

2007 NEW COBRA 50 SERVICE MANUAL

FOREWORD

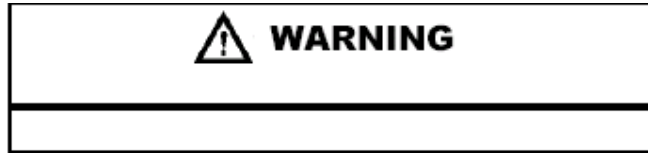
This service manual is designed primarily for use by certified Aeon Master Service Dealer technicians in a properly equipped shop and should be kept available for reference. All references to left and right side of the vehicle are from the operator's perspective when seated in a normal riding position.

Some procedures outlined in this manual require a sound knowledge of mechanical theory, tool use, and shop procedures in order to perform the work safely and correctly. Technicians should read the text and be familiar with service procedures before starting the work. Certain procedures require the use of special tools. Use only the proper tools as specified.



UNDERSTANDING MANUAL SAFETY LABELS AND DIRECTIONS

Throughout this manual, important information is brought to your attention by the following symbols:



SAFETY ALERT WARNING indicates a potential hazard that may result in severe injury or death to the operator, bystander or person(s) inspecting or servicing the vehicle.



SAFETY ALERT CAUTION indicates a potential hazard that may result in minor personal injury or damage to the vehicle.



CAUTION indicates special precautions that must be taken to avoid vehicle damage or property damage.

NOTE:

NOTE provides key information by clarifying instructions.

IMPORTANT:

IMPORTANT provides key reminders during disassembly, assembly and inspection of components.

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CHAPTER 1

GENERAL INFORMATION

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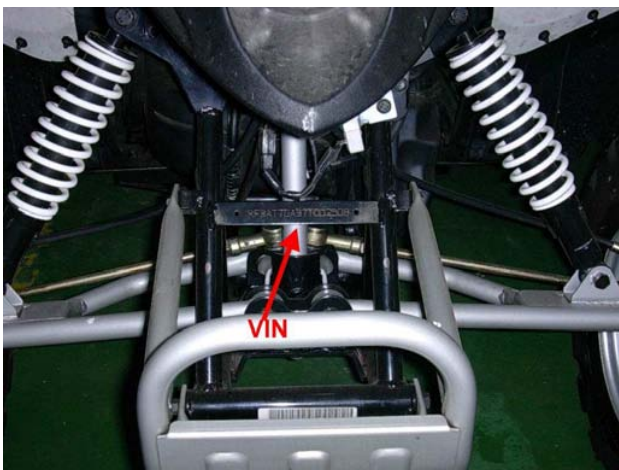
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MODEL INFORMATION

VIN Identification

Engine Serial Number Location

Whenever corresponding about an engine, be sure to refer to the engine serial number. This information can be found stamped on the top LH side of the crankcase as shown below.



Vehicle Identification Number Location

The vehicle identification number (VIN) and engine serial number are important for identification purposes. See the illustrations

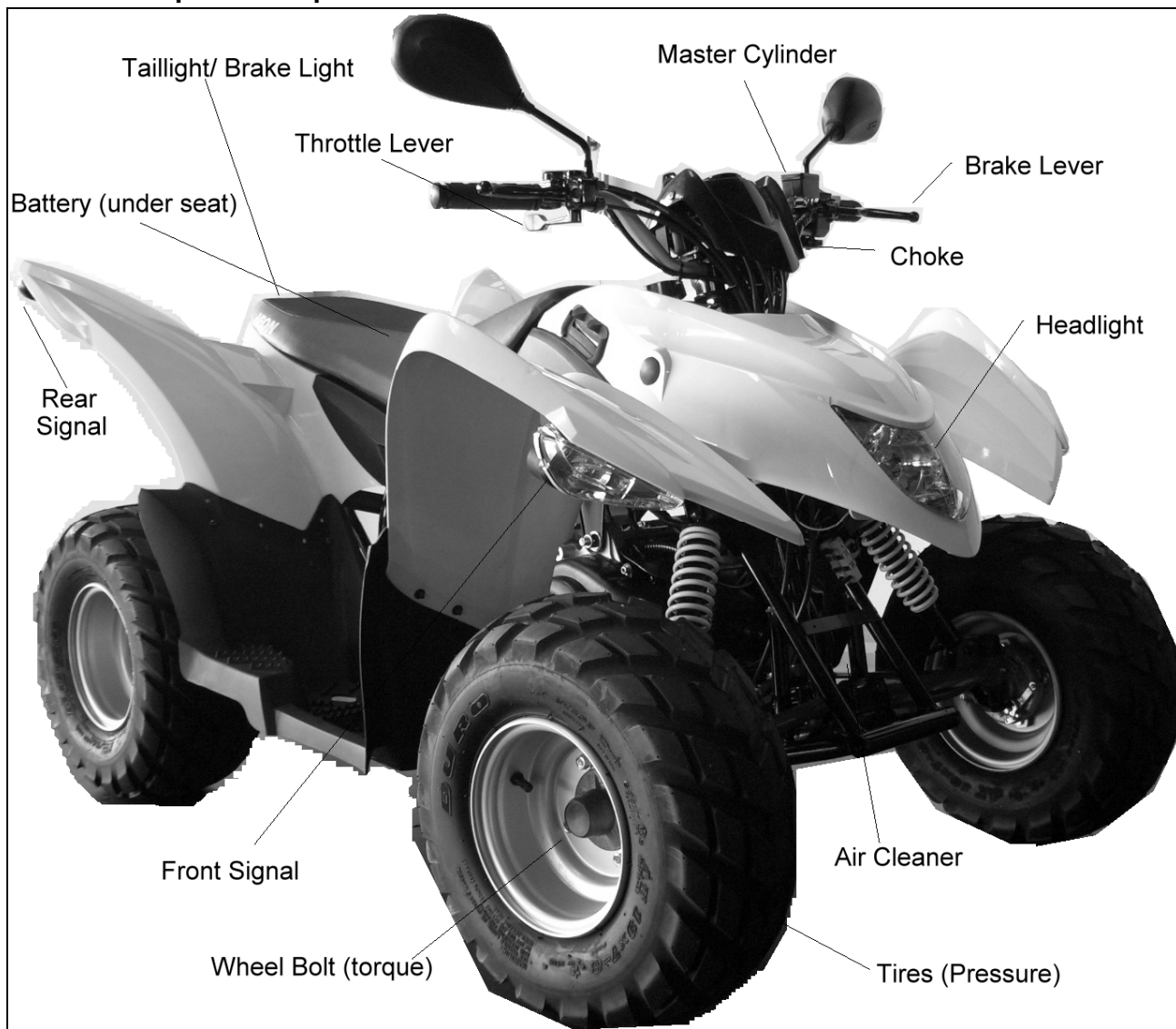


GENERAL SPECIFICATIONS

DESCRIPTION		COBRA 50
ENGINE TYPE		2-Stroke, Horizontal
DISPLACEMENT		49.3 cc
BORE STROKE		40*39.2
COMPRESSION RATIO		7.6:1
MAX. TORQUE		3.73 N-m/ 5724 rpm
STARTING		Electric/ Kicker
LUBRICATION / OIL CAPACITY		Oil Injection / 1 Liter
TRANSMISSION		Automatic (C.V.T system)
TIRE	FRONT	19*7-8
	REAR	18*9.5-8
OVERALL DIMENSION		1676*961.5*1007 mm
GROUND CLEARANCE		112 mm
SUSPENSION	FRONT	Duo- shocks with single A-arm
	REAR	Swing arm with Single shock
BRAKE	FRONT	Drum
	REAR	Disc
WHEELBASE		1051 mm
SEAT HEIGHT		800 mm
DRY WEIGHT		129 kg
MAX. LOAD		140 kg
FUEL		Unleaded Gasoline
FUEL CAPABILITY		5 Liter

GENERAL INFORMATION

Vehicle Component Inspection Location



CHAPTER 2

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PERIODIC MAINTENANCE CHART

Periodic Maintenance Overview

Careful periodic maintenance will help keep your vehicle in the safest, most reliable condition. Inspection, adjustment and lubrication of important components are explained in the periodic maintenance chart.

Inspect, clean, lubricate, adjust and replace parts as necessary. When inspection reveals the need for replacement parts, use genuine Polaris parts available from your dealer.

NOTE: Service and adjustments are critical. If you're not familiar with safe service and adjustment procedures, have qualified dealer perform these operations.

Maintenance intervals in the following chart are based upon average riding conditions and an average vehicle speed of approximately 10 miles per hour. Vehicles subjected to severe use must be inspected and serviced more frequently.

Severe Use Definition

- Frequent immersion in mud, water or sand
- Racing or race-style high RPM use
- Prolonged low speed, heavy load operation
- Extended idle
- Short trip cold weather operation

Pay special attention to the oil level. A rise in oil level during cold weather can indicate contaminants collecting in oil sump or crankcase. Change oil immediately if the oil level begins to rise. Monitor the oil level, and if it continues rise, discontinue use and determine the cause or see your dealer.

Maintenance Chart Key

The following symbols denote potential items to be aware of during maintenance:

■ = CAUTION: Due to the nature of these adjustments, it is recommended this service be performed by authorized Polaris dealer.

◆ = SEVERE USE ITEM -- See Above

NOTE: Inspection may reveal the need for replacement parts. Always use genuine Aeon parts.

WARNING

Improperly performing the procedures marked with a ■ could result in component failure and lead to serious injury or death. Have an authorized Polaris dealer perform these services.

MAINTENANCE

Pre-Ride - 40 Hour Maintenance Interval

Periodic Maintenance Chart

ITEM		Maintenance Interval (whichever comes first)			Remarks
		Hours	Calendar	KM	
■	Steering	-	Pre-Ride	-	Check for free operation
◆	Front- Suspension	-	Pre-Ride	-	Make adjustments as needed.
◆	Rear- Suspension	-	Pre-Ride	-	Make adjustments as needed.
	Tire	-	Pre-Ride	-	Make adjustments as needed.
◆	Brake lever travel	-	Pre-Ride	-	Make adjustments as needed.
	Brake system	-	Pre-Ride	-	Check Operation
	Drive chain	-	Pre-Ride	-	Check condition and slack; refer to "drive chain adjustment"
	Brake light	-	Pre-Ride	-	Check for proper operation.
	Throttle	-	Pre-Ride	-	Check Operation
	Wheels/ Fasteners	-	Pre-Ride	-	Make adjustments as needed.
	Frame fasteners	-	Pre-Ride	-	Make adjustments as needed.
◆	Engine oil lever		Pre-Ride		Make adjustments as needed.
	Air filter		Pre-Ride		Inspect; clean often, replace as needed.
◆	Air box sediment tube		Daily		Drain deposits when visible.
	Head lamp/ tail lamp		Daily		Check operation; apply dielectric grease if replacing.
	CVT housing		Weekly		Drain water as needed, check often if operating in wet conditions.
■	Brake lever travel	10H	Monthly	150	Inspect regularly.
◆	Brake freeplay	10H	Monthly	150	Inspect regularly.
■	Spark plug	10H	Monthly	150	Clean; check condition; adjust gap; replace as needed.
	Idle speed	10H	Monthly	150	Check; adjust as needed.
■	Choke	10H	Monthly	150	Check for proper operation.
	Battery	20H	Monthly	300	Check terminals; clean; test.
◆	Transmission oil change	40H	12M	650	Inspect level; change yearly; perform break-in oil change after the first 10 hours of operation.
◆	Oil pre-filter screen	40H	12M	650	Clean filter at every oil change; clean annually if ATV is operated less than 10 hours.

■ Perform these procedures more often for vehicles subjected to severe use.

◆ Have an authorized Polaris dealer perform these services.

MAINTENANCE

50 - 300 Hour Maintenance Interval

Periodic Maintenance Chart

ITEM	Maintenance Interval (whichever comes first)			Remarks
	Hours	Calendar	KM	
◆ General lubrication	50H	3M	800	Lubricate all grease fittings, pivots, & cables.
■ Carburetor float bowl	50H	6M	800	Drain bowl periodically and prior to storage.
■ Throttle cable	50H	6M	800	Inspect; adjust; lubricate; replace if necessary.
■ Choke cable	50H	6M	800	Inspect; adjust; lubricate; replace if necessary.
◆ Carburetor intake flange	50H	6M	800	Inspect for proper sealing / air leaks.
■ Brake shoe wear	50H	6M	800	Inspect; replace as needed.
■ Drive belt	50H	6M	800	Inspect; replace as needed.
■ Fuel system	100H	12M	1500	Check for leaks at tank cap, lines, fuel valve, filter, carburetor, replace lines every two years.
■ Fuel filter	100H	12M	1500	Replace yearly.
◆ Engine mounts	100H	12M	1500	Inspect.
◆ Exhaust muffler/ pipe	100H	12M	1500	Inspect.
■ Ignition timing	100H	12M	1500	Inspect.
◆ Wring	100H	12M	1500	Inspect for wear, routing, security; apply dielectric grease to connectors subjected to water, mud, etc.
■ Clutch (drive & driven)	100H	12M	1500	Inspect; clean; replace worn parts.
■ Front wheel bearings	100H	12M	1500	Inspect; replace as needed.
■ Toe adjustment	-	-	-	Inspect periodically; adjust when parts are replaced.

■ Perform these procedures more often for vehicles subjected to severe use.

◆ Have an authorized Aeon dealer perform these services.

MAINTENANCE

Frame, Nuts, Bolts and Fastener Inspection

Periodically inspect the torque of all fasteners in accordance with the maintenance schedule. Check that all cotter pins are in place. Refer to specific fastener torques listed in each chapter.

Standard Torque Specifications

The following torque specifications are to be used as a general guideline. There are exceptions in the steering, suspension, and engine areas. Always consult the exploded views in each manual section when available for torque values of fasteners before using standard torque.

Standard Fastener Torques

Thread Size	TORQUE (ft. lbs. / in. lbs.)	TORQUE (Nm)
5 mm bolts and nuts	39-52 in. lbs.	4.5-6 Nm
6 mm bolt and nuts	69-104 in. lbs.	8-12 Nm
8 mm bolts and nuts	13-18 ft. lbs.	18-25 Nm
10 mm bolts and nuts	22-29 ft. lbs.	30-40 Nm
12 mm bolts and nuts	36-43 ft. lbs.	50-60 Nm
4 mm screws	22-30 in. lbs.	2.5-3.4 Nm
5 mm screws	30-43 in. lbs.	3.5-5 Nm
6 mm Hex bolts	87-121 in. lbs.	10-14 Nm
8 mm Hex bolts	17-22 ft. lbs.	24-30 Nm
10 mm Hex bolts	25-32 ft. lbs.	35-45 Nm

Kick-Start Lever and Operation

If the battery becomes too weak to start the engine, use the kick start lever to start the engine until the battery is serviced.

1. Position the vehicle on a level surface.
2. Shift the transmission into neutral (if equipped).
3. Lock the parking brake.
4. Push the engine stop switch up to the RUN position.
5. Turn the key ON.
6. Fold out the kick start lever and place your foot on the lever. Thrust your heel downward to crank the engine.
7. After the engine has started, fold the kick-start lever into place.



2.6

MAINTENANCE

FUEL SYSTEM AND AIR INTAKE

Fuel System Safety



WARNING

Gasoline is extremely flammable and explosive under certain conditions.

WARNING

Always stop the engine and refuel outdoors or in a well ventilated area.

Do not smoke or allow open flames or sparks in or near the area where refueling is performed or where gasoline is stored.

Do not overfill the tank.
Fill the tank to the bottom of the filler neck.
This will allow for thermal expansion.

If you get gasoline in your eyes or swallow gasoline, see your doctor immediately.

If you spill gasoline on your skin or clothing, immediately wash it off with soap and water and change clothing.

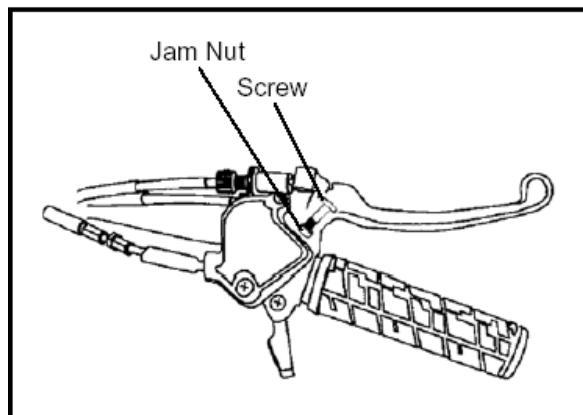
Never start the engine or run it in an enclosed area. Gasoline powered engine exhaust fumes are poisonous and can cause loss of consciousness and death in a short time.

Throttle Stop Speed Control System

Use the following procedure to control how far the throttle opens.

IMPORTANT: This procedure should be performed by *consumers only* when they determine that their child is capable of handling the additional speed.

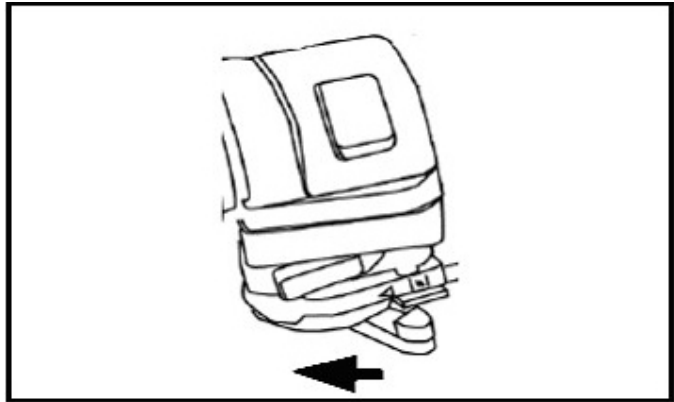
1. Loosen the jam nut.
2. Turn the screw inward to reduce speed or outward to increase speed.
3. Tighten the jam nut after adjusting.



MAINTENANCE

Choke Cable Adjustment

Verify free play of **1.6-4.76 mm (1/16-3/16")** and smooth operation of choke cable.



Adjustments to the freeplay can be made by loosening the choke cable adjustment in or out to gain the desired freeplay.

If smooth choke operation is not obtainable, inspect choke cable for kinks or sharp bends in routing.



Idle Speed Adjustment

1. Start engine and warm it up thoroughly.
2. Adjust idle speed by turning the slide adjustment screw in (clockwise) to increase or out (counterclockwise) to decrease RPM. (Refer to illustration).

Idle Speed

1500 ± 100



Fuel Lines

1. Check fuel lines for signs of wear, deterioration, damage, or leakage. Replace if necessary.
2. Be sure fuel lines are routed properly and secured with cable ties.
3. Replace all fuel lines every two years.

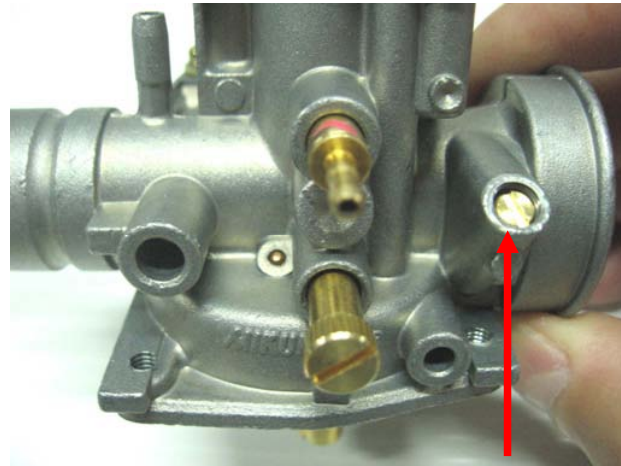
CAUTION

Make sure all fuel lines and vent lines are not kinked or pinched.

MAINTENANCE

Air Screw Adjustment

1. Set idle speed to specification. Always check throttle cable freeplay after adjusting idle speed and adjust if necessary.
2. To adjust the mixture screw setting, you will need to use the Adjustment Screwdriver. Slowly turn the mixture screw clockwise until engine idle RPM begins to decrease. Stop turning at this point.
3. Slowly turn mixture screw counterclockwise until idle speed returns to maximum RPM. Continue turning counterclockwise until idle RPM begins to drop. Stop turning at this point.
4. Center the mixture screw between points in Step 2 and 3.
5. Readjust idle speed if not within specification.



Air Screw

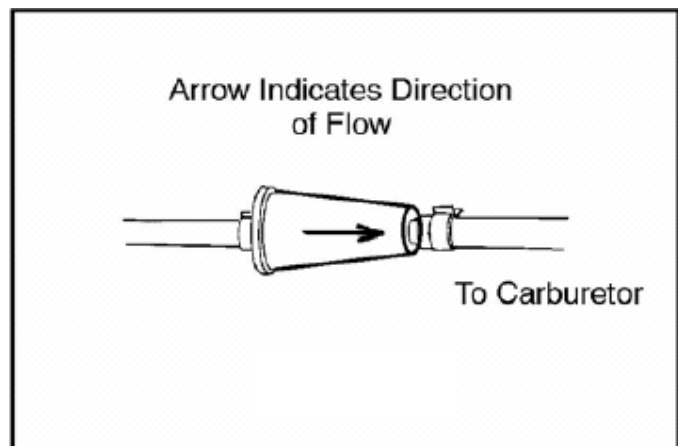
Fuel Filter

The fuel filter should be replaced in accordance with the "Periodic Maintenance Chart" or whenever sediment is visible in the filter.

Fuel Filter Location - Located in-line between fuel valve and carburetor inlet.

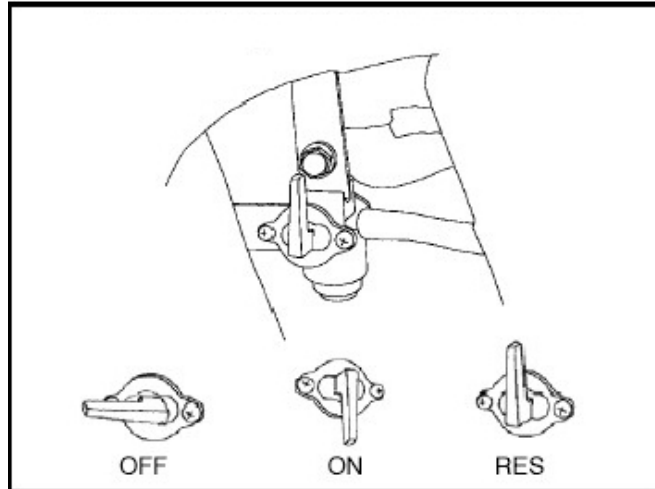
To service the fuel filter:

1. Shut off fuel supply at fuel valve.
2. Remove line clamps at both ends of the filter.
3. Remove fuel lines from filter.
4. Install new filter and clamps onto fuel lines.
5. Turn fuel valve to 'ON'.
6. Start engine and inspect for leaks.



MAINTENANCE

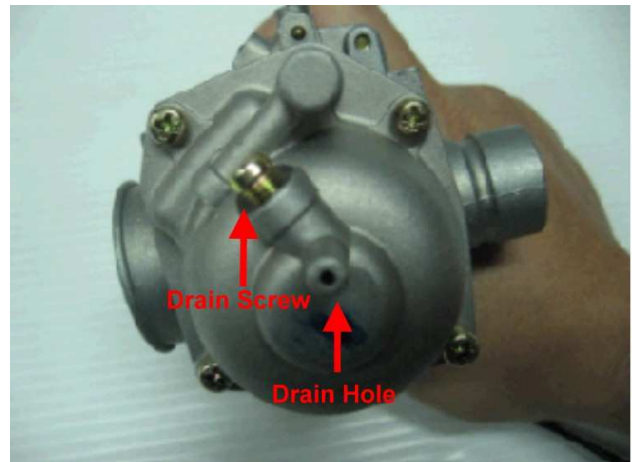
Fuel Valve Location



Carburetor Draining

The carburetor float bowl should be drained periodically to remove accumulated moisture or sediment from the bowl, or before extended periods of storage.

1. Turn fuel valve to the 'OFF' position.
2. Place a container beneath the bowl drain hose.
3. Loosen drain screw and allow fuel in the float bowl and fuel line to drain completely.
4. Inspect the drained fuel for water or sediment.
5. Tighten drain screw.
6. Turn fuel valve to "ON".
7. Check for fuel leaks.
8. Start engine and re-check for leaks.



MAINTENANCE

Air Filter Service

1. Release the screw and remove the cover.
2. Remove the foam air filter. Wash the foam filter in warm soapy water, then rinse and let it dry. If the filter is damaged, install a new foam filter.
3. Apply a commercially available foam filter oil to the foam filter.
4. Reinstall the screen, foam filter and air box cover. Secure the clips.
5. The inlet pipe must toward rear of vehicle.



MAINTENANCE

ENGINE

Transmission Oil Level

Maintain the oil level within the safe range on the filler plug.
Do not overfill.

To check the oil level:

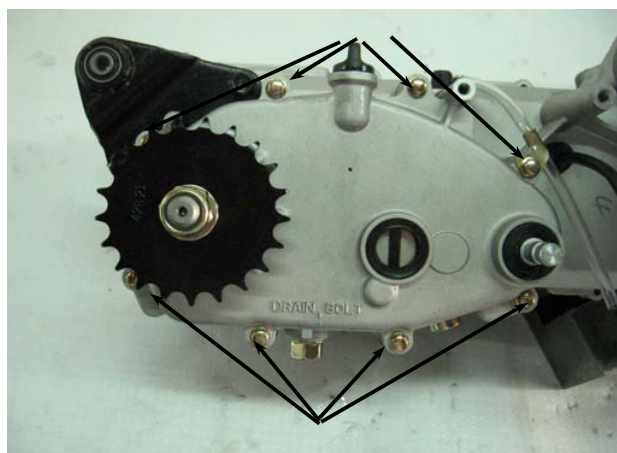
1. Position the vehicle on a level surface.
2. Remove the filler plug.
3. Check oil level by glass window.

NOTE: Rising oil level between checks in cool weather driving, can indicate moisture collecting in the oil reservoir. If the oil level is over the full mark, change the oil.

4. Add the recommended oil as needed.

NOTE: Do not fill over the normal oil operating range. Filling over the normal operating range could cause a mist of oil to enter the air box.

5. Reinstall the filler plug.



Transmission Oil Change

1. Position the vehicle on a level surface.
2. Clean area around the drain plug.
3. Run engine two to three minutes until warm.
4. Stop the engine.

CAUTION

Hot oil can cause serious burns to skin. Do not allow hot oil to come in contact with skin.

5. Place a drain pan beneath the mission case.
6. Remove the drain plug. Allow the oil to drain completely.
7. Inspect the O-ring on drain plug, replace if needed.

NOTE: The sealing surfaces on the drain plug and crankcase should be clean and free of burrs, nicks or scratches.

11. Remove the dipstick. Add 30 oz. (900 ml) of recommended oil. Do not overfill.
12. Reinstall the filler plug.
13. Start the engine. Allow it to idle for one to two minutes.

14. Stop the engine and inspect for leaks.

15. Check the oil level. Add oil as needed to bring the level to the upper mark on the window.

MAINTENANCE

Engine Mounts

Inspect engine mounts for cracks or damage.

Engine Fastener Torque

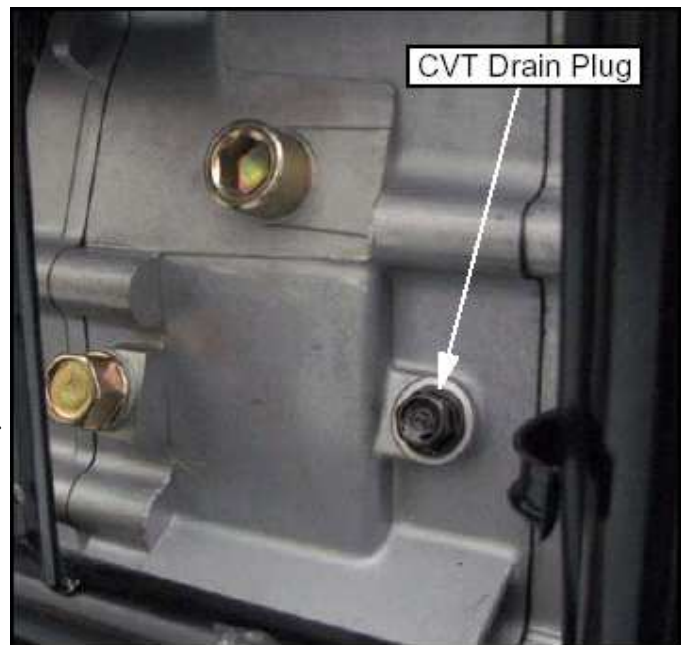
Check engine fasteners and ensure they are tight

CVT Drying

NOTE: If operating the ATV through water, be sure to check the CVT and other components for water ingestion. The ATV should be checked immediately.

There may be some instances when water is accidentally ingested into the CVT system. Use the following instructions to dry it out before operating. The drain plug is located on the bottom of the CVT cover.

1. Remove the drain plug located under the CVT housing. Allow the water to drain. Reinstall the drain plug.
2. Shift the transmission into neutral.
3. Start the engine. Apply varying throttle for 10-15 seconds to expel the moisture and air-dry the belt and clutches. Do not hold the throttle wide open for more than 3 - 4 seconds.
4. Allow the engine RPM to settle to an idle speed.
5. Test for belt slippage. If the belt slips, repeat the process.



CAUTION

Exposure to salt water will cause corrosion to metal components. If the vehicle is operated in salt water areas, rinse it off frequently with fresh water.

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MAINTENANCE

TRANSMISSION AND FINAL DRIVE

Transmission Lubrication

The transmission lubricant level should be checked and changed in accordance with the maintenance schedule.

Remember to:

- Verify the vehicle is level before proceeding.
- Verify the vent hose is routed properly and is not obstructed.
- Follow instructions to check / change transmission fluid.

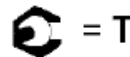
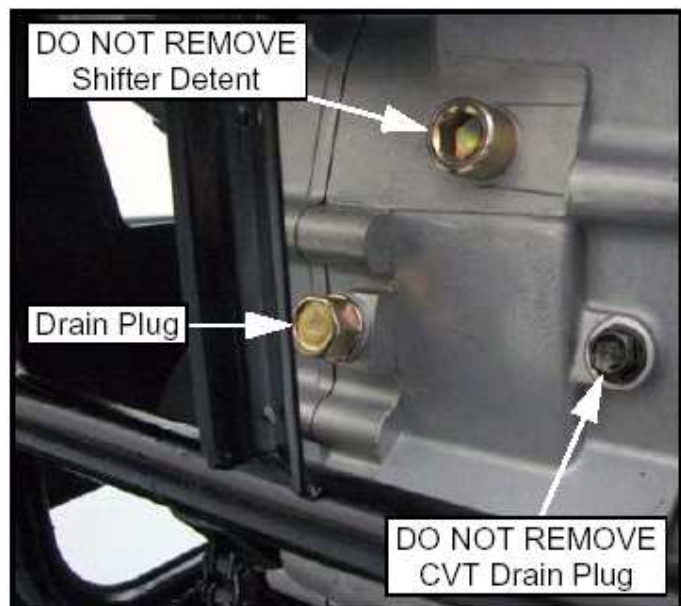
Transmission Lubricant Level

The gear case fill plug is located on the side of the gear case on the right side of the ATV. Maintain the lubricant level at the bottom of the fill plug hole threads.uld be checked monthly and changed annually.

1. Position the vehicle on a level surface.
2. Remove the fill plug.
3. View the lubricant level through the fill hole.
4. If the level is low, add the recommended lubricant.
5. Reinstall the fill plug.

Transmission Lubricant Change

1. Position the vehicle on a level surface.
2. Remove the fill plug.
3. Place a drain pan beneath the transmission.
4. Remove the drain plug and allow the lubricant to drain completely.
5. Clean and reinstall the drain plug. Torque to 14 ft. lbs. (19 Nm).



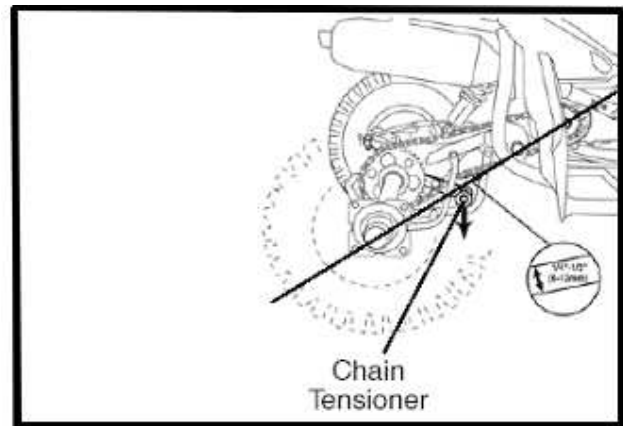
Transmission Drain Plug: 14 ft. lbs. (19 Nm)

6. Add the recommended lubricant. Maintain the lubricant level at the bottom of the fill plug hole threads.
7. Reinstall the fill plug. Check for leaks.

MAINTENANCE

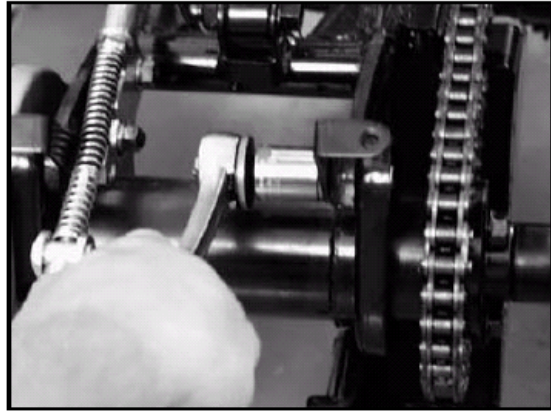
Drive Chain Inspection

1. Check the amount of chain slack by moving the vehicle slightly forward to gain chain deflection.
2. Collapse the suspension with an adjustable trailer tie down. Fasten the strap around the axle and rear bumper tube.
3. Tighten the strap while compressing the suspension to create a straight sight-line between the rear axle and the gear case output shaft. This establishes the tightest chain position.
4. Pull down on the tensioner to move it out of the way, then measure the chain deflection. Allowable chain deflection is **6-12 mm (1/4"-1/2")**.



Drive Chain Adjustment

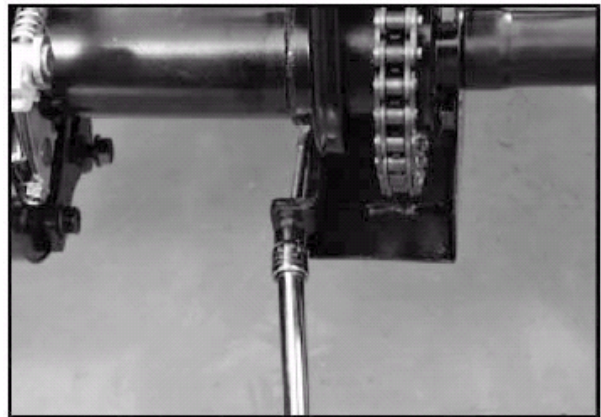
1. Loosen the four (4) rear bearing housing mount bolts.
2. Loosen the chain adjuster lock nut.
3. Turn the chain adjuster clockwise until chain tension is set to specification.



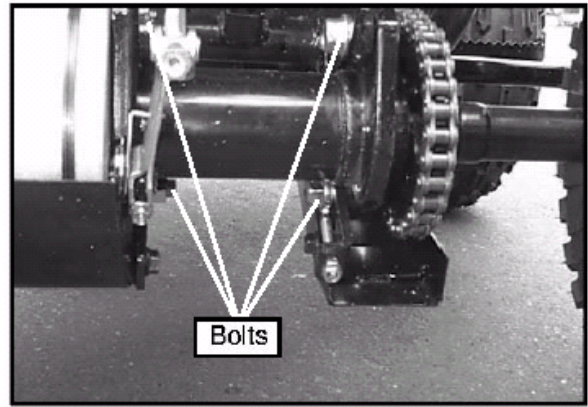
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MAINTENANCE

4. Tighten the chain adjuster lock nut to 84 in. lbs. (9.4 Nm) and re-verify the chain tension is at specification.



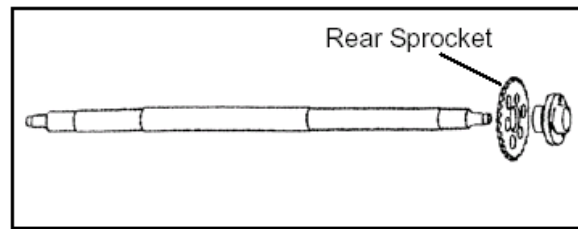
5. Tighten the four (4) bearing housing bolts to **43 lbs. (60 Nm)** and reinstall the rear cover.



Sprocket Inspection

Inspect the front and rear sprockets for worn, broken or bent teeth.

To check for wear, pull upward on the chain at the top of the rear sprocket. Replace sprocket if chain movement exceeds 1/4" (0.6 cm)



MAINTENANCE

ELECTRICAL AND IGNITION SYSTEM

Battery Removal

WARNING

Improperly connecting or disconnecting battery cables can result in an explosion and cause serious injury or death. When removing the battery, always disconnect the negative (black) cable first. When reinstalling the battery, always connect the negative (black) cable last.

To remove the battery:

1. Remove the seat to access the battery.
2. Loosen the bracket securing the battery in position.
3. Disconnect the black negative (-) battery cable first.
4. Disconnect the red positive (+) battery cable last.
5. Lift the battery out of the ATV.

CAUTION

To reduce the chance of sparks:
Whenever removing the battery, disconnect the negative (black) cable first. When reinstalling the battery, install the negative cable last.



