2004



650 Twin

ARCTIC CAT®

ATV Service Manual

2004 ATV SERVICE MANUAL

TABLE OF CONTENTS

SECTION

*Click on the **BLUE** text to go!*

1. General Information 1
2. Periodic Maintenance/Tune-Up 2
3. Engine/Transmission 3
4. Fuel/Lubrication/Cooling 4
5. Electrical System 5
6. Drive System 6
7. Suspension 7
8. Steering/Frame 8
9. Controls/Indicators 9
10. Aids for Maintenance 10
11. Troubleshooting 11

SECTION 1 - GENERAL INFORMATION

1

TABLE OF CONTENTS

General Specifications 1-2
Break-In Procedure 1-3
Gasoline - Oil - Lubricant 1-3
Genuine Parts 1-4
Preparation For Storage 1-5
Preparation After Storage 1-5

General Specifications*

CARBURETOR	
Type	Keihin CVKR-D32 (2)
Main Jet	122 - Front 122 - Rear
Slow Jet	40
Pilot Screw Setting (turns)	2 1/2
Jet Needle	BZL-2.470
Needle Jet	3.6 #3
Idle RPM	1050-1150
Float Arm Height	4 mm (0.16 in.)
Throttle Cable Free-Play (at lever)	3-6 mm (1/8-1/4 in.)
ELECTRICAL	
Spark Plug Type	NGK CR7E
Spark Plug Gap	0.7-0.8 mm (0.028-0.032 in.)
Spark Plug Cap	4750-6250 ohms
Ignition Coil Resistance (primary) (secondary)	0.09-0.13 ohm (terminal (+) to terminal (-)) 3800-5800 ohms (high tension - plug cap removed - to ground)
Igniton Coil Peak Voltage (primary/CDI)	100+ volts (wire (+) to ground)
Magneto Coil Resistance (trigger) (charging)	110-140 ohms (blue to black/white) 0.33-0.49 ohm (black to black)
Magneto Coil Peak Voltage (trigger) (charging)	3.6+ volts (blue to black/white) 14.0-15.0 volts (battery (+) to battery (-))

CHASSIS	
Dry Weight (approx)	293 kg (646 lb)
Length (overall)	205 cm (81 in.)
Height (overall)	125 cm (49.3 in.)
Width (overall)	120.7 cm (47.5 in.)
Suspension Travel (front)	25 cm (10 in.)
Suspension Travel (rear)	25 cm (10 in.)
Ground Clearance	20.3 cm (8 in.)
Brake Type	Hydraulic w/Brake Lever Lock and Auxiliary Brake
Wheelbase	127 cm (50 in.)
Tracking	89 cm (35 in.)
Tire Size	Front - 26 x 8-12 Rear - 26 x 11-12
Tire Inflation Pressure	0.35 kg/cm² (5 psi)
Turning Radius	2.7 m (8.9 ft)
MISCELLANY	
Gas Tank Capacity (rated)	24.6 L (6.5 U.S. gal.)
Coolant Capacity	2.7 L (2.8 U.S. qt)
Differential Capacity	275 ml (9.3 fl oz)**
Rear Drive Capacity	250 ml (8.5 fl oz)***
Engine Oil Capacity	2.05 L (2.17 U.S. qt)
Gasoline (recommended)	87 Octane Regular Unleaded
Engine Oil (recommended)	SAE 10W-40
Differential/Rear Drive Lubricant	SAE Approved 80W-90 Hypoid
Drive Belt Width (minimum)	28.8 mm (1.13 in.)
Brake Fluid	DOT 4
Taillight/Brakelight	12V/5W/27W
Headlight	12V/27W (2)
Starting System	Electric w/Manual Recoil (Emergency)

* Specifications subject to change without notice.

** One inch below plug threads.

*** At the plug threads.

Break-In Procedure

A new ATV and an overhauled ATV engine require a "break-in" period. The first 10 hours (or 200 miles) are most critical to the life of this ATV. Proper operation during this break-in period will help assure maximum life and performance from the ATV.

During the first 10 hours (or 200 miles) of operation, always use less than 1/2 throttle. Varying the engine RPM during the break-in period allows the components to "load" (aiding the mating process) and then "unload" (allowing components to cool). Although it is essential to place some stress on the engine components during break-in, care should be taken not to overload the engine too often. Do not pull a trailer or carry heavy loads during the 10-hour break-in period.

When the engine starts, allow it to warm up properly. Idle the engine several minutes until the engine has reached normal operating temperature. Do not idle the engine for excessively long periods of time.

During the break-in period, a maximum of 1/2 throttle is recommended; however, brief full-throttle accelerations and variations in driving speeds contribute to good engine break-in.

During the break-in period (or whenever the brake pads are replaced), the hydraulic brake pads must be burnished. Slow disc-speed hydraulic brakes must be properly burnished in order to achieve maximum stopping power.

⚠ CAUTION

BRAKE PADS MUST BE BURNISHED TO ACHIEVE FULL BRAKING EFFECTIVENESS. Braking distance will be extended until brake pads are properly burnished.

TO PROPERLY BURNISH THE BRAKES, USE FOLLOWING PROCEDURE:

- **Choose an area sufficiently large to safely accelerate ATV to 30 mph and to brake to a stop.**
- **Accelerate to 30 mph; then compress brake lever to decelerate to 0-5 mph.**
- **Repeat procedure five times until brakes are burnished.**
- **This procedure burnishes the brake pads, stabilizes the pad material, and extends the life of the brake pads.**

⚠ WARNING

Do not attempt sudden stops or put the ATV into a situation where a sudden stop will be required until the brake pads are properly burnished.

■ NOTE: Do not be reluctant to heat up the brake pads during the burnishing procedure.

After the completion of the break-in period, the engine oil and oil filter should be changed. Other maintenance after break-in should include checking of all prescribed adjustments and tightening of all fasteners.

Gasoline - Oil - Lubricant

RECOMMENDED GASOLINE

The recommended gasoline to use is 87 minimum octane regular unleaded. In many areas, oxygenates (either ethanol or MTBE) are added to the gasoline. Oxygenated gasolines containing up to 10% ethanol, 5% methane, or 5% MTBE are acceptable gasolines.

When using ethanol blended gasoline, it is not necessary to add a gasoline antifreeze since ethanol will prevent the accumulation of moisture in the fuel system.

⚠ CAUTION

Do not use white gas. Only Arctic Cat approved gasoline additives should be used.

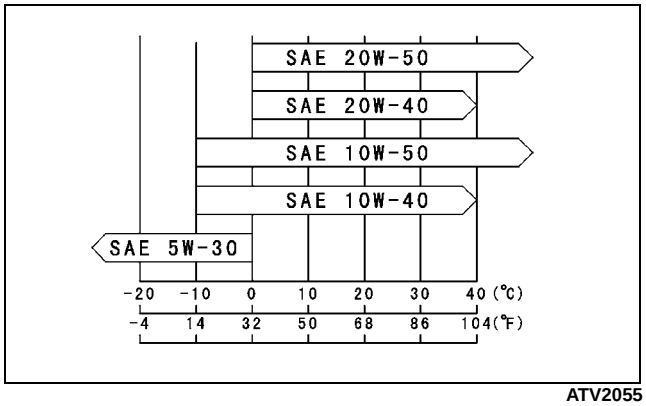
RECOMMENDED ENGINE/ TRANSMISSION OIL

⚠ CAUTION

Any oil used in place of the recommended oil could cause serious engine damage. Do not use oils which contain graphite or molybdenum additives. These oils can adversely affect clutch operation. Also, not recommended are racing, vegetable, non-detergent, and castor-based oils.

The recommended oil to use is Arctic Cat 4-Cycle Engine Oil (p/n 0436-005) or an equivalent oil which is rated SE, SF, or SG under API service classification. These oils meet all of the lubrication requirements of the Arctic Cat ATV engine. The recommended engine oil viscosity is SAE 10W-40. Ambient temperature should determine the correct weight of oil. See the following viscosity chart for details.

VISCOSITY CHART



ATV2055

RECOMMENDED FRONT DIFFERENTIAL/REAR DRIVE LUBRICANT

The recommended lubricant is Arctic Cat Gear Lube (p/n 0436-007) or an equivalent gear lube which is SAE approved 80W-90 hypoid. This lubricant meets all of the lubrication requirements of the Arctic Cat ATV front differentials and rear drives.

⚠ CAUTION

Any lubricant used in place of the recommended lubricant could cause serious front differential/ rear drive damage.

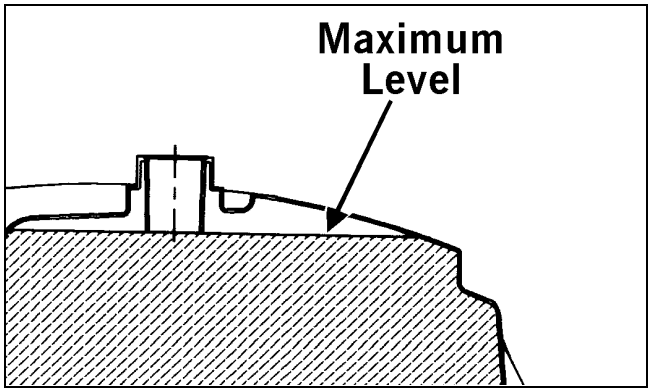
FILLING GAS TANK

⚠ WARNING

Always fill the gas tank in a well-ventilated area. Never add fuel to the ATV gas tank near any open flames or with the engine running. DO NOT SMOKE while filling the gas tank.



KX014



ATV0049C

Since gasoline expands as its temperature rises, the gas tank must be filled to its rated capacity only. Expansion room must be maintained in the tank particularly if the tank is filled with cold gasoline and then moved to a warm area.

⚠ WARNING

Do not overflow gasoline when filling the gas tank. A fire hazard could materialize. Always allow the engine to cool before filling the gas tank.

Tighten the gas tank cap securely after filling the tank.

⚠ WARNING

Do not over-fill the gas tank.

Genuine Parts

When replacement of parts is necessary, use only genuine Arctic Cat ATV parts. They are precision-made to ensure high quality and correct fit. Refer to the appropriate Illustrated Parts Manual for the correct part number, quantity, and description.

Preparation For Storage

⚠ CAUTION

Prior to storing the ATV, it must be properly serviced to prevent rusting and component deterioration.

Arctic Cat recommends the following procedure to prepare the ATV for storage.

1. Clean the seat cushion (cover and base) with a damp cloth and allow it to dry.
2. Clean the ATV thoroughly by washing dirt, oil, grass, and other foreign matter from the entire ATV. Allow the ATV to dry thoroughly. DO NOT get water into any part of the engine or air intake.
3. Either drain the gas tank or add Fuel Stabilizer (p/n 0638-165) to the gas in the gas tank. Remove the air filter housing cover and air filter. Start the engine and allow it to idle; then using Arctic Cat Engine Storage Preserver (p/n 0636-177), rapidly inject the preserver into the air filter opening for a period of 10 to 20 seconds; then stop the engine. Install the air filter and housing cover.

⚠ CAUTION

If the interior of the air filter housing is dirty, clean the area before starting the engine.

4. Drain the carburetor float chambers.
5. Plug the exhaust hole in the exhaust system with a clean cloth.
6. Apply light oil to the upper steering post bushing and plungers of the shock absorbers.
7. Tighten all nuts, bolts, cap screws, and screws. Make sure rivets holding components together are tight. Replace all loose rivets. Care must be taken that all calibrated nuts, cap screws, and bolts are tightened to specifications.
8. Fill the cooling system to the bottom of the stand pipe in the radiator neck with properly mixed coolant.
9. Disconnect the battery cables; then remove the battery, clean the battery posts and cables, and store in a clean, dry area.
10. Store the ATV indoors in a level position.

⚠ CAUTION

Avoid storing outside in direct sunlight and avoid using a plastic cover as moisture will collect on the ATV causing rusting.

Preparation After Storage

Taking the ATV out of storage and correctly preparing it will assure many miles and hours of trouble-free riding. Arctic Cat recommends the following procedure to prepare the ATV.

1. Clean the ATV thoroughly.
2. Clean the engine. Remove the cloth from the exhaust system.
3. Check all control wires and cables for signs of wear or fraying. Replace if necessary.
4. Change the engine/transmission oil and filter.
5. On liquid cooled models, check the coolant level and add properly mixed coolant as necessary.
6. Charge the battery; then install. Connect the battery cables.
7. Check the entire brake systems (fluid level, pads, etc.), all controls, headlights, taillight, brakelight, and headlight aim; adjust or replace as necessary.
8. Tighten all nuts, bolts, cap screws, and screws making sure all calibrated nuts, cap screws, and bolts are tightened to specifications.
9. Check tire pressure. Inflate to recommended pressure as necessary.
10. Make sure the steering moves freely and does not bind.
11. Check the spark plugs. Clean or replace as necessary.
12. Follow the recommendations found in the pre-start inspection.

NOTES

SECTION 2 - PERIODIC MAINTENANCE/TUNE-UP

2

TABLE OF CONTENTS

Periodic Maintenance Chart 2-2
Lubrication Points 2-3
Battery 2-3
Fuses 2-4
Air Cleaner/Filter 2-4
Valve/Tappet Clearance
(Feeler Gauge Procedure) 2-6
Valve/Tappet Clearance
(Valve Adjuster Procedure) 2-7
Testing Engine Compression 2-7
Spark Plugs 2-8
Muffler/Spark Arrester 2-8
Gas/Vent Hoses 2-9
Adjusting Throttle Cable 2-9
Adjusting Engine RPM (Idle) 2-9
Engine/Transmission Oil - Filter 2-9
Front Differential/Rear Drive Lubricant 2-10
Tires 2-11
Steering Components 2-12
Driveshaft/Coupling 2-12
Suspension/Shock Absorbers/Bushings 2-12
Nuts/Bolts/Cap Screws 2-12
Ignition Timing 2-12
Headlight/Taillight-Brakelight 2-12
Switches 2-13
Reverse Shift Lever 2-13
Speedometer/Indicator Lights 2-15
Frame/Welds/Racks 2-16
Electrical Connections 2-16
Hydraulic Brake Systems 2-16
Burnishing Brake Pads 2-18
Coolant 2-18
Checking/Replacing V-Belt 2-18

Periodic Maintenance Chart

A = Adjust
C = Clean
D = Drain
I = Inspect
L = Lubricate
R = Replace

Item	Initial Service After Break-In (First Mo or 100 Mi)	Every Day	Every Month or Every 100 Miles	Every 3 Months or Every 300 Miles	Every 6 Months or Every 500 Miles	Every Year or Every 1500 Miles	As Needed
Battery	I		I				C
Fuses				I			R
Air Filter/One-Way Drain	I	I	C*				R
Valve/Tappet Clearance	I					I	A
Engine Compression						I	
Spark Plugs	I			I			R (4000 Mi or 18 Mo)
Muffler/Spark Arrester					C		R
Gas/Vent Hoses	I	I					R (2 Yrs)
Gas Tank Valve						I	C
Throttle Cable	I	I			C-L		A-R
Carb Float Chambers				D*			
Engine RPM (Idle)	I				I		A
Engine-Transmission Oil Level		I					A
Engine-Transmission Oil/Filter	R			R*			R
Front Differential/Rear Drive Lubricant	I						R (4 Yrs)
Tires/Air Pressure	I			I			R
Steering Components	I	I		I			R
V-Belt	I	Inspect every 100 hours/1100 miles					R
Suspension (Ball joint boots, drive axle boots front and rear, tie rods, differential and rear drive bellows)	I			I*			R
Nuts/Cap Screws/Screws	I			I	I		A
Ignition Timing						I	
Headlight/Taillight-Brakelight	I	I					R
Switches	I	I					R
Reverse Shift Lever					I		A-L
Choke Cable	I			I	C-L		R
Recoil Starter		I					C-R
Handlebar Grips		I					R
Handlebars	I	I					R
Gauges/Indicators	I	I					R
Frame/Welds/Racks	I		I		I		
Electrical Connections					I		C
Complete Brake System (Hydraulic & Auxiliary)	I	I		C			L-R
Brake Pads	I			I*			R
Brake Fluid	I			I			R (2 Yrs)
Brake Hoses	I			I			R (4 Yrs)
Coolant/Cooling System	I		I				R (2 Yrs)

* Service/Inspect more frequently when operating in adverse conditions.

Lubrication Points

It is advisable to lubricate certain components periodically to ensure free movement. Apply light oil to the components using the following list as reference.

A. Throttle Lever Pivot/Cable Ends

B. Brake Lever Pivot

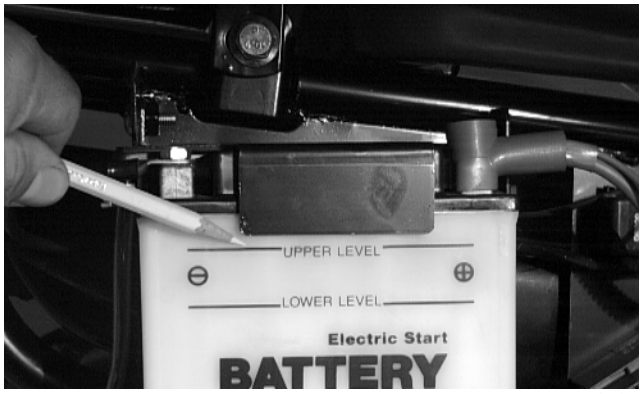
C. Auxiliary Brake Pedal Pivot

D. Choke Cable Upper End

E. Differential Lock Cable Ends

F. Idle RPM Screw (Carburetors)

Battery



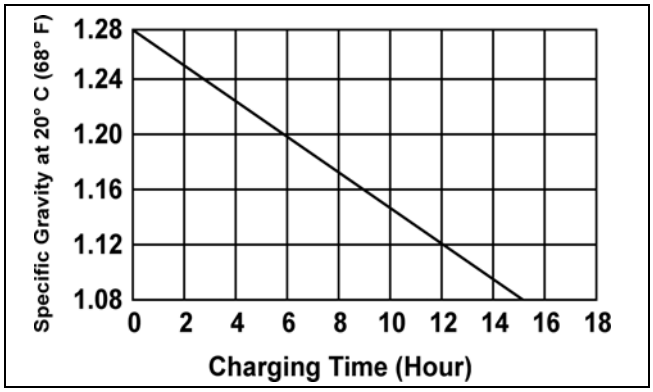
AF879D

The level of the battery fluid must be kept between the upper and lower level lines at all times. If the level drops below the lower level line, add only **distilled water** until it reaches upper level line.

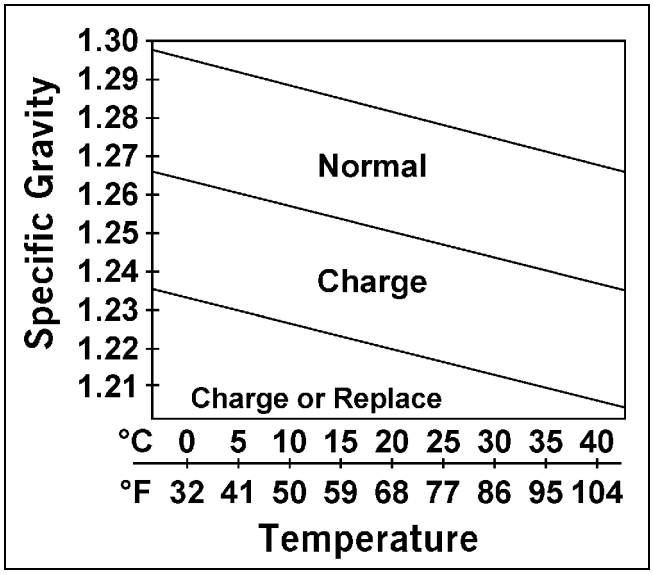
⚠ WARNING

Battery acid is harmful if it contacts eyes, skin, or clothing. Care must be taken whenever handling a battery.

If the battery is discharged, remove the battery from the ATV and charge the battery at the standard charging rate of 1.4A x 10 hr.



ChargTim



Charge

To remove and charge the battery, use the following procedure.

⚠ WARNING

Anytime service is performed on a battery, the following must be observed: keep sparks, open flame, cigarettes, or any other flame away. Always wear safety glasses. Protect skin and clothing when handling a battery. When servicing battery in enclosed space, keep the area well-ventilated. Make sure battery venting is not obstructed.

1. Remove the battery hold-down bracket.
2. Remove the negative battery cable; then remove the positive cable and the battery vent tube. Remove the battery from the ATV. Care should be taken not to damage the vent tube.

⚠ WARNING

Avoid spillage and contact with skin, eyes, and clothing.

⚠ CAUTION

Do not charge the battery while it is in the ATV with the battery terminals connected.

3. Remove the vent plugs; then (if necessary) fill the battery with **distilled water** to the upper level indicated on the battery.

4. Trickle charge the battery at 1.4 amps for 10 hours.

⚠ CAUTION

Never exceed the standard charging rate.

5. After charging, check fluid level and fill with distilled water as necessary; then install vent plugs.

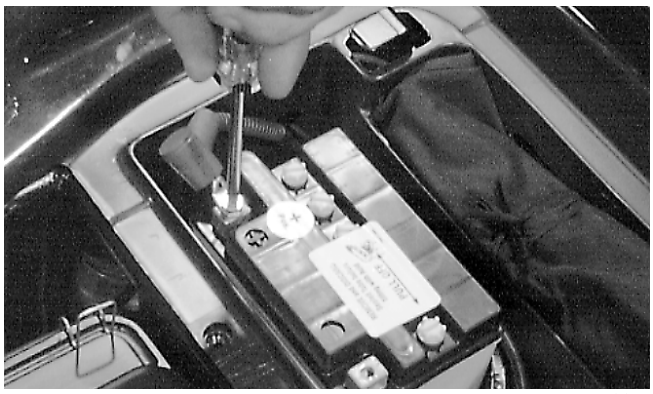
⚠ CAUTION

Before installing the battery, make sure the ignition switch is in the OFF position.

6. Place the battery into position in the ATV and secure with the hold-down bracket.

7. Attach the vent tube and check the vent tube to make sure it is not crimped or obstructed in any way and that it is properly routed through and secured to the frame.

8. Connect cables to the proper terminals: positive cable to the positive terminal (+) and negative cable to the negative terminal (-). Connect the negative cable last.



AF733D

⚠ CAUTION

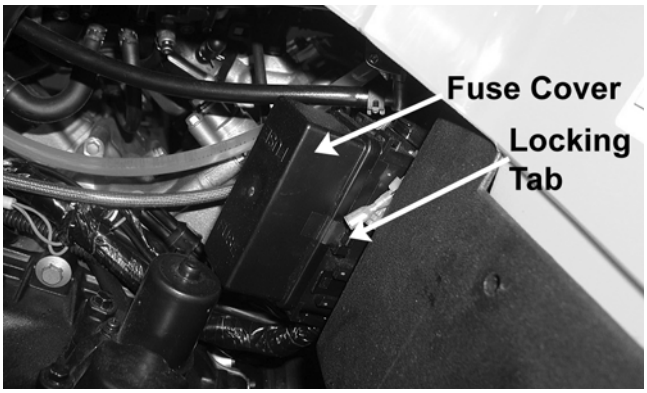
Connecting cables in reverse (positive to negative and negative to positive) can cause serious damage to the electrical system.

FUSES

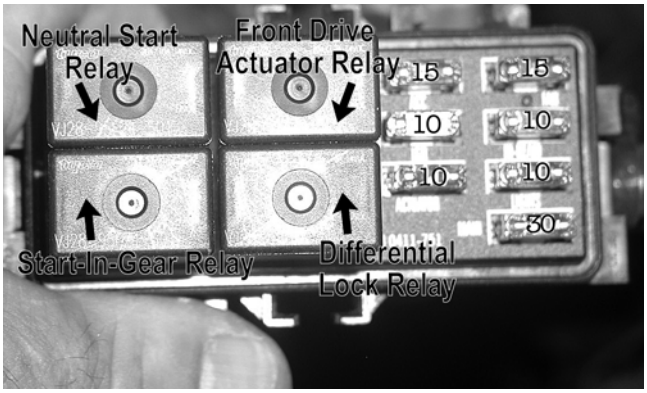
The fuses are incorporated into the Power Distribution Module which is located on the upper frame behind the right front fender.

If there is any type of electrical system failure, always check the fuses first.

■ NOTE: To remove the fuse, compress the locking tabs on either side of the fuse cover and lift off.



KX053A



KX202A

⚠ CAUTION

Always replace a blown fuse with a fuse of the same type and rating.

Air Cleaner/Filter

The air filter inside the air filter housing must be kept clean to provide good engine power and gas mileage. If the ATV is used under normal conditions, service the filter at the intervals specified. If operated in dusty, wet, or muddy conditions, inspect and service the filter more frequently. Use the following procedure to remove the filter and inspect and/or clean it.

CLEANING AND INSPECTING FILTER

⚠ CAUTION

Failure to inspect the air filter frequently if the vehicle is used in dusty, wet, or muddy conditions can damage the engine.

1. Remove the seat; then remove the screws securing the storage compartment cover housing and remove the housing and cover.

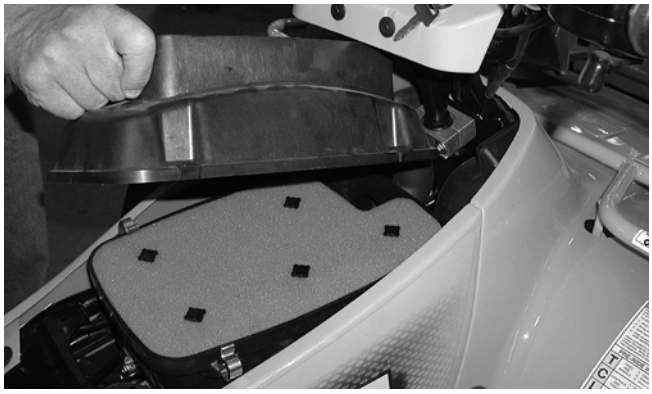


KX038

2. Unsnap the four clips securing the storage compartment/filter housing cover; then remove and set aside.



KX031



KX032

3. Remove the air filter assembly and separate the foam element from the frame.



KX033

4. Fill a wash pan larger than the filter with a non-flammable cleaning solvent; then dip the filter in the solvent and wash it.

■ NOTE: Foam Filter Cleaner (p/n 0436-194) and Foam Filter Oil (p/n 0436-195) are available from Arctic Cat.

5. Dry the filter.

6. Put the filter in a plastic bag; then pour in air filter oil and work the filter. Reattach the filter to the frame.

⚠ CAUTION

A torn air filter can cause damage to the ATV engine. Dirt and dust may get inside the engine if the element is torn. Carefully examine the element for tears before and after cleaning it. Replace the element with a new one if it is torn.

7. Clean any dirt or debris from inside the air cleaner. Be sure no dirt enters the carburetor.

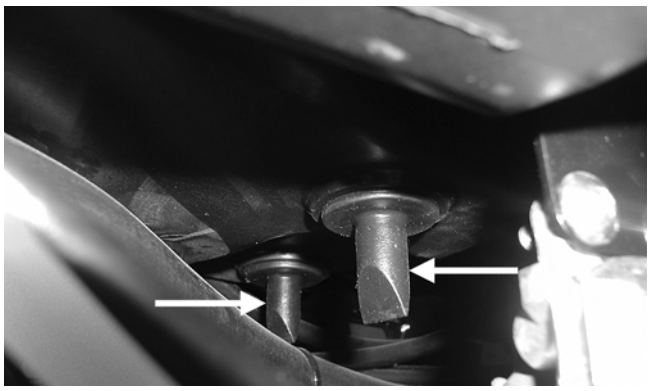
8. Place the filter assembly in the air filter housing making sure it is properly positioned and properly seated with the filter frame down.

9. Install the air filter housing cover and secure with the retaining clips; then install the storage compartment cover housing.

10. Install the seat making sure the seat is properly secured.

CHECKING AND CLEANING DRAINS

1. Inspect one-way drains beneath the main housing for debris and for proper sealing.



KX045A

2. Replace any one-way drain that is cracked or shows any signs of hardening or deterioration.

⚠ CAUTION

The one-way drain to the right is the clean air section of the filter housing. Any leak of this one-way drain will allow dirt into the engine intake causing severe engine damage.

3. Wipe any accumulation of oil or gas from the filter housing and one-way drains.

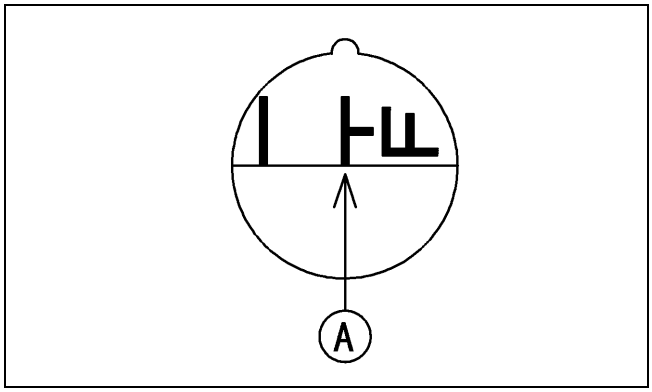
Valve/Tappet Clearance
(Feeler Gauge Procedure)

To check and adjust valve/tappet clearance, use the following procedure.

■NOTE: The seat, air filter housing, front fenders, front inner covers, and side panels must be removed for this procedure.

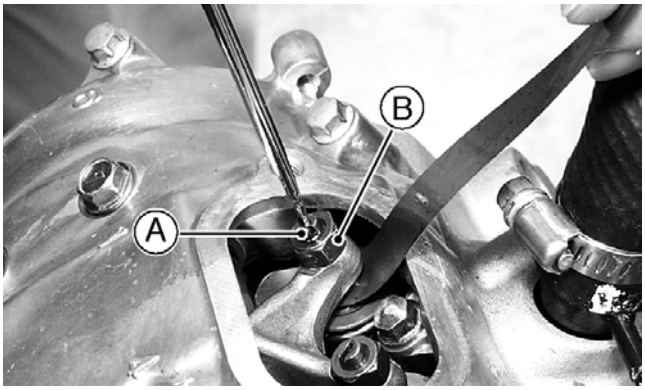
1. Remove the cap screws securing the recoil starter; then remove the recoil starter assembly.
2. Remove the timing inspection plug; then remove the four tappet covers (for more detailed information, see Section 3 - Servicing Top-Side Components).
3. Rotate the crankshaft counterclockwise to the TDC position on the compression stroke indicated by the TF mark (A) on the flywheel. TF is top dead center front.

■NOTE: At this point, the rocker arms and adjuster screws on the front cylinder must not have pressure on them.



ATV2057B

4. Using a feeler gauge, check each valve/tappet clearance. If clearance is not within specifications, loosen jam nut (B) and rotate the tappet adjuster screw (A) until the clearance is within specifications. Tighten each jam nut to 1.2 kg-m (104 in.-lb) after completing the adjustment.



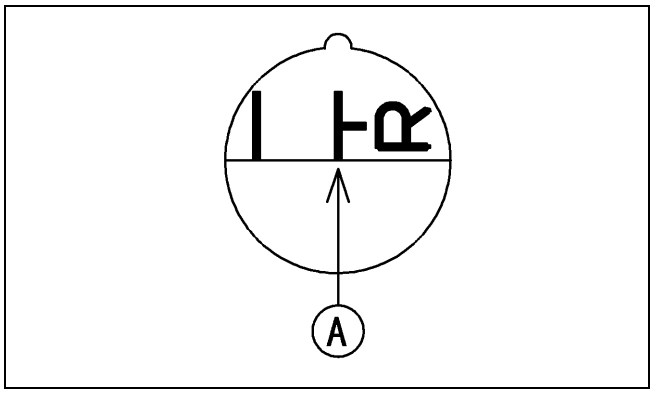
KX227

⚠ CAUTION

The feeler gauge must be positioned at the same angle as the valve and valve adjuster for an accurate measurement of clearance. Failure to measure the valve clearance accurately could cause valve component damage.

■NOTE: Cold tappet clearance is 0.20-0.25 mm (0.0079-0.0098 in.) for exhaust valves and 0.10-0.15 mm (0.0039-0.0059 in.) for intake valves.

5. Rotate the crankshaft counterclockwise until the TR mark (A) aligns in the timing hole. Repeat steps 3-4 for the rear cylinder.



ATV2058B

6. Install the timing inspection plug.
7. Place the four tappet covers into position. Tighten the cap screws securely.
8. Install the recoil starter assembly and tighten the cap screws securely.
9. Install the air filter housing, front inner covers, front fenders, and side panels; then install the seat and make sure it locks securely.

Valve/Tappet Clearance
(Valve Adjuster Procedure)

To check and adjust valve/tappet clearance, use the following procedure.

■ NOTE: The seat, air filter housing, front fenders, front inner covers, and side panels must be removed for this procedure.

1. Remove the cap screws securing the recoil starter; then remove the recoil starter assembly.
2. Remove the timing inspection plug; then remove the four tappet covers (for more detailed information, see Section 3 - Servicing Top-Side Components).
3. Rotate the crankshaft counterclockwise to the TDC position on the compression stroke indicated by the TF mark on the flywheel. TF is top dead center front.

■ NOTE: At this point, the rocker arms and adjuster screws must not have pressure on them.

■ NOTE: Use Valve Gap Adjuster (p/n 0444-092) for this procedure.

3. Place the valve adjuster onto the jam nut securing the tappet adjuster screw; then rotate the valve adjuster dial clockwise until the end is seated in the tappet adjuster screw.
4. While holding the valve adjuster dial in place, use the valve adjuster handle and loosen the jam nut; then rotate the tappet adjuster screw clockwise until friction is felt.
5. Align the valve adjuster handle with one of the marks on the valve adjuster dial.
6. While holding the valve adjuster handle in place, rotate the valve adjuster dial counterclockwise until proper valve/tappet clearance is attained.

■ NOTE: Refer to the appropriate specifications in Feeler Gauge Procedure sub-section for the proper valve/tappet clearance.

■ NOTE: Rotating the valve adjuster dial counterclockwise will open the valve/tappet clearance by 0.05 mm (0.002 in.) per mark.

7. While holding the adjuster dial at the proper clearance setting, tighten the jam nut securely with the valve adjuster handle; then tighten the jam nuts to 1.2 kg-m (104 in.-lb).
8. Rotate the crankshaft counterclockwise until the TR mark aligns in the timing hole; then repeat steps 3-7 for the rear cylinder.
9. Install the timing inspection plug; then install the four tappet covers and tighten securely.
10. Install the recoil starter assembly and tighten the cap screws securely.
11. Install the air filter housing, front inner covers, front fenders, and side panels; then install the seat and make sure it locks securely.

Testing Engine Compression

To test engine compression, use the following procedure.

1. Remove the high tension leads from the spark plugs.
2. Using compressed air, blow any debris from around the spark plugs.

⚠ WARNING

Always wear safety glasses when using compressed air.

3. Remove the spark plugs; then attach the high tension leads to the plugs and ground the plugs on the cylinder head well away from the spark plug holes.
4. Attach the Compression Gauge (p/n 0444-096) to the front or rear cylinder.

■ NOTE: The engine must be warm and the battery must be fully charged for this test.

5. While holding the throttle lever in the full-open position, crank the engine over with the electric starter until the gauge shows a peak reading (five to 10 compression strokes).

■ NOTE: The compression should be within a range of 47-81 psi in the full-open throttle position.

6. Repeat for the second cylinder.

7. If compression is abnormally low, inspect the following items.

   A. Verify starter cranks engine over.

   B. Gauge is functioning properly.

   C. Throttle lever in the full-open position.

   D. Valve/tappet clearance correct.

   E. Valve bent or burned.

   F. Valve seat burned.

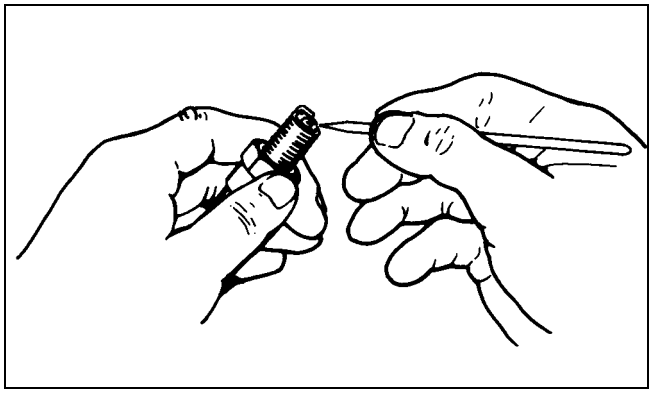
■ **NOTE: To service valves, see Section 3.**

8. Pour 29.5 ml (1 fl oz) of oil into the spark plug hole, reattach the gauge, and retest compression.

9. If compression is now evident, service the piston rings (see Section 3).

Spark Plugs

A light brown insulator indicates that a plug is correct. A white or dark insulator indicates that the engine may need to be serviced or the carburetor may need to be adjusted. To maintain a hot, strong spark, keep the plugs free of carbon.

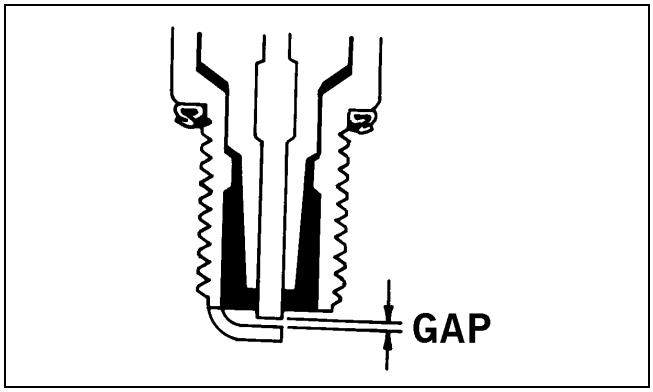


ATV-0051

⚠ CAUTION

Before removing the spark plugs, be sure to clean the area around the spark plugs. Dirt could enter engine when removing or installing the spark plugs.

Adjust the gap to 0.7 - 0.8 mm (0.028 - 0.032 in.) for proper ignition. Use a feeler gauge to check the gap.



ATV0052B

When installing the spark plug, be sure to tighten it to 1.3 kg-m (9.5 ft-lb). A new spark plug should be tightened 1/2 turn once the washer contacts the cylinder head. A used spark plug should be tightened 1/8 - 1/4 turn once the washer contacts the cylinder head.

Muffler/Spark Arrester

The muffler has a spark arrester which must be periodically cleaned. At the intervals shown in the Periodic Maintenance Chart, clean the spark arrester using the following procedure.

⚠ WARNING

Wait until the muffler cools to avoid burns.

1. Shift the transmission into neutral and set the brake lever lock.

2. Elevate the front of the ATV on a safety stand until the muffler is horizontal.

3. Remove the plug from the bottom of the muffler.



KX051A

4. Start the engine and increase RPM to “blow out” the accumulated carbon particles.

5. Stop the engine. Wait until the muffler cools; then install the plug and tighten securely.

Gas/Vent Hoses

Replace the gas hose every two years. Damage from aging may not always be visible. Do not bend or obstruct the routing of the carburetor vent hose. Make certain that the vent hose is securely connected to the carburetor and the opposite end is always open.

Adjusting Throttle Cable

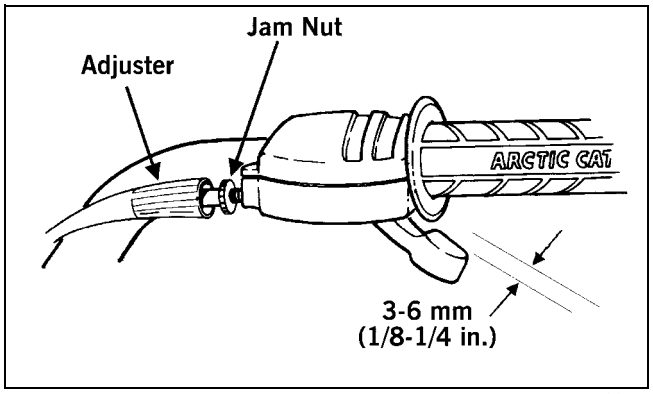
To adjust the throttle cable free-play, follow this procedure.

1. Slide the rubber boot away; then loosen the jam nut from the throttle cable adjuster.



AL611D

2. Slide the rubber boot away and turn the adjuster until the throttle cable has proper free-play of 3-6 mm (1/8 - 1/4 in.) at the lever.



ATV-0047

3. Tighten the jam nut against the throttle cable adjuster securely; then slide the rubber boot over the adjuster.

Adjusting Engine RPM (Idle)

To properly adjust the idle RPM, a tachometer is necessary. To adjust idle RPM, use the following procedure.

1. With the transmission in neutral, start the engine and warm it up to normal operating temperature.
2. Turn the idle adjustment screw clockwise one turn past the recommended RPM setting; then turn it counterclockwise to 1050-1150 RPM.



KX029A

⚠ WARNING

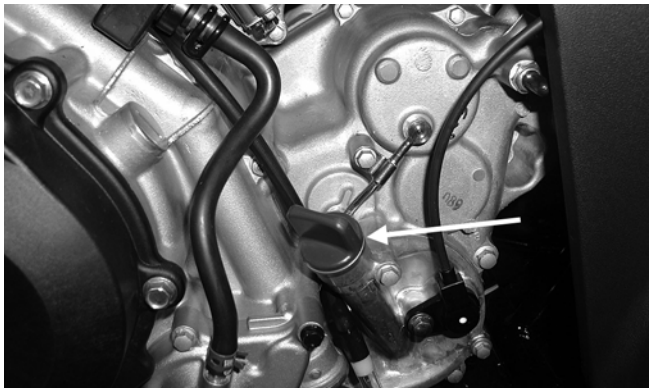
Adjust the idle to the correct RPM. Make sure the engine is at normal operating temperature before adjusting the idle RPM.

Engine/Transmission Oil - Filter

OIL - FILTER

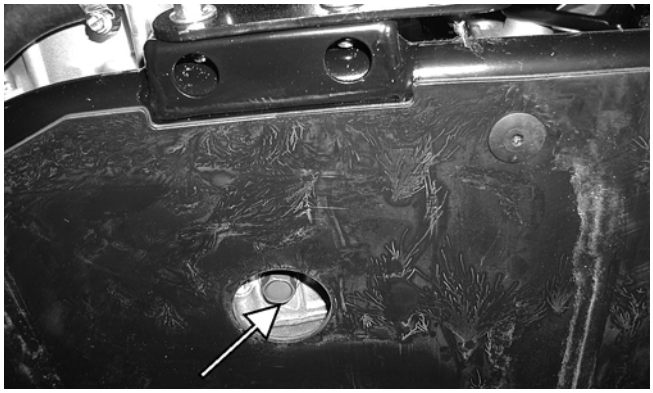
Change the engine oil and oil filter at the scheduled intervals. The engine should always be warm when the oil is changed so the oil will drain easily and completely.

1. Park the ATV on level ground.
2. Loosen the oil level stick/filler plug.



KX019A

3. Remove the drain plug from the bottom of the engine and drain the oil into a drain pan.



KX036A

4. Using the Oil Filter Wrench (p/n 0444-042) and appropriate handle, remove the old oil filter.

■ NOTE: Clean up any excess oil after removing the filter.

5. Apply oil to a new filter gasket and check to make sure it is positioned correctly; then install the new oil filter. Tighten securely.

■ NOTE: Install a new filter gasket each time the filter is replaced.

6. Install the engine drain plug and tighten to 2.0 kg-m (14.5 ft-lb). Pour 2.05 L (2.17 U.S. qt) of the recommended oil in the filler hole. Install the oil level stick/filler plug.

⚠ CAUTION

Any oil used in place of the recommended oil could cause serious engine damage. Do not use oils which contain graphite or molybdenum additives. These oils can adversely affect clutch operation. Also, not recommended are racing, vegetable, non-detergent, and castor-based oils.

7. Start the engine (while the ATV is outside on level ground) and allow it to idle for a few minutes.

8. Turn the engine off and wait approximately one minute.

9. Unscrew the oil level stick and wipe it with a clean cloth.

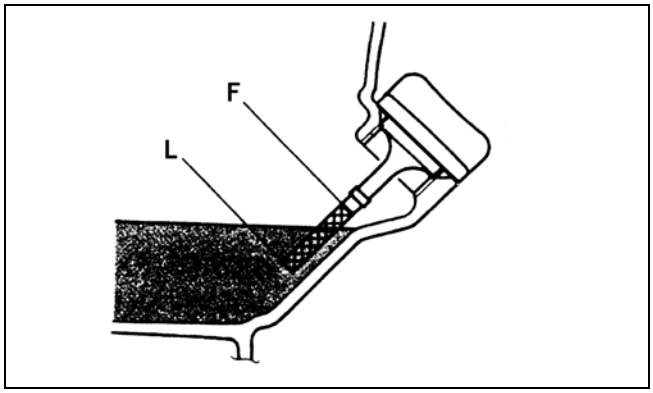
10. Install the oil level stick and thread into the engine case.

■ NOTE: The oil level stick should be threaded into the case for checking the oil level.

11. Remove the oil level stick; the engine oil level should be above the illustrated “L” mark but not higher than the illustrated “F” mark.

⚠CAUTION

Do not over-fill the engine with oil. Always make sure that the oil level is above the “L” mark but not higher than the “F” mark.



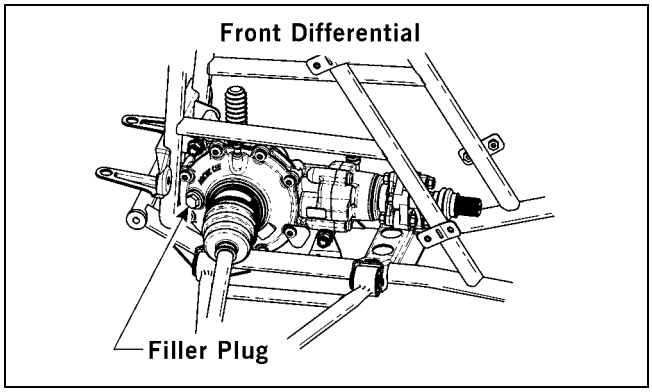
ATV0100A

12. Inspect the area around the drain plug and oil filter for leaks.

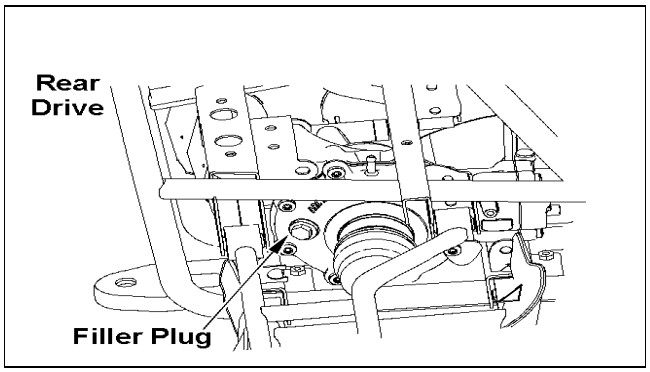
Front Differential/Rear Drive Lubricant

Check and change the lubricant according to the Periodic Maintenance Chart. When changing the lubricant, use approved SAE 80W-90 hypoid gear lube. To check lubricant, use the following procedure.

1. Remove each filler plug; the lubricant level should be 1 in. below the threads of the plug. If low, add SAE approved 80W-90 hypoid gear lube as necessary.



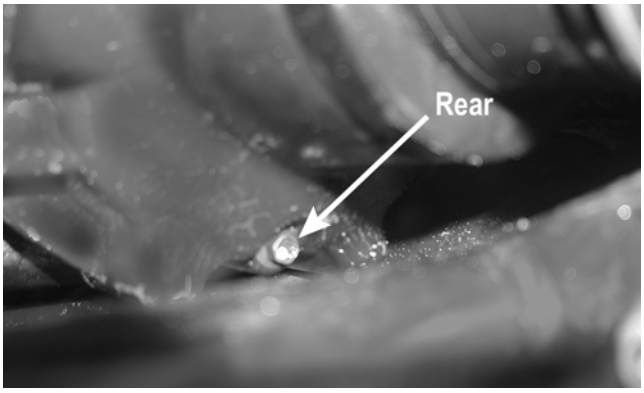
0736-568



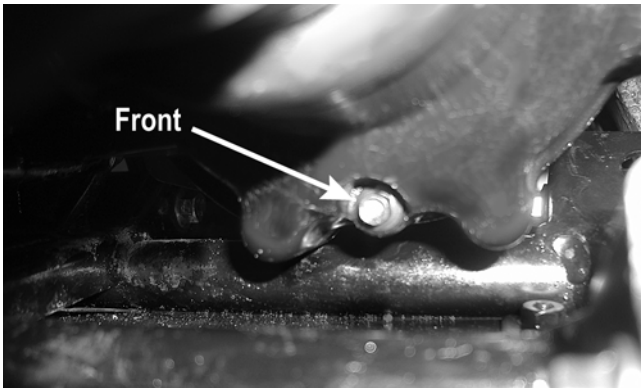
737-686A

To change the lubricant, use the following procedure.

1. Place the ATV on level ground.
2. Remove each oil filler plug.
3. Drain the oil into a drain pan by removing in turn the drain plug from each.



KX396A



KX395A

4. After all the oil has been drained, install the drain plugs and tighten to 0.5 kg-m (3.5 ft-lb).
5. Pour the appropriate amount of recommended oil into each filler hole.
6. Install the filler plugs. Tighten to 2.2 kg-m (16 ft-lb).

■ NOTE: If the differential/rear drive oil is contaminated with water, inspect the drain plug, filler plug, and/or bladder.

⚠ CAUTION

Water entering the outer end of the axle will not be able to enter the rear drive unless the seals are damaged.

Tires

TIRE SIZES

The ATV is equipped with low-pressure tubeless tires of the size and type listed. Do not under any circumstances substitute tires of a different type or size.

⚠ WARNING

Always use the size and type of tires specified. Always maintain proper tire inflation pressure.

TIRE INFLATION PRESSURE

Front and rear tire inflation pressure should be 0.35 kg-cm² (5.0 psi).

A low-pressure gauge is provided in the tool kit to measure the air pressure in the tires. Check the air pressure in all tires before each use of the ATV.

Steering Components

The following steering components should be inspected periodically to ensure safe and proper operation.

A. Handlebar grips not worn, broken, or loose.
B. Handlebar not bent, cracked, and has equal and complete full-left and full-right capability.
C. Steering post bearing assembly/bearing housing not broken, worn, or binding.
D. Ball joints not worn, cracked, or damaged.
E. Tie rods not bent or cracked.
F. Knuckles not worn, cracked, or damaged.
G. Cotter pins not damaged or missing.

Driveshaft/Coupling

The following drive system components should be inspected periodically to ensure proper operation.

A. Spline lateral movement (slop).
B. Coupling cracked, damaged, or worn.

Suspension/Shock Absorbers/Bushings

The following suspension system components should be inspected periodically to ensure proper operation.

A. Shock absorber rods bent, pitted, or damaged.
B. Rubber damper cracked, broken, or missing.
C. Shock absorber body damaged, punctured, or leaking.
D. Shock absorber eyelets broken, bent, or cracked.
E. Shock absorber eyelet bushings worn, deteriorated, cracked, or missing.
F. Shock absorber spring broken or sagging.

Nuts/Bolts/Cap Screws

Tighten all nuts, bolts, and cap screws. Make sure rivets holding components together are tight. Replace all loose rivets. Care must be taken that all calibrated nuts, bolts, and cap screws are tightened to specifications. For proper torque values, see Section 10.

Ignition Timing

The ignition timing cannot be adjusted; however, verifying ignition timing can aid in troubleshooting other components. To verify ignition timing, see Section 5.

Headlight/Taillight-Brakelight

Each time the ATV is used, lights should be checked for proper function. Rotate the ignition switch to the lights position; the headlights and taillight should illuminate. Test the brakelight by compressing the brake lever. The brakelight should illuminate.

HEADLIGHT

■ NOTE: The bulb portion of the headlight is fragile. HANDLE WITH CARE. When replacing the headlight bulb, do not touch the glass portion of the bulb. If the glass is touched, it must be cleaned with a dry cloth before installing. Skin oil residue on the bulb will shorten the life of the bulb.

⚠ WARNING

Do not attempt to remove the bulb when it is hot. Severe burns may result.

To replace the headlight bulb, use the following procedure.

1. Remove the wiring harness connector from the back of the headlight bulb assembly.
2. Grasp the bulb assembly and turn it counterclockwise to remove the bulb assembly from the housing.
3. Install the new bulb assembly into the housing and rotate it completely clockwise.
4. Install the wiring harness connector.

TAILLIGHT-BRAKELIGHT

To replace the taillight-brakelight bulb, use the following procedure.

1. Remove the two screws and remove the lens cover.
2. Push the bulb in and turn it counterclockwise.
3. Install the new bulb by turning it clockwise while pushing in.
4. Install the lens cover.

⚠ CAUTION

Tighten the lens cover screws only until they are snug.

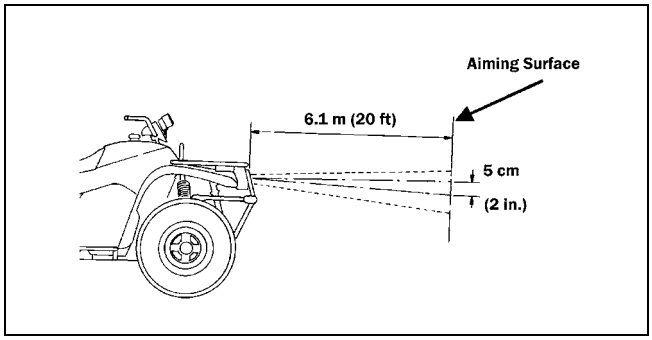
CHECKING/ADJUSTING HEADLIGHT AIM

The headlights can be adjusted vertically and horizontally. The geometric center of the HIGH beam light zone is to be used for vertical and horizontal aiming.

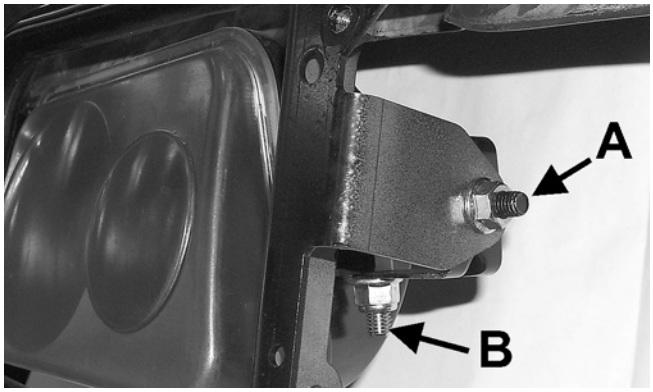
1. Position the ATV on a level floor so the headlights are approximately 6.1 m (20 ft) from an aiming surface (wall or similar aiming surface).

■ NOTE: There should be an average operating load on the ATV when adjusting the headlight aim.

2. Measure the distance from the floor to the mid-point of each headlight.
3. Using the measurements obtained in step 2, make horizontal marks on the aiming surface.
4. Make vertical marks which intersect the horizontal marks on the aiming surface directly in front of the headlights.
5. Switch on the lights. Make sure the HIGH beam is on. DO NOT USE LOW BEAM.
6. Observe each headlight beam aim. Proper aim is when the most intense beam is centered on the vertical mark 5 cm (2 in.) below the horizontal mark on the aiming surface.



ATV-0070C



AF926A

7. Adjust each headlight until correct aim is obtained.
   A. Horizontal — Loosen nut (A) and adjust for proper aiming. Tighten the nut securely.
   B. Vertical— Loosen nut (B) and adjust for proper aiming. Tighten the nut securely.

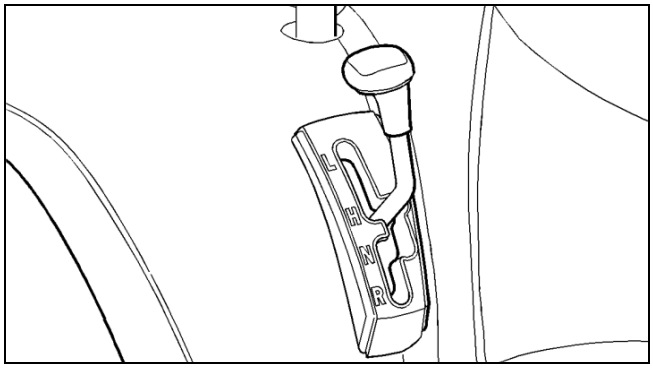
Switches

Each time the ATV is used, switches should be checked for proper operation. Use the following list for reference.

A. Ignition switch — engine will start.
B. Emergency stop switch — engine will stop.
C. Reverse switch — reverse indicator light illuminates.
D. Hi/Lo switch — headlight beam bright and dim.
E. Brake switches — rear brakelight illuminates.

Reverse Shift Lever

CHECKING ADJUSTMENT



0736-565

Stop the ATV completely and shift the transmission into the R position. The reverse gear indicator light should be illuminated.

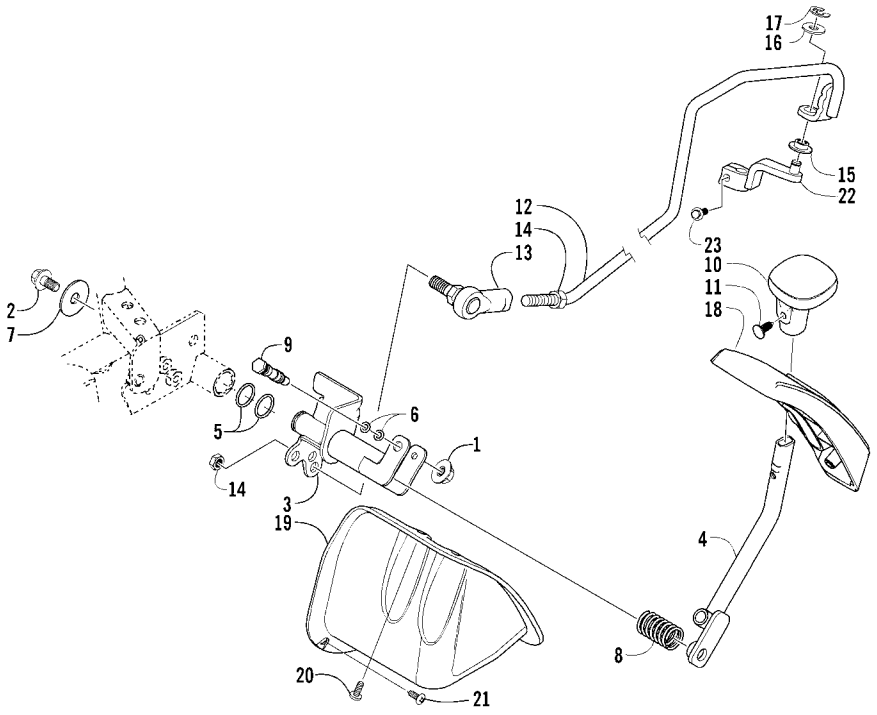
⚠ WARNING

Never shift the ATV into reverse gear when the ATV is moving as it could cause the ATV to stop suddenly throwing the operator from the ATV.

If the reverse lever light does not illuminate when shifted to the reverse position, the switch may be faulty, the fuse may be blown, the bulb may be faulty, a connection may be loose or corroded, or the lever may need adjusting. To adjust, proceed to Adjusting Shift Lever.

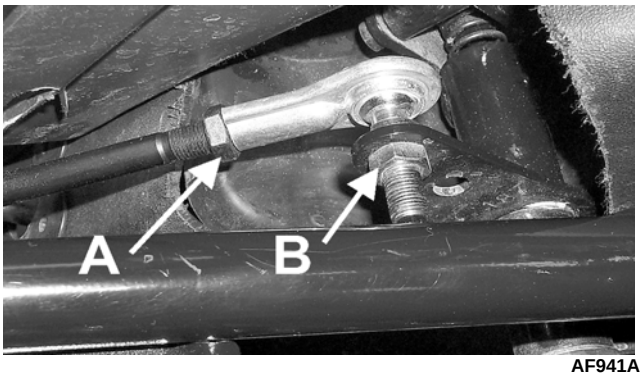
ADJUSTING SHIFT LEVER

KEY
1. Nut
2. Cap Screw
3. Axle
4. Lever
5. O-Ring
6. O-Ring
7. Washer
8. Spring
9. Axle
10. Handle
11. Push Clip
12. Linkage
13. Rod End
14. Nut
15. Bushing
16. Washer
17. E-Ring
18. Plate
19. Shield
20. Machine Screw
21. Self-Tapping Screw
22. Shift Arm
23. Cap Screw



0739-083

1. Place the shift lever in the R position.
2. Remove the seat; then remove the storage compartment cover housing.
3. Remove the left upper body side panel.
4. Loosen shift rod end jam nut (A).

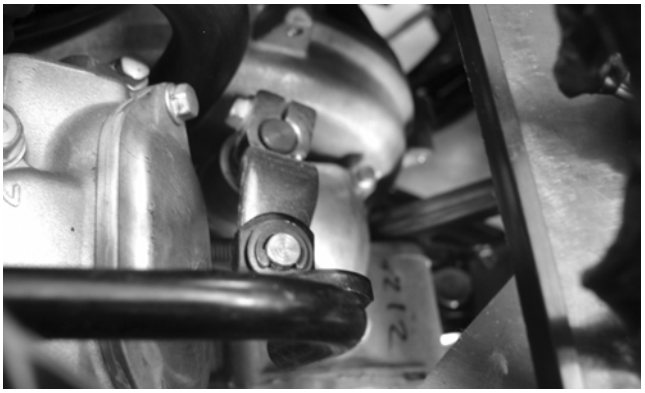


AF941A

5. Using two open-end wrenches, remove lock nut (B) securing the shift rod to the upper shift axle. Discard the lock nut.

■ **NOTE: Never reuse a lock nut. Once a lock nut has been removed, it must be replaced with a new lock nut.**

6. Push the shifter arm to the most forward position (reverse).



KX057

7. Rotate the shift rod end as necessary to align its threaded shaft with the hole in the shifter arm. Secure with a new lock nut (B). Tighten securely.

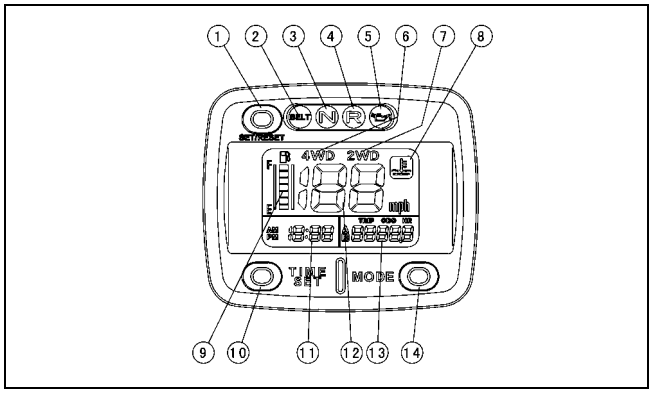
8. Tighten jam nut (A) to secure the adjustment.

9. Install the storage compartment cover housing; then install the seat making sure it locks securely.

Speedometer/Indicator Lights

Each time the ATV is used, the lights should be checked for proper function. Use the following for reference.

■ NOTE: The indicator lights will illuminate for approximately one second when the ignition switch is rotated to the ON position.



ATV2056

1. **Set/Reset Button** — Used (in conjunction with the Time Set button) to advance the hour and minute display for setting the clock and to reset the trip meter display to zero.

2. **Belt Check Indicator** — The Belt light will flash at 0.35-second intervals when excessive belt wear or belt damage is detected. Also, light will illuminate every 100 hours of operation to indicate service requirements.

3. **Neutral Indicator** — The Neutral light will illuminate when the transmission is in neutral and the ignition switch is on. The light will go out when shifted into any gear other than neutral.

4. **Reverse Indicator** — The Reverse light will illuminate when the transmission is shifted into reverse gear. The light will go off when shifted out of reverse.

5. **Oil Pressure Indicator** — An oil pressure warning symbol LED (light emitting diode) will flash when low oil pressure is detected.

6. **4WD Indicator** — Displays 4WD when the front drive selector switch is moved to the 4WD position. Display will go off when 2WD is selected.

7. **2WD Indicator** — Displays 2WD when the front drive selector switch is moved to the 2WD position. Display will go off when 4 WD is selected.

8. **Coolant Temperature Indicator** — A red light will illuminate if the engine overheats. The light should be off during normal operation.

⚠ CAUTION

Continued operation of the ATV with high engine temperature may result in engine damage or premature wear.

■ NOTE: High engine RPM, low vehicle speed, or heavy load can raise engine temperature. Decreasing engine RPM, reducing load, and selecting an appropriate transmission gear can lower the temperature.

■ NOTE: Debris in front of the engine (or packed between the cooling fins of the radiator) can reduce cooling capability. Using a hose, pressure-wash the radiator and the engine to remove any debris preventing air flow.

9. **Fuel Level Indicator** — Shows amount of gasoline in the gas tank. When bottom portion flashes, 3.5 L (0.92 U.S. gal.) of gasoline remains in the tank.

10. **Time Set Button** — Press the button to set clock hours and minutes.

    A. Press the button and the minute display will blink; then adjust the hour display by pressing the Set/Reset Button. Press the Time Set Button to set hour display.

■ NOTE: If the Set/Reset Button is pressed in and held, the hour display will advance continuously.

    B. After the hour display is set, the minute display will blink. Press the Set/Reset Button to set minute display.

11. **Clock** — Clock indicates 12-hour mode.

12. **Speedometer** — Shows approximate ATV speed in km/h or mph.

13. **Odometer/Trip Meters (A & B)/Hour Meter** — Odometer registers the total distance the ATV has traveled. Trip meters can register two different types of distances (for instance, A could register trip distance and B could register distance between stops). Trip meters can be reset. Hour meter registers total ignition switch ON time.

14. **Mode Button** — Used (in conjunction with the Odometer/Trip Meters/Hour Meter) to shift the odometer/trip meters/hour meter display through the four modes: odometer, trip meter (A), trip meter (B), and hour meter.

Frame/Welds/Racks

The frame, welds, and racks should be checked periodically for damage, bends, cracks, deterioration, broken components, and missing components. If replacement or repair constitutes removal, see Section 8.

Electrical Connections

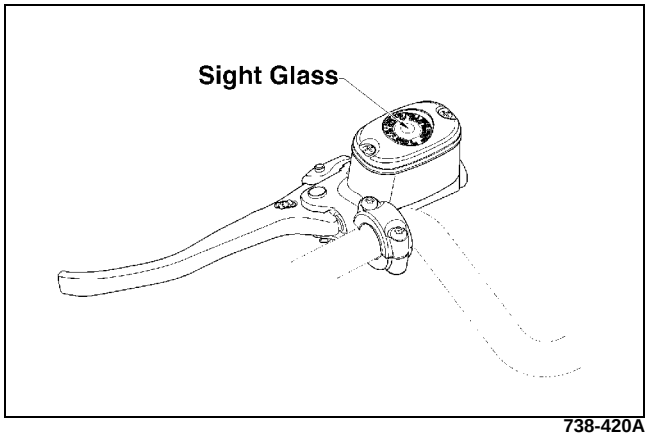
The electrical connections should be checked periodically for proper function. In case of an electrical failure, check fuses, connections (for tightness, corrosion, damage), and/or bulbs. If an electrical component needs to be tested for proper function, see Section 5.

Hydraulic Brake Systems

CHECKING/BLEEDING

The hydraulic brake systems have been filled and bled at the factory. To check and/or bleed a hydraulic brake system, use the following procedure.

1. With the master cylinder in a level position, check the fluid level in the reservoir. If the level in the reservoir is not visible in the sight glass, add DOT 4 brake fluid.

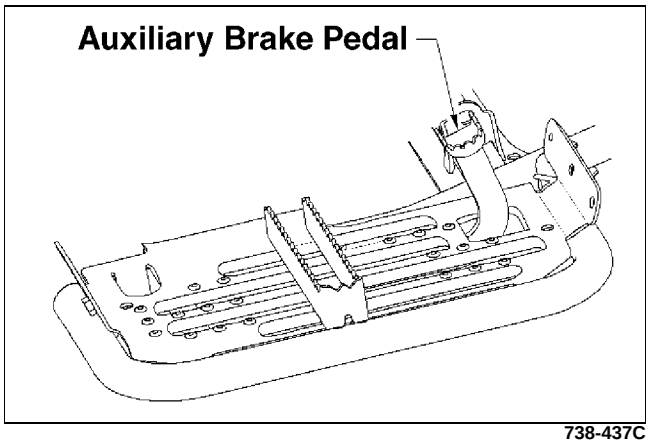


738-420A



CD091

2. Compress the brake lever/pedal several times to check for a firm brake. If the brake is not firm, the system must be bled.



738-437C

3. To bleed the brake system, use the following procedure.

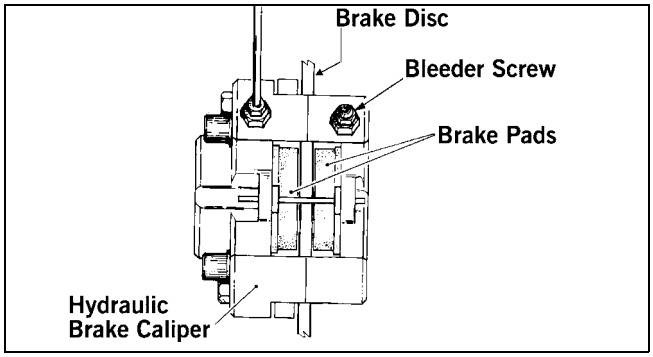
   A. Remove the cover and fill the reservoir with DOT 4 Hi-Temp Brake Fluid (p/n 1639-799).

   B. Install and secure the cover; then slowly compress the brake lever several times.

   C. Remove the protective cap, install one end of a clear hose onto one FRONT bleeder screw, and direct the other end into a container; then while holding slight pressure on the brake lever, open the bleeder screw and watch for air bubbles. Close the bleeder screw before releasing the brake lever. Repeat this procedure until no air bubbles are present.



AF637D



730-434B

■ **NOTE: During the bleeding procedure, watch the reservoir sight glass very closely to make sure there is always a sufficient amount of brake fluid. When the sight glass changes from dark to light, refill the reservoir before the bleeding procedure is continued. Failure to maintain a sufficient amount of fluid in the reservoir will result in air in the system.**

D. Repeat step C until the brake lever is firm.

E. At this point, perform step B, C, and D on the other FRONT bleeder screw; then move to the REAR bleeder screw and follow the same procedure.

4. Carefully check the entire hydraulic brake system that all hose connections are tight, the bleed screws are tight, the protective caps are installed, and no leakage is present.

⚠ CAUTION

This hydraulic brake system is designed to use high-temperature DOT 4 brake fluid only. If brake fluid must be added, care must be taken as brake fluid is very corrosive to painted surfaces.

INSPECTING HOSES

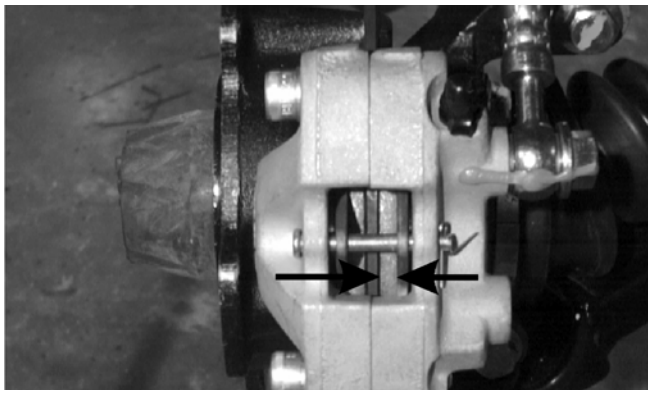
Carefully inspect the hydraulic brake hoses for cracks or other damage. If found, the brake hoses must be replaced.

CHECKING/REPLACING PADS

The clearance between the brake pads and brake discs is adjusted automatically as the brake pads wear. The only maintenance that is required is replacement of the brake pads when they show excessive wear. Check the thickness of each of the brake pads as follows.

1. Remove a front wheel.

2. Measure the thickness of each brake pad.



AF739DB

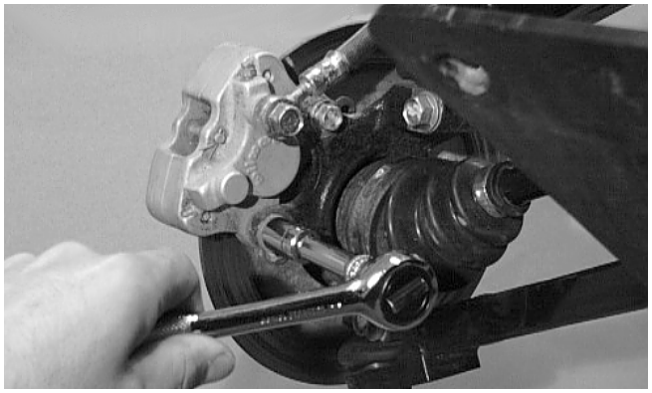
3. If thickness of either brake pad is less than 3.2 mm (0.125 in.), the brake pads must be replaced.

■ **NOTE: The brake pads should be replaced as a set.**

4. To replace the brake pads, use the following procedure.

A. Remove the wheel.

B. Remove the cap screws securing the caliper to the bracket; then remove the cotter pin securing the pads and remove the pads.



AF615D

C. Install the new brake pads; then secure with the pin and cotter pin. Spread the cotter pin.

D. Secure the caliper to the knuckle and/or axle housing with the cap screws. Tighten to 2.8 kg-m (20 ft-lb).



AF615D

E. Install the wheel. Tighten to 5.5 kg-m (40 ft-lb).

5. Burnish the brake pads (see Burnishing Brake Pads in this section).

Burnishing Brake Pads

All brake pads must be burnished to achieve full braking effectiveness. Braking distance will be extended until brake pads are properly burnished. To properly burnish the brake pads, use the following procedure.

⚠ WARNING

Failure to properly burnish the brake pads could lead to premature brake pad wear or brake loss. Brake loss can result in severe injury.

1. Choose an area large enough to safely accelerate the ATV to 30 mph and to brake to a stop.
2. Accelerate to 30 mph; then compress brake lever or apply the auxiliary brake to decelerate to 0-5 mph.
3. Repeat procedure on each brake system five times until brake pads are burnished.
4. Verify that the brakelight illuminates when the hand lever is compressed or the brake pedal is depressed.

Coolant

The cooling system capacity is approximately 2.7 L (2.8 U.S. qt). The cooling system should be inspected daily for leakage and damage. Also, the coolant level should be checked periodically.

When filling the cooling system, use premixed Arctic Cat Antifreeze (p/n 0638-395). While the cooling system is being filled, air pockets may develop; therefore, run the engine for five minutes after the initial fill, shut the engine off, and then fill the cooling system to the upper level mark in the expansion tank.



AN604D

⚠ CAUTION

After operating the ATV for the initial 5-10 minutes, stop the engine, allow the engine to cool down, and check the coolant level. Add coolant as necessary.

Checking/Replacing V-Belt

DRAINING COVER

There is a “duck bill” drain for draining water from the V-belt cover.



KX384A

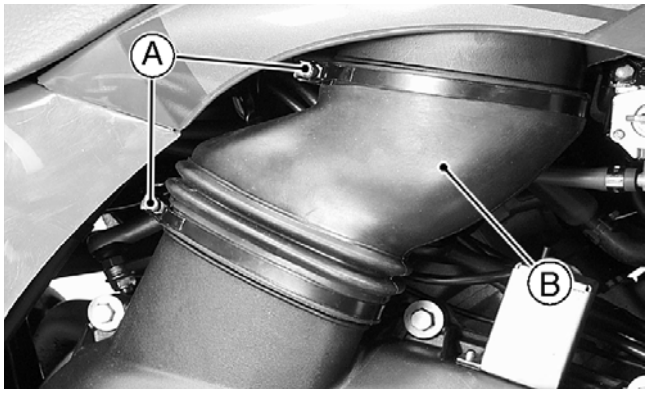
To drain the cover, use the following procedure.

1. Elevate the rear of the ATV (no more than 25°) to allow water trapped in the V-belt cover to run into the cooling inlet duct and drain out through the “duck bill” drain.
2. Shift the range lever to the neutral position; then start the engine.
3. Increase and decrease the RPM several times to “blow out” any water; then stop the engine.

■ NOTE: Always inspect the drain whenever servicing/replacing the V-belt.

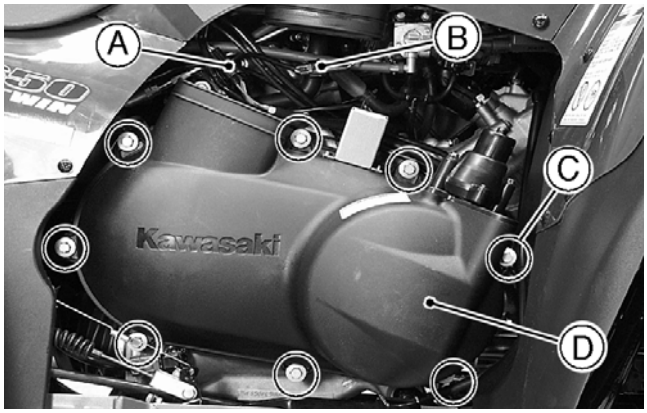
REMOVING

1. Make sure that the ignition switch is in the off position; then remove the clamps (A) and air duct (B).



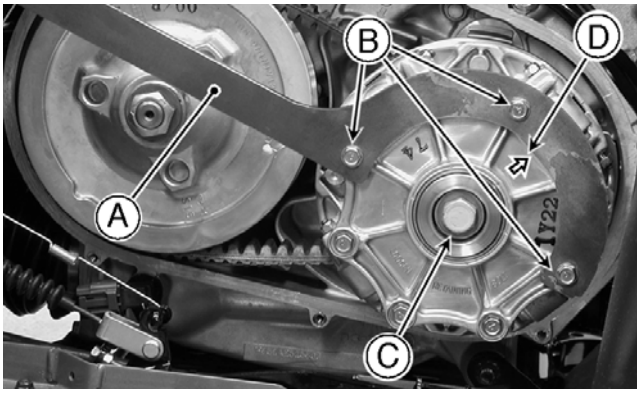
KX229

2. Remove the actuator lead (A) and the Belt Failure Detection Switch lead (B); then remove the cap screws (C) securing the V-belt cover. Remove the cover (D).



KX230

3. Remove the three cover bolts (B) in the positions shown and install an appropriate drive clutch holder (A) as shown. Note the holder's relative position to the arrow mark (D).



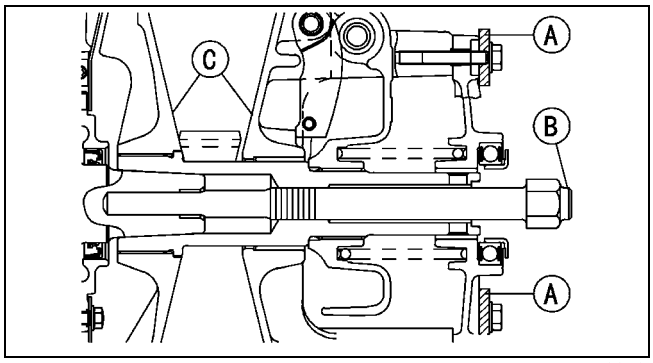
KX231

⚠ CAUTION

Be sure to install the three bolts in the specified positions or the tapped holes will be damaged.

4. Remove the drive clutch cap screw (C) (left-hand threads) and account for two washers and a stepped washer.

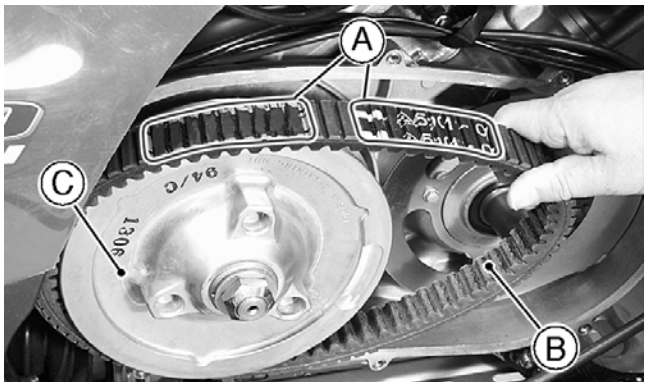
5. Remove the drive clutch (C) from the crankshaft using an appropriate clutch puller tool (B) and turning it clockwise while holding the drive clutch with the drive clutch holder (A).



ATV2059

■NOTE: Before removing the belt, note the markings (A) (or mark the belt using tape or marker) in order to reinstall in the same direction as previously installed.

6. Lift the belt (B) off the driven pulley (C).

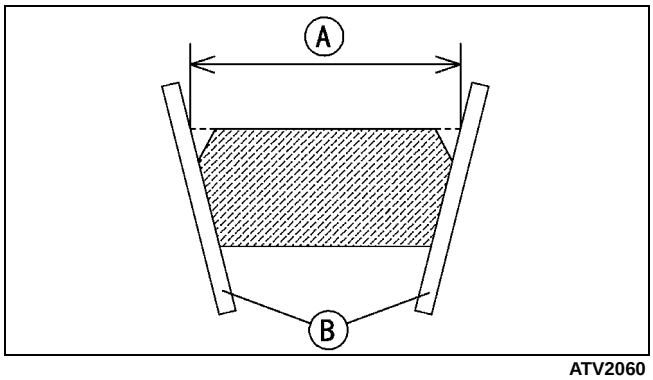


KX232

■NOTE: Inspection of the belt is required every 100 hours or 1100 miles. More frequent inspection is required if the ATV is operated in adverse conditions.

INSPECTING

1. Measure the belt width (A) at several locations using a pair of suitable straightedges (B).



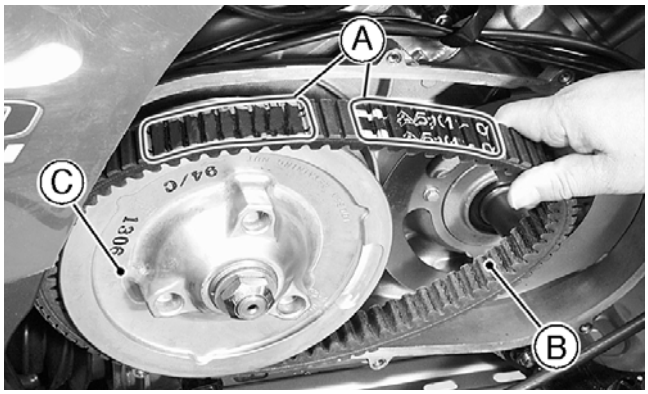
ATV2060

2. If belt width is below the service limit of 28.8 mm (1.13 in.) or there is damage to the belt, it must be replaced.

INSTALLING

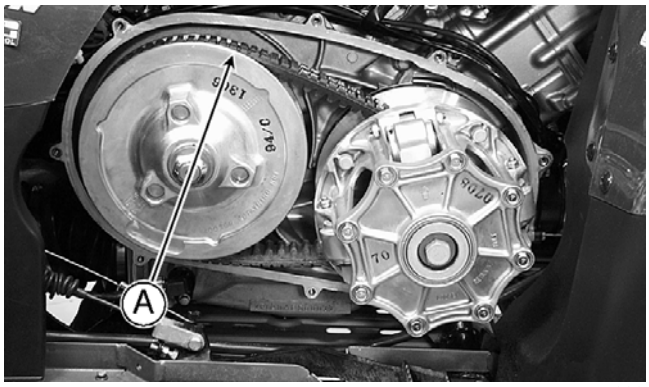
■NOTE: Be sure to install the belt in the same direction as originally installed. When installing a new belt, direct the top of the lettering (A) toward the engine.

1. Loop the belt (B) over the driven pulley (C); then install the drive cluch and tighten to spcifications.



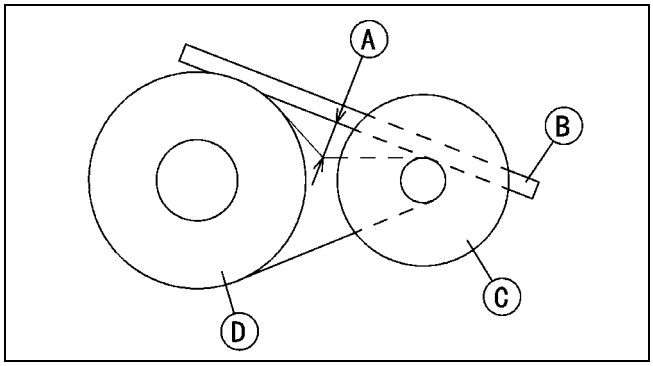
KX232

■NOTE: Make sure the belt is at the top of the driven pulley (A) before checking belt deflection.



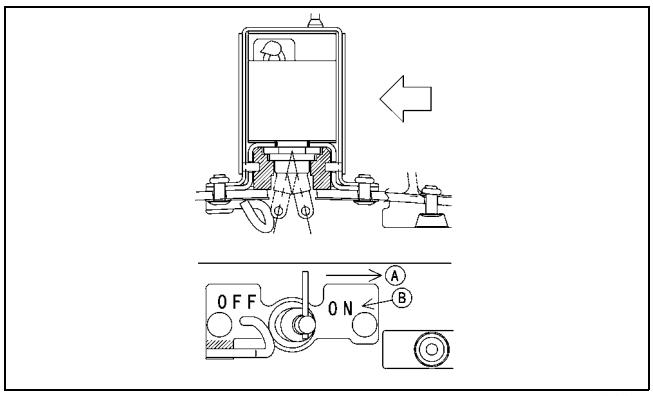
KX233

2. Place a straightedge (B) on top of the belt between the drive clutch (C) and the driven pulley (D); then using a ruler, check the belt deflection (A). Use a maximum force of 6 kg (13 lb) on the ruler. Standard belt deflection is 22-27 mm (0.87-1.06 in.). If belt deflection is out of specifications, see Section 3, Right-Side Components.



ATV2061

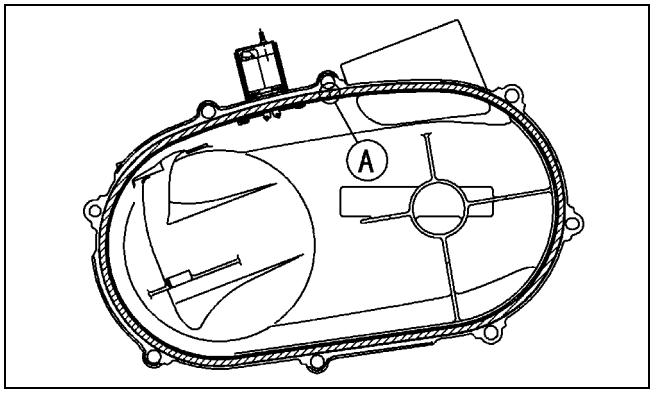
3. Check the position of the Belt Failure Detection Switch (A) and reset to the ON position (B).



ATV2062A

■NOTE: If the Belt Failure Detection Switch has been tripped to the OFF position, the V-belt cover and switch assembly must be replaced and the V-Belt Failure Mode Clearing procedure (see Section 5) must be performed.

4. Install the cover seal into the V-belt cover with the glue joint (A) as shown; then install the V-belt cover and tighten the cap screws to specifications.



ATV2063

5. Connect the actuator lead and the Belt Failure Detection Switch lead; then install the air duct and secure with the clamps.

SECTION 3 - ENGINE/TRANSMISSION

3

TABLE OF CONTENTS

Engine/Transmission 3-2
Specifications 3-2
Table of Contents 3-3

Engine/Transmission

This section has been organized into sub-sections which show a progression for the complete servicing of the Arctic Cat ATV engine/transmission.

To service the center crankcase halves, the engine/transmission must be removed from the frame.

To service top-side, left-side, and right-side components, the engine/transmission does not have to be removed from the frame.

■ **NOTE: Arctic Cat recommends the use of new gaskets, lock nuts, and seals and lubricating all internal components when servicing the engine/transmission.**

■ **NOTE: Some photographs and illustrations used in this section are used for clarity purposes only and are not designed to depict actual conditions.**

Specifications*

VALVES AND GUIDES		
Valve Face Diameter	(intake)	29.4-29.6 mm (1.157-1.165 in.)
	(exhaust)	25.2-25.4 mm (0.992-1.000 in.)
Valve/Tappet Clearance (cold engine)	(intake)	0.10-0.15 mm (0.0039-0.0059 in.)
	(exhaust)	0.20-0.25 mm (0.0079-0.0098 in.)
Valve Guide/Valve Stem Deflection (wobble method)	(intake)	0.03-0.11 mm (0.0012-0.0043 in.)
	(exhaust)	0.09-0.17 mm (0.0035-0.0043 in.)
Valve Guide Inside Diameter		5.000-5.012 mm (0.1969-0.1973 in.)
Valve Stem Outside Diameter	(intake)	4.975-4.990 mm (0.1959-0.1965 in.)
	(exhaust)	4.955-4.970 mm (0.1951-0.1957 in.)
Valve Stem Runout	(max)	0.05 mm (0.002 in.)
Valve Head Thickness (min)	(intake)	0.5 mm (0.020 in.)
	(exhaust)	0.8 mm (0.031 in.)
Valve Face/Seat Width		0.5-1.0 mm (0.020-0.040 in.)
Valve Seat Angle	(intake)	45°/32°/60°
	(exhaust)	45°/32°/60°
Valve Spring Free Length	(min)	41.3 mm (1.63 in.)

CAMSHAFT AND CYLINDER HEAD		
Cam Lobe Height (min)	(intake)	35.52 mm (1.398 in.)
	(exhaust)	35.26 mm (1.388 in.)
Camshaft Journal Oil Clearance	22 mm (max)	0.15 mm (0.0059 in.)
	18 mm (max)	0.14 mm (0.0055 in.)
Camshaft Journal Holder Inside Diameter	22 mm	22.000-22.026 mm (0.8661-0.8670 in.)
	18 mm	18.000-18.018 mm (0.8661-0.8670 in.)
Camshaft Journal Outside Diameter	22 mm	21.959-21.980 mm (0.8645-0.8654 in.)
	18 mm	17.966-17.984 mm (0.7073-0.7080 in.)
Camshaft Runout	(max)	0.10 mm (0.004 in.)
Rocker Arm Inside Diameter		12.000-12.018 mm (0.472-0.473 in.)
Rocker Arm Shaft Outside Diameter		11.973-11.984 mm (0.4714-0.4718 in.)
Cylinder Head Distortion	(max)	0.05 mm (0.002 in.)
Cylinder Head Cover Distortion	(max)	0.05 mm (0.002 in.)

CYLINDER, PISTON, AND RINGS		
Piston Skirt/Cylinder Clearance		0.030-0.040 mm (0.0011-0.0015 in.)
Cylinder Bore		79.994-80.006 mm (3.149-3.150 in.)
Piston Diameter 15 mm (0.6 in.) from Skirt End		79.949-79.964 mm (3.147-3.148 in.)
Cylinder Trueness	(max)	0.05 mm (0.002 in.)
Piston Ring End Gap - Installed	(1st)	0.20 -0.30 mm (0.0079-0.0118 in.)
	(2nd)	0.30-0.45 mm (0.0118-0.0177 in.)
	(oil)	0.20-0.70 mm (0.0079-0.0276 in.)
Piston Ring to Groove Clearance	(1st)	0.040-0.080 mm (0.0016-0.0032 in.)
	(2nd)	0.030-0.070 mm (0.0012-0.0028 in.)
Piston Ring Groove Width	(1st)	1.030-1.050 mm (0.0405-0.0413 in.)
	(2nd)	1.020-1.040 mm (0.0402-0.0409 in.)
Piston Ring Thickness	(1st)	0.97-0.99 mm (0.0382-0.0390 in.)
	(2nd)	0.97-0.99 mm (0.0382-0.0390 in.)

CRANKSHAFT		
Connecting Rod (big end inside diameter)	Marking: None	43.000-43.016 mm (1.6929-1.6935 in.)
	Marking: O	43.009-43.016 mm (1.6933-1.6935 in.)
Connecting Rod (big end side-to-side)		0.16-0.46 mm (0.0063-0.0181 in.)
Connecting Rod (big end bearing insert thickness)	Brown	1.482-1.486 mm (0.0583-0.0585 in.)
	Yellow	1.486-1.490 mm (0.0585-0.0586 in.)
	Green	1.490-1.494 mm (0.0586-0.0588 in.)
Connecting Rod Bend	(max)	0.2 mm - per 100 mm (0.008 in. - per 3.94 in.)
Crank Pin (diameter)	Marking: None	39.984-39.992 mm (1.5742-1.5745 in.)
	Marking: O	39.993-40.000 mm (1.5745-1.5748 in.)
Crankshaft Runout	(max)	0.10 mm (0.0039 in.)

CONNECTING ROD - BIG END BEARING SELECTION		
Rod Marking	Crank Pin Marking	Bearing Insert
None	O	Brown (p/n 3201-293)
None	None	Yellow (p/n 3201-294)
O	O	Yellow (p/n 3201-294)
O	None	Green (p/n 3201-295)

* Specifications subject to change without notice.

Table of Contents

Removing Engine/Transmission 3-3
Left-Side Components 3-6
Removing Left-Side Components 3-6
Right-Side Components 3-8
Removing Right-Side Components 3-8
Top-Side Components 3-9
Removing Top-Side Components 3-10
Center Crankcase Components 3-13
Separating Crankcase Halves 3-13
Disassembling Crankcase Half 3-14
Servicing Components 3-17
Assembling Crankcase Half 3-34
Joining Crankcase Halves 3-38
Installing Right-Side Components 3-44
Installing Left-Side Components 3-45
Installing Top-Side Components 3-47
Installing Engine/Transmission 3-50

Removing Engine/ Transmission

Many service procedures can be performed without removing the engine/transmission from the frame. Closely observe the note introducing each sub-section for this important information.

■ **NOTE: For ease of removal of components, it is advisable to remove front and rear racks, fenders, and side panels prior to engine removal.**

☞ AT THIS POINT

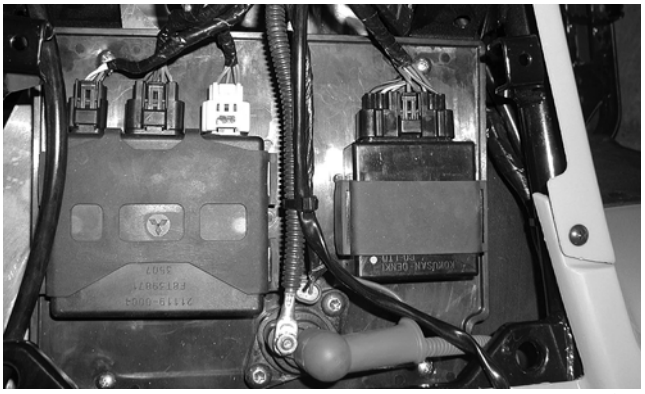
If the technician's objective is to service/replace recoil starter, alternator/rotor flywheel, stator, pick-up coil, starter torque limiter, primary cam chain, water pump impeller/seal, starter clutch, and starter clutch gear, the engine/transmission does not have to be removed from the frame.

Secure the ATV on a support stand to elevate the wheels.

⚠ WARNING

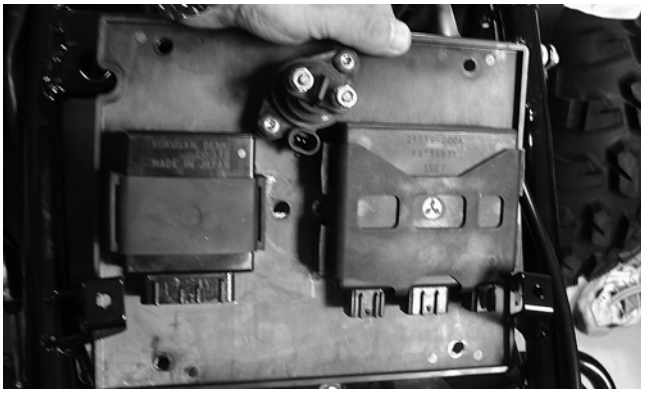
Make sure the ATV is solidly supported on the support stand to avoid injury.

1. Remove the seat; then turn the gas tank valve to the OFF position.
2. Remove the negative cable from the battery; then remove the positive cable. Remove the battery hold-down strap and the battery vent hose; then remove the battery.
3. Disconnect the wiring on the starter relay; then disconnect the CDI unit and the engine brake actuator control connectors.



KX074

4. Remove the four screws securing the electronics mounting tray; then remove the entire assembly.



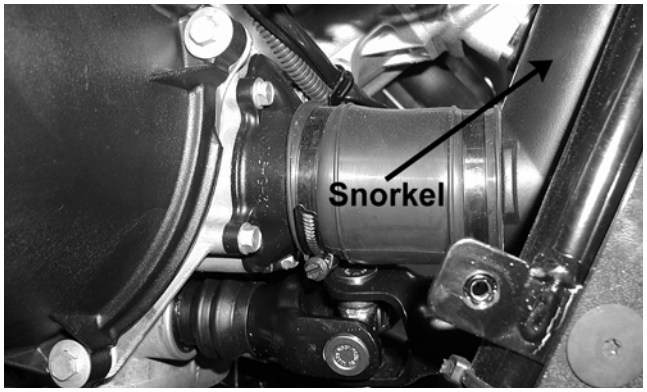
KX130

5. Drain the coolant from the cooling system; then drain the oil from the engine/transmission.



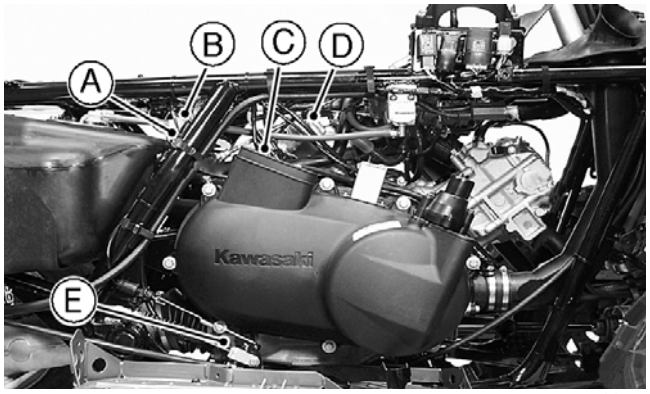
KX036A

6. Remove the hardware securing the right-side and left-side panels; then remove the panels.
7. Remove the storage compartment cover housing, air filter, and air filter housing; then remove the V-belt cooling snorkel.



KX101A

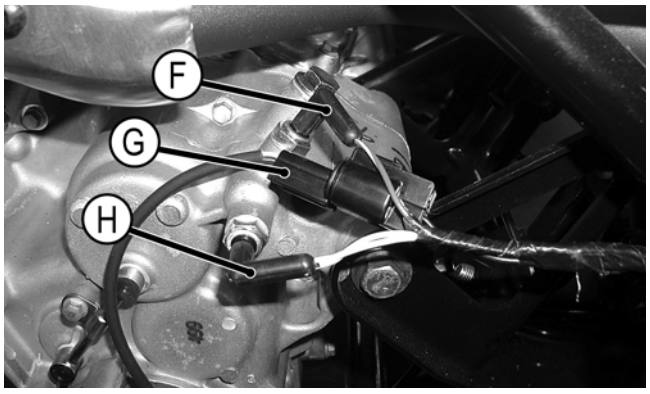
8. Remove the rear V-belt cooling boot; then disconnect the belt failure detection lead (D) and the engine brake control actuator lead (C).



KX234A

9. Disconnect the alternator lead connector (A); then disconnect the pick-up coil lead (B) and the speed sensor connector (E).

10. Remove the neutral position connector (F) and reverse position connector (H); then disconnect the forward and reverse detection sensor lead (G).



