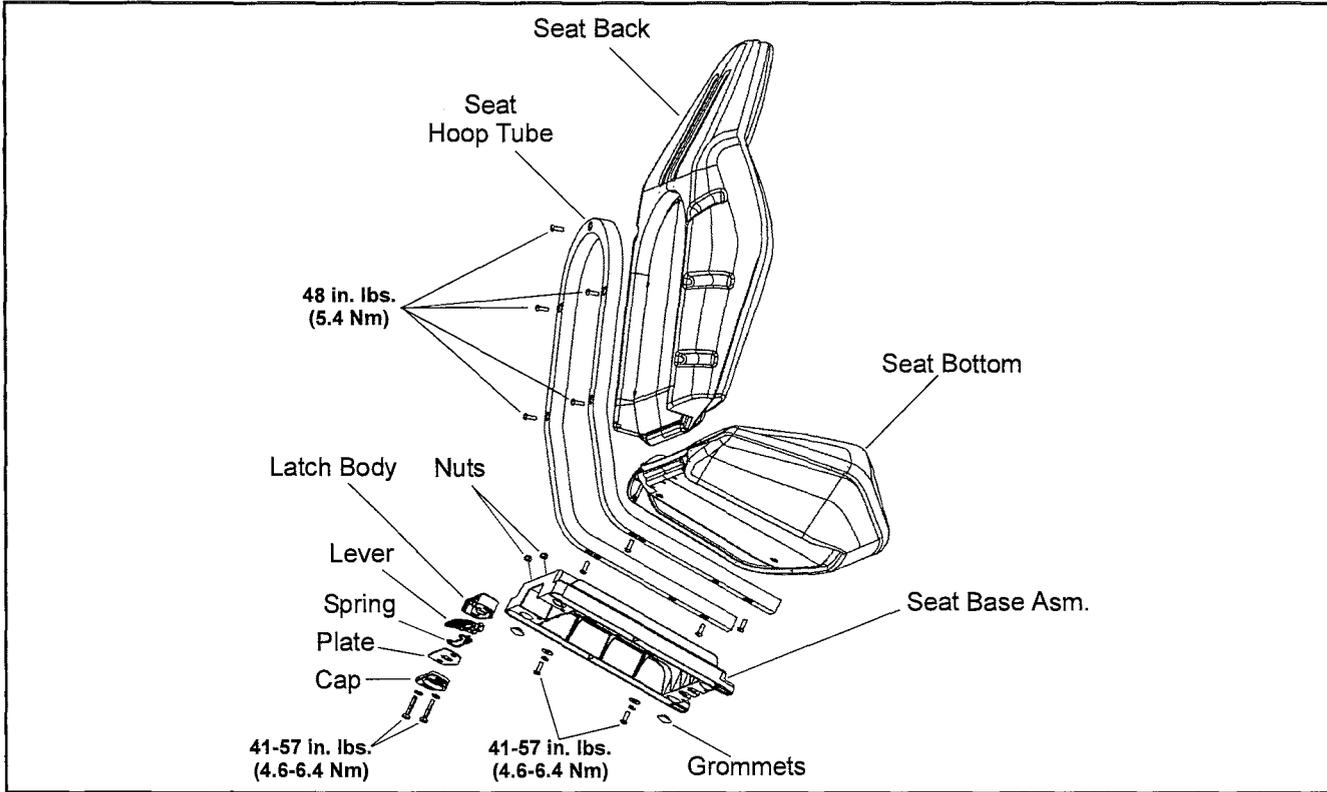
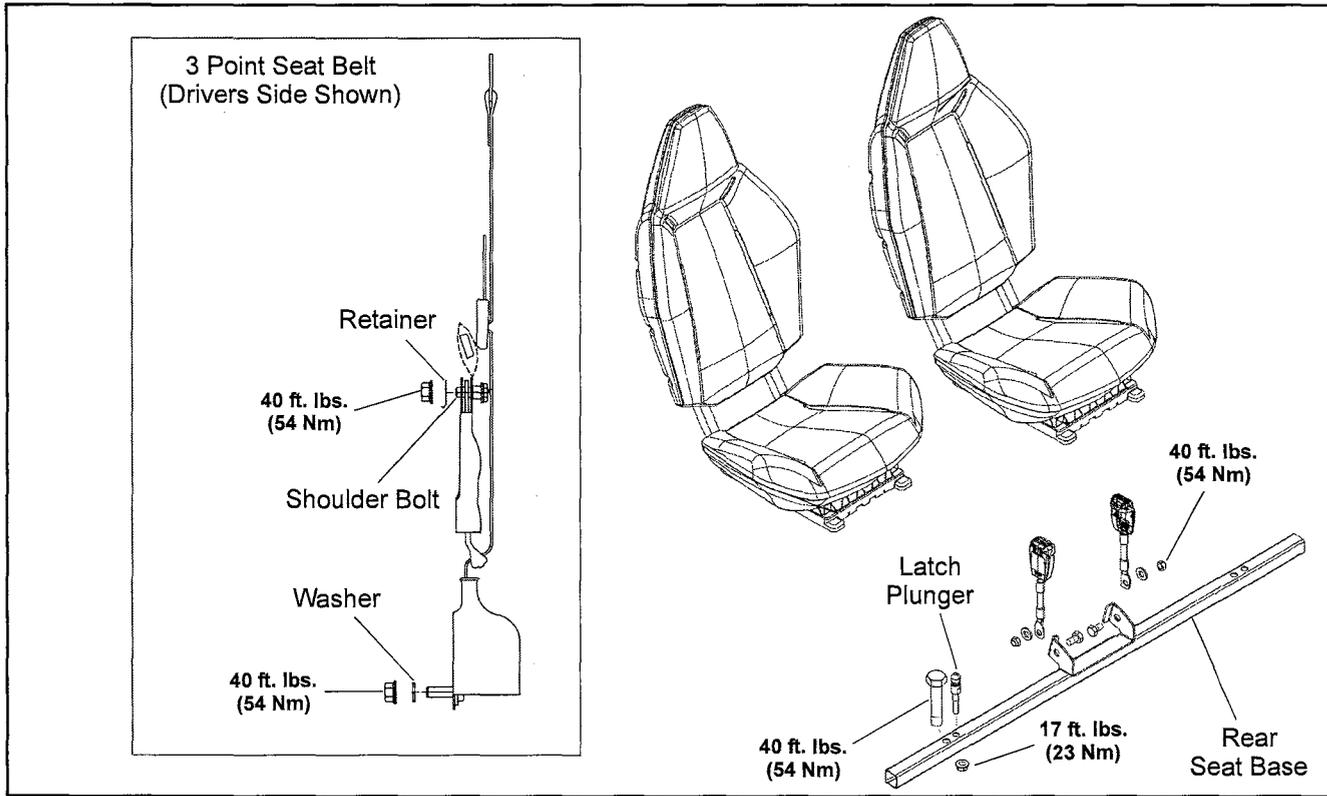


BODY / STEERING / SUSPENSION

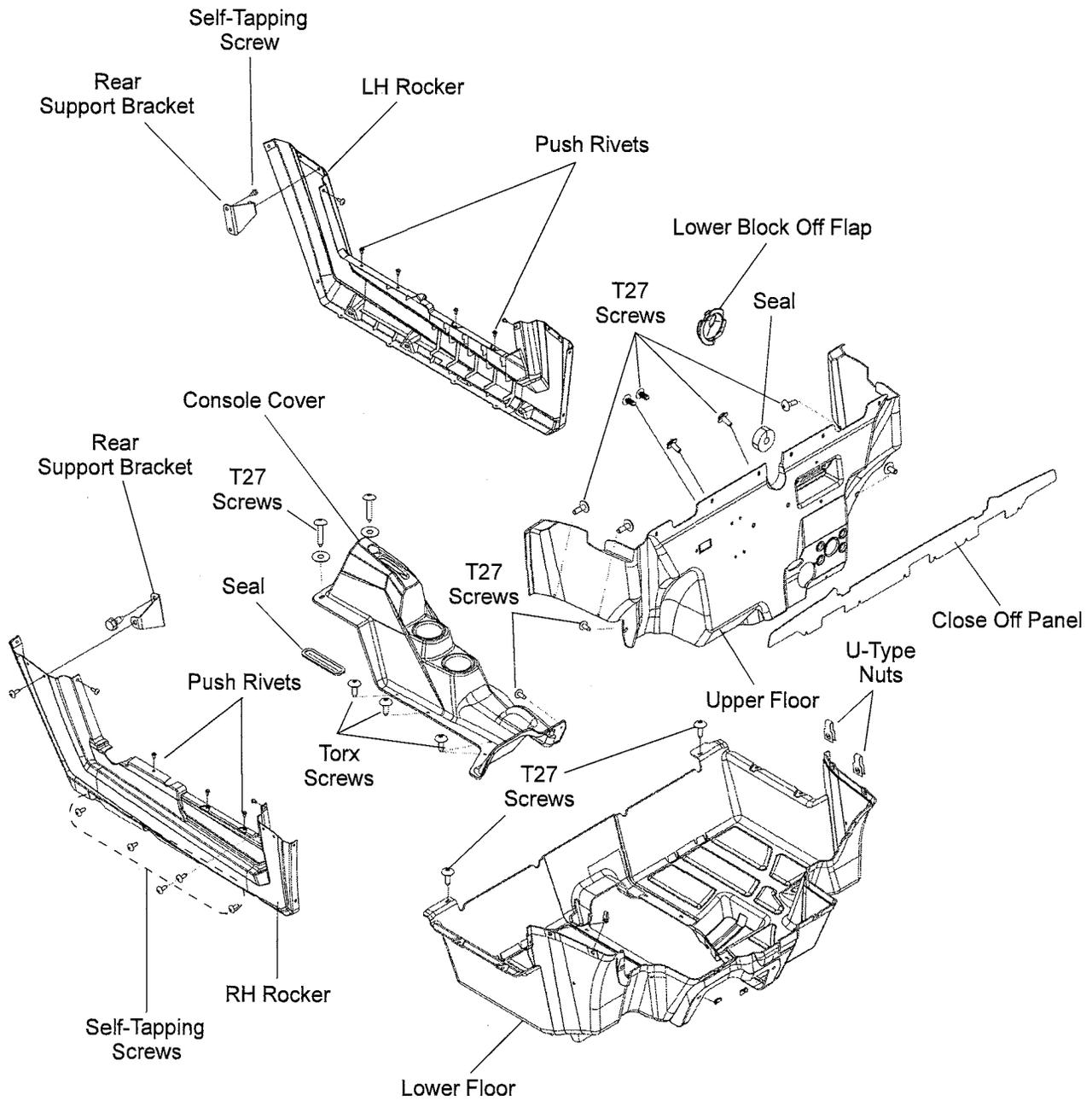
Seat Assembly



Seat Belts / Mounting



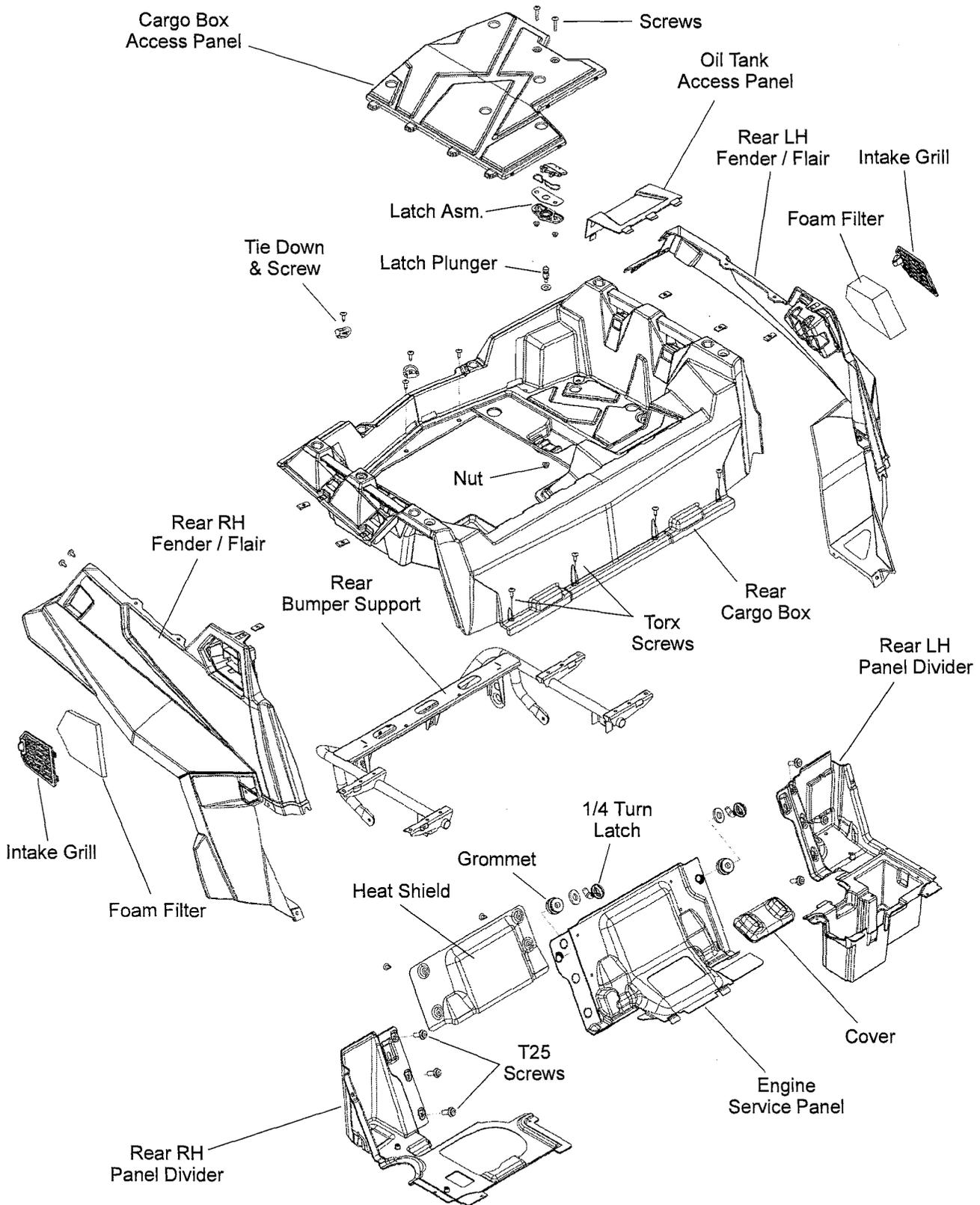
Floor / Rocker Panels



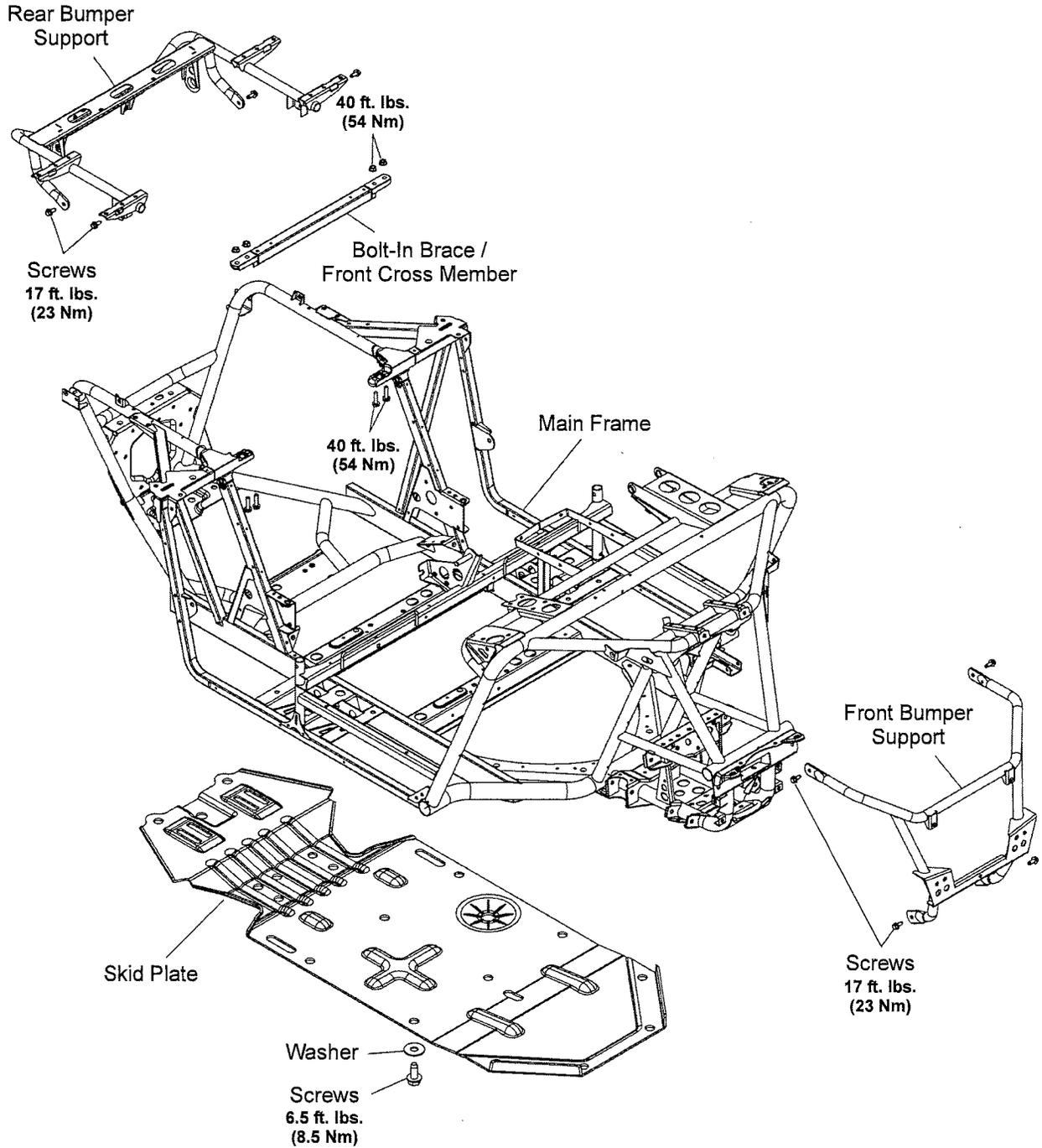
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BODY / STEERING / SUSPENSION

Rear Cargo Box / Fenders



Chassis / Main Frame



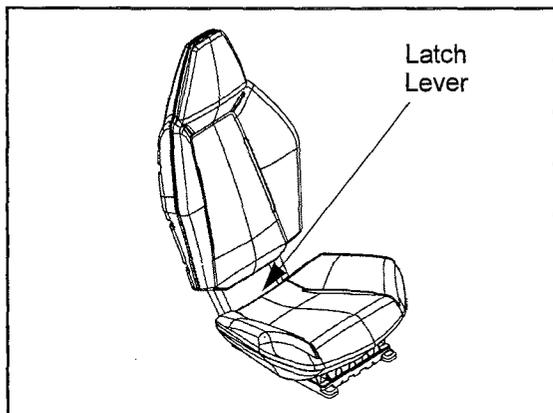
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BODY / STEERING / SUSPENSION

BODY COMPONENT REMOVAL

Seats

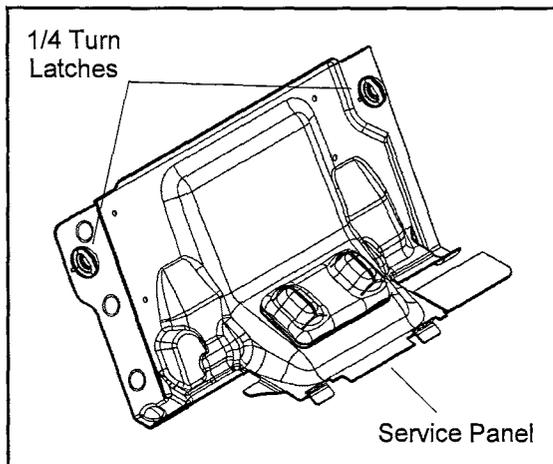
1. To remove the seats, lift upward on the latch lever located behind the seat bottom.



2. Lift upward and forward on the seat while lifting up on the latch lever and remove the seat from the vehicle.

Engine Service Panel

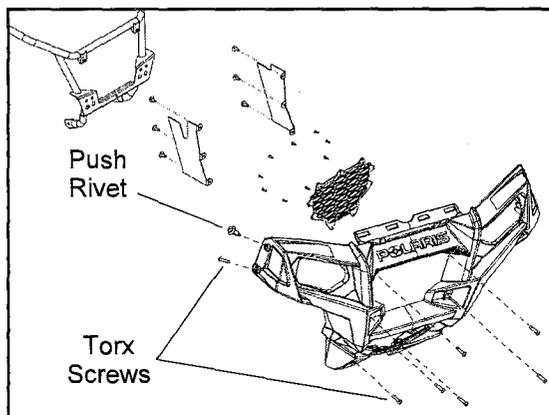
1. Remove driver and passenger seats.
2. Turn both latches 1/4 turn to disengage the panel.



3. Lift the panel upward and towards the front of the vehicle to remove it.

Front Bumper

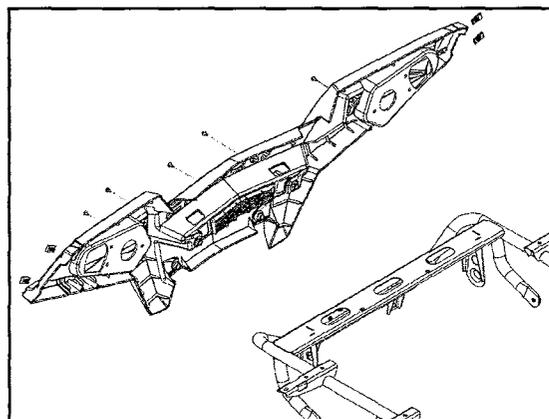
1. Remove the (2) push rivets from the sides of the front bumper.



2. Remove the (8) Torx screws retaining the upper, middle and lower portion of the bumper.
3. Disconnect the front head lamp connectors and remove the front bumper from the vehicle.

Rear Bumper

1. Disconnect the harness connectors at the tail lights.
2. Remove the (10) T-27 Torx screws retaining rear bumper to the cargo box and vehicle frame.

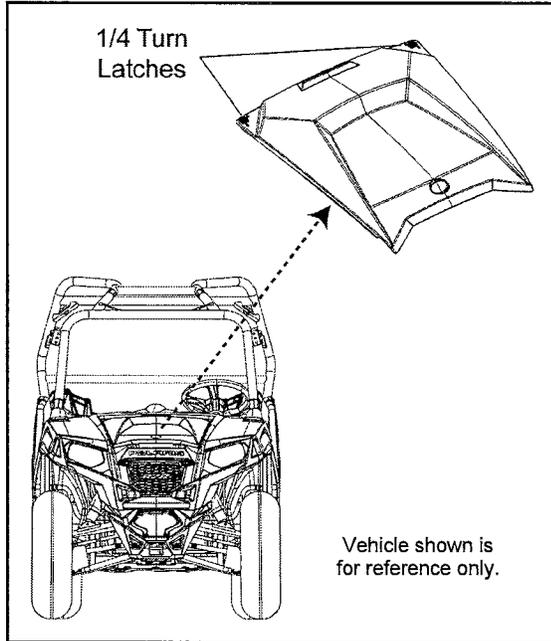


3. Remove rear bumper from vehicle.

Hood and Front Body Work

Hood Removal

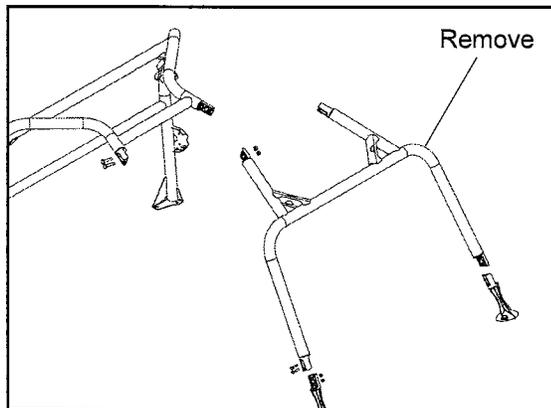
1. To remove the hood, turn both 1/4 turn latches to disengage the rear portion of the hood.



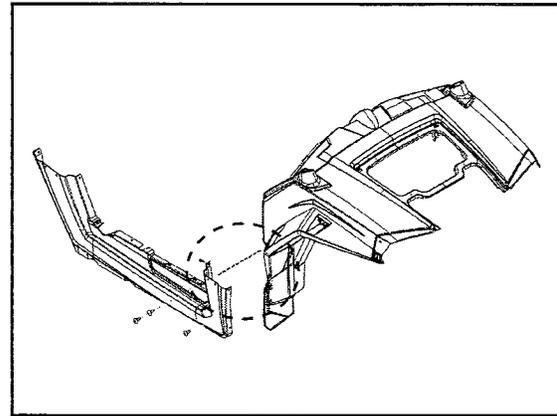
2. Tilt the hood back to disengage the front tabs and remove the hood from the vehicle.

Front Body / Dash Removal

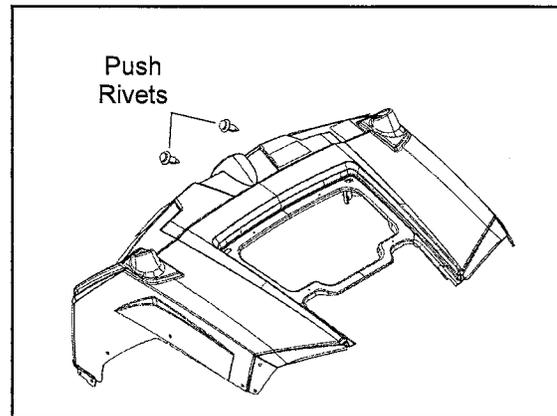
1. Remove the hood as previously described.
2. Remove the front bumper (see "BODY COMPONENT REMOVAL - Front Bumper").
3. Remove the front portion of the cab frame assembly to allow dash removal. Refer to appropriate "CAB FRAME - Assembly / Removal" procedure for assembly torque specifications.



4. Remove the push rivets and screws that attach the dash assembly to the rocker panels on each side.



5. Remove the (2) push rivets that retain the rear portion of the dash assembly.

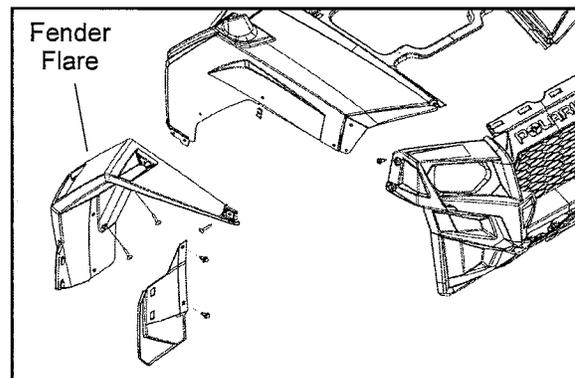


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6. Disconnect all electrical dash components noting their location and wire routing.
7. Remove the dash assembly from the vehicle.

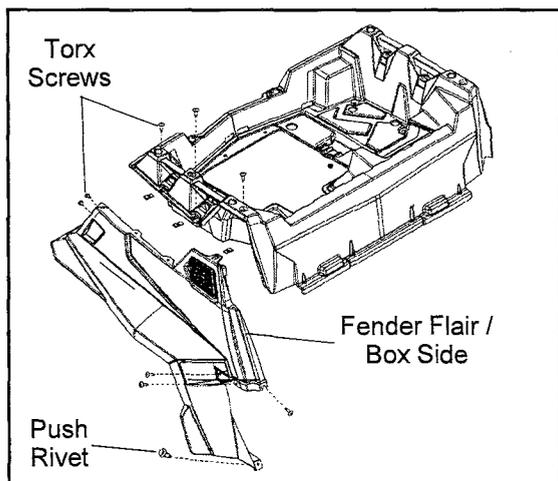
Front Fender Flair Removal

1. Remove the (6) T27 Torx screws and remove fender flairs from the dash assembly.



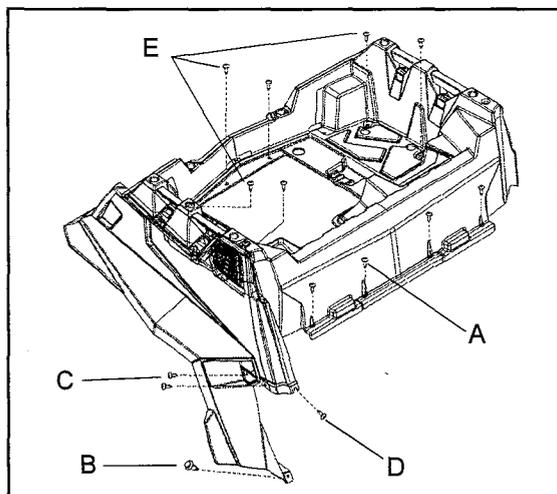
Rear Fender Flair / Box Side Removal

1. Remove the (8) T27 Torx screws and the (1) push rivet. Remove the fender flair / box side from the vehicle.

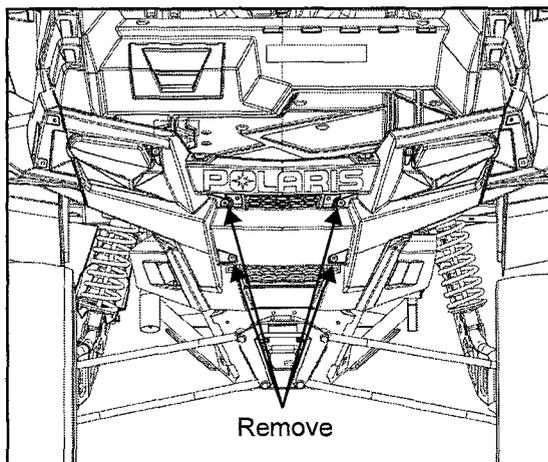


Cargo Box Assembly Removal

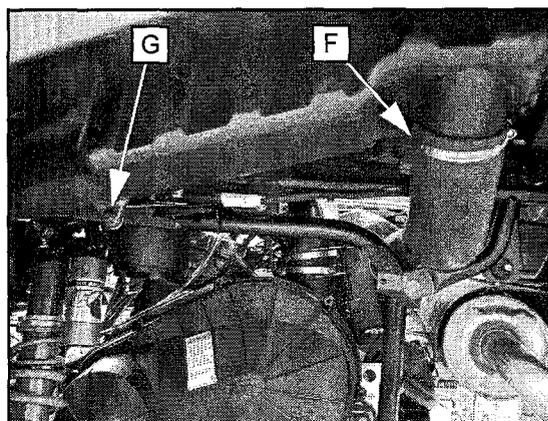
1. Remove the driver and passenger seats.
2. Remove the cargo box panel and the engine service panel.
3. Remove the (4) Torx screws (A) retaining the front of the cargo box to the vehicle frame.
4. Remove the (2) push rivets (B) from both the RH and LH side of the vehicle.
5. Remove the (4) Torx screws (C) from both the RH and LH side of the vehicle.
6. Remove the (2) Torx screws (D) from both the RH and LH side of the vehicle.
7. Remove the (6) Torx screws (E) from the rear cargo box area.



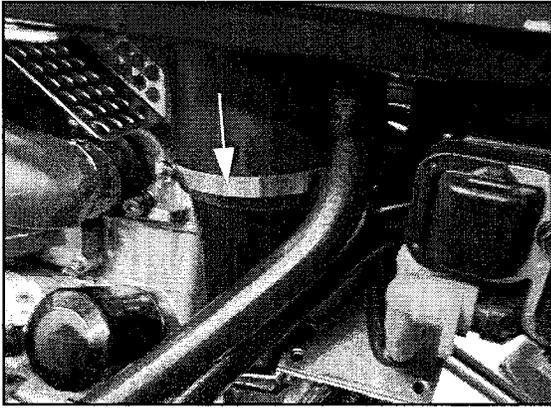
8. Remove the (4) Torx screws that attach the rear bumper to the vehicle frame.



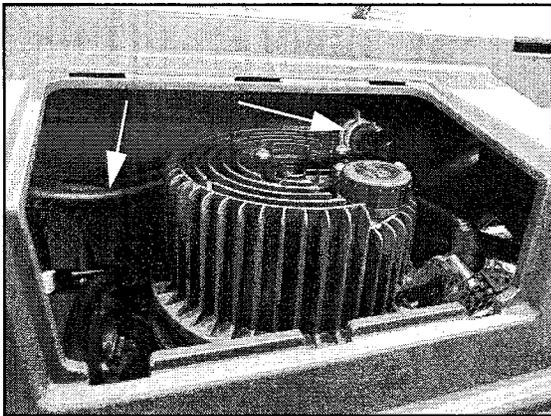
9. Disconnect the wire harness connectors at the tail lights.
10. Loosen the hose clamp (F) and disconnect the engine intake hose from the resonator box.
11. Remove the (2) Torx screws (G) securing the resonator box support bracket (LH side of vehicle) and the clutch intake box support bracket (RH side of vehicle).



- Loosen the hose clamp and disconnect the clutch intake hose from the inner clutch cover.



- Remove the vent hose from the top of the oil tank.

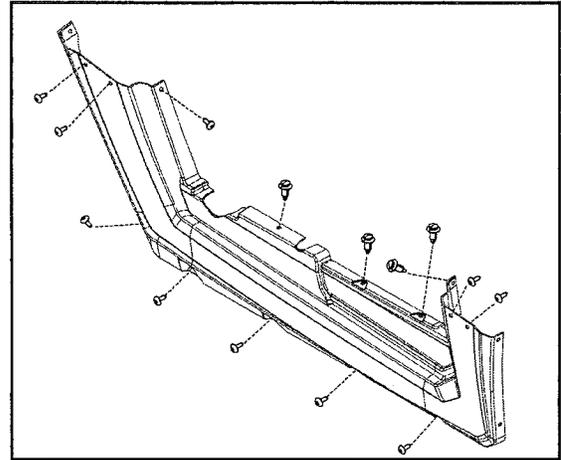


- With the aid of an assistant, carefully lift and guide the cargo box assembly up and off the vehicle frame. Make note of wire and hose routings for reassembly.

Rocker Panels, Console and Floor

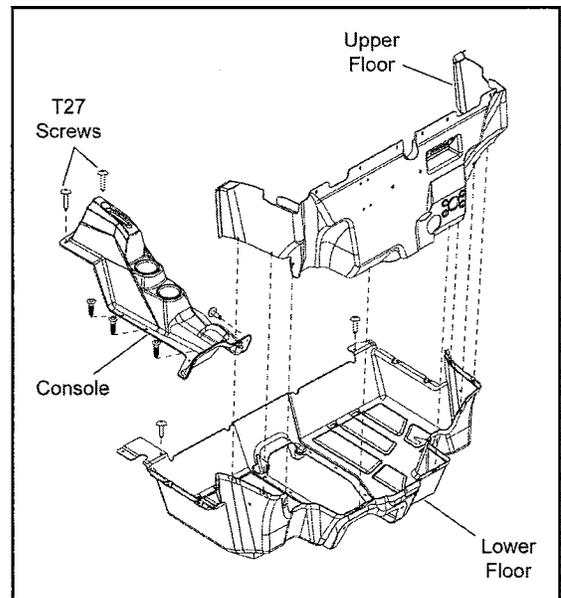
Rocker Panel Removal

- Remove the push rivets and Torx screws retaining the rocker panel and remove panel from the vehicle.



Console and Lower Floor Removal

- Remove both seats and rocker panels (see "Rocker Panel Removal").
- Remove the T27 screws retaining the console to the floor.
- Remove the shift handle knob and remove the console.



- Remove the Torx screws retaining the upper floor to the lower floor.
- Remove the Torx screws retaining the rear portion of the floor and remove the lower floor from the vehicle.

5

Steering Wheel Removal

CAUTION

This procedure should NOT be used on EPS models. Using this procedure on an EPS model can permanently damage the EPS unit and cause a Power Steering Fault.

1. Remove the steering wheel cap.
2. Loosen the nut and back it half way off the steering shaft.
3. With a glove on your hand, place it under the steering wheel. Lift upward on the inner portion of the steering wheel while using a hammer to strike the steering shaft nut.

IMPORTANT: If the steering wheel will not pop loose, proceed to "Steering Shaft Removal".

4. Once the steering wheel pops loose, completely remove the nut and lift the steering wheel off the shaft.

Steering Shaft Removal

1. Remove the pinch bolt retaining the lower portion of the steering shaft to the steering gear box assembly.

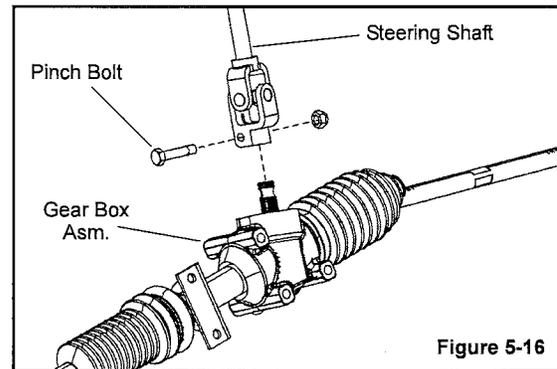


Figure 5-16

2. Remove the fastener retaining the upper portion of the steering wheel tilt shock to the pivot tube.

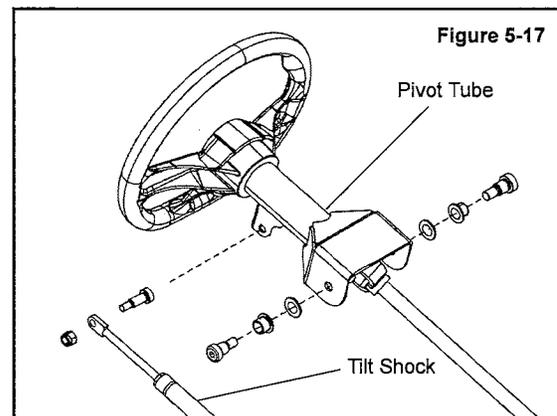


Figure 5-17

3. Remove the (2) fasteners that retain the pivot tube.
4. Remove the steering shaft, pivot tube and steering wheel from the vehicle as an assembly.
5. Refer to steps 11-13 of the "Steering Shaft Bearing Replacement" procedure for installation.

5

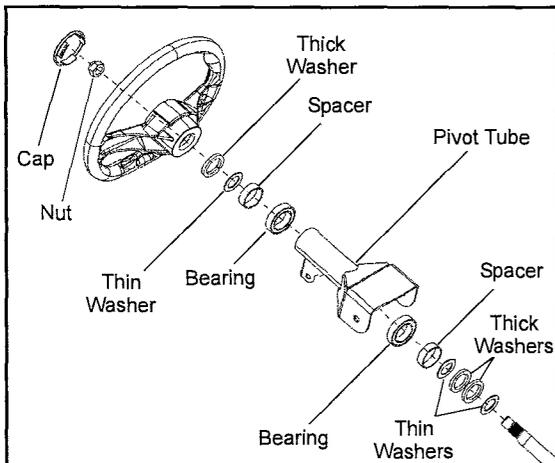
BODY / STEERING / SUSPENSION

Steering Shaft Bearing Replacement

IMPORTANT: Replacement pivot tube assembly comes with new upper and lower bearings installed. Use this procedure if replacing just the bearings only.

1. Perform the "Steering Shaft Removal" procedure.
2. Remove the steering wheel cap and retaining nut.
3. Press steering shaft out of the steering wheel and pivot tube.
4. Note the order and location of the washers and spacers between the steering wheel and pivot tube.
5. Drive the bearings out of the pivot tube using a drift punch.
6. Inspect the pivot tube bearing surfaces for signs of excessive wear or damage.
7. Apply Loctite® 271™ (Red) to the outer circumference of the new lower bearing race. Slide the new lower bearing onto the steering shaft and install the steering shaft through the pivot tube.

NOTE: Use care not to allow any of the Loctite® to get in the bearing.



NOTE: Be sure the lower washers and spacers are still on the steering shaft.

8. Apply Loctite® 271™ (Red) to the outer circumference of the new upper bearing race. Slide the new upper bearing onto the steering shaft and press it into the pivot tube by hand.

NOTE: Use care not to allow any of the Loctite® to get in the bearing.

NOTE: Bearings will be seated in the pivot housing upon tightening the steering wheel nut in step 14.

9. Reinstall the upper washers and spacers in the order in which they were removed.
10. Install the steering wheel and hand tighten the nut. Apply Loctite® 271™.
11. Reinstall the steering shaft assembly in the vehicle. Install the lower portion of the steering shaft onto the steering gear box assembly (see Figure 5-16). Torque the lower pinch bolt to specification.



**Lower Steering Pinch Bolt:
30 ft. lbs. (41 Nm)**

12. Install the (2) fasteners that retain the pivot tube (see Figure 5-17). Torque fasteners to specification.



**Pivot Tube Bolts:
23 ft. lbs. (31 Nm)**

13. Install the fastener retaining the upper portion of the steering wheel tilt shock to the pivot tube (see Figure 5-17). Torque fastener to specification.



**Tilt Shock Bolt:
7 ft. lbs. (10 Nm)**

14. Be sure the front wheels are facing straight forward. Remove the steering wheel and align as needed. Torque the steering wheel nut to 65 ft. lbs. (88 Nm). Apply Loctite® 271™.



**Steering Wheel Nut:
65 ft. lbs. (88 Nm)**

15. Wipe the pivot tube clean of any excess Loctite®.
16. Install steering wheel cap and field test steering operation.

FRONT A-ARMS

Removal / Replacement

The following procedure details upper and lower A-arm removal and replacement on one side of the vehicle.

1. Elevate and safely support the front of the vehicle and remove the front wheel.
2. Remove lower shock fastener (A) from the upper A-arm.
3. Remove upper ball joint pinch bolt (B) from bearing carrier.
4. Using a soft face hammer, tap on bearing carrier to loosen the upper A-arm ball joint end while lifting upward on the upper A-arm. Completely remove the ball joint end from the bearing carrier.
5. Remove the front bumper to allow A-arm bolt removal.
6. Loosen and remove the upper A-arm through-bolt fastener (C) and remove the upper A-arm from the vehicle.
7. Examine A-arm bushings and pivot tube (D). Replace if worn. Discard hardware.

WARNING
The locking agent on the existing bolts was destroyed during removal. DO NOT reuse old hardware. Serious injury or death could result if fasteners come loose during operation.

8. If not replacing the A-arm, thoroughly clean the A-arm and pivot tube.
9. Install new ball joint into A-arm. Refer to "Ball Joint Replacement" section.
10. Insert new A-arm bushings and pivot tube into new A-arm.
11. Install new upper A-arm assembly onto vehicle frame. Torque new bolt to specification.
12. Insert upper A-arm ball joint end into the bearing carrier. Install upper ball joint pinch bolt (B) into the bearing carrier and torque bolt to specification.
13. Attach shock to A-arm with fastener (A). Torque lower shock bolt to specification.
14. Remove lower ball joint pinch bolt (E) from bearing carrier.
15. Using a soft face hammer, tap on bearing carrier to loosen the lower A-arm ball joint end while pushing downward on the lower A-arm. Completely remove the ball joint end from the bearing carrier.
16. Loosen and remove the lower A-arm through-bolt fastener (F) and remove the lower A-arm from the vehicle.
17. Examine A-arm bushings and pivot tube (D). Replace if worn. Discard hardware.

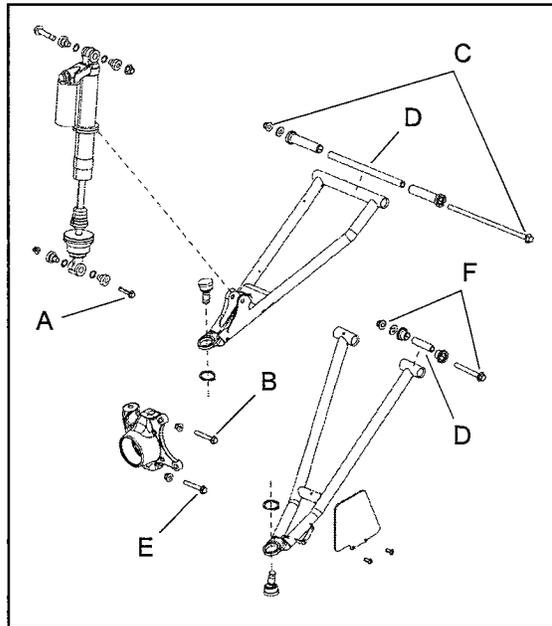
18. If not replacing the A-arm, thoroughly clean the A-arm and pivot tube.
19. Install new ball joint into A-arm. Refer to "Ball Joint Replacement" section.
20. Insert new A-arm bushings and pivot tube into new A-arm.
21. Install new lower A-arm assembly onto vehicle frame. Torque new bolt to specification.
22. Insert lower A-arm ball joint end into the bearing carrier. Install lower ball joint pinch bolt (E) into the bearing carrier and torque bolt to specification.

WARNING
Upon A-arm installation, test vehicle at low speeds before putting into service.

T
Front Upper / Lower A-arm Bolts:
50 ft. lbs. (67.7 Nm)

T
Front Ball Joint Pinch Bolts:
23 ft. lbs. (31 Nm)

T
Shock Mounting Bolts:
50 ft. lbs. (67.7 Nm)



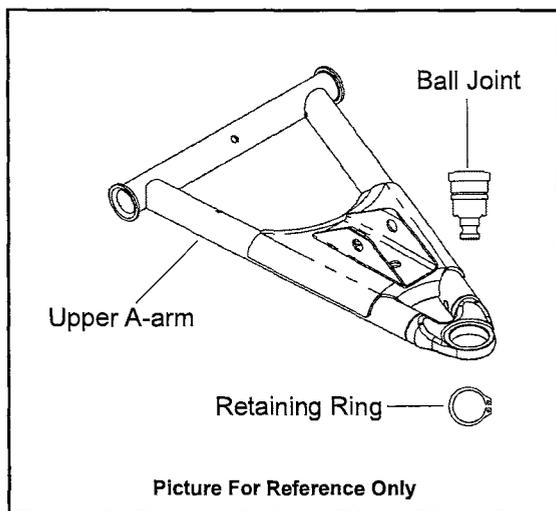
BODY / STEERING / SUSPENSION

BALL JOINT SERVICE

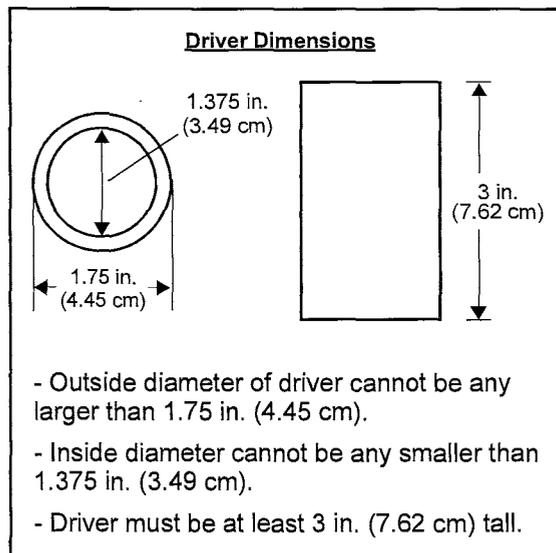
Removal

IMPORTANT: Do not reuse a ball joint if it has been removed for any reason. If removed, it must be replaced. Use this removal procedure only when replacing the ball joint.

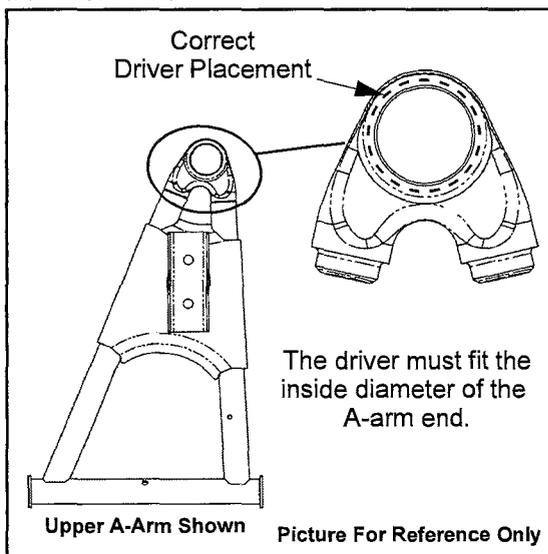
1. The A-arm must be removed to perform this procedure (see "FRONT A-ARMS - Removal / Replacement").



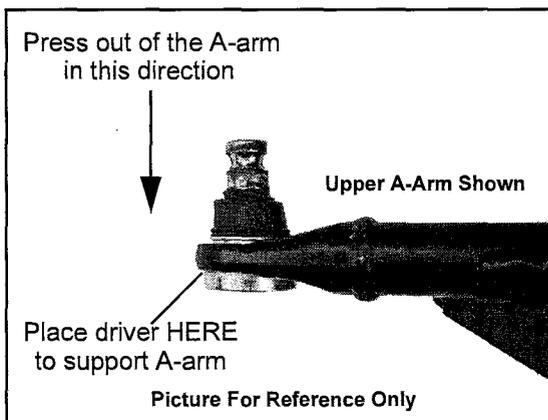
2. Remove the retaining ring from the ball joint.
3. A driver must be used for the removal of the ball joint. Use the dimensions below to fabricate or locate the correct size driver to use in the following process.



4. Use a press and correct size driver to remove the ball joint from the A-arm.

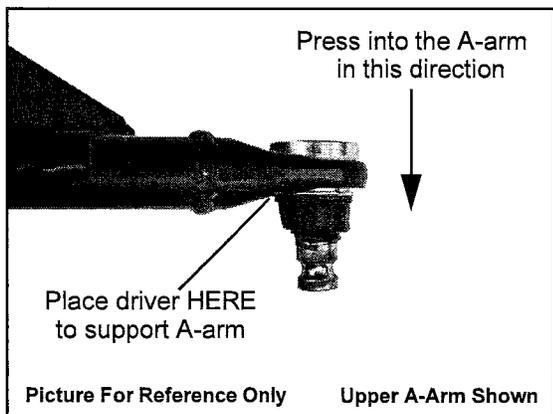


NOTE: The driver must fit the ball joint housing in the A-arm. This will allow the ball joint to be properly pressed out of the A-arm without damaging the A-arm.

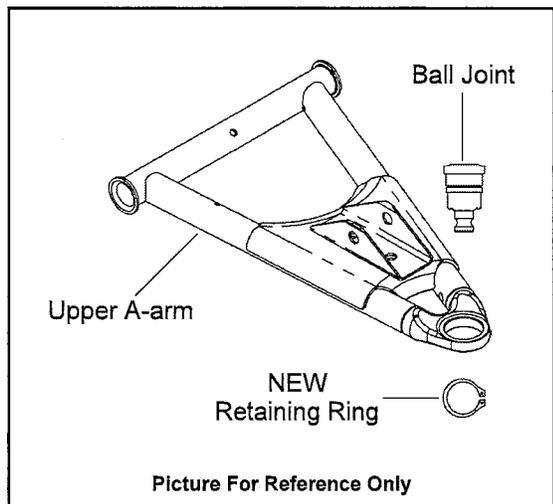


Installation

1. Place the A-arm in the correct position for ball joint installation. Face the A-arm end flat on top of the driver. Carefully drive the ball joint into place until the ball joint is properly seated.



2. After the new ball joint is installed into the A-arm, install a NEW retaining ring.



3. Reinstall the A-arm (see "FRONT A-ARMS - Removal / Replacement").
4. Repeat the ball joint service procedure for any additional A-arm ball joint replacements.

5

BODY / STEERING / SUSPENSION

REAR RADIUS RODS

Removal / Installation

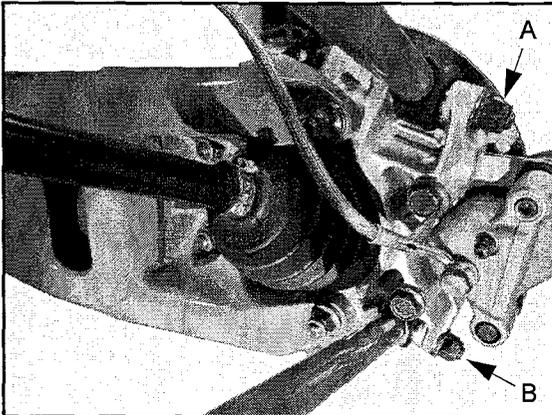
The following procedure details upper and lower radius rod removal and replacement on one side of the vehicle. Repeat the following steps to remove the A-arm from the opposite side.

1. Raise and support vehicle by main frame.

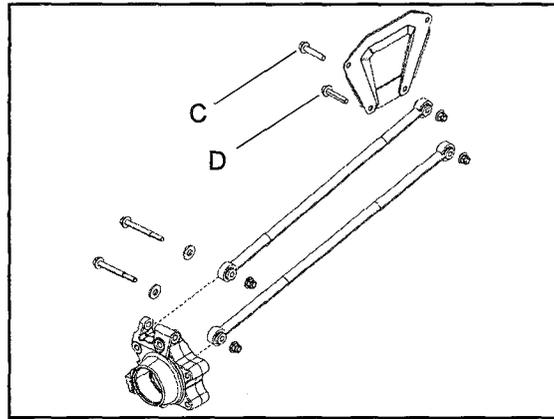
CAUTION

Serious injury may result if machine tips or falls. Be sure machine is secure before beginning this service procedure.

2. Remove the rear wheel nuts and rear wheel.
3. Identify / mark radius rods "upper" and "lower".
4. Remove the nut, bolt and washer (A and B) attaching the upper and lower radius rod to the bearing carrier. Discard the nuts.



5. Remove bolts (C and D) attaching radius rods to the vehicle frame. Discard the nuts.



6. Remove radius rods from vehicle.
7. Examine radius rod shafts, boots and spherical bearings. Replace entire radius rod if any excessive wear is evident.
8. Reverse this procedure to reinstall the radius rods.
9. Torque all fasteners to specification.

NOTE: Use new attaching nuts upon installation of the rear radius rods.



Radius Rod Mounting Bolts:
50 ft. lbs. (67.7 Nm)

WARNING

Upon radius rod installation, test vehicle at low speeds before putting into service.

REAR TRAILING ARM

Trailing Arm Removal / Installation

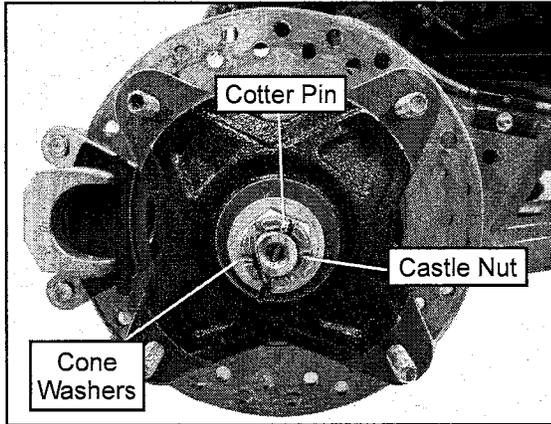
NOTE: Use new attaching nuts upon installation of the rear trailing arm and bearing carrier.

1. Raise and support vehicle by main frame.

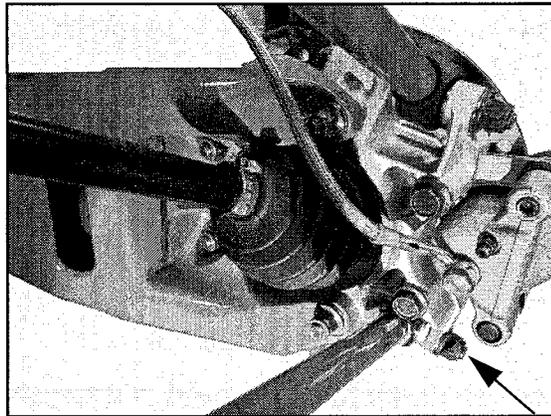
⚠ CAUTION

Serious injury may result if machine tips or falls. Be sure machine is secure before beginning this service procedure.

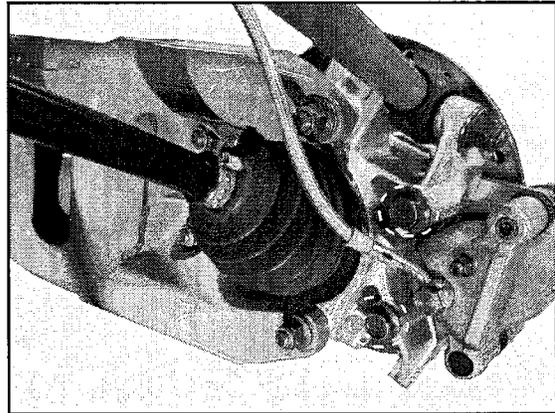
2. Remove the (4) wheel nuts and remove the rear wheel.
3. Remove the cotter pin and loosen the rear wheel hub castle nut. Remove the nut, and (2) cone washers from the rear wheel hub assembly.



4. Remove the lower radius rod mounting bolt, nut and washer from the bearing carrier. Swing radius rod down. Discard the nut.

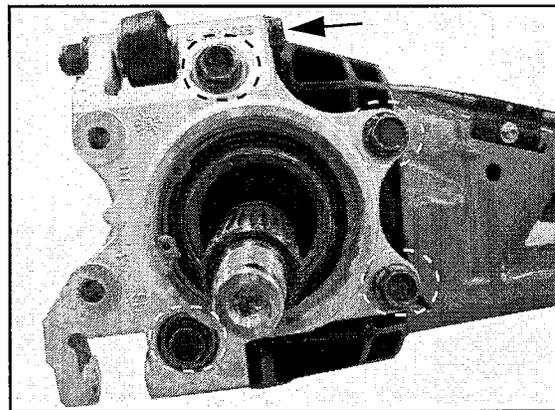


5. Remove the two brake caliper mounting bolts.
CAUTION: Do not hang the caliper by the brake line. Use wire to hang caliper to prevent damage to the brake line.

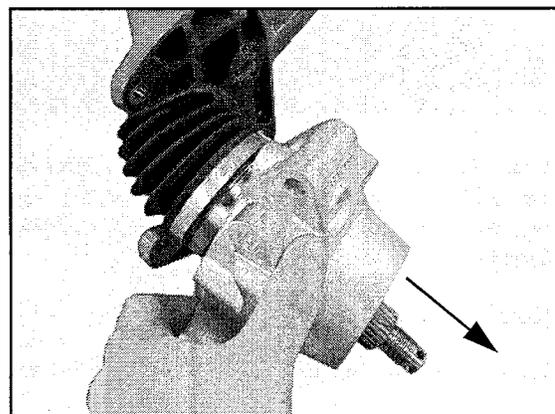


6. Remove the rear wheel hub and brake disk assembly.
7. Remove the (5) remaining bolts that attach the rear bearing carrier to trailing arm. Discard the nuts.

5

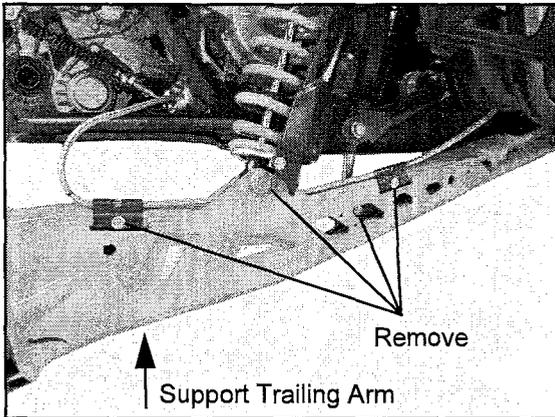


8. Remove the bearing carrier from the rear drive shaft and trailing arm.

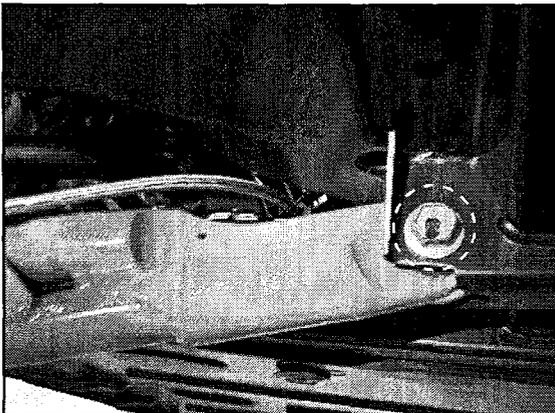


BODY / STEERING / SUSPENSION

9. Rotate bearing by hand and check for smooth rotation. Visually inspect bearing for moisture, dirt, or corrosion. Replace bearing if moisture, dirt, corrosion, or roughness is evident (see Chapter 7).
10. Remove the (2) fasteners that secure the brake line retainers to the trailing arm.
11. Remove the lower stabilizer bar linkage fastener. Discard the nut.
12. Support trailing arm with suitable jack stand or support.
13. Remove the lower shock bolt. Discard the nut.



14. Remove the front trailing arm bolt. Discard the nut.



15. Remove trailing arm from vehicle. Visually inspect trailing arm, bushings and spherical bearing for wear. If bearing requires replacement, refer to "Trailing Arm Spherical Bearing Replacement".
16. Replace trailing arm if physically damaged.
17. Reverse this procedure to reinstall the rear trailing arm.

NOTE: Use new fastener nuts upon installation of the rear trailing arm and bearing carrier.

18. Torque all fasteners to specification.



**Trailing Arm to Main Frame Bolt:
(Trailing arm spherical bearing bolt)
50 ft. lbs. (67.7 Nm)**



**Rear Shock Mounting Bolts:
70 ft. lbs. (95 Nm)**



**Stabilizer Bar Linkage:
31-34 ft. lbs. (42-46 Nm)**



**Radius Rod Mounting Bolts:
50 ft. lbs. (67.7 Nm)**



**Bearing Carrier to Trailing Arm Bolts:
50 ft. lbs. (67.7 Nm)**



**Rear Brake Caliper Mounting Bolts:
30 ft. lbs. (41 Nm)**



**Rear Wheel Hub Castle Nut:
80 ft. lbs. (108 Nm)**



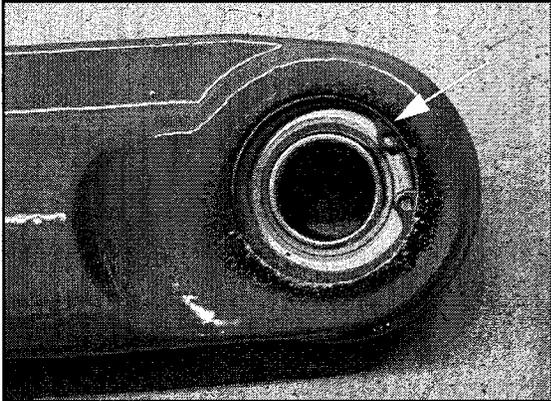
**Wheel Nuts:
30 ft. lbs. (41 Nm) + 90° (1/4 turn)**



Upon rear trailing arm installation, test vehicle at low speeds before putting into service.

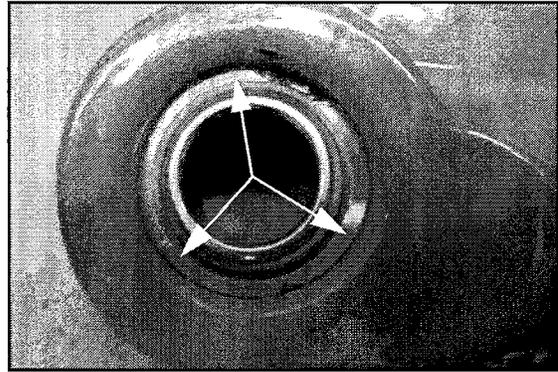
Trailing Arm Spherical Bearing Replacement

1. Remove trailing arm as outlined in this chapter.
2. Inspect spherical bearing for wear.
3. Remove snap ring that retains spherical bearing.



4. Properly support trailing arm so spherical bearing can be pressed out. Press bearing out of trailing arm.

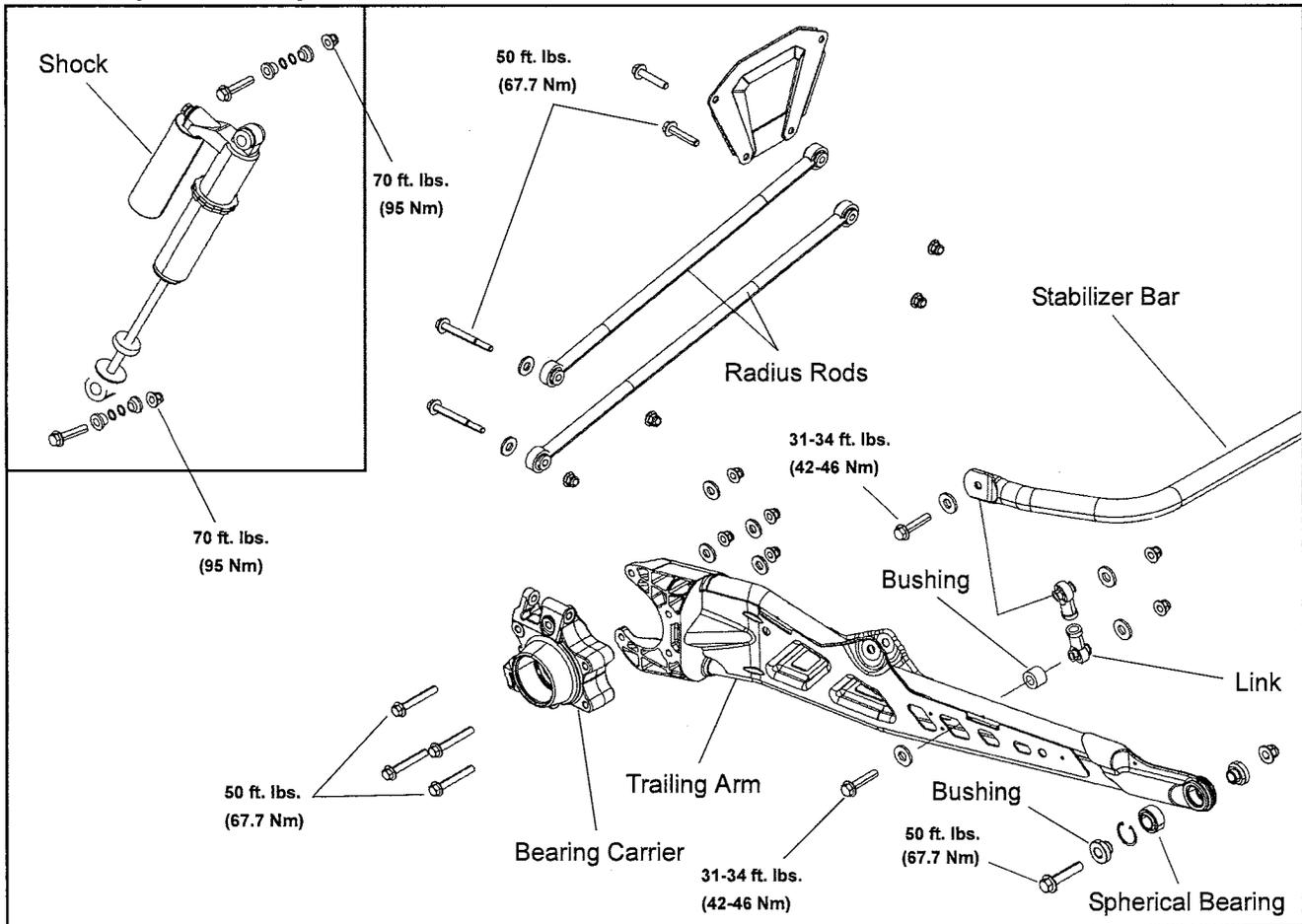
5. Only press on outer most surface of the bearing race, do not press on the center spherical bearing.



6. Inspect trailing arm bearing housing for wear or damage. Replace trailing arm if damaged.
7. Press bearing in until fully seated into trailing arm casting.
8. Install spherical bearing and new snap ring.

5

Rear Suspension Exploded View



5.25

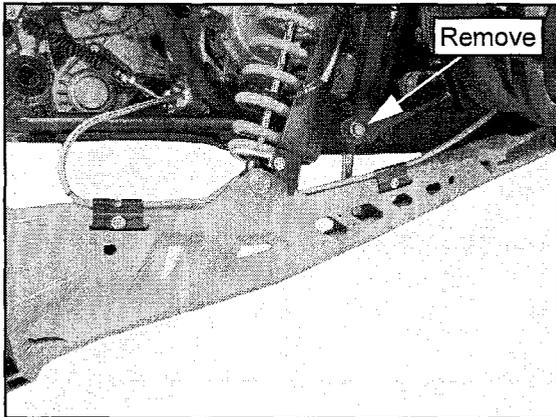
BODY / STEERING / SUSPENSION

REAR STABILIZER BAR

Removal / Installation

Stabilizer Bar Removal

1. Lift and support vehicle by main frame.
2. Remove rear wheels nut and wheels.
3. Identify / mark top side of the stabilizer bar to reference during installation.
4. Remove the fasteners retaining the stabilizer bar to the linkage on each side of the vehicle.



5. Remove the (4) fasteners retaining the stabilizer bar to the vehicle frame (see below).
6. Remove the bushing brackets and bushings for ease of removal.
7. Carefully remove the stabilizer from the LH wheel well area of the vehicle.
8. Mark the location and remove the two stabilizer bar locating clamps (if replacing stabilizer bar).

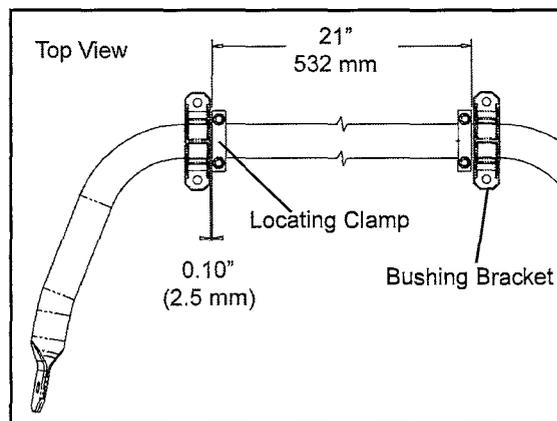
9. Inspect the stabilizer bar for straightness. Inspect the pivot bushings and replace if needed.

Stabilizer Bar Installation

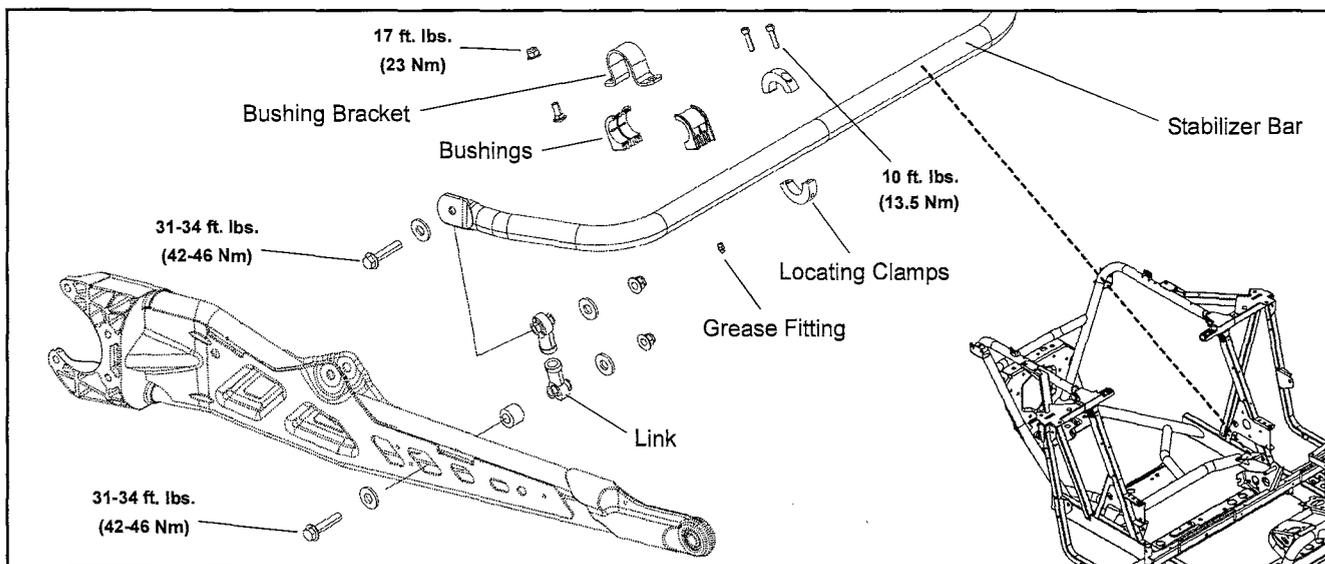
10. Carefully install stabilizer bar through the LH wheel well area.

NOTE: Be sure fuel lines and shift cable are routed ABOVE the stabilizer bar.

11. Fully install stabilizer bar, bushings, bracket and bracket fasteners and stabilizer links. Center stabilizer bar in the frame. Torque fasteners to specification (see below).
12. Install stabilizer bar locating clamps on the INSIDE of the pivot bushing and brackets. There should be a 0.10" (2.5mm) gap between the bushing face and the locating clamps. Torque locating clamps fasteners to specification.



13. Torque all fasteners to specification (see below).
14. Lubricate stabilizer bar pivot bushings via grease fitting (fittings are accessible through skid plate).
15. Install rear wheels and wheel nuts. **Torque wheel nuts to 30 ft. lbs (41 Nm) + 1/4 turn.**



DECAL REPLACEMENT **WARNING**

The following procedure involves the use of an open flame. Perform this procedure in a well ventilated area, away from gasoline or other flammable materials. Be sure the area to be flame treated is clean and free of gasoline or flammable residue.

 **WARNING**

Do not flame treat components that are installed on the vehicle. Remove the component from the vehicle before flame treating.

The body cab components are plastic polyethylene material. Therefore, they must be “flame treated” prior to installing a decal to ensure good adhesion. A bonus of the flame treating procedure is it can be used to reduce or eliminate the whitish stress marks that are sometimes left after a fender or cab is bent, flexed, or damaged.

CAUTION

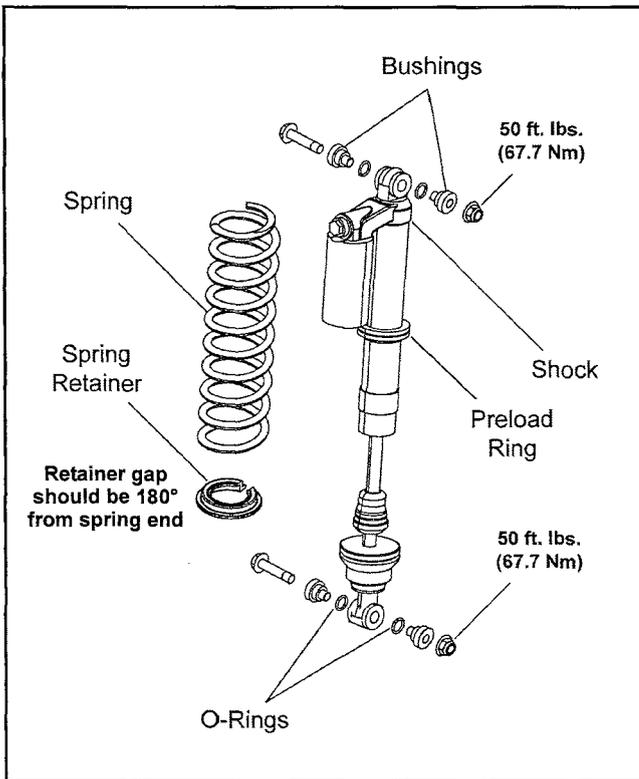
Do not flame treat painted plastic components. Painted plastic surfaces should only be wiped clean prior to decal adhesion.

To flame treat the decal area:

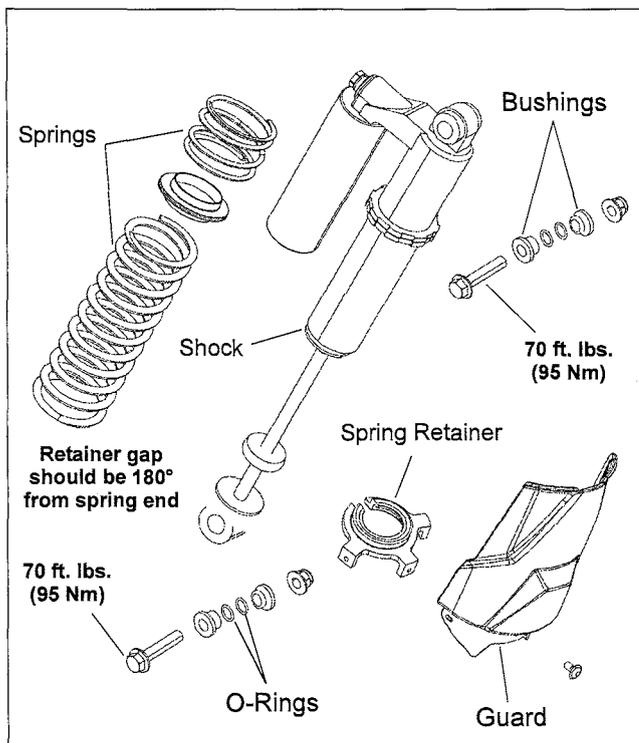
1. Pass the flame of a propane torch back and forth quickly over the area where the decal is to be applied until the surface appears slightly glossy. This should occur after just a few seconds of flame treating. Do not hold the torch too close to the surface (2-3 inches from the flame tip is recommended). Keep the torch moving to prevent damage.
2. Apply the decal on one edge first. Slowly lay down remainder of the decal while rubbing lightly over the decal surface to eliminate any air bubbles during the application.

SHOCKS / SPRINGS / FASTENERS

Front Shock Exploded View



Rear Shock Exploded View



Shock Removal / Installation

1. Elevate the vehicle off the ground to relieve the suspension load.
2. Support under A-arm or trailing arm.
3. Remove the upper and lower fasteners retaining the shock and remove the shock from the vehicle. Discard nuts and replace with new upon installation.
4. Reverse the procedure to reinstall the shock. Torque new fasteners to specification (refer to exploded views).

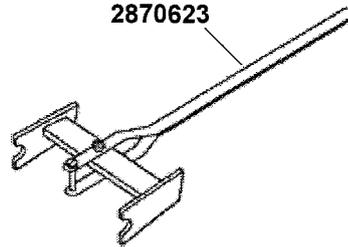


Shock Mounting Bolts:
Front - 50 ft. lbs. (67.7 Nm)
Rear - 70 ft. lbs. (95 Nm)

Shock Replacement

1. Remove the shock and note the spring preload distance (see Chapter 2 for factory settings).
2. Loosen the jam nut and adjustment ring until the spring is loose. If needed, use a spring compressor to compress the spring far enough to remove the spring retainer.

Shock Spring
Compressor Tool
2870623



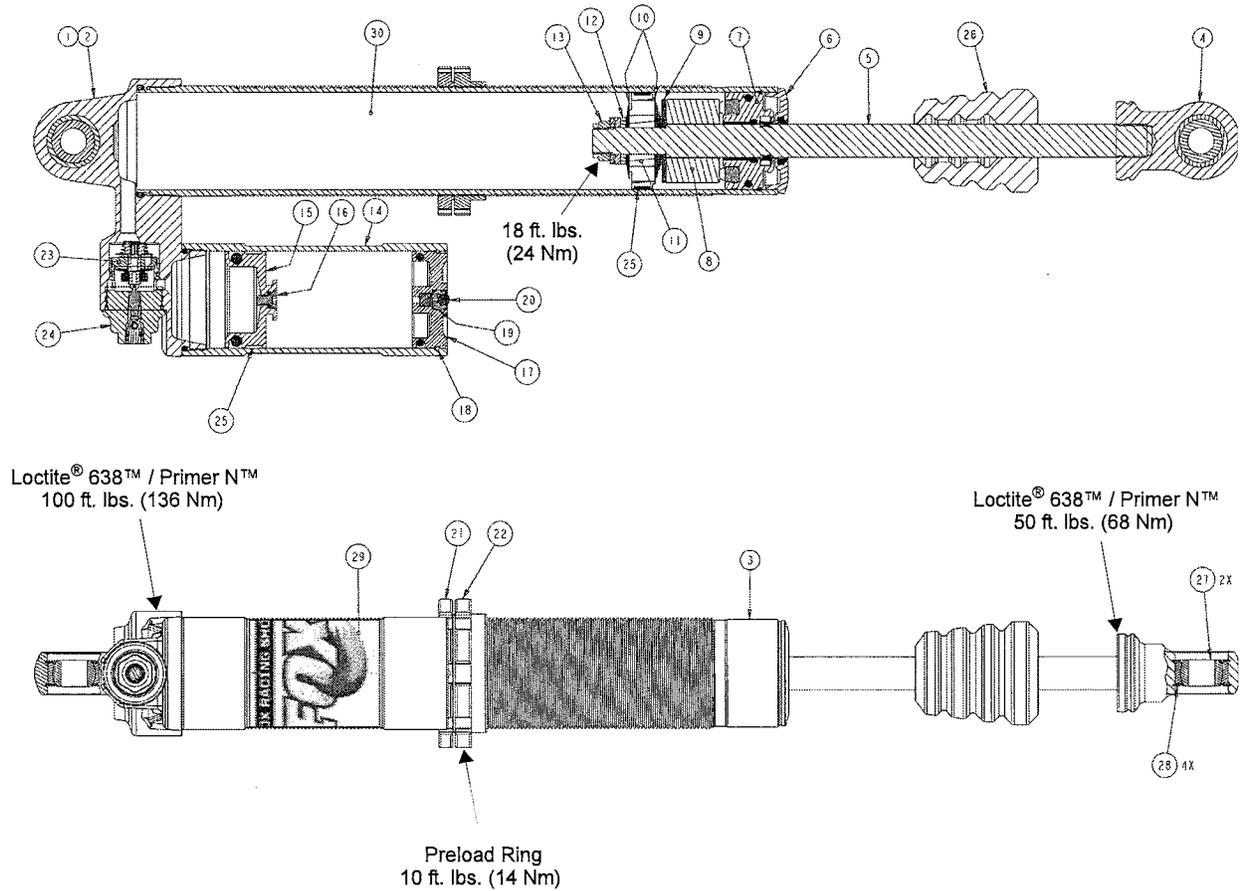
3. Remove the spring and spring retainer from the existing shock and install components onto the new shock.
4. Install the spring(s) and spring retainer.

