FOREWORD

This Arctic Cat Service Manual contains service, maintenance, and troubleshooting information for the 2008 Arctic Cat Thundercat. The complete manual is designed to aid service personnel in service-oriented applications.

This manual is divided into sections. Each section covers a specific ATV component or system and, in addition to the standard service procedures, includes disassembling, inspecting, and assembling instructions. When using this manual as a guide, the technician should use discretion as to how much disassembly is needed to correct any given condition.

The service technician should become familiar with the operation and construction of each component or system by carefully studying the complete manual. This manual will assist the service technician in becoming more aware of and efficient with servicing procedures. Such efficiency not only helps build consumer confidence but also saves time and labor.

All Arctic Cat ATV publications and decals display the words Warning, Caution, Note, and At This Point to emphasize important information. The symbol ⚠ **WARNING** identifies personal safety-related information. Be sure to follow the directive because it deals with the possibility of severe personal injury or even death. The symbol ⚠ **CAUTION** identifies unsafe practices which may result in ATV-related damage. Follow the directive because it deals with the possibility of damaging part or parts of the ATV. The symbol ■ **NOTE:** identifies supplementary information worthy of particular attention. The symbol ☞ **AT THIS POINT** directs the technician to certain and specific procedures to promote efficiency and to improve clarity.

At the time of publication, all information, photographs, and illustrations were technically correct. Some photographs used in this manual are used for clarity purposes only and are not designed to depict actual conditions. Because Arctic Cat Inc. constantly refines and improves its products, no retroactive obligation is incurred.

All materials and specifications are subject to change without notice.

Keep this manual accessible in the shop area for reference.

Product Service and
Warranty Department
Arctic Cat Inc.

February 2008

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ARCTIC CAT ATV SERVICE MANUAL

SECTION 1 - GENERAL INFORMATION/ SPECIFICATIONS

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General Specifications*

CHASSIS	
Brake Type	Hydraulic w/Brake Lever Lock and Auxiliary Brake
Tire Size	Front - 25 x 8-12 Rear - 25 x 10-12
Tire Inflation Pressure	0.35 kg/cm² (5 psi)
MISCELLANY	
Gas Tank Capacity (rated)	24.6 L (6.5 U.S. gal.)
Coolant Capacity	3.3 L (3.5 U.S. qt)
Differential Capacity	275 ml (9.3 fl oz)**
Rear Drive Capacity	250 ml (8.5 fl oz)***
Engine Oil Capacity	2.8 L (3.0 U.S. qt)
Gasoline (recommended)	87 Octane Regular Unleaded
Engine Oil (recommended)	Arctic Cat ACX All-Weather synthetic
Front Differential/Rear Drive Lubricant	SAE Approved 80W-90 Hypoid
Drive Belt Width (minimum)	35.6 mm (1.40 in.)
Brake Fluid	DOT 4
Taillight/Brakelight	12V/8W/27W
Headlight	12V/27W (2)

* Specifications subject to change without notice.
** One inch below plug threads.
*** At the plug threads.

Torque Specifications

EXHAUST COMPONENTS			
Part	Part Bolted To	Torque ft-lb	Torque N-m
Exhaust Pipe	Engine	20	27
ELECTRICAL COMPONENTS			
Engine Ground Cap Screw	Crankcase	8	11
Coil*	Frame	12	16
STEERING COMPONENTS			
Steering Post Bearing Housing	Frame	20	27
Steering Post Bearing Flange	Frame	20	27
Lower Steering Bearing Washer Cap Screw***	Steering Post	40	54
Tie Rod End**	Knuckle/Steering Post	30	41
BRAKE COMPONENTS			
Brake Disc*	Hub	15	20
Brake Hose	Caliper	20	27
Brake Hose	Master Cylinder	20	27
Brake Hose	Auxiliary Brake Cylinder	20	27
Master Cylinder (Rear)	Frame	12	16
Hydraulic Caliper	Knuckle	20	27
Master Cylinder Clamp	Master Cylinder	6	8
Brake Pedal	Brake Pedal Axle	25	34
CHASSIS COMPONENTS			
Footrest	Frame (8 mm)	20	27
Footrest	Frame (10 mm)	40	54
Upper Bumper Support	Frame	35	47

* w/Blue Loctite #243
** w/Red Loctite #271
*** w/Green Loctite #609

SUSPENSION COMPONENTS (Front)			
Part	Part Bolted To	Torque ft-lb	Torque N-m
A-Arm	Frame	50	68
Knuckle	Ball Joint	35	47
Shock Absorber	Frame	50	68
Shock Absorber	Upper A-Arm	50	68
SUSPENSION COMPONENTS (Rear)			
Shock Absorber (Upper)	Frame	50	68
Shock Absorber (Lower)	Lower A-Arm	20	27
A-Arm	Frame	50	68
Knuckle	A-Arm	50	68
DRIVE TRAIN COMPONENTS			
Engine Mount (Rear)	Frame	45	61
Front Differential	Frame/Differential Bracket	38	52
Rear Gear Case	Frame	38	52
Input Shaft Housing	Differential Housing	23	31
Differential Housing Cover***	Differential Housing	23	31
Lock Collar	Differential Housing	125	169
Hub Nut	Shaft/Axle (max)	200	270
Oil Drain Plug	Front Differential/ Rear Drive	45 in.-lb	5
Oil Fill Plug	Front Differential/ Rear Drive	16	22
Oil Drain Plug	Engine	16	22
Wheel	Hub	40	54
Engine Output Flange	Rear Gear Case Input Flange	20	27
Shift Cam Stopper	Shift Stopper	8	11
Shift Cam Plate	Shift Cam Shaft	8	11
Shifter Housing	Crankcase	8	11
ENGINE/TRANSMISSION			
Clutch Shoe	Crankshaft	221	300
Clutch Cover/Housing Assembly	Crankcase	8	11
Crankcase Half (6 mm)	Crankcase Half	8	11
Crankcase Half (8 mm)	Crankcase Half	20	27
Cylinder Head (Cap Screw)	Crankcase	40	54
Cylinder Head (6 mm)	Cylinder	8	11
Cylinder Head (8 mm)	Cylinder	18	24
Cylinder Head Cover	Cylinder Head	9	12
Driven Pulley Nut**	Driveshaft	80	108
Ground Wire	Engine	8	11
Magneto Cover	Crankcase	8	11
Oil Filler Cover	Crankcase	8	11
Speed Sensor Housing	Crankcase	8	11
Starter Motor	Crankcase	8	11
V-Belt Housing	Crankcase	8	11
Intake Manifold	Cylinder	8	11
Output Shaft Flange Nut	Output Shaft	59	80
Magneto Rotor Nut	Crankshaft	107	145
Cam Sprocket**	Camshaft	10	13.5
V-Belt Cover	Clutch Cover	8	11
Spark Plug	Engine	11	15
Drive Pulley Nut**	Clutch Shaft	165	224
Oil Pump Cover	Crankcase	8	11

* w/Blue Loctite #243
** w/Red Loctite #271
*** w/Green Loctite #609

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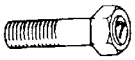
Torque Conversions
(ft-lb/N-m)

ft-lb	N-m	ft-lb	N-m	ft-lb	N-m	ft-lb	N-m
1	1.4	26	35.4	51	69.4	76	103.4
2	2.7	27	36.7	52	70.7	77	104.7
3	4.1	28	38.1	53	72.1	78	106.1
4	5.4	29	39.4	54	73.4	79	107.4
5	6.8	30	40.8	55	74.8	80	108.8
6	8.2	31	42.2	56	76.2	81	110.2
7	9.5	32	43.5	57	77.5	82	111.5
8	10.9	33	44.9	58	78.9	83	112.9
9	12.2	34	46.2	59	80.2	84	114.2
10	13.6	35	47.6	60	81.6	85	115.6
11	15	36	49	61	83	86	117
12	16.3	37	50.3	62	84.3	87	118.3
13	17.7	38	51.7	63	85.7	88	119.7
14	19	39	53	64	87	89	121
15	20.4	40	54.4	65	88.4	90	122.4
16	21.8	41	55.8	66	89.8	91	123.8
17	23.1	42	57.1	67	91.1	92	125.1
18	24.5	43	58.5	68	92.5	93	126.5
19	25.8	44	59.8	69	93.8	94	127.8
20	27.2	45	61.2	70	95.2	95	129.2
21	28.6	46	62.6	71	96.6	96	130.6
22	29.9	47	63.9	72	97.9	97	131.9
23	31.3	48	65.3	73	99.3	98	133.3
24	32.6	49	66.6	74	100.6	99	134.6
25	34	50	68	75	102	100	136

Tightening Torque
(General Bolts)

Type of Bolt	Thread Diameter A (mm)	Tightening Torque
(Conventional or 4 Marked Bolt) 	5	12-36 in.-lb
	6	36-60 in.-lb
	8	7-11 ft-lb
	10	16-25 ft-lb
(7 Marked Bolt) 	5	24-48 in.-lb
	6	6-8 ft-lb
	8	13-20 ft-lb
	10	29-43 ft-lb

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.

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.

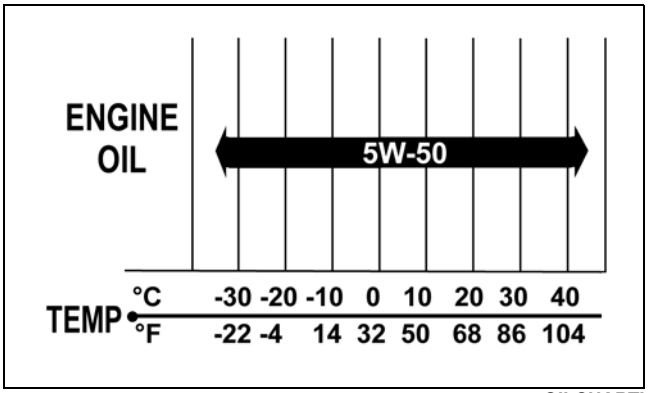
⚠ CAUTION
Do not use white gas. Only Arctic Cat approved gasoline additives should be used.