KX075A

11. Remove the front and rear spark plug caps; then remove the oil pressure sending unit lead (I).



KX046A

12. Remove the left footrest assembly.



KX104

13. Loosen the carburetor intake boot clamp (J); then remove the two coolant hoses (K).



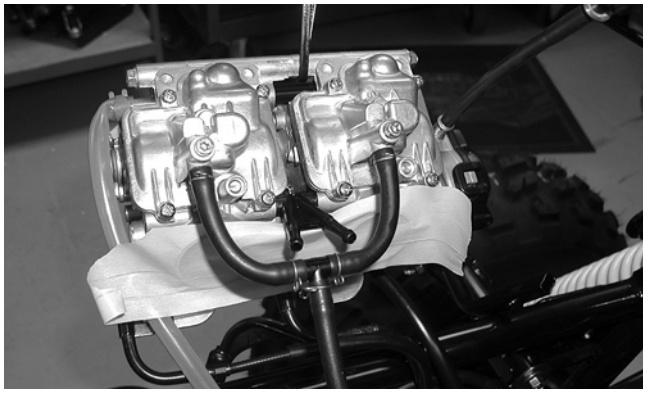
KX025D

14. Remove the throttle cover from the front carburetor; then disconnect the throttle cable.



KX136

15. Lift the carburetors above the frame and tie to the handlebar; then cover the carburetor openings with duct tape or other suitable material.

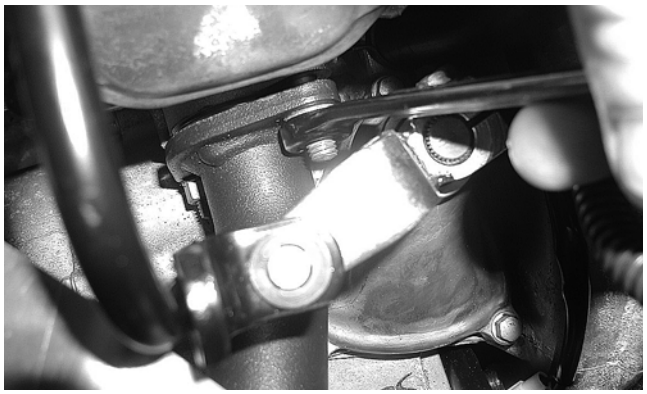


KX121

⚠ CAUTION

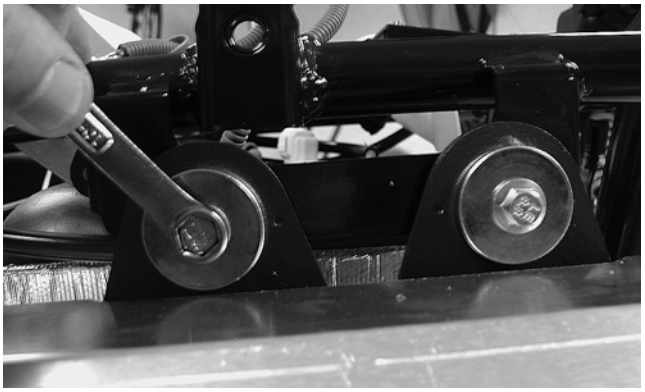
If hardware items or other foreign objects are ingested by the engine on start-up, severe engine damage will occur.

16. Remove the cap screws securing the rear exhaust pipe to the head; then remove the three bolts securing the heat shield to the frame.



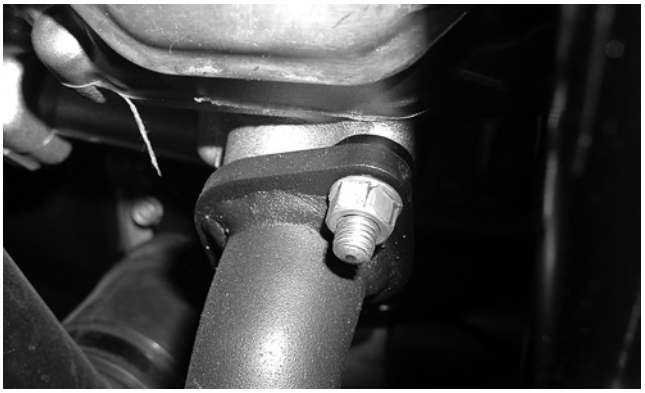
KX141

17. Loosen the muffler clamp; then remove two mounting bolts securing the muffler to the frame. Remove the muffler assembly accounting for one ring gasket and one exhaust pipe bushing seal.



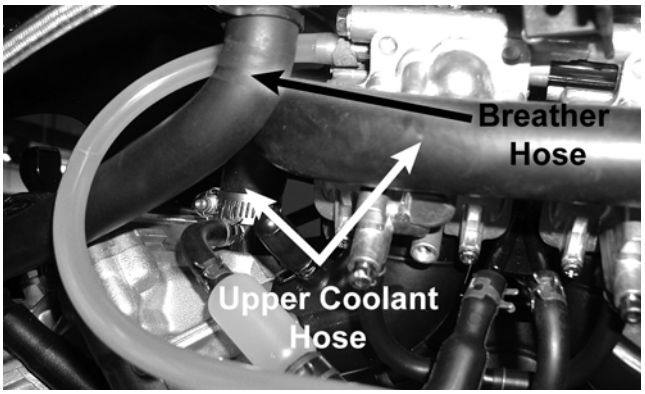
KX126

18. Remove the front exhaust pipe accounting for the ring gasket.



KX067

19. Remove the two upper coolant hoses and the breather hose; then remove the lower coolant hose.



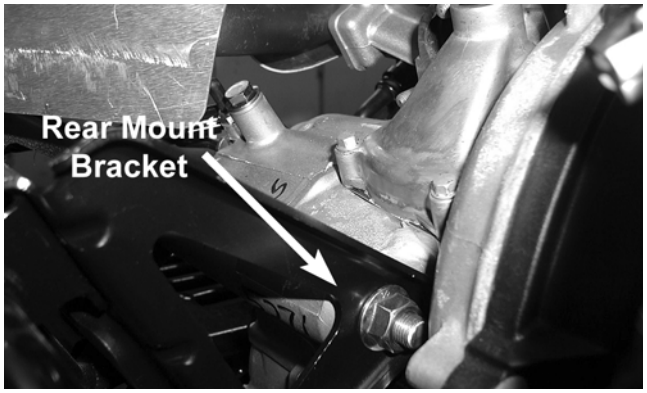
KX086A



KX117A

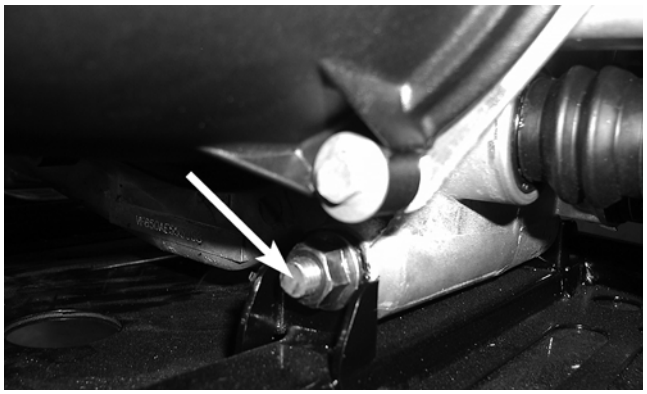
20. Remove the rear engine mount through-bolt; then remove the rear engine mount brackets from the frame.

■NOTE: Removing the brackets will allow the engine to be moved rearward enough to release the front drive coupler.



KX090A

21. Remove the front lower engine mount through-bolt.



KX089A

22. Raise the rear of the engine and maneuver forward to release the rear drive coupler; then lower the rear and shift the engine to the rear to release the front drive coupler.

■NOTE: This will require an assistant to hold cables and lines clear and to assist in maneuvering the engine/transmission assembly out of the frame.

23. Remove the engine/transmission assembly from the left side of the frame.

■NOTE: Tape over or cap all open hoses, lines, and vents to prevent contamination. Make sure that the gas tank valve is in the OFF position and the tank cap is securely tightened.

Left-Side Components

■NOTE: For efficiency, it is preferable to remove and disassemble only those components which need to be addressed and to service only those components. The technician should use discretion and sound judgment.

☞ AT THIS POINT
To service any one specific component, only limited disassembly of components may be necessary. Note the AT THIS POINT information in each sub-section.

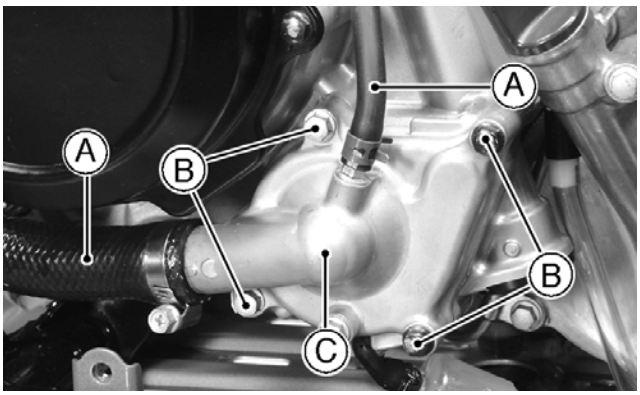
■NOTE: The engine/transmission does not have to be removed from the frame for this procedure.

Removing Left-Side Components

A. Recoil Starter
B. Water Pump
C. Cover
D. Rotor/Flywheel
E. Stator
F. Starter Torque Limiter
G. Starter Clutch/Clutch Gear
H. Oil Pump

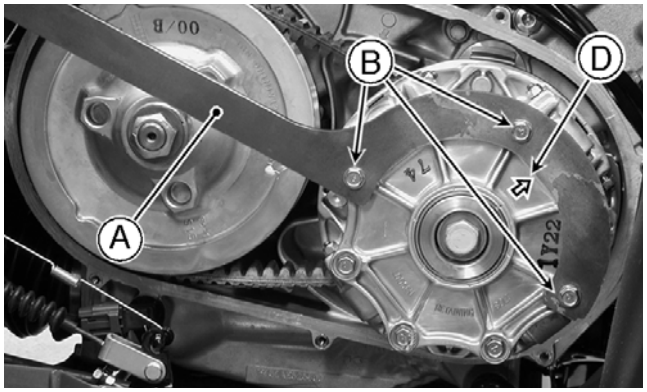
1. Remove the four cap screws securing the recoil starter assembly to the left-side cover; then remove the recoil starter. Account for the gasket.

2. Drain the cooling system including the coolant reserve tank; then remove the coolant hoses (A), four cap screws (B), and the water pump cover (C). Account for the gasket.



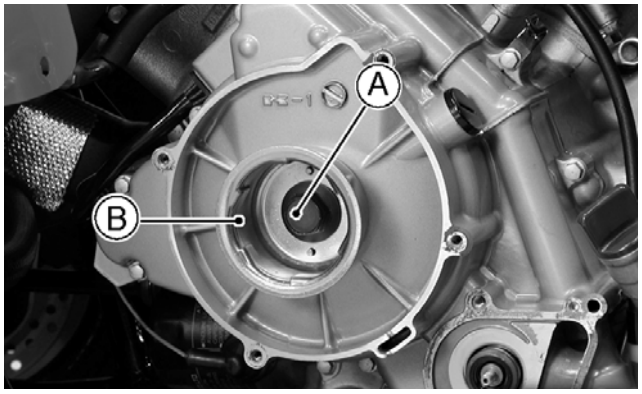
KX235

3. Remove the V-belt cover (See Removing Right-Side Components); then remove the three clutch cover bolts (B) noting the arrow (D) and attach the clutch holding tool (A).



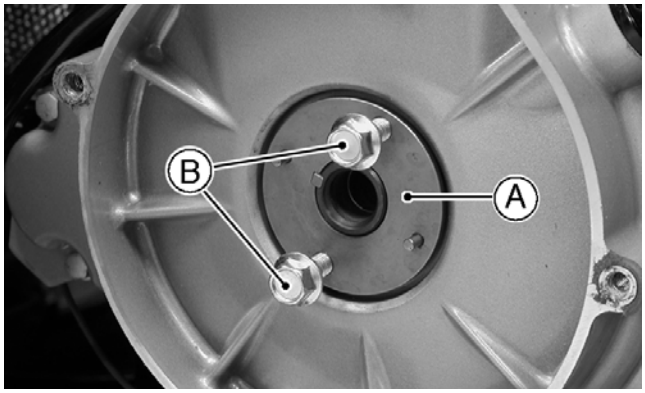
KX236A

4. Hold the clutch stationary while (from the opposite side) loosening the rotor/flywheel cap screw (A); then remove the cap screw and the starter cup (B). Account for the O-ring.



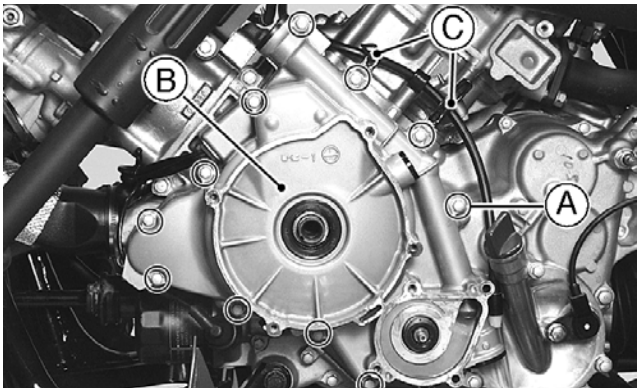
KX237

5. Install two 6 mm cap screws (B) into the collar (A) and remove the collar; then place an oil pan under the left side of the engine.



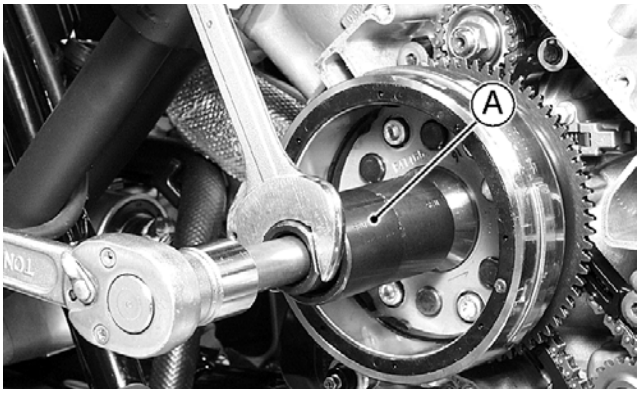
KX238

6. Disconnect the alternator and pick-up coil lead connectors; then remove the alternator cover cap screws (A), alternator cover (B), and the two clamps (C).



KX239

7. Remove the ball bearing; then thread the flywheel puller (A) into the rotor/flywheel.



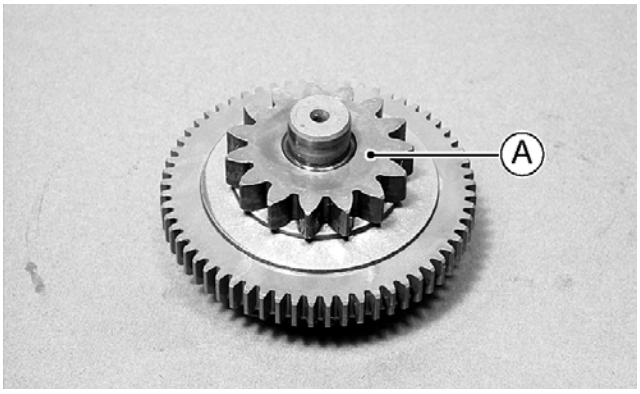
KX240

8. Hold the puller with a suitable wrench and turn the puller screw in to remove the rotor/flywheel. Account for the key.

⚠ CAUTION

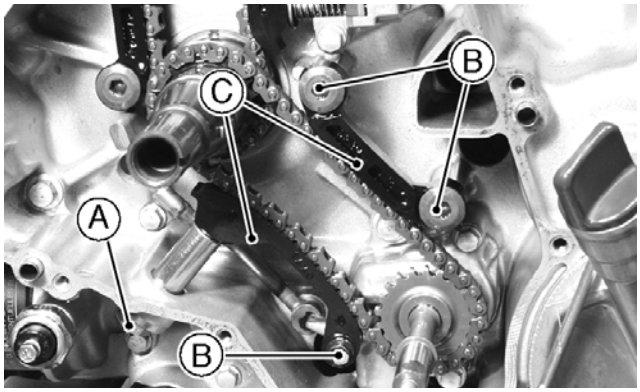
If the rotor is difficult to remove, turn the screw while tapping on the end of the puller screw. Do not strike the rotor/flywheel as a sharp blow can cause magnets to lose strength.

9. Remove the starter torque limiter (A).



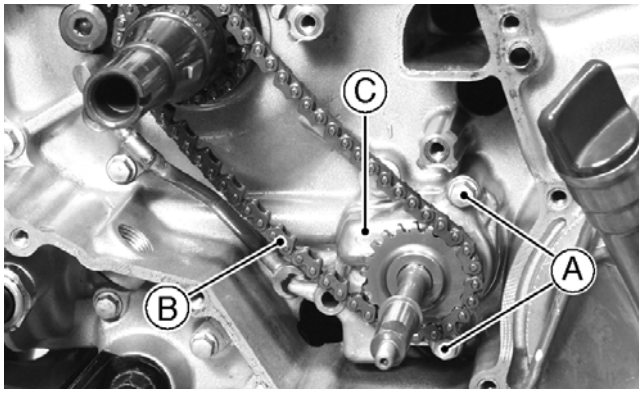
KX241

10. Remove the oil pump drive chain tensioner bolt (A); then remove the chain guide bolts (B) and collar and the chain guides (C).



KX242

11. Remove the cap screws securing the oil pump (A); then remove the oil pump drive chain (B) and oil pump assembly (C).



KX243

Right-Side Components

■NOTE: For efficiency, it is preferable to remove and disassemble only those components which need to be addressed and to service only those components. The technician should use discretion and sound judgment.

☞ AT THIS POINT

To service any one specific component, only limited disassembly of components may be necessary. Note the AT THIS POINT information in each sub-section.

■NOTE: The engine/transmission does not have to be removed from the frame for this procedure.

Removing Right-Side Components

A. V-Belt Cover
B. Driven Pulley
C. Clutch Assembly

⚠ WARNING

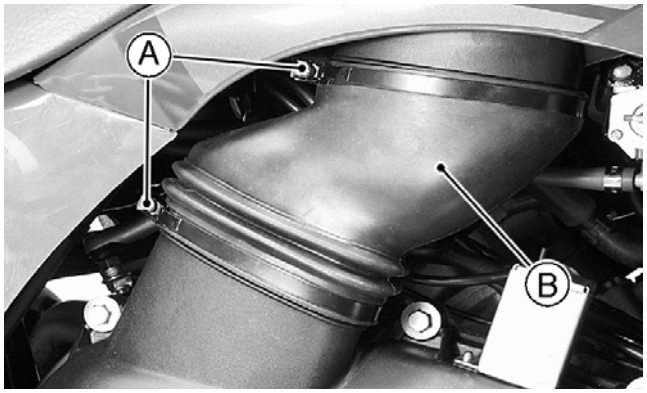
Imbalance of clutch or driven pulley or excessive RPM could cause component failure resulting in severe injury or death. These components are precision balanced and designed to operate within certain RPM limits. Disassembling, assembling, and servicing procedures of clutch and driven pulley must be followed closely. Any modifications that increase RPM may cause failure.

⚠ CAUTION

Do not turn the ignition switch ON while the V-belt cover is removed. This will cause the learning control of the engine brake control to operate and the engine brake actuator may be damaged.

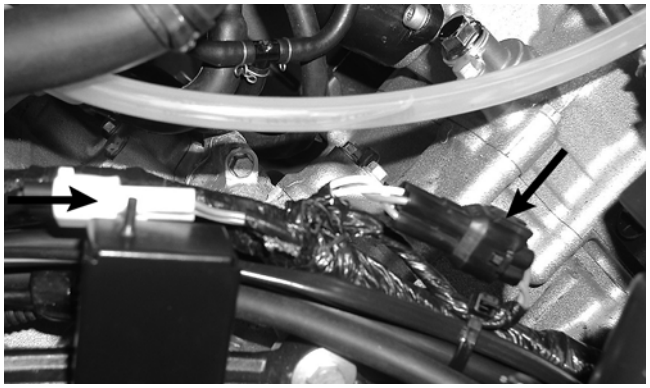
1. Turn the ignition switch to the OFF position and remove the ignition key.

2. Loosen the two clamps (A) securing the air duct boot (B); then remove the boot.



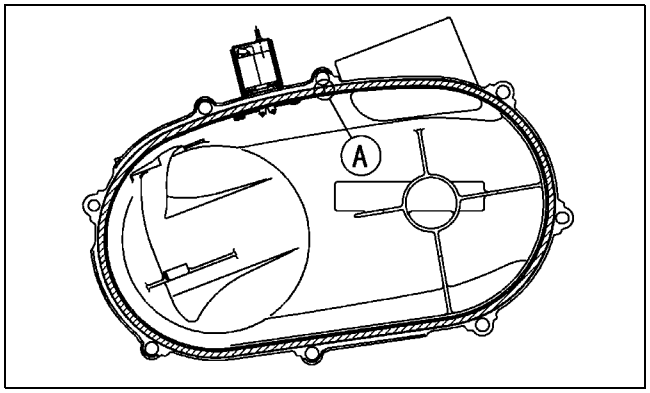
KX244

3. Disconnect the drive belt failure detection connector and the engine brake actuator lead; then remove the cap screws securing the V-belt cover to the crankcase.



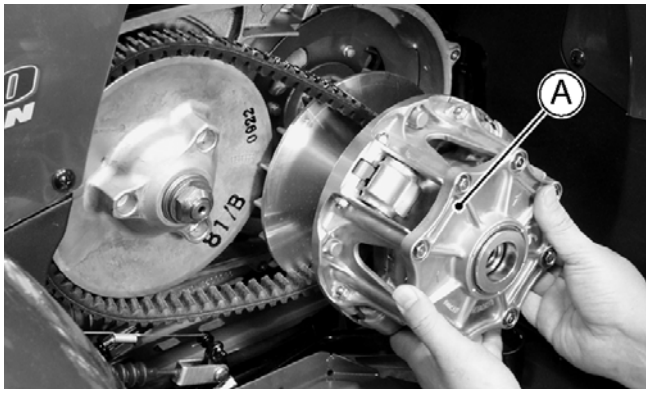
KX138A

4. Remove the V-belt cover accounting for the seal. Note the position of the glue joint (A).

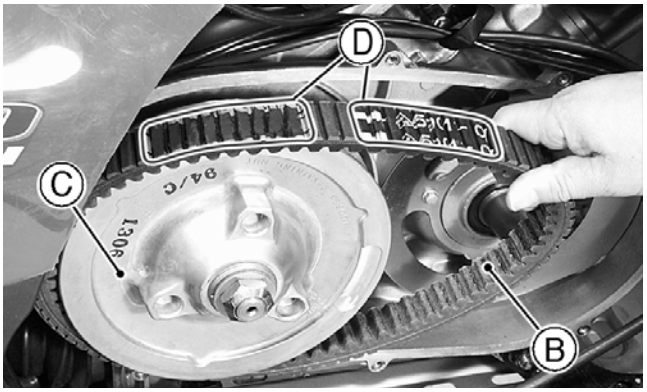


ATV2064

5. Remove the clutch assembly (A); then lift the drive belt (B) off the driven pulley (C). Note the direction of the printed information (D) on the belt or mark the belt for correct installation. See Section 2 for procedure.

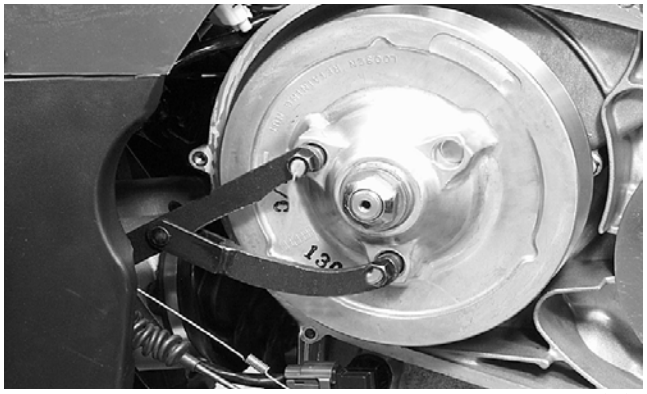


KX245



KX232A

6. Hold the driven pulley with an appropriate holder; then remove the driven pulley nut and the driven pulley.



KX246A

3

Top-Side Components

■NOTE: For efficiency, it is preferable to remove and disassemble only those components which need to be addressed and to service only those components. The technician should use discretion and sound judgment.

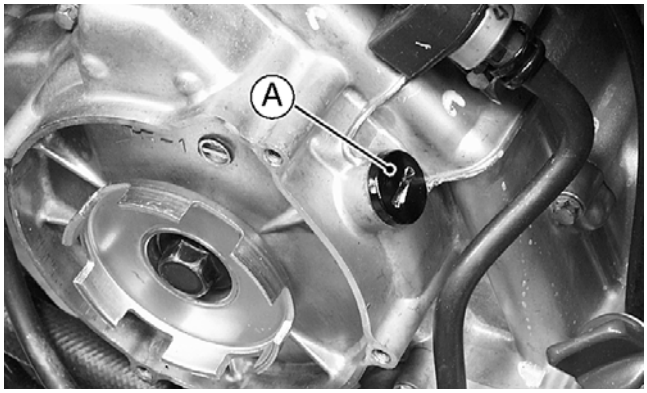
☞ AT THIS POINT
To service any one specific component, only limited disassembly of components may be necessary. Note the AT THIS POINT information in each sub-section.

■NOTE: The engine/transmission does not have to removed from the frame for this procedure.

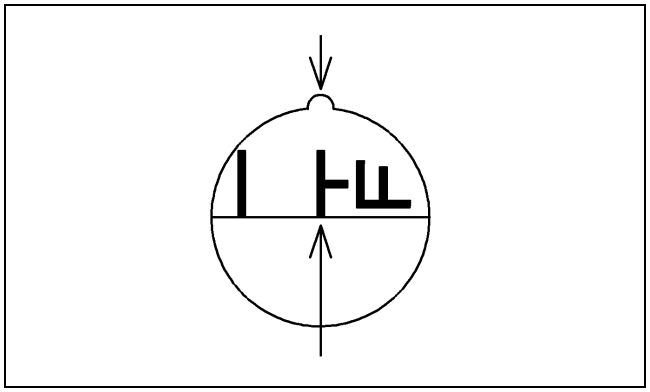
Removing Top-Side Components

A. Valve Covers
B. Cylinder Heads

■NOTE: Remove the spark plugs and timing inspection plug (A); then using the recoil starter, rotate the crankshaft to top-dead-center (TDC) of the compression stroke of the front cylinder. TF is top-dead-center front.



KX247



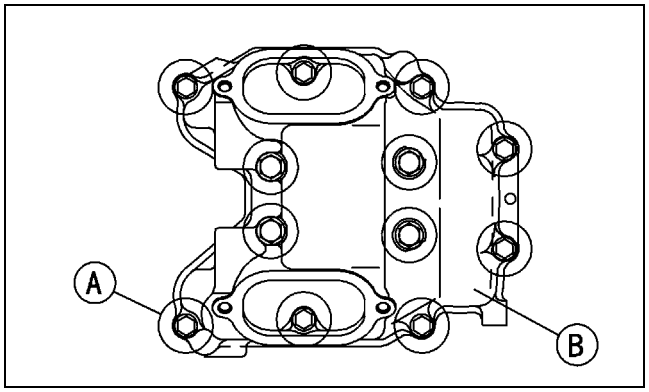
ATV2057A

1. Remove the two tappet covers. Account for two gasket rings.

⚠ CAUTION

Be sure the crankshaft is on TDC of the compression stroke of the front cylinder or valve damage could occur.

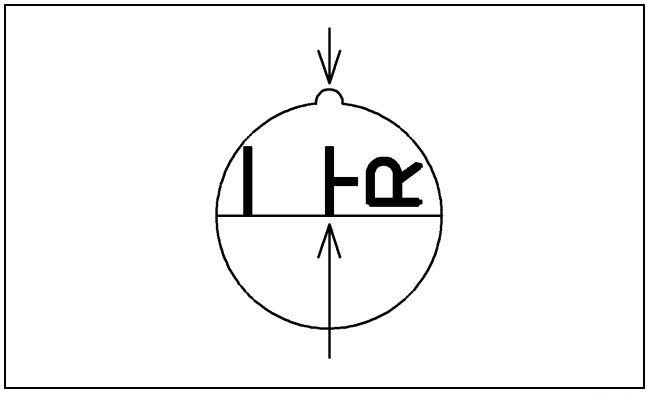
2. Remove the cap screws (A) securing the front valve cover to the head; then remove the front valve cover (B).



ATV2065

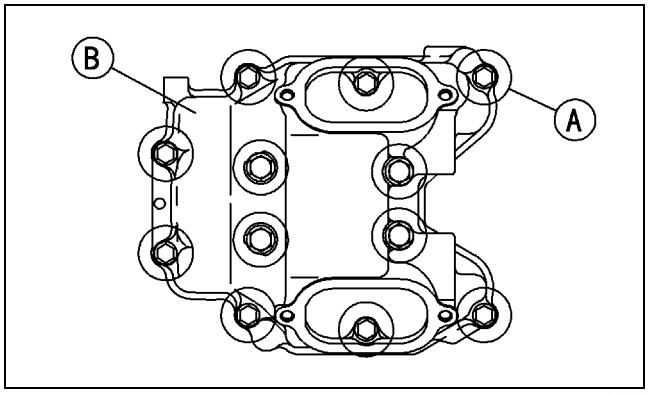
■NOTE: Leave the camshaft and camshaft chain tensioner installed until the rear rocker case is removed or the cam chain will have to be supported while rotating the crankshaft.

3. Rotate the crankshaft counterclockwise to position the rear cylinder at TDC on the compression stroke; then remove the two tappet covers. Account for two gasket rings. TR is top-dead-center rear.



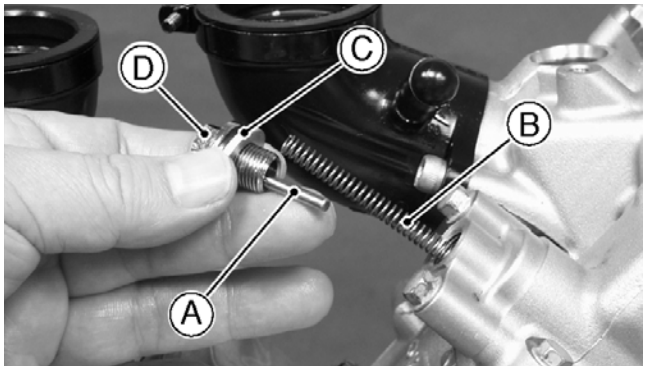
ATV2058A

4. Remove the cap screws (A) securing the rear valve cover to the head; then remove the rear valve cover (B).



ATV2066

5. Remove front and rear camshaft chain tensioners by first removing the spring cap (D). Account for one washer (C), one spring (B), and one guide rod (A) for each tensioner.

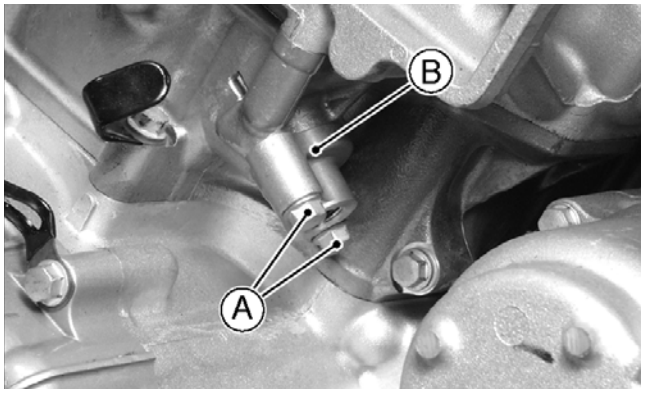


KX248

⚠ CAUTION

This is a ratchet-type chain tensioner and must be completely removed and reset if the mounting bolts are loosened. Retightening the mounting bolts after loosening will cause damage to the tensioner and camshaft chain.

6. Remove the cap screws (A); then remove the cam chain tensioner (B). Repeat for the second cylinder.



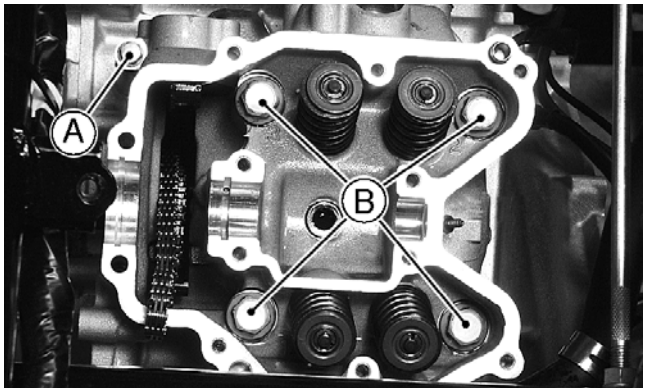
KX249

7. Remove the front camshaft and support the cam chain; then remove the rear camshaft and support the rear cam chain.

⚠ CAUTION

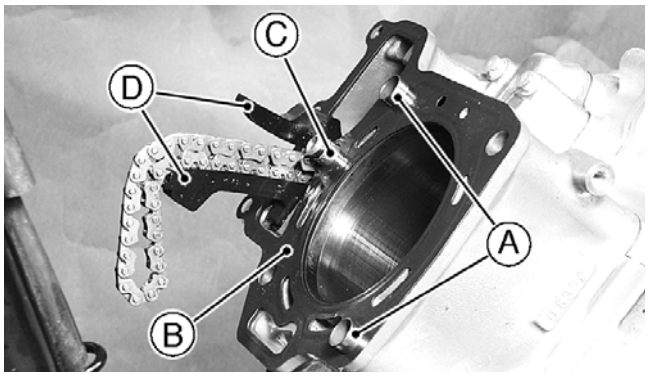
Do not rotate the crankshaft without keeping tension on the camshaft chains or engine damage could occur.

8. Remove the 6 mm cylinder head cap screw (A); then remove front 10 mm cap screws (B) and washers.



KX250A

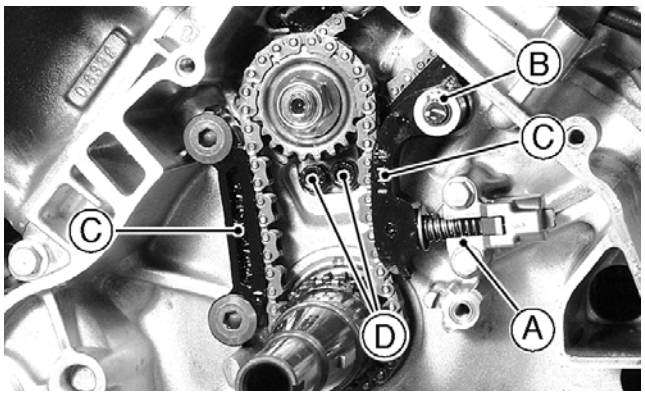
9. Remove the front cylinder head assembly and account for two alignment pins (A), cylinder head gasket (B), oil pipe (C), and camshaft chain guides (D).



KX255

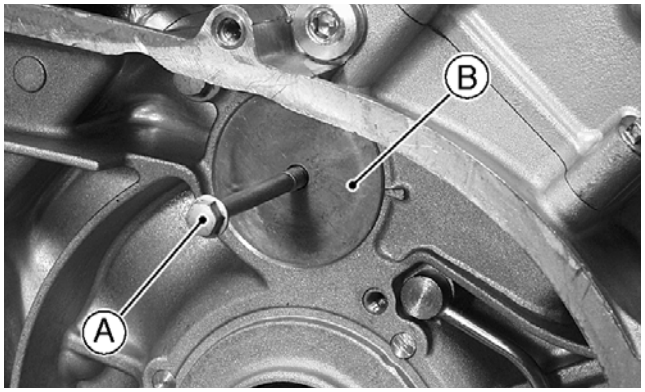
10. Remove the intermediate shaft chain tensioner (A); then remove the circlip (B) and washer.

11. Remove the intermediate shaft chain guides (C); then remove the two cap screws (D).



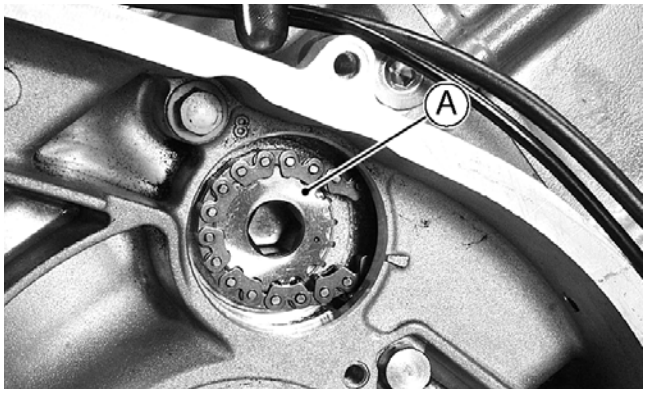
KX251

12. Install a 6 mm cap screw (A) in the tapped hole of the front camshaft drive gear cover (B) and remove the cover. Account for one O-ring.



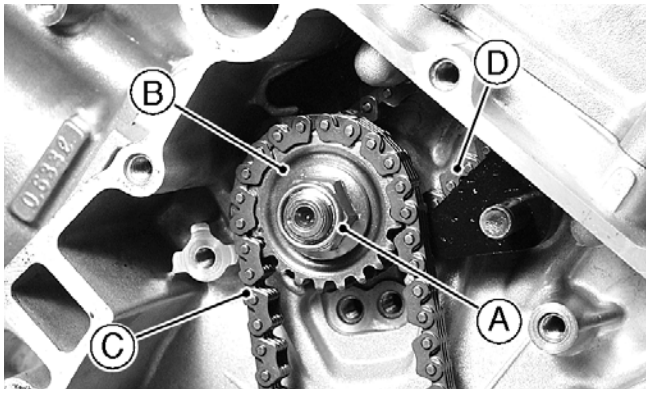
KX252

13. Hold the intermediate shaft (A) with an Allen wrench.



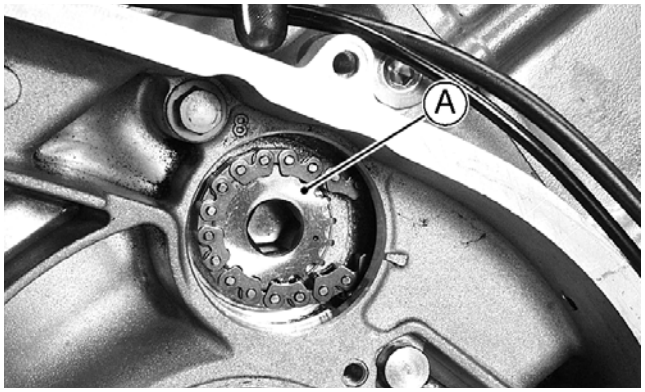
KX253

14. Remove the intermediate shaft sprocket nut (A); then remove the sprocket (B), drive chain (C), and the rear camshaft drive chain (D).



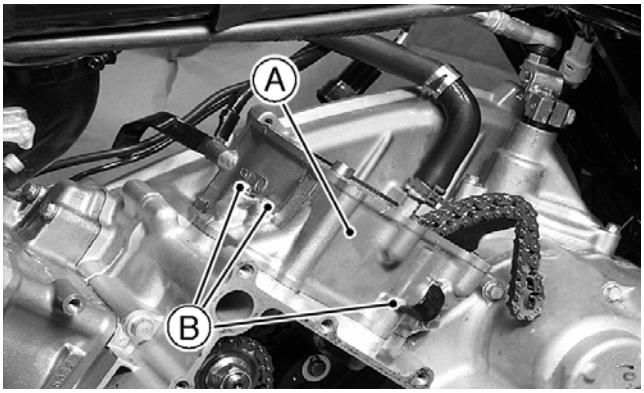
KX254

15. Remove the front camshaft drive chain from the intermediate sprocket (A) on the right side; then remove the shaft from the engine.

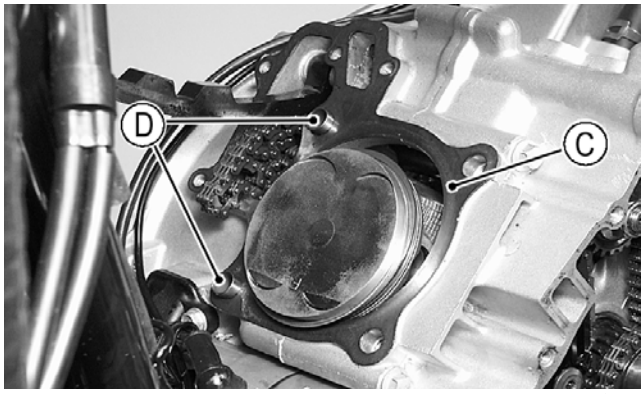


KX253

16. Remove the cylinder bolts (B); then remove the cylinder (A). Account for the base gasket (C) and alignment pins (D).

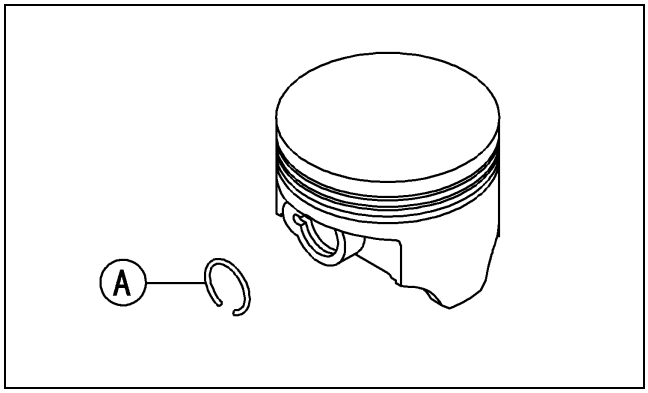


KX256A



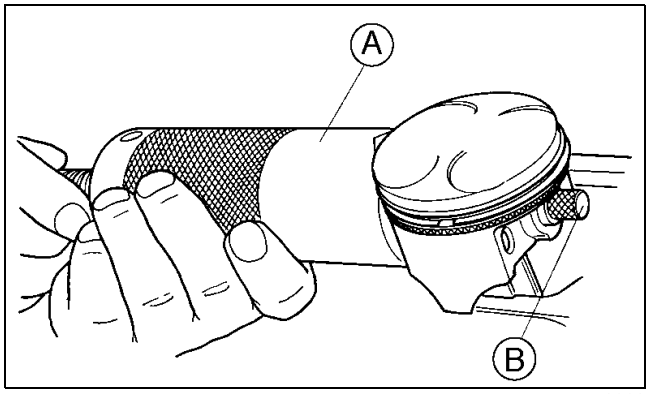
KX257A

17. Place a clean, lint-free cloth under the piston; then remove the piston pin retainer rings (A).



ATV2067

18. Using a piston pin puller (A), remove the piston pins (B); then remove the pistons from the connecting rods.



ATV2068

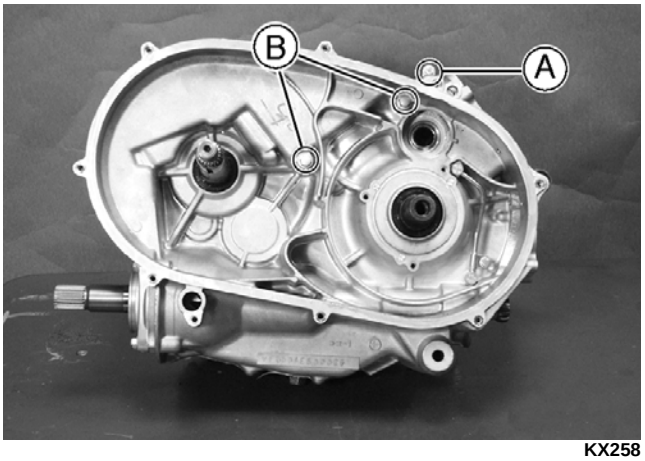
Center Crankcase Components

■**NOTE: This procedure cannot be done with the engine/transmission in the frame. Complete Removing procedures for Left-Side, Right-Side, and Top-Side must precede this procedure.**

■**NOTE: For efficiency, it is preferable to remove and disassemble only those components which need to be addressed and to service only those components. The technician should use discretion and sound judgment.**

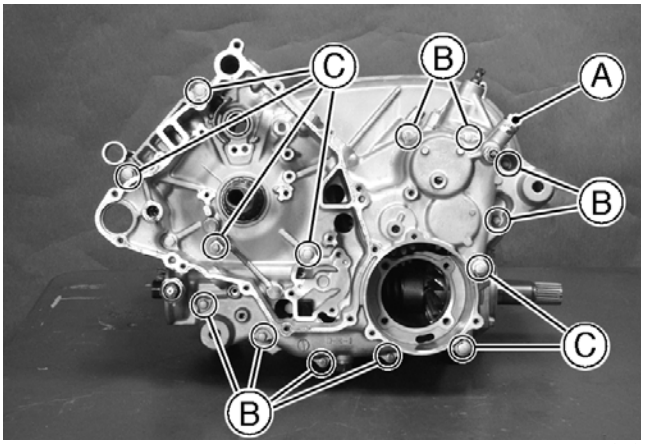
Separating Crankcase Halves

1. Remove the right crankcase bolts (A = 6 mm) (B = 8 mm).



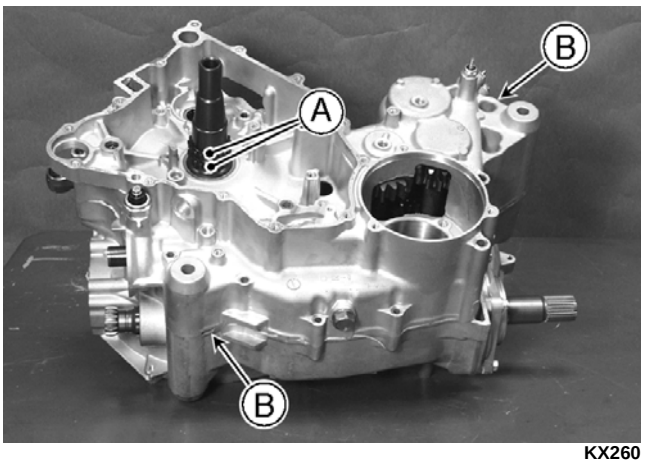
KX258

2. Remove the shift shaft positioning bolt (A) accounting for a washer, spring, and ball; then remove the left crankcase bolts (B = 6 mm) (C = 8 mm).



KX259

3. Wrap tape on the sprockets (A) to protect the crankshaft bushing in the case; then using pry points (B), separate the crankcase and lift off the left side.



KX260

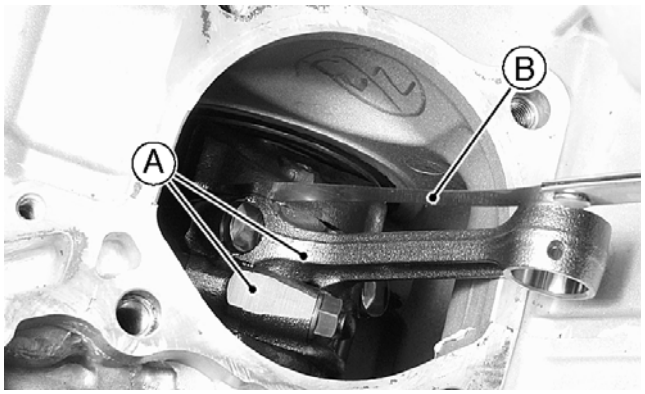
■**NOTE: The right and left crankcase halves are machined as an assembled set; therefore, they must be replaced as a set.**

Disassembling Crankcase Half

1. Using a press, remove the crankshaft from the right case; then mark matching marks on the connecting rods and end caps.

☞ AT THIS POINT

Connecting rod side clearance (A) should be measured with a feeler gauge (B) before disassembling as connecting rods have to be installed for this measurement. Maximum serviceable side clearance is 0.7 mm (0.028 in.). Connecting rods or crankshaft will have to be replaced if measurement exceeds specification.

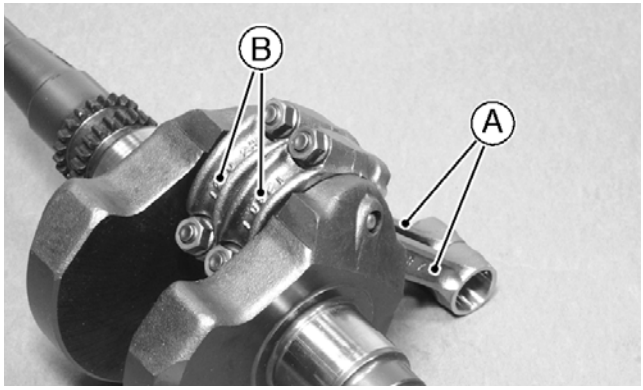


KX261

⚠ CAUTION

Connecting rods are machined with the big end caps installed. Severe engine damage will result if the caps are not installed on their respective rods.

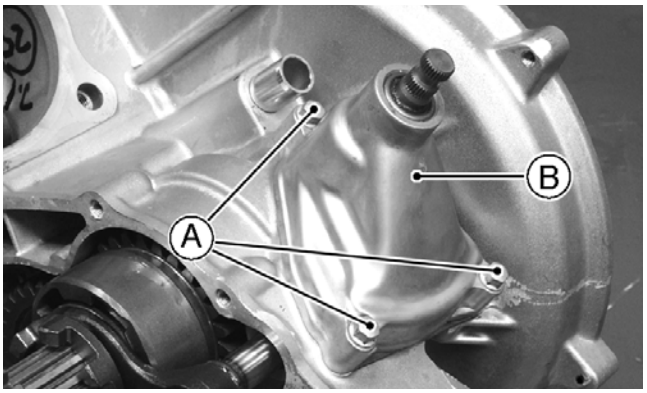
2. Remove the connecting rod nuts; then remove the connecting rods (A) and caps (B).



KX262

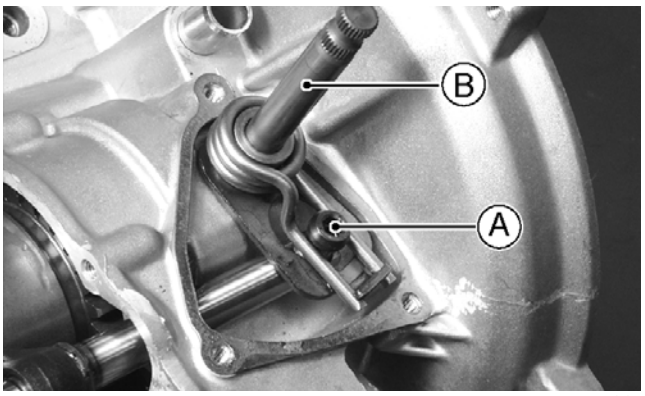
■ **NOTE: Connecting rod cap should be immediately installed on its connecting rod to prevent a mismatch.**

3. Remove the three cap screws (A); then remove the shift shaft cover (B).



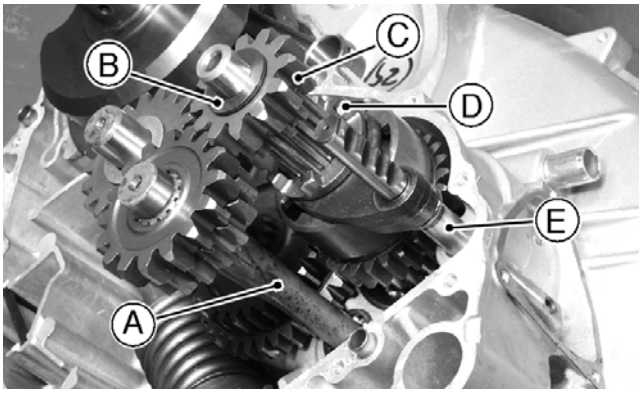
KX263

4. Remove the shift shaft spring anchor (A); then remove the shift shaft (B).



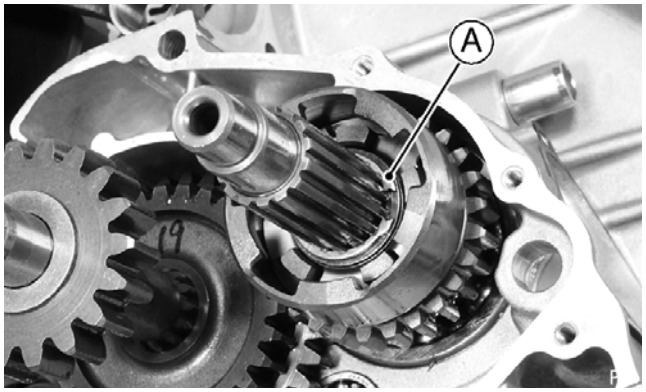
KX264

5. Remove the reverse idler shaft (A), spacer (B), and reverse drive gear (C) accounting for a needle bearing and spacer; then remove the shifter (D) and shift rod (E).



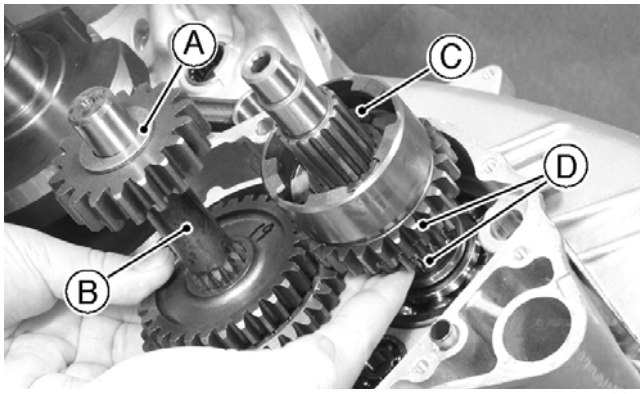
KX265

6. Remove the circlip (A).



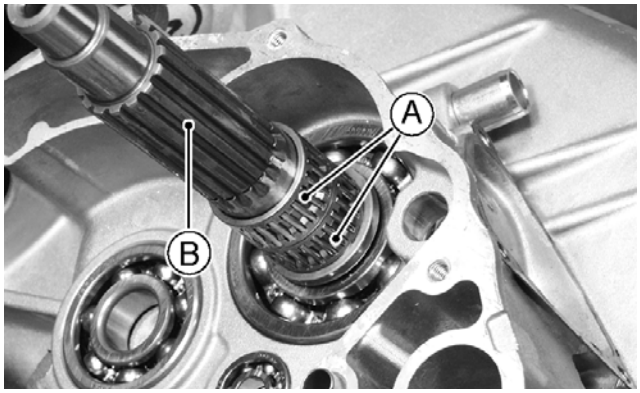
KX266

7. Remove the spacer (A), idler gear assembly (B), and washers and spacer (C); then remove low and high range gears (D).



KX267

8. Remove the two needle bearings (A); then using a press, remove the driven shaft (B).

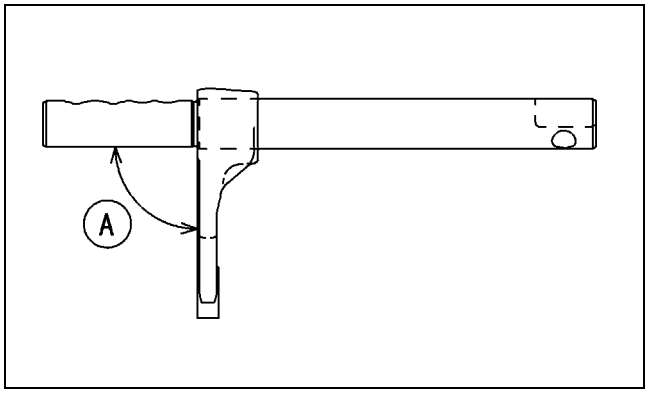


KX268

■**NOTE: Check all parts including gears, shifter, gear dogs, and splines. Replace chipped, damaged, or worn parts.**

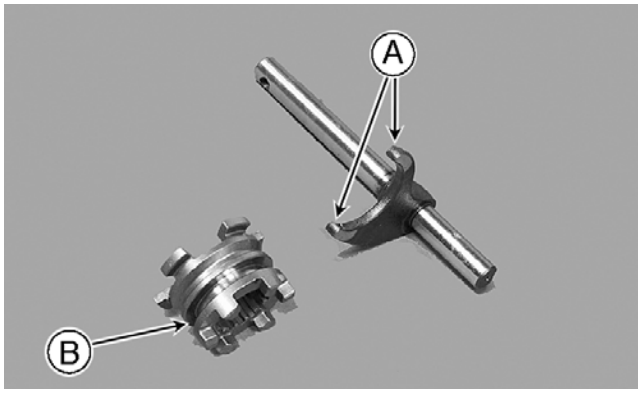

KX269

9. Check angle (A) for shift fork bending. It must be 90°.



ATV2069

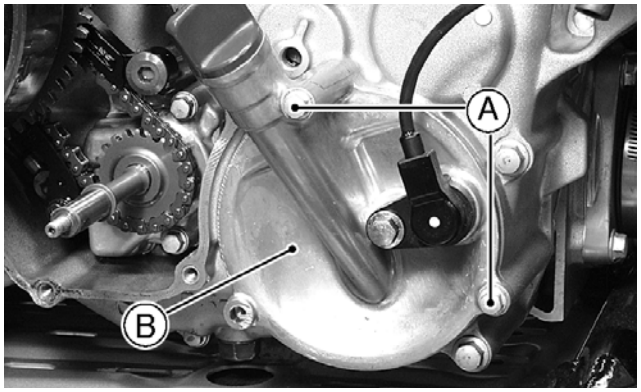
10. Measure the thickness of the shift fork at (A); then measure the shifter groove width (B). If they are out of specification, they must be replaced.



KX270

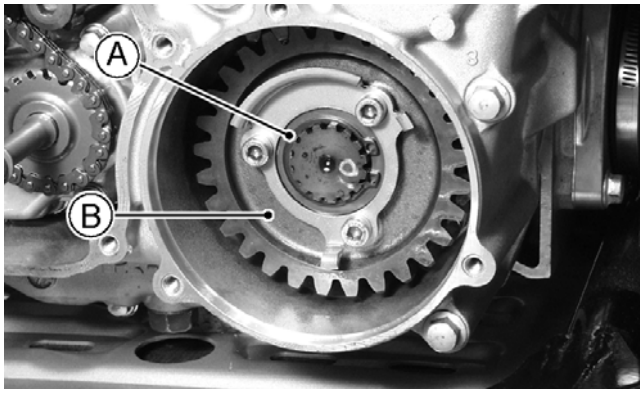
REMOVING OUTPUT DRIVE/DRIVEN BEVEL GEAR ASSEMBLY

1. Remove the oil pipe, cap screws (A), and the output drive bevel gear cover (B).



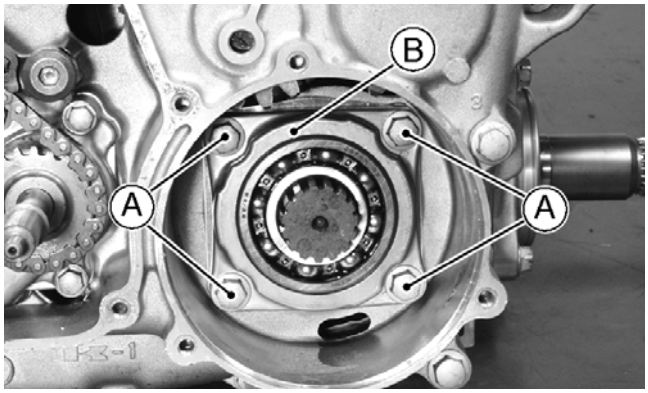
KX271

2. Remove circlip (A); then remove the output drive idler gear (B).



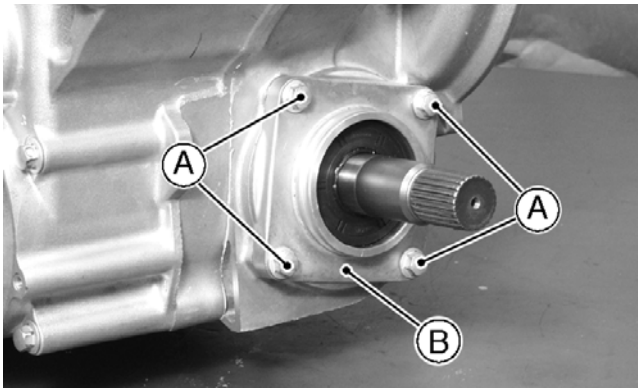
KX272

3. Remove the cap screws (A) securing the output drive bevel gear housing; then remove the housing (B).

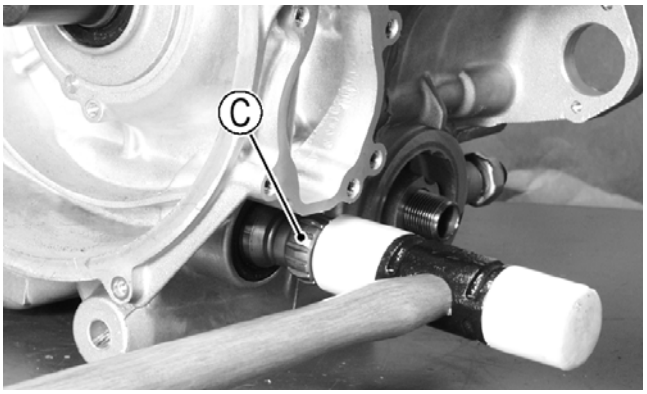


KX273

4. Remove four cap screws (A) securing the output driven bevel gear housing (B); then tap lightly on the front of the output driven bevel gear shaft (C) using a plastic mallet. The output driven bevel gear and housing come off with the shaft assembly.

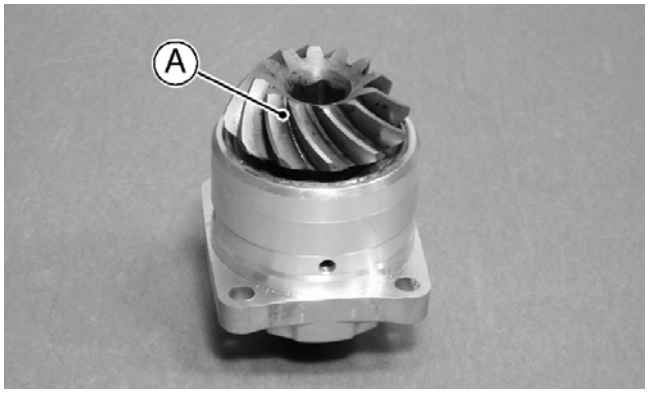


KX274

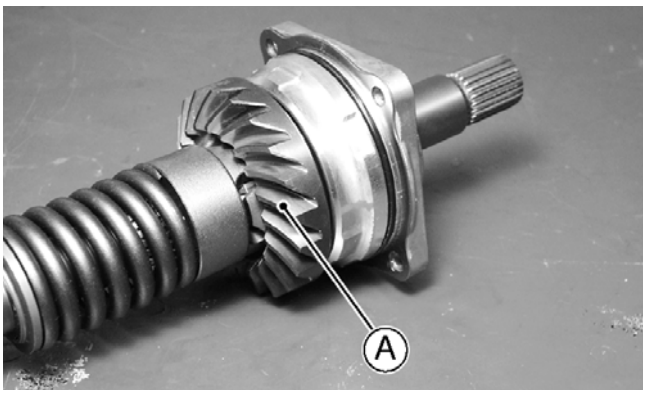


KX275A

■ **NOTE: Check the bevel gears (A) for scoring, chipping, or abnormal gear patterns; then check the bearings by rotating the drive and driven gears. If no abnormalities are detected, set the assemblies aside for installation. Do not remove from housings.**



KX276



KX277

■**NOTE: For disassembling and servicing, refer to Servicing Center Crankcase Components, this section.**

Table of Contents
(Servicing Components)

■**NOTE: Critical engine/transmission specifications are located at the beginning of this section.**

Servicing Top-Side Components 3-17
Valve Assembly 3-17
Piston Assembly 3-21
Cylinder/Cylinder Head Assembly 3-23
Servicing Left-Side Components 3-26
Recoil Starter 3-26
Servicing Right-Side Components 3-26
Driven Pulley Assembly 3-26
Drive Clutch Assembly 3-28
Servicing Center Crankcase Components 3-31
Crankshaft Assembly 3-31
Disassembling Output Drive Bevel Gear Assembly 3-32
Disassembling Output Driven Bevel Gear Assembly 3-33

Servicing Top-Side Components

■**NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

VALVE ASSEMBLY

When servicing valve assembly, inspect valve seats, valve stems, valve faces, and valve stem ends for pits, burn marks, or other signs of abnormal wear.

■**NOTE: Whenever a valve is out of tolerance, it must be replaced.**

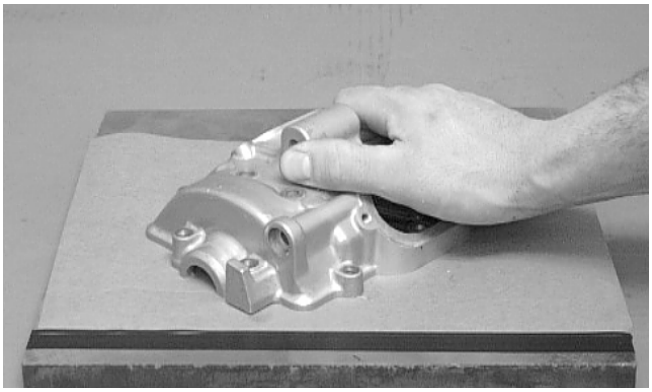
Cleaning/Inspecting Valve Cover

■**NOTE: If the valve cover cannot be trued, the cylinder head assembly must be replaced.**

1. Wash the valve cover in parts-cleaning solvent.
2. Place the valve cover on the Surface Plate (p/n 0644-016) covered with #400 grit wet-or-dry sandpaper. Using light pressure, move the valve cover in a figure eight motion. Inspect the sealing surface for any indication of high spots. A high spot can be noted by a bright metallic finish. Correct any high spots before assembly by continuing to move the valve cover in a figure eight motion until a uniform bright metallic finish is attained.

⚠ CAUTION

Do not remove an excessive amount of the sealing surface or damage to the camshaft will result. Always check camshaft clearance when resurfacing the valve cover.



CC130D

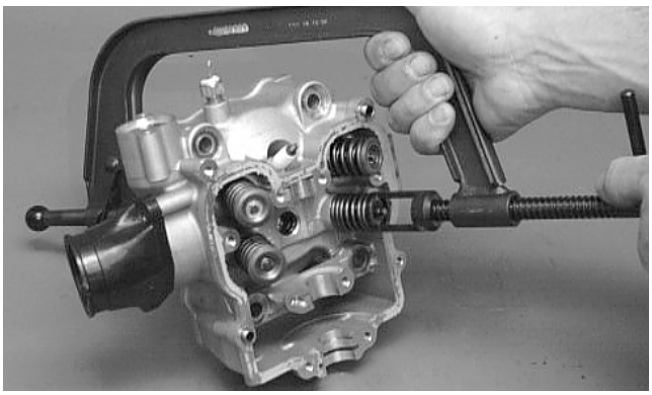
⚠ CAUTION

Water or parts-cleaning solvent must be used in conjunction with the wet-or-dry sandpaper or damage to the sealing surface may result.

Removing Valves

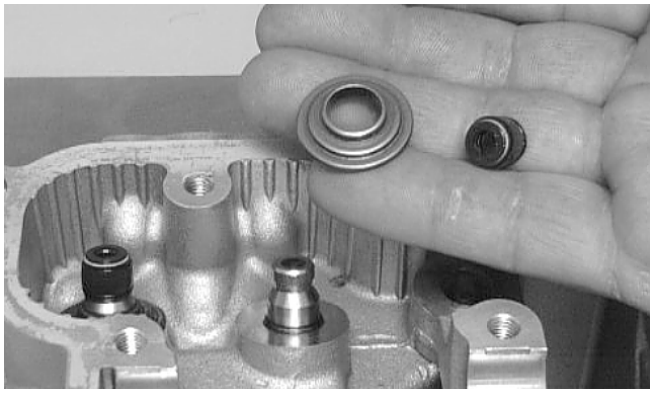
■**NOTE: Keep all valves and valve components as a set. Note the original location of each valve set for use during installation. Return each valve set to its original location during installation.**

1. Using a valve spring compressor, compress the valve springs and remove the valve cotters. Account for an upper spring retainer.



CC132D

2. Remove the valve seal and the lower remaining spring seat. Discard the valve seal.



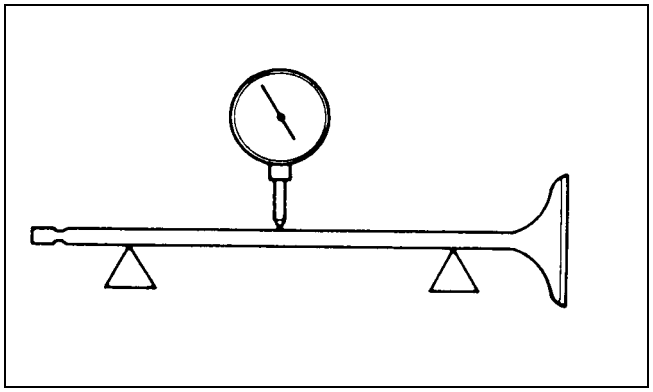
CC136D

■ **NOTE: The valve seals must be replaced.**

3. Remove the valve springs; then invert the cylinder head and remove the valves.

Measuring Valve Stem Runout

1. Support each valve stem end with the V Blocks (p/n 0644-022); then check the valve stem runout using a dial indicator.



ATV-1082

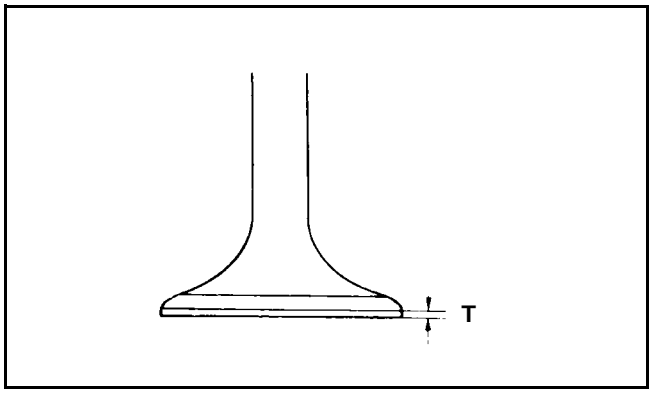
2. Maximum runout must not exceed specifications.

Measuring Valve Stem Outside Diameter

1. Using a micrometer, measure the valve stem outside diameter.
2. Acceptable diameter range (intake valve) must be within specifications.
3. Acceptable diameter range (exhaust valve) must be within specifications.

Measuring Valve Face/Seat Width

1. Using a micrometer, measure the width of the valve face.

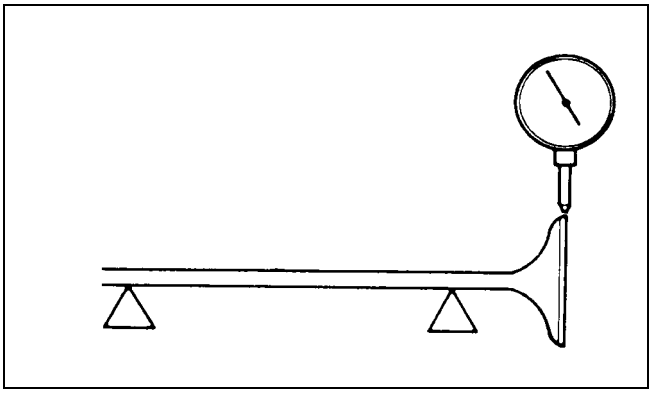


ATV-1004

2. Acceptable width range must be within specifications.

Measuring Valve Face Radial Runout

1. Mount a dial indicator on the surface plate; then place the valve stem on a set of V blocks.
2. Position the dial indicator contact point on the outside edge of the valve face; then zero the indicator.

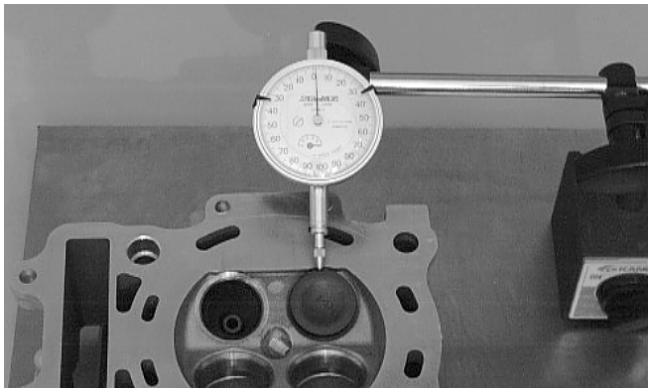


ATV1082A

3. Rotate the valve in the V blocks.
4. Maximum runout must not exceed specifications.

Measuring Valve Guide/Valve Stem Deflection (Wobble Method)

1. Mount a dial indicator and base on the surface plate; then place the cylinder head on the surface plate.
2. Install the valve into the cylinder head; then position the dial indicator contact point against the outside edge of the valve face. Zero the indicator.



CC131D

3. Push the valve from side to side; then from top to bottom.

4. Maximum “wobble” deflection must not exceed specifications.

Measuring Valve Guide (Inside Diameter)

1. Insert a snap gauge 1/2 way down into each valve guide bore; then remove the gauge and measure it with a micrometer.

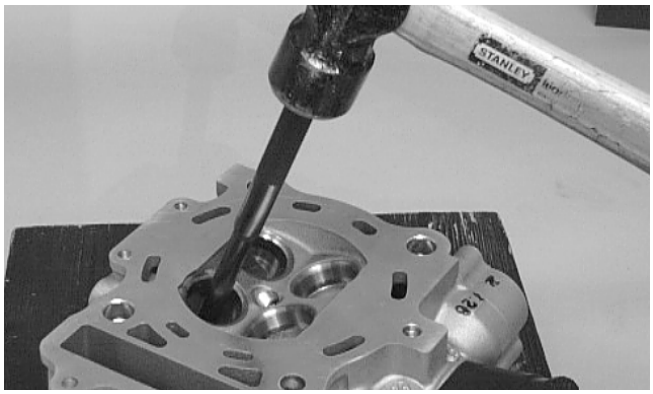
2. Acceptable inside diameter range must be within specifications.

3. If a valve guide is out of tolerance, it must be replaced.

Replacing Valve Guide

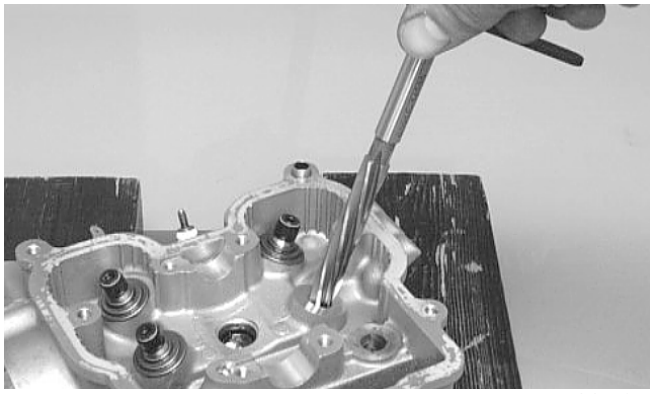
■ **NOTE: If a valve guide is worn or damaged, it must be replaced.**

1. If a valve guide needs replacing, insert a valve guide remover into the valve seat side of the valve guide. Using a hammer, gently drive the valve guide out of the cylinder head.



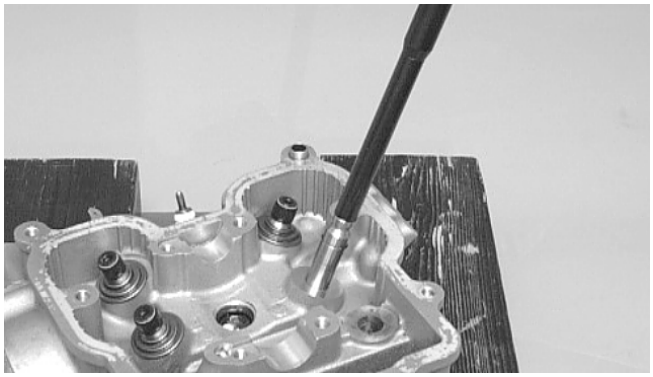
CC137D

2. Using the Standard Valve Guide Reamer (p/n 0444-017), remove any burrs or tight areas from the valve guide journals.



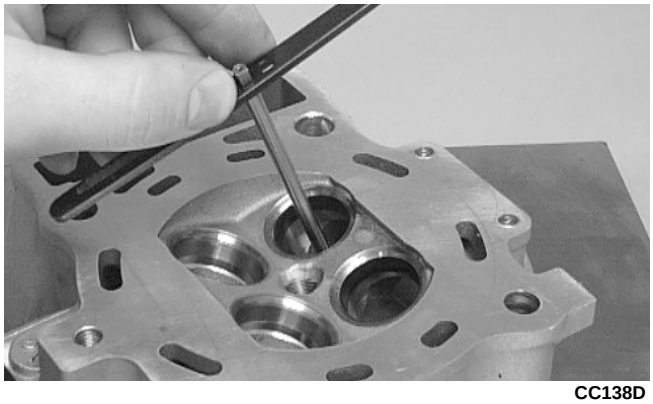
CC142D

3. To install a valve guide, use a valve guide installer and gently drive a valve guide with a retaining clip into the bore from the valve spring side until the retaining clip just contacts the cylinder head.



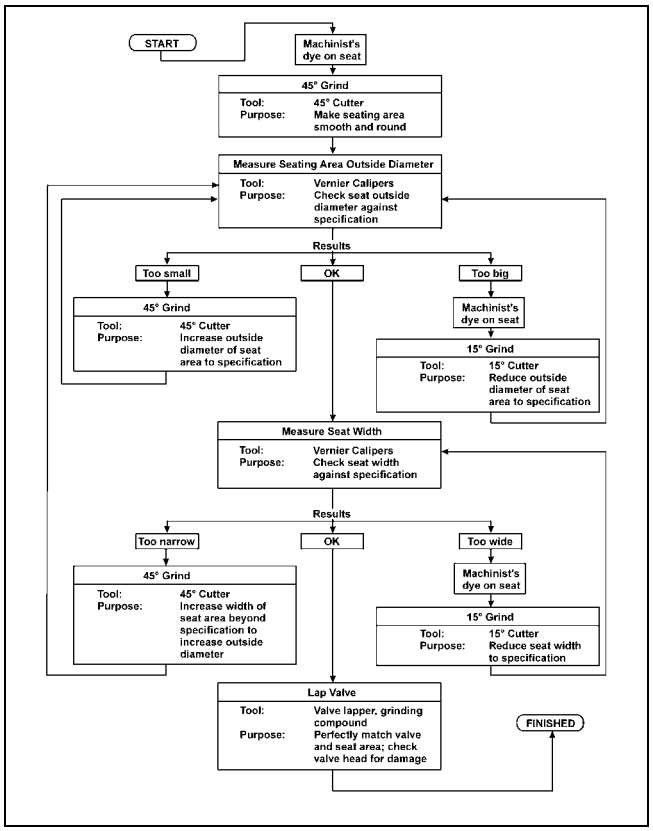
CC143D

4. After installing the guide, use the standard valve guide reamer to remove all burrs and tight areas that may remain in each valve guide.



CC138D

Valve Seat/Guide Servicing Flow Chart



ATV-0107

Grinding Valve Seats

■NOTE: If the valve seat is beyond servicing, the cylinder head must be replaced.

1. Insert an exhaust valve seat pilot shaft into an exhaust valve guide. Slide an exhaust valve seat grinding tool onto the pilot shaft; then using light pressure on a driver handle and a deep socket, grind the exhaust valve seat until within specifications.

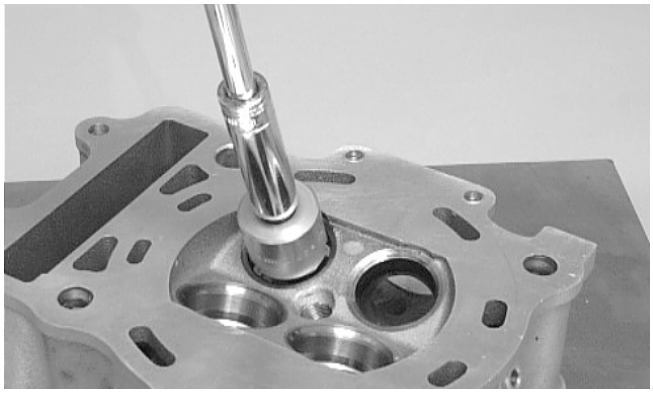
■NOTE: Repeat procedure on the remaining exhaust valve.



CC139D

2. Insert an intake valve seat pilot shaft into one of the intake valve guides. Slide the intake valve seat grinding tool onto the pilot shaft; then using light pressure on a driver handle and a deep socket, grind the intake valve seat until within specifications.

■NOTE: Repeat procedure on the remaining intake valve.



CC140D

Lapping Valves

■NOTE: Do not grind the valves. If a valve is damaged, it must be replaced.

1. Remove all carbon from the valves.
2. Lubricate each valve stem with light oil; then apply a small amount of valve lapping compound to the entire seating face of each valve.
3. Attach the suction cup of a valve lapping tool to the head of the valve.
4. Rotate the valve until the valve and seat are evenly polished.
5. Clean all compound residue from the valve and seat.

Measuring Rocker Arm (Inside Diameter)

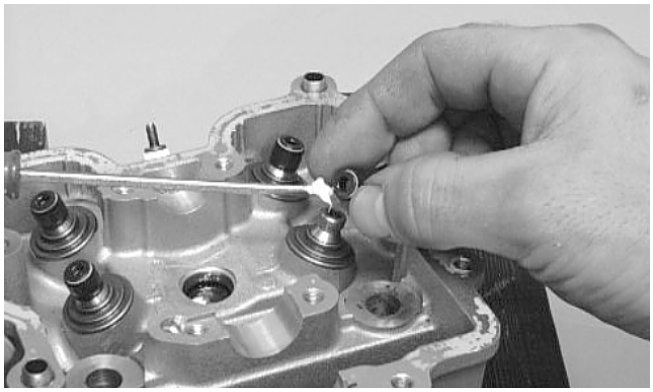
1. Using a dial calipers, measure the inside diameter of the rocker arm.
2. Acceptable inside diameter range must be within specifications.

Measuring Rocker Arm Shaft (Outside Diameter)

1. Using a micrometer, measure the outside diameter of the rocker arm shaft.
2. Acceptable outside diameter range must be within specifications.

Installing Valves

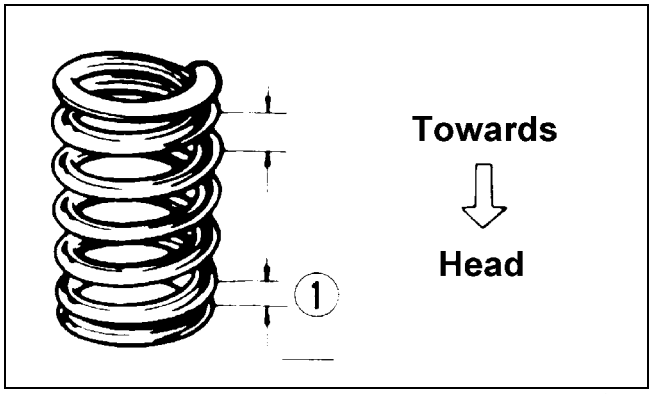
1. Apply grease to the inside surface of the valve seals; then place a lower spring seat and valve guide seal over each valve guide.



CC144D

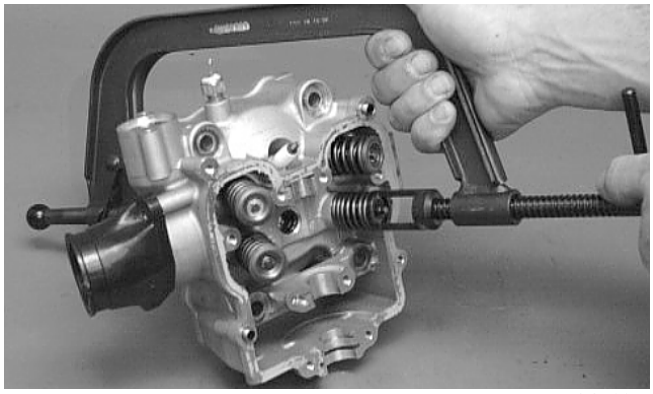
2. Insert each valve into its original valve location.

3. Install the valve spring with closest coils (1) toward the head.



ATV-1011A

4. Place a spring retainer over the valve springs; then using the valve spring compressor, compress the valve springs and install the valve cotters.



CC132D

PISTON ASSEMBLY

■ NOTE: Whenever a piston, rings, or pin is out of tolerance, it must be replaced.

Cleaning/Inspecting Piston

1. Using a non-metallic carbon removal tool, remove any carbon buildup from the dome of the piston.

2. Inspect the piston for cracks in the piston pin, dome, and skirt areas.

3. Inspect the piston for seizure marks or scuffing. Repair with #400 grit wet-or-dry sandpaper and water or honing oil.



AN135

■ NOTE: If scuffing or seizure marks are too deep to correct with the sandpaper, replace the piston.

4. Inspect the perimeter of each piston for signs of excessive "blowby." Excessive "blowby" indicates worn piston rings or an out-of-round cylinder.

Removing Piston Rings

1. Starting with the top ring, slide one end of the ring out of the ring-groove.



CC400D

2. Remove each ring by working it toward the dome of the piston while rotating it out of the groove.

■ NOTE: If the existing rings will not be replaced with new ones, note the location of each ring for proper installation. When installing new rings, install as a complete set only.

Cleaning/Inspecting Piston Rings

1. Take an old piston ring and snap it into two pieces; then grind the end of the old ring to a 45° angle and to a sharp edge.

2. Using the sharpened ring as a tool, clean carbon from the ring-grooves. Be sure to position the ring with its tapered side up.

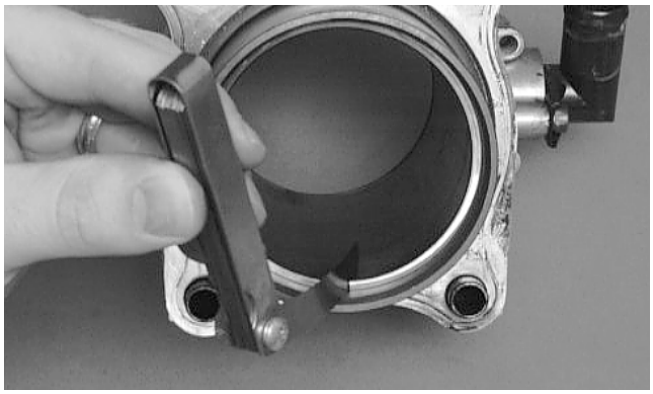
⚠ CAUTION

Improper cleaning of the ring-grooves by the use of the wrong type of ring-groove cleaner will result in severe damage to the piston.

Measuring Piston-Ring End Gap (Installed)

1. Place each piston ring in the wear portion of the cylinder. Use the piston to position each ring squarely in the cylinder.

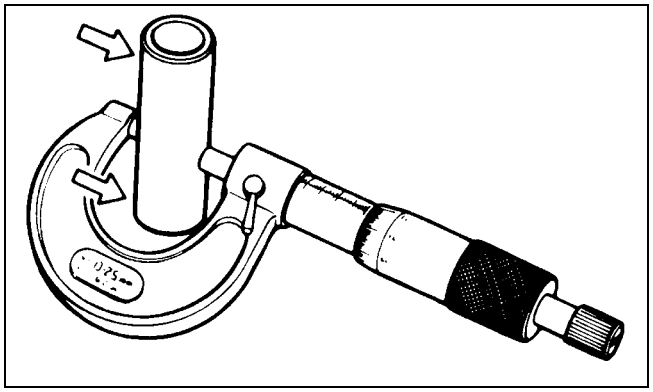
2. Using a feeler gauge, measure each piston-ring end gap. Acceptable ring end gap must be within specifications.



CC280D

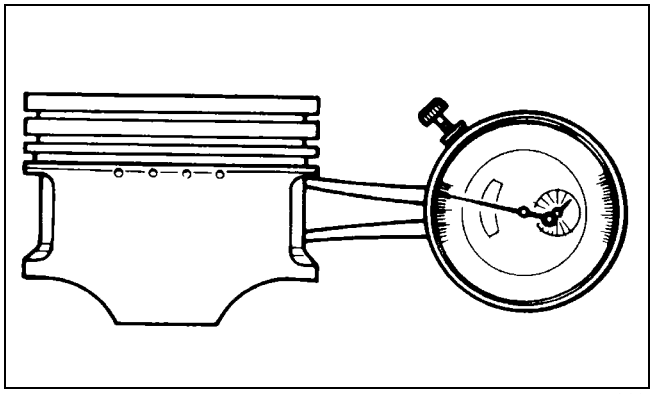
Measuring Piston Pin (Outside Diameter) and Piston-Pin Bore

1. Measure the piston pin outside diameter at each end and in the center. If measurement is not within specifications, the piston pin must be replaced.



ATV-1070

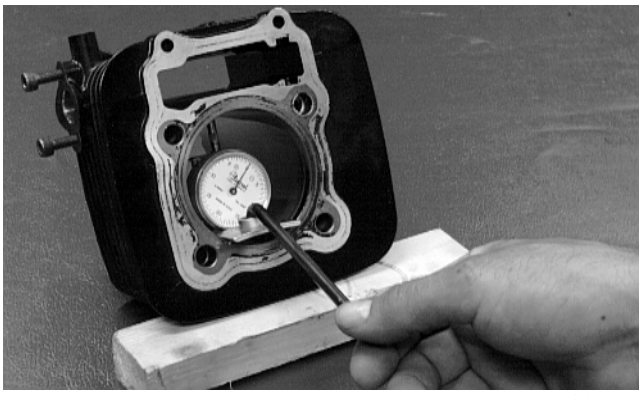
2. Insert an inside dial indicator into the piston-pin bore. The diameter must not exceed specifications. Take two measurements to ensure accuracy.



ATV-1069

Measuring Piston Skirt/ Cylinder Clearance

1. Measure the cylinder front to back in six places.

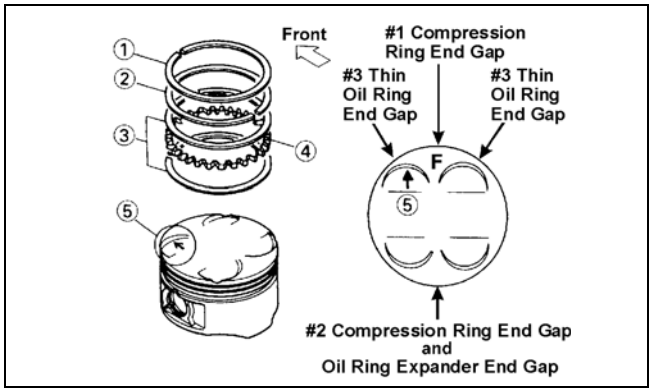


CC397D

2. Measure the corresponding piston diameter at a point 15 mm (0.6 in.) above the piston skirt at a right angle to the piston-pin bore. Subtract this measurement from the measurement in step 1. The difference (clearance) must be within specifications.

Installing Piston Rings

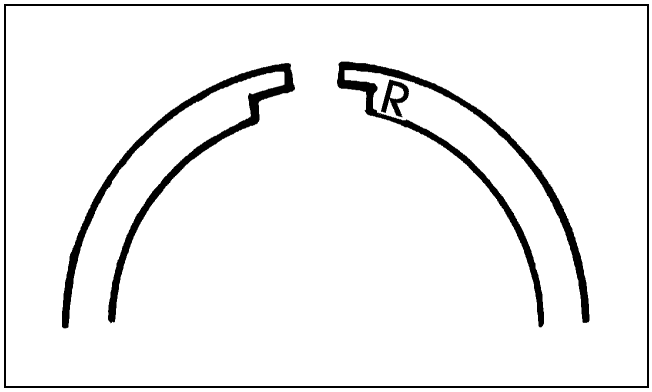
1. Install a thin oil ring (3), ring expander (4), and thin oil ring (3) in the bottom groove of the piston. Stagger the end gaps of the upper and lower thin oil rings according to the illustration. An F is stamped on the piston to indicate front.



ATV-1085C

■**NOTE: Note the direction of the front (F) of the piston (5) for correct ring end gap orientation.**

2. Install the compression rings (1 and 2) so the letter on the top surface of each ring faces the dome of the piston. Rotate the rings until the ring end gaps are on directly opposite sides of the piston (see illustration).



726-306A

⚠ CAUTION

Incorrect installation of the piston rings will result in engine damage.

CYLINDER/CYLINDER HEAD ASSEMBLY

■**NOTE: If the cylinder/cylinder head assembly cannot be trued, they must be replaced.**

Cleaning/Inspecting Cylinder Head

⚠ CAUTION

The cylinder head studs must be removed for this procedure.

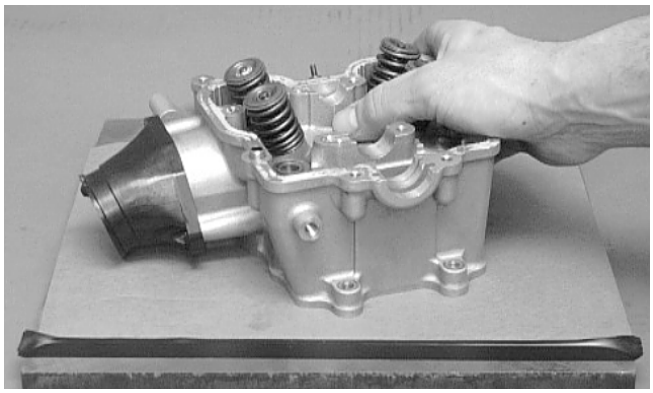
1. Using a non-metallic carbon removal tool, remove any carbon buildup from the combustion chamber being careful not to nick, scrape, or damage the combustion chamber or the sealing surface.

2. Inspect the spark plug hole for any damaged threads. Repair damaged threads using a "heli-coil" insert.

3. Place the cylinder head on the surface plate covered with #400 grit wet-or-dry sandpaper. Using light pressure, move the cylinder head in a figure eight motion. Inspect the sealing surface for any indication of high spots. A high spot can be noted by a bright metallic finish. Correct any high spots before assembly by continuing to move the cylinder head in a figure eight motion until a uniform bright metallic finish is attained.

⚠ CAUTION

Water or parts-cleaning solvent must be used in conjunction with the wet-or-dry sandpaper or damage to the sealing surface may result.



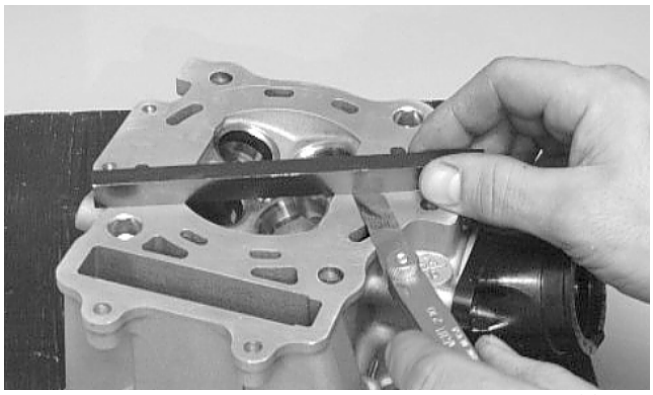
CC128D

Measuring Cylinder Head Distortion

1. Remove any carbon buildup in the combustion chamber.

2. Lay a straightedge across the cylinder head; then using a feeler gauge, check the distortion factor between the head and the straightedge.

3. Maximum distortion must not exceed specifications.



CC141D

Cleaning/Inspecting Cylinder

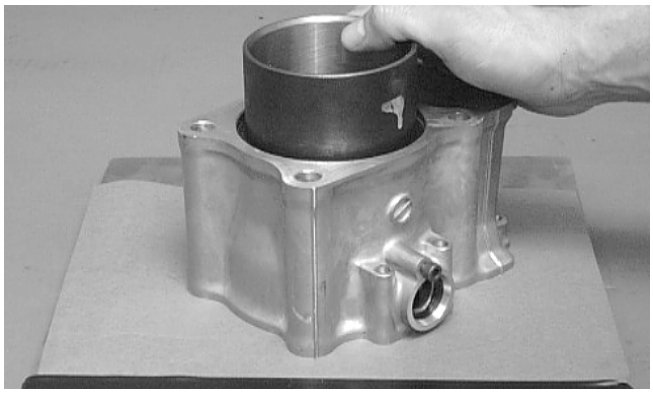
1. Wash the cylinder in parts-cleaning solvent.

2. Inspect the cylinder for pitting, scoring, scuffing, warpage, and corrosion. If marks are found, repair the surface using a cylinder hone (see Honing Cylinder in this sub-section).

3. Place the cylinder on the surface plate covered with #400 grit wet-or-dry sandpaper. Using light pressure, move the cylinder in a figure eight motion. Inspect the sealing surface for any indication of high spots. A high spot can be noted by a bright metallic finish. Correct any high spots before assembly by continuing to move the cylinder in a figure eight motion until a uniform bright metallic finish is attained.

⚠ CAUTION

Water or parts-cleaning solvent must be used in conjunction with the wet-or-dry sandpaper or damage to the sealing surface may result.



CC129D

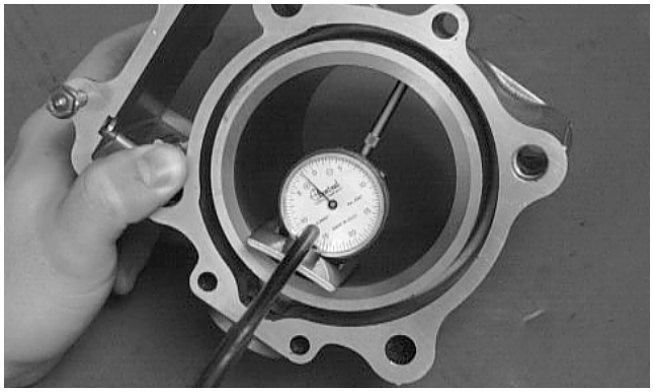
Inspecting Cam Chain Guide

1. Inspect cam chain guide for cuts, tears, breaks, or chips.

2. If the chain guide is damaged, it must be replaced.

Honing Cylinder

1. Using a slide gauge and a dial indicator or a snap gauge, measure the cylinder bore diameter in three locations from top to bottom and again from top to bottom at 90° from the first measurements for a total of six measurements. The trueness (out-of-roundness) is the difference between the highest and lowest reading. Maximum trueness (out-of-roundness) must not exceed specifications.

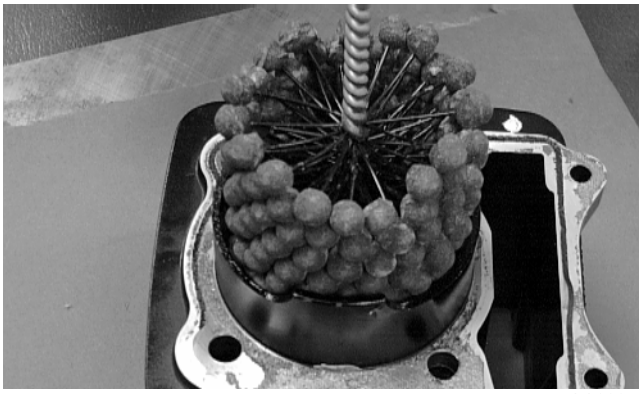


CC127D

2. Wash the cylinder in parts-cleaning solvent.

3. Inspect the cylinder for pitting, scoring, scuffing, and corrosion. If marks are found, repair the surface using a ball hone.

■ NOTE: To produce the proper 60° cross-hatch pattern, use a low RPM drill (600 RPM) at the rate of 30 strokes per minute. If honing oil is not available, use a lightweight petroleum-based oil. Thoroughly clean cylinder after honing using soap and hot water. Dry with compressed air; then immediately apply oil to the cylinder bore. If the bore is severely damaged or gouged, replace the cylinder.



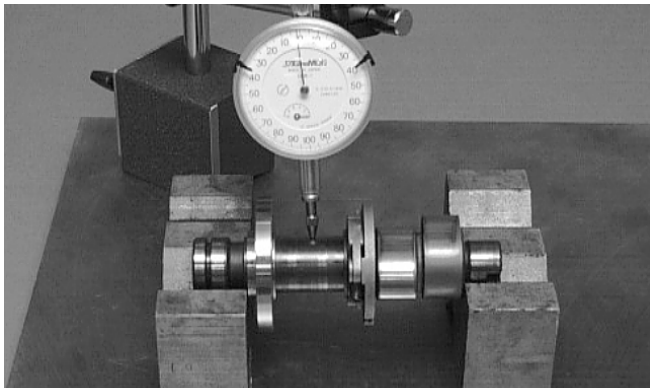
CC390D

4. If any measurement exceeds the limit, replace the cylinder.

Measuring Camshaft Runout

■ NOTE: If the camshaft is out of tolerance, it must be replaced.