IMPORTANT: The spring retainer gap should be 180° from the end of the spring upon installation.

5. Tighten the spring adjustment ring to set the preload distance noted in Step 1 (see Chapter 2 for factory settings).
6. Reinstall the shock onto the vehicle and torque new fasteners to specification.

FOX™ SHOCK EXPLODED VIEWS

FOX™ 2.0 'Piggyback' Shock



5

Ref.	Qty	Description	Ref.	Qty	Description
1.	1	Body Cap Asm.	16.	1	Screw Asm.
2.	1	Body Cap	17.	1	Reservoir End Cap Asm.
3.	1	Body	18.	1	Retaining Ring
4.	1	Eyelet	19.	1	Pellet Retainer Set Screw, Air Valve
5.	1	Shaft	20.	1	Nylon Ball, Air Valve
6.	1	Bearing Cap Asm.	21.	1	Preload Ring, Jam Nut
7.	1	Bearing Asm.	22.	1	Preload Ring
8.	1	Spacer	23.	1	Damping Adjust Asm., Piston
9.	1	Plate, Top-Out	24.	1	Damping Adjust Asm., Concentric Adjuster
10.	1	Valving Asm.	25.	2	Bearing, External
11.	1	Piston, Damping	26.	1	Bumper
12.	2 or 3	Plate, Back-Up	27.	2	Bearing, Spherical
13.	1	Lock Nut	28.	4	Retaining Ring
14.	1	Reservoir	29.	1	Decal
15.	1	Piston Asm, Floating (IFP)	30.	-	Shock Oil (2870995)

BODY / STEERING / SUSPENSION

FOX™ SHOCK SERVICE

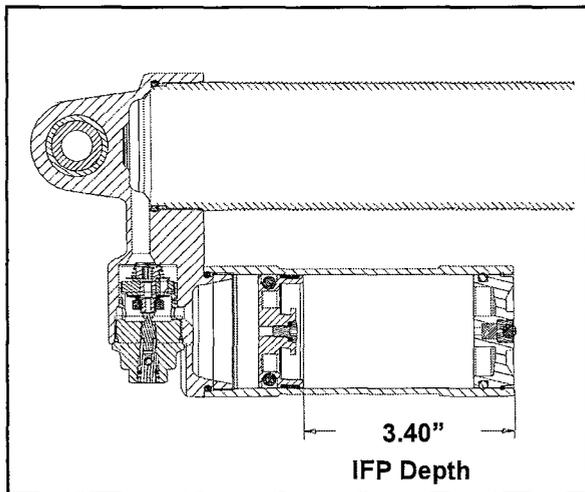
General Service Information

Recommended Service Intervals

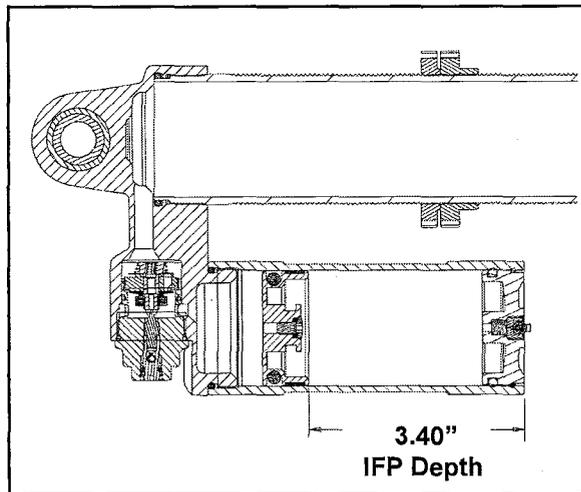
FOX™ Racing Shocks will perform the best if serviced at regular intervals:

- Every ride - Wash and dry the vehicle and suspension
- Every 100 hours - Visually inspect shock seals
- Every 200 hours or 24 months - Change shock oil and replace seals

Front Shock Service Information



Rear Shock Service Information



SHOCK DESIGN DETAILS

Travel	6.62"
Extended Length	22.87"
IFP Location	3.40"
Nitrogen Pressure	200 psi +/- 5%
Gas Shock Oil	2870995 (qt.)

SHOCK DESIGN DETAILS

Travel	7.63"
Extended Length	22.74"
IFP Location	3.40"
Nitrogen Pressure	200 psi +/- 5%
Gas Shock Oil	2870995 (qt.)

SHOCK VALVING

COMPRESSION	REBOUND
1.600 x 0.0080	1.425 x 0.012
1.600 x 0.0060	1.350 x 0.012
1.600 x 0.012	1.250 x 0.015
1.425 x 0.012	1.100 x 0.015
1.350 x 0.012	0.950 x 0.015
1.250 x 0.012	0.800 x 0.010
1.100 x 0.012	0.800 x 0.015
0.950 x 0.012	0.875 x .100 Back-Up
1.570 x 0.128 Top-Out	0.875 x .100 Back-Up
	0.875 x .100 Back-Up
Piston Orifice: 2x 0.070	

SHOCK VALVING

COMPRESSION	REBOUND
1.600 x 0.012	1.425 x 0.010
1.425 x 0.012	1.350 x 0.010
1.350 x 0.012	1.100 x 0.010
1.250 x 0.012	1.100 x 0.010
1.100 x 0.012	0.950 x 0.010
0.950 x 0.012	0.800 x 0.010
1.570 x 0.128 Top-Out	0.875 x 0.100 Back-Up
	0.875 x 0.100 Back-Up
	0.875 x 0.100 Back-Up
Piston Orifice: 1x 0.098	

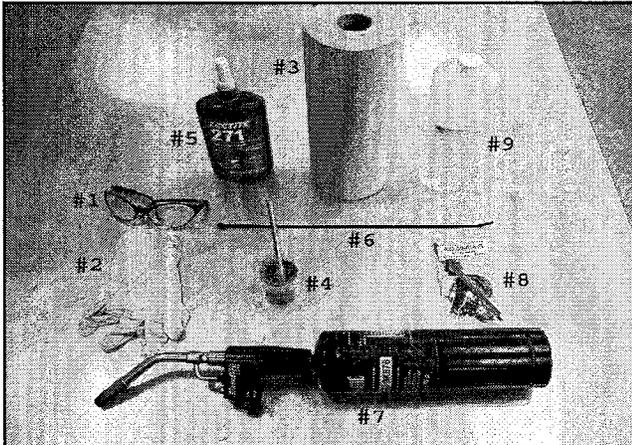
FOX™ Shock Rebuild Information

When performing maintenance on FOX™ shocks, use the Gas Shock Recharging Kit (PN 2200421), as it contains the necessary valves, pressure gauge, and fittings to deflate and pressurize shocks.

WARNING

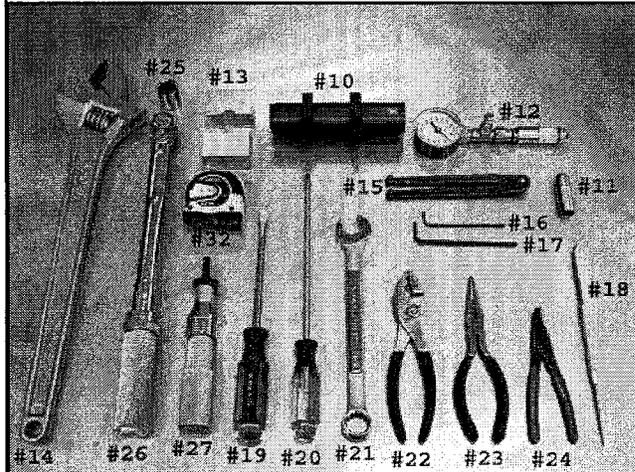
FOX™ shocks contain high pressure nitrogen gas. Extreme caution must be used while handling and working with FOX™ shocks and related high pressure service equipment. The pressure must be released from the shock before disassembly. It is strongly recommended you wear safety glasses and ear protection during these procedures.

TIP: Extreme cleanliness is very important during all disassembly and reassembly operations. This prevents dirt or foreign particles from entering the shock, which causes premature failure.



1. Safety Glasses
2. Latex Gloves
3. Lint Free Towels
4. Assembly Lube (lithium based grease)
5. Loctite #271
6. 12" Tie Wrap (Zip Tie)
7. MAPP Gas or Propane Torch
8. 1.834 TC Seal Kit
9. 5wt. Shock Fluid

Special Tools Required:
 Body Holding Tool (PN 2871071)
 Charging Needle (PN 7052069-A)
 Gas Shock Recharging Kit (PN 2200421)
 FOX™ Shock IFP Tool (PN 2871351)
 Seal Installation Bullet Tool (PN 2201640) (PN 2201639)



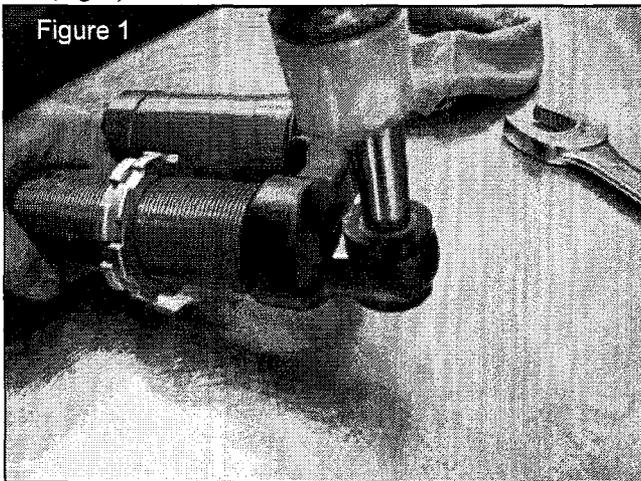
10. IFP Depth Setting Tool
11. Seal Installation Bullet (5/8")
12. Nitrogen Safety Needle
13. 5/8" Shaft Clamps
14. Adjustable Wrench
15. Pin Spanner Wrench (3/16" Pins)
16. 3/32" Hex Key (Allen Wrench)
17. 5/32" Hex Key (Allen Wrench)
18. Scribe or Dental Pick
19. 1/4" Flat Blade Screwdriver
20. #2 Phillips Screwdriver
21. 3/4" Open End Wrench
22. Standard Pliers
23. Small Needle Nose Pliers
24. Snap Ring Pliers
25. Socket
26. Torque Wrench
27. Torque Driver
28. Soft Faced Rubber Mallet
29. Nitrogen Tank w/ Regulator
30. Cleaning Solvent
31. Vise with soft jaws
32. Tape Measure

FOX™ Shock Disassembly

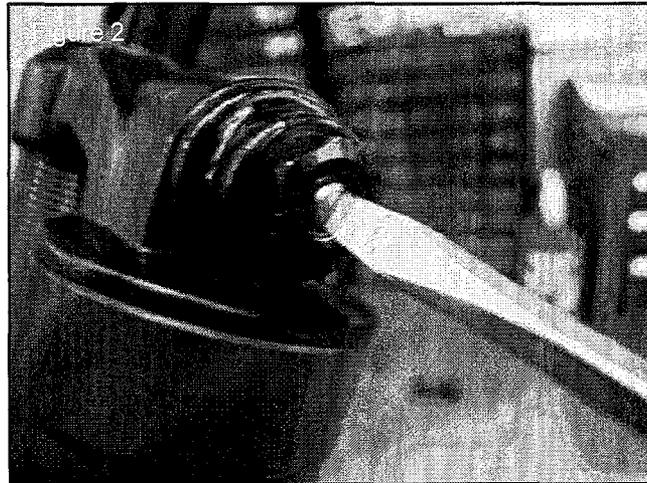
NOTE: Read through all of these instructions first to familiarize yourself with the rebuild procedure. Make sure you have a clean work area, and all of the necessary tools are available. Always use proper safety equipment when working on shock absorbers.

NOTE: Clean the entire shock assembly with soapy water. Try to remove as much dirt and grime as possible by scrubbing with a soft bristle brush. Never pressure wash your shock, as this can force water and debris inside which will damage the seals. Dry the shock assembly with compressed air, if available, or use clean towels.

1. If your shock DOES NOT have a spring installed, skip to Step #4.
Measure the spring set length (Fig. 1). Record this number.
2. Back the preload adjustment ring off until spring is loose on the body. Remove the lower spring retaining clip.
3. Remove the spring.
4. If the shock has spherical bearings in the body cap or shaft eyelet, remove the reducer bushings and O-rings from both ends of the shock. If your shock has polyurethane bushings and sleeves, remove them from both ends of the shock (Fig. 1).



5. Note and record the setting on the Compression Adjuster Screw. Using the Flat Blade Screwdriver, count the clicks as you turn the adjuster clockwise until it stops (Fig. 2). Once you have written this number down, turn the screw all the way counterclockwise until it stops.

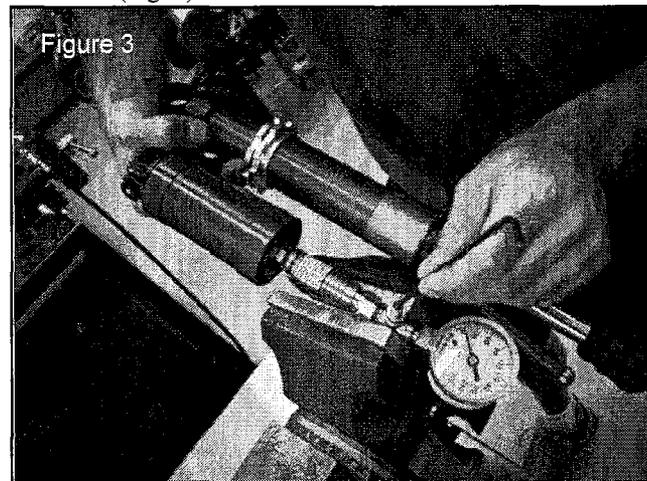


6. Clean the entire shock assembly with soapy water. Try to remove as much dirt and grime as possible by scrubbing with a soft bristle brush. Never pressure wash your shock, as this can force water and debris inside which will damage the seals. Dry the shock assembly with compressed air, if available, or use clean towels.
7. Remove the nylon valve cap from the FOX™ air valve located in the reservoir end cap.
8. Securely clamp FOX™ Nitrogen Safety Needle in vise.

CAUTION

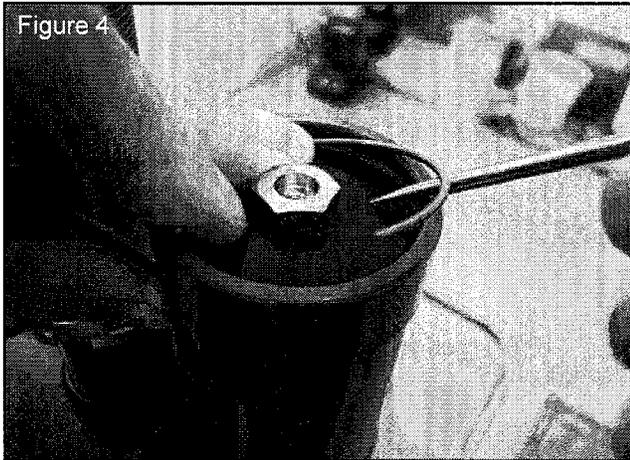
Point air valve away from face and body when charging or discharging any shock.

9. Insert the FOX™ Safety Needle squarely into center of gas valve (Fig. 3).



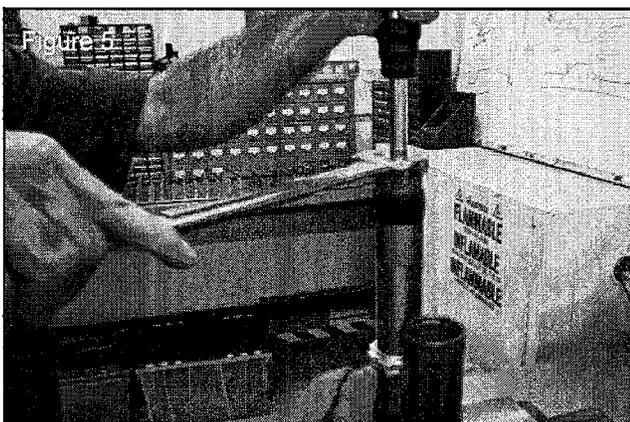
10. Using a blunt object, depress the air valve core to release pressure.
11. When the shock is fully discharged, pull reservoir away from the FOX™ Safety Needle in a straight, smooth motion.

12. Clamp the body cap of the shock securely in vise with shaft side up.
13. Gently tap the reservoir end cap with a rubber mallet to expose the wire retaining ring. Locate the end of the ring and push inward with fingertip. Remove the retaining ring. A scribe or dental pick can also be used for this step, but use extreme caution not to scratch the bore of the reservoir tube (Fig. 4).



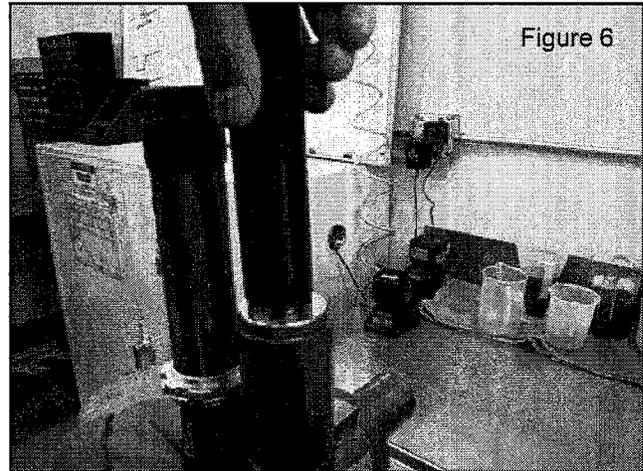
14. Use pliers to grab flats of the gas valve of reservoir cap. Extract cap from reservoir tube using a rocking or twisting motion. Set reservoir cap aside on a clean, lint free paper towel.
15. Use the appropriate size wrench to loosen the bearing assembly (Fig. 5). Unscrew the bearing assembly completely from the body tube. Remove the shaft assembly from the body tube, and place on a clean, lint free paper towel. Remove the shock from the vise and pour shock oil from body tube into a proper disposal container.

NOTE: DO NOT RE-USE OLD SHOCK OIL.



16. Clamp the body cap of the shock securely in vise with the open end of the body tube pointing up.

17. Align the slot of the IFP Depth Setting Tool with the end of the IFP (Internal Floating Piston). Engage the IFP by rotating the tool 90 degrees (Fig. 6). Gently pull the IFP out of the reservoir tube using the IFP Depth Setting Tool, and place it on a clean, lint free towel. Remove the shock from the vise and pour shock oil from body and reservoir tubes into a proper disposal container. **DO NOT RE-USE OLD SHOCK OIL.**



18. Using the 1/8" Hex Tool, remove the IFP bleed screw from the IFP.
19. Clean the body tube, reservoir tube, and the IFP using solvent. Dry with compressed air in a well ventilated area. If compressed air is not available, dry parts using clean, lint free paper towels and let sit in a well ventilated area to allow the solvents to evaporate.
20. Set body assembly aside on a clean, lint free paper towel.
21. Clamp the shaft eyelet securely in vise with the piston end up.
22. Using a 9/16" wrench, remove the piston lock nut from the end of the shaft.
23. Hold the tip of a phillips head screwdriver against the end of shaft. Hold the piston assembly under the top-out plate and lift upwards (Fig. 7). Slide the piston assembly onto the shaft of the Screwdriver. Pull the Screwdriver away from shock shaft while supporting the piston assembly. Slide a 12" tie wrap through the entire piston assembly. Secure the two ends of the zip tie together and remove the screwdriver. There are many pieces to the piston assembly, and the assembly order of these pieces is critical to the proper performance of your shock. This step ensures that the proper order is kept. Place piston assembly on a clean, lint free paper towel.

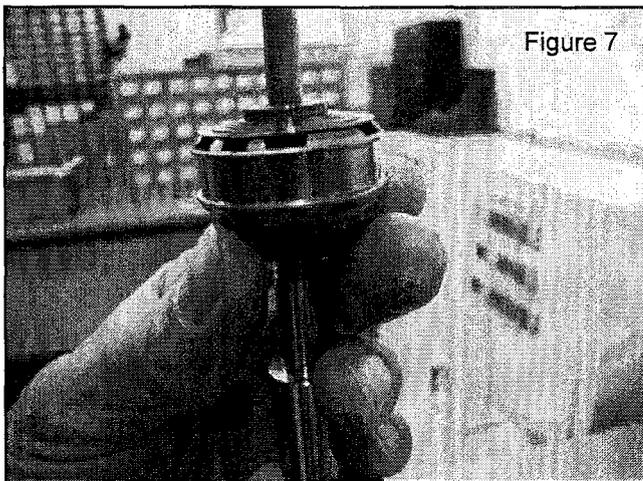


Figure 7

24. Slide bearing assembly off of shaft. Use extreme caution not to scratch inside of the bearing assembly when passing it over the threads at end of shaft.

FOX™ Shock Rebuild

1. Use a scribe or dental pick to remove the U-cup wiper (Fig. 8) and O-ring seals (Fig. 9) from the bearing housing. Be careful not to scratch the seal grooves or the DU bushing that is pressed into the bearing.

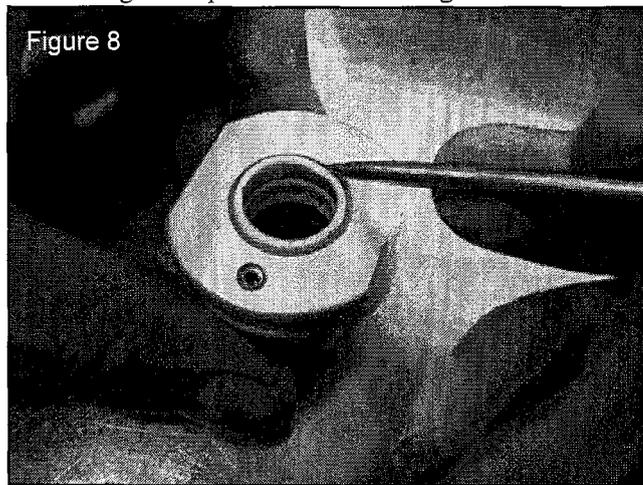


Figure 8

IMPORTANT: Use extreme caution when using a scribe to remove seals. Always "spear" the seal with the point of the scribe. Do not wedge the point of the scribe in behind the seal. This can scratch the surface of the seal groove which will compromise the performance and reliability of the shock absorber.

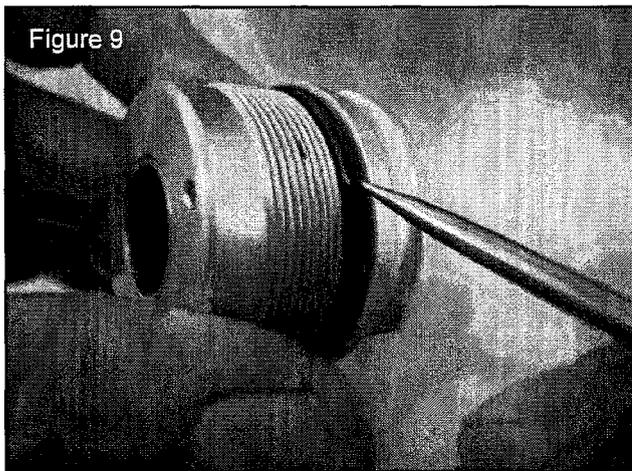


Figure 9

2. Thoroughly clean the bearing housing, and piston assembly with solvent. Dry with compressed air in a well ventilated area. If compressed air is not available, dry parts using clean, lint free paper towels and let sit in a well ventilated area to allow the remaining solvent to evaporate.
3. Use a scribe or dental pick to remove the O-ring seal from the IFP.
4. Use a scribe or dental pick to remove the O-ring seals from the reservoir end cap.
5. Install the new, well lubricated, O-rings into the bearing housing. Correct placement of the shaft seal O-ring is in the groove next to the DU bushing. Check to make sure the seals are properly seated, and are not twisted. If a tool is required to aid in proper seating of O-ring, use the non-writing end of a pen, or a similar soft, blunt object, to push it in.
6. Install the new U-cup seal into bearing. U-cup should be installed so the cupped end is facing the DU bushing inside of bearing. Check to make sure seal is properly seated. If a tool is required to aid in proper seating of U-cup seal, use the non-writing end of a pen, or a similar soft, blunt object, to push it in (Fig. 10).

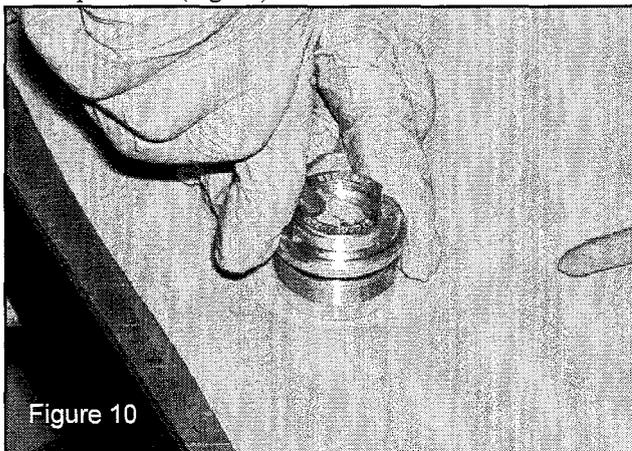
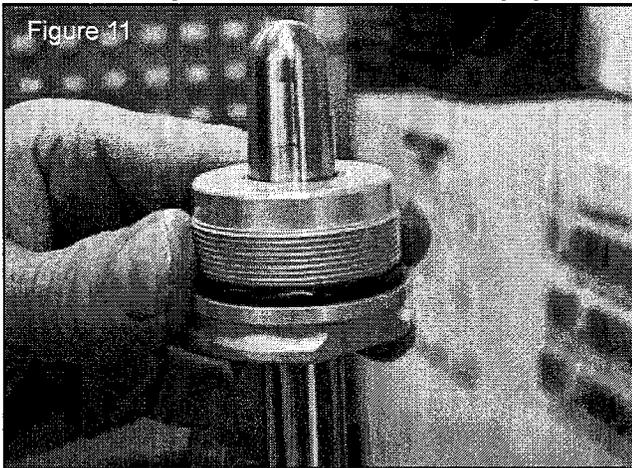


Figure 10

7. Install the scraper in the bearing housing. Check for proper orientation of the scraper in the bearing. The stepped side of the scraper should be visible.
8. Install the new, well greased O-ring onto the IFP.
9. Replace the IFP bleed screw O-ring.
10. Install the new, well greased O-rings into the reservoir end cap.

FOX™ Shock Reassembly

1. Clamp shaft eyelet securely in vise, and place seal bullet tool on end of shaft.
2. Lubricate the bearing assembly seals with an ample amount of assembly lube. Slide the bearing assembly onto shaft with the scraper facing the eyelet (Fig. 11). This should be done in a single smooth motion to avoid damaging the seals.

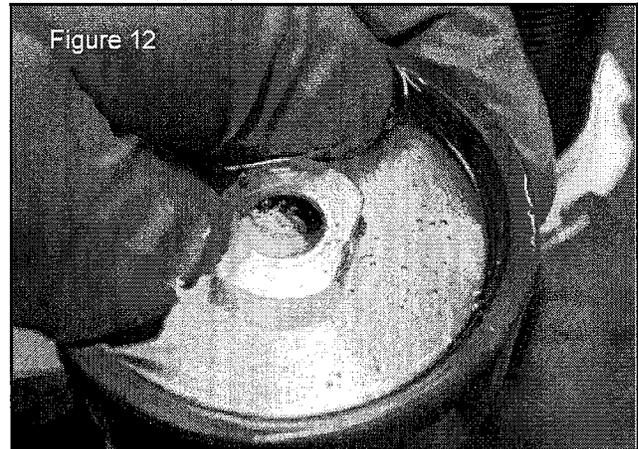


3. Insert the shaft of a Phillips head screwdriver through the center of the piston assembly. The pointed end of the screwdriver should be on the same side as the top-out plate. Cut and remove the tie wrap that was holding the piston assembly together.
4. Hold the piston assembly from underneath the top-out plate and place the end of the screwdriver onto the end of the shock shaft. Slide the piston assembly onto the shaft end. Check to make sure the piston assembly is properly seated, then install the piston lock nut. Torque the nut to **18 ft. lbs. (24 Nm)** using a torque wrench and 9/16" socket. Remove shaft assembly from vise and set it aside on a clean, lint free paper towel.
5. Clamp the body cap of the shock securely in the vise, with the open end of the body facing up.
6. Using the flat blade screwdriver, turn the compression adjuster screw counter clockwise until it stops turning.
7. Lubricate the new IFP O-ring with an ample amount of assembly lube.

8. Fill the reservoir to the retaining ring groove with the recommended oil. You should see bubbles rising to oil surface. Wait until bubbling slows or stops completely. If oil level has fallen, add more oil until level is at retaining ring groove. Insert IFP into reservoir. Use a smooth motion and push straight in until O-ring seats into the retaining ring groove. Use your free hand to wrap new piston band around IFP with the rounded edge out, and push the IFP into the reservoir. Shock oil will come up through the IFP bleed hole.

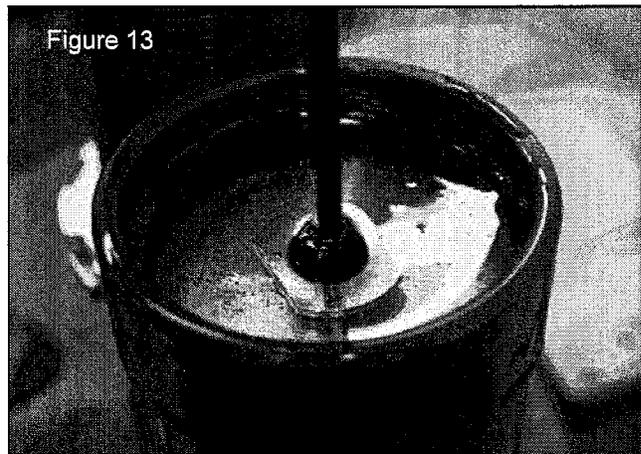
**Polaris Gas Shock Oil - 5 wt.
PN 2870995 - qt.
PN 2872279 - 2.5 gal.**

9. Push the IFP into the reservoir until you have enough oil on top of the IFP so that the bleed hole is under the surface of the oil (Fig. 12).



10. Quickly install the IFP Bleed Screw before the oil level drops and tighten it with the 1/8" Hex Tool (Fig. 13).

NOTE: The IFP will spin in the reservoir when the screw bottoms. This is OK.

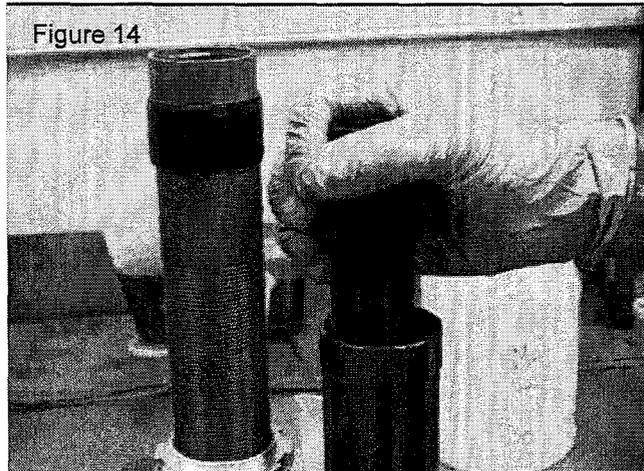


11. Using the IFP Depth Setting Tool, push the IFP into the reservoir until it stops.

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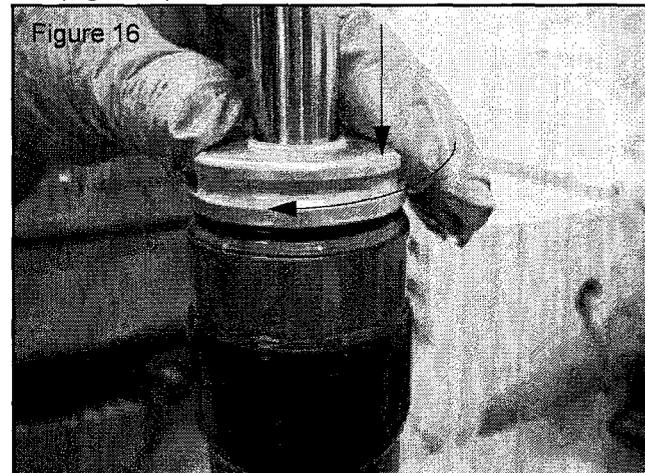
BODY / STEERING / SUSPENSION

12. Fill shock body to the bottom of bearing threads with oil.
13. Using the IFP Depth Setting Tool, slowly pull the IFP up to the mid point of the reservoir. Then push it down to the bottom again (Fig. 14). Be careful not to pull the IFP out completely. Also, be careful that the oil level in the shock body does not disappear below the bottom of the body and into the reservoir. If the oil does recede completely from the body, you must remove the IFP and go back to step 7 of reassembly.



14. As you push the IFP down, you should see bubbles rising to the surface inside the body tube. Repeat this process several times until you don't see any new bubbles inside the body tube.
15. Pull the IFP up until its top is approximately 1" from the end of the reservoir and remove the IFP depth setting tool. Again, be sure the oil level in the shock body does not drop below the bottom of the body. If the oil does recede completely from the body, you must remove the IFP and go back to step 7 of reassembly. Add oil if necessary while pulling up on the IFP.
16. Using the flat blade screwdriver, turn the Compression Adjuster Screw clockwise until it stops turning.
17. Fill the body tube with oil approximately 1/4" below the threads. Wrap the new piston band around the piston, making sure the rounded edges face out. Insert the shaft assembly into the body tube. Slowly push shaft into body until piston assembly is approximately 1" below oil surface.
18. Stroke the shaft up and down slowly over about a 1" range until no air bubble rise from the damping piston. Be careful to keep the damping piston at least 1/4" below the surface of the oil during this process.
19. Bring the damping piston up until it is approximately 1/4" below the surface of the oil. Using the mallet, give 2 - 3 sharp blows to the eyelet, driving the damping piston down into the shock body. This opens the valves on the damping piston. You will see the released air bubbles come to the surface of the oil.

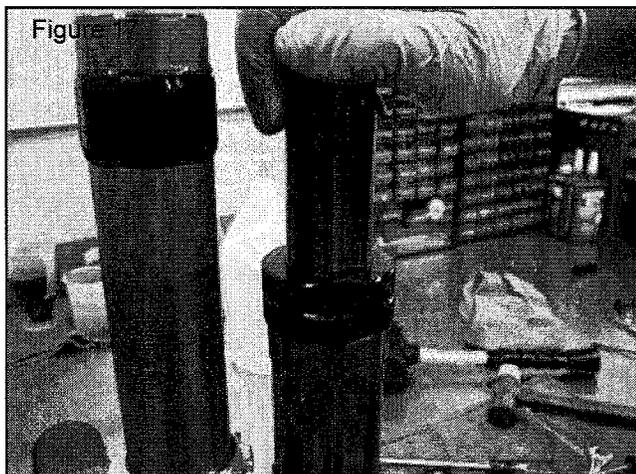
20. Add oil to the body tube until the surface of the oil is to the top of the threads inside the body tube.
21. Pull the damping piston up until it is just below the surface of the oil. Add more oil if necessary.
22. Hold the shaft eyelet with one hand. With other hand, slide the bearing assembly down the shaft until contact with the body is made. Oil will overflow from around the bearing (Figure 16).



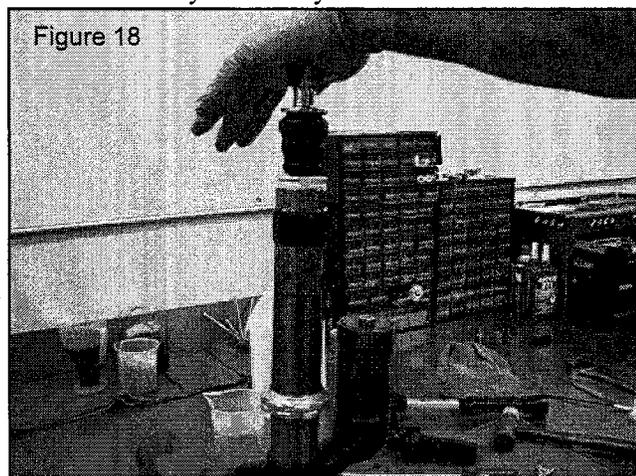
23. Screw the bearing assembly into the body tube by hand, holding the shaft so that the bearing is in contact with the bottom of the damping piston assembly. Be careful not to cross-thread the bearing assembly. When the bearing will no longer thread in by hand, turn the Compression Adjuster Screw all the way counter clockwise using the flat blade screwdriver.
24. Tighten the bearing assembly using the appropriate size open end wrench.
25. Set IFP depth tool to specified length for the correct IFP depth.

Shock IFP Depth:
Front: 3.40" (8.64 cm)
Rear: 3.40" (8.64 cm)

26. Insert IFP depth setting tool into reservoir and engage IFP. Using a long 1/8" hex tool, remove the bleed screw from the center of the IFP. TIP: Apply grease to the end of the hex tool so that the bleed screw sticks to it. This will make it easier to remove it from the IFP.
27. Push the IFP down to the correct depth setting. As you do this, keep the open end of the IFP depth setting tool covered with your hand. Oil will stream through the bleed hole in the IFP as you push it further into the reservoir (Fig. 17).

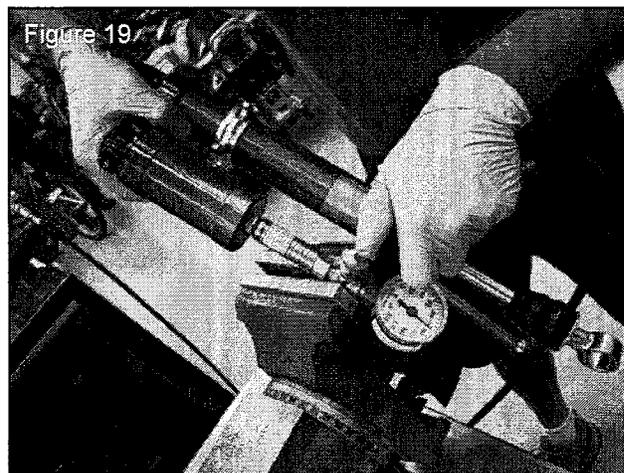


28. Install IFP bleed screw and tighten using the 1/8" hex tool. Remove the IFP depth setting tool. Pour the residual oil out of the reservoir tube into a proper disposal container.
29. Install the reservoir end cap with the FOX™ air valve facing the outside of the reservoir tube. Push down on the reservoir end cap using even pressure, until the retaining ring groove is exposed. Install the wire retaining ring, and check to make sure retaining ring is seated properly.
30. Push the shaft assembly completely into the body tube (Fig. 18). It should go all the way down smoothly and without interference. If it does not, disassemble and reassemble per this procedure. Do not attempt to pull the shaft assembly back out by hand.



31. If reservoir cap is not properly seated against the retaining clip, tap it gently with a rubber mallet until it snaps into place. Remove shock assembly from vise.
32. Securely clamp FOX™ Nitrogen Safety Needle in the vise. Be sure to point the air valve away from your face and body.
33. Insert the safety needle squarely into center of FOX™ air valve, and pressurize the reservoir. Continue filling until the shaft has fully extended and the reservoir pressure is at 200 psi (Fig. 19).

34. Continue charging with gas as you pull the reservoir away from the FOX™ Nitrogen Safety Needle using a smooth, straight motion. Keep the reservoir as straight as possible to prevent the safety needle from bending. As the safety needle is pulled free from the FOX™ air valve, a popping sound should be heard.



WARNING

CHARGE THE SHOCK USING NITROGEN GAS ONLY. DO NOT FILL WITH ANY OTHER GASES. Doing so compromises the performance of the shock and may be EXTREMELY DANGEROUS!

35. Install the nylon valve cap into the FOX™ air valve.
36. Remove the shock from the vise.
37. Clean all oil residue from the shock and reservoir with solvent, and dry with compressed air in a well ventilated area. If compressed air is not available, dry the shock and reservoir using clean, lint free paper towels and let sit in a well ventilated area to allow the solvents to evaporate.
38. Reinstall the spring and the spring retainer.
39. Thread the spring preload ring down against the spring, and set the preload to the measurement you took when you removed the spring.
40. Using the flat blade screwdriver, turn the Compression Adjuster Screw all the way clockwise until it stops. Now turn it counter clockwise while counting the clicks until it matches the original setting which you wrote down during disassembly.
41. Remove the shock from the vise.
42. Reinstall spherical bearing O-rings and reducers or polyurethane bushings and sleeves.

NOTE: After installation, be sure to RIDE SLOWLY initially to ensure the shock and the vehicle's suspension is performing correctly.

CHAPTER 6

CLUTCHING (PVT)

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CLUTCHING (PVT)

SPECIAL TOOLS AND SUPPLIES

TOOL DESCRIPTION	PART NUMBER
Drive Clutch Puller	2872085
Clutch Holding Wrench	9314177
Clutch Holding Fixture	2871358-A
Spider Jam Nut Socket	PU- 50578
Drive Clutch Spider Removal and Installation Tool	2870341
Roller Pin Tool	2870910
Clutch Bushing Replacement Tool Kit	2871226
Piston Pin Puller	2870386
Driven Clutch Compression Tool	PU-50518
Clutch Bushing Replacement Tool Kit	2871025

SPECIAL SUPPLIES	PART NUMBER
Loctite® 609™ and 263™	N/A
RTV Silicone Sealer	8560054

TORQUE SPECIFICATIONS

PVT System Fastener Torques

ITEM	TORQUE VALUE
Drive Clutch Retaining Bolt	96 ft. lbs. (130 Nm)
Driven Clutch Retaining Bolt	40 ft. lbs. (54 Nm)
PVT Inner Cover Bolts	12 ft. lbs. (16 Nm)
PVT Outer Cover Screws	45-50 in. lbs. (5-5.6 Nm)
Spider Jam Nut (Apply 263 Loctite)	250 ft. lbs. (339 Nm)
Drive Clutch Spider (Apply 263 Loctite)	280-300 ft. lbs. (379-406 Nm)
Drive Clutch Cover Plate	100 in. lbs. (12 Nm)

PVT SYSTEM OVERVIEW

General Operation

WARNING

All PVT maintenance or repairs should be performed by a certified Polaris Master Service Dealer (MSD) technician who has received the proper training and understands the procedures outlined in this manual. **Because of the critical nature and precision balance incorporated into the PVT components, it is absolutely essential that no disassembly or repair be made without factory authorized special tools and service procedures.**

The Polaris Variable Transmission (PVT) consists of three major assemblies:

- 1) The Drive Clutch
- 2) The Driven Clutch
- 3) The Drive Belt

The internal components of the drive clutch and driven clutch control engagement (initial vehicle movement), clutch upshift and backshift. During the development of the Polaris vehicle, the PVT system is matched first to the engine power curve; then to average riding conditions and the vehicle's intended usage. Therefore, modifications or variations of components at random are never recommended. Proper clutch setup and careful inspection of existing components must be the primary objective when troubleshooting and tuning.

Drive Clutch Operation

Drive clutches primarily sense engine RPM. The two major components which control its shifting function are the shift weights and the coil spring. Whenever engine RPM is increased, centrifugal force is created, causing the shift weights to push against rollers on the moveable sheave, which is held open by coil spring preload. When this force becomes higher than the preload in the spring, the outer sheave moves inward and contacts the drive belt. This motion pinches the drive belt between the spinning sheaves and causes it to rotate, which in turn rotates the driven clutch.

At lower RPM, the drive belt rotates low in the drive clutch sheaves. As engine RPM increases, centrifugal force causes the drive belt to be forced upward on drive clutch sheaves.

Driven Clutch Operation

Driven clutches primarily sense torque, opening and closing according to the forces applied to it from the drive belt and the transmission input shaft. If the torque resistance at the transmission input shaft is greater than the load from the drive belt, the drive belt is kept at the outer diameter of the driven clutch sheaves.

As engine RPM and horsepower increase, the load from the drive belt increases, resulting in the belt rotating up toward the outer diameter of the drive clutch sheaves and downward into the sheaves of the driven clutch. This action, which increases the driven clutch speed, is called upshifting.

Should the throttle setting remain the same and the vehicle is subjected to a heavier load, the drive belt rotates back up toward the outer diameter of the driven clutch and downward into the sheaves of the drive clutch. This action, which decreases the driven clutch speed, is called backshifting.

In situations where loads vary (such as uphill and downhill) and throttle settings are constant, the drive and driven clutches are continually shifting to maintain optimum engine RPM. At full throttle a perfectly matched PVT system should hold engine RPM at the peak of the power curve. This RPM should be maintained during clutch upshift and backshift. In this respect, the PVT system is similar to a power governor. Rather than vary throttle position, as a conventional governor does, the PVT system changes engine load requirements by either upshifting or backshifting.

PVT Break-In (Drive Belt / Clutches)

A proper break-in of the clutches and drive belt will ensure a longer life and better performance. Break in the clutches and drive belt by operating at slower speeds during the 10 hours as recommended (see Chapter 3 "Engine Break-In Period" for break-in example). Avoid aggressive acceleration and high speed operation during the break-in period.

Maintenance / Inspection

Under normal use the PVT system will provide years of trouble free operation. Periodic inspection and maintenance is required to keep the system operating at peak performance. The following list of items should be inspected and maintained to ensure maximum performance and service life of PVT components. Refer to the troubleshooting checklist at the end of this chapter for more information.

1. **Belt Inspection.**
2. **Drive and Driven Clutch Buttons and Bushings, Drive Clutch Shift Weights and Pins, Drive Clutch Spider Rollers and Roller Pins, Drive and Driven Clutch Springs.**
3. **Sheave Faces.** Clean and inspect for wear.
4. **PVT System Sealing.** Refer to the appropriate illustration(s) on the following pages. The PVT system is air cooled by fins on the drive and driven clutch stationary sheaves. The fins create a low pressure area in the crankcase casting, drawing air into the system through an intake duct. The opening for this intake duct is located at a high point on the vehicle (location varies by model). The intake duct draws fresh air through a vented cover. All connecting air ducts (as well as the inner and outer covers) must be properly sealed to ensure clean air is being used for cooling the PVT system and also to prevent water and other contaminants from entering the PVT area. This is especially critical on units subjected to frequent water forging.

CLUTCHING (PVT)

Overheating / Diagnosis

During routine maintenance, or whenever PVT system overheating is evident, it's important to check the inlet *and* outlet ducting for obstructions. Obstructions to air flow through the ducts will significantly increase PVT system operating temperatures. The vehicle should be operated in Low when extended low vehicle speed operation is anticipated.

CLUTCH DRIVE BELT & COVER RELATED ISSUES: DIAGNOSIS	
Possible Causes	Solutions / What to do
Loading the vehicle into a tall trailer when in high range.	Shift transmission to Low during loading of the vehicle to prevent belt burning.
Starting out going up a steep incline from a stopped position.	When starting out on an incline, use Low gear. Shift transmission to Low during loading of the vehicle to prevent belt burning.
Driving at low RPM or low ground speed (at approximately 3-7 MPH).	Drive at higher speed or use Low. The use of Low is highly recommended for cooler PVT operating temperatures and longer component life.
Insufficient engine warm-up when exposed to low ambient temperatures.	Warm engine at least 5 min., then with transmission in neutral, advance throttle to approx. 1/8 throttle in short bursts, 5 to 7 times. The belt will become more flexible and prevent belt burning.
Slow and easy clutch engagement.	Fast, effective use of the throttle for efficient engagement.
Stuck in mud or snow.	Shift the transmission to Low, carefully use fast, aggressive throttle application to engage clutch. WARNING: Excessive throttle may cause loss of control and vehicle overturn.
Climbing over large objects from a stopped position.	Shift the transmission to Low, carefully use fast, aggressive, brief throttle application to engage clutch. WARNING: Excessive throttle may cause loss of control and vehicle overturn.
Belt slippage from water or snow ingestion into the PVT system.	Remove the PVT drain plug. Shift the transmission to neutral. Using the throttle, vary the engine rpm from idle to full throttle. Repeat several times as required. During this procedure, the throttle should not be held at the full position for more than 10 seconds. Clutch seals should be inspected for damage if repeated leaking occurs.
Clutch malfunction.	Clutch component inspection should be performed by a Polaris MSD certified technician.
Poor engine performance.	Fouled spark plugs, foreign material in fuel tank, restricted fuel lines, or faulty fuel pump may cause symptoms similar to clutching malfunction.
GENERAL RANGE OPERATION GUIDELINES:	Low: Basic operational speeds less than 7 MPH, riding through rough terrain (swamps, mountains, ect.), or low ground speeds.
	High: High ground speeds, or speeds above 7 MPH.

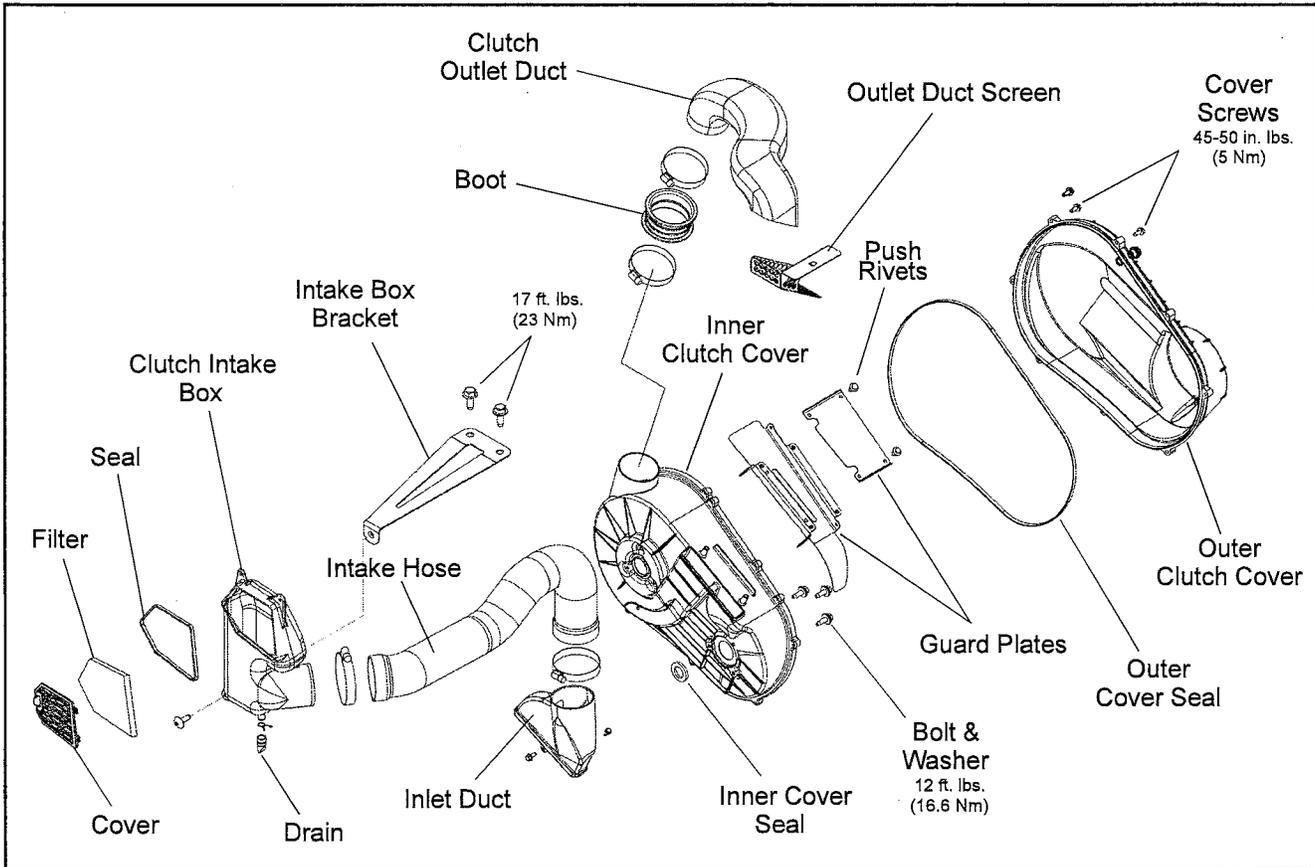
Operating in Low Gear

Low gear should be used when riding through rough terrain or when basic operational ground speeds are less than 7 MPH. Use High gear when basic operational ground speeds are more than 7 MPH.

IMPORTANT: Using High gear for heavy loads, hilly terrain, or in wet, muddy conditions will increase the chance of drive belt burning.

PVT SYSTEM SERVICE

PVT Covers and Ducting Components



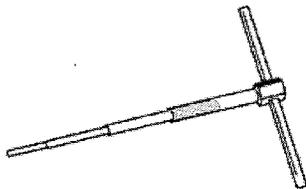
6

PVT Disassembly

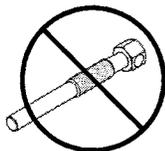
CAUTION

Correct Drive Clutch Puller P/N 2872085

2872085 - Correct Drive Clutch Puller For RZR XP 900



PA-48595 - Incorrect Drive Clutch Puller



1. Remove the seats and engine service panel (see chapter 5).
2. Place transmission in neutral.
3. Raise and support the vehicle.

CAUTION

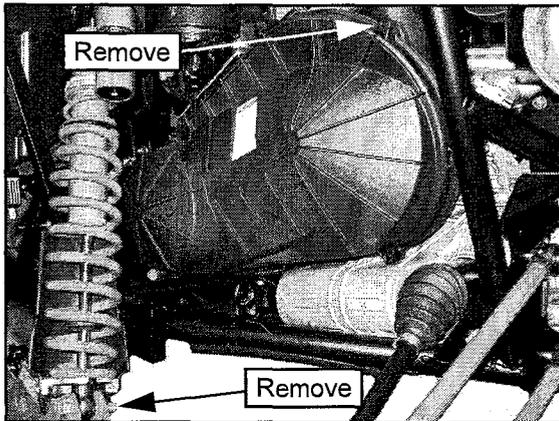
Serious injury may result if machine tips or falls. Be sure machine is secure before beginning this service procedure.

4. Remove the left rear wheel.
5. Remove the lower mounting bolt and nut from the left rear shock. Discard the nut.
6. Swing shock outward toward the front of the vehicle.

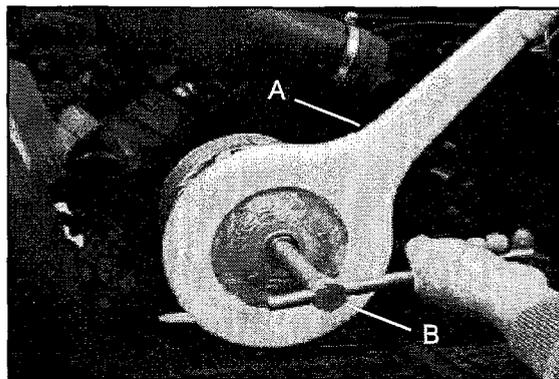
6.5

CLUTCHING (PVT)

- Remove the (8) clutch cover screws and remove the outer clutch cover from the vehicle.



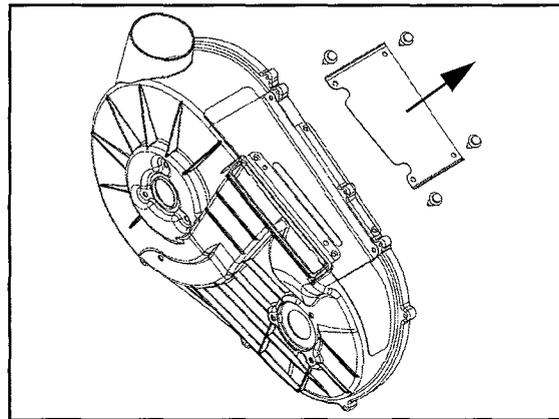
- Mark the drive belt direction of rotation and remove drive belt (see "DRIVE BELT - Belt Removal").
- Remove the driven clutch retaining bolt and driven clutch.
- Install the Drive Clutch Holder PN 9314177 (A).
- Remove the drive clutch retaining bolt and remove drive clutch using the Drive Clutch Puller 2872085 (B).



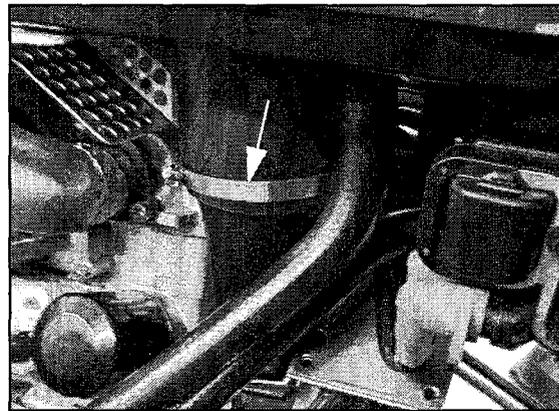
Drive Clutch Puller 2872085
Drive Clutch Holder 9314177

IMPORTANT: Be sure to use the correct Drive Clutch Puller (PN 2872085) to prevent damage to crankshaft.

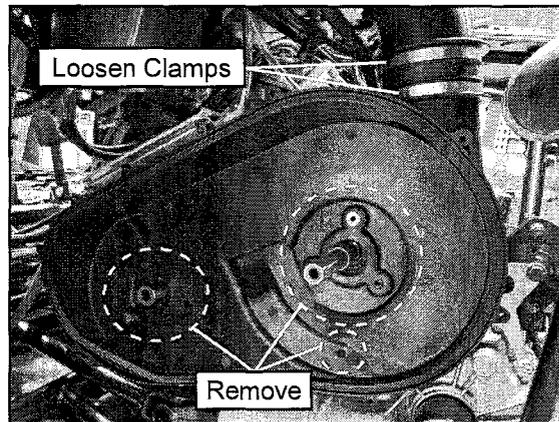
- Remove the (4) push rivets that secure the upper guard plate to the top of the inner PVT cover. Make note of the routing of the fuel lines, vent line, battery cable and wire harness for proper assembly.



- Loosen hose clamp attaching the PVT inlet duct to the inner clutch cover. Disengage hose from the inner clutch cover.



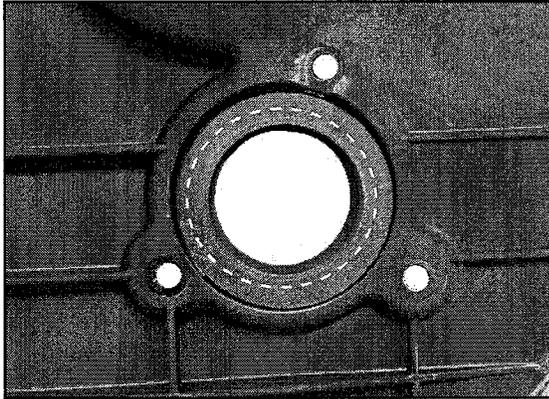
- Loosen the hose clamps that attach the clutch outlet duct to the inner clutch cover. Disengage the hose from the cover.



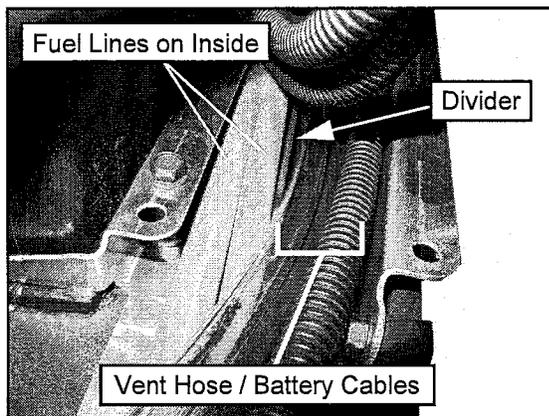
- Remove the (7) bolts that retain the inner clutch cover to the engine and transmission. Remove inner clutch cover.

PVT Assembly

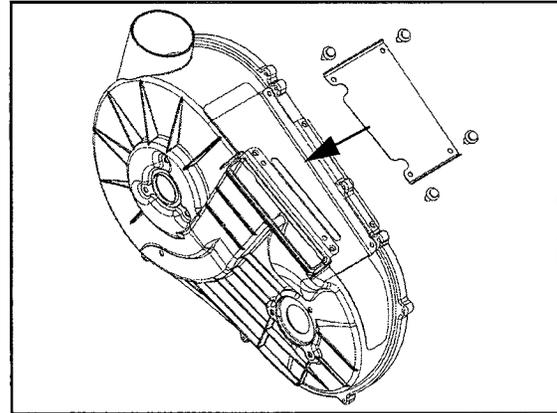
1. Inspect inner clutch cover. Replace if cracked or damaged.
2. Inspect the seal on the transmission input shaft. Replace if damaged.
3. Inspect inner clutch cover seal (engine side). Replace if cracked, torn or damaged.



4. Install and properly align the inner clutch cover. Be sure the fuel line, vent line and battery cables are properly routed through the guard plate as shown.



5. Install the (4) push rivets that secure the protective cover to the top of the inner PVT cover.



6. Install the (4) inner clutch cover bolts and washers that retain the cover to the transmission. Torque bolts to specification.
7. Install the (3) inner clutch cover bolts and washers that retain the cover to the engine. Torque bolts to specification.



**Inner Clutch Cover Bolts:
12 ft. lbs. (16.6 Nm)**

6

8. Clean the splines inside the driven clutch and on the transmission input shaft.
9. Apply a light film of grease to the splines on the shaft.
10. Install the driven clutch, washer and retaining bolt. Torque to specification.



**Driven Clutch Retaining Bolt:
40 ft. lbs. (54 Nm)**

11. Clean the end of the taper on the crankshaft and the tapered bore inside the drive clutch.
12. Install drive clutch onto the engine and torque retaining bolt to specification.



**Drive Clutch Retaining Bolt:
96 ft. lbs. (130 Nm)**

CLUTCHING (PVT)

- 13. Install the drive belt noting direction of belt rotation (see "DRIVE BELT - Belt Installation"). If a new belt is installed, install so numbers can be easily read.
- 14. Install a new outer clutch cover seal with the colored stripe facing the inner clutch cover.
- 15. Reinstall outer clutch cover and secure with screws. Torque screws to specification.

 = T
Outer Clutch Cover Retaining Screws: 45-50 in. lbs. (5.5 Nm)

- 16. Install the clutch inlet and outlet ducts and tighten the hose clamps.
- 17. Install the left rear shock lower mounting bolt and the left rear wheel. Torque fasteners to specification.

 = T
Rear Shock Mounting Bolt: 70 ft. lbs. (95 Nm)

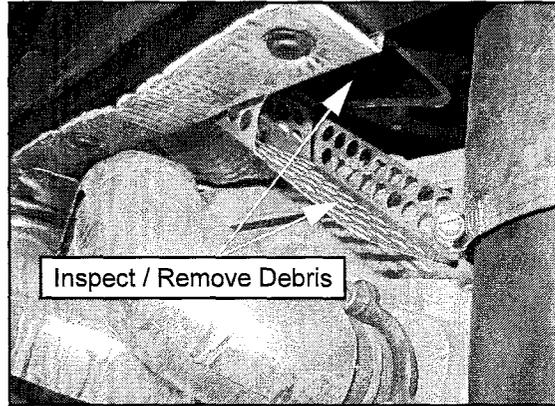
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Wheel Nuts: 30 ft. lbs. (41 Nm) + 90° (1/4 turn)

- 18. Install engine service panel and both seats.

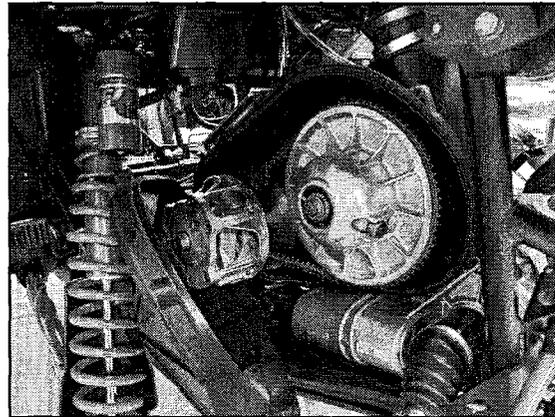
DRIVE BELT

Belt Removal

IMPORTANT: Inspect the entire clutch outlet duct (including the outlet duct screen) when replacing a drive belt. Remove any debris found in the outlet duct or outlet duct screen.



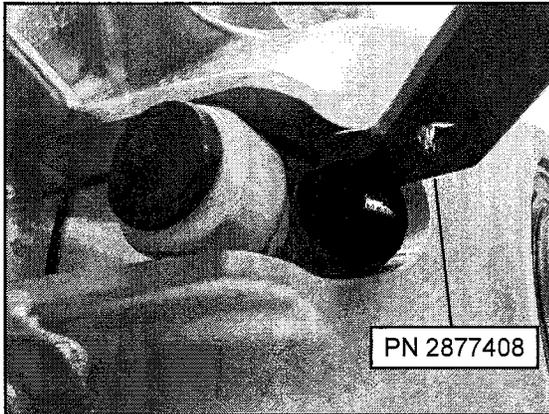
- 1. Remove the (8) screws that retain the outer clutch cover.
- 2. Maneuver the outer clutch cover outward as shown below to access the drive belt.



NOTE: Removal of left rear wheel or left rear shock is NOT necessary for belt replacement.

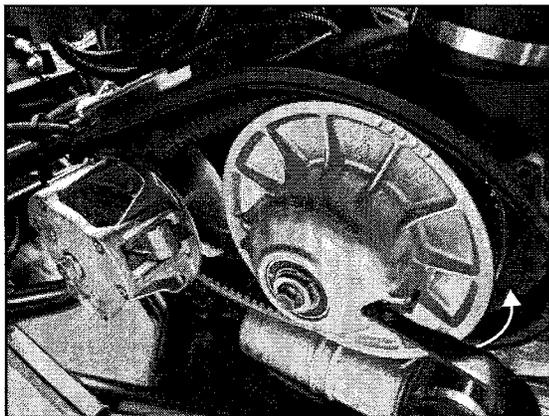
- 3. Mark the drive belt direction of rotation so that it can be installed in the same direction.

4. Insert the belt removal tool (PN 2877408) into the driven clutch as shown (tool included with vehicle's tool kit).



NOTE: Make sure the tool is square with the moveable sheave surface of the driven clutch.

5. Rotate the tool towards the clutch to open the sheaves.



6. Walk the belt out of the driven clutch and drive clutch. Remove the belt from the vehicle.

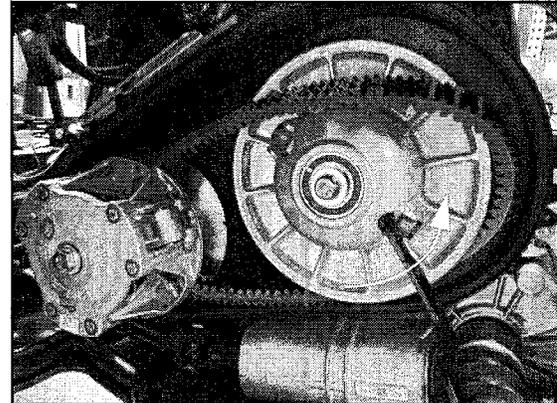
Belt Inspection

1. Inspect belt for hour glassing (extreme circular wear in at least one spot and on both sides of the belt). Hour glassing occurs when the drive train does not move and the drive clutch engages the belt.
2. Inspect belt for loose cords, missing cogs, cracks, abrasions, thin spots, or excessive wear. Compare belt measurements with a new drive belt. Replace if necessary.
3. Belts with thin spots, burn marks, etc., should be replaced to eliminate noise, vibration, or erratic PVT operation. See the Troubleshooting Chart at the end of this chapter for possible causes.

Belt Installation

NOTE: Be sure to install belt in the same direction as it was removed.

1. With the belt removal tool installed (PN 2877408), loop the belt over the drive clutch and over the driven clutch.



2. Rotate the driven clutch and walk the belt into the clutch.
3. Remove the belt removal tool from driven clutch
4. Rotate / spin the driven clutch and belt approximately 5-7 times to properly seat the belt in the driven clutch.
5. Install the outer clutch cover and (8) screws. Torque screws to specification.

6



**Outer Clutch Cover Retaining Screws:
45-50 in. lbs. (5.5 Nm)**

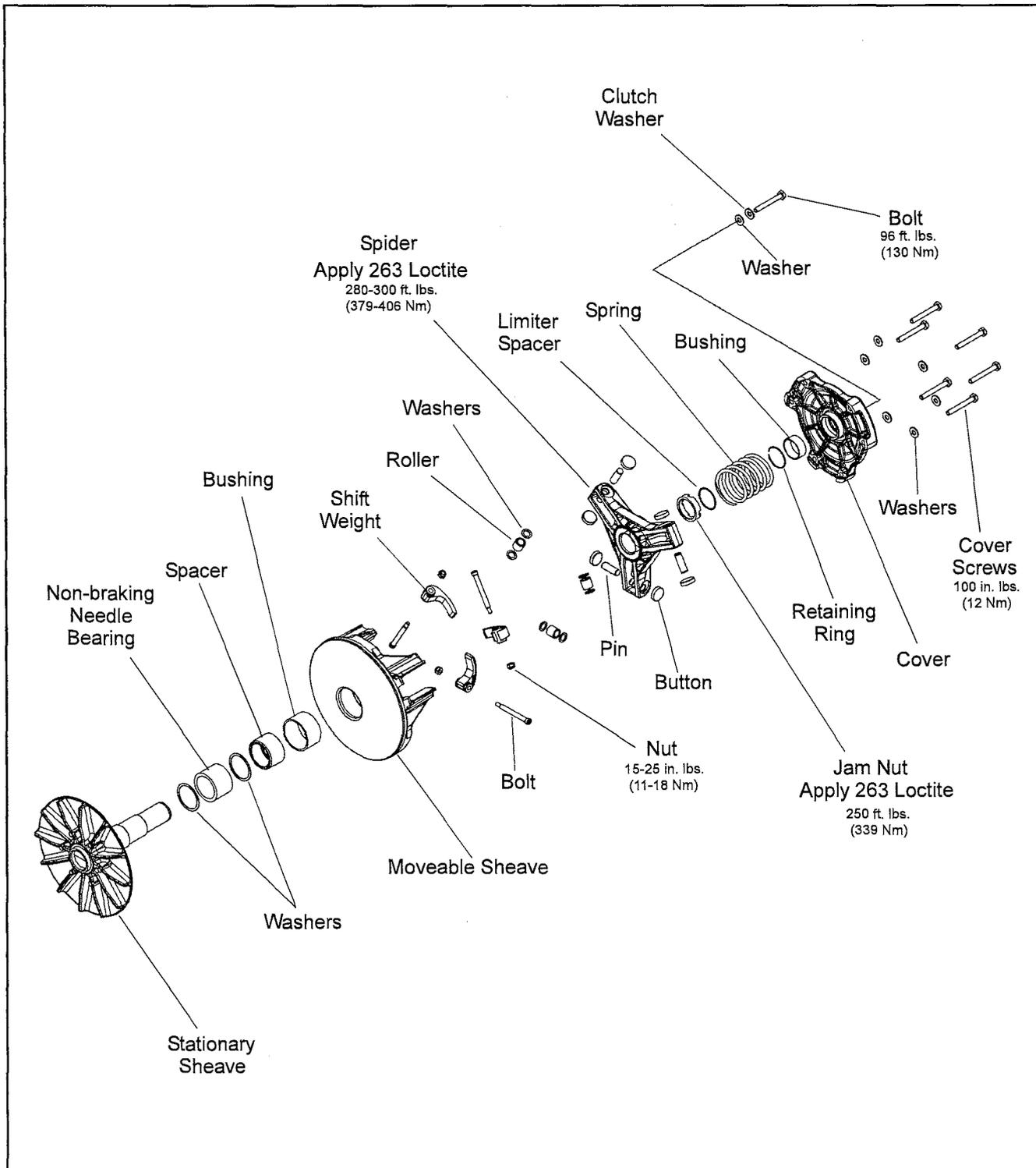
PVT Break-In (Drive Belt / Clutches)

A proper break-in of the clutches and drive belt will ensure a longer life and better performance. Break in the clutches and drive belt by operating at slower speeds during the 10 hour break-in period as recommended (see Chapter 3 "Engine Break-In Period" for break-in example). Pull only light loads. Avoid aggressive acceleration and high speed operation during the break-in period.

CLUTCHING (PVT)

DRIVE CLUTCH SERVICE

Drive Clutch Exploded View

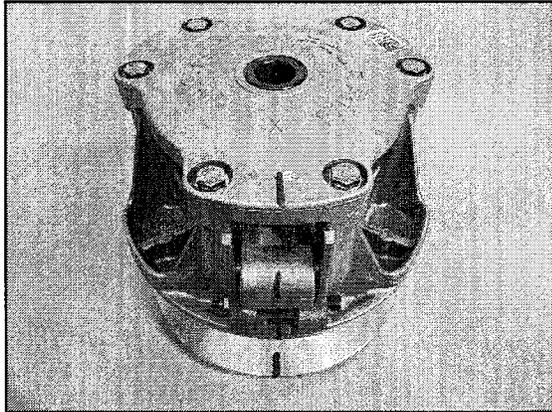


Drive Clutch Disassembly / Inspection

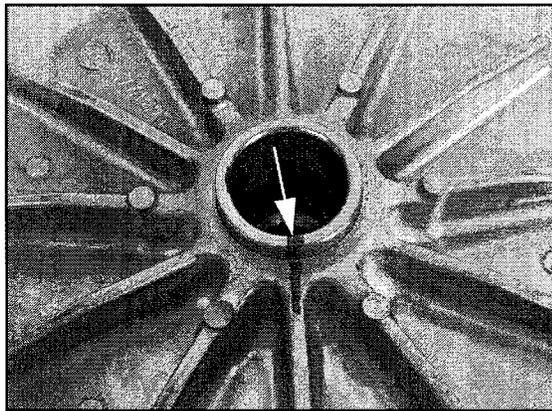
WARNING

The clutch assembly is a precisely balanced unit. Never replace parts with used parts from another clutch assembly!

- Using a permanent marker, mark the cover, spider, moveable and stationary sheaves for reference, as the cast in X's may not have been in alignment before disassembly.



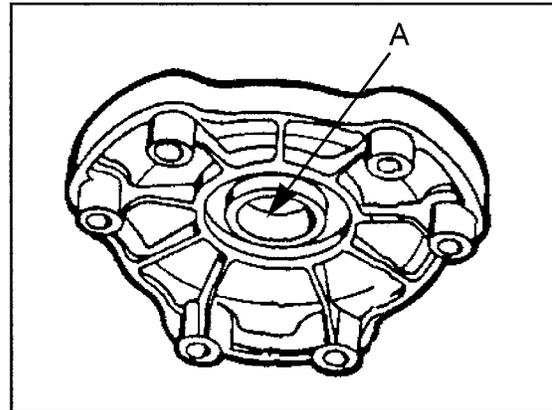
- Mark the stationary sheave and clutch shaft to verify the shaft has not rotated in the sheave after tightening the spider during clutch assembly.



IMPORTANT: Upon reassembly, if the reference marks created in step 2 (illustrated below) are not in alignment, the clutch will not be in balance and the assembly **MUST** be replaced.

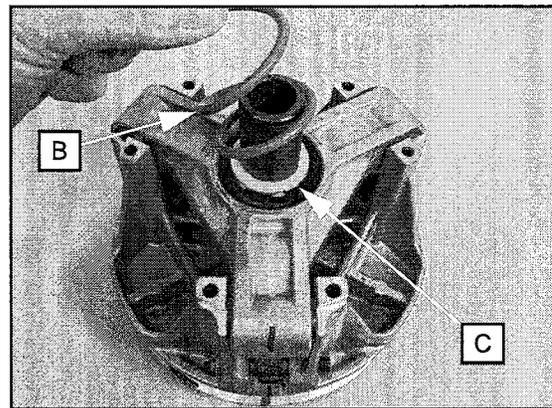
- Remove cover bolts evenly in a cross pattern and remove cover plate.

- Inspect cover bushing (A). The outer cover bushing is manufactured with a Teflon™ coating. Wear is determined by the amount of Teflon™ remaining on the bushing.



Cover Bushing Inspection:
Replace the cover bushing if more brass than Teflon™ is visible on the bushing. Refer to bushing replacement in this chapter.

- Inspect area on shaft where bushing rides for wear, galling, nicks, or scratches. Replace clutch assembly if worn or damaged.
- Remove and inspect the clutch spring (B). Refer to “Drive Clutch Spring Inspection”.



- Remove and inspect limiter spacer (C). Replace if necessary.

CAUTION

DO NOT reassemble the drive clutch without the limiter spacer. Belt life will be greatly reduced.

CLUTCHING (PVT)

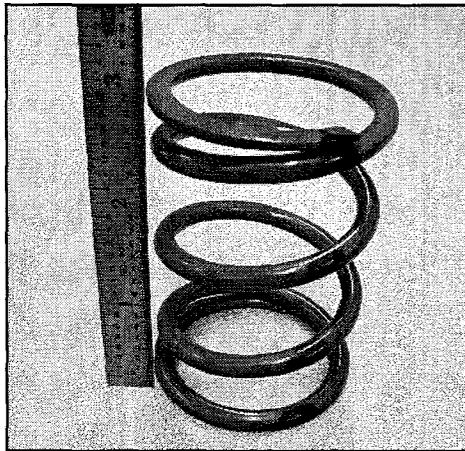
Drive Clutch Spring Inspection

CAUTION

Never shim a drive clutch spring to increase its compression rate. This may result in complete stacking of the coils and subsequent clutch cover failure.

The drive clutch spring is one of the most critical components of the PVT system. It is also one of the easiest to service. Due to the severe relaxation the spring is subject to during operation, it should always be inspected for tolerance limits during any clutch operation diagnosis or repair.

With the spring resting on a flat surface, measure its free length from the outer coil surfaces. Also check to see that spring coils are parallel to one another. Distortion of the spring indicates stress fatigue, requiring replacement.

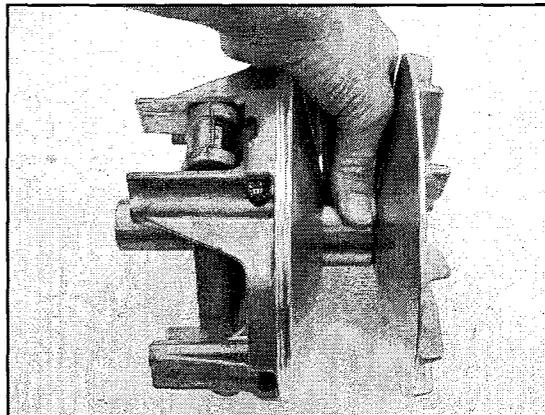


Drive Clutch Spring Specifications

Color	Blue with Yellow Stripe
Free Length	2.65" (67.342 mm)
Spring Rate	125 lb/in (43 kg/mm)
Wire Diameter	0.187" (4.75mm)

Needle Bearing Inspection

1. Rotate the clutch bearing in both clockwise and counter-clockwise directions. The non-braking needle bearing should rotate in both directions on the shaft with only a slight amount of drag.
2. Verify there is no binding or rough spots. If problems are noted continue with disassembly.



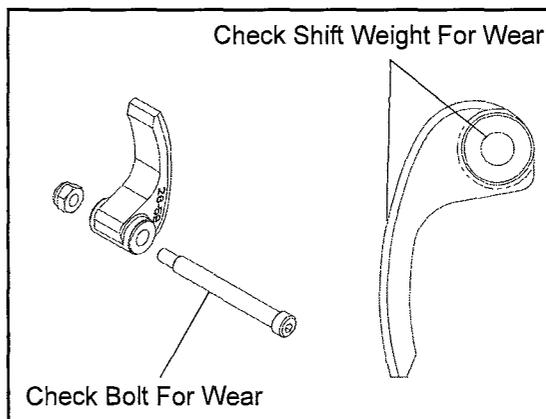
Shift Weight Inspection

1. Remove shift weight bolts and weights. Inspect the contact surface of each weight. The surface should be smooth and free of dents or gall marks. Inspect the weight pivot bore and bolts for wear or galling. If weights or bolts are worn or broken, replace in sets of three with new bolts and nuts.

WARNING

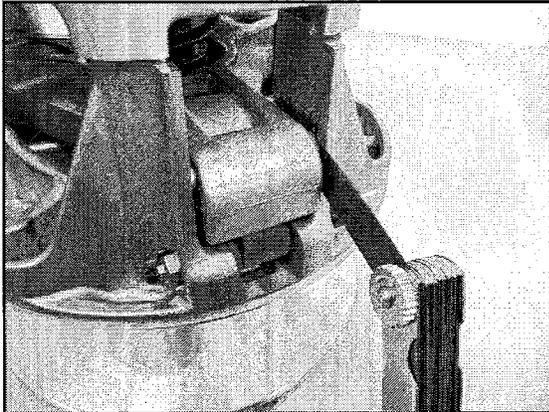
The clutch assembly is a precisely balanced unit. Never replace parts with used parts from another clutch assembly!