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 ACX All-Weather synthetic engine oil, which has been specifically formulated for use in this Arctic Cat engine. Although Arctic Cat ACX All-Weather synthetic engine oil is the only oil recommended for use in this engine, use of any API certified SM 5W-50 oil is acceptable.



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RECOMMENDED FRONT DIFFERENTIAL/REAR DRIVE LUBRICANT

The recommended lubricant is Arctic Cat Gear Lube 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.

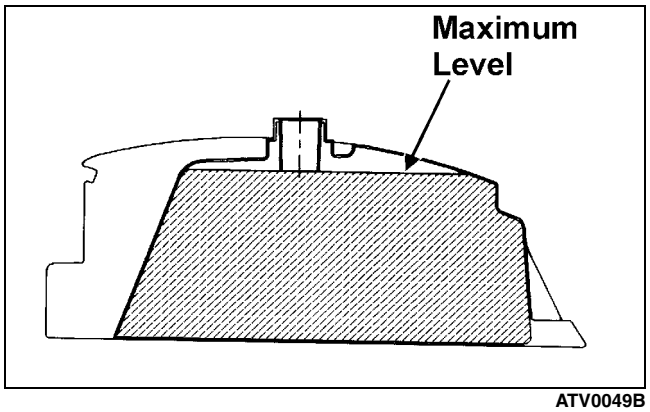
⚠ CAUTION

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.



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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 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, 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. Plug the exhaust hole in the exhaust system with a clean cloth.
5. Apply light oil to the upper steering post bushing and plungers of the shock absorbers.
6. 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.
7. Fill the cooling system to the bottom of the stand pipe in the radiator neck with properly mixed coolant.
8. Disconnect the battery cables; then remove the battery, clean the battery posts and cables, and store in a clean, dry area.
9. 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. Check the coolant level and add properly mixed coolant as necessary.
6. Charge the battery; then install. Connect the battery cables.

⚠ CAUTION

The ignition switch must be in the OFF position prior to installing the battery or damage may occur to the ignition system.

⚠ CAUTION

Connect the positive battery cable first; then the negative.

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 plug. Clean or replace as necessary.

SECTION 2 - PERIODIC MAINTENANCE

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Periodic Maintenance Chart

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

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/Drain Tube	I	I	C*				R
Valve/Tappet Clearance	I				I		A
Engine Compression						I	
Spark Plug	I			I			R (4000 Mi or 18 Mo)
Muffler/Spark Arrester					C		R
Gas/Vent Hoses	I	I					R (2 Yrs)
Throttle Cable	I	I			C-L		A-R
Engine-Transmission Oil Level		I					A
Engine-Transmission Oil/Filter	R			R*			R
Oil Strainer	I				I		C
Front Differential/Rear Drive Lubricant	I		I				R (4 Yrs)
Tires/Air Pressure	I	I					R
Steering Components	I	I		I			R
V-Belt	I				I		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		T				A
Ignition Timing						I	
Headlight/Taillight-Brakelight	I	I					R
Switches	I	I					R
Shift Lever					I		A-L
Handlebar Grips		I					R
Handlebars	I	I					R
Gauges/Indicators	I	I					R
Frame/Welds/Racks	I				I		
Electrical Connections	I				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.

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Periodic Maintenance

This section has been organized into sub-sections which show common maintenance procedures for the Arctic Cat ATV.

■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.

■NOTE: Critical torque specifications are located in Section 1.

SPECIAL TOOLS

A number of special tools must be available to the technician when performing service procedures in this section.

Description	p/n
Compression Tester Kit	0444-213
Oil Filter Wrench	0644-389
Tachometer	0644-275
Timing Light	0644-296
Valve Clearance Adjuster	0444-078

■NOTE: Special tools are available from the Arctic Cat Service Parts Department.

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/Cable Ends

C. Auxiliary Brake Cable Ends

D. Shift Lever Cable End

Battery

After being in service, batteries require regular cleaning and recharging in order to deliver peak performance and maximum service life. The following procedure is recommended for cleaning and maintaining lead-acid batteries. Always read and follow instructions provided with battery chargers and battery products.

⚠ 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 handing 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; then disconnect the battery cables (negative cable first).
2. Remove the battery from the battery compartment; then thoroughly wash the battery and battery compartment with soap and water.

■NOTE: If battery posts, cable ends, or the battery case has a build-up of white/green powder residue, apply water and baking soda to neutralize acid; then flush off with warm soapy water.

3. Using a wire brush, clean the battery posts and cable ends removing all corrosive buildup. Replace damaged cables or cable ends.

⚠ WARNING

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

4. Using a multimeter, test the battery voltage. The meter must read 12.5 or more DC Volts for a fully charged battery.

■NOTE: At this point, if the meter reads as specified, the battery may be returned to service (see step 10).

5. If the meter reads less than specified voltage, charge the battery using the following guidelines.
   A. When using an automatic battery charger, always follow the charger manufacturer's instructions.
   B. When using a constant-current battery charger, use the following Battery Charging Chart.

⚠ CAUTION

Never exceed the standard charging rate.

⚠ WARNING

An overheated battery could explode causing severe injury or death. Always monitor charging times and charge rates carefully. Stop charging if the battery becomes very warm to the touch. Allow it to cool before resuming charging.

Battery Charging Chart (Constant-Current Charger)

Battery Voltage (DC)	Charge State	Charge Time Required (at 1.5-2.0 Amps)
12.5 or more	100%	None
12.2-12.4	75%-99%	3-6 hours
12.0-12.2	50%-74%	5-11 hours
11.0-11.9	25%-49%	13 hours (minimum)
11.5 or less	0-24%	20 hours (minimum)

■NOTE: If the battery voltage is 11.5 DC Volts or less, some chargers may "cut off" and fail to charge. If this occurs, connect a fully charged booster battery in parallel (positive to positive and negative to negative) for a short period of time with the charger connected. After 10-15 minutes, disconnect the booster battery leaving the charger connected and the charger should continue to charge. If the charger "cuts off," replace the battery.

6. After charging the battery for the specified time, remove the battery charger and allow the battery to sit for 1-2 hours.
7. Connect the multimeter and test the battery voltage. The meter should read 12.5 or more DC Volts. If the voltage is as specified, the battery is ready for service.

■NOTE: If voltage in step 9 is below specifications, charge the battery an additional 1-5 hours; then retest. Recheck electrolyte level (standard battery) and the battery is ready for service.

8. Place the battery in the battery compartment; then coat the battery posts and cable ends with a light coat of multi-purpose grease.

⚠ CAUTION

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

9. Connect the battery cables (positive cable first); then install the battery hold-down.

⚠ CAUTION

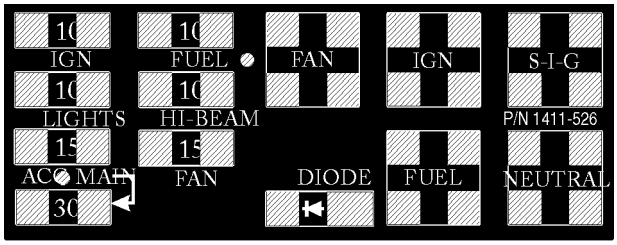
Connecting cables in reverse (positive to negative and negative to positive) can cause serious damage to the electrical system.

Fuses

The fuses are located in a power distribution module under the seat.

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

■NOTE: To remove a fuse, compress the locking tabs on either side of the fuse case and lift out.



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⚠ CAUTION

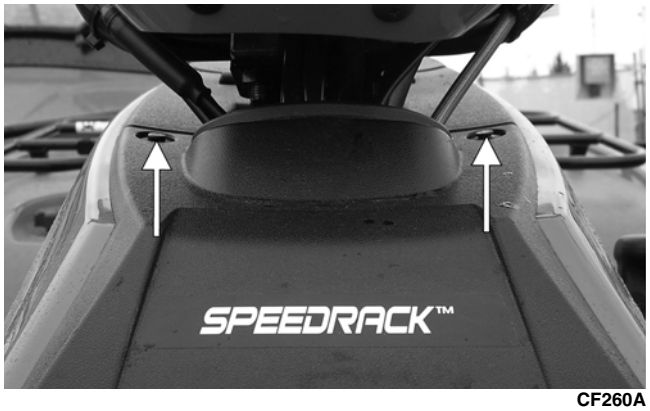
Always replace a blown fuse with a fuse of the same type and rating.

Air Filter

Use the following procedure to remove the filter and inspect and/or clean it.

CLEANING AND INSPECTING FILTER

1. Remove the seat; then remove the appropriate reinstallable rivets securing the storage compartment.



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2. Raise the storage compartment cover; then slide the cover forward and off the compartment. Remove the storage compartment.

3. Remove two wing-nuts; then remove the air filter cover.

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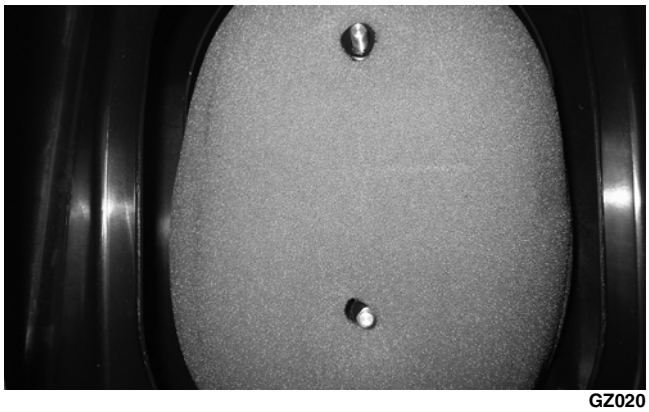

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4. Remove the air filter element/frame assembly and separate the element from the screen.
5. Fill a wash pan larger than the element with a non-flammable cleaning solvent; then dip the element in the solvent and wash it.