Battery Cleaning

Keep the battery terminals and connections free of corrosion. If cleaning is necessary, remove the corrosion with a stiff wire brush. Wash with a solution of one tablespoon baking soda and one cup water. Rinse well with tap water and dry off with clean shop towels. Coat the terminals with dielectric grease or petroleum jelly.

Battery Installation

1. Place the fully charged battery in its holder.
2. Attach the hold-down strap(s).
3. Connect and tighten the red positive (+) cable first.
4. Connect and tighten the black negative (-) cable last.
5. Torque the battery terminal bolts to 3.5 ft. lbs. (4.7 Nm)
6. Verify that the cables are properly routed.

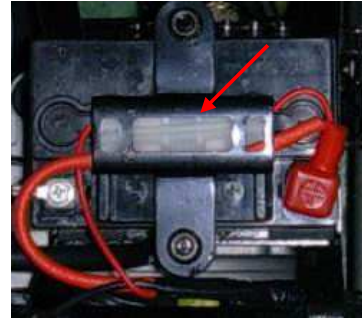
NOTE: When installing a new battery, make sure it's fully charged prior to its initial use. Using a new battery that has not been fully charged can damage the battery and result in a shorter life. It can also hinder vehicle performance. If charging is necessary, use a .5 amp battery charger.

Battery 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.

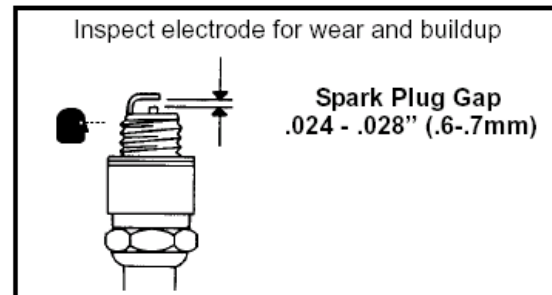
Fuses / Fuse Holder Location

A 7 Amp fuse protects the main electrical system on all models. See illustrations for fuse locations.



Spark Plug Inspection

1. Remove spark plug high tension lead. Clean plug area so no dirt and debris can fall into engine when plug is removed.
2. Remove spark plug.
3. Inspect electrodes for wear and carbon buildup. Look for a sharp outer edge with no rounding or erosion of the electrodes.
4. Clean with electrical contact cleaner or a glass bead spark plug cleaner only. **CAUTION:** A wire brush or coated abrasive should not be used.
5. Measure gap with a wire gauge. Refer to specifications for proper spark plug type and gap. Adjust gap if necessary by bending the side electrode carefully.
6. If necessary, replace spark plug with proper type.
CAUTION: Severe engine damage may occur if the incorrect spark plug is used.
7. Apply a small amount of anti-seize compound to the spark plug threads.
8. Install spark plug and torque to **9 ft. lbs (12 Nm)**.



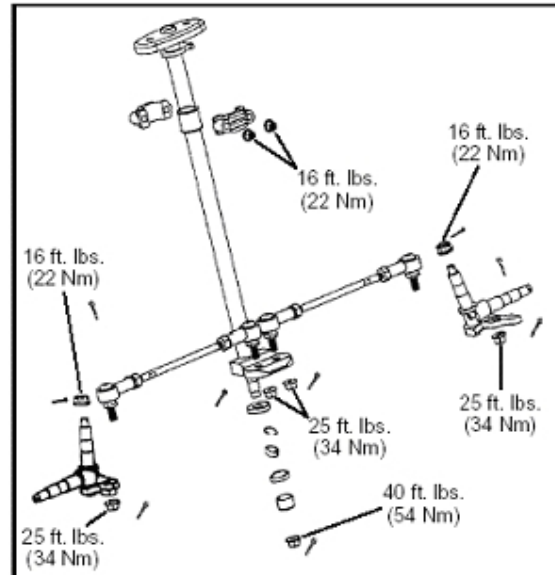
Recommended Spark Plug:
NGK BP7HS

Spark Plug Torque:
12 Nm (9 ft. lbs.)

STEERING AND SUSPENSION

Steering

The steering components should be checked periodically for loose fasteners, worn tie rod ends, and damage. Also check to make sure all cotter pins are in place. If cotter pins are removed, they must not be re-used. Always use new cotter pins. Replace any worn or damaged steering components. Steering should move freely through entire range of travel without binding. Check routing of all cables, hoses, and wiring to be sure the steering mechanism is not restricted or limited.



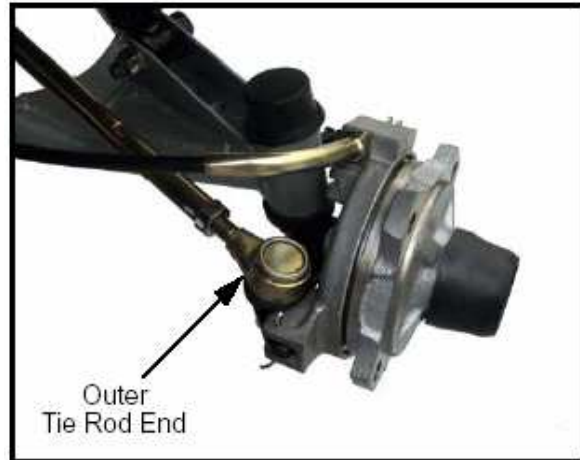
⚠ WARNING

Due to the critical nature of the procedures outlined in this chapter, Polaris recommends steering component repair and adjustment be performed by an authorized Aeon Dealer. Only a qualified technician should replace worn or damaged steering parts. Use only genuine Aeon replacement parts.

MAINTENANCE

Tie Rod End / Steering Inspection

1. Elevate front end of ATV so front wheels are off the ground. Check for any looseness in front hub / wheel assembly by grasping the tire firmly at top and bottom first, and then at front and rear. Try to move the wheel and hub by pushing inward and pulling outward.
2. If abnormal movement is detected, inspect the hub and wheel assembly to determine the cause.
3. Remove the front wheels.
4. Grasp the steering tie rod and pull in all directions feeling for movement in the tie rod end.
5. Repeat inspection for inner tie rod end (on steering post).
6. Replace any worn steering components. Steering should move freely through entire range of travel without binding



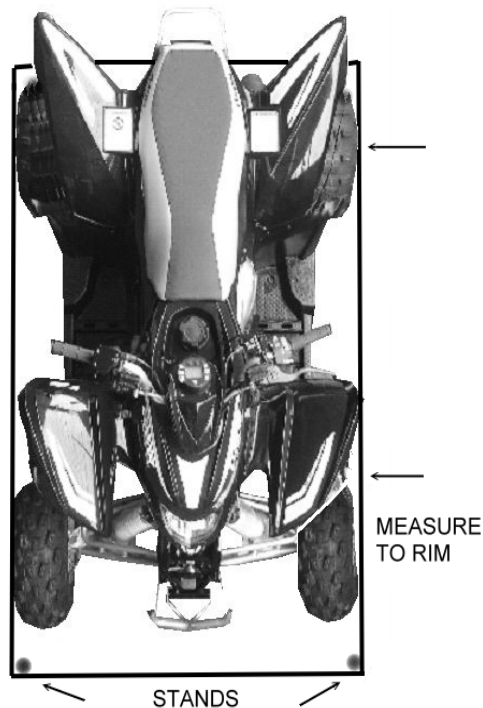
Wheel Alignment

Use the following procedure to check the toe alignment of the vehicle. The recommended toe alignment is 1/8" to 1/4" (3-6 mm) toe out.

1. Set the handlebars in a straight-ahead position.

NOTE: The steering arm can be used as an indicator of whether the handlebars are straight. The arm should always point straight back from the steering post.

2. Place the stands in front of the vehicle, perpendicular to the rear tires.
3. Tie an elastic string around the stands, making sure the string just touches the side surface of the rear tires on each side of the vehicle and goes around the stands in front of the vehicle.
4. Measure the distance from the string to the rim at the front and rear of the front rim. Rear measurement should be 2-3 mm (1/16" - 1/8") more than the front measurement.



MAINTENANCE

Toe Adjustment

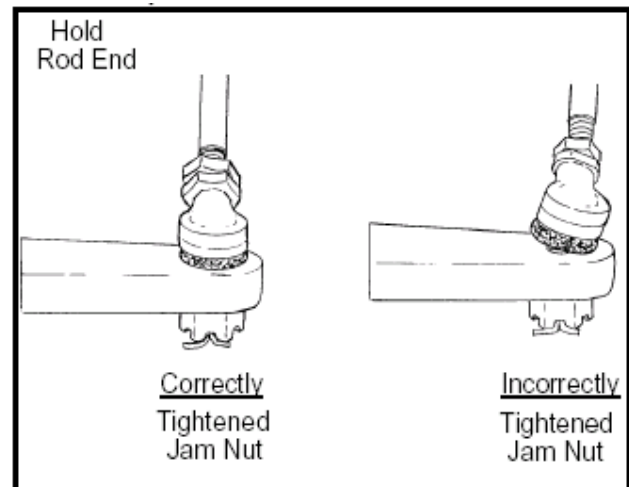
If toe alignment is incorrect, measure the distance between vehicle center and each wheel. This will tell you which tie rod needs adjusting.

NOTE: Be sure the handlebars are straight ahead before determining which tie rod(s) need adjustment.



CAUTION

During tie rod adjustment, it is very important that the following precautions be taken when tightening tie rod end jam nuts. If the rod end is positioned incorrectly it will not pivot, and may break



To adjust toe alignment:

- Hold tie rod end to keep it from rotating.
- Loosen jam nuts at both end of the tie rod.
- Shorten or lengthen the tie rod until alignment is as required to achieve the proper toe setting - (1/8" to 1/4").
- Important: When tightening the tie rod end jam nuts, the rod ends must be held parallel to prevent rod end damage and premature wear. Damage may not be immediately apparent if done incorrectly. See illustration.

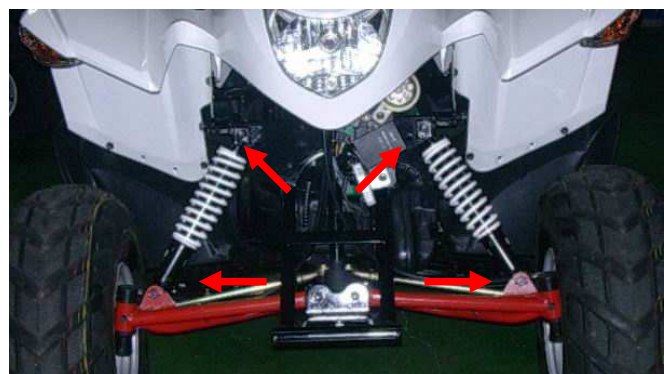
Front Suspension Inspection

Compress and release front suspension. Damping should be smooth throughout the range of travel. Inspect the front shocks and springs to ensure proper function. If the shock is leaking oil, replace it.

Check all front suspension components for wear or damage.

Check shock mounting fasteners to ensure they are tight.

Inspect A-arm and weldments for any sign of damage.



MAINTENANCE

Rear Suspension Inspection

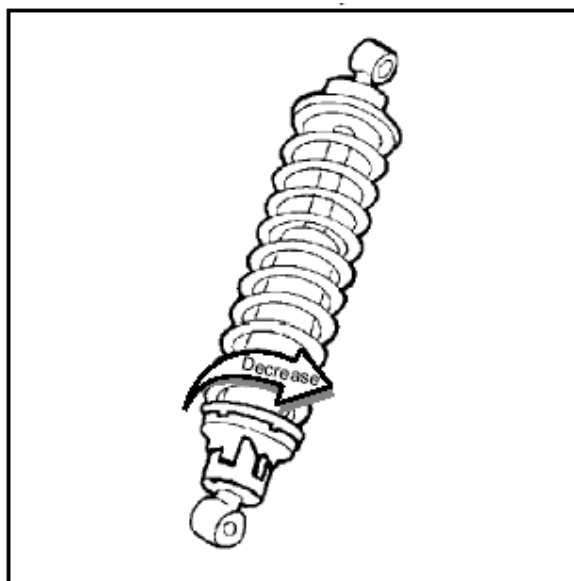
Compress and release rear suspension. Damping should be smooth throughout the range of travel.

- Check all rear suspension components for wear or damage.
- Inspect shock for leakage.
- Inspect the rear shock and spring to ensure proper function. If the shock is leaking oil, replace it. Inspect the swing arm and weldments for any sign of damage.



Suspension Spring Adjustment

The rear spring preload can be adjusted. The front spring preload can be adjusted too. To make preload adjustments, turn the adjuster cam to increase or decrease the amount of preload.



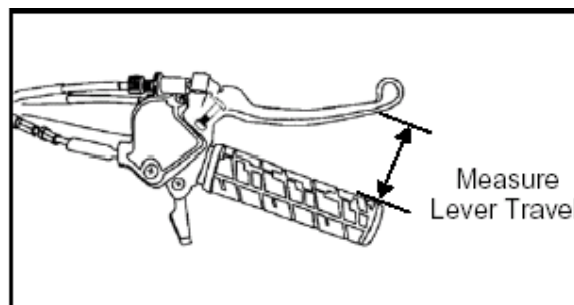
BRAKE SYSTEM

Brake System Inspection

The following checks are recommended to keep the brake system in good operating condition. Service life of brake system components depends on operating conditions. Inspect brakes in accordance with the maintenance schedule and before each ride.

Brake Lever Travel

Check brake lever travel at the intervals recommended in the Periodic Maintenance Chart. Service the brakes when brake lever travel reaches the total lever travel measurement listed in the table below. Always service the brakes when there is no longer sufficient stopping ability at the specified lever travel setting



Component	Total Lever Travel
Front brake lever	1 3/4" (45 mm)
Rear brake lever	2 1/2" (65 mm)

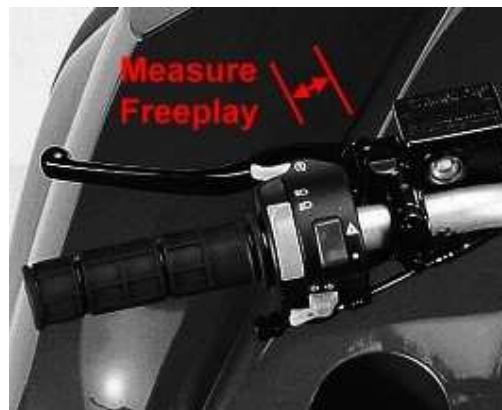
MAINTENANCE

Brake Freeplay

Measure the free-play of the front and rear brakes at the intervals recommended in the Periodic Maintenance Chart. If the freeplay isn't at specification, adjust the freeplay as outlined below.

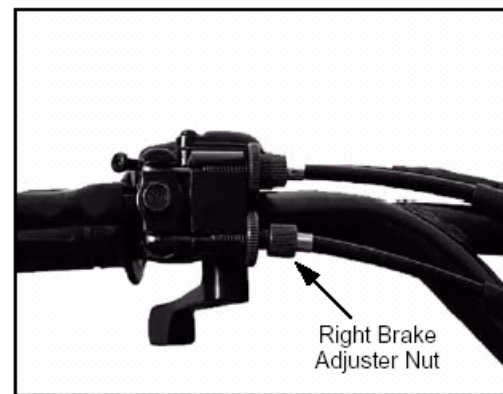
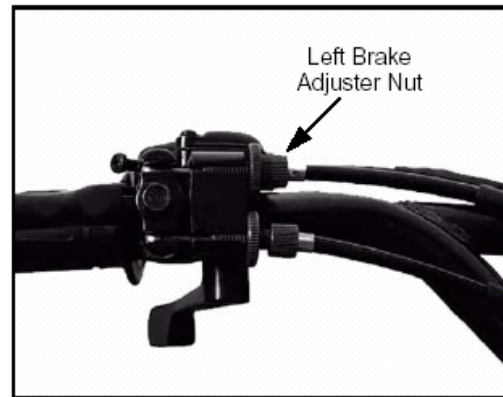
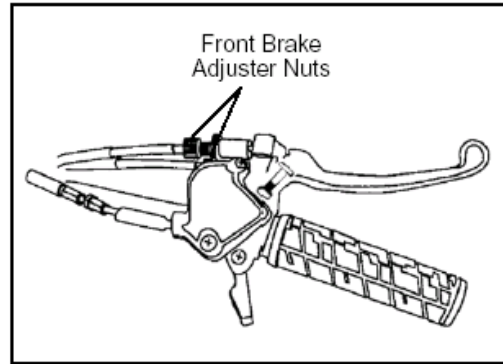
Brake Freeplay Specifications

Front Brake	Rear Brake
2~3mm(0.08"~0.12")	2~3mm(0.08"~0.12")



Front Brake Adjustment

1. Position the vehicle on a level surface.
2. Shift the transmission into neutral.
3. Elevate the front of the vehicle by placing a suitable stand under the frame. The front tires should be slightly off the ground.
4. While rotating the *left* front wheel, tighten the *upper* front brake adjuster nut on the right-hand control.
5. When you begin to feel a slight drag on wheel rotation, loosen the adjuster nut one full turn.
6. While rotating the *right* front wheel, tighten the *lower* front brake adjuster nut on the right-hand control.
7. When you begin to feel a slight drag on wheel rotation, loosen the adjuster nut one full turn.
8. Verify that the right hand brake functions correctly.
9. Verify that brake lever freeplay is at specification.
10. Carefully lower the vehicle to the ground.



WHEELS AND TIRES

Wheels

Inspect all wheels for runout or damage. Check wheel bolts and ensure they are tight. Do not over tighten the wheel bolts.

Wheel, Hub and Spindle Torque Table

Item	Specification
Front wheel bolts	30Nm(22ft. lbs)
Rear wheel bolts	30Nm(22ft. lbs)
Front spindle nut	59Nm(44ft. lbs)
Rear hub retaining nut	79Nm(58ft. lbs)

Wheel Inspection

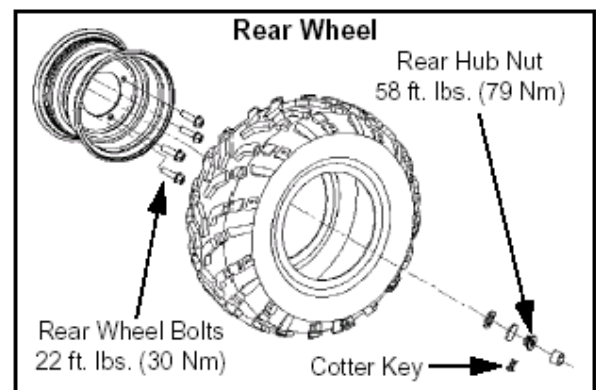
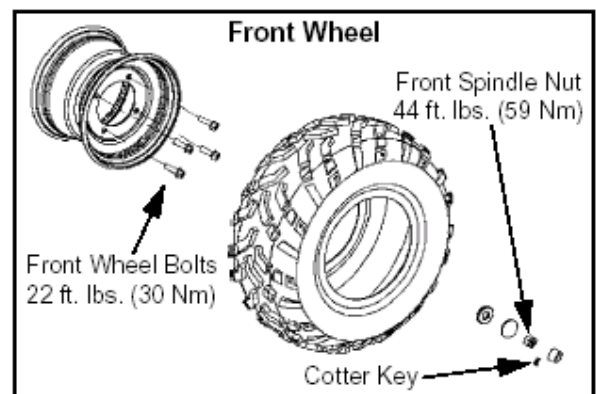
Inspect the front and rear wheel bolts for tightness. Re-torque the wheel bolts periodically and check before each ride.

Wheel Removal - Front / Rear

1. Stop the engine, place the transmission in gear and lock the parking brake.
2. Loosen the wheel bolts slightly.
3. Elevate the side of the vehicle by placing a suitable stand under the footrest frame.
4. Remove the wheel bolts and remove the wheel.

Wheel Installation - Front / Rear

1. With the transmission in gear and the parking brake locked, place the wheel in the correct position on the wheel hub. Be sure the valve stem is toward the outside and rotation arrows on the tire point toward forward rotation.
2. Install the wheel bolts and finger tighten them.
3. Lower the vehicle to the ground.
4. Securely tighten the wheel bolts to 22 ft. lbs. (30 Nm)



CAUTION

If wheels are improperly installed it could affect vehicle handling and tire wear. Be sure to properly torque and install all wheel nuts.

MAINTENANCE

Tire Pressure

Tire Pressure Inspection (PSI - Cold)

Front	Rear
5 psi	5 psi

Tire Inspection

WARNING

Operating an ATV with worn tires will increase the possibility of the vehicle skidding and possible loss of control.

Worn tires can cause an accident.

Always replace tires when the tread depth measures 1/8" (.3 cm) or less.

CHAPTER 3

CVT SYSTEM

CVT SYSTEM	3.2
CVT MAINTENANCE / INSPECTION	3.2
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CLUTCH COVER REMOVAL	3.4
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DRIVE CLUTCH DISASSEMBLY AND INSPECTION	3.5
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DRIVEN CLUTCH SERVICE	3.7
DRIVEN CLUTCH DISASSEMBLY AND INSPECTION	3.7
DRIVEN CLUTCH ASSEMBLY	3.8

CVT SYSTEM**WARNING**

All CVT maintenance or repairs should be performed only by a certified Aeon Service Dealer 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 CVT components, it is absolutely essential that no disassembly or repair be made without factory authorized special tools and service procedures.

The Continuously Variable Transmission (CVT) consists of three major assemblies: 1) The Drive Clutch; 2) The Driven Clutch; and 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 a Aeon ATV, the CVT 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.

CVT Maintenance / Inspection

Under normal operation the CVT 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 CVT components. See "CVT Overheating / Diagnosis" on page 3.3. for more information.

1. Drive clutch rollers and bushings. Driven clutch rollers, pins, and spring.
2. Clutch sheave faces. Clean and inspect for wear.
3. CVT system sealing. The CVT system is air cooled by fins on the drive clutch. The fins create a low pressure area around the drive clutch. The clutch cover, must be sealed to ensure water and other contaminants entering the CVT area.

Drive Clutch Operation

Drive clutches primarily sense engine RPM. The major component which controls shifting function are the shift centrifugal weights (rollers) inside the moveable sheave. Whenever engine RPM is increased, centrifugal force is created, causing the rollers to push against the cam plate and force the moveable sheave toward 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. If belt speed is sufficient, centrifugal friction shoes on the driven clutch overcome their return spring pressure and swing outward against the transmission drive hub, and the vehicle (if in gear) begins to move.

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, changing the ratio of the drive to driven clutch from low to high.

Driven Clutch Operation

CVT driven clutches primarily sense torque, but also react to RPM, applying and retracting the friction shoes according to the forces applied to it from the drive belt, while at the same time reacting to the torque at 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 (low ratio).

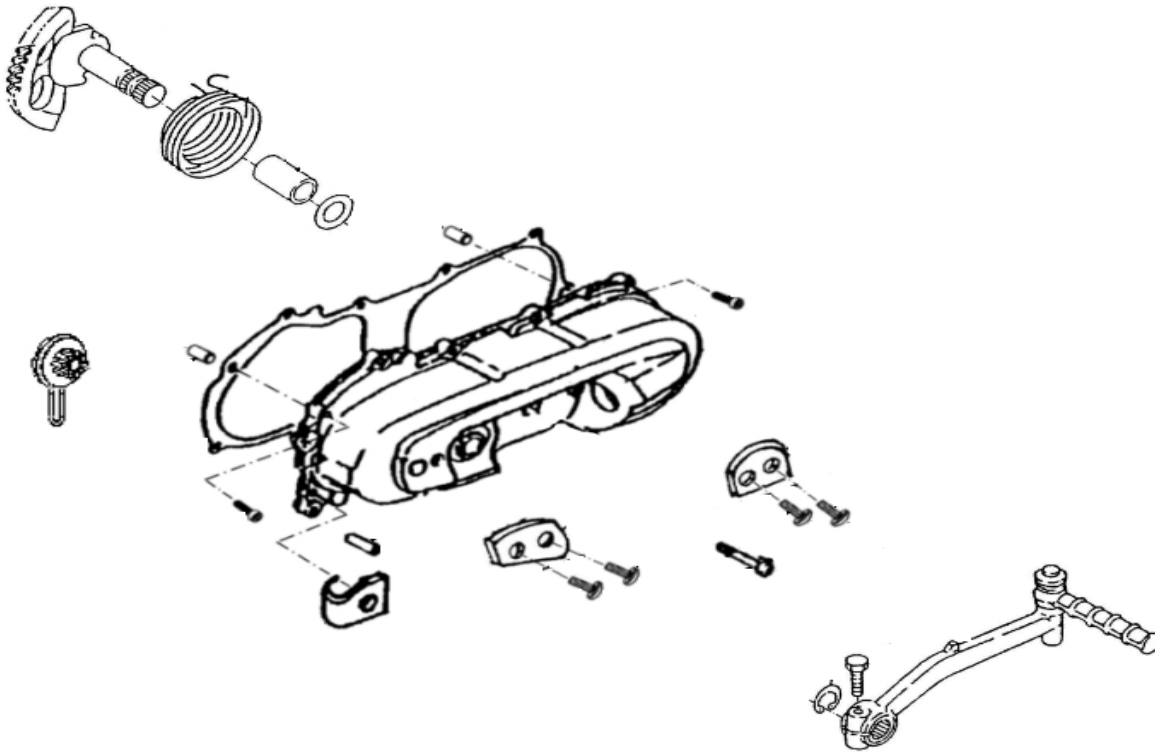
As engine RPM and horsepower increase, the load from the drive belt increases, resulting in the belt rotating up toward the outer diameter of the drive clutch sheaves and downward into the sheaves of the driven clutch. This action, which increases the driven clutch speed, is called upshifting.

Should the throttle setting remain the same and the vehicle is subjected to a heavier load, the torque sensing driven clutch will close, forcing the drive belt back up toward the outer diameter of the driven clutch. This also forces the belt downward into the sheaves of the drive clutch. This action, which decreases the driven clutch speed, is called backshifting. In situations where loads vary and throttle settings are constant, the drive and driven clutches are continually shifting to maintain optimum engine RPM. At full throttle a perfectly matched CVT 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 CVT system is similar to a power governor. Rather than vary throttle position, as a conventional governor does, the CVT system changes engine load requirements by either upshifting or backshifting.

CVT System Drying

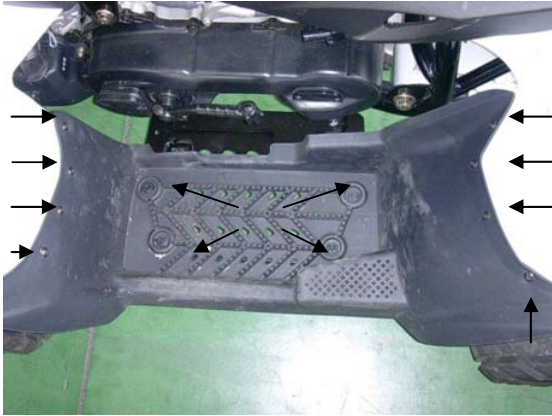
NOTE: If operating the ATV through water, be sure to check the CVT cover and other ATV components for water ingestion. The ATV should be checked immediately. Refer to Owner's Manual for Safe Riding Tips.

1. To drain any water that may be trapped inside the CVT area, remove the CVT drain plug and O-ring located on the bottom of the crankcase and let the water drain out. The CVT drain plug is shown at right.
2. To further expel water from the CVT area cover and to dry out the CVT system, shift the transmission to neutral and rev the engine slightly to expel the moisture. This will also air-dry the belt and clutches.
1. Allow engine RPM to settle to idle speed, shift transmission to lowest available range and test for belt slippage. Repeat as needed.



Clutch Cover Removal

1. Remove the left footrest.



2. Remove kick starter lever.

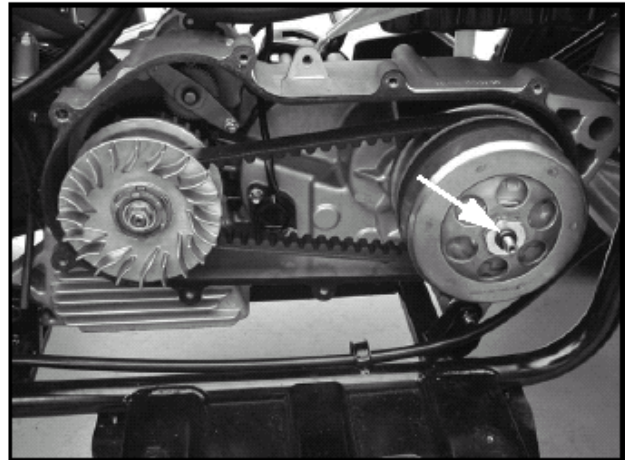


1. Remove all screw and cover with kick start spindle attached.

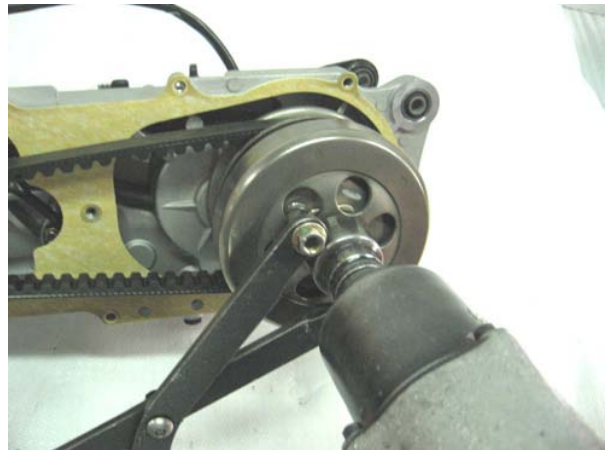


Drive Belt Removal

1. Remove O-ring and nut from driven clutch.



2. Pull outer sheave of driven toward you and push belt as far as possible into driven sheaves to create belt slack.



3. Slide driven clutch off shaft with belt. Remove belt from driven clutch sheaves and then from drive clutch.



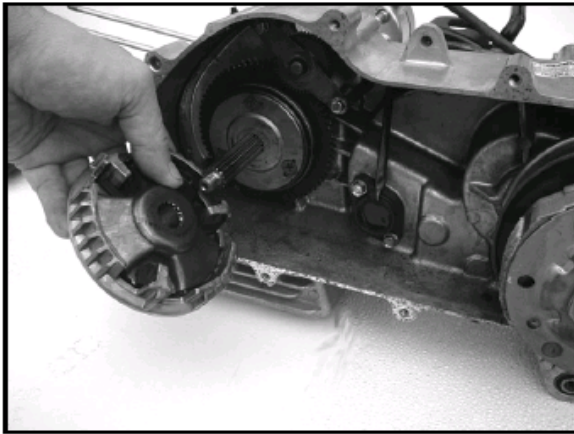
DRIVE CLUTCH SERVICE

Drive Clutch Disassembly and Inspection

1. Remove outer drive clutch sheave and drive belt. Note parts assembly order.

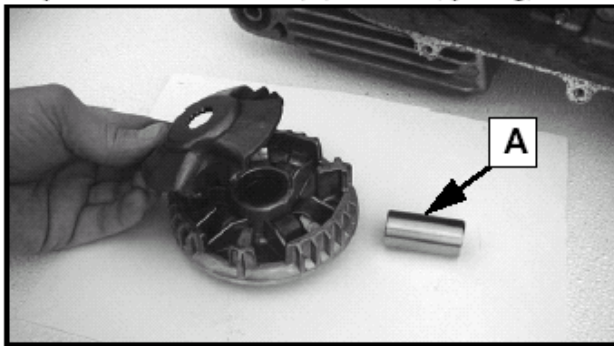
2. Slide sheave and cam plate off crankshaft as an assembly.

NOTE: When removing primary sliding sheave and cam plate assembly, hold cam plate and sliding sheave together. This prevents the rollers from falling out of the assembly.



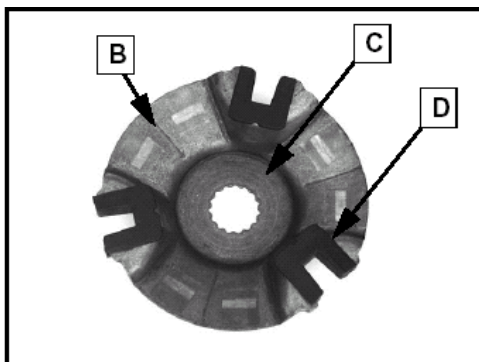
3. Remove cam plate.

4. Inspect surface of sleeve (A) for wear, pitting, or damage.



5. Inspect cam plate for wear on surface (B) and splines (C).

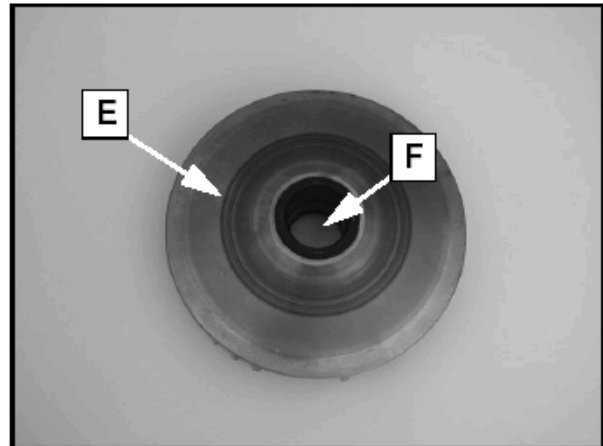
Replace cover guides (D) as a set.



6. Inspect sheave faces (E) for grooves or wear. Check

bushings (F) and seals in the moveable sheave. The sleeve

should be a close, smooth fit in the bushings and seals should fit tightly on the sleeve.

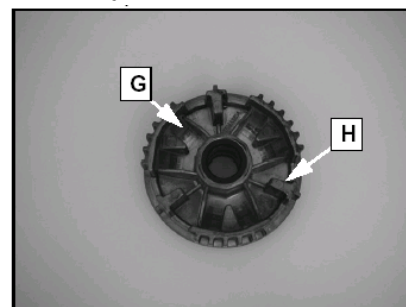


7. Remove and inspect each roller. Replace as a set if any

have flat spots or if worn (they should be cylindrical).

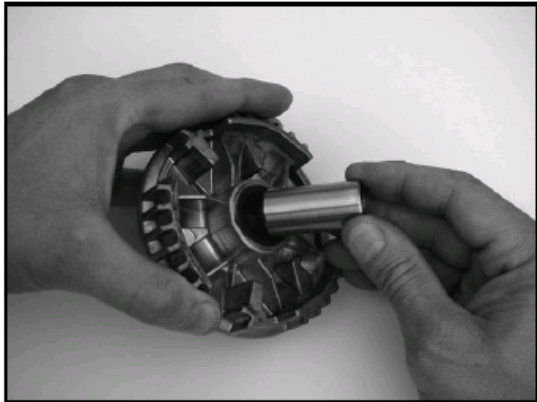


8. Inspect the roller tracks (G) and both sides of the cam plate tabs (H) for wear. Compare the drive and deceleration side of the tabs to determine if drive side is worn. Replace drive clutch assembly if tabs or roller tracks are worn.

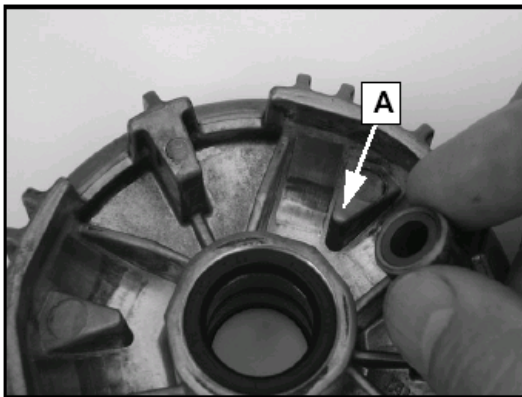


Drive Clutch Assembly

1. Apply a very light film of grease to the seal lips and drive clutch sleeve. Then install the sleeve.



2. Install all rollers with open end facing inward toward divider (A) (the side with inner bushing visible.)



3. Install the cam plate.

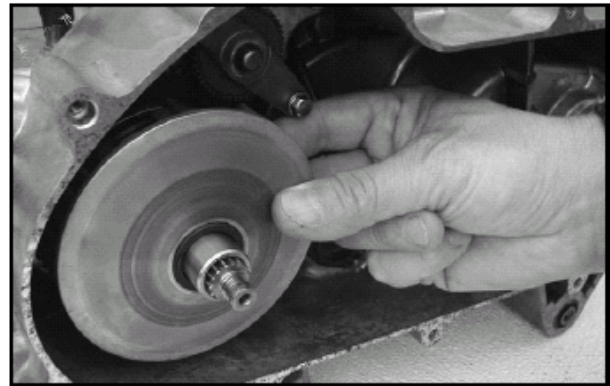


4. Install the bushing, primary sliding sheave and cam plate assembly.

NOTE: When installing the primary sliding sheave and the cam plate assembly, hold the assembly together to prevent the rollers from dislodging.

5. Open the sheaves of the secondary clutch and push the belt down between the sheaves.

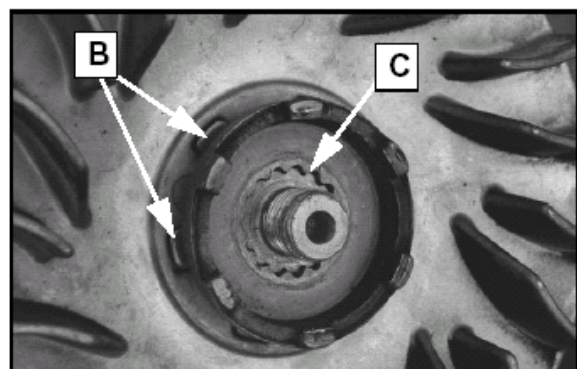
6. Install the driven clutch on the transmission input shaft, looping the belt onto the drive clutch sleeve as shown.



7. Pinch the belt in the middle and install the outer drive clutch sheave as far as possible. Hold outer sheave in place.



