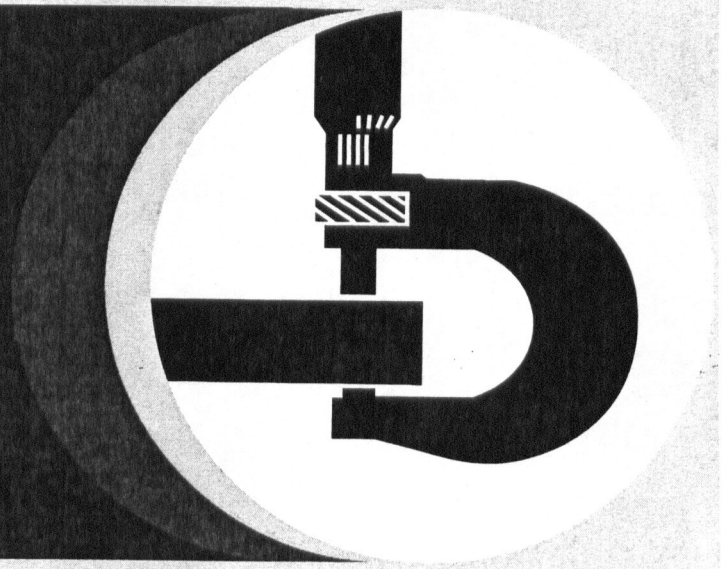
TeamMate® II
1200, 1400, and 1600 Series
Inboard Planetary Axles

COMPONENT TECHNICAL MANUAL



John Deere Waterloo Works
CTM43 (09JAN98)
LITHO IN U.S.A.
ENGLISH

JOHN DEERE

DEERE POWER

Introduction

FOREWORD

This manual is written for an experienced technician. Essential tools required in performing certain service work are identified in this manual and are recommended for use.

Live with safety: Read the safety messages in the introduction of this manual and the cautions presented throughout the text of the manual.

This is the safety-alert symbol. When you see this symbol on the machine or in this manual, be alert to the potential for personal injury.

Use this component technical manual in conjunction with the machine technical manual. See the machine technical manual for information on component removal and installation, and gaining access to the components.

Information is organized in groups for the various components requiring service instruction. At the beginning of each group are summary listings of all applicable essential tools, service equipment and tools, other materials needed to do the job, service parts kits, specifications, wear tolerances, and torque values.

This component technical manual covers the recommended repair procedure for the TeamMate™II 1200, 1400, and 1600 Series Inboard Planetary Axles.

Some components from these axles, such as axle housings, brakes, and input quills, may be serviced without removing the complete axle assembly from the machine. You may have to determine this procedure yourself for a safe removal of such components. See information to remove and install the complete axle assembly, found in your vehicle technical manual.

Clean differential and axle assemblies before servicing. Always work in a clean work area.

Binders, binder labels, and tab sets can be ordered by John Deere dealers direct from the John Deere Distribution Service Center.

This manual is part of a total product support program.

FOS MANUALS—REFERENCE

TECHNICAL MANUALS—MACHINE SERVICE

COMPONENT MANUALS—COMPONENT SERVICE

Fundamentals of Service (FOS) Manuals cover basic theory of operation, fundamentals of troubleshooting, general maintenance, and basic type of failures and their causes. FOS Manuals are for training new personnel and for reference by experienced technicians.

RX,CTM43,IFC -19-07JAN98

NOTICE TO THE DEALER

This Component Technical Manual should be used for the repair of John Deere TeamMate™II 1200, 1400, and 1600 Series Inboard Planetary Axles.

IMPORTANT: Before beginning repair or making adjustments, become familiar with *Axle Identification* and the *Axle Serial Number Plate.* (See General—*Group 10.*)

Discard CTM43 dated 31JAN95

RX,CTM43,DLR -19-05DEC97

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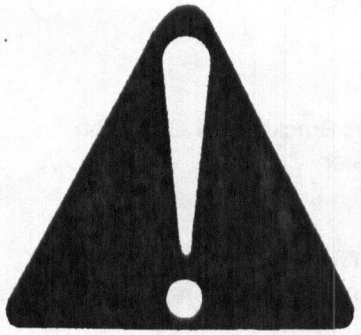
RECOGNIZE SAFETY INFORMATION

This is the safety-alert symbol. When you see this symbol on your machine or in this manual, be alert to the potential for personal injury.

Follow recommended precautions and safe operating practices.



T81389 -UN-07DEC88

DX,ALERT -19-03MAR93

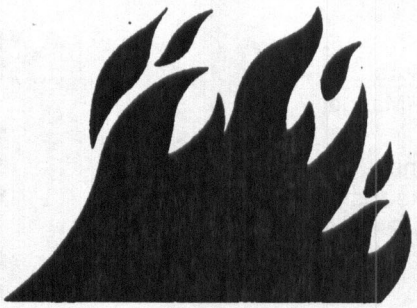
HANDLE FLUIDS SAFELY—AVOID FIRES

When you work around fuel, do not smoke or work near heaters or other fire hazards.

Store flammable fluids away from fire hazards. Do not incinerate or puncture pressurized containers.

Make sure machine is clean of trash, grease, and debris.

Do not store oily rags; they can ignite and burn spontaneously.



TS227 -UN-23AUG88

DX,FLAME -19-04JUN90

PREVENT BATTERY EXPLOSIONS

Keep sparks, lighted matches, and open flame away from the top of battery. Battery gas can explode.

Never check battery charge by placing a metal object across the posts. Use a volt-meter or hydrometer.

Do not charge a frozen battery; it may explode. Warm battery to 16°C (60°F).

TS204 -UN-23AUG88

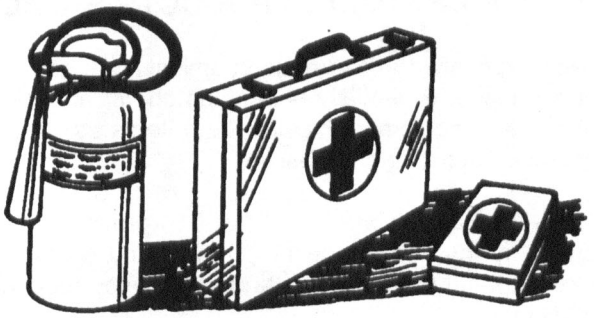
DX,SPARKS -19-03MAR93

PREPARE FOR EMERGENCIES

Be prepared if a fire starts.

Keep a first aid kit and fire extinguisher handy.

Keep emergency numbers for doctors, ambulance service, hospital, and fire department near your telephone.



TS291 -UN-23AUG88

DX,FIRE2 -19-03MAR93

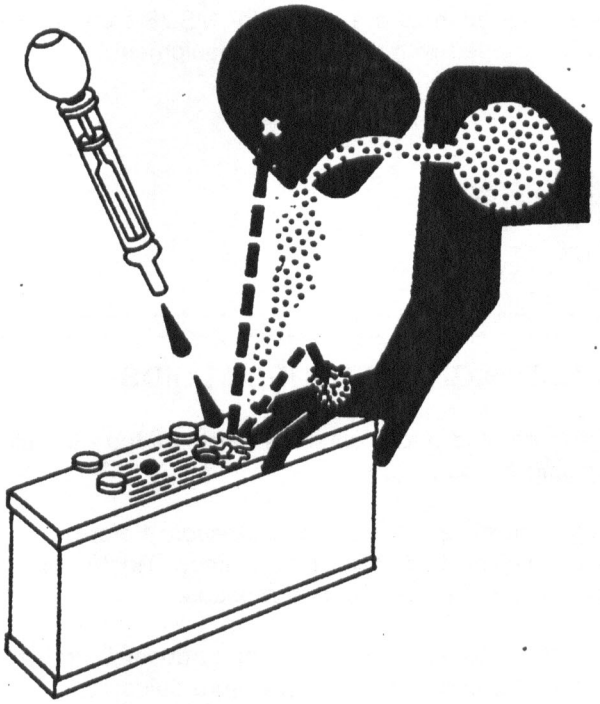
PREVENT ACID BURNS

Sulfuric acid in battery electrolyte is poisonous. It is strong enough to burn skin, eat holes in clothing, and cause blindness if splashed into eyes.

Avoid the hazard by:
1. Filling batteries in a well-ventilated area.
2. Wearing eye protection and rubber gloves.
3. Avoiding breathing fumes when electrolyte is added.
4. Avoiding spilling or dripping electrolyte.
5. Use proper jump start procedure.

If you spill acid on yourself:
1. Flush your skin with water.
2. Apply baking soda or lime to help neutralize the acid.
3. Flush your eyes with water for 15—30 minutes. Get medical attention immediately.

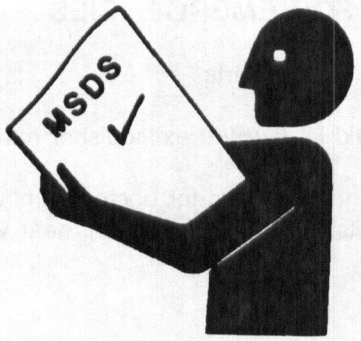
If acid is swallowed:
1. Do not induce vomiting.
2. Drink large amounts of water or milk, but do not exceed 2 L (2 quarts).
3. Get medical attention immediately.



TS203 -UN-23AUG88

DX,POISON -19-21APR93

HANDLE CHEMICAL PRODUCTS SAFELY



TS1132 -UN-26NOV90

Direct exposure to hazardous chemicals can cause serious injury. Potentially hazardous chemicals used with John Deere equipment include such items as lubricants, coolants, paints, and adhesives.

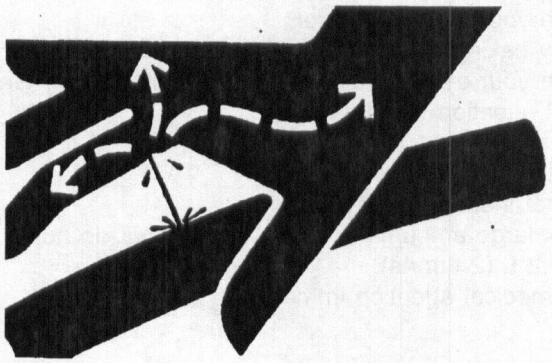
A Material Safety Data Sheet (MSDS) provides specific details on chemical products: physical and health hazards, safety procedures, and emergency response techniques.

Check the MSDS before you start any job using a hazardous chemical. That way you will know exactly what the risks are and how to do the job safely. Then follow procedures and recommended equipment.

(See your John Deere dealer for MSDS's on chemical products used with John Deere equipment.)

DX,MSDS,NA -19-03MAR93

AVOID HIGH-PRESSURE FLUIDS



X9811 -UN-23AUG88

Escaping fluid under pressure can penetrate the skin causing serious injury.

Avoid the hazard by relieving pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure.

Search for leaks with a piece of cardboard. Protect hands and body from high pressure fluids.

If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result. Doctors unfamiliar with this type of injury should reference a knowledgeable medical source. Such information is available from Deere & Company Medical Department in Moline, Illinois, U.S.A.

DX,FLUID -19-03MAR93

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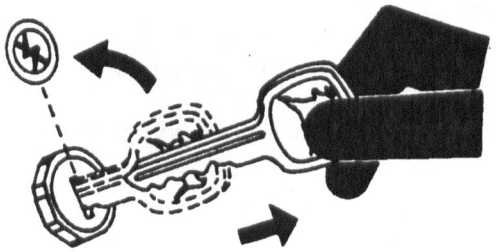
4

PARK MACHINE SAFELY

Before working on the machine:
- Lower all equipment to the ground.
- Stop the engine and remove the key.
- Disconnect the battery ground strap.
- Hang a "DO NOT OPERATE" tag in operator station.



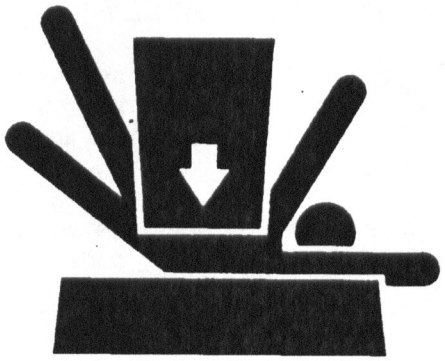
TS230 -UN-24MAY89

DX,PARK -19-04JUN90

SUPPORT MACHINE PROPERLY

Always lower the attachment or implement to the ground before you work on the machine. If you must work on a lifted machine or attachment, securely support the machine or attachment.

Do not support the machine on cinder blocks, hollow tiles, or props that may crumble under continuous load. Do not work under a machine that is supported solely by a jack. Follow recommended procedures in this manual.



TS229 -UN-23AUG88

DX,LOWER -19-04JUN90

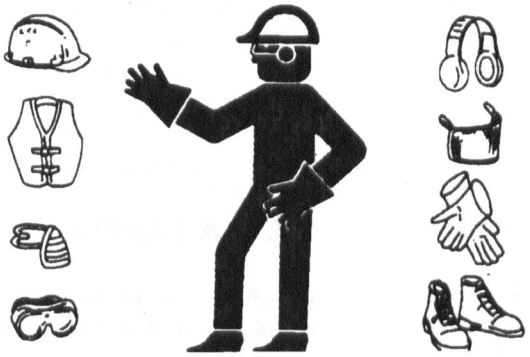
WEAR PROTECTIVE CLOTHING

Wear close fitting clothing and safety equipment appropriate to the job.

Prolonged exposure to loud noise can cause impairment or loss of hearing.

Wear a suitable hearing protective device such as earmuffs or earplugs to protect against objectionable or uncomfortable loud noises.

Operating equipment safely requires the full attention of the operator. Do not wear radio or music headphones while operating machine.

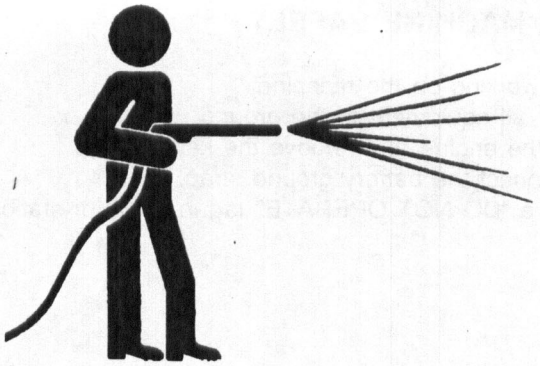


TS206 -UN-23AUG88

DX,WEAR -19-10SEP90

WORK IN CLEAN AREA

Before starting a job:
- Clean work area and machine.
- Make sure you have all necessary tools to do your job.
- Have the right parts on hand.
- Read all instructions thoroughly; do not attempt shortcuts.



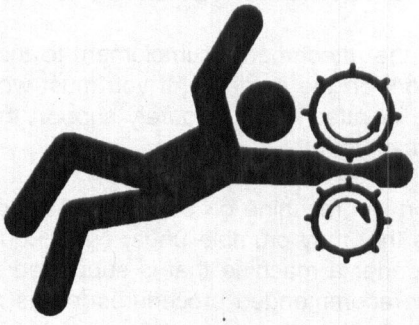
T6642EJ -UN-18OCT88

DX,CLEAN -19-04JUN90

SERVICE MACHINES SAFELY

Tie long hair behind your head. Do not wear a necktie, scarf, loose clothing, or necklace when you work near machine tools or moving parts. If these items were to get caught, severe injury could result.

Remove rings and other jewelry to prevent electrical shorts and entanglement in moving parts.



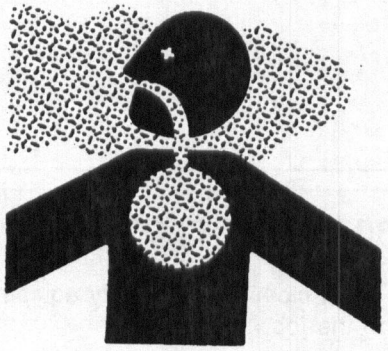
TS228 -UN-23AUG88

DX,LOOSE -19-04JUN90

WORK IN VENTILATED AREA

Engine exhaust fumes can cause sickness or death. If it is necessary to run an engine in an enclosed area, remove the exhaust fumes from the area with an exhaust pipe extension.

If you do not have an exhaust pipe extension, open the doors and get outside air into the area.

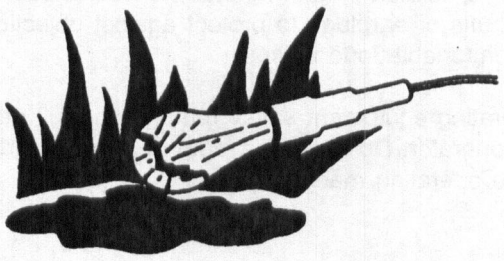


TS220 -UN-23AUG88

DX,AIR -19-04JUN90

ILLUMINATE WORK AREA SAFELY

Illuminate your work area adequately but safely. Use a portable safety light for working inside or under the machine. Make sure the bulb is enclosed by a wire cage. The hot filament of an accidentally broken bulb can ignite spilled fuel or oil.



TS223 -UN-23AUG88

DX,LIGHT -19-04JUN90

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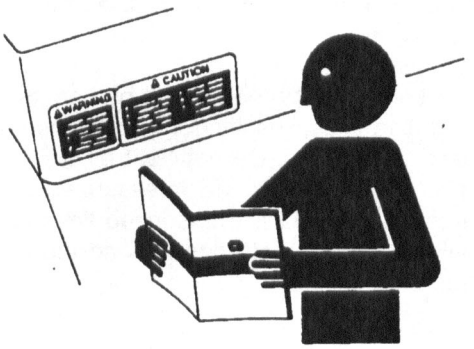
REPLACE SAFETY SIGNS

Replace missing or damaged safety signs. See the machine operator's manual for correct safety sign placement.



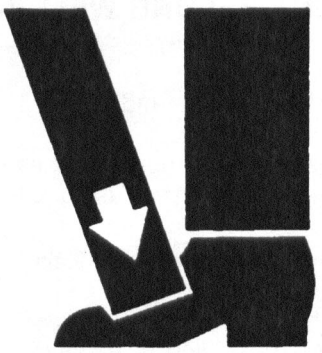
TS201 -UN-23AUG88

DX,SIGNS1 -19-04JUN90

USE PROPER LIFTING EQUIPMENT

Lifting heavy components incorrectly can cause severe injury or machine damage.

Follow recommended procedure for removal and installation of components in the manual.



TS226 -UN-23AUG88

DX,LIFT -19-04JUN90

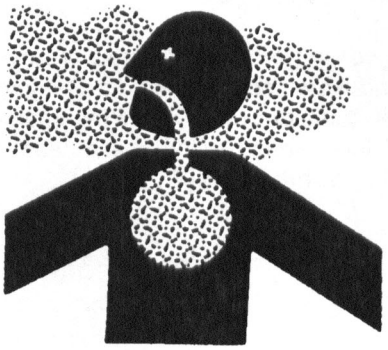
AVOID HARMFUL ASBESTOS DUST

Avoid breathing dust that may be generated when handling components containing asbestos fibers. Inhaled asbestos fibers may cause lung cancer.

Components in products that may contain asbestos fibers are brake pads, brake band and lining assemblies, clutch plates, and some gaskets. The asbestos used in these components is usually found in a resin or sealed in some way. Normal handling is not hazardous as long as airborne dust containing asbestos is not generated.

Avoid creating dust. Never use compressed air for cleaning. Avoid brushing or grinding material containing asbestos. When servicing, wear an approved respirator. A special vacuum cleaner is recommended to clean asbestos. If not available, apply a mist of oil or water on the material containing asbestos.

Keep bystanders away from the area.

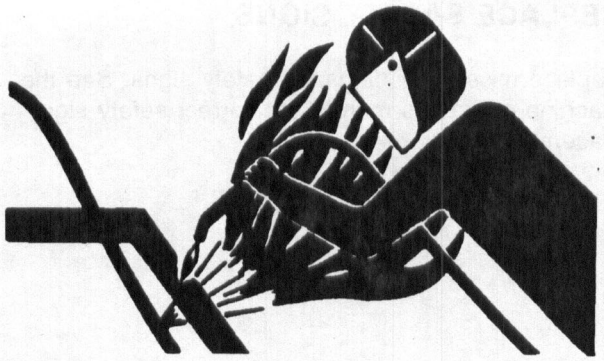


TS220 -UN-23AUG88

DX,DUST -19-15MAR91

AVOID HEATING NEAR PRESSURIZED FLUID LINES

Flammable spray can be generated by heating near pressurized fluid lines, resulting in severe burns to yourself and bystanders. Do not heat by welding, soldering, or using a torch near pressurized fluid lines or other flammable materials. Pressurized lines can be accidentally cut when heat goes beyond the immediate flame area.



TS953 -UN-15MAY90

DX,TORCH -19-03MAR93

REMOVE PAINT BEFORE WELDING OR HEATING

Avoid potentially toxic fumes and dust.

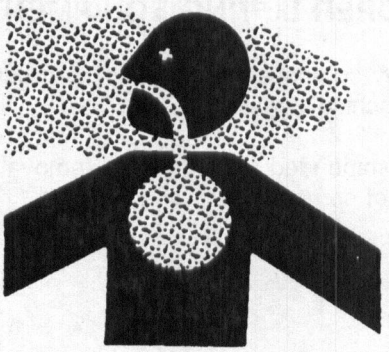
Hazardous fumes can be generated when paint is heated by welding, soldering, or using a torch.

Do all work outside or in a well ventilated area. Dispose of paint and solvent properly.

Remove paint before welding or heating:

- If you sand or grind paint, avoid breathing the dust. Wear an approved respirator.

- If you use solvent or paint stripper, remove stripper with soap and water before welding. Remove solvent or paint stripper containers and other flammable material from area. Allow fumes to disperse at least 15 minutes before welding or heating.



TS220 -UN-23AUG88

DX,PAINT -19-03MAR93

05
8

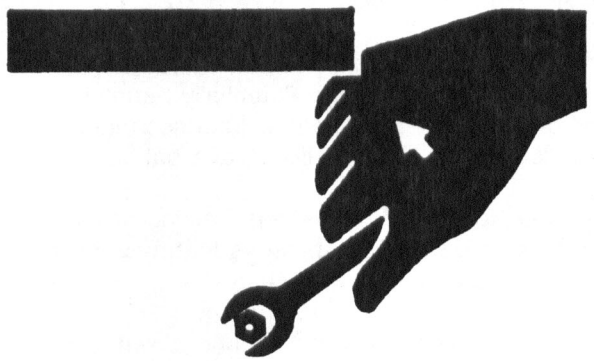
USE PROPER TOOLS

Use tools appropriate to the work. Makeshift tools and procedures can create safety hazards.

Use power tools only to loosen threaded parts and fasteners.

For loosening and tightening hardware, use the correct size tools. DO NOT use U.S. measurement tools on metric fasteners. Avoid bodily injury caused by slipping wrenches.

Use only service parts meeting John Deere specifications.



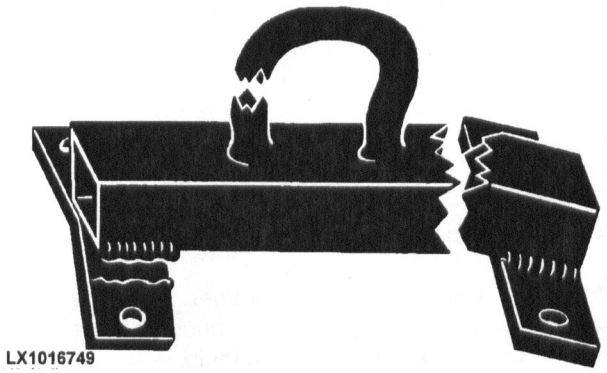
TS779 -UN-08NOV89

DX,REPAIR -19-04JUN90

CONSTRUCT DEALER-MADE TOOLS SAFELY

Faulty or broken tools can result in serious injury. When constructing tools, use proper, quality materials, and good workmanship.

Do not weld tools unless you have the proper equipment and experience to perform the job.



LX1016749 -UN-01JUL97

DX,SAFE,TOOLS -19-19SEP97

DISPOSE OF WASTE PROPERLY

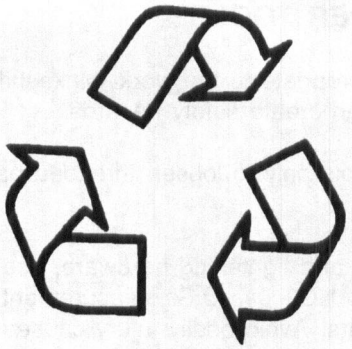
Improperly disposing of waste can threaten the environment and ecology. Potentially harmful waste used with John Deere equipment include such items as oil, fuel, coolant, brake fluid, filters, and batteries.

Use leakproof containers when draining fluids. Do not use food or beverage containers that may mislead someone into drinking from them.

Do not pour waste onto the ground, down a drain, or into any water source.

Air conditioning refrigerants escaping into the air can damage the Earth's atmosphere. Government regulations may require a certified air conditioning service center to recover and recycle used air conditioning refrigerants.

Inquire on the proper way to recycle or dispose of waste from your local environmental or recycling center, or from your John Deere dealer.



TS1133 -UN-26NOV90

DX,DRAIN -19-03MAR93

LIVE WITH SAFETY

Before returning machine to customer, make sure machine is functioning properly, especially the safety systems. Install all guards and shields.

TS231 -19-07OCT88

DX,LIVE -19-25SEP92

GENERAL INBOARD PLANETARY AXLE SPECIFICATIONS—*OEM APPLICATIONS*

Description	1200 Series	1400 Series	1600 Series
Input Yokes	5C, 6C, 7C, 58WB, 155T, 6C With Flange, 1410 With Flange	7C, 16T, 155T 7C With Flange	8C, 1710, 7C With Flange
Input Housing:			
Centerline Pivot	Yes	Yes	Yes
Optional Oscillating Hardware	Yes	Yes	Yes
Input Pinion and Ring Gear Ratio:	4.333:1 4.778:1 5.571:1	4.364:1 4.778:1 5.143:1	4.364:1 4.909:1 5.273:1 5.818:1
Inboard Wet Disk Brakes	Yes	Yes	Yes
Dry Drum Brakes	No	Yes	No
Inboard Planetary Final Drive Ratio:	3.714:1 4.800:1 5.500:1 6.000:1	3.714:1 4.800:1 6.000:1 6.400:1	3.714:1 5.143:1
Length (Axle Flange-to-Flange):			
Narrow	1300 mm (51.2 in.)	1700 mm (66.9 in.) 1810 mm (71.3 in.)	1994 mm (78.5 in.)
Standard	1700 mm (66.9 in.)	1953 mm (76.9 in.) 2063 mm (81.2 in.)	2198 mm (86.5 in.)
Wide	1953 mm (76.9 in.)		
Height	440 mm (17.3 in.)	506 mm (19.9 in.)	592 mm (23.3 in.)
Approximate Weight	726 kg (1600 lb)	862 kg (1900 lb)	1270 kg (2800 lb)
Oil Capacity (Approximate):			
Greased Outer Bearing Axles	18.9 L (20 qt)	28.4 L (30 qt)	45.5 L (48 qt)
Oiled Outer Bearing Axles	21.8 L (23 qt)	31.2 L (33 qt)	48.3 L (51 qt)

RX,4310,1C -19-07JAN98

AXLE IDENTIFICATION

Each TeamMate II Axle has a serial number plate located on the input side of the differential case. Major design changes may be noted within this Component Technical Manual (CTM) and will refer to the information on the serial number plate.

This CTM is used for TeamMate II Axles with the following information on the SECOND line, first five positions (reading left to right) of the serial number plate:

1200 Series	1400 Series	1600 Series
2503R	2513R	2523R

IMPORTANT: Use *CTM18* for TeamMate Axles with *2500R, 2501R, 2510R, 2511R, or 2521R* in the same first five positions of the SECOND line of the serial number plate.

Each John Deere Inboard Planetary Axle has a 13-digit alpha-numeric serial number plate. The top line of the plate identifies the producing factory, component type identification, and six position sequential serial number.

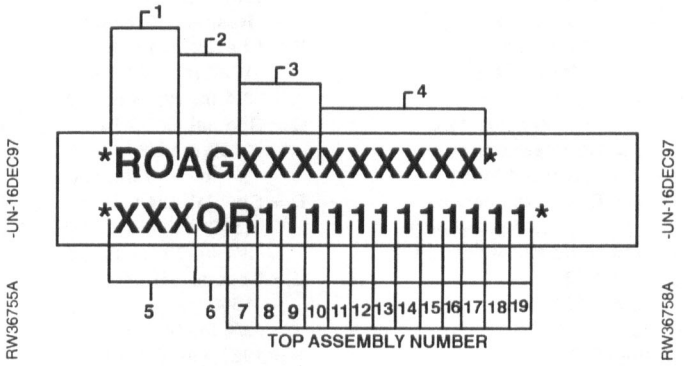
The alpha-numeric code on the second line identifies the axle configuration.

IMPORTANT: Serial number plates must be masked when painting axles to prevent the information from becoming illegible. This information is used for service and warranty purposes.

NOTE: Some serial number plates include the addition of bar-coding.

RX,4310,2C -19-07JAN98

SERIAL NUMBER PLATES—*JOHN DEERE APPLICATIONS*



1—Manufacturing Unit
RO = Waterloo Works
2—Component Identification
AG = Inboard Planetary
3—Configuration Identity
250 = 1200 Series
251 = 1400 Series
252 = 1600 Series

4—Six Position Serial Number
5—Axle Series
250 = 1200 Series
251 = 1400 Series
252 = 1600 Series

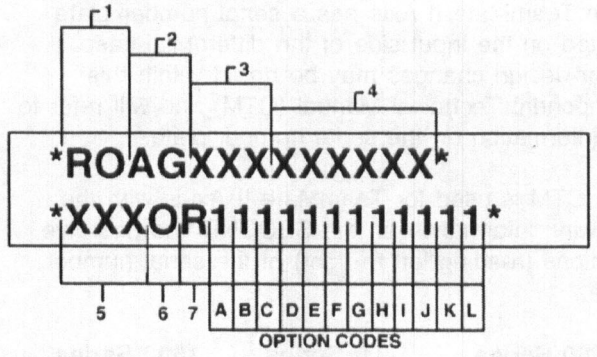
6—Design Version
0 = Transitional
1 = TEAMMATE™I
2 = Not Used
3 = TEAMMATE™II

7—19—Top Assembly Number

RX,4310,3C -19-19DEC97

SERIAL NUMBER PLATE—*OEM APPLICATIONS—1200 SERIES*

RW36755 -UN-16DEC97



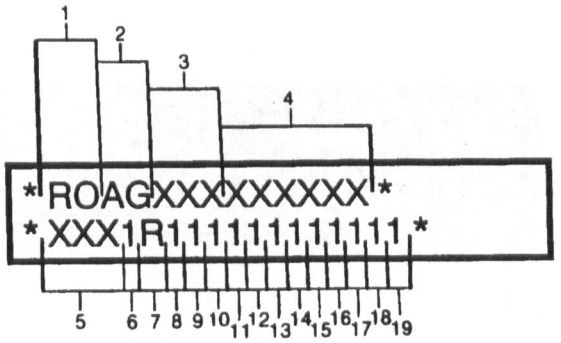
RW36758 -UN-16DEC97

1—Manufacturing Unit
RO = John Deere Waterloo Works
2—Component Identification
AG = Inboard Axles
3—Configuration Identity
250 = Series Code (1200 Series)
4—Serial Number
5—Master Machine Code
250 = 1200 Series
6—Family Code
2 = Transition Axle
3 = TEAMMATE™ II Axle
7—Manufacturing Unit
R = John Deere Waterloo Works
A—Input Rotation; *Travel Direction*
1 = Clockwise; *(Toward Input)*
2 = Clockwise; *(Away from Input)*
3 = Counterclockwise; *(Toward Input)*
4 = Counterclockwise; *(Away from Input)*
B—Spiral Bevel Reduction
1 = 4.333:1
2 = 4.778:1
3 = 5.571:1
C—Input Yoke - *Size and Style*
1 = 5C
2 = 6C
3 = 58WB
5 = 1410 With Brake Disk
6 = 155T - 27NH
7 = 6C With Flange
8 = 7C
9 = 1410 With Flange
D—Flange-to-Flange Width; Wheel Attachment; Outer Bearing Lube
1 = None
2 = 1300 mm (51.2 in.); 3/4 in.-10; Greased
3 = 1300 mm (51.2 in.); Reamed; Greased
4 = 1700 mm (66.9 in.); 3/4 in.-10; Greased
5 = 1700 mm (66.9 in.); Reamed; Greased
6 = 1953 mm (76.9 in.); 3/4 in.-10; Greased
7 = 1953 mm (76.9 in.); Reamed; Greased
B = Special, LH Offset 1627 mm (64.1 in.); 3/4 in.-10; Greased
C = Special RH Offset 1627 mm (64.1 in.); 3/4 in.-10; Greased
D = Special, LH Offset 1500 mm (59.1 in.); 3/4 in.-10; Greased
E = Special RH Offset 1500 mm (59.1 in.); 3/4 in.-10; Greased
F = 1953 mm (76.9 in.); 7/8 in.-14; Greased
G = 1953 mm (76.9 in.); 3/4 in.-10; Permlub
J = 1700 mm (66.9 in.); 3/4 in.-10; Permlub
D—(Continued) Flange-to-Flange Width; Wheel Attachment; Outer Bearing Lube
K = 1953 mm (76.9 in.); 7/8 in.-14; Permlub
L = 1300 mm (51.2 in.); 3/4 in.-10; Permlub
M = 1700 mm (66.9 in.); Reamed; Permlub
N = 1953 mm (76.9 in.); Reamed; Permlub
P = 1300 mm (51.2 in.); 3/4 in.-10; Greased; Zerk Opp. Input
Q = Special RH Offset 1500 mm (59.1 in.); 3/4 in.-10; Greased; Zerk Up
E—Input Housing and Auxiliary Brake
1 = Standard - No Brake
3 = Manual Park Brake
5 = Park Brake *Spring Apply-Hydraulic Release*
B = Park Brake Cover - No Brake
F—Mounting Type
1 = Fixed Mounting
2 = Oscillation - Dual Center Pivot
3 = Oscillation Dual Pivot W/Axle Mounting Holes
G—Brake Type
1 = No Brakes
2 = Independent Brakes
3 = Dual Brakes
A = Dual Brakes, No Axles
H—Differential Type
1 = Standard
2 = No-SPIN™
3 = Capture, DIFF-LOK
4 = Air Boost, DIFF-LOK
I—Differential Case
1 = Standard
J—Final Drive Reduction
1 = None
2 = 3.714:1
3 = 4.800:1
4 = 5.500:1
5 = 6.000:1
B = 1:1 (Fixed)
K—Trim
1 = Nothing (Interfactory)
3 = Primer (Tan)
4 = Paint (Yellow)
L—Miscellaneous Parts
1 = Miscellaneous Parts No Breather
2 = Miscellaneous Parts Breather

RX,4310,4C -19-19DEC97

SERIAL NUMBER PLATE—*OEM APPLICATIONS—1400 SERIES*

RW36756 -UN-16DEC97



RW25329 -UN-15NOV94

1—Manufacturing Unit
RO = John Deere Waterloo Works
2—Component Identification
AG = Inboard Axles
3—Configuration Identity
251 = Series Code (1400 Series)
4—Serial Number
5—Master Machine Code
251 = 1400 Series
6—Family Code
2 = Transition Axle
3 = TEAMMATE™ II Axle
7—Manufacturing Unit
R = John Deere Waterloo Works
A—Input Rotation; *Travel Direction*
1 = Clockwise; *(Toward Input)*
2 = Clockwise; *(Away from Input)*
3 = Counterclockwise; *(Toward Input)*
4 = Counterclockwise; *(Away from Input)*
B—Spiral Bevel Reduction
1 = 4.364:1
2 = 4.778:1
3 = 5.143:1
C—Input Yoke - *Size and Style*
1 = 7C
2 = 16T
3 = 155T - 30NH
5 = 7C With Brake Flange
B = 6C With Brake Flange

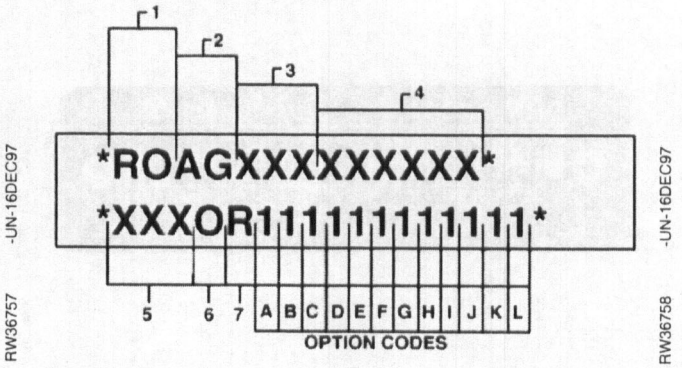
D—Flange-to-Flange Width; Wheel Attachment; Outer Bearing Lube
1 = None
2 = 1953 mm (76.9 in.); 3/4 in.-10; Greased
3 = 1953 mm (76.9 in.); Reamed; Greased
4 = 1700 mm (66.9 in.); 3/4 in.-10; Greased
5 = 1700 mm (66.9 in.); Reamed; Greased
A = 1953 mm (76.9 in.); 7/8 in.-14; Permlub; Inverted Hsgs
F = 1953 mm (76.9 in.); 7/8 in.-14; Greased
G = 1953 mm (76.9 in.); 3/4 in.-10; Permlub
H = 1989 mm (78.3 in.); 7/8 in.-14; Rear Drum Brake
J = 1700 mm (66.9 in.); 3/4 in.-10; Permlub
K = 1953 mm (76.9 in.); 7/8 in.-14; Permlub
M = 1700 mm (66.9 in.); Reamed; Permlub
N = 1953 mm (76.9 in.); Reamed; Permlub
P = 1989 mm (78.3 in.); 7/8 in.-14; Permlub; Front Drum Brake

E—Input Housing and Auxiliary Brake
1 = Standard - No Brake
3 = Manual Park Brake
5 = Park Brake *Spring Apply-Hydraulic Release*
B = Park Brake Cover - No Brake
F—Mounting Type
1 = Fixed Mounting
2 = Oscillation - Dual Center Pivot
3 = Oscillation Dual Pivot With Axle Mounting Holes
G—Brake Type
1 = No Brakes
2 = Independent Brakes
3 = Dual Brakes
A = Dual Brakes, No Axles
B = Independent Brakes, No Axles
C = Brakes, Dry Drum
D = Dual Brakes, Rail Applications

H—Differential Type
1 = Standard
2 = No-SPIN™
3 = Capture, DIFF-LOK
4 = Air Boost, DIFF-LOK
5 = Oil Circulation, DIFF-LOK
I—Differential Case
1 = Standard
J—Final Drive Reduction
1 = None
2 = 3.714:1
3 = 4.800:1
4 = 6.000:1
5 = 6.400:1
K—Trim
1 = Nothing (Interfactory)
3 = Primer (Tan)
4 = Paint (Yellow)
L—Miscellaneous Parts
1 = Miscellaneous Parts No Breather
2 = Miscellaneous Parts Breather

RX,4310,5C -19-19DEC97

SERIAL NUMBER PLATE—*OEM APPLICATIONS—1600 SERIES*



1—Manufacturing Unit
RO = John Deere Waterloo Works
2—Component Identification
AG = Inboard Axles
3—Configuration Identity
252 = Series Code (1600 Series)
4—Serial Number
5—Master Machine Code
252 = 1600 Series
6—Family Code
3 = TEAMMATE™ II Axle
7—Manufacturing Unit
R = John Deere Waterloo Works
A—Input Rotation; *Travel Direction*
1 = Clockwise; *(Toward Input)*
2 = Clockwise; *(Away from Input)*
3 = Counterclockwise; *(Toward Input)*
4 = Counterclockwise; *(Away from Input)*

B—Spiral Bevel Reduction
1 = 4.364:1
2 = 4.909:1
3 = 5.273:1
4 = 5.818:1
C—Input Yoke - *Size and Style*
1 = 8C
2 = 1710
4 = 7C With Brake Flange
D—Flange-to-Flange Width; Wheel Attachment; Outer Bearing Lube
1 = None
2 = 1994 mm (78.5 in.); M24-3; Permlub
3 = 2198 mm (86.5 in.); 3/4 in.-10; Greased
E—Input Housing and Auxiliary Brake
1 = Standard - No Brake
2 = Park Brake *Spring Apply-Hydraulic Release*
3 = Park Brake Cover - No Brake

F—Mounting Type
1 = Fixed Mounting
2 = Oscillation - Dual Center Pivot
G—Brake Type
1 = No Brakes
2 = Independent Brakes
3 = Dual Brakes
A = Dual Brakes, No Axles
H—Differential Type
1 = Standard
3 = Air Boost, DIFF-LOK
C = Oil Circulation, DIFF-LOK
I—Differential Case
1 = Standard

J—Final Drive Reduction
1 = None
2 = 3.714:1
3 = 5.143:1
K—Trim
1 = Nothing (Interfactory)
3 = Primer (Tan)
4 = Paint (Yellow)
L—Miscellaneous Parts
1 = Miscellaneous Parts No Breather
2 = Miscellaneous Parts Breather

RX,4310,6C -19-19DEC97

GENERAL REPAIR PROCEDURES

NOTE: Before beginning the repair, review the following guidelines. These are provided to emphasize the need for attention to detail and care when servicing the axle assembly.

Thoroughly clean the outside before disassembly.

Handle parts carefully to prevent nicking or burring machined surfaces.

Inspection Before Disassembly

- Inspect the planet pinion carrier and axle shaft and the pinion shaft and ring gear before removal as follows:

  1. Wipe the lubricant from the internal working parts and visually inspect the parts for excessive wear or damage.

  2. Inspect the gears for roughness.

  3. Inspect the pinion gear teeth for signs of scoring, abnormal wear, or nicks/chips.

Heating Bearing Cones

IMPORTANT: Heat bearing cones in a bearing heater. Use a thermometer and DO NOT exceed 150°C (300°F).

Cleaning and Inspection

- Clean all parts with clean solvent and use moisture-free air for drying.

Bearings

- Never dry bearings with compressed air. Spinning a bearing without lubrication can damage the bearing.

- Clean bearings with clean solvent, dry thoroughly, and oil before inspection. Inspect bearings for roughness of rotation and excessive wear of rollers.

- Inspect bearing cups for excessive wear.

- Both the bearing cone and roller assembly should be replaced if either the cup or cone has excessive wear.

- Inspect thrust washers and thrust surfaces for distortion, roughness, scoring, or wear.

- When installing bearing cups and cones, make sure they are fully seated.

- Cups and cones are properly seated if a 0.05 mm (0.002 in.) feeler gauge will NOT pass for a 360° circular sweep between cone or cup mounting surface.

Shafts

- Inspect the shaft bearing surfaces for wear or damage.

- Inspect shafts and replace if excessively worn or damaged.

Gears and Planetary Assemblies

- Examine the gear teeth for excessive wear. Replace as necessary.

- The pinion shafts should be inspected for loose fit and/or complete disengagement.

- Check for smooth rotation of gears.

FASTENERS AND TIGHTENING

- Fasteners must be tightened to the specified torque.

- Fasteners must be replaced with the same property class (grade).

- Follow the specified tightening pattern when listed.

- Different models of axles and **Early Version Axles** may have a different torque specification and fastener than **Later Version Axles**. Check the model number and/or the fastener removed and use the correct torque specification and fastener.

RX,4310,7C -19-19DEC97

Assembly

- Use the specified grease when installing seals.
- During assembly, each part should be lubricated with clean hydraulic oil.
- Install the correct cone point shims.
- Needle bearings and thrust washers should be lightly coated with petroleum jelly during assembly.
- Perform specified preload, backlash, and rolling drag torque checks.
- The differential ring gear and drive shaft are replaced as a matched set.

RX,4310,6B -19-22DEC94

SEALANTS AND ADHESIVES CROSS-REFERENCE CHART

U.S. PART NUMBER	CANADIAN PART NUMBER	COLOR	SIZE	DESCRIPTION	LOCTITE NUMBER	SIMILAR LOCTITE PRODUCT
Bonding						
TY15435	TY15702	BLACK AND WHITE	4 gm	Epoxy Adhesive	445	453
TY21517	TY16173	CLEAR	3 gm	Instant Gel Adhesive	454	416, 409, or 495
Gasketing						
T43514	TY9475	RED	50 ml	Rigid Form-in-Place Gasket	277	568
TY6304	TY9484	PURPLE	50 ml	Flexible Form-in-Place Gasket	515	518
TY15934	—	BROWN	16 oz	General Purpose Gasket Dressing	—	Permatex #3
TY16100	TY6337	BROWN	4 oz	General Purpose Gasket Dressing	—	Permatex #3
TY16021	TY16112	BLUE	50 ml	High-Flex Form-in-Place Gasket	17430	
TY16099	TY16113	BURGUNDY	16 oz	High Tack Gasket Dressing	—	Permatex #98
TY16135	TY15705	SILVER BLUE	3 oz	Ultra Blue RTV Silicone Form-in-Place Gasket	587	Permatex #77
Priming						
TY16285	TY9485	GREEN	4.5 oz	Cure Primer	7649	—
Retaining						
TY8311	TY15801	SILVER	50 ml	Quick Metal™ Press Fit	660	—
TY15969*	TY16039	GREEN	50 ml	Maximum Strength	680	635
TY15941	TY16040	GREEN	50 ml	High-Temperature	620	
Threadlocking and Threadsealing						
T43512	TY9473	BLUE	50 ml	Medium Strength	242	241 or 243
TY9370	TY9477	BLUE	6 ml	Medium Strength	242	241 0r 243
T43513	TY9474	CLEAR	50 ml	High Strength	271	262 or 609
TY9371	TY9478	CLEAR	6 ml	High Strength	271	262 or 609
TY9374	TY9481	WHITE	6 ml	Pipe Sealant w/TEFLON®	592	565 or 567
TY9375	TY9480	WHITE	50 ml	Pipe Sealant w/TEFLON	592	565 or 567

** TY15969 replaces T43515*

QUICK METAL is a trademark of Loctite Corporation

TEFLON is a trademark of the DuPont Company

RX,SEAL -19-04SEP97

SEALING INSTRUCTIONS

DISASSEMBLY

- On disassembly, the dowel pins should remain pressed into the differential case and axle housing.
- Measure the length of protrusion to insure dowel pins will not prevent the axle housing from being drawn up tight.
- If dowel pins protrude more than 18 mm (0.709 in.) from the components, remove the dowel pins, clean the holes, and re-install the dowel pins to the specified depth.

Later Version Axles

- On disassembly the dowel pins should remain pressed into the differential case cover.

CLEANING

IMPORTANT: DO NOT use clean and cure primer to clean the surfaces. The primer action will cause the new sealer to set up TOO fast to allow adequate assembly time.

- Clean surfaces with a brass brush or scraper to remove old sealer material. Gel-type paint removers containing ethylene chloride or Loctite™ "Chisel" may be used.
- Clean surfaces using rubbing alcohol to remove oil and grease residue.
- Test for clean surface by applying a few drops of cool water to the surfaces. If water puddles or forms beads, repeat the cleaning procedure.
- A file should be passed on the joint faces to insure no nicks are present.
- Keep surfaces clean and oil free after cleaning.

APPLICATION AND ASSEMBLY

Final Drive Ring Gear-to-Case and Axle Housing:

IMPORTANT: Do not use an excessive amount of sealant.

- Apply a THIN even layer of flexible gasket sealant to ONE surface of the joint. Sufficient amount should be applied so excess is seen around the outside edge of the flange. Narrow overlap areas must be covered with gasket material. Put a bead of sealant around all bolt holes.

IMPORTANT: Temperature of adjoining parts and gasket material must be 13°C (55°F) or above.

- Apply flexible gasket sealant to the differential case surfaces.
- Install final drive ring gear onto differential case. Tap final drive ring gear into position with a lead hammer.
- Apply flexible gasket sealant to the outer surface of the final drive ring gear.
- Install the axle housing assembly onto the final drive ring gear.
- Tighten cap screws to the specified torque starting from center and working toward top and bottom.
- Allow the assembly to cure overnight before filling with oil.

IMPORTANT: Apply TY16285* Cure Primer to sealing surfaces only if overnight curing is not possible.

- Apply primer to the sealing surfaces.
- Use the same sealing application and cap screw tightening procedures as previously instructed.
- Prevent the gasket material from drying before assembly is completed (1 hour maximum).
- Allow 30 minutes minimum cure time at room temperature before filling with oil.

RX,4310,8C -19-07JAN98

Differential Case Cover-to-Case:

- Apply a THIN even layer of flexible gasket sealant to one surface of the joint. Sufficient amount should be applied so excess is seen around the outside edge of the flange. Narrow overlap areas must be covered with gasket material. Put a bead of sealant around all bolt holes.
- Tighten cap screws to specified torque beginning with the center two cap screws, across from each other, and alternately working toward top and bottom.
- Allow the assembly to cure overnight before filling with oil.

IMPORTANT: Apply TY16285* Cure Primer to sealant surfaces only if overnight curing is not possible.

- Apply primer to the sealing surfaces.
- Use the same sealing application and cap screw tightening procedures as previously instructed.
- Prevent the gasket material from drying before assembly is completed (1 hour maximum).
- Allow 30 minutes minimum cure time at room temperature before filling with oil.

** See Group 10—Cross-Reference Chart for Canadian and Loctite Product Numbers*

RX,4310,9C -19-07JAN98

TRANSMISSION, HYDRAULIC, AND GEAR CASE OIL

Use oil viscosity based on the expected air temperature range during the period between oil changes.

The following oils are preferred:

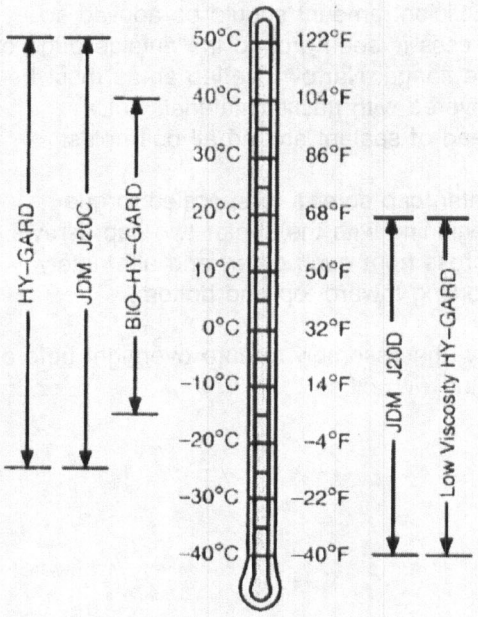
- John Deere HY-GARD®
- John Deere Low Viscosity HY-GARD®

Other oils may be used if they meet one of the following:

- John Deere Standard JDM J20C
- John Deere Standard JDM J20D
- John Deere Standard JDM J27A

Use the following oil when a biodegradable fluid is required:

- John Deere BIO-HY-GARD™[1]



[1]BIO-HY-GARD meets or exceeds the minimum biodegradability of 80% within 21 days according to CEC-L-33-T-82 test method. BIO-HY-GARD should not be mixed with mineral oils because this reduces the biodegradability and makes proper oil recycling impossible

RX,OIL1 -19-07JAN98

SERVICE AND MAINTENANCE SCHEDULE

Service and maintenance is highly dependent upon operating conditions and vehicle application.

Refer to the vehicle operators manual for recommended service and maintenance intervals and procedures.

RX,4410,2A -19-10SEP92

DRAIN AND REFILL AXLE OIL

1. Remove plug (B) to drain oil.

2. Remove fill plug (A) and oil level plug (C).

IMPORTANT: Wait several minutes for oil to transfer to final drives. There is only a small hole connecting final drive compartment to center compartment. This may have to be repeated several times.

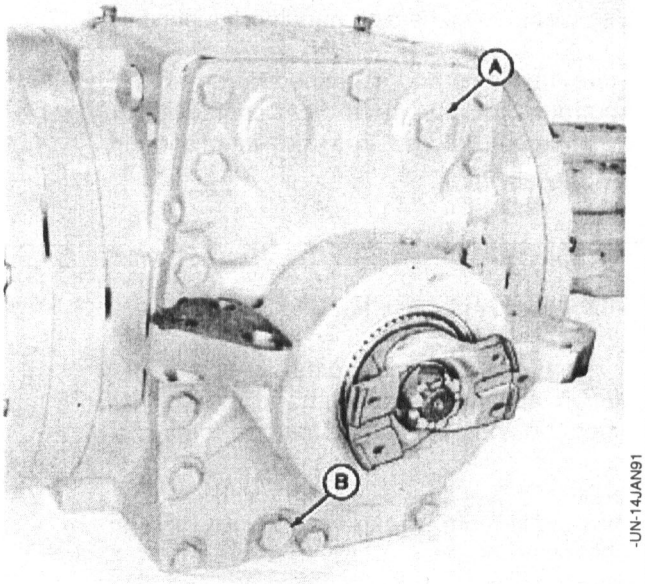
3. Fill axle until oil is to bottom of oil level plug (C) hole.

OIL CAPACITY
(Approximate)
Greased Outer Bearing Axles

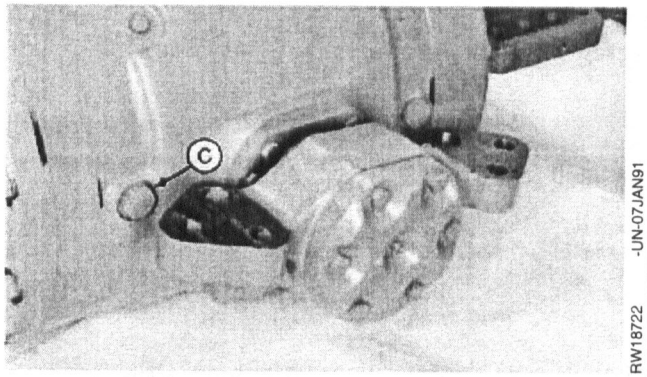
1200 Series	**18.9 L (20 qt)**
1400 Series	**28.4 L (30 qt)**
1600 Series	**45.5 L (48 qt)**

Oiled Outer Bearing Axles

1200 Series	**21.8 L (23 qt)**
1400 Series	**31.2 L (33 qt)**
1600 Series	**48.3 L (51 qt)**



RW18721 -UN-14JAN91



RW18722 -UN-07JAN91

RX,4310,10C -19-07JAN98

ALTERNATIVE AND SYNTHETIC LUBRICANTS

Conditions in certain geographical areas may require lubricant recommendations different from those in this manual.

Synthetic lubricants may be used if meeting the performance requirements in this manual.

The temperature limits and service intervals apply to both conventional and synthetic oils.

Refined base stock products may be used if the finished lubricant meets the performance requirements.

RX,4310,11C -19-07JAN98

LUBRICANT STORAGE

Equipment can operate at top efficiency only if clean lubricants are used.

Use clean containers to handle all lubricants.

Store lubricants and containers in an area protected from dust, moisture, and other contamination. Store containers positioned to avoid water and dirt accumulation.

Make certain all containers are correctly marked to identify contents.

Properly dispose of all old containers and any residual lubricant.

RX,4310,12C -19-07JAN98

MIXING OF LUBRICANTS

In general, avoid mixing different brands or types of oil. Oil manufacturers blend additives to their oils to meet certain specifications and performance requirements.

Mixing different oils can interfere with the proper functioning of these additives and degrade lubricant performance.

Refer to lubricant specifications to obtain specific information and recommendations.

RX,4310,13C -19-07JAN98

GREASE

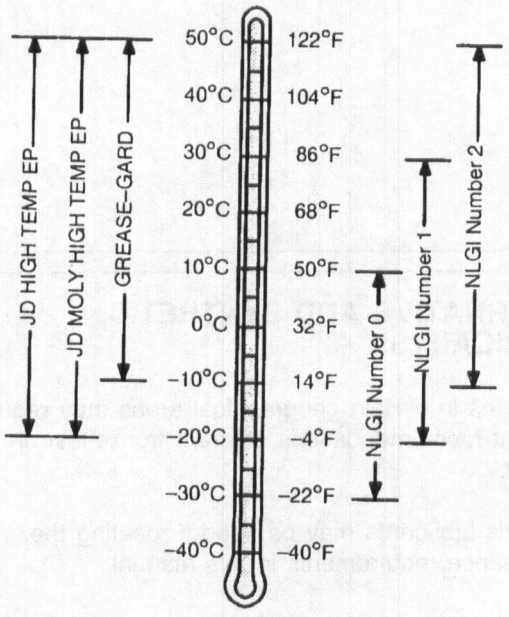
Use grease based on NLGI consistency numbers and the expected air temperature range during the service interval.

The following greases are preferred:

- John Deere HIGH TEMPERATURE EP GREASE
- John Deere MOLY HIGH TEMPERATURE EP GREASE
- John Deere GREASE-GARD™

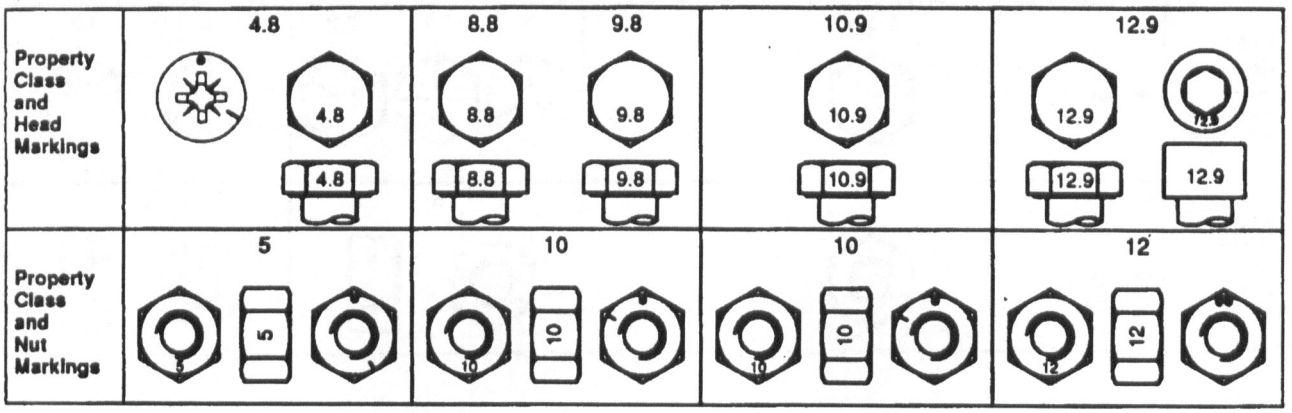
Other greases may be used if meeting the following:

- NLGI Performance Classification GC-LB



RX,GREA1 -19-07JAN98

METRIC BOLT AND CAP SCREW TORQUE VALUES



Size	Class 4.8				Class 8.8 or 9.8				Class 10.9				Class 12.9			
	Lubricated[a]		Dry[a]		Lubricated[a]		Dry[a]		Lubricated[a]		Dry[a]		Lubricated[a]		Dry[a]	
	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft
M6	4.8	3.5	6	4.5	9	6.5	11	8.5	13	9.5	17	12	15	11.5	19	14.5
M8	12	8.5	15	11	22	16	28	20	32	24	40	30	37	28	47	35
M10	23	17	29	21	43	32	55	40	63	47	80	60	75	55	95	70
M12	40	29	50	37	75	55	95	70	110	80	140	105	130	95	165	120
M14	63	47	80	60	120	88	150	110	175	130	225	165	205	150	260	190
M16	100	73	125	92	190	140	240	175	275	200	350	255	320	240	400	300
M18	135	100	175	125	260	195	330	250	375	275	475	350	440	325	560	410
M20	190	140	240	180	375	275	475	350	530	400	675	500	625	460	800	580
M22	260	190	330	250	510	375	650	475	725	540	925	675	850	625	1075	800
M24	330	250	425	310	650	475	825	600	925	675	1150	850	1075	800	1350	1000
M27	490	360	625	450	950	700	1200	875	1350	1000	1700	1250	1600	1150	2000	1500
M30	675	490	850	625	1300	950	1650	1200	1850	1350	2300	1700	2150	1600	2700	2000
M33	900	675	1150	850	1750	1300	2200	1650	2500	1850	3150	2350	2900	2150	3700	2750
M36	1150	850	1450	1075	2250	1650	2850	2100	3200	2350	4050	3000	3750	2750	4750	3500

DO NOT use these values if a different torque value or tightening procedure is given for a specific application. Torque values listed are for general use only. Check tightness of fasteners periodically.

Shear bolts are designed to fail under predetermined loads. Always replace shear bolts with identical property class.

Fasteners should be replaced with the same or higher property class. If higher property class fasteners are used, these should only be tightened to the strength of the original.

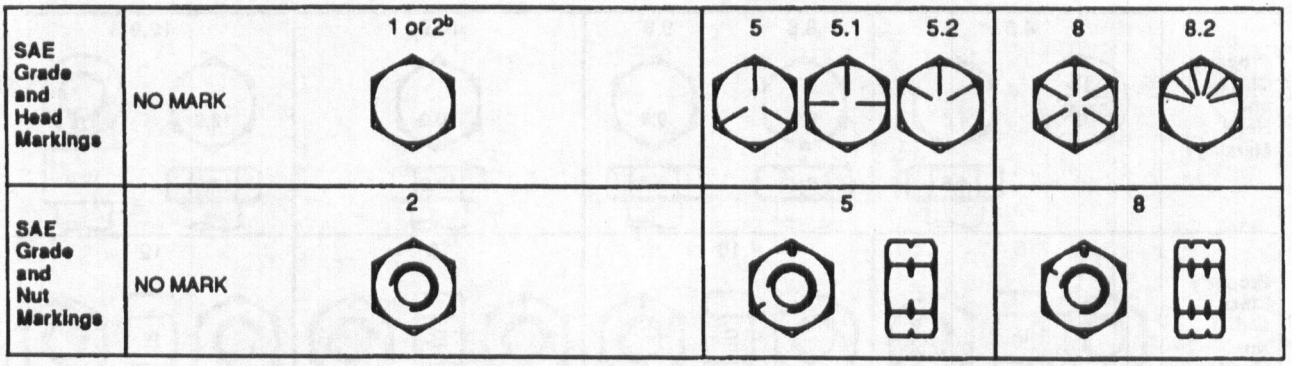
Make sure fasteners threads are clean and that you properly start thread engagement. This will prevent them from failing when tightening.

Tighten plastic insert or crimped steel-type lock nuts to approximately 50 percent of the dry torque shown in the chart, applied to the nut, not to the bolt head. Tighten toothed or serrated-type lock nuts to the full torque value.

[a] "Lubricated" means coated with a lubricant such as engine oil, or fasteners with phosphate and oil coatings. "Dry" means plain or zinc plated without any lubrication.

DX,TORQ2 -19-20JUL94

UNIFIED INCH BOLT AND CAP SCREW TORQUE VALUES



TS1162 -19-04MAR91

Size	Grade 1				Grade 2[b]				Grade 5, 5.1, or 5.2				Grade 8 or 8.2			
	Lubricated[a]		Dry[a]		Lubricated[a]		Dry[a]		Lubricated[a]		Dry[a]		Lubricated[a]		Dry[a]	
	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft
1/4	3.7	2.8	4.7	3.5	6	4.5	7.5	5.5	9.5	7	12	9	13.5	10	17	12.5
5/16	7.7	5.5	10	7	12	9	15	11	20	15	25	18	28	21	35	26
3/8	14	10	17	13	22	16	27	20	35	26	44	33	50	36	63	46
7/16	22	16	28	20	35	26	44	32	55	41	70	52	80	58	100	75
1/2	33	25	42	31	53	39	67	50	85	63	110	80	120	90	150	115
9/16	48	36	60	45	75	56	95	70	125	90	155	115	175	130	225	160
5/8	67	50	85	62	105	78	135	100	170	125	215	160	240	175	300	225
3/4	120	87	150	110	190	140	240	175	300	225	375	280	425	310	550	400
7/8	190	140	240	175	190	140	240	175	490	360	625	450	700	500	875	650
1	290	210	360	270	290	210	360	270	725	540	925	675	1050	750	1300	975
1-1/8	400	300	510	375	400	300	510	375	900	675	1150	850	1450	1075	1850	1350
1-1/4	570	425	725	530	570	425	725	530	1300	950	1650	1200	2050	1500	2600	1950
1-3/8	750	550	950	700	750	550	950	700	1700	1250	2150	1550	2700	2000	3400	2550
1-1/2	1000	725	1250	925	990	725	1250	930	2250	1650	2850	2100	3600	2650	4550	3350

DO NOT use these values if a different torque value or tightening procedure is given for a specific application. Torque values listed are for general use only. Check tightness of fasteners periodically.

Shear bolts are designed to fail under predetermined loads. Always replace shear bolts with identical grade.

Fasteners should be replaced with the same or higher grade. If higher grade fasteners are used, these should only be tightened to the strength of the original.

Make sure fasteners threads are clean and that you properly start thread engagement. This will prevent them from failing when tightening.

Tighten plastic insert or crimped steel-type lock nuts to approximately 50 percent of the dry torque shown in the chart, applied to the nut, not to the bolt head. Tighten toothed or serrated-type lock nuts to the full torque value.

[a] "Lubricated" means coated with a lubricant such as engine oil, or fasteners with phosphate and oil coatings. "Dry" means plain or zinc plated without any lubrication.

[b] Grade 2 applies for hex cap screws (not hex bolts) up to 152 mm (6-in.) long. Grade 1 applies for hex cap screws over 152 mm (6-in.) long, and for all other types of bolts and screws of any length.

DX,TORQ1 -19-20JUL94

UNIFIED INCH BOLT AND CAP SCREW TORQUE VALUES—*GRADE 180*

GRADE 180

Size	Lubricated[a]		Dry[a]	
	N·m	lb-ft	N·m	lb-ft
1/4	16	12	20	15
5/16	33	24	41	30
3/8	60	44	75	55
7/16	98	72	122	90
1/2	146	108	183	135
9/16	212	156	265	195
5/8	292	216	365	270
3/4	520	384	650	480
7/8	840	620	1050	775
1	1256	928	1570	1160

DO NOT use these values if a different torque value or tightening procedure is given for a specific application. Torque values listed are for general use only. Check tightness of fasteners periodically.

Fasteners should be replaced with the same or higher grade. If higher grade fasteners are used, these should only be tightened to the strength of the original.

Make sure fastener threads are clean and correctly started during thread engagement. This will prevent cap screws from failing when tightening.

[a] *"Lubricated" means coated with a lubricant such as engine oil, or fasteners with phosphate and oil coatings. "Dry" means plain or zinc plated without any lubrication.*

RX,4310,10B -19-04JAN95

HYDRAULIC CONNECTIONS

There are several different combinations for hydraulic lines and fittings, for brakes, differential housings, and lubrication lines.

Refer to the vehicle repair manual and/or parts information for the actual application of a particular axle configuration.

RX,4310,14C -19-07JAN98

ESSENTIAL OR RECOMMENDED TOOLS

NOTE: Order tools from the U.S. SERVICE-GARD™ or European Microfiche Tool Catalogs.

ESSENTIAL TOOLS listed are required to perform the job correctly and are obtainable **only** from *SERVICE-GARD* or *European Tool Catalogs.*

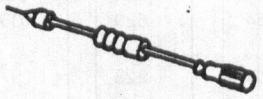
RECOMMENDED TOOLS, as noted, are suggested to perform the job correctly. Some tools may be available from local suppliers or may be fabricated.

RX,TOOLS -19-21APR94

RG5109 -UN-23AUG88

Seal Remover JDG22*

Remove seals



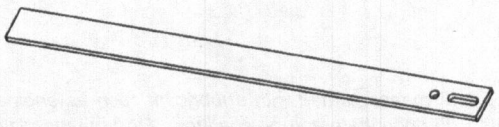
** RECOMMENDED TOOL*

RX,JDG22 -19-08DEC94

RW25383 -UN-02APR96

Yoke Holding Tool JDG924*

Remove and install yoke retaining nut or cap screw



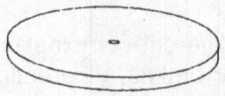
** RECOMMENDED TOOL—May be fabricated—See Group 499 DFRW103*

RX,JDG924,CTM -19-21NOV96

RW25359 -UN-17MAY95

Driver Disk (5-1/4 in.) JDG986*

Install bearing cups



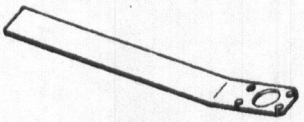
** RECOMMENDED TOOL*

RX,JDG986 -19-29MAR96

RW25331 -UN-21DEC94

Yoke Holding Tool JDT27*

Remove and install input yoke



** RECOMMENDED TOOL—May be fabricated—See Group 499 DF1055*

RX,JDT27,CTM -19-20JAN95

OTHER MATERIAL

Number	Name	Use
TY16021	High-Flex Form-in-Place Gasket	Seal joints

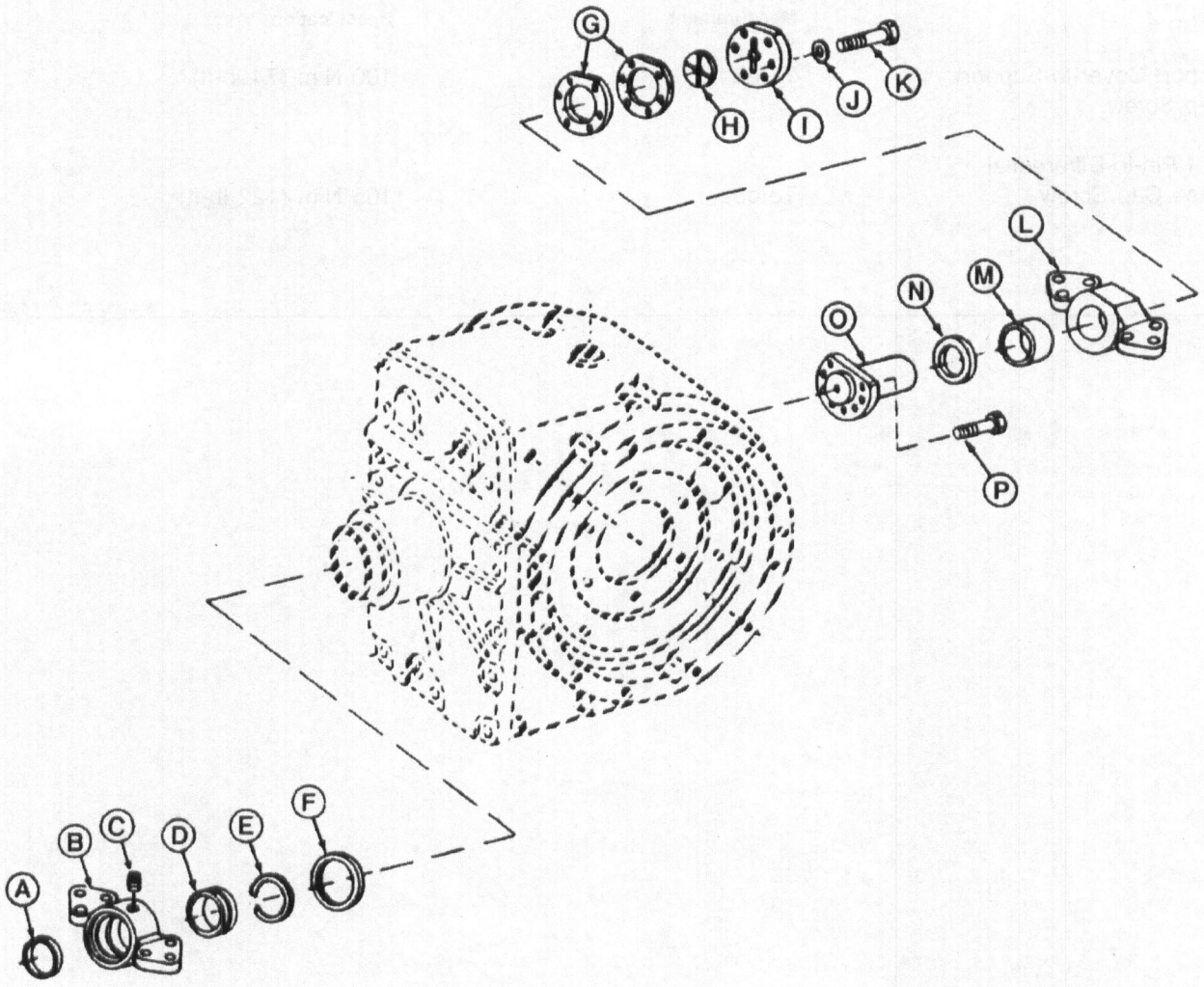
RX,4315,1C -19-19DEC97

SPECIFICATIONS

Item	Measurement	Specification
Support Cover-to-Support Cap Screw	Torque	100 N·m (74 lb-ft)
Pivot Pin-to-Differential Case Cap Screw	Torque	165 N·m (122 lb-ft)

RX,4315,2C -19-19DEC97

EXPLODED VIEW—*DUAL INPUT OSCILLATING SUPPORTS*



RW36536 -UN-24SEP97

A—Seal
B—Support
C—Plug or Fitting
D—Bushing
E—Snap Ring
F—Seal
G—Shim (As Required)
H—Thrust Washer
I—Cover
J—Washer (6 used)
K—Cap Screw (6 used)
L—Support
M—Bushing
N—Seal
O—Pin
P—Cap Screw (13 used)

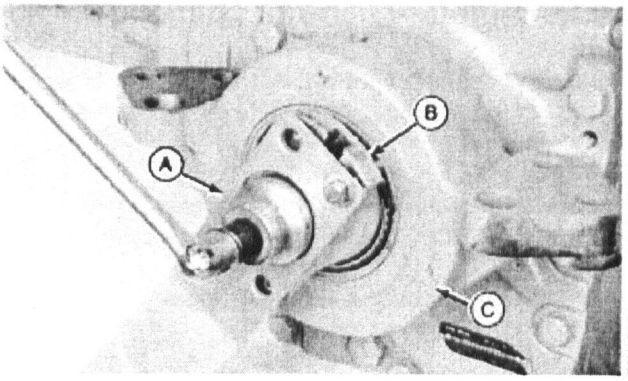
RX,4315,3C -19-01OCT97

REMOVE INPUT OSCILLATING SUPPORT

CAUTION: The approximate weight of oscillating support is 23—57 kg (50—125 lb).

Hold yoke using JDT27 (DF1055*) or JDG924 Yoke Holding Tool (A). Remove nut, washer, O-ring, and yoke (B) from shaft.

Remove oscillating support (C).



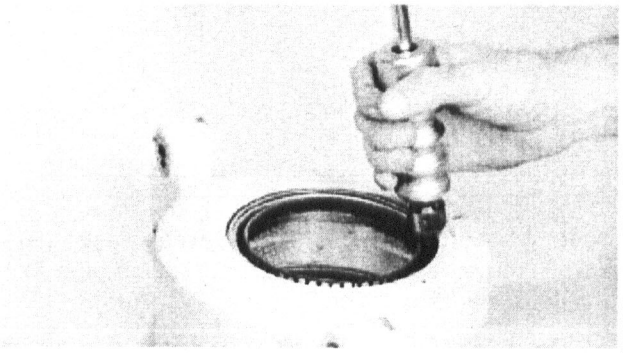
** See Group 499 for optional tool fabrication*

RX,4315,4C -19-07JAN98

DISASSEMBLE AND INSPECT INPUT OSCILLATING SUPPORT

Remove front and rear seals, if necessary, using JDG22 Seal Remover.

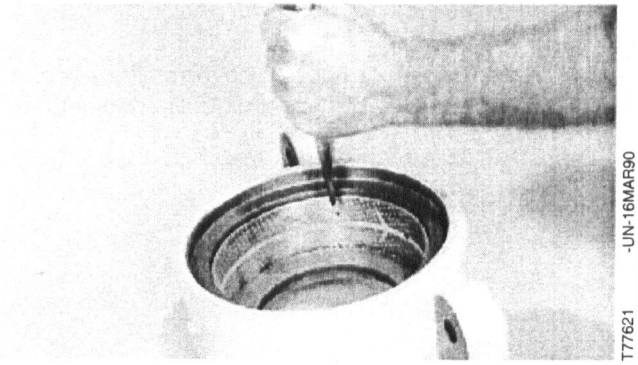
Remove snap ring.



RX,4315,5C -19-01OCT97

Remove worn or damaged bushing using a chisel taking care to avoid damage to the support bore.

Thoroughly clean and inspect oscillating support assembly.



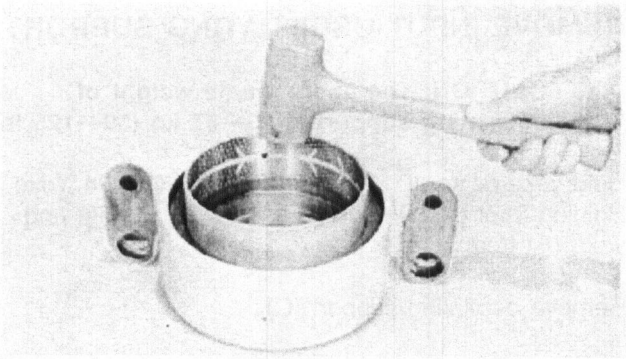
RX,4315,6C -19-01OCT97

ASSEMBLE INPUT OSCILLATING SUPPORT

Install new bushing tight against the bottom of the bore so the split in the bushing is indexed horizontal to the axle centerline.

NOTE: If the support bushing has holes, index the holes toward the grease hole in the support.

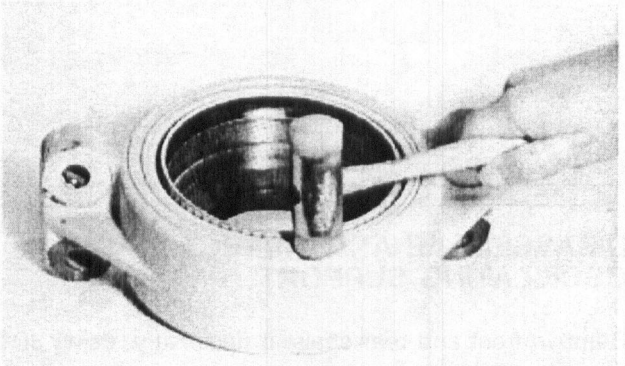
Install the bushing retaining snap ring.



RX,4315,7C -19-19DEC97

Coat sealing lips of both seals and install seals, spring side toward the outside, flush with bore face.

Apply moly grease on lips of both seals and inside surface of bushing.



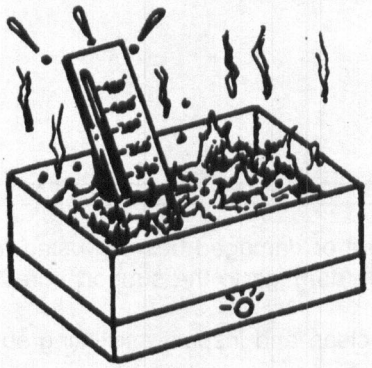
RX,4315,8C -19-19DEC97

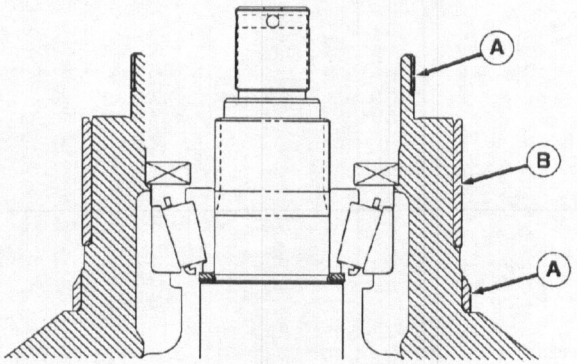
Inspect grease seal sleeve (A) and wear sleeve (B) for wear. Remove sleeves as necessary taking care to avoid damage to housing cover.

CAUTION: Heat parts in a bearing heater. Use a thermometer and do not exceed 150°C (300°F). Plan a safe handling procedure to avoid burns.

Install sleeves on input housing/cover quill if necessary. Make sure sleeves fit tight against quill shoulders.

Install input oscillating support. (See Install Oscillating Support, this group.)





RX,4315,9C -19-19DEC97

INSTALL OSCILLATING SUPPORT

Lubricate both sides and install thrust washer (F).

Lubricate the OD of the differential case cover sleeves.

Install support to input housing/cover.

Install yoke (B) so one of the cotter pin holes is perpendicular to the yoke flanges.

NOTE: Be sure no part of the O-ring is out of the chamfer on the yoke.

Install O-ring (G).

Install washer (D) with recess fitting into the oil ring (away from slotted nut).

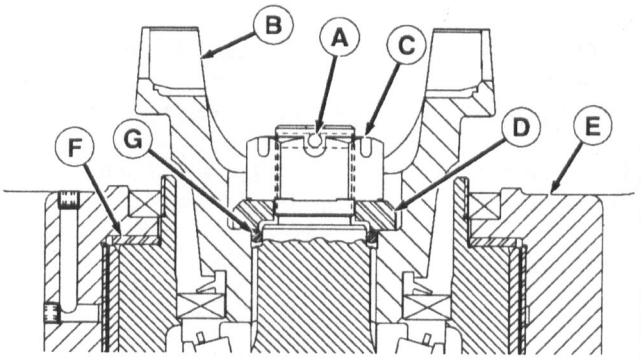
Install slotted nut (C).

Install JDG924 Yoke Holding Tool to yoke.

NOTE: If cotter pin hole does not line up with slotted nut, use a washer of different thickness or tighten the nut more.

Tighten the slotted nut to 373—474 N·m (275—350 lb-ft) so cotter pin can be installed.

Install the cotter pin and bend the ends down against the nut. DO NOT bend ends over end of shaft.



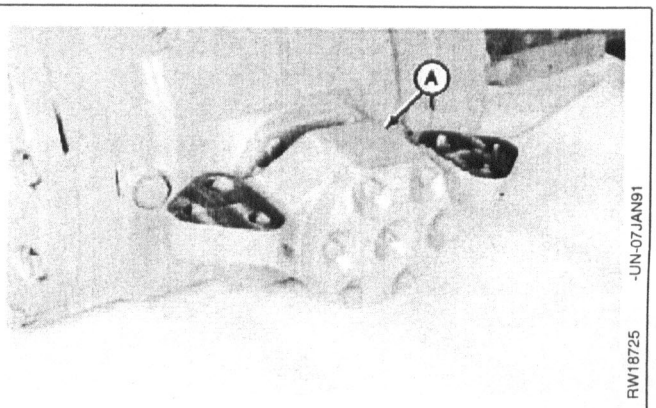
A—Cotter Pin
B—Yoke
C—Yoke Retaining Nut
D—Washer
E—Oscillation Support
F—Thrust Washer
G—O-Ring

RX,4315,10C -19-07JAN98

REMOVE, DISASSEMBLE, AND ASSEMBLE OSCILLATING SUPPORT FROM OPPOSITE END OF INPUT

CAUTION: The approximate weight of support is 23—57 kg (50—125 lb).

Remove oscillating support (A).



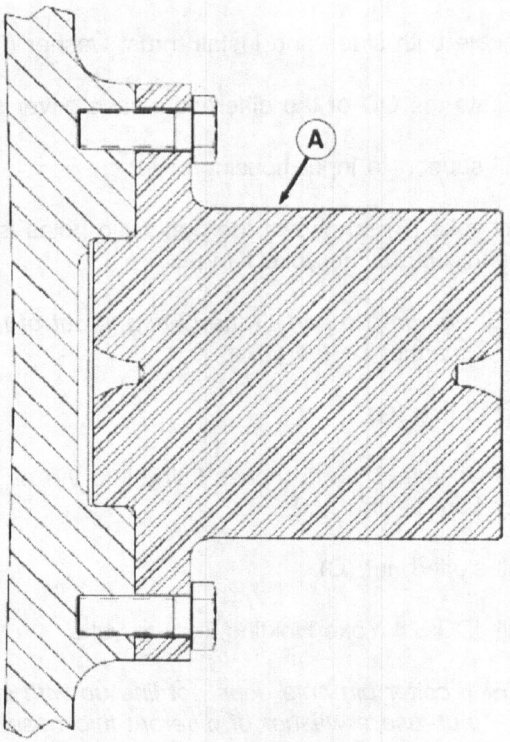
RX,4315,11C -19-07JAN98

Inspect pivot pin and replace as necessary.

Apply a thin even layer of TY16021* Form-in-Place Gasket to interfacing surface of the differential case if differential case pivot pin requires replacement.

Install pivot pin into differential case and tighten cap screws to 165 N·m (122 lb-ft).

Lubricate OD of pivot pin.



RW35950 -UN-10AUG96

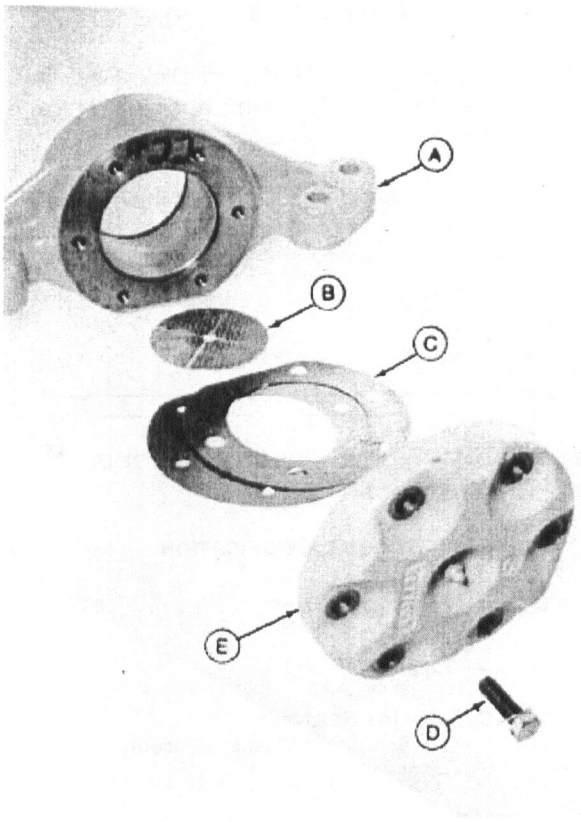
** See Group 10—Cross-Reference Chart for Canadian and Loctite Product Numbers*

RX,4315,12C -19-19DEC97

IMPORTANT: Be careful not to damage shims (C).

Remove parts (B—E).

A—Support
B—Thrust Washer
C—Shim (As Required)
D—Cap Screw and Washer (6 used)
E—Cover

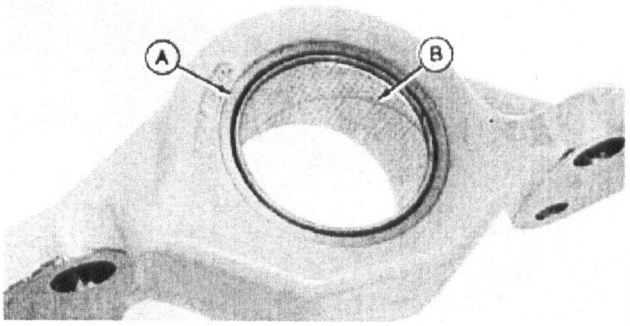


RX,4315,13C -19-19DEC97

Inspect and replace parts as necessary.

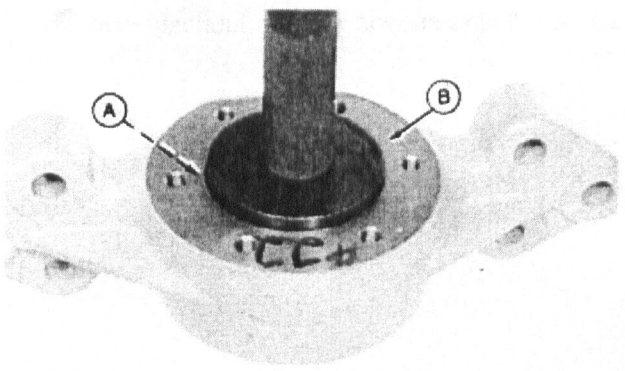
Remove seal (A) using JDG22 Seal Puller.

Remove bushing (B). Bushing is a press fit.



RX,4315,14C -19-19DEC97

Install bushing (A) using a 4-1/2 in. driver disk flush with surface (B). Bushing is a press fit.

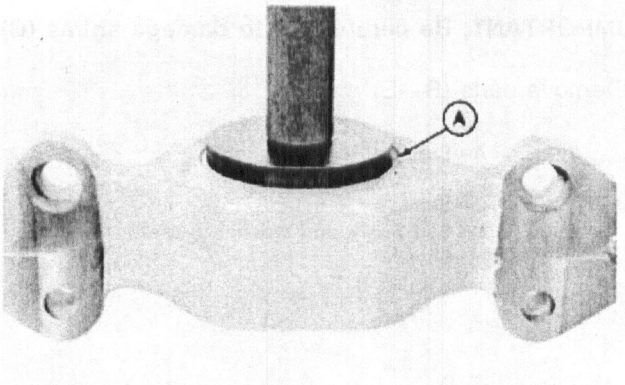


RX,4315,15C -19-19DEC97

Coat sealing lips of seal with oil.

Install seal (A) using JDG986 Driver Disk. Seal face should be flush to 5 mm (0.20 in.) above or below surface of support.

Apply moly grease on lips of seal and inside surface of bushing.



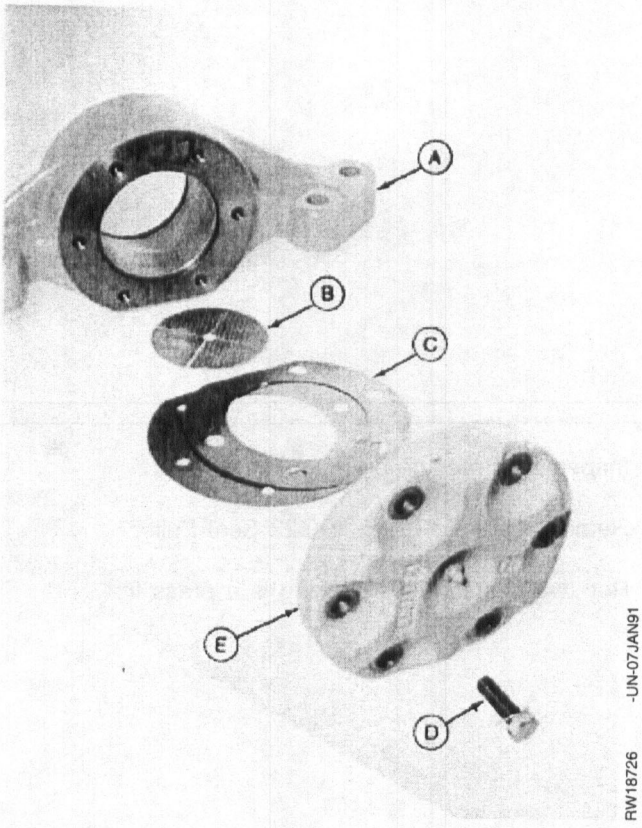
RX,4315,16C -19-19DEC97

Install parts (B—E). Use the same number of shims (C) as removed.

TORQUE SPECIFICATION

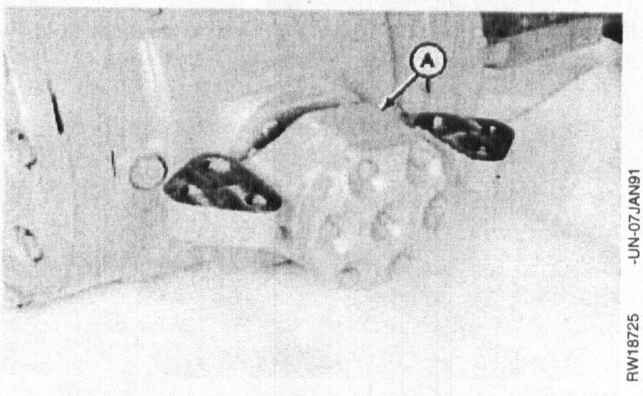
Support Cover-to-Support Cap Screw . . . . . 100 N·m (74 lb-ft)

A—Support
B—Thrust Washer
C—Shim (As Required)
D—Cap Screw and Washer (6 used)
E—Cover



RX,4315,17C -19-19DEC97

Install oscillating support (A) and lubricate with moly grease.



RX,4315,18C -19-19DEC97

ESSENTIAL OR RECOMMENDED TOOLS

NOTE: Order tools from the U.S. SERVICE-GARD™ or European Microfiche Tool Catalogs.

ESSENTIAL TOOLS listed are required to perform the job correctly and are obtainable **only** from *SERVICE-GARD* or *European Tool Catalogs.*

RECOMMENDED TOOLS, as noted, are suggested to perform the job correctly. Some tools may be available from local suppliers or may be fabricated.

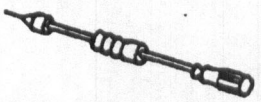
RX,TOOLS -19-21APR94

16
1

RG5109 -UN-23AUG88

Seal Remover JDG22*

Remove seals



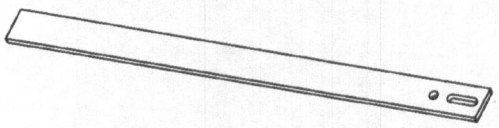
** RECOMMENDED TOOL*

RX,JDG22 -19-08DEC94

RW25383 -UN-02APR96

Yoke Holding Tool JDG924*

Remove and install yoke retaining nut or cap screw



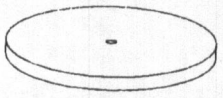
** RECOMMENDED TOOL—May be fabricated—See Group 499 DFRW103*

RX,JDG924,CTM -19-21NOV96

RW25359 -UN-17MAY95

Driver Disk (5-1/4 in.) JDG986*

Install bearing cups



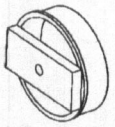
** RECOMMENDED TOOL*

RX,JDG986 -19-29MAR96

RW25469 -UN-20AUG96

Bushing Installer JDG1026

Install oscillating support bushing



RX,JDG1026 -19-09SEP96

OTHER MATERIAL

Number	Name	Use
TY16021	High-Flex Form-in-Place Gasket	Seal joints

See Group 10—Cross-Reference Chart for Canadian and Loctite Product Numbers

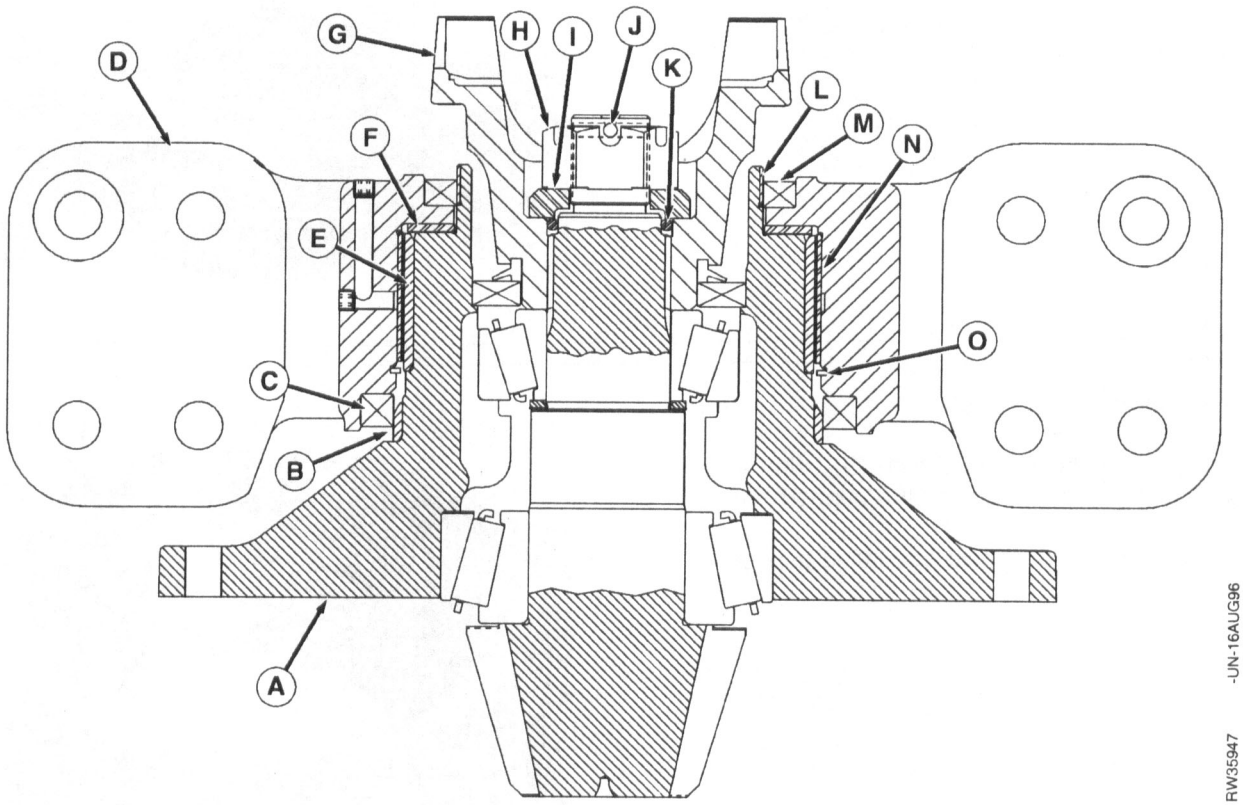
RX,4316,1C -19-19DEC97

SPECIFICATIONS

Item	Measurement	Specification
Support Cover-to-Support Cap Screw	Torque	100 N·m (74 lb-ft)
Pivot Pin-to-Differential Case Cap Screw	Torque	165 N·m (122 lb-ft)
Yoke Retaining Nut	Torque	373—474 N·m (275—350 lb-ft)

RX,4316,2C -19-19DEC97

CROSS-SECTIONAL VIEW—*INPUT QUILL—OSCILLATING*



RW35947 -UN-16AUG96

A—Input Housing/Cover
B—Grease Seal Sleeve
C—Seal
D—Oscillation Support
E—Wear Sleeve
F—Thrust Washer
G—Yoke
H—Yoke Retaining Nut
I—Washer
J—Cotter Pin
K—O-Ring
L—Grease Seal Sleeve
M—Seal
N—Bushing
O—Snap Ring

RX,4316,3C -19-19DEC97

REMOVE OSCILLATING SUPPORT

Remove cotter pin (A).

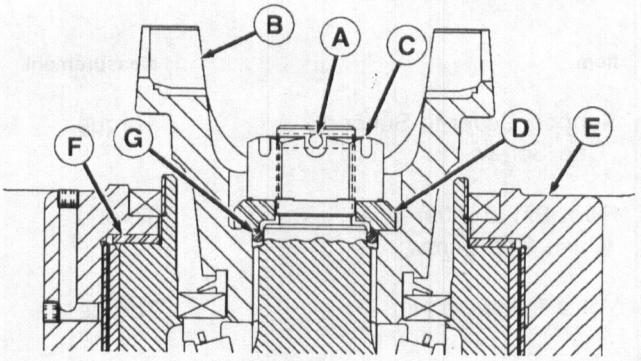
Hold yoke (B) using JDG924 Yoke Holding Tool.

Remove nut (C) and washer (D).

Pull yoke (B) with O-ring (C) from shaft.

Remove support (E), being careful not to damage seals.

A—Cotter Pin
B—Yoke
C—Yoke Retaining Nut
D—Washer
E—Oscillation Support
F—Thrust Washer
G—O-Ring

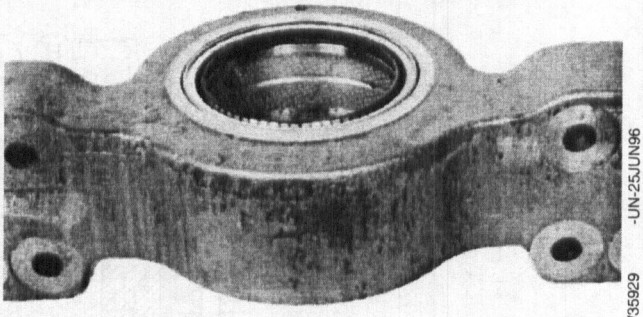


RW35948 -UN-16AUG96

RX,4316,4C -19-19DEC97

DISASSEMBLE OSCILLATING SUPPORT

Remove front and rear seals using JDG22 Seal Remover, if necessary.



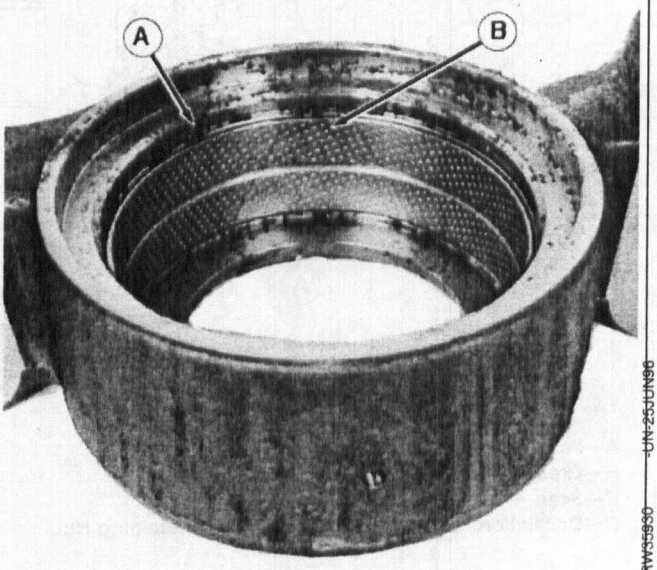
RW35929 -UN-25JUN96

RX,4316,5C -19-19DEC97

Remove snap ring (A).

Remove worn or damaged bushing (B) using a chisel taking care to avoid damage to the support bore.

Thoroughly clean and inspect oscillating support assembly.



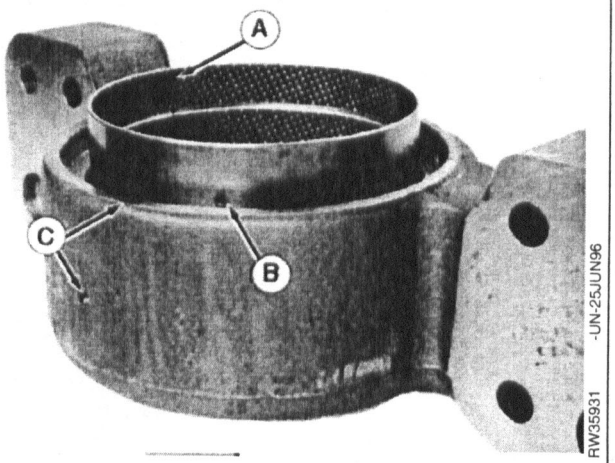
RW35930 -UN-25JUN96

RX,4316,6C -19-19DEC97

ASSEMBLE OSCILLATING SUPPORT

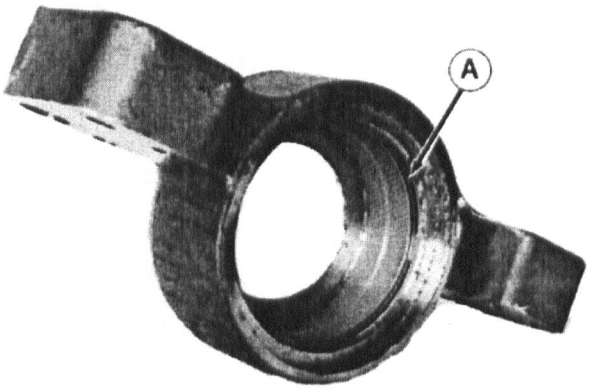
Install bushing using JDG1026 Bushing Installer.

