

JOHN DEERE
WORLDWIDE COMMERCIAL & CONSUMER
EQUIPMENT DIVISION

Gator Utility Vehicle
HPX 4X2 and 4X4 Gas and Diesel

TM2195 FEBRUARY 2005

TECHNICAL MANUAL



JOHN DEERE

North American Version
Litho in U.S.A.

INTRODUCTION

Manual Description

This technical manual is written for an experienced technician and contains sections that are specifically for this product. It is a part of a total product support program.

The manual is organized so that all the information on a particular system is kept together. The order of grouping is as follows:

- Table of Contents
- Specifications and Information
- Identification Numbers
- Tools and Materials
- Component Location
- Schematics and Harnesses
- Theory of Operation
- Operation and Diagnostics
- Diagnostics
- Tests and Adjustments
- Repair
- Other

NOTE: Depending on the particular section or system being covered, not all of the above groups may be used.

The bleed tabs for the pages of each section will align with the sections listed on this page. Page numbering is consecutive from the beginning of the Safety section through the last section.

We appreciate your input on this manual. If you find any errors or want to comment on the layout of the manual please contact us.

Safety

Specifications

Engine - Gas

Engine - Diesel

Electrical

Drive Train

Steering

Brakes

Miscellaneous

All information, illustrations and specifications in this manual are based on the latest information at the time of publication. The right is reserved to make changes at any time without notice.

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SAFETY

Recognize Safety Information



MIF

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.

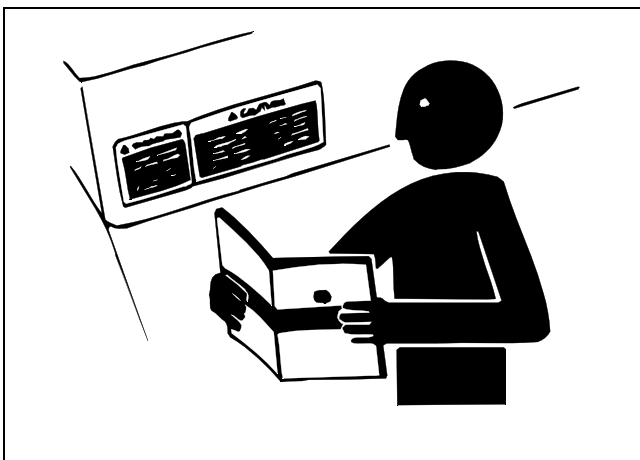
Follow recommended precautions and safe servicing practices.

Understand Signal Words

A signal word - DANGER, WARNING, or CAUTION - is used with the safety-alert symbol. DANGER identifies the most serious hazards.

DANGER or WARNING safety signs are located near specific hazards. General precautions are listed on CAUTION safety signs. CAUTION also calls attention to safety messages in this manual.

Replace Safety Signs

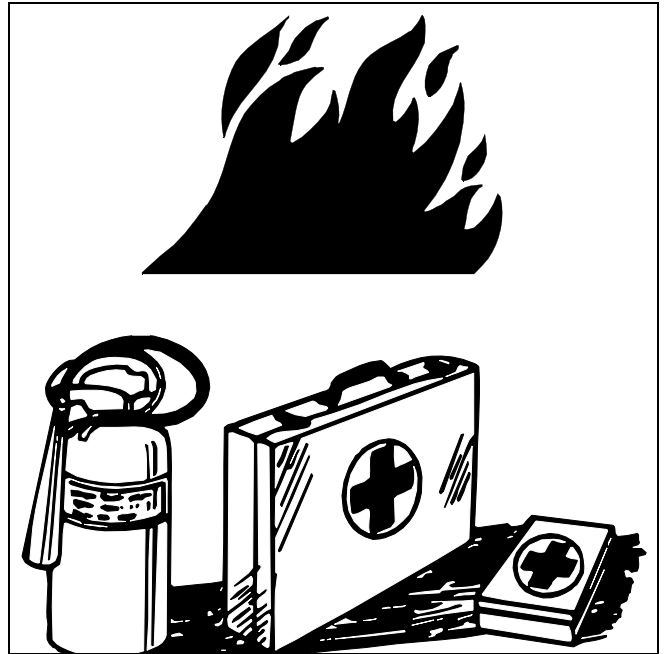


MIF

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

Handle Fluids Safely - Avoid Fires

Be Prepared For Emergencies

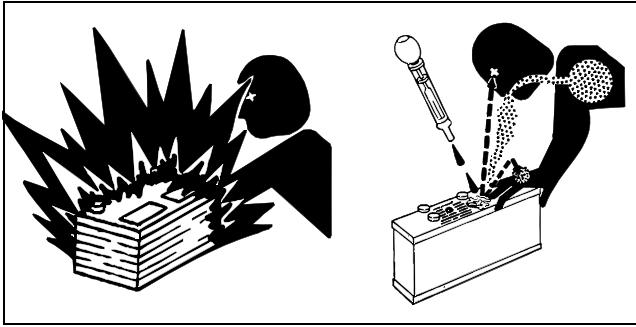


MIF

- 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.
- 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.

SAFETY

Use Care In Handling and Servicing Batteries



MIF

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).

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 acid burns 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.

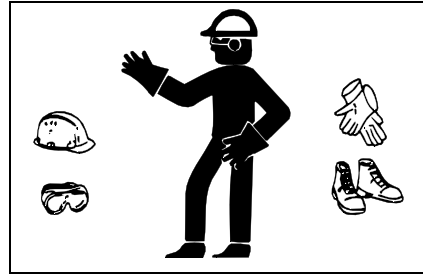
If you spill acid on yourself:

1. Flush your skin with water.
2. Apply baking soda or lime to help neutralize the acid.
3. Flush your eyes with water for 10 - 15 minutes.
4. Get medical attention immediately.

If acid is swallowed:

1. Drink large amounts of water or milk.
2. Then drink milk of magnesia, beaten eggs, or vegetable oil.
3. Get medical attention immediately.

Wear Protective Clothing



MIF

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.

Use Care Around High-pressure Fluid Lines

Avoid High-Pressure Fluids



MIF

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

Avoid injury from escaping fluid under pressure by stopping the engine and relieving pressure in the system before disconnecting or connecting 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.

SAFETY

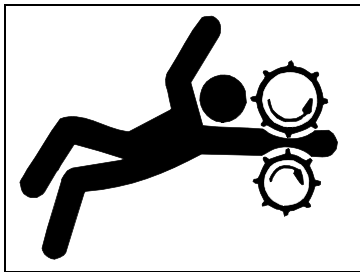
Avoid Heating Near Pressurized Fluid Lines



MIF

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.

Service Machines Safely



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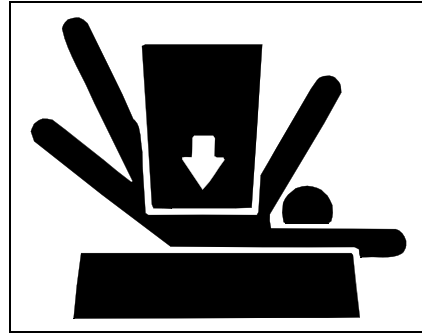
Tie long hair behind your head. Do not wear a necktie, scarf, loose clothing, or necklace when you work near machine tools or moving parts. If these items were to get caught, severe injury could result.

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

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.

Support Machine Properly and Use Proper Lifting Equipment



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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.

Lifting heavy components incorrectly can cause severe injury or machine damage. Follow recommended procedure for removal and installation of components in the manual.

Work In Clean Area

Before starting a job:

1. Clean work area and machine.
2. Make sure you have all necessary tools to do your job.
3. Have the right parts on hand.
4. Read all instructions thoroughly; do not attempt shortcuts.

Using High Pressure Washers

Directing pressurized water at electronic/electrical components or connectors, bearings, hydraulic seals, fuel injection pumps or other sensitive parts and components may cause product malfunctions. Reduce pressure and spray at a 45 to 90 degree angle.

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.

POWER TRAIN - GEAR TESTS AND ADJUSTMENTS

Tests and Adjustments

Transaxle Shift Adjustment

Purpose:

To adjust gear shift lever to center of shift quadrant.

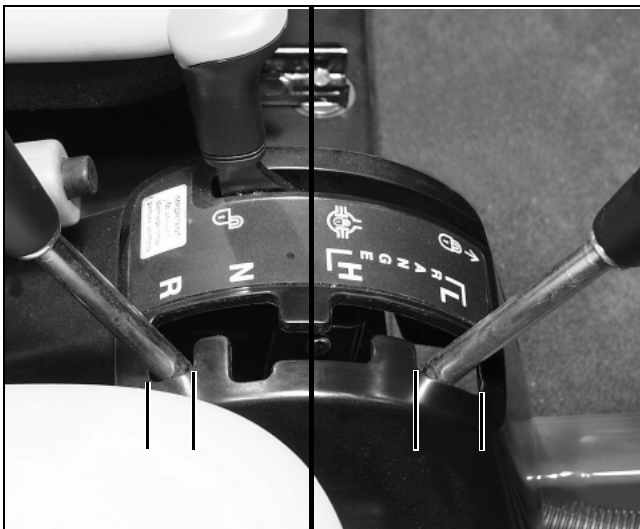
To insure both forward and reverse gears will be completely engaged.