8. Install the claw washer, engaging the inner spline of the washer on the crankshaft and the outer claws (B) in the sheave.



9. Install the kick start drive hub, making sure the inner splines (C) are engaged on the crankshaft.

10. Install flat washer and nut and torque to specification.

Drive Clutch Lock Nut Torque 40 Nm (30 ft. lbs.)

DRIVEN CLUTCH SERVICE

Driven Clutch Disassembly and Inspection

1. Remove driven clutch assembly by removing O-ring and nut.



2. Remove outer drive hub (transmission shaft hub).

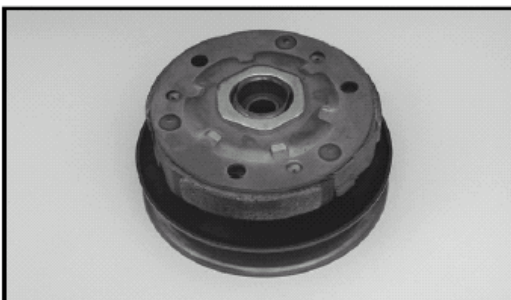
3. Remove drive belt. See "Drive Belt Removal" on page 3.4



4. Secure the driven clutch assembly in a soft jaw vise or clamp. Loosen the retaining nut about 1 turn. Hold downward pressure on the friction shoe plate, and then remove the nut. Release pressure on plate and remove the friction shoe assembly and driven spring.

CAUTION

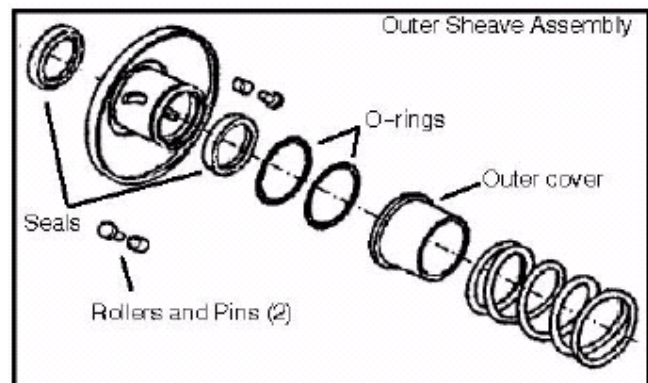
Spring pressure can cause components to eject suddenly. Use care during removal.



5. Remove the outer roller pin cover by turning and pulling up on the cover. Replace the two sealing O-rings.



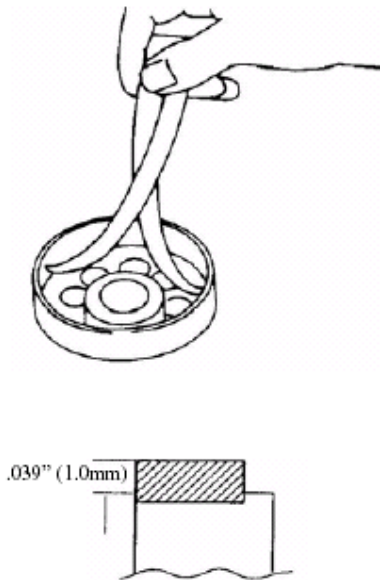
6. Remove rollers and pins using a needle-nose pliers and inspect all components. Replace if any damage or excess wear is found. Replace the o-rings and seals anytime the driven is apart.



7. To replace friction shoes, remove E-clips that retain the backing plate. Use a suitable tool to remove and install the return springs connecting the shoes, using care not to stretch the springs more than is necessary.

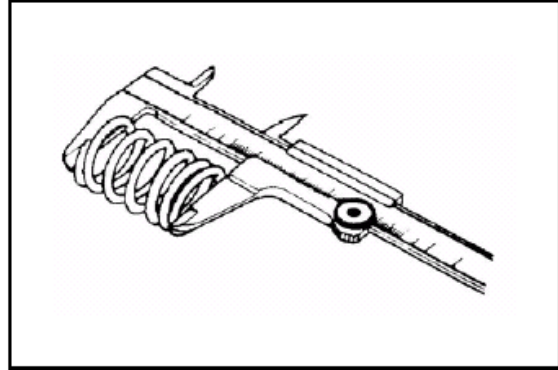


8. Inspect the condition of the secondary clutch drive hub. Measure the inside diameter of the hub using a caliper and compare to specification. If either of these measurements exceeds the limit, replace the drive hub.



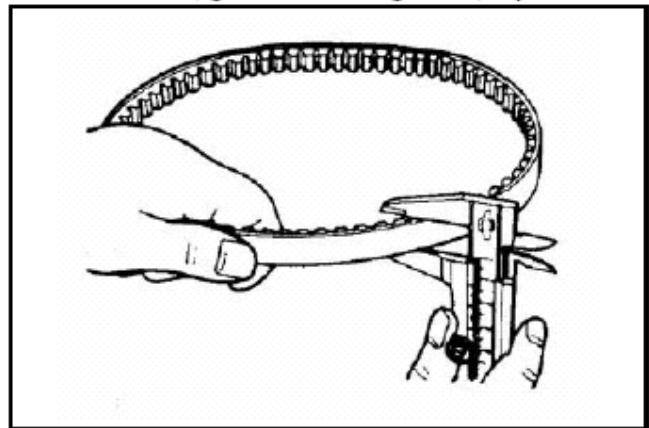
Driven Clutch Hub I. D.
Service Limit: 112.5 mm (4.43")
Driven Clutch Friction Shoe Thickness
Service Limit: 1.0mm (.039")

9. Use a vernier caliper to check the length of the compression spring. At full extension, the measurement should be no less than 69.7 mm.(2.74") . If out of specification, replace the spring.



Driven Compression Spring Length
Service Limit: 69.7mm (2.74")

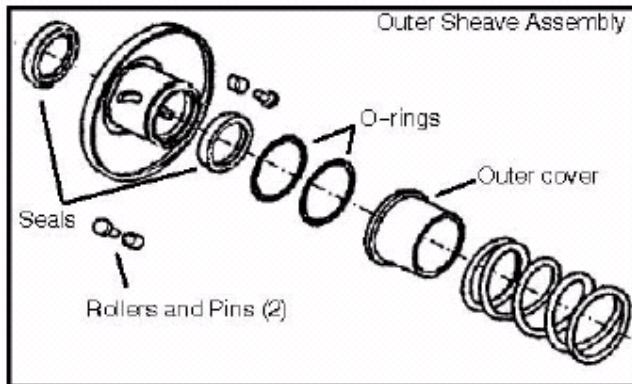
10. Inspect the surface of the drive belt for uneven wear or grease deposits. Using a vernier caliper, measure the width of the belt. The service limit of the belt is .626" (15.9 mm). If the width of the belt is less than the service limit, or if the belt is worn, glazed or hour-glassed, replace.



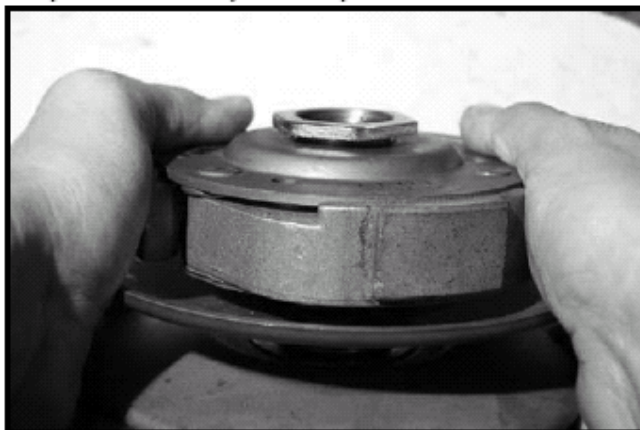
CVT Drive Belt Width
Service Limit:15.9mm(.626")

Driven Clutch Assembly

1. Insert new seals into the outer sheave assembly. Fill the outer sheave cavity with fresh grease and slide onto the inner sheave shaft. Align and insert the (2) roller/pin assemblies. Install new o-rings and the outer roller pin cover. Place the washer onto the threaded shaft and apply Loctite 272 to the threads.



2. Have an assistant available for final assembly. Install the compression spring. Place the friction pad assembly over the spring and compress the driven assembly together with both hands. With the assembly compressed and the threads exposed, have an assistant thread a new assembly nut onto the shaft. Secure the assembly in a clamping device and torque the assembly nut to specification.

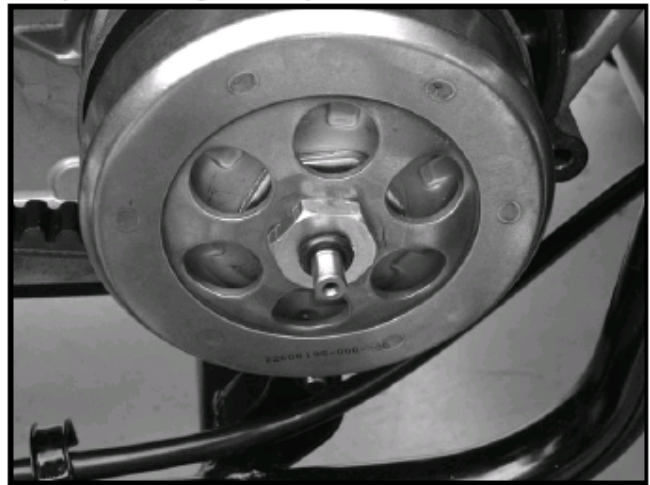


Driven Assembly Nut Torque
50-54 ft. lbs. (68-73 Nm)

3. Install the drive belt on driven clutch and move belt as far into the sheaves as possible.

4. Loop the belt over the drive clutch and install driven clutch on transmission shaft.

5. Install driven clutch hub, then the retaining nut and O-ring. Torque retaining nut to specification.



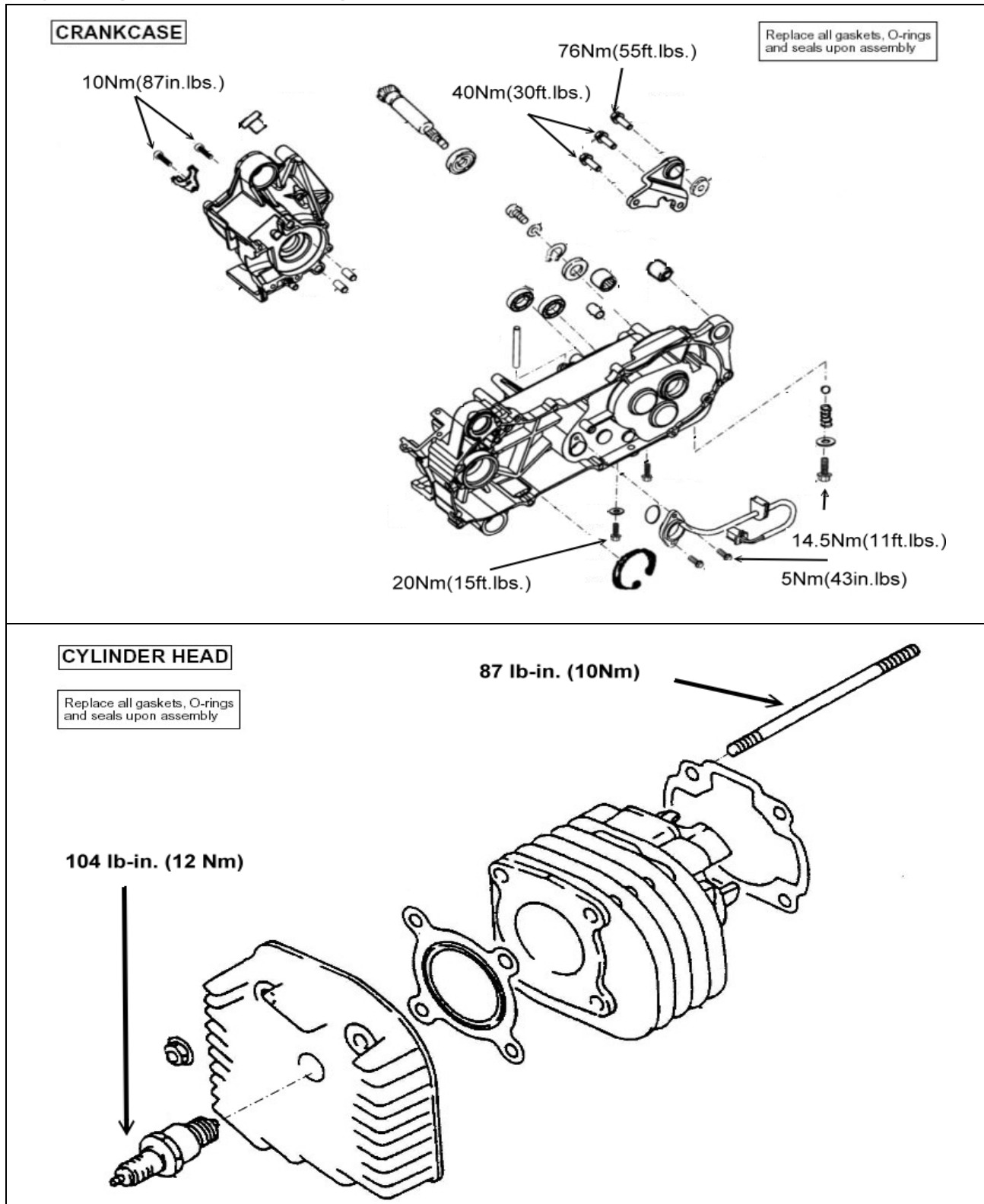
Driven Clutch Nut Torque
34 Nm (24 ft. lbs.)

CHAPTER 4**ENGINE / TRANSMISSION**

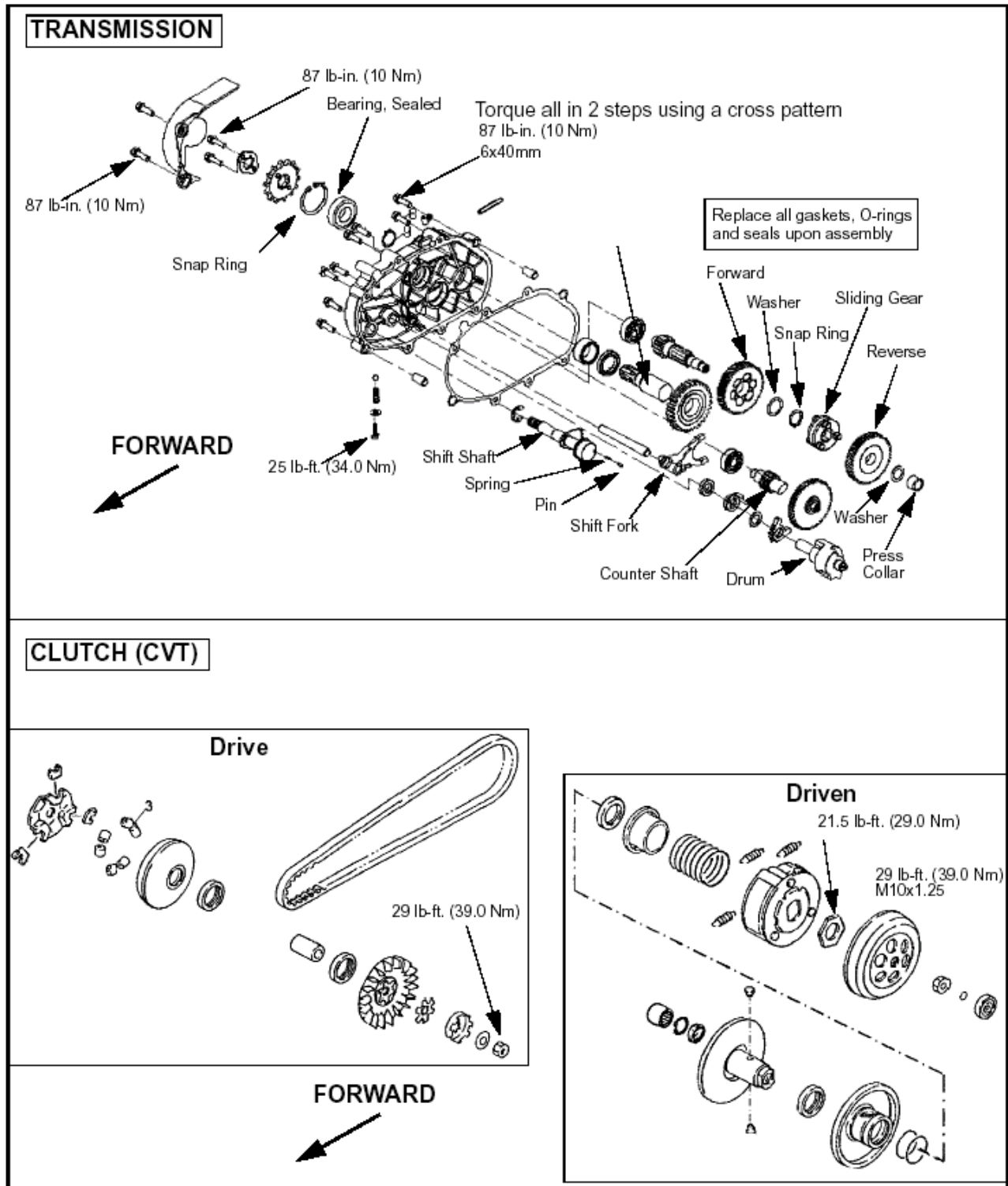
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ENGINE SERVICE

Engine Exploded Views & Torque Values



Engine Exploded Views & Torque Values



Accessible Components

NOTE: The top-end of the engine can be serviced without pulling the engine from the ATV. Loosen the upper steering post mounting bolts to allow enough clearance to remove cylinder head and cylinder. However, it is recommended to pull the engine to service top-end components.

The following components can be serviced or removed with the engine installed in the frame:

- Flywheel
- Alternator/Stator
- Starter Motor/Starter Drive
- Oil pump
- Carburetor
- Transmission

The following components require engine removal for service

- Cylinder Head
- Cylinder
- Piston / Rings
- Crankshaft
- Crankshaft Main Bearings
- Crankcase

NOTE: Crankshaft components are not serviceable.

Replace crankshaft as an assembly.

Engine Removal

1. Clean the ATV and work area thoroughly.
2. Remove seat.
3. Remove front cab and foot rests.
4. Disconnect battery cables.
5. Drain engine oil and / or transmission oil as required.
6. Disconnect or remove from RIGHT Side:
 - Shift lever and gate.
 - Exhaust Pipe
 - Drive Sprocket Cover / Sprocket / Chain
 - Starter Motor
 - Wire Connector - Stator and Neutral Switch
7. Cover any openings with a clean shop towel.
8. Disconnect or Remove From LEFT Side:
 - Spark Plug Wire
 - Breather Hose
 - Carburetor / Manifold
9. Remove (2) engine mount bolts at the front and (1) rear engine mount bolt.
10. Check for any remaining attachments and remove engine from right side of frame.

Engine Installation Notes

After the engine is installed in the frame, review this checklist and perform all steps that apply:

General Items

- Install previously removed components using new gaskets, seals, and fasteners where applicable.
- Perform checks on fluid levels, controls, and all important areas on the vehicle as outlined in the daily pre-ride inspection checklist (refer to Chapter 2).

Transmission Adjustment (If required)

- Before tightening the gear selector bracket screws on the transmission, be sure transmission is in neutral and center the lever in the neutral slot on bracket. Inspect operation and re-adjust bracket if necessary.

Exhaust

- Replace exhaust gaskets.

Engine Mount Torque

- Front mounts 30Nm(22ft. lbs)
- Rear mount 30Nm(22ft. lbs)



Shift lever and gate



Front engine mount bolt and bracket



Rear engine mount

Engine Lubrication

Oil Type:**

2T/ LST

Capacity: Approximately 1000ml (30 oz.)

Transmission Lubrication

Oil Type:

80W/ 90 API

Capacity: Approximately 350 ml (12 oz.)

Drain Plug (Transmission): 16 ft. lbs. (21.5 Nm)

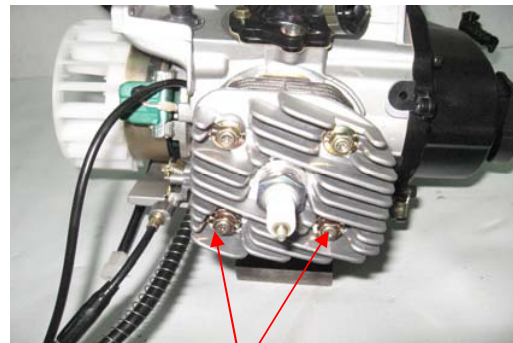
ENGINE DISASSEMBLY

CYLINDER HEAD DISASSEMBLY

1. Loosen all four bolts of cylinder head cover.
2. Remove cylinder head cover.
3. Thoroughly clean cylinder head surface to remove all traces of gasket material and carbon.
4. Remove the cylinder head gasket.



Use care not to damage sealing surface. If there is damage found on the cylinder head combustion chamber, it is recommended the component be replaced.



Stud bolt



Cylinder head gasket

5. Tap cylinder lightly with a plastic hammer in reinforced areas only until loose.



CYLINDER HEAD WARP INSPECTION

Lay a straight across the surface of the head at several difference points and measure warpage by inserting a feeler gauge between the straight edge and the cylinder head surface. If warpage exceeds the service limit, replace the cylinder head.

Cylinder head warp limit: 0.05mm



Combustion chamber inspection

Clean all accumulated carbon deposits from combustion chamber and valve seat area with a soft wire brush. Inspect the combustion chamber for cracks and damage from foreign debris.

WARNING

Low pressure compressed air can blow debris into your face and eyes. Always wear eye protection or a face shield when using pressurized air. Failure to take adequate safety precautions could result in death or serious injury.

CYLINDER WARP INSPECTION

Repeat the measurement. If warpage exceeds the service limit, replace the cylinder.

Cylinder warp limit: 0.02mm

NOTE: Keep all parts in order with respect to their location in the cylinder head.



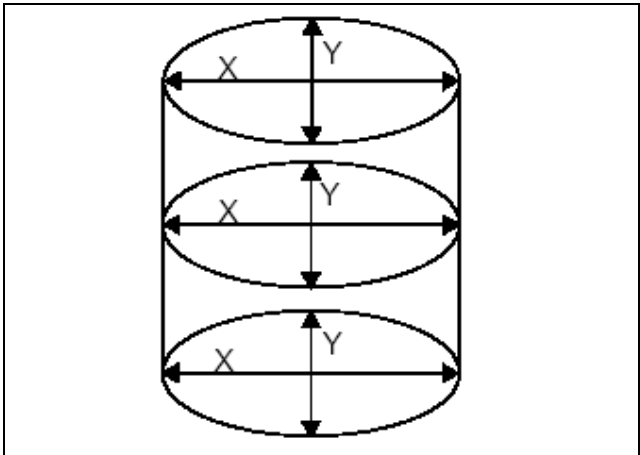
CYLINDER INSPECTION

Maximum cylinder wear occurs at the very top of top ring travel. Minimum wear occurs below ring travel. Failure to measure the cylinder at these point may result in a faulty decision regarding the suitability of the cylinder for continued use.

Using an inside micrometer or dial bore gauge.
Check cylinder bore for out of round and taper.
Proceed as follows:



1. At the top of the piston ring travel zone measuring the cylinder diameter at two locations. Record values for measurement parallel and perpendicular to the crankshaft.
2. Repeat the two measurements at the center of the piston ring travel.
3. Repeat the measurement again at the bottom of the bore at a point below the piston ring travel zone.
5. Rebore the cylinder if out-of-round more than 0.05mm and taper more than 0.05 mm.



Cylinder Taper
Limit: .05 mm.(002") Max.
Cylinder Out of Round
Limit: .05 mm.(002") Max.

Cylinder Honing Procedure



A hone which will straighten as well as remove material from the cylinder is very important. Using a common spring loaded glaze breaker for honing is not advised. Polaris recommends using a rigid hone or arbor honing machine.

Cylinders may be wet or dry honed depending upon the hone manufacturer's recommendations. Wet honing removes more material faster and leaves a more distinct pattern in the bore.

Honing To Deglaze

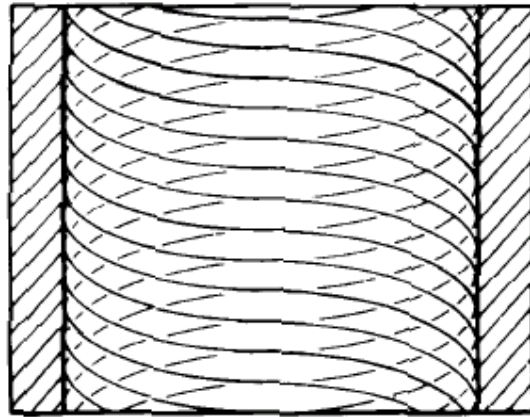
A finished cylinder should have a cross-hatch pattern to ensure piston ring seating and to aid in the retention of the fuel/oil mixture during initial break in. Hone cylinder according to hone manufacturer's instructions, or these guidelines:

- Use a motor speed of approximately 300-500 RPM, run the hone in and out of the cylinder rapidly until cutting tension decreases. Remember to keep the hone drive haft centered (or cylinder centered on arbor) and to bring the stones approximately 1/2" (1.3 cm) above and below the bore at the end of each stroke.

- Release the hone at regular intervals and inspect the bore to determine if it has been sufficiently deglazed, and to check for correct cross-hatch. **NOTE:** Do not allow cylinder to heat up during honing.

IMPORTANT: Clean the Cylinder After Honing

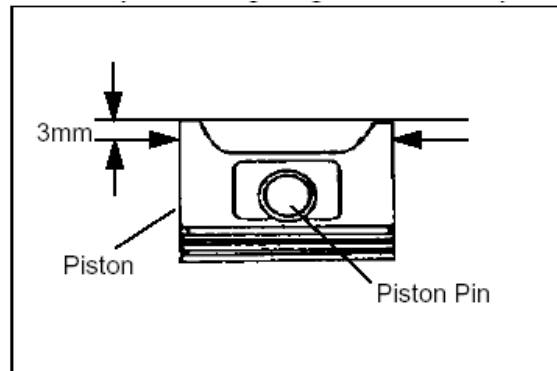
Clean cylinder thoroughly after honing to remove all grit material. Wash cylinder in solvent, then in hot, soapy water. Rinse thoroughly and dry with compressed air. Oil bore immediately with engine oil to prevent rust. If cylinder wear or damage is excessive, replace cylinder. Hone only enough to deglaze the cylinder bore.



EXAMPLE OF CROSS HATCH PATTERN

Piston Inspection

1. Measure piston outside diameter at a point 3mm up from bottom of piston at a right angle to direction of piston pin.
2. Carefully inspect the pistons for damage or excessive wear. Discard piston with cracked, broken or bent ring lands.
3. Check the piston skirt for cracks, gouges, deep scratches or heavy scoring.
4. Check the piston heads for evidence of burning, etching or melting.



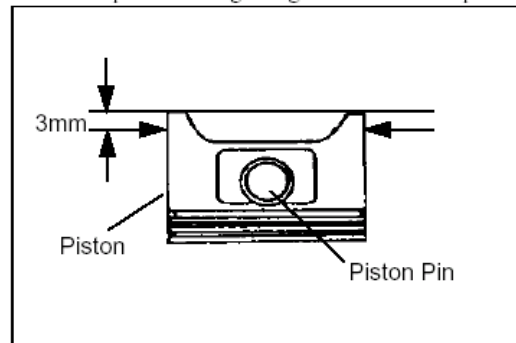
Piston OD.wearing limit: Less 40mm

Piston to Cylinder Clearance

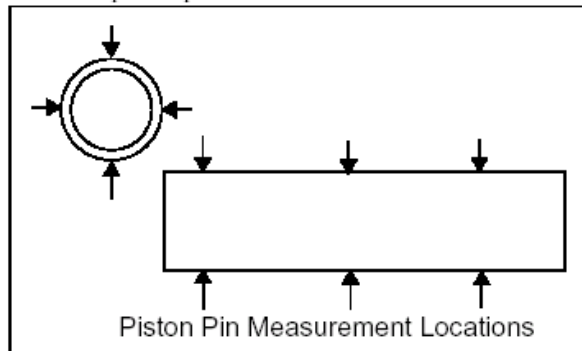
Std: 0.01- 0.04 mm

Limit: 0.1 mm

5. Measure piston pin bore.



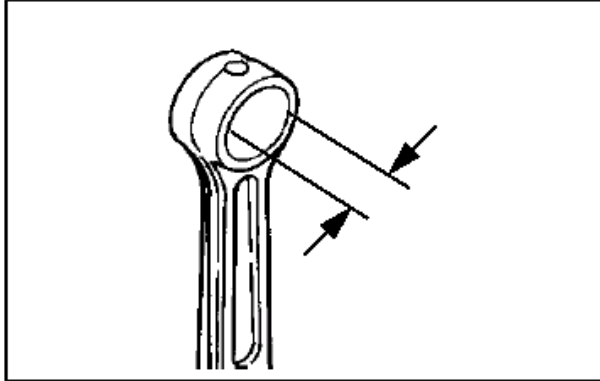
6. Measure piston pin O.D.



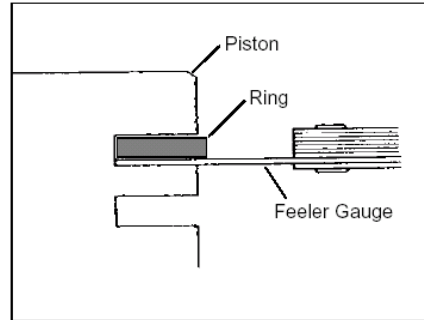
Pin OD. Limit: Less 9.994mm

Pin and Hole clearance limit: Over 0.01mm

7. Measure connecting rod small end ID. Replace crankshaft if connecting rod small end is out-of-round.



8. Measure piston ring to groove clearance by placing the ring in the ring land and measuring with a thickness gauge. Replace piston and rings if ring-to-groove clearance exceeds service limit.



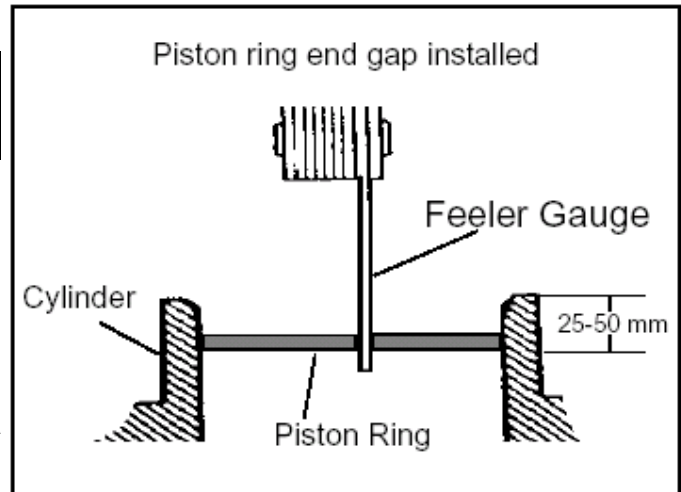
9. Place each piston ring inside cylinder using piston to push ring squarely into place as shown.

Piston Ring Installed gap:
STD- 0.10~0.25mm.(.002~.008")
Limit: 0.5mm.

NOTE: Measure at two points in the cylinder. A difference in end gap indicates cylinder wear. The cylinder should be measured for excessive taper and out of round.

10. If the installed gap measurement exceeds the limit, replace the rings.

NOTE: Always check piston ring installed gap after re-boring a cylinder or when installing new rings. A re-bored cylinder should always be scrubbed thoroughly with hot soapy water, rinsed, and dried completely. Wipe cylinder bore with an oil rag immediately to remove residue and prevent rust.



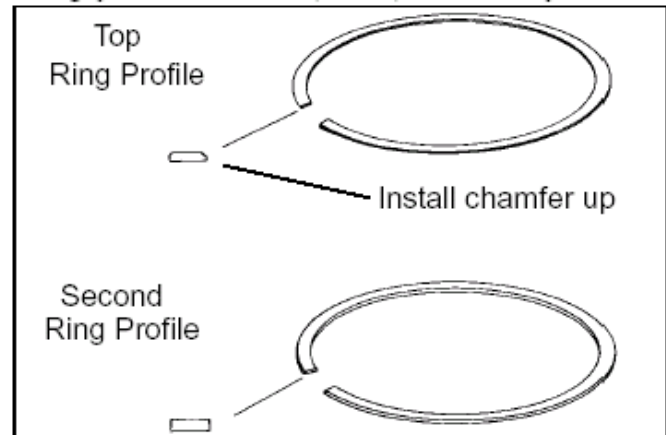
Piston Ring Installation

NOTE: Apply clean engine oil to all ring surfaces and ring lands. Always check piston ring installed gap before rings are installed on piston. If the piston has been in service, clean any accumulated carbon from the ring grooves and oil control ring holes.

1. Place oil control ring expander in oil ring groove with end gap facing forward. The expander has no up or down. The ends should butt squarely together and must not overlap.
2. Install oil ring top rail with end gap at least 30° from the end of the expander.
3. Install bottom rail with gap at least 30° from the end of the expander on the side opposite the top rail gap.
4. Install the second ring with the mark facing up. Position the end gap toward the rear (intake) side of the piston.

5. Install the top ring with the chamfered edge facing up.

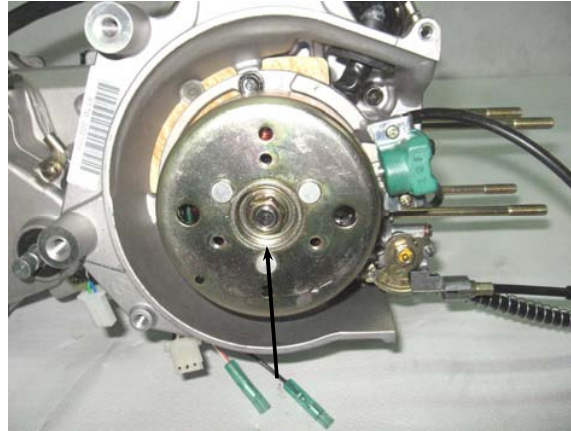
6. Check to make sure the rings rotate freely in the groove when compressed by hand.



Flywheel Removal / Inspection

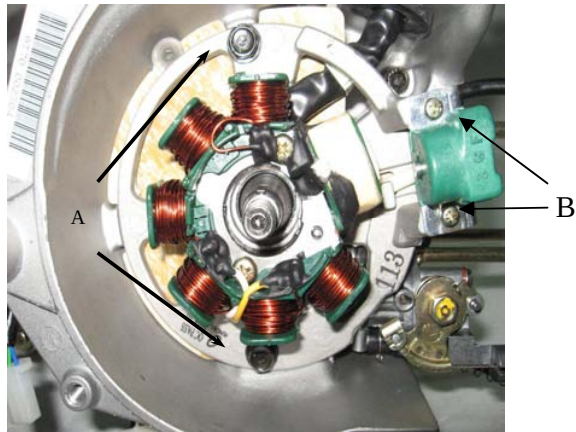
1. Remove the flywheel cover, the flywheel nut, and washer. Install flywheel puller and remove flywheel.

CAUTION: Do not hammer or strike the tool or crankshaft may be damaged.



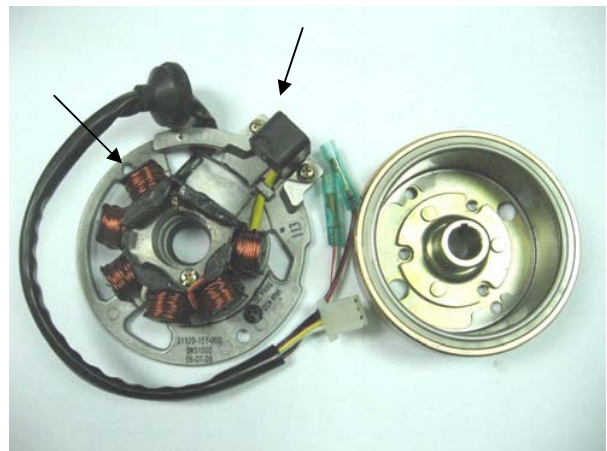
Stator Removal

1. Remove flywheel.
2. Loosen stator screws (A) and pulse coil screws (B) evenly and remove stator. Note wire routing for assembly.

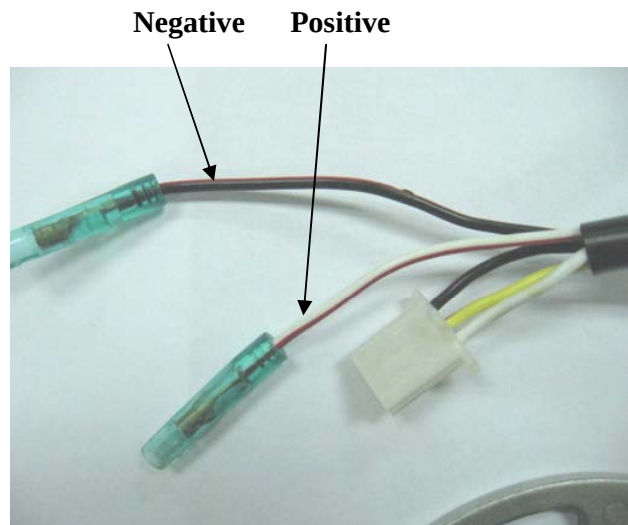


Stator Inspection

Visual inspect the isolation of coil and pulse coil wires.

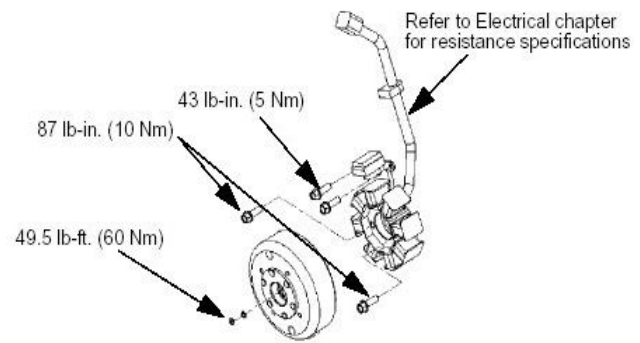


Measure resistance value of each stator leg.
the DC resistance value is 720~ 850.