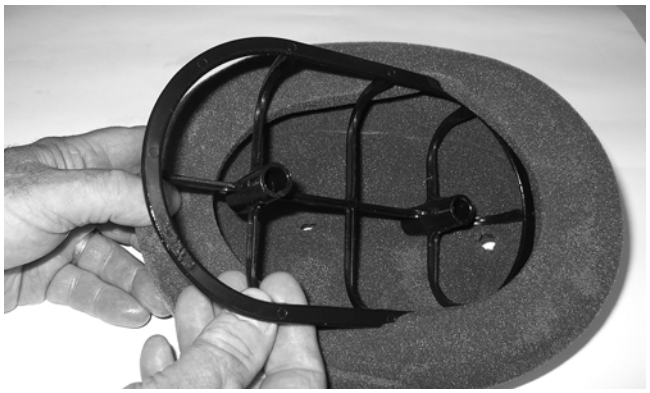
■NOTE: Foam Air Filter Cleaner and Foam Air Filter Oil are available from Arctic Cat.

6. Dry the element.
7. Put the element in a plastic bag; then pour in air filter oil and work the oil into the element. Attach the element to the filter screen.

⚠ CAUTION

A torn air filter element 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.

8. Clean any dirt or debris from inside the air cleaner. Be sure no dirt enters the throttle body.
9. Place the filter assembly in the air filter housing making sure it is properly positioned and properly seated with the filter frame down.



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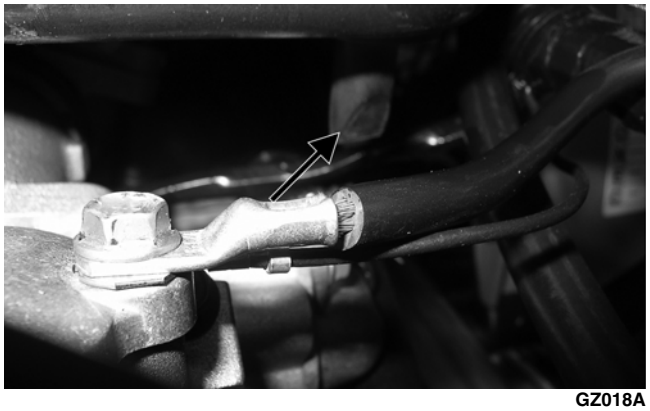
10. Install the air filter housing cover and secure with the wing-nuts.
11. Install the storage compartment; then secure with the reinstallable rivets.

CHECKING AND CLEANING DRAIN

1. Inspect the drain beneath the main housing for debris and for proper sealing.



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2. Replace the drain if it is cracked or shows any signs of hardening or deterioration.
3. Wipe any accumulation of oil or gas from the filter housing and drain.

Valve/Tappet Clearance
(Feeler Gauge Procedure)

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

1. Remove the timing inspection plug; then remove the tappet covers (for more detailed information, see Section 3 - Servicing Top-Side Components).

■NOTE: Remove the crankshaft end cap and install the special cap screw (left-hand threads) to rotate the engine.

2. Rotate the crankshaft to the TDC position on the compression stroke.

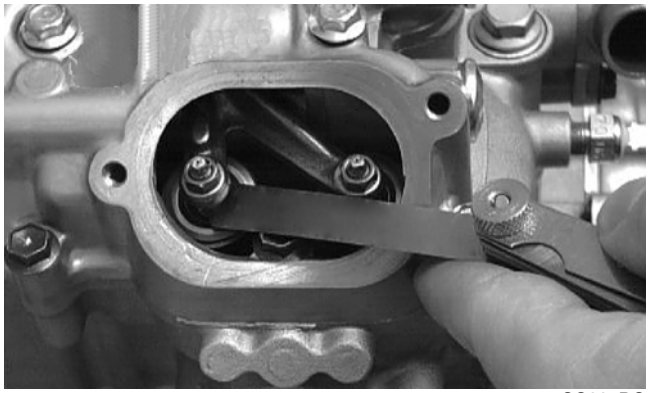
■NOTE: At this point, the rocker arms and adjuster screws must not have pressure on them.

3. Using a feeler gauge, check each valve/tappet clearance. If clearance is not within specifications, loosen the jam nut and rotate the tappet adjuster screw until the clearance is within specifications. Tighten each jam nut securely after completing the adjustment.

⚠ 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.

VALVE/TAPPET CLEARANCE	
Intake	0.1016 mm (0.004 in.)
Exhaust	0.1524 mm (0.006 in.)



CC007DC

4. Rotate the engine 270° to the TDC position of the rear cylinder; then repeat step 3.

GZ059

5. Install the timing inspection plug; then remove the cap screw and install the crankcase and cap.

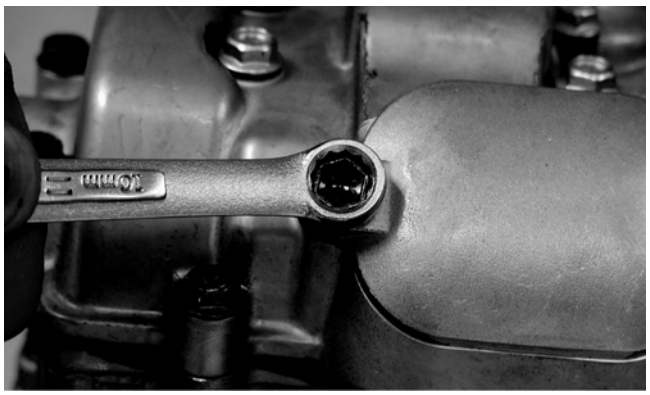
6. Place the two tappet covers into position making sure the proper cap screws are with the proper cover. Tighten the cap screws securely.

Valve/Tappet Clearance
(Valve Adjuster Procedure)

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

■NOTE: The seat, storage compartment cover assembly, compartment box, air filter/filter housing, and left-side/right-side engine panels must be removed for this procedure.

1. Remove the timing inspection plug; then remove the tappet covers (for more detailed information, see Section 3 - Servicing Top-Side Components).



CF005

2. Rotate the crankshaft to the TDC position on the compression stroke of the front cylinder.

GZ063

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

■NOTE: Use Valve Clearance Adjuster 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.
8. Rotate the engine 270° to the TDC position of the rear cylinder; then repeat steps 4-7 for the rear cylinder.
9. Place the tappet covers with O-rings into position; then tighten the covers securely.
10. Install the spark plugs; then install the timing inspection plug and crankshaft end cap.

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 lead to the plugs and ground the plug on the cylinder heads well away from the spark plug hole.
4. Attach the Compression Tester Kit to the cylinder to be tested.

■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).

PEAK COMPRESSION	
CYLINDER	**PSI**
Front	75-85
Rear	120-130

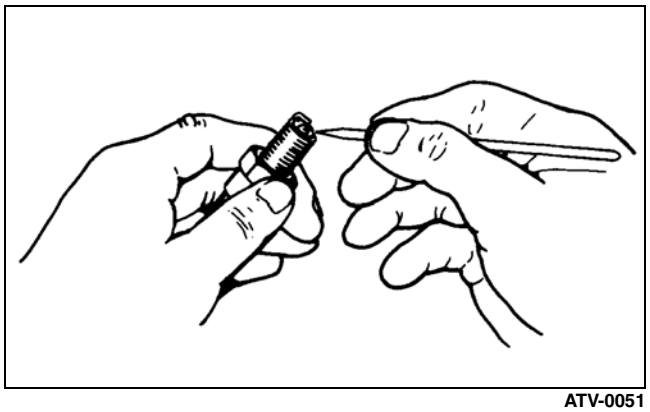
6. If compression is abnormally low, inspect the following items.
   A. Verify starter cranks engine over at normal speed (approximately 400 RPM).
   B. Gauge functioning properly.
   C. Throttle lever in the full-open position.
   D. Valve/tappet clearance correct.
   E. Valve not bent or burned.
   F. Valve seat not burned.

■NOTE: To service valves, see Section 3.

7. Pour 29.5 ml (1 fl oz) of oil into the spark plug holes, reattach the gauge, and retest compression.
8. 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 (if equipped) may need to be adjusted. To maintain a hot, strong spark, keep the plug free of carbon.

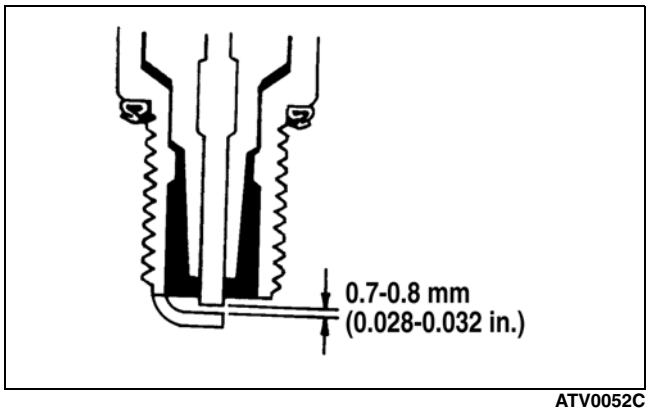


ATV-0051

⚠ CAUTION

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

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.



ATV0052C

When installing the spark plug, be sure to tighten it securely. 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.