To help prevent shifter from disengaging from gear during operation.

Procedure:

1. Park on level surface and lock park brake. Cargo box raised, engine off, key removed.

NOTE: It may be necessary to rock the machine to fully shift into Forward and/or Reverse.



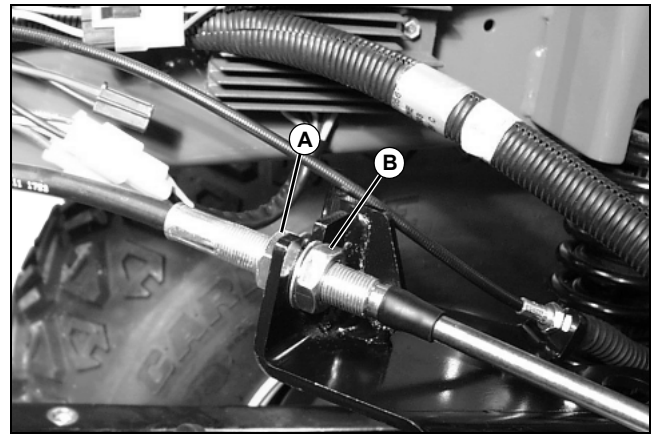
MX31527

Picture Note: Split picture used to show shift lever centered in both Forward and Reverse positions.

2. Shift into forward and reverse. There should be an even gap between the lever and quadrant in both forward and reverse positions. The shift lever should NOT contact the shift quadrant in either forward or reverse.

3. If necessary adjust cable to position shift lever in quadrant.

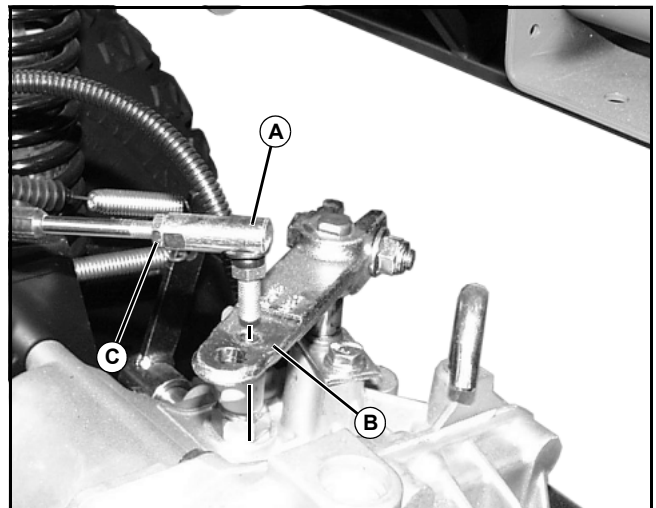
- Place shift lever in the Neutral "N" position.
- Verify that the transaxle clicks firmly into the center neutral position.



MX31528

- Loosen nuts (A) and (B) on transaxle shift cable.
- To move shift lever forward in shift quadrant: Loosen nut (B) and tighten nut (A).
- To move shift lever toward the rear in shift quadrant: Loosen nut (A) and tighten nut (B).
- Adjust nuts until the shift lever is centered in the Neutral position of the shift quadrant opening and does not touch the quadrant when placed fully in Reverse or Range L.

4. Move shift lever until detent inside transaxle clicks firmly into the center neutral position.



MX31526

5. Remove nut and lock washer securing shift cable end (A) to transaxle shift arm (B).

6. Place transaxle shift arm in NEUTRAL position.

7. Place shift lever in NEUTRAL position in shifter quadrant.

8. Check that shift cable end can be inserted and removed from transaxle shift arm easily. Adjust cable end if necessary.

- Loosen jam nut (D).

POWER TRAIN - GEAR TESTS AND ADJUSTMENTS

- While holding shift cable screw or unscrew shift cable end (A) until it can be inserted and removed from transaxle shift arm easily.
- Tighten jam nut (D).

9. Install lock washer and nut securing shift cable end (A) to transaxle shift arm (B).

10. Shift into forward and reverse. There should be an even gap between the lever and quadrant in both forward and reverse positions. The shift lever should NOT contact the shift quadrant in either forward or reverse.

11. Shift into neutral and check neutral start.

12. Drive machine over rough ground to check adjustments.

Differential Lock Adjustment

Purpose:

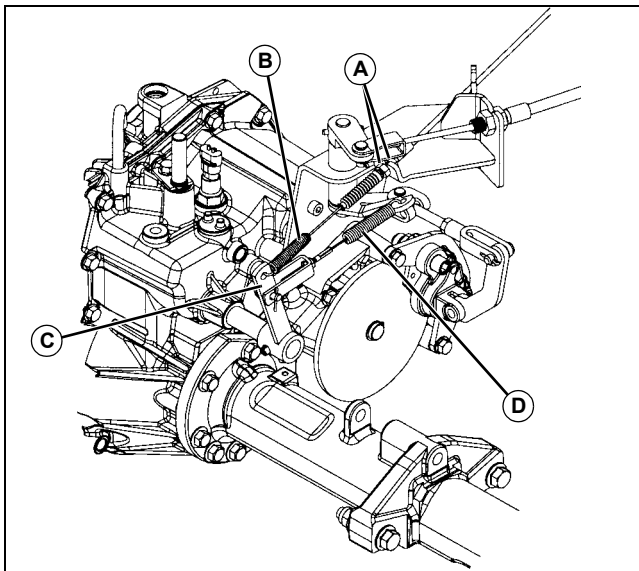
To insure differential shift lever fully engages and disengages differential lock.

To insure differential lock works with park brake.

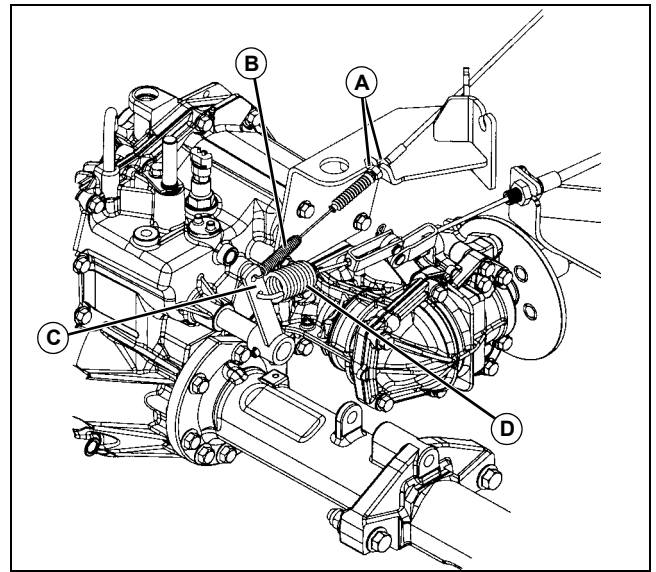
Procedure:

1. Park machine safely on a level surface.
2. Block wheels to prevent machine from rolling.
3. Park brake in the off position.

NOTE: Setting the park brake engages the differential lock and locks the rear wheels together before the park brake is engaged.



Picture Note: 2-Wheel Drive Machine



MX31521

Picture Note: MFWD Machine

4. Loosen jam nuts (A). Adjust nuts until differential cable places tension on spring (B) but does not move differential lock arm (C).

5. Check park brake-to-differential lock arm spring (D) for tension.

- If slight tension is there without the differential lock arm moving, no adjustment is needed.
- If there is no tension but the cable through the spring is taut, no adjustment is needed.
- If there is no tension and the cable through the spring is loose, adjust park brake-to-differential arm cable. See "2-Wheel Drive Park Brake Adjustment" on page 437, or "MFWD Drive Park Brake Adjustment" on page 437.

Results:

1. Engage and disengage differential lock several times.
 - Check that the differential cable places slight tension on spring (B) but does not move differential lock arm (C) with the differential lock released.
 - Check that the differential lock arm moves to engaged position with either the differential lock lever or the park brake engaged. You may have to push the machine a short distance with the wheels turned until the differential lock engages.

POWER TRAIN - GEAR TESTS AND ADJUSTMENTS

MFWD Linkage Adjustment

Purpose:

To set MFWD engagement and disengagement properly and to avoid preload being applied to front differential shift fork. Preload being applied to the shift fork can cause damage if left uncorrected.

