

CHAPTER 5 FINAL DRIVE

WARNING

The parts of different types/ variants/ versions maybe un-interchangeable, even some parts have almost same appearance. Always refer to Parts Manual of each ATV model for spare parts information and service.

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- 5.21 REAR, FRONT PROP SHAFT REMOVAL

5.1 WHEEL, HUB, AND SPINDLE TORQUE TABLE

Item	Specification
Front Wheel Nuts	69 Ft.Lbs 96 N.m
Rear Wheel Nuts	69 Ft.Lbs 96 N.m
Front Hub Nut on Spindle/ outer CV joint	Refer to FRONT HUB INSTALLATION
Rear Hub Retaining Nut	ATV400: 101Ft.Lbs 137N.m

CAUTION: Locking nuts, and bolts with pre-applied locking agent should be replaced if removed. The self- locking properties of the nut or bolt are reduced or destroyed during removal.

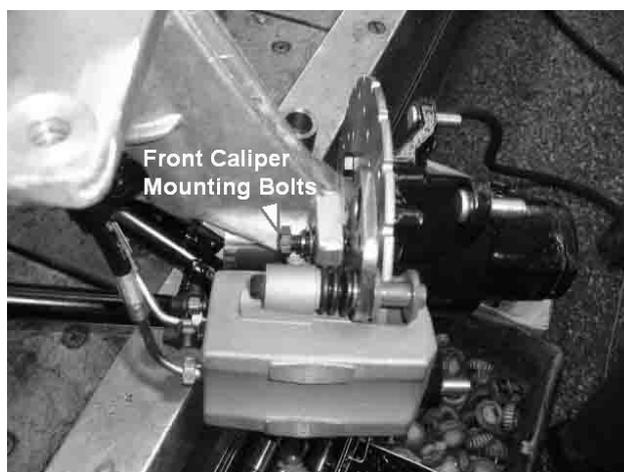
5.2 FRONT HUB DISASSEMBLY/INSPECTION

1. Elevate front end and safely support machine under footrest/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 tire/wheel firmly and checking for movement. It should rotate smoothly without binding or rough spots.
3. Remove wheel nuts and wheel.
4. Remove brake caliper
5. Remove hub cap, cotter pin, front spindle nut, and washer.
6. Rotate each 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.
7. Place a shop towel on hub to protect surface. Carefully pry seal out of hub. Do



not damage the surface of the seal. Clean the hub.

8. Drive bearing out through opposite side of hub and discard.
9. Drive other bearing out and discard.
10. Clean hub and spacer thoroughly.



5.2 FRONT HUB REMOVAL/INSPECTION 4x4

1. Elevate front end and safely support machine Under footrest/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 tire/Wheel firmly and checking for movement. Grasp The top and bottom of the tire. The tire should rotate smoothly without binding or rough spots.
3. Remove wheel nuts and wheel.
4. Remove the two brake caliper attaching bolts.

CAUTION:

Do not hang the caliper by the brake Line. Use wire to hang the caliper to prevent. Possible damage to the brake line.

5. Remove hub cap, cotter pin, front spindle nut, and Washer.
6. Rotate each bearing by hand and check for smooth rotation. Visually inspect



bearing for moisture, dirt, or corrosion, or roughness is evident.



5.3 FRONT HUB INSTALLATION 4X4

1. Inspect the hub strut bearing surface for wear or damage.
2. Apply grease to drive axle spindle.
3. Install spindle through the backside of the hub strut. Install the hub onto the spindle.
4. Install spindle nut and tighten to specification.
5. Install a new cotter pin. Tighten nut slightly if necessary to align cotter pin holes.
6. Rotate wheel and check for smooth operation. Bend both ends of cotter pin around end of Spindle in different directions.
7. Install hub cap.
8. Rotate hub. It should rotate smoothly without binding or rough spots or side play.
9. Install brake caliper using new bolts. Tighten bolts to specified torque.



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 wheel nuts and tighten evenly in a cross pattern to specified torque.



5.4 FRONT HUB BEARING REPLACEMENT 4X4

1. Remove outer snap ring.
2. Form the back side, tap on the outer bearing race with a drift punch in the relief 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 bearing.



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

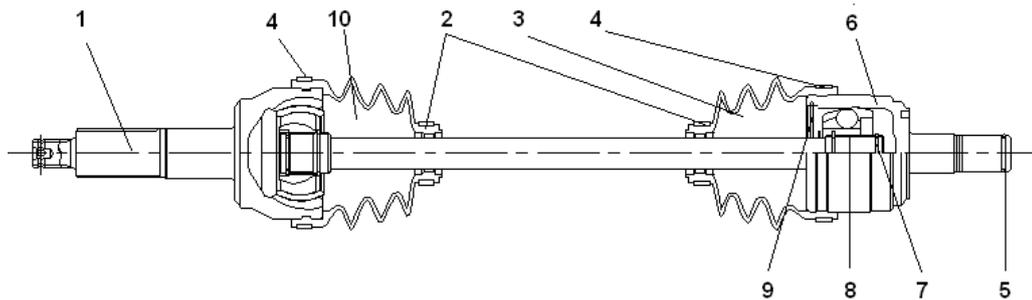
5. Inspect bearing housing for scratches, wear or damage. Replace housing if damaged.



5.5 FRONT DRIVE AXLE (INNER AND OUTER CV JOINT) REMAVAL/

INSPECTION (4X4)

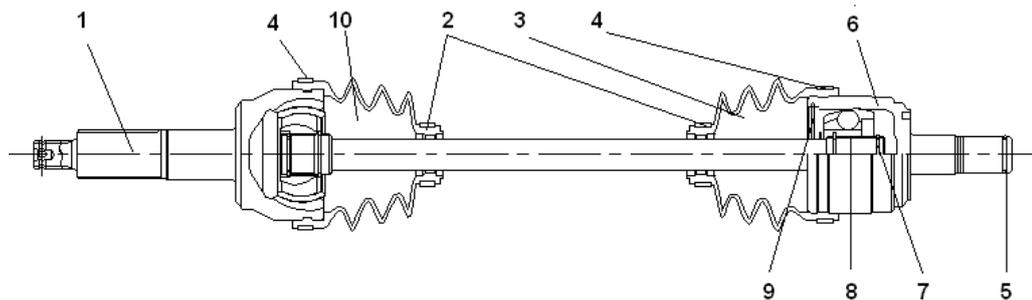
FRONT DRIVE AXLE



5.5 FRONT DRIVE AXLE (INNER AND OUTER CV JOINT) REMAVAL/

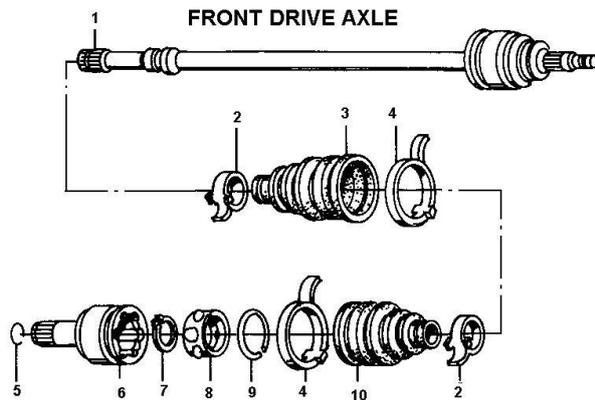
INSPECTION (4X4)

FRONT DRIVE AXLE



NOTE

The outer CV joint cannot be disassembled or repaired, if damage or faulty the drive axle assembly must be replace.