NOTE: A damaged shift weight is usually caused by a damaged or stuck roller in the spider assembly. See "Drive Clutch Roller Pin and Button Service".



Button To Tower Clearance Inspection

1. Inspect the button to tower clearance as shown. Replace the drive clutch if clearance is beyond specification.

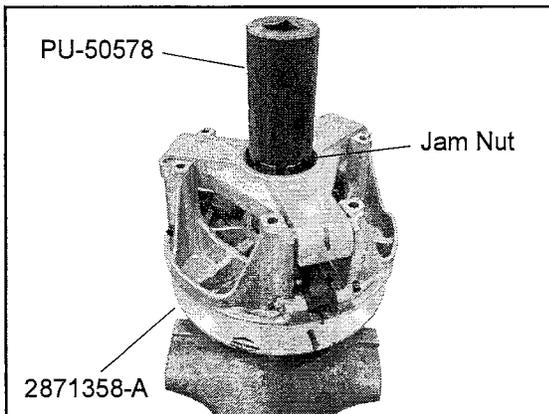


Button to Tower Clearance:
.000-.012 (.000-.304 mm)

2. Inspect the tower sheave surfaces. Replace the drive clutch if worn, damaged or cracked.

Spider Removal

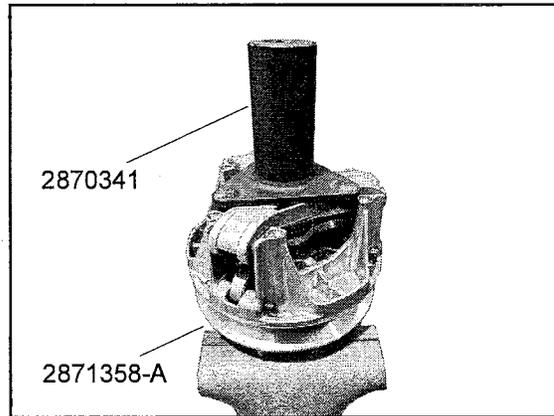
1. Install clutch onto holding fixture (2871358-A) and secure in bench vice. Loosen and remove the spider jam nut (counterclockwise) using the Clutch Spider Nut Socket (PU-50578).



Clutch Spider Nut Socket
(PU-50578)

Clutch Holding Fixture:
(PN 2871358-A)

2. Loosen and remove the spider (counterclockwise) using Clutch Spider Removal / Installation Tool (PN 2870341).

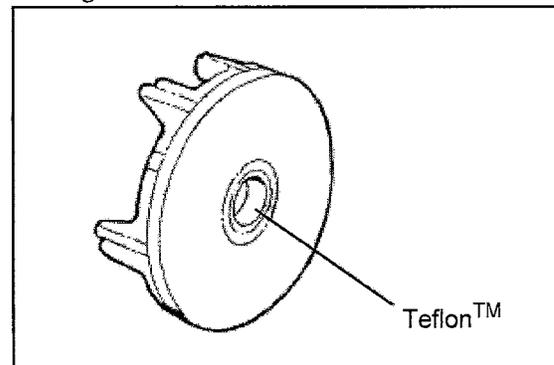


Spider Removal / Installation Tool:
(PN 2870341)

Clutch Holding Fixture:
(PN 2871358-A)

Moveable Sheave Bushing Inspection

3. Inspect the Teflon™ coating on the moveable sheave bushing.



Moveable Sheave Bushing Inspection:

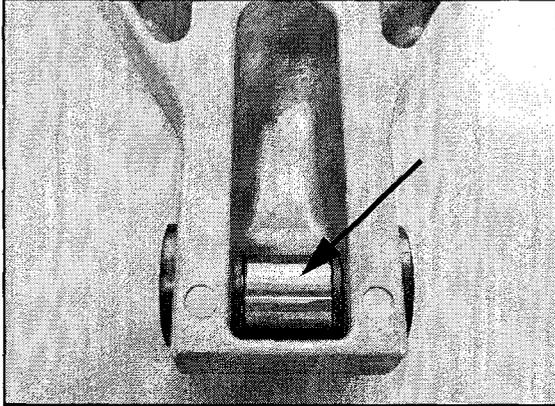
Replace the cover bushing if more brass than Teflon is visible on the bushing.

Refer to bushing replacement in this chapter.

CLUTCHING (PVT)

Roller, Pin, and Thrust Washer Inspection

1. Inspect all rollers, roller bushings and roller pins by pulling a flat metal rod across the roller.
2. Turn roller with your finger. If you notice resistance, galling, or flat spots, replace the drive clutch.

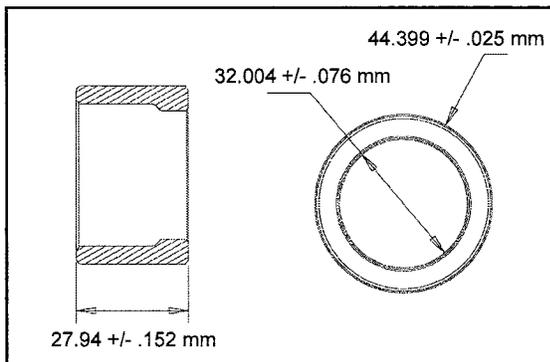
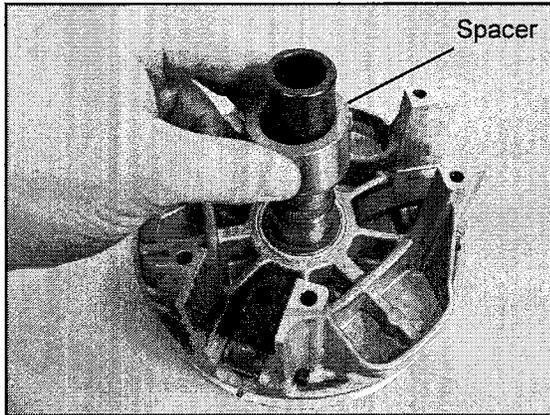


NOTE: Rollers, pins, thrust washers and buttons are not serviceable at the time of this publication.

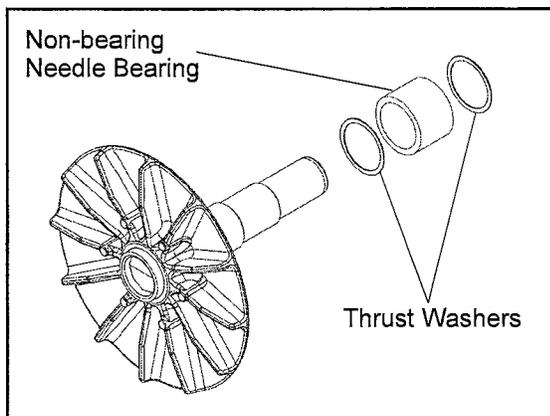
Clutch Inspection

NOTE: Remove cover, spring, limiter spacer and spider following the instructions for drive clutch disassembly, then proceed as follows:

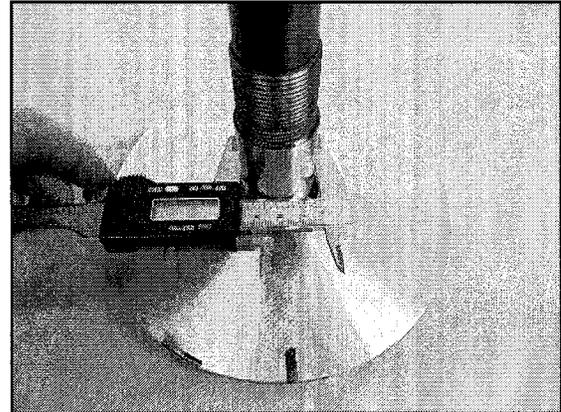
1. Remove and inspect the moveable sheave spacer. Visually inspect the spacer for damage and replace if necessary.



2. Remove the moveable clutch sheave.
3. Lift the bearing and thrust washers off the shaft. Replace as an assembly if worn, damaged, or if operational problems were noted prior to disassembly.



4. Inspect surface of shaft for pitting, grooves or damage. Measure the outside diameter and compare to specifications. Replace the drive clutch assembly if shaft is worn or damaged.



$$\frac{\text{In.}}{\text{mm}} = \text{In. / mm.}$$

Shaft Diameter:
Standard: 1.3725" - 1.3712"
(34.8615 - 34.8488 mm)
Service Limit: 1.3704" (34.8088 mm)

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5. Visually inspect the thrust washers for damage. Measure the thickness and compare to specification. Replace if worn or damaged.

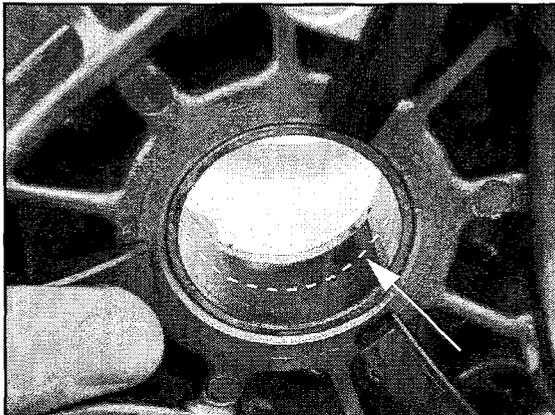
$$\frac{\text{In.}}{\text{mm}} = \text{In. / mm.}$$

Thrust Washer Thickness:
Standard: .030" (.76 mm)
Service Limit: .025" (.64 mm)

CLUTCHING (PVT)

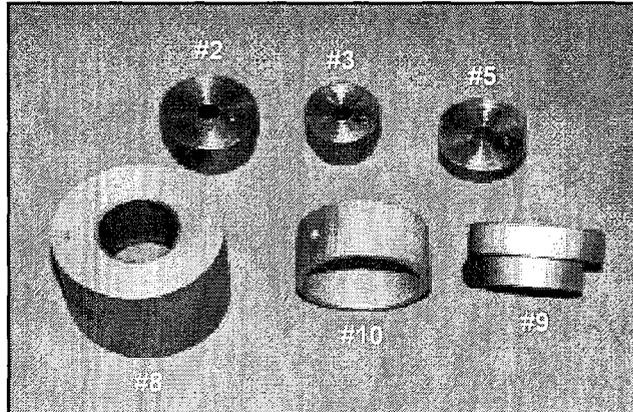
Moveable Sheave Bushing Inspection

Inspect the Teflon™ coating (arrow) on the moveable sheave bushing. Inspect both sheaves for signs of wear, grooving or cracking. De-glaze sheave surfaces with a 3M™ Scotch-Brite Pad if needed.



Moveable Sheave Bushing Inspection:
 Replace the cover bushing if more brass than Teflon™ is visible on the bushing.
 Refer to bushing replacement in this chapter.

*Clutch Bushing Replacement Tool Kit (PN 2871226)



Item	Qty.	Part Description	Part #
#2	1	P-90 Drive/Driven Clutch Bushing Install Tool	5020628
#3	1	Drive Clutch Cover Bushing Removal/Installation Tool (all clutches)	5020629
#5	1	P-90 Driven Clutch Cover Bushing Removal Tool	5020631
#8	1	Main Puller Adapter	5020632
#9	1	Adapter Reducer	5010279
#10	1	Number Two Puller Adapter	5020633

Bushing Service

IMPORTANT: Special Tools Required

EBS Clutch Bushing Tool Kit - 2201379

Item	Qty.	Part Description	Part #
A, B	1	EBS Puller Tool	5132027
C	1	EBS Puller Nut	5132501
D	1	EBS Main Adapter	5132029
E	1	EBS Bushing Removal Tool	5132028
--	1	Instructions	9915111

Additional Special Tools

Qty.	Part Description	Part #
1	Clutch Bushing Replacement Tool Kit	2871226
1	Piston Pin Puller	2870386

NOTE: Bushings are installed at the factory using Loctite™ 609. In order to remove bushings it will be necessary to apply heat evenly to the area around each bushing. Clean all residual Loctite™ from bushing bore prior to installing new bushing.

⚠ CAUTION

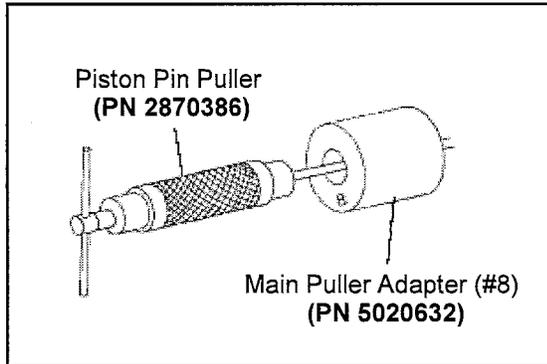
Clutch components will be hot! In order to avoid serious burns, wear insulated gloves during the removal process.

Moveable Sheave - Bushing Removal

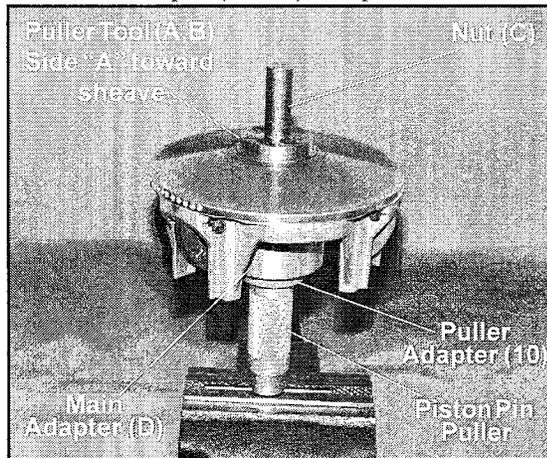
1. Remove clutch as outlined previously in this chapter.
2. Install handle end of the Piston Pin Puller (PN 2870386) securely into bench vise and lightly grease puller threads.

Piston Pin Puller (PN 2870386)

3. Remove nut from puller rod and set aside.



4. Install puller adapter (Item 10 from kit PN 2871226).
5. Install main adapter (Item D) onto puller.



6. With towers pointing toward the vise, slide sheave onto puller rod.
7. Install removal tool (Item A, B) into center of sheave with "A side" toward sheave.

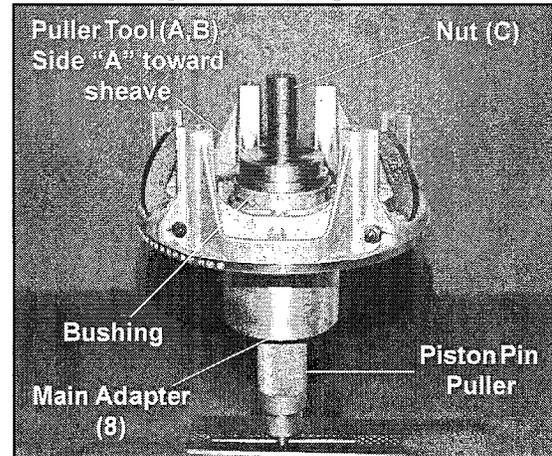
NOTE: Use Bushing Tool PA-47336.

8. Install nut (C) onto end of puller rod and hand tighten. Turn puller barrel to increase tension on sheave if needed. Using a hand held propane torch, apply heat around outside of bushing until tiny smoke tailings appear.

9. Turn sheave counterclockwise on puller rod until it comes free. Lift sheave off puller.
10. Remove nut from puller rod and set aside.
11. Pull bushing removal tool and adapter from puller rod. Remove bushing from tool and discard.

Moveable Sheave - Bushing Installation

1. Place main adapter (Item 8) on puller.

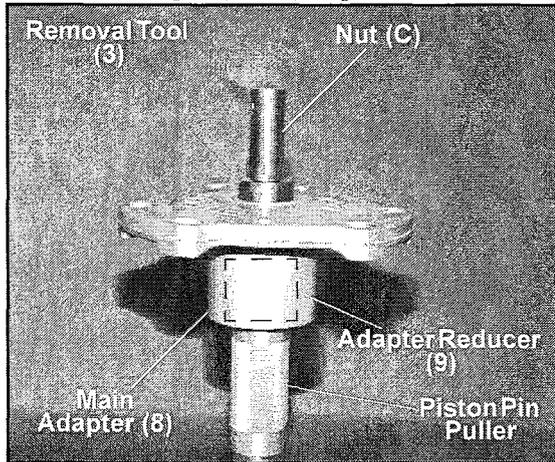


2. Apply Loctite™ 609 evenly to bushing bore inside moveable sheave.
3. Set bushing in place on sheave.
4. Insert installation puller tool (Item A/B) with "A" side down, into center of bushing.
5. With towers pointing upward, slide sheave, bushing and tool onto puller rod.
6. Install nut on puller rod and hand tighten. Turn barrel to apply additional tension if needed.
7. Turn sheave counterclockwise, making sure bushing is drawn straight into bore. Continue until bushing is seated.
8. Remove nut from puller rod and set aside.
9. Remove sheave from puller.
10. Remove installation tool.

CLUTCHING (PVT)

Cover Bushing Removal

1. Install main adapter (Item 8) on puller.



2. Install adapter reducer (Item 9).
3. From outside of clutch cover, insert removal tool (Item 3) into cover bushing.
4. With inside of cover toward vise, slide cover onto puller.
5. Install nut onto puller rod and hand tighten. Turn puller barrel to increase tension as needed.
6. Turn clutch cover counterclockwise on puller rod until bushing is removed and cover comes free.
7. Remove nut from puller rod and set aside.
8. Remove bushing and bushing removal tool from puller. Discard bushing.

Cover Bushing Installation

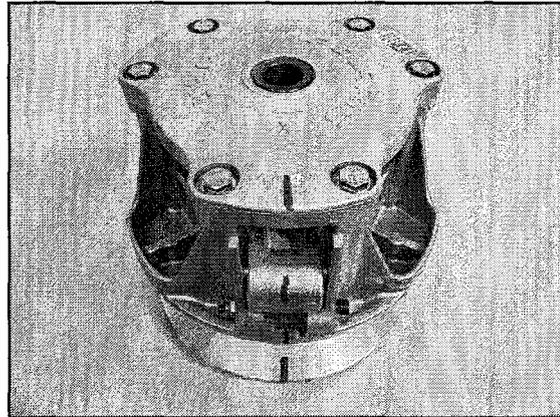
1. Apply Loctite™ 609 evenly to bushing bore in cover.
2. Working from inside of cover, insert new bushing and bushing installation tool into center of clutch cover.
3. With main adapter on puller, insert cover onto puller rod, placing outside of cover toward vise.
4. Install nut on rod and hand tighten. Turn puller barrel to apply more tension if needed.
5. Turn clutch cover counterclockwise on puller rod until bushing is seated.
6. Remove nut from puller rod. Take installation tool and clutch cover off rod.

Drive Clutch Assembly



Do not apply oil or grease to the bushings.

Reassemble the drive clutch in the following sequence. Be sure marks that were made during disassembly are aligned during each phase of assembly.

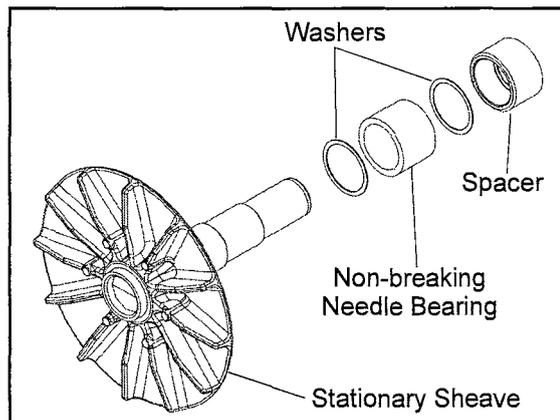


1. Install the shift weights, bolts and nuts onto the moveable sheave. Torque shift weight bolts to specification.

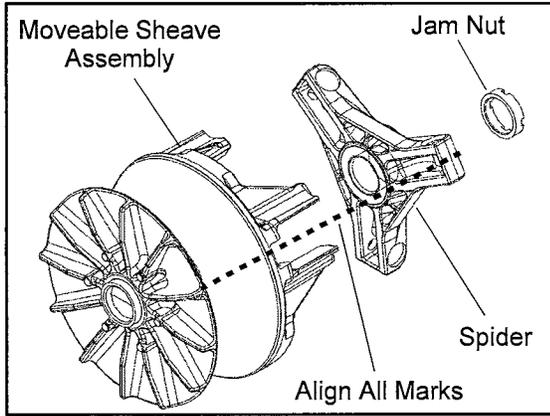


Shift Weight Bolts:
15-20 in. lbs. (11-18 Nm)

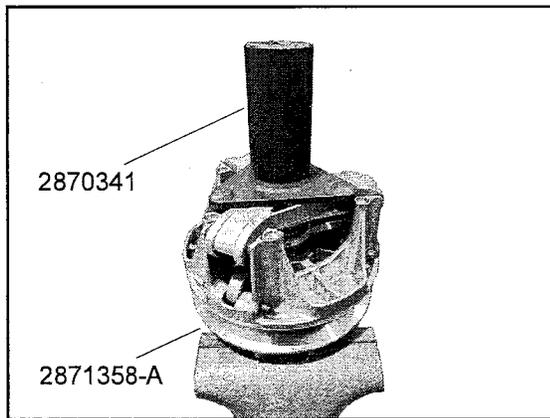
2. Install the non-braking needle bearing, the (2) washers and the spacer onto the stationary sheave.



3. Install moveable sheave onto stationary sheave shaft. Be sure the moveable sheave slides freely on the spacer.
4. Apply Loctite® 263™ to the spider threads.
5. Install the spider assembly onto the shaft threads. Be sure all of the alignment marks are in alignment.



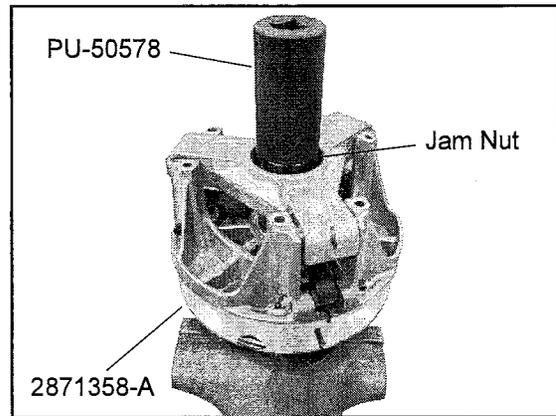
6. Install clutch onto holding fixture (PN 2871358-A) and secure in a bench vice. Tighten the spider using Clutch Spider Tool (PN 2870341). Torque spider to specification.



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Spider Assembly:
280 - 300 ft. lbs. (379 - 406 Nm)
Apply Loctite® 263™ to threads

7. Apply Loctite® 263™ to the threads of the spider jam nut. Install spider jam nut onto stationary shaft threads.
8. Tighten the spider jam nut using Clutch Spider Nut Socket (PU-50578). Torque jam nut to specification.

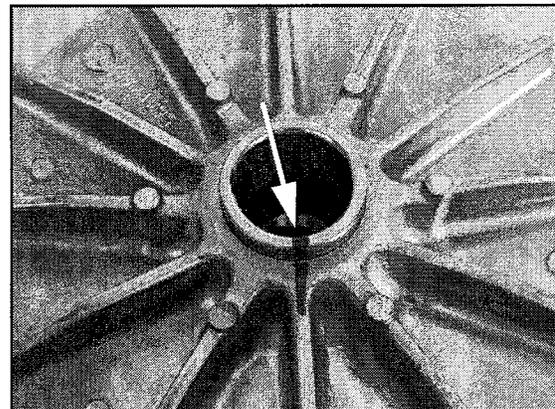


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Spider Jam Nut:
250 ft. lbs. (339 Nm)
Apply Loctite® 263™ to threads

9. After the spider and jam nut have been torqued, remove the clutch assembly from the holding fixture and inspect the alignment marks made during disassembly.

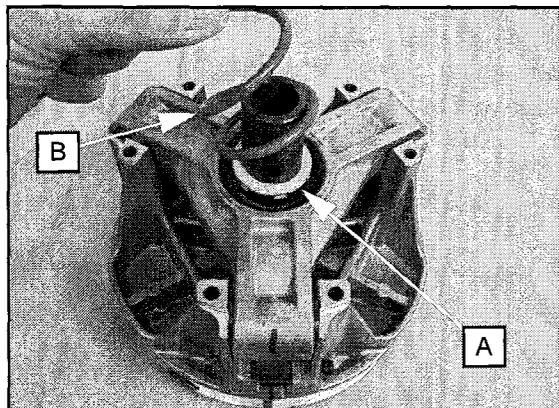
IMPORTANT: If the marks illustrated below are not in alignment upon assembly, the clutch will not be in balance and the drive clutch assembly must be replaced.



6

CLUTCHING (PVT)

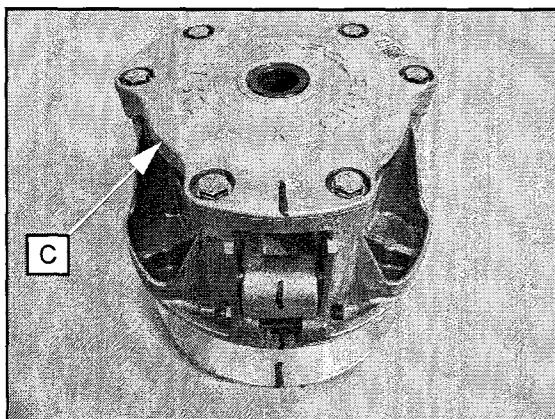
10. Install the limiter spacer (A) and the clutch spring (B).



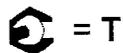
⚠ CAUTION

DO NOT reassemble the drive clutch without the limiter spacer. Belt life will be greatly reduced.

11. Install the drive clutch cover (C). Be sure all alignment marks are in alignment.



12. Install cover bolts and torque in a cross pattern evenly to specification.

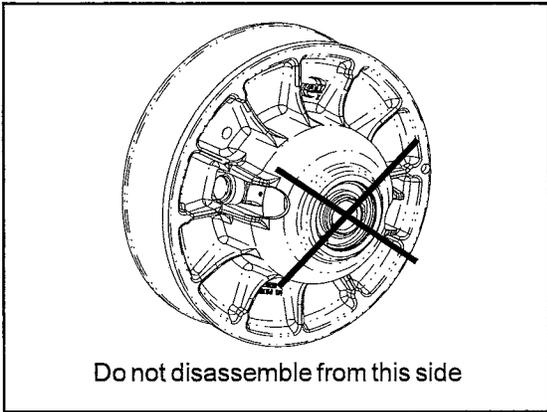


Drive Clutch Cover Bolts:
100 in. lbs. (12 Nm)

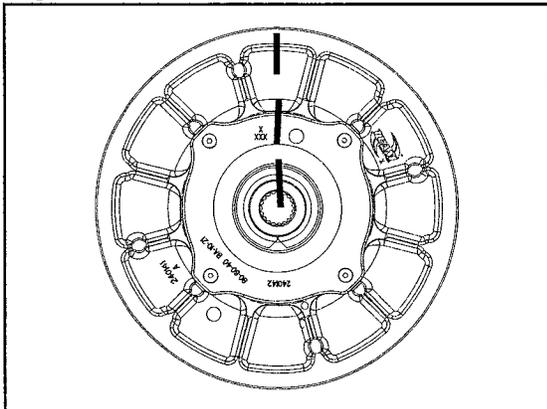
DRIVEN CLUTCH SERVICE

Clutch Disassembly

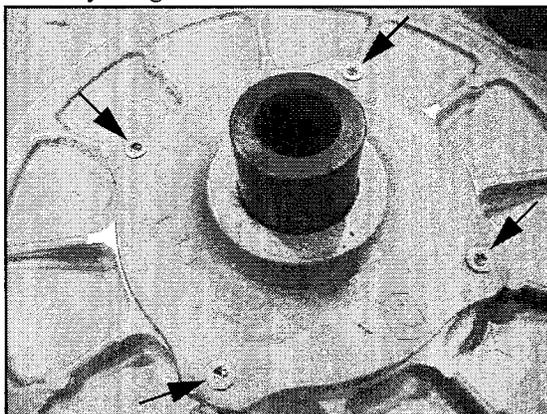
1. Remove driven clutch from the transmission input shaft. Do not attempt disassembly of the driven clutch from the outside snap ring. The driven clutch must be disassembled from the helix side.



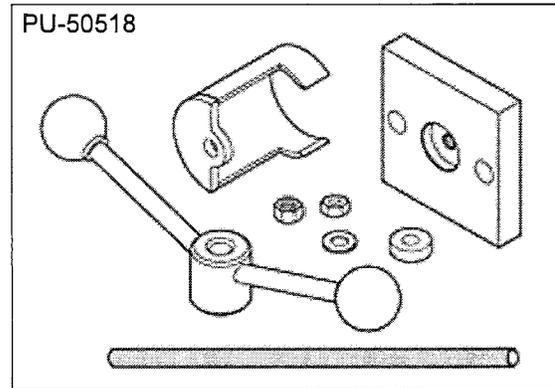
2. It is important to mark the position of the shaft, cam cover, and sheave before disassembly or use the X's on the components for reference. This will aid in reassembly and helps to maintain clutch balance after reassembly.



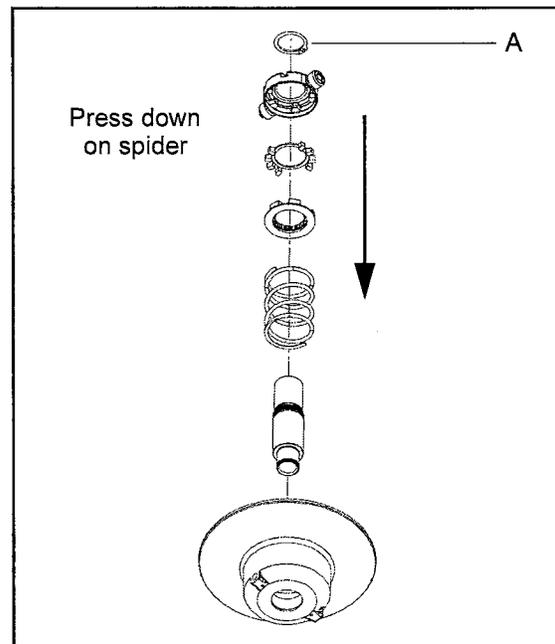
3. Remove the four screws that secure the cam (helix) assembly using a T25 Torx driver.



4. Place the clutch into the Driven Clutch Compression Tool PU-50518.



5. Press down on the top of the spider assembly, pushing the spider onto the shaft. Remove snap ring (A) and slowly release the assembly.

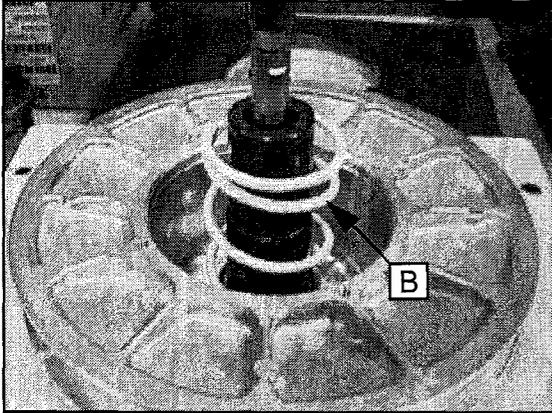


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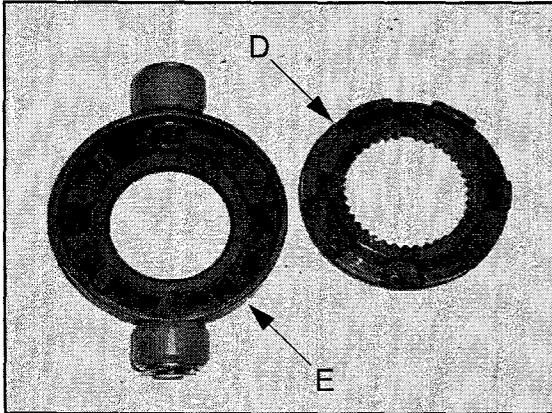
CLUTCHING (PVT)

6. Remove the spider assembly and spring (B).

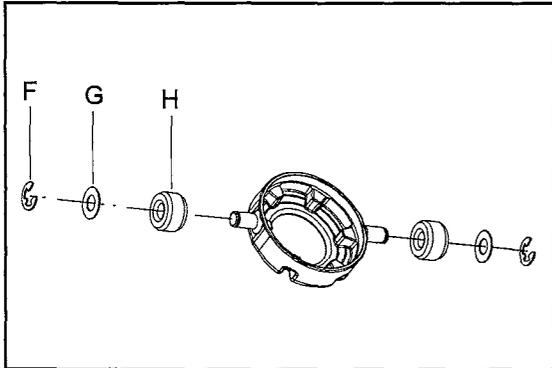
NOTE: Spring is compression only and has no torsional wind.



7. Remove the inside spider plate (D) and spider dampener (E). Inspect the spider dampener (E) for wear and replace if needed.

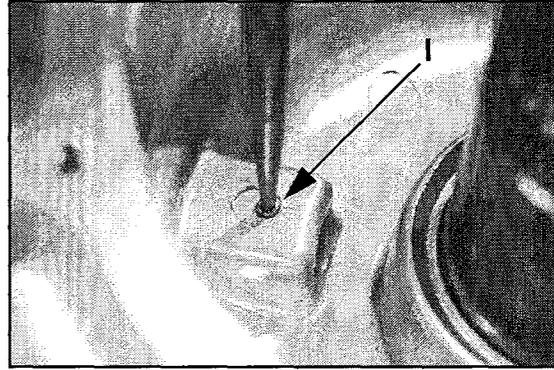


8. Remove the E-clips (F), washers (G), and the clutch rollers (H). Inspect the rollers for wear; replace if worn.

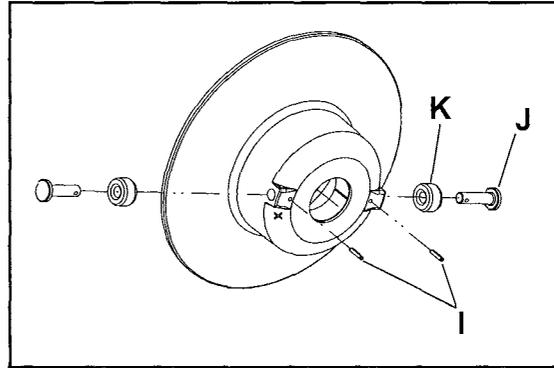


9. Remove the clutch assembly from the holding tool.

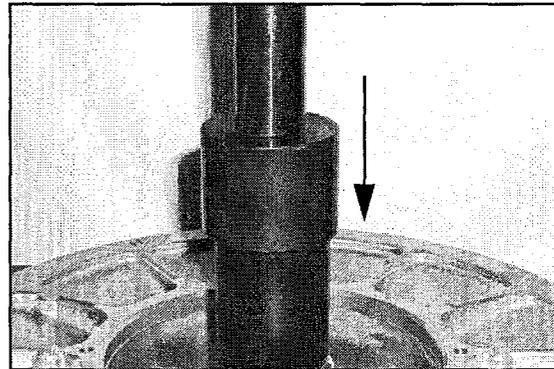
10. Press out the spring pins (I) in the inner sheave.



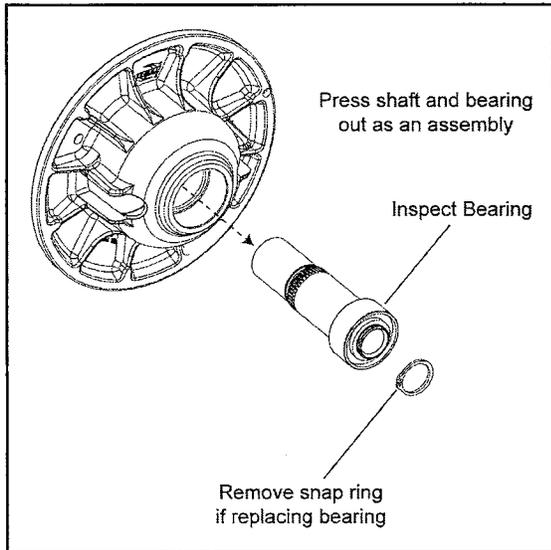
11. Pull out the clutch roller pins (J) and rollers (K).



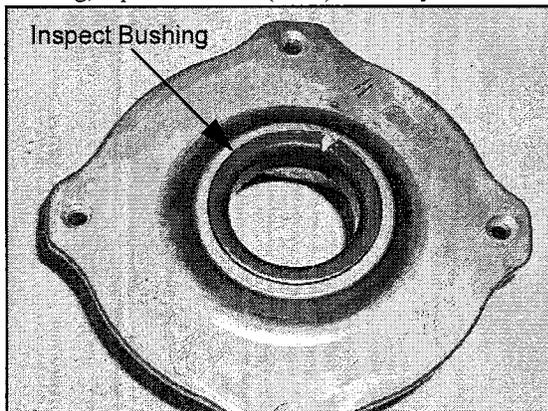
12. Press the shaft and bearing out of the outer sheave using an arbor press.



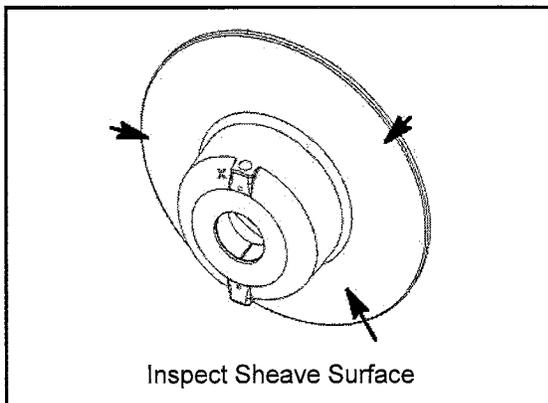
13. Inspect the bearing for wear. Spin the bearing, if the bearing does not spin smoothly, replace it. To replace the bearing, remove the snap ring from the end of the shaft and press the bearing off the shaft.



14. Inspect the cam (helix) assembly bushing for wear. If the bushing is worn or the shaft does not fit snug into the bushing, replace the cam (helix) assembly.



15. Inspect the clutch sheaves for excessive wear or damage.



Bushing Service

IMPORTANT: Special Tools Required

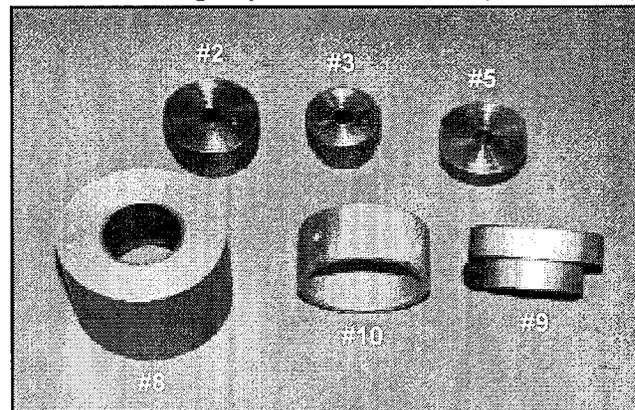
EBS Clutch Bushing Tool Kit - 2201379

Item	Qty.	Part Description	Part #
A, B	1	EBS Puller Tool	5132027
C	1	EBS Puller Nut	5132501
D	1	EBS Main Adapter	5132029
E	1	EBS Bushing Removal Tool	5132028
--	1	Instructions	9915111

Additional Special Tools

Qty.	Part Description	Part #
1	Clutch Bushing Replacement Tool Kit	2871226
1	Piston Pin Puller	2870386

*Clutch Bushing Replacement Tool Kit (PN 2871226)



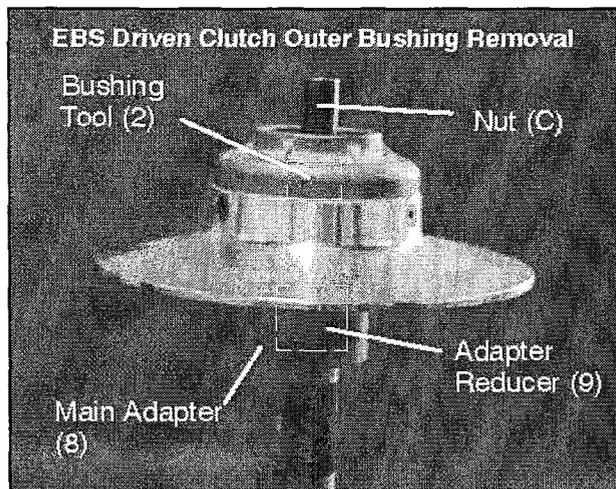
Item	Qty.	Part Description	Part #
#2	1	P-90 Drive/Driven Clutch Bushing Install Tool	5020628
#3	1	Drive Clutch Cover Bushing Removal/Installation Tool (all clutches)	5020629
#5	1	P-90 Driven Clutch Cover Bushing Removal Tool	5020631
#8	1	Main Puller Adapter	5020632
#9	1	Adapter Reducer	5010279
#10	1	Number Two Puller Adapter	5020633

NOTE: Bushings are installed at the factory using Loctite™ 609. In order to remove bushings it will be necessary to apply heat evenly to the area around each bushing. Clean all residual Loctite™ from bushing bore prior to installing new bushing.

CLUTCHING (PVT)

Clutch Bushing Removal

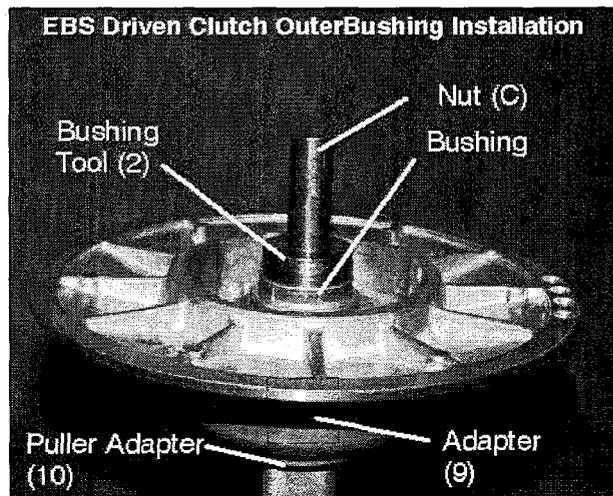
1. Install main puller adapter (Item 8) onto puller.
2. Install adapter reducer (Item 9).
3. Using a hand held propane torch, apply heat around outside of bushing until tiny smoke tailings appear.
4. Flip sheave over so bushing faces downward and install onto puller.
5. Install bushing tool (Item 2).



6. Install left hand nut (C) and spacer onto puller rod and tighten by hand. Turn puller barrel for further tension if needed.
7. Turn clutch sheave counterclockwise until bushing is removed and sheave comes free.
8. Remove nut (C) (left hand thread) from puller rod and set aside.
9. Remove adapters from puller.
10. Remove bushing and removal tool from adapters. Discard bushing.

Clutch Bushing Installation

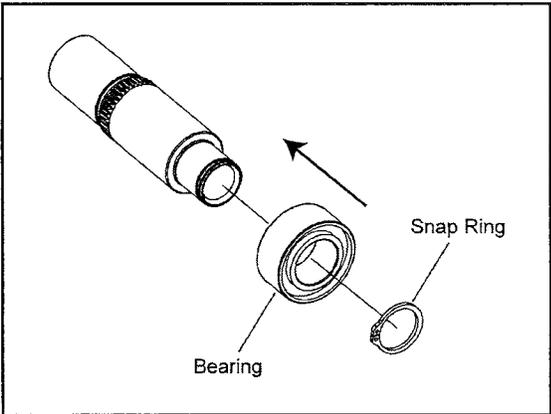
1. Install puller adapter (Item 10) onto puller.
2. Install adapter (Item 9) onto puller.



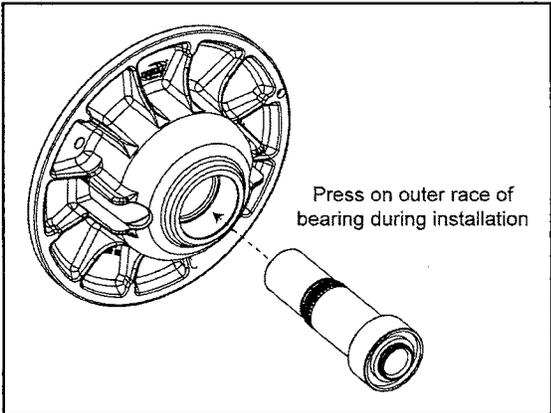
3. Apply Loctite™ 609 evenly to bushing bore inside moveable sheave.
4. Install sheave face down on puller.
5. Install new bushing on installation tool (Item 2) and install assembly into sheave.
6. Install left hand thread nut (C) onto puller rod and hand tighten against installation tool.
7. Turn clutch sheave counterclockwise, making sure bushing is drawn straight into bore. Continue until bushing is seated.
8. Remove nut (C) from puller rod and set aside.
9. Remove installation tool and clutch sheave from puller.

Clutch Assembly

- 1. Install a new bearing onto the clutch shaft using an arbor press. Once bearing is fully seated, install a new snap ring.

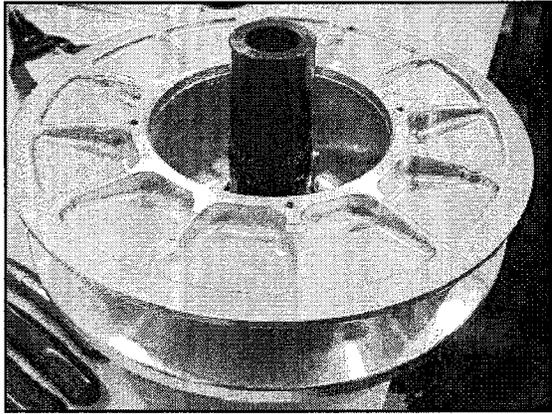
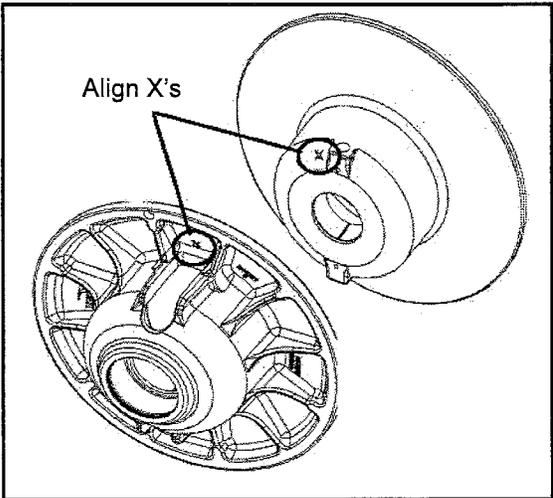


- 2. Install the shaft and bearing assembly into the outer sheave.



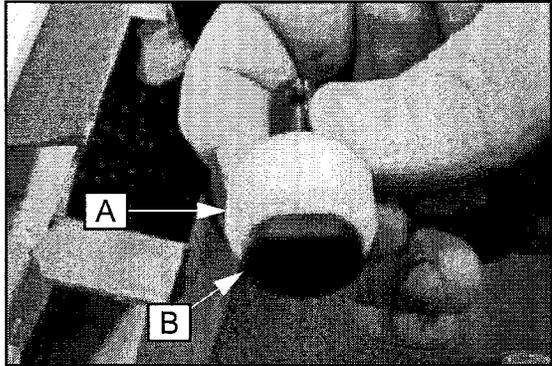
NOTE: Press only on the outer race of the bearing during installation to prevent from damaging the bearing.

- 3. Line up the "X" on the moveable sheave with the "X" on the stationary sheave or use the marks previously used. Put the sheaves together.



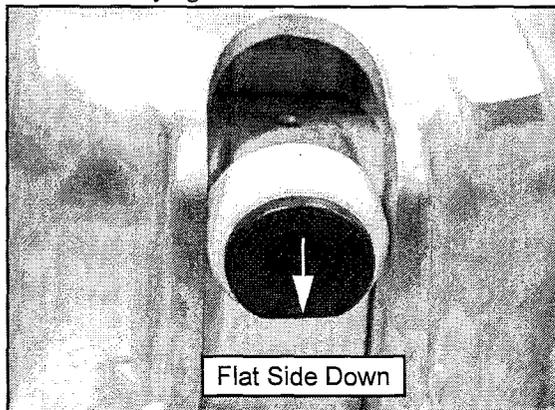
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- 4. Install the roller (A) onto the roller pin (B) on both sides.

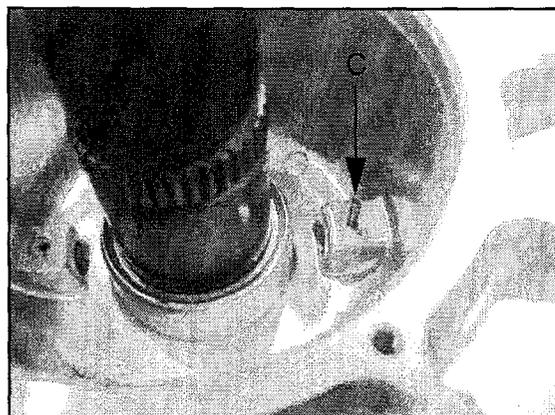


CLUTCHING (PVT)

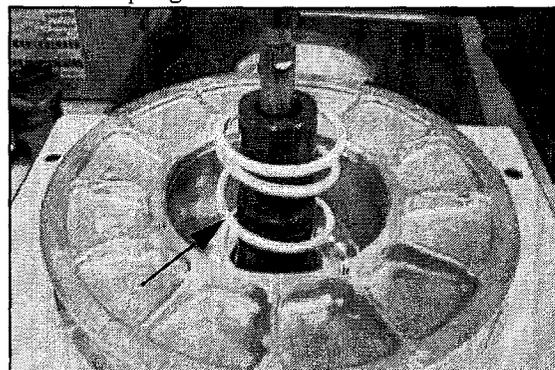
5. Install the roller pin into the sheave assembly on both sides. The flat side of the roller pin faces downward when the shaft side is laying flat on the bench.



6. Install the spring pins (C) to secure the roller pins. Install until flush with sheave surface.

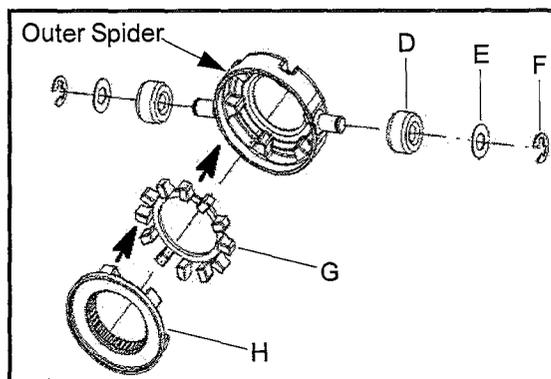


7. Install the spring over the shaft.

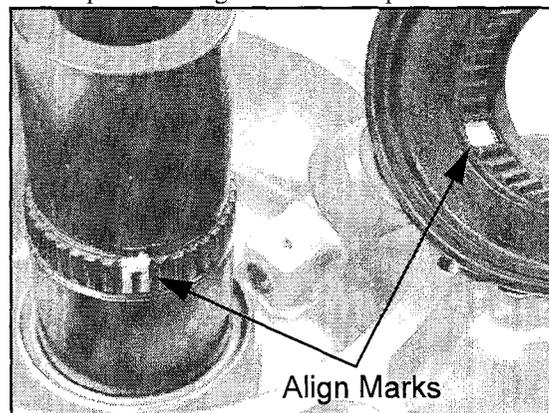


8. Install the clutch rollers (D) onto each side of the outside spider. Install the washers (E) and E-clips (F) to secure the rollers. The rollers should spin freely.

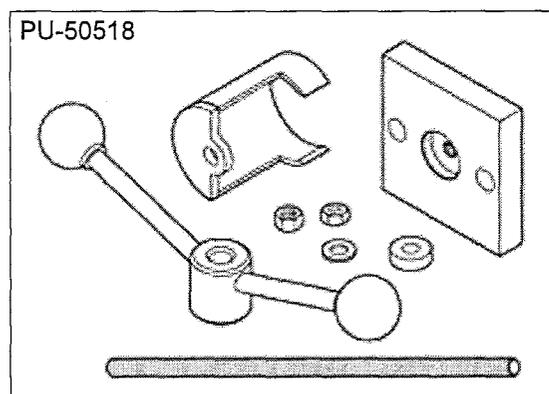
9. Install the spider dampener (G) inside the outer spider and install the inside spider plate (H).



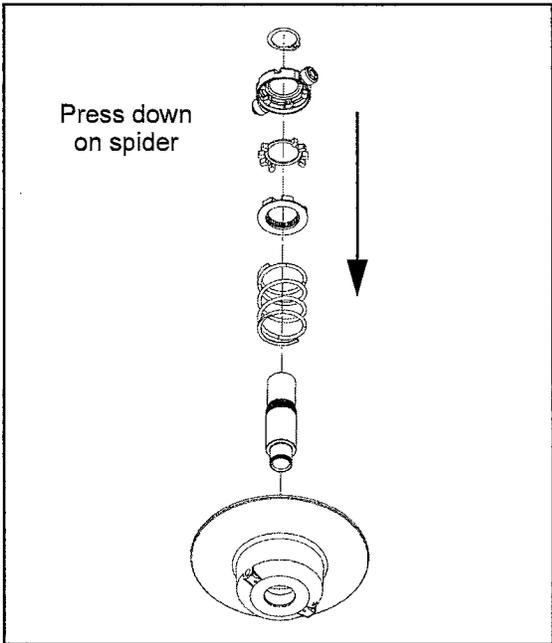
10. Install the spider assembly onto the shaft with the retaining ring on top of the spider. **NOTE:** Use the marks previously made to align the skip tooth spider, or use the "X" on top of the spider and align it with the skip tooth on the shaft.



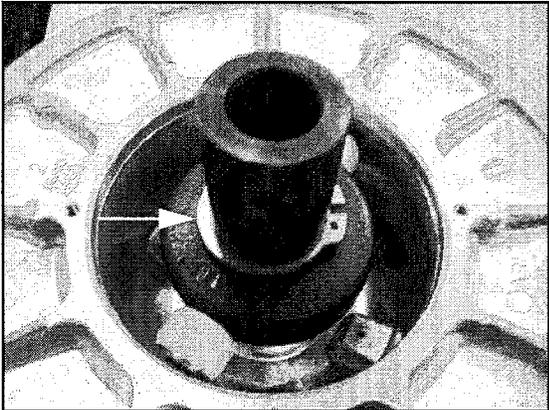
11. Place the clutch into the Driven Clutch Compression Tool PU-50518.



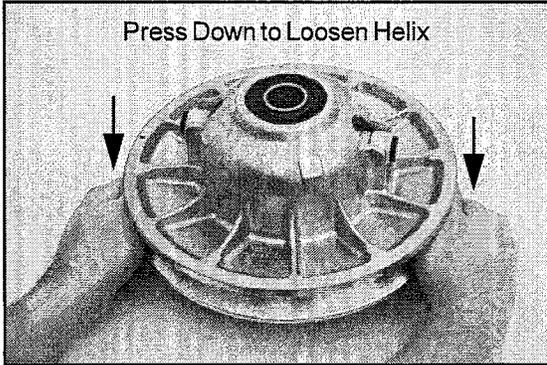
12. Press down on the top of the spider assembly, pushing the spider onto the shaft.



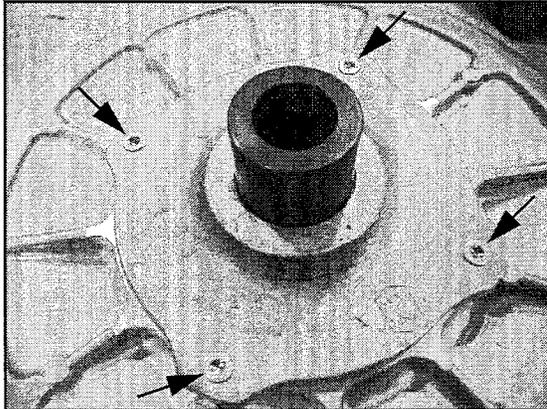
13. Slowly compress the spider into place. If the spider appears to bind while compressing, stop and make sure the skip-tooth on the shaft and the spider are aligned. Once the spider passes the retaining ring notch on the shaft, install the retaining ring.



14. Install the cam (helix) assembly over the shaft. Line up the "X" on the cam, "X" on spider, and "X" on the stationary sheave or use the marks previously made before disassembly. **NOTE:** If the cam assembly (helix) is difficult to install, be sure the sheaves are aligned. To align the sheaves place the clutch assembly on a flat surface with the cam assembly (helix) side down. Press down on the moveable sheave belt face with both hands and the helix will release.



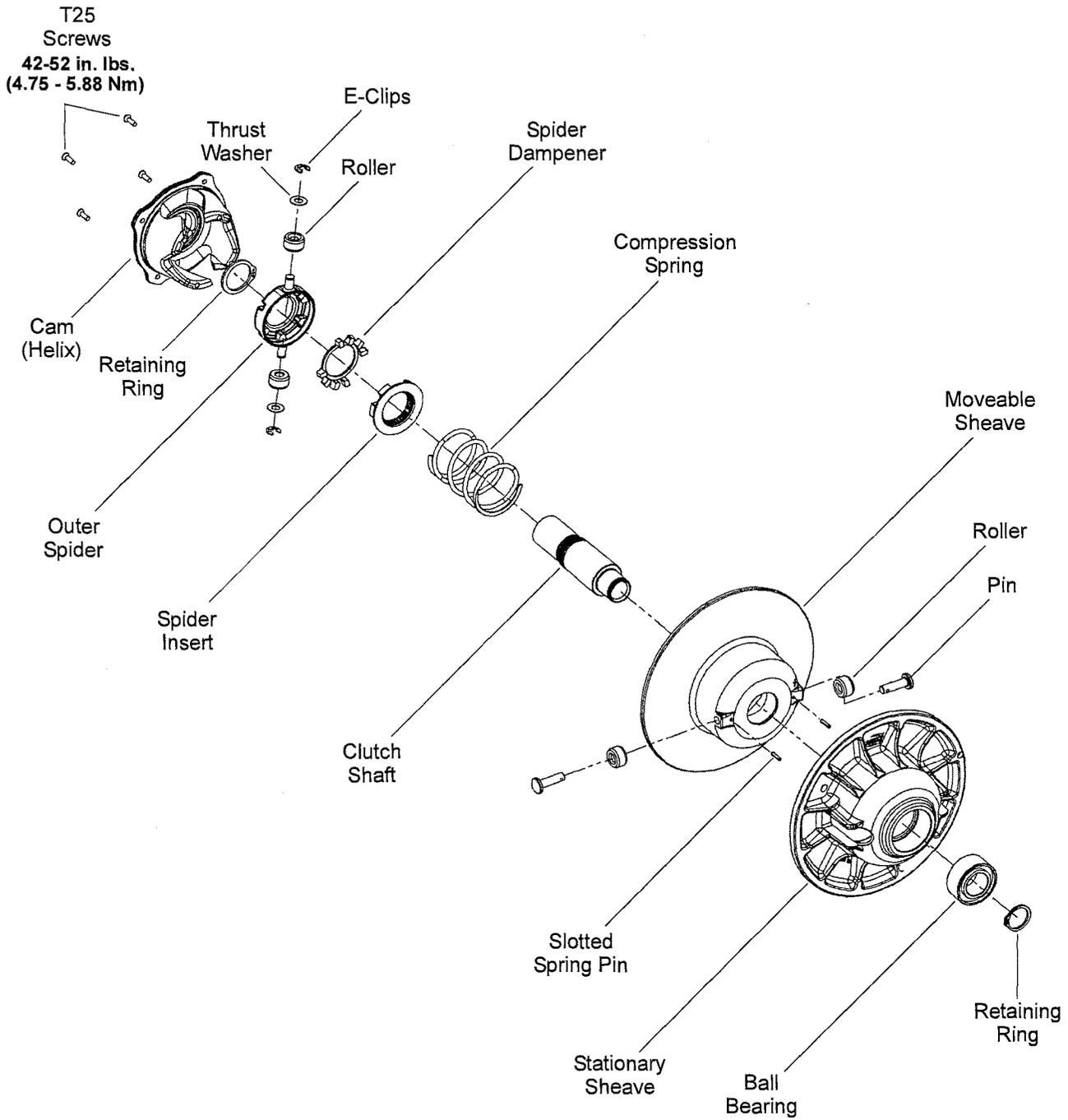
15. Use a T25 Torx driver to install the four helix retaining screws and torque to specification.



Helix Retaining Screws:
42-52 in. lbs. (4.75 - 5.88 Nm)

CLUTCHING (PVT)

Exploded View



TROUBLESHOOTING

Situation	Probable Cause	Remedy
Engine RPM below specified operating range, although engine is properly tuned.	<ul style="list-style-type: none"> -Wrong or broken drive clutch spring. -Drive clutch shift weight too heavy. -Driven clutch spring broken or installed in wrong helix location. 	<ul style="list-style-type: none"> -Replace with recommended spring. -Install correct shift weight kit to match engine application. -Replace spring; refer to proper installation location.
Erratic engine operating RPM during acceleration or load variations.	<ul style="list-style-type: none"> -Drive clutch binding. -Belt worn unevenly - thin / burnt spots. -Driven clutch malfunction. -Sheave face grooved. 	<ul style="list-style-type: none"> A. Disassemble drive clutch; inspect shift weights for wear and free operation. B. Clean and polish stationary shaft hub; reassemble clutch without spring to determine problem area. Replace belt. A. Replace ramp buttons. B. Inspect movable sheave for excessive bushing clearance. -Replace the clutch.
Engine RPM above specified operating range.	<ul style="list-style-type: none"> -Incorrect drive clutch spring (too high spring rate). -Drive clutch shift weights incorrect for application (too light). -Drive clutch binding. -Driven clutch binding. -Converter sheaves greasy; belt slippage. 	<ul style="list-style-type: none"> -Install correct recommended spring. -Install correct recommended shift weights. -Disassemble and clean clutch, inspecting shift weights and rollers. Reassemble without the spring and move sheaves through entire range to further determine probable cause. -Disassemble, clean, and inspect driven clutch, noting worn sheave bushing and ramp buttons and helix spring location. -Clean sheaves with denatured alcohol or brake cleaner, install new belt.
Harsh drive clutch engagement.	<ul style="list-style-type: none"> -Drive belt worn too narrow. -Excessive belt / sheave clearance with new belt. 	<ul style="list-style-type: none"> -Replace belt. -Perform belt / sheave clearance adjustment with shim washers beneath spider.
Drive belt turns over	<ul style="list-style-type: none"> -Wrong belt for application. 	<ul style="list-style-type: none"> -Replace with correct belt.
Belt burnt, thin spots	<ul style="list-style-type: none"> -Abuse (continued throttle application when vehicle is stationary, excess load) -Dragging brake -Slow, easy clutch engagement 	<ul style="list-style-type: none"> -Caution operator to operate machine within guidelines. -Inspect brake system. -Fast, effective use of throttle for efficient engagement.

CLUTCHING (PVT)

Troubleshooting, Continued.....

Situation	Probable Cause	Remedy
PVT cover overheating (melting)	-Plugged air intake or outlet.	-Clear obstruction
	-Belt slippage due to water, oil, grease, etc., rubbing on cover.	-Inspect system. Clean , repair or replace as necessary. Seal PVT system ducts.
	-Clutches or weight being applied to cover while in operation.	-Remove weight. Inform operator.
	-High vs. low range.	-Instruct operator on guidelines for operation in proper driving range for different terrain as outlined in Owner's Safety and Maintenance Manual.
Water ingestion	-Cover seals or ducts leaking	-Find leak and repair as necessary.
	-Operator error	-Instruct operator on guidelines for operation in wet terrain as outlined in Owner's Safety and Maintenance Manual.
Belt slippage	-Belt worn out	-Replace belt.
	-Water ingestion	-Inspect and seal PVT system.
	-Belt contaminated with oil or grease	-Inspect and clean.
PVT noise	-Belt worn or separated, thin spots, loose belt	-Replace belt.
	-Broken or worn clutch components, cover hitting clutches	-Inspect and repair as necessary.
Engagement erratic or stabby	-Thin spots on belt, worn belt	-Replace belt. Refer to belt burnt troubleshooting and instruct operator.
	-Drive clutch bushings stick	-Inspect and repair clutches.

CHAPTER 7

FINAL DRIVE

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FINAL DRIVE

SPECIAL TOOLS

PART NUMBER	TOOL DESCRIPTION
2872608	Roll Pin Removal Tool
8700226	CV Boot Clamp Pliers (earless type)
PU-48951	Axle Boot Clamp Tool

TORQUE SPECIFICATIONS

Wheel and Hub Torque Table

ITEM	SPECIFICATION
Wheel Nuts	30 ft. lbs. (41 Nm) + 90° (1/4 turn)
Front Hub Castle Nut	80 ft. lbs. (108 Nm)
Rear Hub Castle Nut	80 ft. lbs. (108 Nm)
Ball Joint Pinch Bolts	23 ft. lbs. (31 Nm)
Front Brake Caliper Mounting Bolts	31-34 ft. lbs. (42-46 Nm)
Tie Rod End Fastener	42.5 ft. lbs. (58 Nm)
Propshaft Support Bearing Fasteners	16-18 ft. lbs. (22-24 Nm)
Propshaft Bearing Set Screws	65-75 in. lbs. (7.3-8.4 Nm)
Front Gearcase Cover Plate Screws	7-11 ft. lbs. (10-15 Nm)
Front Gearcase Mounting Bolts	30 ft. lbs. (41 Nm)
Bearing Carrier to Trailing Arm Bolts	50 ft. lbs. (67.7 Nm)
Radius Rod to Bearing Carrier Bolts	50 ft. lbs. (67.7 Nm)
Rear Brake Caliper Mounting Bolts	30 ft. lbs. (41 Nm)

FRONT BEARING CARRIER

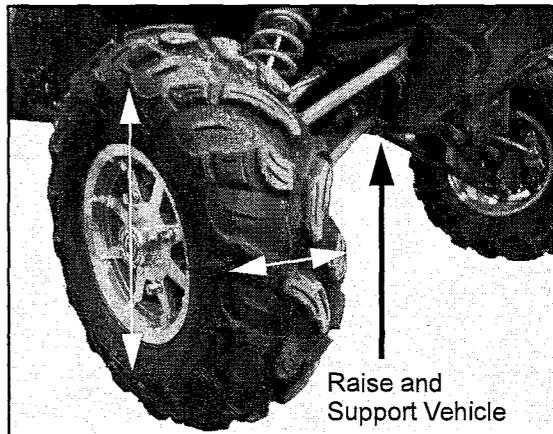
Bearing Carrier Inspection / Removal

1. Elevate front of vehicle and safely support machine under the frame area.

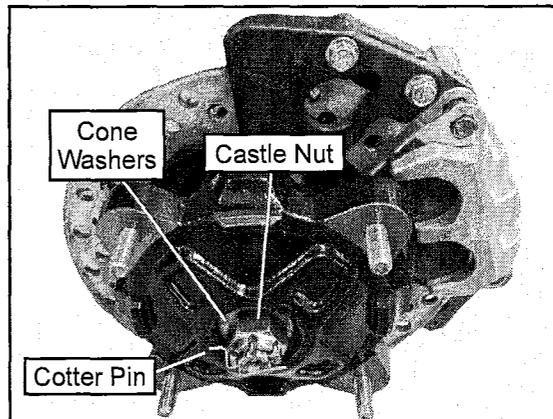
CAUTION

Serious injury may result if machine tips or falls. Be sure machine is secure before beginning this service procedure. Wear eye protection when removing bearings and seals.

2. Check bearings for side play by grasping the top and bottom of the tire firmly and checking for movement. The tire should rotate smoothly without binding or rough spots.



3. Remove the (4) wheel nuts and remove the front wheel.
4. Remove the cotter pin and loosen the front wheel hub castle nut. Remove the nut, and (2) cone washers from the front wheel hub assembly.

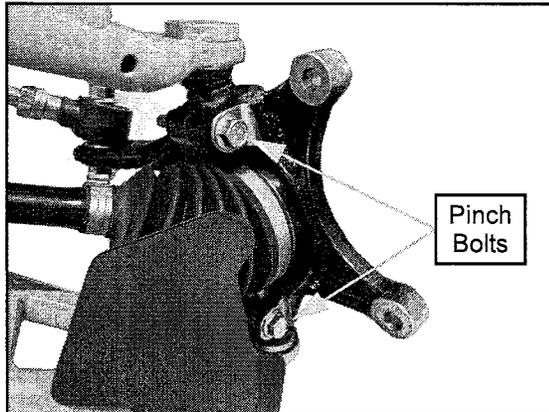


5. Remove the fastener retaining the steering tie rod end to the front bearing carrier.

- Remove and discard the two front brake caliper mounting bolts and remove the caliper from the brake disc (see Chapter 9).

CAUTION: Do not hang the caliper by the brake line. Use wire to hang caliper to prevent damage to the brake line.

- Remove the front wheel hub assembly.
- Remove and discard the upper and lower ball joint pinch bolts.



- Using a soft faced hammer, lightly tap on the bearing carrier while removing the upper and lower ball joint ends.
- Remove the bearing carrier from the front drive shaft.
- Rotate bearing by hand and check for smooth rotation. Visually inspect bearing for moisture, dirt, or corrosion.

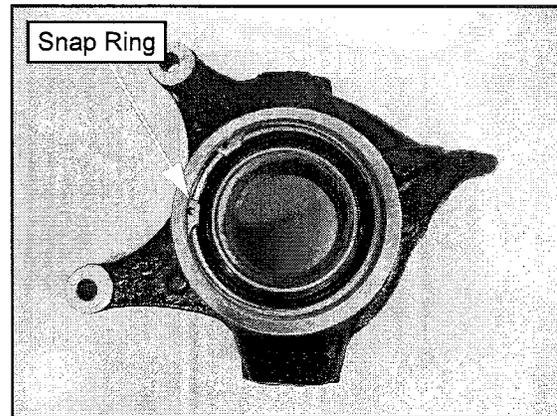
NOTE: Due to extremely close tolerances and minimal wear, the bearings must be inspected visually, and by feel. While rotating bearings by hand, inspect for rough spots, discoloration, or corrosion. The bearings should turn smoothly and quietly, with no detectable up and down movement and minimal movement sideways between inner and outer race.

- Replace bearing if moisture, dirt, corrosion, or roughness is evident.

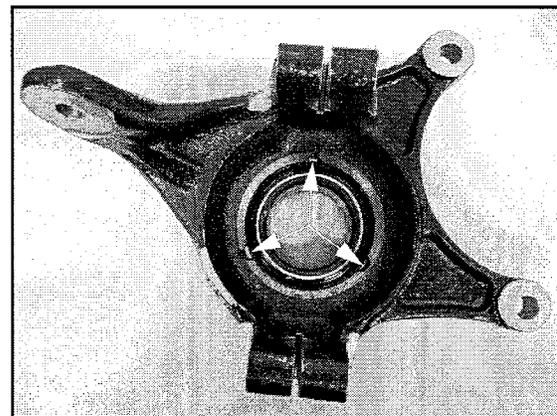
Bearing Replacement

Bearing Removal

- Remove the outer snap ring.



- From the back side of the bearing carrier, tap on the outer bearing race with a drift punch in the reliefs as shown.



- Drive bearing out evenly by tapping on outer race only. Once bearing is at bottom of casting, support casting on outer edges so bearing can be removed.
- Inspect the bearing carrier housing for scratches, wear or damage. Replace front bearing carrier if damaged.

7

FINAL DRIVE

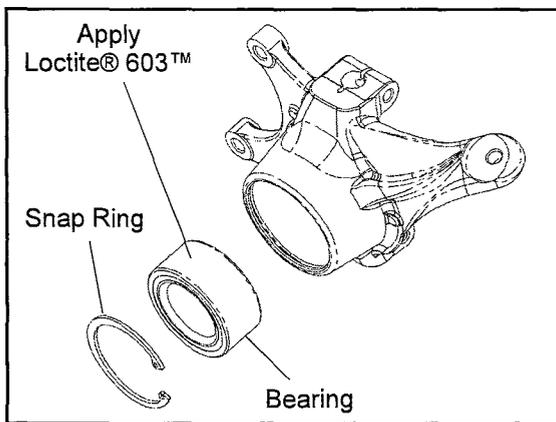
Bearing Installation

5. Thoroughly clean the front bearing carrier housing and the outer race on the new bearing. Be sure that all oil residue has been removed from each surface.
6. Support the bottom of the bearing carrier housing.

CAUTION

Use an arbor and press only on the outer race, otherwise bearing damage may occur.

7. Apply **Loctite® 603™** retaining compound to the outer circumference of the new bearing race and carefully press the new bearing into the bearing carrier housing.

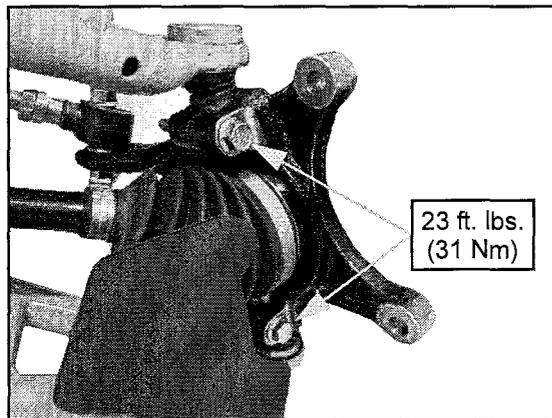


NOTE: Use care to not allow any of the Loctite® compound to get in the bearing.

8. Wipe the housing clean of any excess compound and install the snap ring.

Bearing Carrier Installation

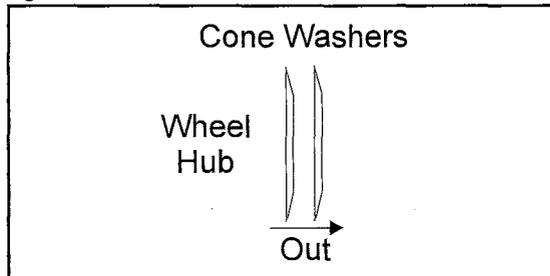
1. Install drive shaft axle through the backside of the bearing carrier.
2. Install the upper and lower ball joint ends into the front bearing carrier.
3. Install **new** pinch bolts and nuts. Torque to specification.



⊕ = T

**Ball Joint Pinch Bolts:
23 ft. lbs. (31 Nm)**

4. Apply Anti-Seize to drive shaft axle splines.
5. Install front wheel hub assembly, cone washers, and hand tighten the castle nut. Install washers with domed side out.



6. Install **new** brake caliper mounting bolts and torque to specification.

⊕ = T

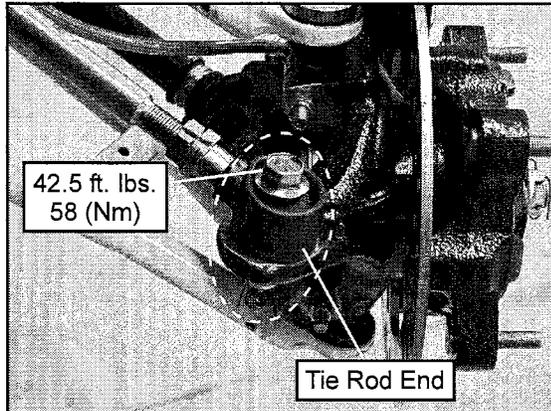
**Front Caliper Mounting Bolts:
31-34 ft. lbs. (42-46 Nm)**

⚠ CAUTION

New bolts have a pre-applied locking agent which is destroyed upon removal. Always use new brake caliper mounting bolts upon assembly.

7. Install the steering tie rod end onto the front bearing carrier.

NOTE: Refer to the photos below to ensure proper placement of the tie rod end.

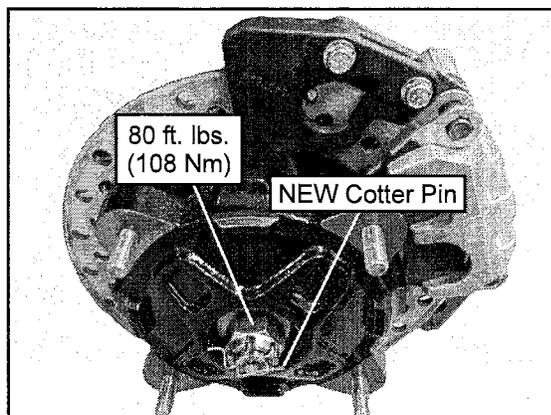


8. Torque the tie rod end fastener to specification and install a new cotter pin.



**Tie Rod End Fastener:
42.5 ft. lbs. (58 Nm)**

9. Torque wheel hub nut to specification and install a new cotter pin. Tighten nut slightly if necessary to align cotter pin holes. Bend both ends of cotter pin around end of spindle in different directions.



**Wheel Hub Castle Nut:
80 ft. lbs. (108 Nm)**

10. Install wheel and (4) wheel nuts. Torque wheel nuts to specification.



**Wheel Nuts:
30 ft. lbs. (41 Nm) + 90° (1/4 turn)**

11. Rotate wheel and check for smooth operation.

FINAL DRIVE

FRONT DRIVE SHAFT

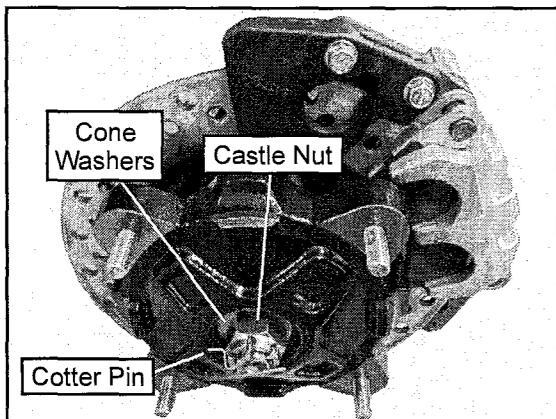
Drive Shaft Removal

1. Elevate front of vehicle and safely support machine under the frame area.

CAUTION

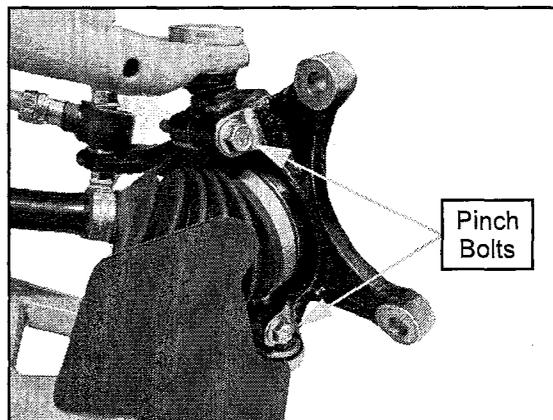
Serious injury may result if machine tips or falls. Be sure machine is secure before beginning this service procedure. Wear eye protection when removing bearings and seals.

2. Remove the (4) wheel nuts and remove the front wheel.
3. Remove the cotter pin and loosen the front wheel hub castle nut. Remove the nut, and (2) cone washers from the front wheel hub assembly.

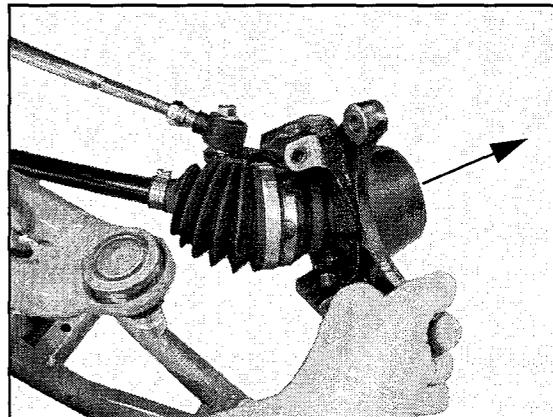


4. Remove and discard the two front brake caliper mounting bolts and remove the caliper from the brake disc (see Chapter 9).
CAUTION: Do not hang the caliper by the brake line. Use wire to hang caliper to prevent damage to the brake line.
5. Remove the front wheel hub assembly.

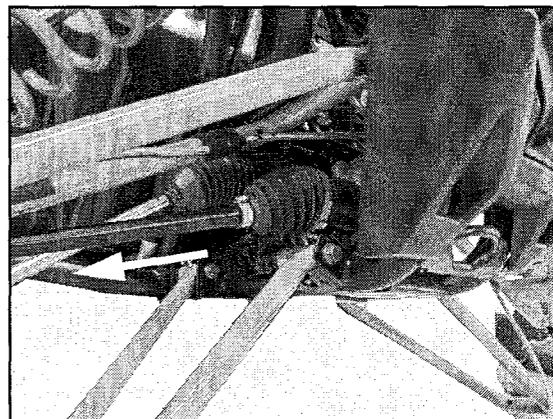
6. Remove and discard the upper and lower ball joint pinch bolts and nuts.



7. Using a soft faced hammer, lightly tap on the bearing carrier while removing the upper ball joint end.
8. Remove the drive shaft from the front bearing carrier.