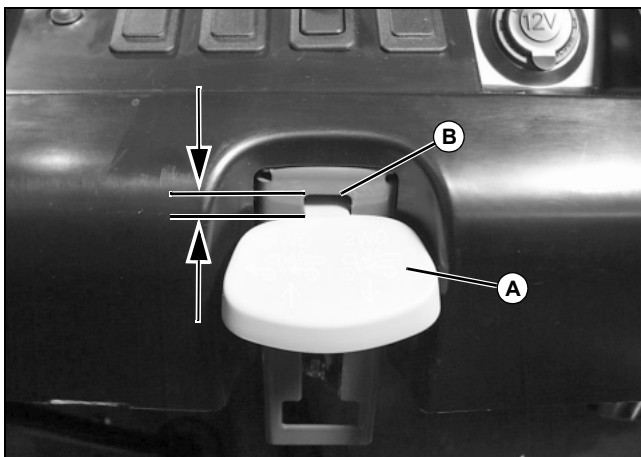
MFWD linkage needs adjustment if the following complaints or symptoms are noted:

- Four wheel drive does not stay engaged under load
- Noise from front axle transfer case

Check Adjustment:

1. Engage the MFWD then park machine safely.

NOTE: It may be necessary to wiggle the MFWD linkage to set it in a "free-float" position.



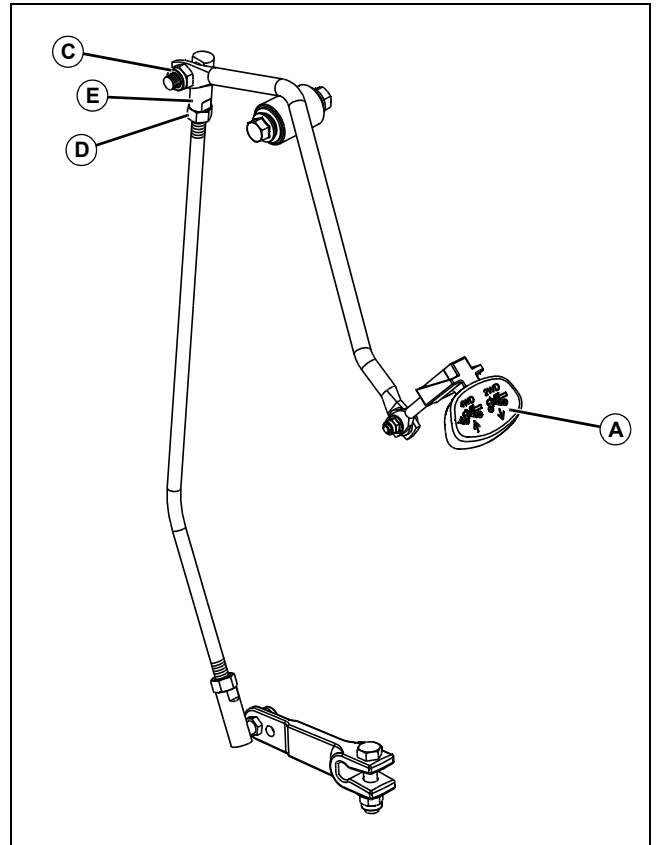
MX32610

2. Check that the top of the MFWD lever (A), when allowed to "free-float", is 1 - 6 mm (0.4 - 0.24 in.) from the top of the lever slot (B).

Results:

- If the MFWD lever is positioned correctly no adjustment is needed.
- If the MFWD lever is too close or too far from the top of the lever follow the Adjustment Procedure.

Adjustment Procedure:



1. Remove lock nut (C) and disconnect adjustment rod from MFWD shift lever rod.
2. Loosen jam nut (D).

NOTE: It may be necessary to adjust both the top and bottom ball joints to ensure proper thread engagement at both ends.

3. Unscrew ball joint (E) to increase gap or screw ball joint onto rod to decrease gap. Adjust as necessary.
4. Tighten jam nut (D).
5. Connect balljoint to shift lever and install lock nut (C).

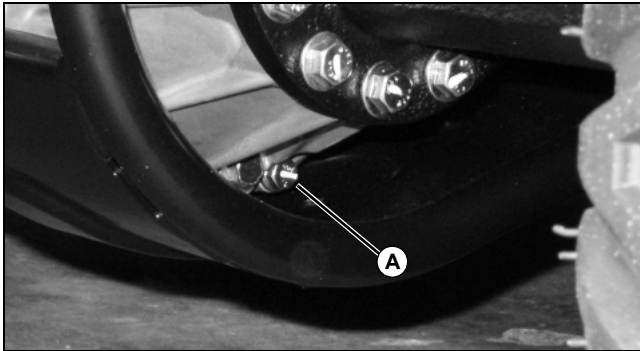
POWER TRAIN - GEAR REPAIR

Repair

Changing Transaxle Oil

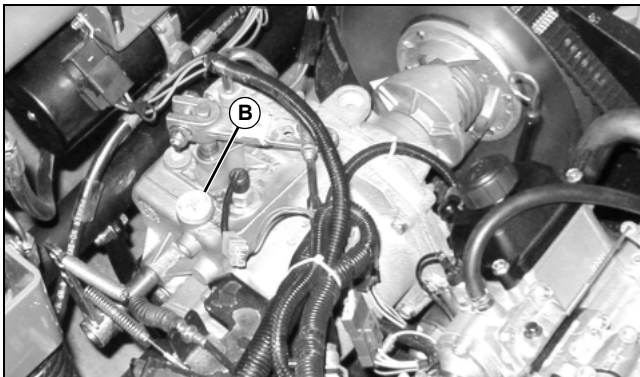
1. Park the vehicle safely.
2. Raise and secure cargo box.

IMPORTANT: Avoid damage! Dirt and debris in oil may cause damage to the transaxle. Clean area around opening before removing plug or dipstick.



MX31028

3. Position drain pan under transaxle drain plug (A).
4. Remove plug and drain oil.
5. Check O-ring on drain plug. Replace if missing or in poor condition.
6. Install and tighten drain plug.



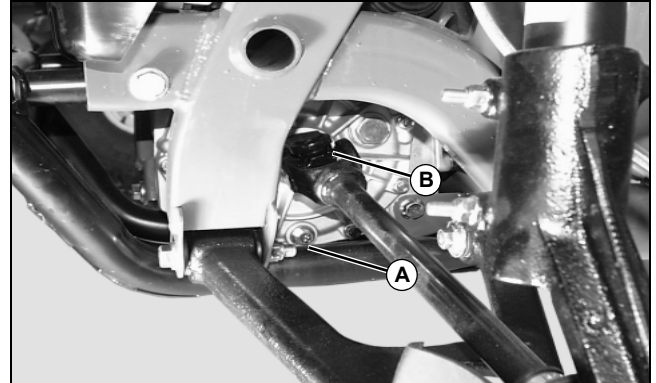
MX31029

7. Remove dipstick (B) located on top of transaxle housing. Wipe dipstick clean.
8. 4X2 Machines: Add approximately 4.5 L (4.8 qt) of oil
4X4 Machines: Add approximately 4.0 L (4.2 qt) of oil.
9. Check oil level by setting dipstick on threads in transaxle case, then removing and checking oil level.
10. Wait for two minutes then check oil level. Add oil if necessary.
11. Install dipstick and tighten.
12. Lower the cargo box.

Changing MFWD Differential Oil - HPX 4x4 and Trail HPX 4x4

1. Operate machine to warm MFWD differential oil.
2. Park machine safely.

IMPORTANT: Avoid damage! Dirt and debris in oil may cause damage to the MFWD differential. Clean area around opening before removing plug.



MX31027

3. Position drain pan under MFWD differential drain plug (A).
4. Remove fill plug (B) located on left side of MFWD differential.
5. Remove MFWD differential drain plug (A) and allow oil to drain.
6. Install and tighten drain plug after all oil has drained.
7. Add approximately 0.9 L (0.95 qt) of oil until the level is even with the bottom of the fill port.
8. Install and tighten fill plug.
9. Check MFWD differential oil level again after the first several hours of operation.

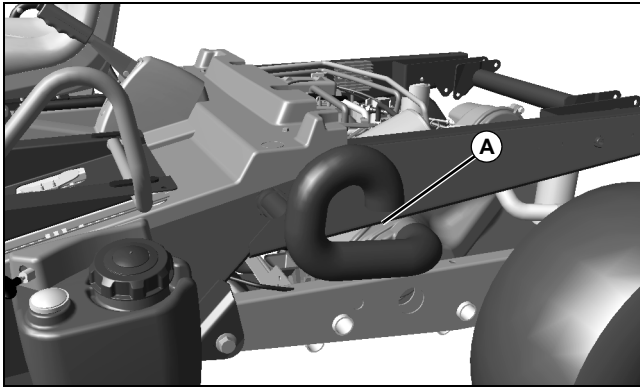
Removing and Installing Clutch Enclosure Cover - Trail HPX 4x4

Removing

CAUTION: Avoid injury! Rotating parts can catch fingers or loose clothing. Stop engine and wait for all moving parts to stop before servicing.