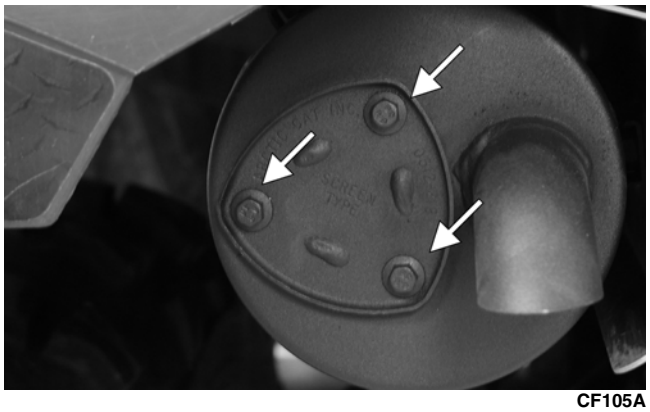
Muffler/Spark Arrester

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. Remove the three cap screws securing the spark arrester assembly to the muffler; then loosen and remove the arrester.

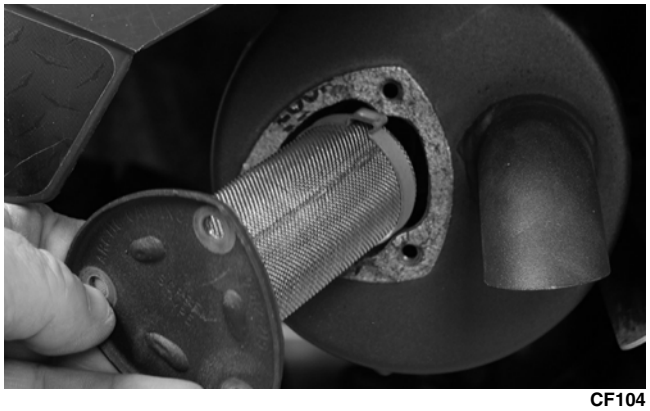


CF105A

2. Using a suitable brush, clean the carbon deposits from the screen taking care not to damage the screen.

■NOTE: If the screen or gasket is damaged in any way, it must be replaced.

3. Install the spark arrester assembly with gasket; then secure with the three cap screws. Tighten to 4.0 ft-lb.



CF104

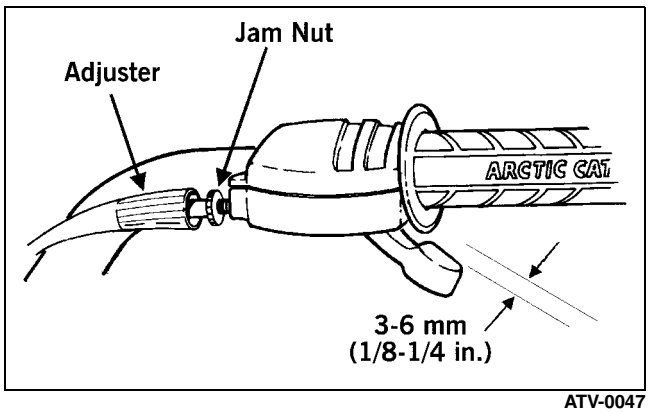
Adjusting Throttle Cable

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. 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)

■**NOTE: The idle RPM is not adjustable.**

Engine/Transmission Oil - Filter - Strainer

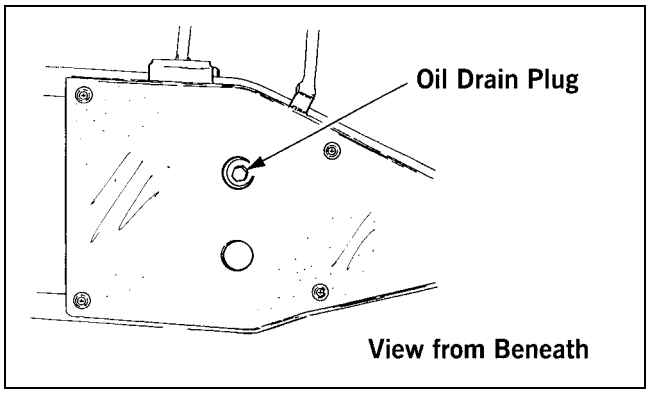
OIL - FILTER

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. Remove the oil level stick/filler plug.

GZ007A

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



733-441A

4. Using the adjustable Oil Filter Wrench and a suitable wrench, remove the old oil filter.

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

5. Apply oil to the sealing ring on the filter; then install the new oil filter. Tighten securely.

6. Install the engine drain plug and tighten to 16 ft-lb. Pour the specified amount of the recommended oil in the filler hole. Install the oil level stick/filler plug.

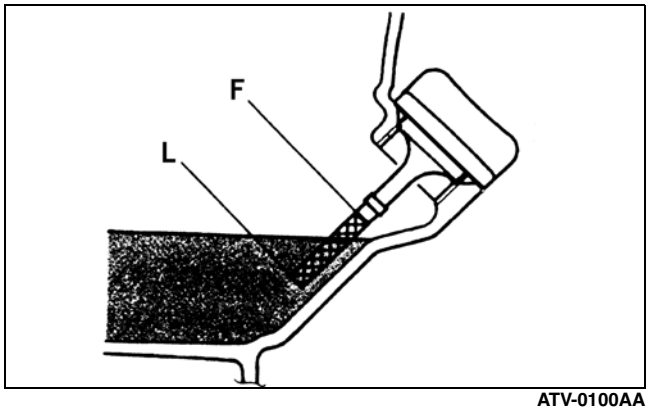
⚠ CAUTION

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. Remove the oil level stick and wipe it with a clean cloth.
10. Install the oil level stick and thread it into the engine case.
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.

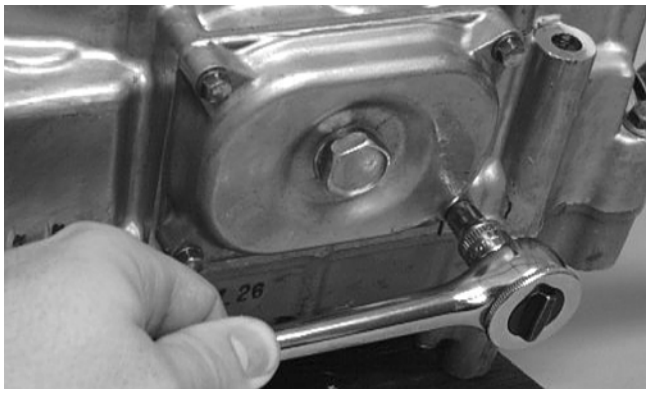


ATV-0100AA

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

STRAINER

1. Remove the belly panel.
2. Remove the cap screws securing the oil strainer cap; then remove the cap.



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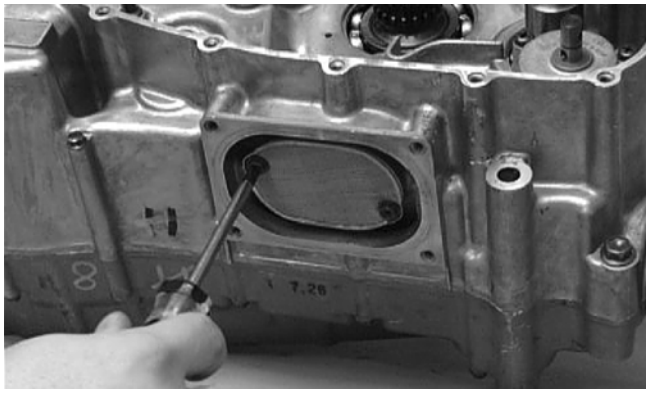
3. Remove the two cap screws securing the strainer; then remove the strainer.

■NOTE: Thoroughly clean any sealant from the oil strainer cap.



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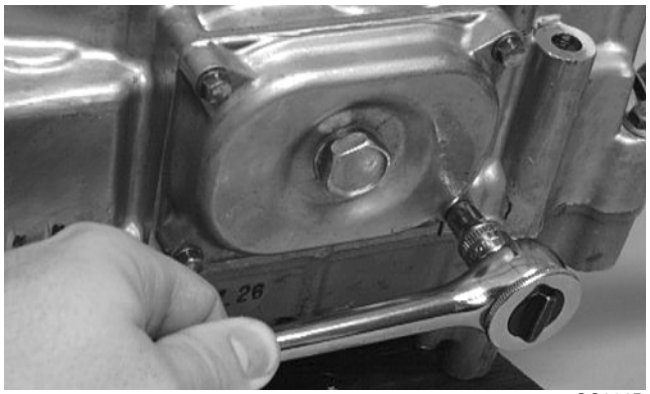
☞ AT THIS POINT

To check/service oil strainer, see Section 3.

4. Place the oil strainer into position beneath the crankcase and secure with the cap screws. Tighten securely.
5. Place the strainer cap into position on the strainer making sure silicone sealant is applied; then secure with the cap screws. Tighten securely.



CC091D

6. Install the belly panel.

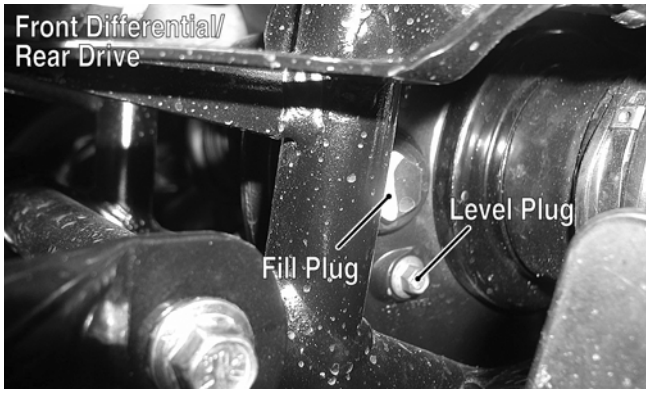
Front Differential/Rear Drive Lubricant

When changing the lubricant, use approved SAE 80W-90 hypoid gear lube.

