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Cannondale Motorsports Service Bulletin

IMPORTANT SAFETY INFORMATION

BULLETIN : SB02-004

MODELS : All Cannondale ATVs

ISSUED : 3/19/02

SUBJECT : ATV Maintenance Schedule

CONDITION : This bulletin provides a list of frequently over-looked owner maintenance items and inspection procedures. The items in this bulletin should be inspected carefully each time a vehicle is brought into the dealership for service. We have found that most damage and replacement reports with these items have been due to little or no owner maintenance. A maintenance schedule is included in the 2002 ATV Owner's Manual. The schedule is intended as a guide only. Dealerships are urged to work with owner's to develop individual maintenance programs matching the their riding style and operating conditions.

Competition events, racing, and extreme operating conditions shorten the interval of any maintenance item. Cannondale ATVs are high performance state-of-the-art vehicles manufactured with lightweight components and precision systems.*

1. **Ball joints** - inspect before each race or every 10 hours
2. **Engine Management System (EMS) relay zip tie** - replace if relay is removed
3. **Fuel fitting O-rings** - inspect for swelling, tears, and lubricate with clean engine oil before re-inserting.
4. **Fuel filter** - replace before each race or every 5 hours
5. **Rear brake disc carrier nut** - inspect disc tightness before each ride
6. **Rear sprocket bolts** - inspect/retorque before each race or every 5 hours
7. **Swingarm chain buffer** - inspect before each race or every 10 hours
8. **Swingarm bearings** - inspect before each race or every 10 hours
9. **Tie rod ends** - grease before each race, or every 10 hours and after washing
10. **Wheel bearings** - inspect before each race or every 5 hours
11. **Wheel hub nuts** - retorque before each race or every 10 hours

*Must be inspected regularly and carefully to assure safety and longevity.

Information is subject to change without notice.

SB02-004.fm

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MAINTENANCE SCHEDULE

Perform a Pre-Ride Inspection before every ride and at scheduled maintenance periods.

C: Clean, R: Replace, L: Lubricate, I: Inspect, verify, clean, adjust, lubricate, replace if necessary

NOTE(s)	NOTE	Regular Maintenance Interval (in hours)							
		BREAK-IN (after 1 hr)	5	10	25	50	100	200	
1. Service more frequently if operating in dusty, sandy or snowy areas. 2. Service more frequently if operating in wet or muddy conditions. 3. Replace every 2 years									
ITEMS									
	WARNING LABELS (condition, readable)		EVERY RIDE						
••	FRAME (mainframe, subframe, swingarm)	I			I		I		
•	FUEL SYSTEM (hoses, tank)	I	I						
	FUEL FILTER		R						
•	THROTTLE OPERATION	I	I						
	AIR FILTER	1	C						
	AIRBOX DRAIN TUBE	2		I, C					
	SPARK PLUG			I		R			
•	IDLE SPEED				I	I			
•	VALVE CLEARANCE				I		I		
•	EXHAUST (spark arrester)				C				
	SWITCHES (engine, stop, start, tether, ignition)	1, 2	I		I				
	LIGHTING (headlight, tail light)		I	I	I				
	ENGINE OIL		R		R				
	ENGINE OIL FILTER(s)		C		C				
•	TRANSMISSION OIL		R		R				
	TRANSMISSION OIL FILTER		C		C				
	DRIVE CHAIN (sag, stretch, buffer, guide block, sprockets (condition/tightness), guards)	1,2	I	I	I				
•	BRAKE FLUID	3	I					R	
••	BRAKE SYSTEM (cables, discs, pads, hoses, etc.)	1,2	I		I		I		
•	BRAKE, REAR, DISC CARRIER		I	I	I				
•	CLUTCH (lever, cable and arm position)	3	I	I	I			R	
	CLUTCH HYD OIL		I					R	
	COOLANT (radiator, cap, hoses, level, strength)	3	I		I			R	
•	SUSPENSION (front/rear shocks, condition, setting)		I	I	I		I		
•••	A-ARMS (grease pivot)	1,2	I		I				
•	NUTS, BOLTS AND FASTENERS			I	I		I		
	SEAT (condition, wear, damage)		I						
••	WHEELS/TIRES (pressure, condition, wear)		I		I	I		I	
	SWINGARM (bearings)	1,2	I	I					
	STEERING ASSEMBLY (fasteners, operation)				I				
•••	A-ARM BUSHINGS				I				
•••	STEERING STABILIZER (grease, inspect mounting bolts, arm link bolts)	1,2	I		I				
	BALL JOINT BOOT CONDITION	1,2	I	I					
••	BALL-JOINT CONDITION	1,2			I				
•••	TIE ROD ENDS (grease, inspect movement, studs and locknuts for tightness)	1,2	I	I	I		I		
• Cannondale dealer service suggested. Servicing owners should have the proper tools, service data, and be mechanically qualified. •• Operational safety involved. The service should be performed by a Cannondale dealer. ••• Lithium soap base grease									

BALL JOINTS

WARNING

Perform the following numbered steps 1-3 for each ball joint. A ball joint **MUST** pass all 3 inspections. If it fails any inspection, the ball joint **MUST** be replaced.

Severely worn ball joints can separate resulting a loss of control resulting in a serious accident. You can be severely or killed.

NOTE :

Whenever a replacement joint is required on a side (right or left), we recommend replacing both joints (upper and lower) as a new set.

A special tool is available for replacing ball joints.

