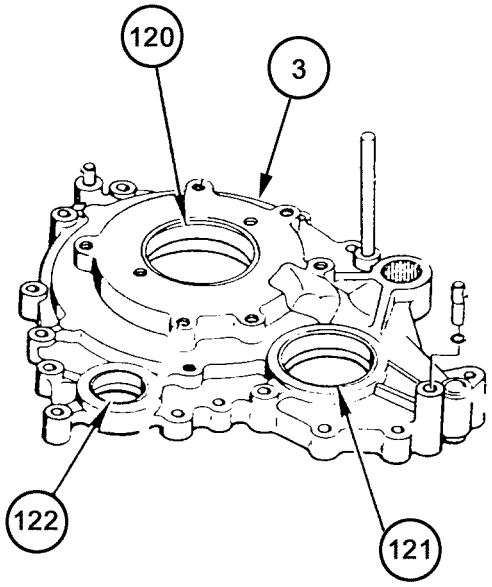


Figure 43. Left Brake Support. (Repeated)

REPAIR INNER BRAKE ADJUSTING LINK PIN

Remove Pin

1. Place inner brake adjusting link (26) in vise.
2. Drive pin (129) from link (26). Discard pin (129).

Install Pin

1. Install new pin (129) to a height of 0.118-0.138 inch (3.00-3.50 mm) above surface of link (26).
2. Remove link (26) from vise.

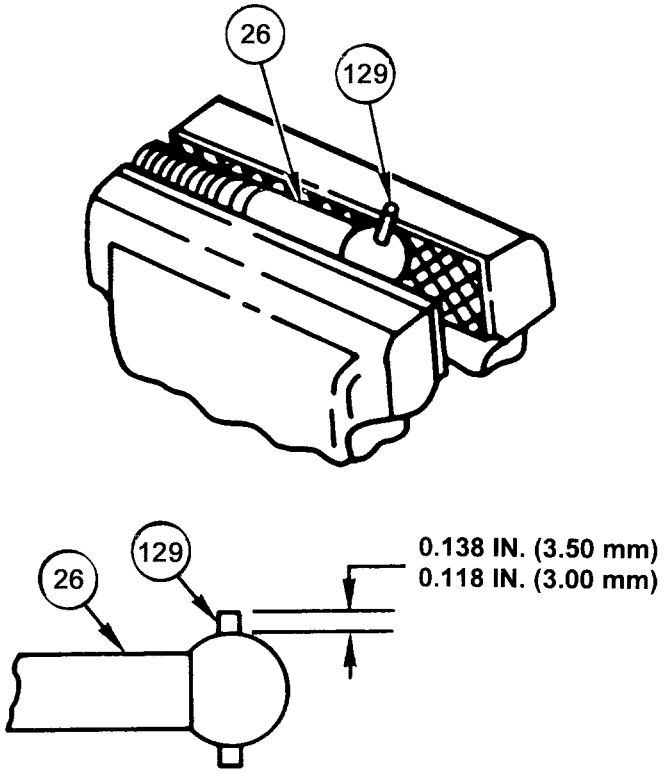


Figure 48. Inner Brake Adjusting Link.

REPLACE BEARINGS ON SPUR GEARS AND SHAFTS

NOTE

Outer races for bearings (130, 131) stay in center housing (left brake support) 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 WP 0016 00-38, for removal of the outer races from center housing (left brake support).

Remove Bearings

1. Remove bearing (130) from left steer and output sun gear (36).

2. Remove bearing (131) from left steer gear (46).

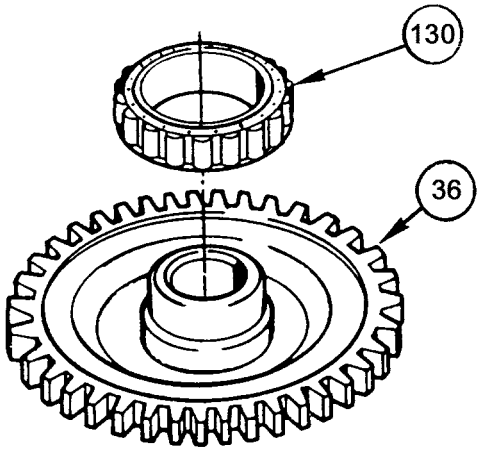


Figure 49. Left Steer and Output Sun Gear.

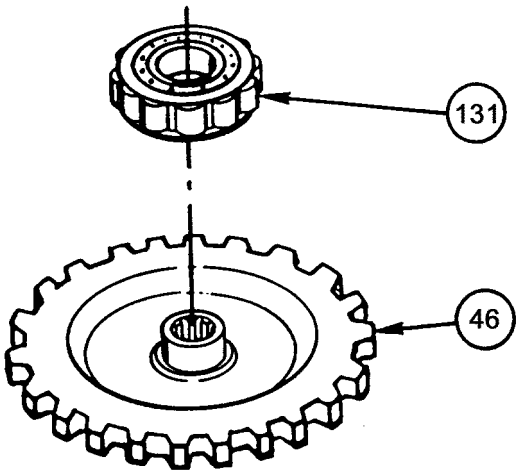


Figure 50. Left Steer Gear.

REPLACE BEARINGS ON SPUR GEARS AND SHAFTS – Cont.

3. Remove bearing (132) from left output shaft (47).

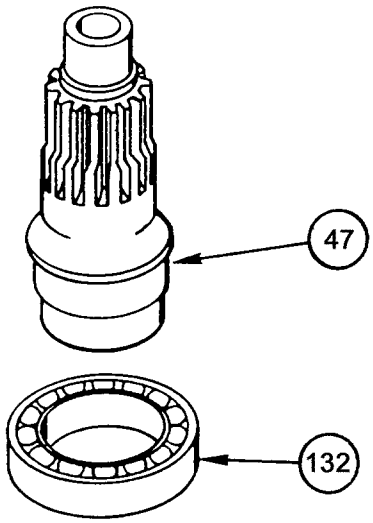


Figure 51. Left Output Shaft.

NOTE

Outer race for bearing (133) stays in bearing retaining plate (116) and outer race for bearing (134) stays in center housing when hydrostatic pump idler gear (119) 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 WP 0016 00-72, for removal of the outer race of bearing (134).

Early configurations of X200-4 utilize two retaining rings (135) with early configurations of hydrostatic pump idler gear (119). Later configurations of X200-4 do not utilize retaining rings (135) with later configurations of hydrostatic pump idler gear (119).

REPLACE BEARINGS ON SPUR GEARS AND SHAFTS – Cont.

4. Remove two retaining rings (135) when present.

5. Remove inner race and rollers of bearings (133, 134) from hydrostatic pump idler gear (119).

WARNING

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

6. Heat bearing retaining plate (116) for one hour.

7. Press outer race of bearing (133) from bearing retaining plate (116).

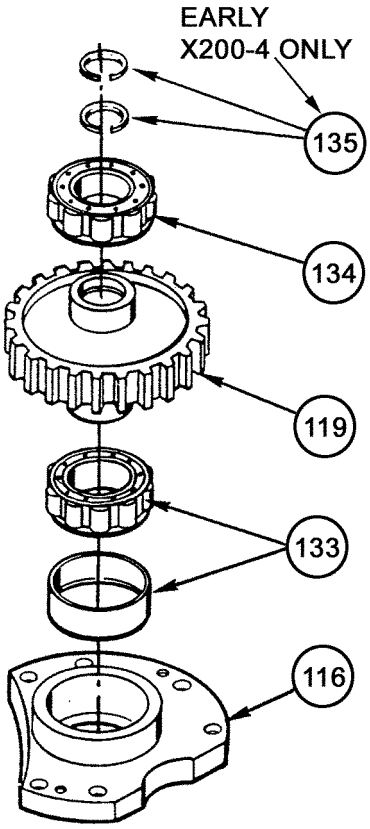


Figure 52. Hydrostatic Pump Idler Gear and Bearing Retaining Plate.

Install Bearings

1. Heat bearing retaining plate (116) for one hour.
2. Press new outer race of bearing (133) to a seat in shoulder of bearing retaining plate (116).
3. Press against the numbered end of bearing (133) to install inner race and rollers of bearing (133) to a seat against the shoulder of hydrostatic pump idler gear (119).
4. Press against the numbered end of bearing (134) to install inner race and rollers of bearing (134) to a seat against the shoulder of hydrostatic pump idler gear (119).
5. Install bearing (130) to a seat against shoulder on left steer and output sun gear (36).

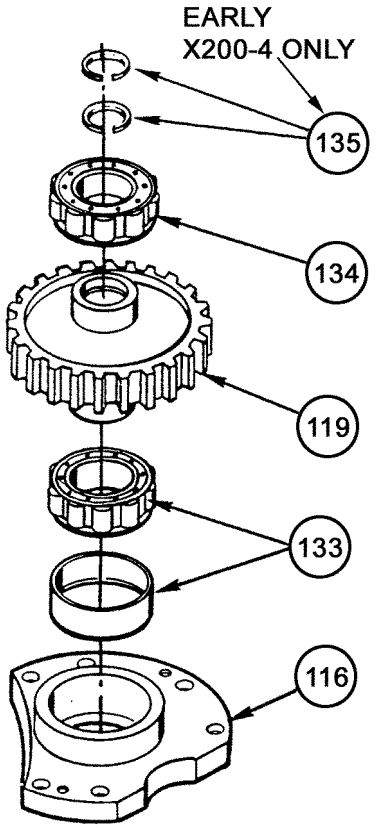


Figure 52. Hydrostatic Pump Idler Gear and Bearing Retaining Plate. (Repeated)

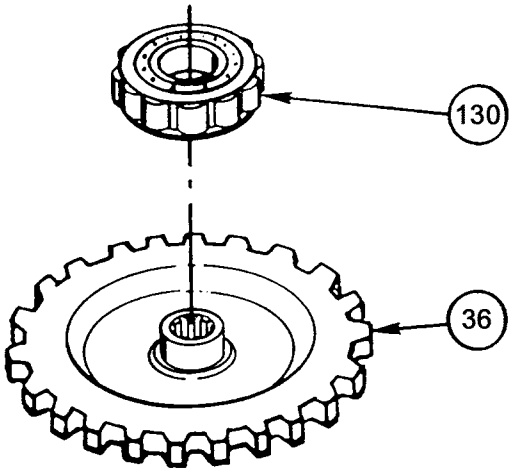


Figure 53. Left Steer Gear.

REPLACE BEARINGS ON SPUR GEARS AND SHAFTS – Cont.

6. Install bearing (132) to a seat against shoulder on left output shaft (47).

7. Install bearing (131) to a seat against shoulder on left steer gear (46).

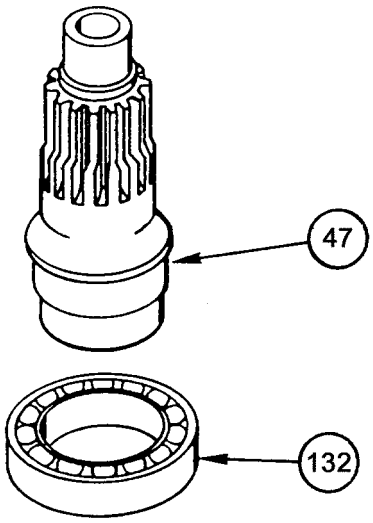


Figure 51. Left Output Shaft. (Repeated)

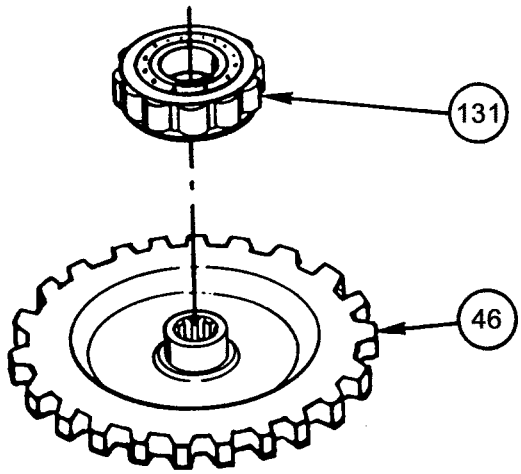


Figure 50. Left Steer Gear. (Repeated)

CAUTION

When removing, handling, or installing clutch pack, keep all clutch plates 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 plate 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.

REPAIR FORWARD CLUTCH HOUSING ASSEMBLY

Remove Forward Clutch Housing Assembly Components

1. Remove retaining ring (136).
2. Remove Clutch Assembly (hub) (137).
3. Remove body hub (138).
4. Remove thrust washer (139).
5. Remove clutch pack consisting of five friction plates (140) and five reaction plates (141).
6. Using wrench and Bar and Stud Assembly (WP 0025, Item 3) and Clutch Compressor (WP 0025, Item 4) , compress retaining plate (142) to gain access to retaining ring (143).
7. Remove retaining ring (143).
8. Remove Bar and Stud Assembly (WP 0025, Item 3) and Clutch Compressor (WP 0025, Item 4) from housing.
9. Remove retaining plate (142).
10. Remove sixteen compression helical springs (144).
11. Remove piston (145) from clutch housing (146).
12. Remove inner seal (147) and outer seal (148) from piston (145). Discard seals (147, 148).

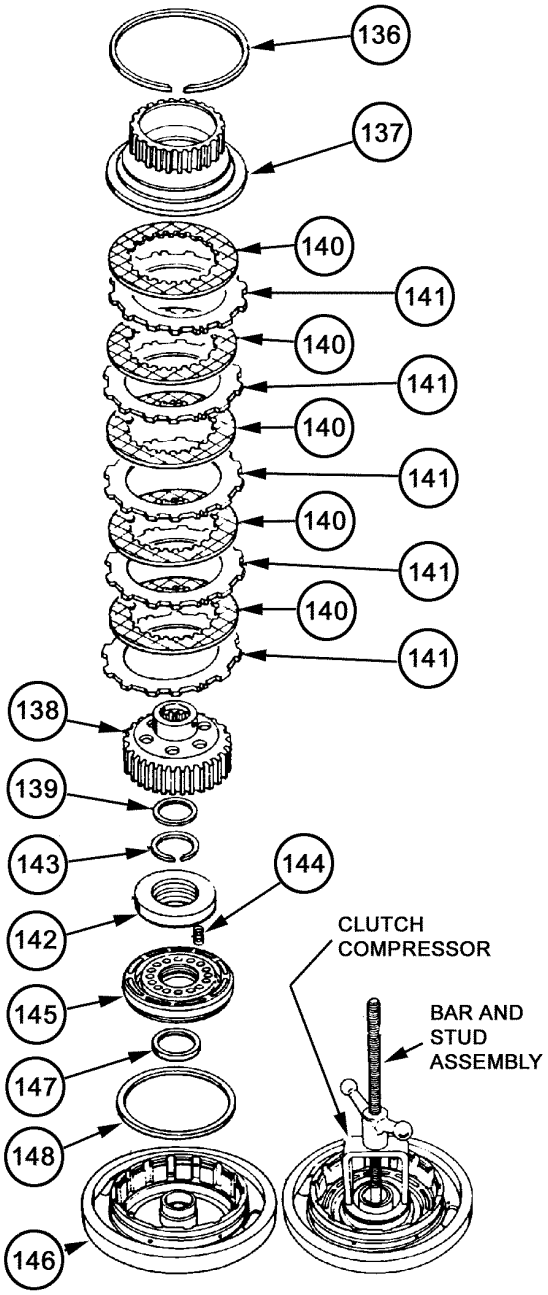


Figure 54 Forward Clutch Housing Assembly Components.

REPAIR FORWARD CLUTCH HOUSING ASSEMBLY - Cont.

Install Forward Clutch Housing Assembly Components

1. Install new outer seal (148) and new inner seal (147) onto piston (145). Coat seals (147, 148) with Petrolatum (WP 0024, Item 14).

2. Coat inside surface of clutch housing (146) with light coat of Petrolatum,(WP 0024, Item 14).

3. Install Inner Seal Protector (WP 0025, Item 17) over hub of clutch housing (146). Coat Inner Seal Protector (WP 0025, Item 17) with light coat of Petrolatum (WP 0024, Item 14).

4. Install piston (145), spring holes upward, into clutch housing (146).

5. Remove Inner Seal Protector (WP 0025, Item 17).

6. Install sixteen springs (144) into spring holes in piston (145).

7. Install retaining plate (142) over springs (144).

8. Lay retaining ring (143) in place on retaining plate (142).

9. Using Bar and Stud Assembly (WP 0025, Item 3) and Clutch Compressor (WP 0025, Item 4), compress retaining plate (142) against spring force to access groove for retaining ring (143).

10. Install retaining ring (143).

11. Remove Bar and Stud Assembly (WP 0025, Item 3) and Clutch Compressor (WP 0025, Item 4).

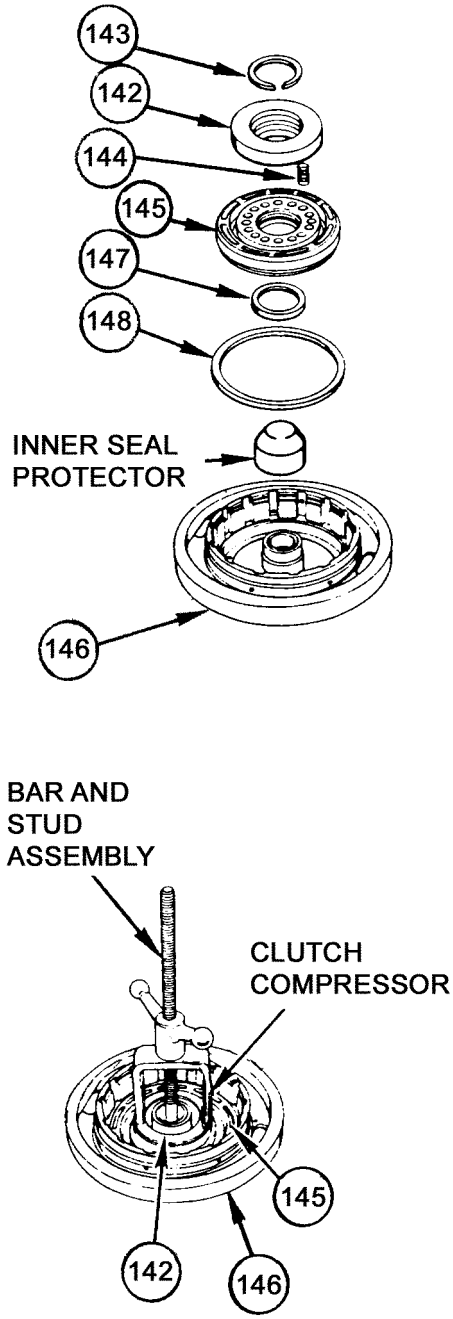


Figure 55. Outer and Inner Seals.

REPAIR FORWARD CLUTCH HOUSING ASSEMBLY - Cont.

12. Coat thrust washer (139) with Petrolatum (WP 0024, Item 14). Install thrust washer (139) in under side of body hub (138).

13. Install body hub (138) over retaining plate (142).

14. Soak five friction plates (140) in Lubricating Oil, Engine (WP 0024, Item 12) for two minutes prior to assembly.

15. Install one reaction plate (141), then one friction plate (140). Continue until all five friction plates (141) and five reaction plates (140) are installed.

16. Install Clutch Assembly (hub) (137).

17. Install retaining ring (136).

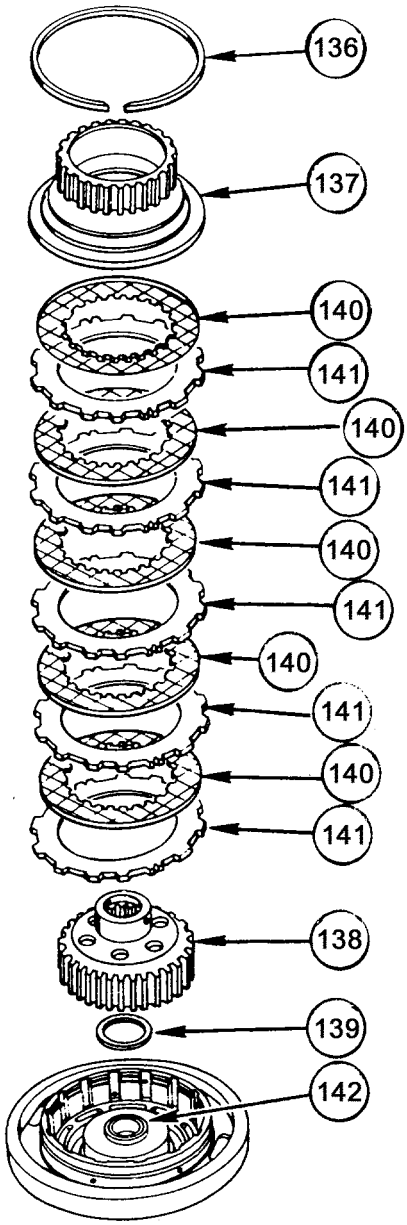


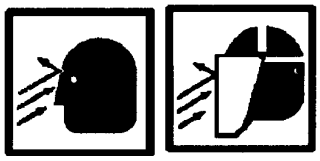
Figure 56. Forward Clutch Housing Assembly Components.

REPAIR FORWARD CLUTCH HOUSING ASSEMBLY - Cont.

Check Assembled Clutch for Damaged Seals

1. Apply Petrolatum (WP 0024, Item 14), onto two seals (149) on smaller hub of the Leak Test Fixture Assembly (WP 0025, Item 7). Install the fixture all the way into Forward Clutch Housing Assembly (74).

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.

2. Connect air hose (150) to coupling (151) and try to turn hub (138). If hub (138) can be turned, repeat Install Forward Clutch Housing Assembly Components task to replace damaged seals. If hub (138) will not turn, the Clutch Assembly is OK.

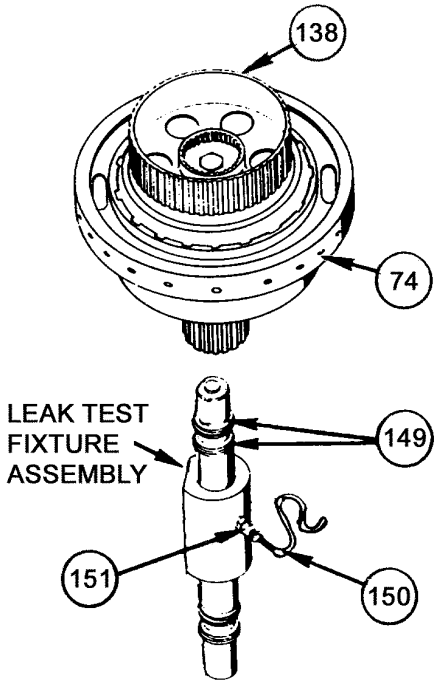


Figure 57. Leak Test Fixture Assembly.

REPAIR FOURTH AND REVERSE CLUTCH HOUSING ASSEMBLY

CAUTION

When removing, handling, or installing clutch pack, keep all clutch 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 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.

REPAIR FOURTH AND REVERSE CLUTCH HOUSING ASSEMBLY - Cont.

Remove Fourth and Reverse Clutch Housing Assembly Components

1. Remove retaining ring (152).
2. Remove clutch plate (backing plate) (153).
3. Remove clutch pack consisting of five friction plates (154) and five reaction plates (155).
4. Using wrench and Bar and Stud Assembly (WP 0025, Item 3) and Clutch Compressor (WP 0025, Item 4) , compress retaining plate (156) to gain access to retaining ring (157).
5. Remove retaining ring (157).
6. Remove Bar and Stud Assembly (WP 0025, Item 3) and Clutch Compressor (WP 0025, Item 4) from housing (158).
7. Remove retaining plate (156).
8. Remove sixteen compression helical springs (159).
9. Remove piston (161) from clutch housing (158).
10. Remove inner seal (161) and outer seal (162) from piston (160). Discard seals (161, 162).

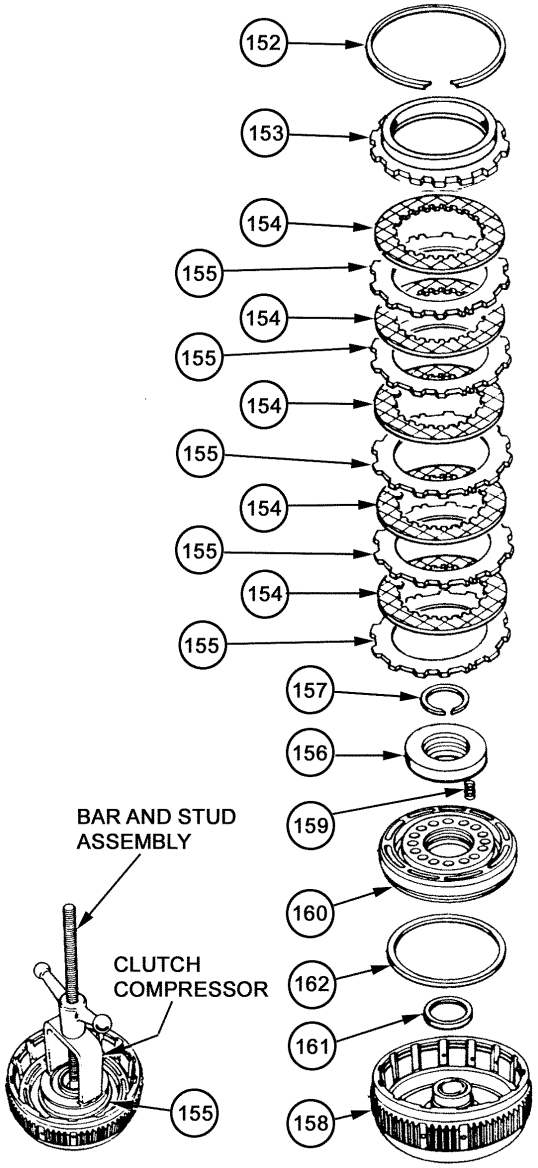


Figure 58. Fourth and Reverse Clutch Housing Assembly Components.

REPAIR FOURTH AND REVERSE CLUTCH HOUSING ASSEMBLY – Cont.

Install Fourth and Reverse Clutch Housing Assembly Components

1. Install new outer seal (162) and new inner seal (161) onto piston (160). Coat seals (161,162) with Petrolatum (WP 0024, Item 14).

2. Coat clutch housing (158) surface with light coat of Petrolatum (WP 0024, Item 14).

3. Install Inner Seal protector (WP 0025, Item 17) over hub of Housing Assembly (158). Coat Inner Seal protector (WP 0025, Item 17) with light coat of Petrolatum (WP 0024, Item 14).

4. Install piston (160), spring holes upward, into clutch housing (158).

5. Remove Inner Seal protector (WP 0025, Item 17) .

6. Install sixteen springs (159) into spring holes in piston (160).

7. Install retaining plate (156) over springs (159).

8. Lay retaining ring (157) in place on retaining plate (156).

9. Using wrench and Bar and Stud Assembly (WP 0025, Item 3) and Clutch Compressor (WP 0025, Item 4) , compress retaining plate (156) against spring force to access groove for retaining ring (157).

10. Install retaining ring (157).

11. Remove Bar and Stud Assembly (WP 0025, Item 3) and Clutch Compressor (WP 0025, Item 4) from Clutch Assembly.

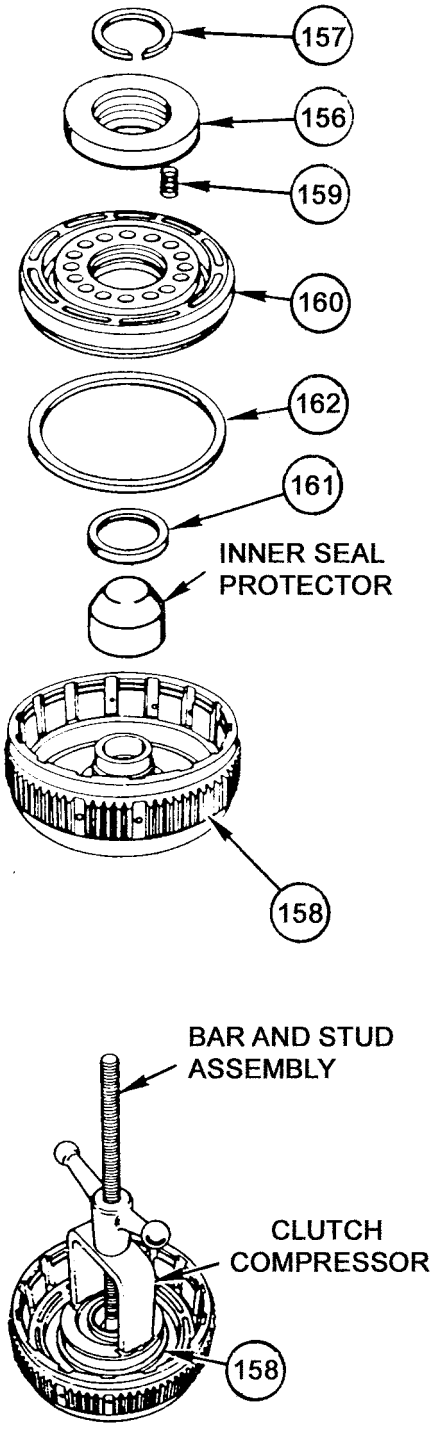


Figure 59. Inner and Outer Seals.

REPAIR FOURTH AND REVERSE CLUTCH HOUSING ASSEMBLY – Cont.

12. Soak five friction plates (154) in Lubricating Oil (WP 0024, Item 12) for two minutes prior to assembly.

13. Install one reaction plate (155), then one friction plate (154). Continue until all five reaction plates (155) and five friction plates (154) are installed into clutch housing (158).

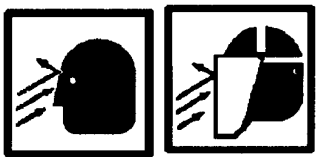
14. Install backing plate (153).

15. Install retaining ring (152).

Check Assembled Clutch for Damaged Seal

1. Apply Petrolatum (WP 0024, Item 14) onto two seals (149) on larger hub of the Leak Test Fixture Assembly (WP 0025, Item 7). Install the fixture all the way into Clutch Assembly (79).

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.

2. Connect air hose (150) to coupling (151) and watch for plates (154) and (155) to press together. If the plates did not press together, repeat Remove Fourth and Reverse Clutch Housing Assembly Components task to replace the damaged seals. If plates moved, the Clutch Assembly is OK.

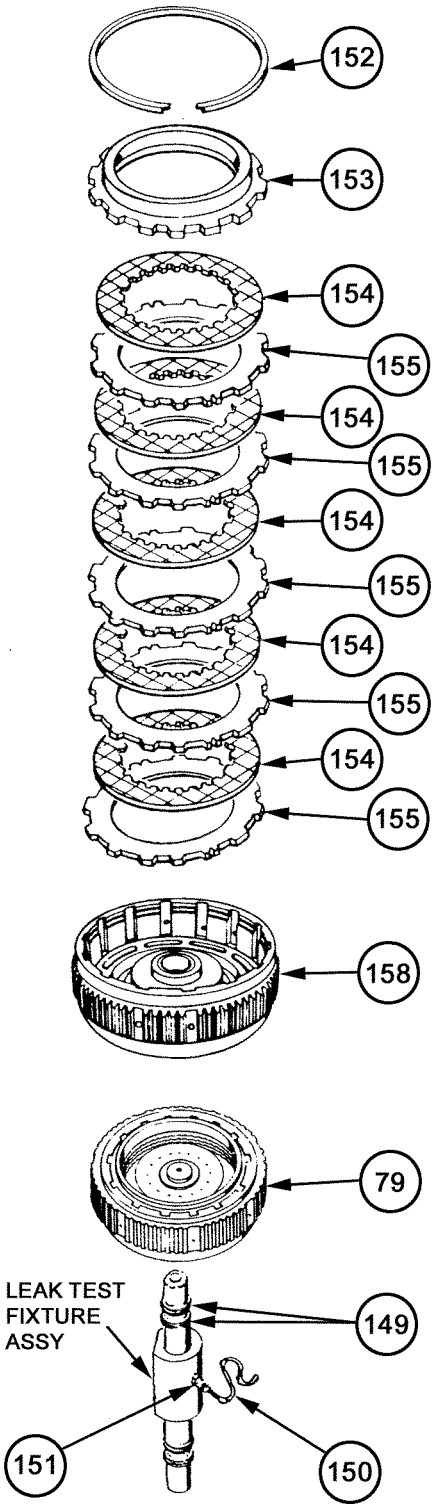


Figure 60. Fourth and Reverse Clutch Housing Assembly Components.

REPAIR SECOND AND THIRD CLUTCH PISTON HOUSING ASSEMBLIES

NOTE

This task will repair either Second Clutch Piston Housing Assembly or Third Clutch Piston Housing Assembly.

Disassemble Clutch Piston Housing Assembly

1. Remove Piston Assembly (163) from piston housing (164).
2. Remove seals (165, 166) from Piston Assembly (163). Discard seals (165, 166).

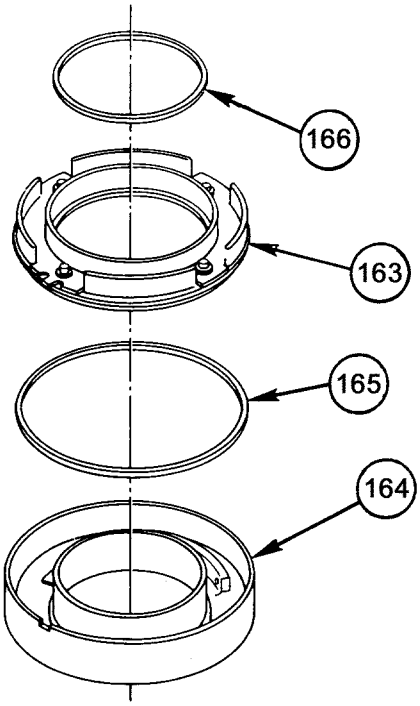


Figure 61. Piston Assembly Components.

REPAIR OF THE CENTER HOUSING ASSEMBLY – Cont. 0016 00

REPAIR SECOND AND THIRD CLUTCH PISTON HOUSING ASSEMBLIES - Cont.

3. Compress spring retainer (167) and, cut and remove four push-on nuts (locking rings) (168). Discard push-on nuts (locking rings) (168).

4. Remove spring retainer (167).

5. Remove twelve springs (169) from piston (170).

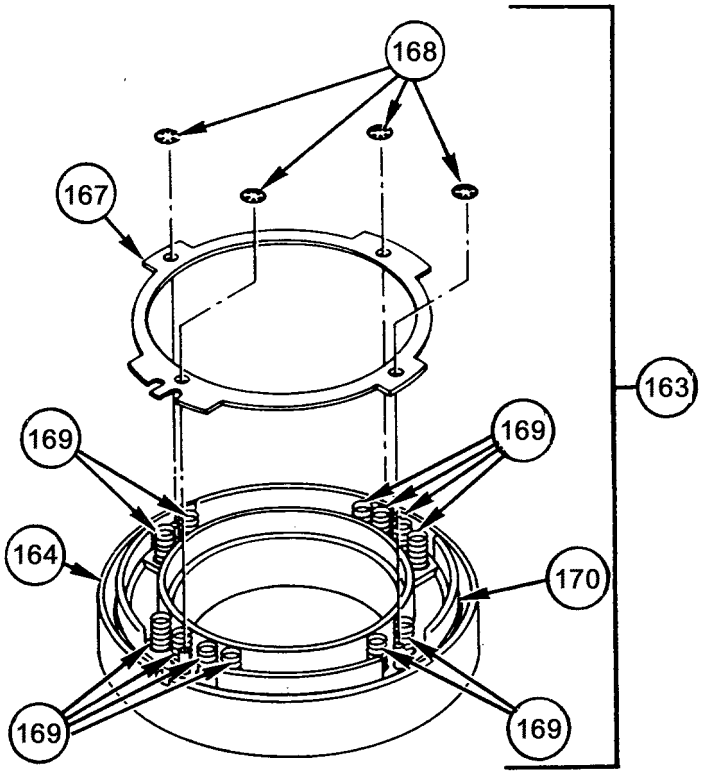


Figure 62. Piston Assembly Components.

REPAIR SECOND AND THIRD CLUTCH PISTON HOUSING ASSEMBLIES - Cont.

Assemble Clutch Piston Housing Assembly

1. Install piston (170) (without seals (165, 166)) into piston housing (164).
2. Install twelve springs (169) into spring holes in piston (170).
3. Install spring retainer (167). Index the spring retainer (167) with cutaways in piston housing (164).
4. Using Installer, Lock Ring (WP 0025, Item 14), install four new push-on nuts (locking rings) (168).
5. Remove Piston Assembly (163) from piston housing (164).
6. Install new seals (165, 166), seal lips downward, onto Piston Assembly (163). Coat seals (165, 166) with Petrolatum (WP 0024, Item 14).
7. Coat the seal mating surfaces of piston housing (164) with light coat of Petrolatum (WP 0024, Item 14).
8. Install Piston Assembly (163) into piston housing (164).

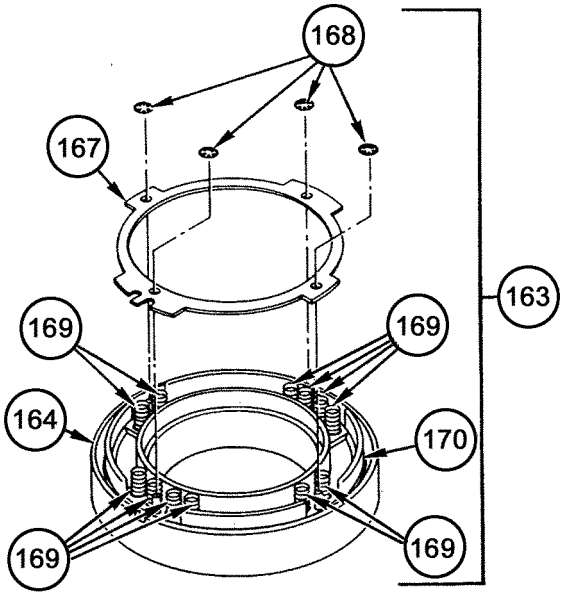


Figure 62. Piston Assembly Components. (Repeated)

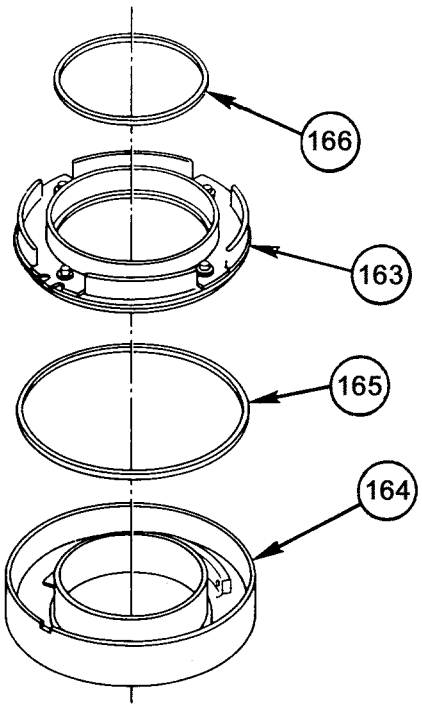


Figure 61. Piston Assembly Components. (Repeated)

REPLACE INPUT SHAFT COMPONENTS

NOTE

Early models of the X200-4A Transmission have a two piece shaft and rear P3 Carrier Assembly configuration. Later models of the X200-4A Transmission have an integral, one piece shaft and rear P3 Carrier Assembly configuration. Record part number of rear P3 Carrier Assembly. Installation of correct bevel gear driven shaft is dependent upon this part number.

Disassemble Input Shaft Components

1. Remove two seal rings (171) from shouldered shaft (range input shaft) (100). Discard seal rings (171).
2. Remove retaining ring (172).
3. Remove front internal gear (173) from range input shaft (100).
4. Remove range input shaft (100) with its attached parts from rear carrier drum (174).
5. Remove center carrier (95) from input shaft (100).

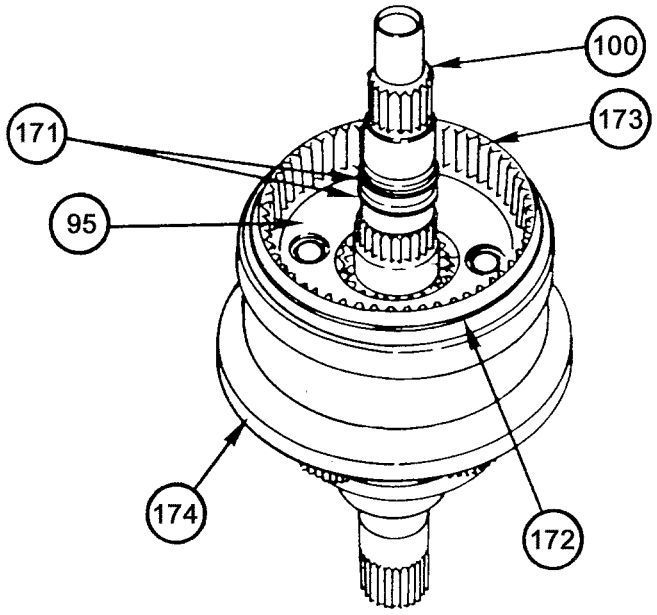


Figure 63. Range Input Shaft and Rear (P3) Carrier Assembly.

REPLACE INPUT SHAFT COMPONENTS – Cont.

6. Remove retaining ring (175) that holds spur gear (rear sun gear) (176) onto range input shaft (100).

7. Remove rear sun gear (176) and attached parts from range input shaft (100).

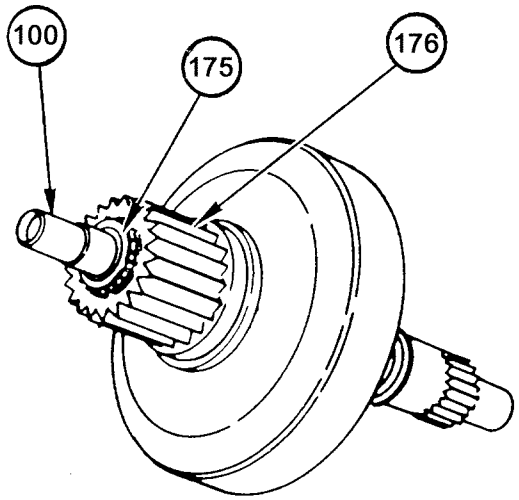


Figure 64. Range Input Shaft and Attached Parts.

8. Remove retaining ring (177) that holds rear sun gear (176) in internal gear (center carrier ring gear) (178).

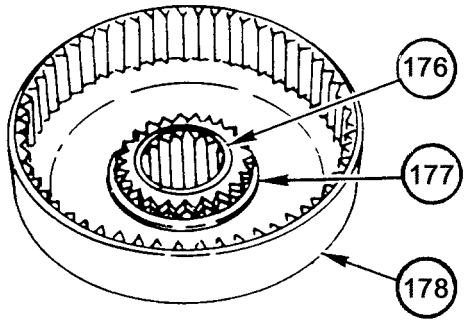


Figure 65. Center Carrier Ring Gear.

REPLACE INPUT SHAFT COMPONENTS – Cont.

9. Remove thrust washer (179) from range input shaft (100).

10. Remove Center Sun Gear Assembly (180) from range input shaft (100).

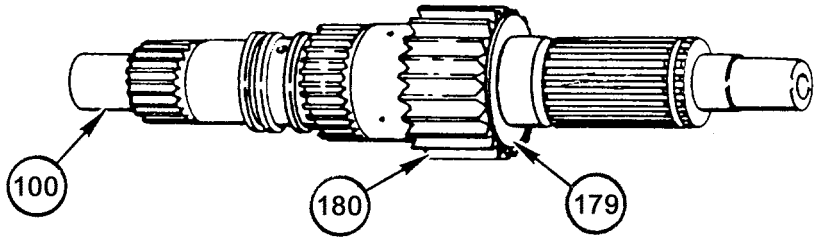


Figure 66. Range Input Shaft.

11. Remove thrust bearing races (181, 182) and thrust bearing (183) from surface of shaft (184) inside Rear Carrier Assembly (185).

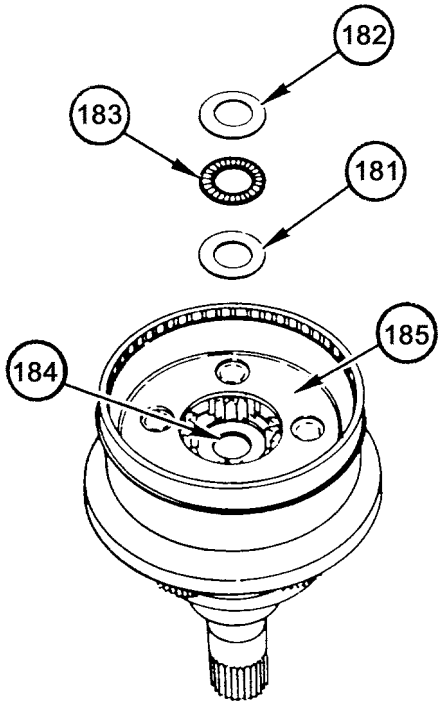


Figure 67. Rear (P3) Carrier Assembly.

REPLACE INPUT SHAFT COMPONENTS – Cont.

12. Remove retaining ring (186) that holds drum (174) onto Rear Carrier Assembly (185) or (187).

13. Remove drum (174) from Carrier Rear Assembly (185) or (187).

NOTE

Disassemble Steps 14 thur 17 and assemble Steps 1 thur 4 apply to transmission with Rear Carrier Assembly P/N (73342) 23018136 installed (185). Assemble Steps 5 thru 6 apply to transmission with Rear Carrier Assembly P/N (73342) 29533535 installed (187).

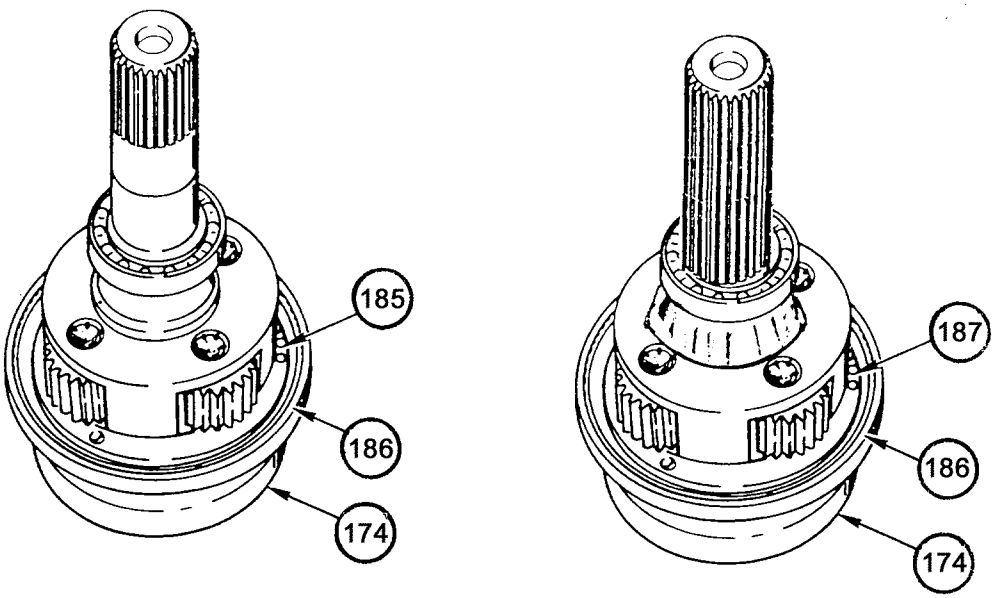


Figure 68. Rear (P3) Carrier Assemblies.

REPLACE INPUT SHAFT COMPONENTS – Cont.

14. Drive shaft (184) into Rear Carrier Assembly (185) so that access to retaining ring (188) is obtained.

NOTE

Opening of retaining ring (188) must be rotated so that it is between gears of Rear Carrier Assembly (185).

Do not remove retaining ring (188) unless parts require replacement.

15. Remove retaining ring (188) that holds shaft (184) to Rear Carrier Assembly (185). When retaining ring (188) is spread, drive downward on shaft (184).

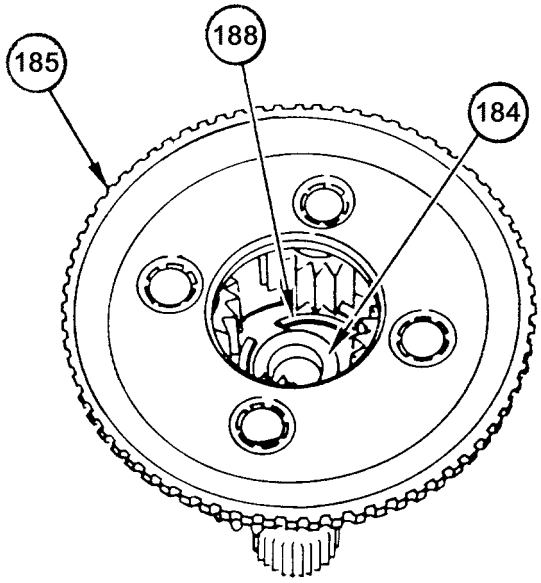


Figure 69. Rear (P3) Carrier Assembly.

REPLACE INPUT SHAFT COMPONENTS – Cont.

NOTE

Do not remove pin (189) and bearing (190) unless replacement is necessary.

16. Remove pin (189) from shaft (184). Discard pin (189).

17. Press bearing (190) from shaft (184). Discard bearing (190)

Assemble Input Shaft Components

1. Install new bearing (190) to seat against the shoulder of shaft (184).

2. Install new pin (189) to a height of 1.92-1.96 inch (48.8-49.7 mm) above surface of shaft (184), measured from opposite side of shaft.

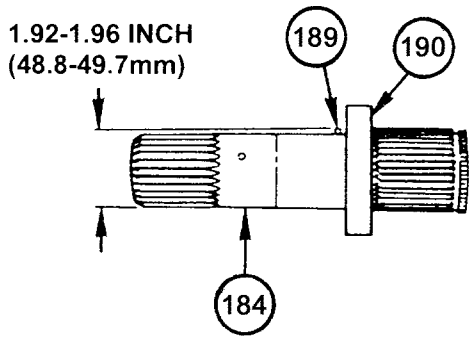


Figure 70. Governor Drive Gear Pin.

REPAIR OF THE CENTER HOUSING ASSEMBLY – Cont. 0016 00

REPLACE INPUT SHAFT COMPONENTS – Cont.

3. Install Rear Carrier Assembly (185) onto shaft (184).

NOTE

Opening of retaining ring (188) must be rotated so that it is between gears of Rear Carrier Assembly (185).

4. Install retaining ring (188) that holds shaft (184) to Rear Carrier Assembly (185).

NOTE

Do not remove bearing (190) unless replacement is necessary.

5. Press bearing (190) from shaft of Rear Carrier Assembly (187). Discard bearing (190).

6. Press new bearing (190) onto Rear Carrier Assembly (187). Press bearing to seat against the shoulder of the shaft and Bushing Assembly (191).

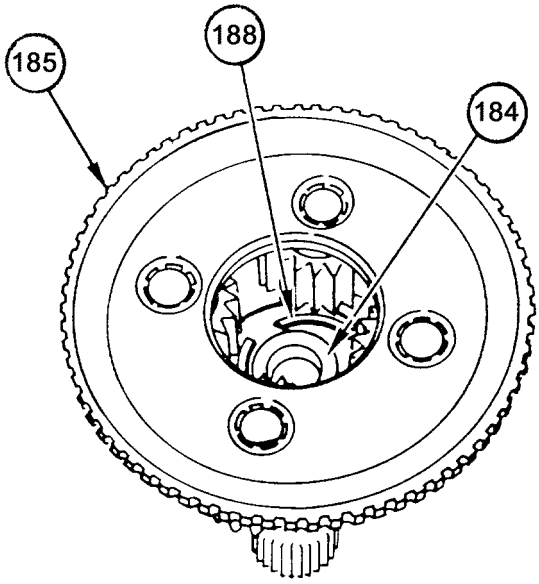


Figure 69. Rear (P3) Carrier Assembly. (Repeated)

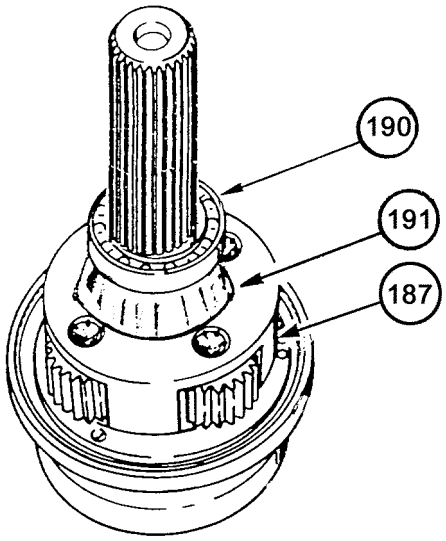


Figure 71. Rear (P3) Carrier Assembly.

REPLACE INPUT SHAFT COMPONENTS – Cont.

7. Install drum (174) onto carrier (185 or 187).
8. Install retaining ring (186) to hold drum (174) onto carrier (185 or 187).

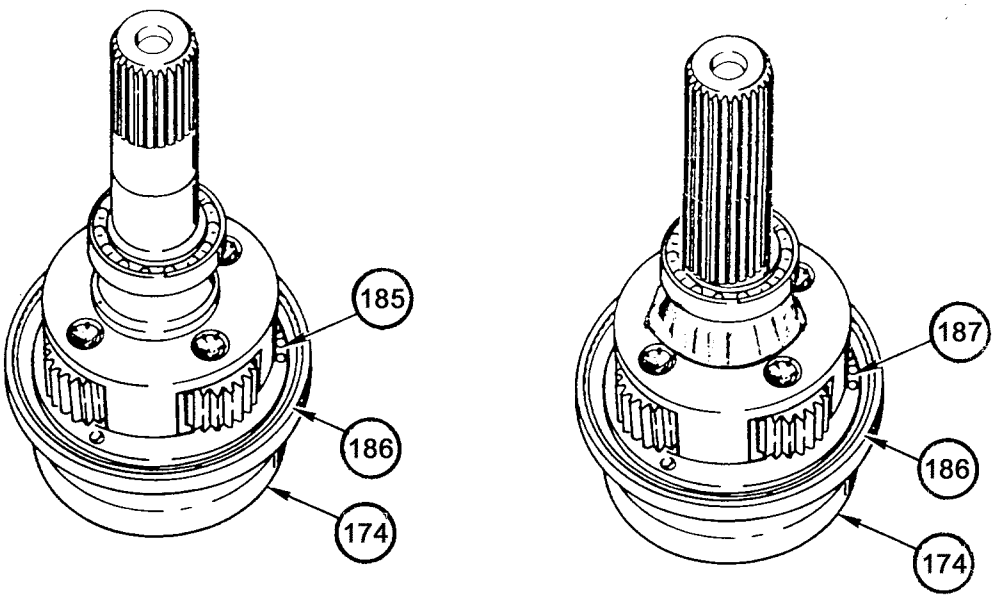


Figure 68. Rear (P3) Carrier Assemblies. (Repeated)

REPLACE INPUT SHAFT COMPONENTS – Cont.

9. Coat thrust bearing races (181, 182) and thrust bearing (183) with Petrolatum (WP 0024, Item 14).

10 Install race (181), bearing (183), and race (182) onto surface of shaft (184) inside rear carrier (185) or (187).

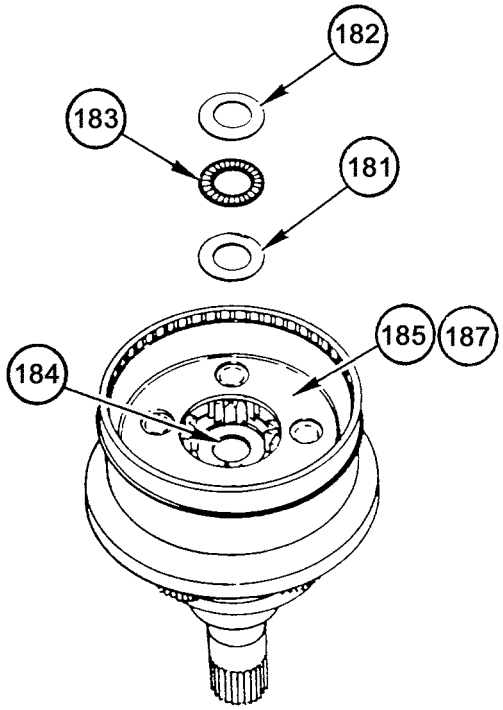


Figure 72. Rear (P3) Carrier Assembly.

REPLACE INPUT SHAFT COMPONENTS – Cont.

11. Install Center Sun Gear Assembly (180) onto range input shaft (100), indexing smaller splines next to two packing grooves in shaft (100).

12. Install thrust washer (179) onto range input shaft (100).

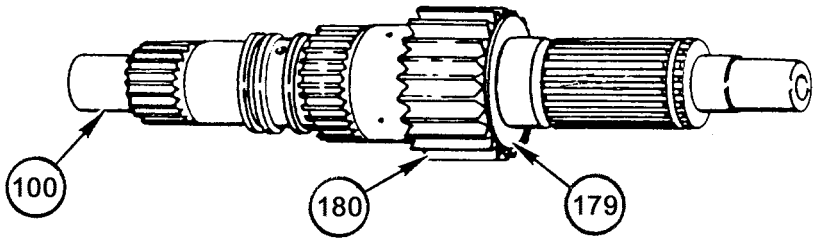


Figure 66 Range Input Shaft. (Repeated)

13. Install retaining ring (177) that holds rear sun gear (176) to center carrier ring gear (178).

14. Install rear sun gear (176) and attached parts onto range input shaft (100).

15. Install retaining ring (175) that holds rear sun gear (176) to range input shaft (100).

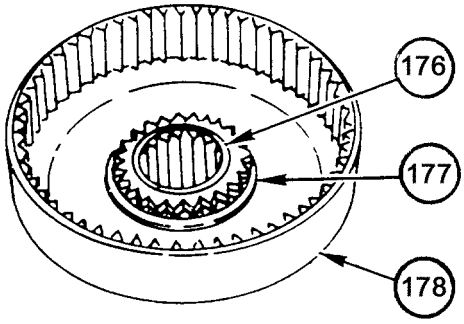


Figure 65. Center Carrier Ring Gear. (Repeated)

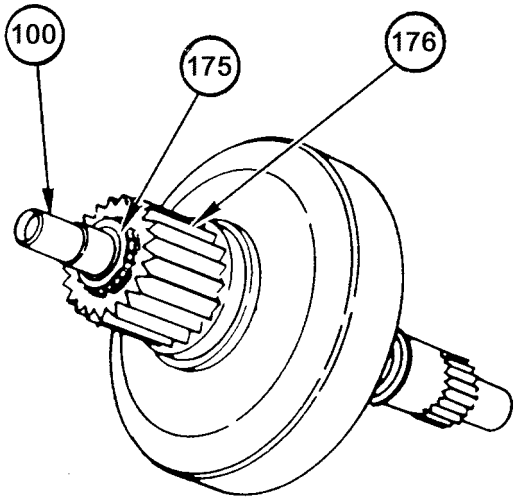


Figure 64. Range Input Shaft and Attached Parts (Repeated)

REPAIR OF THE CENTER HOUSING ASSEMBLY – Cont. 0016 00

REPLACE INPUT SHAFT COMPONENTS – Cont.

16. Install range input shaft (100) with its attached parts into rear carrier drum (174).
17. Install Center Carrier Assembly (95) on range input shaft (100).
18. Install front internal gear (173), large end downward, onto range input shaft (100).
19. Install retaining ring (172).
20. Install new two seal rings (171) onto range input shaft (100).

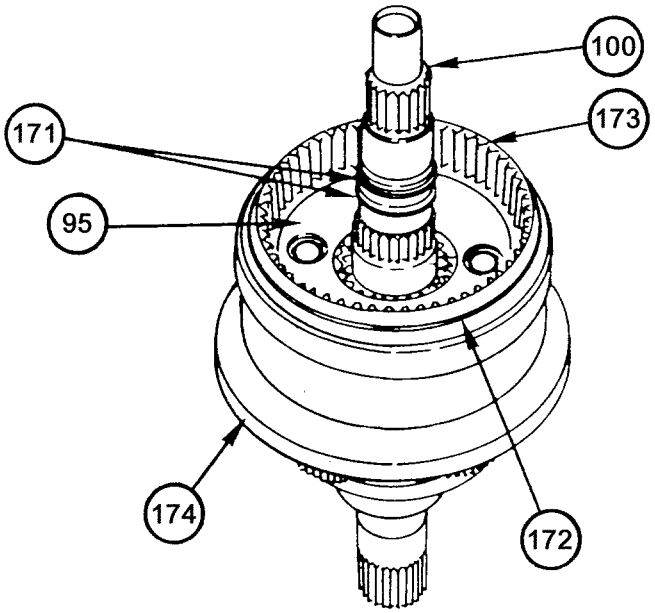


Figure 63. Input Shaft and Rear (P3) Carrier Assembly. (Repeated)

REPAIR CENTER HOUSING COMPONENTS

NOTE

Do not remove center housing components unless repair is necessary.

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 (134) in place. This is the outer race for bearing on hydrostatic pump 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 WP 0016 00-45 for removal of the inner races and rollers.

REPAIR OF THE CENTER HOUSING ASSEMBLY – Cont. 0016 00

REPAIR CENTER HOUSING COMPONENTS – Cont.

Remove Center Housing Components

1. Heat center housing (65) near bearing race (134) for one hour.
2. Remove bearing race (134).

NOTE

Left side of center housing has outer race and rollers (192) 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 Remove Range Input Gears and Hydrostatic Drive Gears WP 0011 00-44, for removal of the inner race for range input gear.

3. Heat center housing (65) near outer race and rollers (192) for one hour.
4. Remove outer race and rollers (192).

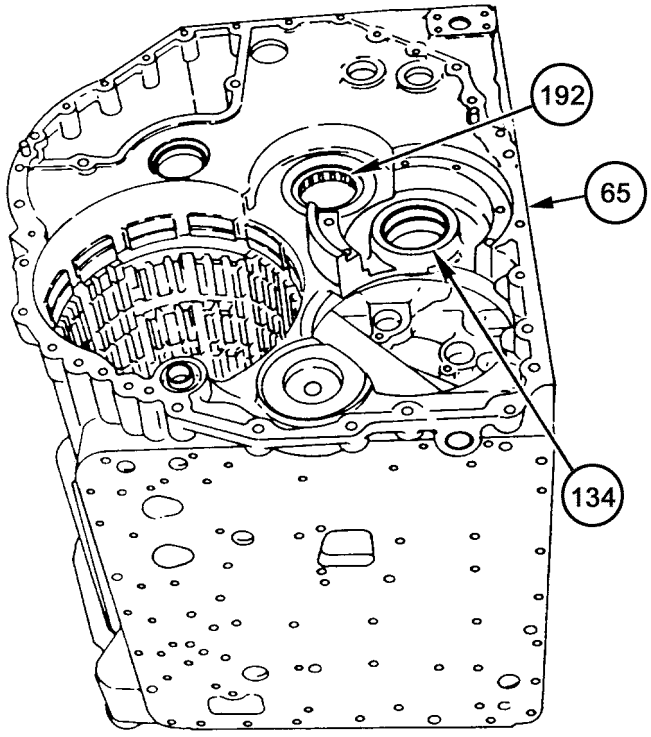


Figure 73. Center Housing.

REPAIR CENTER HOUSING COMPONENTS – Cont.

5. Remove oil transfer sleeve (193) from left side of center housing (65).
6. Remove two headless straight pins (194) from left side of center housing (65).
7. Remove sleeve spacer (tube) (195) from left side of center housing (65).
8. Remove pipe plug (196) from back side of center housing (65).
9. Remove five pipe plugs (197).

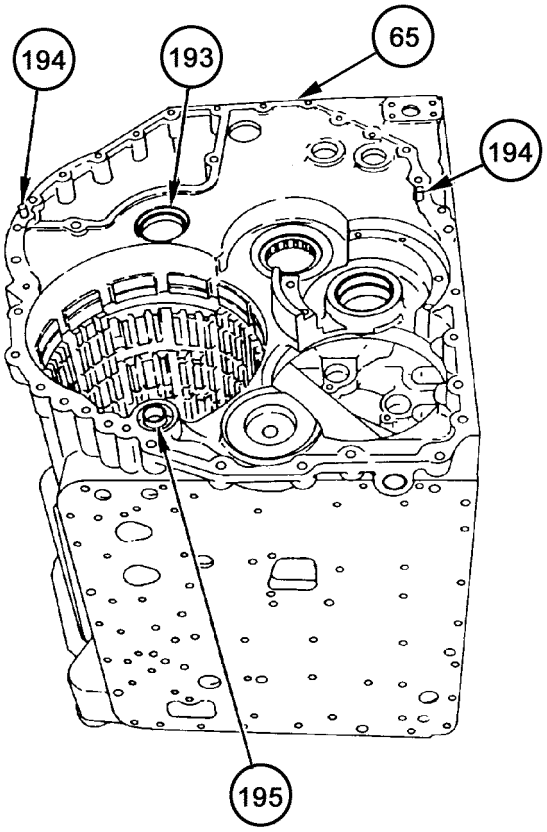


Figure 74. Center Housing.

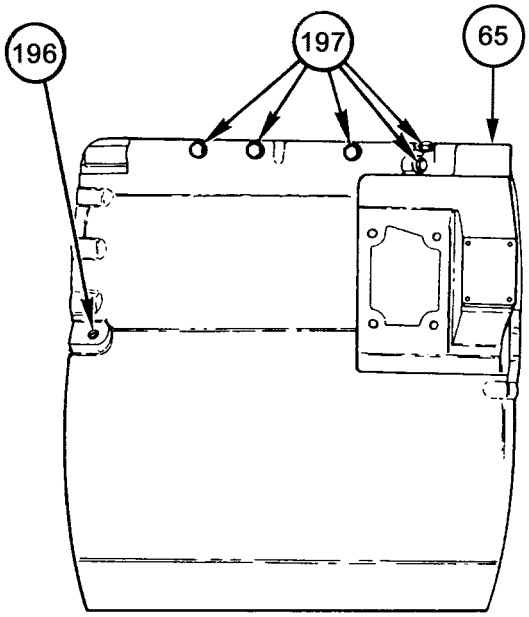


Figure 75. Pipe Plugs.

REPAIR OF THE CENTER HOUSING ASSEMBLY – Cont. 0016 00

REPAIR CENTER HOUSING COMPONENTS – Cont.

10. Using wrench pliers, remove two headless straight pins (198) from front side of center housing (65).

11. Remove two headless straight pins (brake reaction pins) (199) from right side of center housing (65).

12. Remove two headless straight pins (dowels pins) (200) from right side of center housing (65).

13. Remove one headless straight (dowel pin) (201) from right side of center housing (65).

14. Remove needle roller bearing (202) from right side of center housing. Remove thrust washer (203).

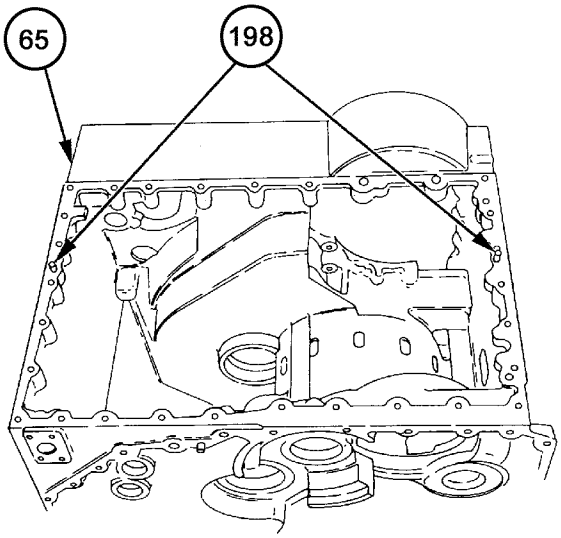


Figure 76. Straight Pins.

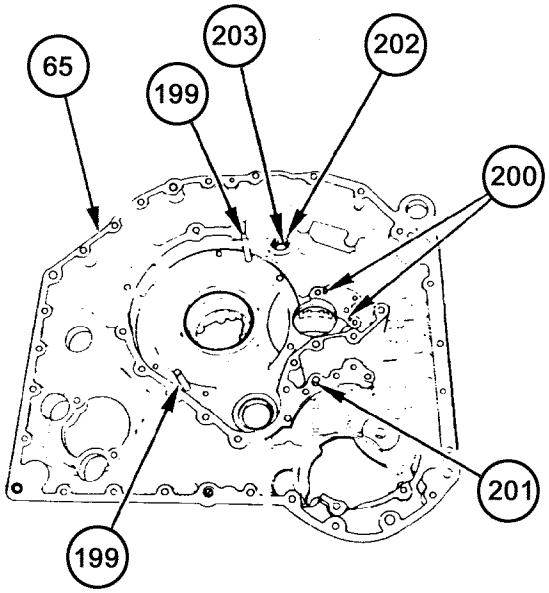


Figure 77. Center Housing.

REPAIR CENTER HOUSING COMPONENTS – Cont.

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 (130, 131) in place. These are for bearings on left steer and output sun 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 WP 0016 00-45, for removal of the inner races and rollers.

15. Heat center support near bearing races (130, 131) for one hour.

16. Remove bearing races (130,131).

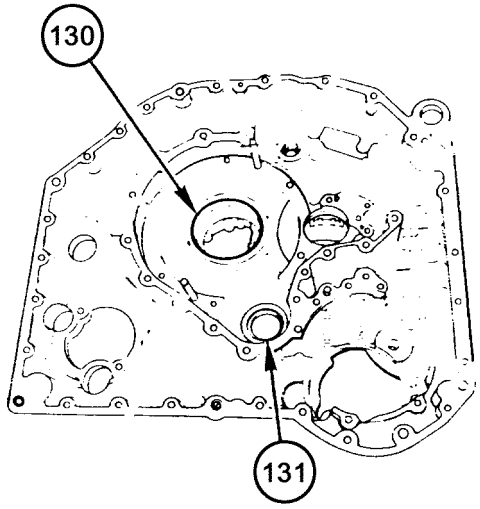


Figure 78. Center Housing.

REPAIR CENTER HOUSING COMPONENTS – Cont.

Replace Helical Coil Inserts

NOTE

Use coil thread insert tool kit to replace any of eight screw thread inserts (helical coil inserts) (204).

1. Pry out end of insert (204).
2. Remove insert (204).
3. Clean out threads on center housing (65).
4. Retap threads at locations of removed inserts (204).

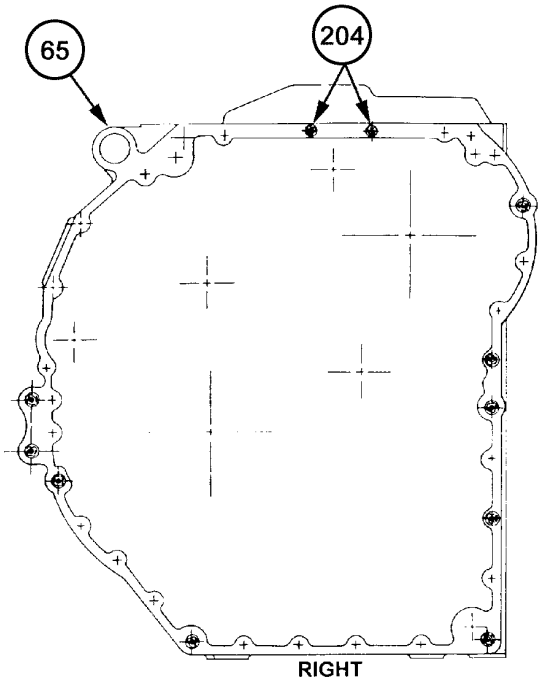


Figure 79. Helical Coil Inserts.

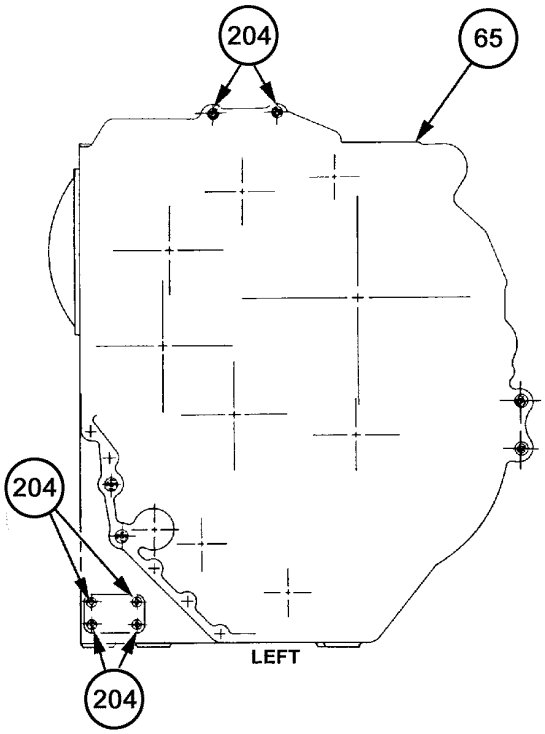
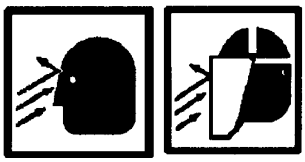


Figure 80. Helical Coil Inserts.

REPAIR OF THE CENTER HOUSING ASSEMBLY – Cont. 0016 00

REPAIR CENTER HOUSING COMPONENTS – Cont.

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.

5. Clean out insert hole in center housing (65) with compressed air.
6. Screw new insert (204) onto insertion tool of coil thread insert kit.
7. Using insertion tool, screw new insert (204) one to two turns below surface of center housing.
8. Drive locking keys in place.
9. Remove insertion tool. Remove tang.

Replace Screw Thread Inserts

Table 1. Insert Screw Thread Table

Insert Item Number	Insert Part Number	Fabricated Tool Parts Required			Wrench Size	Installation Depth Below Center Housing
		Bolt Size	Nut Size	Washer Size		
205	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)
206	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)
207	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)

REPAIR CENTER HOUSING COMPONENTS – Cont.