To check lubricant, remove the rear drive filler plug; the lubricant level should be 1 in. below the threads of the plug. If low, add SAE approved 80W-90 hypoid gear lubricant as necessary.

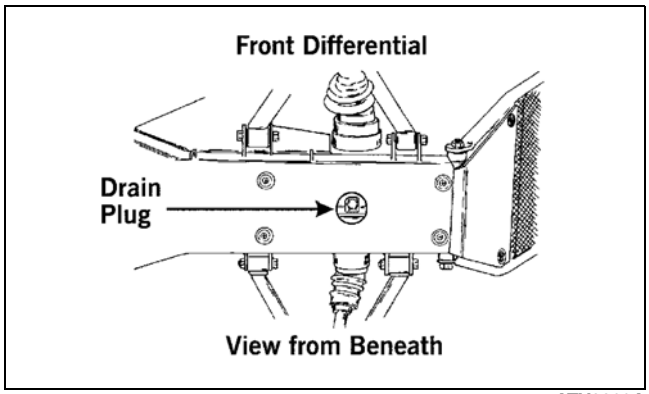
To change the lubricant, use the following procedure.

1. Place the ATV on level ground.
2. Remove each oil fill plug.



AL677C

3. Drain the oil into a drain pan by removing in turn the drain plug from each.



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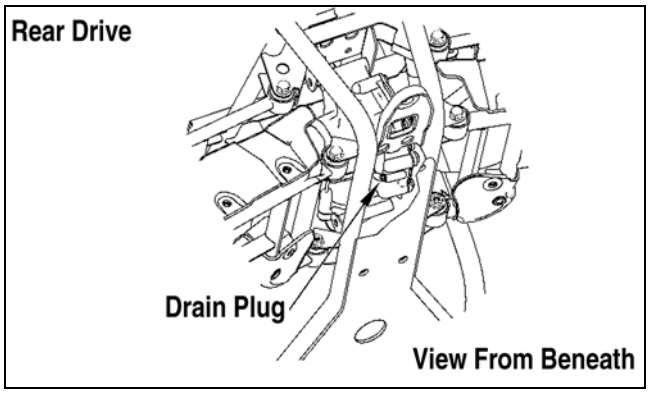


737-651B

4. After all the oil has been drained, install the drain plugs and tighten to 45 in.-lb.
5. Pour the appropriate amount of approved SAE 80W-90 hypoid gear lubricant into the filler hole.
6. Install the fill plugs.

■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 (see Section 1). 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).

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 not bent, pitted, or damaged.

B. Rubber damper not cracked, broken, or missing.

C. Shock absorber body not damaged, punctured, or leaking.

D. Shock absorber eyelets not broken, bent, or cracked.

E. Shock absorber eyelet bushings not worn, deteriorated, cracked, or missing.

F. Shock absorber spring not 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 (see Section 1).

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.

1. Attach the Timing Light to either spark plug high tension lead; then remove the timing inspection plug from the left-side crankcase cover.
2. Using the Tachometer, start the engine and run at 1500 RPM; ignition timing should be 10° BTDC.
3. Install the timing inspection plug.

If ignition timing cannot be verified, the rotor may be damaged, the key may be sheared, the CKP sensor bracket may be bent or damaged, or the ECU may be faulty.

Headlights/Taillight - Brakelight

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.

HEADLIGHTS

■NOTE: The bulb portion of a headlight is fragile. HANDLE WITH CARE. When replacing a 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 a bulb when it is hot. Severe burns may result.

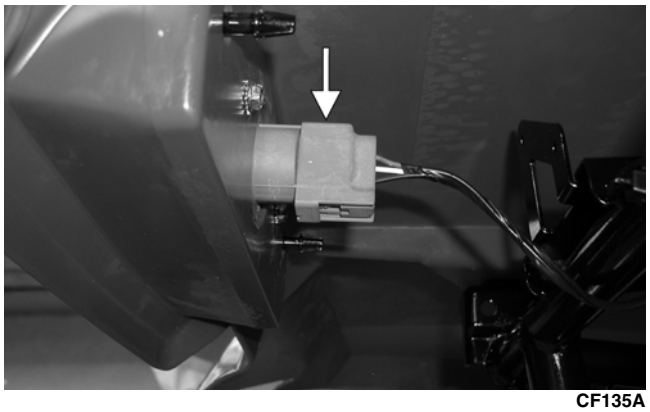
To replace a headlight bulb, use the following procedure.

1. Remove the wiring harness connector from the back of the headlight.
2. Grasp the bulb housing, turn it counterclockwise, and remove the bulb.
3. Install the new bulb 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. Turn the bulb socket assembly counterclockwise and remove from the housing.



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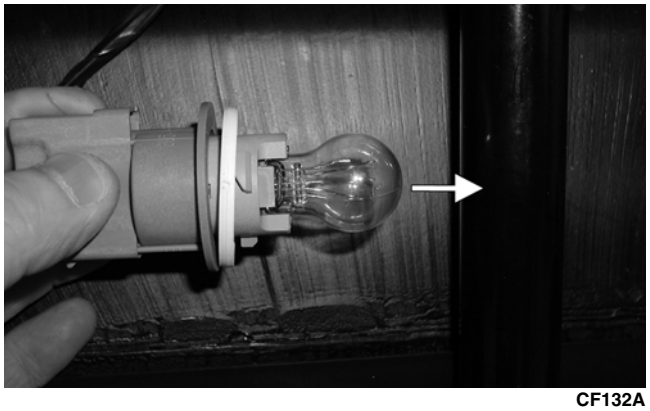
2. Pull the bulb straight out of the socket; then insert a new bulb.



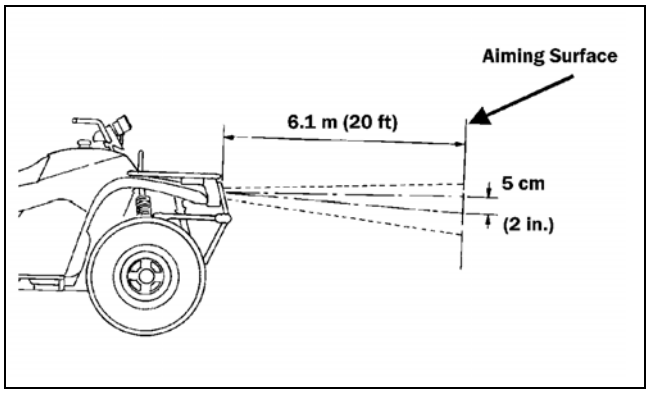
CF132A

3. Insert the bulb socket assembly into the housing and turn it clockwise to secure.

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.

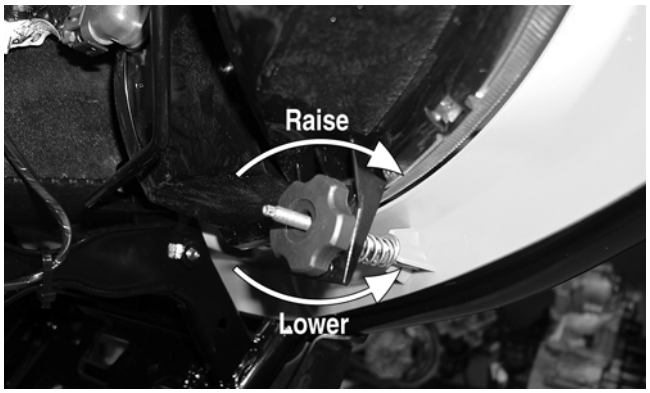
1. Position the ATV on a level floor so the headlights are approximately 6.1 m (20 ft) from an aiming surface (wall or similar aiming surface).



ATV-0070C

■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.
7. Adjust each headlight by turning the adjuster knob clockwise to raise the beam or counterclockwise to lower the beam.



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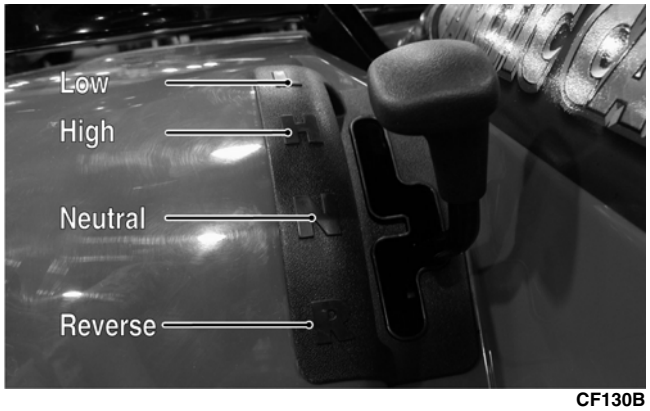
Shift Lever

CHECKING ADJUSTMENT



CF130B

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

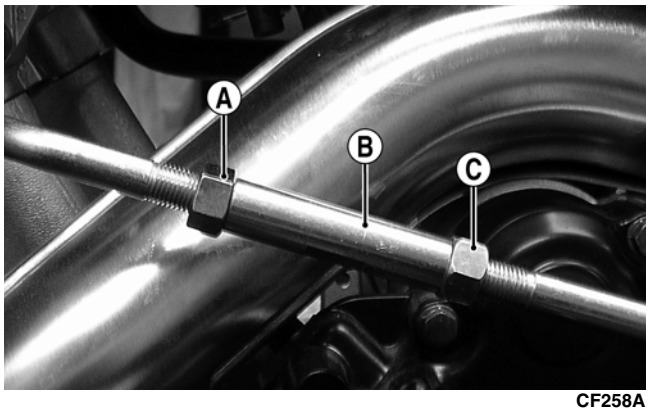
⚠ WARNING

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 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

1. Remove the seat; then remove the left-side engine cover.
2. With the ignition switch in the ON position, loosen jam nut (A) (left-hand threads); then loosen jam nut (C) and with the shift lever in the reverse position, adjust the coupler (B) until the transmission is in reverse and the (R) icon appears on the LCD.