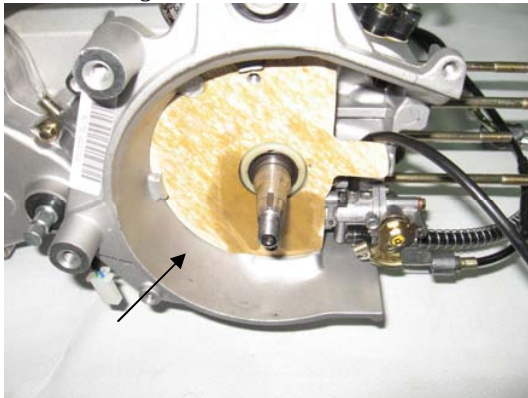
Stator installation

1. Install stator wire into crankcase.
2. Fasten stator screws (A) and pulse coil screws (B).
3. Place the fly wheel then washer in crankshaft.
4. fasten nut onto fly wheel.



Oil Pump Removal

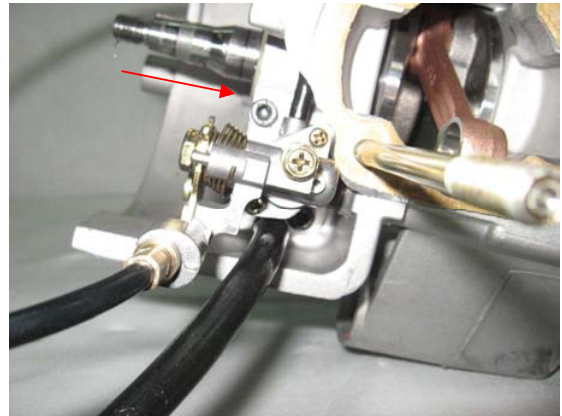
1. Remove stator.
1. Remove gasket.



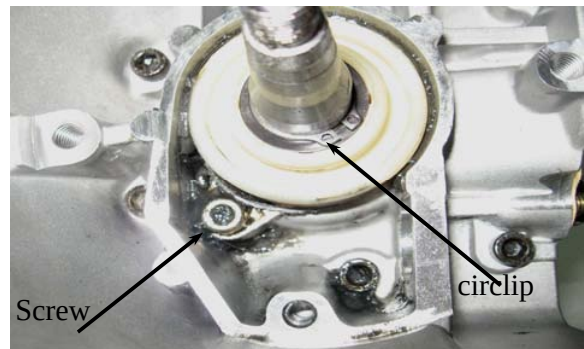
2. Clean up the grease on oil pump gear.



4. Take off the bolts then remove the oil pump.



5. Loosen the bolt then remove the circlip.

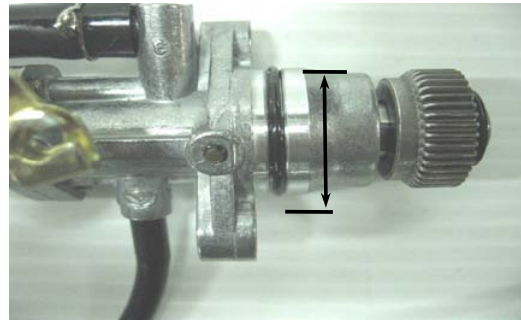


6. Take off wave washer then remove gear.



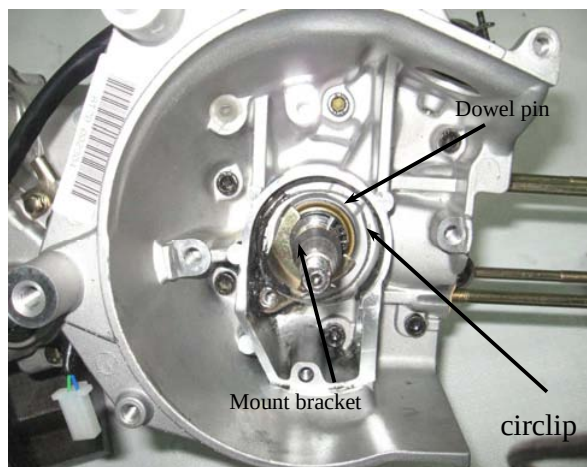
Oil pump body inspection

Inspect the oil pump outside diameter by caliper.



Oil pump OD. Limit: 21.98mm. min.

7. Remove mount bracket then circlip and dowel pin.



Oil tube inspection

Inspect the tube leaking and broken.



Oil pump gear inspection

Inspect the gear outside diameter by caliper.



Gear OD. Limit: 50.825mm. min.

NOTE: The CVT system, starter motor, starter drive, flywheel, stator, oil pump and transmission can be serviced with the engine in the frame.

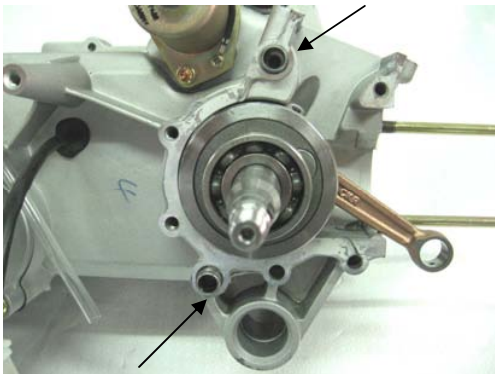
Crankcase Disassembly

NOTE: Engine must be removed to perform crankcase or crankshaft service.

1. Remove engine, cylinder, piston, and stator assembly.
2. Loosen crankcase screws evenly and remove.



3. Separate right crankcase from left by tapping gently with a soft face hammer evenly around the case as required. Leave the crankshaft in the left crankcase half. Do not attempt to remove crankshaft with right case or cam chain will be damaged.

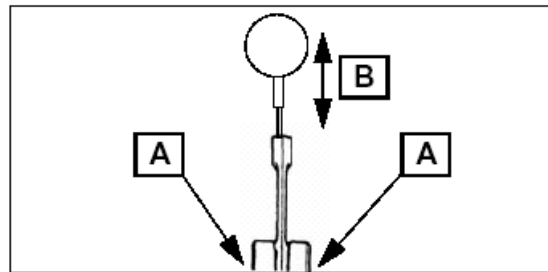


Crankshaft Inspection

1. Inspect the crankshaft main bearings and cam chain sprocket for wear or damage.

NOTE: Due to extremely close tolerances and minimal wear, the bearings must be inspected visually, and by feel. Look for signs of discoloration, scoring or galling. Turn outer race of each bearing. Bearings should turn smoothly and quietly. The inner race of each bearing should fit tightly on the crankshaft. The outer race should be firm with minimal side to side movement and no detectable up and down movement.

2. The connecting rod big end bearing is a roller bearing. Visually inspect connecting rod big end for scoring, damage or excessive wear. If connecting rod passes visual inspection, measure radial clearance carefully with crankshaft clamped in V-blocks at points "A" and a dial indicator measuring total up and down movement "B". Compare to specifications. If clearance is excessive replace the crankshaft assembly.



3. Inspect the clearance of connecting rod big end and flywheel by feeling gauge. If clearance is excessive replace the crankshaft assembly.



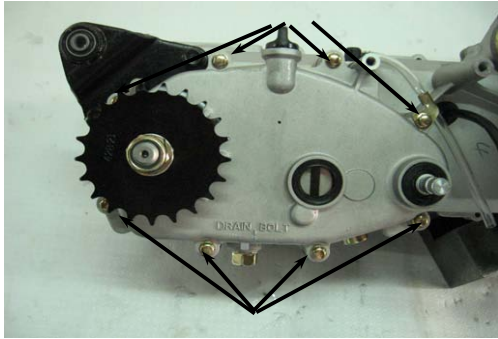
Connecting rod clearance limit: 0.4 mm (.016").

TRANSMISSION

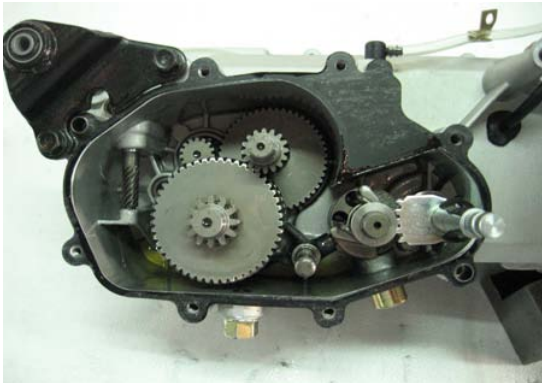
Transmission Disassembly and Inspection

NOTE: Engine removal is not required to service transmission components. Process shown below is with engine removed for clarity.. Differences are noted as required.

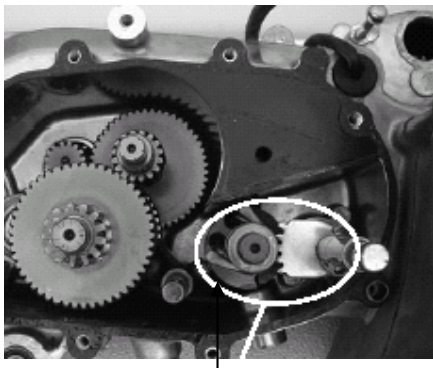
1. Drain the transmission oil from the gear case and engine oil from crankcase.
2. Remove sprocket cover and drive sprocket.



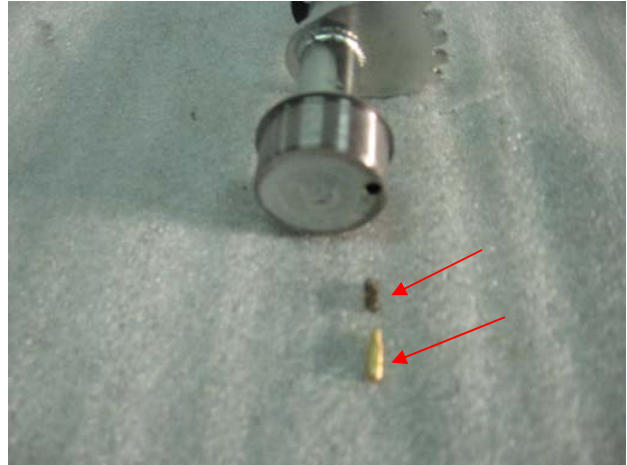
3. Mark shift selector shaft and shift lever arm so the arm can be reinstalled in the same location. Remove arm and bracket.
4. Remove cover with output shaft. Push or tap on shift shaft to keep it in the case.



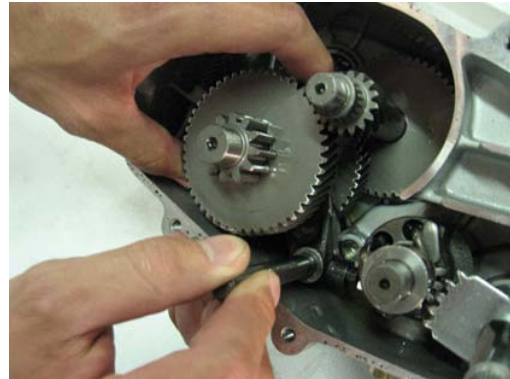
5. Remove gasket and discard.
6. Note timing of shift shaft before removing. The center tooth on shift shaft is positioned between the two dots on the drum teeth.



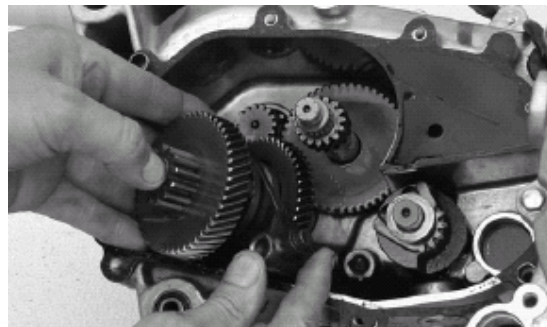
7. Remove the shift shaft by pulling straight outward. DO NOT LOSE the spring and plunger on the inner end of the shaft. This plunger contacts the gear position switch.



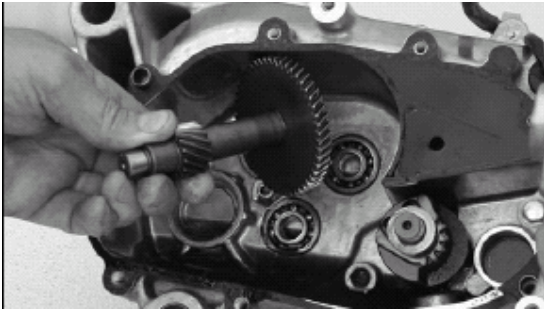
8. Remove shift fork shaft.



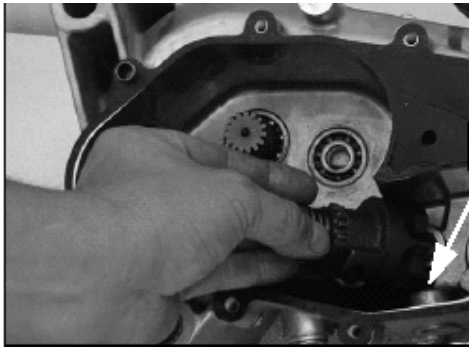
9. Remove main shaft and shift fork as an assembly.



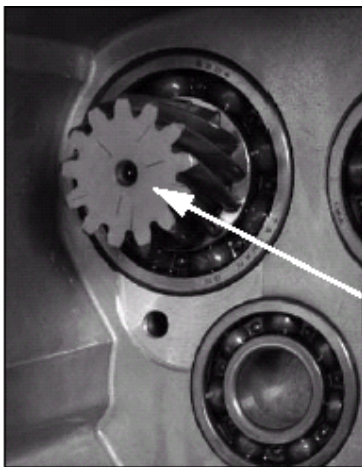
10. Remove the counter shaft.



11. Remove shift drum. Push detent ball located at back against spring pressure to ease removal.



12. If input shaft or gear requires service, remove driven clutch as outlined in CVT Chapter.



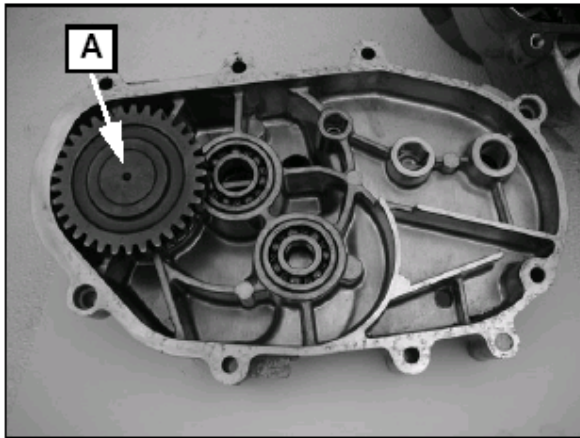
13. Loosen the 12mm hex bolt and remove the shift detent ball and spring assembly.



Transmission Inspection

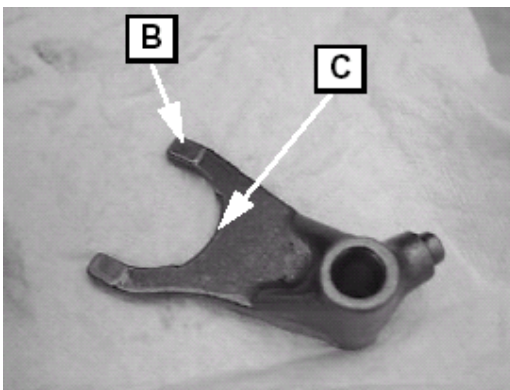
NOTE: Always wear the appropriate protective gear and use caution when operating a press.

1. With transmission components removed, inspect all shaft bearings visually and by feel. Bearings should roll smoothly, without excessive movement or noise. **Replace any bearing that is removed, as the removal process destroys the bearing.**
2. Bearings can be removed using a standard blind bearing remover. Apply lithium grease to outer race of new bearings and press into cover or case by the outer race. Do not press on inner race or bearing will be damaged.
3. Press output shaft (A) out of cover with an arbor press or a hydraulic press from outside to inside, while supporting cover completely.

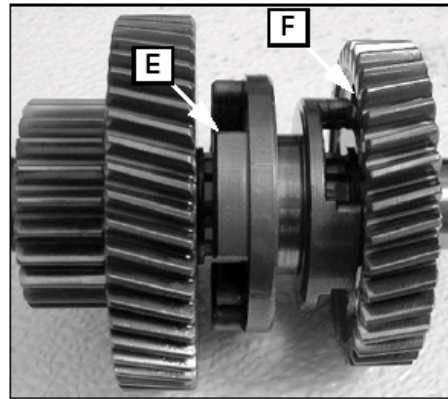


NOTE: Inspect all shafts for wear in the bearing contact areas. The sealed output shaft bearing (in the transmission cover) has a snap ring that must be removed before output shaft bearing can be pressed out of the cover.

4. Inspect the shift fork (B) for scoring or signs of wear. Area (C) should not show contact.



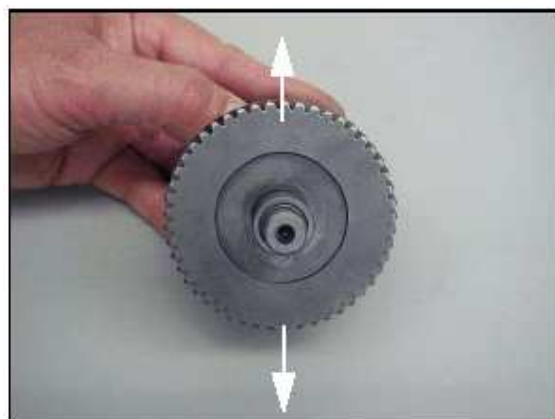
5. Inspect sliding gear dogs and dog slots in the mating gears (F) for wear or damage. The edges of dogs and slots should be square and not rounded. Replace both sliding gear and mating gears if any edges are rounded or chipped.



6. Substantial axial movement in the forward drive gear is due to liberal oil clearance for the bushing, and is a normal condition. Gear replacement is not required due to axial movement if radial movement (shown in Step 6) passes inspection.

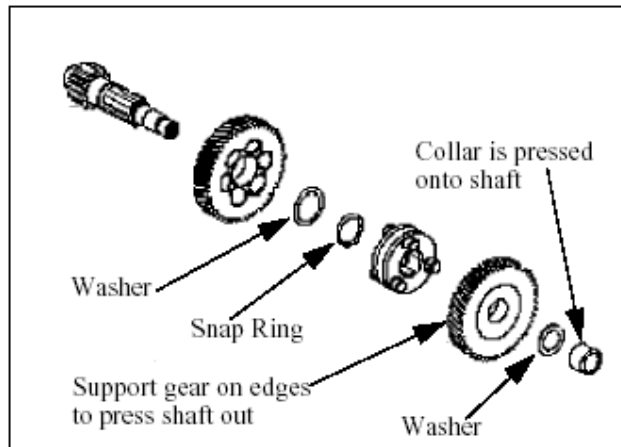


7. Radial movement should not exceed 0.04 mm (.0015 in.).



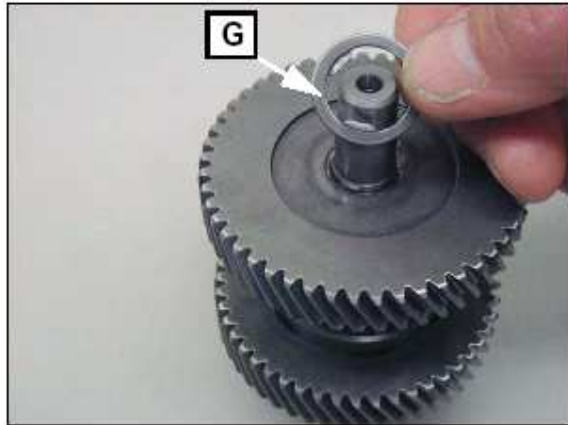
Shaft Disassembly

8. If radial movement in Step 7 was excessive, support the forward gear and press the shaft through the spacer to disassemble it from the shaft.
9. Remove the sliding gear from the shaft.
10. Remove the snap ring and thrust washer to access the reverse gear .

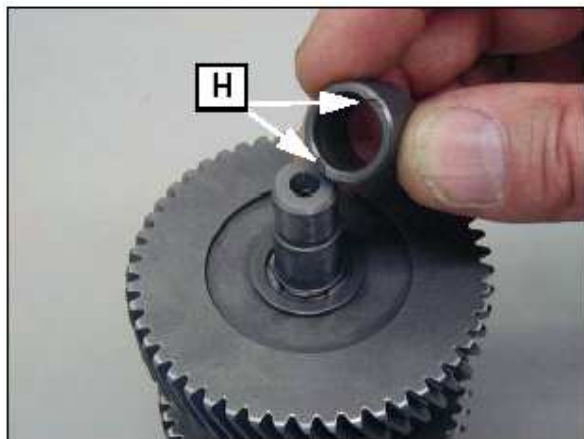


Shaft Assembly

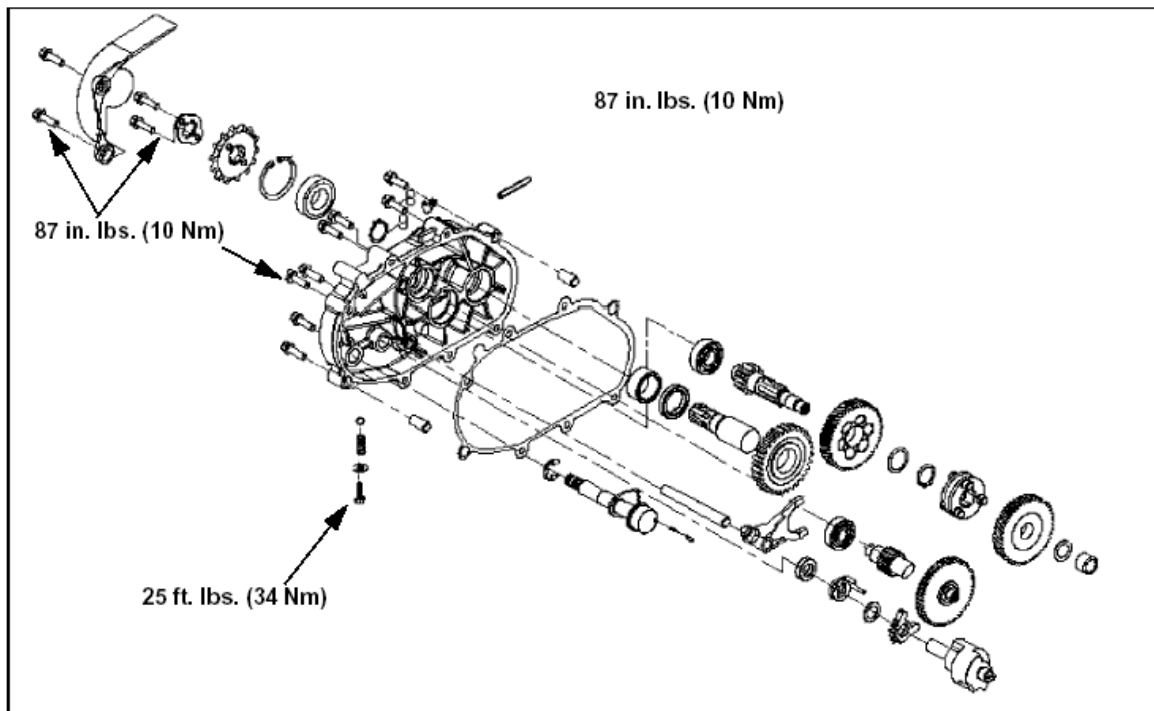
11. Assemble the reverse gear , washer, a new snap ring, and the sliding gear on the shaft.
12. Replace gear and place it on the shaft, followed by the washer (G) as shown.



13. Grooves (H) on spacer face the washer. Press spacer onto shaft until firmly seated against the step on the shaft.

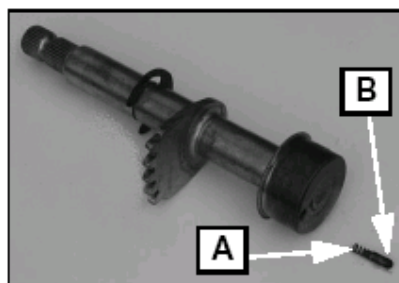


Transmission Assembly



IMPORTANT: To reassemble the transmission, reverse the disassembly procedure, refer to exploded view, and review the following information and special notes.

1. Use caution when installing the gear position indicator spring (A) and pin (B) located in the end of the shift shaft. Removal of the indicator switch (located under the clutch cover) is recommended.

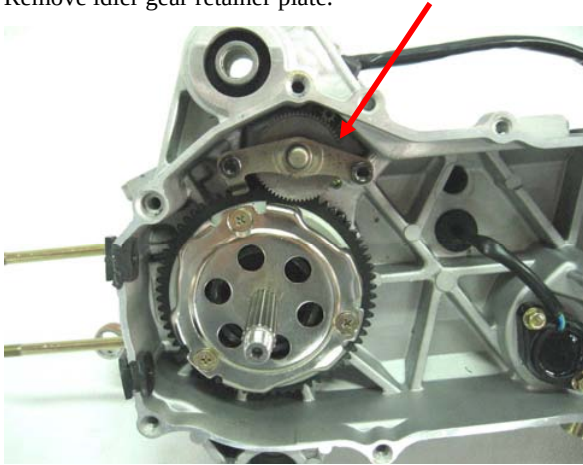


2. Check transmission operation before final assembly, and after installing outer cover and output shaft.

FORWARD	
NEUTRAL	
REVERSE	

Starter Drive Mechanism (Electric)

1. Remove CVT cover. See "Clutch Cover Removal" in Chapter 3.
2. Remove drive clutch.
3. Remove idler gear retainer plate.



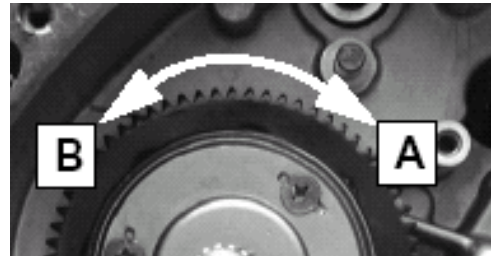
4. Remove idler gear from shaft.



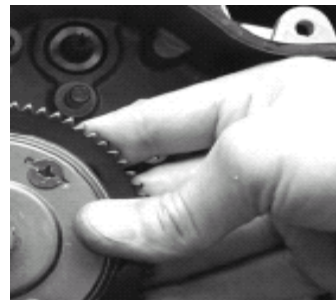
5. Remove thrust washer from shaft.



6. Before removing the starter one-way clutch / gear assembly, inspect the gear operation. The ring gear should rotate smoothly and freely in a clockwise direction (A). The gear should lock and turn the crankshaft when rotated in a counterclockwise direction (B).

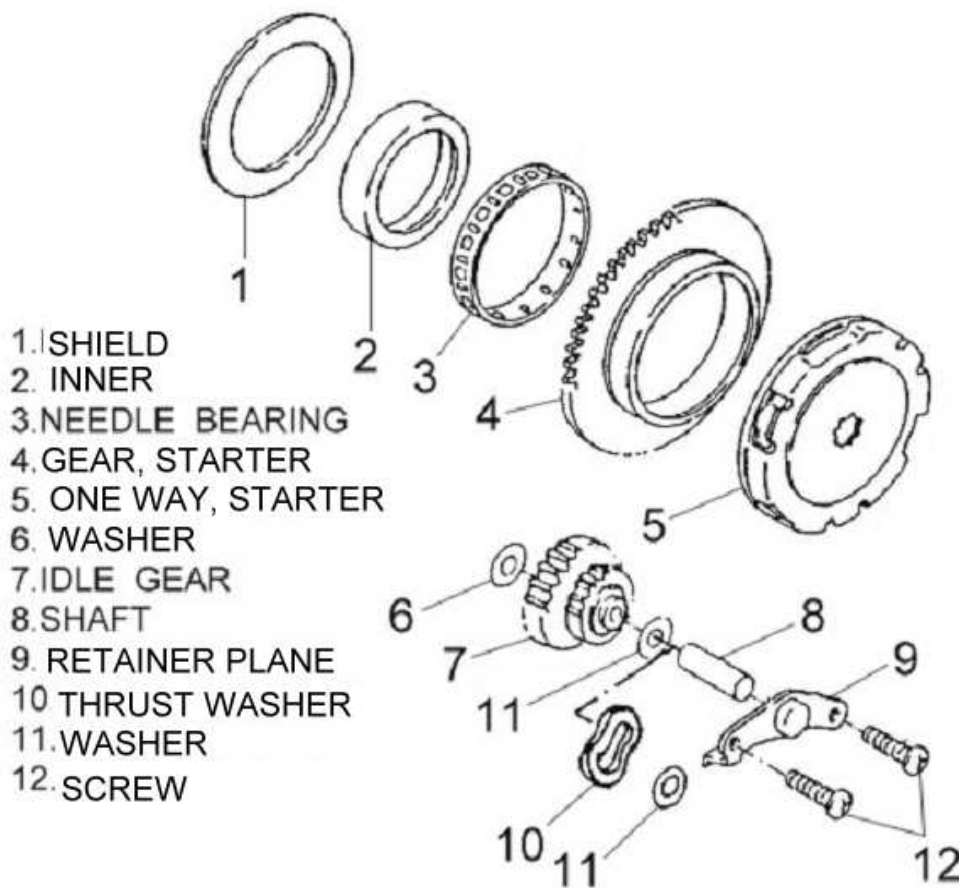


7. Hold the gear and the one-way clutch together to prevent rollers from falling out of the clutch. Remove the one-way clutch and drive gear as an assembly.



8. Lift the gear off of the one-way clutch.





1. Inspect the surface of the gear hub (4). It must be smooth and free of surface damage. Be sure bearing in hub turns smoothly.
2. Remove the rollers, plungers and springs of one way (5). Replace assembly if damaged or worn. Inspect the splines on the one-way clutch for wear or damage.
3. Assemble the springs, plungers, and rollers into the hub. Push each roller back toward plunger and spring, and then release. Rollers should return freely to the extended position and stop against the hub.
4. Place the starter gear (4) in the one way clutch (5) with a counterclockwise rotating motion. Install the needle bearing (3) into the clutch then place inner ring (2) to clutch.
5. Install idler gear washer on shaft and idler gear. Install retaining plate. Re-assemble CVT system (Chapter 3).

Starter Idler Gear Plate

10 Nm (87 in. lbs.)

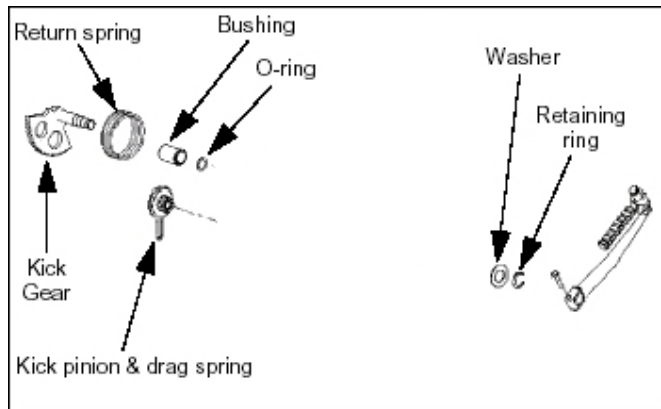
KICK START

Kick Start Disassembly / Inspection



The kick start spring is under tension. Wear face protection during disassembly and assembly of the kick start mechanism.

NOTE: It is not necessary to remove the kick start lever or kick drive components to remove the engine cover.



1. Remove clutch cover and cover gasket. (Chapter 3)
2. Remove the kick pinion with drag spring attached by rotating the kick start pedal.
3. Disconnect hooked end of spring and set against stop.



4. Mark the shaft at the opening of the kick start pedal, or note position of kick start pedal before removing.



5. Remove retaining ring and backing washer from the shaft.



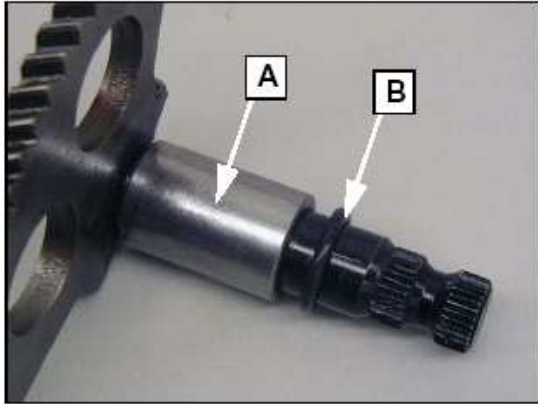
6. Lift hooked end of spring over the stop and allow it to unwind completely (about another 180 degrees).
7. Remove shaft with bushing, O-ring, and spring.



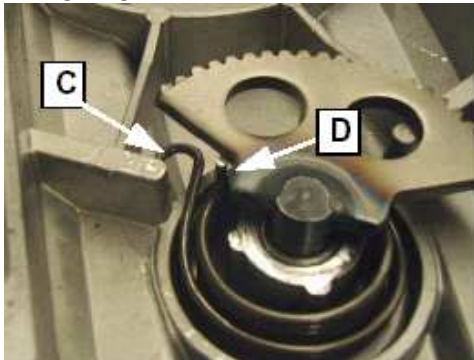
8. Inspect shaft, bushing, and spring for wear or damage. Check shaft pivot boss for cracks.

Kick Start Assembly

1. Secure cover lightly in a vise. Protect the surface of the cover from damage.
2. Install spring in cover with hook and tab ends facing up.
3. Lubricate kick shaft bushing (A) with grease and install on shaft followed by a new O-ring (B).



4. Install shaft with bushing and O-ring into cover.
5. Position hooked end (C) against stop, and engage straight end (D) on edge of gear as shown.



6. Hold spring up against kick gear and rotate gear counterclockwise until trailing edge (E) is past the stop (F). Push gear down until seated and then release gear to rest against the stop.

NOTE: It may be necessary to center the spring on the hub in order to allow shaft to fully seat in the cover.



7. Hold shaft in place so spring does not disengage, and turn cover over.
8. Install retaining ring on shaft.
9. Install kick start pedal, aligning marks made previously.



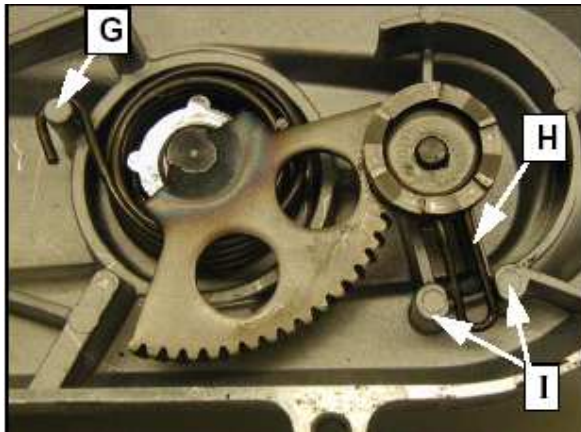
Kick Start Pedal Bolt Torque

87 lb-in. (10 Nm)

10. Install drag spring on kick gear with bend toward bevel gear.



11. Wind the hook end of the spring over the post (G).
12. Install kick pinion with tab of drag spring (H) engaged in the between the posts (I).



TROUBLESHOOTING

Spark Plug Fouling

- Spark plug cap loose or faulty
- Choke cable adjustment, cable or shaft sticking
- Incorrect spark plug heat range or gap
- Carburetor inlet needle and seat worn
- Jet needle and / or needle jet worn or improperly adjusted
- Loose jets in carburetor or calibration incorrect altitude/temperature
- Incorrect float level setting
- CVT system calibrated incorrectly or components or mis-adjusted
- Fuel quality poor (old)
- Low compression
- Restricted exhaust
- Weak ignition (loose coil ground, faulty coil,

Engine (General)

Engine Turns Over But Fails to Start

- No fuel
- Dirt in fuel line or filter
- Fuel will not pass through fuel valve
- Fuel pump inoperative / restricted
- Tank vent plugged
- Engine flooded with fuel
- Low compression (high cylinder leakage)
- No spark (Spark plug fouled)

Engine Does Not Turn Over

- Discharged battery
- Loose or corroded battery terminals / cables
- Starter motor electrical circuit faulty
- Engine seized or mechanical failure
- Kickstart components damaged

Engine Runs But Will Not Idle

- Carburetor pilot (idle) circuit restricted or blocked
- Carburetor misadjusted
- Choke not adjusted properly
- Low compression
- Insufficient valve clearance (too tight)
- Crankcase breather restricted
- Air filter restriction
- Old (degraded) fuel
- Incorrect ignition timing / sheared flywheel key

Engine Idles But RPM Will Not Increase

- Spark plug fouled/weak spark
- Broken throttle cable
- Obstruction in air intake
- Air box removed (reinstall all intake components)
- Incorrect or restricted carburetor jetting
- ETC switch limiting speed
- Reverse speed limiter limiting speed
- Carburetor vacuum slide sticking/diaphragm damaged
- Incorrect ignition timing / sheared flywheel key
- Restricted exhaust system
- Cam lobe worn

Engine Has Low Power

- Spark plug fouled
- Cylinder, piston or ring wear or damage (check compression / cylinder leakage)
- CVT not operating properly
- Restricted exhaust muffler
- Dirty / restricted carburetor
- Cam lobe worn

Piston Failure - Scoring

- Lack of lubrication
- Dirt entering engine through cracks in air filter or ducts
- Engine oil dirty or contaminated

Excessive Smoke and Carbon Buildup

- Excessive piston-to-cylinder clearance
- Worn rings, piston, or cylinder
- Worn valves, guides or seals
- Restricted crankcase vent
- Air filter dirty or contaminated
- Engine oil level too high

Low Compression

- Cylinder head gasket leak
- No valve clearance or incorrectly adjusted
- Cylinder or piston worn
- Piston rings worn, leaking, broken, or sticking
- Bent valve or stuck valve
- Valve spring broken or weak
- Valve not seating properly (bent or carbon accumulated on valve area)
- Rocker arm sticking

Backfiring

- ETC or speed limiter system malfunction
- Fouled spark plug or incorrect plug or plug gap
- Carburetion faulty - lean condition
- Intake / Exhaust system air leaks
- Spark plug cap cracked / broken
- Ignition coil faulty
- Ignition or kill switch circuit faulty
- Ignition timing incorrect
- Sheared flywheel key
- Poor connections in ignition system wiring
- Ignition system wiring wet
- Cam lobe worn or valve sticking
- Lean condition

Transmission

Gear Will Not Engage

- Shift arm indexed incorrectly (hits bracket)
- Shift arm slipping on spline
- CVT Belt broken
- Internal trans gear damage
- Shift fork broken or bent
- Shift shaft broken

Pops Out Of Gear

- Shift arm indexed incorrectly (hits bracket before full engagement)
- Shift arm slipping on spline
- Detent spring or ball missing, worn, or broken
- Gear engagement dogs worn (rounded) or broken
- Shift fork bent

Noise

- Incorrect transmission lubricant
- Lubricant level too low
- Lubricant level too high
- Bearings worn or damaged
- Gears worn or damaged
- CVT problem (belt)
- Final drive (chain or sprockets) worn or damaged

FUEL SYSTEM

CHAPTER 5

FUEL SYSTEM

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Carburetor Function

**WARNING**

Gasoline is extremely flammable and explosive under certain conditions.