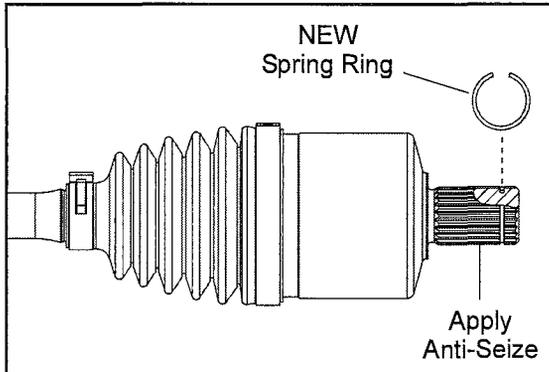


9. With a short, sharp jerk, remove drive shaft from the front gearcase.

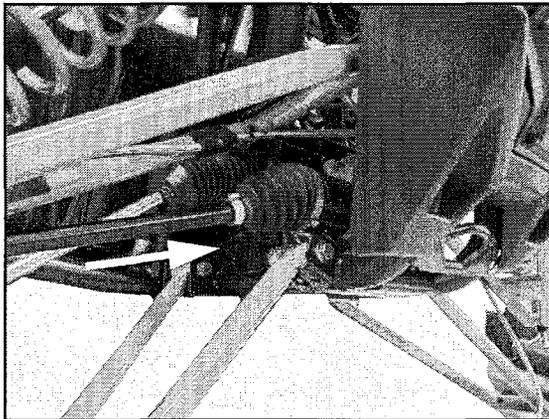


Drive Shaft Installation

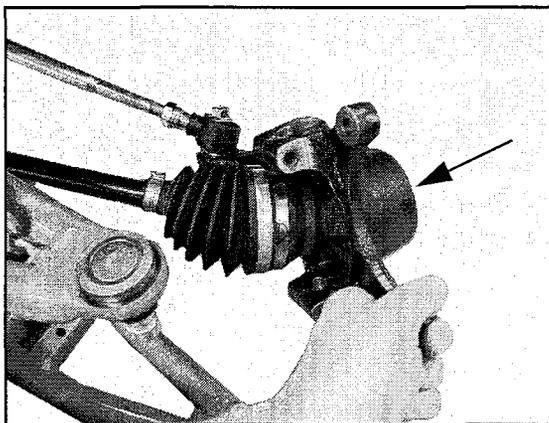
1. Install **new** spring ring on drive shaft. Apply an anti-seize compound to the splines.



2. Align splines of drive shaft with front gearcase and reinstall the drive shaft. Use a rubber mallet to tap on the outboard end of the drive shaft if necessary

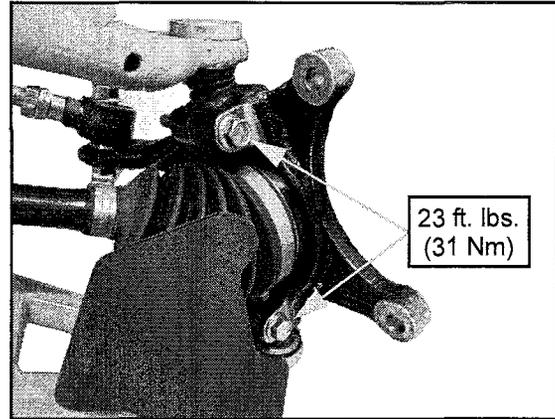


3. Install drive shaft into the front bearing carrier.



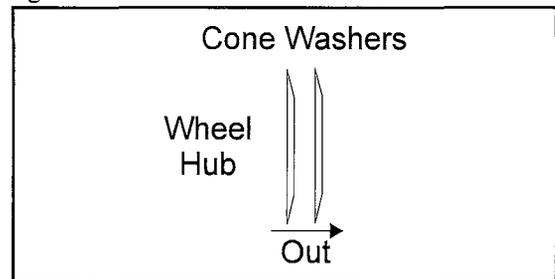
4. Install the upper and lower ball joint ends into the front bearing carrier.

5. Install **new** pinch bolts and nuts. Torque to specification.

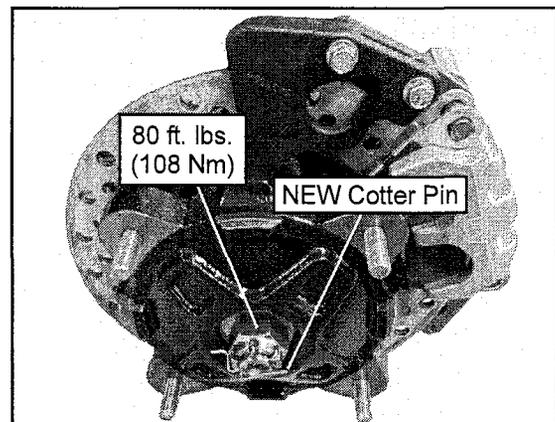


Ball Joint Pinch Bolts:
23 ft. lbs. (31 Nm)

6. Apply Anti-Seize to drive shaft axle splines.
7. Install front wheel hub assembly, cone washers, and hand tighten the castle nut. Install washers with domed side out.



8. Torque wheel hub nut to specification and install a **new** cotter pin. Tighten nut slightly if necessary to align cotter pin holes. Bend both ends of cotter pin around end of spindle in different directions.



FINAL DRIVE



Wheel Hub Castle Nut:
80 ft. lbs. (108 Nm)

9. Install **new** brake caliper mounting bolts and torque to specification.



Front Caliper Mounting Bolts:
31-34 ft. lbs. (42-46 Nm)

CAUTION

New bolts have a pre-applied locking agent which is destroyed upon removal. Always use new brake caliper mounting bolts upon assembly.

10. Install wheel and (4) wheel nuts. Torque wheel nuts to specification.



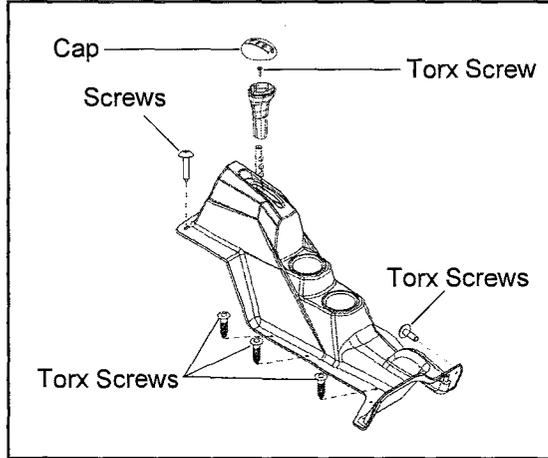
Wheel Nuts:
30 ft. lbs. (41 Nm) + 90° (1/4 turn)

11. Rotate wheel and check for smooth operation.

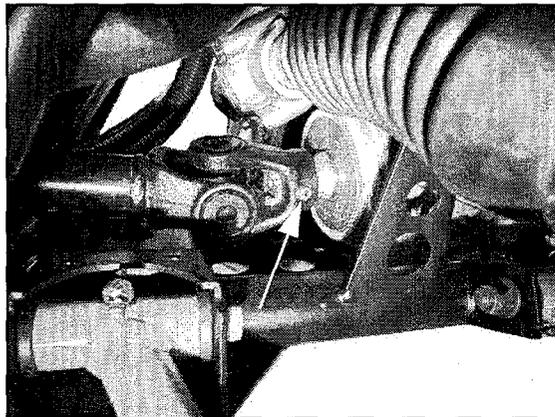
PROPSHAFT SERVICE

Removal / Installation

1. Remove both seats and engine service panel.
2. Remove the gear selector and center console.



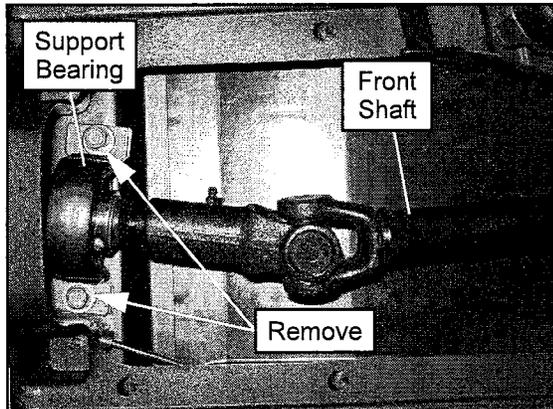
3. Raise and support the vehicle.
4. Locate the propshaft roll pin and use the Roll Pin Removal Tool (PN 2872608) to remove the roll pin. Discard roll pin.



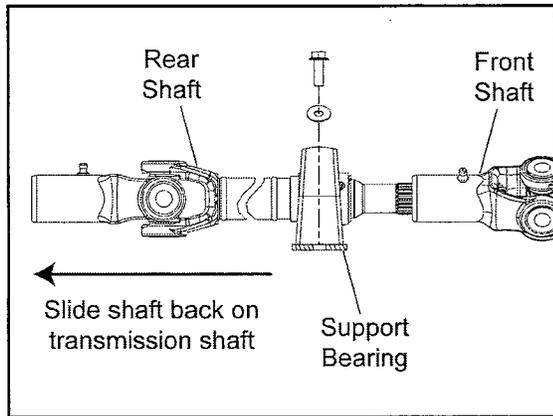
Roll Pin Removal Tool (PN 2872608)

NOTE: Right front wheel can be removed to gain better access to the propshaft roll pin.

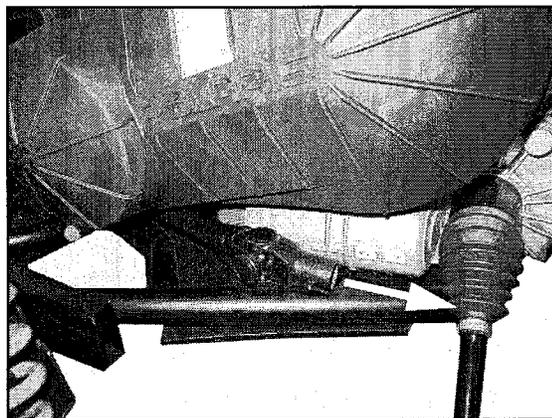
- Remove the (2) fasteners retaining the support bearing.



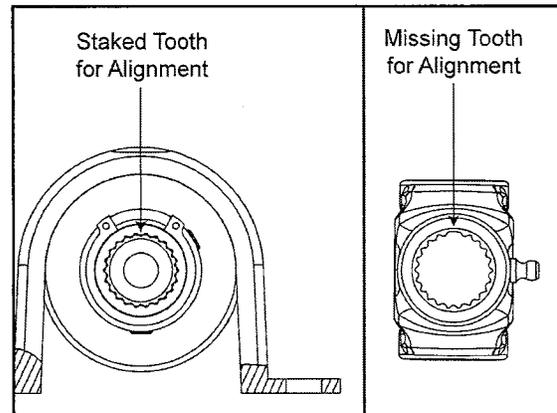
- Slide the rear portion of the propshaft back to separate it from the front portion. Slide the rear shaft / support bearing to the passenger side of the vehicle.



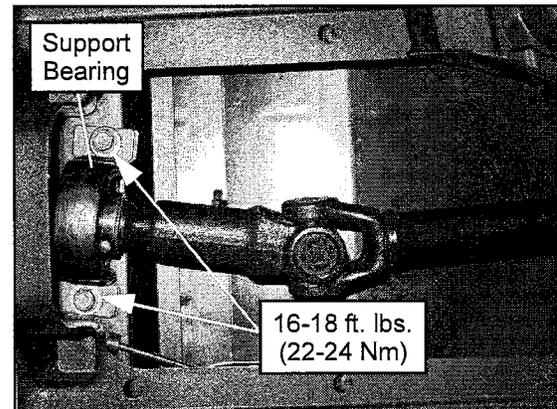
- Slide the front portion of the propshaft back and away from the front gearcase to remove it.
- If removing the rear portion of the propshaft, remove the bearing support (upper & lower half) from the shaft.
- Pull the rear portion of the propshaft forward to disengage it from the transmission output splines. Using care, pull the shaft straight out of the back of the vehicle.



- Reverse this procedure to reinstall and assemble the front and rear portions of the propshaft.
- Lubricate the front gearcase splines with Anti-Seize.
- Lubricate the propshaft mid joint with Polaris All Purpose Grease.
- Lubricate the propshaft transmission splines with Polaris All Purpose Grease.
- Align the front and rear portions of the propshaft as shown below and slide them together.



- Torque the support bearing fasteners to specification.



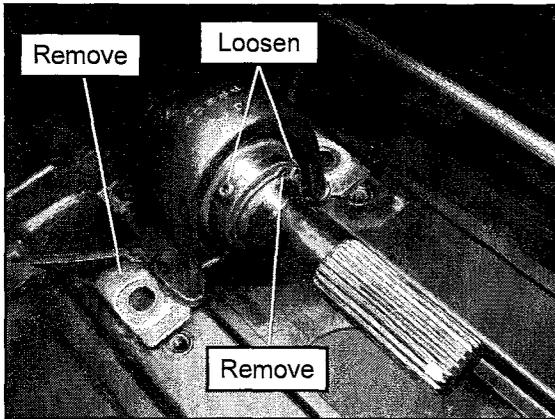
**Support Bearing Fasteners:
16-18 ft. lbs. (22-24 Nm)**

- When installing the front portion of the propshaft, use a new roll pin.

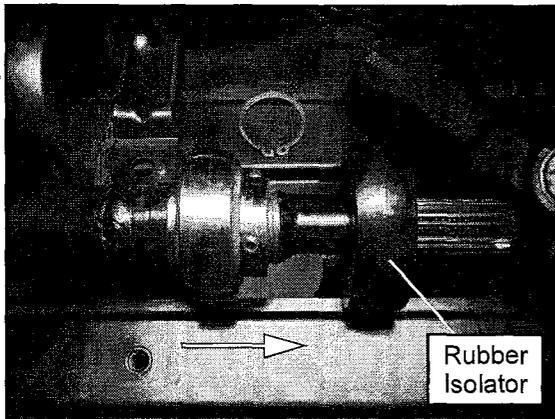
FINAL DRIVE

Support Bearing Replacement

1. Follow steps 1-9 of the "Removal / Installation" procedure.
2. Remove the bearing support (upper and lower half) and the retaining ring. Loosen the (2) set screws retaining the bearing to the shaft.



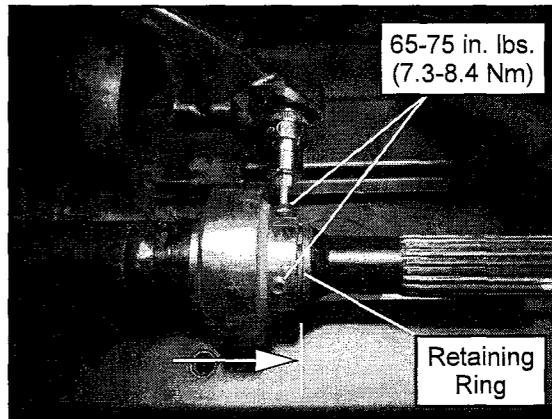
3. Remove the rubber isolator from the bearing and slide the bearing off the end of the shaft.



NOTE: If bearing is seized on the shaft, remove the rear portion of the shaft from the vehicle. Refer to "Removal / Installation".

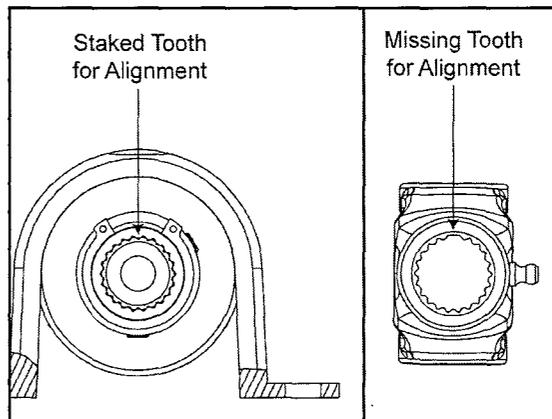
4. Clean the mounting surface of the shaft and install the new bearing.
5. Install a **new** retaining ring and slide the bearing tight against the retaining ring.

6. Apply Loctite® 242™ to the set screw threads and torque the (2) bearing set screws to specification.



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Bearing Set Screws:
65-75 in. lbs. (7.3-8.4 Nm)

7. Align the front and rear portions of the propshaft as shown below and slide them together.



8. Install the rubber isolator over the bearing.
9. Install the upper and lower halves of the bearing support along with the (2) fasteners. Torque the support bearing fasteners to specification.

 = T
Support Bearing Fasteners:
16-18 ft. lbs. (22-24 Nm)

10. Install the front portion of the propshaft onto the front gearcase and install a **new** roll pin.
11. Reinstall the center console, selector handle and seats.

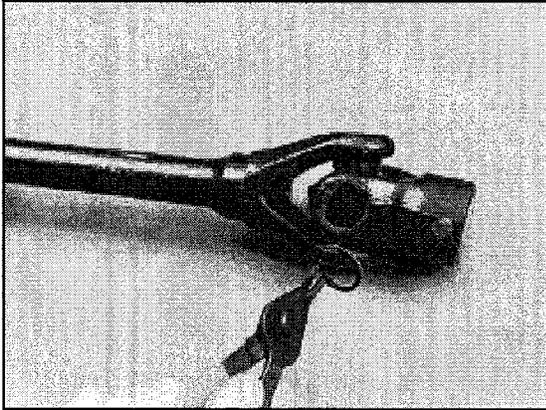
PROPSHAFT U-JOINT SERVICE

Disassembly

CAUTION

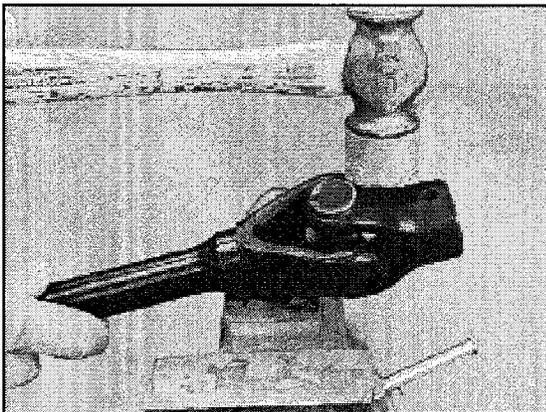
Always wear eye protection.

1. Remove internal or external snap ring from bearing caps.

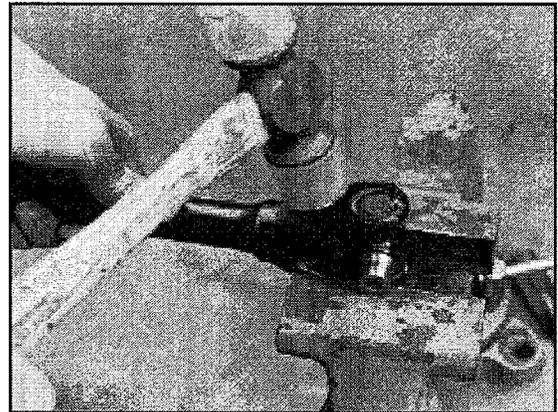


NOTE: If yoke or bearing is removed, cross bearing must be replaced. Note orientation of grease fitting and mark inner and outer yoke for correct re-positioning during installation.

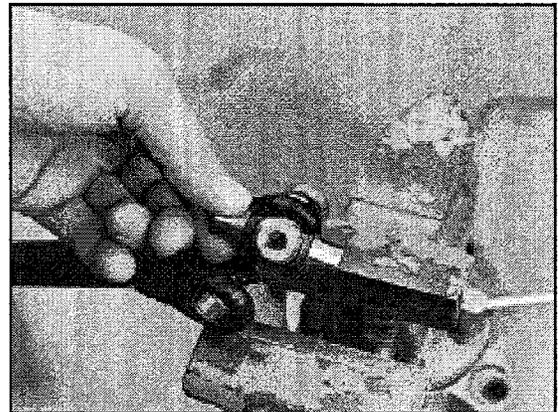
2. Support inner yoke as shown and drive outer yoke down (bearing cap out) with a soft face hammer.



3. Support U-joint in vise as shown and drive inner yoke down to remove remaining bearing caps.



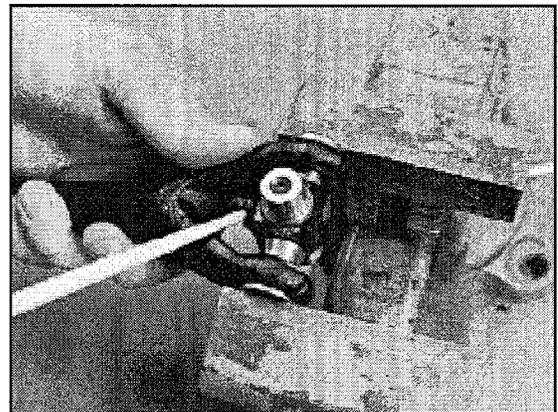
4. Force U-joint cross to one side and lift out of inner yoke.



7

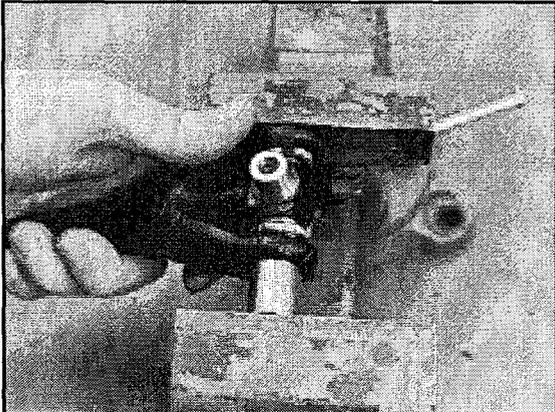
Assembly

1. Install new bearing caps in yoke by hand. Carefully install U-joint cross with grease fitting properly positioned inward toward center of shaft. Take care not to dislodge needle bearings upon installation of cross joint.
2. Tighten vise to force bearing caps in.

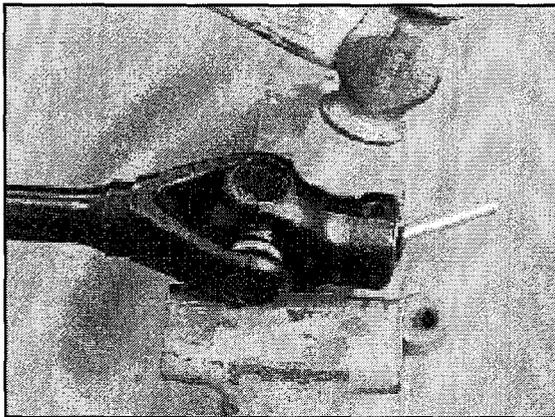


FINAL DRIVE

- Using a suitable arbor, fully seat the bearing cap in one side. Continually check for free movement of bearing cross as bearing caps are assembled.



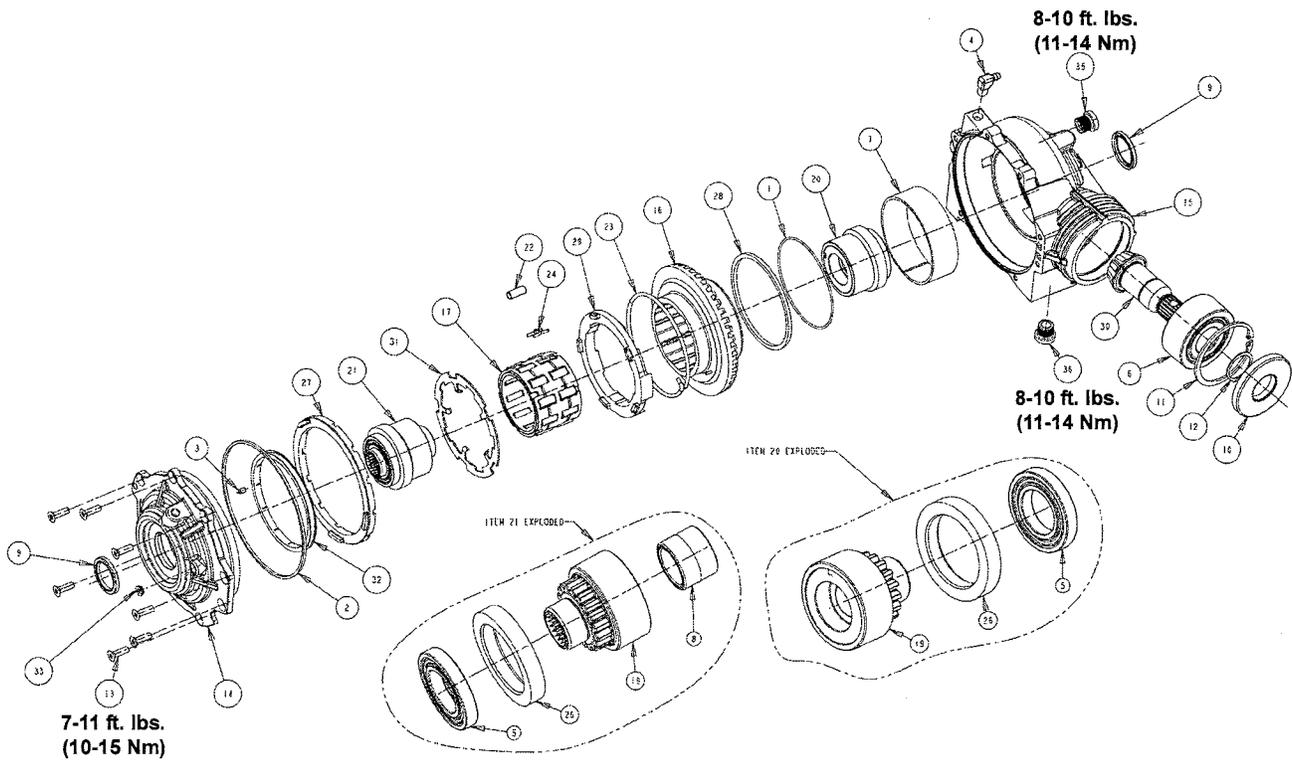
- Install snap ring to contain bearing cap just installed. Repeat procedure for other side.
- Install outer yoke, aligning marks made at disassembly and repeat Steps 1-3 to install bearing caps on outer yoke.
- Seat all bearing caps against snap rings by supporting cross shaft and tapping on each corner as shown.



- When installation is complete, yokes must pivot freely in all directions without binding. If the joint is stiff or binding, tap the yoke lightly to center the joint until it pivots freely.

FRONT GEARCASE / CENTRALIZED HILLIARD

Centralized Hilliard Exploded View



7

REF#	DESCRIPTION	QTY	REF#	DESCRIPTION	QTY
1	O-Ring	1	17	Roll Cage	1
2	O-Ring	1	19	Hub / Race Assembly	2
3	Dowel Pin	1	20	Hub Sub-Assembly (Female)	1
4	Vent Hose Fitting	1	21	Hub Sub-Assembly (Male)	1
5	Ball Bearing	2	22	Rollers	20
6	Ball Bearing (Double Row)	1	23	Torsion Spring	1
7	Bushing	1	24	H-Clip Spring	20
8	Bushing	1	26	Nylon Spacer	2
9	Oil Seal	2	27	Backlash Spacer	1
10	Oil Seal	1	28	Ring Gear Spacer	1
11	Retaining Ring, Internal	1	29	Torsion Spring Retainer	1
12	Retaining Ring	1	30	Pinion Gear	1
13	Cover Screws, M6 (T30 Torx)	7	31	Armature Plate	1
14	Cover Plate Assembly	1	32	AWD Coil	1
15	Gearcase Housing	1	35	Fill Plug	1
16	Clutch Housing (Ring Gear)	1	36	Drain Plug, Magnetic	1

FINAL DRIVE

All Wheel Drive Operation

The AWD switch may be turned on or off while the vehicle is moving, however, AWD will not enable until the engine RPM drops below 3100. Once the AWD is enabled, it remains enabled until the switch is turned off.

Engage the AWD switch before getting into conditions where the front wheel drive may be needed. If the rear wheels are spinning, release the throttle before switching to AWD.

CAUTION

Switching to AWD while the rear wheels are spinning may cause severe drive shaft and gearcase damage. Always switch to AWD while the rear wheels have traction or are at rest.

With the AWD switch off, the vehicle drives through the rear wheels only (2 wheel drive). When the AWD is enabled, the front drive acts as an on-demand AWD system. This means, the front drive will engage once the rear wheels have lost traction, and will remain engaged until the torque requirement goes away (i.e. rear wheels regain traction).

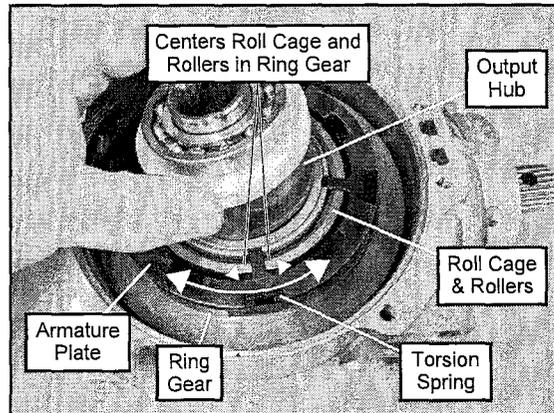
CAUTION

If the rear wheels are spinning, release the throttle before turning the AWD switch on. If AWD is engaged while the wheels are spinning, severe drive shaft and front gearcase damage could result.

AWD Engagement: When the AWD switch is activated, the AWD coil is powered by a 12 Vdc input which creates a magnetic field. This magnetic field attracts an armature plate that is keyed to the roll cage. When the ring gear and roll cage are spinning (vehicle is moving), the energized coil and armature plate will apply drag to the roll cage that indexes the rollers inside the ring gear to an engagement position. While in the engagement position, the front drive will be in an “over-running” condition (not engaged), until the rear wheels lose traction. Once the rear wheels begin to lose traction, the front drive will engage by coupling the output hubs to the ring gear via the rollers. The front drive will remain engaged until the torque requirement goes away (i.e. rear wheels regain traction).

AWD Disengagement: Once the rear wheels regain traction, the front wheels will return to the “over-running” condition. The vehicle is now back to rear wheel drive until the next loss of rear wheel traction occurs.

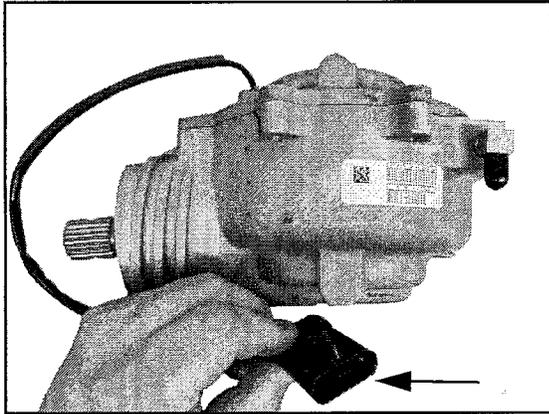
Torsion Spring Operation: The torsion spring acts as a return mechanism to help disengage the coupling of the output hubs and ring gear by creating an “over-running” condition for the rollers upon disengagement.



AWD Diagnosis

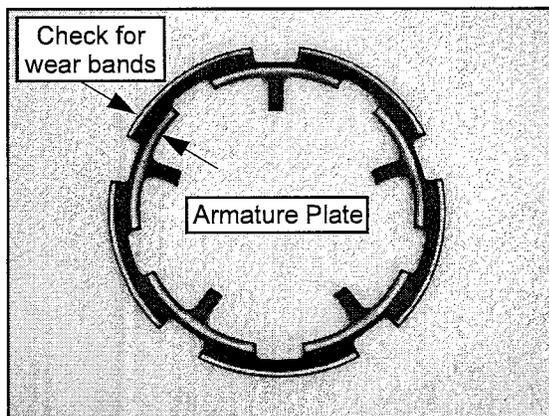
Symptom: AWD Will Not Engage

1. Check the gearcase coil resistance. To test the coil resistance, measure between the Grey and Brown/White wires. The measurement should be within specification.

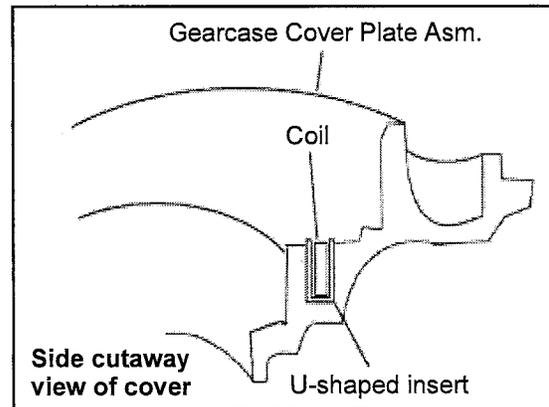


Front Gearcase Coil Resistance:
21.6 - 26.4 Ohms

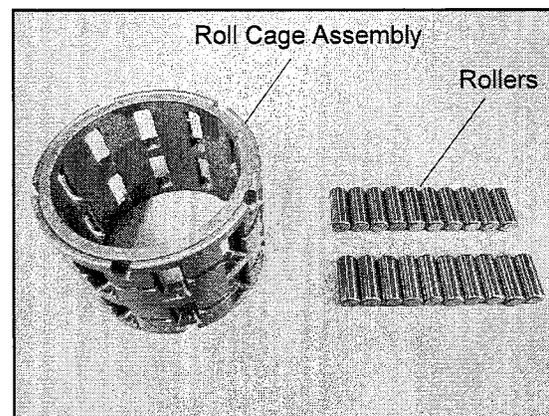
2. Turn the ignition and AWD switches on and place gear selector in High or Low gear. Check for minimum battery voltage at the Gray and Brown/White chassis wires that power the coil. A minimum of 11 Vdc should be present.
3. If electrical tests are within specification, remove gearcase (see "Gearcase Removal") and inspect components.
4. Inspect the armature plate for a consistent wear pattern. There should be two distinct wear bands (one band inside the other). If only one band of wear is present (or if there is wear between the two bands), inspect the coil area as indicated in Step 5. A wear band with an interrupted wear mark may indicate a warped plate, which may cause intermittent operation. See the following illustrations:



5. Check to make sure the coil is seated in the U-shaped insert that is pressed into the gearcase cover. The top of the coil should be seated below the U-shaped insert. The U-shaped insert controls the pole gap. If the top of the coil is above the surface of the U-shaped insert it raises the armature plate, thereby increasing pole gap. If the pole gap increases the coil will not be strong enough to engage the AWD system. If this is found, replace the cover plate assembly.



6. Inspect the rollers for nicks and scratches. The rollers must slide up, down, in and out freely within the roll cage sliding surfaces and H-springs.
7. Inspect the roll cage assembly for cracks or excessive wear. If damaged, replace the roll cage assembly.

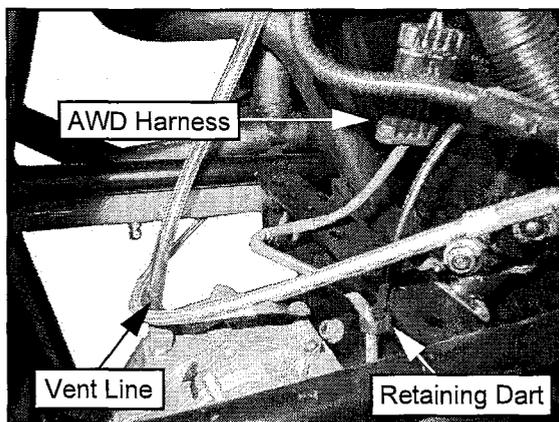


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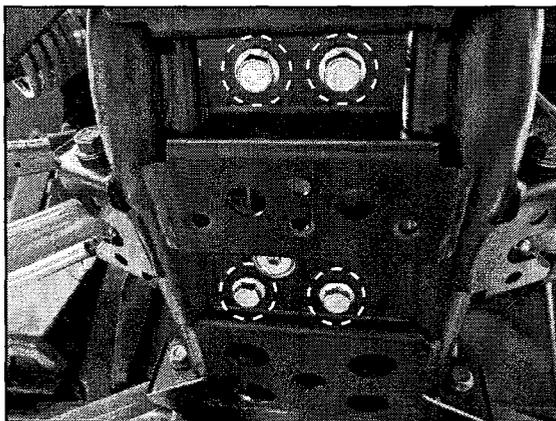
FINAL DRIVE

Gearcase Removal

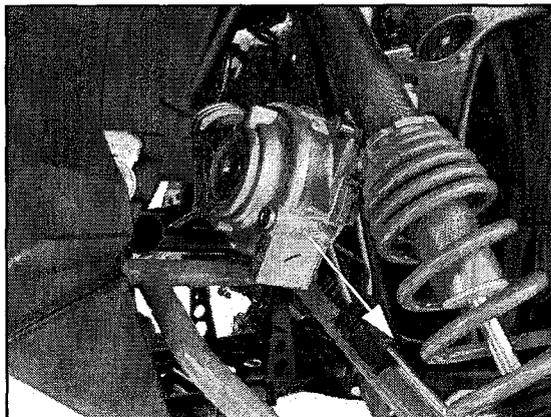
1. Raise and support vehicle
2. Place gear selector in neutral.
3. Refer to "FRONT DRIVE SHAFT - Drive Shaft Removal" and remove both front drive shafts from the front gearcase.
4. Remove the front section of the propshaft (see "PROPSHAFT SERVICE").
5. Disconnect the wire harness for the front gearcase and remove the harness from the retaining dart.
6. Remove the vent line from the front gearcase and plug vent line fitting.



7. Remove the (4) bolts securing the front gearcase to the frame.

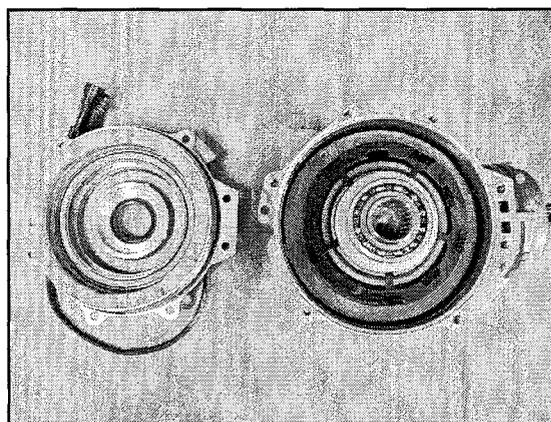
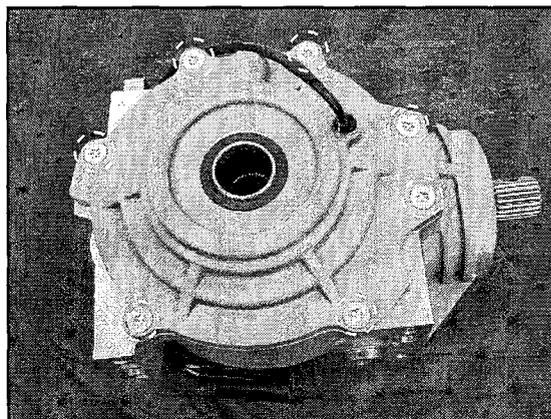


8. Rotate front of gearcase up so the input shaft is facing down. Lift and remove the gearcase from the front LH wheel well area and slide it out of the vehicle above the upper A-arm.

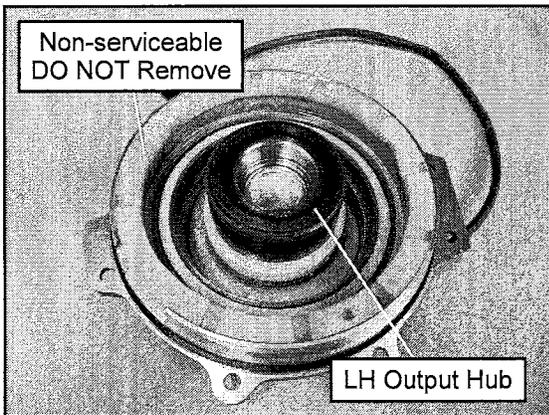
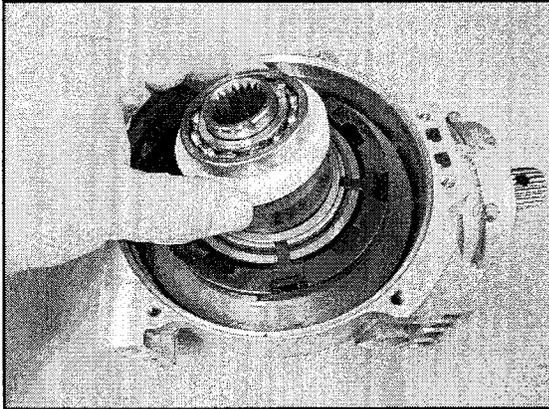


Gearcase Disassembly / Inspection

1. Drain and properly dispose of gearcase fluid. Remove any metal particles from the drain plug magnet.
2. Remove the (7) cover screws and remove the cover plate assembly.

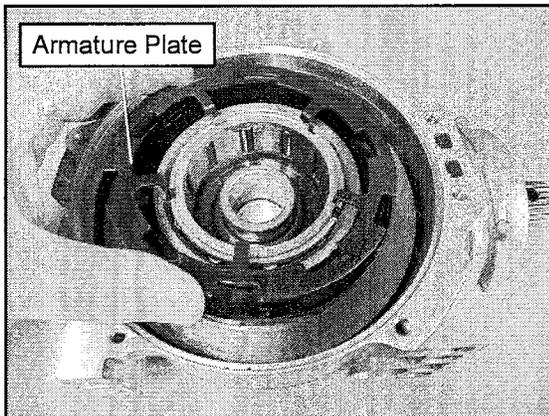


3. Remove the LH output hub assembly from the clutch housing or outer cover plate assembly.

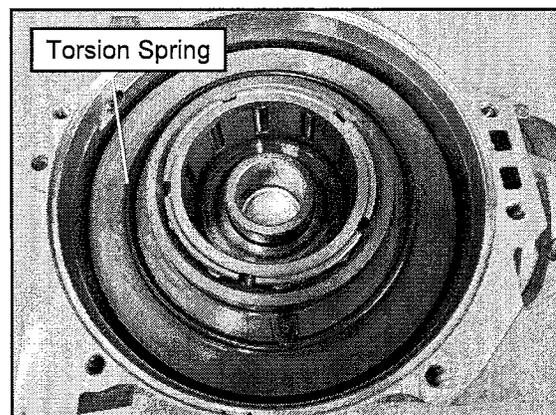
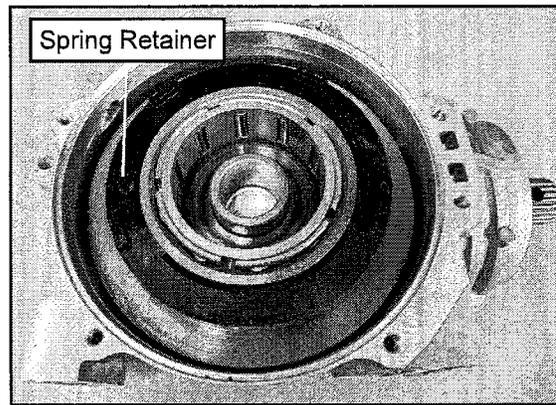


NOTE: Nylon spacer is non-serviceable and should not be removed.

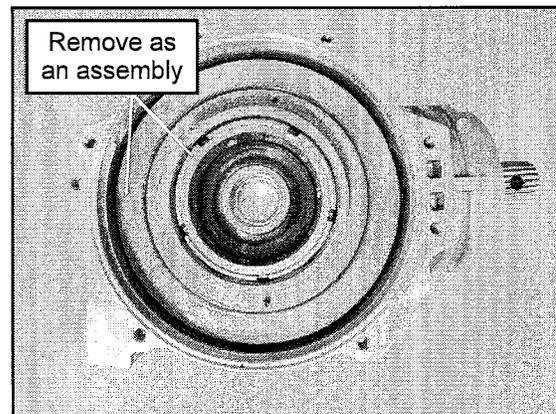
4. Remove and inspect the armature plate. Refer to “AWD Diagnosis” for detailed inspection process.



5. Remove the torsion spring retainer and torsion spring from the top of the ring gear.



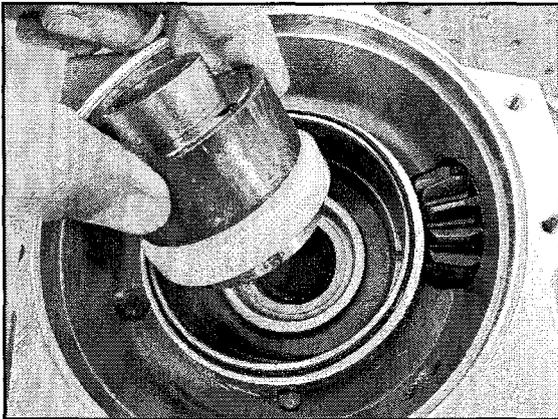
6. Remove the clutch housing / ring gear and roll cage assembly from the gearcase housing.



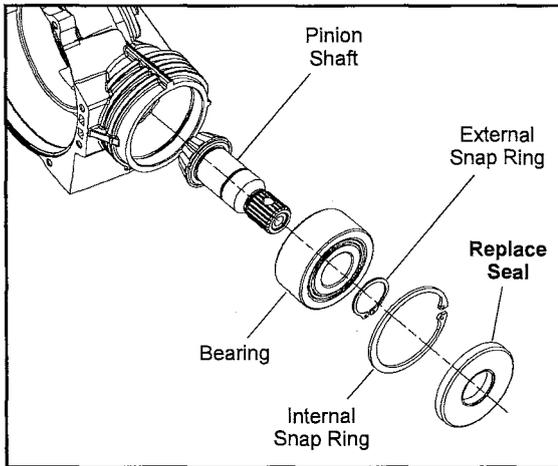
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FINAL DRIVE

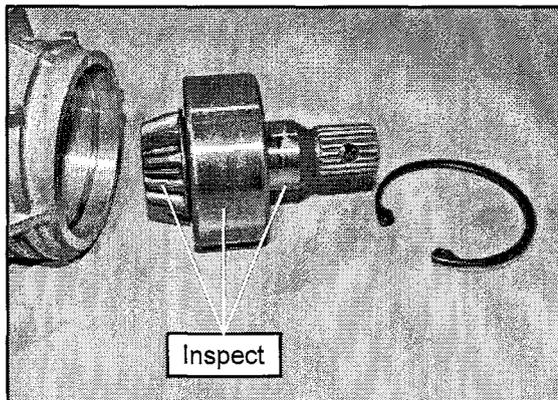
7. Remove the RH output hub assembly from the gearcase housing.



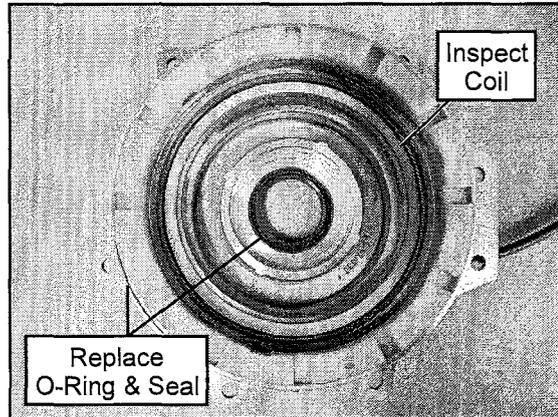
8. Remove pinion seal, internal retaining ring and pinion gear assembly from the gearcase housing. Inspect and clean the gearcase housing and replace all oil seals and O-rings.



9. Inspect the pinion gear for chipped, broken or missing teeth. Inspect the pinion bearing for signs of wear and the pinion shaft seal surface for pitting.



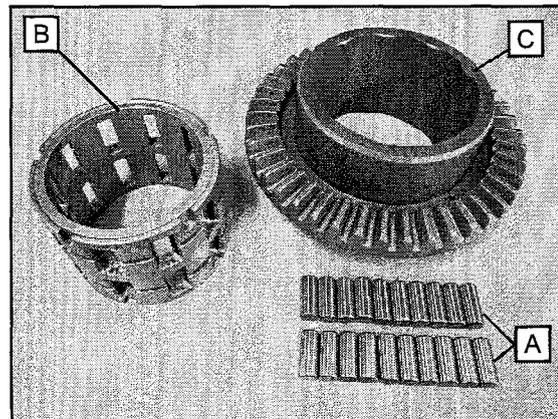
10. Inspect the AWD coil located in the outer cover plate assembly. Refer to "AWD Diagnosis" for detailed inspection process. Replace the cover plate seal and O-ring.



11. Remove the roll cage assembly and rollers from the clutch housing. Use a shop towel to cover the housing in order to retain all the rollers.

NOTE: Rollers are spring loaded. Take care not to allow them to fall out or lose them upon removal of the roll cage.

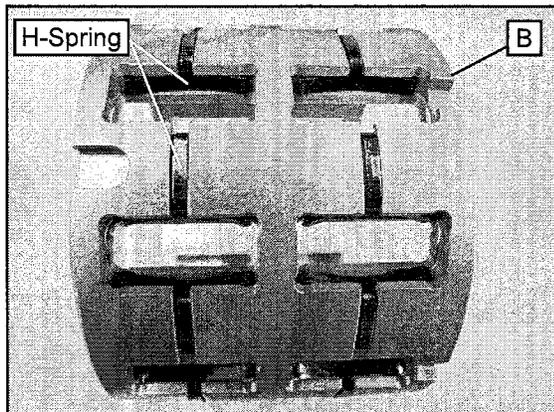
12. Thoroughly clean all parts and inspect the rollers (A) for nicks and scratches. The rollers must slide up and down and in and out freely within the roll cage (B) sliding surfaces and H-springs.



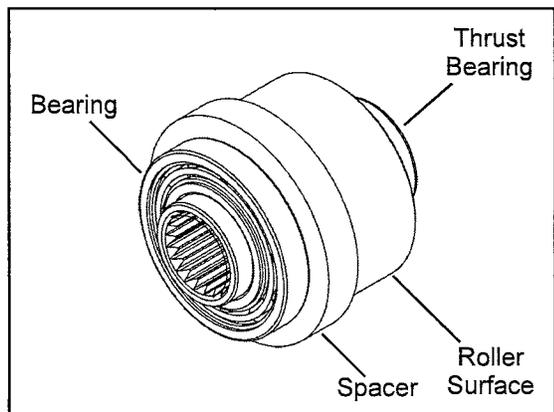
IMPORTANT: Refer to the "Electronic Parts Catalog" for individual part availability. Most parts are to be replaced as an assembly or as a complete kit.

13. Inspect clutch housing / ring gear (C) for a consistent wear pattern. Inspect the ring gear for chipped, broken, or missing teeth.

14. Inspect the roll cage assembly (B) sliding surfaces and H-springs. The sliding surfaces must be clean and free of nicks, burrs or scratches. If damaged, replace the roll cage assembly.



15. Inspect both output hub assemblies. Inspect the bearings and replace if needed.



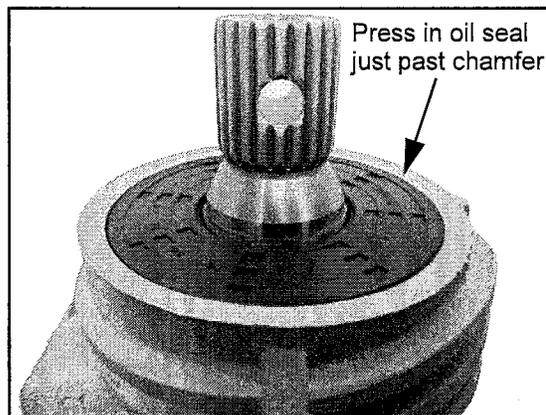
16. Clean and inspect all remaining front gearcase components. Check each for excessive wear or damage.

Gearcase Assembly

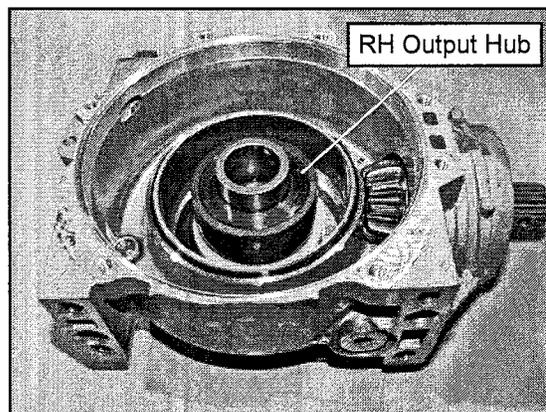
1. As mentioned during gearcase disassembly section, replace all O-rings, seals and worn components.
2. Install pinion shaft assembly and install internal snap ring.

NOTE: If bearing replacement was required, press new bearing onto the pinion shaft and install a new external snap ring.

3. Install a new pinion shaft seal into the pinion gear housing. Using a universal seal installer, press the new seal into the housing until the seal is just below the housing chamfer.



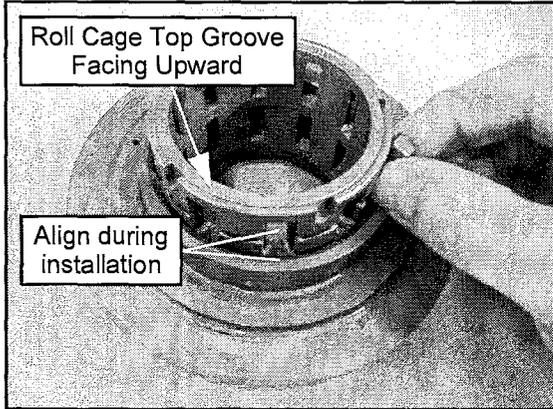
4. Install the RH output hub into the gearcase housing.



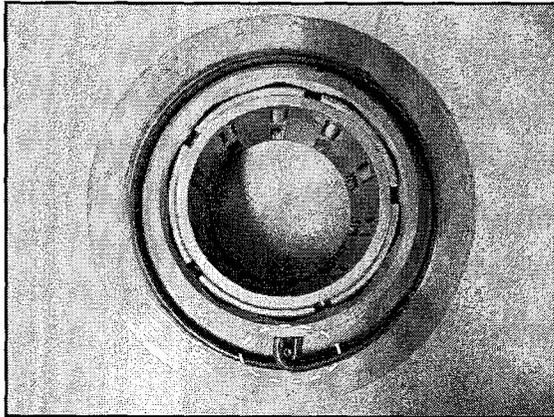
FINAL DRIVE

5. Carefully install the rollers into the roll cage assembly while installing the assembly into the clutch housing.

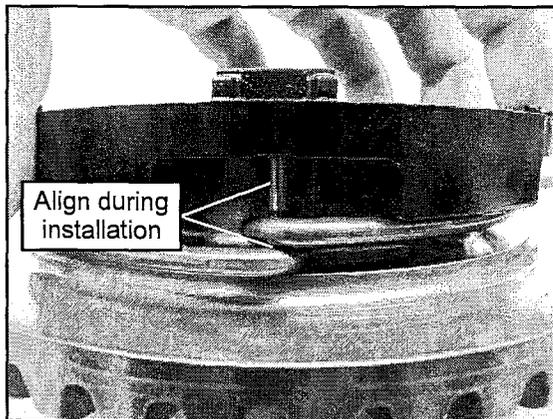
NOTE: Install the roll cage so that the ring gear grooves line up with the roll cage windows (see below). Be sure roll cage top groove is facing upward.



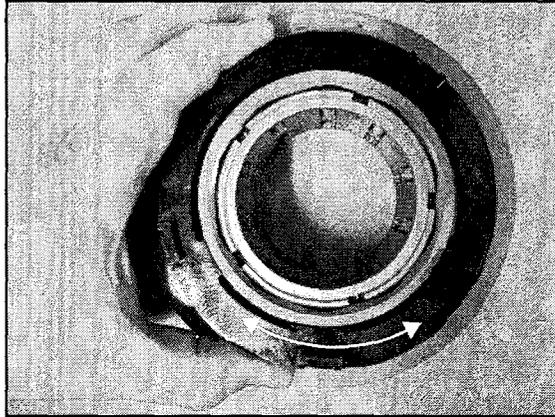
6. Install the torsion spring by wrapping each leg of the spring around the dowel pin on the ring gear.



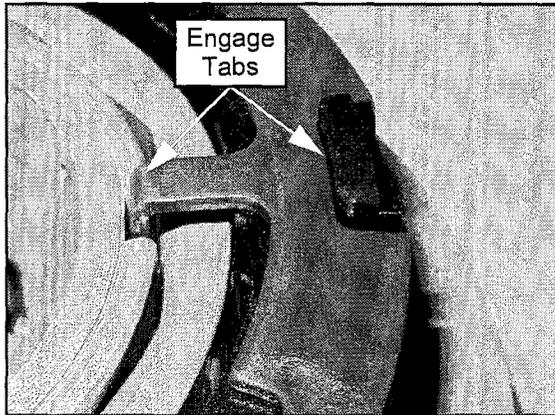
7. Align the spring retainer dowel pin with the ring gear dowel pin and install the retainer on top of the torsion spring.



8. Check the action of the torsion spring by rotating in both directions to ensure the spring and retainer are installed properly.

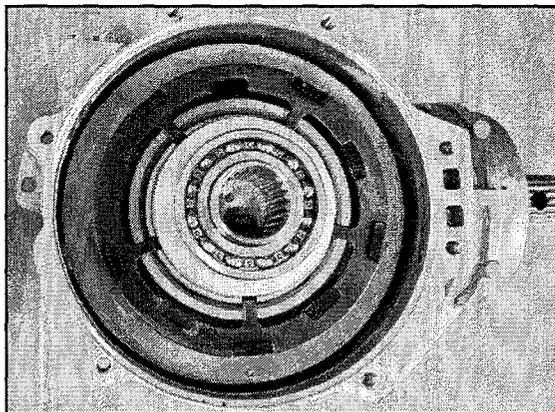


9. Install the armature plate. Be sure all of the armature plate tabs are fully engaged into the roll cage assembly and that it is resting properly on the torsion spring retainer.



NOTE: Verify armature plate tabs are in the roll cage slots and that it rests properly on the spring retainer.

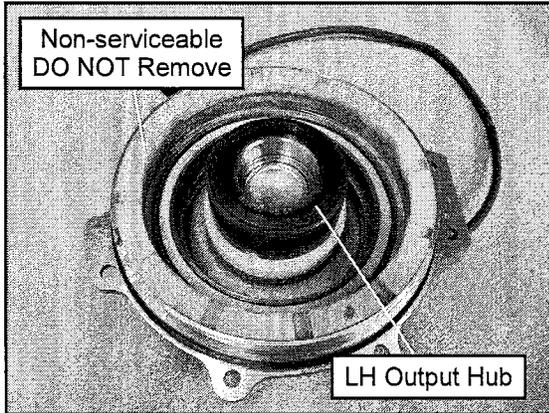
10. Carefully install the ring gear and roll cage assembly into the gearcase housing.



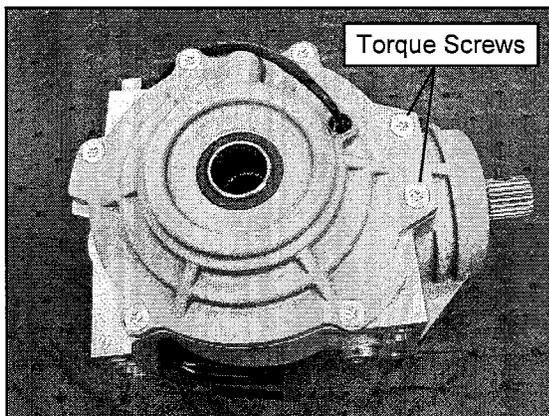
11. Install a new O-ring on the cover plate assembly.

NOTE: Be sure the square O-ring is placed flat on the cover surface. If the O-ring is twisted fluid leakage may occur.

12. Carefully install the LH output hub assembly into the cover plate. Take care not to damage the new cover plate seal while installing the output hub.



13. Install the output cover assembly onto the gearcase housing. Install the (7) cover plate screws and torque to specification.

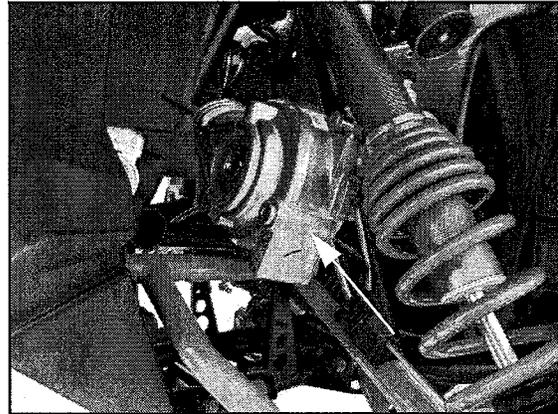


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**Cover Plate Screws:
7-11 ft. lbs. (10-15 Nm)**

Gearcase Installation

1. Install the gearcase back into the vehicle through the LH wheel well area, above the upper A-arm.

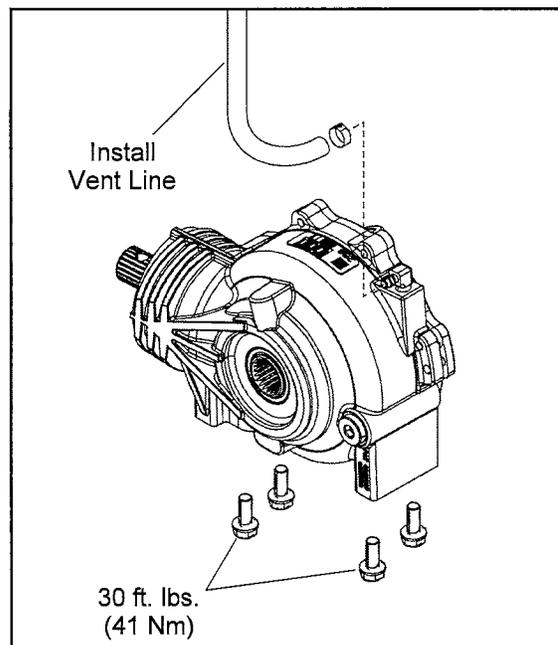


2. Lubricate the splines of the front gearcase with Anti-Seize.
3. Install the propshaft onto the front gearcase input shaft. Use a NEW spring pin in the front propshaft.
4. Install the (4) bolts that secure the front gearcase to the frame and torque to specification.

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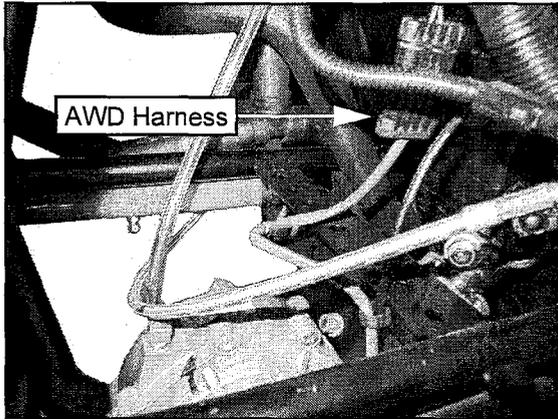
**Front Gearcase Mounting Bolts:
30 ft. lbs. (41 Nm)**

5. Install the vent line.

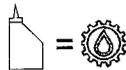


FINAL DRIVE

6. Connect the AWD wire harness.



7. Refer to "FRONT DRIVE SHAFT - Drive Shaft Installation" and install both front drive shafts into the gearcase.
8. Add the proper lubricant to the front gearcase. Refer to Chapter 2 for fluid fill and change information.



Recommended Front Gearcase Fluid:

Polaris Demand Drive Plus
(PN 2877922) (Quart)

Capacity: 6.75 oz. (200 ml)

REAR BEARING CARRIER

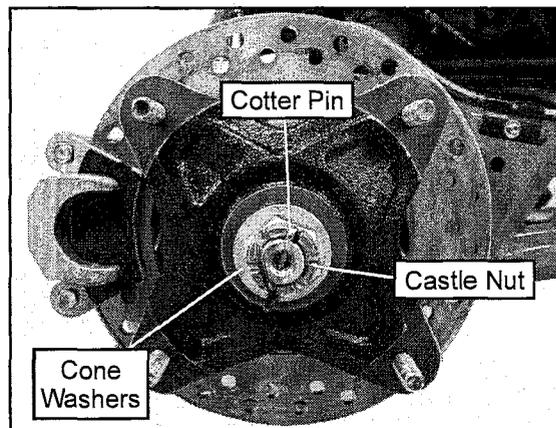
Bearing Carrier Inspection / Removal

1. Elevate rear of vehicle and safely support machine under the frame area.

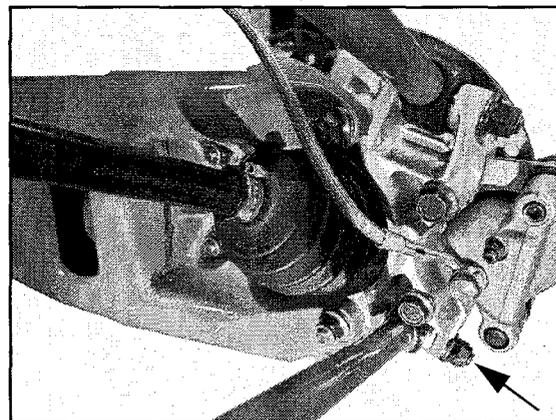
CAUTION

Serious injury may result if machine tips or falls. Be sure machine is secure before beginning this service procedure. Wear eye protection when removing bearings and seals.

2. Check bearings for side play by grasping the top and bottom of the tire firmly and checking for movement. The tire should rotate smoothly without binding or rough spots.
3. Remove the (4) wheel nuts and remove the rear wheel.
4. Remove the cotter pin and loosen the rear wheel hub castle nut. Remove the nut, and (2) cone washers from the rear wheel hub assembly.

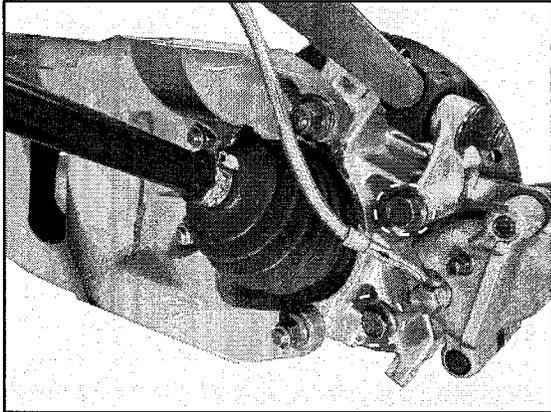


5. Remove the lower radius rod outer mounting bolt, nut and washer from the bearing carrier. Swing radius rod down. Discard the nut.

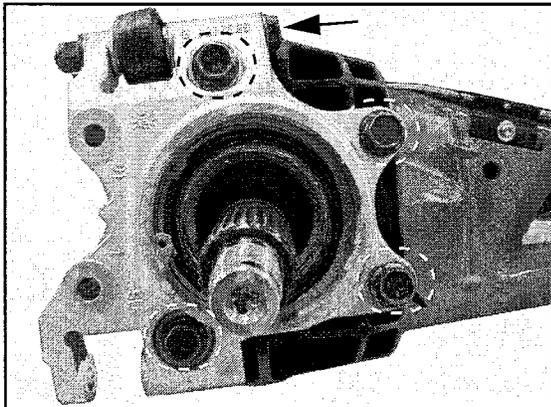


- Remove the two brake caliper mounting bolts. Remove the rear brake caliper assembly.

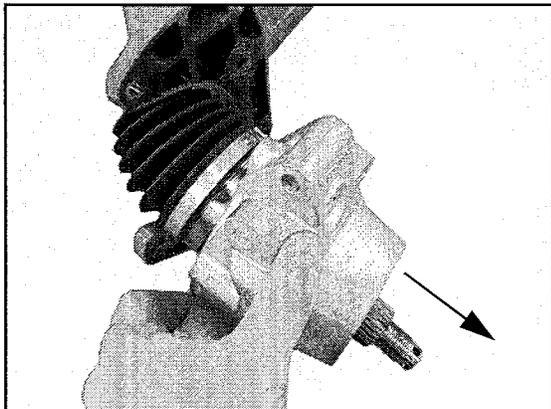
CAUTION: Do not hang the caliper by the brake line. Use wire to hang caliper to prevent damage to the brake line.



- Remove the rear wheel hub and brake disk assembly.
- Remove the (5) remaining bolts that attach the rear bearing carrier to the trailing arm. Discard the nuts.



- Remove the bearing carrier from the rear drive shaft and trailing arm.



- Rotate bearing by hand and check for smooth rotation. Visually inspect bearing for moisture, dirt, or corrosion.

NOTE: Due to extremely close tolerances and minimal wear, the bearings must be inspected visually, and by feel. While rotating bearings by hand, inspect for rough spots, discoloration, or corrosion. The bearings should turn smoothly and quietly, with no detectable up and down movement and minimal movement sideways between inner and outer race.

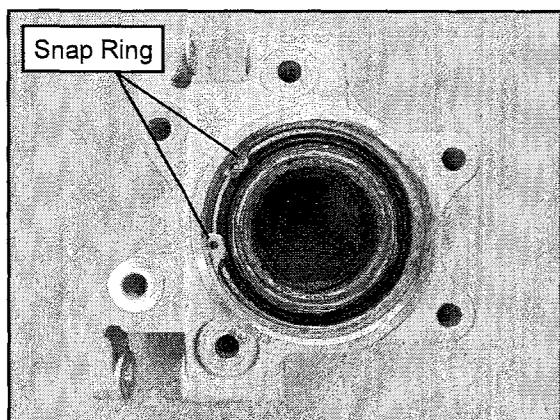
- Replace bearing if moisture, dirt, corrosion, or roughness is evident.

FINAL DRIVE

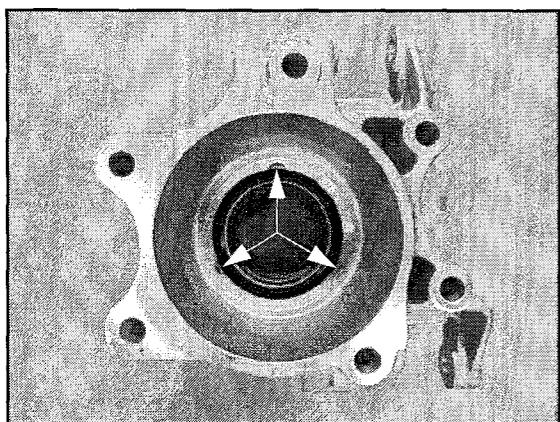
Bearing Replacement

Bearing Removal

1. Remove the outer snap ring.



2. From the back side of the bearing carrier, tap on the outer bearing race with a drift punch in the reliefs as shown.



3. Drive bearing out evenly by tapping on outer race only. Once bearing is at bottom of casting, support casting on outer edges so bearing can be removed.
4. Inspect the bearing carrier housing for scratches, wear or damage. Replace rear bearing carrier if damaged.

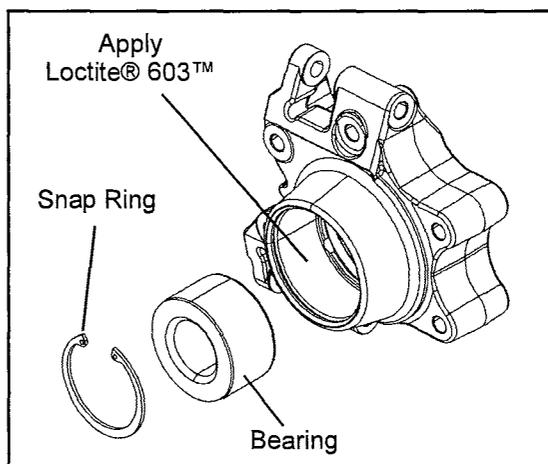
Bearing Installation

5. Thoroughly clean the rear bearing carrier housing and the outer race on the new bearing. Be sure that all oil residue has been removed from each surface.
6. Support the bottom of the bearing carrier housing.

CAUTION

Use an arbor and press only on the outer race, otherwise bearing damage may occur.

7. Apply **Loctite® 603™** retaining compound to the outer circumference of the new bearing race and carefully press the new bearing into the bearing carrier housing.

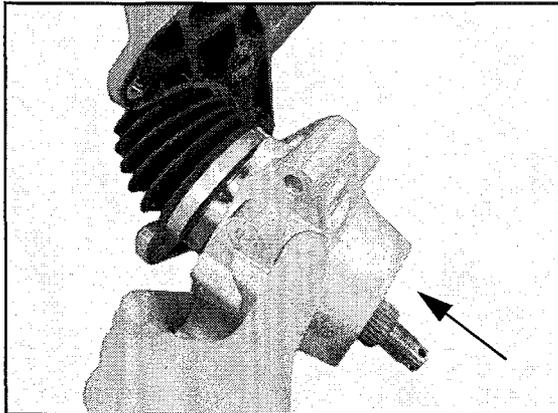


NOTE: Use care to not allow any of the **Loctite®** compound to get in the bearing.

8. Wipe the housing clean of any excess compound and install the snap ring.

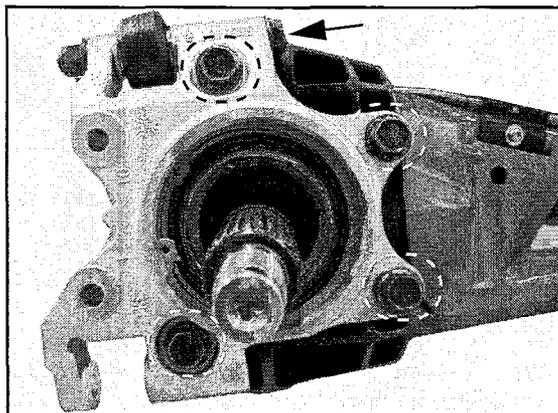
Bearing Carrier Installation

1. Install drive shaft through the backside of the bearing carrier.



2. Install the (4) fasteners that attach the rear bearing carrier to the trailing arm. Install the (1) fastener that attaches the upper radius rod to the bearing carrier. Torque bolts to specification.

NOTE: Use new nuts upon installation of the rear bearing carrier.



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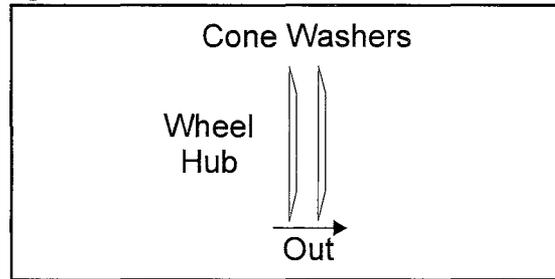
Bearing Carrier to Trailing Arm Bolts:
50 ft. lbs. (67.7 Nm)

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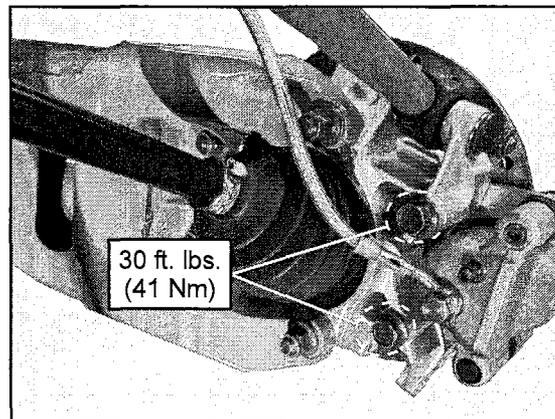
Radius Rod to Bearing Carrier Bolts:
50 ft. lbs. (67.7 Nm)

3. Apply anti-seize to drive shaft splines.

4. Install rear wheel hub assembly, cone washers, and hand tighten the castle nut. Install washers with domed side out.



5. Install the rear brake caliper assembly and new bolts. Torque to specification.

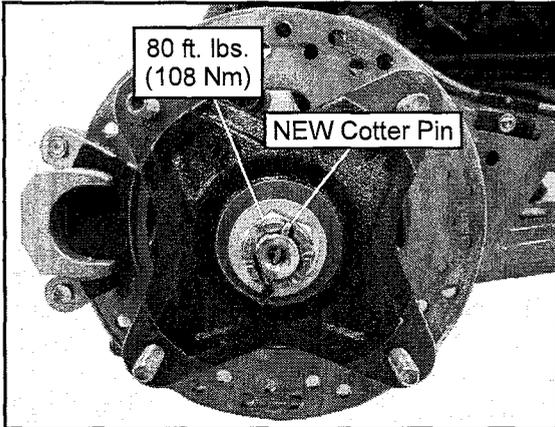


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Rear Caliper Mounting Bolts:
30 ft. lbs. (41 Nm)

FINAL DRIVE

- Torque wheel hub nut to specification and install a new cotter pin. Tighten nut slightly if necessary to align cotter pin holes.



 = T
Wheel Hub Castle Nut:
80 ft. lbs. (108 Nm)

- Install wheel and (4) wheel nuts. Torque wheel nuts to specification.

 = T
Wheel Nuts:
30 ft. lbs. (41 Nm) + 90° (1/4 turn)

- Rotate wheel and check for smooth operation. Bend both ends of cotter pin around end of spindle in different directions.

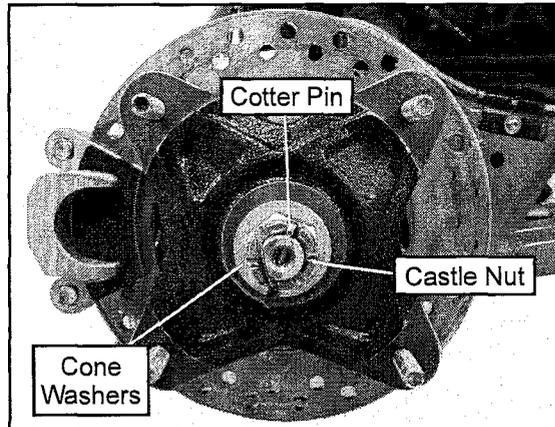
REAR DRIVE SHAFT

Drive Shaft Removal

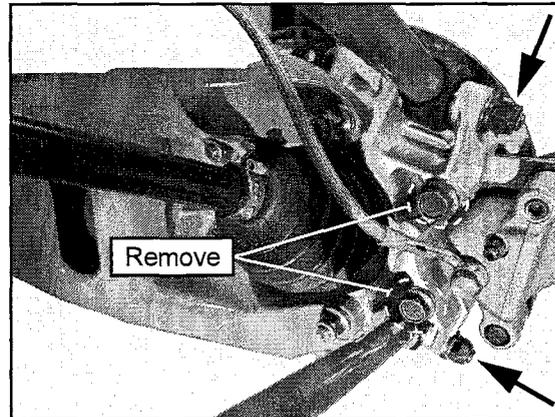
- Raise and support the vehicle.

 **CAUTION**
 Serious injury may result if machine tips or falls. Be sure machine is secure before beginning this procedure. Always wear eye protection.

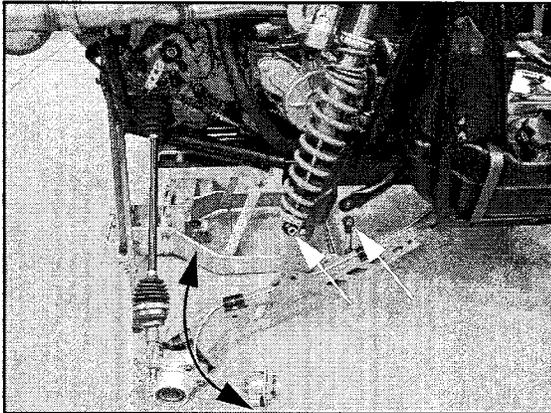
- Remove the wheel nuts from rear wheel. Remove the rear wheel.
- Remove the cotter pin and loosen the rear wheel hub castle nut. Remove the nut, and (2) cone washers from the rear wheel hub assembly.



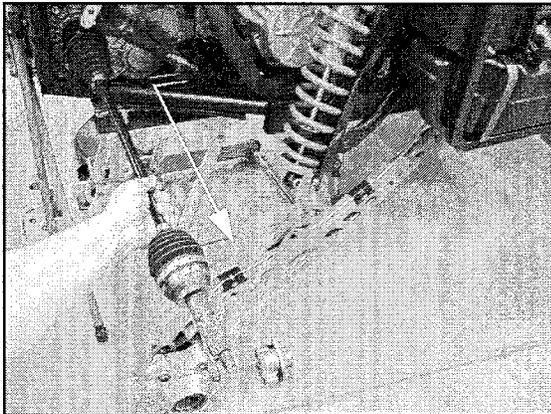
- Remove the (2) bolts attaching the upper and lower radius rods to the bearing carrier. Discard the nuts. Let the radius rods swing downward.
- Remove the brake caliper mounting bolts. Remove the rear brake caliper assembly.
CAUTION: Do not hang the caliper by the brake line. Use wire to hang caliper to prevent damage to the brake line.



6. Remove the rear hub assembly from the bearing carrier.
7. Support the trailing arm from underneath.
8. Remove the lower shock mounting bolt and nut. Swing the shock inward. Discard the nut.
9. Remove the stabilizer bar mounting bolt, washer and nut. Discard the nut.
10. Lift the trailing arm assembly upward so the rear drive shaft is parallel with the ground.
11. Leaving the drive shaft in the transmission, swing the rear trailing arm assembly outward until it is free from the rear drive shaft.
12. Lower the trailing arm.

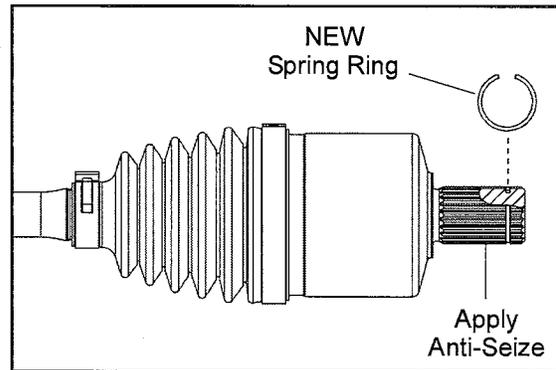


13. With a short, sharp jerk, remove drive shaft from the transmission splines.

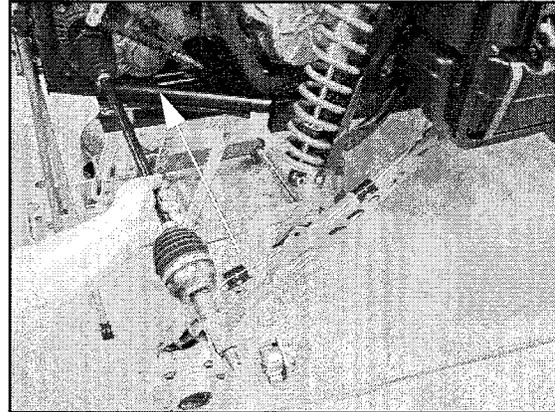


Drive Shaft Installation

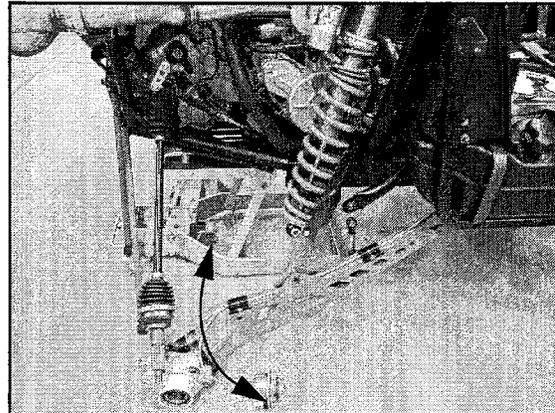
1. Install **new** spring ring on drive shaft. Apply an anti-seize compound to the splines.