TOOL : **Ball joint press**
 P/N 971-6000687

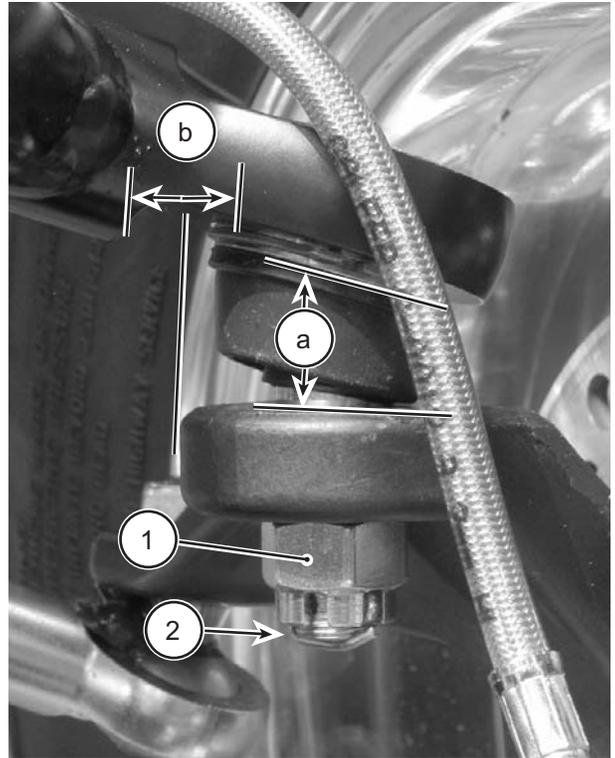
STEP 1: UPPER BALL JOINT AXIAL / LATERAL PLAY INSPECTION

Make sure the stud nut is tightened to the specified torque.

Inspect the cotter pin; replace new if removed, missing, or damaged.

With the wheels on the ground, check the upper ball joint axial play by moving the upper A-arm up and down.

The maximum axial play should be 0.040 in (1.0 mm). If the axial play is of specification, replace the ball joint.



1. Stud Nut (Tightening torque - 35.0 lbf•ft (47.5 N•m))
2. Cotter pin
- a. Upper ball joint maximum axial play (0.040 in (1.0 mm))
- b. Upper ball joint maximum lateral play (0.040 in (1.0 mm))

To check the lateral play, place the vehicle on level ground and point the front wheels straight ahead.

Push and pull the top of the tire to detect lateral play.

The maximum lateral play should be 0.040 in (1.0 mm).

If the lateral play is out of specification, replace the ball joints.

STEP 2: LOWER BALL JOINT AXIAL / LATERAL PLAY INSPECTION

Place a jack stand under the lower A-arm and raise the vehicle so that the front wheel is off the ground.

Make sure the stud nut is tightened to the specified torque.

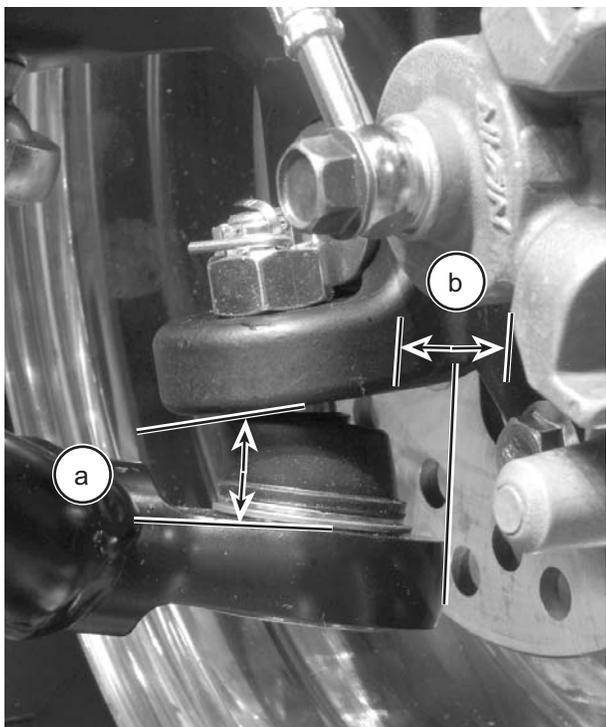
Inspect the cotter pin; replace new if removed, missing, or damaged.

To check the lower ball joint axial play, lift the bottom of the tire.

The maximum axial play should be 0.040 in (1.0 mm). If the axial play is out of specification, replace the ball joint.

To check the lateral play, push and pull the bottom of the tire.

The maximum lateral play should be 0.040 in (1.0 mm). If the lateral play is out of specification, replace the ball joints.



a. Lower joint maximum axial play
b. Lower joint maximum lateral play

STEP 3: BOOT INSPECTION

Carefully inspect each of the ball joint boots for damage (e.g., splitting, cracks, tears). Be sure to examine the entire boot. If the boot is damaged, water, dirt, or other contaminants have entered the ball joint. Replace the ball joint.

CAUTION

Even if the boot is undamaged, water, dirt or other contaminants may have entered the ball joint. An intact boot does not guarantee that the ball joints are still serviceable. Even with an intact boot, you **MUST** perform steps 1 and 2 above.