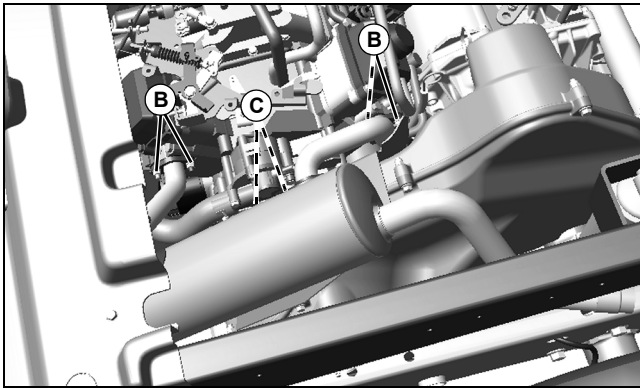
1. Park the vehicle safely.
2. Raise and secure cargo box.

POWER TRAIN - GEAR REPAIR



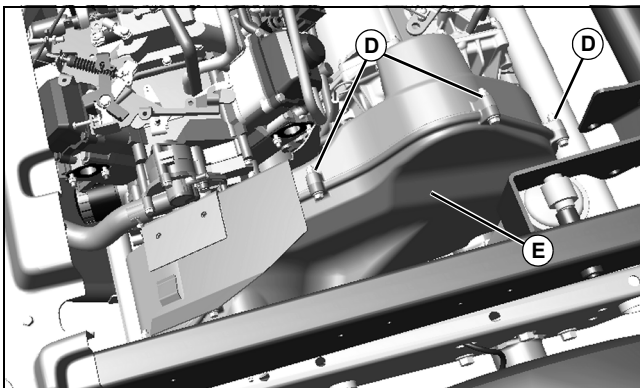
MX31486

3. Remove breather intake hose (A).



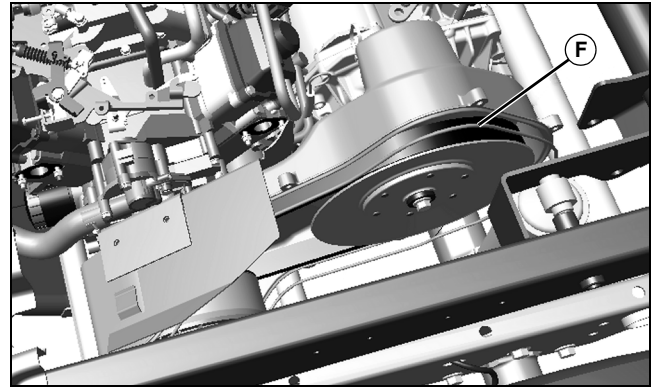
MX31495

4. Remove the nuts (B) securing the muffler to engine block and cap screws (C) securing the muffler to the mounting bracket.
5. Remove muffler.



MX31496

6. Remove the ten cap screws and nuts (D) (three shown), securing the enclosure cover (E) to the enclosure.
7. Remove the enclosure cover (E).



MX31497

8. Remove and inspect the seal gasket (F) for cracks or damage.

Installing

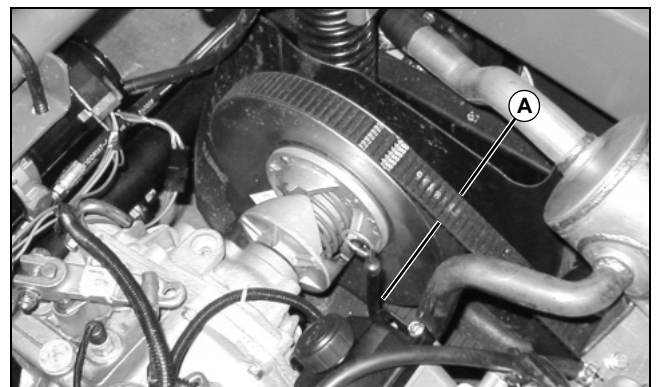
1. Install seal gasket (F) onto enclosure.
2. Install the enclosure cover (E) and secure with ten cap screws and nuts (D) (three shown).
3. Install muffler and secure with nuts (B) to engine block and cap screws (C) to the mounting bracket.
4. Install breather intake hose (A).
5. Lower the cargo box.

Checking Drive Belt



CAUTION: Avoid injury! Rotating parts can catch fingers or loose clothing. Stop engine and wait for all moving parts to stop before servicing.

1. Park the vehicle safely.
2. Raise and secure cargo box.
3. HPX Trail Gator 4x4: Remove clutch enclosure.
4. Rotate and inspect belt for wear or damage.



MX31031

5. Measure the top surface of the belt width at (A).

POWER TRAIN - GEAR REPAIR

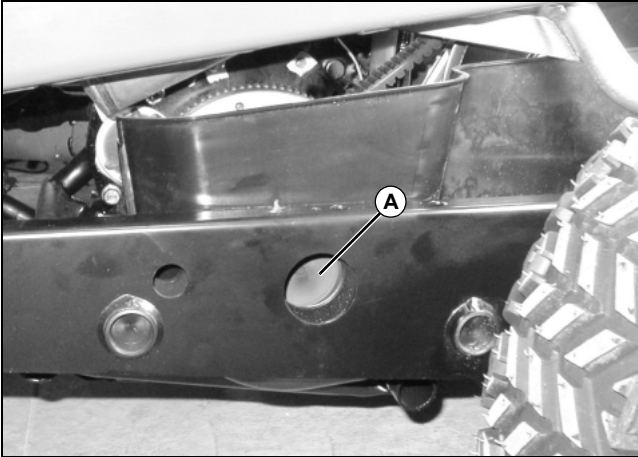
Dimension should be a minimum of 27 mm (1.1 in.).

6. Replace belt if worn beyond limit.
7. HPX Trail Gator 4x4: Install clutch enclosure.
8. Lower the cargo box.

Cleaning Primary Drive Clutch

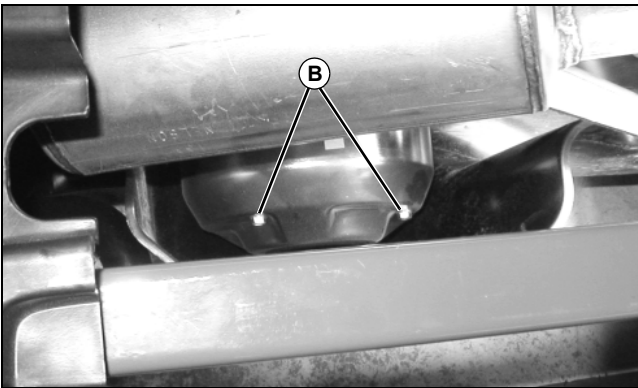
IMPORTANT: Avoid damage! Never lubricate any part of the primary drive clutch.

1. Park the vehicle safely.



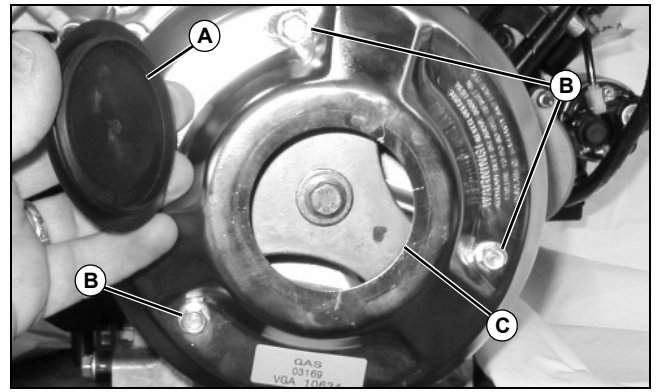
MX31484

2. Remove clutch cover plug (B).



MX31483

3. Remove three screws (B) securing clutch cover. Pull cover away from clutch.



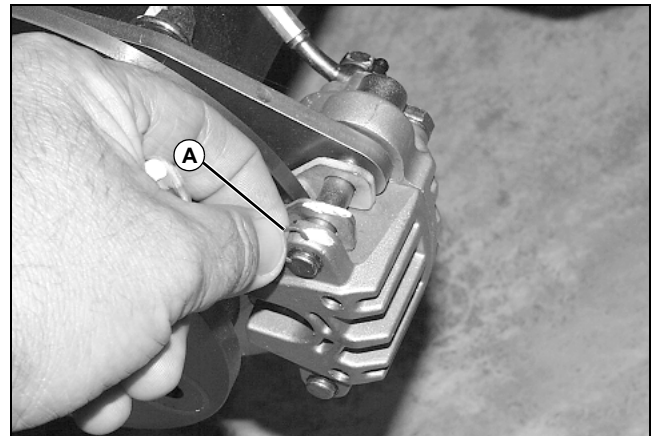
MX31485

Picture Note: Engine and clutch assembly removed for clarity only.

4. Through clutch access hole (C), use compressed air to blow dust and debris out of clutch.
5. Install clutch cover and tighten screws (B).
6. Install clutch cover plug (B).