2. Align splines of drive shaft with transmission splines and reinstall the drive shaft. Use a rubber mallet to tap on the outboard end of the drive shaft if necessary.



3. Swing the rear trailing arm assembly outward and upward until the rear axle can be inserted into the bearing carrier. Support the trailing arm from underneath.



FINAL DRIVE

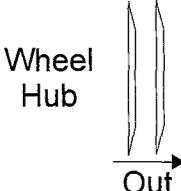
4. Install the lower shock mounting bolt and **new** nut. Torque fastener to specification.

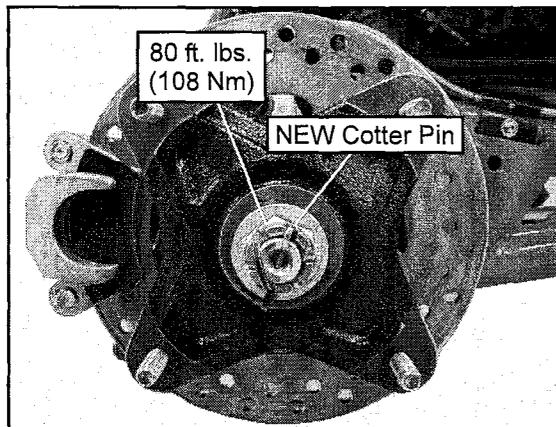
 = T
Lower Shock Bolt to Trailing Arm: 70 ft. lbs. (95 Nm)

5. Install the stabilizer bar mounting bolt, washer and **new** nut. Torque fastener to specification.

 = T
Stabilizer Bar Linkage: 31-34 ft. lbs. (42-46 Nm)

6. Apply Anti-Seize to drive shaft axle splines.
7. Install rear wheel hub assembly. Install the (2) cone washers and castle nut. Torque castle nut to specification. Install new cotter pin.

Cone Washers


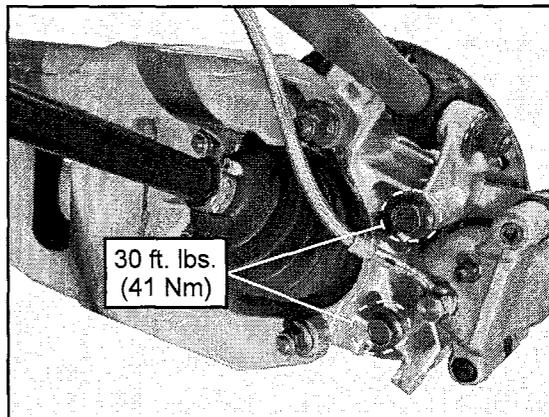


 = T
Rear Wheel Hub Castle Nut: 80 ft. lbs. (108 Nm)

8. Install the radius rod bolts, washers and **new** nuts. Torque fasteners to specification.

 = T
Radius Rods to Bearing Carrier: 50 ft. lbs. (67.7 Nm)

9. Install the rear brake caliper assembly and **new** bolts. Torque to specification.



 = T
Rear Caliper Mounting Bolts: 30 ft. lbs. (40.6 Nm)

10. Install wheel and (4) wheel nuts. Torque wheel nuts to specification.

 = T
Wheel Nuts: 30 ft. lbs. (41 Nm) + 90° (1/4 turn)

DRIVE SHAFT CV JOINT / BOOT REPLACEMENT

Drive Shaft / CV Joint Handling Tips

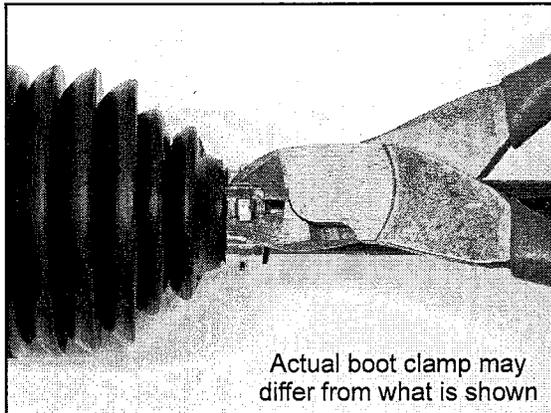
Care should be exercised during drive shaft removal or when servicing CV joints. Drive shaft components are precision parts.

Cleanliness and following these instructions is very important to ensure proper shaft function and a normal service life.

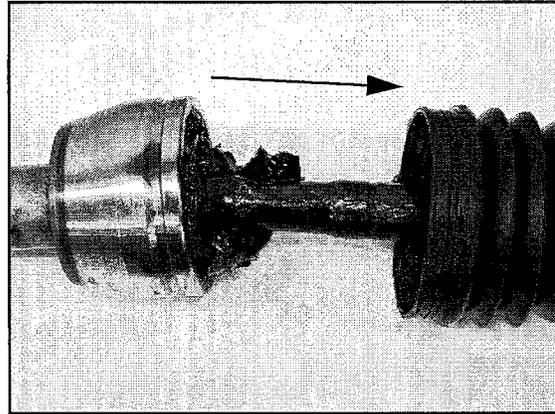
- The complete drive shaft and joint should be handled by getting hold of the interconnecting shaft to avoid disassembly or potential damage to the drive shaft joints.
- Over-angling of joints beyond their capacity could result in boot or joint damage.
- Make sure surface-ground areas and splines of shaft are protected during handling to avoid damage.
- Do not allow boots to come into contact with sharp edges or hot engine and exhaust components.
- The drive shaft is not to be used as a lever arm to position other suspension components.
- Never use a hammer or sharp tools to remove or to install boot clamps.
- Be sure joints are thoroughly clean and that the proper amount and type of grease is used to refill when joint boots are replaced and when joints are cleaned. Refer to text for grease capacity of CV joints and CV joint boots.

Outer CV Joint / Boot Replacement

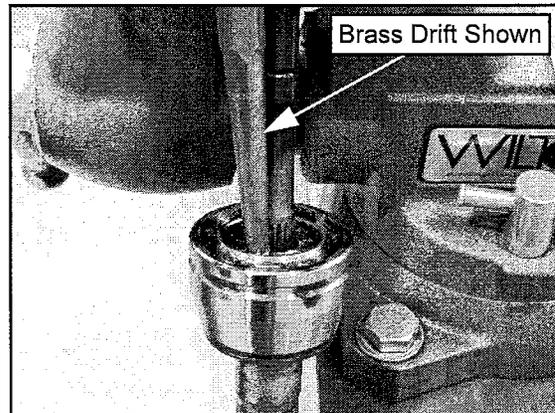
1. Using a side cutters, cut away and discard the boot clamps.



2. Remove the large end of the boot from the CV joint and slide the boot down the shaft.



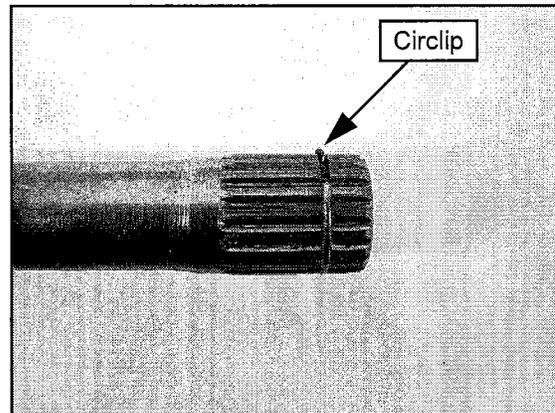
3. Clean the grease from the face of the joint.
4. Place the drive shaft in a soft-jawed vise. Using a soft-faced hammer, or brass drift, strike the inner race of the joint to drive the joint off the drive shaft. Be sure to tap evenly around the joint to avoid binding.



7

IMPORTANT: Tap on inner race only!

5. Make sure the circlip is on the shaft and not left in the joint.



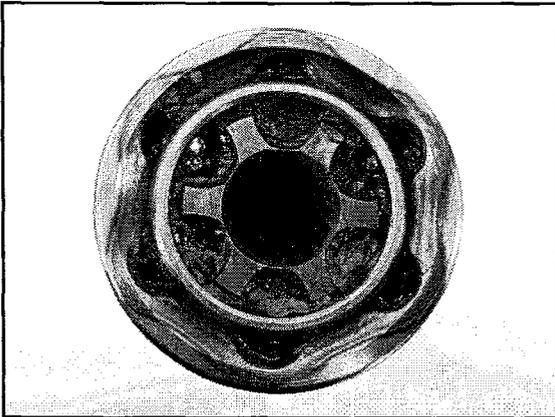
FINAL DRIVE

6. Remove the CV boot from the shaft.

CAUTION

Complete disassembly of the CV joint is **NOT** recommended. The internal components are a precision fit and develop their own characteristic wear patterns. Intermixing the internal components could result in looseness, binding, and/or premature failure of the joint.

IMPORTANT: If the grease in the joint is obviously contaminated with water and/or dirt, the joint should be replaced.



7. Thoroughly clean the joint with an appropriate solvent and dry the joint to prevent any residual solvent from being left in the joint upon reassembly.
8. Visually inspect the joint by tilting the inner race to one side to expose each ball. Severe pitting, galling, play between the ball and its cage window, any cracking or damage to the cage, pitting or galling or chips in raceways call for joint replacement.

NOTE: Shiny areas in ball tracks and on the cage spheres are normal. Do not replace CV joints because parts have polished surfaces. Replace CV joint only if components are cracked, broken, worn or otherwise unserviceable.

9. Clean the splines on the end of the shaft and apply a light coat of grease prior to reassembly.
10. Slide the small boot clamp and boot (small end first) onto the drive shaft and position the boot in its groove machined in the shaft.
11. Install a new circlip on the end of the shaft.

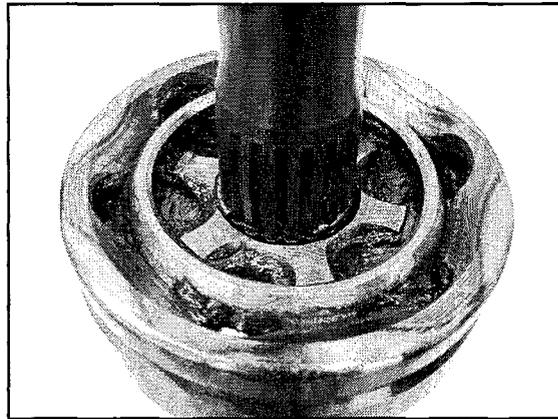
12. Grease the joint with the special CV joint grease provided in the boot replacement kit. Fill the cavity behind the balls and the splined hole in the joint's inner race. Pack the ball tracks and outer face flush with grease. Place any remaining grease into the boot.

CAUTION

The grease provided in the replacement kit is specially formulated for wear resistance and durability. **DO NOT** use substitutes or mix with other lubricants.

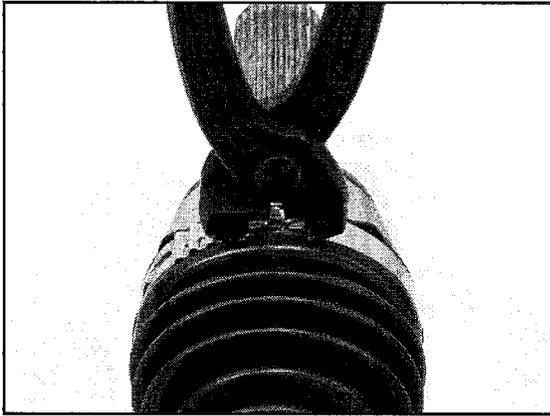
NOTE: The amount of grease that's provided is pre-measured, so use all the grease.

13. Slide the joint onto the drive shaft splines and align the circlip with the lead-in chamfer on the inner race of the joint.



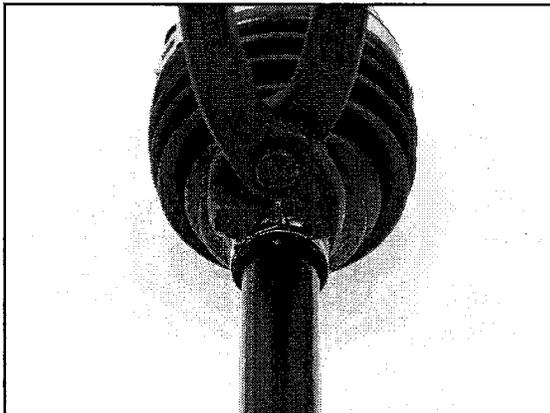
14. Use a soft-faced hammer to tap the joint onto the drive shaft until it locks into place.
15. Pull on the joint to make sure it is securely locked in place.
16. Remove excess grease from the CV joint's external surfaces and place the excess grease in the boot.
17. Pull the boot over the joint and position the boot lips into the grooves on the joint housing and shaft. Make sure the boot is not dimpled or collapsed.

18. Install and tighten the large clamp using the appropriate clamp tool.



Axle Boot Clamp Tool: PU-48951
or
CV Boot Clamp Pliers: 8700226

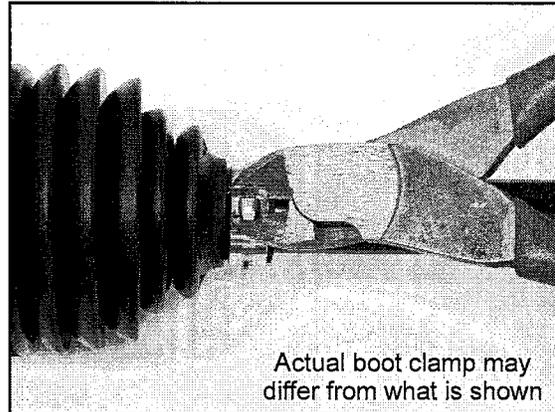
19. While pulling out on the CV shaft, fully extend the CV joint and slide a straight O-ring pick or a small slotted screw driver between the small end of the boot and the shaft. This will allow the air pressure to equalize in the CV boot in the position that the joint will spend most of its life. Before you remove your instrument, be sure the small end of the boot is in its correct location on the shaft.
20. Install and tighten the small clamp on the boot using the appropriate clamp tool.



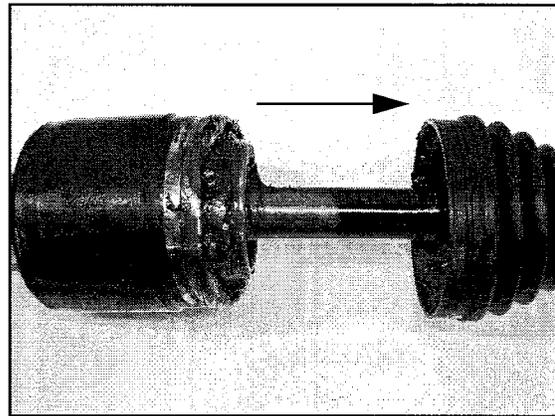
Axle Boot Clamp Tool: PU-48951
or
CV Boot Clamp Pliers: 8700226

Inner Plunging Joint / Boot Replacement

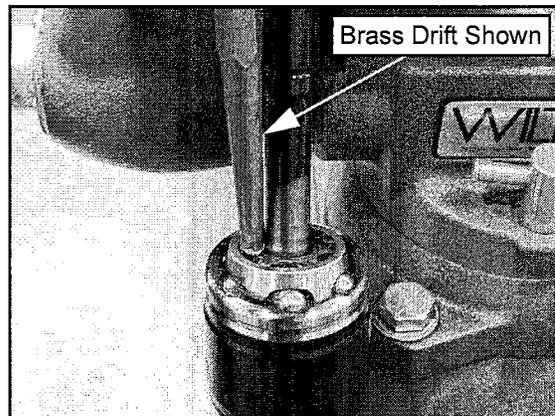
1. Using a side cutters, cut away and discard the boot clamps.



2. Remove the large end of the boot from the plunging joint and slide the boot down the shaft.



3. Clean the grease from the face of the joint and place the drive shaft in a soft-jawed vise.
4. Using a soft-faced hammer, or brass drift, strike the inner race of the joint to drive the joint off the drive shaft. Be sure to tap evenly around the joint to avoid binding.

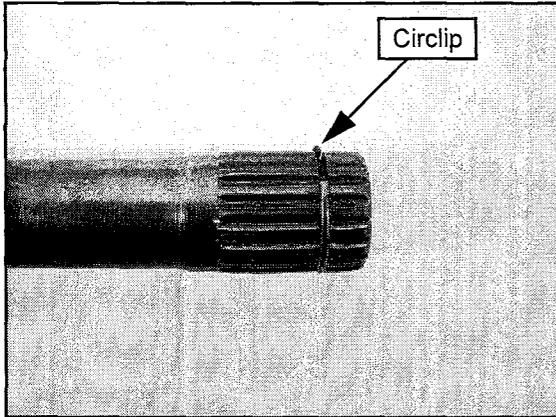


IMPORTANT: Tap on inner race only!

7

FINAL DRIVE

5. Make sure the circlip is on the shaft and not left in the joint.

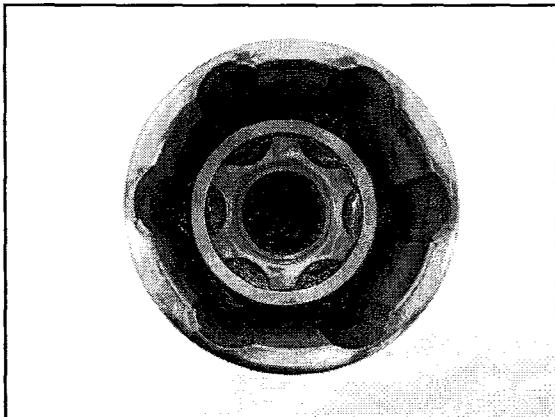


6. Remove the boot from the shaft.

CAUTION

Complete disassembly of the plunging joint is NOT recommended. The internal components are a precision fit and develop their own characteristic wear patterns. Intermixing the internal components could result in looseness, binding, and/or premature failure of the joint.

IMPORTANT: If the grease in the joint is obviously contaminated with water and/or dirt, the joint should be replaced.



7. Thoroughly clean the joint with an appropriate solvent and dry the joint to prevent any residual solvent from being left in the joint upon reassembly.
8. Visually inspect the joint for damage. Replace if needed.
9. Clean the splines on the end of the shaft and apply a light coat of grease prior to reassembly.

10. Slide the small boot clamp and boot (small end first) onto the drive shaft and position the boot in its groove machined in the shaft.

11. Install a **new** circlip on the end of the shaft.

12. Grease the joint with the special joint grease provided in the boot replacement kit. Fill the cavity behind the balls and the splined hole in the joint's inner race. Pack the ball tracks and outer face flush with grease. Place any remaining grease into the boot.

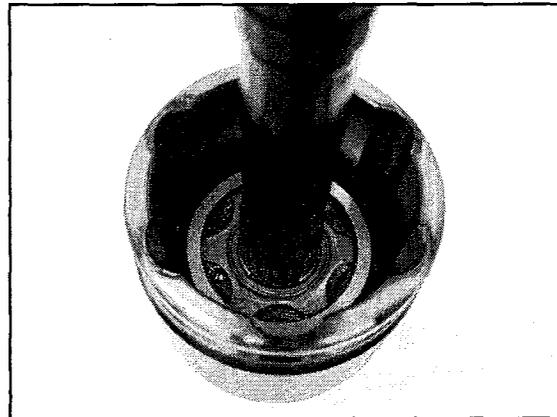
CAUTION

The grease provided in the replacement kit is specially formulated for wear resistance and durability. **DO NOT** use substitutes or mix with other lubricants.

NOTE: The amount of grease that's provided is pre-measured, so use all the grease.

13. Fully compress the joint and push the drive shaft firmly into the inner race.

14. Align the circlip with the lead-in chamfer.



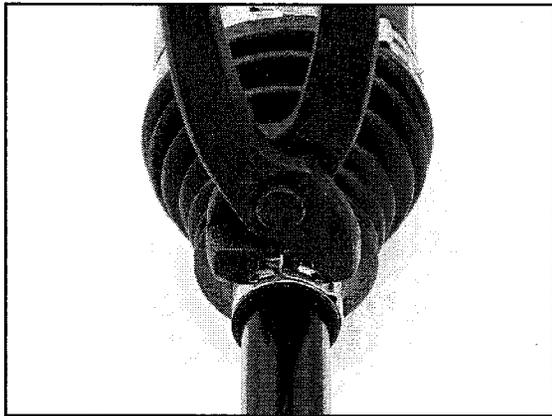
15. Use a soft-faced hammer to tap the joint onto the drive shaft until you reach the end of the splines and the joint locks in place.

16. Pull on the joint to test that the circlip is seated and that the joint is securely fastened to the shaft.

17. Remove excess grease from the plunging joint's external surfaces and place the excess grease in the boot.

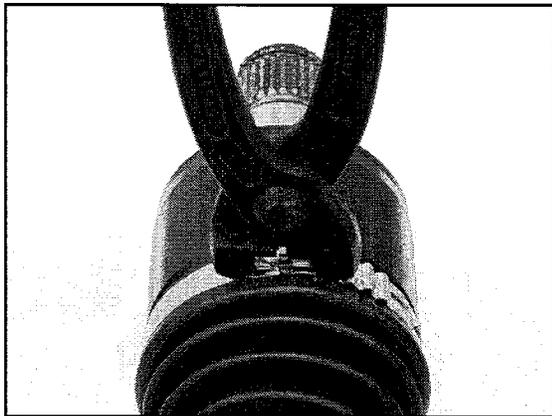
18. Pull the boot over the joint and position the boot lips into the grooves on the joint housing and shaft. Make sure the boot is not dimpled or collapsed.

19. Install and tighten the small clamp using the appropriate clamp tool.



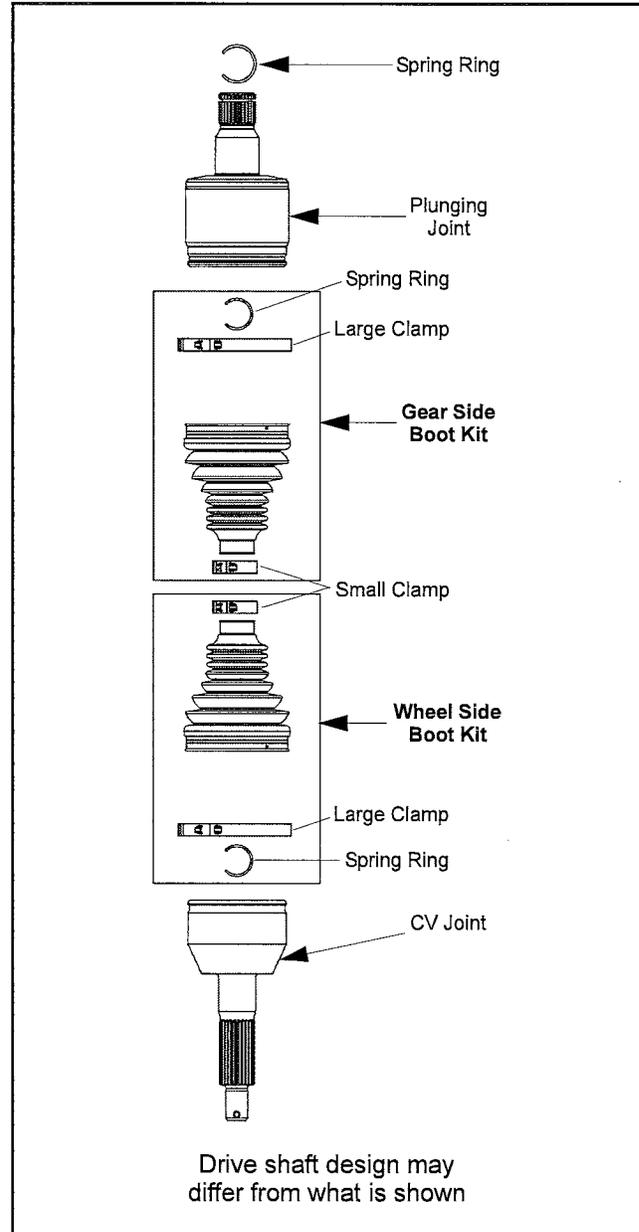
**Axle Boot Clamp Tool: PU-48951
or
CV Boot Clamp Pliers: 8700226**

20. Pull out on the drive shaft to center the joint in the housing. Slide a straight O-ring pick or a small slotted screw driver between the large end of the boot and the joint housing and lift up to equalize the air pressure in the boot.
21. Position the boot lip in its groove. Install and tighten the large clamp using the appropriate clamp tool.



**Axle Boot Clamp Tool: PU-48951
or
CV Boot Clamp Pliers: 8700226**

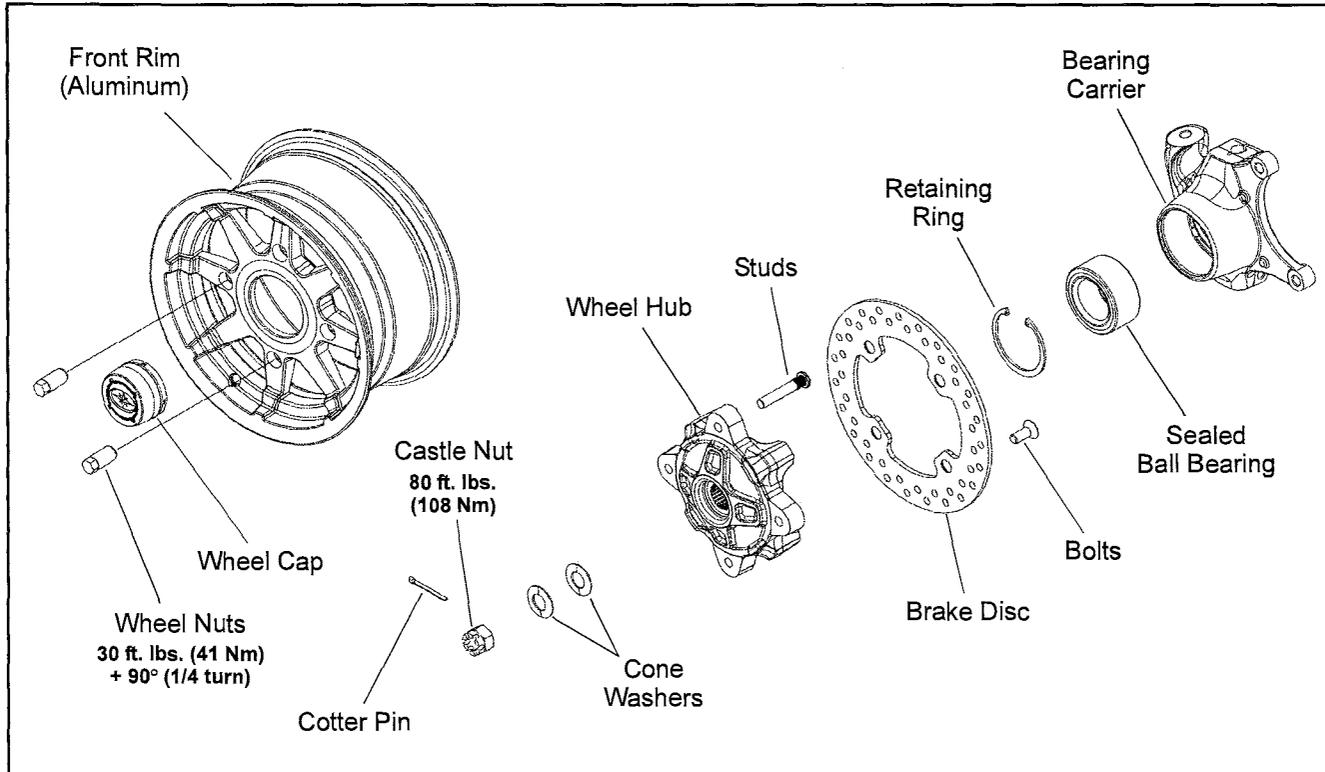
Drive Shaft Exploded View



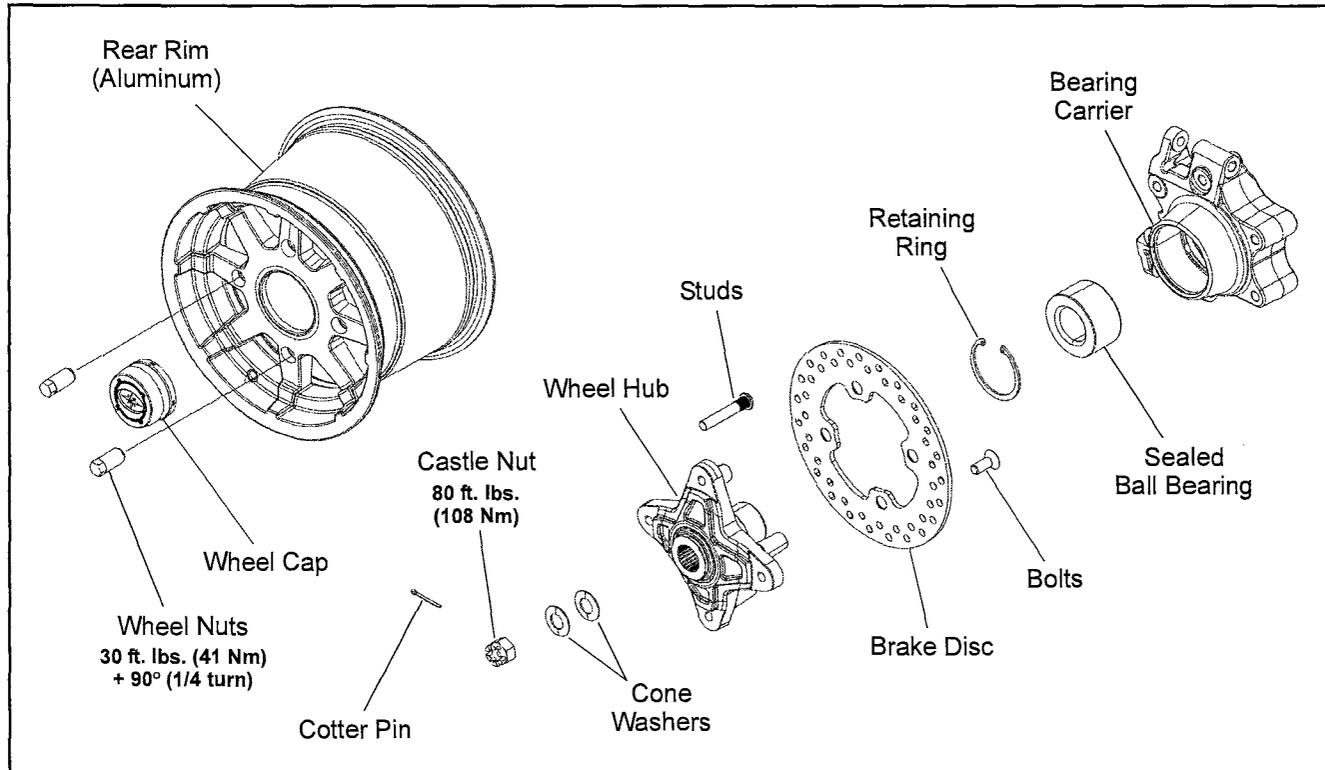
FINAL DRIVE

WHEEL HUBS

Front Hub Exploded View



Rear Hub Exploded View



CHAPTER 8

TRANSMISSION

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TRANSMISSION

SPECIFICATIONS

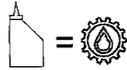
Torque Specifications

ITEM	TORQUE VALUE
Bearing Retaining Plate Screws	8-10 ft. lbs. (11-14 Nm)
Bell Crank Nut	12-18 ft. lbs. (16-24 Nm)
Fill / Drain Plugs	10-14 ft. lbs. (14-19 Nm)
Gear Sector Cover	7-9 ft. lbs. (9-12 Nm)
Park Flange Screws	8-10 ft. lbs. (11-14 Nm)
Rear Transmission Isolator Mount Bolt	40 ft. lbs. (54 Nm)
Snorkel Tube	Refer to "Snorkel Gear Backlash Procedure"
Snorkel Tube Locking Screw	8-10 ft. lbs. (11-14 Nm)
Support and Shift Cable Bracket Bolts	17 ft. lbs. (23 Nm)
Transmission Case Screws	15-20 ft. lbs. (20-27 Nm)
Vehicle Speed Sensor Screw	7-9 ft. lbs. (9-12 Nm)

Special Tools

PART NUMBER	TOOL DESCRIPTION
PA-50231	Snorkel Tool
2871698 (Part of 2871702 Kit)	Rear Output Seal Driver
2871699 (Part of 2871702 Kit)	Rear Driveshaft Seal Guide
2871282	Bearing Seal Driver (50 mm)
PU-50566	Transmission Nut Socket
PU-50658	Clutch Center Distance Tool

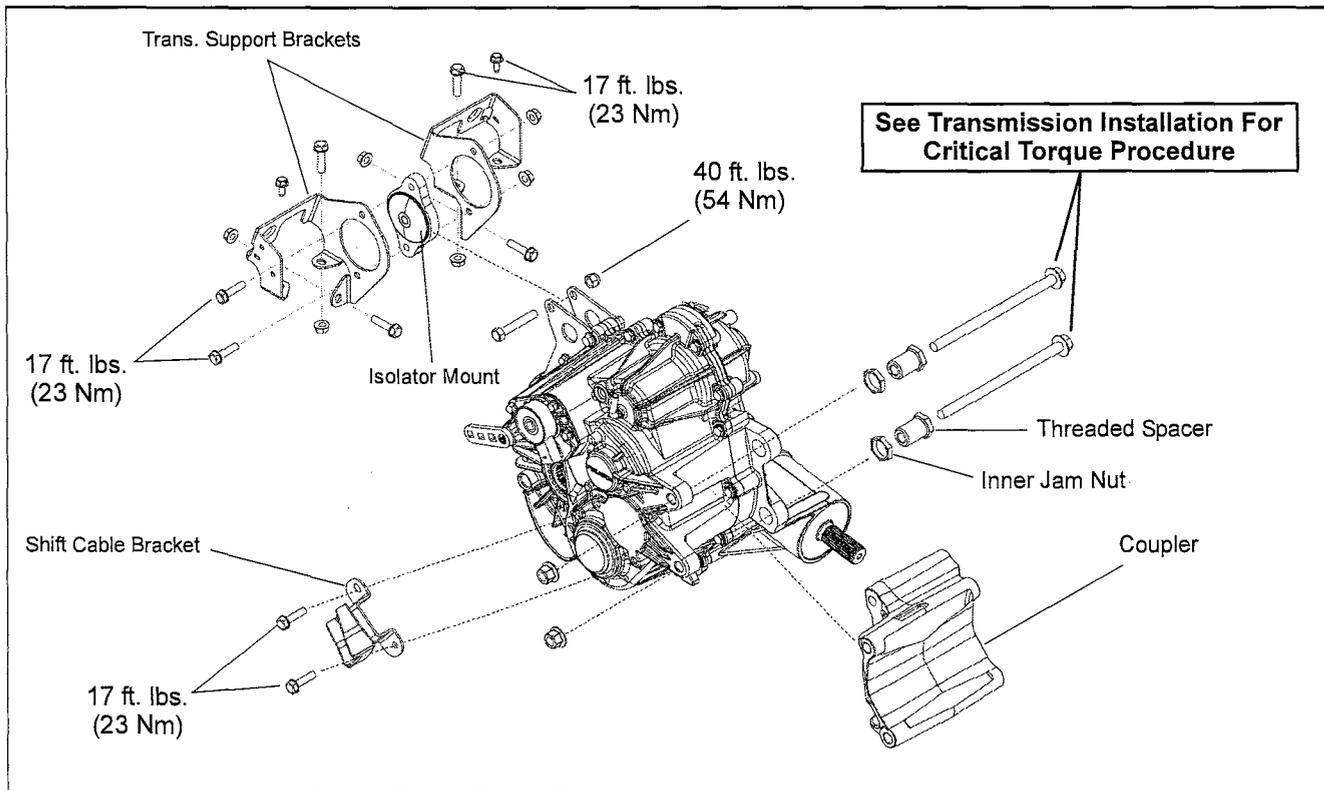
Lubrication



Recommended Transmission Lubricant:
AGL Plus (PN 2878068) (Quart)

Capacity: 44 oz. (1300 ml)

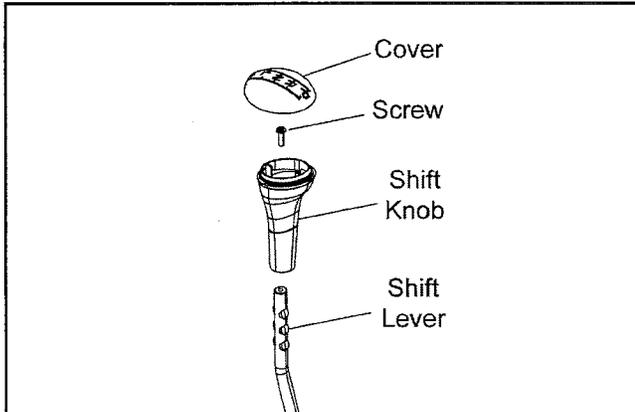
Transmission Mounting and Torque Values



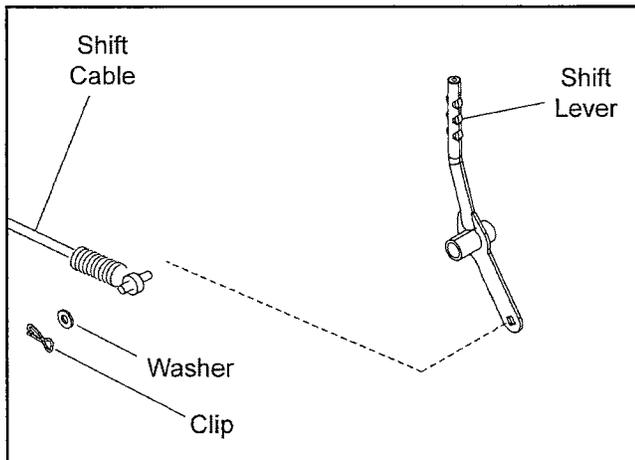
SHIFT LEVER

Removal

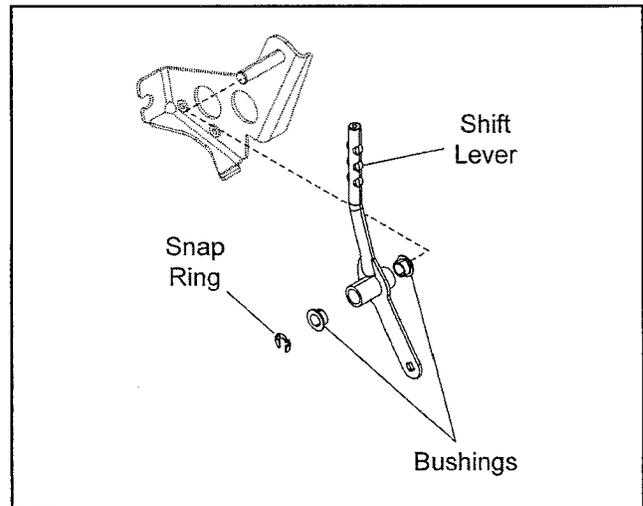
1. Remove the shift knob cover, retaining screw and shift knob from the shift lever.



2. Remove the screws retaining the center console using a T27 and T30 Torx driver. Remove the console from the vehicle.
3. Remove the clip and washer retaining the shift cable to the shift lever and disconnect the cable end from the lever.



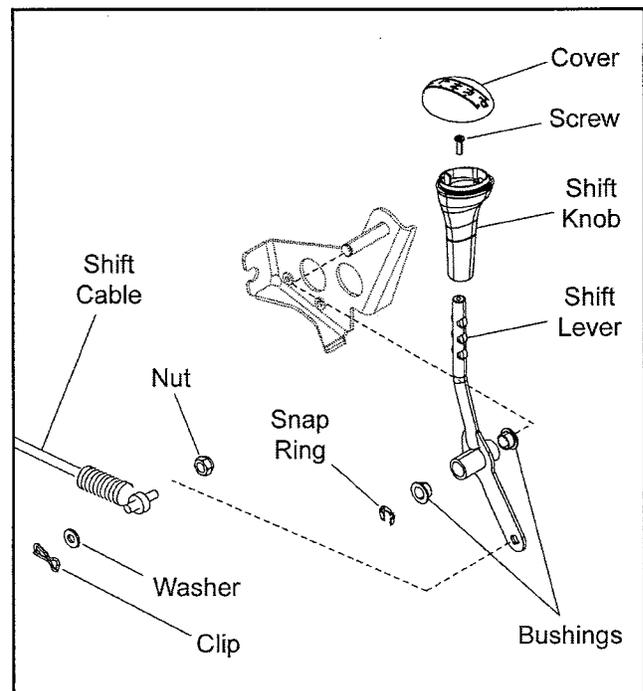
4. Remove the retaining ring and slide the shift lever off the mounting bracket and out from the frame.



5. Remove both bushings from the shift lever and service as needed.

Installation

1. Perform the removal steps in reverse order to install the gear shift lever (lever, cable, console, shift knob).



TRANSMISSION

SHIFT CABLE

Inspection

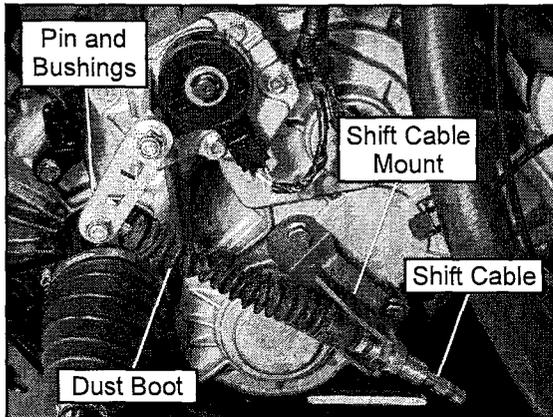
Shift cable adjustment may be necessary if symptoms include:

- No gear position or AWD display on instrument cluster
- Ratcheting noise on deceleration
- Inability to engage into a gear
- Excessive gear clash (noise)
- Gear selector moving out of desired range

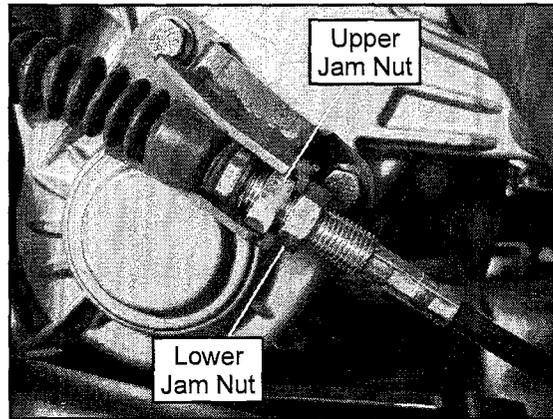
Inspect shift cable, clevis pins, and pivot bushings and replace if worn or damaged.

Adjustment

1. Locate the shift cable attached to the transmission case in the right rear wheel well area.
2. Inspect shift cable, clevis pin, pivot bushings, and dust boot. Replace if worn or damaged.



3. If adjustment is required, loosen the lower jam nut and pull the cable out of the mount to move the upper jam nut.



4. Adjust the shift cable so there is the same amount of cable travel when shifting slightly past HIGH gear and PARK.
5. Thread the upper or lower jam nut as required to obtain proper cable adjustment.

NOTE: This procedure may require a few attempts to obtain the proper adjustment.

6. Once the proper adjustment is obtained, place the shift cable and upper jam nut into the mount. Tighten the lower jam nut against the mount.
7. Start engine and shift through all gears to ensure the shift cable is properly adjusted. If transmission still ratchets after cable adjustment, the transmission will require service.

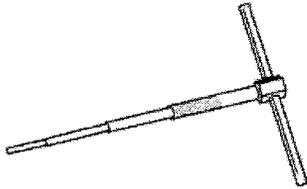
TRANSMISSION SERVICE

Transmission Removal

CAUTION

Correct Drive Clutch Puller P/N 2872085

2872085 - Correct Drive Clutch Puller For RZR XP 900



PA-48595 - Incorrect Drive Clutch Puller



CAUTION

THE ENGINE TO TRANSMISSION COUPLER BRACKET REQUIRES A CRITICAL TORQUE PROCEDURE AS OUTLINED IN THIS CHAPTER.



Critical Joint: Failure to follow torque procedure outlined in Service Manual will result in damage to the engine case.

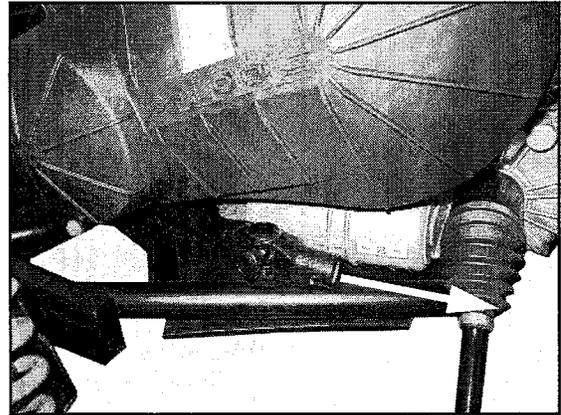
- | | | |
|---------------------------------|-------------------------|----------------------|
| 1. 10 ft-lbs
threaded spacer | 2. 33 ft-lbs
jam nut | 3. 75 ft-lbs
bolt |
|---------------------------------|-------------------------|----------------------|

1. Remove the seats, console cover and engine service panel (see Chapter 5).
2. Disconnect the (-) negative battery cable from the battery.
3. Remove the rear bumper and cargo box as an assembly (see Chapter 5).
4. Remove the air box assembly (see Chapter 4 "ECT Sensor Replacement").
5. Raise and support the vehicle.

CAUTION

Serious injury may result if machine tips or falls. Be sure machine is secure before beginning this procedure. Always wear eye protection.

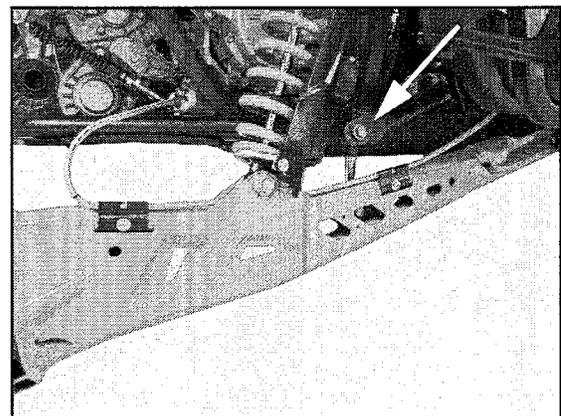
6. Remove the propshaft from the transmission input shaft (see Chapter 7).



7. Remove rear wheels from the vehicle.
8. If internal transmission repair is required, drain the transmission lubricant (see Chapter 2).
9. Remove the lower mounting bolt from the left rear shock. Swing shock outward.
10. Remove the outer clutch cover, drive belt, drive clutch, driven clutch, inner clutch cover and clutch outlet duct (see Chapter 6).

IMPORTANT: Be sure to use the correct Drive Clutch Puller (PN 2872085) to prevent damage to crankshaft.

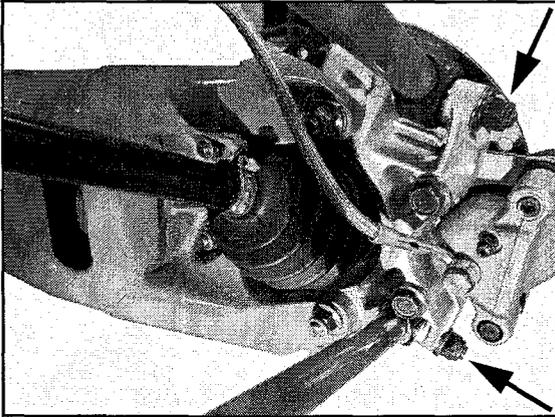
11. Loosely install the left rear shock bolt to hold left rear trailing arm up in position.
12. Remove the stabilizer bar mounting bolt and nut from both sides. Discard nuts and replace with new upon assembly.



8

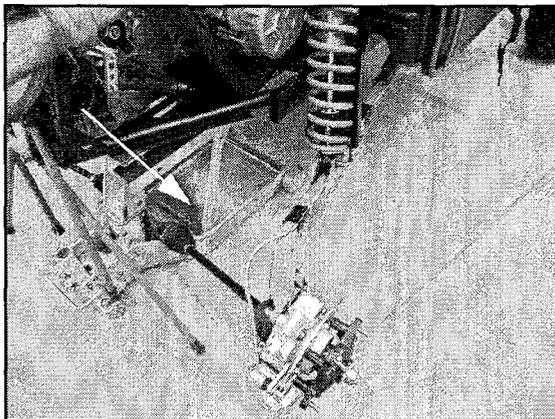
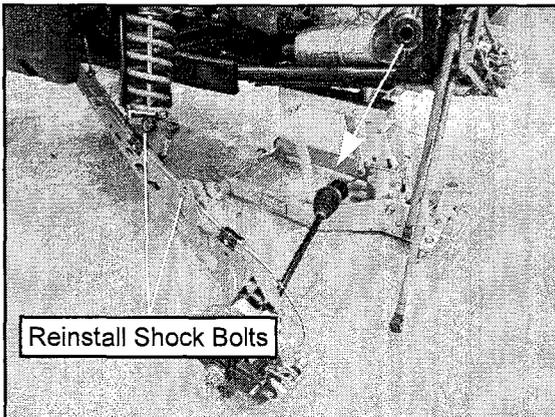
TRANSMISSION

13. Remove the (4) bolts attaching the upper and lower radius rods to the bearing carriers (left and right side). Discard nuts and replace with new upon assembly. Allow the radius rods swing downward.

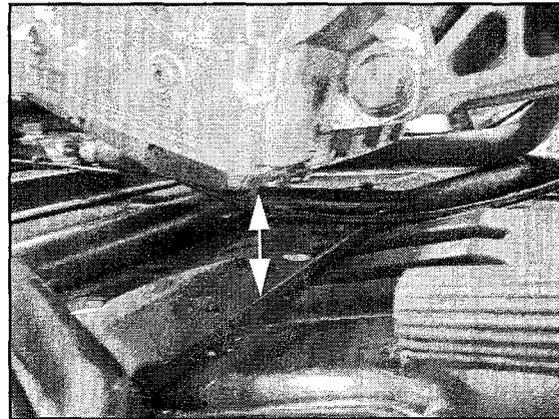


14. Remove both lower shock bolts (left and right side) while supporting the trailing arms from underneath. Lift trailing arms up and swing trailing arms outward to remove the drive shafts from the transmission.

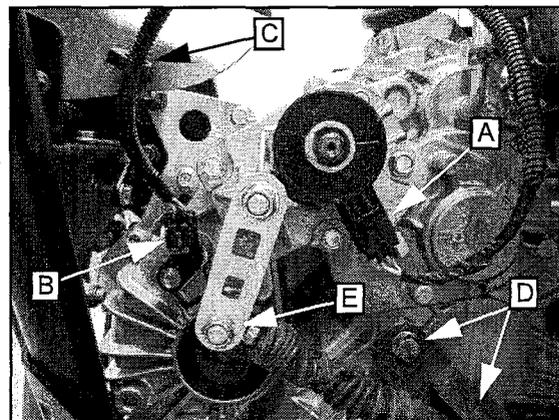
15. Maneuver the drive shafts out of the vehicle frame. Reinstall the lower shock bolts to hold the trailing arms up during the rest of the removal procedure.



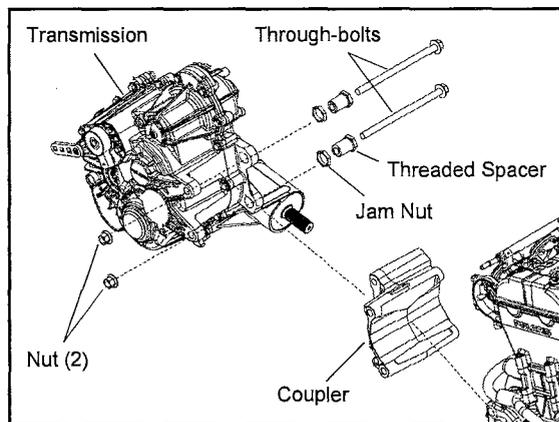
16. Place a spacer or support between the vehicle frame and engine to hold the engine up in position.



17. Remove vent hose from transmission.
18. Remove the gear position switch connector (A), speed sensor connector (B), harness from routing clip (C), shift bracket bolts (D), shift bracket (D), shift cable clevis pin and washer (E) from the transmission.



19. **To remove the through-bolts:** Hold through-bolt firmly in position with an open ended wrench from the left hand side of the transmission. From the right hand side of the transmission, remove the nut that secures through-bolt.

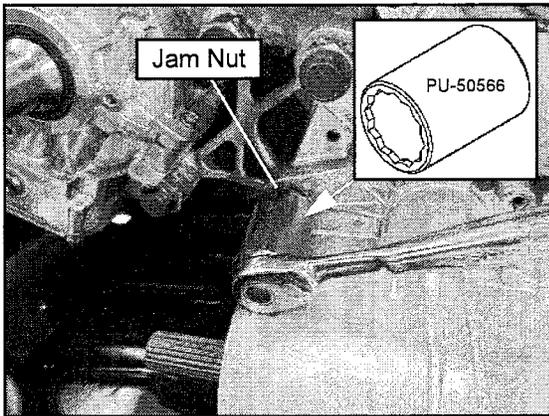


IMPORTANT: Be sure the through-bolt does not rotate while removing the nut from the right hand side of the transmission.

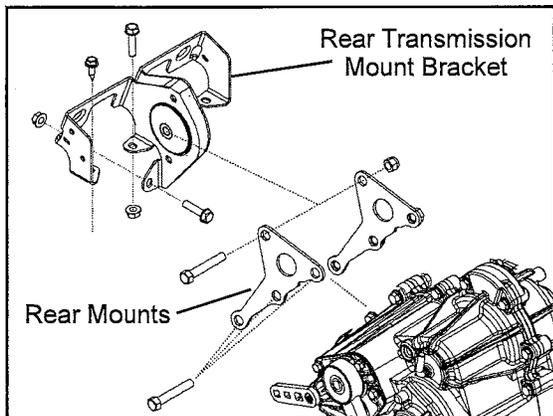
CAUTION

The threaded spacers must not rotate while removing the through-bolts.
Severe transmission damage may occur if the threaded spacers rotate while removing the through-bolts.

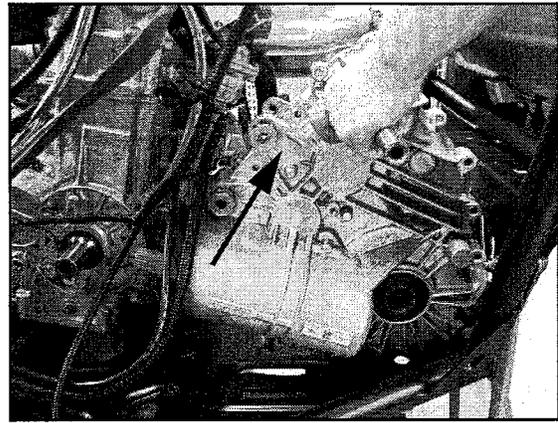
20. Remove the through bolts from the left hand side of the vehicle after the nut has been removed. Discard the through-bolts and the nuts.
21. Using special tool PU-50566, loosen the inner jam nuts and remove the threaded spacers from the transmission case. Inspect threads, replace if damaged or if wear is evident.



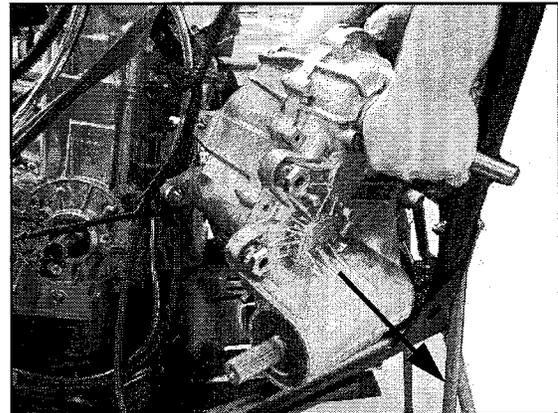
22. Remove the (2) rear exhaust springs securing the muffler to the rear transmission mounting bracket.
23. Remove the (6) bolts attaching the rear transmission mount bracket to the frame. Remove the (3) bolts that attach the (2) rear mounts to the transmission. Remove the mount assemblies from the vehicle.



24. Slide transmission towards the rear of the vehicle. Lift the front of the transmission upward.



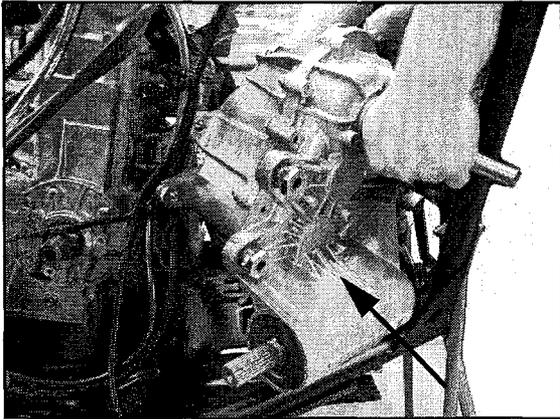
25. Rotate front of the transmission towards the left hand side of the vehicle. With the help of an assistant, remove transmission from the left rear wheel well area.



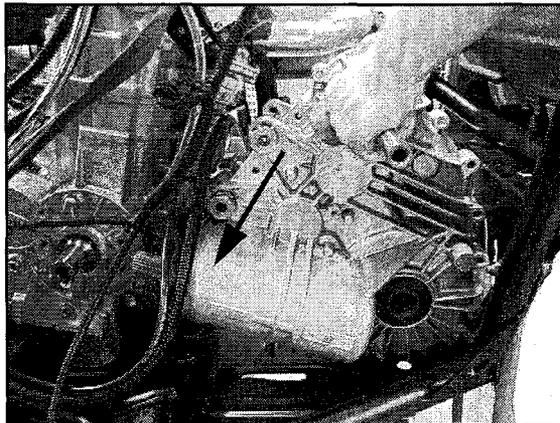
TRANSMISSION

Transmission Installation

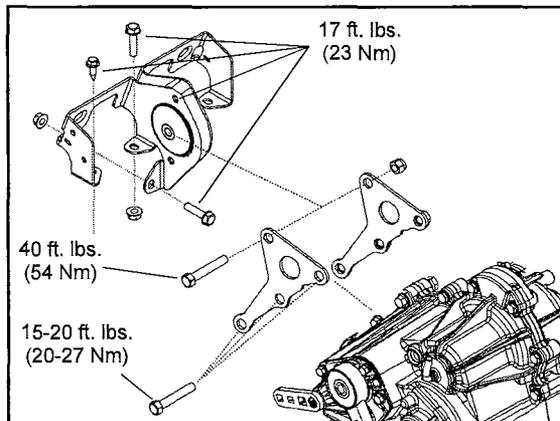
1. With the help of an assistant, position the rear of the transmission into the vehicle frame through the left rear wheel well area.



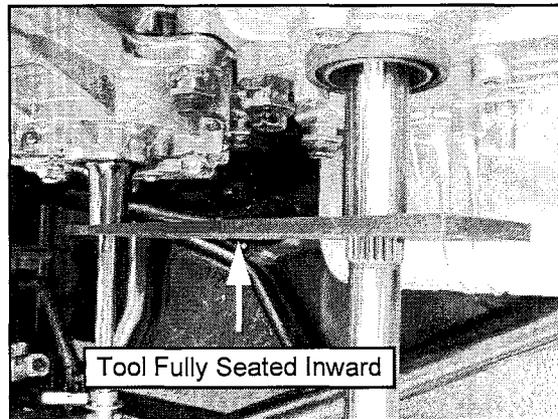
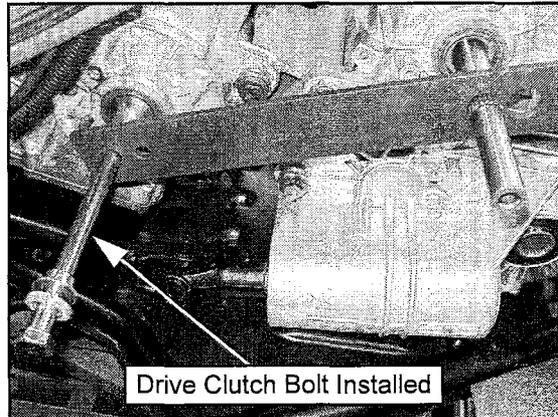
2. Slide transmission towards the rear of the vehicle while lifting the front of the transmission upward. Rotate the front of the transmission towards the engine. When in position, lower the front of the transmission.



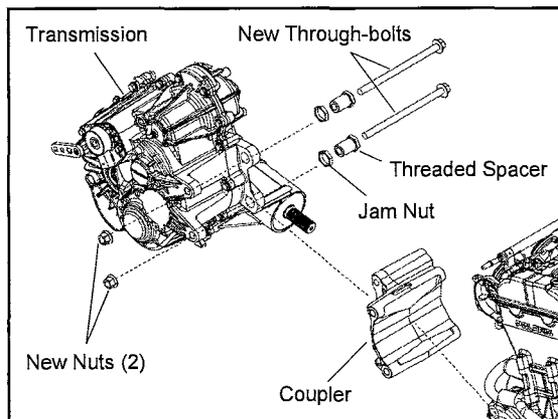
3. Install the rear transmission mount assemblies. Torque all fasteners to specification.



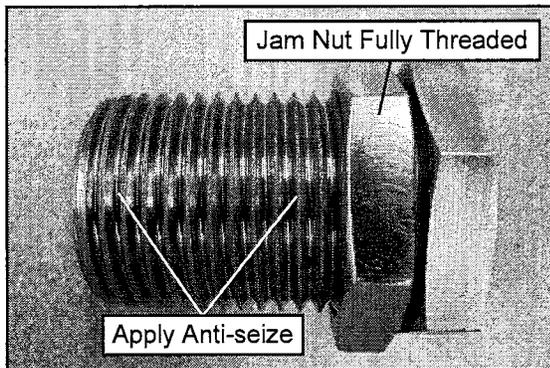
4. Install the (2) rear exhaust springs securing the muffler to the rear transmission mounting bracket.
5. Install the Clutch Center Distance Tool (PU-50658) onto the crankshaft and transmission input shaft to properly position the clutch center distance. The pictures below show the tool (PU-50658) properly installed.



6. Align coupler and front transmission mounting holes.



- Apply anti-seize to the threaded spacers and fully thread the inner jam nuts onto threaded spacers.



- Install threaded spacers into the transmission case by hand approximately 3 turns.
- Install NEW transmission through-bolts and nuts by hand.
- Lightly tighten both threaded spacers by hand. Be sure inner jam nuts are fully threaded onto the threaded spacers.

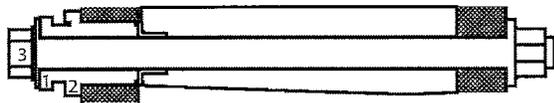
- Using special tool PU-50566 and a proper torque wrench, torque the threaded spacer to **10 ft. lbs. (14 Nm)**.
- Using special tool PU-50566 and a proper torque wrench, torque the inner jam nut to **33 ft. lbs. (45 Nm)**.
- From the right side of the transmission, torque the (2) new nuts onto the through-bolts to **75 ft. lbs. (102 Nm)**. Be sure the through-bolts do not rotate while applying torque to the nut.

CAUTION

The threaded spacers must not rotate while installing the through-bolts. Severe transmission damage may occur if the threaded spacers rotate while installing the through-bolts.

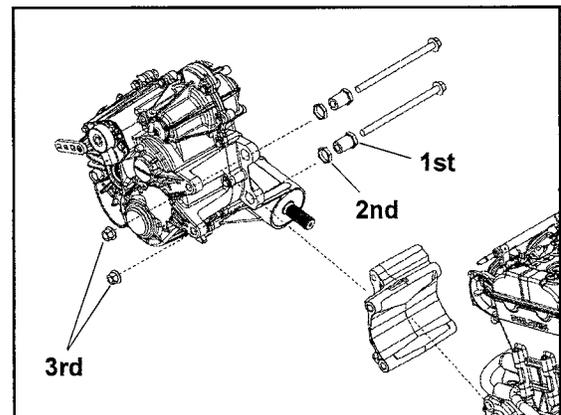
CAUTION

THE ENGINE TO TRANSMISSION COUPLER BRACKET REQUIRES A CRITICAL TORQUE PROCEDURE AS OUTLINED IN THIS CHAPTER.

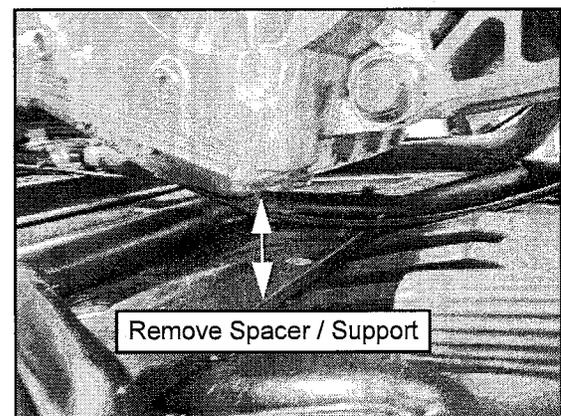
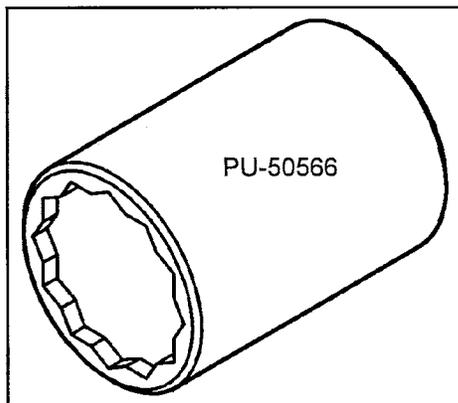


Critical Joint: Failure to follow torque procedure outlined in Service Manual will result in damage to the engine case.

- | | | |
|------------------------------|----------------------|-------------------|
| 1. 10 ft-lbs threaded spacer | 2. 33 ft-lbs jam nut | 3. 75 ft-lbs bolt |
|------------------------------|----------------------|-------------------|

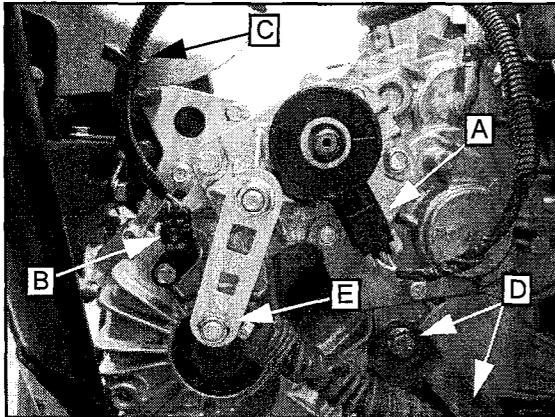


- Remove the clutch center distance tool.
- Remove the spacer or support between the vehicle frame and engine.



TRANSMISSION

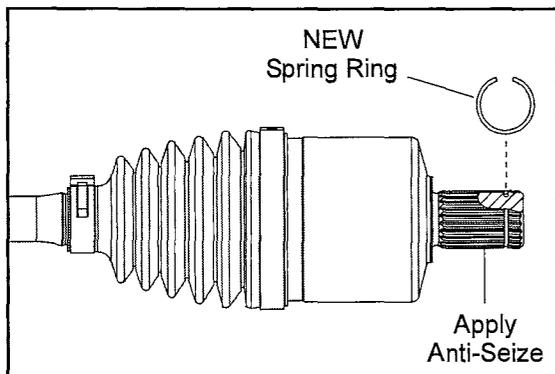
16. Install and properly route the gear position switch connector (A), speed sensor connector (B), harness into routing clip (C), shift bracket (D), shift bracket bolts (D), shift cable clevis pin and washer (E) onto the transmission.



17. Torque the (2) shift cable bracket bolts to specification.

 = T
Shift Cable Bracket Bolts: 17 ft. lbs. (23 Nm)

18. Install and properly route the vent hose.
19. Lubricate the transmission splines and mid propshaft joint splines with Polaris All Purpose Grease. Install the propshaft onto the transmission input shaft (see Chapter 7).
20. Install inner clutch cover, outlet duct, drive clutch, driven clutch, belt and outer clutch cover (see Chapter 6).
21. Install new spring ring on rear drive shafts. Apply an anti-seize compound to the splines.

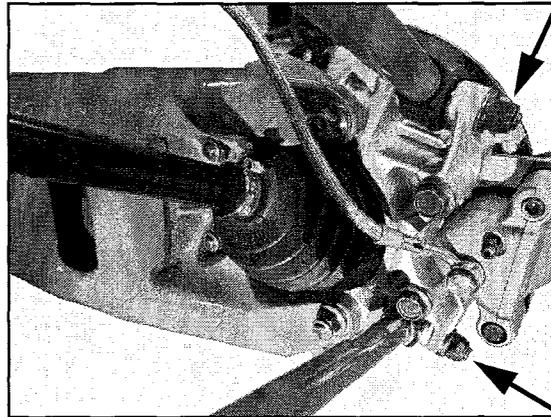


22. Swing the rear trailing arm out and up. Align the splines of the drive shaft with the transmission splines. Push inward on the trailing arm assembly until the rear drive shafts lock into the transmission splines.

23. Install the rear shocks onto the trailing arms and install the lower mounting bolts with new retaining nuts. Torque to specification.

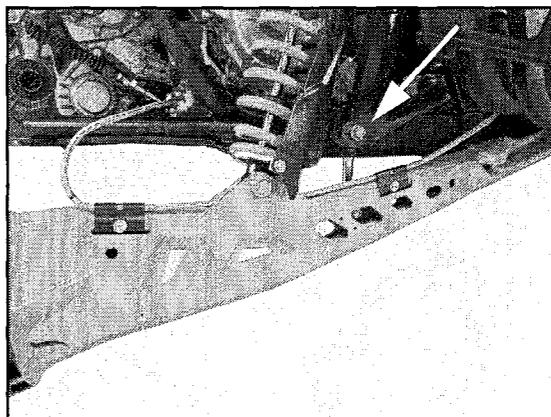
 = T
Rear Shock Mounting Bolts: 70 ft. lbs. (95 Nm)

24. Install the (4) rear radius rods to the bearing carriers on each side. Use new retaining nuts. Torque to specification.



 = T
Radius Rod Bolts: 50 ft. lbs. (67.7 Nm)

25. Install the stabilizer bar link mounting bolts and new nuts. Torque to specification.

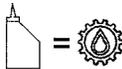


 = T
Stabilizer Bar Linkage: 31-34 ft. lbs. (42-46 Nm)

26. Install rear wheels and wheel nuts. Torque to specification.

 = T
Wheel Nuts: 30 ft. lbs. (41 Nm) + 90° (1/4 turn)

27. Properly lower the vehicle.
28. Install the air box assembly as outlined in the EFI Chapter (see Chapter 4 “ECT Sensor Replacement”).
29. Install the rear bumper and cargo box as an assembly (see Chapter 5).
30. Connect the (-) negative battery cable.
31. Install the engine service panel, console cover and seats.
32. If transmission lubricant was drained, fill the transmission with the specified amount of **Polaris AGL Plus** (see Chapter 2 “Transmission Lubrication”).

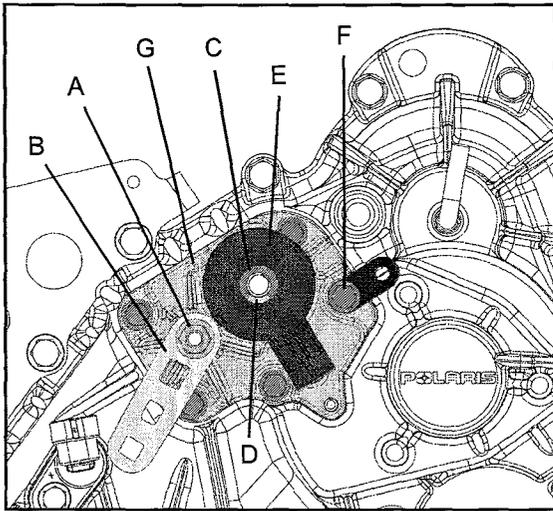
 =
Recommended Transmission Lubricant: AGL Plus (PN 2878068) (Quart)
Capacity: 44 oz. (1300 ml)

TRANSMISSION

Transmission Disassembly

NOTE: Refer to the exploded view at the end of this chapter as a reference.

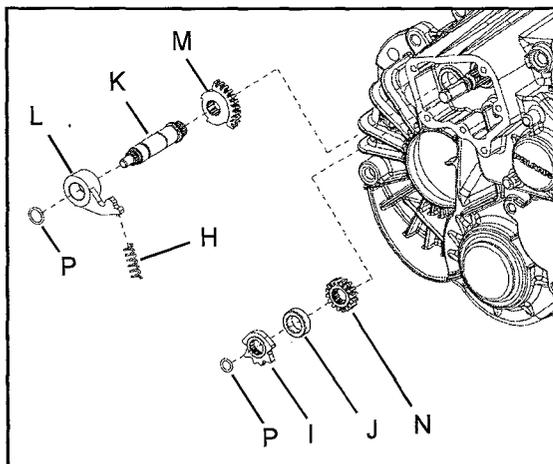
1. Place the transmission in High gear before disassembly.
2. Drain and properly dispose of the transmission lubricant (see Chapter 2).
3. Remove the bellcrank nut (A) and bellcrank (B).



4. Remove the E-clip (C) that retains the spring washer (D), flat washer (D) and gear switch (E). Remove the switch.
5. Remove the sector cover bolts (F) and remove the sector cover (G).

NOTE: Removal can be aided by using your thumbs to press in on the shafts while pulling out the cover with your fingers.

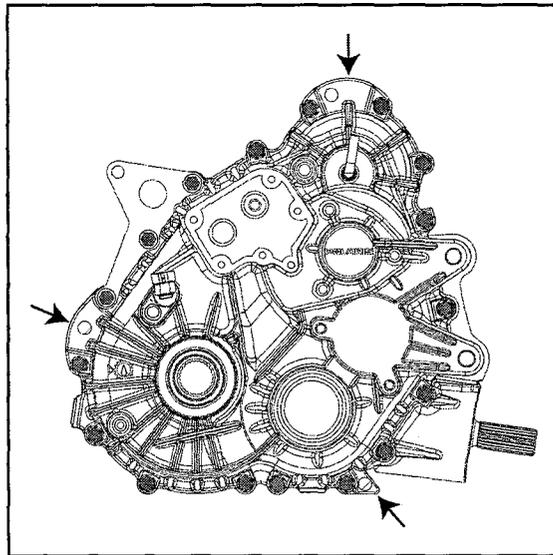
6. Remove the compression spring (H).



7. Remove the detent star (I). Note how the detent star fits onto the splined shaft with the raised edge facing outward for reassembly.
8. Remove the spacer (J).
9. Remove the shift shaft (K), detent pawl (L) and the shift sector gears (M and N).

IMPORTANT: Note the timing marks on the shift gears (M and N) for reassembly purposes.

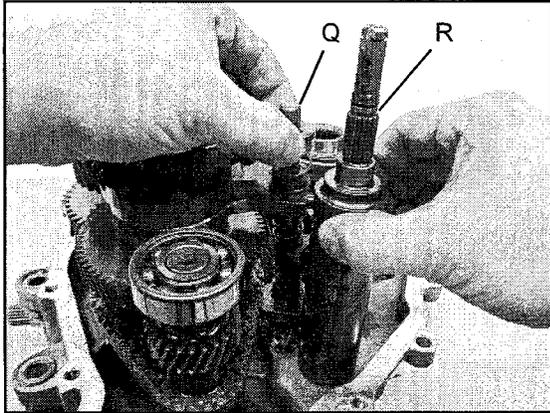
10. Remove the O-rings (P) from each shaft and discard. Use new O-rings upon assembly.
11. Remove all the transmission case bolts. Using suitable pry bars, remove the cover using the designated pry points (indicated by the black arrows in the illustration below).



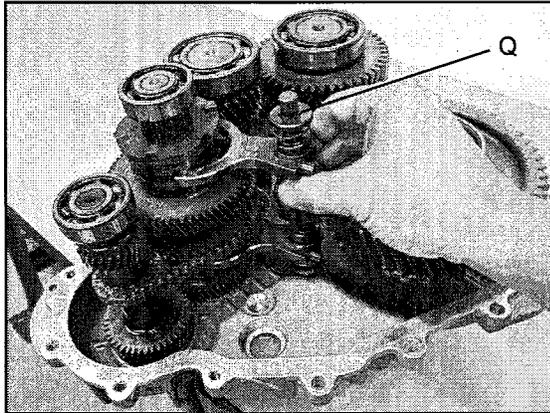
CAUTION

Do not pry on case sealing surfaces.
Use only the designated pry points
on the transmission.

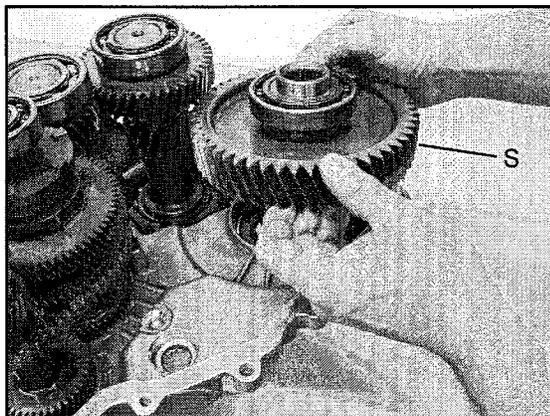
12. Lift up on the shift shaft rail (Q) and move the rail assembly rearward to allow the shift fork pins to be removed from the shift drum (R). Remove the shift drum (R) from the transmission housing.



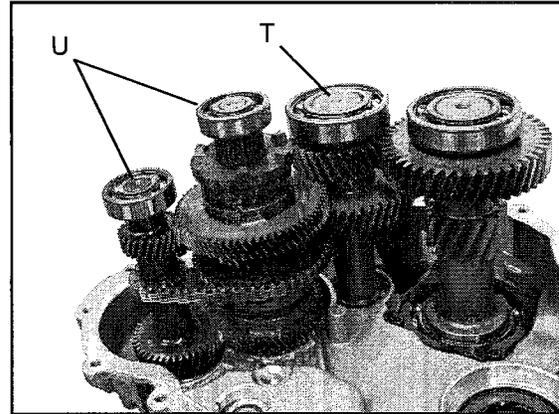
13. Remove the shift shaft rail (Q) and shift forks from the transmission housing as an assembly.



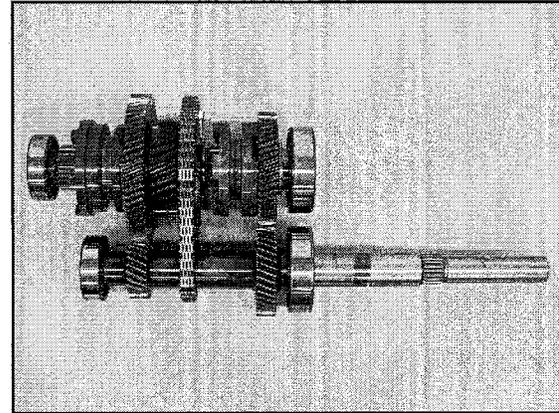
14. Remove the rear output shaft assembly (S) by lifting underneath the gear or by tapping the shaft from the opposite side.



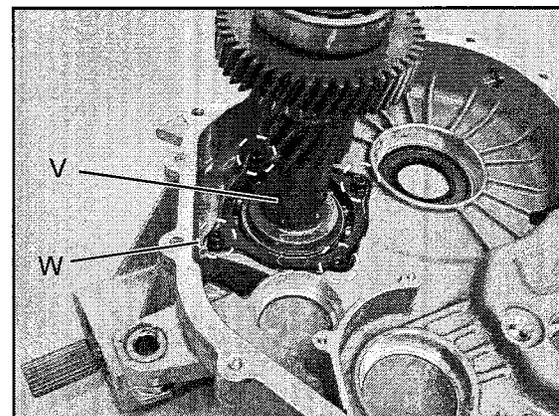
15. Remove the idler gear shaft assembly (T) and gear cluster assembly (U) from the transmission housing by pulling both assemblies straight up.



16. Place the gear cluster assembly on a clean surface for inspection. If disassembly is required, refer to "Gear Cluster Disassembly".



17. Using a 5 mm Allen wrench, remove the screws that secure the pinion shaft assembly (V). Lift the pinion shaft assembly straight up to remove it from the housing. Note the longer screw (W) that locks the snorkel tube.