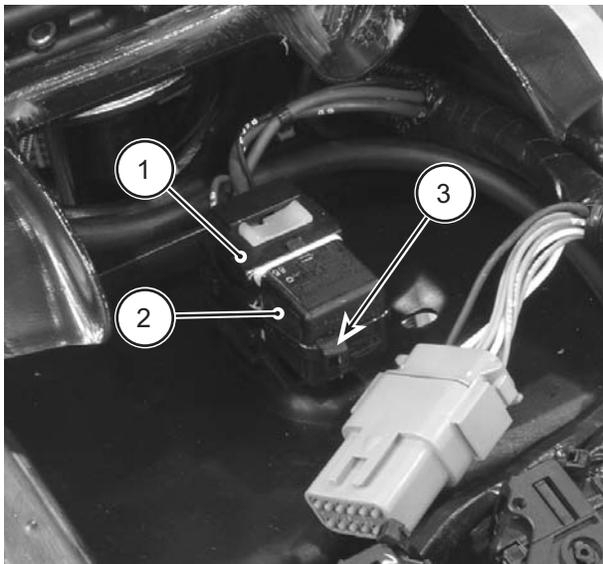
Move the vehicle front suspension up and down and make sure the stud of each joint moves freely. Replace the joint if necessary.



1. Boot

EMS RELAY ZIP TIE

1. Make sure the engine management system power relay is secured to the harness socket with a zip tie. Use a zip tie with a 5 mm wide band. Position the zip tie through the wiring on the bottom of the socket and over the top of the relay. Be sure not to damage or pinch the wiring when securing the tie.



The EMS power relay is located on the electronics tray. The air filter was removed for this photo.

1. Harness socket
2. Relay
3. Zip tie (5 mm band)

FUEL FITTING O-RINGS

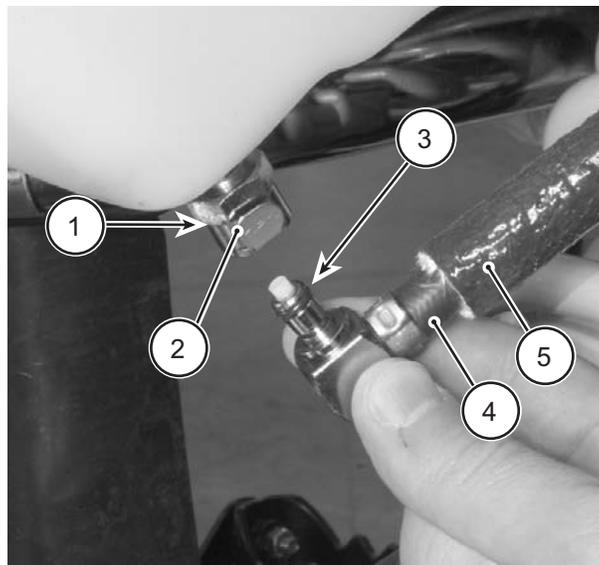
WARNING

Gasoline is highly flammable and explosive. Work in well-ventilated area which is free of sources that could ignite any spilled fuel accidentally (e.g., cigarettes, welders, torches, grinders, electric shop tools, etc.)

1. Anytime the fuel hoses are removed from the return (front of tank) or outlet (rear of tank), be sure to check the condition of the fitting O-rings. Damaged O-rings can leak fuel or restrict or block the flow of fuel causing reduced

performance. Check for signs of swelling, tears, rips, or other damage.

Before re-inserting the hose ends into either fitting, press in the tabs on the quick connects. Apply some clean engine oil to the O-ring and insert it into the fitting until the tab lock ejects. It will click. Make sure the hose is locked into the fitting. Check for fuel leaks. Do not operate the vehicle if gasoline leaks are observed. Take corrective action.



1. Quick connect fitting (tank outlet - rear of tank)
2. Tab
3. Hose fitting O-ring
4. Fuel hose
5. Shielding

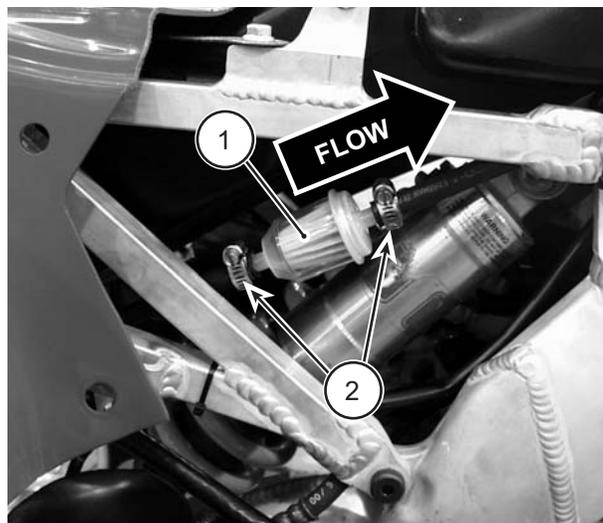
FUEL FILTER REPLACEMENT

1. We recommend replacing the fuel filter every 5 hours of operation. Replacement filters are inexpensive and easily installed.

Use a replacement filter rated 35 microns or damage to the fuel system can occur.

Make sure the engine and exhaust system are completely cool. Remove the fuse, seat, and right side panel. Cradle the fuel filter with the hoses attached in a clean dry shop towel to help absorb any residual fuel that will drain as

the filter is removed. Loosen the fuel hose clamps and remove the fuel filter.



- 1. Inline fuel filter
- 2. Fuel hose clamps

2. Install the specified fuel filter and tighten the hose clamps securely. Be sure to observe any flow indicator marked on the filter body.
3. Reinstall removed components.
4. Follow-up with a visual inspection of the entire fuel system. If any leaks or damage are found, take corrective action.

REAR BRAKE DISC CARRIER NUT

Inspect for play in the rear brake disc carrier before every ride to ensure proper brake function and to protect the rear axle assembly from damage. Inspect for play in the rear brake disc carrier before every ride to ensure proper brake function and to protect the rear axle assembly from damage.