1. Place the camshaft on a set of V blocks; then position the dial indicator contact point against the shaft and zero the indicator.

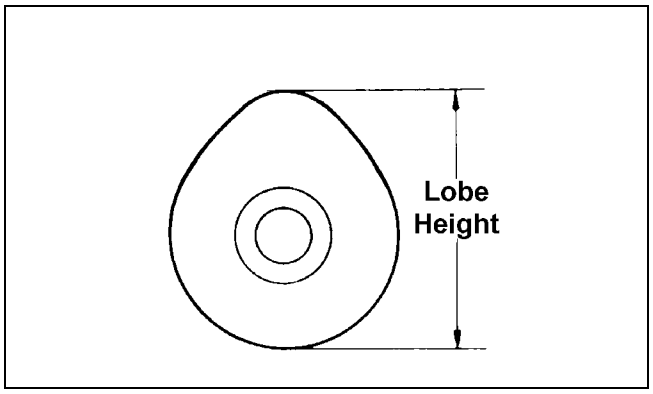


CC283D

2. Rotate the camshaft and note runout; maximum tolerance must not exceed specifications.

Measuring Camshaft Lobe Height

1. Using a calipers, measure each cam lobe height.



ATV1013A

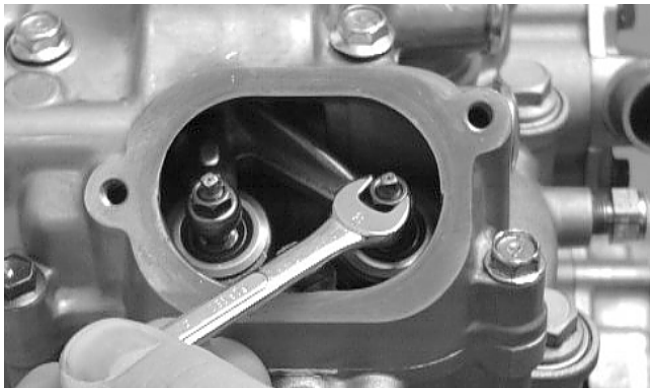
2. The lobe heights must not exceed minimum specifications.

Inspecting Camshaft Bearing Journal

1. Inspect the bearing journal for scoring, seizure marks, or pitting.
2. If excessive scoring, seizure marks, or pitting is found, the cylinder head assembly must be replaced.

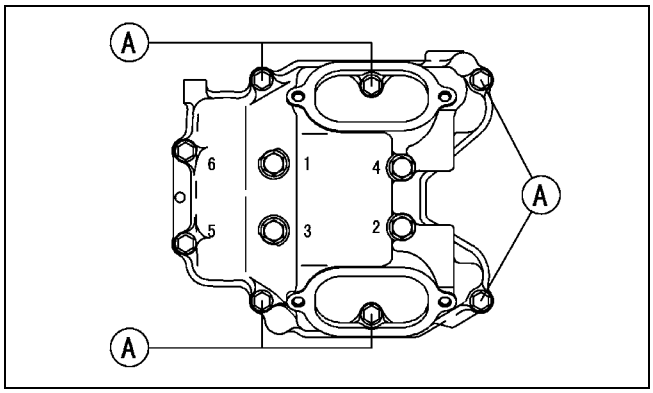
Measuring Camshaft to Cylinder Head Clearance

1. Remove the adjuster screws and jam nuts.



CC005D

2. Place a strip of plastigauge in each of the camshaft lands in the cylinder head.
3. Place the valve cover on the cylinder head and secure with the valve cover cap screws. Tighten in correct sequence to specifications.

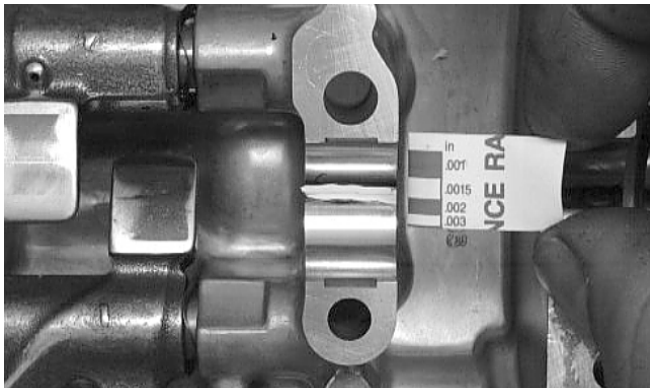


ATV2070

■ NOTE: Tighten cap screws 1-4 with washers to 0.9 kg-m (78 in.-lb), cap screws 5-6 to 1.0 kg-m (87 in.-lb), and cap screws (A) to 1.0 kg-m (87 in.-lb).

■ NOTE: Do not rotate the camshaft when measuring clearance.

4. Remove the cap screws securing the valve cover to the cylinder; then remove the valve cover and camshaft.
5. Match the width of the plastigauge with the chart found on the plastigauge packaging to determine camshaft to cylinder head and valve cover clearance.



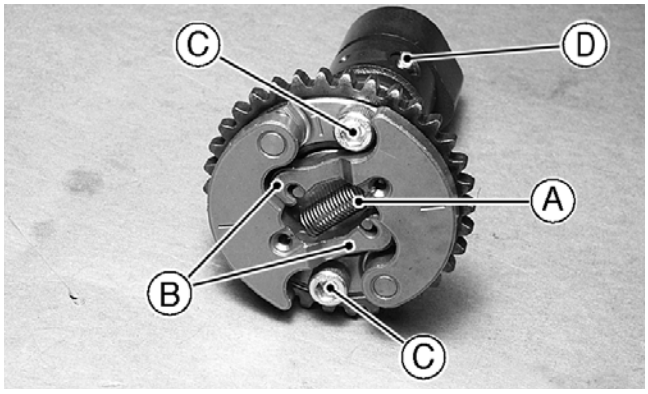
CC145D

6. If clearance is excessive, measure the journals of the camshaft.

■ **NOTE: If the journals are worn, replace the camshaft; then measure the clearance again. If it is still our of tolerance, replace the cylinder head.**

Inspecting Automatic Compression Release

1. Check that the weights (B) are in the retracted position. If the weights are extended, check the spring (A) for distortion or breakage or pivot pins (C) for binding.



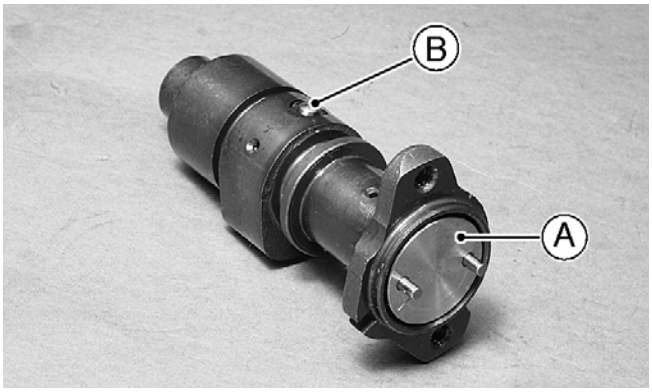
KX278A

2. Manually extend the weights. The pin (D) should retract and the weights should move without binding and return when released. Pin (D) should extend when the weights are released.

■ **NOTE: If any binding or resistance other than the spring tension is felt, the automatic compression release must be replaced.**

3. Check that the shaft (A) rotates and the pin (B) is not broken, chipped, or worn flat.

■ **NOTE: Do not remove shaft (A) or pin (B) as they are not serviceable and cannot be reassembled. The camshaft assembly must be replaced if any defects are found.**



KX279

Servicing Left-Side Components

RECOIL STARTER

■ **NOTE: The recoil starter is a non-serviceable component. If it is damaged or if it does not function properly, it must be replaced as a complete unit.**

Servicing Right-Side Components

■ **NOTE: Whenever a part is worn excessively, cracked, damaged in any way, or out of tolerance, replacement is necessary.**

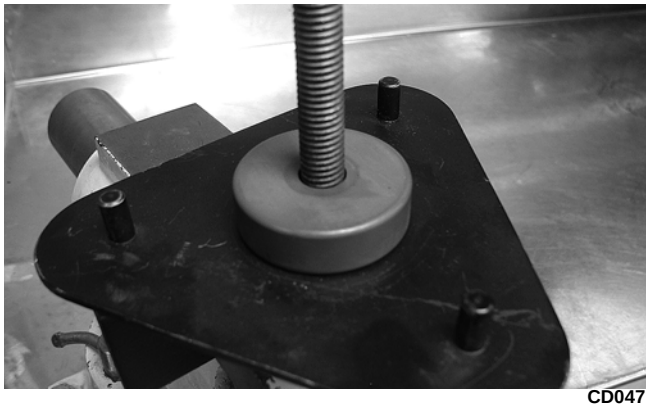
DRIVEN PULLEY ASSEMBLY

Disassembling

⚠ WARNING

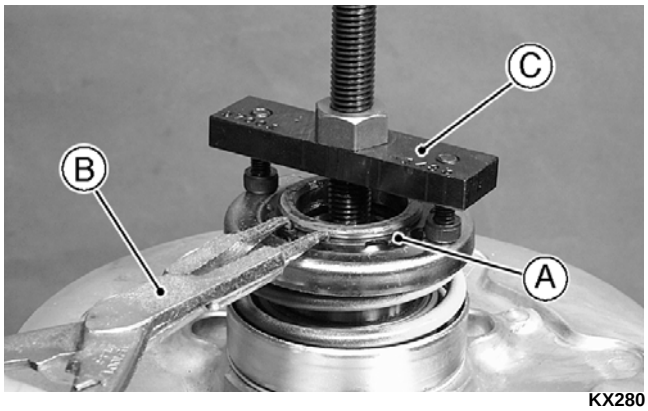
This procedure involves relaxing a compressed spring assembly. DO NOT attempt disassembling without the proper tools.

1. Secure Driven Pulley Compressor (p/n 0444-121) in a suitable holding fixture such as a bench vise.


CD047

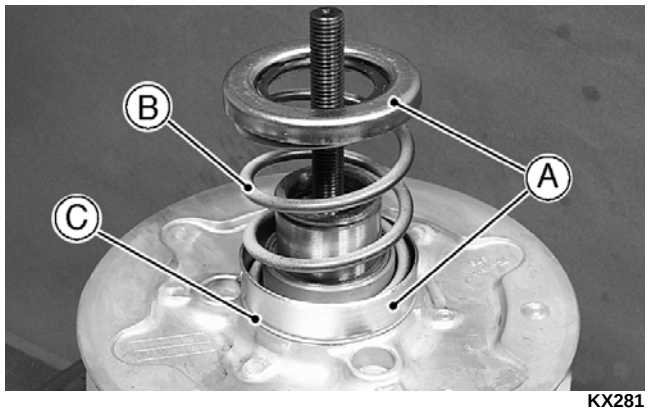
2. Place the driven pulley assembly onto the compressor tool base engaging the dowel pins into appropriate holes in the fixed face of the assembly.

3. Tighten the nut against Spring Holder (p/n 0444-162) (C) to compress the springs; then using a circlip pliers (B), remove the circlip (A).



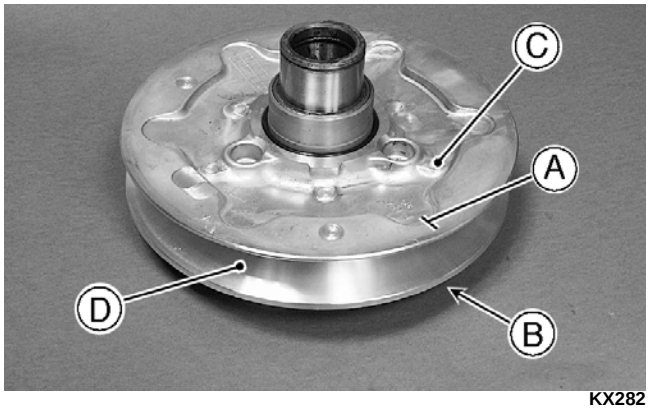
KX280

4. Relax the spring by removing the nut and spring holder; then remove the spring seats (A), spring (B), and thrust plate (C).



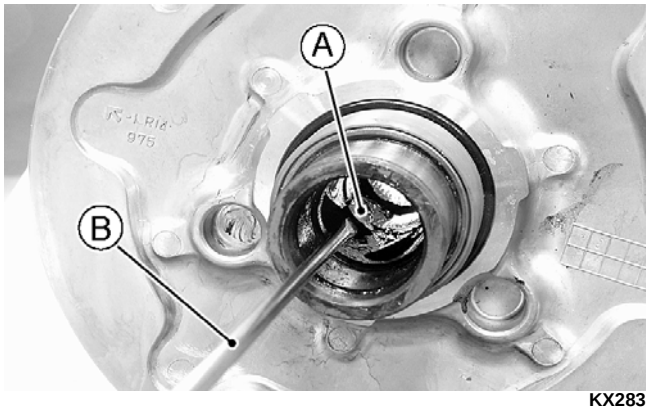
KX281

5. Make matching marks (A) and (B) on the movable sheave (C) and stationary sheave (D) to allow installation in the same position.



KX282

6. Wipe out excessive grease; then using a standard tip screwdriver (B), dislodge the four guide pins (A).



KX283

7. Remove the spacers; then thoroughly clean all parts in a high flash-point solvent.

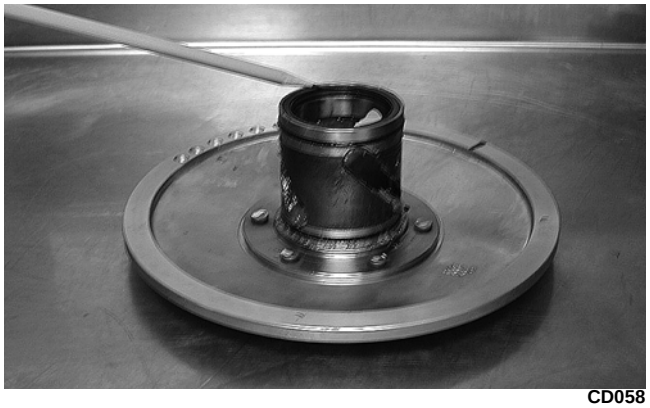
Inspecting

1. Inspect the pulley faces for wear, galling, or grooving.

2. Inspect the O-rings on the movable face for nicks, tears, or swelling.


CD057

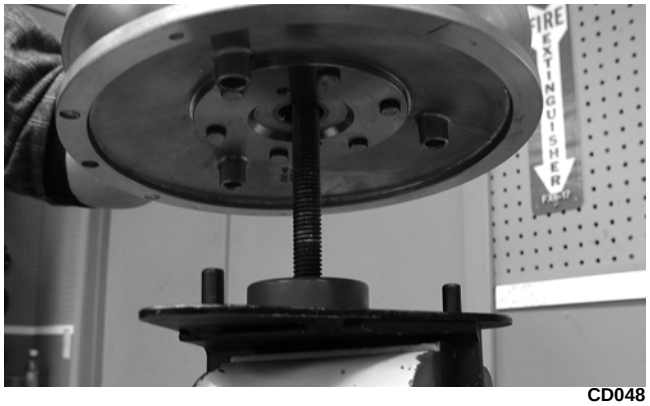
3. Inspect two grease seals in the movable face for nicks, cuts, or damage.


CD058

4. Inspect the pins and bushings for wear, flat spots, looseness, or cracking.

Assembling

1. Place the fixed face of the driven pulley on the pulley compressor base making sure the dowel pins are engaged in the appropriate holes in the pulley face.



CD048

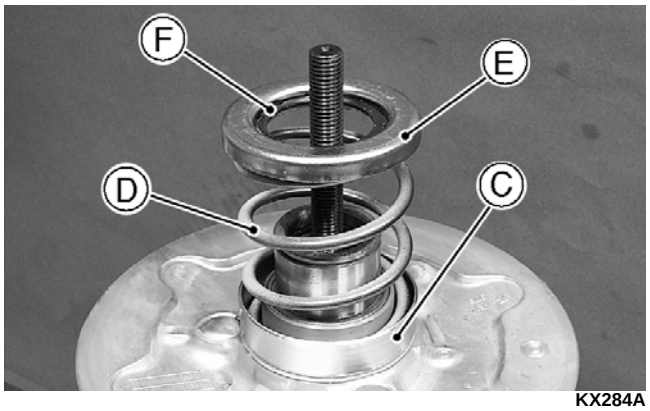
2. Install the four pins and spacers into the fixed face hub; then pack the cam slots in the movable face with multi-purpose grease.


CD061

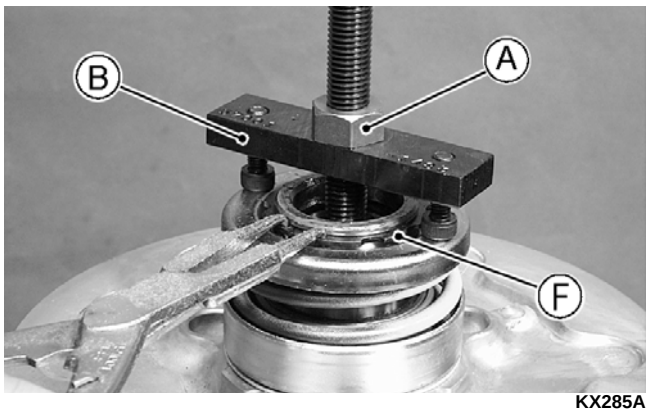
3. Apply multi-purpose grease to the O-rings and grease seals on the movable face; then install on the fixed face making sure the alignment marks are properly aligned.


CD060

4. Install the spring seat (C), spring (D), spring seat (E), and circlip (F); then attach the spring holder (B) and tighten nut (A) until the circlip (F) can be installed.



KX284A



KX285A

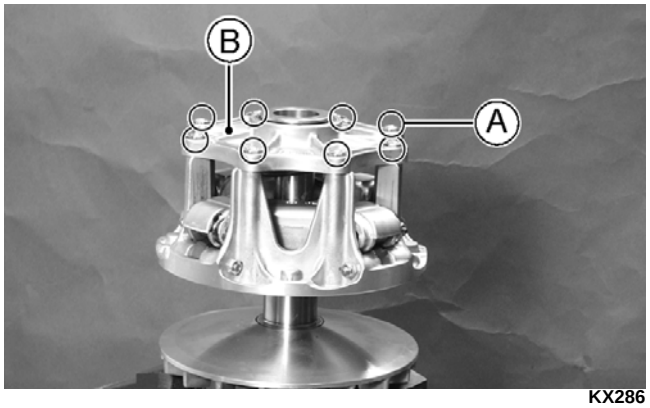
5. Loosen the nut and remove the spring holder; then remove the driven pulley assembly from the driven pulley compressor.

DRIVE CLUTCH ASSEMBLY

Disassembling

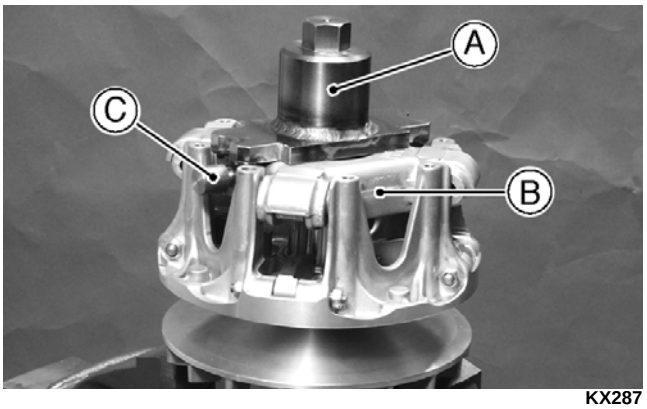
1. Hold the drive clutch holder in a suitable vise; then set the clutch on the holder engaging the holding pins with the clutch back.

2. Remove the drive clutch cover bolts (A); then remove the clutch cover (B). Account for the spring and spacers.



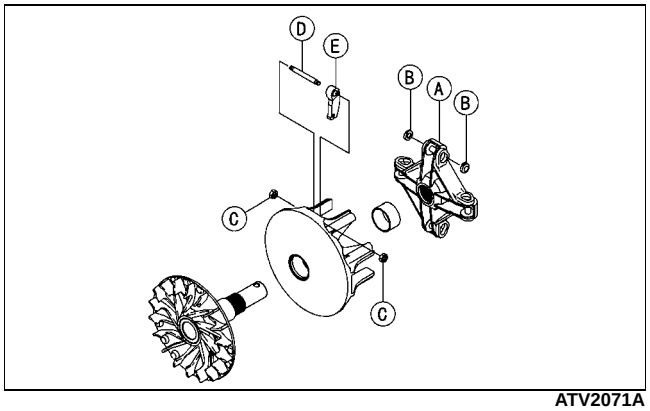
KX286

3. Place the spider wrench (A) on the spider (B) and tighten the bolt (C); then turn the wrench clockwise and remove the spider with the movable sheave.



KX287

4. Remove the shoes (B), nuts (C), ramp weight pins (D), and ramp weights (E) from the spider (A); then clean all parts thoroughly in a high flash-point solvent.



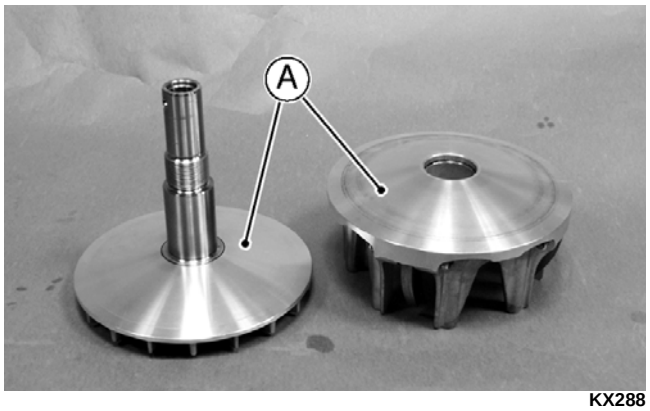
ATV2071A

Inspecting

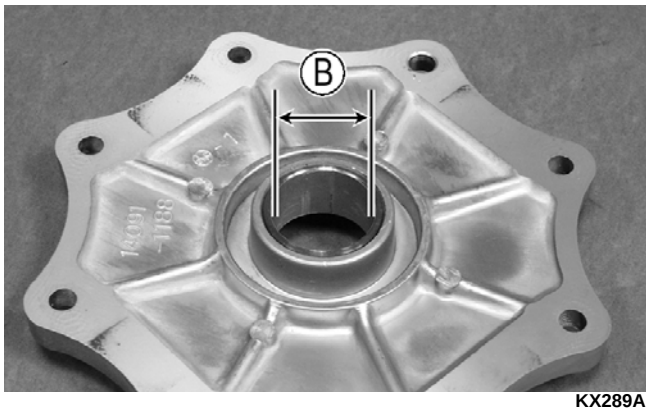
⚠ WARNING

Inspect all rotating parts carefully for cracks, loose bolts, chips, or nicks. Clutches and driven pulleys rotate at high speeds and can break up with explosive force causing severe injury or death.

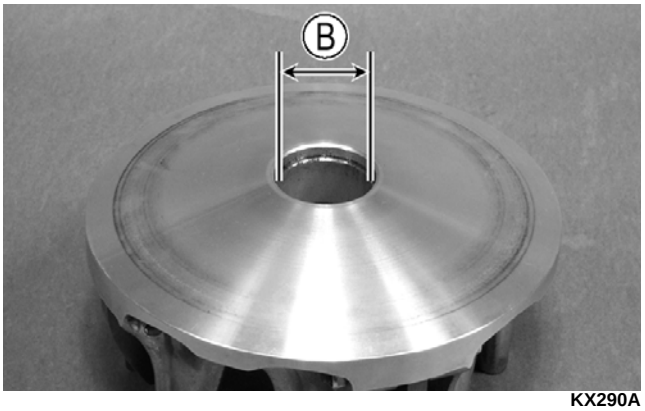
1. Inspect the sheave faces (A) for cracks, galling, or hollowing; then check all bushings (B).



KX288

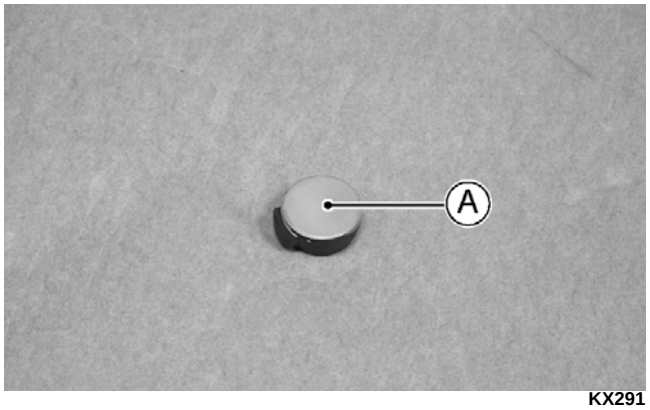


KX289A



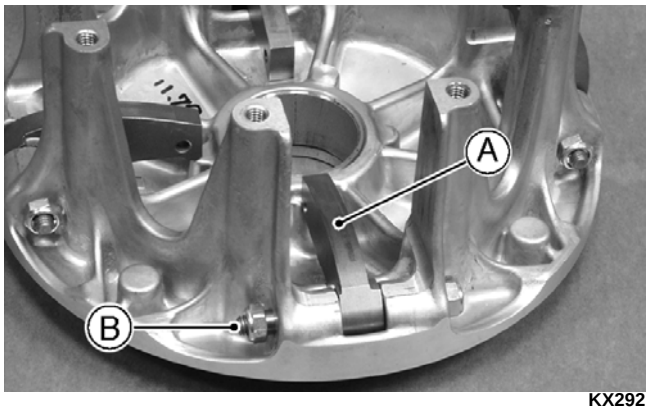
KX290A

2. Inspect spider shoes (A) for wear or damage. If any are damaged, replace the complete set.



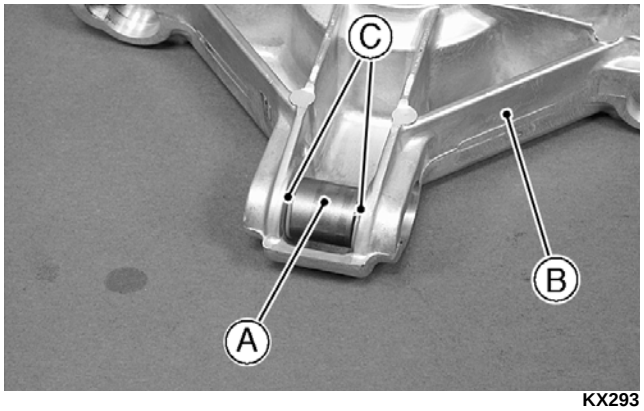
KX291

3. Inspect the ramp weights (A) and pins (B) in the movable sheave. Replace any worn parts.



KX292

4. Inspect the rollers (A) and washers (C) in the spider. If they are worn, replace the spider assembly (B).



KX293

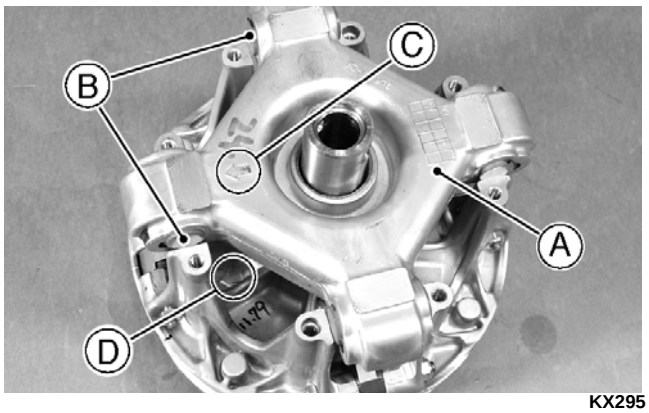
Assembling

1. Install the ramp weights (A) and tighten nuts (B) to specifications; then check that the ramp weights swing freely.



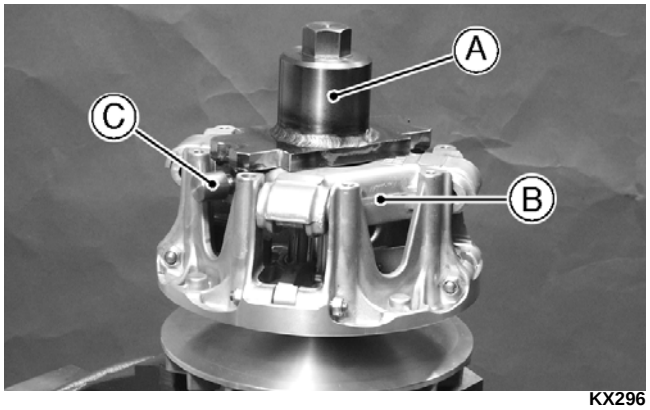
KX294

2. Place the fixed sheave on the clutch holder; then install the movable sheave, spider (A) and shoes (B) aligning the arrow (C) with the arrow (D) on the movable sheave.



KX295

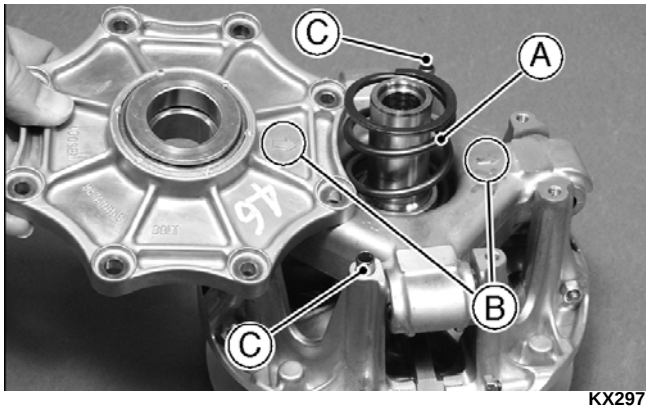
3. Install the spider wrench (A) on the spider (B) and tighten bolt (C); then tighten spider counterclockwise to specifications.



KX296

4. Install the spring spacer in the spider; then install the spring (A) in the spider groove.

5. Install the alignment pins (C); then install the clutch cover aligning the arrows (B) on the clutch cover and spider. Tighten to specifications.



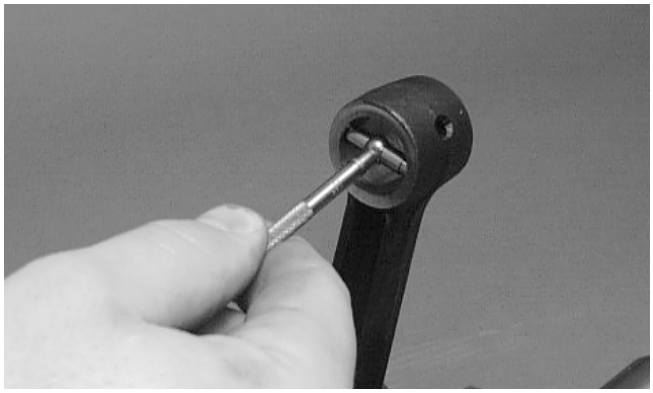
KX297

Servicing Center Crankcase Components

CRANKSHAFT ASSEMBLY

Measuring Connecting Rod (Small End Inside Diameter)

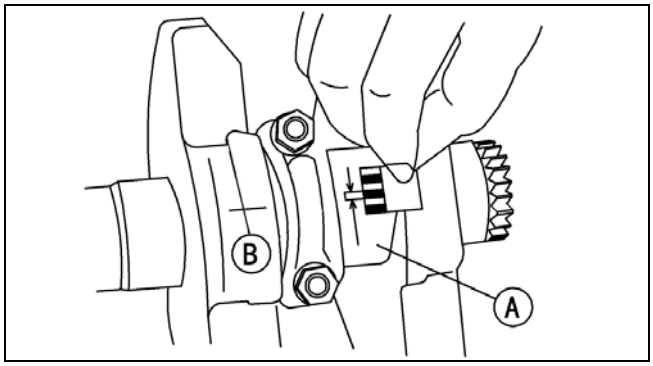
1. Insert a snap gauge into the upper connecting rod small end bore; then remove the gauge and measure it with micrometer.


CC290D

2. Maximum diameter must not exceed specifications.

■ **NOTE: Always tighten connecting rod cap nuts to the specified torque value before making any measurements.**

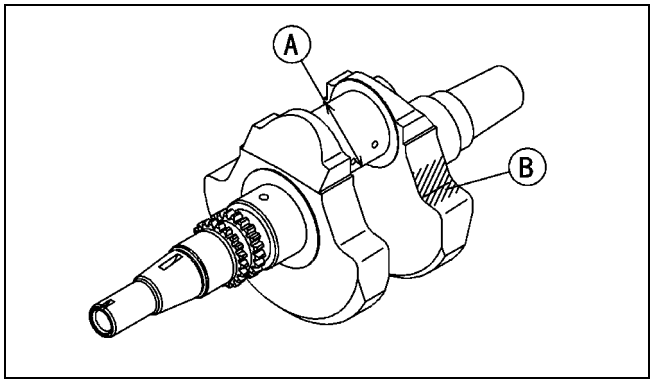
3. Measure the connecting rod big end insert to crank pin clearance using plastigauge. Check the clearance (A) by reading the width (B) with the gauge provided. Clearance must be within specifications. Do not move the connecting rod with the plastigauge installed.



ATV2072

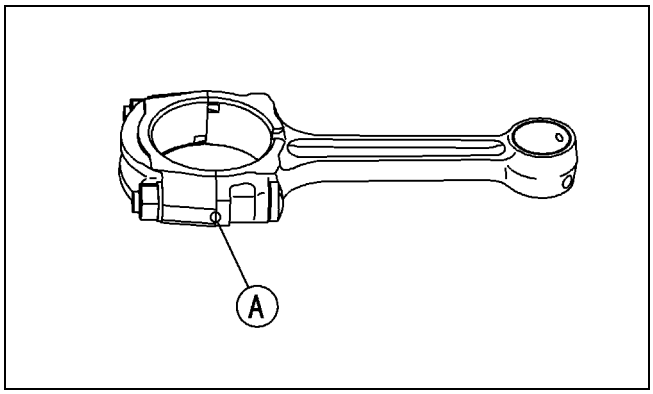
4. Measure the crank pin diameter (A) and check the crankshaft marking (B). If no mark is on the crankshaft, the crank pin diameter should be 39.984-39.992 mm (1.5742-1.5745 in.). If the crankshaft is marked with "O," crank pin diameter should be 39.993-40.000 mm (1.5745-1.5748 in.).

■ **NOTE: If the crank pin diameter does not coincide with the marking, make a new mark.**



ATV2073

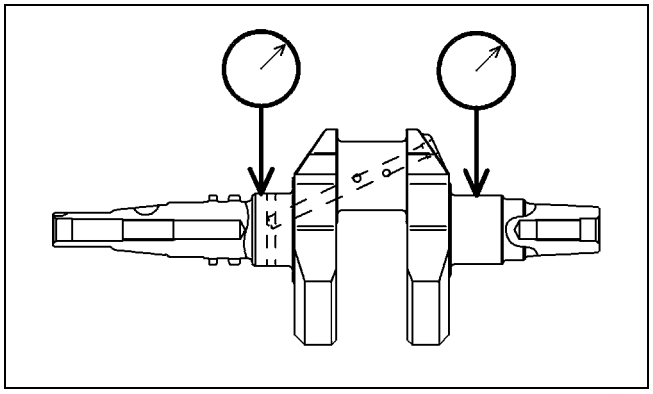
5. Measure the connecting rod big end inside diameter; then check the mark (A) to see if the measurement coincides with the mark. If there is no mark on the connecting rod, the big end inside diameter should be 43.000-43.016 mm (1.6929-1.6935 in.). If there is an "O," the big end inside diameter should be 43.009-43.016 mm (1.6933-1.6935 in.).



ATV2074

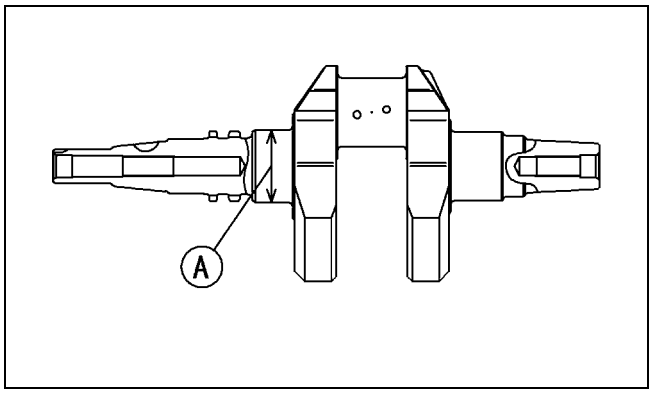
6. Place the crankshaft on a set of V blocks; then mount a dial indicator and base on the surface plate.

7. Slowly turn the crankshaft and note the readings at the points indicated. Crankshaft runout must be less than 0.10 mm (0.0039 in.).



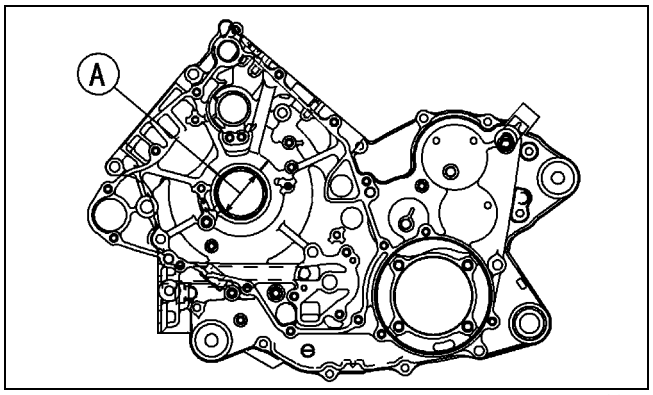
ATV2075

8. Measure the crankshaft main journal (A). It must be greater than 41.96 mm (1.652 in.).



ATV2076

9. Measure the main bearing bore diameter (A) in the crankcase. It must be less than 42.08 mm (1.6567 in.).

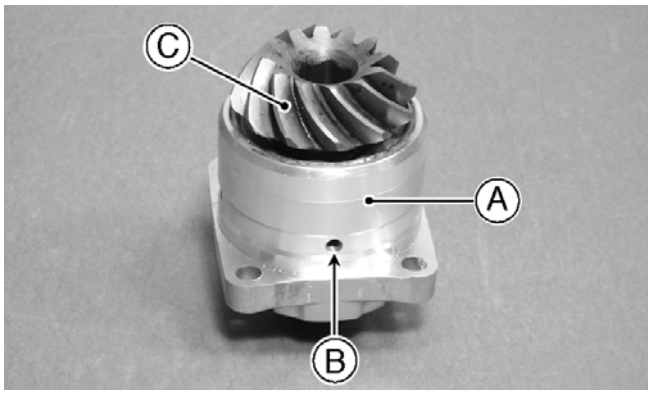


ATV2077

DISASSEMBLING OUTPUT DRIVE BEVEL GEAR ASSEMBLY

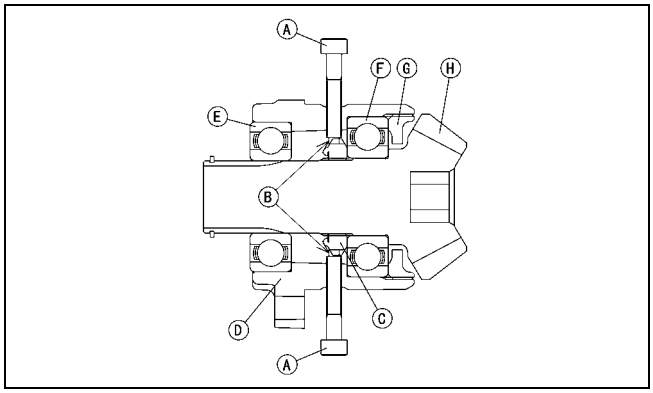
☞ AT THIS POINT
If no abnormal wear, chipping, or bearing roughness is found, proceed to Installing Output Drive/Driven Bevel Gears in this sub-section.

1. Look through the bolt hole (B) in the drive housing (A); then rotate the drive bevel gear (C) until a notch in the internal bearing retainer nut can be seen.



KX298

2. Install and tighten four nut-holding bolts (A) in the four threaded holes. See illustration for location of assembly components.



ATV2078

Key:

A. Nut-Holding Bolts

B. Nut Notches

C. Inner Bearing Holding Nut

D. Drive Bevel Gear Housing

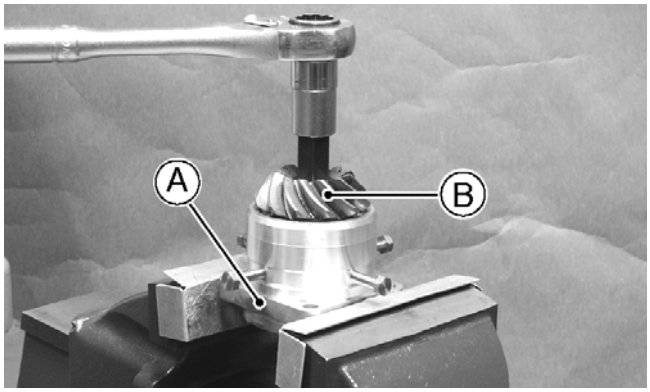
E. Outer Ball Bearing

F. Inner Ball Bearing

G. Bearing Holder

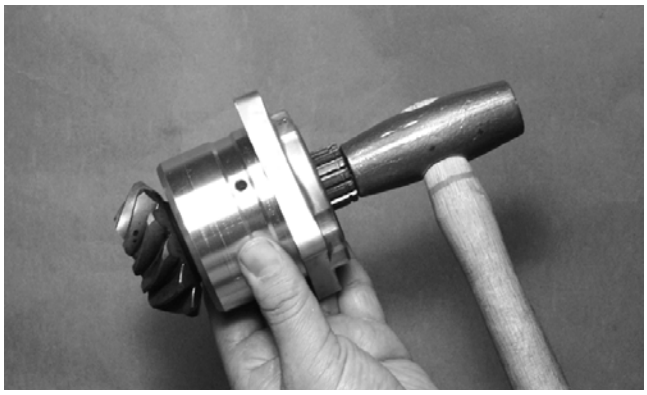
H. Drive Bevel Gear

3. Loosen the bevel gear (B) using an Allen wrench while holding the housing (A) in a vise; then continue to turn the bevel gear (about 4-5 turns) until the internal nut is free of the holder bolts.



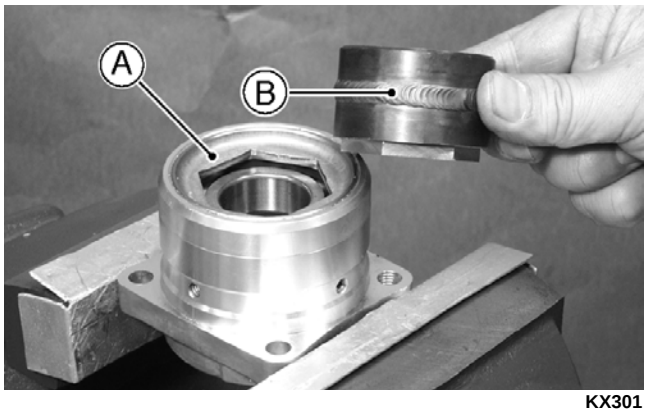
KX299

4. Loosen the holder bolts, removing one; then using a brass or copper mallet, drive the shaft out until the notches of the retainer nut can be seen (see step 1).


KX300

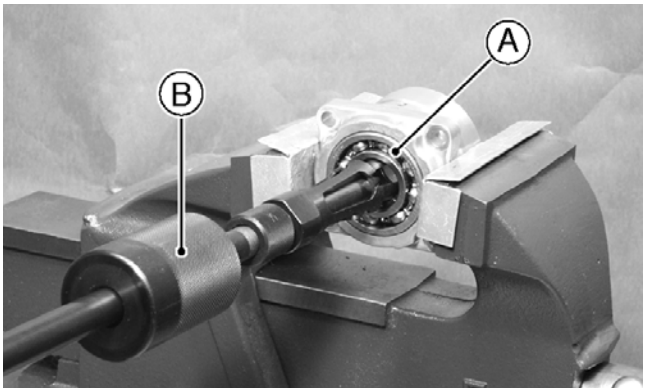
5. Retighten the holder bolts and repeat steps 1 and 3 until the bevel gear can be removed from the housing; then remove the four holding bolts.

6. Remove the bearing holder (A) using a special hex wrench (B). Apply heat to soften the Loctite.

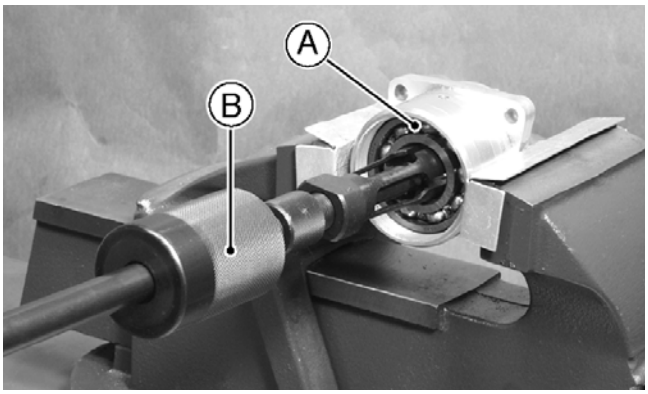


KX301

7. Remove the outer ball bearing (A) using a suitable seal and bearing remover (B); then remove the bevel gear retainer nut and the inner ball bearing.



KX302



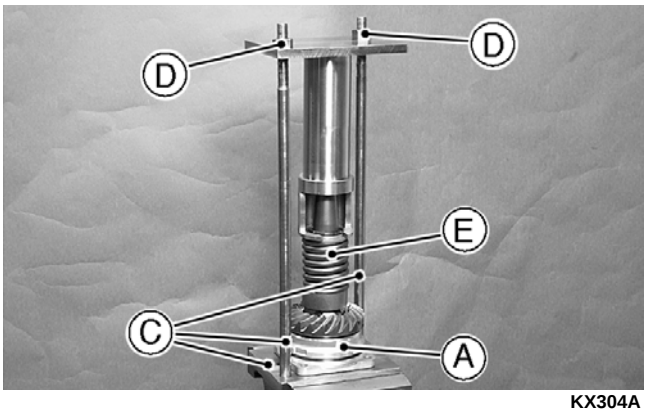
KX303

DISASSEMBLING OUTPUT DRIVEN BEVEL GEAR ASSEMBLY

☞ AT THIS POINT

If no abnormal chipping or bearing roughness is found, proceed to Installing Output Drive/Driven Bevel Gears in this sub-section.

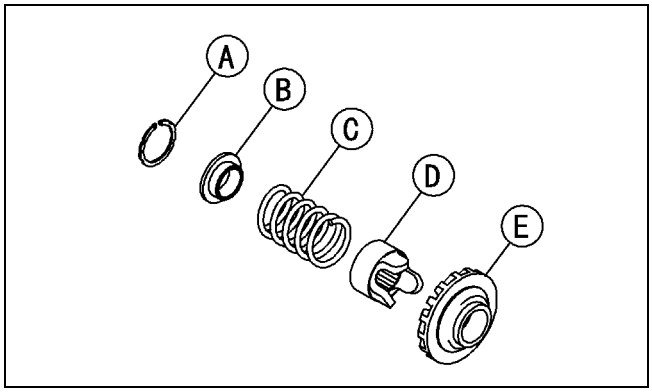
1. Secure the driven bevel gear assembly holding tool (C) in a vise; then set the housing assembly (A) on the holder, tighten nuts (D), and compress the damping spring (E).



KX304A

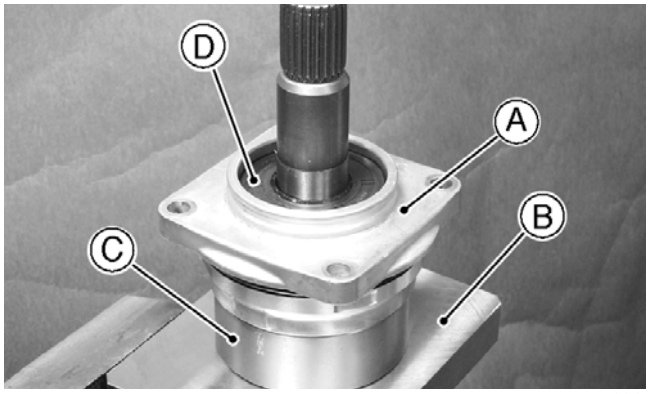
2. Remove the circlip (A); then loosen and remove the holder nuts and spring compressor.

3. Remove the spring holder (B), spring (C), cam damper (D), and the driven bevel gear (E).



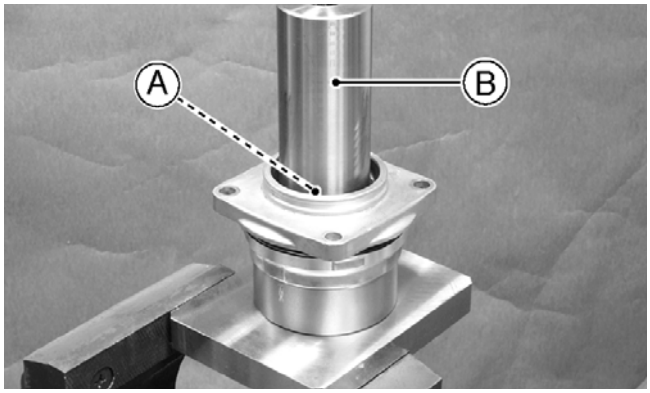
ATV2080

4. Hold the housing assembly (A) with the output shaft holder (B) and spacer (C) in a vise; then remove the oil seal (D).



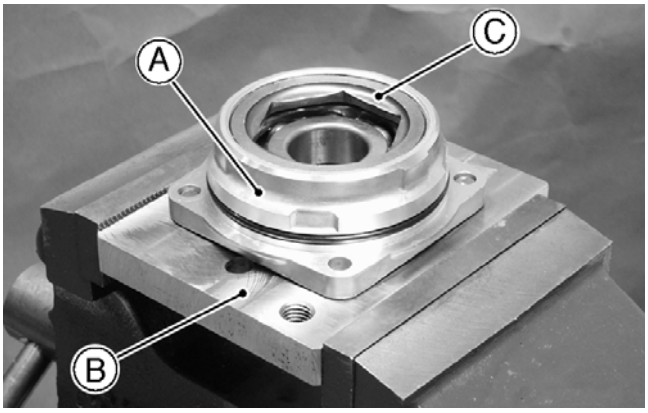
KX306

5. Using a special deep socket (B), remove the output shaft retainer nut (A).

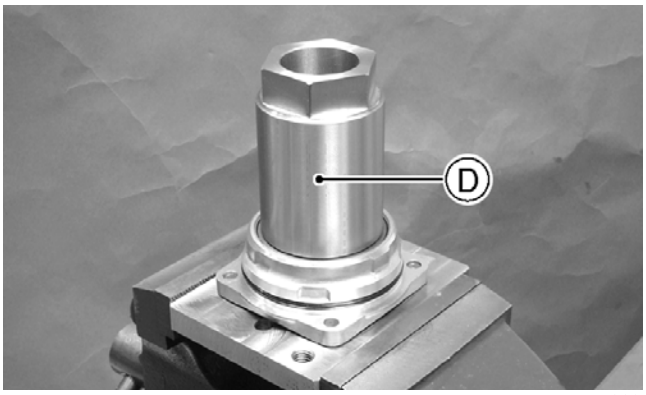


KX307

6. With the housing assembly (A) secured on the holder (B), apply heat to the bearing retainer (C); then use the special hex wrench (D) to remove the bearing retainer. Remove the ball bearing from the housing.



KX308



KX309

Assembling Crankcase Half

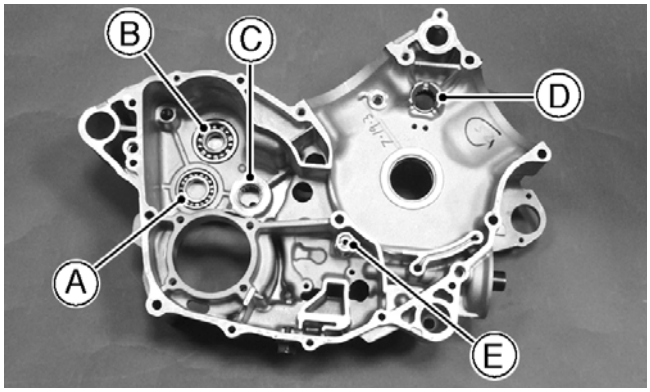
■NOTE: Be sure to clean all parts thoroughly before assembly. Use compressed air to ensure that all oil passages are clear of blockage.

⚠ CAUTION

The crankcase halves are machined together; therefore, they are a matched pair. Using unmatched crankcase halves will result in severe engine damage.

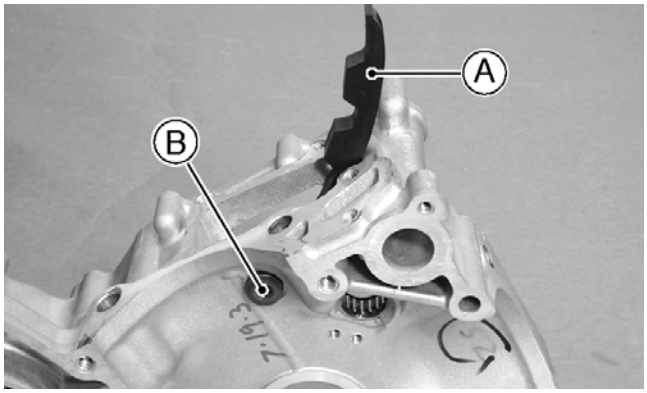
1. Using a press, install ball bearings (A) and (B) into the crankcase making sure that the seal on bearing (B) is directed toward the crankcase; then press in needle bearings (C) and (D) until flush with bore (insert bearing (D) from the outside).

2. Install the oil pressure relief valve (E); then coat all bearings with clean engine oil.



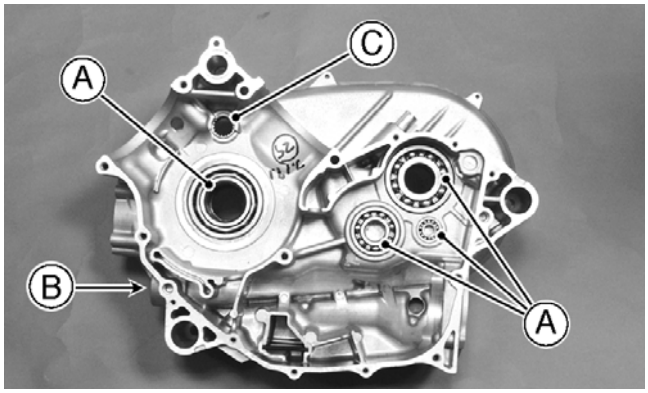
KX310

3. Install the rear cylinder camshaft chain guide (A) and tighten bolt (B) to 2.0 kg-m (14.5 ft-lb).



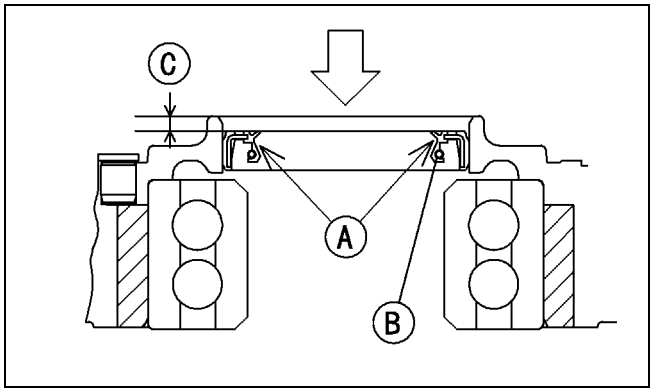
KX311

4. Press ball bearings (A) into the case until they bottom out; then press in needle bearings (B) and (C) until flush with bore (insert bearing (B) from the outside). Coat all bearings with clean engine oil.



KX312

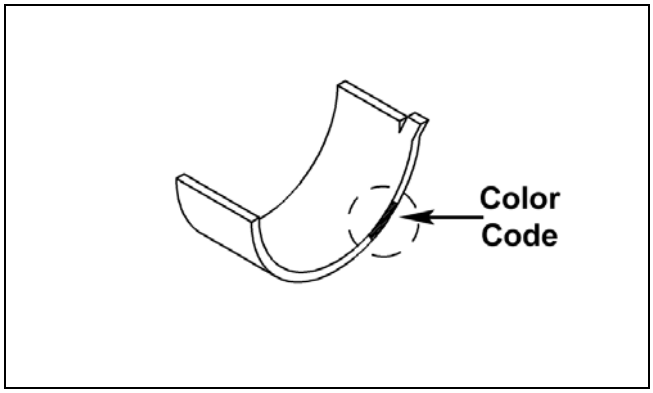
5. Apply grease to the lip (A) of the crankshaft oil seal (B); then press the seal in so that it sits 3 mm (0.12 in.) inward (C) from the end of the housing.



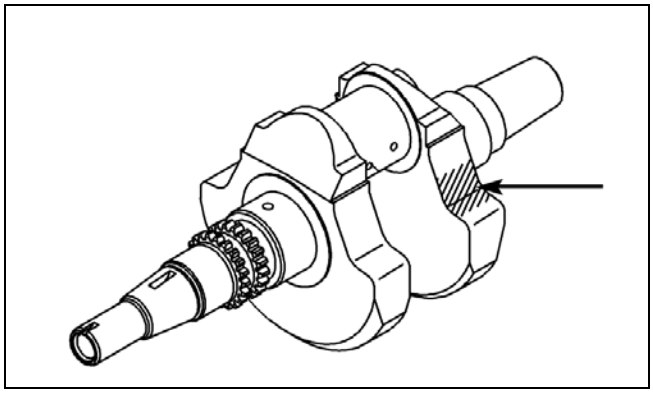
ATV2081

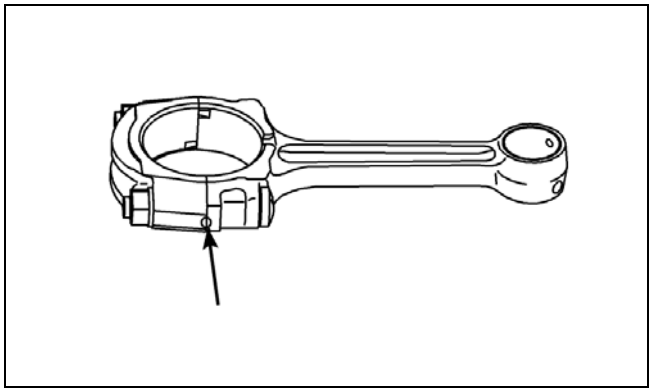
6. Select connecting rod big end inserts using the following chart and the markings on the crankshaft and connecting rod.

Big End Bearing Insert Selection		
Con-Rod Big End Bore Diameter Marking	Crank Pin Diameter Mark	Bearing Insert Size Color
None	○	Brown
None	None	Yellow
○	○	
○	None	Green



ATV2082A


ATV2073A

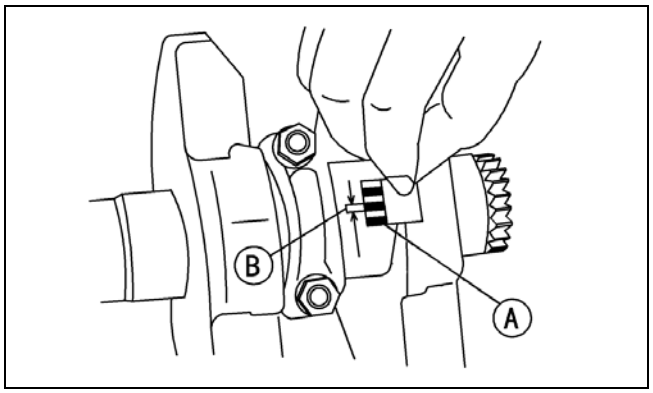


ATV2074A

7. Install the inserts into the connecting rods and caps; then use plastigauge (A) to measure connecting rod/crankshaft clearance (B). Tighten the connecting rod nuts to 3.5 kg-m (25 ft-lb).

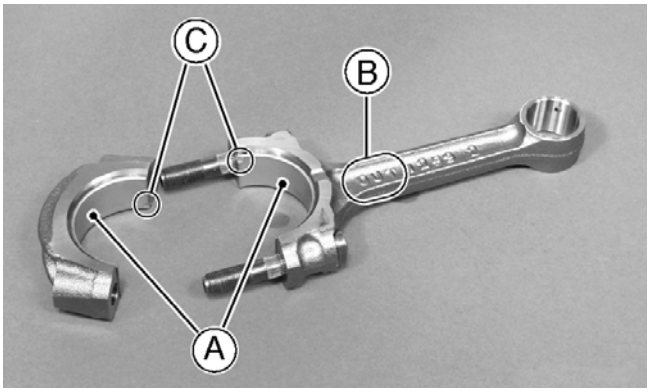
■ **NOTE: Do not move the connecting rod with plastigauge installed or the reading will be compromised.**

8. Remove the connecting rods and read the clearance with the gauge provided. The clearance must be 0.028-0.052 mm (0.0011-0.0020 in.) standard with a maximum service limit of 0.09 mm (0.0035 in.).



ATV2072A

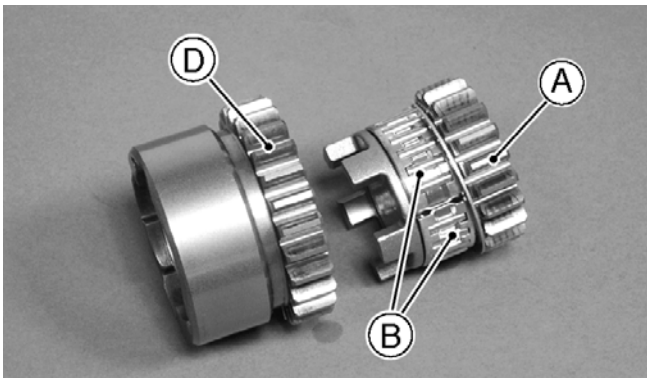
9. Clean off all traces of plastigauge from the crankshaft and inserts; then assemble on the crankshaft using clean, molybdenum disulfide oil on the inserts (A). Make sure that the "OUT" marks (B) on both connecting rods are directed towards the outside of the crankshaft and the grooves (C) of the cap and connecting rod are on the same side.



KX313

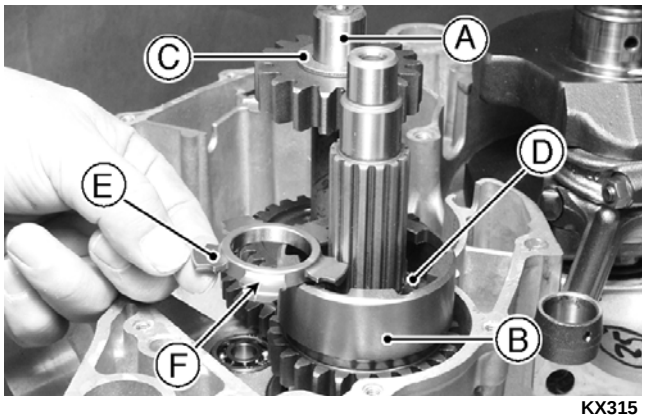
10. Install the crankshaft assembly in the right crankcase half.

11. Using a press, install the driven shaft in the crankcase until it is bottomed; then install the needle bearings (B) on the low gear (A) along with the high gear (D).



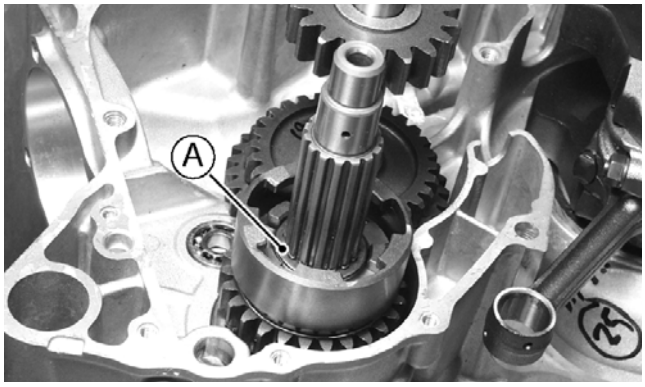
KX314A

12. Install the idler shaft (A) with gear assembly (B), spacer (C), and spacer (D); then install spacer (E) with the stepped side (F) directed outward.



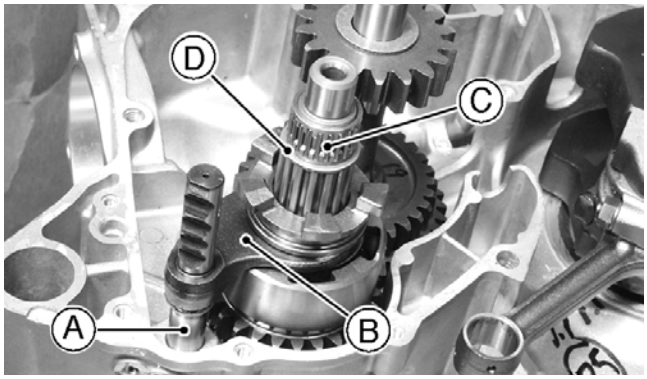
KX315

13. Install a spacer, toothed washer (A), and the circlip on the driven shaft.



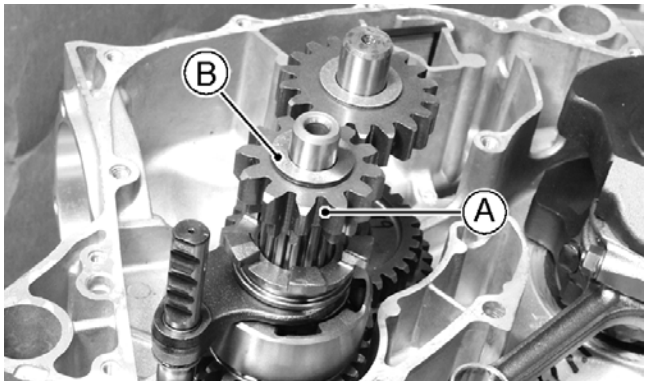
KX316

14. Apply clean engine oil to the shift rod (A), shift fork (B), and needle bearing (C); then install the shift rod with shifter, spacer (D), and needle bearing.

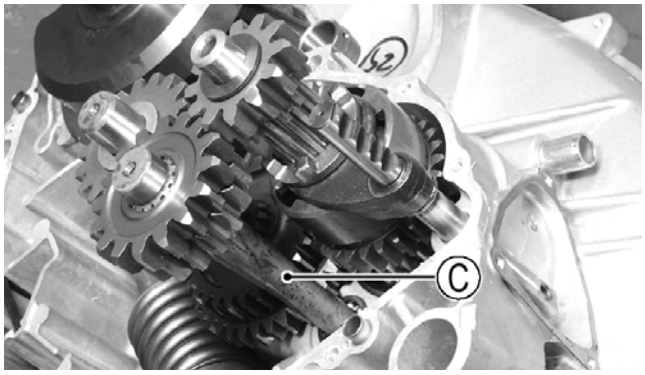


KX317

15. Install the reverse drive gear (A) and spacer (B); then install the reverse idler (C).

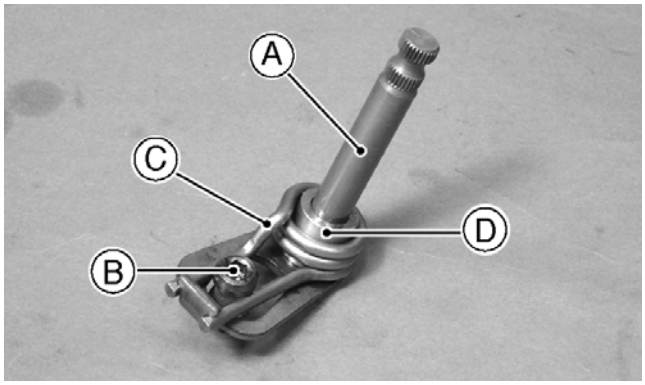


KX318



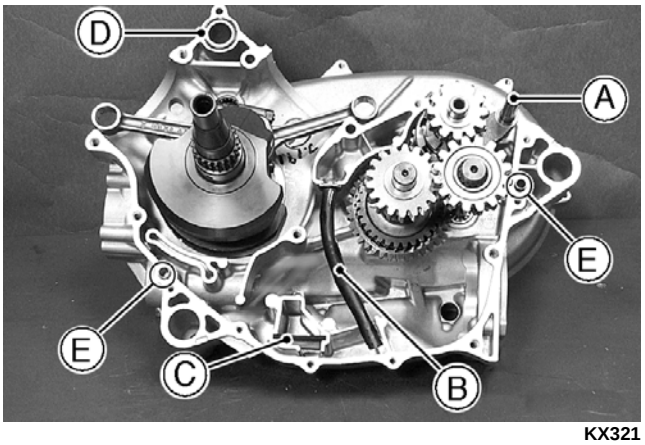
KX319A

16. Apply molybdenum disulfide oil to the shift shaft (A); then install the shift spring (C) and guide (D). Apply red Loctite #271 to the shift shaft spring bolt (B) and tighten to 2.5 kg-m (18 ft-lb).



KX320

17. Make sure that the crankshaft, transmission shafts and shift shaft (A), oil tube (B), oil screen (C), O-ring (D), and alignment pins (E) are in place in the right crankcase half; then apply clean engine oil to the moving parts and grease to all O-rings and seals.

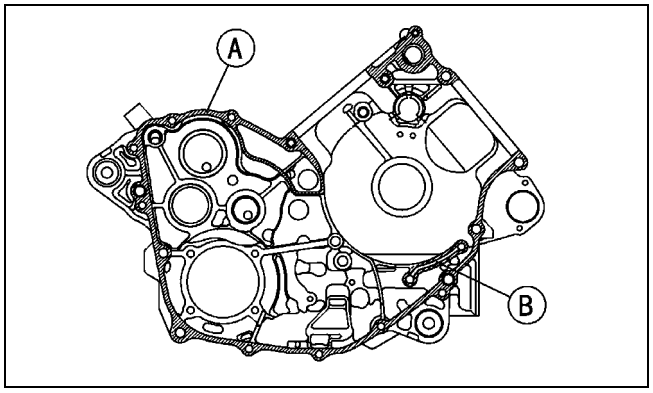


KX321

Joining Crankcase Halves

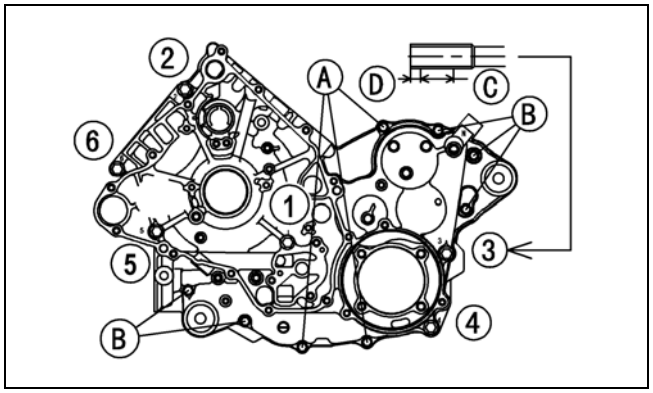
A. Breather Tube
B. Positioning Bolt
C. Drive Bevel Gear (Assembling)
D. Driven Bevel Gear (Assembling)
E. Drive/Driven Bevel Gears (Installing)
F. Backlash (Adjusting)
G. Tooth Contact (Adjusting)
H. Camshaft Drive Chains (Installing)
I. Intermediate Shaft

1. Apply Three Bond Sealant (p/n 0636-070) to the mating surface of the left crankcase half (A) being careful to keep sealant out of the oil passage (B); then join the crankcase halves.

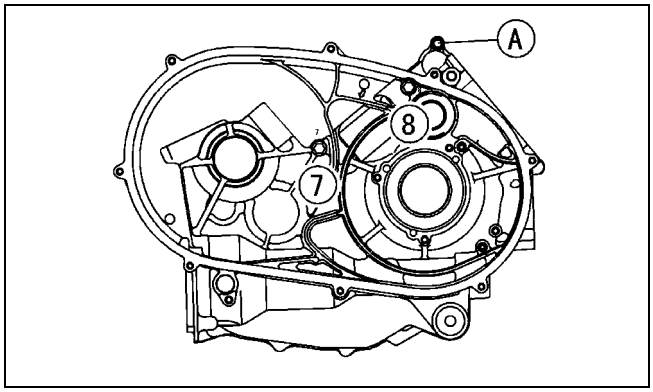


ATV2083

2. Apply blue Loctite #242 to the thread area (C), except tip (D) of left case cap screw (3); then install and tighten the 8 mm cap screws to 2.0 kg-m (14.5 ft-lb) following the tightening sequence 1-8. Tighten the 6 mm crankcase cap screws (A) and (B) to 1.0 kg-m (7 ft-lb).

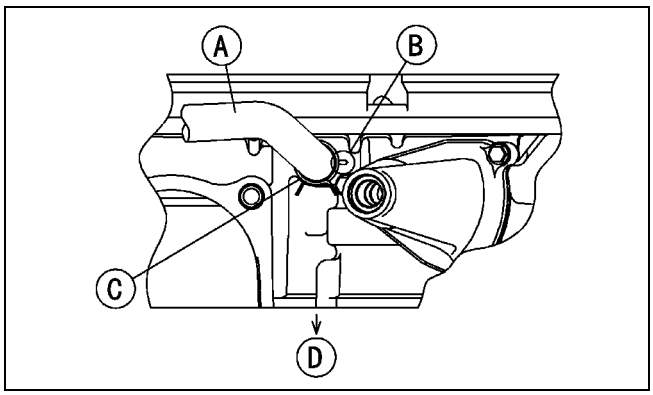


ATV2084A



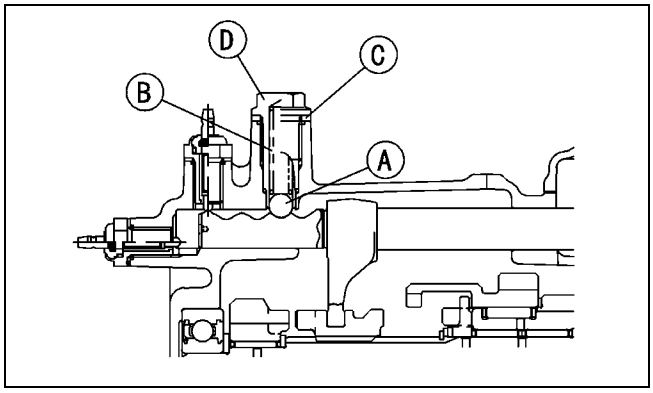
ATV2085

3. Install the breather tube (A) on the crankcase fitting aligning the white line on the tube with the mark (B) on the crankcase; then install the clamp (C) directing the open end toward the left side (D) of the crankcase.



ATV2086

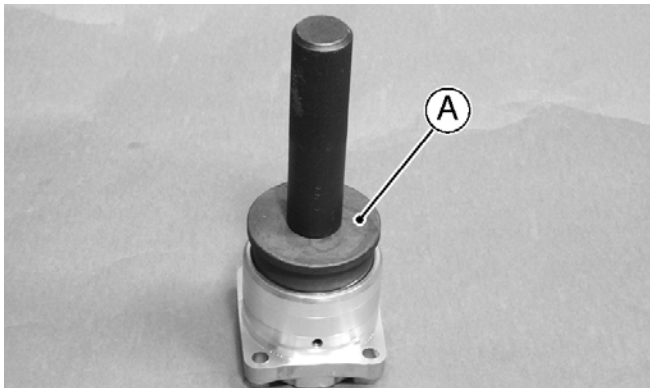
4. Apply grease to the steel ball (A) and spring (B); then install the steel ball, spring, washer (C), and shift shaft positioning bolt (D). Tighten the shift shaft positioning bolt to 2.5 kg-m (18 ft-lb).



ATV2087

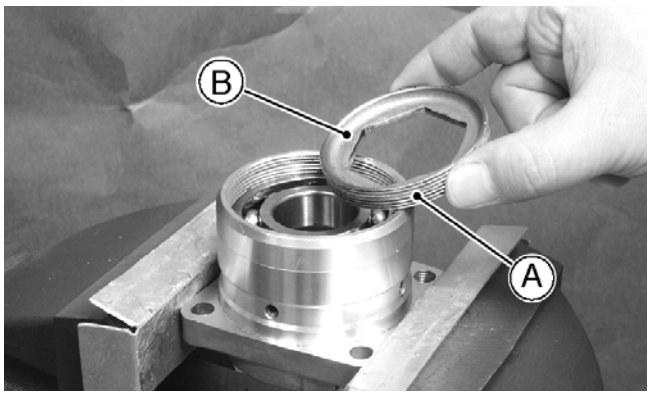
5. Check that the crankshaft and driven shaft turn freely. If any of the shafts don't turn freely, separate the crankcase halves to locate the problem.

6. Using the bearing driver (A), drive the bearing into the housing until it bottoms out.



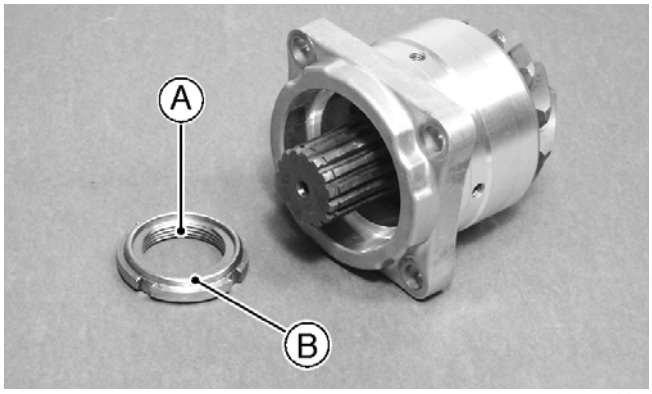
KX322

7. Place the bearing housing into the holding fixture; then apply blue Loctite #242 on the threads of the bearing retainer (A). Install with the dished side (B) directed away from the bearing and tighten to 12 kg-m (87 ft-lb).



KX323

8. Press the drive bevel gear in until it bottoms; then apply blue Loctite #242 to the threads (A) of the bevel gear retainer nut and with the raised side (B) directed away from the bearing, tighten to 16 kg-m (116 ft-lb).



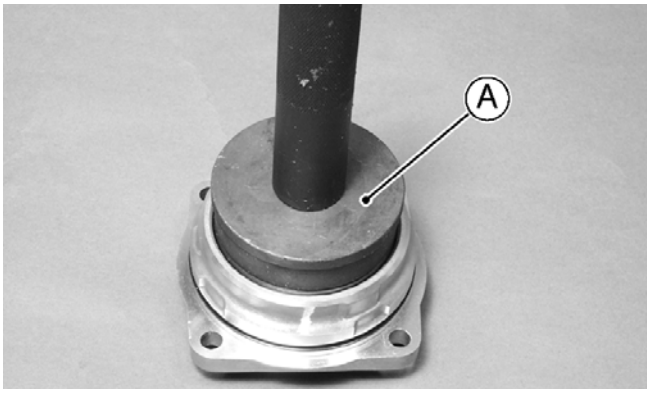
KX324

9. Press the outer ball bearing in until it is bottomed out.



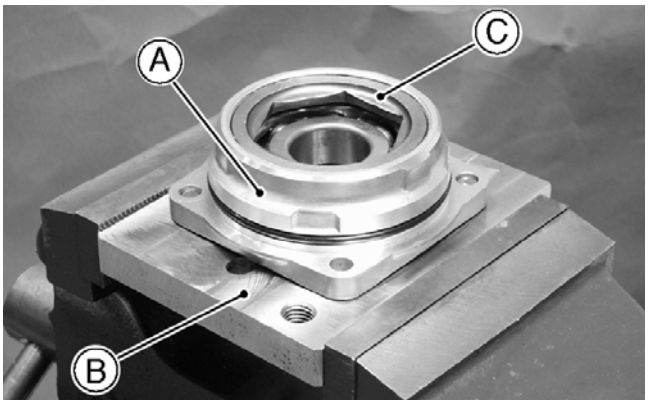
KX325A

10. Using the bearing driver (A), drive the bearing into the housing until it bottoms out.



KX326

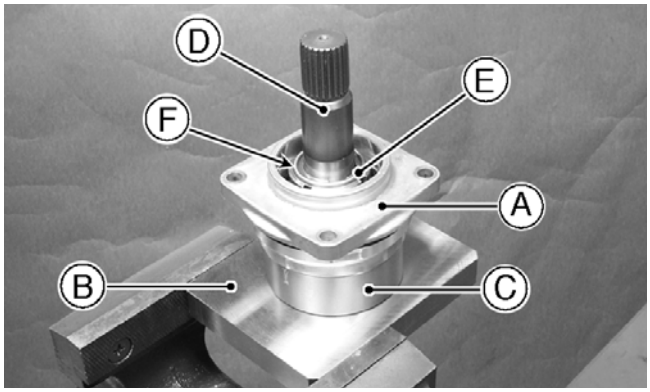
11. Place the bearing housing (A) into the holding fixture (B); then apply blue Loctite #242 to the threads of the bearing retainer (C). Install the bearing retainer and tighten to 14 kg-m (101 ft-lb).



KX327

12. Secure the output shaft holding fixture (B) and spacer (C) in a vise; then hold the housing assembly (A) and install the output shaft (D) in the housing.

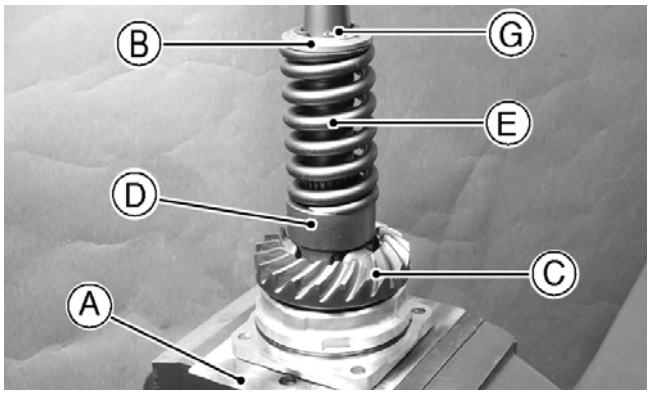
13. Apply blue Loctite #242 to the threads of the output shaft retainer nut (E) and with the protruding side (F) directed away from the bearing, tighten to 16 kg-m (116 ft-lb).



KX328

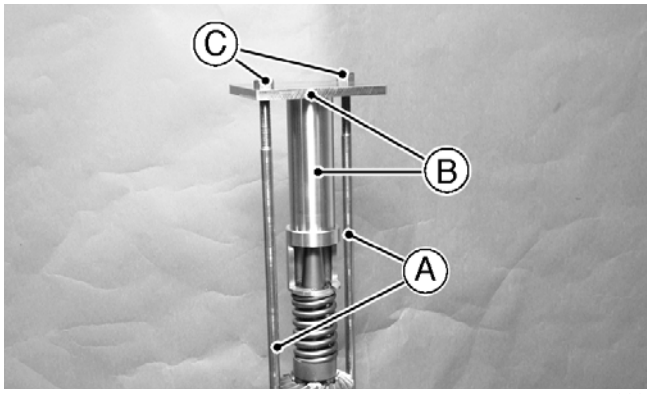
14. Apply grease to the output drive oil seal; then install in the housing being careful not to damage the lip of the seal or distort the seal.

15. Secure the holding fixture (A) in a vise; then install the driven bevel gear (C), cam damper (D), spring (E), spring holder (B), and circlip (G).

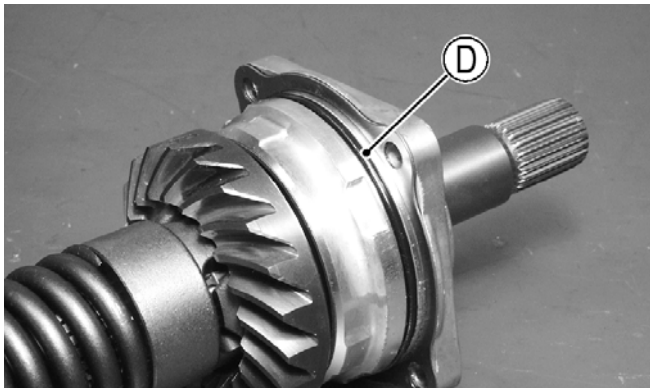


KX329A

16. Install the guide bars (A), spring compressor (B), and nuts (C); then tighten the nuts (C) until the circlip (D) can be installed. After seating the circlip, remove the nuts (C), compressor (B), and guide rods (A). Apply grease to the O-ring seal on the housing.

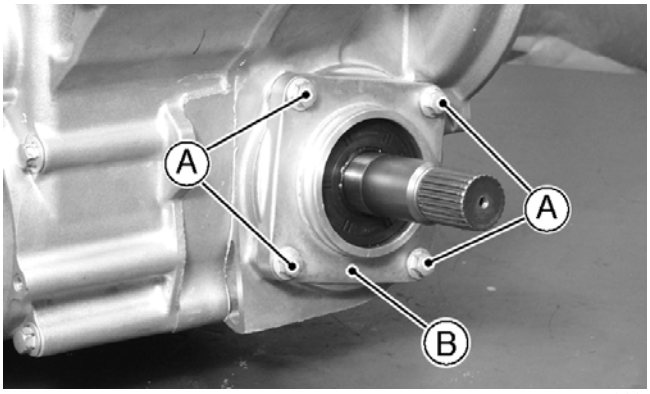


KX330



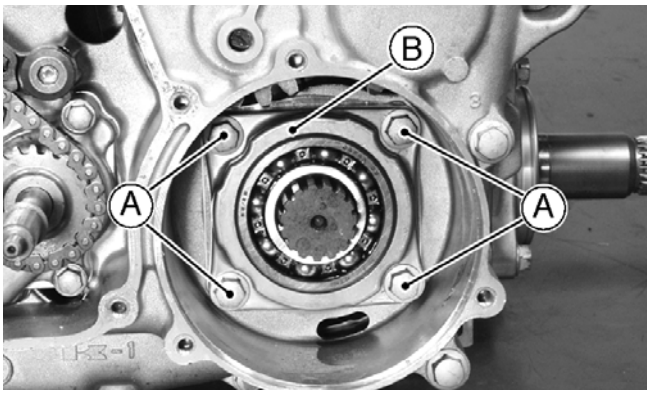
KX331A

17. Install the driven gear assembly (B) in the crankcase; then tighten the four cap screws (A) to 2.7 kg-m (19.5 ft-lb).



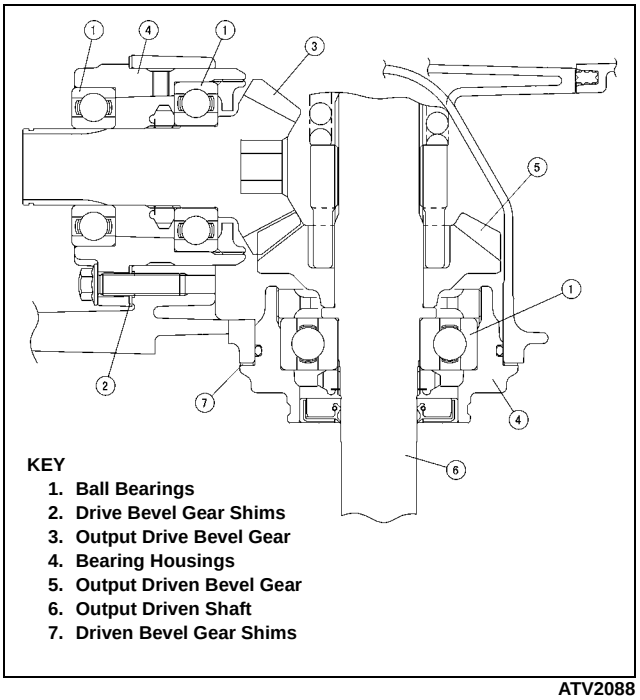
KX332

18. Install the drive bevel gear housing (B); then tighten the four cap screws (A) to 2.7 kg-m (19.5 ft-lb).

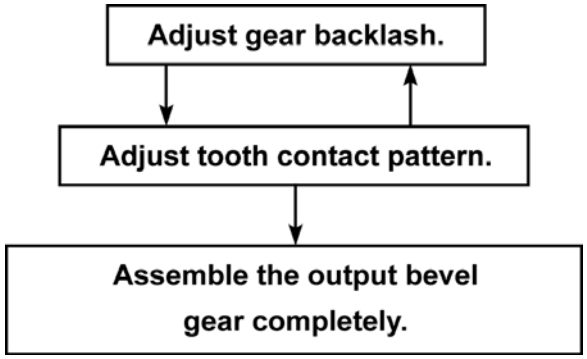


KX333

■ **NOTE: If any of the output bevel gear (backlash-related) parts have been replaced, the Adjusting Backlash and Adjusting Tooth Contact procedures must be followed.**

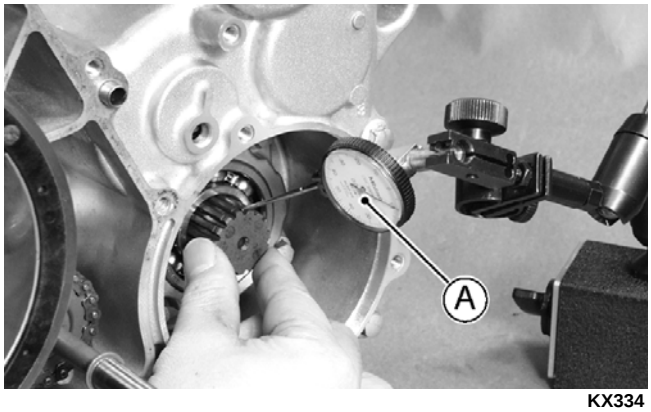


ATV2088



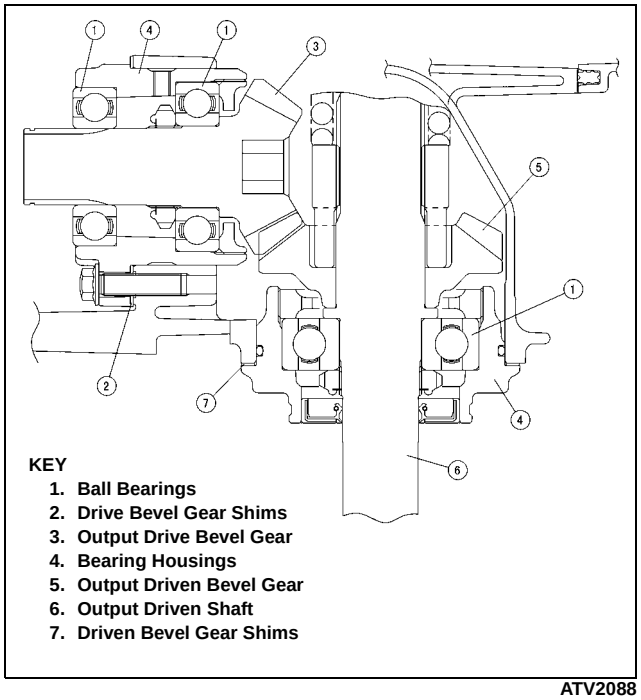
ATV2092

19. Set the dial indicator (A) against the output driveshaft spline groove; then rock the driveshaft slightly until gear lash (play) is taken out in one direction (do not let driven shaft turn). Zero the dial indicator and rock the shaft in the opposite direction until gear contact is made. The new reading is the backlash. It should be between 0.05-0.11 mm (0.0020-0.0043 in.).



KX334

■**NOTE: To decrease backlash, decrease the thickness of shims (7). To increase backlash, increase the thickness of shims (7). Make small changes at a time.**

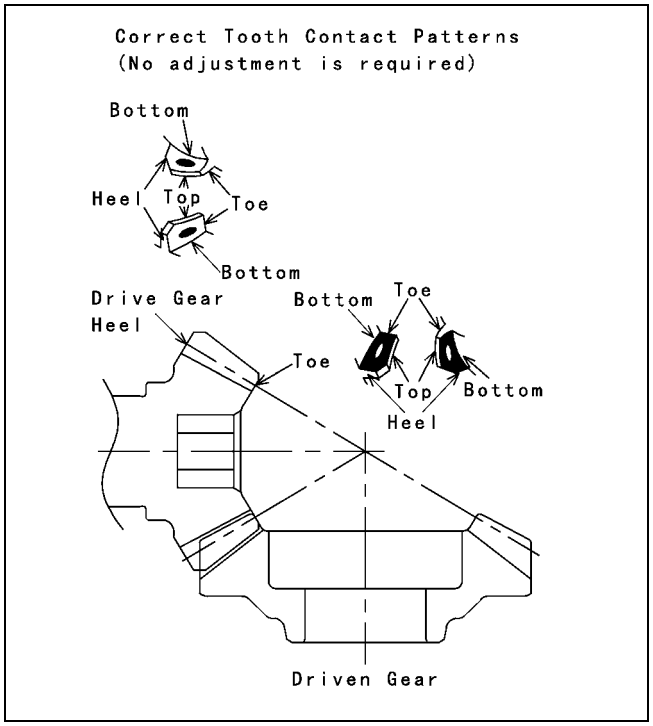


ATV2088

Driven Bevel Gear Shims for Backlash Adjustment
Thickness
0.15 mm (0.006 in.).
0.2 mm (0.008 in.).
0.5 mm (0.020 in.).
0.8 mm (0.031 in.).
1.0 mm (0.039 in.).
1.2 mm (0.047 in.).

20. Remove the drive bevel gear housing assembly; then clean all oil from the bevel gears. Apply a thin even coat of machinist layout dye on the bevel gears.

21. Rotate the driveshaft several revolutions in both directions while applying resistance to the drive gear. Note the drive and coast contact patterns on the bevel gears.

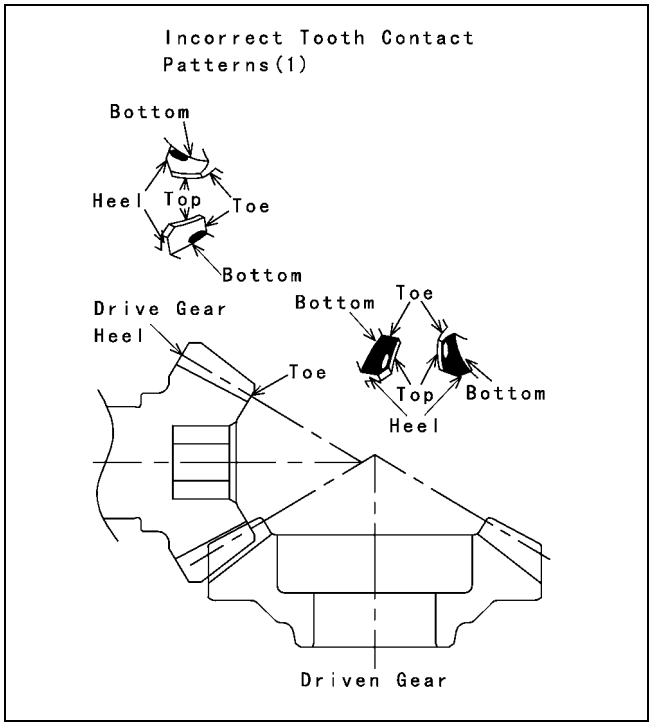


ATV2089

22. Increase or decrease shim thickness on the drive bevel gear housing until the correct contact pattern is obtained.

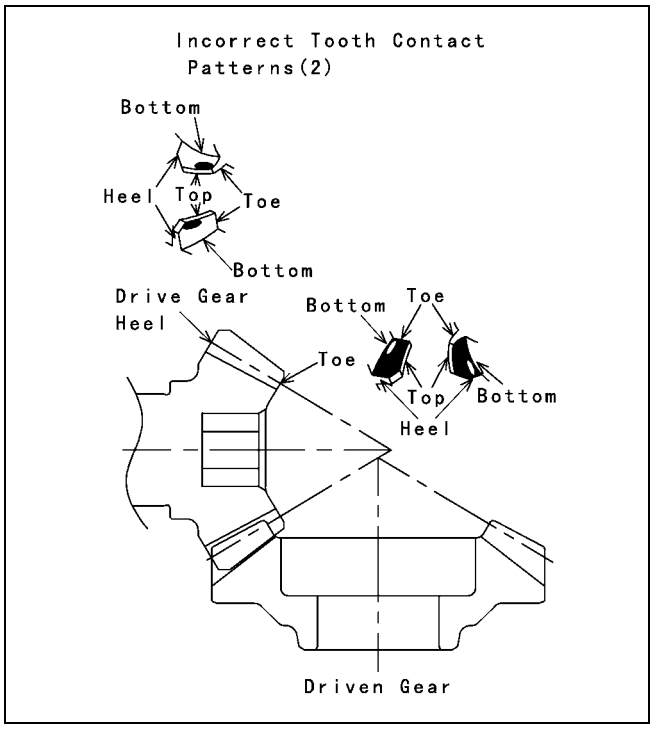
■ **NOTE: Always check gear backlash after changing any shims.**

■ **NOTE: The following illustration indicates that the drive gear is running too shallow in the set. Decrease drive housing shims and increase driven housing shims.**



ATV2090

■ **NOTE: The following illustration indicates that the drive gear is running too deep in the set. Increase drive housing shims and decrease driven housing shims.**

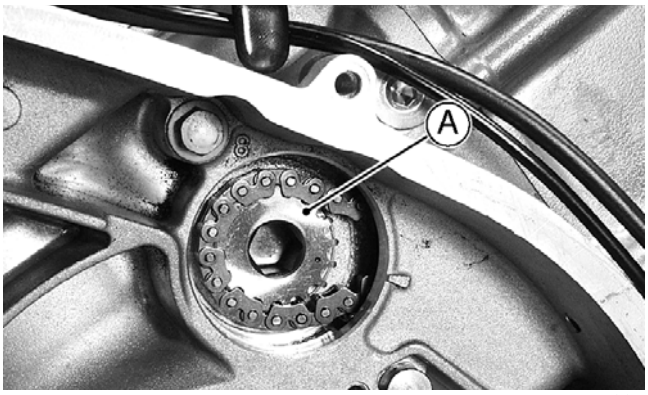


ATV2091

■ **NOTE: Changing driven housing shims will affect backlash more than contact pattern. Changing drive housing shims will affect contact pattern more than backlash. Always recheck backlash.**

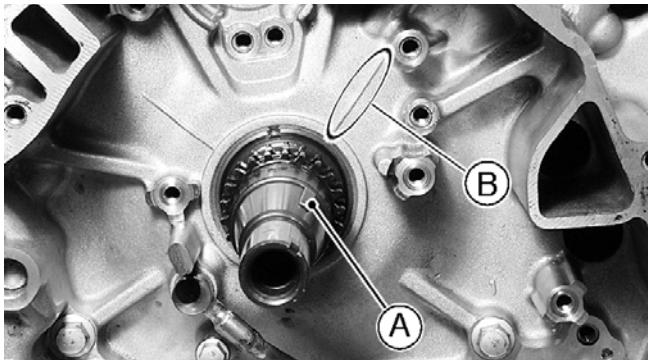
23. After backlash and contact patterns are within specifications, install the bevel gear assemblies in accordance with steps 1 and 2 of this sub-section.

24. From the right side, install the intermediate cam driveshaft (A) and front camshaft chain.



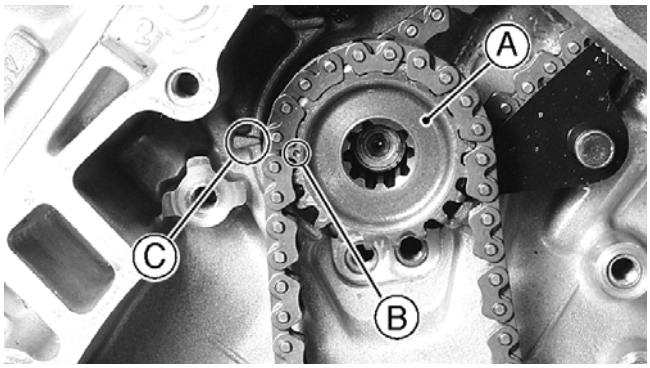
KX335

25. Align the keyway (A) with the index line (B) on the crankcase; then install the timing chain and engage the intermediate shaft sprocket.