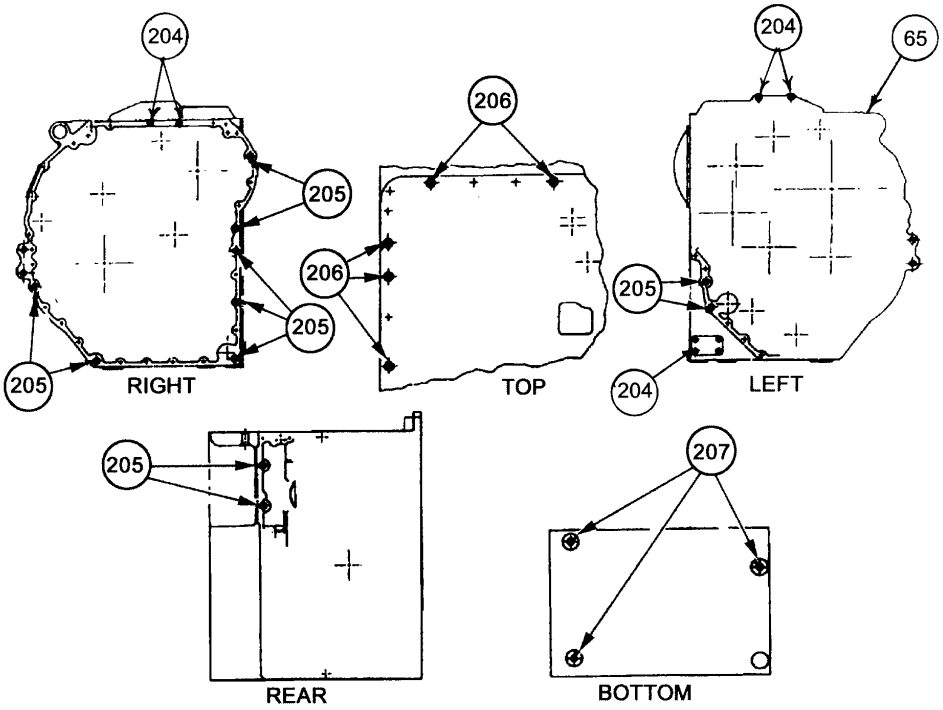


Figure 81. Inserts.

NOTE

Refer to Figure 81 and Table 1, for location of inserts and correct size of bolt, nut, and flat washer to use for replacement of any screw thread inserts (205, 206, 207).

1. If any insert(s) (205, 206, 207) must be replaced, assemble bolt, nut, and flat washer selected from Table 1. Refer to (WP 0027, Item 6) to fabricate spacer for the respective insert to be replaced.

2. Screw tip of bolt into one insert (205, 206, 207) in center housing.

3. Using combination wrenches selected from Table 1, turn bolt to the left (counterclockwise) and remove insert (205, 206, 207).

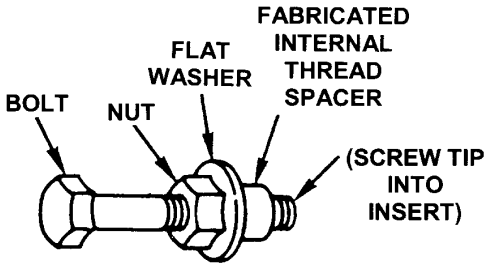


Figure 82. Insert Removal Tool.

REPAIR OF THE CENTER HOUSING ASSEMBLY – Cont. 0016 00

REPAIR CENTER HOUSING COMPONENTS – Cont.

4. If insert(s) (205, 206, 207) were removed, assemble bolt, nut, and insert selected from Table 1. Screw nut against insert.

5. Using combination wrenches selected from Table 1, install insert (205, 206, 207) into center housing to dimension shown in Table 1.

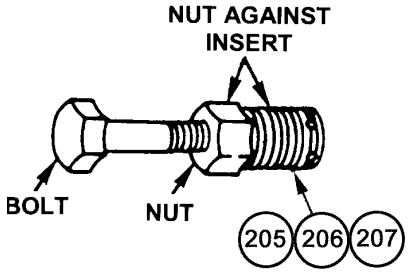


Figure 83. Insert Installation Tool.

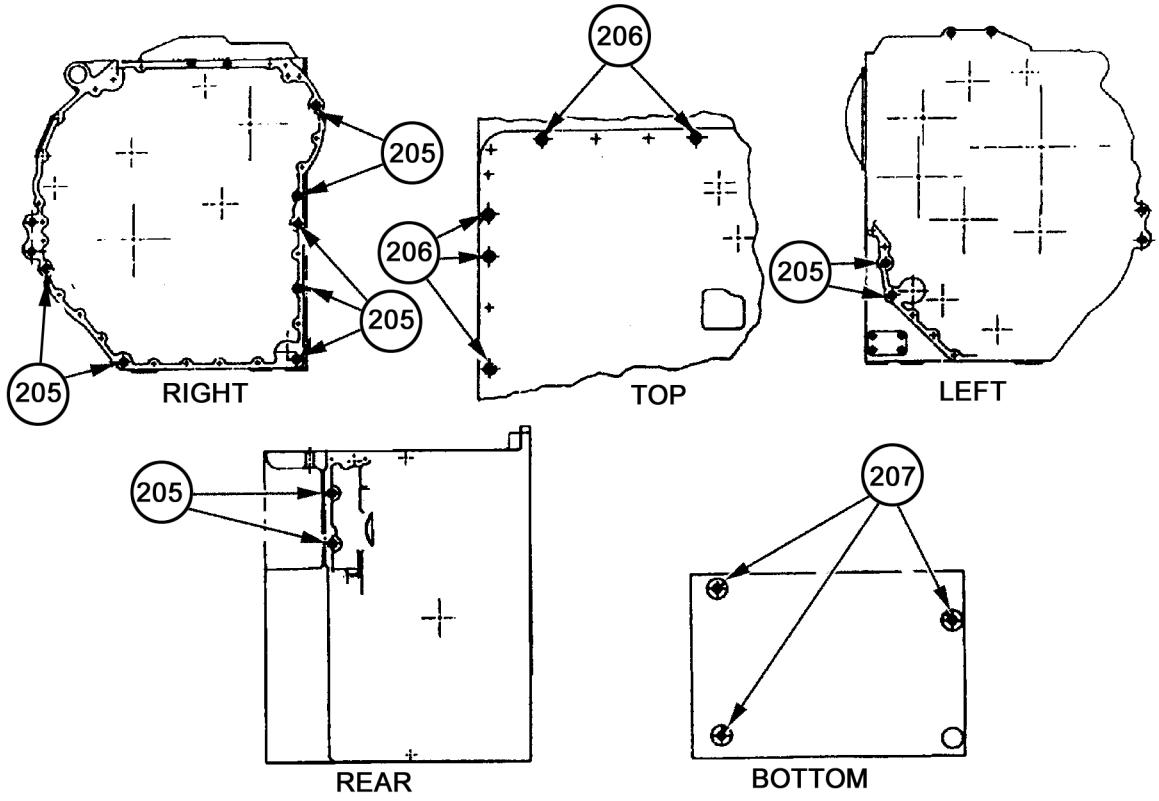


Figure 84. Inserts.

REPAIR CENTER HOUSING COMPONENTS – Cont.

Replace Identification Plate

CAUTION

DO NOT REMOVE IDENTIFICATION PLATE (208) 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.

1. If identification plate is loose or must be replaced, remove four screws (209).
2. If identification plate must be replaced, remove Identification plate (208).
3. Install identification plate (208) and secure it with four new screws (209).

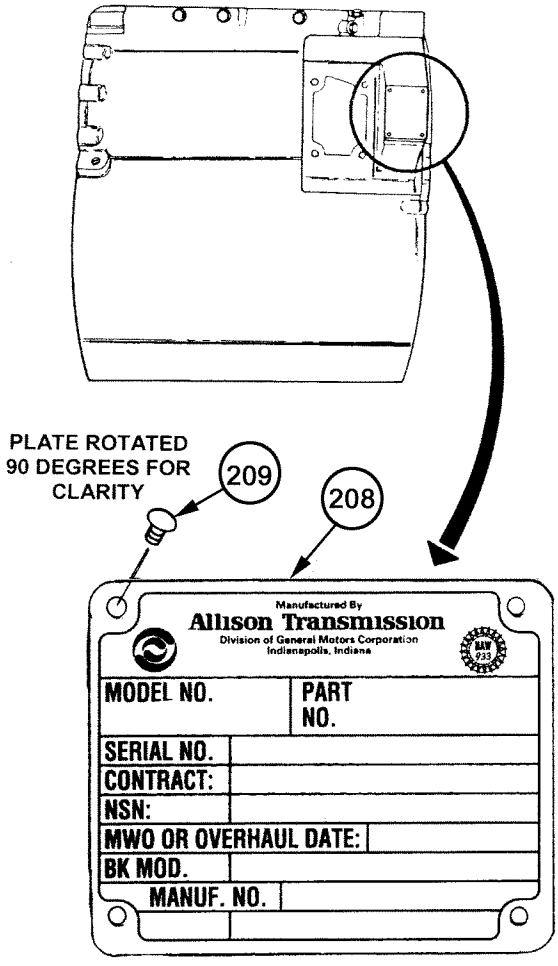


Figure 85. Identification Plate.

REPAIR OF THE CENTER HOUSING ASSEMBLY – Cont. 0016 00

REPAIR CENTER HOUSING COMPONENTS – Cont.

Install Center Housing Components

WARNING

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

1. Heat center housing near locations for bearing races (130, 131) 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.

2. Freeze new bearing races (130, 131) in Carbon Dioxide (WP 0024, Item 5) for one hour.

REPAIR OF THE CENTER HOUSING ASSEMBLY – Cont. 0016 00

REPAIR CENTER HOUSING COMPONENTS – Cont.

3. Install new bearing races (130, 131) into bores in center housing to a firm seat against the shoulders in the bores.

4. Allow center housing (65) to return to room temperature.

5. Install thrust washer (203) in right side of center housing (65).

6. Press with driver against numbered end to install bearing (202). Press bearing (202) to a depth of 6.28 inches (159.5 mm) below the outmost surface of the right side of center housing.

7. Install one pin (201) to a height of 0.40 inches (10.2 mm) above the surface of the right side of center housing.

8. Install two pins (200) to a height of 0.25 inches (6.4 mm) above the surface of the right side of center housing.

9. Install two pins (199) to a height of inches (8.00 mm) above the surface of the right side of center housing.

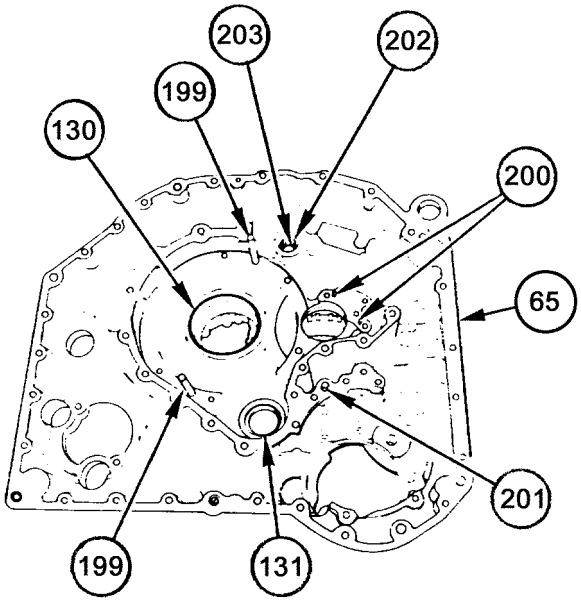


Figure 86. Center Housing.

REPAIR CENTER HOUSING COMPONENTS – Cont.

10. Install two pins (198) to a height of 0.38 inches (9.7 mm) above the front side of center housing.
11. Install five pipe plugs (197).
12. Torque five plugs (197) to 50-60 lb-in (6-7 N·m).
13. Install pipe plug (196) in back side of center housing.
14. Torque plug (196) to 50-60 lb-in (6-7 N·m).

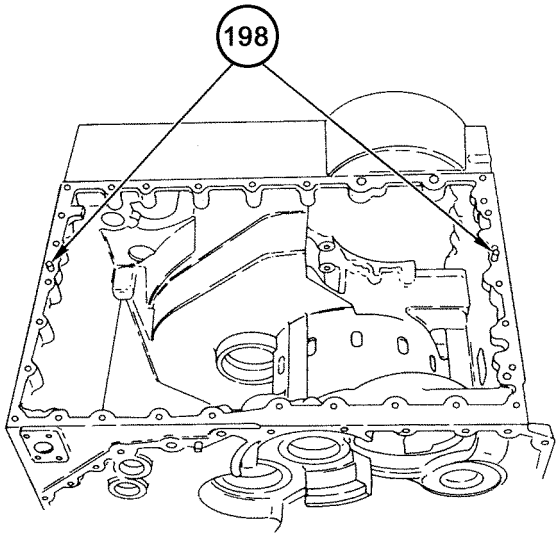


Figure 87. Straight Pins.

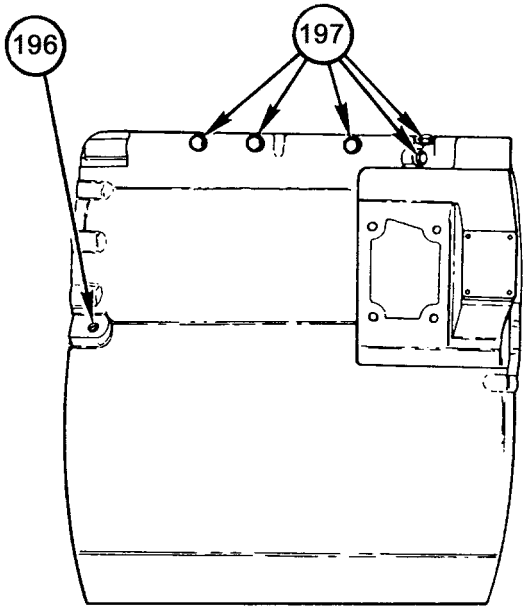


Figure 88. Pipe Plugs.

REPAIR OF THE CENTER HOUSING ASSEMBLY – Cont. 0016 00

REPAIR CENTER HOUSING COMPONENTS – Cont.

15. Install sleeve spacer (tube) (195) to a height of 0.12 inches (3.0 mm) above left side of center housing (65).

16. Install two pins (194) to a height of 0.38 inches (9.7 mm) above left side of center housing (65).

17. Install oil transfer sleeve (193) to a seat in its bore in left side of center housing (65).

WARNING

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

18. Heat center housing near location for outer race and rollers (192) for one hour.

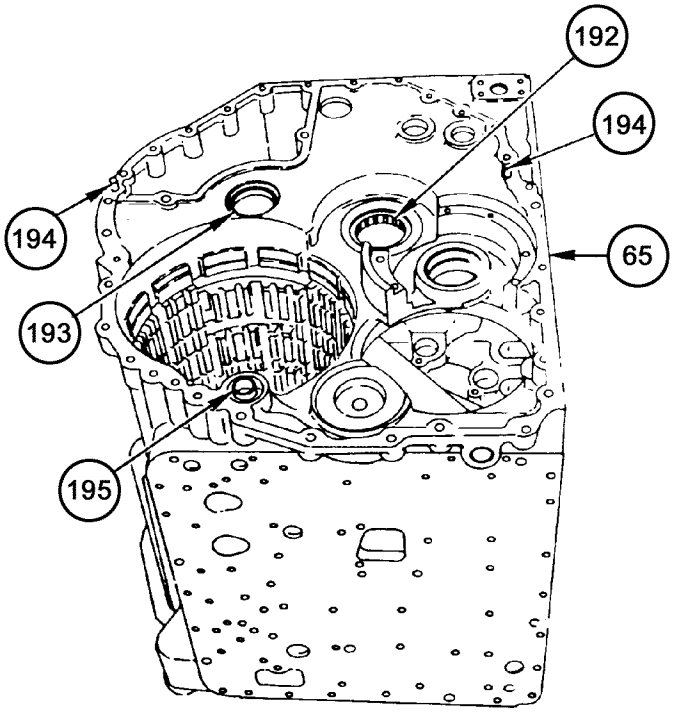


Figure 89. Center Housing.

REPAIR CENTER HOUSING COMPONENTS – Cont.

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.

19. Freeze new outer race and rollers (192) in Carbon Dioxide (WP 0024, Item 5) for one hour.
20. Install new race and rollers (192) to a firm seat against the shoulder in the bore.
21. Allow center housing to return to room temperature.

WARNING

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

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.

22. Heat center housing near location for bearing race (134) for one hour.

REPAIR OF THE CENTER HOUSING ASSEMBLY – Cont. 0016 00

REPAIR CENTER HOUSING COMPONENTS – Cont.

23. Freeze new bearing race (134) in Carbon Dioxide (WP 0024, Item 5) for one hour.

24. Install new bearing race (134) into bore in center housing to a firm seat against the shoulder in the bore.

25. Allow center housing to return to room temperature.

NOTE

Later manufactured Housing Assembly center (machined) will have an orifice plug installed at location (210). Orifice plug (210) is installed flush to 0.100 below housing surface. The orifice plug was installed as an oil flow product improvement. This orifice plug is not maintenance significant. If orifice plug (210) is missing, do not attempt to install one.

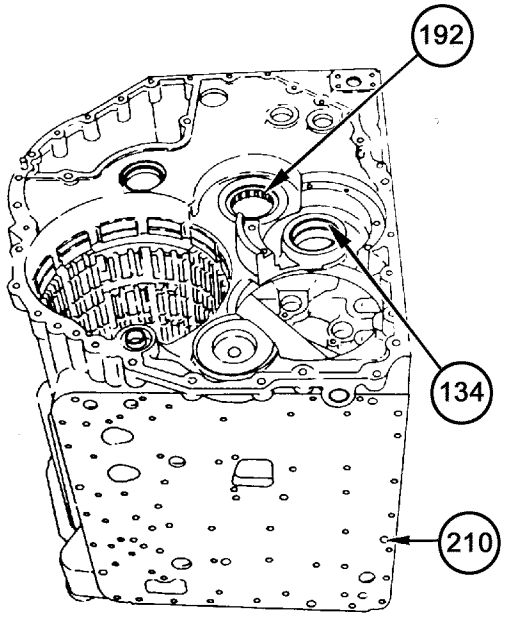


Figure 90. Center Housing.

INSTALL IDLER GEAR ASSEMBLY

NOTE

Transmission is on maintenance stand, left end up.

1. Install hydrostatic pump idler gear (119) into center housing (65).
2. Install bearing retaining plate (116) into center housing (65).
3. Install six washers (115) and bolts (114) to retain bearing retaining plate (116) to center housing (65).
4. Torque six bolts (114) to 36-43 lb-ft (49-68 N·m).

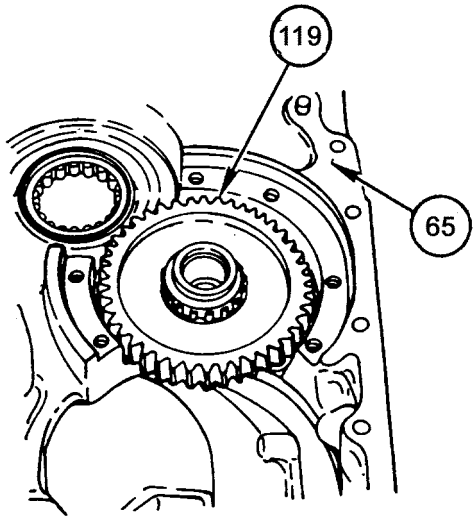


Figure 42. Hydrostatic Pump Idler Gear. (Repeated)

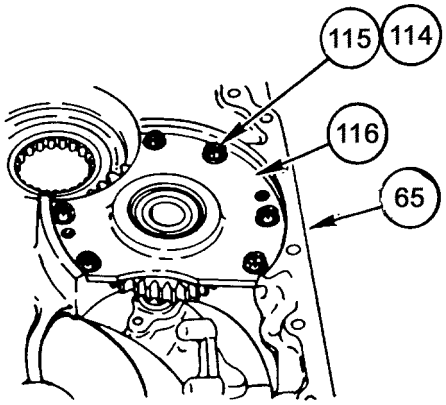


Figure 40. Bearing Retaining Plate. (Repeated)

INSTALL RANGE PACK

1. Install new packings (112, 113) onto first clutch piston (111). Coat packings (112, 113) with Petrolatum (WP 0024, Item 14).

2. Install Inserter and Remover (WP 0025, Item 12) into center housing.

3. Mark outer piston face with Marker, Tube Type, Black (WP 0024, Item 13) across from tang. Mark range bore above slot in center housing. This will assist in properly locating first clutch piston (111) in center housing.

4. Grasp cross members on first clutch piston (111) at two points, 180 degrees apart and install first clutch piston (111) into center housing. Index the tang on piston with the slot in center housing.

5. Remove Inserter and Remover (WP 0025, Item 12).

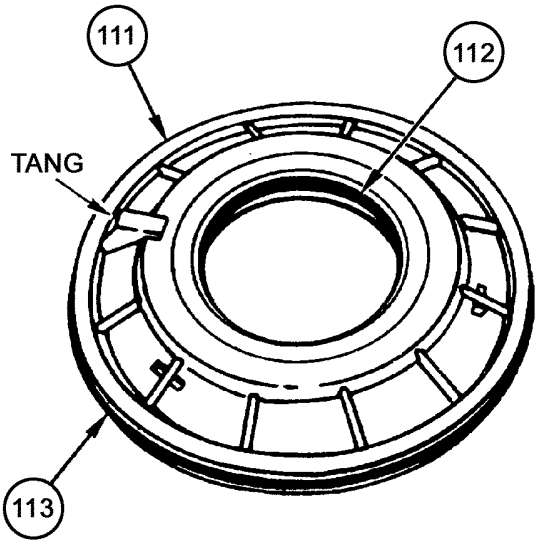


Figure 39. First Clutch Piston. (Repeated)

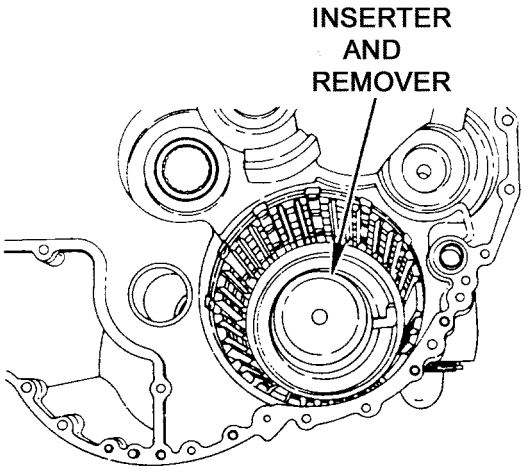


Figure 91. Seal Assembly Inserter and Remover.

INSTALL RANGE PACK – Cont.

6. Install twenty-six springs (110) into spring pockets in first clutch piston (107).

7. Install piston spring retainer (108) over springs (110). Be sure twenty-six springs (110) are seated in piston spring retainer (108).

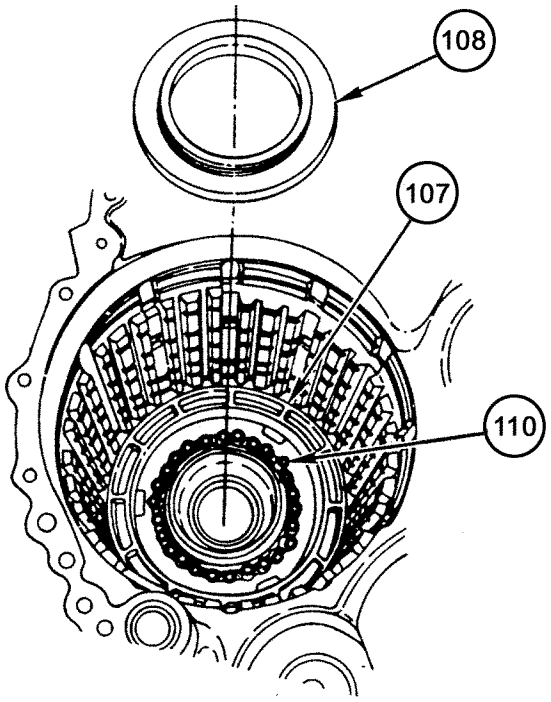


Figure 92. Springs and First Clutch Piston.

INSTALL RANGE PACK – Cont.

8. Remove wing nut from Bar and Stud Assembly (WP 0025, Item 3) and Clutch Compressor (WP 0025, Item 6).

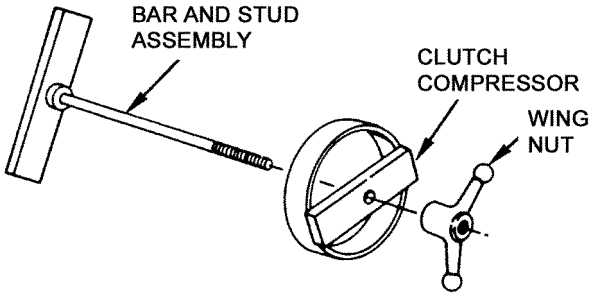


Figure 36. Bar and Stud Assembly and Compressor. (Repeated)

9. Put Bar and Stud Assembly (WP 0025, Item 3) inside transmission through first clutch piston (107) in range pack bore and hold in place. Place Shim (WP 0027, Item 5) under Bar and Stud Assembly (WP 0025, Item 3) so that Bar and Stud Assembly is level, centered, and will compress spring retainer evenly.

10. Install Clutch Compressor (WP 0025, Item 6) over stud, then install wing nut.

11. Turn wing nut on Clutch Compressor (WP 0025, Item 6) until piston spring retainer (108) is compressed enough to enable installation of retaining ring (109).

12. Reach through opening in Clutch Compressor (WP 0025, Item 6) and install retaining ring (109).

13. Remove wing nut and Clutch Compressor (WP 0025, Item 6).

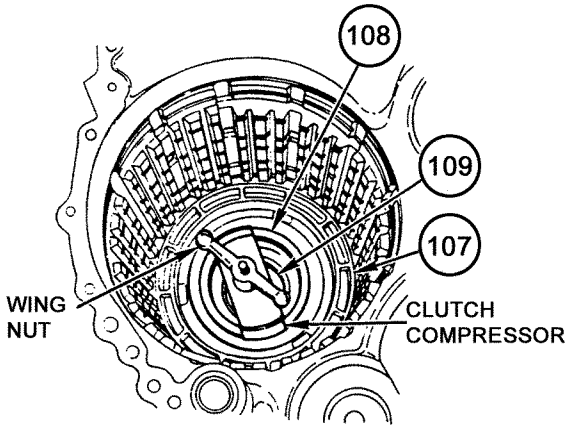


Figure 37. Bar and Stud Assembly and Compressor Installed. (Repeated)

INSTALL RANGE PACK – Cont.

CAUTION

When removing, handling, or installing clutch packs, keep all clutch plates 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 plate or plate needs to be replaced, replace the entire clutch pack. Individual clutch plates should not be replaced, because such new plates will not have the surface contour of adjoining older plates, decreasing effectiveness of the clutch pack.

14. (First Clutch Pack) Install one of five reaction plates (211) into range pack bore.

15. Soak four friction plates (212) in Lubricating Oil (WP 0024, Item 12) for two minutes prior to assembly. Install one of four friction plates (212) onto reaction plate (211).

16. Install internal gear (106), shorter splines downward.

17. Install second of five reaction plates (211), then second of four friction plates (212) onto internal gear (106) until all five reaction plates (211) and all four friction plates (212) have been installed.

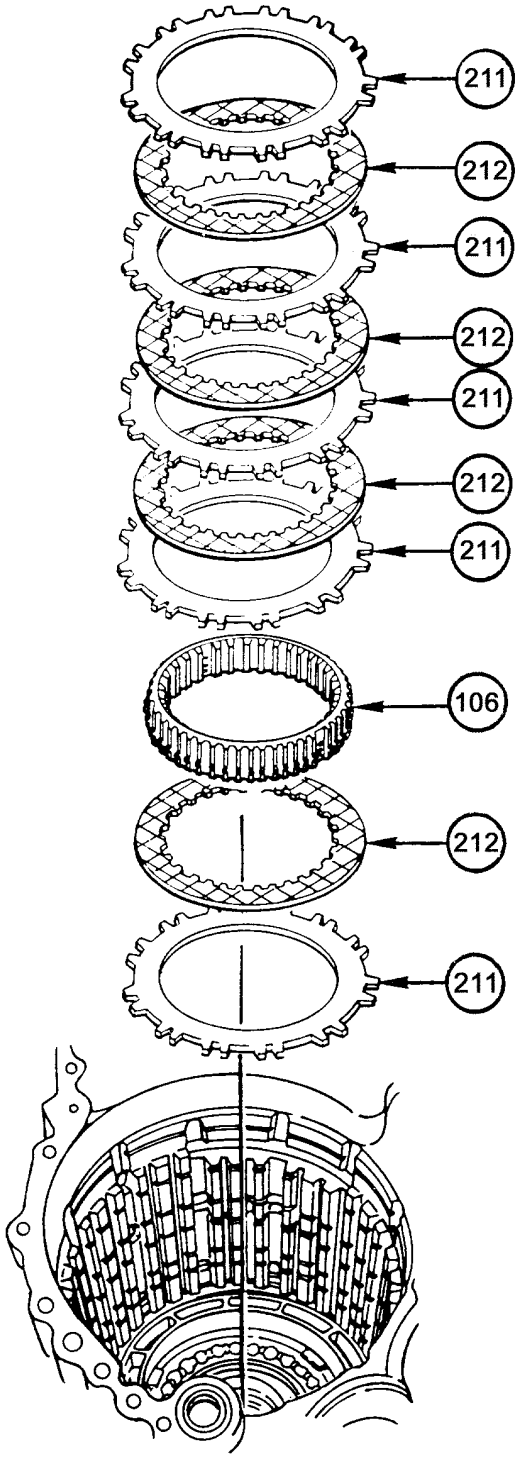


Figure 93. Range Pack Components.

INSTALL RANGE PACK – Cont.

18. Install clutch plate (backing plate) (106) onto reaction plate (211).
19. Install retaining ring (103) to retain backing plate (106).
20. Install retaining ring (102) into range pack bore.

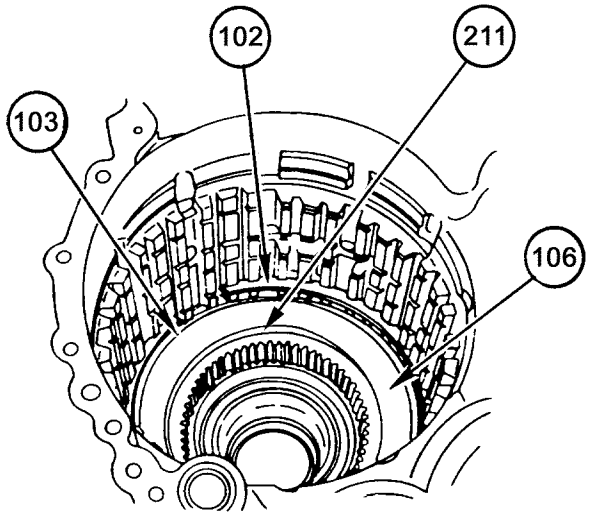


Figure 94. Range Pack Components.

REPAIR OF THE CENTER HOUSING ASSEMBLY – Cont. 0016 00

INSTALL RANGE PACK – Cont.

21. Put Lifter (WP 0025, Item 15) over end of shouldered shaft (range input shaft) (100) and put lower end of Lifter (WP 0025, Item 15) in groove below splined area of center sun gear (213).

22. Using thumb screw on Lifter (WP 0025, Item 15), tighten bottom of lifting tool in groove.

23. Install Hook (WP 0025, Item 11) in top of Lifter (WP 0025, Item 15).

24. Using hoist, Hook (WP 0025, Item 11) and Lifter (WP 0025, Item 15), lower range input shaft (100) and attached Center Carrier Assembly (95) to a seat against retaining ring (102).

25. Remove Hook (WP 0025, Item 11) and Lifter (WP 0025, Item 15).

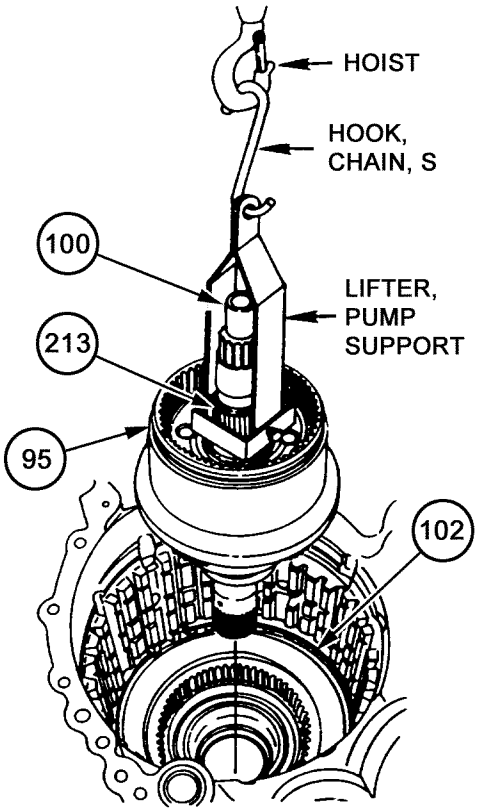


Figure 95. Special Tools.

REPAIR OF THE CENTER HOUSING ASSEMBLY – Cont. 0016 00

INSTALL RANGE PACK – Cont.

26. Using Marker, Tube Type, Black, (WP 0024, Item 13) mark edge of Second Clutch Piston Housing Assembly (99) above bolt hole.

27. Install Second Clutch Piston Housing Assembly (99), aligning bolt hole in piston Housing Assembly (99) with bolt hole in center housing.

28. Install washer (89) and bolt (88) through center housing and into Piston Housing Assembly (99) finger tight.

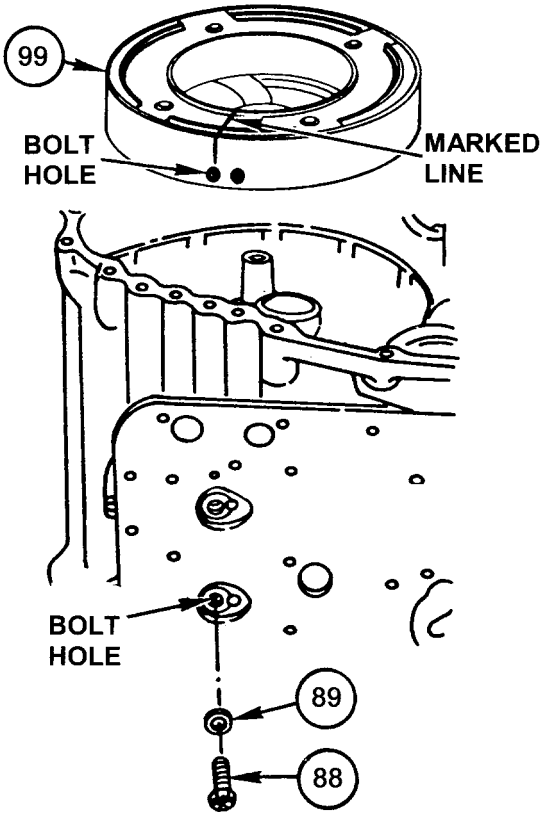


Figure 96. Mark Second Clutch Piston.

INSTALL RANGE PACK – Cont.

29. Using feeler gauge, measure space between Second Clutch Piston Housing Assembly (99) and top of retaining ring groove in range pack bore of center housing. Select retaining ring (96) from Table 2.

Table 2. Retaining Ring Selection

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. Install selected retaining ring (96).

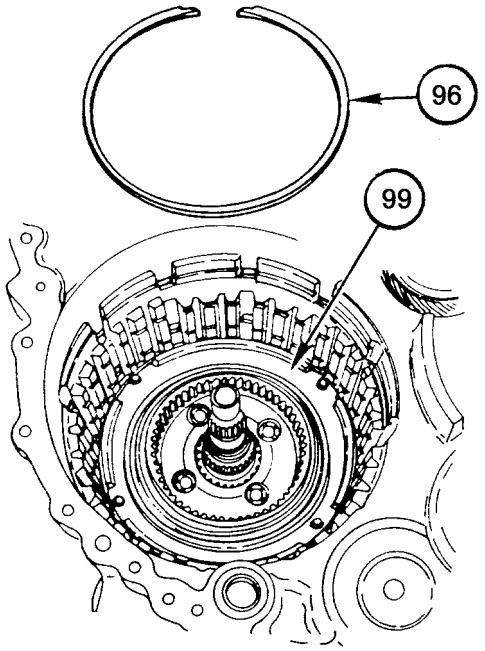


Figure 97 Select Retaining Ring.

REPAIR OF THE CENTER HOUSING ASSEMBLY – Cont. 0016 00

INSTALL RANGE PACK – Cont.

31. Torque bolt (88) (installed in Step 28) to 36-43 lb-ft (49-68 N·m).

32. Coat thrust washer (94) with Petrolatum (WP 0024, Item 14) and install it on the underside of Front Carrier Assembly (92) .

33. Install Front Carrier Assembly (92) into center housing, being careful that thrust washer bearing (94) stays in place.

34. Install thrust washer (93) onto Front Carrier Assembly (92) .

35. (Second Clutch) Soak four friction plates (214) in Lubricating Oil (WP 0024, Item 12) for two minutes prior to assembly. Install one reaction plate (215) and then one friction plate (214).

36. Repeat Step 35 until all five reaction plates (215) and all four friction plates (214) are installed.

37. Install retaining ring (98).

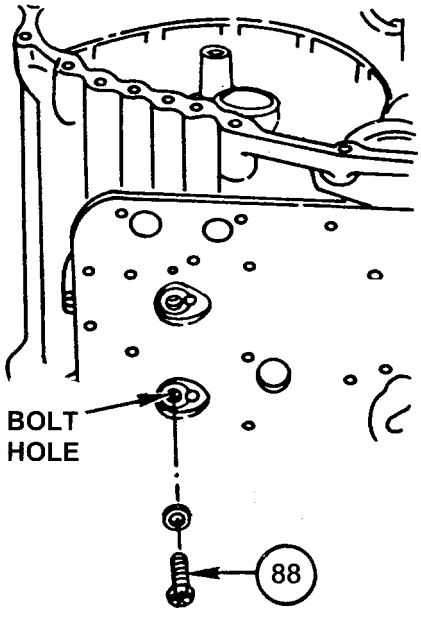


Figure 98. Center Housing.

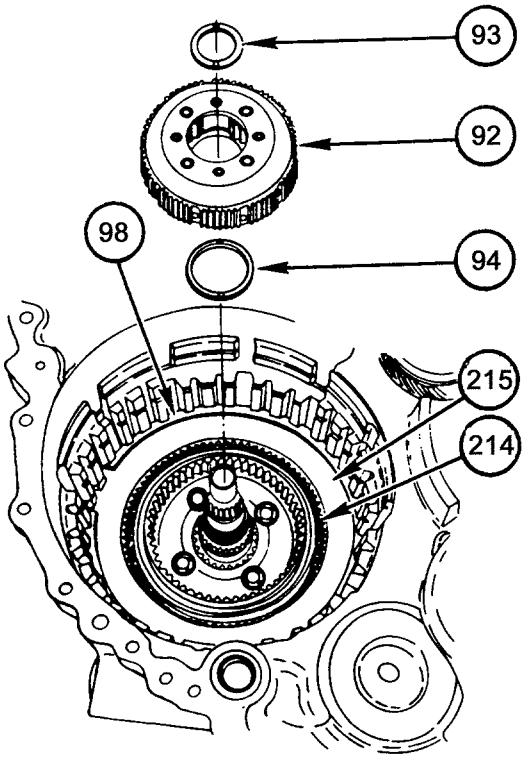


Figure 99. Front Carrier Assembly.

INSTALL RANGE PACK – Cont.

38. Using Marker (WP 0024, Item 13), mark edge of Third Clutch Piston Housing Assembly (91) above bolt hole.

39. Install Third Clutch Piston Housing Assembly (91), aligning bolt holt in Piston Housing Assembly (91) with bolt hole in center housing.

40. Install washer (89) and bolt (88) through center housing and into Piston Housing Assembly (91) finger tight.

41. Using feeler gauge, measure space between Piston Housing Assembly (91) and top of retaining ring groove in range pack bore of center housing. Select retaining ring (90) from Table 3.

Table 3. Retaining Ring Selection

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

INSTALL RANGE PACK – Cont.

42. Install selected retaining ring (90).

43. Torque bolt (88) (installed in Step 40) to 36-43 lb-ft (49-68 N·m).

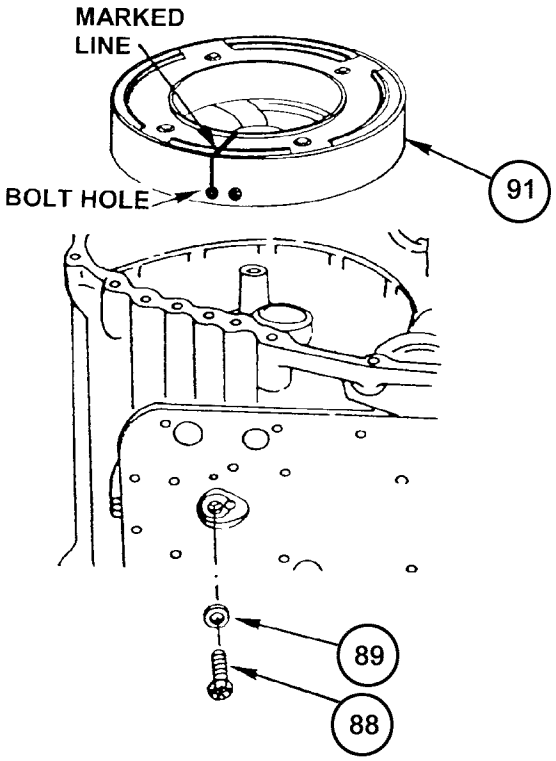


Figure 100. Mark Third Clutch Piston.

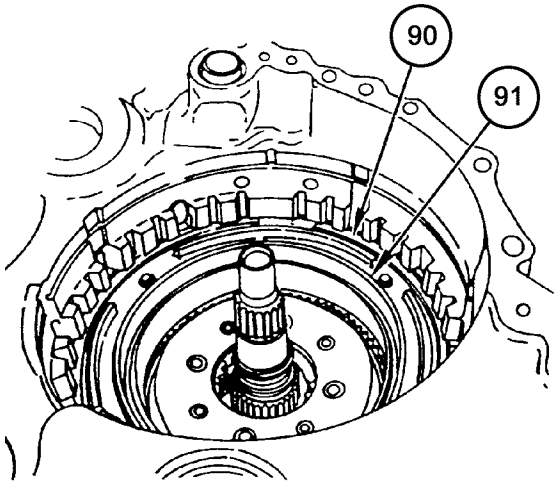


Figure 29. Third Clutch Piston Housing Assembly and Retaining Ring (Repeated)

INSTALL RANGE PACK – Cont.

44. Soak three friction plates (216) in Lubricating Oil (WP 0024, Item 12) for two minutes prior to assembly. Install one reaction plate (217), then one friction plate (216).

45. Repeat Step 44 until all four reaction plates (217) and all three friction plates (216) are installed.

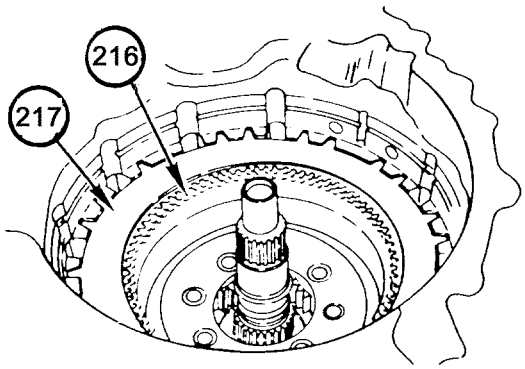


Figure 101. Range Pack Components.

46. Coat backing plate pin (86) with Petrolatum (WP 0024, Item 14). Install pin (86) into slot in clutch plate (third clutch backing plate) (85).

47. Install clutch backing plate (85). Evenly tap clutch backing plate (85) and pin (86), ensuring that pin (86) is seated in slot in range bore of center housing.

48. Install retaining ring (84) that retains clutch backing plate (85).

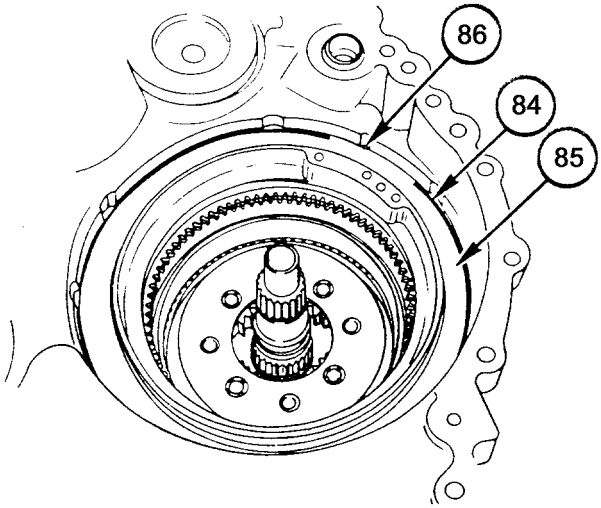


Figure 26. Third Clutch Backing Plate. (Repeated)

INSTALL RANGE PACK – Cont.

49. Install new preformed packings (82, 83) onto two pitot tubes (81). Coat packings (82, 83) with Petrolatum (WP 0024, Item 14).

50. Install two tubes (81), small end first, into bores in center housing (65).

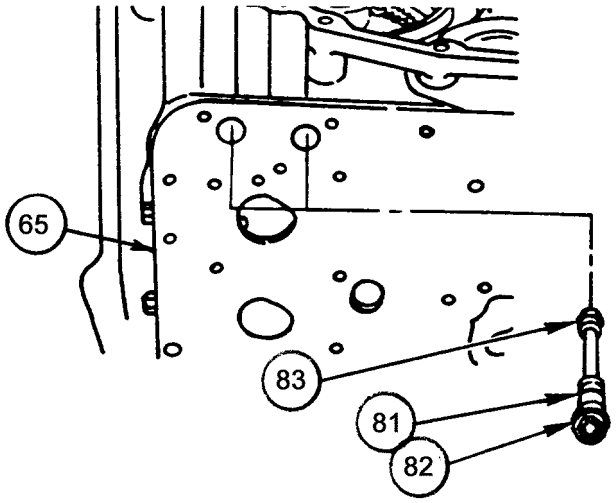


Figure 25. Pitot Tubes. (Repeated)

51. Install Fourth and Reverse Clutch Assembly (79).

52. Install thrust washer (78) onto Fourth and Reverse Clutch Assembly (79).

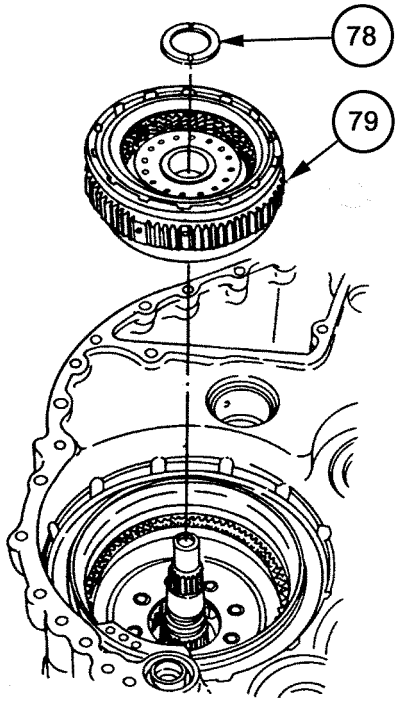


Figure 24. Fourth and Reverse Clutch Assembly. (Repeated)

REPAIR OF THE CENTER HOUSING ASSEMBLY – Cont. 0016 00

INSTALL RANGE PACK – Cont.

53. Line up clutch plates in Fourth and Reverse Clutch Assembly (79). Install Forward Clutch Housing Assembly (74) into Fourth and Reverse Clutch Assembly (79).

NOTE

If forward clutch does not easily install, place mating output gear on the hub to use as a tool to help rock the hub slightly back and forth, and left and right to a seat. The forward clutch housing is fully seated when it rocks evenly in all four directions.

54. Rotate Forward Clutch Housing Assembly (74) so that one of the slotted openings (75) is located over the bolt holes for pitot (76).

55. Install pitot (76). Install two screws (77) to hold pitot (76) in place.

56. Torque two screws (77) to 108-132 lb-in (12-15 N·m).

57. Lay Retaining Fixture (WP 0027, Item 1) in place on forward clutch housing (74) and center housing (65).

58. Install 3/8-16 x 3/4 inch bolt (73) to retain Retaining Fixture (WP 0027, Item 1).

59. Turn transmission right end upward.

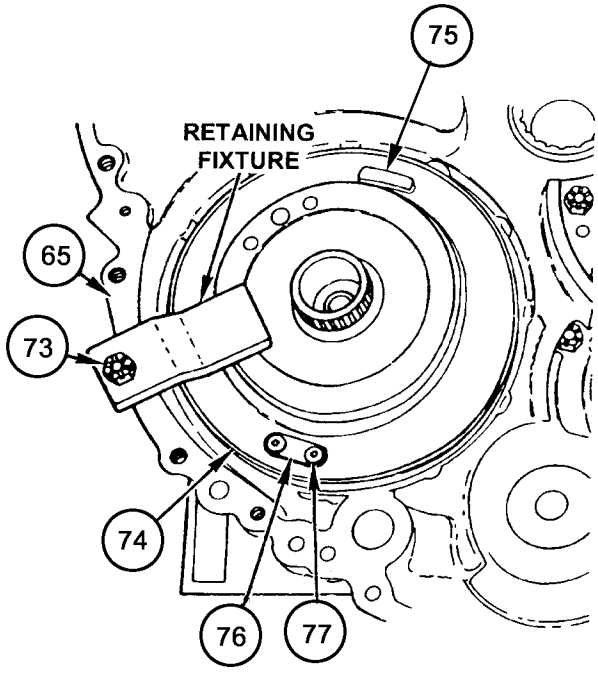


Figure 102. Range Pack Components.

REPAIR OF THE CENTER HOUSING ASSEMBLY – Cont. 0016 00

INSTALL GOVERNOR DRIVE GEAR, GOVERNOR BODY ASSEMBLY, AND GOVERNOR ASSEMBLY

NOTE

Transmission is on maintenance stand, right side up.

1. X200-4 with Rear Carrier Assembly P/N 23018136. Install governor drive gear (72) slot downward, onto range output shaft (218) engaging pin in shaft (218) with slot in gear.
2. X200-4A with Rear Carrier Assembly P/N 29533535. Install governor drive gear (72) onto range output shaft (218).
3. X200-4A. Install retaining ring (71) into groove of range output shaft (218).
4. Install Governor Body Assembly (70).
5. Install three washers (68) and bolts (69) to retain Governor Body Assembly (70).
6. Torque three bolts (69) to 36-43 lb-ft (49-68 N·m).

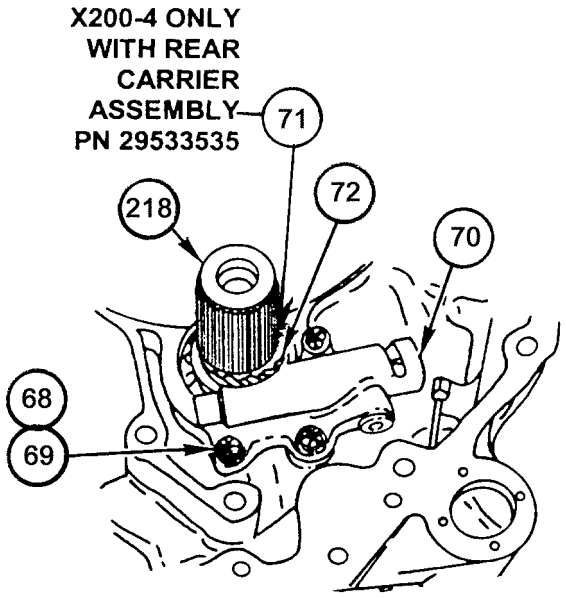


Figure 103. Governor Drive Gear.

REPAIR OF THE CENTER HOUSING ASSEMBLY – Cont. 0016 00

INSTALL GOVERNOR DRIVE GEAR, GOVERNOR BODY ASSEMBLY, AND GOVERNOR ASSEMBLY – Cont.

7. Install Governor Assembly (67), turning it slightly to the left (counterclockwise).
8. Install new gasket (66) and access cover (64).
9. Install four washers (63) and four bolts (62) to retain access cover (64) to center housing (65).
10. Torque four bolts (62) to 17-20 lb-ft (23-27 N·m).

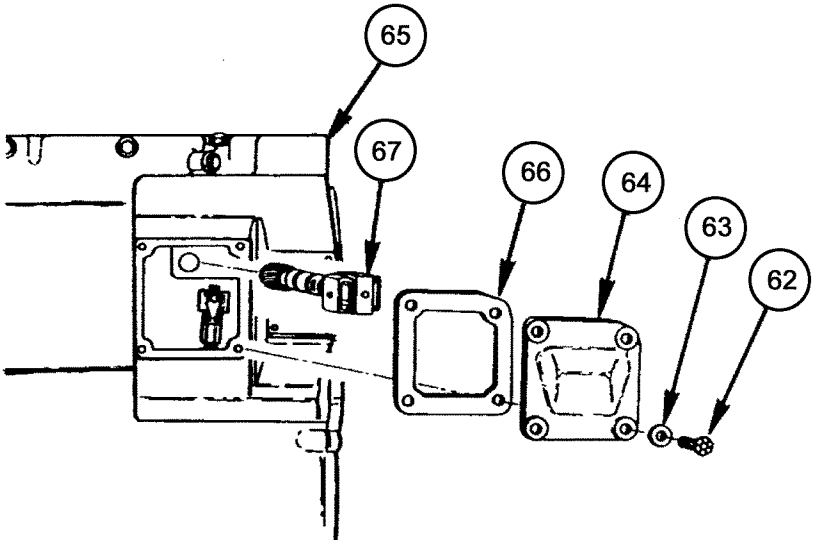


Figure 21. Governor Access Cover. (Repeated)

INSTALL HYDROSTATIC PUMP AND MOTOR ASSEMBLY (HYDROSTAT)

NOTE

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

1. Install 32-tooth hydrostatic gear (61) on end of hydrostat (51) opposite hydrostat mounting end, with larger shoulder of gear out.
2. Install retaining ring (60) to hold gear (61) on hydrostat (51).
3. Install 13-tooth hydrostatic drive gear (58) on hydrostat (51) mounting end, with shoulder of gear out.
4. Install retaining ring (59) to hold gear (58) on hydrostat (51).
5. Install eyebolt in threaded hole (57) located in shaft on mounting end of hydrostat (51).

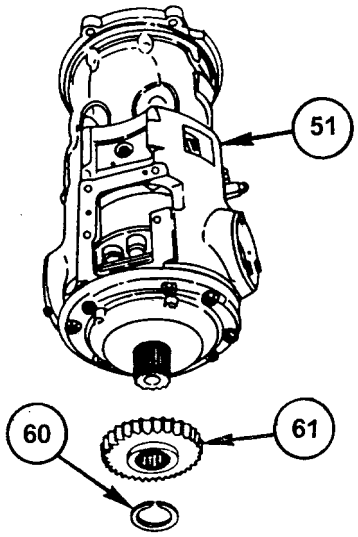


Figure 20. 32-Tooth Hydrostatic Gear. (Repeated)

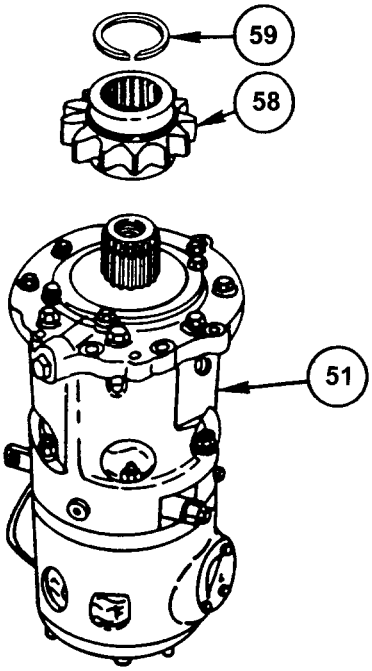


Figure 19. 13-Tooth Hydrostatic Drive Gear. (Repeated)

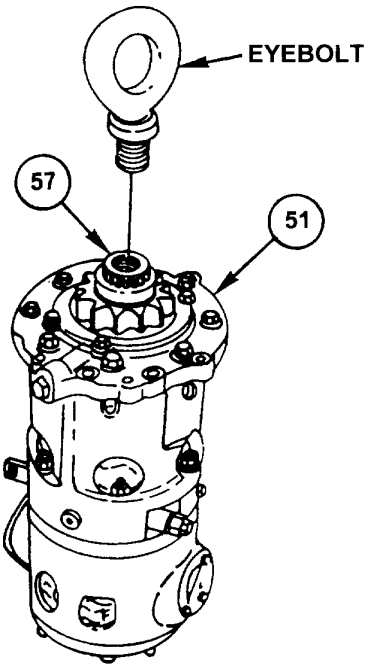


Figure 104. Eyebolt.

REPAIR OF THE CENTER HOUSING ASSEMBLY – Cont. 0016 00

INSTALL HYDROSTATIC PUMP AND MOTOR ASSEMBLY (HYDROSTAT) - Cont.

6. Install Hook (WP 0025, Item 11) in eyebolt and attach hoist; hoist hydrostat (51) over hydrostat bore in center housing (65).

NOTE

Center housing is cut away to receive the raised part of the hydrostat housing where the Steer Control Assembly will be installed.

7. Turn hydrostat (51) so that platform (219) for Steer Control Assembly lines up with recess (220) in center housing (65). Lower hydrostat into transmission, aligning gear at base of hydrostat with gear in center housing.

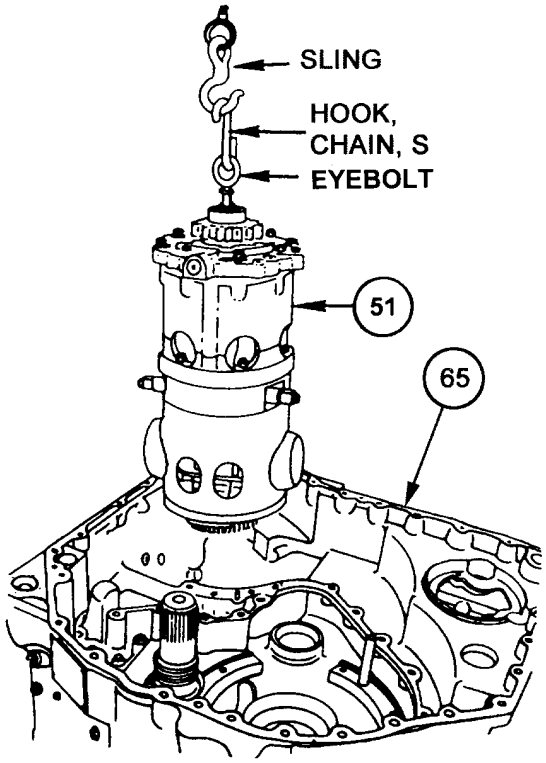


Figure 105. Hoisting Hydrostatic.

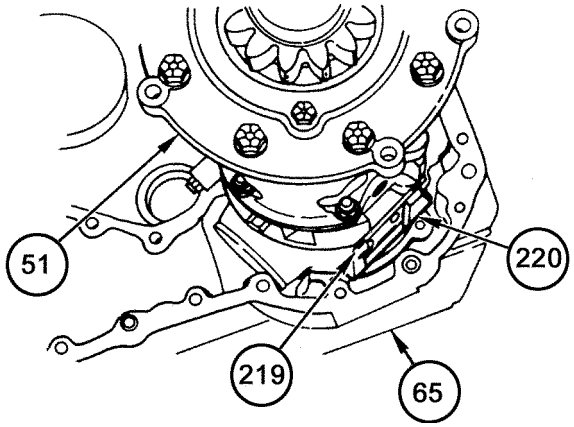


Figure 106. Hydrostat.

INSTALL HYDROSTATIC PUMP AND MOTOR ASSEMBLY (HYDROSTAT) - Cont.

NOTE

Leave hoist hooked to hydrostat so that you can raise and turn hydrostat as necessary to align bolt holes.

8. Install six bolts (55) and six washers (56) in hydrostat (51).
9. Remove hoist, Hook (WP 0025, Item 11), and eyebolt from hydrostat (51).
10. Torque six bolts (55) to 36-43 lb-ft (49-68 N·m).

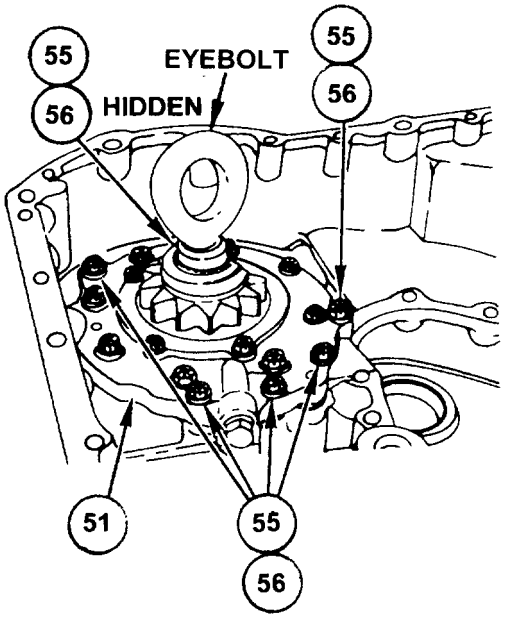


Figure 107. Hydrostat.

REPAIR OF THE CENTER HOUSING ASSEMBLY – Cont. 0016 00

INSTALL STEER CONTROL ASSEMBLY

1. Turn transmission to input side up.

WARNING

Prior to placing Steer Control Assembly (50) on hydrostat (51), check to make sure control rod pin (221) is engaged into feedback lever (222). If control rod pin (221) is not engaged into feedback lever (222), rotate control rod (223) until engaged. Non-engagement will cause vehicle failure of full steer during start-up.

2. Place Steer Control Assembly (50) on hydrostat (51).
3. Install two 5/16-18 x 2-1/4 inch bolts (224) and washers (225) in Steer Control Assembly (50).
4. Install two 5/16-18 x 1-1/2 inch bolts (226) and washer (227) in Steer Control Assembly (50).
5. Apply Sealant (WP 0024, Item 17) on threads of two socket head screws (49).
6. Install two socket head screws (49) in cam lever of Steer Control Assembly (50).
7. Torque four bolts (224, 226) to 17-20 lb-ft (23-27 N·m).
8. Torque two socket head screws (49) to 87-88 lb-ft (117-119 N·m).

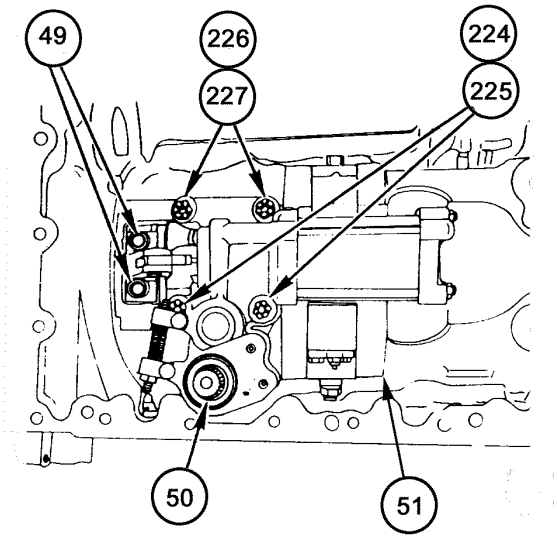


Figure 108. Pin and Rod Engagement.

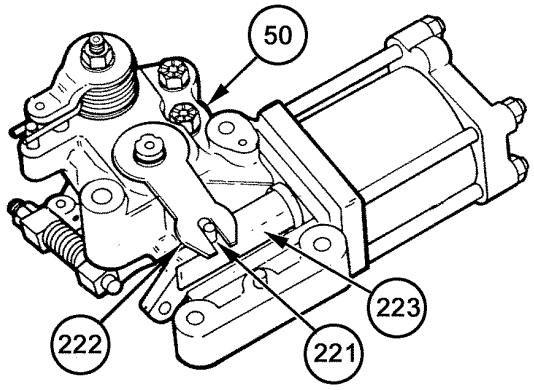


Figure 109. Hydrostatic Control Assembly.

INSTALL OUTPUT PUMP DRIVE GEAR, LEFT OUTPUT SHAFT, LEFT STEER AND OUTPUT SUN GEAR, AND LEFT STEER GEAR

NOTE

Transmission is on maintenance stand, left end up.

1. Coat output pump drive gear (48) with Petrolatum (WP 0024, Item 14). Install output pump drive gear (48) onto left output shaft (47).
2. Install left output shaft (47), with gear (48) in place, into center housing.
3. Install left steer gear (46).
4. Install left steer and output sun gear (36).

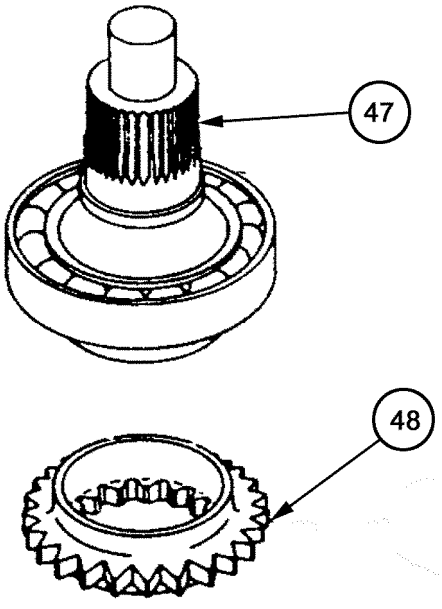


Figure 110. Output Pump Gear and Left Output Shaft.

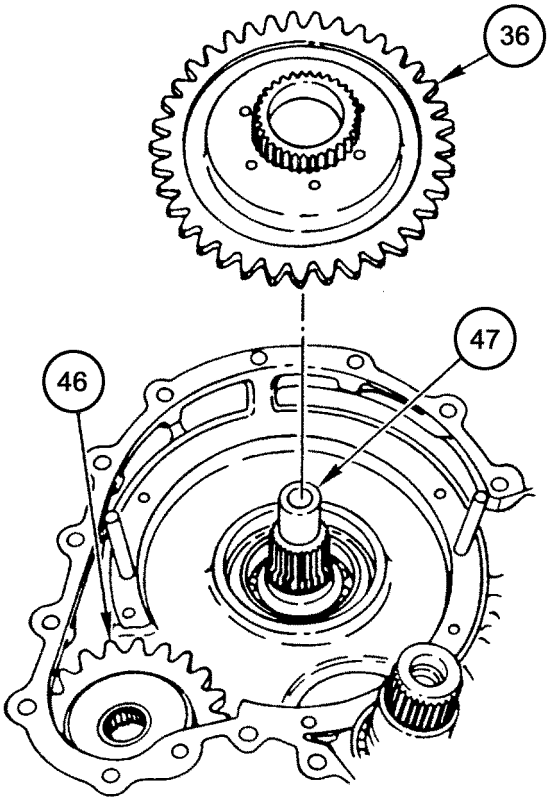


Figure 13. Left Steer Gear and Output Sun Gears. (Repeated)

REPAIR OF THE CENTER HOUSING ASSEMBLY – Cont. 0016 00

INSTALL LEFT BRAKE ASSEMBLY

1. Install six headless straight pins (45) in brake backing plate (44). Wrap with Bands, Rubber (WP 0024, Item 2) to hold pins (45) in place.

NOTE

When rubber bands are removed from holding six pins (45), one pin, (shown at location in Figure 112), will drop down. To aid in assembly, a (shim), feeler gauge must be placed under the pin to retain it in an upward position.

2. Install brake backing plate (44), along with pins (45). Remove Bands (WP 0024, Item 2). Place feeler gauge blade (shim) under one pin (45) (at location shown in Figure 112) to hold selected pin (45) upward until assembly is complete.
3. Install five washers (43) and five bolts (42) that retain backing plate (44).
4. Torque five bolts (42) to 36-43 lb-ft (49-68 N·m).
5. Install brake coolant seal (41).
6. Install four brake reaction pins (28).
7. Install six springs (40) over six pins (45).

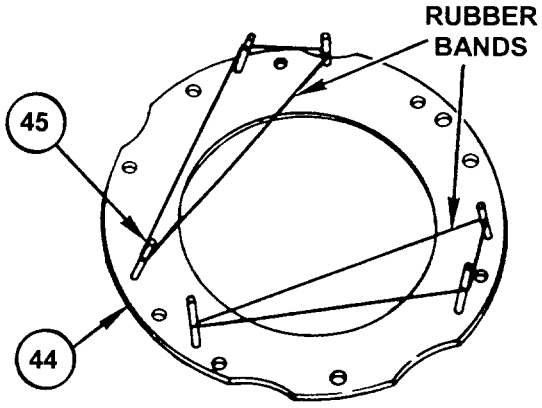


Figure 111. Brake Backing Plate.

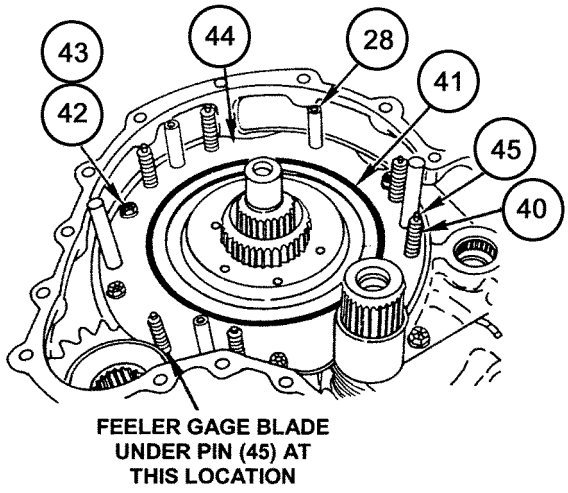


Figure 112. Brake Backing Plate.

INSTALL LEFT BRAKE ASSEMBLY – Cont.

8. Coat thrust washer (35) with Petrolatum (WP 0024, Item 14) and install it on output carrier (32).
9. Install output carrier (32) and thrust washer (35) into brake clutch drum (33).
10. Install retaining ring (34) to retain output carrier (32) in brake clutch drum (33).
11. Invert the components assembled in Step 10, and install the assembly into the center housing.
12. Coat thrust washer (31) with Petrolatum (WP 0024, Item 14) and install onto the underside of spur gear cluster (30).
13. Install gear cluster (30) and thrust washer (31) into clutch drum (33).
14. Soak six friction plates (228) in Lubricating Oil (WP 0024, Item 12) for two minutes prior to installation. Install one friction plate (228), then one reaction plate (229).
15. Repeat Step 14 until all six friction plates (228) and all five reaction plates (229) are installed.

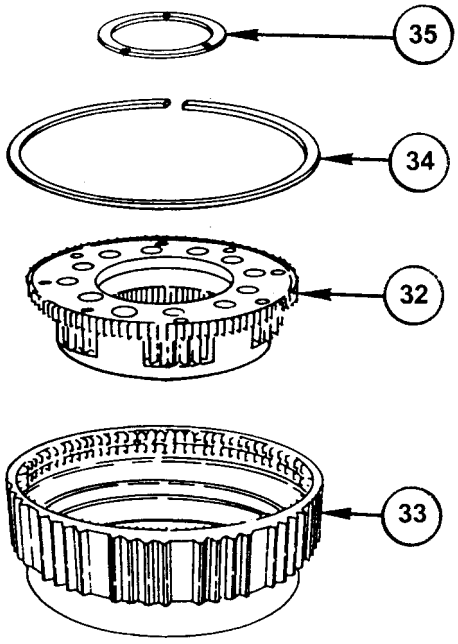


Figure 113. Output Carrier and Brake Clutch Drum.

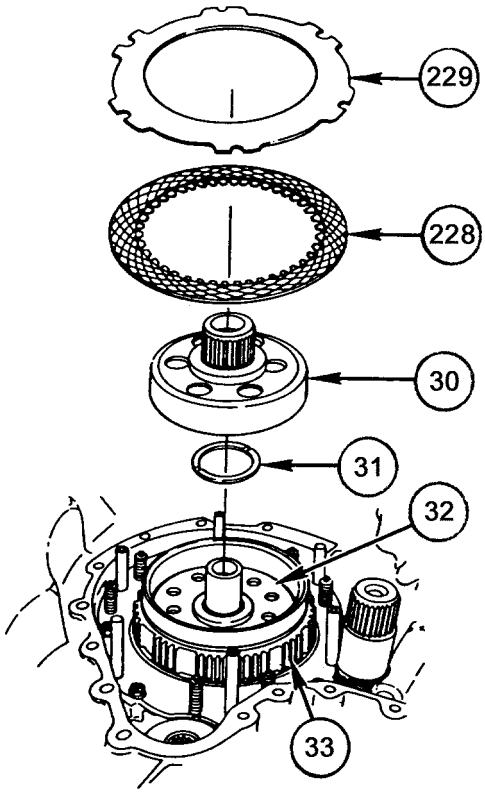


Figure 114. Friction and Reaction Plates.

REPAIR OF THE CENTER HOUSING ASSEMBLY – Cont. 0016 00

INSTALL LEFT BRAKE ASSEMBLY – Cont.

16. Install clutch plate (37) onto clutch stack, ensuring that six pins (45) are engaged.

17. With one hand, press downward on clutch plate (37), against spring force, near one pin (45). Install retaining ring (38). Using same method, install five more retaining rings (38). Remove feeler gauge (shim) installed previously to retain pin (45) in an upward position.

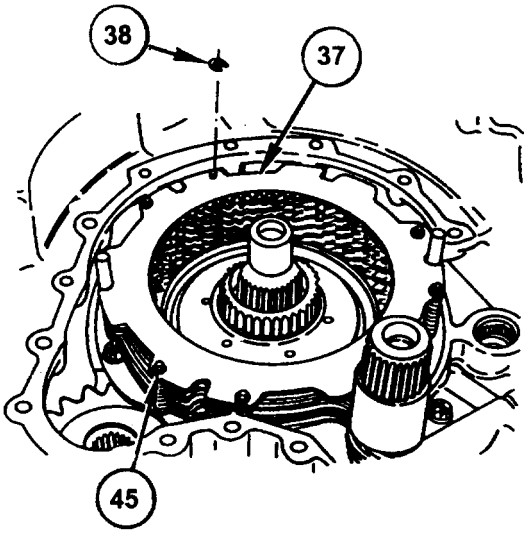


Figure 115. Friction and Reaction Plates.