⚠ WARNING

POTENTIAL HAZARDS

- (1) Injury to your hands (burns, cuts)
- (2) Crashing the ATV, losing control

WHAT CAN HAPPEN

(1) Brake discs operate at very high temperatures and remain hot for a period of time after the brakes are released. If you touch them, you can burn yourself. Also, brake discs can develop very sharp edges; they can be sharp enough to cut your hands or skin severely.

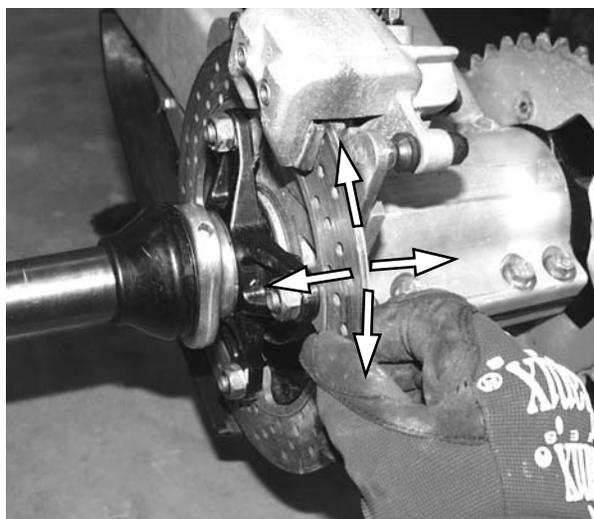
(2) If you operate this ATV with a malfunctioning brake system you can lose the brakes. You can lose control of the vehicle resulting in an accident with severe injury or death.

HOW TO AVOID THE HAZARD

(1) Always allow the brake discs to cool completely before servicing. Wear a protective leather glove when checking the rear brake disc for play.

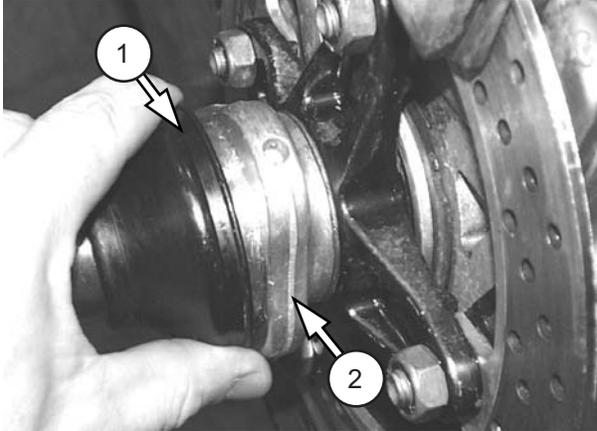
(2) Never ride this ATV with a malfunctioning brake system. Contact an authorized Cannondale motorsports dealer for servicing.

1. Place the vehicle on firm level ground. Make sure the rear brake disc is completely cool and the disc mounting bolts are tightened to the specified torque before continuing. Tighten the brake disc mounting bolts to 25.0 lbf•ft (33.9 N•m).
2. Using a protective leather glove, firmly hold the rear portion of the brake disc and test the disc for any side-to-side or rotational play. Test by trying to move the disc up and down (rotational play) and left and right (side-to-side play). Make sure you are not rotating the wheel when attempting to detect play. There should be no play in the disc. If play is detected, the rear brake disc carrier nut must be tightened.



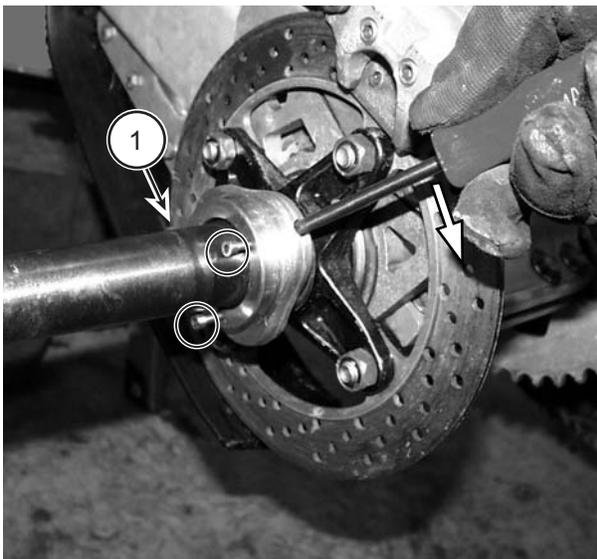
This photo shows how to detect play in the rear brake disc. There should be no play found. If play is found, the brake disc carrier preload nut must be tightened.

- To tighten the nut, place the vehicle on firm level ground and block/chock the wheels so that vehicle is prevented from rolling.
- Remove the protective boot covering the rear brake disc carrier preload nut and slide it back. It helps to use a thin-blade screwdriver to carefully pry the boot edge away from the nut. Rotate the boot as it is removed.



- Protective boot
- Preload nut

- Loosen and back out the allen bolts. It is not necessary to remove them. Using a tool with a shaft diameter closely matching the diameter of the holes in the preload nut, carefully hand tighten the preload nut by rotating the tool handle in the direction indicated (see photo). Use only moderate force when tightening the preload nut. Using greater force on the preload nut (e.g., cheater bars, pipe wrenches, etc.) will not extend the maintenance interval for the brake disc carrier; it will damage the nut and axle assembly.