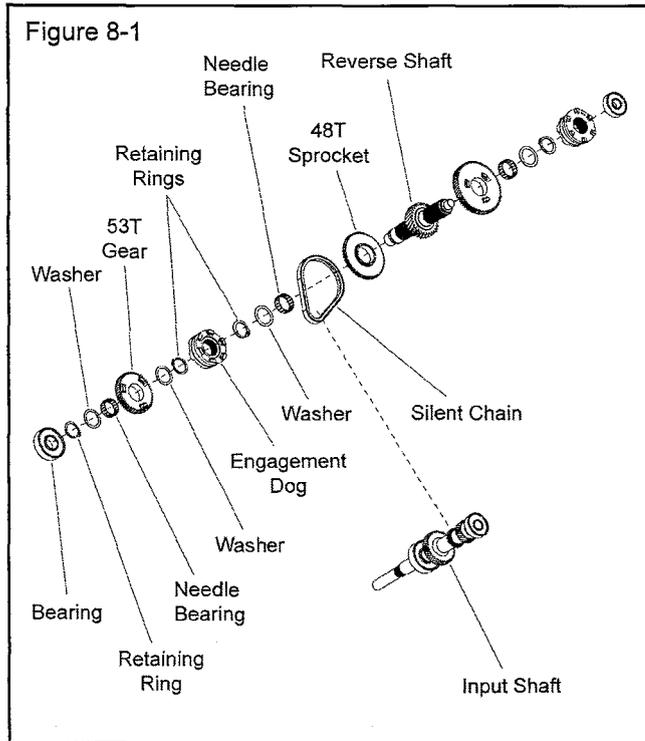


TRANSMISSION

18. Remove all seals from the gearcase halves and clean the cases in preparation for assembly.

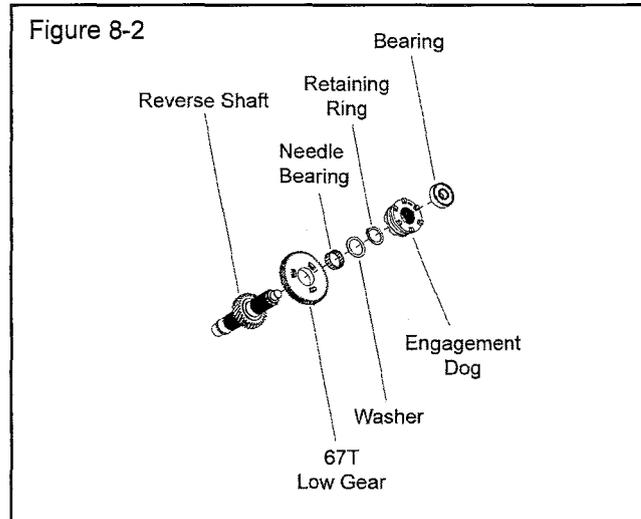
Gear Cluster Disassembly

19. Remove the bearing from the reverse shaft using a bearing puller. Remove the retaining ring and slide the washers, 53T gear and needle bearing off the reverse shaft (see Figure 8-1).

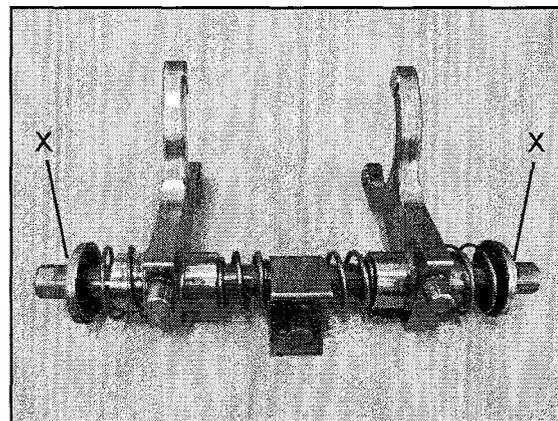


- 20. Remove the retaining ring and engagement dog from the reverse shaft (see Figure 8-1).
- 21. Remove the retaining ring, washer, needle bearing, and sprocket from the reverse shaft (see Figure 8-1).
- 22. Tilt the two shafts towards each other and remove the silent chain from the two shafts.

23. If necessary, disassemble the other end of the reverse shaft. Remove the bearing, engagement dog, retaining ring, washer, gear and needle bearing from the reverse shaft (see Figure 8-2).



24. To disassemble the shift shaft rail remove the snap ring (X) from the end of the shift rail on either side.



⚠ CAUTION

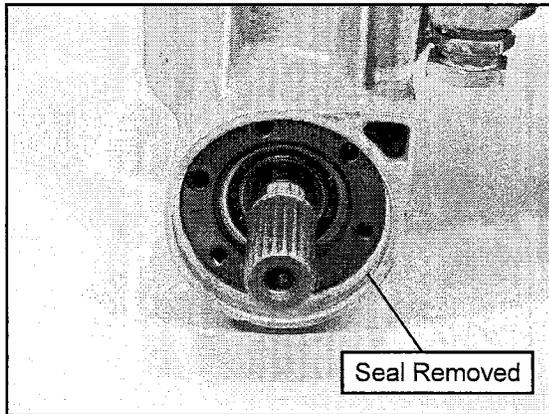
Use caution when disassembling the shift rail. The compressed springs on the shift rail may pop off causing eye or face injury.

Snorkel Shaft Removal / Disassembly

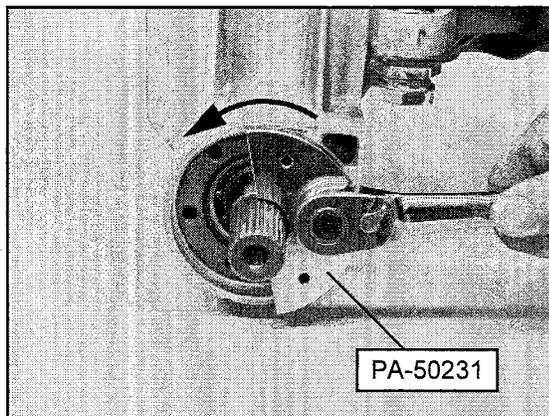
CAUTION

The pinion shaft must be removed prior to removing the snorkel shaft assembly. Failure to remove pinion shaft, will result in damage to the snorkel shaft.

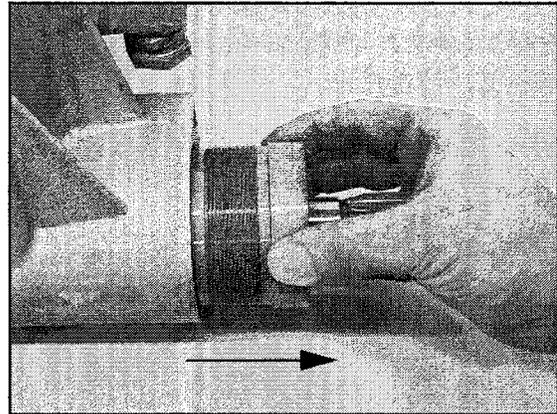
25. Extract the seal from the snorkel shaft to access the snorkel tube for removal.



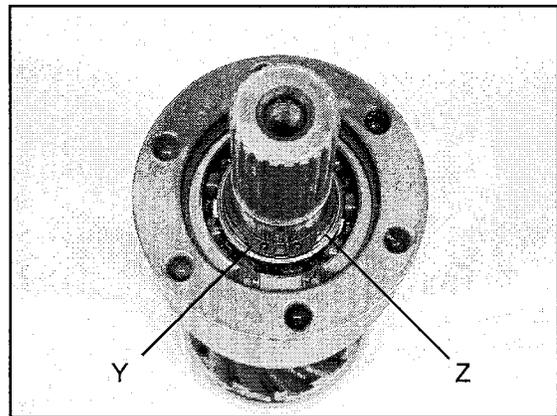
26. Using the Snorkel Tool (PA-50231), fully loosen the snorkel tube.



27. Remove the snorkel tube and shaft assembly from the transmission case.

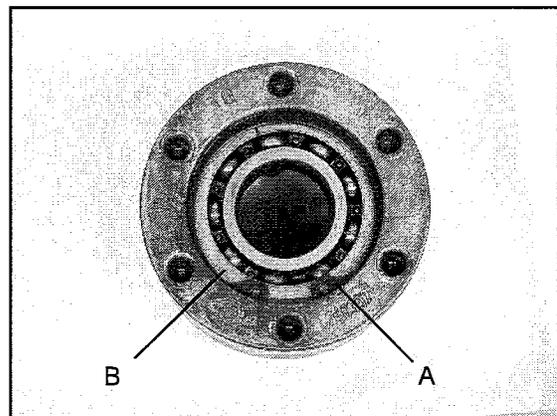


28. Remove the snap ring (Y) and shim (Z) from the snorkel shaft.



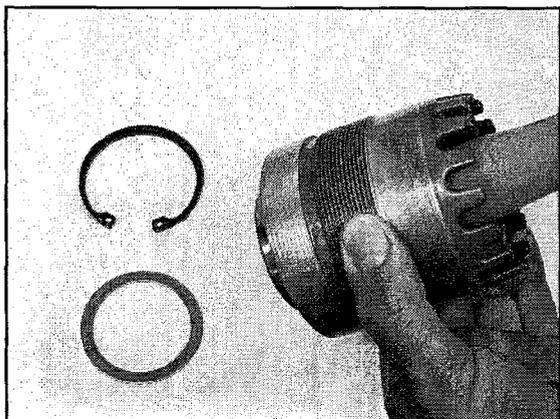
29. Use an arbor press to remove the snorkel tube from the snorkel shaft.

30. Remove the snap ring (A) and shim (B) retaining the bearing in the snorkel tube.

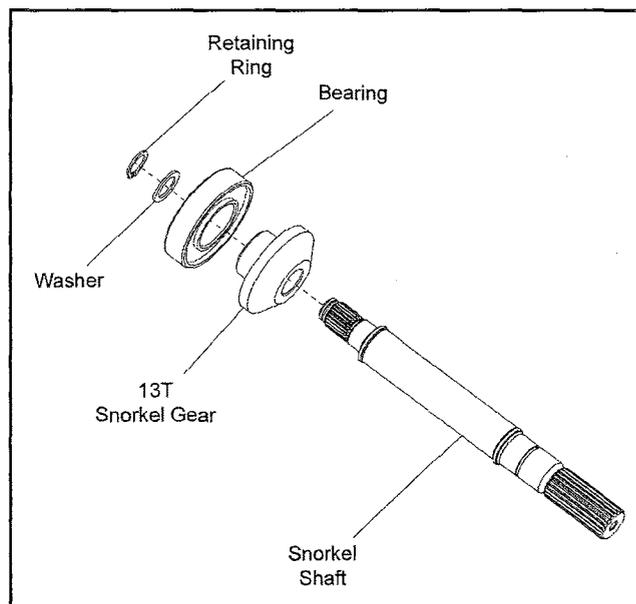


TRANSMISSION

31. Lightly tap on the bearing from the opposite side to remove it from the snorkel tube.



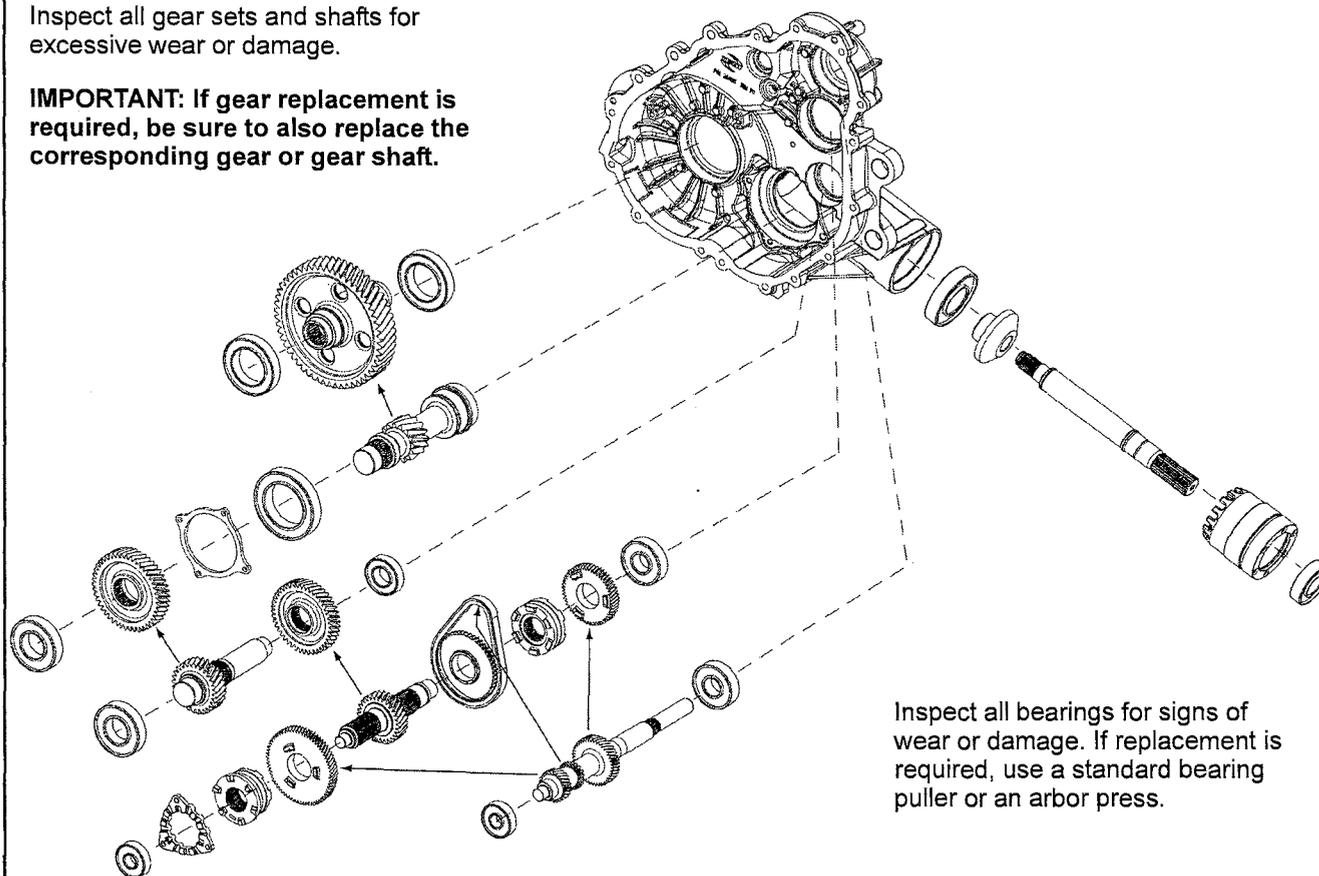
32. Remove the retaining ring to remove the remaining washer, bearing and gear from the snorkel shaft.



Gear / Shaft / Bearing Inspection

Inspect all gear sets and shafts for excessive wear or damage.

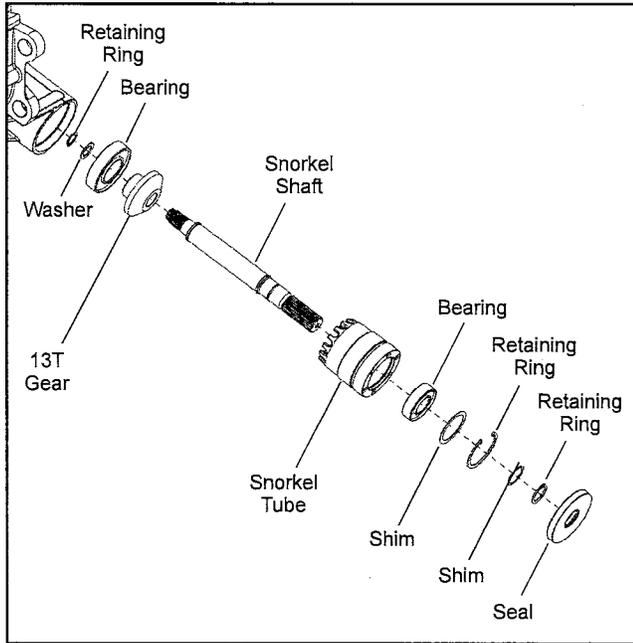
IMPORTANT: If gear replacement is required, be sure to also replace the corresponding gear or gear shaft.



Inspect all bearings for signs of wear or damage. If replacement is required, use a standard bearing puller or an arbor press.

Snorkel Gear Backlash Procedure

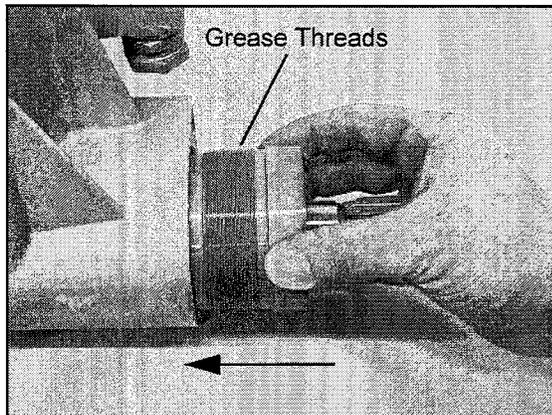
1. Reassemble the snorkel tube and snorkel shaft assembly by reversing the disassembly procedure (see "Snorkel Shaft Removal / Disassembly" in previous section).



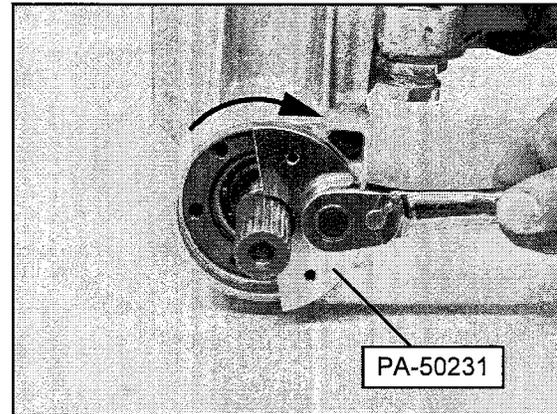
2. After the 13T gear and bearing are pressed onto the snorkel shaft (flush to the shoulder), install the washer and new retaining ring.
3. Press the gear back towards the retaining ring. Avoid excessive force so the retaining ring is not damaged or pre-stressed significantly.

IMPORTANT: Failure to press the gear back against the washer and retaining ring will lead to a gear backlash change after vehicle is placed into service.

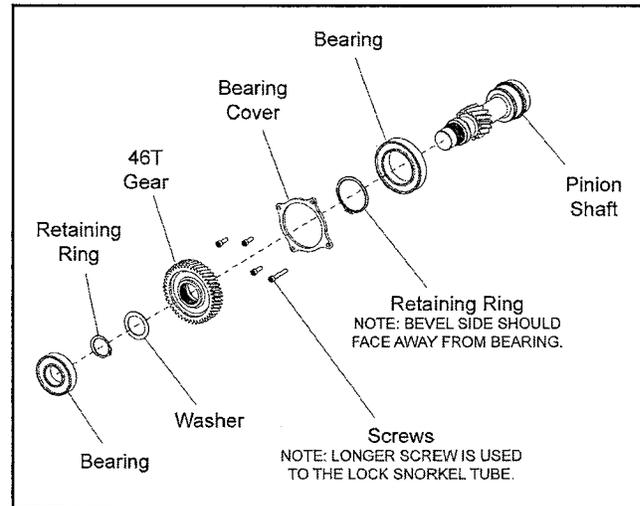
4. Apply a small amount of white lithium grease or Anti-Seize on the threads of the snorkel tube.



5. Install the snorkel shaft into the gearcase. Using the Snorkel Tool (PA-50231), tighten the snorkel tube until it is lightly seated in the transmission housing.



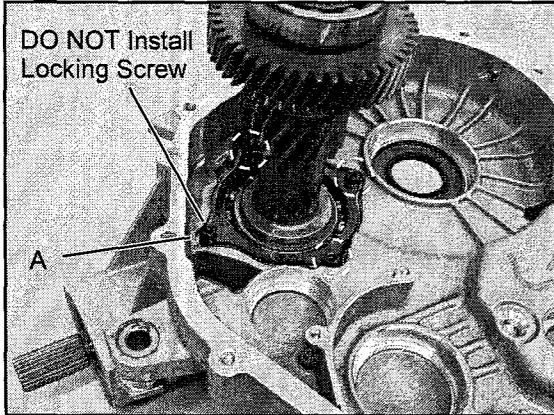
6. Inspect the pinion shaft assembly. Replace bearings if needed. Inspect each gear for damage, chips or abnormally worn teeth.



NOTE: If pinion shaft was disassembled, the bearing cover must be installed on the shaft before installing the 46T gear.

TRANSMISSION

7. Install the pinion shaft assembly. Be sure to properly mesh the snorkel shaft bevel gear with the pinion shaft bevel gear.
8. Apply Loctite 242® to the threads of the bearing cover retaining screws.
9. Using a 5 mm Allen wrench, install only the (3) screws that secure the pinion shaft assembly as shown below. Leave the longer locking screw (A) out at this point.



IMPORTANT: DO NOT install the longer screw (A). Installing the longer screw will lock the snorkel tube and not allow for backlash setting adjustment.

10. Torque the bearing cover retaining screws to specification.

 = T
Bearing Cover Retaining Screws: 8-10 ft. lbs. (11-14 Nm)

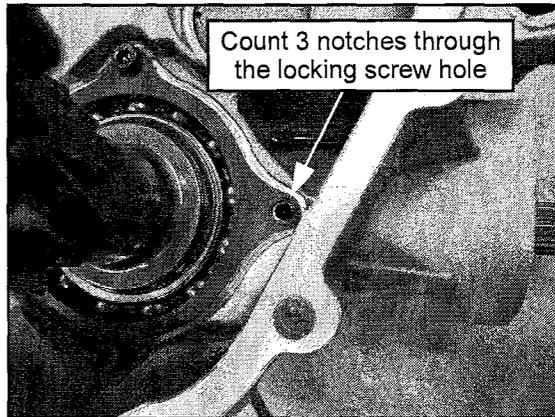
11. Rotate the snorkel tube *counterclockwise* using the snorkel tool (PA-50231) until the snorkel gear and pinion gear have 'zero' backlash.

IMPORTANT: DO NOT overtighten the snorkel tube when backing it out. At the 'zero' backlash position, you should still be able to turn the snorkel shaft using your fingers, but it will feel rough and may have some tight spots.

12. Look down into the transmission housing to see the snorkel locking screw hole opening to reference your starting point.

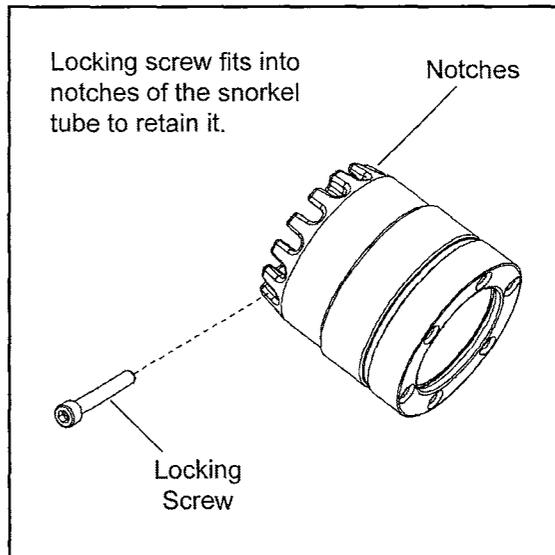
NOTE: If you have a hard time seeing into the hole, insert a small Allen wrench, punch or screwdriver into the hole to feel when the notch is aligned with the hole.

13. Slowly rotate the snorkel tube *clockwise* while counting the number of notches passing through the hole opening as you rotate the tube. Rotate the snorkel tube to the **3rd** notch from the 'zero' backlash position obtained in step 11.

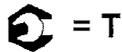
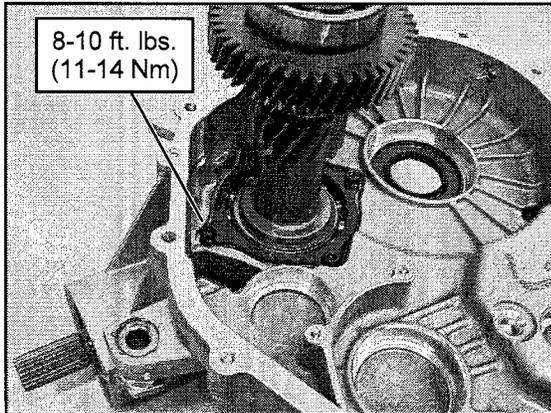


14. Check the pinion shaft gear backlash again by feel. If the pinion shaft gear lash appears to be too tight, rotate the snorkel shaft *clockwise* to the next notch (4th notch).

15. Once the backlash is set, apply Loctite 242® to the threads and install the locking screw to secure the snorkel tube.



16. Torque the locking screw to specification.

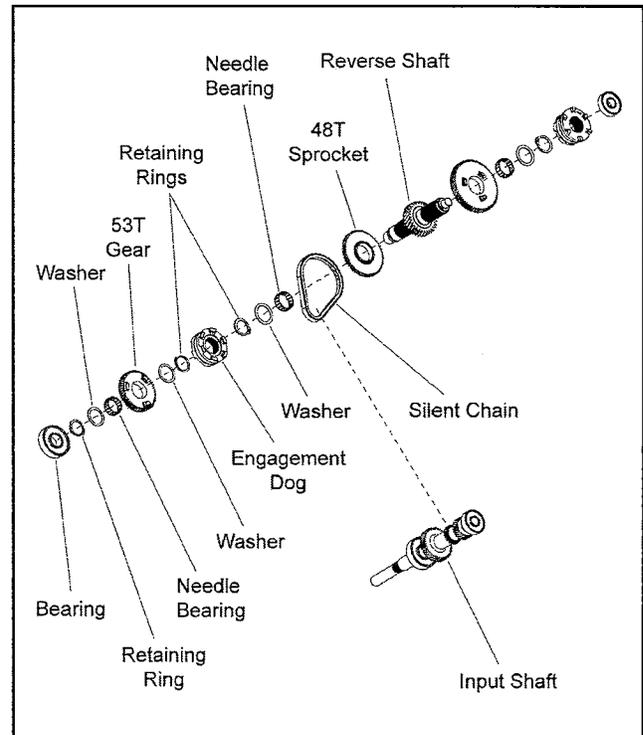
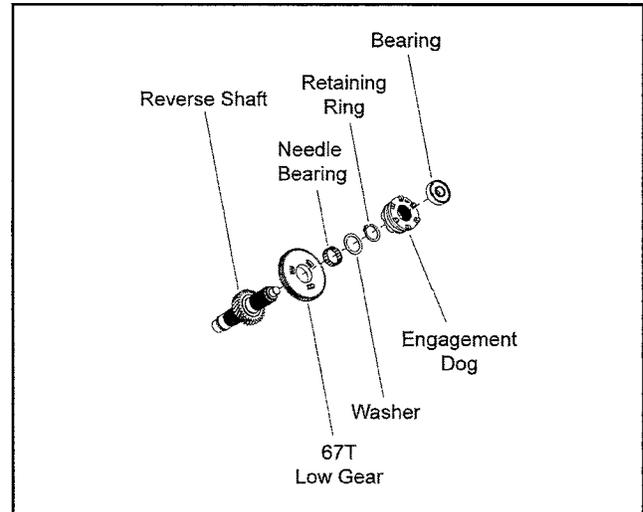


Snorkel Locking Screw:
8-10 ft. lbs. (11-14 Nm)

Transmission Assembly

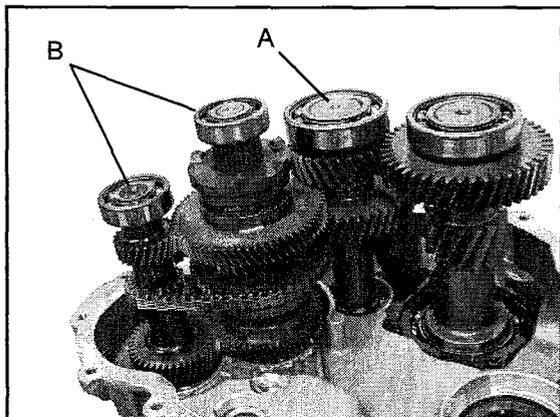
IMPORTANT: The snorkel shaft and pinion shaft must be installed prior to transmission assembly. The snorkel shaft cannot be installed after assembling the transmission.

1. Clean both transmission case halves thoroughly. Inspect case half mating surfaces for damage.
2. Assemble the reverse shaft assembly and input shaft assembly if previously disassembled (see illustrations).

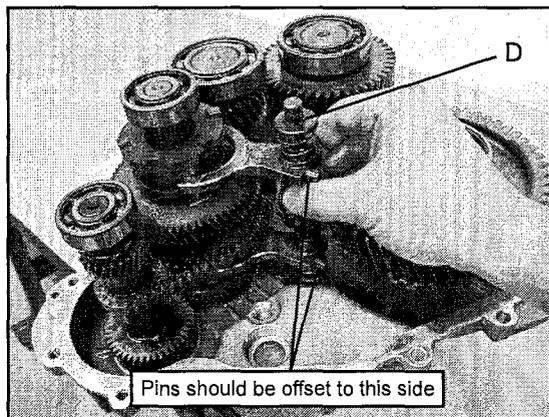


TRANSMISSION

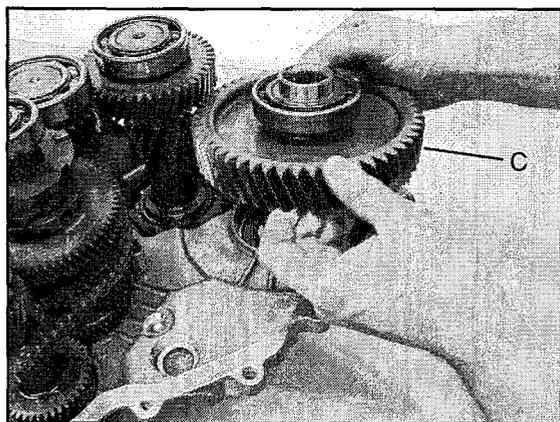
3. Install the idler gear shaft assembly (A) and gear cluster assembly (B) into the transmission housing, all at the same time.



6. Install the shift shaft rail (D) and shift forks into the transmission housing as an assembly. Be sure the shift forks are engaged into the engagement dogs.

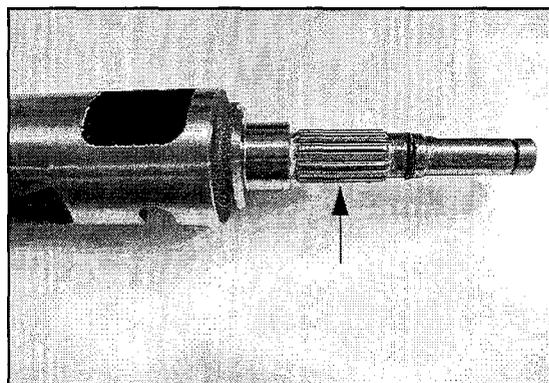


4. Install the rear output shaft assembly (C).

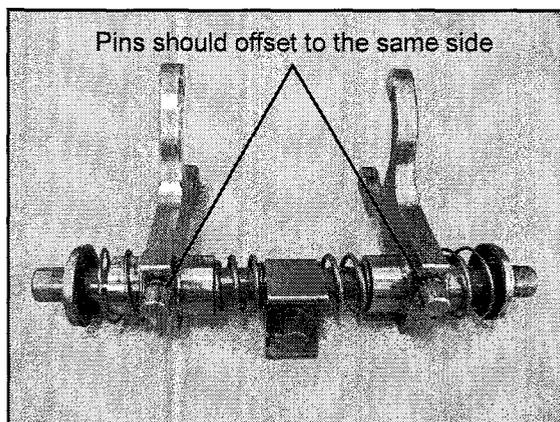


- NOTE:** Shift fork pins should be offset towards the input shaft as shown above.

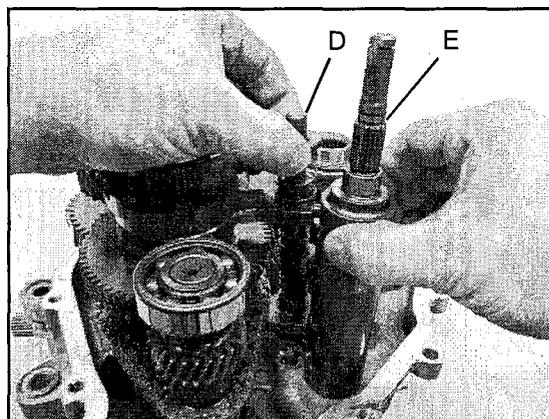
7. Inspect the shift drum for any damage or wear. Inspect the splines of the shift drum.



5. Assemble the shift shaft rail if previously disassembled.

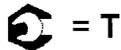
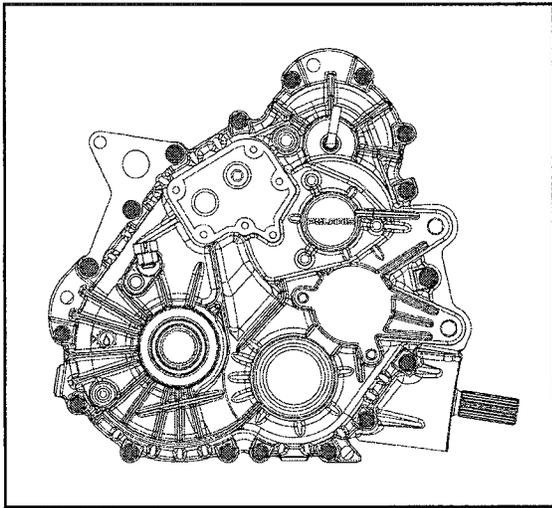


8. Install the shift drum (E) into the transmission housing. Lift up on the shift shaft rail (D) and move the rail assembly towards the shift drum to allow the shift fork ends to be installed into the shift drum (E).



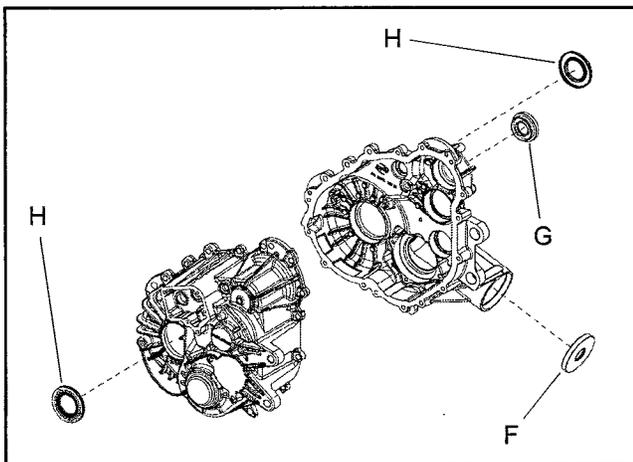
NOTE: Both shift forks need to be orientated the same way, so that the shift fork pins are both offset to the same side of the rail.

9. Apply a continuous bead of Crankcase 3 Bond Sealant (PN 2871557) to the left hand transmission mating surface.
10. Install the transmission case cover and retaining bolts. Torque bolts to specification.

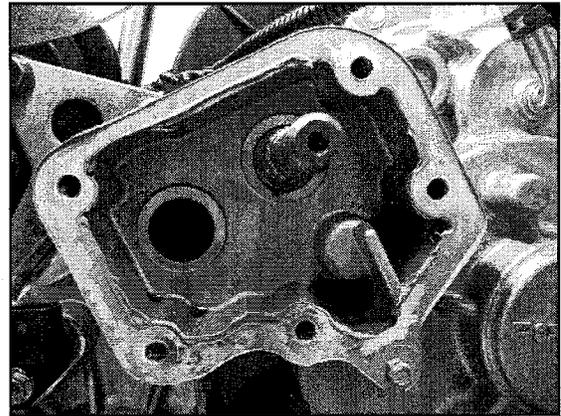


Transmission Case Bolts:
15-20 ft. lbs. (20-27 Nm)

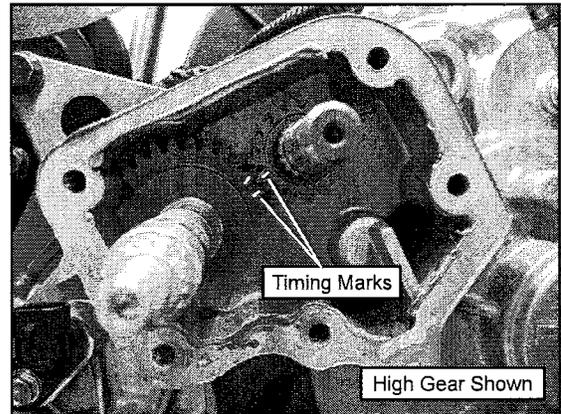
11. Install new seals into the transmission case halves.
 - The snorkel shaft seal (F), should be pressed in until it seats against the housing counter-bore.
 - The input shaft seal (G), should be pressed in until it seats flush with the housing.
 - The rear output shaft seals (H), can be installed using a standard bushing installation tool. Seals should be installed just past the case lead-in chamfer (.070 in. or 1.8 mm from the outer face of the bore).



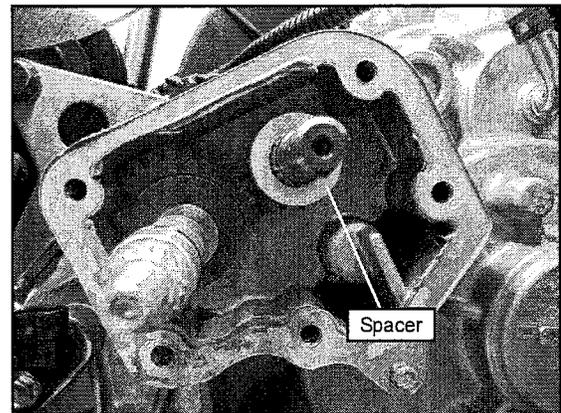
12. Thoroughly clean the shift shaft housing. **Be sure the transmission is in High gear prior to reassembly.**



13. Install the sector gear (16T) onto the shift drum shaft. Install the shift shaft assembly and sector gear (11T) into the bushing pocket on the left side. Align the timing marks on the gears as shown.

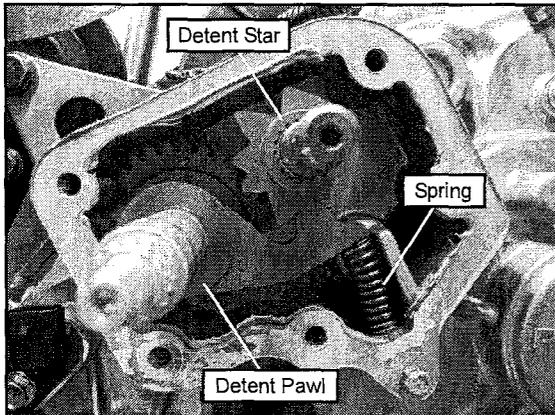


14. Install the spacer onto the shift drum shaft.

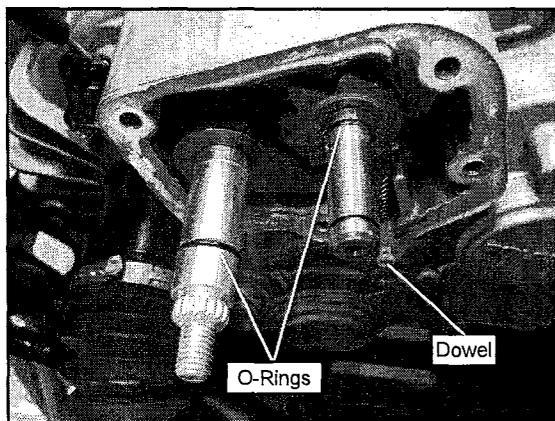


TRANSMISSION

15. Install the detent star onto the shift drum shaft. Be sure to install the detent star with the raised edge facing outward and skip-tooth aligned.
16. Install the detent pawl onto the shift shaft and carefully install the compression spring.



17. Install a new O-ring on each shift shaft. Apply a small amount of white lithium grease on the O-rings, shift shafts and component contact surfaces prior to installing the sector cover.



18. Clean the transmission and gear sector cover mating surfaces thoroughly.
19. Apply Crankcase Sealant (3-Bond) (PN 2871557) onto the cover and transmission case mating surface.
20. Install the sector cover and align the transmission case dowel with the alignment hole. Install and torque the bolts to specification.

 = T
Sector Cover Bolts: 7-9 ft. lbs. (9-12 Nm)

21. Install the transmission drain plug and torque to specification.

 = T
Fill / Drain Plug: 10-14 ft. lbs. (14-19 Nm)

22. Install the bellcrank onto the shift shaft. Note the key splined on the bellcrank and shift shaft. Install the nut and torque to specification.

 = T
Bellcrank Nut: 12-18 ft. lbs. (16-24 Nm)

23. Refer to "Transmission Installation" to complete the repair.

TROUBLESHOOTING

Troubleshooting Checklist

Check the following items when shifting difficulty is encountered.

- Shift cable adjustment/condition
- PVT alignment (clutch center distance)
- Idle speed (throttle cable routing)
- Transmission lubricant type/quality
- Loose fasteners on sector gear cover
- Worn rod ends, clevis pins, or pivot arm bushings
- Shift selector rail travel
- Worn, broken or damaged internal transmission components

NOTE: To determine if shifting difficulty or problem is caused by an internal transmission problem, isolate the transmission by disconnecting the shift cable end from the transmission bellcrank. Manually select each gear range at the transmission bellcrank, and test ride vehicle. If it functions properly, the problem is outside the transmission.

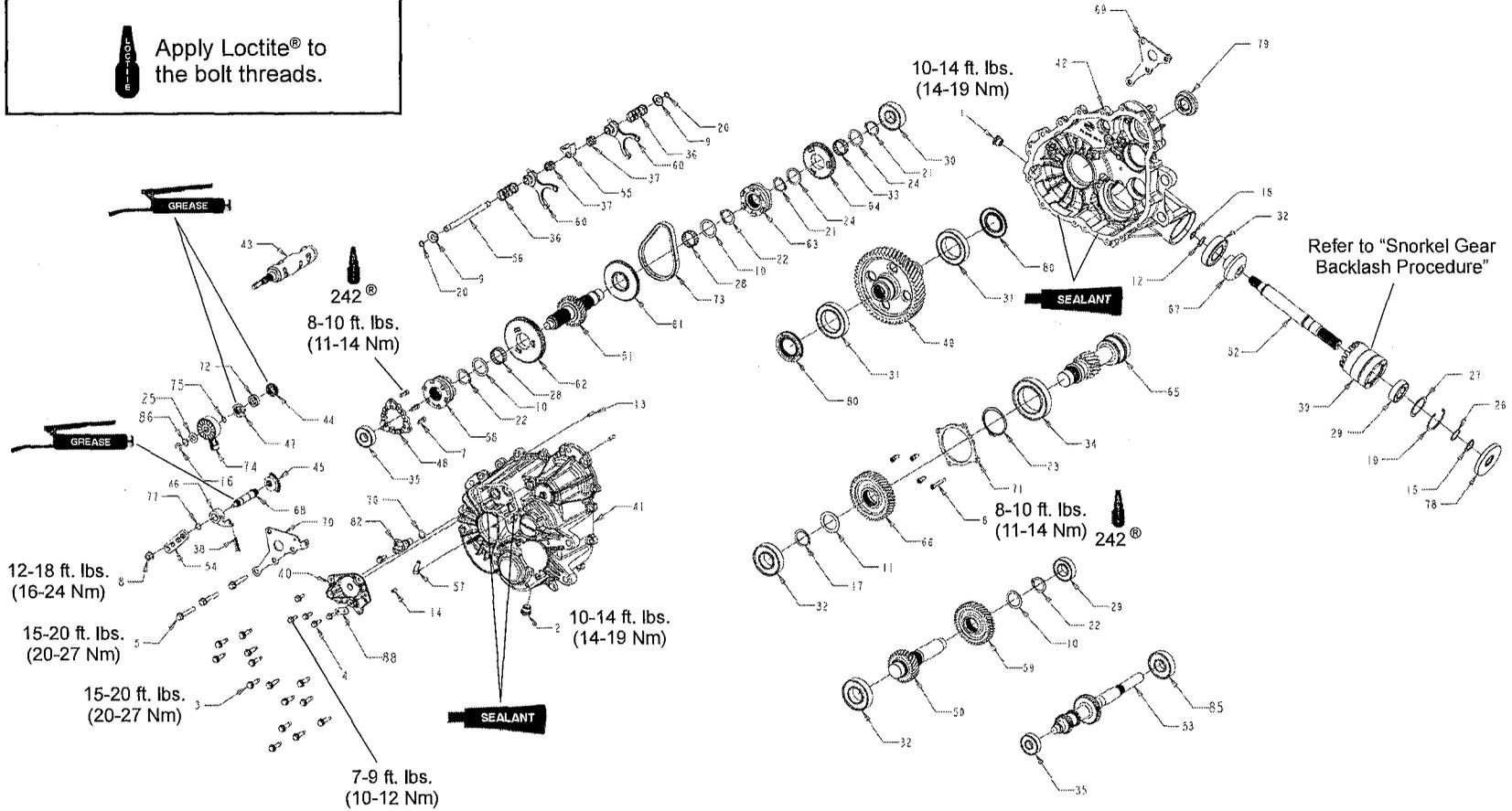
If transmission problem remains, disassemble transmission and inspect all gear dogs for wear (rounding) or damage. Inspect all bearings, circlips, thrust washers and shafts for wear.

FOR REASSEMBLY

 Apply White Lithium Based Grease.

 Apply Polaris Crankcase Sealant.

 Apply Loctite® to the bolt threads.



Exploded View, Continued

Ref.	Qty.	Description	Ref.	Qty.	Description
1.	1	Fill Plug	44.	1	Gear, Sector 16T
2.	1	Drain Plug, Magnetic	45.	1	Gear, Sector 31T
3.	14	Screw, M8 x 1.25 x 30	46.	1	Pawl, Detent
4.	6	Screw, M6 x 1 x 20	47.	1	Star, Detent
5.	3	Screw, M8 x 50	48.	1	Plate, Park, 12-Face
6.	1	Screw, M6 x 1 x 40	49.	1	Shaft, Output 53T
7.	6	Screw, M6 x 1 x 18	50.	1	Shaft, Idler 29T
8.	1	Nut, NyLoc, M8 x 1.25	51.	1	Shaft, Reverse 29T
9.	2	Washer, Cup	52.	1	Shaft, Front Output
10.	3	Washer	53.	1	Shaft, Input Helical
11.	1	Washer	54.	1	Bellcrank
12.	1	Washer	55.	1	Collar, Shift
13.	2	Pin, Dowel	56.	1	Rail, Shift Shaft
14.	1	Pin, Spring	57.	1	Tube, Vent, 1/4 in.
15.	1	Retaining Ring, External	58.	1	Shift Dog, Park
16.	1	Snap Ring	59.	1	Gear, 44T
17.	1	Retaining Ring, External	60.	2	Fork, Shift
18.	1	Retaining Ring, External	61.	1	Sprocket, 48T, 6-Face
19.	1	Retaining Ring, Internal	62.	1	Gear, Low 67T
20.	2	Retaining Ring, External	63.	1	Engagement Dog, 6-Face
21.	2	Retaining Ring, External	64.	1	Gear, 53T
22.	3	Retaining Ring, External	65.	1	Shaft, Pinion 11T
23.	1	Retaining Ring, External	66.	1	Gear, 46T
24.	2	Washer, Thrust	67.	1	Gear, Snorkel 13T
25.	1	Washer, Thrust	68.	1	Shaft, Shift
26.	1	Shim	69.	1	Weldment, Rear Mount Bracket
27.	1	Shim	70.	1	Bracket, Rear Mount
28.	2	Bearing, Needle Cage	71.	1	Cover, Bearing, Center Drive
29.	2	Bearing, Ball	72.	1	Spacer
30.	2	Bearing, Ball	73.	1	Chain, Silent
31.	2	Bearing, Ball	74.	1	Switch, Rotary, 2-Pin
32.	3	Bearing, Ball	75.	1	O-Ring
33.	1	Bearing, Needle Cage	76.	1	O-Ring
34.	1	Bearing, Ball	77.	1	O-Ring
35.	2	Bearing, Ball	78.	1	Seal, Triple Lip
36.	2	Spring, Compression	79.	1	Seal, Dual Lip
37.	2	Spring, Compression	80.	2	Seal, Triple Lip
38.	1	Spring, Compression, Detent	81.	-	N/A
39.	1	Tube, Snorkel	82.	1	Sensor, Speed
40.	1	Cover, Sector Gears	85.	1	Bearing, Ball
41.	1	Case, RH	86.	1	Spring, Wave
42.	1	Case, LH	88.	1	Bracket, Wire Harness
43.	1	Drum, Shift			

CHAPTER 9

BRAKES

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BRAKES

GENERAL SPECIFICATIONS

FRONT BRAKE SYSTEM		
Item	Standard	Service Limit
Front Brake Pad Thickness	.297 ± .007" (7.54 ± .178 mm)	.180" (4.6 mm)
Front Brake Disc Thickness	.188" (4.78 mm)	.170" (4.32 mm)
Front Brake Disc Runout	-	.010" (.254 mm)

REAR BRAKE SYSTEM		
Item	Standard	Service Limit
Rear Brake Pad Thickness	.298 ± .007" (7.57 ± .178 mm)	.180" (4.6 mm)
Rear Brake Disc Thickness	.188" (4.78 mm)	.170" (4.32 mm)
Rear Brake Disc Runout	-	.010" (.254 mm)

TORQUE SPECIFICATIONS

Item	Torque ft. lbs.	Torque Nm
Front Caliper Mounting Bolts	31-34	42-46
Rear Caliper Mounting Bolts	30	41
Brake Line Flare	12-15	16-20
Brake Line Banjo Bolts (Caliper Attachment)	15	20
Brake Line Banjo Bolt (Master Cylinder Attachment)	15	20
Brake Switch	15	20
Brake Disc to Hub Bolts	30	41
Master Cylinder to Frame	17	23
Brake Pedal Mounting Bracket to Frame	17	23

SPECIAL TOOLS

Part Number	Tool Description
2870975	Mity Vac™ Pressure Test Tool

BRAKE SYSTEM SERVICE NOTES

Disc brake systems are light weight, low maintenance, and perform well in the conditions this vehicle will routinely encounter. There are a few things to remember when replacing disc brake pads or performing brake system service to ensure proper system function and maximum pad service life.

- DO NOT over-fill the master cylinder fluid reservoir.
- Make sure the brake pedal returns freely and completely.
- Adjust stop pin on brake caliper(s) after pad service.
- Check and adjust master cylinder reservoir fluid level after pad service.
- Make sure atmospheric vent on reservoir is unobstructed.
- Test for brake drag after any brake system service and investigate cause if brake drag is evident.
- Make sure caliper moves freely on guide pins (where applicable).
- Inspect caliper piston seals for foreign material that could prevent caliper pistons from returning freely.
- Perform a brake burnishing procedure after installing new pads to maximize service life.
- DO NOT lubricate or clean the brake components with aerosol or petroleum products. Use only approved brake cleaning products.

BRAKE NOISE TROUBLESHOOTING

Dirt or dust buildup on the brake pads and disc is the most common cause of brake noise (squeal caused by vibration). If cleaning does not reduce the occurrence of brake noise, Permatex™ *Disc Brake Quiet* can be applied to the back of the pads. Follow directions on the package. This will keep pads in contact with caliper piston(s) to reduce the chance of squeaks caused by dirt or dust.

Brake Noise Troubleshooting	
Possible Cause	Remedy
Dirt, dust, or imbedded material on pads or disc	Spray disc and pads with CRC Brakeleen™ or an equivalent non-flammable aerosol brake cleaner. Remove pads and/or disc hub to clean imbedded material from disc or pads.
Pad(s) dragging on disc (noise or premature pad wear) because of improper adjustment Master cylinder reservoir overfilled Master cylinder compensating port restricted Master cylinder piston not returning completely Caliper piston(s) not returning Operator error (riding the brake)	Adjust pad stop (front calipers) Set to proper level Clean compensating port Inspect. Repair as necessary Clean piston(s) seal Educate operator
Loose wheel hub or bearings	Check wheel and hub for abnormal movement.
Brake disc warped or excessively worn	Replace disc
Brake disc misaligned or loose	Inspect and repair as necessary
Noise is from other source (axle, hub, disc or wheel)	If noise does not change when brake is applied check other sources. Inspect and repair as necessary
Wrong pad for conditions	Change to a softer or harder pad

BRAKES

HYDRAULIC BRAKE SYSTEM OPERATION

The Polaris brake system consists of the following components or assemblies: brake pedal, master cylinder, hydraulic brake lines, brake calipers, brake pads, and brake discs, which are secured to the drive line.

When the foot activated brake lever is applied it applies pressure on the piston within the master cylinder. As the master cylinder piston moves inward it closes a small opening (compensating port) within the cylinder and starts to build pressure within the brake system. As the pressure within the system is increased, the pistons located in the brake calipers move outward and apply pressure to the moveable brake pads. These pads contact the brake discs and move the calipers in their floating bracket, pulling the stationary side pads into the brake discs. The resulting friction reduces brake disc and vehicle speed.

The friction applied to the brake pads will cause the pads to wear. As these pads wear, the piston within the caliper moves further outward and becomes self adjusting. Fluid from the reservoir fills the additional area created when the caliper piston moves outward.

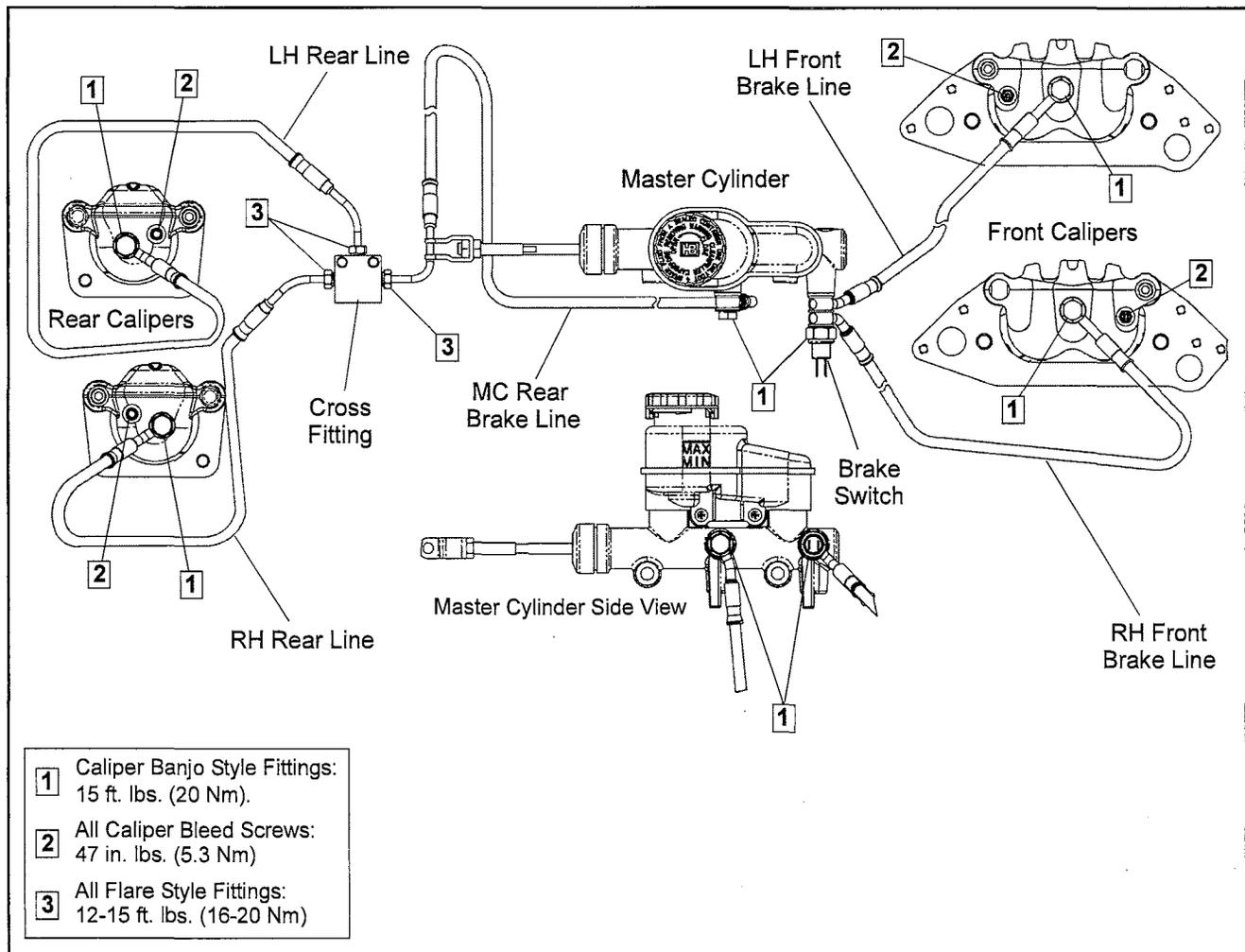
Brake fluid level is critical to proper system operation. Too little fluid will allow air to enter the system and cause the brakes to feel spongy. Too much fluid could cause brakes to drag due to fluid expansion.

Located within the master cylinder is the compensating port which is opened and closed by the master cylinder piston assembly. As the temperature within the hydraulic system changes, this port compensates for fluid expansion or contraction. Due to the high temperatures created within the system during heavy braking, it is very important that the master cylinder reservoir have adequate space to allow for fluid expansion. **Never overfill the reservoir! Do not fill the reservoir beyond the MAX LEVEL line!**

When servicing Polaris brake systems use only **Polaris DOT 4 Brake Fluid (PN 2872189)**. **WARNING:** Once a bottle is opened, use what is necessary and discard the rest in accordance with local laws. Do not store or use a partial bottle of brake fluid. Brake fluid is hygroscopic, meaning it rapidly absorbs moisture. This causes the boiling temperature of the brake fluid to drop, which can lead to early brake fade and the possibility of serious injury.

BRAKE SYSTEM EXPLODED VIEW

RZR XP 900

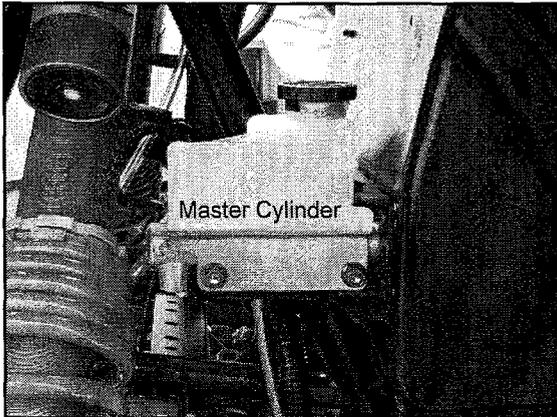


BRAKES

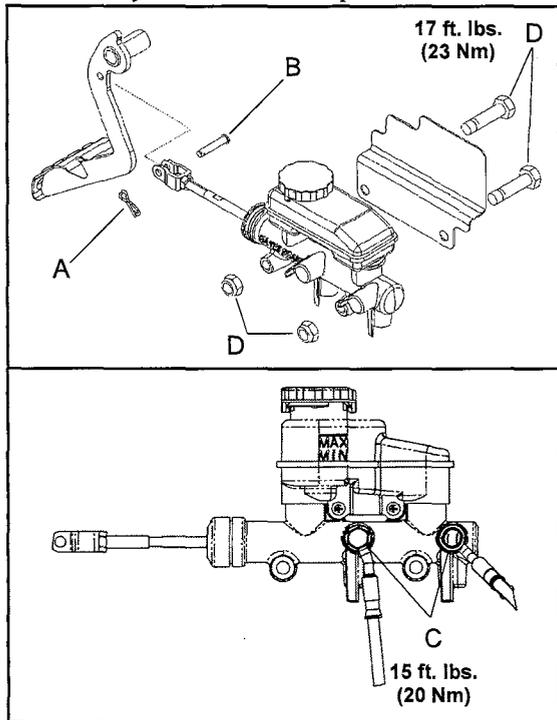
MASTER CYLINDER

Removal

1. Locate the master cylinder above the left front tire in the wheel well area.



2. Remove the clip (A) from the clevis pin (B) that attaches the master cylinder to the brake pedal lever.



3. Place a container to catch brake fluid under the master cylinder brake line banjo bolts (C).

CAUTION

Brake fluid will damage finished surfaces. Do not allow brake fluid to come in contact with finished surfaces.

NOTE: Make note of front and rear brake line locations to master cylinder.

4. Loosen the brake line banjo bolts (C) and allow fluid to drain.

NOTE: Dispose of fluid properly. Do not re-use.

5. Remove the two mounting fasteners (D) that secure the master cylinder to the frame.

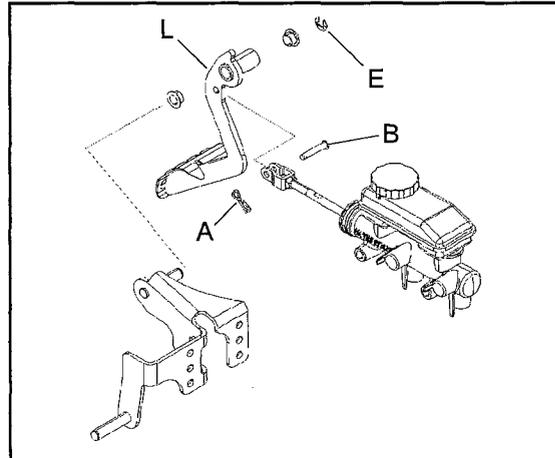
Installation

1. Reverse Steps 1-5 for master cylinder installation. Refer to the torque specifications in the illustration.
2. After installing the foot brake check pedal freeplay. Pedal freeplay should not exceed .090" (2.286 mm).

BRAKE PEDAL LEVER

Pedal Removal

1. Locate the brake pedal lever (L) and remove the master cylinder clevis pin (B) and clip (A).
2. Remove the E-ring (E) from the pedal mount and remove the brake pedal lever (L) from the vehicle.



Pedal Installation

1. Reverse "Removal" steps to install brake pedal lever. Brake pedal freeplay should not exceed .090" (2.28 mm).

Brake Pedal Freeplay:
.090" (2.28 mm)

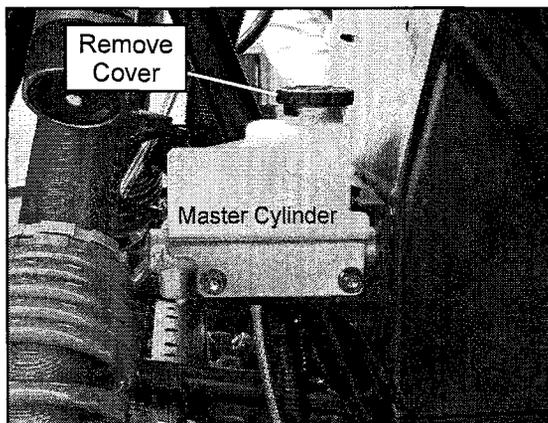
BRAKE BLEEDING / FLUID CHANGE

NOTE: When bleeding the brakes or replacing the fluid always start with the furthest caliper from the master cylinder.

⚠ CAUTION
Always wear safety glasses.

⚠ CAUTION
Brake fluid will damage finished surfaces. Do not allow brake fluid to come in contact with finished surfaces. This procedure should be used to change fluid or bleed brakes during regular maintenance.

1. Clean master cylinder reservoir cover thoroughly and remove the cover.



2. If changing fluid, remove old fluid from reservoir with a Mity Vac™ pump or similar tool.

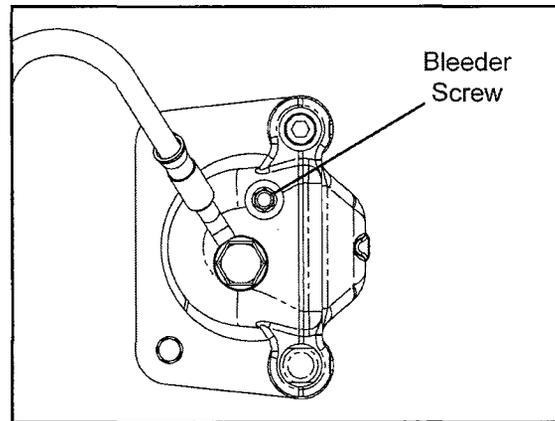
Mity Vac™ (PN 2870975)

3. Add brake fluid to the indicated MAX level of reservoir.

Polaris DOT 4 Brake Fluid (PN 2872189)

4. Begin bleeding procedure with the caliper that is farthest from the master cylinder. Install a box end wrench on caliper bleeder screw. Attach a clean, clear hose to fitting and place the other end in a clean container. Be sure the hose fits tightly on fitting.

5. Have an assistant slowly pump foot pedal until pressure builds and holds.
6. Hold brake pedal down to maintain pedal pressure, and open bleeder screw. Close bleeder screw and release pedal.



NOTE: Do not release foot pedal before bleeder screw is tight or air may be drawn into master cylinder.

7. Repeat procedure until clean fluid appears in bleeder hose and all air has been purged. Add fluid as necessary to maintain level in reservoir.

⚠ CAUTION
Maintain at least 1/2"(1.27 cm) of brake fluid in the reservoir to prevent air from entering the master cylinder.

8. Tighten bleeder screw securely and remove bleeder hose. Torque bleeder screw to 47 in. lbs. (5.3 Nm).
9. Repeat procedure Steps 5 - 8 for the remaining calipers.
10. Add brake fluid to MAX level inside reservoir.

Master Cylinder Fluid Level
Between the MIN and MAX line shown on the reservoir.

11. Install master cylinder reservoir cover.
12. Field test machine at low speed before putting into service. Check for proper braking action and pedal reserve. With pedal firmly applied, pedal reserve should be no less than 1/2"(1.3 cm).
13. Check brake system for fluid leaks.

BRAKES

FRONT BRAKE PADS

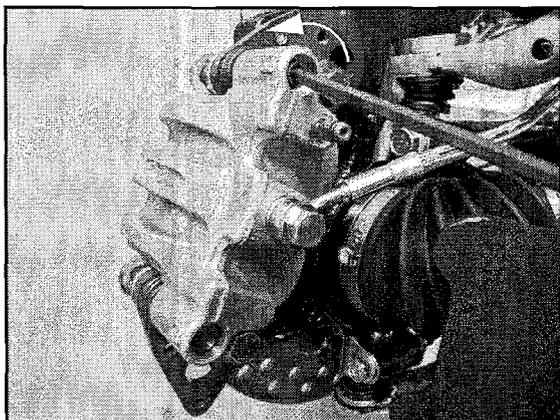
Pad Removal

1. Elevate and support front of vehicle.

⚠ CAUTION

Use care when supporting vehicle so that it does not tip or fall. Severe injury may occur if machine tips or falls.

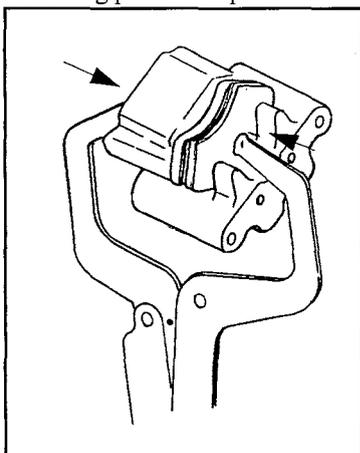
2. Remove the wheel nuts and front wheel.
3. Loosen the pad adjuster screw 2-3 turns.



4. Remove the upper and lower caliper mounting bolts and remove the caliper from the front hub.

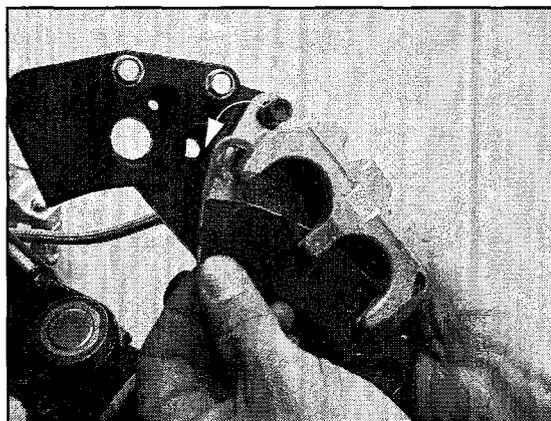
NOTE: When removing caliper, use care not to damage brake line. Support caliper so to avoid kinking or bending brake line.

5. Push caliper piston into caliper bore slowly using a C-clamp or locking pliers with pads installed.



NOTE: Brake fluid will be forced through compensating port into master cylinder fluid reservoir when piston is pushed back into caliper. Remove excess fluid from reservoir as required.

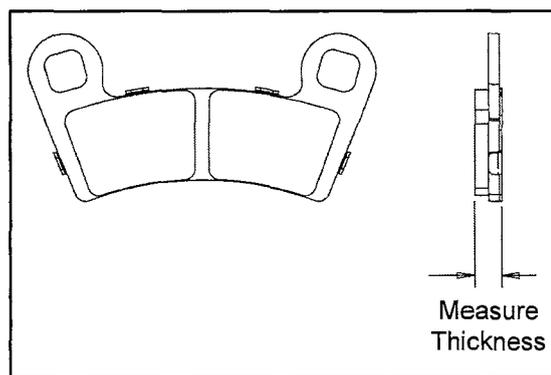
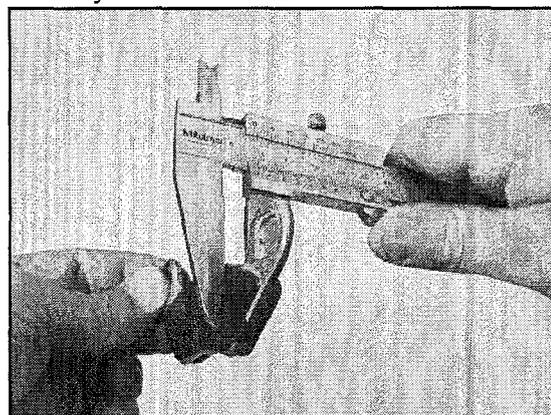
6. Push the mounting bracket inward and the slip outer brake pad out between the bracket and caliper body.



7. Remove the inner pad from the bracket and caliper.

Pad Inspection

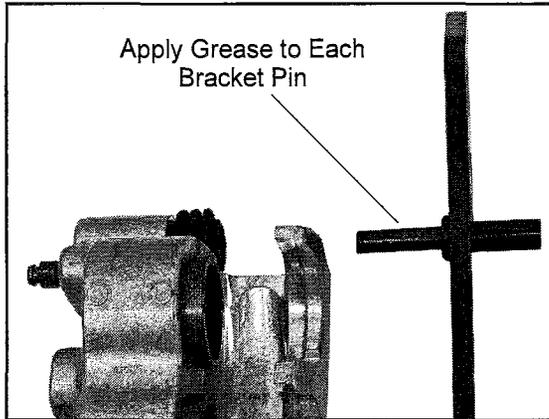
1. Measure the thickness of the pad material. Replace pads if worn beyond the service limit.



Front Brake Pad Thickness:
.297 ± .007" (7.5 ± .178 mm)
Service Limit: .180" (4.6 mm)

Pad Assembly / Installation

1. Lubricate mounting bracket pins with a light film of silicone grease and install rubber dust boots.

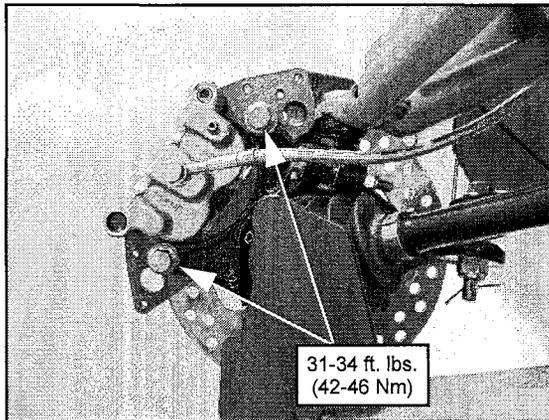


2. Compress mounting bracket and make sure dust boots are fully seated. Install pads with friction material facing each other.

WARNING

If brake pads are contaminated with grease, oil, or liquid soaked do not use the pads. Use only new, clean pads.

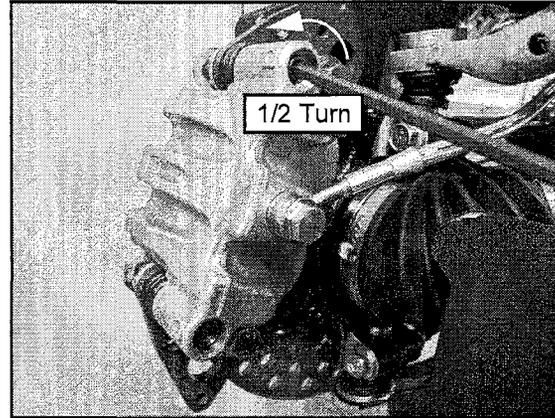
3. Install caliper onto front hub and torque mounting bolts to specification.



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Front Caliper Mount Bolt:
31-34 ft. lbs. (42-46 Nm)

4. Slowly pump the brake pedal until pressure has been built up. Maintain at least 1/2, (12.7 mm) of brake fluid in the reservoir to prevent air from entering the brake system.
5. Install the adjustment set screw and turn clockwise until stationary pad contacts disc, then back off 1/2 turn (counterclockwise).



6. Verify fluid level in reservoir is up to MAX line inside reservoir and install reservoir cap.

Master Cylinder Fluid

Up to MAX line inside reservoir

7. Install wheel and torque wheel nuts to specification.

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Wheel Nuts:
30 ft. lbs. (41 Nm) + 90° (1/4 turn)

Brake Burnishing Procedure

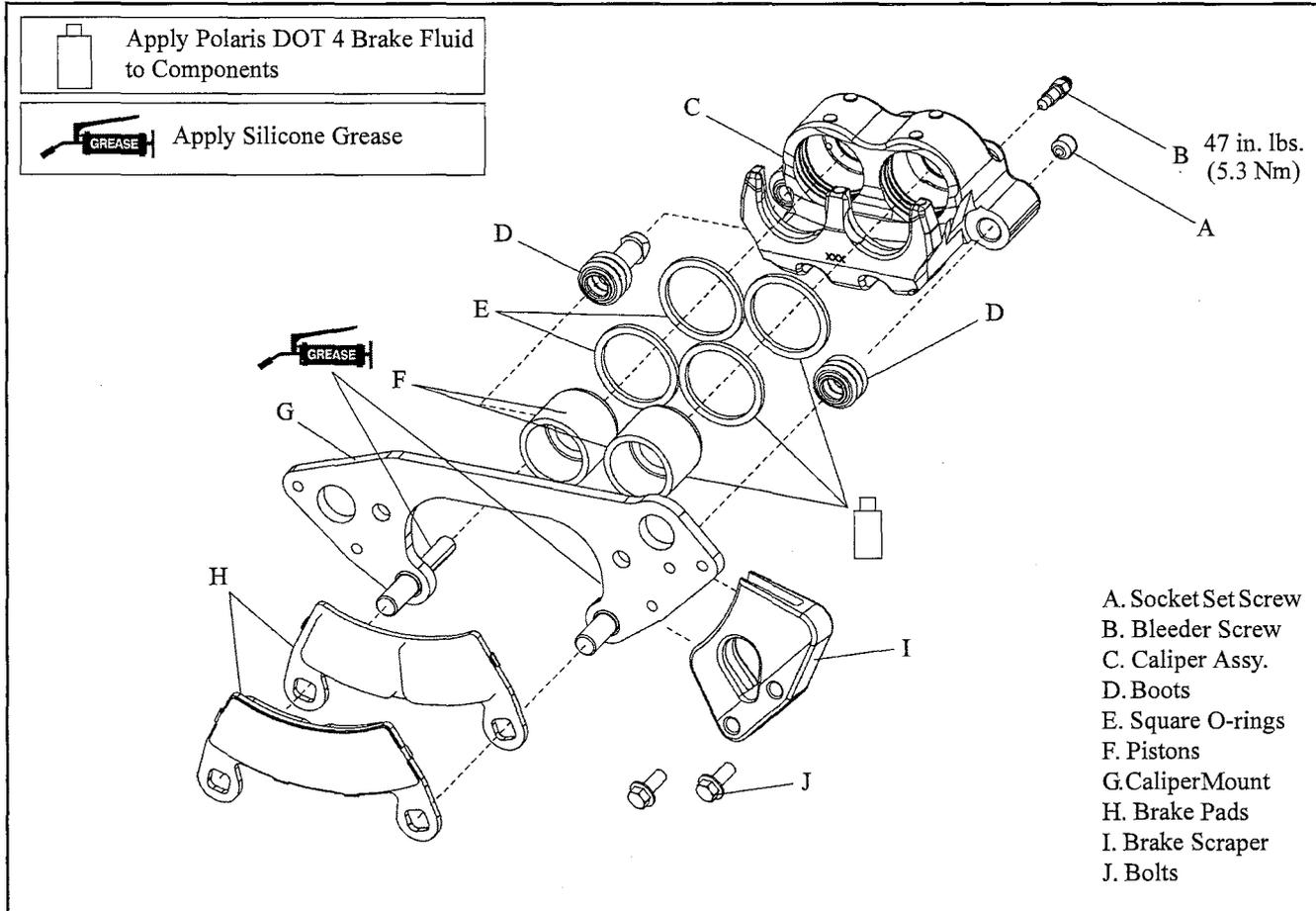
It is required that a burnishing procedure be performed after installation of new brake pads to extend service life and reduce noise.

Start machine and slowly increase speed to 30 mph. Gradually apply brakes to stop machine. Allow pads and disc to cool sufficiently during the procedure. Do not allow pads or disc to become hot or warping may result. Repeat this procedure 10 times. **Do not make more than 3 stops per 1 mile (1.6 km).**

BRAKES

FRONT CALIPER SERVICE

Caliper Exploded View



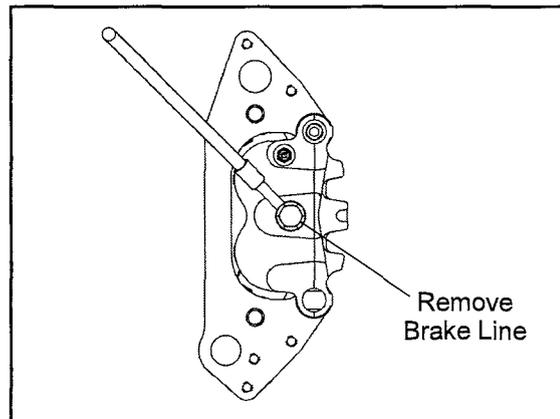
Caliper Removal

1. Elevate and safely support the front of the vehicle.
2. Remove the (4) wheel nuts and the front wheel.
4. Place a container below the caliper to catch brake fluid when removing the line. Remove brake line from caliper.

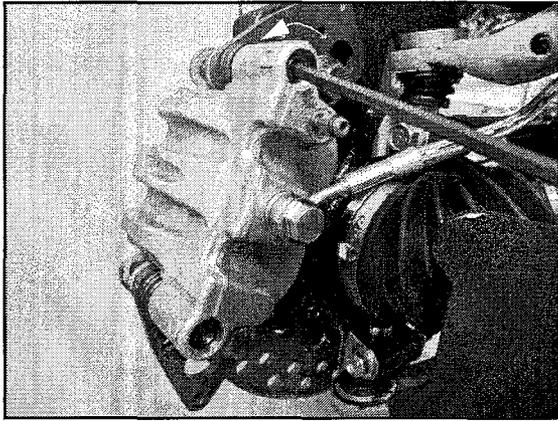
CAUTION

Use care when supporting vehicle so that it does not tip or fall. Severe injury may occur.

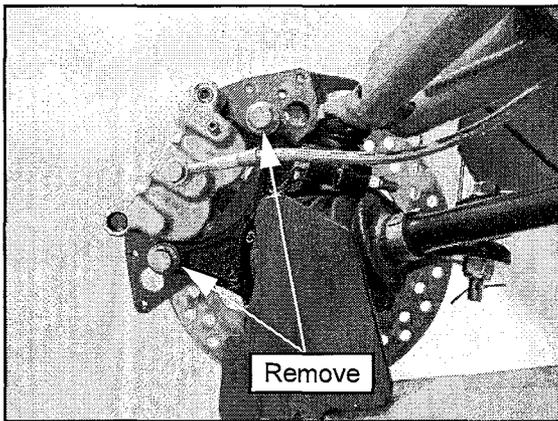
3. Clean caliper area before removal.



- Loosen brake pad adjustment set screw 2-3 turns to allow brake pad removal after the caliper is removed.

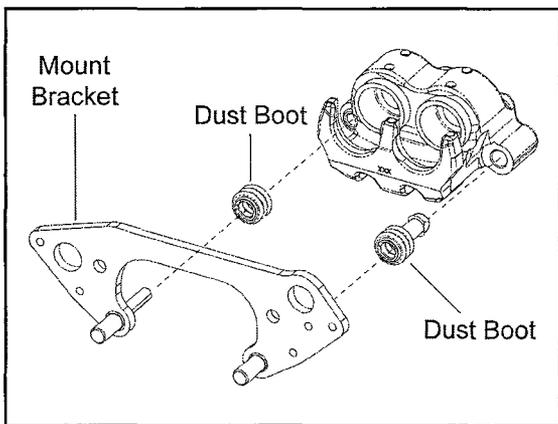


- Remove the two caliper mounting bolts and remove the caliper assembly from the front hub.



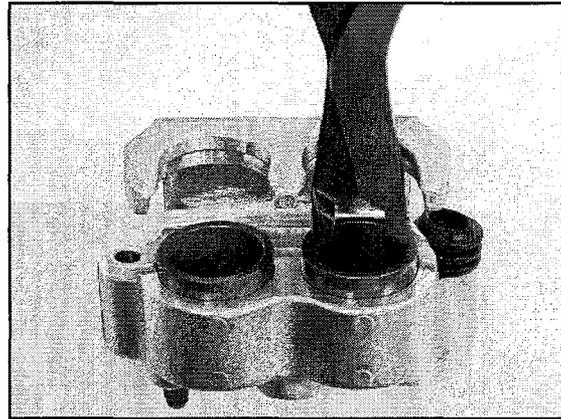
Caliper Disassembly

- Remove both brake pads from the caliper (see "FRONT BRAKE PADS - Pad Removal").
- Remove mount bracket assembly and dust boots.