Always stop the engine and refuel outdoors or in a well ventilated area.

Do not overfill the tank. The tank is at full capacity when the fuel reaches the bottom of the filler neck. Leave room for expansion of fuel.

Never start the engine or let it run in an enclosed area.

Gasoline powered engine exhaust fumes are poisonous and can cause loss of consciousness and death in a short time.

Never drain the float bowl when the engine is hot.

Severe burns may result.

Do not smoke or allow open flames or sparks in or near the area where refueling is performed or where gasoline is stored.

If you get gasoline in your eyes or if you should swallow gasoline, seek medical attention immediately.

If you spill gasoline on your skin or clothing, immediately wash with soap and water and change clothing.

Carburetor Component Function			
System	Main Components	Main Function	Main Affect
Float System (Level Control)	Inlet Pipe, Needle and Seat, Float and Float Pin	Maintains specified fuel level in float chamber (carburetor float bowl).	All systems; all throttle ranges
Venting	Passages in carburetor and vent lines.	Supplies atmospheric pressure to float chamber.	All systems; all throttle ranges.
Starter (Choke Plate)	Choke Lever, Cable, and Choke Butterfly	Supplies additional fuel air mixture necessary for cold starting.	All throttle ranges. Greatest effect low throttle settings and idle.
Pilot (Idle System)	Pilot Jet / Passageways, Pilot-Mixture Screw with Spring Washer and Sealing O-Ring, Pilot Outlet and Throttle Valve.	Primarily supplies fuel at idle and low throttle positions.	Mainly idle 1/4 throttle. Minimal effect after 1/2 throttle.
Main System	Main Jet, Main Air Passage, Needle Jet, Jet Needle, Throttle Valve.	Supplies fuel at mid-range and high throttle settings.	1/4 to full throttle.

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Carburetion Specifications

COBRA 100 SUNWORLD	
Pilot Air Screw	1 1/4
Needle	H68T
Pilot Jet	#25
Main Jet	#82.5
E-clip Position	3 From Top

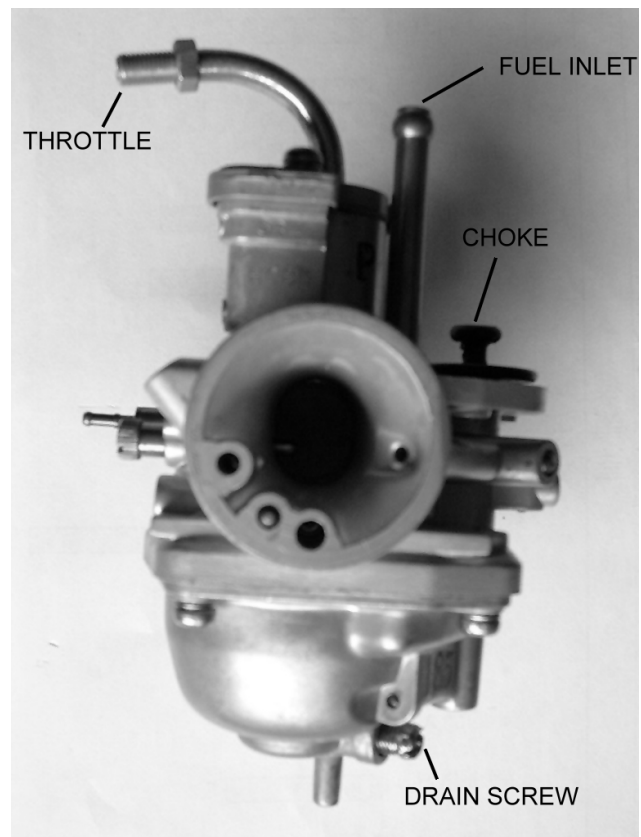
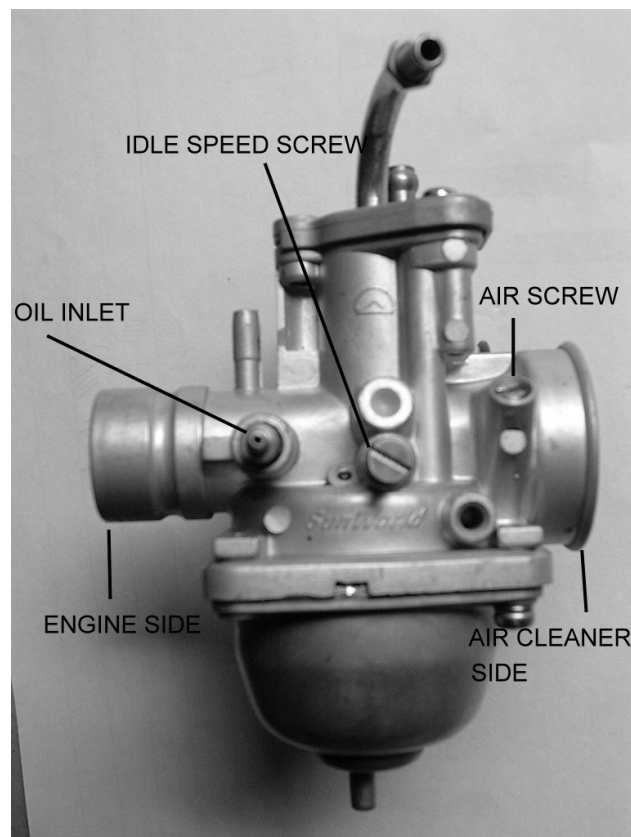
COBRA 50 MIKUNI	
Pilot Air Screw	1
Needle	3CR1
Pilot Jet	#17.5
Main Jet	#80
E-clip Position	4 From Top

CARBURETOR OPERATION

Operation Overview

The engine of a vehicle is operated under a wide range of conditions, from idling with the throttle valve remaining almost closed, to full load or maximum output with the throttle valve fully opened. In order to meet the requirements for the proper mixture ratio under these varying conditions, a low speed fuel system, or pilot system, and a main fuel system are provided in these type of carburetors.

The function of a carburetor is to produce a combustible air/fuel mixture by breaking fuel into tiny particles in the form of vapor, to mix the fuel with air in a proper ratio, and to deliver the mixture to the engine. A proper ratio means an ideal air/fuel mixture which can burn without leaving an excess of fuel or air. Whether the proper mixture ratio is maintained or not is the key to efficient engine operation. This carburetor has varying operations depending upon varying driving conditions. It is constructed of a float system, pilot system, main system, and starter system or initial starting device.



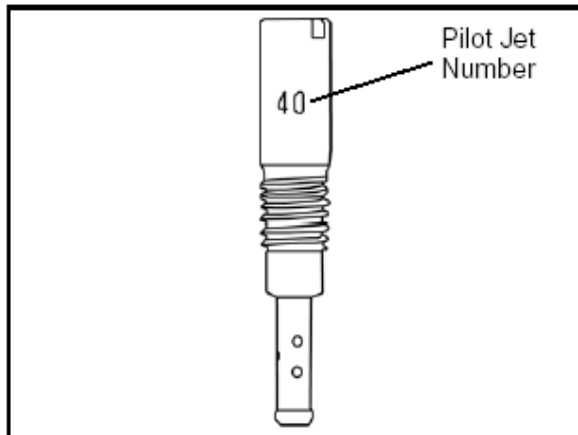
Float System

The float system is designed to maintain a constant height of gasoline during operation. When the fuel flowing from the fuel pump into the float chamber through the needle valve reaches the constant fuel level, the floats rise. When the buoyancy of the float and the fuel pressure of the fuel pump balance, the needle valve seals the orifice in the needle seat, preventing further fuel delivery, and the level of fuel in the bowl remains relatively constant.

The fuel level in the bowl assists in controlling the amount of fuel in the fuel mixture. Too high a level allows more fuel than necessary to leave the nozzle, enriching the mixture. Too low a level results in a leaner mixture, since not enough fuel leaves the nozzle. Therefore, the predetermined fuel level should not be changed arbitrarily.

Pilot Jet

From idling to low speeds, the fuel supply is metered by the pilot jet. There are several air bleed openings in the sides of the pilot jet which reduce the fuel to mist. The number stamped on the jet is an indication of the amount of fuel in cc's which passes through the jet during a one minute interval under a given set of conditions.



Air Mixture Screw

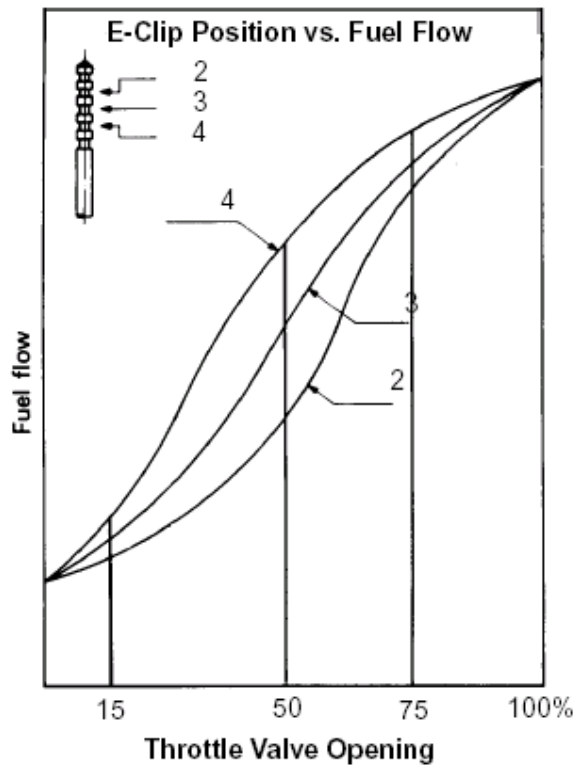
The pilot mixture screw controls the fuel mixture from idle to low speeds. The tapered tip of the mixture screw projects into the fuel mixture passage leading to the pilot jet air bleeds. By turning the screw in or out, the cross sectional area of the air passage is varied, in turn varying the pilot jet air supply and changing the mixture ratio.

CAUTION

The air screw is calibrated at the factory to meet EPA / CARB regulations for air quality standards. Cleaning of the pilot circuit must be performed by a certified repair shop to ensure air quality standards are not exceeded.

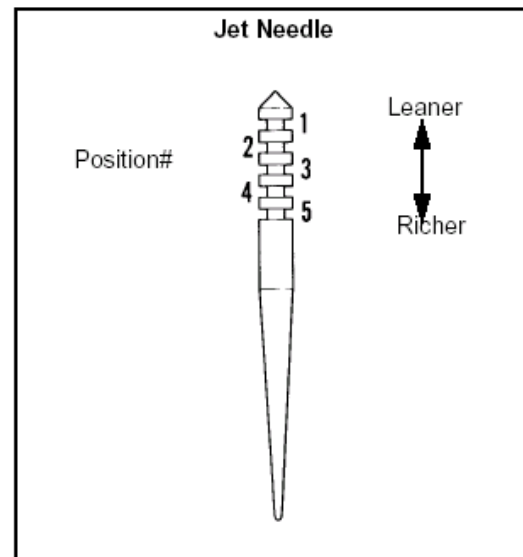


Air / Fuel Mixture Ratio



Jet Needle

The jet needle has five adjustment grooves cut into the upper portion, and is tapered from approximately the middle of the needle to the lower end. The top is fixed to the center of the throttle valve by the needle clip, and the tapered end extends into the needle jet. Fuel flows through the space between the needle jet and jet needle. This space does not vary until the throttle reaches the 1/4 open point. At that time the tapered portion of the needle begins to move out of the jet, affecting fuel flow as the opening enlarges. If the needle clip is changed from the standard position to a lower groove, the needle taper starts coming out of the jet sooner, resulting in a richer mixture. Moving the clip higher produces a leaner mixture. If the taper is worn due to vibration, fuel flow may be significantly affected.

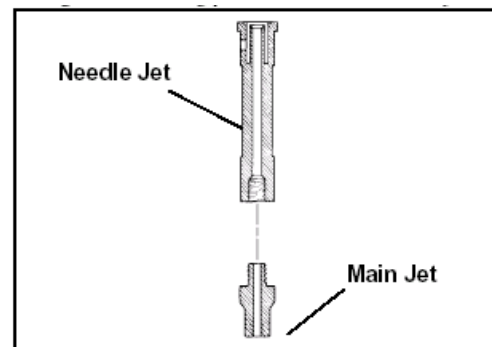


A carburetor with a slide type throttle valve is also called a variable venturi type carburetor. In this type of carburetor, the needle jet and jet needle serve to control proper air/fuel mixture ratio at the medium throttle valve opening (between 1/4 and 3/4 opening).

Having the proper needle jet and jet needle has a major impact on engine performance at partial load. The jet needle tapers off at one end and the clearance between the jet needle and the needle jet increases as the throttle valve opening gets wider. The air/fuel mixture ratio is controlled by the height of the "E" clip inserted into one of the five slots provided in the head of the jet needle. The previous chart shows the variation of fuel flow based on the height of the "E" clip.

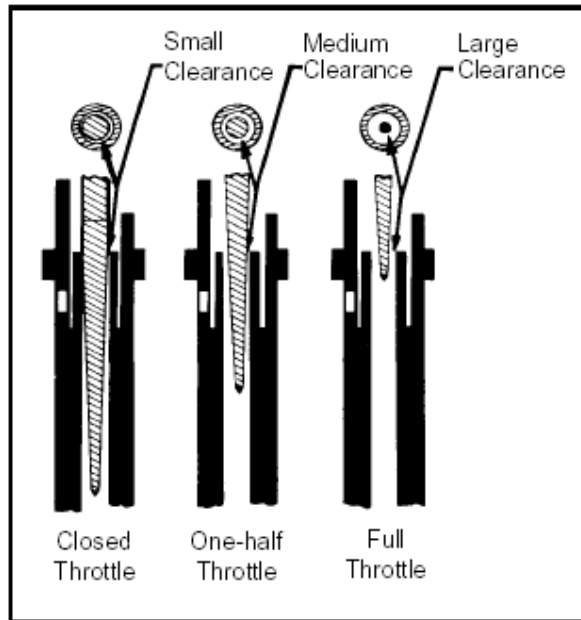
Needle Jet

The needle jet works in conjunction with the jet needle to regulate fuel flow rate. An air bleed opening in the side of the needle jet brings in air measured by the air jet. This air initiates the mixing and atomizing process inside the needle jet.



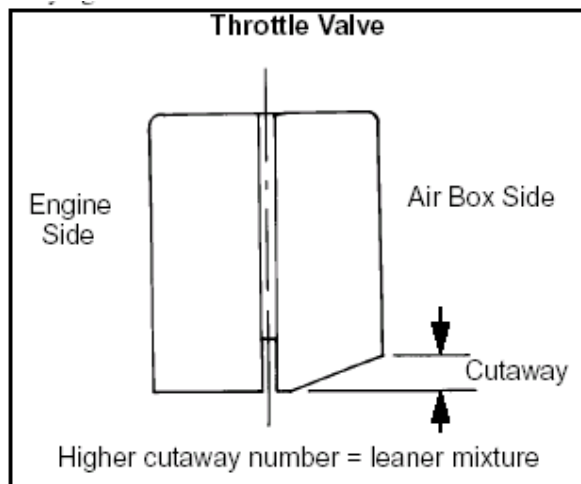
Throttle Opening vs. Fuel Flow

In a full throttle condition the cross sectioned area between the jet needle and the needle jet is larger than the cross sectioned area of the main jet. The main jet therefore has greater control over fuel flow.



Throttle slide

The throttle slide controls the rate of engine air intake by moving up and down inside the main bore. At small throttle openings, air flow control is performed chiefly by the cutaway. By controlling air flow the negative pressure over the needle jet is regulated, in turn varying the fuel flow.



Throttle valves are numbered 1.0, 1.5, 2.0, etc., according to the size of the cutaway. The higher the number, the leaner the gasoline/air mixture.

Main Jet

When the throttle opening becomes greater and the area between the needle jet and jet needle increases, fuel flow is metered by the main jet. The number on the jet indicates the amount of fuel

CCs which will pass through it in one minute under controlled conditions. Larger numbers give a greater flow, resulting in a richer mixture.

FUEL SYSTEM

Pilot System (Idle - 3/8 Throttle)

The pilot system's main function is to meter fuel at idle and low speed driving. Though its main function is to supply fuel at low speed, it does feed fuel continuously throughout the entire operating range.

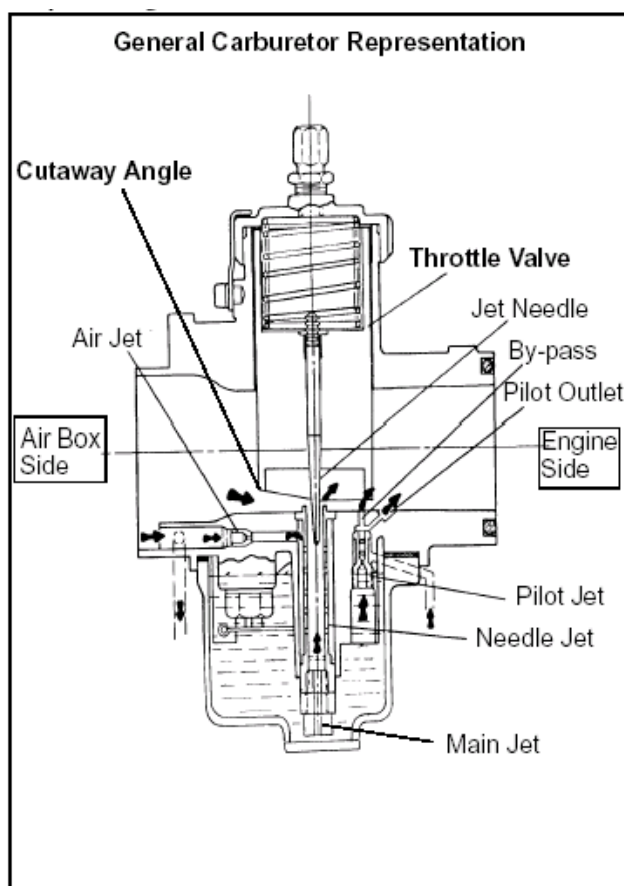
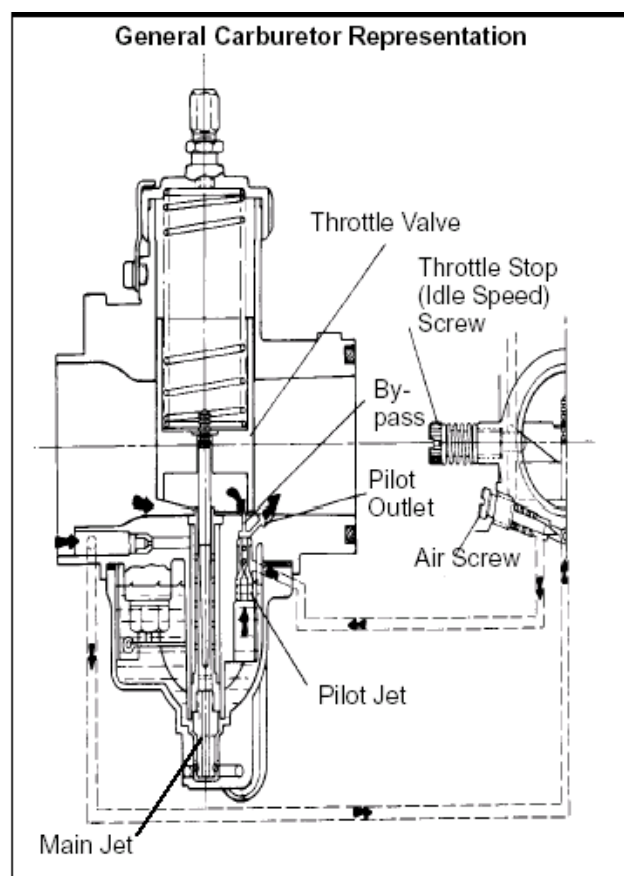
Fuel for the pilot jet is drawn from the float bowl, mixed with air regulated by the air screw, and delivered to the engine through the pilot outlet.

The mixture is regulated to some degree by adjusting the air screw. When the air screw is closed, the fuel mixture is made richer as the amount of air is reduced. When the air screw is opened, the mixture is made more lean as the amount of air is increased.

Slide Cutaway (1/8 - 3/8 Throttle)

Throttle valve cutaway effect is most noticeable at 1/4 throttle opening. The amount of cutaway is pre-determined for a given engine to maintain a 14:1 air/fuel ratio at part throttle. A steep angle would indicate a fairly lean mixture because there is less resistance to air flow. A flat angle would provide a much richer mixture because there is more resistance to air flow.

The venturi shape can be adjusted for each engine's breathing characteristics by using a different valve cutaway angle. A number will be stamped into the bottom of the valve (e.g. 2.5) indicating the size of the cutaway. The higher the number, the steeper the angle.



FUEL SYSTEM

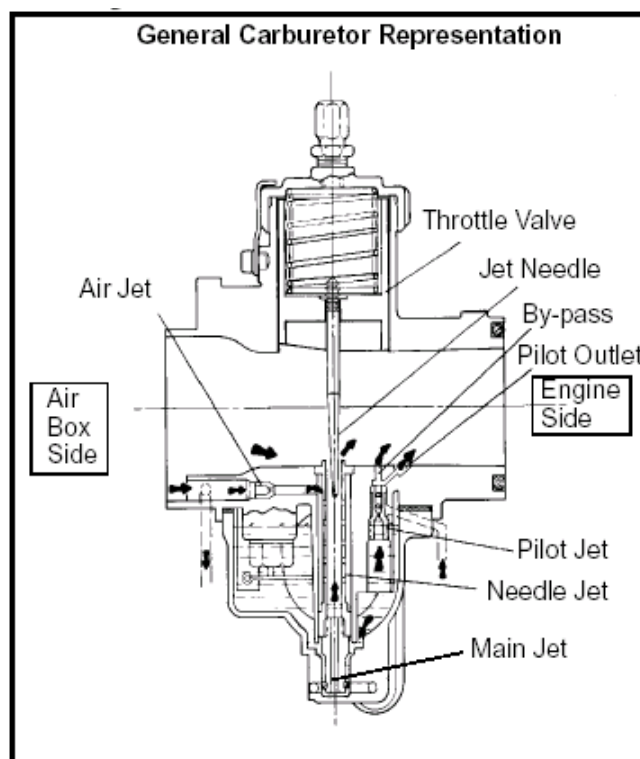
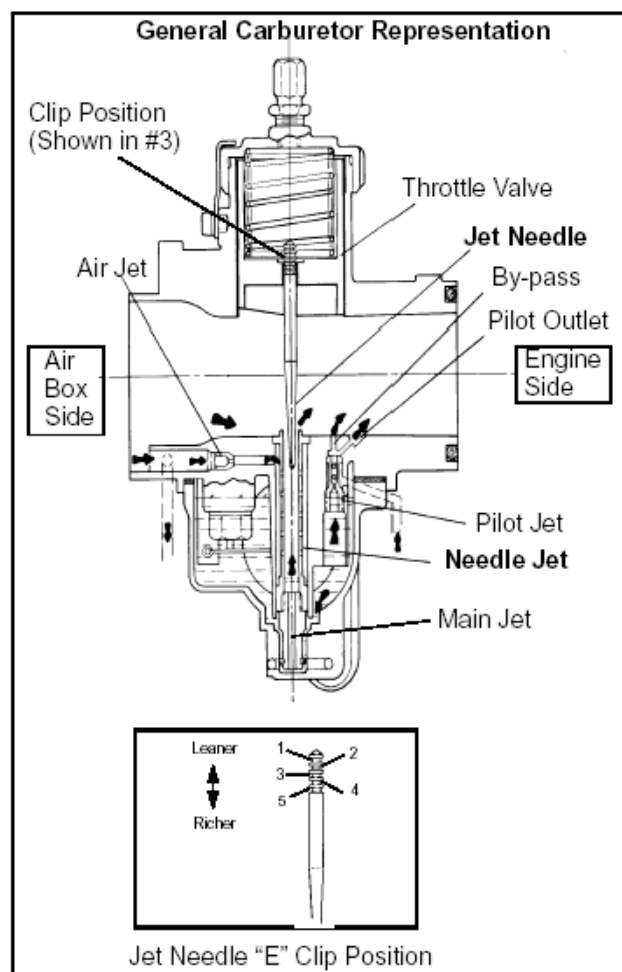
Jet Needle / Needle Jet (3/8 - 3/4 Throttle)

The jet needle and needle jet have the most effect between 3/8 and 3/4 throttle opening. Some mixture adjustment can be accomplished by changing the location of the "E" clip on the needle. Moving the clip down raises the needle in the jet passage and richens the mixture. Moving the clip up lowers the needle in the jet passage and leans the mixture. Letter and number codes are stamped into the needle and the jet indicating sizes and tapers of each.

Main System (3/4 to Full Throttle)

The main system is designed for delivering fuel between low speed and high speed operation. This system is made up of the jet needle, needle jet, and main jet. The main system begins to take effect as soon as there is enough air flow into the carburetor venturi to draw fuel up through the main jet and needle jet assembly. This system works in conjunction with the needle jet system.

During low speed driving, there is very little clearance between the jet needle and the needle jet; therefore, very little fuel from the main jet can pass between the jet needle and the needle jet. As the throttle valve opening is increased, the tapered jet needle is raised farther out of the needle jet, allowing greater fuel flow. Under full throttle opening, the cross sectioned area of clearance between the jet needle and the needle jet becomes greater than the cross sectioned area of the main jet. Thus the main jet is now controlling the amount of fuel flow.



Fuel Delivery

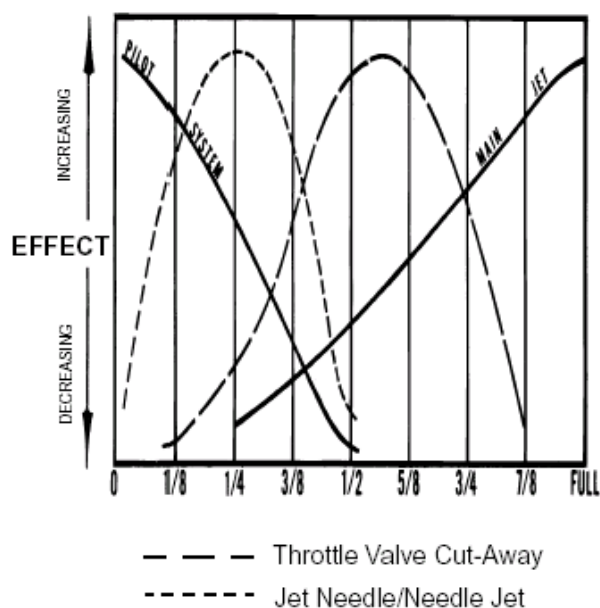
The throttle opening chart below demonstrates component relationship to fuel flow versus throttle valve opening.

The pilot system's main function is that of a low speed jet. Its most effective range of fuel delivery is from idle to approximately 3/8 throttle valve opening.

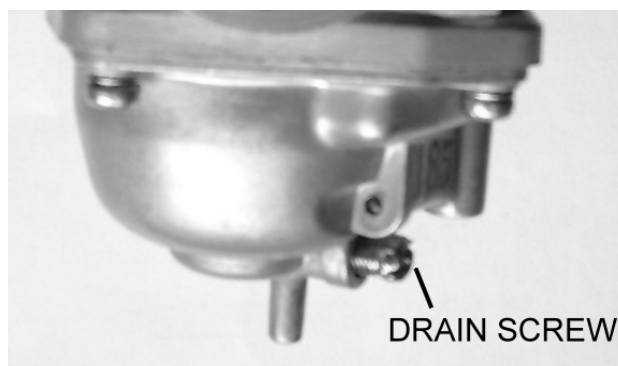
The throttle slide controls the rate of engine air by its movement up and down in the carburetor venturi. At small throttle openings the air flow is regulated chiefly by the valve cutaway, with greatest effectiveness at 1/4 throttle opening. Throttle valves are numbered 1.0, 1.5, 2.0, etc., according to the size of the cutaway.

Decreasing the cutaway number will increase the amount of fuel delivered in its effective range.

The jet needle and needle jet have an effective operating range from approximately 1/8 to 7/8 throttle opening. The amount of fuel delivered during this range relies upon the jet needle clip position, as well as the needle jet size and other specifications. The main jet affects fuel delivery at 1/4 throttle and consistently increases to full throttle opening.

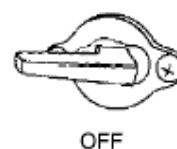
THROTTLE OPENING - Theory**CARBURETOR SERVICE****Carburetor Float Bowl Draining**

The carburetor float bowl should be drained periodically to remove moisture or sediment from the bowl, or before extended periods of storage.



NOTE: Drain screw is located on the side of the float bowl.

1. Place a clean container beneath the bowl drain spigot or bowl drain hose.
2. Turn the fuel valve to "OFF".



3. Loosen drain screw and allow fuel in the float bowl and fuel line to drain completely.
4. Inspect the drained fuel for water or sediment.
5. Tighten drain screw.

6. Turn fuel valve to "ON".



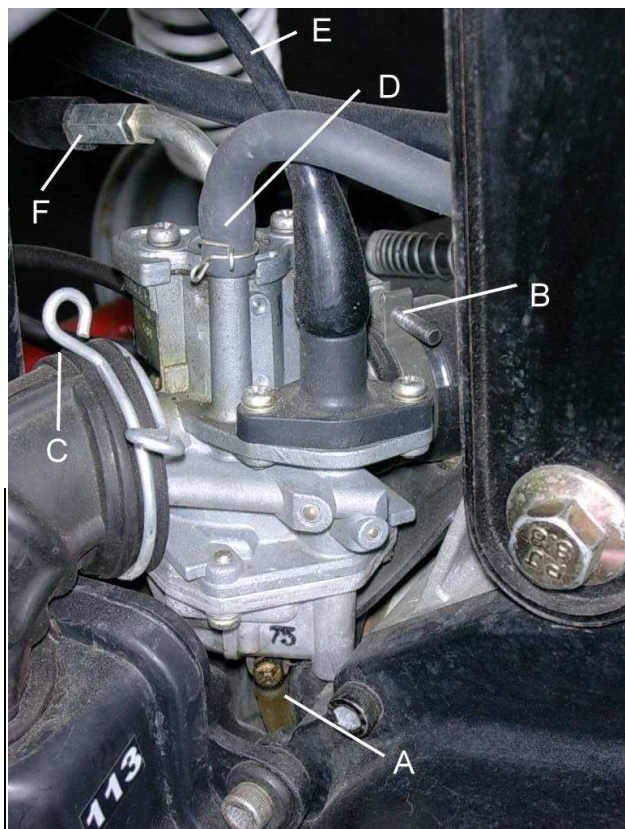
7. Inspect carburetor for fuel leaks
8. Start machine and re-check for leaks.

FUEL SYSTEM

Carburetor Removal - General

The following procedure is provided to use as a reference when removing the carburetor from vehicle. Some steps may differ slightly between models.

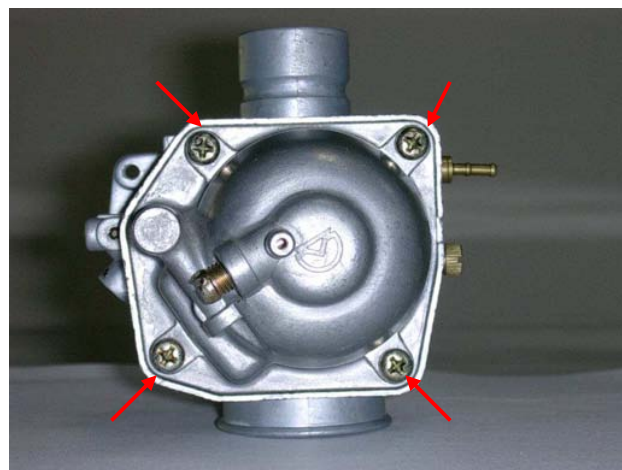
1. Turn the fuel valve "OFF" and drain the fuel from the carb through the drain screw (A).
2. Loosen or remove screw (B).
3. Loosen the intake boot clamp (C) between the carburetor and air cleaner.
4. Loosen fuel tube clamp (D) then remove fuel tube.
5. Loosen oil tube clamp then remove oil tube.
6. Disconnect the choke cable end from the choke lever.
7. Disconnect the throttle cable end from the throttle lever.
8. Remove carburetor from ATV.



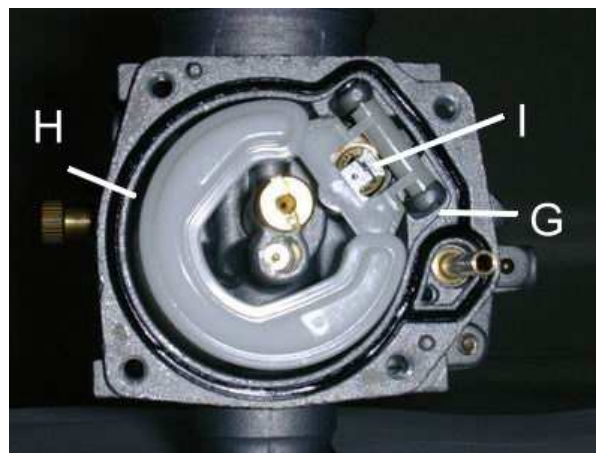
Carburetor Disassembly

Use the following procedure to disassemble the carburetor.

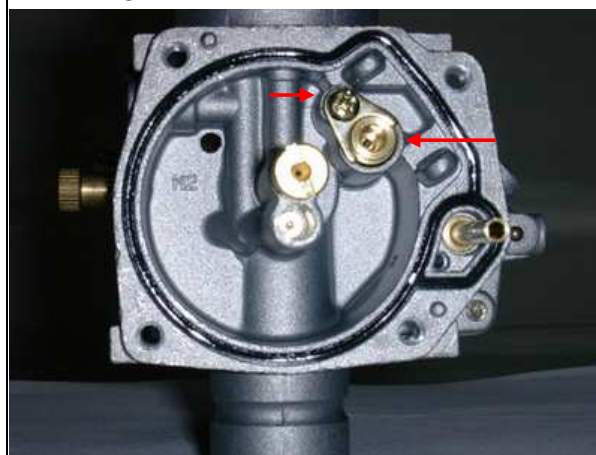
1. Remove the (4) float bowl screws and float bowl.



2. Remove the float pin (G), float (H), and inlet needle (I).

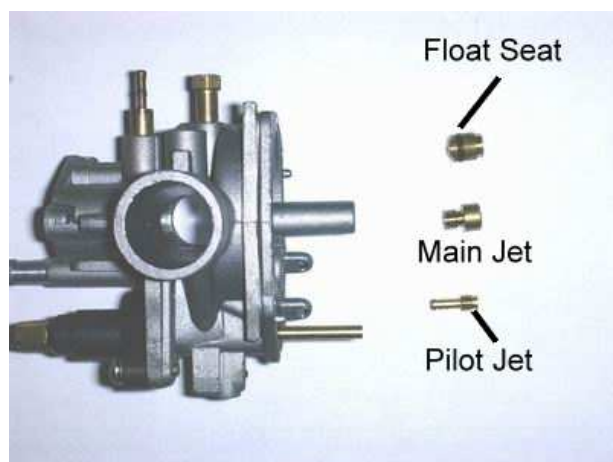


3. Remove the screw of the inlet seat and remove the retaining bracket and seat from the carburetor.



FUEL SYSTEM

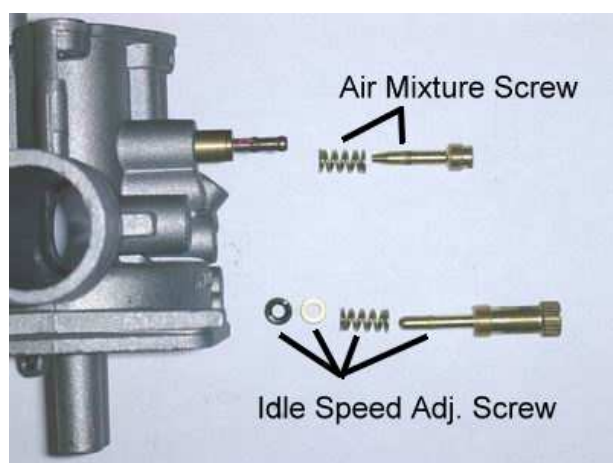
4. Remove the pilot jet , main jet , and from the carb body.