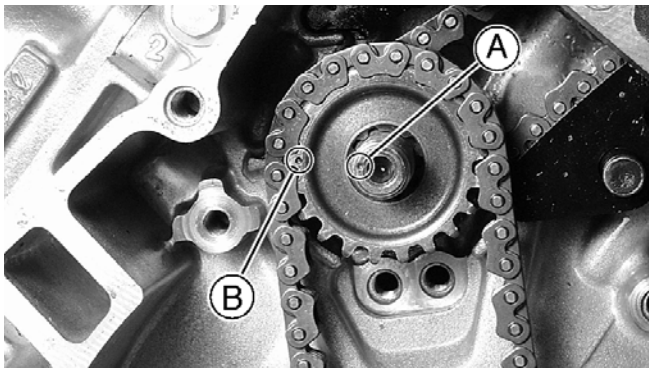
KX336

26. Align the punch mark (B) on the intermediate shaft sprocket (A) with the index mark (C) on the crankcase.



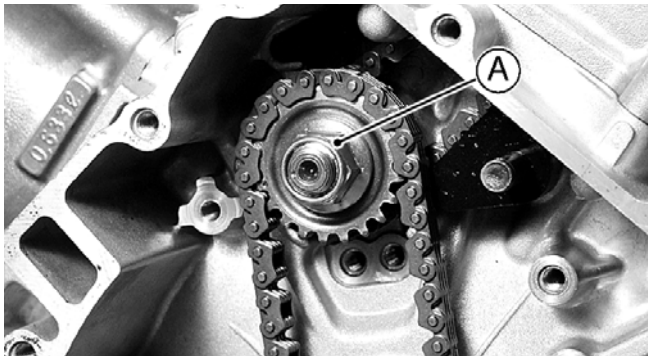
KX337

27. Engage the splines of the intermediate drive sprocket and shaft aligning the punch mark (A) on the shaft with the punch mark (B) on the sprocket.



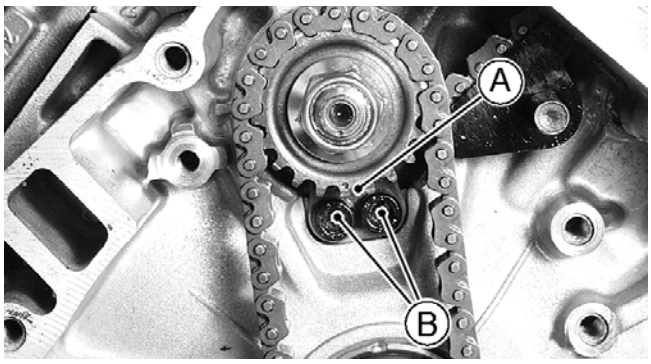
KX338

28. Install the nut (A); then hold the intermediate shaft from the right side with an Allen wrench and tighten to 4.5 kg-m (32.5 ft-lb).



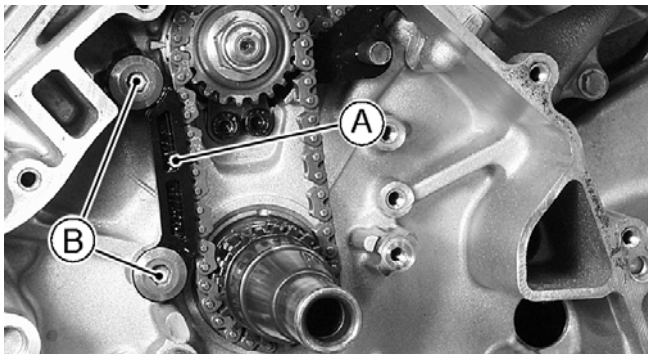
KX339

29. Install the position plate (A); then tighten cap screws (B) to 0.9 kg-m (78 in.-lb).



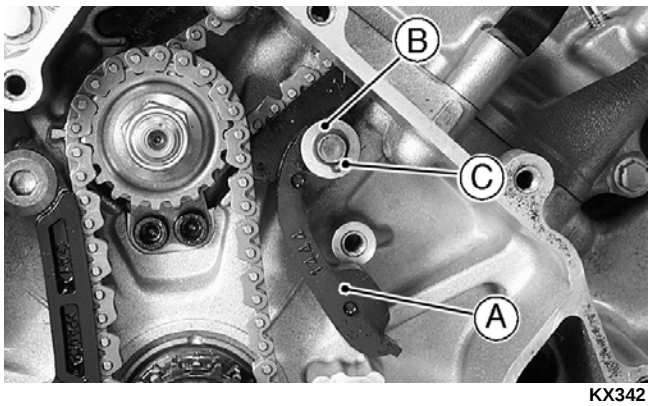
KX340

30. Install the front intermediate shaft chain guide (A); then tighten the mounting cap screws (B) to 0.9 kg-m (78 in.-lb).



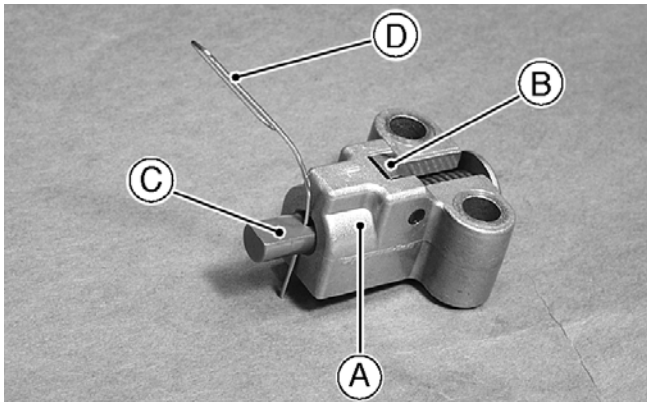
KX341

31. Place the rear intermediate chain guide (A) onto the pivot as shown; then secure with a flat washer (B) and circlip (C).



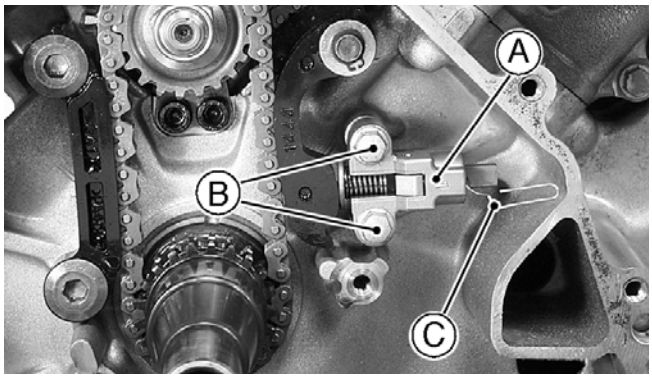
KX342

32. To prepare the intermediate shaft chain tensioner (A) for installation, release the stopper (B); then push the rod (C) into the housing and secure with a piece of wire (D).



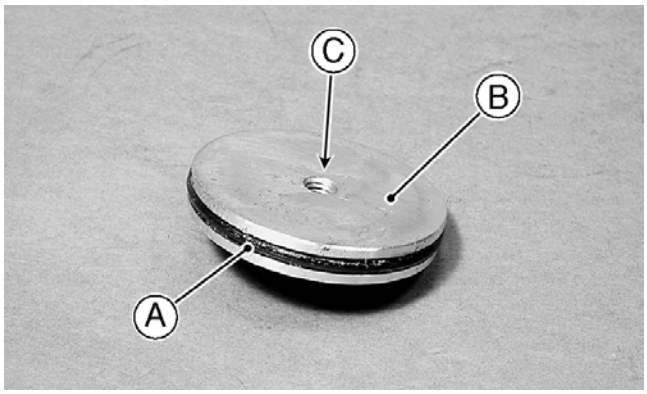
KX343

33. Secure the chain tensioner assembly (A) to the crankcase with cap screws (B); then tighten to 0.9 kg-m (78 in.-lb) and remove the wire (C).



KX344

34. Apply grease to the O-ring (A); then install the cover (B) into the right side of the crankcase with the tapped hole (C) directed outward.



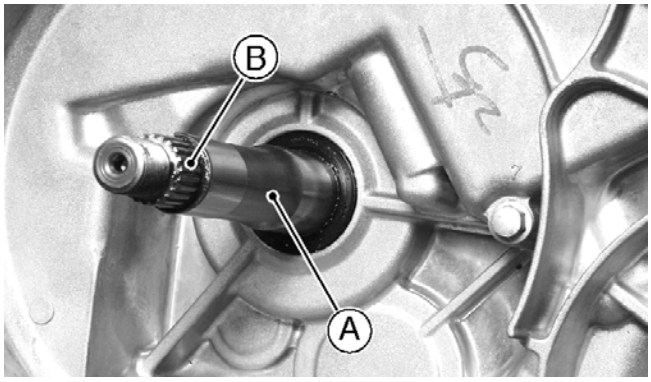
KX345

⚠ CAUTION

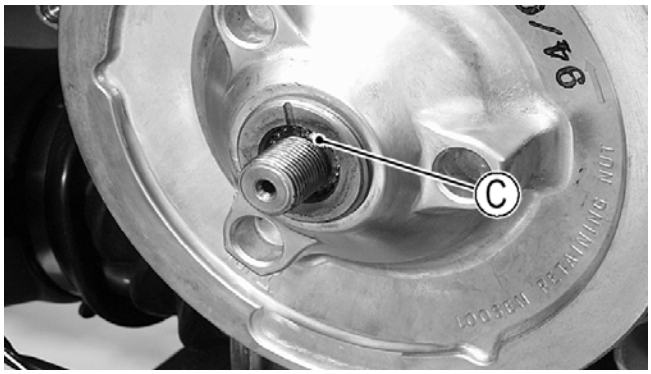
Make sure tension is kept on the front and rear cam chains whenever the crankshaft is rotated. Damage to the crankcase could occur.

Installing Right Side Components

1. Install the driven pulley on the transmission driven shaft (A) being careful not to jam the splines (B) with the splines in the pulley (C).

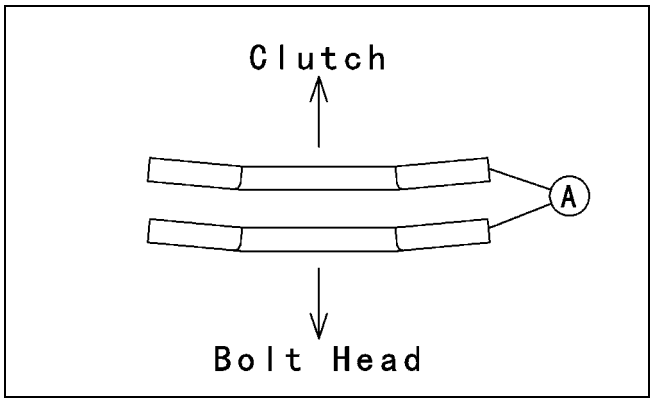


KX346

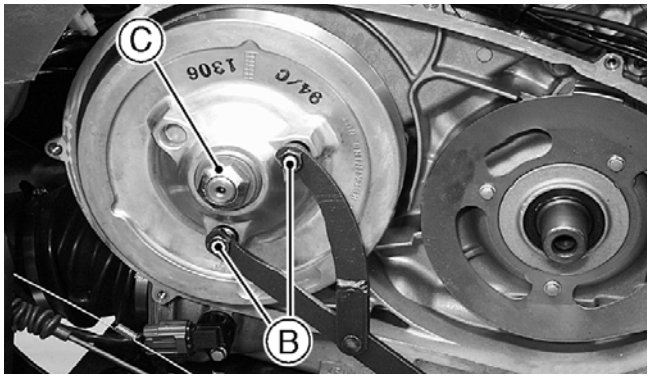


KX347A

2. Install the two bevel washers (A) with the concave side directed towards the driven pulley; then use the pulley holder (B) to hold the driven pulley and tighten the nut (C) to 9.5 kg-m (69 ft-lb).

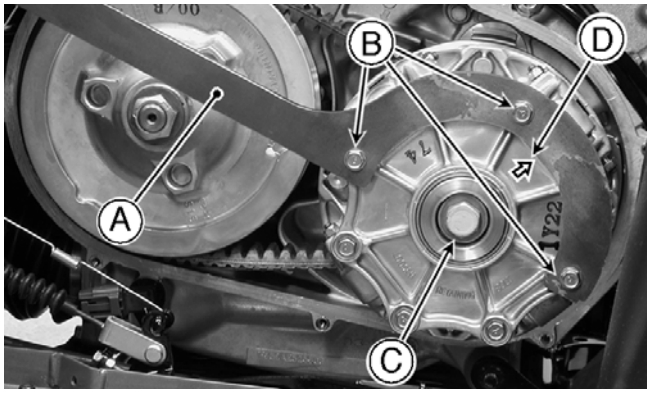


ATV2093



KX348A

3. Loop the belt over the driven pulley; then install the drive clutch with holding tool (A) with cap screws (B) referenced to the arrow (D) and tighten the cap screw (C) (left-hand threads) to 9.5 kg-m (69 ft-lb).



KX349

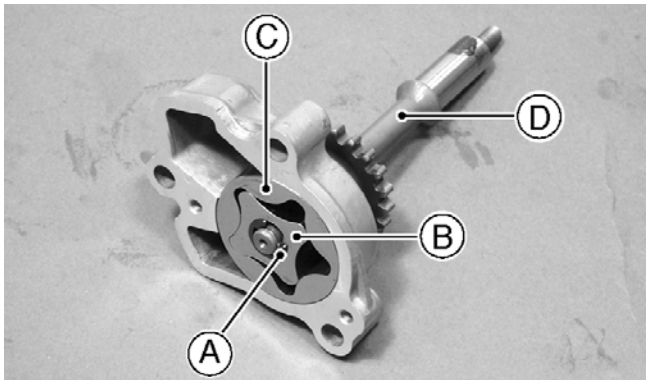
4. Check that drive belt deflection is within specifications (see Section 2).

☞ AT THIS POINT

The drive clutch holder can be left installed to hold the crankshaft for left-side component installation.

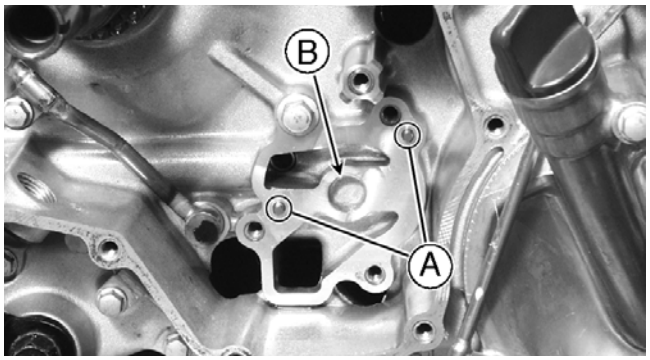
Installing Left-Side Components

1. Install a new circlip (A) securing the oil pump rotor (B) in rotor (C); then apply clean engine oil to the rotors and shaft (D).



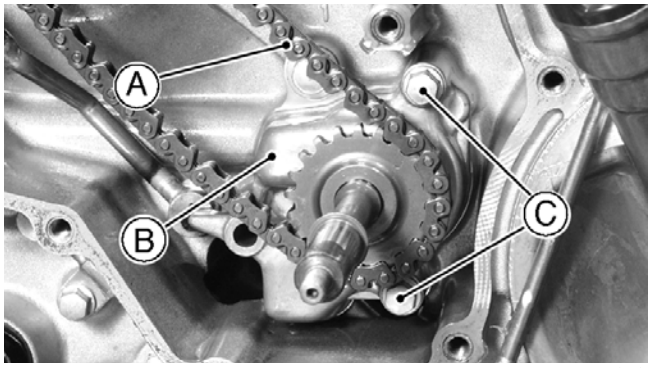
KX350A

2. Make sure that alignment pins (A) are in place and apply clean engine oil to oil port (B).



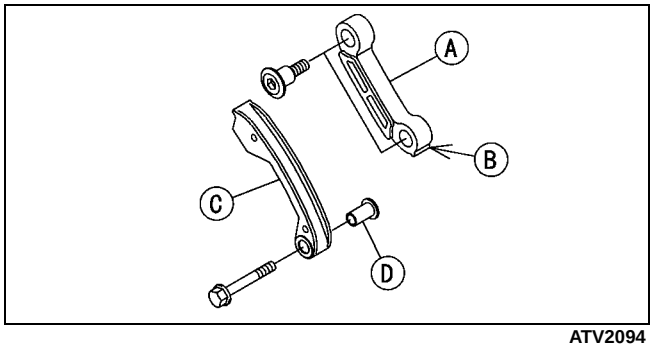
KX351

3. Install the oil pump drive chain (A) with the oil pump assembly (B); then tighten the cap screws (C) to 0.9 kg-m (78 in.-lb).



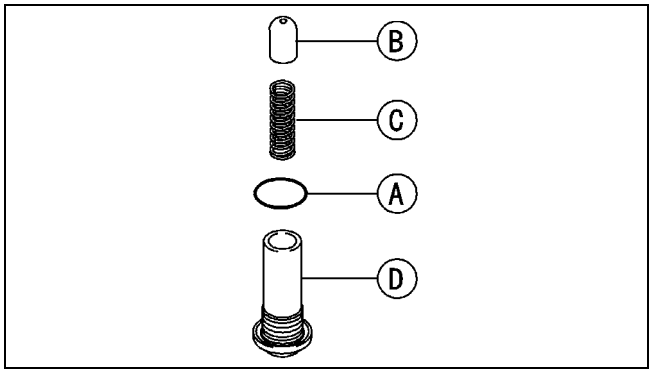
KX352

4. Install the upper chain guide (A) with the tab (B) directed downward; then install the lower chain guide (C) and collar (D). Tighten the chain guide attaching bolts to 0.9 kg-m (78 in.-lb).



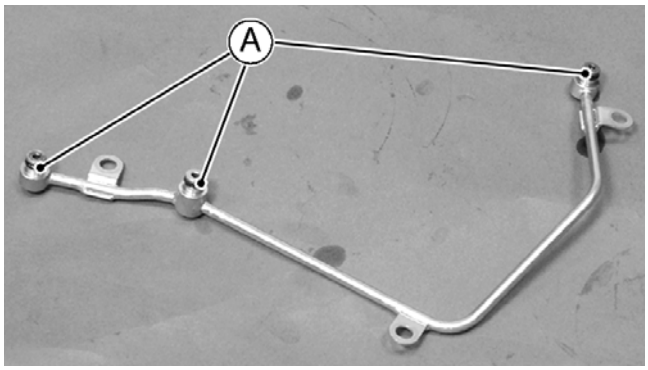
ATV2094

5. Apply grease to the O-ring (A); then install the pin (B), spring (C), and oil pump chain tensioner bolt (D) and tighten to 2.5 kg-m (18 ft-lb).



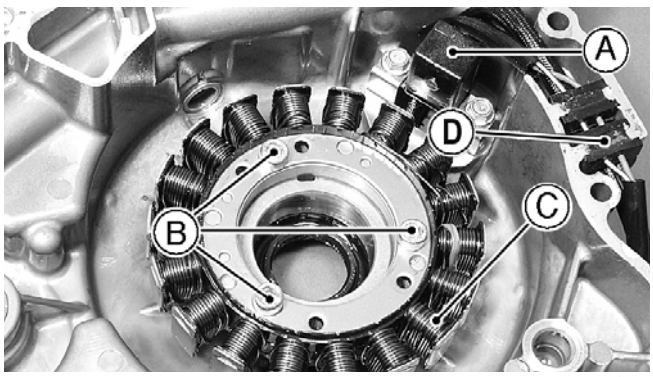
ATV2095

6. Install new O-rings (A) on the oil pipe fittings; then apply clean engine oil and install on the crankcase tightening the oil pipe cap screws to 0.9 kg-m (78 in.-lb).



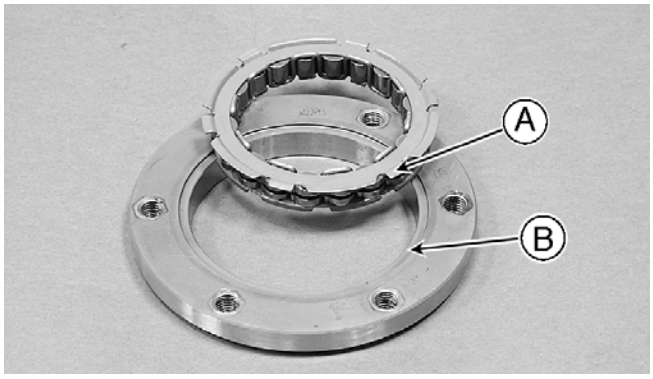
KX353

7. Install the pick-up coil (A) and stator (C) and tighten cap screws (B) to 1.3 kg-m (9.5 ft-lb); then install the lead grommets (D) in the alternator cover.



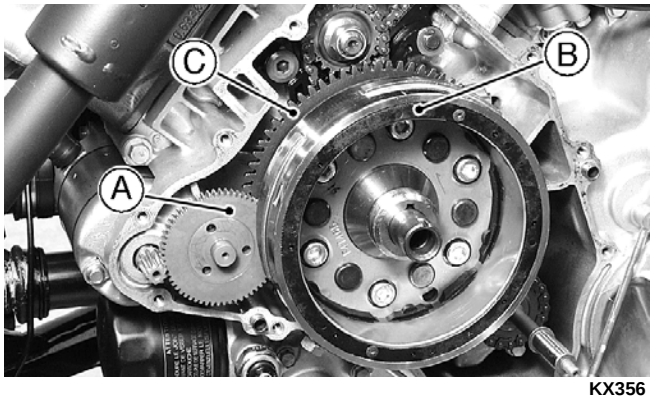
KX354

8. Install the one-way clutch so the flange (A) fits on the recess (B) of the race; then install on the rotor/flywheel and attach with the cap screws. Coat threads with blue Loctite #242 and tighten to 3.5 kg-m (25 ft-lb).



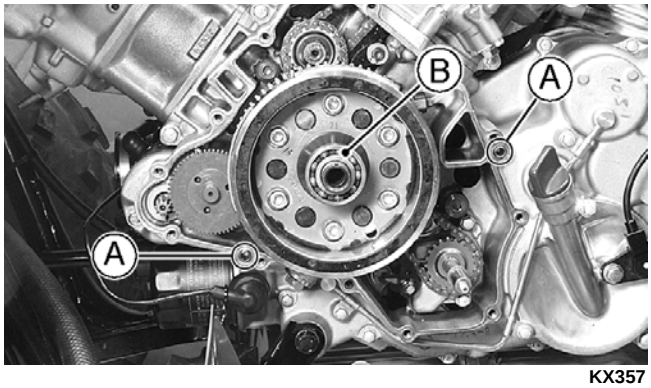
KX355

9. Install the starter clutch gear (C) and torque limiter (A); then wipe the crankshaft and rotor/flywheel mating surfaces clean and install the rotor/flywheel (B) while turning the starter clutch gear.



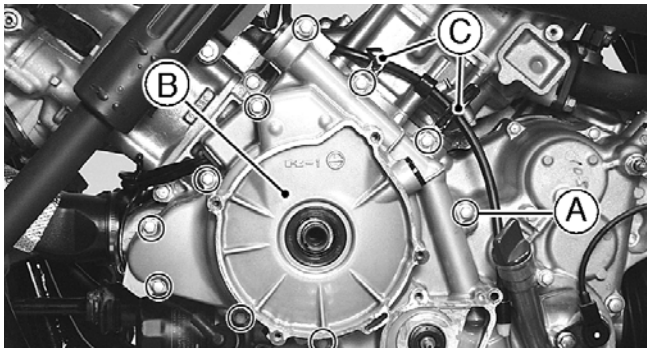
KX356

10. Ensure that the alignment pins (A) are installed; then install the bearing (B).



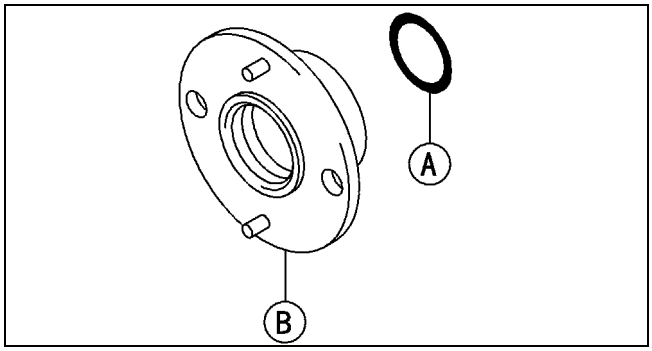
KX357

11. Apply grease to the alternator cover oil seal; then install the cover (B), cover cap screws (A), and clamps (C). Tighten the cap screws to 0.9 kg-m (78 in.-lb).



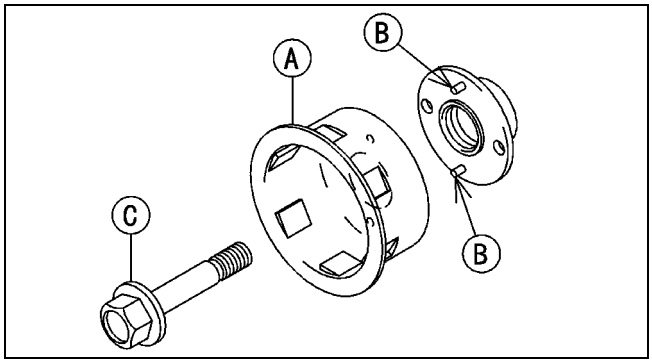
KX358

12. Install a new O-ring (A) in the collar (B); then apply grease to the O-ring and install the collar into the alternator cover.



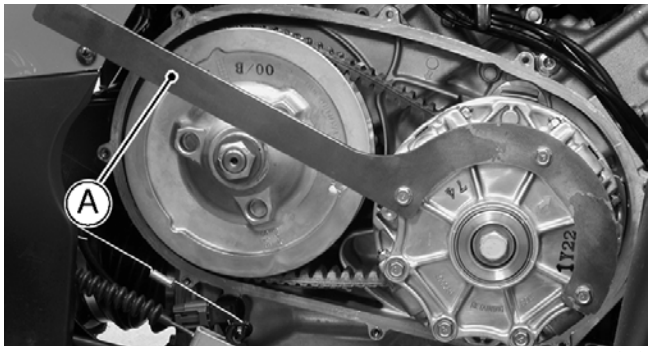
ATV2096

13. Align the holes in the starter cup (A) with the pins (B) in the collar; then hold the drive clutch with the holder and tighten the rotor/flywheel cap screw (C) to 13 kg-m (94 ft-lb).



ATV2097

14. Remove the clutch holding tool (A); then reinstall the three cap screws and tighten the drive clutch cover bolts using a crisscross pattern to 1.3 kg-m (9.5 ft-lb).



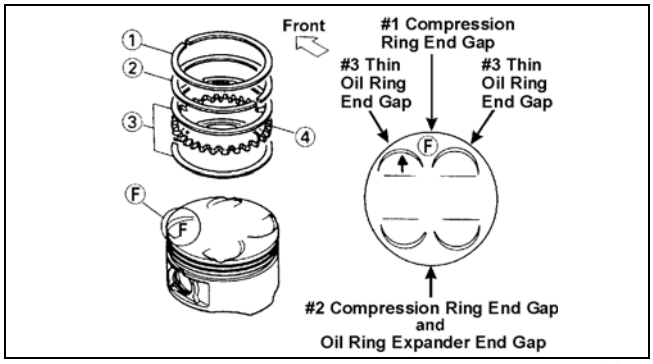
KX359

Installing Top-Side Components

A. Piston
B. Cylinder
C. Cylinder Heads
D. Camshafts

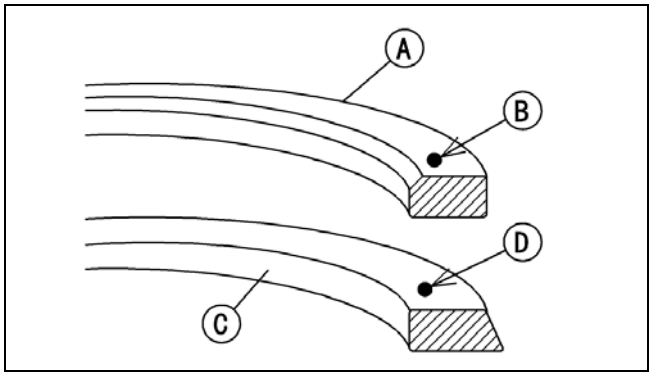
■NOTE: If the piston rings were removed, install them in this sequence.

A. Install ring expander (4) in the bottom groove of the piston; then install the thin oil rings (3) over the expander making sure the expander ends do not overlap. Stagger the end gaps of the upper and lower thin oil rings according to the illustration.



ATV-1085D

B. Install compression ring #2 (C) so the “RN” mark (D) is up; then install the top compression ring #1 (A) so the “R” mark (B) is up.



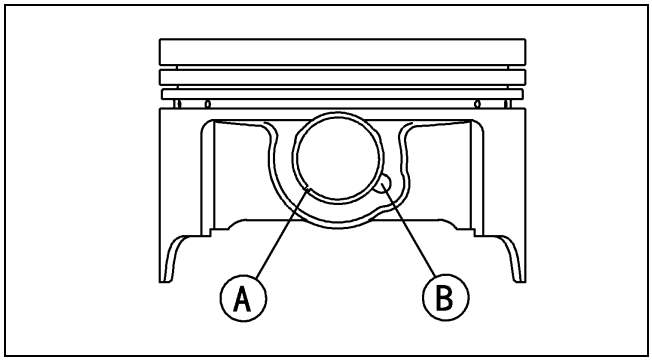
ATV2098

⚠ CAUTION

Incorrect installation of the piston rings will result in engine damage.

1. Install the pistons on the connecting rods making sure there is a circlip on each side and the open end of the circlip (A) does not align with the notch (B) in the piston.

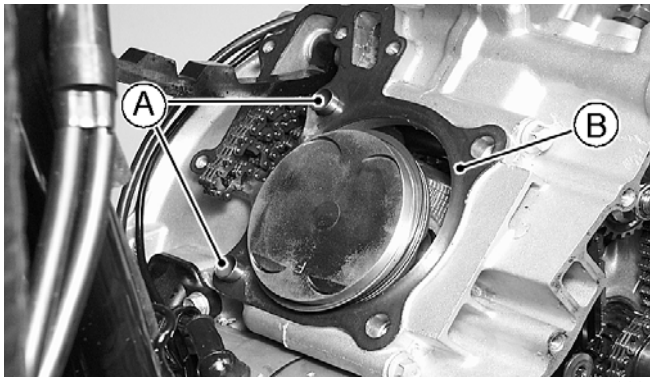
■ NOTE: The pistons should be installed so the F is directed toward both front and rear pistons.



ATV2099

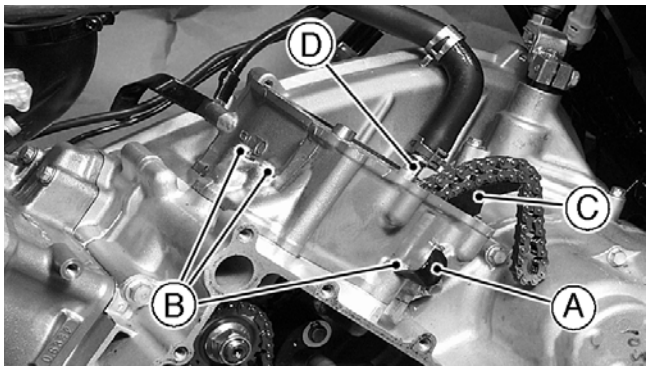
■ NOTE: When installing the circlips in the piston, compress them only enough to install. Do not over compress.

2. Install two alignment pins (A) for each cylinder; then position a new base gasket (B) as shown.



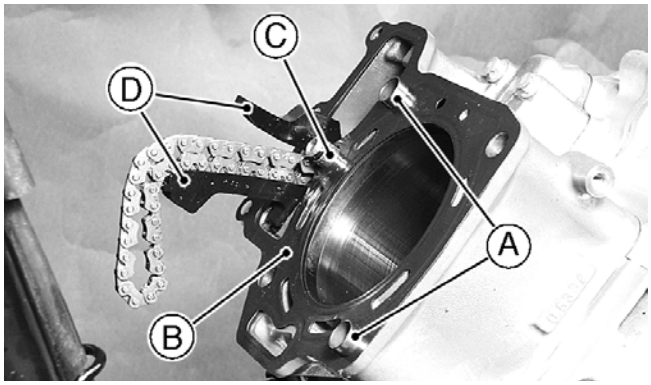
KX360

3. Apply clean engine oil to the piston skirts and cylinder walls; then install the cylinders and clamp (A) (rear only) and tighten the cylinder cap screws (B) to 1.0 kg-m (87 in.-lb). Install the cam chain guide (C) and the oil pipe (D).



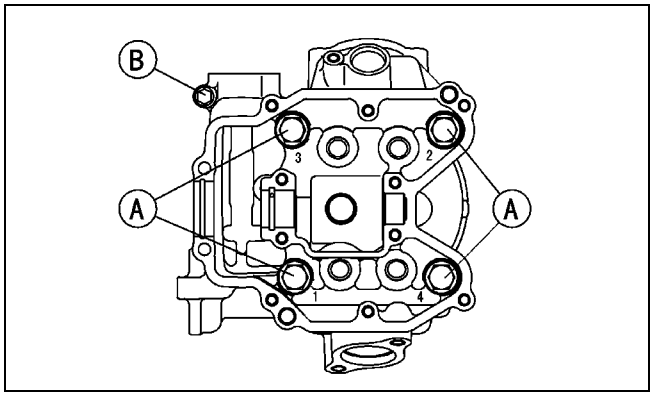
KX361

4. Locate alignment pins (A) as shown; then place a new head gasket (B) into position and install the oil pipe (C) and camshaft chain guides (D).



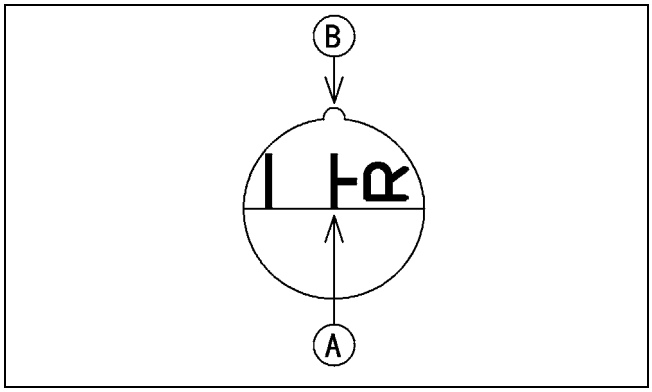
KX362

5. Install the cylinder heads and tighten cap screws (A) in the sequence illustrated to 2.5 kg-m (18 ft-lb); then in the same sequence, tighten to the final value of 5.0 kg-m (36 ft-lb). Tighten cap screw (B) to 1.0 kg-m (87 in.-lb).



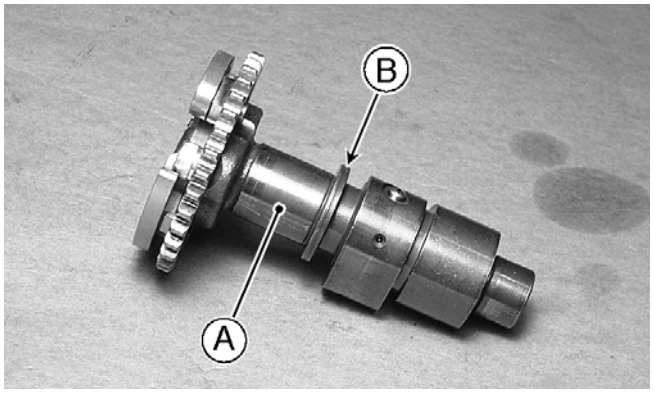
ATV2100

6. Using a wrench on the alternator bolt, turn the crankshaft clockwise to align the “TR” mark (A) with the notch (B) in the inspection window.



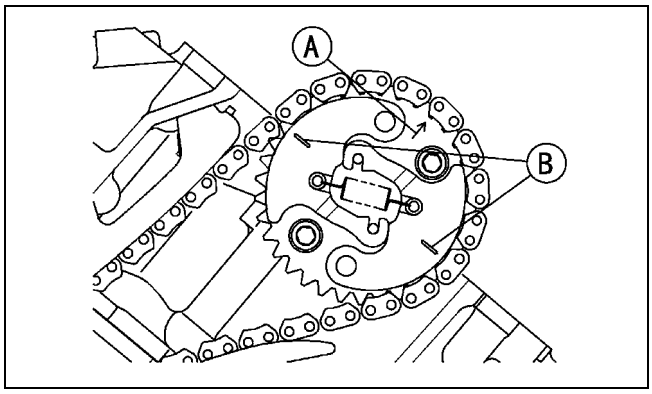
ATV2101

7. Install the rear camshaft (A) identified by the groove (B).



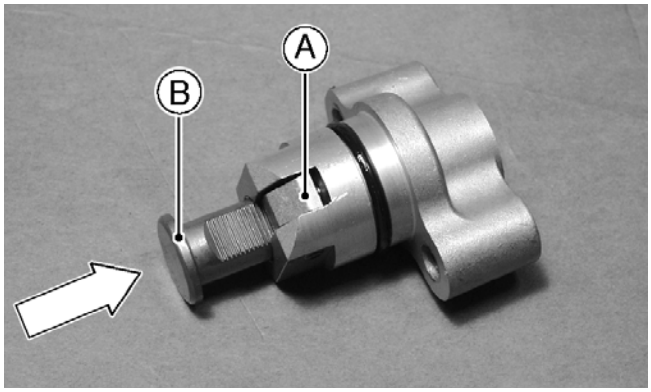
KX363

8. Direct the arrow (A) of the rear camshaft upward (left side view); then engage the rear camshaft sprocket with the chain aligning the index marks (B) with the cylinder head upper surface.



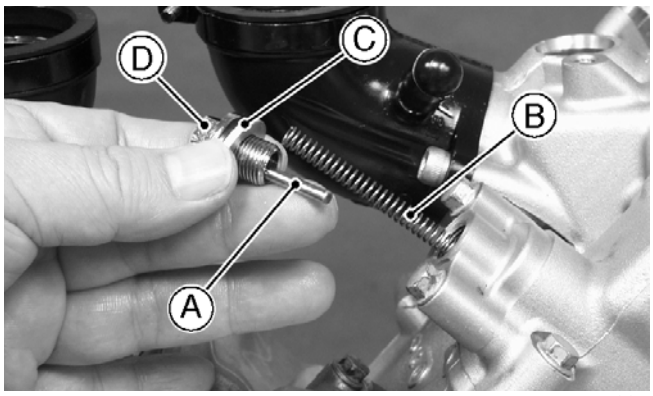
ATV2102

9. Release the ratchet (A) and press the push rod (B) into the camshaft chain tensioner body; then install on the rear cylinder and tighten the cap screws to 0.9 kg-m (78 in.-lb).



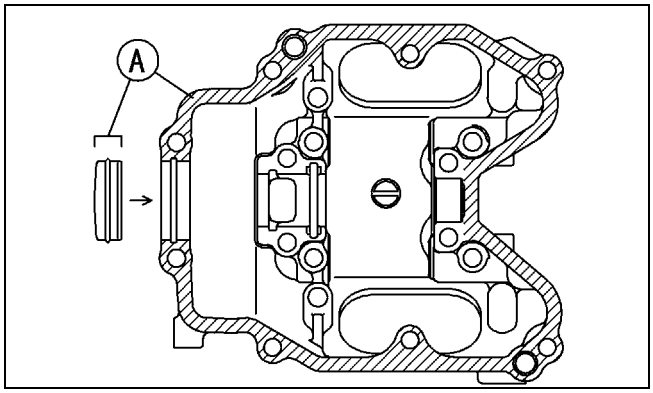
KX364

10. Install pin (A), spring (B), washer (C), and chain tensioner cap bolt (D); then tighten cap bolt to 2.2 kg-m (16 ft-lb).



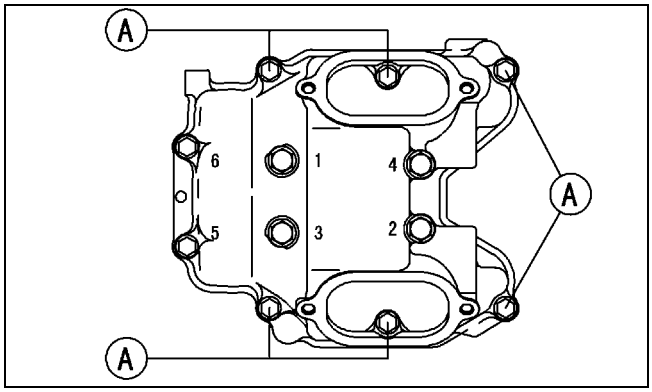
KX365

11. Apply clean engine oil to the camshaft; then apply a thin coat of Three Bond Sealant (p/n 0636-070) (A) to the outer surface of the cap and the upper surface of the cylinder head.



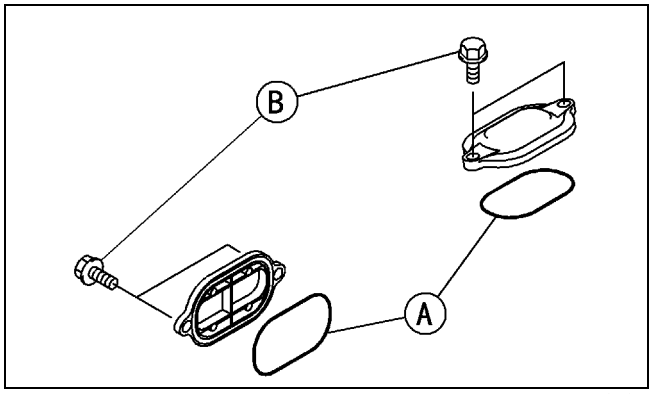
ATV2103

12. Install the valve cover making sure that the rocker arms and adjuster screws do not have pressure on them; then tighten the valve cover cap screws as follows: 1-4 with washers, 0.9 kg-m (78 in.-lb); 5 and 6, 1.0 kg-m (87 in.-lb); (A) 1.0 kg-m (87 in.-lb). Use the illustrated tightening sequence for cap screws 1-6.



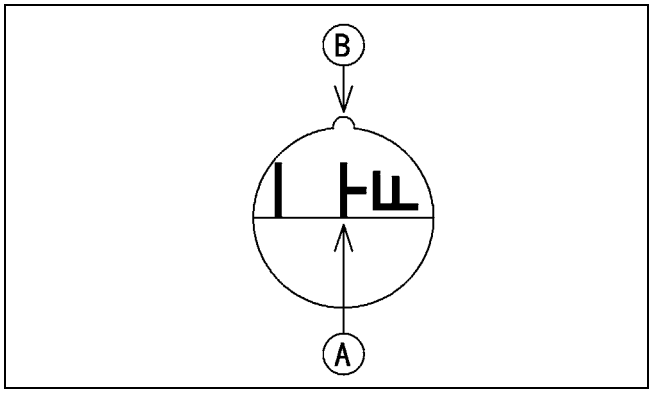
ATV2104

13. Adjust valve clearance (See Section 2); then apply grease to O-rings (A) and install the tappet covers. Tighten the cap screws (B) to 0.9 kg-m (78 in.-lb).



ATV2105

14. Using a wrench on the alternator bolt, turn the crankshaft clockwise 270° and align the "TF" mark (A) with the notch (B) in the inspection window.



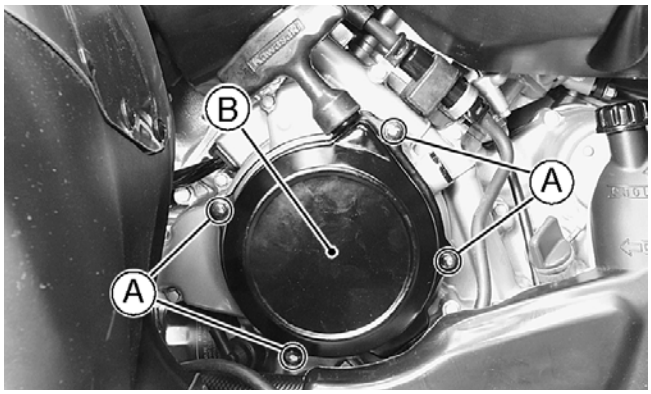
ATV2106

15. Repeat steps 8-12 for the front camshaft.

■ **NOTE: All views are from the right side for the front camshaft.**

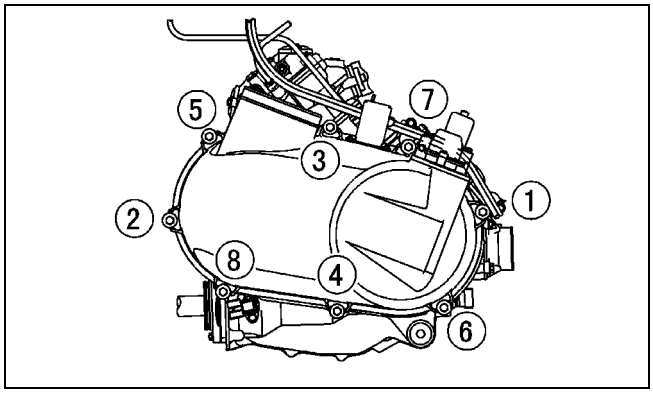
16. Install the spark plugs (if removed) and tighten to 1.3 kg-m (9.5 ft-lb).

17. Install the recoil starter assembly (B) and tighten the cap screws (A) to 1.2 kg-m (9 ft-lb).



KX366

18. Install the V-belt cover; then tighten the cap screws to 0.9 kg-m (6.5 ft-lb) in the sequence illustrated.

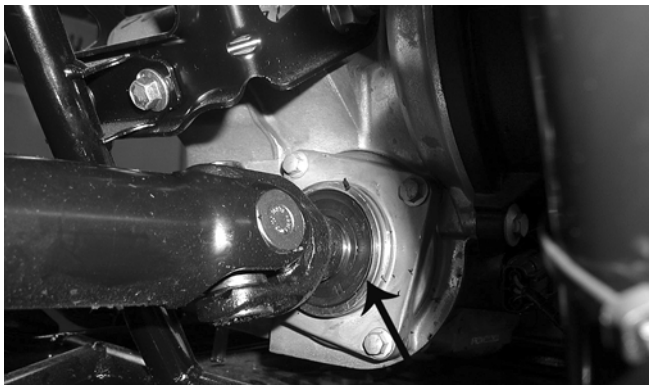


ATV2107

Installing Engine/Transmission

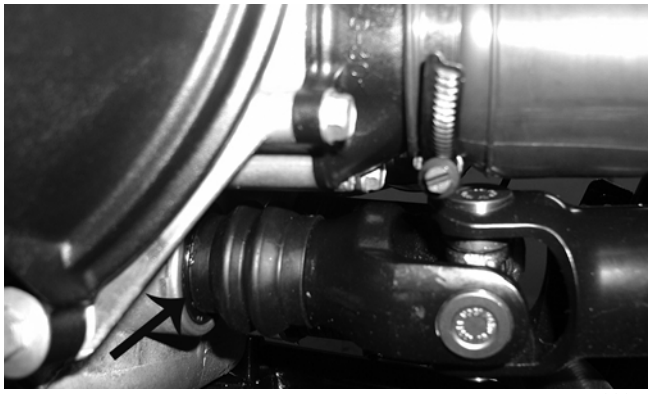
■ **NOTE: Arctic Cat recommends that new gaskets and O-rings be installed whenever servicing the ATV.**

1. Using a suitable lifting device, set the engine/transmission into the frame cradle from the left side; then align the splines of the rear drive shaft coupler and slide the engine/transmission rearward and engage the coupler.



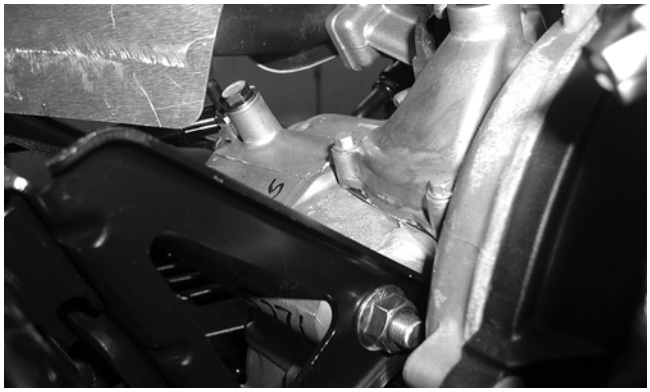
KX078A

2. Raise the front of the engine/transmission sufficiently to enable the front drive coupler to engage the front output shaft; then lower the front of the engine/transmission and engage the coupler. Slide the boot over the yoke.



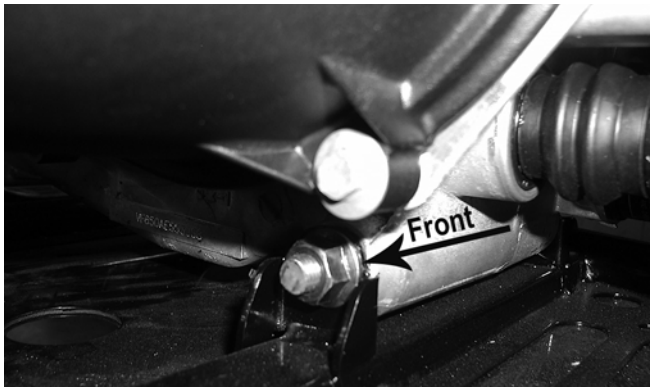
KX088A

3. Install the rear engine mount bracket to the frame. Do not tighten the bolts a this time.

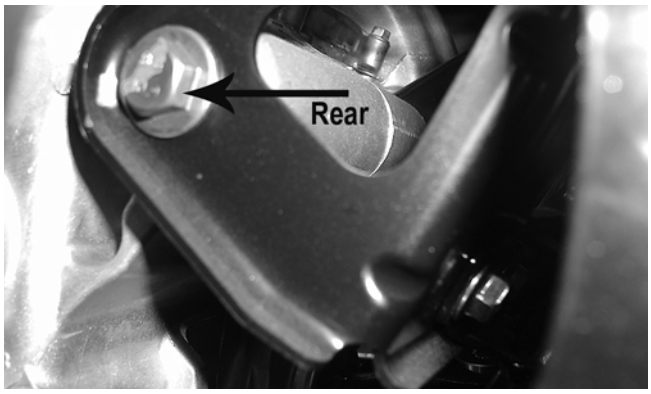


KX090

4. Align the engine with the front mount ears and install the front through-bolt; then install the rear through-bolt.



KX089B



KX069A

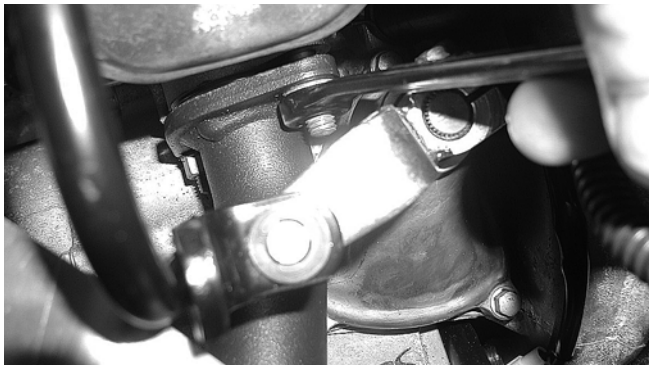
5. Tighten the rear bracket to frame bolts securely; then tighten the front and rear through-bolt nuts to 6.0 kg-m (43.5 ft-lb).

6. Install the front exhaust pipe with a new seal ring. Do not tighten the retainer nuts at this time.



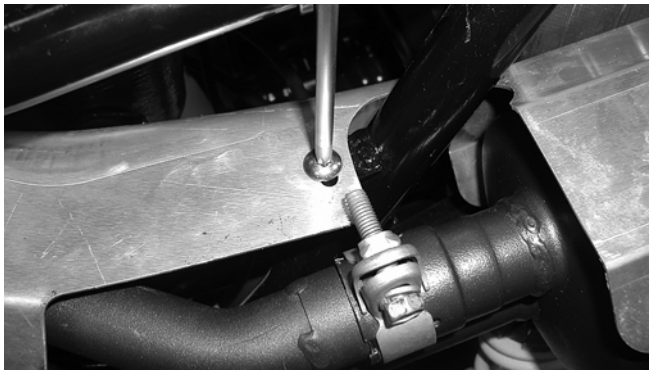
KX076

7. Install the muffler and rear exhaust pipe assembly with a new seal ring and seal bushings; then evenly tighten all the exhaust pipe retainer nuts.

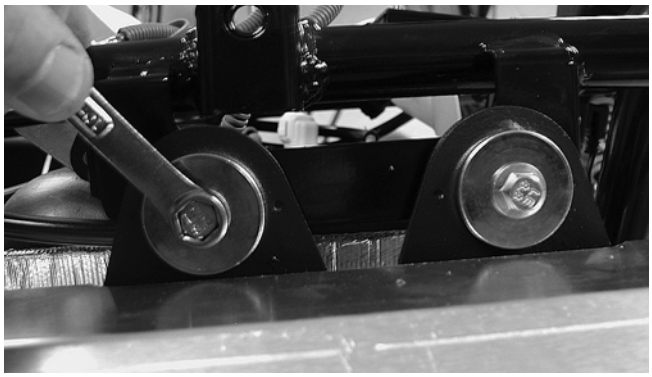


KX141

8. Install all exhaust system heat shields and tighten the mounting screws securely; then install two muffler mounts, hardware, and bolts and tighten securely.

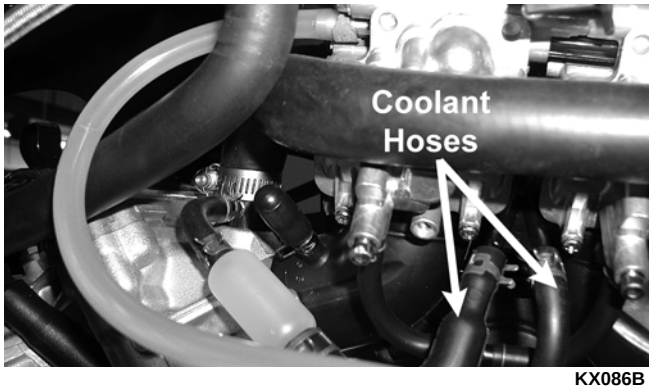


KX123



KX126

9. Install the two upper and one lower coolant hoses and tighten the hose clamps securely. Make sure to install the two coolant hoses connected to the carburetors.



KX086B

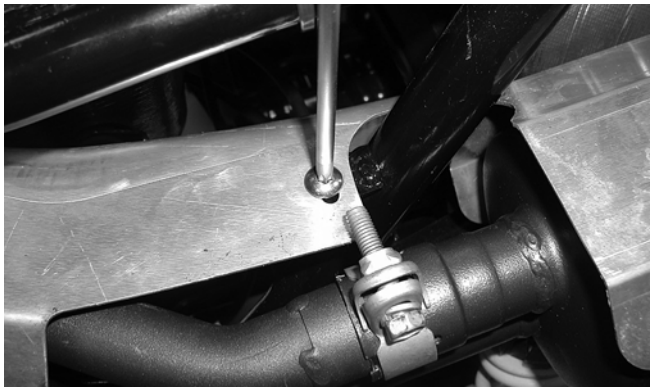
10. Remove the tape or caps from the intake hoses checking for any dirt, hardware items, or liquids; then install the carburetors into the intake hoses and tighten the clamps securely. Make sure the carburetors are securely seated by rocking side to side after installation.

⚠ CAUTION

Make sure to check intake hoses for any foreign matter. Severe engine damage will occur if liquids or hardware items are ingested at start-up.

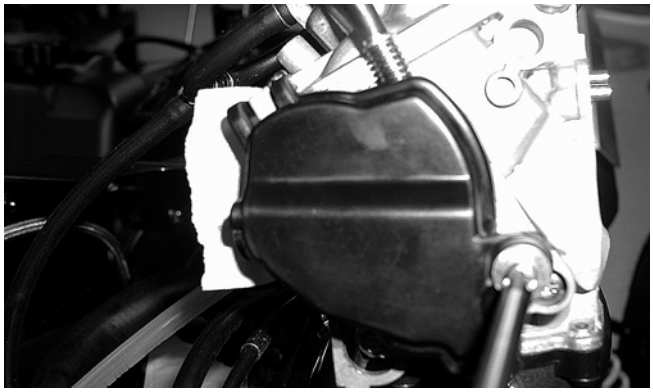


KX122



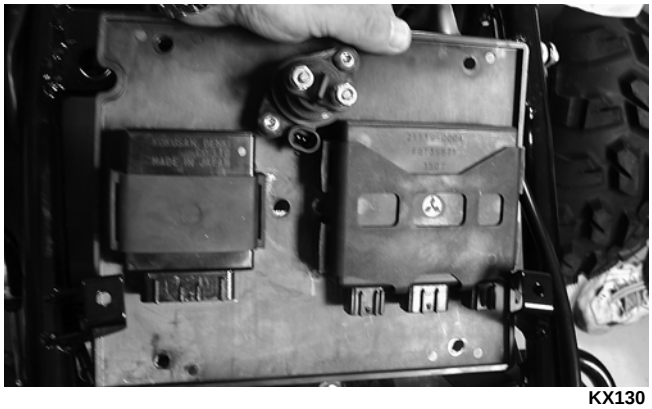
KX123

11. Connect the throttle cable and check for proper free-play; then install the cover and tighten the screw securely.



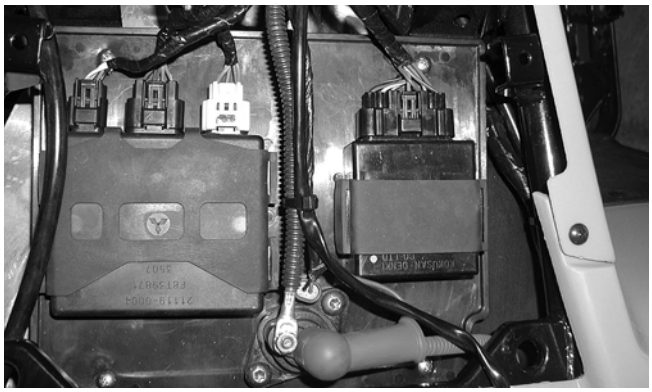
KX136

12. Install the electronics mounting tray with the CDI, starter relay, and EBC module attached; then secure with four mounting screws.



KX130

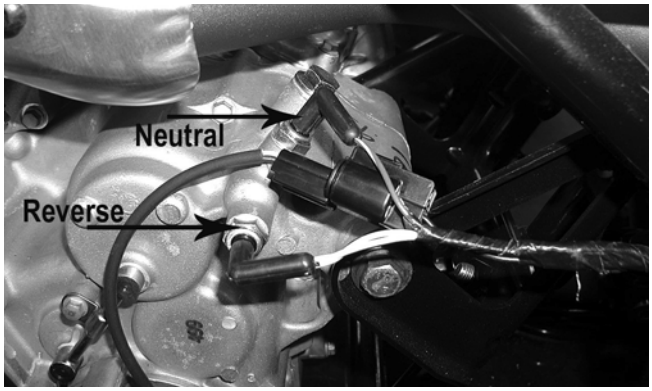
13. Connect the four disconnect plugs as shown; then connect the battery positive cable and starter lead to the starter relay.



KX074

14. Connect the starter cable to the starter lug and tighten securely.

15. Connect the alternator and pick-up coil leads; then attach the reverse indicator lead and neutral indicator lead to the switches.



KX075B

16. Connect the speed sensor, forward/reverse sensor lead, and oil pressure warning lead; then connect the drive belt failure detector lead and the engine brake control servo lead to the main harness. Connect the spark plug wires.

17. Remove the tape from the carburetor inlets checking for any foreign material; then using red Loctite #271, install the lower air cleaner housing and tighten the mounting screws securely.

18. Install the air filter and air filter cover.



KX119



KX118

19. Install the left footrest; then tighten the 10 mm cap screws to 5.5 kg-m (40 ft-lb) and the 8 mm cap screws to 2.8 kg-m (20 ft-lb).

20. Install all fenders, side panels, and racks that were removed; then install the storage compartment cover.

21. Install the battery by connecting the positive cable first; then connecting the negative cable.

22. Install the seat making sure it is properly secured.

23. Fill with recommended oil and coolant. See Section 2.

NOTES

SECTION 4 - FUEL/LUBRICATION/COOLING

4

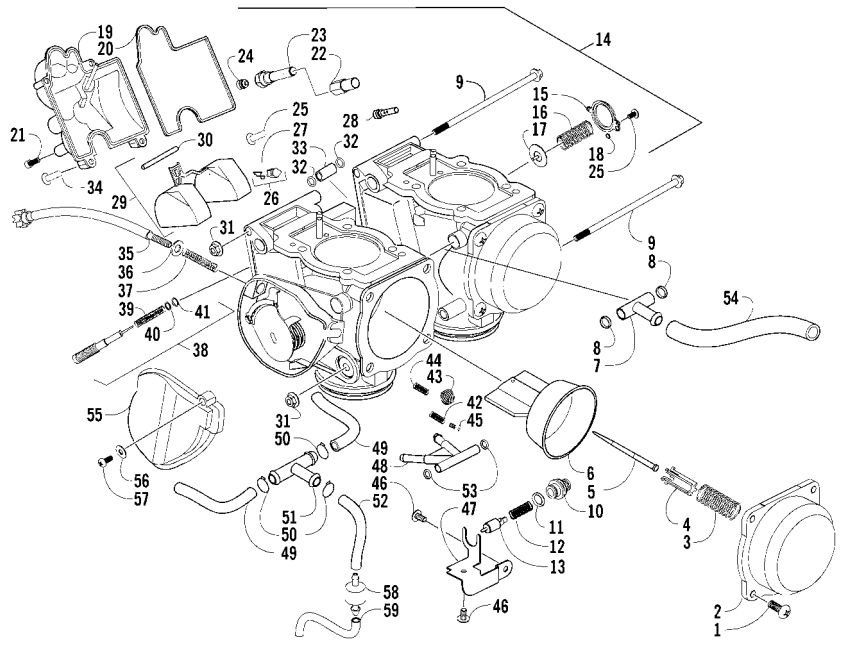
TABLE OF CONTENTS

Carburetor Specifications 4-2
Carburetor Schematic 4-2
Carburetor 4-3
Cleaning and Inspecting Carburetor 4-6
Throttle Cable Free-Play 4-8
Engine RPM (Idle) 4-8
Gas Tank 4-9
Gas Tank Valve 4-9
Gas/Vent Hoses 4-10
Electric Fuel Pump 4-10
Oil Flow Chart 4-10
Testing Oil Pump Pressure 4-11
Oil Pressure Relief Valve 4-11
Liquid Cooling System 4-12
Radiator 4-13
Hoses/Thermostat 4-14
Fan 4-14
Water Pump/Alternator Cover 4-15
Testing Electric Fuel Pump 4-16

Carburetor Specifications

ITEM	
Type	Keihin CVKR-D32 (2)
Main Jet	122 (Front)/122 (Rear)
Slow Jet	40
Pilot Screw Setting (turns)	2 1/2
Needle Jet	3.6 #3
Jet Needle	BZL-2.470
Idle RPM	1050-1150
Float Arm Height	3-5 mm (0.12-0.20 in.)
Throttle Cable Free-Play (at lever)	3-6 mm (1/8-1/4 in.)

Carburetor Schematic



KEY

1. Screw
2. Cover
3. Spring
4. Spring Seat
5. Jet Needle
6. Piston
7. T-Fitting
8. O-Ring
9. Bolt
10. Cap
11. O-Ring
12. Spring
13. Starter Valve
14. Float Chamber Assy
15. Pump Cover
16. Spring
17. Diaphragm Assy
18. O-Ring
19. Float Chamber
20. O-Ring
21. Drain Plug
22. Jet Holder
23. Needle Jet
24. Main Jet
25. Screw
26. Needle Valve
27. Clip
28. Slow Jet
29. Float Assy
30. Float Pin
31. Nut
32. O-Ring
33. Fitting
34. Screw
35. Idle Adjust Screw
36. Washer
37. Spring
38. Pilot Screw Assy
39. Spring
40. Washer
41. O-Ring
42. Spring
43. Spring
44. Spring
45. Stop Screw
46. Screw
47. Plate
48. T-Fitting
49. Hose
50. Clamp
51. T-Fitting
52. Hose
53. O-Ring
54. Hose
55. Cover
56. Washer
57. Machine Screw
58. Check Valve
59. Hose

0739-201

Carburetor

⚠ WARNING

Whenever any maintenance or inspection is performed on the fuel system during which there may be fuel leakage, there should be no welding, smoking, open flames, etc., in the area.

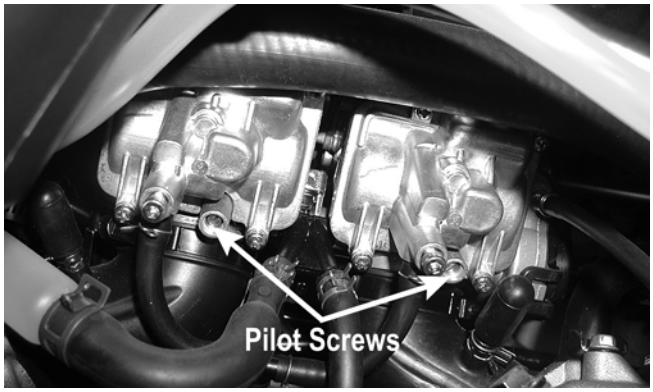
TROUBLESHOOTING

1. Drain float bowls into a clean, clear container. Look for rust particles, water droplets, or other contamination.
2. Momentarily turn the ignition switch to the ON position. Fuel should resume flowing indicating fuel supply to the carburetors is normal.

⚠ CAUTION

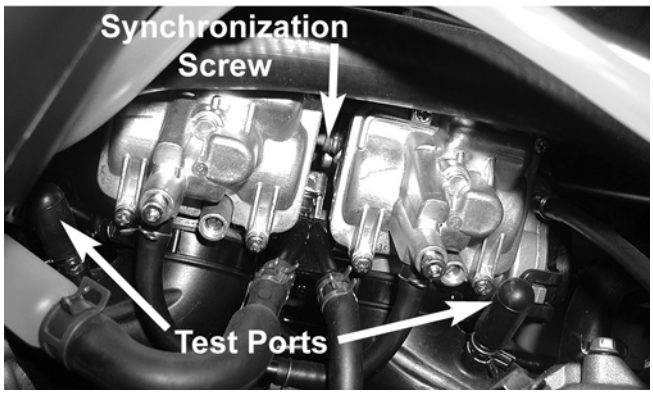
Do not leave ignition switch on as fuel will be pumped to the carburetors and a spill could occur.

3. Dispose of the drained fuel properly; then move the ATV outside or to a properly ventilated engine run area.
4. Start the engine and warm up to operating temperature; then attach a tachometer and adjust the idle RPM to 1050-1150 RPM. Turn the handlebar full left and full right. If RPM changes, check for throttle cable adjustment or improper routing.
5. Rock carburetors from side to side and note RPM. Air leaks will cause RPM to increase. Tighten all clamps, boots, and hoses. Inspect for cracks.
6. Check the air filter housing and air filter for water, fuel, dirt, or other contamination. Wash or replace if necessary.
7. Check pilot adjustment by turning pilot screws in until lightly seated; then back out 2 1/4 turns. If no change in RPM is noted as the screws are turned in, check for an air leak between the carburetor and the cylinder head.



KX025E

8. Check for proper carburetor synchronization by attaching suitable vacuum gauges to the test ports; then start the engine and increase the RPM above idle. The gauges should read within 2 cm/Hg (0.78 in./Hg) of each other. Turn the synchronization screw to equalize vacuum.



KX025C

■ NOTE: Idle RPM must be reset any time the synchronization screw is adjusted.

REMOVING

1. Turn the gas tank valve to the OFF position.
2. Remove the seat; then drain the coolant.
3. Remove the storage compartment cover and air filter housing cover; then remove the air filter.
4. Disconnect the hoses from the carburetors to the gas tank valve connection.
5. Remove the screws securing the lower air filter housing to the carburetors; then remove the lower housing and tape over the carburetor inlets.

⚠ CAUTION

Severe engine damage will occur if hardware items or other foreign objects are ingested by the engine on start-up.

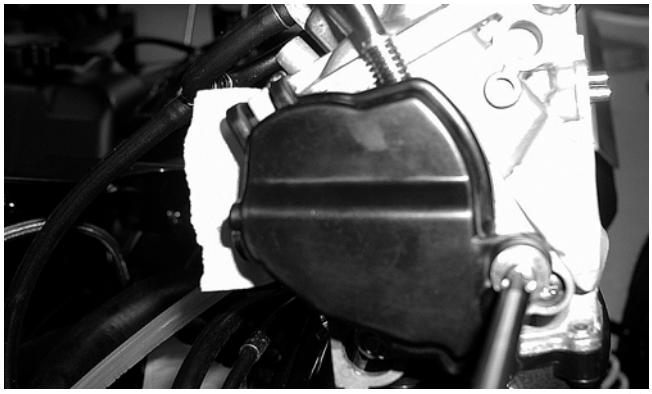


KX118



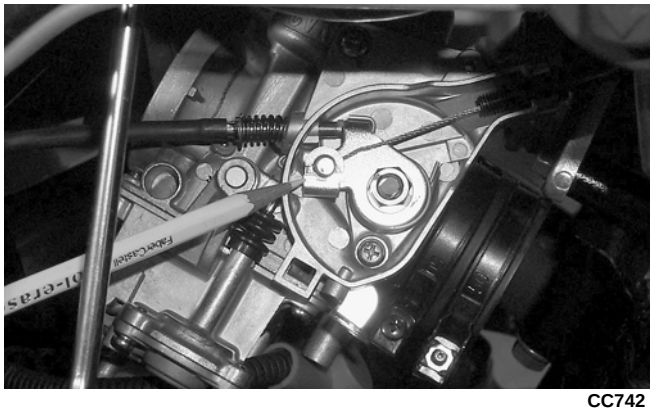
CKX119

6. Remove the screw securing the throttle actuator cover to the front carburetor; then remove the cover.



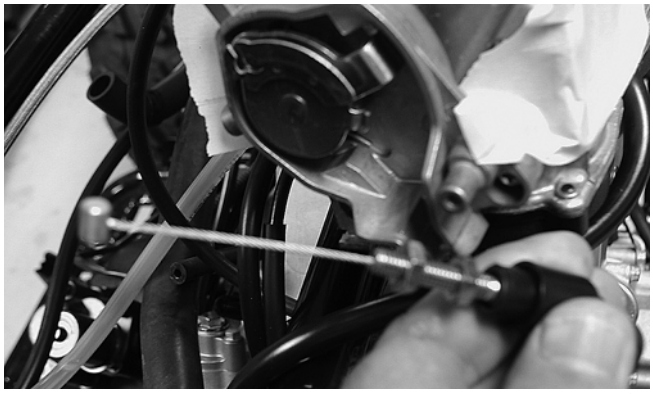
KX136

7. Remove the throttle cable from the actuator arm.



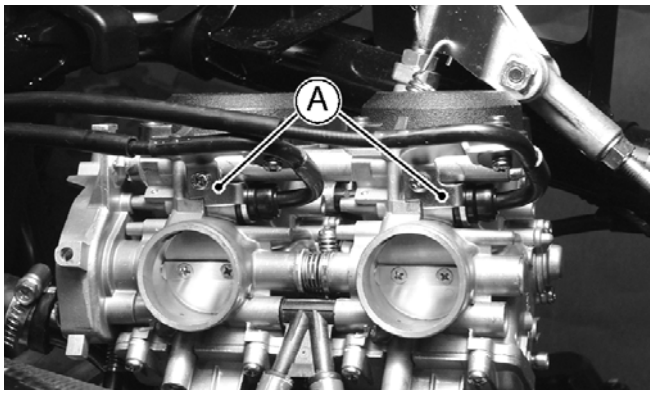
CC742

8. Loosen the outer jam nut securing the throttle cable to the carburetor body; then route the cable out of the way.



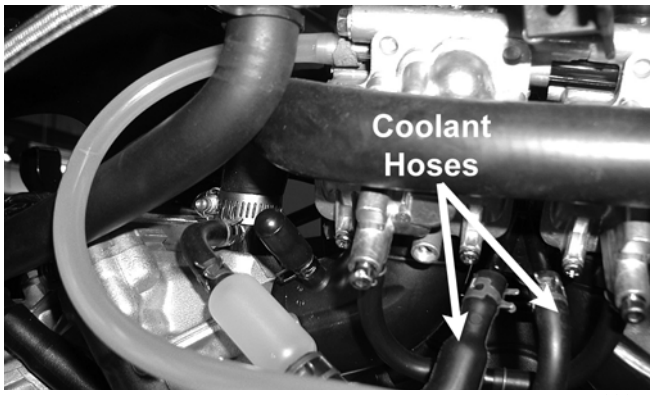
KX137

9. Remove the Phillips-head screws holding the cable end plates (A); then pull out the starter plungers and set aside.



KX367

10. Disconnect the coolant hoses, breather tubes, and intake tubes; then remove the carburetors.



KX086B

11. Use tape to cover and seal the intake tubes.



KX122

⚠ CAUTION

Any objects or liquid entering the intake tubes will fall into the engine causing severe damage if the engine is turned over or started.

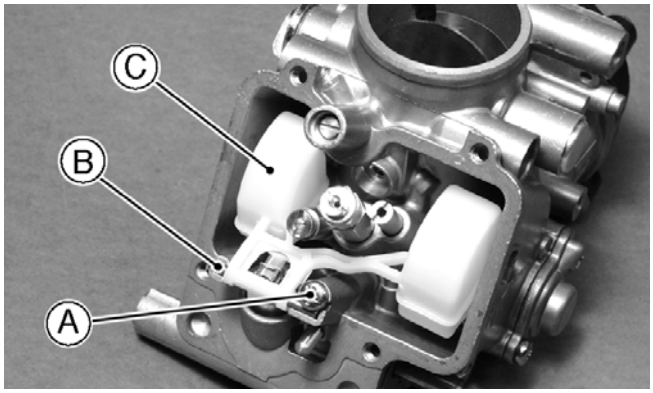
ADJUSTING FLOAT LEVEL

1. Drain all fuel from the carburetors; then remove the screws securing the float chamber and remove the float chamber. Account for four screws and one O-ring gasket.

⚠ WARNING

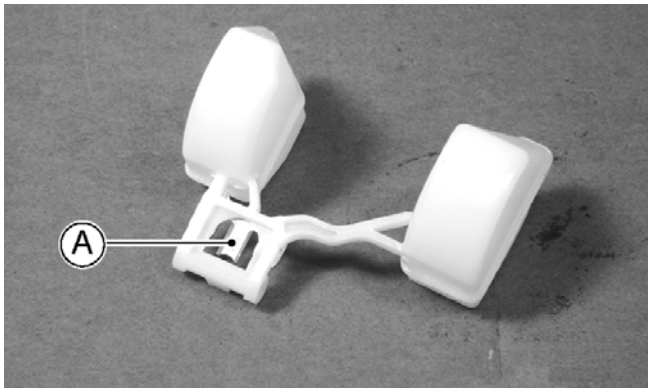
Whenever any maintenance or inspection is made on the fuel system during which there may be fuel leakage, there should be no welding, smoking, open flames, etc., in the area.

2. Remove the set screw (A); then slide the pivot pin (B) out and remove the float (C).



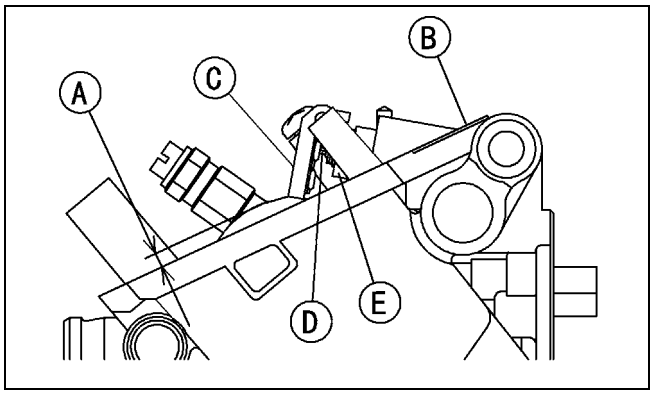
KX368

3. Bend the float valve contact tab (A) slightly to adjust float height.



KX369

4. Measure the float height (A) from the float chamber mating surface (B) by tilting the carburetor so the float valve contact tab (C) just touches the float valve rod (D). The float valve spring (E) must not be compressed. Float height should be 3-5 mm (0.12-0.20 in.).



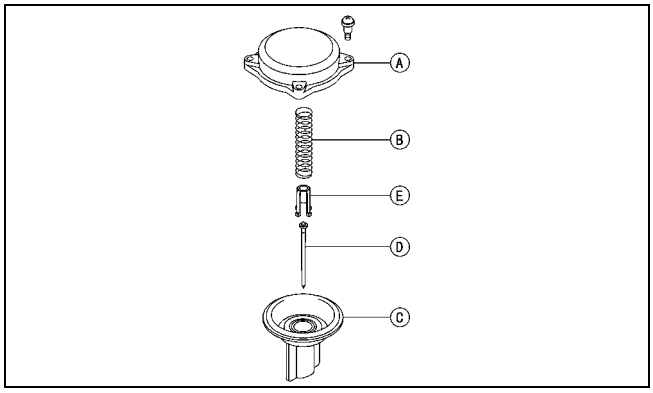
ATV2108

■ NOTE: Increasing the float height lowers the fuel level, and decreasing the float height raises the fuel level.

DISASSEMBLING

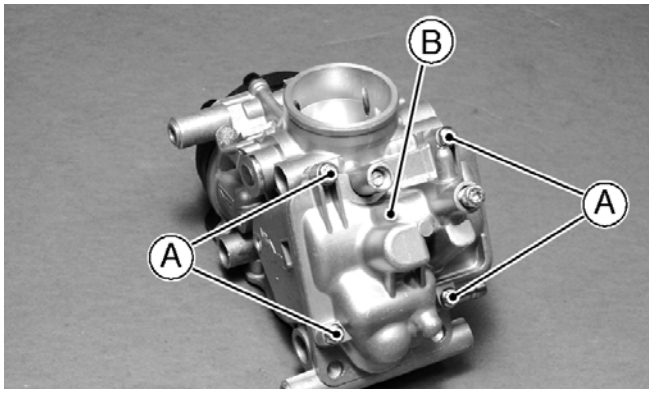
■ NOTE: The carburetors do not have to be separated to disassemble.

1. Remove the vacuum chamber cover (A), spring (B), and vacuum piston (C); then remove the jet needle (D) and spring seat (E) from the vacuum piston.



ATV2109

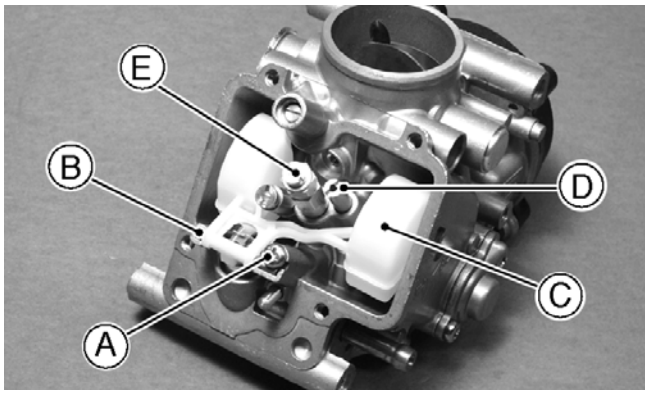
2. Remove the four screws (A) securing the float chamber (B); then remove the float chamber. Account for the O-ring seal.



KX370

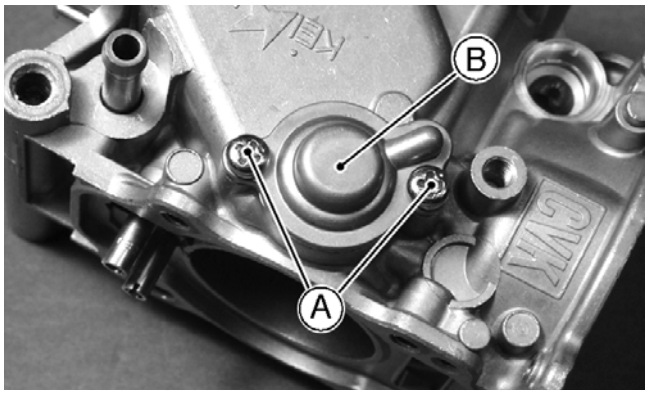
■**NOTE: Do not remove the pilot screws unless idle problems have been encountered. If pilot screws are removed, the carburetors will have to be synchronized after installation.**

3. Remove set screw (A); then remove the float pivot pin (B), float (C), needle valve, slow jet (D), and main jet (E).

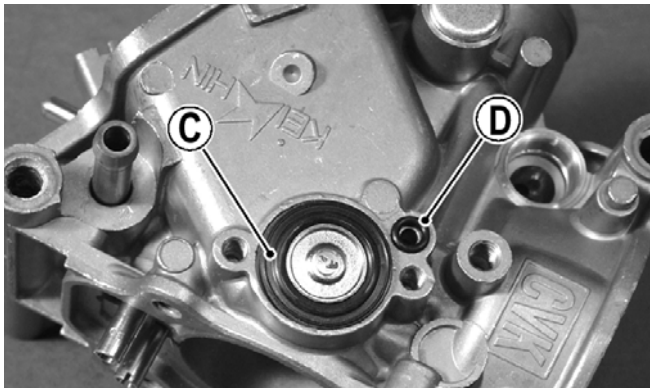


KX371

4. Remove the screws (A) and pump cover (B) from the carburetor body; then remove the diaphragm (C) and O-ring (D).



KX372



KX373A

Cleaning and Inspecting Carburetor

■**NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

⚠ WARNING

When drying components with compressed air, always wear safety glasses.

⚠ CAUTION

This carburetor body has plastic parts that cannot be removed. Use only a mild, high flash-point carburetor cleaning solvent safe for plastic.

1. Place all plastic components in a wire basket and submerge in carburetor cleaner.
2. Soak for 30 minutes; then rinse with fresh parts-cleaning solvent.
3. Wash all non-metallic components with soap and water. Rinse thoroughly.
4. Dry all components with compressed air only making sure all holes, orifices, and channels are unobstructed.
5. Inspect the carburetor body for cracks, nicks, stripped threads, and any other imperfections in the casting.
6. Inspect the vacuum piston/diaphragm for cracks, imperfections in the casting, or cracks and tears in the rubber.
7. Inspect float for damage.
8. Inspect gasket and O-rings for distortion, tears, or noticeable damage.

9. Inspect tips of the jet needle, pilot screw, and the needle valve for wear, damage, or distortion.

10. Inspect the slow jet and main jet for obstructions or damage.

■ NOTE: If the slow jet is obstructed, the mixture will be extremely lean at idle and part-throttle operation.

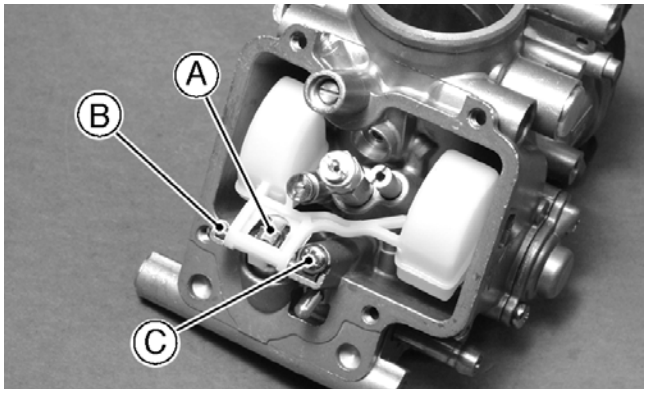
11. Inspect the starter valve and seat for wear or damage.

ASSEMBLING

⚠ CAUTION

Do not force or overtighten carburetor jets and fittings. Damage to the jets or carburetor could occur.

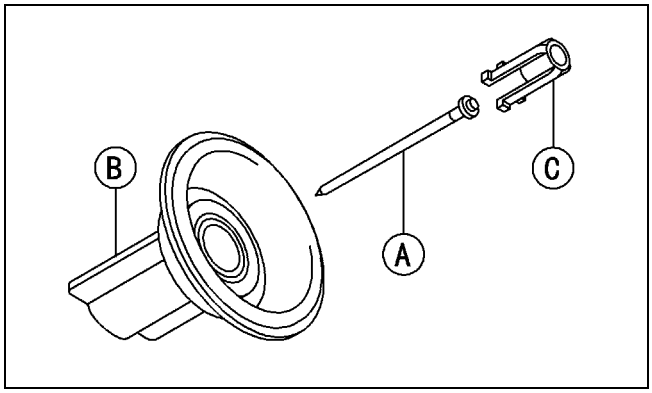
1. Install the needle valve into the valve seat and engage and hook the needle hanger (A) onto the float tab; then insert the float pivot pin (B) into the pivot post and tighten the set screw (C).



KX374

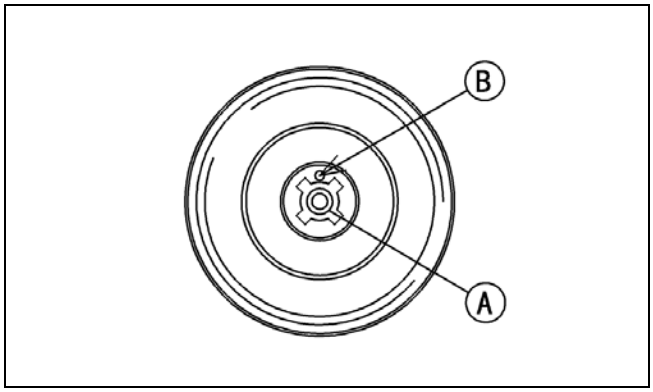
2. Install the main jet and slow jet.

3. Insert the jet needle (A) into the vacuum piston (B); then install the spring seat (C) over the needle.



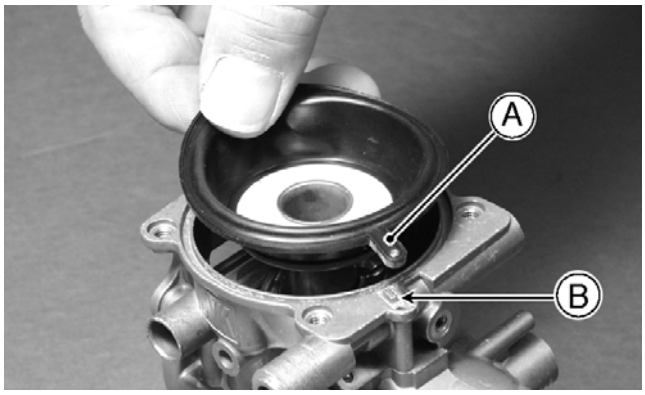
ATV2110

4. Turn the spring seat (A) so it does not block the vent hole (B).



ATV2111

5. Install the piston into the carburetor body and engage the tab (A) of the diaphragm into the recess (B); then install the spring and vacuum chamber cover. Secure with four screws.

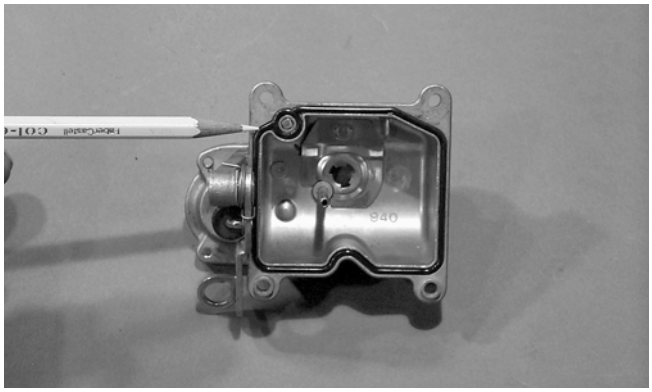


KX375

6. Install the pump diaphragm and O-ring; then install the pump cover and secure with two screws.

■ NOTE: Check float arm height by placing the carburetor on its side w/float contacting the needle; then measure with a caliper the height when the float arm is in contact with the needle valve. Float arm height should be 3-5 mm (0.12-0.20 in.).

7. Place the float chamber into position making sure the O-ring is properly positioned; then secure with Phillips-head screws.



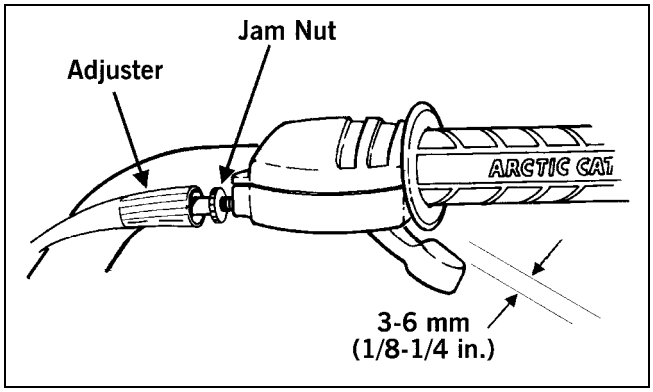
CC750

INSTALLING

1. Lay the carburetor on top of the engine; then install the starter plungers and secure with the retainer screws.
2. Connect vent lines; then connect the coolant hoses.
3. Insert the carburetor into the intake tubes making sure they seat properly; then tighten the clamps securely.
4. Connect the throttle cable to the throttle actuator arm; then install the cable into the anchor housing and tighten the nuts securely.
5. Install the actuator housing cover and secure with the screws.
6. Connect the hose to the gas tank valve; then connect the carburetor float chamber drains and route outlet hose behind engine.
7. Install the air filter housing onto the carburetors and secure with eight cap screws; then install the air filter, filter housing cover, and storage compartment cover.

Throttle Cable Free-Play

1. Check throttle cable free-play at the lever; free-play should be 3-6 mm (1/8 - 1/4 in.).
2. To adjust, slide the rubber boot away from the adjuster located near the throttle lever. Loosen the jam nut and rotate the adjuster in the appropriate direction until proper free-play is attained. Tighten the jam nut against the adjuster; then slide the rubber boot over the adjuster.



ATV-0047

Engine RPM (Idle)

To properly adjust the idle RPM, a tachometer is necessary.

To adjust idle RPM, use the following procedure.

1. Start the engine and warm it up to operating temperature.
2. Turn the idle adjustment screw clockwise or counterclockwise until the engine idles at 1050-1150 RPM.

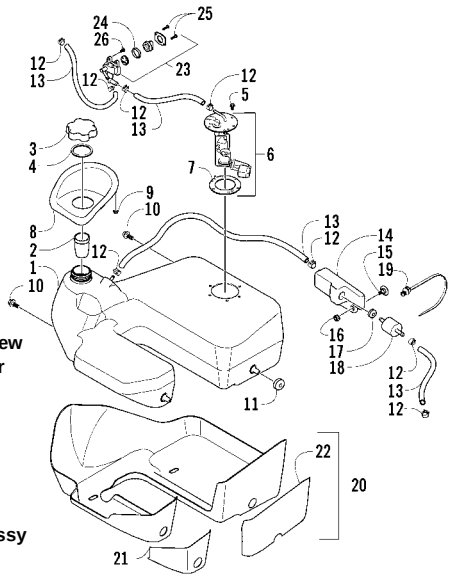
⚠ WARNING

Adjust the idle to the correct RPM. Make sure the engine is fully warm before adjusting the idle RPM.


KX029A

Gas Tank

KEY
1. Gas Tank
2. Sleeve
3. Tank Cap
4. Gasket
5. Screw
6. Fuel Pump
7. Damper
8. Insert
9. Nut
10. Cap Screw
11. Grommet
12. Hose Clamp
13. Fuel Hose
14. Breather
15. Shoulder Screw
16. Nut w/Washer
17. Grommet
18. Check Valve
19. Cable Tie
20. Shield
21. Shield
22. Shield
23. Tank Valve Assy
24. O-Ring
25. Screw
26. Screw



0739-082

⚠ WARNING

Whenever any maintenance or inspection is made on the fuel system during which there may be fuel leakage, there should be no welding, smoking, open flames, etc., in the area.

REMOVING

1. Turn the gas tank valve to the OFF position.
2. Remove the seat.
3. Remove the rear rack and fenders.
4. Disconnect the hose from the fuel pump to the tank valve at the fuel pump.
5. Remove the cap screws securing the gas tank to the frame.
6. Disconnect the fuel pump/fuel gauge connector; then remove the gas tank.

CLEANING AND INSPECTING

■**NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

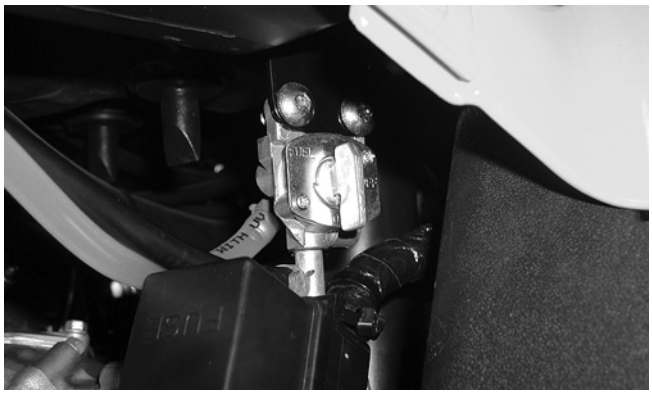
1. Clean all gas tank components with parts-cleaning solvent.
2. Inspect all hoses for cracks or leaks.
3. Inspect tank cap and tank for leaks, holes, and damaged threads.

INSTALLING

1. Place the gas tank into position in the frame; then install the cap screws. Tighten securely.
2. Connect the fuel hose from the gas tank valve; then connect the fuel pump/fuel gauge connector.
3. Install the vent hose; then fill the gas tank with gasoline.
4. Turn the gas tank valve to the ON position and inspect for leakage.
5. Install the rear fenders and rack; then install the seat making sure it latches securely.

Gas Tank Valve

The ATV has a valve separate from the gas tank. There are two positions: ON and OFF.

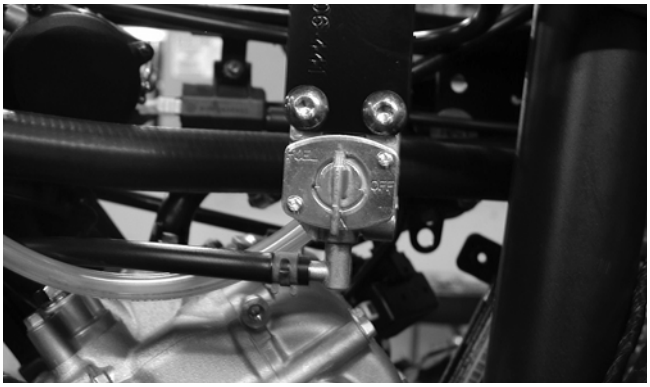


KX030

In the OFF position, the valve will not allow gasoline to flow to the carburetor. In the ON position (the normal operating position), gasoline is pumped from the tank to the carburetor. The ignition switch must be in the ON position to activate the electric fuel pump. When turning the valve to either of the two positions, be sure the indicator is pointed directly at the position desired.

REMOVING/INSPECTING

1. Remove the gas hose from the valve by releasing the spring clamp.
2. Remove the two screws securing the valve; then remove the valve.



KX027

3. Inspect for and remove any obstructions in the valve.

INSTALLING

1. Place the valve on the frame and secure with the screws. Tighten securely.
2. Install the gas hoses onto the valve with the spring clamps.

Gas/Vent Hoses

Replace the gas hose every two years. Damage from aging may not always be visible. Do not bend or obstruct the routing of the carburetor vent hose. Make certain that the vent hose is securely connected to the carburetor and the opposite end is always open.

Electric Fuel Pump

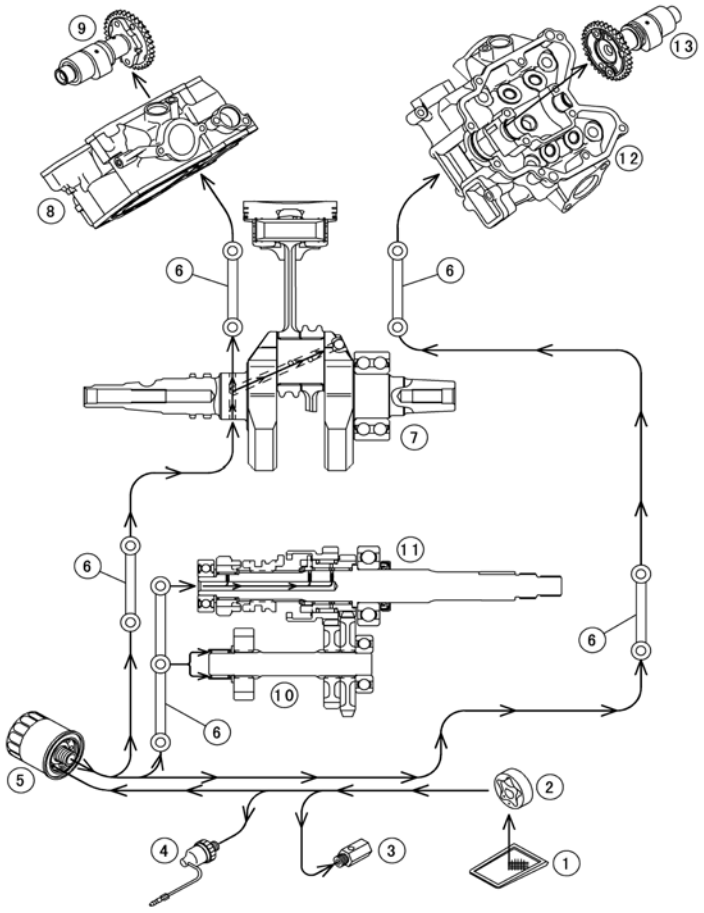
The electric fuel pump and fuel level sensor are a non-serviceable assembly. If either fails, the fuel pump assembly must be replaced.

■ **NOTE: For testing the fuel pump, see Testing Electric Fuel Pump in this section.**

Oil Flow Chart

KEY

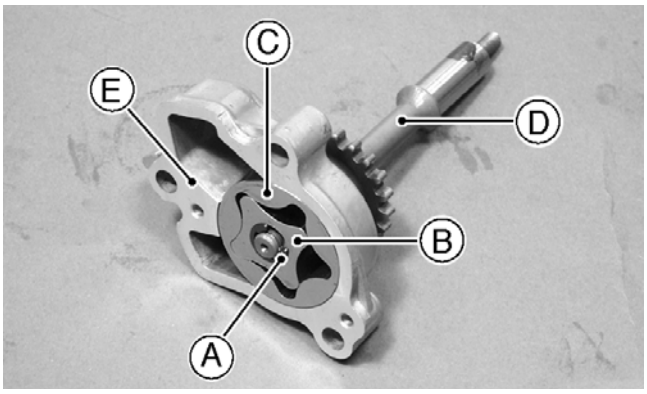
1. **Oil Screen**
2. **Oil Pump**
3. **Relief Valve**
4. **Oil Pressure Switch**
5. **Oil Filter**
6. **Oil Pipe**
7. **Crankshaft**
8. **Rear Cylinder Head**
9. **Rear Camshaft**
10. **Transmission Idle Shaft**
11. **Transmission Driveshaft**
12. **Front Cylinder Head**
13. **Front Camshaft**



ATV2112

REMOVING/DISASSEMBLING

1. Remove the oil pump from the engine (see Left-Side Components in Section 3).
2. Remove the circlip (A) on the driveshaft; then remove the inner rotor (B), outer rotor (C), oil pump driveshaft (D), and the oil pump housing (E).



KX376

CLEANING AND INSPECTING

■NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

1. Clean all oil-pump components.
2. Inspect the rotors for scoring and gouges.
3. Inspect the driveshaft and driven sprocket for damage.
4. Inspect the pump housing for cracks or damage.