18. Install two new preformed packings (22, 23) into face of brake cam (17).

CAUTION

Be sure to install seals (20, 21) so that seal lips are in direction shown in Figure 116. If seals are not installed correctly, components will not function correctly.

19. Install new seal (21), seal lip downward.

20. Install new seal (20), seal lip upward.

REPAIR OF THE CENTER HOUSING ASSEMBLY – Cont. 0016 00

INSTALL LEFT BRAKE ASSEMBLY – Cont.

21. Coat packings (22, 23) and seals (20, 21) with Petrolatum (WP 0024, Item 14).

22. Hold two spring tension clips (25) in place on brake cam (17) in position shown in Figure 116.

23. Install bolt (24) to retain clips (25).

24. Torque bolt (24) to 108-132 lb-in (12-15 N·m).

25. Assemble inner brake adjusting link (26) and outer brake adjusting link (27) so that threads on inner link (26) cannot be seen.

26. Install slotted end of outer link (27) into brake cam (17) so that flat on link (27) is against free ends of spring tension clips (25).

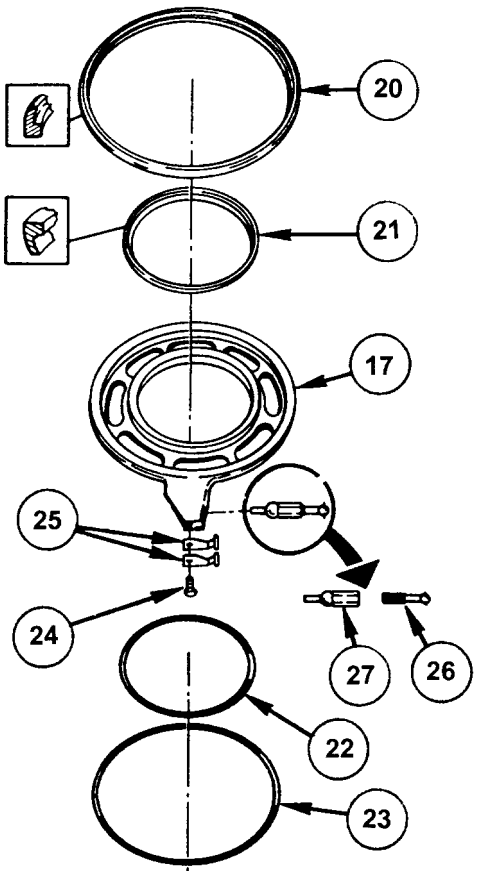


Figure 116 Left Brake Components.

REPAIR OF THE CENTER HOUSING ASSEMBLY – Cont. 0016 00

INSTALL LEFT BRAKE ASSEMBLY – Cont.

27. Place left brake support (3), inside surface upward, on Block, Wood, Lumber, Soft Wood 2x4x24 inch (WP 0024, Item 3).
28. Install stationary cam (9) onto two pins (230) in support (3). Ensure bolt holes are aligned.
29. Tap stationary cam (9) onto pins (230) until cam is seated.
30. Turn support (3) over and place on Block, Wood, Lumber, Soft Wood 2x4x24 inch (WP 0024, Item 3).
31. Install three washers (7) and three bolts (5).
32. Torque three bolts (5) to 17-20 lb-ft (23-27 N·m).
33. Turn support (3) over and place on Block, Wood, Lumber, Soft Wood 2x4x24 inch (WP 0024, Item 3).
34. Install new hook-type metal seal ring (10) onto retainer (8).
35. Coat seal ring (10) with Petrolatum (WP 0024, Item 14).

INSTALL LEFT BRAKE ASSEMBLY – Cont.

36. Tip support (3) on edge.

37. Install retainer (8), flat side first, into support (3). Start two washers (6) and two bolts (4) into support (3) to hold retainer (8) in place.

38. Turn support (3) over and place on Block, Wood, Lumber, Soft Wood 2x4x24 inch (WP 0024, Item 3).

39. Torque two bolts (4) to 10-12 lb-ft (14-16 N·m).

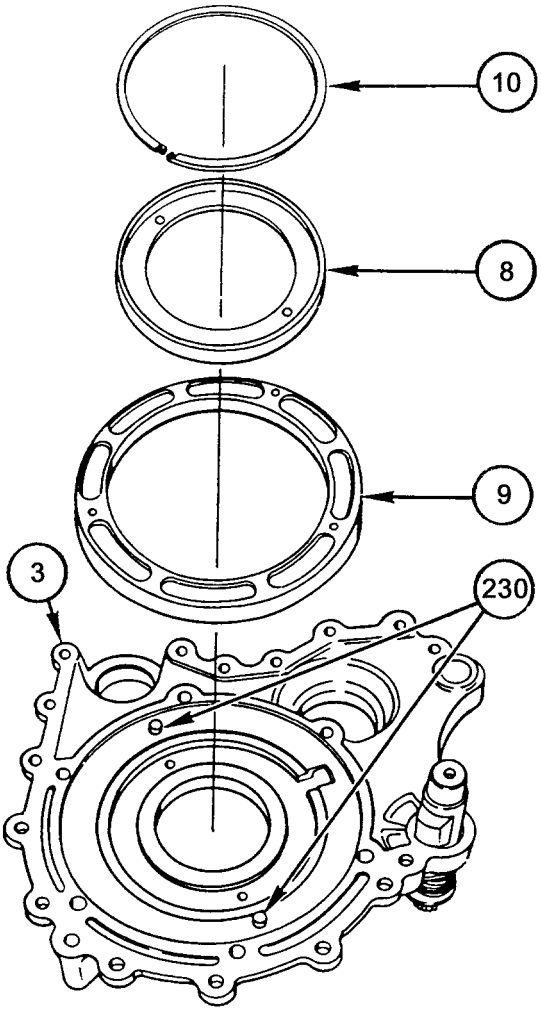


Figure 117. Left Brake Components.

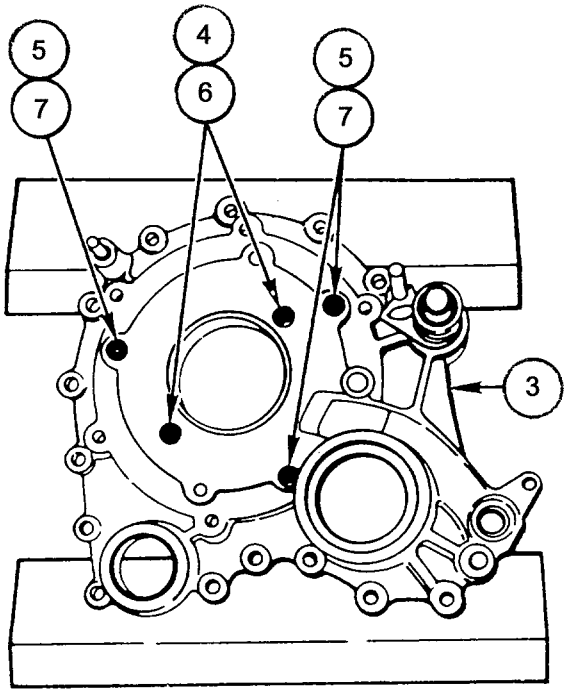


Figure 3. Left Brake Support. (Repeated)

INSTALL LEFT BRAKE ASSEMBLY – Cont.

40. Turn support (3) over and place on Block, Wood, Lumber, Soft Wood 2x4x24 inch (WP 0024, Item 3).

41. Install control cam (cam shaft) (12) into support (3).

42. Install retaining ring (16) onto cam shaft (12).

43. Turn support (3) over and place on Block, Wood, Lumber, Soft Wood 2x4x24 inch (WP 0024, Item 3).

44. Install control cam (stop) (15) onto cam shaft (12).

45. Install torsion helical spring (14) onto cam shaft (12). Engage straight end of spring (14) behind pin in support (3); engage hook end of spring (14) with hole in stop (15).

46. Install washer (13) onto cam shaft (12).

47. Install retaining ring (11) against washer (13).

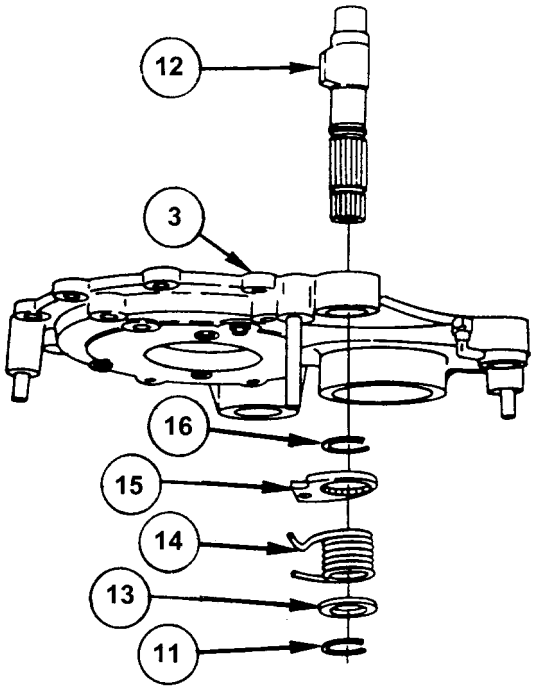


Figure 5. Left Brake Components. (Repeated)

INSTALL LEFT BRAKE ASSEMBLY – Cont.

48. Turn support (3) over and place on Block, Wood, Lumber, Soft Wood 2x4x24 inch (WP 0024, Item 3).

49. Install eight balls (18) into lowest areas of ramps on stationary cam (9).

50. Apply Petrolatum (WP 0024, Item 14) to balls (18) and in ramps around balls.

51. Hold brake cam (17) in position shown in Figure 146.

52. Install end of inner link (26) in pocket of cam shaft (12). Holding brake cam (17), turn and twist cam (17) so that end of link (26) is fully seated in pocket of cam shaft (12).

53. After link (26) is seated in pocket of cam shaft (12), place brake cam (17) onto stationary cam (9). Arm on brake cam (17) must be about two inches counterclockwise from cam shaft (12).

54. Turn slotted end of link (27) counterclockwise until tension is felt. Then, continue to turn 1/2 to 3/4 of a turn, but not to the extent that cam (17) starts to lift.

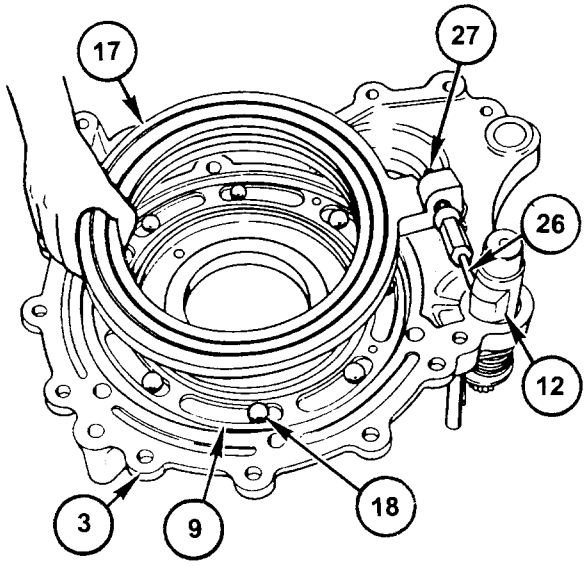


Figure 118. Brake Cam.

INSTALL LEFT BRAKE ASSEMBLY – Cont.

55. Install support (3) into center housing (65), aligning cam shaft (12) with bearing (202) in center housing. Seat support (3).

56. Install fifteen washers (2) and fifteen bolts (1) that retain support (3).

57. Using handle and Socket (WP 0025, Item 23), turn cam shaft (12) ever so slightly so that shaft (12) will seat in bearing (202).

58. Torque fifteen bolts (1) to 54-65 lb-ft (74-88 N·m).

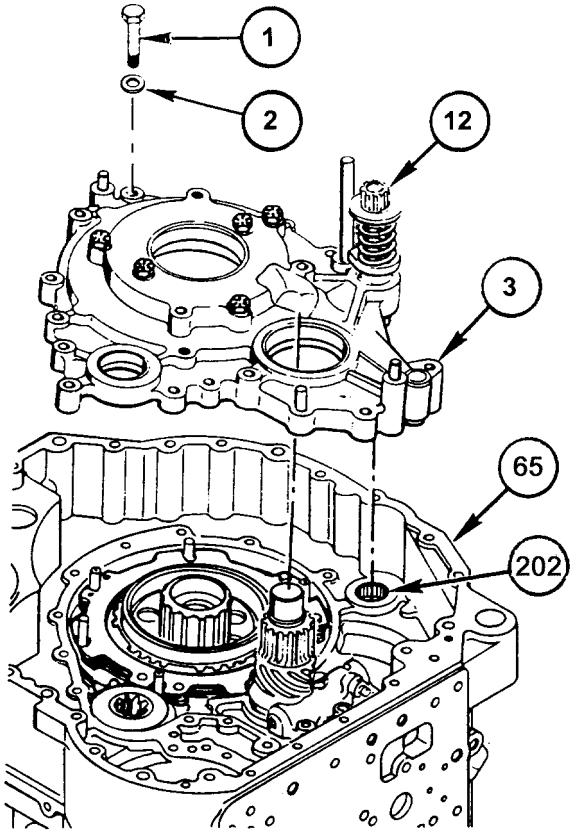


Figure 119. Left Brake Components.

END OF WORK PACKAGE

REPAIR TRANSMISSION TOP COMPONENTS 0017 00

THIS WORK PACKAGE COVERS:

Repair Transmission Top Components.

INITIAL SETUP

Personnel Required
Track Vehicle Repairer 63H20 (2)

Common Tools
Shop Equipment, Automotive Maintenance and Repair: Field Maintenance, Basic, Less Power (WP 0025, Item 20)
Tool Kit, General Mechanic's Automotive (WP 0025, Item 27)

Repair Parts
Mandatory Replacement Parts, Table 1

Preliminary Procedure
Main Control Valve Body Assembly is removed. Lockup Valve Body Assembly is removed. Refer to WP 0011.

SCOPE
This Work Package addresses repairing the Transmission Top Components.

ITEMS COVERED IN THIS WORK PACKAGE **PAGE**

REPAIR TRANSMISSION TOP COMPONENTS – Cont. 0017 00

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 the transmission. Bolt must be retrieved, even if transmission has to be disassembled.

NOTE

Do not remove solenoids (1) unless replacement is necessary.

For solenoid A, one bolt (6) is 1/4 inch longer than the other bolts (4). This is to allow for the thickness of spring retainer (5).

1. Remove two bolts (4) from any of four solenoids (1) on Main Valve Body Assembly (2), or remove two bolts (4) and (6) from solenoid A on the Main Valve Body Assembly (2). Remove two bolts (4) from any of two solenoids (1) on Lockup Valve Body Assembly (3).
2. For solenoid A, remove spring retainer (5).
3. Remove any of the seven solenoids (1), if necessary.

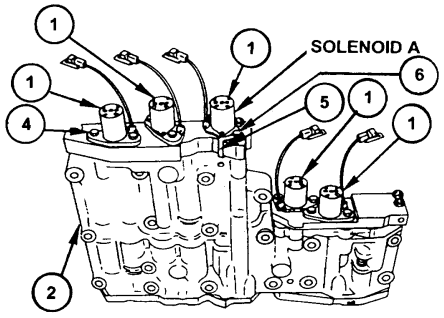


Figure 1. Solenoids.

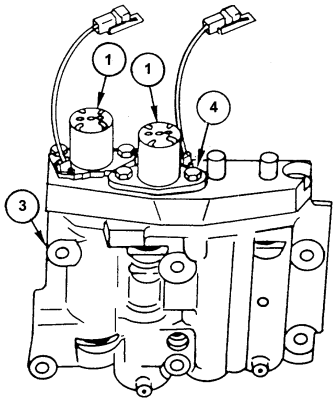


Figure 2. Solenoids.

REPAIR TRANSMISSION TOP COMPONENTS – Cont. 0017 00

REPAIR: REPLACE INSULATORS, TERMINALS ON SOLENOIDS, WIRING HARNESS

REMOVE TERMINAL FROM INSULATOR

1. Insert two small screwdrivers between insulator (7) and terminal (8).
2. Press down on screwdrivers to release insulator (7) from terminal (8). Pull terminal (8) from insulator (7).

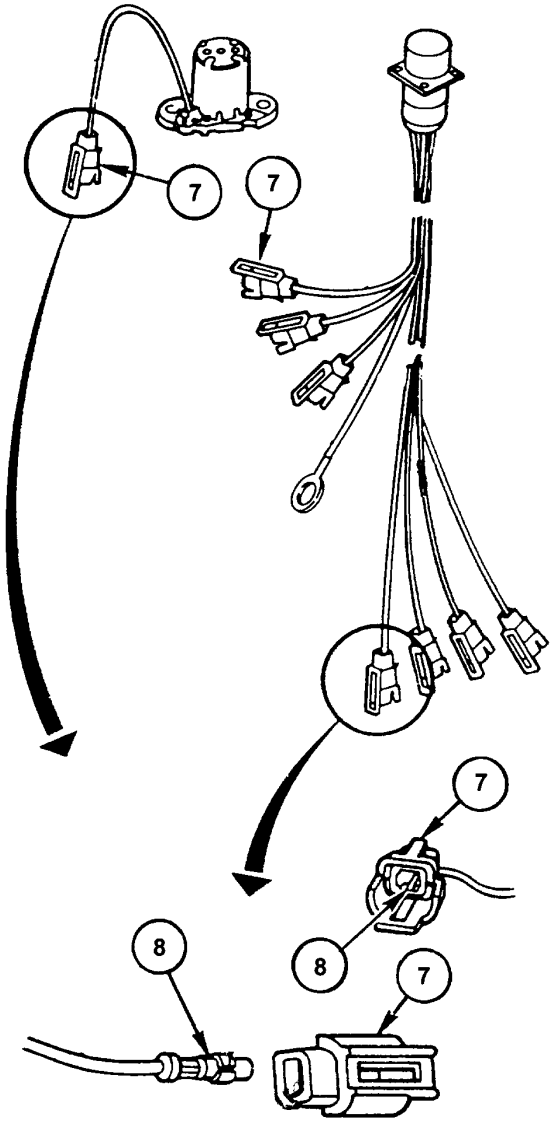


Figure 3. Terminal and Insulator.

REPLACE TERMINAL

1. Cut quick disconnect terminal (8) or straight ring (ground) terminal (9) off lead (10) as close to terminal (8, 9) as possible.

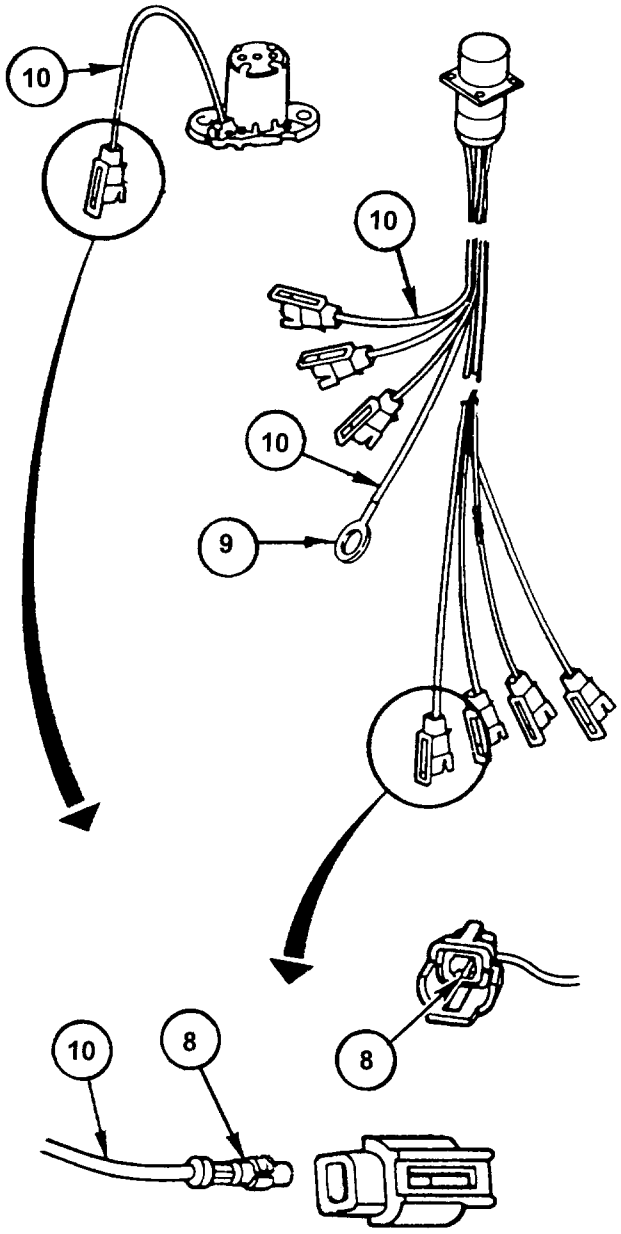


Figure 4. Terminal and Insulator.

REPLACE TERMINAL – CONT.

2. Strip 1/4 inch (6 mm) of insulation from end of lead (10).

3. Put new terminal (8, 9) on stripped end of lead (10). Bend tabs (11) of terminal (8, 9) around insulation and bend tabs (12) around wire of lead (10). Bend tangs (13) slightly away from terminal (8).

Install Terminal Onto Insulator

1. Line up slot (14) on terminal (8) with key (15) in new insulator (7). Push insulator (7) onto terminal (8) until tangs lock into place.

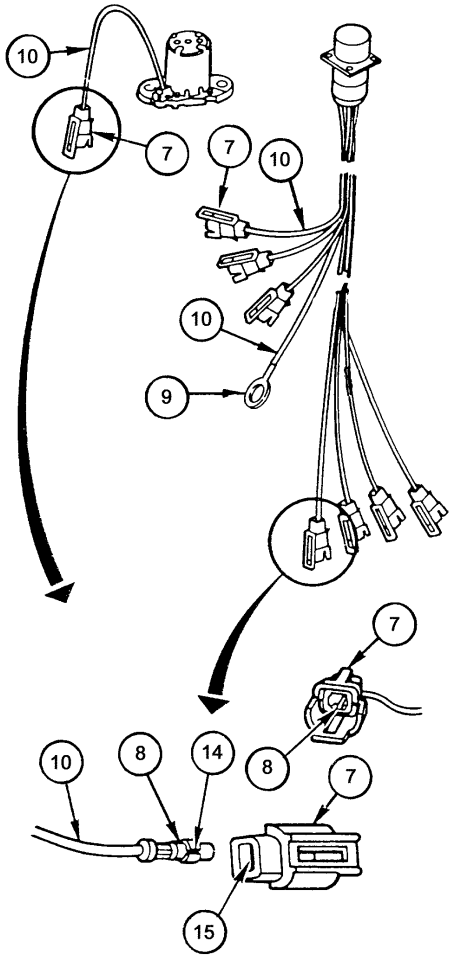


Figure 5. Terminal and Insulator.

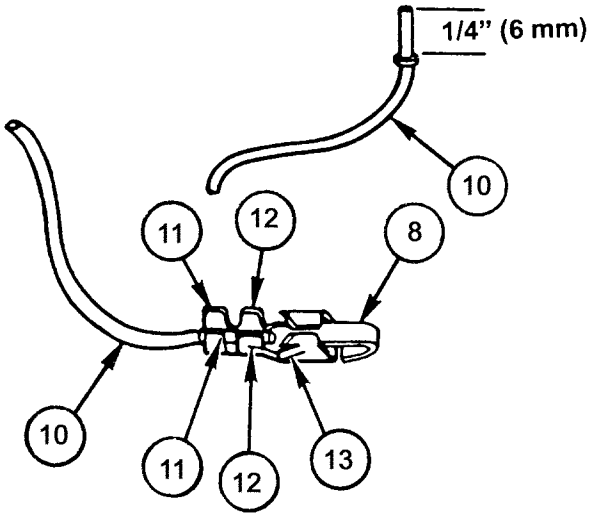


Figure 6. Terminal and Insulator.

INSTALL SOLENOIDS

1. For any solenoids (1) being replaced, be sure there is a preformed packing (16) in place on the underside of each new solenoid (1).

2. Install new solenoids (1) in positions shown on Main Control Valve Body Assembly (2) and on Lockup Valve Body Assembly (3).

3. For solenoid A, install spring retainer (5) in position shown to cover exhaust port.

4. Install two bolts (4) into each of four solenoids (1) on Main Valve Body Assembly (2), or install one bolt (4) and one bolt (6) into solenoid A on the Main Valve Body Assembly (2). Install two bolts (4) into each of two solenoids (1) on Lockup Valve Body Assembly (3).

5. Torque all replaced bolts (4) and (6) to 108-132 lb-in (12-15 N·m).

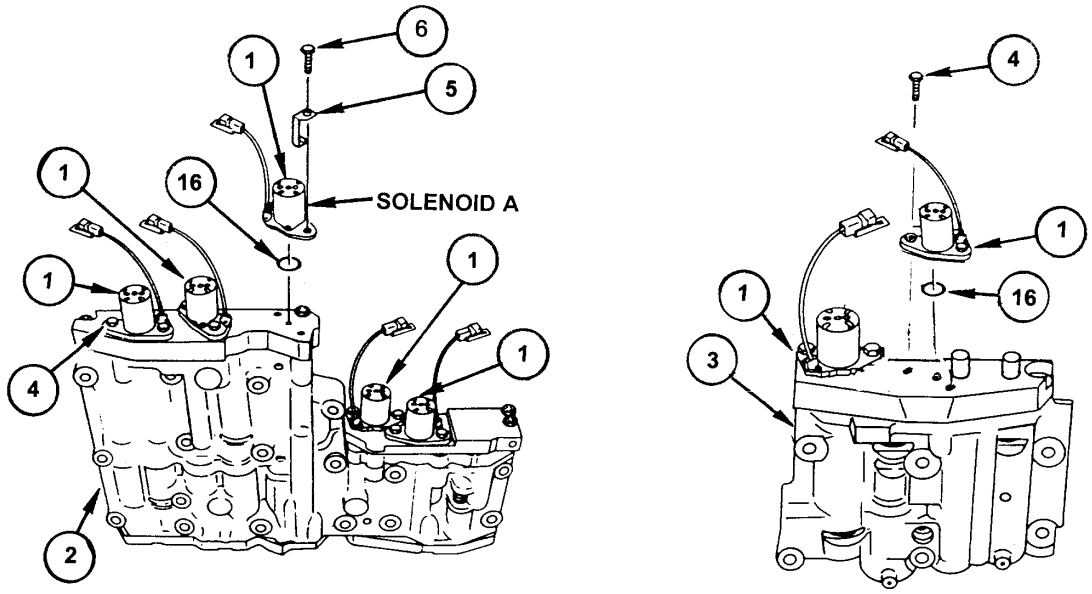


Figure 7. Solenoids.

MANDATORY REPLACEMENT PARTS

Refer to Table 1. Mandatory Replacement Parts for Replacing Top Cover Components. Work Package 0026 contains a complete list of all mandatory replacement parts necessary for maintenance of the X200-4 and X200-4A Transmissions.

Table 1. Mandatory Replacement Parts for Replacing Top Cover Components.

WP 0026 ITEM NO.	NOMENCLATURE	QTY
7	Seal, Plain Encased	1
52	Seal, Plain Encased	1

REPLACING TOP COVER COMPONENTS, OIL TRANSFER PLATE COMPONENTS.

REPLACE PACKING ASSEMBLY

NOTE

Shipping plug (P/N 73342 23047353) may or may not be installed, dependent upon origin of transmission. This opening is used for the throttle modulator, a vehicle part which is installed when the vehicle power pack is installed.

1. Remove bolt (17) and bracket (18). (If present, remove metal shipping plug.)
2. Drive Packing Assembly (seal) (19) from inside of top cover. Throw away Packing Assembly (seal) (19).
3. Using a 1/2 inch drive, 13/16 inch socket as a driver, drive against the identification numbers on new Packing Assembly (seal) (19). Install new Packing Assembly (seal) (19) to a firm seat against the shoulder in the bore.
4. Install shipping plug if present.
5. Install bolt (17) and bracket (18) over shipping plug, if shipping plug is present.
6. Torque bolt (17) to 156-180 lb-in (18-20 N·m).

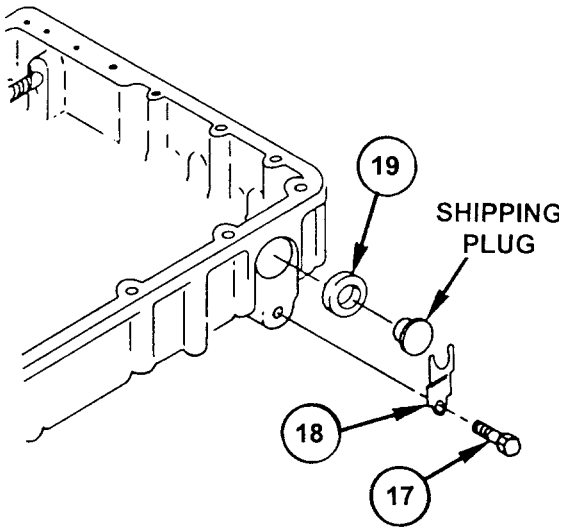
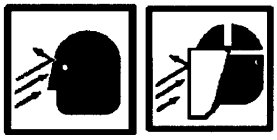


Figure 8. Packing Assembly (Seal).

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 (20) are removed and installed.

CAUTION

When removing spring pins (20), be careful not to cut spring pins (20).

1. Tap two pins (20) flush with push rod (22).
2. Remove two pins (20).
3. Pull linear actuator cap (21) from headless straight pin (push rod) (22).
4. From inside of top cover, push to remove push rod (22) and extension (23) through cover.
5. Remove extension (23) from push rod (22).
6. Remove spring (24).

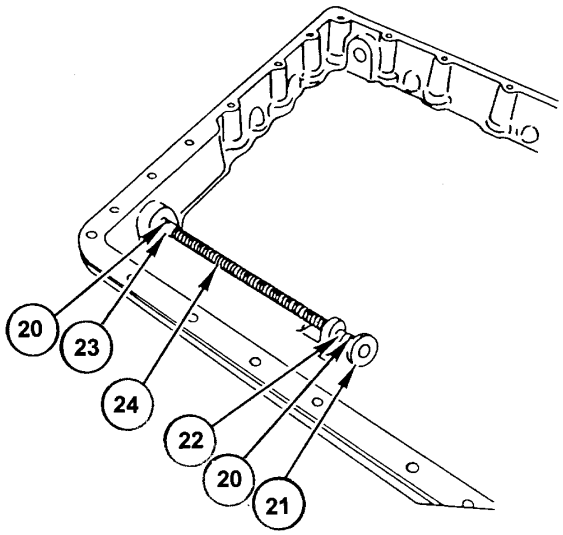


Figure 9. Push Rod Components.

REPLACE PUSH ROD COMPONENTS – CONT.

7. Pry plain encased seal (25) from inside of cover. Discard seal (25).

8. Using a 1/2 inch drive, 13/16 inch socket as a driver, drive against the identification numbers on new plain encased seal (25). Install new plain encased seal (25) to a firm seat against the shoulder in the bore.

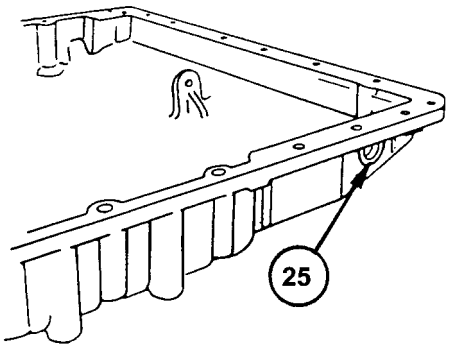


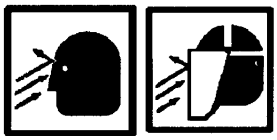
Figure 10. Seal.

REPLACE PUSH ROD COMPONENTS – CONT.

9. Insert rod (22) through bracket.

10. Install extension (23), beveled end first, into bore. Tap extension into seal (25) 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 (20) is installed.

WARNING



Spring loaded parts can fly and injure you. Push rod components are spring loaded and must be restrained when spring pins (20) are removed and installed.

11. The other soldier, install spring (24) onto rod (22) inside cover. Install rod (22) into extension (23) and install pin (20). Tap pin (20) until it is of equal height on both sides of extension (23).

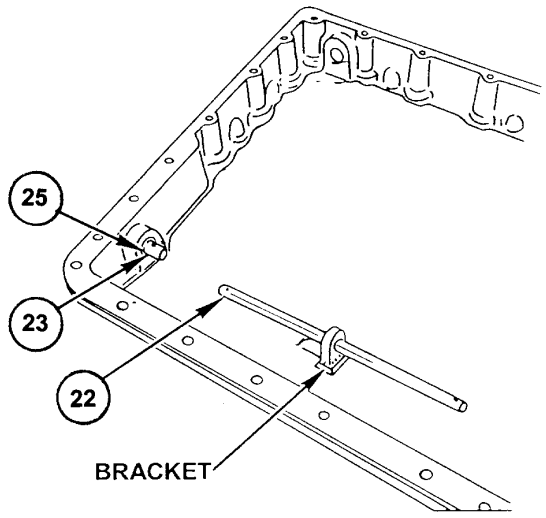


Figure 11. Push Rod Components.

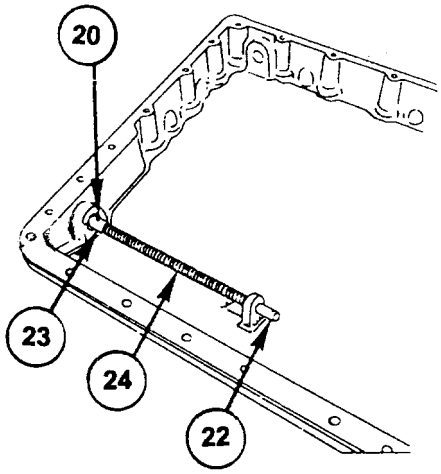


Figure 12. Push Rod Components.

REPLACE PUSH ROD COMPONENTS – CONT.

12. Place cap (21) onto rod (22).

13. Install other pin (20) to hold cap (21) on rod (22). Tap pin (20) until it is of equal height on both sides of rod (22).

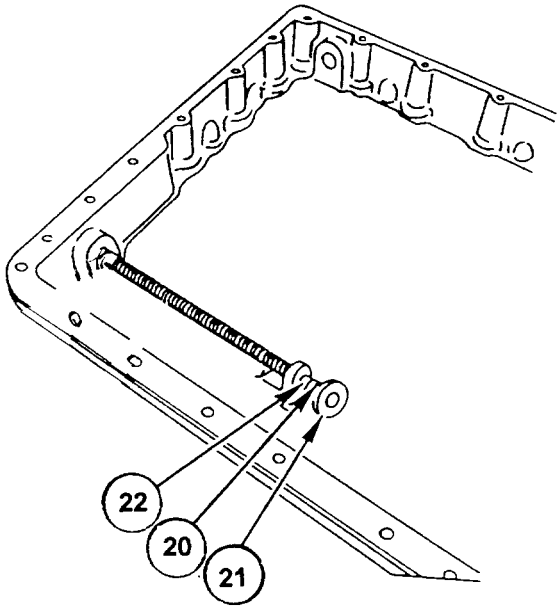


Figure 13. Push Rod Components.

REPLACE OIL TRANSFER PLATE PLUGS

NOTE

Do not remove plugs (26) unless replacement is necessary.

1. Remove any of four plugs (26).
2. Install any of four new plugs (26).
3. Torque any replaced plugs (26) to 50-60 lb-in (6-7 N·m).

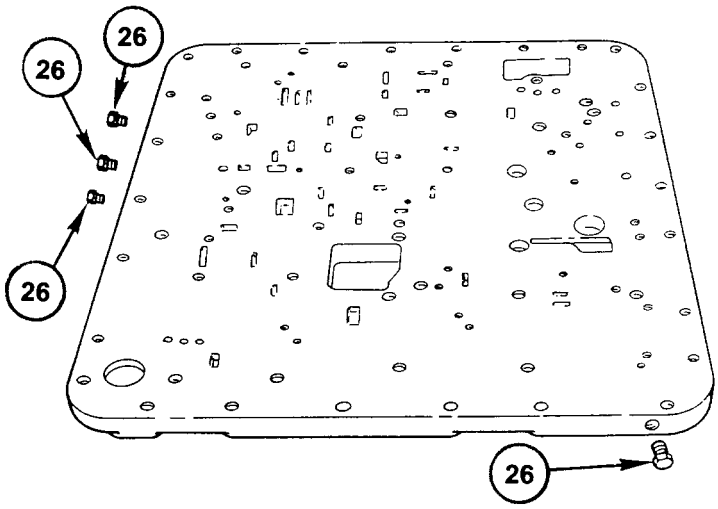


Figure 14. Oil Transfer Plate Plugs.

END OF WORK PACKAGE

REPAIR CONVERTER ELEMENT COMPONENTS 0018 00

THIS WORK PACKAGE COVERS:

Repair Converter Element Components.

INITIAL SETUP

Personnel Required
Track Vehicle Repairer 63H20 (1)

Common Tools
Shop Equipment, Automotive Maintenance and Repair: Field Maintenance, Basic, Less Power (WP 0025, Item 20)
Tool Kit, General Mechanic's Automotive (WP 0025, Item 27)

Repair Parts
Mandatory Replacement Parts, Table 1
Retainer, O-Ring (73342) 29541128

Supplies
Brush Artist (WP 0024, Item 4)
Ink, Etching, Acid (WP 0024, Item 11)
Lubricating Oil (WP 0024, Item 12)
Petrolatum, Technical, (Petroleum Jelly) (WP 0024, Item 14)

Preliminary Procedure
Torque Converter is removed. Refer to WP 0011.

SCOPE
This Work Package addresses repairing converter element components.

ITEMS COVERED IN THIS WORK PACKAGE **PAGE**

REPAIR CONVERTER ELEMENT COMPONENTS

NOTE

Converter Pump Cover Assembly (2) has been product improved. If Converter Pump Cover Assembly (2) is other than P/N (73342) 29541129, retainer (1) must be replaced with P/N (73342) 29541128.

Perform Product Improvement

1. Inspect Converter Pump Cover Assembly (2) to verify assembly part number.
2. If Converter Pump Cover Assembly (2) is other than (73342) 29541129, then replace retainer (1) with part number (73342) 29541128, as described WP 0018 00-3 “Disassemble Converter Pump Cover Assembly”.

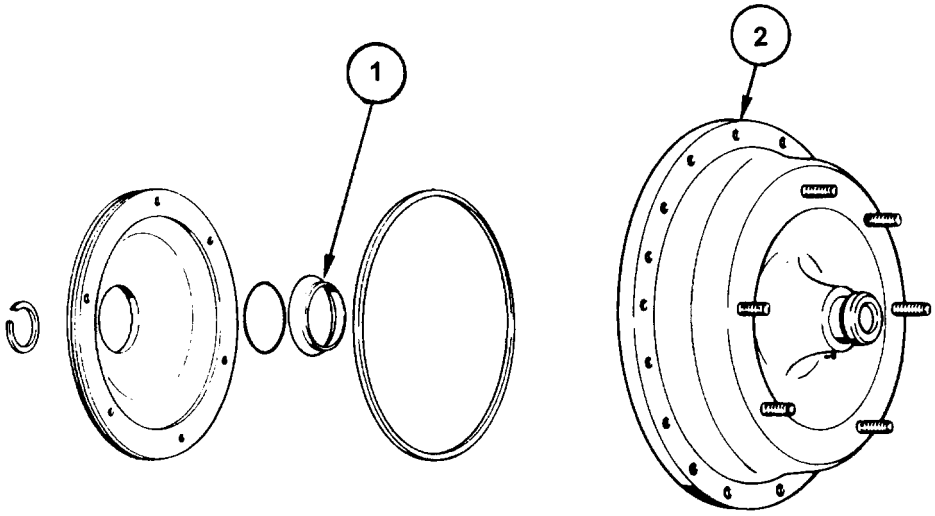


Figure 1. Converter Element Components.

WARNING

Ink, Etching, Acid is poisonous and may cause sickness or death if ingested.

3. Using Ink, Etching, Acid (WP 0024, Item 11) obliterate ASSY P/N from Converter Pump Assembly and remark in the same proximity and size as old marking ASSY P/N 73342 2941129.

Mandatory Replacement Parts

Refer to Table 1. Mandatory Replacement Parts for Repairing Converter Element Components. Work Package 0026 contains a complete list of all mandatory replacement parts necessary for maintenance of the X200-4 and X200-4A Transmissions.

Table 1. Mandatory Replacement Parts for Repairing Converter Element Component.

WP 0026 ITEM NO.	NOMENCLATURE	QTY
11	Ring, Transmission	1
12	O-Ring	1

Disassemble Converter Pump Cover Assembly

1. Remove retaining ring (3).
2. Turn Converter Pump Assembly over (studs up) and drop assembly on work bench to bump piston (4) out.
3. Remove transmission, ring (6) from piston (4) and O-ring (5) from retainer (1). Throw away transmission, ring (6) and O-ring (5).
4. If replacement is necessary, remove retainer (1) from Converter Pump Assembly (2).

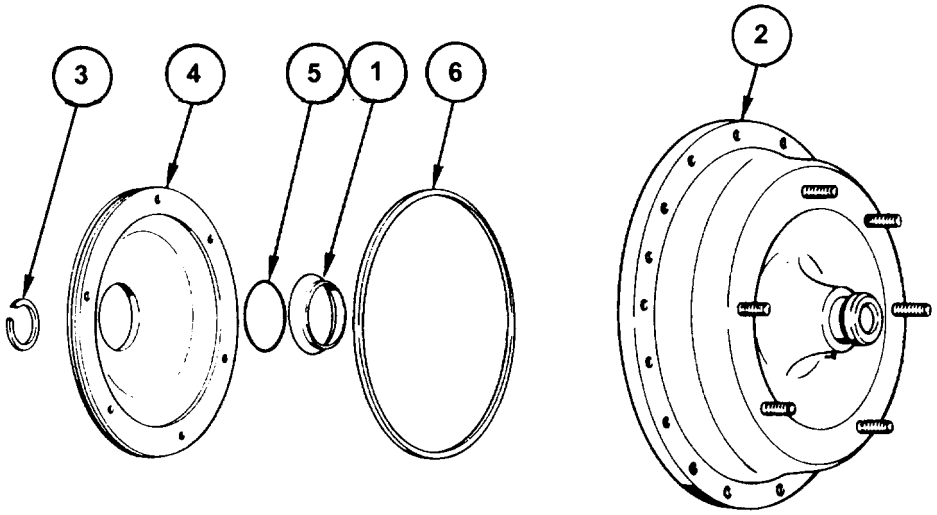


Figure 2. Converter Element Components.

REPAIR CONVERTER ELEMENT COMPONENTS – Cont. 0018 00

Assemble Converter Pump Cover Assembly

1. Install retainer (1) to a seat in pump cover (2).
2. Install new transmission, ring (6) onto piston (4) and new O-ring (5) onto retainer (1). Apply Lubricating Oil (WP 0024, Item 12) to O-Ring (5) and transmission, ring (6).
3. Install piston (4) into Converter Pump Cover Assembly (2), aligning bleed hole in piston (4) with stud in cover (2).
4. Install retaining ring (3).

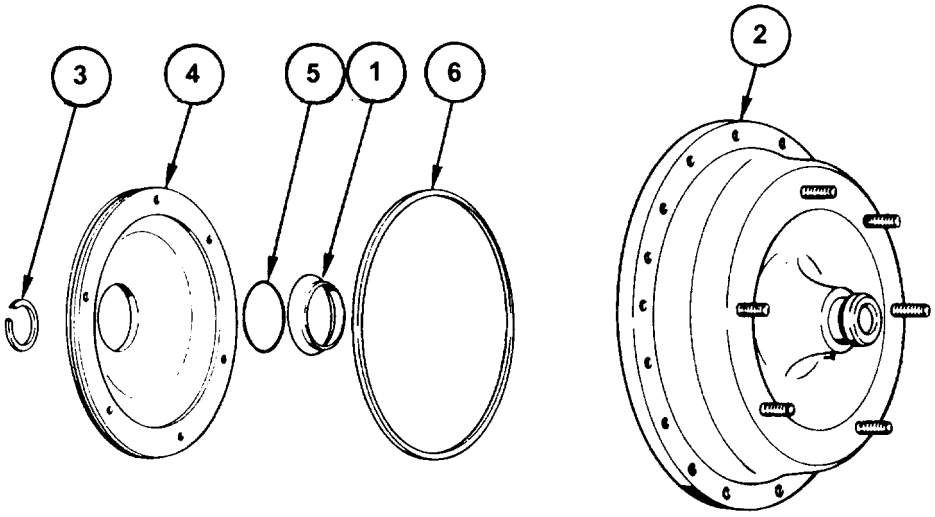


Figure 2. Converter Element Components. (Repeated)

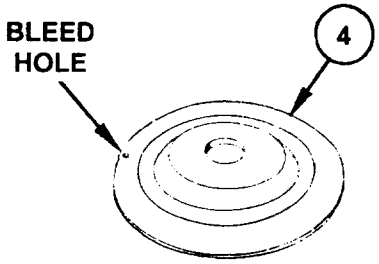


Figure 3. Bleed Hole.

Disassemble Stator Group

1. Remove retaining ring (7) from stator (8).
2. Pull up on race (9). Remove rear stator washer (10).
3. Remove thrust washer (11).

NOTE

Springs (12) and rollers (13) will fall free from cam (14) when race (9) is removed.

4. Remove race (9). (Springs (12) and rollers (13) will fall free from cam (14).) Remove cam (14).
5. Remove thrust washer (15).
6. Remove bearing (16) and race (17).
7. Remove clutch disk (front stator washer) (18).
8. Remove retaining ring (19).

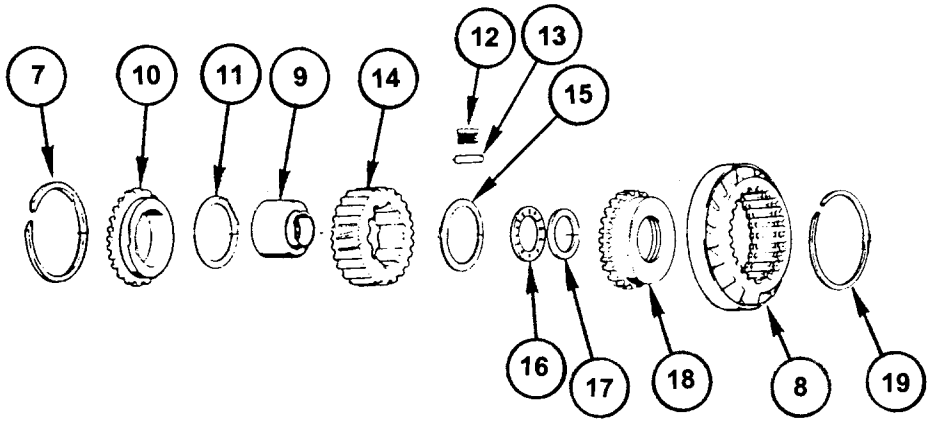


Figure 4. Stator Components.

Assemble Stator Group

1. Install retaining ring (19) into stator (8).
2. Install clutch disk (front stator washer) (18).
3. Install race (17) and bearing (16).
4. Install thrust washer (15).
5. Install race (9). Install cam (14).
6. Using petrolatum (WP 0024, Item 14) to hold parts in place, install twelve springs (12) and rollers (13) into cam (14) in position shown in illustration. The open end of the spring touching the roller must be toward the center of cam (14). Rollers (13) are installed in the shallow ends of cam (14) pockets.
7. Install thrust washer (11).
8. Install rear stator washer (10).
9. Install retaining ring (7).

Assemble Stator Group – Cont.

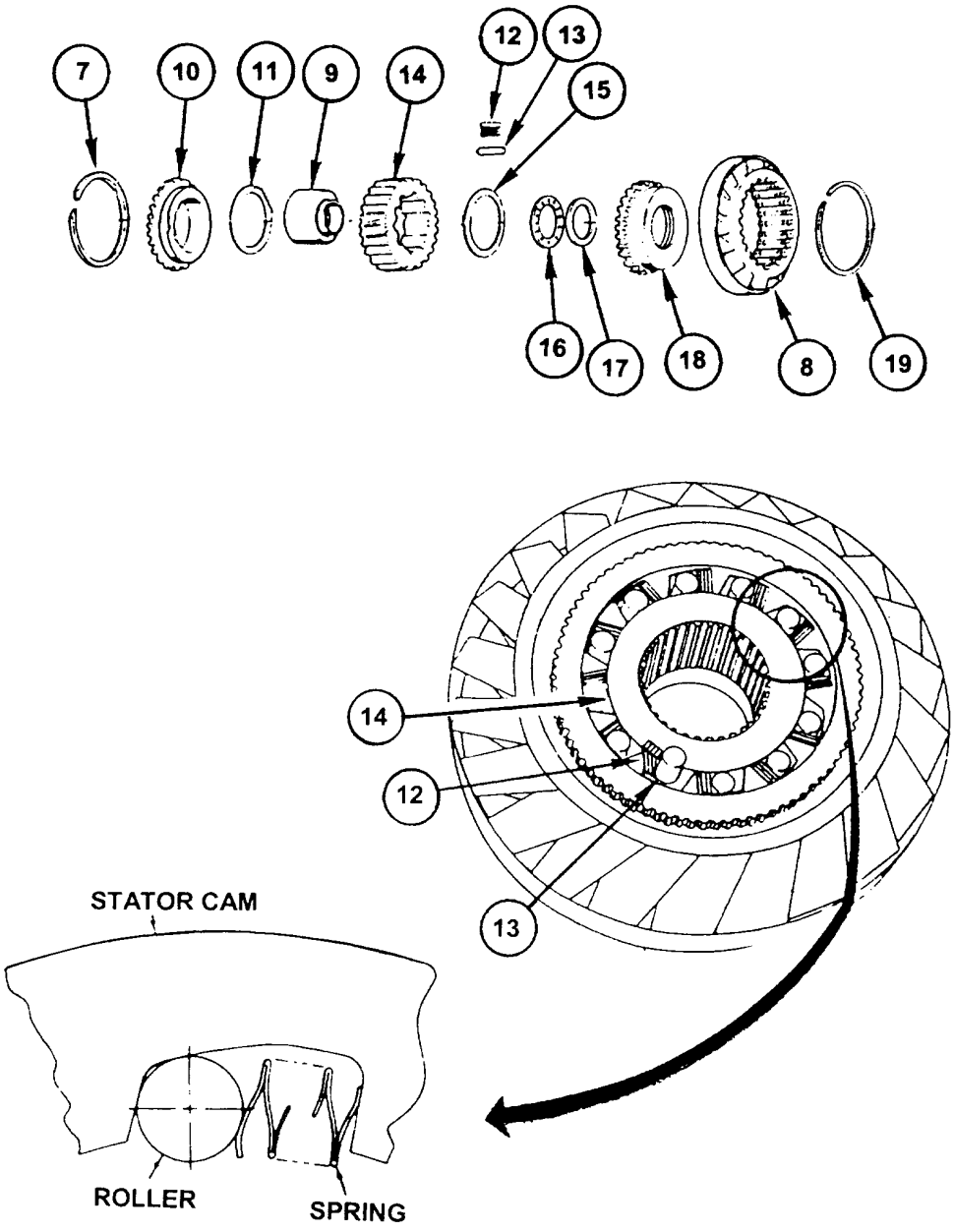


Figure 5. Stator Components.

END OF WORK PACKAGE

CHAPTER 4

SUPPORTING INFORMATION

FINAL ADJUSTMENTS 0019 00

THIS WORK PACKAGE COVERS:

Final static checks and adjustments performed after the maintenance actions have been completed and prior to use, shipment, or storage.

INITIAL SETUP

Personnel Required
Track Vehicle Repairer 63H20 (1)

Common Tools
Shop Equipment, Automotive Maintenance and Repair: Field Maintenance, Basic, Less Power (WP 0025, Item 20)
Tool Kit, General Mechanic's Automotive (WP 0025, Item 27)

Special Tools
Socket, Socket Wrench (Adapter, Splined, Brake Adjustment) (WP 0025, Item 23)

Repair Parts
Mandatory Replacement Parts, Table 1 and Table 2.

Preliminary Procedures
All maintenance actions have been completed.

SCOPE

This Work Package contains the information for performing Final Static Checks and Adjustments required after maintenance actions have been completed and prior to use, shipment or storage. Output Shaft Drag Check, Torque Wrench Check, and Adjustment of Left and Right Hand Brakes are addressed.

ITEMS COVERED IN THIS WORK PACKAGE **PAGE**

FINAL ADJUSTMENTS – Cont. 0019 00

OVERVIEW

Final static checks and adjustments shall be performed after maintenance actions have been completed and prior to use, shipment, or storage.

Functional tests shall be performed with the transmission coupled to the engine and the power pack installed in the vehicle. (Refer to vehicle manual). 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.

OUTPUT SHAFT DRAG CHECK

Overview

When the left or right end cover has been removed and maintenance work has been performed on either cover, or 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.

The Output Shaft Drag 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 lb-ft (27 N·m) of torque. When rotation of the output shaft produces a torque reading higher that 20 lb-ft (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 lb-ft (68 N·m), or more, because of all the oil being moved around. However, an uneven drag check reading, such as 50 lb-ft (68 N·m) on one shaft and 40 lb-ft (54 N·m) on the other shaft, would indicate something binding in the side with the high reading.

When there is excessive drag on one output shaft, there will probably also be excessive drag on the other output shaft. The output shaft with the higher torque reading represents the side of the transmission which must be disassembled.

FINAL ADJUSTMENTS – Cont. 0019 00

OUTPUT SHAFT DRAG CHECK, LEFT AND RIGHT SIDE

1. If tab of washer (1) is bent, straighten bent tab of washer (1) that retains bolt (2) on output flange (3).

2. Using torque wrench on bolt (2), turn output flange (3) to right (clockwise). Torque while turning should not exceed 20 lb-ft (27 N·m).

3. If dimple is not present in washer (1), punch dimple in washer (1). Dimple must go down into dimple hole (4) in left and right output flanges (3).

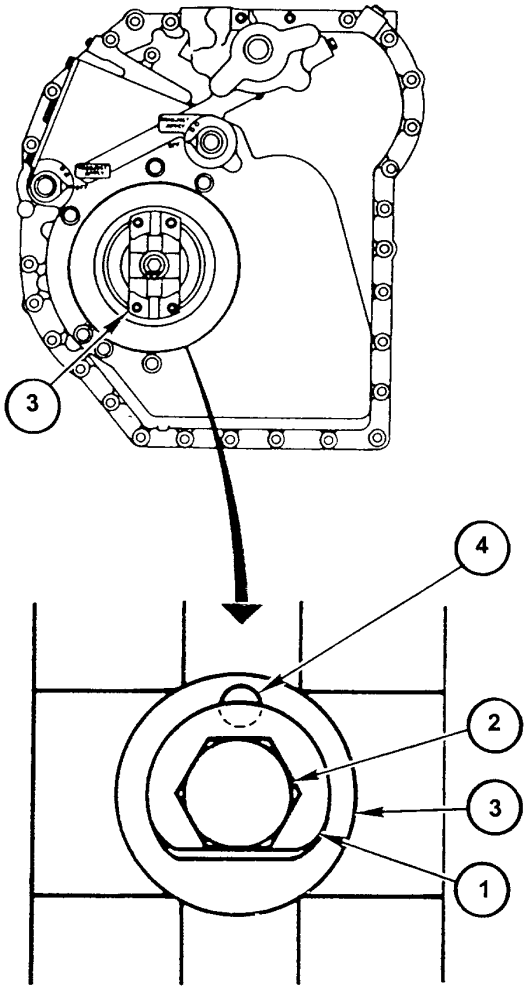


Figure 1. View, Right Side End Cover.

FINAL ADJUSTMENTS – Cont. 0019 00

OUTPUT SHAFT DRAG CHECK, LEFT AND RIGHT SIDE – Cont.

NOTE

Tab of washer (1) may be on any flat of the bolt head (2), except tab must be away from dimple hole (4).

4. Bend tab on washers (1) up against flat of left and right bolt heads (2).

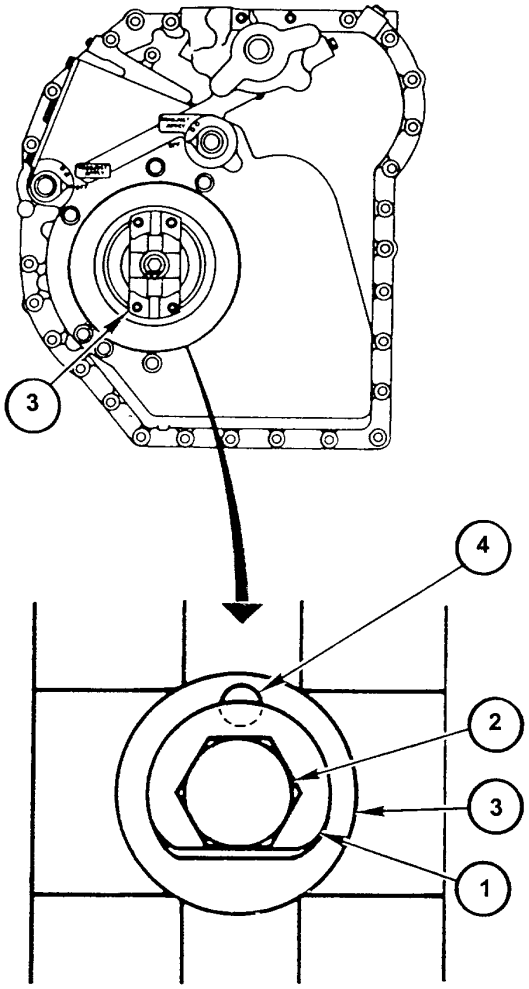


Figure 1. View, Right Side End Cover. (Repeated)

Follow on Procedure

1. If torque reading in drag check did not exceed 20 lb-ft (27 N·m), go to brake adjustments.

2. If torque reading in drag check exceeded 20 lb-ft (27 N·m), return transmission to maintenance with report on output shaft drag check.

TORQUE WRENCH CHECK

Overview

When the Left or Right End Cover has been removed and maintenance work has been performed in either cover of the left or right brakes, a Torque Wrench Check must be performed. This check will indicate if an assembly error exists, such as omission of a spacer or gear or binding of parts.

The Torque Wrench 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.

This check is performed on a dry transmission (a transmission not filled with oil).

NOTE

The Torque Wrench Check provides an accurate method to check brakes.

When a brake is adjusted properly, 40 lb-ft (54 N·m) applied to the torque wrench, on the brake apply shaft, should cause the indicator to line up opposite the APPLY mark.

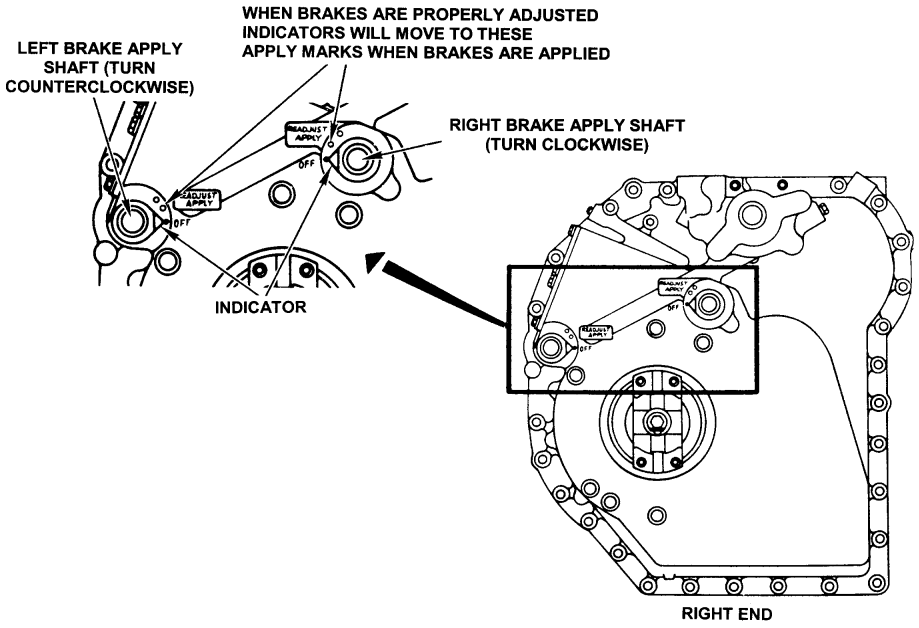


Figure 2. View, Right Side End Cover.

FINAL ADJUSTMENTS – Cont. 0019 00

TORQUE WRENCH CHECK – Cont.

1. Using torque wrench and Socket, Socket Wrench (WP 0025, Item 23), 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 in relation to the APPLY mark. Adjust brake if indicator does not line up opposite APPLY mark. (Refer to WP 0019 00-7, Adjust Left Hand Brake).

3. Using torque wrench and, Socket, Socket Wrench (WP 0025, Item 23), 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 WP 0019 00-9, Adjust Right Hand Brake).

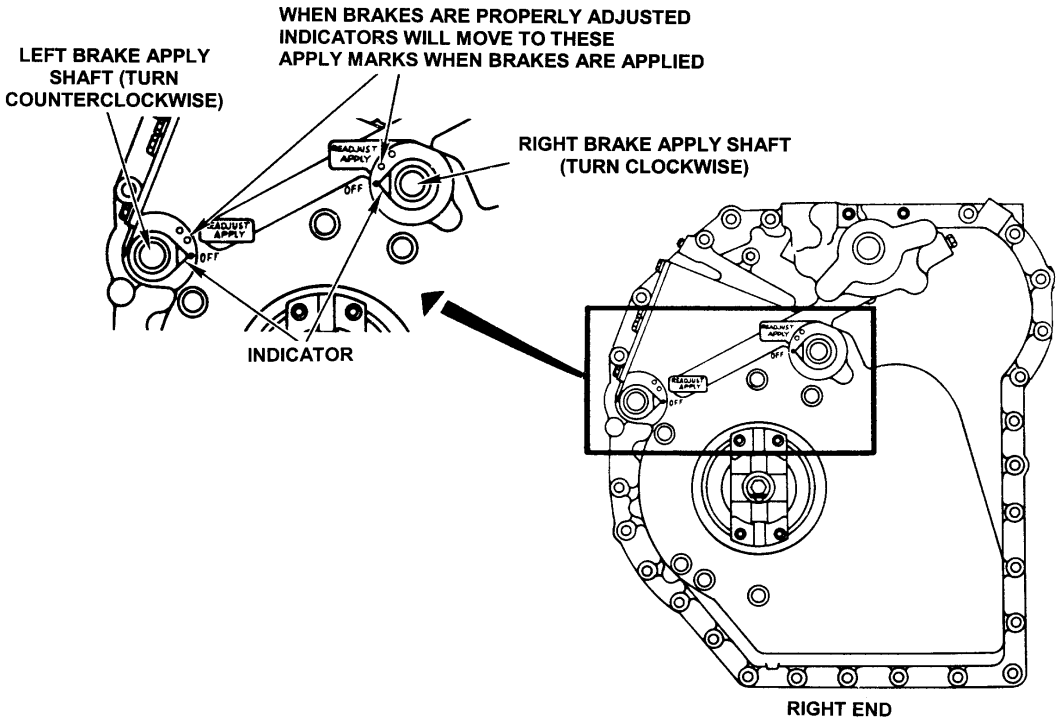


Figure 2. View, Right Side End Cover. (Repeated)

ADJUST LEFT HAND BRAKE

Mandatory Replacement Parts

Refer to Table 1. Mandatory Replacement Parts for Adjusting the Left Hand Brake.
Work Package 0026 contains a complete list of all mandatory replacement parts necessary for maintenance of the X200-4 and X200-4A Transmissions.

Table 1. Mandatory Replacement Parts for Adjusting the Left Hand Brake.

WP 0026 ITEM NO.	NOMENCLATURE	QTY
31	Gasket	1

NOTE

Brake needs tightening 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 (60º) at a time until proper brake adjustment is achieved.

ADJUST LEFT HAND BRAKE – Cont.

1. Remove four bolts (5) and four washers (6) retaining LH Brake Adjusting Cover (7).

2. Remove LH Brake Adjusting Cover (7) and gasket (8). Discard gasket (8).

3. Remove Governor Assembly (9) by turning Governor Assembly clockwise to disengage gear teeth.

NOTE

Wrench turned to right (counterclockwise rotation of Adjusting Link) tightens brake.

Wrench turned to left (clockwise rotation of Adjusting Link) loosens brake.

4. Alternately turn Adjusting Link (10) and apply Socket, Socket Wrench (WP 0025, Item 23) and torque wrench at 40 lb-ft (54 N·m) on Left Brake Apply Shaft (11) until indicator lines up opposite APPLY mark.

5. Install Governor Assembly (9), engaging gear counterclockwise.

6. Install LH Brake Adjusting Cover (7) with new gasket (8).

7. Install four bolts (5) and four washers (6) retaining LH Brake Adjusting Cover (7).

8. Torque four bolts (5) to 17-20 lb-ft (23-27 N·m).

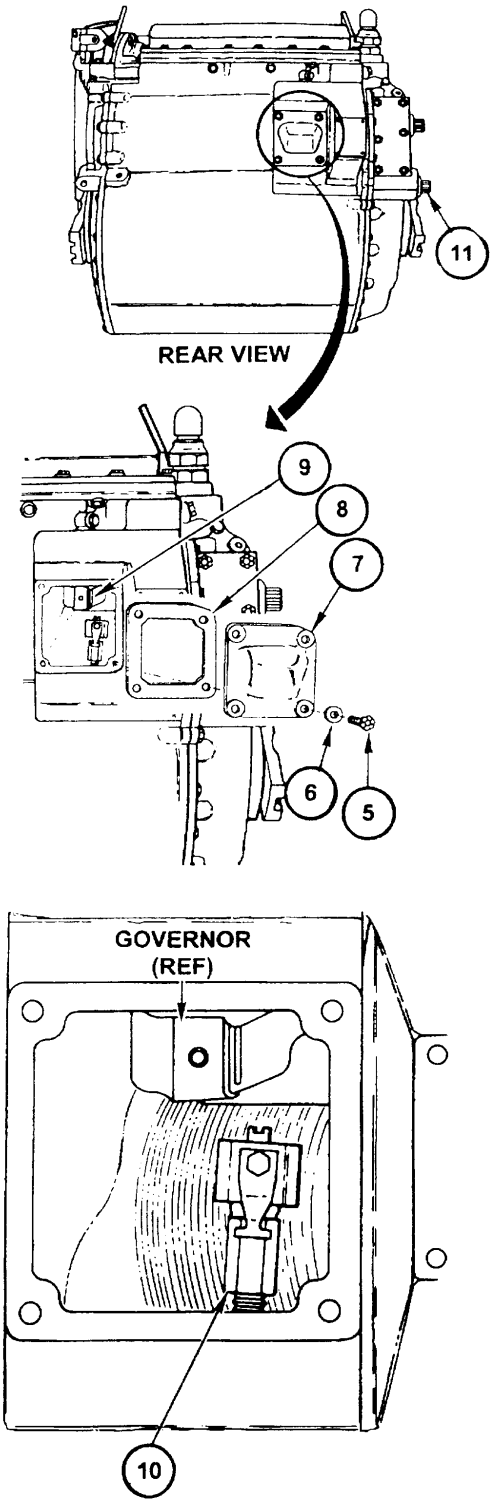


Figure 3. Left Brake Adjusting Link.

ADJUST RIGHT HAND BRAKE

Mandatory Replacement Parts.

Refer to Table 2. Mandatory Replacement Parts for Adjusting the Right Hand Brake. Work Package 0026 contains a complete list of all mandatory replacement parts necessary for maintenance of the X200-4 and X200-4A Transmissions.

Table 2. Mandatory Replacement Parts for Adjusting the Right Hand Brake.

WP 0026 ITEM NO.	NOMENCLATURE	QTY
32	Gasket	1

NOTE

Brake needs tightening 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 1/16 turn (60º) at a time until proper brake adjustment is achieved.

X200-4A. Prior to removal of RH Brake Adjusting Cover, note location of chain in relation to bolt.

ADJUST RIGHT HAND BRAKE – Cont.

1. Remove six bolts (12) and six washers (13) retaining RH Brake Adjusting Cover (14).
2. Remover RH Brake Adjusting Cover (14) and gasket (15). Discard gasket (15).

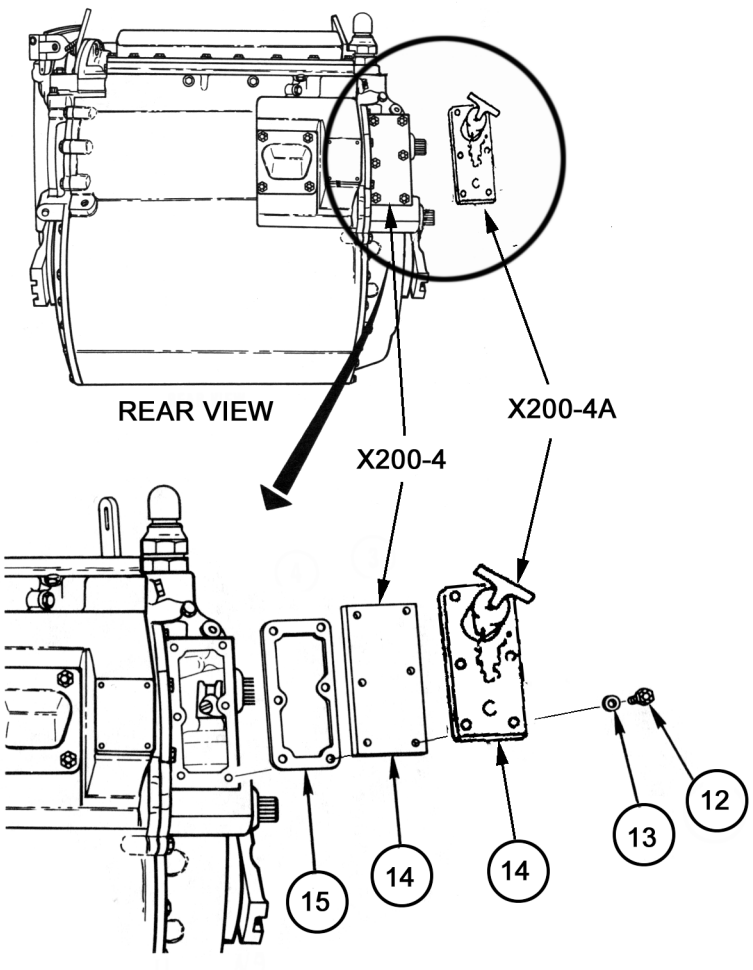


Figure 4. Right Hand Brake Adjusting Cover.

FINAL ADJUSTMENTS – Cont. 0019 00

ADJUST RIGHT HAND BRAKE – Cont.

NOTE

Screwdriver turned clockwise in slotted tip of Right Adjusting Link loosens brake.

Screwdriver turned counterclockwise in slotted tip of Right Adjusting Link tightens brake.

3. Alternately turn Right Adjusting Link (16) 1/6 turn (60º) with screwdriver and apply Socket, Socket Wrench (WP 0025, Item 23) and torque wrench at 40 lb-ft (54 N·m) on Right Brake Shaft (17) until indicator lines up opposite APPLY mark.

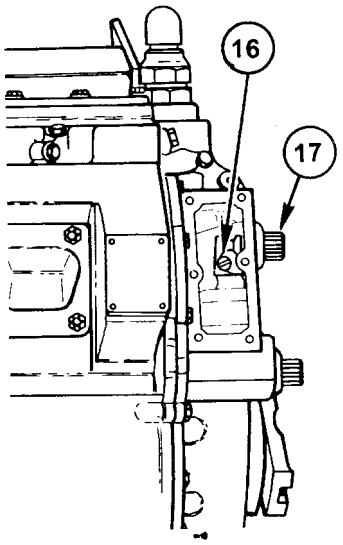


Figure 5. Right Hand Brake Adjusting Link.

FINAL ADJUSTMENTS – Cont. 0019 00

ADJUST RIGHT HAND BRAKE – Cont.

4. Install RH Brake Adjusting Cover (14) with new gasket (15).

5. Install six bolts (12) and six washers (13) retaining RH Brake Adjusting Cover (14).

NOTE

X200-4A. Oil filler cap chain is bolted under the top outside bolt and washer of the six bolts and six washers which retain the RH Brake Adjusting Cover to the End Cover.

6. Torque six bolts (12) to 13-15 lb-ft (17-20 N·m).

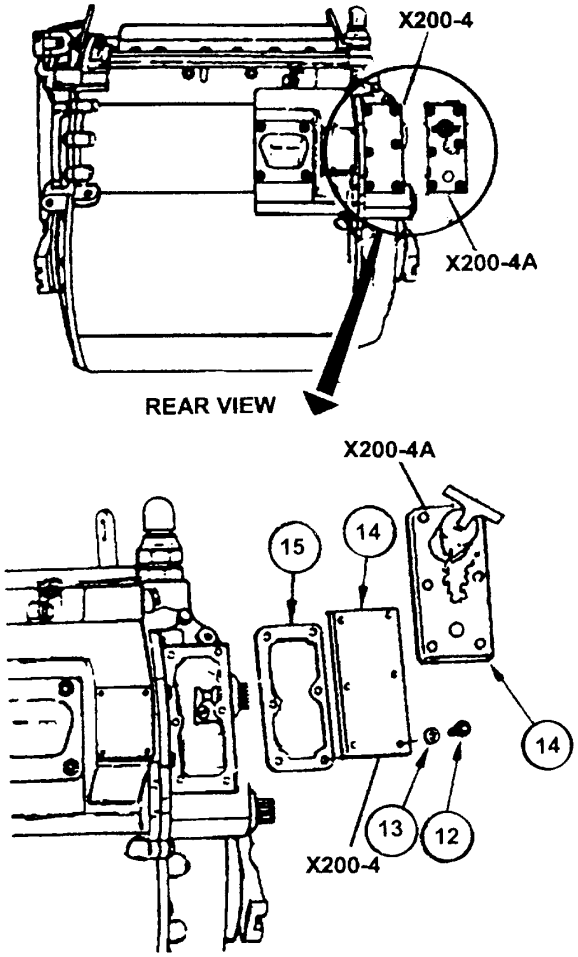


Figure 6. Right Hand Brake Adjusting Cover.

END OF WORK PACKAGE

REFERENCES 0020 00

SCOPE

This Work Package lists all Field Manuals, Forms, Technical Manuals and miscellaneous publications referenced in this manual.