Install new bushing so the split (A) is indexed horizontal to the axle centerline and holes (B) in the bushing are toward the grease hole (C) in the oscillating support.



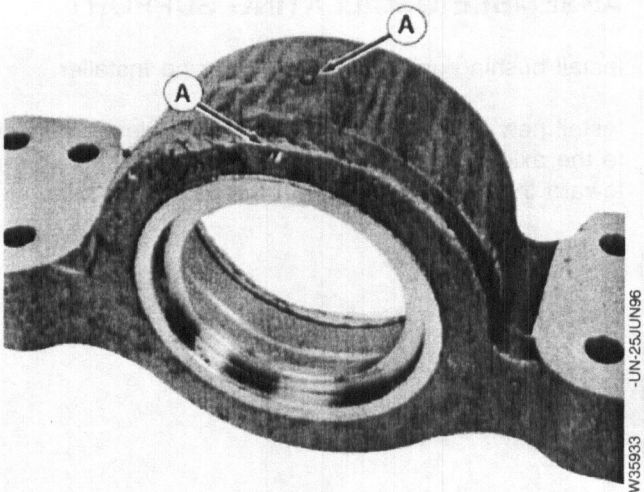
RX,4316,7C -19-19DEC97

Install the bushing retaining snap ring (A).



RX,4316,8C -19-19DEC97

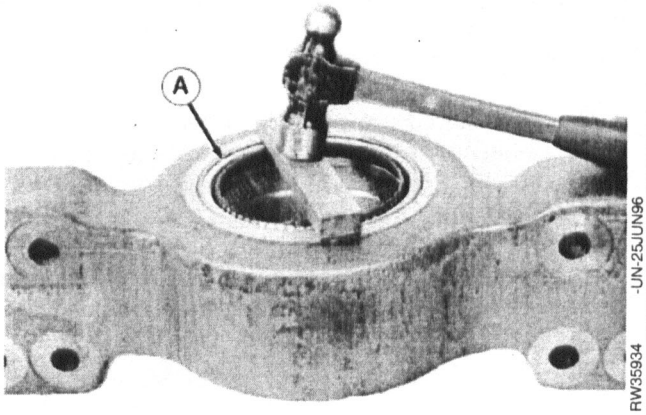
Install pipe plugs or grease fitting in top holes (A) or front of support.



RX,4316,9C -19-19DEC97

Install seals (A) flush with surface of support, with spring side facing outward. Use a flat bar and carefully work around the diameter of the seal.

Apply moly grease on lips of both seals and inside surface of bushing.



Rear Seal

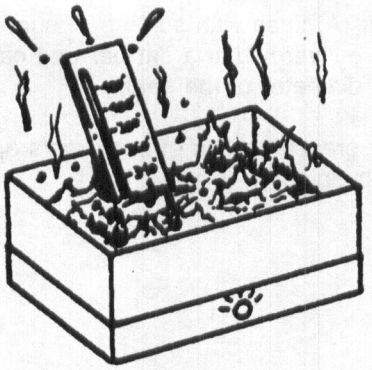
Front Seal

RX,4316,10C -19-19DEC97

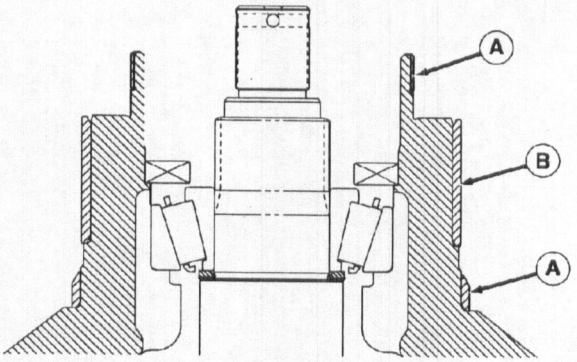
Inspect grease seal sleeve (A) and wear sleeve (B) for wear. Remove sleeves as necessary taking care to avoid damage to housing cover.

CAUTION: Heat parts in a bearing heater. Use a thermometer and do not exceed 150°C (300°F). Plan a safe handling procedure to avoid burns.

Install sleeves on input housing/cover quill if necessary. Make sure sleeves fit tight against quill shoulders.



T81191 -UN-23FEB89



RW35949 -UN-23SEP96

RX,4316,11C -19-19DEC97

INSTALL OSCILLATING SUPPORT

Lubricate both sides and install thrust washer (F).

Lubricate the OD of the differential case cover sleeves.

Install support to input housing/cover.

Install yoke (B) so one of the cotter pin holes is perpendicular to the yoke flanges.

NOTE: Be sure no part of the O-ring is out of the chamfer on the yoke.

Install O-ring (G).

Install washer (D) with recess fitting into the oil ring (away from slotted nut).

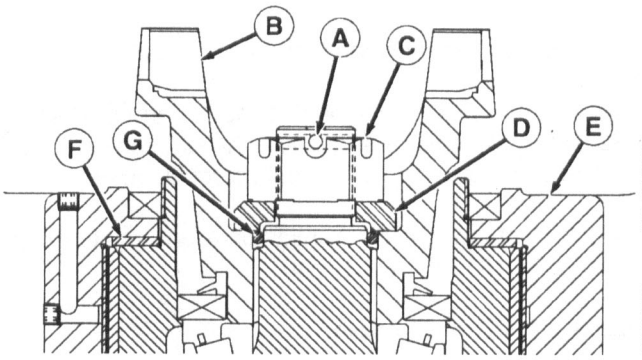
Install slotted nut (C).

Install JDG924 Yoke Holding Tool to yoke.

NOTE: If cotter pin hole does not line up with slotted nut, use a washer of different thickness or tighten the nut more.

Tighten the slotted nut to 373—474 N·m (275—350 lb-ft) so cotter pin can be installed.

Install the cotter pin and bend the ends down against the nut. DO NOT bend ends over end of shaft.



A—Cotter Pin
B—Yoke
C—Yoke Retaining Nut
D—Washer
E—Oscillation Support
F—Thrust Washer
G—O-Ring

RX,4316,12C -19-07JAN98

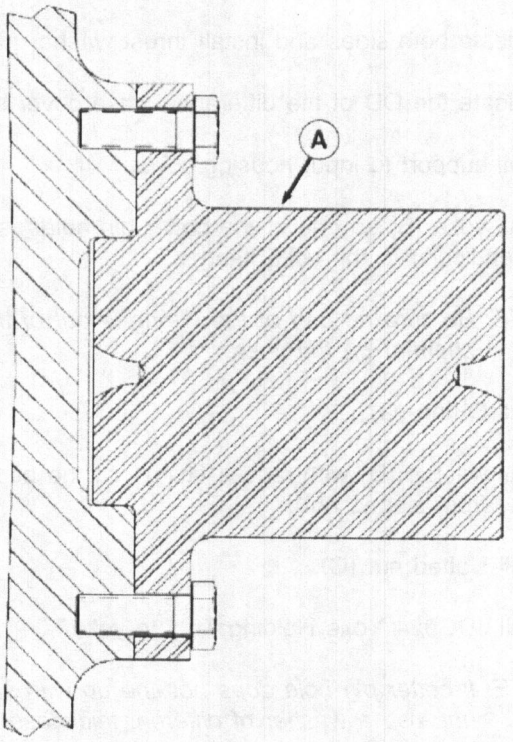
REMOVE AND INSTALL PIVOT PIN

Inspect pivot pin and replace as necessary.

Apply a thin even layer of TY16021* Form-in-Place Gasket to interfacing surface of the differential case if differential case pivot pin requires replacement.

Install pivot pin into differential case and tighten cap screws to 165 N·m (122 lb-ft).

Lubricate OD of pivot pin.



RW35950 -UN-10AUG96

16 9

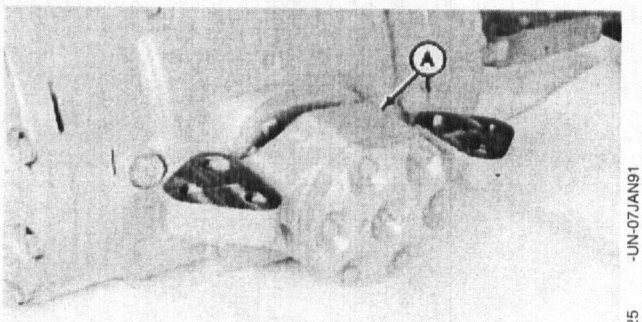
** See Group 10—Cross-Reference Chart for Canadian and Loctite Product Numbers*

RX,4316,13C -19-19DEC97

REMOVE, DISASSEMBLE, AND ASSEMBLE OSCILLATING SUPPORT FROM OPPOSITE END OF INPUT

CAUTION: The approximate weight of support is 23—57 kg (50—125 lb).

Remove oscillating support (A).



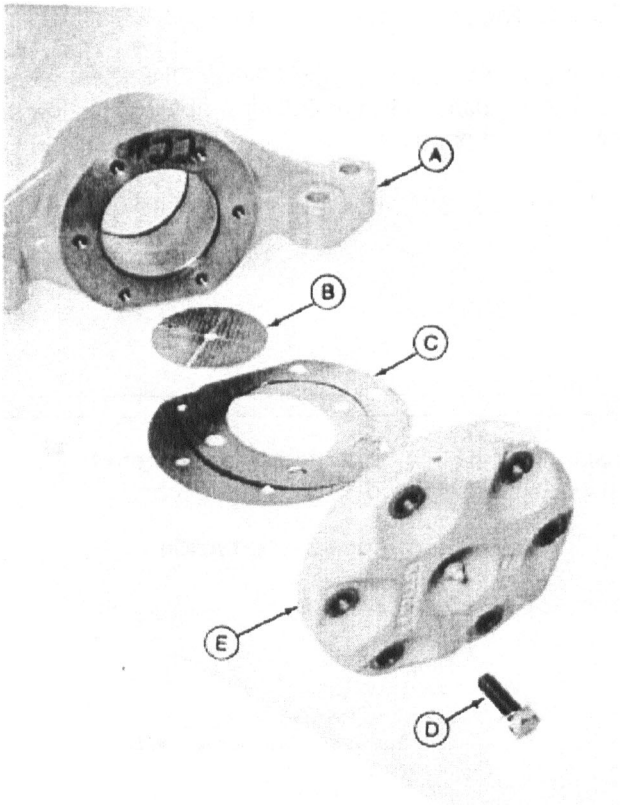
RW18725 -UN-07JAN91

RX,4315,11C -19-07JAN98

IMPORTANT: Be careful not to damage shims (C).

Remove parts (B—E).

A—Support
B—Thrust Washer
C—Shim (As Required)
D—Cap Screw and Washer (6 used)
E—Cover

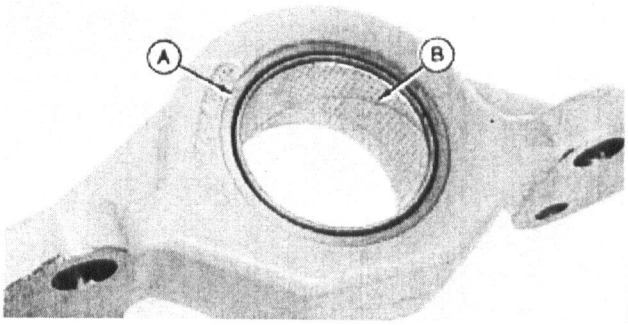


RX,4315,13C -19-19DEC97

Inspect and replace parts as necessary.

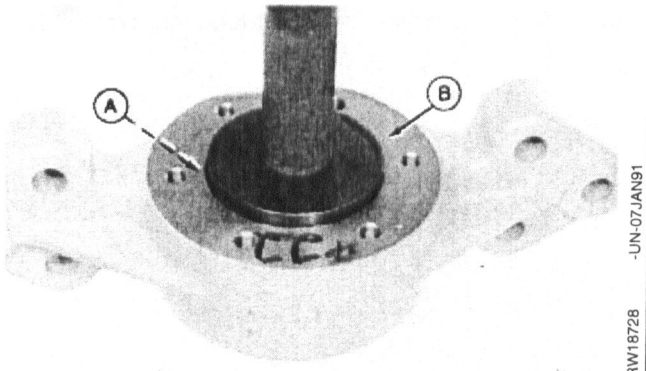
Remove seal (A) using JDG22 Seal Puller.

Remove bushing (B). Bushing is a press fit.



RX,4315,14C -19-19DEC97

Install bushing (A) using a 4-1/2 in. driver disk flush with surface (B). Bushing is a press fit.

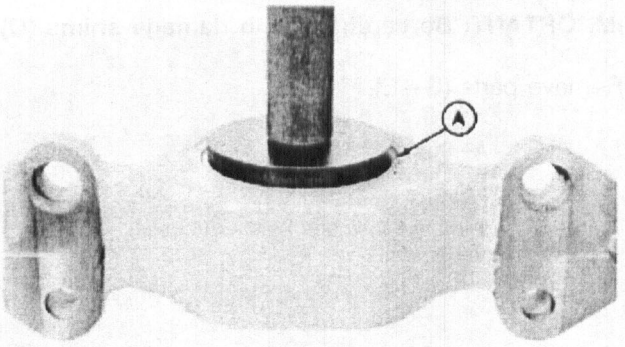


RX,4315,15C -19-19DEC97

Coat sealing lips of seal with oil.

Install seal (A) using JDG986 Driver Disk. Seal face should be flush to 5 mm (0.20 in.) above or below surface of support.

Apply moly grease on lips of seal and inside surface of bushing.



RX,4315,16C -19-19DEC97

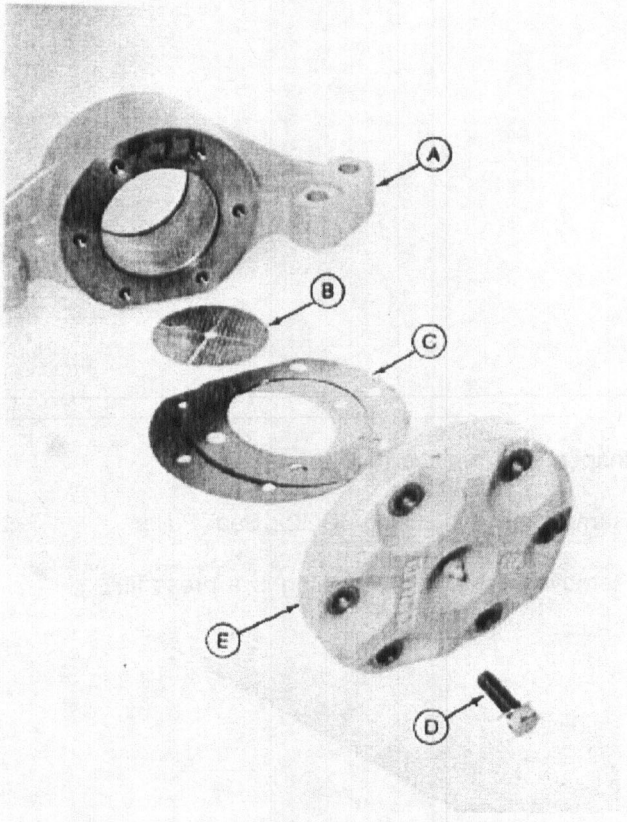
16
11

Install parts (B—E). Use the same number of shims (C) as removed.

TORQUE SPECIFICATION

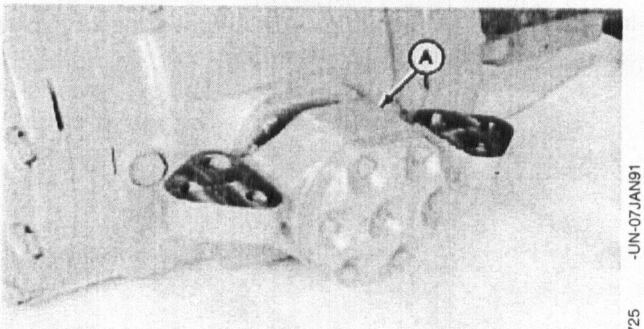
Support Cover-to-Support Cap Screw . . . . . 100 N·m (74 lb-ft)

A—Support
B—Thrust Washer
C—Shim (As Required)
D—Cap Screw and Washer (6 used)
E—Cover



RX,4315,17C -19-19DEC97

Install oscillating support (A) and lubricate with moly grease.



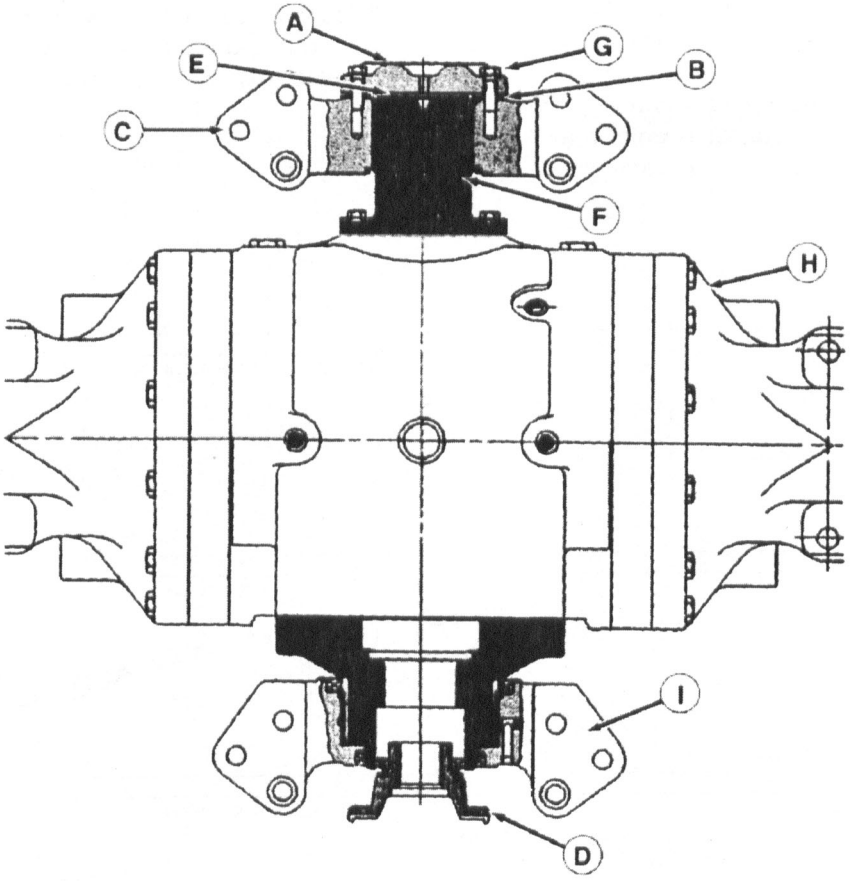
RX,4316,14C -19-19DEC97

SPECIFICATIONS

Item	Measurement	Specification
Support Cover-to-Support Cap Screw	Torque	100 N·m (74 lb-ft)
Axle Assembly	End Play	0.076—0.330 mm (0.003—0.013 in.)

RX,4317,1C -19-19DEC97

ADJUST AXLE ASSEMBLY END PLAY—IN VEHICLE



A—Support Cover
B—End Play Shims
C—Support Bracket
D—Input Yoke
E—Thrust Washer
F—Pivot Pin
G—Support Cover Retaining Screw (5 used)
H—Axle Assembly
I—Input End Support Bracket

Remove the support cover (A) and any shims (B) from the support (C) opposite the input yoke (D).

Hold the thrust washer (E) in position with grease between the pivot pin (F) and thrust washer.

Install the cover without any shims.

Install three cover retaining cap screws (G) in alternating holes.

Tighten cap screws to 20 N·m (15 lb-ft) to push the axle assembly (H) toward the input end support (I).

Measure the gap between the cover (A) and the support (C).

Calculate the shims required to equal the gap, then add necessary shims to provide 0.076—0.330 mm (0.003—0.013 in.) axle end play.

Remove the cover and install the calculated shim pack.

Install and tighten the cover retaining cap screws to 100 N·m (74 lb-ft).

RX,4317,2C -19-19DEC97

ESSENTIAL OR RECOMMENDED TOOLS

NOTE: Order tools from the U.S. SERVICE-GARD™ or European Microfiche Tool Catalogs.

ESSENTIAL TOOLS listed are required to perform the job correctly and are obtainable **only** from *SERVICE-GARD* or *European Tool Catalogs.*

RECOMMENDED TOOLS, as noted, are suggested to perform the job correctly. Some tools may be available from local suppliers or may be fabricated.

RX,TOOLS -19-21APR94

RW25560 -UN-29AUG96

Special Mounting Brackets JDG19

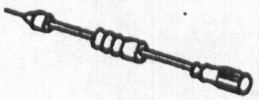
Remove and install components

RX,JDG19 -19-29AUG96

RG5109 -UN-23AUG88

Seal Remover JDG22*

Remove seals



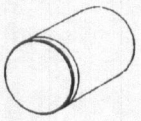
* *RECOMMENDED TOOL*

RX,JDG22 -19-08DEC94

RW25381 -UN-14JUN95

Bearing Installer JDG926

Install bearings



RX,JDG926 -19-26MAR96

RW25388 -UN-15JUN95

Seal Installer JDG985*

Install pinion shaft oil seal

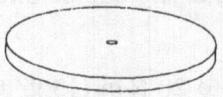
* *Used with JDG926*

RX,JDG985 -19-09JAN98

RW25359 -UN-17MAY95

Driver Disk (5-1/4 in.) JDG986*

Install bearing cups



* *RECOMMENDED TOOL*

RX,JDG986 -19-29MAR96

OTHER MATERIAL

Number	Name	Use
T43513	Threadlock and Sealer High Strength	Seal joints
TY6304	Flexible Form-in-Place Gasket	Seal joints
TY16285	Cure Primer	Speed cure of liquid gasket

See Group 10—Cross-Reference Chart for Canadian and Loctite Product Numbers

RX,4320,1C -19-19DEC97

SPECIFICATIONS

Item	Measurement	Specification
Pinion Shaft:		
1200 Series	Torque	356 N·m (262 lb-ft)
1400 Series	Torque	356 N·m (262 lb-ft)
Input Housing-to-Differential Case Cap Screw:		
1200 Series		
M12 Cap Screw	Torque	165 N·m (122 lb-ft)
M16 Cap Screw	Torque	310 N·m (229 lb-ft)
1400 Series	Torque	310 N·m (229 lb-ft)
Input Shaft	End Play	0.025—0.075 mm (0.001—0.003 in.)

RX,4320,2C -19-19DEC97

REMOVE AND INSTALL INPUT HOUSING

CAUTION: The approximate weight of input housing is:

1200 Series . . . . . 41 kg (90 lb)
1400 Series . . . . . 49 kg (110 lb)

Remove oscillation supports if necessary or, if equipped. (See 1200-1400 Oscillation Supports, Group 15.)

NOTE: Use JDG19 Lift Brackets with lifting straps attached to an overhead hoist to remove input housing.

Remove cap screws (A) to remove input housing (B).

NOTE: Threaded jack screw holes (C) have been provided to break the cover to case seal.

Repair or replace as necessary.

Clean input housing and differential case adjoining surfaces.

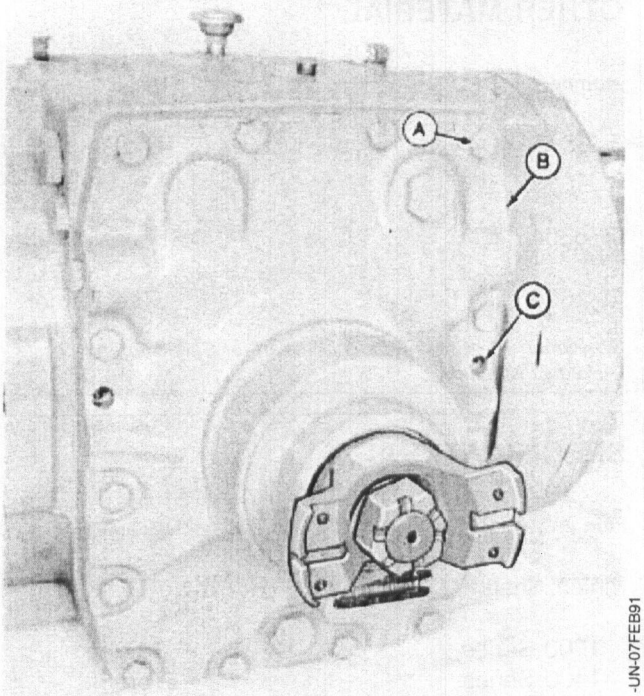
NOTE: Apply TY16285 Cure Primer to housing/cover adjoining surfaces if overnight curing is not possible.*

Apply TY6304* Gasket to differential case surface. (See Sealing Instructions, Group 10.)

Install input housing. Tighten cap screws.

Torque Specification

1200 Series M12 Cap Screw . . . . . 165 N·m (122 lb-ft)
1200 Series M16 Cap Screw . . . . . 310 N·m (229 lb-ft)
1400 Series . . . . . 310 N·m (229 lb-ft)



RW18730 -UN-07FEB91

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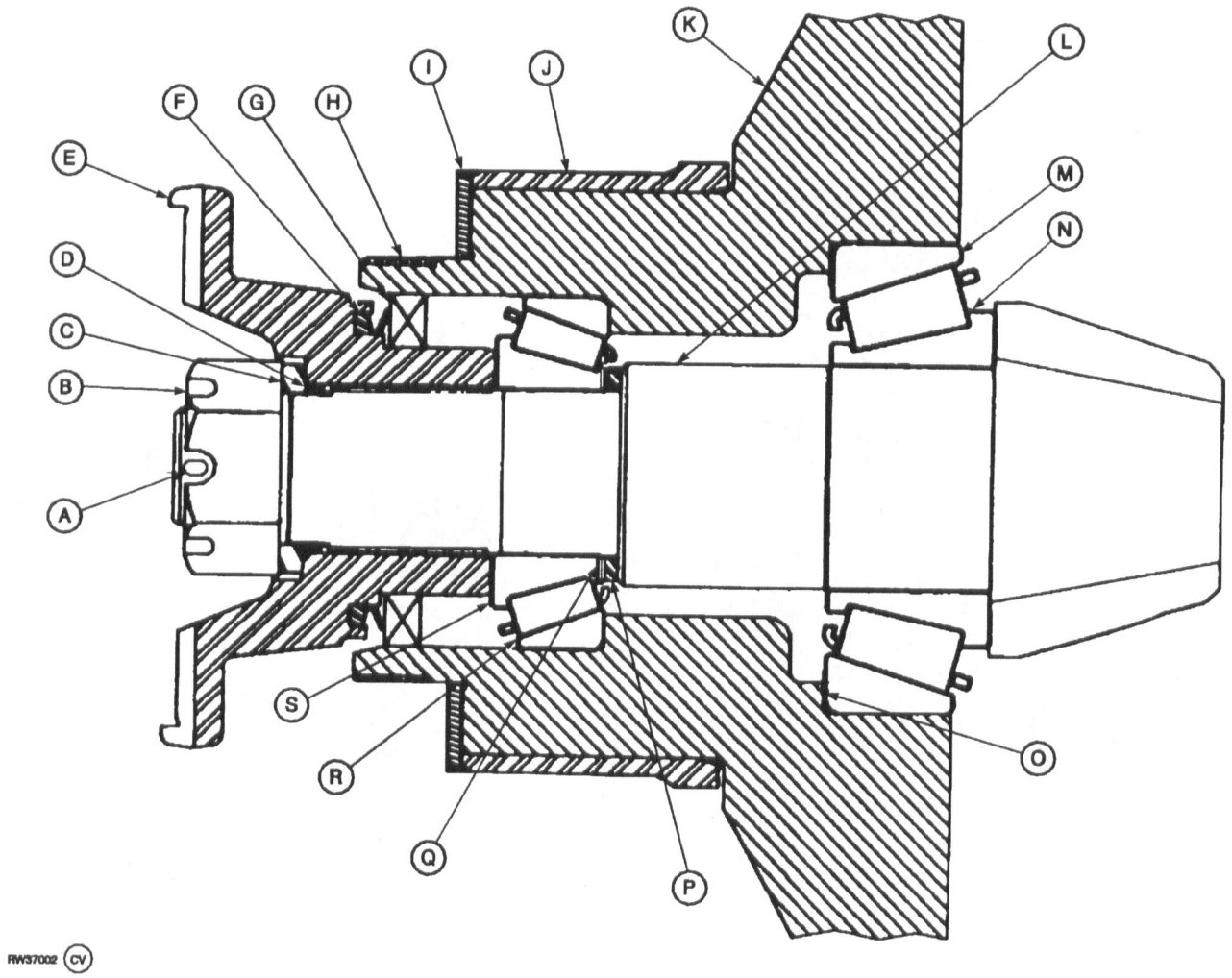
** See Group 10—Cross-Reference Chart for Canadian and Loctite Product Numbers*

RX,4320,3C -19-07JAN98

CROSS-SECTIONAL VIEW—*INPUT HOUSING/COVER*

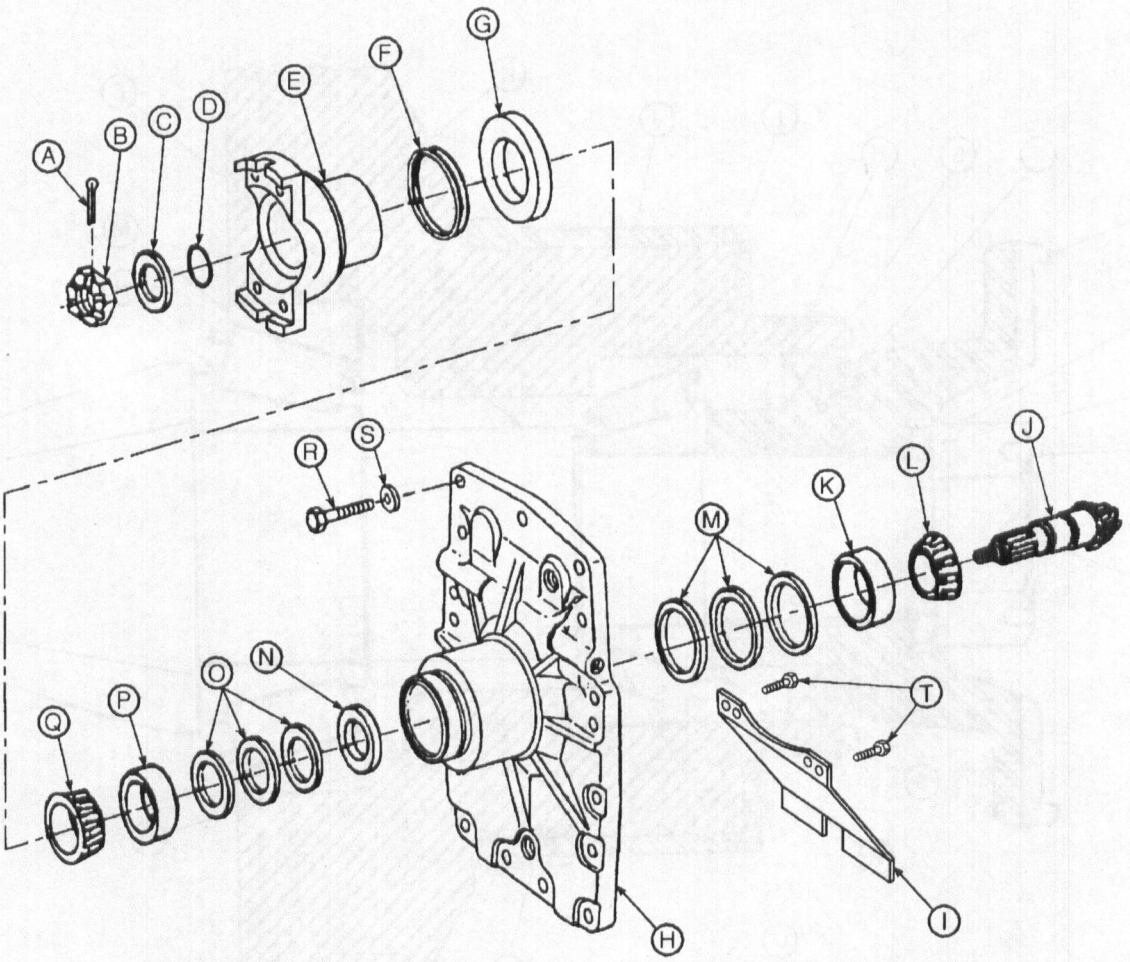


A—Cotter Pin
B—Slotted Nut
C—Washer
D—O-Ring
E—Yoke
F—V-Ring Seal
G—Primary Oil Seal
H—Wear Sleeve
I—Thrust Washer
J—Wear Sleeve
K—Housing/Cover
L.—Bevel Pinion Shaft
M—Rear Bearing Cup
N—Rear Bearing Cone
O—Cone Point Shim Pack
P—Spacer
Q—End Play Shim Pack
R—Front Bearing Cup
S—Front Bearing Cone

Oscillating Input Housing

RX,4320,4C -19-19DEC97

EXPLODED VIEW—*INPUT HOUSING/COVER*



RW37003A -UN-04APR96

A—Cotter Pin
B—Slotted Nut
C—Washer
D—O-Ring
E—Yoke
F—V-Ring Seal
G—Primary Oil Seal
H—Housing/Cover
I—Oil Baffle *
J—Bevel Pinion Shaft
K—Rear Bearing Cup
L—Rear Bearing Cone
M—Cone Point Shim Pack
N—Spacer
O—End Play Shim Pack
P—Front Bearing Cup
Q—Front Bearing Cone
R—Cap Screw (15 used)
S—Washer (15 used)
T—Cap Screw

** John Deere Application Only*

RX,4320,5C -19-09JAN98

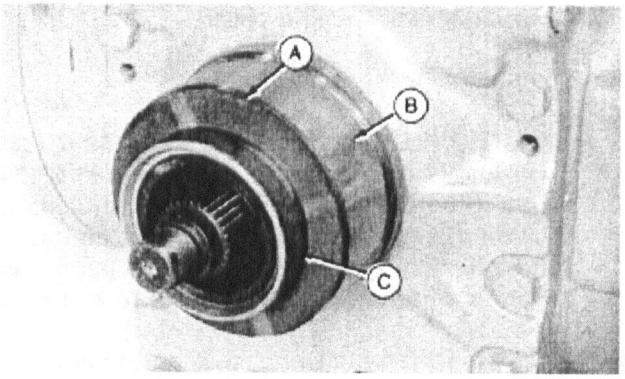
DISASSEMBLE AND ASSEMBLE INPUT HOUSING

Remove oscillation support if equipped. (See 1200-1400 Oscillation Supports, Group 15.)

Remove thrust washer (A).

Cut sleeves (B) and (C) if replacement is required using a sharp chisel. Remove sleeves.

Remove input shaft from housing using a press.

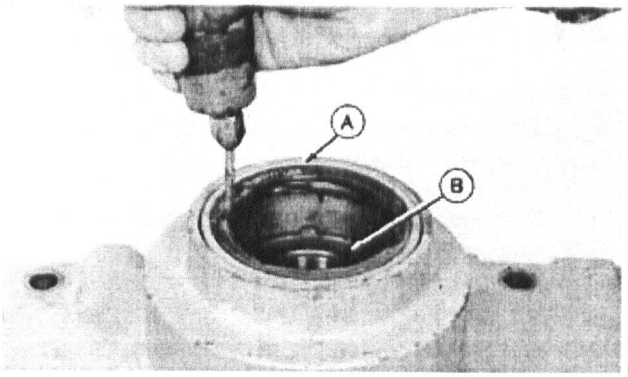


RX,4320,6C -19-19DEC97

Remove seal (A) using JDG22 Seal Remover.

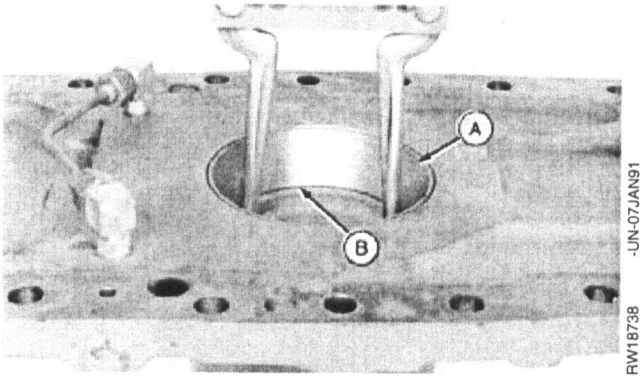
Remove bearing cone (B).

Remove front bearing cup from housing.



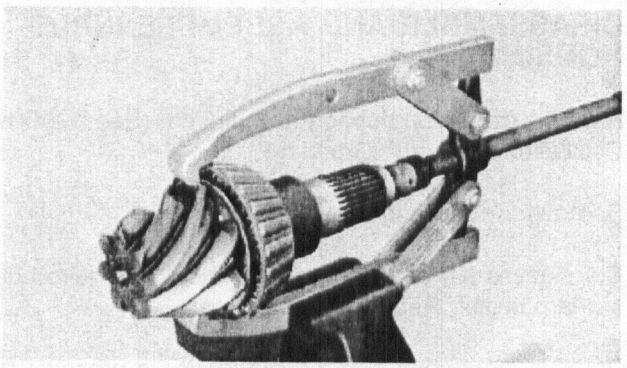
RX,4320,7C -19-01OCT97

Remove rear bearing cup (A) and shims (B) from housing.



RX,4320,8C -19-01OCT97

Remove rear bearing using a puller.



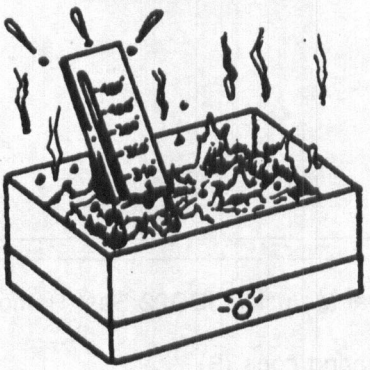
T77691 -UN-16MAR90

Replace parts as necessary.

CAUTION: DO NOT heat oil over 182°C (360°F). Oil fumes or oil can ignite above 193°C (380°F). Use a thermometer. Do not allow a flame or heating element to come in direct contact with the oil. Heat the oil in a well ventilated area. Plan a safe handling procedure to avoid burns.

IMPORTANT: Differential ring gear and pinion shaft are serviced as a matched set. Be sure number stamped on ring gear and pinion end of shaft are the same. Adjust cone point when replacing ring gear and pinion shaft. a

Heat bearing cone to 150°C (300°F) and install on shaft.



T81191 -UN-23FEB89

Make the following adjustments when replacing any of the bearing cups, bearing cones, ring gear, spiral bevel shaft, input housing/cover, or differential case.

- Spiral Bevel
- Cone Point for Tooth Contact Pattern
- Pinion Shaft End Play
- Differential Pre-load
- Differential Backlash

RX,4320,9C -19-19DEC97

DETERMINE DIFFERENTIAL DRIVE SHAFT CONE POINT SHIM PACK

NOTE: The constant dimension consists of the nominal case dimension, (distance between centerline of differential cross bores and the face of case cover) and the nominal cover dimension, (distance between the cover surface and the bearing cup seat).

1. Record applicable constant dimension.

Constant Dimensions

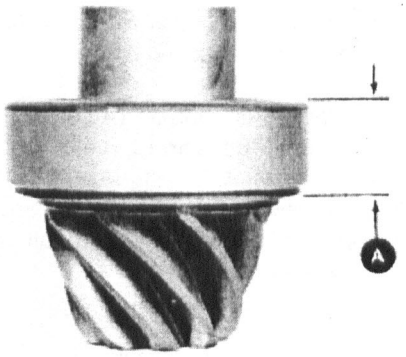
1200 Series . . . . . 226.420 mm (8.914 in.)
1400 Series . . . . . 257.800 mm (10.150 in.)

2. Record applicable bearing with cup width (A).

Bearing/Cup Width

1200 Series . . . . . 44.552 mm (1.754 in.)
1400 Series . . . . . 46.152 mm (1.817 in.)

3. Record the bearing growth dimension 0.038 mm (0.0015 in.) which allows for increased width of bearing when cup is pressed into housing/cover.



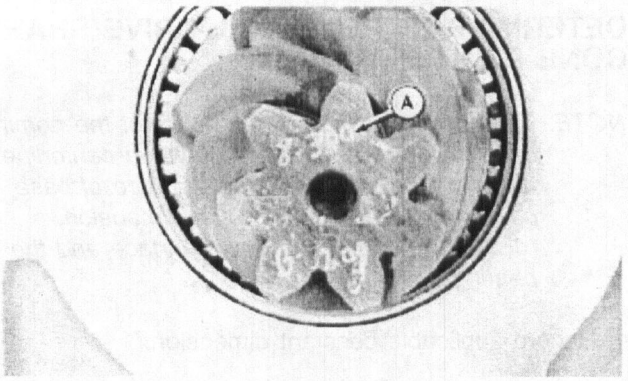
RW13192 -UN-16APR90

RX,4320,10C -19-01OCT97

NOTE: Convert all dimensions to metric before calculating shim pack.

4. Record the metric dimension (A) etched or stamped on the pinion end of the spiral bevel shaft.

5. Subtract dimensions from Step 2, 3, and 4 from constant dimension in Step 1. The result is the correct shim pack thickness.



EXAMPLE

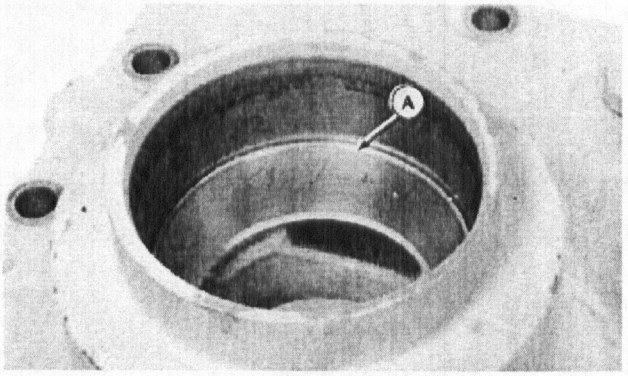
Step 1		257.800 mm	Constant Dimension
Step 2	-	46.152 mm	Bearing Width
Step 3	-	0.038 mm	Bearing Growth Dimension
Step 4	-	210.820 mm	Dimension on Shaft
Step 5	=	0.790 mm	Shim Pack Thickness

NOTE: Shims must always be measured individually due to slight variations in thickness. Never measure an entire shim pack.

RX,4320,11C -19-07JAN98

CONTINUE ASSEMBLY

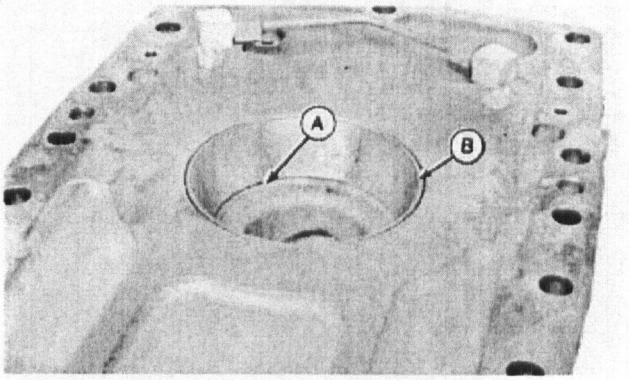
Install front bearing cup (A) in housing.



RX,4320,12C -19-01OCT97

Install shim pack (A) as previously calculated.

Install rear bearing cup (B) tight against shims.



RX,4320,13C -19-01OCT97

Install wear sleeves (A) and (C) flush with surface.

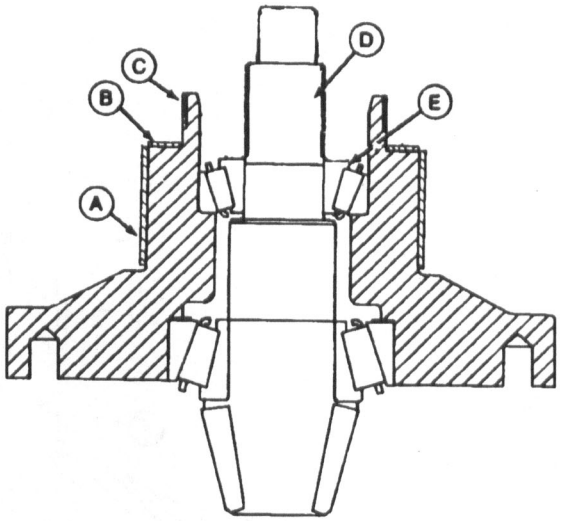
Install thrust washer (B).

Install pinion shaft (D) into housing.

IMPORTANT: Do not install front bearing cone spacer or shims.

Press front bearing cone onto shaft and into bearing cup.

A—Wear Sleeve
B—Thrust Washer
C—Wear Sleeve
D—Input Pinion Shaft
E—Front Bearing Cone



RW20627 -UN-18FEB92

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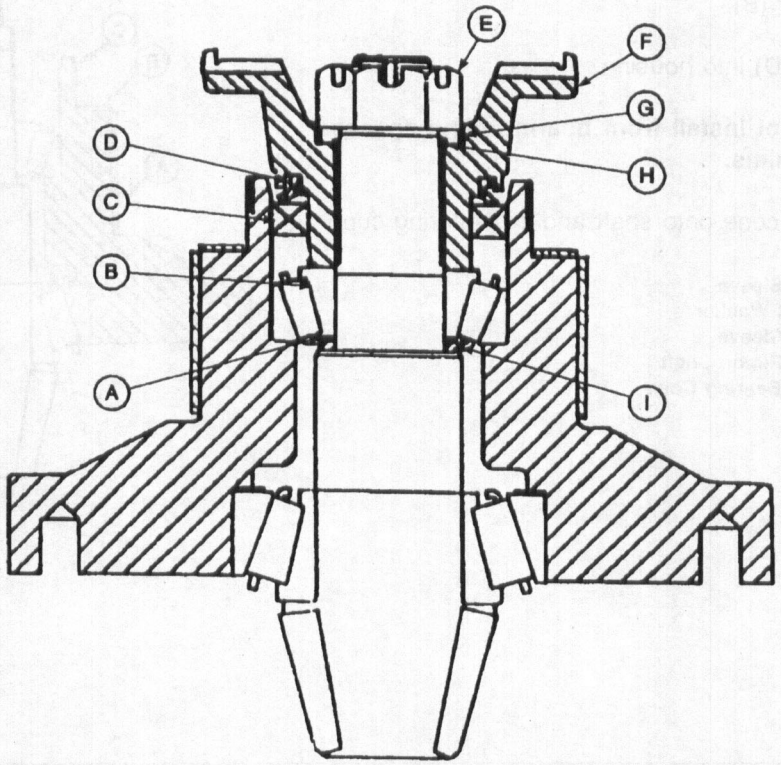
RX,4320,14C -19-01OCT97

ADJUST INPUT PINION SHAFT END PLAY



A—Front Bearing Cone Shims (As Required)
B—Front Bearing Cone
C—Primary Oil Seal
D—V-Ring Seal
E—Slotted Nut
F—Yoke
G—Washer
H—O-Ring
I—Spacer

Oscillating Input Housing

RW37004 -UN-20OCT94

20 11

NOTE: Cone point adjustment must be done before input pinion shaft adjustment.

IMPORTANT: Make input pinion shaft adjustment with shaft in vertical position (pinion end down). Oil seals must not be installed on assembly. Front bearing cone spacer and shims must not be installed.

Install yoke (F), washer (G) and slotted nut (E). Tighten nut to 604 N·m (445 lb-ft) while rotating housing to seat bearings.

Remove slotted nut and yoke. Press shaft out of housing.

Install spacer (I) with the inside diameter chamfer toward pinion gear.

Install enough shims (A) to provide end play.

Press cone (B) onto input shaft until seated against shims.

Install yoke (F), washer (G) and slotted nut (E). Tighten nut to 604 N·m (445 lb-ft) while rotating housing to seat bearings.

Loosen nut to less than 272 N·m (200 lb-ft) and then tighten to 356 N·m (262 lb-ft).

Turn shaft several times using 8—18 N (2—4 lb force) on yoke end of shaft.

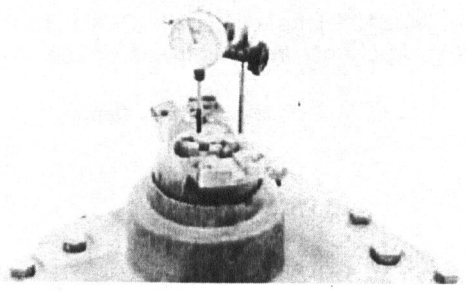
Measure end play using an upward pressure of 102—302 N (23—68 lb force).

RX,4320,15C -19-07JAN98

NOTE: The thickness of the shim pack includes the spacer.

Adjust size of shim pack to obtain 0.025—0.075 mm (0.001—0.003 in.) end play.

IMPORTANT: Tighten the slotted nut to 604 N·m (445 lb-ft) while rotating the housing each time the yoke and bearing cone are installed. Loosen nut to less than 272 N·m (200 lb-ft) and then tighten to 356 N·m (262 lb-ft).

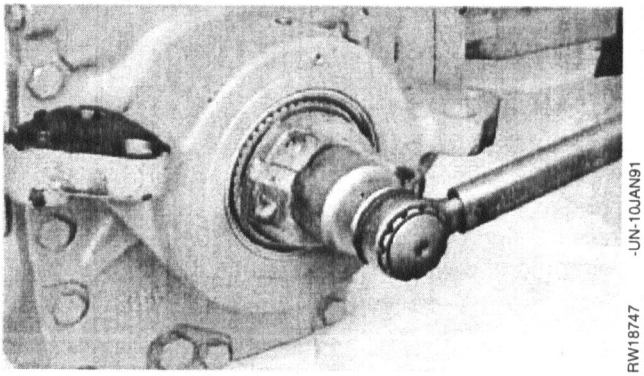


RW18745 -UN-10JAN91

RX,4320,16C -19-07JAN98

Tighten slotted nut to 356 N·m (262 lb-ft) after correct bearing setting is obtained.

NOTE: Install a new washer behind slotted nut to obtain correct torque specification if necessary.

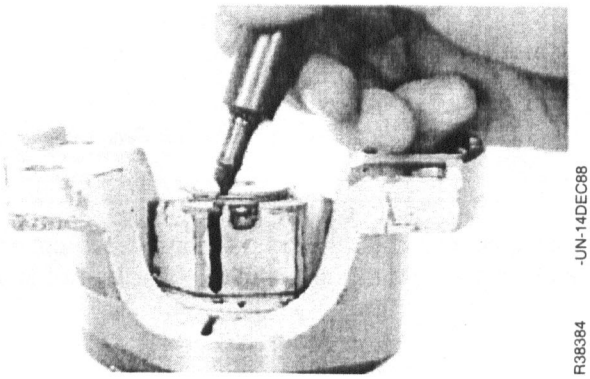


RW18747 -UN-10JAN91

RX,4320,17C -19-19DEC97

NOTE: Slotted nut and yoke must be removed to install seal.

Mark slotted nut and end of pinion shaft. Remove nut and yoke. Apply hydraulic oil to yoke-end bearing.



R38384 -UN-14DEC88

RX,4320,18C -19-01OCT97

NOTE: Instructions for installing the primary oil seal are included with the replacement part.

Apply T43513* Threadlock and Sealer to the OD of the oil seal. Apply oil on sealing lips of seal.

Installed Seal Depth

1200 Series	7.64 mm (0.300 in.)
1400 Series	6.07 mm (0.240 in.)

Install oil seal into input housing.

For 1400 Series Axles, perform the following step:

Install seal using JDG985 Seal Driver in conjunction with JDG926 Bearing Installer.

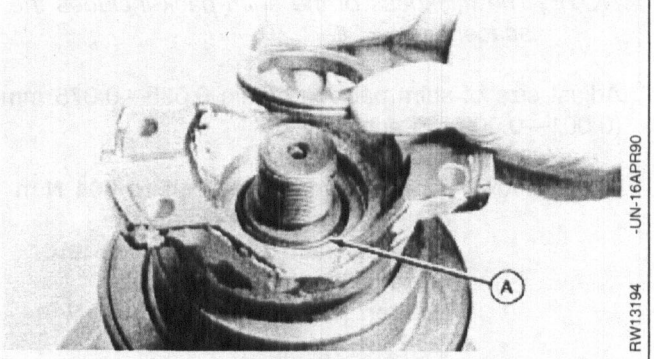
NOTE: JDG985 Seal Driver installs the seal to the correct depth.

For 1200-1400 Series Axles, perform the following steps:

Install V-ring seal onto yoke.

NOTE: Be sure no part of O-ring (A) is out of the chamfer on the yoke.

Install O-ring (A) and washer. Tighten slotted nut to correct torque while aligning marks.



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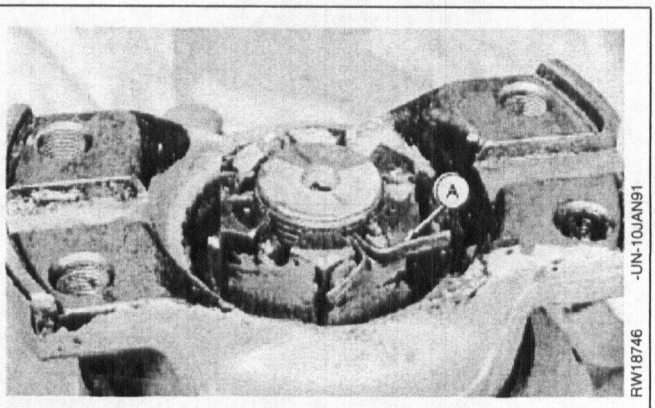
** See Group 10—Cross-Reference Chart for Canadian and Loctite Product Numbers*

RX,4320,19C -19-07JAN98

Install cotter pin (A). Bend the ends of the cotter pin against the flats of the nut, NOT over end of shaft.



RX,4320,20C -19-01OCT97

ESSENTIAL OR RECOMMENDED TOOLS

NOTE: Order tools from the U.S. SERVICE-GARD™ or European Microfiche Tool Catalogs.

ESSENTIAL TOOLS listed are required to perform the job correctly and are obtainable **only** from *SERVICE-GARD* or *European Tool Catalogs.*

RECOMMENDED TOOLS, as noted, are suggested to perform the job correctly. Some tools may be available from local suppliers or may be fabricated.

RX,TOOLS -19-21APR94

RW25560 -UN-29AUG96

Special Mounting Brackets JDG19

Remove and install components

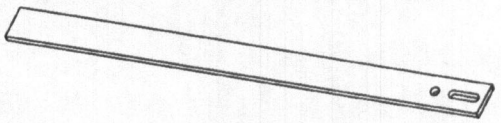
RX,JDG19 -19-29AUG96

RW25383 -UN-02APR96

Yoke Holding Tool JDG924*

Remove and install yoke retaining nut or cap screw

** RECOMMENDED TOOL—May be fabricated—See Group 499 DFRW103*



RX,JDG924,CTM -19-21NOV96

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RW25387 -UN-14JUN95

Seal Installer JDG925*

Install input shaft yoke oil seals *(1600 Series Axles)*

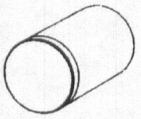
** RECOMMENDED TOOL*

RX,JDG925 -19-08JUL95

RW25381 -UN-14JUN95

Bearing Installer JDG926

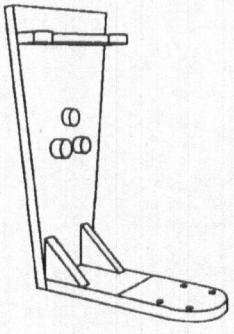
Install bearings



RX,JDG926 -19-26MAR96

Axle Support Bracket JDG927*

Support axle assembly, using D05223ST rollover stand, during disassembly, adjustment, and assembly



RW25374 -UN-17MAY95

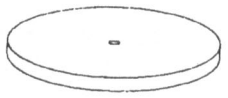
** RECOMMENDED TOOL*

RX,JDG927 -19-11MAY95

RW25359 -UN-17MAY95

Driver Disk (6-3/8 in.) JDG932*

Install seals and bearing cups



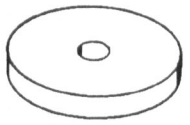
* *RECOMMENDED TOOL*

RX,JDG932 -19-26APR95

RW25380 -UN-23MAY95

Driver Disk (4-3/4 in.) JDT35*

Install seals and bearing cups



* *RECOMMENDED TOOL*

RX,JDT35 -19-24JUN97

OTHER MATERIAL

Number	Name	Use
T43513	Threadlock and Sealer High Strength	Seal joints
TY6304	Flexible Form-in-Place Gasket	Seal joints
TY16285	Cure Primer	Speed cure of liquid gasket

See Group 10—Cross-Reference Chart for Canadian and Loctite Product Numbers

RX,4321,1C -19-19DEC97

SPECIFICATIONS

Item	Measurement	Specification
Yoke Retaining Nut	Final Torque	373—474 N·m (275—350 lb-ft)
Input Housing/Cover Cap Screws	Torque	310 N·m (229 lb-ft)
Bevel Pinion Shaft	End Play	0.0025—0.075 mm (0.001—0.003 in.)
Hollow Dowel Pins	Installed Height	8.5 mm (0.330 in.)
Input Shaft Seal	Installed Depth Below Surface	55.25 mm (2.17 in.)

RX,4321,2C -19-19DEC97

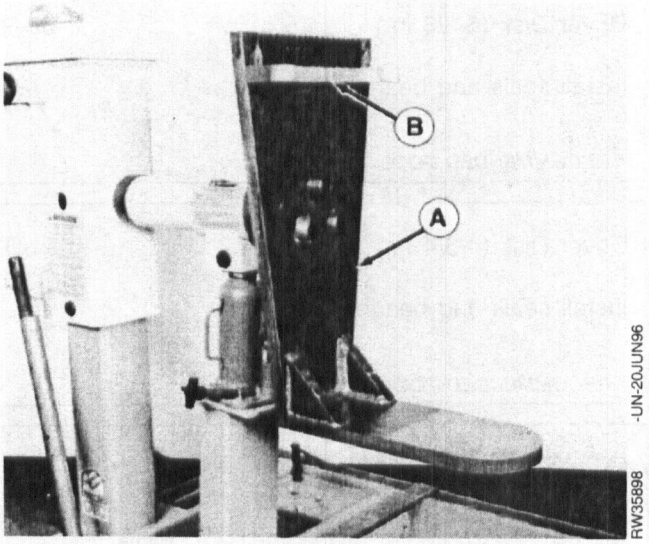
INSTALL AXLE IN REPAIR STAND

Remove axle from vehicle. (Refer to the Vehicle Repair Manual.)

Remove the oscillating support and pivot pin (if equipped). (Refer to Remove Oscillating Support).

Install JDG927 Support Bracket (A) to D05223ST Engine Rollover Stand.

Remove the support bracket top adapter (B).



RX,4321,3C -19-19DEC97

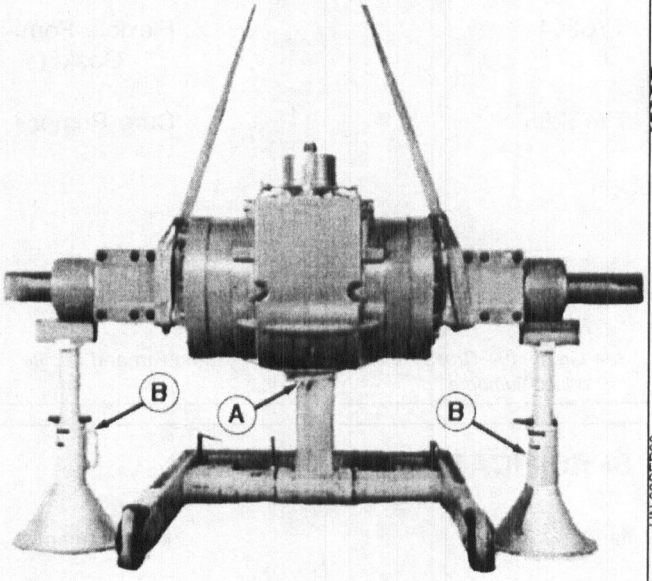
Install the axle assembly to the support bracket.

Install four M12 x 50 mm cap screws (A).

Remove two of the cover cap screws and substitute 25 mm (1 in.) longer cap screws and install the support bracket top adapter if the input housing/cover is NOT being removed.

Install cone stands (B) under the axle housings to improve stability until the final drive assemblies are removed.

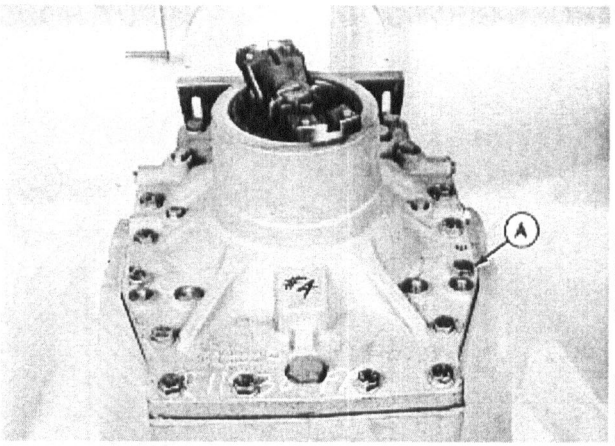
Remove chains/straps and lift brackets.



RX,4321,4C -19-19DEC97

REMOVE INPUT HOUSING/COVER

Remove 18 cap screws (A).

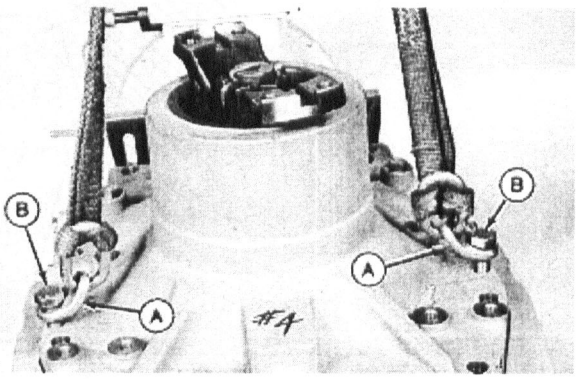


RX,4321,5C -19-19DEC97

Install and turn one of the cover cap screws (B) into JDG19 Lift Brackets (A) and holes on each side to loosen cover seal. Turn cap screws until seal is broken.

Install lifting straps to lift brackets.

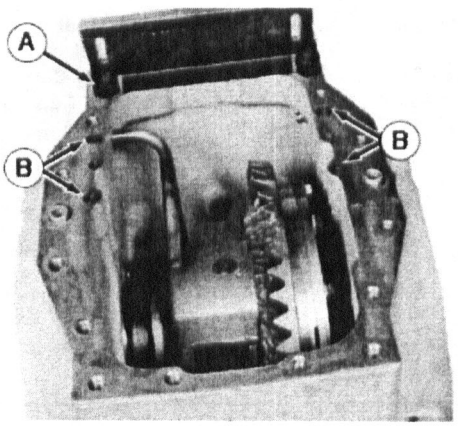
Lift cover from differential case.



RX,4321,6C -19-19DEC97

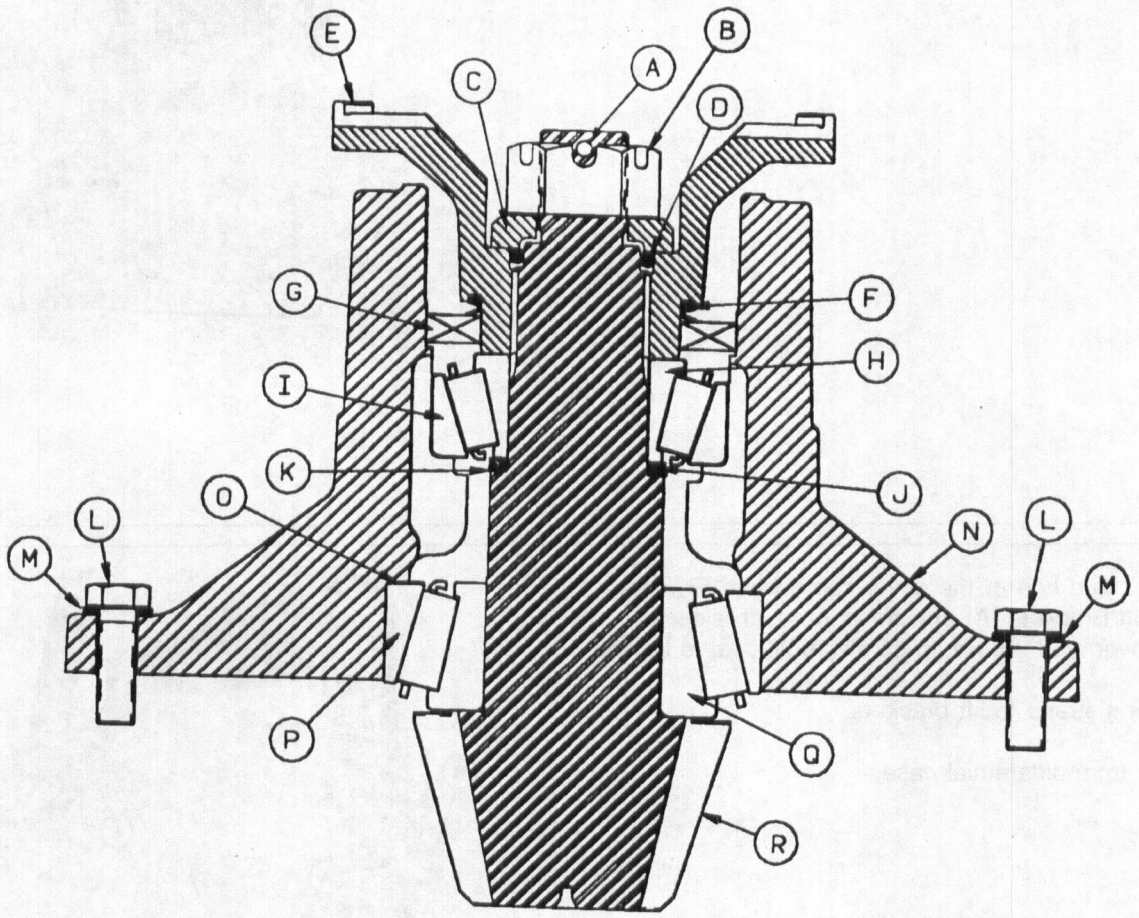
Install support bracket top adapter (A) to bracket and differential case.

Inspect four O-rings (B).



RX,4321,7C -19-19DEC97

CROSS-SECTIONAL VIEW—*INPUT HOUSING/COVER*

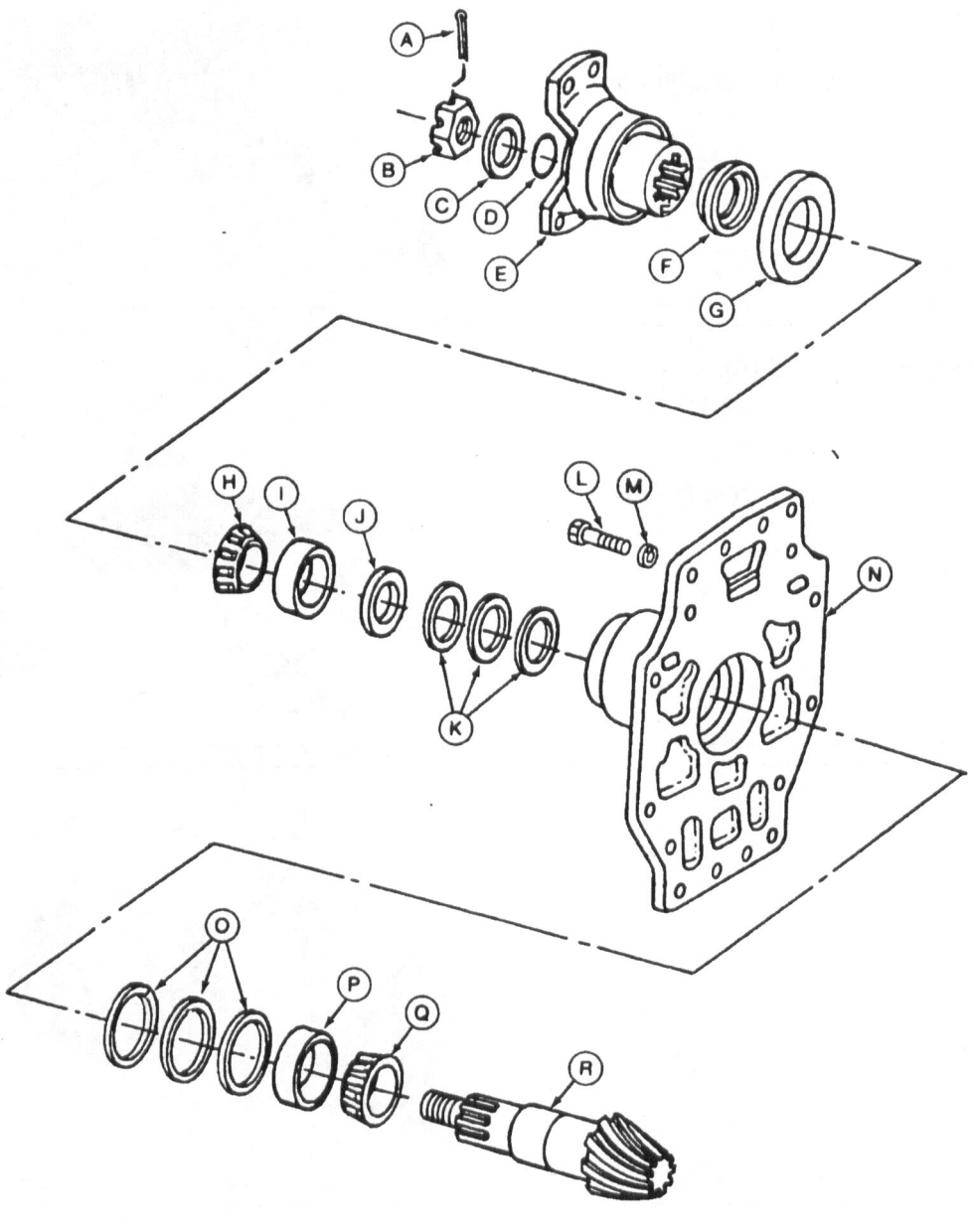


A—Cotter Pin
B—Nut
C—Spacer
D—Oil Ring
E—Yoke
F—Dust Seal
G—Oil Seal
H—Bearing Cone
I—Bearing Cup
J—Spacer
K—End Play Shim Pack
L—Cap Screw (18 used)
M—Washer (18 used)
N—Input Housing/Case Cover
O—Cone Point Shim Pack
P—Bearing Cup
Q—Bearing Cone
R—Spiral Bevel Pinion Shaft

Non-Oscillating Input Housing

RX,4321,8C -19-19DEC97

EXPLODED VIEW—*INPUT HOUSING/COVER*



A—Cotter Pin	F—Dust Seal	K—End Play Shim Pack	O—Cone Point Shim Pack
B—Nut	G—Oil Seal	L—Cap Screw (18 used)	P—Bearing Cup
C—Spacer	H—Bearing Cone	M—Washer (18 used)	Q—Bearing Cone
D—Oil Ring	I—Bearing Cup	N—Input Housing/Case Cover	R—Spiral Bevel Pinion Shaft
E—Yoke	J—Spacer		

Non-Oscillating Input Housing

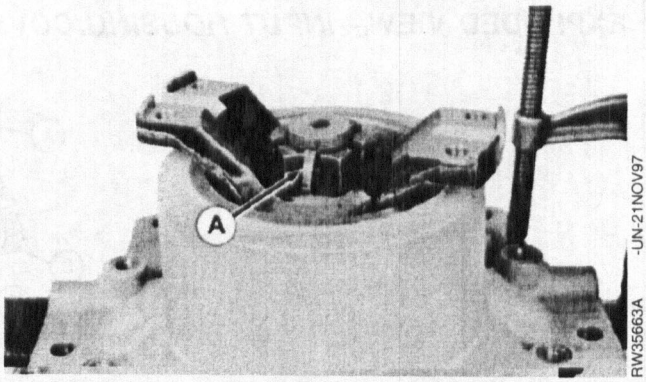
RX,4321,9C -19-19DEC97

DISASSEMBLE INPUT HOUSING/COVER AND BEVEL PINION SHAFT

Install the cover into a shop press.

Install a clamp to retain the cover in position on the press.

Remove cotter pin (A).

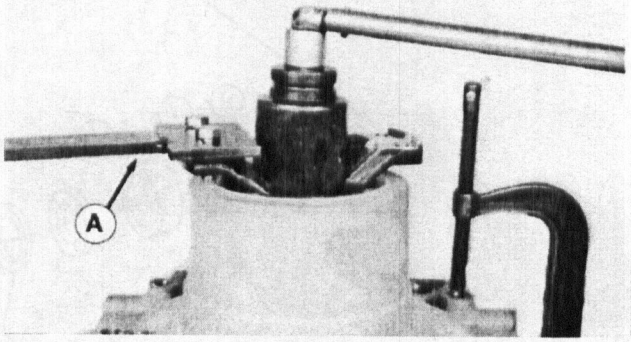


RX,4321,10C -19-19DEC97

Install JDG924 Yoke Holding Tool (A).

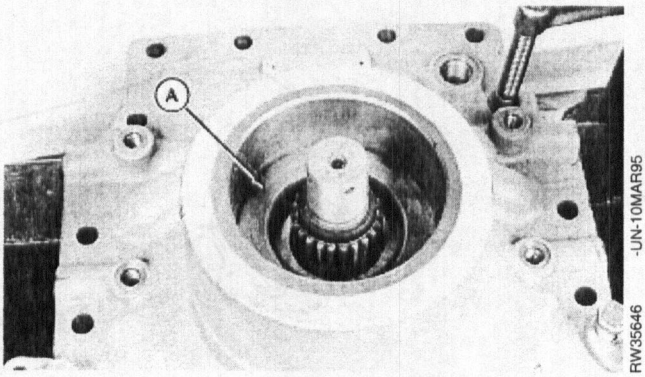
Remove slotted nut from shaft.

Remove input yoke, spacer, and O-ring from shaft.



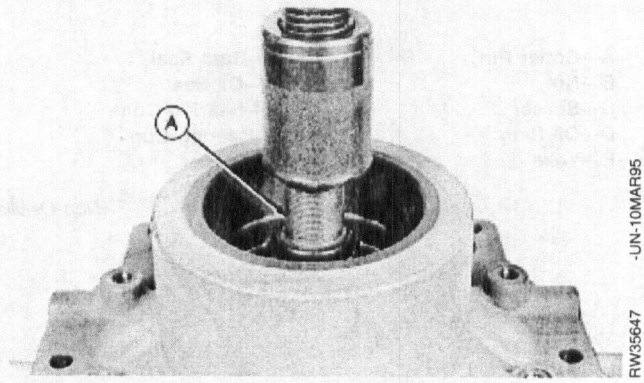
RX,4321,11C -19-19DEC97

Remove seal (A).



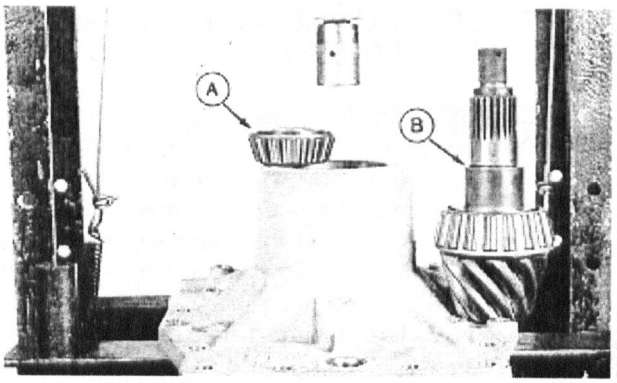
RX,4321,12C -19-19DEC97

Remove bevel pinion shaft (A) using a press. DO NOT allow the shaft to drop.



RX,4321,13C -19-19DEC97

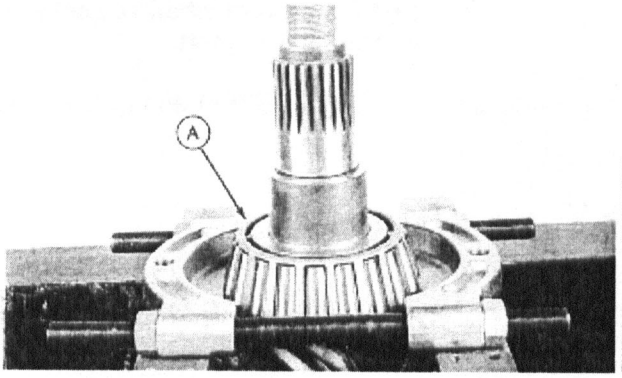
Remove bearing cone (A) and shim pack (B). Keep shims in the original sequence with bearing cone.



RX,4321,14C -19-19DEC97

Inspect bearing and shaft for wear.

Remove bearing (A) from shaft, if necessary, using a bearing splitter.

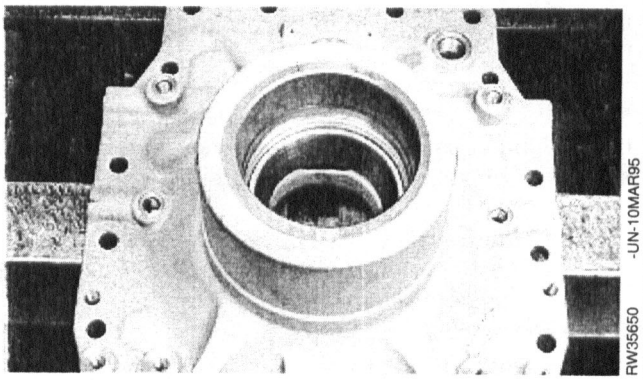


RX,4321,15C -19-19DEC97

Remove the front and rear bearing cups.

NOTE: Replace shims before bearing cup is installed.

Inspect and clean quill thoroughly.



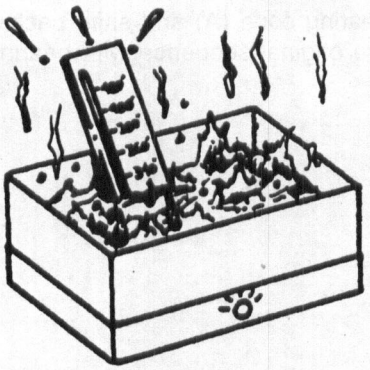
RX,4321,16C -19-19DEC97

ASSEMBLE INPUT HOUSING/COVER AND BEVEL PINION SHAFT

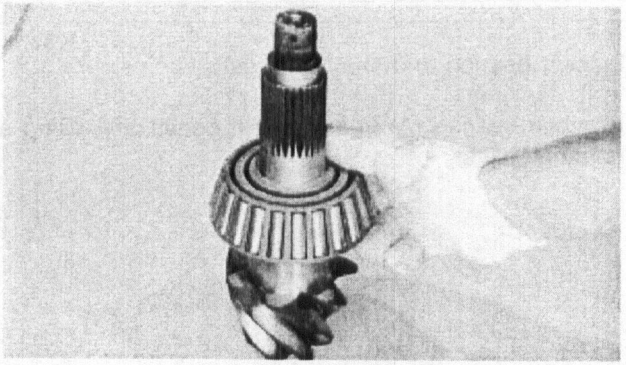
CAUTION: DO NOT heat oil over 182°C (360°F). Oil fumes or oil can ignite above 193°C (380°F). Use a thermometer. Do not allow a flame or heating element to come in direct contact with the oil. Heat the oil in a well ventilated area. Plan a safe handling procedure to avoid burns.

IMPORTANT: Differential ring gear and pinion shaft are serviced as a matched set. Be sure number stamped on ring gear and pinion end of shaft are the same. Adjust cone point when replacing ring gear and pinion shaft.

Heat bearing cone to 150°C (300°F) and install on shaft.



T81191 -UN-23FEB89



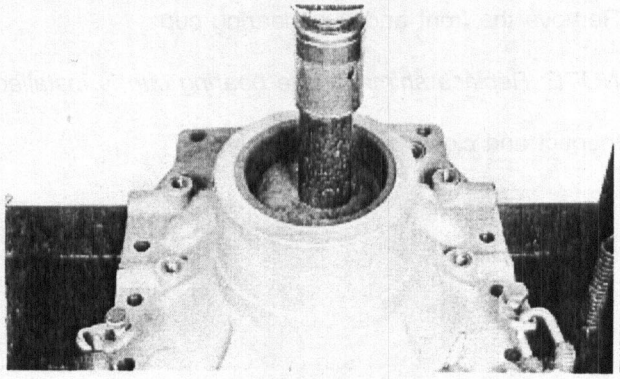
T77690 -UN-16MAR90

RX,4321,17C -19-19DEC97

Install outer bearing cup to bottom of bore using JDT35 Driver Disk (4-3/4 in.).

Make the following adjustments when replacing any of the bearing cups, bearing cones, ring gear, spiral bevel shaft, input housing/cover, or differential case.

- Spiral Bevel
- Cone Point for Tooth Contact Pattern
- Pinion Shaft End Play
- Differential Pre-load
- Differential Backlash



RW35651 -UN-10MAR95

RX,4321,18C -19-19DEC97

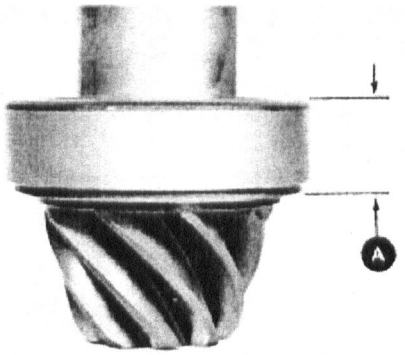
DETERMINE DIFFERENTIAL DRIVE SHAFT CONE POINT SHIM PACK

NOTE: The constant dimension consists of the nominal case dimension, (distance between centerline of differential cross bores and the face of case cover) and the nominal cover dimension, (distance between the cover surface and the bearing cup seat).

1. Record constant dimension of 296.30 mm (11.660 in.)

2. Record the bearing with cup width (A) of 54.077 mm (2.129 in.).

3. Record the bearing growth dimension 0.063 mm (0.0025 in.) which allows for increased width of bearing when cup is pressed into housing/cover.



RW13192 -UN-16APR90

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RX,4321,19C -19-19DEC97

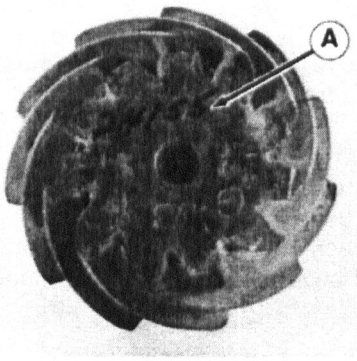
4. Record the metric dimension (A) etched or stamped on the pinion end of the spiral bevel shaft.

5. Subtract dimensions from Step 2, 3, and 4 from constant dimension in Step 1. The result is the correct shim pack thickness.

EXAMPLE

Step 1		296.300 mm	Constant Dimension
Step 2	-	54.077 mm	Bearing Width
Step 3	-	0.063 mm	Bearing Growth Dimension
Step 4	-	241.550 mm	Dimension on Shaft
Step 5	=	0.610 mm	Shim Pack Thickness

NOTE: Shims must always be measured individually due to slight variations in thickness. Never measure an entire shim pack.

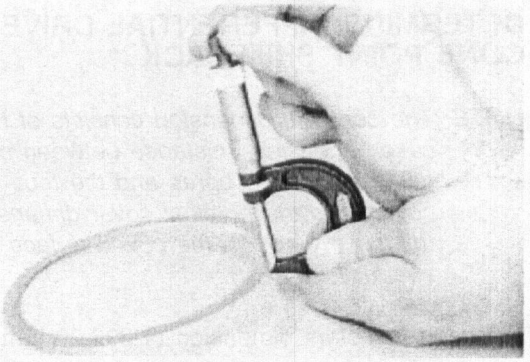


RW36077 -UN-13NOV96

RX,4321,20C -19-07JAN98

CONTINUE ASSEMBLY OF INPUT HOUSING/COVER

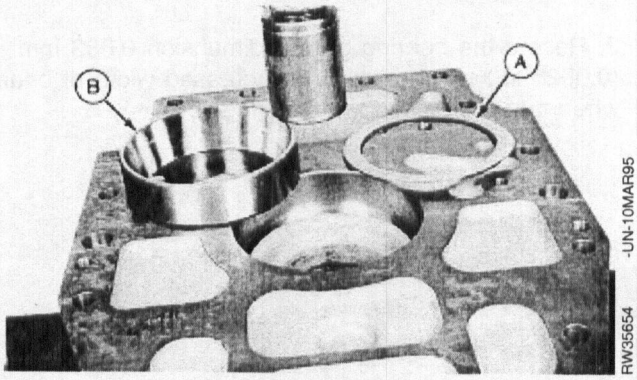
Measure each shim separately to equal the shim pack required.



RX,4321,21C -19-19DEC97

Install the shim pack (A) previously calculated.

Install the inner bearing cup (B) using JDG932 Driver Disk (6-3/8 in.). The cup must be tight against the shims.



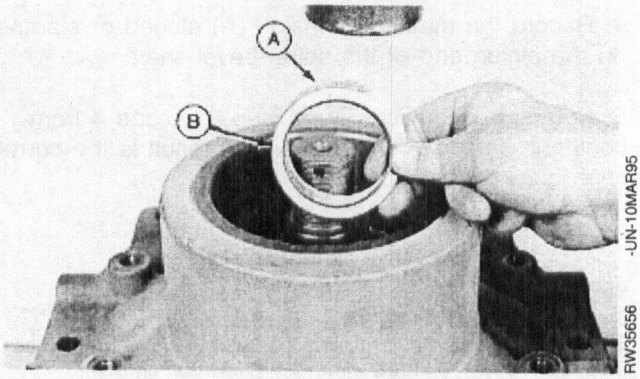
RX,4321,22C -19-19DEC97

Install bevel pinion shaft through housing/cover.

IMPORTANT: Chamfer ID of spacer must face away from shims.

NOTE: Use shim pack of 1.30 mm (0.050 in.). Measurement does not include the spacer.

Install shim pack to provide end play. Put shims (A) against spiral bevel shaft shoulder and then spacer (B).



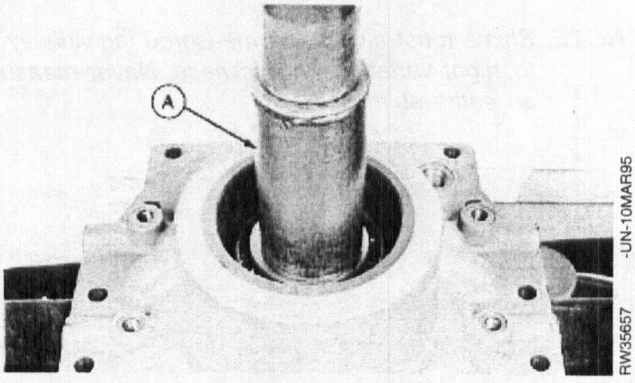
RX,4321,23C -19-06JAN98

Press outer bearing cone onto spiral bevel shaft using JDG926 Bearing Installer (A).

Rotate the housing/cover several times in both directions to roll-in the bearings.

Press the cone onto the shaft again.

IMPORTANT: DO NOT install oil seal until drive shaft adjustment has been completed.



RX,4321,24C -19-19DEC97

Install the pinion shaft retaining nut.

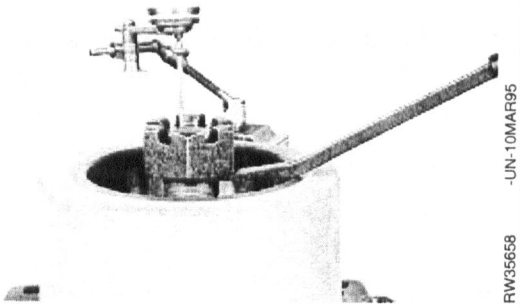
Measure end play using a dial indicator. Apply an upward pressure using a pry bar.

Remove pinion shaft and add or subtract shims until the specified end play is obtained.

END PLAY SPECIFICATION

End Play	0.025—0.075 mm (0.001—0.003 in.)

Remove tools and nut.



RW35658 -UN-10MAR95

RX,4321,25C -19-19DEC97

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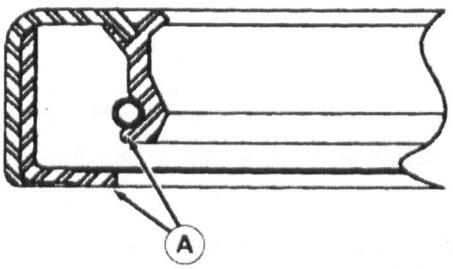
12

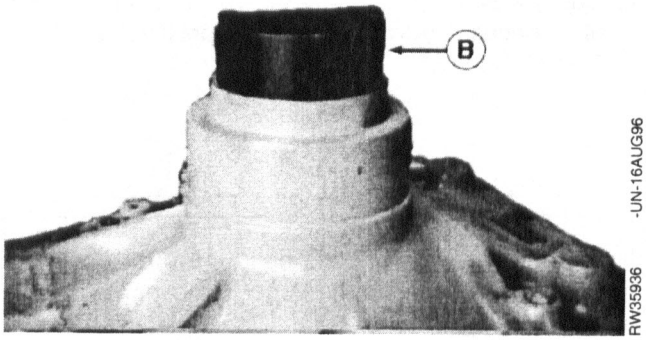
Apply T43513* Threadlock and Sealer to the OD of the oil seal. Apply oil on sealing lips of yoke seal. Install seal using JDG925 Seal Driver (B) with spring side (A) of seal facing away from driver.

NOTE: Using the JDG925 Seal Driver will install the seal to the correct depth.

Install seal 55.25 mm (2.17 in.) below the end of housing/cover.



RW35960 -UN-14NOV97



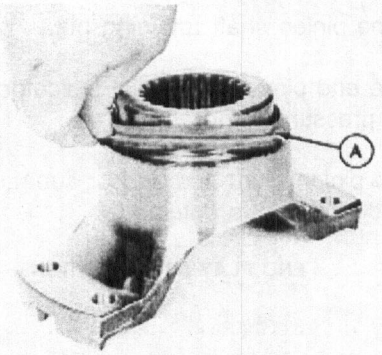
RW35936 -UN-16AUG96

** See Group 10—Cross-Reference Chart for Canadian and Loctite Product Numbers*

RX,4321,26C -19-19DEC97

IMPORTANT: DO NOT apply oil to the seal or the yoke recess.

Install the dust seal (A) into the yoke recess.



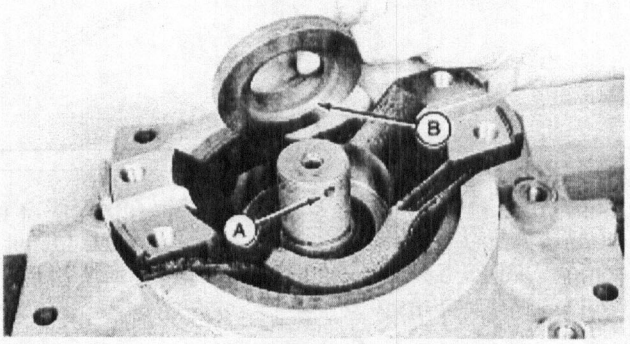
RX,4321,27C -19-19DEC97

Install yoke so one of the cotter pin holes (A) is perpendicular to the yoke flanges.

NOTE: Be sure no part of the oil ring is out of the chamfer on the yoke.

Install the oil ring.

Install retaining washer with recess (B) fitting onto the oil ring (away from slotted nut).



RX,4321,28C -19-19DEC97

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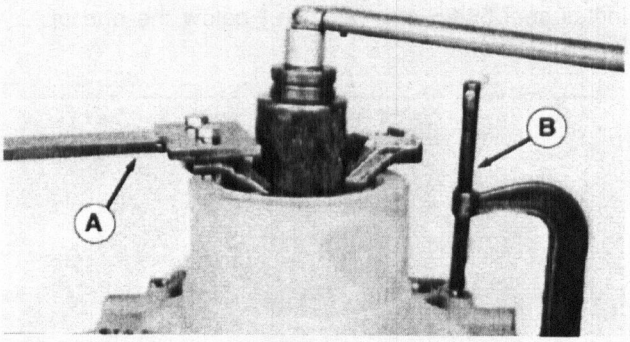
13

Install a clamp (A) to retain the cover in position on the press.

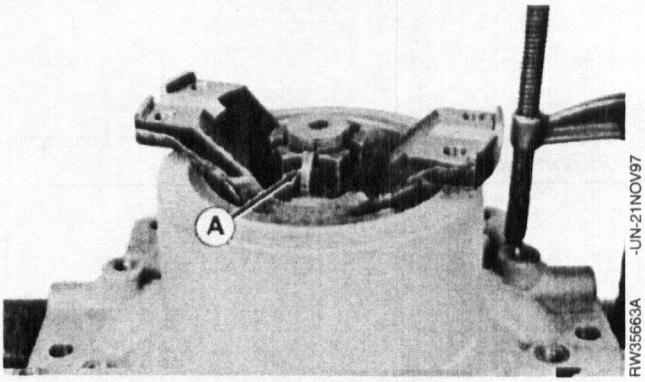
Install JDG924 Yoke Holding Tool (B).

Tighten slotted nut so cotter pin can be installed. Use a retaining washer of different thickness or reinstall the yoke, if necessary to meet torque specification of 373—474 N·m (275—350 lb ft).



RX,4321,29C -19-19DEC97

Install the cotter pin (A) and bend the ends down against the nut. DO NOT bend the cotter pin over the end of the shaft.



RX,4321,30C -19-19DEC97

INSTALL INPUT HOUSING/COVER

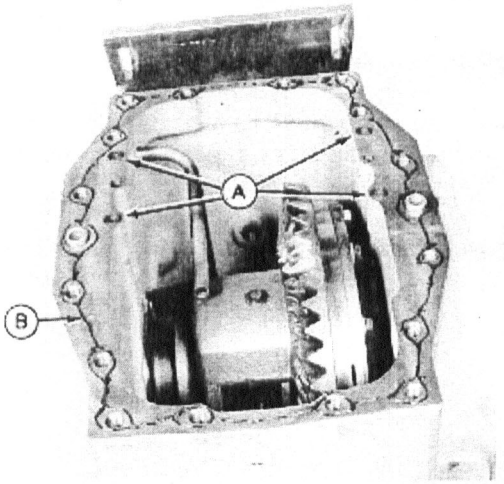
Remove support bracket adapter plate and clean differential case and input housing/cover adjoining surfaces before installation.

Install four O-rings (A).

Apply TY16285* Cure Primer to housing/cover adjoining surface if overnight curing is not possible.

Apply a 1/8 in. bead (B) of TY6304* Gasket to differential surface. Narrow overlap areas must have a bead of sealant applied. Put a bead of sealant around all bolt holes. (See Sealing Instructions, Group 10.)

Allow joint between cover and case to cure 30 minutes before adding oil to the assembly.



RW35706 -UN-29MAR95

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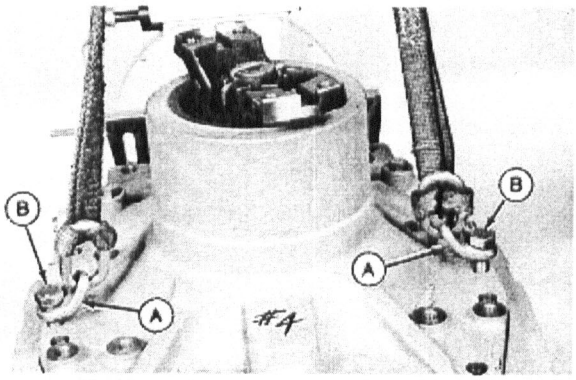
14

** See Group 10—Cross-Reference Chart for Canadian and Loctite Product Numbers*

RX,4321,31C -19-19DEC97

Install JDG19 Lift Brackets to cover jack screw holes using two of the cover cap screws.

Install input housing/cover to differential case.



RW35643 -UN-10MAR95

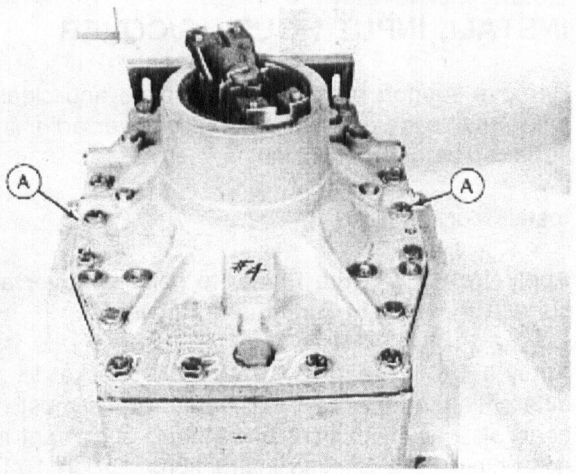
RX,4321,32C -19-19DEC97

Install the two longer cap screws (A).

Install the remaining cap screws.

Tighten cap screws to 310 N·m (229 lb-ft) beginning with the center two cap screws, across from each other and alternately working toward each end.

Remove axle from repair stand and install in vehicle.



RX,4321,33C -19-19DEC97

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15

ESSENTIAL OR RECOMMENDED TOOLS

NOTE: Order tools from the U.S. SERVICE-GARD™ or European Microfiche Tool Catalogs.

ESSENTIAL TOOLS listed are required to perform the job correctly and are obtainable **only** from *SERVICE-GARD* or *European Tool Catalogs.*

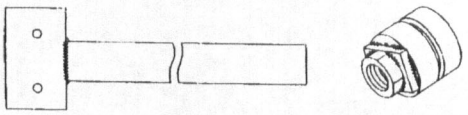
RECOMMENDED TOOLS, as noted, are suggested to perform the job correctly. Some tools may be available from local suppliers or may be fabricated.

RX,TOOLS -19-21APR94

RW25333 -UN-21DEC94

Pinion Shaft Tool DFRW102*

Remove and install spiral bevel pinion shaft *(Axles with Tow Disconnect)*



** RECOMMENDED TOOL—See Group 499 for tool fabrication*

RX,DFRW102A,CTM-19-20JAN95

RW25560 -UN-29AUG96

Special Mounting Brackets JDG19

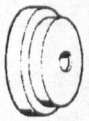
Remove and install components

RX,JDG19 -19-29AUG96

RW19937 -UN-19MAY92

Seal Installer JDG236

Install seals and bearing cups



RX,JDG236 -19-29JUN93

OTHER MATERIAL

Number	Name	Use
TY6304	Flexible Form-in-Place Gasket	Seal joints
T43513	Threadlock and Sealer High Strength	Seal joints

See Group 10—Cross-Reference Chart for Canadian and Loctite Product Numbers

RX,4325,1C -19-19DEC97

SPECIFICATIONS

Item	Measurement	Specification
Bevel Pinion Shaft Slotted Nut:		
Seating Cups and Cones	Torque	1330 N·m (980 lb-ft)
Final Installation	Torque	790 N·m (583 lb-ft)
Input Housing-to-Differential Case Cap Screw:		
1200 Series		
M12 Cap Screw	Torque	150 N·m (111 lb-ft)
M16 Cap Screw	Torque	310 N·m (229 lb-ft)
1400 Series	Torque	310 N·m (229 lb-ft)
Axle Disconnect Housing-to-Input Housing/Case Cover Cap Screw	Torque	125 N·m 92 lb-ft)
Pinion Shaft	End Play	0.025—0.075 mm (0.001—0.003 in.)