ASSEMBLING/INSTALLING

1. Place the shaft into the pump housing; then install the inner and outer rotors and secure with a circlip.
2. Install the oil pump into the engine (see Left-Side Components in Section 3).

Testing Oil Pump Pressure

■NOTE: The engine must be warmed up to operating temperature for this test.

1. Connect the Arctic Cat Engine Tachometer (p/n 0644-275) to the engine.
2. Remove the oil pressure sender switch; then connect the Oil Pressure Gauge (p/n 0444-039) to the open port using a suitable adapter.

■NOTE: Some oil seepage may occur when installing the oil pressure gauge. Wipe up oil residue with a cloth.

3. Start the engine and run at 4500 RPM.
4. The oil pressure gauge must read as 4.9 kg-cm^2 (69.7 psi).

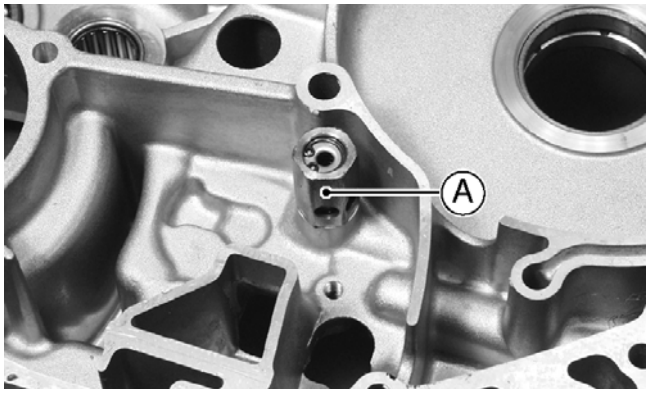
■NOTE: If the oil pressure is considerably lower than specified, check the pressure relief valve, for a damaged oil seal, for a defective oil pump, and/or for crankshaft bearing insert wear.

■NOTE: If the oil pressure is higher than specified, check for too heavy engine oil weight (see Section 2), clogged oil passage, clogged oil filter, or improper installation of the oil filter.

Oil Pressure Relief Valve

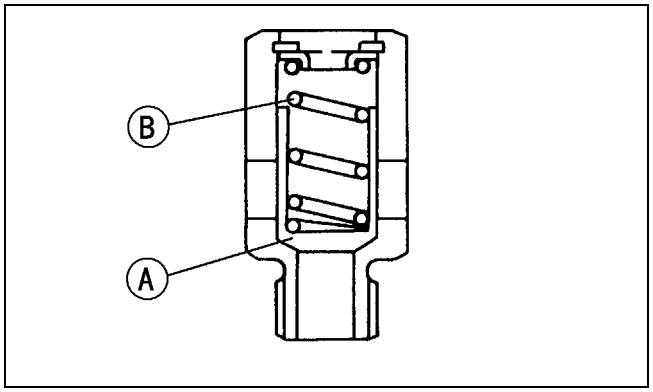
■NOTE: To remove the oil pressure relief valve, the center crankcase must be separated (see Section 3).

1. Remove the oil pressure relief valve (A); then check the valve for debris or metal filings.



KX377

2. Using a wooden dowel (or other non-metallic instrument), apply pressure to the relief valve plunger (A) and ensure that it moves freely and returns to the closed position by the force of spring (B).



ATV2113

3. If the valve movement is not smooth, wash in suitable solvent; then repeat step 2.

■ **NOTE: The valve is not serviceable and individual parts are not available. If the plunger movement is not free and smooth, replace the valve.**

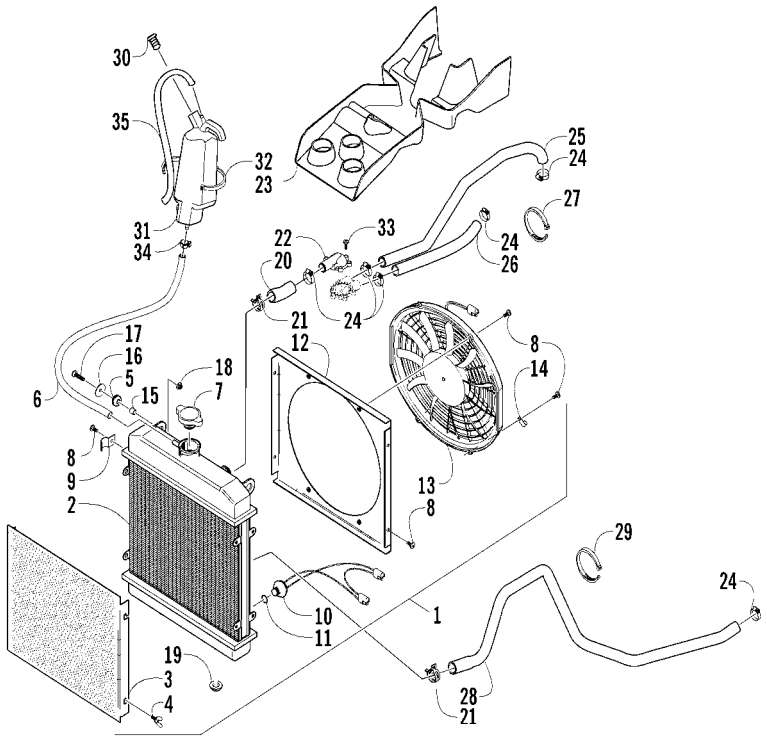
INSTALLING

1. Apply blue Loctite #242 to the threads of the oil pressure relief valve; then install and tighten to 1.5 kg-m (11 ft-lb).
2. Assemble engine (see Section 3).

Liquid Cooling System

KEY

1. Radiator Assy
2. Radiator
3. Radiator Screen
4. Thumb Screw
5. Grommet
6. Vent Hose
7. Radiator Cap
8. Machine Screw
9. Clamp
10. Temperature Sender
11. O-Ring
12. Fan Shroud
13. Fan
14. Clamp
15. Collar
16. Washer
17. Cap Screw
18. Nut w/Washer
19. Stem Bushing
20. Coolant Hose
21. Hose Clamp
22. Thermostat Housing
23. Air Diverter
24. Hose Clamp
25. Coolant Hose
26. Coolant Hose
27. Cable Tie
28. Coolant Hose
29. Cable Tie
30. Stopper
31. Overflow Tank
32. Cable Tie
33. Cap Screw
34. Hose Clamp
35. Vent Hose



0739-135

The cooling system capacity is approximately 2.7 L (2.8 U.S. qt). The cooling system should be inspected daily for leakage and damage. Also, the coolant level should be checked periodically.

When filling the cooling system, use premixed Arctic Cat Antifreeze (p/n 0638-395). While the cooling system is being filled, air pockets may develop; therefore, run the engine for five minutes after the initial fill, shut the engine off, and then fill the cooling system to the bottom of the stand pipe in the radiator neck.

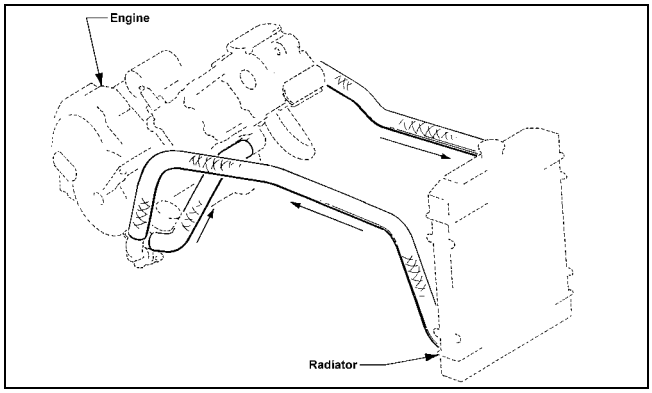


AN604D

⚠ CAUTION

After operating the ATV for the initial 5-10 minutes, stop the engine, allow the engine to cool down, and check the coolant level. Add coolant as necessary.

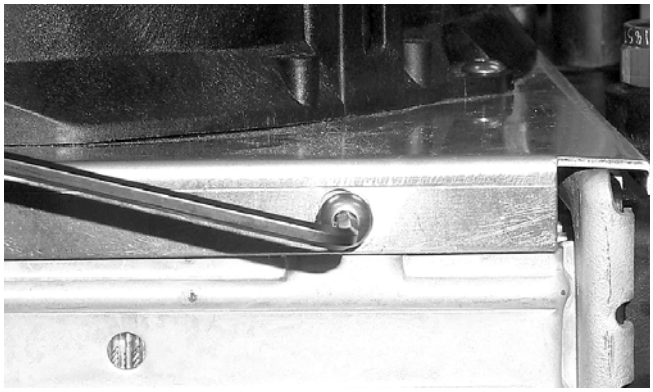
Radiator



0732-411

REMOVING

1. Drain the coolant at the engine.
2. Remove the front rack (see Section 8).
3. Remove the front bumper and grille assembly (see Section 8).
4. Remove the upper and lower coolant hoses.
5. Remove the cap screws and nuts securing the radiator to the frame.
6. Disconnect the fan wiring from the main wiring harness; then remove the radiator/fan assembly and account for the grommets and collars.
7. Remove the fan/fan shroud assembly from the radiator.



CC863

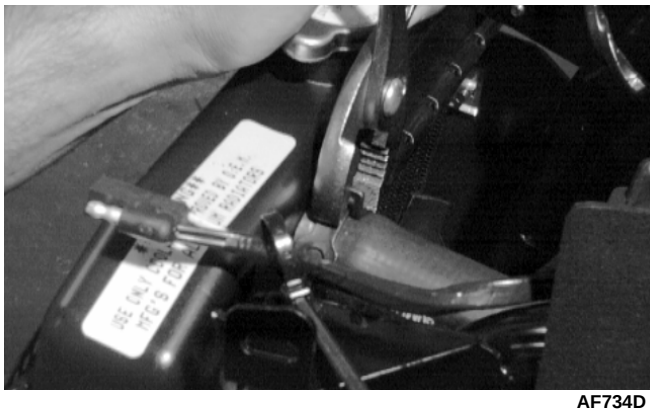
CLEANING AND INSPECTING

■NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

1. Flush the radiator with water to remove any contaminants.
2. Inspect the radiator for leaks and damage.
3. Inspect all hoses for cracks and deterioration.
4. Inspect all fasteners and grommets for damage or wear.

INSTALLING

1. Position the fan/fan shroud assembly on the radiator; then secure with existing hardware.
2. Place the radiator with grommets and collars into position on the frame; then install the cap screws and nuts. Tighten securely.
3. Install the upper and lower coolant hoses; then secure with hose clamps.



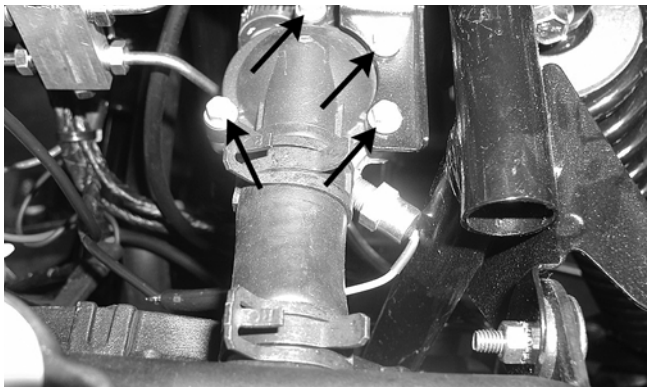
AF734D

4. Install the front bumper and grille assembly (see Section 8).
5. Install the front rack (see Section 8).
6. Fill the cooling system (2.7 L or 2.8 U.S. qt) with antifreeze. Check for leakage.
7. Connect the fan wiring to the main wiring harness.

Hoses/Thermostat

REMOVING

1. Remove the front rack and fenders; then remove the center splash shield.
2. Drain the cooling system down approximately 1 quart.
3. Remove the cap screws securing the thermostat housing to the mounting bracket; then remove the remaining two cap screws and separate the housing and cover.



KX193A

4. Remove the thermostat and account for the seal.

INSPECTING

■ NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

1. Inspect the thermostat for corrosion, wear, or spring damage.
2. Using the following procedure, inspect the thermostat for proper operation.
   A. Suspend the thermostat in a container filled with water.
   B. Heat the water and monitor the temperature with a thermometer.
   C. The thermostat should start to open at 69.5-72.5°C (157-162°F).
   D. If the thermostat does not open, it must be replaced.
3. Inspect all coolant hoses, connections, and clamps for deterioration, cracks, and wear.

■ NOTE: All coolant hoses and clamps should be replaced every four years or 4000 miles.

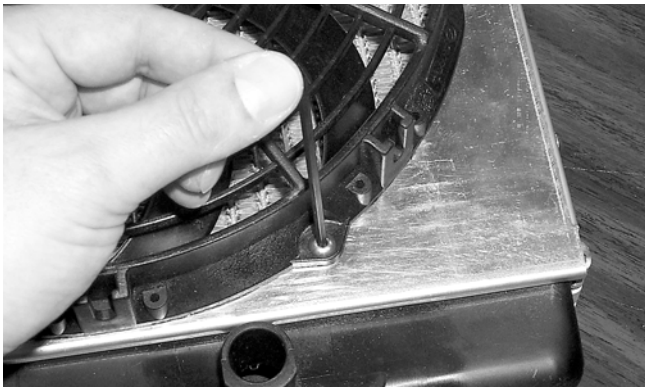
INSTALLING

1. Place the thermostat and seal into the thermostat housing; then finger-tighten the thermostat housing to the mounting bracket with the two cap screws.
2. Install the remaining two cap screws; then tighten the four cap screws to 0.9 kg-m (78 in.-lb).
3. Fill the cooling system (2.7 L or 2.8 U.S. qt) with antifreeze. Check for leakage.
4. Install the center splash shield; then install the fenders and front rack.

Fan

REMOVING

1. Remove the radiator (see Radiator in this section).
2. Remove the fan assembly from the radiator.



CC862

INSTALLING

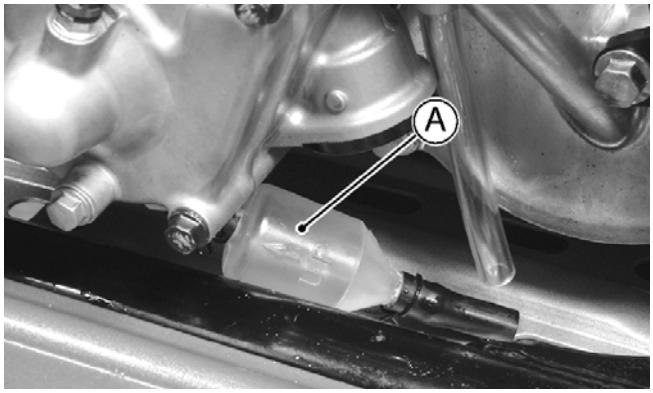
1. Position the fan assembly on the radiator; then secure with existing hardware.

■ NOTE: The fan wiring must be in the upper-right position.

2. Install the radiator (see Radiator in this section).

Water Pump/Alternator Cover

■NOTE: Check for water pump seal leakage by examining drain catch tank (A).

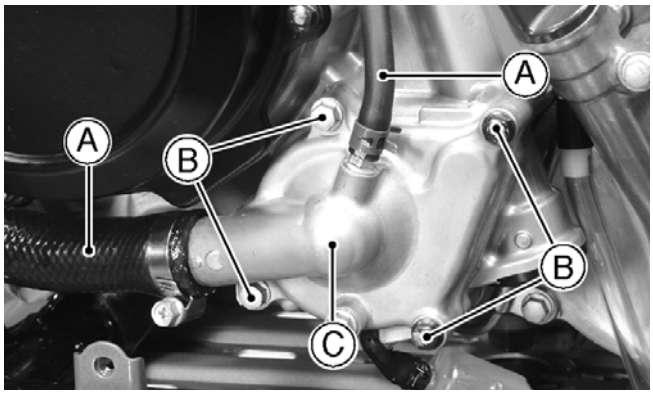


KX383

☞ AT THIS POINT

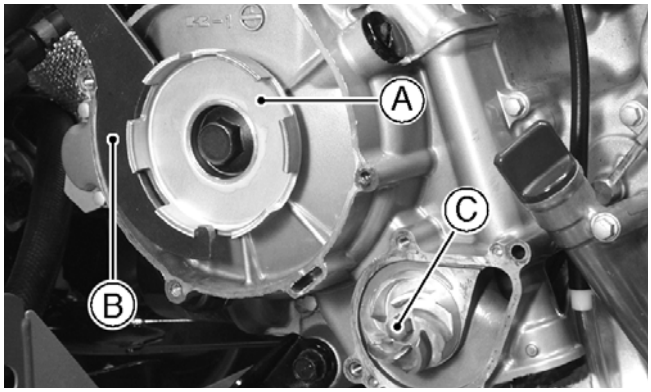
If there is no coolant in the catch tank, proceed to step 1 to inspect the impeller.

1. Drain the coolant; then remove hoses (A), cap screws (B), and the water pump cover (C). Account for the gasket and two alignment pins.



KX378

2. Remove the recoil starter (see Removing Left-Side Components in Section 3); then using a suitable holding wrench (B) to hold the starter cup (A), loosen the impeller (C) by turning counterclockwise.



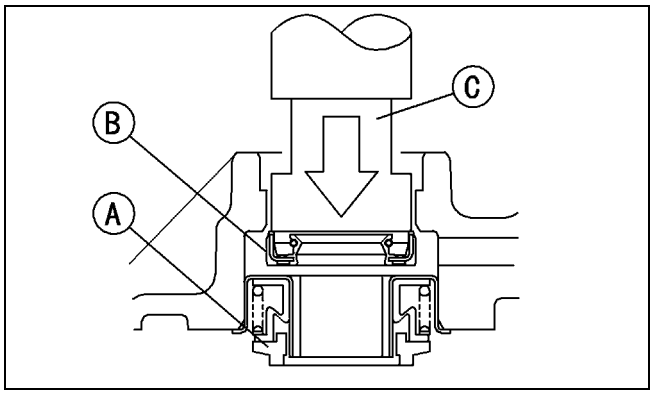
KX379

☞ AT THIS POINT

If the impeller is corroded or damaged, replace the impeller; then proceed to step 10. If additional service on the water pump/alternator cover is necessary, proceed to step 3.

3. Remove the alternator cover (see Removing Left-Side Components in Section 3); then using a suitable bearing driver, remove the water pump bearing from the alternator cover.

4. Press out the mechanical seal (A) and oil seal (B) from the inside of the alternator cover using bearing driver (C).

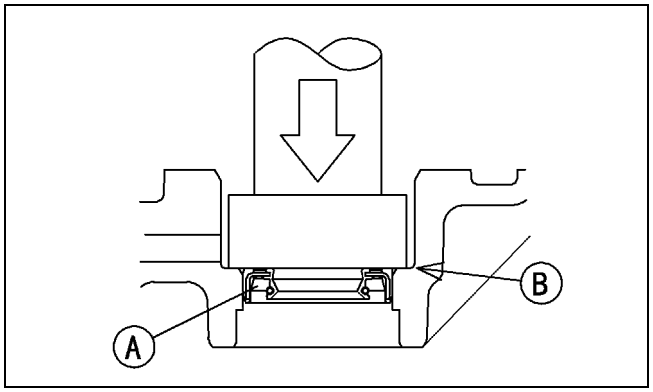


ATV2114

⚠ CAUTION

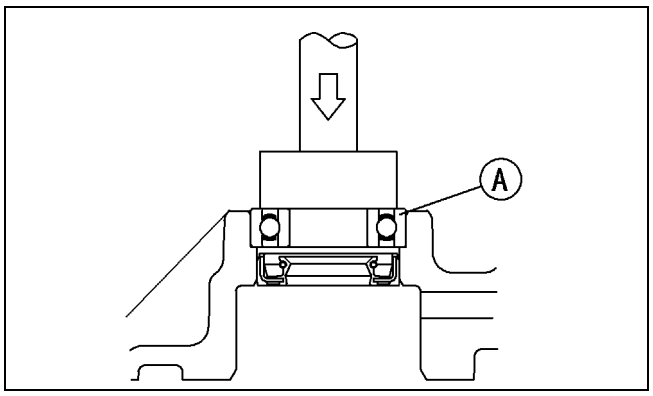
If the mechanical seal, oil seal, or the ball bearing is removed, always replace all three as a set. Be careful not to block the inspection hole with the oil seal. If the inspection hole is blocked, coolant will pass through the oil seal and flow into the crankcase causing severe engine damage.

5. Apply high temp grease to the oil seal lip; then press oil seal (A) from the outside of the alternator cover until flush with (B).

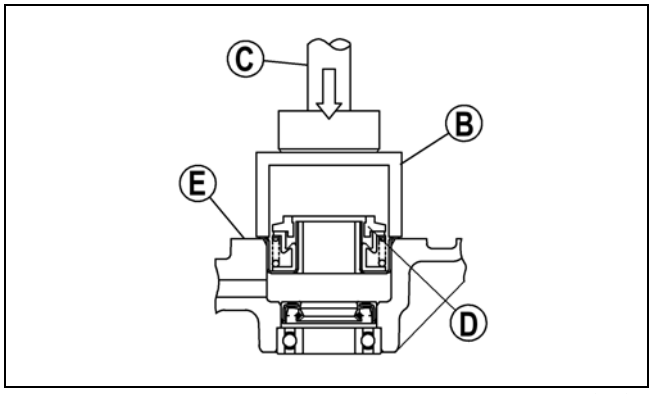


ATV2115

6. Press ball bearing (A) into the alternator cover from the inside until it is bottomed; then using a suitable socket (B) and bearing driver (C), press in a new mechanical seal (D) until the flange stops at (E).



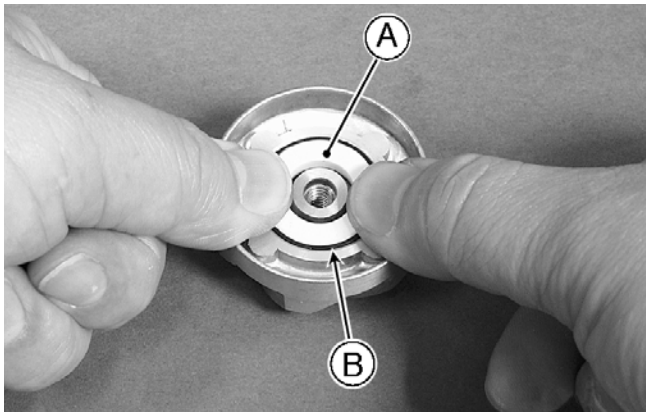
ATV2117



ATV2118A

7. Carefully clean the sliding surfaces of the new mechanical seal with clean solvent; then apply the coolant to the sliding surface to provide initial lubrication.

8. Apply coolant to the surfaces of the rubber seal and sealing seat (A); then press the rubber seal (B) and sealing seat into the impeller until the seat bottoms out.



KX380

9. Install the alternator cover (see Installing Left-Side Components in Section 3); then install the impeller and tighten clockwise to 0.8 kg-m (69 in.-lb).

10. Make sure that the alignment pins are correctly inserted; then using a new gasket, install the water pump cover and tighten the cap screws to 0.9 kg-m (78 in.-lb).

11. Install the recoil starter (see Installing Left-Side Components Section 3).

12. Install the coolant hoses onto the pump cover; then fill the cooling system with recommended coolant (see Section 2).

Testing Electric Fuel Pump

☞ AT THIS POINT

Prior to removing the electric fuel pump, the following check should be performed to determine that removal is necessary.

⚠ WARNING

Whenever any maintenance or inspection is made on the fuel system during which there may be fuel leakage, there should be no welding, smoking, open flames, etc., in the area.

1. Turn the ignition switch ON and listen for a momentary “whirring” sound of the pump building pressure. If the sound is heard (10 seconds), no electrical checks are necessary. Turn the ignition switch OFF.

2. Disconnect the fuel hose from the pump to the gas tank valve; then install a suitable pressure gauge.



KX192

3. Turn the ignition switch to the ON position. The fuel pressure should build until the pump shuts off. Pressure should read 0.18-0.23 kg-cm^2 (2.6-3.3 psi).

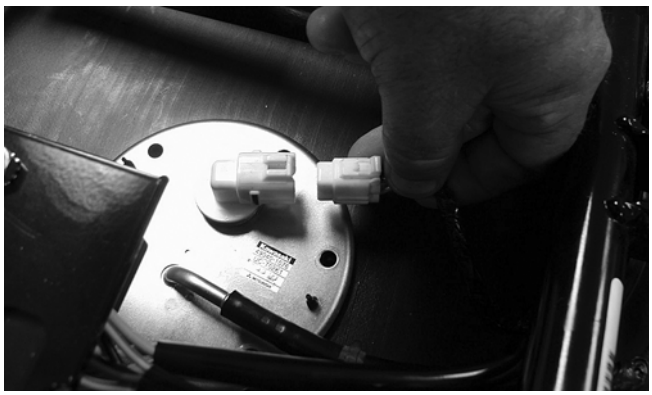
4. If the pump is not running, disconnect the fuel pump/tank sensor connector by reaching under the rear rack from behind.

5. Connect a multimeter to the power supply leads with the red tester lead to the brown wire and the black tester lead to the black/red wire; then turn the ignition switch to the ON position. The meter should red battery voltage. If battery voltage is indicated and the fuel pump does not run, replace the pump assembly. If no battery voltage is indicated, check the CDI and the vehicle tilt sensor.

■ **NOTE: To test the fuel gauge tank sensor, the fuel pump assembly must be removed.**

REMOVING

1. Remove the rear rack and fenders; then disconnect the power supply/ fuel gauge connector.



KX186

2. Remove the spring clamp; then remove the fuel hose.

3. Remove the screws securing the fuel pump to the gas tank; then make a reference mark on the fuel pump and tank.



KX187

4. Rotate the fuel pump assembly clockwise 90° to allow removal without removing the fuel tank.

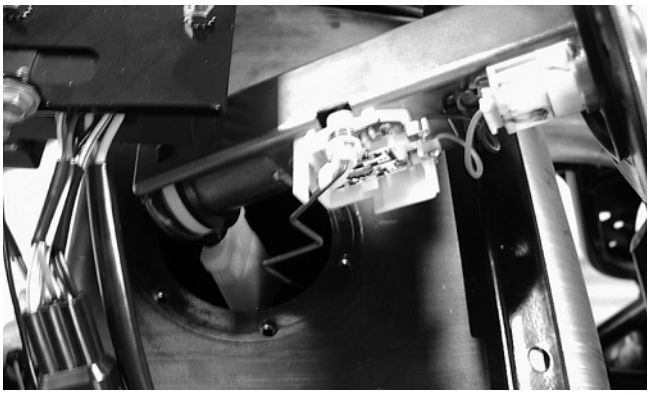


KX188

5. Lift out the fuel pump assembly carefully tilting it forward to clear the voltage regulator; then guide the pump and float lever through the opening in the gas tank.

⚠ CAUTION

Take care not to damage the float or float arm or replacement of the entire assembly will be necessary.



KX190

6. Using duct tape or other suitable means, cover the fuel pump opening.

INSPECTING

☞ AT THIS POINT

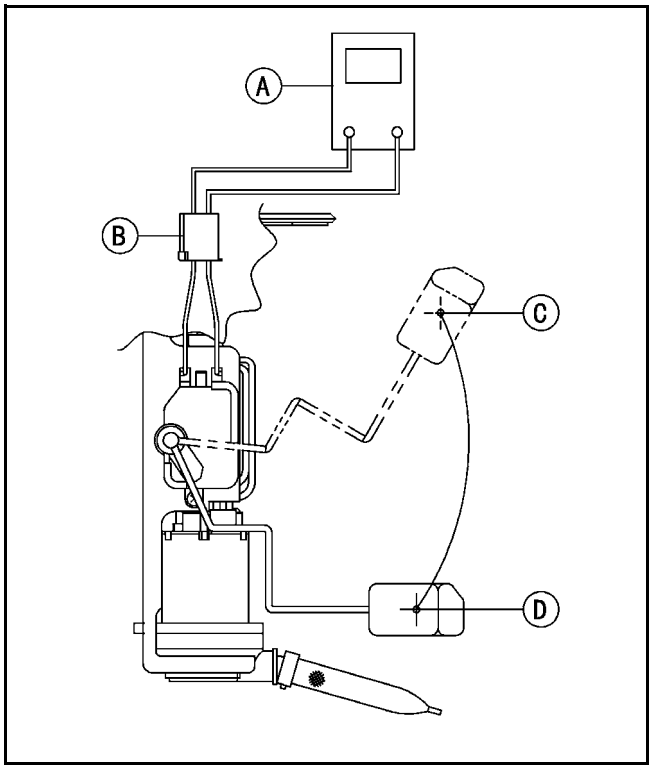
If the pump has failed earlier test and must be replaced, proceed to INSTALLING.

1. Inspect the fuel screen and blow clean with low pressure compressed air.
2. Move the float lever and check for free movement. The float assembly should return to the lower position without force. If not, replace the fuel pump assembly.



KX191

3. Test the fuel gauge tank sensor by connecting a multimeter (A) to the fuel sensor leads (B); then select OHMS. The multimeter should show 120 ohms at full fuel position (C) and 3 ohms at empty fuel position (D).

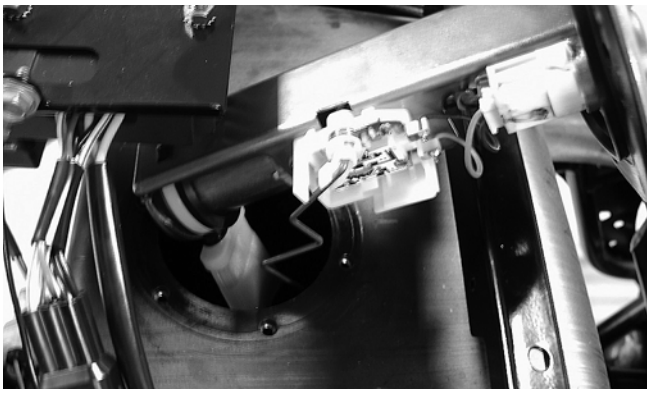


ATV2116

■ **NOTE: If readings are erratic, clean the resistor wiper and resistor with clean alcohol and retest. If still not correct, replace the fuel pump assembly.**

INSTALLING

1. Mark the new fuel pump with a reference mark in the same location as the removed pump; then place the new gasket on the pump.
2. Remove the material covering the fuel pump opening; then carefully guide the fuel pump into position taking care not to damage the float or float lever.



KX190

3. Rotate the fuel pump counterclockwise 90° or until the match marks align; then install the mounting screws and tighten securely using a crisscross pattern.

■ **NOTE: It is important to install the fuel pump with the correct orientation to ensure adequate float lever clearance.**

4. Connect the wires, fuel hose, and spring clamp; then turn the ignition switch to the ON position. Note that the fuel pump runs momentarily and the fuel gauge indicates the proper fuel level.
5. With the transmission in neutral and brake lever lock engaged, start the engine and check for normal operation. Check for any fuel leaks.
6. Install any wire ties that were removed; then install the rear fenders, rack, and seat making sure the seat locks securely.

SECTION 5 - ELECTRICAL SYSTEM

TABLE OF CONTENTS

Specifications 5-2
Battery 5-2
Testing Electrical Components 5-2
Accessory Receptacle/Connector 5-3
Brakelight Switch (Auxiliary) 5-3
Brakelight Switch (Handlebar Control) 5-4
Coolant Temperature and Cooling Fan Switches 5-4
Fan Motor 5-5
Power Distribution Module 5-5
Fuses 5-6
Ignition Coils 5-6
Ignition Switch 5-7
Handlebar Control Switches 5-8
Front Drive Selector Switch 5-9
Front Drive Selector Actuator 5-9
Differential Lock Switch 5-9
Magneto Coils 5-10
Starter Motor 5-11
Starter Relay 5-15
Neutral Start Relay 5-15
CDI Unit 5-16
Regulator/Rectifier 5-16
Neutral Start/Start-in-Gear Relays 5-16
Headlights 5-16
Taillight - Brakelight 5-17
Ignition Timing 5-17
Electronic Speedometer 5-18
V-Belt Failure Mode Clearing 5-22
100-Hour Belt Inspection Mode Clearing 5-23
Engine Brake Actuator Resistance 5-23
Engine Brake Controller Power Supply Voltage 5-23
Controller-to-Engine Brake Actuator Voltage 5-24
Forward/Reverse Detecting Sensor Resistance 5-24
Output-to-Actuator Voltage 5-24
Output-to-Speed Sensor Voltage 5-25
Speed Sensor Signal Voltage 5-25
Tilt Sensor Voltage 5-25
Wiring Diagram 5-27

Specifications

IGNITION	
Spark Plug Type	NGK CR7E
Spark Plug Gap	0.7-0.8 mm (0.028-0.032 in.)
Spark Plug Cap	4750-6250 ohms
Ignition Coil Resistance (primary)	0.09-0.13 ohm (terminal (+) to terminal (-))
(secondary)	3800-5800 ohms (high tension - plug cap removed - to ground)
Ignition Coil Peak Voltage (primary/CDI)	100 volts or more (wrie (+) to ground)
MAGNETO	
Magneto Coil Resistance (trigger)	110-140 ohms (blue to black/white)
(charging)	0.33-0.49 ohm (black to black)
Magneto Coil Peak Voltage (trigger)	3.6 volts or more (blue to black/white)
(charging)	14-15 volts (battery (+) to battery (-))

Battery

⚠ WARNING

Anytime service is performed on a battery, the following must be observed: keep sparks, open flame, cigarettes, or any other flame away. Always wear safety glasses. Protect skin and clothing when handling a battery. When servicing battery in enclosed space, keep the area well-ventilated. Make sure venting tube of battery is always open once battery is filled with electrolyte.

1. Remove the battery from the ATV.

⚠ WARNING

Remove the negative cable first; then remove the positive cable.

⚠ CAUTION

Do not charge the battery while it is in the ATV with the battery terminals connected.

2. Remove the vent plugs; then fill the battery with electrolyte to the UPPER level indicated on the battery.

■ NOTE: Electrolyte should be at room temperature before filling. Do not use water or any other liquid to activate a battery.

⚠ WARNING

Electrolyte is a sulfuric acid solution. Avoid spillage and contact with skin, eyes, and clothing.

3. Allow the battery to stand for 15-30 minutes after filling. Electrolyte level may fall during this time. Refill with electrolyte to UPPER level line.

4. Trickle-charge the battery at 1.4 amps for 8-10 hours.

5. After charging, check electrolyte level and fill with DISTILLED WATER as necessary; then install the vent plugs. Wash off acid spillage with water and dry the battery.

⚠ CAUTION

Before installing the battery, make sure the ignition switch is in the OFF position.

6. Place the battery into position in the ATV and secure; then connect the vent hose to the battery.

7. Connect cables to the proper terminals: positive cable to the positive terminal (+) and negative cable to the negative terminal (-). Connect the negative cable last.

⚠ CAUTION

Connecting cables in reverse (positive to negative and negative to positive) can cause serious damage to the electrical system.

8. Check the vent tube to make sure it is not pinched or obstructed in any way and that it is properly routed down through the frame.

Testing Electrical Components

All of the electrical tests should be made using the Fluke Model 73 Multimeter (p/n 0644-191) and when testing peak voltage, the Peak Voltage Reading Adapter (p/n 0644-307) must be used. If any other type of meter is used, readings may vary due to internal circuitry. When troubleshooting a specific component, always verify first that the fuse(s) are good, that the bulb(s) are good, that the connections are clean and tight, that the battery is fully charged, and that all appropriate switches are activated.

■ NOTE: For absolute accuracy, all tests should be made at room temperature of 68° F.

Accessory Receptacle/Connector

■NOTE: This test procedure is for either the receptacle or the connector.

VOLTAGE

1. Set the meter selector to the D.C. Voltage position.
2. Connect the red tester lead to the red/white wire or the positive connector; then connect the black tester lead to ground.



AR606D

3. The meter must show battery voltage.

■NOTE: If the meter shows no battery voltage, troubleshoot the battery, fuse, receptacle, connector, or the main wiring harness.

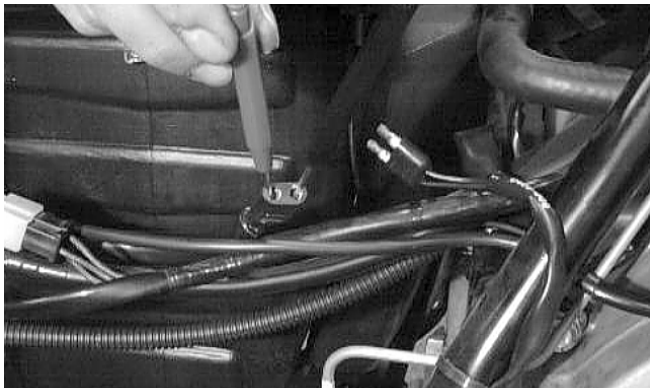
Brakelight Switch (Auxiliary)

The switch connector is the two-prong connector on the right side of the engine directly above the brake cable adjuster.

■NOTE: The ignition switch must be in the ON position.

VOLTAGE (Wiring Harness Side)

1. Set the meter selector to the D.C. Voltage position.
2. Connect the red tester to the orange wire; then connect the black tester lead to ground.



AR627D

3. The meter must show battery voltage.

■NOTE: If the meter shows no battery voltage, troubleshoot the battery, fuse, switch, or the main wiring harness.

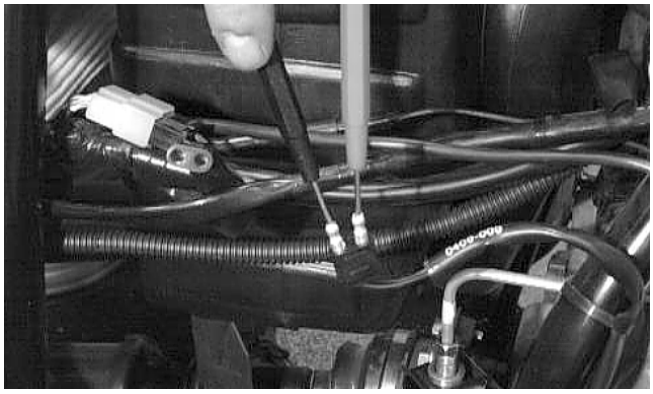
■NOTE: If the meter shows battery voltage, the main wiring harness is good; proceed to test the switch/component, the connector, and the switch wiring harness for resistance.

RESISTANCE (Switch Connector)

⚠ CAUTION

Always disconnect the battery when performing resistance tests to avoid damaging the multimeter.

1. Set the meter selector to the OHMS position.
2. Connect the red tester lead to one black wire; then connect the black tester lead to the other black wire.



AR626D

3. When the brake pedal is depressed, the meter must show less than 1 ohm.

■NOTE: If the meter shows more than 1 ohm of resistance, troubleshoot or replace the switch/component, the connector, or the switch wiring harness.

Brakelight Switch
(Handlebar Control)

The switch connector is the two-prong black connector in front of the steering post. To access the connector, the front rack and front fenders must be removed (see Section 8).

■NOTE: The ignition switch must be in the ON position.

VOLTAGE
(Wiring Harness Connector)

1. Set the meter selector to the D.C. Voltage position.
2. Connect the red tester lead to the orange wire; then connect the black tester lead to ground.



AR622D

3. The meter must show battery voltage.

■NOTE: If the meter shows no battery voltage, troubleshoot the battery, fuse, switch, or the main wiring harness.

■NOTE: If the meter shows battery voltage, the main wiring harness is good; proceed to test the switch/component, the connector, and the switch wiring harness for resistance.

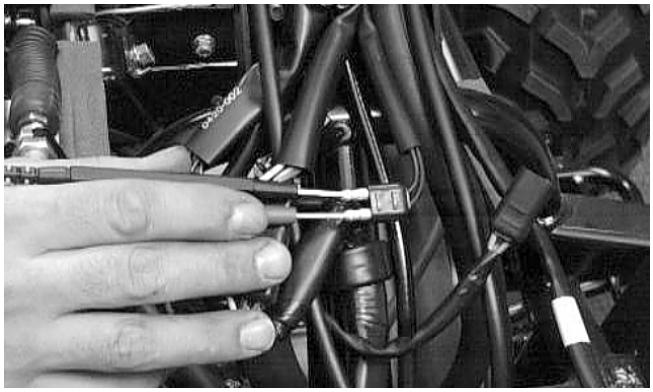
RESISTANCE
(Switch Connector)

⚠ CAUTION

Always disconnect the battery when performing resistance tests to avoid damaging the multimeter.

■NOTE: The brake lever must be compressed for this test. Also, the ignition switch must be in the OFF position.

1. Set the meter selector to the OHMS position.
2. Connect the red tester lead to one black wire; then connect the black tester lead to the other black wire.



AR621D

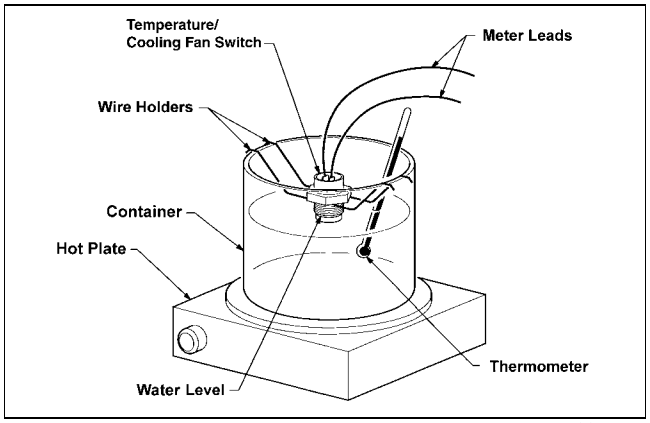
3. When the lever is compressed, the meter must show less than 1 ohm.

■NOTE: If the meter shows more than 1 ohm of resistance, troubleshoot or replace the switch/component, the connector, or the switch wiring harness.

Coolant Temperature and Cooling Fan Switches

1. Connect the meter leads (selector in the OHMS position) to the switch contacts.
2. Suspend the switch and a thermometer in a container of water; then heat the water.

■NOTE: Neither the switch nor the thermometer should be allowed to touch the bottom of the container or inaccurate readings will occur. Use wire holders to suspend switch and thermometer.



733-554E

3. On the coolant temperature switch when the water temperature reaches 112°-118° C (234°-244° F) the meter should read a closed circuit.

4. On the coolant temperature switch, allow the water to cool, and when the temperature is at (or just before) a temperature of 108°-111° C (226°-232° F), the meter should read an open circuit.

5. On the cooling fan switch when the temperature reaches 66°-68° C (150°-155° F), the meter should read a closed circuit.

6. On the cooling fan switch, allow the water to cool, and when the temperature is at (or just before) a temperature of 62°-65° C (145°-149° F), the meter should read an open circuit.

7. If the readings are not as indicated, the switch must be replaced.

8. Install the switch and tighten securely.

9. Connect the switch leads.

Fan Motor

To access the connector (located directly behind the fan), the front rack and front fenders must be removed (see Section 8).

■NOTE: The ignition switch must be in the ON position.

VOLTAGE (Main Harness Connector to Fan Motor)

1. Set the meter selector to the D.C. Voltage position.

2. Connect the red tester lead to the black/red wire (the black 2-prong at the fan motor); then connect the black tester lead to ground.

3. The meter must show battery voltage.

■NOTE: If the meter shows no battery voltage, troubleshoot the battery, fuse, motor, or the main wiring harness.

■NOTE: If the meter shows battery voltage, the main wiring harness is good. The connector should be checked for resistance.

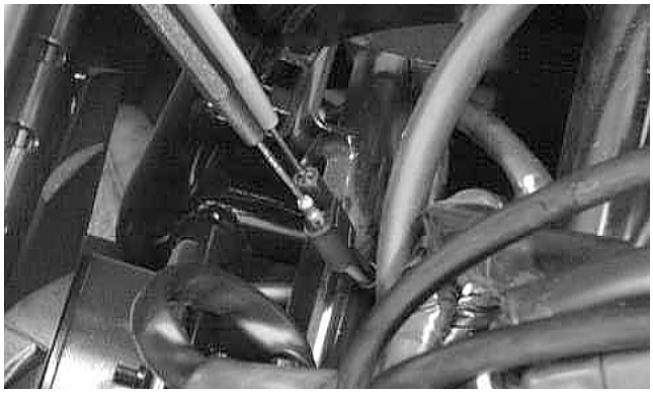
RESISTANCE (Fan Motor Connector)

⚠ CAUTION

Always disconnect the battery when performing resistance tests to avoid damaging the multimeter.

1. Set the meter selector to the OHMS position.

2. Connect the red tester lead to the red wire; then connect the black tester lead to the black wire.



AR645D

3. The meter must show less than 1 ohm.

■NOTE: If the meter shows more than 1 ohm of resistance, troubleshoot or replace the switch/component, the connector, or the switch wiring harness.

■NOTE: To determine if the fan motor is good, connect the red wire from the fan connector to a 12 volt D.C. power supply; then connect the black wire from the fan connector to ground. The fan should operate.

⚠ CAUTION

Care should be taken to keep clear of the fan blades.

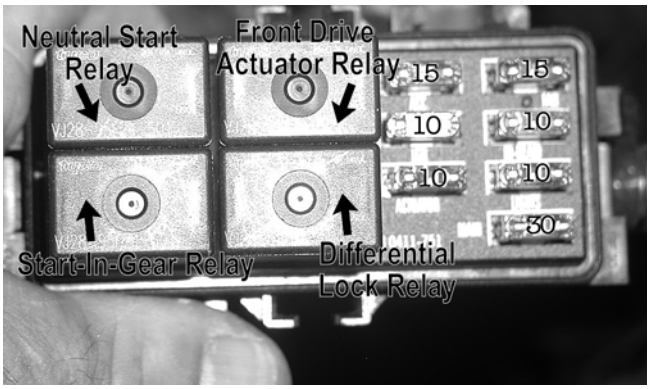
Power Distribution Module

The fuses are located on the power distribution module above the footrest behind the right front fender. To remove the cover, compress the locking tabs on either side of the cover and lift off.



KX054A

If there is any type of electrical system failure, always check the fuses first.



KX202A

■**NOTE: The ignition switch must be in the LIGHTS position.**

1. Remove all fuses from the power distribution module.
2. Set the meter selector to the D.C. Voltage position.
3. Connect the black tester lead to ground.
4. Using the red tester lead, contact each end of the fuse holder connector terminals individually.
5. The meter must show battery voltage from one side of the connector terminal ends.

■**NOTE: Battery voltage will be indicated from only one side of the fuse holder connector terminal; the other side will show 0 volts.**

■**NOTE: When testing the HI-Beam fuse holder, the headlight dimmer switch must be in the HI position; when testing the LIGHTS fuse holder, the headlight dimmer switch must be in the LO position.**

■**NOTE: If the meter shows no battery voltage, troubleshoot the battery, switches, or the power distribution module/main wiring harness.**

Fuses

⚠ CAUTION

Always disconnect the battery when performing resistance tests to avoid damaging the multimeter.

1. Set the meter selector to the OHMS position.
2. Connect the red tester lead to one spade end of the fuse; then connect the black tester lead to the other spade end.
3. The meter must show less than 1 ohm resistance. If the meter reads open, replace the fuse.

■**NOTE: Make sure the fuses are returned to their proper position according to amperage. Proper fuse locations are embossed on the power distribution module.**

Ignition Coils

The ignition coils are attached to the upper frame behind the left side panel. To access the coils, the left side panel must be removed (see Section 8).

⚠ WARNING

Most voltages generated by the ignition system are sufficient to interrupt pacemakers! All technicians, especially those using pacemakers, must avoid contact with all electrical connections when making these tests.

PEAK VOLTAGE (Primary Side)

■**NOTE: The ignition switch must be in the ON position; the emergency stop switch must be in the RUN position. Also, the front coil wire must be disconnected from the rear coil.**

1. Set the meter selector to the D.C. Voltage position.
2. Connect the red tester lead to the white/blue wire (front coil) or white/green wire (rear coil); then connect the black tester lead to ground.
3. The meter must show 31V ± 20%.
4. With the tester leads connected, depress the starter button.
5. The meter must show 100V or more.

■**NOTE: If the voltage is not as specified in one or both of the above tests, inspect the main wiring harness, connectors, charge coil, magneto rotor and magnets, magneto rotor key, or the CDI unit.**

RESISTANCE

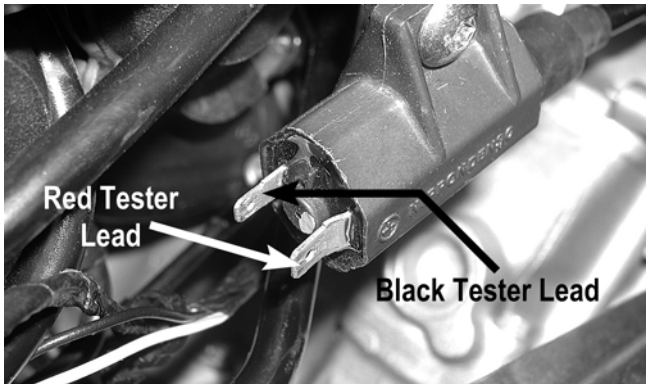
⚠ CAUTION

Always disconnect the battery when performing resistance tests to avoid damaging the multimeter.

■ NOTE: For these tests, the meter selector should be set to the OHMS position.

Primary Winding

1. Connect the red tester lead to the (+) terminal (with the wire removed); then connect the black tester lead to the (-) terminal.

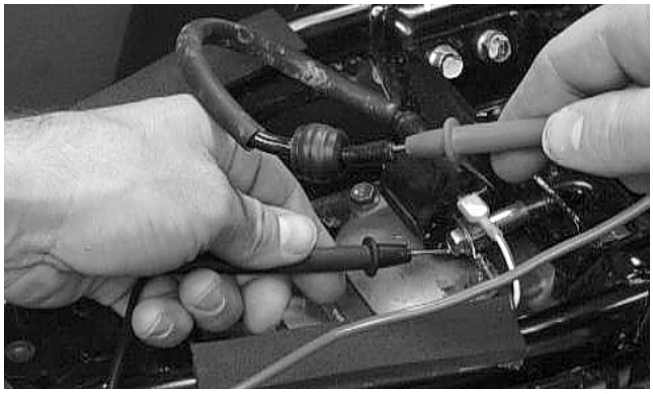


KX201A

2. The meter reading must be within specification.

Secondary Winding

1. Connect the red tester lead to the high tension lead (plug cap removed); then connect the black tester lead to ground.



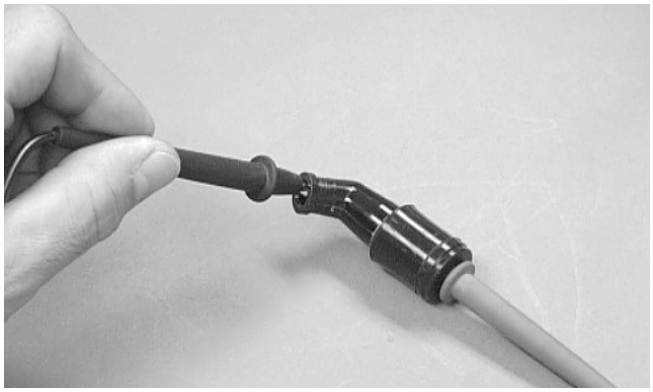
AR601D

2. The meter reading must be within specification.

■ NOTE: If the meter does not show as specified, replace ignition coil.

Spark Plug Cap

1. Connect the red tester lead to one end of the cap; then connect the black tester lead to the other end of the cap.



AR603D

2. The meter reading must be within specification.

■ NOTE: If the meter does not read as specified, replace the spark plug cap.

Ignition Switch

The connector is beneath the front fenders. To access the connector, the front rack, front fenders, and instrument pod must be removed.

VOLTAGE

■ NOTE: Perform this test on the lower side of the connector.

1. Set the meter selector to the D.C. Voltage position.
2. Connect the red meter lead to the red wire; then connect the black meter lead to ground.
3. Meter must show battery voltage.

■ NOTE: If the meter shows no battery voltage, troubleshoot the battery or the main wiring harness.

RESISTANCE

⚠ CAUTION

Always disconnect the battery when performing resistance tests to avoid damaging the multimeter.

■ NOTE: Perform this test on the upper side of the connector.

1. Turn the ignition switch to the ON position.
2. Set the meter selector to the OHMS position.
3. Connect the red tester lead to the red wire; then connect the black tester lead to the brown wire.
4. The meter must show 980-1020 ohms.

5. Turn the ignition switch to the LIGHTS position.
6. Connect the red tester lead to the red wire; then connect the black tester lead to the brown wire.
7. The meter must show 980-1020 ohms.
8. Connect the red tester lead to the red wire; then connect the black tester lead to the gray wire.
9. The meter must show less than 1 ohm.
10. With the switch in the OFF position, connect the red tester lead to the red wire and the black tester lead to each of the remaining wires (brown, red/black, and gray). The meter must show an open circuit on all wires.

■ **NOTE: If the meter does not show the specified values, replace the ignition switch assembly.**

Handlebar Control Switches

The connector is in front of the steering post. To access the connector, the front rack and front fenders must be removed (see Section 8).

■ **NOTE: These tests should be made on the top side of the connector.**

⚠ CAUTION

Always disconnect the battery when performing resistance tests to avoid damaging the multimeter.

RESISTANCE (HI Beam)

1. Set the meter selector to the OHMS position.
2. Connect the red tester lead to the yellow wire; then connect the black tester lead to the gray wire.
3. With the dimmer switch in the HI position, the meter must show less than 1 ohm.

■ **NOTE: If the meter shows more than 1 ohm of resistance, troubleshoot or replace the switch/component, the connector, or the switch wiring harness.**

RESISTANCE (LO Beam)

1. Connect the red tester lead to the white wire; then connect the black tester lead to the gray wire.
2. With the dimmer switch in the LO position, the meter must show an open circuit.

■ **NOTE: If the meter reads resistance, troubleshoot or replace the switch/component, the connector, or the switch wiring harness.**

RESISTANCE (Starter Button)

1. Set the meter selector to the Diode position.
2. Connect the red tester lead to the orange wire; then connect the black tester lead to the yellow/green wire.
3. With the starter button depressed, the meter must show less than 1 ohm.
4. With the starter button released, the meter must show an open circuit.
5. Connect the red tester lead to the yellow/green wire; then connect the black tester lead to the orange wire.
6. With the starter button depressed, the meter must show an open circuit.

■ **NOTE: If the meter does not show as specified, replace the switch/component, connector, or switch harness.**

RESISTANCE (Emergency Stop)

1. Set the meter selector to the OHMS position.
2. Connect the red tester lead to the orange wire; then connect the black tester lead to the orange/white wire.
3. With the switch in the OFF position, the meter must show an open circuit.
4. With the switch in the RUN position, the meter must show less than 1 ohm.

■ **NOTE: If the meter shows more than 1 ohm of resistance, troubleshoot or replace the switch/component, the connector, or the switch wiring harness.**

RESISTANCE (Reverse Override)

The connector is the four-prong white one in front of the steering post. To access the connector, the front rack and front fenders must be removed (see Section 8).

1. Set the meter selector to the OHMS position.
2. Connect the red tester lead to one red/yellow wire; then connect the black tester lead to the other red/yellow wire. The meter must show less than 1 ohm.
3. Depress and hold the reverse override button. The meter must show an open circuit.

4. Connect the red tester lead to the blue wire; then connect the black meter lead to the black wire. The meter must show an open circuit.

5. Depress and hold the reverse override button. The meter must show less than 1 ohm.

■ NOTE: If the meter does not show as specified, replace the switch/component, connector, or switch harness.

Front Drive Selector Switch

The connector is the two-wire black snap-lock one in front of the steering post. To access the connector, the front rack and front fenders must be removed (see Section 8).

■ NOTE: Resistance tests should be made with the connector disconnected and on the selector-side of the connector.

RESISTANCE

⚠ CAUTION

Always disconnect the battery when performing resistance tests to avoid damaging the multimeter.

1. Set the meter selector to the OHMS position.

2. Connect the red tester lead to the red wire; then connect the black tester lead to the white wire.

3. With the selector switch in the 2WD position, the meter must show a closed circuit.

4. With the selector switch in the 4WD position, the meter must show an open circuit.

■ NOTE: If the meter does not show as specified, replace the front drive selector switch.

VOLTAGE

■ NOTE: The battery must be connected when performing voltage tests.

1. Set the meter selector to the D.C. Voltage position.

2. Connect the black tester lead to the negative battery terminal.

3. Connect the red tester lead to the orange wire on the harness side of the connector.

4. Turn the ignition switch to the RUN position.

5. The meter must show 12 D.C. volts.

■ NOTE: If the meter shows other than specified, check the harness, connector, 30 amp fuse, and battery connections.

Front Drive Selector Actuator

■ NOTE: With the engine stopped and the ignition switch in the ON position, a momentary "whirring" sound must be noticeable each time the selector switch is moved to 2WD and 4WD. Test the switch, 30 amp fuse, and wiring connections prior to testing the actuator.

VOLTAGE

1. Select the 2WD position on the front drive selector switch; then disconnect the four-prong connector on the actuator wiring harness.

2. With the ignition switch in the OFF position, connect the black tester lead to the black wire in the supply harness; then connect the red tester lead to the orange wire in the supply harness.

3. Turn the ignition switch to the ON position. The meter must show 12 D.C. volts.

4. Connect the red tester lead to the white/red wire in the supply harness. The meter must show 12 D.C. volts.

5. Select the 4WD position on the front drive selector switch; then connect the red tester lead to the white/red wire in the supply harness. The meter must show 0 D.C. volts.

6. Connect the red tester lead to the orange wire in the supply harness. The meter must show 12 D.C. volts.

■ NOTE: If the voltage readings are as specified and the actuator does not function correctly, replace the actuator (see Section 6).

Differential Lock Switch

1. Remove the left front inner fender panel.

2. Select D.C. Voltage on the multimeter; then connect the red tester lead to the switch terminal (leaving the wire connected) and the black tester lead to ground.

3. Turn the ignition switch to the ON position and select 2 WD on the front drive selector switch; then while watching the meter (12 D.C.volts), select the lock position on the differential lock. The meter should drop to 0 volts.

■NOTE: It may be necessary to rock the ATV slightly to engage the differential lock fully.

Magneto Coils

VOLTAGE (Charging Coil - Output)

1. Set the meter selector to the D.C. Voltage position.
2. Connect the red tester lead to the positive battery post; then connect the black tester lead to the negative battery post.
3. With the engine running at a constant 5000 RPM (with the headlights on), the meter must show 14-15 D.C. volts.

⚠ CAUTION

Do not run the engine at high RPM for more than 10 seconds.

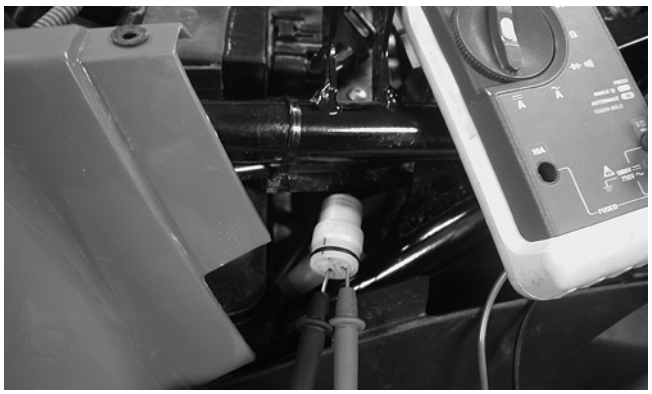
■NOTE: If voltage is lower than specified, test charging coil - no load.

VOLTAGE (Charging Coil - No Load)

The connector is the white one on the right side behind the engine.

■NOTE: Test the connector that comes from the engine.

1. Set the meter selector to the A.C. Voltage position.
2. Test between the three black wires for a total of three tests.



KX387

3. With the engine running at a constant 3000 RPM, all wire tests must show 39-59 A.C. volts.

⚠ CAUTION

Do not run the engine at high RPM for more than 10 seconds.

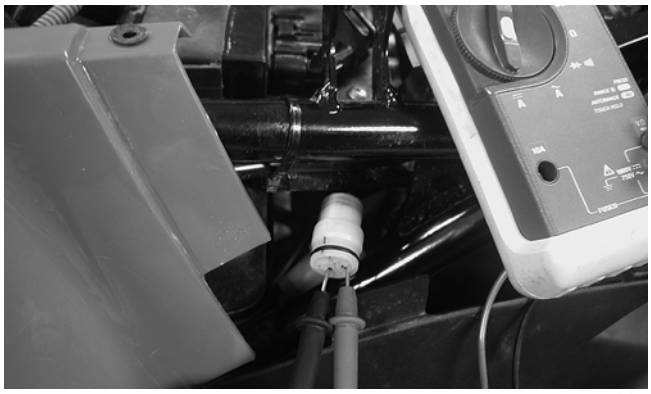
■NOTE: If both charging coil tests failed, check all connections, etc., and test again. If no voltage is present, replace the stator assembly.

RESISTANCE (Charging Coil)

⚠ CAUTION

Always disconnect the battery when performing resistance tests to avoid damaging the multimeter.

1. Set the meter selector to OHMS position.
2. Test between the three black wires for a total of three tests.



KX387

3. The meter reading must be within specification.

RESISTANCE (Trigger Coil)

⚠ CAUTION

Always disconnect the battery when performing resistance tests to avoid damaging the multimeter.

1. Set the meter selector to the OHMS position.
2. Connect the red tester lead to the black/white wire; then connect the black tester lead to the blue wire. The meter reading must be within specification.

PEAK VOLTAGE

■NOTE: All of the peak voltage tests should be made using the Fluke Model 73 Multimeter (p/n 0644-191) with Peak Voltage Reading Adapter (p/n 0644-307). If any other type of tester is used, readings may vary due to internal circuitry.

■NOTE: The battery must be at full charge for these tests.

Magneto Coil (Trigger)

1. Set the meter selector to the D.C. Voltage position.
2. Connect the red tester lead to the black/white wire; then connect the black tester lead to the blue wire.
3. Crank the engine over using the electric starter.
4. The meter reading must be within specification.

Magneto Coil (Charging)

1. Set the meter selector to the D.C. Voltage position.
2. Connect the red tester lead to the black wire; then connect the black tester lead to black wire #1.
3. Crank the engine over using the electric starter.
4. The meter reading must be within specification.

■ **NOTE: Repeat steps 2-4 for black wire #2.**

Starter Motor

REMOVING/DISASSEMBLING

1. Disconnect the battery.

⚠ CAUTION

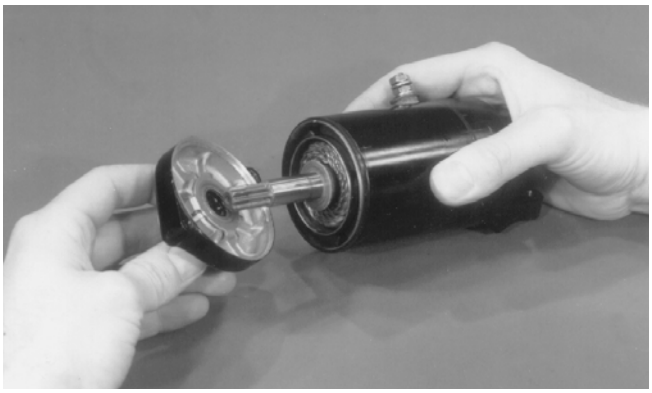
Always disconnect the negative battery cable from the battery first; then disconnect the positive cable.

2. Remove the nut securing the positive cable to the starter; then remove the cable from the starter.
3. Remove the two cap screws securing the starter to the crankcase; then remove the starter. Account for the wiring forms and an O-ring.
4. For assembly purposes, scribe a line across the outside of the starter assembly.



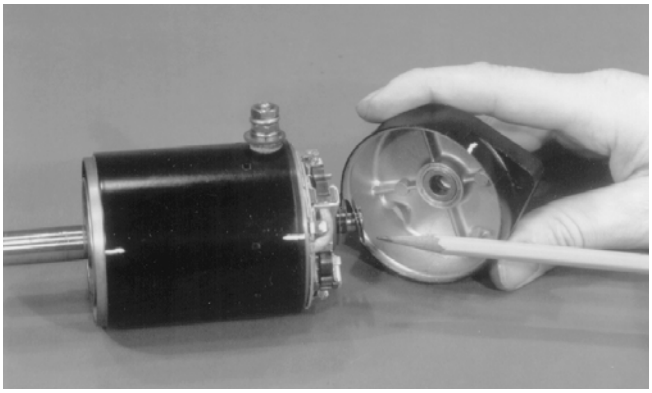
AR652D

5. Remove the two long starter cap screws securing the starter components.
6. Remove the front cover from the starter housing and armature shaft. Account for a seal protector and three washers.



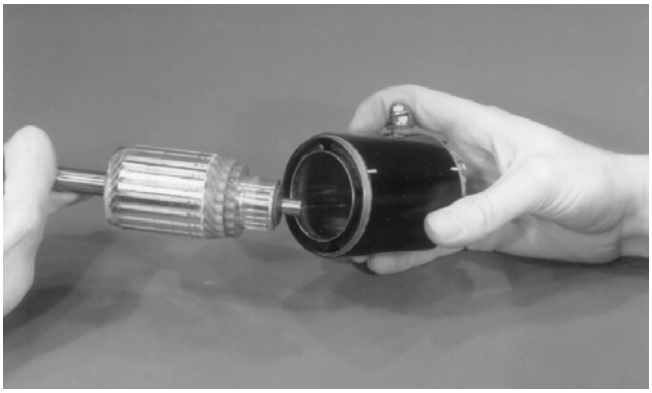
BC003

7. Remove the rear cover.



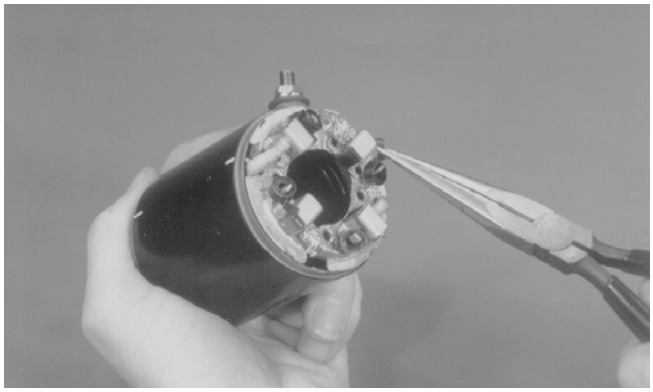
BC005

8. Slide the armature free of the starter housing.



BC006

9. Bend the two positive brushes outward; then remove the brush holder.

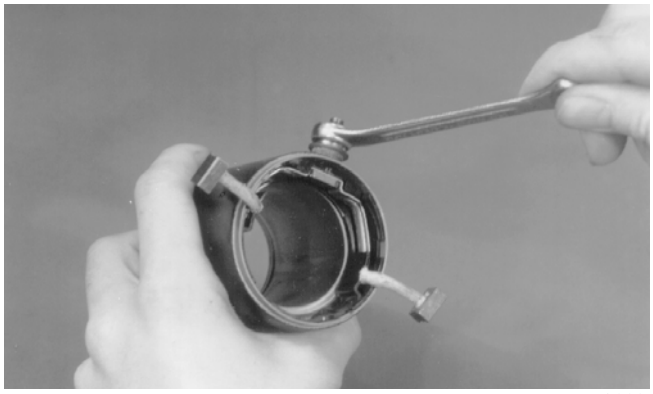


BC007



BC010

10. Remove the nut from the positive post. Account for the lock washer, flat washer, a fiber washer, and an O-ring.



BC008

11. Remove the positive brush assembly from the starter housing.



BC009

CLEANING AND INSPECTING

■NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

1. Thoroughly clean all components except the armature and brushes in parts-cleaning solvent; then dry with compressed air.

⚠ CAUTION

Do not wash the armature and brushes in any kind of solvent. Use only compressed air and a clean dry, lint-free cloth.

2. Inspect all threaded areas for damage or stripped threads.

3. Inspect the brush holder assembly and brushes for damage or wear. Using a caliper, measure the length of the brushes. If brush measurement is less than 10.1 mm (0.40 in.), replace with new brushes and brush springs as a set.

4. Inspect the brush leads for cracks, wear, or fraying. If any of these conditions exist, replace with new brushes and brush springs as a set.

5. Inspect the rear cover bushing for wear.

6. Inspect the front cover bearing for wear.

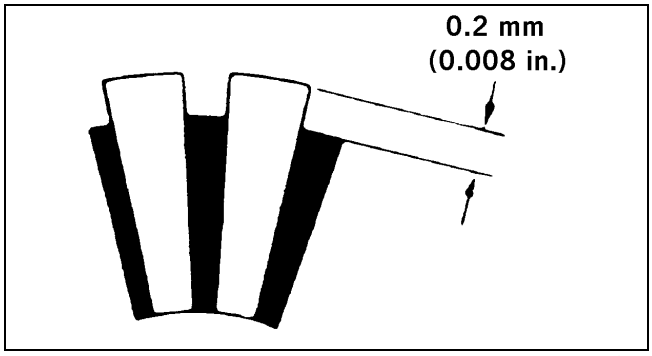
7. Inspect the brass commutator end of the armature for any burned spots or damage. If the commutator is lightly burned or damaged, the armature must be replaced. This is a molded commutator and turning it down in a lathe should not be attempted.

⚠ CAUTION

Do not use emery cloth to clean the commutator as emery particles will become imbedded in the brass commutator resulting in a short circuit. Use only #200 grit sandpaper.

8. Inspect the commutator end of the armature for buildup in the grooves. Carefully remove any buildup by undercutting using a thinly ground hacksaw blade. Do not undercut any deeper than the original groove which can be seen by looking at the end of the commutator.

9. Using a caliper, measure the undercut. Maximum undercut groove must be 0.2 mm (0.008 in.).



ATV-1054

⚠ CAUTION

Buildup in the grooves must be removed to prevent any chance of an electrical arc between individual sections of the commutator.

10. Inspect the commutator for shorting using a multimeter and the following procedure.

    A. Set the selector to the OHMS position.

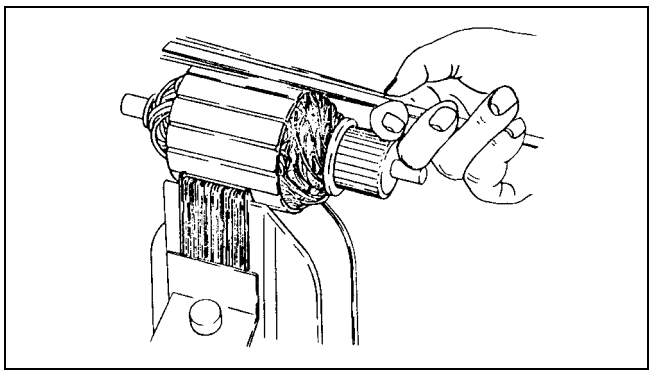
    B. Touch the black lead to the armature shaft.

    C. Using the red tester lead, probe the commutator end of the armature. The meter indicator should not change. If the indicator shows resistance, the armature is shorted and must be replaced.

11. Inspect the armature for shorting using a "growler" and the following procedure.

    A. Place the armature in the "growler."

    B. While holding a metal strip on the armature, rotate the armature an entire revolution. If the metal strip vibrates at any point on the armature, the armature is shorted and must be replaced.



0725-653

12. Inspect the ground brushes to make sure they are properly grounded. Use a multimeter and the following procedure.

    A. Set the selector to the OHMS position.

    B. Touch the black tester lead to a ground brush.

    C. Touch the red tester lead to the brush holder assembly.

■ NOTE: If no resistance is indicated, check the ground connection for tightness and for cleanliness. If there is still no meter indication, replace the brush assembly.

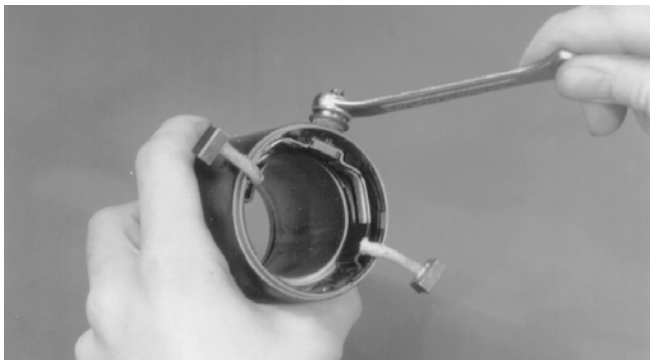
ASSEMBLING/INSTALLING

1. Install the positive post on the positive brush assembly; then install on the starter housing.



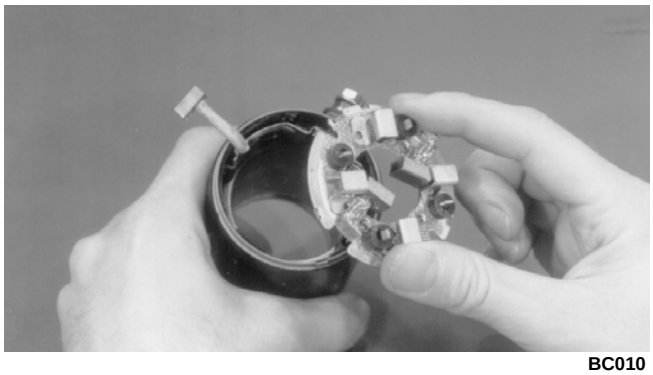
BC009

2. On the positive post, install an O-ring washer, a fiber washer, a flat washer, and a lock washer. Secure with the nut.



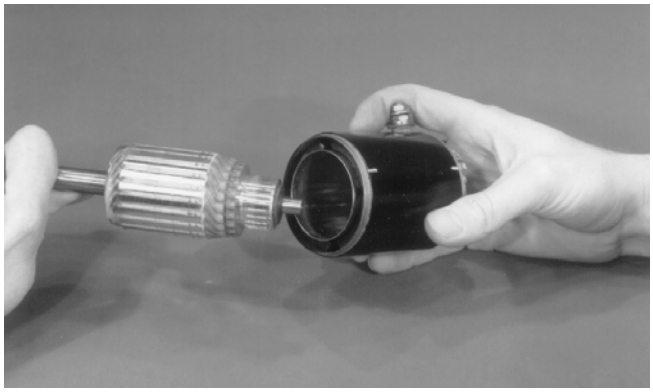
BC008

3. Align the tab on the brush holder with the notch in the starter housing; then install.



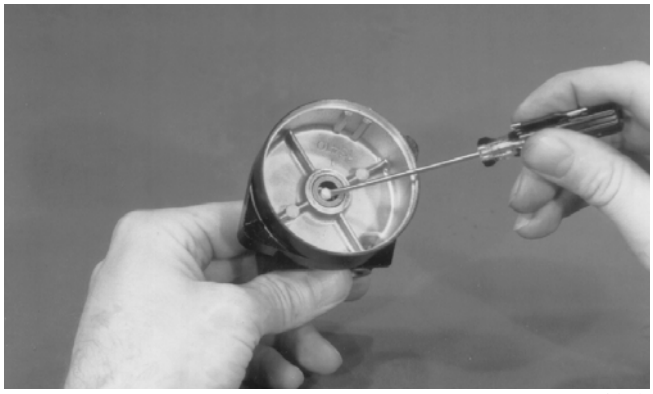
BC010

4. Install the armature into the starter housing; then while holding the brushes out, slide the commutator into the brush holder.



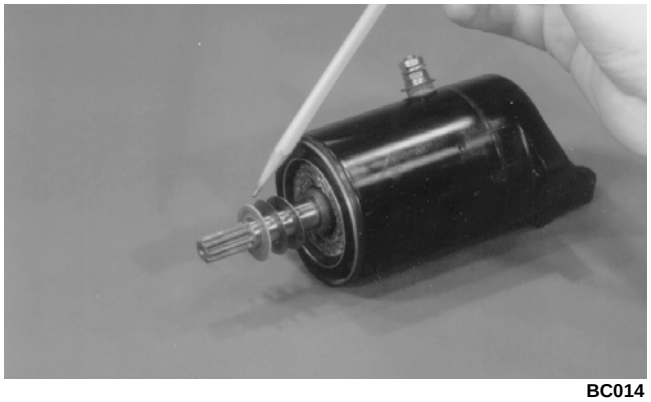
BC006

5. Apply a small amount of grease to the rear cover bushing; then install the cover on the starter housing making sure the reference marks align.



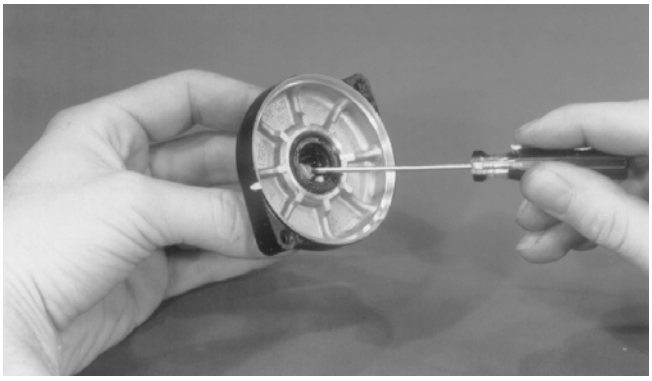
BC013

6. In order, install the thick metal washer, thin metal washer, and the fiber washer on the armature shaft; then install the housing O-ring on the starter housing.

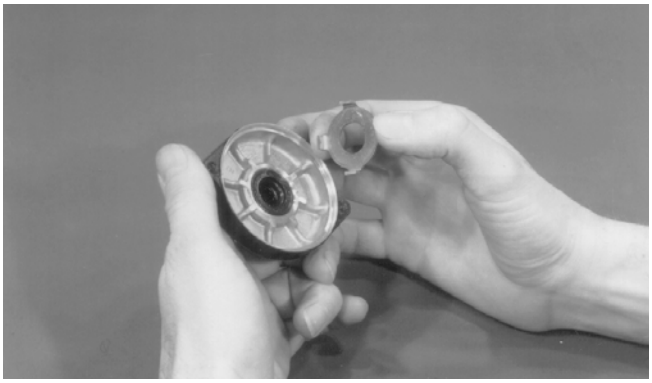


BC014

7. Apply a small amount of grease to the front cover bearing and seal; then install the seal protector.



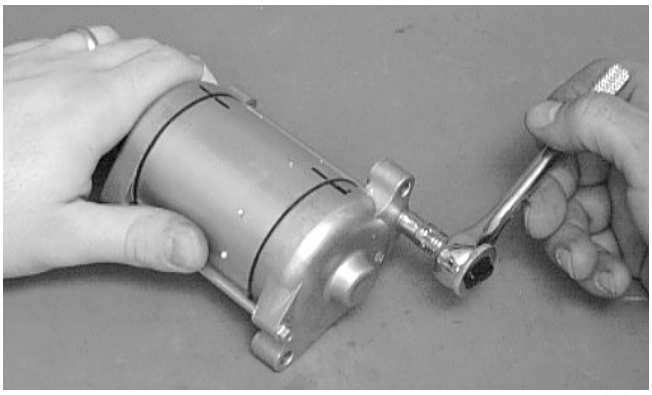
BC015



BC004

8. Place the front cover onto the starter housing making sure it seats properly.

9. Apply red Loctite #271 to the threads of the two long cap screws and install. Tighten to 0.8-1.2 kg-m (6-9 ft-lb).



AR653D

10. Apply a small amount of grease to the O-ring seal on the starter; then install the starter into the crankcase. Secure with two cap screws and wiring forms.

11. Secure the positive cable to the starter with the nut.

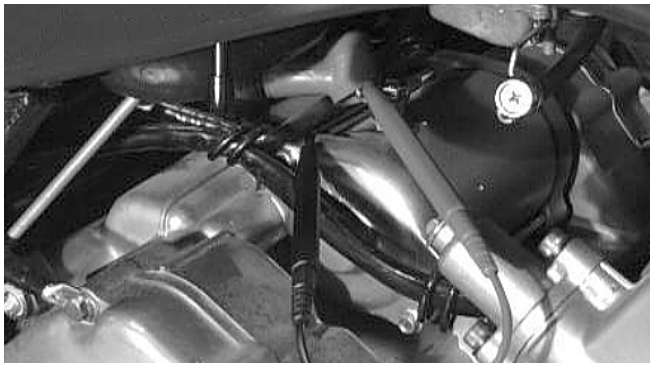
12. Connect the battery.

TESTING VOLTAGE

Perform this test on the starter motor positive terminal. To access the terminal, slide the boot away.

■NOTE: The ignition switch must be in the ON position, the emergency stop switch in the RUN position, and the shift lever in the NEUTRAL position.

1. Set the meter selector to the D.C. Voltage position.
2. Connect the red tester lead to the starter terminal; then connect the black tester lead to ground.
3. With the starter button depressed, the meter must show a drop in battery voltage and the starter motor should operate.

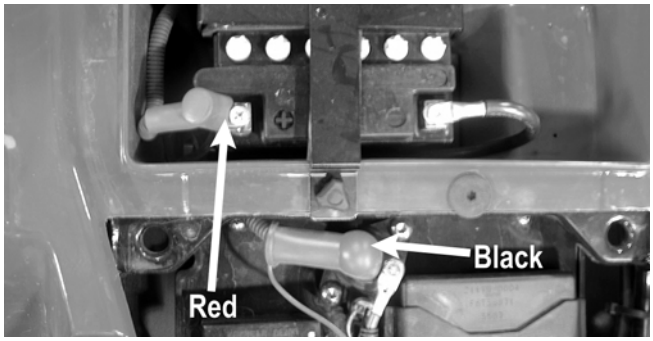


AR607D

■NOTE: If the meter showed no battery voltage, inspect the main fuse, ground connections, starter motor lead, battery voltage (at the battery), switches, starter relay, or neutral start relay.

Starter Relay

1. Remove the seat; then using the multimeter set to the D.C. Voltage position, check the relay as follows.
2. Connect the red tester lead to the positive battery terminal; then connect the black tester lead to the starter cable connection on the starter relay. The meter must show battery voltage.



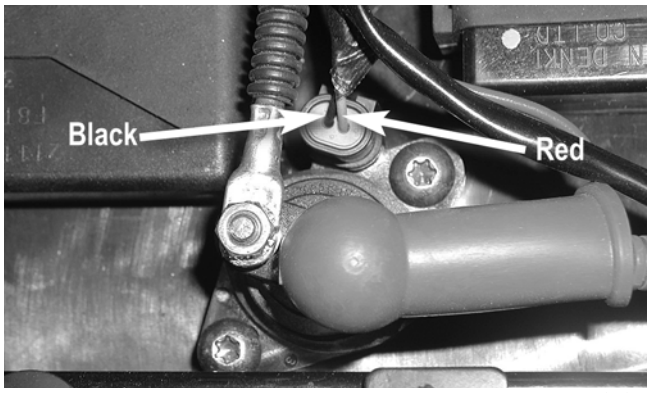
KX206A

■NOTE: Make sure that the ignition switch is in the ON position, transmission in neutral, brake lock released, and the emergency stop switch in the RUN position.

3. Depress the starter button while observing the multimeter. The multimeter should drop to 0 volts and a “click” should be heard from the relay.

■NOTE: If a “click” is heard and any voltage is indicated by the multimeter, replace the starter relay. If no “click” is heard and the multimeter continues to indicate battery voltage, proceed to step 4.

4. Disconnect the two-wire plug from the starter relay; then connect the red tester lead to the green wire and the black tester lead to the black wire.



KX059A

5. Depress the starter button and observe the multimeter.

■NOTE: If battery voltage is indicated, replace the starter relay. If no voltage is indicated, proceed to Neutral Start Relay check.

Neutral Start Relay

■NOTE: Make sure that the ignition switch is in the ON position, transmission in neutral, brake lever lock released, and the emergency stop switch in the RUN position.

Compress the hand brake lever or depress the auxiliary brake pedal and observe the multimeter.

■NOTE: If battery voltage is indicated on the multimeter, replace the neutral start relay. If no voltage is indicated, check the starter button or wiring harness. Connect the two-wire plug into the neutral start relay.

CDI Unit

The CDI is located beneath the seat near the battery.

■ NOTE: The CDI unit is not a serviceable component. If the unit is defective, it must be replaced.

The CDI is rarely the cause for electrical problems; however, if the CDI is suspected, substitute another CDI unit to verify the suspected one is defective.

■ NOTE: Prior to replacing the CDI unit to assure the CDI unit is defective, it is advisable to perform a CDI peak voltage test (see Ignition Coils in this section) and/or perform a continuity test of the wiring harness from the CDI connector to the CDI unit.

Regulator/Rectifier

The regulator/rectifier is located under the rear rack and rear fenders. Try to verify all other charging system components before the regulator/rectifier is replaced.

TESTING

1. Start engine and warm up to normal operating temperatures; then connect a multimeter to the battery as follows.
2. Select the D.C. Voltage position; then connect the red tester lead to the positive battery post and the black tester lead to the negative battery post.
3. Start the engine and slowly increase RPM. The voltage should increase with the engine RPM to a maximum of 15.5 D.C. volts.

■ NOTE: If voltage rises above 15.5 D.C. volts, the regulator is faulty or a battery connection is loose or corroded. Clean and tighten battery connections or replace the regulator/rectifier. If voltage does not rise, check Voltage (Charging Coil - No Load) in this section. If charging coil voltage is normal, replace the regulator/rectifier.

Neutral Start/Front Drive Actuator/Start-in-Gear/ Differential Lock Relays

The relays are indentical plug-in type located on the power distribution module. Relay function can be checked by switching relay positions. The relays are interchangeable.

■ NOTE: The relay schematic is embossed on the relay housing for testing continuity.

■ NOTE: The module and wiring harness are not a serviceable component and must be replaced as an assembly.

Headlights

The connectors are the four 2-wire ones secured to the front bumper supports (two on each side) with cable ties.

BULB VERIFICATION (Low and High Beam)

■ NOTE: Perform this test on each headlight bulb. Also, a 12-volt external power supply w/jumpers will be needed.

1. Disconnect the wiring harness from the bulb to be tested.
2. Connect the power supply (positive) to one bulb contact; then connect the power supply (negative) to the remaining bulb contact.
3. The bulb should illuminate.
4. If the bulb fails to illuminate, it must be replaced.

VOLTAGE

■ NOTE: Perform this test in turn on the main harness side of all four connectors. Also, the ignition switch must be in the LIGHTS position.

■ NOTE: The LO beam is the outside bulb, and the HI beam is the inside bulb.

1. Set the meter selector to the D.C. Voltage position.
2. Connect the red tester lead to one wire; then connect the black tester lead to the other wire.
3. With the dimmer switch in the LO position, test the two outside connectors (LO beam). The meter must show battery voltage.

4. With the dimmer switch in the HI position, test the two inside connectors (HI beam). The meter must show battery voltage.

■ NOTE: If battery voltage is not shown in any test, inspect the fuses, battery, main wiring harness, connectors, or the left handlebar switch.

Taillight - Brakelight

The connector is the 3-prong one located under the rear fender assembly.

BULB VERIFICATION

■ NOTE: Perform this test on the taillight-brakelight side of the connector. Also, a 12-volt external power supply (jumper) will be needed.

1. Connect the power supply (positive) to the yellow wire; then connect the power supply (negative) to the brown wire.
2. The taillight should illuminate.
3. With the negative power supply still connected, connect the positive supply wire to the red wire.
4. The brakelight should illuminate.

■ NOTE: If either the taillight or brakelight fails to illuminate, inspect the bulb, the connectors, or the component wiring harness.

VOLTAGE (Taillight)

■ NOTE: Perform this test on the main harness side of the connector. Also, the ignition switch should be in the LIGHTS position.

1. Set the meter selector to the D.C. Voltage position.
2. Connect the red tester lead to the pink wire; then connect the black tester lead to the black wire.
3. With the ignition key in the LIGHTS position, the meter must show battery voltage.

■ NOTE: If the meter shows no voltage, inspect fuses, wiring harness, connectors, and switches.

VOLTAGE (Brakelight)

■ NOTE: Perform this test on the main harness side of the connector. Also, the ignition switch should be in the ON position and the brake (either foot pedal or hand lever) must be applied.

■ NOTE: Make sure the brake lever (hand) and brake pedal (auxiliary) are properly adjusted for this procedure.

1. Set the meter selector to the D.C. Voltage position.
2. Connect the red tester lead to the red/blue wire; then connect the black tester lead to the black wire.
3. With either brake applied, the meter must show battery voltage.

■ NOTE: If the meter shows no voltage, inspect bulb, fuses, wiring harness, connectors, and switches.

Ignition Timing

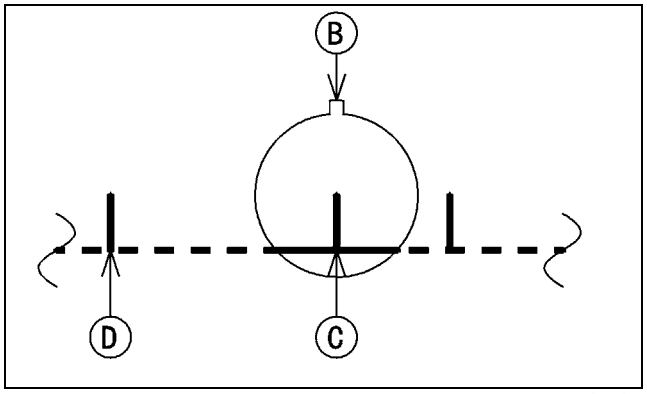
The ignition timing cannot be adjusted; however, verifying ignition timing can aid in troubleshooting other components. To verify ignition timing, use the following procedure.

⚠ WARNING

Oil will spray out of the timing inspection hole when the engine is running. Cover or shield the ATV around the inspection plug. Always wear protective glasses when doing timing checks.

1. Attach the engine Timing Light (p/n 0644-197) to the front spark plug high tension lead; then remove the timing inspection plug from the left-side crankcase cover.
2. With the Arctic Cat Engine Tachometer (p/n 0644-275) connected, start the engine and run at the specified RPM.
3. Ignition timing should be according to the following chart and illustration.

Engine Speed r/min (RPM)	Slot (B) Aligned With
1100 and below	Advanced mark (C) on alternator rotor
5000 and above	Advanced mark (D) on alternator rotor



ATV2119A

4. Install the timing inspection plug.

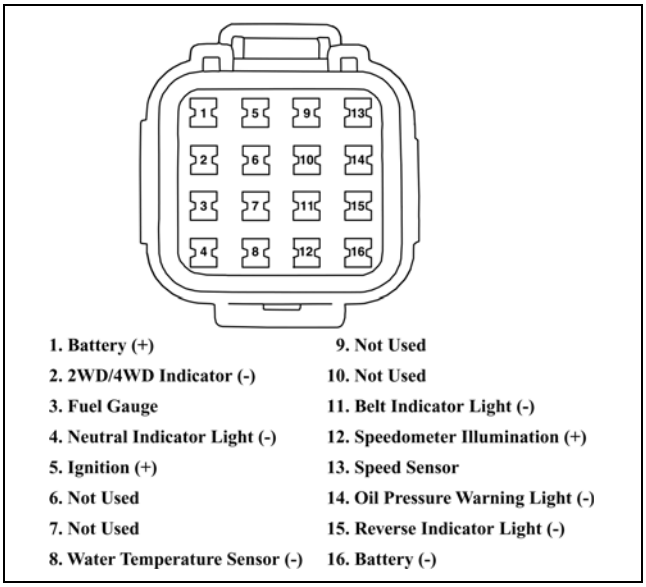
If ignition timing is incorrect, replace the CDI and pick-up coil.

Electronic Speedometer/Indicator Lights

REMOVING

1. Remove the four nylon fasteners securing the instrument pod; then remove the ignition switch retaining nut.
2. Remove the front rack and front fenders; then disconnect the multi-pin connector.
3. Remove the three nuts securing the mounting studs; then remove the speedometer.

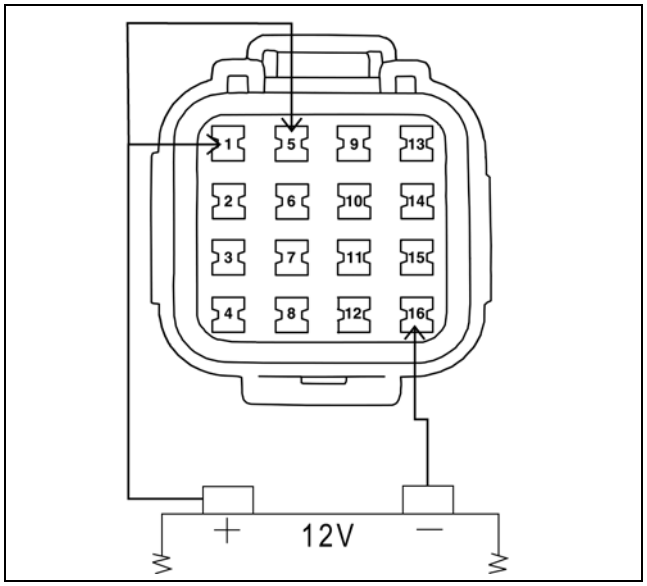
TESTING



ATV2208A

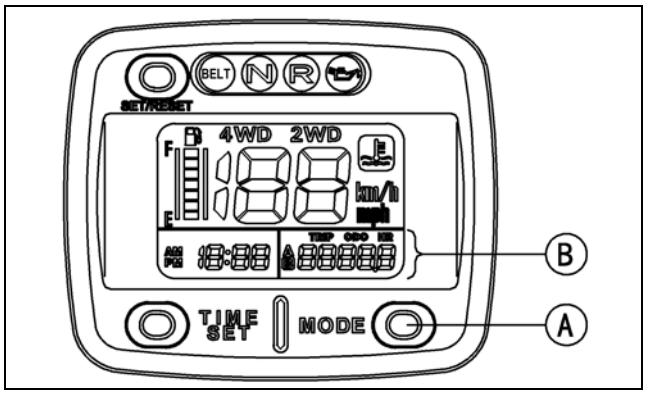
1. Connect a 12-volt battery with the positive wire to terminal (1) and the negative wire to terminal (16); then connect a jumper wire from terminal (1) to terminal (5). All LCD displays on the speedometer should appear for one second.

■ **NOTE: If any functions (segments or displays) are not normal or display as indicated, the speedometer must be replaced.**



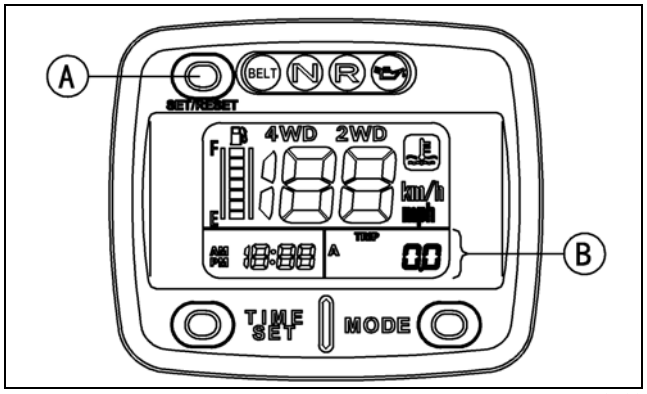
ATV2208B

2. Connect the positive wire to terminals (1) and (5) and the negative wire to terminal (16); then depress and hold the mode button (A). The display (B) should cycle through the four modes CDO-ODO-TRIPA-TRIPB-HOUR.



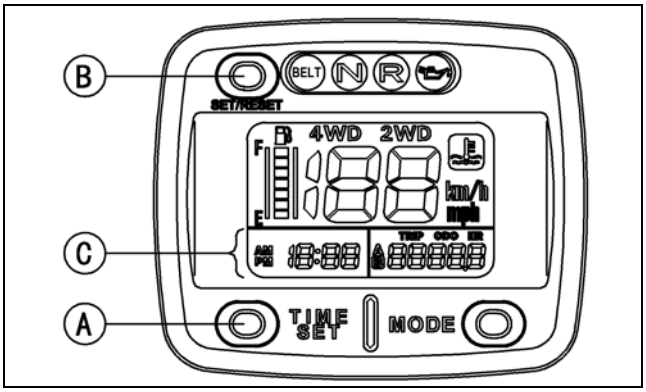
ATV2121

3. Cycle the speedometer to TRIPA or TRIPB mode; then check that when the SET/RESET button (A) is depressed, the display shows 0.0 (B).



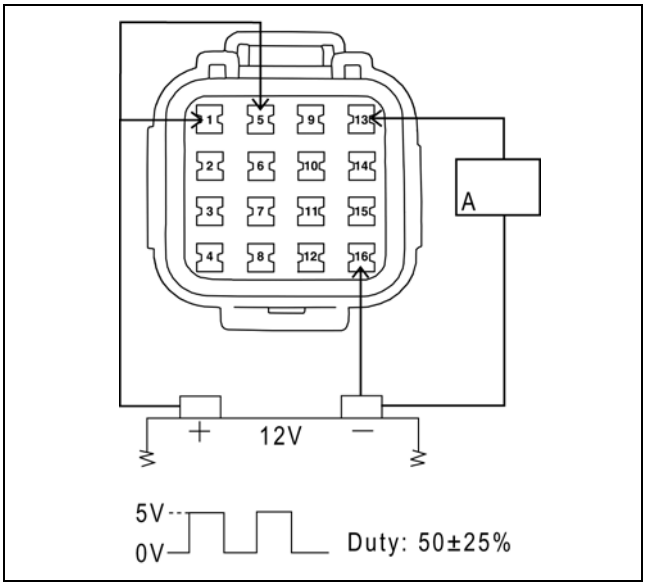
ATV2122

4. Check that when the TIME SET (A) and the SET/RESET (B) buttons are depressed, the time (C) will reset.



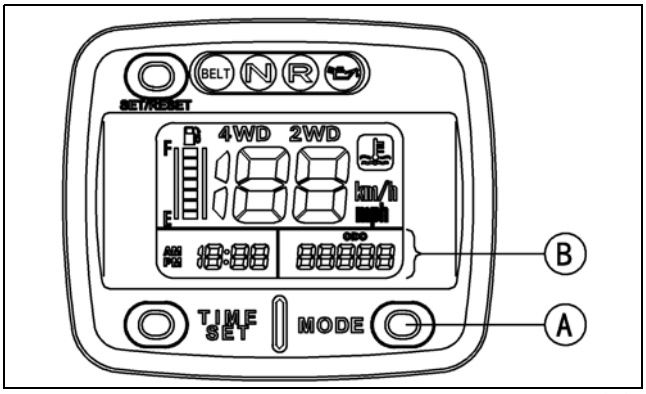
ATV2123

5. Connect a signal oscillator (A) to the battery negative post and the output to terminal (13); then set the oscillator frequency to 620 Hz. The speedometer should read approximately 40 mph.



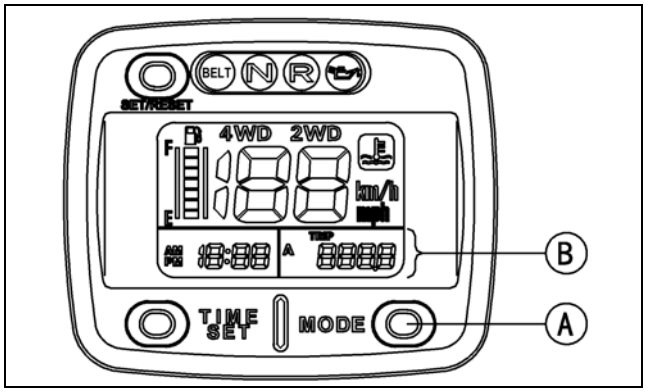
ATV2208C

6. Leave the wires connected as in step 5 and press the MODE button (A) to cycle to the odometer (B); then increase the frequency of the oscillator. The odometer should start to count faster.



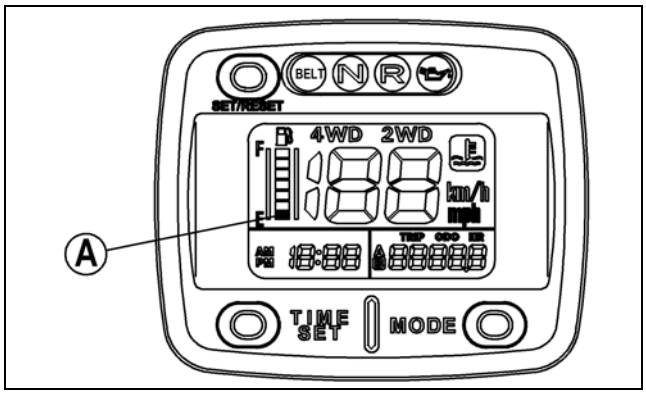
ATV2125

7. Depress the MODE button (A) and cycle to trip meters A and B (B); then check the function of both trip meters in the same manner as the odometer. Disconnect the oscillator.