REFERENCES

FIELD MANUALS

FM 38-700	Packaging of Material - Preservation
FM 38-701	Packaging of Material - Packing

FORMS

SF 364	Report of Discrepancy (ROD)

LUBRICATION ORDERS

LO 9-2350-277-12	Lubrication Order

PAMPHLETS

DA PAM 40-13	Training in First Aid and Emergency Medical Treatment
DA PAM 738-750	Functional User's Manual for the Army Maintenance Management System (TAMMS)

TECHNICAL BULLITENS

TB 9-289	Reconditioning of Type I and Type ll Reusable Metal Containers
TB 43-0211	Oil Analysis Program User's Guide

TECHNICAL MANUALS

TM 9-214	Inspection, Care and Maintenance of Antifriction Bearings
TM 9-243	Use and Care of Hand Tools and Measuring Tools
TM 38-750	The Army Maintenance Management System (TAMMS)
TM 9-2350-247- Series	(M548A3) Carrier, Cargo, Full Tracked
TM 9-2350-277- Series	(M58) Carrier, Personnel, Full Tracked
TM 9-2350-277- Series	(M113A3) Carrier, Personnel, Full Tracked
TM 9-2350-277- Series	(M577A3) Carrier, Command Post, Light Tracked
TM 9-2350-277- Series	(M1059A3) Carrier, Smoke Generator, Full Tracked
TM 9-2350-277- Series	(M1064A3) Carrier, Mortar, 120 MM, Self-Propelled

REFERENCES – Cont.

REFERENCES – Cont. 0020 00

TECHNICAL MANUALS – Cont.

TM 9-2350-277- Series	(M1068A3) Carrier, Standardized Integrated Command Post System
TM 9-2350-366- Series	(BMP-2 OSV) Carrier, Personnel, Full Tracked
TM 9-2520-272-34&P	Direct and General Support Maintenance Manual (Including Repair Pars and Special Tools List) for Cross Drive Transmission W/Container, Model X200-4 and X200-4A

END OF WORK PACKAGE

REPAIR PARTS AND SPECIAL TOOLS LIST INTRODUCTION 0021 00

THIS WORK PACKAGE COVERS:

This Work Package provides general instructions regarding how to use the Repair Parts and Special Tools List (RPSTL).

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 Direct Support and General Support maintenance of the X200-4/4A 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.

GENERAL

In addition to the Introduction, this RPSTL is divided into the following:

1. Repair Parts List contains lists of spares and repair parts authorized by this RPSTL for use in the performance of maintenance. This 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. Sending units, brackets, filters, and bolts are listed with the component they mount on. Bulk materials are listed by item name in WP (EXPENDABLE AND DURABLE ITEMS LIST). Repair parts kits are listed separately in their own functional group. Repair parts for reparable special tools are also listed. Items listed are shown on their associated illustrations.

2. Special Tools List contains lists of special tools, special TMDE, and special support equipment authorized by this RPSTL (as indicated by Basis of Issue (BOI) information in the DESCRIPTION AND USABLE ON CODE (UOC column). Tools that are components of common tool sets and/or Class VII are not listed.

3. Cross-Reference Indexes Work Packages. There are two Cross-Reference Indexes Work Packages in this RPSTL: The National Stock Number (NSN) Index Work Package, and the Part Number (P/N) Index Work Package. The National Stock Number Index work package refers you to the figure and item number. The Part Number Index Work Package refers you to the figure and item number.

REPAIR PARTS AND SPECIAL TOOLS LIST INTRODUCTION 0021 00

EXPLANATION OF COLUMNS IN THE REPAIR PARTS LIST AND SPECIAL TOOLS LIST WORK PACKAGES

ITEM NO. (Column (1)). Indicates the number used to identify items called out in the illustration.

SMR CODE (Column (2)). The SMR code containing supply/requisitioning information, maintenance level authorization criteria, and disposition instruction, as shown in the following breakout:

Source Code	Maintenance Code		Recoverability Code
XX	X	X	X
1st two positions: How to get an item.	3rd position: Who can install, replace, or use the item.	4th position: Who can do complete repair* on the item.	5th position: Who determines disposition action on unserviceable items.

*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.

Source Code. The source code tells you how you get an item needed for maintenance, repair, or overhaul of an end item/equipment. Explanations of source codes follow:

Source Code	Application/ Explanation
PA, PB, PC**, PD, PE, PF, PG	Stock items; use the applicable NSN to requisition/request items with these source codes. They are authorized to the level indicated by the code entered in the 3rd 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 level indicated in the 3rd position of the SMR code. The complete kit must be requisitioned and applied.
MO- Made at unit/ AVUM level MF- Made at DS/ AVIM level MH- Made at GS level ML- Made at SRA MD- Made at depot	Items with these codes are not to be requisitioned/ requested individually. They must be made from bulk material which is identified by the P/N in the DESCRIPTION AND USABLE ON CODE (UOC) column and listed in the bulk material group work package of the RPSTL. If the item is authorized to you by the 3rd position code of the SMR code, but the source code indicates it is made at higher level, order the item from the higher level of maintenance.

EXPLANATION OF COLUMNS IN THE REPAIR PARTS LIST AND SPECIAL TOOLS LIST WORK PACKAGES – Cont.

AO-	Assembled by unit/AVUM 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 3rd position of the SMR code authorizes you to replace the item, but the source code indicates the item is assembled at a higher level, order the item from the higher level of maintenance.
AF-	Assembled by DS/AVIM level	
AH-	Assembled by GS level	
AL-	Assembled by SRA	
AD-	Assembled by depot	

XA - Do not requisition an "XA" coded item. Order the next higher assembly. (Refer to NOTE below.)
XB - If an item is not available from salvage, order it using the CAGEC and P/N.
XC - Installation drawings, diagrams, instruction sheets, field service drawings; identified by manufacturer's P/N.
XD - Item is not stocked. Order an XD-coded item through normal supply channels using the CAGEC and P/N 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 items source coded "XA" or those aircraft support items restricted by requirements of AR 750-1.

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:

Third Position. 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 the following levels of maintenance:

Maintenance Code	Application/Explanation
C -	Crew or operator maintenance done within unit/AVUM maintenance.
O -	Unit level/AVUM maintenance can remove, replace, and use the item.
F -	Direct support/AVIM maintenance can remove, replace, and use the item.
H -	General support maintenance can remove, replace, and use the item.

EXPLANATION OF COLUMNS IN THE REPAIR PARTS LIST AND SPECIAL TOOLS LIST WORK PACKAGES – Cont.

Maintenance

Code	Application/Explanation
L -	Specialized repair activity can remove, replace, and use the item.
D -	Depot can remove, replace, and use the item.

Fourth Position. The maintenance code entered in the fourth position tells you whether or not the item is to be repaired and identifies the lowest maintenance level with the capability to do complete repair (perform all authorized repair functions).

NOTE

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.

Maintenance Code	Application/Explanation
O -	Unit/AVUM is the lowest level that can do complete repair of the item.
F -	Direct support/AVIM 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 (TBA).
D -	Depot is the lowest level that can do complete repair of the item.
Z -	Nonreparable. No repair is authorized.
B -	No repair is authorized. No parts or special tools are authorized for maintenance of "B" coded item. However, the item may be reconditioned by adjusting, lubricating, etc., at the user level.

REPAIR PARTS AND SPECIAL TOOLS LIST INTRODUCTION 0021 00

EXPLANATION OF COLUMNS IN THE REPAIR PARTS LIST AND SPECIAL TOOLS LIST WORK PACKAGES – Cont.

Recoverability Code. Recoverability codes are assigned to items to indicate the disposition action on unserviceable items. The recoverability code is shown in fifth position of the SMR code as follows:

Recoverability Code	Application/Explanation
Z -	Nonreparable item. When unserviceable, condemn and dispose of the item at the level of maintenance shown in the third position of the SMR code.
O -	Reparable item. When uneconomically reparable, condemn and dispose of the item at the unit 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 are 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 (such as precious metal content, high dollar value, critical material, or hazardous material). Refer to appropriate manuals/directives for specific instructions.

NSN (Column (3)). The NSN for the item is listed in this column.

CAGEC (Column (4)). The Commercial and Government Entity Code (CAGEC) is a five-digit code which is used to identify the manufacturer, distributor, or Government agency/activity that supplies the item.

PART NUMBER (Column (5)). 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 an NSN to requisition an item, the item you receive may have a different P/N from the number listed.

EXPLANATION OF COLUMNS IN THE REPAIR PARTS LIST AND SPECIAL TOOLS LIST WORK PACKAGES – Cont.

DESCRIPTION AND USABLE ON CODE (UOC) (Column (6)). This column includes the following information:

1. The Federal Item Name, and when required, a minimum description to identify the item.

2. P/Ns of bulk materials are referenced in this column in the line entry to be manufactured or fabricated.

3. Hardness Critical Item (HCI). A support item that provides the equipment with special protection from electromagnetic pulse (EMP) damage during a nuclear attack.

4. The statement END OF FIGURE appears just below the last item description in Column (6) for a given figure in both the repair parts list and special tools list Work Packages.

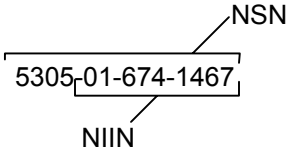
QTY (Column (7)). The QTY (quantity per figure) column indicates the quantity of the item used in the breakout shown on the illustration/figure, which is prepared for a functional group, subfunctional group, or an assembly. A "V" appearing in this column instead of a quantity indicates that the quantity is variable and quantity may change from application to application.

EXPLANATION OF CROSS-REFERENCE INDEXES WORK PACKAGES FORMAT AND COLUMNS

1. National Stock Number (NSN) Index Work Package.

STOCK NUMBER Column. This column lists the NSN in National item identification number (NIIN) sequence. The NIIN consists of the last nine digits of the NSN.

Example:



When using this column to locate an item,ignore the first four digits of the NSN. However, the complete NSN should be used when ordering items by stock number.

FIG. Column. This column lists the number of the Figure where the item is identified/located. The figures are in numerical order in the repair parts list and special tools list Work Packages.

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.

2. Part Number (P/N) Index Work Package. P/Ns in this Index are listed in ascending alphanumeric sequence (vertical arrangement of letter and number combinations 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).

PART NUMBER Column. Indicates the P/N assigned to the item.

REPAIR PARTS AND SPECIAL TOOLS LIST INTRODUCTION 0021 00

EXPLANATION OF CROSS-REFERENCE INDEXES WORK PACKAGES FORMAT AND COLUMNS – Cont.

FIG. Column. This column lists the number of the Figure where the item is identified/located in the repair parts list and special tools list Work Packages.

ITEM Column. The item number is the number assigned to the item as it appears in the Figure referenced in the adjacent figure number column."

SPECIAL INFORMATION

UOC. The UOC appears in the lower left corner of the Description Column heading. Usable on codes are shown as "UOC: ..." in the Description Column (justified left) on the first line under the applicable item/nomenclature. Uncoded items are applicable to all models. Identification of the UOCs used in the RPSTL are:

USABLE ON Code	Used On
XTZ	MODEL X200-4 Transmission
X4A	MODEL X200-4A Transmission

Fabrication Instructions. Bulk materials required to manufacture items are listed in the bulk material functional group of this RPSTL. Part numbers for bulk material are also referenced in the Description Column of the line item entry for the item to be manufactured/fabricated. Detailed fabrication instructions for items source coded to be manufactured or fabricated are found in appropriate authorized maintenance level technical manuals.

Index Numbers. Items which have the word BULK in the figure column will have an index number shown in the item number column. This index number is a cross-reference between the NSN / P/N Index Work Packages and the bulk material list in the repair parts list Work Package."

HOW TO LOCATE REPAIR PARTS

1. When NSNs or P/Ns Are Not Known.

First. Using the table of contents, determine the assembly group to which the item belongs. This is necessary since figures are prepared for assembly groups and subassembly groups, and lists are divided into the same groups.

Second. Find the figure covering the functional group or the subfunctional group to which the item belongs.

Third. Identify the item on the figure and note the number(s).

Fourth. Look in the repair parts list Work Packages for the figure and item numbers. The NSNs and part numbers are on the same line as the associated item numbers.

2. When NSN Is Known.

First. If you have the NSN, look in the STOCK NUMBER column of the NSN Index Work Package. The NSN is arranged in NIIN sequence. Note the figure and item number next to the NSN.

REPAIR PARTS AND SPECIAL TOOLS LIST INTRODUCTION 0021 00

HOW TO LOCATE REPAIR PARTS – Cont.

Second. Turn to the figure and locate the item number. Verify that the item is the one you are looking for.

3. When P/N Is Known.

First. If you have the P/N and not the NSN, look in the PART NUMBER column of the P/N Index Work Package. Identify the figure and item number.

Second. Look up the item on the figure in the applicable repair parts list Work Package.

ABBREVIATIONS

Abbreviation	Explanation
bk	brake
cl	clutch
gr	gear
hydrostat	hydrostatic pump and motor assembly
LH	left-hand
mach	machining
Phy Sec Cl	physical security classification
rev	reverse
RH	right-hand
rvs	reverse
scav	scavenge
SRA	specialized repair activity
UOC	usable on code
V	variable

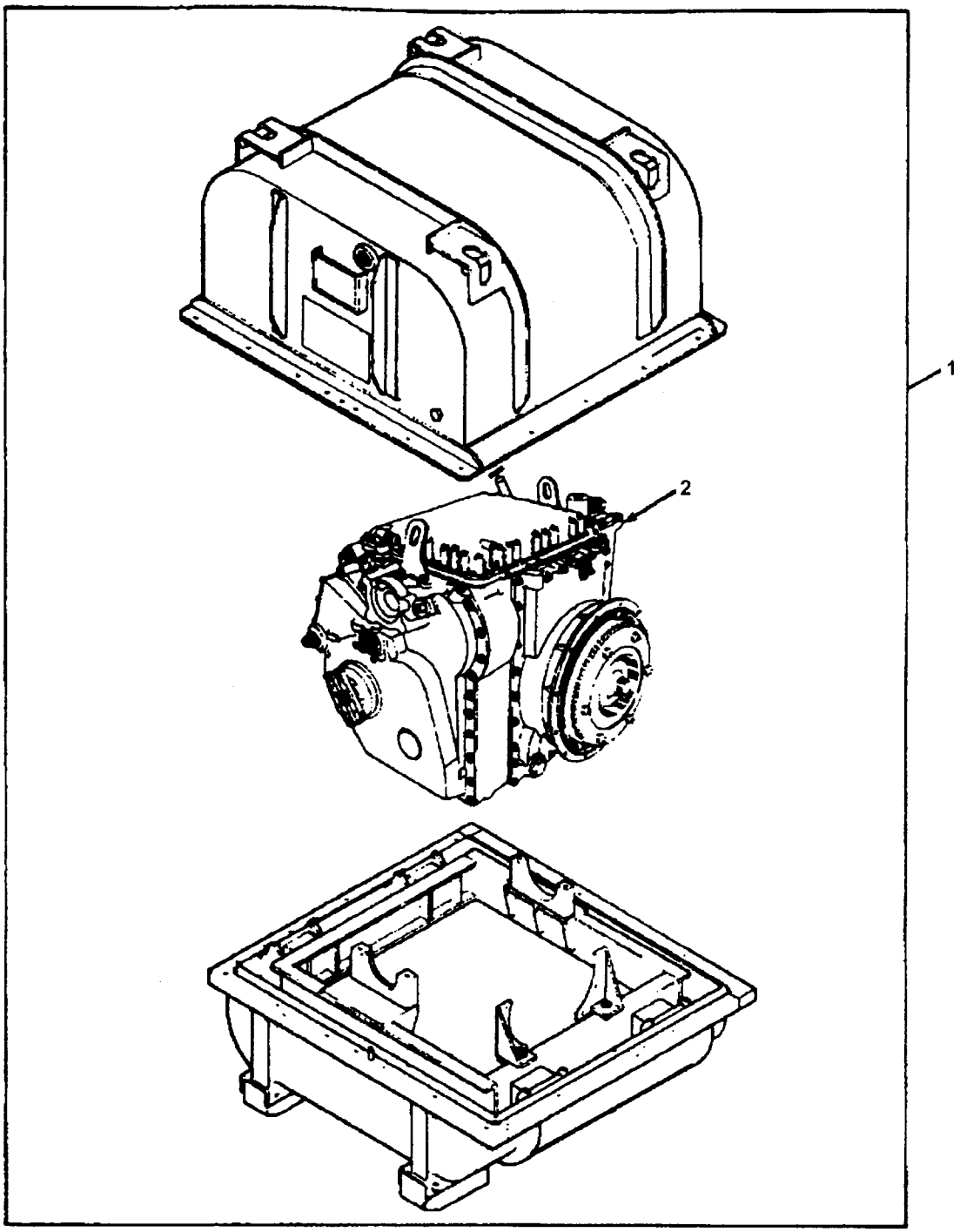


Figure 1. Transmission With Container.

TRANSMISSION WITH CONTAINER 0021 00

(1) Item NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 07 TRANSMISSION	
					GROUP 0710 TRANSMISSION ASSEMBLY	
					FIG. 1 TRANSMISSION WITH CONTAINER	
1	PAFDD	2520-01-397-1074	19207	12371043	TRANSMISSION W/CONTAINER (CONTAINS –4A TRANSMISSION)	1
1	PAFHD	2520-01-201-4784	19207	5703227	TRANSMISSION W/CONTAINER (CONTAINS –4 TRANSMISSION)	1
2	XAFHD		19207	12291400-1	TRANSMISSION X200-4 (UOC: XTZ) (SEE FIGS 23 THRU 29 FOR COMPONENT PARTS)	1
2	XAFHD		19207	12371041	TRANSMISSION X200-4A (UOC: X4A) (SEE FIGS 23 THRU 29 FOR COMPONENT PARTS)	1

END OF FIGURE

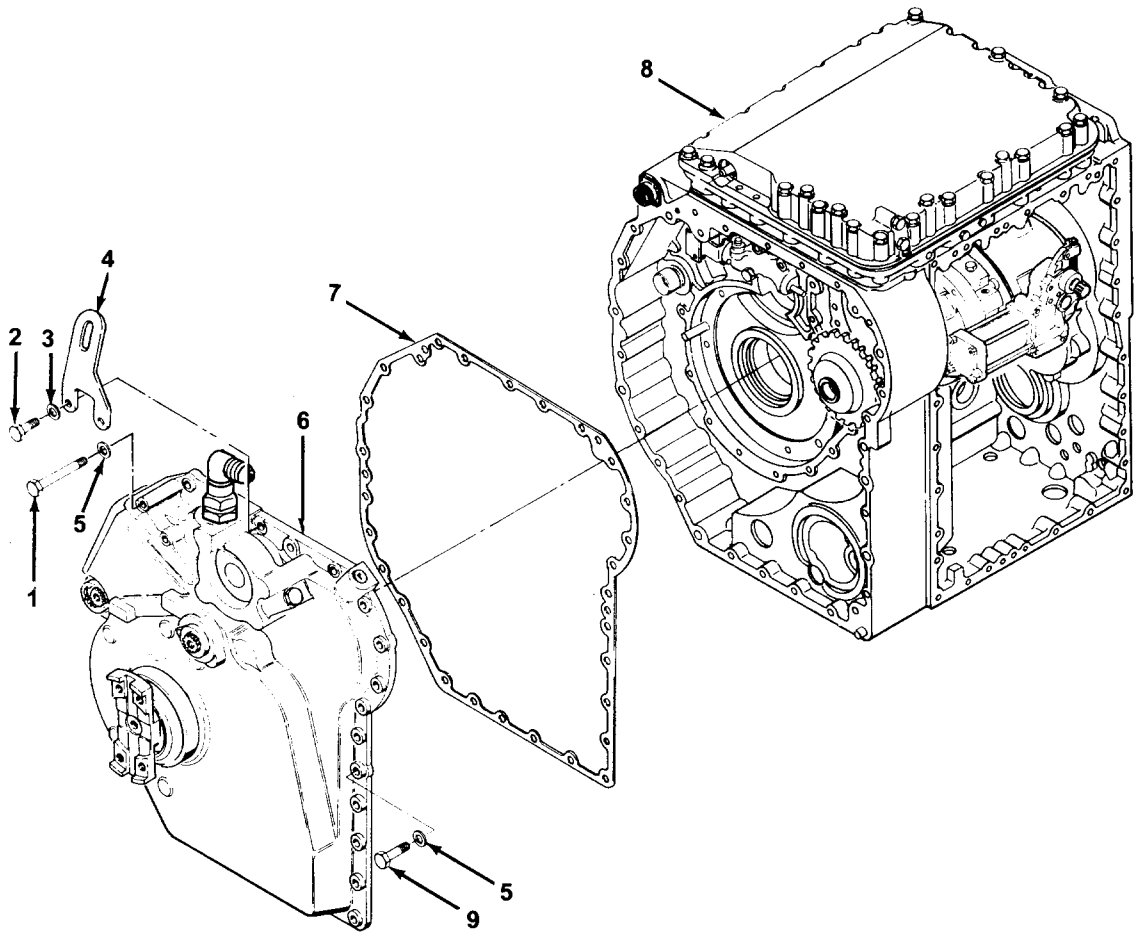


Figure 2. Right Hand Cover and Center Housing.

RIGHT HAND COVER AND CENTER HOUSING 0021 00

(1) Item NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 07 TRANSMISSION	
					GROUP 0710 TRANSMISSION ASSEMBLY	
					FIG. 2 RIGHT HAND COVER AND CENTER HOUSING	
1	PAHZZ	5306-01-216-3993	24617	9434184	BOLT,SELF-LOCKING	1
2	PAOZZ	5306-01-256-6811	24617	9425091	BOLT,SELF-LOCKING	2
3	PAOZZ	5310-01-057-3111	78229	H-117-C	WASHER,FLAT	2
4	PAOZZ	5340-01-258-8531	73342	23047394	BRACKET,ANGLE	1
5	PAHZZ	5310-01-057-3111	78229	H-117-C	WASHER,FLAT	27
6	AHHDD		73342	23045131	COVER ASSY,RH COMP (UOC: XTZ) (SEE FIGS 15, 32, 33 FOR COMPONENT PARTS)	1
6	AHHDD		73342	29510211	COVER ASSY,RH COMP (UOC: X4A) (SEE FIGS 15, 32, 33 FOR COMPONENT PARTS)	1
7	PAHZZ	5330-01-216-4015	73342	23018072	GASKET	1
8	AHHHD		73342	23045130	HSG ASSY,CTR COMP (UOC: XTZ) (SEE FIGS 11, 17 THRU 22 AND 31)	1
8	AHHHD		73342	29510162	HSG ASSY,CTR COMP (UOC: X4A) (SEE FIGS 11, 17 THRU 22 AND 31)	1
9	PAHZZ	5306-01-216-1333	24617	9409082	BOLT,SELF-LOCKING	26

END OF FIGURE

OUTPUT DRIVE GEAR AND STEER SHAFT DRIVE GEAR 0021 00

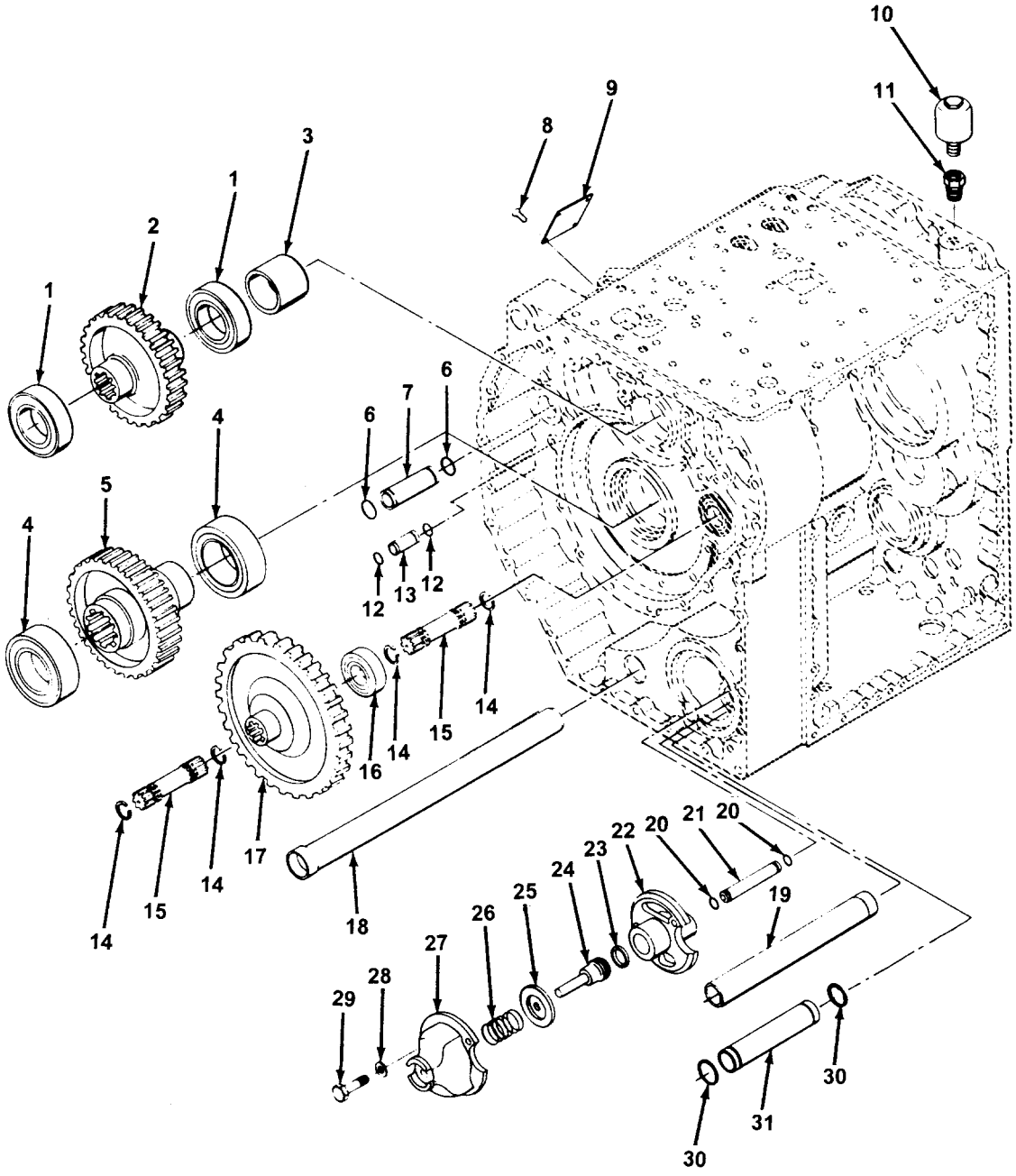


Figure 3. Output Drive Gear and Steer Shaft Drive Gear.

OUTPUT DRIVE GEAR AND STEER SHAFT DRIVE GEAR 0021 00

(1) Item NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 07 TRANSMISSION	
					GROUP 0710 TRANSMISSION ASSEMBLY	
					FIG. 3 OUTPUT DRIVE GEAR AND STEER SHAFT DRIVE GEAR	
1	PAHZZ	3110-01-217-2235	82994	BS226345	BEARING,ROLLER CYLI	2
2	PAHZZ	3020-01-216-7605	73342	23018104	GEAR,SPUR (UOC: XTZ)	1
2	PAHZZ	3020-01-422-4103	73342	29511850	GEAR,SPUR (UOC: X4A) (SUPERCEDED BY PN 29533541)	1
2	PAHZZ		73342	29533541	GEAR,SPUR (UOC: X4A)	1
3	PAHZZ	5365-01-217-0858	73342	23018103	SPACER,SLEEVE (USE WITH CARRIER ASSY PN 23018136 AND, SHAFT SHOULDERED PN 23018096)	1
4	PAHZZ	3110-01-216-5737	82994	BS226344	BEARING,ROLLER CLYI	2
5	PAHZZ	3020-01-216-8593	73342	23018106	GEAR, SPUR (UOC: XTZ)	1
5	PAHZZ	3020-01-421-0127	73342	29511851	GEAR, SPUR (UOC: X4A) (SUPERCEDED BY PN 29533540)	1
5	PAHZZ		73342	29533540	GEAR, SPUR (UOC: X4A)	1
6	PAHZZ	5331-01-219-2547	73342	23040580	O-RING	2
7	PAHZZ	4710-01-216-6625	73342	23045406	TUBE,METALLIC	1
8	PAOZZ	5305-00-253-5615	96906	MS21318-21	SCREW,DRIVE	4
9	PBOZZ	9905-01-253-1276	73342	23046541	PLATE,IDENTIFICATIO (UOC: XTZ)	1
9	PBOZZ	9905-01-423-1611	73342	29513282	PLATE,IDENTIFICATIO (UOC: X4A)	1
10	PAOZZ	2520-00-914-4680	73342	6774565	BREATHER	1
11	PAOZZ	4730-01-188-3183	72582	444335	REDUCER,PIPE	1
12	PAHZZ	5331-01-219-2548	73342	23018753	O-RING (QTY 2 USED WITH TUBE, METALLIC PN 23045408) (QTY 1 USED WITH TUBE, METALLIC PN 29510216) (PART OF ASSY PN 29510214)	2
13	PAHZZ	4710-01-216-6626	73342	23045408	TUBE,METALLIC (UOC:XTZ) (USE WITH RIGHT HAND BRAKE SUPPORT PN 23018037)	1
14	PAHZZ	5342-00-679-9787	73342	6756606	RING,SNAP	4
15	PAHZZ	3040-01-225-9023	73342	23018111	SHAFT,SHOULDERED (UOC: XTZ)	2
15	PAHZZ	3040-01-422-4102	73342	29510181	SHAFT,SHOULDERED (UOC: X4A)	2

OUTPUT DRIVE GEAR AND STEER SHAFT DRIVE GEAR 0021 00

(1) Item NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
16	PAHZZ	3110-01-216-4031	82994	BS226348	BEARING,ROLLER CLYI	1
17	PAHZZ	3020-01-216-8592	73342	23018116	GEAR,SPUR (UOC: XTZ)	1
17	PAHZZ	3020-01-421-0129	73342	29510240	GEAR,SPUR (UOC: X4A)	1
18	XDHZZ		73342	23017855	TUBE,METALLIC	1
19	PAHZZ	4730-01-214-9392	73342	23018163	STRAINER ELEMENT,SE	1
20	PAHZZ	5331-01-219-2546	73342	23040579	O-RING	2
21	PAHZZ	4710-01-216-6624	73342	23045405	TUBE,METALLIC	1
22	PAHZZ	2520-01-220-0119	73342	23017856	DIAPHRAGM,EQUALIZ	1
23	PAHZZ	5330-01-216-5711	73342	23018234	RETAINER,PACKING	1
24	PAHZZ	2520-01-214-9340	73342	23017857	PISTON AND PIN ASSE	1
25	PAHZZ	2520-01-214-3157	73342	23018025	VALVE,RESERVOIR EQU	1
26	PAHZZ	5360-01-216-3265	73342	23018049	SPRING,HECLIAL,COMP	1
27	PAHZZ	2520-01-214-9341	73342	23018086	HOUSING,SPRING-EQUA	1
28	PAHZZ	5310-00-274-8041	90407	12084P11	WASHER,FLAT	2
29	PAHZZ	5305-01-057-4264	63005	9409030	SCREW,CAP,HEXAGON H	2
30	PAHZZ	5331-01-219-2545	73342	23040582	O-RING	2
31	PAHZZ	4710-01-216-6623	73342	23045407	TUBE,METALLIC	1

END OF FIGURE

RANGE INPUT DRIVEN GEAR AND DRIVE GEAR 0021 00

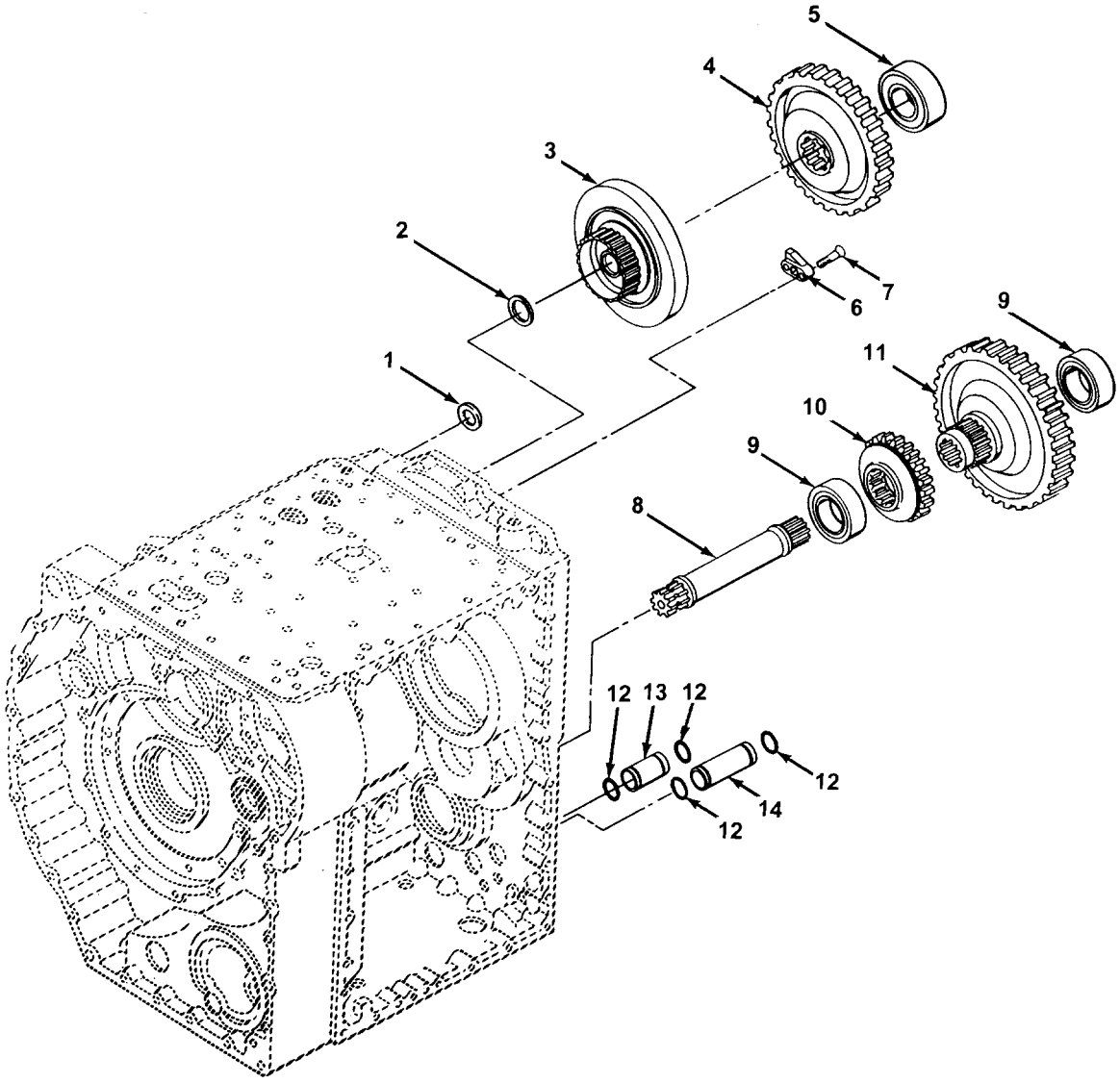


Figure 4. Range Input Driven Gear and Drive Gear.

RANGE INPUT DRIVEN GEAR AND DRIVE GEAR 0021 00

(1) Item NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 07 TRANSMISSION	
					GROUP 0710 TRANSMISSION ASSEMBLY	
					FIG. 4 RANGE INPUT DRIVEN GEAR AND DRIVE GEAR	
1	PAHZZ	5331-00-165-1943	73342	6832517	O-RING	1
2	PAHZZ	3120-01-216-8283	73342	23018282	BEARING,WASHER,THRU	1
3	AHHHH		73342	23045116	CLUTCH ASSY,FWD (SEE FIG 16 FOR COMPONENT PARTS)	1
4	PAHZZ	3020-01-216-8591	73342	23018092	GEAR,SPUR (SUPERECEDED BY PN 29533539)	1
4	PAHZZ	3020-01-509-4924	73342	29533539	GEAR,SPUR	1
5	PAHZZ	3110-01-217-2235	43334	BU1012L-18	BEARING,ROLLER,CYLI	1
6	PAHZZ	2520-01-216-8566	73342	23018044	PITOT,TRANSMISSION	1
7	PAHZZ	5305-01-217-4004	24617	455531	SCREW,CAP,SOCKET HE	2
8	PAHZZ	3040-01-216-3952	73342	23018157	SHAFT,SHOULDERED (USE WITH CARRIER ASSY PN 23018136)	1
8	PAHZZ	3040-01-499-0471	73342	29533537	SHAFT,SHOULDERED (USE WITH CARRIER ASSY PN 29533535)	1
9	PAHZZ	3110-01-269-6368	82994	BS226346	BEARING,ROLLER,CYLI	2
10	PAHZZ	3020-01-216-7604	73342	23018159	GEAR,SPUR	1
11	PAHZZ	3020-01-216-7603	73342	23018158	GEAR,SPUR (SUPERCEDED BY PN 29533538)	1
11	PAHZZ		73342	29533538	GEAR,SPUR	1
12	PAHZZ	5331-00-167-5110	73342	23040581	O-RING	4
13	PAHZZ	4730-01-238-6996	73342	23046064	COUPLING,TUBE	1
14	PAHZZ	4730-01-220-9163	73342	23045374	COUPLING,TUBE	1

END OF FIGURE

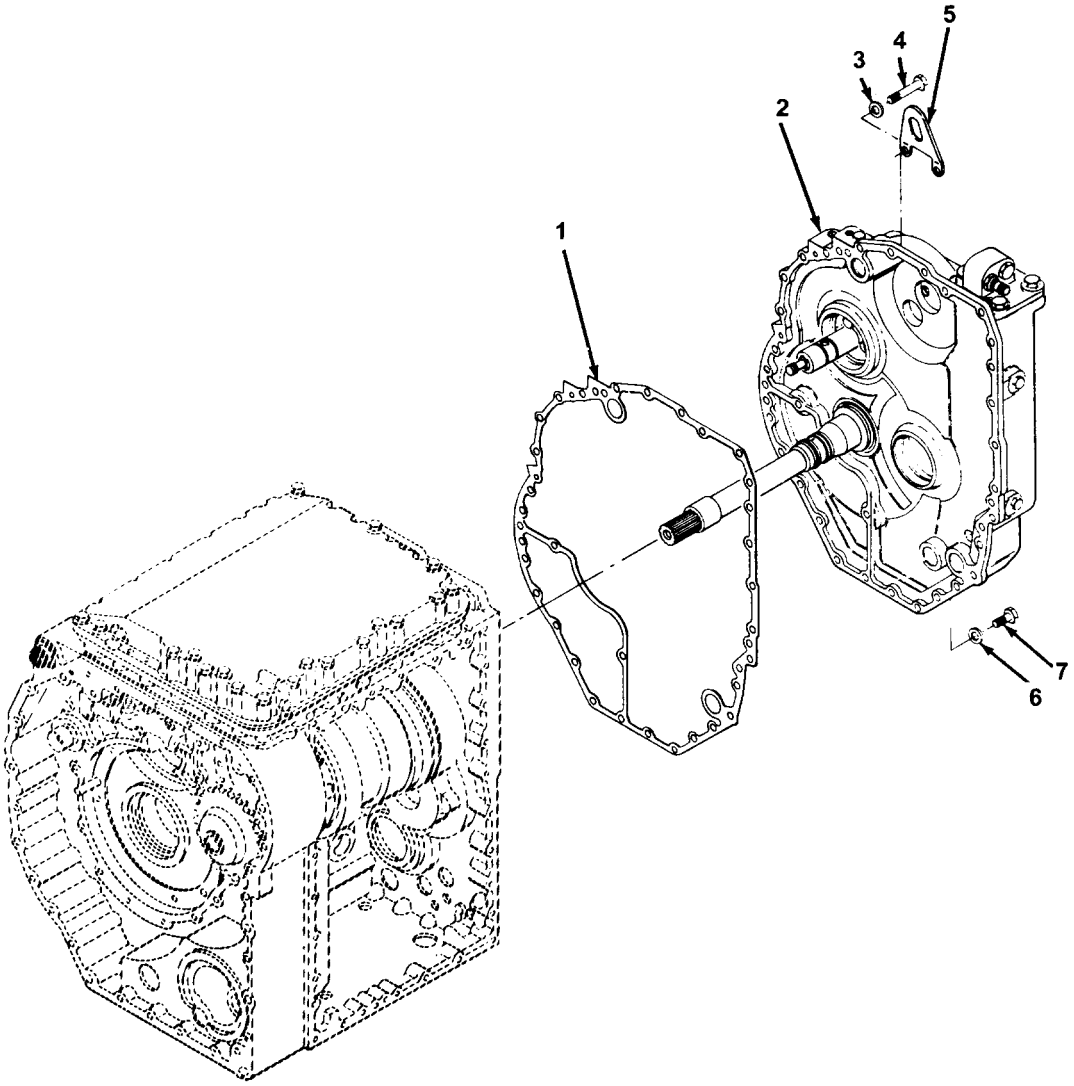


Figure 5. Left Hand Cover.

LEFT HAND COVER 0021 00

(1) Item NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 07 TRANSMISSION	
					GROUP 0710 TRANSMISSION ASSEMBLY	
					FIG. 5 LEFT HAND COVER	
1	PAHZZ	5330-01-406-7801	73342	23018076 NON-ASBESTOS	GASKET	1
2	AHHDD		73342	23045132	COVER ASSY,LH COMP (UOC: XTZ) (SEE FIG 14 AND 26 FOR COMPONENT PARTS)	1
2	AHHDD		73342	29511630	COVER ASSY,LH COMP (UOC: X4A) (SEE FIG 14 AND 26 FOR COMPONENT PARTS)	1
3	PAOZZ	5310-01-057-3111	78229	H-117-C	WASHER,FLAT	2
4	PAOZZ	5306-01-256-6811	24617	9425091	BOLT,SELF-LOCKING	2
5	PAOZZ	5340-01-257-4369	73342	23047393	BRACKET,ANGLE	1
6	PAHZZ	5310-01-057-3111	78229	H-117-C	WASHER,FLAT	29
7	PAHZZ	5306-01-216-1333	24617	9409082	BOLT,SELF-LOCKING	29

END OF FIGURE

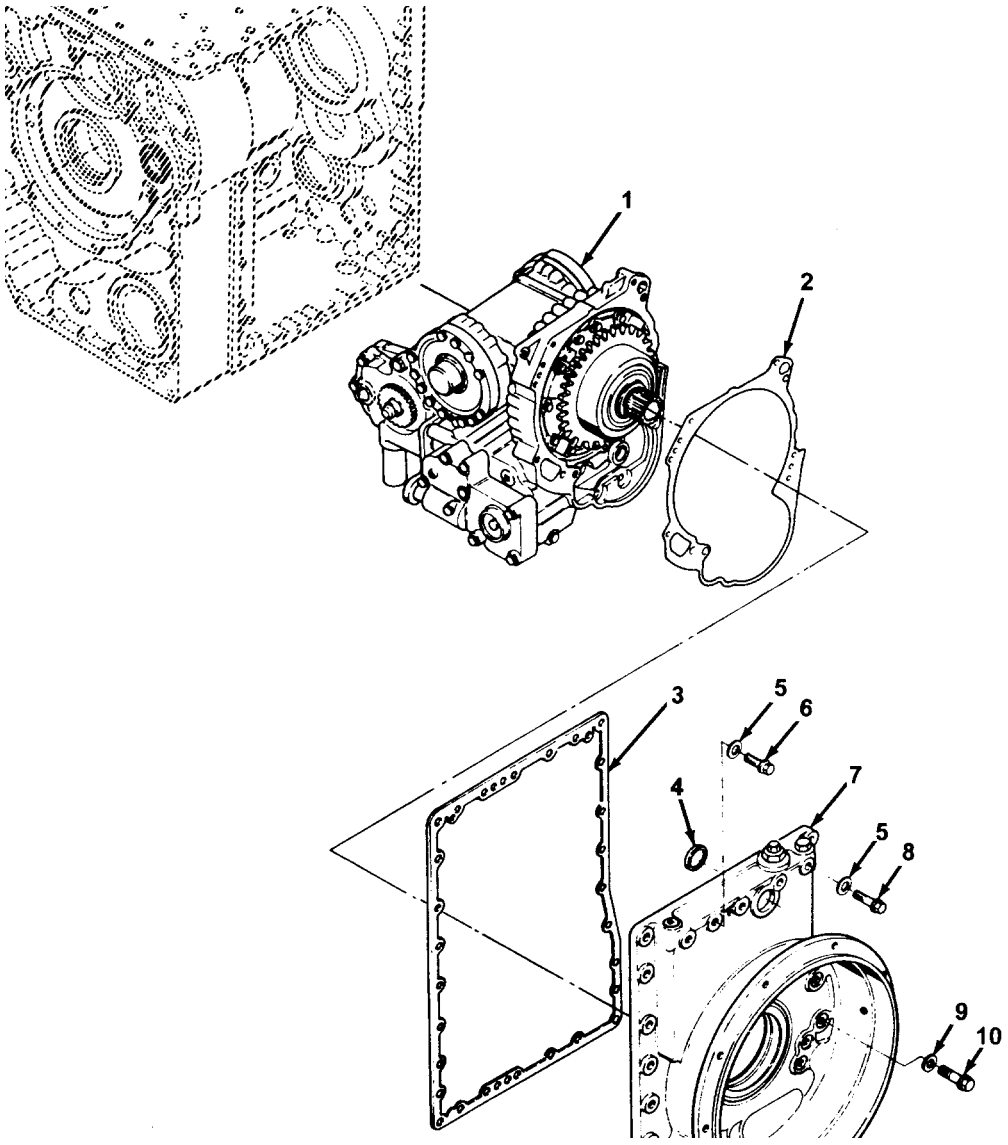


Figure 6. Bevel Gear and Input Housing.

BEVEL GEAR AND INPUT HOUSING 0021 00

(1) Item NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 07 TRANSMISSION	
					GROUP 0710 TRANSMISSION ASSEMBLY	
					FIG. 6 BEVEL GEAR AND INPUT HOUSING	
1	AHHHH		73342	23045119	BEVEL GEAR ASSY (USE WITH BEVEL GEAR DRIVEN SHAFT PN 23018157) (SEE FIGS 12, 13, 23, 24, AND 25 FOR COMPONENT PARTS) (SUPERCEDED BY BEVEL GEAR ASSEMBLY PN 29537797)	1
1	AHHHH		73342	29537797	BEVEL GEAR ASSY (USE WITH BEVEL GEAR DRIVEN SHAFT PN 29533537) (SEE FIGS 12, 13, 23, 24, AND 25 FOR COMPONENT PARTS.)	1
2	PAHZZ	5330-01-217-2201	73342	23018187	GASKET	1
3	PAHZZ	5330-01-217-7013	73342	23018073	GASKET	1
4	PAHZZ	5330-01-287-5798	73342	23048292	PACKING,PREFORMED	1
5	PAHZZ	5310-01-057-3111	78229	H-117-C	WASHER,FLAT	29
6	PAHZZ	5306-01-218-0700	24617	9408993	BOLT,SELF-LOCKING	5
7	PAHHH	3040-01-286-0318	73342	23048310	HOUSING,MECHANICAL (SEE FIG 10 FOR COMPONENT PARTS)	1
8	PAHZZ	5306-01-216-1333	24617	9409082	BOLT,SELF-LOCKING	24
9	PAHZZ	5310-00-274-8041	90407	12084P11	WASHER,FLAT	9
10	PAHZZ	5305-01-057-4264	63005	9409030	SCREW,CAP,HEXAGON H	9

END OF FIGURE

CONVERTER PUMP AND COVER 0021 00

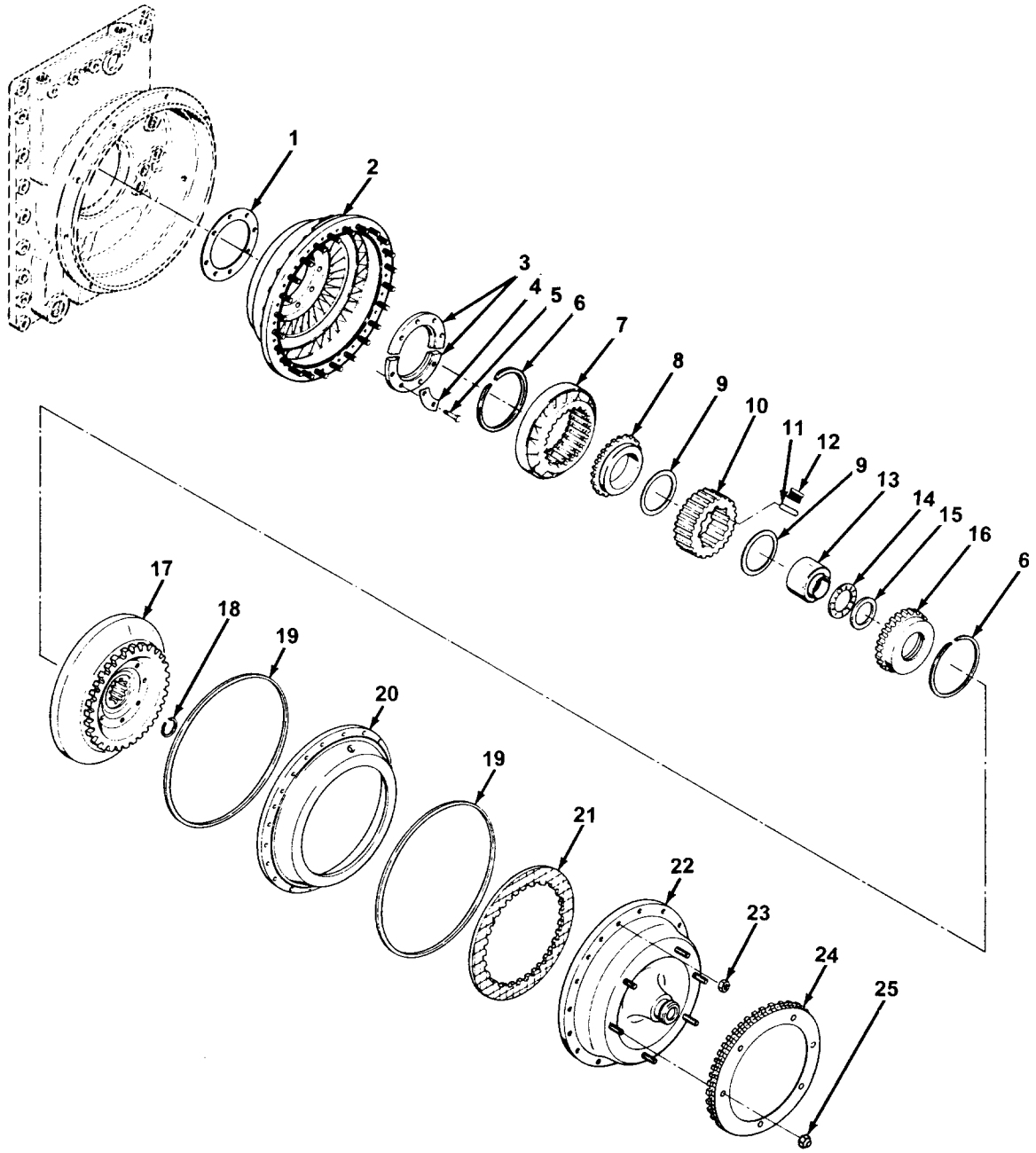


Figure 7. Converter Pump and Cover.

CONVERTER PUMP AND COVER 0021 00

(1) Item NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 07 TRANSMISSION	
					GROUP 0710 TRANSMISSION ASSEMBLY	
					FIG. 7 CONVERTER PUMP AND COVER	
1	PAHZZ	5330-01-216-6657	73342	23018191	GASKET	1
2	PAHZZ	4320-01-213-8028	73342	23017981	PUMP,ROTARY (UOC: XTZ)	1
2	PAHZZ	2520-01-499-1438	73342	29505983	PUMP,ROTARY (UOC: X4A)	1
3	PAHZZ	3110-01-217-2262	73342	23018195	PLATE,RETAINING,BEA	2
4	PAHZZ	5340-01-217-2305	73342	23018194	LOCKING PLATE,NUT A	4
5	PAHZZ	5305-00-051-4078	96906	MS90727-36	SCREW,CAP,HEXAGON H	8
6	PAHZZ	5325-00-282-7017	73342	6750199	RING,RETAINING	2
7	PAHZZ	2520-01-214-9333	73342	23018075	STATOR,TORQUE CONVE (UOC: XTZ)	1
7	PAHZZ	2520-01-499-9055	73342	29505981	STATOR,TORQUE,CONVE (UOC: X4A)	1
8	PAHZZ	3040-00-733-4742	19207	8351717	SHAFT,SHOULDERED (WASHER,CAM ROLLER)	1
9	PAHZZ	3120-00-841-0271	19207	8351718	BEARING,WASHER,THRU	2
10	PAHZZ	2520-00-736-0268	19207	8351725	CAM,TRANSMISSION ST	1
11	PAHZZ	3110-00-770-7842	19207	7707842	ROLLER,BEARING	12
12	PAHZZ	5360-00-736-0271	19207	8351366	SPRING,HELICAL,COMP	12
13	PAHZZ	3120-01-215-9776	73342	23018190	ROLLER,LINEAR-ROTAR	1
14	PAHZZ	3110-00-939-6843	60380	NTA-3650	RETAINER AND ROLLER	1
15	PAHZZ	3110-00-839-9149	60380	TRD-3648	SEAT,BEARING	1
16	PAHZZ	2520-01-214-5793	73342	23018117	DISK,CLUTCH	1
17	PAHZZ	2520-01-214-3854	73342	23018165	TURBINE ASSEMBLY,TR	1
18	PAHZZ	5325-01-217-1021	73342	23018254	RING,RETAINING	1
19	PAHZZ	5330-00-631-8125	73342	23016564	GASKET	2
20	PAHZZ	2520-00-679-6972	73342	6756778	RETAINER,CLUTCH PLA	1
21	PAHZZ	2520-01-261-1715	73342	23046108	CLUTCH HALF,POSITIV	1
22	AHHHH		73342	23046164	COVER ASSY,CONV (SEE FIG 9 FOR COMPONENT PARTS) (SUPERCEDED BY ASSY PN 29541129)	1
22	AHHHH		73342	29541129	COVER ASSY,CONV (SEE FIG 9 FOR COMPONENT PARTS)	1
23	PAHZZ	5310-00-088-0553	24617	190139	NUT,SELF-LOCKING,HE	24
24	PAFZZ	2520-01-251-4395	19207	11650255	RING,SUPPORT,TRANSM	1
25	PAFZZ	2520-00-557-6220	73342	6836873	KIT,FLEX DISK NUT	6

END OF FIGURE

TOP COVER 0021 00

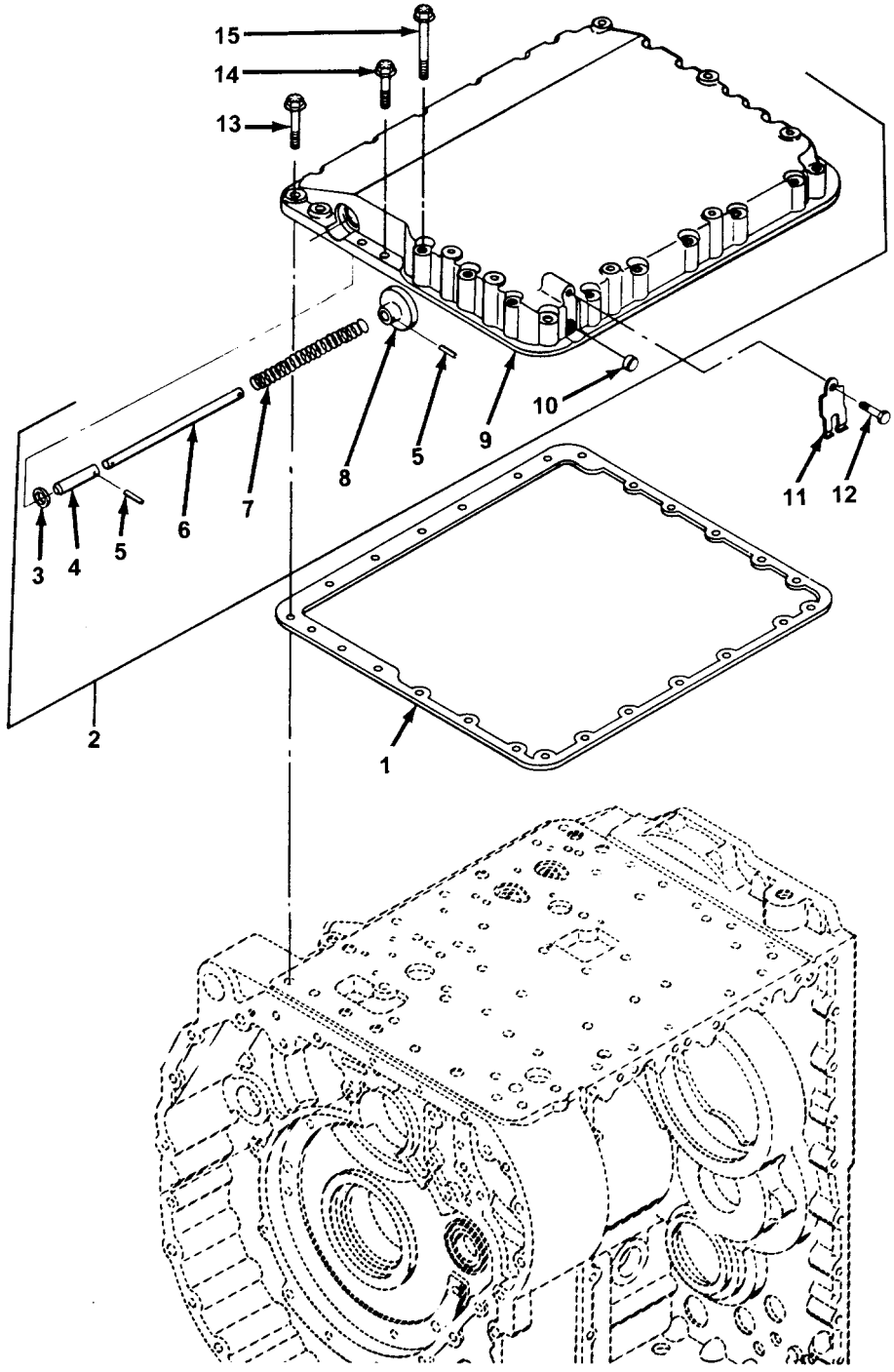


Figure 8. Top Cover.

TOP COVER 0021 00

(1) Item NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 07 TRANSMISSION	
					GROUP 0710 TRANSMISSION ASSEMBLY	
					FIG. 8 TOP COVER	
1	PAOZZ	5330-01-217-4041	73342	23045129	GASKET	1
2	PAOFF	5340-01-216-8479	73342	23045114	COVER,ACCESS	1
3	PAFZZ	5330-01-216-4005	80201	504260	.SEAL,PLAIN ENCASED	1
4	PAFZZ	2520-01-220-6737	73342	23017949	.EXTENSION,PUSH ROD	1
5	PAFZZ	5315-01-095-3110	72582	455862	.PIN,SPRING	2
6	XBFZZ		73342	23017951	.PIN,STRAIGHT,HE	1
7	PAFZZ	5360-01-217-1017	73342	23017953	.SPRING,HELICAL,COMP	1
8	PAFZZ	3040-01-214-3184	73342	23017952	.CAP,LINEAR ACTUATIN	1
9	XAFZZ		73342	23018270	.COVER,XMSN TOP	1
10	PAFZZ	5330-01-216-5698	73342	23045344	.SEAL,PLAIN ENCASED	1
11	PAOZZ	2520-00-557-6619	73342	8627650	REATAINER,MODULATOR	1
12	PAOZZ	5306-01-217-2915	24617	9409000	BOLT,SELF-LOCKING	1
13	PAOZZ	5306-01-217-3992	24617	9441598	BOLT,MACHINE	9
14	PAOZZ	5306-01-217-2908	24617	9427637	BOLT,MACHINE	2
15	PAOZZ	5306-01-217-2909	24617	9441599	BOLT,MACHINE	15

END OF FIGURE

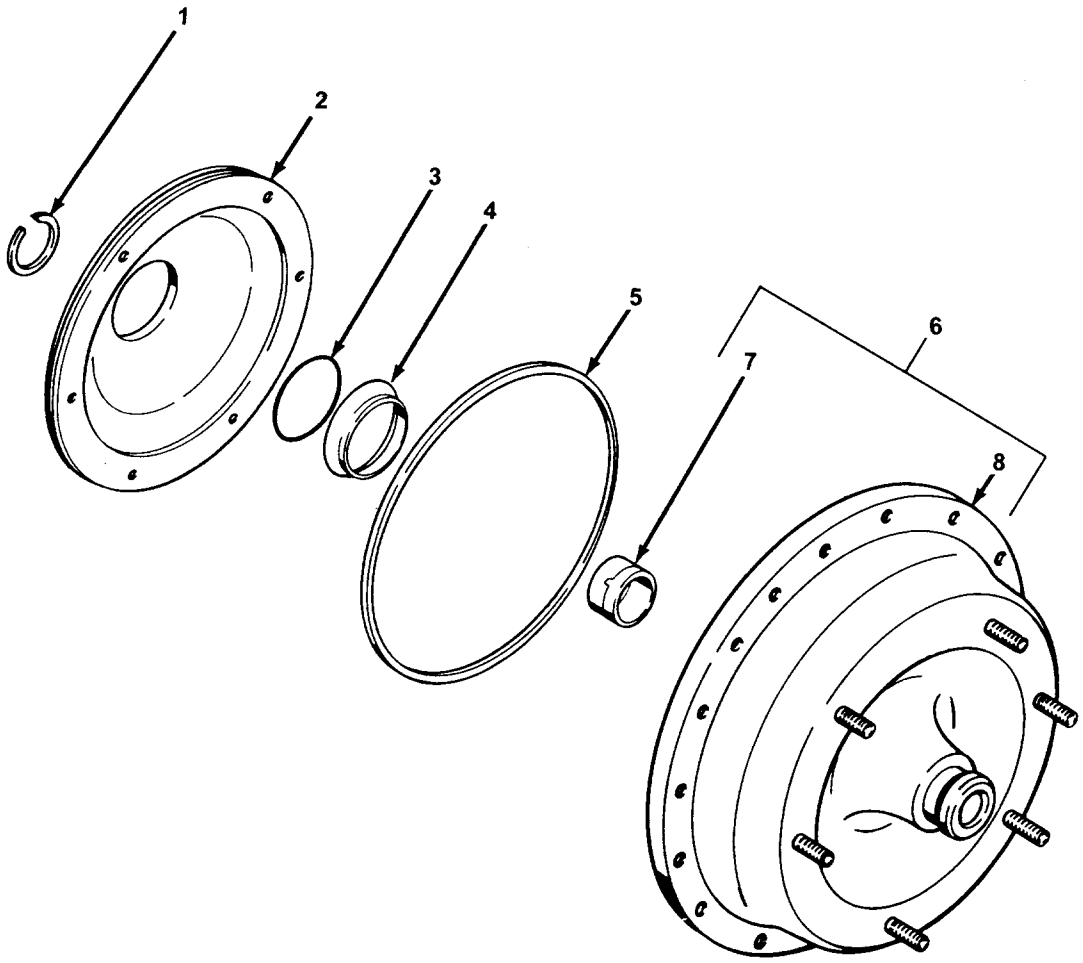


Figure 9. Converter Pump Cover and Lockup Piston.

CONVERTER PUMP COVER AND LOCKUP PISTON 0021 00

(1) Item NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 07 TRANSMISSION	
					GROUP 0710 TRANSMISSION ASSEMBLY	
					FIG. 9 CONVERTER PUMP COVER AND LOCKUP PISTON	
1	PAHZZ	5325-01-028-8203	73342	6836676	RING,RETAINING (USE WITH ASSY PN 23046164 AND 29541129)	1
2	PAHZZ	2520-00-767-5417	73342	6770845	PISTON, CLUTCH SHAFT (USE WITH ASSY PN 23046164 AND 29541129)	1
3	PAHZZ	5331-00-821-4490	73342	6770820	O-RING (USE WITH ASSY PN 23046164 AND 29541129)	1
4	PAHZZ	5330-01-509-5908	73342	29537621	RETAINER,PACKING (USE WITH ASSY PN 23046164) (SUPERCEDED BY PN 29541128)	1
4	PAHZZ	5330-01-509-1404	73342	29541128	RETAINER,PACKING (USE WITH ASSY PN 29541129)	1
4	PAHZZ	5330-00-450-1942	73342	6770822	RETAINER,PACKING (REPLACED BY PN 29537621)	1
5	PAHZZ	2520-00-679-6974	73342	6758036	SEAL RING,TRANSMISS (USE WITH ASSY PN 23046164 AND 29541129)	1
6	PAHDD	2520-01-235-9590	73342	23046165	COVER ASSEMBLY,PUMP (USE WITH ASSY PN 23046164 AND 29541129)	1
7	PADZZ	3120-00-679-7068	73342	6756782	.BEARING,SLEEVE	1
8	XAHZZ		73342	23046166	.COVER ASSY,MACH	1

END OF FIGURE

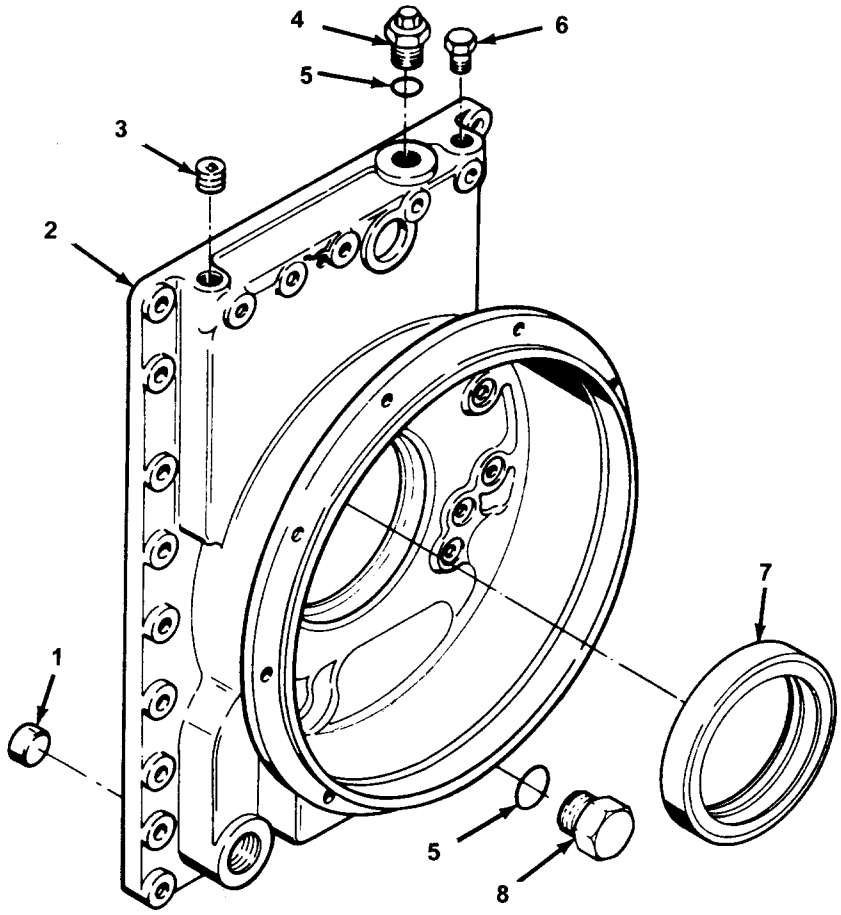


Figure 10. Input Housing.

INPUT HOUSING 0021 00

(1) Item NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 07 TRANSMISSION	
					GROUP 0710 TRANSMISSION ASSEMBLY	
					FIG. 10 INPUT HOUSING	
1	PAHZZ	5365-01-216-5750	73342	23018028	BUSHING BLANK	1
2	XAHZZ		73342	23048455	HOUSING,INPUT L (USE WITH HOUSING, MECHANICAL PN 23048310) (SEE FIG 6 FOR NEXT HIGHER ASSY)	1
3	PAHZZ	4730-01-213-8030	73342	23018209	PLUG,PIPE	1
4	PAOZZ	5365-01-223-3673	73342	23018085	PLUG,MACHINE THREAD	1
5	PAOZZ	5331-01-291-5078	73342	23016014	O-RING	2
6	XDOZZ		89619	6432-35788-1	PIPE,PLUG (LU PRESSURE PORT)	1
7	PAHZZ	5330-00-904-8110	80201	530677	SEAL,PLAIN ENCASED	1
8	PAOZZ	5365-01-017-2652	73342	23018179	PLUG,MACHINE THREAD	1

END OF FIGURE

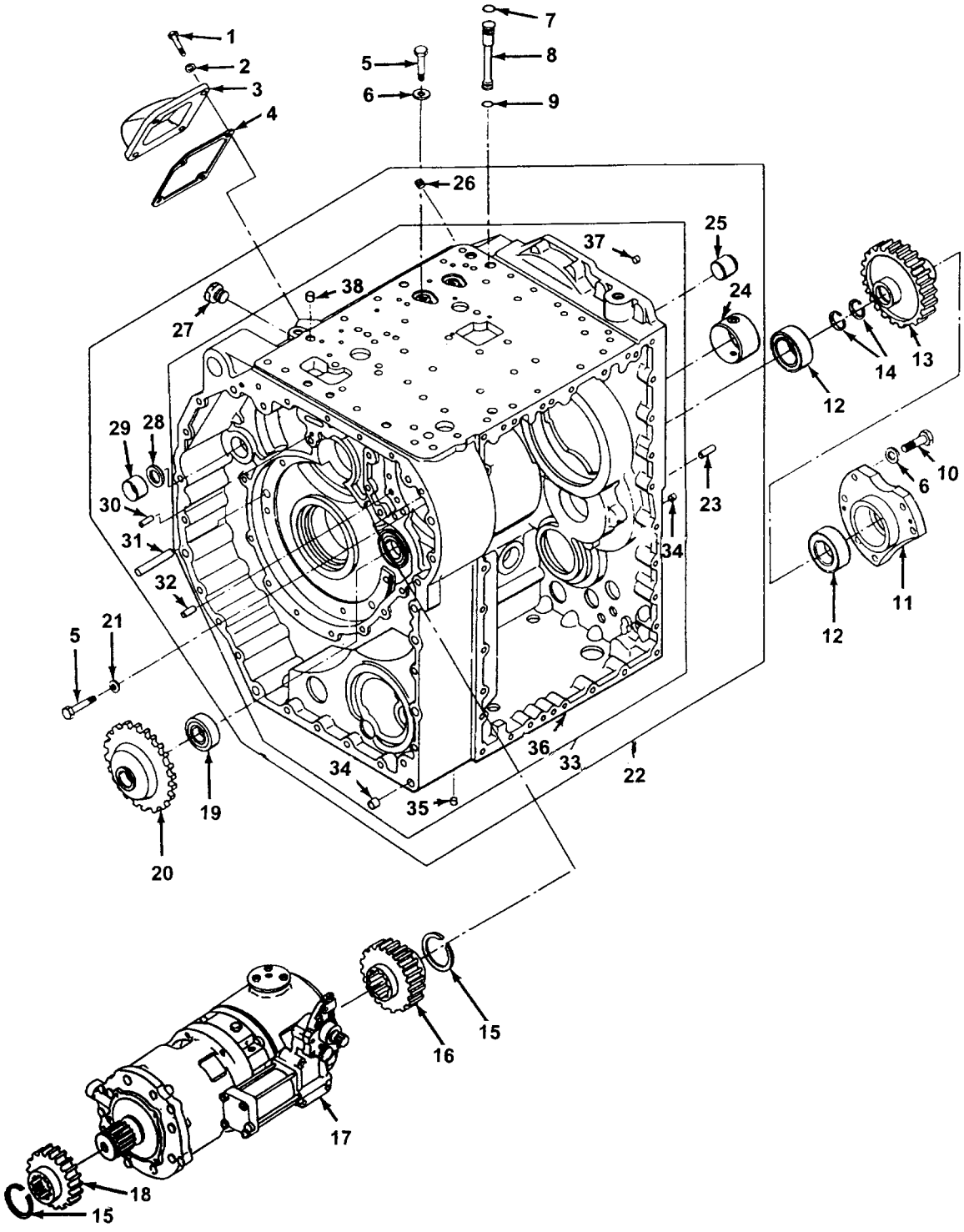


Figure 11. Center Housing and Hydrostatic Pump and Motor.