RX,4325,2C -19-19DEC97

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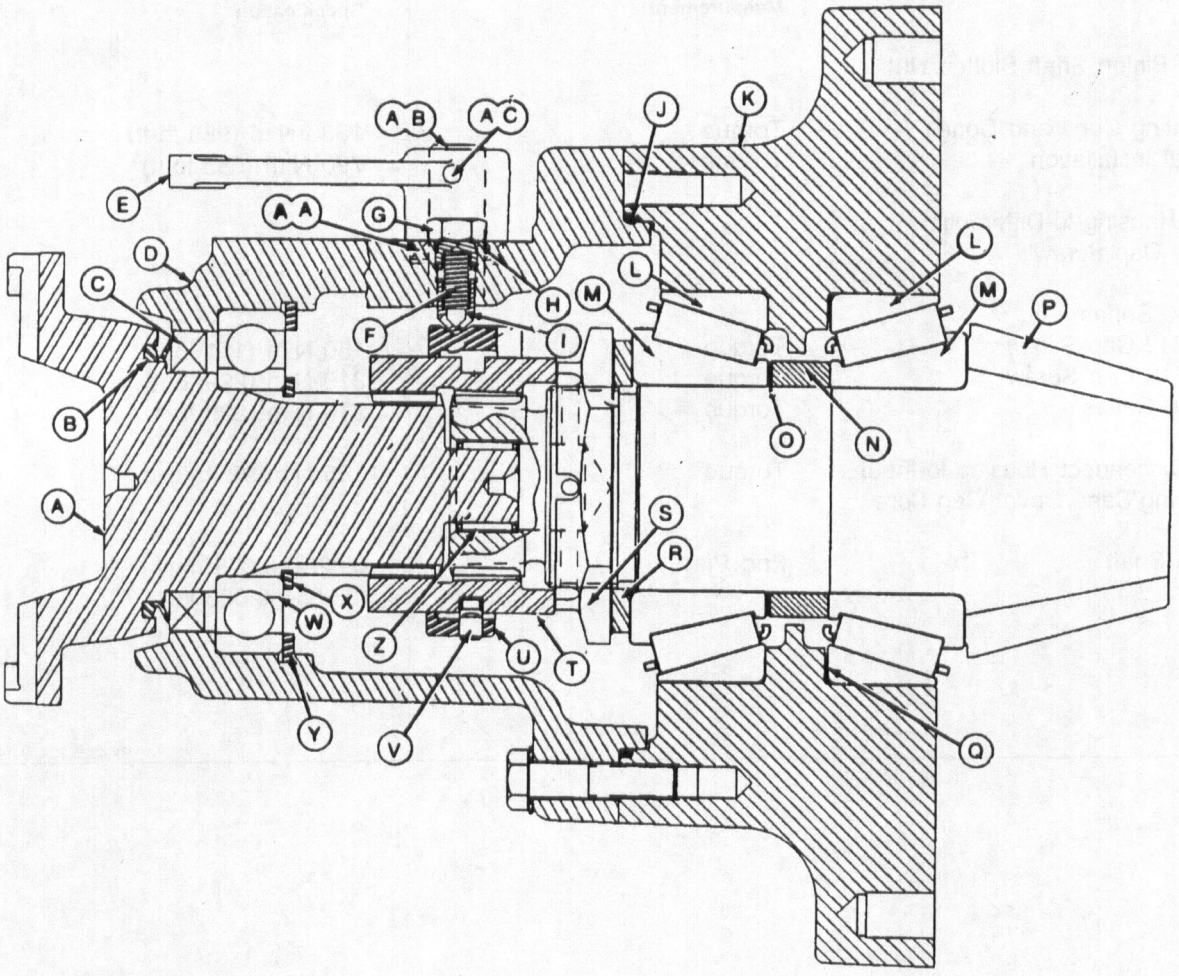
2

CROSS-SECTIONAL VIEW—*AXLE DISCONNECT AND INPUT HOUSING/CASE COVER*



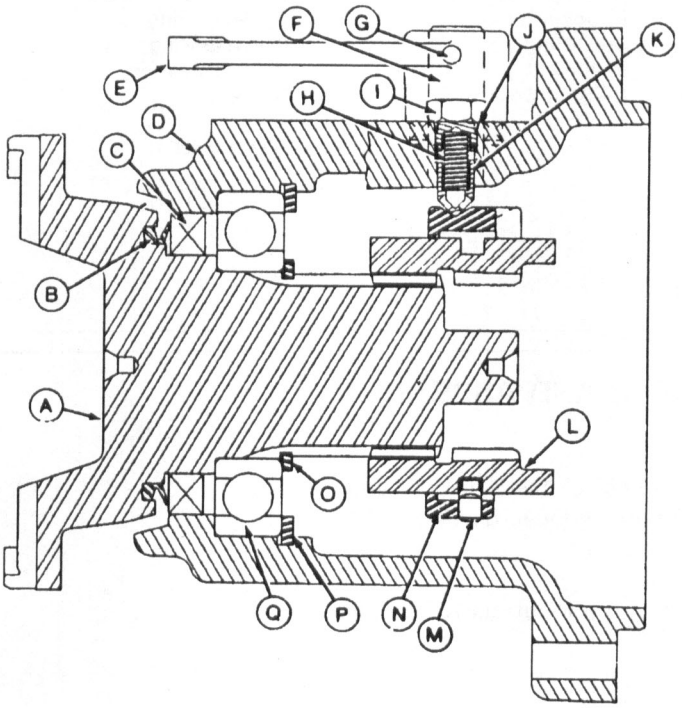
A—Yoke
B—V-Ring Seal
C—Seal
D—Disconnect Housing
E—Lever
F—Detent Spring
G—Detent Plug
H—O-Ring
I—Detent
J—O-Ring
K—Input Housing/Case Cover
L—Bearing Cup
M—Bearing Cone
N—Spacer
O—End Play Shims
P—Bevel Pinion Shaft
Q—Cone Point Shims
R—Special Washer
S—Nut
T—Shift Collar
U—Disconnect Yoke
V—Collar Guide (2 used)
W—Ball Bearing
X—Snap Ring
Y—Snap Ring
Z—Needle Bearing
AA—Seal
AB—Shifter Yoke Shaft
AC—Spring Pin

IMPORTANT: The spiral bevel pinion shaft and spiral bevel gear must be replaced as a matched set or damage will result.

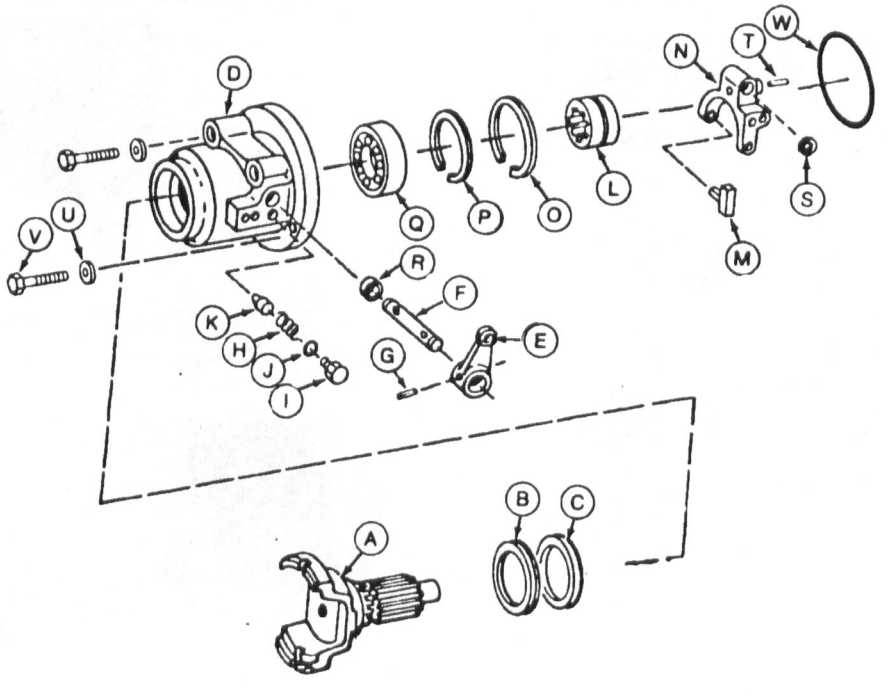
NOTE: Bearing cones are press fit.

RX,4325,3C -19-01OCT97

CROSS-SECTIONAL AND EXPLODED VIEWS—*AXLE DISCONNECT*



RW35587 -UN-02DEC94



RW35600 -UN-02DEC94

RX,4325,4B -19-22DEC94

A—Yoke Shaft
B—V-Ring Seal
C—Seal
D—Disconnect Housing
E—Lever
F—Shaft
G—Spring Pin
H—Detent Spring
I—Detent Plug
J—O-Ring
K—Detent
L—Shift Collar
M—Collar Guide (2 used)
N—Disconnect Yoke
O—Snap Ring
P—Snap Ring
Q—Ball Bearing
R—Seal
S—Thrust Washer (2 used)
T—Spring Pin
U—Washer (6 used)
V—Cap Screw (6 used)
W—O-Ring

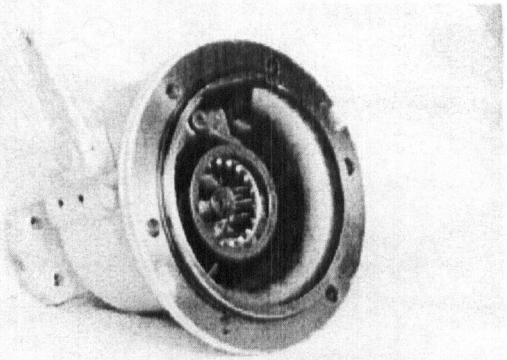
Legend for Axle Disconnect

RX,4325,5B -19-05JAN95

REMOVE DISASSEMBLE AND ASSEMBLE AXLE DISCONNECT

NOTE: Refer to Axle Disconnect Cross-Sectional and Exploded Views during removal, disassembly, and assembly.

Remove axle disconnect from the input quill/differential case cover.



RW13184 -UN-16APR90

RX,4325,6B -19-22DEC94

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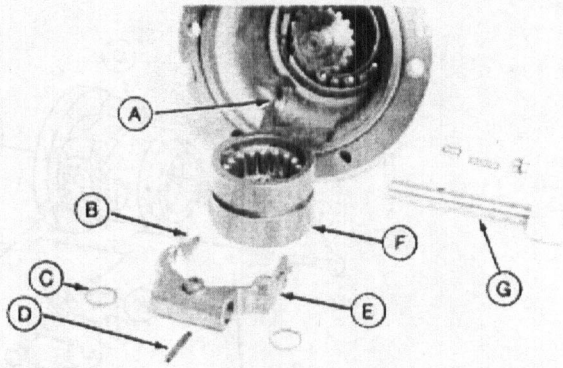
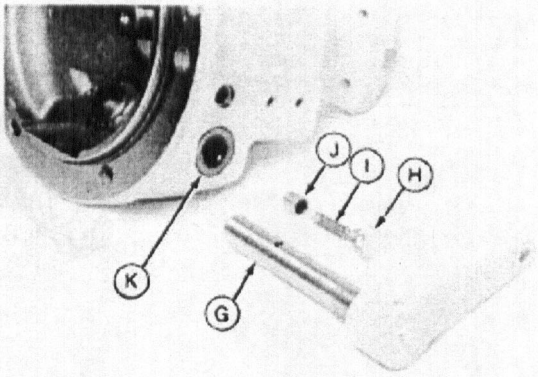
Remove spring pin (D) from disconnect yoke (E) to remove disconnect lever and shaft assembly (G).

Inspect all parts for damage or wear and replace as needed.

A—Thrust Washer Bores
B—Collar Guides (2 used)
C—Thrust Washers (2 used)
D—Spring Pin
E—Disconnect Yoke
F—Shift Collar
G—Lever Arm and Shaft
H—Detent Plug
I—Detent Spring
J—Detent
K—Lever Arm Seal



RW13185 -UN-16APR90



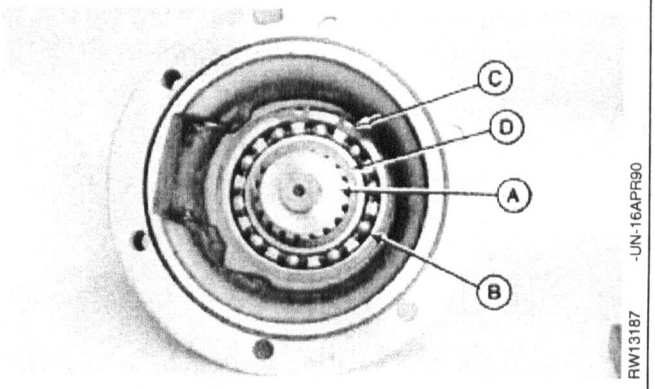
RW13186 -UN-16APR90

RX,4325,7B -19-05JAN95

Remove snap rings (C) and (D) to remove yoke shaft (A) and ball bearing (B).

Inspect parts and replace as necessary.

A—Yoke Shaft
B—Ball Bearing
C—Snap Ring
D—Snap Ring



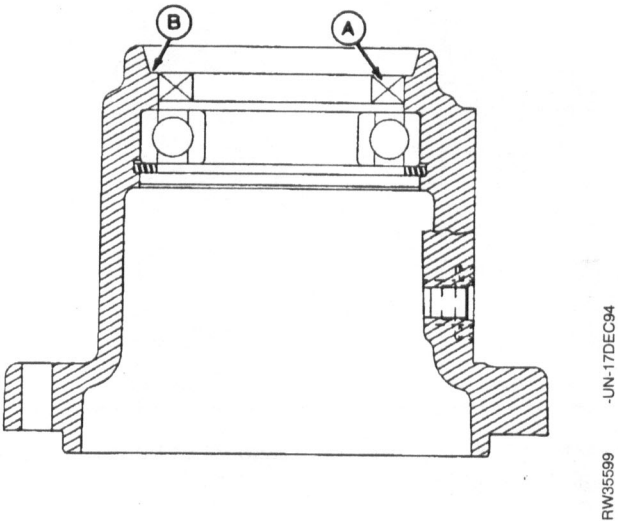
RX,4325,8B -19-22DEC94

Apply T43513* Threadlock and Sealer to the OD of the seal.

NOTE: Additional instructions for installing the oil seal are included with the replacement part.

Install yoke seal (A) using a 2-15/16 in. pilot disk and a 4-1/4 in. driver disk, with spring side away from driver. Install seal flush with surface (B) of housing.

Coat seal lips and metal face of seal with hydraulic oil.

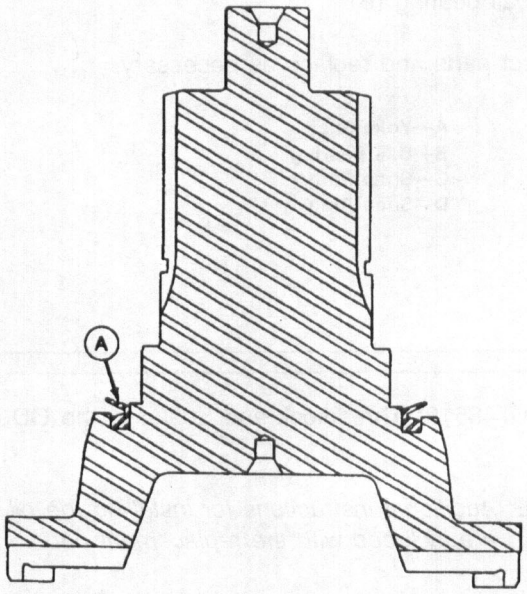


** See Group 10—Cross-Reference Chart for Canadian and Loctite Product Numbers*

RX,4325,4C -19-19DEC97

Install V-ring seal (A) in the groove of the yoke shaft making sure seal bottoms in the groove.

Apply oil to the V-ring seal lips.



RW35601 -UN-17DEC94

RX,4325,10B -19-05JAN95

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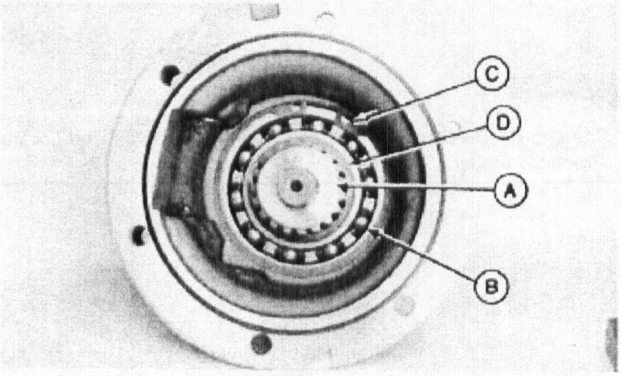
Install yoke shaft (A) into disconnect housing and install ball bearing (B).

Install snap rings (C) and (D).

A—Yoke Shaft
B—Ball Bearing
C—Snap Ring
D—Snap Ring



RW13187 -UN-16APR90

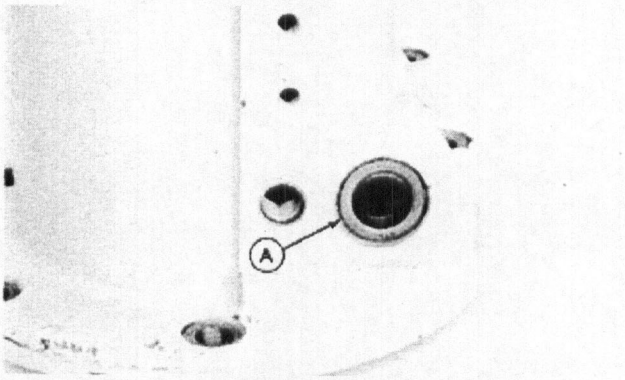
RX,4325,11B -19-22DEC94

Coat seal outer diameter using T43513* Threadlock and Sealer.

Install lever arm seal (A) using an 11/16 in. pilot disk and a 1-3/16 in. driver disk with spring side away from driver.

Install seal flush with housing.

** See Group 10—Cross-Reference Chart for Canadian and Loctite Product Numbers*



R40064 -UN-23JAN90

RX,4325,5C -19-19DEC97

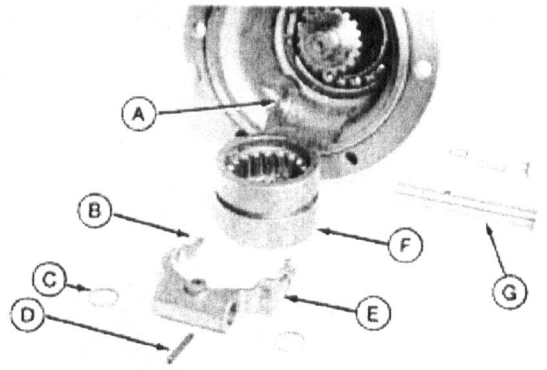
Install shift collar (F) to the input yoke shaft.

Install collar guides (B) to yoke (E). Hold thrust washers (C) in place with petroleum jelly or grease and install the yoke assembly onto the shift collar and into the housing.

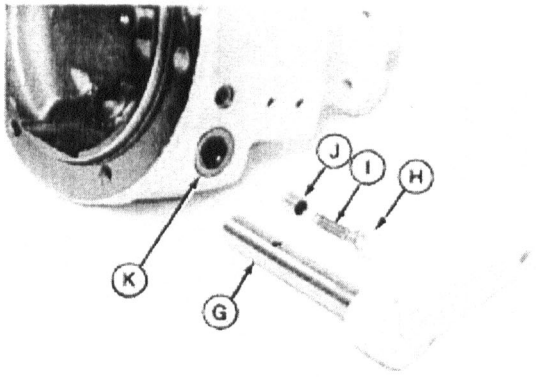
Install lever arm assembly (G) into the housing and through the yoke assembly.

Install yoke-to-lever arm shaft assembly spring pin (D) with the lever pointing the same way as when removed.

A—Thrust Washer Bores
B—Collar Guides (2 used)
C—Thrust Washers (2 used)
D—Spring Pin
E—Disconnect Yoke
F—Shift Collar
G—Lever Arm and Shaft
H—Detent Plug
I—Detent Spring
J—Detent
K—Lever Arm Seal



RW13185 -UN-16APR90



RW13186 -UN-16APR90

RX,4325,13B -19-05JAN95

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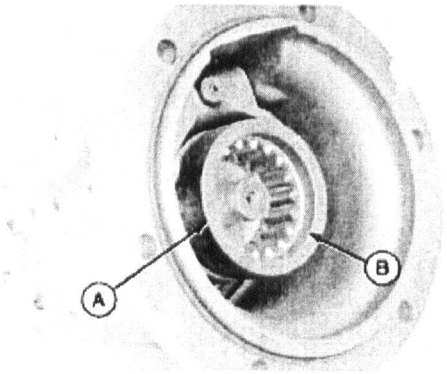
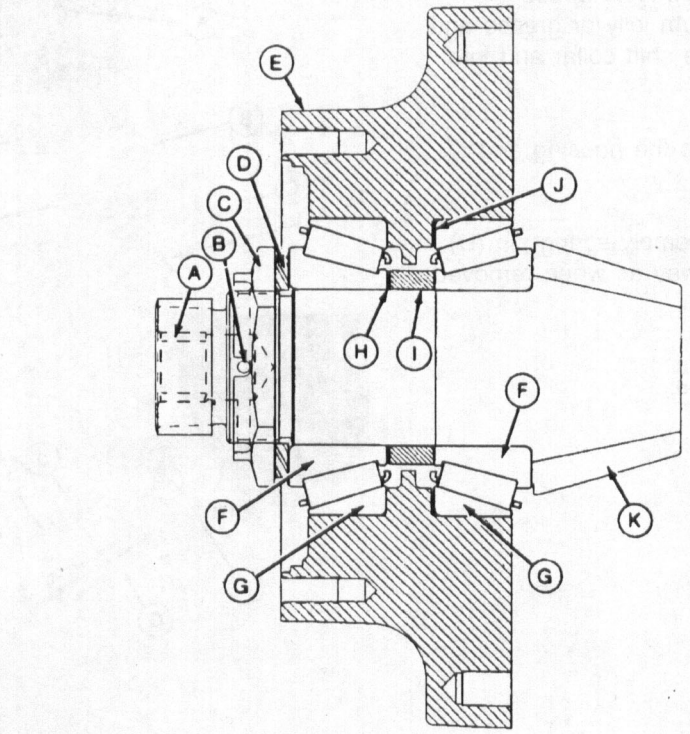
IMPORTANT: Make sure shift collar (A) is installed with stepped end (B) toward differential cover.



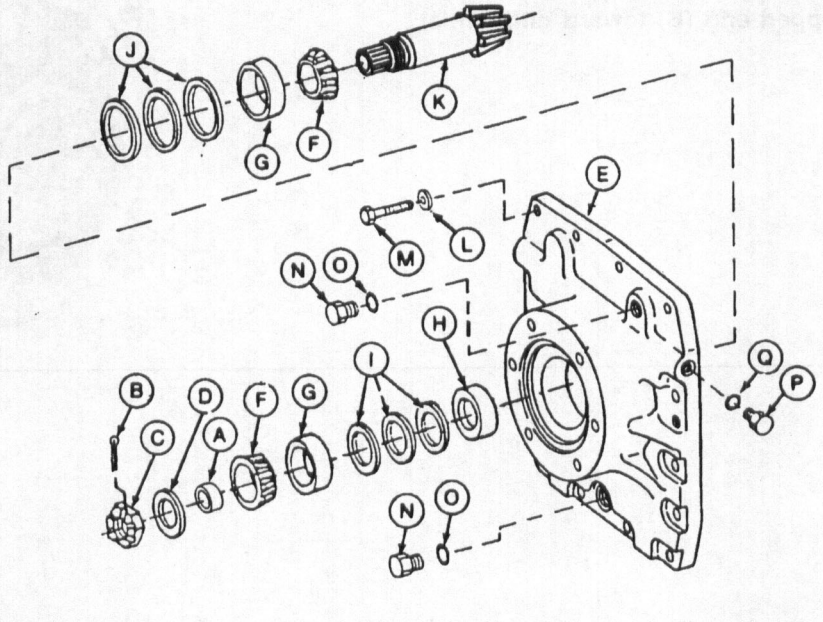
R40065 -UN-23JAN90

RX,4325,14B -19-22DEC94

CROSS-SECTIONAL AND EXPLODED VIEWS—*INPUT HOUSING/CASE COVER*



RW35589 -UN-06JAN95



RW35602 -UN-17DEC94

RX,4325,6C -19-07JAN98

A—Needle Bearing
B—Cotter Pin
C—Nut
D—Special Washer
E—Input Housing/Case Cover
F—Bearing Cone
G—Bearing Cup
H—End Play Shims
I—Spacer
J—Cone Point Shims
K—Pinion Shaft
L—Washer
M—Cap Screw
N—Plug (2 used)
O—O-Ring (2 used)
P—Plug
Q—O-Ring

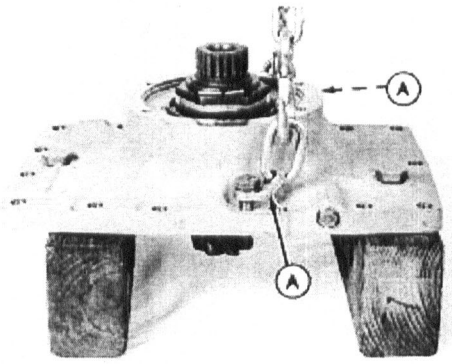
Input Housing/Case Cover

RX,4325,7C -19-01OCT97

REMOVE INPUT HOUSING/CASE COVER

CAUTION: Avoid possible personal injury. Use proper lifting equipment. Approximate weight of input housing assembly is:

1200 Series ..... 40 kg (88 lb)
1400 Series ..... 46 kg (102 lb)



RW35607 -UN-17DEC94

Remove cover-to-differential case cap screws.

Insert the two cap screws removed from cover into the threaded holes.

Turn cap screws evenly until cover-to-case seal is broken.

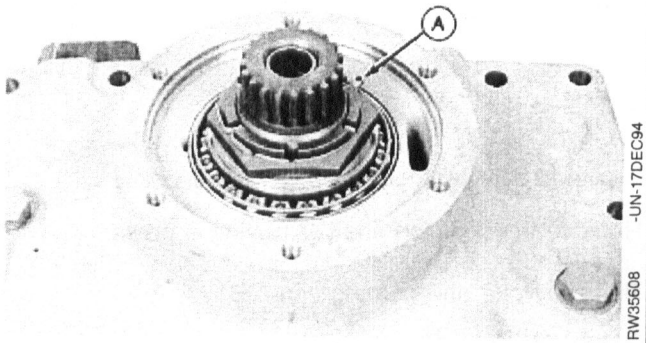
Lift cover from differential case using JDG19 Lift Brackets (A) at the threaded holes in the cover.

Put the cover on wooden blocks.

RX,4325,8C -19-08JAN98

DISASSEMBLE INPUT HOUSING/CASE COVER AND PINION SHAFT

Remove nut retaining cotter pin (A).



RW35608 -UN-17DEC94

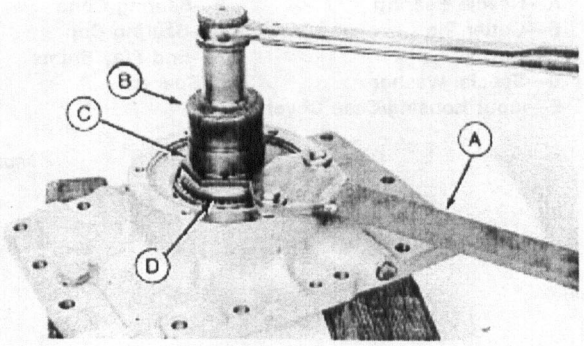
RX,4325,9C -19-01OCT97

Install Nut/Cover Holding Tool (A) from DFRW102* Pinion Shaft Tool.

Install Shaft Turning Tool (B) from DFRW102 Pinion Shaft Tool.

Turn shaft to loosen nut.

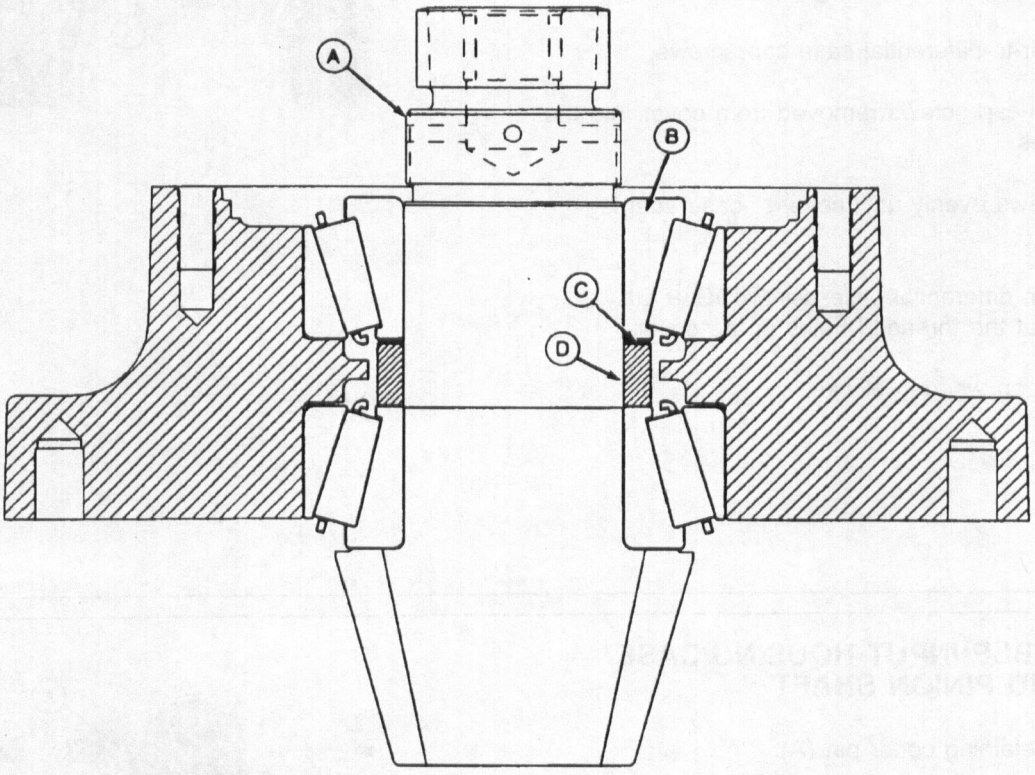
Remove tools, nut (C), and special washer (D).



A—Nut/Cover Holding Tool
B—Shaft Turning Tool
C—Pinion Shaft Turning Tool
D—Special Washer

** See Group 499 for tool fabrication*

RX,4325,10C -19-07JAN98



A—Bevel Pinion Shaft **B—Bearing Cone** **C—End Play Shims** **D—Spacer**

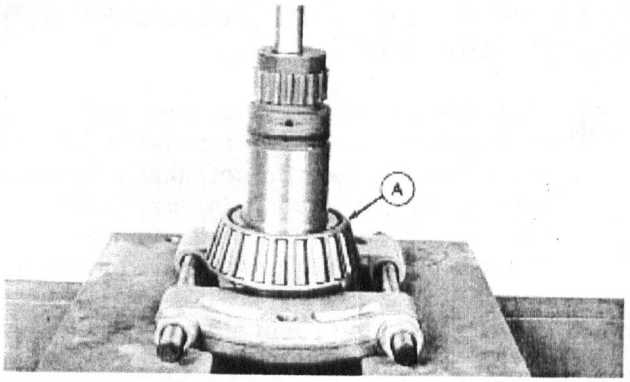
Remove bevel pinion shaft (A) using a press.

Remove yoke end bearing cone (B).

Remove the end play shims (C) and spacer (D) from the bevel pinion shaft.

RX,4325,20B -19-22DEC94

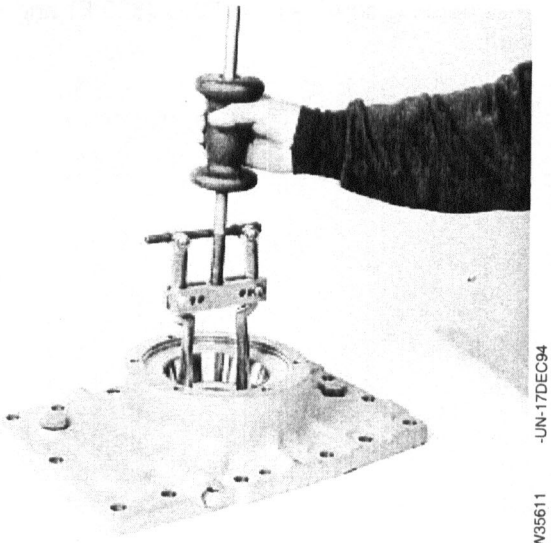
Remove the pinion end bearing cone (A) using a knife-edge puller and a press.



RX,4325,21B -19-22DEC94

NOTE: Cone point shims are located behind the pinion end bearing cup.

Remove the bearing cups from the input quill/case cover using a two-jaw internal puller and a slide hammer.



RX,4325,22B -19-22DEC94

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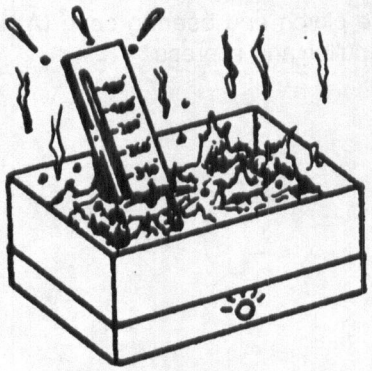
ASSEMBLE INPUT HOUSING/CASE COVER AND PINION SHAFT

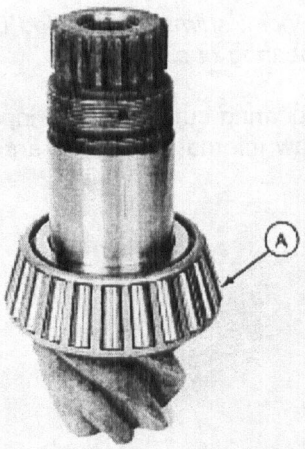
CAUTION: DO NOT heat oil over 182°C (360°F). Oil fumes or oil can ignite above 193°C (380°F). Use a thermometer. Do not allow a flame or heating element to come in direct contact with the oil. Heat the oil in a well ventilated area. Plan a safe handling procedure to avoid burns.

IMPORTANT: The spiral bevel shaft and spiral bevel gear must be replaced as a matched set.



T81191 -UN-23FEB89

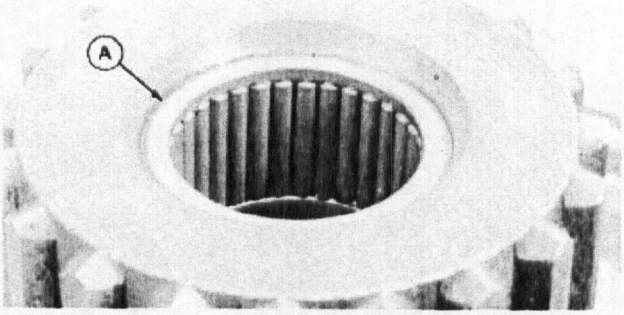
Heat bearing cone (A) to 150°C (300°F) and install on shaft.



RW35612 -UN-06JAN95

RX,4325,11C -19-01OCT97

Replace yoke shaft needle bearing (A) if worn or damaged. Press bearing 3 mm (0.12 in.) below end surface of spiral bevel shaft using a 15/16 in. pilot disk and a 1-3/16 in. driver disk.



R40106 -UN-23JAN90

RX,4325,12C -19-01OCT97

DETERMINE DIFFERENTIAL DRIVE SHAFT CONE POINT SHIM PACK

NOTE: The constant dimension consists of the nominal case dimension, (distance between centerline of differential cross bores and the face of case cover) and the nominal cover dimension, (distance between the cover surface and the bearing cup seat).

1. Record applicable constant dimension.

Constant Dimensions

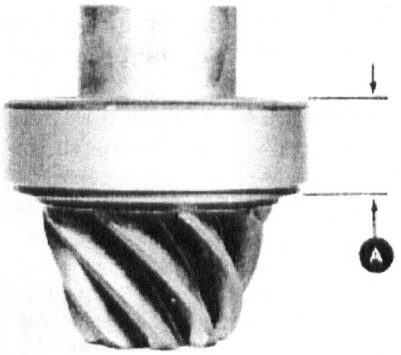
1200 Series . . . . . 228.800 mm (9.010 in.)
1400 Series . . . . . 257.800 mm (10.150 in.)

2. Record applicable bearing with cup width (A).

Bearing/Cup Width

1200 Series . . . . . 46.152 mm (1.817 in.)
1400 Series . . . . . 46.152 mm (1.817 in.)

3. Record the bearing growth dimension 0.038 mm (0.0015 in.) which allows for increased width of bearing when cup is pressed into housing/cover.



RW13192 -UN-16APR90

RX,4325,13C -19-07JAN98

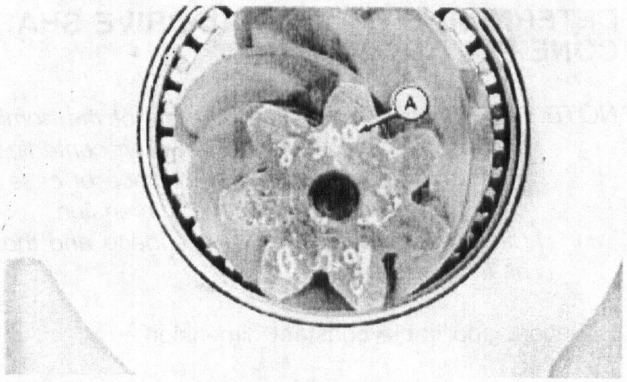
4. Record the metric dimension (A) etched or stamped on the pinion end of the spiral bevel shaft.

5. Subtract dimensions from Step 2, 3, and 4 from constant dimension in Step 1. The result is the correct shim pack thickness.

EXAMPLE

Step 1		257.800 mm	Constant Dimension
Step 2	-	46.152 mm	Bearing Width
Step 3	-	0.038 mm	Bearing Growth Dimension
Step 4	-	210.950 mm	Dimension on Shaft
Step 5	=	0.660 mm	Shim Pack Thickness

NOTE: Shims must always be measured individually due to slight variations in thickness. Never measure an entire shim pack.



RX,4325,14C -19-07JAN98

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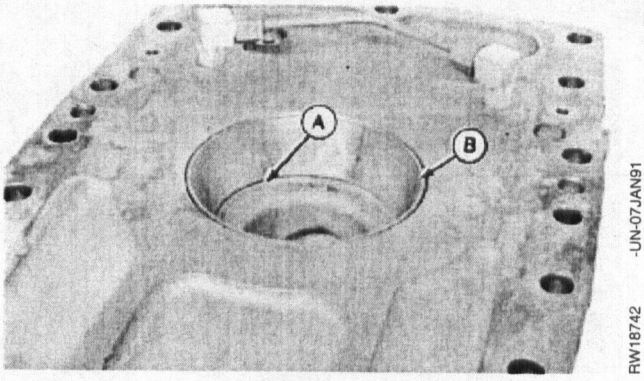
15

CONTINUE ASSEMBLY

Install cone point shim pack (A) as previously determined.

Install rear bearing cup (B) using a JDG236 Seal Installer.

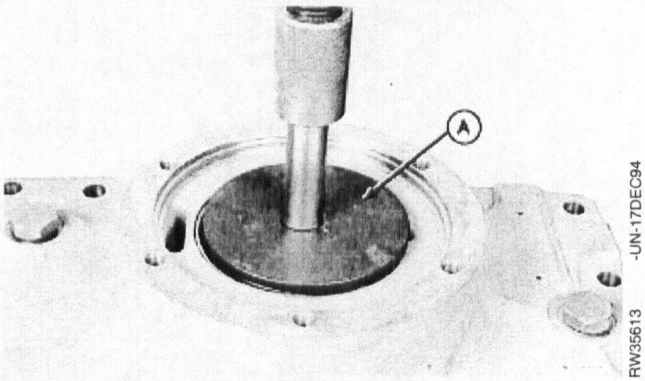


RX,4325,15C -19-01OCT97

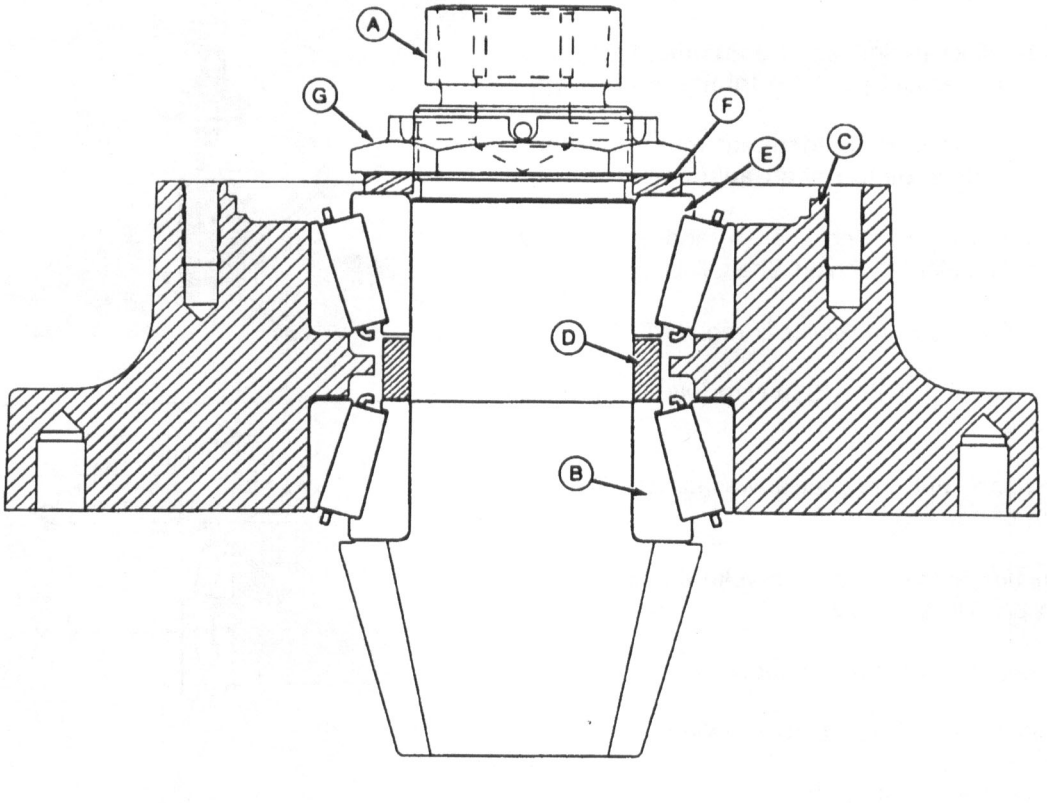
Install outer bearing cup to bottom of bore using JDG236 Seal Installer (A).

Make the following adjustments when replacing bearing cups, bearing cones, ring gear, bevel pinion shaft, input housing/case cover, or differential case:

- **Cone Point**
- **Pinion Shaft End Play**
- **Differential Preload**
- **Differential Backlash**
- **Tooth Contact Pattern**



RX,4325,16C -19-19DEC97



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16

A—Bevel Pinion Shaft
B—Pinion End Bearing Cone
C—Input Housing/Case Cover
D—Spacer
E—Yoke End Bearing Cone
F—Special Washer
G—Slotted Nut

Install pinion shaft (A), with pinion end bearing cone (B) in position, into input housing (C).

Install spacer (D) with NO shims, yoke end bearing cone (E), and special washer (F).

Install slotted nut (G) finger tight.

RX,4325,17C -19-01OCT97

ADJUST PINION SHAFT

IMPORTANT: Make pinion shaft adjustment with shaft in vertical position (pinion end down).

Cone point adjustment must be done before pinion shaft adjustment.

1. Install Nut/Housing Holding Tool (A) and Shaft Turning Tool (B) from DFRW102* Pinion Shaft Tool.

NOTE: Use of a torque multiplier is required.

2. Tighten slotted nut (C) to 1330 N·m (980 lb-ft) to seat cups and cones.

3. Remove slotted nut and special washer (D). Press shaft (E) out of housing.

4. Install enough shims (F) behind yoke end bearing cone (G) to provide end play.

5. Install cone on bevel pinion shaft.

6. Repeat Steps 1—3 (with shims installed).

7. Loosen nut to less than 272 N·m (200 lb-ft) then tighten to 790 N·m (583 lb-ft).

8. Turn shaft several times using a downward force of 48—98 N (11—22 lb force) on yoke end of shaft.

NOTE: Measure end play with bevel pinion shaft in vertical position.

9. Install a dial indicator (H) and measure end play using an upward pressure of 490—890 N (110—200 lb force).

10. Adjust size of shim pack to provide end play of 0.025—0.075 mm (0.001—0.003 in.).

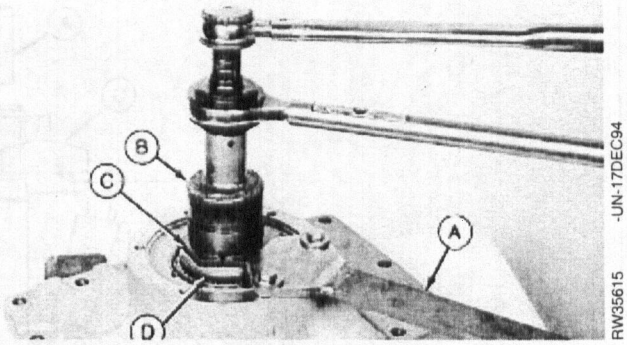
IMPORTANT: Tighten the slotted nut each time the yoke and bearing cone are installed. Loosen nut to less than 272 N·m (200 lb-ft), then tighten.

11. Tighten slotted nut so cotter pin can be installed when correct bearing setting is obtained. Use a different washer if necessary to obtain torque specification.

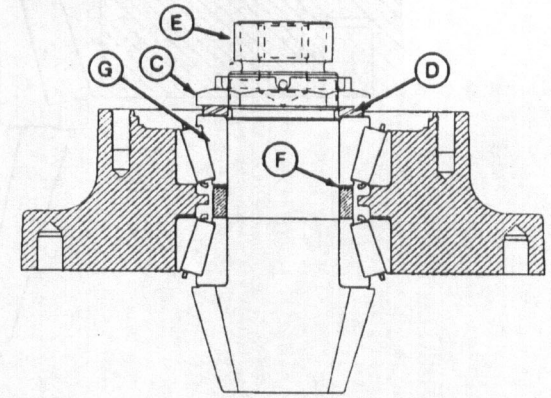
TORQUE SPECIFICATION

Slotted Nut . . . . . 790 N·m (583 lb-ft)

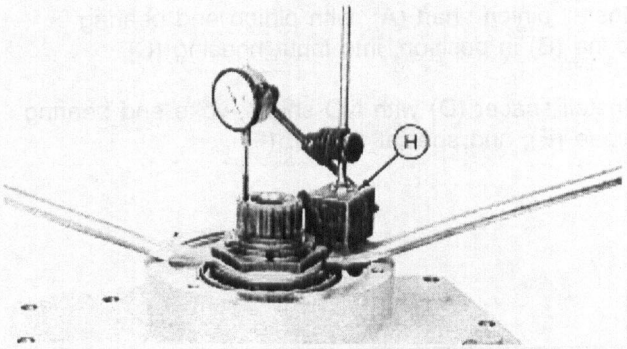
** See Group 499 for tool fabrication*



RW35615 -UN-17DEC94



RW35605 -UN-17DEC94

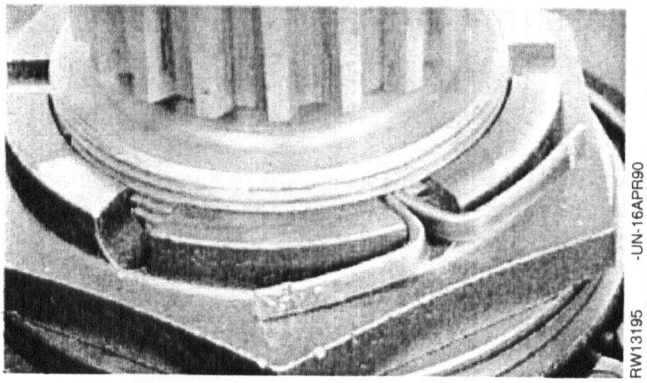


RW35616 -UN-17DEC94

A—Nut/Housing Holding Tool
B—Shaft Turning Tool
C—Shaft Retaining Nut
D—Special Washer
E—Bevel Pinion Shaft
F—End Play Shims
G—Yoke End Bearing Cone
H—Dial Indicator

RX,4325,18C -19-07JAN98

IMPORTANT: Cotter pin ends must be bent 90° to centerline of pinion shaft to prevent cotter pin interference with full engagement of shift collar.



RW13195 -UN-16APR90

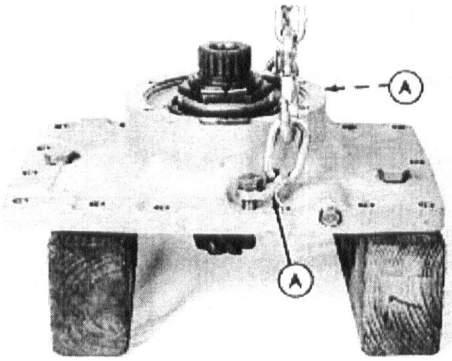
RX,4325,31B -19-31JAN95

INSTALL INPUT HOUSING/CASE COVER

Clean housing/cover adjoining surfaces. (See Sealing Instructions, Group 10.)

Apply TY6304* Gasket to the case surface that contacts the input housing/case cover.

Install JDG19 Lift Brackets (A) at the threaded holes of the housing and attach to an overhead hoist.



RW35607 -UN-17DEC94

Install housing to differential case.

25
18

Install and tighten housing/cover-to-case cap screws to specification.

TORQUE SPECIFICATION

1200 Series	
M12 Cap Screws	150 N·m (111 lb-ft)
M16 Cap Screws	310 N·m (229 lb-ft)
1400 Series	310 N·m (230 lb-ft)

** See Group 10—Cross-Reference Chart for Canadian and Loctite Product Numbers*

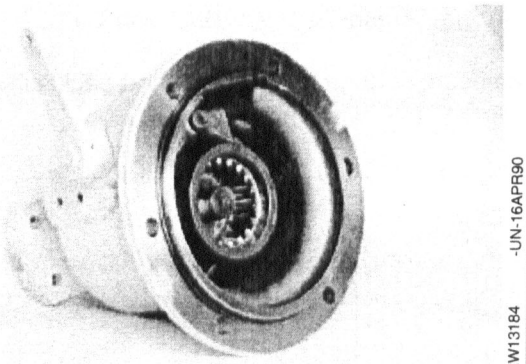
RX,4325,19C -19-19DEC97

INSTALL AXLE DISCONNECT

Install axle disconnect to the input housing/case cover.

Install and tighten axle disconnect housing-to-input housing/case cover cap screws.

Tighten cap screws to 125 N·m (92 lb-ft).



RW13184 -UN-16APR90

RX,4325,20C -19-01OCT97

ESSENTIAL OR RECOMMENDED TOOLS

NOTE: Order tools from the U.S. SERVICE-GARD™ or European Microfiche Tool Catalogs.

ESSENTIAL TOOLS listed are required to perform the job correctly and are obtainable **only** from *SERVICE-GARD* or *European Tool Catalogs.*

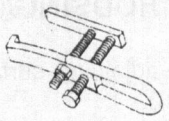
RECOMMENDED TOOLS, as noted, are suggested to perform the job correctly. Some tools may be available from local suppliers or may be fabricated.

RX,TOOLS -19-21APR94

RW25335 -UN-21DEC94

Differential Lifting Tool DFRW7*

Removing and installing differential



** RECOMMENDED TOOL—See Group 499 for tool fabrication*

RX,DFRW7A,CTM -19-05JAN95

RW18962 -UN-24FEB92

Seal Installing Tool JD320

Install seal

RX,JD320 -19-14FEB92

RW25560 -UN-29AUG96

Special Mounting Brackets JDG19

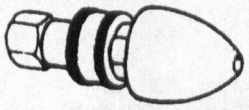
Remove and install components

RX,JDG19 -19-29AUG96

T6557CI -UN-01NOV88

Air Test Plug JDG185

Test differential lock quill

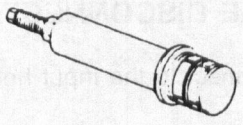


RX,JDG185A -19-25FEB92

RW18963 -UN-24FEB92

Rolling Torque Tool with Backlash Bar JDG712A

Measure rolling drag (torque) and backlash



RX,JDG712A -19-27MAR97

OTHER MATERIAL

Number	Name	Use
T43513	Threadlock and Sealer High Strength	Seal joints
TY15435	Epoxy	Lock threads
TY16021	High-Flex Form-in-Place Gasket	Seal joints
TY16285	Cure Primer	Speed cure of liquid gasket

See Group 10—Cross-Reference Chart for Canadian and Loctite Product Numbers

RX,4330,1C -19-19DEC97

SPECIFICATIONS

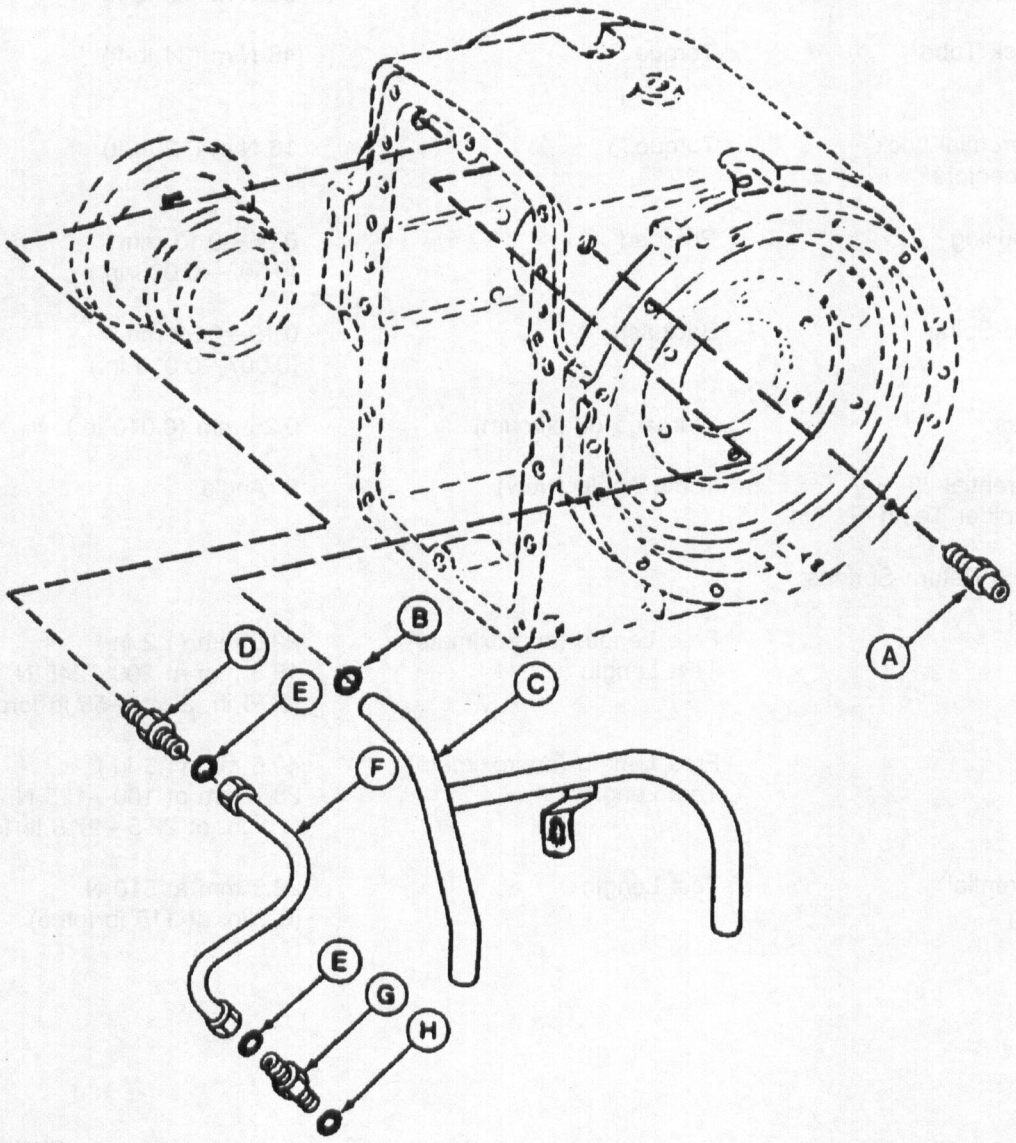
Item	Measurement	Specification
Ring Gear Cap Screws:		
1200 Series	Torque	150 N·m (110 lb-ft)
1400 Series	Torque	290 N·m (214 lb-ft)
Differential Housing Cap Screws:		
1400 Series:		
D Grade	Torque	74 N·m (55 lb-ft)
F Grade	Torque	183 N·m (135 lb-ft)
DIF-LOK Differential Cover-to-Differential Housing Cap Screws:		
1200 Series	Torque	47 N·m (35 lb-ft)
1400 Series:		
D Grade	Torque	75 N·m (56 lb-ft)
F Grade	Torque	95 N·m (70 lb-ft)
Standard Differential Housing Cap Screws	Torque	101 N·m (75 lb-ft)
No-SPIN Differential Housing Cap Screws	Torque	101 N·m (75 lb-ft)
Differential Side Quill Cap Screws:		
With Washers	Torque	90 N·m (66 lb-ft)
Flange Head	Torque	125 N·m (92 lb-ft)
Input Housing-to-Differential Case Cap Screw:		
1200 Series Standard Input		
M12 Cap Screw	Torque	165 N·m (122 lb-ft)
M16 Cap Screw	Torque	310 N·m (229 lb-ft)
1400 Series Standard Input	Torque	310 N·m (229 lb-ft)
Input Housing/Differential Case Cover Cap Screws:		
1200 Series Disconnect Housing		
M12 Cap Screws	Torque	150 N·m (111 lb-ft)
M16 Cap Screws	Torque	310 N·m (229 lb-ft)
1400 Series Disconnect Housing	Torque	310 N·m (229 lb-ft)
Air Boost Check Valve	Torque	1.4 N·m (12 lb-in.)

Continued on next page

Item	Measurement	Specification
Differential Lock Tube	Torque	28 N·m (20 lb-ft)
Differential Lock Tube Jam Nut	Torque	46 N·m (34 lb-ft)
Standard Differential Lock Oil Line Connectors	Torque	16 N·m (12 lb-ft)
Differential Housing	Pre-load	0.05—0.13 mm (0.002—0.005 in.)
Bevel Pinion-to-Spiral Bevel Gear	Backlash	0.19—0.39 mm (0.007—0.015 in.)
Disk and Plates	Warpage (Maximum)	0.25 mm (0.010 in.)
No-SPIN Differential Clutch and Spider Teeth	Tooth Angle (New)	5° Angle
Differential Lock Return Springs:		
1200 Series	Free Length (approximate) Test Length	29.5 mm (1.2 in.) 18.8 mm at 200—245 N (0.75 in. at 45—55 lb force)
1400 Series	Free Length (approximate) Test Length	40.6 mm (1.6 in.) 28.7 mm at 100—125 N (1.1 in. at 22.5—27.5 lb force)
No-SPIN Differential Return Spring	Test Length	22.9 mm at 510 N (0.9 in. at 115 lb force)

RX,4330,2C -19-19DEC97

EXPLODED VIEW—DIFFERENTIAL LOCK LINES—*AIR BOOST SYSTEM*

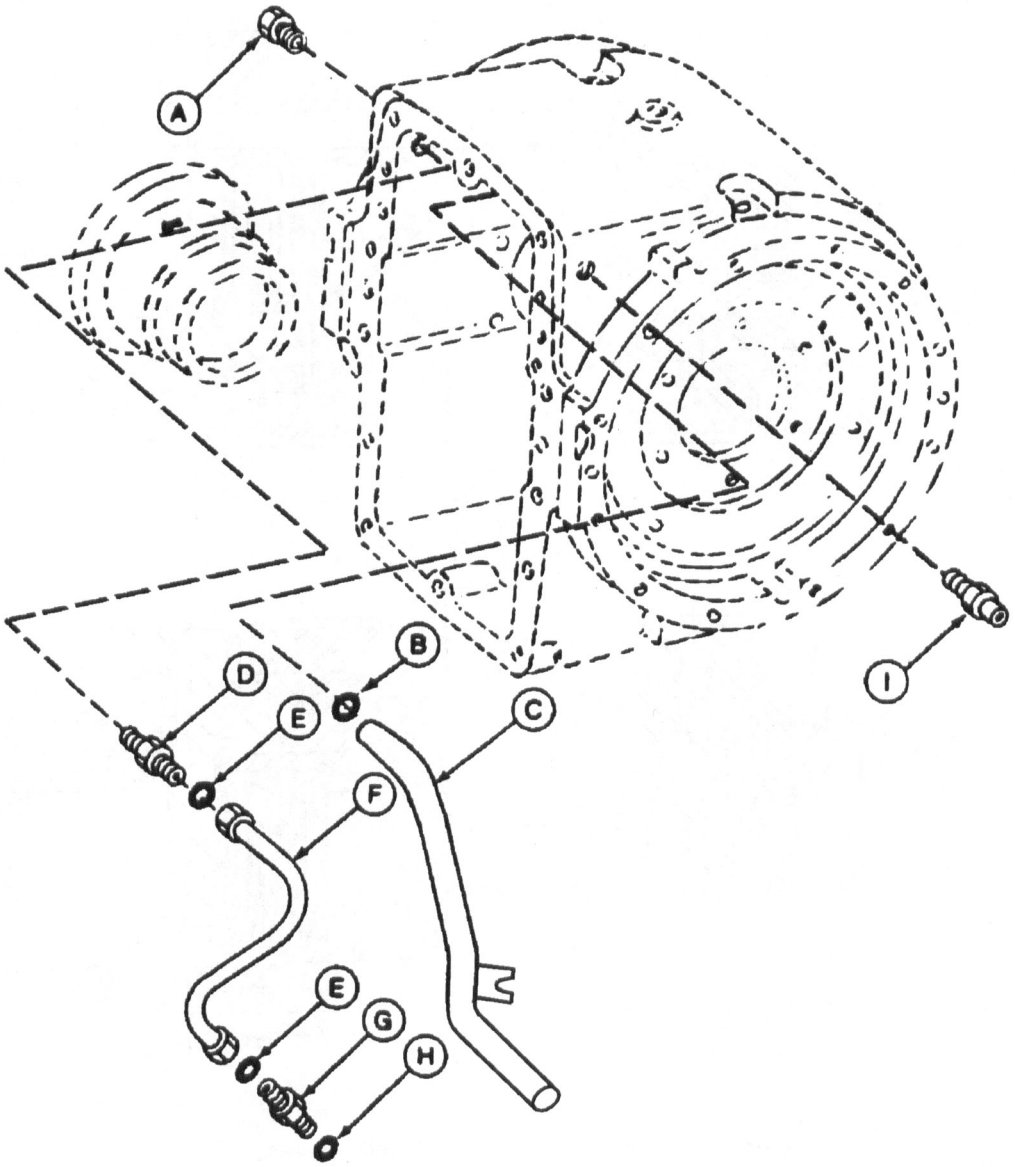


RW36538 -UN-14NOV97

A—Air Pressure Adapter
B—O-Ring
C—Oil Return Tube
D—Adapter
E—O-Ring (2 used)
F—Oil Line
G—Adapter
H—O-Ring

RX,4330,3C -19-19DEC97

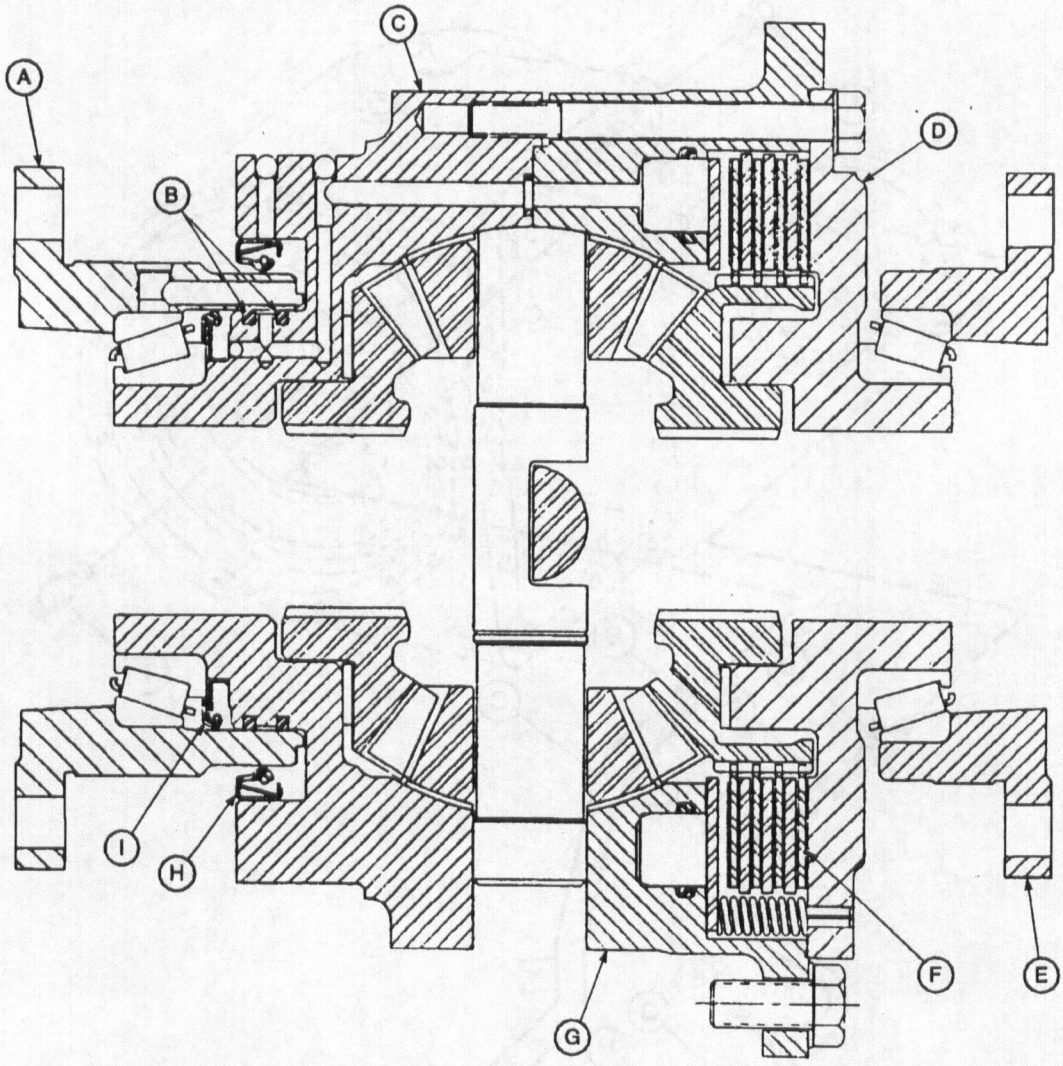
EXPLODED VIEW—DIFFERENTIAL LOCK LINES—*SUCTION TUBE*



A—Oil Pressure Adapter
B—O-Ring
C—Suction Tube
D—Adapter
E—O-Ring (2 used)
F—Oil Line
G—Adapter
H—O-Ring
I—Air Pressure Adapter

RX,4330,4C -19-19DEC97

CROSS-SECTIONAL VIEW—DIFFERENTIAL ASSEMBLY WITH DIFFERENTIAL LOCK 1200 SERIES—*CAPTURE SYSTEM*

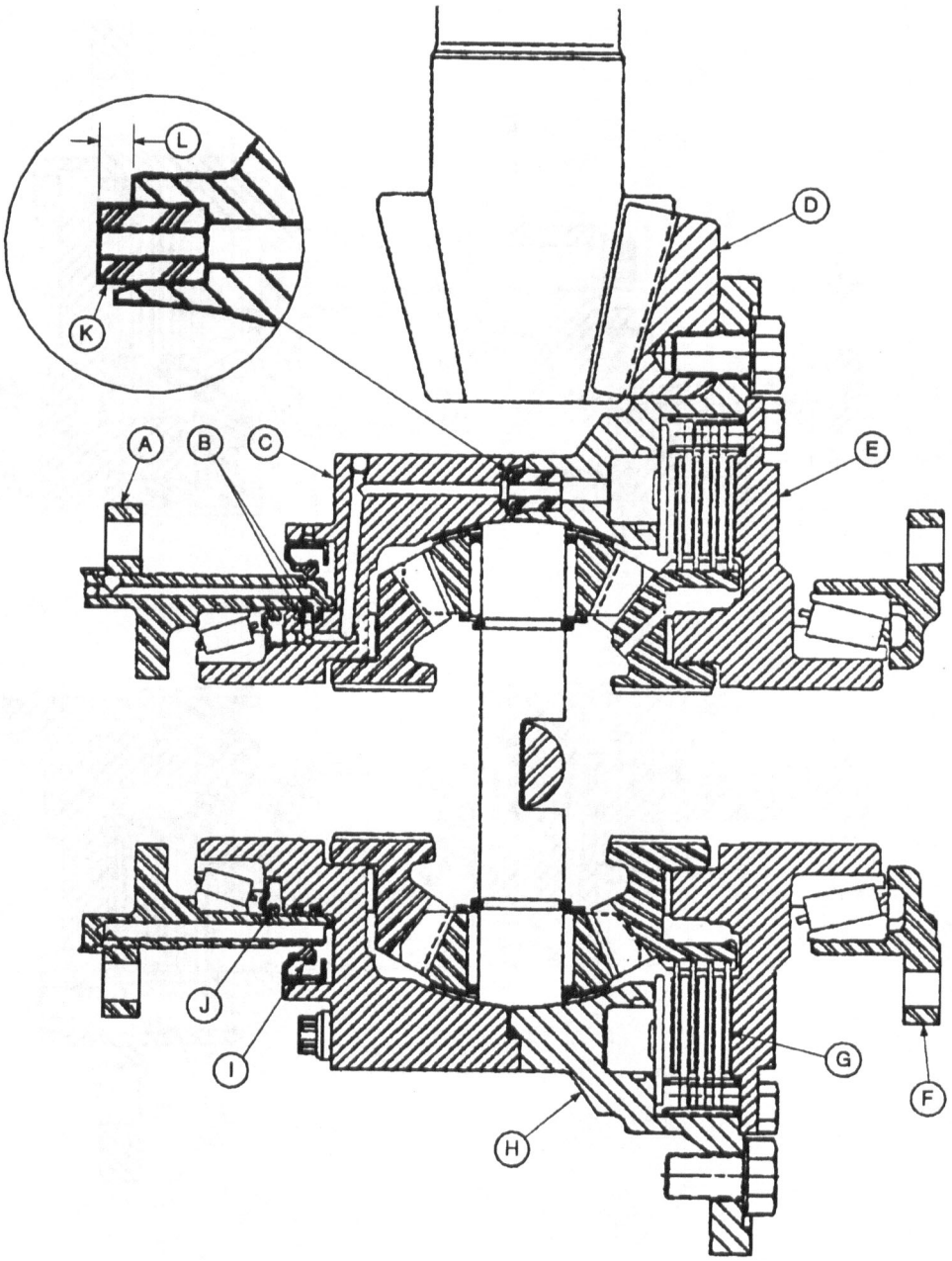


A—Quill
B—Sealing Ring (2 used)
C—Differential Housing Cover
D—Cover
E—Quill
F—Differential Lock Assembly
G—Differential Housing
H—Oil Seal
I—Oil Seal

RW37018 -UN-18OCT94

RX,4330,4B -19-22DEC94

CROSS-SECTIONAL VIEW—DIFFERENTIAL ASSEMBLY WITH DIFFERENTIAL LOCK 1400 SERIES EARLIER STYLE—*CAPTURE SYSTEM*



RW37019 (CV)

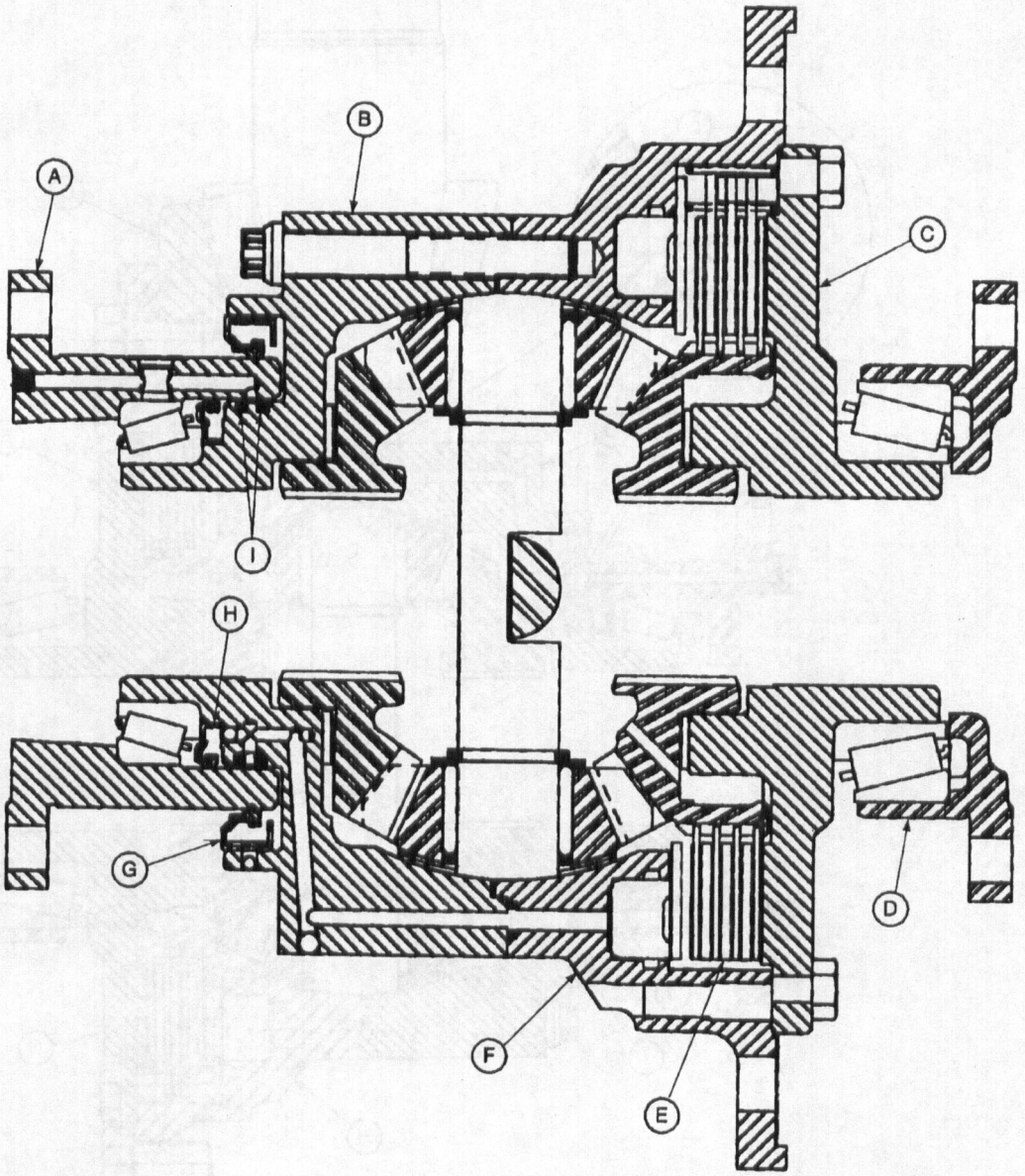
RW37019 -UN-31OCT94

A—Quill
B—Sealing Ring (2 used)
C—Differential Housing Cover
D—Spiral Bevel Gear
E—Cover
F—Quill
G—Differential Lock Assembly
H—Differential Housing
I—Oil Seal
J—Oil Seal
K—Bushing
L—Bushing Height *
7.4—7.7 mm
(0.285—0.305 in.)

** Initial Assembly of New Part*

RX,4330,5B -19-25JAN95

CROSS-SECTIONAL VIEW—DIFFERENTIAL ASSEMBLY WITH DIFFERENTIAL LOCK 1400 SERIES LATER STYLE—*CAPTURE SYSTEM*

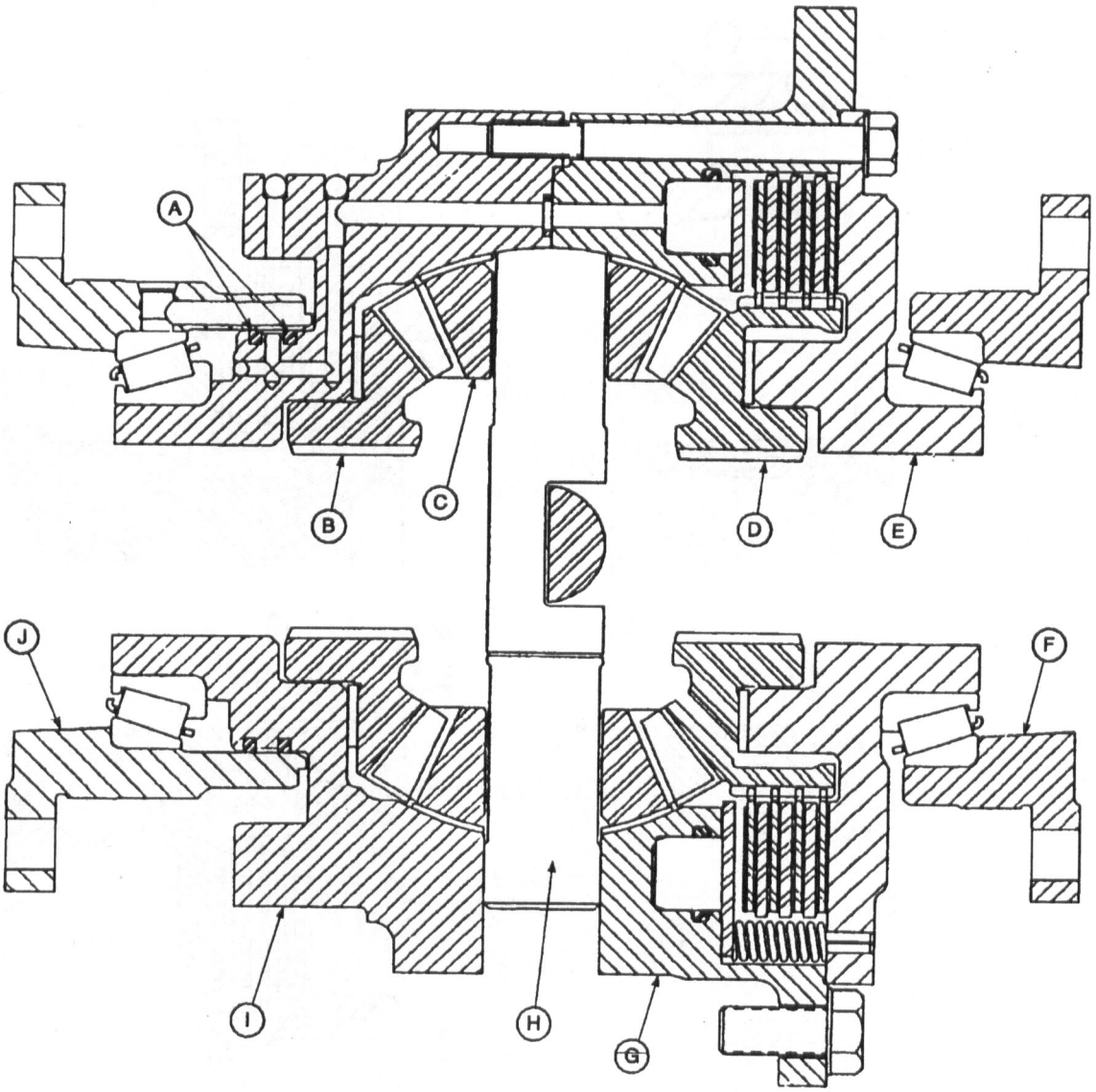


A—Quill
B—Differential Housing Cover
C—Cover
D—Quill
E—Differential Lock Assembly
F—Differential Housing
G—Oil Seal
H—Oil Seal
I—Sealing Ring (2 used)

RW37021 -UN-31OCT94

RX,4330,6B -19-22DEC94

CROSS-SECTIONAL VIEW—DIFFERENTIAL ASSEMBLY WITH DIFFERENTIAL LOCK 1200 SERIES—*AIR BOOST SYSTEM*



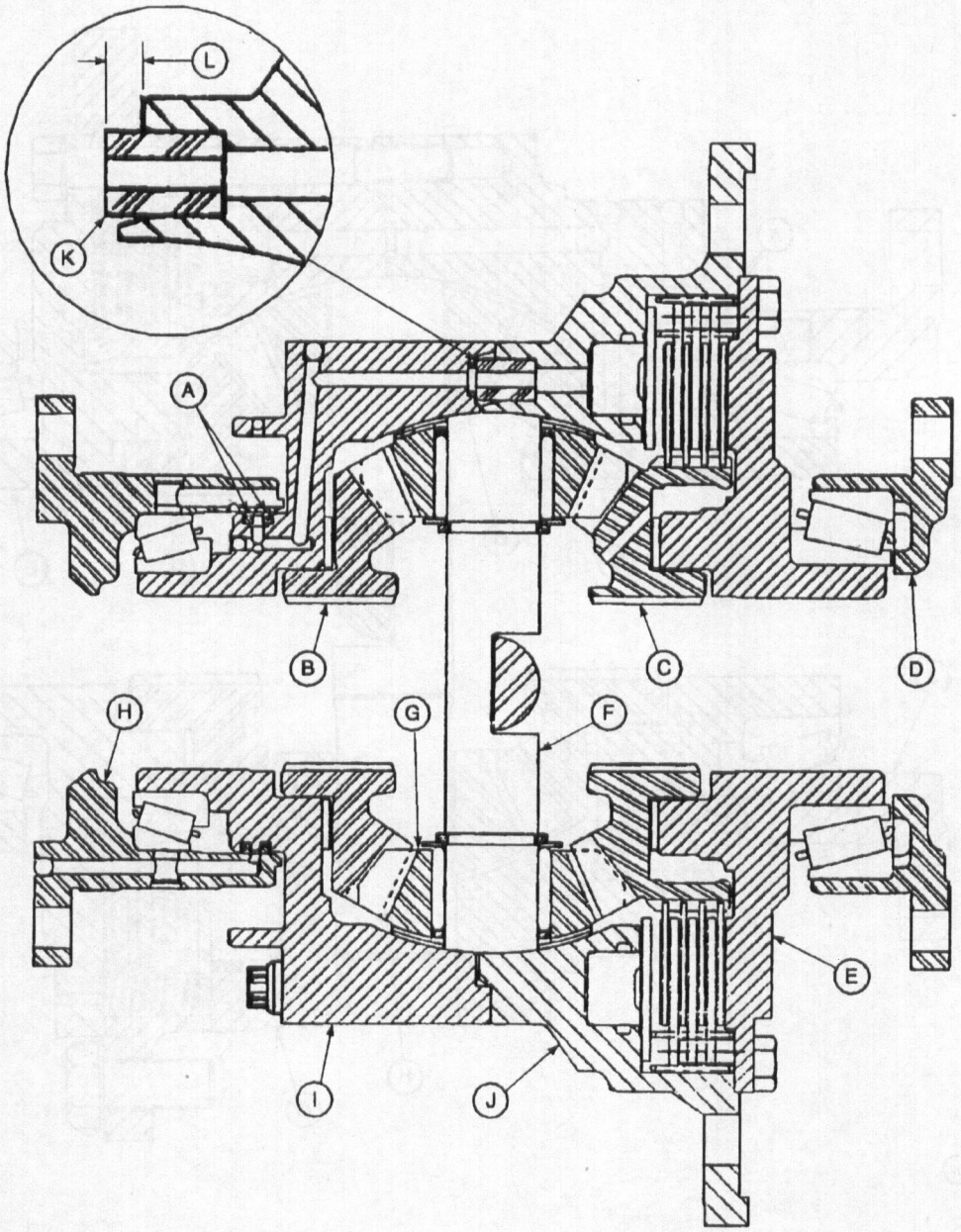
RW37022 (CV)

RW37022 -UN-18OCT94

A—Sealing Rings
B—Bevel Gear
C—Bevel Pinion
D—Bevel Lock Gear
E—Housing Cover
F—Bearing Quill
G—Differential Housing
H—Bevel Pinion Shaft
I—Differential Housing
J—Bearing Quill

RX,4330,7B -19-22DEC94

CROSS-SECTIONAL VIEW—DIFFERENTIAL ASSEMBLY WITH DIFFERENTIAL LOCK 1400 SERIES EARLIER STYLE—*AIR BOOST SYSTEM*



RW37023 (CV)

RW37023 -UN-31OCT94

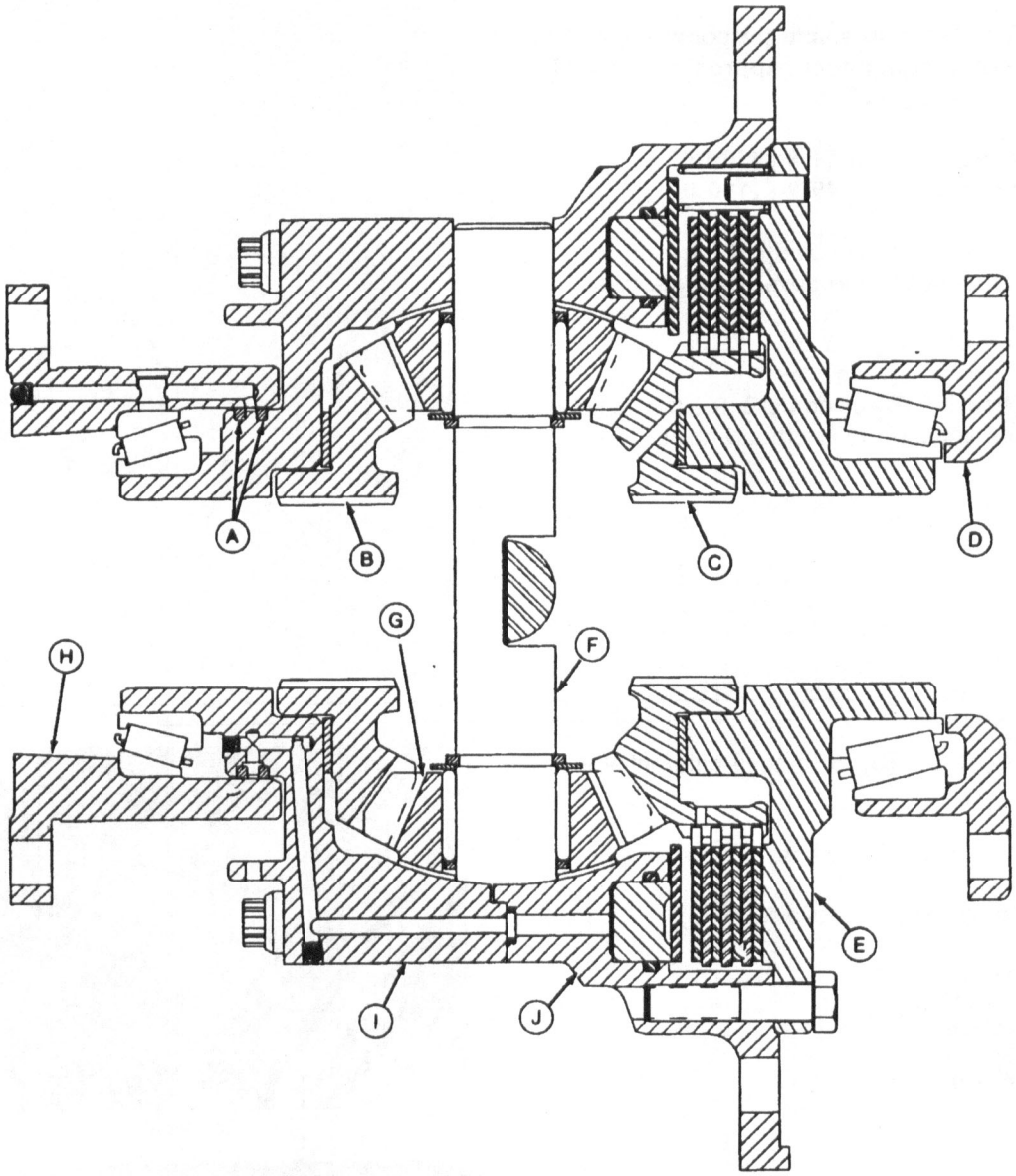
30 11

A—Sealing Rings
B—Bevel Gear
C—Bevel Lock Gear
D—Bearing Quill
E—Differential Housing Cover
F—Bevel Pinion Shaft
G—Bevel Pinion
H—Bearing Quill
I—Differential Housing
J—Differential Housing with Lock
K—Bushing
L—Bushing Height *
7.4—7.7 mm
(0.285—0.305 in.)

* *Initial Assembly of New Part*

RX,4330,8B -19-25JAN95

CROSS-SECTIONAL VIEW—DIFFERENTIAL ASSEMBLY WITH DIFFERENTIAL LOCK 1400 SERIES LATER STYLE—*AIR BOOST SYSTEM*



A—Sealing Rings
B—Bevel Gear
C—Bevel Lock Gear
D—Bearing Quill
E—Differential Housing Cover
F—Bevel Pinion Shaft
G—Bevel Pinion
H—Bearing Quill
I—Differential Housing
J—Differential Housing with Lock

RX,4330,9B -19-22DEC94

REMOVE DIFFERENTIAL ASSEMBLY

Remove axle housing from differential case. (See Remove Axle Housings, Group 35.)

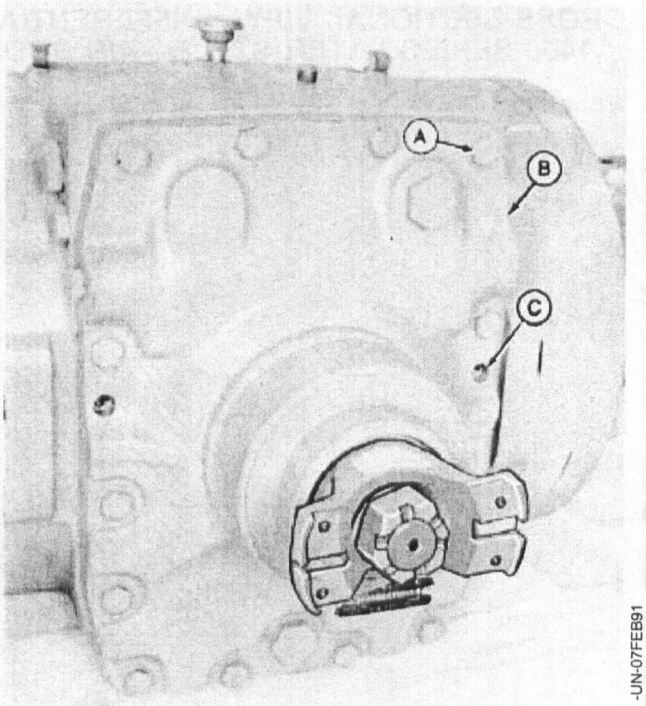
CAUTION: Avoid possible personal injury. Use proper lifting equipment. Approximate weight of input housing is:

1200 Series ..... 41 kg (90 lb)
1400 Series ..... 49 kg (110 lb)

NOTE: Threaded jack screw holes (C) have been provided to loosen the cover from the case.

Remove cap screws (A).

Remove input housing (B) using JDG19 Lift Brackets with lifting straps attached to overhead hoist.



RW18730 -UN-07FEB91

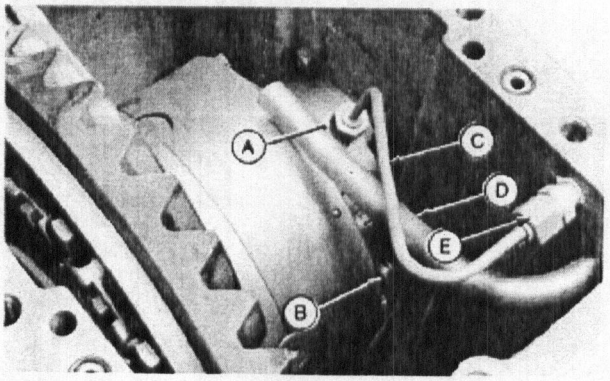
RX,4330,5C -19-07JAN98

Remove fittings (A) and (E) to remove differential lock oil line (C).

Inspect O-rings. Replace if necessary.

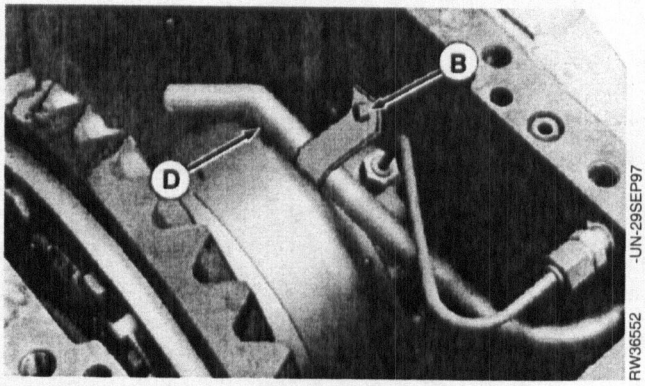
Remove cap screw (B) to remove tube (D).

A—Fitting
B—Cap Screw
C—Oil Line
D—Tube
E—Fitting



RW18694 -UN-07JAN91

Air Boost Tube



RW36552 -UN-29SEP97

Suction Tube

RX,4330,6C -19-07JAN98

Install DFRW7* Lifting Tool (A) and hoist.

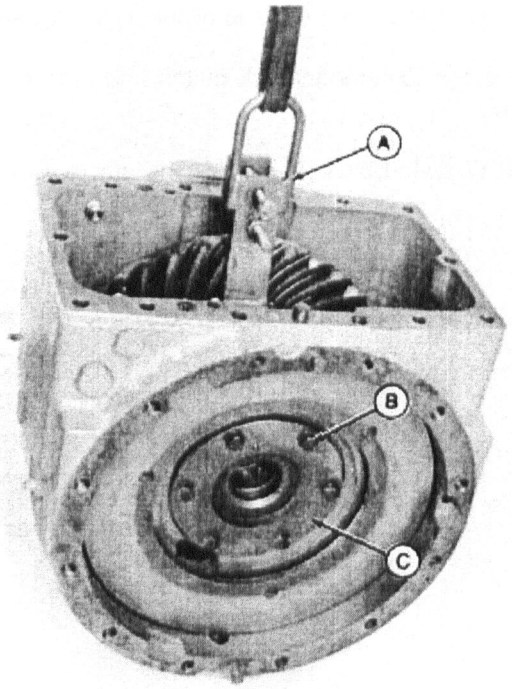
Raise differential assembly enough to relieve weight on bearing quills.

Remove six cap screws (B) from each side to remove bearing quills.

NOTE: Keep shims with respective bearing quill.

Remove bearing quills (C).

Carefully remove differential assembly.



RW18695 -UN-07JAN91

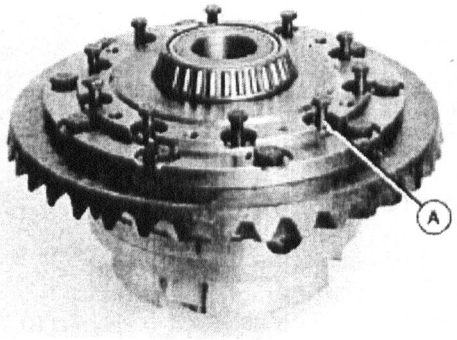
** See Group 499 for tool fabrication*

RX,4330,7C -19-19DEC97

DISASSEMBLE, INSPECT, AND ASSEMBLE DIFFERENTIAL HOUSING

30
14

Remove inner cap screws (A).



RW13221 -UN-16APR90

RX,4330,8C -19-19DEC97

Remove top half of assembly and put on work bench.

Remove cover, differential lock plates and return springs (A).

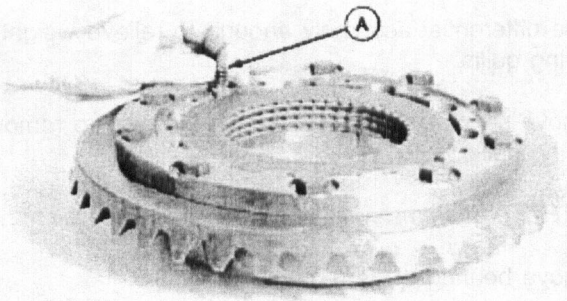
Install **NEW** spring pins (B), if old pins are removed.

Inspect and test springs as necessary.

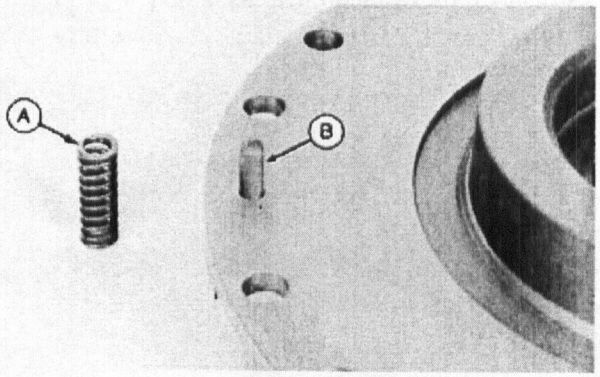
NEW SPRING SPECIFICATION

1200 Series:
Free Length (approximate) . . . . . 29.5 mm (1.2 in.)
Test Length . . . . . 18.8 mm at 200—245 N (0.750 in. at 45—55 lb force)

1400 Series:
Free Length (approximate) . . . . . 40.6 mm (1.6 in.)
Test Length . . . . . 28.7 mm at 100—125 N (1.1 in. at 23—28 lb force)



RW13222 -UN-16APR90



R40086 -UN-23JAN90

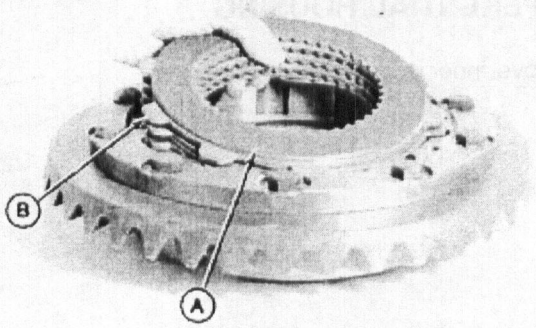
RX,4330,9C -19-07JAN98

Inspect disks (A). Replace if:

- Peening is evident or splines have backlash
- Warping or coning exceeds 0.25 mm (0.010 in.)
- Friction material is burned, flaked, or pitted
- Friction material is worn to bottom of grooves

Inspect separator plates (B). Replace if:

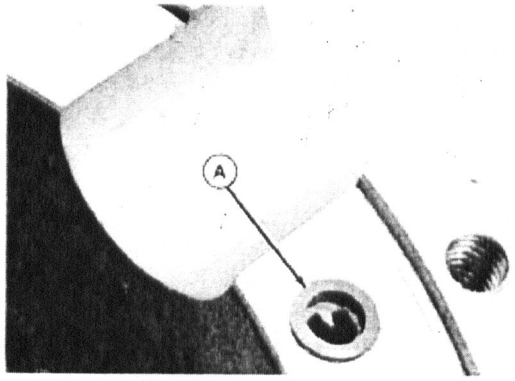
- Scored or galled
- Tangs are worn or damaged
- Warpage or coning exceeds 0.25 mm (0.010 in.)



RW13223 -UN-16APR90

RX,4330,10C -19-19DEC97

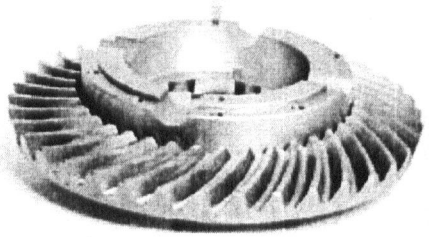
Inspect piston inlet seal (A). Replace if necessary. Hold in position with petroleum jelly.



RW13224 -UN-16APR90

RX,4330,11C -19-19DEC97

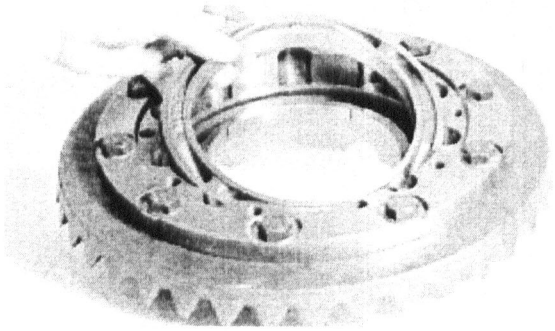
Remove differential lock piston from housing using a JDG185 Air Test Plug.



RW13225 -UN-16APR90

RX,4330,12C -19-19DEC97

Inspect piston for nicks or scratches and replace if necessary.

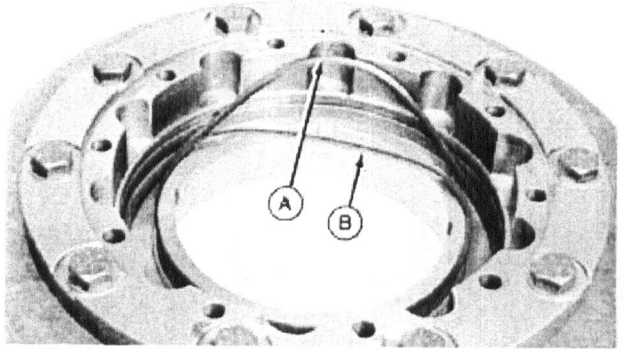


RW13226 -UN-19APR90

RX,4330,13C -19-19DEC97

Remove and inspect seals (A) and (B) in piston bore. Replace if necessary. Coat with a light oil or petroleum jelly.

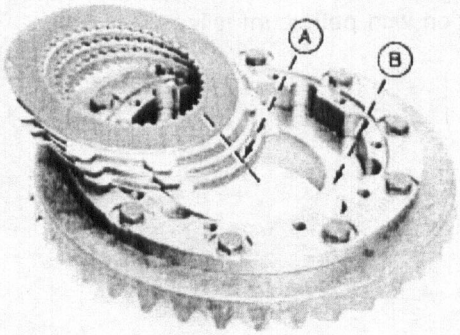
Coat piston with light oil or petroleum jelly. Install piston. Tap piston gently to avoid binding piston in bore.



RW13227 -UN-16APR90

RX,4330,14C -19-07JAN98

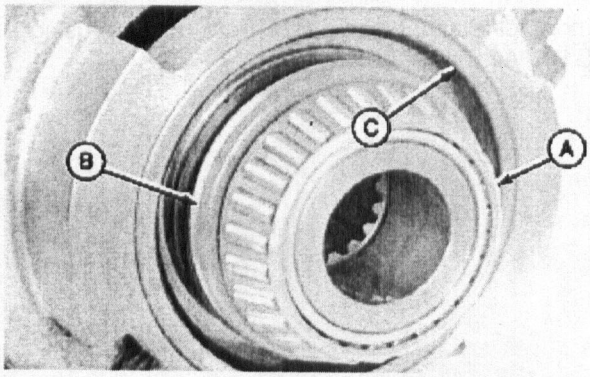
Replace plates and disks, beginning with plate with a full set of tangs (B). Alternate disks and plates, making sure plates with missing tangs are aligned (A).



RW13228 -UN-16APR90

RX,4330,15C -19-19DEC97

Inspect bearing cone (A), inner seal (B), and outer seal (C) for wear or damage.

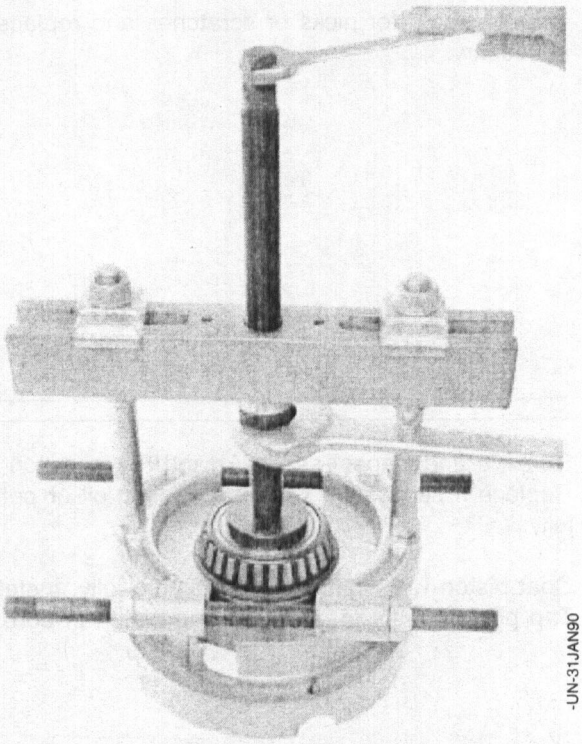


R37795 -UN-01FEB90

RX,4330,16C -19-19DEC97

NOTE: Inner oil seal must be removed with bearing if replacement is necessary.

Remove bearing cone and seal, using a bearing puller.



T94283 -UN-31JAN90

RX,4330,17C -19-19DEC97

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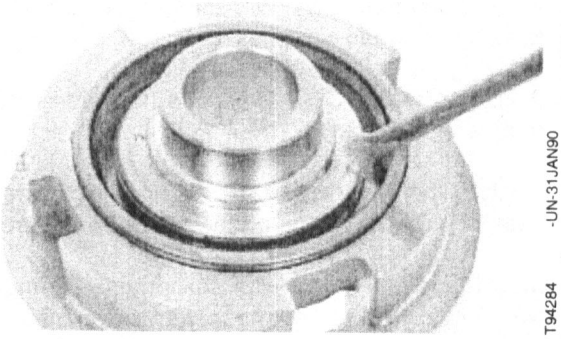
17

Inspect outer seal. Replace as necessary, being careful not to damage seal ring groove.