NOTE: Always order and replace 6 and 8 together

REMOVAL

1. Place the vehicle on level ground and set the parking brake, Block the rear wheels so the vehicle will not roll in either direction.
2. Remove the front wheels, steering tie rods, disconnect the A arm on the ball joint end as described in this Chapter and Chapter 4.

CAUTION

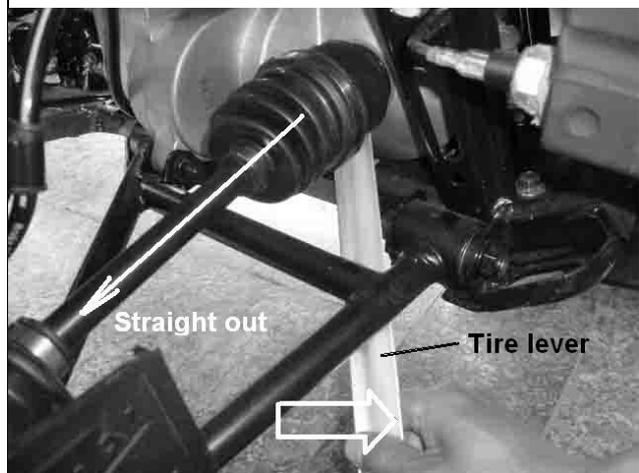
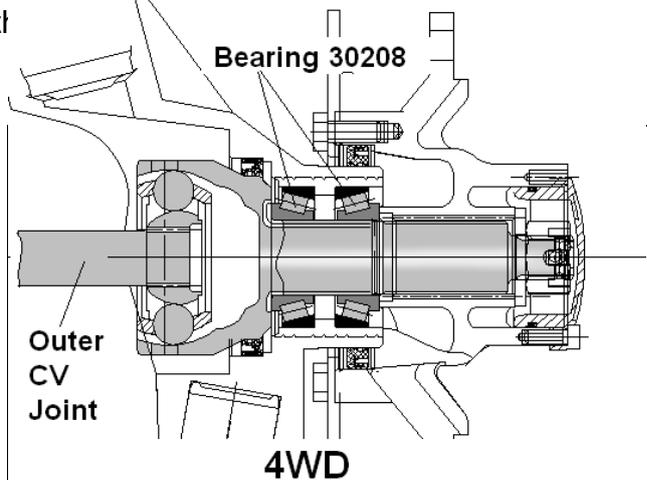
To avoid damage to the front differential oil seal, hold the front drive shaft horizontal and straight out from the front differential during removal.

3. Hold the drive shaft straight out.
4. Place a tire lever between the inner CV joint and the differential housing, with a small piece of wood against the housing to help get "leverage" and protect the casting. "pop" the in inner CV joint out from the front differential.

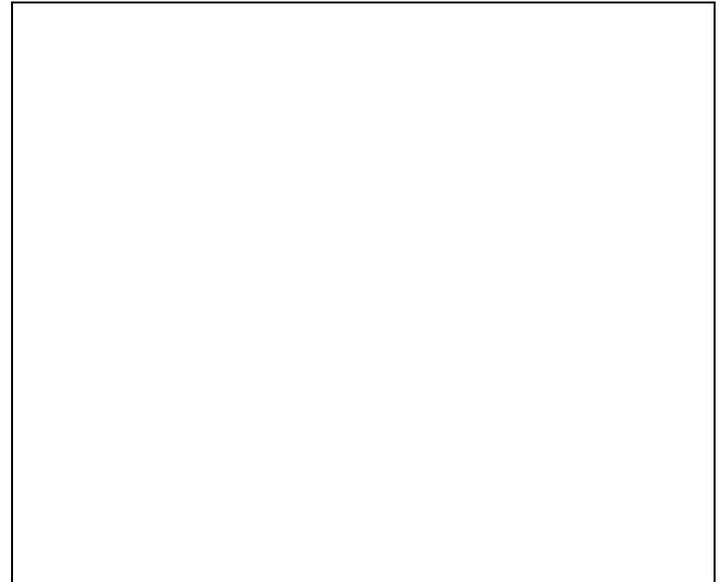
INSPECTION

NOTE The boots are subjected to a lot of abuse if the vehicle is ridden in rough terrain. If the boots are damage and left un-repaired, the driveshaft joints will fair prematurely by allowing the joint to be exposed to dirt, mud and moisture. This also allow the loss of critical lubrication.

1. Drive axle/ outer CV joint assembly.
2. Boot band "A".
3. Outer board boot.
4. Boot band "B".
5. Stopper ring
6. Outer CV joint
7. Circlip
8. Bearing*
9. stopper ring
10. Inboard boot.



1. Check the rubber boots for wear, cuts or damage and replace if necessary as described under the Disassembly / Assembly procedure in this chapter.
2. Move each end of the drive shaft in a circular motion (and also a reciprocate for inner one) and check the drive shaft joints for excessive wear or play.
3. This inner CV joint (inboard pivot joint) can be serviced if there is wear or play. The outer CV joint (outboard pivot joint) cannot be serviced if worn or damage and if necessary, the drive shaft assembly must be replaced.