CENTER HOUSING AND HYDROSTATIC PUMP AND MOTOR 0021 00

(1) Item NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 07 TRANSMISSION	
					GROUP 0710 TRANSMISSION ASSEMBLY	
					FIG. 11 CENTER HOUSING AND HYDROSTATIC PUMP AND MOTOR	
1	PAOZZ	5306-01-216-7375	24617	9440903	BOLT,SELF-LOCKING	4
2	PAOZZ	5310-01-216-1367	73342	23018199	WASHER,FLAT	4
3	PAOZZ	5340-01-216-1465	73342	23018221	COVER,ACCESS	1
4	PAOZZ	5330-01-216-4012	73342	23017880	GASKET	1
5	PAHZZ	5306-01-083-6443	96906	MS35764-236	BOLT,SELF-LOCKING	8
6	PAHZZ	5310-00-776-7670	73342	6769636	WASHER,FLAT	8
7	PAHZZ	5331-01-216-5705	73342	6836130	O-RING	2
8	PAHZZ	4710-01-214-3241	73342	23018172	TUBE ASSEMBLY,METAL	2
9	PAHZZ	5331-01-216-5704	73342	6836129	O-RING	2
10	PAHZZ	5306-00-940-9028	72582	9409028	BOLT,SELF-LOCKING	6
11	PAHZZ	3110-01-218-3395	73342	23017878	PLATE,RETAINING,BEA	1
12	PAHZZ	3110-01-216-4031	82994	BS226348	BEARING,ROLLER,CYLI	2
13	PAHZZ	3020-01-214-8864	73342	23018160	GEAR,SPUR (SUPERCEDED BY PN 29512613)	1
13	PAHZZ		73342	29512613	GEAR,SPUR	1
14	PAHZZ	5325-01-217-1023	73342	6836111	RING,RETAINING (QTY 2 USED WITH PN 23018160) (QTY 0 USED WITH PN 29512613)	2
15	PAHZZ	5325-01-217-3077	73342	6832579	RING,RETAINING	2
16	PAHZZ	3020-01-215-3344	73342	23018074	GEAR,SPUR	1
17	PAHDD	4320-01-376-5651	73342	29511632	PUMP UNIT,AXIAL PIS (SEE FIGS 27, 28, 29, AND 30 FOR COMPONENT PARTS)	1
17	XDHDD		90166	893025	PUMP AND MOTOR ASSE (UOC: XTZ) (SUPERCEDED BY PUMP AND MOTOR ASSY PN 893038 (29511632)) (SEE FIGS 27, 28, 29, AND 30 FOR COMPONENT PARTS)	1
18	PAHZZ	3020-01-214-7354	73342	23018115	GEAR,SPUR	1
19	PAHZZ	3110-01-216-4033	82994	BS226347	BEARING,ROLLER,CYLI	1
20	PAHZZ	3020-01-214-7353	73342	23018113	GEAR,SPUR (UOC: XTZ)	1
20	PAHZZ	3020-01-422-1971	73342	29510171	GEAR,SPUR (UOC: X4A)	1
21	PAHZZ	5310-00-274-8041	90407	12084P11	WASHER,FLAT	6
22	PAHHH	3040-01-198-0713	73342	23045026	HOUSING,MECHANICAL	1
23	PAHZZ	5315-00-480-4453	72582	141242	.PIN,STRAIGHT,HEADLE	4
24	PAHZZ	4730-01-214-1560	73342	23017854	.SLEEVE,OIL TRANSFER	1
25	PAHZZ	5365-01-217-0856	73342	23017853	.SPACER,SLEEVE	1
26	PAHZZ	4730-00-808-6814	73342	23018205	.PLUG,PIPE	1
27	PAOZZ	4730-01-221-7138	73342	23018206	.PLUG,PIPE (PRESSURE PORT, C3, C4, C5, G2 AND LUBE)	5

CENTER HOUSING AND HYDROSTATIC PUMP AND MOTOR 0021 00

Item NO.	SMR CODE	NSN	CAGEC	PART NUMBER	DESCRIPTION AND USABLE ON CODE (UOC)	QTY
28	PAHZZ	3120-01-216-2869	73342	6832310	.BEARING,WASHER,THRU	1
29	PAHZZ	3110-00-277-0559	60380	B188OH	.BEARING,ROLLER,NEED	1
30	PAHZZ	5315-00-044-3767	24617	443767	.PIN,STRAIGHT,HEADLE	2
31	PAHZZ	5315-01-215-7514	73342	23018031	.PIN,STRAIGHT,HEADLE	2
32	PAHZZ	5315-00-014-1262	24617	141262	.PIN,STRAIGHT,HEADLE	1
33	XAHDD		73342	23045027	.HOUSING CENTER MACH	1
34	PAHZZ	5325-01-216-1737	73342	23049119	..INSERT,SCREW THREAD	11
35	PAHZZ	5325-01-217-5074	73342	23018271	..INSERT,SCREW THREAD	3
36	XAHZZ		73342	23045028	..HOUSING CENTER	1
37	PAHZZ	5325-00-290-4518	24617	452692	..INSERT,SCREW THREAD	8
38	PAHZZ	5325-01-291-2181	73342	23049118	..INSERT,SCREW THREAD	5

END OF FIGURE

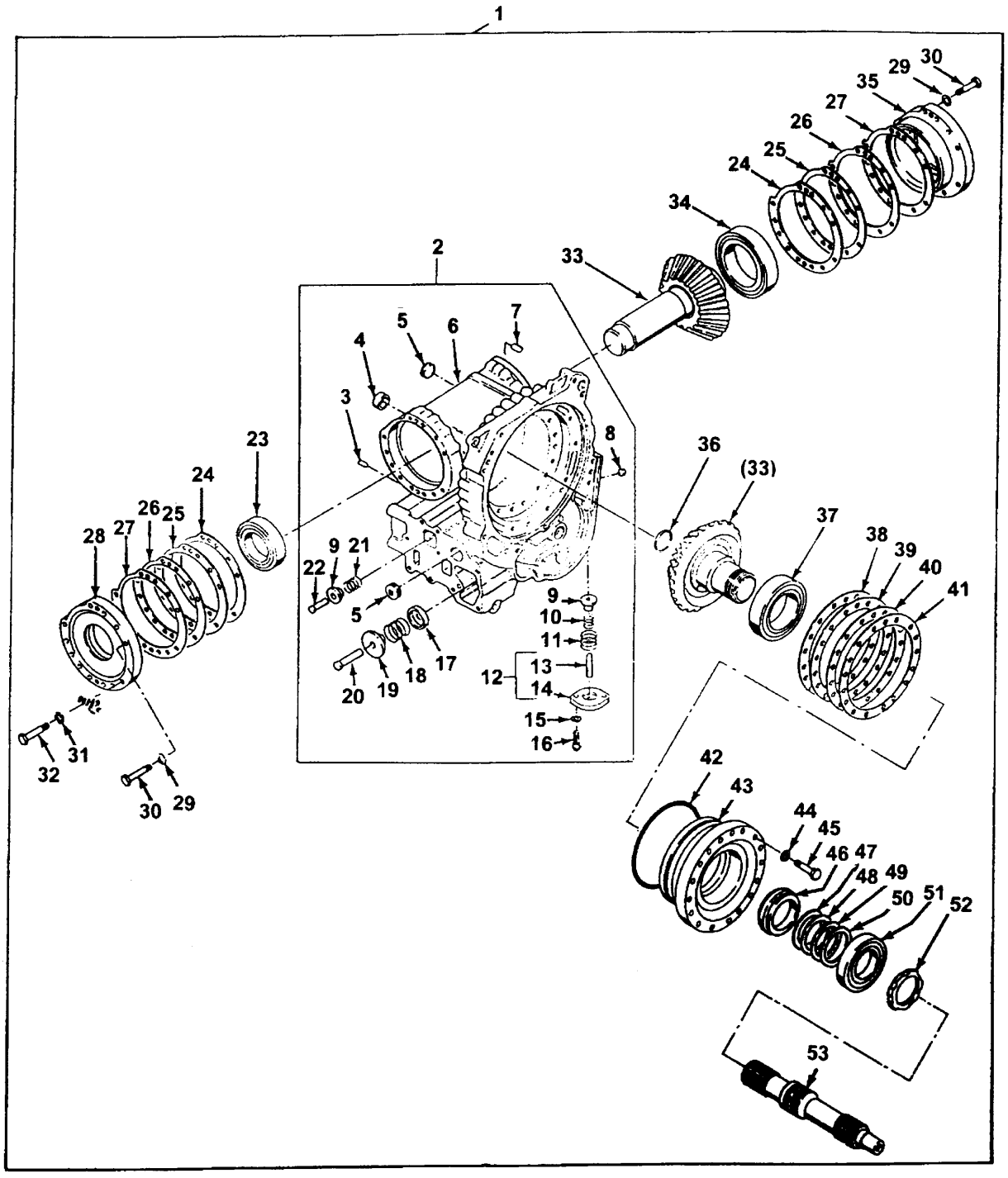


Figure 12. Bevel Gear and Bevel Gear Carrier.

BEVEL GEAR AND BEVEL GEAR CARRIER 0021 00

(1) Item NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 07 TRANSMISSION	
					GROUP 0710 TRANSMISSION ASSEMBLY	
					FIG. 12 BEVEL GEAR AND BEVEL GEAR CARRIER	
1	XDHDD		73342	23048301	ASSEMBLY HOUSING,ME (UOC: XTZ) (USE WITH TRANS PN 12291400-1) (SUPERCEDED BY PN 29511029)	1
1	XDHDD		73342	29511029	CARRIER ASSEMBLY (USE WITH BEVEL GEAR ASSY PN 23045119) (USE WITH TRANS PN 12291400-1 AND PN 12371041) (SUPERCEDED BY PN 29537798)	1
1	XDHDD		73342	29537798	CARRIER ASSEMBLY (USE WITH BEVEL GEAR ASSY 29537797) (USE WITH TRANS PN 12291400-1 AND PN 12371041)	1
2	PADDD	3040-01-268-7211	73342	23048300	.HOUSING,MECHANICAL (UOC: XTZ) (USE WITH CARRIER ASSY PN 23048301) (SUPERCEDED BY PN 29511028)	1
2	XDDDD		73342	29511028	.CARRIER ASSEMBLY (USE WITH CARRIER ASSY PN 29511029 & 20537798)	1
3	PADZZ	5315-00-014-1195	24617	141195	..PIN,STRAIGHT,HEADLE	2
4	PADZZ	3110-00-902-1657	60380	B1210X0H	..BEARING,ROLLER,NEED	2
5	PADZZ	4730-01-048-9371	96906	MS14314-5Z	..PLUG,PIPE	2
6	XADZZ		73342	23048299	..CARRIER,BEVEL GEAR (UOC: XTZ) (USE WITH CARRIER ASSY PN 23048300)	1
6	XADZZ		73342	29511027	..CARRIER,BEVEL GEAR (UOC: X4A) (USE WITH CARRIER ASSY PN 29511028)	1
7	PADZZ	5315-00-014-1240	24617	141240	..PIN,STRAIGHT,HEADLE	4
8	PADZZ	4730-00-808-6814	15434	C0505027400	..PLUG,PIPE	2
9	PADZZ	5365-01-217-4079	73342	23018047	..SPACER,SLEEVE	2
10	PADZZ	5360-01-216-3266	73342	6836135	..SPRING,HELICAL,COMP	1
11	PADZZ	5360-00-200-6365	19207	7709601	..SPRING,HELICAL,COMP	1
12	PAHHH	2520-01-203-9885	73342	23018053	..COVER ASSEMBLY,VAL	1
13	XBDZZ		24617	141210	…PIN,STRAIGHT,HEADLE	1
14	XADZZ		73342	23018054	…COVER,CHECK VALVE	1
15	PADZZ	5310-01-084-1197	24617	9422846	..WASHER,FLAT	2
16	XDDZZ		24617	9409076	..BOLT,SELF-LOCKING	2
17	PADZZ	2520-01-214-1559	73342	23018051	..GUIDE,TRANSMISSION	1
18	PADZZ	5360-01-216-3265	73342	23018049	..SPRING,HELICAL,COMP	1
19	PADZZ	2520-01-214-1558	73342	23018050	..HUB,TRANSMISSION	1
20	PADZZ	5315-01-217-2270	73342	23018052	..PIN,STRAIGHT,HEADED	1
21	PADZZ	5360-00-044-3945	73342	6769825	..SPRING,HELICAL,COMP	1
22	XBDZZ		73342	23018048	..PIN,STRAIGHT,HEADED	1

BEVEL GEAR AND BEVEL GEAR CARRIER 0021 00

(1) Item NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
23	PADZZ	3110-00-789-1842	60038	LM603049 LM603011	.BEARING,ROLLER,TAPE	1
24	PADZZ	5365-01-216-2824	73342	23018128	.SHIM	V
25	PADZZ	5365-01-216-2825	73342	23018129	.SHIM	V
26	PADZZ	5365-01-216-2826	73342	23018130	.SHIM	V
27	PADZZ	5365-01-272-1258	73342	23048640	.SPACER,PLATE	V
28	PADZZ	3110-01-218-1566	73342	23018132	.PLATE,RETAINING,BEA	1
29	PADZZ	5310-00-274-8041	90407	12084P11	.WASHER,FLAT	23
30	PADZZ	5306-01-083-6443	96906	MS35764-236	.BOLT,SELF-LOCKING	23
31	PAHZZ	5310-00-274-8041	90407	12084P11	.WASHER,FLAT	1
32	PAHZZ	5306-01-083-6443	96906	MS35764-236	.BOLT,SELF-LOCKING	1
33	PADZZ	3020-01-214-3845	73342	23018000	.GEAR SET,BEVEL,MATC (USE WITH CARRIER ASSY, BEVEL GEAR PN 29511029) (SUPERCEDED BY PN 29533248)	1
33	PADZZ		73342	29533248	.GEAR SET,BEVEL,MATC (USE WITH CARRIER ASSY, BEVEL GEAR PN 29537798)	1
34	PADZZ	3110-00-427-6591	60038	JM612949 JM612910	.BEARING,ROLLER,TAPE	1
35	PADZZ	3110-01-216-4086	73342	23018131	.PLATE,RETAINING,BEA	1
36	PADZZ	5325-01-217-1021	73342	23018254	.RING,RETAINING	1
37	PADZZ	3110-00-488-3879	60038	JM511946 JM511910	.BEARING,ROLLER,TAPE	1
38	PADZZ	5365-01-217-2208	73342	23018122	.SHIM	V
39	PADZZ	5365-01-217-2209	73342	23018123	.SHIM	V
40	PADZZ	5365-01-217-2210	73342	23018124	.SHIM	V
41	PADZZ	5365-01-272-7479	73342	23048638	.SHIM	V
42	PADZZ	5331-01-216-5702	73342	23018245	.O-RING	1
43	PADZZ	3110-01-222-3354	73342	23018119	.PLATE,RETAINING,BEA (UOC: XTZ) (USE WITH CARRIER ASSY PN 23018045)	1
43	PADZZ	3110-01-222-3354	73342	23048298	.PLATE,RETAINING,BEA (USE WITH CARRIER ASSY PN 23048301, 29511029 AND 29537798)	1
44	PADZZ	5310-01-092-5495	24617	9422848	.WASHER,FLAT (QTY 15 USED WITH PN 23018045) (QTY 14 USED WITH PN 23048301) (QTY 13 USED WITH PN 29531029 AND 29537798)	15
45	PADZZ	5306-00-843-6398	24617	9416011	.BOLT,SELF-LOCKING (QTY 15 USED WITH PN 23018045) (QTY 14 USED WITH PN 23048301) (QTY 13 USED WITH PN 29531029 AND 29537798)	15
46	PADZZ	5330-01-217-4047	73342	23018121	.RETAINER,PACKING	1
47	PADZZ	5365-01-217-2966	73342	23018125	.SHIM	V
48	PADZZ	5365-01-217-2967	73342	23018126	.SHIM	V
49	PADZZ	5365-01-217-2968	73342	23018127	.SHIM	V
50	PADZZ		73342	23048639	.SPACER,RING	V
51	PADZZ	3110-00-138-6426	60038	JM207049 JM207010	.BEARING,ROLLER,TAPE	1

BEVEL GEAR AND BEVEL GEAR CARRIER 0021 00

(1) Item NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
52	PADZZ	5310-01-216-1354	73342	23018120	.NUT,PLAIN,ROUND	1
53	PADZZ	3040-01-222-0265	73342	23045917	.SHAFT,SHOULDERED	1

END OF FIGURE

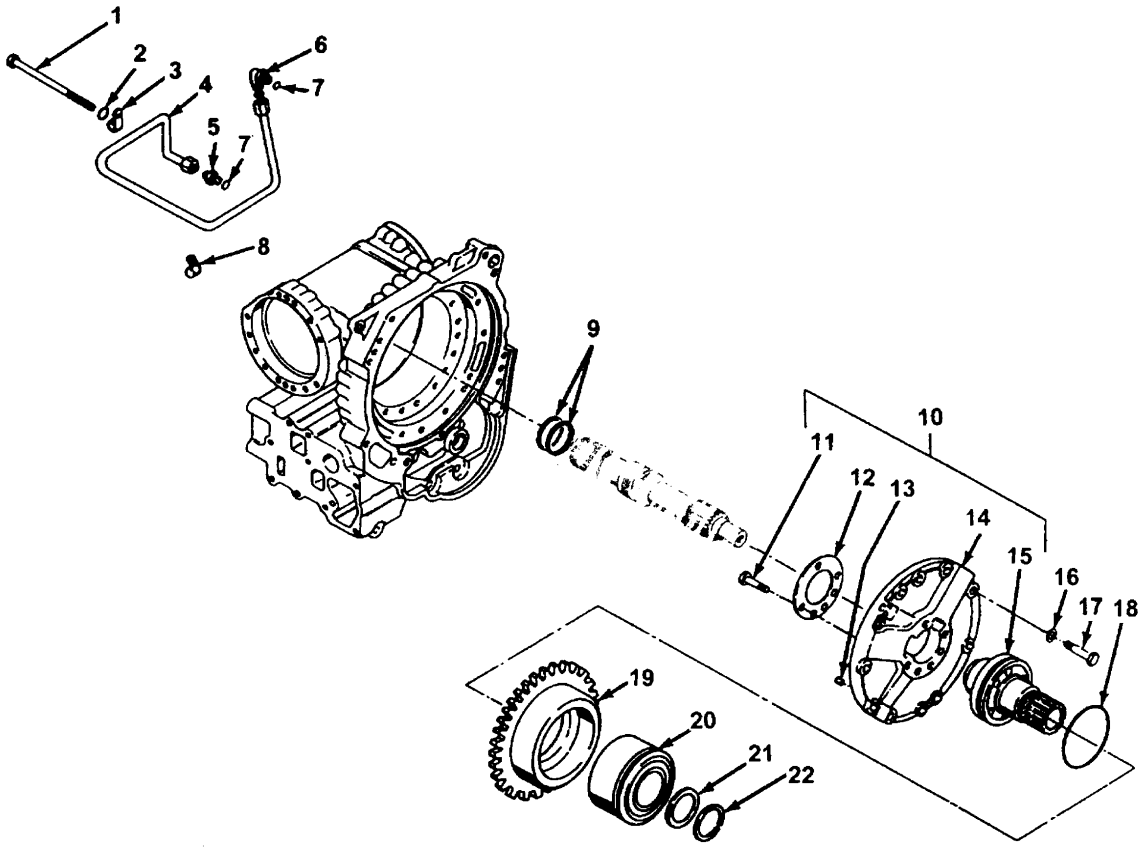


Figure 13. Oil Transfer Diaphragm and Input Pump Drive Gear.

OIL TRANSFER DIAPHRAGM AND INPUT PUMP DRIVE GEAR 0021 00

(1) Item NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 07 TRANSMISSION	
					GROUP 0710 TRANSMISSION ASSEMBLY	
					FIG. 13 OIL TRANSFER DIAPHRAGM AND INPUT PUMP DRIVE GEAR	
1	PAHZZ	5305-01-499-6623	24617	9442435	BOLT,MACHINE	1
2	PAHZZ	5310-01-084-1197	24617	9422846	WASHER,FLAT	1
3	PAHZZ	5340-01-216-6785	73342	23018186	CLAMP,LOOP	1
4	PAHZZ	4710-01-238-7100	73342	23046057	TUBE ASSEMBLY,METAL	1
5	PAHZZ	4730-01-214-3112	24617	9410714	NIPPLE,TUBE	1
6	XBHZZ		24617	9411180	ELBOW,TUBE TO BOSS	1
7	PAHZZ	5331-01-216-5703	73342	23018247	O-RING	2
8	XDHZZ		73342	23018185	CLAMP,LOOP	1
9	PAHZZ	5330-01-216-6765	73342	6836115	SEAL RING,METAL	2
10	PAHDD	2520-01-198-0498	73342	23018020	DIAPHRAGM ASSEMBLY	1
11	PADZZ	5305-01-058-4612	72582	9409060	.SCREW,MACHINE	6
12	PADZZ	5365-01-217-4051	73342	23018188	.SPACER,PLATE	1
13	XBDZZ		24617	141255	.PIN,STRAIGHT,HE	2
14	PADZZ	2520-01-214-3855	73342	23018021	.DIAPHRAGM,OIL TRANS	1
15	PADZZ	3040-01-214-3175	73342	23018022	.GEARSHAFT,SPUR	1
16	PAHZZ	5310-00-274-8041	90407	12084P11	WASHER,FLAT	9
17	PAHZZ	5306-01-083-6443	96906	MS35764-236	BOLT,SELF-LOCKING	9
18	PAHZZ	5330-01-238-4613	73342	23018235	PACKING,PREFORMED	1
19	PAHZZ	3020-01-214-5787	73342	23017980	GEAR,SPUR	1
20	PAHZZ	3110-01-273-2329	3L092	5212WLAB	BEARING,BALL,ANNULA	1
21	PAHZZ	5365-01-217-4052	73342	23018256	SPACER,PLATE	1
22	PAHZZ	5325-01-217-3075	73342	23018255	RING,RETAINING	1

END OF FIGURE

LEFT HAND END COVER AND OUTPUT SHAFT 0021 00

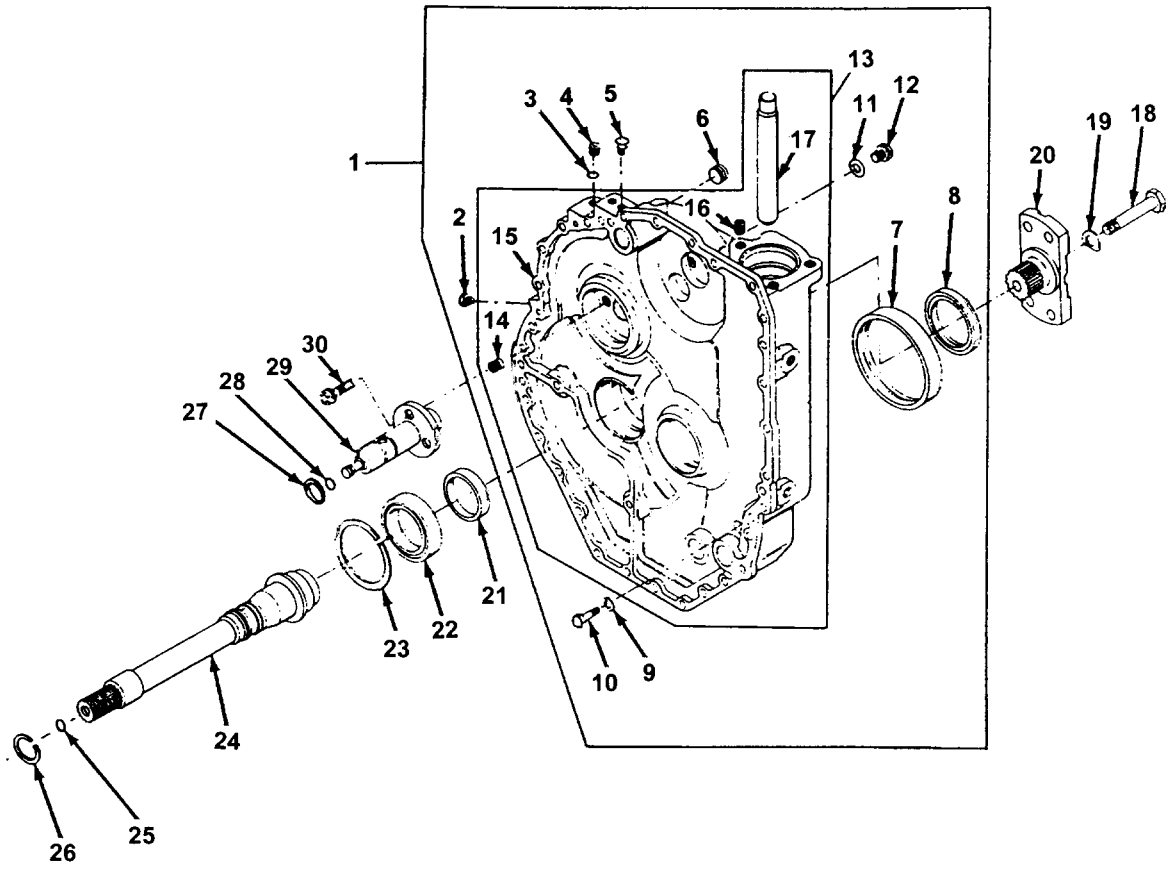


Figure 14. Left Hand End Cover and Output Shaft.

LEFT HAND END COVER AND OUTPUT SHAFT 0021 00

(1) Item NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 07 TRANSMISSION	
					GROUP 0710 TRANSMISSION ASSEMBLY	
					FIG. 14 LEFT HAND END COVER AND OUTPUT SHAFT	
1	PADDD	5340-01-216-7640	73342	23018292	COVER,ACCESS	1
2	PAHZZ	4730-01-221-7138	73342	23018206	.PLUG,PIPE	1
3	PAOZZ	5331-01-216-2815	73342	23045477	.O-RING	1
4	PAOZZ	5365-01-014-4453	73342	23045447	.PLUG,MACHINE THREAD	1
5	XDOZZ		89619	6432-35788-1	.PLUG,PIPE	4
6	PAHZZ	4730-01-214-1502	73342	23018208	.PLUG,PIPE	1
7	PADZZ	2520-01-216-8565	73342	23018042	.COVER,SLEEVE	1
8	PAOZZ	5330-01-216-4006	73342	6883697	.SEAL,PLAIN ENCASED	1
9	PADZZ	5310-01-092-5496	24617	9422845	.WASHER,FLAT	1
10	PADZZ	5306-01-217-6970	73342	23018279	.BOLT,SELF-LOCKING	1
11	PAFZZ	5331-00-108-5691	82796	91501166	.O-RING (UOC: XTZ) (USE W/ PLUG PN MS51840-27) (NOT USED IN ALL TRANSMISSION MODELS)	1
12	PAFZZ	5365-01-057-3309	96906	MS51840-27	.PLUG,MACHINE THREAD (UOC: XTZ) (NOT USED IN ALL TRANSMISSION MODELS)	1
13	XADDD		73342	23018289	.COVER ASSY,END MACH	1
14	PADZZ	5325-01-291-2181	73342	23049118	..INSERT,SCREW THREAD	3
15	XADZZ		73342	23018288	..COVER,LH END	1
16	PAHZZ	5325-01-216-1737	73342	23049119	..INSERT,SCREW THREAD	3
17	PADZZ	4730-01-214-2369	73342	23018198	..REDUCER,TUBE	1
18	PAOZZ	5305-01-216-7378	24617	454465	SCREW,CAP,HEXAGON H	1
19	PAOZZ	5310-00-799-4910	73342	6752556	WASHER,SPRING TENSI	1
20	PAOZZ	3010-01-214-9337	73342	23017998	FLANGE,COMPANION,UN	1
21	PAHZZ	3130-01-217-2284	73342	23045191	LINER,BEARING HOUSI	1
22	PAHZZ	3110-00-592-9967	40152	SK200-37	BEARING,BALL,ANNULA	1
23	PAHZZ	5325-01-217-2069	73342	23045232	RING,RETAINING	1
24	PAHZZ	3040-01-214-9301	73342	23017954	SHAFT,SHOULDERED (UOC: XTZ)	1
24	PAHZZ	2520-01-422-4101	73342	29510209	SHAFT,SHOULDERED (UOC: X4A)	1
25	PAHZZ	5330-01-216-5711	73342	23018234	RETAINER,PACKING (UOC: X4A)	1
26	PAHZZ	5330-01-266-3312	73342	23048171	RETAINER,PACKING	2
27	PAHZZ	5330-01-286-5468	73342	23049059	RETAINER,PACKING	2
28	PAHZZ	5330-01-221-9177	73342	23018233	SEAL,NONMETALLIC RO	1
29	PADZZ	4710-01-216-1159	73342	23018087	TUBE ASSEMBLY,METAL	1
30	XDDZZ		73342	23015337	BOLT	3

END OF FIGURE

RIGHT HAND END COVER AND BRAKE APPLY CAM SHAFT 0021 00

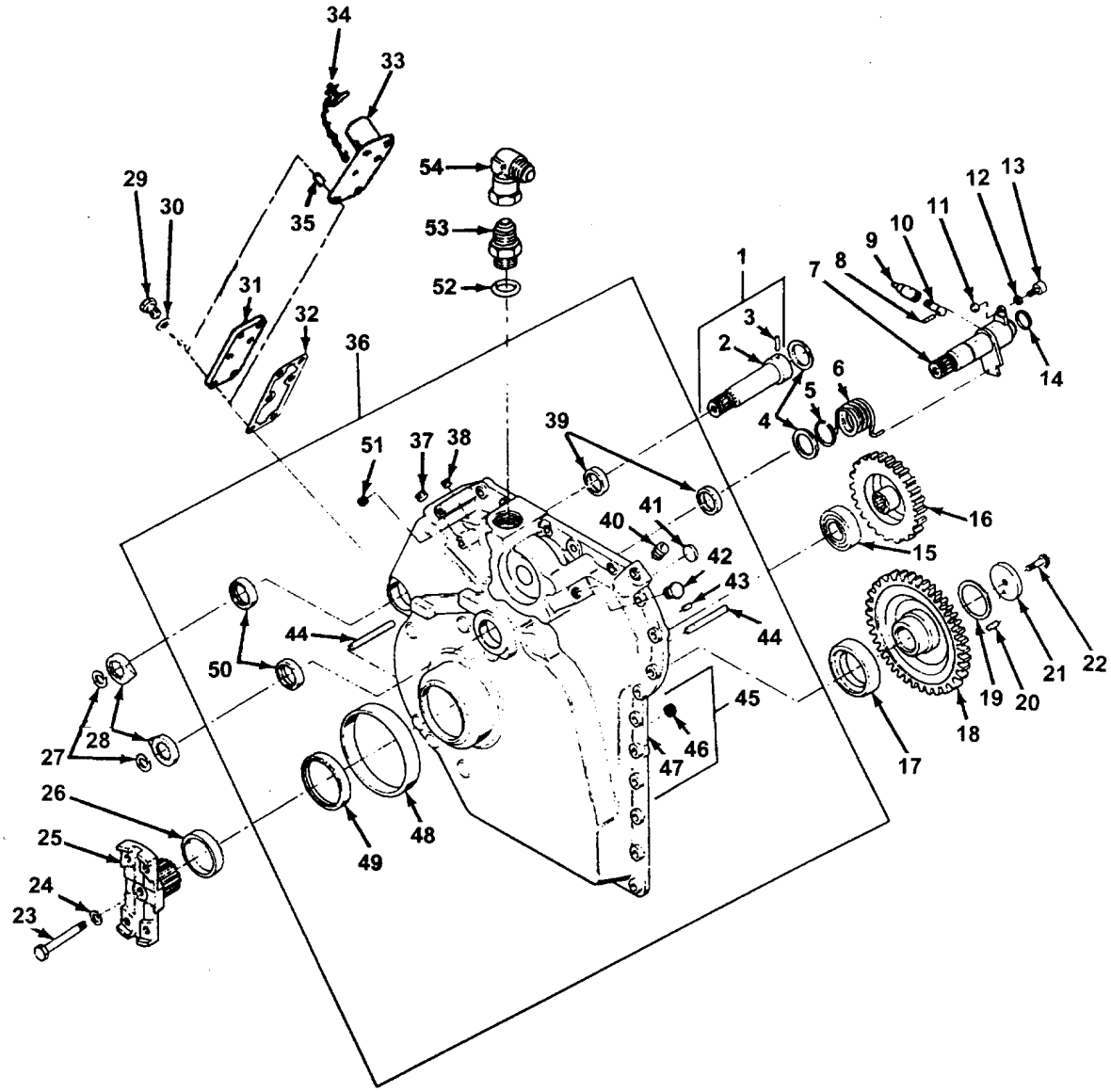


Figure 15. Right Hand End Cover and Brake Apply Cam Shaft.

RIGHT HAND END COVER AND BRAKE APPLY CAM SHAFT 0021 00

(1) Item NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 07 TRANSMISSION	
					GROUP 0710 TRANSMISSION ASSEMBLY	
					FIG. 15 RIGHT HAND END COVER AND BRAKE APPLY CAM SHAFT	
1	PAHHH	3040-01-214-9300	73342	23018232	SHAFT,SHOULDERED	1
2	XAHZZ		73342	23018147	.SHAFT,BRK APPLY LH	1
3	XBHZZ		24617	9421003	.PIN,SPRING	1
4	PAHZZ	5310-01-216-1369	73342	6836102	WASHER,FLAT	2
5	PAHZZ	5325-00-079-2212	73342	6751633	RING,RETAINING	1
6	PAHZZ	5360-01-216-3271	73342	23018151	SPRING,HELICAL,TORS	1
7	PAHZZ	3040-01-214-1605	73342	23018024	CAM,CONTROL	1
8	XBHZZ		24617	455675	PIN,SPRING	1
9	PAHZZ	2520-01-214-3867	73342	23018143	LINK,BRAKE ADJUSTIN	1
10	PAHZZ	2520-01-214-3866	73342	23018142	LINK,BRAKE ADJUSTIN	1
11	PAHZZ	5310-01-112-7932	24617	443318	NUT,SELF-LOCKING,HE	1
12	PAHZZ	5365-01-217-0857	73342	23018150	SPACER,SLEEVE	1
13	PAHZZ	3110-01-221-3077	73342	23018149	CAM FOLLOWER,NEEDLE	1
14	PAHZZ	5310-01-216-1370	73342	23018262	WASHER,FLAT	1
15	PAHZZ	3110-01-216-4033	82994	BS226347	BEARING,ROLLER,CYLI	1
16	PAHZZ	3020-01-214-9399	73342	23018112	GEAR,SPUR (UOC: XTZ)	1
16	PAHZZ	3020-01-420-8039	73342	29510213	GEAR,SPUR (UOC: X4A)	1
17	PAHZZ	3110-00-913-8113	82994	BS226349	BEARING,ROLLER,CYLI	1
18	PAHZZ	3020-01-214-9398	73342	23018152	GEAR,SPUR (UOC: XTZ)	1
18	PAHZZ	3020-01-422-1972	73342	29510212	GEAR,SPUR (UOC: X4A)	1
19	PAHZZ	3120-01-217-2250	73342	23018154	BEARING,WASHER,THRU	1
20	PAHZZ	5315-01-113-0985	24617	455160	PIN	1
21	PAHZZ	3040-01-215-0645	73342	23018153	PLATE,RETAINING,SHA (UOC: XTZ)	1
21	XDHZZ		73342	29515106	PLATE,RETAINING,SHA (UOC: X4A)	1
22	PAHZZ	5306-00-940-9028	24617	9409028	BOLT,SELF-LOCKING	1
23	PAOZZ	5305-01-216-7378	24617	454465	SCREW,CAP,HEXAGON H	1
24	PAOZZ	5310-00-799-4910	73342	6752556	WASHER,SPRING TENSI	1
25	PAOZZ	3110-01-214-9337	73342	23017998	FLANGE,COMPANION,UN	1
26	PAHZZ	3130-01-217-2284	73342	23045191	LINER,BEARING HOUSI	1
27	PAOZZ	5325-00-770-7326	19207	7707326	RING,RETAINING	2
28	PAOZZ	3040-01-214-1607	73342	23017999	CAM,CONTROL	2
29	PAOZZ	5306-01-216-3992	24617	9425094	BOLT,SELF-LOCKING	6
30	PAOZZ	5310-01-216-1367	73342	23018199	WASHER,FLAT	6
31	PAOZZ	5340-01-215-9845	73342	23017881	COVER,ACCESS (UOC: XTZ)	1
32	PAOZZ	5330-01-216-6654	73342	23017882	GASKET	1
33	PAOZZ	5340-01-421-2816	73342	29525171	PLATE,RETAINING,SEA (UOC: X4A)	1

RIGHT HAND END COVER AND BRAKE APPLY CAM SHAFT 0021 00

(1) Item NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
34	PAOZZ	5342-01-421-2817	73342	29510241	CAP,FILLER OPENING (UOC: X4A)	1
35	PAOZZ	4730-01-499-2506	73342	23018210	PLUG,PIPE (UOC: X4A)	1
36	XDHHH		73342	23018291	COVER ASSEMBLY,END (SEE FIG 2 FOR NEXT HIGHER ASSEMBLY)	1
37	PAHZZ	4730-01-213-8030	73342	23018209	.PLUG,PIPE (PRESSURE PORT,LUBE)	1
38	PAHZZ	4730-00-808-6814	73342	23018205	.PLUG,PIPE	1
39	PAHZZ	3110-00-277-0559	60380	B188OH	.BEARING,ROLLER,NEED	2
40	PAHZZ		81348	WW-P-471 ACABCC	.PLUG,PIPE (PRESSURE PORT,MAIN)	1
41	PAHZZ	5365-01-216-5750	73342	23018028	.BUSHING BLANK	2
42	PAOZZ	4730-01-040-1798	11649	SS-6-P	.PLUG,PIPE (PRESSURE PORT,BK APPLY)	1
43	PAHZZ	5315-01-093-0059	72750	141217	.PIN,STRAIGHT,HEADLE	2
44	PAHZZ	5315-01-215-7514	73342	23018031	.PIN,STRAIGHT,HEADLE	2
45	XAHDD		73342	23018285	.COVER ASSY,RH MACH	1
46	PAHZZ	5325-01-216-1737	73342	23049119	..INSERT,SCREW THREAD	4
47	XAHZZ		73342	23018284	..COVER,RH END	1
48	PAHZZ	5365-01-231-9152	73342	23018036	.SLEEVE,COVER	1
49	PAOZZ	5330-01-216-4006	73342	6883697	.SEAL,PLAIN ENCASED	1
50	PAOZZ	5330-01-245-7162	73342	6836137	.SEAL,PLAIN ENCASED	2
51	PAOZZ	4730-00-808-6814	73342	23018205	.PLUG,PIPE (PRESSURE PORT, BK SIG)	1
52	PAOZZ	5331-00-816-3546	96906	MS28778-20	O-RING (USE WITH ADAPTER PN MS51525A20 AND ELBOW, TUBE PN 29516442 IF NOT PART OF ELBOW ASSEMBLY)	1
53	PAOOZ	4730-01-066-1282	96906	MS51525A20	ADAPTER,STRAIGHT,TU (USE WITH ELBOW PN MS51521A20, 23047081)	1
54	PAOZZ	4730-01-238-6443	96906	MS51521A20	ELBOW,TUBE (SUPERCEDED BY PN 29516442)	1
54	PAOZZ	4730-01-389-7796	73342	29516442	ELBOW	1

END OF FIGURE

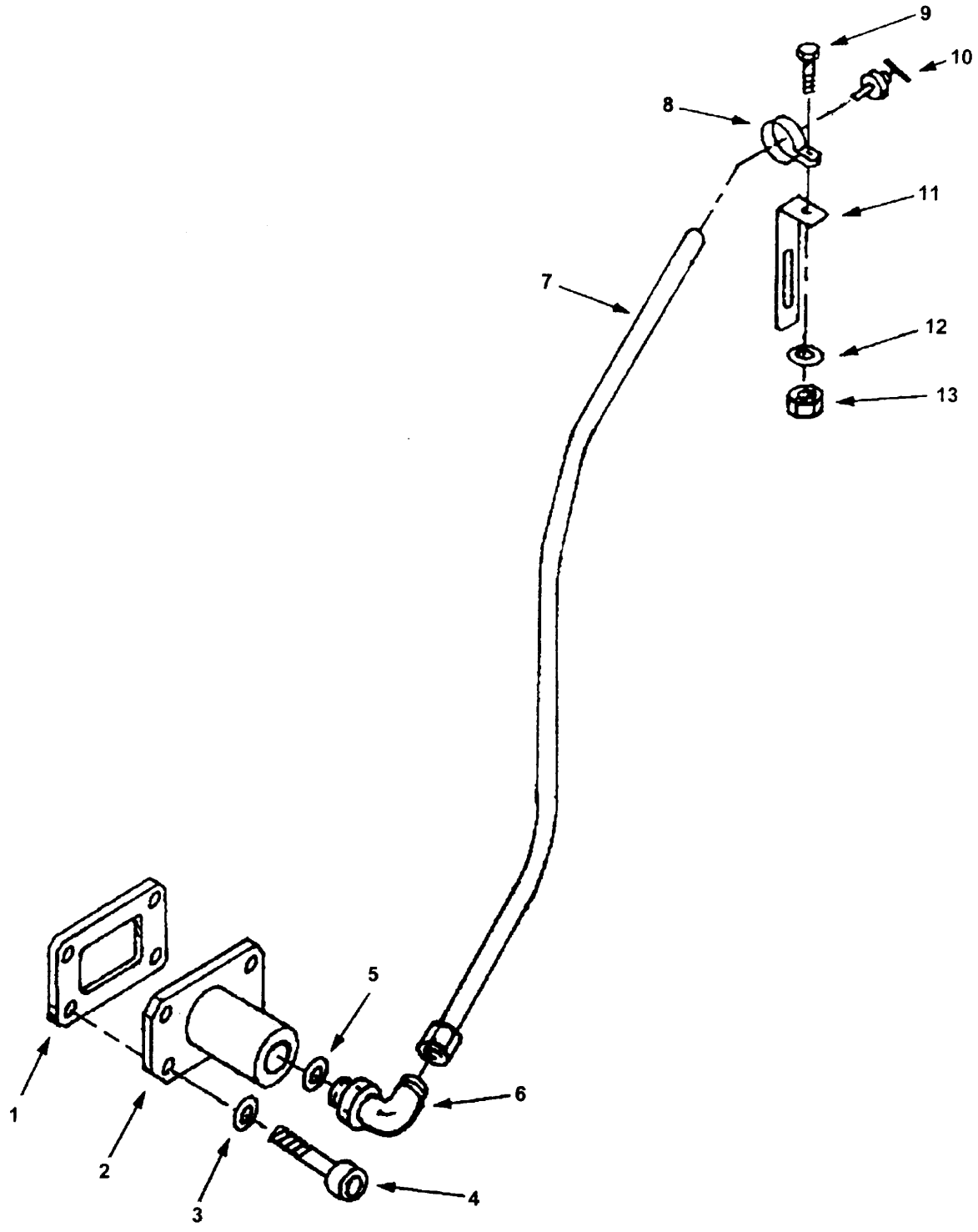


Figure 16. Fill Tube Assembly.

FILL TUBE ASSEMBLY 0021 00

(1) Item NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 07 TRANSMISSION	
					GROUP 0710 TRANSMISSION ASSEMBLY	
					FIG. 16 FILL TUBE ASSEMBLY	
1	PAOZZ	5330-01-420-8736	73342	29510236	GASKET (UOC: X4A)	1
2	PAOZZ	4730-01-420-5913	73342	29510235	ADAPTER (UOC: X4A)	1
3	PAOZZ	5310-01-321-8610	24617	274517	WASHER,FLAT (UOC: X4A) (SUPERCEDED BY WASHER, FLAT P/N 2436163)	4
3	PAOZZ	5310-01-412-4013	24617	2436163	WASHER,FLAT (UOC: X4A)	4
4	PAOZZ	5305-00-978-9395	96906	MS16997-100	SCREW,CAP,SOCKET HE (UOC: X4A)	4
5	PAOZZ	5331-01-498-9979	73342	23015806	O-RING (UOC: X4A)	1
6	PAOZZ	4730-01-496-6942	73342	29502318	ELBOW,BOSS (UOC: X4A)	1
7	PAOZZ	4710-01-421-8747	73342	29528638	TUBE,BENT,METALLIC (UOC: X4A)	1
8	PAOZZ	5340-01-496-9455	73342	29528640	CLAMP,LOOP (UOC: X4A)	1
9	PAOZZ	5305-01-496-2803	24617	9416754	SCREW,CAP,HEXAGON H (UOC: X4A)	1
10	PAOZZ	6680-01-496-8759	73342	29528639	GAGE ROD, LIQUID LEV (UOC: X4A)	1
11	PAOZZ		73342	29513283	BRACKET,MOUNTING (UOC: X4A)	1
12	PAOZZ	5310-00-922-2017	72582	120217	WASHER,LOCK (UOC: X4A)	1
13	PAOZZ	5310-01-422-2147	24617	116003	NUT,MACHINE (UOC: X4A)	1

END OF FIGURE

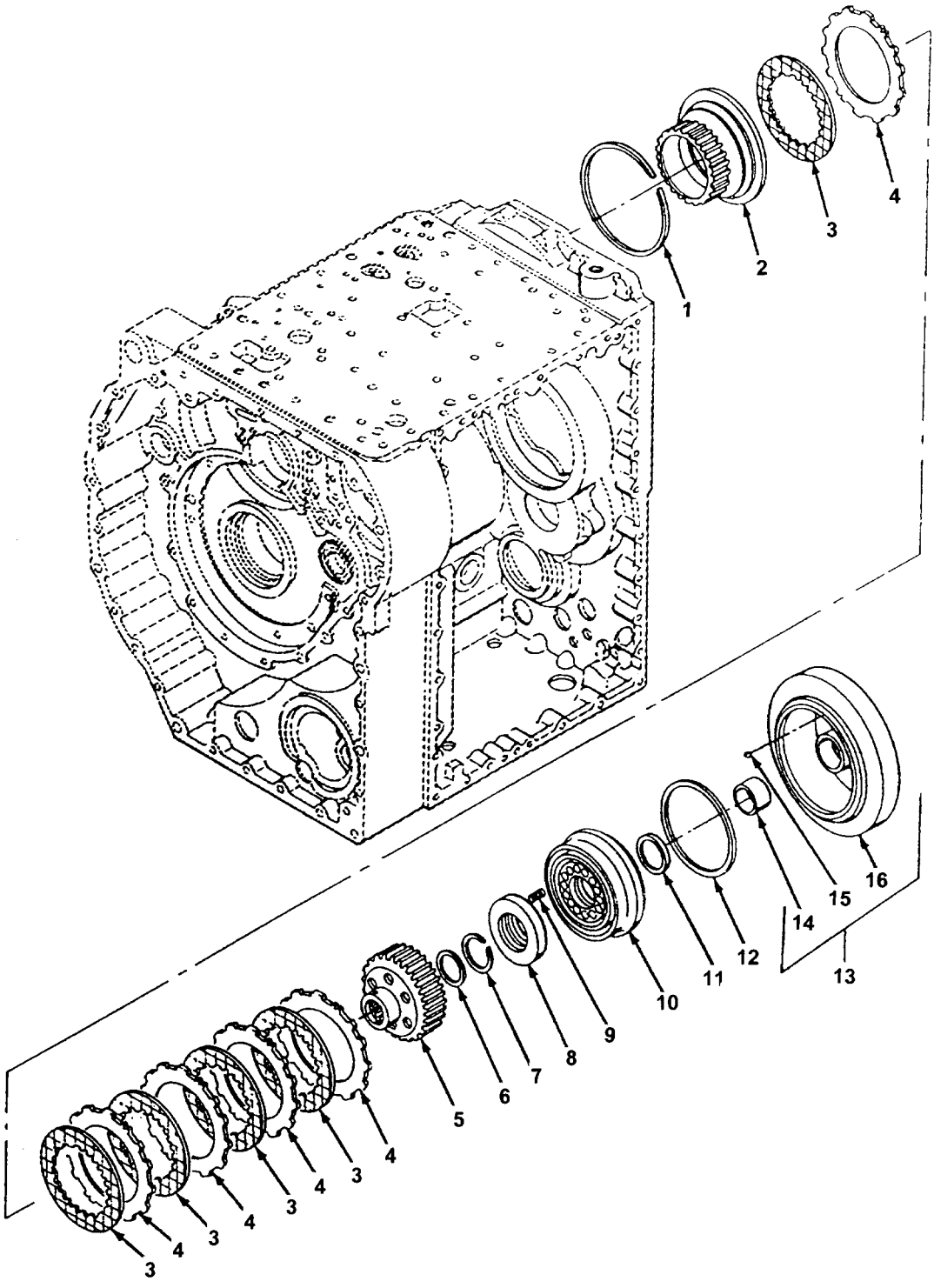


Figure 17. Forward Clutch.

FORWARD CLUTCH 0021 00

(1) Item NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 07 TRANSMISSION	
					GROUP 0713 INTERMEDIATE CLUTCH	
					FIG. 17 FORWARD CLUTCH	
1	PAHZZ	5325-01-217-1022	73342	23015985	RING,RETAINING	1
2	PAHZZ	2520-01-216-7648	73342	23018231	CLUTCH ASSEMBLY,FRI (FWD CLUTCH BACKING PLATE)	1
3	PAHZZ	2520-01-237-2872	73342	23046713	DISK,CLUTCH	5
4	PAHZZ	2520-01-214-9409	73342	6836518	DISK,CLUTCH (SUPERCEDED BY PN 29530330)	5
4	PAHZZ	2520-00-272-1947	73342	29530330	DISK,CLUTCH	5
5	PAHZZ	2520-01-214-9417	73342	23018094	HUB,BODY	1
6	PAHZZ	3120-01-216-8283	73342	23018282	BEARING,WASHER,THRU	1
7	PAHZZ	5325-01-171-3392	73342	6884730	RING,RETAINING	1
8	PAHZZ	5340-01-254-6471	73342	23047191	HOLDER,SPRING	1
9	PAHZZ	5360-01-248-1587	73342	23045233	SPRING,HELICAL,COMP	16
10	PAHZZ	2520-01-250-1909	73342	23048456	CLUTCH,POSITIVE (FWD CLUTCH POSITION)	1
11	PAHZZ		73342	29520291	SEAL,AIR,AIRCRAFT G (INNER)	1
12	PAHZZ		73342	29520292	SEAL,OUTER	1
13	PAHDD	3040-01-198-0506	73342	23018011	HOUSING,MECHANICAL	1
14	PADZZ	3120-01-216-1423	73342	23018008	.BEARING,SLEEVE	1
15	XADZZ		73342	8622757	.BALL	2
16	XADZZ		73342	23018192	.HOUSING & RING ASSY	1

END OF FIGURE

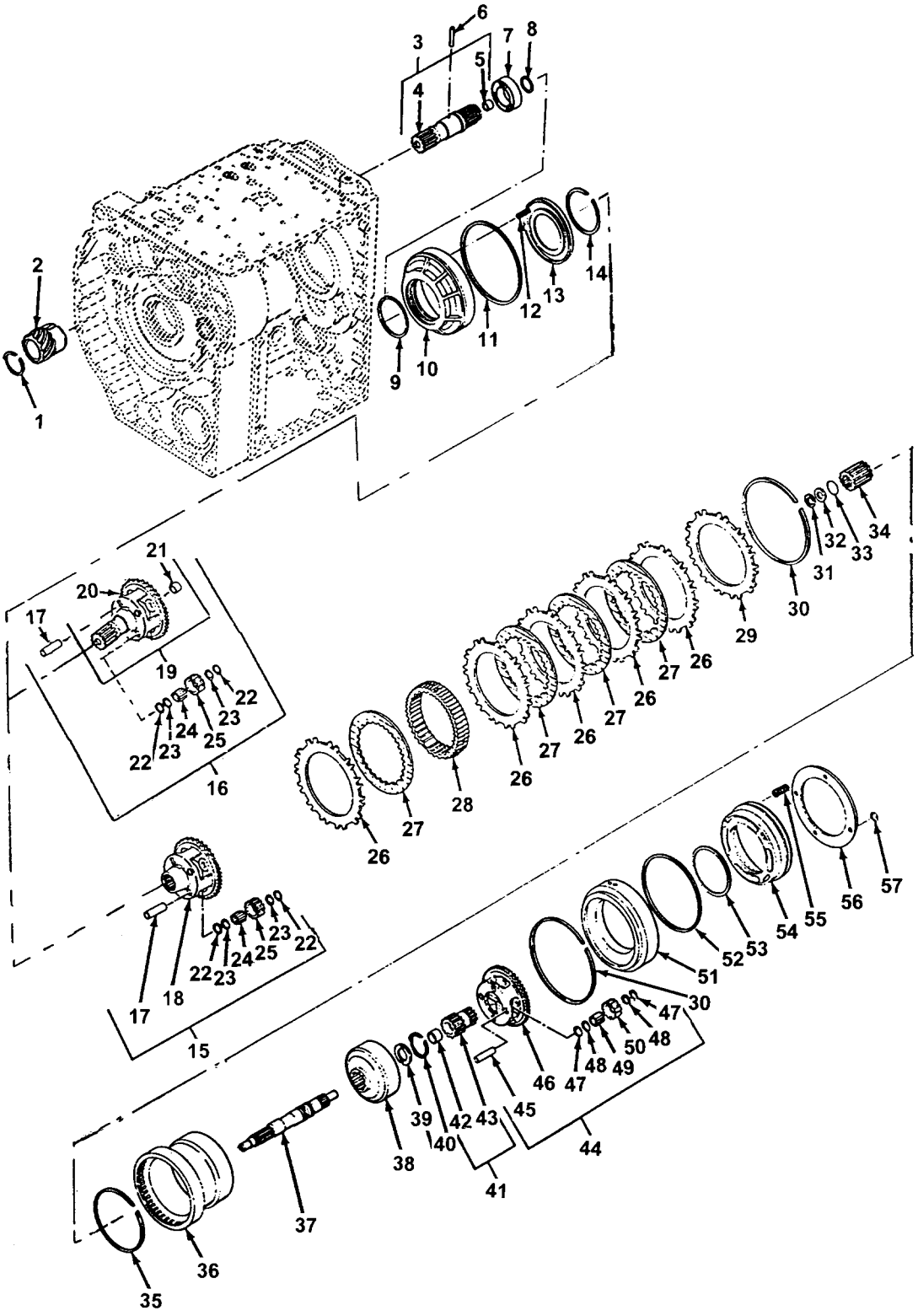


Figure 18. First Clutch, Center Carrier and Rear Carrier.

FIRST CLUTCH, CENTER CARRIER AND REAR CARRIER 0021 00

(1) Item NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 07 TRANSMISSION	
					GROUP 0713 INTERMEDIATE CLUTCH	
					FIG. 18 FIRST CLUTCH, CENTER CARRIER AND REAR CARRIER	
1	PAHZZ	3020-01-214-5786	73342	23018257	GEAR, HELICAL (USE WITH SHAFT, SHOULDERED PN 23018096) (SUPERCEDED BY PN 29533533)	1
1	PAHZZ	3020-01-499-3410	73342	29533533	GEAR,HELICAL (USE WITH SHAFT, SHOULDERED PN 23018096 AND SNAP RING PN 29533534)	1
2	PAHZZ	5325-01-499-7207	73342	29533534	SNAP RING (USE WITH GEAR HELICAL PN 29533533)	1
3	PAHDD	3040-01-214-3145	73342	23018096	SHAFT,SHOULDERED (USE WITH CARRIER ASSY REAR PN23018136, GEAR HELICAL [GEAR GOVERNOR DRIVE] PN 23018257, AND PIN PN 456641)	1
4	XAHZZ		73342	23018097	.SHAFT,RANGE OUTPUT (USE WITH SHAFT,SHOULDERED PN 23018096)	1
5	PADZZ	3120-01-203-9887	73342	23018168	.BUSHING,SLEEVE (USE WITH SHAFT,SHOULDERED PN 23018096)	1
6	XDHZZ		24617	456641	PIN,SPRING (USE WITH SHAFT,SHOULDERED PN 23018096)	1
7	PAHZZ	3110-01-243-3798	3L092	110X4	BEARING,BALL,ANNULA	1
8	PAHZZ	5325-01-217-5032	73342	23018274	RING,RETAINING (USE WITH SHAFT,SHOULDERED PN 23018096)	1
9	PAHZZ	5330-01-083-3065	73342	6883031	SEAL,PLAIN	1
10	PAHZZ	2520-01-146-1034	73342	23011665	PISTON,CLUTCH TRANS	1
11	PAHZZ	2520-01-079-6700	73342	6883033	SEAL,AIR,AIRCRAFT G	1
12	PAHZZ	5360-01-079-3097	73342	6880251	SPRING,PISTON RELEA	26
13	PAHZZ	2520-01-064-8849	73342	6834339	RETAINER,PISTON SPR	1
14	PAHZZ	5325-00-557-5794	73342	6833993	RING,RETAINING	1
15	PAHDD	2520-01-198-0499	73342	23018136	CARRIER ASSEMBLY (USE WITH SHAFT,SHOULDERED PN 23018096, GEAR,HELICAL PN 23018257 AND PIN PN 456641) (SUPERCEDED BY PN 29533535)	1

FIRST CLUTCH, CENTER CARRIER AND REAR CARRIER 0021 00

(1) Item NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
16	PAHDD	3010-01-499-3418	73342	29533535	CARRIER,ASSEMBLY (USE WITH GEAR SET BEVEL MATCHED PN 29533248, GEAR, HELICAL PN 29533533 & SNAPRING PN 29533534)	1
17	KDDZZ	3040-01-108-8606	73342	6835567	.SHAFT,STRAIGHT (USE WITH CARRIER ASSY PN 23018136 AND PN 29533535) (PART OF KIT PN 5703229)	4
18	XADZZ		73342	23018137	.CARRIER,REAR (USE WITH CARRIER ASSY PN 23018136)	1
19	XADDD		73342	29533868	.CARRIER,REAR (USE WITH CARRIER ASSY PN 29533535)	1
20	XADZZ		73342	29533536	..CARRIER (USE WITH CARRIER,REAR PN 29533868)	1
21	PADZZ	3120-01-203-9887	73342	23018168	..BUSHING,SLEEVE (USED IN CARRIER,REAR PN 29533868) (PART OF KIT PN 5703229)	1
22	KDDZZ	3110-01-110-7828	73342	6839375	.SEAT,BEARING BRONZE (PLACE NEXT TO CARRIER) (USE WITH CARRIER ASSY PN 23018136 AND PN 29533535) (PART OF KIT PN 5703229)	8
23	KDDZZ	3120-01-116-6473	73342	23018960	.BEARING,WASHER,THRU (STEEL WASHER) (USE WITH CARRIER ASSY PN 23018136 AND PN 29533535) (PART OF KIT PN 5703229)	8
24	KDDZZ	3110-01-110-1041	73342	6834915	.BEARING,ROLLER,NEED (USE WITH CARRIER ASSY PN 23018136 AND PN 29533535) (PART OF KIT PN 5703229)	72
25	KDDZZ		73342	23045482	.PINION ASSY,MATCHED (4 GEARS PN 23018138) (USE WITH CARRIER ASSY PN 23018136 AND PN 29533535) (PART OF KIT PN 5703229)	1
26	PAHZZ	2520-01-214-3238	73342	23018099	DISK,CLUTCH	5
27	PAHZZ	2520-01-214-3239	73342	23018225	DISK,CLUTCH (QTY 4 USED WITH PN 23045130) (QTY 5 USED WITH PN 29510162)	5
28	PAHZZ	3020-01-214-3859	73342	23018135	GEAR,INTERNAL (UOC: XTZ)	1
28	PAHZZ	3020-01-422-3966	73342	29510166	GEAR,INTERNAL (UOC: X4A)	1
29	PAHZZ	2520-01-214-3240	73342	23018167	DISK,CLUTCH (UOC: XTZ)	1
29	PAHZZ	2520-01-509-2403	73342	29510167	DISK,CLUTCH (UOC: X4A)	1

FIRST CLUTCH, CENTER CARRIER AND REAR CARRIER 0021 00

(1) Item NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
30	PAHZZ	5325-00-007-2969	73342	6884275	RING,RETAINING	2
31	PAHZZ	3110-00-788-1406	60380	NTA1220	RETAINER AND ROLLER	1
32	PAHZZ	3110-00-684-5541	60380	TRC1220	SEAT,BEARING	2
33	PAHZZ	5325-01-217-4262	73342	6836117	RING,RETAINING	1
34	PAHZZ	3020-01-214-9397	73342	23018102	GEAR,SPUR (SUPERCEDED BY PN 29510169) (UOC: XTZ)	1
34	PAHZZ	3020-01-422-1970	73342	29510169	GEAR,SPUR (SUPERCEDED BY PN 29537280) (UOC: X4A)	1
34	PAHZZ		73342	29537280	GEAR,SPUR	1
35	PAHZZ	5325-00-557-5835	73342	6834512	RING,RETAINING	1
36	PAHZZ	3040-01-214-3860	73342	23018101	BRAKE DRUM	1
37	XDHZZ		73342	23018095	SHAFT,SHOULDERED (SUPERCEDED BY PN 29536993) (UOC: XTZ)	1
37	PAHZZ		73342	29510168	SHAFT,SHOULDERED (SUPERCEDED BY PN 29536993) (UOC: X4A)	1
37	PAHZZ		73342	29536993	SHAFT,SHOULDERED	1
38	PAHZZ	3020-01-214-9394	73342	23018139	GEAR,INTERNAL	1
39	PAHZZ	3120-01-216-8283	73342	23018282	BEARING,WASHER,THRU	1
40	PAHZZ	5325-01-217-3076	73342	23018178	RING,RETAINING	1
41	PAHDD	3020-01-198-0689	73342	23018010	GEAR,CLUSTER	1
42	PADZZ	3120-01-216-1423	73342	23018008	.BEARING,SLEEVE	2
43	XADZZ		73342	23018009	.GEAR,CTR SUN	1
44	PAHDD	2520-00-172-1951	73342	6831676	CARRIER ASSEMBLY (CENTER)	1
45	KDDZZ	5315-01-112-8641	73342	6831679	.PIN (PART OF KIT PN 5703230)	4
46	XAHZZ		73342	6831677	.CARRIER,CENTER	1
47	KDDZZ	3120-01-084-4606	73342	6839376	.BEARING,WASHER,THRU BRONZE (PLACE NEXT TO CARRIER) (PART OF KIT PN 5703230)	8
48	KDDZZ	3110-01-085-8435	73342	6831680	.SEAT,BEARING (PART OF KIT PN 5703230)	8
49	KDDZZ		60380	Q8308	.ROLLER,BEARING (PART OF KIT PN 5703230)	76
50	KDDZZ		73342	23045483	.PINION ASSY,MATCHED (4 GEARS PN 6831678) (PART OF KIT PN 5703230)	1
51	PAHZZ	3040-01-214-3861	73342	23018100	HOUSING,MECHANICAL	1
52	PAHZZ	5330-01-280-5809	73342	23011456	SEAL,PLAIN	1
53	PAHZZ	2840-01-185-0146	73342	23011475	SEAL,AIR,GAS TURBIN	1
54	PAHZZ	2520-01-160-5655	73342	6834817	PISTON (2nd CLUTCH PISTON)	1
55	PAHZZ	5360-01-216-3267	73342	23018299	SPRING,HELICAL,COMP	12
56	XBHZZ		73342	6834129	RING,SPRING,RETAINE	1
57	PAHZZ	5310-01-143-0542	24617	3909063	PUSH ON NUT	4

END OF FIGURE

SECOND AND THIRD CLUTCH, FRONT CARRIER, FOURTH AND REVERSE CLUTCH

0021 00

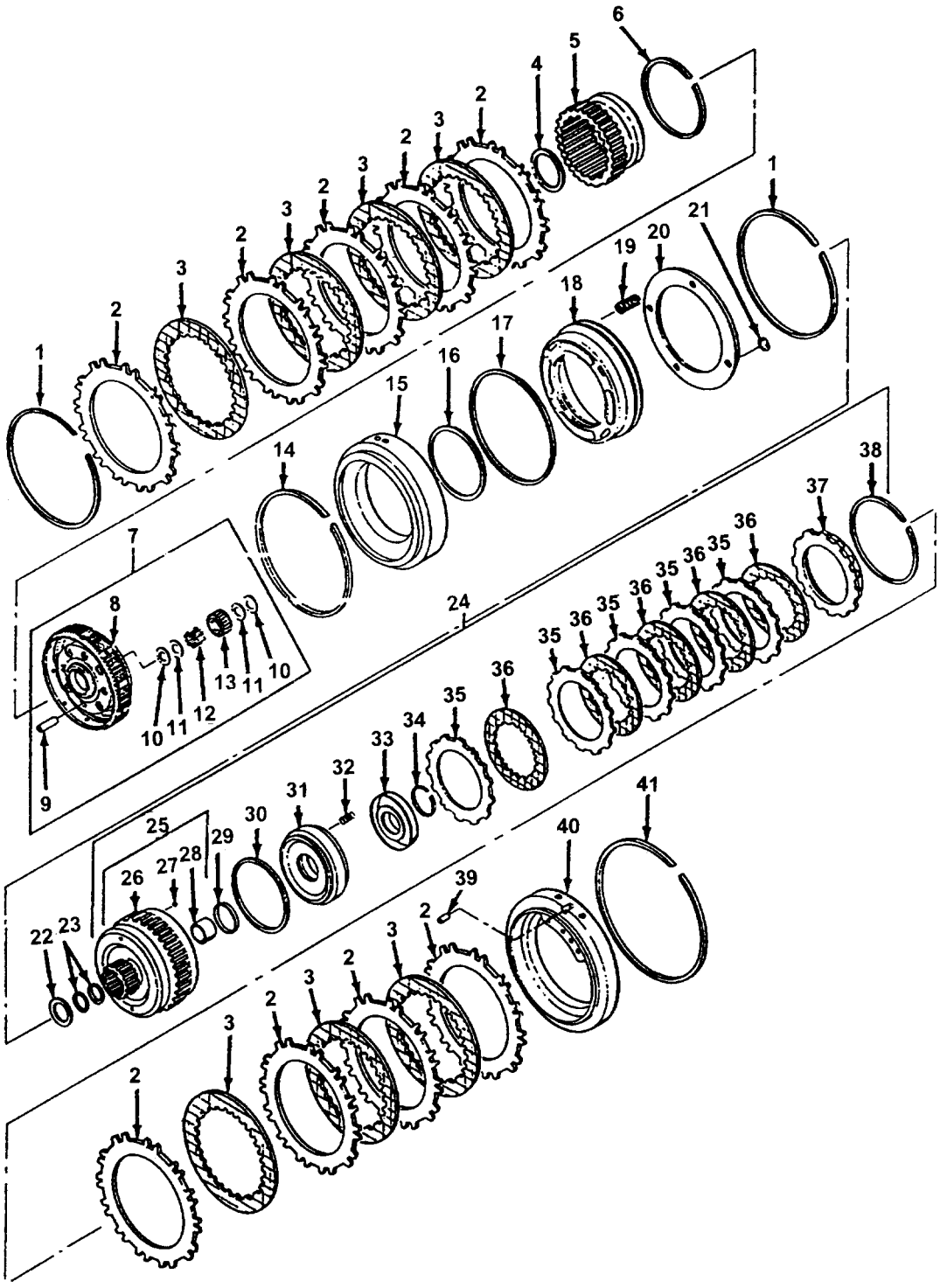


Figure 19. Second and Third Clutch, Front Carrier, Fourth and Reverse Clutch.

SECOND AND THIRD CLUTCH, FRONT CARRIER, FOURTH AND REVERSE CLUTCH 0021 00

(1) Item NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 07 TRANSMISSION	
					GROUP 0713 INTERMEDIATE CLUTCH	
					FIG. 19 SECOND AND THIRD CLUTCH, FRONT CARRIER, FOURTH AND REVERSE CLUTCH	
1	PAHZZ	5325-01-218-0796	73342	6884273	RING,RETAINING	V
1	PAHZZ	5325-01-217-3072	73342	6884274	RING,RETAINING	V
1	PAHZZ	5325-00-007-2969	73342	6836547	RING,RETAINING	V
1	PAHZZ	5325-01-217-4263	73342	6884276	RING,RETAINING	V
2	PAHZZ	2520-01-214-3238	73342	23018099	DISK,CLUTCH	9
3	PAHZZ	2520-01-214-3239	73342	23018225	DISK,CLUTCH	7
4	PAHZZ	3120-00-005-5880	73342	6831673	BEARING,WASHER,THRU	1
5	PAHZZ	3020-00-432-1255	73342	6831675	GEAR,INTERNAL (SUPERCEDED BY PN29503503) (UOC: XTZ)	1
5	PAHZZ	3020-01-389-7784	73342	29503503	GEAR,INTERNAL	1
6	PAHZZ	5325-00-838-8049	73342	6755007	RING,RETAINING	1
7	PAHDD	2520-01-235-9600	73342	23046074	CARRIER ASSEMBLY,FR	1
8	XADZZ		73342	23046075	.FLANGE AND CARRIER	1
9	KDDZZ	3040-01-108-7761	73342	6834309	.SHAFT,STRAIGHT (PART OF KIT PN 5703228)	4
10	KDDZZ	3120-01-152-1051	73342	6839514	.BEARING,WASHER,THRU (BRONZE, PLACE NEXT TO CARRIER) (PART OF KIT PN 5703228)	8
11	KDDZZ	5310-01-113-0992	73342	6833991	.WASHER,PIN THRUST (PART OF KIT PN 5703228)	8
12	KDDZZ	3110-01-006-9129	60380	Q8036	.ROLLER,BEARING (PART OF KIT PN 5703228)	80
13	KDDZZ		73342	23045481	.PINION ASSY, MATCHED (4 GEARS PN 6834310) (PART OF KIT PN 5703228)	1
14	PAHZZ	5325-00-007-2969	73342	6836547	RING,RETAINING	1
15	PAHZZ	3040-01-214-3861	73342	23018100	HOUSING,MECHANICAL (3RD CLUTCH PISTON HOUSING; ALSO SERVES AS 2ND CLUTCH BACKING PLATE)	1
16	PAHZZ	2840-01-185-0146	73342	23011475	SEAL,AIR,GAS TURBIN	1
17	PAHZZ	5330-01-145-0697	73342	6836799	SEAL,PLAIN	1
18	PAHZZ	2520-01-160-5655	73342	6834817	PISTON (3RD CLUTCH PISTON)	1
19	PAHZZ	5360-01-216-3267	73342	23018299	SPRING,HELICAL,COMP	12
20	XBHZZ		73342	6834129	RING,SPRING RETAINE	1
21	PAHZZ	5310-01-143-0542	24617	3909063	PUSH ON NUT	4
22	PAHZZ	5310-01-162-7707	73342	23013453	WASHER,THRUST	1
23	PAHZZ	5330-01-214-1479	73342	6836264	SEAL RING,METAL	2
24	AHHHH		73342	23045115	CL ASSY,FWD & REV	1

SECOND AND THIRD CLUTCH, FRONT CARRIER, FOURTH AND REVERSE CLUTCH 0021 00

(1) Item NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
25	PAHDD	3040-01-198-0501	73342	23018006	.HOUSING,MECHANICAL (SUPERCEDED BY PN29537303)	1
25	PAHDD	2520-01-508-6840	73342	29537303	.HOUSING,FRICTION CLUTCH	1
26	XAHZZ		73342	23018007	..HOUSING, 4TH CL (SUPERCEDED BY PN 29537283)	1
26	XAHZZ		73342	29537283	..HOUSING,4TH CLUTCH	1
27	XADZZ		73342	8622757	..BALL	2
28	PADZZ	3120-01-216-1423	73342	23018008	..BEARING,SLEEVE	1
29	PAHZZ	5330-01-509-4404	73342	29520291	.SEAL,AIR,AIRCRAFT G	1
30	PAHZZ	5330-01-509-0298	73342	29520292	.SEAL,OUTER	1
31	PAHZZ	2520-01-250-1909	73342	23048456	.CLUTCH,POSITIVE (4TH & REV CLUTCH PISTON)	1
32	PAHZZ	5360-01-248-1587	73342	23045233	.SPRING,HELICAL,COMP	16
33	PAHZZ	5340-01-254-6471	73342	23047191	.HOLDER,SPRING	1
34	PAHZZ	5325-01-171-3392	73342	6884730	.RING,RETAINING	1
35	PAHZZ	2520-00-172-1947	73342	29530330	.DISK,CLUTCH	5
36	PAHZZ	2520-01-237-2872	73342	23046713	.DISK,CLUTCH	5
37	PAHZZ	2520-00-008-9987	73342	23017763	.DISK,CLUTCH	1
38	PAHZZ	5325-01-217-1022	73342	23015985	.RING,RETAINING	1
39	PAHZZ	5315-01-211-6485	24617	141190	PIN,STRAIGHT,HEADLE	1
40	PAHZZ	2520-01-214-3944	73342	23018098	DISK,CLUTCH (3RD CLUTCH BACKING PLATE)	1
41	PAHZZ	5325-01-217-4264	73342	6836108	RING,RETAINING	1

END OF FIGURE

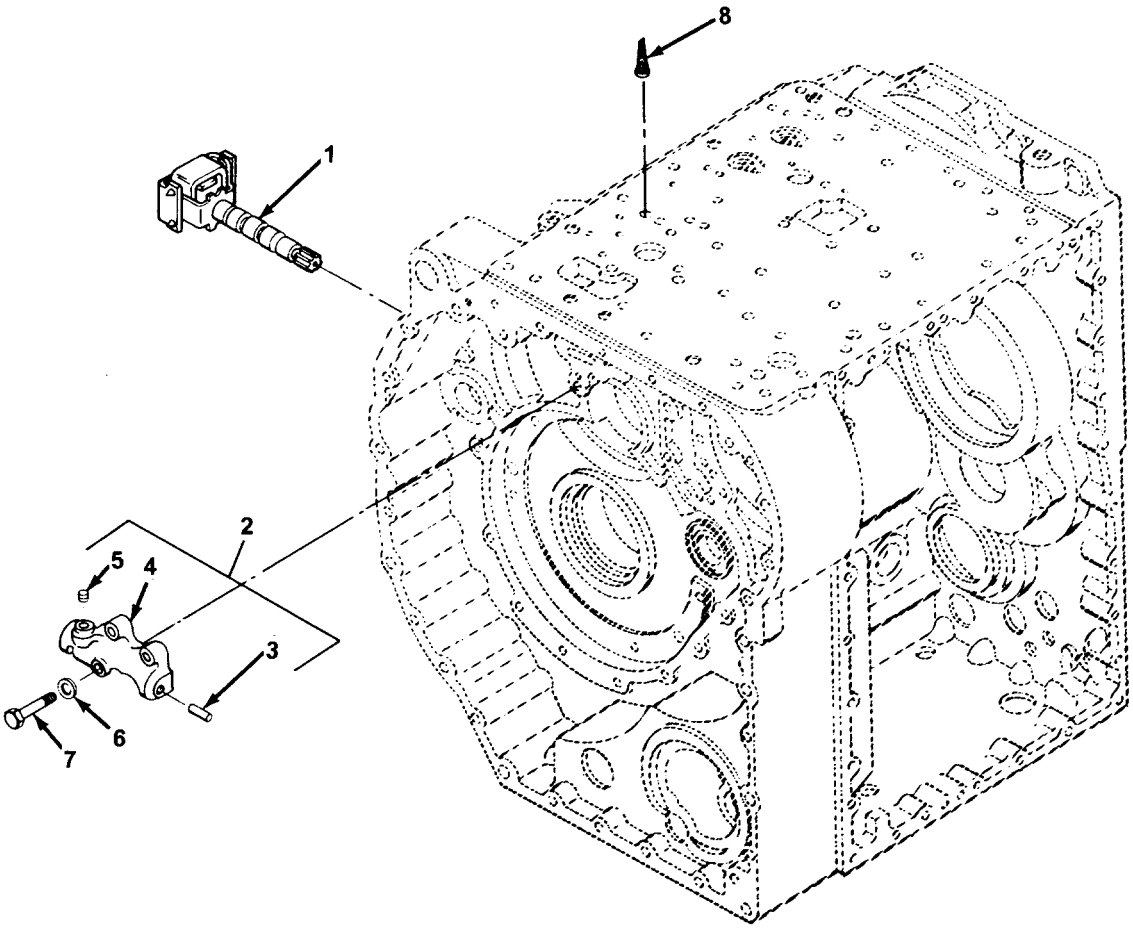


Figure 20. Governor and Governor Body.