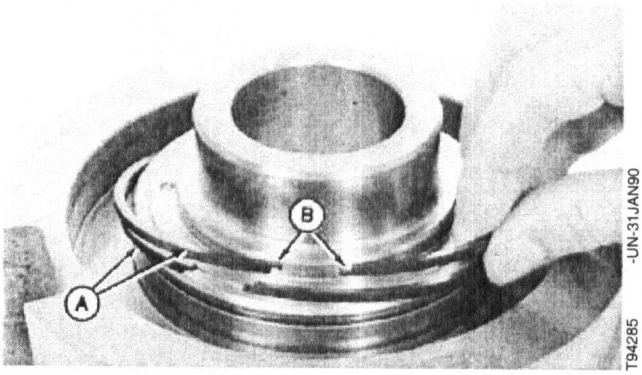


RX,4330,18C -19-19DEC97

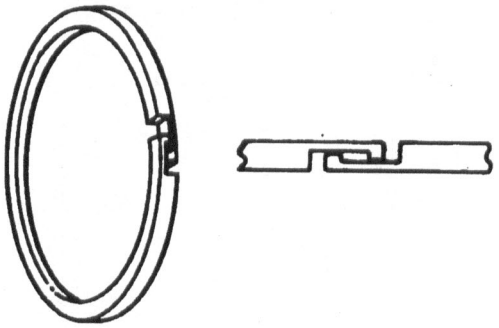
Remove sealing rings (A). Open the rings slightly to remove or install.

Inspect sealing rings for scratches or grooves. Inspect the locks (B) on the ends of rings.

Inspect sealing ring grooves for wear or damage. Replace rings as necessary. Make sure sealing ring ends are correctly locked together.



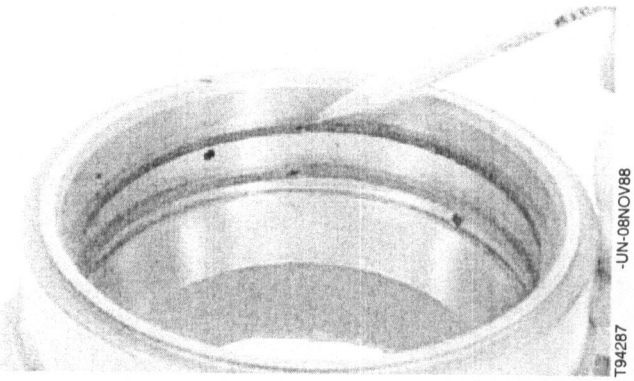
Differential Lock with Capture System



RX,4330,19C -19-19DEC97

Inspect sealing ring patterns in quill for skips, nicks, or scratches.

Install sealing rings. Be sure a gap is between locks on ends of sealing rings. Install new rings if no gap exists. Check new rings for gap. Replace quill if no gap is present.



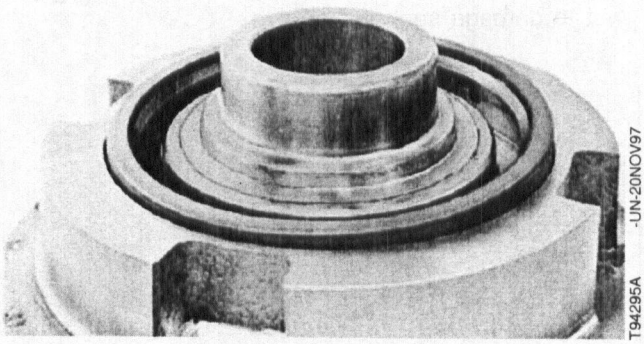
RX,4330,20C -19-19DEC97

Clean outside diameter of seal and bearing quill bore using chlorethane, lacquer thinner, or equivalent. Avoid handling cleaned surfaces.

Apply TY16285* Cure Primer to housing bore. Allow 3 minutes for primer to dry.

Apply a thin layer of T43513* Threadlock and Sealer to seal OD. The entire surface should be covered.

Install new outer seal with sealing lips (spring side) away from driver. Install seal flush with outer machined surface.

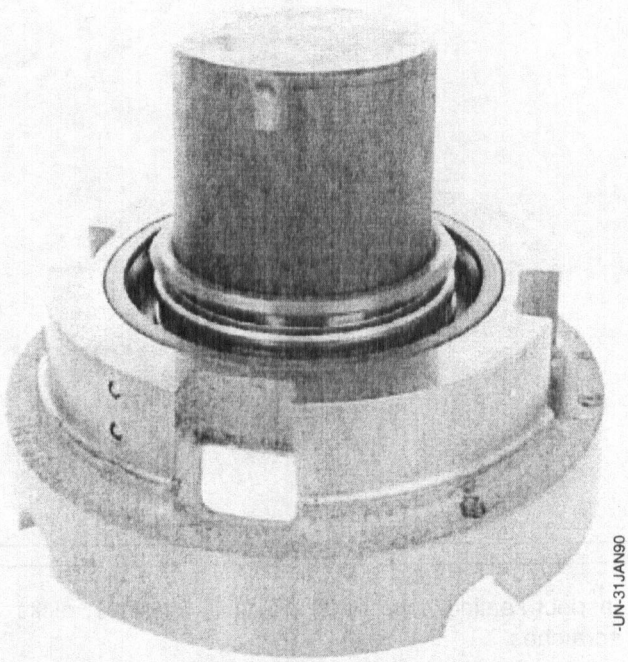


** See Section 10—Cross-Reference Chart for Canadian and Loctite Product Numbers*

RX,4330,21C -19-19DEC97

Install new inner seal (spring side down) even with bearing shoulder using JD320 Seal Installation Tool.

NOTE: A pipe with minimum ID of 87.33 mm (3.438 in.), maximum OD of 98.43 mm (3.875 in.) and minimum length of 38.10 mm (1.50 in.) may be substituted for the seal installation tool.

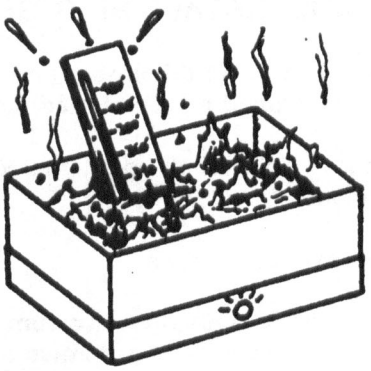


RX,4330,22C -19-19DEC97

CAUTION: DO NOT heat oil over 182°C (360°F). Oil fumes or oil can ignite above 193°C (380°F). Use a thermometer. DO NOT allow a flame or heating element to come in direct contact with the oil. Heat the oil in a well-ventilated area.

Press or heat bearing cones to 1250°C (300°F) and install tight against shoulder.

Coat bearings with a light oil after cooling.



T81191 -UN-23FEB89

RX,4330,23C -19-19DEC97

ASSEMBLE AND TEST DIFFERENTIAL LOCK QUILL

IMPORTANT: Inspect for leakage whenever bearing quill or cup is replaced.

Remove old sealant material from quill bore using chlorethane, lacquer thinner or equivalent. Avoid handling cleaned surfaces.

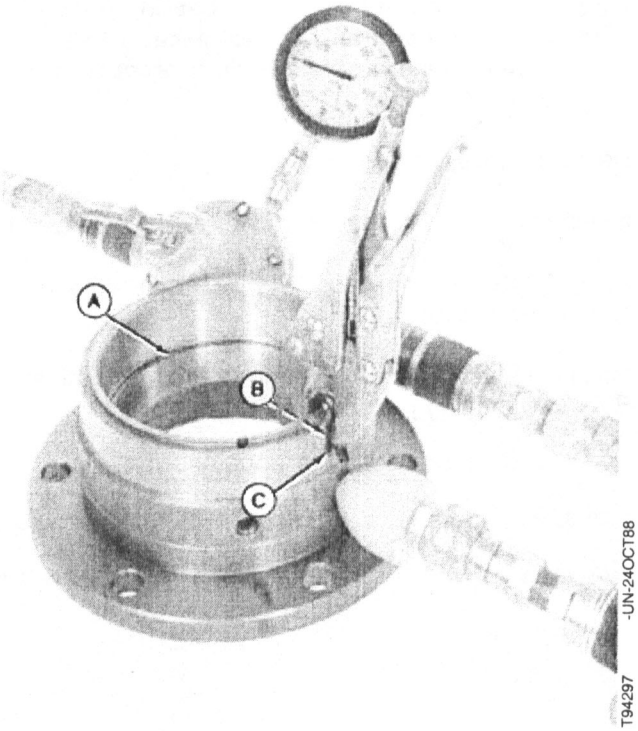
Apply T16285* Cure Primer to cup. Allow three minutes for primer to dry.

Apply TY16021* Gasket to quill bore where drilled holes break into bore.

Install bearing cup (A) tight against quill shoulder. Allow 30 minutes for TY16021* Gasket to cure before test.

Test for leakage around pressure (inlet) passage. Block passage (B) using a piece of a large O-ring and a pair of locking pliers.

Apply clean hydraulic oil around bearing cup. Check for air leakage using a JDG185 Air Test Plug and 100 kPa (14.5 psi) minimum pressure. If leakage is present, replace bearing cup and/or quill.

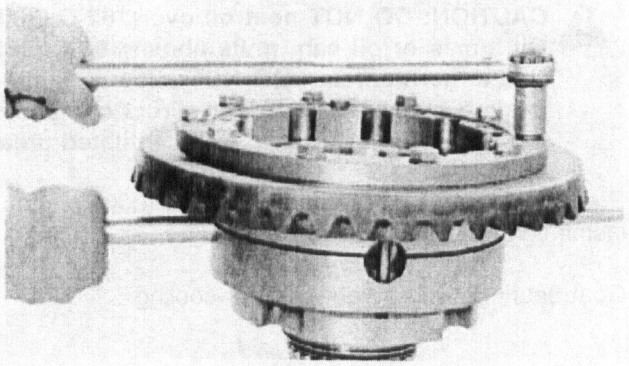


T94297 -UN-24OCT88

** See Group 10—Cross-Reference Chart for Canadian and Loctite Product Numbers*

RX,4330,24C -19-07JAN98

REMOVE AND INSTALL RING GEAR


R38734 -UN-03JAN89

IMPORTANT: The bevel drive gear and shaft must be replaced as a matched set.

Install pry bar in pinion shaft bore by removing bevel pinion assembly.

Remove ring gear cap screws.

IMPORTANT: DO NOT use a petroleum base solvent to degrease cap screws and ring gear.

Clean cap screws and threaded holes in ring gear using lacquer thinner or chlorethane if ring gear is to be reused.

CAUTION: Heat parts in a bearing heater. Use a thermometer and do not exceed 150°C (300°F). Plan a safe handling procedure to avoid burns.

Heat ring gear to maximum 150°C (300°F).

Install gear on housing with cap screw holes aligned.

Apply TY15435* Epoxy to lower 19.0 mm (0.75 in.) of cap screw threads.

Install cap screws and tighten in criss-cross pattern. Repeat tightening pattern three times.

RING GEAR CAP SCREW TORQUE SPECIFICATIONS

1200 Series	150 N·m (110 lb-ft)
1400 Series	300 N·m (220 lb-ft)

** See Group 10—Cross-Reference Chart for Canadian and Loctite Product Numbers*

RX,4330,25C -19-07JAN98

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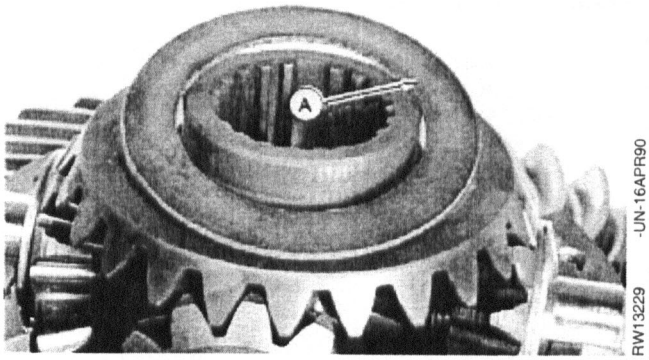
DISASSEMBLE, INSPECT, AND ASSEMBLE DIFFERENTIAL PINIONS

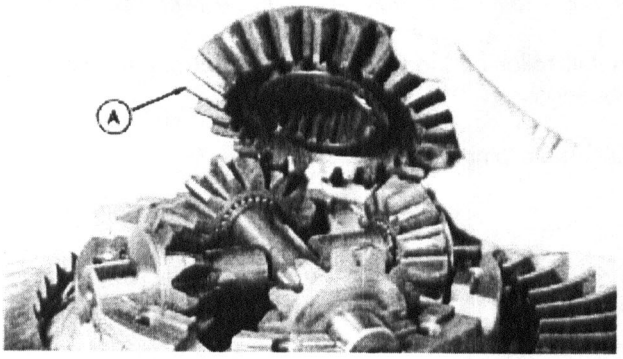
Inspect thrust washer (A).

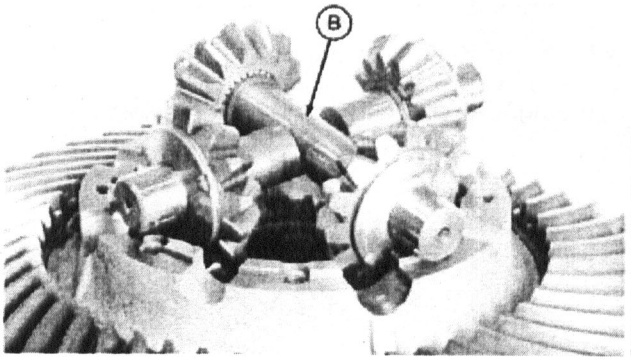


RX,4330,26C -19-19DEC97

Remove and inspect bevel gear (A).

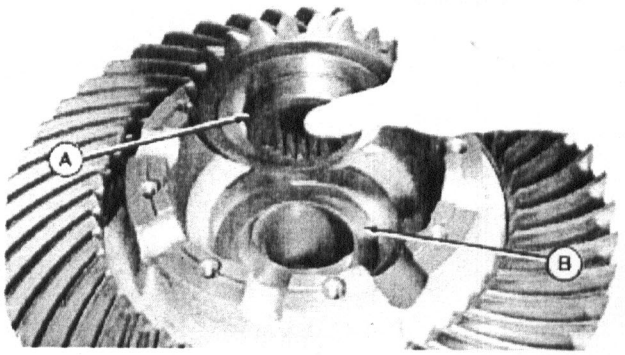
Remove pinion set (B) as a unit.





RX,4330,27C -19-19DEC97

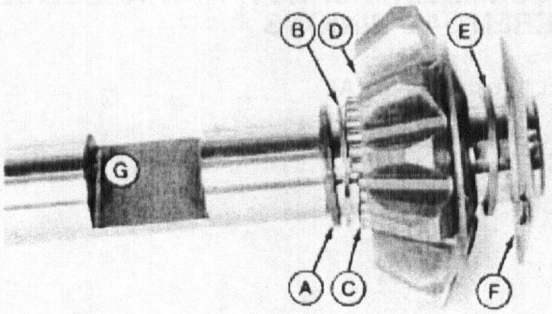
Remove and inspect inside bevel gear (A), and thrust washer (B).



RX,4330,28C -19-19DEC97

Inspect parts (A—G).

A—Snap Ring
B—Bearing Thrust Washer
C—Roller Bearings
D—Pinion
E—Bearing Thrust Washer
F—Pinion Thrust Washer
G—Pinion Shaft



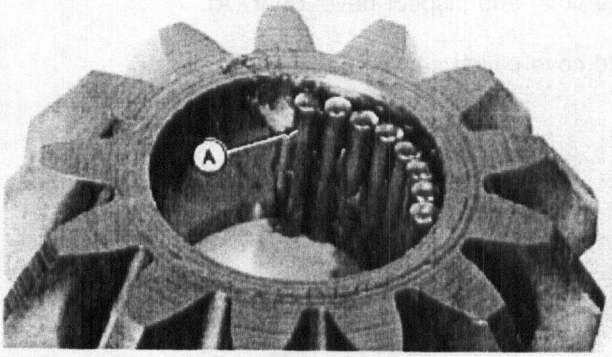
RW13233 -UN-16APR90

RX,4330,29C -19-19DEC97

NOTE: Roller bearings (A) must be replaced as a set.

Install roller bearing set (A) using petroleum jelly to hold bearings.

Assemble pinion shaft.

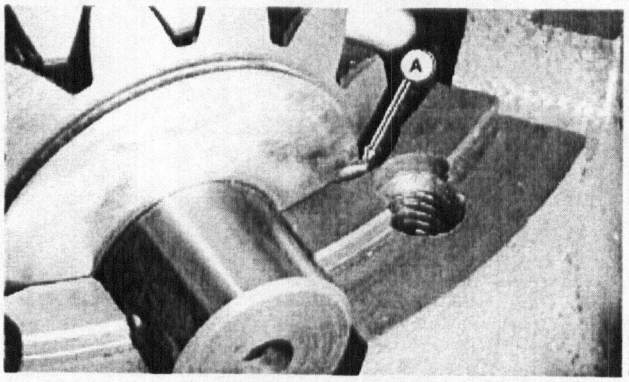


RW13234 -UN-16APR90

RX,4330,30C -19-19DEC97

Install pinion shaft assembly.

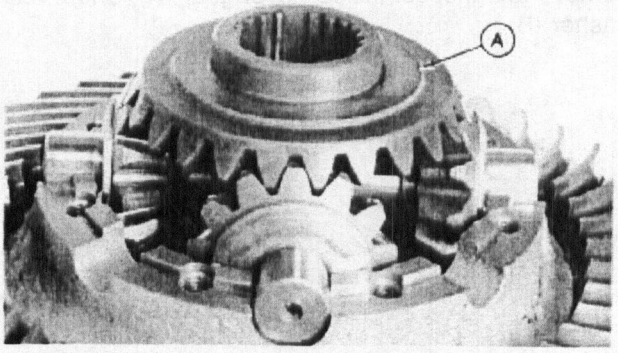
Align tangs (A) with differential housing slots on each pinion.



RW13524 -UN-16APR90

RX,4330,31C -19-19DEC97

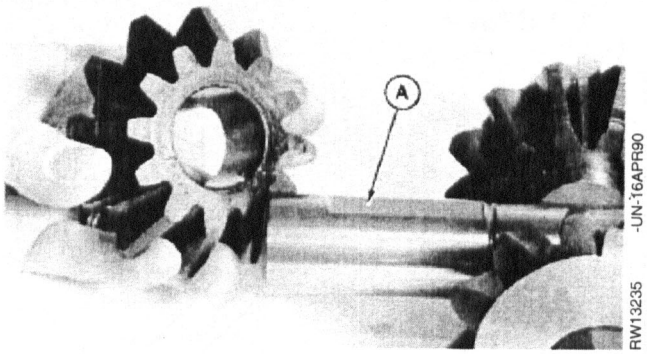
Install thrust washer (A).



RW13525 -UN-16APR90

RX,4330,32C -19-19DEC97

NOTE: The 1200 series differential lock axles use a four-pinion journal bearing (no roller bearings). Lubrication is provided to each pinion by flat spot (A) on pinion shafts.

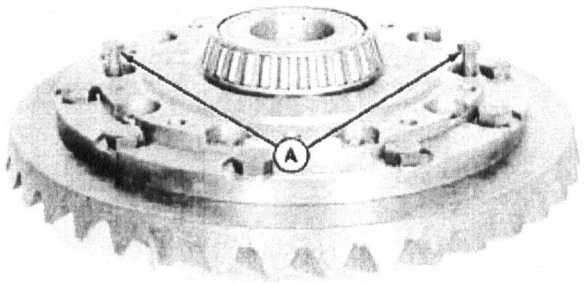


RX,4330,33C -19-19DEC97

For 1200 Series Axles, perform the following steps:

Install two cap screws (A) to align cap screw holes.

Tap cover down into housing. Install and tighten cap screws to 47 N·m (35 lb-ft).



RX,4330,34C -19-07JAN98

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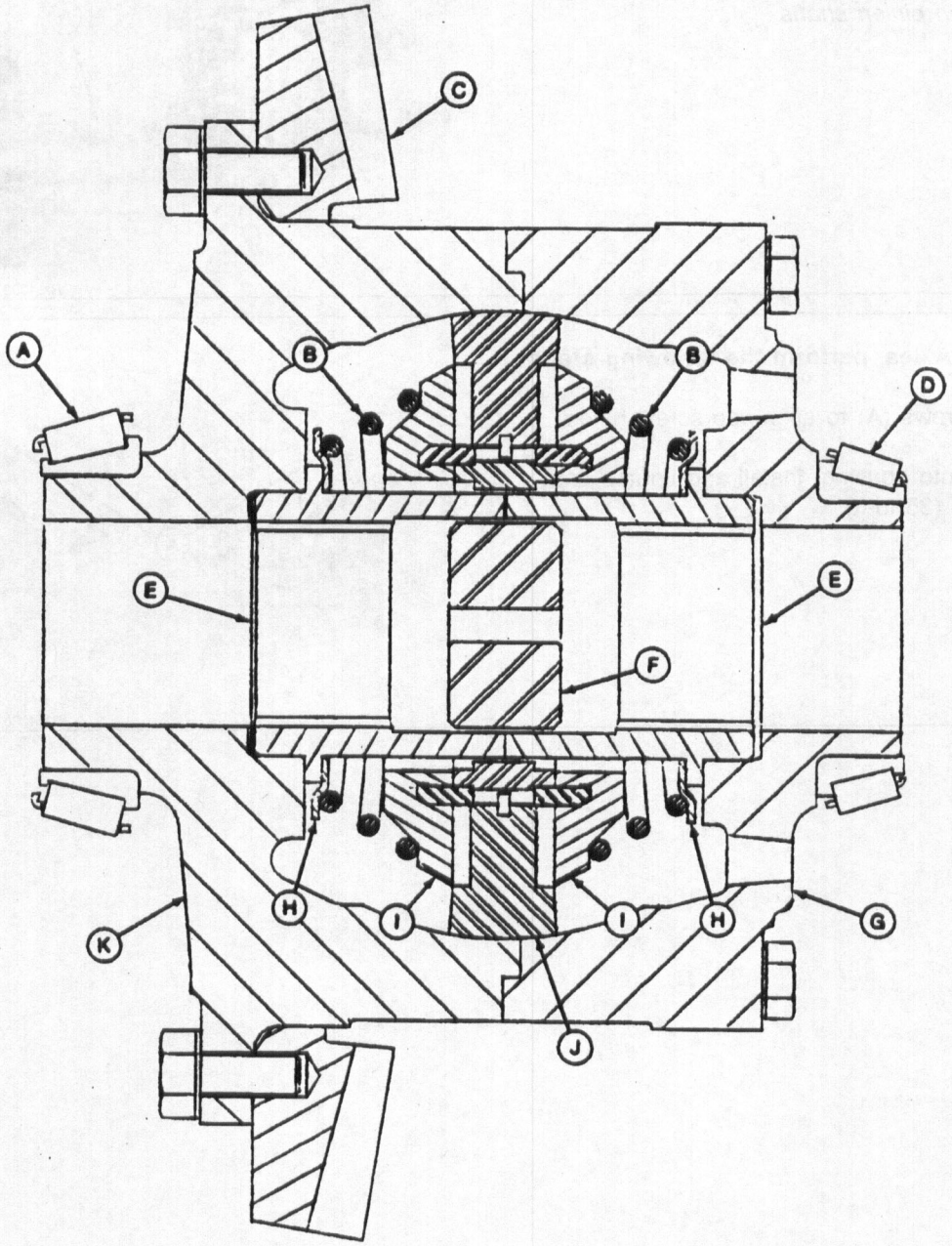
CROSS-SECTIONAL VIEW—DIFFERENTIAL ASSEMBLY
NO-SPIN™



R40144 -UN-03JAN89

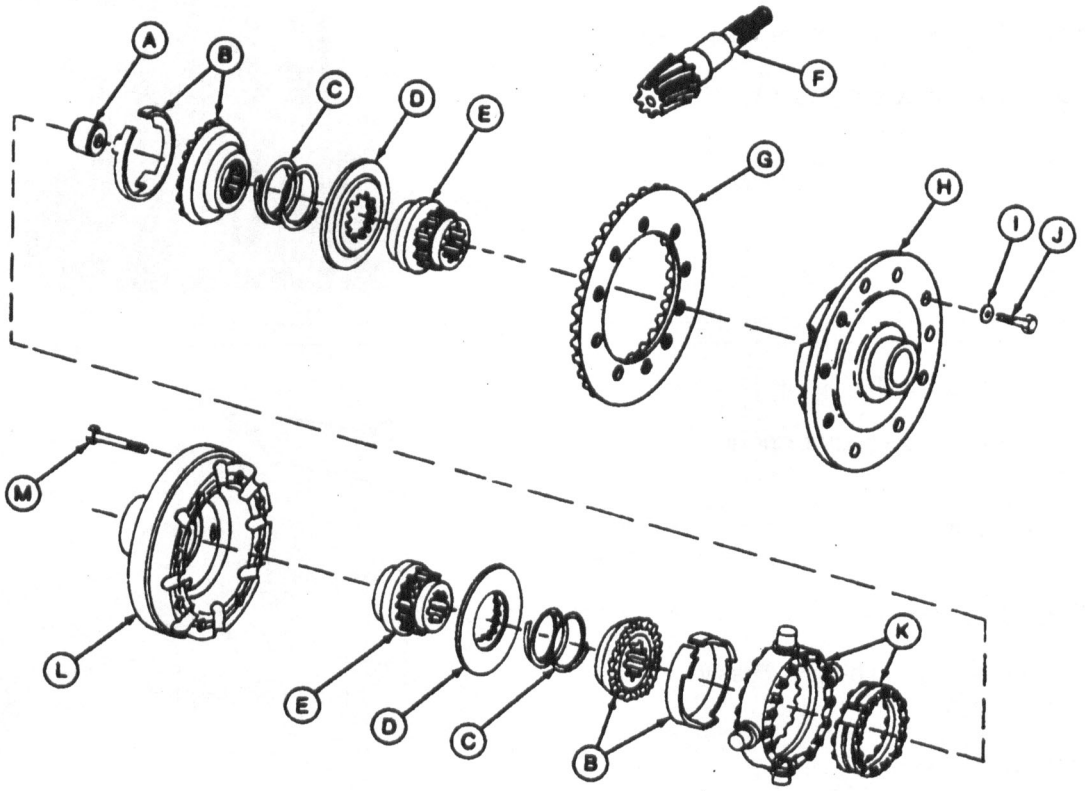
A—Bearing Cone
B—Spring
C—Spiral Bevel Ring Gear
D—Bearing Cone
E—Gear
F—Stop
G—Differential Housing
H—Guide
I—Clutch Assembly
J—Spider Assembly
K—Differential Housing

NOTE: Bearing cones and cups are press fit.

No-SPIN™ is a trademark of the Dyneer Corporation

RX,4330,14B -19-20JAN95

EXPLODED VIEW—DIFFERENTIAL ASSEMBLY—*NO-SPIN*



A—Stop
B—Clutch Assembly
C—Spring
D—Guide
E—Gear
F—Spiral Bevel Pinion
G—Spiral Bevel Ring Gear
H—Differential Housing
I—Washer
J—Cap Screw
K—Spider Assembly
L—Differential Housing
M—Cap Screw

RX,4330,15B -19-19JAN95

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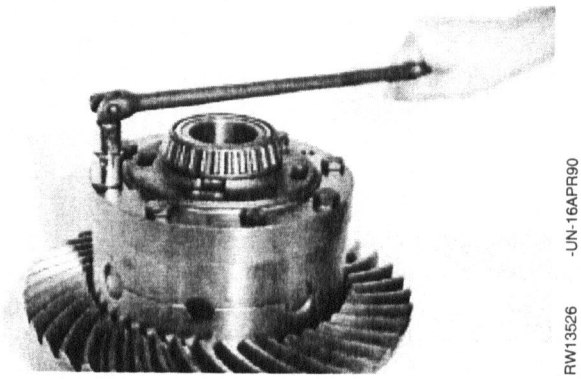
26

DISASSEMBLE, INSPECT, AND ASSEMBLE NO-SPIN DIFFERENTIAL

Inspect bearing. Remove and replace if necessary.

Remove only six cap screws at this time.



RX,4330,35C -19-19DEC97

DISASSEMBLE, INSPECT, AND ASSEMBLE NO-SPIN DIFFERENTIAL

Inspect bearing. Remove and replace if necessary.

Remove only six cap screws at this time.

RW13526 -UN-16APR90

RX,4330,36C -19-19DEC97

Carefully remove parts (A—I).

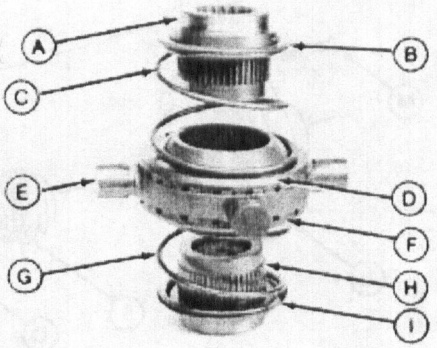
NEW PARTS SPECIFICATIONS

Clutch and Spider Teeth	-5° Angle
Return Spring (Test Length)	22.9 mm at 510 N (0.9 in. at 115 lb force)

NOTE: Locking ability will decrease as the parts wear.

Inspect clutch and spider teeth for excessive wear or rounding of teeth edges.

Lightly lubricate parts (A—I).



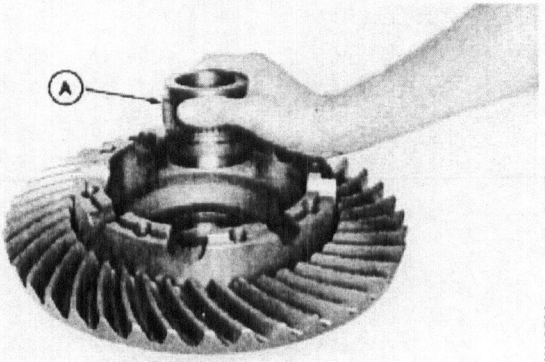
RW13528 -UN-16APR90

A—Gear
B—Spring Retainer
C—Spring
D—Clutch and Hold-Out Ring Assembly
E—Spider Assembly
F—Hold-Out Ring Assembly
G—Spring
H—Gear
I—Spring Retainer

RX,4330,37C -19-19DEC97

Install ground hub of side gear (A) into bore of differential housing.

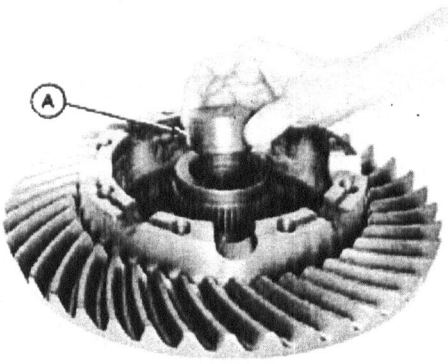
NOTE: Side gear must rotate smoothly.



RW13529 -UN-16APR90

RX,4330,38C -19-19DEC97

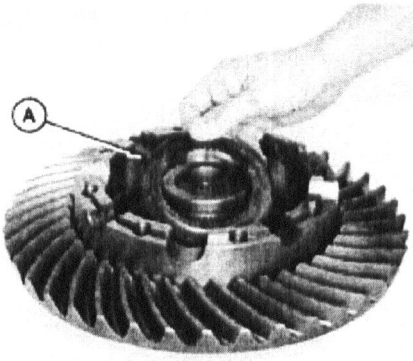
Install stop (A).



RW13530 -UN-16APR90

RX,4330,39C -19-19DEC97

Install spring retainer (A), raised hub side up, over gear splines.



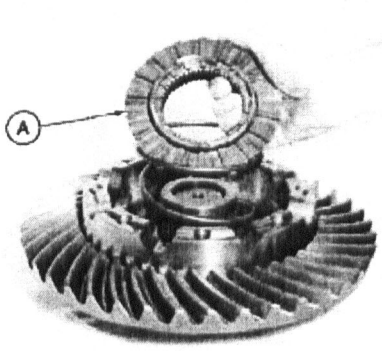
RW13531 -UN-16APR90

RX,4330,40C -19-19DEC97

IMPORTANT: Spring must not bind. Coils cannot overlap. There must be contact between spring retainer and end coil when clutch and side gears are fully indexed.

Install clutch and hold-out ring assembly (A) over spring with teeth facing up.

Push down clutch to ensure spring is correctly functioning.

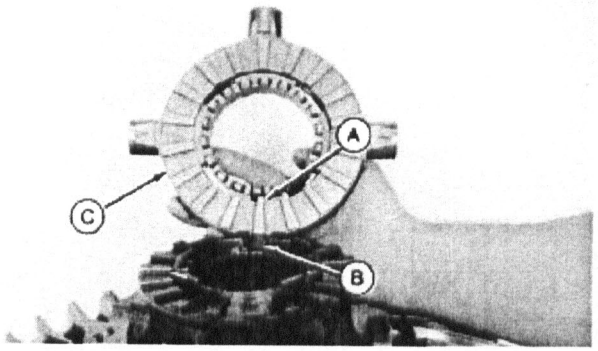


RW13532 -UN-16APR90

RX,4330,41C -19-19DEC97

IMPORTANT: Protruding tooth (A) must fit into slot (B) of hold-out ring.

Install spider assembly (C).



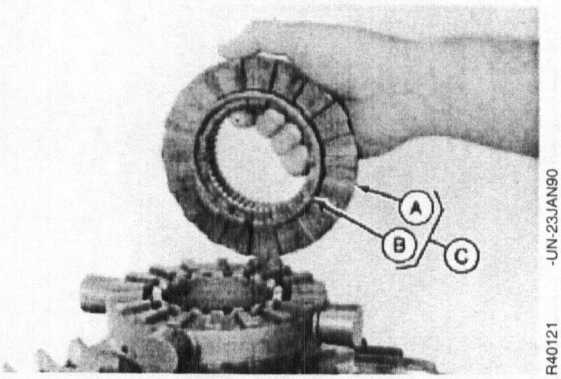
R40120 -UN-23JAN90

RX,4330,42C -19-19DEC97

Install upper clutch and hold-out ring assembly (C).

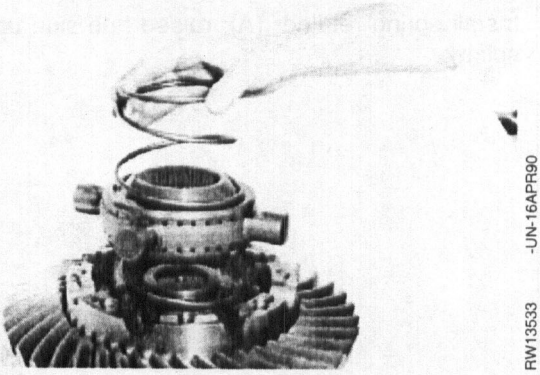
IMPORTANT: Protruding tooth must fit into hold-out ring slot.

A—Differential Clutch Cam
B—Cam Hold-Out Ring
C—Hold-Out Ring Assembly



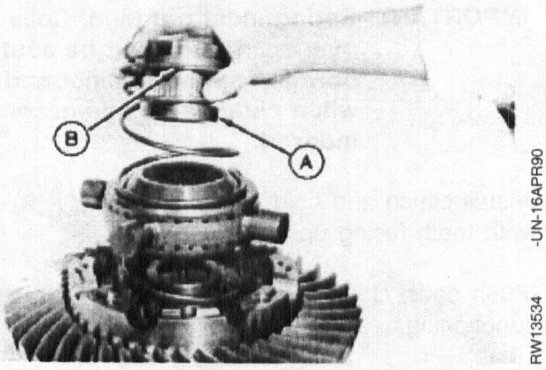
RX,4330,43C -19-19DEC97

Install spring on clutch and hold-out ring assembly.



RX,4330,44C -19-19DEC97

Install side gear (A) and retainer (B). Be sure lip on retainer faces toward spring.



RX,4330,45C -19-19DEC97

Install housing cover (A) pushing down to engage splines of clutch assembly and side gear.

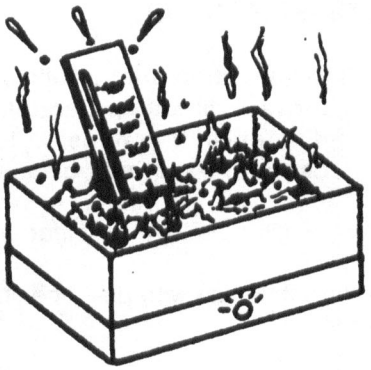
IMPORTANT: Backlash between the clutch teeth must be felt.

Install and tighten cap screws to 101 N·m (75 lb-ft).

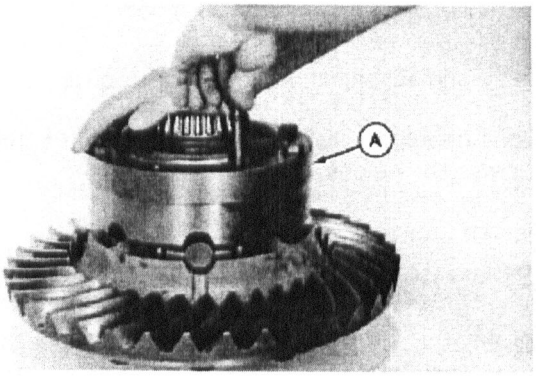
CAUTION: Heat parts in bearing heater. Use a thermometer and do not exceed 150°C (300°F). Plan a safe handling procedure to avoid burns.

Heat bearing not to exceed 150°C (300°F).

Install bearing cone on cover tight against shoulder.



T81191 -UN-23FEB89



R40115 -UN-23JAN90

RX,4330,46C -19-19DEC97

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INSTALL DIFFERENTIAL

IMPORTANT: Install differential to allow for proper forward direction. Carefully lower differential into housing to avoid damaging bearings or seals.

Install DFRW7* Lifting Tool (A) on differential assembly.

Carefully lower differential with quill openings aligned with axle bores.

NOTE: Make sure there are enough shims to obtain measurable end play.

Install original shims with respective quill.

Install bearing quills (C). Install and hand tighten cap screws (B). Release tension on hoist.

Tighten cap screws.

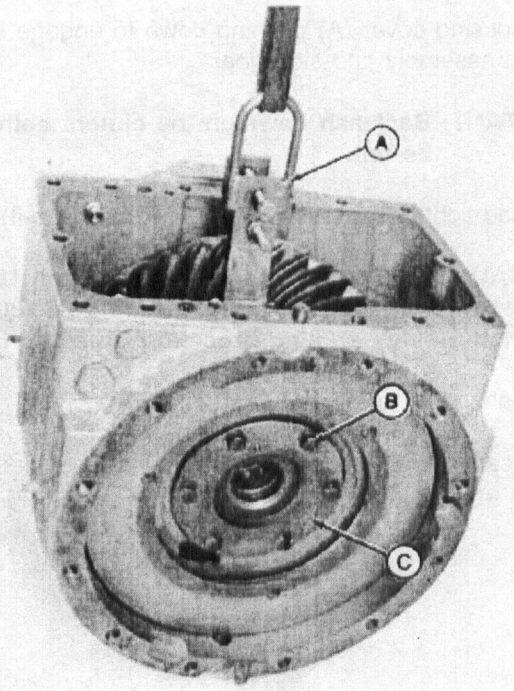
CAP SCREW TORQUE SPECIFICATION

With Washers	90 N·m (66 lb-ft)
Flange Head	125 N·m (92 lb-ft)

Remove lifting tool.

Make the following adjustments when replacing bearing cups, bearing cones, ring gear, spiral bevel shaft, quill or differential case:

- Spiral Bevel
- Cone Point for Tooth Contact Pattern
- Pinion Shaft End Play
- Differential Pre-load
- Differential Backlash



RW18695 -UN-07JAN91

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** See Group 499 for tool fabrication*

RX,4330,47C -19-19DEC97

INSTALL DIFFERENTIAL LOCK LINES

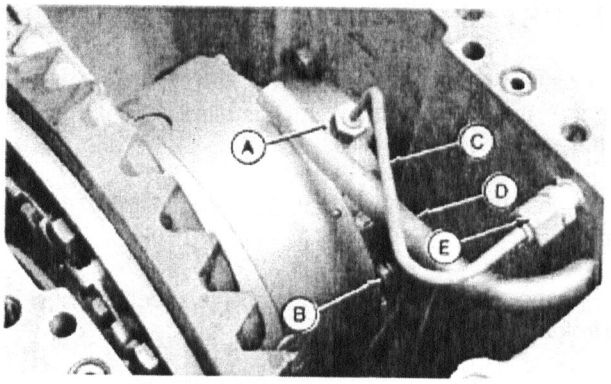
Install tube (D) making sure the tube does not rub on the differential housing.

Tighten cap screw (B).

Install line (C).

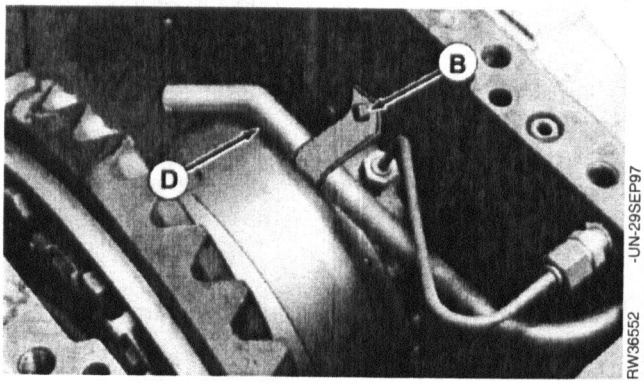
Tighten fittings (A) and (E).

A—Fitting
B—Cap Screw
C—Oil Line
D—Tube
E—Fitting



RW18694 -UN-07JAN91

Air Boost Tube



RW36552 -UN-29SEP97

Suction Tube

RX,4330,48C -19-19DEC97

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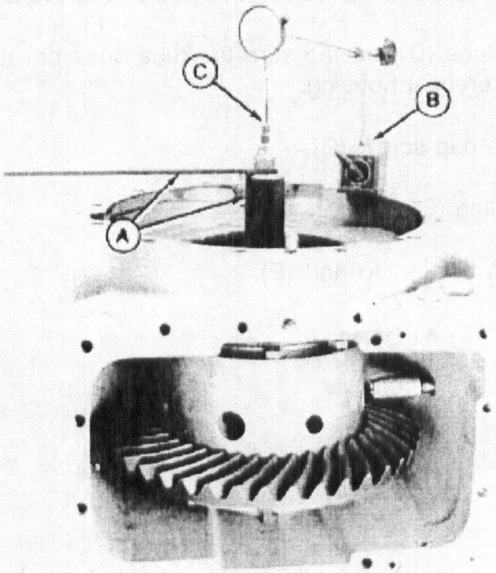
ADJUST DIFFERENTIAL BEARING PRELOAD



RW20770 -UN-18FEB92

1. Position differential assembly with ring gear down, without the input pinion shaft installed. (Centerline of differential housing vertical.)

2. Install JDG712A Backlash Tool (A) in the differential housing.

3. Rotate the differential housing six revolutions in order to roll in the bearings.

4. Install a dial indicator and magnetic base (B) with indicator extension resting (C) on top of the backlash tool.

5. Force the differential housing up and down noting the amount of end play.

NOTE: Shims are available in various sizes. (See Parts Catalog). Measure shims individually for accurate measurement.

IMPORTANT: Preload is required on the differential housing bearings.

6. Deduct shims from bearing quill to obtain 0.05—0.13 mm (0.002—0.005 in.) bearing preload.

EXAMPLE

Step 5	0.152 mm	Measured End Play
Step 6	+ 0.102 mm	Specified Preload
Step 7	= 0.254 mm	Shim Pack Thickness

7. Install bearing quill and shim pack determined in Step 6 and tighten cap screws.

TORQUE SPECIFICATION

Bearing Quill Cap Screw
- With Washers . . . . . 90 N·m (66 lb-ft)
- Flange Head Cap Screw . . . . . 125 N·m (92 lb-ft)

8. Adjust differential backlash. (See Adjust Differential Backlash, this group.)

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RX,4330,49C -19-07JAN98

ADJUST DIFFERENTIAL BACKLASH

IMPORTANT: Differential side bearing preload must be established before setting differential backlash.

1. Install input pinion shaft assembly.

2. Position differential assembly in upright position. Centerline of differential housing should be horizontal.

3. Install JDG712A Backlash Tool (A) on the ring gear side of the differential housing assembly.

4. Rotate the differential housing until a ring gear cap screw is positioned behind cast slot (B) in differential case.

NOTE: The JDG712A Backlash Tool contains marks to indicate where to place the dial indicator for 1200 and 1400 Series Axles. These marks represent the outside diameter of the ring gear.

5. Install indicator (C) on the differential ring gear side. Indicator extension must rest on the appropriate axle marking (D).

6. Retain the input yoke, using a cap screw (E) through the yoke against a spacer block (F) resting against the input shaft quill.

7. Rotate the differential housing back and forth using a pry bar against the ring gear cap screw in the cast slot. Measure the backlash between the spiral bevel ring gear and the input pinion shaft bevel gear. Measure in three locations 120° apart. Average the three readings.

DIFFERENTIAL BACKLASH SPECIFICATION

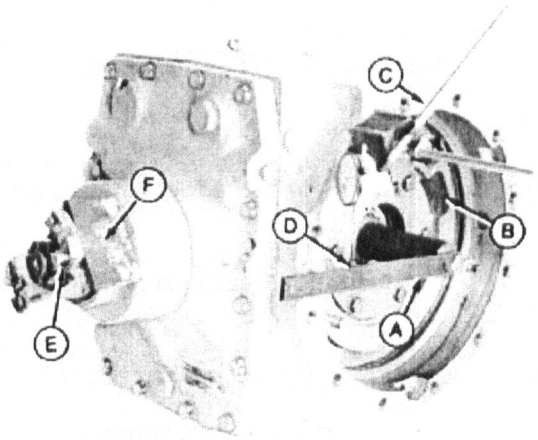
Bevel Pinion-to-Spiral Bevel Gear	0.19—0.39 mm (0.007—0.015 in.)

NOTE: To increase backlash move shims to side quill closest to ring. To decrease, move shims from side quill closest to ring gear.

8. Tighten the differential bearing quill-to-case cap screws after bearing preload and backlash is correctly adjusted.

TORQUE SPECIFICATION

Bearing Quill Cap Screw:	
With Washers	90 N·m (66 lb-ft)
Flange Head Cap Screw	125 N·m (92 lb-ft)



RW20771 -UN-18FEB92

A—JDG712A Backlash Tool
B—Cast Slot
C—Dial Indicator and Magnetic Base
D—Pointer Extension on Tool Bar
E—Cap Screw
F—Spacer Block

RX,4330,50C -19-07JAN98

INSTALL HOUSING/COVER

Clean housing/cover (B) and differential case adjoining surfaces. (See Sealing Instructions, Group 10.)

Remove jack screws from holes (C).

Check to make sure the two dowel pins are pressed into housing/cover.

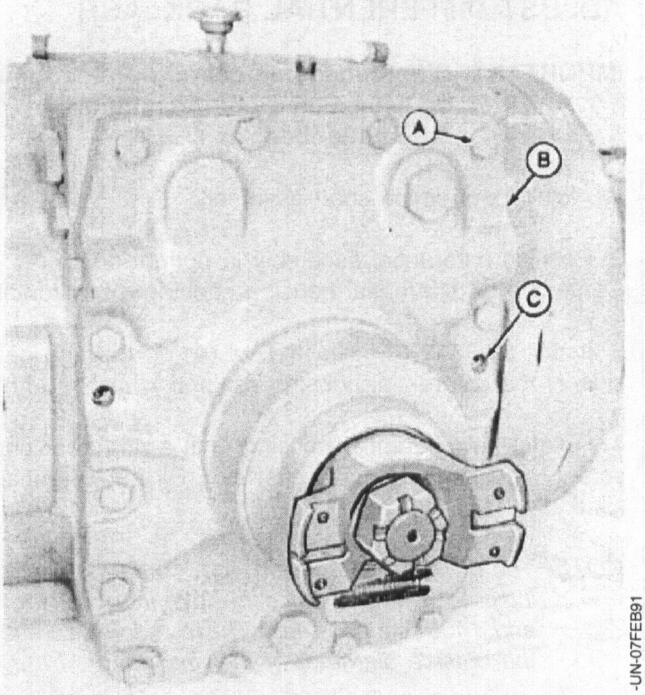
Apply T43513* Gasket to sealing surface of differential case.

Install housing/cover. Tighten cap screws (A).

TORQUE SPECIFICATIONS

1200 Series M12 Cap Screw	165 N·m (122 lb-ft)
1200 Series M16 Cap Screw	310 N·m (122 lb-ft)
1400 Series	310 N·m (229 lb-ft)

** See Group 10—Cross-Reference Chart for Canadian and Loctite Product Numbers*



RW18730 -UN-07FEB91

RX,4330,51C -19-07JAN98

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ESSENTIAL OR RECOMMENDED TOOLS

NOTE: Order tools from the U.S. SERVICE-GARD™ or European Microfiche Tool Catalogs.

ESSENTIAL TOOLS listed are required to perform the job correctly and are obtainable **only** from *SERVICE-GARD* or *European Tool Catalogs.*

RECOMMENDED TOOLS, as noted, are suggested to perform the job correctly. Some tools may be available from local suppliers or may be fabricated.

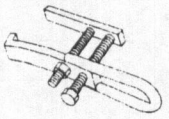
RX,TOOLS -19-21APR94

Differential Lifting Tool DFRW7*

Removing and installing differential

** RECOMMENDED TOOL—See Group 499 for tool fabrication*

RW25335 -UN-21DEC94



RX,DFRW7A,CTM -19-05JAN95

Special Mounting Brackets JDG19

Remove and install components

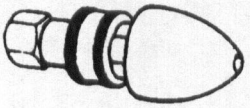
RW25560 -UN-29AUG96

RX,JDG19 -19-29AUG96

Air Test Plug JDG185

Test differential lock quill

T6557CI -UN-01NOV88

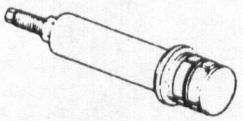


RX,JDG185A -19-25FEB92

Rolling Torque Tool with Backlash Bar JDG712A

Measure rolling drag (torque) and backlash

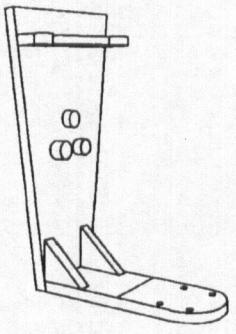
RW18963 -UN-24FEB92



RX,JDG712A -19-27MAR97

Axle Support Bracket JDG927*

Support axle assembly, using D05223ST rollover stand, during disassembly, adjustment, and assembly



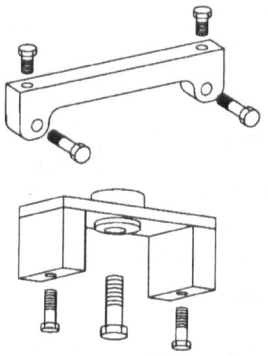
RW25374 -UN-17MAY95

** RECOMMENDED TOOL*

RX,JDG927 -19-11MAY95

Axle Support Bracket Adapter Set JDG984*

Support axle during repair



RW25416 -UN-25APR96

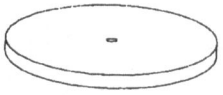
* *RECOMMENDED TOOL—Used with JDG927*

RX,JDG984 -19-26MAR96

RW25359 -UN-17MAY95

Driver Disk (5 in.) JDG987*

Install bearing cups



* *RECOMMENDED TOOL*

RX,JDG987 -19-29MAR96

OTHER MATERIAL

Number	Name	Use
TY15435	Epoxy	Lock threads
TY6304	Flexible Form-in-Place Gasket	Seal joints
TY16285	Cure Primer	Speed cure of liquid gasket

See Group 10—Cross-Reference Chart for Canadian and Loctite Product Numbers

RX,4331,1C -19-19DEC97

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SPECIFICATIONS

Item	Measurement	Specification
Baffle-to-Case Cap Screw	Torque	35 N·m (26 lb-ft)
Ring Gear Cap Screw	Torque	290 N·m (220 lb-ft)
Differential Cover-to-Differential Housing Cap Screw	Torque	183 N·m (135 lb-ft)
Cover-to-Case Cap Screw	Torque	310 N·m (228 lb-ft)
Differential Lock Cover-to-Differential Housing Cap Screw	Torque	95 N·m (70 lb-ft)
Differential Side Bearing Quill Cap Screws	Torque	125 N·m (92 lb-ft)
Input Housing/Differential Case Cover Cap Screw	Torque	310 N·m (229 lb-ft)
Breather Tube-to-Case	Torque	13 N·m (9 lb-ft)
Air Boost Check Valve	Torque	1.4 N·m (12 lb-in.)
Differential Lock Connector-to-Case	Torque	15 N·m (11 lb-ft)
Differential Lock Connector-to-Bearing Quill	Torque	13 N·m (9 lb-ft)
Differential Lock Oil Line Connectors	Torque	16 N·m (12 lb-ft)
Bleed Screw Bushings-to-Case	Torque	34 N·m (25 lb-ft)
Bleed Screw-to-Bushing	Torque	15 N·m (11 lb-ft)
Differential Housing	Pre-load	0.05—0.13 mm (0.002—0.005 in.)
Bevel Pinion-to-Spiral Bevel Gear	Backlash	0.19—0.39 mm (0.007—0.015 in.)
Differential Lock Disk	Thickness (New) Groove Depth (New)	3.31 mm (0.130 in.) 0.20—0.46 mm (0.008—0.018 in.)
Disk and Plates	Warpage (Maximum)	0.25 mm (0.010 in.)

Continued on next page

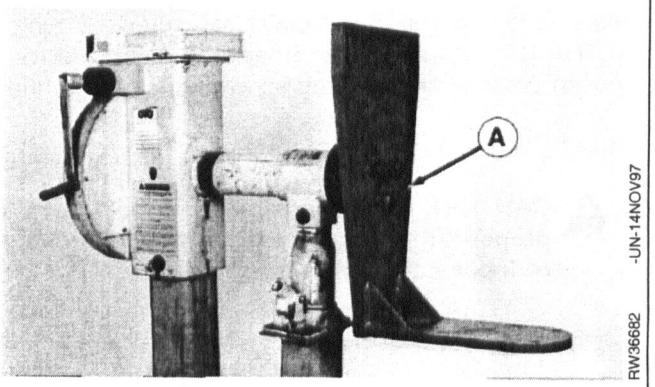
Item	Measurement	Specification
Differential Lock Return Spring	Free Length (approximate) Test Length	40.6 mm (1.6 in.) 28.7 mm at 100—125 N (1.1 in. at 22.5—27.5 lb force)

RX,4331,2C -19-19DEC97

INSTALL DIFFERENTIAL CASE ASSEMBLY IN REPAIR STAND

Remove axle from vehicle.

Install JDG927 Support Bracket (A) to D05223ST Engine Rollover Stand.

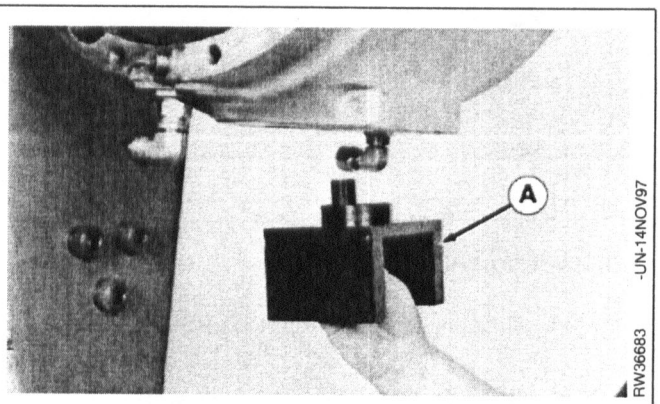


RX,4331,3C -19-19DEC97

Attach lift brackets, strap, and hoist to differential case assembly.

Remove fitting from center recessed area.

Raise assembly and install JDG984 Adapter (A) to the differential case.



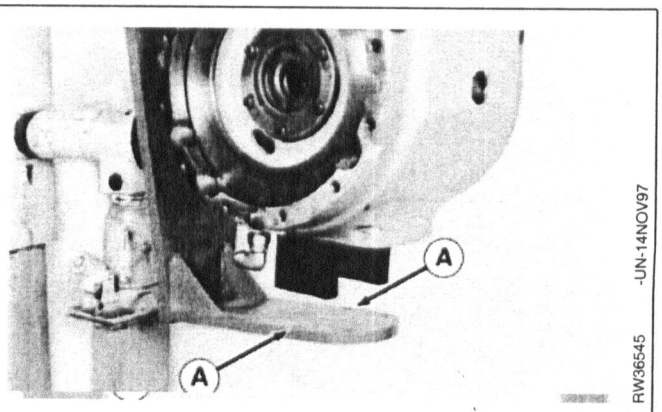
RX,4331,4C -19-19DEC97

Install the differential case assembly to the support bracket.

Install the support bracket adapter-to-support bracket cap screws using bracket holes (A).

CAUTION: Once the supporting hoist is disconnected, DO NOT rotate the differential case assembly in the rollover stand.

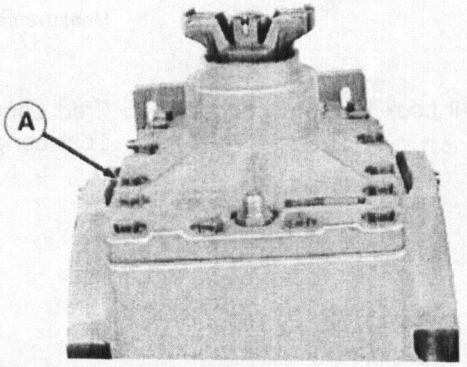
Remove chains, strap, and lift brackets.



RX,4331,5C -19-19DEC97

REMOVE INPUT HOUSING/COVER

Remove 15 cap screws (A).

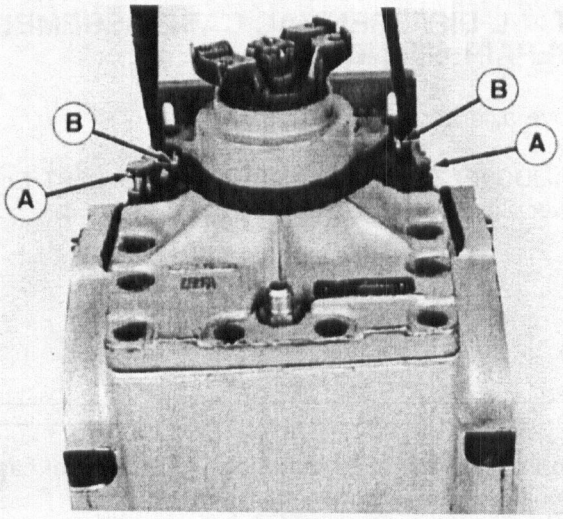


RX,4331,6C -19-19DEC97

Install and turn one of the cover cap screws (A) into JDG19 Lift Brackets (B) and holes on each side to loosen cover seal. Turn cap screws until seal is broken.

Install lifting strap to lift brackets.

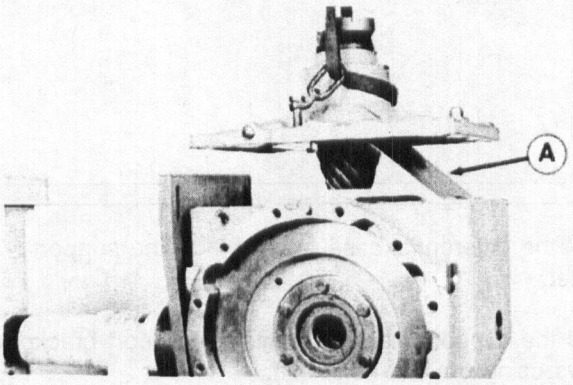
CAUTION: Avoid possible personal injury. Use proper lifting equipment. Approximate weight of input housing is 49 kg (110 lb).



RX,4331,7C -19-08JAN98

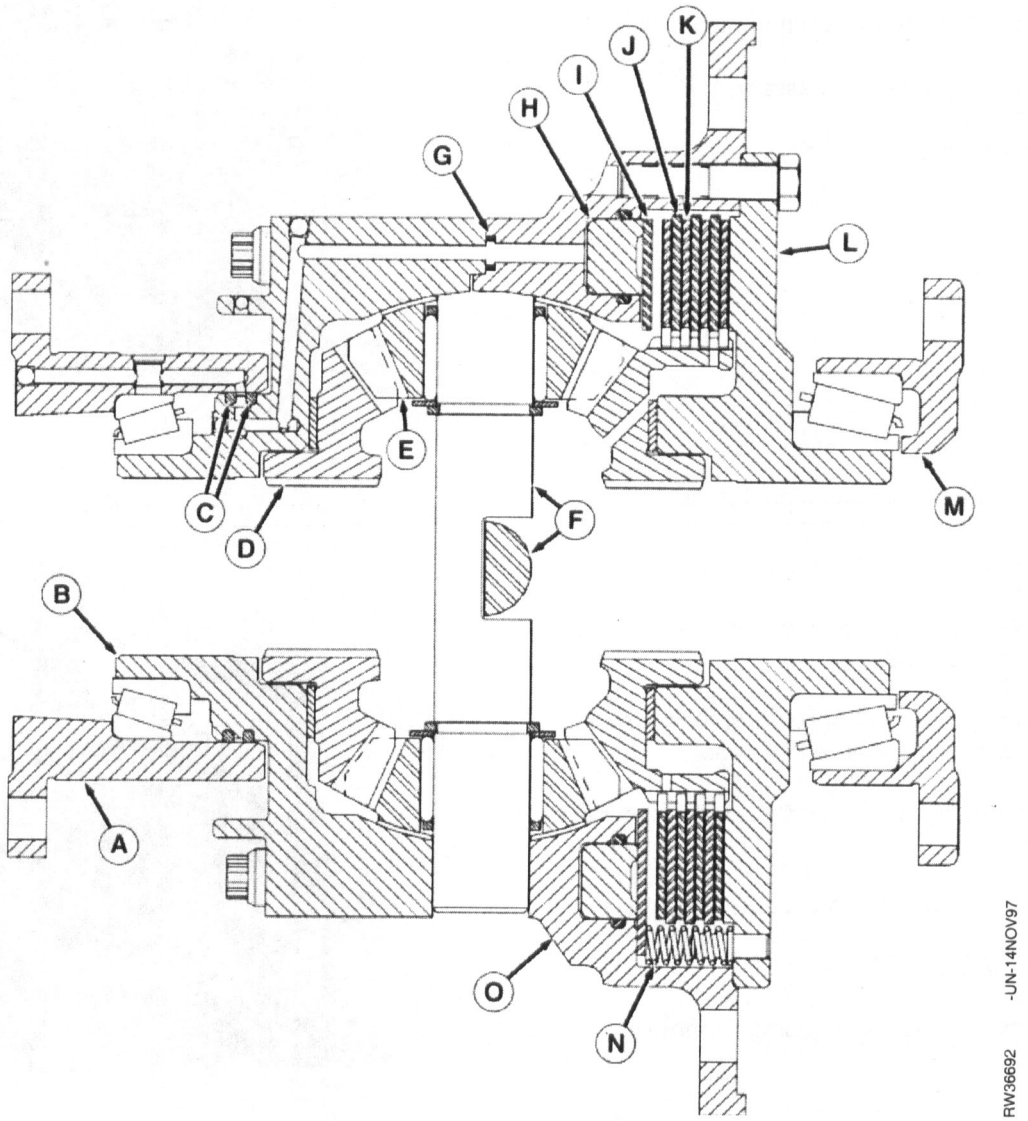
Lift cover from differential case.

Remove oil baffle (A) from input housing/cover.



RX,4331,8C -19-19DEC97

CROSS-SECTIONAL VIEW—*DIFFERENTIAL ASSEMBLY WITH DIFFERENTIAL LOCK*



A—Bearing Quill
B—Differential Housing
C—Sealing Rings
D—Bevel Gear
E—Bevel Pinion (4 used)
F—Bevel Pinion Shaft (2 used)
G—Packing
H—Piston
I—Piston Return Plate
J—Disk (4 used)
K—Separator Plate (3 used)
L—Differential Housing Cover
M—Bearing Quill
N—Return Spring (3 used)
O—Differential Housing with Lock

RX,4331,9C -19-19DEC97

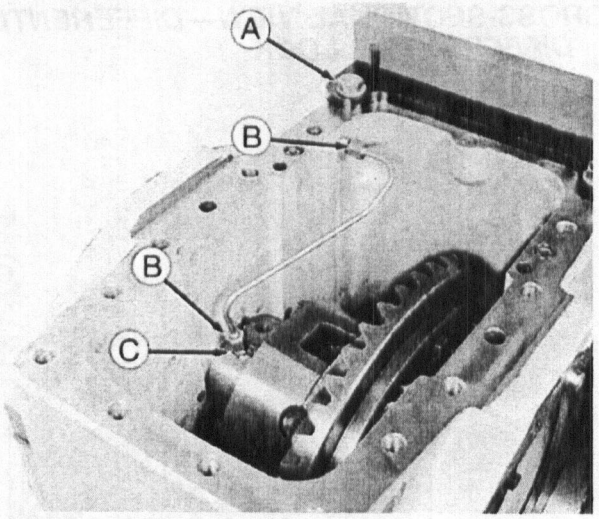
REMOVE DIFFERENTIAL ASSEMBLY

Install JDG984 Support Bracket Adapter (A).

Remove fittings (B) to remove differential lock oil line.

Inspect O-rings. Replace if necessary.

Remove adapter (C).



RX,4331,10C -19-19DEC97

Install DFRW7* Lifting Tool (A) and hoist.

Raise differential housing assembly enough to relieve weight on bearing quills.

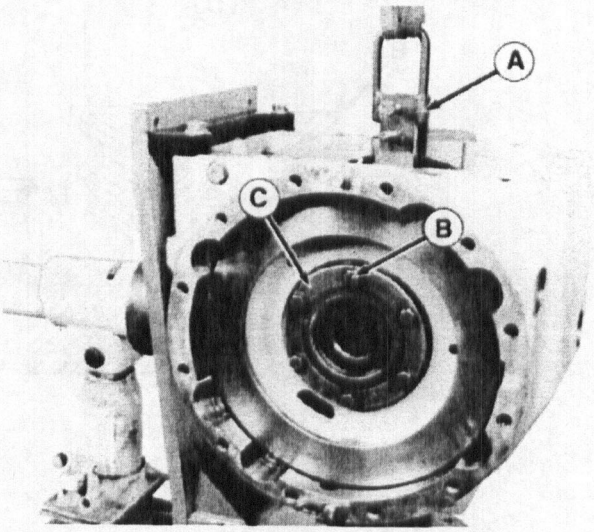
NOTE: Top cap screws (B) on both quills have nuts on the inside of the differential case.

Remove six cap screws from each side to remove bearing quills.

NOTE: Keep shims with respective bearing quill.

Remove bearing quills (C).

Carefully remove differential housing assembly.



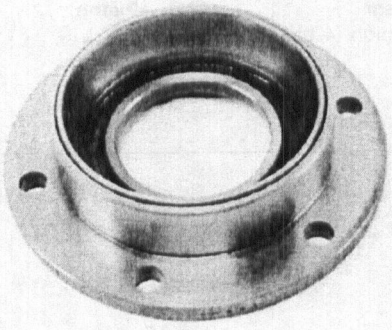
** See Group 499 for tool fabrication*

RX,4331,11C -19-19DEC97

Inspect ring gear side bearing quill and cup.

Remove cup and replace as necessary.

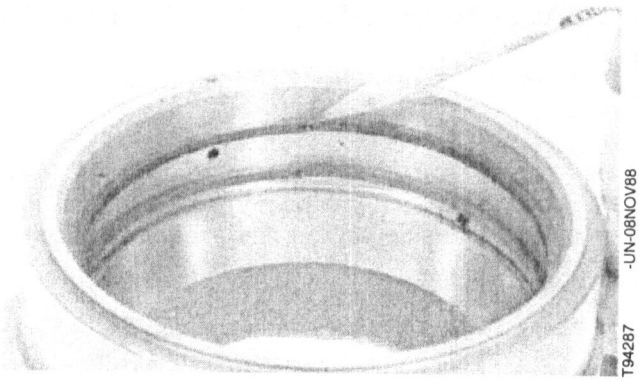
Install cup in quill tight to bottom of bore, using JDG987 Disk (5 in.).



RX,4331,12C -19-19DEC97

Inspect sealing ring patterns in differential lock quill for skips, nicks, or scratches.

Temporarily install sealing rings. Be sure a gap is between locks on ends of sealing rings. Install new rings if no gap is present. Check new rings for gap. Replace quill if no gap is present.



RX,4331,13C -19-19DEC97

DISASSEMBLE, ASSEMBLE, AND TEST DIFFERENTIAL LOCK QUILL

Remove and replace bearing cup as necessary.

IMPORTANT: Inspect for leakage whenever bearing quill and/or cup is replaced.

Remove old sealant material from quill bore using chlorethane, lacquer thinner or equivalent. Avoid handling cleaned surfaces.

Apply TY16285* Cure Primer to cup. Allow three minutes for primer to dry.

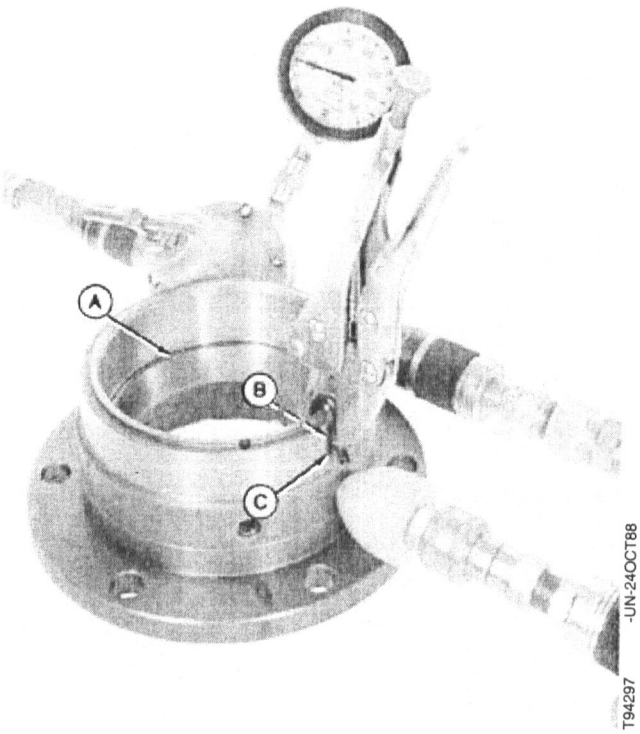
Apply TY6304* Gasket to quill bore where drilled holes break into bore.

Install bearing cup (A) tight against quill shoulder using a 4-3/8 in. driver disk. Allow 30 minutes for liquid gasket to cure before test.

Test for leakage around pressure (inlet) passage. Block passage (B) using a piece of a large O-ring and a pair of locking pliers.

Apply clean hydraulic oil around bearing cup. Check for air leakage using a JDG185 Air Test Plug and 100 kPa (14.5 psi) minimum pressure. If leakage is present, replace bearing cup and/or quill.

NOTE: If bearing quill requires replacement, the new quill will have the bearing cup already installed and sealed.



** See Group 10—Cross-Reference Chart for Canadian and Loctite Product Numbers*

RX,4331,14C -19-07JAN98

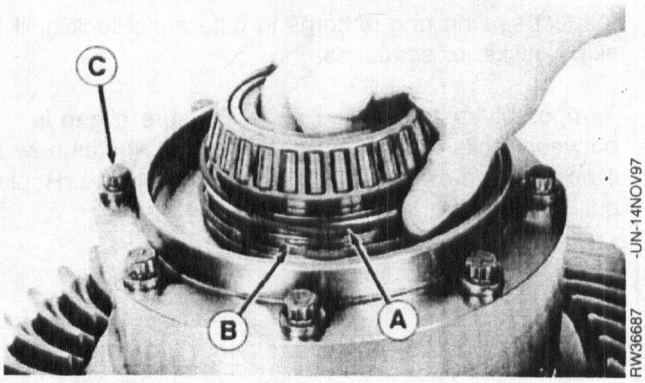
DISASSEMBLE DIFFERENTIAL HOUSING

Remove sealing rings (A). Open the rings slightly to remove or install.

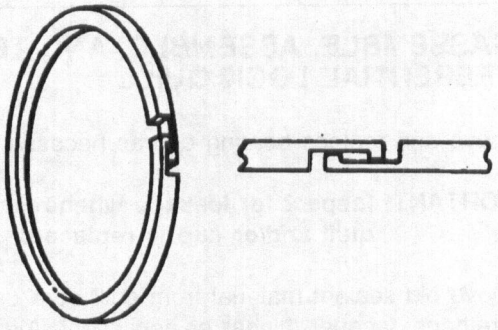
Inspect sealing rings for scratches or grooves. Inspect the locks (B) on the ends of rings. Inspect sealing ring grooves. Make sure sealing ring ends are correctly locked together.

Remove housing assembly cap screws (C).

Remove differential housing.



RW36687 -UN-14NOV97



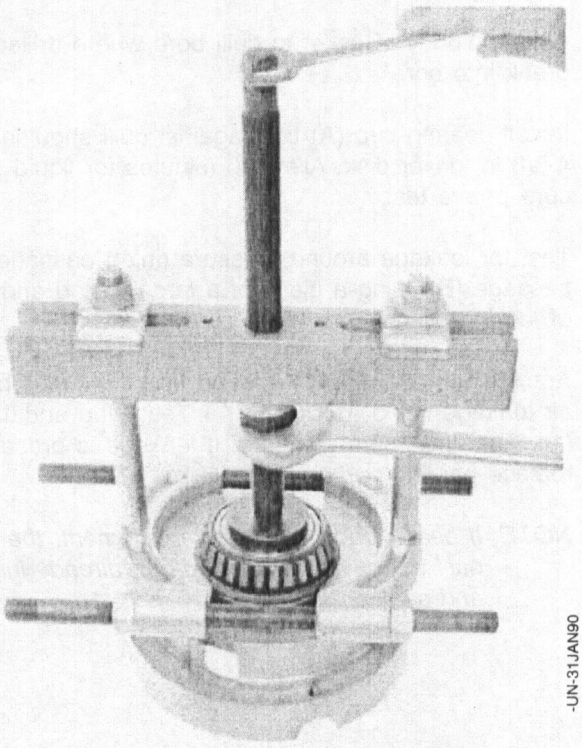
R39894 -UN-10SEP90

RX,4331,15C -19-19DEC97

Inspect bearing cone.

Remove bearing cone, using a bearing puller.

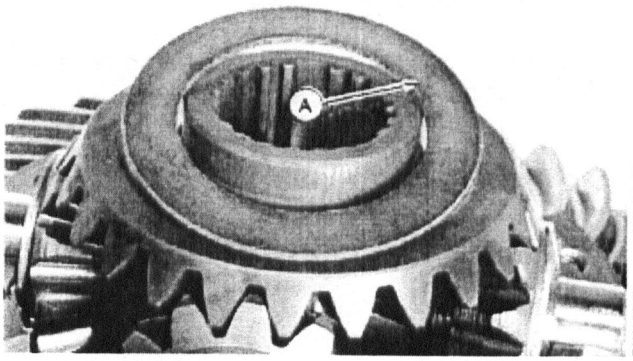
Install new bearing cone using a 3-3/8 in. driver disk.



T94283 -UN-31JAN90

RX,4331,16C -19-19DEC97

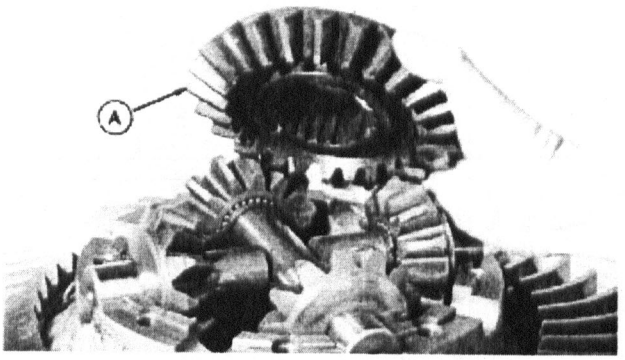
Inspect bevel thrust washer (A).

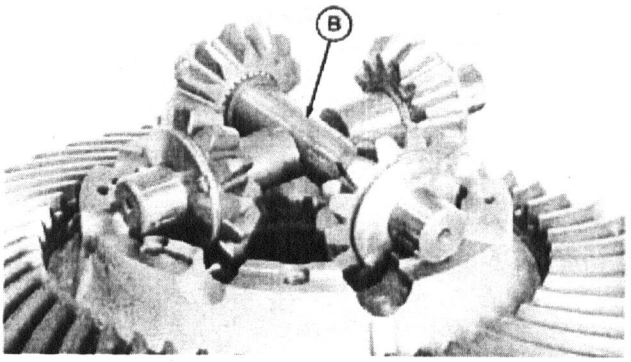


RX,4331,17C -19-19DEC97

Remove and inspect bevel gear (A).

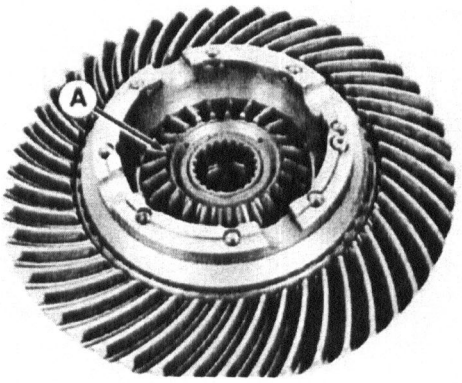
Remove pinion set (B) as a unit.





RX,4331,18C -19-19DEC97

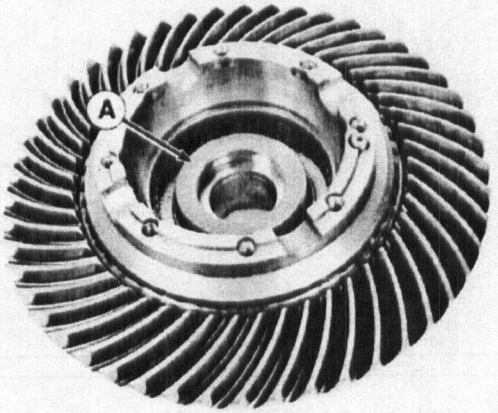
Remove and inspect bevel lock gear (A).



RX,4331,19C -19-19DEC97

Remove and inspect thrust washer (A).

NOTE: The thrust washer may stick to the bevel lock gear as it is removed.

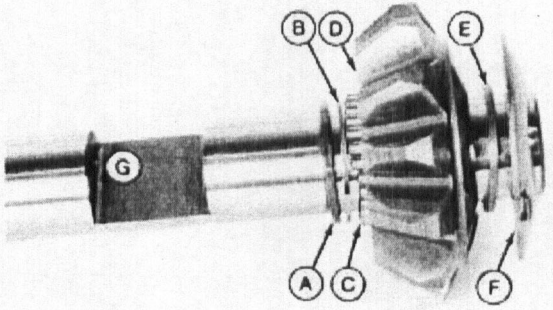


RW36689 -UN-14NOV97

RX,4331,20C -19-19DEC97

Inspect parts (A—G).

A—Snap Ring
B—Bearing Thrust Washer
C—Roller Bearings
D—Pinion
E—Bearing Thrust Washer
F—Pinion Thrust Washer
G—Pinion Shaft



RW13233 -UN-16APR90

RX,4331,21C -19-19DEC97

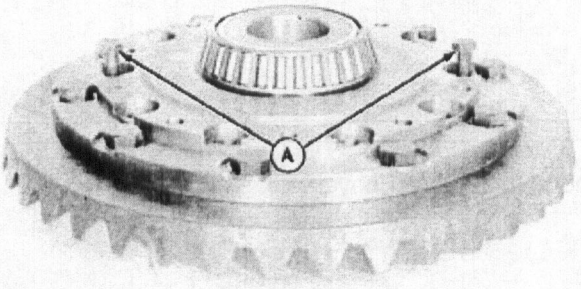
Put ring gear side of housing assembly on work bench.

Remove inner cap screws (A).

Remove cover.

Inspect cover bearing cone and remove and replace as necessary.

Install new cone using 3-9/16 in. driver disk.



R40107 -UN-23JAN90

RX,4331,22C -19-07JAN98

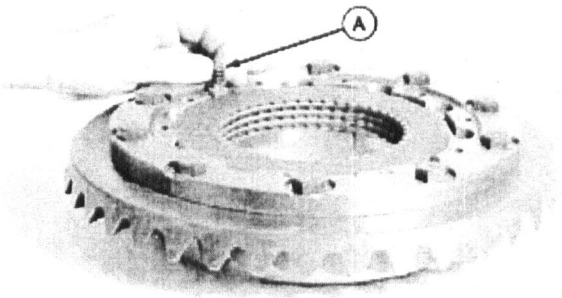
Remove piston return springs (A).

Install **NEW** spring pins (B) in cover so end of pin is flush with the outer surface of the cover, if necessary to remove spring pins.

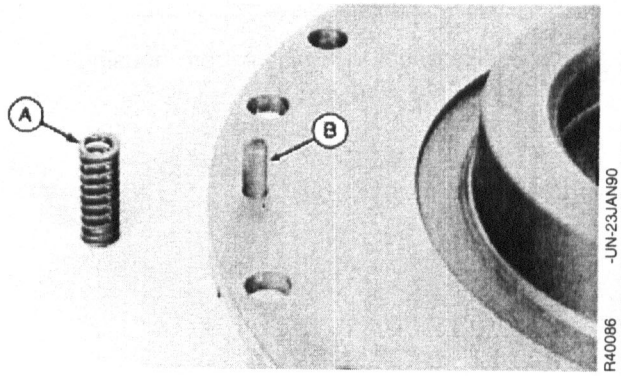
Inspect and test springs as necessary.

NEW SPRING SPECIFICATION

Free Length (approximate)	40.6 mm (1.6 in.)
Test Length	28.7 mm at 100—125 N (1.1 in. at 23—28 lb force)



RW13222 -UN-16APR90



R40086 -UN-23JAN90

RX,4331,23C -19-19DEC97

Remove disks, plates, and piston return plate.

Inspect disks (A). Replace if:

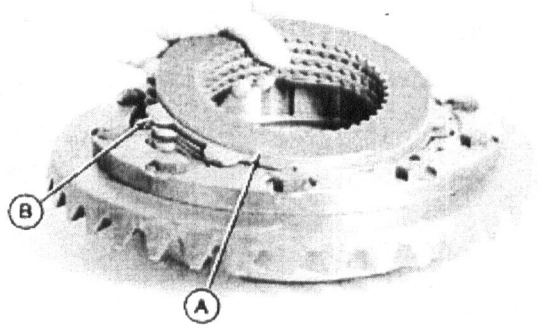
- Peening is evident or splines have backlash
- Warping or coning exceeds 0.25 mm (0.010 in.)
- Friction material is burned, flaked, or pitted
- Friction material is worn to bottom of grooves

DISK SPECIFICATION

Thickness (New)	3.31 mm (0.130 in.)
Groove Depth (New)	0.20—0.46 mm (0.008—0.018 in.)

Inspect separator plates (B). Replace if:

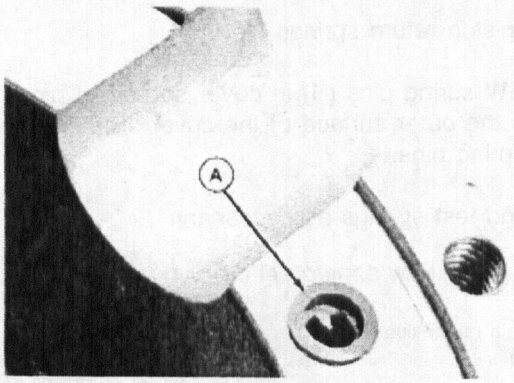
- Scored or galled
- Tangs are worn or damaged
- Warpage or coning exceeds 0.25 mm (0.010 in.)



RW13223 -UN-16APR90

RX,4331,24C -19-07JAN98

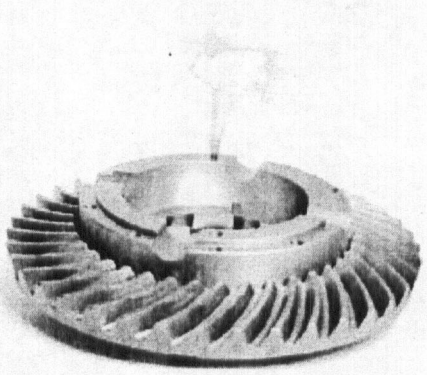
Inspect piston inlet seal (A). Hold in position with petroleum jelly.



RW13224 -UN-16APR90

RX,4331,25C -19-19DEC97

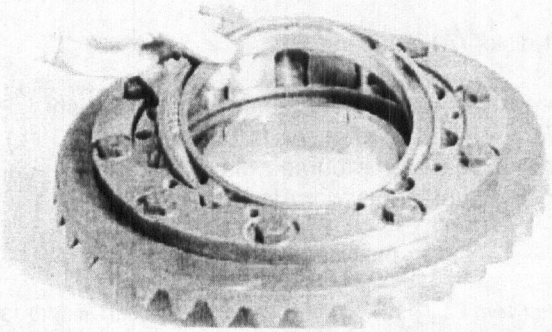
Remove differential lock piston from housing using a JDG185 Air Test Plug.



RW13225 -UN-16APR90

RX,4331,26C -19-19DEC97

Inspect piston for nicks or scratches.

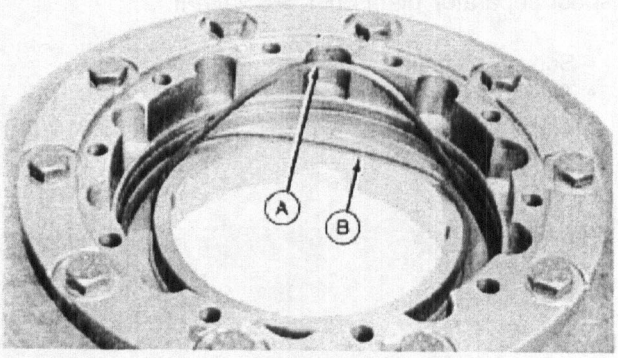


RW13226 -UN-19APR90

RX,4331,27C -19-19DEC97

Remove and inspect seals (A) and (B) in piston bore. Coat with a light oil or petroleum jelly.

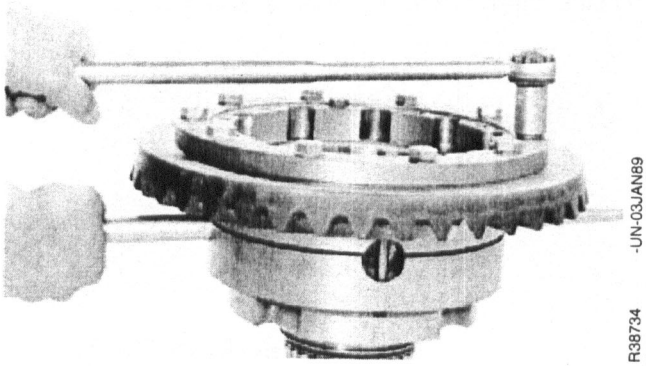
Coat piston with light oil or petroleum jelly. Install piston. Tap piston gently to avoid bending piston in bore.



RW13227 -UN-16APR90

RX,4331,28C -19-19DEC97

REMOVE AND INSTALL RING GEAR



IMPORTANT: The bevel drive gear and shaft must be replaced as a matched set.

Install pry bar in pinion shaft bore by removing bevel pinion assembly. This will aid in cap screw removal.

Remove ring gear cap screws.

IMPORTANT: DO NOT use a petroleum base solvent to degrease cap screws and ring gear.

Clean cap screws and threaded holes in ring gear using lacquer thinner or chlorethane if ring gear is to be reused.

CAUTION: Heat parts in a bearing heater. Use a thermometer and do not exceed 150°C (300°F). Plan a safe handling procedure to avoid burns.

Heat ring gear to maximum 150°C (300°F).

Install gear on housing with cap screw holes aligned.

Apply TY15435* Epoxy to lower 19.0 mm (0.75 in.) of cap screw threads.

Install cap screws and tighten in criss-cross pattern. Repeat tightening pattern three times.

RING GEAR CAP SCREW SPECIFICATION

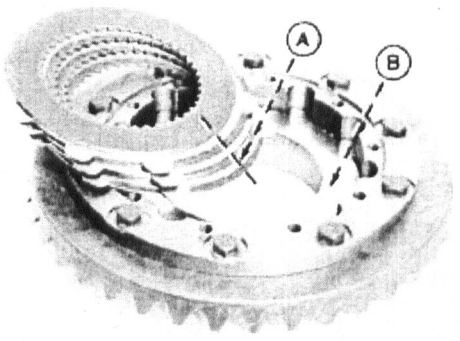
Torque . . . . . 290 N·m (214 lb-ft)

31
14

** See Group 10—Cross-Reference Chart for Canadian and Loctite Product Numbers*

RX,4331,29C -19-07JAN98

ASSEMBLE DIFFERENTIAL HOUSING ASSEMBLY

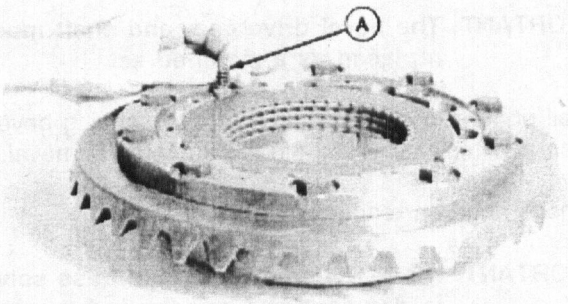


Install the piston return plate (B).

Alternately install plates and disks (A) beginning with a disk against the piston return plate (B).

RX,4331,30C -19-19DEC97

Install three piston return springs (A).



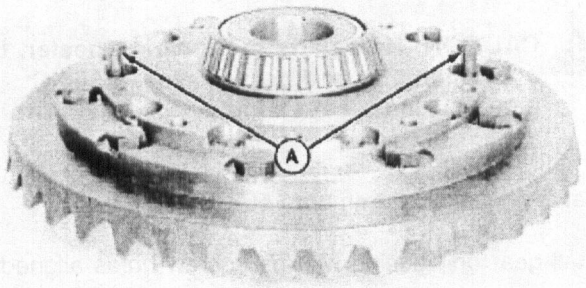
RW13222 -UN-16APR90

RX,4331,31C -19-19DEC97

Install the differential cover making sure the dowel pins fit into the piston return springs.

Install two cap screws (A) to align cap screw holes.

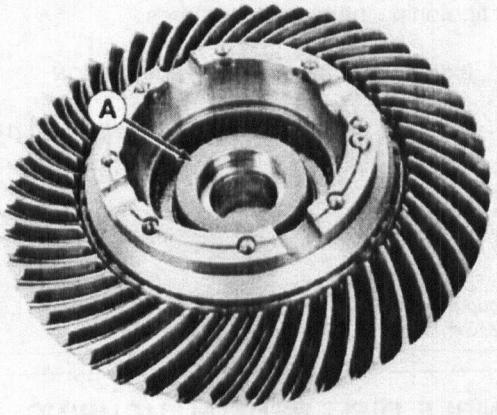
Tap cover down into housing. Install and tighten cap screws to 95 N·m (70 lb-ft).



R40107 -UN-23JAN90

RX,4331,32C -19-19DEC97

Install thrust washer (A).

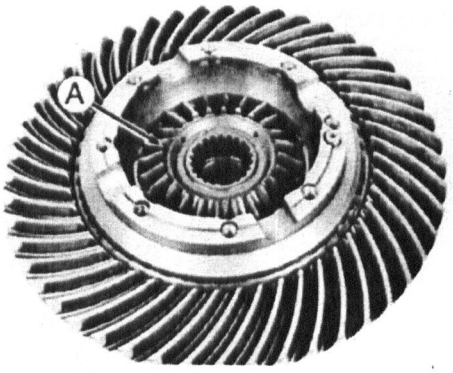


RW36689 -UN-14NOV97

RX,4331,33C -19-19DEC97

Install bevel lock gear (A) guiding the splines on the bevel lock gear through the splines on the clutch disks.

Make sure the gear is seated on the thrust washer and the bevel lock gear is past all of the disks.

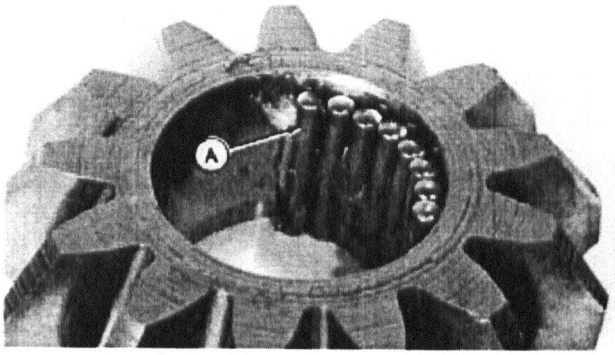


RW35818A -UN-21JUL97

RX,4331,34C -19-19DEC97

NOTE: Roller bearings (A) must be replaced as a set.

Install roller bearing set (A) using petroleum jelly to hold bearings in position.

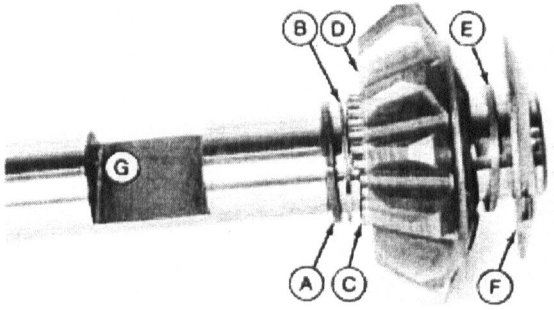


RW13234 -UN-16APR90

RX,4331,35C -19-19DEC97

Assemble pinion shafts.

A—Snap Ring
B—Bearing Thrust Washer
C—Roller Bearings
D—Pinion
E—Bearing Thrust Washer
F—Pinion Thrust Washer
G—Pinion Shaft

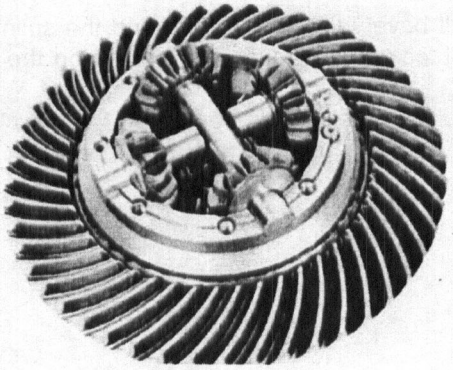


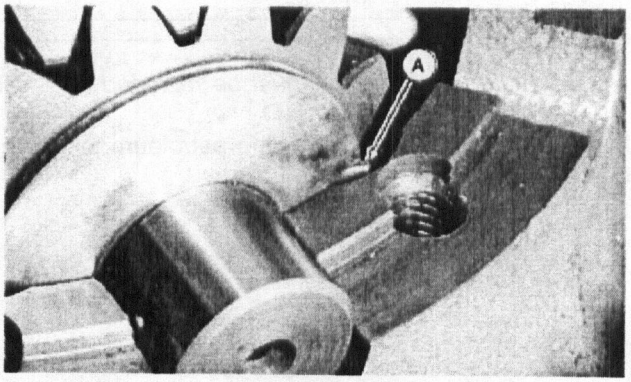
RW13233 -UN-16APR90

RX,4331,36C -19-19DEC97

Install pinion shaft assembly.

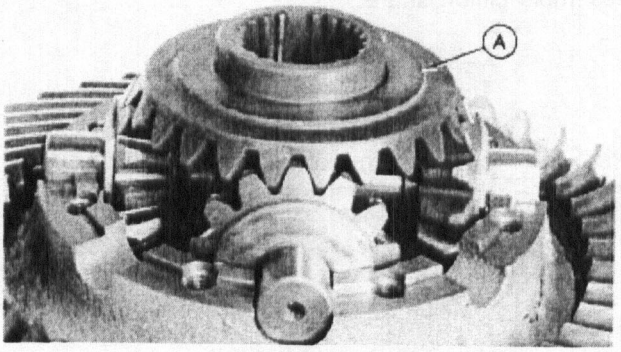
Align tangs (A) on each pinion thrust washer with differential housing slots.





RX,4331,37C -19-19DEC97

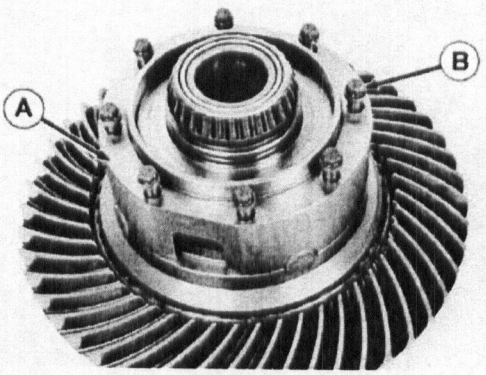
Install bevel gear with thrust washer (A).



RX,4331,38C -19-19DEC97

Install differential housing (A) to differential cover.

Install and tighten cap screws (B) to 183 N·m (135 lb-ft).



RX,4331,39C -19-19DEC97

INSTALL DIFFERENTIAL

IMPORTANT: Install differential for correct forward direction. Carefully lower differential into housing to avoid damaging bearings or seals.

Install DFRW7* Lifting Tool (A) on differential assembly.

Carefully lower differential with quill openings aligned with axle bores.

Install original shims (B) with respective quill.

Install bearing quills (C).

NOTE: Top cap screws (D) on both quills, have nuts on the inside of the differential case.

Install and hand tighten bearing quill retaining cap screws. Release tension on hoist.

Tighten cap screws.

TORQUE SPECIFICATION

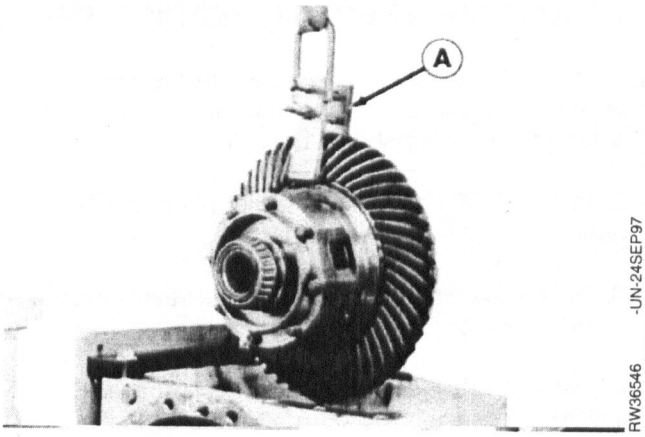
Bearing Quill Cap Screw	125 N·m (92 lb-ft)

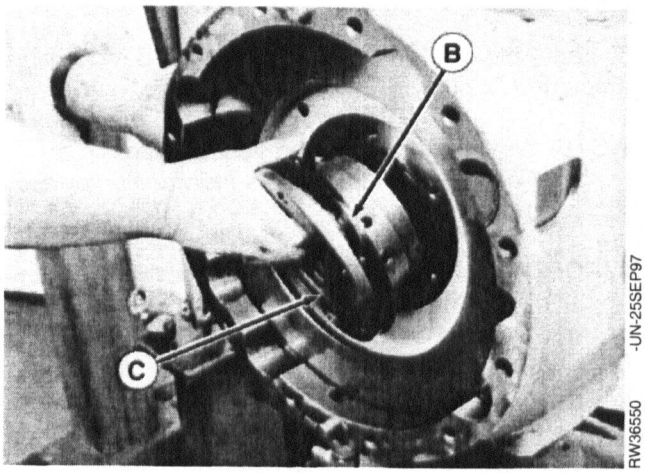
Remove lifting tool.

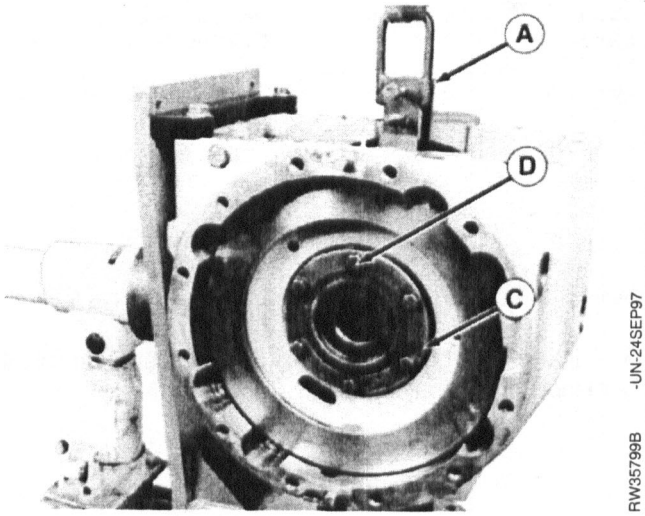
Make the following adjustments when replacing bearing cups, bearing cones, ring gear, spiral bevel shaft, quill or differential case:

- Spiral Bevel
- Cone Point for Tooth Contact Pattern
- Pinion Shaft End Play
- Differential Pre-load
- Differential Backlash

A—Lifting Tool
B—Bearing Quill Shims
C—Bearing Quill
D—Top Bearing Quill Retaining Cap Screws (Nuts on Inside)



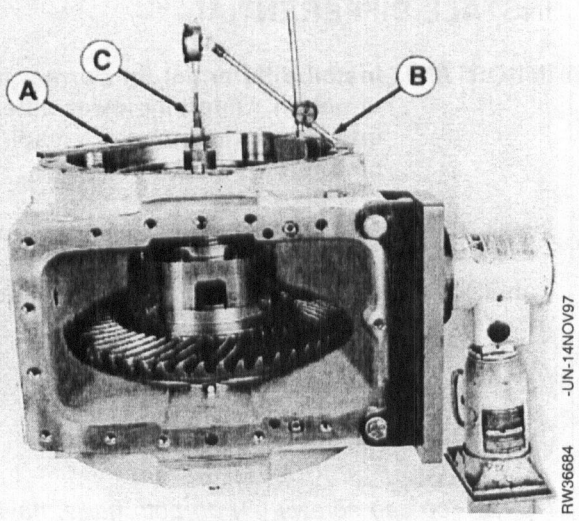




** See Group 499 for tool fabrication*

RX,4331,40C -19-08JAN98

ADJUST DIFFERENTIAL BEARING PRELOAD



1. Position differential assembly with the ring gear down, without the input pinion shaft installed. Centerline of the differential housing should be vertical.