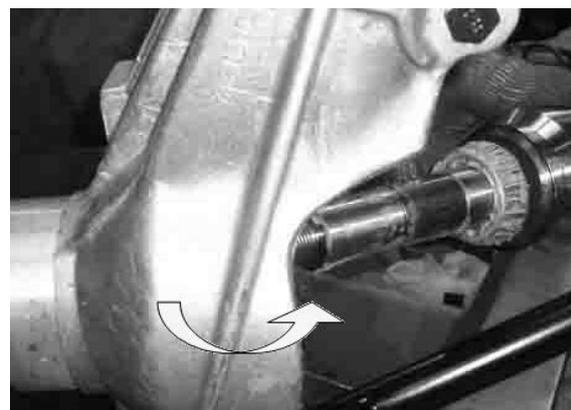
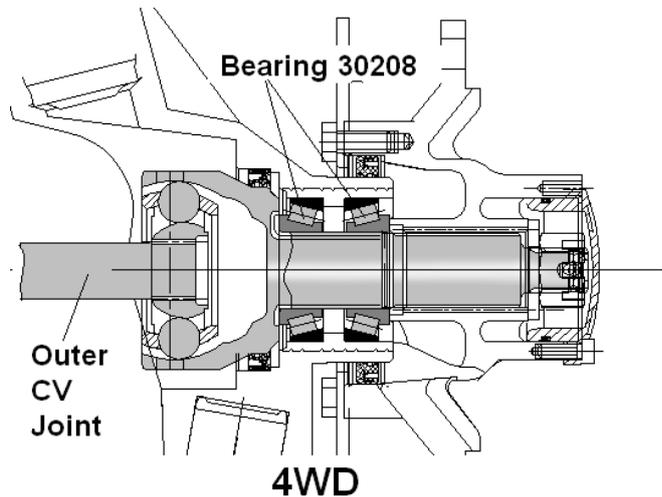


5.6 FRONT DRIVE AXLE INSTALLATION (4X4)

CAUTION

To avoid damage to the front differential oil seal and the strut oil seal, hold the front drive shaft horizontal and straight into the strut during installation.

1. Hold the drive shaft straight in from the front differential.
2. Push the drive shaft straight into the front differential and push it in all the way until it bottoms out. If necessary, carefully tap on the outer end of the drive shaft with a rubber mallet or soft-faced mallet.
3. After the drive shaft is installed, pull the inner CV joint a little to make sure the drive shaft stopper ring has locked into the front differential side gear groove.
4. Carefully install the outer CV joint (spindle) into the strut, install the front hub and wheel.
5. Install the ball joint on the A arm, the steering tie rods, the hubs and the wheels as described in this Chapter and Chapter 4.



5.7 FRONT DRIVE AXLE DISASSEMBLY/ INSPECTION (4X4)

INNER CV JOINT DISASSEMBLY

NOTE

The outer CV joint cannot be disassembled or repaired, if damage or faulty the drive axle assembly must be replace.

1. Open the clamps on both boot band “A” and “B” on the inner CV joint, then remove boot band “B” .Discard the boot band, it cannot be reused.
2. Carefully slide the boot (A) onto the drive axle and off the inboard joint.
3. Wipe out all of the molybdenum disulfide grease within the inboard joint cavity.
4. Remove the stopper ring from the inboard joint.
5. Remove the inner CV joint.
6. Remove the circlip and slide off the bearing assembly. Be careful not to drop any of the steel balls from the bearing cage.
7. slide the inner CV off the drive axle and discard the boot band “A”, it cannot be reused.
8. If the outboard boot requires replacement, perform the following:
 - a. Open the clamps on both boot bands “A” and “B” on the outer CV joint, then remove boot band “B” .Discard the boot band, it cannot be reused.
 - b. Slide the outboard boot off the drive axle and discard the boot band “A” , it cannot be reused.
9. Inspect the drive axle as described in this chapter.

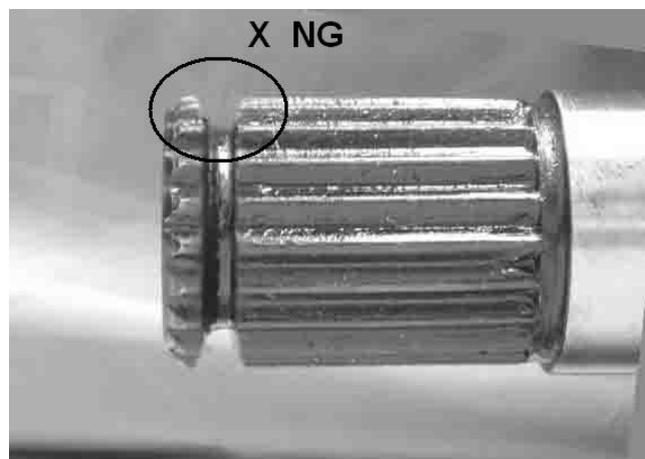
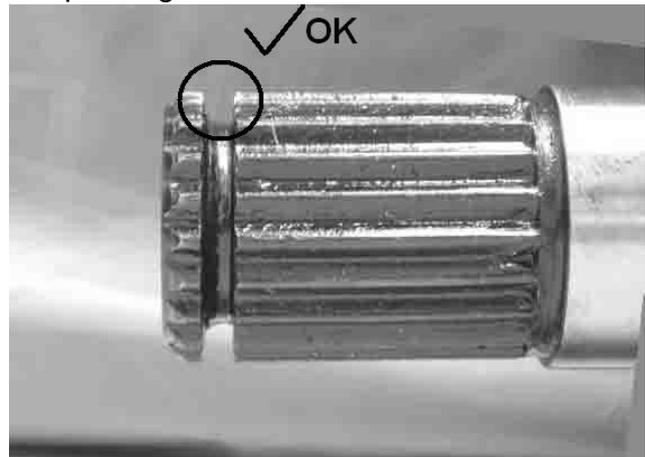
INNER CV JOINT INSPECTION

1. Clean the bearing assembly in solvent and thoroughly dry.
2. Inspect the steel balls, bearing case and the bearing race for wear or damage.
3. Check for wear or damage to the inner splines of the bearing race.
4. If necessary, disassembly the bearing assembly for further inspection. Carefully



Remove the stopper ring

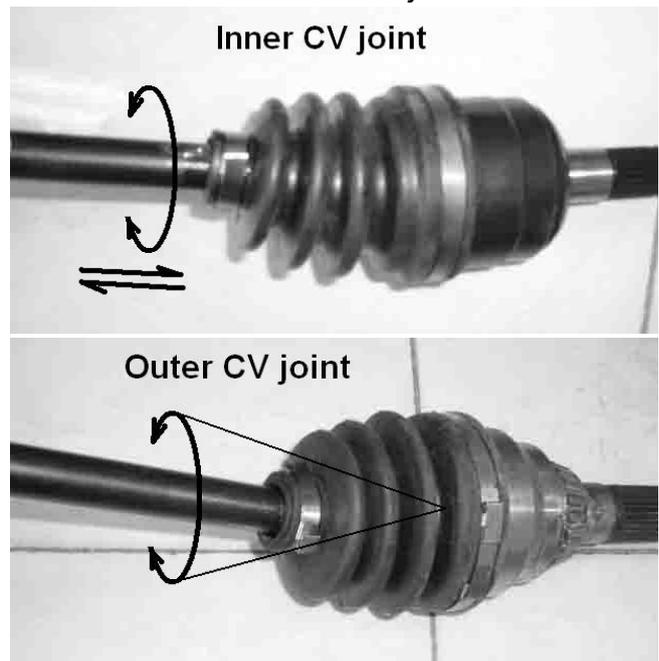
Inspect groove



remove the steel balls from the bearing cage then remove the bearing race from the bearing cage.