GOVERNOR AND GOVERNOR BODY 0021 00

(1) Item NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 07 TRANSMISSION	
					GROUP 0714 SERVO UNIT	
					FIG. 20 GOVERNOR AND GOVERNOR BODY	
1	PAOZZ	2520-01-213-7763	73342	23017861	GOVERNOR ASSEMBLY,T	1
2	PAHDD	2520-01-214-4317	73342	23017859	BODY ASSEMBLY,GOVER	1
3	PADZZ	5315-01-215-7515	24617	141223	.PIN,STRAIGHT,HEADLE	1
4	XAHZZ		73342	23018222	.BODY,GOVERNOR	1
5	XBDZZ		73342	23018252	.PLUG,PUMP RECIPROCA	1
6	PAHZZ	5310-00-274-8041	90407	12084P11	WASHER,FLAT	3
7	PAHZZ	5306-01-085-3876	24617	9409239	BOLT,SELF-LOCKING	3
8	PAFZZ	4730-01-213-7794	73342	23045247	STRAINER ELEMENT,SE	1

END OF FIGURE

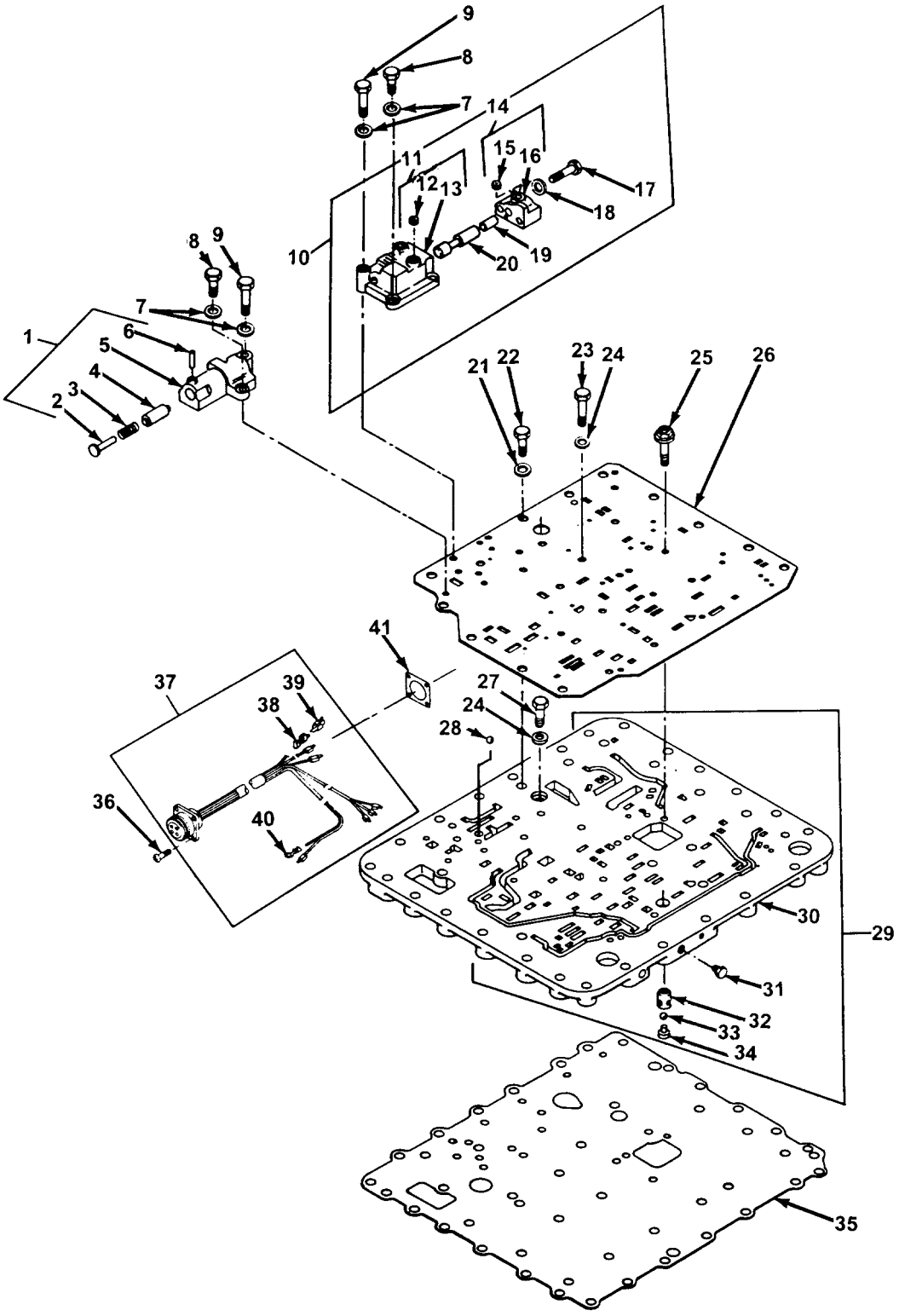


Figure 21. G2 Backup, Priority Valve.

G2 BACKUP, PRIORITY VALVE 0021 00

(1) Item NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 07 TRANSMISSION	
					GROUP 0714 SERVO UNIT	
					FIG. 21 G2 BACKUP, PRIORITY VALVE	
1	PAFDD	4810-01-214-4015	73342	23018623	VALVE,LINEAR,DIRECT	1
2	PADZZ	5340-01-216-3810	73342	23017894	.SEAT,HELICAL COMPRE	1
3	PADZZ	5360-01-216-0829	73342	23045269	.SPRING,HELICAL,COMP	1
4	PADZZ	2520-01-214-3154	73342	6837389	.VALVE,PRIORITY	1
5	XADZZ		73342	23018622	.BODY,PRIORITY VAL	1
6	PADZZ	5315-01-095-3110	72582	455862	.PIN,SPRING	1
7	PAFZZ	5310-01-102-3270	24617	2436161	WASHER,FLAT	7
8	PAFZZ	5306-01-216-0230	24617	9432105	BOLT,SELF-LOCKING	3
9	PAFZZ	5306-00-589-8167	63005	445568	BOLT,MACHINE	4
10	PAFDD	4820-01-214-3869	73342	23018615	VALVE BODY ASSEMBLY	1
11	XADDD		73342	23018618	.BODY ASSY,BACKUP	1
12	PADZZ	5342-01-220-9246	92555	PLEA2501220	..PLUG	2
13	XADZZ		73342	23018611	..BODY	1
14	PBDDD	5340-01-217-2162	73342	23018613	.COVER,ACCESS	1
15	PADZZ	5342-01-220-9246	92555	PLEA2501220	..PLUG	1
16	XADZZ		73342	23018612	..COVER,ACCESS	1
17	PADZZ	5305-00-400-5542	24617	445567	.SCREW,CAP,HEXAGON H	2
18	PADZZ	5310-01-102-3270	24617	2436161	.WASHER,FLAT	2
19	PADZZ	3040-01-214-3155	73342	23018624	.SHAFT,STRAIGHT (VALVE,OVERRIDE)	1
20	PADZZ	4820-01-214-3193	73342	23018614	.SLIDE,DIRECTIONAL C	1
21	PAFZZ	5310-01-092-5496	24617	9422845	WASHER,FLAT	1
22	PAFZZ	5306-01-215-9129	24617	9415972	BOLT,SELF-LOCKING	1
23	PAFZZ	5306-00-944-6812	24617	9409014	BOLT,SLEF-LOCKING	5
24	PAFZZ	5310-01-084-1197	24617	9422846	WASHER,FLAT	6
25	PAFZZ	5306-01-216-7364	24617	9440986	BOLT,MACHINE	2
26	PAFZZ	2520-01-214-9334	73342	23018619	PLATE SEPARATOR	1
27	XBFZZ		24617	9409076	BOLT,SELF-LOCKING	1
28	PAFZZ	3110-01-216-3718	73342	23045386	BALL,BEARING	1
29	PAFHH	2520-01-216-8564	73342	23018617	PLATE ASSEMBLY,OIL	1
30	XAFZZ		73342	23018616	.PLATE,OIL	1
31	PAOZZ	4730-01-221-7138	73342	23018206	.PLUG,PIPE (PRESSURE PORT, RV SIG, TV, G1 AND G2)	4
32	PAHZZ	5340-01-213-8017	73342	23017901	.COVER,ACCESS	1
33	PAHZZ	3110-01-237-2758	73342	23045388	.BALL,BEARING	1
34	PAHZZ	4820-01-213-7959	73342	23017902	.VALVE,STOP-CHECK	1
35	PAFZZ	5330-01-251-1931	73342	23047805	GASKET	1
36	XDFZZ		24617	159184	SCREW,MACHINE	4
37	PAFFF	5995-01-214-5783	73342	23017899	WIRING HARNESS,BRAN	1
38	PAFZZ	5940-01-082-6615	77060	2973915	.THERMAL,QUICK DISC	7
39	PAFZZ	5970-01-080-3153	77060	12020381	.NYLON INSULATOR	7
40	PAFZZ	5940-01-246-2086	77060	2989521	.TERMINAL,LUG	1
41	PAFZZ	5330-01-218-7143	73342	6832550	GASKET	1

END OF FIGURE

LOCKUP VALVE (VALVE SOLENOID) 0021 00

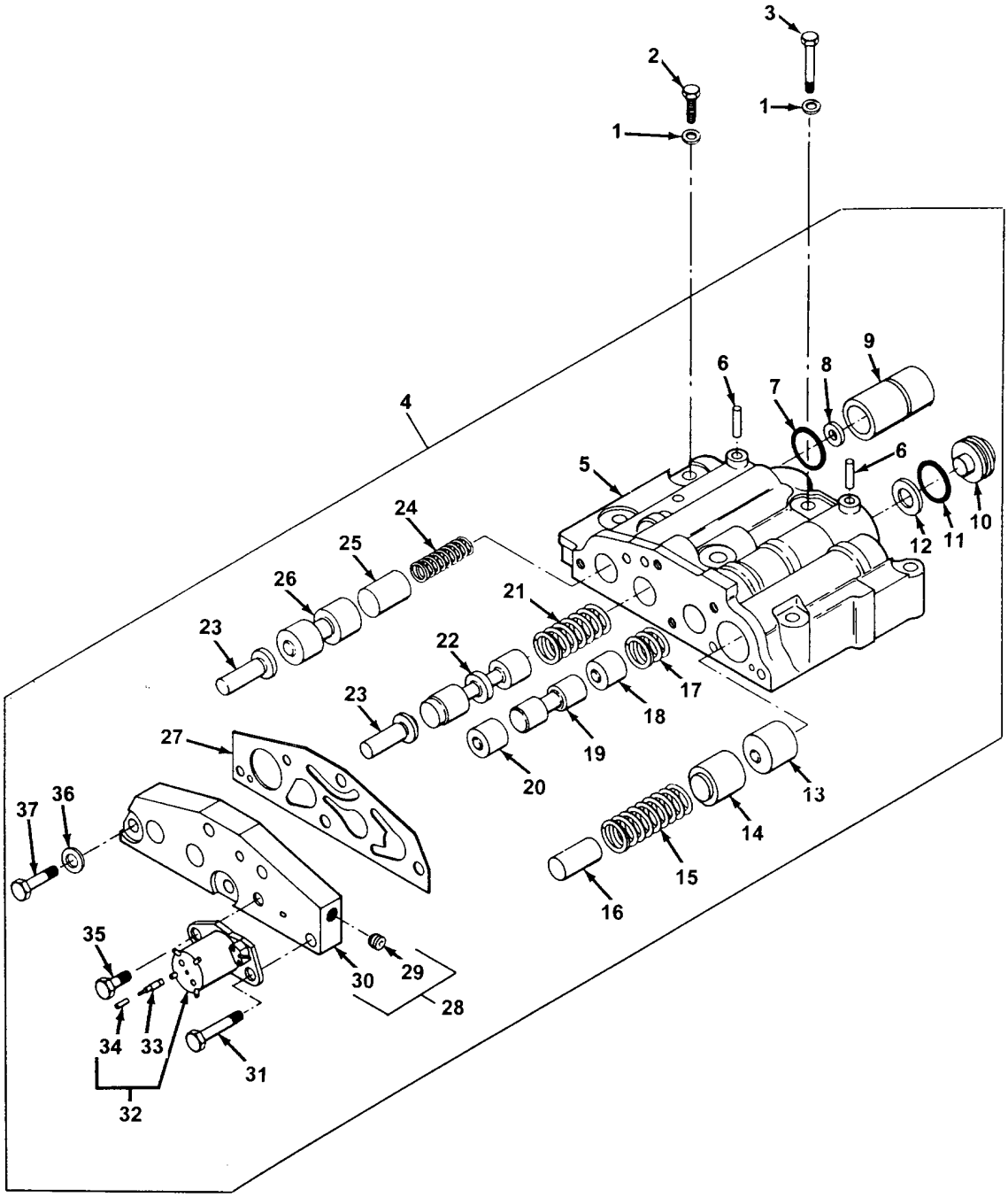


Figure 22. Lockup Valve (Valve Solenoid).

LOCKUP VALVE (VALVE SOLENOID) 0021 00

(1) Item NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 07 TRANSMISSION	
					GROUP 0714 SERVO UNIT	
					FIG. 22 LOCKUP VALVE (VALVE, SOLENOID)	
1	PAFZZ	5310-01-084-1197	24617	9422846	WASHER,FLAT	6
2	PAFZZ	5306-01-164-7448	24617	9409621	BOLT,MACHINE	2
3	PAFZZ	5306-01-147-1202	24617	9431456	BOLT,SELF-LOCKING	4
4	PAFDD	4810-01-198-0504	73342	23017931	LOCKUP VALVE	1
5	XDDZZ		73342	23017932	.BODY,LOCKUP CONTRO	1
6	PADZZ	5315-01-216-1504	24617	456826	.PIN,SPRING	2
7	PADZZ	5330-01-080-3253	73342	6771005	.SEAL,NONMETALLIC RO	1
8	PADZZ	5310-00-168-6412	81487	23601-00160	.WASHER,FLAT	V
9	XDDZZ		73342	23017943	.SLEEVE,DIRECTIONAL	1
10	XDDZZ		73342	23017938	.SLIDE,DIRECTIONAL C	1
11	PADZZ	5331-01-258-9151	73342	6835307	.O-RING	1
12	XDDZZ		73342	23017937	.WASHER,FLAT	V
13	XDDZZ		73342	23017911	.PISTON,VALVE	1
14	XADZZ		73342	23017912	.TRIMMER PLUG,TRANSM	1
15	XBDZZ		73342	6833945	.SPRING	1
16	PADZZ	4820-01-006-9636	73342	6835734	.STOP,VALVE	1
17	PADZZ	5360-01-216-4462	73342	23017936	.SPRING,HELICAL,COMP	V
17	PADZZ	5360-01-371-9313	73342	29503594	.SPRING,HELICAL,COMP (OPTIONAL FOR PN 23017936)	V
18	XDDZZ		73342	23017935	.PLUG,VALVE	1
19	PADZZ	2520-01-213-8599	73342	23017934	.VALVE,SIGNAL CONTRO	1
20	XDDZZ		73342	23017933	.VALVE,SIGNAL PLUG	1
21	PADZZ	5360-01-218-0793	73342	6778016	.SPRING,HELICAL,COMP	1
22	XDDZZ		73342	23017944	.SLIDE,DIRECTIONAL C	1
23	PADZZ	5340-01-217-4179	73342	23017939	.PLUNGER,DETENT	2
24	PADZZ	5360-01-216-4463	73342	23017942	.SPRING,HELICAL,COMP	V
24	PADZZ	5360-01-371-9314	73342	29505538	.SPRING,HELICAL,COMP (OPTIONAL FOR PN 23017942)	V
25	XDDZZ		73342	23017941	.PLUG,VALVE,TRANSMIS	1
26	XDDZZ		73342	23017940	.SLIDE,DIRECTIONAL C	1
27	PADZZ	5330-01-217-7014	73342	23017945	.GASKET	1
28	PADDD	5340-01-207-3481	73342	23017946	.COVER ASSEMBLY PUSH	1
29	PADZZ	5342-01-220-9246	92555	PLEA2501220	..PLUG	1
30	XADZZ		73342	23017947	..COVER,LOCKUP VAL	1
31	PAFZZ	5306-01-216-9849	24617	9440987	.BOLT,MACHINE	3
32	PAFFF	5945-01-132-4189	54906	40900	.SOLENOID,ELECTRICAL	2
33	PAFZZ	5940-01-082-6615	77060	2973915	..TERMINAL,QUICK DISC	1
34	PAFZZ	5970-01-080-3153	77060	12020381	..NYLON INSULATOR	1
35	PAFZZ	5306-01-216-1322	24617	9440984	.BOLT,MACHINE	1
36	PADZZ	5310-01-092-5496	24617	9422845	.WASHER,FLAT	2
37	PADZZ	5306-00-940-9062	24617	9409062	.BOLT,SELF-LOCKING	2

END OF FIGURE

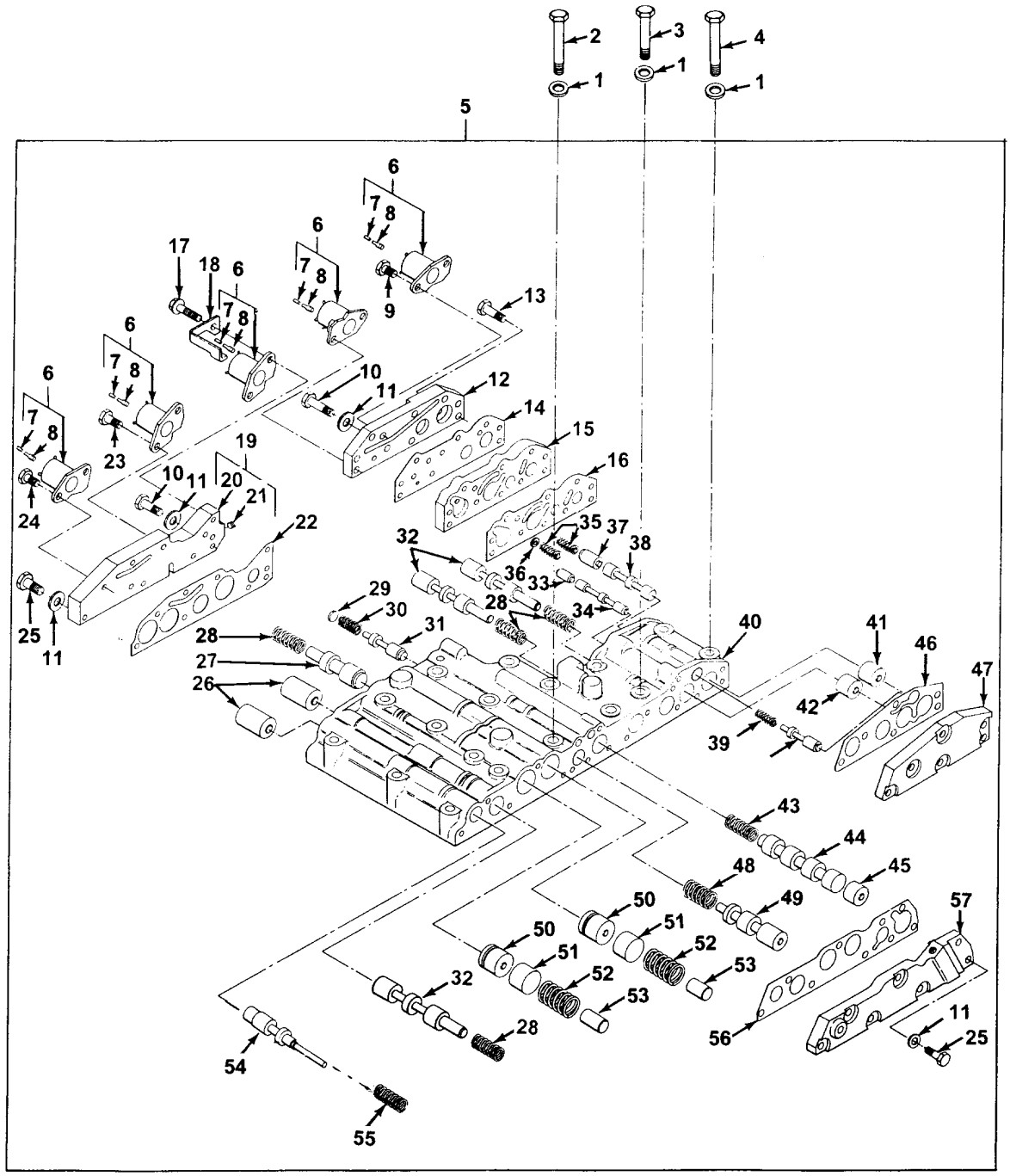


Figure 23. Control Valve.

CONTROL VALVE 0021 00

(1) Item NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 07 TRANSMISSION	
					GROUP 0714 SERVO VALVE	
					FIG. 23 CONTROL VALVE	
1	PAFZZ	5310-01-084-1197	24617	9422846	WASHER,FLAT	17
2	PAFZZ	5306-01-263-2018	24617	9419287	BOLT,MACHINE	5
3	PAFZZ	5306-01-045-6594	24617	9409015	BOLT,SELF-LOCKING	4
4	PAFZZ	5306-01-147-1202	24617	9431456	BOLT,SELF-LOCKING	8
5	PAFDD	2520-01-257-3881	73342	23048196	VALVE ASSEMBLY,CONT	1
6	PAFFF	5945-01-132-4189	54906	40900	.SOLENOID,ELECTRICAL	5
7	PAFZZ	5970-01-080-3153	77060	12020381	..NYLON INSULATOR	1
8	PAFZZ	5940-01-082-6615	77060	2973915	..TERMINAL,QUICK DISC	1
9	PAFZZ	5306-01-216-7364	24617	9440986	.BOLT,MACHINE	2
10	PADZZ	5306-01-216-1334	24617	9409253	.BOLT,SELF-LOCKING	4
11	PADZZ	5310-01-092-5496	24617	9422845	WASHER,FLAT	18
12	PADZZ	2520-01-214-9336	73342	23017886	COVER,REAR-SHIFT VA	1
13	PADZZ	5306-01-216-0230	24617	9432105	.BOLT,SELF-LOCKING	2
14	PADZZ	2520-01-214-3150	73342	23017884	.PLATE,INTERMEDIATE	1
15	PADZZ	2520-01-261-4017	73342	23048193	.PLATE,OIL TRANSFER	1
16	PADZZ	5330-01-217-2202	73342	23017888	.GASKET	1
17	PAFZZ	5306-01-216-7365	24617	9440988	.BOLT,MACHINE	3
18	PAFZZ	2590-01-214-1563	73342	23047359	.SPRING,RETAINER SPA	1
19	PADDD	4820-01-204-9942	73342	23017929	.CAP,VALVE (COVER)	1
20	XADZZ		73342	23017930	..COVER,CONT VALVE	1
21	PADZZ	5342-01-220-9246	92555	PLEA2501220	..PLUG	1
22	PADZZ	5330-01-216-4014	73342	23017928	.GASKET	1
23	PAFZZ	5306-01-216-1322	24617	9440984	.BOLT,MACHINE	1
24	PAFZZ	5306-01-216-9849	24617	9440987	.BOLT,MACHINE	4
25	PADZZ	5306-00-940-9062	24617	9409062	.BOLT,SELF-LOCKING	15
26	PADZZ	4730-01-213-8051	73342	23017927	.PLUG,VALVE,LOCKUP T	2
27	PADZZ	4820-01-213-8098	73342	23017926	.SLIDE,DIRECTIONAL C	1
28	PADZZ	5360-01-218-0793	73342	6778016	.SPRING,HELICAL,COMP	4
29	PADZZ	5365-01-217-4661	73342	23045303	.SPACER,PLATE	V
29	PADZZ	5365-01-273-2320	73342	23048641	.SPACER,PLATE	V
29	PADZZ	5365-01-272-3346	73342	23048642	.SPACER,PLATE	V
30	PADZZ	5360-01-216-0828	73342	6836140	.SPRING,HELICAL,COMP	1
31	PADZZ	2520-01-214-9389	73342	23017924	.SLIDE,DIRECTIONAL C	2
32	PADZZ	2520-01-214-1615	73342	23017910	.SLIDE,DIRECTIONAL C	3
33	PADZZ	4820-01-261-1692	73342	23048194	.VALVE,SIGNAL PLUG	1
34	PADZZ	2520-01-214-4410	73342	23017920	.SLIDE,DIRECTIONAL C	1
35	PADZZ	5360-01-215-7688	73342	23017919	.SPRING,HELICAL,COMP (OPTIONAL)	V
35	PADZZ	5360-01-265-6742	73342	23048260	.SPRING,HELICAL,COMP (OPTIONAL)	V
36	XDDZZ		24617	221431	.WASHER,FLAT (OPTIONAL; QTY 0-4) (USED WITH OPTIONAL SPRING PN 23048260)	V
37	PADZZ	4820-01-276-3528	73342	23048645	.PISTON,VALVE	1

CONTROL VALVE 0021 00

(1) Item NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
38	PADZZ	2520-01-214-9388	73342	23017922	.SLIDE,DIRECTIONAL,C	1
39	PADZZ	5360-01-216-7437	73342	23017923	.SPRING,HELICAL,COMP (REPLACED BY PN 6774817)	1
39	PADZZ		73342	6774817	.SPRING,HELICAL,COMPRESSION	1
40	PADZZ	4810-01-214-4014	73342	23017905	.BODY,VALVE	1
41	PADZZ	4730-01-213-8049	73342	23017921	.PLUG,SIGNAL,VALVE	1
42	PADZZ	4730-01-214-3868	73342	23017890	.PLUG,SIGNAL,VALVE	1
43	PADZZ	5360-01-083-5500	73342	6836144	.SPRING,HELICAL,COMP	1
44	PADZZ	2520-01-214-4409	73342	23017914	.SLIDE,DIRECTIONAL C	1
45	PADZZ	4730-01-215-4323	73342	23017915	.PLUG,FORWARD,REVERSE	1
46	PADZZ	5330-01-216-4013	73342	23017889	.GASKET	1
47	PBDZZ	5340-01-238-8759	73342	23017887	.COVER,ACCESS	1
48	PADZZ	5360-01-216-5972	73342	6833944	.SPRING,HELICAL,COMP	1
49	PADZZ	2520-01-214-4408	73342	23017913	.SLIDE,DIRECTIONAL C	1
50	XDDZZ		73342	23017911	.PISTON,VALVE	2
51	XDDZZ		73342	23017912	.TRIMMER PLUG,TRANSM	2
52	PADZZ	5360-01-216-7059	73342	6833940	.SPRING,HELICAL,COMP	2
53	PADZZ	4820-01-006-9636	73342	6835734	.STOP,VALVE	2
54	PADZZ	4820-01-205-0034	73342	23017906	.VALVE,STOP-CHECK	1
55	PADZZ	5360-01-216-8210	73342	23017909	.SPRING,HELICAL,COMP	1
56	PADZZ	5330-01-217-4043	73342	23017916	.GASKET	1
57	PADZZ	4820-01-204-9941	73342	23017917	.CAP,VALVE (COVER)	1

END OF FIGURE

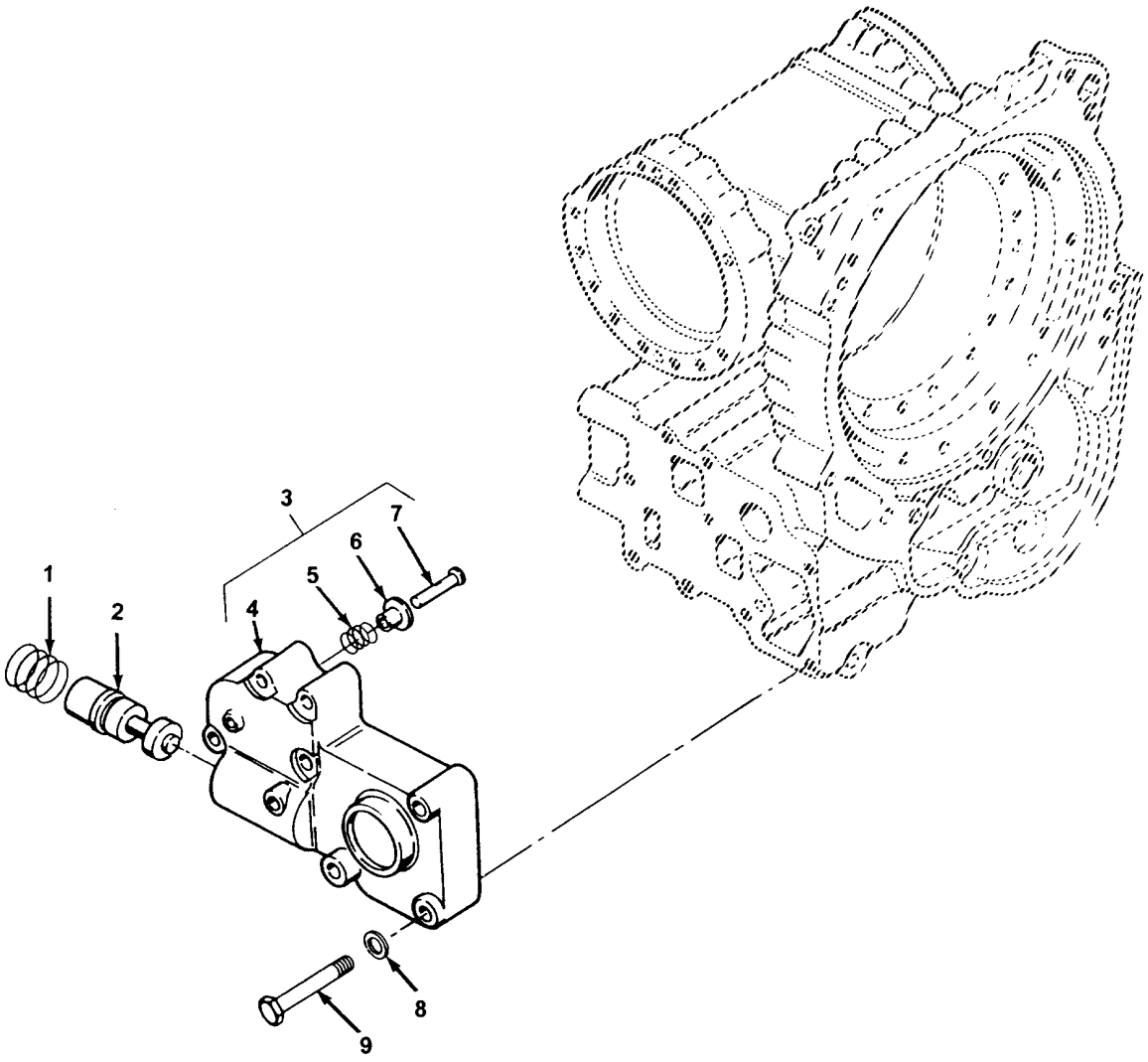


Figure 24. Push Start Valve.

PUSH START VALVE 0021 00

(1) Item NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 07 TRANSMISSION	
					GROUP 0714 SERVO UNIT	
					FIG. 24 PUSH START VALVE	
1	PAHZZ	5360-01-215-7690	73342	23018059	SPRING,HELICAL,COMP	1
2	PAHZZ	2520-01-214-3190	73342	23018058	SLIDE,DIRECTIONAL C	1
3	PAHDD	4820-01-205-0035	73342	23018055	VALVE,CHECK	1
4	XADZZ		73342	23018056	.BODY,PUSH-START	1
5	PADZZ	5360-01-215-7689	73342	23018057	.SPRING,HELICAL,COMP	1
6	PADZZ	5365-01-217-4079	73342	23018047	.SPACER,SLEEVE	1
7	XDDZZ		73342	23018048	.PIN,STRAIGHT,HEADED	1
8	PAHZZ	5310-01-084-1197	24617	9422846	WASHER,FLAT	9
9	PAHZZ	5306-01-164-7448	24617	9409621	BOLT,SELF-LOCKING	9

END OF FIGURE

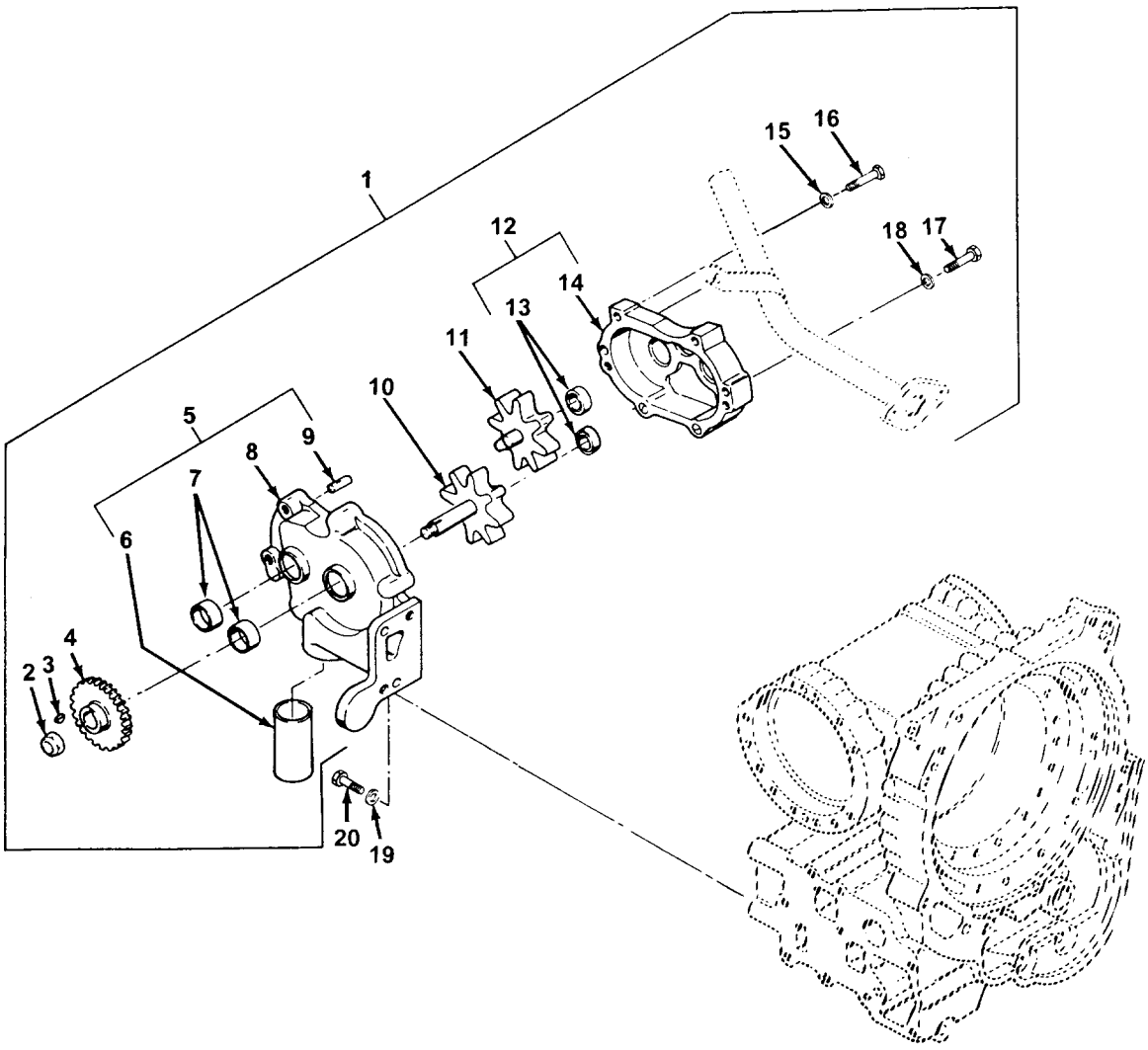


Figure 25. Output Oil Pump.

OUTPUT OIL PUMP 0021 00

(1) Item NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 07 TRANSMISSION	
					GROUP 0721 COOLERS, PUMPS, MOTORS	
					FIG. 25 OUTPUT OIL PUMP	
1	PAHDD	2520-01-198-0495	73342	23018062	PUMP,OUTPUT OIL	1
2	PADZZ	5310-00-402-5220	19207	11649930	.NUT,SELF-LOCKING,HE	1
3	PADZZ	5315-00-687-5218	96906	MS35756-3	.KEY,WOODRUFF	1
4	PADZZ	3020-01-214-7352	73342	23018070	.GEAR,SPUR	1
5	PADDD	4320-01-198-0497	73342	23018067	.COVER,HYDRAULIC PUM	1
6	XDDZZ		73342	23018068	..STRAINER ELEMENT,SE	1
7	PADZZ	3110-00-770-6097	24617	457249	..BEARING,ROLLER,NEED	2
8	XADZZ		73342	23018069	..COVER,OUT PUMP	1
9	PADZZ	5315-00-014-1195	24617	141195	..PIN,STRAIGHT,HEADLE	2
10	PADZZ	3040-01-214-3176	73342	23018065	.GEARSHAFT,SPUR	1
11	PADZZ	3020-01-214-9396	73342	23018066	.GEAR,SPUR	1
12	PADDD	4320-01-198-0496	73342	23018063	.COVER,HYDRAULIC,PUM	1
13	PADZZ	3110-00-770-6097	24617	457249	..BEARING,ROLLER,NEED	2
14	XADZZ		73342	23018064	..BODY,OUTPUT OIL	1
15	PAHZZ	5310-01-084-1197	24617	9422846	.WASHER,FLAT	1
16	PAHZZ	5305-01-126-4076	24617	9409224	.SCREW,CAP,HEXAGON	1
17	PADZZ	5305-00-638-2362	24617	9409225	.SCREW,CAP,HEXAGON	5
18	PADZZ	5310-01-084-1197	24617	9422846	.WASHER,FLAT	5
19	PAHZZ	5310-00-274-8041	90407	12084P11	.WASHER,FLAT	2
20	PAHZZ	5305-01-057-4264	24617	9409030	.SCREW,CAP,HEXAGON H	2

END OF FIGURE

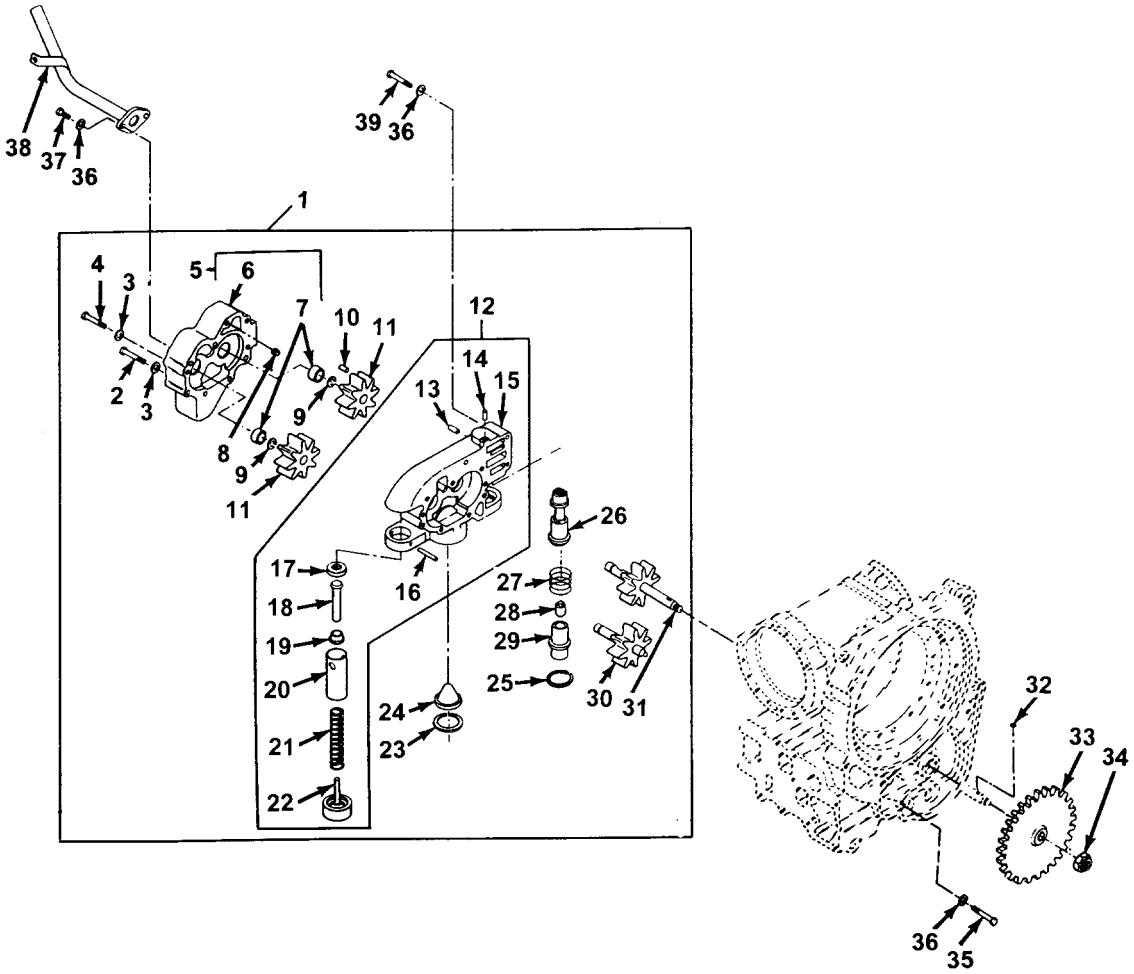


Figure 26. Scavenge and Input Pumps.

SCAVENGE AND INPUT PUMPS 0021 00

(1) Item NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 07 TRANSMISSION	
					GROUP 0721 COOLERS, PUMPS, MOTORS	
					FIG. 26 SCAVENGE AND INPUT PUMPS	
1	PAHDD	2520-01-251-5490	73342	23047907	PUMP ASSEMBLY,SCAVE	1
2	PADZZ	5305-01-126-4076	24617	9409224	.SCREW,CAP,HEXAGON	2
3	PADZZ	5310-01-084-1197	24617	9422846	.WASHER,FLAT	5
4	PADZZ	5306-01-263-2018	24617	9419287	.BOLT,MACHINE	3
5	PFDDD	2520-01-251-5491	73342	23047906	.COVER ASSY,PUMP	1
6	XADZZ		73342	23047905	..COVER,SCAVENGE	1
7	PADZZ	3110-00-120-3096	60380	B1210X0H	..BEARING,ROLLER,NEED	2
8	PADZZ	5365-01-259-9642	73342	23047877	..RING,TOLERANCE	1
9	PADZZ	5325-01-214-3265	73342	23046127	.RING,RETAINING	2
10	PADZZ	3110-01-277-2400	73342	23048680	.ROLLER,BEARING	1
11	PADZZ	3020-01-214-3935	73342	23046119	.GEAR,SPUR	2
12	PADDD	2520-01-235-9594	73342	23046125	.HOUSING ASSEMBLY,SC	1
13	PADZZ	5315-00-014-1195	24617	141195	..PIN,STRAIGHT,HEADLE	2
14	PADZZ	5315-00-014-1105	24617	141105	..PIN,STRAIGHT,HEADLE	1
15	XADZZ		73342	23046124	..HOUSING,SVC,IN PUMP	1
16	PADZZ	5315-01-205-5572	24617	273541	..PIN,SPRING	1
17	XDDZZ		73342	23045679	..SEAT,VALVE	1
18	XDDZZ		73342	23045681	..DISK VALVE	1
19	PADZZ	5365-01-215-7400	73342	23045680	..SPACER,SLEEVE	1
20	PADZZ	3120-01-216-3726	73342	23045682	..BUSHING,SLEEVE	1
21	PADZZ	5360-01-216-0831	73342	23045684	..SPRING,HELICAL,COMP	1
22	XDDZZ		73342	23045683	..COVER,HIGH PRESSURE	1
23	PAHZZ	5325-00-282-5312	96906	MS16625-162	.RING,RETAINING	1
24	XDHZZ		73342	23017974	.STRAINER ELEMENT,SE	1
25	PADZZ	5325-00-252-4746	96906	MS16625-150	.RING,RETAINING	1
26	PADZZ	2520-01-214-7166	73342	23017975	.CARTRIDGE,CHECK VAL	1
27	PADZZ	5360-01-231-0481	73342	6836136	.SPRING,HELICAL,COMP	V
27	PADZZ	5360-01-291-5626	73342	23049120	.SPRING,HELICAL,COMP	V
28	PADZZ	2520-01-214-1614	73342	23017978	.SLIDE,DIRECTIONAL C	1
29	PADZZ	2520-01-214-4318	73342	23017977	.HOUSING,REVERSE BOO	1
30	PADZZ	3040-01-214-3916	73342	23046121	.GEARSHAFT,SPUR	1
31	PADZZ	3040-01-214-3915	73342	23046120	.GEARSHAFT,SPUR	1
32	PAHZZ	5315-00-687-5218	96906	MS35756-3	KEY,WOODRUFF	1
33	PAHZZ	3020-01-215-8825	73342	23017877	GEAR,SPUR	1
34	PAHZZ	5310-00-402-5220	19207	11649930	NUT,SELF-LOCKING,HE	1
35	PAHZZ	5306-01-147-1202	73342	9431456	BOLT,SELF-LOCKING	7
36	PAHZZ	5310-01-084-1197	24617	9422846	WASHER,FLAT	11
37	PAHZZ	5306-01-241-5072	24617	9425096	BOLT	2
					(SUPERCEDED BY PN 9430182)	
37	PAHZZ		24617	9430182	BOLT	2
38	PAHZZ	4710-01-239-2199	73342	23046133	TUBE AND FITTINGS,M	1
39	PAHZZ	5306-00-543-5696	72582	9409126	BOLT,SELF-LOCKING	2

END OF FIGURE

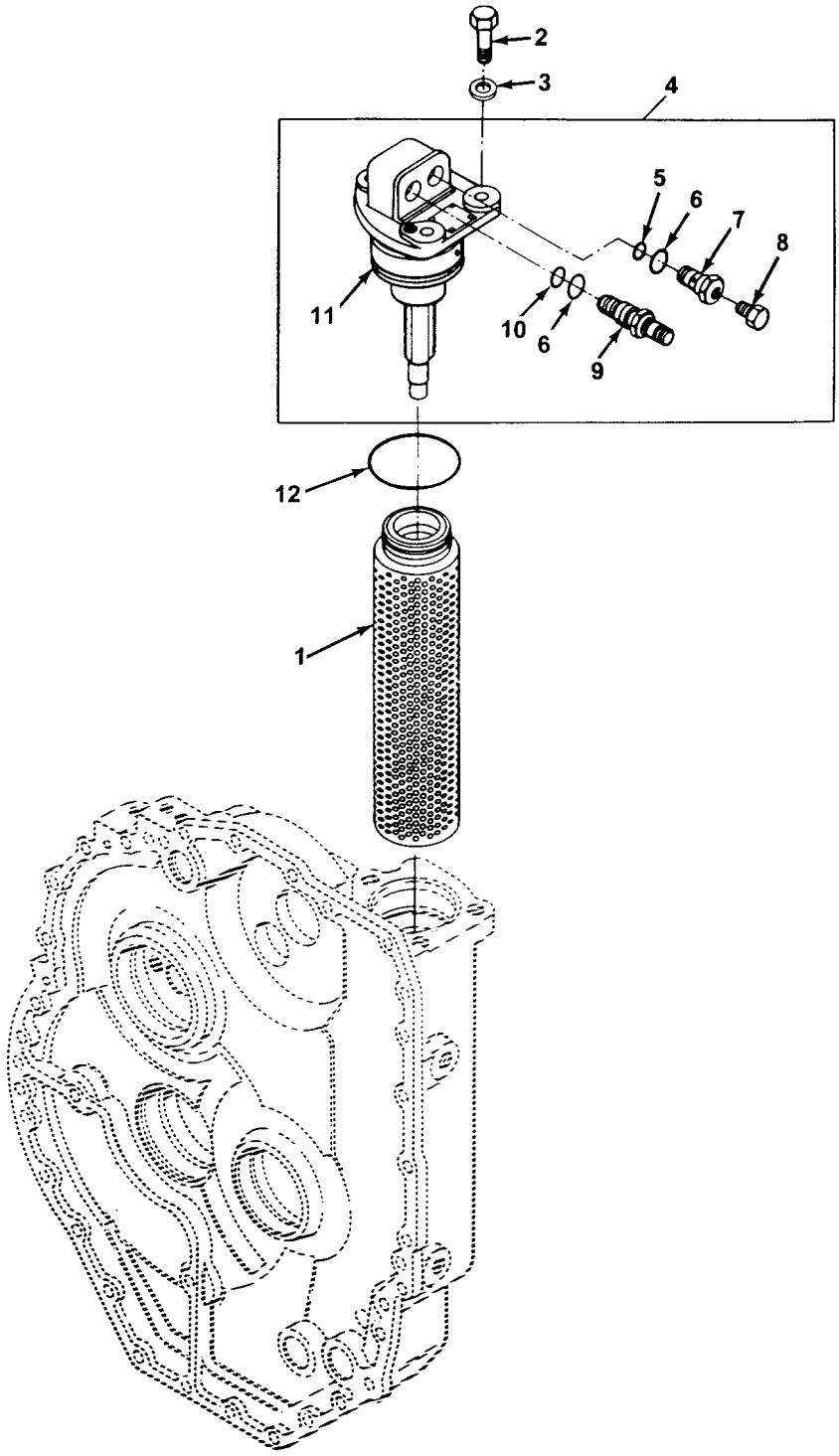


Figure 27. Filter Cover Assembly and Filter Element.

FILTER COVER ASSEMBLY AND FILTER ELEMENT 0021 00

(1) Item NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 07 TRANSMISSION	
					GROUP 0721 COOLERS, PUMPS, MOTORS	
					FIG. 27 FILTER COVER ASSEMBLY AND FILTER ELEMENT	
1	KFOZZ		73342	23017868	ELEMENT ASSY,FILTER (PART OF KIT PN 5703232)	1
2	PAOZZ	5306-01-216-1333	24617	9409082	BOLT,SELF-LOCKING	3
3	PAOZZ	5310-01-057-3111	78229	H-117-C	WASHER,FLAT	3
4	PAOZZ	2520-01-214-9338	73342	23045145	COVER ASSEMBLY,FILT	1
5	PAOZZ	5331-01-216-2816	73342	6836134	.O-RING	1
6	PAOZZ	5331-01-080-3254	73342	6882689	.O-RING	2
7	PAOZZ	4730-01-223-2518	73342	23046415	.BOLT,FLUID PASSAGE	1
8	PAOZZ	4730-01-221-7138	73342	23018206	.PLUG,PIPE (PRESSURE PORT, MAIN)	1
9	PAOZZ	5930-01-207-6350	98087	1500PT129	.SWITCH,PRESSURE-THE	1
10	PAOZZ	5331-00-166-0992	81349	M83248/1-016	.O-RING	1
11	PAOZZ	2940-01-224-4361	73342	23017875	.HEAD,FLUID FILTER	1
12	KFOZZ		73342	23018260	PACKING,PREFORMED (PART OF KIT PN 5703232)	2

END OF FIGURE

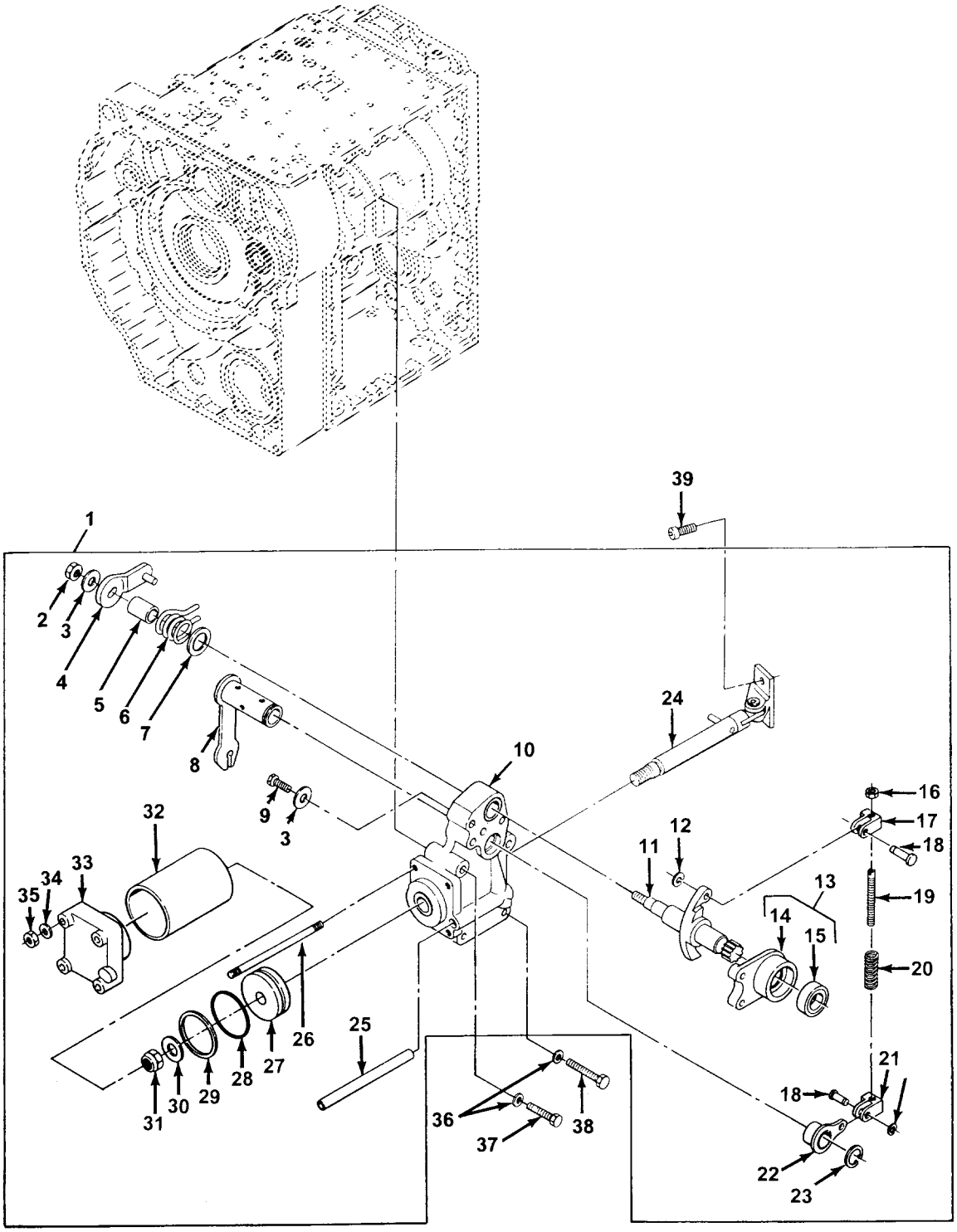


Figure 28. Steer Control Assembly.

STEER CONTROL ASSEMBLY 0021 00

(1) Item NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 07 TRANSMISSION	
					GROUP 0721 COOLERS, PUMPS, MOTORS	
					FIG. 28 STEER CONTROL ASSEMBLY	
1	ADHDD		90166	830710	CONTROL ASSY,STEER	1
2	PADZZ	5310-01-097-7994	90166	870705	.NUT,SELF-LOCKING,HE	1
3	PADZZ	5310-01-253-5930	90166	842894	.WASHER,FLAT	3
4	PADZZ	2520-01-238-8826	90166	830665	.LEVER,REMOTE CONTRO	1
5	PADZZ	3120-01-241-2851	90166	842633	.BUSHING,SLEEVE	1
6	PADZZ	5360-01-241-3264	90166	842669	.SPRING,HELICAL,TORS	1
7	PADZZ	5310-01-247-8212	90166	842635	.WASHER,FLAT	1
8	PADZZ	2520-01-235-9598	90166	830661	.VALVE ASSEMBLY,SERV	1
9	PADZZ	5305-00-638-2362	24617	9409225	.SCREW,CAP,HEXAGON H	2
10	PADZZ	2520-01-234-1898	90166	842690	.HOUSING,CONTROL (SUPERCEDED BY PN 3030071-001)	1
10	PADZZ	2520-01-K70-6301	90166	3030071-001	.HOUSING,CONTROL (UOC: X4A)	1
11	PADZZ	3040-01-240-3080	90166	842885	.SHAFT,SHOULDERED	1
12	PADZZ	5325-01-243-5289	90166	871941	.RING,RETAINING	2
13	PADDD	2520-01-235-9599	90166	830666	.RETAINER ASSEMBLY,S	1
14	XADZZ		90166	842683	..RETAINER,SEAL (MACH)	1
15	PADZZ	5330-00-003-0887	02892	870115	..SEAL,LIP,PLATE ASSY	1
16	PADZZ	5310-01-097-7957	90166	870561	.NUT,PLAIIN,HEXAGON	1
17	PADZZ	5340-01-244-1473	90166	842449	.CLEVIS,ROD END	1
18	PADZZ	5315-01-245-3673	90166	842451	.PIN,GROOVED,HEADED	2
19	PADZZ	5307-01-241-5173	90166	842638	.STUD,STEPPED	1
20	PADZZ	5360-01-241-3246	90166	842639	.SPRING,HELICAL,COMP	1
21	PADZZ	5340-01-242-7146	90166	842448	.CLEVIS,ROD END	1
22	PADZZ	2520-01-246-6418	90166	830713	.SLEEVE ASSEMBLY,VAL	1
23	PADZZ	5325-00-080-9091	79136	5108-87H	.RING,RETAINING	1
24	PADZZ	5340-01-241-4282	90166	830663	.CONNECTOR,ROD END	1
25	PADZZ	4710-01-238-8783	90166	842632	.TUBE,TRANSFER	1
26	PADZZ	5307-01-241-5172	90166	842637	.STUD,PLAIN	4
27	XBDZZ	5331-00-580-4394	90166	840297	.PISTON ASSY,PUMP	1
28	PADZZ	5331-00-580-4394	96906	MS28775-129	.O-RING	1
29	PADZZ	2520-01-238-8767	90166	871294	.RING,PISTON	1
30	PADZZ	5310-01-246-5785	90166	870539	.WASHER,FLAT	1
31	PADZZ	5310-01-241-2675	90166	870709	.NUT,SELF-LOCKING,HE	1
32	PADZZ	2990-01-238-8831	90166	842634	.CYLINDER,SLEEVE	1
33	PBDZZ	5340-01-242-2796	90166	842666	.COVER,ACCESS	1
34	PADZZ	5310-01-241-2687	90166	842461	.WASHER,FLAT	4
35	PADZZ	5310-01-241-2676	90166	870703	.NUT,SELF-LOCKING,HE	4
36	PAHZZ	5310-01-253-5930	90166	842894	WASHER,FLAT	4
37	PAHZZ	5306-01-164-7448	24617	9409621	BOLT,SELF-LOCKING	2
38	PAHZZ	5306-00-944-6812	24617	9409014	BOLT,SELF-LOCKING	2
39	PAHZZ	5305-00-001-5017	90166	870888	SCREW,CAP,SOCKET HE	2

END OF FIGURE

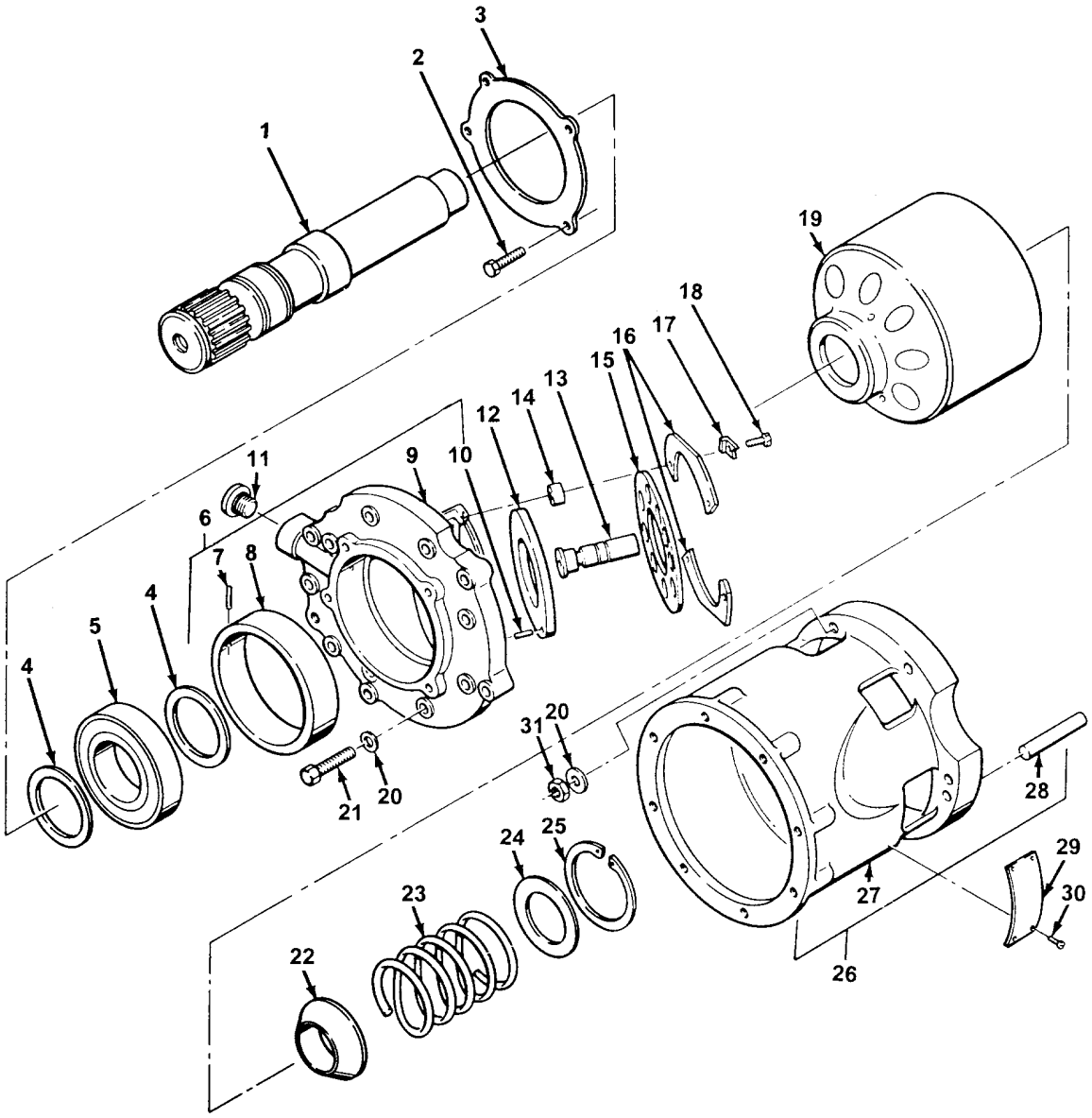


Figure 29. Motor Component Parts.

MOTOR COMPONENT PARTS 0021 00

(1) Item NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 07 TRANSMISSION	
					GROUP 0721 COOLERS, PUMPS, MOTORS	
					FIG. 29 MOTOR COMPONENT PARTS	
1	PADZZ	3040-01-238-8773	90166	842679	SHAFT,MOTOR	1
2	PADZZ	5306-00-940-9011	24617	9409011	BOLT,SELF-LOCKING	4
3	PADZZ	3110-01-241-2943	90166	842657	PLATE,RETAINING,BEA	1
4	PADZZ	5325-00-498-2864	90166	870102	RING,RETAINING	2
5	PADZZ	3110-00-554-3248	90166	870642	BEARING,BALL,ANNULA	1
6	PADDD	3040-01-235-9644	90166	842688	HEAD,HYDRAULIC MOTO	1
7	PADZZ	5315-01-258-1497	90166	870068	.PIN,SPRING	1
8	XADZZ		90166	842642	.BUSHING,SLEEVE	1
9	XADZZ		90166	850236	.FLANGE,MOUNTING	1
10	PADZZ	5315-01-371-8568	90166	873173	.PIN,STRAIGHT,HEADLE	1
11	PADZZ	5365-01-247-6952	90166	873017	PLUG,MACHINE THREAD	1
12	PADZZ	4320-01-372-7368	90166	843095	PLATE,CAM, PUMP	1
13	XDDZZ		90166	830692	PISTON ASSEMBLY (SUPERCEDED BY PN 940734)	9
13	PADZZ	2520-01-467-9005	90166	940734	PISTON ASSEMBLY	9
14	PADZZ	5365-01-242-0828	90166	842626	SPACER,SLEEVE	4
15	XBDZZ		90166	940735	PLATE,PISTON,PUMP	1
16	PADZZ	5340-01-372-3558	90166	843090	CLIP,RETURN,PLATE	2
17	PADZZ	5310-00-562-3932	90166	841163	WASHER,KEY	4
18	PADZZ	5306-01-017-9962	90166	870151	BOLT	4
19	PADZZ	3040-01-241-6851	90166	841665	CYLINDER,ACTUATING	1
20	PADZZ	5310-01-280-5798	90166	843003	WASHER,FLAT	14
21	PADZZ	5306-01-083-6443	96906	MS35764-236	BOLT,SELF-LOCKING	8
22	PADZZ	2520-01-241-5636	90166	842742	RETAINER,SHAFT,HELICAL C	1
23	PADZZ	5360-00-909-0313	90166	840022	SPRING,STEERING,GEA	1
24	PADZZ	5310-00-935-9041	90166	840023	WASHER,FLAT	1
25	PADZZ	5365-00-152-0311	02892	870103	RING	1
26	PADDD	2520-01-235-9597	90166	830664	HOUSING,ASSEMBLY,MO	1
27	XADZZ		90166	842689	.HOUSING,MOTOR (MACH)	1
28	PADZZ	5315-00-819-6282	96906	MS16555-61	.PIN,STRAIGHT,HEADLE	2
29	XADZZ		90166	842702	NAMEPLATE (SEE FIG 11 FOR NEXT HIGHER ASSEMBLY)	1
30	XADZZ		90166	872885	SCREW,DRIVE (PROVIDED WITH NAMEPLATE)	4
31	PADZZ	5310-01-241-2677	90166	842627	NUT,SELF-LOCKING,HE	6

END OF FIGURE

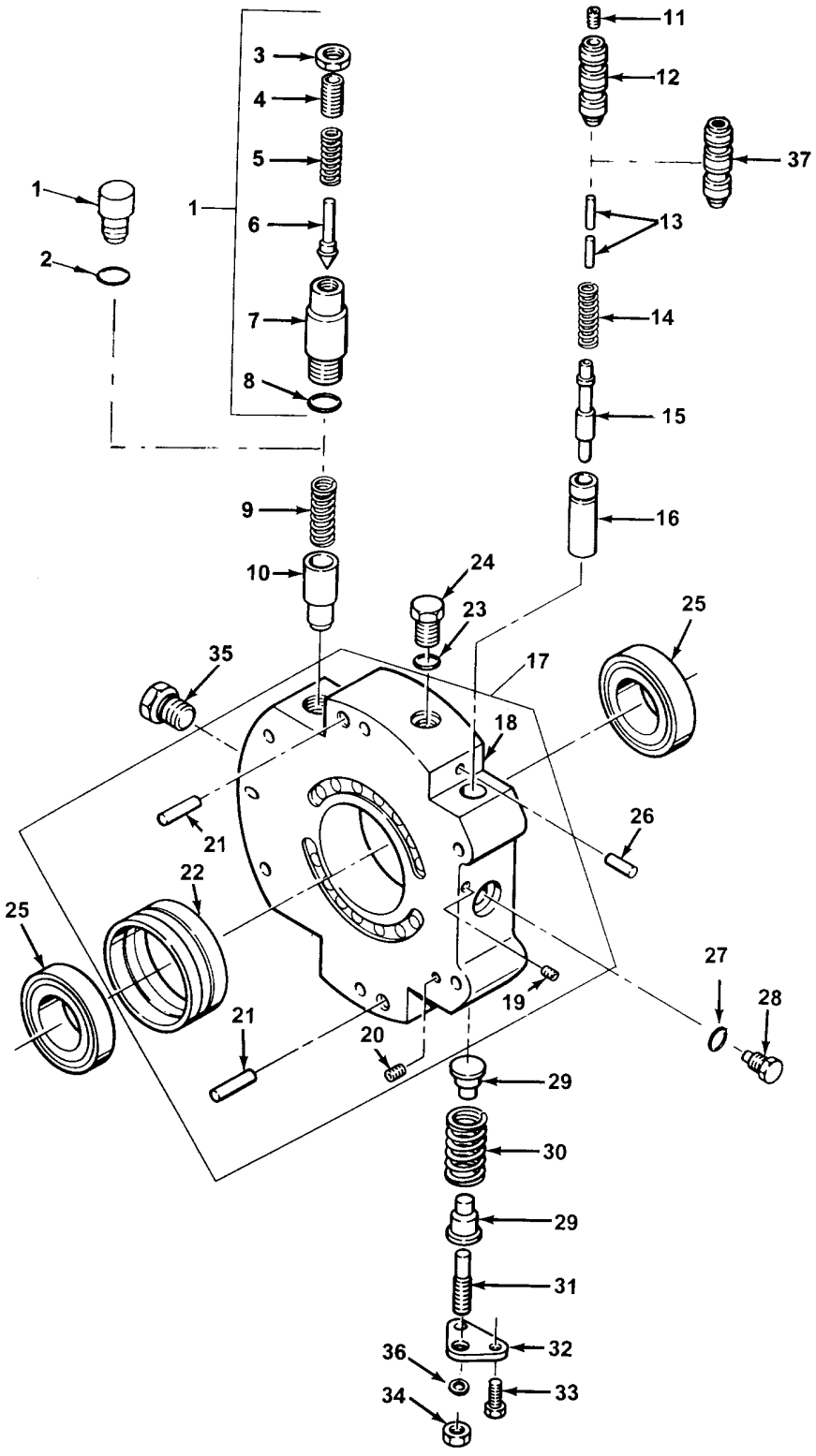


Figure 30. Manifold Component Parts.