CF258A

3. Tighten the jam nuts securely; then shift the transmission to each position and verify correct adjustment.
4. Install the left-side engine cover and seat making sure the seat locks securely in place.

■NOTE: An E (Error) in the gear position icon indicates no signal or a poor ground wire connection in the circuit. Troubleshoot the harness connectors, gear shift position connector, gear shift position switch, and LCD connector.

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

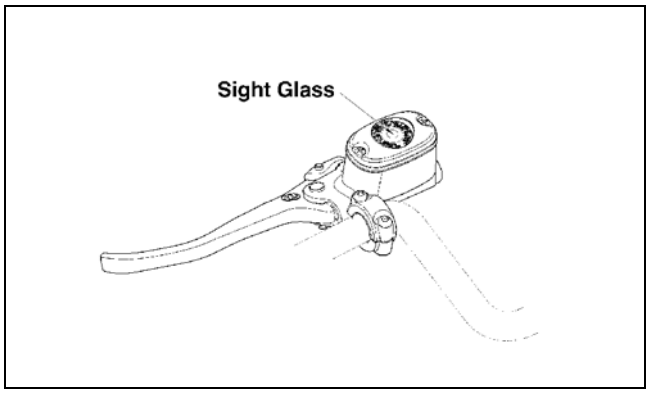
The electrical connections should be checked periodically for proper function. In case of an electrical failure, check fuses, connections (for tightness, corrosion, damage), and/or bulbs. If an electrical component needs to be tested for proper function, see Section 5.

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.



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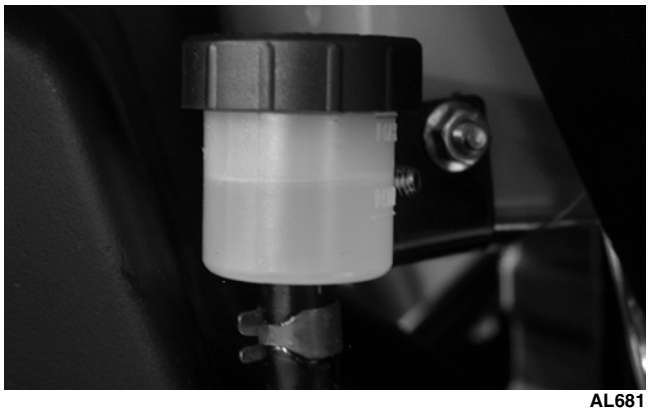

AL681

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.

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

   A. Remove the cover and fill the reservoir with DOT 4 Brake Fluid.

   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.

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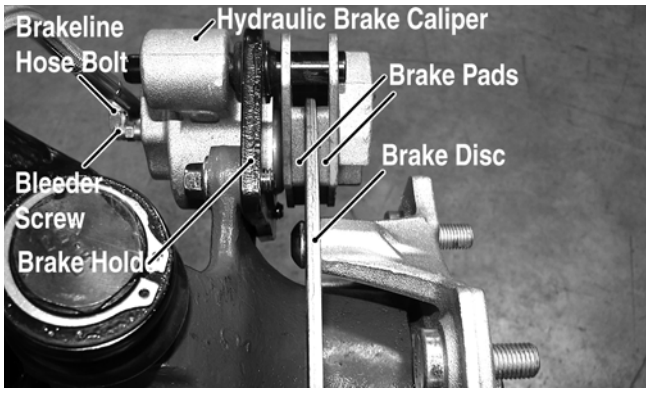

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■NOTE: During the bleeding procedure, watch the reservoir sight glass very closely to make sure there is always a sufficient amount of brake fluid. When the sight glass changes from dark to light, refill the reservoir before the bleeding procedure 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 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.

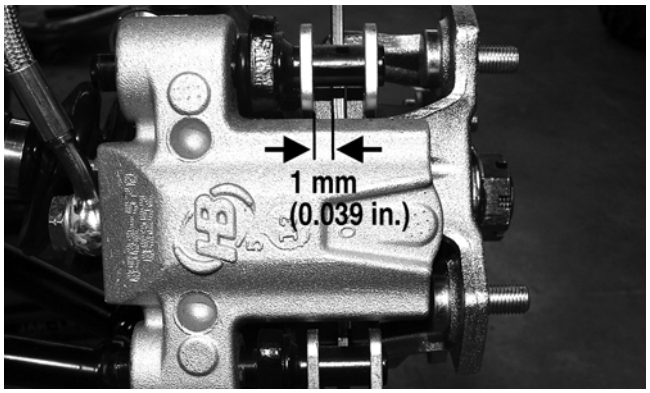
CHECKING/REPLACING PADS

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.

3. If thickness of either brake pad is less than 1.0 mm (0.039 in.), the brake pads must be replaced.



PR376B

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

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

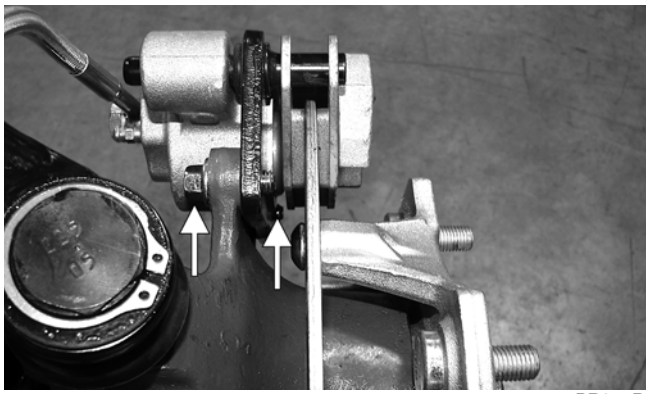
   A. Remove the wheel.

   B. Remove the cap screws securing the caliper holder to the knuckle; then remove the pads.

PR237

   C. Install the new brake pads.

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



PR377B

   E. Install the wheel. Tighten to 40 ft-lb.

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

Burnishing Brake Pads

Brake pads (both hydraulic and auxiliary) 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.
4. Adjust the auxiliary brake (if necessary).
5. Verify that the brakelight illuminates when the hand lever is compressed or the brake pedal is depressed.

Coolant

When filling the cooling system, use premixed Arctic Cat Antifreeze. 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.

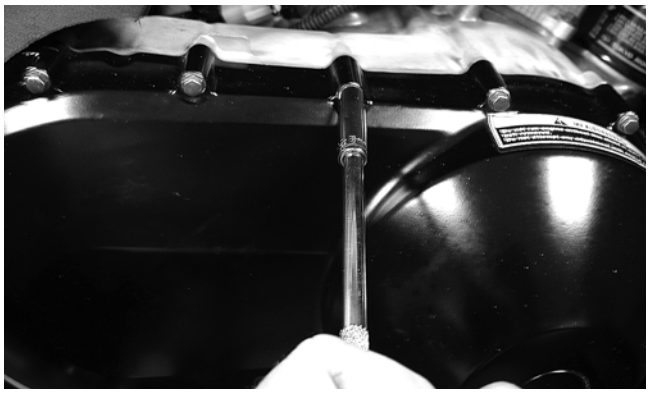
⚠ CAUTION

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

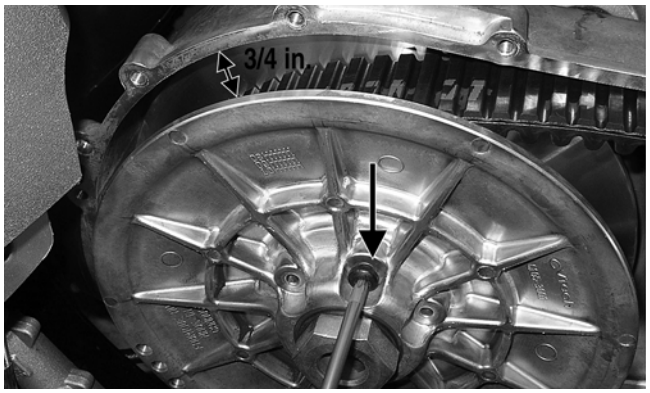
REMOVING

1. Remove the right-side footrest (see Section 8).
2. Remove the cap screws securing the V-belt cover; then using a rubber mallet, gently tap on the cover tabs to loosen the cover. Remove the cover.



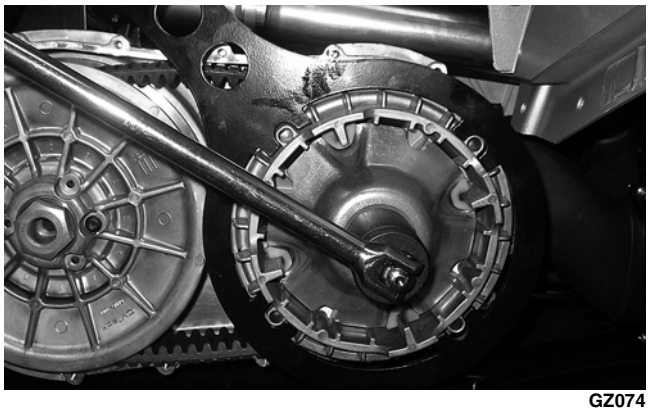
CD078

3. Using one of the V-belt cover cap screws, thread it into the threaded boss on the fixed driven face and spread the driven pulley to allow the V-belt to drop down approximately 3/4 in. into the pulley.