5. If any of the components of the bearing assembly are damaged, replace the entire assembly as no replacement parts are available.
6. Clean the inner CV joint in solvent and thoroughly dry.
7. Inspect the interior of the inboard joint where the steel balls ride. Check for wear or damage and replace the joint if necessary.
8. Inspect the snap ring groove on the inboard joint for wear or damage.
9. Inspect the splines on the inner CV joint for wear or damage.
10. Check the stopper ring in the end of the inboard joint. Make sure it seats in the groove correctly, if damage the ring must be replaced.
11. Inspect the exterior of the inner CV joint for cracks or damage, replace if necessary. Check the movement of the joint for excessive play or noise by moving the drive axle in a circular and reciprocate direction.
12. Inspect the drive axle for bending, wear or damage.
13. Inspect the inner end splines, the outer end splines and the front hub cotter pin hole for wear or damage. If any of these areas are worn or damaged, replace the drive axle.

Check the movement of the joint



NOTE. Inner CV joint must be replaced with the bearing as an assembly.

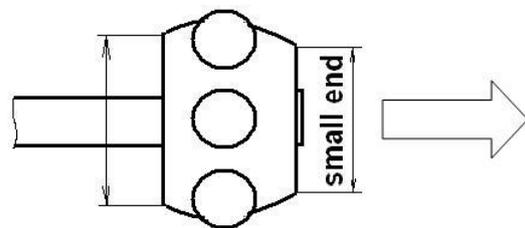
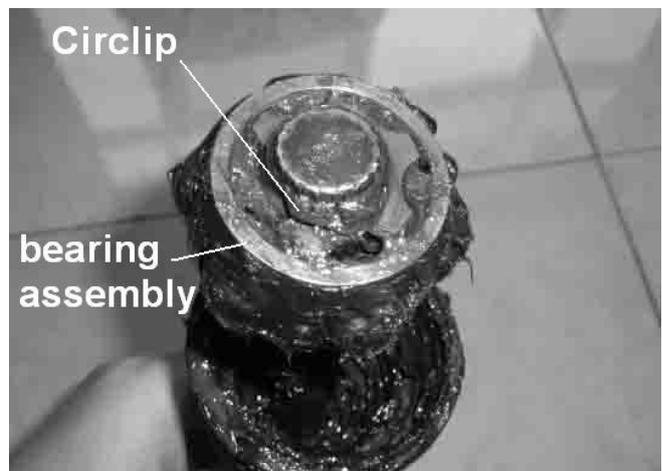
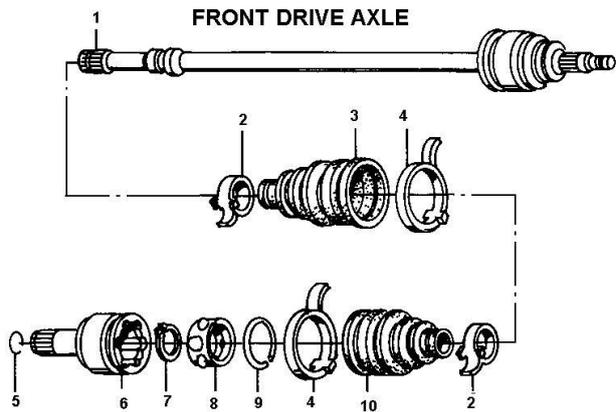
5.8 FRONT DRIVE AXLE ASSEMBLY (4X4)

1. The rubber boots are not identical and must be installed on the correct joint. The boots are marked as follows:
 - a. Inner CV joint boot : “inner”,
 - b. Outer CV joint boot: “outer”.
2. IF the outboard boot was removed, install a new boot onto the drive axle at this time.

NOTE

Position the new boot bands with their tabs facing toward the rear of the vehicle.

3. Install 2 new small boot bands onto the drive axle.
4. Install the inboard boot and move the small boot band onto the boot. Bend down the tab on the boot band and secure the tab with the locking clips and tap them with a plastic hammer. Make sure they are locked in place.
5. If the bearing assembly was disassembled, assemble the bearing as follows:
 - a. Position the bearing race and install the race into the bearing case. Align the steel ball receptacles in both parts.
 - b. Install the steel balls into their receptacles in the bearing case.
 - c. Pack the bearing assembly with molybdenum disulfide grease. This will help hold the steel balls in place.
6. Position the bearing assembly with the small end of the bearing going on first and install the bearing onto the drive axle.
7. Push the bearing assembly on until it stops, then install the circlip, Make sure the circlip seats correctly in the drive axle groove.
8. Apply a liberal amount of molybdenum disulfide grease to the bearing assembly. Work the grease in between the balls, the race and the case. Make sure all voids are filled with grease.
9. Apply a liberal amount of molybdenum disulfide grease to the inner surfaces of the inboard joint.
10. Install the inboard joint over the bearing assembly and install the stopper ring.



Make sure it is seated correctly in the inboard joint groove.

11. After the stopper ring is in place, fill the inboard joint cavity behind the bearing assembly with additional molybdenum disulfide grease.
12. Pack each boot with the following amounts of molybdenum disulfide grease:
 - a. Inboard boot: 35-55grams(1.2-1.9oz.).
 - b. Outboard boot: 30-50grams(1.1-1.8oz.).
13. Move the inboard boot onto the inner CV joint.
14. Move the inboard joint on the drive axle.

NOTE

Position the new boot bands with their tabs facing toward the rear of the vehicle .

15. Move the small boot band onto the boot. Bend down the tab on the boot band and secure the tab with the locking clips and tap them with a plastic hammer. Make sure they are locked in place.
16. Install the large boot bands onto each boot.

CAUTION

It is critical to avoid undue stress on the rubber boots after the drive axle is installed and the vehicle is run. Don't twist the boot, and always set the both ends in designed position.

17. Secure all large boot bands. Bend down the tab on the boot band and secure the tab with the locking clip and tap them with a plastic hammer. Make sure they are locked in place.
18. If removed, install the stopper ring and make sure it is seated correctly in the drive axle groove.
19. Apply molybdenum disulfide grease to the end splines.