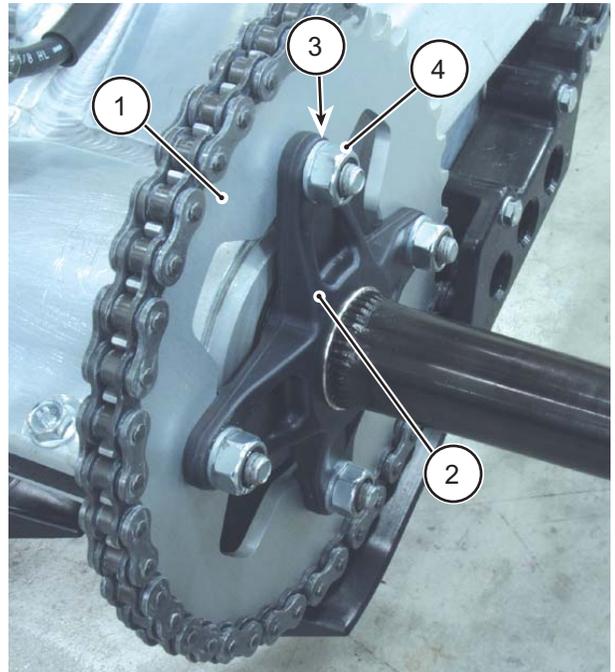


- Allen bolts (2 of 3 visible in photo)

- Tighten the allen bolts uniformly. They should be tightened snug. Do not over-tighten them.
- Reinstall the protective boot and recheck the rear brake disc carrier for play. If play is still present, do not ride the vehicle; the axle, nut, or carrier may be damaged. Inspect the entire assembly and take corrective action.

REAR SPROCKET BOLTS

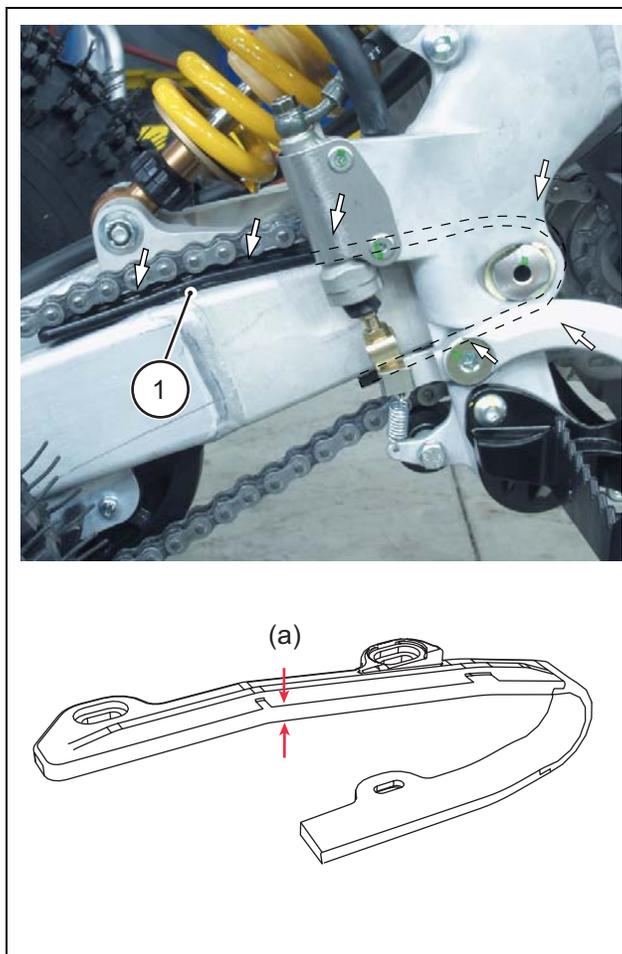
- Tighten the rear sprocket mounting bolts to 35.0 lbf•ft (47.5 N•m).



- Rear sprocket
- Carrier
- Washer
- Nut (Tightening torque - 35.0 lbf•ft (47.5 N•m))

SWINGARM CHAIN BUFFER

1. Lift the chain up off the buffer with your fingers. Inspect the entire length of the swingarm buffer carefully; wear may be distributed unevenly (deep grooves in spots). Be sure to check the area nearest to the countershaft sprocket. Replace the buffer if uneven wear is found.
2. Measure the thickness on both the upper and lower sides of the swingarm and at several points along its entire length. The minimum buffer thickness at any point is 0.118 in (3.0 mm). If the buffer thickness is out of specification, replace it with a new one.



Components have been removed for clarity

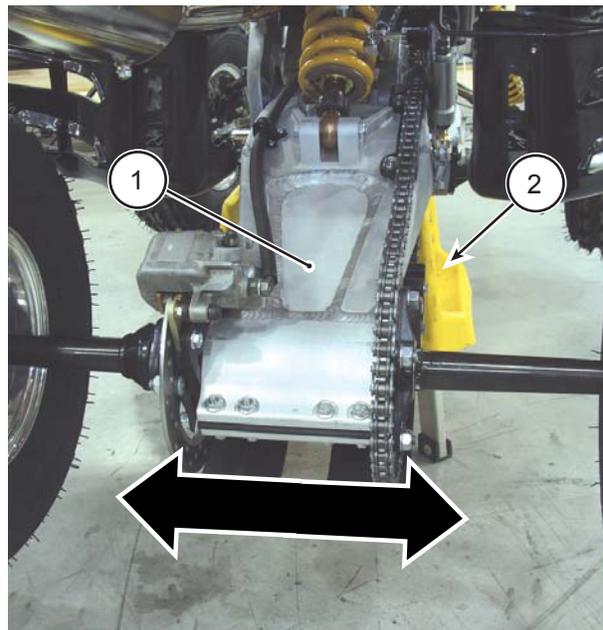
1. Swingarm buffer
2. Thickness - (Minimum = 0.118 in (3.0 mm))

SWINGARM BEARINGS

1. Place a work stand under the frame below the engine so that the swingarm is suspended and

the rear wheels are off the ground.