2. Install JDG712A Backlash Tool (A) in the differential housing.

3. Rotate the differential housing six revolutions in order to roll in the bearings.

4. Install a dial indicator and magnetic base (B) with indicator extension resting (C) on top of the backlash tool.

5. Force the differential housing up and down noting the amount of endplay.

NOTE: Shims are available in various sizes. (See Parts Catalog). Measure shims individually for accurate measurement.

IMPORTANT: Preload is required on the differential housing bearings.

6. Deduct shims from bearing quill to obtain 0.05—0.13 mm (0.002—0.005 in.) bearing preload.

EXAMPLE

Step 5	0.152 mm	Measured End Play
Step 6	+ 0.102 mm	Specified Preload
Step 7	= 0.254 mm	Shim Pack Thickness

7. Install bearing quill and shim pack and tighten cap screws.

TORQUE SPECIFICATION

Bearing Quill Cap Screw . . . . . 125 N·m (92 lb-ft)

8. Adjust differential backlash. (See Adjust Differential Backlash, this group.)

RX,4331,41C -19-07JAN98

INSTALL DIFFERENTIAL LOCK LINES

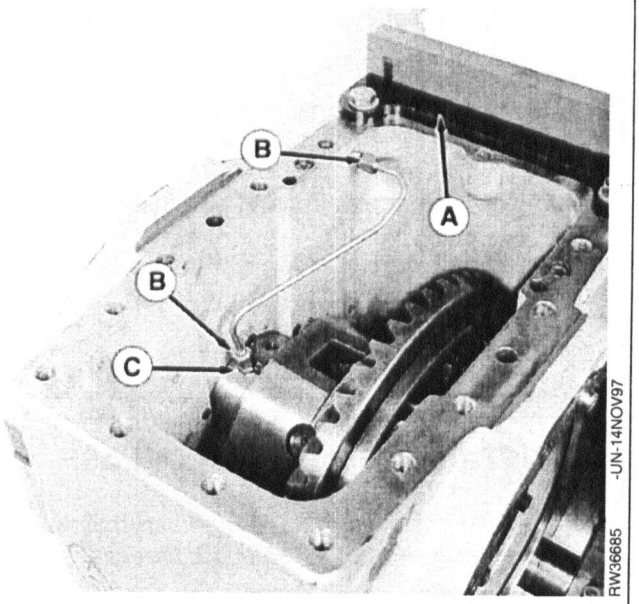
Install adapter (C).

Install line.

Tighten fittings (B).

CAUTION: Once the support bracket is removed, DO NOT rotate the differential case assembly in the rollover stand.

Remove support bracket adapter (A).



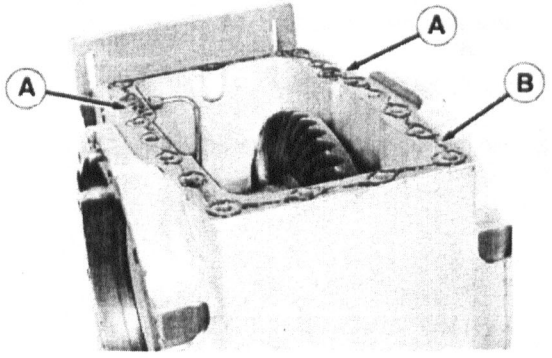
RX,4331,42C -19-19DEC97

INSTALL INPUT HOUSING/COVER

Clean differential case and input housing/cover adjoining surfaces and tapped holes before installation.

Wipe adjoining surfaces with a soft cloth dampened with isopropyl alcohol/water mixture and wipe dry.

Apply TY6304* Gasket (B) to differential case surface and TY16285* Cure Primer to housing/cover adjoining surface. Allow joint between cover and case 30 minutes cure time before adding oil to the assembly.



31
20

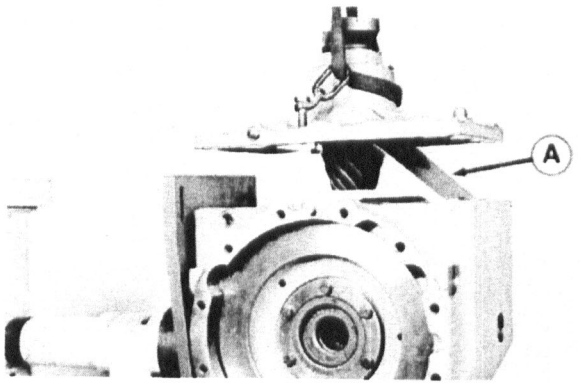
** See Group 10—Cross-Reference Chart for Canadian and Loctite Product Numbers*

RX,4331,43C -19-19DEC97

Install JDG19 Lift Brackets to cover jack screw holes using two of the cover cap screws.

Install oil baffle (A) and tighten cap screws to 35 N·m (26 lb-ft).

Install input housing/cover to differential case.



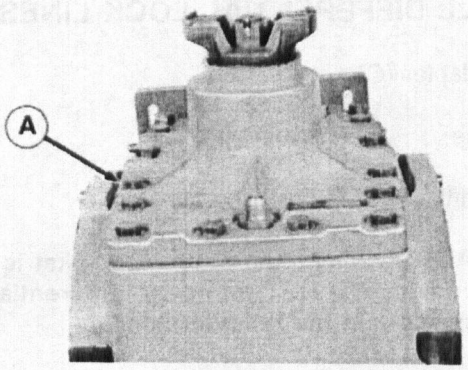
RX,4331,44C -19-19DEC97

Install (15) cap screws (A).

Tighten the cap screws to 310 N·m (228 lb-ft) beginning with the center two cap screws, across from each other and alternately working toward each end.

Remove axle from repair stand and install in machine.

Allow assembly to cure overnight before filling with oil.



RW36690 -UN-14NOV97

RX,4331,45C -19-19DEC97

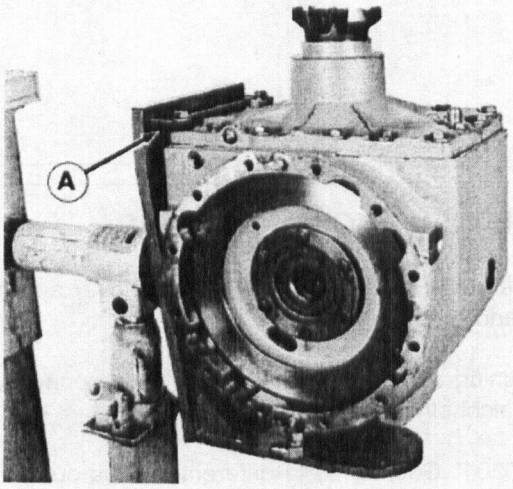
ADJUST DIFFERENTIAL BACKLASH

NOTE: Differential side bearing preload must be established before setting differential backlash.

CAUTION: Make sure the mounting bracket top adapter (A) is installed to prevent the differential case assembly from falling from the rollover stand.

Install input housing/cover.

Install the support bracket top adapter (A).



RW36548 -UN-24SEP97

RX,4331,46C -19-08JAN98

31 21

Turn the differential assembly into upright position. Centerline of the differential housing should be horizontal.

Install JDG712A Backlash Tool (A) on the ring gear side of the differential housing assembly.

Rotate the differential housing until a ring gear cap screw is positioned behind cast slot in differential case.

NOTE: The JDG712A Backlash Tool contains marks to indicate where to place the dial indicator for 1200 and 1400 Series Axles. These marks represent the outside diameter of the ring gear.

Install indicator so the indicator extension rests on the appropriate axle marking (1400) on the backlash tool arm.

Retain the input yoke, using a cap screw (B) through the yoke against a spacer block (C) resting against the input shaft quill.

Rotate the differential housing back and forth using a pry bar against the ring gear cap screw in the cast slot. Measure the backlash between the spiral bevel ring gear and the input pinion shaft bevel gear. Measure in three locations 120° apart. Average the three readings.

DIFFERENTIAL BACKLASH SPECIFICATION

Bevel Pinion-to-Spiral Bevel Gear	0.19—0.39 mm (0.007—0.015 in.)

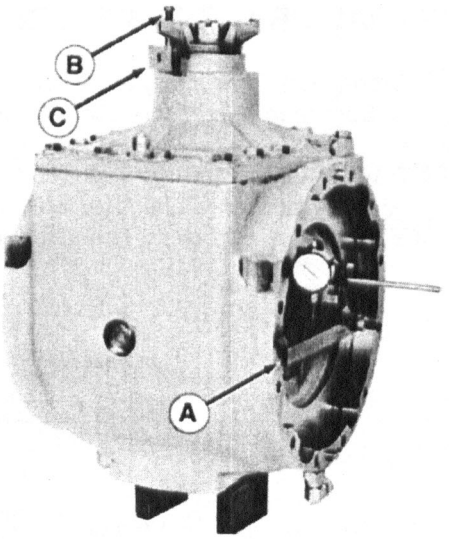
NOTE: To increase backlash move shims to side quill closest to ring. To decrease, move shims from side quill closest to ring gear.

Tighten the differential bearing quill-to-case cap screws after bearing preload and backlash is correctly adjusted.

TORQUE SPECIFICATION

Bearing Quill Cap Screw	125 N·m (92 lb-ft)

Remove the differential case assembly from the repair stand and install in vehicle.



RW36547 -UN-24SEP97

RX,4331,47C -19-07JAN98

ESSENTIAL OR RECOMMENDED TOOLS

NOTE: Order tools from the U.S. SERVICE-GARD™ or European Microfiche Tool Catalogs.

ESSENTIAL TOOLS listed are required to perform the job correctly and are obtainable **only** from *SERVICE-GARD* or *European Tool Catalogs.*

RECOMMENDED TOOLS, as noted, are suggested to perform the job correctly. Some tools may be available from local suppliers or may be fabricated.

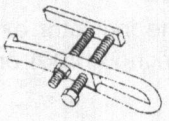
RX,TOOLS -19-21APR94

Differential Lifting Tool DFRW7*

Removing and installing differential

** RECOMMENDED TOOL—See Group 499 for tool fabrication*

RW25335 -UN-21DEC94



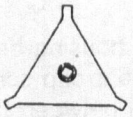
RX,DFRW7A,CTM -19-05JAN95

Differential Bearing Quill Adjustment Tool . . . JDG880A*

Remove and install differential housing bearing quills

** RECOMMENDED TOOL*

RW25161 -UN-22JUN94

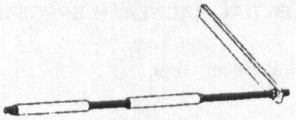


RX,JDG880A -19-09SEP96

Backlash Checking Tool JDG923A

Check differential bevel pinion to ring gear backlash

RW25339 -UN-14JUN95

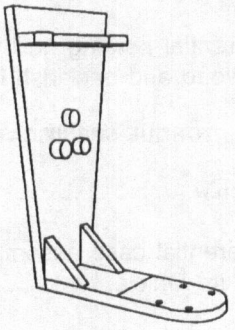


RX,JDG923A -19-05SEP96

Axle Support Bracket JDG927*

Support axle assembly, using D05223ST rollover stand, during disassembly, adjustment, and assembly

** RECOMMENDED TOOL*



RW25374 -UN-17MAY95

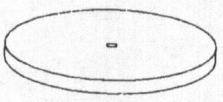
RX,JDG927 -19-11MAY95

Driver Disk (6-3/8 in.) JDG932*

Install seals and bearing cups

** RECOMMENDED TOOL*

RW25359 -UN-17MAY95

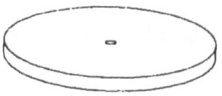


RX,JDG932 -19-26APR95

RW25359 -UN-17MAY95

Driver Disk (5-3/8 in.) JDG933*

Install seals and bearing cups



* *RECOMMENDED TOOL*

RX,JDG933 -19-26APR95

OTHER MATERIAL

Number	Name	Use
PT106	Paint and Decal Remover	Clean surfaces and threads
TY15435	Fast Cure Epoxy	Retain cap screws

See Group 10—Cross-Reference Chart for Canadian and Loctite Product Numbers

RX,4332,1C -19-19DEC97

SPECIFICATIONS

Item	Measurement	Specification
Pinion Shaft-to-Pinion Hub Cap Screw	Torque	70 N·m (52 lb-ft)
Housing Cover-to-Ring Gear Cap Screw	Torque	318 N·m (235 lb-ft)
Differential Quill Lock Plate Cap Screw	Torque	26 N·m (19 lb-ft)
Differential Housing Assembly Rolling Drag	Torque	1—2 N·m (13—44 lb-in.)
Differential Housing	Backlash	0.15—0.40 mm (0.005—0.015 in.)
Differential Lock Disk	Thickness (new)	3.2 mm (0.126 in.)
Piston Return Spring	Free Length (approximate) Test Length	29.5 mm (1.16 in.) 19 mm at 200—267 N (0.74 in. at 45—60 lb force)

RX,4332,2C -19-19DEC97

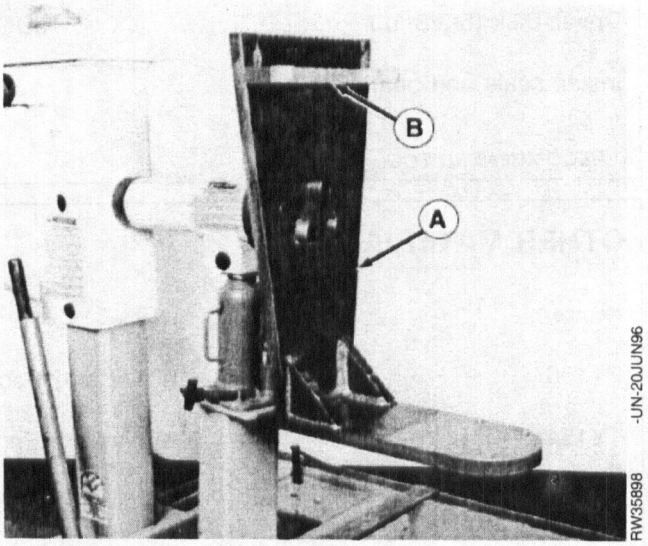
INSTALL AXLE IN REPAIR STAND

Remove axle from machine. (Refer to Machine Repair Manual.)

Remove the oscillating support and pivot pin (if equipped). (See 1600 Oscillation Supports, Group 16.)

Install JDG927 Support Bracket (A) to D05223ST Engine Rollover Stand.

Remove the support bracket top adapter (B).



RX,4332,3C -19-19DEC97

Install the axle assembly to the support bracket.

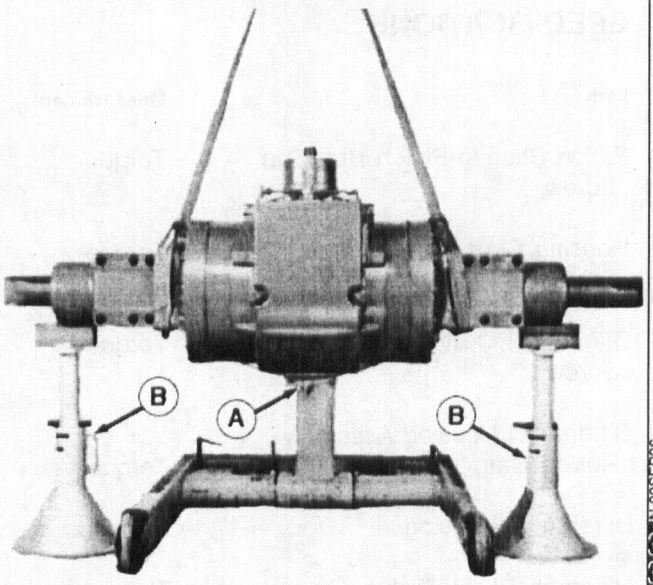
Install four M12 x 50 mm cap screws (A).

Install cone stands (B) under the axle housings to improve stability until the final drive assemblies are removed.

Remove chains/straps and lift brackets.

If input housing/cover is NOT being removed, perform the following step:

Remove two of the cover cap screws and substitute 25 mm (1 in.) longer cap screws and install the support bracket top adapter.

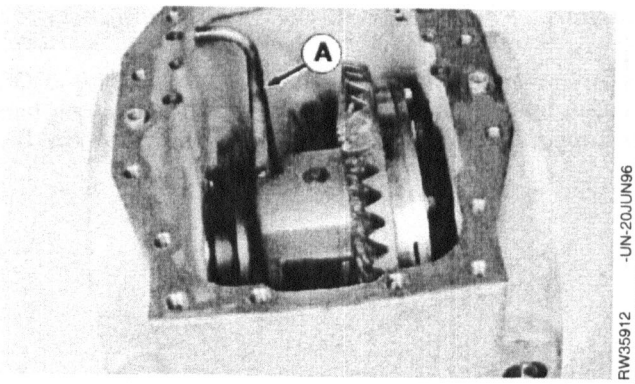


RX,4332,4C -19-19DEC97

REMOVE DIFFERENTIAL

Remove input housing/differential case cover. (See Remove Input Housing/Cover, Group 21.)

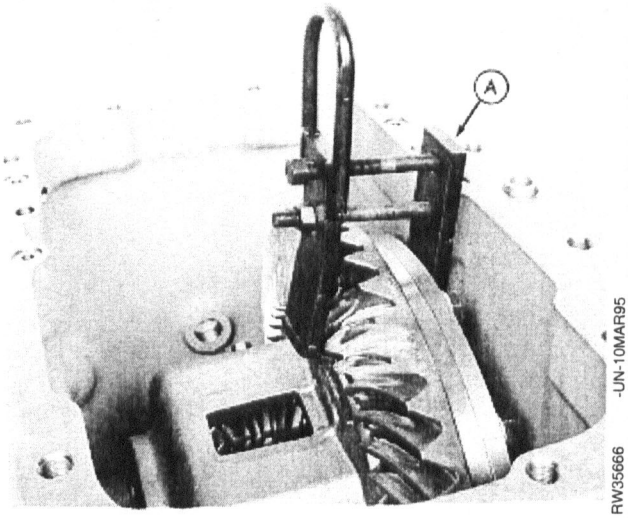
Remove oil return tube (A), if equipped.



RX,4332,5C -19-19DEC97

Install DFRW7* Lifting Tool (A).

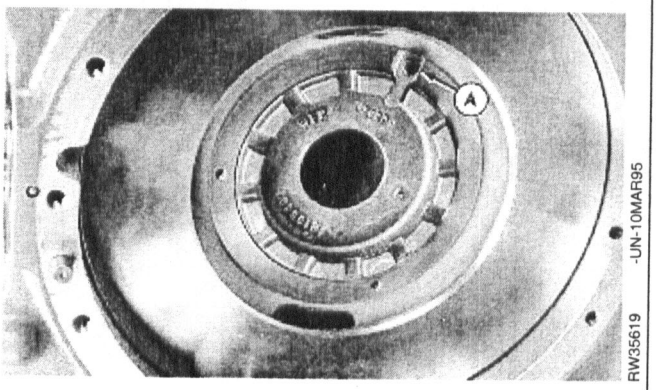
Raise differential housing enough to relieve the weight on the bearing quills, using an overhead hoist.



** See Group 499 for tool fabrication*

RX,4332,6C -19-19DEC97

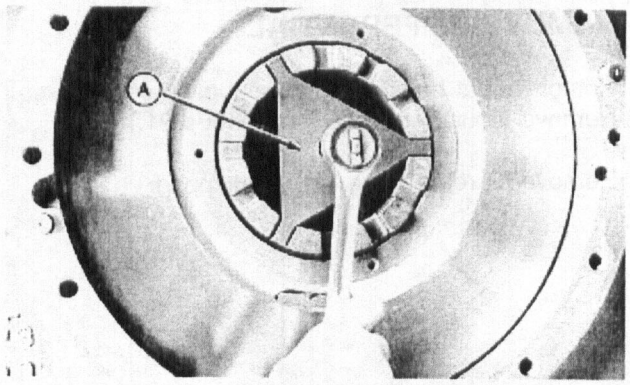
Remove quill lock plate retaining cap screw and lock plate (A), both sides.



RX,4332,7C -19-19DEC97

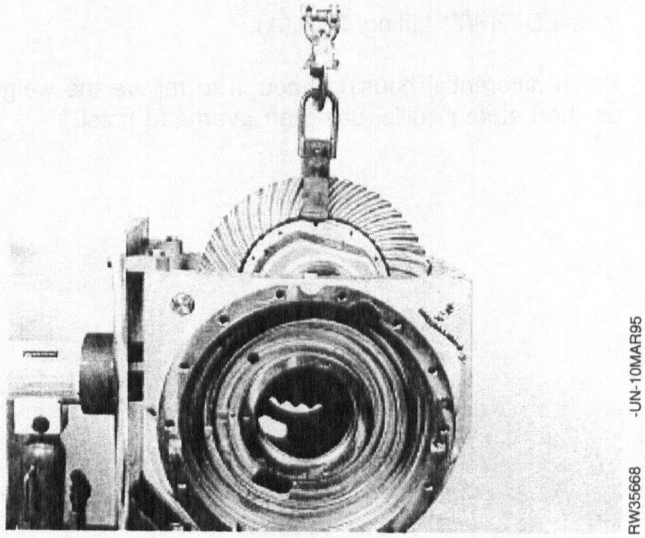
NOTE: Remove the non-ring gear side quill first.

Remove both differential bearing quills, using JDG880A Differential Bearing Quill Adjustment Tool (A), while supporting the differential with the lifting fixture.



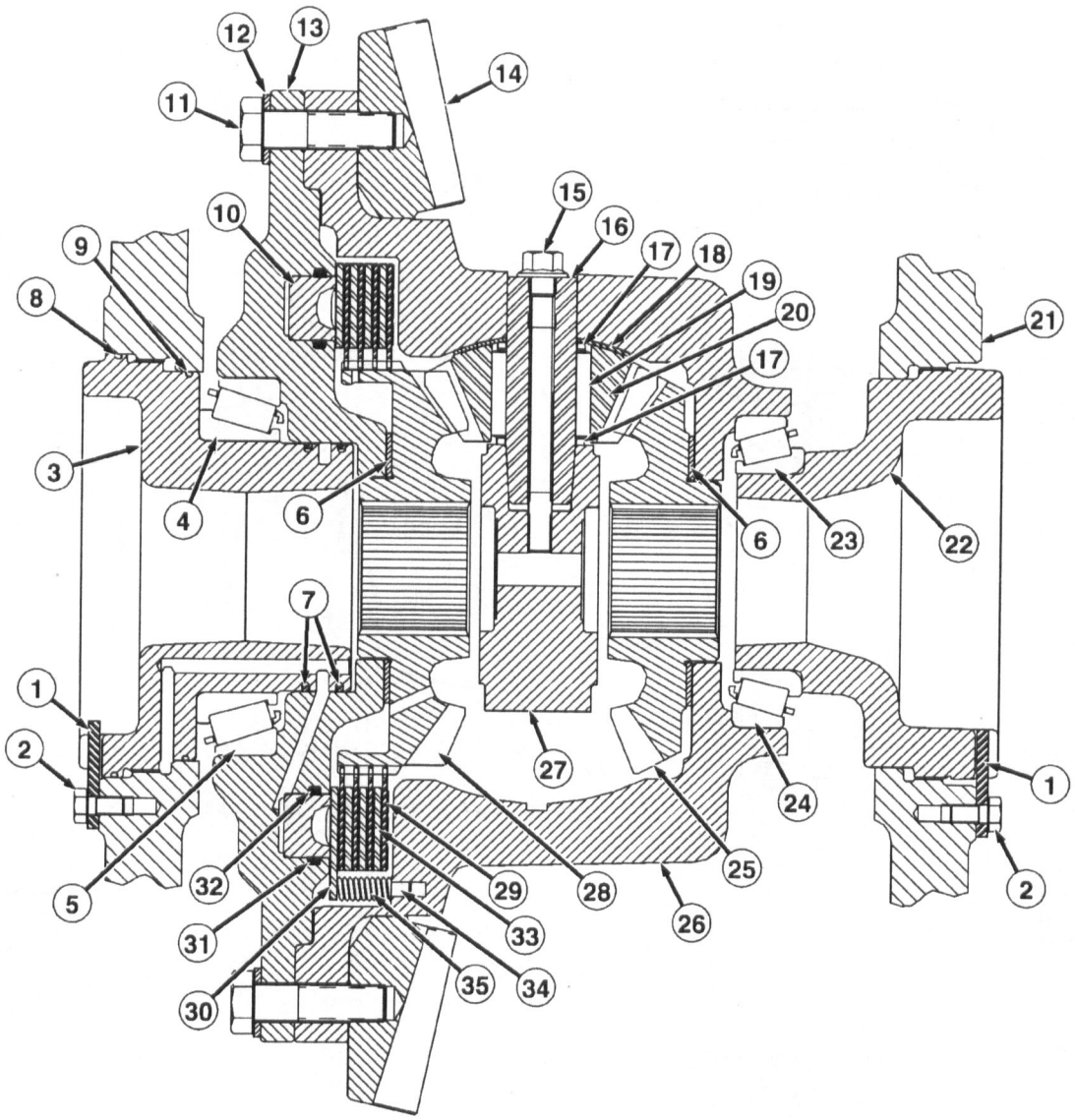
RX,4332,8C -19-19DEC97

Remove the differential using the lifting fixture and a hoist.



RX,4332,9C -19-19DEC97

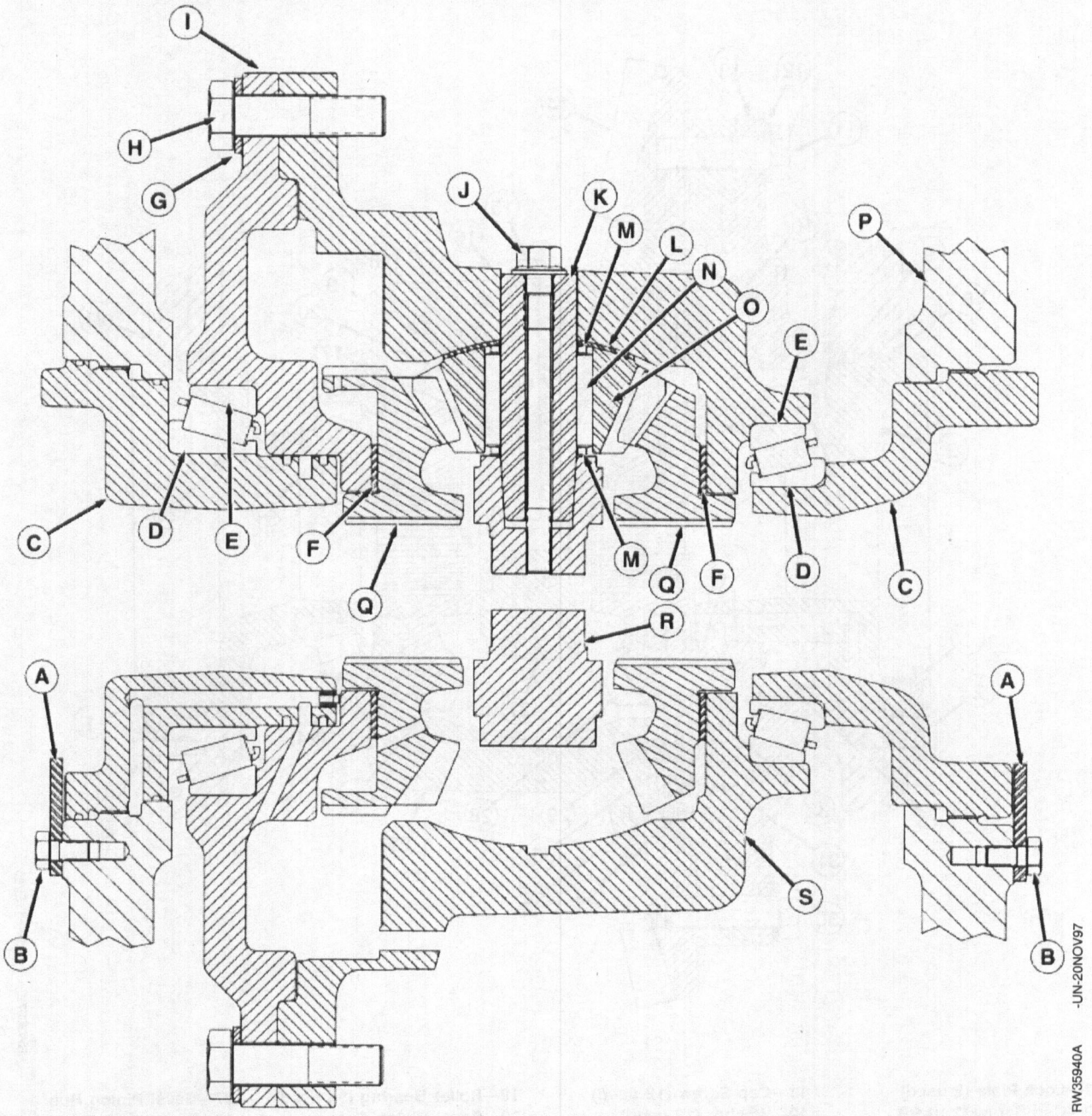
CROSS-SECTIONAL VIEW—*DIFFERENTIAL WITH DIFFERENTIAL LOCK*



1—Lock Plate (2 used)
2—Cap Screw (2 used)
3—Bearing Quill
4—Bearing Cone
5—Bearing Cup
6—Thrust Washer (2 used)
7—Sealing Ring (2 used)
8—O-Ring Packing
9—O-Ring Packing
10—Piston
11—Cap Screw (12 used)
12—Washer (12 used)
13—Cover
14—Spiral Bevel Gear
15—Cap Screw (3 used)
16—Bevel Pinion Shaft (3 used)
17—Thrust Washer (6 used)
18—Conical Thrust Washer (3 used)
19—Roller Bearing (54 used)
20—Bevel Pinion Gear (3 used)
21—Differential Case
22—Bearing Quill
23—Bearing Cone
24—Bearing Cup
25—Bevel Gear
26—Housing
27—Bevel Pinion Hub
28—Bevel Lock Gear
29—Disk (4 used)
30—Piston Return Plate
31—Packing Ring
32—Packing Ring
33—Separator Plate (3 used)
34—Spring Pin (3 used)
35—Spring (3 used)

RX,4332,10C -19-19DEC97

CROSS-SECTIONAL VIEW—*STANDARD DIFFERENTIAL*



A—Lock Plate (2 used)
B—Cap Screw (2 used)
C—Bearing Quill
D—Bearing Cone
E—Bearing Cup
F—Thrust Washer (2 used)
G—Washer (12 used)
H—Cap Screw (12 used)
I—Cover
J—Cap Screw (3 used)
K—Bevel Pinion Shaft (3 used)
L—Conical Thrust Washer (3 used)
M—Thrust Washer (6 used)
N—Roller Bearing (54 used)
O—Bevel Pinion Gear (3 used)
P—Differential Case
Q—Bevel Gear
R—Bevel Pinion Hub
S—Housing

RX,4332,11C -19-08JAN98

DISASSEMBLE, INSPECT, AND ASSEMBLE DIFFERENTIAL

NOTE: Refer to Differential—Cross-Sectional View during disassembly.

Remove the differential cover and housing-to-ring gear cap screws (A).

Remove the cover by prying in the slots (B) between the cover and housing.

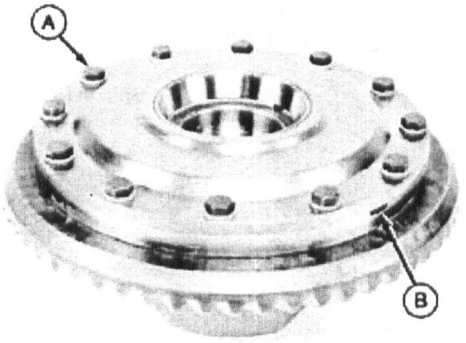
IMPORTANT: Differential ring gear and pinion shaft are serviced as a matched set. Be sure number stamped on ring gear and pinion end of shaft are the same. Adjust cone point when replacing ring gear and pinion shaft.

Inspect gear teeth on gear set.

Remove gear from housing if necessary.

NOTE: Remove the heads from two extra housing-to-ring gear cap screws to be used as guide pins during ring gear installation.

Install ring gear on housing. (See General Repair Procedures, Group 10, for heating instructions.)

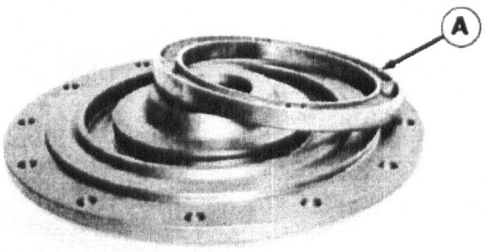


RW35241 -UN-12APR94

RX,4332,12C -19-19DEC97

Remove the differential lock piston (A) from the cover by applying air to lock piston inlet using an air nozzle.

Remove packing rings from the cover.



RW35913 -UN-20JUN96

RX,4332,13C -19-19DEC97

Remove disks, separator plates, and piston return plate.

Remove differential bevel lock gear with thrust washer.

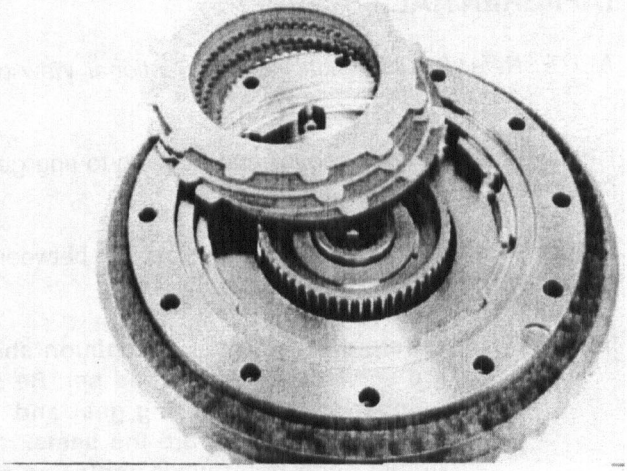
CLUTCH DISK SPECIFICATION

Thickness (new)	3.2 mm (0.126 in.)

Remove and inspect piston return springs.

NEW SPRING SPECIFICATION

Free Length (approximate)	29.5 mm (1.16 in.)
Test Length	19 mm at 200—267 N (0.74 in. at 45—60 lb force)

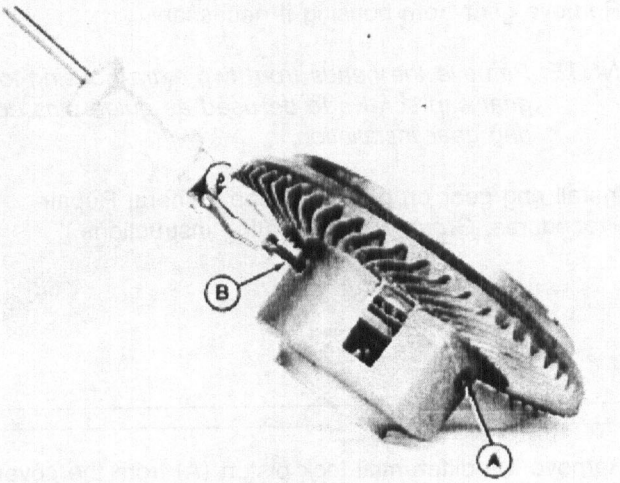


RX,4332,14C -19-19DEC97

Remove the pinion shaft retaining cap screws (A).

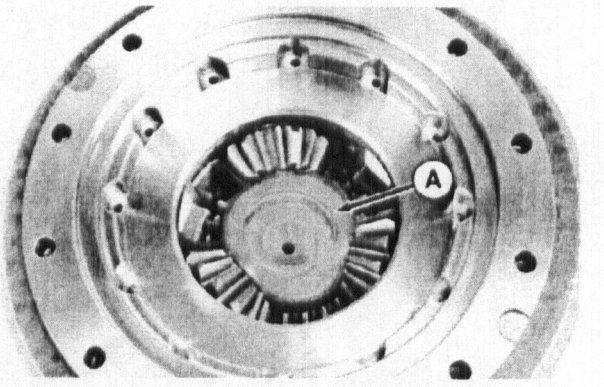
Install a 19M7361 (12 x 50 mm) cap screw (B) into the pinion shaft and use a slide hammer to pull the pinion shafts from the hub.

NOTE: Leave the shafts in the pinion assemblies.



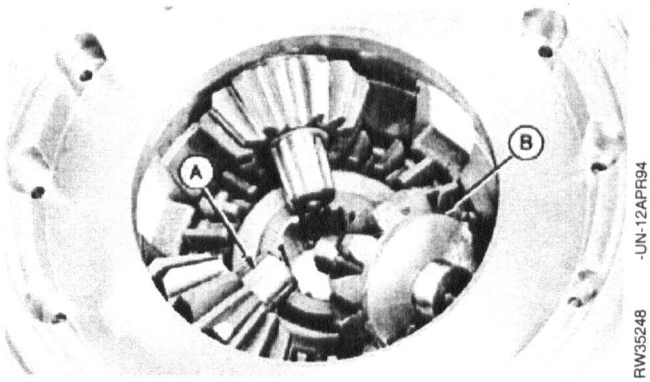
RX,4332,15C -19-19DEC97

Remove the bevel pinion hub (A).



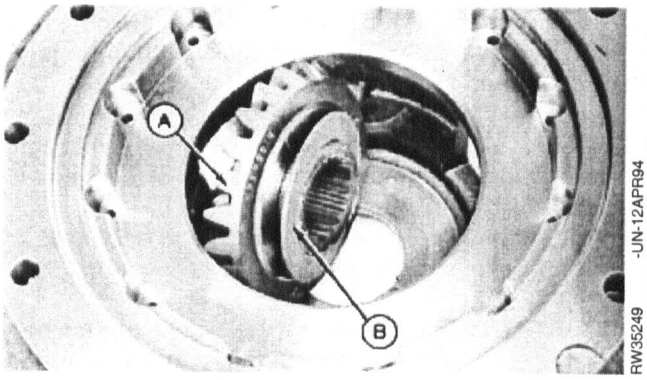
RX,4332,16C -19-19DEC97

Push the shafts (A) inward into the pinion assemblies and remove (B), spherical thrust washer, outer thrust washer, needles, inner thrust washer, and bevel pinions with shaft.



RX,4332,17C -19-19DEC97

Remove the bevel gear (A) and thrust washer (B).



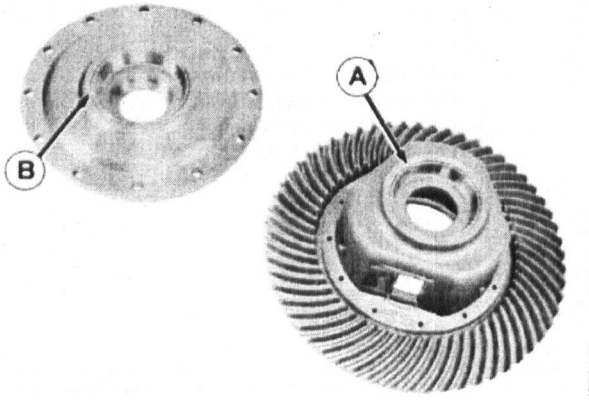
RX,4332,18C -19-19DEC97

Remove bearing cups (A) and (B) if necessary.

IMPORTANT: Make sure the cups are seated in the bottom of the bores.

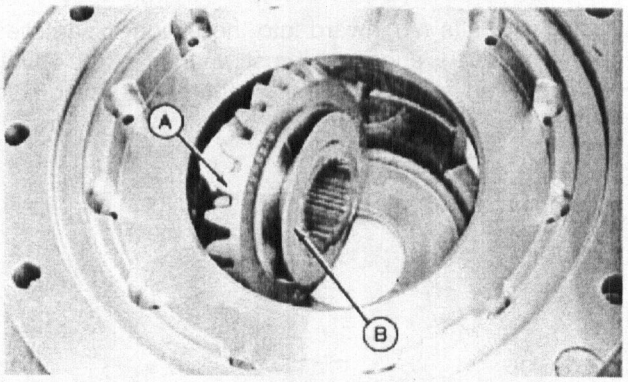
Install new bearing cup (A) in differential housing using JDG933 Driver Disk (5-3/8 in.).

Install new bearing cup (B) in cover using JDG923 Driver Disk (6-3/8 in.).



RX,4332,19C -19-19DEC97

Install bevel gear (A) and thrust washer (B) into the housing.



RX,4332,20C -19-19DEC97

Coat the spherical thrust washers (A) with light clean grease and install into housing making sure tangs (B) are positioned in the recess.

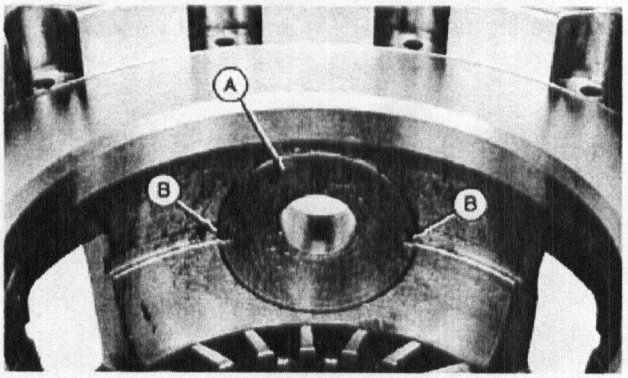
Coat the ID of the differential bevel pinions with light clean grease and install the needle roller bearings (D).

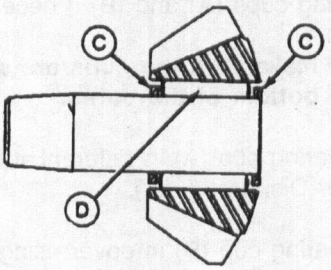
Install the needle thrust washers (C) on each side of the needle bearings in the pinions.

IMPORTANT: The needle thrust washer must be between the needles and the spherical thrust washer and the needles and the hub.

Install the pinion shafts into the pinion gear assemblies.

A—Spherical Thrust Washer (3 used)
B—Thrust Washer Tangs
C—Needle Thrust Washer (6 used)
D—Needle Bearings (54 used)

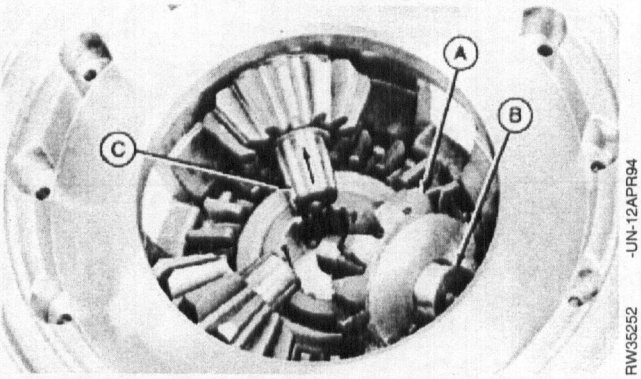




RX,4332,21C -19-19DEC97

Install the pinion assemblies (A), from the inside, into the spherical thrust washer and push the shafts (B) into the housing.

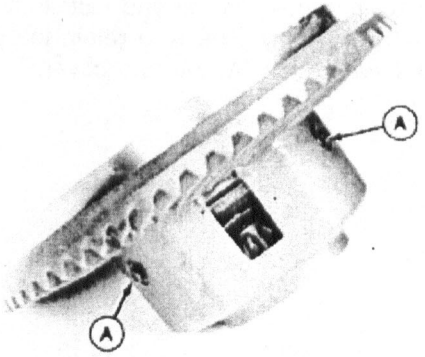
Push the pinion shafts (C) into the pinion assembly and install the hub.



RX,4332,22C -19-19DEC97

Push the shafts into the hub and install and tighten pinion shaft-to-pinion hub cap screws (A) to 70 N·m (52 lb-ft).

Strike each shaft with a drift or socket hitting only the shaft after tightening all three cap screws. Retighten cap screws to 70 N·m (52 lb-ft).



RW35253 -UN-12APR94

RX,4332,23C -19-19DEC97

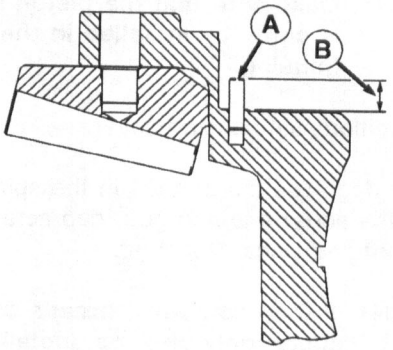
NOTE: There are three spring pins installed in the housing in the three holes that are NOT drilled through.

Install piston return spring guide pin (A) into housing to specified height (B).

SPRING PIN HEIGHT

Top of Pin to Housing Surface . . . . . 13.5 mm (0.531 in.)

Install the piston return springs.



RW36073 -UN-23SEP96

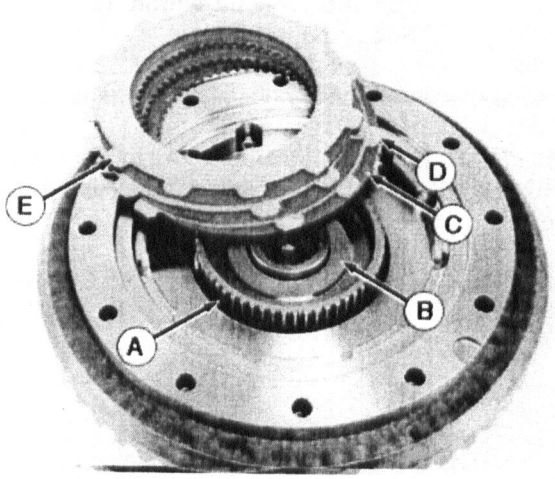
RX,4332,24C -19-19DEC97

Install differential bevel lock gear (A) making sure thrust washer (B) is correctly positioned.

Install the four disks (C) and three separator plates (D) alternately, starting with a disk against the housing.

Install piston return plate (E).

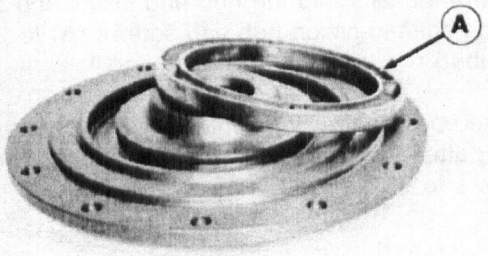
A—Bevel Lock Gear
B—Thrust Washer
C—Disk (4 used)
D—Separator Plate (3 used)
E—Piston Return Plate



RW36069 -UN-16SEP96

RX,4332,25C -19-19DEC97

Coat the packing rings with oil and install into the differential cover. Apply grease to retain the piston in the cover and install piston (A) into the cover.



RW35913 -UN-20JUN96

RX,4332,26C -19-19DEC97

IMPORTANT: Make sure that the piston return plate is correctly installed in the differential housing.

Install the differential housing cover.

Clean and degrease the threads in the spiral bevel ring gear and the housing-to-ring gear cap screws with PT106 Paint and Decal Remover.

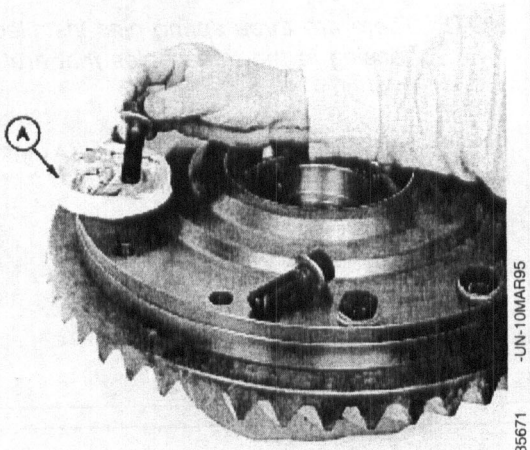
IMPORTANT: If the cap screw threads can not be thoroughly cleaned, install NEW cap screws.

Cap screws MUST be tightened to specified torque within 10 minutes of Epoxy application.

Remove the ring gear-to-housing guide pins.

Apply TY15435 Fast Cure Epoxy (A) to the lower 19 mm (0.750 in.) of cap screw threads and install cap screws with washers.

Tighten the housing cover cap screws to 318 N·m (235 lb-ft).



RW35671 -UN-10MAR95

RX,4332,27C -19-19DEC97

32
13

Remove bearing cups (A) as necessary.

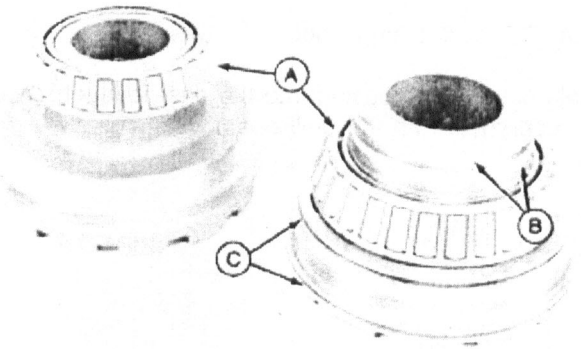
Install new differential bearing cones (A). Make sure cones are seated against shoulders.

Install the bearing cone on the non-ring gear side quill using a 3-3/4 in. driver disk.

Heat the bearing cone and install onto the ring gear side quill against the shoulder. Allow to cool and seat the cone using a brass drift. (See General Repair Procedures.)

Remove and replace the differential lock sealing rings (B).

Remove and replace the O-ring packings (C).



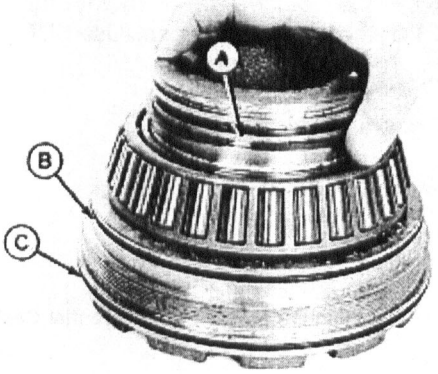
RW35245 -UN-12APR94

RX,4332,28C -19-19DEC97

Install the differential lock sealing rings onto the quill making sure the ends (A) are locked.

Rotate the rings so the joints are 180° apart.

Install O-rings (B) and (C).



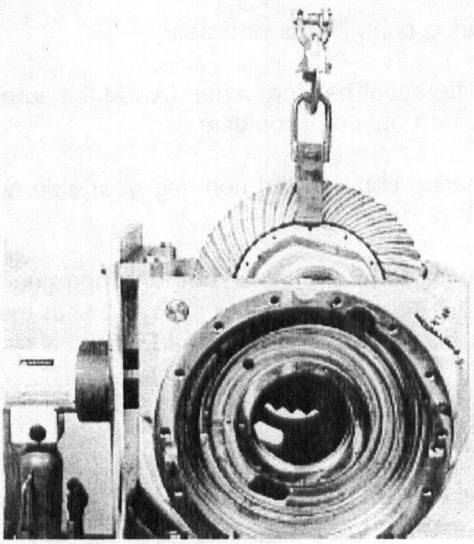
RW35672 -UN-10MAR95

RX,4332,29C -19-19DEC97

INSTALL DIFFERENTIAL

Install DFRW7* Lifting Tool.

Install differential housing into the case enough to align the differential with the quill openings.


RW35668 -UN-10MAR95

** See Group 499 for tool fabrication*

RX,4332,30C -19-19DEC97

Lubricate the sealing rings (A) and O-ring packings (B) and (C).

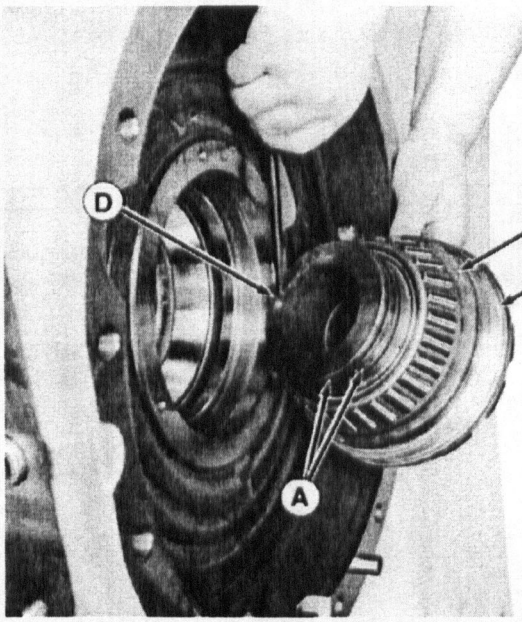
Make sure plug (D) is solidly in position.

IMPORTANT: Turn the side quill ONLY in a clockwise direction.

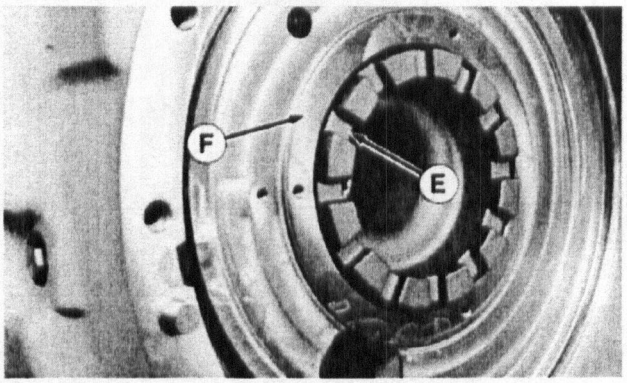
Install and tighten the gear side quill until the bottom surface (E) of the notches are flush with the machined surface (F) of the differential case. Use JDG880A Quill Adjustment Tool, if necessary.

Remove hoist and lifting tool.

A—Differential Lock Seal Rings
B—O-Ring
C—O-Ring
D—Passageway Plug
E—Surface of Notch
F—Machined Surface of Differential Case



RW36541 -UN-29SEP97



RW36554 -UN-30SEP97

RX,4332,31C -19-19DEC97

Rotate the differential case so the side quill bores are in a vertical position with the ring gear side of the differential housing down.

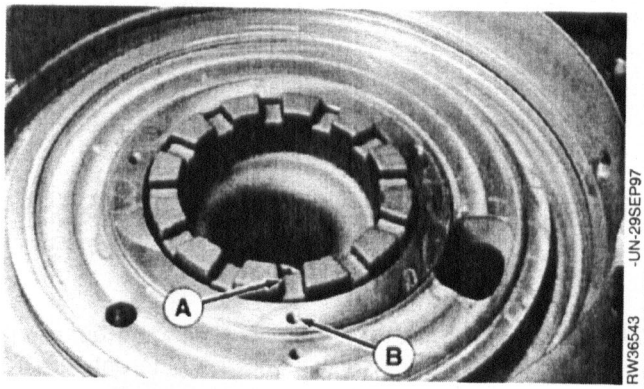
IMPORTANT: The differential housing assembly MUST have end play and be able to rotate.

Install and hand tighten the non-ring gear side quill while rotating the differential housing assembly to seat the bearings.

Align any notch (A) with any adjacent tapped hole (B).

Make sure there is measurable backlash and the housing has end play.

Rotate the differential housing assembly a minimum of six revolutions to seat the bearings.



RX,4332,32C -19-19DEC97

ADJUST DIFFERENTIAL PRELOAD

Install JDG923A Backlash Adjusting Tool (A) through the differential housing making sure the ring gear side is down.

IMPORTANT: Measure the rolling drag force once the differential housing assembly is rotating.

Measure rolling drag force using a bending beam torque wrench. Measure the force once the differential is rotating.

Note the measurement. This is the baseline reading.

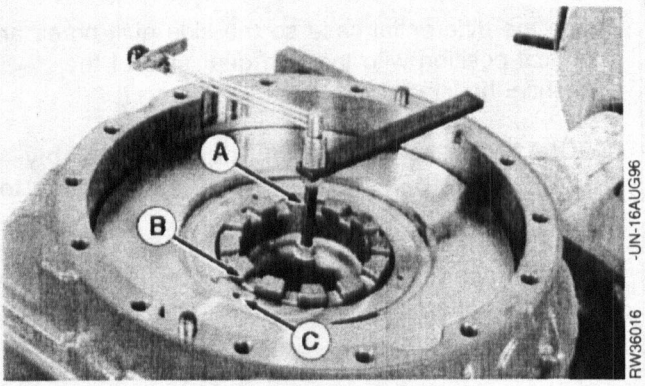
Alternately rotate the differential using a bending beam torque wrench and tighten the non-ring gear side quill in a clockwise direction one cap screw location at a time until rolling drag force increases above the baseline reading 1—2 N·m (13—44 lb-in).

IMPORTANT: Always stop with a notch and screw location aligned.

NOTE: If rolling drag force is too high, loosen the side quill to zero force and repeat the procedure.

Tighten the non-ring gear side quill ONE additional screw location, using the notch closest to a screw location.

Proceed with adjusting differential backlash.



32
17

RX,4332,33C -19-08JAN98

ADJUST DIFFERENTIAL BACKLASH

Install input housing/case cover. (See 1600 Input Housing/Case Cover, Group 21.)

IMPORTANT: Make sure the support bracket top adapter is installed before rotating the differential case assembly.

Install the support bracket top adapter to bracket and input housing/cover.

IMPORTANT: Position the dial indicator on the bar at the correct dimension.

Install JDG923A Backlash Checking Tool (A) and a dial indicator with the bar on the non-ring gear side of the differential housing.

The dial indicator pointer (B) should rest against the bar 267 mm (10.5 in.) from the centerline of the differential housing.

Hold the pinion shaft stationary and rotate the ring gear using a pry bar through the differential case opening (DO NOT use the backlash checking tool bar to rotate the housing.) Note the backlash. Check the backlash in at least three locations 120° apart.

BACKLASH SPECIFICATION

Backlash	0.15—0.40 mm (0.005—0.015 in.)

Rotate the differential case so side quill bores are in a horizontal position. Remove tools and adjust backlash.

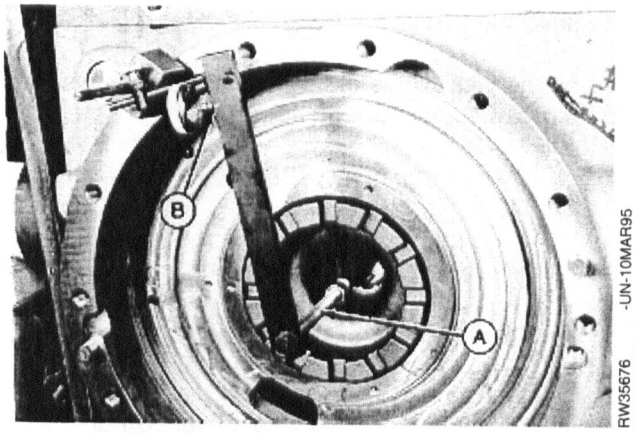
NOTE: Each notch on the quill equals 0.15 mm (0.005 in.) of backlash.

IMPORTANT: Rotate both quills the same amount to maintain correct preload.

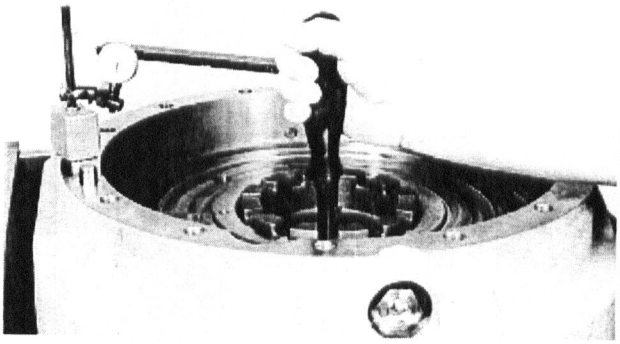
Count the number of notches, and rotate the opposite quill the same number of notches when rotating quills.

If backlash is high, first, rotate the non-ring gear side quill counter-clockwise and then the gear side quill clockwise.

If backlash is low, first, rotate the gear side quill counter-clockwise and then the non-ring gear side quill clockwise.



RW35676 -UN-10MAR95


RW35678 -UN-10MAR95

RX,4332,34C -19-19DEC97

Remove the backlash checking tools.

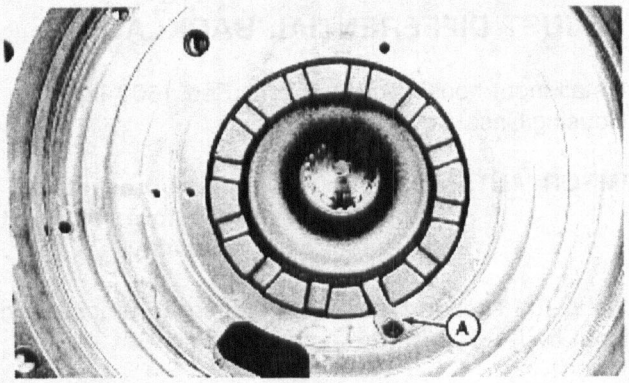
Install the lock plates and retaining cap screws and tighten cap screws to 26 N·m (19 lb-ft).

Install brake components. (See 1600 Single Disk Brakes, Group 41.)

Install axle assemblies.

Remove the axle from repair stand.

Complete the input housing/cover installation procedure. (See 1600 Input Housing/Case Cover, Group 21.)



RX,4332,35C -19-19DEC97

ESSENTIAL OR RECOMMENDED TOOLS

NOTE: Order tools from the U.S. SERVICE-GARD™ or European Microfiche Tool Catalogs.

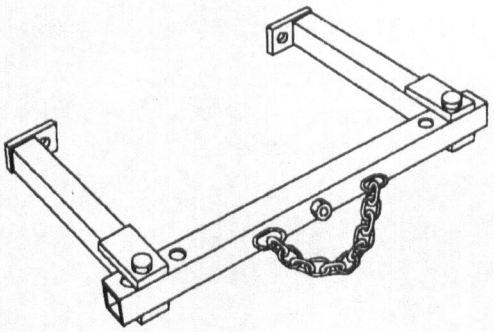
ESSENTIAL TOOLS listed are required to perform the job correctly and are obtainable **only** from *SERVICE-GARD* or *European Tool Catalogs.*

RECOMMENDED TOOLS, as noted, are suggested to perform the job correctly. Some tools may be available from local suppliers or may be fabricated.

RX,TOOLS -19-21APR94

Axle Adjusting Tool DF1057*

Rotate axle housing to measure rolling drag torque



RW25324 -UN-16NOV94

** RECOMMENDED TOOL—See Group 499 for tool fabrication*

RX,DF1057A,CTM -19-05JAN95

RW25334 -UN-21DEC94

Seal Installer JDG824

Install outer axle seal on 1200 Series Axles

RX,JDG824 -19-15DEC94

RW25334 -UN-21DEC94

Seal Installer JDG825

Install outer axle seal on 1400 Series Axles

RX,JDG825 -19-15DEC94

OTHER MATERIAL

Number	Name	Use
R72232	Lead Balls	Determine axle shim pack thickness
TY16285	Cure Primer	Speed cure of liquid gasket
TY16021	High-Flex Form-in-Place Gasket	Seal joints

See Group 10—Cross-Reference Chart for Canadian and Loctite Product Numbers

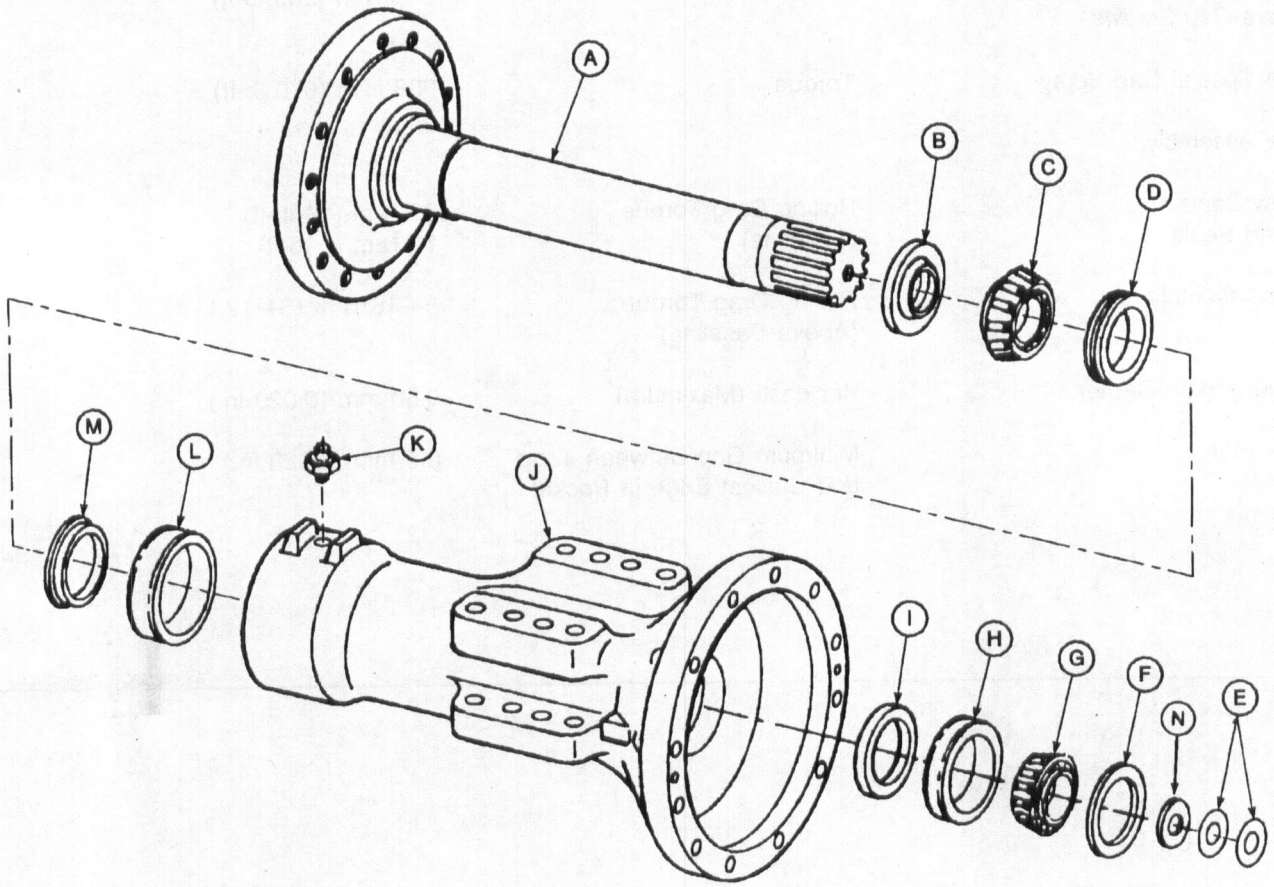
RX,4335,1C -19-19DEC97

SPECIFICATIONS

Item	Measurement	Specification
Housing-to-Differential Case Cap Screws	Torque	364 N·m (269 lb-ft)
Axle Special Cap Screw	Torque	908 N·m (670 lb-ft)
Axle Assembly:		
New Seals Used Seals	Rolling Drag Torque (Baseline)	22 N·m (16 lb-ft) 10 N·m (7 lb-ft)
Axle Assembly	Rolling Drag Torque (Above Baseline)	8—16 N·m (6—12 lb-ft)
Planet Pinion Carrier	Backlash (Maximum)	0.50 mm (0.020 in.)
Lock Plate	Minimum Gap Between Tang and Closest Edge in Pocket	0.5 mm (0.020 in.)

RX,4335,2C -19-19DEC97

EXPLODED VIEW—*AXLE SHAFT AND HOUSING—GREASED OUTER BEARING*



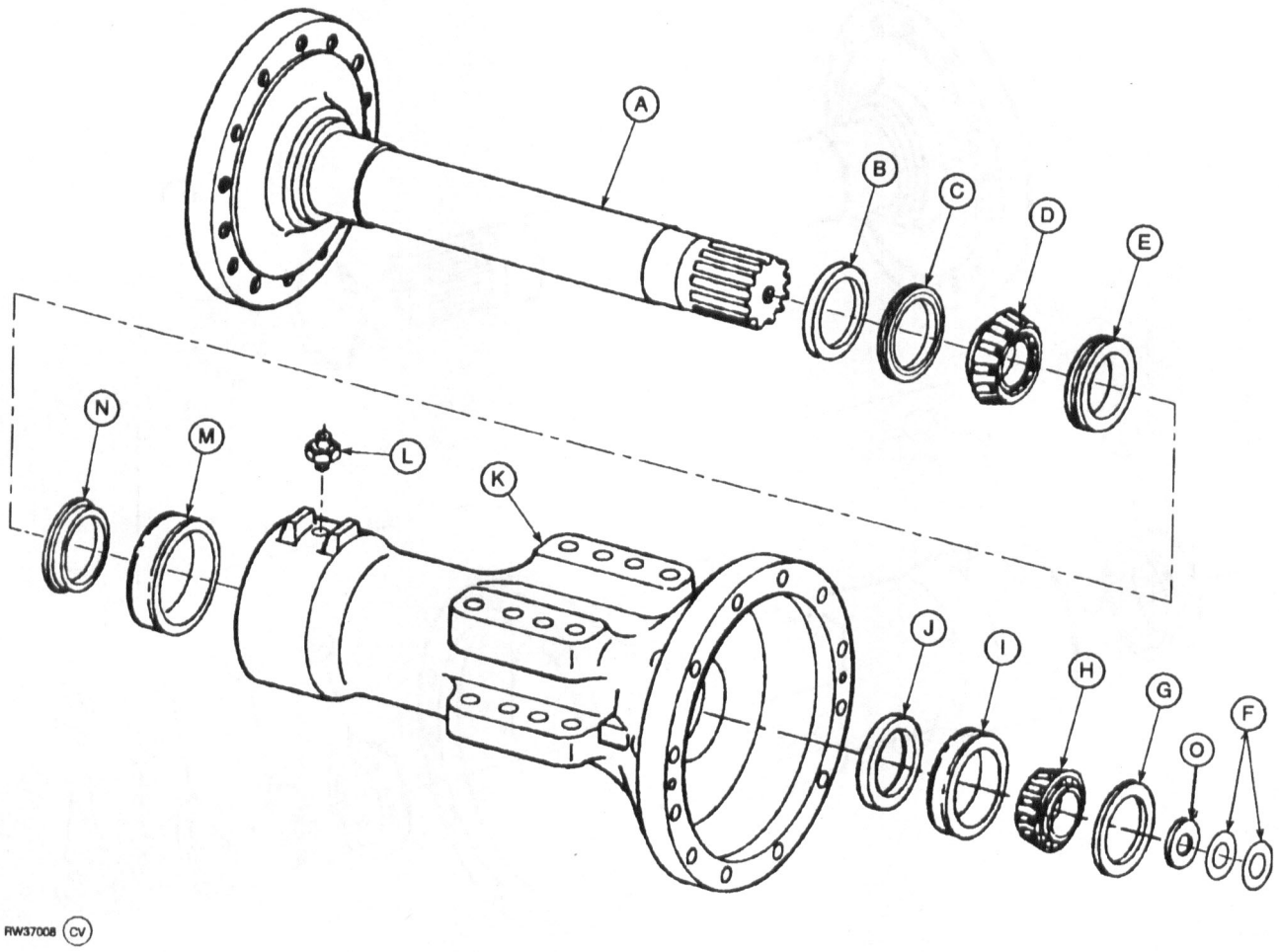
RW37006 -UN-27JAN95

A—Axle Shaft
B—Seal
C—Bearing Cone
D—Seal
E—Shim Pack
F—Thrust Washer
G—Bearing Cone
H—Bearing Cup
I—Seal
J—Axle Housing
K—Lubrication Fitting
L—Bearing Cup
M—Seal Cup
N—Thick Washer

NOTE: Bearing cups, cones and seals are press fit.

RX,4335,3C -19-08JAN98

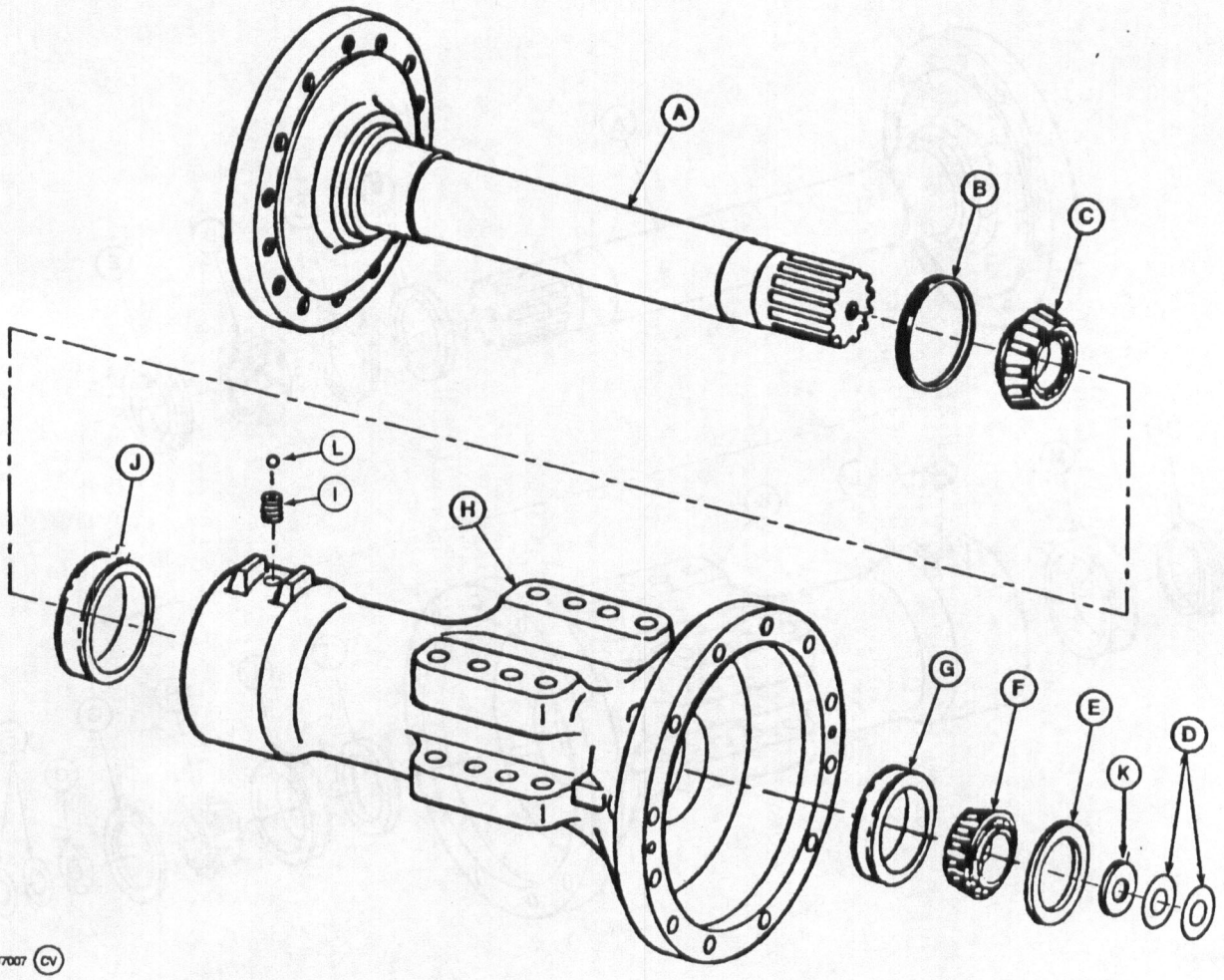
EXPLODED VIEW—*AXLE SHAFT AND HOUSING—GREASED OUTER BEARING WITH SPACER*



A—Axle Shaft
B—Spacer
C—Seal
D—Bearing Cone
E—Seal
F—Shim Pack
G—Thrust Washer
H—Bearing Cone
I—Bearing Cup
J—Seal
K—Axle Housing
L—Lubrication Fitting
M—Bearing Cup
N—Seal Cup
O—Thick Washer

RX,4335,4C -19-08JAN98

EXPLODED VIEW—AXLE SHAFT AND HOUSING
OILED OUTER BEARING AXLES



A—Axle Shaft
B—Oil Seal
C—Bearing Cone
D—Shim Pack
E—Thrust Washer
F—Bearing Cone
G—Bearing Cup
H—Axle Housing
I—Plug
J—Bearing Cup
K—Thick Washer
L—Ball

RX,4335,5B -19-24JAN95

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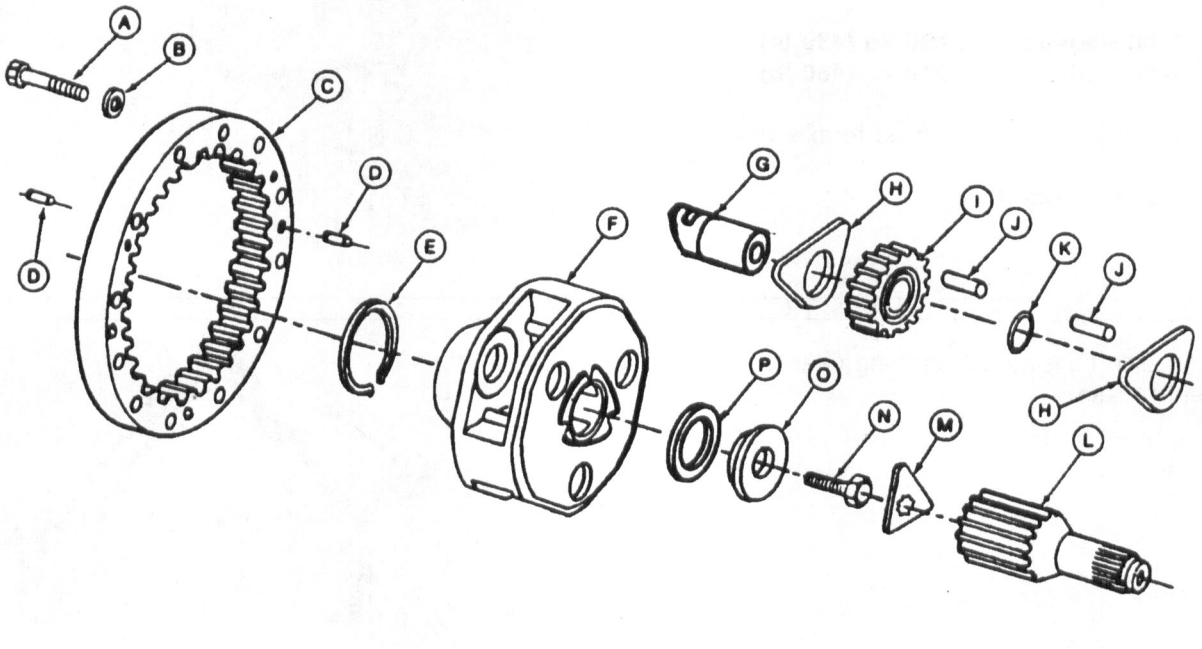
EXPLODED VIEW—*FINAL DRIVE*

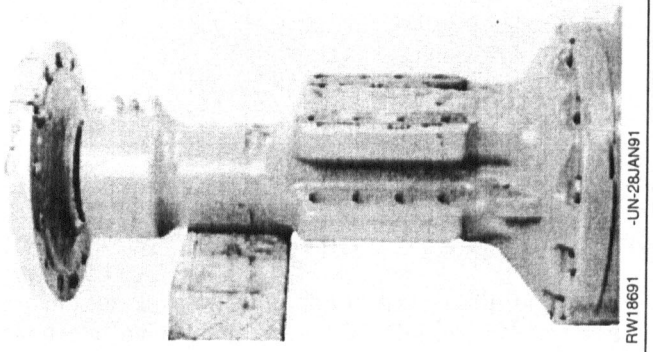


A—Cap Screw
B—Washer
C—Final Drive Gear
D—Dowel Pin
E—Snap Ring
F—Planet Pinion Carrier
G—Planet Pinion Shaft
H—Thrust Washer
I—Planet Pinion
J—Bearing, Roller
K—Spacer
L—Drive Shaft/Sun Pinion
M—Lock Plate
N—Cap Screw
O—Special Washer
P—Thrust Washer

RX,4335,6B -19-22DEC94

REMOVE AXLE HOUSINGS

Support differential case and both axle housings. This will prevent axle assembly from tipping when removing axle housings.



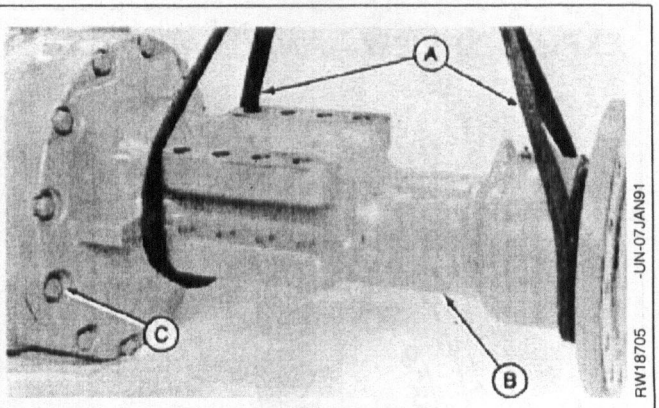
RX,4335,5C -19-19DEC97

CAUTION: Avoid possible personal injury. Use proper lifting equipment. Approximate weight of axle housings are:

1200 Series ..... 196 kg (430 lb)
1400 Series ..... 218 kg (480 lb)

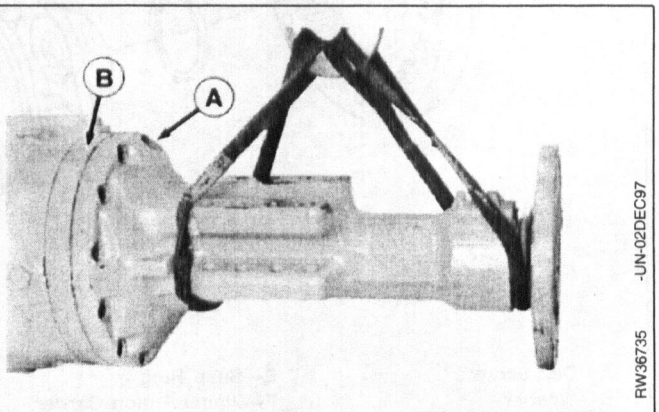
Attach lifting straps (A) and hoist to axle housing (B).

Remove cap screws (C).



RX,4335,6C -19-08JAN98

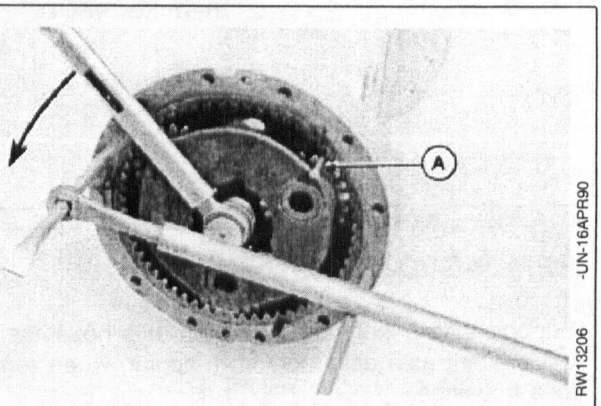
Remove axle housing (A) and ring gear (B) from differential case.



RX,4335,7C -19-19DEC97

Insert metal pin (A) into planetary teeth to prevent rotation. Remove lock plate and loosen special cap screw. Do not remove cap screw.

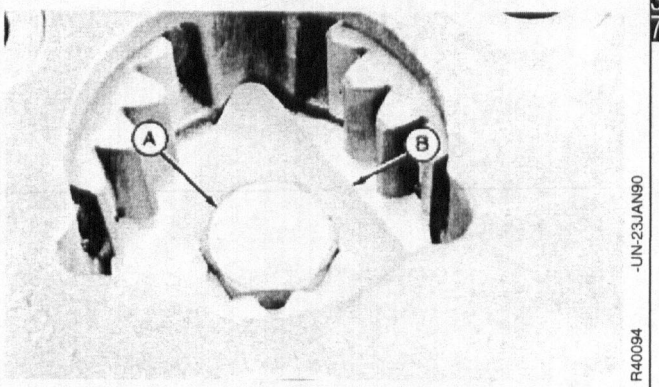
NOTE: Leave ring gear installed to axle housing until special cap screw is loosened if axle has a loose ring gear.



RX,4335,8C -19-19DEC97

Tighten or loosen cap screw (A) to remove lock plate (B).

Install and adjust axle bearings using a planet pinion carrier assembly. DO NOT install final drive ring gear during adjustment of axle bearings.



RX,4335,9C -19-19DEC97

35
7

REMOVE AXLE SHAFT

CAUTION: Avoid possible personal injury. Use proper lifting equipment.

Remove ring gear from axle housing.

Hoist axle housing assembly to an upright position.

Remove special cap screw, shims, and carrier assembly. Save shims for reassembly.

Attach DF1057* Axle Adjusting Tool (A) to axle housing.

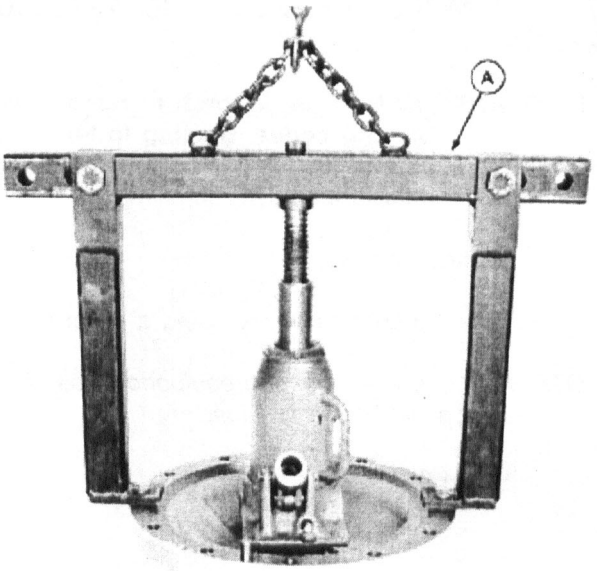
Attach chain hoist to axle removal tool.

Put disks between hydraulic jack and axle shaft.

NOTE: For oiled outer bearing axles, separation of the axle housing and shaft will damage the outer oil seal. A NEW seal MUST be installed each time the housing is removed.

Push the axle shaft out of the bearing cone.

Remove the housing from the shaft.



R40095 -UN-23JAN90

** See Group 499 for tool fabrication*

RX,4335,10C -19-19DEC97

DISASSEMBLE, INSPECT, AND ASSEMBLE AXLE SHAFT

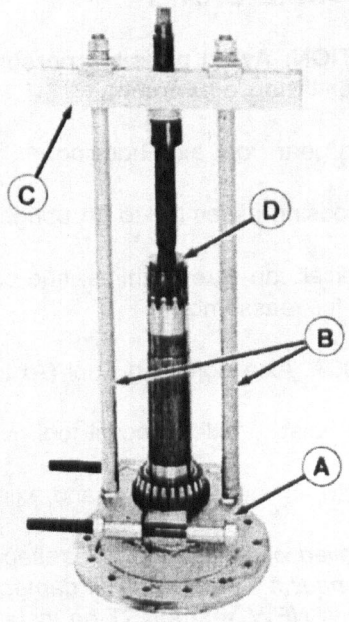
IMPORTANT: DO NOT use a torch to remove axle bearing cones. Heating to temperatures as low as 204°C (400°F) will cause early axle failure.

Inspect bearing and seal.

Remove bearing cone and seal using a puller tool.

NOTE: For oiled outer bearing equipped axles, the outer oil seal MUST be replaced.

A—Bearing Puller
B—Puller Legs
C—Puller
D—4-1/4 in. Disk



RW36736 -UN-02DEC97

RX,4335,11C -19-19DEC97

For axles WITH SPACERS, perform the following step

Install spacer (E).

For all axles with GREASED OUTER BEARING, perform the following steps:

Install outer grease seal (D) flush with bearing cone shoulder of axle shaft with "This Side Out" toward axle flange.

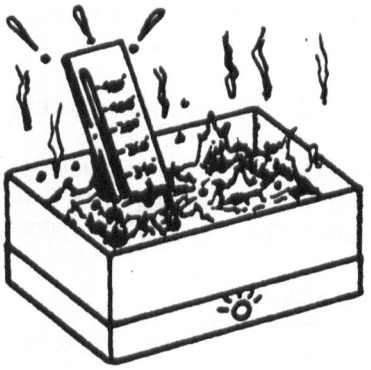
CAUTION: DO NOT heat oil over 182°C (360°F). Oil fumes or oil can ignite above 193°C (380°F). Use a thermometer. DO NOT allow a flame or heating element to come in direct contact with the oil. Heat the oil in a well-ventilated area.

Heat bearing cone (F) to 80—150°C (175—300°F) and install on shaft so bearing cone is against shoulder. Pack bearing cone and seal with grease after bearing cools.

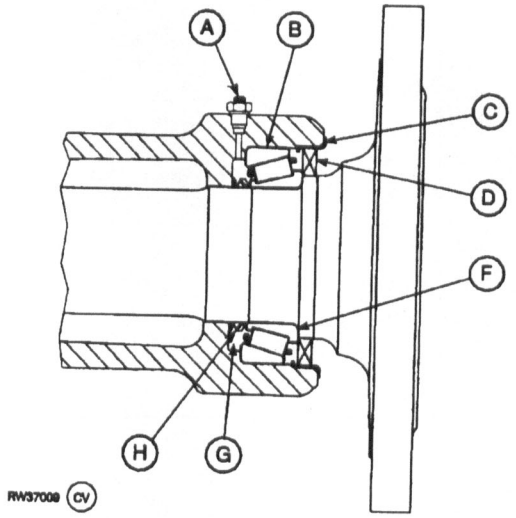
Install face seal (H) against bearing cone with sealing lip away from cone. Apply grease to face of sealing lip.

Fill cavity (G) until grease purges past seal (D), after axle shaft is assembled into axle housing.

A—Lubrication Fitting
B—Bearing Cup
C—Seal Cup
D—Seal
E—Spacer
F—Bearing Cone
G—Grease Cavity
H—Seal

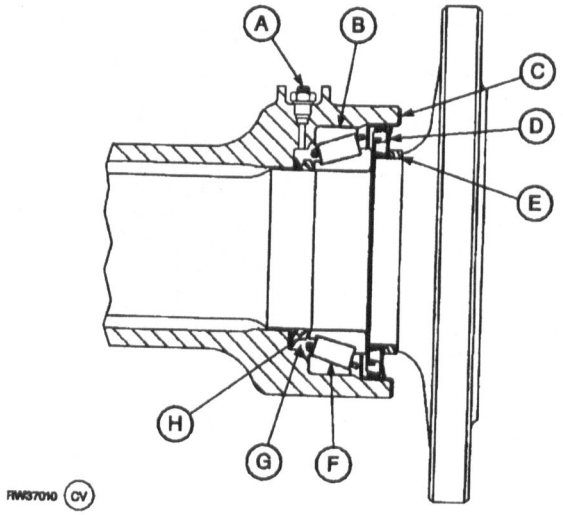


T81191 -UN-23FEB89



RW37009 -UN-21OCT94

Without Spacer



RW37010 -UN-20OCT94

With Spacer

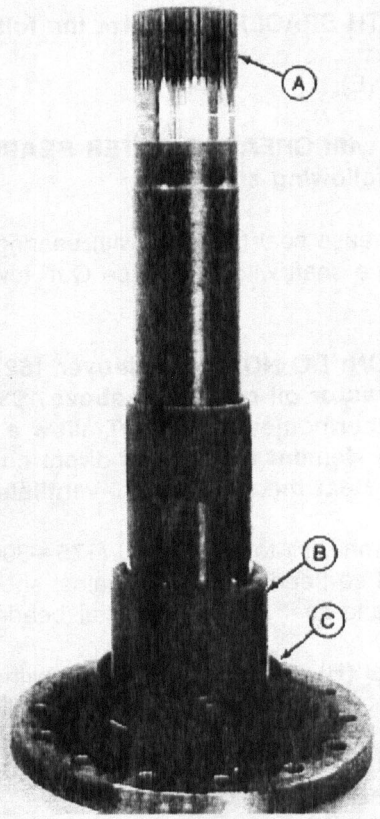
RX,4335,12C -19-19DEC97

For axle with OILED OUTER BEARING, perform the following steps:

IMPORTANT: DO NOT disassemble the oil seal.

Install oil seal (C) with spring side toward axle splines (A) using JDG824 Seal Installer for 1200 Series Axles or JDG825 Seal Installer for 1400 Series Axles.

A—Splines
B—Seal Installer
C—Oil Seal



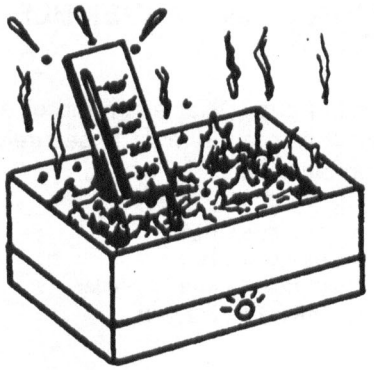
RW37012 -UN-18OCT94

RX,4335,13C -19-19DEC97

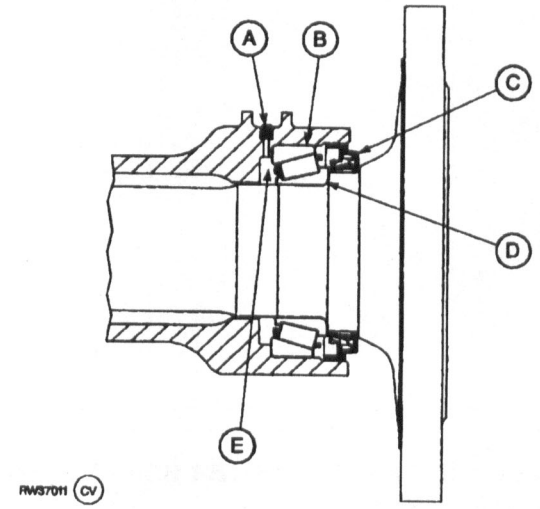
CAUTION: DO NOT heat oil over 182°C (360°F). Oil fumes or oil can ignite above 193°C (380°F). Use a thermometer. DO NOT allow a flame or heating element to come in direct contact with the oil. Heat the oil in a well-ventilated area.

Heat bearing cone (D) to 80—150°C (175°—300°F) and install on shaft so bearing cone is against shoulder.

A—Plug
B—Bearing Cup
C—Oil Seal
D—Bearing Cone
E—Oil Filled Cavity



T81191 -UN-23FEB89



RW37011 -UN-20OCT94

Oil Lubricated Outer Bearing Axle

RX,4335,14C -19-19DEC97

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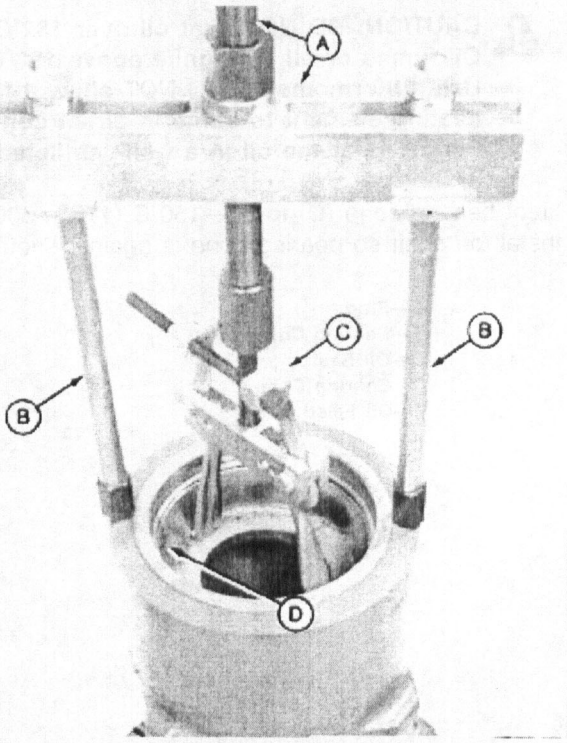
DISASSEMBLE AND ASSEMBLE AXLE HOUSING

Remove bearing cup (D) at each end of axle housing with a puller. Puller tangs must fit securely in cast openings beneath cups.

A—D01290AA Puller
B—D01291AA Puller
C—D01241AA Internal Puller
D—Outer Bearing Cup

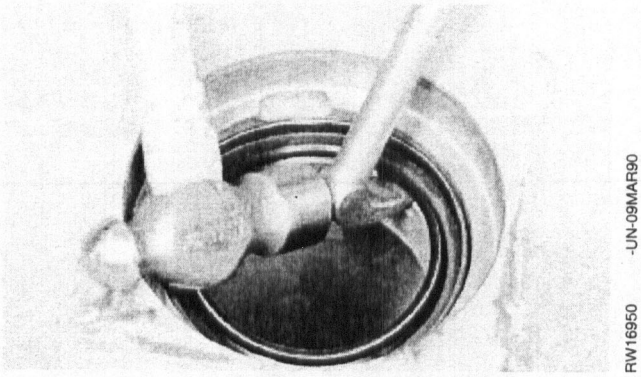


Greased Outer Bearing Axle

RX,4335,15C -19-08JAN98

For axles with GREASED OUTER BEARING, perform the following steps:

Remove inner grease seal if worn or damaged.



RX,4335,16C -19-19DEC97

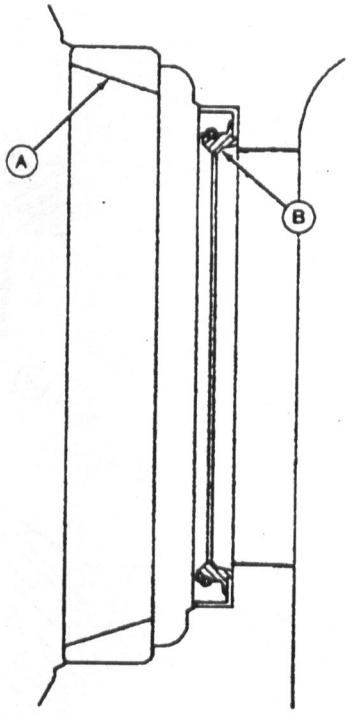
Coat inner seal bore using TY16285* Cure Primer. Apply TY16021* Gasket to outside diameter of seal.

Install inner oil seal (B) flush with bottom of bore with spring side of seal facing seal driver. Apply multi-purpose grease on lips of seal.

IMPORTANT: Be careful not to damage seal against bottom of bore. Seal must be straight in the bore and must not be more than 0.51 mm (0.020 in.) deeper than the opposite side when installed.

For ALL axles, perform the following steps:

Install bearing cup (A) to bottom of bore.



RW13200 -UN-03JAN89

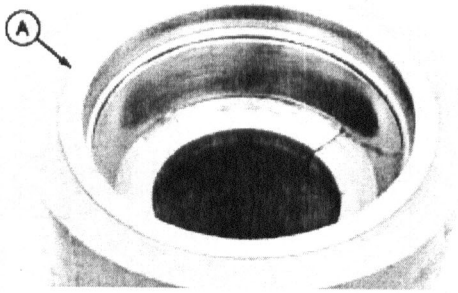
** See Group 10—Cross-Reference Chart for Canadian and Loctite Product Numbers*

RX,4335,17C -19-09JAN98

Install outer bearing cup, using appropriate diameter driver, to bottom of bore.

For axle with GREASED OUTER BEARING, perform the following step:

Install axle outer seal cup (A) flush to end of axle housing using appropriate diameter driver or a block of wood.