5.9 REAR HUB INSPECTION

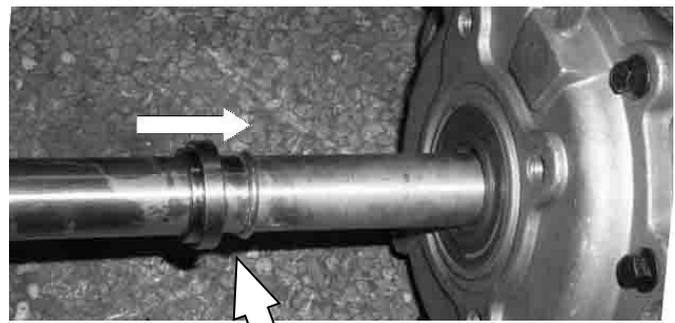
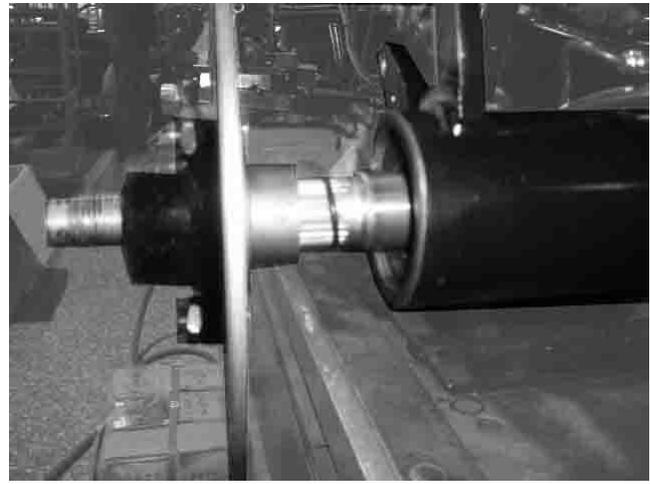
1. Support machine securely with rear wheels elevated.
2. Grasp wheel/hub and check for movement.
3. If movement is detected, inspect hub, hub nut torque and bearing condition and correct as necessary.

5.10 REAR AXLE REMOVAL

1. Lock the parking brake. Remove rear axle cap.
2. Remove cotter pin.
3. Loosen- but do not remove- the hub retaining nut.
4. Loosen- but do not remove- the wheel nuts.
5. Safely support the rear of the ATV.

CAUTION

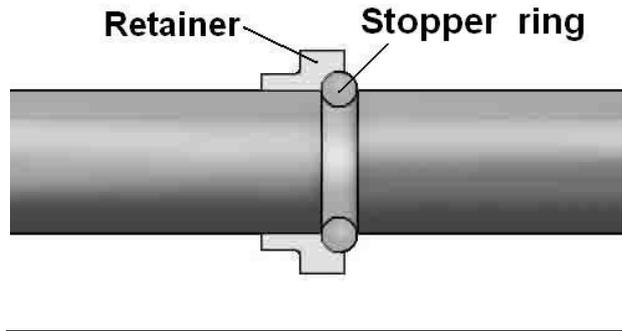
7. Serious injury could occur if machine tips or falls.
8. Remove wheels.
9. Remove hubs.
10. Remove brake hose clamp and brake shield(s).
11. Remove rear brake caliper(s) and support it from machine frame.
12. Remove rear brake disc(s).
13. Remove skid plate(s).
14. Remove left swing arm asm bolts.
15. Remove axle tube(s) bolts from rear gear case (and remove the right side tube).
16. Slide axle through rear gearcase to the right enough to allow the axle tube to slip off between axle and swing arm asm.
17. Remove ring retainer (the hog ring) and spacer (collar) from axle.
18. Slide axle through the gear case and remove from vehicle.



19. Remove o-ring seals from both sides of gear case and discard.

5.11 REAR AXLE INSTALLATION

1. Grease and install new o - rings on rear gearcase.
2. Slide axle through rear gearcase until ring retainer groove is accessible to the left of gearcase.
3. Install new hog ring and retainer.



NOTE

Retainer (Spacer) should enclose stopper ring (hog ring).

4. Slide axle tube assembly over axle shaft until it engages the swing arm asm .
5. Install new axle tube bolts loosely.
6. Install left swing arm asm bolts and torque to 59-67 ft. lbs (80-90Nm).
7. Torque axle tube bolts in a cross pattern to 60 ft. lbs(80 Nm).
8. Re- install skid plate and torque bolts to 25 ft.lbs (34Nm).

Install new greased o - ring on axle and slide brake disc on splines of the axle.

Install brake caliper on brake disc and torque bolts to 20 ft.lbs(25 Nm) .

Anchor the brake hoses to the swing arm asm using the hold down clamp.

Install wheel hub, large flat washer.

Install cone nuts with domed side facing outward.

Torque axle nut and wheel nuts.

Install a new cotter pin. Tighten nut slightly to align holes if required.

Install hub cap.

Rear Hub Nut Torque:

80 ft.lbs.(110.6Nm)

Rear Wheel Nut Torque:

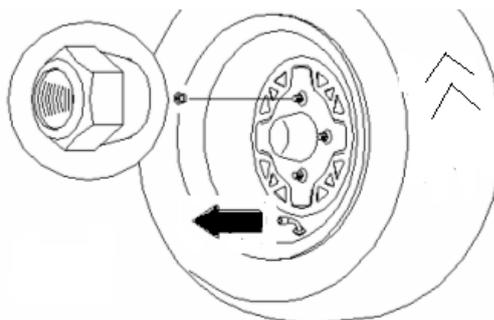


50 ft.lbs.(69Nm)

5.12 REAR AXLE BEARING

REMOVAL

1. Remove the axle tube from the machine.
2. Remove outer axle seal and discard
3. Remove outer bearing and spacer.
4. Remove inner bearing retaining ring and inner bearing.



Rear

Tapered nuts: install with tapered side against wheel

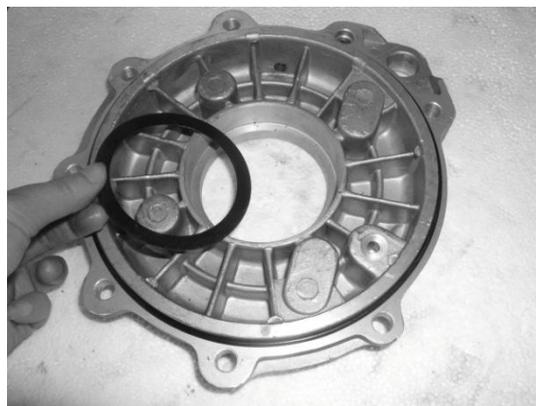


5.13 REAR AXLE BEARING INSTALLATION

1. Clean bearing surface on axle tube and install new bearing (s), retaining ring and seals reversing steps of rear axle bearing removal..
2. Torque brake caliper, rear hub nut, and rear wheel nuts to specifications.

5.14 REAR GEARCASE DISASSEMBLY

1. Drain and properly dispose of used oil.
 2. Remove bolts and output shaft cover.
 3. Remove ring gear assembly from the act put cover.
 4. Remove ring gear bearing shim from the cover and retain for re-assembly.
 5. Remove and discard the output cover seal and O- ring.
 6. Remove input cover and O- ring.
- Remove pinion shaft assembly. Inspect



pinion gear for chipped, broken or missing teeth .Replace assembly if necessary.