Hold the rear of the swingarm on both sides and attempt to move it left and right to detect any lateral play. No play should be detected. If play is detected, do not ride the vehicle; replace the swingarm bearings and seals.



Notice the position of the work stand. The rear wheels are off the ground.

1. Swingarm
2. Work stand positioned under main frame (below engine)

TIE ROD ENDS

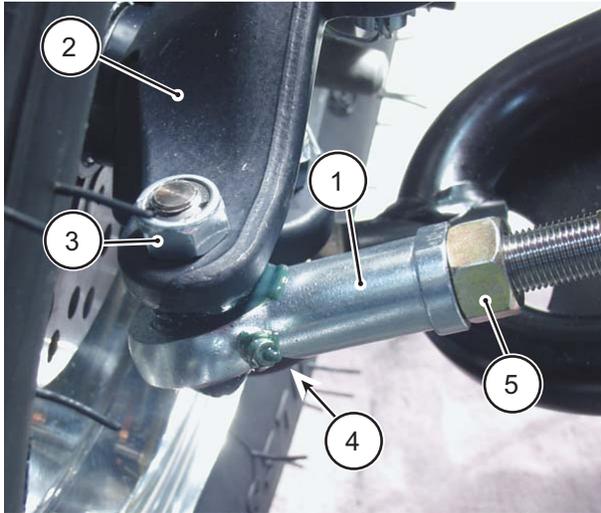
1. Check the inner and outer joints of both sides of the vehicle for excessive wear or damage. Replace any loose or damaged joints as a set and adjust the vehicle toe-in.

Check the orientation and alignment of the joint ends. See "TIE ROD ASSEMBLY" on page 10. Make sure the joint lock nuts are tightened securely.

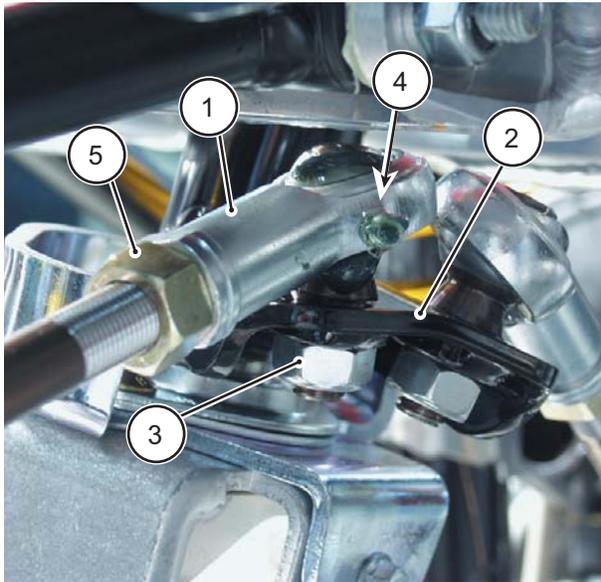
Lubricate the inner and outer tie rod ends. Use a lithium soap-based grease.

NOTE :

Be sure to grease the end joints after washing!