MANIFOLD COMPONENT PARTS 0021 00

(1) Item NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 07 TRANSMISSION	
					GROUP 0721 COOLERS, PUMPS, MOTORS	
					FIG. 30 MANIFOLD COMPONENT PARTS	
1	PADZZ	4820-01-238-7961	90166	830659	BODY,VALVE (USE WITH PUMP AND MOTOR ASSY PN 893025) (UOC: XTZ)	2
1	PADZZ	5365-00-792-0809	90166	840037	PLUG,MACHINE THREAD (USE WITH PUMP AND MOTOR ASSY PN 893038) (UOC: X4A)	2
2	PADZZ	5330-00-152-3049	02892	871908	PACKING (USE WITH PUMP AND MOTOR PN 893038) (UOC: X4A)	2
3	XBDZZ		90166	871298	.NUT,PLAIN,HEXAGON (UOC: XTZ)	1
4	XBDZZ		90166	842705	.SETSCREW (UOC: XTZ)	1
5	XDDZZ		90166	841233	.SPRING,HELICAL,COMP (UOC: XTZ)	1
6	XDDZZ		90166	842430	.VALVE,PILOT (UOC: XTZ)	1
7	XADZZ		90166	842650	.PLUG,CHECK VALVE (UOC: XTZ)	1
8	PADZZ	5330-00-152-3049	02892	871908	.PACKING (UOC: XTZ)	1
9	PADZZ	5360-00-169-8367	02892	840036	SPRING,SPECIAL	2
10	PADZZ	5340-01-250-5545	90166	842649	PLUNGER,DETENT (USE WITH PUMP AND MOTOR ASSY PN 893025) (UOC: XTZ)	2
10	PADZZ	5340-01-376-4633	90166	840035	PLUNGER,DETENT (USE WITH PUMP AND MOTOR ASSY PN 893038) (UOC: X4A)	2
11	XBDZZ		02892	872492	PLUG,PIPE (REPLACED BY PN 940968)	1
12	PADZZ	2520-01-241-7029	90166	842651	BODY,PRESSURE,TRANS (REPLACED BY PN 940968)	1
13	XDDZZ		90166	871049	PIN,STRAIGHT,HEADLE	2
14	PADZZ	5360-01-249-0611	90166	840687	SPRING,HELICAL,COMP	1
15	PADZZ	4810-01-238-9855	90166	842063	SLIDE,DIRECTIONAL C	1
16	PADZZ	2520-01-238-8784	90166	842171	SLEEVE,VALVE	1
17	PADDD	2520-01-239-6835	90166	842697	MANIFOLD ASSEMBLY (USE WITH PUMP AND MOTOR ASSY PN 893025) (UOC: XTZ)	1
17	PADDD	4730-01-375-7411	90166	843247	MANIFOLD,HYDRAULIC (USE WITH PUMP AND MOTOR ASSY PN 893038) (REPLACED BY PN 3030072-001) (UOC: X4A)	1

MANIFOLD COMPONENT PARTS 0021 00

(1) Item NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
17	PADDD	4730-01-375-7411	62983	3030072-001	MANIFOLD,HYDRAULIC (USE WITH PUMP AND MOTOR ASSY PN 893038) (UOC: X4A)	1
18	XADZZ		90166	850231	.MANIFLOD (USE WITH PUMP AND MOTOR ASSY PN 893025 AND 893038)	1
19	PADZZ	5305-01-245-8750	90166	872994	.SCREW,SET (QUANTITY 2, MAY BE A COMBINATION OF 2 EA PN 872994 OR 0 EA PN 872944 AND 2 EA PN 872992 OR 2 EA PN PLGA2180020A. TOTAL QUANTITY BETWEEN ITEMS 18 & 19 EQUAL 4 EA) (PN 872994 SUPERCEDED BY PN 872992. PN 872992 SUPERCEDED BY PN PLGA2180020A)	2
19	PADZZ	5340-01-119-6092	92555	PLGA2180020A	.PLUG ASSEMBLY,SEALI	2
20	PADZZ	5305-01-259-2442	90166	872992	.SETSCREW (QUANTITY 2 MAY BE A COMBINATION OF 2 EA PN 872992 OR 2 EA PN PLGA1561020A. TOTAL QUANTITY BETWEEN ITEMS 18 & 19 EQUAL 4 EA) (PN 872992 SUPERCEDED BY PN PLGA1561020A)	2
20	XDDZZ		92555	PLGA1561020A	.PLUG,PROTECTIVE DUS	2
21	XADZZ		90166	842704	.BUSHING,SLUG	2
22	XADZZ		90166	842648	.DISTRIBUTOR,CHARGE	1
23	PADZZ	5330-01-250-0651	90166	871904	PACKING,PREFORMED	2
24	PADZZ	5365-00-610-6325	02892	840146	PLUG	2
25	XBDZZ		90166	872821	BEARING,ROLLER,CYLI	2
26	PFDZZ	5315-00-926-5866	96906	MS9390-440	PIN,STRAIGHT,HEADLE	1
27	PADZZ	5331-01-256-6894	90166	871902	O-RING	1
28	PADZZ	5365-01-269-2676	90166	842653	PLUG,MACHINE THREAD	1
29	XBDZZ		90166	840206	SEAT,HELICAL,COMPRE	2
30	PADZZ	5360-01-241-3247	90166	840726	SPRING,HELICAL,COMP	1
31	XDDZZ		90166	843142	KEY SET,SOCKET HEAD (SUPERCEDED BY PN 940736)	1
31	XDDZZ		90166	940736	SETSCREW	1
32	PADZZ	2520-01-288-1959	90166	843141	CAP,PRESSURE ADJUST	1
33	PADZZ	5305-00-813-4495	19207	9409088	SCREW,CAP,SOCKET HE	2
34	PADZZ	5310-01-329-8189	90166	870861	NUT,PLAIN,HEXAGON	1
35	PADZZ	5365-01-247-6952	90166	873017	PLUG,MACHINE,THREAD	1
36	PADZZ	5310-01-509-2815	90166	940738	WASHER,HIGH,STRENGT	1
37	PADZZ	2520-01-508-0138	90166	940968	BODY,PRESSURE,TRANS	1

END OF FIGURE

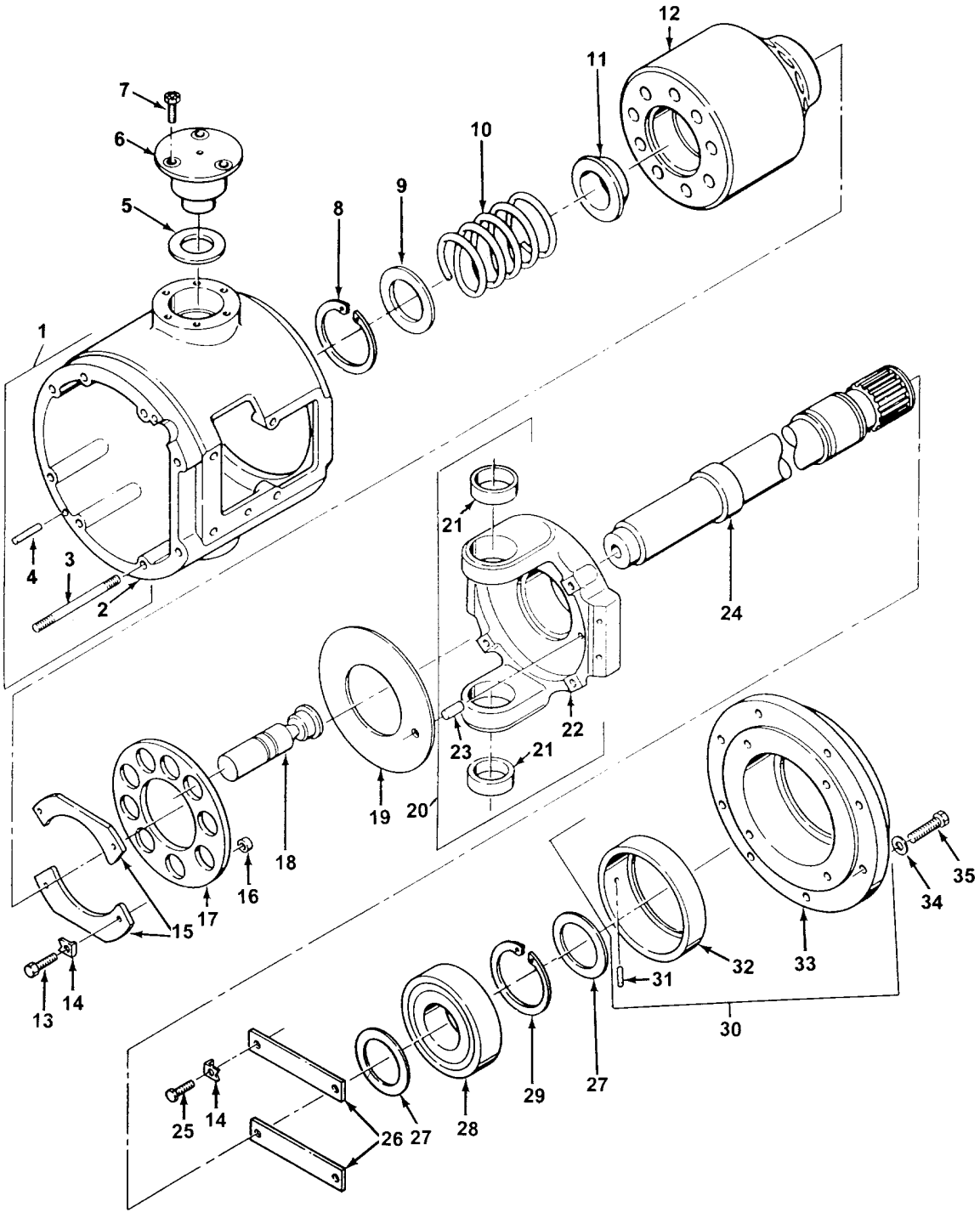


Figure 31. Pump Component Parts.

PUMP COMPONENT PARTS 0021 00

(1) Item NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 07 TRANSMISSION	
					GROUP 0721 COOLERS, PUMPS, MOTORS	
					FIG. 31 PUMP COMPONENT PARTS	
1	PADDD	2520-01-255-3350	90166	830824	HOUSING ASSEMBLY, PU	1
2	XADZZ		90166	843088	.HOUSING (MACH)	1
3	PADZZ	5307-01-241-5171	90166	842623	.STUD,PLAIN	6
4	PADZZ	5315-00-819-6282	96906	MS16555-61	.PIN,STRAIGHT,HEADLE	2
5	PADZZ	3120-00-104-0635	90166	840029	BEARING,WASHER,THRU	2
6	PADZZ	3040-01-241-5567	90166	842678	CAM, CONTROL	2
7	XBDZZ		24617	9409067	BOLT	6
8	PADZZ	5365-00-152-0311	02892	870103	RING	1
9	PADZZ	5310-00-935-9041	90166	840023	WASHER,FLAT	1
10	PADZZ	5360-00-909-0313	90166	840022	SPRING,STEERING GEA	1
11	PADZZ	2520-01-241-5636	90166	842742	RETAINER,HELICAL,CO	1
12	PADZZ	3040-01-241-6851	90166	841665	CYLINDER,ACTUATING	1
13	PADZZ	5306-00-169-8389	90166	870181	BOLT	4
14	PADZZ	5310-00-562-3932	02892	841163	WASHER,KEY	8
15	PADZZ	5340-01-372-3558	90166	843090	CLIP,RETURN,PLATE	2
16	PADZZ	5365-01-242-0827	90166	842621	SPACER,SLEEVE	4
17	XBDZZ		90166	940735	PLATE,PISTON,PUMP	1
18	XDDZZ		90166	830692	PISTON ASSEMBLY (SUPERCEDED BY PN 940734)	9
18	PADZZ	2520-01-467-9005	90166	940734	PISTON ASSEMBLY	9
19	PADZZ	4320-01-372-7368	90166	843095	PLATE,CAM, PUMP	1
20	PADDD	3040-01-372-5309	90166	830724	CAM,CONTROL	1
21	PADZZ	3110-00-690-8987	90166	870647	.BEARING,ROLLER,CYLI	2
22	XADZZ		90166	842999	.CAM (MACH)	1
23	PADZZ	5315-01-371-8568	90166	873173	.PIN,STRAIGHT,HEADLE	1
24	PADZZ	3040-01-241-4695	90166	842675	SHAFT,SHOULDERED	1
25	PADZZ	5305-01-097-7827	02892	870140	SCREW,CAP,HEXAGON H (UOC: XTZ) (USE WITH PUMP AND MOTOR ASSY PN 893025)	4
26	PADZZ	5365-01-245-4124	90166	842618	SPACER,PLATE (UOC: XTZ) (USE WITH PUMP AND ASSY PN 893025)	2
27	PADZZ	5325-00-498-2864	90166	870102	RING,RETAINING	2
28	PADZZ	3110-00-554-3248	90166	870642	BEARING,BALL,ANNULA	1
29	PADZZ	5365-01-500-3607	90166	870104	SPRING,RETAINING (USE WITH PUMP AND ASSY PN 893038)	1
30	PADDD	3040-01-239-6930	90166	842684	HEAD,HYDRAULIC MOTO (UOC: XTZ) (USE WITH PUMP AND ASSY PN 893025)	1
30	PADZZ	4320-01-375-8130	90166	843211	HEAD,HYDRAULIC MOTO (USE WITH PUMP AND ASSY PN 893038)	1

PUMP COMPONENT PARTS 0021 00

(1) Item NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
31	PADZZ	5315-01-258-1497	90166	870068	.PIN,SPRING (UOC: XTZ) (USE WITH HEAD, HYDRAULIC MOTO PN 842684)	1
32	PADZZ	3120-01-241-2850	90166	842642	.BUSHING,SLEEVE (UOC: XTZ) (USE WITH HEAD, HYDRAULIC MOTO PN 842684)	1
33	XADZZ		90166	850233	FLANGE,MOUNTING (UOC: XTZ) (USE WITH HEAD, HYDRAULIC MOTO PN 842684)	1
34	PADZZ	5310-01-280-5798	90166	843003	WASHER,FLAT	8
35	PADZZ	5305-01-057-4264	63005	9409030	SCREW,CAP,HEXAGON H	8

END OF FIGURE

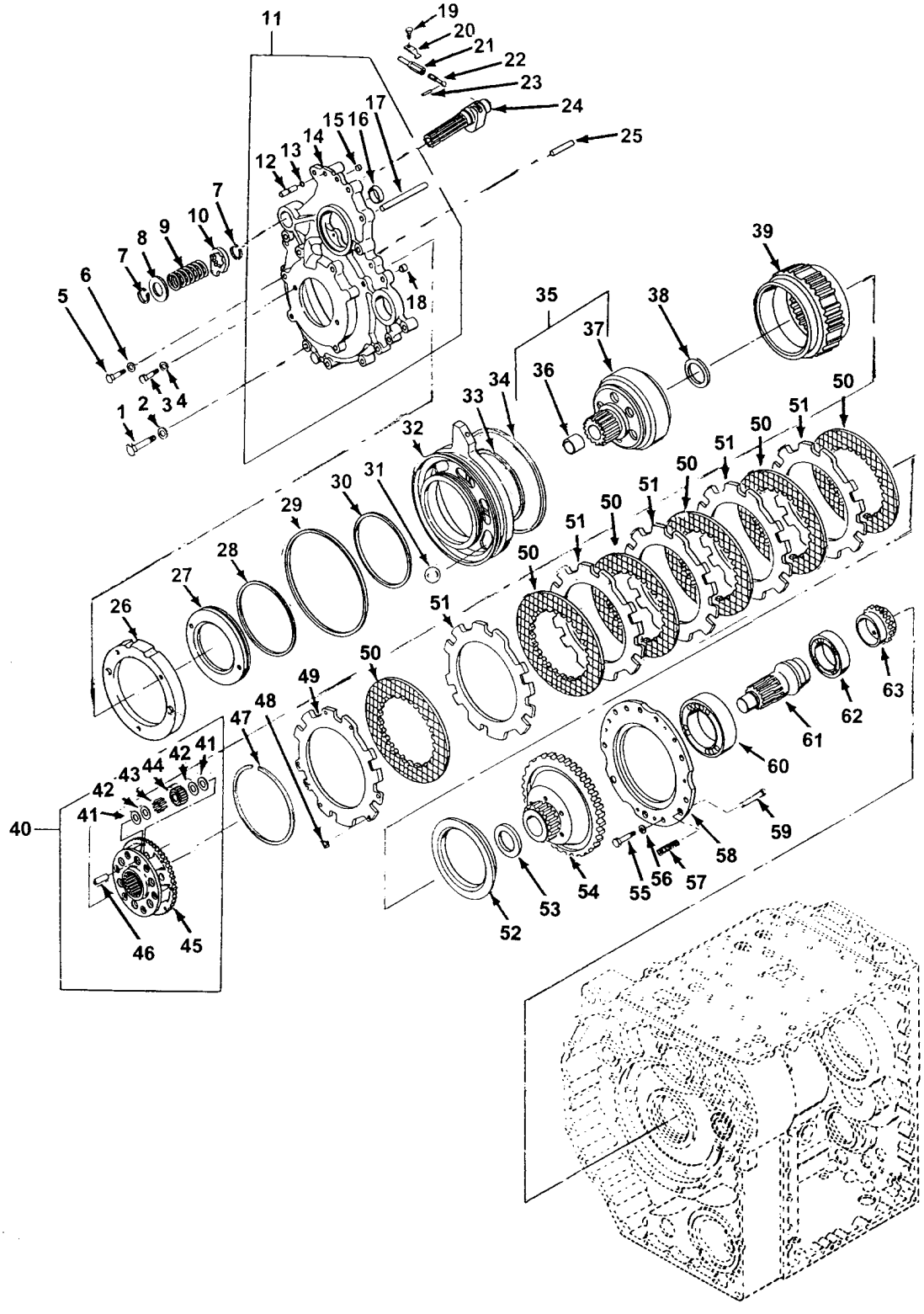


Figure 32. Left Hand Brake and Output Carrier.

LEFT HAND BRAKE AND OUTPUT CARRIER 0021 00

(1) Item NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 07 TRANSMISSION	
					GROUP 0726 BRAKES	
					FIG. 32 LEFT HAND BRAKE AND OUTPUT CARRIER	
1	PAHZZ	5306-00-843-6398	24617	9416011	BOLT,SELF-LOCKING	15
2	PAHZZ	5310-01-092-5495	24617	9422848	WASHER,FLAT	15
3	PAHZZ	5306-01-274-6483	24617	9409074	BOLT,MACHINE	2
4	PAHZZ	5310-01-092-5496	24617	9422845	WASHER,FLAT	2
5	PAHZZ	5305-00-125-9966	63005	9409012	SCREW,CAP,SOCKET HE	3
6	PAHZZ	5310-01-084-1197	24617	9422846	WASHER,FLAT	3
7	PAHZZ	5325-00-770-7326	63005	7707326	RING,RETAINING	2
8	PAHZZ	3110-01-216-1366	73342	23018148	WASHER,FLAT	1
9	PAHZZ	5360-01-215-9935	73342	23018146	SPRING,HELICAL,TORS	1
10	PAHZZ	3040-01-214-1606	73342	23018145	CAM,CONTROL	1
11	PAHHH	2530-01-217-8136	73342	23018029	SPIDER,BRAKE (UOC: XTZ) (SUPERCEDED BY (PN 29510174)	1
11	PAHHH	2530-01-389-7353	73342	29510174	SPIDER,BRAKE	1
12	XDHZZ		73342	23018280	.PIN,STRAIGHT,HE	2
13	PAHZZ	5325-01-216-1705	73342	23018281	.RING,RETAINING	2
14	XAHZZ		73342	23018030	.SUPPORT,LH BRAKE (UOC: XTZ) (USE WITH PN 23018029)	1
14	XAHZZ		73342	29510175	.SUPPORT,LH BRAKE (USE WITH PN 29510174)	1
15	PAHZZ	4820-01-213-0035	73342	23045348	.PLUG,VALVE	1
16	PAHZZ	3110-00-277-0559	60380	B-188	.BEARING,ROLLER,NEED	1
17	PAHZZ	5315-01-215-7514	73342	23018031	.PIN,STRAIGHT,HEADLE	1
18	PAHZZ	5315-00-014-1275	24617	141275	.PIN,STRAIGHT,HEADLE	2
19	PAHZZ	5305-00-206-1533	24617	9409072	SCREW,CAP,HEXAGON H	1
20	PAHZZ	5340-01-216-3299	73342	23018144	CLIP,SPRING TENSION	2
21	PAHZZ	2520-01-214-3867	73342	23018143	LINK,BRAKE ADJUSTIN	1
22	PAHZZ	2520-01-214-3866	73342	23018142	LINK,BRAKE ADJUSTIN	1
23	XBHZZ		24617	455675	PIN,SPRING	1
24	PAHZZ	3040-01-214-1604	73342	23018023	CAM,CONTROL	1
25	PAHZZ	5315-01-217-3032	73342	23018114	PIN,STRAIGHT,HEADLE	4
26	PAHZZ	3040-01-214-3864	73342	23018110	CAM,BRAKE APPLY-STA	1
27	PAHZZ	5330-01-217-4048	73342	23018109	RETAINER,PACKING	1
28	PAHZZ	5330-01-218-1565	73342	6836113	SEAL RING,METAL	1
29	PAHZZ	5330-01-215-9503	73342	6836128	SEAL RING,METAL	1
30	PAHZZ	5325-01-215-9687	73342	6836127	RING,RETAINING (SEAL RING)	1
31	PAHZZ	3110-00-100-6170	72582	453621	BALL,BEARING	8
32	PAHZZ	2520-01-214-3865	73342	23018083	CAM,BRAKE,TRANSMISS	1
33	PAHZZ	5330-01-238-5879	73342	23046647	GASKET	1
34	PAHZZ	5331-01-237-2967	73342	23046648	O-RING	1
35	PAHDD	3020-01-198-0690	73342	23018014	GEAR CLUSTER	1
36	PADZZ	3120-01-216-1423	73342	23018008	.BEARING,SLEEVE	1
37	XAHZZ		73342	23018015	.GEAR,STR RING	1
38	PAHZZ	3120-01-216-1440	73342	23018237	BEARING,WASHER,THRU	1

LEFT HAND BRAKE AND OUTPUT CARRIER 0021 00

(1) Item NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
39	PAHZZ	2520-01-214-3863	73342	23018078	DRUM,BRAKE CLUTCH	1
40	PAHDD	2520-01-198-0502	73342	23018275	CARRIER ASSEMBLY (UOC: XTZ)	1
40	XDHDD		73342	29510172	CARRIER ASSEMBLY (UOC: X4A)	1
41	KDDZZ	3120-01-152-1051	73342	6839514	.BEARING,WASHER,THRU (PART OF KIT PN 5703231) (UOC: XTZ)	12
41	KDDZZ		73342	29510173	.BEARING,WASHER,THRU (POLYAMIDE) (PART OF KIT PN 12371042) (UOC: X4A)	12
42	KDDZZ	5310-01-113-0992	73342	6833991	.WASHER,PIN THRUST (PART OF KIT PN 5703231) (PART OF KIT PN 12371042)	12
43	KDDZZ	3110-01-006-9129	60380	Q8036	.ROLLER,BEARING (PART OF KIT PN 5703231) (PART OF KIT PN 12371042)	120
44	KDDZZ		73342	23045484	.PINION ASSY,MATCHED (6 GEARS PN 6834310) (PART OF KIT PN 5703231) (PART OF KIT PN 12371042)	1
45	XDDZZ		73342	23018276	.FLANGE AND CARRIER	1
46	KDDZZ	3040-01-108-7761	73342	6834309	.SHAFT,STRAIGHT (PART OF KIT PN 5703231) (PART OF KIT PN 12371042)	6
47	PAHZZ	5325-01-217-2303	73342	6836110	RING,RETAINING	1
48	PAHZZ	5325-00-720-8064	02978	ERNB260	RING,RETAINING	6
49	PAHZZ	2520-01-214-9408	73342	23018082	DISK,CLUTCH	1
50	PAHZZ	2520-01-214-9385	73342	23046537	PRESSURE PLATE ASSE	6
51	PAHZZ	2520-01-246-2952	73342	23046681	DISK,CLUTCH	5
52	PAHZZ	5330-01-216-7424	73342	23018080	SEAL,BRAKE COOLANT	1
53	PAHZZ	3120-01-216-1439	73342	23018236	BEARING,WASHER,THRU	1
54	PAHZZ	3020-01-215-3345	73342	23018108	GEAR CLUSTER	1
55	PAHZZ	5306-00-940-9028	72582	9409028	BOLT,SELF-LOCKING	5
56	PAHZZ	5310-00-776-7670	73342	6769636	WASHER,FLAT	5
57	PAHZZ	5360-01-216-3269	73342	23018081	SPRING,HELICAL,COMP	6
58	PAHZZ	3040-01-214-5792	73342	23018079	PLATE,BACKING,BRAKE	1
59	XBHZZ		73342	23018156	PIN,STRAIGHT,HEADLE	6
60	PAHZZ	3110-01-216-4032	82994	BS226350	BEARING,ROLLER,CYLI	1
61	PAHZZ	3040-01-214-3841	73342	23018105	SHAFT,SHOULDERED (UOC: XTZ)	1
61	PAHZZ	3040-01-214-3841	73342	29510170	SHAFT,SHOULDERED (UOC: X4A)	1
62	PAHZZ	3110-00-144-8571	38443	114KS	BEARING,BALL,ANNULA	1
63	PAHZZ	3020-01-215-8826	73342	23018071	GEAR,SPUR	1

END OF FIGURE

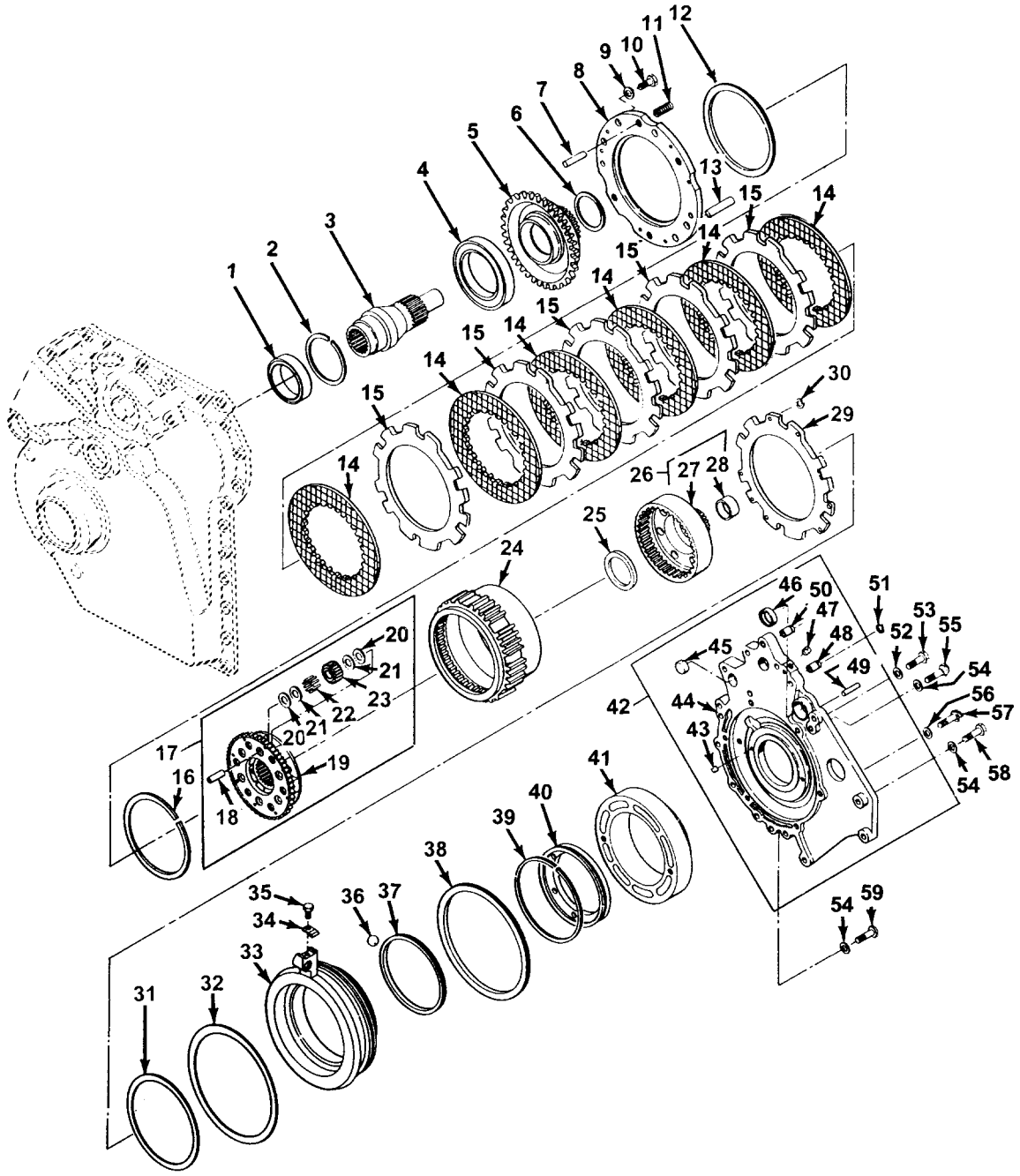


Figure 33. Right Hand Brake and Output Carrier.

RIGHT HAND BRAKE AND OUTPUT CARRIER 0021 00

(1) Item NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 07 TRANSMISSION	
					GROUP 0726 BRAKES	
					FIG. 33 RIGHT HAND BRAKE AND OUTPUT CARRIER	
1	PAHZZ	3110-00-592-9967	40152	SK200-37	BEARING,BALL,ANNULA	1
2	PAHZZ	5325-01-217-2069	73342	23045232	RING,RETAINING	1
3	PAHZZ	3040-01-217-1122	73342	23017955	SHAFT,SHOULDERED	1
4	PAHZZ	3110-01-216-4032	82994	BS226350	BEARING,ROLLER,CYLI	1
5	PAHZZ	3020-01-214-9400	73342	23018107	GEAR CLUSTER	1
6	PAHZZ	3120-01-216-1439	73342	23018236	BEARING,WASHER,THRU	1
7	XBHZZ		73342	23018156	PIN,STRAIGHT,HEADLE	6
8	PAHZZ	3040-01-214-5792	73342	23018079	PLATE,BACKING,BRAKE	1
9	PAHZZ	5310-00-776-7670	73342	6769636	WASHER,FLAT	4
10	PAHZZ	5306-00-940-9028	24617	9409028	BOLT,SELF-LOCKING	4
11	PAHZZ	5360-01-216-3269	73342	23018081	SPRING,HELICAL,COMP	6
12	PAHZZ	5330-01-216-7424	73342	23018080	SEAL,BRAKE COOLANT	1
13	PAHZZ	5315-01-217-3032	73342	23018114	PIN,STRAIGHT,HEADLE	4
14	PAHZZ	2520-01-214-9385	73342	23046537	PRESSURE PLATE ASSE	6
15	PAHZZ	2520-01-246-2952	73342	23046681	DISK,CLUTCH	5
16	PAHZZ	5325-01-217-2303	73342	6836110	RING,RETAINING	1
17	PAHDD	2520-01-198-0502	73342	23018275	CARRIER ASSEMBLY (UOC: XTZ)	1
17	XDHDD		73342	29510172	CARRIER ASSEMBLY (UOC: X4A)	1
18	KDDZZ	3040-01-108-7761	73342	6834309	.SHAFT,STRAIGHT (PART OF KIT PN 5703231) (PART OF KIT PN 12371042)	1
19	XDDZZ		73342	23018276	.FLANGE AND CARRIER	1
20	KDDZZ	3120-01-152-1051	73342	6839514	.BEARING,WASHER,THRU (PART OF KIT PN 5703231) (UOC: XTZ)	12
20	KDDZZ		73342	29510173	.BEARING,WASHER,THRU (PART OF KIT PN 12371042) (UOC: X4A)	12
21	KDDZZ	5310-01-113-0992	73342	6833991	.WASHER,PIN THRUST (PART OF KIT PN 5703231) (PART OF KIT PN 12371042)	12
22	KDDZZ	3110-01-006-9129	60380	Q8036	.ROLLER,BEARING (PART OF KIT PN 5703231) (PART OF KIT PN 12371042)	120
23	KDDZZ		73342	23045484	.PINION ASSY,MATCHED (6 GEARS PN 6834310) (PART OF KIT PN 5703231) (PART OF KIT PN 12371042)	1
24	PAHZZ	2520-01-214-3863	73342	23018078	.DRUM,BRAKE CLUTCH	1
25	PAHZZ	3120-01-216-1440	73342	23018237	BEARING,WASHER,THRU	1
26	PAHDD	3020-01-198-0690	73342	23018014	GEAR,CLUSTER	1
27	XAHZZ		73342	23018015	.GEAR,STR RING	1
28	PADZZ	3120-01-216-1423	73342	23018008	.BEARING,SLEEVE	1
29	PAHZZ	2520-01-214-9408	73342	23018082	DISK,CLUTCH	1

RIGHT HAND BRAKE AND OUTPUT CARRIER 0021 00

(1) Item NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
30	PAHZZ	5325-00-720-8064	02978	ERNB260	RING,RETAINING	6
31	PAHZZ	5330-01-238-5879	73342	23046647	GASKET	1
32	PAHZZ	5331-01-237-2967	73342	23046648	O-RING	1
33	PAHZZ	2520-01-214-3865	73342	23018083	CAM,BRAKE,TRANSMISS	1
34	PAHZZ	5340-01-216-3299	73342	23018144	CLIP,SPRING TENSION	2
35	PAHZZ	5305-00-206-1533	24617	9409072	SCREW,CAP,HEXAGON H	1
36	PAHZZ	3110-00-100-6170	72582	453621	BALL,BEARING	8
37	PAHZZ	5325-01-215-9687	73342	6836127	RING,RETAINING	1
38	PAHZZ	5330-01-215-9503	73342	6836128	SEAL RING,METAL	1
39	PAHZZ	5330-01-218-1565	73342	6836113	SEAL RING,METAL	1
40	PAHZZ	5330-01-217-4048	73342	23018109	RETAINER,PACKING	1
41	PAHZZ	3040-01-214-3864	73342	23018110	CAM,BRAKE APPLY-STA	1
42	PAHHH	2530-01-213-1626	73342	23018037	SUPPORT ASSEMBLY,BR (SUPERCEDED BY PN 29510214) (UOC: XTZ)	1
42	PAHHH	2530-01-213-1626	73342	29510214	SPIDER,BRAKE	1
43	PAHZZ	5315-00-014-1275	24617	141275	.PIN,STRAIGHT,HEADLE	2
44	XAHZZ		73342	23018038	.SUPPORT,RH BRK (USE WITH PN 23018037) (UOC: XTZ)	1
44	XAHZZ		73342	29510215	.SUPPORT,RH BRAKE (USE WITH PN 29510214)	1
45	XAHZZ		73342	23018028	.BUSHING BLANK	1
46	PAHZZ	3110-00-277-0559	60380	B-188	.BEARING,ROLLER,NEED	1
47	PAHZZ	4730-00-808-6814	15434	C0505027400	.PLUG,PIPE	1
48	PBHZZ	4730-01-214-2366	73342	23018039	.COUPLING,TUBE	1
49	PAHZZ	5315-01-215-7514	73342	23018031	.PIN,STRAIGHT,HEADLE	1
50	PAHZZ		73342	29510216	.TUBE (USE WITH PN 29510214) (UOC: X4A)	1
51	PAHZZ	5330-01-221-9177	73342	23018233	SEAL,NONMETALLIC RO	1
52	PAHZZ	5310-01-092-5495	24617	9422848	WASHER,FLAT	14
53	PAHZZ	5306-00-896-7228	24617	9409513	BOLT,SELF-LOCKING	2
54	PAHZZ	5310-01-084-1197	24617	9422846	WASHER,FLAT	3
55	PAHZZ	5305-01-126-4076	24617	9409224	SCREW,CAP,HEXAGON HE	1
56	PAHZZ	5310-01-092-5496	24617	9422845	WASHER,FLAT	2
57	PAHZZ	5306-01-274-6483	24617	9409074	BOLT,SELF-LOCKING	2
58	PAHZZ	5306-00-843-6398	24617	9416011	BOLT,SELF-LOCKING	12
59	PAHZZ	5305-00-125-9966	63005	9409012	SCREW,CAP,SOCKET HE	2

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RIGHT BRAKE APPLY VALVE BODY AND BRAKE COOLANT VALVE BODY 0021 00

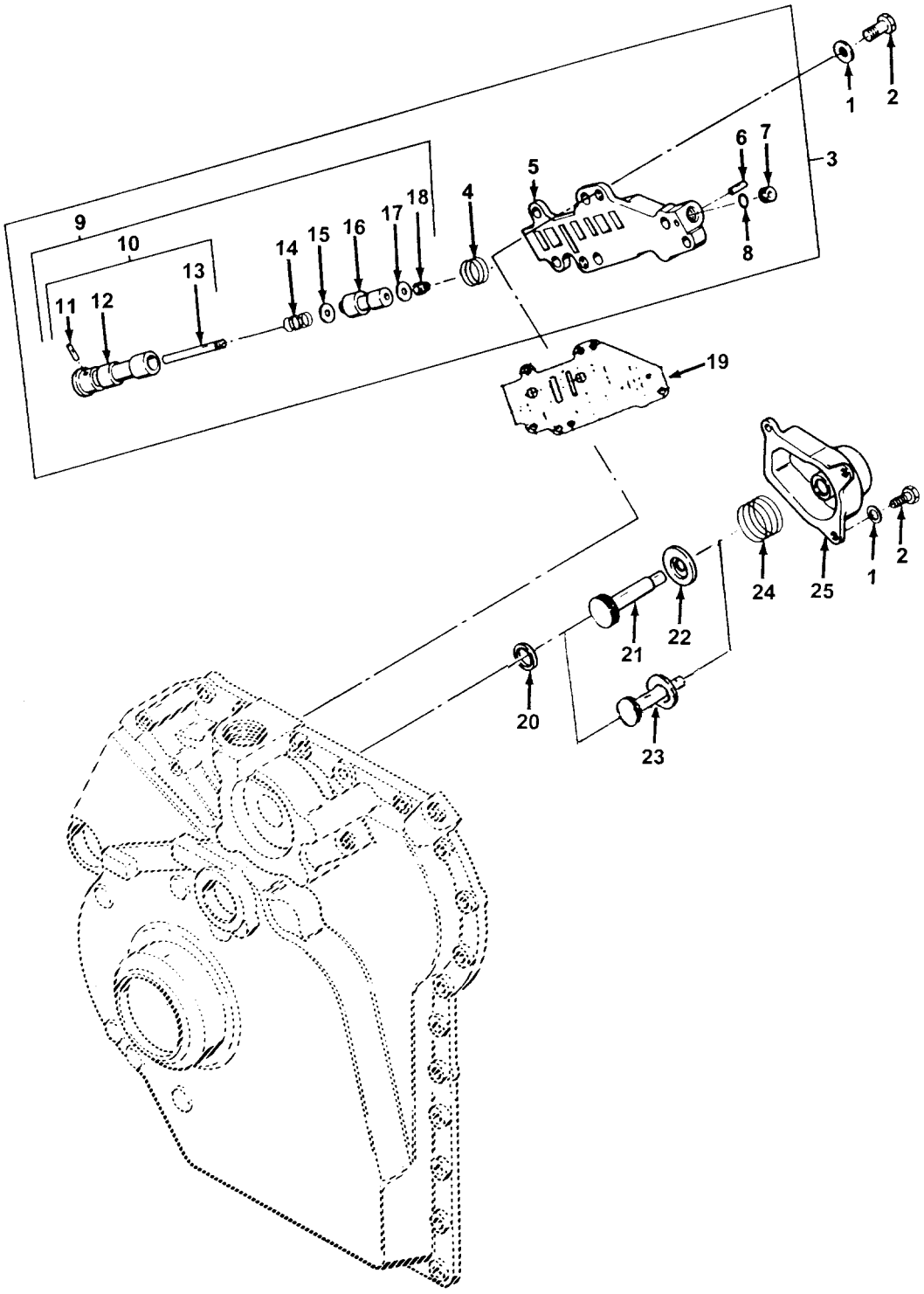

Figure 34. Right Brake Apply Valve Body and Brake Coolant Valve Body.

RIGHT BRAKE APPLY VALVE BODY AND BRAKE COOLANT VALVE BODY 0021 00

(1) Item NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 07 TRANSMISSION	
					GROUP 0726 BRAKES	
					FIG. 34 RIGHT BRAKE APPLY VALVE BODY AND BRAKE COOLANT VALVE BODY	
1	PAHZZ	5310-01-084-1197	24617	9422846	WASHER,FLAT	8
2	PAHZZ	5305-00-125-9966	63005	9409012	SCREW,CAP,SOCKET HE	8
3	PAHHH	2530-01-213-1625	73342	29503140	BODY ASSEMBLY,BRAKE	1
4	PAHZZ	5360-01-216-6995	73342	23017996	.SPRING,HELICAL,COMP	1
5	XAHZZ		73342	23048059	.BODY,BRK APPLY REG (USE WITH ASSY PN 29501427) (SUPERCEDED BY PN 29503136) (UOC:XTZ)	1
5	XAHZZ		73342	29503136	.BODY,BRK APPLY REG	1
6	XBHZZ		24617	455675	.PIN,SPRING (USE WITH PN 23048087 & 23048059) (UOC: XTZ)	1
7	PAHZZ	5342-01-217-0960	73342	23045125	.PLUG (USE WITH PN 23048087 & 23048059) (UOC: XTZ)	1
8	PAHZZ	5331-01-216-4009	73342	23045126	.O-RING (USE WITH PN 23048087 & 23048059) (UOC: XTZ)	1
9	PAHDD	2520-01-198-0505	73342	23017989	.VALVE,BRAKE REGULATOR (FOR REPLACEMENT USE ASSY PN 29501428) (UOC: XTZ)	1
9	PAHDD	4820-01-372-8138	73342	29501428	.REGULATING,FLUID,PR (USE WITH PN 29501427 & 29503140	1
10	ADDDD		73342	23017990	..VALVE ASSEMBLY,BRAKE REGULATOR	1
11	PADZZ	5315-01-216-1505	24617	455141	...PIN,SPRING	1
12	PADZZ	4810-01-216-6489	73342	23017991	...VALVE,REGULATING,FLUID	1
13	PADZZ	5315-01-220-5201	73342	23017992	…PIN,GROOVED,HEADLES	1
14	PADZZ	5360-01-216-0830	73342	23017993	..SPRING,HELICAL,COMP (FOR REPLACEMENT USE PN 29501219) (UOC: XTZ)	1
14	PADZZ	5360-01-372-3133	73342	29501219	..SPRING,HELICAL,COMP (USE WITH VALVE ASSY,BRAKE PN 29501428)	1
15	PADZZ	5365-01-215-9831	73342	23017994	..SHIM	V
16	PADZZ	2520-01-214-9042	73342	23017995	..SLIDE,DIRECTIONAL C	1
17	PADZZ	5310-01-092-5496	24617	9422845	..WASHER,FLAT	1
18	PADZZ	5310-00-770-8035	19207	7708035	..NUT,SLEEVE	1

RIGHT BRAKE APPLY VALVE BODY AND BRAKE COOLANT VALVE BODY 0021 00

(1) Item NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
19	PAHZZ	5340-01-507-8620	73342	29536577	PLATE, SEPERATOR (INSTALL SEPARATOR PLATE WHEN BRAKE BODY ASSEMBLY IS REMOVED. IF NO SEPARATOR PLATE IS PRESENT, DISCARD BRAKE BODY ASSEMBLY AND REPLACE WITH NEW ASSEMBLY. IF PLATE IS PRESENT, BRAKE BODY MAY BE SENT TO OVERHAUL, IF NECESSARY)	1
20	PAHZZ	5330-01-216-5711	73342	23018234	RETAINER,PACKING	1
21	PAHZZ	4820-01-286-5644	73342	23047496	STEM,FLUID VALVE (REPLACED BY PN 29538237)	1
22	PAHZZ	4820-01-213-8723	73342	23017983	DISK,VALVE (REPLACED BY PN 29538237)	1
23	PAHZZ	4820-01-213-8723	73342	29538237	DISK,VALVE	1
24	PAHZZ	5360-01-216-3270	73342	6836252	SPRING,HELICAL,COMP	1
25	PAHZZ	2520-01-214-9339	73342	23018155	BODY,BRAKE COOLANT	1

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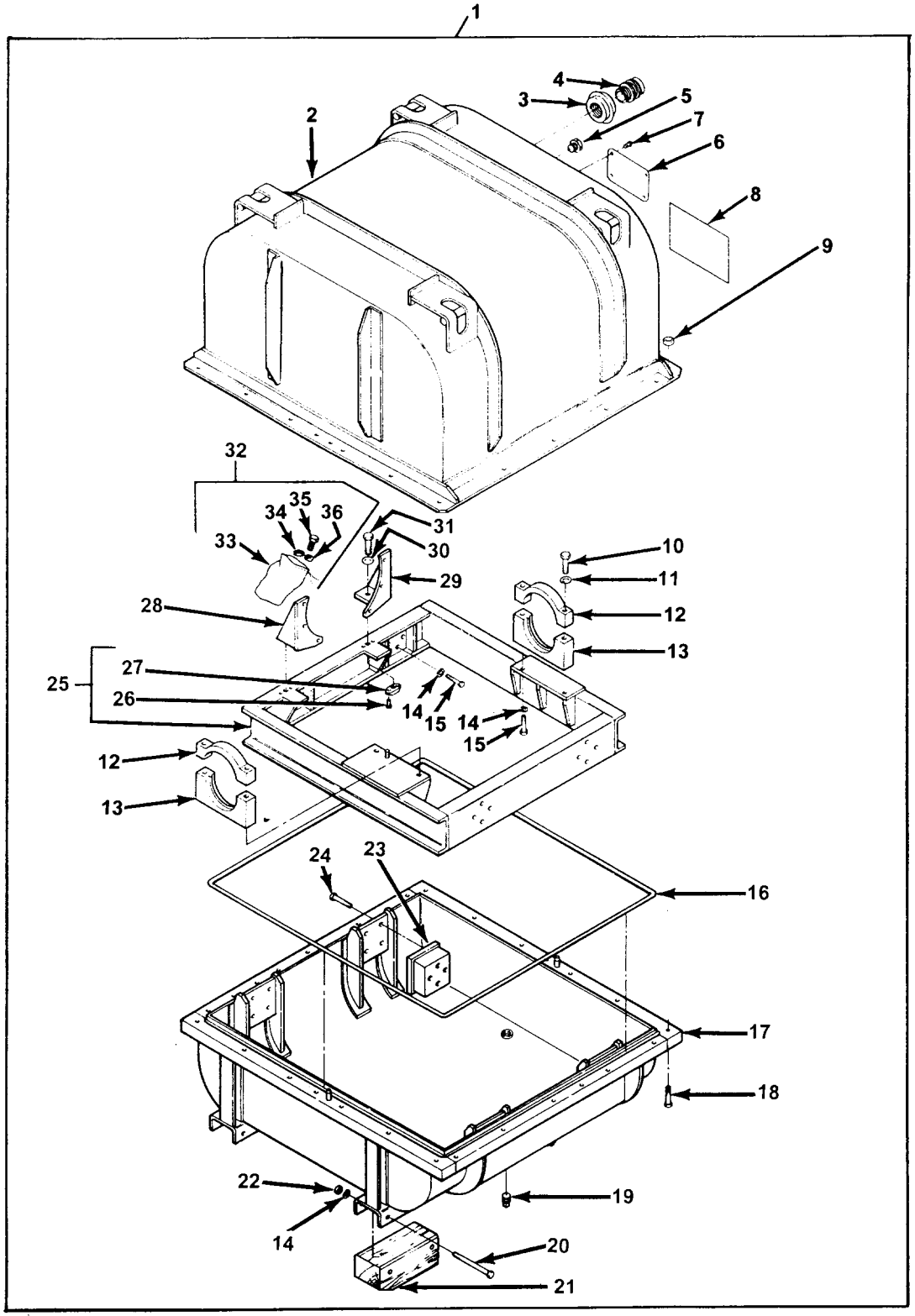

Figure 35. Transmission Shipping and Storage Container.

TRANSMISSION SHIPPING AND STORAGE CONTAINER 0021 00

(1) Item NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 33 SPECIAL PURPOSE KITS	
					GROUP 3301 SPECIAL PURPOSE KITS	
					FIG. 35 TRANSMISSION SHIPPING AND STORAGE CONTAINER	
1	PAFHD	2520-01-235-9591	19207	11650169	CONTAINER,X200 TRAN	1
2	PBFZZ		19207	11650252	.TOP WELDMENT	1
3	PAHZZ	8145-01-266-1104	19207	12344383	.PORT,DESICCANT	1
4	PAHZZ	4820-01-115-6463	19207	12302146	.VALVE,VACUUM EQUA	1
5	PAHZZ	6685-00-618-1822	00334	SK2155	.INDICATOR,HUMIDITY	1
6	PBHZZ	9905-00-409-8948	19207	7973325	.PLATE,IDENTIFICATIO	1
7	PAHZZ	5305-00-253-5625	96906	MS21318-46	.SCREW,DRIVE	4
8	PBHZZ	7690-01-239-2312	19207	11650193	.MARKER,IDENTIFICATI	1
9	PAFZZ	5310-00-768-0318	96906	MS51967-14	.NUT,PLAIN,HEXAGON	22
10	PAFZZ	5305-00-719-5240	96906	MS90727-117	.SCREW,CAP,HEXAGON H	4
11	PAFZZ	5310-00-584-5272	96906	MS35338-48	.WASHER,LOCK	4
12	PAFZZ	3130-01-243-3876	19207	11650188	.CAP,PILLOW BLOCK	2
13	PAFZZ	2520-01-242-6794	19207	11650186	.BASE,SUPPORT CRADLE	2
14	PAHZZ	5310-00-584-5272	96906	MS35338-48	.WASHER,LOCK	28
15	PAHZZ	5305-00-990-0695	80205	B1821BH050 F088N	.SCREW,CAP,HEXAGON H	20
16	PAFZZ	5330-01-249-3091	19207	11650251	.RUBBER,SHEET,SOLID	1
17	PBFZZ	2520-01-247-2974	19207	11650183	.BOTTOM WELDMENT	1
18	PAFZZ	5305-00-071-2067	80204	B1821BH050 C125N	.SCREW,CAP,HEXAGON H	22
19	PAFZZ	4730-00-221-2140	96906	MS20913-6S	.PLUG,PIPE	1
20	PAHZZ	5305-00-071-1781	96906	MS90725-128	.SCREW,CAP,HEXAGON H	8
21	PAHZZ	8145-01-115-0442	19207	12302107-4	.SKID,WOOD	4
22	PAHZZ	5310-00-768-0318	96906	MS51967-14	.NUT,PLAIN,HEXAGON	8
23	PAHZZ	5342-01-258-6164	19207	11650184	.MOUNT,RESILIENT	4
24	PAHZZ	5305-00-903-7794	96906	MS51095-410	.SCREW,CAP,HEXAGON H	16
25	PBHHH	2510-01-232-7727	19207	11650185	.FRAME,MOUNTING	1
26	PAHZZ	5320-00-291-0925	96906	MS20427-5C10	..RIVET,SOLID	4
27	PAHZZ	5310-01-241-6355	80205	NAS1031AX8	..NUT,SELF-LOCKING,PL	2
28	XDFZZ		19207	11650187-2	.BRACKET,MOUNTING	1
29	XDFZZ		19207	11650187-1	.BRACKET,MOUNTING	1
30	PAFZZ	5310-00-809-5998	96906	MS27183-18	.WASHER,FLAT	2
31	PAFZZ	5305-00-725-0154	96906	MS90727-112	.SCREW,CAP,HEXAGON H	2
32	AFFFF		19207	11650190	..SACKED ITEM	1
33	PAFZZ	8105-00-477-3716	19207	10890481	..BAG,MAIL	1
34	PAFZZ	5310-00-959-1488	96906	MS51922-21	..NUT,SELF-LOCKING HE	6
35	PAFZZ	5305-00-269-3240	80204	B1821BH038 F150N	..SCREW,CAP,HEXAGON H	6
36	PAFZZ	5310-00-080-6004	96906	MS27183-14	..WASHER,FLAT	6

END OF FIGURE

BULK MATERIAL AND HARDWARE SUPPLIES 0021 00

(1) Item NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 95 GENERAL USE STANDARDIZED PARTS	
					GROUP 9501 HARDWARE SUPPLIES AND BULK MATERIAL	
					FIG. BULK BULK MATERIAL AND HARDWARE SUPPLIES	
1	PAFZZ		23540	TC-18	CAP,PROTECTIVE	1
2	PAHZZ	6850-00-264-6572	81349	MIL-D-3464	DESICCANT,ACTIVE BAG (42 UNITS MADE FROM 3 EACH 16 UNIT PACKS OF 19207 PN 8355706)	V
3	PAHZZ	8010-00-297-0586	81348	TT-E-529	PAINT,OLIVE DRAB	V
4	PAHZZ	8010-00-297-0584	81348	TT-E-529	PAINT,WHITE,STENCILING	V
5	PAFZZ	5340-01-383-4817	99017	FC-16	PLUG,PROTECTIVE	1
6	XAHZZ	8030-00-850-7076	81349	DOD-P-15328	PRIMER,ACID COMPONENT	V
7	PAHZZ	8030-00-281-2726	81349	DOD-P-15328	PRIMER,COATING	V
8	PAHZZ	8010-00-161-7275	81348	TT-P-664	PRIMER,RED OXIDE	V
9	XAHZZ	8030-00-850-7076	81349	DOD-P-15328	PRIMER,WASH (REFERENCE 61196 PN PR-WASH)	V
10	PAFZZ		73342	29539549	STRAP,TIE DOWN	2
11	PAHZZ	9525-00-529-9106	96906	MS20995-NC51	WIRE,LOCK	V

END OF FIGURE

REPAIR KITS 0021 00

(1) Item NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)			(7) QTY
					GROUP 94 REPAIR KITS			
					GROUP 9401 REPAIR KITS			
					FIG. KITS REPAIR KITS			
1	PADZZ	2520-01-214-7116	19207	5703228	PARTS KIT,DRIVING V			
					ASSY (FRONT CARRIER)			
					BEARING,WASHER, THRUST (WASHER,BRONZE)	(8)	19-10	
					PINION ASSEMBLY MATCHED SET	(1)	19-13	
					ROLLER,BEARING (NEEDLE)	(80)	19-12	
					SHAFT,STRAIGHT	(4)	19-9	
					WASHER,PIN,THRUST	(8)	19-11	
2	PADZZ	2520-01-214-3846	19207	5703229	PARTS KIT,DRIVING V			
					ASSY (REAR CARRIER)			
					BUSHING,SLEEVE	(1)	18-21	
					PINION ASSEMBLY MATCHED SET	(1)	18-25	
					BEARING,ROLLER, NEEDLE	(72)	18-24	
					SHAFT,STRAIGHT	(4)	18-17	
					SEAT,BEARING (WASHER,BRONZE)	(8)	18-22	
					WASHER,THRUST (STEEL)	(8)	18-23	
3	PADZZ	2520-01-214-3847	19207	5703230	PARTS KIT,DRIVING V			
					ASSY (CENTER CARRIER)			
					BEARING,WASHER, THRUST (WASHER,BRONZE)	(8)	18-47	
					PIN	(4)	18-45	
					PINION ASSEMBLY MATCHED SET	(1)	18-50	
					ROLLER,BEARING (NEEDLE)	(72)	18-49	
					SEAT,BEARING (WASHER,STEEL)	(8)	18-48	

REPAIR KITS 0021 00

(1) Item NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
4	PADZZ	2520-01-214-7117	19027	5703231	PARTS KIT,OUTPUT ..... V CARRIER (OUTPUT CARRIER) (UOC: XTZ) BEARING,WASHER, THRUST (WASHER,BRONZE) (12) 32-41 PINION ASSEMBLY, MATCHED SET (1) 32-44 ROLLER,BEARING (NEEDLE) (120) 32-43 SHAFT,STRAIGHT (6) 32-46 WASHER,PIN,THRUST (WASHER,STEEL) (12) 32-42	
5	PAOZZ	4330-01-214-9303	19207	5703232	PARTS KIT FLUID ..... V PRESSURE (OIL FILTER KIT) ELEMENT,ASSY, FILTER (1) 27-1 PACKING,PREFORMED (2) 27-12	
6	PADZZ		19207	12371042	PARTS KIT,OUTPUT ..... V CARRIER (OUTPUT CARRIER) (UOC: X4A) BEARING,WASHER, THRUST (WASHER,POLYAMIDE) (12) 32-41 PINION ASSEMBLY, MATCHED SET (1) 32-44 ROLLER,BEARING (NEEDLE) (120) 32-43 SHAFT,STRAIGHT (6) 32-46 WASHER,PIN,THRUST (WASHER,STEEL) (12) 32-42	

END OF FIGURE

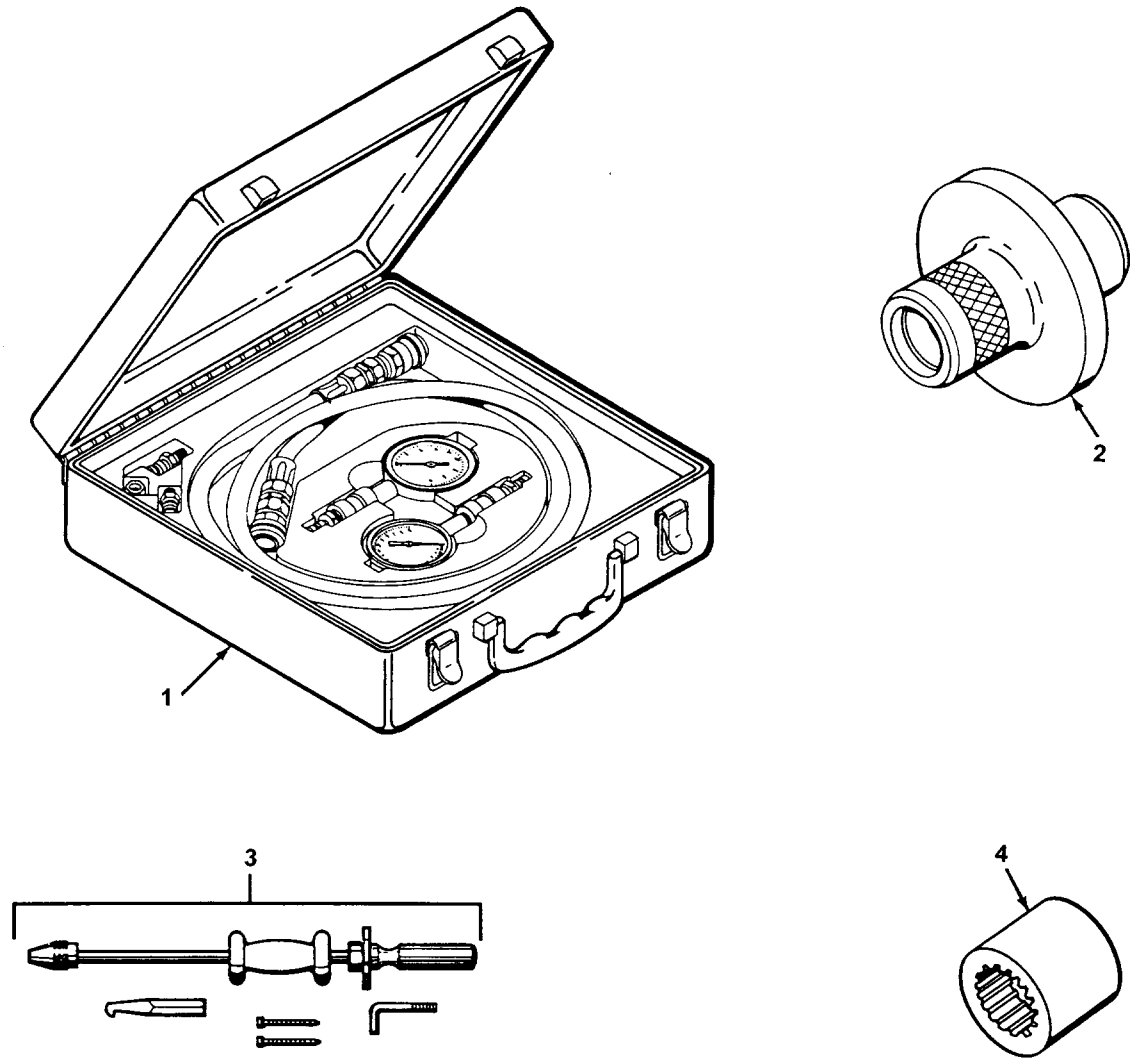

Figure 36. Special Tools (Organizational).

SPECIAL TOOLS (ORGANIZATIONAL)

(1) Item NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 26 SPECIAL TOOLS	
					GROUP 2604 SPECIAL TOOLS	
					FIG. 36 SPECIAL TOOLS (ORGANIZATIONAL)	
1	PEOZZ	6695-01-242-6795	19207	11650182	PRESSURE GAGE KIT (QTY PER SET 1)	1
2	PEOZZ	5120-01-242-6796	19207	11650176	INSERTER,SEAL (QTY PER SET 1)	1
3	PEOZZ	5180-01-048-2153	33287	J24171	PULLER KIT,UNIVERSA (QTY PER SET 1)	1
4	PEOZZ	5120-00-906-1051	19207	8355955	SOCKET,SOCKET WRENC (QTY PER SET 1)	1

END OF FIGURE

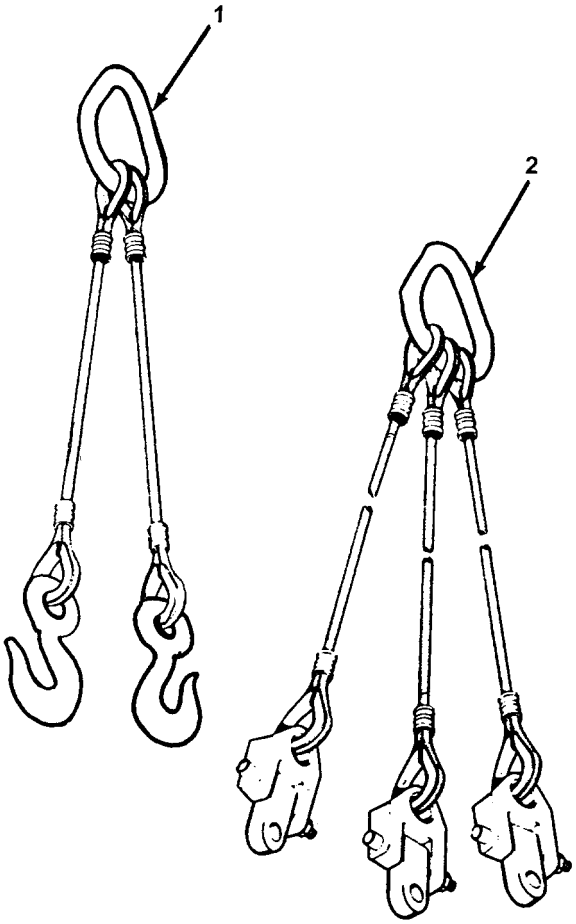

Figure 37. Special Tools (Direct Support).

SPECIAL TOOLS (DIRECT SUPPORT) 0021 00

(1) Item NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 26 SPECIAL TOOLS	
					GROUP 2604 SPECIAL TOOLS	
					FIG. 37 SPECIAL TOOLS (DIRECT SUPPORT)	
1	PEFZZ	4910-01-086-1681	19207	12268037	SLING,ENGINE AND TR ..... (QTY PER SET 1)	1
2	PEFZZ	3940-01-087-0155	19207	12268036	SLING,MULTIPLE LEG..... (QTY PER SET 1)	1

END OF FIGURE

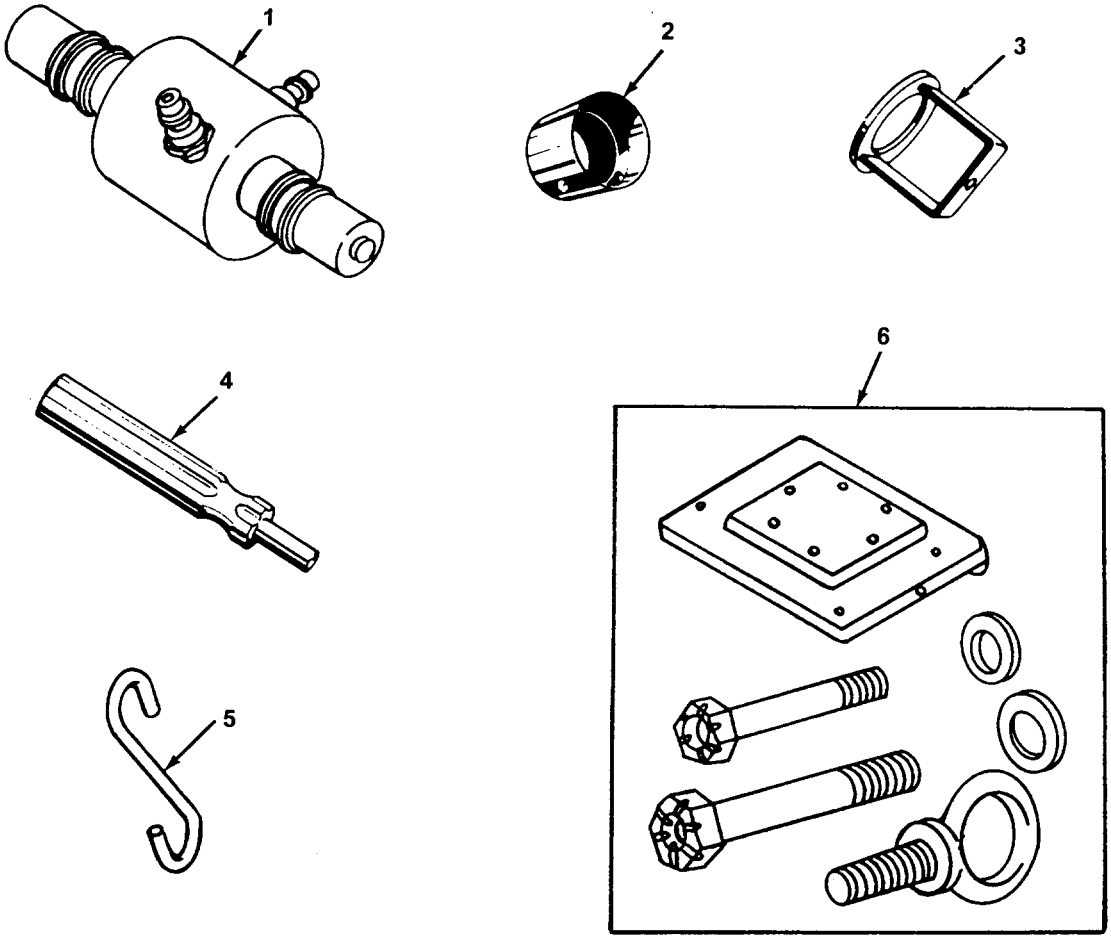

Figure 38. Special Tools (General Support).

SPECIAL TOOLS (GENERAL SUPPORT) 0021 00

(1) Item NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 26 SPECIAL TOOLS	
					GROUP 2604 SPECIAL TOOLS	
					FIG. 38 SPECIAL TOOLS (GENERAL SUPPORT)	
1	PEHZZ	2520-01-242-6797	19207	11650178	FIXTURE ASSEMBLY, LE (QTY PER SET 1)	1
2	PEHZZ	4910-01-178-6551	25341	J21362	PROTECTOR,INNER SEA (QTY PER SET 1)	1
3	PEHZZ	5120-01-176-3890	25341	J23616	COMPRESSOR,CLUTCH (QTY PER SET 1)	1
4	PEHZZ	5120-01-054-4050	33287	J24453	INSTALLER,LOCKRING (QTY PER SET 1)	1
5	PEHZZ	4030-01-178-7310	19207	11650102	HOOK,CHAIN,S (QTY PER SET 2)	2
6	PEHZZ	5342-01-242-6798	19207	11650180	ADAPTER KIT,CONTAIN (QTY PER SET 1)	1

END OF FIGURE

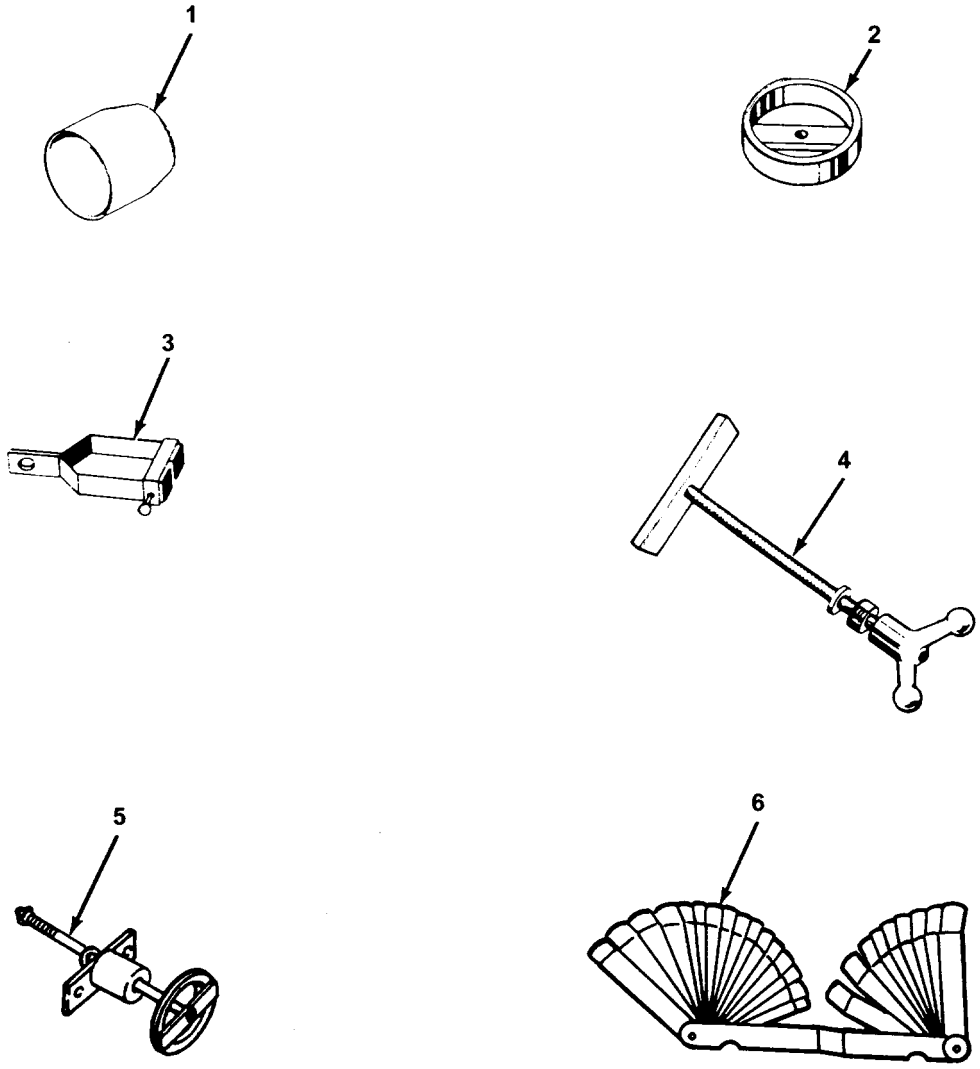

Figure 39. Special Tools (General Support).