Transaxle Removal and Installation

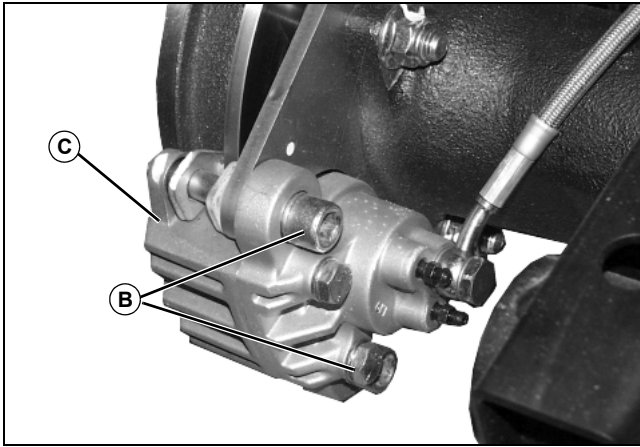
1. Park machine safely on a level surface.
2. Block wheels to prevent machine from rolling.
3. Park brake in the off position.
4. Remove cargo box from machine.
5. Jack up rear of machine and place on stands.
6. Remove rear wheels.



MX31556

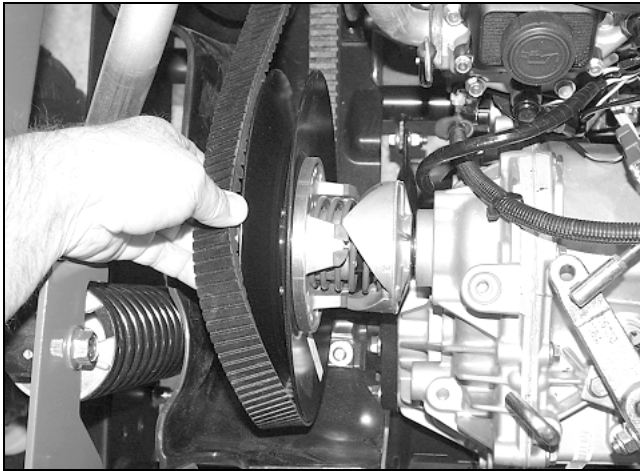
7. Remove circlips (A) from brake caliper bolts.

POWER TRAIN - GEAR REPAIR



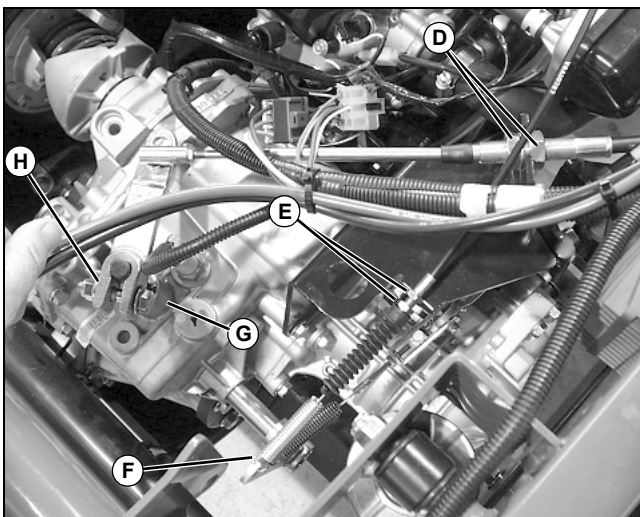
MX31557

8. Remove brake caliper bolts (B) and caliper (C) from each side of machine.



MX31555

9. Remove drive belt.

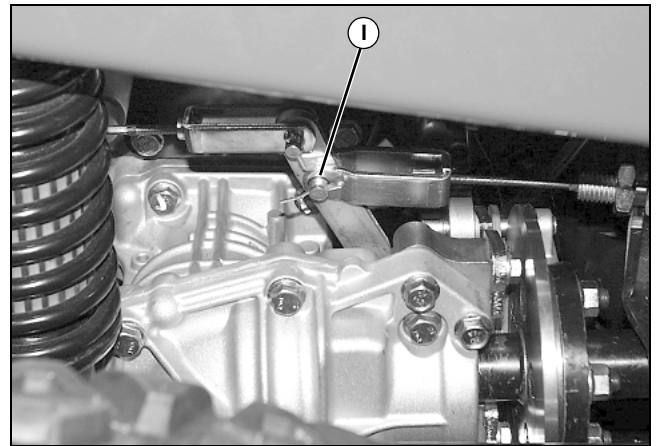


MX31558

10. Loosen cable adjusting nuts (D and E) and lift cables out of brackets.

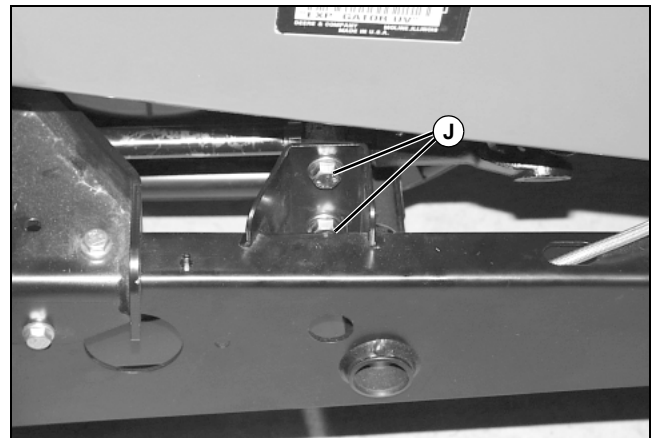
11. Disconnect spring (F) from lever.

12. Loosen pinch bolt (H) and slide lever off of shaft.



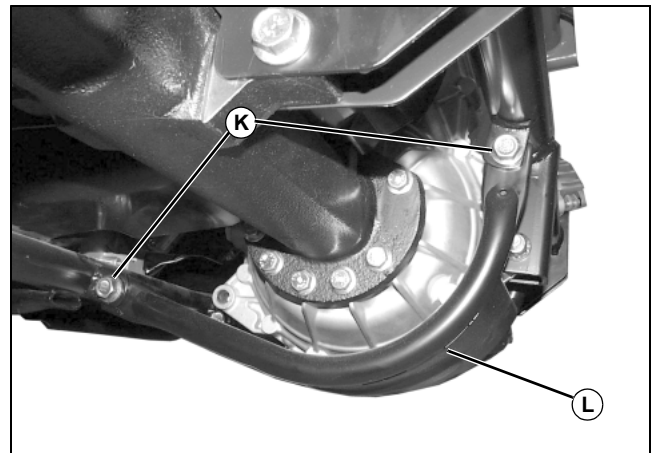
MX31559

13. Remove cotter pin and pin (I) from park brake cable.



MX32145

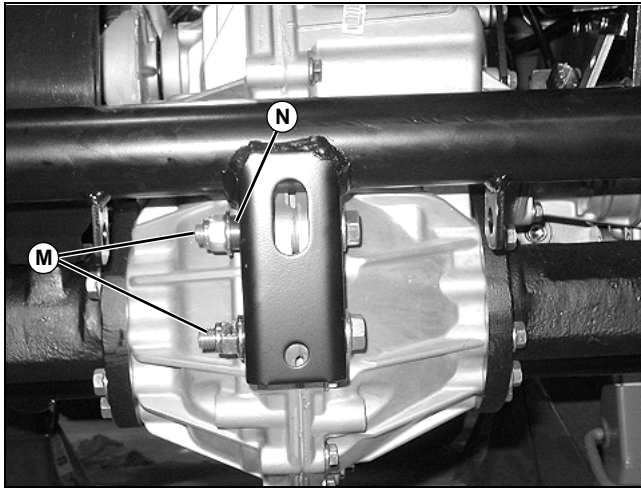
14. If unit is equipped with MFWD remove the two bolts (J) from the MFWD drive shaft support bearing.



MX31564

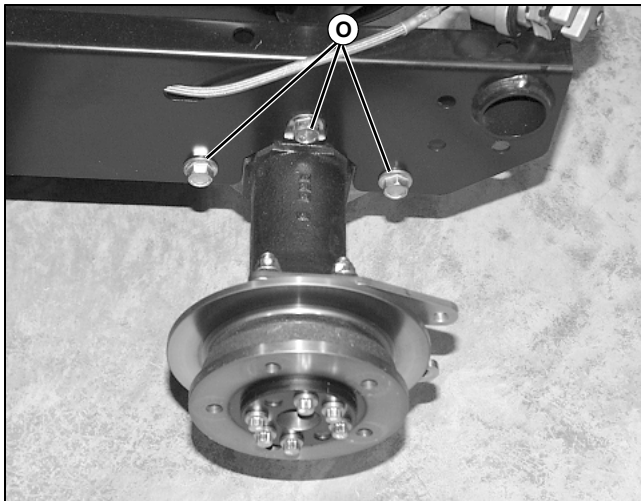
15. Remove four cap screws and nuts (K) from skid plate (L) and remove skid plate.