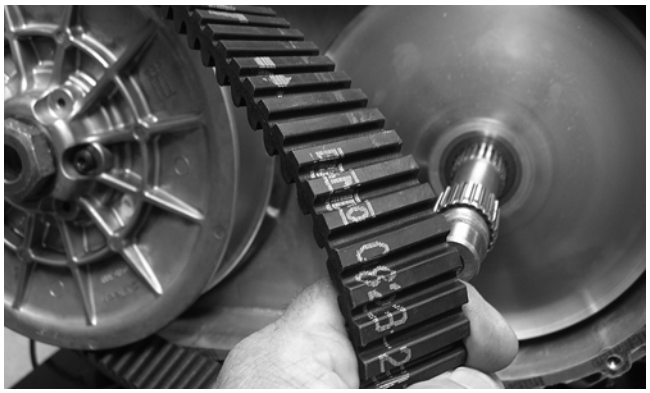
GZ076A

4. Remove the nut securing the movable drive face; then remove the face. Account for the spacer.



GZ074

5. Remove the V-belt.



GZ085

INSTALLING

1. Spread the faces of the driven clutch by threading in a push-bolt; then when the faces are separated, insert the belt and push down between the faces.

GZ076A

2. Place the V-belt into position over the front shaft.

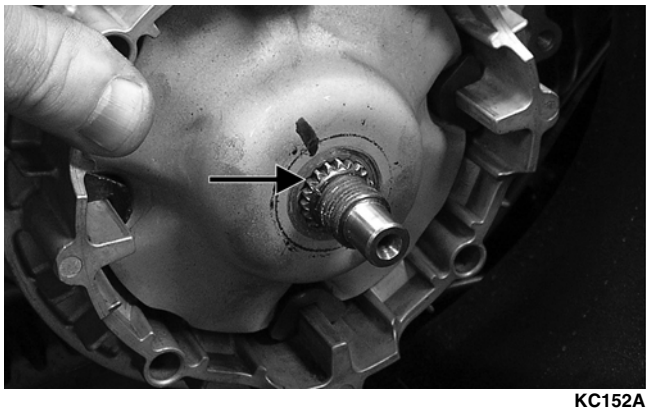
GZ085

■**NOTE: The arrow on the V-belt should point forward.**

3. Pinch the V-belt together near its center and slide the spacer and movable drive face onto the driveshaft. Secure the drive face with a nut. Tighten the nut to 165 ft-lb.

⚠ CAUTION

Make sure the fixed drive plate is completely seated on the clutch shaft with splines protruding prior to installing the nut or a false torque and subsequent damage may occur.



KC152A

■NOTE: At this point, the push-bolt can be removed.

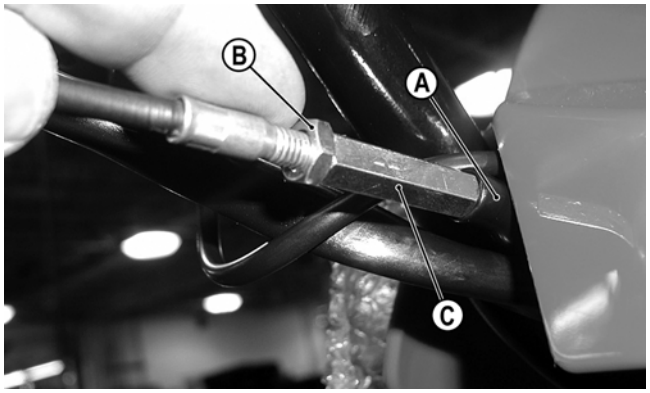
4. Rotate the V-belt and pulleys until the V-belt is flush with the top of the driven pulley.
5. Place the V-belt cover gasket into position; then install the cover and secure with the cap screws. Tighten the cap screws to 8 ft-lb.
6. Secure the front fender to the footrest with the two cap screws. Tighten securely.
7. Install the right-side footrest (see Section 8).

Adjusting Differential Lock Cable

If the differential or differential lock system has been serviced, the differential lock cable should be checked and/or adjusted for proper free-play.

To adjust the cable, use the following procedure.

1. With the differential lock selector in the UNLOCK position, slide the rubber boot (A) off the adjuster; then loosen the jam nut (B). Turn the adjuster (C) to achieve 1/4 in. of free-play measured at the end of the differential lock lever.



CD560A

2. Select the 2WD position on the front drive selector switch; then turn the ignition switch to the ON position and select the LOCK position on the differential lock selector. The front drive actuator should operate engaging four-wheel drive.

■NOTE: It may be necessary to turn the handlebar or rock the ATV forward and backward to align the differential lock splines and allow engagement.

3. Return the differential lock selector to the UNLOCK position and listen for the front drive actuator to operate.
4. Turn the ignition switch to the OFF position. Tighten the jam nut securely; then install the boot on the adjuster.

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SECTION 3 - ENGINE/TRANSMISSION

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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.

■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.

■NOTE: Critical torque specifications are located in Section 1.

SPECIAL TOOLS

A number of special tools must be available to the technician when servicing the engine/transmission.

Description	p/n
Clutch Sleeve Hub Holder	0444-007
Connecting Rod Holder	0444-006
Magneto Rotor Remover	0444-206
Oil Filter Wrench	0644-389
Piston Pin Puller	0644-328
Side Case Puller	0644-262
Spanner Wrench	0444-153
Surface Plate	0644-016
Valve Clearance Adjuster	0444-078
V Blocks	0644-022

■NOTE: Special tools are available from the Arctic Cat Service Parts Department.

Specifications*

VALVES AND GUIDES		
Valve Face Diameter	(intake) (exhaust)	31.6 mm (1.24 in.) 27.9 mm (1.10 in.)
Valve/Tappet Clearance (cold engine)	(intake) (exhaust)	0.1016 mm (0.004 in.) 0.1524 mm (0.006 in.)
Valve Guide/Stem Clearance	(intake/exhaust)	0.013 mm (0.0005 in.)
Valve Guide/Valve Stem Deflection (wobble method)	(max)	0.35 mm (0.014 in.)

VALVES AND GUIDES (cont)		
Valve Guide/Valve Stem Deflection (wobble method)	(max)	0.35 mm (0.014 in.)
Valve Guide Inside Diameter		5.000-5.012 mm (0.1969-0.1973 in.)
Valve Stem Outside Diameter	(intake/exhaust)	4.972-4.987 mm (0.1957-0.1963 in.)
Valve Stem Runout	(max)	0.1 mm (0.0039 in.)
Valve Head Thickness	(min)	2.3 mm (0.0906 in.)
Valve Stem End Length	(min)	3.97 mm (0.156 in.)
Valve Face/Seat Width	(intake) (exhaust)	2.25 mm (0.0886 in.) 2.60 mm (0.1024 in.)
Valve Seat Angle	(intake/exhaust)	45° 15'-45° 30'
Valve Face Radial Runout	(max)	0.2 mm (0.0079 in.)
Valve Spring Free Length	(min)	38.7 mm (1.524 in.)
Valve Spring Tension @ 31.5 mm (1.24 in.)	(outer)	19.0 kg (42 lb)
CAMSHAFT AND CYLINDER HEAD		
Cam Lobe Height (min)	(intake/exhaust)	33.53 mm (1.320 in.)
Camshaft Journal Holder Inside Diameter	(right & center) (left)	21.98-22.04 mm (0.8654-0.8677 in.) 17.48-17.53 mm (0.6882-0.6902 in.)
Camshaft Journal Outside Diameter	(right & center) (left)	21.96-21.98 mm (0.8646-0.8654 in.) 17.47-17.48 mm (0.6878-0.6882 in.)
Camshaft Runout	(max)	0.05 mm (0.002 in.)
Rocker Arm Inside Diameter		12.000-12.018 mm (0.4724-0.4731 in.)
Rocker Arm Shaft Outside Diameter		11.97-11.98 mm (0.4713-0.4717 in.)
Cylinder Head/Cover Distortion	(max)	0.05 mm (0.002 in.)
CYLINDER, PISTON, AND RINGS		
Piston Skirt/Cylinder Clearance		0.05 mm (0.002 in.)
Piston Diameter 15 mm (0.6 in.) from Skirt End		91.949-97.959 mm (3.619-3.620 in.)
Piston Ring Free End Gap	(1st/2nd)	12.5 mm (0.492 in.)
Bore x Stroke		92 x 71.5 mm (3.66 x 2.81 in.)
Cylinder Trueness	(max)	0.0075 mm (0.003 in.)
Piston Ring End Gap - Installed		0.36 mm (0.014 in.)
Piston Ring to Groove Clearance (max)	(1st) (2nd)	0.034 mm (0.0013 in.) 0.033 mm (0.0013 in.)
Piston Ring Groove Width	(1st/2nd) (oil)	1.202-1.204 mm (0.0473-0.0474 in.) 2.501-2.503 mm (0.09846-0.09854 in.)
Piston Ring Thickness	(1st/2nd)	1.170-1.195 mm (0.0461-0.0470 in.)
Piston Pin Bore	(max)	20.012 mm (0.788 in.)
Piston Pin Outside Diameter	(min)	19.995 mm (0.7872 in.)
CRANKSHAFT		
Connecting Rod (small end inside diameter)	(max)	20.021 mm (0.788 in.)
Connecting Rod (big end side-to-side)		0.95 mm (0.037 in.)
Connecting Rod (big end width)		21.95 mm (0.864 in.)
Connecting Rod @ 150 mm (5.9 in.) (small end deflection)	(max)	0.3 mm (0.0118 in.)
Crankshaft (web-to-web)		98 mm (3.858 in.)
Crankshaft Runout	(max)	0.03 mm (0.0012 in.)
Oil Pump Gerotor Clearance	(max)	0.15 mm (0.006 in.)

* Specifications subject to change without notice.