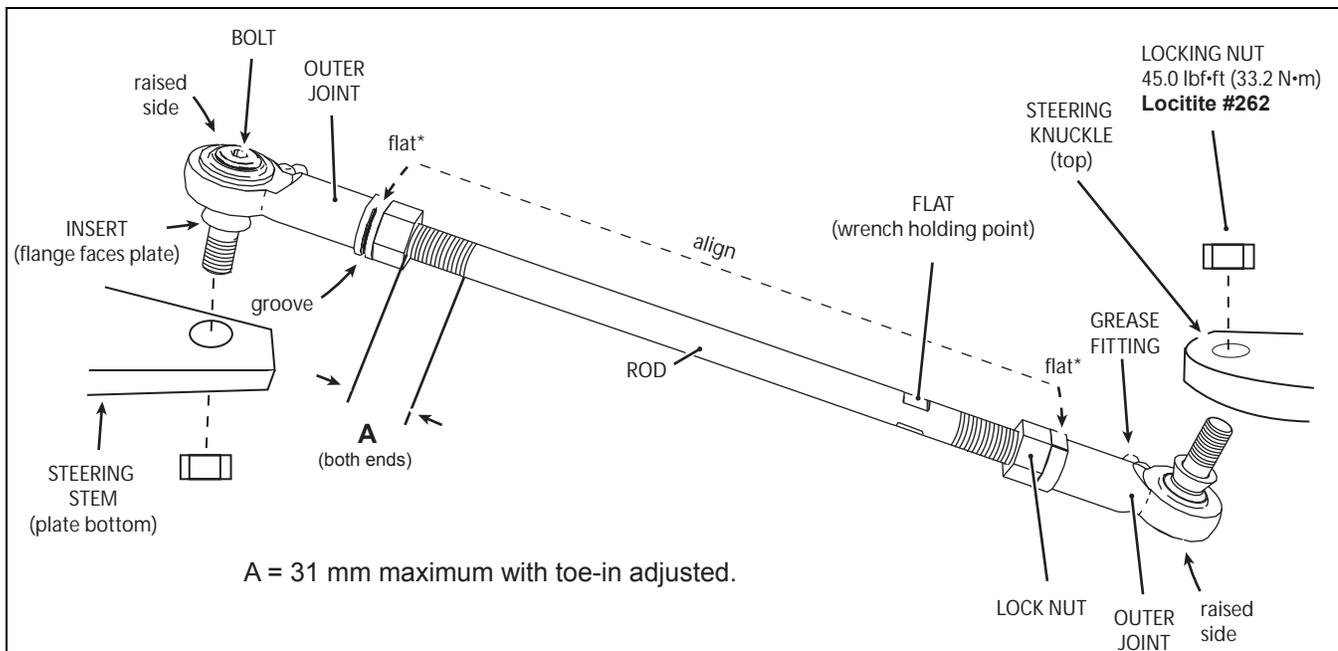


1. Outer joint (left)
2. Steering knuckle (left)
3. Locking nut (Tightening torque - 45.0 lbf•ft (61.0 N•m) - Loctite #262)
4. Grease fitting
5. Lock nut



1. Inner joint (left)
2. Steering stem plate
3. Locking nut (Tightening torque - 45.0 lbf•ft (61.0 N•m) - Loctite #262)
4. Grease fitting
5. Lock nut

TIE ROD ASSEMBLY



* When installing the tie rod assembly or making toe adjustments, be sure to install the joints so that the flat on each joint aligns with the other.

TOE-IN ADJUSTMENT

WARNING

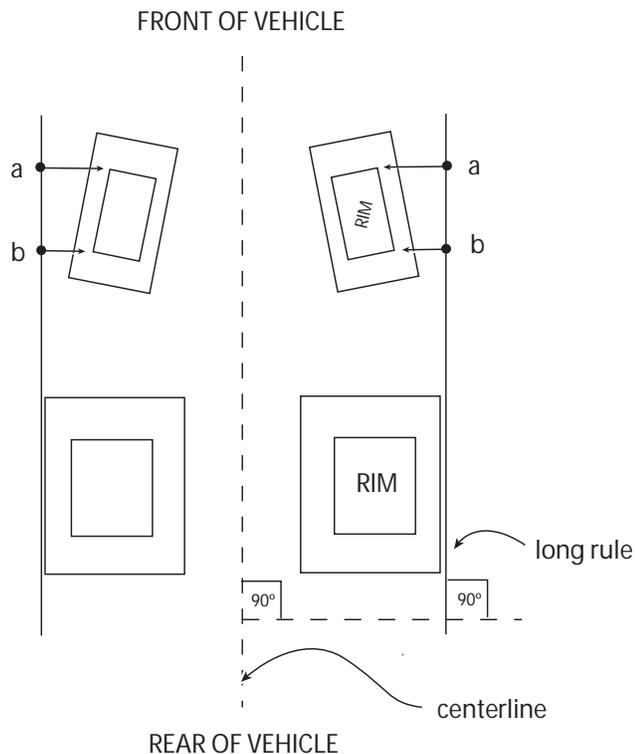
Match toe-in on both the left and right wheels.

Ensure specification A (maximum thread length) does not exceed 31 mm with toe-in adjusted. If A exceeds 31 mm, the rod can separate from the joint end resulting in a loss of vehicle control.

1. Regulate tire pressure and position vehicle on a level surface.
2. Straighten the handlebars and make sure movement is restricted during the measurement or adjustments to the tie-rod ends.
3. Position a long rule on the outside edge of the rear tire so that it aligns with the front wheel. Make sure the long rule is held parallel to the vehicle centerline.
4. Measure the distance from the rule to the rim at point (a). Measure the distance from the rule to the rim at point (b).
5. Calculate the **toe-in for each side** = (a) - (b).

TOE-IN (4.5 ± 0.5mm on each side)

6. To adjust the toe, loosen the inner and outer locking nuts.
7. Using a wrench positioned on the wrench holding point, turn the rod to increase or decrease the toe-in.
8. Tighten the locking nuts securely when completed.



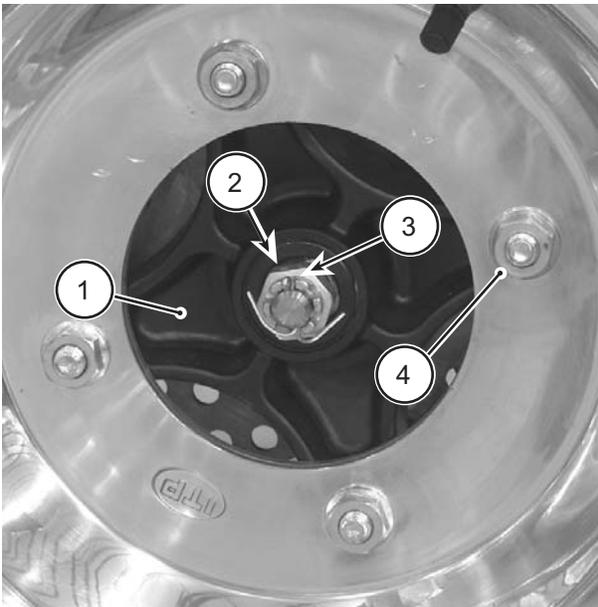
WHEEL HUB NUTS

⚠ WARNING

Always use new cotter pins. Replace damaged ones.

Once the specified torque is reached, tighten the nut until the grooves align with the cotter pin hole; do not loosen the nut to install a cotter pin.