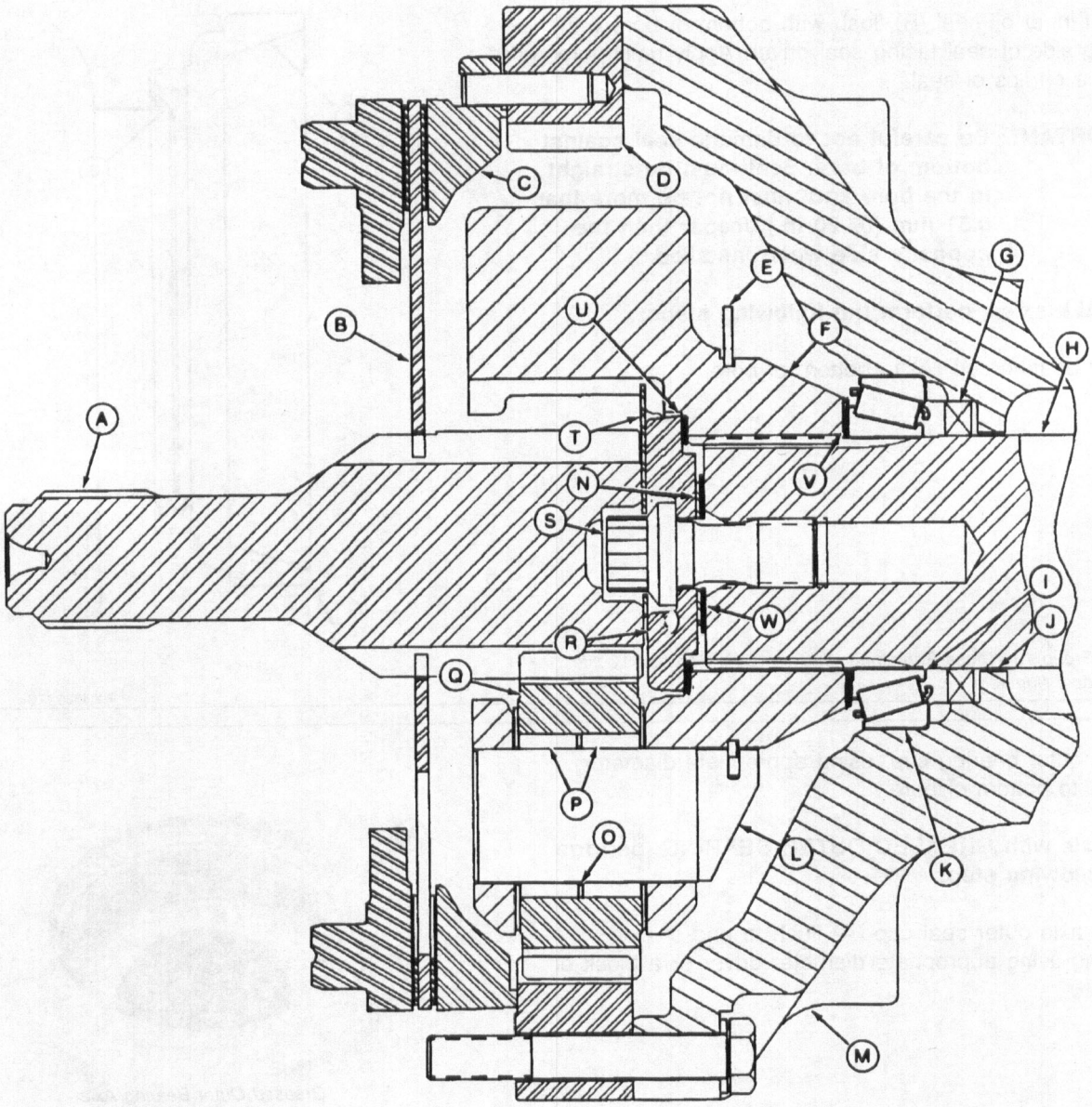


R35899 -UN-03JAN89

Greased Outer Bearing Axle

RX,4335,18C -19-19DEC97

CROSS-SECTIONAL VIEW—*PLANET PINION CARRIER AND AXLE SHAFT*



RW18684 -UN-27JAN95

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A—Drive Shaft/Sun Pinion
B—Brake Disk
C—Brake Backing Plate
D—Final Drive Ring Gear
E—Snap Ring
F—Carrier
G—Seal*
H—Axle Shaft
I—Bearing Cone
J—Grease Dam
K—Bearing Cup
L—Pinion Shaft (3 used)
M—Axle Housing
N—Shim Pack
O—Spacer (3 used)
P—Bearing Roller
1200 Axle (186 used)
1400 Axle (144 used)
Q—Pinion (3 used)
R—Carrier Retaining Washer
S—Special Cap Screw
T—Lock Plate
U—Thrust Washer
V—Thrust Washer
W—Thick Washer

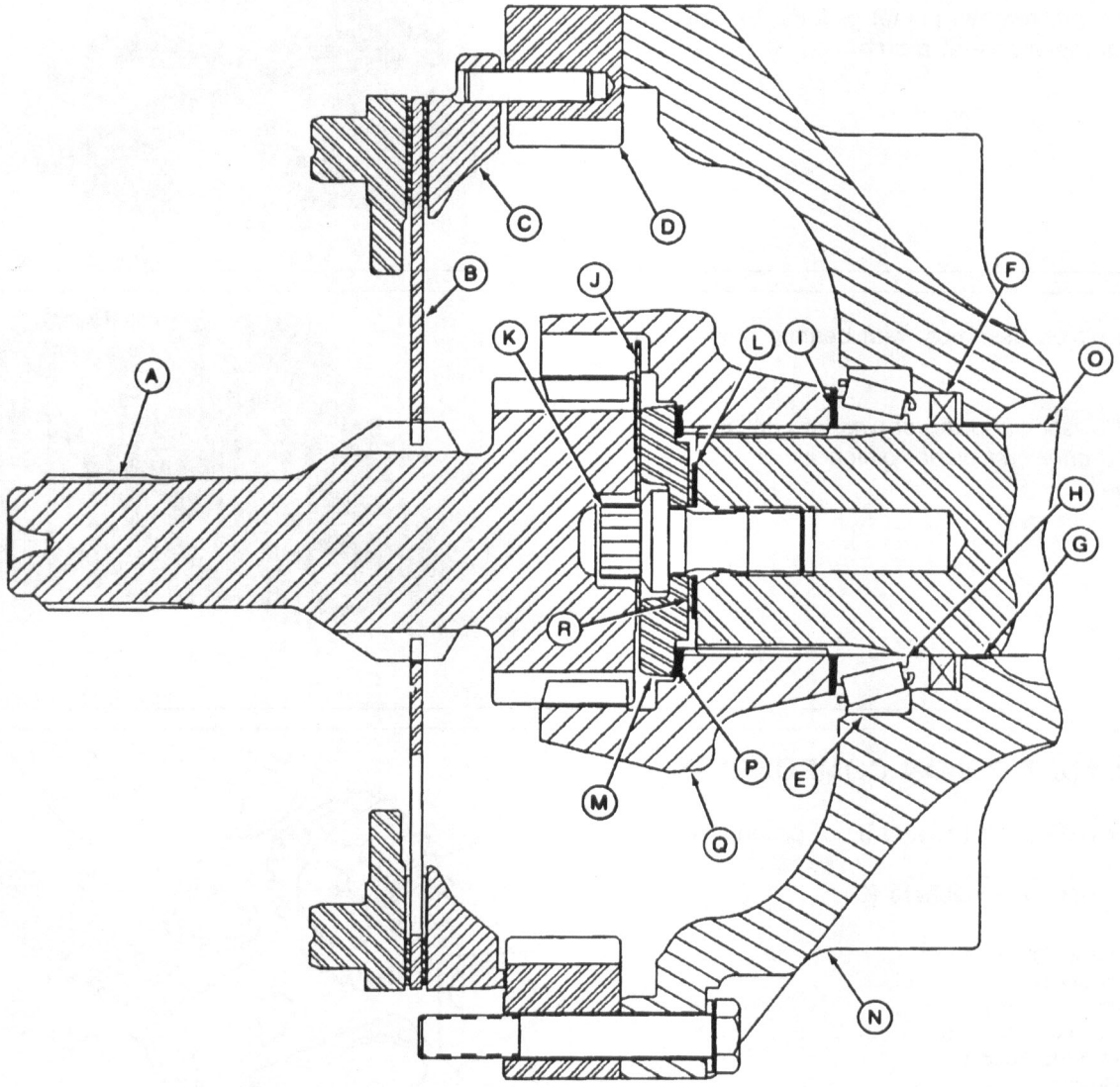
Seal (G), bearing cone (I), and cup (K) are press fit.

NOTE: Shim pack (N) is installed with thick washer (W) against axle shaft (H).

** Greased Outer Bearing Axles*

RX,4335,19C -19-08JAN98

CROSS-SECTIONAL VIEW—*FINAL DRIVE HUB AND AXLE SHAFT—1200 SERIES*



RW18711 -UN-27JAN95

A—Drive Shaft/Sun Pinion
B—Brake Disk
C—Brake Backing Plate
D—Final Drive Ring Gear
E—Bearing Cup
F—Seal*
G—Grease Dam
H—Bearing Cone
I—Thrust Washer
J—Lock Plate
K—Special Cap Screw
L—Thick Washer
M—Carrier Retaining Washer
N—Axle Housing
O—Axle Shaft
P—Thrust Washer
Q—Final Drive Hub
R—Shim Pack

NOTE: Bearing cups, cones, and seals are press fit.

Shim pack (L) is installed with thick washer (L) against axle shaft (O).

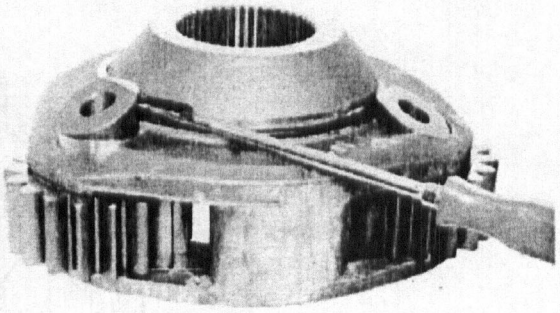
** Greased Outer Bearing Axles*

RX,4335,18B -19-24JAN95

DISASSEMBLE PLANET PINION CARRIER

Thoroughly clean planet pinion carrier.

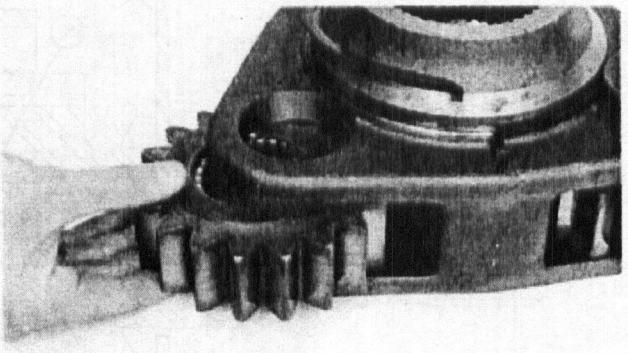
Remove snap ring to remove planet pinions. Remove one planet pinion assembly at a time.



RX,4335,20C -19-08JAN98

Remove planet pinion assembly with bearing rollers and thrust washers.

NOTE: Special washer and thrust washer can be removed after first planet pinion assembly is removed.



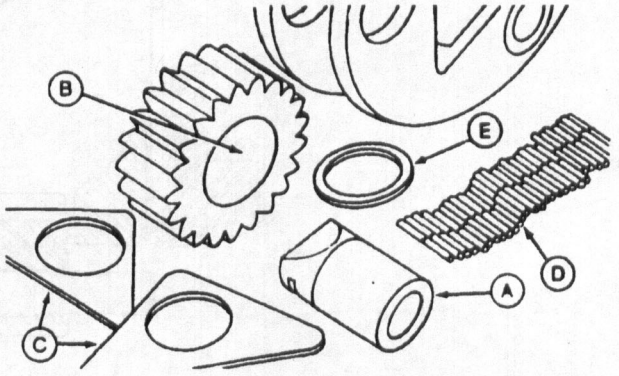
RX,4335,21C -19-08JAN98

INSPECT PLANET PINION COMPONENTS

Inspect OD of pinion shaft (A) and ID of pinion (B).

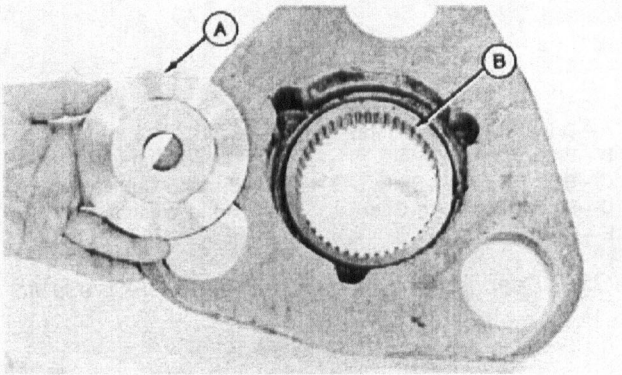
Inspect triangular-shaped washers (C).

A—Pinion Shaft (3 used)
B—Pinion (3 used)
C—Washers (6 used)
D—Bearing Rollers
E—Spacer (3 used)



RX,4335,22C -19-08JAN98

Inspect carrier retaining washer (A) and carrier contact surface (B) for galling. Replace carrier if damaged area exceeds 20 percent of the total contact surface.



RX,4335,23C -19-08JAN98

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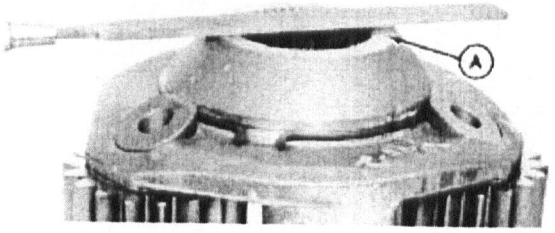
NOTE: High spots on carrier can be filed down on contact surface. If damaged area exceeds 20 percent of the total contact surface, replace carrier.



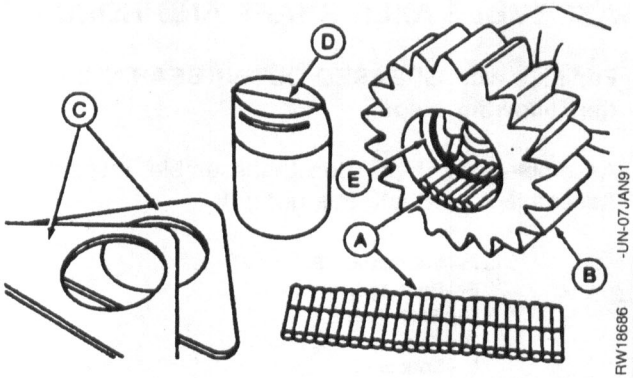
RX,4335,24C -19-08JAN98

ASSEMBLE PLANET PINION CARRIER

NOTE: Use petroleum jelly or oil soluble grease to hold bearing rollers in position during assembly.

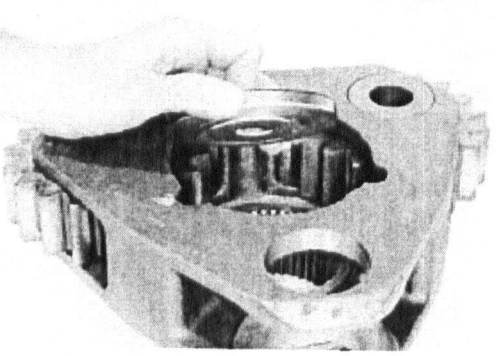
Install rollers with original pinion. Replace all pinion rollers if any are damaged or lost.

A—Bearing Rollers
B—Pinion (3 used)
C—Washer (6 used)
D—Pinion Shaft (3 used)
E—Spacer



RX,4335,25C -19-08JAN98

Install NEW thrust washer and carrier retaining washer, step side toward axle, before the last planet pinion assembly is installed.



RX,4335,26C -19-08JAN98

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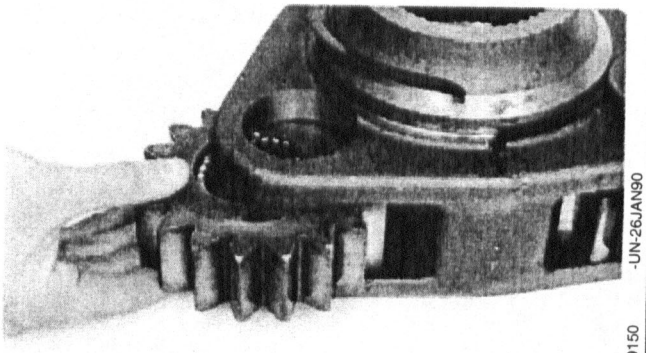
IMPORTANT: Make sure there is clearance between thrust washers and pinions after assembly.

Install thrust washers using petroleum jelly to hold washers in position. Check for clearance.

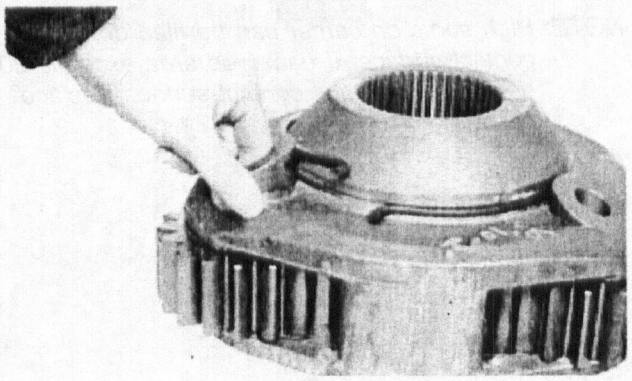
Install planet pinion assembly.



RX,4335,27C -19-08JAN98

Install the planet pinion shaft, with groove toward the snap ring.

Install the pinion shaft and the snap ring.



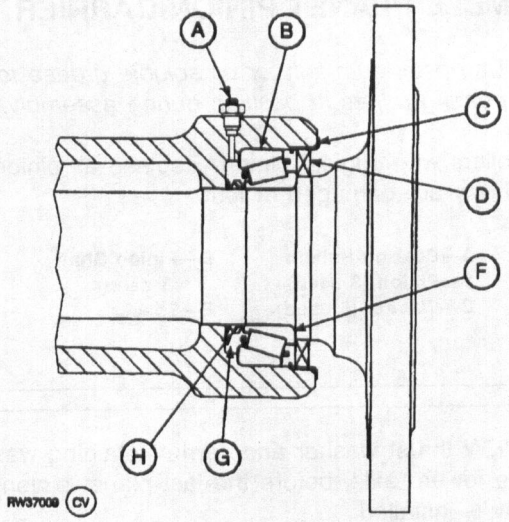
RX,4335,28C -19-08JAN98

ASSEMBLE AXLE SHAFT AND HOUSING

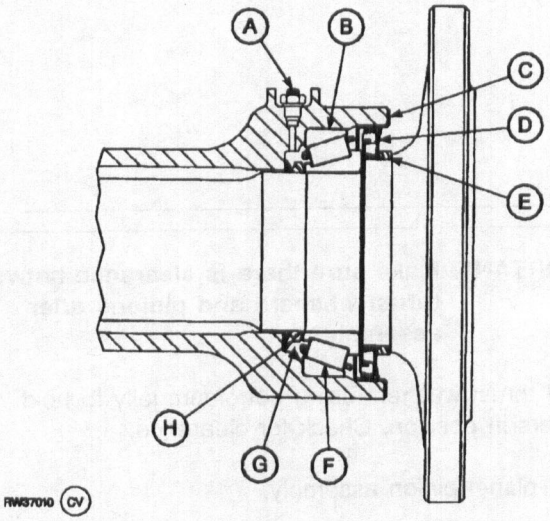
For axle with GREASED OUTER BEARING, perform the following steps:

Assemble axle shaft. (See Disassemble, Inspect, and Assemble Axle Shaft, this group.)

A—Lubrication Fitting
B—Bearing Cup
C—Seal Cup
D—Seal
E—Spacer
F—Bearing Cone
G—Grease Cavity
H—Seal



Without Spacer



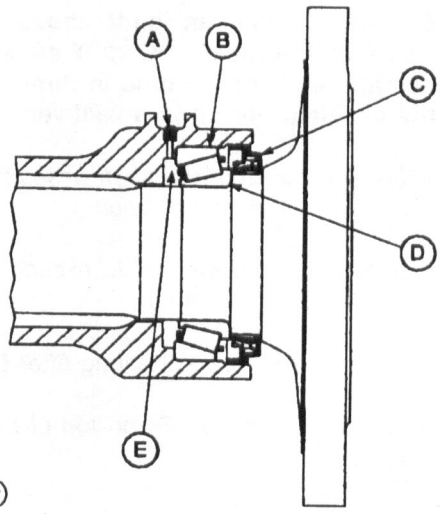
With Spacer

RX,4335,29C -19-08JAN98

For axle with OILED OUTER BEARING, perform the following step:

Assemble axle shaft. (See Disassemble, Inspect, and Assemble Axle Shaft, this group.)

A—Plug
B—Bearing Cup
C—Oil Seal
D—Bearing Cone
E—Oil Filled Cavity



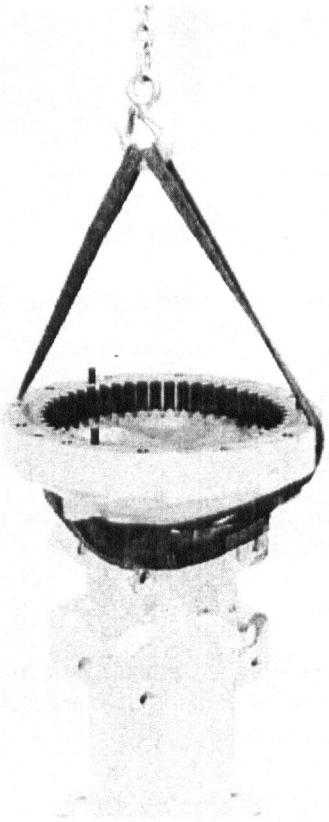
RX,4335,30C -19-08JAN98

For ALL axles, perform the following steps:

Put assembled axle shaft on flange end.

Carefully lower axle housing onto axle shaft using a hoist. Make sure shaft and housing seals are not damaged.

Turn axle housing approximately three revolutions to seat outer bearing cone.



RX,4335,31C -19-08JAN98

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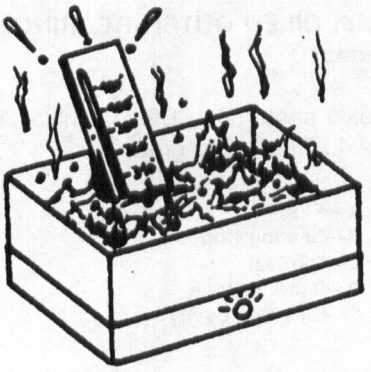
CAUTION: DO NOT heat oil over 182°C (360°F). Oil fumes or oil can ignite above 193°C (380°F). Use a thermometer. DO NOT allow a flame or heating element to come in direct contact with the oil. Heat the oil in a well-ventilated area.

NOTE: The axle housing and shaft assembly must remain in a vertical position.

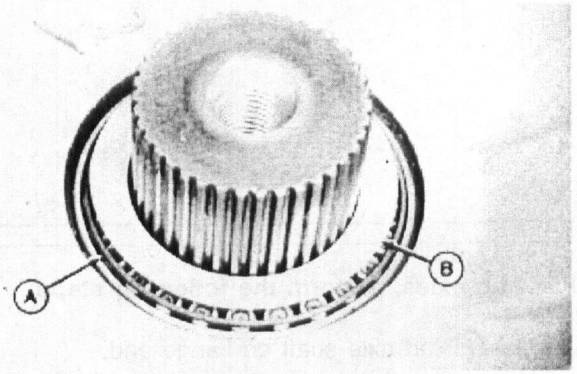
Heat inner bearing cone (A) not to exceed 150°C (300°F), and install on shaft.

Apply clean lubricating oil to bearing after bearing cools.

Install a new thrust washer (B) on top of bearing cone.



T81191 -UN-23FEB89



R40099 -UN-23JAN90

RX,4335,32C -19-08JAN98

ADJUST AXLE BEARINGS

Check to make sure inner bearing-to-carrier thrust washer (A) is installed.

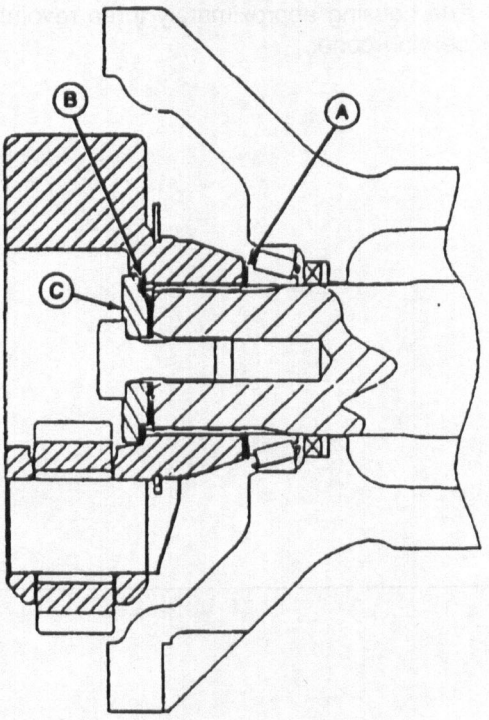
Install planet pinion carrier assembly, making sure a new thrust washer (B) is in position behind carrier retaining washer (C).

Finger-tighten special cap screw, then carefully place axle assembly on its side.

Tighten special cap screw to 908 N·m (670 lb-ft).

Lift entire assembly to vertical position using a hoist. Turn axle three revolutions to make sure bearing cups and cones are seated.

Loosen special cap screw several turns. Lift axle housing and tap axle flange with lead hammer to make sure there is no preload on bearings.



RW20631 -UN-18FEB92

Greased Outer Bearing Axle

RX,4335,33C -19-08JAN98

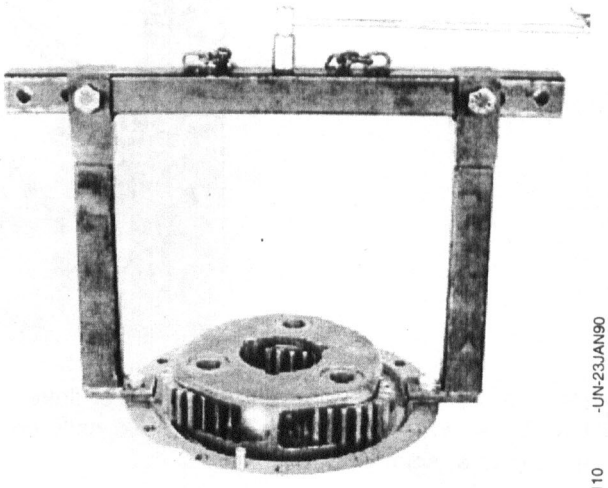
IMPORTANT: Rolling drag torque must be measured with axle in vertical position and cap screw loosened.

Measure the rolling drag torque. Measurement must not exceed specification.

ROLLING DRAG TORQUE SPECIFICATION

New Seals	22 N·m (16 lb-ft)
Used Seals	10 N·m (7 lb-ft)

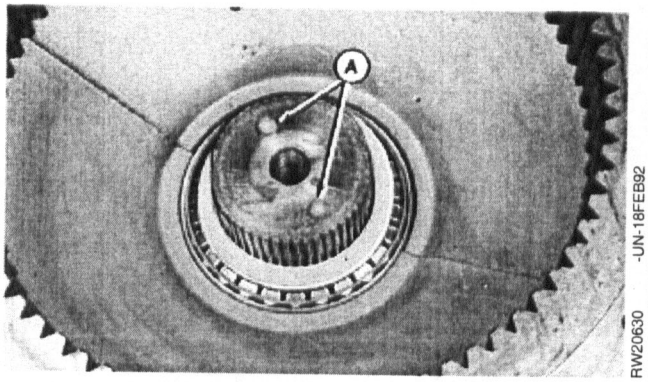
Remove special cap screw and carrier.



R40110 -UN-23JAN90

RX,4335,34C -19-08JAN98

Put two 8—10 mm (0.3—0.4 in.) diameter (R72232 lead Balls (A) on end of axle shaft, 180° apart. Use grease to hold balls in position.



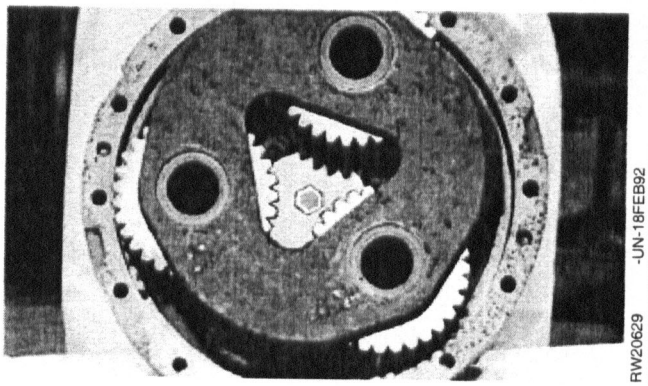
RW20630 -UN-18FEB92

RX,4335,35C -19-08JAN98

Install the carrier and tighten the cap screw to 196 N·m (145 lb-ft).

Rotate the carrier at least 12 times in both directions and check rolling drag torque. Torque must increase 8—16 N·m (6—12 lb-ft) over previous reading.

Increase cap screw torque by 68 N·m (50 lb-ft) if reading is low. Check rolling drag torque. Continue procedure until correct increase in reading is obtained.



RW20629 -UN-18FEB92

RX,4335,36C -19-08JAN98

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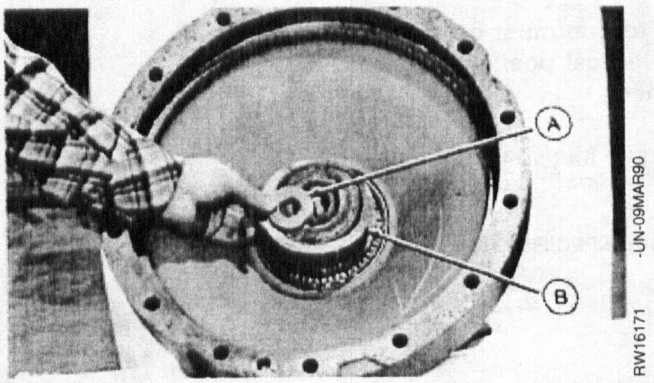


Remove carrier and measure thickness of flattened lead balls. Average thickness of the two balls equals thickness of shim pack required.

IMPORTANT: Shims vary in thickness and need to be measured individually. Never measure an entire shim pack.

Raise axle housing 13 mm (0.5 in.) using a hoist. Tap the axle flange with a lead hammer to remove any preload on the bearings.

Install shim pack (A) as measured with the thickest shim next to end of axle shaft. Be sure thrust washer (B) is in position.

RX,4335,37C -19-08JAN98

Install planet pinion carrier assembly and tighten special cap screw (A) to 908 N·m (670 lb-ft).

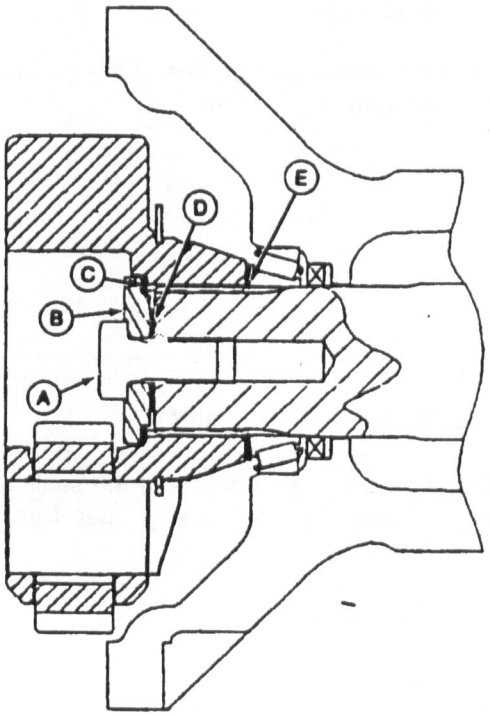
Rotate axle housing 12 times and measure rolling drag torque. Torque must increase 8—16 N·m (6—12 lb-ft) over previous reading.

NOTE: Adding or removing an 0.13 mm (0.005 in.) shim will change rolling drag torque by approximately 8 N·m (6 lb-ft).

Raise axle housing 13 mm (0.500 in.) before adding shims. Tap axle flange with a lead hammer to remove any preload on bearings.

Adjust shim pack thickness and repeat the two proceeding steps until the required rolling drag torque is obtained.

A—Special Cap Screw
B—Special Washer
C—Thrust Washer
D—Shim Pack
E—Thrust Washer



RW20632 -UN-18FEB92

Greased Outer Bearing Axle

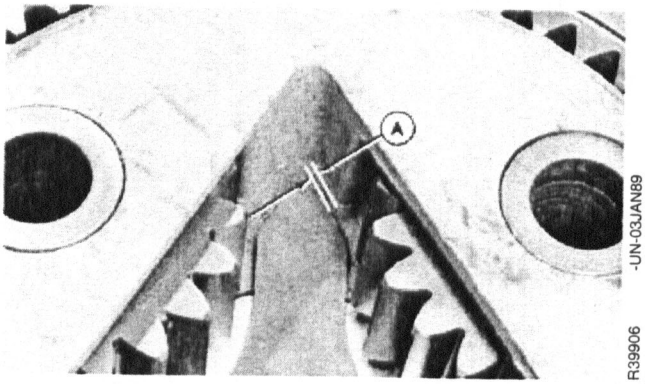
RX,4335,38C -19-08JAN98

Lubricate both sides of lock plate using multi-purpose grease. Install lock plate over cap screw head.

Turn the lock plate over or rotate cap screw head up to eight degrees to install lock plate correctly.

LOCK PLATE MINIMUM GAP SPECIFICATION

Gap Between Tang and Closest Edge in Pocket (A) . . . . . 0.5 mm (0.020 in.)

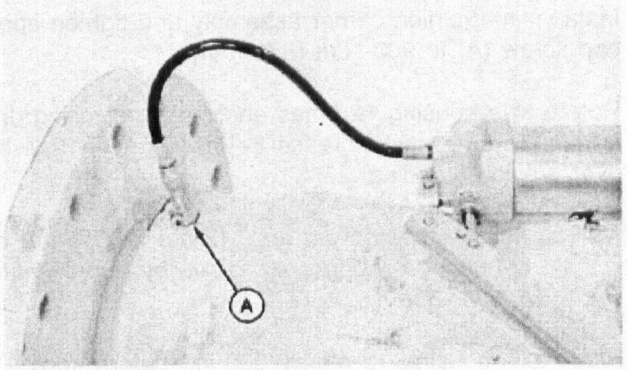


R39906 -UN-03JAN89

RX,4335,39C -19-08JAN98

For axle with GREASED OUTER BEARING, perform the following step:

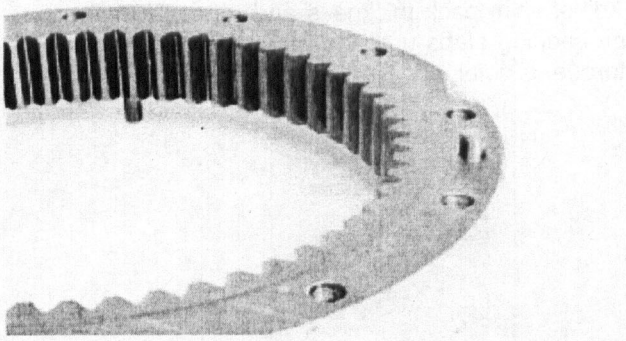
Fill bearing housing with grease at fitting (A) until grease escapes past outer axle seal.



RX,4335,40C -19-08JAN98

INSTALL AXLE HOUSING

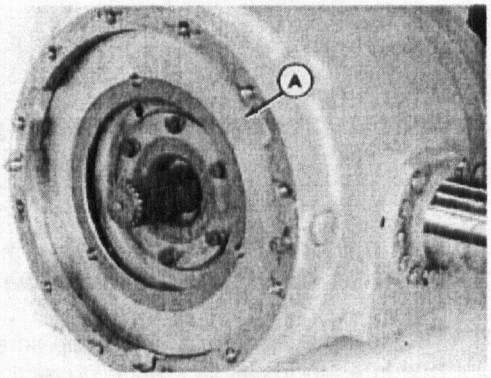
Clean both sides of ring gear and the sealing surfaces of differential case and axle housing. (See Sealing Instructions, Group 10.)



RX,4335,41C -19-08JAN98

NOTE: See Group 40 for brake assembly repair.

Install brake piston (A).



RX,4335,42C -19-08JAN98

35
25

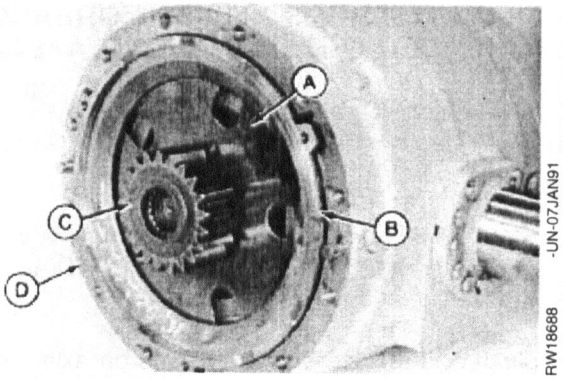
Install sun pinion shaft (C).

Install brake disk (A).

Install backing plate (B).

Apply TY16021* Gasket to differential case surface (D). (See Sealing Instructions, Group 10.)

A—Brake Disk
B—Backing Plate
C—Sun Pinion Shaft
D—Differential Case Surface



** See Group 10—Cross-Reference Chart for Canadian and Loctite Product Numbers*

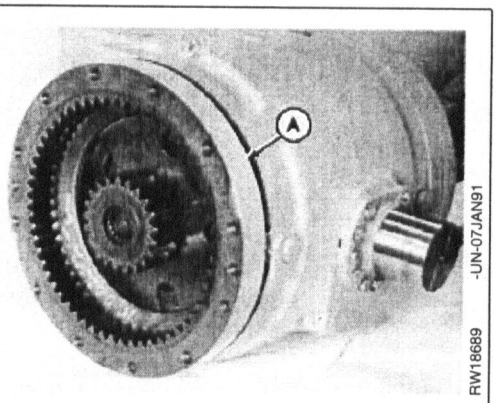
RX,4335,43C -19-08JAN98

Install ring gear (A) to differential case. Tap the ring gear into position with a lead hammer.

Apply TY16021* Gasket to the outer surface of the ring gear. (See Sealing Instructions, Group 10.)

Install axle housing assembly onto differential case.

Tighten cap screws to 364 N·m (269 lb-ft) starting from center and working toward top and bottom.



** See Group 10—Cross-Reference Chart for Canadian and Loctite Product Numbers*

RX,4335,44C -19-08JAN98

35
26

FILL AXLE HOUSING WITH GREASE *(GREASED OUTER BEARING AXLES)*

NOTE: Seal (D) and possibly seal (B) will need replacement if bearing (C) fails. Grease dam (A) may also be damaged.

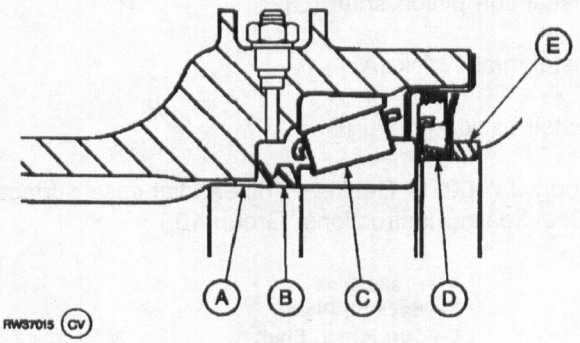
Axle housing may be used if there is no more than 2 mm (0.079 in.) RADIAL damage to grease dam (A).

Clean and replace damaged parts on axle shaft.

Inspect bearing cup in axle housing.

Remove rough edges on grease dam (A).

Clean all foreign material from the axle housing.



RW37015 -UN-20OCT94

A—Grease Dam
B—Seal
C—Bearing
D—Seal
E—Spacer

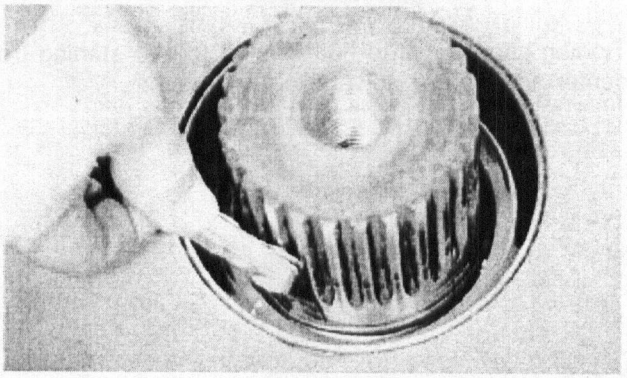
RX,4335,45C -19-08JAN98

IMPORTANT: Perform this procedure before adjusting axle bearings if grease dam was damaged.

Assemble axle shaft and housing in vertical position, taking care not to damage seals.

Carefully put a feeler gauge blade under lips of inner seal to relieve air lock when filling housing with grease.

Fill axle housing with grease until grease comes from seal opening.



R38555 -UN-03JAN89

RX,4335,46C -19-08JAN98

ESSENTIAL OR RECOMMENDED TOOLS

NOTE: Order tools from the U.S. SERVICE-GARD™ or European Microfiche Tool Catalogs.

ESSENTIAL TOOLS listed are required to perform the job correctly and are obtainable **only** from *SERVICE-GARD* or *European Tool Catalogs.*

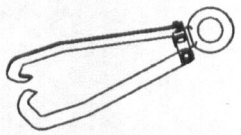
RECOMMENDED TOOLS, as noted, are suggested to perform the job correctly. Some tools may be available from local suppliers or may be fabricated.

RX,TOOLS -19-21APR94

RW25417 -UN-08APR96

Planetary Lifting Tool JDG890A*

Remove and install planetary assembly



** RECOMMENDED TOOL*

RX,JDG890A -19-19AUG96

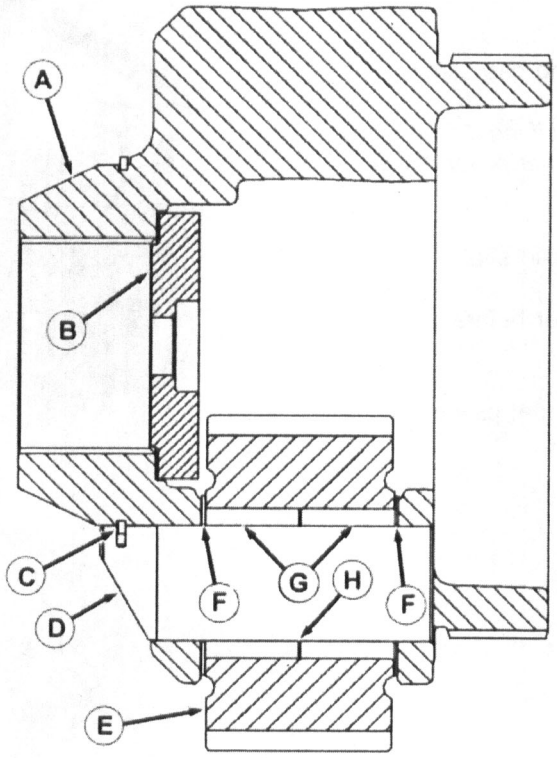
OTHER MATERIAL

Number	Name	Use
TY16021	High-Flex Form-in-Place Gasket	Seal joints

See Group 10—Cross-Reference Chart for Canadian and Loctite Product Numbers

RX,4336,1C -19-19DEC97

CROSS-SECTIONAL VIEW—*PLANET PINION CARRIER*



RW36681A -UN-20NOV97

A—Planetary Carrier
B—Special Washer
C—Snap Ring
D—Pinion Shaft
E—Pinion Gear
F—Thrust Washer
G—Needle Rollers
H—Needle Roller Spacer

RX,4336,2C -19-19DEC97

DISASSEMBLE PLANET PINION CARRIER

Remove brake components, final drives, and final drive ring gears.

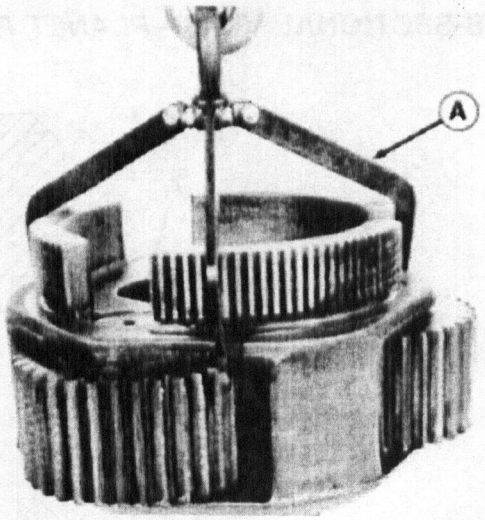
Remove carrier to axle shaft retaining cap screw.

NOTE: JDG890A Planetary Carrier Lifting Tool (A) may be used for handling the planet pinion carrier assembly.

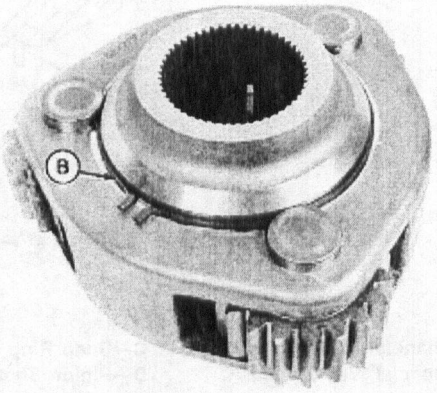
Remove planet pinion carrier from axle shaft.

Thoroughly clean planet pinion carrier before disassembly.

Remove snap ring (B) to remove planet pinions. Remove one planet pinion assembly at a time.



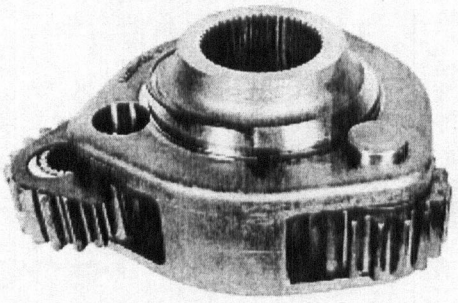
RW35838A -UN-21JUL97



RW35670 -UN-10MAR95

RX,4336,3C -19-19DEC97

Remove planet pinion with bearing rollers and thrust washers as an assembly.



RW35680 -UN-10MAR95

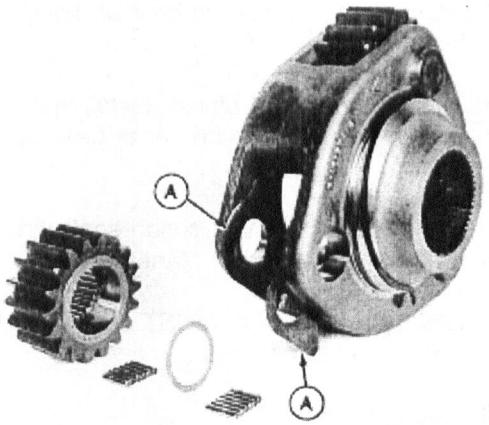
RX,4336,4C -19-19DEC97

INSPECT PLANET PINION COMPONENTS

Inspect OD of pinion shaft and ID of pinion.

Inspect thrust washers (A).

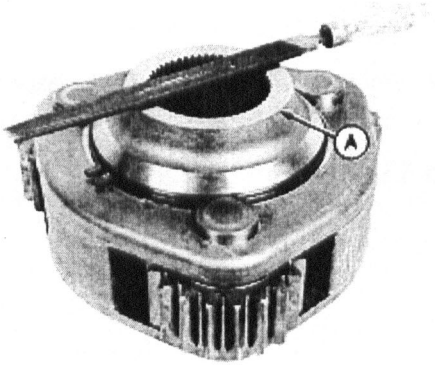
Remove and inspect special washer. Inspect washer contact surface. Replace carrier if damaged area exceeds 20 percent of the total contact surface.



RW35708 -UN-29MAR95

RX,4336,5C -19-19DEC97

File any high spots on carrier contact surface (A). If damaged area exceeds 20 percent of the total contact surface, replace carrier.



RW35684 -UN-10MAR95

RX,4336,6C -19-19DEC97

ASSEMBLE PLANET PINION CARRIER

NOTE: Hold thrust washers in position using petroleum jelly.

Install rollers with original pinion. Install spacer between bearing rollers. Replace entire set of bearing rollers for each pinion.

Make sure to position planet pinion shaft thrust washers (A) on each side of planet pinion.

NOTE: The special washer MUST be installed before the last planet pinion gear.

Install special washer.

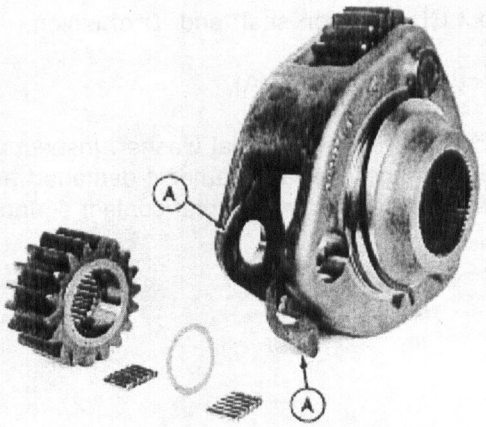
Check for clearance between thrust washers and pinion after assembly.

Install planet pinion shafts, with grooves toward the snap ring.

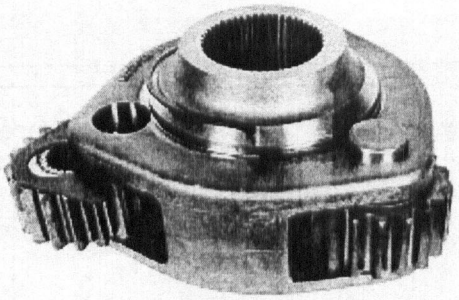
Install the snap ring in position.

NOTE: Refer to the Machine Technical Manual for component installation procedures.

Install planet pinion carrier to axle shaft.



RW35708 -UN-29MAR95



RW35680 -UN-10MAR95

RX,4336,7C -19-08JAN98

INSPECT AND INSTALL FINAL DRIVE RING GEAR

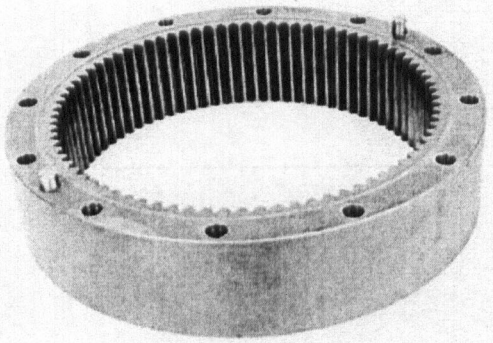
Inspect ring gear.

Clean both sides of ring gear and adjoining surfaces of brake backing plate and final drive.

Apply TY16021* Gasket to both sides of ring gear and adjoining surfaces.

Install dowel pins (A) on both sides of ring gear.

Install final drive ring gear to final drive.



RW35832A -UN-21JUL97

36
5

** See Group 10—Cross-Reference Chart for Canadian and Loctite Product Numbers*

RX,4336,8C -19-19DEC97

OTHER MATERIAL

Number	Name	Use
TY16021	High-Flex Form-in-Place Gasket	Seal joints

See Group 10—Cross-Reference Chart for Canadian and Loctite Product Numbers

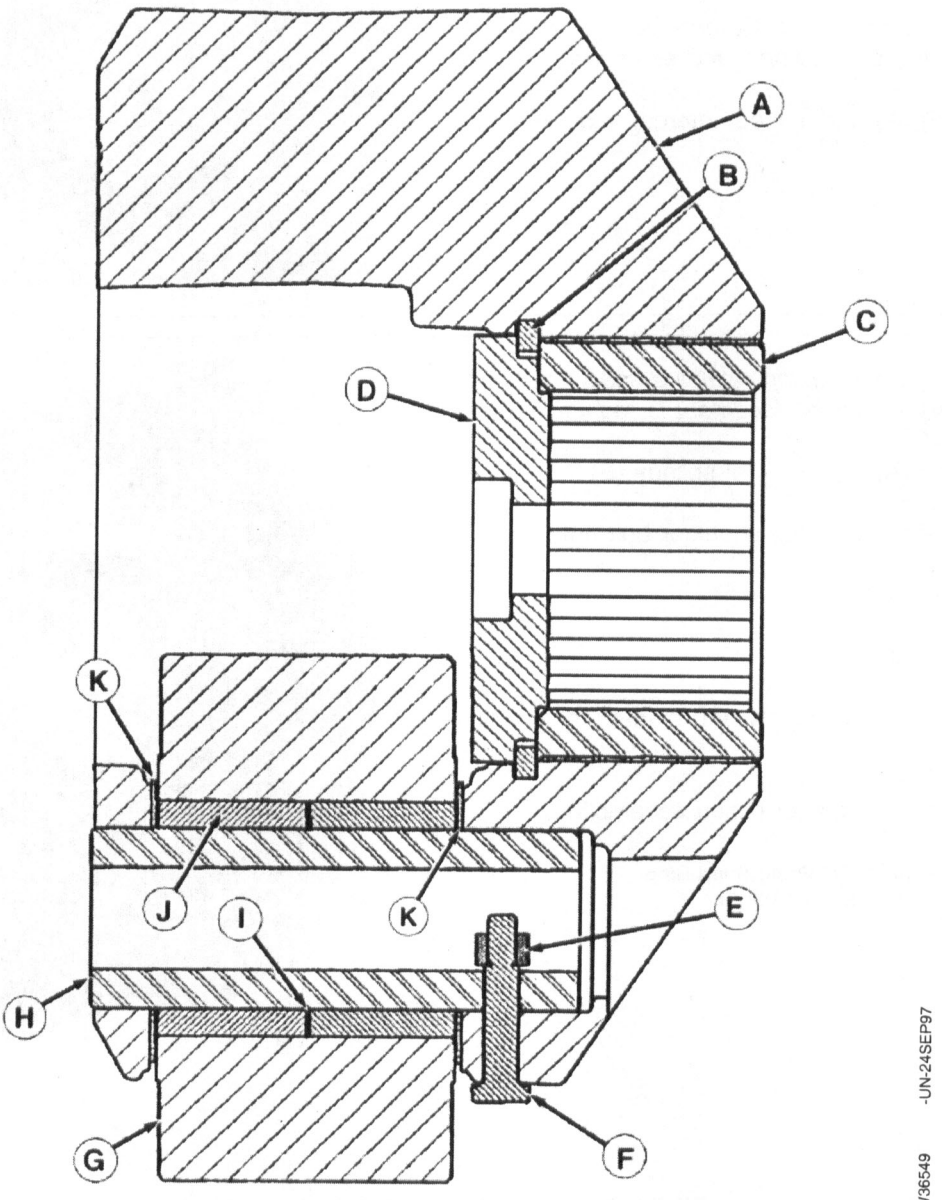
RX,4337,1C -19-19DEC97

SPECIFICATIONS

Item	Measurement	Specification
Pinion Shaft Retaining Bolts	Torque	18 N·m (13 lb-ft)

RX,4337,2C -19-19DEC97

CROSS-SECTIONAL VIEW—*PLANET PINION CARRIER*



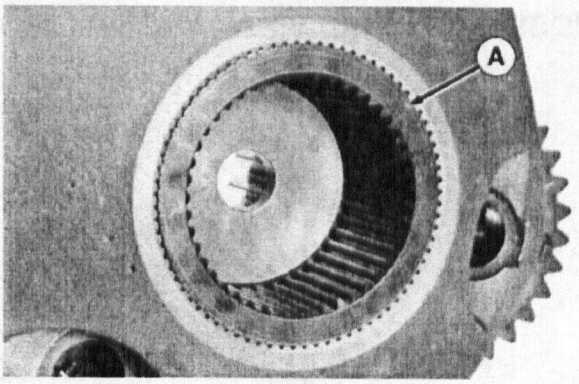
A—Planetary Carrier
B—Snap Ring
C—Coupling
D—Special Washer
E—Nut (3 used)
F—Shoulder Bolt (3 used)
G—Pinion Gear (3 used)
H—Pinion Shaft (3 used)
I—Needle Roller Spacer (3 used)
J—Needle Rollers (144 used)
K—Thrust Washer (6 used)

RX,4337,3C -19-19DEC97

DISASSEMBLE, INSPECT, AND ASSEMBLE PLANET PINION CARRIER

NOTE: Refer to Planet Pinion Carrier-Cross-Sectional View during disassembly and assembly.

Remove coupling (A) and inspect internal and external splines.



RX,4337,4C -19-19DEC97

NOTE: Removing the coupling retaining snap ring is not necessary unless replacement is required.

Inspect snap ring (A) and internal splines (B).

Remove pinion shaft retaining shoulder bolt nut (C).

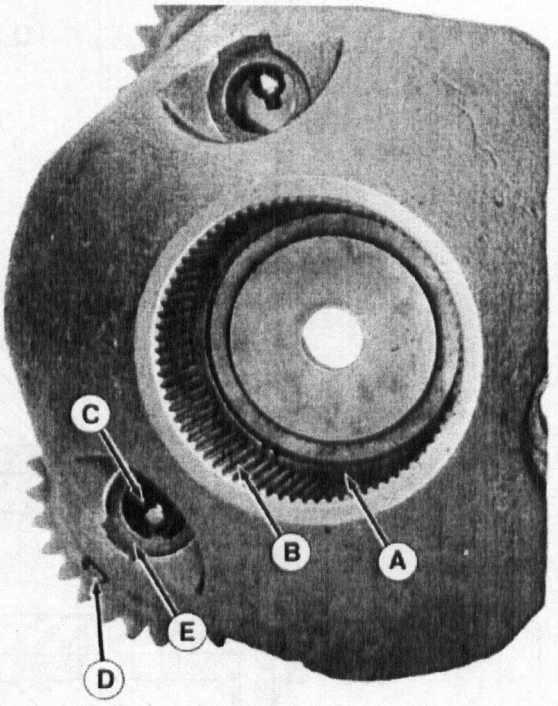
Remove shoulder bolt (D).

Remove pinion shaft (E).

Remove planet pinion assembly and planet pinion thrust washers.

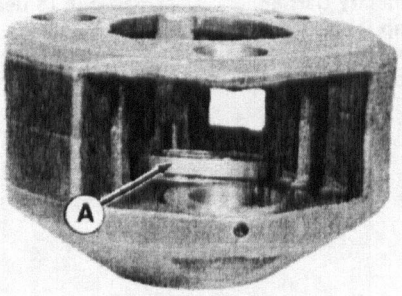
Remove the remaining planet pinion assemblies.

A—Coupling Retaining Snap Ring
B—Carrier Internal Splines
C—Nut
D—Shoulder Bolt
E—Pinion Shaft



RX,4337,5C -19-08JAN98

Remove the carrier retaining washer (A) from the carrier.



RX,4337,6C -19-19DEC97

Remove needle rollers and bearing spacer from pinions.

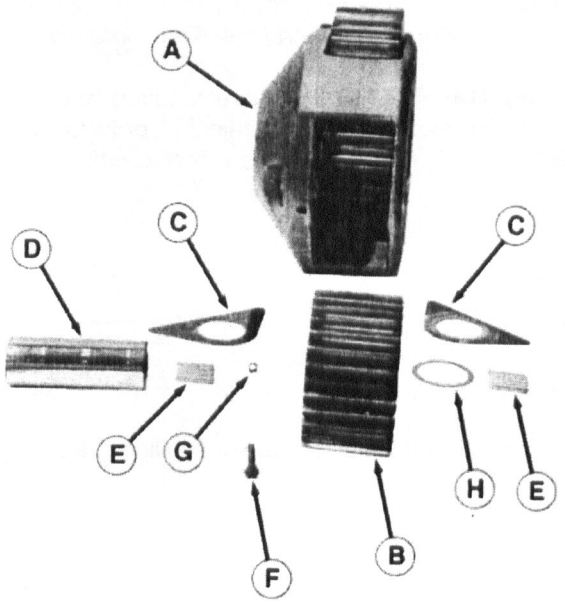
NOTE: A pair of heavy duty internal snap ring pliers with 90° tips is necessary to install the snap ring.

Install coupling retaining snap ring before installing the pinions.

NOTE: Use grease to hold the rollers in the pinions during assembly.

Assemble in reverse order making sure carrier retaining washer is installed before installing the pinion assemblies.

A—Planet Pinion Carrier
B—Pinion Gear
C—Thrust Washer (6 used)
D—Pinion Shaft (3 used)
E—Needle Rollers (144 used)
F—Shoulder Bolt (3 used)
G—Nut (3 used)
H—Pinion Bearing Spacer (3 used)

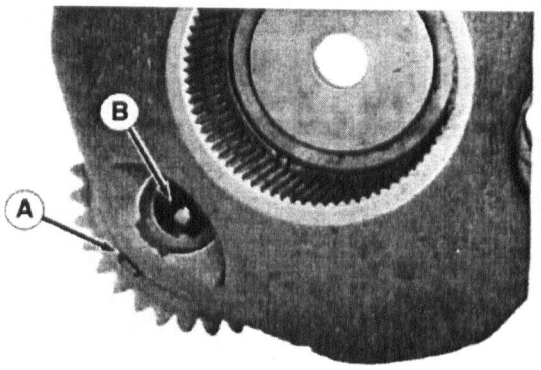


RW36750 -UN-11DEC97

RX,4337,7C -19-08JAN98

Install the pinion shaft retaining bolts (A).

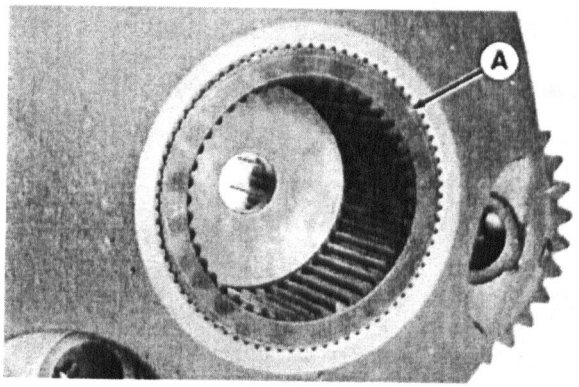
Install and tighten nuts (B) to 18 N·m (13 lb-ft).



RW36751 -UN-11DEC97

RX,4337,8C -19-19DEC97

Install coupling (A).



RW36747 -UN-11DEC97

RX,4337,9C -19-19DEC97

ESSENTIAL OR RECOMMENDED TOOLS

NOTE: Order tools from the U.S. SERVICE-GARD™ or European Microfiche Tool Catalogs.

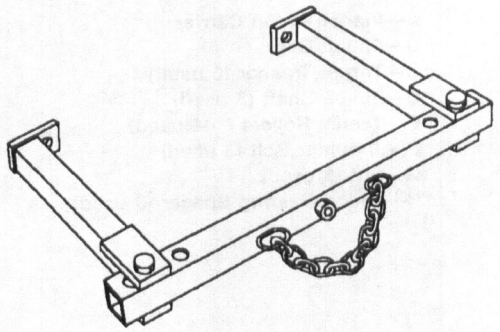
ESSENTIAL TOOLS listed are required to perform the job correctly and are obtainable **only** from *SERVICE-GARD* or *European Tool Catalogs.*

RECOMMENDED TOOLS, as noted, are suggested to perform the job correctly. Some tools may be available from local suppliers or may be fabricated.

RX,TOOLS -19-21APR94

Axle Adjusting Tool DF1057*

Rotate axle housing to measure rolling drag torque



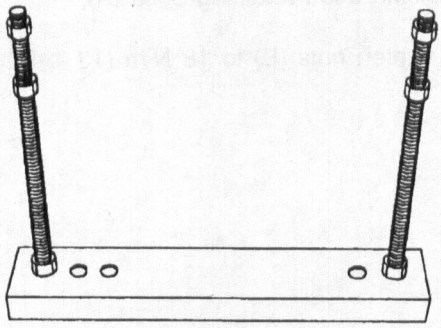
RW25324 -UN-16NOV94

** RECOMMENDED TOOL—See Group 499 for tool fabrication*

RX,DF1057A,CTM -19-05JAN95

Axle Jacking Tool DFRW30*

Remove axle housing from axle shaft



RW25328 -UN-16NOV94

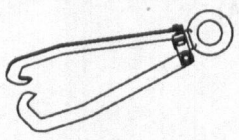
** RECOMMENDED TOOL—See Group 499 for tool fabrication*

RX,DFRW30A,CTM -19-17OCT97

RW25417 -UN-08APR96

Planetary Lifting Tool JDG890A*

Remove and install planetary assembly

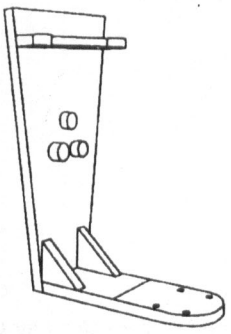


** RECOMMENDED TOOL*

RX,JDG890A -19-19AUG96

Axle Support Bracket JDG927*

Support axle assembly, using D05223ST rollover stand, during disassembly, adjustment, and assembly



RW25374 -UN-17MAY95

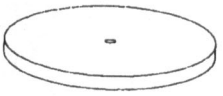
* *RECOMMENDED TOOL*

RX,JDG927 -19-11MAY95

RW25359 -UN-17MAY95

Driver Disk (7 in.) JDG931*

Install seals and bearing cups



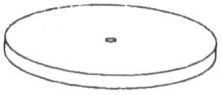
* *RECOMMENDED TOOL*

RX,JDG931 -19-26APR95

RW25359 -UN-17MAY95

Driver Disk (6-3/8 in.) JDG932*

Install seals and bearing cups



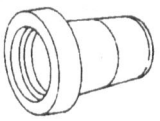
* *RECOMMENDED TOOL*

RX,JDG932 -19-26APR95

RW25154 -UN-22JUN94

Seal Installer JDG989

Install outer axle oil seal on flanged axle shaft

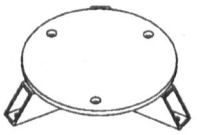


RX,JDG989 -19-19AUG96

RW25538 -UN-27SEP96

Axle Mounting Stand JDG1008*

Support final drives during disassembly and assembly



* *RECOMMENDED TOOL*

RX,JDG1008 -19-19AUG96

RW25126 -UN-26MAY94

Lifting Eyebolt JDG1025*

Lift axle shafts

* *RECOMMENDED TOOL*

RX,JDG1025 -19-09SEP96

OTHER MATERIAL

Number	Name	Use
R72232	Lead Balls	Determine axle shim pack thickness
TY16285	Cure Primer	Speed cure of liquid gasket
TY16021	High-Flex Form-in-Place Gasket	Seal joints

See Group 10—Cross-Reference Chart for Canadian and Loctite Product Numbers

RX,4338,1C -19-19DEC97

SPECIFICATIONS

Item	Measurement	Specification
Sensor Disk-to-Carrier Cap Screws	Torque	35 N·m (26 lb-ft)
Housing-to-Differential Case Cap Screws	Torque	See Install Final Drive Assemblies Tightening Procedure
Axle Special Cap Screw	Torque	908 N·m (670 lb-ft)
Axle Assembly	Rolling Drag Torque (Maximum)	25 N·m (18 lb-ft)
Axle Assembly	Rolling Drag Torque (Above Baseline)	16—37 N·m (12—27 lb-ft)
Axle Shaft	Diameter (New)	110.07—110.133 mm (4.335—4.336 in.)

RX,4338,2C -19-09JAN98

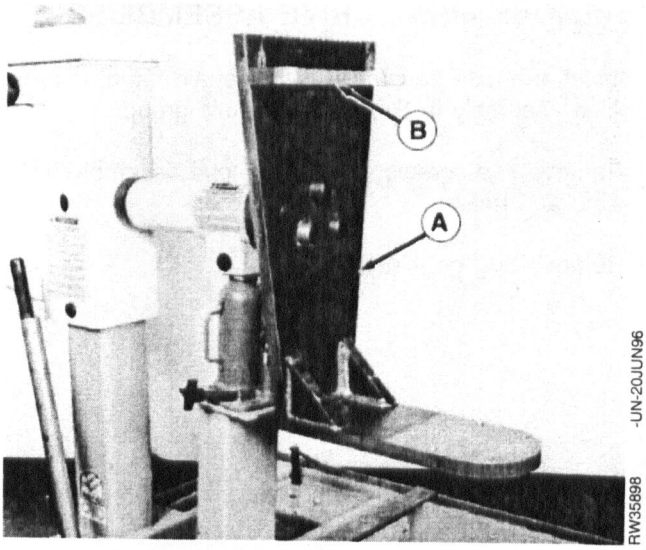
INSTALL AXLE IN REPAIR STAND

Remove axle from machine. (Refer to Machine Repair Manual.)

Remove the oscillating support and pivot pin (if equipped). (See 1600 Oscillation Supports, Group 16.)

Install JDG927 Support Bracket (A) to D05223ST Engine Rollover Stand.

Remove the support bracket top adapter (B).



RX,4332,3C -19-19DEC97

Install the axle assembly to the support bracket.

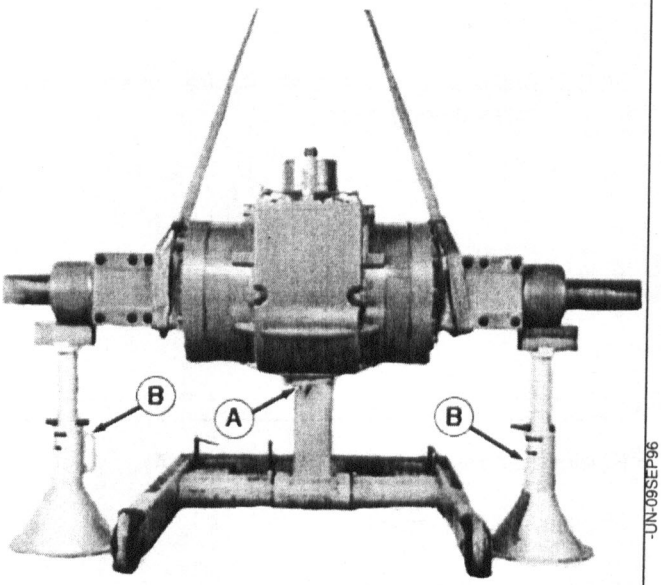
Install four M12 x 50 mm cap screws (A).

Install cone stands (B) under the axle housings to improve stability until the final drive assemblies are removed.

Remove chains/straps and lift brackets.

If input housing/cover is NOT being removed, perform the following step:

Remove two of the cover cap screws and substitute 25 mm (1 in.) longer cap screws and install the support bracket top adapter.



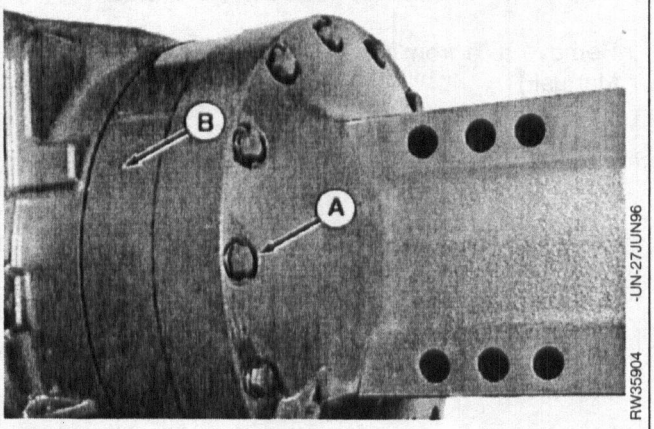
RX,4332,4C -19-19DEC97

REMOVE FINAL DRIVE ASSEMBLIES

Install the axle assembly in the repair stand. (See Install Axle Assembly in Repair Stand, this group.)

Remove cap screws (A) and remove assembly using a sling and hoist.

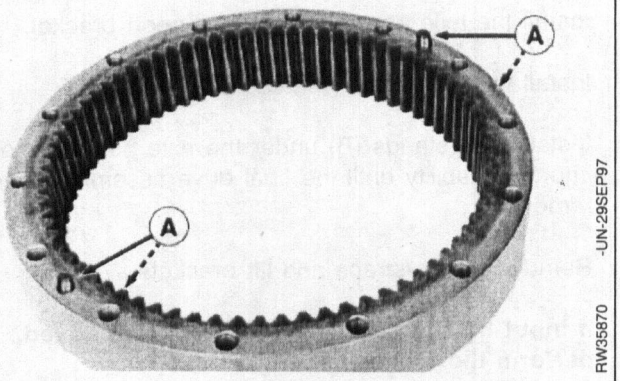
Remove ring gear (B).



RX,4338,3C -19-19DEC97

Inspect ring gear.

NOTE: Make sure dowel pins (A) are installed on both sides of ring gear.

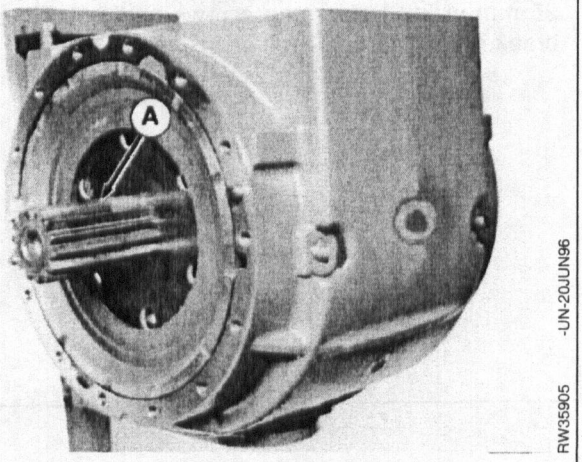


RX,4338,4C -19-19DEC97

Remove and inspect sun pinion shaft (A).

Replace as necessary.

Install sun pinion shaft.



RX,4338,5C -19-19DEC97

INSTALL FINAL DRIVE ASSEMBLIES

NOTE: Apply sealant to one surface only in a given joint.

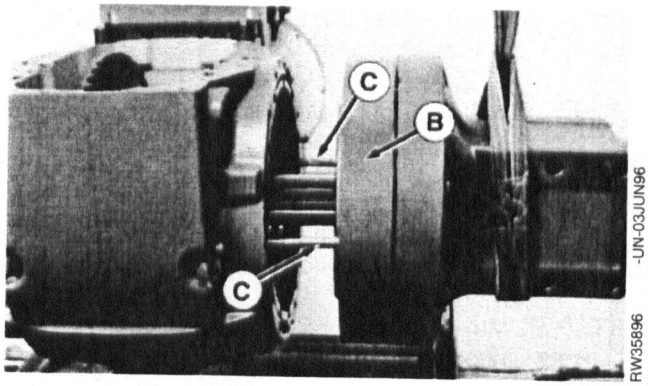
Clean sealing surfaces and apply TY16021* Gasket to differential case and outer ring gear surfaces.

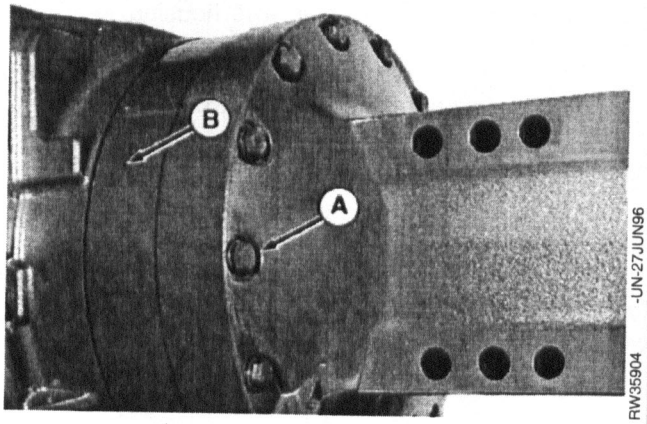
NOTE: Fabricate two guide pins (C) by removing the heads from 19M8190 cap screws (16 mm x 180 mm).

Install guide pins.

Install ring gear (B) on final drive assembly leaving a slight gap between axle housing and ring gear to prevent sealant from setting up, prior to tightening of cap screws.

Tighten all cap screws (A) to 230 N·m (170 lb-ft) using a criss-cross pattern.





** See Group 10—Cross-Reference Chart for Canadian and Loctite Product Numbers*

RX,4338,6C -19-09JAN98

Follow Steps A—D as illustrated, for each cap screw (A) using a criss-cross pattern.

NOTE: Put the first mark at a corner of the socket and the second mark 90° (1/4 turn) counterclockwise from the first mark.

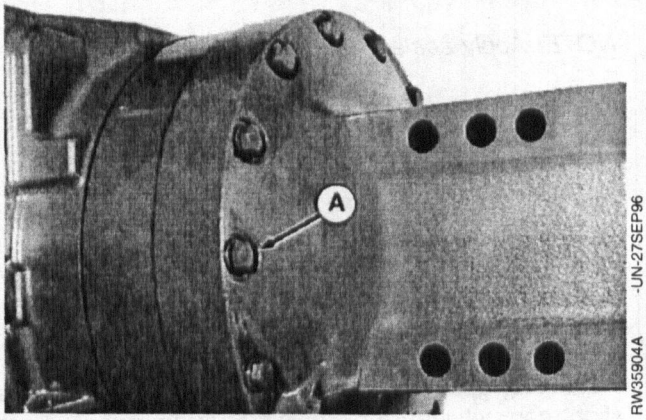
STEP A: Make a mark on socket and a second mark 90° (1/4 turn) counterclockwise from first mark.

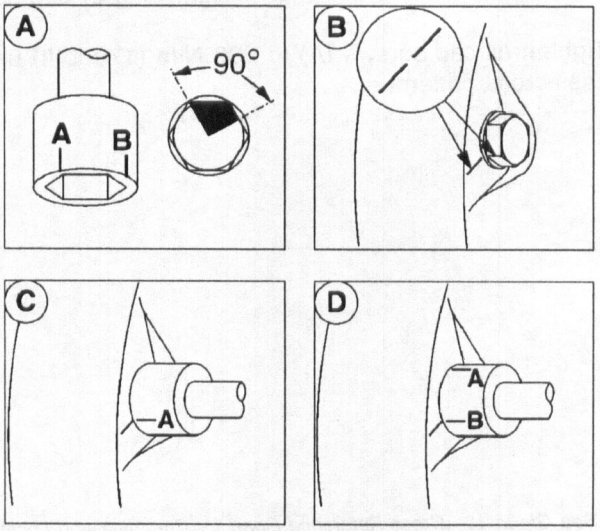
STEP B: Make a reference mark on a corner of the cap screw and on the axle housing next to cap screw.

STEP C: Put socket on cap screw so the first mark on socket aligns with mark on axle housing.

STEP D: Tighten cap screw 1/4 turn (90°) until second mark on socket aligns with mark on axle housing.

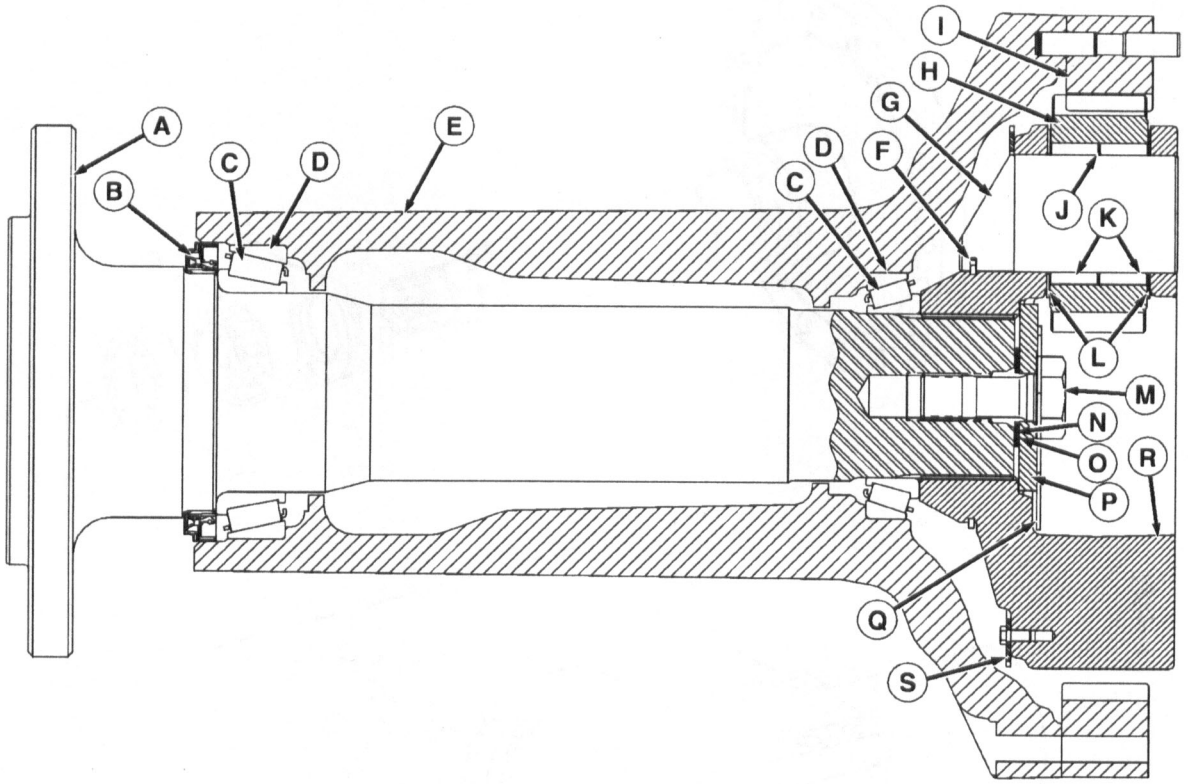
Remove the axle assembly from the repair stand.





RX,4338,7C -19-09JAN98

CROSS-SECTIONAL VIEW—*FINAL DRIVE AND AXLE ASSEMBLY OILED OUTER AXLE BEARING*

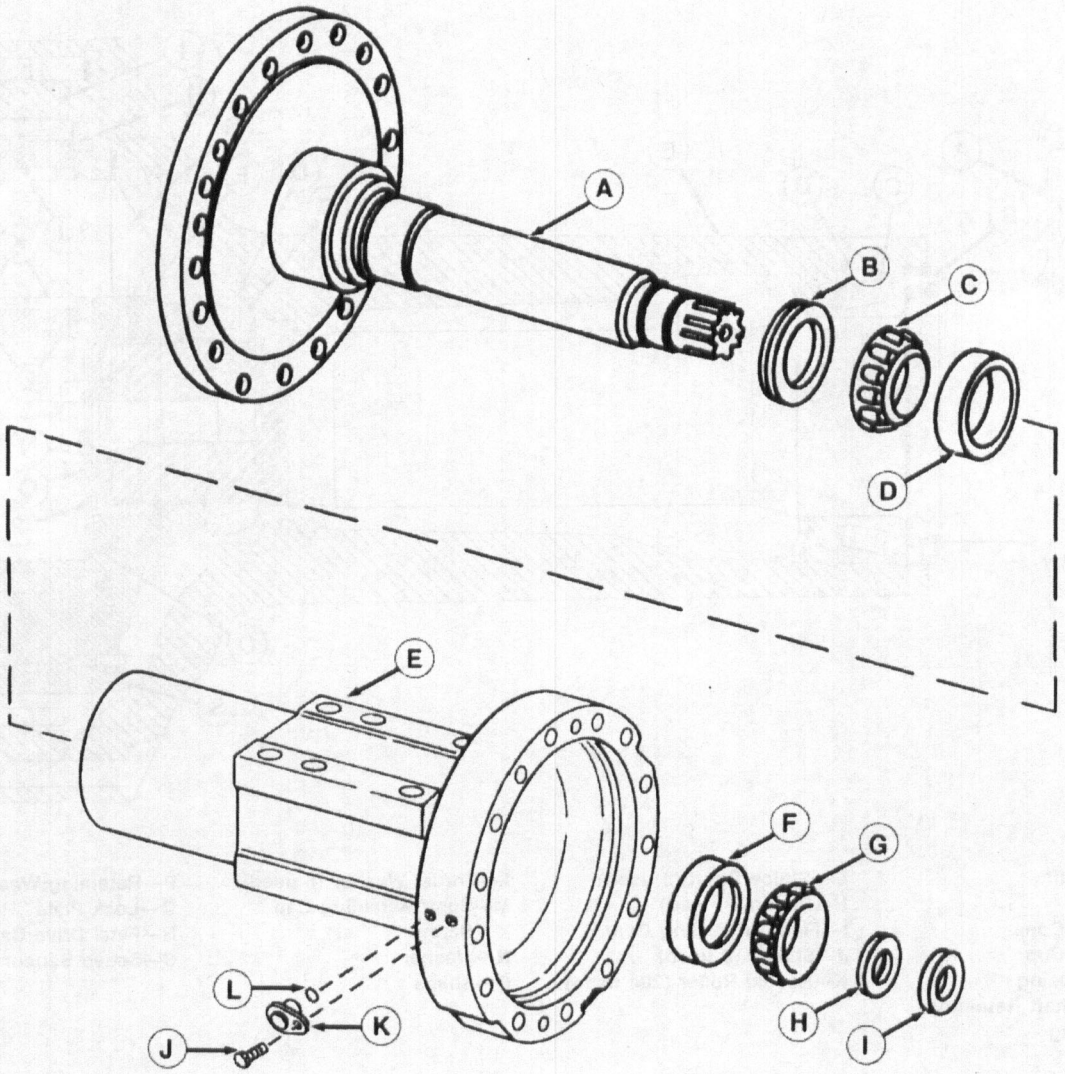


A—Axle Shaft
B—Oil Seal
C—Bearing Cone
D—Bearing Cup
E—Axle Housing
F—Pinion Shaft Retaining Snap Ring
G—Pinion Shaft (3 used)
H—Pinion (3 used)
I—Final Drive Ring Gear
J—Spacer (3 used)
K—Needle Roller (204 used)
L—Thrust Washer (6 used)
M—Shaft Retaining Cap Screw
N—Washer
O—Shims
P—Retaining Washer
Q—Lock Plate
R—Final Drive Carrier
S—Speed Sensor Disk *

** John Deere Application Only*

RX,4338,8C -19-09JAN98

EXPLODED VIEW—*AXLE SHAFT AND HOUSING OILED OUTER AXLE BEARING*

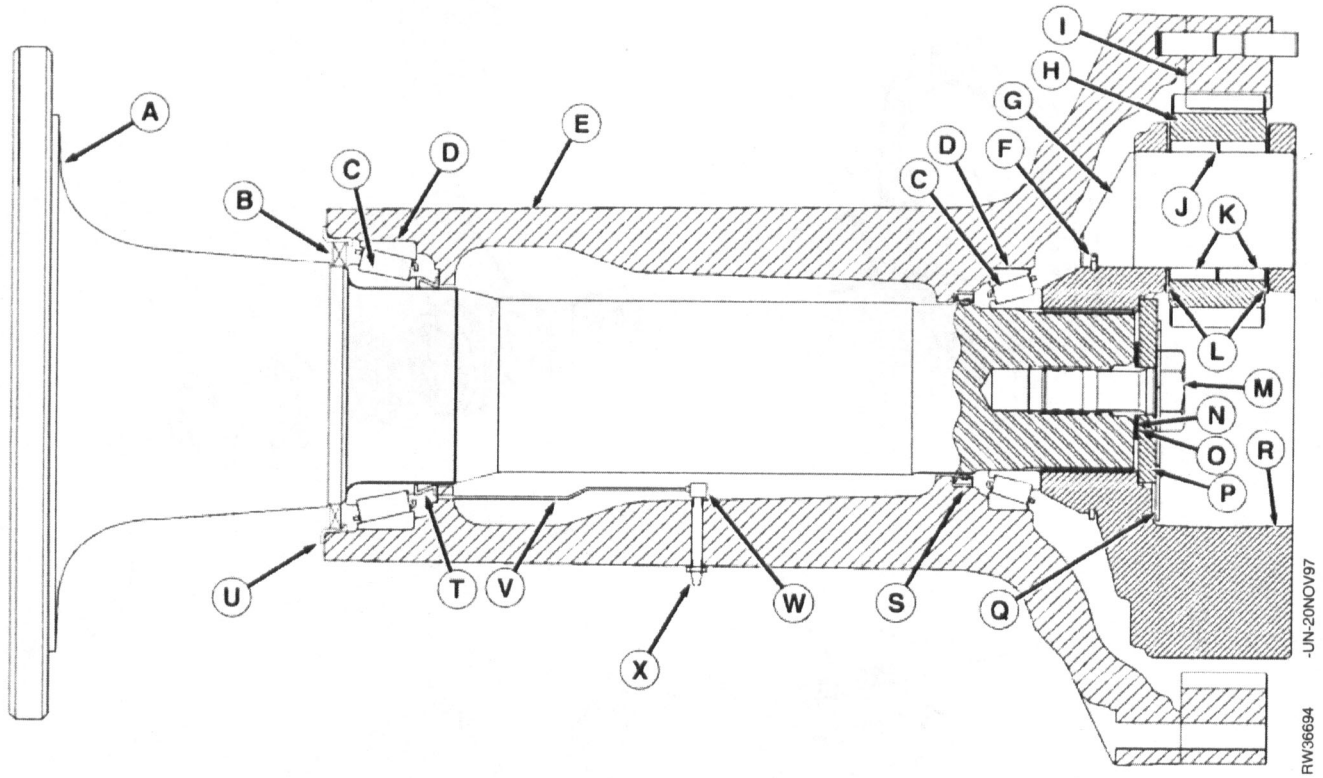


A—Axle Shaft
B—Oil Seal
C—Bearing Cone
D—Bearing Cup
E—Axle Housing
F—Bearing Cup
G—Bearing Cone
H—Shim
I—Washer
J—Cap Screw *
K—Speed Sensor Plug *
L—O-Ring *

John Deere Application Only

RX,4338,9C -19-09JAN98

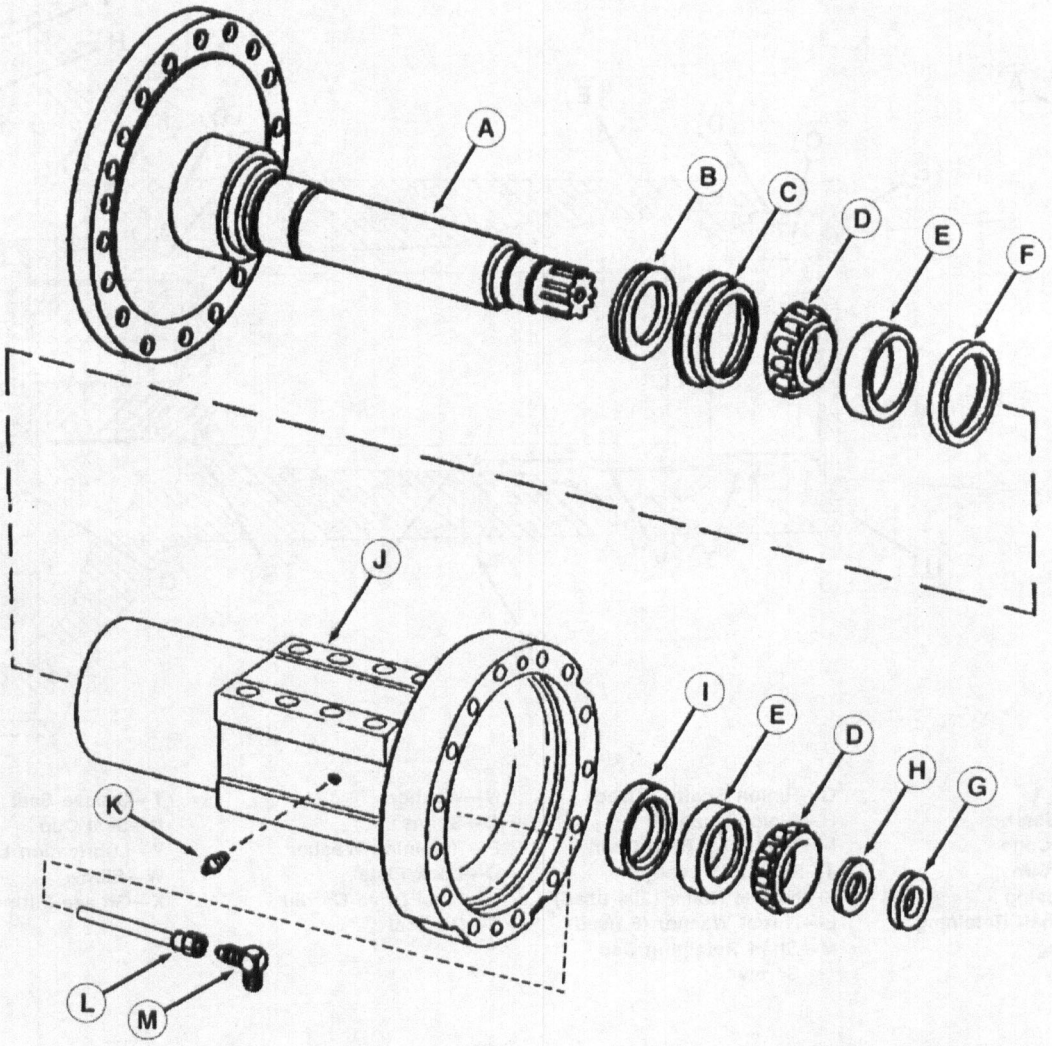
CROSS-SECTIONAL VIEW—*FINAL DRIVE AND AXLE ASSEMBLY GREASED OUTER AXLE BEARING*



A—Axle Shaft
B—Grease Seal
C—Bearing Cone
D—Bearing Cup
E—Axle Housing
F—Pinion Shaft Retaining Snap Ring
G—Pinion Shaft (3 used)
H—Pinion (3 used)
I—Final Drive Ring Gear
J—Spacer (3 used)
K—Needle Roller (204 used)
L—Thrust Washer (6 used)
M—Shaft Retaining Cap Screw
N—Washer
O—Shims
P—Retaining Washer
Q—Lock Plate
R—Final Drive Carrier
S—Oil Seal
T—Grease Seal
U—Seal Cup
V—Lubrication Line
W—Elbow
X—Grease Fitting

RX,4338,10C -19-09JAN98

EXPLODED VIEW—*AXLE SHAFT AND HOUSING GREASED OUTER AXLE BEARING*



A—Axle Shaft
B—Grease Seal
C—Seal Cup
D—Bearing Cone
E—Bearing Cup
F—Grease Seal
G—Retaining Washer
H—Shims
I—Oil Seal
J—Axle Housing
K—Grease Fitting
L—Lubrication Line
M—Elbow

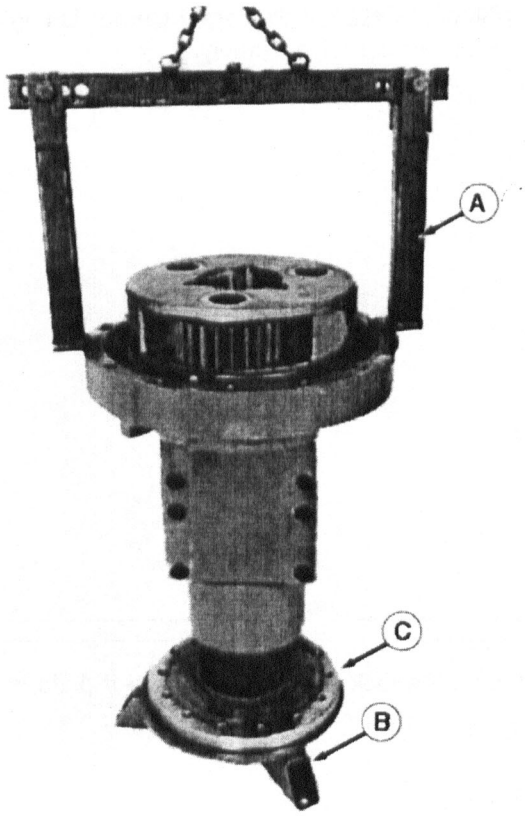
RX,4338,11C -19-09JAN98

DISASSEMBLE FINAL DRIVE

NOTE: Refer to Final Drive—Cross-Sectional View during disassembly.

Install DF1057* Axle Adjusting Tool (A) and install the final drive assembly into the JDG1008 Rear Axle Support Stand (B) bolted to the floor.

Use three of the wheel mounting bolts (C), to fasten axle to the support stand.



RW35925 -UN-25JUN96

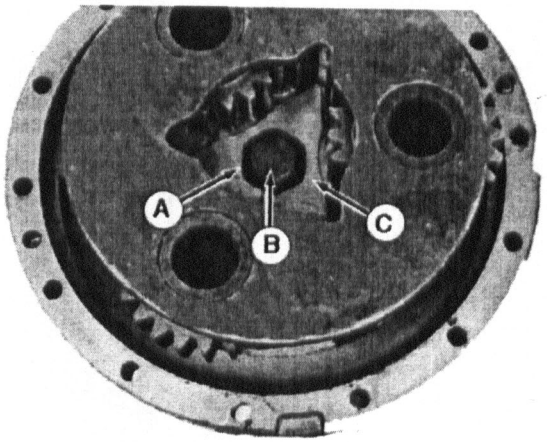
** See Group 499 for tool fabrication*

RX,4338,12C -19-19DEC97

NOTE: O-ring (A) is installed at the factory to retain the lock plate on the special cap screw (B) during assembly.

Remove the O-ring (A) and slightly loosen or tighten the planet pinion carrier retaining washer-to-axle special cap screw (B) and remove the lock plate (C) from the screw head.

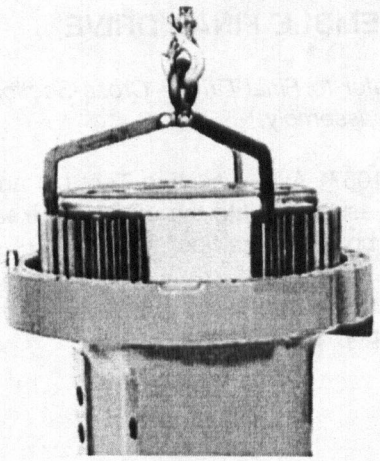
Remove the cap screw from the carrier.



RW35926 -UN-25JUN96

RX,4338,13C -19-19DEC97

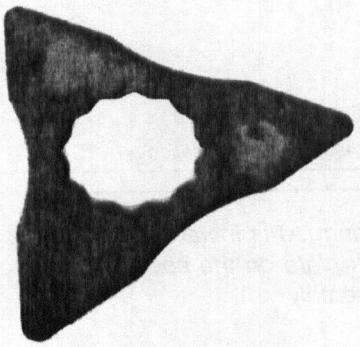
Install the JDG890A Planetary Carrier Lifting Tool and remove the carrier assembly.



RW35907 -UN-27JUN96

RX,4338,14C -19-19DEC97

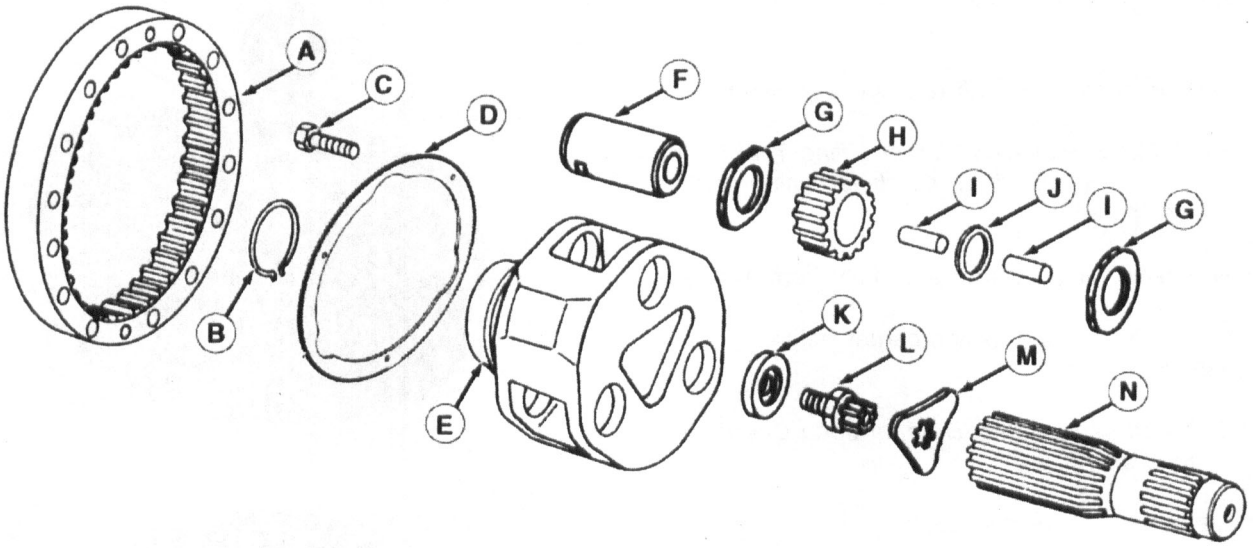
Inspect the lock plate, and replace if plate is bowed.



RW35915 -UN-20JUN96

RX,4338,15C -19-19DEC97

EXPLODED VIEW—*FINAL DRIVE PLANETARY CARRIER*



A—Final Drive Ring Gear
B—Snap Ring
C—Cap Screw *
(3 used)
D—Speed Sensor Disk *
E—Planetary Pinion Carrier
F—Planet Pinion Shaft
(3 used)
G—Thrust Washer (6 used)
H—Planet Pinion (3 used)
I—Bearing Roller (204 used)
J—Spacer (3 used)
K—Retaining Washer
L—Cap Screw
M—Lock Plate
N—Sun Pinion Shaft

** John Deere Application Only*

RX,4338,16C -19-09JAN98

DISASSEMBLE PLANET PINION CARRIER

Remove brake components, final drives, and final drive ring gears.

Remove carrier to axle shaft retaining cap screw.

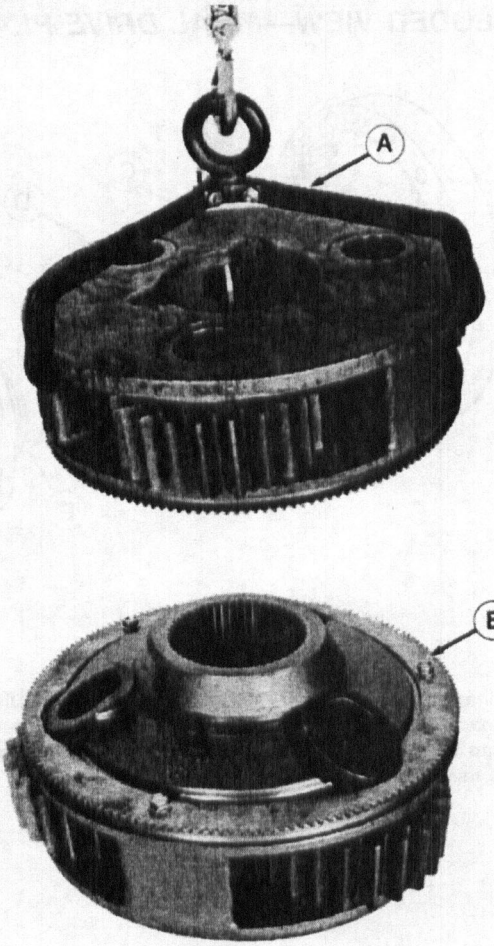
NOTE: JDG890A Planetary Carrier Lifting Tool (A) may be used for handling the planet pinion carrier assembly.

Remove planet pinion carrier assembly from axle shaft.

Thoroughly clean planet pinion carrier before disassembly.

NOTE: Speed sensor disk (B) is for John Deere application only.

Remove speed sensor disk (B).



RW35923 -UN-20JUN96

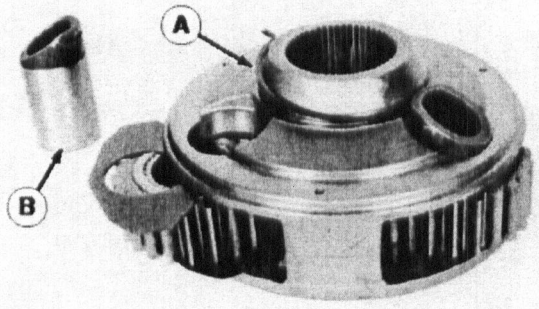
RW35924 -UN-20JUN96

RX,4338,17C -19-09JAN98

NOTE: Remove one pinion shaft and pinion at a time.

Remove snap ring (A) to remove pinion shaft (B).

Remove planet pinion with bearing rollers and thrust washers as an assembly.



RW35917 -UN-20JUN96

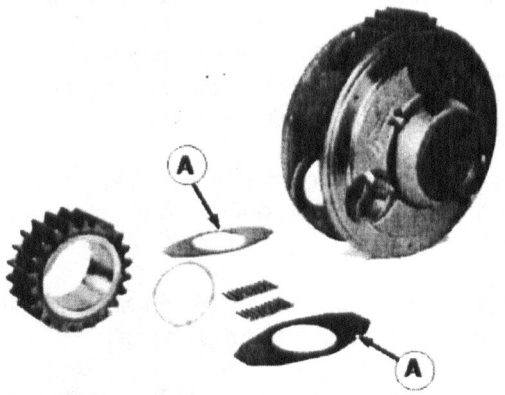
RX,4338,18C -19-19DEC97

INSPECT PLANET PINION COMPONENTS

Inspect OD of pinion shaft and ID of pinion.

Inspect thrust washers (A).

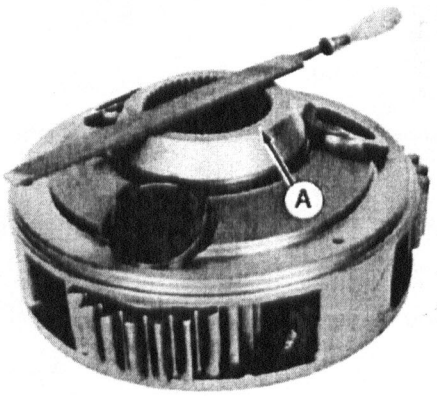
Remove and inspect special washer contact surface. Replace carrier if damaged area exceeds 20 percent of the total contact surface.