5.15 REAR GEARCASE ASSEMBLY

1. Replace all O-rings, seals, and worn components.
2. Press pinion shaft seal into input cover until flush with sealing surface.
3. Inspect pinion shaft bushing.
4. Inspect bearings on rear axle and pinion shafts. To replace, press new bearing on to.

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 side to side .

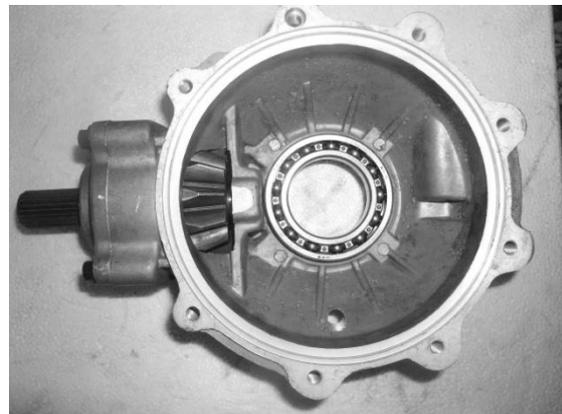
5. Clean pinion shaft and snap ring and apply Loctite™ 242 to threads. Tighten lock nut to specification.
6. Install pinion shaft and input cover plate with new o- ring and torque bolts to 14 ft. lbs.

Cover Bolts Torque
14ft.lbs.(20 Nm)

7. Install ring gear assembly

NOTE

The same shim thickness placed behind ring gear bearing must also be put behind the cover button.

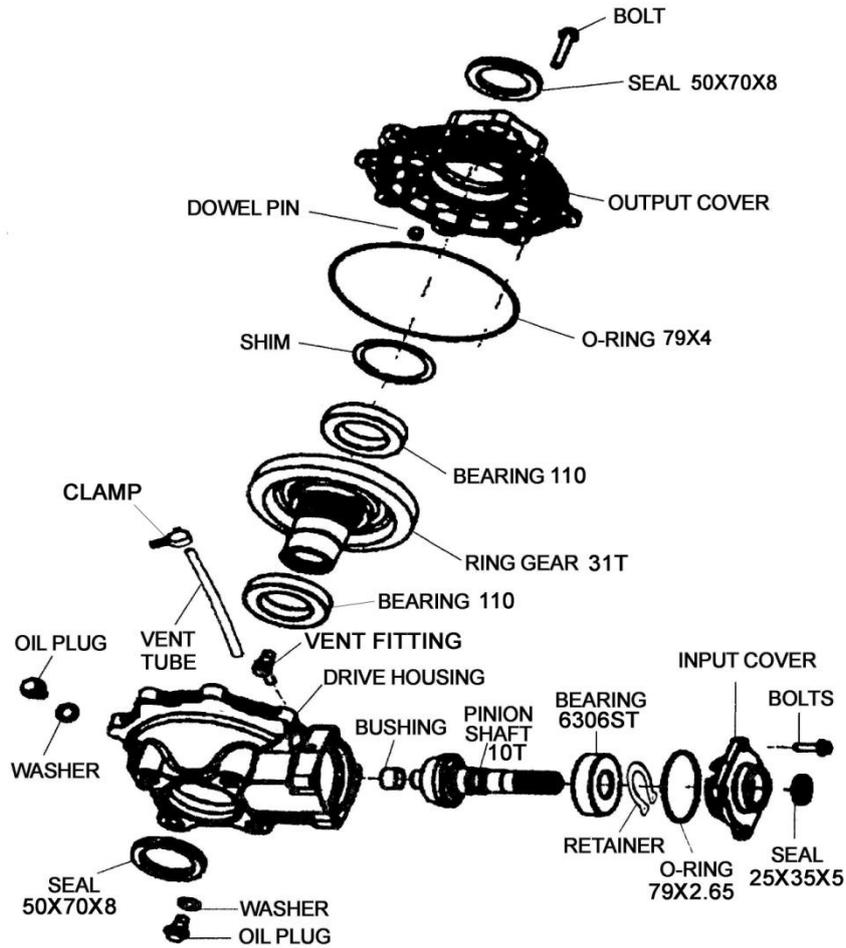


8. Install out put cover with new o- ring and torque bolts to 14 ft. lbs.

Cover Bolts Torque

14ft.lbs.(20Nm)

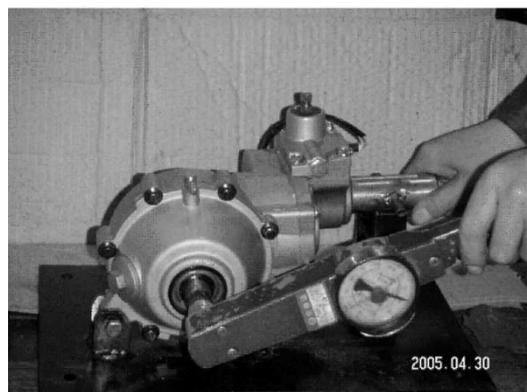
REAR GEARCASE EXPLODED VIEW



5.16 FRONT GEARCASE SLIP LIMIT TORQUE TEST

CAUTION: Slip limit torque relate to the preload on the differential (see 5.20 FRONT DIFFRENTIAL ASSEMBLY), and affect the Steering Effort (heavy steering). Always field test the ATV carefully and thoroughly after front gearcase and differential service for vehicle maneuvers and operation.

Mount the front gear case assembly to Torque Test Jig. The input shaft must be firmly held by the jig, and measure one side output shaft by turning with a torque gauge until another side start to spin counter wise.



**Slip torque: 35---45N.m for Europe
45---55N.m for USA**

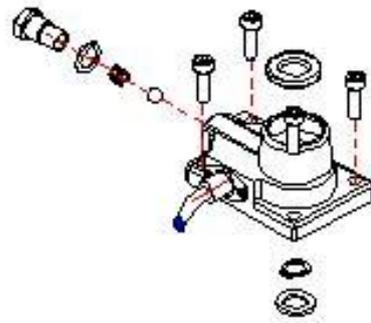
Note: It is recommended to replace the FRONT DIFFRENTIAL as an assembly when out of specification.

5.17 FRONT GEARCASE DISASSEMBLY/ INSPECTION

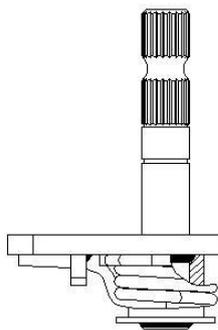
1. Drain and properly dispose of used oil.
2. Remove bolts and selector cover..



3. Remove screws and selector switch from the selector cover.
4. Remove bolt, washer, spring and detent ball from the selector cover.