SPECIAL TOOLS (GENERAL SUPPORT) 0021 00

(1) Item NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 26 SPECIAL TOOLS	
					GROUP 2604 SPECIAL TOOLS	
					FIG. 39 SPECIAL TOOLS (GENERAL SUPPORT)	
1	PEHZZ	5120-01-096-3493	19207	12268021	INSERTER AND REMOVE (QTY PER SET 1)	1
2	PEHZZ	5120-01-054-7221	33287	J24452	COMPRESSOR,CLUTCH S (QTY PER SET 1)	1
3	PEHZZ	5120-01-054-4056	33287	J24473	LIFTER,PUMP SUPPORT (QTY PER SET 1)	1
4	PEHZZ	5120-01-048-2158	33287	J24204-2	BAR AND STUD ASSEMB (QTY PER SET 1)	1
5	PEHZZ	5120-01-176-3891	25341	J23630-02	COMPRESSOR,CLUTCH S (QTY PER SET 1)	1
6	PEHZZ	5210-01-355-2126	55719	FB300A	GAGE,THICKNESS (QTY PER SET 1)	1
					END OF FIGURE	

END OF WORK PACKAGE

NATIONAL STOCK NUMBER INDEX 0022 00

STOCK NUMBER	FIG.	ITEM
5305-00-001-5017	28	39
5330-00-003-0887	28	15
3120-00-005-5880	19	4
5325-00-007-2969	18	30
	19	1
	19	14
2520-00-008-9987	19	37
5315-00-014-1105	26	14
5315-00-014-1195	12	3
	25	9
	26	13
5315-00-014-1240	12	7
5315-00-014-1262	11	32
5315-00-014-1275	32	18
	33	43
5315-00-044-3767	11	30
5360-00-044-3945	12	21
5305-00-051-4078	7	5
5305-00-071-1781	35	20
5305-00-071-2067	35	18
5325-00-079-2212	15	5
5310-00-080-6004	35	36
5325-00-080-9091	28	23
5310-00-088-0553	7	23
3110-00-100-6170	32	31
	33	36
3120-00-104-0635	31	5
5331-00-108-5691	14	11
3110-00-120-3096	26	7
5305-00-125-9966	32	5
	33	59
	34	2
3110-00-138-6426	12	51
3110-00-144-8571	32	62
5365-00-152-0311	29	25
	31	8
5330-00-152-3049	30	2
	30	8
8010-00-161-7275	BULK	8
5331-00-165-1943	4	1
5331-00-166-0992	27	10
5331-00-167-5110	4	12
5310-00-168-6412	22	8
5360-00-169-8367	30	9
5306-00-169-8389	31	13
2520-00-172-1947	19	35
2520-00-172-1951	18	44
5360-00-200-6365	12	11
5305-00-206-1533	32	19
	33	35
4730-00-221-2140	35	19
5325-00-252-4746	26	25
5305-00-253-5615	3	8
5305-00-253-5625	35	7

STOCK NUMBER	FIG.	ITEM
6850-00-264-6572	BULK	2
5305-00-269-3240	35	35
2520-00-272-1947	17	4
5310-00-274-8041	3	28
	6	9
	11	21
	12	29
	12	31
	13	16
	20	6
	25	19
3110-00-277-0559	11	29
	15	39
	32	16
	33	46
8030-00-281-2726	BULK	7
5325-00-282-5312	26	23
5325-00-282-7017	7	6
5325-00-290-4518	11	37
5320-00-291-0925	35	26
8010-00-297-0584	BULK	4
8010-00-297-0586	BULK	3
5305-00-400-5542	21	17
5310-00-402-5220	25	2
	26	34
9905-00-409-8948	35	6
3110-00-427-6591	12	34
3020-00-432-1255	19	5
5330-00-450-1942	9	4
8105-00-477-3716	35	33
5315-00-480-4453	11	23
3110-00-488-3879	12	37
5325-00-498-2864	29	4
	31	27
9525-00-529-9106	BULK	11
5306-00-543-5696	26	39
3110-00-554-3248	29	5
	31	28
5325-00-557-5794	18	14
5325-00-557-5835	18	35
2520-00-557-6220	7	25
2520-00-557-6619	8	11
5310-00-562-3932	29	17
	31	14
5331-00-580-4394	28	28
5310-00-584-5272	35	11
	35	14
5306-00-589-8167	21	9
3110-00-592-9967	14	22
	33	1
5365-00-610-6325	30	24
6685-00-618-1822	35	5
5330-00-631-8125	7	19
5305-00-638-2362	25	17

NATIONAL STOCK NUMBER INDEX 0022 00

STOCK NUMBER	FIG.	ITEM
	28	9
2520-00-679-6972	7	20
2520-00-679-6974	9	5
3120-00-679-7068	9	7
5342-00-679-9787	3	14
3110-00-684-5541	18	32
5315-00-687-5218	25	3
	26	32
3110-00-690-8987	31	21
5305-00-719-5240	35	10
5325-00-720-8064	32	48
	33	30
5305-00-725-0154	35	31
3040-00-733-4742	7	8
2520-00-736-0268	7	10
5360-00-736-0271	7	12
2520-00-767-5417	9	2
5310-00-768-0318	35	9
	35	22
3110-00-770-6097	25	7
	25	13
5325-00-770-7326	15	27
	32	7
3110-00-770-7842	7	11
5310-00-770-8035	34	18
5310-00-776-7670	11	6
	32	56
	33	9
3110-00-788-1406	18	31
3110-00-789-1842	12	23
5365-00-792-0809	30	1
5310-00-799-4910	14	19
	15	24
4730-00-808-6814	11	26
	12	8
	15	38
	15	51
	33	47
5310-00-809-5998	35	30
5305-00-813-4495	30	33
5331-00-816-3546	15	52
5315-00-819-6282	29	28
	31	4
5331-00-821-4490	9	3
5325-00-838-8049	19	6
3110-00-839-9149	7	15
3120-00-841-0271	7	9
5306-00-843-6398	12	45
	32	1
	33	58
8030-00-850-7076	BULK	6
8030-00-850-7076	BULK	9
5306-00-896-7228	33	53
3110-00-902-1657	12	4
5305-00-903-7794	35	24
5330-00-904-8110	10	7
5120-00-906-1051	36	4
5360-00-909-0313	29	23
	31	10
3110-00-913-8113	15	17
2520-00-914-4680	3	10
5310-00-922-2017	16	12
5315-00-926-5866	30	26
5310-00-935-9041	29	24
	31	9
3110-00-939-6843	7	14
5306-00-940-9011	29	2
5306-00-940-9028	11	10
	15	22
	32	55
	33	10
5306-00-940-9062	22	37
	23	25
5306-00-944-6812	21	23
	28	38
5310-00-959-1488	35	34
5305-00-978-9395	16	4
5305-00-990-0695	35	15
3110-01-006-9129	19	12
	32	43
	33	22
4820-01-006-9636	22	16
	23	53
5365-01-014-4453	14	4
5365-01-017-2652	10	8
5306-01-017-9962	29	18
5325-01-028-8203	9	1
4730-01-040-1798	15	42
5306-01-045-6594	23	3
5180-01-048-2153	36	3
5120-01-048-2158	39	4
4730-01-048-9371	12	5
5120-01-054-4050	38	4
5120-01-054-4056	39	3
5120-01-054-7221	39	2
5310-01-057-3111	2	3
	2	5
	5	3
	5	6
	6	5
	27	3
5365-01-057-3309	14	12
5305-01-057-4264	3	29
	6	10
5305-01-057-4264	25	20
	31	35
5305-01-058-4612	13	11
2520-01-064-8849	18	13

NATIONAL STOCK NUMBER INDEX 0022 00

NATIONAL STOCK NUMBER INDEX 0022 00

STOCK NUMBER	FIG.	ITEM
	33	17
4810-01-198-0504	22	4
2520-01-198-0505	34	9
3040-01-198-0506	17	13
3020-01-198-0689	18	41
3020-01-198-0690	32	35
	33	26
3040-01-198-0713	11	22
2520-01-201-4784	1	1
2520-01-203-9885	12	12
3120-01-203-9887	18	5
	18	21
4820-01-204-9941	23	57
4820-01-204-9942	23	19
4820-01-205-0034	23	54
4820-01-205-0035	24	3
5315-01-205-5572	26	16
5340-01-207-3481	22	28
5930-01-207-6350	27	9
5315-01-211-6485	19	39
4820-01-213-0035	32	15
2530-01-213-1625	34	3
2530-01-213-1626	33	42
	33	42
2520-01-213-7763	20	1
4730-01-213-7794	20	8
4820-01-213-7959	21	34
5340-01-213-8017	21	32
4320-01-213-8028	7	2
4730-01-213-8030	10	3
	15	37
4730-01-213-8049	23	41
4730-01-213-8051	23	26
4820-01-213-8098	23	27
2520-01-213-8599	22	19
4820-01-213-8723	34	22
	34	23
5330-01-214-1479	19	23
4730-01-214-1502	14	6
2520-01-214-1558	12	19
2520-01-214-1559	12	17
4730-01-214-1560	11	24
2590-01-214-1563	23	18
3040-01-214-1604	32	24
3040-01-214-1605	15	7
3040-01-214-1606	32	10
3040-01-214-1607	15	28
2520-01-214-1614	26	28
2520-01-214-1615	23	32
4730-01-214-2366	33	48
4730-01-214-2369	14	17
4730-01-214-3112	13	5
3040-01-214-3145	18	3
2520-01-214-3150	23	14
2520-01-214-3154	21	4
3040-01-214-3155	21	19
2520-01-214-3157	3	25
3040-01-214-3175	13	15
3040-01-214-3176	25	10
3040-01-214-3184	8	8
2520-01-214-3190	24	2
4820-01-214-3193	21	20
2520-01-214-3238	18	26
	19	2
2520-01-214-3239	18	27
	19	3
2520-01-214-3240	18	29
4710-01-214-3241	11	8
5325-01-214-3265	26	9
3040-01-214-3841	32	61
	32	61
3020-01-214-3845	12	33
2520-01-214-3846	KITS	2
2520-01-214-3847	KITS	3
2520-01-214-3854	7	17
2520-01-214-3855	13	14
3020-01-214-3859	18	28
3040-01-214-3860	18	36
3040-01-214-3861	18	51
	19	15
2520-01-214-3863	32	39
	33	24
3040-01-214-3864	32	26
	33	41
2520-01-214-3865	32	32
2520-01-214-3865	33	33
2520-01-214-3866	15	10
	32	22
2520-01-214-3867	15	9
	32	21
4730-01-214-3868	23	42
4820-01-214-3869	21	10
3040-01-214-3915	26	31
3040-01-214-3916	26	30
3020-01-214-3935	26	11
2520-01-214-3944	19	40
4810-01-214-4014	23	40
4810-01-214-4015	21	1
2520-01-214-4317	20	2
2520-01-214-4318	26	29
2520-01-214-4408	23	49
2520-01-214-4409	23	44
2520-01-214-4410	23	34
5995-01-214-5783	21	37
3020-01-214-5786	18	1
3020-01-214-5787	13	19
3040-01-214-5792	32	58
	33	8

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STOCK NUMBER	FIG.	ITEM
2520-01-214-5793	7	16
2520-01-214-7116	KITS	1
2520-01-214-7117	KITS	4
2520-01-214-7166	26	26
3020-01-214-7352	25	4
3020-01-214-7353	11	20
3020-01-214-7354	11	18
3020-01-214-8864	11	13
2520-01-214-9042	34	16
3040-01-214-9300	15	1
3040-01-214-9301	14	24
4330-01-214-9303	KITS	5
2520-01-214-9333	7	7
2520-01-214-9334	21	26
2520-01-214-9336	23	12
3010-01-214-9337	14	20
	15	25
2520-01-214-9338	27	4
2520-01-214-9339	34	25
2520-01-214-9340	3	24
2520-01-214-9341	3	27
2520-01-214-9385	32	50
	33	14
2520-01-214-9388	23	38
2520-01-214-9389	23	31
4730-01-214-9392	3	19
3020-01-214-9394	18	38
3020-01-214-9396	25	11
3020-01-214-9397	18	34
3020-01-214-9398	15	18
3020-01-214-9399	15	16
3020-01-214-9400	33	5
2520-01-214-9408	32	49
	33	29
2520-01-214-9409	17	4
2520-01-214-9417	17	5
3040-01-215-0645	15	21
3020-01-215-3344	11	16
3020-01-215-3345	32	54
4730-01-215-4323	23	45
5365-01-215-7400	26	19
5315-01-215-7514	11	31
	15	44
	32	17
	33	49
5315-01-215-7515	20	3
5360-01-215-7688	23	35
5360-01-215-7689	24	5
5360-01-215-7690	24	1
3020-01-215-8825	26	33
3020-01-215-8826	32	63
5306-01-215-9129	21	22
5330-01-215-9503	32	29
	33	38
5325-01-215-9687	32	30
	33	37
3120-01-215-9776	7	13
5365-01-215-9831	34	15
5340-01-215-9845	15	31
5360-01-215-9935	32	9
5306-01-216-0230	21	8
	23	13
5360-01-216-0828	23	30
5360-01-216-0829	21	3
5360-01-216-0830	34	14
5360-01-216-0831	26	21
4710-01-216-1159	14	29
5306-01-216-1322	22	35
	23	23
5306-01-216-1333	2	9
	5	7
	6	8
	27	2
5306-01-216-1334	23	10
5310-01-216-1354	12	52
3110-01-216-1366	32	8
5310-01-216-1367	11	2
	15	30
5310-01-216-1369	15	4
5310-01-216-1370	15	14
3120-01-216-1423	17	14
	18	42
	19	28
	32	36
	33	28
3120-01-216-1439	32	53
	33	6
3120-01-216-1440	32	38
	33	25
5340-01-216-1465	11	3
5315-01-216-1504	22	6
5315-01-216-1505	34	11
5325-01-216-1705	32	13
5325-01-216-1737	11	34
	14	16
	15	46
5331-01-216-2815	14	3
5331-01-216-2816	27	5
5365-01-216-2824	12	24
5365-01-216-2825	12	25
5365-01-216-2826	12	26
3120-01-216-2869	11	28
5360-01-216-3265	3	26
	12	18
5360-01-216-3266	12	10
5360-01-216-3267	18	55
	19	19
5360-01-216-3269	32	57

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STOCK NUMBER	FIG.	ITEM
	33	11
5360-01-216-3270	34	24
5360-01-216-3271	15	6
5340-01-216-3299	32	20
	33	34
3110-01-216-3718	21	28
3120-01-216-3726	26	20
5340-01-216-3810	21	2
3040-01-216-3952	4	8
5306-01-216-3992	15	29
5306-01-216-3993	2	1
5330-01-216-4005	8	3
5330-01-216-4006	14	8
	15	49
5331-01-216-4009	34	8
5330-01-216-4012	11	4
5330-01-216-4013	23	46
5330-01-216-4014	23	22
5330-01-216-4015	2	7
3110-01-216-4031	3	16
	11	12
3110-01-216-4032	32	60
	33	4
3110-01-216-4033	11	19
	15	15
3110-01-216-4086	12	35
5360-01-216-4462	22	17
5360-01-216-4463	22	24
5330-01-216-5698	8	10
5331-01-216-5702	12	42
5331-01-216-5703	13	7
5331-01-216-5704	11	9
5331-01-216-5705	11	7
5330-01-216-5711	3	23
	14	25
	34	20
3110-01-216-5737	3	4
5365-01-216-5750	10	1
	15	41
5360-01-216-5972	23	48
4810-01-216-6489	34	12
4710-01-216-6623	3	31
4710-01-216-6624	3	21
4710-01-216-6625	3	7
4710-01-216-6626	3	13
5330-01-216-6654	15	32
5330-01-216-6657	7	1
5330-01-216-6765	13	9
5340-01-216-6785	13	3
5360-01-216-6995	34	4
5360-01-216-7059	23	52
5306-01-216-7364	21	25
	23	9
5306-01-216-7365	23	17
5306-01-216-7375	11	1
5305-01-216-7378	14	18
	15	23
5330-01-216-7424	32	52
	33	12
5360-01-216-7437	23	39
3020-01-216-7603	4	11
3020-01-216-7604	4	10
3020-01-216-7605	3	2
5340-01-216-7640	14	1
2520-01-216-7648	17	2
5360-01-216-8210	23	55
3120-01-216-8283	4	2
	17	6
	18	39
5340-01-216-8479	8	2
2520-01-216-8564	21	29
2520-01-216-8565	14	7
2520-01-216-8566	4	6
3020-01-216-8591	4	4
3020-01-216-8592	3	17
3020-01-216-8593	3	5
5306-01-216-9849	22	31
	23	24
5365-01-217-0856	11	25
5365-01-217-0857	15	12
5365-01-217-0858	3	3
5342-01-217-0960	34	7
5360-01-217-1017	8	7
5325-01-217-1021	7	18
	12	36
5325-01-217-1022	17	1
	19	38
5325-01-217-1023	11	14
3040-01-217-1122	33	3
5325-01-217-2069	14	23
	33	2
5340-01-217-2162	21	14
5330-01-217-2201	6	2
5330-01-217-2202	23	16
5365-01-217-2208	12	38
5365-01-217-2209	12	39
5365-01-217-2210	12	40
3110-01-217-2235	3	1
	4	5
3120-01-217-2250	15	19
3110-01-217-2262	7	3
5315-01-217-2270	12	20
3130-01-217-2284	14	21
	15	26
5325-01-217-2303	32	47
	33	16
5340-01-217-2305	7	4
5306-01-217-2908	8	14

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STOCK NUMBER	FIG.	ITEM
5306-01-217-2909	8	15
5306-01-217-2915	8	12
5365-01-217-2966	12	47
5365-01-217-2967	12	48
5365-01-217-2968	12	49
5315-01-217-3032	32	25
	33	13
5325-01-217-3072	19	1
5325-01-217-3075	13	22
5325-01-217-3076	18	40
5325-01-217-3077	11	15
5306-01-217-3992	8	13
5305-01-217-4004	4	7
5330-01-217-4041	8	1
5330-01-217-4043	23	56
5330-01-217-4047	12	46
5330-01-217-4048	32	27
	33	40
5365-01-217-4051	13	12
5365-01-217-4052	13	21
5365-01-217-4079	12	9
	24	6
5340-01-217-4179	22	23
5325-01-217-4262	18	33
5325-01-217-4263	19	1
5325-01-217-4264	19	41
5365-01-217-4661	23	29
5325-01-217-5032	18	8
5325-01-217-5074	11	35
5306-01-217-6970	14	10
5330-01-217-7013	6	3
5330-01-217-7014	22	27
2530-01-217-8136	32	11
5306-01-218-0700	6	6
5360-01-218-0793	22	21
	23	28
5325-01-218-0796	19	1
5330-01-218-1565	32	28
	33	39
3110-01-218-1566	12	28
3110-01-218-3395	11	11
5330-01-218-7143	21	41
5331-01-219-2545	3	30
5331-01-219-2546	3	20
5331-01-219-2547	3	6
5331-01-219-2548	3	12
2520-01-220-0119	3	22
5315-01-220-5201	34	13
2520-01-220-6737	8	4
4730-01-220-9163	4	14
5342-01-220-9246	21	12
	21	15
	22	29
	23	21

STOCK NUMBER	FIG.	ITEM
3110-01-221-3077	15	13
4730-01-221-7138	11	27
	14	2
	21	31
	27	8
5330-01-221-9177	14	28
	33	51
3040-01-222-0265	12	53
3110-01-222-3354	12	43
	12	43
4730-01-223-2518	27	7
5365-01-223-3673	10	4
2940-01-224-4361	27	11
3040-01-225-9023	3	15
5360-01-231-0481	26	27
5365-01-231-9152	15	48
2510-01-232-7727	35	25
2520-01-234-1898	28	10
2520-01-235-9590	9	6
2520-01-235-9591	35	1
2520-01-235-9594	26	12
2520-01-235-9597	29	26
2520-01-235-9598	28	8
2520-01-235-9599	28	13
2520-01-235-9600	19	7
3040-01-235-9644	29	6
3110-01-237-2758	21	33
2520-01-237-2872	17	3
	19	36
5331-01-237-2967	32	34
	33	32
5330-01-238-4613	13	18
5330-01-238-5879	32	33
	33	31
4730-01-238-6443	15	54
4730-01-238-6996	4	13
4710-01-238-7100	13	4
4820-01-238-7961	30	1
5340-01-238-8759	23	47
2520-01-238-8767	28	29
3040-01-238-8773	29	1
4710-01-238-8783	28	25
2520-01-238-8784	30	16
2520-01-238-8826	28	4
2990-01-238-8831	28	32
4810-01-238-9855	30	15
4710-01-239-2199	26	38
7690-01-239-2312	35	8
2520-01-239-6835	30	17
3040-01-239-6930	31	30
3040-01-240-3080	28	11
5310-01-241-2675	28	31
5310-01-241-2676	28	35
5310-01-241-2677	29	31

STOCK NUMBER	FIG.	ITEM
5310-01-241-2687	28	34
3120-01-241-2850	31	32
3120-01-241-2851	28	5
3110-01-241-2943	29	3
5360-01-241-3246	28	20
5360-01-241-3247	30	30
5360-01-241-3264	28	6
5340-01-241-4282	28	24
3040-01-241-4695	31	24
5306-01-241-5072	26	37
5307-01-241-5171	31	3
5307-01-241-5172	28	26
5307-01-241-5173	28	19
3040-01-241-5567	31	6
2520-01-241-5636	29	22
	31	11
5310-01-241-6355	35	27
3040-01-241-6851	29	19
	31	12
2520-01-241-7029	30	12
5365-01-242-0827	31	16
5365-01-242-0828	29	14
5340-01-242-2796	28	33
2520-01-242-6794	35	13
6695-01-242-6795	36	1
5120-01-242-6796	36	2
2520-01-242-6797	38	1
5342-01-242-6798	38	6
5340-01-242-7146	28	21
3110-01-243-3798	18	7
3130-01-243-3876	35	12
5325-01-243-5289	28	12
5340-01-244-1473	28	17
5315-01-245-3673	28	18
5365-01-245-4124	31	26
5330-01-245-7162	15	50
5305-01-245-8750	30	19
5940-01-246-2086	21	40
2520-01-246-2952	32	51
2520-01-246-2952	33	15
5310-01-246-5785	28	30
2520-01-246-6418	28	22
2520-01-247-2974	35	17
5365-01-247-6952	29	11
	30	35
5310-01-247-8212	28	7
5306-01-274-6483	32	3
	33	57
4820-01-276-3528	23	37
3110-01-277-2400	26	10
5310-01-280-5798	29	20
	31	34
5330-01-280-5809	18	52
3040-01-286-0318	6	7
5360-01-248-1587	17	9
	19	32
5360-01-249-0611	30	14
5330-01-249-3091	35	16
5330-01-250-0651	30	23
2520-01-250-1909	17	10
	19	31
5340-01-250-5545	30	10
5330-01-251-1931	21	35
2520-01-251-4395	7	24
2520-01-251-5490	26	1
2520-01-251-5491	26	5
9905-01-253-1276	3	9
5310-01-253-5930	28	3
	28	36
5340-01-254-6471	17	8
	19	33
2520-01-255-3350	31	1
5306-01-256-6811	2	2
	5	4
5331-01-256-6894	30	27
2520-01-257-3881	23	5
5340-01-257-4369	5	5
5315-01-258-1497	29	7
	31	31
5342-01-258-6164	35	23
5340-01-258-8531	2	4
5331-01-258-9151	22	11
5305-01-259-2442	30	20
5365-01-259-9642	26	8
4820-01-261-1692	23	33
2520-01-261-1715	7	21
2520-01-261-4017	23	15
5306-01-263-2018	23	2
	26	4
5360-01-265-6742	23	35
8145-01-266-1104	35	3
5330-01-266-3312	14	26
3040-01-268-7211	12	2
5365-01-269-2676	30	28
3110-01-269-6368	4	9
5365-01-272-1258	12	27
5365-01-272-3346	23	29
5365-01-272-7479	12	41
5365-01-273-2320	23	29
3110-01-273-2329	13	20
5330-01-286-5468	14	27
4820-01-286-5644	34	21
5330-01-287-5798	6	4
2520-01-288-1959	30	32
5325-01-291-2181	11	38
	14	14
5331-01-291-5078	10	5
5360-01-291-5626	26	27

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STOCK NUMBER	FIG.	ITEM
5310-01-321-8610	16	3
5310-01-329-8189	30	34
5210-01-355-2126	39	6
5315-01-371-8568	29	10
	31	23
5360-01-371-9313	22	17
5360-01-371-9314	22	24
5360-01-372-3133	34	14
5340-01-372-3558	29	16
	31	15
3040-01-372-5309	31	20
4320-01-372-7368	29	12
	31	19
4820-01-372-8138	34	9
4730-01-375-7411	30	17
	30	17
4320-01-375-8130	31	30
5340-01-376-4633	30	10
4320-01-376-5651	11	17
5340-01-383-4817	BULK	5
2530-01-389-7353	32	11
3020-01-389-7784	19	5
4730-01-389-7796	15	54
2520-01-397-1074	1	1
5330-01-406-7801	5	1
5310-01-412-4013	16	3
4730-01-420-5913	16	2
3020-01-420-8039	15	16
5330-01-420-8736	16	1
3020-01-421-0127	3	5
3020-01-421-0129	3	17
5340-01-421-2816	15	33
5342-01-421-2817	15	34
4710-01-421-8747	16	7
3020-01-422-1970	18	34
3020-01-422-1971	11	20
3020-01-422-1972	15	18
5310-01-422-2147	16	13
3020-01-422-3966	18	28
2520-01-422-4101	14	24
3040-01-422-4102	3	15
3020-01-422-4103	3	2
9905-01-423-1611	3	9
2520-01-467-9005	29	13
	31	18
5305-01-496-2803	16	9
4730-01-496-6942	16	6
6680-01-496-8759	16	10
5340-01-496-9455	16	8
5331-01-498-9979	16	5
3040-01-499-0471	4	8
2520-01-499-1438	7	2
4730-01-499-2506	15	35
3020-01-499-3410	18	1
3010-01-499-3418	18	16
5305-01-499-6623	13	1
5325-01-499-7207	18	2
2520-01-499-9055	7	7
5365-01-500-3607	31	29
5340-01-507-8620	34	19
2520-01-508-0138	30	37
2520-01-508-6840	19	25
5330-01-509-0298	19	31
5330-01-509-1404	9	4
2520-01-509-2403	18	29
5310-01-509-2815	30	36
5330-01-509-4404	19	29
3020-01-509-4924	4	4
5330-01-509-5908	9	4
2520-01-K70-6301	28	10

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PART NUMBER	FIG.	ITEM
WW-P-471-ACABCC	15	40
10890481	35	33
110X4	18	7
114KS	32	62
116003	16	13
11649930	25	2
	26	34
11650102	38	5
11650169	35	1
11650176	36	2
11650178	38	1
11650180	38	6
11650182	36	1
11650183	35	17
11650184	35	23
11650185	35	25
11650186	35	13
11650187-1	35	29
11650187-2	35	28
11650188	35	12
11650190	35	32
11650193	35	8
11650251	35	16
11650252	35	2
11650255	7	24
12020381	21	39
	22	34
	23	7
120217	16	12
12084P11	3	28
	6	9
	11	21
	12	29
	12	31
	13	16
	20	6
	25	19
12268021	39	1
12268036	37	2
12268037	37	1
12291400-1	1	2
12302107-4	35	21
12302146	35	4
12344383	35	3
12371041	1	2
12371042	KITS	6
12371043	1	1
141105	26	14
141190	19	39
141195	12	3
	25	9
141195	26	13
141210	12	13
141217	15	43
141223	20	3
141240	12	7
141242	11	23
141255	13	13
141262	11	32
141275	32	18
	33	43
1500PT129	27	9
159184	21	36
190139	7	23
221431	23	36
23011456	18	52
23011475	18	53
	19	16
23011665	18	10
23013453	19	22
23015337	14	30
23015806	16	5
23015985	17	1
	19	38
23016014	10	5
23016564	7	19
23017763	19	37
23017853	11	25
23017854	11	24
23017855	3	18
23017856	3	22
23017857	3	24
23017859	20	2
23017861	20	1
23017868	27	1
23017875	27	11
23017877	26	33
23017878	11	11
23017880	11	4
23017881	15	31
23017882	15	32
23017884	23	14
23017886	23	12
23017887	23	47
23017888	23	16
23017889	23	46
23017890	23	42
23017894	21	2
23017899	21	37
23017901	21	32
23017902	21	34
23017905	23	40
23017906	23	54
23017909	23	55
23017910	23	32
23017911	22	13
	23	50
23017912	22	14

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PART NUMBER	FIG.	ITEM
23017912	23	51
23017913	23	49
23017914	23	44
23017915	23	45
23017916	23	56
23017917	23	57
23017919	23	35
23017920	23	34
23017921	23	41
23017922	23	38
23017923	23	39
23017924	23	31
23017926	23	27
23017927	23	26
23017928	23	22
23017929	23	19
23017930	23	20
23017931	22	4
23017932	22	5
23017933	22	20
23017934	22	19
23017935	22	18
23017936	22	17
23017937	22	12
23017938	22	10
23017939	22	23
23017940	22	26
23017941	22	25
23017942	22	24
23017943	22	9
23017944	22	22
23017945	22	27
23017946	22	28
23017947	22	30
23017949	8	4
23017951	8	6
23017952	8	8
23017953	8	7
23017954	14	24
23017955	33	3
23017974	26	24
23017975	26	26
23017977	26	29
23017978	26	28
23017980	13	19
23017981	7	2
23017983	34	22
23017989	34	9
23017990	34	10
23017991	34	12
23017992	34	13
23017993	34	14
23017994	34	15
23017995	34	16
23017996	34	4
23017998	14	20
	15	25
23017999	15	28
23018000	12	33
23018006	19	25
23018007	19	26
23018008	17	14
	18	42
	19	28
	32	36
	33	28
23018009	18	43
23018010	18	41
23018011	17	13
23018014	32	35
	33	26
23018015	32	37
	33	27
23018020	13	10
23018021	13	14
23018022	13	15
23018023	32	24
23018024	15	7
23018025	3	25
23018028	10	1
	15	41
	33	45
23018029	32	11
23018030	32	14
23018031	11	31
	15	44
	32	17
	33	49
23018036	15	48
23018037	33	42
23018038	33	44
23018039	33	48
23018042	14	7
23018044	4	6
23018047	12	9
23018047	24	6
23018048	12	22
	24	7
23018049	3	26
	12	18
23018050	12	19
23018051	12	17
23018052	12	20
23018053	12	12
23018054	12	14
23018055	24	3
23018056	24	4
23018057	24	5

PART NUMBER	FIG.	ITEM
23018058	24	2
23018059	24	1
23018062	25	1
23018063	25	12
23018064	25	14
23018065	25	10
23018066	25	11
23018067	25	5
23018068	25	6
23018069	25	8
23018070	25	4
23018071	32	63
23018072	2	7
23018073	6	3
23018074	11	16
23018075	7	7
23018076 NON-ASBESTOS	5	1
23018078	32	39
	33	24
23018079	32	58
	33	8
23018080	32	52
	33	12
23018081	32	57
	33	11
23018082	32	49
	33	29
23018083	32	32
	33	33
23018085	10	4
23018086	3	27
23018087	14	29
23018092	4	4
23018094	17	5
23018095	18	37
23018096	18	3
23018097	18	4
23018098	19	40
23018099	18	26
	19	2
23018100	18	51
	19	15
23018101	18	36
23018102	18	34
23018103	3	3
23018104	3	2
23018105	32	61
23018106	3	5
23018107	33	5
23018108	32	54
23018109	32	27
	33	40
23018110	32	26

PART NUMBER	FIG.	ITEM
23018110	33	41
23018111	3	15
23018112	15	16
23018113	11	20
23018114	32	25
	33	13
23018115	11	18
23018116	3	17
23018117	7	16
23018119	12	43
23018120	12	52
23018121	12	46
23018122	12	38
23018123	12	39
23018124	12	40
23018125	12	47
23018126	12	48
23018127	12	49
23018128	12	24
23018129	12	25
23018130	12	26
23018131	12	35
23018132	12	28
23018135	18	28
23018136	18	15
23018137	18	18
23018139	18	38
23018142	15	10
	32	22
23018143	15	9
	32	21
23018144	32	20
	33	34
23018145	32	10
23018146	32	9
23018147	15	2
23018148	32	8
23018149	15	13
23018150	15	12
23018151	15	6
23018152	15	18
23018153	15	21
23018154	15	19
23018155	34	25
23018156	32	59
	33	7
23018157	4	8
23018158	4	11
23018159	4	10
23018160	11	13
23018163	3	19
23018165	7	17
23018167	18	29
23018168	18	5

PART NUMBER	FIG.	ITEM
23018168	18	21
23018172	11	8
23018178	18	40
23018179	10	8
23018185	13	8
23018186	13	3
23018187	6	2
23018188	13	12
23018190	7	13
23018191	7	1
23018192	17	16
23018194	7	4
23018195	7	3
23018198	14	17
23018199	11	2
	15	30
23018205	11	26
	15	38
	15	51
23018206	11	27
	14	2
	21	31
	27	8
23018208	14	6
23018209	10	3
	15	37
23018210	15	35
23018221	11	3
23018222	20	4
23018225	18	27
	19	3
23018231	17	2
23018232	15	1
23018233	14	28
	33	51
23018234	3	23
	14	25
	34	20
23018235	13	18
23018236	32	53
	33	6
23018237	32	38
	33	25
23018245	12	42
23018247	13	7
23018252	20	5
23018254	7	18
	12	36
23018255	13	22
23018256	13	21
23018257	18	1
23018260	27	12
23018262	15	14
23018270	8	9
23018271	11	35
23018274	18	8
23018275	32	40
	33	17
23018276	32	45
	33	19
23018279	14	10
23018280	32	12
23018281	32	13
23018282	4	2
	17	6
	18	39
23018284	15	47
23018285	15	45
23018288	14	15
23018289	14	13
23018291	15	36
23018292	14	1
23018299	18	55
	19	19
23018611	21	13
23018612	21	16
23018613	21	14
23018614	21	20
23018615	21	10
23018616	21	30
23018617	21	29
23018618	21	11
23018619	21	26
23018622	21	5
23018623	21	1
23018624	21	19
23018753	3	12
23018960	18	23
23040579	3	20
23040580	3	6
23040581	4	12
23040582	3	30
23045026	11	22
23045027	11	33
23045028	11	36
23045114	8	2
23045115	19	24
23045116	4	3
23045119	6	1
23045125	34	7
23045126	34	8
23045129	8	1
23045130	2	8
23045131	2	6
23045132	5	2
23045145	27	4
23045191	14	21
	15	26

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PART NUMBER	FIG.	ITEM
29503503	19	5
29503594	22	17
29505538	22	24
29505981	7	7
29505983	7	2
29510162	2	8
29510166	18	28
29510167	18	29
29510168	18	37
29510169	18	34
29510170	32	61
29510171	11	20
29510172	32	40
	33	17
29510173	32	41
	33	20
29510174	32	11
29510175	32	14
29510181	3	15
29510209	14	24
29510211	2	6
29510212	15	18
29510213	15	16
29510214	33	42
29510215	33	44
29510216	33	50
29510235	16	2
29510236	16	1
29510240	3	17
29510241	15	34
29511027	12	6
29511028	12	2
29511029	12	1
29511630	5	2
29511632	11	17
29511850	3	2
29511851	3	5
29512613	11	13
29513282	3	9
29513283	16	11
29515106	15	21
29516442	15	54
29520291	17	11
	19	29
29520292	17	12
	19	30
29525171	15	33
29528638	16	7
29528639	16	10
29528640	16	8
29530330	17	4
	19	35
29533248	12	33
29533533	18	1
29533534	18	2
29533535	18	16
29533536	18	20
29533537	4	8
29533538	4	11
29533539	4	4
29533540	3	5
29533541	3	2
29533868	18	19
29536577	34	19
29536993	18	37
29537280	18	34
29537283	19	26
29537303	19	25
29537621	9	4
29537797	6	1
29537798	12	1
29538237	34	23
29539549	BULK	10
29541128	9	4
29541129	7	22
2973915	21	38
	22	33
	23	8
2989521	21	40
3030071-001	28	10
3030072-001	30	17
3909063	18	57
	19	21
40900	22	32
	23	6
443318	15	11
443767	11	30
444335	3	11
445567	21	17
445568	21	9
452692	11	37
453621	32	31
	33	36
454465	14	18
	15	23
455141	34	11
455160	15	20
455531	4	7
455675	15	8
	32	23
	34	6
455862	8	5
	21	6
456641	18	6
456826	22	6
457249	25	7
	25	13
504260	8	3

PART NUMBER	FIG.	ITEM
5108-87H	28	23
5212WLAB	13	20
530677	10	7
5703227	1	1
5703228	KITS	1
5703229	KITS	2
5703230	KITS	3
5703231	KITS	4
5703232	KITS	5
6432-35788-1	10	6
	14	5
6750199	7	6
6751633	15	5
6752556	14	19
6752556	15	24
6755007	19	6
6756606	3	14
6756778	7	20
6756782	9	7
6758036	9	5
6769636	11	6
	32	56
	33	9
6769825	12	21
6770820	9	3
6770822	9	4
6770845	9	2
6771005	22	7
6774565	3	10
6774817	23	39
6778016	22	21
	23	28
6831673	19	4
6831675	19	5
6831676	18	44
6831677	18	46
6831679	18	45
6831680	18	48
6832310	11	28
6832517	4	1
6832550	21	41
6832579	11	15
6833940	23	52
6833944	23	48
6833945	22	15
6833991	19	11
	32	42
	33	21
6833993	18	14
6834129	18	56
	19	20
6834309	19	9
	32	46
	33	18
6834339	18	13
6834512	18	35
6834817	18	54
	19	18
6834915	18	24
6835307	22	11
6835567	18	17
6835734	22	16
	23	53
6836102	15	4
6836108	19	41
6836110	32	47
	33	16
6836111	11	14
6836113	32	28
6836113	33	39
6836115	13	9
6836117	18	33
6836127	32	30
	33	37
6836128	32	29
	33	38
6836129	11	9
6836130	11	7
6836134	27	5
6836135	12	10
6836136	26	27
6836137	15	50
6836140	23	30
6836144	23	43
6836252	34	24
6836264	19	23
6836518	17	4
6836547	19	1
	19	14
6836676	9	1
6836799	19	17
6836873	7	25
6837389	21	4
6839375	18	22
6839376	18	47
6839514	19	10
	32	41
	33	20
6880251	18	12
6882689	27	6
6883031	18	9
6883033	18	11
6883697	14	8
	15	49
6884273	19	1
6884274	19	1
6884275	18	30
6884276	19	1

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6884730	17	7
	19	34
7707326	15	27
	32	7
7707842	7	11
7708035	34	18
7709601	12	11
7973325	35	6
830659	30	1
830661	28	8
830663	28	24
830664	29	26
830665	28	4
830666	28	13
830692	29	13
	31	18
830710	28	1
830713	28	22
830724	31	20
830824	31	1
8351366	7	12
8351717	7	8
8351718	7	9
8351725	7	10
8355955	36	4
840022	29	23
	31	10
840023	29	24
	31	9
840029	31	5
840035	30	10
840036	30	9
840037	30	1
840146	30	24
840206	30	29
840297	28	27
840687	30	14
840726	30	30
841163	29	17
	31	14
841233	30	5
841665	29	19
	31	12
842063	30	15
842171	30	16
842430	30	6
842448	28	21
842449	28	17
842451	28	18
842461	28	34
842618	31	26
842621	31	16
842623	31	3
842626	29	14
842627	29	31
842632	28	25
842633	28	5
842634	28	32
842635	28	7
842637	28	26
842638	28	19
842639	28	20
842642	29	8
	31	32
842648	30	22
842649	30	10
842650	30	7
842651	30	12
842653	30	28
842657	29	3
842666	28	33
842669	28	6
842675	31	24
842678	31	6
842679	29	1
842683	28	14
842684	31	30
842688	29	6
842689	29	27
842690	28	10
842697	30	17
842702	29	29
842704	30	21
842705	30	4
842742	29	22
	31	11
842885	28	11
842894	28	3
	28	36
842999	31	22
843003	29	20
843003	31	34
843088	31	2
843090	29	16
	31	15
843095	29	12
	31	19
843141	30	32
843142	30	31
843211	31	30
843247	30	17
850231	30	18
850233	31	33
850236	29	9
8622757	17	15
	19	27
8627650	8	11
870068	29	7

PART NUMBER	FIG.	ITEM
870068	31	31
870102	29	4
	31	27
870103	29	25
	31	8
870104	31	29
870115	28	15
870140	31	25
870151	29	18
870181	31	13
870539	28	30
870561	28	16
870642	29	5
	31	28
870647	31	21
870703	28	35
870705	28	2
870709	28	31
870861	30	34
870888	28	39
871049	30	13
871294	28	29
871298	30	3
871902	30	27
871904	30	23
871908	30	2
	30	8
871941	28	12
872492	30	11
872821	30	25
872885	29	30
872992	30	20
872994	30	19
873017	29	11
	30	35
873173	29	10
873173	31	23
893025	11	17
91501166	14	11
940734	29	13
	31	18
940735	29	15
	31	17
940736	30	31
940738	30	36
9408993	6	6
9409000	8	12
9409011	29	2
9409012	32	5
	33	59
	34	2
9409014	21	23
	28	38
	33	56
9409015	23	3
9409028	11	10
	15	22
	32	55
	33	10
9409030	3	29
	6	10
	25	20
	31	35
9409060	13	11
9409062	22	37
	23	25
9409067	31	7
9409072	32	19
	33	35
9409074	32	3
	33	57
9409076	12	16
	21	27
9409082	2	9
9409082	5	7
	6	8
	27	2
9409088	30	33
9409126	26	39
9409224	25	16
	26	2
	33	55
9409225	25	17
	28	9
9409239	20	7
9409253	23	10
9409513	33	53
9409621	22	2
	24	9
	28	37
940968	30	37
9410714	13	5
9411180	13	6
9415972	21	22
9416011	12	45
	32	1
	33	58
9416754	16	9
9419287	23	2
	26	4
9421003	15	3
9422845	14	9
	21	21
	22	36
	23	11
	32	4
	34	17

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EXPENDABLE AND DURABLE ITEMS LIST 0024 00

INTRODUCTION

Scope

This work package lists expendable and durable items that you will need to operate and maintain the X200-4/4A Transmissions. This list is for information only and is not authority to requisition the listed items. These items are authorized to you by CTA 50-970, Expendable/Durable Items (Except Medical, Class V Repair Parts, and Heraldic Items), or CTA 8-100, Army Medical Department Expendable/ Durable Items.

Explanation of Columns in the Expendable/ Durable Items List.

Column (1) - Item Number. This number is assigned to the entry in the list and is referenced in the narrative instructions to identify the item (e.g., “Use Lubricating Oil, Grade 15W-40 [WP 0024, Item 12]”).

Column (2) - Level. This column is the lowest level of maintenance that requires the listed item (C = Operator/Crew, F = Direct Support, H = General Support, D = Depot).

Column (3) - National Stock Number. This is the NSN assigned to the item which you can use to requisition it.

Column (4) - Item Name, Description, Commercial and Government Entity Code (CAGE), and Part Number (P/N). This column provides the other information you need to identify the item.

Column (5) - Unit of Measure (U/M). This code shows the physical measurement or count of an item, such as gallon, dozen, gross, etc.

EXPENDABLE AND DURABLE ITEMS LIST

Table 1. Expendable and Durable Items List.

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) ITEM NAME, DESCRIPTION, CAGE, PART NUMBER	(5) U/M
1	H	8040-00-118-2695	Adhesive, Sealant, Silicone, RTV, Non-corrosive, Type 1, 1/2 oz. Primer and 2.8 oz. Adhesive in a 3 oz. Tube. (81349) M46146AWY	KT
2	F	7510-00-205-1438	Bands, Rubber No. 19 (81348) ZZ-R-1415	BX
3	F	5510-00-220-6194 5510-00-274-5300	Block, Wood, Lumber, Soft wood (81348) MML751 2x4 in x 8 ft 4x4 in x 14 ft	BF

EXPENDABLE AND DURABLE ITEMS LIST – Cont. 0024 00

Table 1. Expendable and Durable Items List – Cont.

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) ITEM NAME, DESCRIPTION, CAGE, PART NUMBER	(5) U/M
4	H	8020-00-224-8004	Brush, Artist's (17866) 2920SIZE11 (81351) 42-57ASIZE6	EA
5	H	6830-00-247-0619	Carbon Dioxide, Technical (Dry Ice) (81348) BB-C-104	LB
6	F	5350-00-221-0872	Cloth, Abrasive, Crocus (58536) A-A-1206	PK
7	C	8305-01-152-3587	Cloth, Batiste, Lint-free, White (81349) MIL-C-4919	YD
8	H	6850-00-264-6572	Desiccant, Activated (81349) MIL-D-3464 (16210) PROTEK-SORB 121 (19207) 8355706 42 Units, Made From 3 Each 16 Unit Packs of (19207) 8355706 (16 units per bag, 150 bags per drum)	DR
9	G	8415-00-268-7859	Gloves, Leather (58536) A-A-50022	PR
10	F	9150-00-944-8953	Grease, High Temperature (83149) MIL-RF-81322	CN
11	H	7510-00-894-0774	Ink, Etching, Acid (12744) A15-1BLACK (36969) DR1MARQUETTEBLACK15	BT
12	C	9150-01-421-1427	Lubricating Oil, Engine (81349) MIL-L-2104, Grade 15W-40	GL
13	F	7520-00-973-1059 7520-00-973-1059	Marker, Tube Type, Black (95070) MARKSALOTBLACK (81348) GG-M-00114	DZ
14	F	9150-00-250-0926	Petrolatum, Technical (Petroleum Jelly) (81348) VV-P-236	CN

Table 1. Expendable and Durable Items List. Cont.

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) ITEM NAME, DESCRIPTION, CAGE, PART NUMBER	(5) U/M
15	F	7920-00-205-1711	Rag, Wiping, 50 lb Bale (58536) A-A-531	BE
16	F	8030-00-849-0071	Sealing Compound, Gasket (81349) MIL-S-45180	TB
17	F	8030-00-111-2762	Sealant, Lubricating, Thread Locking (81349) MIL-S-46163	BT
18	F	9515-01-380-9063	Shim Stock, 1/32 in thick (81348) MIL-S-22499/3	SH
19	F	6810-00-141-6078	Sodium Phosphate, Tribasic Anhydrous (81348) O-S-642	LB
20	C	6850-01-277-0595 7930-01-328-2030	Solvent, Cleaning (59557) 134 HI-SLOV Cleaning Compound, Solvent, Detergent (0JVH6) PF DEGREASER	GL
21	F		Strap, Tie Down (73342) 29539549	PK
22	F	7510-00-473-9513	Tape, Masking (81349) MIL-T-23397	RL
23	F	4020-00-291-5901	Twine, Cotton, 16 –Ply (81348) T-T-871	LB

END OF WORK PACKAGE

TOOL IDENTIFICATION LIST 0025 00

This Work Package lists all common tools, and supplements and special tools/fixtures needed to maintain the X200-4/4A Transmission.

Explanation of Columns in the Tool Identification List

Column (1) – Item Number. This number is assigned to the entry in the list and is referenced in the initial setup to identify the item (e.g., Pressure Gauge Kit (WP 0025 00, item 16)).

Column (2) – Item Name. This column lists the item by noun nomenclature and other descriptive features (e.g., Gauge, belt tension).

Column (3) – National Stock Number. This is the National Stock Number (NSN) assigned to this item; use it to requisition the item.

Column (4) – Part Number/CAGE. Indicates the primary number used by the manufacture (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. The manufacture's Commercial and Government Entity Code (CAGEC) is also included.

Column (5) – Reference. This column identifies the authorizing supply catalog or RPSTL for items listed in this Work Package.

TOOL IDENTIFICATION LIST

(1) ITEM NO.	(2) ITEM NAME	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER/CAGE	(5) REFERENCE
1	Adapter, Socket Wrench, 1/2 Inch to 3/8 Inch Square Drive	5120-00-240-8702	5523A54 39428	GSA
2	Adapter Kit, Container	5342-01-242-6798	11650180 19207	TM 9-2520-272-34&P
3	Bar and Stud Assembly	5120-01-048-2158	J24204-2 33287	TM 9-2520-272-34&P
4	Compressor, Clutch Spring	5120-01-176-3890	J23616 25341	TM 9-2520-272-34&P
5	Clutch Compressor, Spring	5120-01-176-3891	J2363-02 25341	TM 9-2520-272-34&P
6	Compressor, Clutch Spring	5120-01-054-7221	J24452 33287	TM 9-2520-272-34&P
7	Fixture Assembly, Leak Test	2520-01-242-6797	11650178 19207	TM 9-2520-272-34&P

(1) ITEM NO.	(2) ITEM NAME	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER/CAGE	(5) REFERENCE
8	Gauge, Thickness	5210-01-355-2126	FB300A 55719	TM 9-2520-272-34&P
9	Heater Gun Type, Electric	4940-01-028-7493	HG-501A 83284	GSA
10	Hoist, Lifting 1 Ton Capacity	3950-01-170-6276	00104 08722	GSA
11	Hook, Chain, S	4030-01-178-7310	11650102 19207	TM 9-2520-272-34&P
12	Inserter and Remover Seal	5120-01-096-3493	12268021 19207	TM 9-2520-272-34&P
13	Inserter, Seal	5120-01-242-6796	11650176 19207	TM 9-2520-272-34&P
14	Installer, Lock ring	5120-01-054-4050	J24453 33287	TM 9-2520-272-34&P
15	Lifter, Pump Support	5120-01-054-4056	J24473 33287	TM 9-2520-272-34&P
16	Pressure Gauge Kit	6695-01-242-6795	11650182 19207	TM 9-2520-272-34&P
17	Protector, Inner Seal	4910-01-178-6551	J21362 25341	TM 9-2520-272-34&P
18	Puller Kit, Universal	5180-01-048-2153	J24171 33287	TM 9-2520-272-34&P
19	Rotary Tool Kit, Electric (grinder)	5130-01-014-6856	396 18531	GSA
20	Shop Equipment, Automotive Maintenance and Repair: Field Maintenance, Basic, Less Power	4910-00-754-0705	SC 4910-95CLA31 19204	GSA
21	Sling, Engine and Transmission, Motor Vehicle	4910-01-086-1681	12268037 19207	TM 9-2520-272-34&P
22	Sling, Multiple Leg	3940-01-087-0155	12268036 19207	TM 9-2520-272-34&P
23	Socket, Socket Wrench	5120-00-906-1051	8355955 19207	TM 9-2520-272-34&P
24	Screwdriver Attachment, Socket Wrench, 1/8 inch (Allen)	5120-00-516-4979	TW-4B 96508	GSA

(1) ITEM NO.	(2) ITEM NAME	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER/CAGE	(5) REFERENCE
25	Screwdriver Attachment, Socket Wrench, 3/8 inch (Allen)	5120-00-683-8597	TW-6B 96508	GSA
26	Socket, Socket Wrench, 11/16 inch (Allen)	5130-01-348-9416	IMF220 55719	GSA
27	Tool Kit, General Mechanic's Automotive	5180-00-177-7033	SC 5180-90-CL-N26 50980	GSA

END OF WORK PACKAGE

MANDATORY REPLACEMENT PARTS LIST 0026 00

This Work Package includes a list of all mandatory replacement parts referenced in the Work Package initial setups and procedures. These are items that must be replaced during the maintenance or repair whether they have failed or not.

MANDATORY REPLACEMENT PARTS LIST

Table 1. Mandatory Replacement Parts List.

ITEM NO.	PART NUMBER/ CAGEC	NSN	NOMENCLATURE	QTY
1	MS28778-10 96906	5331-00-108-5691	O-Ring	1
2	MS28778-20 96906	5331-00-816-3546	O-Ring	1
3	120217 72582	5310-00-922-2017	Washer, Lock	1
4	159184 24617	5305-00-801-4506	Screw, Machine	4
5	190139 24617	5310-00-008-0553	Nut, Self-Locking, Hex	24
6	443318 24617	5310-01-112-7932	Nut, Self-Locking, Hex	1
7	504260 80201	5330-01-216-4005	Seal, Plain Encased	1
8	3909063 24617	5310-01-143-0542	Push-On Nut	8
9	5703232 19207	4330-01-214-9303	Parts Kit, Fluid Pressure Filter	1
10	6752556 73342	5310-00-799-4910	Washer, Spring Tension	2
11	6758036 73342	2520-00-679-6974	Seal Ring, Transmission	1
12	6770820 73342	5331-00-821-4490	O-Ring	1
13	6832517 73342	5331-00-165-1943	O-Ring	1
14	6832550 73342	5330-01-218-7143	Gasket	1
15	6836113 73342	5330-01-218-1565	Seal Ring, Metal	2
16	6836115 73342	5330-01-216-6765	Seal Ring, Metal	2
17	6836127 73342	5325-01-215-9687	Ring Retaining (Seal Ring, Metal)	2
18	6836128 73342	5330-01-215-9503	Seal Ring, Metal	2
19	6836129 73342	5331-01-216-5704	O-Ring	2

MANDATORY REPLACEMENT PARTS LIST - Cont 0026 00

ITEM NO.	PART NUMBER/ CAGEC	NSN	NOMENCLATURE	QTY
20	6836130 73342	5331-01-216-5705	O-Ring	2
21	6836137 73342	5330-01-245-7162	Seal, Plain Encased	2
22	6836264 73342	5330-01-214-1479	Seal Ring, Metal	2
23	6883031 73342	5330-01-083-3065	Seal, Plain	1
24	6883033 73342	2520-01-079-6700	Seal, Transmission	1
25	6883697 73342	5330-01-216-4006	Seal, Plain Encased	2
26	11649930 19207	5310-00-402-5220	Nut, Self-Locking, Hex	1
27	23011456 73342	5330-01-280-5809	Seal, Plain	2
28	23011475 73342	2840-01-185-0146	Seal Ring, Transmission	2
29	23015806 73342	5331-01-498-9979	O-Ring	1
30	23016014 73342	5331-01-291-5058	O-Ring	2
31	23016564 73342	5330-00-631-8125	Gasket	2
32	23017880 73342	5330-01-216-4012	Gasket	2
33	23017882 73342	5330-01-216-6654	Gasket	2
34	23018072 73342	5330-01-216-4015	Gasket	1
35	23018076 NON-ASBESTOS 73342	5330-01-406-7801	Gasket	1
36	23018080 73342	5330-01-216-7424	Seal, Brake Coolant	2
37	23018187 73342	5330-01-217-2201	Gasket	1
38	23018191 73342	5330-01-216-6657	Gasket	1
39	23018194 73342	5340-01-217-2305	Locking Plate, Nut and Bolt	4
40	23018210 73342	4730-01-499-2506	Plug, Pipe	1
41	23018233 73342	5330-01-221-9177	Seal, Nonmetallic Round Section	1

MANDATORY REPLACEMENT PARTS LIST - Cont 0026 00

ITEM NO.	PART NUMBER/ CAGEC	NSN	NOMENCLATURE	QTY
42	23018234 73342	5330-01-216-5711	Retainer, Packing	2
43	23018235 73342	5330-01-238-4613	Packing, Preformed	1
44	23018247 73342	5331-01-216-5703	O-Ring	2
45	23018753 73342	5331-00-219-2548	O-Ring	1
46	23040579 73342	5331-01-219-2546	O-Ring	2
47	23040580 73342	5331-01-219-2547	O-Ring	2
48	23040581 73342	5331-00-167-5110	O-Ring	4
49	23040582 73342	5331-01-219-2545	O-Ring	2
50	23045126 73342	5331-01-216-4009	O-Ring	1
51	23045129 73342	5330-01-217-4041	Gasket	1
52	23045344 73342	5330-01-216-5698	Seal, Plain Encased	1
53	23045477 73342	5331-01-216-2815	O-Ring	1
54	23046647 73342	5330-01-238-5879	Gasket	2
55	23046648 73342	5331-01-237-2967	O-Ring	2
56	23047805 73342	5330-01-251-1931	Gasket	1
57	23048171 73342	5330-01-266-3312	Retainer, Packing	2
58	23048292 73342	5330-01-287-5798	Packing, Preformed	1
59	23049059 73342	5330-01-286-5468	Retainer, Packing (Seal Ring, Hook)	2
60	29510236 73342	5330-01-420-8736	Gasket	1
61	29520291 73342	5330-01-509-4404	Seal, Plain (Inner)	2
62	29520292 73342	5330-01-509-0298	Seal, Plain (Outer)	2

END OF WORK PACKAGE

ILLUSTRATED LIST OF MANUFACTURED ITEMS 0027 00

THIS WORK PACKAGE COVERS:

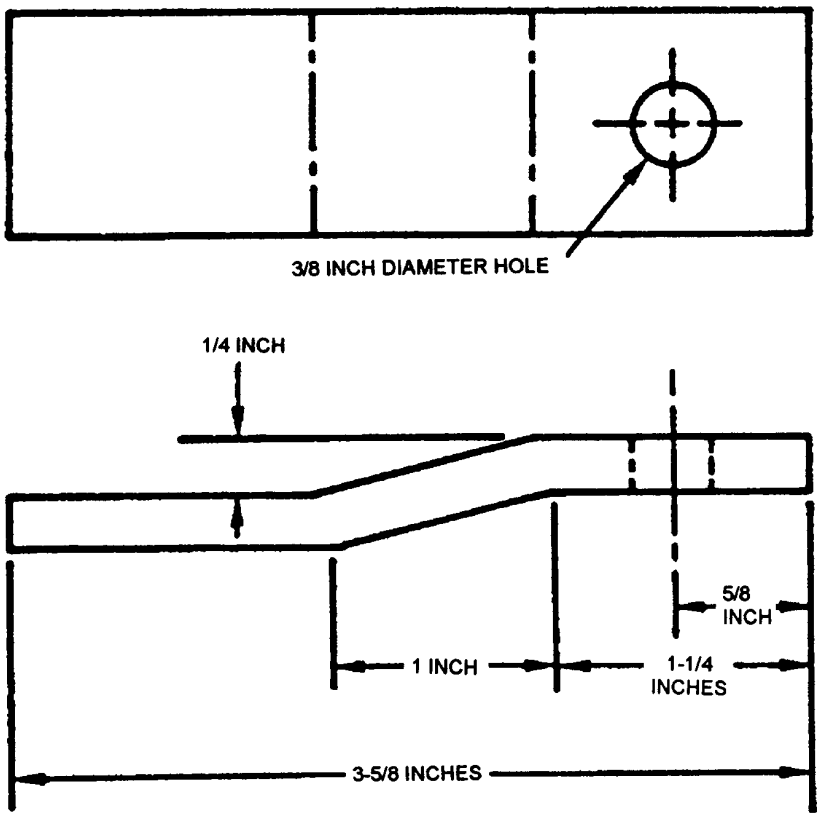
The instructions for making the simple tools used in some maintenance tasks.

SCOPE

This work package contains the instructions for making the simple tools used in some maintenance tasks. Materials are addressed as necessary.

Item 1. RETAINING FIXTURE

Use to remove Left End Cover Assembly.



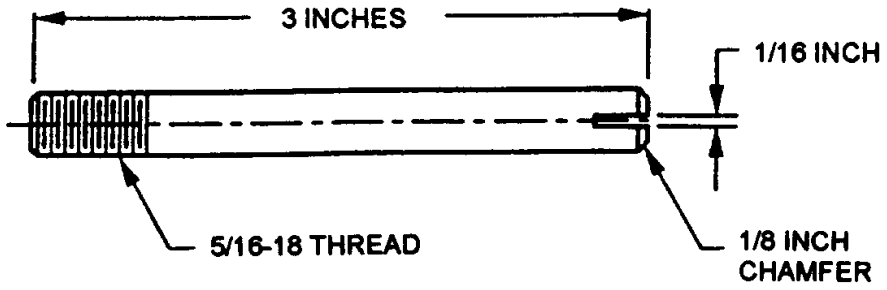
Make fixture from 1/4 x 1-inch steel bar stock. Grind off burs and sharp corners.

Material: Steel.

ILLUSTRATED LIST OF MANUFACTURED ITEMS – Cont. 0027 00

Item 2. GUIDE PIN

Use to install Converter Element Components.

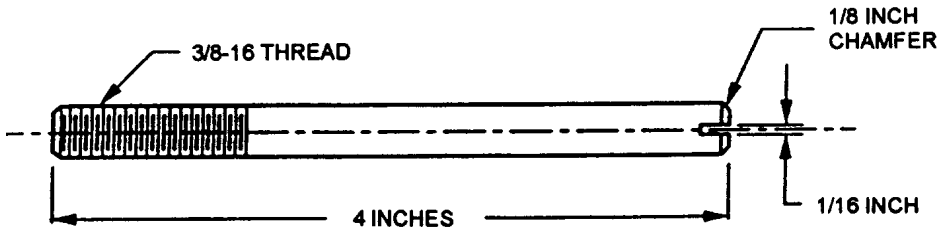


Make guide pin by cutting head off 5/16-18 x 3 inch bolt. Cut 1/16 inch slot for screwdriver. Grind off all burrs.

Material: Steel.

Item 3. GUIDE PIN

Use to install Left End Cover Assembly.



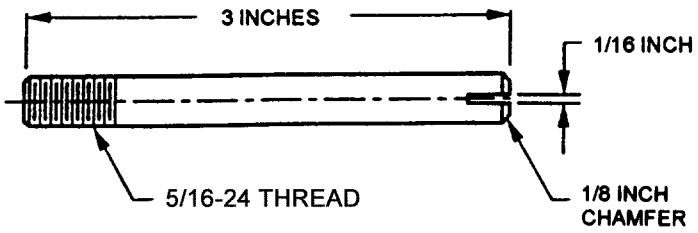
Make guide pin by cutting head off 3/8-16 x 4 inch bolt. Cut 1/16 inch slot for screwdriver. Grind off all burrs.

Material: Steel.

ILLUSTRATED LIST OF MANUFACTURED ITEMS – Cont. 0027 00

Item 4. GUIDE PIN

Use to install Transmission Top Components.

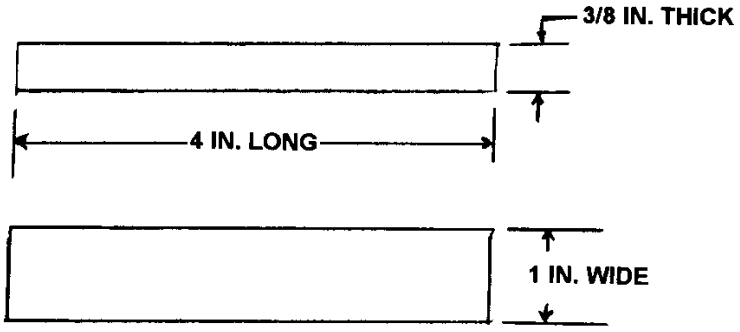


Make guide pin by cutting head off 5/16-24 x 3 inch bolt. Cut 1/16 inch slot for screwdriver. Grind off all burrs.

Material: Steel.

Item 5. SHIM

Use to repair center housing, install 1st clutch piston.



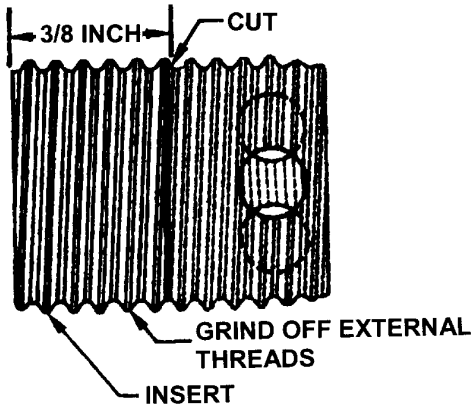
Make shim from 3/8 inch steel plate.

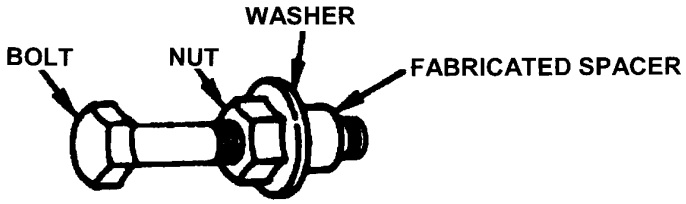
Material: Steel.

ILLUSTRATED LIST OF MANUFACTURED ITEMS – Cont. 0027 00

Item 6. INSERT INSTALLER, REMOVER

Use to Repair Center Housing Components.





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

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 external threads of insert.

Material: Steel.

P/N	Insert	Bolt	Nut	Washer
452692	3/8-16 thread	5305-01-387-0114	5310-00-680-7270	5310-01-389-7014
23018271	1/2-13 thread	5305-00-071-2079	5310-00-808-8019	5310-00-614-3506
23049118	5/16-18 thread	5306-01-210-0767	5310-01-064-3422	5310-00-880-5977
23049119	3/8-16 thread	5305-01-387-0114	5310-00-680-7270	5310-01-389-7014

END OF WORK PACKAGE

STANDARD TORQUE SPECIFICATIONS 0028 00

SCOPE

The purpose of this work package is to provide a reference of standard torque specifications used in maintenance and repair of the X200-4/4A Transmission and it's metal storage and shipping container.

HOW TO USE TORQUE TABLES

NOTE

Manufacturer's marks may vary. Grades and manufacturer's marks appear on the screw/bolt head.

1. Identify grade of bolt by looking at the markings on the top of the bolt head.
2. Measure the diameter of the screw/bolt you are installing.
3. Count the number of threads per inch or use a pitch gauge.
4. Under the heading SIZE, look down the column until you find the diameter of the screw/bolt you are installing.
5. Under the heading THREADS, find the number of threads per inch that matches the number of threads that you counted in Step 3.
6. Under the heading TORQUE, find the torque value for the screw/bolt that you are installing.
7. For nuts installed on bolts see Table 3.

STANDARD TORQUE SPECIFICATIONS

Table 1. Torque values in pound feet/ Newton meters
Standard heat-treated (grade 5) screws and bolts.

Size	Threads	Torque
1/4	20	9-11 (12-15)
	28	10-12 (14-16)
5/16	18	13-16 (18-22)
	24	14-18 (19-24)
3/8	16	26-32 (35-43)
	24	33-40 (45-54)
7/16	14	42-50 (57-68)
	20	50-60 (68-81)
1/2	13	67-80 (91-108)
	20	83-100 (112-136)
5/8	11	117-140 (159-190)
	18	134-182 (182-217)
3/4	16	215-250 (291-339)

STANDARD TORQUE SPECIFICATIONS - Cont. 0028 00

STANDARD TORQUE SPECIFICATIONS – Cont.

Table 2. Torque values in pound feet/ Newton meters
Special heat-treated (grade 8) self-locking screws, bolts, and Allen-head screws.

Size	Threads	Torque
1/4	20	9-11 (12-15)
	28	10-12 (14-16)
5/16	18	17-20 (23-27)
	24	19-23 (26-31)
3/8	16	36-43 (49-58)
	24	41-49 (56-66)
7/16	14	54-65 (73-88)
	20	64-77 (87-105)
1/2	13	81-97 (110-131)
	20	96-115 (130-156)
5/8	11	164-192 (222-260)
	18	193-225 (262-305)
3/4	16	337-385 (457-522)

STANDARD TORQUE SPECIFICATIONS – Cont.

Table 3. Torque values in pound feet/ Newton meters
Nuts on bolts.

Size	Threads	Torque
5/16	24	14-18 (19-24)
5/8	18	134-160 (182-217)
3/4	16	215-250 (291-339)

END OF WORK PACKAGE

GLOSSARY

WORDS AND TERMS

Term	Definition
	A
Acceptance Inspection	The examination and /or testing of material to determine acceptance to specified requirements set forth in purchase descriptions, contracts, and/or other criteria.
Acceptable Quality Level	The maximum percent defective or the maximum number of defects per hundred units that can be considered satisfactory for the purpose of sampling inspection.
Alloy	A metallic substance composed of two or more elements which possesses properties different from those of its constituents.
Ampere-Turn	An ampere-turn is the product of the number of turns in the coil times the number of amperes used.
Attribute	A characteristic or property which is appraised in terms of whether it does not exist with respect to a given requirement.
Axial	Situated around, in the direction of, on, or along an axis.
	B
Base Metal	Original machined or cast metal form or shape. Parent metal.
Bend	A force change in configuration due to wear, mutilation, or deterioration.
Black Light	Light in the near-ultraviolet range, used in the inspection of fluorescent penetrant or magnetic particles.
Blow Holes	Voids caused by gases; these gases may be either entrapped or liberated in the metal (castings) as it solidifies.
Brinelling	A hardening of metal from excessive loading or pounding.
Burr	Local rise of material forming a protruding sharp point or high spot.
	C
Chipping	Loss of material over a larger area than that of nicks.
Control Valve Body	This unit contains most of the hydraulic controlling devices such as the steering valves, range selection valve, main pressure regulator, converter pressure regulator, and lubricating pressure regulator.
Component	Any part or group of parts that, when together, form a subassembly or assembly.

GLOSSARY – Cont.

WORDS AND TERMS Cont.

Term	Definition
	C Cont.
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.
Counterbore	A sunken machined surface around a machined hole usually for seal rings or packings.
Crack	Surface or material break caused by stress which results in partial or complete separation of material.
Critical Defect	A defect that judgment and experience indicate is likely to result in hazardous or unsafe conditions for individuals using, maintaining, or depending upon the product or is likely to prevent performance of the tactical function of the major end item.
	D
Deburr	To remove a burr from a machined surface.
Defect	Any nonconformance of a characteristic with specified requirements.
Deviation	Written authorization, granted prior to the manufacture of an item, to depart from a particular performance or design requirement of a contract, specification, or referenced document, for a specific number of units or special period of time.
Diagnostic	Pertaining to the act of examining, observing, and analyzing systems to determine the condition of that being inspected.
Distortion	Loss of original shape, either local or over an area. Includes bends, twists, warps, bulges, dents, kinks, flattening, or crushing.
DMWR	Depot maintenance work requirement.
	E
Elongation	Stretching or lengthening of original dimensions; usually applies to bolt holes.
End Cover	Right and Left Hand Assemblies. Each unit contains an output planetary, a brake, a steering pinion, gears and an output flange or coupling.
Excessive Wear	Obvious wear beyond expectations. Determined by inspector's experience. Term is applicable to parts visually inspected.

GLOSSARY – Cont.

WORDS AND TERMS Cont.

Term	Definition
	F
Ferromagnetic	Materials which are strongly attracted by a magnetic field.
Final Inspection Record	A checklist and record of inspections and verification of results obtained during final tests and adjustments.
First Article Inspection	After acceptance by the contractor quality assurance activity, and approval of the first overhauled unit, TACOM key inspection will conduct a complete first article inspection and approval for production.
Fit	The term “fit” as used in this manual refers to the mating of associated parts and/or components. a. A loose fit is the condition where sufficient tolerance is provided between the associated parts to allow free movement. b. A tight, interference, or press fit is when one part with a given outer diameter is pressed into a part with an equal or smaller inner diameter to prevent associated parts from moving in relation to each other. c. A shrink fit is provided when one part with a given outer diameter is chilled and the other part with a given outer diameter is heated to permit mating. A shrink fit is accomplished when the associated parts return to normal, ambient temperature.
Front Housing	This unit consists of a large aluminum casting containing the main input oil pump, output oil pump, and oil filter. It is assembled with the rear housing as a matched set and is identified by serial number near the top splitline.
Fluorescent	The property of certain materials to emit visible light when exposed to near ultraviolet or black light.
	G
Gall	A scratch or groove caused by rubbing.
Gouge	A groove in or breakdown of metal surfaces from foreign contact under heavy pressure. Usually, loss of material rather than displacement.
Groove	A long, narrow channel or depression.

GLOSSARY – Cont.

WORDS AND TERMS Cont.

Term	Definition
	H
	I
In-Process Inspection	Inspection which is performed during the manufacture or repair cycle in an effort to prevent defects from occurring and to inspect the characteristics and attributes which are not capable of being inspected at final inspection.
Inspection	The examination and testing of supplies and services to determine whether they conform to specified requirements.
	J K
	L
Leakage	Evidence of a fluid beyond its container.
	M
Magnetic Particle	A nondestructive inspection method for inspection locating discontinuities at or below the surface in ferromagnetic materials. It utilizes broken magnetic fields to attract finely divided magnetic particles which mark the defect.
Malfunction	Failure to function properly as designed.
Measuring and Test Equipment	All devices used to measure, gauge, test, inspect, diagnose, or otherwise examine materials, supplies, and equipment to determine compliance with technical requirements.
Mobilization	The act of assembling and organizing national resources to support national objectives in time of war or other national emergencies.
	N
Newton	Metric term for force.
Newton Meter	Metric term for torque.
Nick	A small groove or notch. Usually, displacement of material rather than loss.
Nonconformance	The failure of a unit or product to conform to specified requirements for any quality characteristics.

WORDS AND TERMS Cont.

GLOSSARY – Cont.

Term	Definition
	O
One Hundred Percent	Inspection in which specified characteristics of each unit inspection or product are examined or tested to determine conformance with requirements.
Overhaul	That maintenance effort/service/action necessary to restore an item to a completely serviceable/operational condition as prescribed by maintenance standards in appropriate technical publications.
Overheating in	A condition indicated by discoloration of parts which usually results a loss of hardness. Usually caused by lack of lubrication, malfunction of parts, or excessive wear.
	P
Parent Metal	Original machined or cast metal form or shape. Base metal.
Peen	To deform metal by pounding with a hard object.
Penetrant Inspection	A process to detect discontinuities open to the surface, such as cracks, cold shuts, laps, porosity, etc. A penetrating liquid (fluorescent or visible dye) is applied to the surface and is drawn into the discontinuity to indicate the flaw when the developer is applied.
Physical	Method of inspecting parts requiring action.
Pitting	A material surface cavity, usually with defined rough edges. Usually caused by rust and corrosion.
Pound Foot	Unit of energy equal to the amount of energy required to raise a weight of one pound to a height of one foot.
Pound Inch	Unit of energy equal to the amount of energy required to raise a weight of one pound to a height of one inch.
	Q
Quality	The composite of all attributes or characteristics, including the performance, of an item or product.
Quality Assurance	A planned and systematic pattern of all actions necessary to provide adequate confidence that the item or product conforms to established technical requirements.
Quality Control	A management function whereby control of quality of raw or produced material is exercised for the purpose of preventing production of defective material.

WORDS AND TERMS Cont.

GLOSSARY – Cont.

Term	Definition
	Q Cont.
Quality Program	The requirement for the establishment and maintenance of a requirement quality program that shall assure adequate quality throughout all areas of contract performance; i.e., design, development, fabrication, processing, assembly, inspection, test, maintenance, packaging, shipping, storage, and site installation.
	R
Random Sample	A sample selected in such a way that each unit of the population has equal chance of being selected.
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.
Rear Housing	This unit consists of a large aluminum casting containing the low range servo, reverse range servo, band adjusting screws and the band apply arms and linkages. It is assembled with the front housing as a matched set and is identified by serial number near the top splitline.
Rebuild	Consists of those services/actions for the restoration of unserviceable equipment to a like new condition in accordance with original manufacturing standards.
Reliability	The probability that an item will perform its intended function for a specified interval under stated conditions.
Repair	A process of fixing something that is damaged or worn or does not operate or function properly.
Rub	Evidence of friction caused by contact of two items.
	S
Sample	One or more units of production drawn from a lot or batch, the units of the sample being selected at random without regard to their quality.
Scoring	Deep tears or brakes in material surfaces from foreign contact under pressure. May show temperature effect from high friction.

GLOSSARY – Cont.

WORDS AND TERMS Cont.

Term	Definition
	S Cont.
Scratch	A slight tear or break in material surface from momentary foreign Contact
Specification	A document intended primarily for use in procurement, which clearly and accurately describes the essentials and technical requirements for items, materials, or services, including the procedures by which it will be determined that the requirements have been met. They may also contain preservation, packaging, and marking requirements.
Spline	A keyway between two mating parts. Usually used with multiple keyways.
Surface Abrasions	A surface condition where surface material is displaced or removed.
	T
Testing	An element of inspection; generally denotes the determination by technical means of the properties or elements of supplies, or components thereof, including functional operation, and involves the established scientific principles and procedures.
Tolerance	Permissible deviation or variation from exact dimensions or standards.
Torque	A force or combination of forces that produces or tends to produce a twisting or rotating motion. The amount of force applies to fasteners as prescribed by tightening instructions.
Torque Converter	The torque converter (also called converter) consists mainly of a turbine, a pump and a stator. The converter transmits power from the engine to the transmission gearing. The torque converter serves as both a torque multiplier and a fluid coupling.
	U
Unserviceable	Parts, components, assemblies, etc., that are worn, damaged, mutilated, etc., to the extent that they cannot be used for their intended purpose.
	V
Visual	Method of inspecting parts using unaided human eye.

GLOSSARY – Cont.

WORDS AND TERMS Cont.

Term	Definition
	W
Waiver	A written authorization to accept a configuration item or other designated items which, during production or after having been submitted for inspection, are found to depart from specified requirements but are nevertheless considered suitable for use “as is” or after rework by an approved method.
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.
Wear Limits	An indication of the point to which a part may be worn before replacement is necessary.
	X Y Z

SYMBOLS

±	Plus or Minus
o	Degree
%	Percent
*	Footnote
**	Footnote

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RECOMMENDED CHANGES TO PUBLICATIONS AND BLANK FORMS For use of this form, see AR 25-30; the proponent agency is OAASA	Use Part II *(reverse)* for Repair Parts and Special Tool Lists (RPSTL) and Supply Catalogs/Supply Manuals (SC/SM).	DATE 30 June 2004

TO: *(Forward to proponent of publication or form) (Include ZIP Code)* Technical Publication Information Office TACOM-RI 1 Rock Island Arsenal Rock Island Arsenal, IL 61299-7630	FROM: *(Activity and location) (Include ZIP Code)* Co. B 1st Tracked Vehicle BN. 3rd MARDIV FMF FPO San Francisco, CA. 96602

PART I - ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS

PUBLICATION/FORM NUMBER	DATE	TITLE
TM 9-2520-272-34&P	15 Feb. 2004	DIRECT, AND GENERAL SUPPORT MAINTENANCE MANUAL (INCLUDING RPSTL)

ITEM	PAGE	PARA-GRAPH	LINE	FIGURE NO.	TABLE	RECOMMENDED CHANGES AND REASON
1	WP 0009 0009 00-2	3	2			CORRECT SPELLING FROM 'WORD' INSTALLL TO INSTALL

* *Reference to line numbers within the paragraph or subparagraph.*

TYPED NAME, GRADE OR TITLE	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION	SIGNATURE
Carter, R. Sgt.	317-378-4187	R. Carter, Sgt.

TO: *(Forward direct to addressee listed in publication)*	FROM: *(Activity and location) (Include ZIP Code)*	DATE
Technical Publication Information Office TACOM-RI 1 Rock Island Arsenal Rock Island Arsenal, IL 61299-7630	Co. B 1st Tracked Vehicle BN. 3rd MARDIV FMF FPO San Francisco, CA. 96602	30 June 2004

PART II - REPAIR PARTS AND SPECIAL TOOL LISTS AND SUPPLY CATALOGS/SUPPLY MANUALS

PUBLICATION NUMBER	DATE	TITLE
TM 9-2520-272-34&P	15 Feb. 2004	DIRECT, AND GENERAL SUPPORT MAINTENANCE MANUAL (INCLUDING RPSTL)

PAGE NO.	COLM NO.	LINE NO.	NATIONAL STOCK NUMBER	REFERENCE NO.	FIGURE NO.	ITEM NO.	TOTAL NO. OF MAJOR ITEMS SUPPORTED	RECOMMENDED ACTION
WP 0053 0053 00-2			2520-01-099-0000		53	2		CORRECT NOMENCLATURE FROM "WORD" PIN TO SUPPORT

PART III - REMARKS *(Any general remarks or recommendations, or suggestions for improvement of publications and blank forms. Additional blank sheets may be used if more space is needed.)*

TYPED NAME, GRADE OR TITLE	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION	SIGNATURE
Carter, R. Sgt.	317-378-4187	A. Carter, Sgt.

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By Order of the Secretary of the Army:

PETER J. SCHOOMAKER
General, United States Army
Chief of Staff

Official:

SANDRA R. RILEY
Administrative Assistant to the
Secretary of the Army

0407601

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METRIC CONVERSION CHART

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 Kilometers	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

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 = I Megagram = I . I Short Tons

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

Liquid Measure

1 Milliliter = 0.001 Liters = 0.0338 Fluid Ounces
1 Liter = 1000 Milliliters = 33.82 Fluid Ounces

Cubic Measure

1 Cu. Centimeter = 1000 Cu. Millimeters = 0.06 Cu. Inches
1 Cu. Meter = I ,000,000 Cu. Centimeters = 35.31 Cu. Feet

Temperature

5/9 (°F - 32) = °C
212° Fahrenheit is equivalent to 100° Celsius
90° Fahrenheit is equivalent to 32.2° Celsius
32° Fahrenheit is equivalent to 0° Celsius
9/5 °C + 32 = °F

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