POWER TRAIN - GEAR REPAIR



MX31560

16. Remove the two rear transaxle mounting cap screws and nuts (M). Note location of spacer (N).



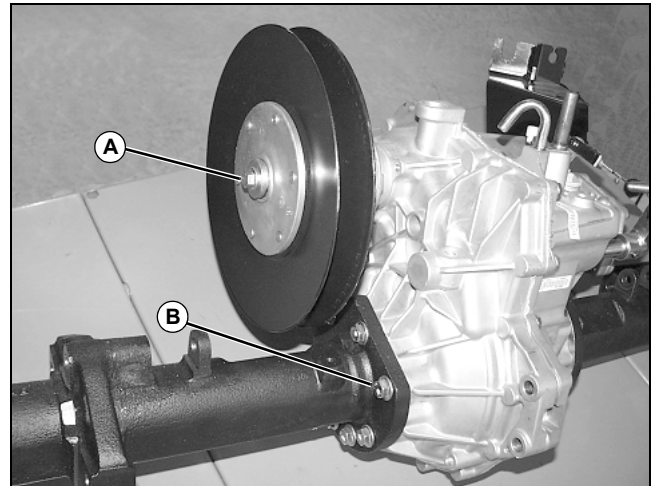
MX31561

17. Support transaxle assembly with a floor jack and remove three axle mounting bolts (O) from each side.

18. Secure the lower swinging frame to the upper frame to keep it from coming down with the transaxle.

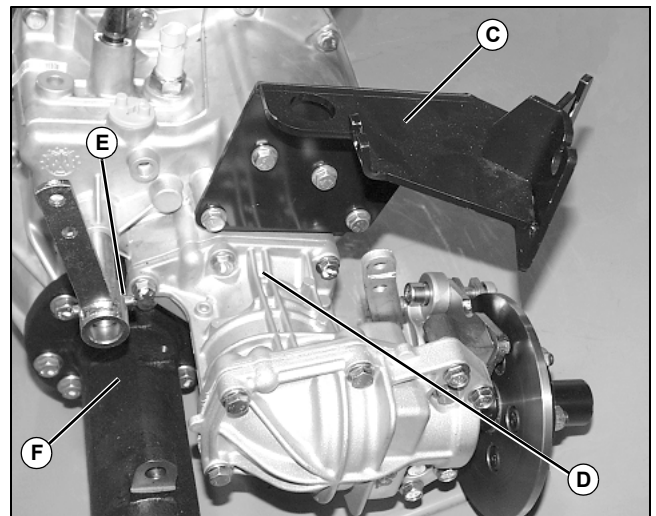
19. Start to lower transaxle until axle housing mounting holes are just below the swinging frame. Move axle to right until driven clutch clears guard, then lower transaxle completely.

Transaxle Disassembly and Assembly



MX31563

1. Remove cap screw and washer (A) and remove driven clutch. Remove cap screws (B) and remove axle housing from left side of transaxle.



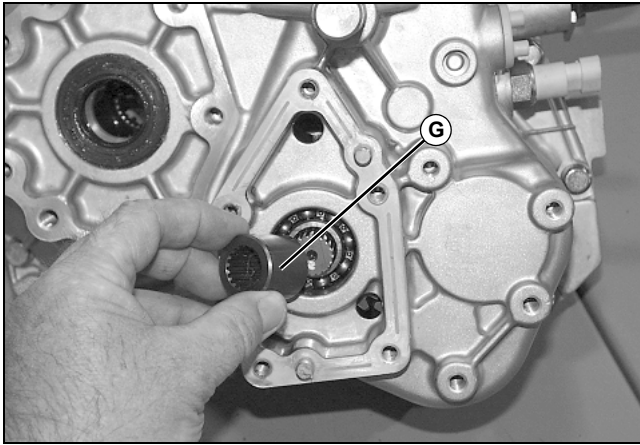
MX31562

2. Remove cable support bracket (C), front drive bevel gear box (D) MFWD only, differential lock lever (E), and right axle housing (F).