2. Remove cable with valve from the carb body.



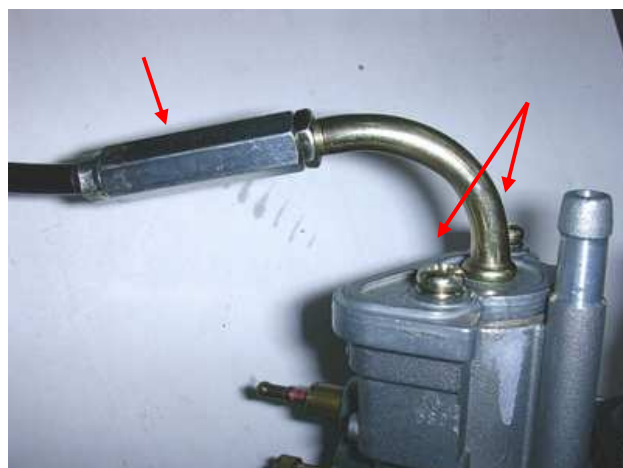
5. Note the position of both the air mixture screw and idle speed adjustment screw and remove both from the carb body.



3. Loosen the choke seat screw.

**Throttle Valve and Choke Disassembly**

1. Loosen the cable nut and valve cover.



4. Remove whole choke with cable then take apart as following .



FUEL SYSTEM**Carburetor Cleaning****⚠ WARNING**

Protect eyes from contact with cleaner. Take appropriate safety measures during these procedures. Safety glasses and chemical resistant gloves are required. Should you get cleaner in your eyes or if you swallow cleaner, seek medical attention immediately. Carburetor cleaners can be extremely caustic. Extended periods of soaking can loosen the adhesive sealer on the passage drill-way plugs. Do not soak rubber or plastic components or O-rings in caustic cleaning solutions. Irreparable damage may occur. Do not use agitator-type carburetor cleaning equipment. Rubber parts must be cleaned with mild detergent and hot water only.

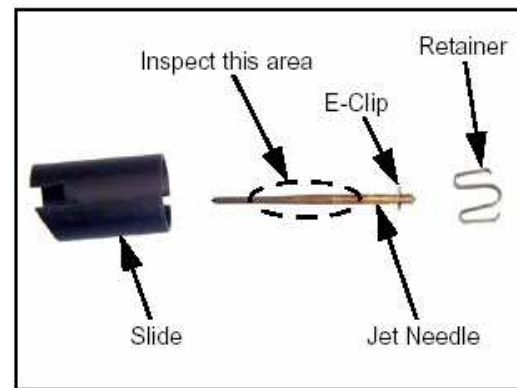
1. Thoroughly clean the carburetor body, jets, and all passages with carburetor cleaner or electrical contact cleaner.
2. If the carburetor is extremely dirty or contaminated with fuel residue and varnish, soak for short periods only in carburetor cleaner, and rinse in hot water.
3. Replace the jets if they have a buildup of fuel residue or bacterial growth that cannot be removed. Even a small amount of residue will reduce the flow characteristics of the jet.
4. Verify all passages and jets are unobstructed by spraying electrical contact cleaner through the passages.

IMPORTANT: Do not use wire or welding tip cleaners as the orifice size may be altered.

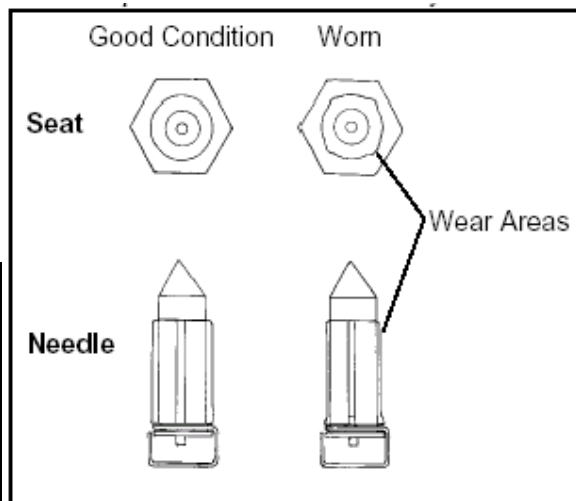
5. Use low pressure air to dry carburetor body and all components.

Carburetor Inspection

1. Remove the carburetor slide assembly. Disassemble the components and inspect for wear. Inspect slide needle and look for discoloration, shiny spots, or an area that looks different than the rest of the needle. The middle to upper portion of the needle contacts the needle jet and is the most likely wear point. If slide needle shows signs of wear replace both the needle and needle jet to prevent a rich condition.

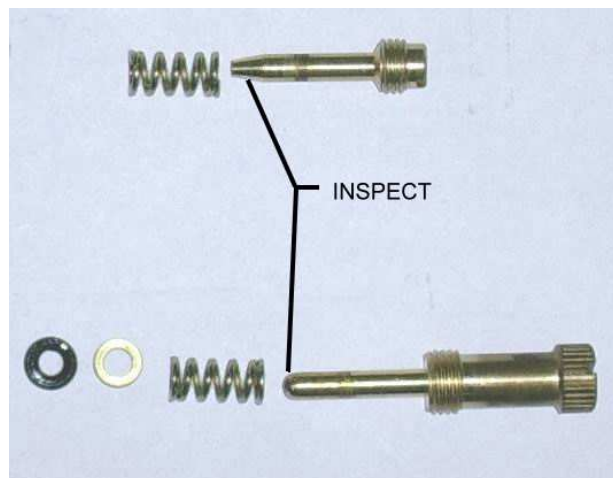


2. Inspect the inlet needle tapered surface for any sign of wear or damage. Be sure the spring loaded pin is free moving and returns freely when pushed. The inlet needle and seat should be pressure tested after assembly.



FUEL SYSTEM

3. Inspect the idle speed adjust screw tip for flat spots and the pilot mixture screw tip for damage. If any damage is present on either screw, it must be replaced.



4. Inspect the float bowl vent tube for cracks near the bottom of the tube.

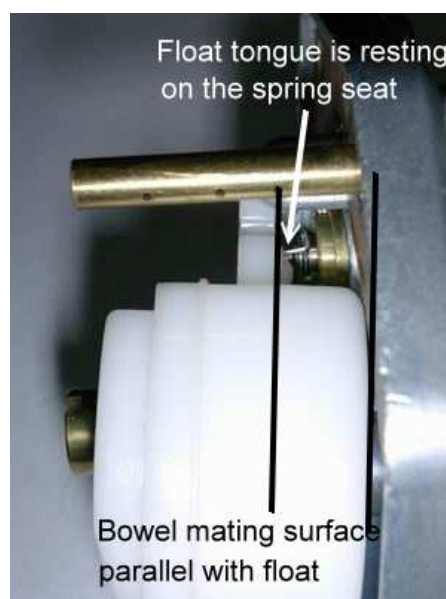
NOTE: A continuous fuel leak from the carburetor drain hose can be a result of a cracked bowl vent tube.



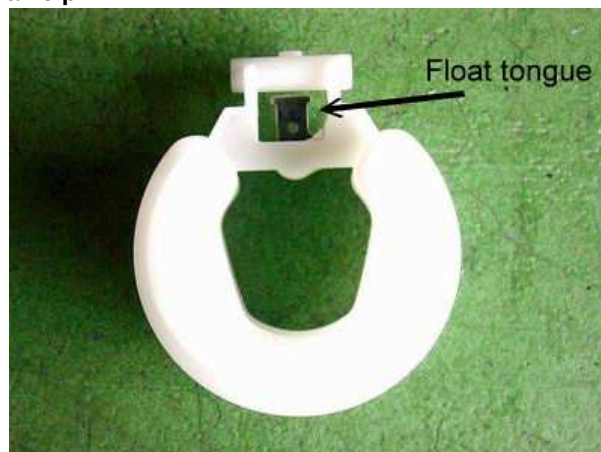
Float Height Adjustment

1. Place the carburetor at a level position to remove weight from float arm. In this position, the float tongue will rest slightly outward.
2. With the carburetor at rest and level, slightly tilt the carburetor back. The float should fall into the correct position, with the float tongue resting lightly on the inlet needle valve pin without compressing the spring. The bottom of the float should be parallel with the float bowl mating surface.

IMPORTANT: When measuring the height, verify the inlet needle valve spring is not compressed.



NOTE: If the float is past parallel with the mating surface, the carburetor has likely been tilted back too far and the float tongue is compressing the needle valve pin.



**Float Height:
Parallel to Gasket Surface $\pm$ 1mm**

FUEL SYSTEM

Carburetor Assembly

1. Replace parts in proper order. Refer to the parts exploded view or “Disassembly” steps for further detail
2. Install the pilot air mixture screw, spring, washer, and Oring as an assembly (Mikuni Only). Lubricate the O-Ring with oil or light grease before installation. Turn the screw in until it lightly contacts the seat. Back out the specified number of turns.

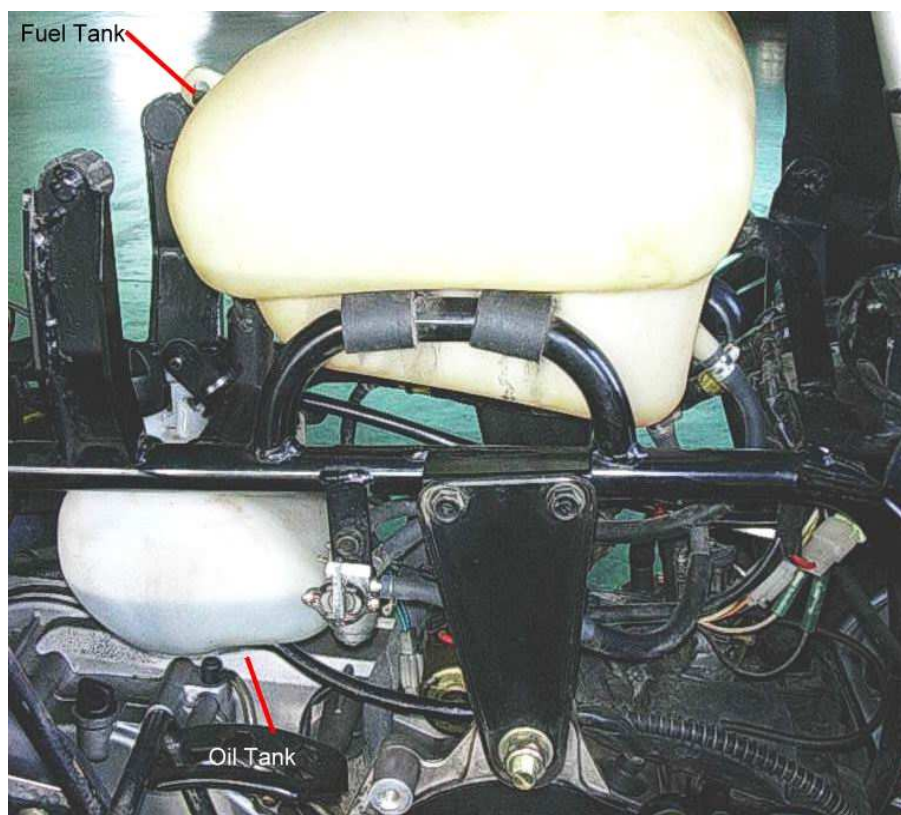
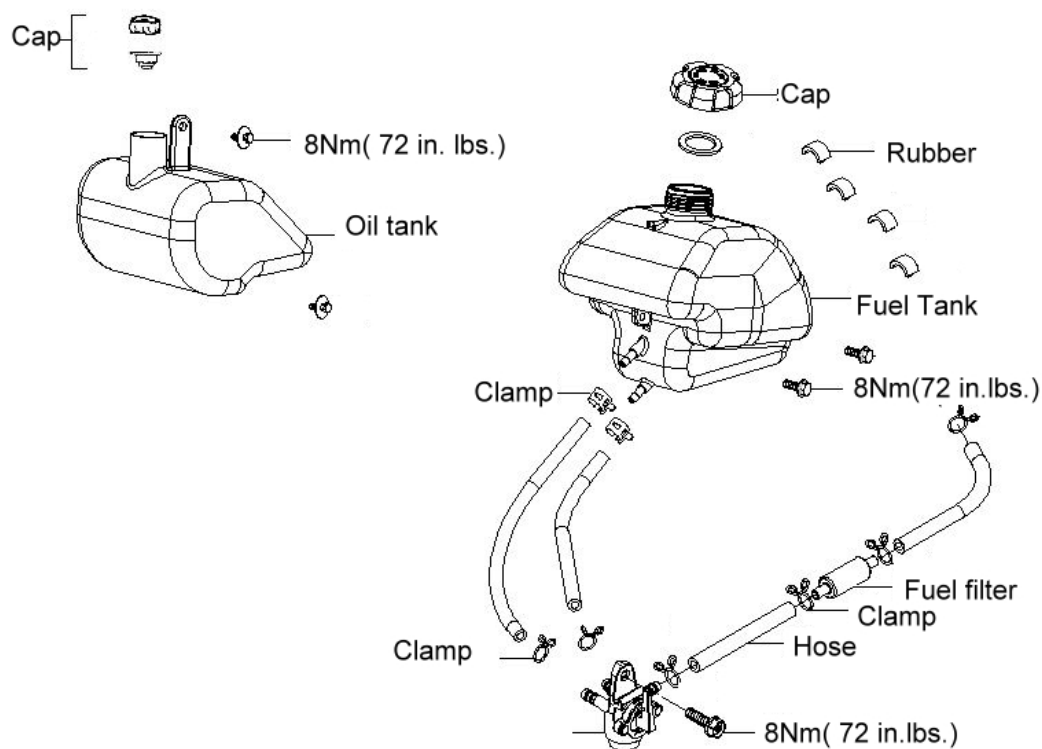
NOTE: The final air mixture screw must be adjusted with the engine running.

**Air Screw Base Setting
(Set at Factory)
Factory Specification:
50cc Mikuni: 2.5 Turns Out**

Needle and Seat Leak Test

1. Install the float bowl.
2. Invert the carburetor and install a Mity-Vac™ (PN 2870975) to the fuel inlet fitting.
3. Apply 5 PSI pressure to inlet fitting. The needle and seat should hold pressure indefinitely. If not, inspect needle and seat and seat O-ring or gasket.



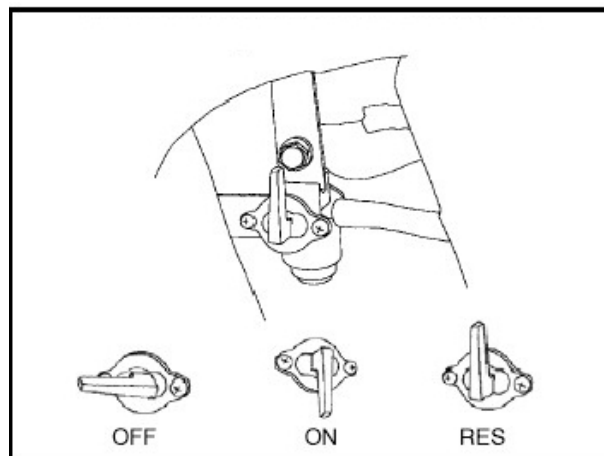
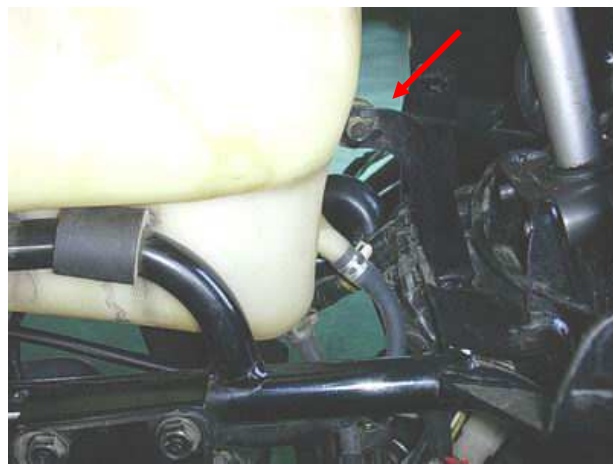
FUEL SYSTEM**Fuel and oil tank location**

FUEL SYSTEM

Fuel Tank Removal

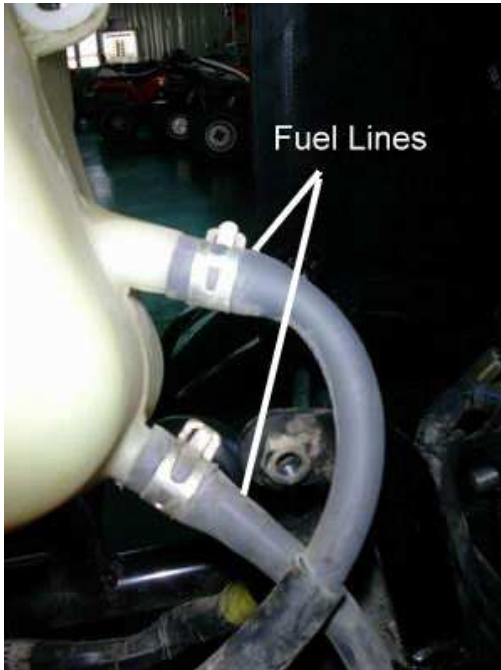
See Chapter 6 for body removal procedures to gain access the fuel tank.

1. Completely drain fuel from fuel tank. Be sure the fuel valve is set to "RES" to get the majority of the fuel drained from the tank.
2. Remove the two bolts that attach the fuel tank to the frame.

**Oil Tank Removal**

1. Completely drain oil from oil tank..
2. Remove a bolt that attach the oil tank to the frame.

3. Carefully lift up on the fuel tank.
4. Place a shop rag or towel underneath the tank and remove both fuel lines from the tank.



5. To reinstall the tank, reverse the removal procedure. Be sure to torque the tank mounting bolts.

Fuel & Oil Tank Mounting Bolt Torque
8 Nm (72 in. lbs.)



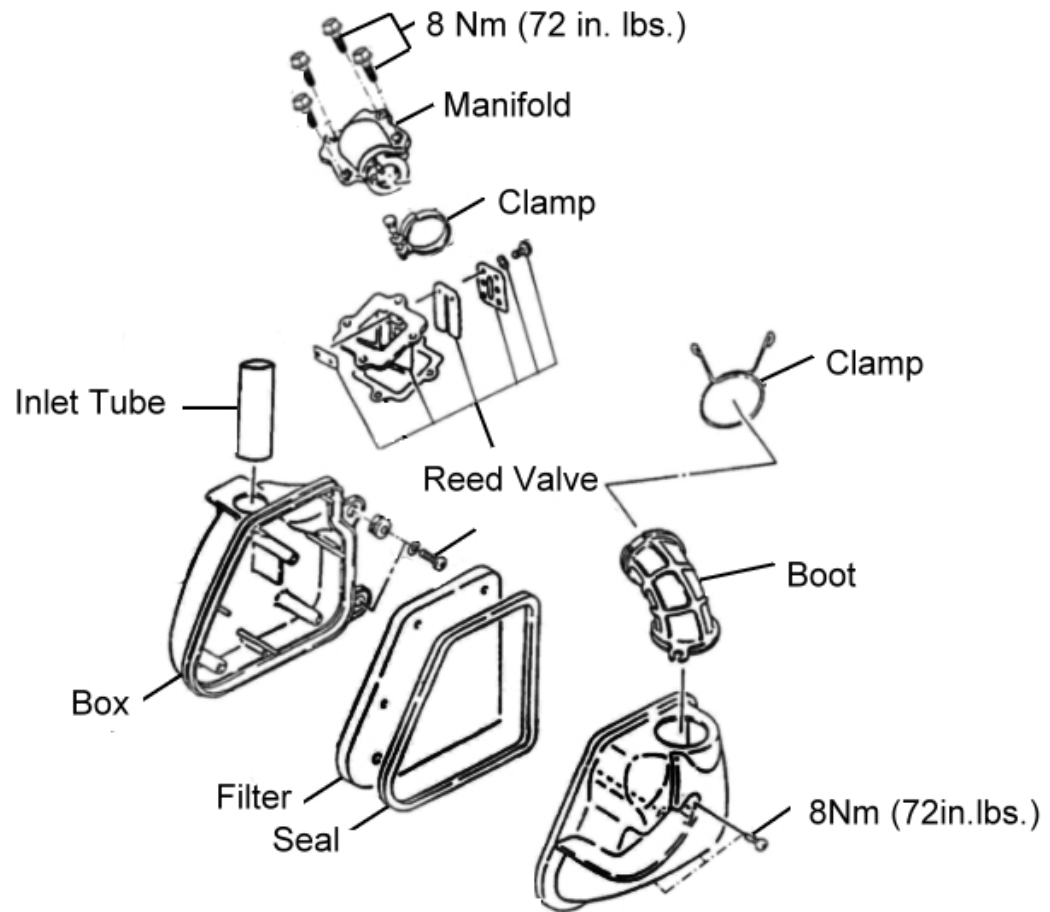
3. Carefully lift up on the oil tank.
4. Remove the oil line and oil gauge from the tank.



5.16

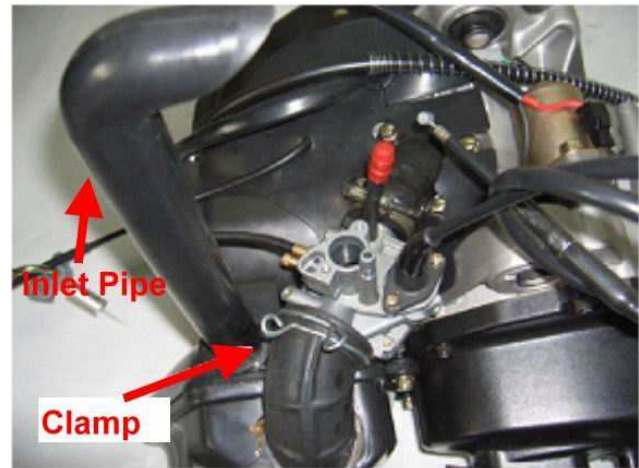
FUEL SYSTEM

AIR CLEANER EXPLODED VIEW



Air Cleaner Removal

1. Release the screw and remove the cover.
2. Remove the foam air filter. Wash the foam filter in warm soapy water, then rinse and let it dry. If the filter is damaged, install a new foam filter.
3. Apply a commercially available foam filter oil to the foam filter.
4. Reinstall the screen, foam filter and air box cover. Secure the clips.
5. The inlet pipe must toward rear of vehicle.



TROUBLESHOOTING

Fuel Starvation / Lean Mixture

Symptoms: Hard start or no start, bog, backfire, popping through intake / exhaust, hesitation, detonation, low power, spark plug erosion, engine runs hot, surging, high idle, idle speed erratic.

- No fuel in tank
- Restricted tank vent, or routed improperly
- Fuel lines or fuel valve restricted
- Fuel filter plugged
- Carburetor vent line(s) restricted
- Plugged or restricted inlet needle and seat screen or inlet passage
- Clogged jets or passages
- Float stuck, holding inlet needle closed or inlet needle stuck
- Float level too low
- Intake air leak (throttle shaft, intake ducts, airbox or air cleaner cover)
- Jet needle position incorrect
- Incorrect pilot screw adjustment

Rich Mixture

Symptoms: Fouls spark plugs, black, sooty exhaust smoke, rough idle, poor fuel economy, engine runs rough/ misses, poor performance, bog, engine loads up, backfire.

- Air intake restricted (inspect intake duct)
- Air filter dirty / plugged
- Choke plate sticking, incorrectly adjusted choke
- Choke cable binding or improperly routed
- Incorrect pilot air / fuel screw adjustment
- Faulty inlet needle and seat
- Faulty inlet needle seat O-Ring
- Float level too high
- Poor fuel quality (old fuel)
- Loose jets
- Worn jet needle / needle jet or other carburetor parts
- Dirty carburetor (air bleed passages or jets)
- Weak or damaged choke plate return spring
- Fouled spark plug

Poor Idle

Idle Too High

- Idle adjusted improperly / air mixture screw damaged
- Throttle cable sticking, improperly adjusted, routed incorrectly
- Choke cable sticking, improperly adjusted, routed incorrectly
- Plugged or restricted pilot jet

Idle Too Low

- Choke cable bending or incorrectly adjusted
- Idle speed set incorrectly
- Air mixture screw misadjusted or damaged
- Belt dragging
- Ignition timing incorrect
- Worn jet needle / needle jet
- Plugged or restricted pilot jet

Erratic Idle

- Choke cable bending or incorrectly adjusted
- Throttle cable incorrectly adjusted
- Air leaks, dirty carburetor passages (pilot circuit)
- Pilot mixture screw damaged or adjusted incorrectly
- Tight valves
- Ignition timing incorrect
- Belt dragging
- Dirty air cleaner
- Engine worn
- Spark plug fouled
- Idle speed set incorrectly
- Worn jet needle / needle jet
- Plugged or restricted pilot jet

CHAPTER 6

BODY / SUSPENSION / STEERING

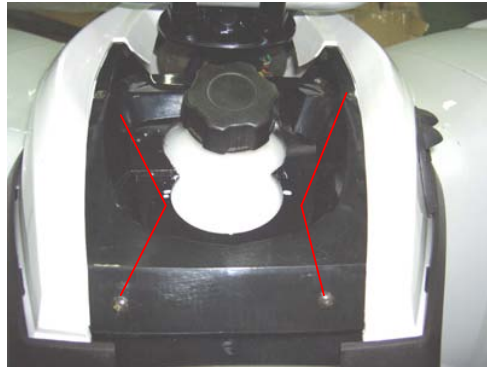
GENERAL INFORMATION	6.2
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Torque Specifications

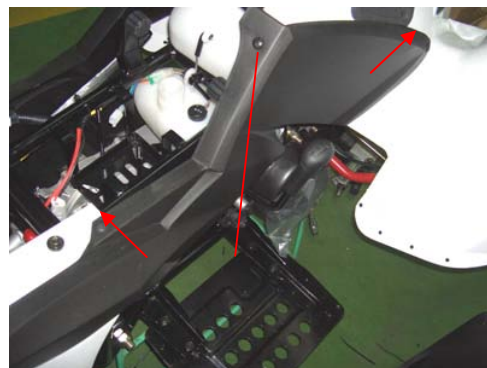
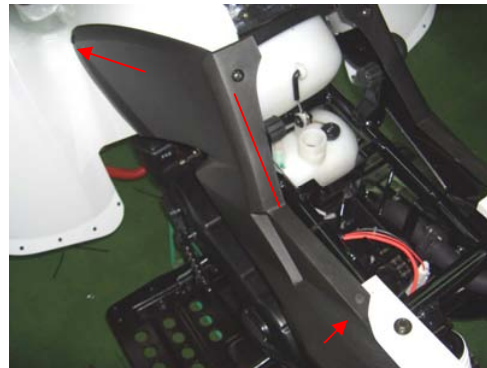
Fastener	Torque
Suspension Fasteners	
A-Arm Attaching Bolt	34 Nm (25 ft. lbs.)
Shock Mounting Bolts	Front: 34 Nm (25 ft. lbs.) Rear: 49 Nm (36 ft. lbs.)
Swing Arm Mounting Bolt	88 Nm (65 ft. lbs.)
Steering Fasteners	
Handlebar Adjuster Block	10 Nm (84 in. lbs.)
Inner Tie Rod Bolts	34 Nm (25 ft. lbs.)
Outer Tie Rod Bolts	34 Nm (25 ft. lbs.)
Steering Post Mount Nuts	22 Nm (16 ft. lbs.)
Steering Post Nut	54 Nm (40 ft. lbs)
Final Drive Fasteners	
Front Wheel Spindle Nut	59 Nm (44 ft. lbs)
Rear Wheel Hub Nut	79 Nm (58 ft. lbs.)
Front / Rear Wheel Bolts	30 Nm (22 ft. lbs.)
Sprocket Bolts	Front: 9.8 Nm. (87 in. lbs.) Rear: 22 Nm (16 ft. lbs.)
Chain Tensioner Bolt	10 Nm (84 in. lbs.)
Bearing Carrier Mounting Bolts	54 Nm (40 ft. lbs.)
Chain Guard Bolts	22 Nm (16 ft. lbs)

BODY REMOVAL

1. Lift up on the seat latch and remove the seat.
2. Remove the 4 screws of the fuel tank cover.



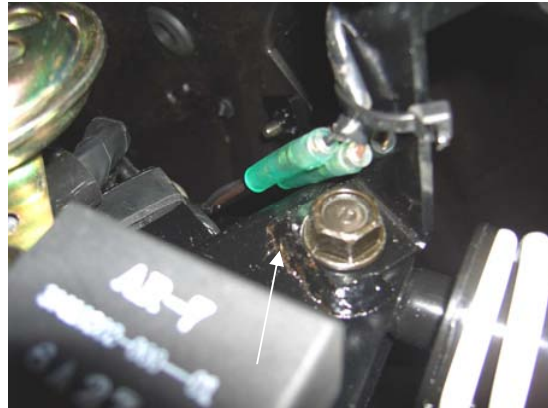
3. Remove the 2 screws and 4 insert rivets from 2 side panels.
4. Remove 2 side panels from front and rear cabs.



5. Remove the 2 bolts attaching the body to the footwells on each side.
6. Remove the 8 screws attaching front and rear cabs to the footwells on each side.



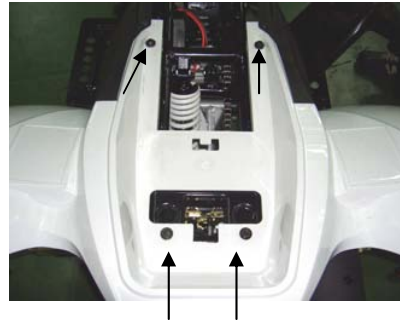
9. Disconnect both front indicator plugs.



7. Remove the 2 bolts attaching the body to the front cab on each side.



10. Completely remove the front cab from body.
11. Remove 2 footwells from body.
12. Remove the 4 bolts of rear cab.



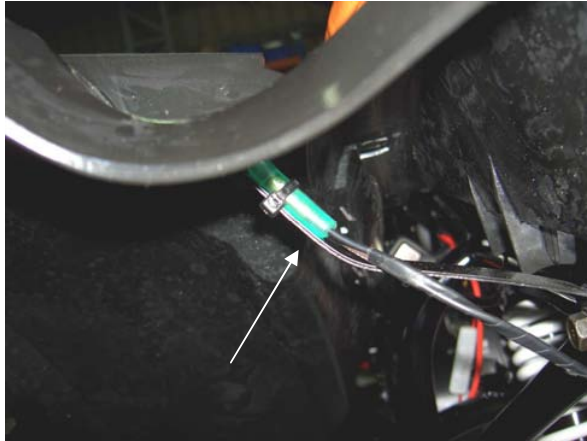
8. Disconnect the headlight harness.



13. Disconnect the taillight harness.
14. Remove the 2 bolts attaching the rear cabs then take off taillight.



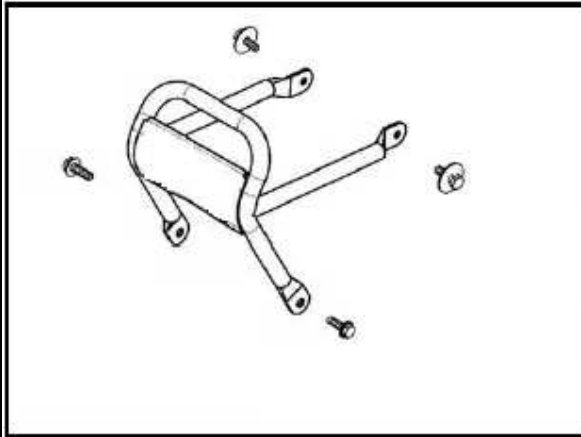
15. Cut off the straps of rear indicators then disconnect indicator plugs with main harness.



16. Remove Rear cab from cab.

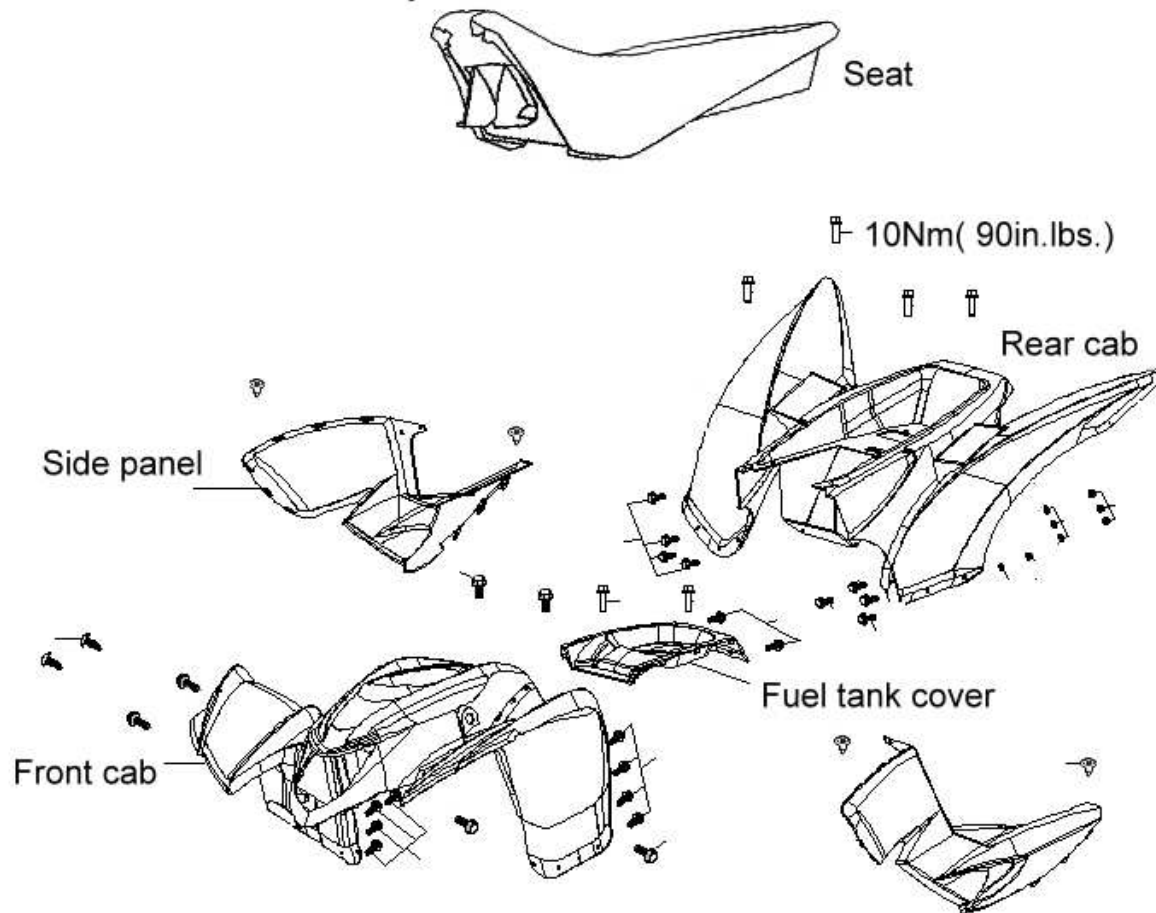
Front Bumper Removal / Installation

1. Remove the (4) mounting bolts retaining the front bumper and remove the bumper from the ATV.



2. Reverse the previous procedure to reinstall the bumper.
3. Torque mounting bolts to 87 in. lbs. (9.8 Nm).

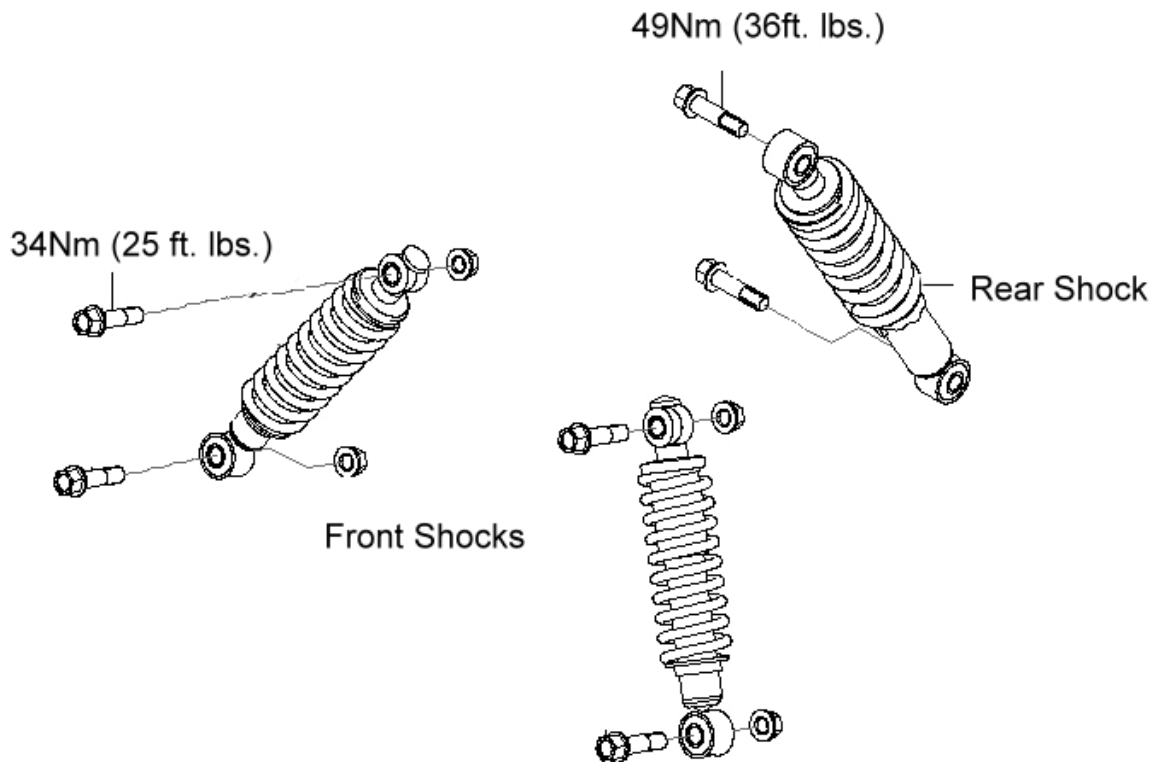
**Front Bumper Mount Bolt Torque
10 Nm (90 in. lbs.)**



Body Exploded View

SUSPENSION

Shocks and Springs

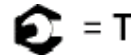


Front Shock Removal

1. Elevate front end of the ATV off the ground to remove shock spring tension.

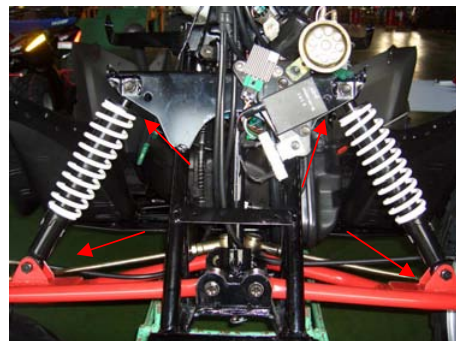


Severe injury could occur if machine tips or falls.