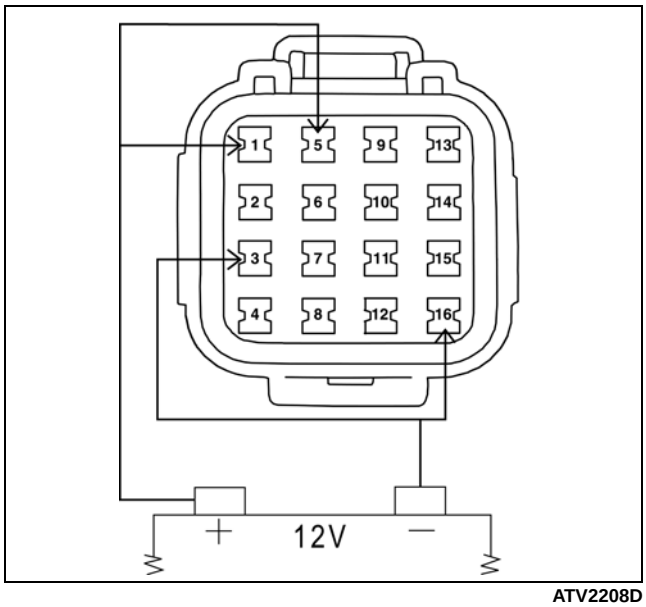
ATV2126

8. Connect the wires in the same manner as step 1; the first segment LCD (A) should flash.

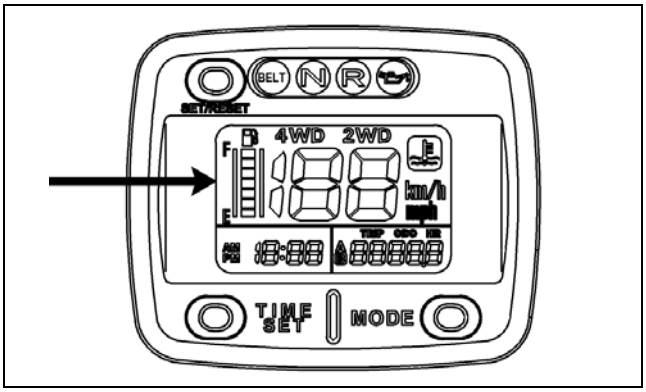


ATV2127

9. Connect a jumper wire from the negative battery terminal to terminal (3) on the connector. When connected, one segment in the fuel gauge should appear every 15 seconds.



ATV2208D

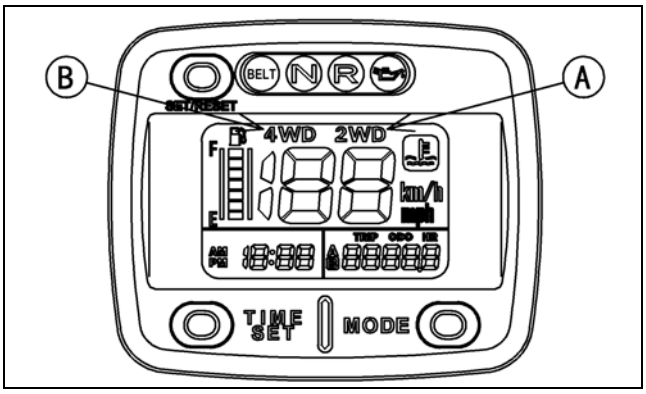


ATV2121A

⚠ CAUTION

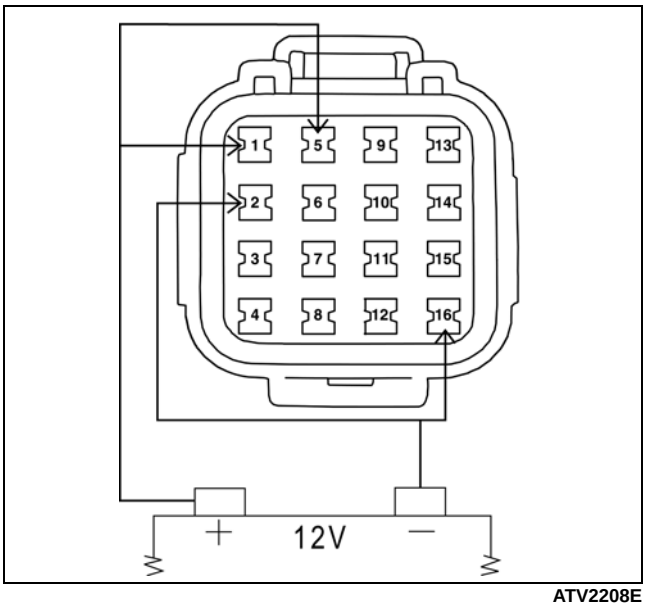
Remove the jumper wire after all segments have appeared or meter damage will occur.

10. With wires connected in the same manner as step 1, the 2WD indicator (A) should appear.



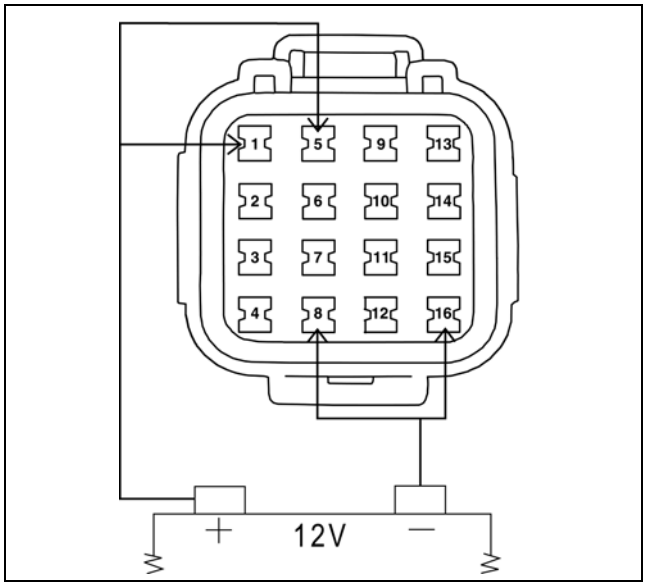
ATV2129

11. Connect the jumper wire from the negative battery terminal to terminal (2) of the connector. The 4WD indicator (B) should appear.

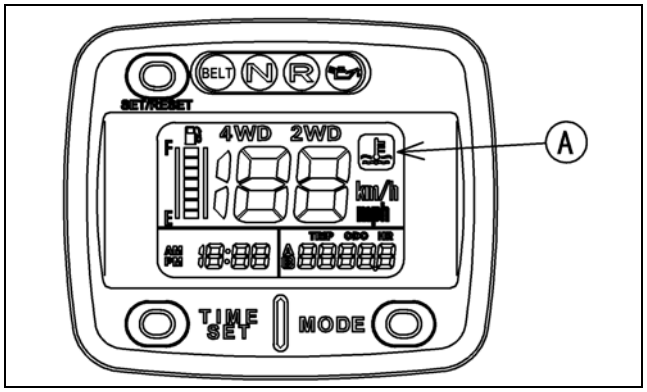


ATV2208E

12. Connect a jumper wire from the negative battery terminal to terminal (8) of the connector. The water temperature warning light (A) should appear.

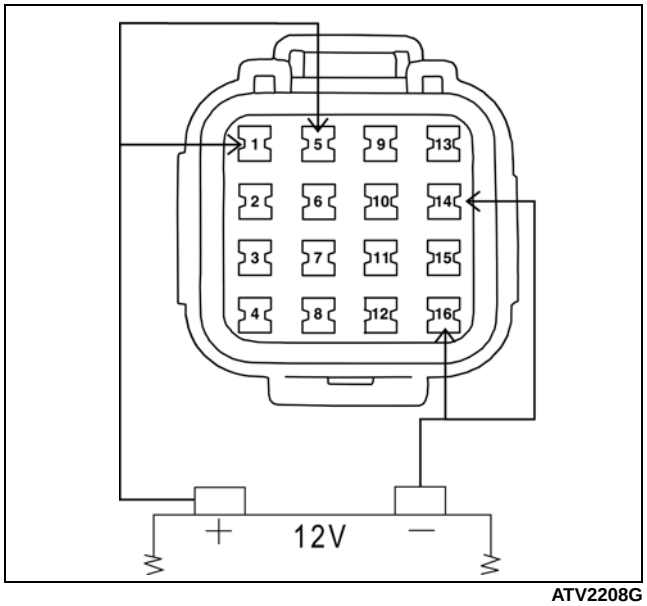


ATV2208F

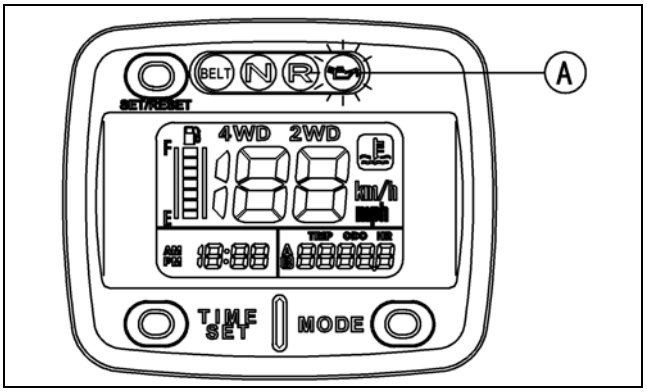


ATV2132

13. Connect a jumper wire from the negative battery terminal to terminal (14) of the connector. The oil pressure warning light (A) should flash.

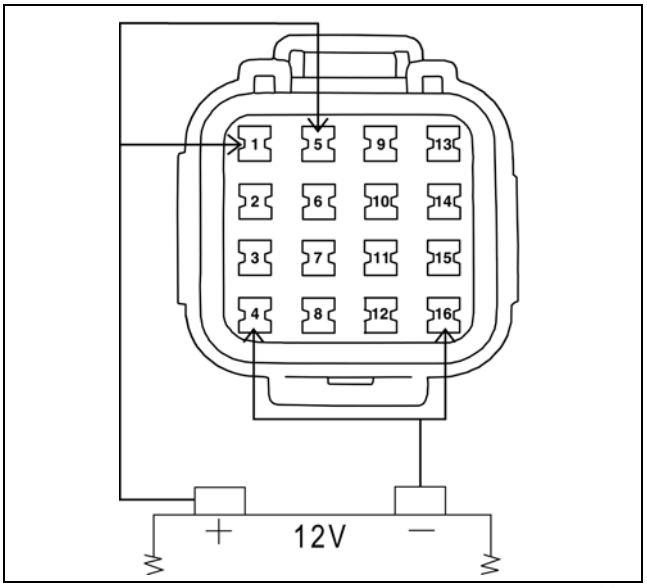


ATV2208G

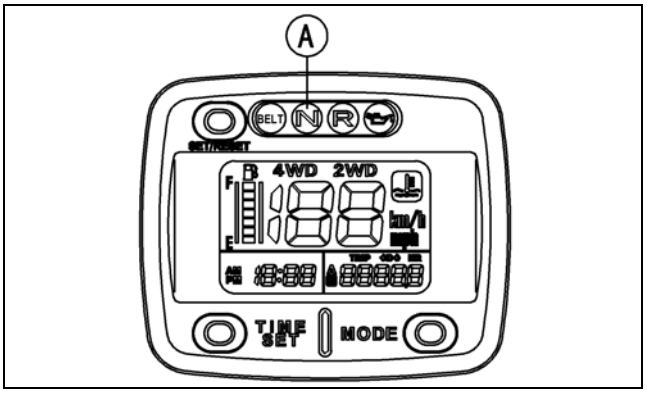


ATV2134

14. Connect a jumper wire from the negative battery terminal to terminal (4) in the connector. The neutral indicator light (A) should illuminate.

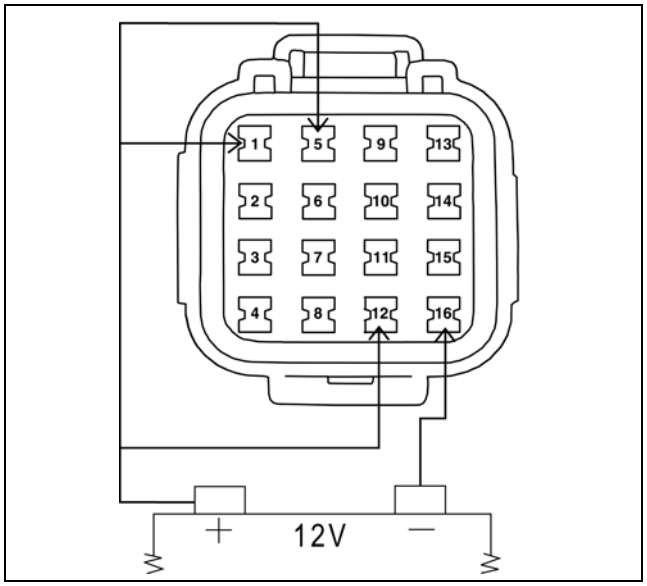


ATV2208H

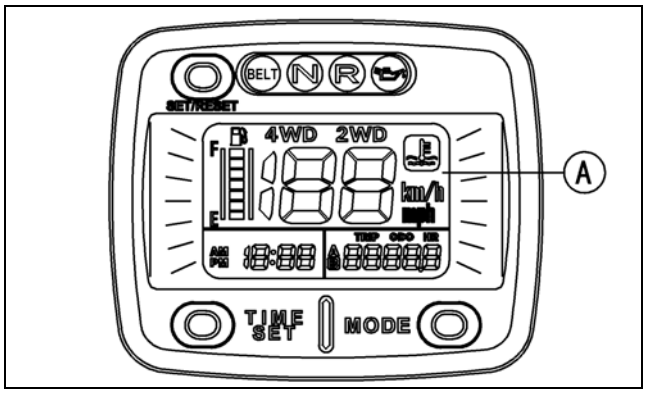


ATV2136

15. Connect a jumper wire from the positive battery terminal to terminal (12) of the connector. The speedometer backing light (A) should illuminate.

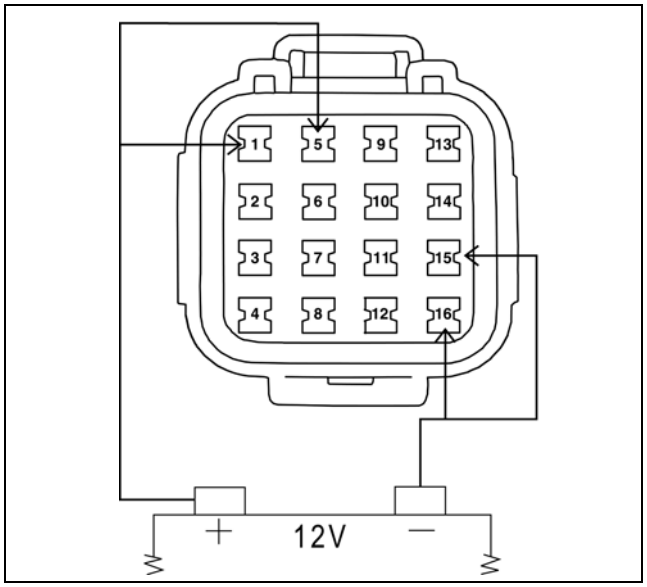


ATV2208I



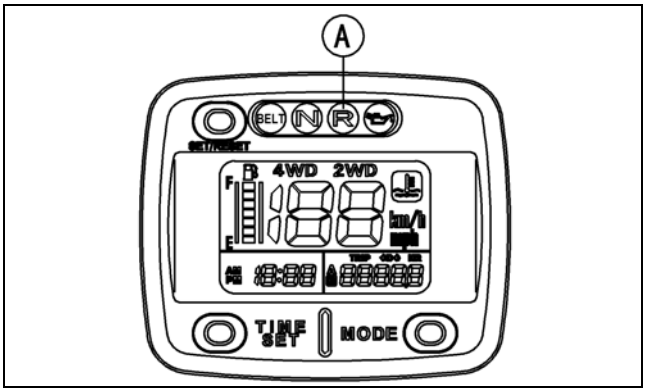
ATV2138

16. Connect a jumper wire from the negative battery terminal to terminal (15) of the connector. The reverse indicator light (A) should illuminate.



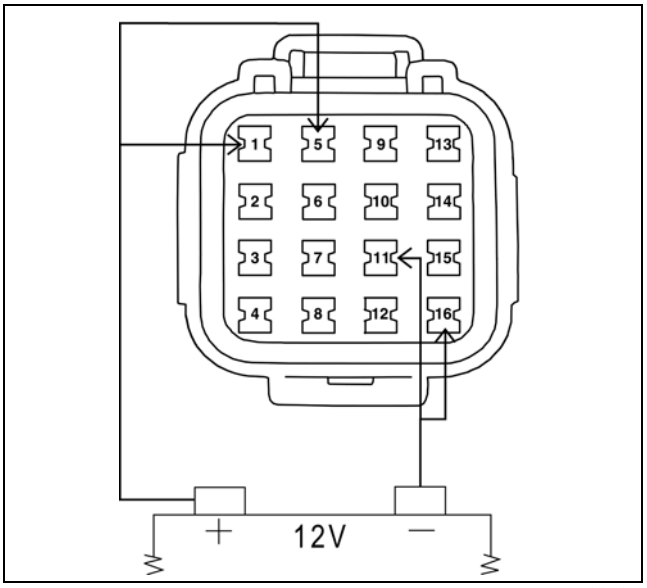
ATV2208J

5

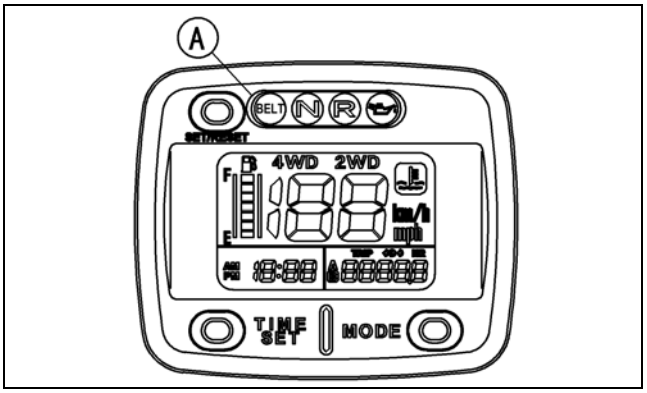


ATV2140

17. Connect a jumper wire from the negative battery terminal to terminal (11) in the connector. The belt indicator light (A) should illuminate.



ATV2208K



ATV2142

INSTALLING

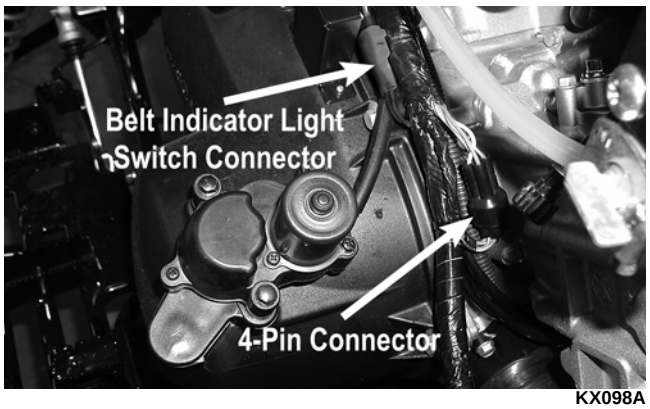
1. Route the new wiring harness down through the opening; then place the speedometer into position and secure with the three nuts. Connect the multi-pin connector.
2. Install the front fenders and front rack; then install the instrument pod and secure with the nylon fasteners.
3. Secure the ignition switch with the retaining nut.

V-Belt Failure Mode Clearing

PROCEDURE

■ **NOTE: See Section 2 for V-belt inspection.**

1. Turn the ignition switch to the OFF position; then disconnect the 4-pin connector and the belt indicator light switch connector.



KX098A

2. Install the Reset Connector (p/n 0486-161) into the forward 4-pin connector; then turn the ignition switch to ON. Allow the belt indicator light to flash for 10 seconds or more; then turn the ignition switch to OFF.

■ **NOTE: The light will flash rapidly for 5 seconds; then it will flash slowly. Allow the light to flash slowly for at least 5 seconds before turning the ignition switch off.**

3. Remove the reset connector and connect the 4-pin connectors and the belt indicator light switch connector.
4. Turn the ignition switch to the ON position and confirm that the belt indicator light goes off.

100-Hour Belt Inspection Mode Clearing

Every 100 hours, the belt indicator light will illuminate to alert for inspection. See Section 2 - Checking/Replacing V-Belt. To reset the belt indicator light use the following procedure.

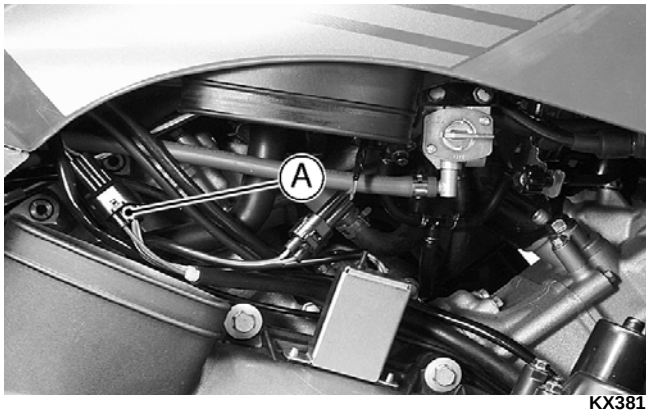
⚠ WARNING

V-belt inspection must be conducted in accordance with Section 2. Belt separation and lock-up could cause severe injury or death.

1. Turn the ignition switch to the OFF position; then disconnect the 4-pin connector.
2. Connect the Reset Connector (p/n 0486-161) into the forward 4-pin connector; then turn the ignition switch to the ON position. The belt indicator light should flash rapidly.
3. Disconnect the belt indicator light switch connector. The light should flash slowly. Allow the light to flash for 10 seconds before turning the ignition switch off.
4. Turn the ignition switch to the OFF position; then remove the reset connector.
5. Connect the 4-pin connector and the belt indicator light switch connector; then turn the ignition switch to the ON position. The belt indicator light should go off.

Engine Brake Actuator Resistance

1. Remove the air duct boot; then disconnect the actuator lead connector (A).

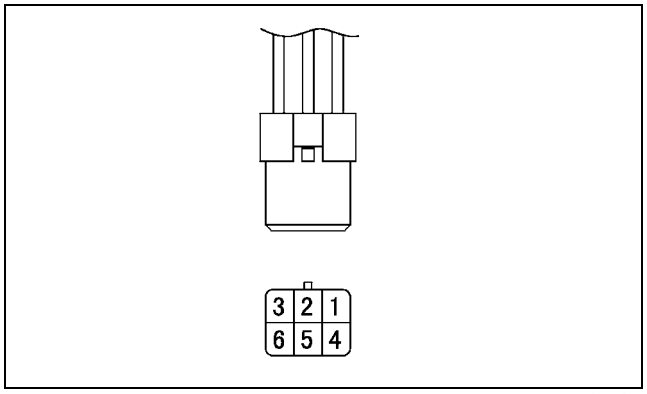


KX381

⚠ CAUTION

Always disconnect the battery when performing resistance tests to avoid damaging the multimeter.

2. Use the multimeter and select the ohms function; then measure resistance as follows: pins 4 (red) - 6 (black), 3-15 ohms; pins 1 (orange) - 3 (blue), 3500-6500 ohms; pins 2 (yellow) - 3 (blue), 630-5330 ohms. If readings are not as specified, replace the engine brake actuator.



ATV2143A

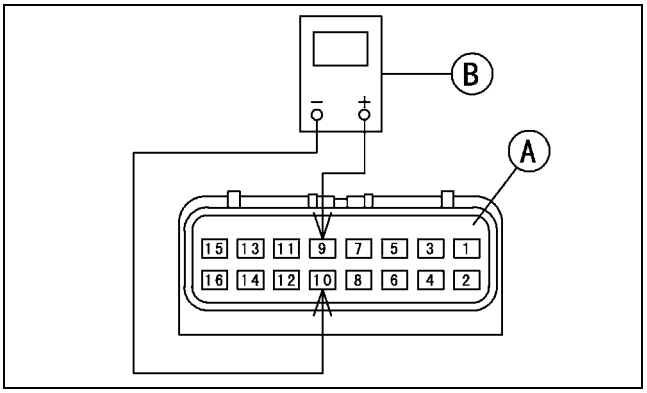
Engine Brake Controller Power Supply Voltage

■NOTE: For the following tests, make sure the battery is fully charged.

■NOTE: Needle adapters will be required on the multimeter leads as these tests are made with the controller connected.

1. Select D.C. Voltage on the multimeter (B); then turn the ignition switch ON.
2. In the brake controller (A), connect the red tester lead to the orange wire terminal (9) and the black tester lead to the black wire terminal (10). The meter should read battery voltage.

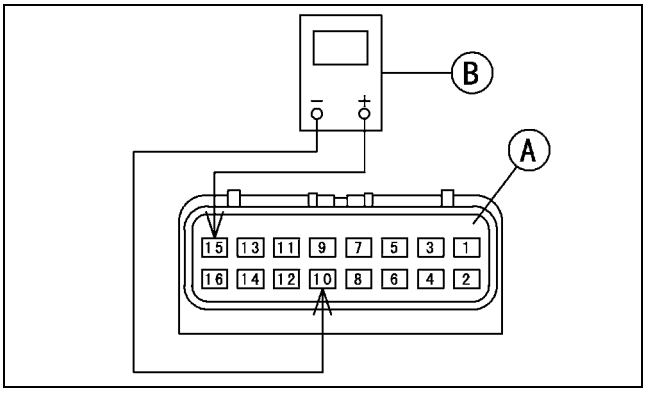
3. If battery voltage is not present, check the 30-amp fuse, ignition switch, or wiring harness.



ATV2144

Controller-to-Engine Brake Actuator Voltage

1. Support the ATV on a stand or suitable jack so the wheels are off the ground; then select D.C. Voltage on the multimeter (B). Connect the red tester lead to the brown/white wire terminal (15) and the black tester lead to the black wire terminal (10) in the controller (A).



ATV2145

2. Turn the ignition switch ON and spin a rear wheel in the forward direction; then allow the wheel to stop. After at least one second, turn the ignition switch OFF.

3. After two seconds, observe the meter until the actuator stops. The controller output voltage should vary from 5-12 D.C. volts. If the voltage is not within specifications, check the forward/reverse detecting sensor. If the sensor is normal, replace the actuator controller.

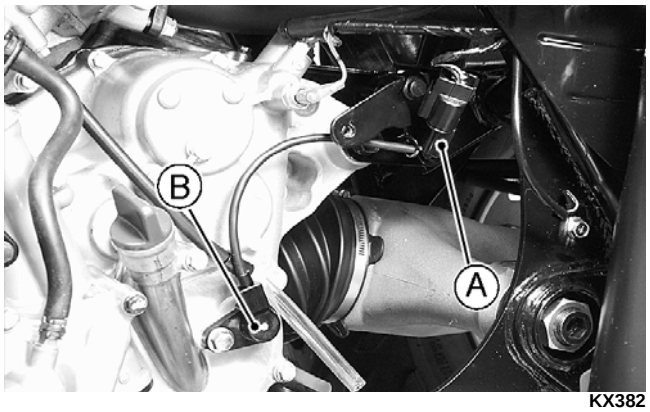
Forward/Reverse Detecting Sensor Resistance

⚠ CAUTION

Always disconnect the battery when performing resistance tests to avoid damaging the multimeter.

1. Disconnect the sensor lead wire connector (A); then select OHMS on the multimeter and check resistance between the sensor pins. The meter should read 1200-1600 ohms.

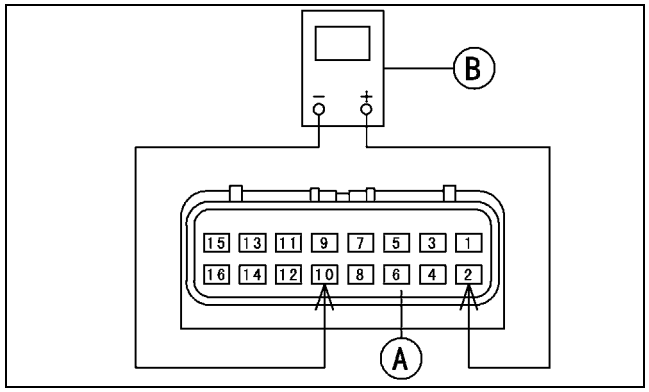
2. Check each lead of the sensor to ground. The meter should show an open circuit or infinity (∞). If either test fails, replace the sensor (B).



KX382

Output-to-Actuator Voltage

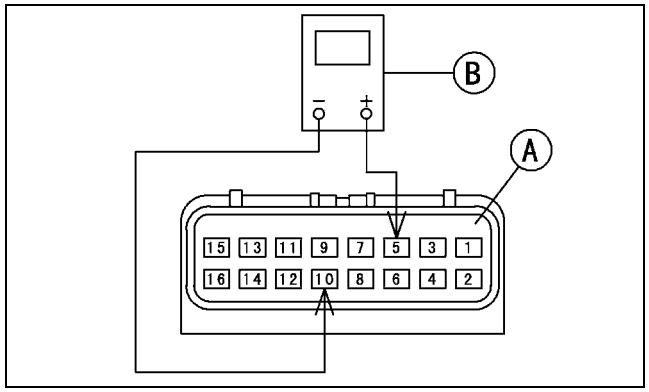
Select D.C. Voltage on the multimeter (B) and turn the ignition switch ON; then connect the red tester lead to the black/green wire terminal (2) and the black tester lead to the black wire terminal (10) in the controller (A). The controller output voltage should be 4.8 ± 0.2 D.C. volts. If the reading is not as specified, replace the actuator controller.



ATV2146

Output-to-Speed Sensor Voltage

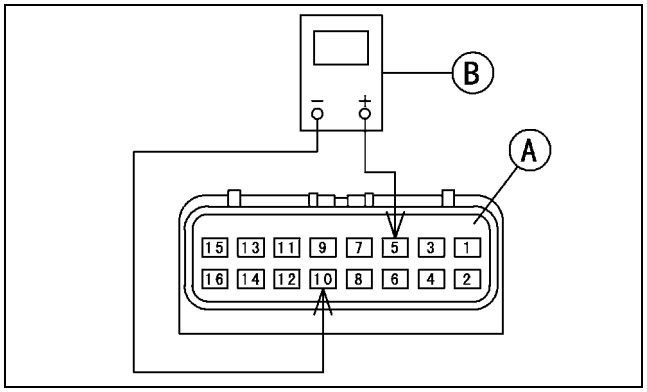
Select D.C. Voltage on the multimeter (B), disconnect the speed sensor connector, and turn the ignition switch ON; then connect the red meter lead to the pink/white wire terminal (5) and the black tester lead to the black wire terminal (10) in the controller (A). The meter should read 5 ± 0.25 D.C. volts. If the reading is not as specified, replace the actuator controller.



ATV2147

Speed Sensor Signal Voltage

1. Support the ATV on a stand or suitable jack so the wheels are off the ground; then turn the ignition switch ON.
2. Select D.C. Voltage on the multimeter (B); then connect the red tester lead to the pink/white wire terminal (5) and the black tester lead to the black wire terminal (10) in the controller (A).



ATV2147

3. Spin a rear wheel in the forward direction while observing the multimeter. The meter should alternately show 0 volts and 5 D.C. volts. If the reading is not as specified, replace the speed sensor.

Tilt Sensor Voltage

⚠ WARNING

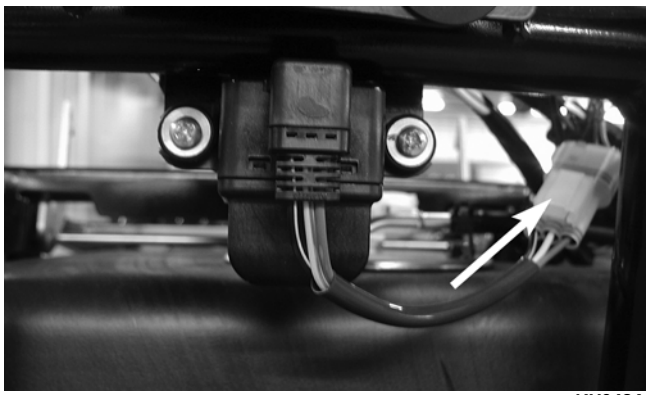
Incorrect installation of the tilt sensor could cause sudden loss of engine power which could result in loss of vehicle control resulting in injury or death.

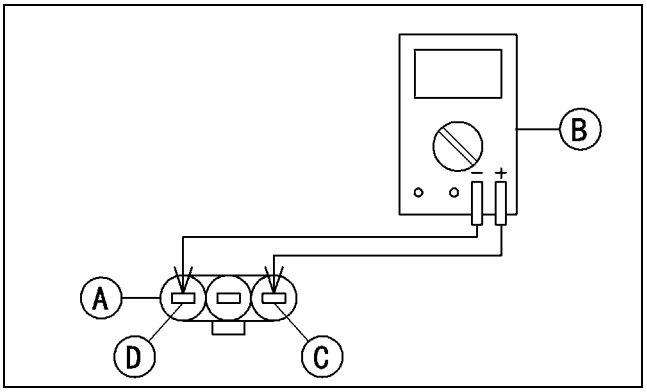
⚠ CAUTION

Do not drop the tilt sensor as shock can damage the internal mechanism.

SUPPLY VOLTAGE

1. Disconnect the three-wire connector (A); then select D.C. Voltage on the multimeter (B) and connect the red tester lead to the orange wire terminal (C) and the black tester lead to the black wire terminal (D) (harness side).

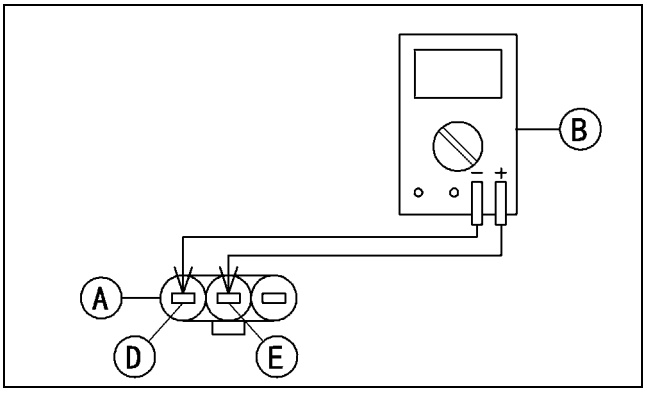

KX043A



ATV2148

2. Turn the ignition switch to the ON position. The multimeter should read battery voltage. If battery voltage is not indicated, check the 30-amp fuse, wiring harness, or the ignition switch.

3. Remove the red tester lead and connect to the blue wire terminal (E). The multimeter should read 5.0 D.C. volts. If the specified voltage is not indicated, check the CDI unit.



ATV2149

OUTPUT VOLTAGE

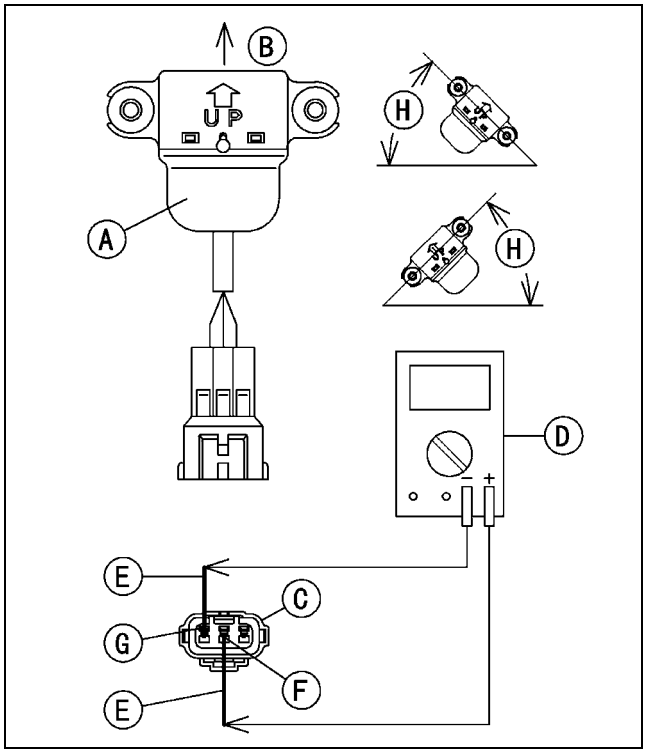
■NOTE: Needle adapters will be required on the multimeter leads as the following tests are made with the sensor connected.

1. Connect the three-wire connector (C); then remove the two mounting screws securing the tilt sensor to the rear frame.


KX043

2. Install the needle adapters (E) to the multimeter leads; then select D.C. Voltage on the multimeter (D).

3. Connect the red tester lead to the yellow/green wire terminal (F) and the black tester lead black/yellow wire terminal (G); then turn the ignition switch ON and with the tilt sensor (A) held with the UP arrow as shown (B), observe the meter. The meter should read 0.4-1.4 D.C. volts.



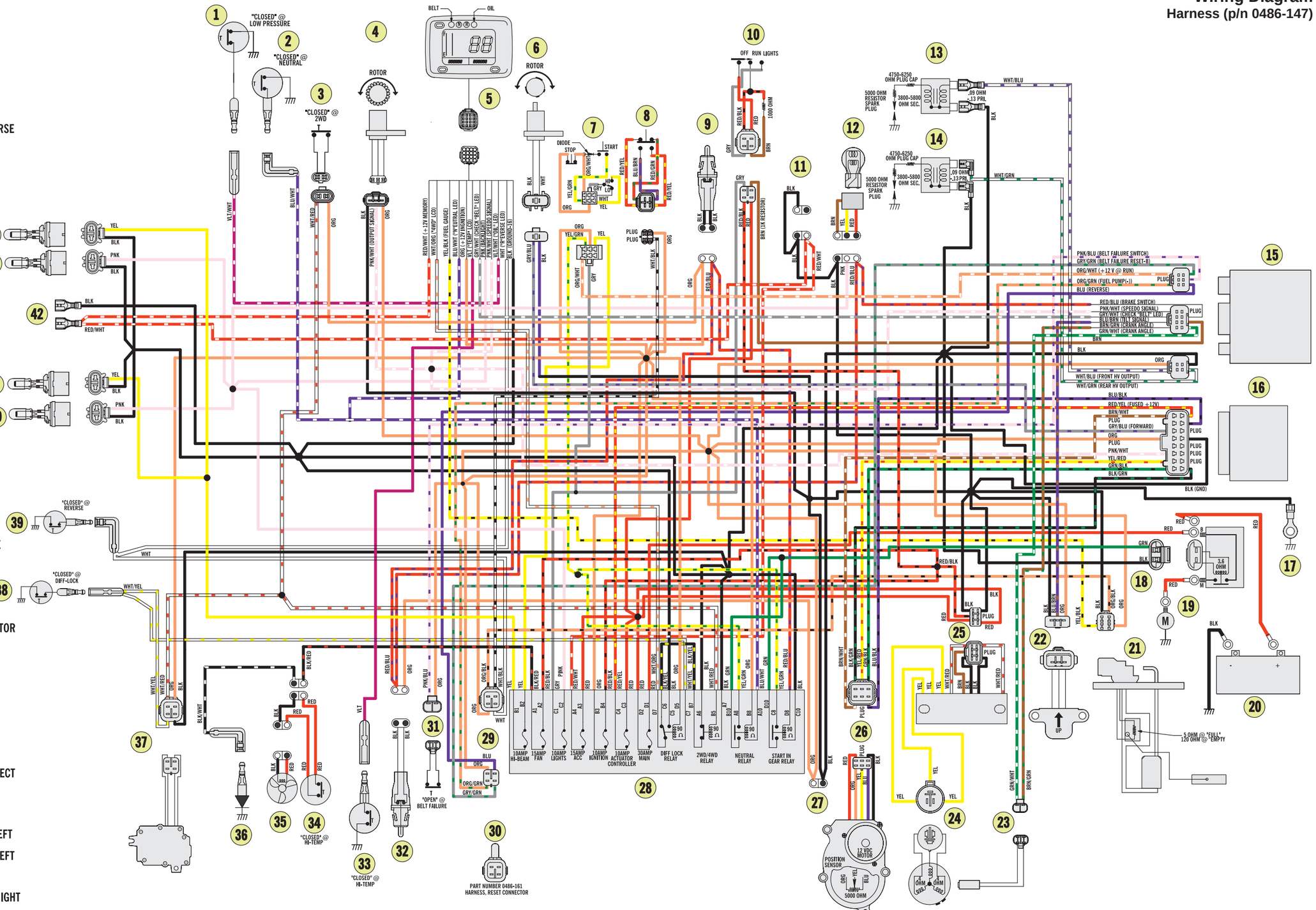
ATV2150

4. Tilt the sensor (H) 60°-70° left and right observing the meter. The meter should read 3.7-4.4 D.C. volts after approximately one second in the tilted position. If the meter readings are not as specified, replace the tilt sensor.

5. Install the mounting screws making sure the sensor lead is directed toward the rear of the ATV and the UP arrow is directed up; then tighten the screws securely.

Wiring Diagram
Harness (p/n 0486-147)

1. SWITCH, OIL PRESSURE
2. SWITCH, NEUTRAL
3. SWITCH, 2WD/4WD
4. SENSOR, SPEEDO
5. LCD, MULTIFUNCTION
6. SENSOR, FORWARD/REVERSE
7. CONTROL, LEFT HANDLE
8. REVERSE OVERRIDE
9. SWITCH, HAND BRAKE
10. SWITCH, KEY
11. ACCESSORY, REAR
12. TAILLIGHT
13. COIL, FRONT IGN.
14. COIL, REAR IGN.
15. CDI
16. CONTROLLER, ACTUATOR
17. GROUND, CHASSIS
18. RELAY, STARTER
19. MOTOR, STARTER
20. BATTERY, 12V
21. SENSOR, FUEL/PUMP
22. SENSOR, TILT
23. SENSOR, CRANK ANGLE
24. MAGNETO
25. REGULATOR/RECTIFIER
26. ACTUATOR, ENGINE BRAKE
27. ACCESSORY, SWITCHED
28. PDM
29. BELT FAILURE, RESET A
30. HARNESS, RESET CONNECTOR
31. SWITCH, BELT FAILURE
32. SWITCH, FOOT BRAKE
33. SWITCH, WATER TEMP
34. SWITCH, TEMP. FAN
35. FAN MOTOR
36. DIODE, FAN
37. ACTUATOR, 2WD/4WD SELECT
38. SWITCH, 4WD DIFF. LOCK
39. SWITCH, REVERSE
40. HEADLIGHT, LOW-BEAM LEFT
41. HEADLIGHT, HIGH-BEAM LEFT
42. ACCESSORY, FRONT
43. HEADLIGHT, HIGH-BEAM RIGHT
44. HEADLIGHT, LOW-BEAM RIGHT



SECTION 6 - DRIVE SYSTEM

6

TABLE OF CONTENTS

Drive System 6-2
General Information 6-2
Rear Suspension/Rear Drive Assembly Schematics 6-3
Front Drive Actuator 6-4
Front Differential 6-5
Drive Axles 6-18
Rear Gear Case 6-23
Hub 6-24
Hydraulic Brake Caliper 6-26
Hydraulic Brake Assembly Schematic 6-27

Drive System

■ **NOTE: Some photographs and illustrations used in this section are used for clarity purposes only and are not designed to depict actual conditions.**

General Information

All gear cases are tagged beneath a cover bolt. This tag is marked with a production date code, sequence code, and a ratio code.

A "6" on the lower-right corner indicates a 3.6:1 gear set ratio (10:36 teeth).

The die-cast aluminum housings have been assembled with thread-rolling screws (trilobular). When assembling with these screws, start the screws carefully into the housing; then use the following torque values.

Size	New Housing	Reassembled Housing
M6 (Torx T-30 Recess)	1.1-1.3 kg-m (8-9.5 ft-lb)	0.9-1.2 kg-m (6.5-9 ft-lb)
M8 (Torx T-40 Recess)	3.5-4.3 kg-m (25-31 ft-lb)	2.9-3.5 kg-m (21-25 ft-lb)
M10 (Torx T-50 Recess)	5.1-6.3 kg-m (37-45.5 ft-lb)	4.3-5.3 kg-m (31-38 ft-lb)

SPECIFICATIONS

Specific specifications regarding the the gear cases (capacities, lubricant type, etc.) can be found in Section 1 of this manual.

Ring Gear Backlash	0.28-0.38 mm (0.011-0.015 in.)
Ring Gear End Play	0.1-0.2 mm (0.004-0.008 in.)

SPECIAL TOOLS

A number of special tools must be available to the technician when servicing the gear case.

Description	p/n
Boot Clamp Pliers	0444-120
Pinion Gear/Shaft Removal Tool	0444-127
Slide Hammer w/CV Joint Attachment	0444-123
CV Joint Attachment (Only)	0444-119
Internal Hex Socket (48 mm)	0444-104

■ **NOTE: Special tools are available from the Arctic Cat Service Parts Department.**

TROUBLESHOOTING

If a noise is heard from the gear case area, it can be difficult to locate and/or diagnose. If the noise is related to wheel speed, but not to engine RPM, the problem is probably in the final drive or engine/transmission bevel gear set. When a problem is localized, a number of inspections must be made to pinpoint that problem. The most obvious of the inspections include CV boots, wheel and hub nut tightness, wheel bearing damage, gear case lubricant contamination, low lubricant level, seal leakage at the input shaft, CV joints, or selector arm.

■ **NOTE: Small metallic particles will collect on the magnetic drain plug as a normal part of break-in and will also give a metallic cast to drained lubricant. Contamination would include large particles or water which gives a "milky" look to the lubricant.**

■ **NOTE: Lubricant on a new pinion housing assembly could be grease. If the front of the gear case is leaking at the rear drive boot, wipe excess lubricant from the bottom of the pinion housing; then operate the ATV for a period of time. Inspect the pinion housing area for any signs of leakage. If lubricant is again on the bottom of the pinion housing, the seal must be replaced.**

Additional troubleshooting could include the following.

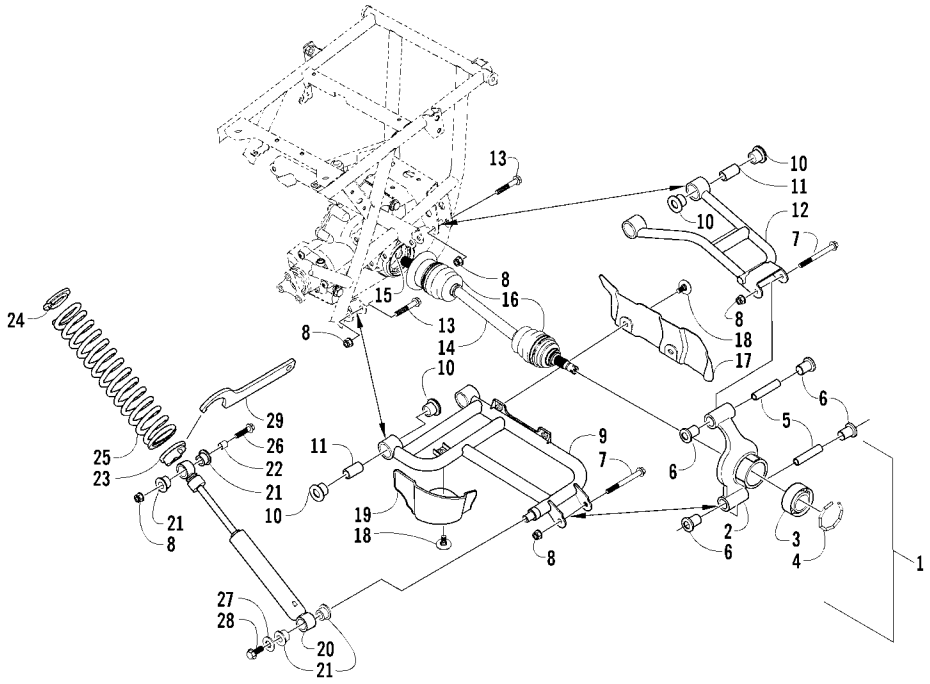
- Binding/abrupt motion: CV boot torn (grease loss, foreign object damage, broken cage); gear lubricant loss or not filled (bearing seizure, broken gear teeth, seal leakage, bladder or hose leakage, missing filler/drain plug).
- Noise from drive system: wheel or gear case bearing damage, improper gear backlash, improper assembly, low or no gear case lubricant.
- Lockup: gear case lubricant loss or not filled, water contamination causing bearing seizure.

Rear Suspension/Rear Drive Assembly Schematics

REAR SUSPENSION/AXLE ASSEMBLY

KEY

1. Knuckle
2. Knuckle
3. Wheel Bearing
4. Retaining Ring
5. Collar
6. Bushing
7. Cap Screw
8. Lock Nut
9. A-Arm
10. Bushing
11. Collar
12. A-Arm
13. Cap Screw
14. Axle
15. Clip
16. Boot Repair Kit
17. Boot Guard
18. Body Screw
19. Boot Guard
20. Shock Absorber
21. Bushing
22. Sleeve
23. Adjuster Cam
24. Retainer
25. Spring
26. Cap Screw
27. Washer
28. Cap Screw
29. Spanner Wrench

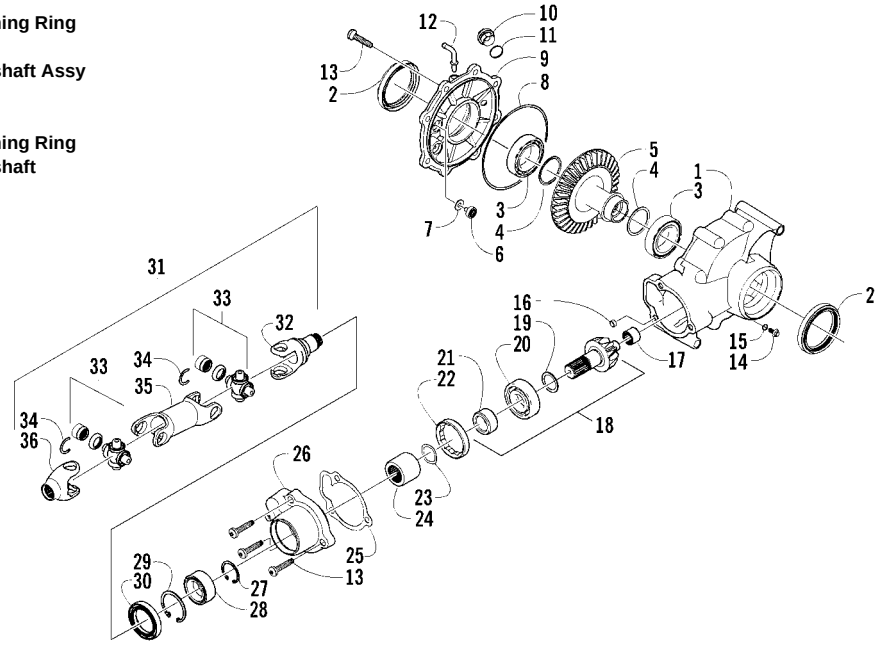


0739-056

REAR DRIVE GEAR CASE ASSEMBLY

KEY

1. Housing
2. Seal
3. Bearing
4. Shim
5. Ring Gear
6. Thrust Button
7. Shim
8. O-Ring
9. Cover
10. Filler Plug
11. O-Ring
12. Fitting
13. Self-Tapping Screw
14. Magnetic Plug
15. O-Ring
16. Dowel Pin
17. Bearing
18. Pinion Gear Assy
19. Shim
20. Bearing
21. Collar
22. Lock Collar
23. Wave Washer
24. Collar
25. Gasket
26. Pinion Housing
27. Retaining Ring
28. Bearing
29. Retaining Ring
30. Seal
31. Driveshaft Assy
32. Yoke
33. Joint
34. Retaining Ring
35. Driveshaft
36. Yoke



0739-145

Front Drive Actuator

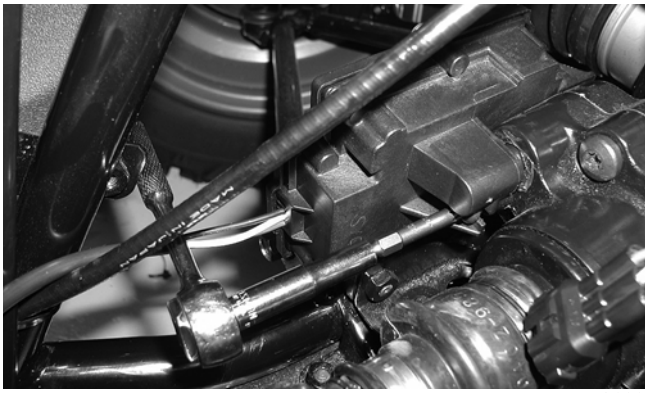
■ NOTE: The actuator is not a serviceable component. If it is defective, it must be replaced.

■ NOTE: The actuator will operate only when the ignition switch is in the ON position.

The front drive actuator is located on the left side of the front drive input housing. With the engine stopped and the ignition switch in the ON position, a momentary "whirring" sound can be heard each time the front drive selector switch is shifted. If no sound is heard, see Section 5. If the actuator runs constantly or makes squealing or grinding sounds, the actuator must be replaced.

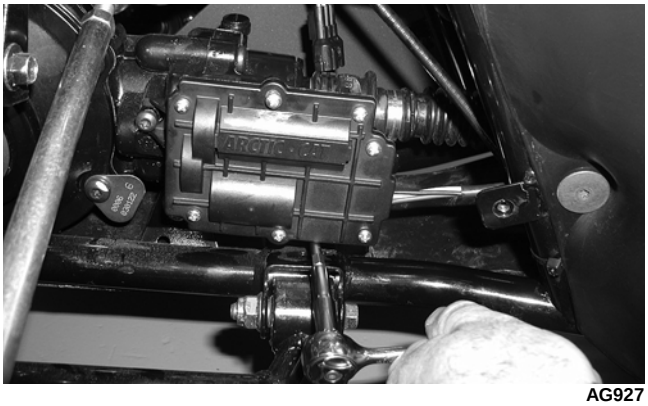
REMOVING

1. Remove the left-front inner fender panel; then disconnect the three-prong connector on the actuator harness.
2. Using a T-30 torx wrench, remove the mounting cap screw from the driveshaft side of the actuator.



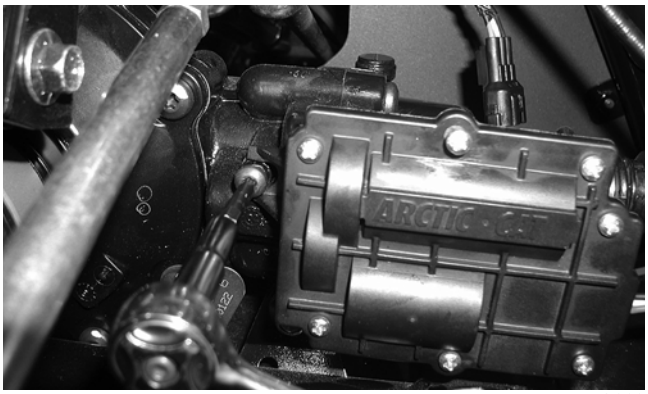
AG926

3. Remove the mounting cap screw from below the actuator on the suspension side.



AG927

4. Loosen but do not remove the mounting cap screw at the front of the actuator; then slide the actuator to the rear enough to clear the slotted mounting tab and the selector shaft. Account for an O-ring.



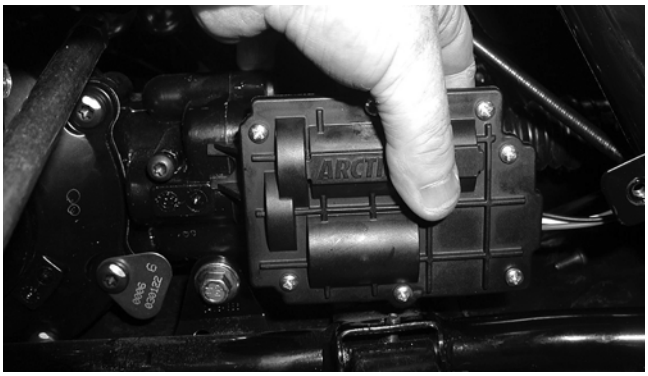
AG928

INSTALLING

1. Ensure that all mounting surfaces are clean and free of debris.

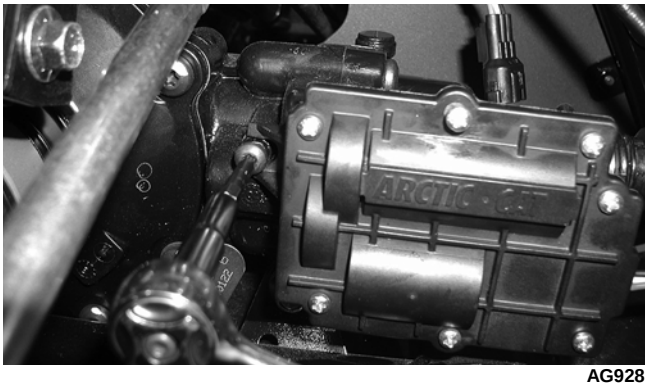
■ NOTE: Apply Arctic Cat ATV High-Performance Grease (p/n 0436-501) to the O-ring surface.

2. Place the O-ring into position; then align the actuator with the selector shaft and slide it forward onto the shaft taking care to engage the cap screw in the slot of the front mounting tab.



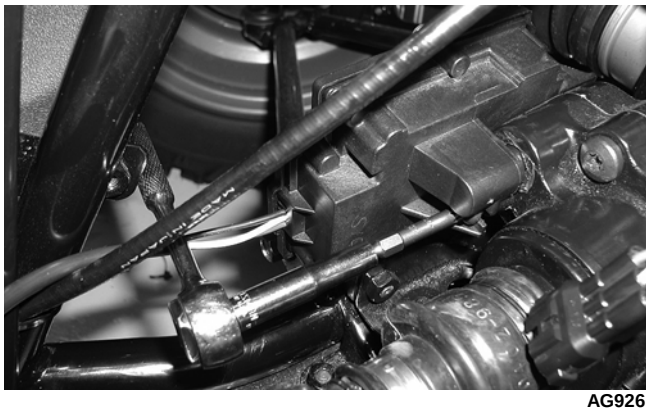
AG925

3. While holding the actuator firmly forward, tighten the front cap screw to hold the actuator in place; then install but do not tighten the two remaining cap screws.



AG928

4. Loosen the front cap screw; then tighten the cap screw on the driveshaft side.



AG926

■**NOTE: It is important to tighten this cap screw while the others are loose to ensure proper seating of the actuator.**

5. Tighten the remaining cap screws; then connect the electrical plug to the main harness.
6. Turn the ignition switch to the ON position and check the operation by shifting the selector switch several times.
7. Secure the wiring harness to the frame with a nylon cable tie; then install the inner fender panel.

■**NOTE: Make sure that the wiring harness is clear of the exhaust pipe and left-side tie rod.**

Front Differential

■**NOTE: To remove the rear gear case, see Rear Gear Case in this section.**

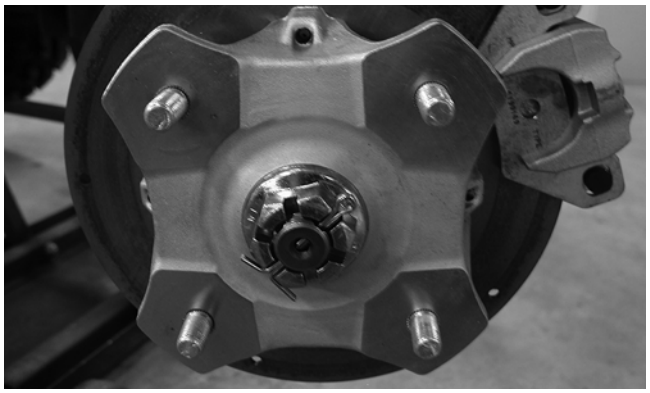
REMOVING DIFFERENTIAL

1. Secure the ATV on a support stand to elevate the wheels.

⚠ WARNING

Make sure the ATV is solidly supported on the support stand to avoid injury.

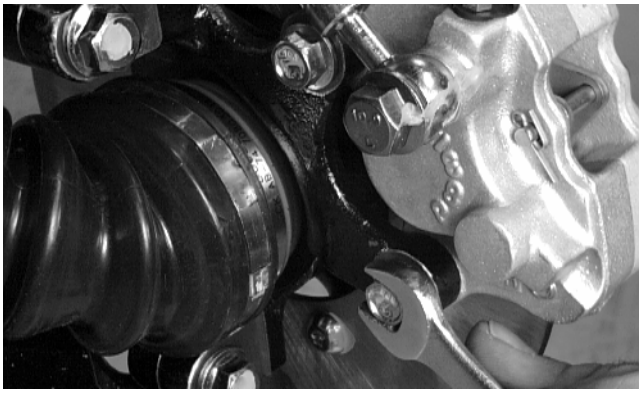
2. Remove the filler plug and the drain plug and drain the gear lubricant into a drain pan; then reinstall the plugs.
3. Remove the front wheels.
4. Pump up the hand brake; then engage the brake lever lock.
5. Remove the cotter pin securing the hex nut; then remove the hex nut and washer. Release the brake lever lock.



KX041

■**NOTE: It is not necessary to remove the brake hoses from the calipers for this procedure.**

6. Remove the brake calipers. Account for the cap screws.



AF894D

7. Remove the tie rod cotter pins and discard the pins.



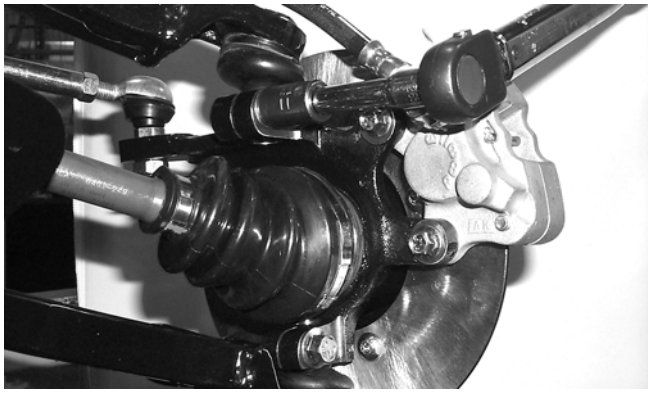
AF895D

8. Remove the tie rod lock nuts.



AF896D

9. Remove the upper ball joint cap screws taking care not to strip the threads on the ball joint shaft; then using a rubber mallet, tap the end of the axle and free it from the knuckle assembly.



AF628D

10. Pull the steering knuckle away from the axle taking care not to damage the seals with the axle end.



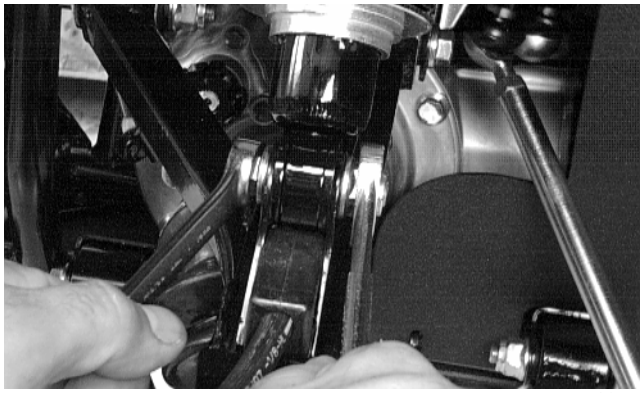
KX151

11. Support the axle to not allow it to drop or hang.

⚠ CAUTION

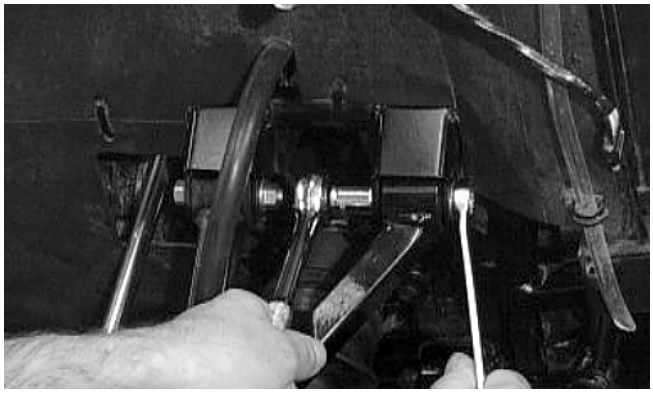
The axle must be supported. If the axle is allowed to drop or hang, damage to the inner CV joint may occur.

12. Remove the lower shock bolts. Account for the lock nuts; then move the shocks aside and secure them with a strap.



AF897D

13. Remove the upper A-arm lock nuts and cap screws; then remove the A-arms.



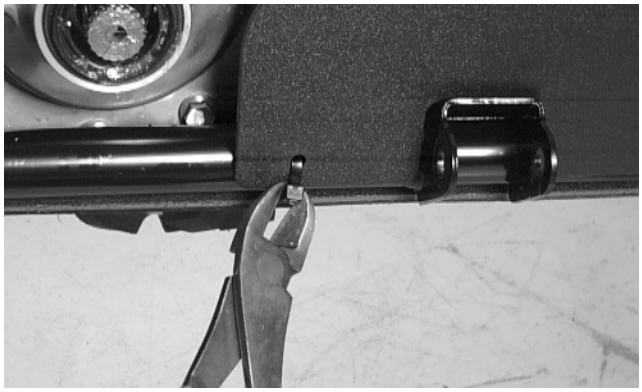
AF610D

14. Using a slide hammer, remove the front axles.



AF899D

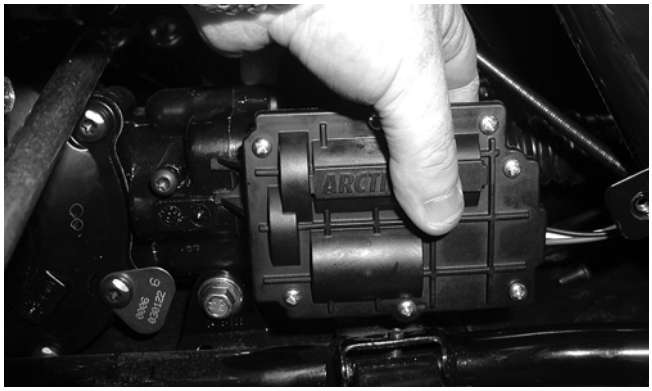
15. Remove the inner fender panels; then loosen the clamp on the front air duct and move the duct aside.



AF902D

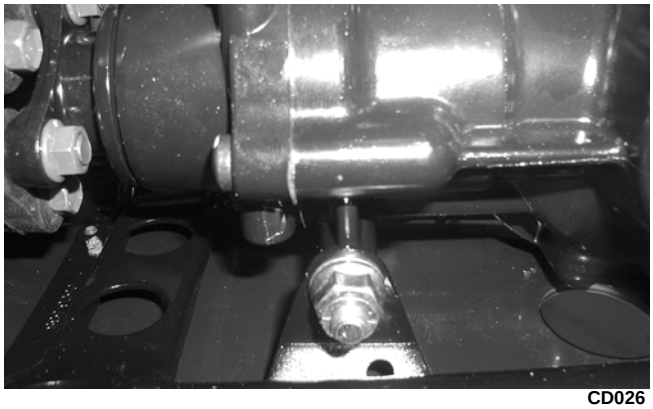
■**NOTE: To remove the panels, there will be a torx-head screw and three cable ties per side.**

16. Using a T-30 torx wrench, remove the three screws securing the front drive actuator to the gear case; then remove the actuator (see Front Drive Actuator in this section).



AG925

17. Remove the lower differential mounting bolt. Account for a lock nut and washers.



CD026

18. Remove the upper differential mounting bolt. Account for a lock nut and washers.



CD016

19. Free the differential assembly from the frame mountings; then shift the assembly forward in the frame sufficiently to disengage the splines of the driveshaft from the engine.



KX161

20. Lay the differential on right side; then maneuver it out of the frame with the driveshaft attached.



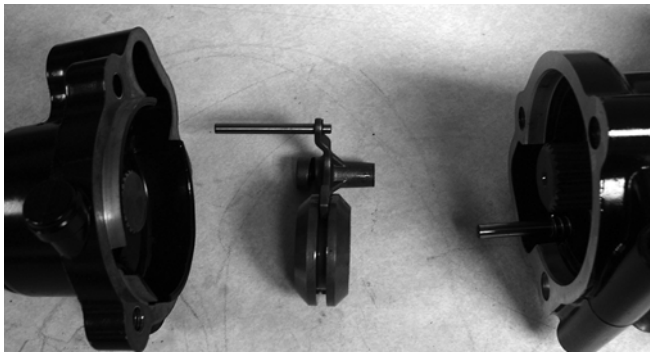
KX159

Disassembling Input Shaft Housing

■**NOTE: This procedure can be performed on a rear gear case.**

1. Using a T-40 torx wrench, remove the cap screws securing the input shaft housing cover.

2. Using a rubber mallet, remove the cover. Account for a gasket. Remove the fork, collar, and spring. Note the location of all the components for assembling purposes.



CD106

3. Remove the circlip; then remove the input shaft from the housing.

■ NOTE: The input shaft-to-bearing clearance is a hand-press fit. A light tap with a rubber mallet may be necessary to remove the shaft from the bearing.

4. Remove the input shaft from the housing.



KX210

5. Using a seal removal tool, remove the input shaft seal.

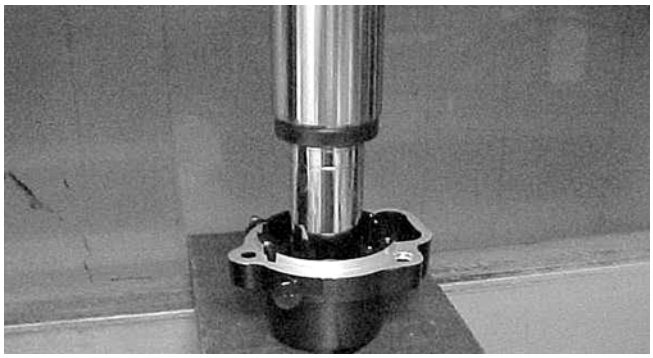


KX218

6. Remove the snap ring securing the input shaft bearing; then place the input shaft housing in a press and remove the bearing.



KX219



AF984

Assembling Input Shaft Housing

1. Place the input shaft housing in a press and install the input shaft bearing. Secure the bearing with the existing snap ring making sure the sharp edge of the snap ring faces to the outside.

⚠ CAUTION

Care must be taken to press on the outside race only or bearing damage will occur.



KX220



AF994

2. Install the input shaft seal making sure it is flush with the edge of the housing.



KX221



KX222

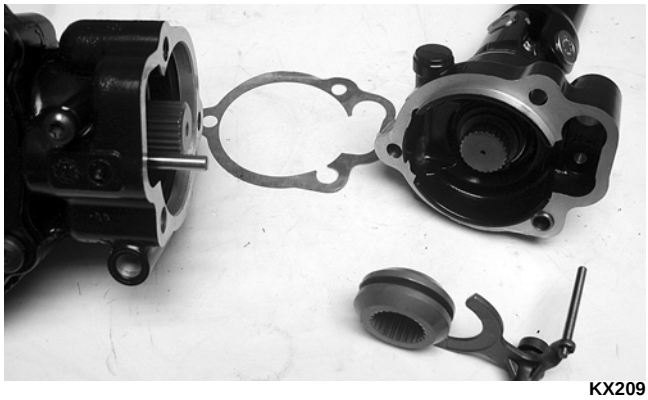
3. Install the input shaft into the housing; then secure it in the bearing with the circlip.



KX210

4. Place the input shaft assembly with a new gasket onto the gear housing; then secure with the existing cap screws. Tighten to 2.9-3.5 kg-m (21-25 ft-lb).

■ NOTE: If a new gear housing is being installed, tighten the cap screws to 3.5-4.3 kg-m (25-31 ft-lb).



KX209



KX158

Disassembling Pinion Gear

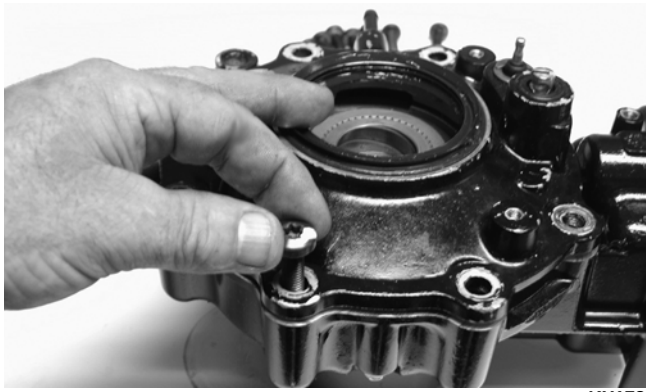
■ NOTE: This procedure can be performed on a rear gear case.

1. Using a T-40 torx wrench, remove the cap screws securing the input assembly. Account for the coupler, fork, and spring.



KX209

2. Using a T-40 torx wrench, remove the cap screws securing the differential cover. Account for and make note of the ID tag location for assembling purposes.



KX173

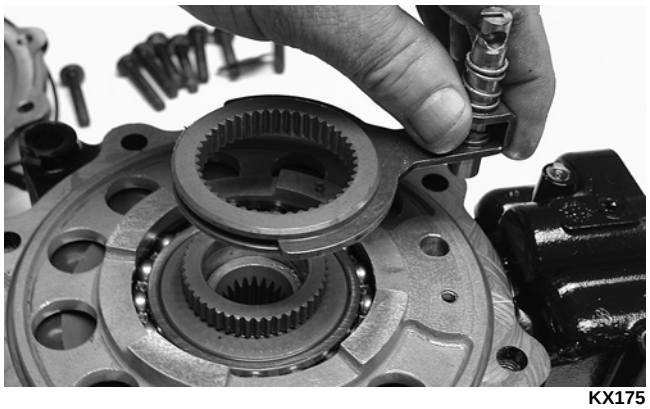
3. Using a plastic mallet, tap lightly to remove the differential cover. Account for an O-ring.



KX174

■ **NOTE: If the cover is difficult to remove, pry on the cover in more than one recessed location.**

4. Remove the splined coupler, shifter fork, pin, and spring of the differential lock assembly and set aside. Note position of parts for assembling purposes.



KX175

5. Make match marks on the left bearing housing and differential housing; then remove the plate and account for a shim. Mark the shim as left-side.



KX176



KX177



KX178

6. Place the differential with the open side down; then lift the housing off the spider assembly. Account for shim(s) and mark as right-side.



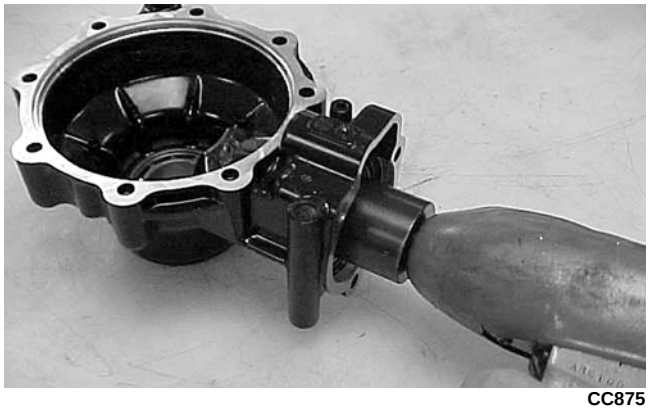
KX179



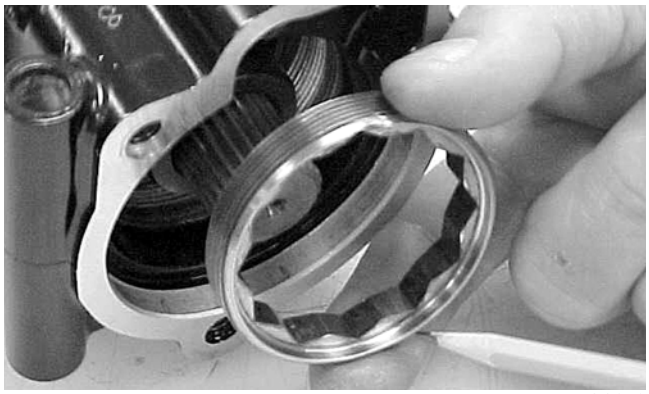
KX181

7. Using the 48 mm Internal Hex Socket (p/n 0444-104), remove the nut securing the pinion gear assembly.

■ NOTE: On a front differential, the nut has right-hand threads. On a rear gear case, the nut has left-hand threads.

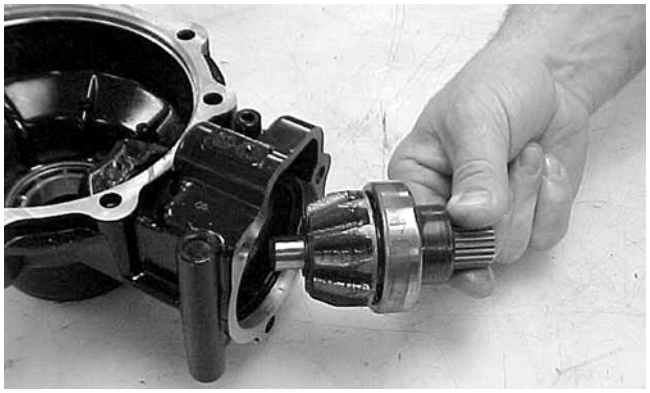


CC875



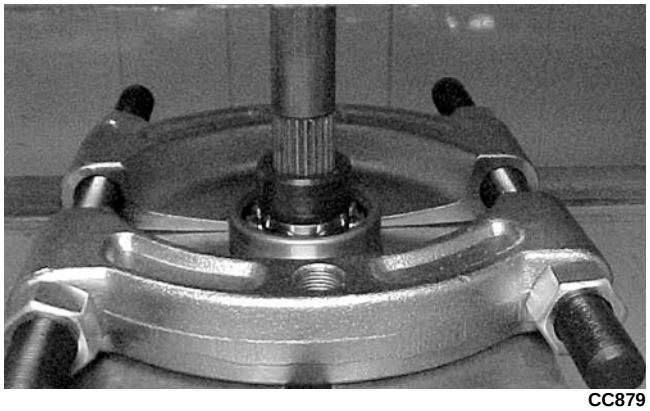
CC876

8. Using the Pinion Gear/Shaft Removal Tool (p/n 0444-127) and a hammer, remove the pinion gear from the housing.



CC878

9. Secure the pinion gear in a bearing puller; then remove the pinion bearing using a press. Account for a collar, a bearing, and a shim.



CC879

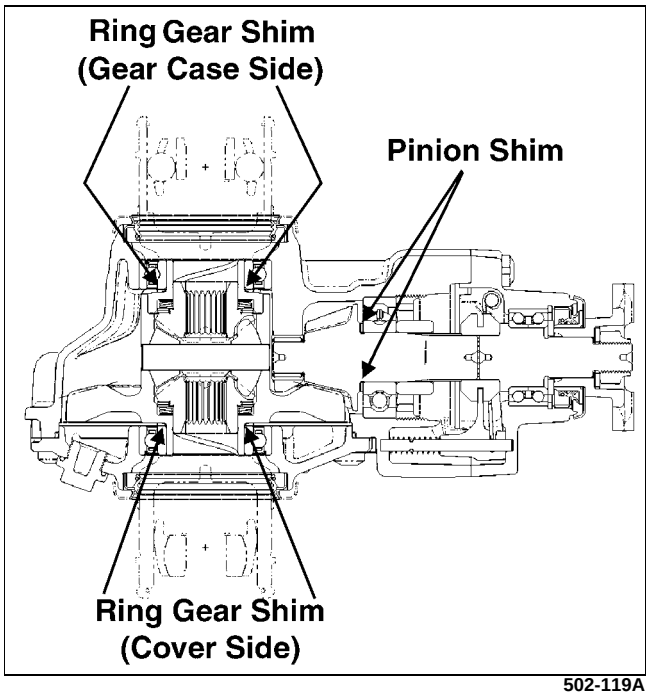


CC880

■ NOTE: If gears are being replaced, use the existing shims. The numbers are scribed onto the gears: the ring gear has the number on the opposite side of the gears, and the pinion gear has the number on the end of the pinion gear shaft by the splines. If no number is present, it should be considered as being in the O category.

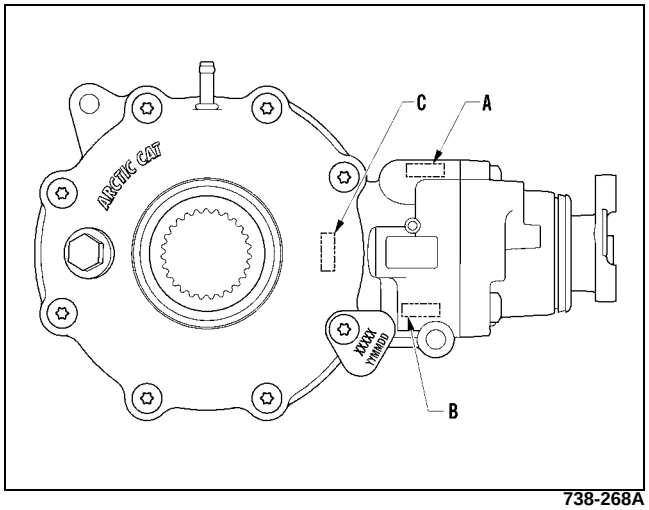
■ NOTE: If the housing is being replaced, proceed to the following Shimming Procedure/Shim Selection sub-section.

Shimming Procedure/Shim Selection



502-119A

1. Press bearings into bores by outer ring to hard contact with seat.
2. Note the following shim selections (shims are nominally 1.5 mm/0.060 in. thick):
   A. Pinion Gear Sub-Assembly - add the value (A) on the gear case housing with 1.5 mm (0.060 in.); then subtract the value on the 10-tooth pinion gear. This will give you the proper shim thickness.
   B. Cover Side - add the value (B) on the gear case housing to the value (C) on the gear case cover; then add 1.5 mm (0.060 in.). This will give you the proper shim thickness.
   C. Gear Case Side - install a 1.3-1.4 mm (0.050-0.055 in.) shim and tighten the bolts to 3.5-4.3 kg-m (25-31 ft-lb). Verify backlash to be within a range of 0.28-0.38 mm (0.011-0.015 in.) and end-play to be within a range of 0.10-0.20 mm (0.004-0.008 in.). If not within specification range, reselect shim until backlash specification range can be verified.

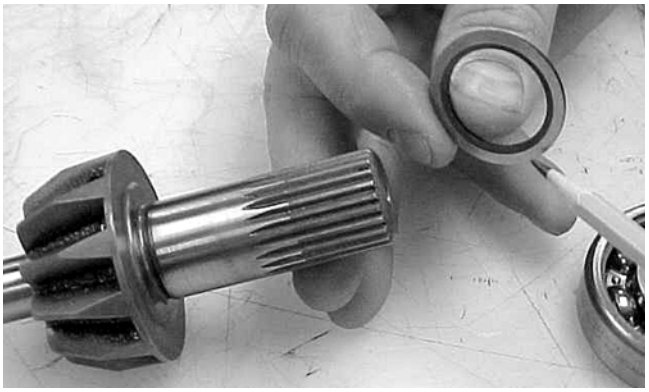


738-268A

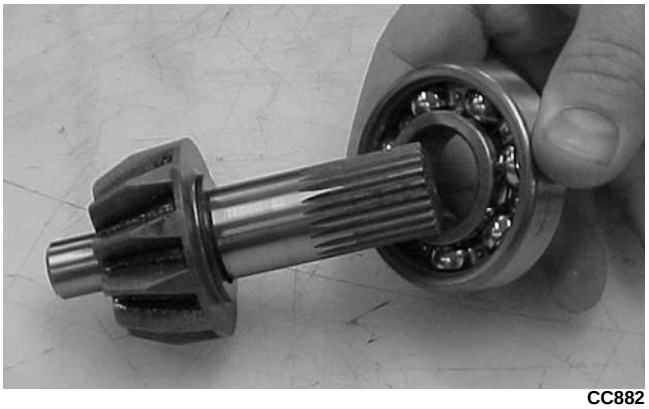
3. Apply molybdenum disulfide grease to all oil seal lips.
4. Prelubricate journal on pinion assembly with SAE 80W-90 hypoid gear lubricant prior to pressing assembly into gear case housing.
5. Tighten lock collar to 16.6 kg-m (120 ft-lb) and deform/lock edge approximately 1.5 mm (0.060 in.) into lower oil channel.

Assembling Pinion Gear

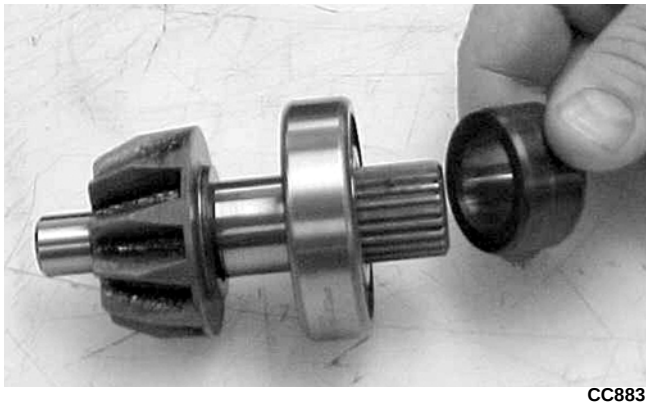
1. Place the shim (with the chamfer side toward the inside) onto the pinion shaft; then install the bearing onto the pinion shaft. Install the pinion shaft collar.



CC881

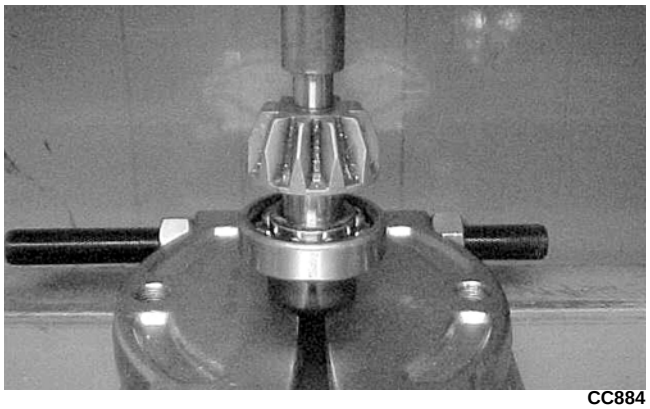


CC882



CC883

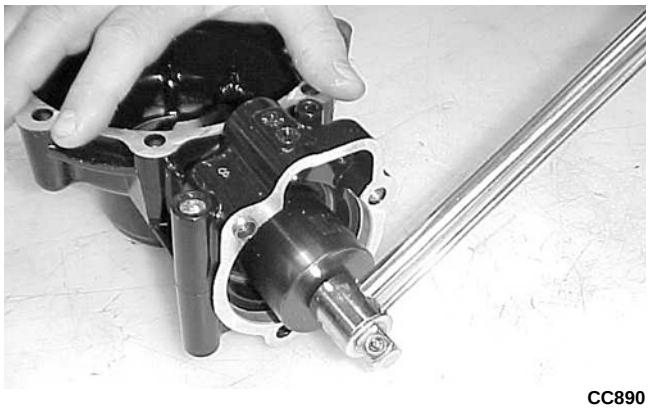
2. Place the pinion assembly in a bearing puller; then install the bearing using a press.



CC884

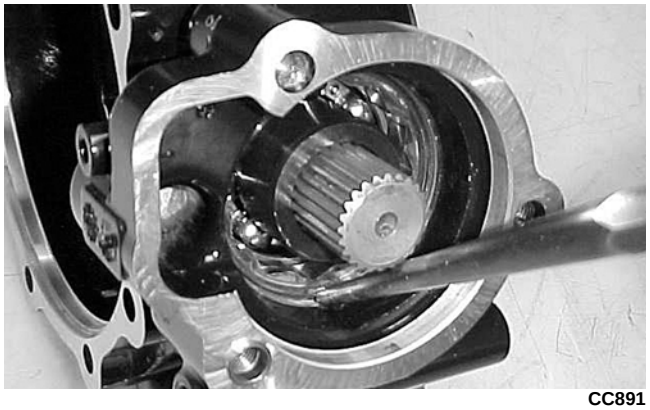
3. Install the pinion gear assembly into the housing. Using the 48 mm Internal Hex Socket (p/n 0444-104), secure the pinion gear assembly with the existing nut. Tighten to 17.5 kg-m (125 ft-lb).

■ NOTE: On a front differential, the nut has right-hand threads. On a rear gear case, the nut has left-hand threads.



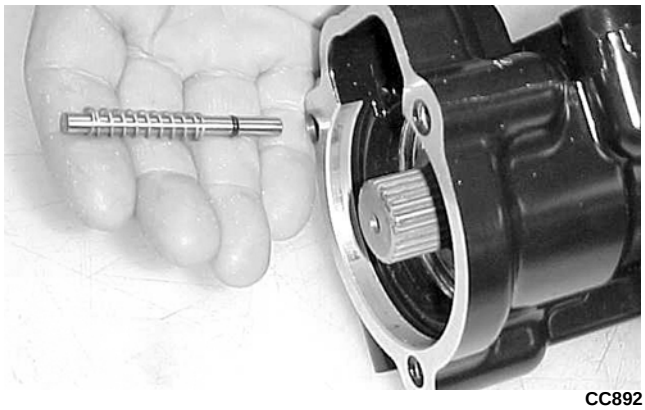
CC890

4. Place a punch on the edge of the nut in the oil gallery area; then using a hammer, stake the nut to ensure that the nut will remain securely tightened.



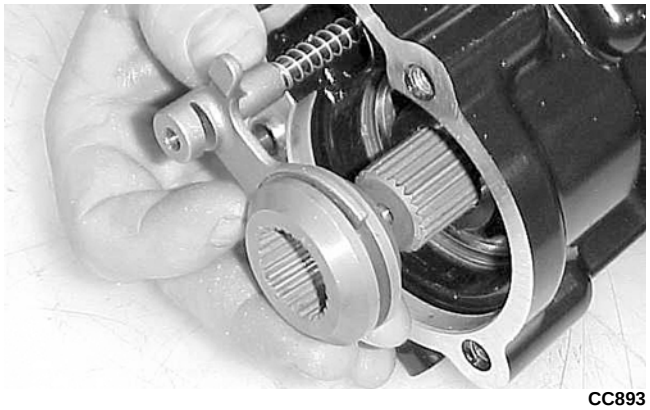
CC891

5. Install the shift fork shaft w/spring into the gear housing making sure the shaft O-ring is positioned to the inside.



CC892

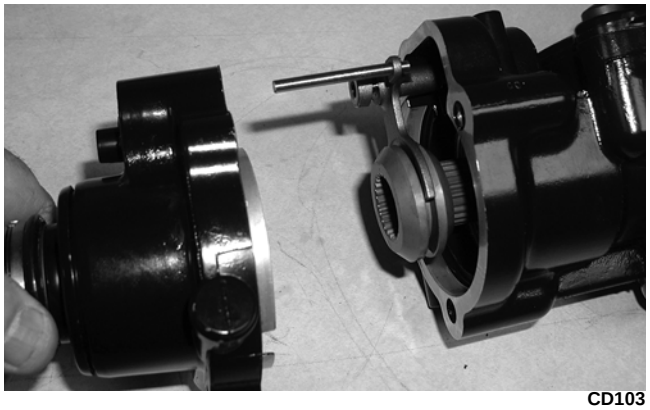
6. Install the shift fork assembly making sure the fork leg is facing upward. Apply a small amount of oil to the gasket; then install the gasket.



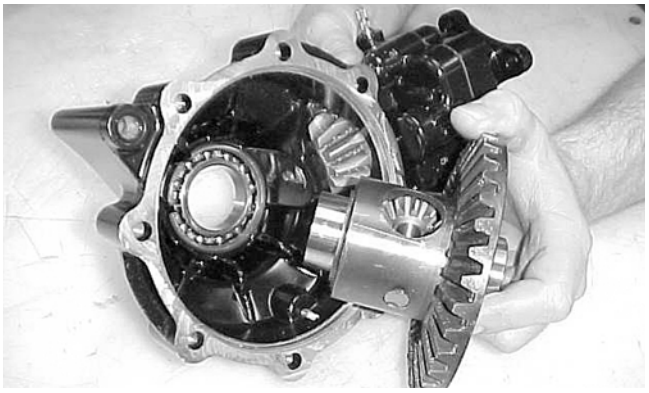
CC893

7. Place the input shaft assembly onto the gear housing; then secure with the existing cap screws. Tighten to 2.9-3.5 kg-m (21-25 ft-lb).

■ NOTE: If a new gear housing is being installed, tighten the cap screws to 3.5-4.3 kg-m (25-31 ft-lb).



CD103



CC897



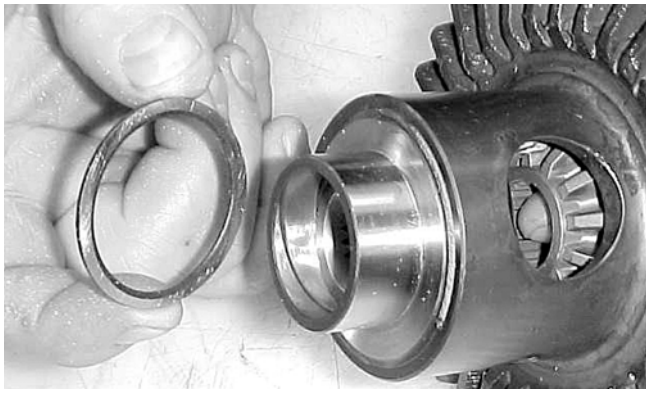
CD110



KX178

8. Install the proper shim onto the ring gear spider assembly making sure the chamfer side of the shim is facing toward the ring gear. Install the ring gear in the housing; then install the outside shim with the chamfer side of the shim toward the ring gear.

■ **NOTE: The spider and ring gear assembly must be replaced as a complete unit.**



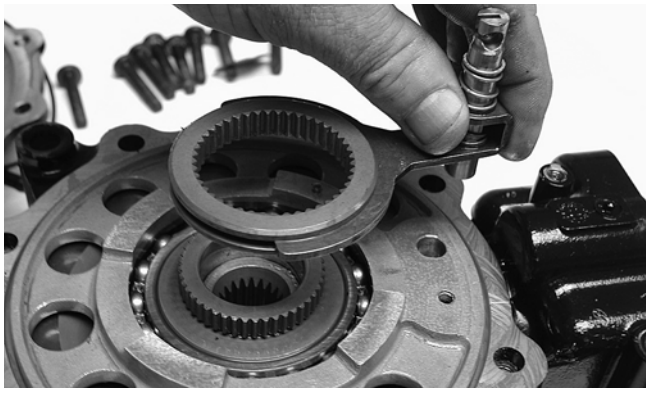
CC896

9. Install the left bearing housing aligning the match mark to the mark on the differential housing.



KX177

10. Install the differential lock assembly into the bearing housing; then place the O-ring on the differential housing.



KX175



KX174

11. Making sure the O-ring is properly positioned on the differential cover, install the differential cover with existing hardware. Account for the ID tag. Tighten the cap screws to 2.9-3.5 kg-m (21-25 ft-lb).

■ NOTE: Grease can be applied to the O-ring for ease of assembling.

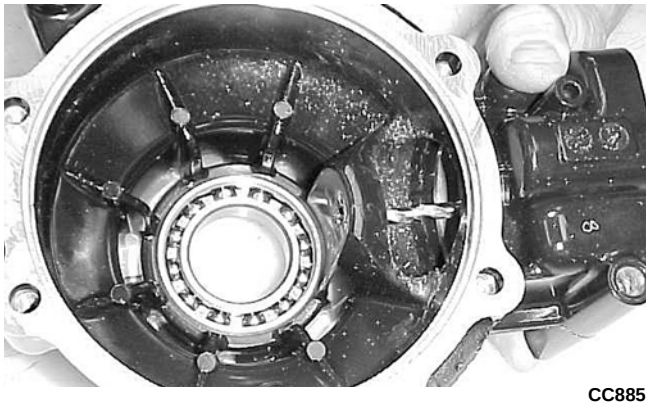
■ NOTE: If a new gear housing is being installed, tighten the cap screws to 3.5-4.3 kg-m (25-31 ft-lb).

Removing Needle Bearing

■ NOTE: Removing the needle bearing is rarely necessary. Avoid removing the needle bearing unless the bearing is clearly damaged.

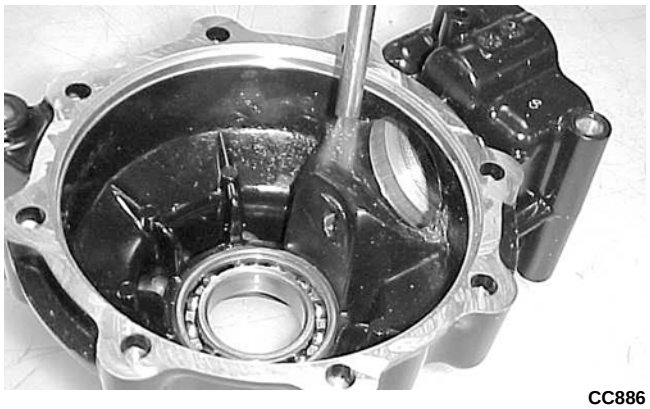
■ NOTE: This procedure can be performed on a rear gear case.

1. Place a 6.35 mm (1/4 in.) drill bit on the inside surface of the needle bearing (against the bottom side); then drill through the pinion shaft needle bearing housing.



CC885

2. Using a propane torch, heat the area surrounding the needle bearing to approximately 300°.



CC886

3. Using a flat-nosed punch, drive the bearing out of the housing.



CC887

Installing Needle Bearing

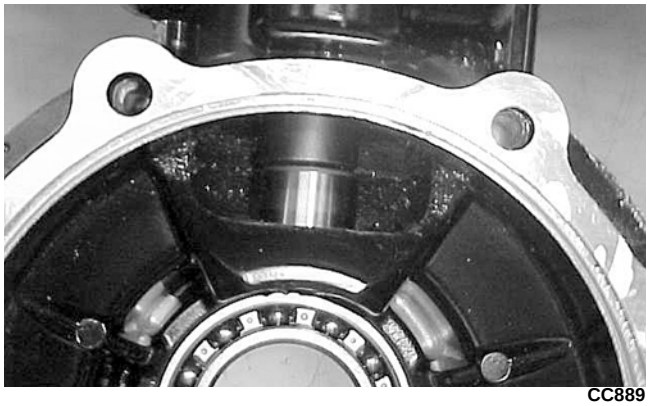
1. Place the new bearing into the housing.



CC888

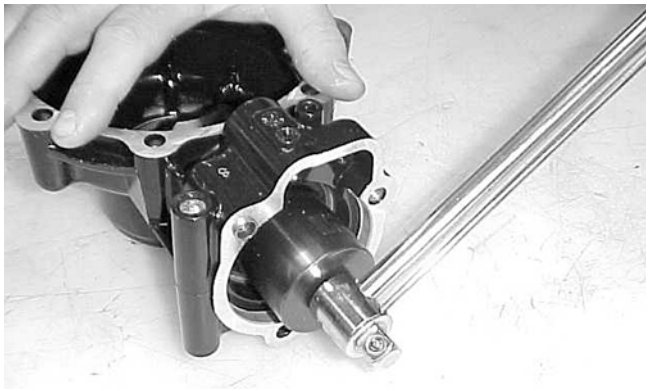
2. Using a suitable driver, install the needle bearing into the housing making sure the bearing is seated.

■ NOTE: Do not push the bearing too far into the housing.