1. To tighten the front wheel hub (axle) nut, remove the cotter pin and discard it. Remove the hub nut and apply grease to the hub nut threads. Reinstall the nut and tighten to the specified torque. Install a new cotter pin and bend the leg as indicated (see photo).

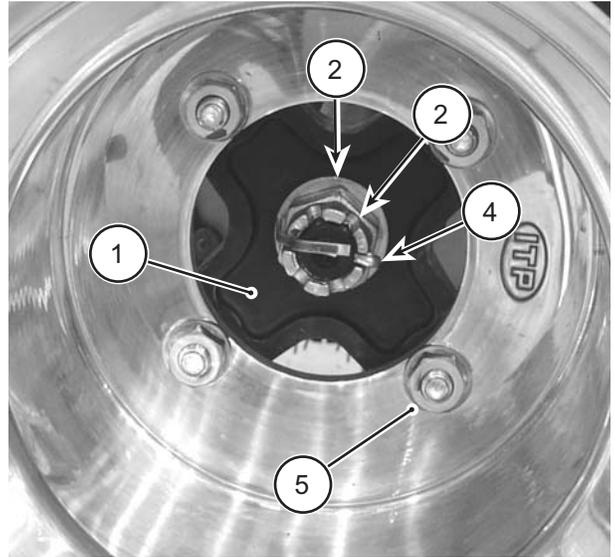


1. Front wheel hub
2. Hub (axle) nut (Tightening torque - 35.0 lbf•ft 47.5 N•m)
3. Cotter pin
4. Wheel "lug" nut (4) (Tightening torque - 35.0 lbf•ft (47.5 N•m))

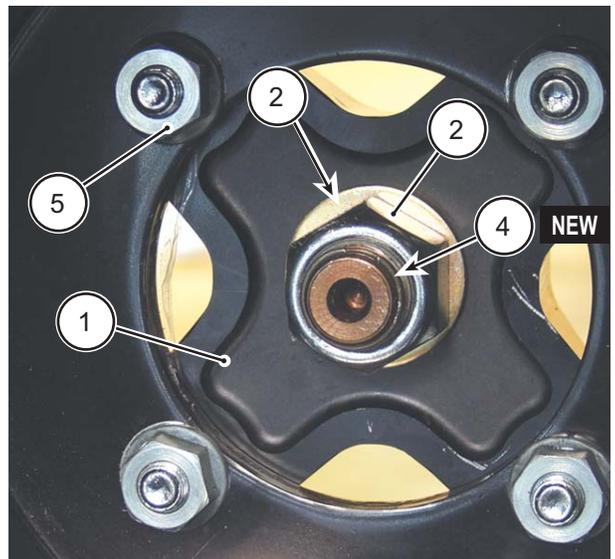
⚠ WARNING

Ring clips can strike your eye unexpectedly. Wear safety glasses!

1. To tighten the rear wheel hub nuts, apply grease to the hub nut threads and seating surface (against large washer). Tighten the hub nut to the specified torque. Further tighten it until the grooves align with the cotter pin hole. Install a new cotter pin and bend the pin legs as indicated (see photo).



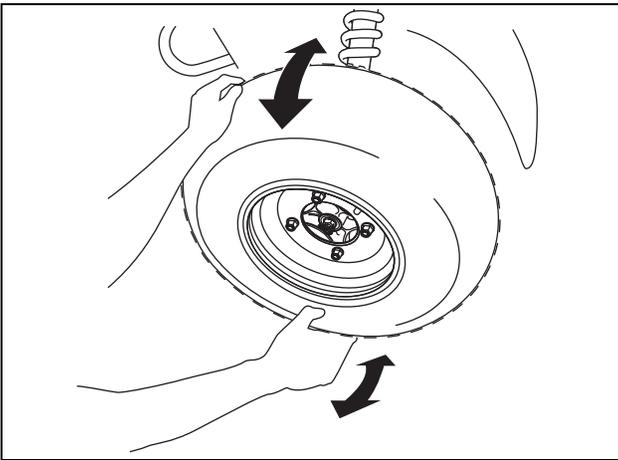
1. Rear wheel hub (Castellated nut)
2. Hub nut (Tightening torque - 125.0 lbf•ft 169.5 N•m)
3. Washer
4. Cotter pin
5. Wheel "lug" nut (4) (Tightening torque - 35.0 lbf•ft (47.5 N•m))



1. Rear wheel hub Moto 440 (Nylon lock nut)
2. Washer
3. Hub nut (Tightening torque - 125.0 lbf•ft 169.5 N•m)
Re-use limit = 3 times
4. Ring clip - install new
5. Wheel "lug" nut (4) (Tightening torque - 35.0 lbf•ft (47.5 N•m))

WHEEL BEARINGS

1. To check the condition of the front wheel bearings, raise the front of the vehicle and place a stable support under the vehicle frame so that no weight is on the front wheels.
2. Hold the top and bottom of the tire with your hands and attempt to detect any play by pushing in and pulling out the wheel. If excessive lateral play is detected, don't ride the vehicle. Remove the wheel hub and inspect the wheel bearings.



3. With the hub removed, turn the inner race of each bearing with your finger; the bearings should rotate smoothly and quietly. Also make sure the outer race fits tightly in the hub. If the bearings do not turn smoothly and quietly or the bearings do not fit tightly in the hub, replace the bearings. Replace bearings as a set.

NOTE :

If you detect excessive play during the wheel inspection, other suspension and steering system damage may be present (e.g., damaged or worn A-arm bushings, damaged or worn ball joints, incorrectly adjusted or loose tie rod ends, or other damage).