POWER TRAIN - GEAR REPAIR

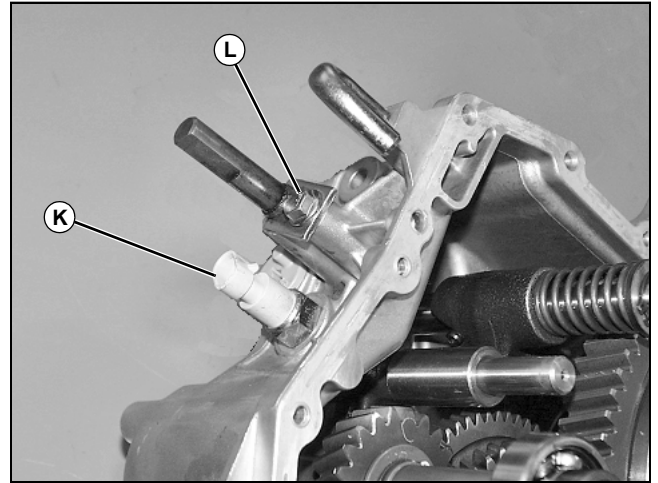
MX31729

5. Use pry areas provided (I) and gently pry apart case halves. Remove left case half (J).



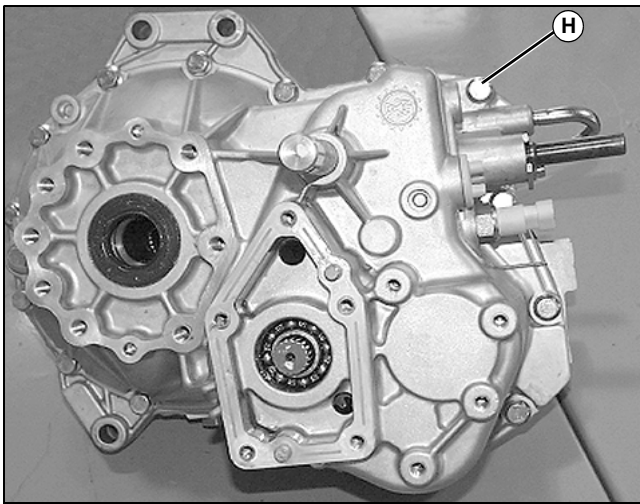
MX31565

3. Remove splined collar (G) MFWD only.



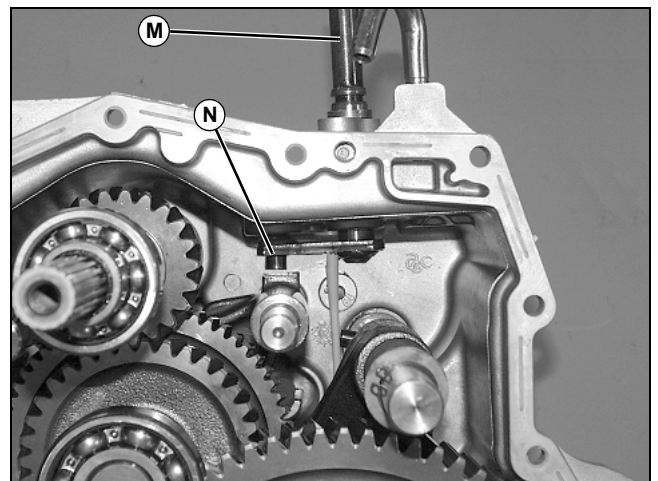
MX31730

6. Remove neutral switch (K) and cap screw and keeper plate (L).



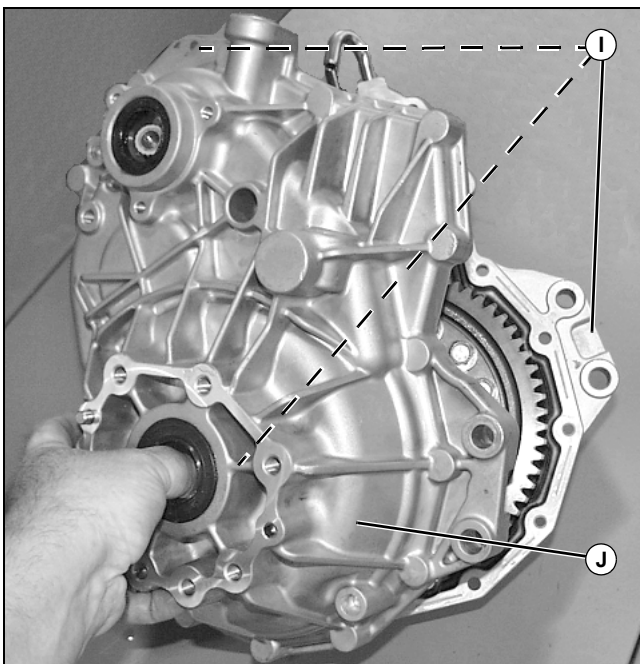
MX31728

4. Remove 16 cap screws (H) from transaxle case.

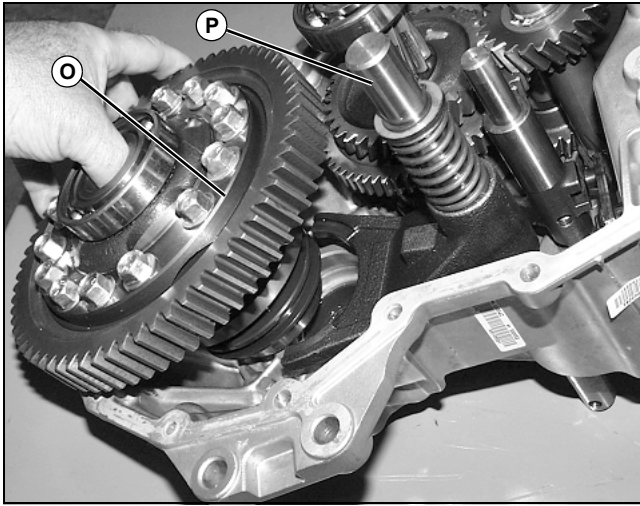


MX31731

7. Pull shaft (M) up until pin (N) is out of slot in shift fork.

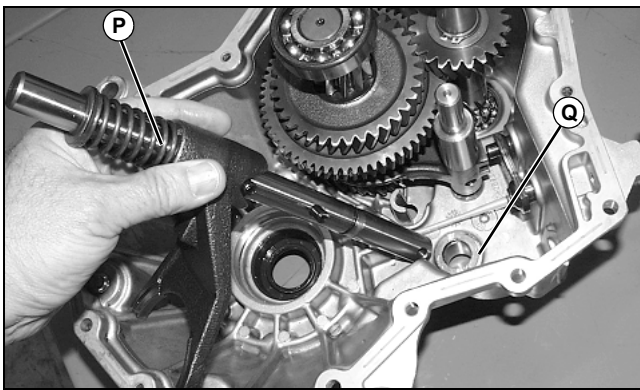


POWER TRAIN - GEAR REPAIR



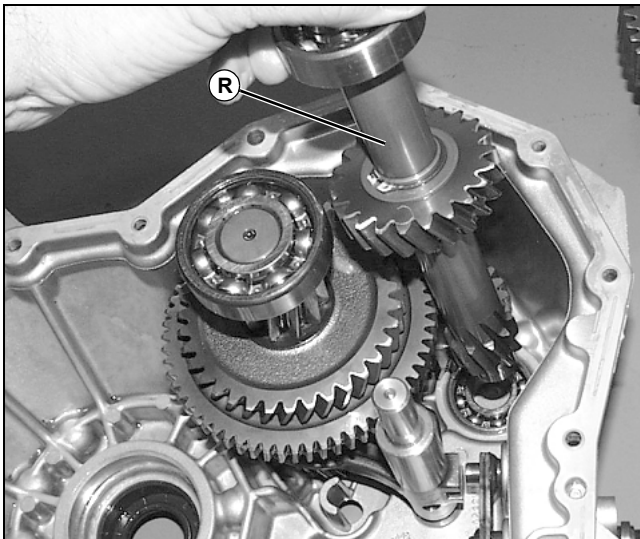
MX31732

8. Simultaneously lift differential assembly (O) and differential lock shaft (P) until bearing on differential clears bore in case. Differential can then be lowered out of fork and removed.



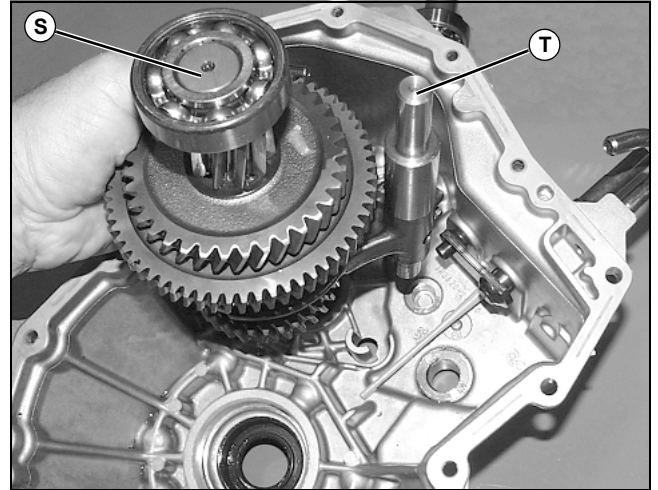
MX31733

9. Pull differential lock shaft (P) and washer (Q) out of case.



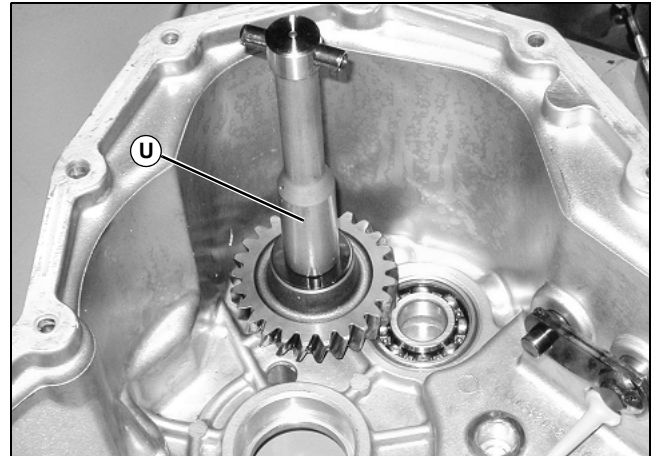
MX31734

10. Remove input shaft (R).



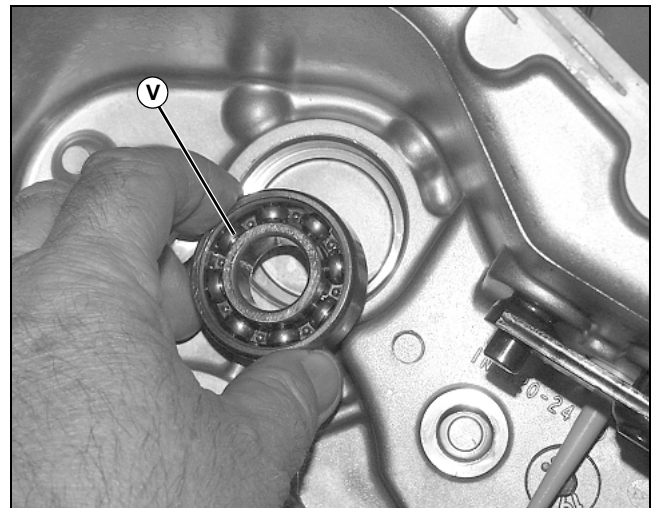
MX31735

11. Remove reduction shaft (S) and shift fork and shaft assembly (T).



MX31736

12. Remove reverse idler shaft and gear (U).



MX31737

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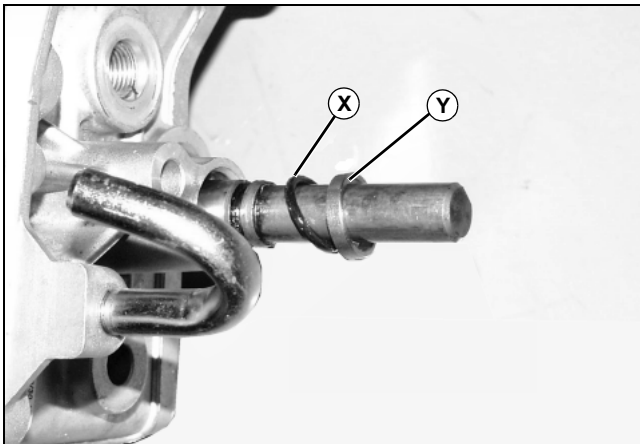
POWER TRAIN - GEAR REPAIR