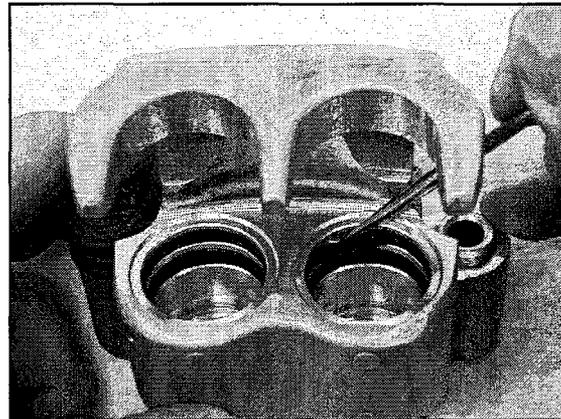
- Thoroughly clean the caliper before disassembly and prepare a clean work area for disassembly.

- Use a commercially available caliper piston pliers to extract the pistons from the caliper.



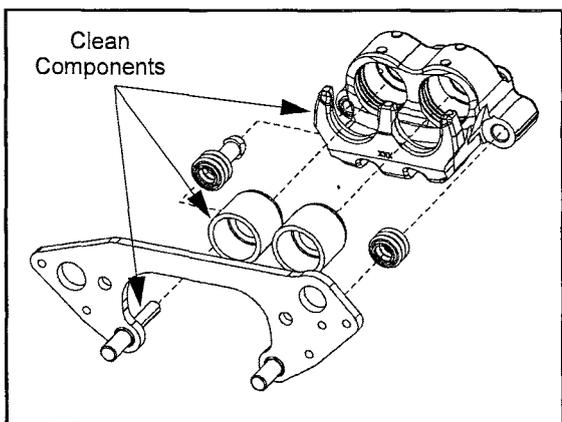
IMPORTANT: Do not remove the caliper pistons with a standard pliers. The piston sealing surfaces will become damaged if a standard pliers is used.

- Once the pistons are removed, use a pick to carefully remove the square O-rings from the caliper. O-rings should be replaced during caliper service.



BRAKES

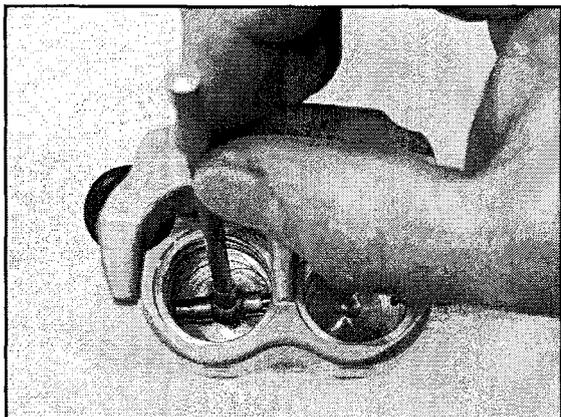
6. Clean the caliper body, piston, and retaining bracket with brake cleaner or alcohol.



NOTE: Be sure to clean seal grooves in caliper body.

Caliper Inspection

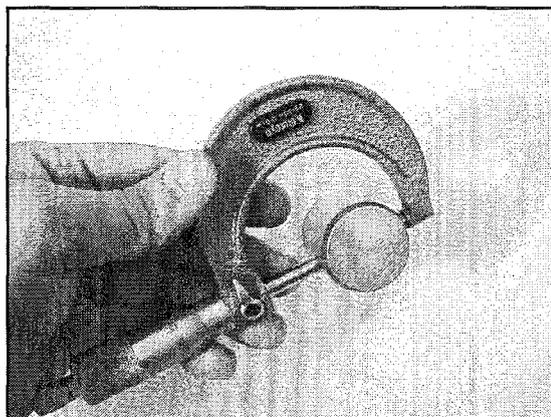
1. Inspect caliper body for nicks, scratches, pitting or wear. Measure bore size and compare to specifications. Replace if damaged or worn beyond service limit.



$$\text{Caliper} = \text{In. / mm.}$$

Front Caliper Piston Bore I.D.:
Std: 1.373" (34.87 mm)
Service Limit: 1.375" (34.93 mm)

2. Inspect piston for nicks, scratches, pitting or wear. Measure piston diameter and replace if damaged or worn beyond service limit.



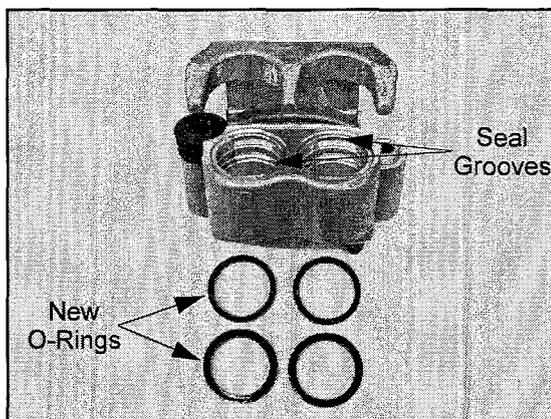
$$\text{Piston} = \text{In. / mm.}$$

Front Caliper Piston O.D.:
Std: 1.370" (34.80 mm)
Service Limit: 1.368" (34.75 mm)

3. Inspect the brake disc and pads as outlined in this chapter.

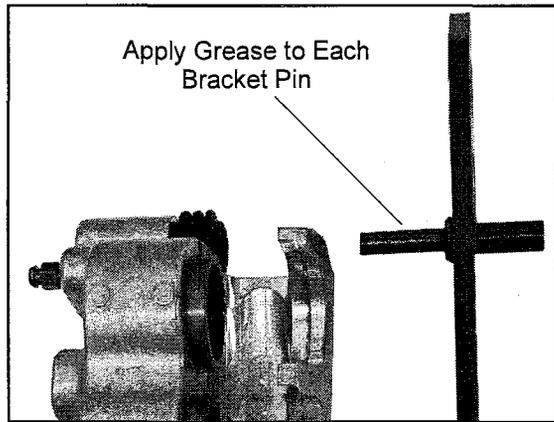
Caliper Assembly

1. Install new O-rings in the caliper body. Be sure the grooves are clean and free of residue or brakes may drag upon assembly.



2. Coat pistons with clean Polaris DOT 4 Brake Fluid. Install pistons with a twisting motion while pushing inward. Piston should slide in and out of bore smoothly, with light resistance.

- Lubricate the mounting bracket pins with silicone grease and install the rubber dust seal boots.

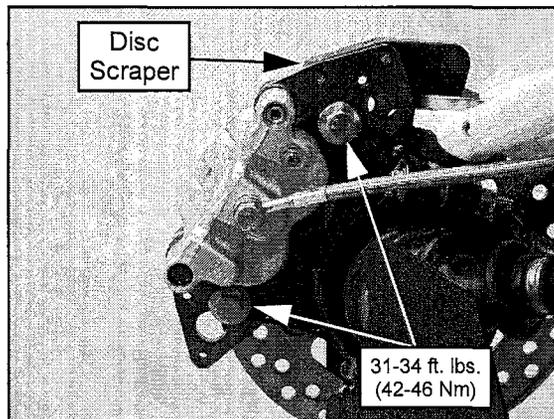


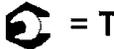
- Compress the mounting bracket and make sure the dust seal boots are fully seated. Install the brake pads. Clean the disc and pads with brake parts cleaner or denatured alcohol to remove any dirt, oil or grease.

Caliper Installation

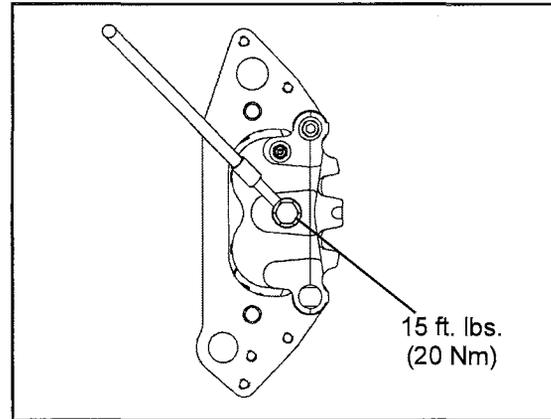
- Install the brake line onto the caliper taking care not to allow any debris to enter the caliper.
- Install the caliper and torque the mounting bolts to specification.

IMPORTANT: If disc scraper was removed, reinstall it upon caliper installation.

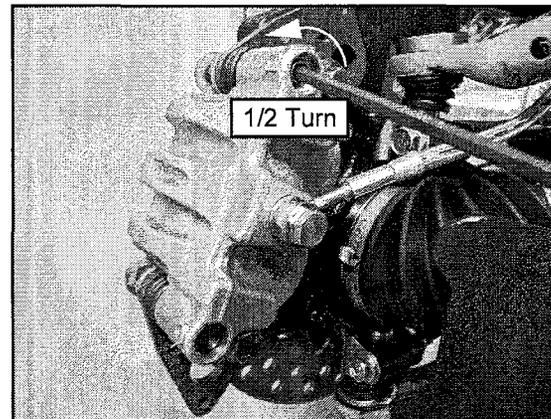


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Front Caliper Mount Bolt: 31-34 ft. lbs. (42-46 Nm)

- Torque the banjo bolt to the proper torque specification.



- Install the adjustment set screw and turn clockwise until stationary pad contacts disc, then back off 1/2 turn (counterclockwise).



- Perform brake bleeding procedure as outlined earlier in this chapter.
- Install wheel and torque wheel nuts to specification.

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Wheel Nuts: 30 ft. lbs. (41 Nm) + 90° (1/4 turn)

- Field test unit for proper braking action before putting into service. Inspect for fluid leaks and firm brakes. Make sure the brake is not dragging when pedal is released. If the brake drags, re-check assembly and installation.

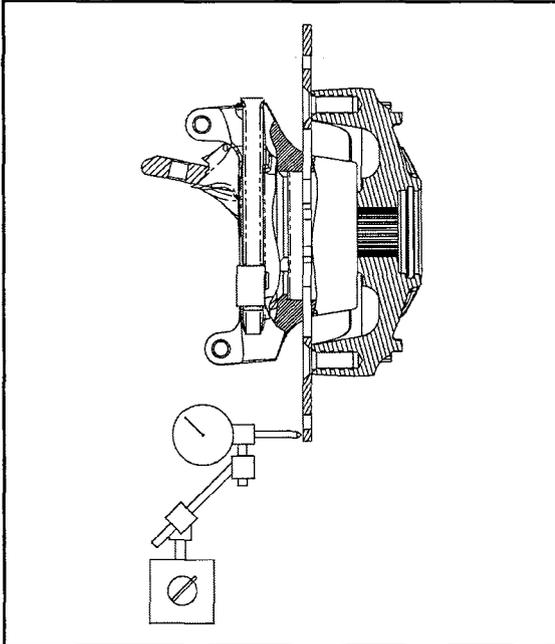
NOTE: If new pads are installed, refer to "FRONT BRAKE PADS - Brake Burnishing Procedure".

BRAKES

FRONT BRAKE DISC

Disc Runout

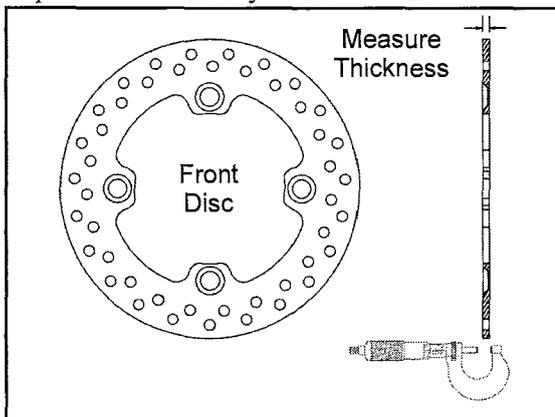
1. Mount dial indicator as shown to measure disc runout. Slowly rotate the disc and read total runout on the dial indicator. Replace the disc if runout exceeds specification.



Brake Disc Runout
Service Limit: .010" (.254 mm)

Disc Inspection

1. Visually inspect disc for scoring, scratches, or gouges. Replace the disc if any deep scratches are evident.
2. Use a 0-1" micrometer and measure the disc thickness at eight different points around the pad contact surface. Replace disc if worn beyond service limit.

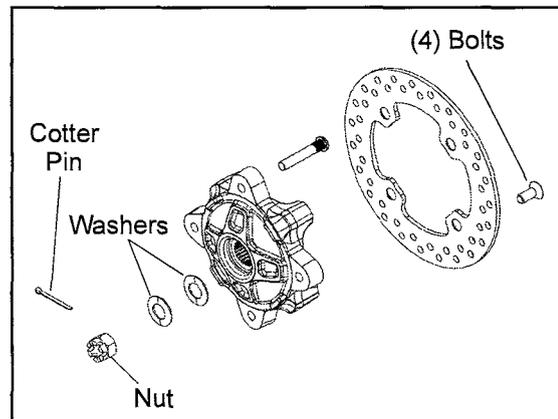


Brake Disc Thickness
New: .188" (4.78 mm)
Service Limit .170" (4.32 mm)

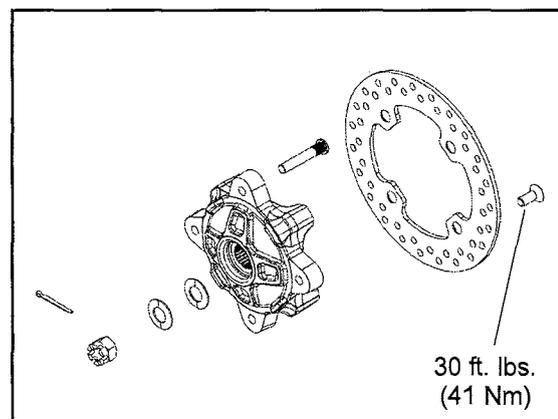
Brake Disc Thickness Variance
Service Limit: .002" (.051 mm)
difference between measurements

Disc Replacement

1. Remove the front brake caliper (see "FRONT CALIPER SERVICE").
2. Remove wheel hub cotter pin, castle nut and washers.
3. Remove the wheel hub assembly from the vehicle and remove the (4) bolts retaining the disc to the hub.



4. Clean the wheel hub mating surface and install new disc on wheel hub.
5. Install new bolts and torque to **30 ft. lbs. (41 Nm)**.



CAUTION

Always use new brake disc mounting bolts. The bolts have a pre-applied locking agent which is destroyed upon removal.

6. Install wheel hub assembly, washers, and castle nut. Torque castle nut to **80 ft. lbs. (108 Nm)** and install a new cotter pin.
7. Install the front brake caliper (see "FRONT CALIPER SERVICE").
8. Follow bleeding procedure outlined earlier in this chapter.
9. Field test unit for proper braking action before putting into service. Inspect for fluid leaks and firm brakes. Make sure the brake is not dragging when pedal is released. If the brake drags, re-check assembly and installation.

REAR BRAKE PADS

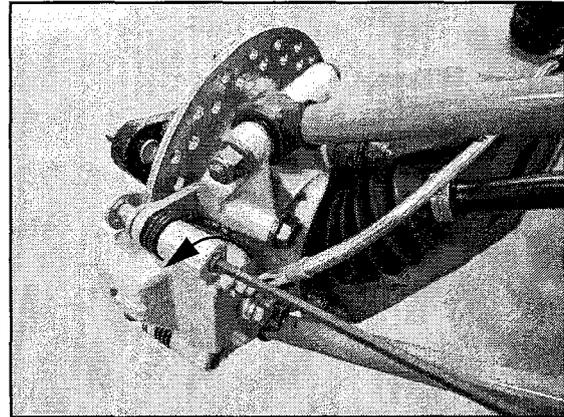
Pad Removal

1. Elevate and support rear of vehicle.

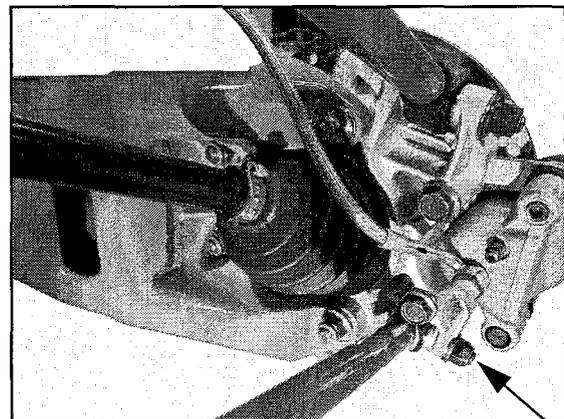
CAUTION

Use care when supporting vehicle so that it does not tip or fall. Severe injury may occur if machine tips or falls.

2. Remove the rear wheel.
3. Loosen pad adjuster screw 2-3 turns.

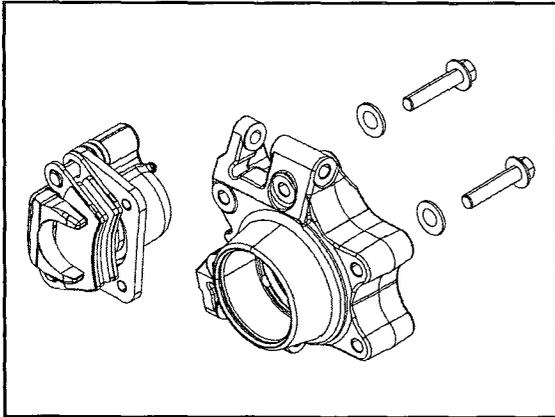


4. Remove the lower radius rod outer mounting bolt, nut and washer from the bearing carrier. Swing radius rod down. Discard the nut.



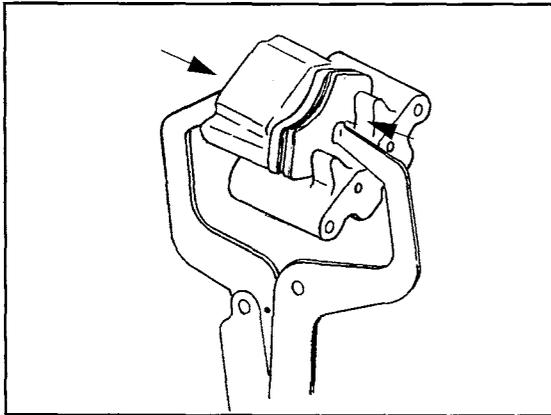
BRAKES

5. Remove the two caliper mounting bolts and lift caliper off the brake disc.



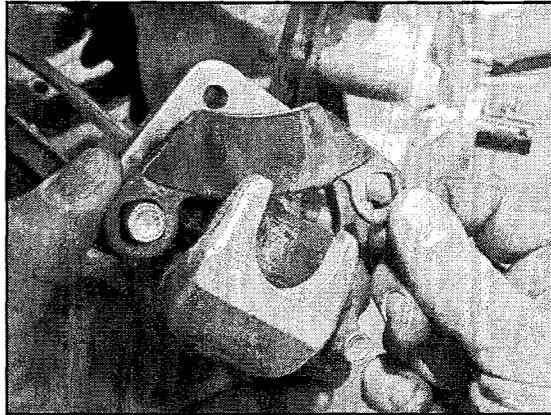
NOTE: When removing caliper, be careful not to damage brake line. Support caliper so as not to kink or bend brake line.

6. Push caliper piston into the caliper bore slowly using a C-clamp or locking pliers with pads installed.

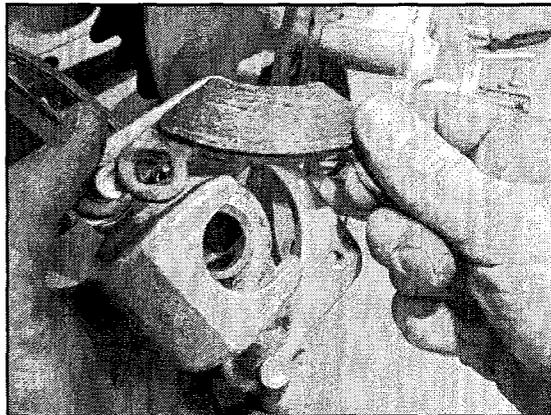


NOTE: Brake fluid will be forced through compensating port into master cylinder fluid reservoir when piston is pushed back into caliper. Remove excess fluid from reservoir as required.

7. Push caliper mounting bracket inward and slip outer brake pad past the edge to remove.

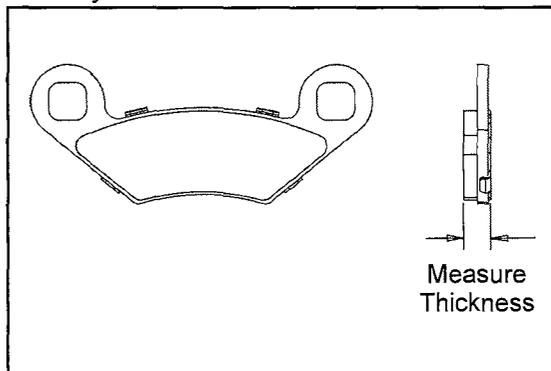


8. Remove the inner brake pad.



Pad Inspection

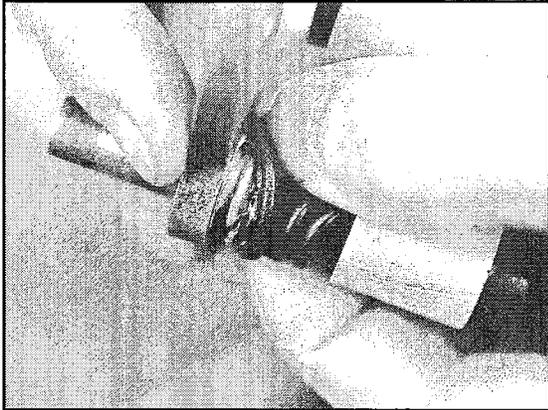
1. Clean the caliper with brake cleaner or alcohol.
2. Measure the thickness of the pad material. Replace pads if worn beyond the service limit.



Rear Brake Pad Thickness:
.298" ± .007" (7.57 mm ± .178 mm)
Service Limit: .180" (4.6 mm)

Pad Assembly / Installation

1. Lubricate mounting bracket pins with a light film of silicone grease and install rubber dust boots.

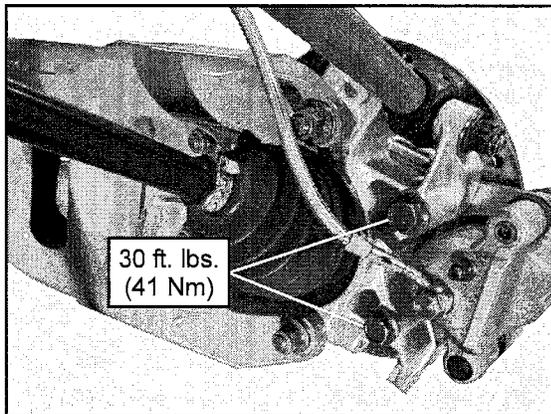


2. Compress mounting bracket and make sure dust boots are fully seated. Install pads with friction material facing each other.

WARNING

If brake pads are contaminated with grease, oil, or liquid soaked do not use the pads. Use only new clean pads.

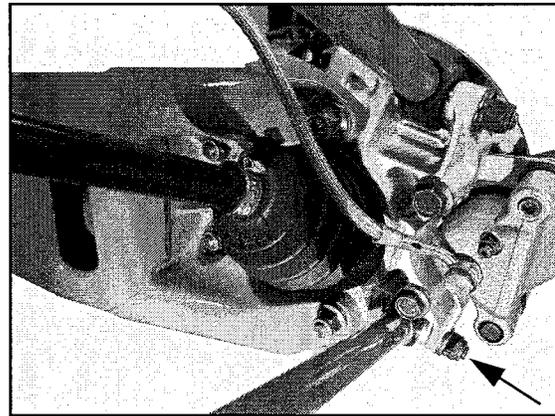
3. Install caliper and torque mounting bolts to specification.



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Rear Caliper Mount Bolt:
30 ft. lbs. (41 Nm)

4. Install lower radius rod bolt, washer and new nut. Torque to specification.



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Radius Rod to Bearing Carrier Bolt:
50 ft. lbs. (67.7 Nm)

5. Slowly pump the brake pedal until pressure has been built up. Maintain at least 1/2, (12.7 mm) of brake fluid in the reservoir to prevent air from entering the brake system.
6. Install the adjustment set screw and turn clockwise until the stationary pad contacts the disc, then back off 1/2 turn.
7. Verify fluid level in reservoir is up to the MAX line inside reservoir and install reservoir cap.

Master Cylinder Fluid
Up to MAX line inside reservoir

8. Install wheel and torque wheel nuts to specification.

T

Wheel Nuts:
30 ft. lbs. (41 Nm) + 90° (1/4 turn)

Brake Burnishing Procedure

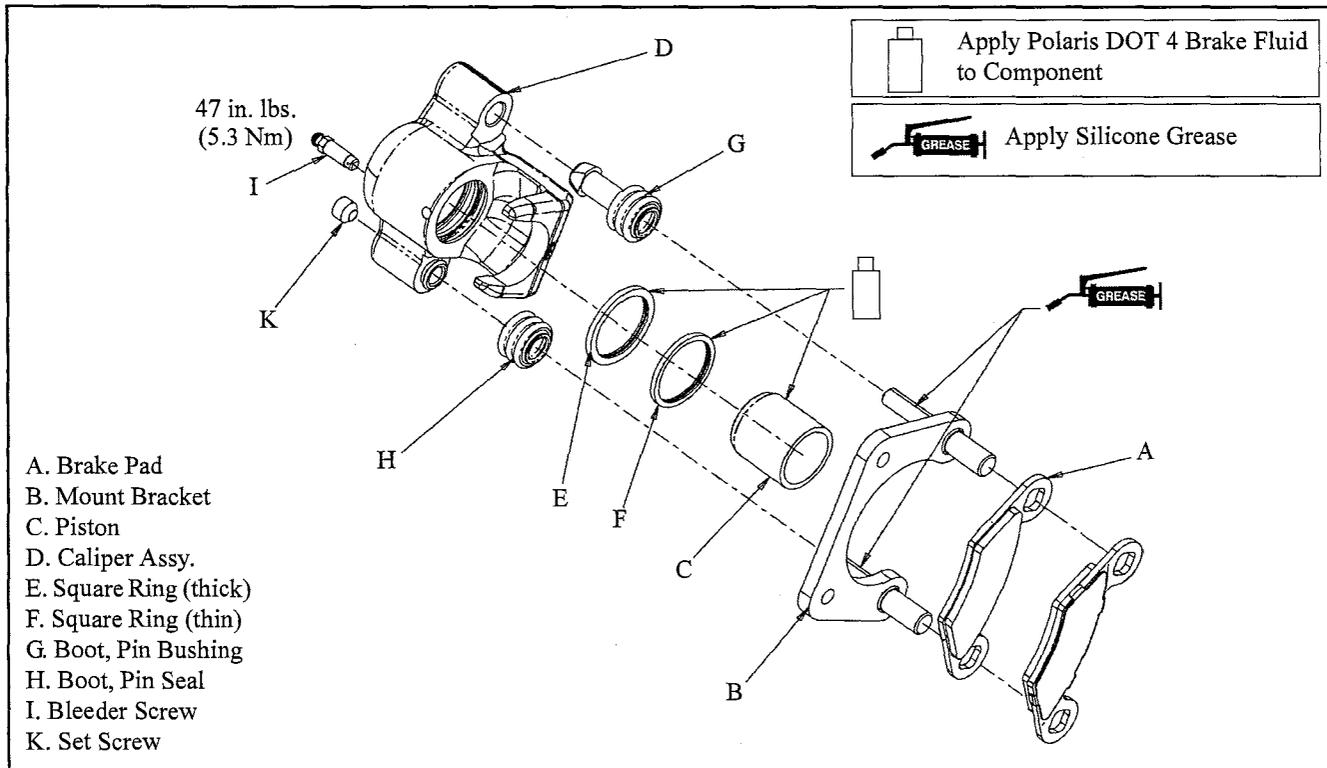
It is required that a burnishing procedure be performed after installation of new brake pads to extend service life and reduce noise.

Start machine and slowly increase speed to 30 mph. Gradually apply brakes to stop machine. Allow pads and disc to cool sufficiently during the procedure. Do not allow pads or disc to become hot or warping may result. Repeat this procedure 10 times. **Do not make more than 3 stops per 1 mile (1.6 km).**

BRAKES

REAR CALIPER SERVICE

Caliper Exploded View



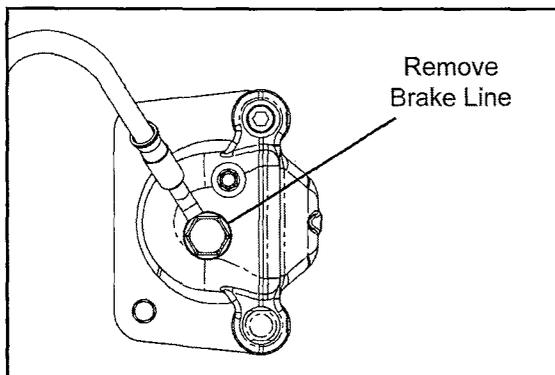
Caliper Removal

1. Elevate and safely support the rear of the vehicle.

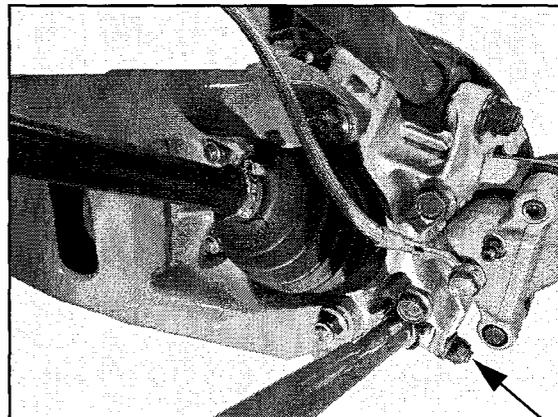
CAUTION

Use care when supporting vehicle so that it does not tip or fall. Severe injury may occur.

2. Remove the (4) wheel nuts and rear wheel. Clean caliper area before removal.
3. Place a container below the caliper to catch the brake fluid when removing the line. Remove brake line from caliper.

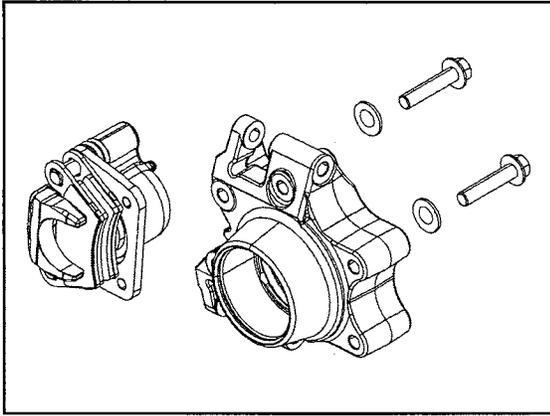


4. Remove the lower radius rod outer mounting bolt, nut and washer from the bearing carrier. Swing radius rod down. Discard nut.



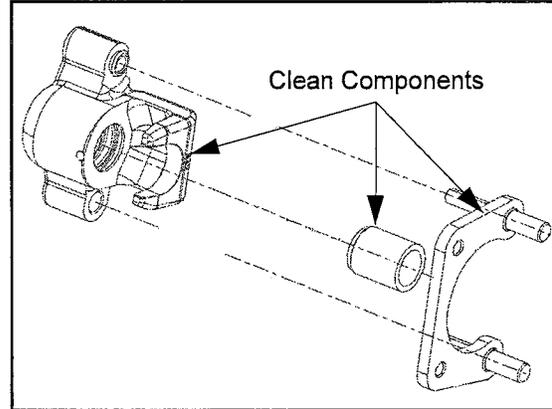
5. Loosen the brake pad adjustment set screw to allow brake pad removal after the caliper is removed.

- Remove the two caliper mounting bolts and remove the caliper.



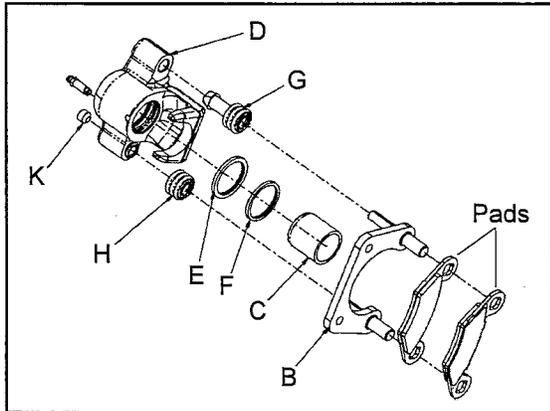
- Clean the caliper body, piston, and retaining bracket with brake cleaner or alcohol.

NOTE: Be sure to clean seal grooves in caliper body.

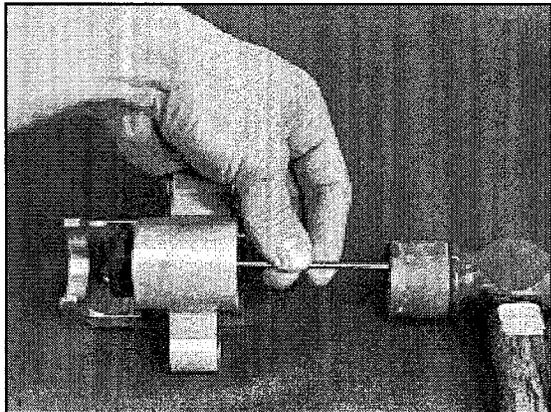


Caliper Disassembly

- Remove brake pad adjustment set screw (K).
- Push upper pad retainer pin inward and slip brake pads past the edge and remove from the caliper.
- Remove mounting bracket (B) and dust boots (G) and (H).

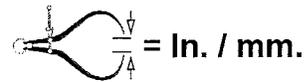
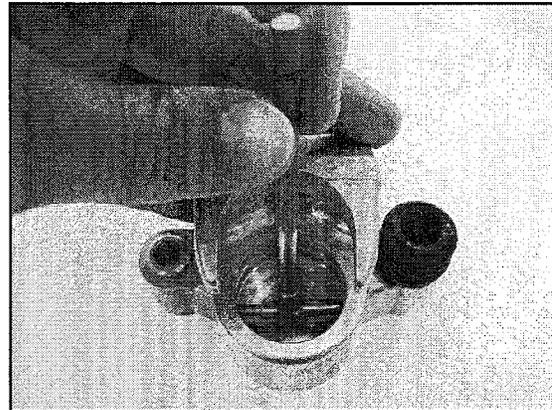


- Using a hammer and a small punch, remove the piston (C) from the caliper body (D). Remove the square O-rings (E) and (F) from the caliper body (D).



Caliper Inspection

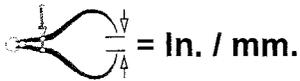
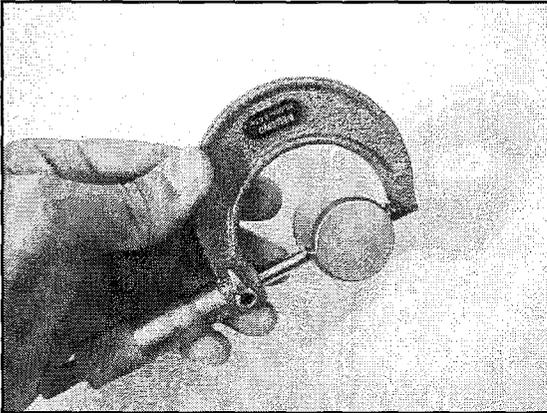
- Inspect caliper body for nicks, scratches or wear. Measure bore size and compare to specifications. Replace if damage is evident or if worn beyond service limit.



Rear Caliper Piston Bore I.D.:
Standard: 1.505" (38.23 mm)
Service Limit: 1.507" (38.28 mm)

BRAKES

2. Inspect piston for nicks, scratches, wear or damage. Measure diameter and replace if damaged or worn beyond service limit.

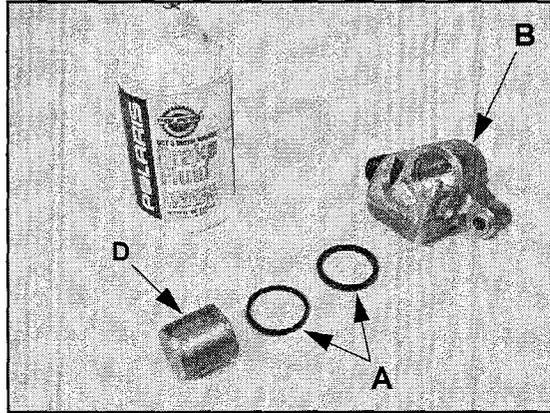


Rear Caliper Piston O.D.:
Standard: 1.500" (38.10 mm)
Service Limit: 1.498" (38.05 mm)

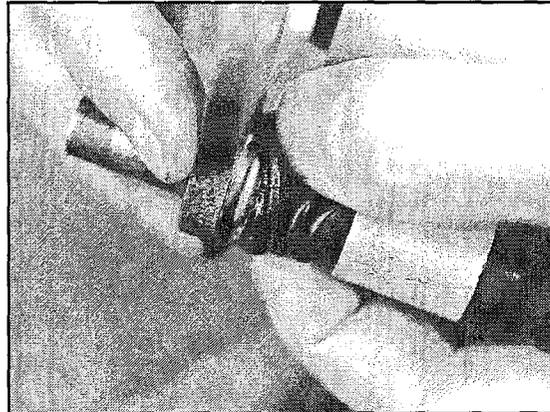
3. Inspect the brake disc and pads as outlined in this chapter.

Caliper Assembly

1. Install new caliper seals (A) in the caliper body (B). Be sure groove is clean and free of residue or brakes may drag upon assembly.



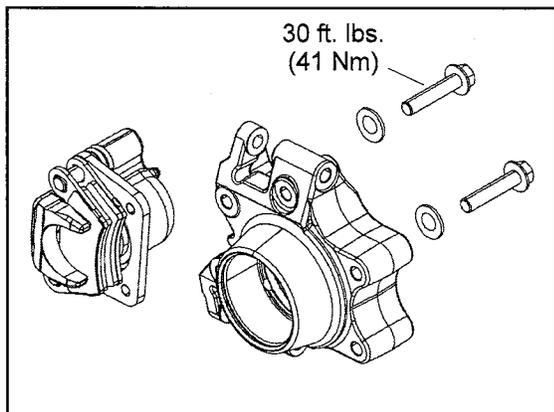
2. Coat piston with clean Polaris DOT 4 Brake Fluid (PN 2872189). Install piston (D) with a twisting motion while pushing inward. Piston should slide in and out of bore smoothly with light resistance.
3. Lubricate the mounting bracket pins with silicone grease and install the rubber dust seal boots.



4. Compress the mounting bracket and make sure the dust seals are fully seated. Install the brake pads. Clean the disc and pads with brake parts cleaner or denatured alcohol to remove any dirt, oil or grease.

Caliper Installation

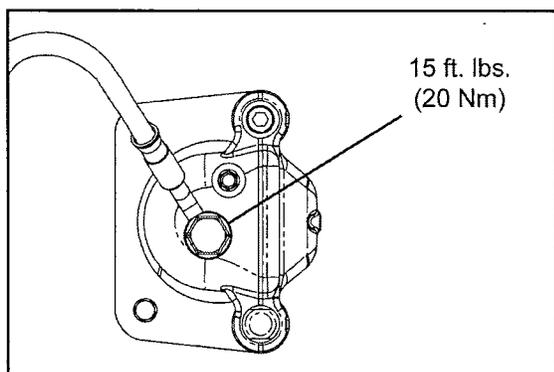
1. Install the rear caliper with the mounting bolts. Torque mounting bolts to specification.



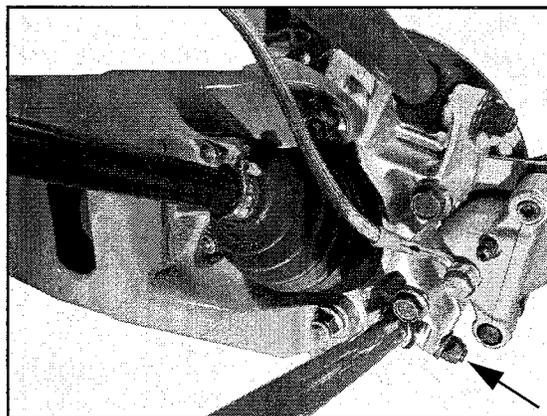
⚙️ = T

**Rear Caliper Mount Bolt:
30 ft. lbs. (41 Nm)**

2. Install brake line banjo bolt and torque to specification.



3. Install lower radius rod bolt, washer and new nut. Torque to specification.



⚙️ = T

**Radius Rod to Bearing Carrier Bolt:
50 ft. lbs. (67.7 Nm)**

4. Install the pad adjustment screw and turn until stationary pad contacts disc, then back off 1/2 turn.
5. Follow bleeding procedure outlined earlier in this chapter.
6. Install wheel and torque wheel nuts to specification.

⚙️ = T

**Wheel Nuts:
30 ft. lbs. (41 Nm) + 90° (1/4 turn)**

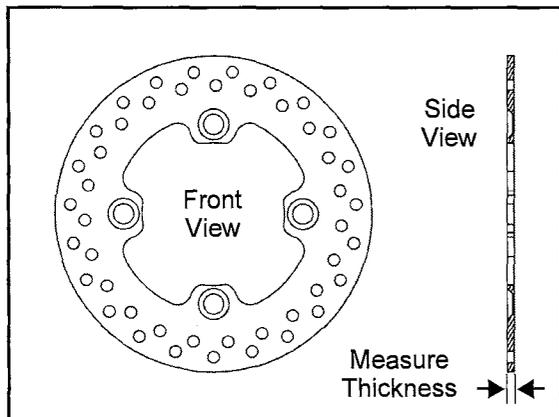
NOTE: If new pads are installed, refer to "REAR BRAKE PADS - Brake Burnishing Procedure".

BRAKES

REAR BRAKE DISC

Disc Inspection

1. Visually inspect disc for scoring, scratches, or gouges. Replace the disc if any deep scratches are evident.
2. Use a 0-1" micrometer and measure the disc thickness at eight different points around the pad contact surface. Replace disc if worn beyond service limit.



Brake Disc Thickness
New: .188" (4.78 mm)
Service Limit: .170" (4.32 mm)

Brake Disc Thickness Variance
Service Limit: .002" (.051 mm)
Difference Between Measurements

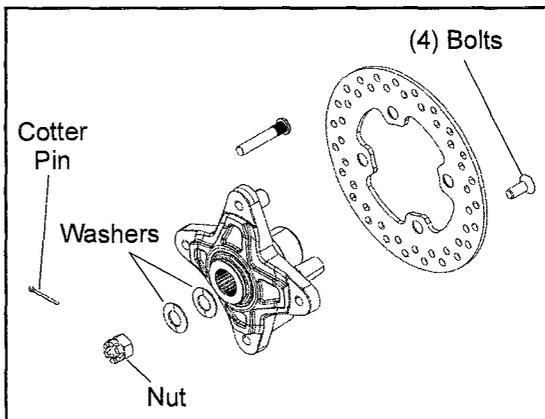
3. Mount a dial indicator and measure disc runout. Slowly rotate the disc and read total runout on the dial indicator. Replace the disc if runout exceeds specifications.

Brake Disc Runout
Service Limit: .010" (.254 mm)

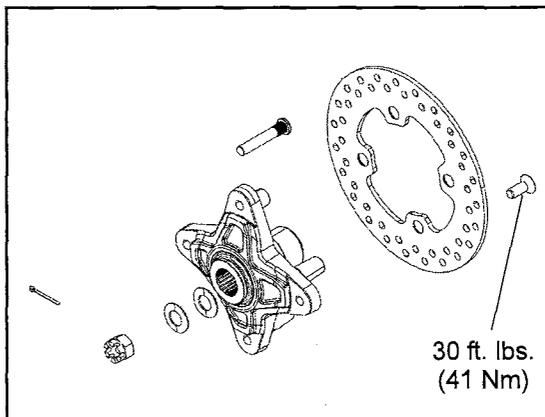
Disc Replacement

1. Remove rear brake caliper (see "REAR CALIPER SERVICE").
2. Remove wheel hub cotter pin, castle nut and washers.

3. Remove the hub assembly from the vehicle and remove the (4) bolts retaining the disc to the hub.



4. Clean the wheel hub mating surface and install new disc on wheel hub.
5. Install new bolts and torque to 30 ft. lbs. (41 Nm).



CAUTION
Always use new brake disc mounting bolts. The bolts have a pre-applied locking agent which is destroyed upon removal.

6. Install wheel hub assembly, washers, and castle nut. Torque castle nut to 80 ft. lbs. (108 Nm) and install a new cotter pin.
7. Install rear caliper (see "REAR CALIPER SERVICE"). Follow bleeding procedure outlined earlier in this chapter.
8. Field test unit for proper braking action before putting into service. Inspect for fluid leaks and firm brakes. Make sure the brake is not dragging when pedal is released. If the brake drags, re-check assembly and installation.

TROUBLESHOOTING

Brakes Squeal / Poor Brake Performance

- Air in system
- Water in system (brake fluid contaminated)
- Caliper or disc misaligned
- Caliper dirty or damaged
- Brake line damaged or lining ruptured
- Worn disc and/or friction pads
- Incorrectly adjusted stationary pad
- Worn or damaged master cylinder or components
- Damaged break pad noise insulator
- Brake pads dragging
- Brake caliper dragging

Pedal Vibration

- Disc damaged
- Disc worn (runout or thickness variance exceeds service limit)

Caliper Overheats (Brakes Drag)

- Compensating port plugged
- Pad clearance set incorrectly
- Brake pedal binding or unable to return fully
- Residue build up under caliper seals
- Operator riding brakes

Brakes Lock

- Alignment of caliper to disc
- Caliper pistons sticking
- Improper assembly of brake system components

CHAPTER 10

ELECTRICAL

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GENERAL INFORMATION**Special Tools**

Part Number	Tool Description
PV-43568	Fluke™ 77 Digital Multimeter
PV-43526	Connector Test Kit
2870630	Timing Light
PU-50338	Battery Hydrometer
2460761	Hall Effect Sensor Probe Harness
2871745	Static Timing Light Harness
PU-50296	Battery Conductance Analyzer (MDX-610P)
PU-49466	Relay Bypass
-	Digital Wrench™ (see Chapter 4)

Electrical Service Notes

Keep the following notes in mind when diagnosing an electrical problem:

- Refer to wiring diagram for stator and electrical component resistance specifications.
- When measuring resistance of a component that has a resistance value under 10 Ohms, remember to subtract meter lead resistance from the reading. Connect the leads together and record the resistance. The resistance of the component is equal to tested value minus the lead resistance.
- Become familiar with the operation of your meter. Be sure leads are in the proper jack for the test being performed (i.e. 10A jack for current readings). Refer to the Owner's Manual included with your meter for more information.
- Voltage, amperage, and resistance values included in this manual are obtained with a Fluke™ 77 Digital Multimeter (PV-43568). This meter is used when diagnosing electrical problems. Readings obtained with other meters may differ.
- Pay attention to the prefix on the multimeter reading (K, M, etc.) and the position of the decimal point.
- For resistance readings, isolate the component to be tested. Disconnect it from the wiring harness or power supply.

Under-Dash Components

The following switches and components can be accessed underneath the instrument / dash panel:

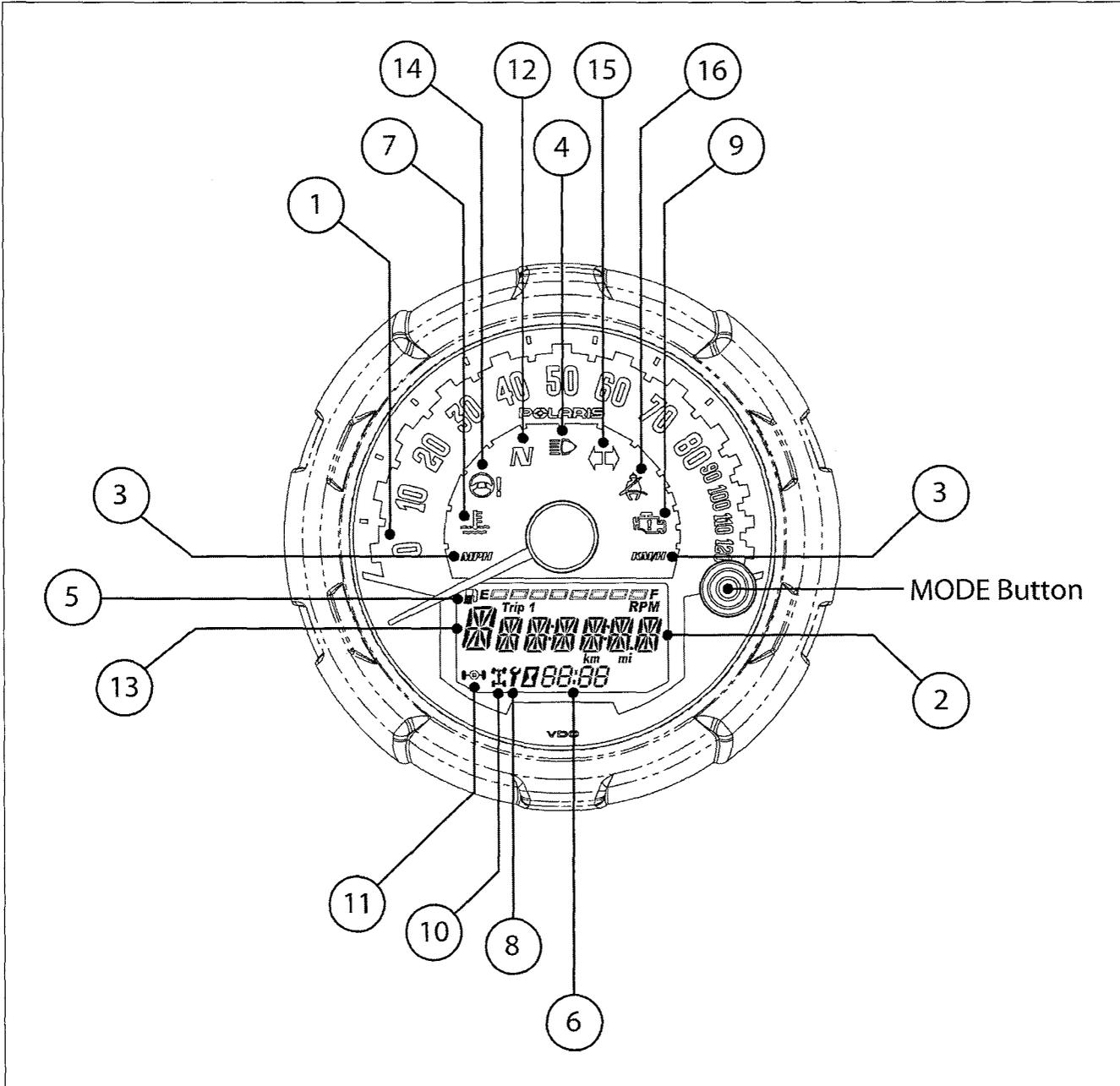
- Speedometer
- Digital Wrench Diagnostic Connector
- AWD Switch
- Headlamp Switch
- 12 Vdc Accessory Power Point
- Ignition Switch
- Fuse / Relay Box

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INSTRUMENT CLUSTER

Overview

The instrument cluster displays critical vehicle information to the user. Reference the following page for display functions and descriptions.



NOTE: Some features are not applicable to all models.

IMPORTANT: The use of a high pressure washer may damage the instrument cluster. Wash the vehicle by hand or with a garden hose using mild soap. Certain products, including insect repellents and chemicals, will damage the instrument cluster lens. Do not use alcohol to clean the instrument cluster. Do not allow insect sprays to contact the lens. Immediately clean off any gasoline that splashes on the instrument cluster.

10.4

Rider Information Display

The rider information display is located in the instrument cluster. All segments will light up for 1 second at start-up.

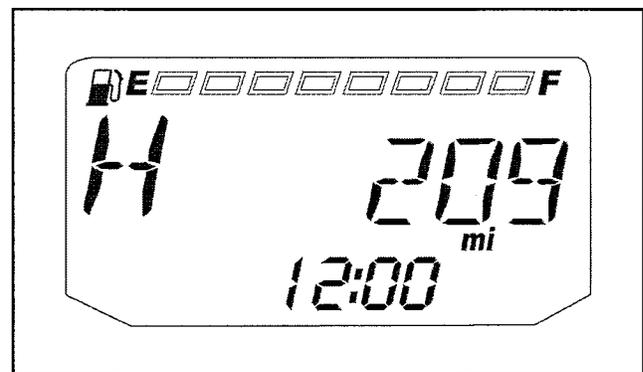
NOTE: If the instrument cluster fails to illuminate, a battery over-voltage may have occurred and the instrument cluster may have shut off to protect the electronic speedometer.

1. **Vehicle Speed Display** - Analog display of vehicle speed in MPH or km/h.
2. **Information Display Area - Odometer / Trip Meter / Tachometer / Engine Temperature / Engine Hours / Service Info / Clock** - LCD display of the service hour interval, total vehicle miles or km., total engine hours, a trip meter, engine RPM and engine temperature.
3. **MPH / KM/H Display** - MPH is displayed when the instrument cluster is in the *Standard* mode. KM/H is displayed when the instrument cluster is in the *Metric* mode.
4. **High Beam Indicator** LED icon illuminates whenever the Headlamp switch is in the high beam position.
5. **Fuel Level Indicator** - LCD bar graph indicating current fuel level. All segments will flash when the last segment is cleared indicating a low fuel warning.
6. **Clock** - Displays current time in either 12-hour or 24-hour formats.
7. **Engine Temperature Indicator** - LED icon illuminates when the ECM determines the engine is overheating. The indicators will initially flash to indicate the engine is overheating. The indicators will stay lit and not flash if a severe overheating condition exists.
8. **Service Interval Indicator** - Preset at the factory and adjustable by the user, a flashing wrench symbol alerts the operator that the preset service interval has been reached and maintenance should be performed. The wrench icon will flash for 10 seconds upon start-up once it reaches 0.
9. **Check Engine MIL** - Illuminated when the ECM has detected a Diagnostic Trouble Code in the engine management system.
10. **AWD Indicator** - Illuminated when the AWD / TURF switch is in the *AWD* position.
11. **TURF Indicator** - Illuminated when the AWD / TURF switch is in the *TURF* position (INT'L Models Only).
12. **Neutral Gear Indicator** - LED icon illuminates when gear selector is in the neutral (N) position.
13. **Gear Position Indicator** - Displays gear selector position.
H = High
L = Low
N = Neutral
R = Reverse
P = Park
-- = Gear Signal Error (shifter stuck between gears)
14. **Power Steering System MIL** - LED icon illuminates when a fault has occurred with the power steering system. This indicator illuminates when the key is turned to the ON position and goes off when the engine is started (EPS Option Only).
15. **Turn Signal / Hazard Lamp Indicator** - LED icon illuminates whenever the LH, RH or hazard lamps are activated (INT'L Models Only).
16. **Helmet / Seat Belt Indicator** - LED icon illuminates for several seconds when the key is turned to the ON position. The lamp is a reminder to the operator to ensure all riders are wearing helmets and seat belts before operating the vehicle.

Information Display Area

The LCD portion of the instrument cluster is the information display area. Information displayed in this area includes: odometer, trip meter, engine RPM, engine hours, service interval, clock, engine Diagnostic Trouble Codes (DTCs) and power steering DTCs.

Odometer

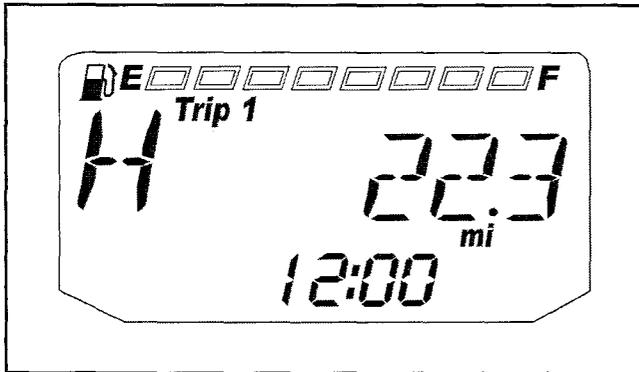


10

The odometer records and displays the total distance traveled by the vehicle. The odometer can not be reset.

ELECTRICAL

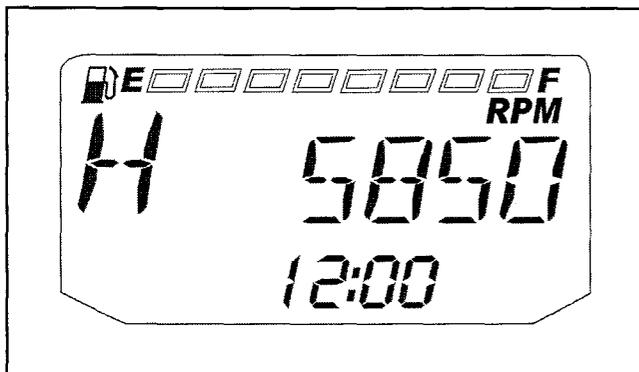
Trip Meter



The trip meter records the miles traveled by the vehicle on each trip. To reset the trip meter:

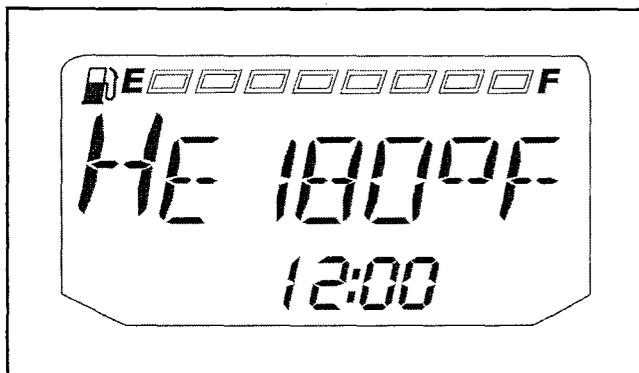
1. Toggle the MODE button to TRIP 1.
2. To reset to 0, push and hold the MODE button until the distance display changes to 0.

Tachometer (RPM)



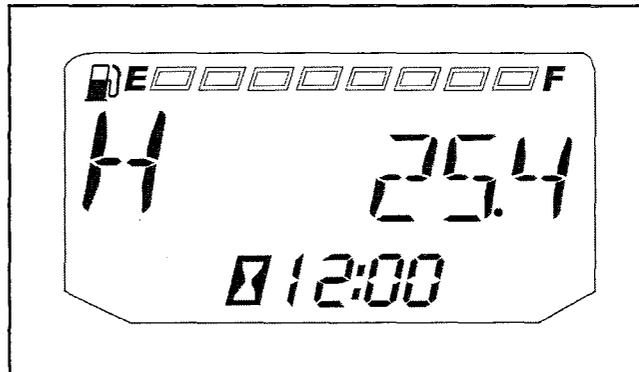
Engine RPM can be displayed digitally.

Engine Temperature



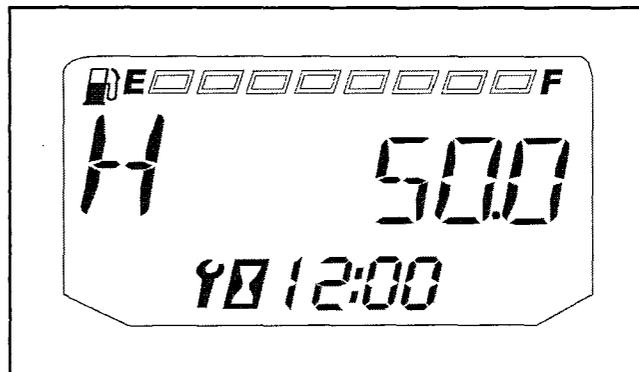
Engine temperature can be displayed in Fahrenheit or Celsius. Refer to "Units of Measurement" to change the format.

Engine Hours



Engine hours are logged anytime the engine is running. Total hours can not be reset.

Programmed Service Interval

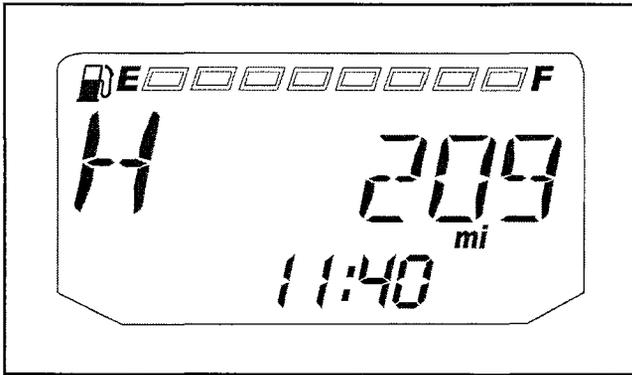


The initial factory service interval setting is 50 hours. Each time the engine is started, the engine hours are subtracted from the service interval hours. When the service interval reaches 0, the LCD wrench icon will flash for approximately 10 seconds each time the engine is started.

To change the hour setting or reset the function, follow these steps:

1. Toggle the MODE button until the wrench icon is displayed in the information area.
2. Press and hold the MODE button until the information display area begins to flash.
3. Toggle the MODE button to increase the service interval hours in 5 hour increments to a maximum of 100 hours.
4. To turn off the service interval function, toggle the MODE button until "OFF" is displayed.

Clock



The clock displays the time in a 12-hour or 24-hour format. Refer to "Units of Measurement" to change the format (Standard 12-hour / Metric-24 hour). To set the clock, follow these steps:

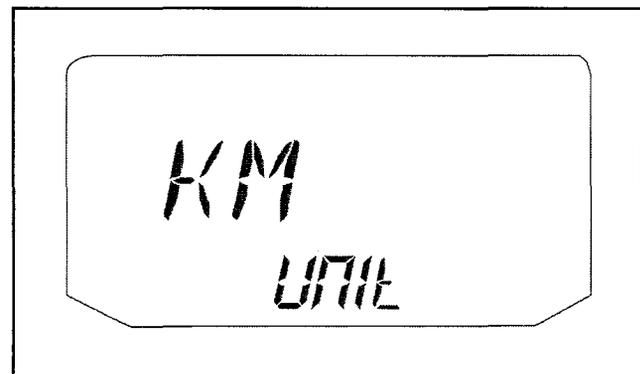
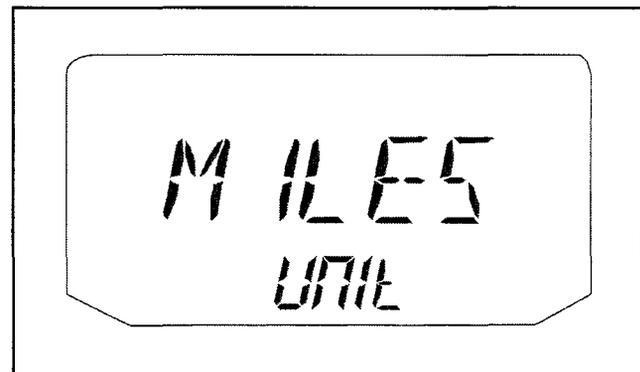
1. Toggle the MODE button until the odometer is displayed.
2. Press and hold the MODE button until the hour segment flashes. Release the button.
3. With the segment flashing, tap the MODE button to advance to the desired setting.
4. Press and hold the MODE button until the next segment flashes. Release the button.
5. Repeat steps 3-4 twice to set the 10 minute and 1 minute segments. After completing the 1-minute segment, step 4 will save the new settings and exit the clock mode.

Units of Measurement

	Standard Display	Metric Display
Distance	Miles (MPH)	Kilometers (KM/H)
Time	12-Hour Clock	24-Hour Clock
Temperature	Fahrenheit	Celsius

To change between Standard and Metric units of measurement, follow these steps:

1. Turn the key to the OFF position.
2. Press and hold the MODE button while turning the key to the ON position.
3. When the display flashes the distance setting, tap the MODE button to advance to the desired setting.



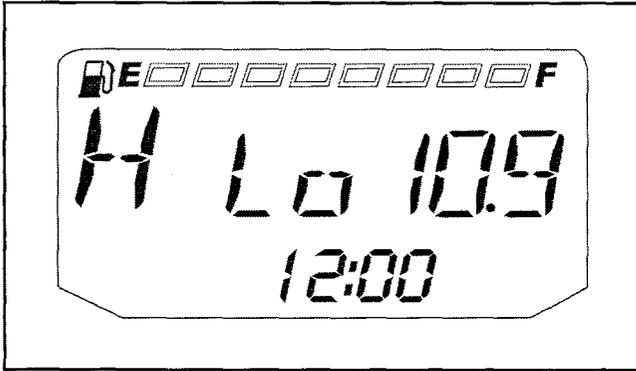
4. Press and hold the MODE button to save the setting and advance to the next display option.
5. Repeat the procedure to change remaining display settings.

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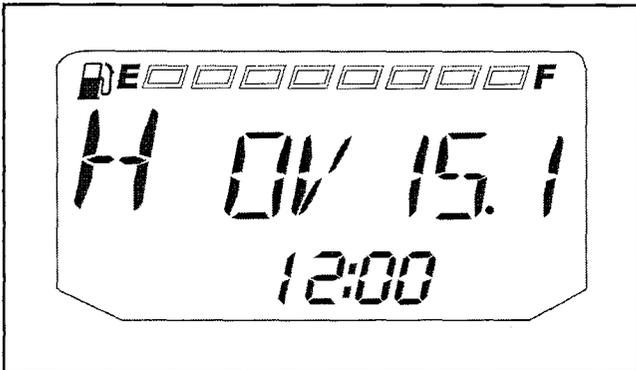
Under / Over Voltage

This warning usually indicates that the vehicle is operating at an RPM too low to keep the battery charged. It may also occur when the engine is at idle and a high electrical load is applied (lights, cooling fan or other accessories).

If battery voltage drops below 11 volts, a warning screen will display "Lo" and provide the present battery voltage. If voltage drops below 8.5 volts, LCD backlighting and icons will turn off.



If battery voltage rises above 15 volts, a warning screen will display "OV" and provide the present battery voltage. If voltage rises above 16.5 volts, LCD backlighting and icons will turn off.

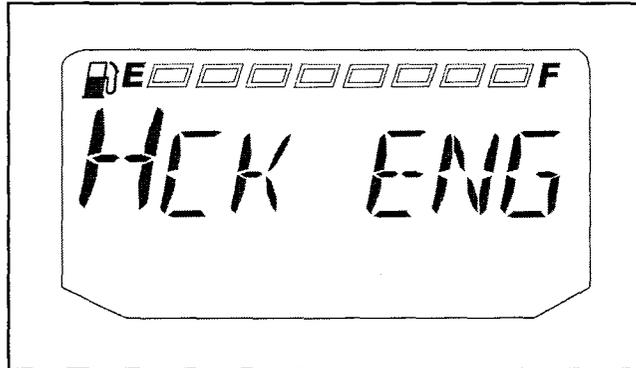


Diagnostic Mode

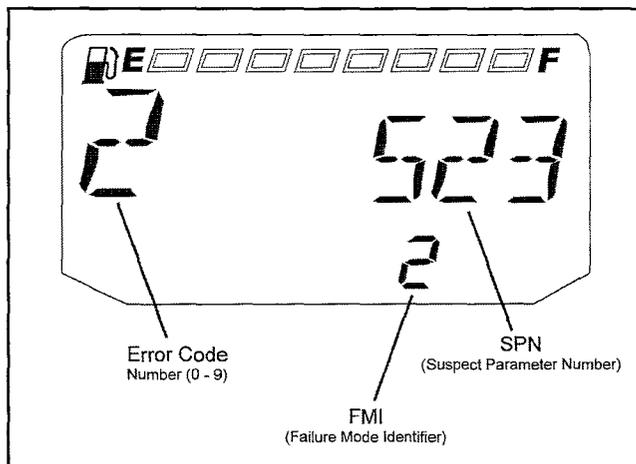
The diagnostic mode is accessible only when the check engine MIL has been activated.

Use the following procedure to display diagnostic trouble codes that were activated during current ignition cycle causing the MIL to illuminate. Diagnostic trouble codes will remain stored in the gauge (even if MIL turns off) until the key is turned off.

1. If the trouble code(s) are not displayed, use the MODE button to toggle until "CK ENG" displays on the information display area.



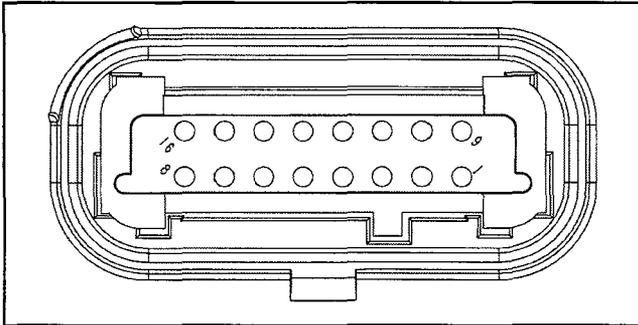
2. Press and hold the MODE button to enter the diagnostics code menu.
3. A set of three numbers will appear in the information area.
 - The first number (located far left) can range from 0 to 9. This number represents the total number of trouble code present (example: 2 means there are 3 codes present).
 - The second number (located top right) can be 2 to 6 digits in length. This number equates to the suspected area of fault (SPN).
 - The third number (located bottom right) can be 1 to 2 digits in length. This number equates to the fault mode (FMI).



- Use the trouble code reference table in the EFI Chapter for a description of each code (see Chapter 4).
- If more than one code exists, press the MODE button to advance to the next trouble code.
- To exit the diagnostic mode, press and hold the MODE button or turn the ignition key OFF once the codes are recorded.

NOTE: If there is a diagnostic problem with the power steering system, the power steering MIL will illuminate and blink in place of the check engine MIL.

Instrument Cluster Pinouts



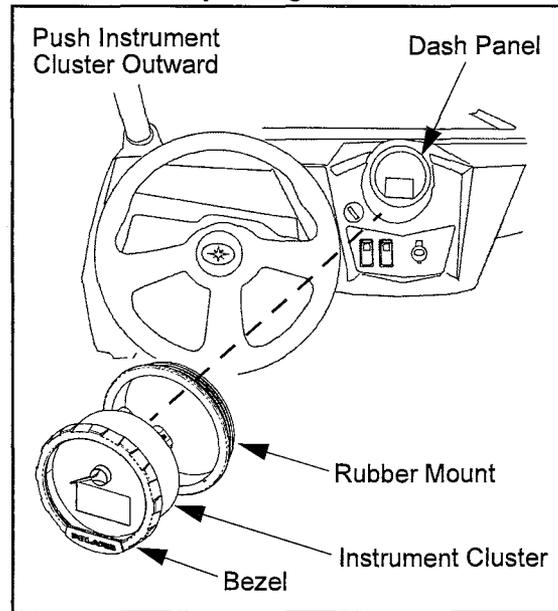
FUNCTION	PIN
CAN High	1
CAN Low	2
Switched Power (Vdc)	3
Constant Power (Vdc)	4
Ground	5
High Beam Input	8
Fuel Level Sensor	11
International Models Only	
Turn Signal Input, LH	6
Turn Signal Input, RH	7

Instrument Cluster Removal

NOTE: Do not allow alcohol or petroleum products to come in contact with the instrument cluster lens.

- Disconnect the wire harness connector from the back side of the instrument cluster.

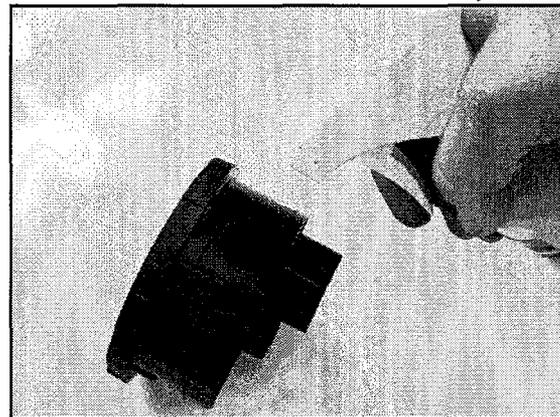
- Push the instrument cluster out from the back side of the dash while securely holding the dash and rubber mount.



NOTE: Do not remove the rubber mount from the dash panel. Only remove the rubber mount if necessary. The bezel is a snap-on assembly and is a serviceable part.

Instrument Cluster Installation

- Spray a soap and water mixture onto the outer surface area of the instrument cluster. This will help the instrument cluster slide into the rubber mount more easily.



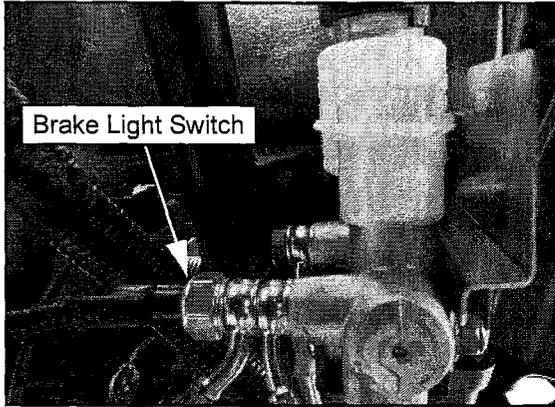
- Be sure the rubber mount inside the dash is fully installed and that the indexing key on the rubber mount is lined up with the keyway in the dash.
- Hold the dash securely and insert the instrument cluster into the dash. Twist the instrument cluster gently in a clockwise motion to properly seat the instrument cluster into the rubber mount. Apply pressure on the bezel while pressing down on the instrument cluster.

ELECTRICAL

SWITCHES / CONTROLS

Brake Light Switch

1. The brake light switch is located on the front brake line banjo bolt of the master cylinder. The brake switch can be accessed through the left front wheel well opening.

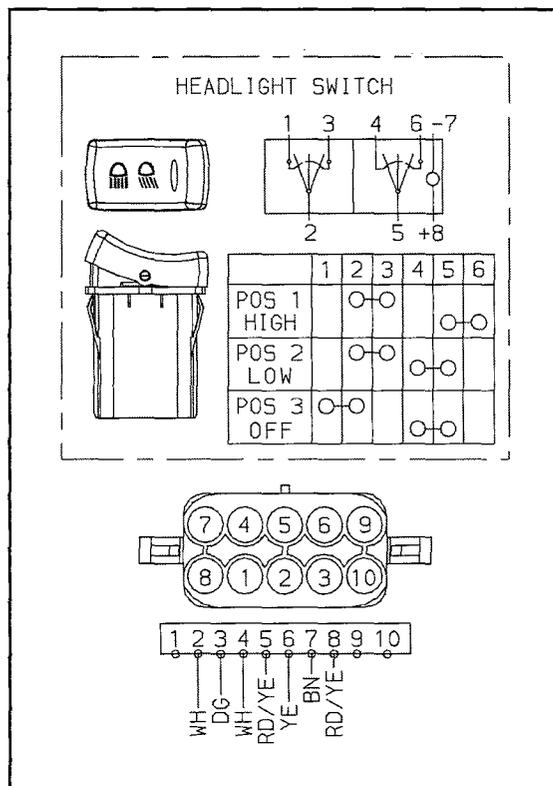


2. Disconnect wire harness from switch and connect an ohmmeter across switch contacts. The reading should be infinite (OL).
3. Apply the brake and check for continuity. If there is no continuity or if resistance is greater than 0.5 ohms, clean the switch terminals. Re-test and replace switch if necessary.
4. For switch replacement, refer to Chapter 9 "Brakes".

Headlamp Switch

1. Disconnect the headlamp switch harness by depressing the connector locks and pulling on the connector. Do not pull on the wiring.
2. Test between the 3 sets of outputs (OFF / LOW / HIGH). If any of the tests fail, replace headlamp switch assembly.

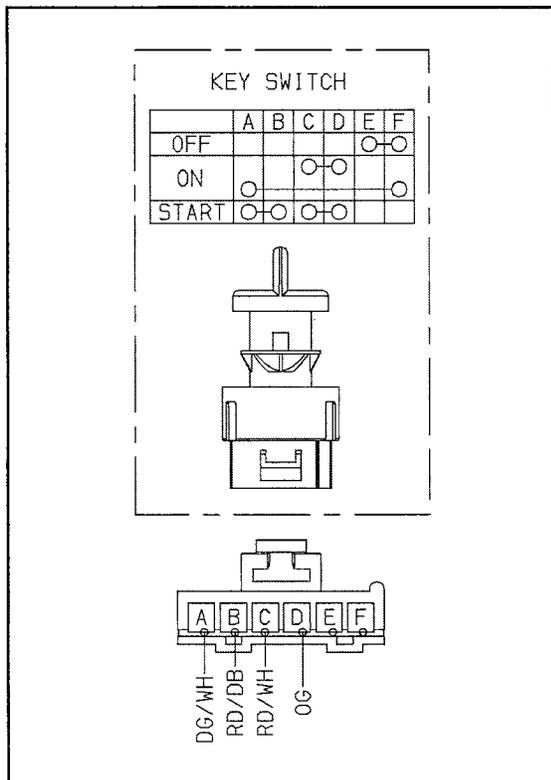
- Move the switch to HIGH. There should be continuity between switch pins 2 and 3; 5 and 6.
- Move the switch to LOW. There should be continuity between switch pins 2 and 3; 4 and 5.
- Move the switch to OFF. There should be continuity between switch pins 1 and 2; 4 and 5.



NOTE: Pins 7 and 8 provide power and ground to light the switch lamp.

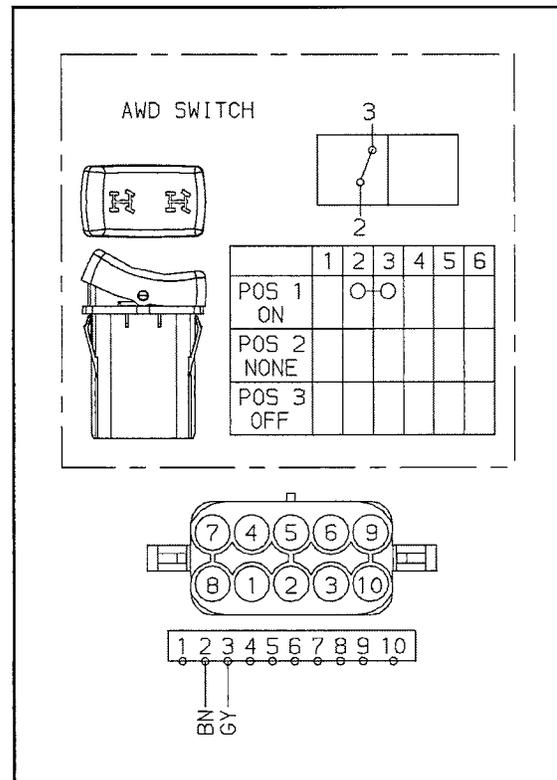
Ignition Key Switch

1. Disconnect the key switch harness by depressing the connector lock and pulling on the connector. Do not pull on the wiring.
2. Test between the 3 sets of outputs (OFF / ON / START). If any of the tests fail, replace ignition switch assembly.
 - Turn the ignition key to ON. There should be continuity between switch pins C and D.
 - Turn the ignition key to START. There should be continuity between switch pins A and B; C and D.



AWD / 2WD Switch

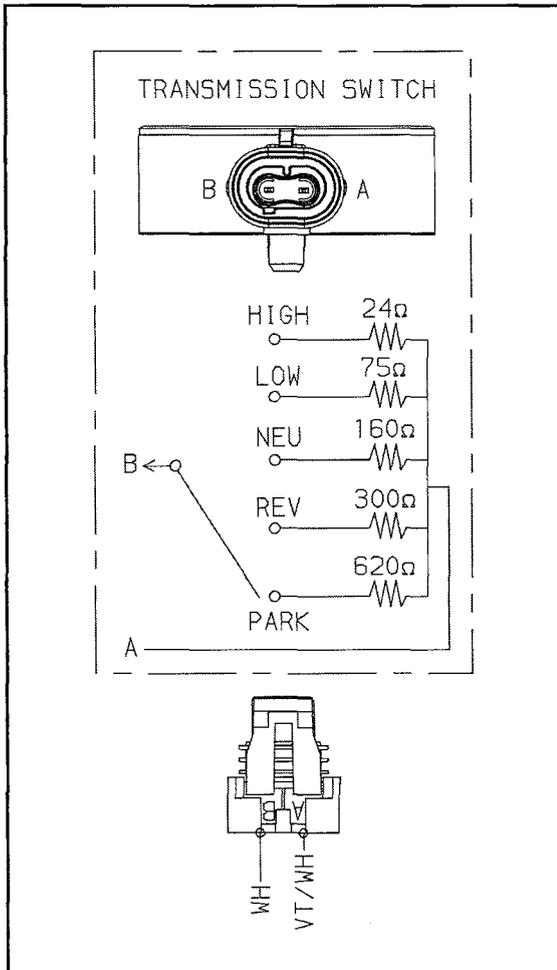
1. Disconnect the AWD / 2WD switch harness by depressing the connector locks and pulling on the connector. Do not pull on the wiring.
2. Test between the 2 sets of outputs (AWD / 2WD). If any of the tests fail, replace the switch assembly.
 - Move the switch to AWD (ON). There should be continuity between switch pins 2 and 3.
 - Move the switch to 2WD (NONE / OFF). There should be no continuity between any pins.



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Transmission (Gear Position) Switch

1. The transmission (gear position) switch is located on the RH side of the transmission and can be accessed through the RH wheel well area.
2. Disconnect the transmission switch harness by lifting the connector lock and pulling on the connector. Do not pull on the wiring.
3. Test the transmission switch continuity readings for each gear position and compare to the specification table below.