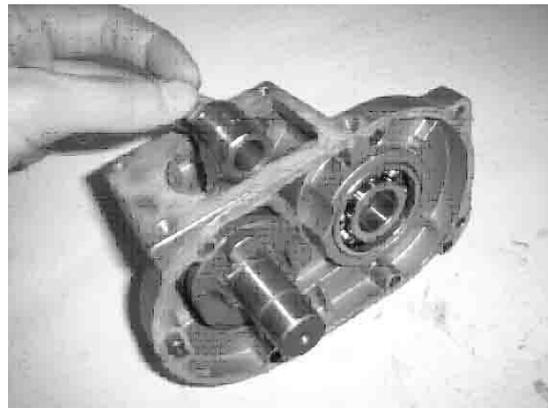
5. Remove seal, washers, circlip and selector shaft assembly from the selector cover.



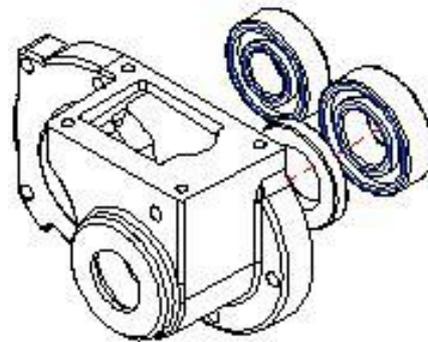
6. Remove bolts and diff case cover.
7. Remove pins, gear and selector rail.



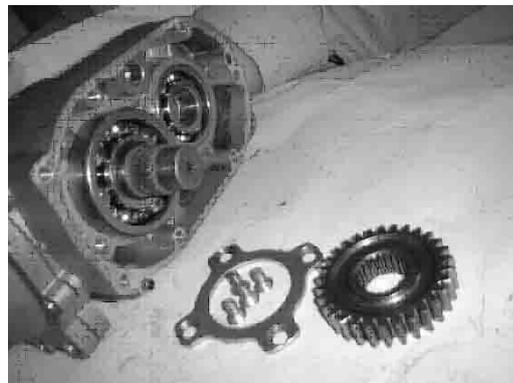
8. Remove selector fork, splined dog and input shaft.



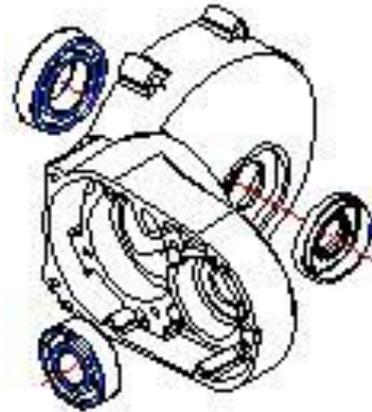
9. Remove bearing and seal.



10. Remove gear, screws, pinion shaft retainer plate and pinion shaft.



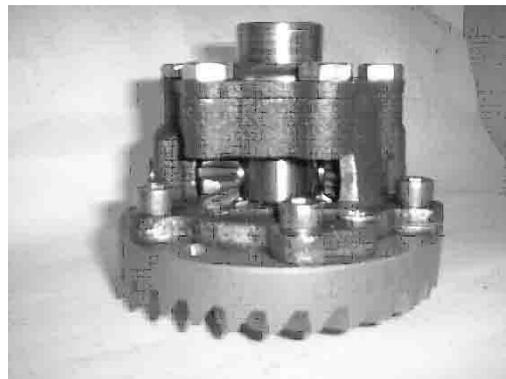
11. Remove seal from the case.



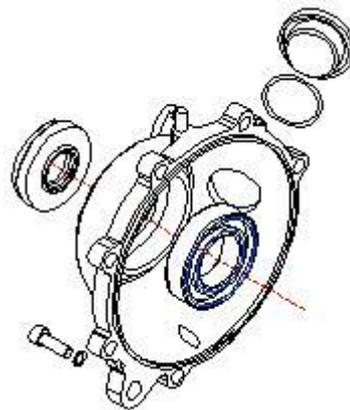
12. Remove bolts, left cover and differential.



Differential →



13. Remove seal from left cover.



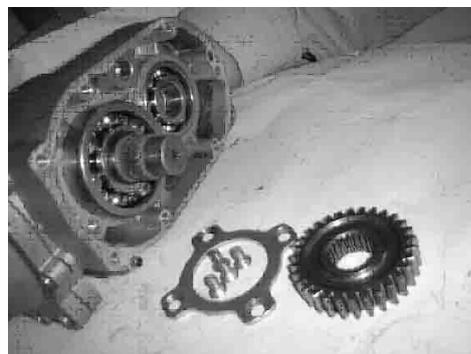
14. Clean all components and inspect for wear. Inspect gears for wear, cracks, chips or broken teeth. Inspect engagement dogs and detent ball housing, replace if edges are rounded. Inspect

casting for crack. Inspect bearings for smooth operation. Check for excessive play between inner and outer race. Inspect detent spring and finger spring for wear, cracks, relaxation. Replace part with any defects.

IMPORTANT: New seals should be installed after the transmission is completely assembled.

5.18 FRONT GEARCASE ASSEMBLY

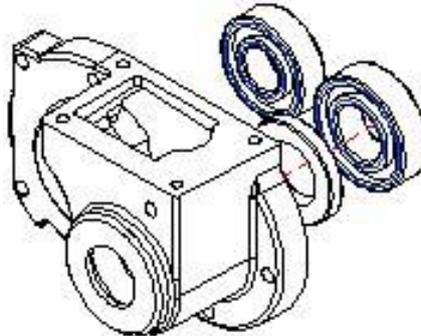
1. Install pinion shaft with bearing.
2. Install retainer plate with flat side toward bearing and torque screws.
Apply Loctite™ 243(Blue) to screw threads and torque screws to 8ft.lbs. (12Nm)



3. Install gear.

4. Install oil seal.

IMPORTANT: New seals should be installed after the transmission is completely assembled.



5. Install input shaft, splined dog, selector fork.
6. Install selector rail, gear and pins.



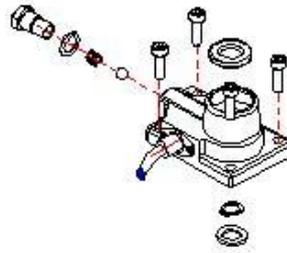
7. Apply LocTite™ 518 to mating surfaces, reinstall cover and torque bolts.
8ft.lbs. (12Nm)



8. Install selector shaft assembly, washers, circlip, and new seal into the selector cover.
9. Install detent ball, spring, washer and bolt.
10. Install selector switch with new O-ring and screws.



11. Apply LocTite™ 518 to mating surfaces, reinstall selector cover and torque bolts.
8ft.lbs. (12Nm)



12. Install differential into case.,
Apply LocTite™ 518 to mating surfaces, reinstall left cover and torque bolts.
14ft.lbs. (20Nm)
13. Install new seals.