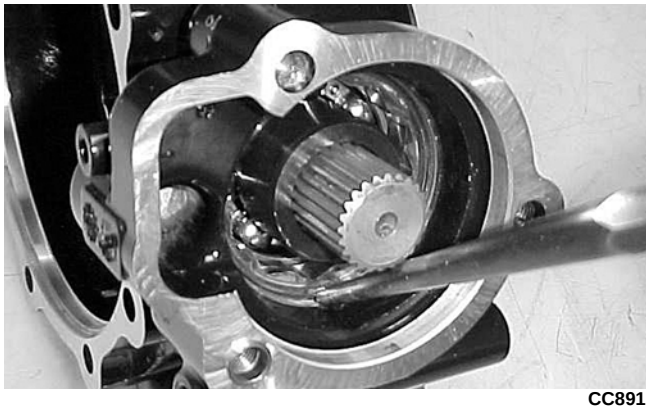
CC889

3. Install the pinion shaft and secure with the existing 48 mm nut. Tighten to 17.5 kg-m (125 ft-lb).



CC890

4. Place a punch on the edge of the nut in the oil gallery area; then using a hammer, stake the nut to ensure that the nut will remain securely tightened.



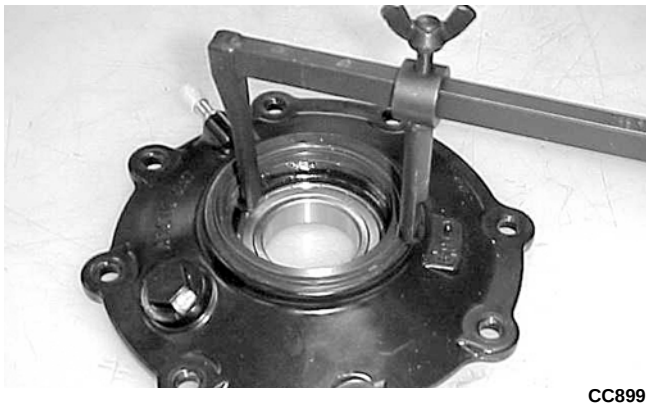
CC891

5. Install the input shaft housing.

Removing/Installing Axle Seal

■ NOTE: This procedure can be performed on a rear gear case.

1. Remove the seal using a seal removal tool.



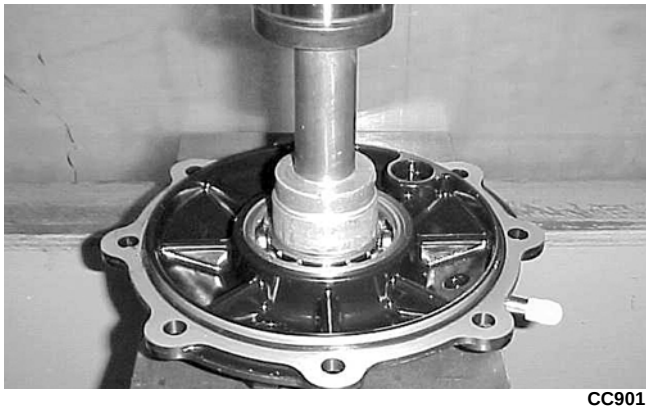
CC899

2. Using a press, remove the bearing.



CC900

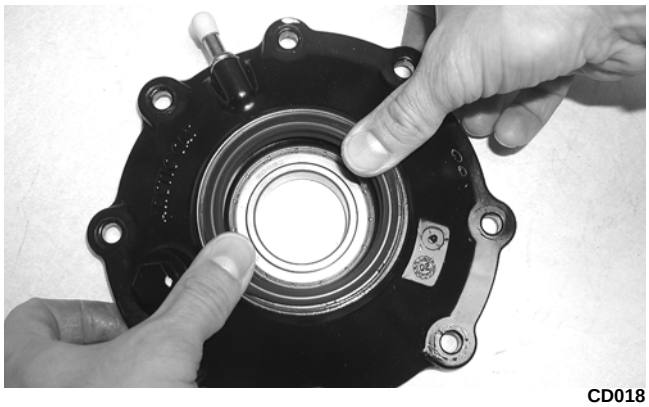
3. Using a press, install the new axle bearing into the housing.



CC901

■**NOTE: Prior to installing the seal, apply grease to the seal outside diameter.**

4. Install the seal into the housing pressing evenly on the outside edge until the seal is seated.



CD018

5. Repeat steps 1-4 for the opposite side.

INSTALLING DIFFERENTIAL

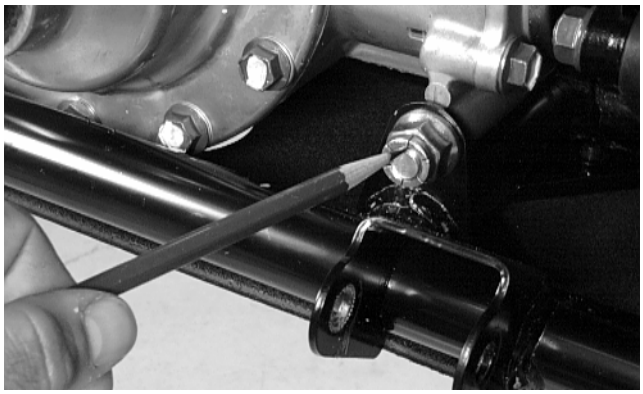
1. Align the splined input yoke with the front output splines; then place the differential into position on the frame and install the cap screws, washers, and flex-lock nuts. Tighten to 6.2 kg-m (45 ft-lb). Make sure the rubber boot is properly seated on the input yoke.



KX161



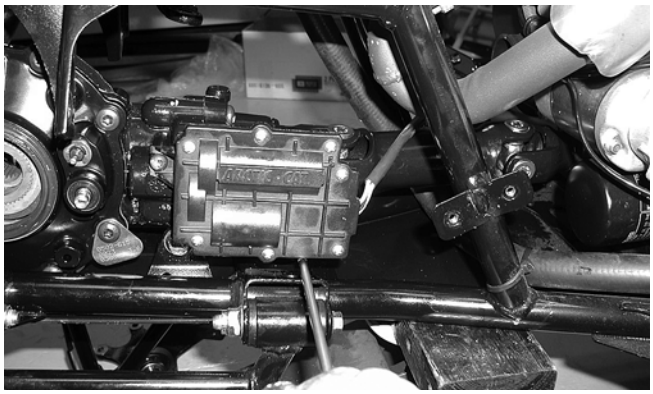
AF905D



AF904D

2. Pour 275 ml (9.3 fl oz) of SAE 80W-90 hypoid lubricant into the differential and install the filler plug. Tighten to 2.2 kg-m (16 ft-lb).

3. Install the front drive actuator and tighten the screws securely; then connect the lead to the main harness.



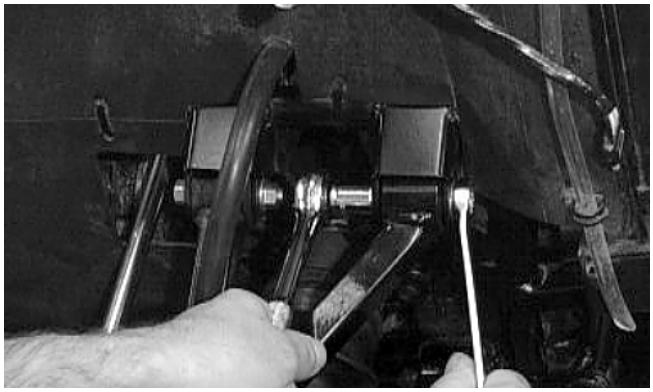
KX164

4. Install the inner fender panels.

■**NOTE: To secure the side panels, use a torx-head screw and three cable ties per side.**

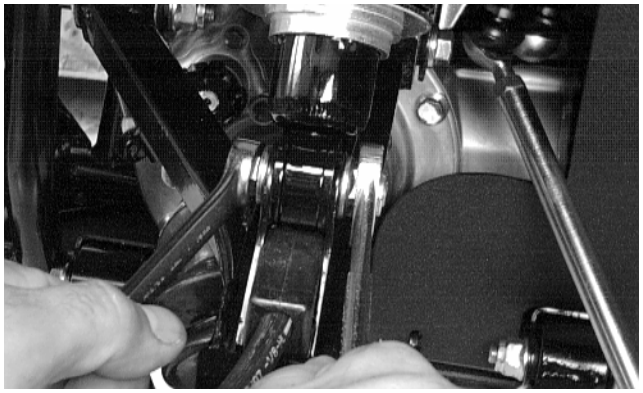
5. Install the front axles (see Drive Axles in this section).

6. Secure the upper A-arms with cap screws and lock nuts. Tighten to 4.8 kg-m (35 ft-lb).



AF610D

7. Secure the lower shock eyelets with cap screws and lock nuts. Tighten to 4.8 kg-m (35 ft-lb).

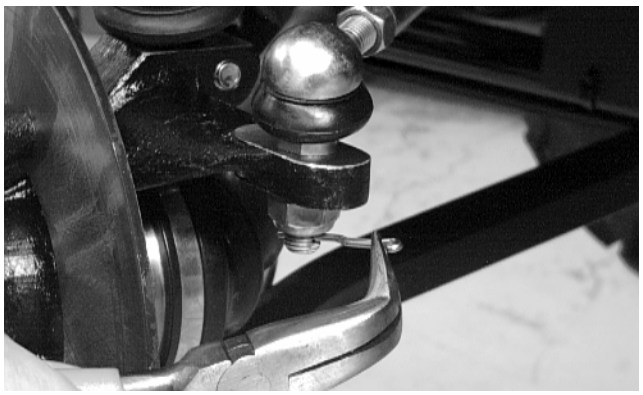


AF897D

8. Secure the tie rods with the lock nuts. Tighten to 4.2 kg-m (30 ft-lb); then install and spread the cotter pins.

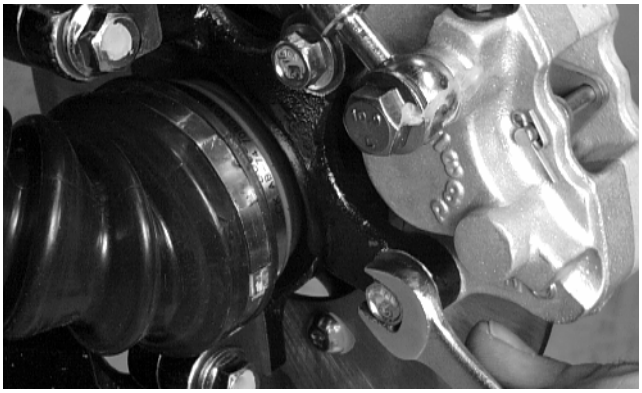


AF896D



AF895D

9. Install the brake calipers. Secure with the cap screws tightened to 2.8 kg-m (20 ft-lb).



AF894D

10. Install the wheels and tighten to 5.5 kg-m (40 ft-lb).

11. Remove the ATV from the support stand.

Drive Axles

REMOVING REAR DRIVE AXLE

1. Secure the ATV on a support stand to elevate the wheels.

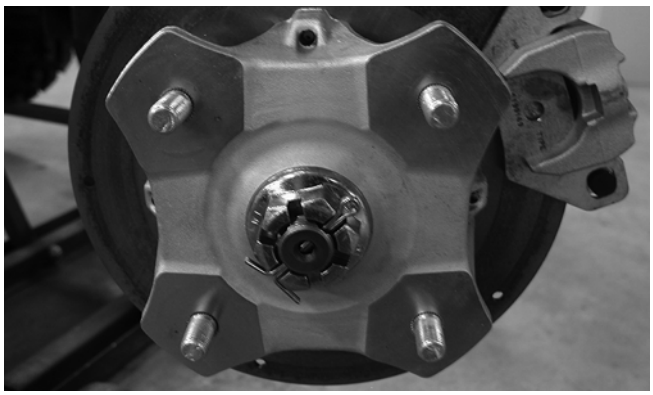
⚠ WARNING

Make sure the ATV is solidly supported on the support stand to avoid injury.

2. Pump up the hand brake; then engage the brake lever lock.

3. Remove the wheel.

4. Remove the cotter pin securing the hex nut; then remove the hex nut and rubber washer. Release the brake lever lock.



KX041

5. Remove the two brake calipers (right side only).

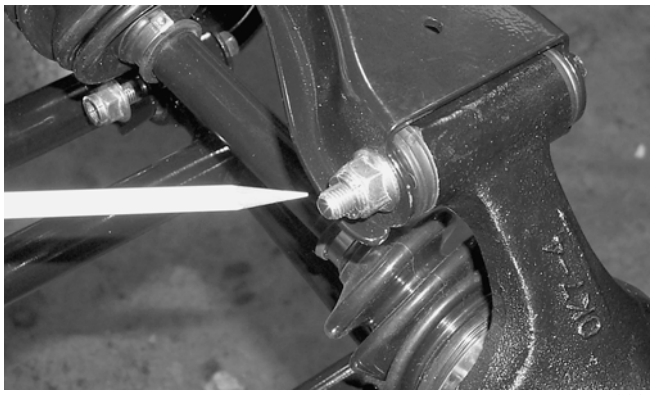
■ **NOTE: Do not allow a brake caliper to hang from its hose.**

⚠ CAUTION

The calipers should be supported. If the calipers are allowed to hang from the hoses, damage may occur.

6. Slide the hub out of the knuckle and set aside.

7. Remove the cap screw and lock nut securing the knuckle to the upper A-arm. Discard the lock nut.

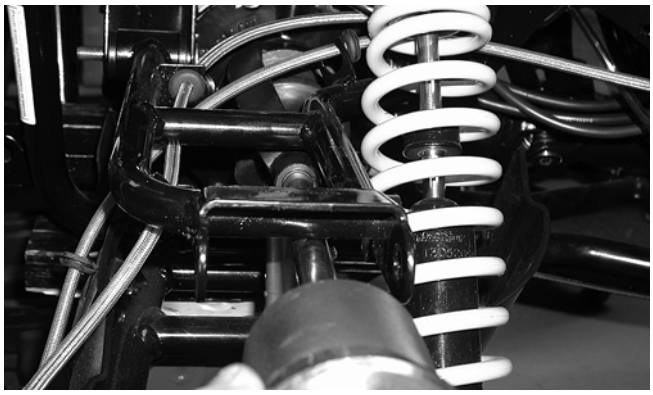


AF936

■ **NOTE: Never reuse a lock nut. Once a lock nut has been removed, it must be replaced with a new lock nut.**

8. While holding the drive axle stationary, pull the top of the knuckle out and down until it is free of the drive axle.

9. Place a drain pan under the ATV to contain any oil leakage; then using a slide hammer, remove the drive axle.



KX184

REMOVING FRONT DRIVE AXLE

1. Secure the ATV on a support stand to elevate the wheels.

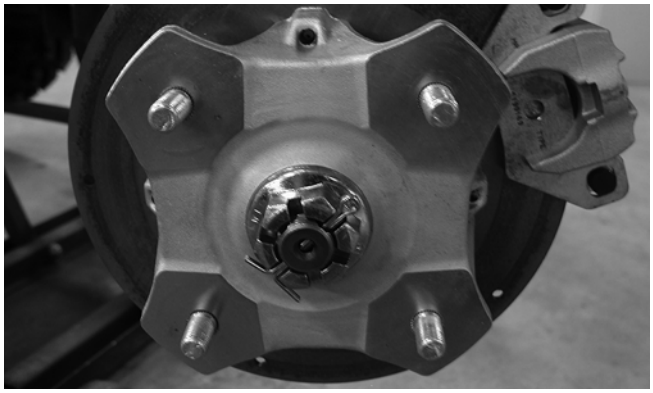
⚠ WARNING

Make sure the ATV is solidly supported on the support stand to avoid injury.

2. Pump up the hand brake; then engage the brake lever lock.

3. Remove the wheel.

4. Remove the cotter pin securing the hex nut; then remove the hex nut and washer. Release the brake lever lock.



KX041

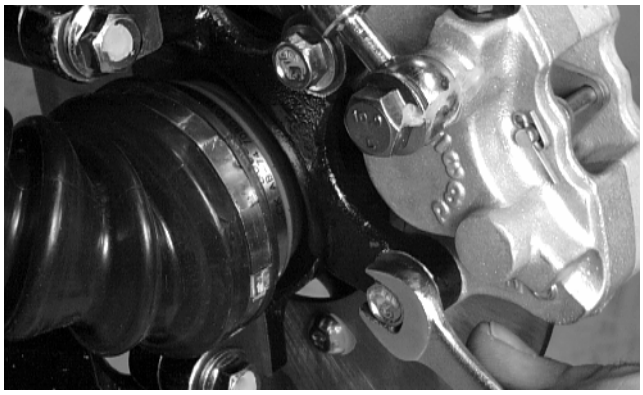
■ **NOTE: It is not necessary to remove the brake hose from the caliper for this procedure.**

5. Remove the brake caliper.

■ **NOTE: Support the caliper. Do not allow the caliper to hang from its hose.**

⚠ CAUTION

The caliper should be supported. If the caliper is allowed to hang from its hose, damage may occur.



AF894D

6. Slide the hub w/brake disc out of the steering knuckle and set aside.

7. Remove the tie rod from the steering knuckle.



AF896D

8. Remove the cap screw and lock nut securing the lower shock eyelet to the upper A-arm. Discard the lock nut.

■ **NOTE: Never reuse a lock nut. Once a lock nut has been removed, it must be replaced with a new lock nut.**

9. Remove the cap screw securing the upper A-arm ball joint to the steering knuckle; then disengage the ball joint from the knuckle.

10. While holding the drive axle stationary, pull the top of the steering knuckle out and down until it is free of the drive axle.

11. Place a drain pan under the ATV to contain any oil leakage; then using a slide hammer, remove the drive axle.



AF899D

CLEANING AND INSPECTING

■ **NOTE: Always clean and inspect the drive axle components to determine if any service or replacement is necessary.**

1. Using a clean towel, wipe away any oil or grease from the axle components.



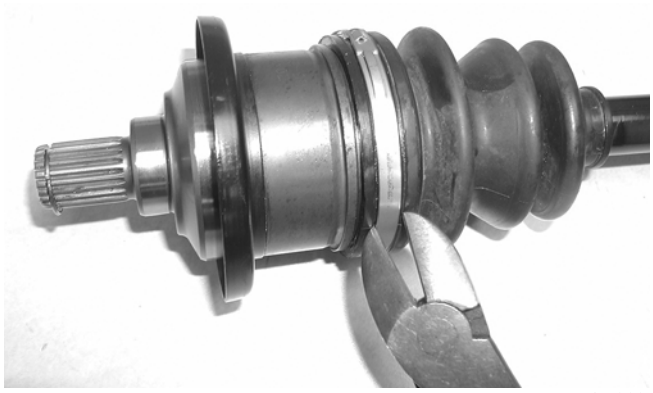
CD019

2. Inspect boots for any tears, cracks, or deterioration.

■ **NOTE: If a boot is damaged in any way, it must be replaced with a boot kit.**

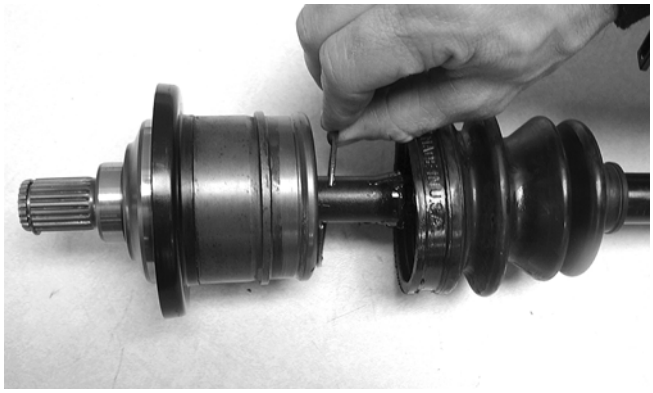
DISASSEMBLING AXLES

1. Using a side-cutters (or suitable substitute), remove the large clamp from the boot.



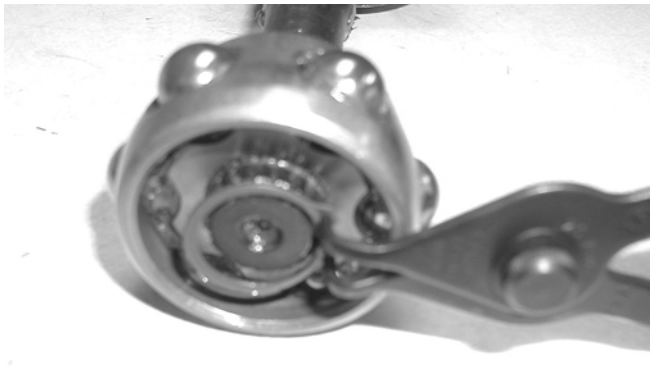
CD020

2. Wipe away excess grease to access the retaining ring. Using an awl or circlip pliers, remove the circlip.



CD021

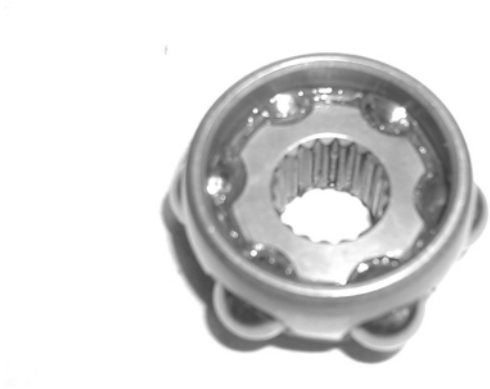
3. Using a snap ring pliers, remove the circlip securing the bearing ring to the shaft. Note the direction of the bearing for assembling purposes.



CD023

4. Note the difference inside each bearing ring end for assembling purposes; then remove the bearing ring.

■ **NOTE: The recess of the bearing must face toward the housing.**

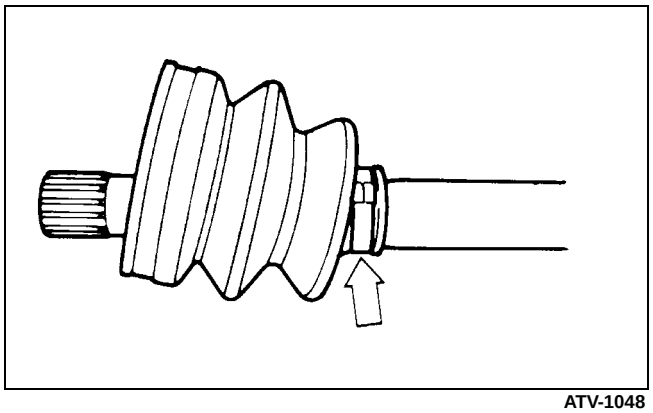


CD022

5. Inspect the splines of the shaft, the bearing ring, and the housing for damage.

■ **NOTE: If any damage is apparent to the splines, the bearing ring, and/or the housing, the drive axle must be replaced as an assembly.**

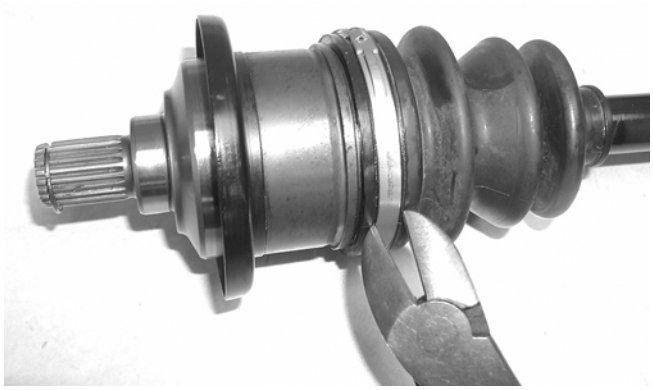
6. Using a side-cutters (or suitable substitute), remove the small clamp from the shaft.



ATV-1048

■ **NOTE: At this point if the outer boot is damaged, continue with step 7.**

7. Using a side-cutters (or suitable substitute), remove both outer boot clamps from the shaft. Note the position of the different-sized clamps for assembling purposes.



CD020

8. Apply grease from the kit into the knuckles and the new outer boot.

■ **NOTE: The large grease pack is for the inner drive axle bearing and boot assembly.**

9. Slide the new outer boot onto the shaft with the new clamps positioned as shown. Note the different-sized clamps from removal.

■ **NOTE: The boot is positioned correctly when the small end of the boot seats down into the recessed groove.**

10. Using Boot Clamp Pliers (p/n 0444-120), secure both outer boot clamps.

⚠ CAUTION

It is important that the clamps are positioned correctly or they may loosen when in motion.



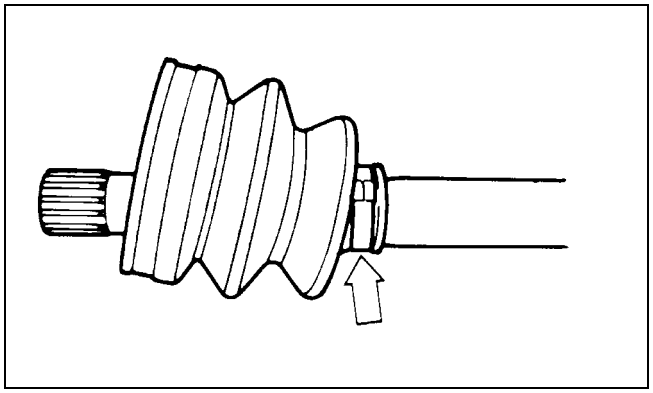
CD024

ASSEMBLING AXLES

1. Install the inner boot with the small clamp making sure the ends of the clamp are positioned correctly.

■ **NOTE: The boot is positioned correctly when the small end of the boot seats down into the recessed groove.**

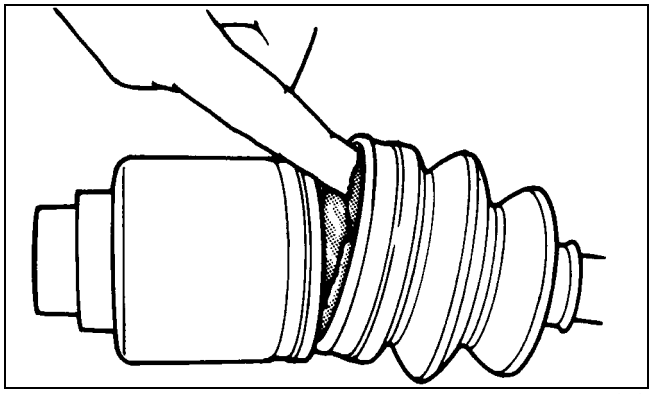
2. Using the boot clamp pliers, secure the small clamp of the inner boot.



ATV-1048

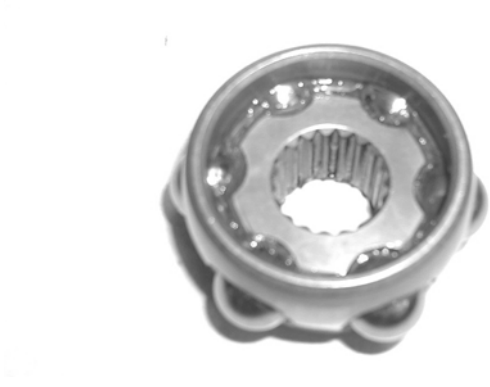
3. Apply grease from the kit onto the bearing ring making sure grease is on both the inner and outer sides; then apply the remainder of the grease into the housing and boot.

■ **NOTE: The large grease pack is for the inner drive axle bearing and boot assembly.**



ATV-1052

4. Install the bearing onto the shaft making sure the recess of the bearing is facing the housing.

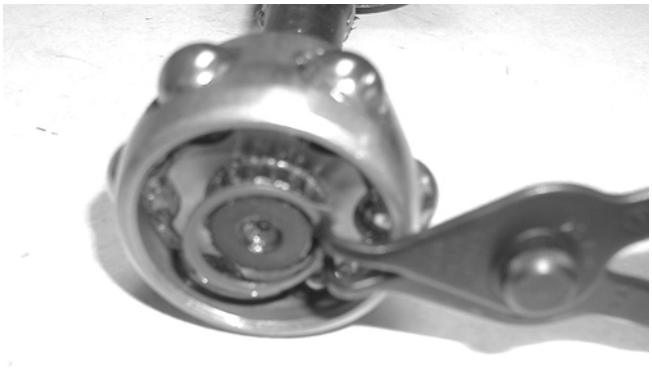


CD022

⚠ CAUTION

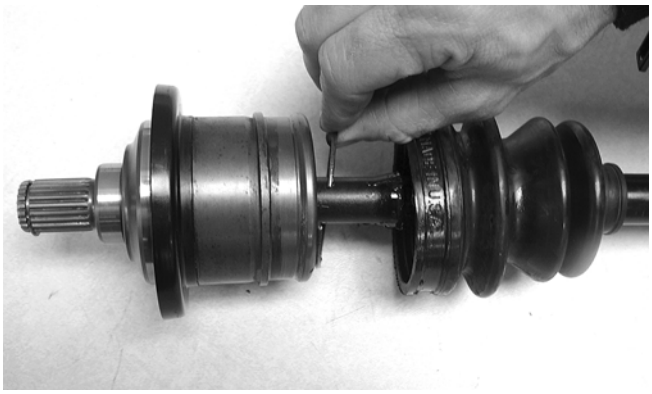
The bearing ring must go onto the shaft with the side without splines facing toward the small clamp of the inner boot or severe damage will result.

5. Secure the bearing ring with the circlip making sure the sharp side of the circlip faces away from the boot.



CD023

6. Making sure the marks made during disassembling align, slide the housing over the bearing ring; then install the circlip.



CD021

7. Slide the boot over the housing; then using the boot clamp pliers, secure the boot with the clamp.



CD024

8. Inspect the axle components for correct positioning of the four clamps. Also, inspect the boots for being correctly positioned on the shaft.

INSTALLING REAR DRIVE AXLE

1. Apply Arctic Cat ATV High-Performance Grease (p/n 0436-501) to the splines; then slide the drive axle into place in the gear case.

■ **NOTE: To assure proper seating of the axle, give it a light pull; the axle should remain "clipped" in place.**

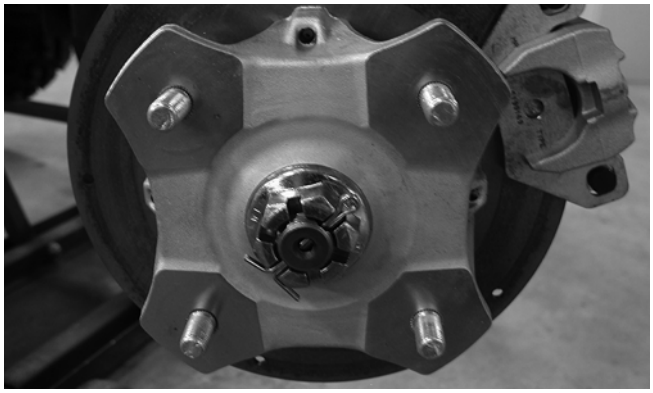
2. Swing the knuckle up and onto the drive axle; then place the knuckle into place in the upper A-arm. Secure the knuckle to the A-arm with a cap screw and a new lock nut. Tighten to 4.8 kg-m (35 ft-lb).

3. Place the hub into position on the axle followed by a washer and hex nut. Tighten the hex nut finger-tight at this time.

4. If the brake calipers were removed, position them on the knuckle and secure with existing cap screws. Tighten the auxiliary brake caliper cap screws to 2.1 kg-m (15 ft-lb). Tighten the hydraulic brake caliper cap screws to 2.8 kg-m (20 ft-lb).

5. Pump up the hand brake lever; then engage the brake lever lock.

6. Tighten the hub hex nut (from step 3) to 17.5 kg-m (125 ft-lb); then install and spread a new cotter pin making sure each side of the pin is flush to the hub nut.



KX041

7. Install the wheel. Tighten to 5.5 kg-m (40 ft-lb).

8. Remove the ATV from the support stand and release the brake lever lock.

9. Check the engine/transmission oil level and add oil as necessary.

INSTALLING FRONT DRIVE AXLE

1. Position the drive axle in the gear case and steering knuckle; then insert the upper A-arm ball joint into the steering knuckle. Secure with a cap screw tightened to 4.8 kg-m (35 ft-lb).

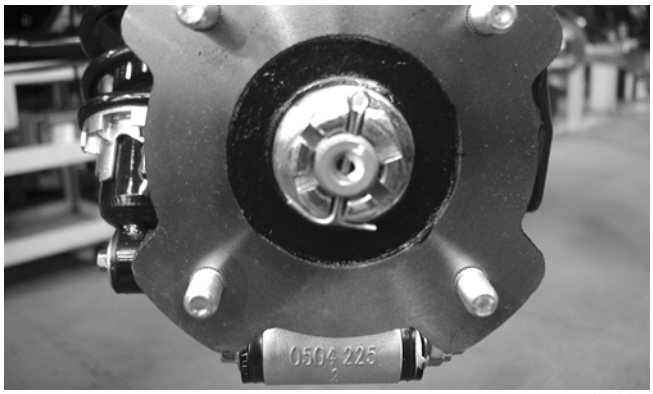
2. Place the brake hose into position on the upper A-arm; then secure the lower shock eyelet to the A-arm with a cap screw and a new lock nut. Tighten to 4.8 kg-m (35 ft-lb).

3. Secure the tie rod to the steering knuckle with a new lock nut. Tighten securely; then install and spread a new cotter pin.

4. Slide the hub w/brake disc into position in the steering knuckle followed by a washer and hex nut. Tighten finger-tight at this time.

5. Install the brake caliper on the steering knuckle. Tighten to 2.8 kg-m (20 ft-lb); then pump up the hand brake lever and engage the brake lever lock.

6. Tighten the hub hex nut (from step 4) to 10.4 kg-m (75 ft-lb); then install and spread a new cotter pin making sure each side of the pin is flush to the hub nut.

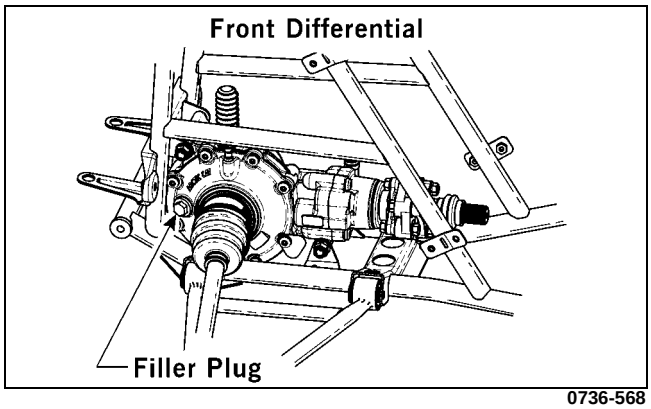


CD027

7. Install the wheel and tighten to 5.5 kg-m (40 ft-lb).

8. Remove the ATV from the support stand and release the brake lever lock.

9. Check the front differential oil level and add oil as necessary.



0736-568

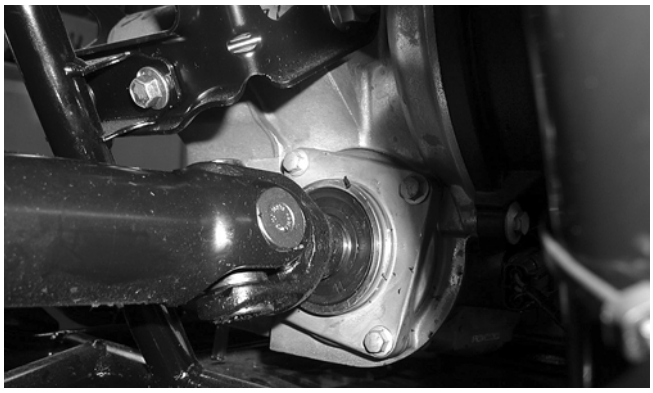
Rear Gear Case

REMOVING

1. Remove the left-side rear A-arms (see Rear A-Arms in Section 7).

2. Remove both of the rear drive axles (see Drive Axles in this section).

3. Remove the two cap screws and lock nuts securing the rear gear case to the frame; then move the gear case to the rear sufficiently to disengage the splined yoke from the rear output spline shaft. Remove through the left frame opening.



KX078

☞ AT THIS POINT

For servicing the input shaft, pinion gear, needle bearing, and axle seal, see Front Differential in this section.

INSTALLING

1. Slide the gear case into position through the left side of the frame; then move the gear case to the rear sufficiently to engage the splined yoke with the splined rear output shaft.
2. Position the gear case so the mounting cap screws can be installed; then with washers and new lock nuts, tighten to 4.3-5.3 kg-m (31-38 ft-lb).

■ NOTE: If a new gear housing is being installed, tighten the cap screws to 5.1-6.3 kg-m (37-45.5 ft-lb).

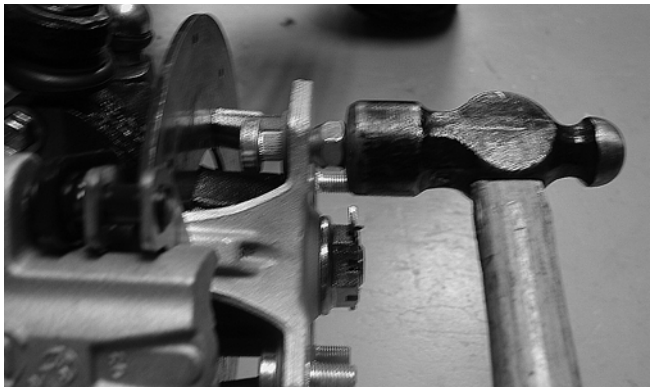
3. Install the rear drive axles (see Drive Axles in this section).
4. Install the left-side rear A-arms (see Rear A-Arms in Section 7).

Hub

■ NOTE: The hubs on this ATV have replaceable wheel studs. These studs are easily changed without removing the hub.

REPLACING WHEEL STUDS

1. Support the ATV on adequate stands or a lift; then remove the applicable wheel.
2. Thread a lug nut onto the stud; then using a hammer drive the stud out of the hub.



KX132

■ NOTE: If the threads are damaged, simply drive the stud out without threading on a nut.

⚠ WARNING

If any studs are loose in the hub, the hub must be replaced. Loose studs will not hold the wheel securely to the hub and hub breakage or wheel loss could occur causing loss of control, injury, or death.

3. Insert a new stud in the hub; then install a lug nut with the flat side next to the hub and using an air wrench, draw the stud into the hub.

■ NOTE: Do not reuse wheel studs once removed.

REMOVING

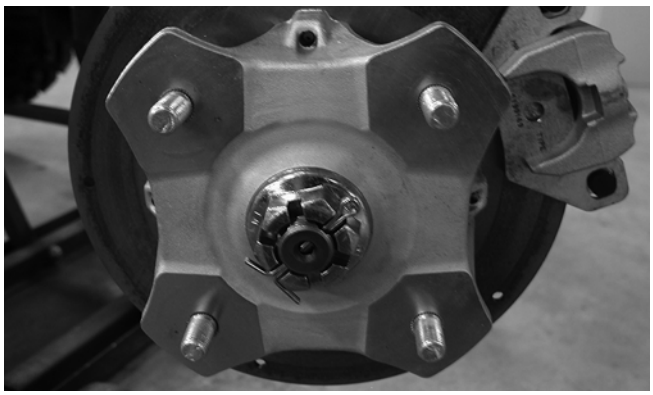
1. Secure the ATV on a support stand to elevate the wheel; then remove the wheel.

⚠ WARNING

Make sure the ATV is solidly supported on the support stand to avoid injury.

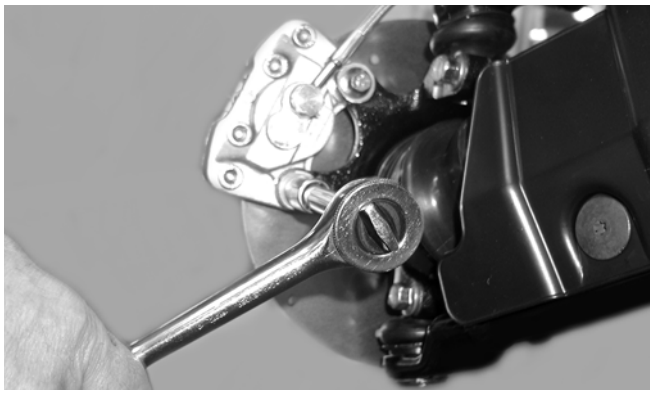
2. Remove the cotter pin from the nut.

■ NOTE: During assembly, new cotter pins should be installed.



KX041

3. Remove the nut securing the hub. Account for a washer.
4. Remove the brake caliper.



CD007

5. Remove the hub assembly.
6. Remove the four cap screws securing the brake disc.

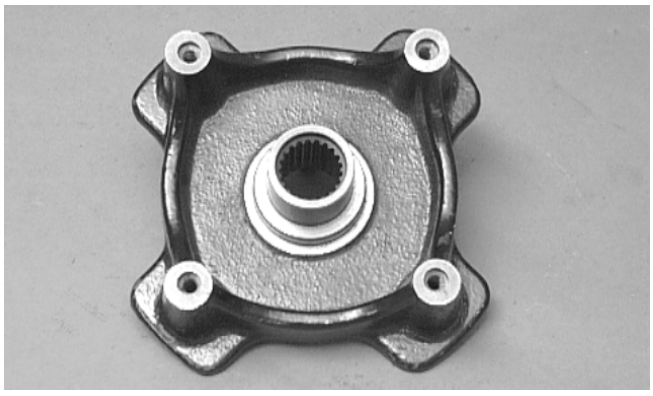
CLEANING AND INSPECTING

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Clean all hub components.
2. Inspect all threads for stripping or damage.
3. Inspect the brake disc for cracks or warping.
4. Inspect the sealing area of the hub for pits.
5. Inspect the hub splines for signs of wear.
6. Inspect the hub for cracks.

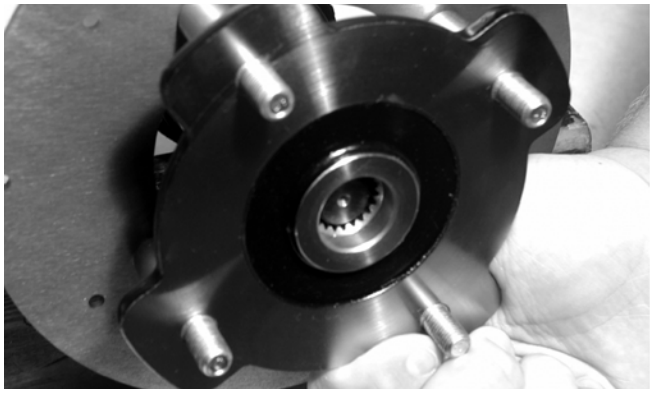
INSTALLING

1. Secure the brake disc to the hub with the four cap screws coated with blue Loctite #243. Tighten to 2.1 kg-m (15 ft-lb).
2. Apply grease to hub sealing area and on the splines.



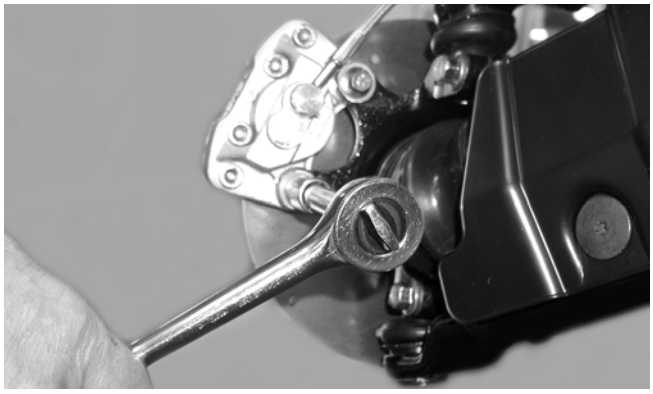
AF736D

3. Install the hub assembly onto the splines of the shaft.



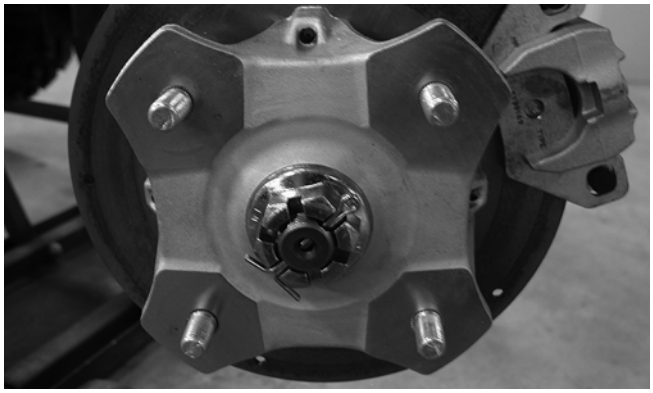
CD009

4. Insert the hub seal onto the shaft; then position it into the hub.
5. Place the washer onto the shaft; then secure the hub assembly with the nut. Tighten only until snug.
6. Secure the brake caliper to the knuckle with the two cap screws. Tighten the caliper to 2.8 kg-m (20 ft-lb).



CD007

7. Tighten the hub nut (from step 5) to 10.4 kg-m (75 ft-lb) for the front or 17.5 kg-m (125 ft-lb) for the rear; then install and spread a new cotter pin making sure each side of the pin is flush to the hub nut.



KX041

8. Install the wheel and tighten to 5.5 kg-m (40 ft-lb).



CD006

9. Remove the ATV from the support stand.

Hydraulic Brake Caliper

■**NOTE: The brake caliper is a non-serviceable component; it must be replaced as an assembly.**

REMOVING/DISASSEMBLING

1. Secure the ATV on a support stand to elevate the wheel; then remove the wheel.

⚠ WARNING

Make sure the ATV is solidly supported on the support stand to avoid injury.

2. Drain the brake fluid from the entire hydraulic system (reservoir, hoses, and caliper).



AF637D

⚠ CAUTION

Brake fluid is highly corrosive. Do not spill brake fluid on any surface of the ATV and do not reuse brake fluid.

3. Remove the brake hose from the caliper; then remove the caliper.



AF636D

CLEANING AND INSPECTING

1. Clean all caliper components (except the brake pads) with parts-cleaning solvent.
2. Inspect the brake pads for damage and excessive wear.

■**NOTE: For measuring brake pads, see Section 2.**

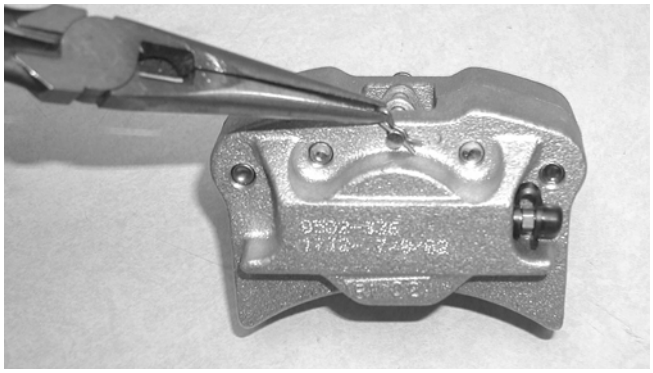
ASSEMBLING/INSTALLING

1. Push the pistons into the caliper as far as they will go to allow clearance for the brake pads.

⚠ CAUTION

Care should be taken that the piston and cylinder are not scratched.

2. Install the brake pads and secure with the pin and cotter pin.



CD029

3. Place the brake caliper assembly into position and secure with the cap screws. Tighten the caliper to 2.8 kg-m (20 ft-lb).
4. Place a new crush washer on each side of the brake hose fitting and install it on the caliper. Tighten to 4.2 kg-m (30 ft-lb).
5. Fill the reservoir; then bleed the brake system (see Section 2).
6. Install the wheel. Tighten to 5.5 kg-m (40 ft-lb).

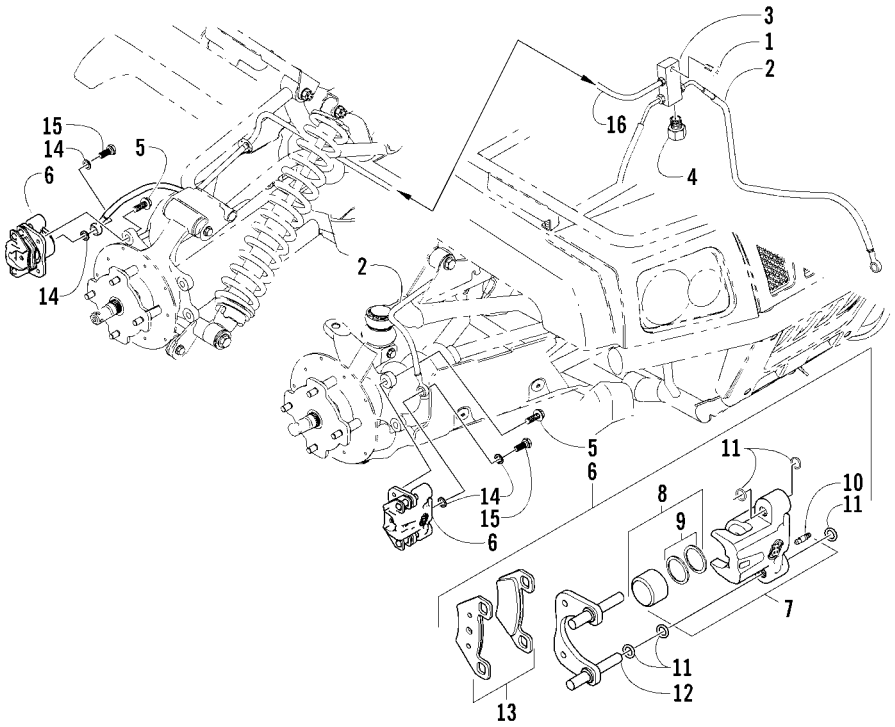


CD006

7. Remove the ATV from the support stand and verify brake operation.

Hydraulic Brake Assembly Schematic

KEY
1. Cap Screw
2. Hose - Front
3. Junction Block
4. Plug
5. Cap Screw
6. Caliper
7. Housing
8. Piston/Seal Set
9. Seal Set
10. Bleeder Valve
11. O-Ring
12. Bracket Assy
13. Brake Pad
14. Crush Washer
15. Oil Bolt
16. Hose - Rear



0739-253

6

NOTES

SECTION 7 - SUSPENSION

7

TABLE OF CONTENTS

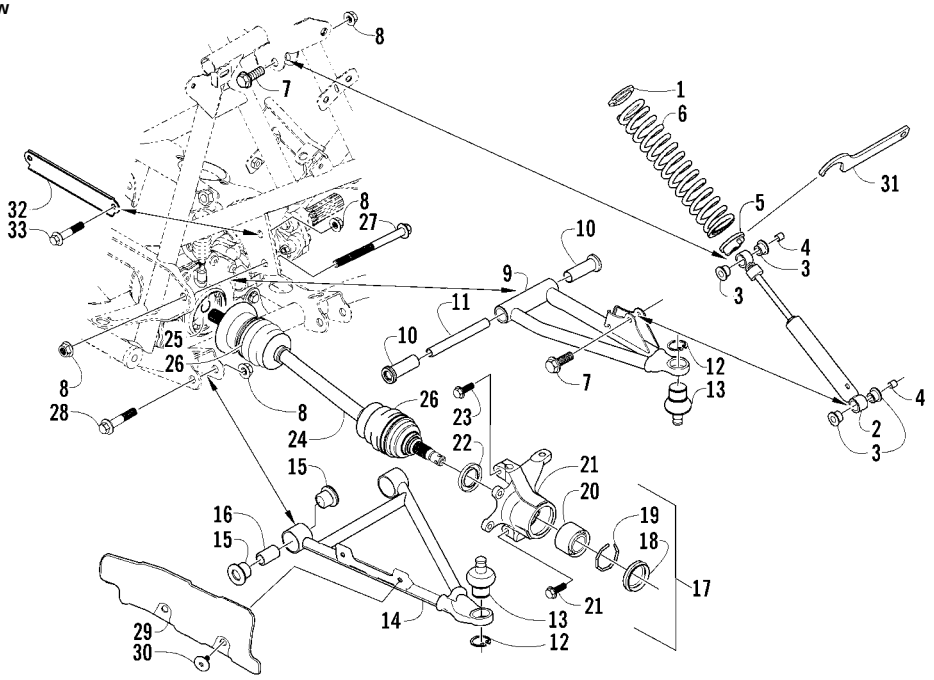
Front and Rear Suspension Assembly Schematics 7-2
Shock Absorbers 7-3
Front A-Arms 7-4
Rear A-Arms 7-7
Wheels and Tires 7-9

Front and Rear Suspension Assembly Schematics

KEY

1. Retainer
2. Shock Absorber
3. Bushing
4. Sleeve
5. Adjuster Cam
6. Spring
7. Cap Screw
8. Lock Nut
9. A-Arm Assy
10. Bushing
11. Collar
12. Ball Joint Clip
13. Ball Joint
14. A-Arm
15. Bushing
16. Collar
17. Knuckle Assy
18. Seal
19. Bearing Clip
20. Wheel Hub Bearing
21. Knuckle
22. Seal
23. Cap Screw
24. Drive Axle
25. Clip
26. Boot Repair Kit
27. Cap Screw
28. Cap Screw
29. Boot Guard
30. Body Screw
31. Spanner Wrench
32. A-Arm Brace
33. Cap Screw

FRONT

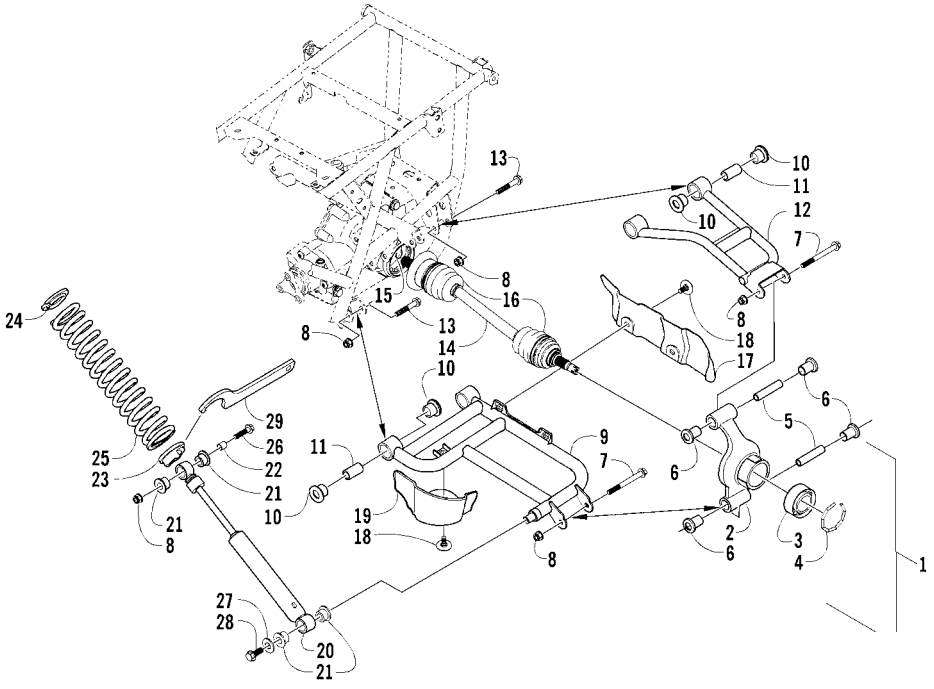


0739-292

KEY

1. Knuckle Assy
2. Knuckle
3. Bearing
4. Retaining Ring
5. Collar
6. Bushing
7. Cap Screw
8. Lock Nut
9. A-Arm
10. Bushing
11. Collar
12. A-Arm
13. Cap Screw
14. Drive Axle
15. Clip
16. Boot Repair Kit
17. Boot Guard
18. Body Screw
19. Boot Guard
20. Shock Absorber
21. Bushing
22. Sleeve
23. Adjuster Cam
24. Retainer
25. Spring
26. Cap Screw
27. Washer
28. Cap Screw
29. Spanner Wrench

REAR



0739-056

Shock Absorbers

REMOVING

1. Secure the ATV on a support stand to elevate the wheels and to release load on the suspension.

⚠ WARNING

Make sure the ATV is solidly supported on the support stand to avoid injury.

2. Remove the two cap screws and nuts securing each front shock absorber to the frame. Account for bushings and sleeves from each.



AF605D

⚠ CAUTION

On the rear suspension, additional support stands are necessary to support the rear axle when the shock absorbers are removed or damage may occur.

3. Remove the two cap screws and nut securing each rear shock absorber to the frame and rear suspension. Account for bushings and sleeves from each.



AF626D

4. Compress the shock absorber spring, remove the retainer, and remove the spring.



AF730D

CLEANING AND INSPECTING

■NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

1. Clean all shock absorber components in parts-cleaning solvent.
2. Inspect each shock rod for nicks, pits, rust, bends, and oily residue.
3. Inspect all springs, spring retainers, shock rods, dampers, bushings, shock bodies, and eyelets for cracks, leaks, and bends.

INSTALLING

1. Place the shock absorber spring over the shock absorber, compress the spring, and install the retainer.
2. Place bushings and sleeves (where appropriate) into shock eyelet; then install shock with two cap screws and nuts. Tighten all nuts to 4.8 kg-m (35 ft-lb).

⚠ CAUTION

Do not tighten the nuts beyond the 4.8 kg-m (35 ft-lb) specification or the shock eyelet or mount WILL be damaged.

■NOTE: The rear shock absorber-to-lower A-arm cap screw torque factor is 2.8 kg-m (20 ft-lb).

3. Remove the ATV from the support stand.

Front A-Arms

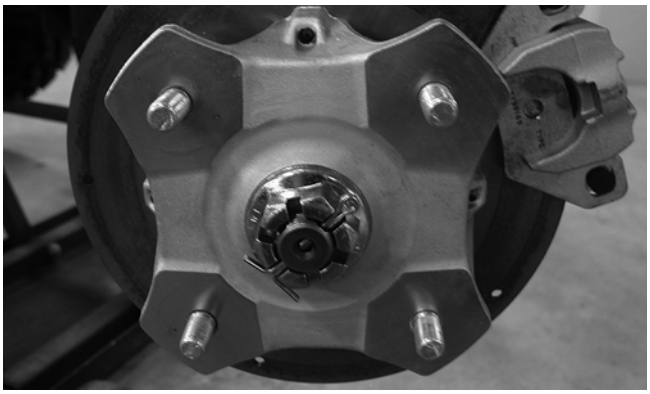
REMOVING

1. Secure the ATV on a support stand to elevate the wheel; then remove the wheel.

⚠ WARNING

Make sure the ATV is solidly supported on the support stand to avoid injury.

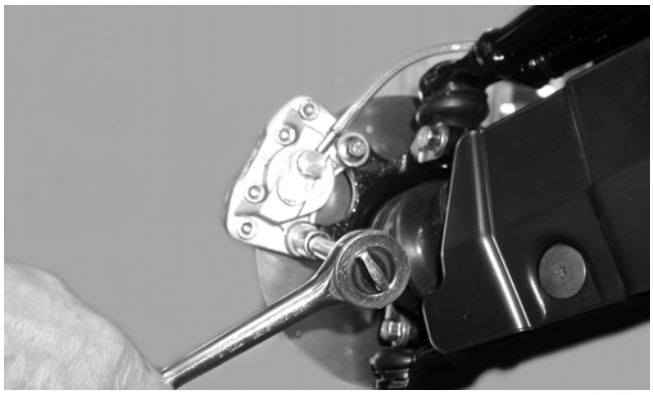
2. Remove the wheel cap from the hub; then remove the cotter pin from the nut.



KX041

3. Remove the nut securing the hub. Account for a washer.

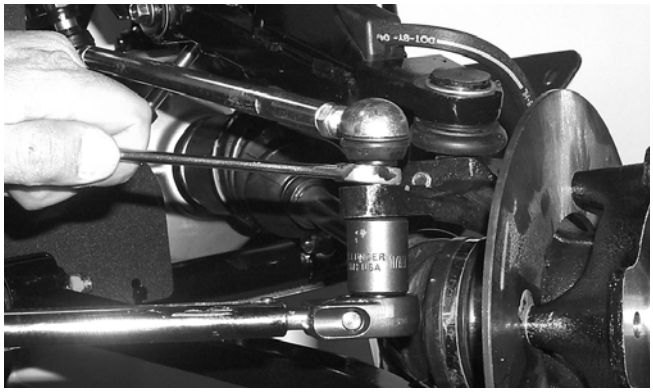
4. Remove the brake caliper.



CD007

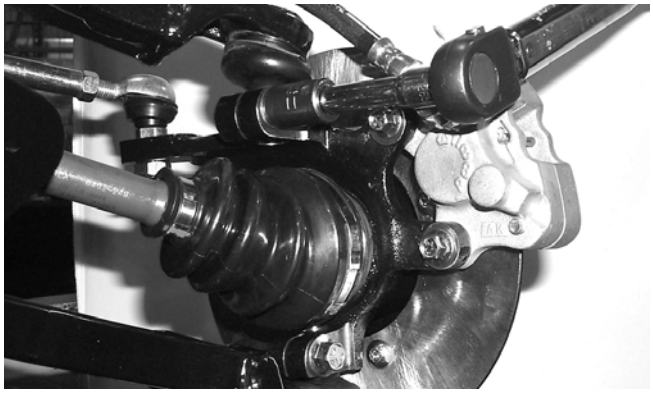
5. Remove the hub assembly.

6. Remove the cotter pin and slotted nut securing the tie rod end to the knuckle; then remove the tie rod end from the knuckle.



AF618D

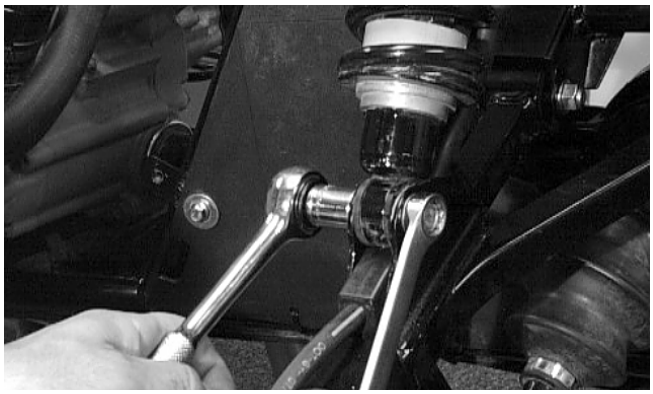
7. Remove the cap screws securing the ball joints to the knuckle.



AF628D

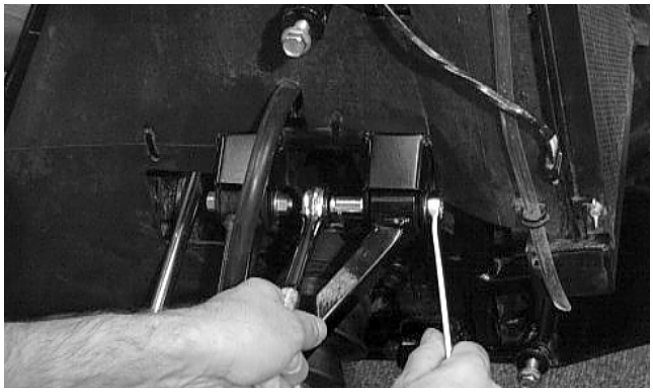
8. Tap the ball joints out of the knuckle; then remove the knuckle.

9. Remove the lower shock absorber eyelet from the upper A-arm.



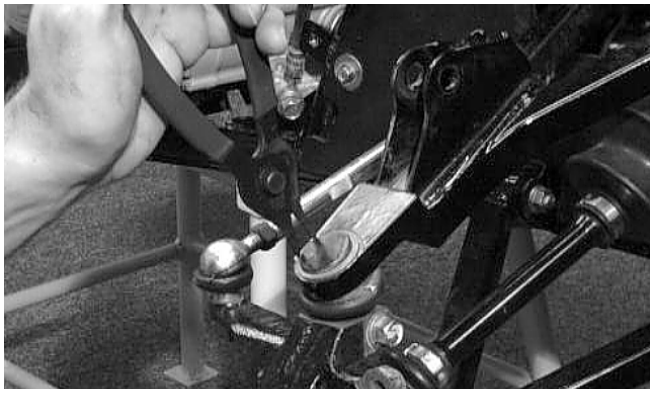
AF626D

10. Remove the cap screws securing the A-arms to the frame.



AF610D

11. Remove the circlip from the ball joint; then remove the ball joint from the A-arm.



AF616D

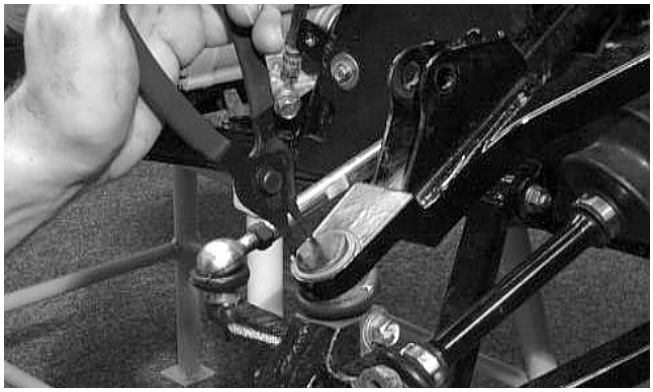
CLEANING AND INSPECTING

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Clean all A-arm components in parts-cleaning solvent.
2. Clean the ball joint mounting hole of all residual Loctite, grease, oil, or dirt for installing purposes.
3. Inspect the A-arm for bends, cracks, and worn bushings.
4. Inspect the ball joint mounting holes for cracks or damage.
5. Inspect the frame mounts for signs of damage, wear, or weldment damage.

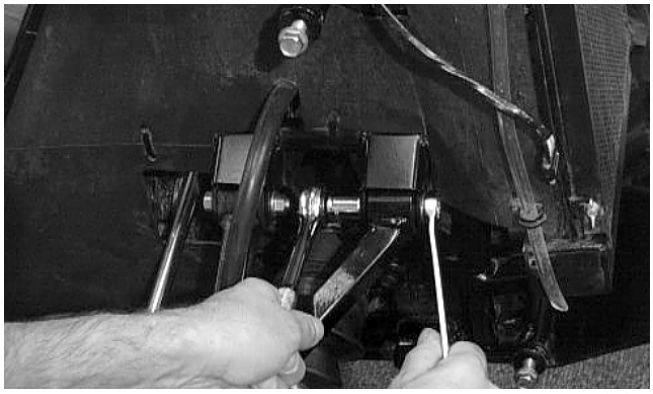
INSTALLING

1. Apply green Loctite #609 to the entire outside diameter of the ball joint; then install the ball joint into the A-arm and secure with the circlip.



AF616D

2. Install the A-arm assemblies into the frame mounts and secure with the cap screws. Only finger-tighten at this time.



AF610D

3. Route the brake hose through the upper A-arm shock absorber mount.



AF627D

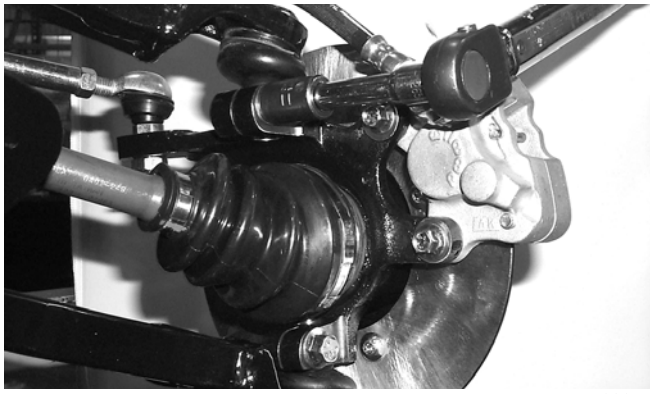
4. Secure the lower eyelet of the shock absorber to the upper A-arm. Tighten nut to 4.8 kg-m (35 ft-lb).

⚠ CAUTION

Do not tighten the nut beyond the 4.8 kg-m (35 ft-lb) specification or the shock eyelet or mount WILL be damaged.

5. Secure the A-arm assemblies to the frame mounts (from step 2). Tighten the cap screws to 4.8 kg-m (35 ft-lb).

6. Install the knuckle assembly onto the ball joints and secure with cap screws. Tighten to 4.8 kg-m (35 ft-lb).



AF628D

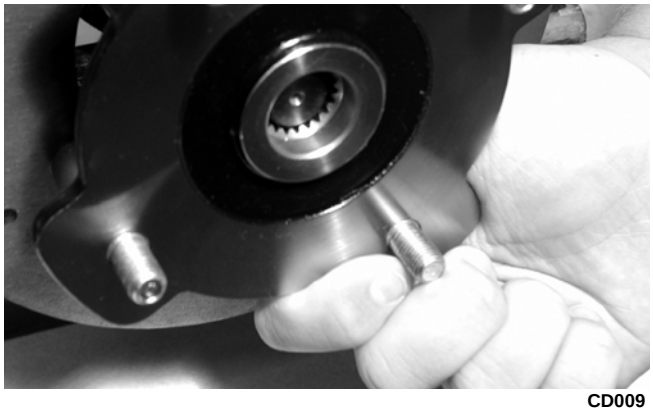
7. Install the tie rod end and secure with the nut. Tighten to 4.2 kg-m (30 ft-lb); then install a new cotter pin and spread the pin to secure the nut.

■ **NOTE: During assembly, new cotter pins should be installed.**



AF618D

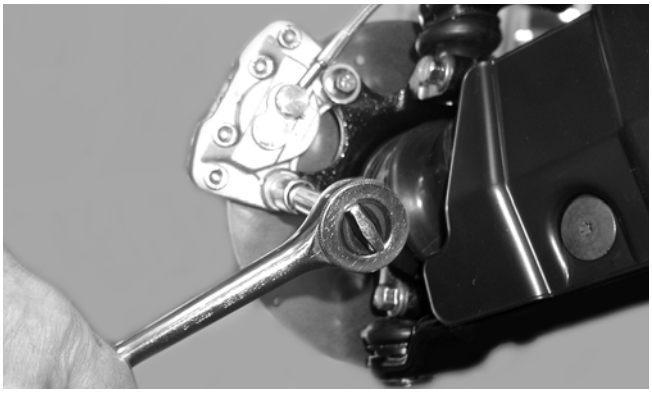
8. Apply grease to hub sealing area and on the drive axle splines; then install the hub assembly onto the drive axle.



CD009

9. Place the washer onto the shaft; then secure the hub assembly with the nut. Tighten only until snug.

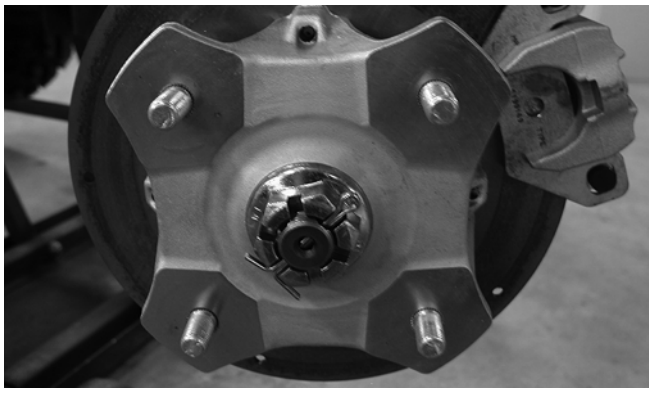
10. Secure the brake caliper to the knuckle with the two cap screws. Tighten to 2.8 kg-m (20 ft-lb).



CD007

11. Secure the hub nut (from step 10) to the shaft/axle. Tighten to 10.4 kg-m (75 ft-lb).

12. Install a new cotter pin and spread the pin to secure the nut.



KX041

13. Install the wheel cap.

14. Install the wheel and tighten to 5.5 kg-m (40 ft-lb).



CD006

15. Remove the ATV from the support stand.

Rear A-Arms

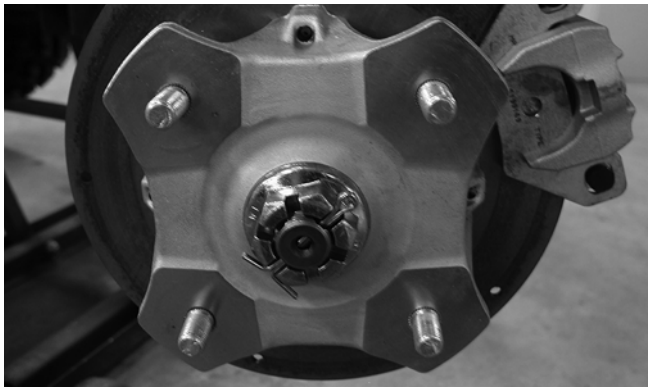
REMOVING

1. Secure the ATV on a support stand to elevate the wheels.

⚠ WARNING

Make sure the ATV is solidly supported on the support stand to avoid injury.

2. Pump up the hand brake; then engage the brake lever lock.
3. Remove the wheel and rubber wheel cap.
4. Remove the cotter pin securing the hex nut; then remove the hex nut and washer. Release the brake lever lock.



KX041

5. Remove the two brake calipers (right side only).

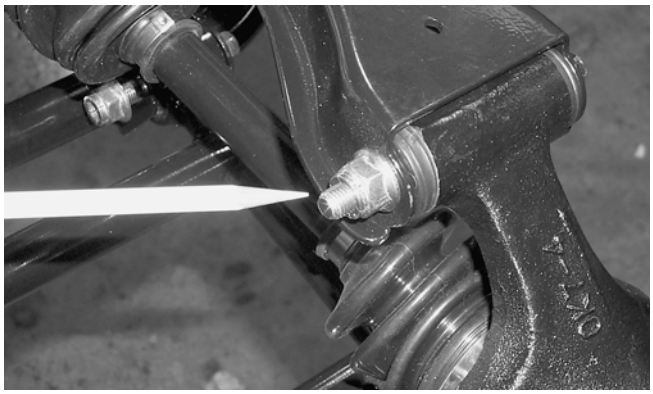
■ NOTE: Do not allow the brake calipers to hang from their cable/hose.

6. Remove the cap screws and lock nut securing the shock absorber to the frame and lower A-arm; then remove the shock absorber.
7. Remove the cap screws securing the boot guard to the lower A-arm.



AF934

8. Slide the hub out of the knuckle and set aside.
9. Remove the cap screws and lock nuts securing the knuckle to the A-arms. Discard the lock nuts.



AF936

■ NOTE: Never reuse a lock nut. Once a lock nut has been removed, it must be replaced with a new lock nut.

10. Remove the cap screws and lock nuts securing the A-arms to the frame; then remove the A-arms.

■ NOTE: If removing the upper right A-arm, it will be necessary to disconnect the brake hose and brake cable from the A-arm.

CLEANING AND INSPECTING

■ NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

1. Clean all A-arm components in parts-cleaning solvent.
2. Inspect the A-arm for bends, cracks, and worn bushings.
3. Inspect the frame mounts for signs of damage, wear, or weldment damage.

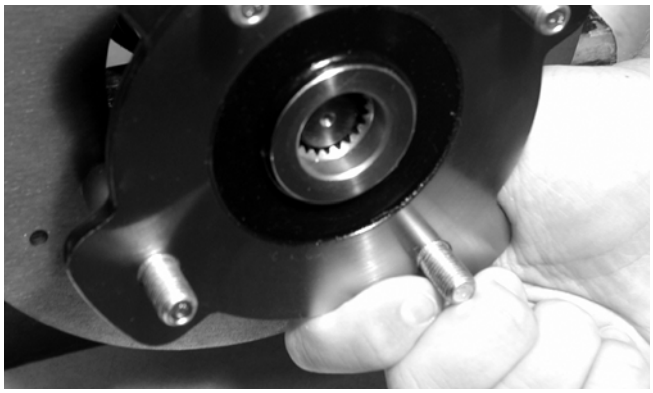
INSTALLING

1. Install the A-arm assemblies into the frame mounts and secure with the cap screws and new lock nuts. Only finger-tighten at this time.

2. Slide the knuckle onto the drive axle and into position on the A-arms; then secure the knuckle to the A-arms with cap screws and new lock nuts. Tighten to 4.8 kg-m (35 ft-lb).

3. Tighten the hardware securing the A-arms to the frame mounts (from step 1) to 4.8 kg-m (35 ft-lb).

4. Apply grease to hub sealing area and on the drive axle splines; then install the hub assembly onto the drive axle.

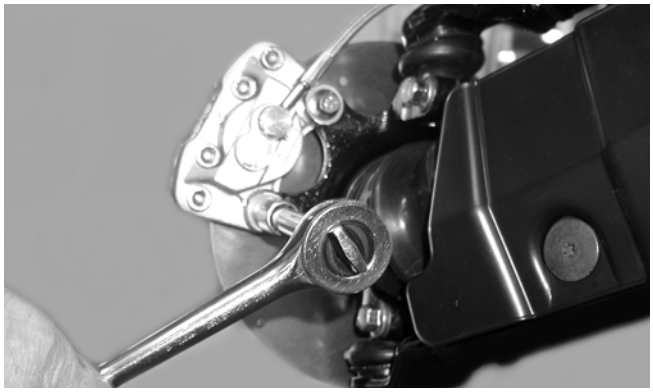


CD009

5. Place the washer onto the drive axle; then secure the hub assembly with the nut. Tighten only until snug.

6. Secure the brake caliper to the knuckle with the two cap screws (right side only). Tighten the hydraulic caliper to 2.8 kg-m (20 ft-lb).

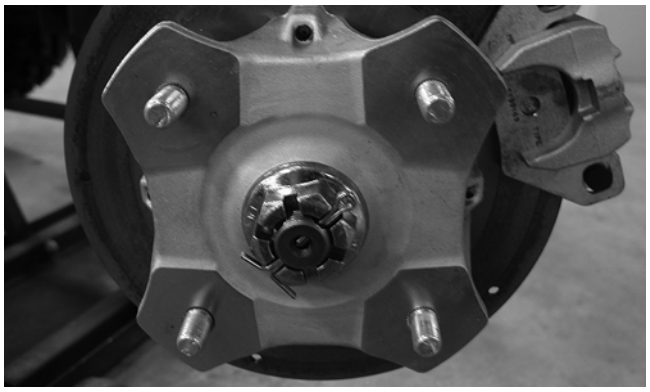
■ **NOTE: Ensure that the brake hose and brake cable are properly routed and secured to the upper A-arm.**



CD007

7. Secure the hub nut (from step 6) to the drive axle. Tighten to 17.5 kg-m (125 ft-lb).

8. Install a new cotter pin and spread the pin to secure the nut.



KX041

9. Secure the shock absorber to the frame with a cap screw and new lock nut. Tighten to 4.8 kg-m (35 ft-lb).

10. Secure the shock absorber to the lower A-arm with a cap screw and new lock nut. Tighten to 2.8 kg-m (20 ft-lb).

11. Secure the boot guard to the lower A-arm with the two cap screws. Tighten securely.

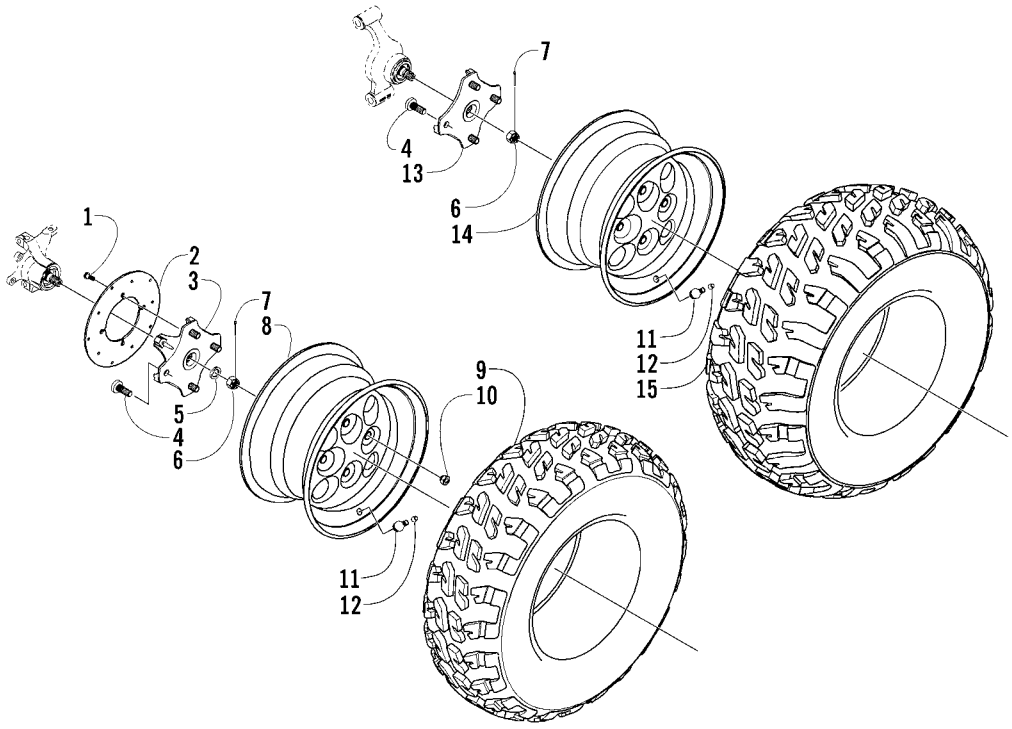
12. Install the wheel cap.

13. Install the wheel and tighten to 5.5 kg-m (40 ft-lb).

14. Remove the ATV from the support stand.

Wheels and Tires

KEY
1. Machine Screw
2. Brake Disc
3. Wheel Hub - Front
4. Hub Stud
5. Hub Seal
6. Castle Nut
7. Cotter Pin
8. Wheel
9. Tire - Front
10. Mounting Nut
11. Valve Stem
12. Valve Stem Cap
13. Wheel Hub - Rear
14. Wheel
15. Tire - Rear



0739-058

TIRE SIZE

⚠ WARNING

Use only Arctic Cat approved tires when replacing tires. Failure to do so could result in unstable ATV operation.

The ATV is equipped with low-pressure tubeless tires of the size and type listed below. Do not under any circumstances substitute tires of a different type or size.

⚠ WARNING

Do not mix tire tread patterns. Use the same pattern type on front and rear. Failure to heed warning could cause poor handling qualities of the ATV and could cause excessive drive train damage not covered by warranty.

TIRE INFLATION PRESSURE

Front and rear tire inflation pressure should be 0.35 kg/cm² (5.0 psi).

REMOVING

1. Secure the ATV on a support stand to elevate the wheels.

⚠ WARNING

Make sure the ATV is solidly supported on the support stand to avoid injury.

2. Remove the wheels.

■ NOTE: Keep left-side and right-side wheels separated for installing them on their proper sides.



CD006

CLEANING AND INSPECTING

■ NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

1. Clean the wheels and hubs with parts-cleaning solvent.
2. Clean the tires with soap and water.
3. Inspect each wheel for cracks, dents, or bends.
4. Inspect each tire for cuts, wear, missing lugs, and leaks.

INSTALLING

1. Install each wheel on its hub.



CD006

■ NOTE: Make sure each wheel is installed on its proper hub as noted in removing (the "rotation arrow" must indicate forward direction of rotation).



AF612D

2. Tighten to 5.5 kg-m (40 ft-lb).

CHECKING/INFLATING

1. Using an air pressure gauge, measure the air pressure in each tire. Adjust the air pressure as necessary to meet the recommended inflation pressure.



CD005

2. Inspect the tires for damage, wear, or punctures.

⚠ WARNING

Do not operate the ATV if tire damage exists.

■ NOTE: If repair is needed, follow the instructions found on the tire repair kit or remove the wheel and have it repaired professionally.

■ NOTE: Be sure all tires are the specified size and have identical tread pattern.

3. Check the front wheel toe-in and toe-out and adjust as necessary (see Section 8).
4. Test drive the ATV on a dry, level surface and note any pulling to the left or right during acceleration, deceleration, and braking.

■ NOTE: If pulling is noted, measure the circumference of the front and rear tires on the pulling side. Compare the measurements with the tires on the opposite side. If pulling is noted during braking only, check and adjust the brakes as necessary and recheck operation (see Section 2).

5. Increase the air pressure in the tires with the smallest circumference measurement until all tires are equal in circumference.
6. Repeat steps 4-5 as necessary to ensure proper handling.

SECTION 8 - STEERING/FRAME

TABLE OF CONTENTS

Steering Post/Tie Rods 8-2
Handlebar Grip 8-4
Steering Knuckles 8-4
Measuring/Adjusting Toe-In/Toe-Out 8-8
Body Panel Assembly Schematic 8-10
Front Rack 8-10
Front Bumper Assembly 8-11
Front Fender/Side Panels 8-12
Fender Flares/Extensions 8-13
Footrests 8-14
Belly Panel 8-14
Exhaust System 8-14
Rear Rack 8-15
Rear Fender 8-15
Adjusting Headlight 8-16
Taillight Assembly 8-16
Seat 8-17

Steering Post/ Tie Rods

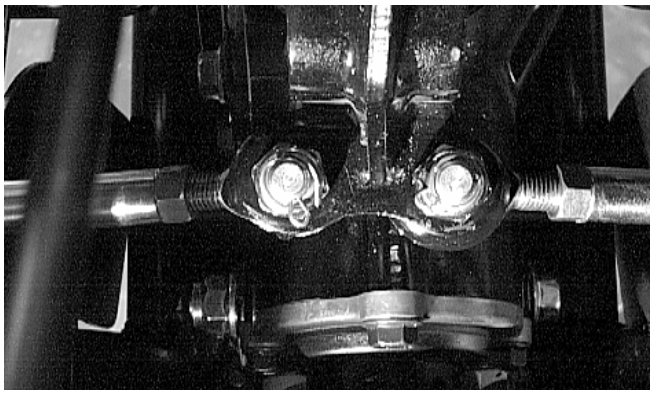
REMOVING

1. Remove the seat (see Seat in this section).
2. Remove the storage compartment cover; then remove the cap screws securing the storage compartment/air filter cover.



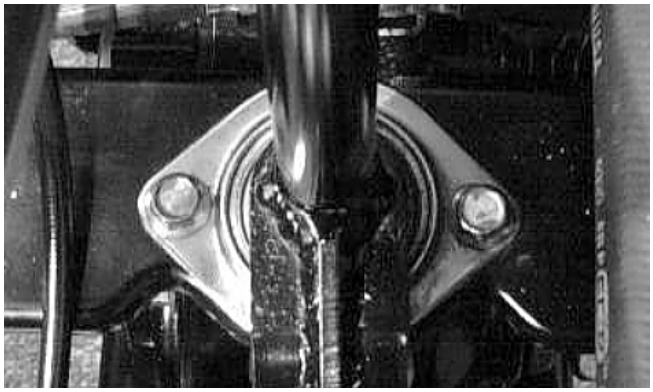
KX038

3. Remove the cotter pin and slotted nut securing each tie rod end to the steering post arm. Remove the tie rod ends from the arm.



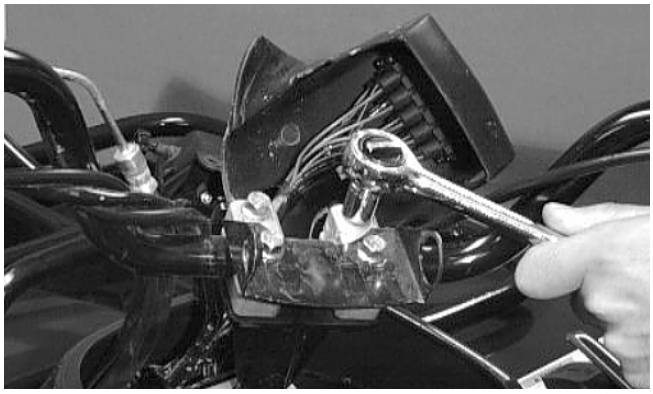
AF778D

4. Remove the cotter pin and slotted nut securing the side tie rod ends to the knuckles. Remove the tie rod ends from the knuckles; then remove the tie rods.
5. Remove the cap screws securing the steering post bearing flange.



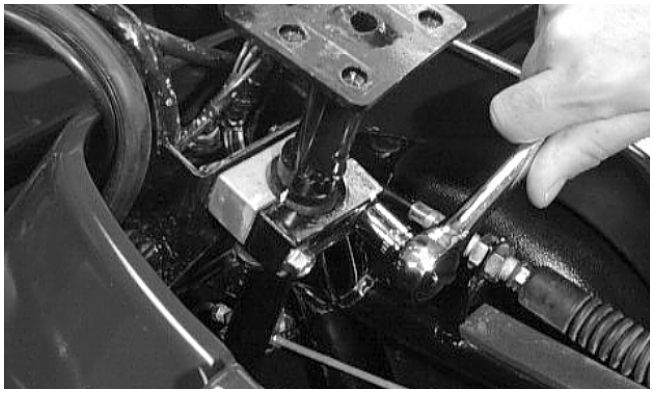
AL600D

6. Remove the nylon fastners securing the instrument pod.
7. Remove the retaining nut securing the ignition switch; then remove the instrument pod.
8. Remove the four cap screws securing the handlebar caps (blocks) to the steering post; then move the handlebar out of the way.



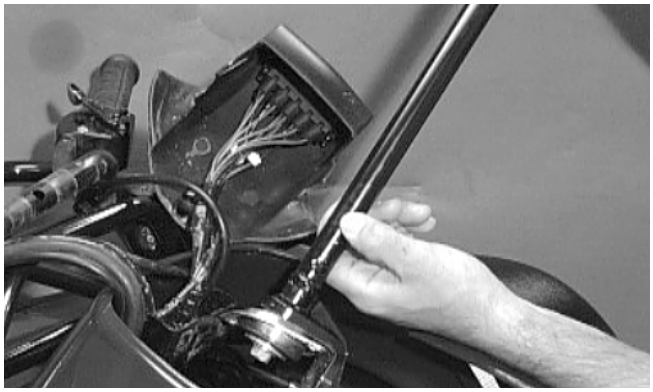
AL614D

9. Remove the two cap screws securing the upper steering post bearing housings to the frame.

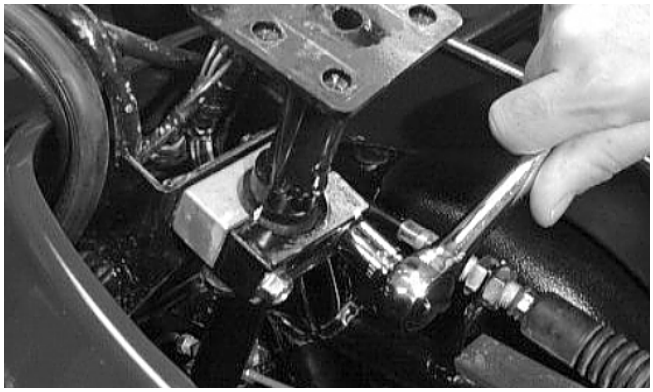


AL619D

10. Remove the steering post.



AL618D



AL619D

CLEANING AND INSPECTING

■NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

1. Wash the tie rod ends in parts-cleaning solvent. Dry with compressed air. Inspect the pivot area for wear. Apply a low-temperature grease to the ends.

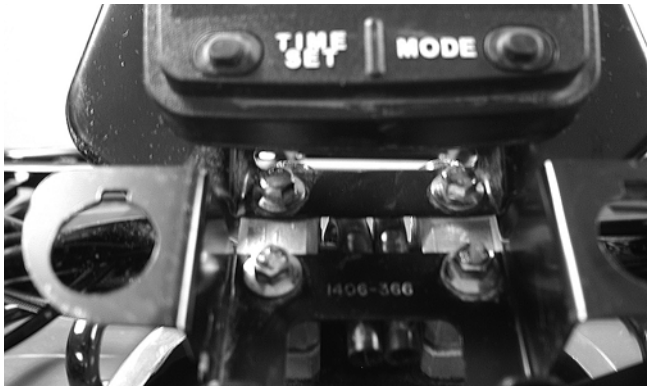
⚠ WARNING

Always wear safety glasses when using compressed air.

2. Inspect the tie rods for damaged threads or wear.
3. Inspect the tie rods for cracks or unusual bends.
4. Inspect all welded areas for cracks or deterioration.
5. Inspect the steering post and steering-post brackets for cracks, bends, or wear.
6. Inspect the bearing halves, bearing caps, and bearing housings for cracks or wear.
7. Inspect the handlebar tube for cracks, wear, or unusual bends.
8. Inspect the handlebar grips for damage or wear.

INSTALLING

1. Place the steering post into position; then place the upper steering post bearings and housings on the steering post and install the two cap screws through the housings and into the frame. Tighten the cap screws to 2.8 kg-m (20 ft-lb).
2. Place the handlebar into position and secure with the handlebar caps (blocks). Tighten the four cap screws to 2.8 kg-m (20 ft-lb).



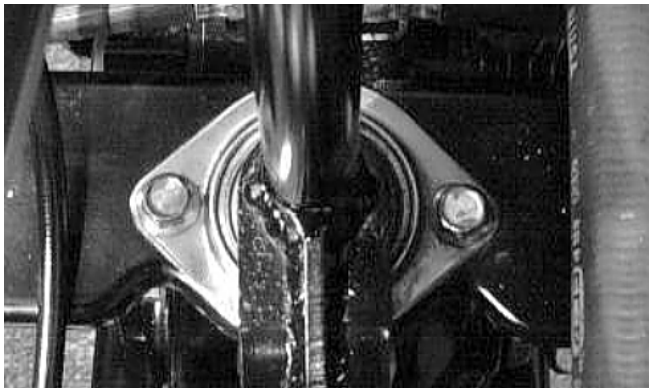
KX385

3. Place the ignition switch into position; then place the instrument pod into position and secure with the ignition switch retaining nut.



KX386

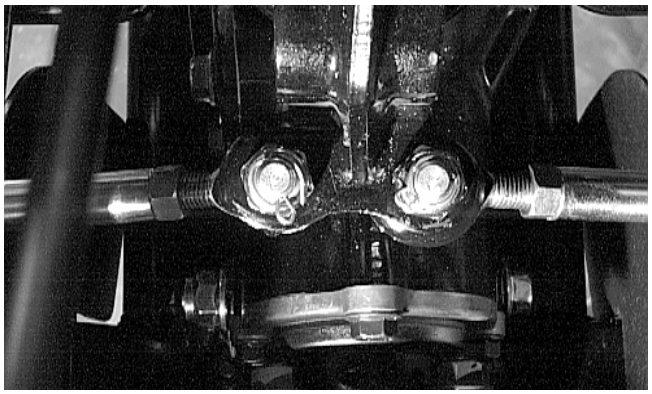
4. Secure the instrument pod with the four nylon fasteners.
5. Place the steering post bearing flange into position. Secure with the cap screws tightened to 2.8 kg-m (20 ft-lb).



AL600D

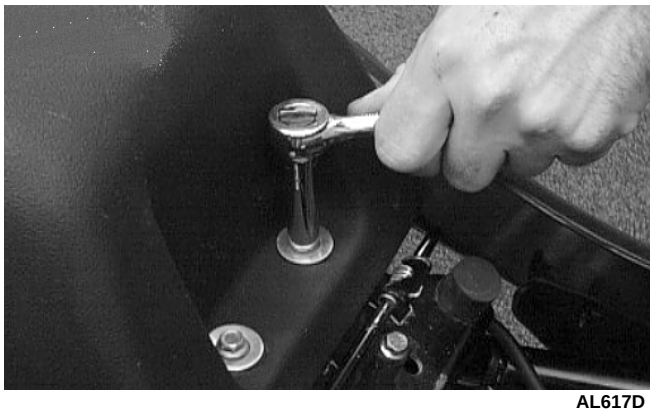
6. Insert the tie rod ends into the knuckles; then install the slotted nuts and tighten to 4.2 kg-m (30 ft-lb). Lock the nuts with new cotter pins.

7. Insert the tie rod ends into the steering post arm; then install the slotted nuts and tighten to 4.2 kg-m (30 ft-lb). Lock the nuts with new cotter pins.



AF778D

8. Place the storage compartment/air filter cover into position; then secure with the two cap screws.



AL617D

9. Install the storage compartment cover with the four snap fasteners.

10. Install the seat (see Seat in this section).

Handlebar Grip

REMOVING

1. Remove the plug from the head of the rivet.

2. Using a 1/8-in. drill bit, drill out the rivet.

3. Using compressed air between the grip and the handlebar, twist the grip back and forth until it slides free of the handlebar.

INSPECTING

■ NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

1. Inspect the grip for wear, cuts, or cracks.

2. Inspect the grip for deterioration.

INSTALLING

■ NOTE: Before installing a grip, use contact spray or alcohol to clean the inside of the grip and the handlebar of glue residue, oil, or any other contaminant.

1. Apply a liberal amount of Handlebar Grip Adhesive (p/n 0636-071) to the inside of the grip.

2. Align the rivet hole in the grip with the rivet hole in the handlebar; then align the notch (inside the grip) with the slot in the handlbar and slide the grip onto the handlebar until it is fully seated.

3. Wipe off any excess glue; then secure the grip with a new rivet.

4. Install the plug on the head of the rivet.

Steering Knuckles

REMOVING AND DISASSEMBLING

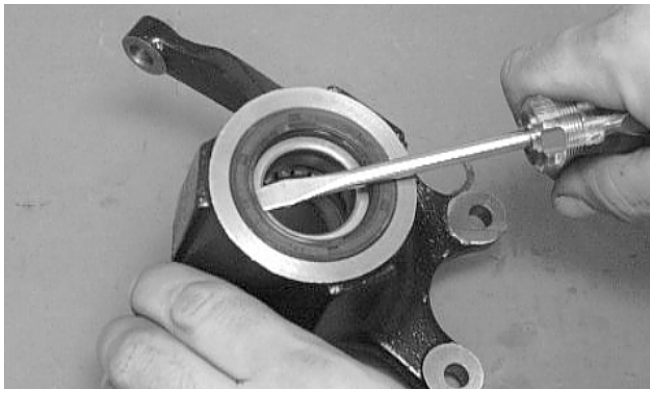
1. Secure the ATV on a support stand to elevate the wheel; then remove the wheel.

⚠ WARNING

Make sure the ATV is solidly supported on the support stand to avoid injury.

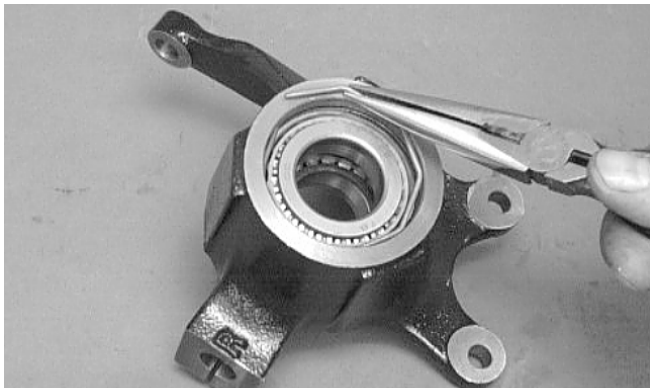
2. Remove the wheel cap from the hub; then remove the cotter pin from the nut.

3. Remove the nut securing the hub. Account for a washer and a hub seal.
4. Remove the brake caliper.
5. Remove the hub assembly.
6. Remove the cotter pin from the tie rod end and remove the tie rod end from the knuckle.
7. Remove the two cap screws securing the ball joints in the knuckle.
8. Tap the ball joint end out of the knuckle; then remove the knuckle.
9. Remove the seal from the knuckle.



AF725D

10. Remove the bearing retainer.



AF726D

11. Remove the bearings.

⚠ CAUTION

Use extreme care when removing the bearing. If the bearing is allowed to fall, it will be damaged and will have to be replaced.