13. Remove input shaft bearing (V) from case.



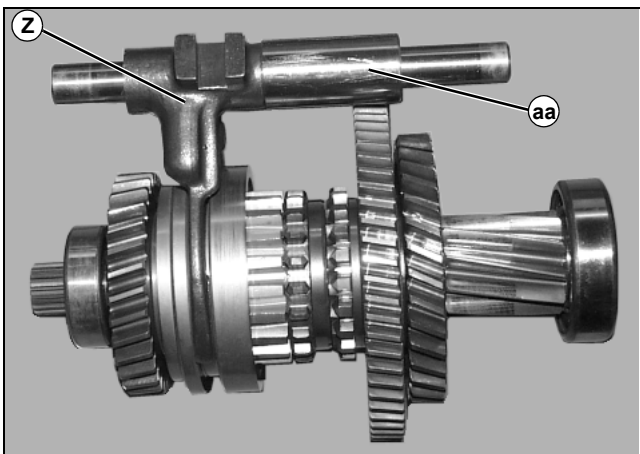
MX31739

14. Pull shift shaft (W) into case and then push back in.



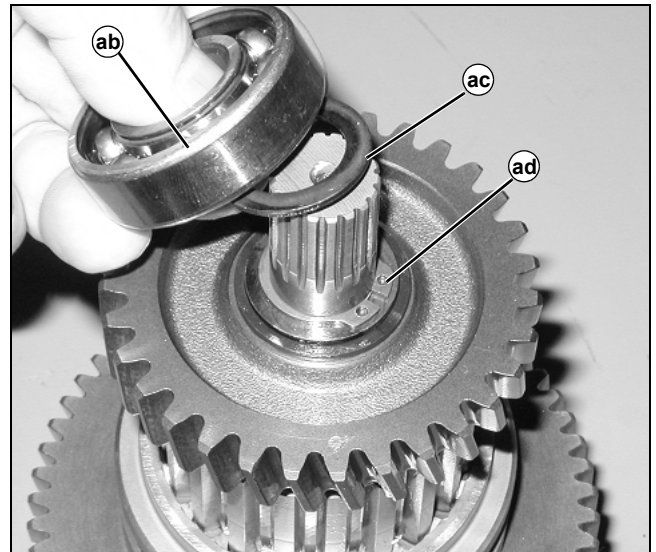
MX31738

15. O-ring (X) and spacer (Y) should come out on shaft, if not, remove shaft and pull them out with a small hook tool.



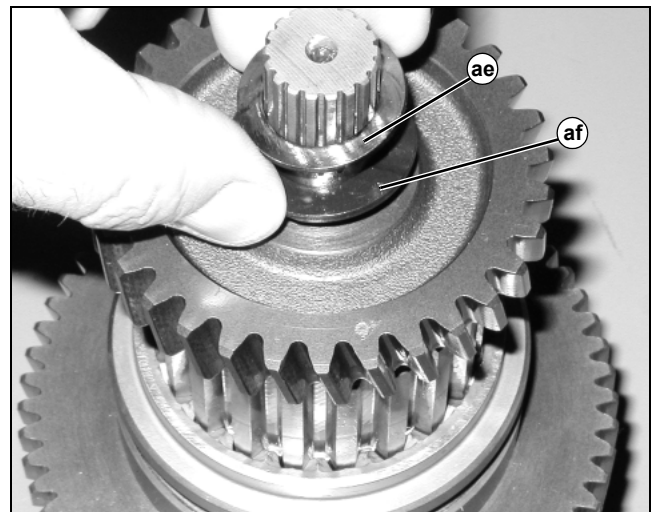
MX31740

16. Remove shift fork (Z) and spacer (aa).



MX31741

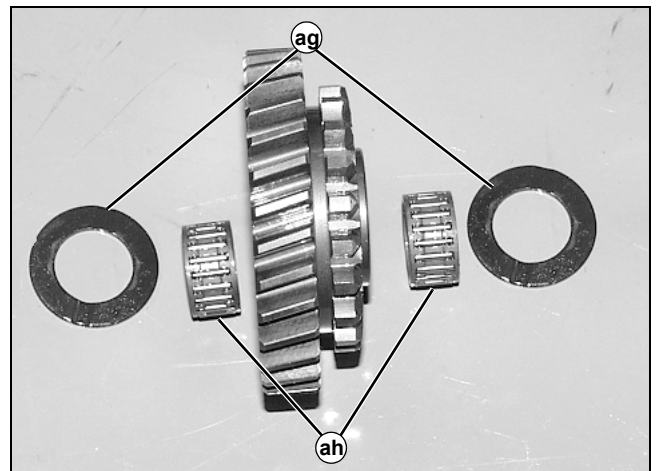
17. Remove bearing (ab), washer (ac), and snap ring (ad).



MX31742

18. Remove washer (ae) and thrust washer (af).

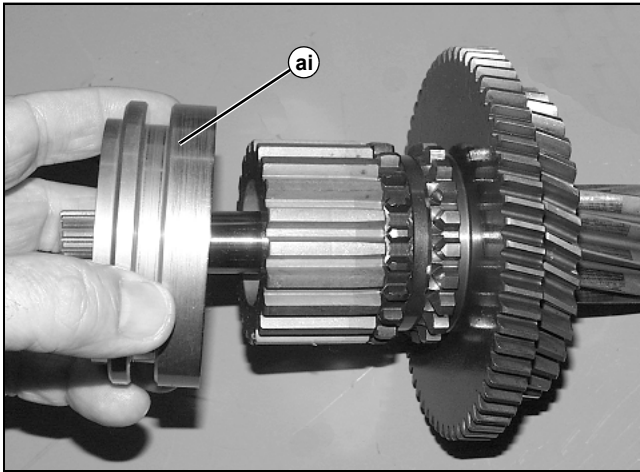
19. Remove reverse gear (af).



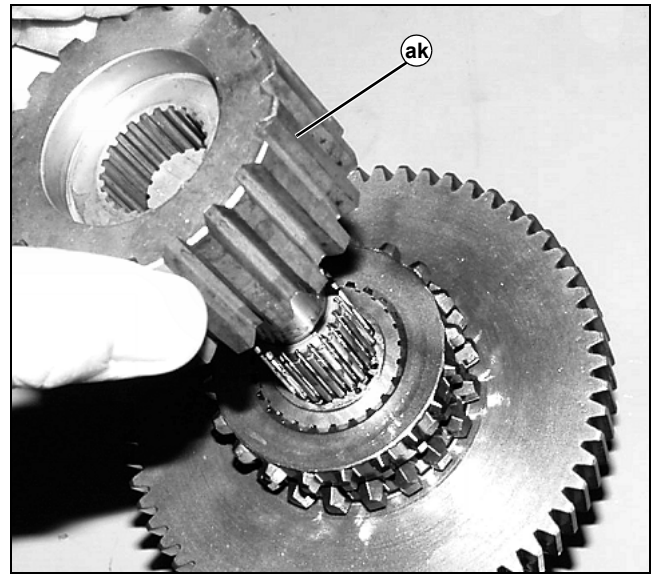
POWER TRAIN - GEAR REPAIR

MX31743

20. Inspect thrust washers (ag) and bearings (ah).

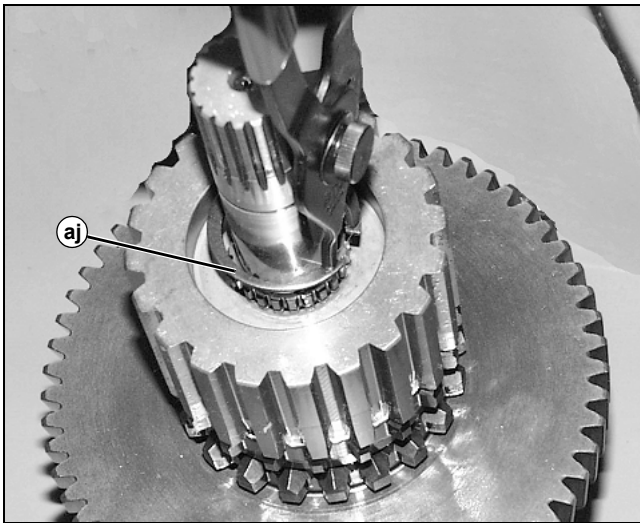


MX31744



MX31746

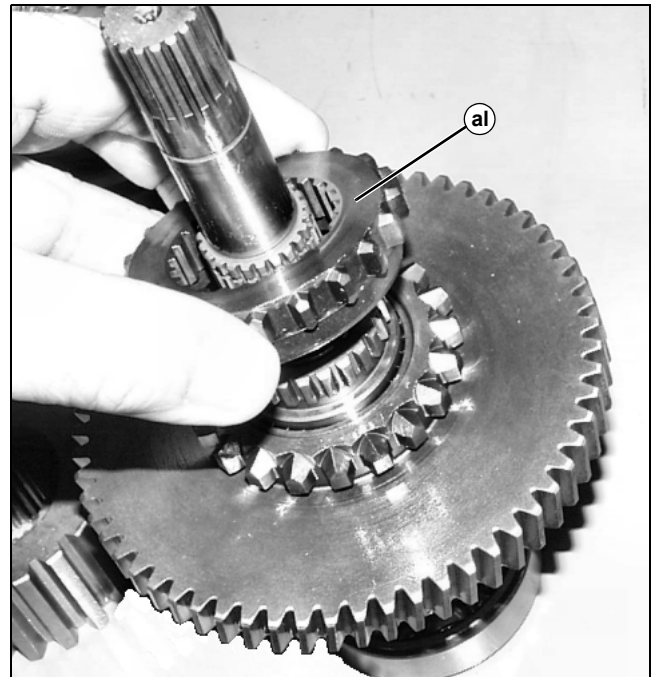
21. Remove shift collar (ai).



MX31745

22. Remove snap ring (aj).

23. Remove splined collar (ak).



MX31747

24. Remove high gear collar (al).