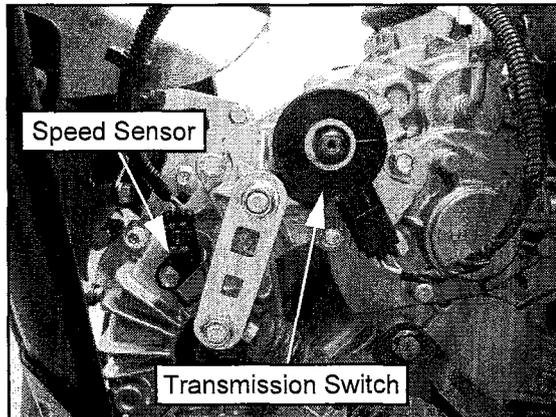


Gear Position	Resistance Value when measured at switch terminals A and B
HIGH	24 Ω
LOW	75 Ω
NEU	160 Ω
REV	300 Ω
PARK	620 Ω

VEHICLE SPEED SENSOR

Speed Sensor Location

The speed sensor is located on the RH side of the transmission and can be accessed through the rear RH wheel well area.



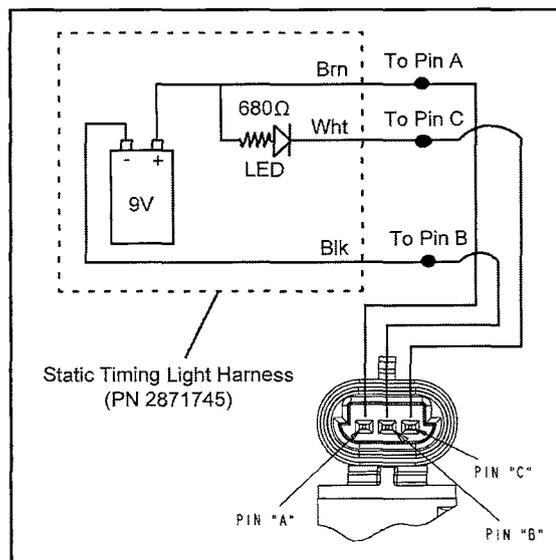
Speed Sensor Testing

Special Tools Required:

Static Timing Light Harness (PN 2871745)

Hall Sensor Probe Harness (PN 2460761)

1. Disconnect the 3 wire harness from the speed sensor and remove the sensor from the transmission.
2. Connect the wires from the Static Timing Light Harness to the sensor 3 pin connector using the Hall Sensor Probe Harness (PN 2460761).
3. Pass a screwdriver back and forth in front of the sensor tip.
4. Be sure connections are good and 9V battery is in good condition. If the light flashes, the sensor is good.



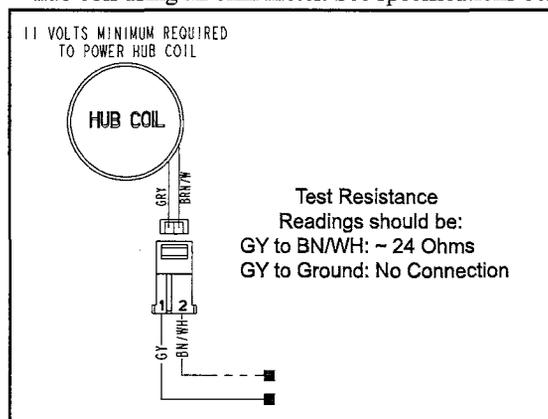
ALL WHEEL DRIVE COIL

Operation Overview

- When the key switch is “ON”, 12 VDC power is present at the hub coil.
- When the AWD switch is “ON”, and if the criteria is met, the Engine Controller provides a ground path (brown/white wire). When this occurs the AWD icon should display in the instrument cluster.
- The AWD system must be grounded to operate.

Diagnosing System Failures

- Verify the AWD switch is functional and that a minimum of 11 volts is present at the hub coil.
- Verify the AWD hub coil is functional. Test the AWD hub coil using an ohm meter. See specifications below:



AWD Hub Coil Resistance:
24 Ω \pm 5%

- Verify the wiring harness, wiring, connectors, connector pins and grounds are undamaged, clean and connect properly.
- Verify continuity of wire connections with a known good volt/ohm meter.

IMPORTANT: Verify all wires and wiring connections have been tested properly with a known good volt/ohm meter before suspecting a component failure. 80% of all electrical issues are caused by bad/failed connections and grounds.

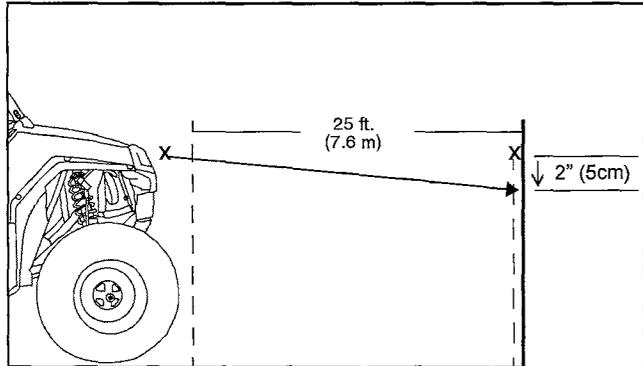
ELECTRICAL

HEAD LIGHTS

Headlight Adjustment

The headlight beams are adjustable.

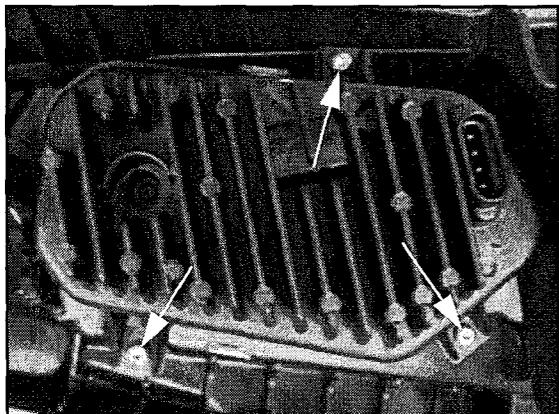
1. Place the vehicle on a level surface with the headlight approximately 25 ft. (7.6 m) from a wall.



2. Measure the distance from the floor to the center of the headlight and make a mark on the wall at the same height.
3. With the machine in Park, start the engine and turn the headlight switch to the LOW position.
4. The most intense part of the LOW beam headlight beam should be aimed 2 in. (5 cm) below the mark placed on the wall in Step 2.

NOTE: Rider weight must be included in the seat while performing this procedure.

5. Adjust the beam to the desired position by loosening or tightening the (3) T-25 adjustment screws and moving the lamp to the appropriate height.



6. Adjust the beam to desired position. Repeat the procedure to adjust the other headlight.

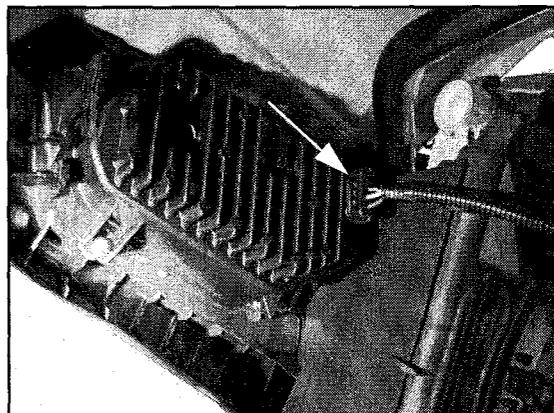
WARNING

Due to the nature of light utility vehicles and where they are operated, headlight lenses become dirty. Frequent washing is necessary to maintain lighting quality. Riding with poor lighting can result in severe injury or death.

Headlamp Replacement

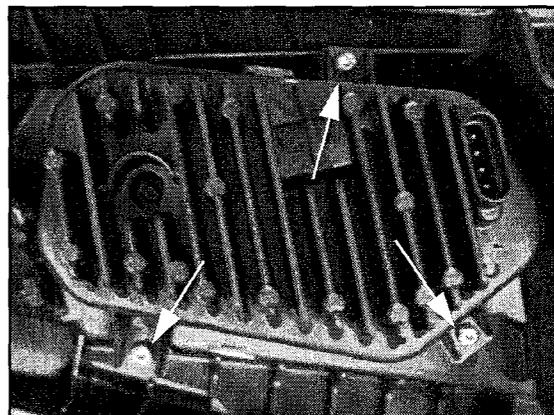
IMPORTANT: If an LED headlamp has fogging or moisture inside, disconnect the headlamp(s) for a few days to allow the moisture to clear out.

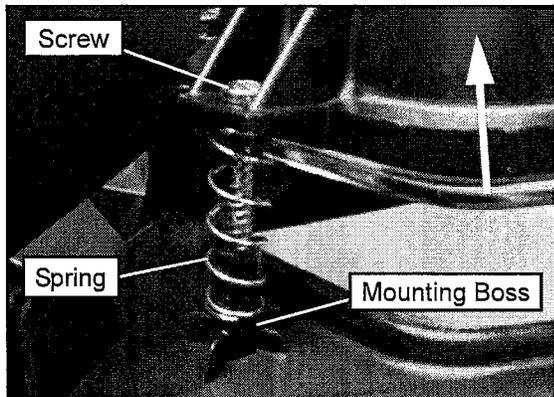
1. Disconnect the wire harness from the headlamp assembly. Be sure to pull on the connector, not on the wiring.



2. Remove the (3) T-25 headlamp mounting screws and (3) adjustment preload springs.

NOTE: The front bumper can be removed and placed face down on a suitable workbench to ease headlamp replacement (see Chapter 5).

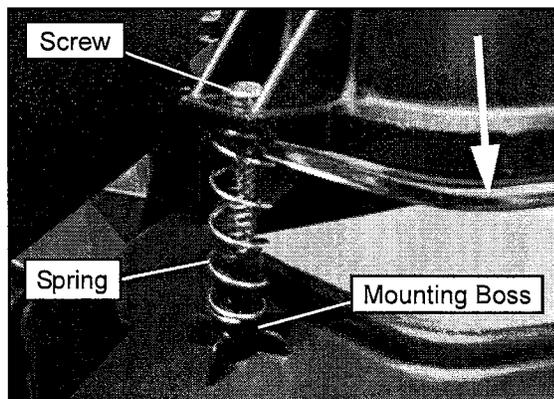




- Carefully lift and remove headlamp assembly from the bumper.

Headlamp Installation

- Install the headlamp adjustment springs onto the front bumper mounting bosses.
- Insert the (3) T-25 headlamp mounting screws into the headlamp assembly mounting holes.
- Maneuver the headlamp assembly into position. Be sure all (3) headlamp springs and mounting screws are properly aligned with mounting bosses on the front bumper.



- Fully tighten all (3) headlamp screws until the headlamp assembly is full seated. Back headlamp mounting screws off 1/8" to 1/4" (2-3 turns).
- Install the front bumper as shown in Chapter 5 if previously removed.
- Connect headlamp electrical connector to the headlamp assembly.
- Perform the "Headlight Adjustment" procedure as shown in this chapter.

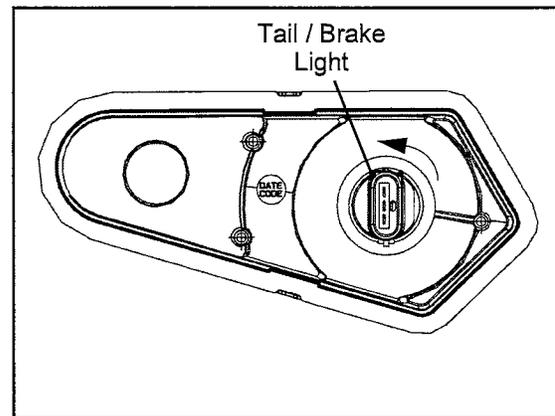
TAIL / BRAKE LIGHTS

Bulb Replacement

Before replacing the bulb(s), use a digital multi-meter to test the harness to ensure the lamp is receiving 12 volts and that a ground path is present.

If a tail light or brake light does not work the bulb may need to be replaced.

- Remove bulb by turning the rubber base 1/4 turn and pulling the bulb out. Replace it with recommended bulb. Apply Dielectric Grease (PN 2871329).

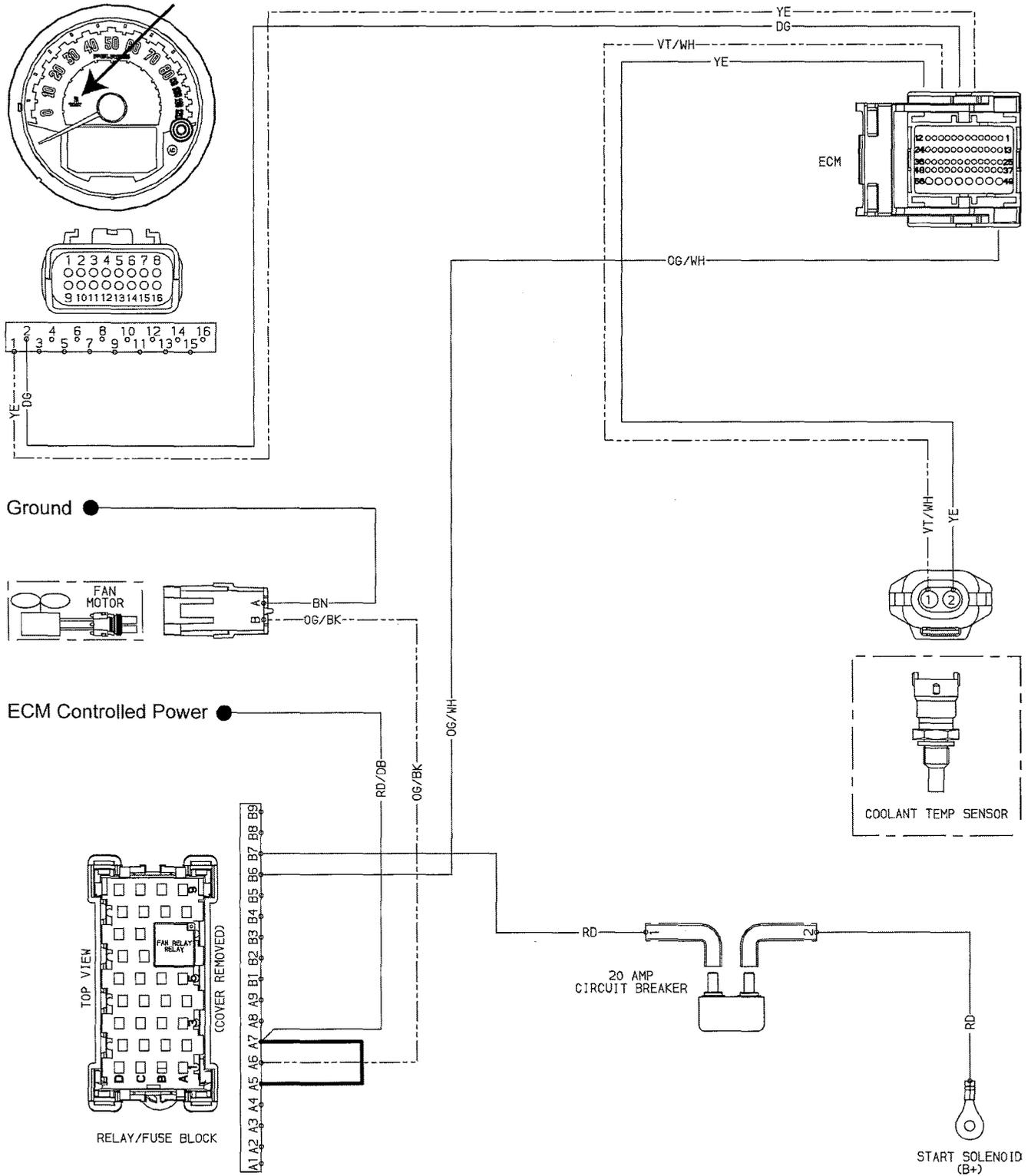


- Test the tail light and brake light to verify it is working properly.

ELECTRICAL

COOLING SYSTEM

Cooling System Break-Out Diagram



Fan Control Circuit Operation / Testing

Power is supplied to the fan via the Orange/Black wire when the relay is ON. The ground path for the fan motor is through the Brown harness wire. Refer to "RELAYS" later in this chapter for more information on fan functions.

⚠ CAUTION

Keep hands away from fan blades during operation. Serious personal injury could result.

NOTE: The fan may not function or operation may be delayed if coolant level is low or if air is trapped in the cooling system. Be sure cooling system is full and purged of air.

Fan Control Circuit Bypass Test

1. Disconnect harness from coolant temperature sensor on the engine cylinder head (see Chapter 4 for location).
2. With the transmission in Park, start the engine. After a few seconds, the fan should start running and the "Check Engine" indicator should display on the instrument cluster. This indicates all other components are working properly.
3. If the fan does not run or runs slowly, check the fan motor wiring, ground, motor condition and mechanical relay for proper operation. Repair or replace as necessary. If the fan runs with the sensor harness disconnected, but will not turn on when the engine is hot, check the coolant temperature sensor and connector terminals.

Coolant Temperature Sensor

The coolant temperature sensor can be tested using an ohmmeter or voltmeter.

1. With the engine and temperature sensor at room temperature (68°F = 20°C), disconnect the harness.
2. With the meter in the ohms mode, place the meter leads onto the sensor contacts.
3. Use the table Temperature / Resistance table to determine if the sensor needs to be replaced.

TEMPERATURE °F (°C)	RESISTANCE
68 °F (20 °C)	2.5 k Ω ± 6%
212 °F (100 °C)	186 Ω ± 2%

NOTE: If the coolant temperature sensor or circuit malfunctions the radiator fan will default to 'ON' while the engine is running.

EFI DIAGNOSTICS

EFI Component Testing

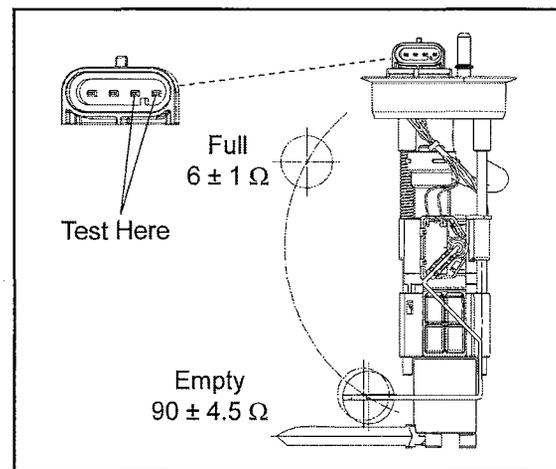
All EFI component information and diagnostic testing procedures are located in **Chapter 4**.

Refer to Chapter 4 "Electronic Fuel Injection System (EFI)" when diagnosing an EFI system or component.

FUEL SENDER

Testing

1. Remove the fuel pump assembly from the fuel tank (see Chapter 4 "Fuel Pump Replacement").
2. Using an Ohm meter, measure the resistance of the fuel sender as shown below.



3. Allow the sender float to sit in the **empty position** and compare to specification.

Fuel Sender - Empty: 90 ± 4.5 Ω

4. Slowly move the sender float to the **full position** and compare to specification.

Fuel Sender - Full: 6 ± 1 Ω

5. If the readings are out of specification, or if the reading is erratic or LCD display "sticks", check the following before replacing the fuel pump assembly:

- Loose float
- Float contact with tank
- Bent float rod

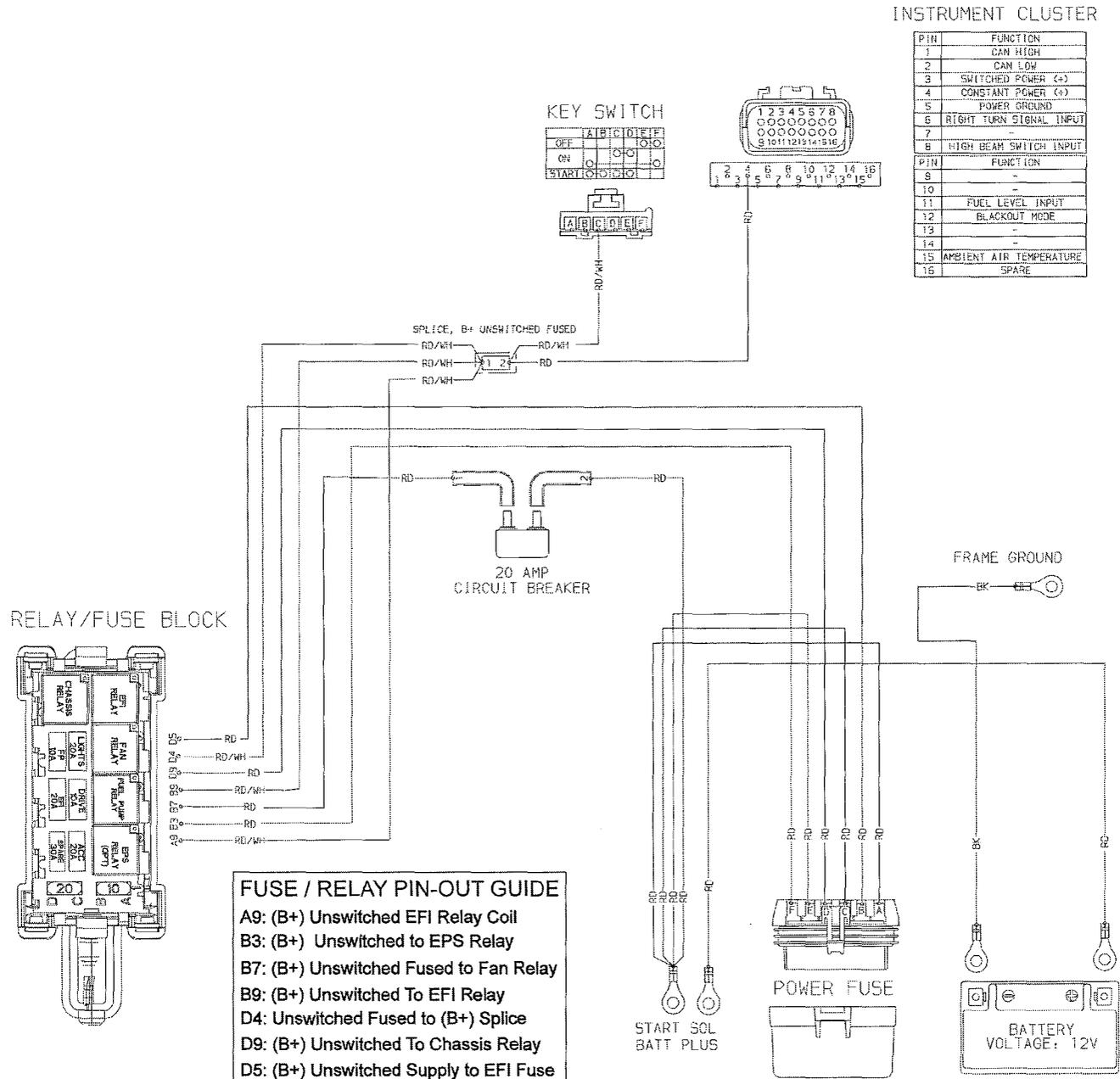
6. If none of the conditions exist, the fuel sender assembly is faulty. Replace the fuel pump assembly (see Chapter 4).

ELECTRICAL

FUSE BOX: FUSES / RELAYS / CIRCUIT BREAKER

Overview / Operation

Located in the fuse box under the dash, the fuses provide overload protection for wiring and components such as the instrument cluster, ECU, EFI system, main harness, lights, accessories and power steering. The relays assist with component operation like the cooling fan, fuel pump, EFI system, drive system and electronic power steering. A separate 20-amp circuit breaker protects the fan motor circuit.

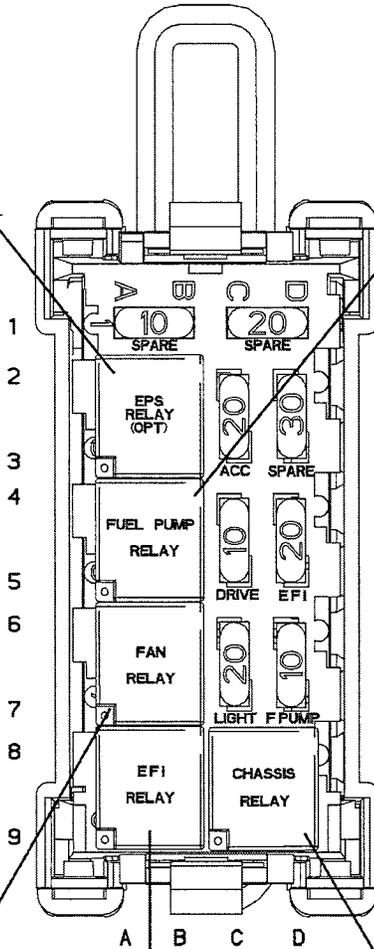
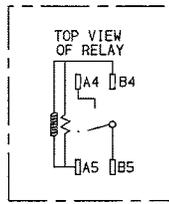
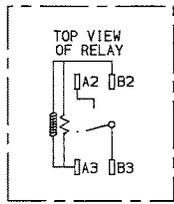


Fuse Box Detail

A3-EP5 RELAY COIL B+
 B3-EP5 RELAY POWER IN
 B2-EP5 RELAY COIL B-
 A2-EP5 RELAY PWR OUT

FUSE/RELAY BLOCK

A5-FUEL PUMP RELAY COIL B+
 B5-FUEL PUMP RELAY POWER IN
 B4-FUEL PUMP RELAY COIL B-
 A4-FUEL PUMP RELAY PWR OUT



C2-ACC FUSE OUT
 C3-ACC FUSE IN

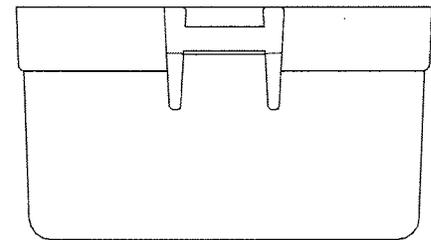
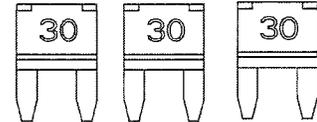
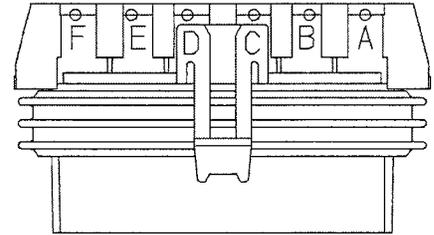
D4-EFI FUSE OUT
 D5-EFI FUSE IN

C4-DRIVE FUSE OUT
 C5-DRIVE FUSE IN

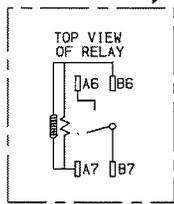
D6-FUEL PUMP FUSE OUT
 D7-FUEL PUMP FUSE IN

C6-LIGHTS FUSE OUT
 C7-LIGHTS FUSE IN

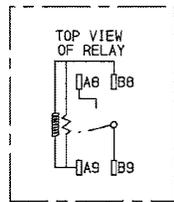
A-EFI FUSE IN
 B-EFI FUSE OUT
 C-CHASSIS FUSE IN
 D-CHASSIS FUSE OUT
 E-EPS FUSE IN
 F-EPS FUSE OUT



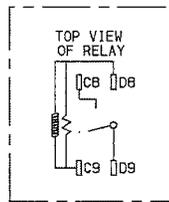
POWER FUSE



A7-FAN RELAY COIL B+
 B7-FAN RELAY POWER IN
 B6-FAN RELAY COIL B-
 A6-FAN RELAY PWR OUT



A9-EFI RELAY COIL B+
 B9-EFI RELAY POWER IN
 B8-EFI RELAY COIL B-
 A8-EFI RELAY PWR OUT



C9-CHASSIS RELAY COIL B+
 D9-CHASSIS RELAY POWER IN
 D8-CHASSIS RELAY COIL B-
 C8-CHASSIS RELAY PWR OUT

IMPORTANT: All relays (PN 4011283) located in fuse box are the same and can be swapped out to help diagnose electrical problems.

ELECTRICAL

Relay Operation

Located in the fuse box under the dash, the relays assist with component operation like the cooling fan, fuel pump and EFI system, drive system and EPS.

CHASSIS RELAY provides power to the following systems:

- Lights (Headlights / Taillights)
- Drive (AWD)
- Accessory (12V Receptacles / Accessory Options)

CHASSIS RELAY

COLOR	FUNCTION
Red	30-Amp fuse protected 12 Vdc constant battery voltage.
Brown	Relay coil ground.
Orange	12 Vdc power input from key switch to enable relay.
White	Provides 12 Vdc power for lights, drive and accessory circuits.

EFI RELAY provides power to the following systems:

- Fuel Injectors
- Ignition Coil
- Fan Relay
- Fuel Pump Relay

EFI RELAY

COLOR	FUNCTION
Red / White	20-Amp fuse protected 12 Vdc constant battery voltage.
Dark Green / Yellow	ECU ground input to enable relay.
Red / White	20-Amp fuse protected 12 Vdc constant battery voltage.
Red / Dark Blue	Provides 12 Vdc power for EFI system circuits.

FAN RELAY provides power to the following system:

- Fan Motor

FAN RELAY

COLOR	FUNCTION
Red	20-Amp circuit breaker protected 12 Vdc constant battery power.
Orange / White	ECU ground input to enable relay.
Red / Dark Blue	12 Vdc switched power from EFI relay.
Orange / Black	Provides 12 Vdc power for fan operation.

FUEL PUMP RELAY provides power to the following system:

- Fuel Pump

FUEL PUMP RELAY

COLOR	FUNCTION
Red / Green	10-Amp fuse protected 12 Vdc battery voltage.
Dark Green / Yellow	ECU ground input to enable relay.
Red / Dark Blue	12 Vdc switched power from EFI relay.
Red / Blue	Provides 12 Vdc power for fuel pump operation.

EPS RELAY (OPT) provides power to the following system:

- Electronic Power Steering Unit

EPS RELAY (OPT)

COLOR	FUNCTION
Red	30-Amp fuse protected 12 Vdc constant battery voltage.
Brown	Relay coil ground.
Orange	12 Vdc power input from key switch to enable relay.
Orange	Provides 12 Vdc power for EPS operation.

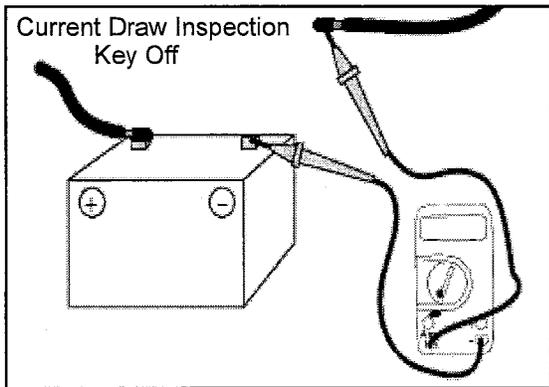
CHARGING SYSTEM

Current Draw - Key Off

⚠ CAUTION

Do not connect or disconnect the battery cable or ammeter with the engine running. Damage will occur to electrical components.

Connect an ammeter in series with the negative battery cable. Check for current draw with the key off. If the draw is excessive, loads should be disconnected from the system one by one until the draw is eliminated. Check component wiring as well as the component for partial shorts to ground to eliminate the draw.



**Current Draw - Key Off:
Maximum of .01 DCA (10 mA)**

Charging System “Break Even” Test

⚠ CAUTION

Do not allow the battery cables to become disconnected with the engine running. Follow the steps below as outlined to reduce the chance of damage to electrical components.

The “break even” point of the charging system is the point at which the alternator overcomes all system loads (lights, etc.) and begins to charge the battery. Depending on battery condition and system load, the break even point may vary slightly. The battery should be fully charged before performing this test.

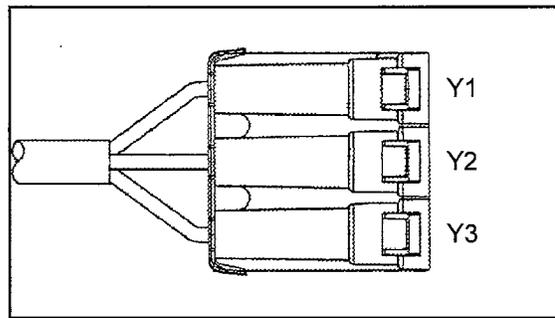
⚠ WARNING

Never start the engine with an ammeter connected in series. Damage to the meter or meter fuse will result.
Do not run test for extended period of time.
Do not run test with high amperage accessories.

1. Using an inductive amperage metering device, (set to DC amps) connect to the negative battery cable.
2. With engine off, key switch and lights in the on position, the ammeter should read negative amps (battery discharge).
3. Shift transmission into park and start the engine. With the engine running at idle, observe meter readings.
4. Increase engine RPM while observing ammeter and tachometer. Note the RPM at which the battery starts to charge (ammeter indication is positive).
5. With lights and other electrical loads off, the “break even” point should occur at approximately 1500 RPM or lower.
6. With the engine running, turn the lights on and depress the brake pedal to keep brake lights on.
7. Repeat test, observing ammeter and tachometer. With lights on, charging should occur at or below 2000 RPM.

Charging System Stator (Alternator) Tests

Three tests can be performed using a multi-meter to determine the condition of the stator (alternator).



TEST 1: Resistance Value of Each Stator Leg

1. Measure the resistance value of each of the three stator legs: Y1 to Y2, Y1 to Y3, and Y2 to Y3. Each test should measure: **0.11Ω ± 15%**

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Test	Connect Meter Leads To:	Ohms Reading
Battery Charge Coil	Y1 to Y2	0.11Ω ± 15%
Battery Charge Coil	Y1 to Y3	0.11Ω ± 15%
Battery Charge Coil	Y2 to Y3	0.11Ω ± 15%

ELECTRICAL

NOTE: If there are any significant variations in ohm readings between the three legs it is an indication that one of the stator legs may be weak or failed.

TEST 2: Resistance Value of Each Stator Leg to Ground

1. Measure the resistance value of each of the stator legs to ground: Y1 to Ground, Y2 to Ground, Y3 to Ground. Each test should measure: **Open Line (OL)**

Test	Connect Meter Leads To:	Ohms Reading
Battery Charge Coil	Y1, Y2, or Y3 to Ground	Open Line (Infinity)

NOTE: Any measurement other than Infinity (open) will indicate a failed or shorted stator leg.

TEST 3: Measure AC Voltage Output of Each Stator Leg at Charging RPM

1. Set the selector dial to measure AC Voltage.
2. Start the engine and let it idle.
3. While holding the engine at a specified RPM, separately measure the voltage across each 'leg' of the stator by connecting the meter leads to the wires leading from the alternator (Y1 to Y2, Y1 to Y3, Y2 to Y3).
4. Refer to the following table for approximate AC Voltage readings according to RPM. Test each leg at the specified RPM in the table.

Example: The alternator current output reading should be approximately **21 VAC at 1300 RPM** between each 'leg'.

NOTE: If one or more of the stator leg output AC voltage varies significantly from the specified value, the stator may need to be replaced.

RPM Reading	AC Voltage (VAC) Reading
1300	21 VAC ± 25%
3000	47 VAC ± 25%
5000	79 VAC ± 25%

Stator (Alternator) Replacement

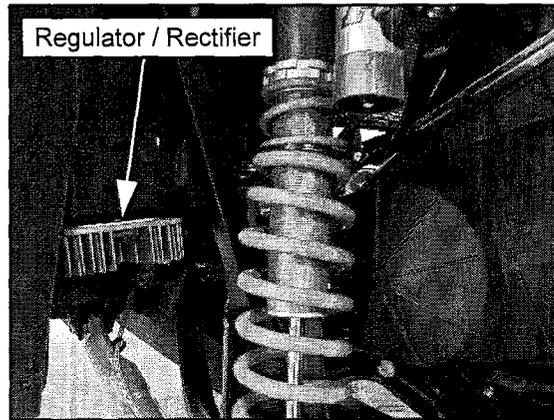
Refer to Engine Chapter "Stator Cover Removal / Inspection" procedure to service the stator.

NOTE: The stator cover can be removed with the engine installed in the chassis.

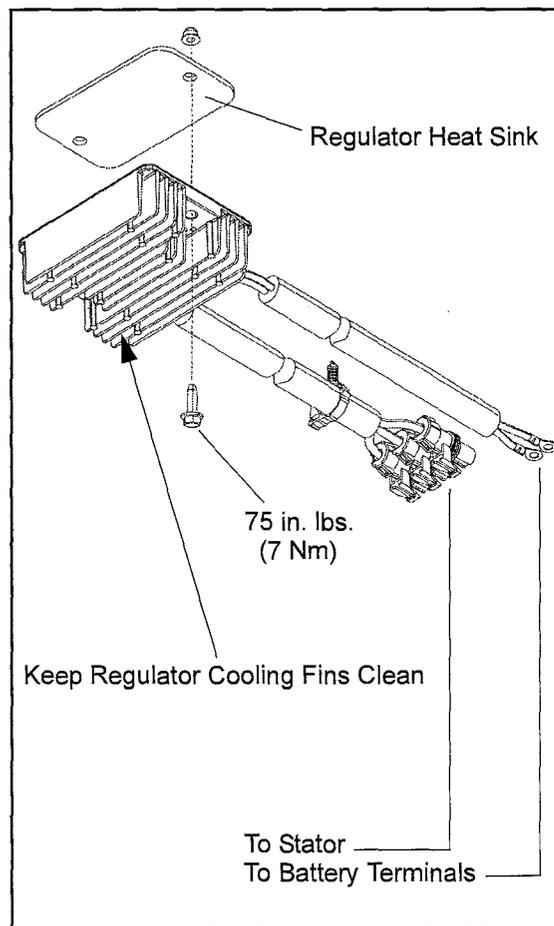
IMPORTANT: Be sure to thoroughly clean the area around the stator cover prior to removal.

Regulator / Rectifier

The Regulator / Rectifier is located in the left rear wheel well area in front of the left rear shock. It is mounted under the LH panel divider, below the ECU.

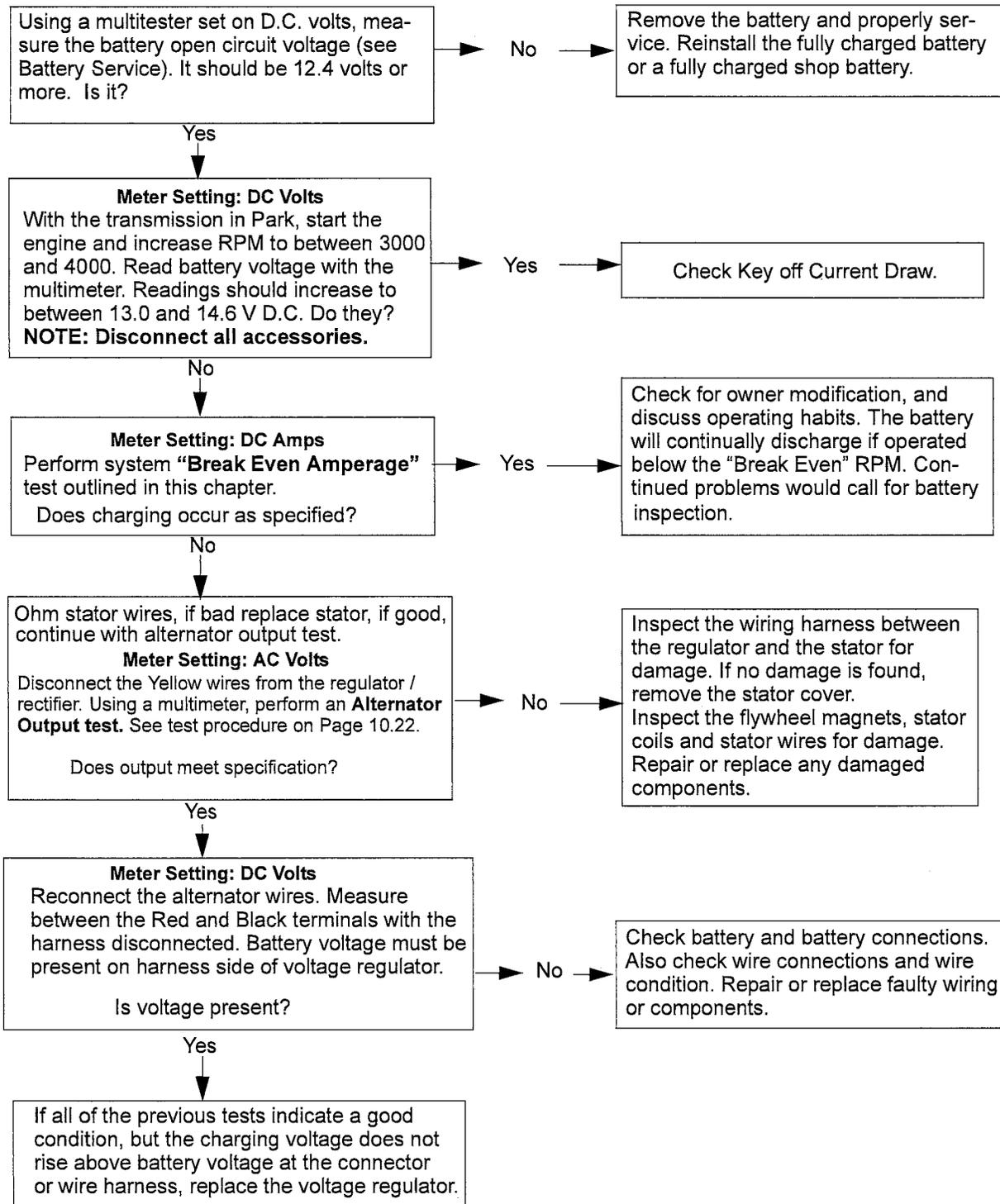


NOTE: If the regulator / rectifier overheats, the unit will turn itself off to cool down. The unit will turn on again after it has cooled down. If it turns off, verify the cooling fins are clean, free from debris and that adequate airflow is present.



Charging System Testing Flow Chart

Whenever charging system problems are suspected, proceed with the following system check after verifying that all wires are in good condition, connected and not exposed or pinched.



ELECTRICAL

BATTERY SERVICE

Battery Specifications

Battery PN 4011224

Type	Polaris / Deka ETX30L Sealed - Maintenance Free
Voltage	12 Vdc
Nominal Capacity @ 10 HR Rate	30 AH
CCA	365
Nominal Open Circuit Voltage	12.8 Vdc or more.
Recommended Charging Rate	1.8A @ 5-10 HR or 6.0A @ 1 HR

IMPORTANT: Never attempt to open the battery. If the seal is broken, the battery will be ruined and will fail within a few weeks.

General Battery Information

WARNING

CALIFORNIA PROPOSITION 65 WARNING:
Batteries, battery posts, terminals and related accessories contain lead and lead compounds, and other chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. WASH HANDS AFTER HANDLING.

WARNING

Battery electrolyte is poisonous. It contains acid! Serious burns can result from contact with the skin, eyes, or clothing.

ANTIDOTE:

External: Flush with water.

Internal: Drink large quantities of water or milk. Follow with milk of magnesia, beaten egg, or vegetable oil. Call a physician immediately.

Eyes: Flush with water for 15 minutes and get prompt medical attention.

Batteries produce explosive gases. Keep sparks, flame, cigarettes, etc. away. Ventilate when charging or using in closed space. Always shield eyes when working near batteries.

Keep out of reach of children.

1. Check battery voltage with a volt/ohm meter. A fully charged battery should be 12.8 V or higher.
2. If the voltage is below 12.6 V, the battery will need to be recharged (see "Charging Procedure").

To service a Maintenance Free battery:

1. Remove battery from the vehicle (see Chapter 2).
2. Test battery with a voltage meter or load tester to determine battery condition. This will determine the length of time required to charge the battery to full capacity. Refer to OCV table (see "OCV - Open Circuit Voltage Test").
3. Charge the battery as recommended (see "Charging Procedure").

Battery Removal / Installation

See Chapter 2 "Maintenance" for battery removal and installation procedures.

Battery Off Season Storage

Whenever the vehicle is not used for a period of three months or more, remove the battery from the vehicle, ensure that it's fully charged, and store it out of the sun in a cool, dry place. Check battery voltage each month during storage and recharge as needed to maintain a full charge.

NOTE: Battery charge can be maintained by using a Polaris battery tender charger or by charging once a month to make up for normal self-discharge. Battery tenders can be left connected during the storage period, and will automatically charge the battery if the voltage drops below a pre-determined point.

Battery Testing

Whenever a service complaint is related to either the starting or charging systems, the battery should be checked first.

The following are two tests which can easily be made on a sealed Maintenance Free battery to determine its condition: OCV Test and a Load Test.

OCV - Open Circuit Voltage Test

Battery voltage should be checked with a digital multimeter. Readings of 12.6 volts or less require further battery testing and charging. See the following chart and "Load Test".

NOTE: Maintenance Free batteries should be kept at a high state of charge during storage. If the battery is stored or used at a low state of charge, hard crystal sulfation will form on the plates, reducing the efficiency and service life of the battery.

NOTE: Use a volt/ohm meter to test battery voltage.

Battery PN 4011224

OPEN CIRCUIT VOLTAGE	
State of Charge	Maintenance Free
100%	12.8 V and up
75% Charged	12.6 V
50% Charged	12.3 V
25% Charged	12.0 V
0% Charged	11.8 V or less

Load Test



To prevent shock or component damage, remove spark plug high tension leads and connect securely to engine ground before proceeding.

A battery may indicate a full charge condition in the OCV test, but still may not have the storage capacity necessary to properly function in the electrical system. For this reason, a battery capacity or load test should be conducted whenever poor battery performance is encountered.

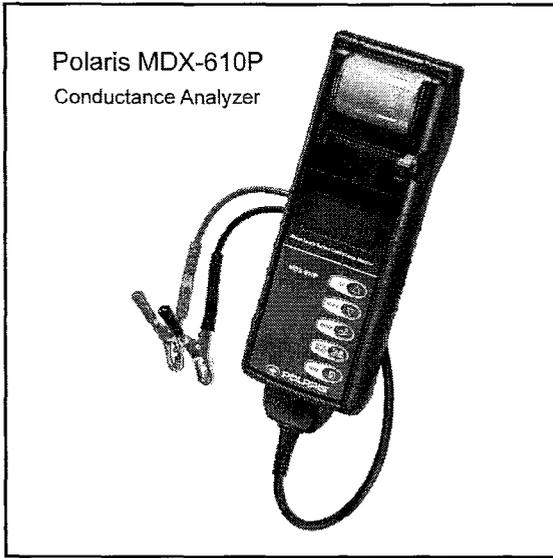
To perform this test, use a load testing device that has an adjustable load. Apply a load of three times the ampere-hour rating. At 14 seconds into the test, check battery voltage. A good 12V battery will have at least 10.5 volts. If the reading is low, charge the battery and retest.

ELECTRICAL

Battery Conductance Analyzer

Conductance describes the ability of a battery to conduct current. A conductance tester functions by sending a low frequency AC signal through the battery and a portion of the current response is captured, from this output a conductance measurement is calculated. Conductance testing is more accurate than voltage, specific gravity, or load testing.

Authorized Polaris dealers/distributors are required to use the conductance analyzer when testing 12V Polaris batteries.



Polaris MDX-610P
SPX PN: PU-50296

Charging Procedure

If battery voltage is 12.6 Vdc or less, the battery may need recharging. When using an automatic charger, refer to the charger manufacturer's instructions for recharging.

Do not exceed 6 amps when charging the 4011224 battery.

NOTE: Charge the battery using an automatic charger that will not exceed 14.6 Vdc. An automatic charger will signal when charging is complete.

NOTE: Allow the battery to stand disconnected for at least 1-2 hours after being properly charged. If the voltage drops below 12.6 volts, charging was ineffective or the battery needs to be replaced.

WARNING

An overheated battery could explode, causing severe injury or death. Always watch charging times carefully. Stop charging if the battery becomes very warm to the touch. Allow it to cool before resuming charging.

Battery PN 4011224

State of Charge	Voltage (DC)	Action	Charge Time
100%	12.8 or more	None, check again in 3 months	None Required
75% - 100%	12.6 - 12.8	May need slight charge	3 - 6 hrs
50% - 75%	12.3 - 12.6	Needs Charge	5 - 11 hrs
25% - 50%	12.0 - 12.3	Needs Charge	At least 13 hrs
0% - 25%	12.0 or less	Needs Charge	At least 20 hrs

NOTE: Follow the charger instructions supplied by the manufacture regarding the order or connections, switch positions and when to connect the charger to an outlet.

STARTING SYSTEM

Troubleshooting

Starter Motor Does Not Run

- Battery discharged
- Loose or faulty battery cables or corroded connections (see Voltage Drop Tests)
- Related wiring loose, disconnected, or corroded
- Poor ground connections at battery cable, starter motor or starter solenoid (see Voltage Drop Tests)
- Faulty key switch
- Faulty starter solenoid or starter motor
- Engine problem - seized or binding (can engine be rotated easily)

Starter Motor Turns Over Slowly

- Battery discharged
- Excessive circuit resistance - poor connections (see Voltage Drop Test)
- Engine problem - seized or binding (can engine be rotated easily)
- Faulty or worn brushes in starter motor

Starter Motor Turns - Engine Does Not Rotate

- Faulty starter drive
- Faulty starter drive gears or starter motor gear
- Faulty flywheel gear or loose flywheel

Voltage Drop Test

The Voltage Drop Test is used to test for bad connections. When performing the test, you are testing the amount of voltage drop through the connection. A poor or corroded connection will appear as a high voltage reading. Voltage shown on the meter when testing connections should not exceed 0.1 VDC per connection or component.

To perform the test, place the meter on DC volts and place the meter leads across the connection to be tested. Refer to the voltage drop tests on the starter system in this chapter.

**Voltage should not exceed
.1 DC volts per connection**

Starter Motor Removal

1. Remove the driver side seat and disconnect the battery.
2. Raise and support rear of vehicle.
3. Remove the RH rear wheel.
4. Remove the (+) positive wire from the starter motor terminal.
5. From the RH side wheel well using an 8mm flex socket, remove the negative battery cable nut and the (2) fasteners securing the starter motor to the engine.



NOTE: The (-) negative battery cable is mounted to the engine using the upper starter mounting bolt / stud.

6. Remove the starter from the engine.

Starter Motor Installation

1. Inspect and replace starter motor O-ring if needed.
2. Lubricate the starter motor O-ring with fresh engine oil.
3. Install the starter motor onto the engine case.
4. Hand tighten the upper starter mounting bolt / stud.
5. Install and torque the lower mounting bolt to specification.

IMPORTANT: Tighten the lower starter bolt first, as the bottom hole acts as a pilot hole to properly align the starter drive (bendix) with the flywheel. This helps prevent binding and starter damage.

6. Torque the upper starter mounting screw to specification.
7. Install the (-) negative battery cable to the upper starter mounting bolt / stud. Torque nut to specification.



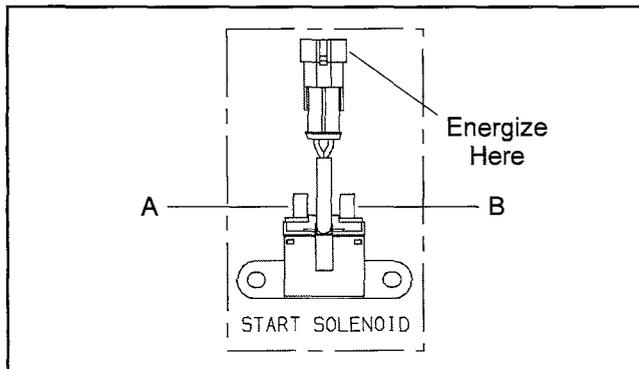
**Starter Mounting Bolts and Nut:
7 ft. lbs. (10 Nm)**

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ELECTRICAL

Starter Solenoid Bench Test

Test the start solenoid by powering the solenoid using battery voltage for a maximum of 5 seconds. With the solenoid energized, resistance should read about 0 - 0.5Ω between terminals (A) and (B). If resistance measurement is out of specification, replace the starter solenoid.

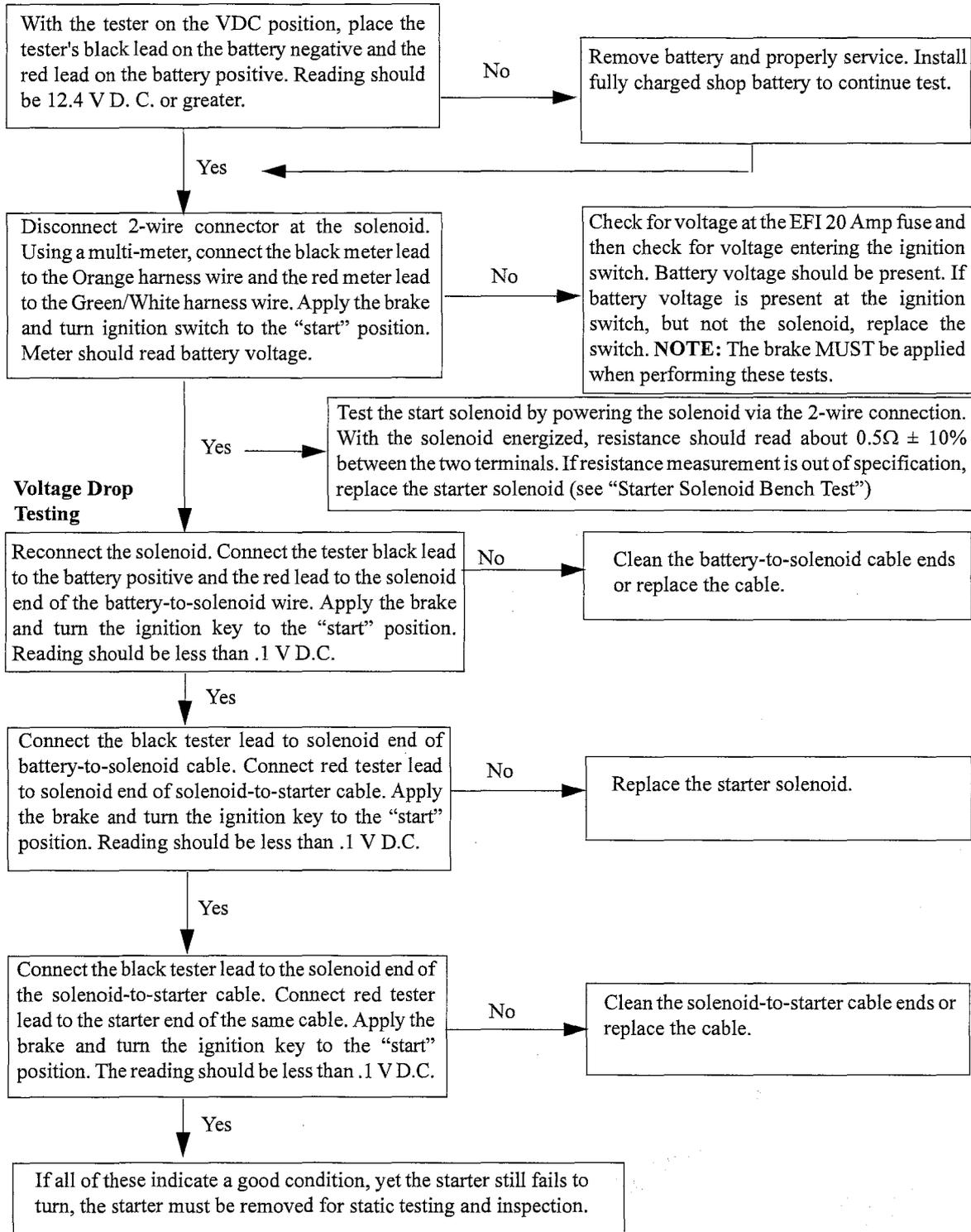


Starter Solenoid Operation

To energize the Starter Solenoid the following must occur:

- The brake must be applied to provide a ground path via the Orange wire.
- The key switch must be turned to the "start" position to provide 12V power via the Green / White wire.
- Once the pull-in coil is energized, the solenoid provides a current path for 12V power to reach the starter motor.

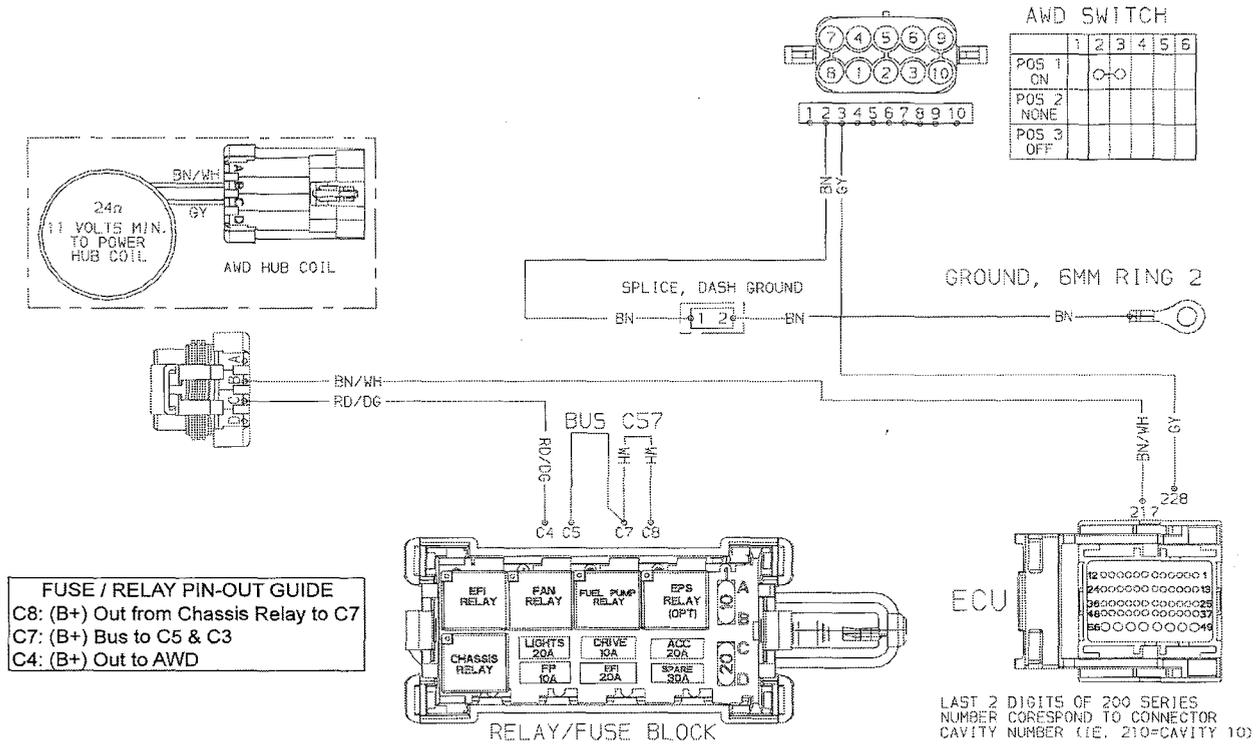
NOTE: See "ELECTRICAL SYSTEM BREAOUTS: Starter-Interlock" provided in this chapter for starter solenoid operation.

STARTING SYSTEM TESTING FLOW CHART**Condition: Starter fails to turn over the engine.**

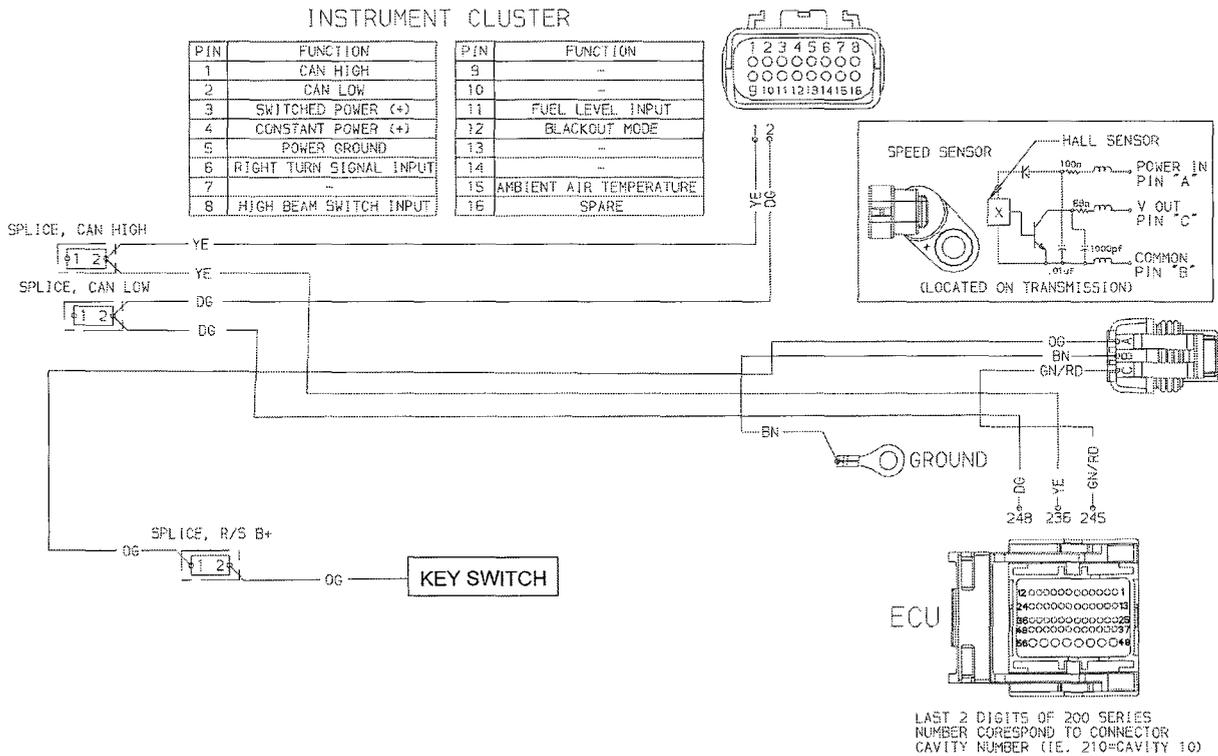
ELECTRICAL

ELECTRICAL SYSTEM BREAKOUTS

AWD

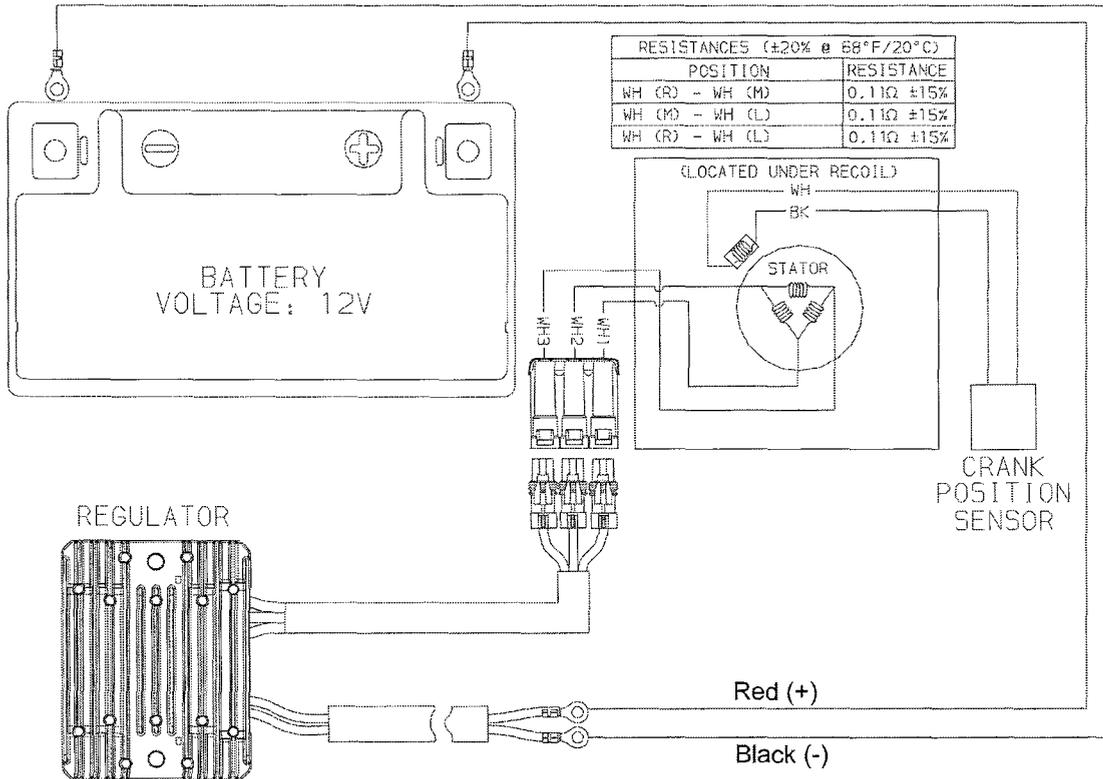


Vehicle Speed Sensor

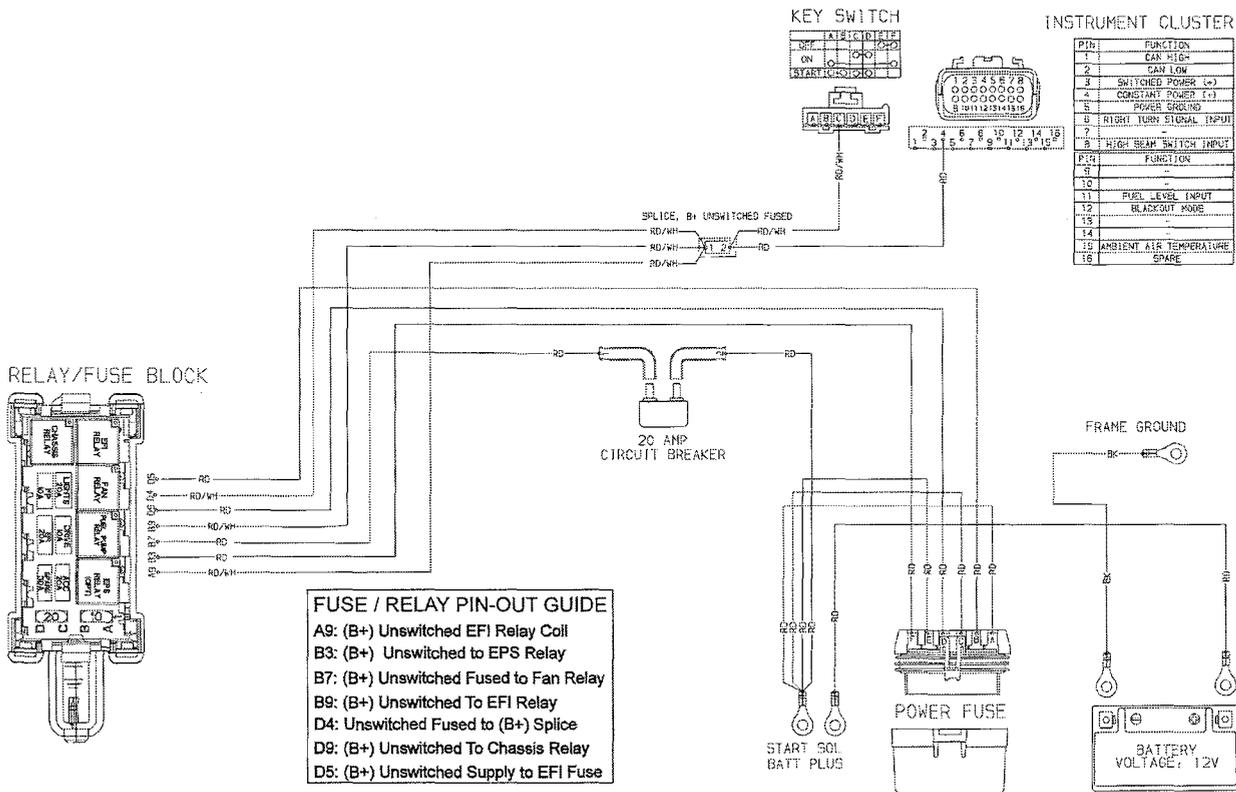


ELECTRICAL

Charging System



Chassis Power

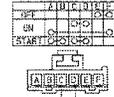


EFI

FUSE / RELAY PIN-OUT GUIDE

- A3: (B+) To Chassis Relay Coil Control
- A4: (B+) Fuel Pump
- A5, A7: (B+) Fan/Fuel Pump Relay Coil
- A8: (B+) EFI Relay out to Splice, ECM
- A9: (B+) Unswitched EFI Relay Coil
- B4: (-) Fuel Pump Relay Coil Control
- B5: (B+) Fuel Pump Relay
- B8: (-) EFI Relay Coil Control
- B9: (B+) Unswitched to EFI Relay
- D4: (B+) Splice, Unswitched
- D6: (B+) out to Fuel Pump Relay

KEY SWITCH



INSTRUMENT CLUSTER

PIN	FUNCTION	PIN	FUNCTION
1	CAN HIGH	8	-
2	CAN LOW	10	-
3	SAFETY POWER (+)	11	FUEL LEVEL INPUT
4	CONSTANT POWER (-)	12	BLACKOUT MODE
5	POWER GROUND	13	-
6	HIGHT TURN SIGNAL INPUT	14	-
7	-	15	AMBIENT AIR TEMPERATURE
8	HIGH BEAM SWITCH INPUT	16	SPARE

DIAGNOSTIC



FUEL PUMP

TANK LEVEL RESISTANCE (Ω)	
FULL	6.0k ± 1.0k
EMPTY	50.0k ± 5.0k

PIN	FUNCTION
1	FUEL LEVEL SENSOR (+)
2	FUEL LEVEL SENSOR (-)
3	FUEL PUMP (+)
4	FUEL PUMP (-)

PIN	FUNCTION
1	AIR TEMP SENSOR
2	MANIFOLD SENSOR
3	GROUND
4	MPE
5	SV

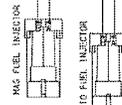
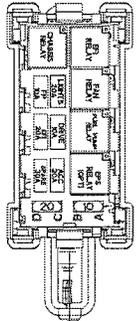
MAGS



ECU

LAST 2 DIGITS OF 2001 SERIES PART NUMBER ARE: 100000110

RELAY/FUSE BLOCK



IDLE AIR CONTROL

PINS	RESISTANCE
1-2	30k ± 1.2k
2-3	30k ± 1.2k
1-3	60k ± 2.4k
4-5	30k ± 1.2k
5-6	30k ± 1.2k
4-6	60k ± 2.4k

ALL OTHER COMBINATIONS: OPEN

COOLANT TEMP SENSOR



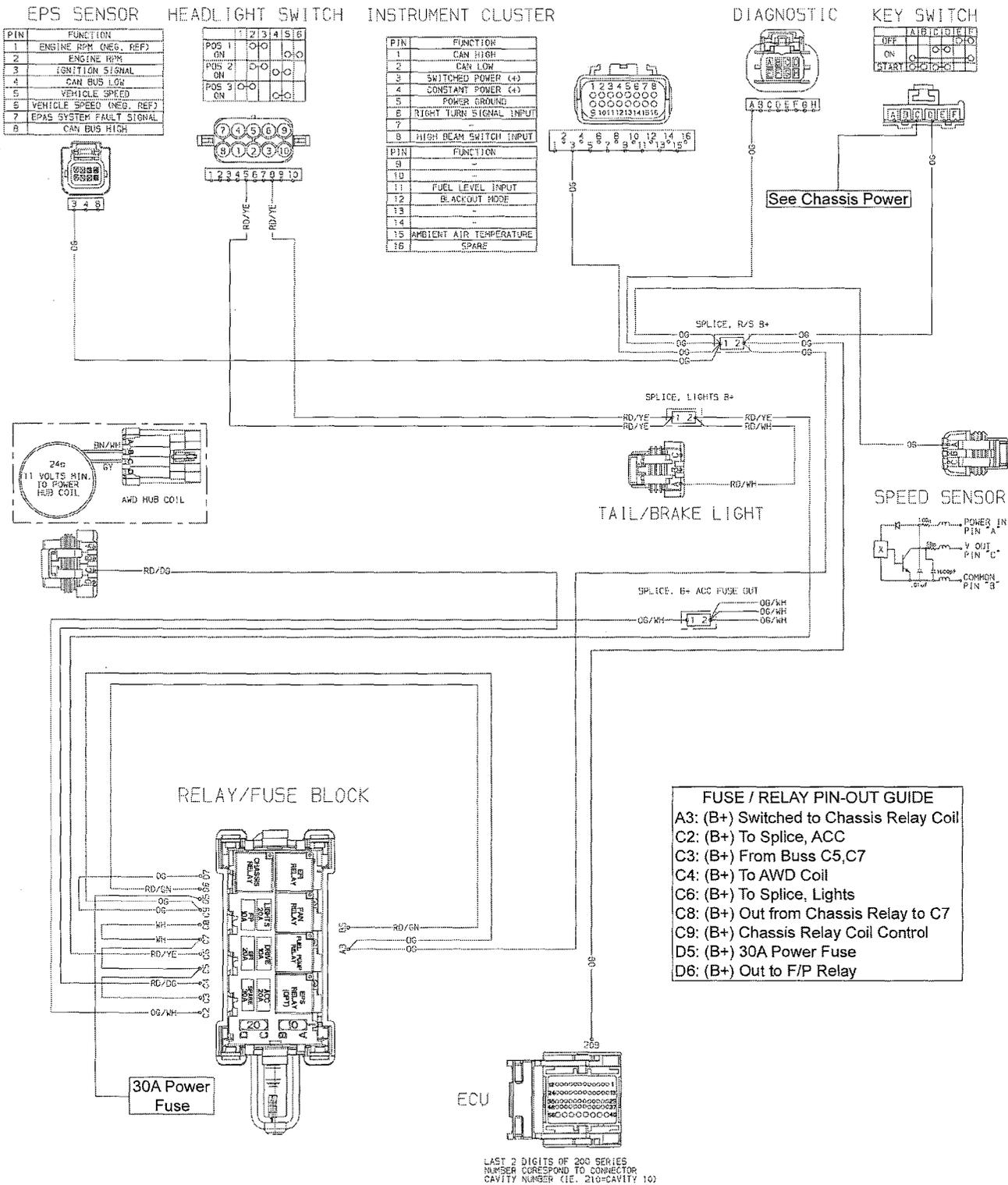
CPS

GROUND, 6MM RING 1
GROUND, 6MM RING 2

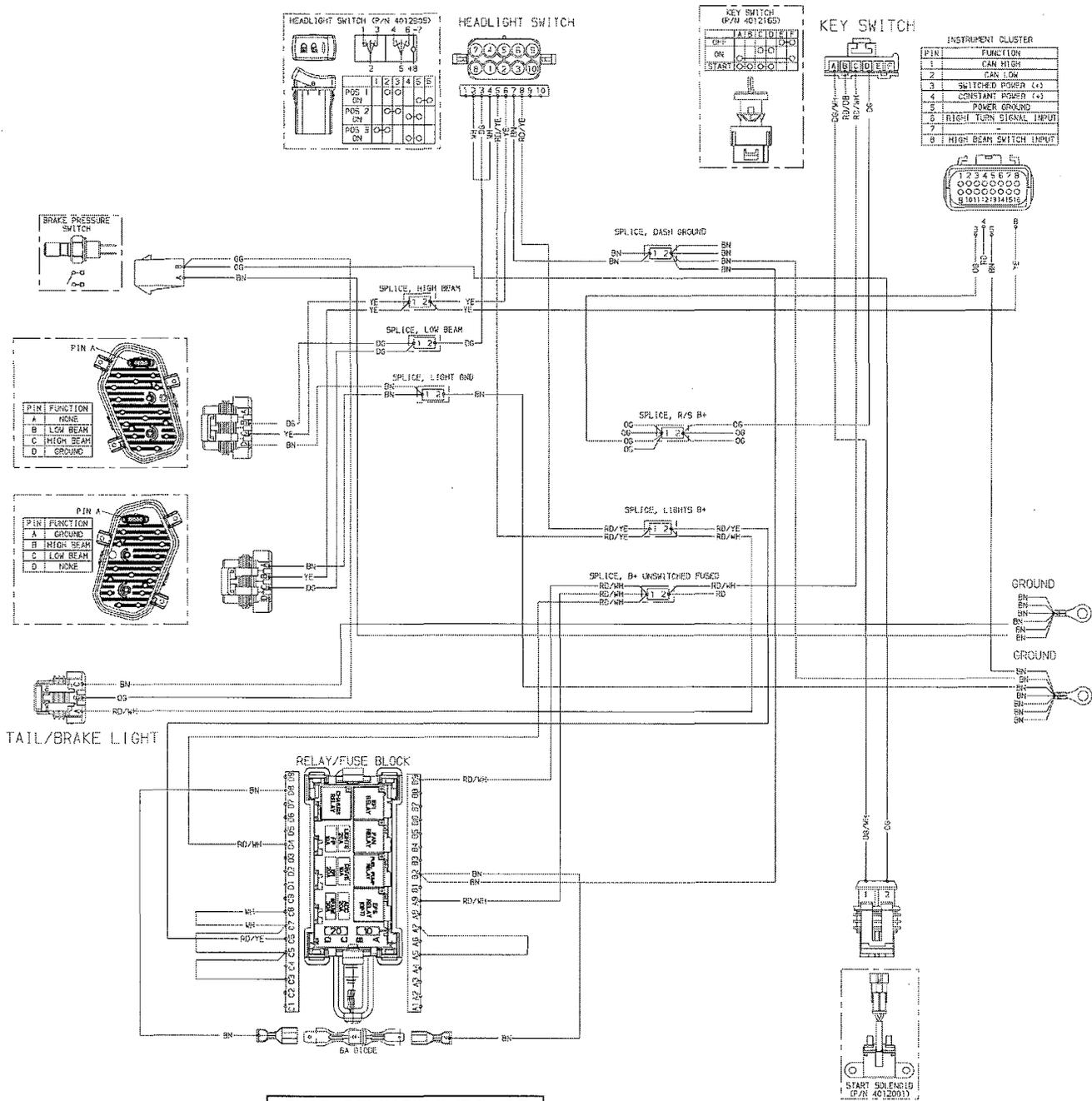


ELECTRICAL

Key-On Battery Power



Lights

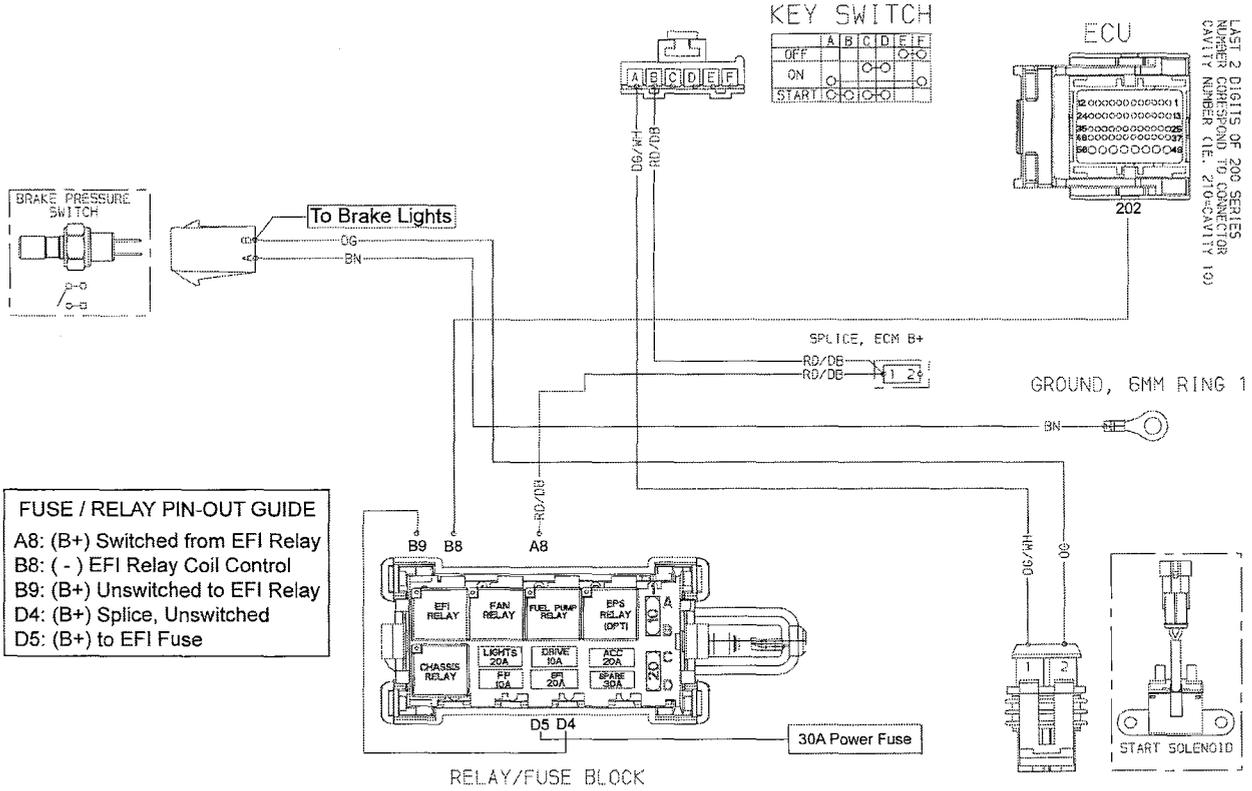


FUSE / RELAY PIN-OUT GUIDE

A9: (+) Unswitched EFI Relay Coil
 B2: (-) Ground, EPS Relay Coil
 B9: (+) Unswitched to EFI Relay
 C6: (+) To Splice, Lights
 D4: (+) Splice, Unswitched
 D8: (-) Ground, Chassis Relay Coil

ELECTRICAL

Starter-Interlock



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