CLEANING AND INSPECTING

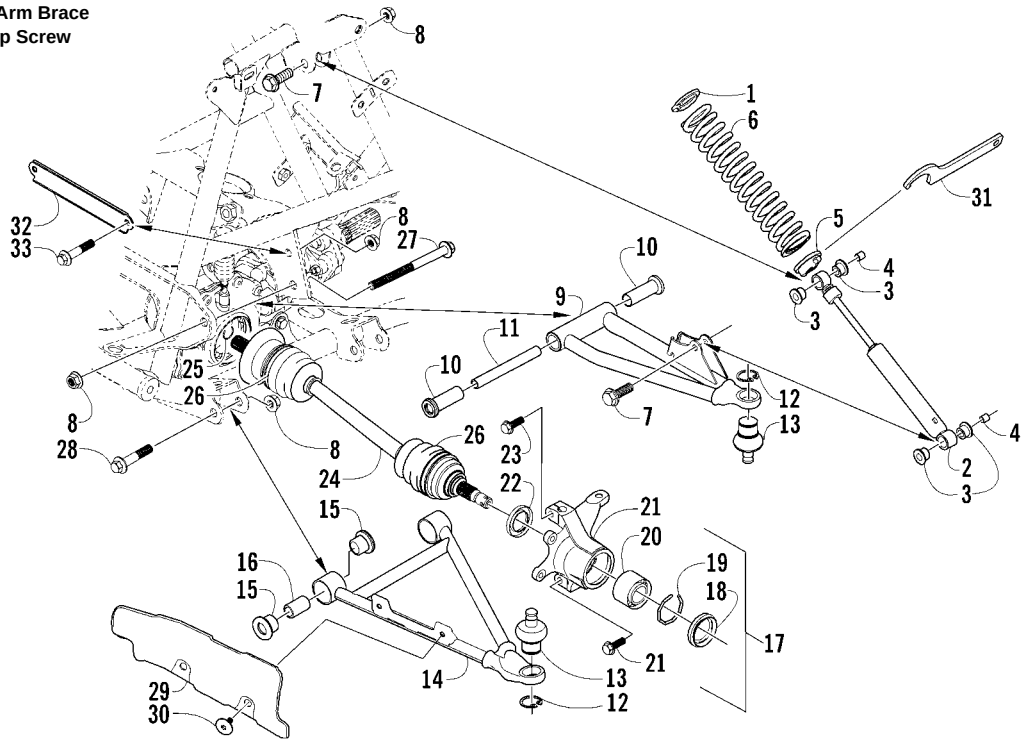
■NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

1. Clean all knuckle components.
2. Inspect the bearing for pits, gouges, rusting, or premature wear.
3. Inspect the knuckle for cracks, breaks, or porosity.
4. Inspect threads for stripping or damage.

ASSEMBLING AND INSTALLING

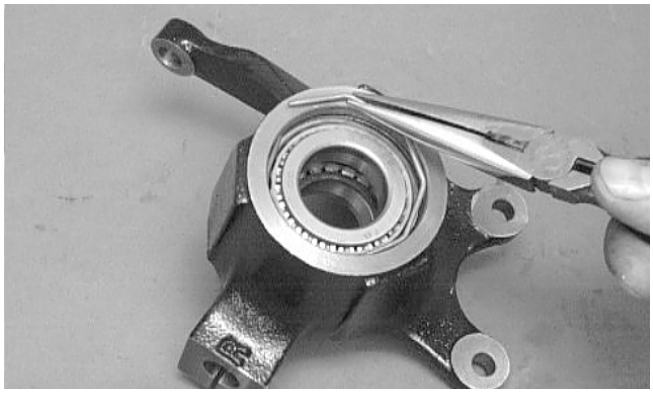
KEY

1. Retainer
2. Shock Absorber
3. Bushing
4. Sleeve
5. Adjuster Cam
6. Spring
7. Cap Screw
8. Lock Nut
9. A-Arm Assy
10. Bushing
11. Collar
12. Ball Joint Clip
13. Ball Joint
14. A-Arm
15. Bushing
16. Collar
17. Knuckle Assy
18. Seal
19. Bearing Clip
20. Wheel Hub Bearing
21. Knuckle
22. Seal
23. Cap Screw
24. Drive Axle
25. Clip
26. Boot Repair Kit
27. Cap Screw
28. Cap Screw
29. Boot Guard
30. Body Screw
31. Spanner Wrench
32. A-Arm Brace
33. Cap Screw



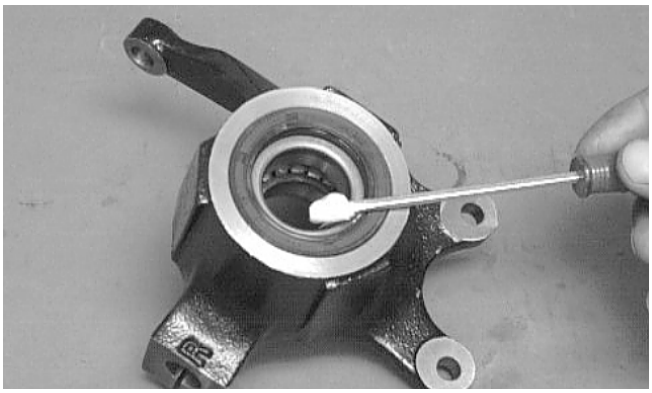
0739-292

1. Install the bearing.
2. Install the bearing retainer.



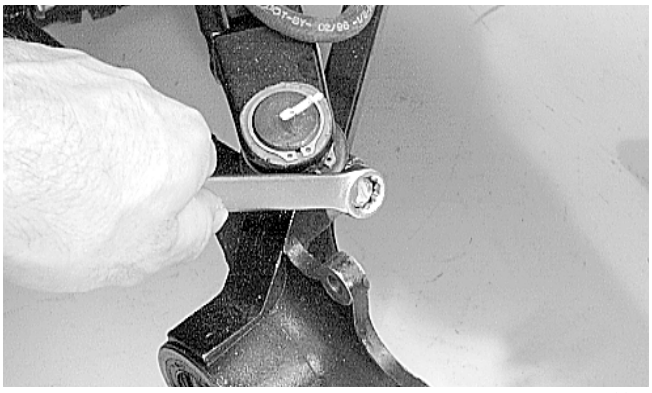
AF726D

3. Install a new seal into the knuckle making sure the seal is flush with the knuckle.
4. Apply grease to the seal.



AF724D

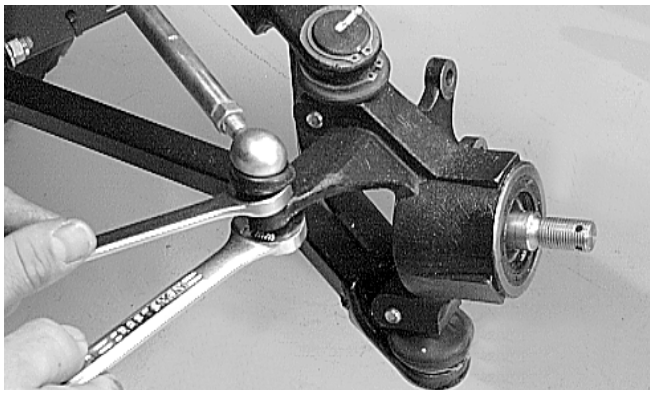
5. Install the knuckle to the upper and lower ball joints and secure with the two cap screws. Tighten to 4.8 kg-m (35 ft-lb).



AF760D

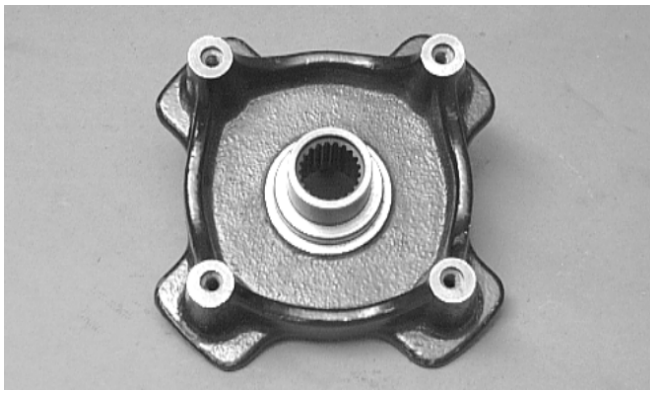
6. Install the tie rod end and secure with the nut. Tighten to 4.2 kg-m (30 ft-lb); then install a new cotter pin and spread the pin.

■ NOTE: During assembling, new cotter pins should be installed.



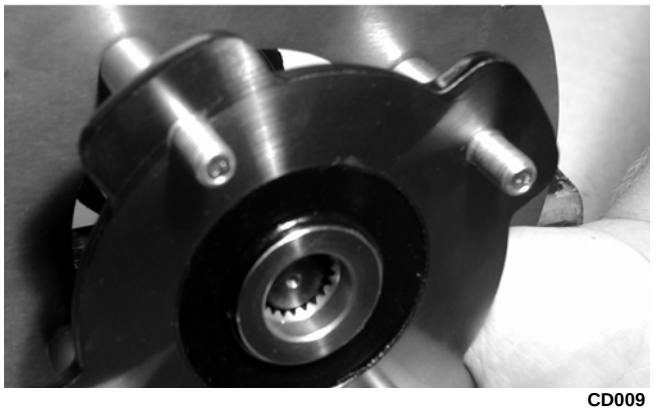
AF759D

7. Apply a small amount of grease to the hub sealing area and on the splines.



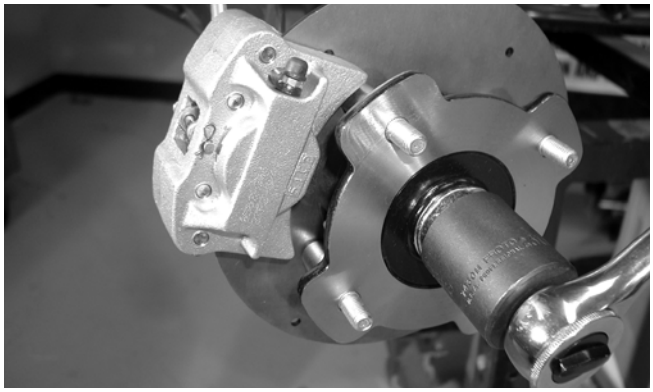
AF736D

8. Install the hub assembly onto the splines of the shaft.



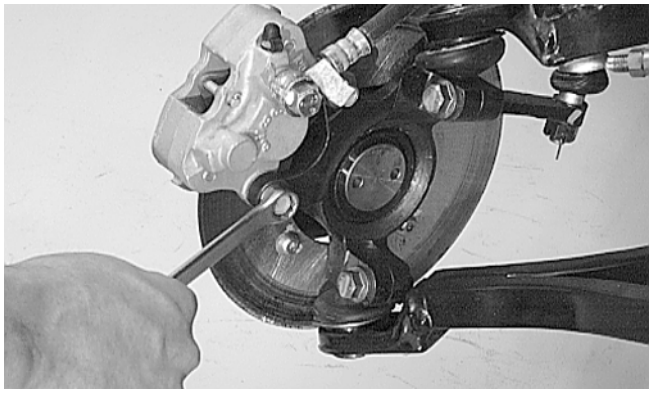
CD009

9. Place the washer onto the shaft; then secure the hub assembly with the nut. Tighten only until snug.



CD015

10. Secure the brake caliper to the knuckle with the two cap screws. Tighten to 2.8 kg-m (20 ft-lb).



AF746D

11. Secure the hub nut (from step 10) to the shaft. Tighten to 10.4 kg-m (75 ft-lb).

12. Install a new cotter pin and spread the pin to secure the nut.

13. Install the wheel cap.

14. Install the wheel and tighten to 5.5 kg-m (40 ft-lb).



CD006

15. Remove the ATV from the support stand.

Measuring/Adjusting Toe-In/Toe-Out

1. Thoroughly wash the ATV to remove excess weight (mud, etc.).
2. Refer to the specifications and ensure the tires are properly inflated to the recommended pressure.

■ NOTE: Ensure the inflation pressure is correct in the tires or inaccurate measurements can occur.

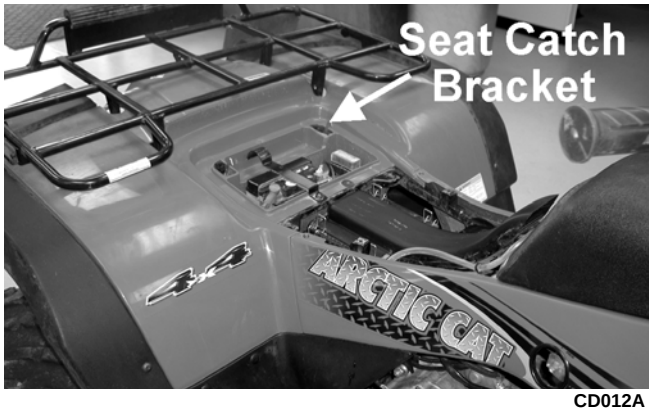


CD005

3. Place the ATV in a level position taking care not to push down or lift up on the front end; then turn the handlebar to the straight ahead position.

■ NOTE: When measuring and adjusting, there should be a normal operating load on the ATV (without an operator but with Arctic Cat approved accessories).

4. Measure the distance from the outside edge of each handlebar grip to the seat catch brackets.



CD012A

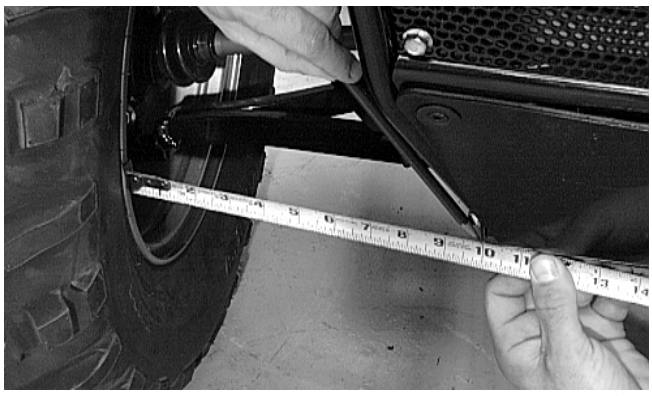
5. Adjust the handlebar direction until the two measurements are equal; then secure the handlebar to the rear rack using tie-down straps.

■ NOTE: Care must be taken not to allow the handlebar to turn while securing it.

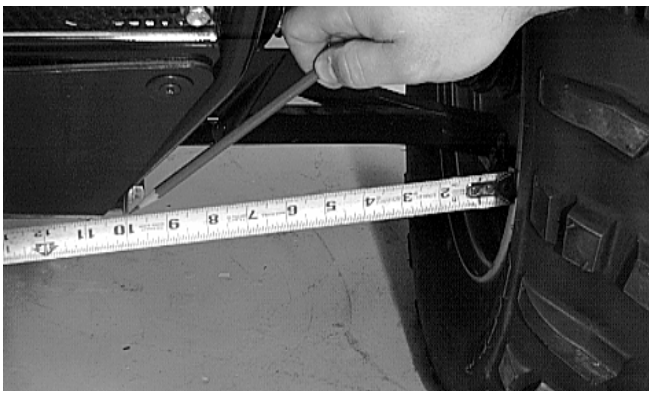


CD014

6. Measure the distance from the inside of each front rim to the lower frame tube.



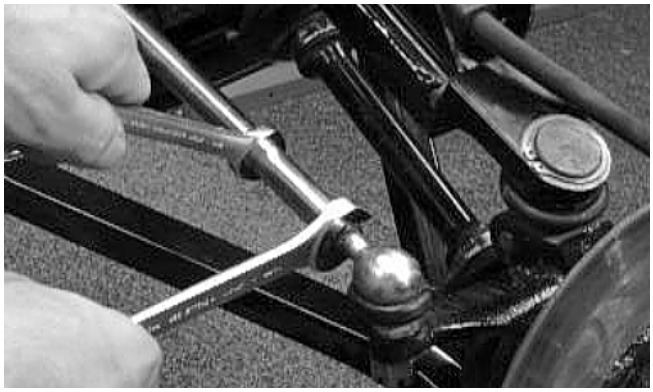
AF785D



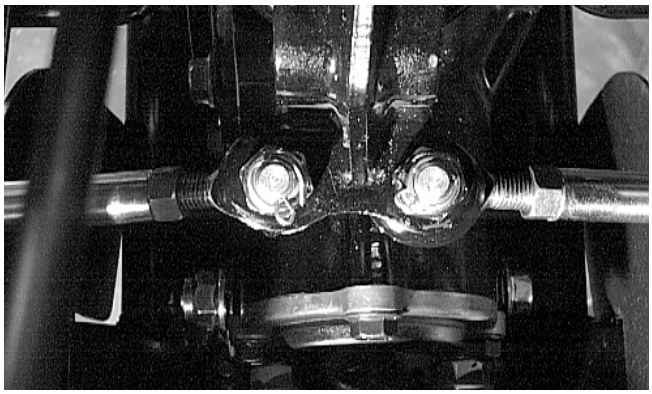
AF786D

■ NOTE: The distances from the inside rims to the frame tubes should be equal. If the measurements are equal, proceed to step 8; if the measurements are not equal, proceed to step 7.

7. To make the measurements equal, loosen the appropriate tie rod jam nuts and adjust accordingly; then proceed to step 8.



AF617D



AF778D

■**NOTE: The front wheels do not have to be removed to adjust the tie rod. Also, care should be taken not to disturb the handlebar position.**

8. Using a permanent marker of some type, mark the center of each front tire (at a height parallel to the belly panel).



AF789D

9. Measure the overall width of the front tires (at a height parallel to the belly panel) at the front side; then record the measurement.

10. Push the ATV forward until the marks are parallel to the belly panel on the back side; then measure the overall width of the front tires at the rear side.



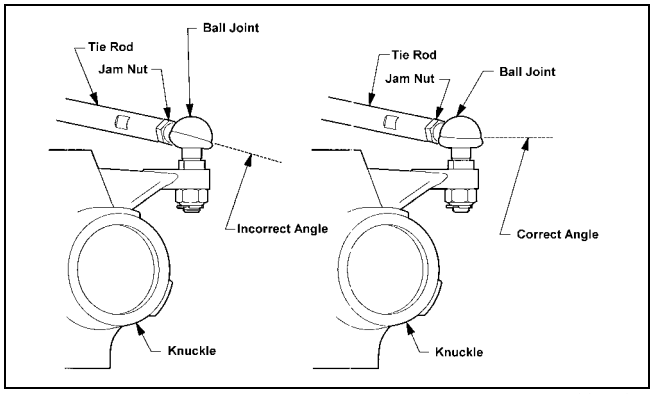
CD013

11. The difference in the measurements must show 6.4 mm (1/4 in.) toe-in (the front measurement 6.4 mm (1/4 in.) less than the rear measurement).

■**NOTE: The 6.4 mm (1/4 in.) toe-in difference is per side.**

12. If the difference in the measurements does not show a 6.4 mm (1/4 in.) toe-in, adjust both tie rods equally in until within specification.

■**NOTE: Prior to locking the jam nuts, make sure the ball joints are at the center of their normal range of motion and at the correct angle.**

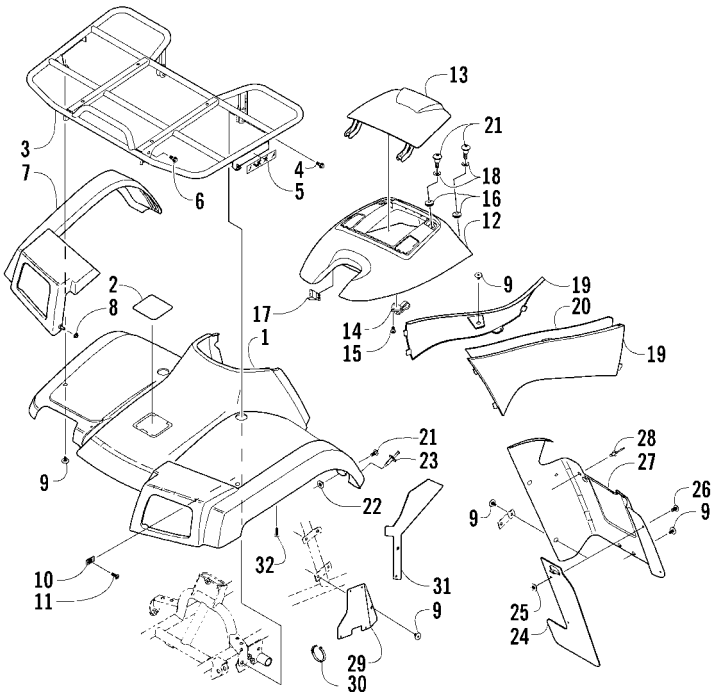


733-559A

Body Panel Assembly Schematic

KEY

1. Fender Panel
2. Access Cover
3. Rack
4. Cap Screw
5. Reflector
6. Cap Screw
7. Flare
8. Stamped Nut
9. Body Screw
10. Speed Nut
11. Machine Screw
12. Storage Compartment
13. Cover
14. Cover Hinge
15. Self-Tapping Screw
16. Grommet
17. Clip
18. Washer
19. Side Panel
20. Heat Shield
21. Shoulder Screw
22. T-Nut w/Teeth
23. Rivet
24. Flare Extension
25. T-Nut w/Teeth
26. Machine Screw
27. Kick Panel
28. Plastic Rivet
29. Fender Panel
30. Cable Tie
31. Fender Panel
32. Self-Tapping Screw



0739--033

Front Rack

REMOVING

1. Remove the two cap screws securing the fenders to the rack.



AF600DA

2. Remove the cap screws securing the rack to the frame and front bumper assembly.
3. Remove the front rack from the ATV.

CLEANING AND INSPECTING

■**NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Clean all rack components with parts-cleaning solvent.
2. Inspect all welds for cracking or bending.
3. Inspect threaded areas of all mounting bosses for stripping.
4. Inspect for missing decals and/or reflectors.

INSTALLING

1. Place the rack into position on the frame and bumper. Start the cap screws and finger-tighten only.
2. Install the two cap screws securing the rack to the fenders. Tighten all hardware securely.

Front Bumper Assembly

REMOVING

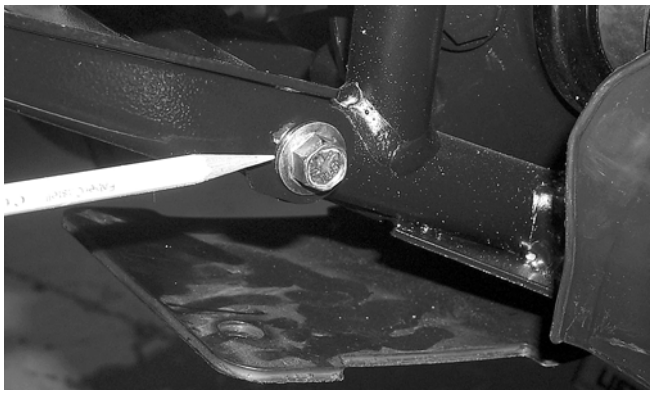
■**NOTE: Remove the headlights with the front bumper.**

1. Remove the main wiring harness connectors from the four headlights.
2. Remove the two screws securing the grille to the front bumper.
3. Remove the two push nuts securing the fender extension to the front bumper. Push the fender extension studs out of the front bumper.



CC856

4. Remove the four cap screws securing the front skid plate to the front bumper.
5. Remove the two cap screws securing the front bumper to the frame.



CC858

6. Remove the two cap screws securing the front bumper to the front bumper supports.



CC857

7. Remove the front bumper with headlights.

CLEANING AND INSPECTING

■**NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Clean all bumper components with parts-cleaning solvent.
2. Inspect all welds for cracking or bending.
3. Inspect threaded areas of all mounting bosses for stripping.
4. Inspect the wiring harness and headlights for damage.
5. Inspect the screen for damage or air-flow obstructions.

INSTALLING

1. Place the front bumper assembly into position on the frame and secure with four cap screws. Tighten securely.
2. Secure the front skid plate to the front bumper with the four cap screws. Tighten securely.
3. Place the two fender extension studs through the front bumper and secure with the existing push nuts.



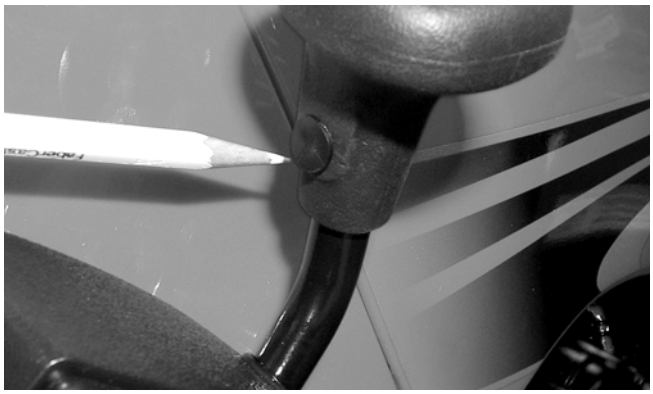
CC856

4. Position the grille in the front bumper and secure.
5. Connect the wiring to each of the headlights.

Front Fender/ Side Panels

REMOVING

1. Remove the front rack (see Front Rack in this section).
2. Remove the three cap screws securing the two side panels to the frame and rear fenders; then remove the side panels.
3. Using a small flat-blade screwdriver, carefully remove the retaining pin securing the gear shift knob to the shift lever; then remove the knob from the lever.



CC852

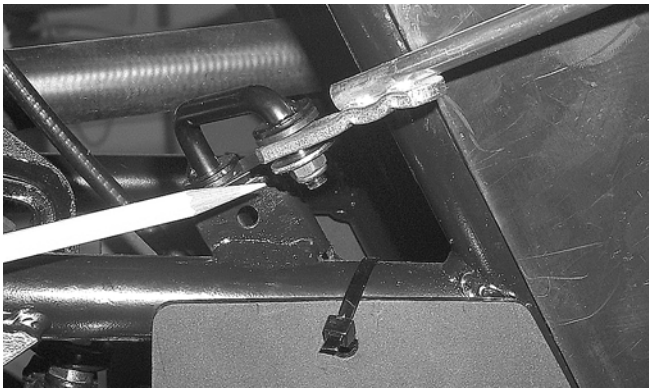
4. Remove the three machine screws securing the gear shift linkage cover to the fender and remove the cover.

■ **NOTE: The cover is located inside the left-front wheel well.**



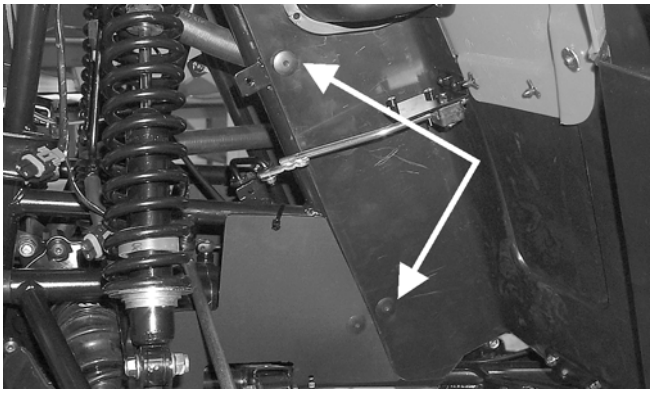
CC851

5. Remove the nut securing the drive selector linkage. Account for a washer and bushing.

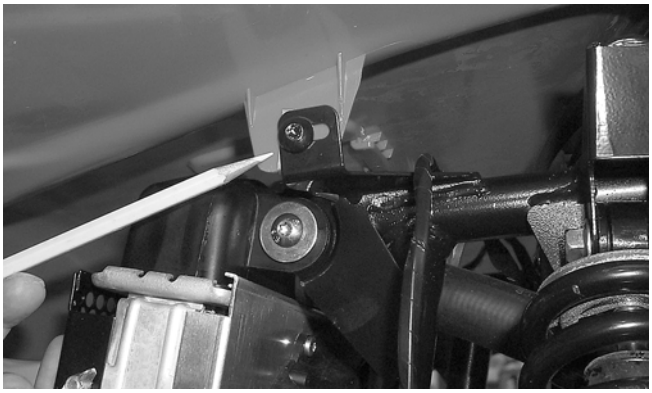


CC853

6. Remove the six cap screws securing the fender to the frame.

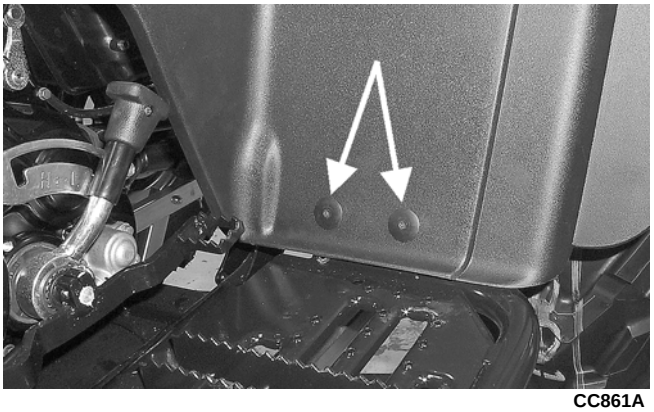


CC854A



CC855

7. Remove the four cap screws and nuts securing the fender to the footrests.



CC861A

8. Disconnect the wires from the accessory plug (if equipped); then remove the accessory plug from the fender.

9. Remove the fenders from the ATV.

CLEANING AND INSPECTING

■ NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

1. Clean all fender components with part-cleaning solvent and soap and water.

2. Inspect fenders for cracks and/or loose rivets.

3. Inspect for any missing decals.

INSTALLING

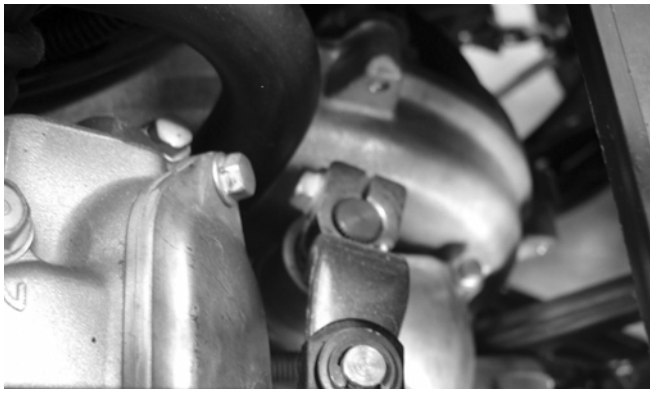
1. Place the fenders into position on the ATV.

2. Install the accessory plug (if equipped) into the fender; then connect the two accessory plug wires.

■ NOTE: The accessory plug red wire goes on the center connector.

3. Install the cap screws (five per side) securing the fenders to the frame and footrests and finger-tighten; then tighten the ten fasteners securely.

4. Connect the drive selector linkage using existing hardware. Tighten securely.



KX057

5. Install the gear shift linkage cover in the left-front fender well. Tighten securely.



CC851

6. Place the gear shift knob into position on the shift lever and secure with the retaining pin.

7. Place the side panels into position and secure.

8. Install the front rack (see Front Rack in this section).

Fender Flares/ Extensions

REMOVING

1. Using a side-cutter, remove the appropriate plastic rivets.

■ NOTE: To remove a front extension, first remove the grille; then remove the push nuts securing the extension to the bumper.

2. Remove the cap screws securing the extensions or flares to the frame and footrest.

3. Remove the self-tapping screws securing the extension to the fender.

INSTALLING

1. Place the flare or extension into position. Using the Plastic Rivet Setter (p/n 0444-056), secure with Plastic Rivets (p/n 0423-046) or suitable substitute.

2. Secure the extensions or flares with the cap screws and self-tapping screws.

Footrests

REMOVING

1. Remove the cap screws securing the fender extension to the footrest. Account for all cap screws and one nut.

■ NOTE: It will be easiest to remove the front inner cap screw by removing the nut from inside the wheel well.

2. On the right-side footrest, disconnect the foot brake switch from the main wiring harness.

3. Remove the cap screws securing the footrest to the frame; then remove the footrest.

■ NOTE: On the right-side footrest, it will be necessary to remove the foot brake cable from the brake pedal.

CLEANING AND INSPECTING

■ NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

1. Clean the footrest in parts-cleaning solvent.

2. Inspect the footrest weldments for cracks or unusual bends.

3. Inspect all tubing for cracks or unusual bends.

INSTALLING

1. Connect the foot brake cable to the brake pedal (right-side footrest).

2. Place the footrest into position on the frame and loosely secure with the four cap screws.

3. Secure the fender extension to the footrest with existing hardware. Tighten securely.

4. Tighten the 10 mm footrest cap screws (from step 2) to 5.5 kg-m (40 ft-lb); then tighten the 8 mm cap screws (from step 2) to 2.8 kg-m (20 ft-lb).

5. Connect the foot brake switch to the main wiring harness. Ensure that the harness is properly secured to the frame and away from any moving parts.

Belly Panel

REMOVING

1. Remove the machine screws and shoulder washers securing the belly panel to the underside of the frame.

2. Remove the belly panel.

INSTALLING

1. Place the belly panel into position on the underside of the frame.

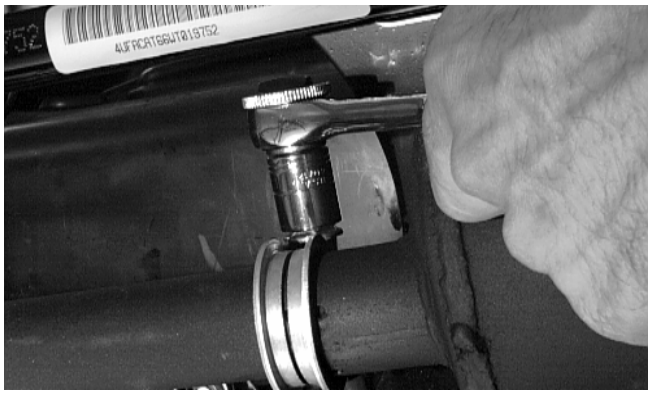
2. Install the machine screws and shoulder washers. Tighten securely.

Exhaust System

REMOVING MUFFLER

1. Remove the cap screws securing the muffler to the frame and account for all mounting hardware.

2. Loosen the clamp at the muffler/exhaust pipe juncture; then remove the nuts securing the rear exhaust pipe to the cylinder and remove the muffler.



CH056D

INSPECTING MUFFLER

■ NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

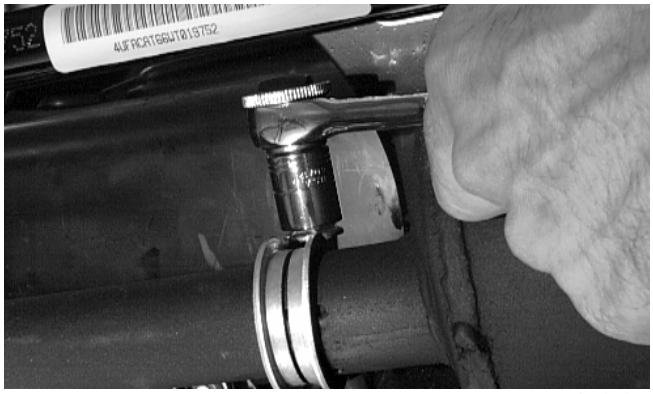
1. Inspect muffler externally for cracks, holes, and dents.

2. Inspect the muffler internally by shaking the muffler back and forth and listening for rattles or loose debris inside the muffler.

■**NOTE: For additional details on cleaning the muffler/spark arrester, see Section 2.**

INSTALLING MUFFLER

1. Install the muffler on the frame and into the muffler/exhaust pipe juncture and rear cylinder exhaust port accounting for all mounting hardware.
2. Tighten cap screws securely; then tighten the juncture clamp and the nuts securing the exhaust pipe to the rear cylinder.



CH056D

Rear Rack

REMOVING

1. Remove the cap screws securing the rear rack to frame and rear fenders. Account for any washers.
2. Lift the rack upward and remove from the frame.

CLEANING AND INSPECTING

■**NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Clean all rear rack components with parts-cleaning solvent.
2. Inspect all welds for cracking or bending.
3. Inspect threaded areas of all mounting bosses for stripping.
4. Inspect for missing decals and/or reflectors.

INSTALLING

1. Place the rack into position on the frame; then install the cap screws and any washers.
2. Tighten all fasteners securely.

Rear Fender

REMOVING

1. Remove the seat (see Seat in this section).
2. Remove the rear rack (see Rear Rack in this section).
3. Remove side panels (see Front Fender/Side Panels in this section).
4. Remove the cap screws and washers securing the fender to the frame and footrests.
5. Remove the battery hold-down and tool kit and disconnect the battery cables (negative cable first) and the vent hose; then remove the battery.
6. Route the battery cables and vent hose out of the fender through the hole at the bottom of the battery compartment.
7. Disconnect the taillight wiring harness three-prong connector; then remove the fender.

CLEANING AND INSPECTING

■**NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Clean all rear fender components with parts-cleaning solvent and soap and water.
2. Inspect side panels, fender extensions, and rear fenders for cracks and loose rivets.
3. Inspect threaded areas of all mounting bosses for stripping.
4. Inspect for missing decals.

INSTALLING

1. Place the fender into position on the frame.
2. Route the battery cables and vent hose into the fender through the hole at the bottom of the battery compartment.
3. Secure the fender to the frame and footrests with existing cap screws and washers. Tighten securely.
4. Place the battery in position in the compartment; then install the vent hose, battery cables (positive cable first), the tool kit, and the battery hold-down.
5. Route the taillight wiring harness over the rear frame; then connect the three-prong connector.
6. Install the side panels (see Front Fender/Side Panels in this section).

7. Install the rear rack (see Rear Rack in this section).
8. Install the seat (see Seat in this section).

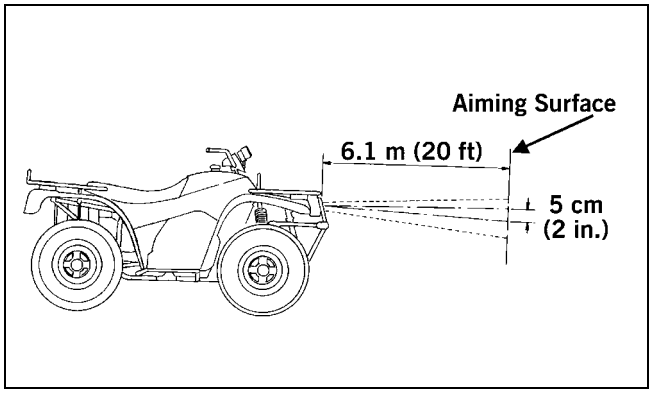
Adjusting Headlight

The headlights can be adjusted vertically and horizontally. The geometric center of the HIGH beam light zone is to be used for vertical and horizontal aiming.

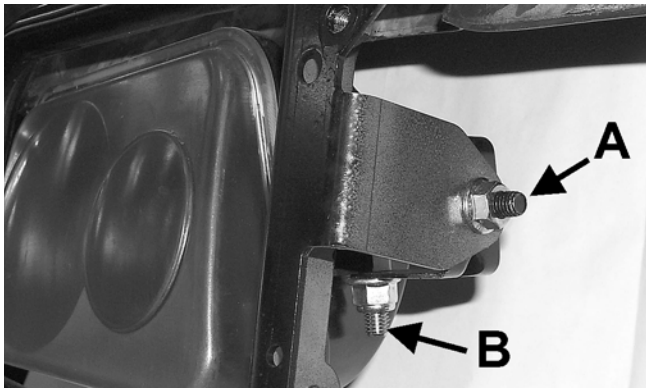
1. Position the ATV on a level floor so the headlights are approximately 6.1 m (20 ft) from an aiming surface (wall or similar aiming surface).

■NOTE: There should be an average operating load on the ATV when adjusting the headlight aim.

2. Measure the distance from the floor to the mid-point of each headlight.
3. Using the measurements obtained in step 2, make horizontal marks on the aiming surface.
4. Make vertical marks which intersect the horizontal marks on the aiming surface directly in front of the headlights.
5. Switch on the lights. Make sure the HIGH beam is on. DO NOT USE LOW BEAM.
6. Observe each headlight beam aim. Proper aim is when the most intense beam is centered on the vertical mark 5 cm (2 in.) below the horizontal mark on the aiming surface.



ATV-0070



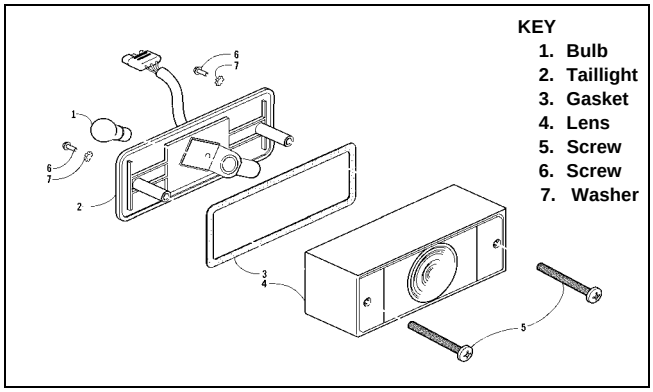
AF926A

7. Adjust each headlight until correct aim is obtained.
   A. Horizontal - Loosen nut (A) and adjust for proper aiming. Tighten the nut securely.
   B. Vertical - Loosen nut (B) and adjust for proper aiming. Tighten the nut securely.

⚠ WARNING

Do not operate the ATV unless the headlight beam is adjusted properly. An incorrectly adjusted beam will not provide the operator the optimum amount of light.

Taillight Assembly



0732-336

REMOVING

1. Unplug the three-prong connector and free the taillight wiring harness from the frame.
2. Remove the torx-head cap screws securing the taillight assembly to the frame. Account for any washers.
3. Remove the taillight assembly.

INSPECTING

■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Inspect wiring harness, three-prong connector, lens, base, cap screws, and socket for damage.
2. Inspect all wires for corroding, pinching, and cracking.
3. Inspect the bulb for wattage, voltage, and proper operation.

INSTALLING

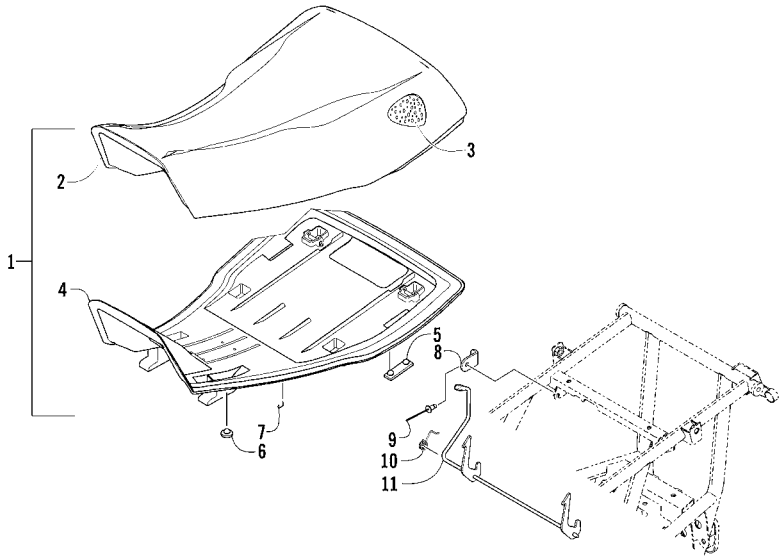
1. Place the assembly into position on the frame and secure with torx-head cap screws and any washers.
2. Tighten the cap screws securely.
3. Route the wiring harness over the rear frame; then connect the three-prong connector.

Seat

REMOVING/INSTALLING

KEY

1. Seat Assy
2. Cover
3. Foam
4. Base Assy
5. Base Bumper
6. Base Bumper
7. Staple
8. Plate
9. Rivet
10. Spring
11. Seat Latch



0739-289

1. To remove the seat, pull the seat lock lever backward (located under the rear rack between the storage compartment and the frame). Raise the rear of the seat and slide it rearward.
2. To lock the seat into positon, slide the front of the seat into the seat retainers and push down firmly on the rear of seat. The seat should automatically lock into position.

NOTES

SECTION 9 - CONTROLS/INDICATORS

9

TABLE OF CONTENTS

Hand Brake Lever/Master Cylinder Assembly 9-2
Auxiliary Brake Assembly Schematic 9-4
Throttle Control 9-4
Drive Selector 9-6
Shift Lever 9-6
Speedometer (Electronic)/Indicator Lights 9-8

Hand Brake Lever/ Master Cylinder Assembly

■**NOTE: The master cylinder is a non-serviceable component; it must be replaced as an assembly.**

REMOVING

1. Slide a piece of flexible tubing over one of the wheel bleeder valves and direct the other end into a container. Remove the reservoir cover; then open the bleeder valve. Allow the brake fluid to drain completely.

■**NOTE: Compressing the brake lever several times will quicken the draining process.**



AF637D

2. Place an absorbent towel around the connection to absorb brake fluid. Remove the brake hose from the master cylinder.

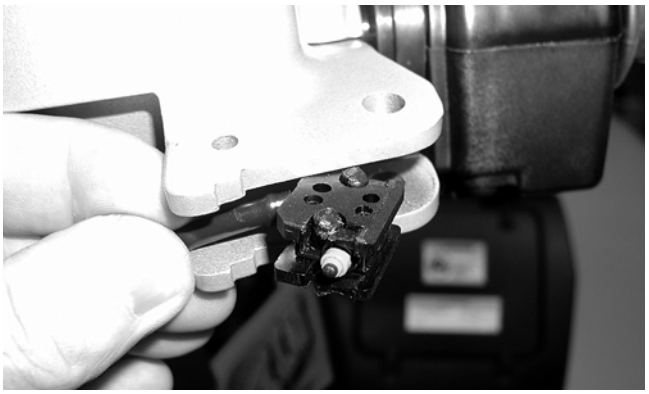


AG929

⚠ CAUTION

Brake fluid is highly corrosive. Do not spill brake fluid on any surface of the ATV.

3. Remove the circlip and pivot pin securing the brake lever to the master cylinder housing; then remove the brake lever and set aside.
4. Dislodge the brakelight switch from the master cylinder housing by gently pressing it toward the pivot pin hole in the housing; then lay it aside leaving the switch and wiring harness connected.



BC205

5. Remove the clamp screws securing the brake housing to the handlebar; then remove the assembly from the handlebar.



AG924

INSPECTING

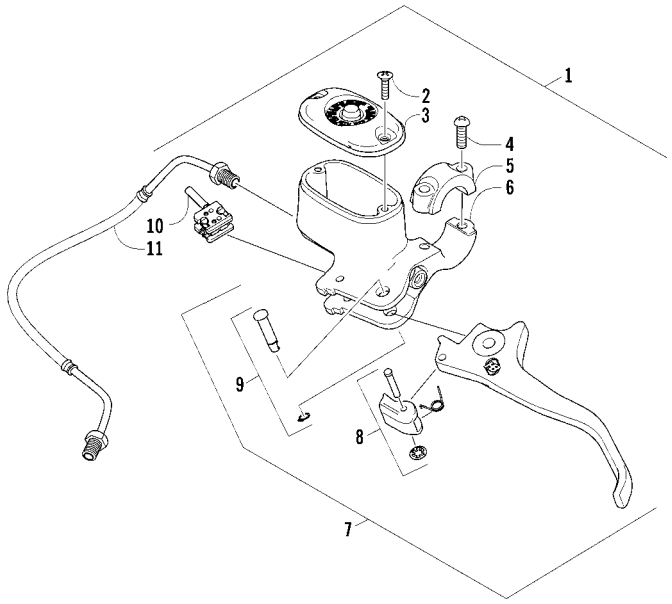
■**NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Inspect the pin securing the brake lever for wear.
2. Inspect the brake lever for elongation of the pivot hole.
3. Inspect the reservoir for cracks and leakage.
4. Inspect the brake hose for cracks and deterioration and the condition of the fittings (threaded and compression).
5. Inspect the brakelight switch for corrosion, cracks, missing or broken mounting tabs, or broken and frayed wiring.

■**NOTE: If the brakelight switch is determined to be not serviceable, see Section 5.**

INSTALLING

KEY
1. Brake Assy
2. Screw
3. Cover
4. Screw
5. Clamp
6. Master Cylinder
7. Brake Lever
8. Brake Lever Lock
9. Pin
10. Brake Switch
11. Hose



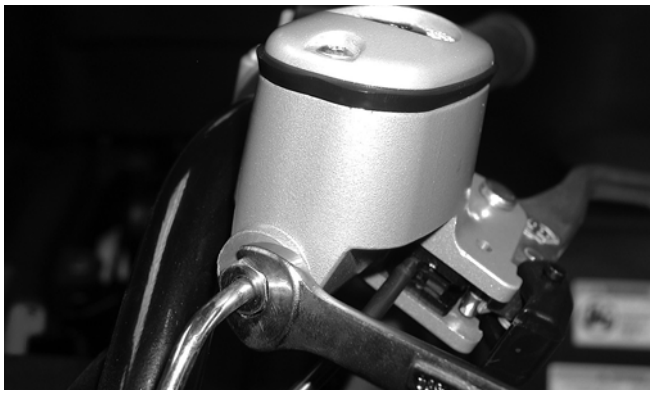
0738-331

1. Position the brake housing on the handlebar. Secure with clamp screws; then tighten securely.



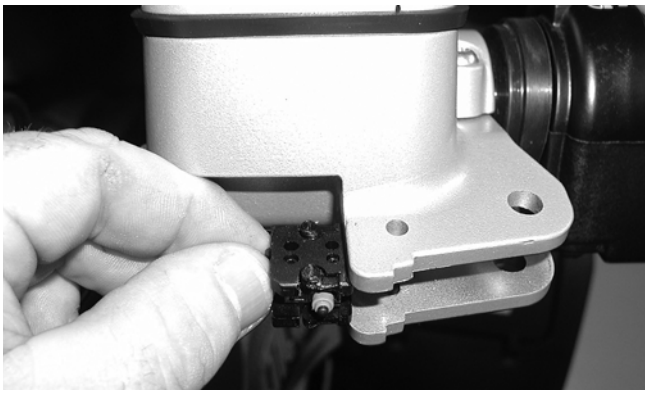
AG924

2. Install the brake hose on the master cylinder. Tighten to 0.8 kg-m (6 ft-lb).



AG929

3. Gently press the brakelight switch into the housing (left to right) until the mounting tabs snap into the four locating holes; then install the brake lever, pivot pin, and circlip.



BC206

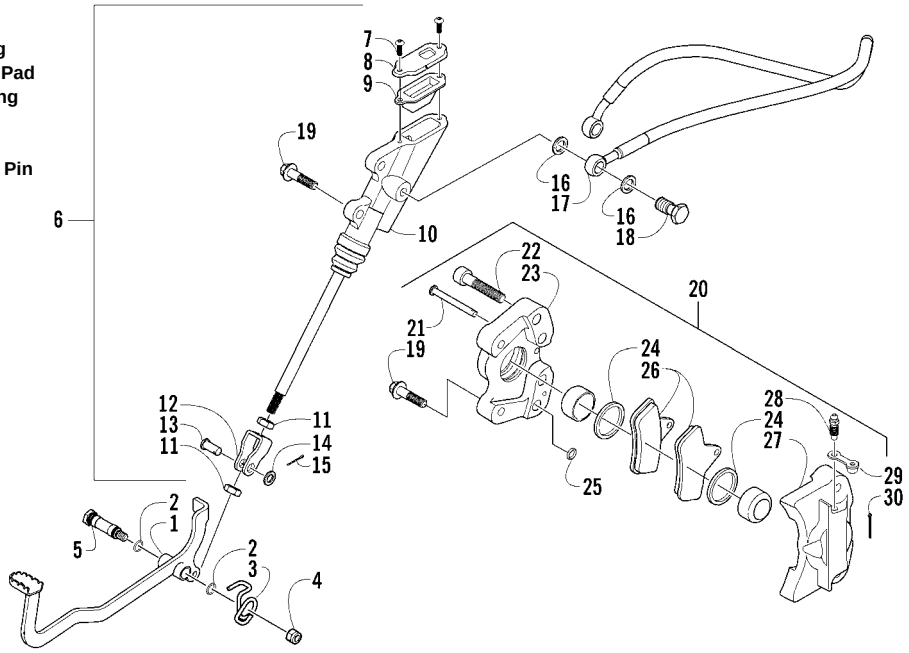
4. Bleed the brake system (see Section 2).

Auxiliary Brake Assembly Schematic

Pressing the auxiliary brake pedal downward will apply the auxiliary brake to the rear wheels.

KEY

1. Brake Lever
2. O-Ring
3. Spring
4. Nut
5. Axle
6. Brake Assy
7. Screw
8. Cover
9. Bladder
10. Master Cylinder
11. Jam Nut
12. Rod Actuator
13. Clevis Pin
14. Washer
15. Cotter Pin
16. Washer
17. Hose
18. Fitting Bolt
19. Cap Screw
20. Caliper
21. Pin
22. Cap Screw
23. Housing
24. O-Ring
25. O-Ring
26. Brake Pad
27. Housing
28. Valve
29. Cap
30. Cotter Pin

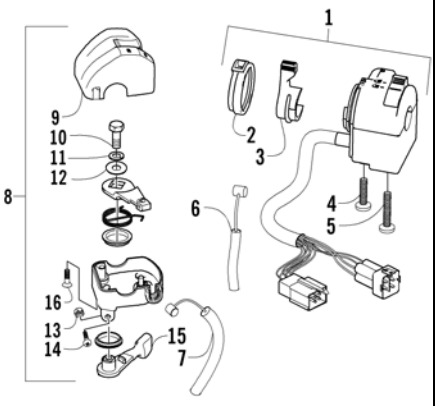


0739-060

Throttle Control

KEY

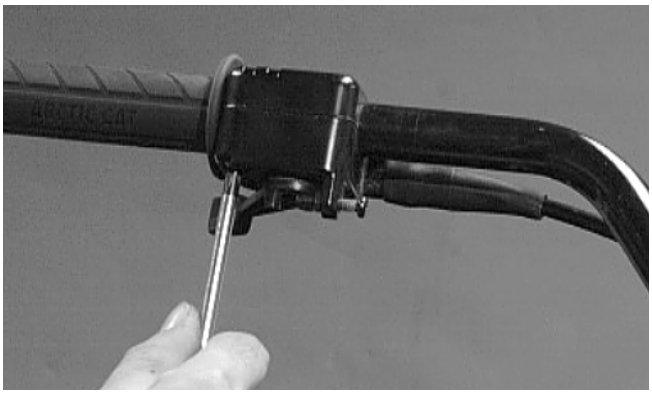
1. Control Switch Assy
2. Cover
3. Choke Lever
4. Screw
5. Cap Screw
6. Choke Cable
7. Throttle Cable
8. Throttle Case
9. Cover
10. Cap Screw
11. Lock Washer
12. Washer
13. Nut
14. Screw
15. Lever
16. Screw



739-055A

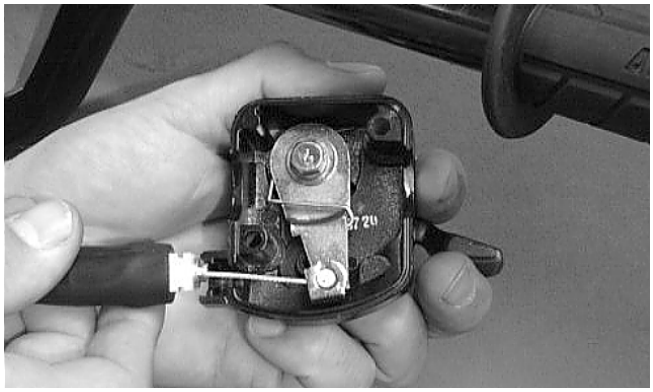
REMOVING

1. Remove the two machine screws securing the throttle control to the handlebar.



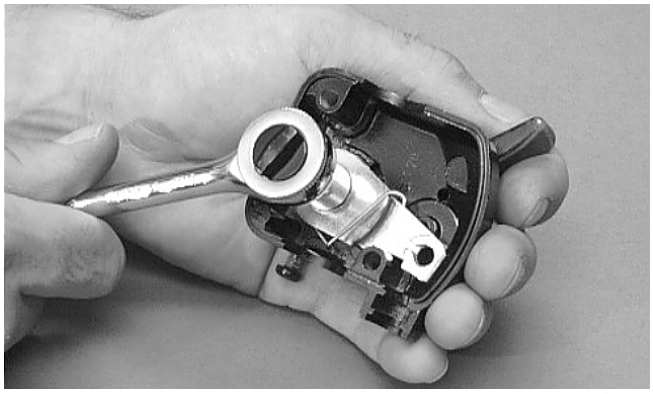
AL610D

2. Slide the grommet out of the lower half of the throttle control; then remove the cable from the actuator arm.



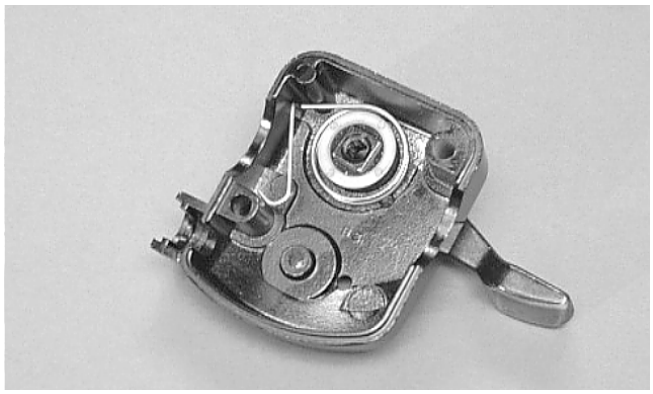
AF676D

3. Remove the cap screw, lock washer, and washer securing the actuator arm to the throttle control lever.



AF677D

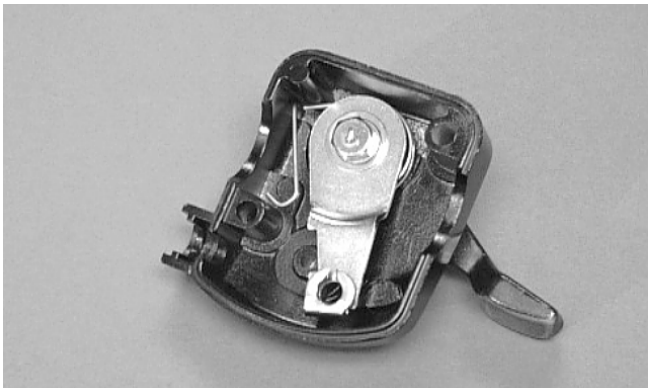
4. Remove the actuator arm and account for a bushing. Note the position of the return spring for installing purposes.



AF678D

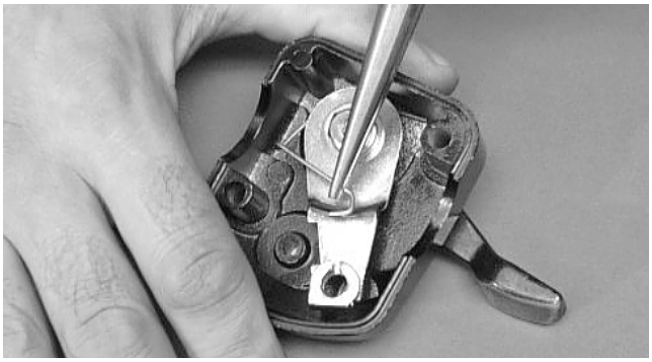
INSTALLING

1. Place the return spring into the throttle control; then place the bushing and actuator arm into position. Secure with the cap screw, lock washer, and washer.



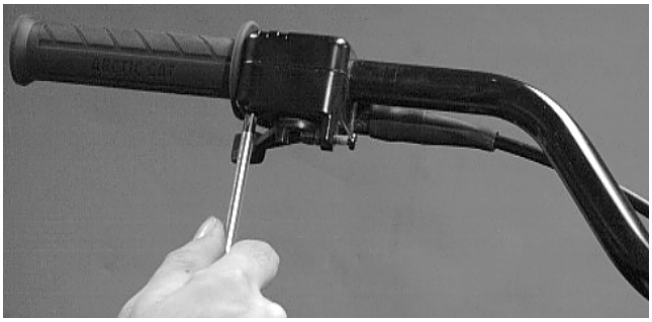
AF679D

2. Using a pair of needle-nose pliers, place the spring into position on the actuator arm.



AF680D

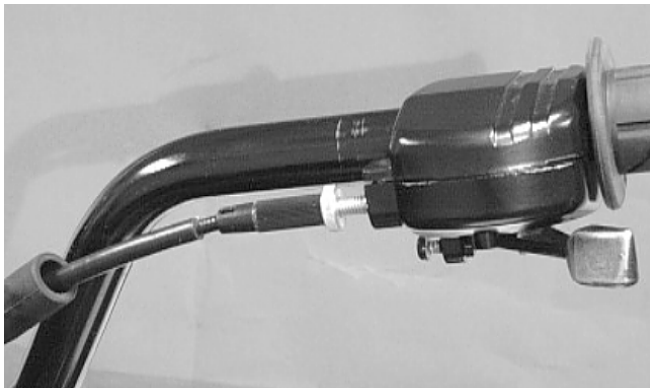
3. Place the two halves of the throttle control onto the handlebars and secure with the two machine screws.



AL610D

ADJUSTING

1. Slide the boot back to reveal the jam nut; then loosen the jam nut.



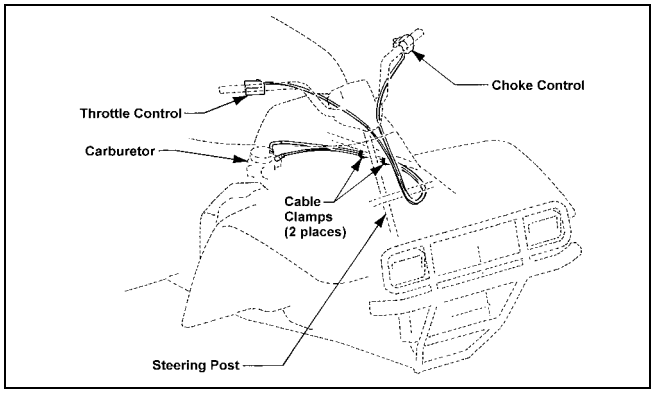
AF682D

2. Rotate the adjuster sleeve until 0.5-1.0 mm (0.02-0.04 in.) is attained.



AL611D

3. Secure the adjustment by tightening the jam nut; then slide the boot over the jam nut.

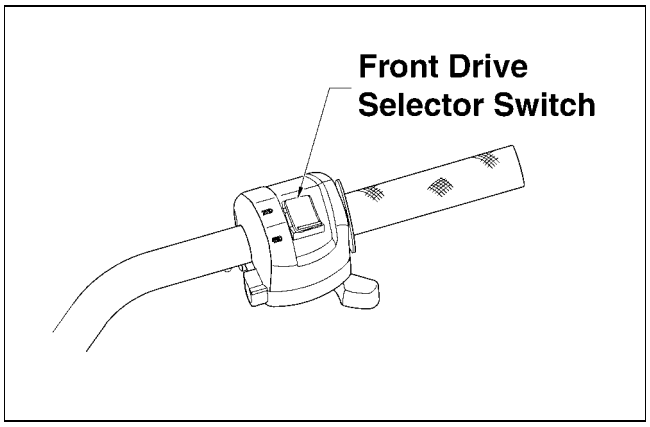


0732-412

Drive Selector

The automatic drive selector allows the operator to operate in either 2-wheel drive (rear wheels) or 4-wheel drive (all wheels). For normal riding on flat, dry, hard surfaces, 2-wheel drive should be sufficient. In situations of aggressive trail conditions, 4-wheel drive would be the desired choice.

To either engage or disengage the front wheels, move the switch to the 4WD position or to the 2WD position.



738-422A

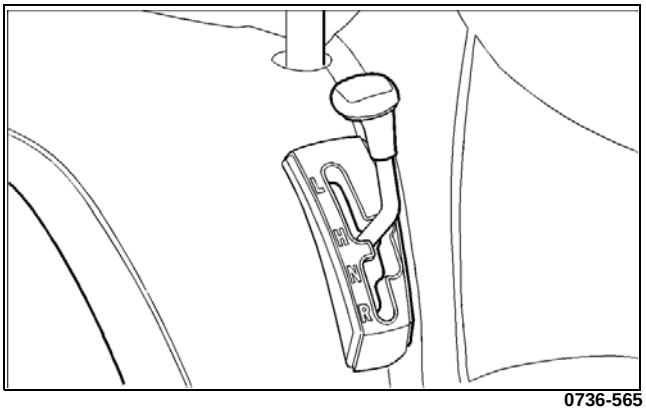
⚠ CAUTION

Do not attempt to either engage or disengage the front differential while the ATV is moving.

Shift Lever

The ATV with an automatic transmission has a dual-range transmission with reverse. To shift the ATV, follow these steps:

1. To engage the high range from neutral, move the shift lever forward.
2. To engage the low range from high range, move the shift lever outward and forward.

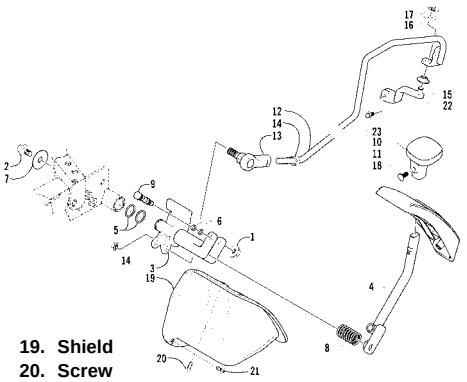


0736-565

3. To engage reverse gear from neutral, move the shift lever outward and rearward into the R position.

KEY

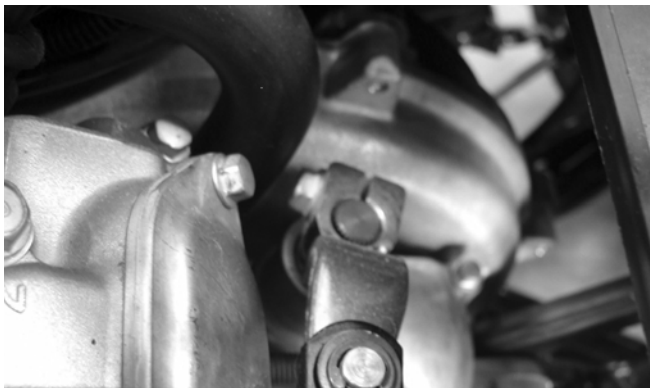
1. Nut
2. Cap Screw
3. Axle
4. Lever
5. O-Ring
6. O-Ring
7. Washer
8. Spring
9. Axle
10. Handle
11. Clip
12. Linkage
13. Rod End
14. Nut
15. Bushing
16. Washer
17. E-Ring
18. Plate
19. Shield
20. Screw
21. Screw
22. Shift Arm
23. Cap Screw



0739-083

REMOVING

1. Remove the seat (see Section 8).
2. Remove the three machine screws securing the left-side panel to the frame and rear fender; then remove the left-side panel.
3. Remove the E-clip securing the shift rod to the engine shift arm.



KX057

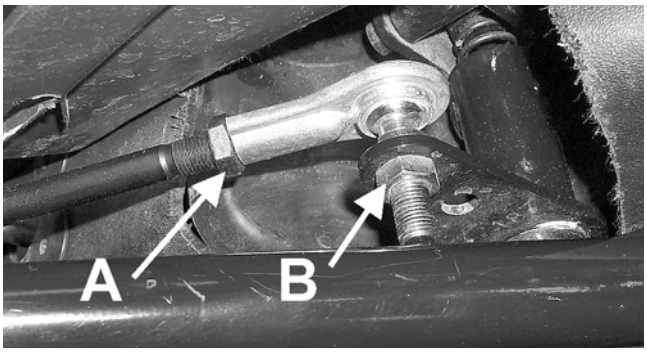
4. Remove the three machine screws securing the gear shift linkage cover to the fender and remove the cover.

■ NOTE: The cover is located inside the left-front wheel well.



CC851

5. Remove the axle and nut securing the shift lever to the upper shift arm; then remove the shift lever. Account for the spring and two O-rings on the axle.
6. Using two open-end wrenches, remove the lock nut (B) securing the shift rod to the upper shift arm. Remove the shift rod and discard the lock nut.

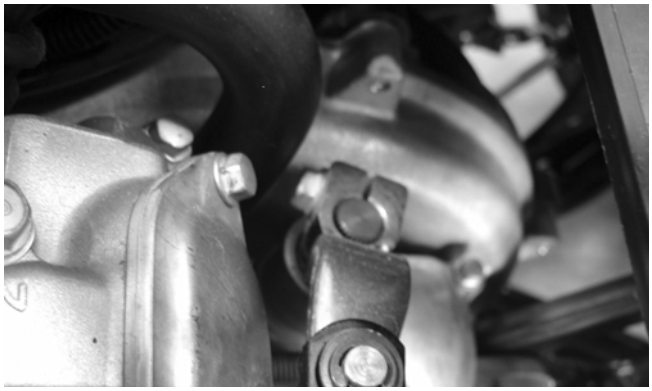


AF941A

■ NOTE: Never reuse a lock nut. Once a lock nut has been removed, it must be replaced with a new lock nut.

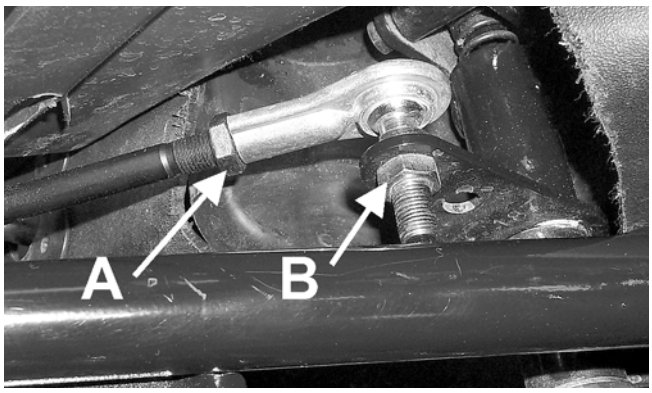
INSTALLING

1. Place the shift rod into position on the engine shift arm and secure with the existing E-clip.



KX057

2. Using a new lock nut, secure the shift rod to the upper shift arm; then using two open-end wrenches, tighten securely.



AF941A

3. Place the spring into position between the upper shift arm and shift lever; then making sure the O-rings are in place on the axle, secure the shift lever to the arm with the existing axle and nut.

4. Install the gear shift linkage cover on the fender in the left-front wheel well. Tighten the three machine screws securely.

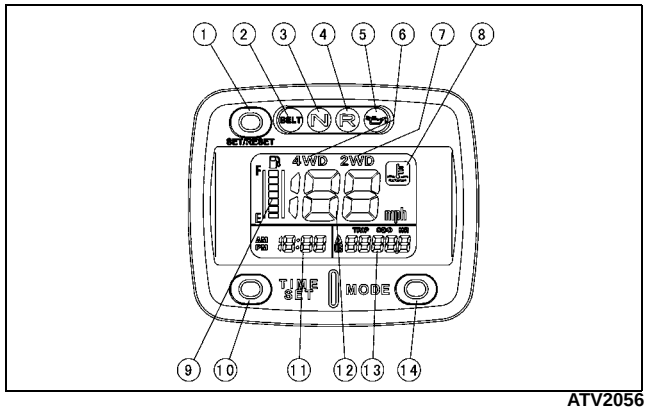
5. Place the left-side panel into position on the frame and secure with the three machine screws.

6. Install the gas tank (see Section 4); then install the seat (see Section 8).

7. Check shift lever adjustment (see Section 2).

Speedometer (Electronic)/Indicator Lights

■ NOTE: The indicator lights will illuminate for approximately one second when the ignition switch is rotated to the ON position.



ATV2056

1. **Set/Reset Button** — Used (in conjunction with the Time Set button) to advance the hour and minute display for setting the clock and to reset the trip meter display to zero.

2. **Belt Check Indicator** — The Belt light will flash at 0.35-second intervals when excessive belt wear or belt damage is detected. Also, light will illuminate every 100 hours of operation to indicate service requirements.

3. **Neutral Indicator** — The Neutral light will illuminate when the transmission is in neutral and the ignition switch is on. The light will go out when shifted into any gear other than neutral.

4. **Reverse Indicator** — The Reverse light will illuminate when the transmission is shifted into reverse gear. The light will go off when shifted out of reverse.

5. **Oil Pressure Indicator** — An oil pressure warning symbol LED (light emitting diode) will flash when low oil pressure is detected.

6. **4WD Indicator** — Displays 4WD when the front drive selector switch is moved to the 4WD position. Display will go off when 2WD is selected.

7. **2WD Indicator** — Displays 2WD when the front drive selector switch is moved to the 2WD position. Display will go off when 4 WD is selected.

8. **Coolant Temperature Indicator** — A red light will illuminate if the engine overheats. The light should be off during normal operation.

⚠ CAUTION

Continued operation of the ATV with high engine temperature may result in engine damage or premature wear.

■ NOTE: High engine RPM, low vehicle speed, or heavy load can raise engine temperature. Decreasing engine RPM, reducing load, and selecting an appropriate transmission gear can lower the temperature.

■ NOTE: Debris in front of the engine (or packed between the cooling fins of the radiator) can reduce cooling capability. Using a hose, pressure-wash the radiator and the engine to remove any debris preventing air flow.

9. **Fuel Level Indicator** — Shows amount of gasoline in the gas tank. When bottom portion flashes, 3.5 L (0.92 U.S. gal.) of gasoline remains in the tank.

10. **Time Set Button** — Press the button to set clock hours and minutes.

    A. Press the button and the minute display will blink; then adjust the hour display by pressing the Set/Reset Button. Press the Time Set Button to set hour display.

■ NOTE: If the Set/Reset Button is pressed in and held, the hour display will advance continuously.

    B. After the hour display is set, the minute display will blink. Press the Set/Reset Button to set minute display.

11. **Clock** — Clock indicates 12-hour mode.

12. **Speedometer** — Shows approximate ATV speed in km/h and mph.

13. **Odometer/Trip Meters (A & B)/Hour Meter** — Odometer registers the total distance the ATV has traveled. Trip meters can register two different types of distances (for instance, A could register trip distance and B could register distance between stops). Trip meters can be reset. Hour meter registers total ignition switch ON time.

14. **Mode Button** — Used (in conjunction with the Odometer/Trip Meters/Hour Meter) to shift the odometer/trip meters/hour meter display through the four modes: odometer, trip meter (A), trip meter (B), and hour meter.

REPLACING SPEEDOMETER

To replace the speedometer, use the following procedure.

1. Remove the four nylon fasteners securing the instrument pod; then remove the ignition switch retaining nut.
2. Remove the front rack and front fenders; then disconnect the multi-pin connector.
3. Remove the three nuts securing the mounting studs; then remove the speedometer.
4. Route the new wiring harness down through the opening; then mount the speedometer and secure with the three nuts; then connect the multi-pin connector.
5. Install the front fenders and front rack; then install the instrument pod and secure with the nylon fasteners.
6. Secure the ignition switch with the retaining nut.

NOTES

SECTION 10 - AIDS FOR MAINTENANCE

10

TABLE OF CONTENTS

Torque Specifications 10-2
Torque Conversions 10-3
Tightening Torque (General Bolts) 10-3

Torque Specifications

DRIVE TRAIN COMPONENTS			
Part	Part Bolted To	Torque kg-m	Torque ft-lb
Engine Mounting Through-Bolts	Frame	5.5	40
Engine Mount (Rear)	Frame	2.8	20
Front Differential*	Frame/Diff Bracket	5.5	40
Rear Output Joint Assy	Engine	2.8	20
Bearing Housing/Axle Assy	Axle Housing	5.5	40
Diff Housing Cover***	Diff Housing	2.6	19
Drive Bevel Gear Nut***	Shaft	11-13	79.5-94
Differential Gear Case***	Hub	2.3-3	16.5-22
Hub Nut (Front) (Rear)	Shaft/Axle (max) Shaft/Axle (max)	10.4 17.5	75 125
Oil Drain Plug	Front Diff/Rear Dr	0.5	3.5
Oil Fill Plug	Front Diff/Rear Dr	2.2	16
Oil Drain Plug	Engine	2.0	14.5
Inspection Plug	Rear Drive	0.5	3.5
Wheel	Hub	5.5	40

EXHAUST COMPONENTS			
Part	Part Bolted To	Torque kg-m	Torque ft-lb
Exhaust Pipe	Engine/Frame	2.8	20

ELECTRICAL COMPONENTS			
Part	Part Bolted To	Torque kg-m	Torque ft-lb
Coil*	Head Bracket	1.7	12
Ground Wire	Engine	1.1	8

STEERING COMPONENTS			
Part	Part Bolted To	Torque kg-m	Torque ft-lb
Handlebar Block	Steering Post	2.8	20
Steering Post Bearing Housings	Frame	2.8	20
Steering Post Bearing Flange	Frame	2.8	20
Lower Steering Bearing Washer Cap Screw***	Steering Post	5.5	40
Tie Rod End	Knuckle/Steering Post	4.2	30

BRAKE COMPONENTS			
Part	Part Bolted To	Torque kg-m	Torque ft-lb
Brake Disc*	Hub	2.1	15
Brake Hose	Caliper	4.2	30
Brake Hose	Master Cylinder	0.8	6
Master Cylinder Cover	Master Cylinder	.03	10 in.-lb
Auxiliary Brake Lever	Footrest	9.7	70
Hydraulic Caliper	Axle Retainer Assy	2.8	20

CHASSIS COMPONENTS			
Part	Part Bolted To	Torque kg-m	Torque ft-lb
Footrest	Frame (8 mm)	2.8	20
Footrest	Frame (10 mm)	5.5	40
Reverse Shift Lever*	Frame	2.8	20

SUSPENSION COMPONENTS (Front)			
Part	Part Bolted To	Torque kg-m	Torque ft-lb
A-Arm (All)	Frame	4.8	35
Ball Joint Cap Screw	Knuckle	4.8	35
Shock Absorber	Frame	4.8	35
Shock Absorber	Upper A-Arm	4.8	35

SUSPENSION COMPONENTS (Rear)			
Part	Part Bolted To	Torque kg-m	Torque ft-lb
Axle Retainer Assy	Axle Housing	5.5	40
Axle Housing/Hitch	Rear Gear Case	4.8	35
Axle Housing/Hitch	Rear Gear Case (New)	5.5	40
Swing Arms	Axle Housing	4.8	35
Swing Arms**	Frame	4.8	35
Shock Absorber	Axle Housing/Frame	4.8	35

ENGINE/TRANSMISSION			
Part	Part Bolted To	Torque kg-m	Torque ft-lb
Crankcase Half (6 mm)	Crankcase Half	1.0	7
Crankcase Half (8 mm)	Crankcase Half	2.0	14.5
Cylinder Head (Cap Screws)	Crankcase	5.0	36
Cylinder Head (6 mm)	Cylinder	1.0	7
Driven Pulley Nut	Fixed Face	9.5	69
Fixed Driven	Clutch Shaft	9.5	69
Ground Wire	Engine	1.1	8
Magneto Cover	Crankcase	0.9	6.5
Mechanical Water Pump Impeller	Pump Shaft	0.8	6
Recoil Starter	Left-Side Cover	1.2	9
Magneto Rotor Nut	Crankshaft	13	94
Starter Flange	Crankshaft	0.85	6.5
V-Belt Cover	Crankcase	0.9	6.5
Spark Plug	Engine	1.3	9.5

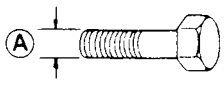
* w/Blue Loctite #243
** w/Red Loctite #271
*** w/Green Loctite #609

Torque Conversions

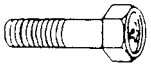
ft-lb	kg-m	ft-lb	kg-m	ft-lb	kg-m	ft-lb	kg-m	ft-lb	kg-m
1	0.1	21	2.9	41	5.7	61	8.4	81	11.2
2	0.3	22	3.0	42	5.8	62	8.6	82	11.3
3	0.4	23	3.2	43	5.8	63	8.7	83	11.5
4	0.6	24	3.3	44	6.1	64	8.9	84	11.6
5	0.7	25	3.5	45	6.2	65	9.0	85	11.8
6	0.8	26	3.6	46	6.4	66	9.1	86	11.9
7	1.0	27	3.7	47	6.5	67	9.3	87	12.0
8	1.1	28	3.9	48	6.6	68	9.4	88	12.2
9	1.2	29	4.0	49	6.8	69	9.5	89	12.3
10	1.4	30	4.2	50	6.9	70	9.7	90	12.5
11	1.5	31	4.3	51	7.1	71	9.8	91	12.6
12	1.7	32	4.4	52	7.2	72	10.0	92	12.8
13	1.8	33	4.6	53	7.3	73	10.1	93	12.9
14	1.9	34	4.7	54	7.5	74	10.2	94	13.0
15	2.1	35	4.8	55	7.6	75	10.4	95	13.1
16	2.2	36	5.0	56	7.7	76	10.5	96	13.3
17	2.4	37	5.1	57	7.9	77	10.7	97	13.4
18	2.5	38	5.3	58	8.0	78	10.8	98	13.6
19	2.6	39	5.4	59	8.2	79	10.9	99	13.7
20	2.8	40	5.5	60	8.3	80	11.1	100	13.8

Tightening Torque
(General Bolts)

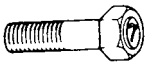
Type of Bolt	Thread Diameter A (mm)	Tightening Torque	
		kg-m	ft-lb
(Conventional or 4 Marked Bolt)	5	0.2-0.4	1.5-3.0
	6	0.4-0.7	3.0-5.0
	8	1.0-1.6	7.0-11.5
	10	2.2-3.5	16.0-25.5
(7 Marked Bolt)	5	0.3-0.6	2.0-4.5
	6	0.8-1.2	6.0-8.5
	8	1.8-2.8	13.0-20.0
	10	4.0-6.0	29.0-43.5



Conventional Bolt



4 Marked Bolt



7 Marked Bolt

NOTES

SECTION 11 - TROUBLESHOOTING

TABLE OF CONTENTS

Engine 11-2
Drive 11-6
Fuel System 11-7
Electrical 11-8
Steering/Suspension 11-10
Brakes 11-11

Engine

Problem: Engine will not start or is hard to start (Compression too low)	
Condition	**Remedy**
1. **Valve clearance** out of adjustment	1. Adjust clearance
2. **Valve guides** worn - seated poorly	2. Repair - replace guides
3. **Valves** mistimed	3. Adjust valve timing
4. **Piston rings** worn excessively	4. Replace rings
5. **Cylinder bore** worn	5. Replace - rebore cylinder
6. **Spark plug** seating poorly	6. Tighten plug
7. **Starter motor** cranks too slowly - does not turn	7. See Electrical in this section
Problem: Engine will not start or is hard to start (No spark)	
Condition	**Remedy**
1. **Spark plug** fouled	1. Clean - replace plug
2. **Spark plug** wet	2. Clean - dry plug
3. **Magneto** defective	3. Replace magneto
4. **CDI unit** defective	4. Replace CDI unit
5. **Ignition coil** defective	5. Replace ignition coil
6. **High-tension lead** open - shorted	6. Replace high tension lead
Problem: Engine will not start or is hard to start (No fuel reaching the carburetor)	
Condition	**Remedy**
1. **Gas tank vent hose** obstructed	1. Clean vent hose
2. **Carburetor inlet needle** defective	2. Replace needle
3. **Fuel hose** obstructed	3. Clean - replace hose
4. **Fuel screens** obstructed	4. Clean - replace inlet screen - valve screen
5. **Gas tank valve** clogged or defective	5. Clean - replace valve
6. **Electric fuel pump** defective	6. Replace pump
Problem: Engine stalls easily	
Condition	**Remedy**
1. **Spark plug** fouled	1. Clean plug
2. **Magneto** defective	2. Replace magneto
3. **CDI unit** defective	3. Replace CDI unit
4. **Carburetor jets** obstructed	4. Clean jets
5. **Valve clearance** out of adjustment	5. Adjust clearance
Problem: Engine noisy (Excessive valve chatter)	
Condition	**Remedy**
1. **Valve clearance** too large	1. Adjust clearance
2. **Valve spring(s)** weak - broken	2. Replace spring(s)
3. **Rocker arm** - **rocker arm shaft** worn	3. Replace arm - shaft
4. **Camshaft** worn	4. Replace camshaft

Problem: Engine noisy (Noise seems to come from piston)	
Condition	**Remedy**
1. **Piston - cylinder** worn	1. Replace - service piston - cylinder
2. **Combustion chamber carbon** buildup	2. Clean chamber
3. **Piston pin - piston pin bore** worn	3. Replace - service pin - bore
4. **Piston rings - ring groove(s)** worn	4. Replace rings - piston
Problem: Engine noisy (Noise seems to come from timing chain)	
Condition	**Remedy**
1. **Chain** stretched	1. Replace chain
2. **Sprockets** worn	2. Replace sprockets
3. **Tension adjuster** malfunctioning	3. Repair - replace adjuster
Problem: Engine noisy (Noise seems to come from clutch)	
Condition	**Remedy**
1. **Crankshaft splines - bearings** worn	1. Replace crankshaft - bearings
2. **Countershaft - hub splines** worn	2. Replace countershaft - hub
3. **Clutch plate teeth** worn	3. Replace clutch plate(s)
4. **Driven - drive clutch plates** distorted - broken	4. Replace clutch plate(s)
5. **Clutch dampers** weak	5. Replace dampers
Problem: Engine noisy (Noise seems to come from crankshaft)	
Condition	**Remedy**
1. **Bearing** worn - burned	1. Replace bearing
2. **Lower rod-end bearing** worn - burned	2. Replace bearing
3. **Connecting rod side clearance** too large	3. Replace thrust washer(s)
Problem: Engine noisy (Noise seems to come from transmission)	
Condition	**Remedy**
1. **Gears** worn - rubbing	1. Replace gears
2. **Splines** worn	2. Replace shaft(s)
3. **Primary gears** worn - rubbing	3. Replace gears
4. **Bearings** worn	4. Replace bearings
5. **Bushing** worn	5. Replace bushing
Problem: Engine noisy (Noise seems to come from secondary-transmission/left-side cover)	
Condition	**Remedy**
1. **Gears - shaft(s)** worn	1. Replace gears - shafts
2. **Bearing(s)/bushing(s)** damaged	2. Replace bearing(s)/bushing(s)
Problem: Engine noisy (Noise seems to come from secondary bevel gear and final driven shaft)	
Condition	**Remedy**
1. **Drive - driven bevel gears** damaged - worn	1. Replace gears
2. **Backlash** excessive	2. Adjust backlash
3. **Tooth contact** improper	3. Adjust contact
4. **Bearing** damaged	4. Replace bearing
5. **Gears** worn - rubbing	5. Replace gears
6. **Splines** worn	6. Replace shaft(s)
7. **Final driven shaft thrust clearance** too large	7. Replace thrust washer(s)

Problem: Secondary-transmission will not shift or shift back	
Condition	**Remedy**
1. **Sliding dog** broken - worn	1. Replace dog
2. **Gearshift fork** broken - worn	2. Replace fork
3. **Hi/Low shift lever** out of adjustment	3. Adjust lever
4. **Gearshift cam** worn	4. Replace cam
5. **Cam stopper spring** weak	5. Replace spring
6. **Gearshift fork shaft** worn	6. Replace shaft
Problem: Engine idles poorly	
Condition	**Remedy**
1. **Valve clearance** out of adjustment	1. Adjust clearance
2. **Valve seating** poor	2. Replace - service seats - valves
3. **Valve guides** defective	3. Replace guides
4. **Rocker arms - arm shaft** worn	4. Replace arms - shafts
5. **Magneto** defective	5. Replace magneto
6. **CDI unit** defective	6. Replace CDI unit
7. **Spark plug** fouled - **gap** too wide	7. Adjust gap - replace plug
8. **Ignition coil** defective	8. Replace ignition coil
9. **Float** out of adjustment	9. Adjust float height
10. **Jets** obstructed	10. Clean jets
11. **Pilot screw setting** improper	11. Adjust pilot screw
Problem: Engine runs poorly at high speed	
Condition	**Remedy**
1. **High RPM "cut out"** against RPM limiter	1. Shift into higher gear - decrease speed
2. **Valve springs** weak	2. Replace springs
3. **Valve timing** out of adjustment	3. Adjust timing
4. **Cams - rocker arms** worn	4. Replace cams - arms
5. **Spark plug gap** too narrow	5. Adjust gap
6. **Ignition coil** defective	6. Replace ignition oil
7. **Float level** too low	7. Adjust float height
8. **Air cleaner element** obstructed	8. Clean element
9. **Fuel hose** obstructed	9. Clean - prime hose
Problem: Exhaust smoke dirty or heavy	
Condition	**Remedy**
1. **Oil (in the engine)** overfilled - contaminated	1. Drain excess oil - replace oil
2. **Piston rings - cylinder** worn	2. Replace - service rings - cylinder
3. **Valve guides** worn	3. Replace guides
4. **Cylinder wall** scored - scuffed	4. Replace - service cylinder
5. **Valve stems** worn	5. Replace valves
6. **Stem seals** defective	6. Replace seals

Problem: Engine lacks power	
Condition	**Remedy**
1. **Valve clearance** incorrect	1. Adjust clearance
2. **Valve springs** weak	2. Replace springs
3. **Valve timing** out of adjustment	3. Adjust timing
4. **Piston ring(s) - cylinder** worn	4. Replace - service rings - cylinder
5. **Valve seating** poor	5. Repair seats
6. **Spark plug** fouled	6. Clean - replace plug
7. **Rocker arms - shafts** worn	7. Replace arms - shafts
8. **Spark plug gap** incorrect	8. Adjust gap - replace plug
9. **Carburetor jets** obstructed	9. Clean jets
10. **Float level** out of adjustment	10. Adjust float height
11. **Air cleaner element** obstructed	11. Clean element
12. **Oil (in the engine)** overfilled - contaminated	12. Drain excess oil - change oil
13. **Intake manifold** leaking air	13. Tighten - replace manifold
14. **Cam chain** worn	14. Replace cam chain
Problem: Engine overheats	
Condition	**Remedy**
1. **Carbon deposit (piston crown)** excessive	1. Clean piston
2. **Oil** low	2. Add oil
3. **Octane** low - **gasoline** poor	3. Drain - replace gasoline
4. **Oil pump** defective	4. Replace pump
5. **Oil circuit** obstructed	5. Clean circuit
6. **Gasoline level (in float chamber)** too low	6. Adjust float height
7. **Intake manifold** leaking air	7. Tighten - replace manifold
8. **Coolant level** low	8. Fill - examine system for leaks
9. **Fan** malfunctioning	9. Check fan fuse - replace fan
10. **Fan switch** malfunctioning	10. Replace fan switch
11. **Thermostat** stuck - closed	11. Replace thermostat
12. **Radiator hoses - cap** damaged - obstructed	12. Clear obstruction - replace hoses

Drive

Problem: Power not transmitted from engine to wheels	
Condition	**Remedy**
1. **Rear axle shaft serration** worn - broken	1. Replace shaft
Problem: Power not transmitted from engine to either front wheel	
Condition	**Remedy**
1. **Secondary drive - driven gear teeth** broken	1. Replace gear(s)
2. **Propeller shaft serration** worn - broken	2. Replace shaft
3. **Coupling** damaged	3. Replace coupling
4. **Coupling joint serration** worn - damaged	4. Replace joint
5. **Front drive - driven bevel gears** broken - damaged	5. Replace gear(s)
6. **Front differential gears/pinions** broken - damaged	6. Replace gears - pinions
7. **Sliding dog/shaft/fork** worn - damaged	7. Replace gear(s)
8. **Front drive axle** worn - damaged	8. Replace axle
9. **Front drive axle serration** worn - damaged	9. Replace axle

Problem: Starting impaired	
Condition	**Remedy**
1. **Starter jet** obstructed	1. Clean jet
2. **Starter jet passage** obstructed	2. Clean passage
3. **Starter body - carburetor** leaking air	3. Tighten - adjust - replace gasket
4. **Starter valve** not operating properly	4. Check - adjust valve
Problem: Idling or low speed impaired	
Condition	**Remedy**
1. **Slow jet** obstructed - loose	1. Clean - tighten jet
2. **Slow jet outlet** obstructed	2. Clean outlet
3. **Low speed fuel screw setting** incorrect	3. Adjust screw
4. **Starter valve** not fully closed	4. Adjust valve
5. **Float height** incorrect	5. Adjust float height
Problem: Medium or high speed impaired	
Condition	**Remedy**
1. **High RPM "cut out"** against RPM limiter	1. Shift into higher gear - decrease RPM speed
2. **Main jet** obstructed	2. Clean main jet
3. **Needle jet** obstructed	3. Clean needle jet
4. **Throttle vacuum piston** not operating properly	4. Check piston operation
5. **Filter** obstructed	5. Clean filter
6. **Float height** incorrect	6. Adjust float height
7. **Starter valve** not fully closed	7. Adjust valve
Problem: Overflow and fuel level fluctuations	
Condition	**Remedy**
1. **Float valve** worn - damaged	1. Replace valve
2. **Float valve spring** broken	2. Replace spring
3. **Float** not working properly	3. Adjust float height - replace float
4. **Float valve** dirty	4. Clean valve
5. **Float height** too high - too low	5. Adjust float height

Problem: Spark absent or weak	
Condition	**Remedy**
1. **Ignition coil** defective	1. Replace ignition coil
2. **Spark plug** defective	2. Replace plug
3. **Magneto** defective	3. Replace magneto
4. **CDI unit** defective	4. Replace CDI unit
5. **Pick-up coil** defective	5. Replace pick-up coil
Problem: Spark plug fouled with carbon	
Condition	**Remedy**
1. **Mixture** too rich	1. Adjust carburetor
2. **Idling RPM** too high	2. Adjust carburetor
3. **Gasoline** incorrect	3. Change to correct gasoline
4. **Air cleaner element** dirty	4. Clean element
5. **Spark plug** incorrect (too cold)	5. Replace plug
6. **Valve seals** cracked - missing	6. Replace seals
7. **Oil rings** worn - broken	7. Replace rings
Problem: Spark plug electrodes overheat or burn	
Condition	**Remedy**
1. **Spark plug** incorrect (too hot)	1. Replace plug
2. **Engine** overheats	2. Service cooling system
3. **Spark plug** loose	3. Tighten plug
4. **Mixture** too lean	4. Adjust carburetor
Problem: Magneto does not charge	
Condition	**Remedy**
1. **Lead wires/connections** shorted - loose - open	1. Repair - replace - tighten lead wires
2. **Magneto coils** shorted - grounded - open	2. Replace magneto coils
3. **Regulator/rectifier** shorted - punctured	3. Replace regulator/rectifier
Problem: Magneto charges, but charging rate is below the specification	
Condition	**Remedy**
1. **Lead wires** shorted - open - loose (at terminals)	1. Repair - tighten lead wires
2. **Stator coils (magneto)** grounded - open	2. Replace stator coils
3. **Regulator/rectifier** defective	3. Replace regulator/rectifier
4. **Electrolyte** low	4. Add distilled water
5. **Cell plates (battery)** defective	5. Replace battery

Problem: Magneto overcharges	
Condition	**Remedy**
1. **Internal battery** short circuited	1. Replace battery
2. **Regulator/rectifier resistor** damaged - defective	2. Replace resistor
3. **Regulator/rectifier** poorly grounded	3. Clean - tighten ground connection
Problem: Charging unstable	
Condition	**Remedy**
1. **Lead wire** intermittently shorting	1. Replace lead wire
2. **Magneto** internally shorted	2. Replace magneto
3. **Regulator/rectifier** defective	3. Replace regulator/rectifier
Problem: Starter button not effective	
Condition	**Remedy**
1. **Battery charge** low	1. Recharge - replace battery
2. **Switch contacts** defective	2. Replace switch
3. **Starter motor brushes** not seating	3. Repair - replace brushes
4. **Starter relay** defective	4. Replace relay
5. **Emergency stop - ignition switch** off	5. Turn on switches
6. **Wiring connections** loose - disconnected	6. Connect - tighten - repair connections
Problem: Battery "sulfation" (Acidic white powdery substance or spots on surfaces of cell plates)	
Condition	**Remedy**
1. **Charging rate** too low - too high	1. Replace battery
2. **Battery electrolyte** excessive - insufficient	2. Keep electrolyte to prescribed level
3. **Specific gravity** too high - too low	3. Charge battery - add distilled water
4. **Battery** run-down - damaged	4. Replace battery
5. **Electrolyte** contaminated	5. Recharge - replace battery
Problem: Battery discharges too rapidly	
Condition	**Remedy**
1. **Electrolyte** contaminated	1. Replace battery
2. **Specific gravity** too high	2. Charge battery - add distilled water
3. **Charging system (charging operation)** not set properly	3. Check magneto - regulator/rectifier - circuit connections - adjust for specified charging operation
4. **Cell plates** overcharged - damaged	4. Replace battery - correct charging system
5. **Battery** short-circuited	5. Replace battery
6. **Specific gravity** too low	6. Recharge battery
Problem: Battery polarity reversed	
Condition	**Remedy**
1. **Battery** incorrectly connected	1. Reverse connections - replace battery

Steering/Suspension

Problem: Handling too heavy or stiff	
Condition	**Remedy**
1. **Front wheel alignment** incorrect	1. Adjust alignment
2. **Lubrication** inadequate	2. Lubricate appropriate components
3. **Tire inflation pressure** incorrect	3. Adjust pressure
4. **Tie rod ends** seizing	4. Replace tie rod ends
5. **Linkage connections** seizing	5. Repair - replace connections
Problem: Steering oscillation	
Condition	**Remedy**
1. **Tires** inflated unequally	1. Adjust pressure
2. **Wheel(s)** wobbly	2. Replace wheel(s)
3. **Wheel hub cap screw(s)** loose - missing	3. Tighten - replace cap screws
4. **Wheel hub bearing** worn - damaged	4. Replace bearing
5. **Tie rod ends** worn - loose	5. Replace - tighten tie rod ends
6. **Tires** defective - incorrect	6. Replace tires
7. **A-arm bushings** damaged	7. Replace bushings
8. **Bolts - nuts (frame)** loose	8. Tighten bolts - nuts
Problem: Steering pulling to one side	
Condition	**Remedy**
1. **Tires** inflated unequally	1. Adjust pressure
2. **Front wheel alignment** incorrect	2. Adjust alignment
3. **Wheel hub bearings** worn - broken	3. Replace bearings
4. **Frame** distorted	4. Repair - replace frame
5. **Shock absorber** defective	5. Replace shock absorber
Problem: Steering impaired	
Condition	**Remedy**
1. **Tire pressure** too high	1. Adjust pressure
2. **Steering linkage connections** worn	2. Replace connections
3. **Cap screws (suspension system)** loose	3. Tighten cap screws
Problem: Tire wear rapid or uneven	
Condition	**Remedy**
1. **Wheel hub bearings** worn - loose	1. Replace bearings
2. **Front wheel alignment** incorrect	2. Adjust alignment
Problem: Steering noise	
Condition	**Remedy**
1. **Caps screws - nuts** loose	1. Tighten cap screws - nuts
2. **Wheel hub bearings** broken - damaged	2. Replace bearings
3. **Lubrication** inadequate	3. Lubricate appropriate components

Problem: Suspension too soft	
Condition	**Remedy**
1. **Spring(s)** weak	1. Replace spring(s)
2. **Shock absorber** damaged	2. Replace shock absorber
Problem: Suspension too stiff	
Condition	**Remedy**
1. **A-arm-related bushings** worn	1. Replace bushing
Problem: Suspension noisy	
Condition	**Remedy**
1. **Cap screws (suspension system)** loose	1. Tighten cap screws
2. **A-arm-related bushings** worn	2. Replace bushings
Problem: Rear wheel oscillation	
Condition	**Remedy**
1. **Rear wheel hub bearings** worn - loose	1. Replace bearings
2. **Tires** defective - incorrect	2. Replace tires
3. **Wheel rim** distorted	3. Replace rim
4. **Wheel hub cap screws** loose	4. Tighten cap screws
5. **Auxiliary brake** adjusted incorrectly	5. Adjust brake
6. **Rear suspension arm-related bushing** worn	6. Replace bushing
7. **Rear shock absorber** damaged	7. Replace shock absorber
8. **Rear suspension arm nut** loose	8. Tighten nut

Brakes

Problem: Braking poor	
Condition	**Remedy**
1. **Pad** worn	1. Replace pads
2. **Pedal free-play** excessive	2. Adjust free-play
3. **Brake fluid** leaking	3. Repair - replace hydraulic system
4. **Hydraulic system** leaking air	4. Bleed hydraulic system
5. **Master cylinder/brake cylinder seal** worn	5. Replace seal(s)
Problem: Brake lever travel excessive	
Condition	**Remedy**
1. **Hydraulic system** entrapped air	1. Bleed hydraulic system
2. **Brake fluid** low	2. Add fluid to proper level
3. **Brake fluid** incorrect	3. Replace with correct fluid
4. **Piston seal - cup** worn	4. Replace seal - cup
Problem: Brake fluid leaking	
Condition	**Remedy**
1. **Connection joints** loose	1. Tighten joints
2. **Hose** cracked	2. Replace hose
3. **Piston seal** worn	3. Replace seal

NOTES