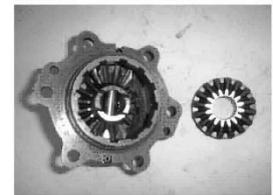


5.19 FRONT DIFFERENTIAL DISASSEMBLY/ INSPECTION

1. Remove bolts and bevel crownwheel.



- 2. Remove bolts and differential cap A.
- 3. Remove spring seat, springs, outer single clutch plate, differential plat, outer double clutch plate, bevel gear and gear axle washer.



4. Remove bolts and differential cap B.



5. Remove spring seat, springs, outer single clutch plate, differential plat, outer double clutch plate, bevel gear and gear axle washer.



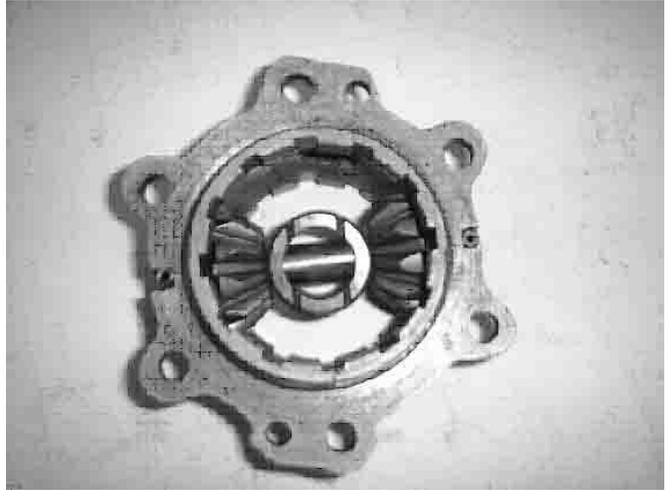
6. Remove roll pin from center pin.
 7. Remove center pin, bevel pinion washers, bevel pinions and center spacer from differential housing.



8 Clean all components and inspect for wear. Inspect gears for wear, cracks, chips or broken teeth. Inspect inner and outer splines on the spider gears and friction plates, replace if edges are rounded. Inspect casting for crack. Inspect axletree for smooth operation, check for excessive play between inner and outer race. Inspect dish spring for wear, cracks, relaxation. Replace part with any defects.

5.20 FRONT DIFFERENTIAL ASSEMBLY

1. Install center pin, bevel pinion washers, bevel pinions and center spacer into differential housing.



2. Install bevel gear, gear axle washer, outer double clutch plate, differential plate, outer single clutch plate, springs, spring seat.



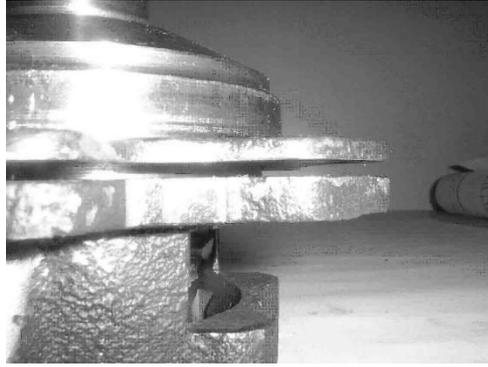
3. Install differential cap A.



4. Check the preload clearance.

Clearance: 1.2—1.5mm

Out of specification → change spring seat, spring, .replace clutch plate as necessary,



5. Install bevel crownwheel, Apply Loctite™ 271 (red) to screw threads and torque bolts to 24ft.lbs. (32Nm)



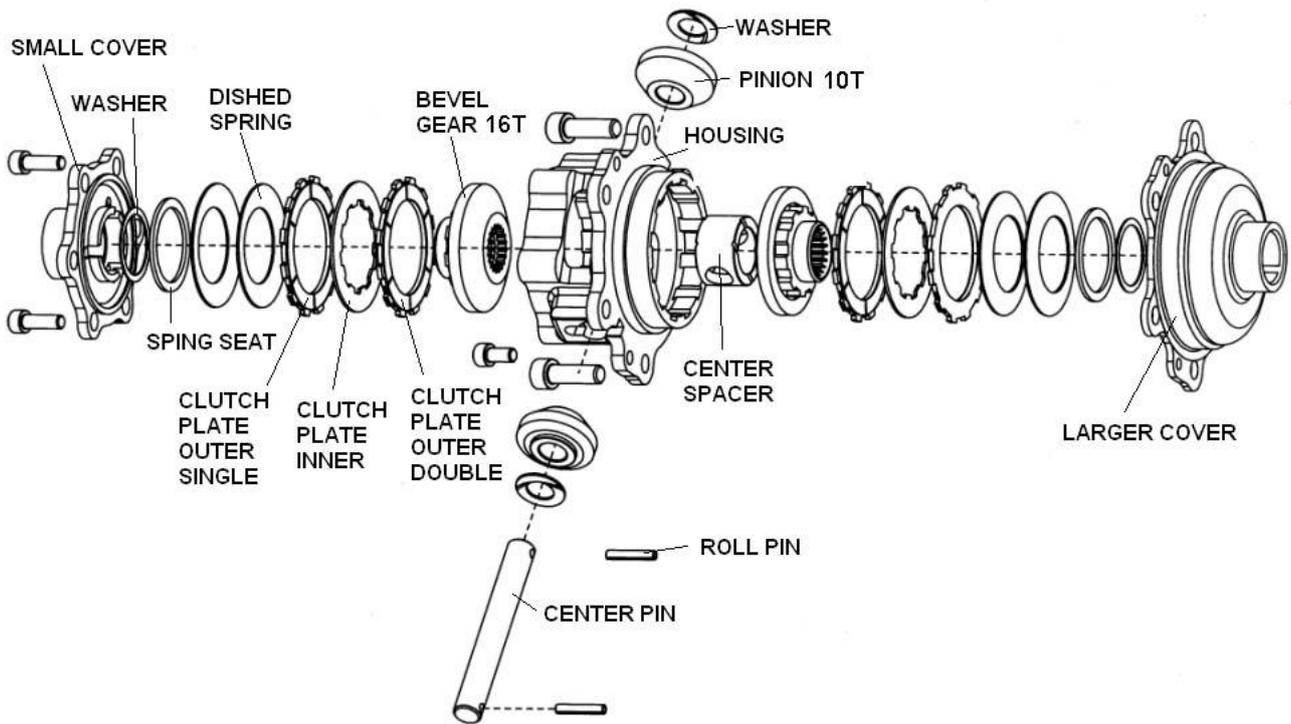
6. Install bevel gear, gear axle washer, outer double clutch plate, differential plate, outer single clutch plate, springs, spring seat.



7. Install differential cap B.



DIFFERENTIAL CENTRE EXPLODED VIEW



5.21 REAR, FRONT PROP SHAFT REMOVAL

Using roll pin remover, remove the roll pin from prop shaft



Slide the prop shaft back and away from the gear case. (The swing arm must be disassembly from the frame before the rear prop shaft removal).