Front Shock Mounting Bolt Torque:
34 Nm (25 ft. lbs.)

2. Remove the upper shock mounting bolt from the frame and the lower shock mounting bolt from the front suspension arm / A-arm.
3. Replace the shock or spring as required.
4. Install shock as shown in Figure 5.8.
5. Torque shock mounting bolts to specification.



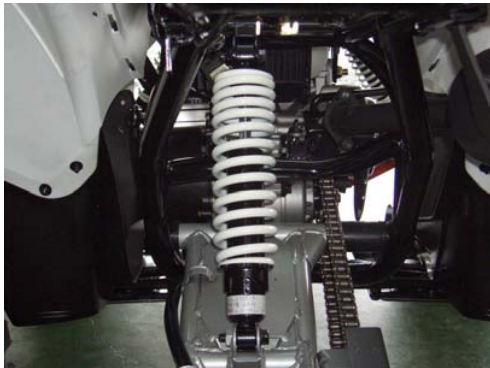
Rear Shock Removal

1. Elevate rear end of the ATV off the ground to remove shock spring tension.



Severe injury could occur if machine tips or falls.

2. Remove the upper shock mounting bolt from the frame and the lower shock mounting bolt from the swing arm.



3. Replace the shock, spring or adjuster cam as required
4. Install the shock as shown in Figure 5.9.
5. Torque shock mounting bolts to specification.

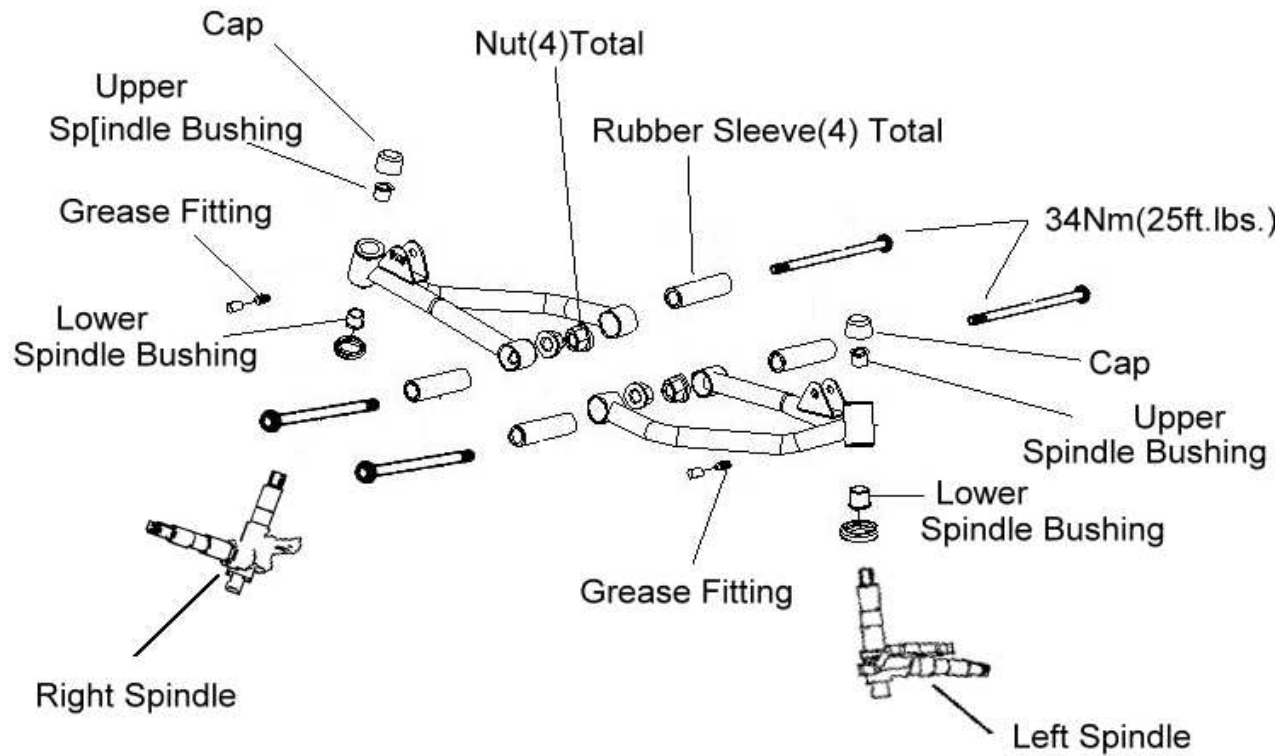


Front Shock Mounting Bolt Torque:

36 Nm (49 ft. lbs.)

FRONT A-ARM

A-arm Exploded View



A-arm Replacement

1. Elevate front end of ATV off the ground far enough to remove the wheel.



CAUTION

Severe injury could occur if machine tips or falls.

2. Remove the dust cap and cotter pin.
3. Remove wheel nut and remove wheel and hub as an assembly.



4. Remove the cotter pin from the upper spindle castle nut and remove the nut.



5. Slide the spindle assembly out from the end of the control arm.

6. Remove the lower shock mounting fastener and the inner A-arm fasteners.



7. Remove A-arm from the ATV.
8. To reinstall, reverse steps 1 - 7. Torque all fasteners to specification.



Inner Control Arm Bolt Torque:
34 Nm (25 ft. lbs.)



Front Shock Mounting Bolt Torque:
34 Nm (25 ft. lbs.)



Wheel Nut Torque:
59 Nm (44 ft. lbs.)

SWING ARM

Removal

1. Elevate rear end of ATV off the ground far enough to remove the rear wheel(s).

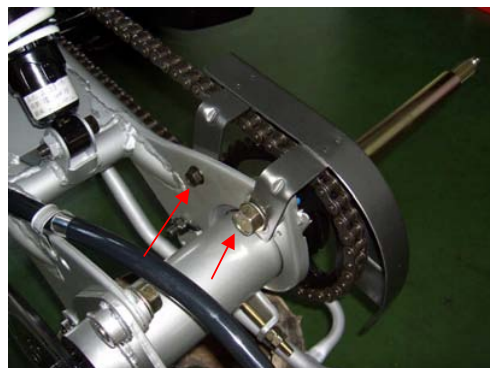


Severe injury could occur if machine tips or falls.

2. Remove the dust cap and cotter pin from 2 rear wheels
3. Remove 2 rear wheels nut and remove wheel and hub as an assembly.



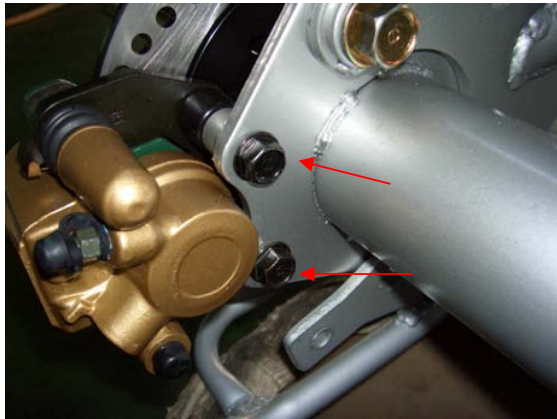
3. Remove the chain protector cover



4. Take off the master link from chain then remove chain from sprocket.
8. Remove disc from rear axle.



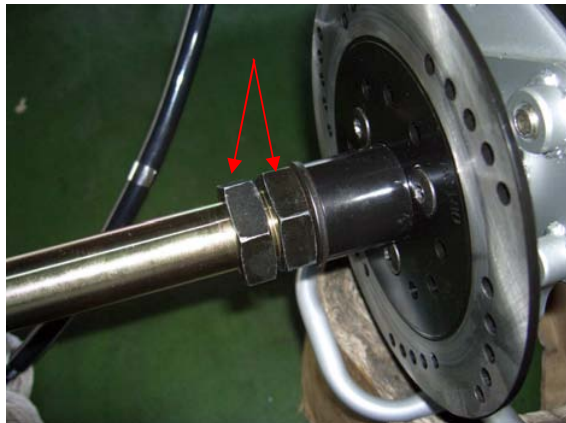
5. Take off 2 bolts from caliper then remove caliper.
6. Ensure don't loosen brake oil tube bolt.



9. Remove 4 axle hub bolts from swing arm.
10. Slide axle out of the axle housing and rear sprocket and remove the housing and sprocket assemblies.



7. Loosen 2 nuts from rear axle.

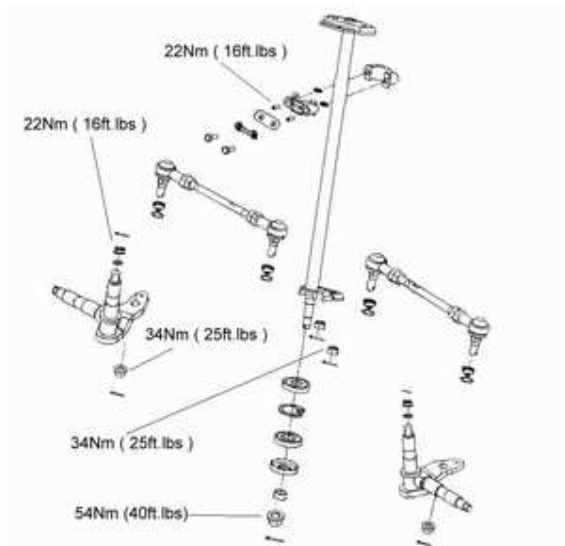


9. Remove a through bolt lower shock mounting bolt from swing arm and remove swing arm from body.

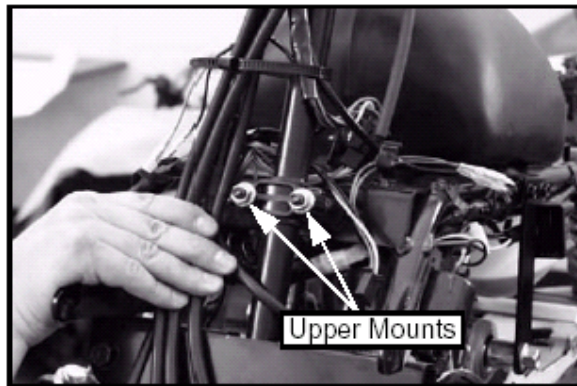


STEERING

Steering Assembly Exploded View

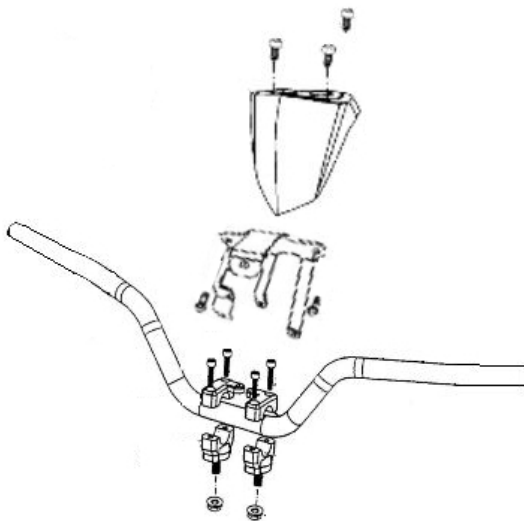


2. Remove the upper steering post mounting bolts.

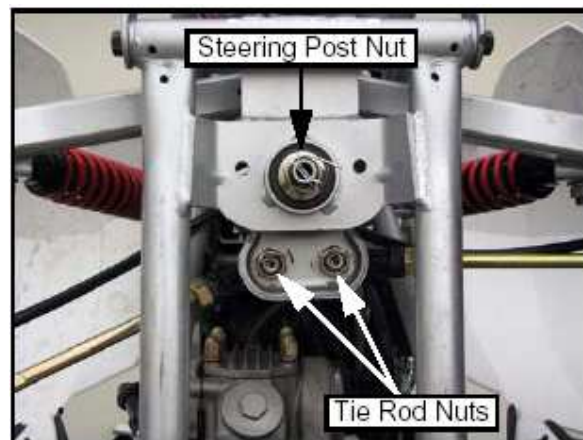


Steering Post Removal

1. Remove handlebar fasteners and retainer block.



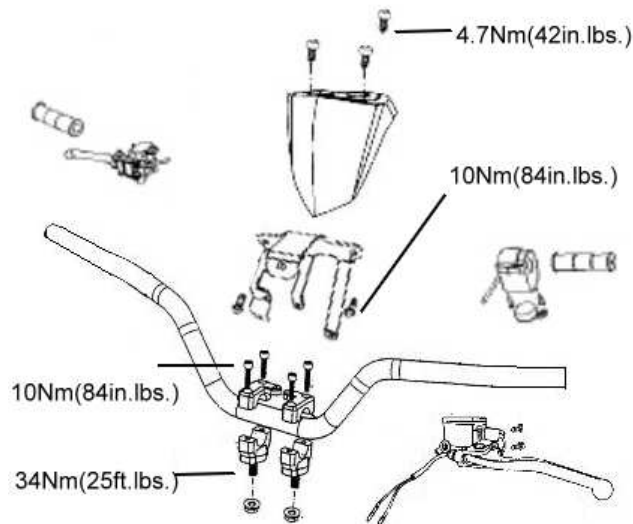
3. Remove the inner tie-rod nuts and the steering post nut.



4. Carefully remove the steering post from the ATV.

5. To reinstall, reverse steps 1 - 4. Torque all fasteners to specification. See torque specifications listed in the exploded view.

HANDLEBAR



1. Install the lower clamps.
2. Proceed to "Brake Lever Adjustments".

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 side panels, front and rear fender cabs 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.

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 (5- 7.5 cm. 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.

CHAPTER 7

BRAKES

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SPECIFICATIONS**General Specifications**

Front Brake Drum		
Item	Standard	Service Limit
Brake Shoe Thickness	2.54 mm (0.10")	1.27 mm (0.05")
Brake Drum Inner Diameter	85.09 mm (3.35")	84.33 mm (3.32")
Rear Brake Disc		
Item	Standard	Service Limit
Brake Pad Thickness	5 mm (0.20")	2 mm (0.08")
Brake Disc Thickness	4.2 mm (0.17")	3.8mm (0.15")

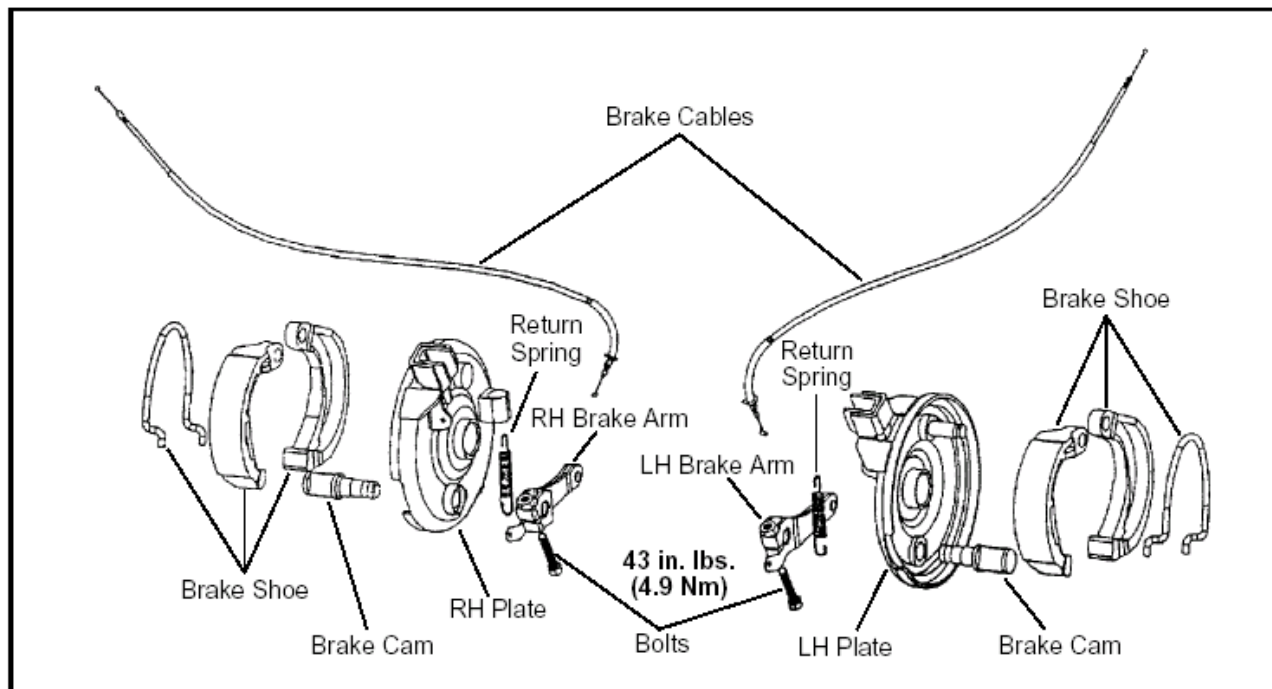
Torque Specifications

Item	Torque (Nm)	Torque (ft. lbs. except where noted*)
Brake Arm Retaining Bolts	4.9	43 in. lbs.
Axle Housing Flange Nuts or Brake Plate Bolts	54	40
Chain Guard Bolts	22	16

NOTE: Refer to the tightening procedures in this chapter when torquing the bolts. Some special procedures are used when torquing certain bolts and fasteners.

FRONT BRAKES

Exploded View



Front Brake Service

1. Elevate front end of ATV off the ground far enough to remove the wheel.



CAUTION

Severe injury could occur if machine tips or falls.

2. Remove the dust cap and cotter pin.
3. Remove wheel nut and remove wheel and hub as an assembly.



4. Remove the outer bearing spacer from the wheel hub.



5. Inspect the outer seal and outer bearing for wear or damage. 8. Inspect spindle shaft surface for pitting or other damage.

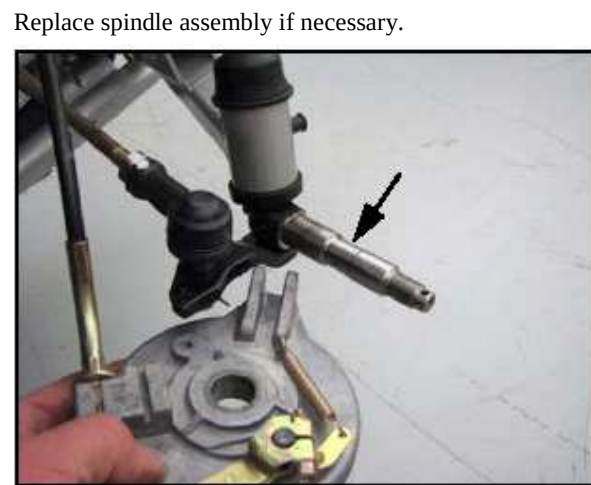


6. Flip the wheel hub and inspect the inner seal and inner bearing for wear or damage.



Brake Drum Backing Plate Removal

7. Remove the backing plate assembly from the spindle shaft assembly.



Replace spindle assembly if necessary.

Brake Shoe Removal

9. Reinstall brake backing plate and components if previously removed.
10. Using a suitable tool, lift up on the spring near the retainer stud as shown and remove the spring.



CAUTION

Spring is under tension. Wear safety glasses and use caution when removing spring.
Severe injury can result.

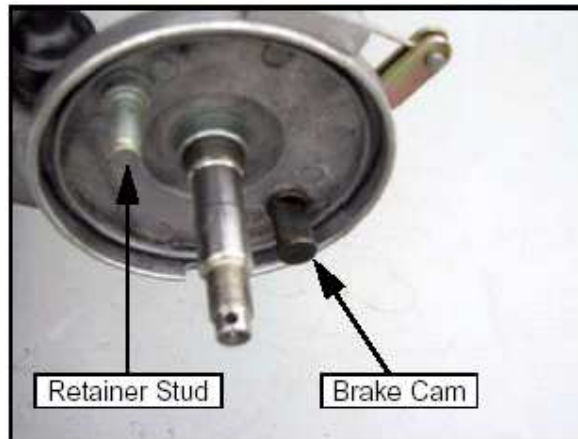
11. Slide brake shoes off retainer stud and remove from backing plate.



12. Inspect the brake shoe pad material. Replace if worn beyond specification.

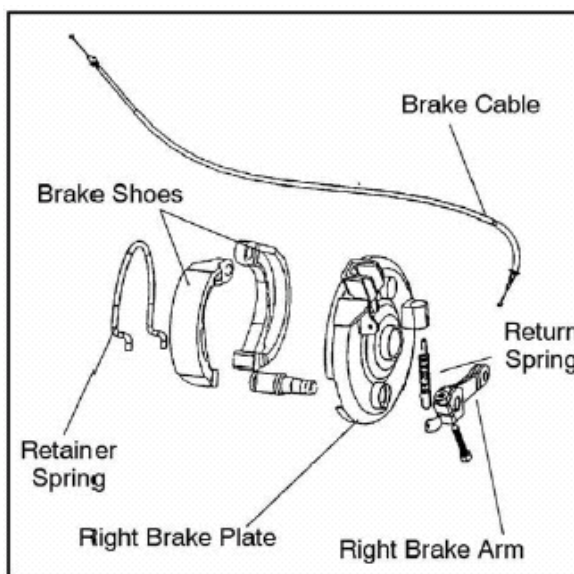


13. Inspect the shoe retainer stud and brake cam for wear or damage.



Brake Assembly

14. Use the illustration below as reference when reassembling the front brake components.



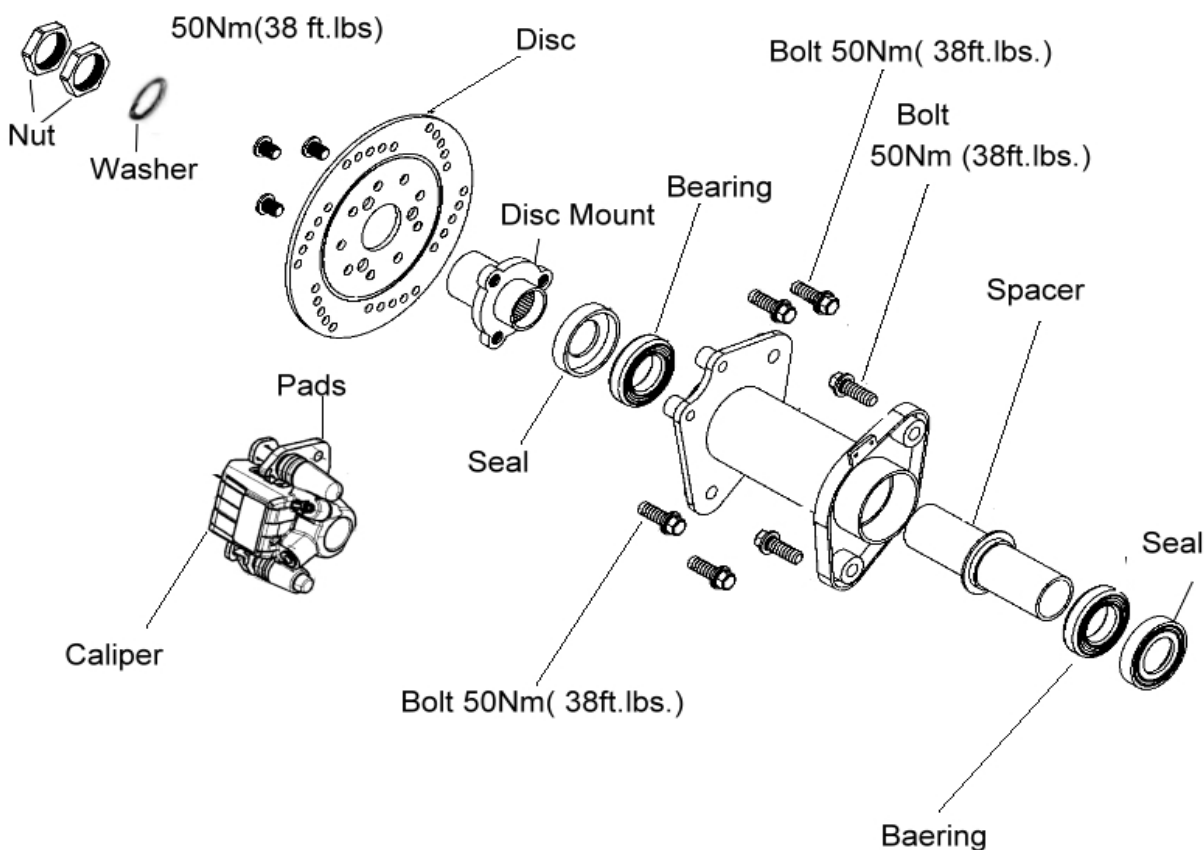
16. Inspect oil seals and bearings for wear or damage upon assembly. Replace bearings and seals if necessary.

17. Install the wheel hub and tighten the front spindle nut to specification.

Front Brake Shoe Pad Thickness: Service Limit: 1.27 mm (0.05")

**Front Wheel Spindle Nut Torque:
60 Nm (44 ft. lbs.)**

NOTE: Perform the "Brake Lever Adjustment" procedure outlined in Chapter 2 when finished.



Rear Brake Service

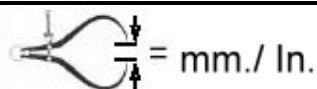
NOTE: Follow the “Swing Arm Removal” procedure outlined in Chapter 6 to access the rear brake components.

1. Follow the “Swing Arm Removal” procedure to the point where the rear brake disc housing can be accessed.

NOTE: You do not need to fully disassemble the rear axle / swing arm to service the rear brakes.

2. Inspect the brake pads contact disc surface and the axle housing seal surface for excessive wear, pitting, or damage. Replace if necessary.





Rear Brake Pad Thickness:

Service Limit: 0.08" (2 mm)



Rear caliper fluid filling/ bleeding

1. Close the bleed valve
2. Fill the master cylinder with DOT 4 brake fluid.
3. Connect a commercially available brake bleeder to the bleed valve.
4. Pump the brake bleeder and loosen bleed valve.
5. Add brake fluid when the fluid level in the master cylinder is low.

Rear Caliper Fluid Replacement and Air Bleeding

Brake fluid draining

1. Remove the master cylinder cover.



2. Connect the bleed hose to bleed valve.
3. Loosen the bleed valve and pump the brake lever until no more fluid flow out of the bleed valve.



NOTE:

1. Check the fluid level often while bleeding the brake to prevent air from being pumped into the system.
2. Repeat the above procedure until air bubbles do not appear in the plastic hose.
3. If air is entering the bleeder from around the bleed valve threads, seal the threads with Teflon tape.
4. Close the bleed valve and operate brake lever. If it still feels spongy, bleed the system again.
5. If a brake bleeder is not available, use the following procedure:
Pump up the system pressure with the brake lever until lever resistance is felt.

ELECTRICAL

CHAPTER 8

ELECTRICAL

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GENERAL INFORMATION

Electrical System Service Notes

Reference the following notes when diagnosing electrical problems.

- The ignition system timing is non-adjustable. The specifications in Chapter 1 are intended for reference only.
- Refer to wiring diagram for stator and electrical component resistance specifications.
- When measuring resistance of a component that has a low 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 the 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 the meter for more information.
- Voltage, amperage, and resistance values included in this manual are obtained with a Fluke™ 77 Digital Multimeter. This meter is acceptable for use 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.
- The letter of wires color show as following:

B	Black
R	Red
Y	Yellow
W	White
L	Blue
P	Pink
BR	Brow
G	Green
O	Orange
DB	Deep blue
DG	Deep green
B/W	Black/ White
B/R	Black/ Red
Y/W	Yellow/ White
Y/L	Yellow/ Blue
Y/R	Yellow/ Red
G/R	Green/ Red
G/Y	Green/ Red
W/R	White/ Red
W/L	White/ Blue
L/R	Blue/ Red
L/W	Blue/ White
L/B	Blue / Black
R/W	Red/ White
BR/W	Brown/ White

SWITCHES AND CONTROLS

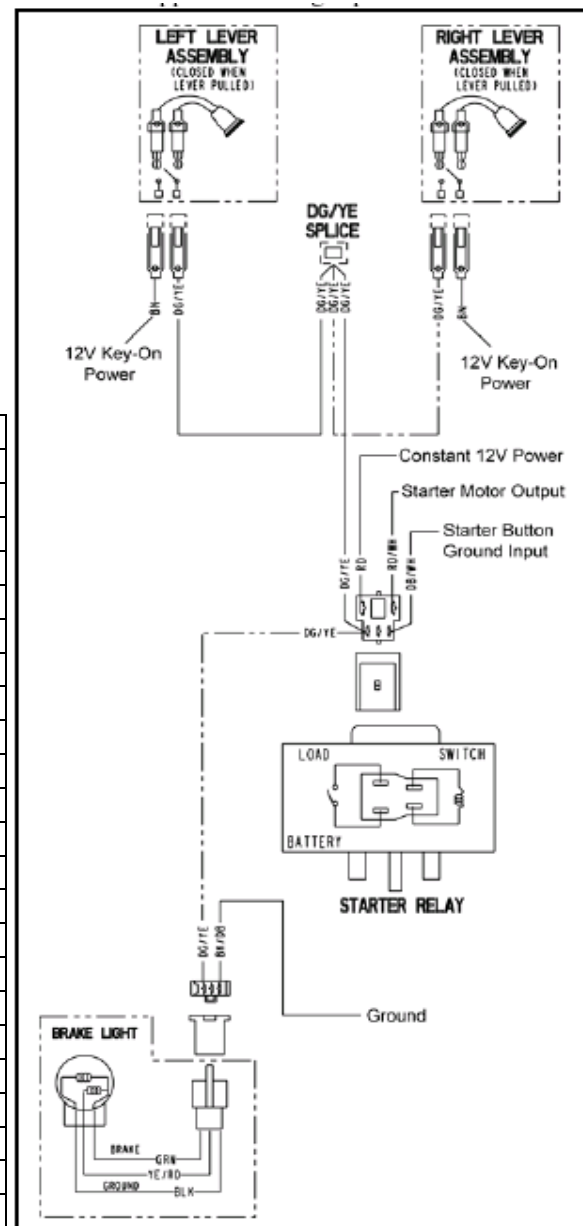
Brake Lever Switches

Each brake lever utilizes an electrical brake switch that sends voltage to activate the starter relay and brake light.

1. Locate the brake switches on each of the brake levers.
2. Disconnect wire harness from brake switch and connect an ohmmeter across the two switch wires.

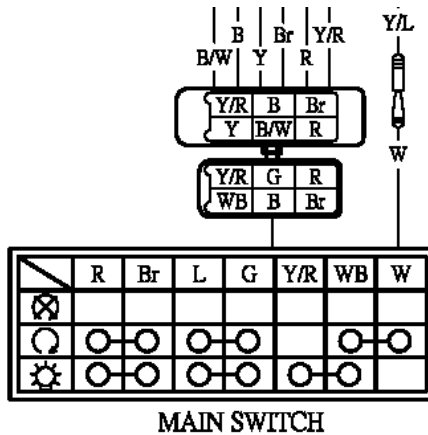
The reading should be infinite (•).

3. Apply brake the brake lever(s) and check for continuity between switch contacts. Replace switch if there is no continuity or if the resistance is greater than .5 ohms when the brake is applied with slight pressure.



Key Switch

The key switch can be tested with an ohm meter.



When the key switch is turned to the "ON" position, there should be continuity between the red (R) and brown (Br) wires. There should also be continuity between the black (B) and green (G) wires. Also be continuity between the white (W) and white black (W/B) wires.

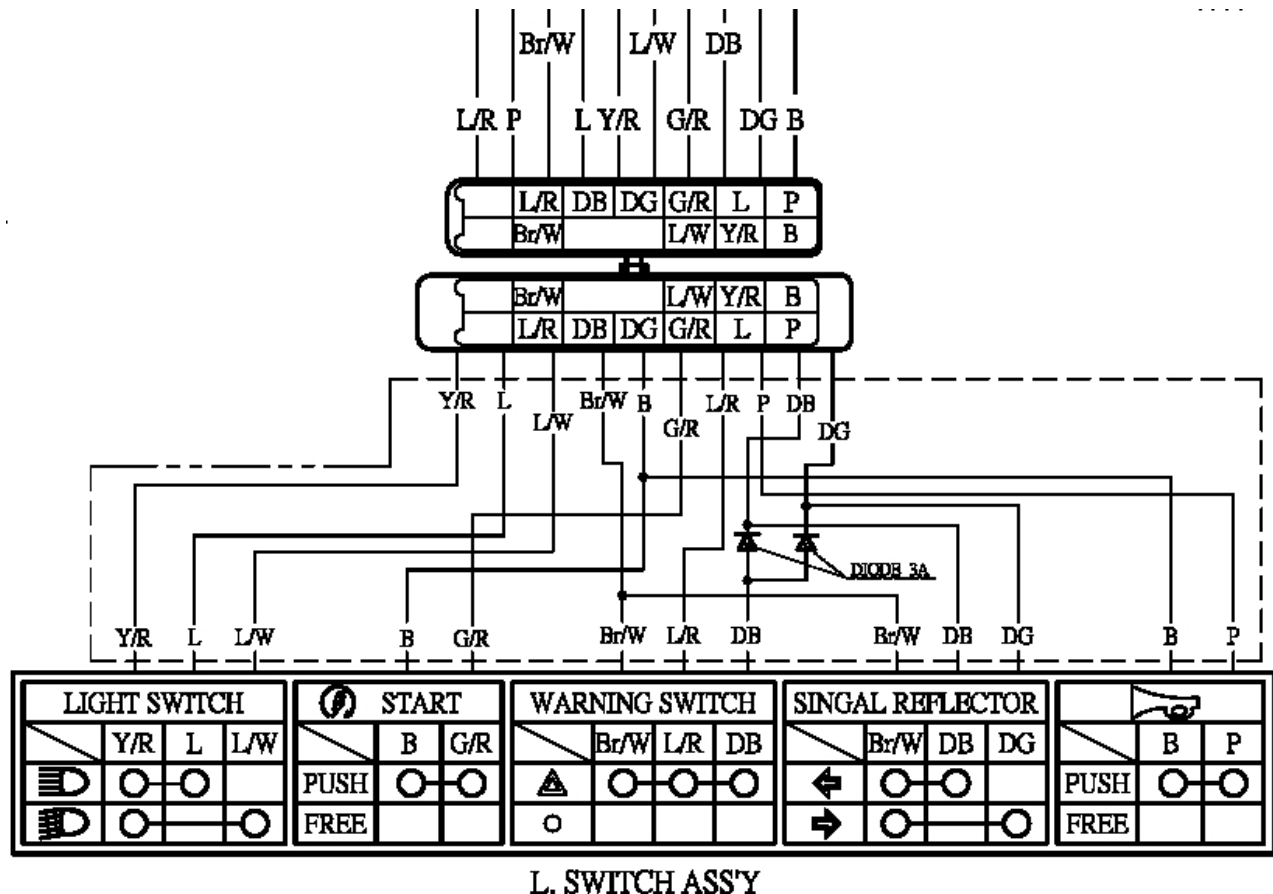
When the key is turned to the "OFF" position, there should no continuity between any of the wires.

When the key switch is turned to the "☼" position, there should be continuity between the red (R) and brown (Br) wires. There should also be continuity between the black (B) and green (G) wires. Also be continuity between the yellow red (Y/R) and white black (WB) wires.

Left Hand Switch Assembly

The following illustration shows the internal operation of the

LH switch assembly. If any part of the switch is faulty, the entire LH switch assembly must be replaced.



HEADLIGHTS

The headlights are powered by an AC current from the Generator / Stator.

When headlight switch on but working, perform the following:

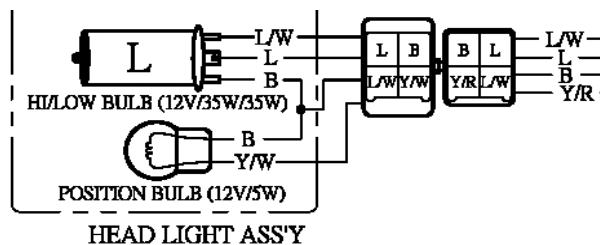
1. Disconnect the harness from the faulty light.
2. Using a Volt Ohm Meter, measure the AC voltage between the yellow red (YE/RD) and black (BK) wires. Voltage above 5 VAC should be present when unit is running.