RW35918 -UN-20JUN96

RX,4338,19C -19-19DEC97

File any high spots on carrier contact surface (A). If damaged area exceeds 20 percent of the total contact surface, replace carrier.



RW35919 -UN-25JUN96

RX,4338,20C -19-19DEC97

ASSEMBLE PLANET PINION CARRIER

NOTE: Hold thrust washers and bearing rollers in position during assembly using petroleum jelly or an oil soluble grease.

Install rollers with original pinion. Install spacer between bearing rollers. Replace entire set of rollers for each pinion.

Make sure to position planet pinion shaft thrust washers (A) on each side of planet pinion.

NOTE: The special washer MUST be installed before the last planet pinion gear.

Install special carrier retaining washer.

Check for clearance between thrust washers (A) and pinion after assembly.

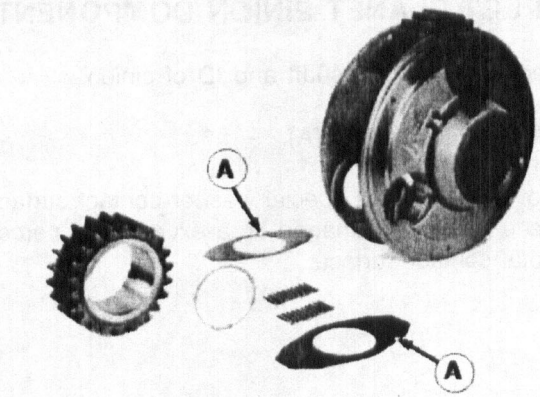
Install planet pinion shafts (B), with grooves toward the snap ring (C).

Install the snap ring.

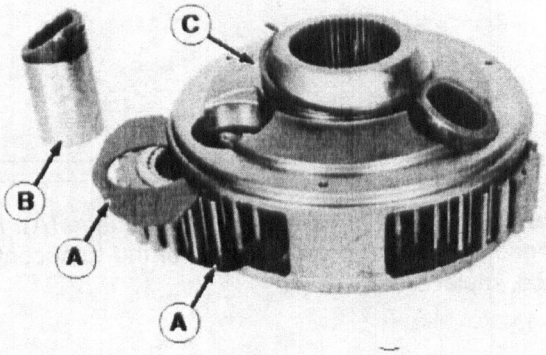
NOTE: Speed sensor disk is for John Deere application only.

Install speed sensor disk to carrier and tighten cap screws to 35 N·m (26 lb-ft).

Install planet pinion carrier to axle shaft.



RW35918 -UN-20JUN96



RW35920 -UN-20JUN96

RX,4338,21C -19-09JAN98

REMOVE AXLE HOUSING

Remove planet pinion carrier as previously instructed.

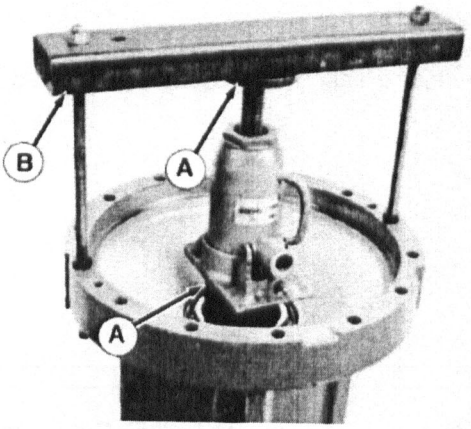
IMPORTANT: Use a disk (A) between head of jack and axle shaft to avoid damage to end of shaft. Use a second disk between top of jack and tool crossbar for added strength to crossbar.

Press axle shaft through inner bearing using a hydraulic jack and DFRW30* Axle Jacking Tool (B).

Remove hydraulic jack, disk, and jacking tool and remove bearing cone.

NOTE: For oiled outer bearing axles, separation of the axle housing and shaft will damage the outer oil seal. A NEW seal MUST be installed each time the housing is removed.

Remove axle housing from axle shaft using a hoist with a chain or strap around the axle jacking tool. Be sure housing is balanced on the chain or strap.



RW35908 -UN-25JUN96

** See Group 499 for tool fabrication*

RX,4338,22C -19-19DEC97

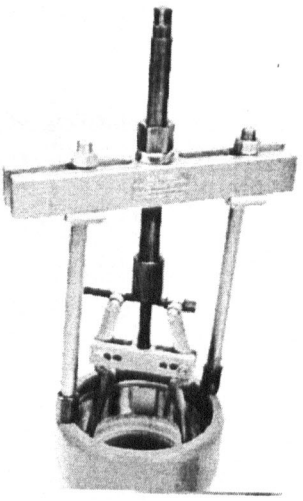
DISASSEMBLE AND ASSEMBLE AXLE HOUSING

NOTE: Refer to Final Drive—Cross-Sectional View during disassembly and assembly.

Remove inner and outer bearing cups using puller tools.

Install outer bearing cup tight to bottom of bore using JDG931 Driver Disk (7 in.).

Install inner bearing cup tight to bottom of bore using JDG932 Driver Disk (6-3/8 in.).

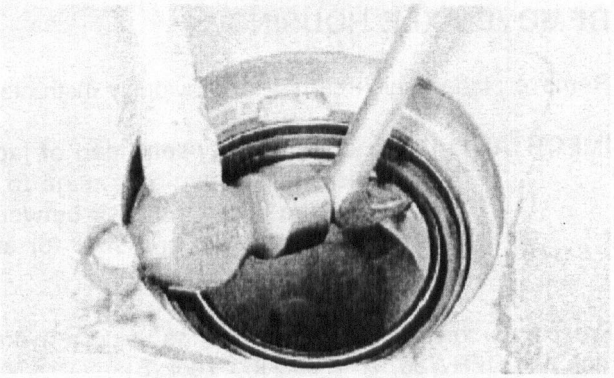


RW35875 -UN-23MAY96

RX,4338,23C -19-19DEC97

For axles with GREASED OUTER BEARING, perform the following steps:

Remove inner grease seal if worn or damaged.



RW16950 -UN-09MAR90

RX,4335,16C -19-19DEC97

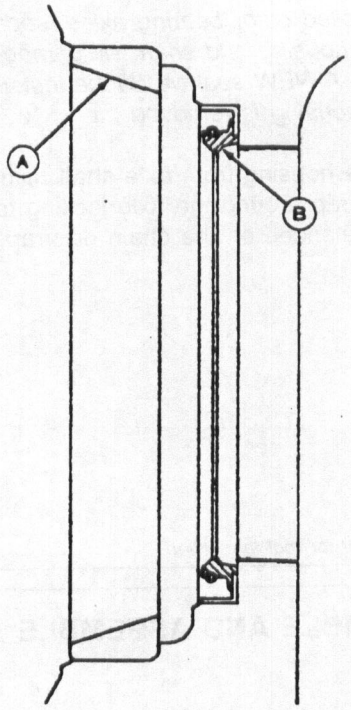
Coat inner seal bore using TY16285* Cure Primer. Apply TY16021* Gasket to outside diameter of seal.

Install inner oil seal (B) flush with bottom of bore with spring side of seal facing seal driver. Apply multi-purpose grease on lips of seal.

IMPORTANT: Be careful not to damage seal against bottom of bore. Seal must be straight in the bore and must not be more than 0.51 mm (0.020 in.) deeper than the opposite side when installed.

For ALL axles, perform the following steps:

Install bearing cup (A) to bottom of bore.



RW13200 -UN-03JAN89

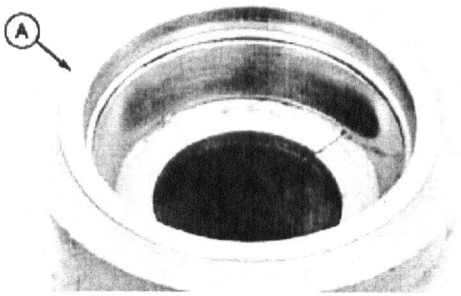
** See Group 10—Cross-Reference Chart for Canadian and Loctite Product Numbers*

RX,4335,17C -19-09JAN98

Install outer bearing cup, using appropriate diameter driver, to bottom of bore.

For axle with GREASED OUTER BEARING, perform the following step:

Install axle outer seal cup (A) flush to end of axle housing using appropriate diameter driver or a block of wood.



R35899 -UN-03JAN89

Greased Outer Bearing Axle

RX,4335,18C -19-19DEC97

DISASSEMBLE, INSPECT, AND ASSEMBLE AXLE SHAFT

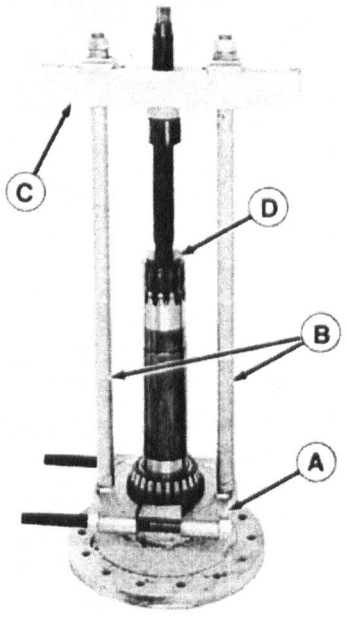
IMPORTANT: DO NOT use a torch to remove axle bearing cones. Heating to temperatures as low as 204°C (400°F) will cause early axle failure.

Inspect bearing and seal.

Remove bearing cone and seal using a puller tool.

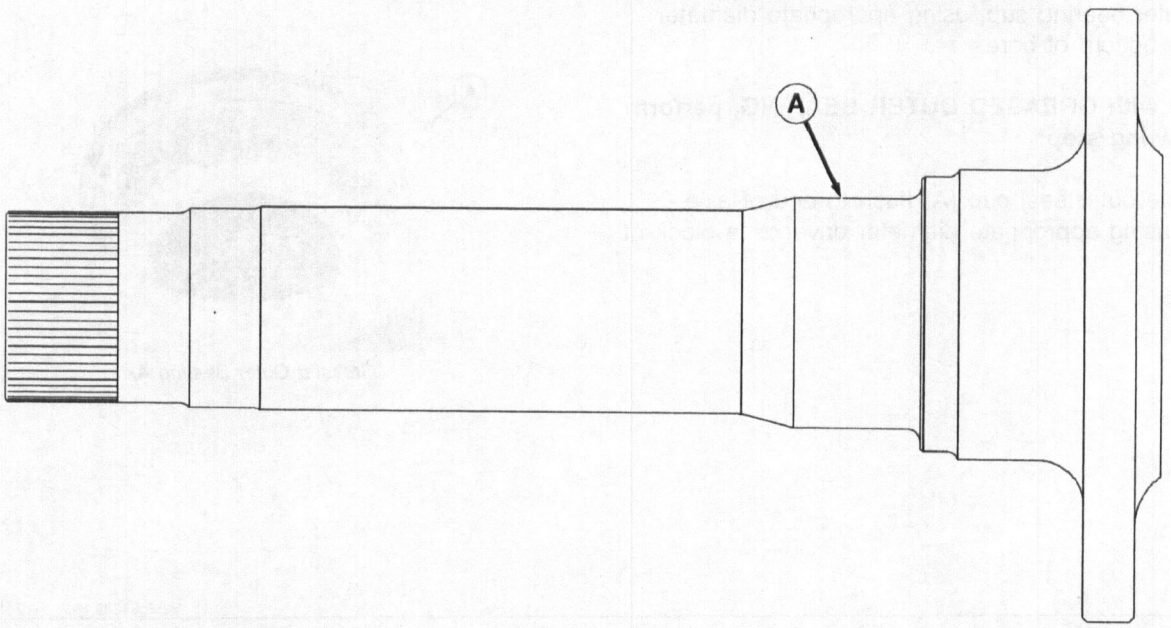
NOTE: For oiled outer bearing equipped axles, the outer oil seal MUST be replaced.

A—Bearing Puller
B—Puller Legs
C—Puller
D—4-1/4 in. Disk



RW36736 -UN-02DEC97

RX,4335,11C -19-19DEC97



RW35952 -UN-09SEP96

Inspect axle shaft outer bearing adjoining surface.

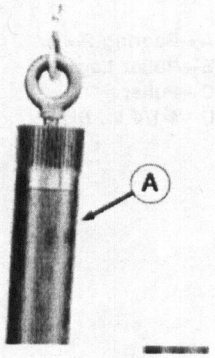
Replace parts as required.

NEW AXLE DIAMETER SPECIFICATION

Diameter (A)	133.388—133.428 mm (5.251—5.253 in.)

RX,4338,24C -19-19DEC97

Install JDG1025 Lifting Eye (A), and remove the axle shaft from the support stand.



RW35938 -UN-28JUN96

RX,4338,25C -19-19DEC97

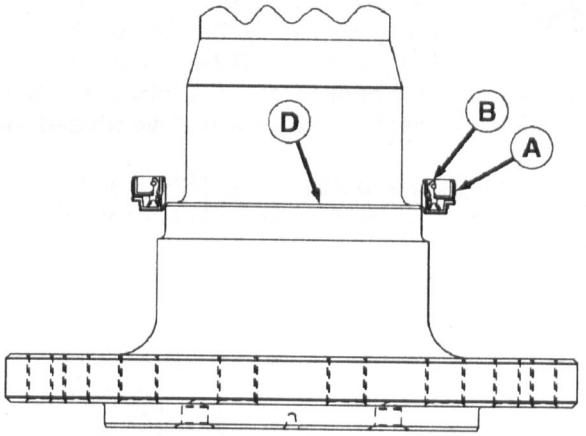
For axles with oiled outer axle bearings, perform the following steps:

Dip the axle shaft outer seal in oil to ensure the seal OD and the gap between seal halves are lubricated.

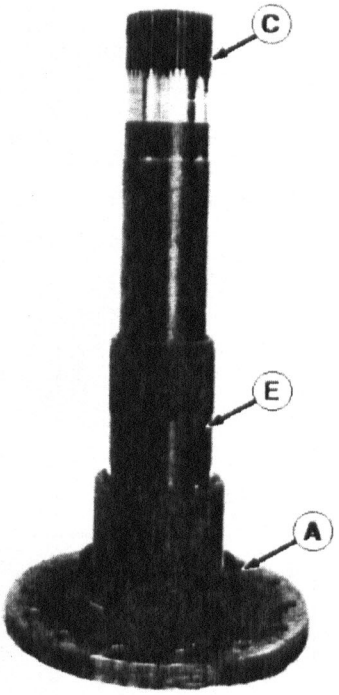
Position oil seal (A) on axle shaft with spring side (B) toward axle splines (C).

Assemble seal onto axle shaft flush to 0.5 mm (0.020 in.) below the bearing cone shoulder (D) using JDG989 Seal Installer (E).

A—Oil Seal
B—Spring Side of Oil Seal
C—Axle Splines
D—Axle Shaft Bearing Cone Shoulder
E—JDG989 Seal Installer



RW35959 -UN-09SEP96

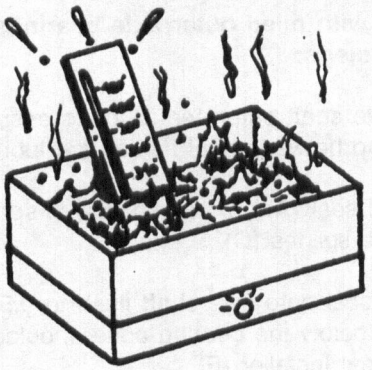


RW35921 -UN-16AUG96

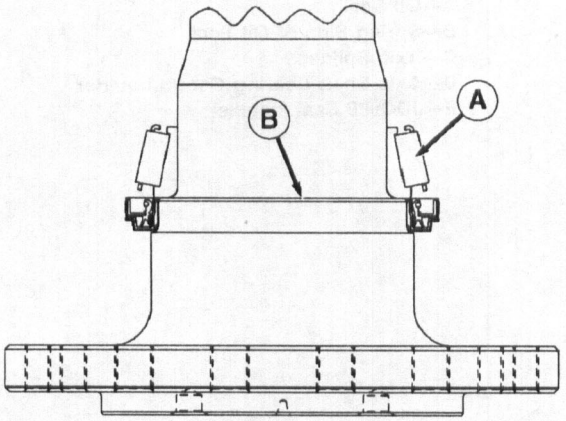
RX,4338,26C -19-19DEC97

CAUTION: DO NOT heat oil over 182°C (360°F). Oil fumes or oil can ignite above 193°C (380°F). Use a thermometer. DO NOT allow a flame or heating element to come in direct contact with the oil. Heat the oil in a well-ventilated area.

Heat bearing cone to 80—150°C (175°—300°F) and install on shaft so bearing cone (A) is tight against shoulder (B).



T81191 -UN-23FEB89



RW35953 -UN-23SEP96

RX,4338,27C -19-19DEC97

For axles with GREASED OUTER BEARING, perform the following steps:

Install outer grease seal (E) flush with bearing cone shoulder of axle shaft with "This Side Out" toward axle flange.

CAUTION: DO NOT heat oil over 182°C (360°F). Oil fumes or oil can ignite above 193°C (380°F). Use a thermometer. DO NOT allow a flame or heating element to come in direct contact with the oil. Heat the oil in a well-ventilated area.

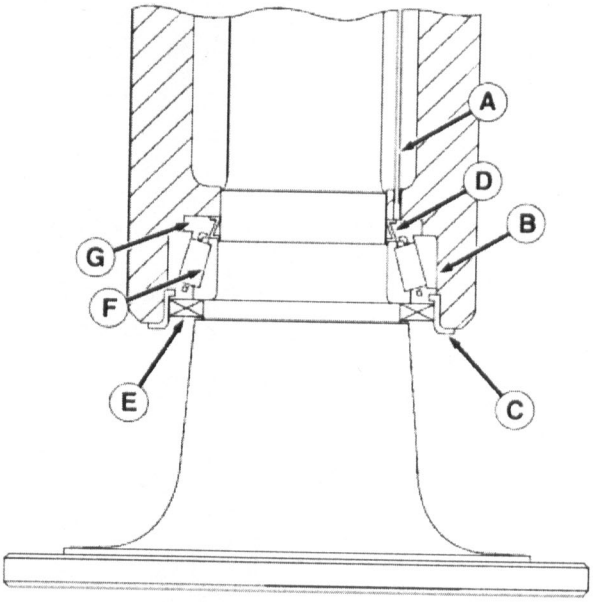
Heat bearing cone (F) to 80—150°C (175—300°F) and install on shaft so bearing cone is against shoulder. Pack bearing cone and seal with grease after bearing cools.

Install seal (D) against bearing cone with sealing lip away from cone. Apply grease to face of sealing lip.

Fill cavity (G) until grease purges past seal (D), after axle shaft is assembled into axle housing.

A—Lubrication Line
B—Bearing Cup
C—Seal Cup
D—Seal
E—Seal
F—Bearing Cone
G—Grease Cavity

T81191 -UN-23FEB89



RW36693 -UN-20NOV97

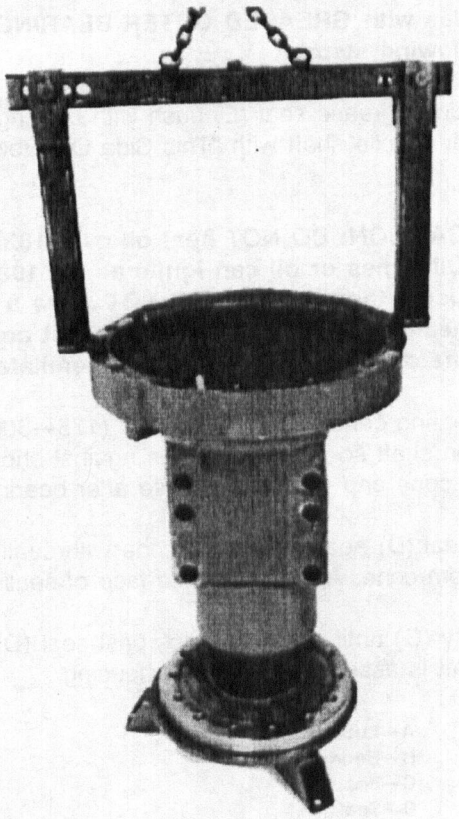
RX,4338,28C -19-09JAN98

INSTALL AXLE HOUSING

Lift axle housing vertically over axle shaft.

Carefully lower axle housing over shaft.

Turn axle housing three revolutions to seat outer bearing cone.



RW35927 -UN-25JUN96

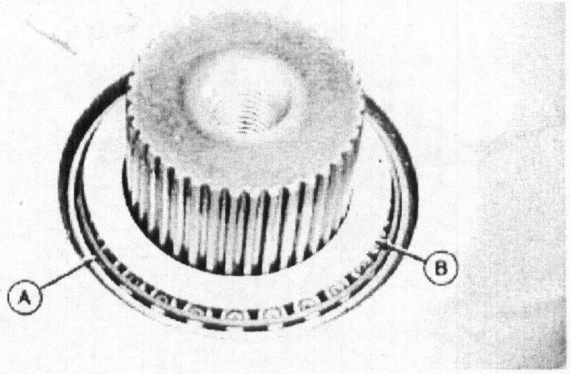
RX,4338,29C -19-19DEC97

CAUTION: DO NOT heat oil over 182°C (360°F). Oil fumes or oil can ignite above 193°C (380°F). Use a thermometer. DO NOT allow a flame or heating element to come in direct contact with the oil. Heat the oil in a well-ventilated area.

IMPORTANT: DO NOT install the bearing cone all the way in place. This assures end play.

Heat and install inner bearing cone (A).

Apply a clean lubricating oil and install a new thrust washer (B) on top of bearing cone when bearing cools.



R40099 -UN-23JAN90

RX,4338,30C -19-19DEC97

ADJUST AXLE BEARINGS

Check axle housing on axle shaft to make sure there is a measurable amount of end play.

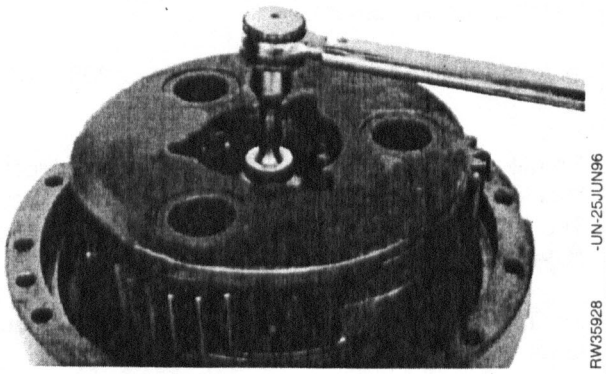
Install planetary assembly using JDG890A Planetary Carrier Lifting Tool.

Tighten special cap screw to 170 N·m (125 lb-ft).

Turn axle six revolutions to make sure bearing cups and cones are seated.

Loosen special cap screw to zero torque.

Check axle housing on axle shaft to make sure there is no preload on bearings.



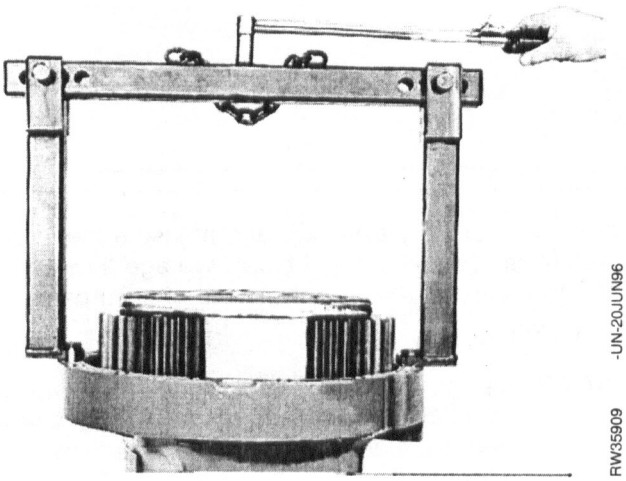
RX,4338,31C -19-19DEC97

Install DF1057* Axle Adjusting Tool.

Measure and record the "baseline" rolling drag torque with the special cap screw loose using a bending beam torque wrench.

Note the rolling drag torque.

The rolling drag torque measured should not exceed 25 N·m (18 lb-ft).



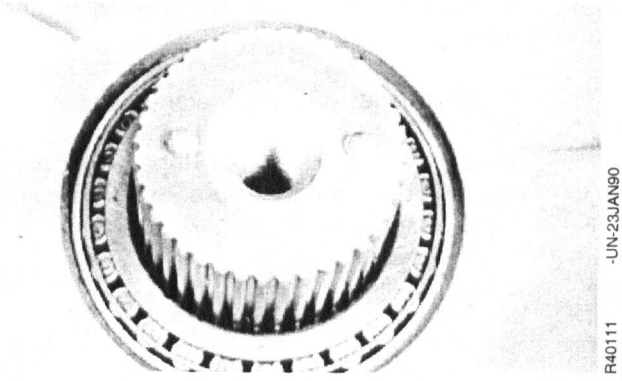
** See Group 499 for tool fabrication*

RX,4338,32C -19-19DEC97

Remove special cap screw and planetary assembly.

Put two 8—10 mm (0.3—0.4 in.) diameter lead balls on end of axle shaft 180° apart. Use grease to hold balls in position.

NOTE: Lead balls are available by ordering R72232.



RX,4338,33C -19-19DEC97

38
26

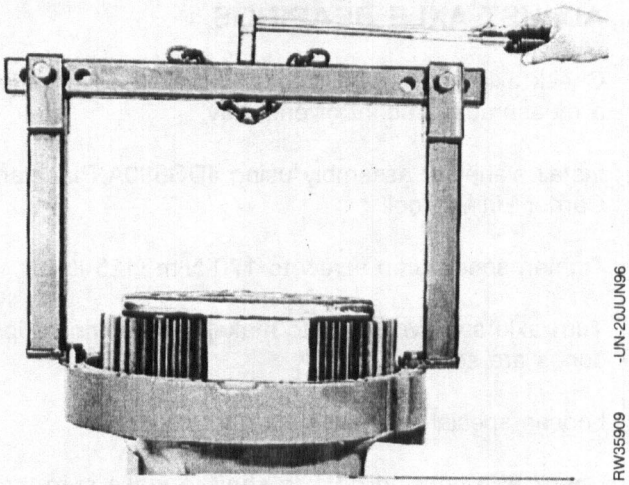
Install planetary assembly.

Install and tighten special cap screw to 908 N·m (670 lb-ft).

Rotate the carrier at least 12 times in both directions and check rolling drag torque. Note the rolling drag torque. The rolling drag torque must increase 16—37 N·m (12—27 lb-ft) over "baseline" reading.

Increase torque in 68 N·m (50 lb-ft) steps if torque is low.

Rotate the carrier at least six times in both directions and check rolling drag torque each time. Continue procedure until correct increase is obtained.



RW35909 -UN-20JUN96

RX,4338,34C -19-09JAN98

Remove planetary assembly and measure the individual thickness of flattened lead balls. Average thickness of the two lead balls equals thickness of shim pack required.

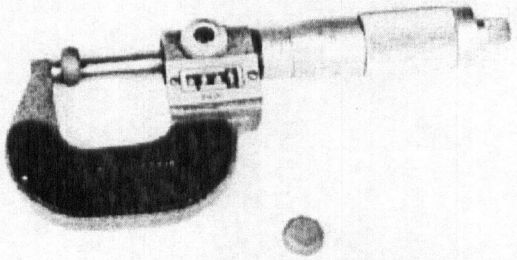
NOTE: The thick washer is part of the shim pack. Shims must always be measured individually due to slight variations in thickness. Never measure an entire pack.

Loosen the axle flange-to-support stand bolts several turns.

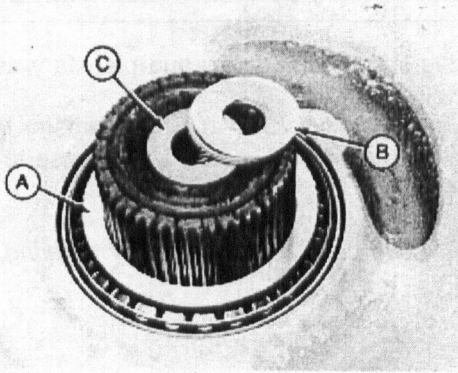
Relieve the bearing preload by lifting the axle assembly and hitting the inner end of the axle shaft with a heavy lead hammer.

Tighten the axle flange-to-support stand bolts.

Install shim pack (B) as previously determined. Install the thick washer (C) next to end of axle shaft. Be sure thrust washer (A) is correctly positioned.



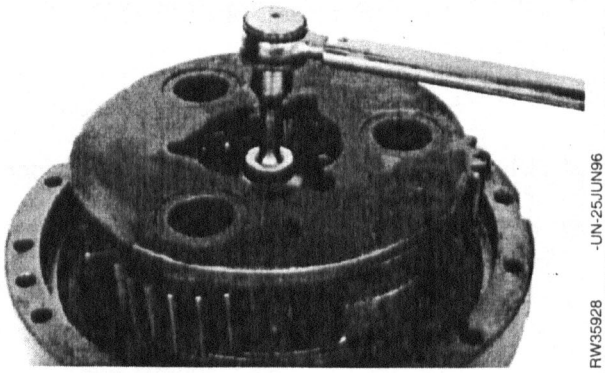
RW13211 -UN-16APR90



RW35308 -UN-28APR94

RX,4338,35C -19-19DEC97

Install planetary assembly and tighten special cap screw to 908 N·m (670 lb-ft).



RX,4338,36C -19-19DEC97

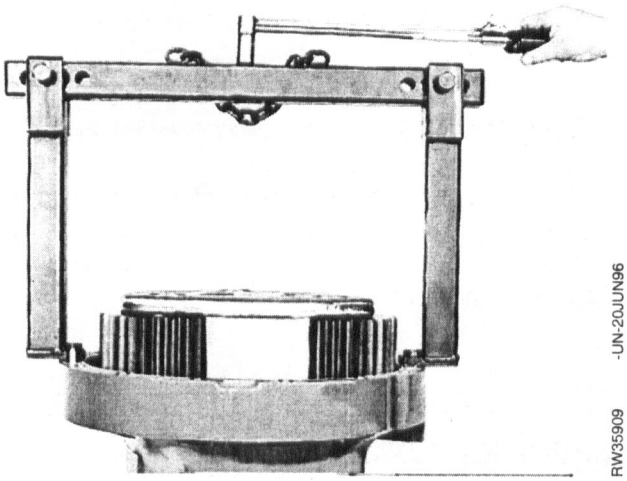
Rotate axle housing 12 times, checking the rolling drag torque. Rolling drag torque must be 16—37 N·m (12—27 lb-ft) over the baseline torque.

NOTE: Adding or removing a 0.13 mm (0.005 in.) shim will change rolling drag torque by approximately 8 N·m (6 lb-ft).

IMPORTANT: Remove any preload on bearings before adding shims.

NOTE: Add shims if rolling drag torque is high or remove shims if rolling drag torque is low.

Adjust shim pack thickness as required.



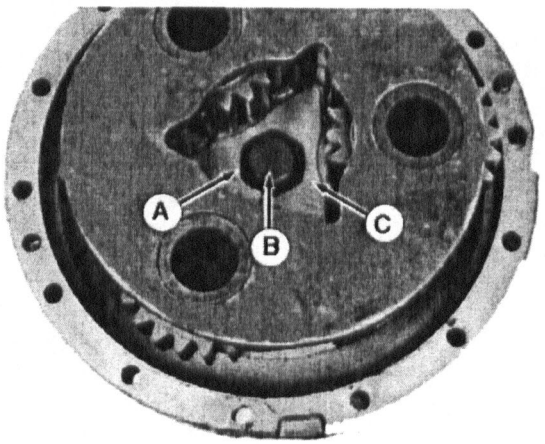
RX,4338,37C -19-09JAN98

Install lock plate (C).

Slightly loosen or tighten the special cap screw (B) to hold the lock plate on the cap screw.

NOTE: O-ring (A) is installed at the factory to retain lock plate (C) during assembly.

Install the O-ring (A) over the cap screw head.



RX,4338,38C -19-19DEC97

ESSENTIAL OR RECOMMENDED TOOLS

NOTE: Order tools from the U.S. SERVICE-GARD™ or European Microfiche Tool Catalogs.

ESSENTIAL TOOLS listed are required to perform the job correctly and are obtainable **only** from *SERVICE-GARD* or *European Tool Catalogs.*

RECOMMENDED TOOLS, as noted, are suggested to perform the job correctly. Some tools may be available from local suppliers or may be fabricated.

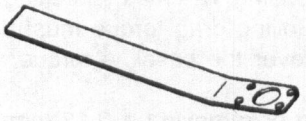
RX,TOOLS -19-21APR94

Yoke Holding Tool JDT27*

Remove and install input yoke

** RECOMMENDED TOOL—May be fabricated—See Group 499 DF1055*

RW25331 -UN-21DEC94

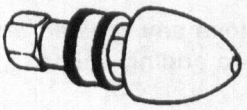


RX,JDT27,CTM -19-20JAN95

Air Test Plug JDG185

Test differential lock quill

T6557CI -UN-01NOV88



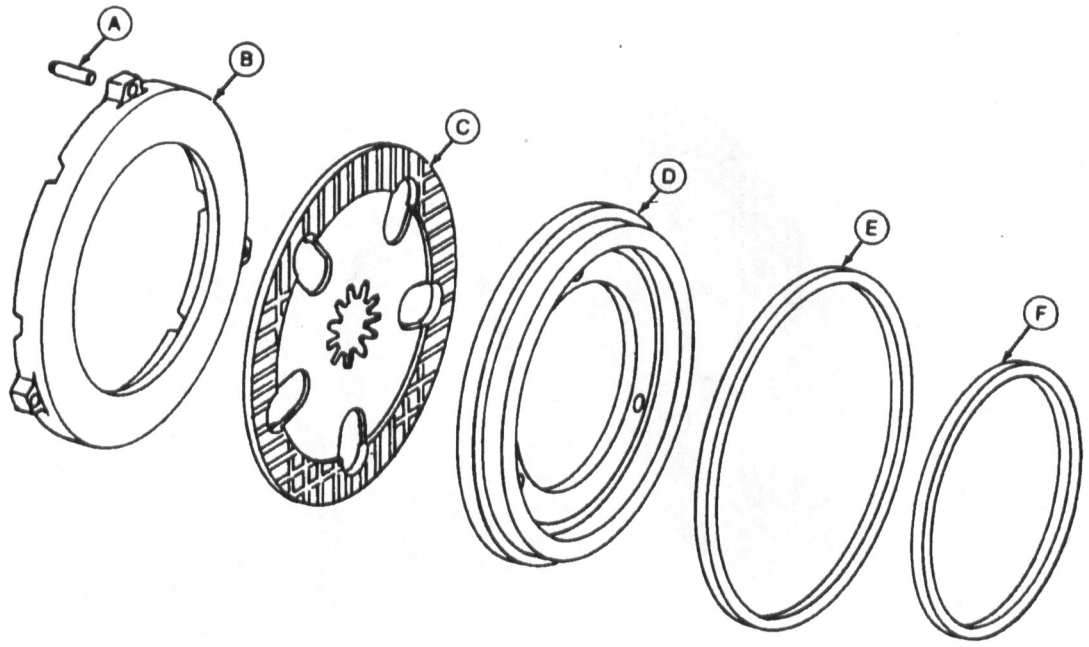
RX,JDG185A -19-25FEB92

SPECIFICATIONS

Item	Measurement	Specification
Brake Disk	Thickness (New)	7.57 mm (0.298 in.)

RX,4340,1C -19-01OCT97

EXPLODED VIEW—*BRAKE COMPONENTS*
EARLY DESIGN—THREE DOWEL

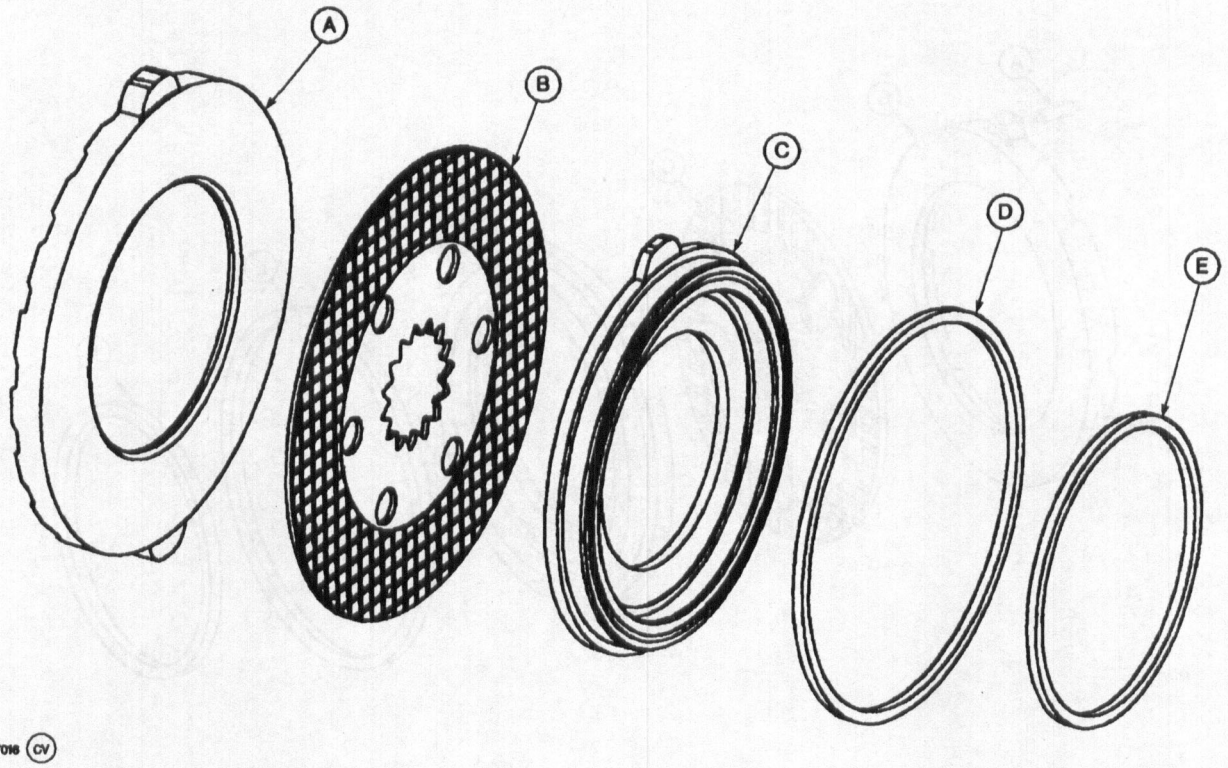


RW18680 -UN-13DEC90

A—Dowel (3 used)
B—Backing Plate
C—Brake Disk
D—Piston
E—OD Packing
F—ID Packing

RX,4340,2C -19-09JAN98

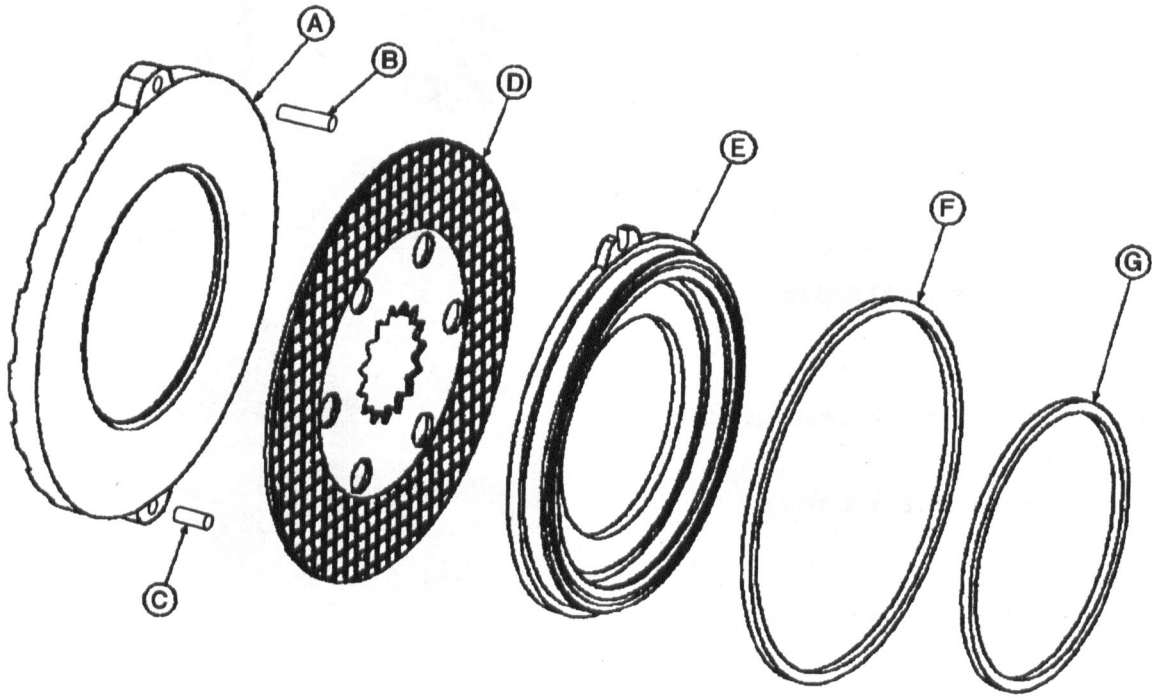
EXPLODED VIEW—*BRAKE COMPONENTS*
LATER DESIGN



A—Backing Plate
B—Brake Disk
C—Piston
D—OD Packing
E—ID Packing

RX,4340,3C -19-09JAN98

EXPLODED VIEW—*BRAKE COMPONENTS LATER DESIGN—RETAINED BACKING PLATE*



RW36544 -UN-29SEP97

A—Backing Plate
B—Dowel Pin
C—Dowel Pin
D—Brake Disk
E—Piston
F—OD Packing
G—ID Packing

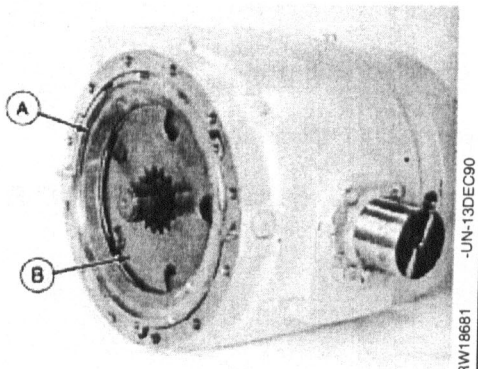
RX,4340,4C -19-09JAN98

DISASSEMBLE AND ASSEMBLE BRAKES

Remove final drive sun pinion.

Remove backing plate (A).

Remove brake disk (B).



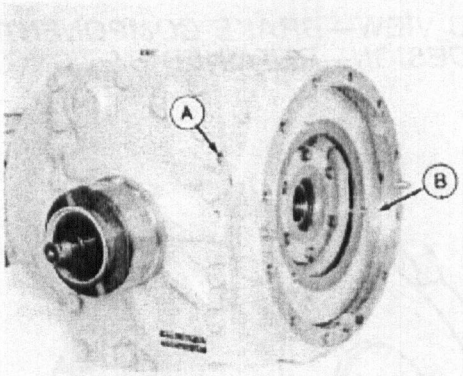
RW18681 -UN-13DEC90

RX,4340,5C -19-19DEC97

IMPORTANT: Make sure brake piston (B) does not get damaged coming out of bore.

Apply air pressure at port (A) using JDG185 Air Test Plug to remove brake piston (B).

Clean brake piston and piston bore to remove all debris.



RW18682 -UN-13DEC90

RX,4340,6C -19-19DEC97

Remove and discard packings (A) and (B).

Inspect all parts.

Replace backing plate if surface is pitted, galled, or scratched.

BRAKE DISK SPECIFICATION

Thickness (New) . . . . . 7.57 mm (0.298 in.)

Replace brake disk if damaged or facing is worn to bottom of grooves.

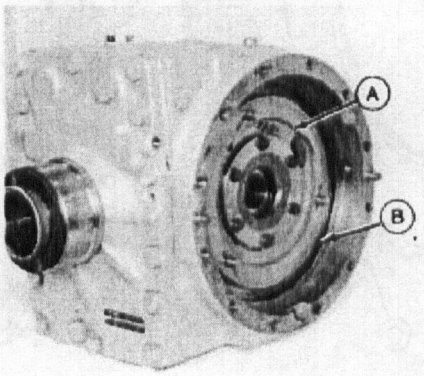
Replace brake piston if pitted, galled, or scratched.

Thoroughly oil packings and bore to ease piston installation.

Install new packings (A) and (B).

IMPORTANT: Make sure brake piston is completely installed in the bore.

Install brake piston.



RW18683 -UN-13DEC90

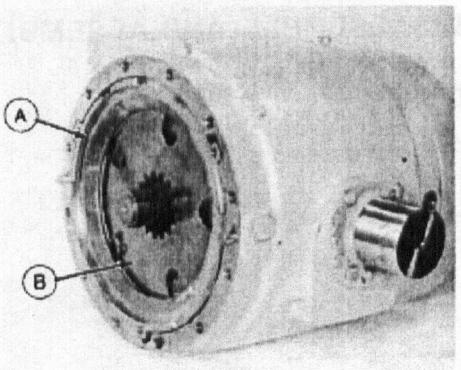
RX,4340,7C -19-19DEC97

Install brake disk (B).

Install backing plate.

Install final drive sun pinion.

Install axle housing. (See 1200-1400 Final Drives/ Planetary Carriers, Group 35.)



RW18681 -UN-13DEC90

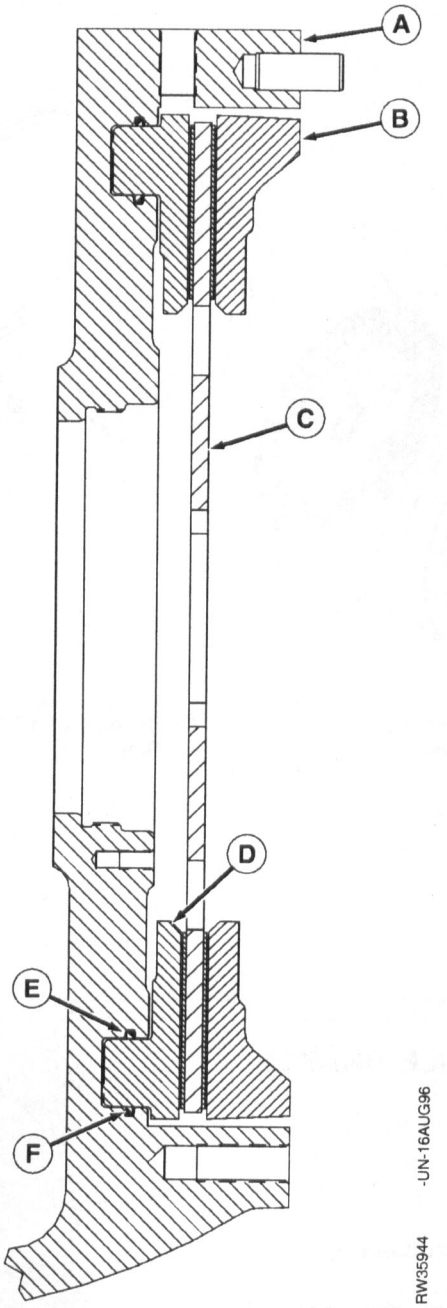
RX,4340,8C -19-09JAN98

SPECIFICATIONS

Item	Measurement	Specification
Brake Disk	Thickness (New)	7.57 mm (0.298 in.)
Brake Disk	Groove Depth (New)	0.99 mm (0.040 in.)

RX,4341,1C -19-19DEC97

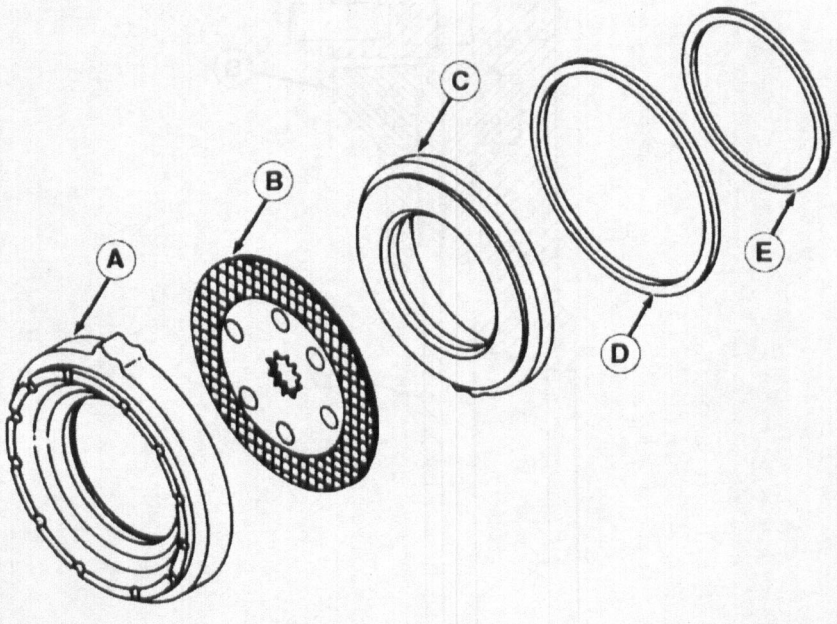
CROSS-SECTIONAL VIEW—*BRAKE COMPONENTS*



A—Differential Case
B—Brake Backing Plate
C—Brake Disk
D—Brake Piston
E—Inner Brake Piston Packing Ring
F—Outer Brake Piston Packing Ring

RX,4341,2C -19-19DEC97

EXPLODED VIEW—*BRAKE COMPONENTS*



A—Backing Plate with Retaining Pins
B—Brake Disk
C—Piston
D—Brake Piston OD Packing Ring
E—Brake Piston ID Packing Ring

RX,4341,3C -19-19DEC97

DISASSEMBLE AND ASSEMBLE BRAKES

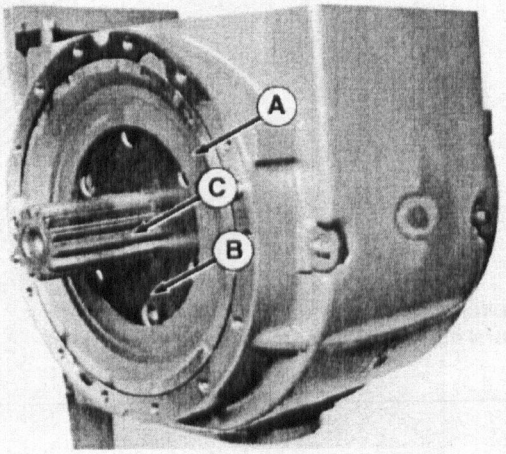
Remove final drives and final drive ring gears.

Remove brake backing plate (A).

Remove brake disk (B) and sun pinion shaft (C).

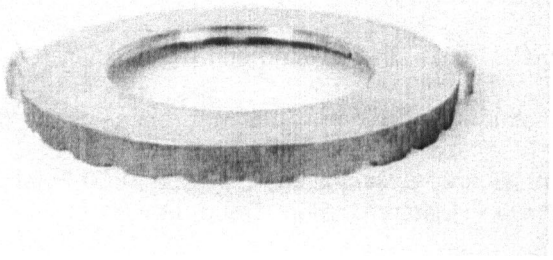
IMPORTANT: Make sure brake piston does not get damaged coming out of bore.

Apply air pressure at brake pressure port using an air nozzle to remove brake piston.



RX,4341,4C -19-19DEC97

Inspect brake backing plate and replace as necessary.



RW35911 -UN-20JUN96

RX,4341,5C -19-19DEC97

Remove and discard packings (A) and (B).

Inspect all parts.

BRAKE DISK SPECIFICATION

Thickness (New)	7.57 mm (0.298 in.)
Groove Depth (New)	0.99 mm (0.040 in.)

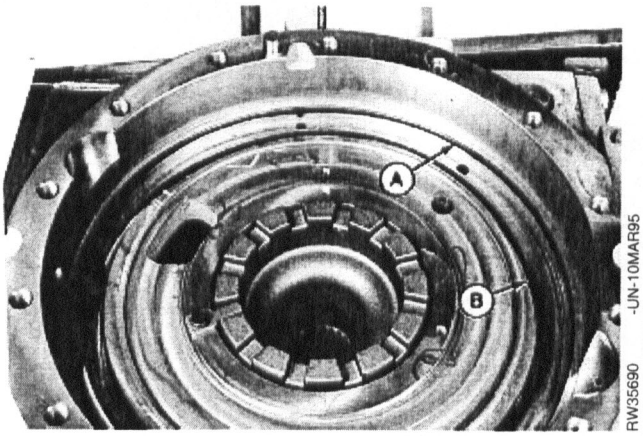
Replace brake disk if damaged or facing is worn to bottom of grooves.

Clean brake piston and piston bore to remove all debris.

Replace brake piston if pitted, galled, or scratched.

Thoroughly oil packings and bore to ease piston installation.

Install new packings (A) and (B).



RW35690 -UN-10MAR95

RX,4341,6C -19-19DEC97

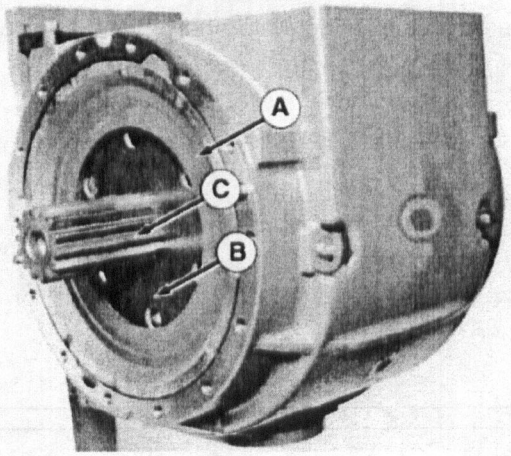
IMPORTANT: Make sure brake piston is completely installed in the bore.

Install brake piston.

Install brake disk (B) and sun pinion shaft (C).

Install brake backing plate with retaining pins (A).

Install final drive assemblies. (See 1600 Final Drive/Planetary Carrier, Group 38.)



RW35910 -UN-20JUN96

RX,4341,7C -19-19DEC97

ESSENTIAL OR RECOMMENDED TOOLS

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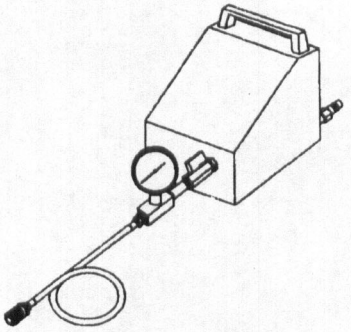
RECOMMENDED TOOLS, as noted, are suggested to perform the job correctly. Some tools may be available from local suppliers or may be fabricated.

RX,TOOLS -19-21APR94

Vacuum Test Kit JT07250

Check brake piston sealing rings on inboard planetary axles



RW25386 -UN-14JUN95

RX,JT07250 -19-21JUN95

SPECIFICATIONS

Item	Measurement	Specification
Brake Disk	Thickness (New)	3.30 mm (0.129 in.)
Brake Disk	Groove Depth (Minimum)	0.25 mm (0.009 in.)

RX,4342,1C -19-09JAN98

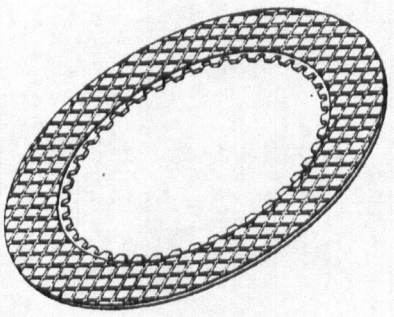
BRAKE INSPECTION— *HYDRAULIC BRAKES*

BRAKE DISK SPECIFICATION (Multiple Disk Service Brakes)

Thickness (New) . . . . . 3.30 mm (0.129 in.)

Groove Depth (Minimum) . . . . . 0.25 mm (0.009 in.)

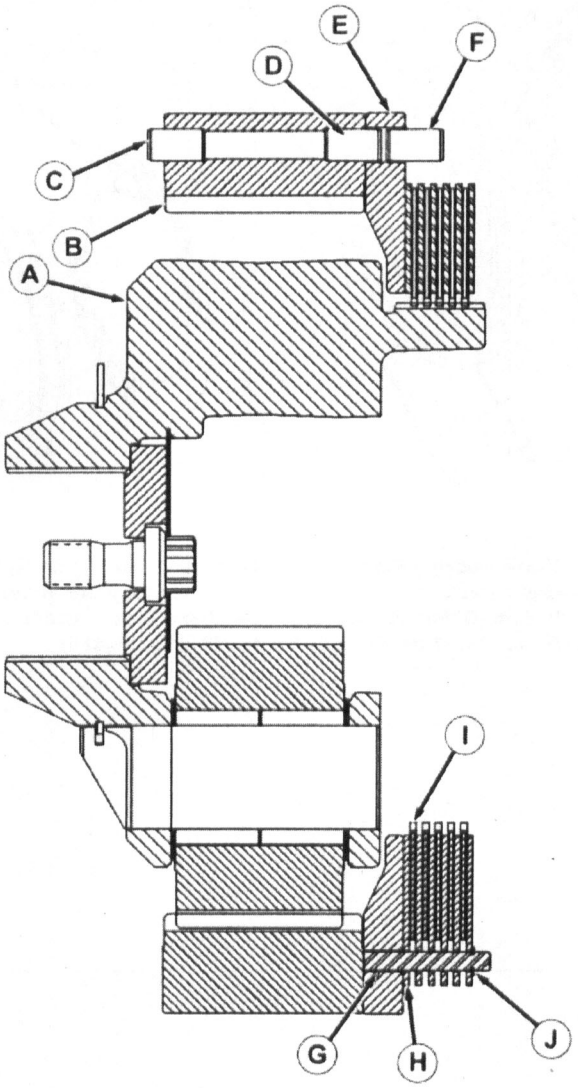
Replace the disk if oil grooves are no longer visible.



RW22220 -UN-25AUG92

RX,4342,2C -19-09JAN98

CROSS-SECTIONAL VIEW—*BRAKE COMPONENTS—MULTIPLE DISK BRAKES*

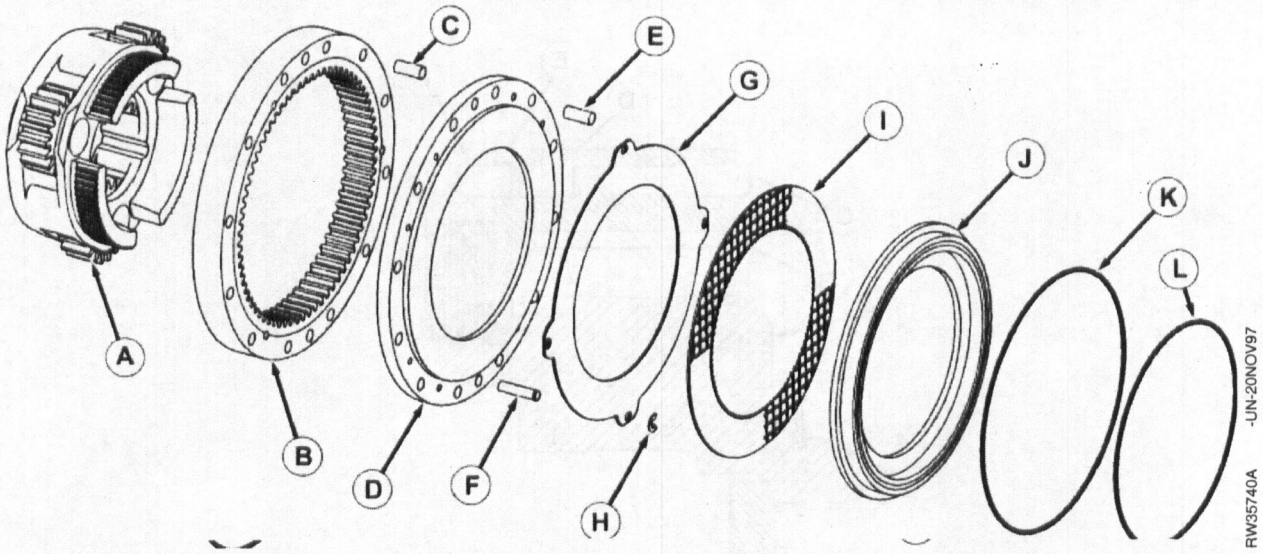


RW35836B -UN-21NOV97

A—Planetary Carrier with Brake Hub
B—Final Drive Ring Gear
C—Ring Gear-to-Final Drive Housing Dowel Pin
D—Ring Gear-to-Brake Backing Plate Dowel Pin
E—Brake Backing Plate
F—Brake Backing Plate-to-Differential Case Dowel Pin
G—Brake Pack Retaining Pin
H—Separator Plate (6 used)
I—Brake Disk (5 used)
J—"E" Clip

RX,4342,3C -19-09JAN98

EXPLODED VIEW—*BRAKE COMPONENTS—MULTIPLE DISK BRAKES*



A—Planetary Carrier with Brake Hub
B—Final Drive Ring Gear
C—Ring Gear-to-Brake Backing Plate Dowel Pin (2 used)
D—Brake Backing Plate
E—Brake Backing Plate-to-Differential Case Dowel Pin (2 used)
F—Brake Pack Retaining Pin
G—Separator Plate (6 used)
H—Brake Disk (5 used)
I—"E" Clip (2 used)
J—Brake Piston
K—Outer Packing Ring
L—Inner Packing Ring

RX,4342,4C -19-09JAN98

REMOVE AND INSTALL BRAKE COMPONENTS FROM DIFFERENTIAL CASE

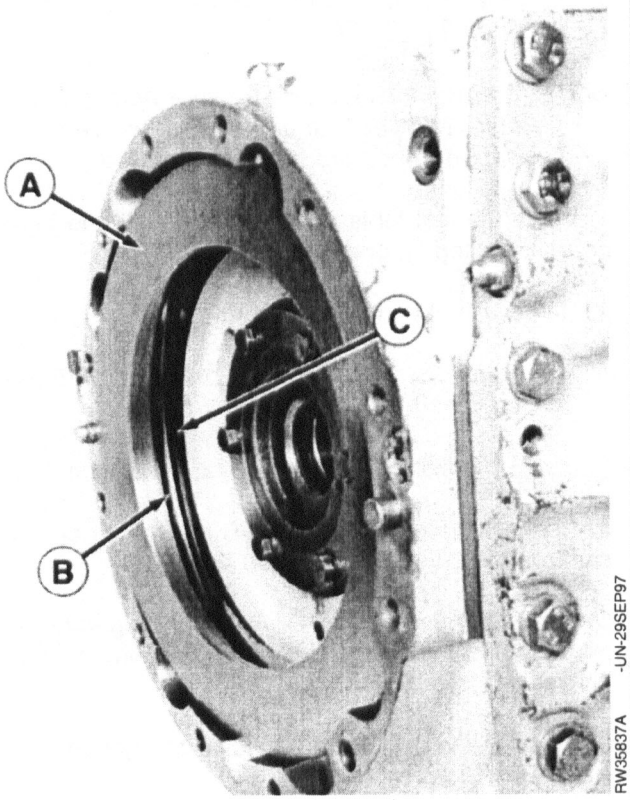
Remove and inspect brake piston (A).

Remove and replace packing rings (B) and (C).

Apply oil to the packing rings and the piston bore.

Install packing rings (B) and (C) in the grooves.

Install the brake piston (A).



RX,4342,5C -19-19DEC97

BRAKE PISTON PACKINGS—*VACUUM LEAKDOWN TEST*

NOTE: Perform leakdown test before proceeding with installation of final drives. Test will verify the packing rings are correctly installed.

1. Verify the test kit is operating correctly and there are no leaks in the lines or fittings.

2. Remove brake inlet fitting from cover.

NOTE: Repeat the test for each brake circuit if axle is equipped with independent brakes.

3. Install DR fitting (A) from JT07250 Vacuum Test Kit.

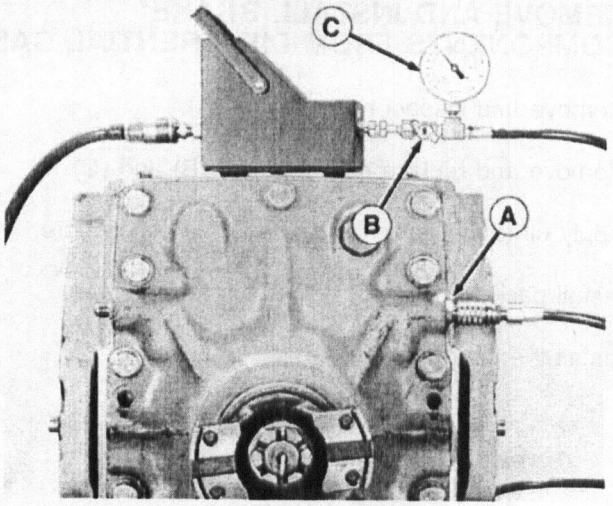
4. Connect the test kit to the DR and an air source capable of 620 kPa (6 bar) (90 psi).

5. Open the vacuum line valve (B) and operate the pump until a minimum of 20 in. of vacuum is indicated on the gauge (C).

6. Close the valve (B) and observe the gauge. Use a stopwatch.

7. Let vacuum stabilize. After vacuum has stabilized, NO LEAKDOWN is permissible.

8. Inspect all fittings, brake piston, seals, and packing rings if leakdown occurs. Remove, replace and install new parts as necessary.



RW35839A -UN-12AUG97

RX,4342,6C -19-09JAN98

ESSENTIAL OR RECOMMENDED TOOLS

NOTE: Order tools from the U.S. SERVICE-GARD™ or European Microfiche Tool Catalogs.

ESSENTIAL TOOLS listed are required to perform the job correctly and are obtainable **only** from *SERVICE-GARD* or *European Tool Catalogs.*

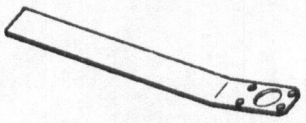
RECOMMENDED TOOLS, as noted, are suggested to perform the job correctly. Some tools may be available from local suppliers or may be fabricated.

RX,TOOLS -19-21APR94

RW25331 -UN-21DEC94

Yoke Holding Tool JDT27*

Remove and install input yoke



** RECOMMENDED TOOL—May be fabricated—See Group 499 DF1055*

RX,JDT27,CTM -19-20JAN95

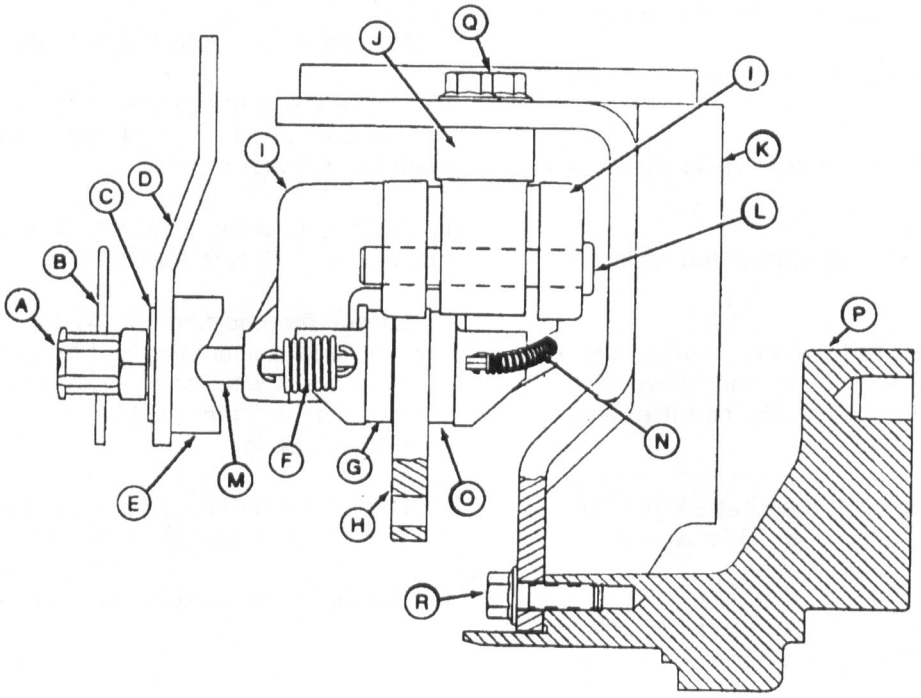
43
1

SPECIFICATIONS

Item	Measurement	Specification
Park Brake Support Bracket-to-Differential Cover Cap Screw	Torque	70 N·m (52 lb-ft)
Park Brake Disk-to-Input Yoke Flange Cap Screw	Torque	70 N·m (52 lb-ft)
Park Brake Mounting Bracket-to-Support Bracket Cap Screw	Torque	70 N·m (52 lb-ft)
Park Brake Adjusting Screw	Torque	100 N·m (74 lb-ft)
Park Brake Adjusting Screw Lock Nut	Torque	100 N·m (74 lb-ft)
Park Brake Pad	Thickness (Minimum)	3.5 mm (0.140 in.)
Park Brake Disk-to-Brake Pad	Clearance	0.5 mm (0.020 in.)

RX,4343,1C -19-19DEC97

CROSS-SECTIONAL VIEW—*MANUAL PARK BRAKE*



RW35597 -UN-27JAN95

A—Castellated Nut
B—Pin
C—Washer
D—Lever
E—Lever Cam
F—Spring (2 used)
G—Brake Pad (Outer)
H—Brake Disk
I—Brake Caliper
J—Mounting Bracket
K—Support Bracket
L—Brake Caliper Equalizing Pin (2 used)
M—Brake Pad Push Pin (2 used)
N—Spring
O—Brake Pad (Inner)
P—Input Quill/Case Cover
Q—Cap Screw (4 used)
R—Cap Screw (5 used)

RX,4343,2C -19-19DEC97

REMOVE, ASSEMBLE, AND ADJUST PARK BRAKE—*MANUAL*

1. Install JDT27 or DF1055* or Yoke Holding Tool. Remove brake disk-to-input yoke flange cap screws.

2. Loosen mounting bracket-to-support bracket cap screws (Q).

3. Remove support bracket-to-differential case cover cap screws (R).

4. Inspect brake disk (H) for scoring and replace if needed.

5. Remove springs (F) and (N) and inspect brake pads (G) and (O). Replace brake pads when wear has reached the rivets or the brake pad thickness is 3.5 mm (0.140 in.) or less.

6. Install park brake support bracket-to-differential case cover. Tighten cap screws (R) to 70 N·m (52 lb-ft).

7. Install brake disk to input yoke flange. Install JDT27 or DF1055 Yoke Holding Tool. Tighten cap screws to 70 N·m (52 lb-ft).

8. Remove retaining nut pin (B) and loosen nut (A).

9. Move the lever (D) to the vertical up position.

10. Center the brake caliper (I) on the mounting pins and tighten the nut until both brake pads (G) and (O) make contact with the disk.

11. Tighten mounting bracket-to-support bracket cap screws (Q) to 70 N·m (52 lb-ft).

12. Loosen the retaining nut (A) 1/6 revolution, plus any additional amount required to line up the castellation slot with the pin hole. This gives approximately 0.5 mm (0.020 in.) clearance between the disk and pads.

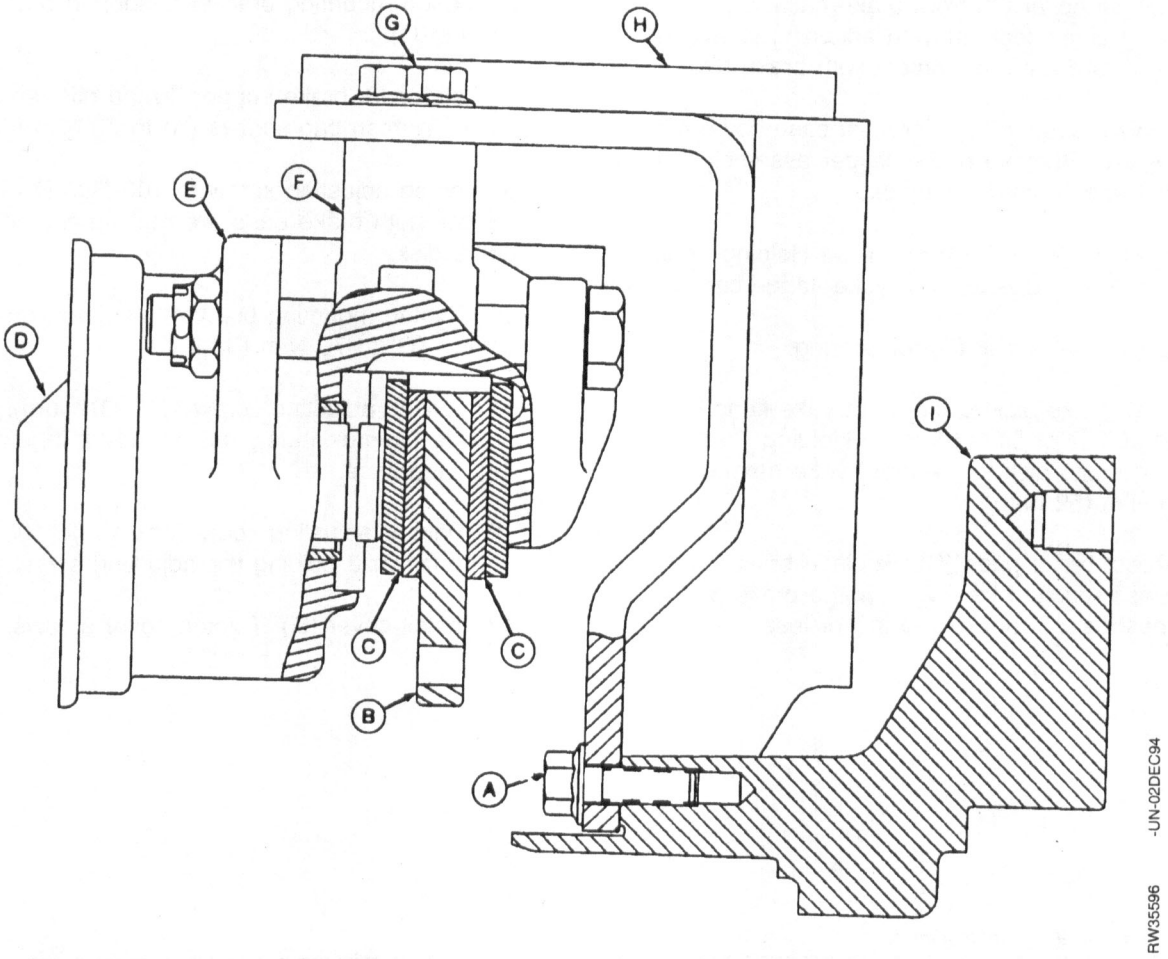
13. Loosen the castellated nut and turn the lever to the vertical up position if necessary.

14. Tighten the nut and install the retaining pin.

** See Group 499 for tool fabrication*

RX,4343,3C -19-09JAN98

CROSS-SECTIONAL VIEW—*SPRING APPLIED/HYDRAULIC RELEASE PARK BRAKE*



A—Cap Screw (5 used)
B—Brake Disk
C—Brake Pad
D—Cover
E—Brake Caliper Assembly
F—Mounting Bracket
G—Cap Screw (4 used)
H—Support Bracket
I—Differential Case Cover

RX,4343,4C -19-19DEC97

REMOVE, ASSEMBLE, AND ADJUST PARK BRAKE—*SPRING APPLIED/ HYDRAULIC RELEASE*

1. Remove cover (D) from brake caliper. Loosen adjusting screw lock nut and adjusting screw so brake pads are not in contact with brake disk.

2. Remove support-to-differential case cover cap screws (A). Remove brake caliper assembly (E) with bracket and support from disk.

3. Install JDT27 or DF1055* Yoke Holding Tool. Remove brake disk-to-input yoke flange cap screws.

4. Inspect brake disk (B) for scoring.

5. Install brake disk to the input yoke flange. Install JDT27 or DF1055 Yoke Holding Tool. Tighten brake disk to the input yoke hex nuts to 70 N·m (52 lb-ft).

6. Inspect brake pads (C). Replace brake pads when wear has reached the rivets or the brake pad thickness is 3.5 mm (0.140 in.) or less.

7. Loosen mounting bracket-to-support bracket cap screws (G).

8. Install park brake support to the differential case cover. Tighten cap screws (A) to 70 N·m (52 lb-ft).

9. Tighten adjusting screw to 100 N·m (74 lb-ft). This insures both brake pads are making contact with the brake disk.

10. Tighten mounting bracket-to-support bracket cap screws (G) to 70 N·m (52 lb-ft).

11. Loosen adjusting screw 180° (1/2 turn). This provides approximately 0.5 mm (0.02 in.) pad-to-disk total clearance.

12. Tighten adjusting screw lock nut to 100 N·m (74 lb-ft) while holding the adjusting screw in position.

13. Install cover (D). Tighten cover screws.

** See Group 499 for tool fabrication*

RX,4343,5C -19-09JAN98

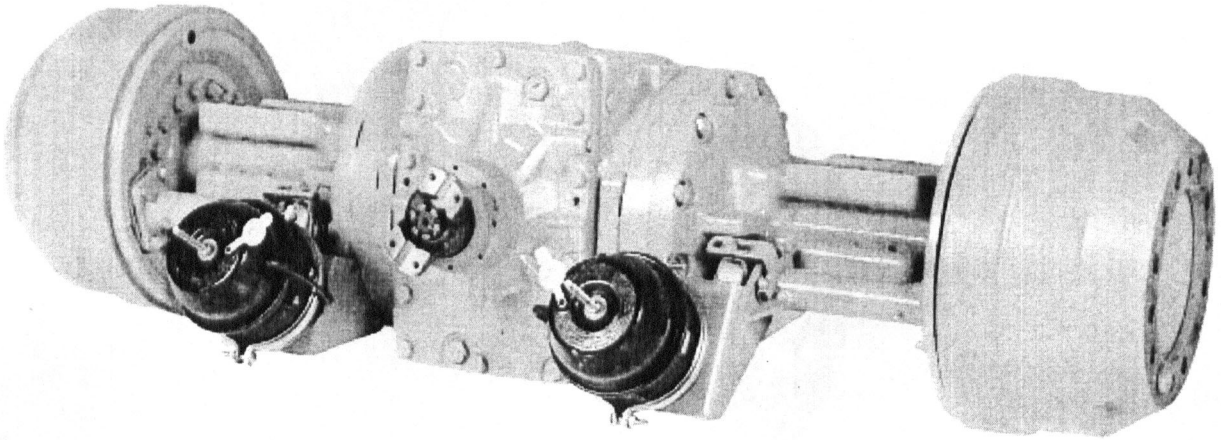
SPECIFICATIONS

Item	Measurement	Specification
Brake Actuating Camshaft	Input Torque (maximum)	2542 N·m (1875 lb-ft)
Spider-to-Axle Housing Cap Screw	Torque	310 N·m (229 lb-ft)
U-Bolt-to-Bracket Assembly Nuts	Torque	34 N·m (25 lb-ft)
Dust Shield-to-Spider Cap Screw	Torque	18 N·m (13 lb-ft)
Air Chamber Bracket-to-Spider Cap Screw	Torque	100 N·m (74 lb-ft)
Air Chamber Inner Bracket-to-Axle Housing Cap Screw	Torque	70 N·m (52 lb-ft)
Air Chamber Mounting Nuts	Torque	210 N·m (155 lb-ft)
Camshaft	End Play (Axial)	0.13—1.14 mm (0.005—0.045 in.)
	Play (Radial)	0.51 mm (0.020 in.)
Brake Lining	Thickness (minimum) From Brake Shoe From Lining Bolt Head	 6.4 mm (0.250 in.) 1.59 mm (0.063 in.)
Air Chamber Face-to-Clevis Pin Centerline	Rod Length "Y"	69.1 ± 3.18 mm (2.72 ± 0.125 in.)
Air Chamber Face-to-Threaded Rod End	Rod Length "X"	37.3 ± 3.18 mm (1.47 ± 0.125 in.)

RX,4345,1C -19-19DEC97

45
1

1400 SERIES DRY DRUM BRAKE AXLE



RW35586 -UN-10AUG94

Supplier *	Model Number	Component Description	Service Manual
EATON	EB-180-7R	Brake Components	EB-32
MGM	TR-TS3030	Spring Brake Air Chamber	5011
HALDEX	(Furnished by Eaton)	Automatic Slack Adjuster	EB-22

IMPORTANT: Brake compounding MUST be avoided.

Exceeding the 2542 N·m (1875 lb-ft) input torque will void the warranty.

Refer to Eaton and MGM Service Manuals for service procedures other than the procedures listed in this manual.

Refer to John Deere, Eaton, and MGM Parts Manuals for replacement parts.

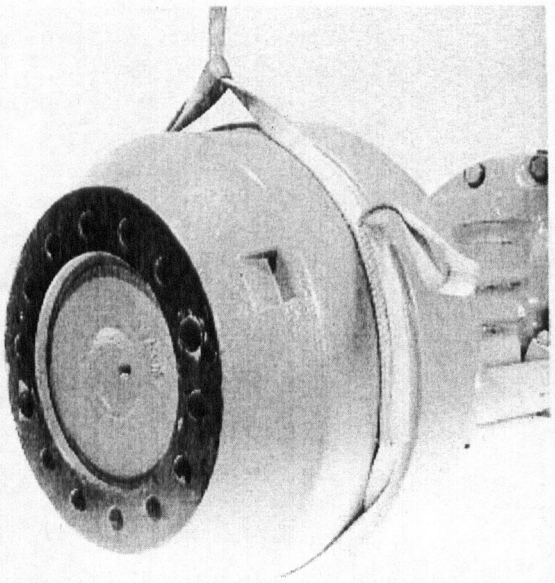
"Brake Compounding" is when the service brake is applied at the same time the parking brake is applied.

Service brake pressure added to the parking brake spring pressure can potentially exceed the (2542 N·m (1875 lb-ft) torque specification on the brake actuating camshaft.

** Components, parts, and service information is provided by John Deere and the listed suppliers*

RX,4345,2C -19-09JAN98

REMOVE BRAKE DRUM



Set parking brake and block the wheels to prevent vehicle movement.

Raise drive axle with a floor jack and support axle on suitable stands.

Cage air brake chamber. (Refer to Manual Release Section of Service Manual 5011.)

IMPORTANT: DO NOT use an air wrench to loosen the adjusting nut. Stripping of the gear will result.

Loosen (counterclockwise) the adjustment nut on the brake adjusters. A ratcheting sound will occur. Continue turning until shoes are fully returned to released position and clear of drum. (Refer to Service Manual EB-22.)

CAUTION: Avoid possible personal injury. Use proper lifting equipment. Brake drum weighs 71 kg (157 lb).

Install a lifting strap to the brake drum and attach to a mobile floor crane.

IMPORTANT: Do not force drum if drum is difficult to remove. Excessive pulling force may damage brake components.

Remove drum carefully, by pulling outboard while rocking from side to side.

RX,4345,3C -19-09JAN98

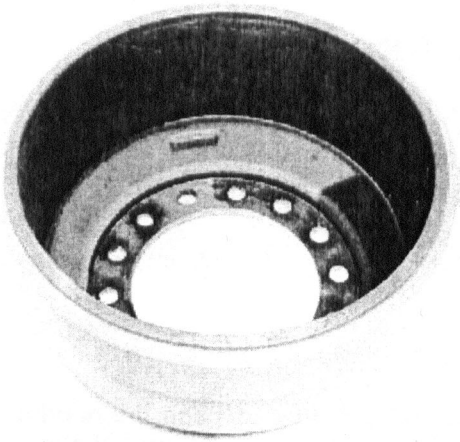
INSPECT BRAKE DRUM

Inspect drum for cracks, heat-checks, glazing, grooving, run-out and out-of-round.

Check drum inner diameter.

NOTE: Drums that are glazed, grooved, or out-of-round may be turned if maximum inner diameter specification is not exceeded.

Replace the drum if drum is cracked or exceeds the maximum inner diameter as indicated on the outer diameter.



RW35489 -UN-18JUN94

RX,4345,4B -19-22DEC94

REMOVE BRAKE ADJUSTER

Perform all steps for removal of drum.

Remove brake shoes. (Refer to Removal/Disassembly Section of Service Manual EB-32.)

Remove cotter pin from clevis pin (A).

Turn the adjuster nut (B) until the tension is released from the clevis pin.

Remove the clevis pin.

CAUTION: Always cage the parking brake spring before working on air chamber.

Remove the air chamber. (Refer to Removal and Installation Section of Service Manual 5011.)

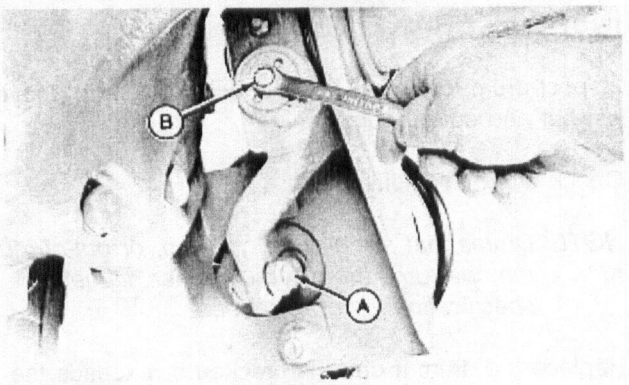
IMPORTANT: DO NOT cut the threaded rod for removal.

Remove the air chamber inner bracket-to-axle housing cap screws (C) and remove the bracket.

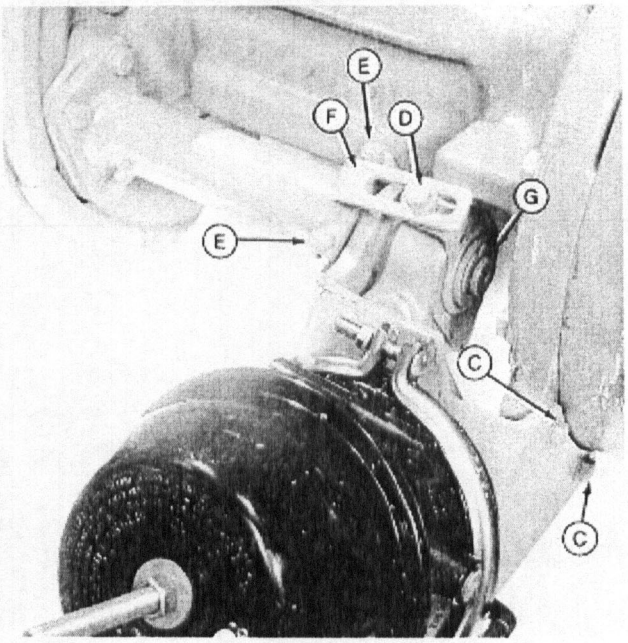
Remove the anchor bracket-to-brake adjuster control arm bolt (D).

Remove the anchor bracket U-bolt nuts (E) and remove the U-bolt and anchor bracket (F).

Remove retaining ring (G), outer washer, and shim washers from the camshaft.



RW35502 -UN-18JUN94



RW35503 -UN-18JUN94

A—Push Rod Clevis Pin
B—Adjuster Nut
C—Inner Bracket-to-Axle Housing Cap Screw
D—Anchor Bracket-to-Brake Adjuster Control Arm Bolt
E—Anchor Bracket U-Bolt Nuts
F—Anchor Bracket
G—Brake Adjuster Retaining Ring

RX,4345,5B -19-20JAN95

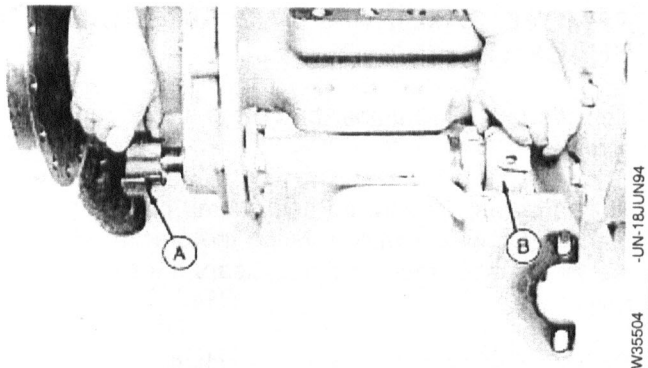
Mark the orientation of brake adjuster to air chamber bracket and the orientation of the camshaft to the spider before removal.

IMPORTANT: Do not use a hammer to aid removal of brake adjuster. Damage to brake adjuster and/or camshaft splines may result.

Pull the camshaft (A) outward to disengage the camshaft from the brake adjuster (B).

Remove the brake adjuster.

Remove the inner washer (C) from the camshaft.



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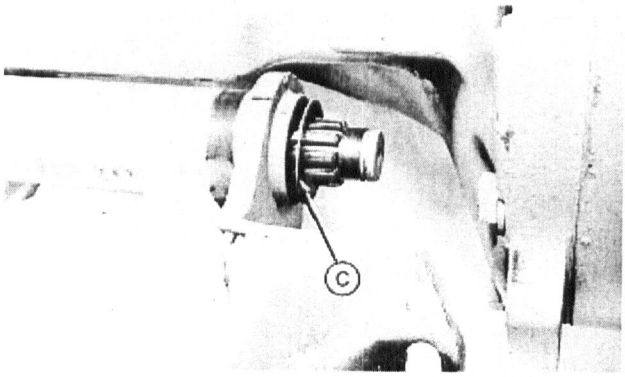


RW35505 -UN-18JUN94

RX,4345,4C -19-09JAN98

REMOVE CAMSHAFT AND AIR CHAMBER BRACKET

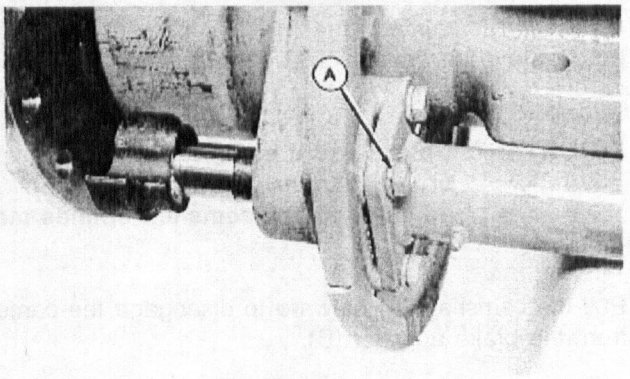
Remove four air chamber bracket-to-spider cap screws (A).

Pull camshaft (B) outward and pull air chamber bracket (C) inward while rotating the bracket so the air chamber mounting pad clears the axle housing.

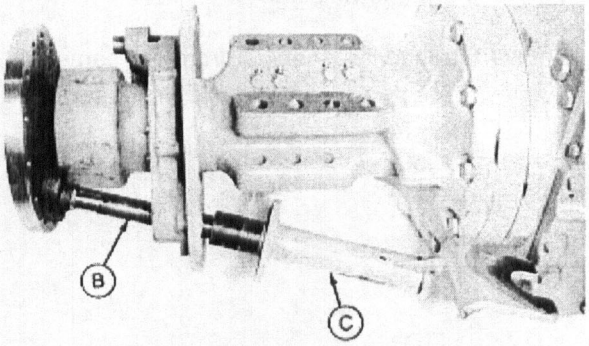
Remove the bracket from the camshaft.

Remove the camshaft from the spider (D).

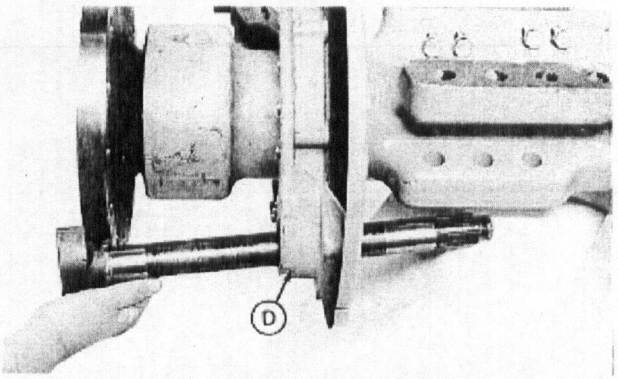
A—Air Chamber Outer Bracket-to-Spider Cap Screws (4 used)
B—Camshaft
C—Bracket
D—Spider



RW35507 -UN-18JUN94



RW35508 -UN-18JUN94

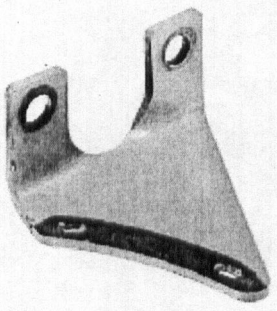


RW35509 -UN-18JUN94

RX,4345,7B -19-22DEC94

INSPECT AIR CHAMBER INNER BRACKET

Inspect inner bracket for a bent or broken condition. Replace as necessary.



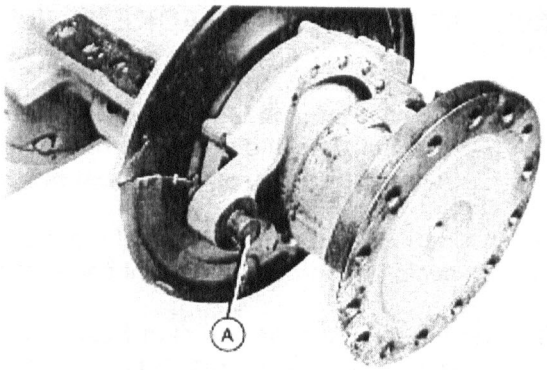
RW35517 -UN-18JUN94

RX,4345,8B -19-22DEC94

INSPECT SPIDER ASSEMBLY

Inspect mounting bolt holes for cracks in cam area and around anchor pin. Replace spider assembly if any cracks are found.

Inspect anchor pin (A). Replace spider assembly if loose or grooved more than 0.79 mm (0.031 in.) below original surface.



RX,4345,5C -19-09JAN98

REMOVE AND INSTALL SPIDER ASSEMBLY

Remove final drive housing and shaft. (See Final Drive Axle Housing and Shafts, Section 35.)

Mark orientation of spider with reference to axle flange before removal to assure the new spider is correctly positioned during installation.

Remove spider-to-axle housing cap screws (A).

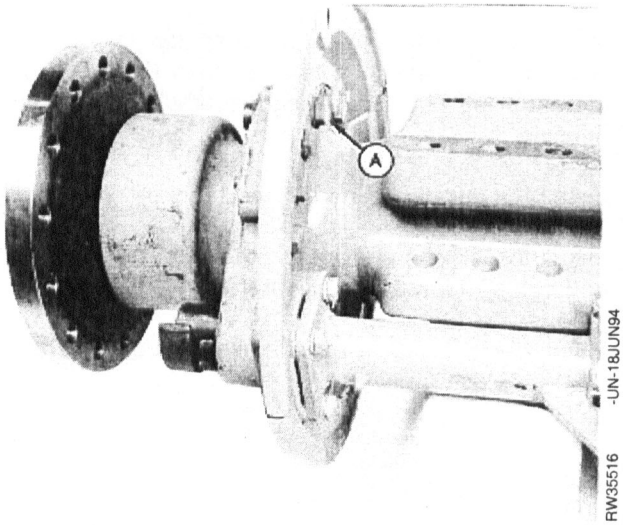
Remove spider from axle housing.

Refer to spider orientation mark made upon removal. Align marks and position the spider on the axle flange and install cap screws.

Tighten cap screws to 310 N·m (229 lb-ft).

Install final drive housing and shaft. (See Final Drive Axle Housings and Shafts, Group 35.)

Perform all steps for installation of camshaft, air chamber bracket, brake adjuster, dust shield, brake shoes, and drum.



RX,4345,6C -19-19DEC97

INSTALL AIR CHAMBER BRACKET AND CAMSHAFT

IMPORTANT: Use extreme care when installing the bracket onto the camshaft to avoid damage to the seals and bushings.

Apply a thin film of grease on the inside of the camshaft bushings and seals, and on spline area of camshaft.

IMPORTANT: DO NOT grease the cam head surface. For proper operation, this surface must remain free of oil, grease, or other contaminants.

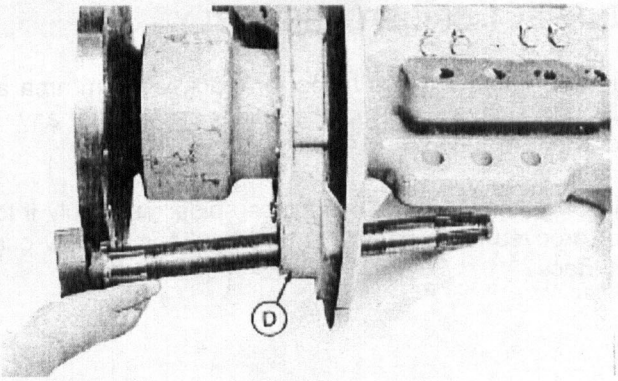
Install the camshaft through the spider (D). Put the bracket (C) carefully on the camshaft (B) while rotating the camshaft and bracket so the bracket clears the axle housing.

Install the cam head end of the bracket into the spider.

Install the air chamber bracket-to-spider cap screws (A) and tighten to 100 N·m (74 lb-ft).

Install brake adjuster, air chamber, shoes, and drum.

A—Cap Screws
B—Camshaft
C—Bracket
D—Spider



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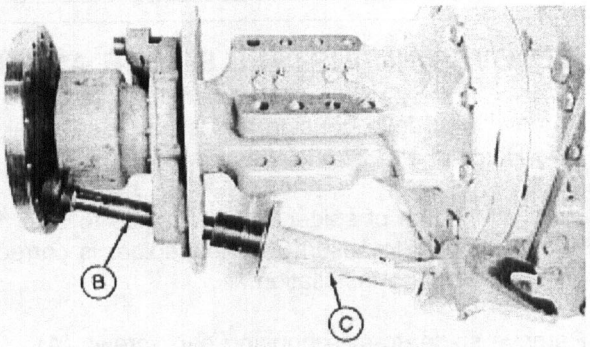

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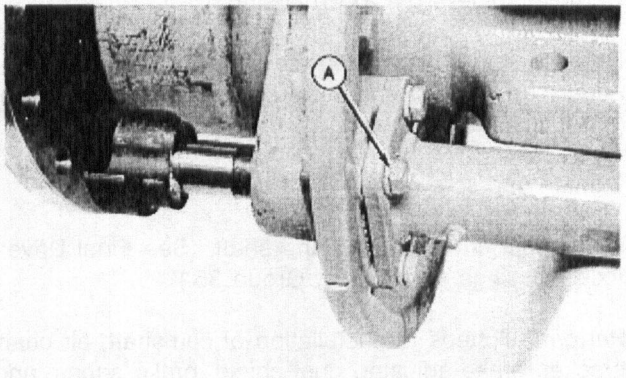

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RX,4345,11B -19-22DEC94

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INSTALL BRAKE ADJUSTER

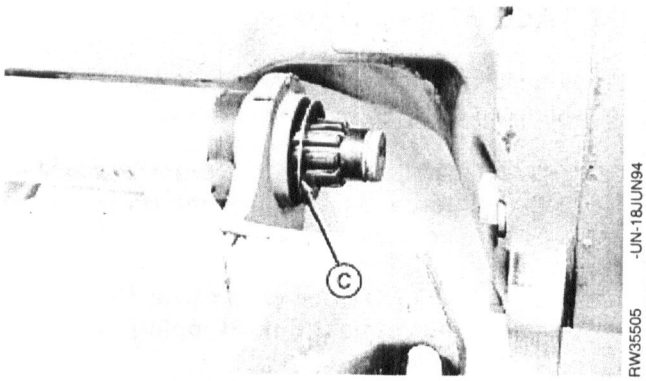
NOTE: Inner washer is identified by the 1.59 mm (0.063 in.) thickness and larger hole.

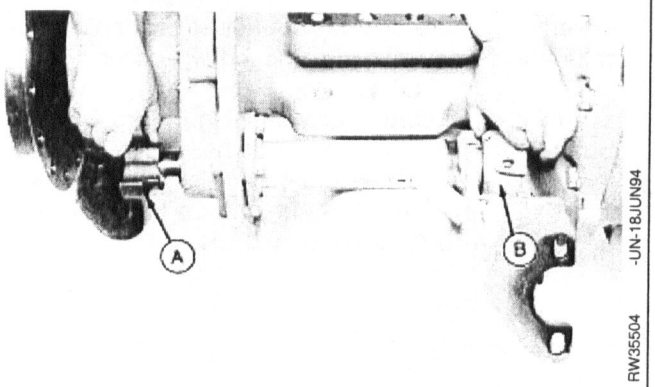
Install brake adjuster inner washer (C) on camshaft.

Apply a thin film of grease to the brake adjuster splines.

Pull the camshaft (A) outward and rotate the cam head so the camshaft to spider orientation marks are aligned.

Install the brake adjuster (B) on the camshaft so the orientation marks are aligned.





RX,4345,7C -19-19DEC97

NOTE: Shim washers are available in two thicknesses of 0.76 mm (0.030 in.) and 1.52 mm (0.060 in.)

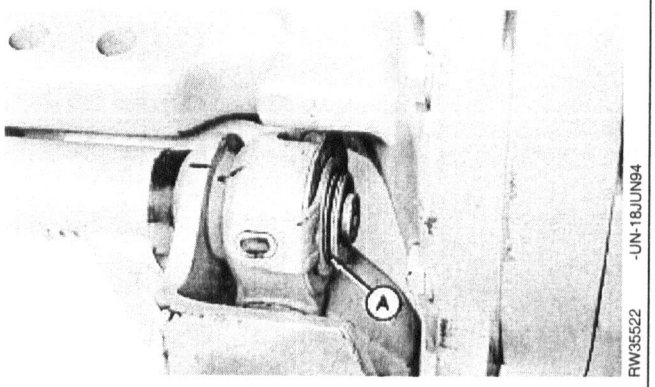
Install the same camshaft shim washers (A) that were removed.

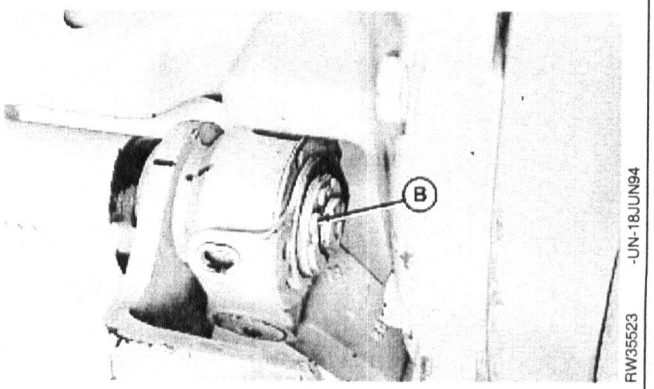
Install the retaining snap ring (B).

Check and adjust camshaft axial play. (Refer to Installation/Assembly Section Service Manual EB-32.)

Install inner air chamber bracket.

Install air chamber. (Refer to Removal and Installation Section of Service Manual 5011.)