If voltage is present:

1. Replace the faulty bulb.

If voltage is not present:

1. The black wire should have continuity to ground. If no continuity is present, check for an open in the wiring harness or a poor connection.
2. If black wire has good continuity to ground, check the wiring harness from the stator to the running lights. There should be continuity between the (YE/RD) wire at the light connector and the (YE/RD) wire at the Generator / Stator.
3. If continuity is good. Perform stator resistance tests by using the resistance chart located in the wiring diagram.
4. Replace Generator / Stator if resistance is not within specification.



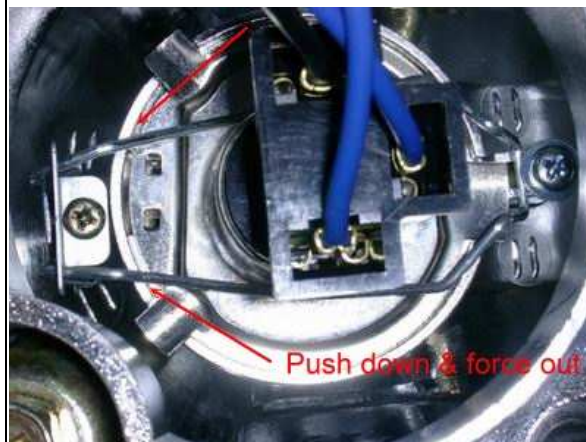
Headlight Lamp Replacement

If the headlights do not operate, lamp replacement may be required. Install only the recommended replacement lamps.

1. Remove the socket rubber seal.



2. Remove the socket rubber seal.



3. Remove the plug and replace bulb.



4. Pull the position bulb and replace it.



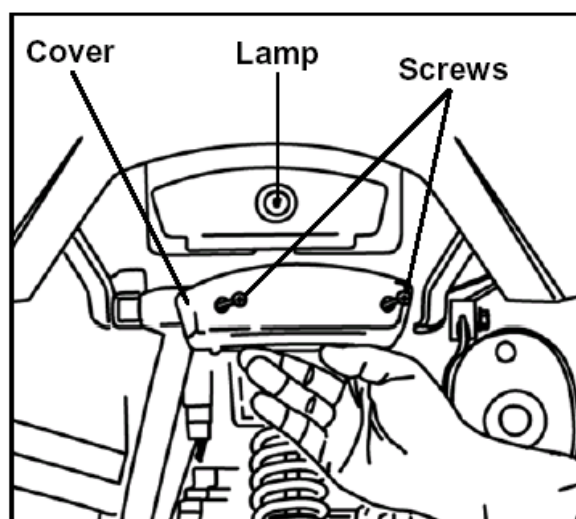
5. Reinstall the socket into the housing and Start the engine to make sure the lights come on. If the lights do not operate, check the charging system and related wiring for possible malfunction.

TAIL LIGHT

Tail Light Lamp Replacement

If the tail light lamp does not work, the lamp may need to be replaced.

1. Remove the two screws securing the lens cover. Remove the lens cover.
2. Remove the lamp and replace it with a new recommended lamp. Apply Dielectric Grease (PN 2871329) to the lamp terminals.
3. Test the light for proper operation.
4. Reinstall the lens cover.



INDICATOR LAMPS

Indicator Lamp Replacement

1. Remove the handlebar pod to access the lamps.
2. Disconnect the indicator light wire connections from the harness.



3. Remove the nut from the backside of the indicator lamp.



4. Remove the lamp.
5. Install new lamp(s) into the cover or pod and secure with retaining nut.
6. Apply dielectric grease to the wire connections of the new lamp.
7. Reconnect wire connections and assemble the handlebar cover or pod.
8. Turn ignition key to the "ON" position and shift the transmission into "Neutral" or "Reverse" to verify light operation.



9. If the lights do not operate, check battery voltage at the light harness and check related wiring for possible malfunction.

Signal Replacement

The 4 signals are sealed by water proof glue. If any part of the signal is faulty, the entire signal assembly must be replaced.

1. Take off the front or rear signal wire plug with harness.



2. Remove front signal and bracket from cab as picture.

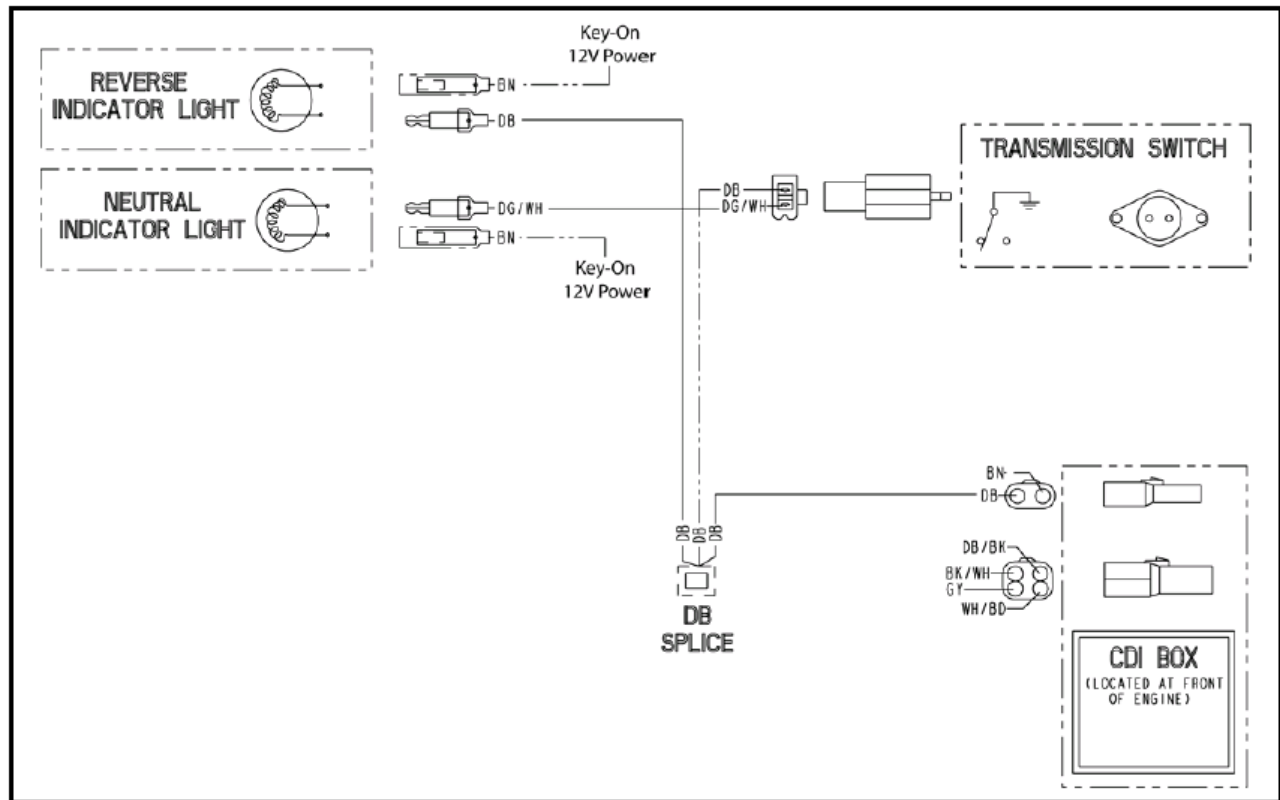


3. Remove rear signal and bracket from cab as picture.



TRANSMISSION SWITCH

Transmission Switch - Circuit Breakout

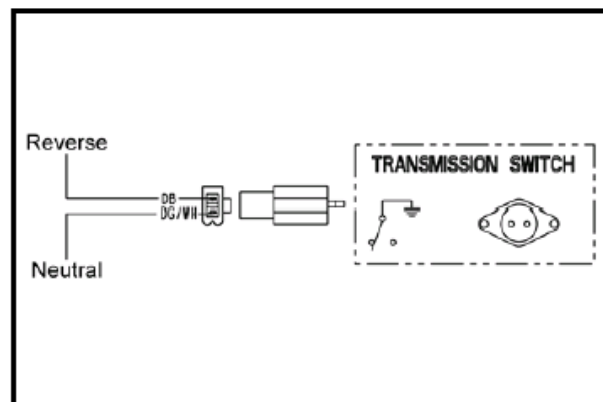


Testing

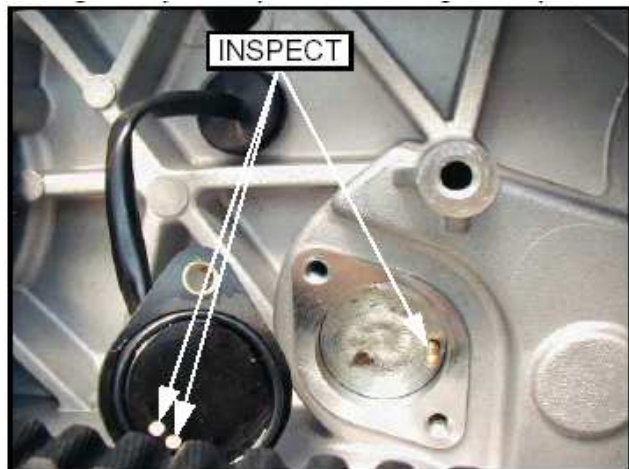
1. With the switch installed, use an ohmmeter to test continuity between the switch leads and engine ground.
2. First, shift the transmission into "neutral" and test for continuity between the G, Br wires and ground.
3. Then shift the transmission into "reverse" and test for continuity between the B, Br wires and ground. In both tests you should have continuity to ground.

Removal

1. Remove the CVT cover. The indicator switch will be visible between the drive and driven clutch. Refer to CVT Chapter for CVT cover removal and installation.
2. Remove the (2) screws and pull on switch to release from crankcase.

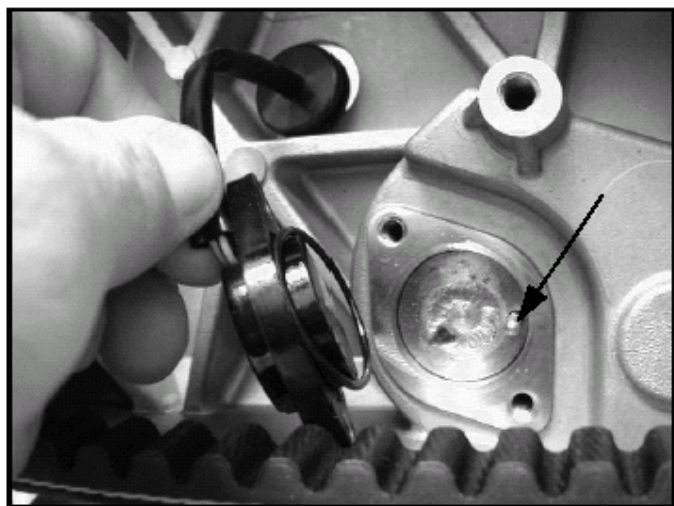


3. Inspect the shift indicator contacts, shift drum, pin and spring. Verify the pin is not sticking in the drum or is damaged. Replace any worn or damaged components.



Installation

1. Install spring and pin into shift drum.
2. Install switch with new O-ring. Route wires through crankcase.
3. Install retaining screws.
4. Torque screws to 4.5 - 6 Nm (39 - 52 in. lbs.).



IGNITION SYSTEM

Overview

The Cobra 50 ATV ignition system consists of a simple magnetodrive system that includes a stator Pulser Coil, CDI Box, Ignition Coil and related wiring / connectors.

Timing is non-adjustable on this ignition system.

Ignition System Troubleshooting

No Spark, Weak or Intermittent Spark

- No 12 volt power on brown (BR) wire at CDI box or no CDI box ground path from the black (B) wire
- Spark plug gap incorrect
- Fouled spark plug
- Faulty spark plug cap or poor connection to high tension lead
- Related wiring loose, disconnected, shorted, or corroded
- Engine Stop switch or ignition switch faulty
- Poor ignition coil ground
- Faulty stator (measure resistance of all ignition related windings)
- Incorrect wiring (inspect color coding in connectors etc)
- Faulty ignition coil winding (measure resistance of primary and secondary)
- Sheared flywheel key
- Flywheel loose or damaged
- Excessive crankshaft runout on magneto. (RH) end should not exceed .005"
- Faulty CDI module

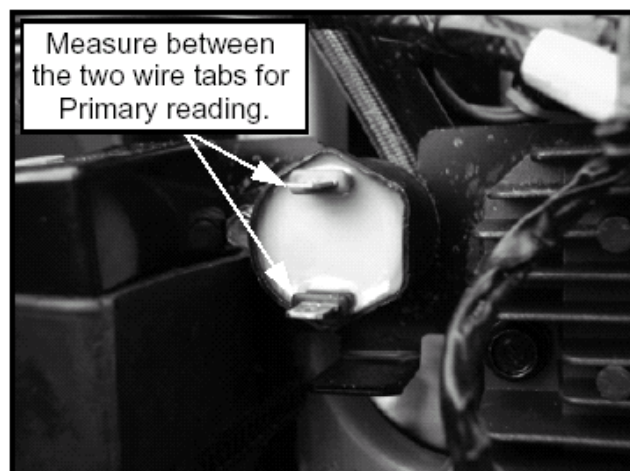
RPM Ignition Limiter Functions

NOTE: The CDI box reads the RPM signal from the stator. The CDI box acts as a limiter by retarding the ignition timing if RPM reaches the specified limit. In reverse gear, the CDI box retards ignition timing and limits RPM once it receives a ground path from the transmission switch blue (L) wire indicating the ATV is in reverse.

CDI WIRES

PLUG	COLOR	DECCRIPTION
3-WIRE	B/W	KEY SWITCH "OFF" SIGNAL INPUT.
	R/W	FLYWHEEL IGNITION ANGLE SIGNAL INPUT.
	B/R	STATOR IGNITION VOLTAGE INPUT.
6-WIRE	BR	DC VOLTAGE INPUT.
	B	GROUND
	GRAY/ Y	REVERSE SIGNAL
	GRAY/ L	NEUTRAL
	G/Y	BRAKE LIGHT SIGNAL
	W/L	IGNITION COIL DC INPUT.

Ignition Coil Test



CDI Output Test

Using Peak Reading Adaptor

Re-connect all wires to the CDI box. Disconnect the white/blue CDI output wire from ignition coil primary terminal. Install the Peak Reading Adaptor to your meter and connect one meter lead to engine ground and the other to the white/blue CDI Output wire at the ignition coil. Set meter to read DC Volts. Crank engine and verify CDI output to the ignition coil. When finished, reconnect CDI output wire to ignition coil.

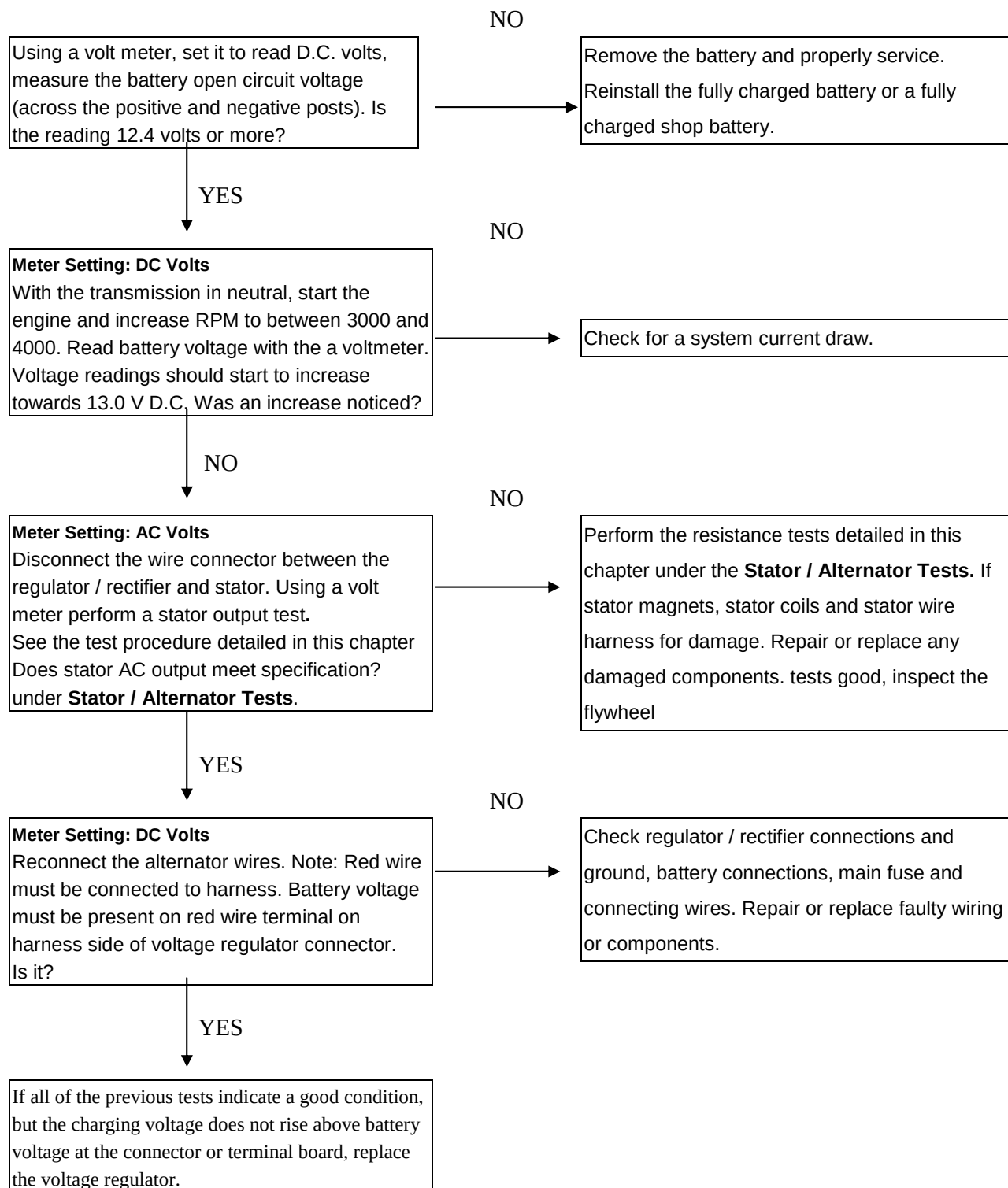
Test Description	Resistance
Ignition Coil Primary Winding	0.2 Ω $\pm$ 20%
Ignition Coil Secondary Winding (With Cap Installed)	8 K Ω $\pm$ 20%
(Without Cap Installed)	3 K Ω $\pm$ 20%
Spark Plug Resistor Cap	5 K Ω

Out put test	Connect meter lead to:	Reading
CDI output	W/B to Engine Ground	180DC Volts $\pm$ 20%

CHARGING SYSTEM

Charging System Testing

Whenever charging system problems are suspected, proceed with the following system checks:



Main Fuse / Fuse Holder Location

A 7 Amp fuse protects the main electrical system on all models. See illustrations for fuse locations.



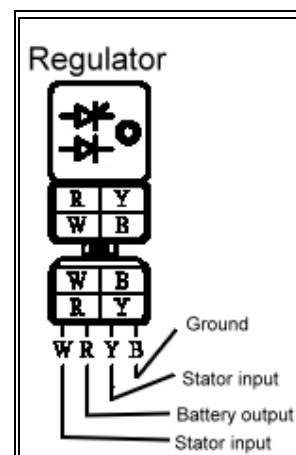
NOTE: Use only the recommended fuse capacity, as use of a higher amperage fuse to correct blown-fuse situations could lead to electrical component damage.

Voltage Regulator / Rectifier

1. The voltage regulator / rectifier is located under the headlight of front cab on all model.



2. If a problem exists with the charging system, test the components around the regulator/rectifier to isolate the component. If the stator is supplying sufficient AC current and there is no DC current leaving the regulator/rectifier, replace the component.



Stator / Alternator Tests

Two tests can be performed using a multimeter to determine the condition of the stator (alternator).

TEST 1: Measure resistance value of each stator leg.

1. Measure the resistance value of the stator legs. Use the following chart as a reference when testing.

Ohm Test	Connect Meter Leads To:	Ω Reading
Battery Charge Coil	Black to Ground	$0.1\Omega \pm 20\%$
	Black to Yellow	$0.5\Omega \pm 20\%$
	Black to White	$0.6\Omega \pm 20\%$

TEST 2: Measure AC voltage output of each stator leg. Test at **cranking rpm** with a voltmeter set to read AC volts.

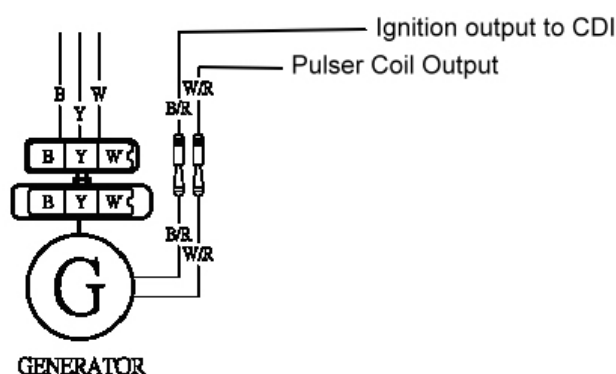
2. Turn over the engine with the starter motor.

3. First measure from the red wire (R) to engine ground.

Compare readings to specifications.

4. Next measure from the yellow wire (YE) to engine ground.

Compare readings to specifications.



AC Output Test	Connect Meter Leads To:	AC Reading
Battery Charge Coil	White to Ground	12 VAC
Light on	Yellow to Ground	8 VAC
Battery Charge Coil	White to Ground	19 VAC
Light off	Yellow to Ground	13 VAC

NOTE: To check the charging system output further, start the engine and perform the same tests. Voltage should increase with increased RPM.

BATTERY

Battery Maintenance Service Notes

WARNING

Battery electrolyte is poisonous. It contains sulfuric acid. Serious burns can result from contact with 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 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 an enclosed space.

Always shield eyes when working near batteries.

KEEP OUT OF REACH OF CHILDREN.

CAUTION

Always wear safety glasses, rubber protective gloves and appropriate clothing when working with batteries.

IMPORTANT: DO NOT activate cobra 50 ATV batteries unless they will be put into service within 30 days of activation.

Cobra 50/100 ATVs have a Low Maintenance style battery.

Do not remove the battery cap strip to check acid level or add water once the battery have been activated. Perform the proper battery tests and charge or replace the battery as required.

New batteries must be fully charged before use or battery life will be significantly reduced (10-30% of the battery's full potential).

NOTE: DO NOT use a constant high-amperage battery charger to charge this style of battery. Use a low-amperage charger capable of charging voltage that is 1/10 of the battery amp-hour rating.

New Battery Activation

⚠ WARNING

Battery electrolyte is poisonous. It contains sulfuric acid. Serious burns can result from contact with skin, eyes or clothing. Antidote:

External: Flush with water.

Internal: Drink large quantities of water or milk.

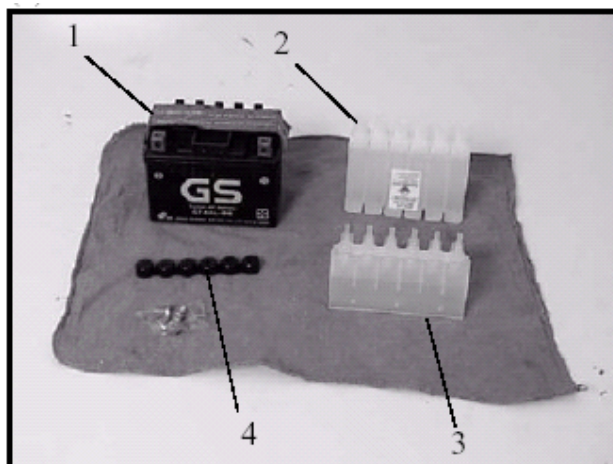
Eyes: Flush with water for 15 minutes and get prompt medical attention.

Batteries produce explosive gases. Keep sparks, cigarettes, etc. away. Ventilate when charging or using in an enclosed space. Always shield eyes when working near batteries.

KEEP OUT OF REACH OF CHILDREN

To ensure maximum service life and performance from a new battery, perform the following steps.

1. Remove the battery (1), battery acid (2), funnel (3) and cap (4) from the box.



2. Remove the protective strip from the top of the battery. Insert the battery electrolyte funnel into the filler holes.
3. Carefully press the battery electrolyte pack onto the funnel. The funnel will puncture the pack seals, releasing electrolyte into the battery. Allow the pack to drain for 20 minutes, periodically tapping the sides to release any airlock or bubbles that may be present.
4. Properly dispose of the battery electrolyte pack. Let battery set with the vent cap strip off for 30 minutes to allow full absorption of the electrolyte. After 30 minutes, install the battery seal strip onto the battery.
5. Charge the battery initially for 3 to 5 hours using Christie Charger or a charger with an output capable of 1/10th the battery's amp-hour rating.

Battery Removal

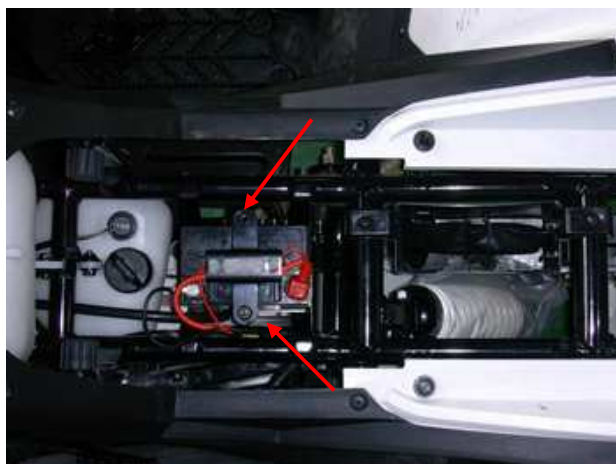
⚠ WARNING

Improperly connecting or disconnecting battery cables can result in an explosion and cause serious injury or death. When removing the battery, always disconnect the negative (black) cable first.

When reinstalling the battery, always connect the negative (black) cable last.

To remove the battery:

1. Remove the seat to access the battery.



2. Remove the 2 nuts securing the battery bracket to the frame.
3. Disconnect the black negative (-) battery cable first.
4. Disconnect the red positive (+) battery cable last.
5. Lift the battery out of the ATV.

⚠ CAUTION

To reduce the chance of sparks:

Whenever removing the battery, disconnect the negative (black) cable first. When reinstalling the battery, install the negative cable last.

Battery Cleaning

Keep the battery terminals and connections free of corrosion. If cleaning is necessary, remove the corrosion with a stiff wire brush. Wash with a solution of one tablespoon baking soda and one cup water. Rinse well with tap water and dry off with clean shop towels. Coat the terminals with dielectric grease or petroleum jelly.

Battery Installation

1. Place the fully charged battery in its holder.
2. Attach the hold-down strap(s).
3. Connect and tighten the red positive (+) cable first.
4. Connect and tighten the black negative (-) cable last.
5. Torque the battery terminal bolts to 3.5 ft. lbs. (4.7 Nm)
6. Verify that the cables are properly routed.

NOTE: When installing a new battery, make sure it's fully charged prior to its initial use. Using a new battery that has not been fully charged can damage the battery and result in a shorter life. It can also hinder vehicle performance. If charging is necessary, use a .5 amp battery charger.

Battery Voltage Test

Battery voltage should be checked with a digital multi-tester. Readings of 12.4 or less require further battery testing and charging. See Load Test.

NOTE: Batteries should be kept at or near a full charge as possible. If the battery is stored or used in a partially charged condition, crystal sulfation will form on the plates, reducing the efficiency and service life of the battery.

Battery Load Test

CAUTION

Remove the spark plug high tension lead and connect securely to engine ground before proceeding.

A battery may indicate a full charge condition in the battery voltage test and the specific gravity 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 suspected. To perform this test:

1. Connect a multi-tester to the battery in the same manner as was done in the battery voltage test. The reading should be 12.4 volts or greater.

2. Engage the electric starter and view the registered battery voltage while cranking the engine. Continue the test for 15 seconds. During this cranking period, the observed voltage should not drop below 9.5 volts.

3. If the beginning voltage is 12.6 or higher and the cranking voltage drops below 9.5 volts during the test, replace the battery.

Battery Charging Procedure

Charge the battery using a charger capable of producing voltage

1/10th of the battery's amp/hr rating. *Example:* COBRA 50 ATV batteries have an amp/hr rating of 4.85 amps. Do not exceed .5 amps charging voltage or damage to the battery will result.

Fully charged, the battery should read **12.8-13.0 Volts**. After charging is complete, let the battery stand 1-2 hours and re-test the voltage. **Do not overcharge the battery!**

There is no need to remove the cell cap strip or add water for the life of the battery.

COBRA 50/100 ATV BATTERY CHARGING CHART			
State of Charge	VOLTAGE	ACTION	CHARGE TIME
100%	12.8-13.0V	None	FULL None Required
75%	12.5-12.8V	Slight Charge	3-6 Hours @ 0.5 A
50%	12-12.5V	Charge	5-11 Hours @ 0.5 A
25%	11.5-12.0V	Charge	13+ Hours @ 0.5 A Check Charging
0%	Less than 11.5v	Charge	20 Hours @ 0.5 A Battery may be dead

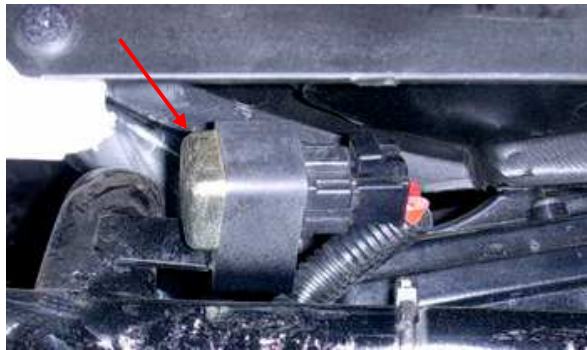
Because of the characteristics of a sealed battery, overcharging decreases the volume of electrolyte. The longer the overcharge time, the greater the drop in electrolyte, and subsequently starting power. Water cannot be added to a sealed battery. *If a sealed battery is overcharged, it will have to self-discharge before it can be used.* Overcharging can also warp plates, making future charging difficult. Watch charging times carefully, or use a charger with limited charging time/current capabilities. Always stop charging if the battery becomes warm to the touch. Let it cool sufficiently before resuming charging.

Battery 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.

STARTER SYSTEM

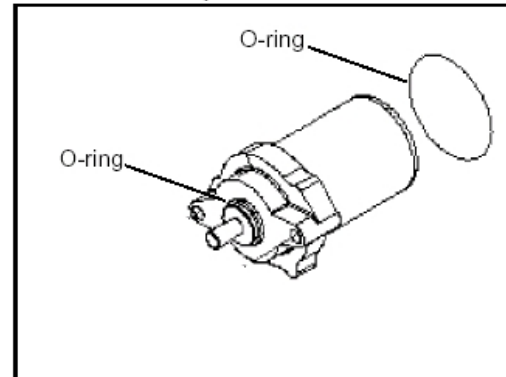
Starter Relay



The starter relay consists of a simple 2-way circuit. Power is present at the (RD) wire from the battery. Once the switching side of the relay receives power from the brake switch and a ground path from the starter button, battery power is sent to the starter motor to crank the engine.

Starter Motor Service

The starter motor is a complete service part. If it is determined that the starter motor is the failed part, replace as needed. See the parts manual for correct part numbers.



Starter Disassembly

NOTE: Use only electrical contact cleaner to clean starter motor parts. Other solvents may leave a residue or damage internal parts and insulation.

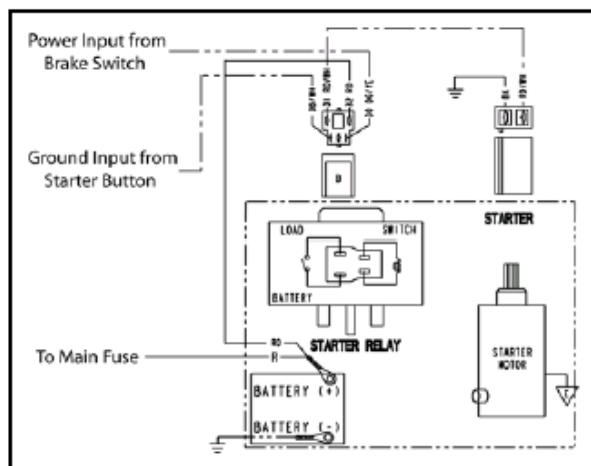
NOTE: Some starter motors may not be serviceable.

Replacement of entire assembly may be required.

Check the parts manual for replacement part information.

1. Disconnect the negative battery cable and starter motor harness. Remove the (2) bolts from the starter and pull it from the engine.

Use the illustration below when troubleshooting a "No Start" condition.



2. Remove the 2 screws and washers.



3. Remove magnet housing while holding the armature and brush holder section together.



Starter Brush Inspection / Replacement

1. Using an Ohm meter, measure the resistance between the cable terminal and the insulated brush. The reading should be .3 ohms or less. Measure the resistance between the cable terminal and brush housing. Make sure the brush is not touching the case. The reading should be infinite (no reading).

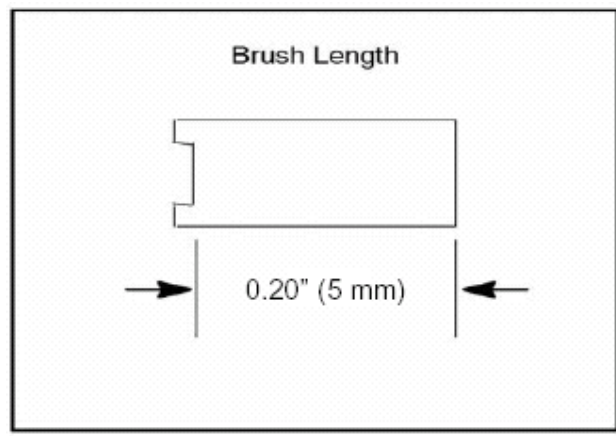


2. Remove the brush plate and brushes. Measure the brush length and replace if worn past the service limit.

Brush Length Service Limit 5 mm (0.20")

3. Inspect the surface of the commutator for wear or discoloration. See Armature Test.

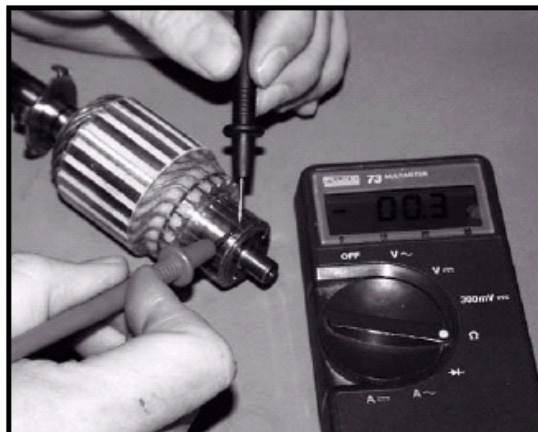
4. Be sure that the terminal bolt insulation washer is properly seated in the housing and the tab on the brush plate engages the notch in the brush plate housing.



Armature Test

1. Inspect surface of commutator. Replace if excessively worn or damaged.

2. Using a digital multi-tester, measure the resistance between each of the commutator segments. The reading should be .3 ohms or less.



3. Measure the resistance between each commutator segment and the armature shaft. The reading should be infinite. (no continuity)



4. Check commutator bars for discoloration. Bars discolored in pairs indicate shorted coils, requiring replacement of the starter motor.
5. Place armature in a growler. Turn growler on and position a hacksaw blade or feeler gauge lengthwise 1/8 " (.3 cm) above armature coil laminates. Rotate armature 360°. If hacksaw blade is drawn to armature on any pole, the armature is shorted and must be replaced.
6. Inspect the permanent magnets in starter housing. Make sure they are not cracked or separated from housing.

CAUTION

Use care when handling the starter housing. Do not drop or strike the housing, as magnet damage is possible. If the magnets are damaged, the starter must be replaced.

Starter Reassembly

1. Place armature in field magnet casing.
2. Inspect and replace the O-rings if damaged.
3. Install case sealing O-ring. Make sure O-ring is in good condition and not twisted on the case. Lubricate the ends of the armature shaft and oil seal with a light film of grease, and install housing.
4. Install brush housing onto the armature, pushing back brushes while installing armature shaft.
5. Reinstall starter motor housing screws and washers. Make sure O-rings are in good condition and seated in groove. Tighten sufficiently.
6. Reinstall the starter motor to the engine.

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.

To perform the test, place the meter on DC volts and place the meter leads across the connection to be tested. Refer to the chart on next page to perform voltage drop tests on the starter system.

**Voltage should not exceed
.1 DC volts per connection**

Starter System Troubleshooting

Starter Motor Does Not Turn

- Battery discharged - low specific gravity
- 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 starter button
- Faulty ignition switch (Do other systems function?)
- Faulty starter solenoid or starter motor
- Engine problem - seized or binding (Can engine be rotated easily with recoil starter?).

Starter Motor Turns Over Slowly

- Battery discharged - low specific gravity
- Excessive circuit resistance - poor connections (see Voltage Drop Test below)

• Engine problem - seized or binding (Can engine be rotated easily with recoil starter?)

- Faulty or worn brushes in starter motor
- Automatic compression release inoperative

Starter Motor Turns - Engine Does Not Rotate

- Faulty starter drive
- Faulty starter drive gears or starter motor gear
- Faulty flywheel gear or loose flywheel

Starter System Testing

Condition: Starter motor fails to turn engine. **NOTE:** Make sure engine crankshaft is free to turn before proceeding with dynamic testing of starter system. A digital multimeter must be used for this test.