RX,4345,13B -19-22DEC94

INSTALL BRAKE DRUM

Install a lifting strap to the brake drum and attach to a mobile floor crane.

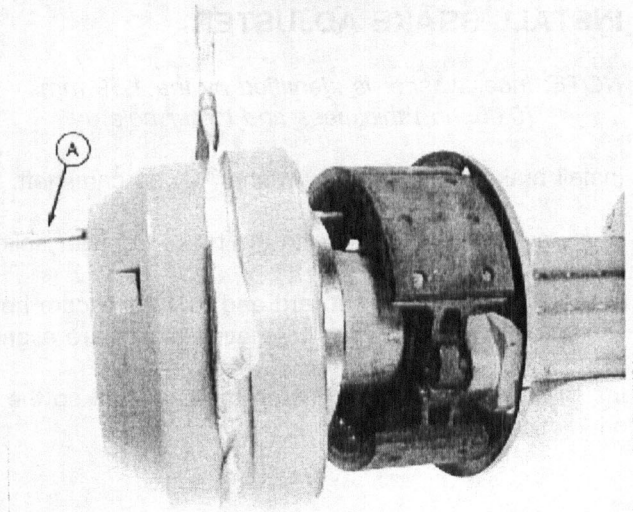
IMPORTANT: DO NOT force the drum. Excessive force may damage the brake components.

DO NOT use an air wrench to loosen adjustment nut. Stripping of the gear will result.

Loosen (counterclockwise) the adjustment nut on the brake adjuster. A ratcheting sound will occur.

Install the drum carefully by pushing inward while rocking from side to side and using a prybar (A) as a guide pin.

Adjust the brake adjuster and perform brake operation check. (Refer to Service Manual EB-22.)



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RX,4345,8C -19-09JAN98

TROUBLESHOOT AXLE AND DIFFERENTIAL

Symptom	Problem	Solution
Oil Coming Out Breather		
Oil Level Correct	Internal breather tube missing or misaligned	Install tube or reposition V-notch tube
Oil Level High	Capture system	
	Seals	Replace
	Lines	Repair or replace
	Fittings	Tighten or replace
	Differential lock piston packings	Replace
	Differential lock housing packings	Replace
	Brake system leaks	
	Packings	Replace
	Fittings	Tighten or replace
	Lines	Repair or replace
	Internal cracks in differential case	Inspect and replace as necessary
No Differential Lock Function		
Pressure-to-Axle Normal	Restriction in pressure circuit Fittings Friction elements	Disassemble axle and inspect and repair as necessary
Pressure-to-Axle Low		Axle OK
Deadhead Pressure at Axle Normal	Seal rings leaking	Replace
	Piston packings leaking	Replace
	Differential housing packings leaking	Replace
	Lines	Repair or replace
	Fittings	Tighten or replace
Deadhead Pressure at Axle Low		Axle OK
No Differential Function		
Differential Lock Deadhead Pressure-at-Axle (No Pressure)	Warped and/or seized plates	Perform differential lock function test. Inspect and replace as necessary.
	Seized bevel pinions	Replace
Differential Lock Deadhead Pressure-at-Axle (High Pressure)		Axle OK

Continued on next page

Symptom	Problem	Solution
Standard Axle	Seized bevel pinions	Replace
No-SPIN Axle (Perform No-SPIN Differential Test, Group 115)	Passes test Fails test	Normal Replace No-SPIN assembly
Differential Lock Chatters (Perform Differential Lock Function Test, Group 115)	Passes	Normal for application. Some chatter is normal in articulated vehicles with dual tires and high steering capacities.
	Fails	Vehicle problem
Poor Brake Performance	Low fluid level Break or hole in lines Pressure low	Fill to correct level Replace as necessary Inspect and repair or replace brake valve
	Air in brake system Brake valve malfunction	Bleed brakes Inspect and repair or replace brake valve
	Worn brake parts	Inspect and replace as necessary
	Brake system pressure low—disconnect brake line and deadhead against gauge	Compare to manufacturer specification
	Brake accumulator charge low	Inspect and repair or replace as necessary
	Seal damage	Inspect and replace as necessary
	Hardened seals	Check brake valve release. Improper brake fluid type. One pint in five gallons of incorrect fluid type will contaminate system.
Brakes Chatter/Squeal	Check disks/pistons	Replace as necessary. Residual brake back pressure. Drain and fill with hydraulic oil having anti-chatter additive. Use of friction modifying additives is not recommended.
	Air in brake system	Bleed brakes
	Wrong oil in differential	Drain and refill with correct oil

Continued on next page

Symptom	Problem	Solution
Brakes Operate Only On One Side		
Dual Brakes	One side not braking	Plugged crossover line
Individual Brakes	Both sides not braking	Do leakdown test
Brakes Drag	Brake pedal not returning	Inspect floor mat and pedal
	Warped Brake Disk	Inspect brake disk
	Debris holding brake valve open	Inspect and repair or replace as necessary
	Stuck brake piston	Repair
Brakes Lock Up	Brake valve malfunction	Inspect and repair or replace as necessary
Master Cylinder Continually Low		
Deadhead Pressure Test	Low	Axle OK
	High	
	External leaks	Repair as necessary
	Seals	Do leakdown test and repair as necessary
	Internal leaks	
	Packings	Replace
	Fittings	Tighten or replace
	Lines	Repair or replace
	Internal cracks	Inspect and replace as necessary

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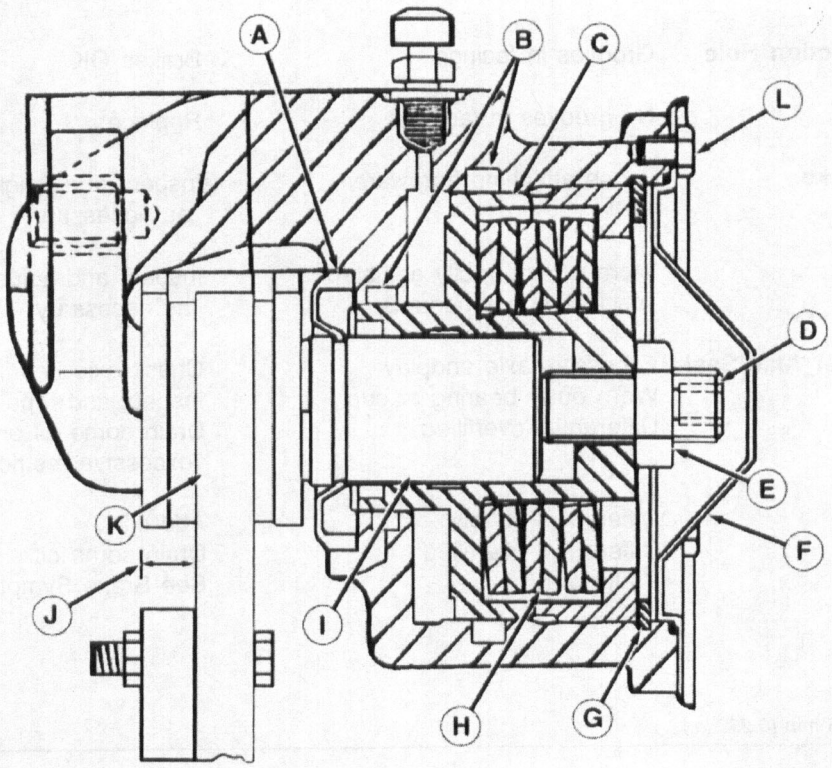
Continued on next page

Symptom	Problem	Solution
Brake Inspection		
View Through Inspection Hole	Grooves in facings	Brakes OK
	No grooves in facings*	Replace
Axle-to-Vehicle Clunks	Loose attaching hardware	Inspect and retighten or replace as necessary
	Worn or incorrectly adjusted oscillation components	Inspect and adjust or replace as necessary
Oil Seeping From Outer Axle Seal	Excessive axle endplay Worn outer bearing or cup Differential overfilled	Check axle bearing adjustment Inspect and repair or replace Drain some oil or check system for excessive restriction
Axle Overheats	Differential oil low Differential overfilled Brake drag	Add oil Drain some oil See Brake Symptoms, this group

** Original groove depth is 0.75 mm (0.298 in.)*

RX,43100,1C -19-09JAN98

ADJUST PARK BRAKE—*SPRING APPLIED/HYDRAULIC RELEASE*



A—Dust Seal
B—Seals
C—Piston
D—Parking Brake Adjusting Screw
E—Lock Nut
F—Cover
G—Snap Ring
H—Spring Washers
I—Shaft
J—Brake Pad Assembly Thickness
K—Parking Brake Disk
L—Cap Screw (3 used)

PAD-TO-DISK RUNNING CLEARANCE

Maximum . . . . . 4.76 mm (0.187 in.)
Minimum . . . . . 0.5 mm (0.020 in.)

1. Park machine on level surface.

2. Stop engine. This will engage park brake.

3. Put blocks in front and behind tires.

4. Loosen mounting bracket to support bracket cap screws.

5. Remove park brake adjustment cover cap screws (L) and cover (F). Loosen the lock nut (E).

6. Tighten park brake adjustment screw (D) to 100 N·m (75 lb-ft).

7. Tighten mounting bracket to support bracket cap screws to 70 N·m (50 lb-ft).

8. Loosen adjusting screw 180° (1/2 turn). This provides approximately 0.5 mm (0.02 in.) pad-to-disk clearance.

9. Tighten adjusting lock nut (E) to 100 N·m (74 lb-ft) while holding the adjusting screw in position.

10. Install cover (F) and tighten cap screws (L).

RX,43105,1C -19-09JAN98

PARK BRAKE PRESSURE TEST

SPECIFICATIONS

Oil Temperature	40° ± 6°C (100° ± 10°F)
Engine Speed	Slow Idle
Park Brake Pressure (Off)	16 200 kPa ± 345 kPa (162 ± 3.5 bar) (2350 ± 50 psi)

TOOLS REQUIRED

- Gauge 20 500 kPa (205 bar) (3000 psi)
- 38H1029 Tee -(-4 M ORFS X -4 M ORFS X -4 M ORFS) -(Parker 4R6LO-S)
- Test Hose

1. Install tee onto park brake inlet and connect inlet pressure line.
2. Install hose and gauge.
3. Connect a temperature reader and heat the hydraulic oil to specification.
4. Put the park brake switch in the "OFF" position.
5. Read the park brake pressure.
6. Check brake pump pressure according to vehicle instructions if pressure is too high or low.
7. Check the park brake solenoid valve according to vehicle instructions if pressure does not drop to zero when the park brake is "ON".

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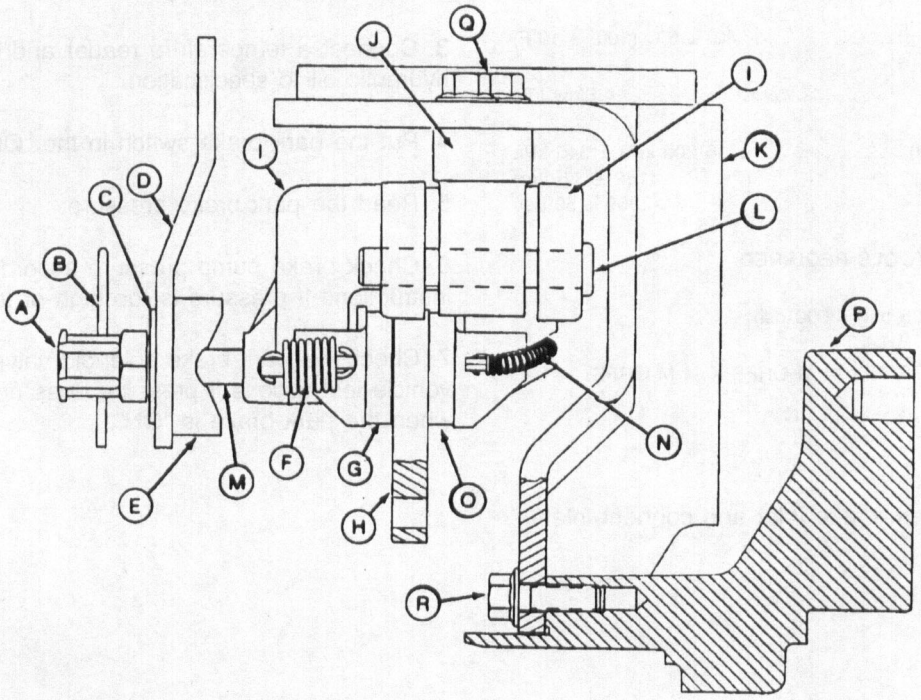
RX,43105,2B -19-19JAN95

ADJUST PARK BRAKE—*MANUAL*



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A—Castellated Nut
B—Pin
C—Washer
D—Lever
E—Lever Hub
F—Spring (2 used)
G—Brake Pad (Outer)
H—Brake Disk
I—Brake Caliper
J—Mounting Bracket
K—Support Bracket
L—Caliper Assembly Equalizing Pins (2 used)
M—Brake Pad Push Pins (2 used)
N—Spring
O—Brake Pad (Inner)
P—Input Quill/Case Cover
Q—Cap Screws (4 used)
R—Cap Screws (5 used)

PAD-TO-DISK RUNNING CLEARANCE

Minimum . . . . . 0.5 mm (0.020 in.)

1. Loosen mounting bracket to support bracket cap screws (Q).

2. Remove pin (B) and loosen the castellated nut (A).

3. Turn the lever (D) to the vertical position.

4. Center the brake calipers (I) on the mounting pins and tighten the nut until both brake pads (G) and (O) contact the disk.

5. Tighten mounting bracket to support bracket cap screws (Q) to 70 N·m (52 lb-ft).

6. Loosen the nut one full castellation, (one-sixth revolution), plus any additional amount required to line up the castellation slot with the pin hole. This gives approximately 0.5 mm (0.020 in.) pad-to-disk clearance.

7. Loosen the castellated nut and turn the lever to the vertical position if necessary.

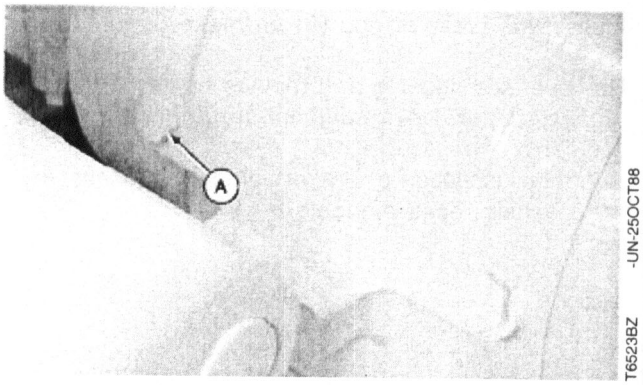
8. Tighten the nut (A) and install pin (B).

RX,43105,2C -19-09JAN98

BRAKE DISK INSPECTION (EXTERNAL)

Brake disks can be inspected for wear through the external inspection ports (A).

Remove brake inspection port plug (A).



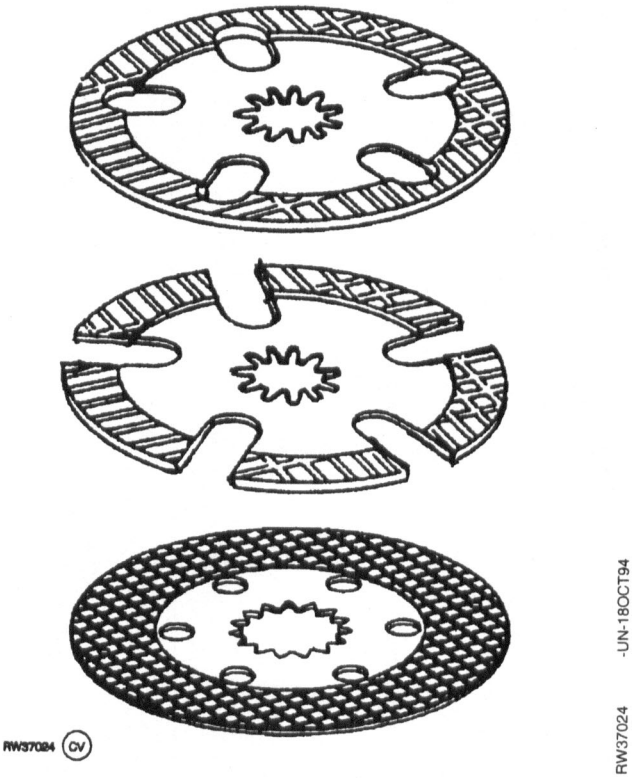
RX,43105,3C -19-19DEC97

NOTE: There are three different types of brake disks, depending on application.

BRAKE DISK SPECIFICATION

Thickness (New)	7.57 mm (0.298 in.)
Groove Depth (Minimum)	0.99 mm (0.040 in.)

Replace the disk if oil grooves are no longer visible.

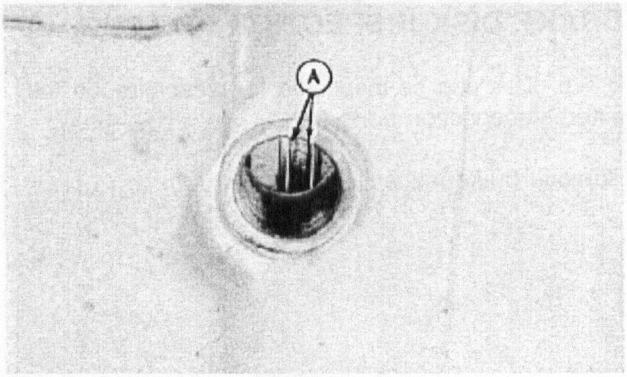


RX,43105,4C -19-19DEC97

Inspect the brake linings (A) on brake disk.

Remove axle housing and replace brake disc if oil grooves (B) on facing material are no longer visible.

If further inspection of brake elements is necessary, see the machine repair manuals.



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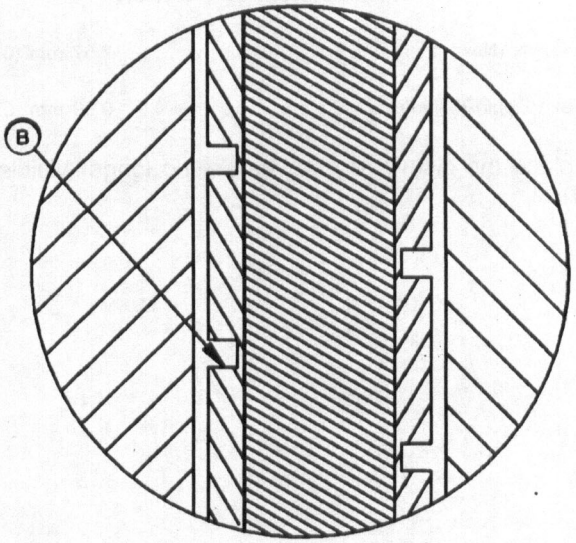


T8137AC (CV)

T8137AC -UN-03DEC93

RX,43105,5C -19-19DEC97

ANNULAR BRAKE PISTON INSPECTION

Observe material buildup and/or scuffing on the piston inner seal area (D).

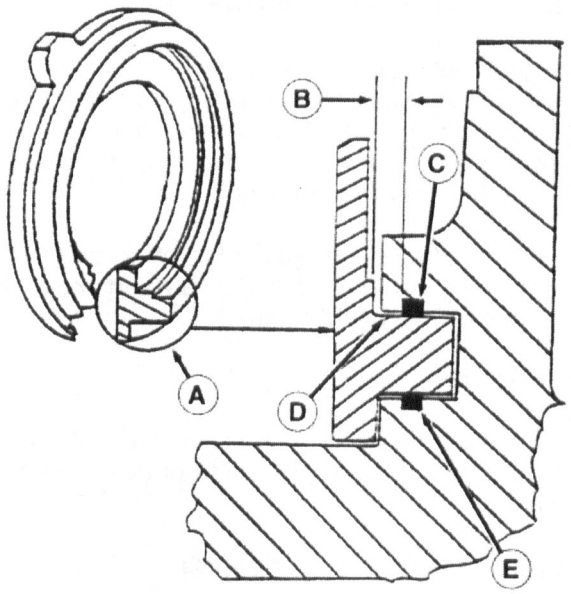
NOTE: Brake piston scuffed area (B) of 6.5 mm (0.250 in.) or less indicates normal wear on surface (D) and does not affect the inner packing (C) on the piston.

Replace the brake piston if scuffed area extends inward toward the piston seal more than 6.5 mm (0.250 in.).

NOTE: Differential case does not require replacement when only surface scuffing exists.

Install NEW piston packings whenever piston is removed.

Thoroughly clean the brake piston, adjacent differential case surface and the piston packing grooves.



A—Piston Cross Section
B—Maximum Allowable Scuffed Area
C—Inner Piston Packing
D—Scuffed Area on Piston Sealing Surface
E—Outer Piston Packing

RX,43105,6C -19-09JAN98

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LEAKDOWN TEST—BRAKE PISTON PACKINGS

1. Disconnect brake inlet line and fill passage with oil.

2. Install a pressure gauge and hand pump.

3. Apply 6552—7242 kPa (66—72 bar) (950—1050 psi) with bleed screws closed. There should be no visible oil leakage and the pressure should **NOT** drop more than 345 kPa (3.5 bar) (50 psi) in one minute.

4. Release the pressure.

5. Apply 35—103 kPa (0.4—1.0 bar) (5—15 psi) with bleed screws closed. There should be no visible oil leakage and **NO** pressure drop in one minute.

6. Inspect or install new brake piston or seal if leakage is excessive.

RX,43105,6B -19-24JAN95

BLEED HYDRAULIC BRAKES

Each axle assembly is equipped with two brake bleed screws. Brakes must be bled whenever there is a potential for air entering the system. Bleed both the passages (one at a time), whether the axle is equipped with dual or independent brakes.

NOTE: Two people are required to bleed brake system oil, one to operate brake valve and other to open and close bleed screws.

1. Engage park brake.

2. Put a clear plastic tube on bleed screw (B) to route flow to hydraulic reservoir filler (A) or other suitable container.

3. Start engine and run at slow idle.

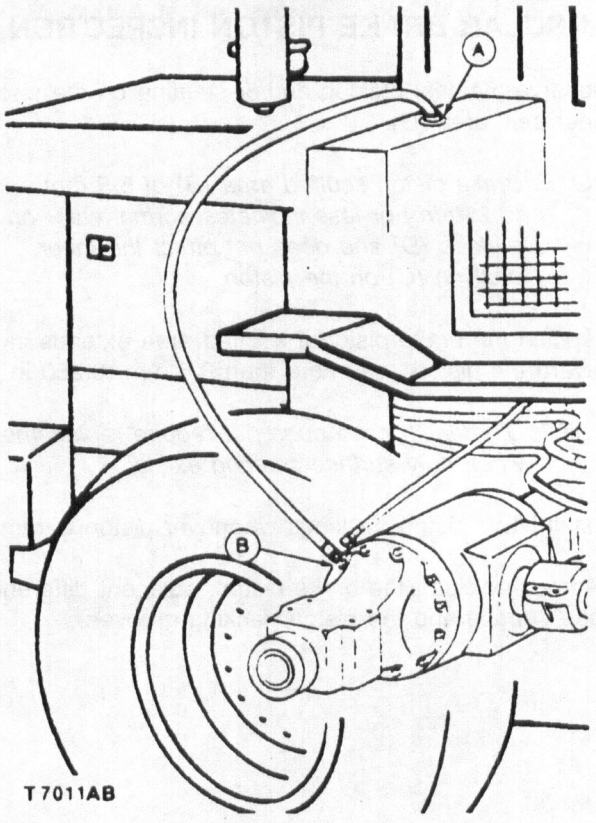
4. Push and hold brake pedal down until brake bleeding procedure is complete.

IMPORTANT: Stop bleeding procedure if bubbles continue for more than 3 minutes. Check and correct problem, then continue.

5. Open one bleed screw on axle assembly until hydraulic oil starts to flow. Close bleed screw when oil air bubbles disappear. Release brake pedal.

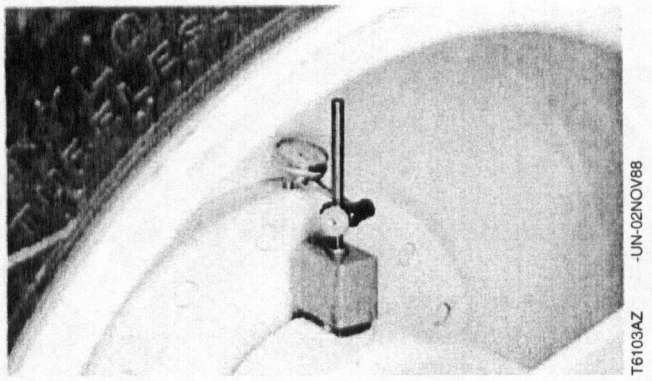
6. Repeat Steps 3—5 for other bleed screw.

7. Check hydraulic oil level in the axle assembly.



RX,43105,7C -19-09JAN98

AXLE VERTICAL MOVEMENT CHECK *



SPECIFICATION

Axle Shaft Movement
Maximum . . . . . 0.38 mm (0.015 in.)

1. Clean axle shaft to bare metal where dial indicator touches.

NOTE: Dial indicator can be installed on bottom of axle housing.

2. Install dial indicator as close to axle housing as possible. Dial indicator probe must not contact axle housing.

IMPORTANT: Depress brake pedal so axle does not turn when machine is raised.

3. Carefully raise machine until wheel is off ground.

4. Depress brake pedal. Turn dial indicator to "zero". Lower machine to ground. Record dial indicator measurement. Repeat check to make sure measurement is accurate.

If measurement does not repeat, check to make sure magnetic base of dial indicator is positioned correctly.

If recorded measurement is above specification, remove differential and axle assembly. Disassemble and inspect planetary-to-axle shaft cap screw, bronze thrust washer, bearings, and outer seal. (See repair procedure in Group 35.)

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** End play check with axle on machine*

RX,43110,1C -19-09JAN98

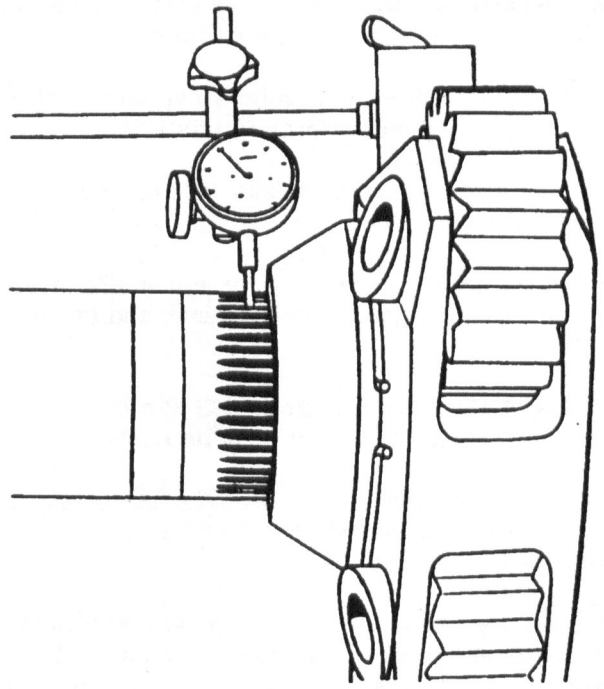
CHECK CARRIER BACKLASH

NOTE: Not required for Agricultural Applications.

1. Support axle shaft securely in horizontal position and put carrier on shaft.

2. Install dial indicator.

3. Rotate carrier to check for backlash. Maximum allowable backlash is 0.50 mm (0.020 in.). Replace parts as necessary.



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RX,43110,2C -19-09JAN98

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CHECK RING GEAR AND PINION TOOTH CONTACT PATTERN

1. Tooth bearing pattern (3) must start at location (4) 3—13 mm (0.120—0.520 in.) from toe end of pinion.

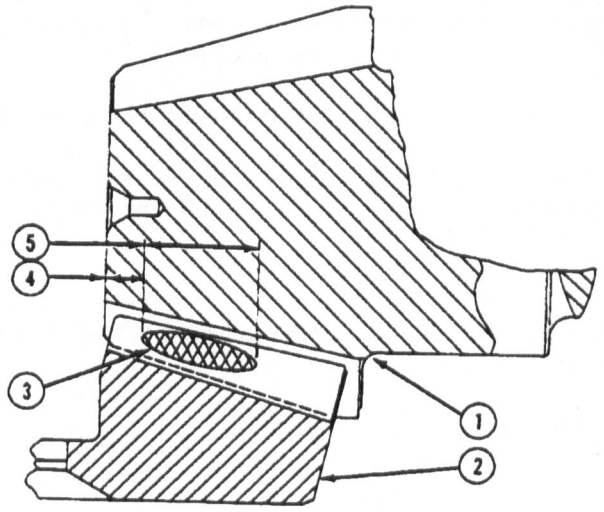
2. Measure length of tooth pattern (5).

TOOTH PATTERN LENGTH

1200 Series	30 mm (1.180 in.) Minimum
1400 Series	33 mm (1.300 in.) Minimum

3. Adjust cone point shim pack to obtain correct tooth contact pattern.

1—Input Shaft Pinion
2—Spiral Bevel Gear
3—Tooth Bearing Pattern
4—Pattern Location
5—Pattern Length



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RX,43110,3C -19-09JAN98

AIR TEST DIFFERENTIAL LOCK CAPTURE SYSTEM

IMPORTANT: Do this test before testing differential lock sealing ring with oil.

DO NOT fill differential case with oil when performing this test.

1. Install a cap on the differential lock oil return connector (A).

2. Assemble a pressure regulator, a 414 kPa (4 bar) (60 psi) pressure gauge, needle valve, and gauge on an air hose.

IMPORTANT: Pressure above 345 kPa (3.45 bar) (50 psi) may damage seals.

3. Connect air hose to the differential lock pressure line connector (B). Apply 345 kPa (3.45 bar) (50 psi) pressure to inlet port.

4. Open the pressure regulator handle slowly, with needle valve closed and air supply on, until 345 kPa (3.45 bar) (50 psi) registers on the pressure regulator gauge.

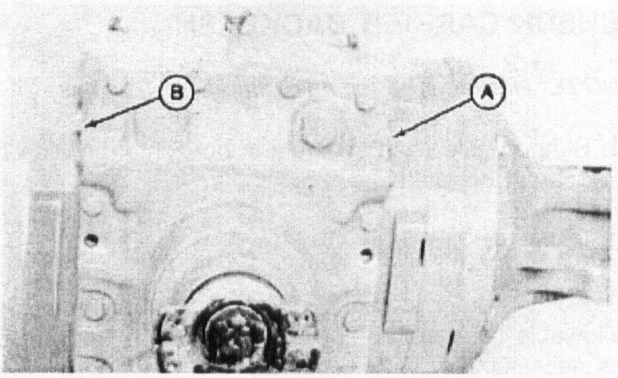
5. Open the needle valve slowly until 345 kPa (3.45 bar) (50 psi) is read on the second pressure gauge. Reduce pressure to 70 kPa (0.7 bar) (10 psi).

6. Close the needle valve and disconnect the air supply.

7. Turn differential housing by hand. After two minutes, note gauge reading. Pressure should have remained at 70 kPa (0.7 bar) (10 psi).

8. Check for foreign material under seal lips. Install new oil seals, packings, housings, lock quill or connectors if leakage occurs.

9. Test system again for accuracy.



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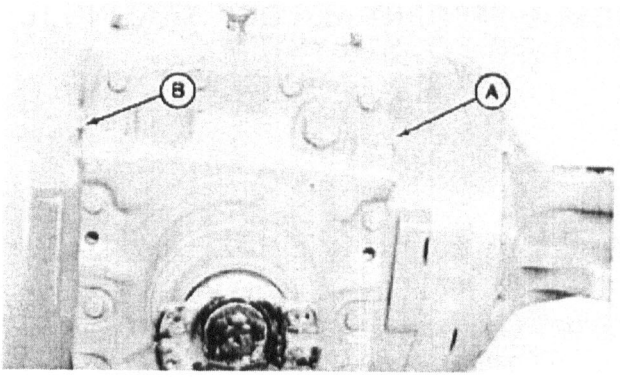
RX,43115,1B -19-20JAN95

OIL TEST DIFFERENTIAL LOCK CAPTURE SYSTEM



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IMPORTANT: Test differential lock capture system with air before this test. DO NOT fill differential case with oil when doing this test.

1. Install a 0—6895 kPa (0—69 bar) (0—1000 psi) pressure gauge into the differential lock circuit.

NOTE: A slave machine with a differential lock function can be used as a source for oil pressure.

2. Connect the pressure source to the pressure line connector (B).

IMPORTANT: The return line connector must be open during this test or the seals will be damaged.

3. Put a bucket under return line connector (A) to catch return oil.

4. Apply 3690—4380 kPa (36.9—43.8 bar) (535—635 psi) pressure to the inlet port.

5. Turn the differential housing and measure the leakage from the return line with a calibrated container. The leakage must not exceed 1.89 L/m (0.5 gpm). If excessive leakage is evident, inspect or install new sealing rings, differential housing, or bearing quill.

115 2

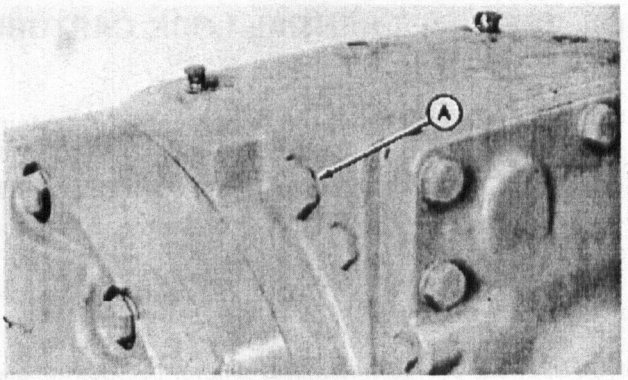
6. Check for internal leakage into the differential case. The leakage can be caused by faulty housings, lock-side quills, sealing rings, or connections.

RX,43115,2B -19-20JAN95

TEST DIFFERENTIAL LOCK SEALING RINGS WITH AIR BOOST SYSTEM

TEST SPECIFICATIONS

Oil Temperature	40 ± 4°C (104 ± 7°F)
Engine Speed	Slow Idle
Maximum Leakage	1.9 L/m (0.5 G/m)



RW18706 -UN-07JAN91

NOTE: Leakage is measured by disconnecting the line from the air boost return port (A).

The air supply line must remain connected, and the air pressure source operating.

Test differential at specifications. Allow the leakage to stabilize a few minutes, with the differential lock applied, before measuring.

Inspect or install new sealing rings, differential housing or bearing quill if leakage is excessive.

RX,43115,1C -19-09JAN98

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3

AIR TEST AXLE ASSEMBLY

NOTE: Axle must be completely assembled.

1. Remove grease fittings from axle housing. (If equipped.)

NOTE: DO NOT fill differential case.

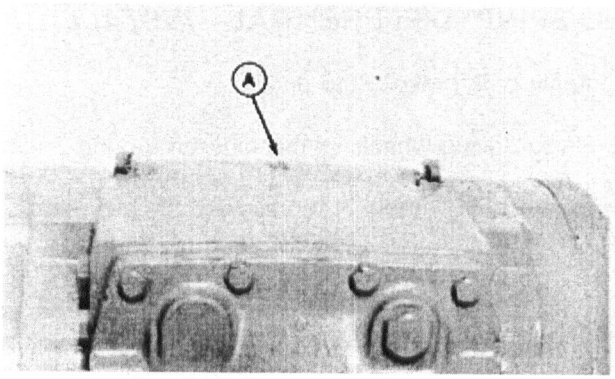
2. Apply 69 kPa (0.7 bar) (10 psi) air pressure to axle assembly through breather plug (A) hole. Shut off air supply once pressure is reached.

IMPORTANT: To avoid damaging seals, air pressure must not exceed 100 kPa (1.0 bar) 14.5 psi).

3. Note gauge reading after five minutes. Pressure should remain at 69 kPa (0.7 bar) (10 psi). A pressure drop is a sign of leakage. Apply liquid soap to suspected joints to find source of leak.

NOTE: Air leakage or grease extrusion from grease fitting holes in ends of axles indicates a bad inner axle oil seal.

4. Install the grease fittings and lubricate axle outer bearings, after axle assembly has passed the air test.



RW18709 -UN-10JAN91

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RX,43115,2C -19-09JAN98

NO-SPIN™ DIFFERENTIAL—*INSTALLATION TEST*

1. Apply park brake. Stop engine.

2. Raise driving wheels of machine off ground.

3. Rotate both wheels in the forward direction as far as possible using an assistant.

4. Hold the right wheel forward and rotate the left wheel rearward.

5. Rotate both wheels rearward as far as possible.

6. Hold the right wheel rearward and rotate the left wheel forward.

7. Repeat Steps 3—6 holding the left wheel and rotating the right wheel in the opposite direction.

If Correctly Installed:

The rotating (or overrunning) wheel should cam out easily by hand, rotate freely in both directions and produce a soft indexing or clicking sound. The No-SPIN differential should not reengage until the direction of rotation is reversed.

If Repeated Loud Indexing or Clicking Sounds are Heard:

One of the driven clutch assemblies may not be correctly assembled to the spider. Recheck assembly and installation steps in Group 30.

If Either Wheel Does Not Rotate Freely in Both Directions:

Recheck each assembly and installation step. Also, check park and service brakes for possible drag caused by incorrect adjustment.

RX,43115,3C -19-09JAN98

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5

NO-SPIN™ DIFFERENTIAL—*OPERATION TEST*

Check that both wheels of the axle are driving. Make test under load, so engine torque is applied through the No-SPIN differential with the wheels on the ground. One way to achieve this load is to drive up against a solid obstruction (on loose dirt or gravel, if possible) and attempt to spin both wheels together. Perform this test in forward and reverse.

On a flat surface, with good traction, drive the vehicle in a tight circle in forward and reverse to be sure the outside wheel is free to overrun (i.e., the outside tire does not scuff). A clicking or indexing sound may be heard. The sound of gear engagement may also be heard upon completion of the turn. This is normal.

RX,43115,6B -19-05JAN95

NO-SPIN™ DIFFERENTIAL TEST

1. Raise front of machine off ground.

2. Apply park brake. Stop engine.

NOTE: Use an assistant to help rotate wheels.

3. Rotate both wheels at the same time, in the forward direction as far as possible.

4. Hold the left wheel forward and rotate the right wheel rearward.

5. Rotate both wheels at the same time, rearward as far as possible.

6. Hold the left wheel rearward and rotate the right wheel forward.

7. Repeat Steps 3—6 holding the right wheel and rotating the left wheel in the opposite direction.

LOOK: When both wheels are rotated in the same direction, both wheels must stop after turning a few inches.

When one wheel is held in one direction, the other wheel must disengage and turn freely when turned in the opposite direction.

NOTE: When one wheel turns freely, the differential will make a clicking noise.

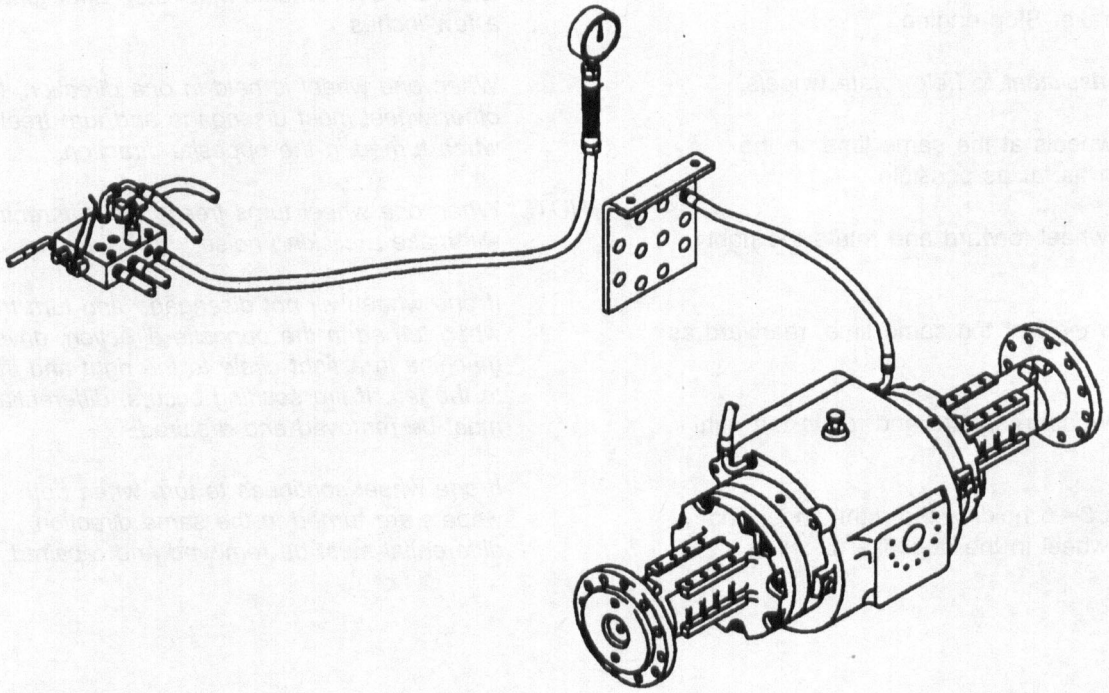
If one wheel will not disengage and turn freely when turned in the opposite direction, drive machine in a tight circle to the right and then to the left. If tire scuffing occurs, differential must be removed and repaired.

If one wheel continues to turn when both wheels are turned in the same direction, differential must be removed and repaired.

RX,43110,5B -19-06JUL95

115 6

DIFFERENTIAL LOCK FUNCTION TEST



T7817AJ (CV)

T7817AJ -UN-08SEP92

SPECIFICATIONS

Oil Temperature	65 ± 6°C (150 ± 10°F)
Engine Speed	Fast Idle
Differential Lock Pressure	4138—4482 kPa (41—45 bar) (600—650 psi)

REQUIRED TOOLS

- JT03455 Adapter (7/16-20 M JIC X -4 F ORFS)
- 38H1414 Cap (-4) (Parker No. 4FNL-S)
- Gauge 0—6900 kPa (0—69 bar) (0—1000 psi)

1. Connect test gauge and fitting to pressure reducing valve-to-differential lock line. Cap the axle differential lock line.
2. Heat hydraulic system oil to test specifications.
3. Actuate differential lock.
4. Run engine at specification.

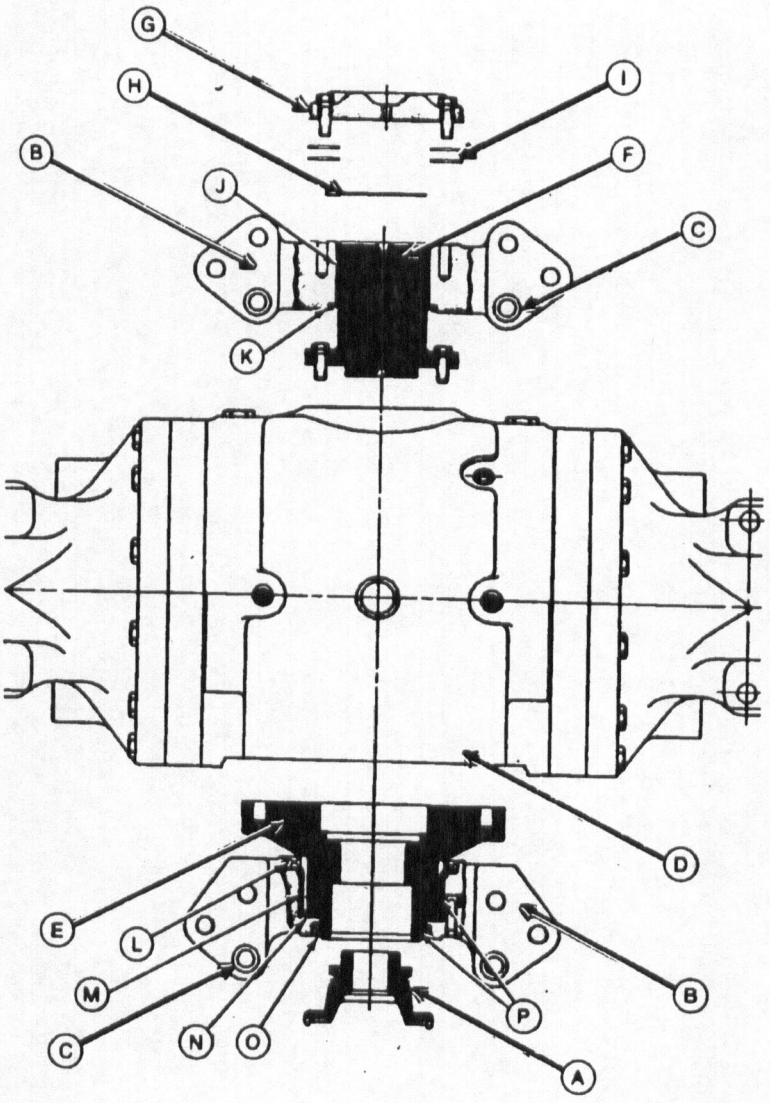
Pressure must reach test specifications.

If pressure is not to specification, perform the pressure reducing valve test in accordance with machine Operation and Test Technical Manual.

Perform differential lock leakage test in this group if pressure is to specification and differential lock is not working correctly.

RX,43115,4C -19-09JAN98

AXLE OSCILLATION



RW35606 -UN-17DEC94

A—Input Yoke
B—Axle Support
C—Support Alignment Bushing
D—Differential Case
E—Input Cover/Quill
F—Axle Pivot Pin
G—Cover
H—Thrust Washer
I—Shims
J—Bushing
K—Grease Seal
L—Grease Seal
M—Bushing
N—Thrust Washer
O—Grease Seal
P—Wear Sleeves

TeamMate™ II axles with dual oscillation supports mount the axle to the vehicle and allow the axle to oscillate about the yoke center line perpendicular to the direction of travel.

The supports are lubricated with grease, have replaceable bushings, and are sealed for long-life.

Axle support alignment bushings (C) provide fixed axial mountings for the axle supports.

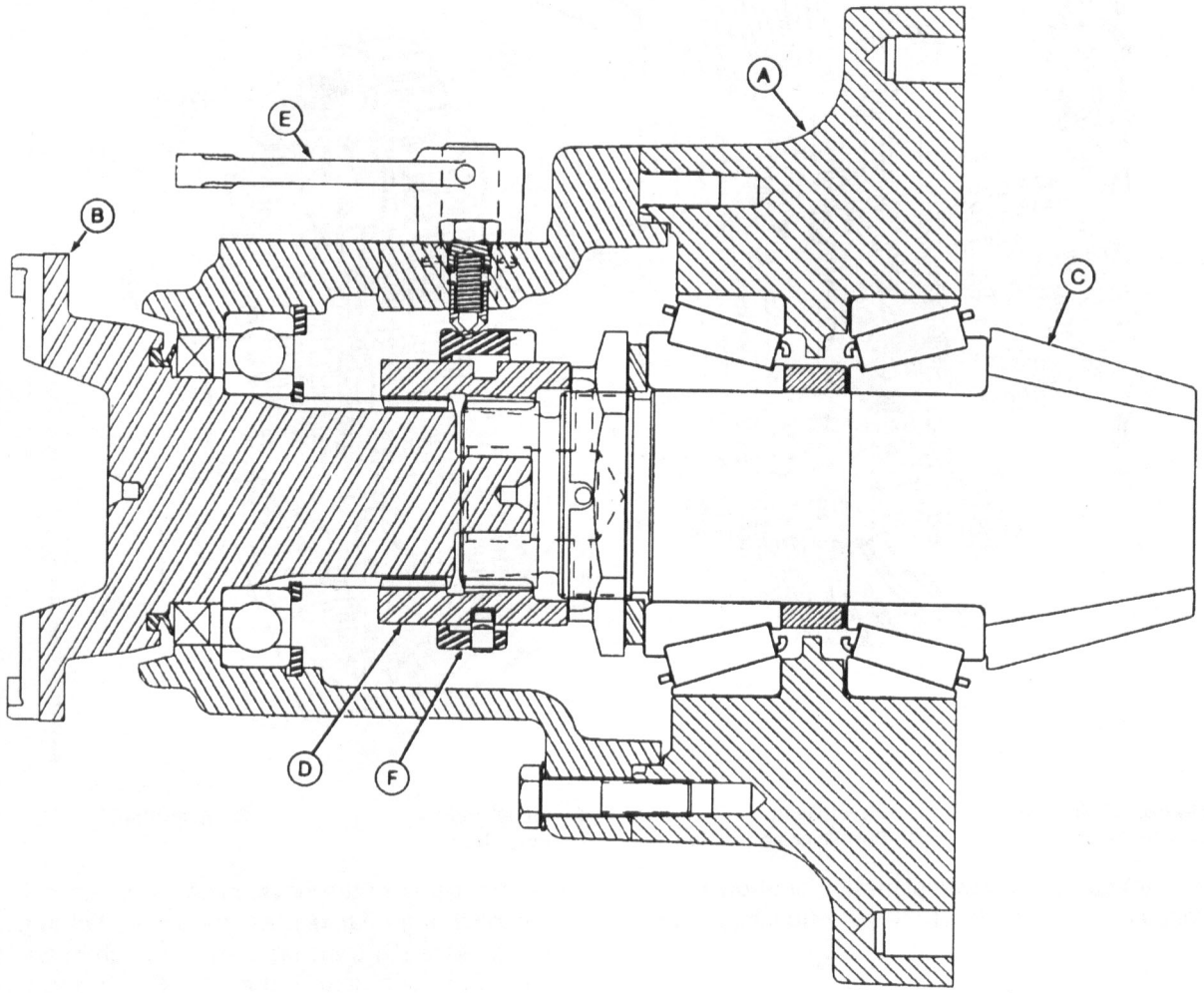
There is a thrust washer (N) at the cover/quill support and (H) at the pivot pin support. Shims (I) between the cover and the pivot pin support provide end play between the axle and the supports for correct axle oscillation.

The cover/quill (E) has replaceable wear sleeves (P).

The axle oscillation pivot pin (F) is replaceable.

RX,43120,1C -19-09JAN98

AXLE DISCONNECT OPERATION



RW35618 -UN-06JAN95

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A—Input Quill/Differential Case Cover
B—Input Yoke
C—Bevel Pinion Shaft
D—Shift Collar
E—Shift Lever
F—Shifter Yoke

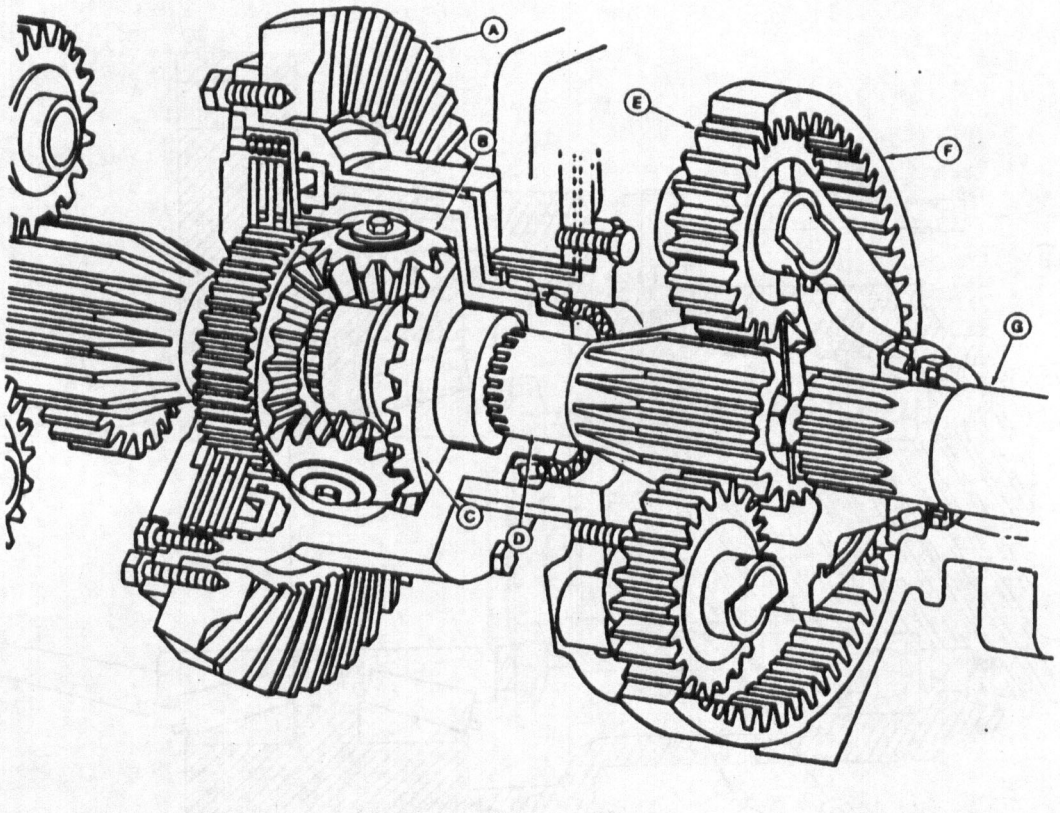
The optional axle disconnect is located on the input quill/cover (A) of the axle.

When the axle is connected to the drive line, the input yoke (B) drives the bevel pinion shaft (C) through the collar (D).

When the axle is to be disconnected, mechanical linkage connected to lever (E) shifts the shifter yoke (F) which moves the collar to disconnect the bevel pinion shaft from the input yoke.

RX,43120,2B -19-19JAN95

INBOARD PLANETARY AXLE OPERATION



A—Spiral Bevel Ring Gear
B—Bevel Pinions
C—Bevel Gears
D—Sun Gear and Pinion
E—Planet Pinion
F—Ring Gear
G—Axle Shaft

Inboard planetary axles have planetary final drive gears located to the inside of the axle housings and shaft.

The planetary drive uses three pinion gears contained in a planetary carrier and a ring gear positioned between the differential case and the axle housing. The planetary carrier is splined to the axle shaft.

Power flows from the bevel pinion input shaft to the differential ring gear (A). As the differential turns, the bevel pinions (B) transmit power through bevel gears (C) to sun gear and pinion (D). The sun gear and pinion rotates three planet pinions (E) that "walk around" a ring gear (F) which is fixed between the differential case and the axle housing.

The planet pinion gears rotate the planet pinion carrier which is splined to the axle shaft (G) which is rotated the same direction as the sun pinion gear.

RX,43120,9B -19-15NOV96

DIFFERENTIAL OPERATION

The function of the differential is to distribute the power to each side of the axle while allowing the wheels to turn at different speeds. The bevel pinion input shaft meshes with the bevel ring gear (A) which turns the differential housing (B). Torque is transferred from the housing to the final drive shafts (C) through a coupling (D) in the differential housing.

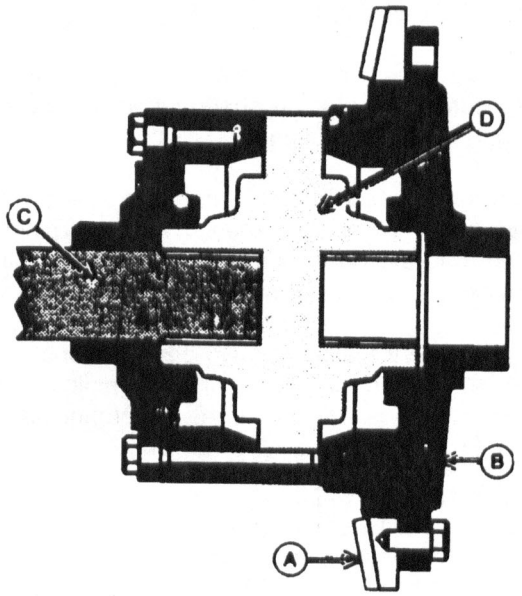
John Deere **TeamMate™ II** axles have three different differential coupling designs. All three designs are not available on all axle series.

Standard Differential

John Deere Dif-Lok Differential

No-SPIN™ Differential

A—Bevel Ring Gear
B—Differential Housing
C—Final Drive Shaft
D—"Coupling" (Three Designs)



RW20726 -UN-18FEB92

RX,43120,2C -19-19DEC97

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STANDARD DIFFERENTIAL OPERATION

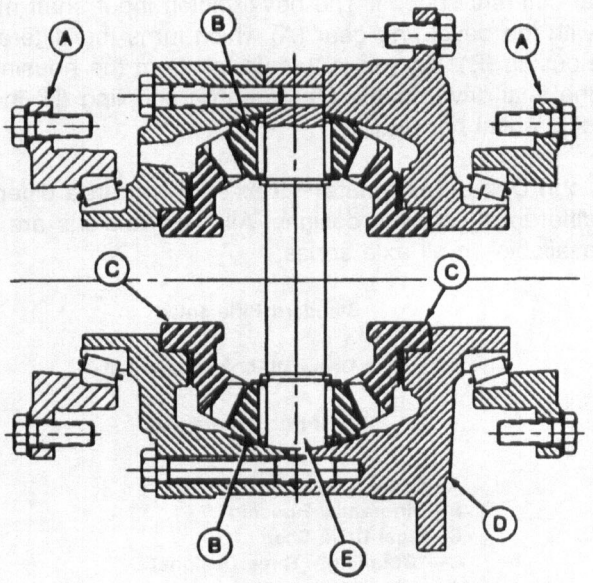
The standard differential uses straight bevel pinions (B) and bevel side gears (C) that rotate with the differential housing (D) as one unit.

Each axle receives the same rotation, therefore each wheel turns at the same speed when moving in a straight forward direction.

When the machine enters a turn, the inside wheel turns slower than the outside wheel. The bevel pinions are forced to rotate on their own axis (E) and "walk around" the slower axle's bevel side gear.

The 1200 series axle has two bevel pinions.
The 1400 series axle has four bevel pinions.
The 1600 series axle has three bevel pinions.

A—Bearing Quill
B—Bevel Pinions
C—Bevel Side Gear
D—Differential Housing
E—Bevel Pinion Shaft

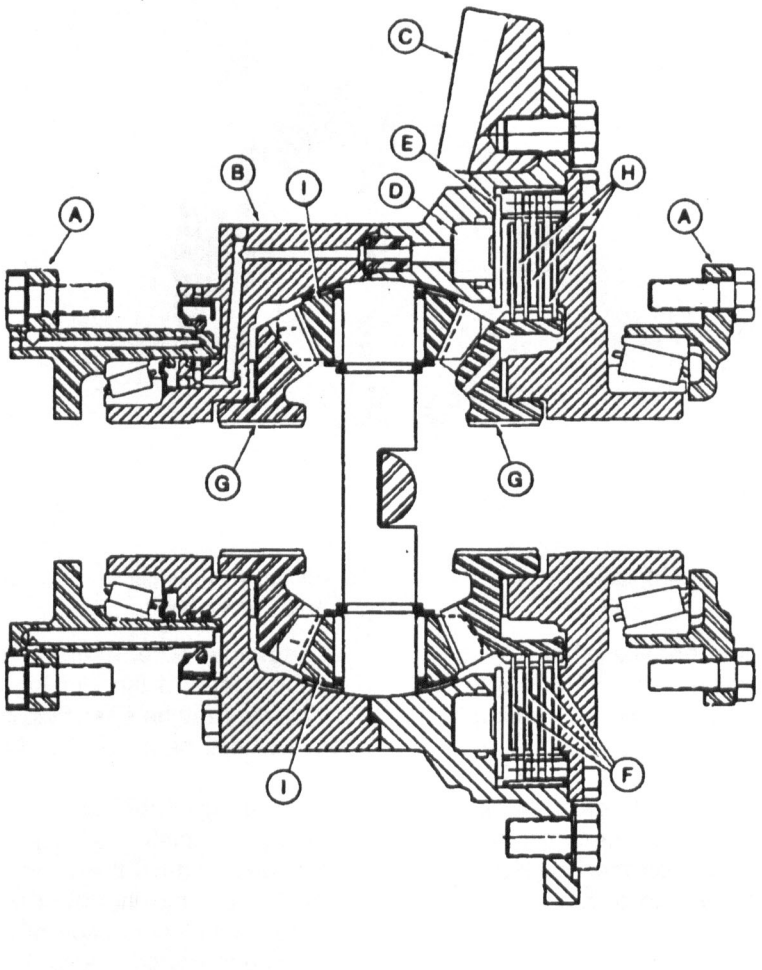


RW20765 -UN-18FEB92

Cross-Sectional View

RX,43120,3C -19-19DEC97

DIF-LOK DIFFERENTIAL OPERATION



A—Quill
B—Differential Housing
C—Spiral Bevel Gear
D—Differential Lock Clutch Piston
E—Piston Return Plate
F—Clutch Disk
G—Bevel Side Gear
H—Separator Plate
I—Bevel Pinion

Cross-Sectional View

The DIF-LOK differential uses an optional hydraulic differential lock valve to lock the differential. When the differential lock pedal is applied, the valve allows pressure oil to flow to the differential. The oil presses against the clutch piston (D), compressing the clutch disks (F) against the plates (E and H) and housing (B). The clutch disks are splined to the bevel side gear (G) with separator plates between the disks tanged to the housing. When oil pressure is applied, the bevel gear (G) locks to the differential housing, which locks up the bevel pinion (I) and prevents the bevel pinions from "walking around" the bevel gears.

DIF-LOK differentials require both a hydraulic pressure system and a drain system.

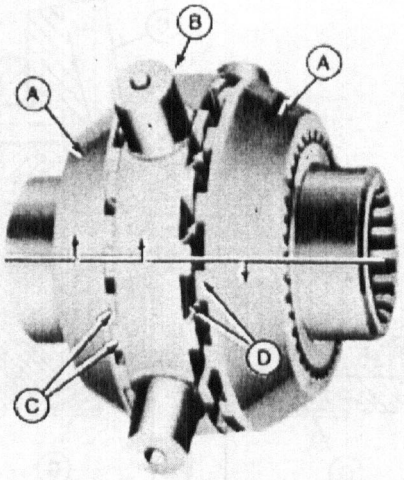
There are two types of drain systems available:

Capture System

Air Boost System

RX,43120,11B -19-04JAN95

NO-SPIN™ DIFFERENTIAL OPERATION



RW20773 -UN-18FEB92

A—Driven Clutches **B—Spider** **C—Clutch Teeth Engaged with Spider Teeth** **D—Clutch Teeth Disengaged from Spider Teeth**

The No-SPIN™ differential is not like other differentials since it is normally engaged and still allows for relative motion between wheels during cornering.

The No-SPIN™ unit replaces bevel gears, bevel pinions, bevel pinion shafts in the differential housing. Axles are splined to side gears on the No-SPIN™ unit. The side gears are splined to driven clutches (A).

When driving straight, the clutch teeth (C) of the spider (B) and driven clutches (A) are fully engaged and the whole unit rotates.

During times when there is a driven wheel slippage, as the speed of the slipping wheel increases, the differential ratchets, shifting the load to the opposite drive wheel, causing a ratcheting sound.

During a turn under power, the inside driven wheel remains completely engaged with the spider (C) and continues to drive the vehicle. The outside driven wheel automatically disengages (D) from the spider with a ratchet-like action allowing the outer wheel to free-wheel around the corner.

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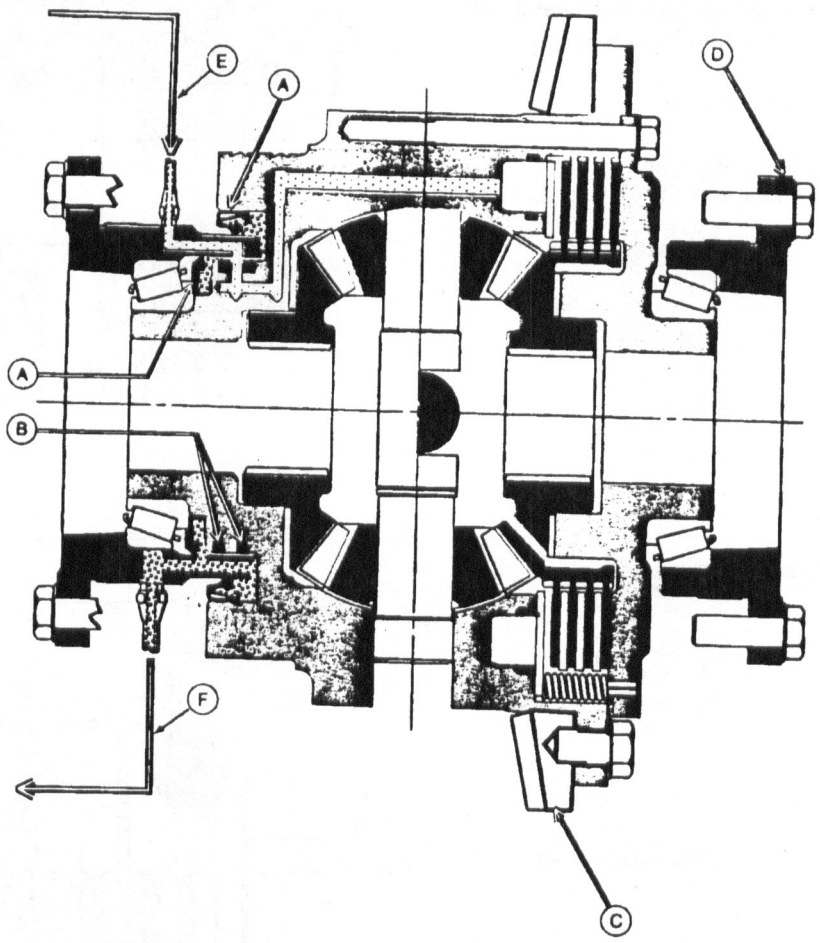
RX,43120,3B -19-19JAN95

CAPTURE SYSTEM OPERATION



RW35593 -UN-02DEC94

A—Low Pressure Lip Seals
B—Seal Rings
C—Ring Gear
D—Differential Case Attachment
E—Supply Oil
F—Sump Oil

The capture system separates differential lock engaging pressure oil from the normal axle assembly oil by using two low pressure lip seals (A) outside the high-pressure cast seal rings (B).

The high-pressure seal rings are able to withstand the supply pressure, but some leakage will be present. Oil seeping past the high-pressure seals, when the differential lock is in use, is captured by the outer low-pressure seals. The trapped oil is then returned to sump.

Low pressure seals are not tolerant to pressure spikes and are difficult to replace.

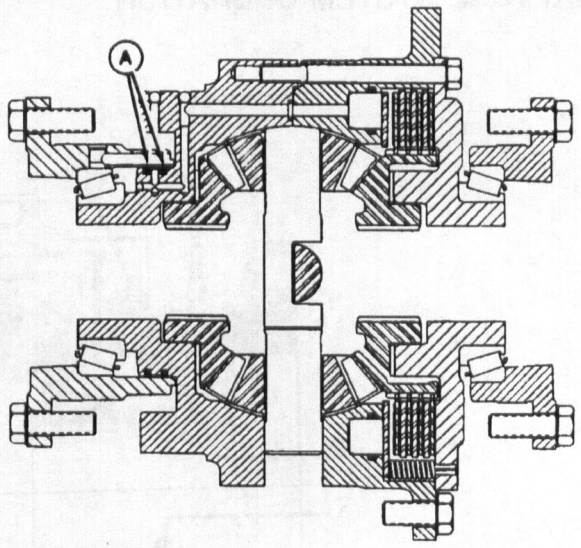
RX,43120,4B -19-19JAN95

AIR BOOST SYSTEM OPERATION

The air boost system allows differential lock engaging pressure oil to combine with the normal axle assembly oil within the differential case and axle housings.

Outer low pressure seals are not required.

Oil seeping past the high-pressure seals (A) when the differential lock is in use, flows into the differential case.



RX,43120,6A -19-19JAN95

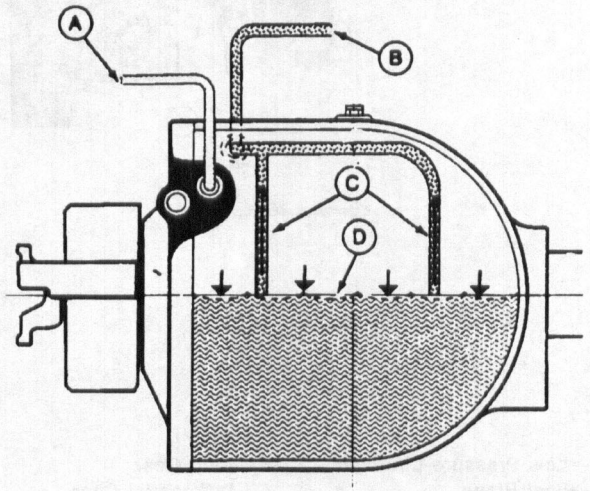
PRESSURIZED DIFFERENTIAL CASE OPERATION

Oil level stability is accomplished by pressurizing the differential case with air from the engine turbocharger or an air compressor.

The pressurized air (A) flows into the top of the case. Drain line (B) connects to two vertical tubes (C) that extend from the top of the differential case down to the axle center line (D).

If the oil level is below the end of the pipes, air flows through the axle and the drain line to sump and is vented to atmosphere.

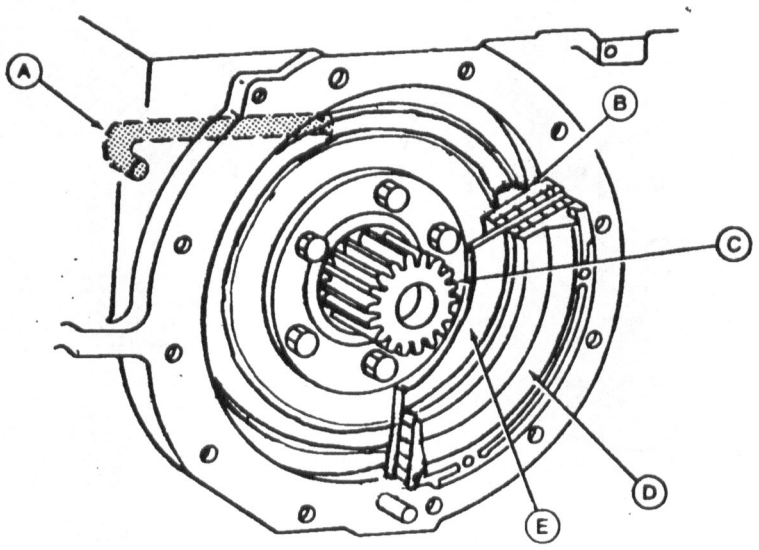
If the oil level rises above the end of the pipes due to differential lock seal ring leakage, it is forced by the pressurized air, up the pipes and through the drain line to sump.



A—Pressurized Air
B—Drain Line
C—Oil Level Tubes
D—Axle Center Line

RX,43120,12B -19-04JAN95

SERVICE BRAKE OPERATION—SINGLE DISK



RW18731 -UN-27JAN95

A—Brake Pressure Oil
B—Brake Piston
C—Sun Pinion Shaft
D—Brake Backing Plate
E—Brake Disk

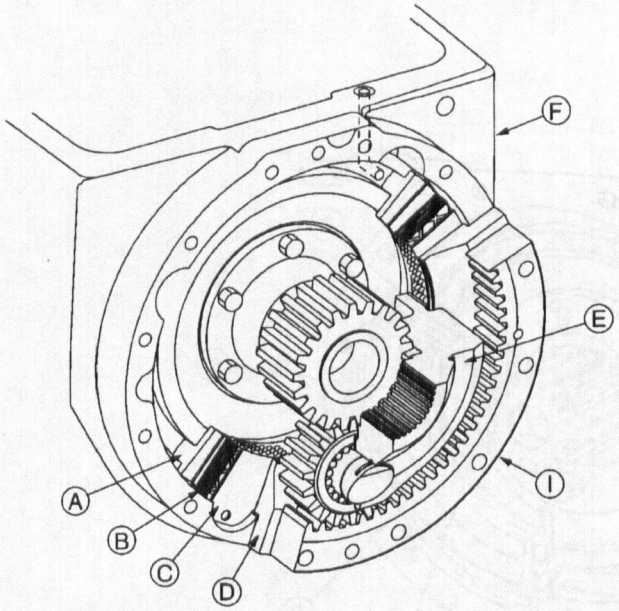
The single disk **TeamMate™ II** axle service brake consists of an annular piston (B), a brake disk (E), with brake facing material bonded to each side, and a brake backing plate (D). The service brake is located on each side of the differential case.

Brake pressure oil (A) forces the brake piston (B) against the brake disk (E). This forces the brake disk against the pressure plate (D) which is fixed to the differential case.

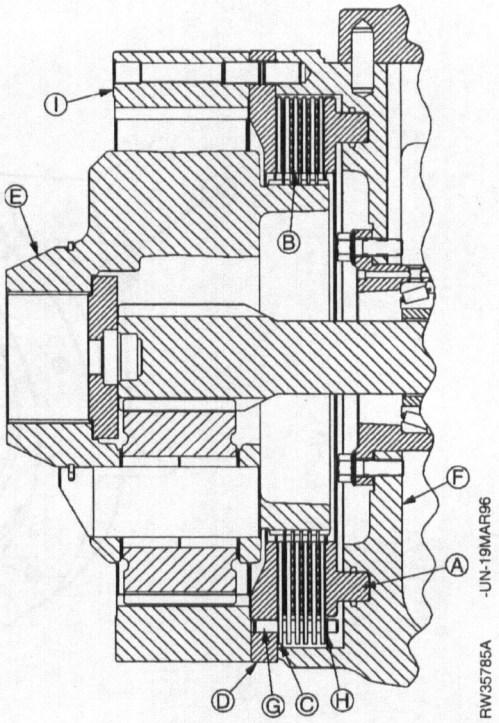
The brake disk is splined to the sun pinion gear (C) of the planetary carrier assembly. With the brake disk forced against the backing plate, braking of the axles occurs on the sun pinion shaft.

RX,43120,4C -19-19DEC97

SERVICE BRAKE OPERATION—*MULTIPLE DISK*



RW35741A -UN-19MAR96



RW35785A -UN-19MAR96

A—Brake Piston
B—Brake Disk
C—Separator Plate
D—Brake Backing Plate
E—Planetary Carrier/Brake Hub Assembly
F—Differential Case
G—Brake Pack Retaining Pin
H—"E" Clip
I—Final Drive Ring Gear

The multiple disk service brake consists of an annular piston (A), separator plates (C), brake disks (B) with brake facing material bonded to each side, and a brake backing plate (D). The multiple disk service brake pack is attached to the planetary carrier/brake hub assembly (E) and is located on each side of the differential case (F).

The annular piston is located in the differential case. The separator plates and brake disks are retained to the brake backing plate by the retaining pins (G) and "E" clips (H).

The final drive ring gear (I), brake backing plate (D), and the brake pack are sandwiched between the differential case and the final drive housing. The brake disks are internally splined to the brake hub on the planetary carrier assembly. The brake separator plates are externally tanged to the differential case.

Brake pressure oil forces the brake piston against the first separator plate and compresses the separator plates and brake disks together and against the brake backing plate. With the brake disks forced against the separator plates, braking of the axle occurs on the planetary carrier assembly which is attached to the final drive shaft.

When pressure to the piston is released, the piston is retracted into the piston bore of the differential case by the piston packing rings.

When force against the separator plates is released, the brake disks are allowed to rotate freely.

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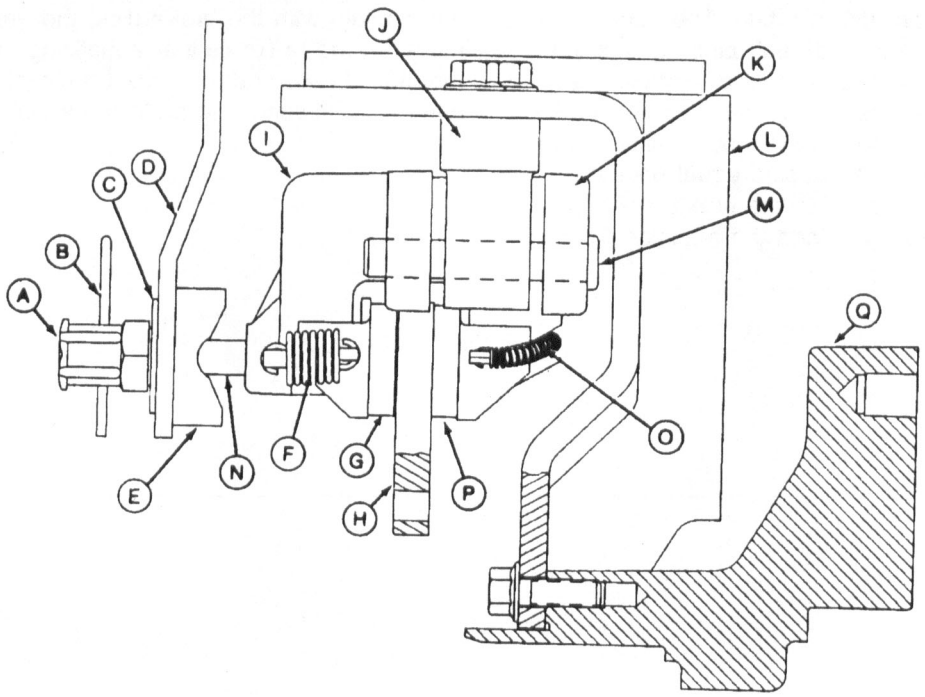
RX,43120,5C -19-09JAN98

PARK BRAKE OPERATION—*MANUAL*



RW35595 -UN-02DEC94

A—Castellated Nut
B—Pin
C—Washer
D—Lever
E—Lever Cam
F—Spring (2 used)
G—Brake Pad (Outer)
H—Brake Disk
I—Brake Caliper
J—Mounting Bracket
K—Support Bracket
L—Brake Caliper Equalizing Pin (2 used)
M—Brake Pad Push Pin (2 used)
N—Spring
O—Brake Pad (Inner)
P—Input Quill/Case Cover
Q—Cap Screws (4 used)
R—Cap Screws (5 used)

The park brake assembly is fastened to the input quill/case cover (P) by means of support bracket (K) and mounting bracket (J). The caliper assembly (I) is attached to the mounting bracket by two pins (L). The pins allow the caliper assembly with the brake pads (G) and (O) attached to move back and forth to allow equal pad pressure to be applied to the brake disk (H) which is attached to the axle yoke.

The spring (N) on the inner brake pad retains the brake pad in position in the caliper assembly.

The two springs (F) on the outer caliper retain the brake pad in position in the caliper assembly and also act as pad return springs.

RX,43120,5B -19-24JAN95

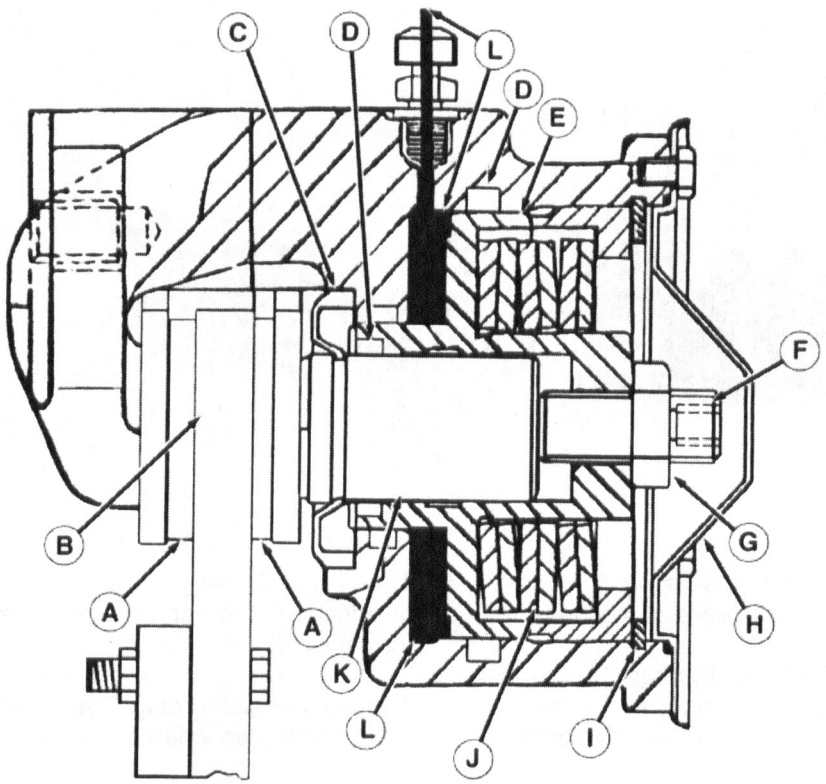
The park brake is mechanically applied and released.

When the park brake is applied, a cable attached between the control and the lever causes the lever (D) attached to the cam (E) to rotate. The cam rotates, moving the brake pad push pins against the outer brake pad (G). As the outer pad contacts the brake disk, the caliper assemblies move on the brake caliper equalizing pins, forcing the inner brake pad to also contact the brake disk causing equal pressure from both pads to be applied to the brake disk holding the disk from turning and the machine from moving.

When the park brake control is released, the force from the pad push pins to the outer brake pad is released, allowing the springs (F) to return the brake pad to the released position. Since there is no longer any contact with the brake disk, the brake calipers move on the brake caliper equalizing pins preventing the inner brake pad to contact the brake disk. As the pads are released, the park brake disk is free to turn.

RX,43120,6B -19-05JAN95

PARK BRAKE OPERATION—*SPRING APPLIED/HYDRAULIC RELEASE*



RW36753 -UN-11DEC97

A—Brake Pads
B—Brake Disk
C—Dust Seal
D—Piston Seals
E—Piston
F—Brake Adjusting Screw
G—Lock Nut
H—Cover
I—Snap Ring
J—Spring Washers
K—Shaft
L—Pressure Oil
M—Brake Bleed Screw

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14

The park brake is spring applied and hydraulically released. When the park brake is applied or machine is shut off, spring pressure applies the park brake. The spring washers (J) force the piston (E) to push the brake adjusting screw (F) against the shaft (K). The shaft forces the pads (A) against the brake disk (B) which is attached to the axle yoke. The park brake pads hold the disk from turning and the machine from moving.

When the park brake switch is in the OFF position, the switch energizes a park brake solenoid on a pressure reducing valve. The solenoid routes brake pump pressure oil (L) to the piston (E). The piston moves against the spring washers (J) and releases the force from the shaft (K) on the brake pads (A). As the pads are released, the park brake disk (B) is free to turn.

To Release the Park Brake:

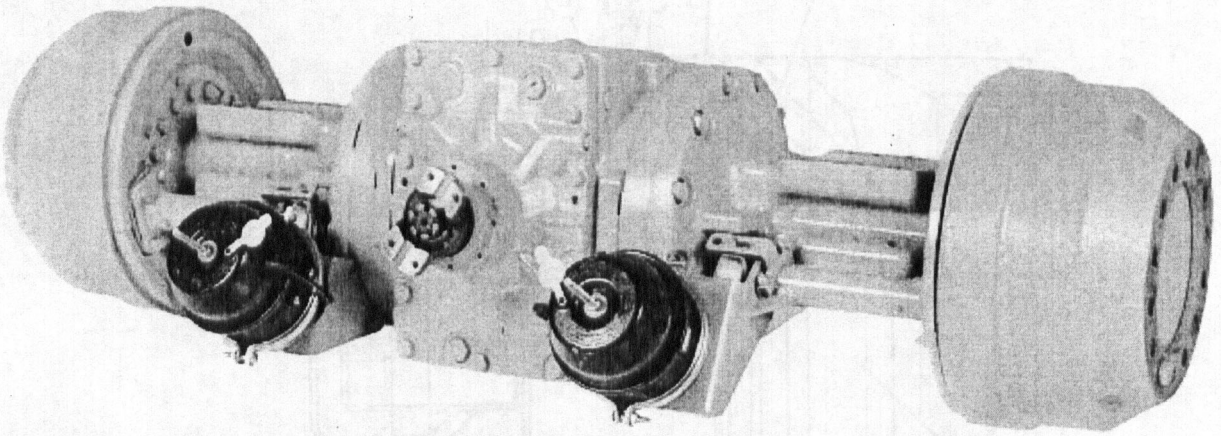
1. The switch has to be in the OFF position.

2. When the machine is shut off with the switch in the OFF position, the switch has to be cycled from OFF to ON to OFF after the machine has been started.

3. The park brake can be manually released to move the machine. Remove the cover (H), loosen lock nut (G), and turn out park brake adjusting screw (F). Turn adjusting screw back in to engage park brake.

RX,43120,6C -19-09JAN98

DRY DRUM BRAKE OPERATION



RW35586 -UN-10AUG94

NOTE: Refer to Eaton and MGM Manuals for further illustrations of dry drum brake components.

The 1400 Series **TeamMate™ II** dry drum brakes are air operated, single anchor, drum type, with internal expanding shoes actuated by cam rollers contacting an "S" head camshaft.

The camshaft is rotated by an automatic slack adjuster splined to the camshaft that is actuated by the push rod of the air chamber when brake application is made.

Each wheel is actuated by its own air chamber.

The air chamber is a double diaphragm integrated parking brake type with a manual release feature for service or towing.

The manual release tool is permanently stored in the release tool storage pocket on the spring brake chamber.

The park brake is spring engaged and air disengaged. The park brake spring chamber is permanently sealed to prevent inadvertent disassembly of the chamber allowing sudden release of the high energy power spring.

The sealed park brake spring chamber draws air through the external breather tube from the inside protected area of the service brake chamber for long-life corrosion protection.

The service brake is air engaged and spring disengaged. The service brake chamber is accessible for servicing.

The highly visible orange band on the piston rod quickly indicates when brake service may be required.

The automatic slack adjuster is connected by a pin to an adjustable yoke on the push rod.

When brakes are applied, the stroke of the piston rod rotates the slack adjuster which is splined to the "S" headed camshaft. The cam rollers, riding up the cam head, move the shoes into contact with the drum.

The slack adjuster control arm is bolted to the anchor bracket and by rotating the adjusting hex, lining-to-drum clearance is established.

Upon brake application, the slack adjuster rotates and moves the shoes into contact with the drum.

When brake application is released, the slack adjuster returns to the original position plus additional travel brought about by lining wear. The automatic adjustment constantly maintains the lining-to-drum clearance.

RX,43120,8B -19-19JAN95

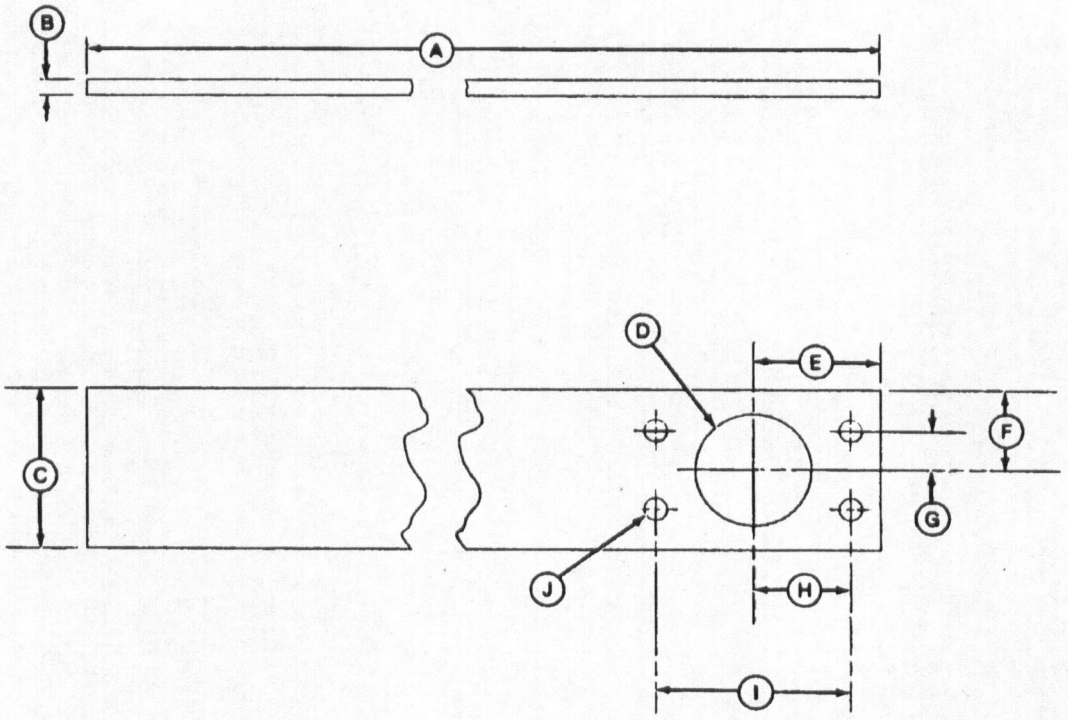
FABRICATED TOOLS

Fabricated tools are tools identified by the factory as necessary for proper servicing that can be made at the dealership.

Use the information in this section to fabricate the tools required to perform service correctly.

RX,DFRW,INTRO -19-17OCT90

DF1055—YOKE HOLDING TOOL



RW18930 -UN-22OCT91

A—915 mm (36 in.)
B—10 mm (0.375 in.)
C—100 mm (4 in.)
D—70 mm (2.75 in.)
E—77 mm (3 in.)
F—50 mm (2 in.)
G—21.44 mm (0.84 in.)
H—57.15 mm (2.25 in.)
I—114.3 mm (4.5 in.)
J—14 mm (0.56 in.) Drill Four Places

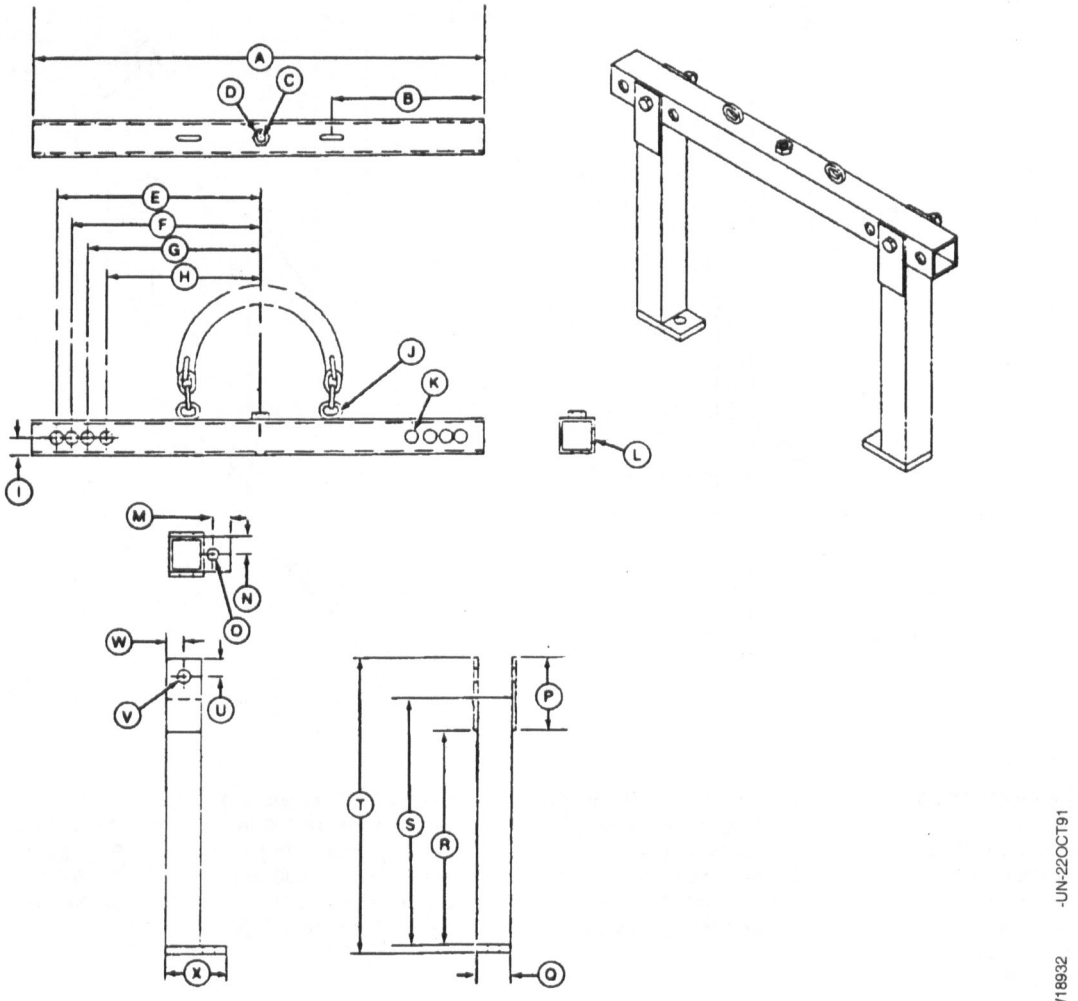
Material Required:

1—10 x 100 x 915 mm Flat Steel (0.375 x 4 x 36 in.)

Tool is used to hold yoke while removing nut.

RX,DF1055 -19-21NOV96

DF1057—AXLE ADJUSTING TOOL



A—660.4 mm (26 in.)
B—225.4 mm (8.87 in.)
C—1/2 in. Drilled Hole (2 Places)
D—Welded Nut (Centered)
E—300 mm (11.81 in.)
F—274.1 mm (10.79 in.)
G—250.8 mm (9.87 in.)
H—223.8 mm (8.81 in.)
I—25.4 mm (1 in.)
J—0.25 x 1 x 1.38 in. Each Chain Link
K—3/4 in. Drilled Hole (8 Places)
L—0.1875 x 2 x 2 in. Tube
M—25.4 mm (1 in.)
N—25.4 mm (1 in.)
O—11/16 in. Drilled Hole
P—104.7 mm (4.13 in.)
Q—50.8 mm (2 in.)
R—307.9 mm (12.12 in.)
S—355.6 mm (14 in.)
T—425.2 mm (16.74 in.)
U—25.4 mm (1 in.)
V—3/4 in. Drilled Hole (2 Places)
W—25.4 mm (1 in.)
X—88.9 mm (3.5 in.)

Material Required:

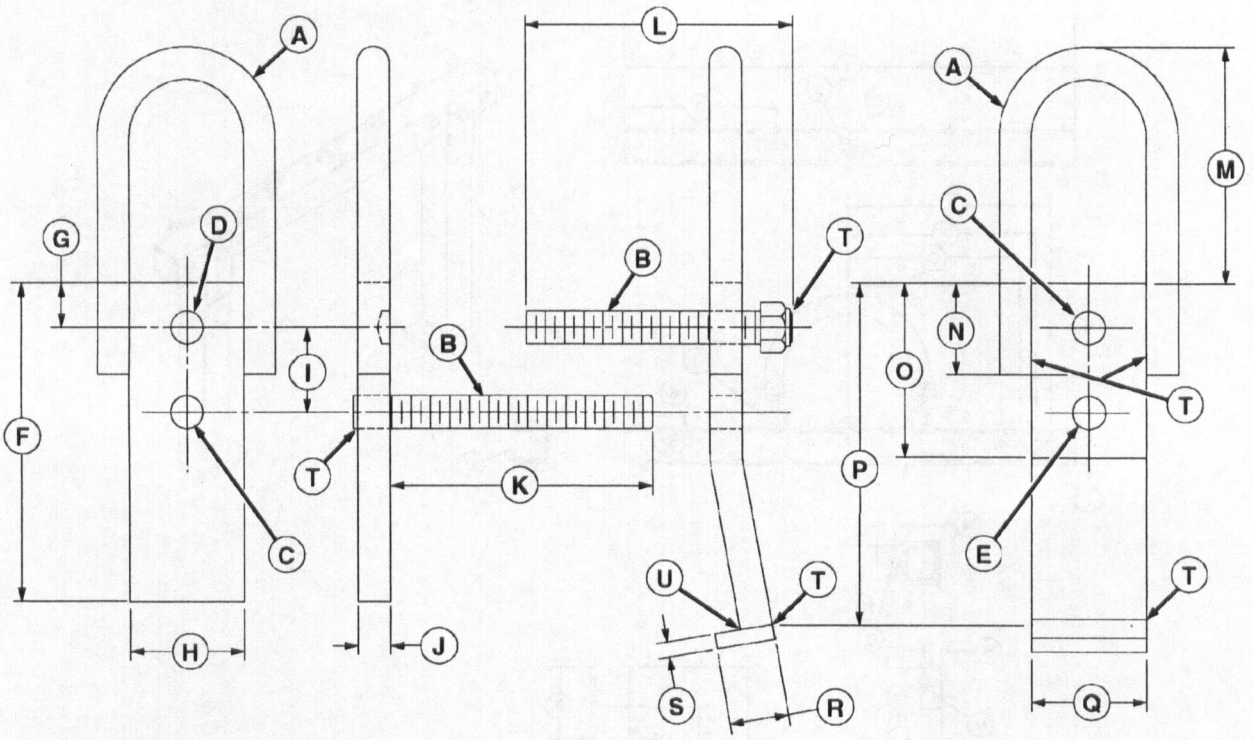
1—2 x 2 in. Steel Tube
1—2 x 1.2 in. Flat Steel

Use an odd number of links in the section of chain.

Tool is used to remove axle shaft and adjust axle bearings.

RX,DF1057 -19-21NOV96

DFRW7—DIFFERENTIAL LIFTING TOOL



RW18920A -UN-19JUN97

A—12.70 mm (0.500 in.) Round
B—1/2 in. x 13 UNC Threaded Rod
C—1/2 in. x 13 UNC
D—9/16 in. Drill 6.35 mm (0.250 in.) Deep Max.
E—9/16 in. Drill Through
F—139.7 mm (5.500 in.)
G—19.05 mm (0.750 in.)
H—50.8 mm (2 in.)
I—38.1 mm (1.500 in.)
J—12.7 mm (0.500 in.)
K—114.3 mm (4.500 in.)
L—114.3 mm (4.500 in.)
M—101.6 mm (4 in.)
N—38.1 mm (1.500 in.)
O—76.2 mm (3 in.)
P—152.4 mm (6 in.)
Q—50.8 mm (2 in.)
R—25.4 mm (1 in.)
S—6.35 mm (0.250 in.)
T—Weld
U—No Weld

Material Required:

2—1/2 in. x 13 UNC Nuts
2—305 mm (12 in.) of 12.70 mm (0.500 in.) Round
1—241 mm (9.5 in.) of 1/2 in. x 13 UNC Threaded Round
1—6.35 x 50.80 x 25.40 mm (0.250 x 2 x 1 in.) Flat Steel
1—2.92 mm (11.5 in.) of 12.70 x 50.80 mm (0.500 x 2 in.) Flat Steel

The differential lifting tool is used to remove and install the differential housing.

RX,DFRW7 -19-18JUN97

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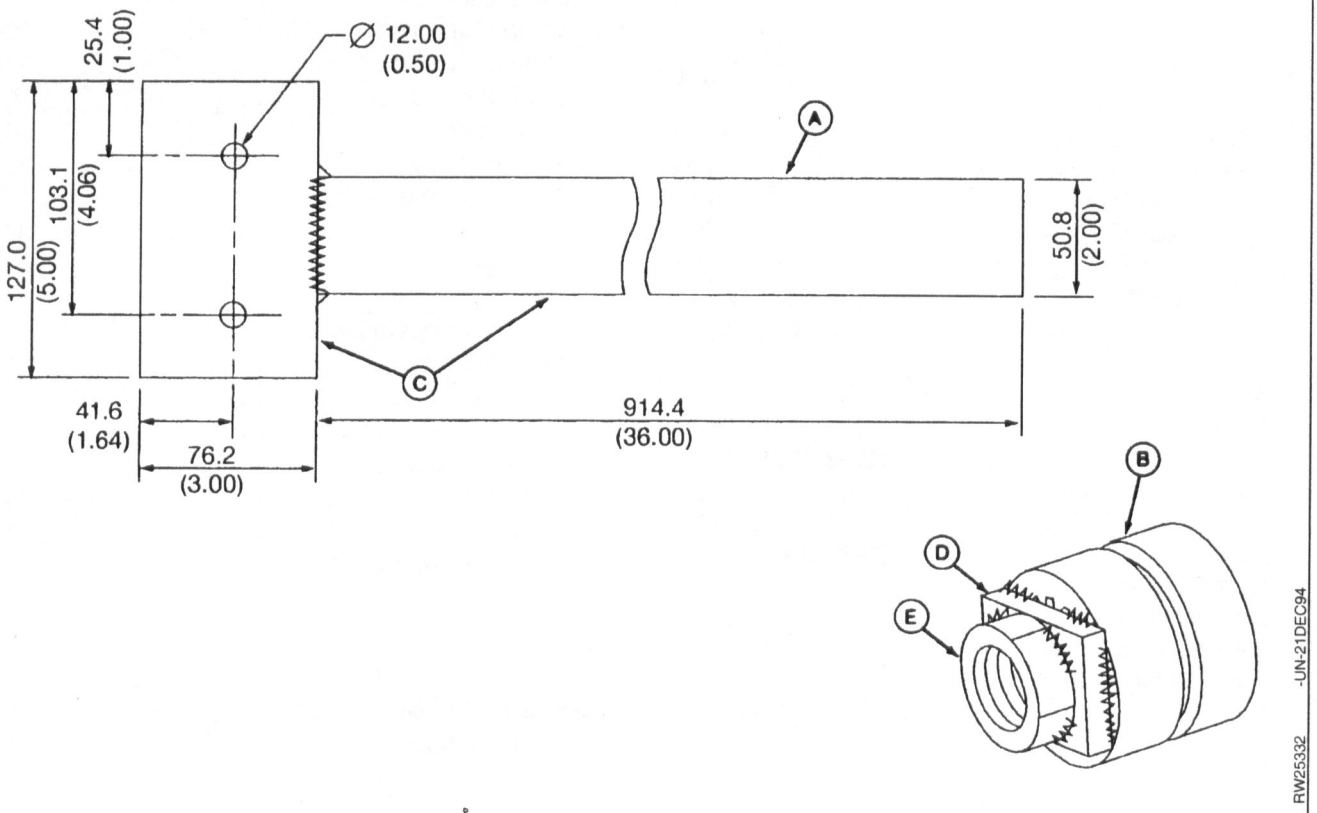
DFRW102—PINION SHAFT TOOL



A—Holding Tool
B—Shaft Turning Tool
C—1/2 in. Cold Rolled Steel
D—1/2 x 2-1/2 x 2-1/2 in. Cold Rolled Steel
E—1-1-1/2 in. Nut

Material Required:

- R88601 Collar to make turning tool
- 1/2 in. Cold Rolled Steel

Nut/cover holding tool (A) is used to hold retaining nut and cover while rotating type pinion shaft.

Shaft turning tool (B) is used to rotate pinion shaft to tighten the retaining nut.

Fabricate tools as illustrated.

These tools are used to remove and install the spiral bevel pinion shaft for axles with tow disconnect.

RX,DFRW102 -19-04JAN95

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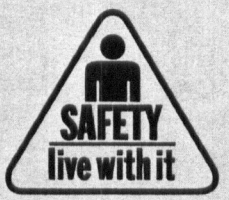
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