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Troubleshooting

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 Section 5 - Troubleshooting
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. **Crankshaft position sensor** defective	3. Replace CKP sensor
4. **ECU** defective	4. Replace ECU
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 fuel injector)	
Condition	**Remedy**
1. **Gas tank vent hose** obstructed	1. Clean vent hose
2. **Fuel hose** obstructed	2. Clean - replace hose
3. **Fuel screens** obstructed	3. Clean - replace inlet screen - valve screen
4. **Fuel pump** defective	4. Replace fuel pump
Problem: Engine stalls easily	
Condition	**Remedy**
1. **Spark plug** fouled	1. Clean plug
2. **Magneto** defective	2. Replace magneto
3. **ECU** defective	3. Replace ECU
4. **Fuel injector** obstructed	4. Replace fuel injector
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
5. **Valve tappets** worn	5. Replace tappets
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 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 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: 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. **ECU** defective	5. Replace ECU
6. **Spark plug** fouled - gap too wide	6. Adjust gap - replace plug
7. **Ignition coil** defective	7. Replace ignition coil
8. **Fuel injector** obstructed	8. Replace fuel injector
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 - tappets** worn	4. Replace cams - arms - tappets
5. **Spark plug gap** too narrow	5. Adjust gap
6. **Ignition coil** defective	6. Replace ignition oil
7. **Air cleaner element** obstructed	7. Clean element
8. **Fuel hose** obstructed	8. Clean or replace hose
9. **Fuel pump** defective	9. Replace fuel pump
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** incorrect	3. Re-time valve gear
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. **Fuel injector** obstructed	9. Replace injector
10. **Air cleaner element** obstructed	10. Clean element
11. **Oil (in the engine)** overfilled - contaminated	11. Drain excess oil - change oil
12. **Intake manifold** leaking air	12. Tighten - replace manifold
13. **Cam chain** worn	13. 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. **Intake manifold** leaking air	6. Tighten - replace manifold
7. **Coolant level** low	7. Fill - examine system for leaks
8. **Fan** malfunctioning	8. Check fan fuse - replace fan
9. **Fan switch** malfunctioning	9. Replace fan switch
10. **Thermostat** stuck - closed	10. Replace thermostat
11. **Radiator hoses - cap** damaged - obstructed	11. Clear obstruction - replace hoses

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(Thundercat)

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.

☞ AT THIS POINT

If the technician's objective is to service front Top-Side Components, Left-Side Components, or Right-Side Components, the engine/transmission does not have to be removed from the frame.

☞ AT THIS POINT

If the technician's objective is to service/replace the oil strainer (from beneath the engine/transmission), the engine/transmission does not have to be removed from the frame.

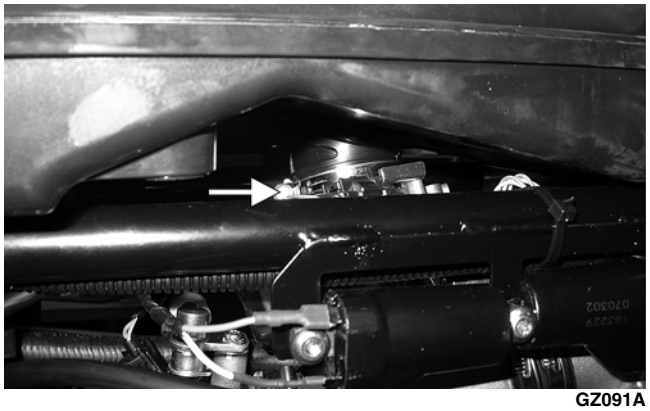
Secure the ATV on a support stand to elevate the wheels.

⚠ WARNING

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

1. Remove the seat and tool tray; then remove the negative battery cable.
2. Remove the front rack, gauge pod, footwells and footrests; then remove the front body panel (see Section 8).
3. Disconnect the IAT sensor connector; then loosen the clamp securing the inlet air boot to the throttle body and remove the air filter housing assembly.

GZ013

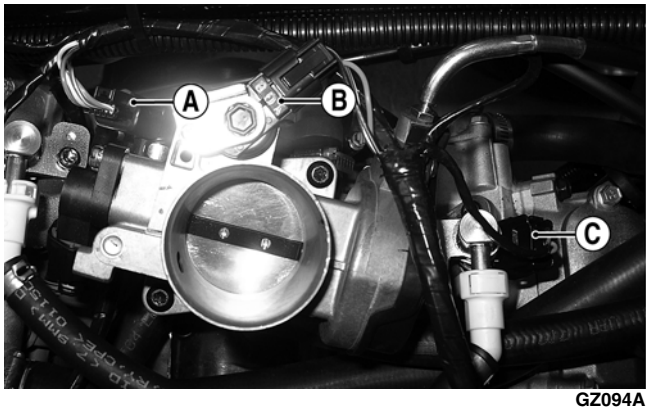


GZ091A

4. Using an absorbent towel, clean any spilled gasoline; then press the gasline hose connectors and remove from the fuel rails.

GZ124

5. Disconnect the TPS connector (A), MAP sensor connector (C), and ISC valve connector (B) from the throttle body; then route the harness and connectors away from the engine.



GZ094A

■NOTE: Using a suitable marker, mark the locations of any ties that are removed to relocate wiring out of the way.

6. Loosen the clamps securing the throttle body to the intake manifolds; then remove the throttle body and leaving the throttle cable connected, lay the assembly over the handlebar.

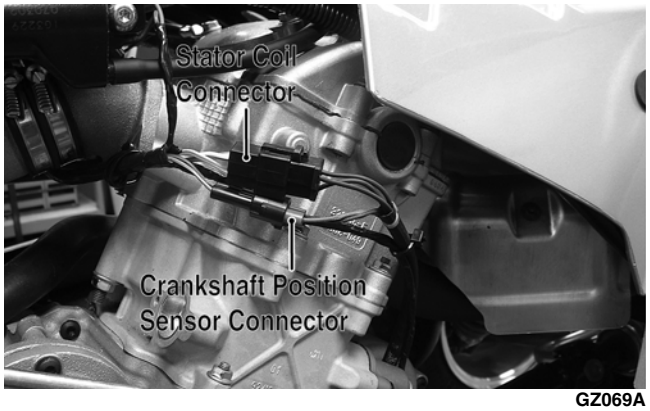

GZ090B

7. Disconnect the fuel injector wiring connectors; then remove the intake manifolds leaving the injectors installed.


GZ106

GZ107

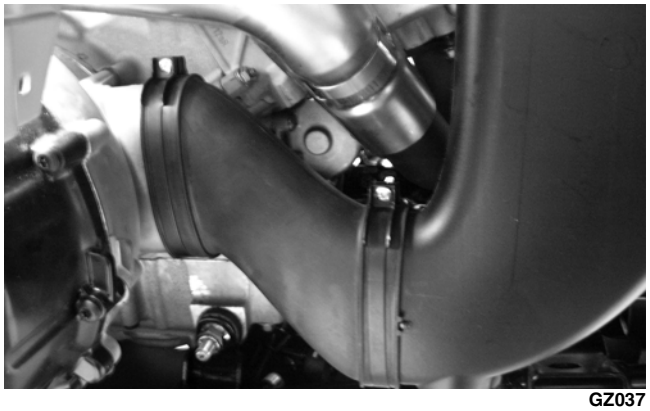
8. Disconnect the stator coil connector and the crankshaft position sensor connector; then disconnect the gear shift position switch connector.



GZ069A

GZ368A

9. Loosen the clamps securing the V-belt cooling ducts to the V-belt housing; then disconnect the cooling ducts.



GZ037

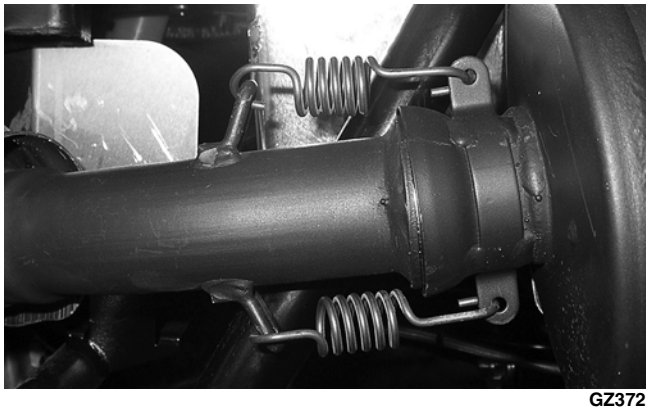
GZ103B

10. Remove the E-clips securing the shift linkage to the shift lever and shift shaft; then remove the shift linkage. Account for two bushings and two flat washers.

11. Remove the cap screws securing the rear drive-shaft yoke flange to the rear output flange.

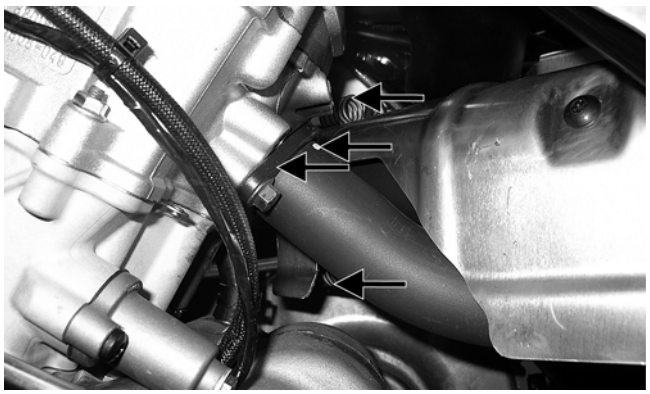
GZ374

12. Remove the exhaust pipe springs at the muffler and remove the muffler. Account for the grafoil seal.



GZ372

13. Remove the nuts securing the rear exhaust pipe to the cylinder; then remove the springs securing the rear exhaust pipe to the front exhaust pipe and remove the rear exhaust pipe. Account for a grafoil seal on the pipe juncture and a seal in the cylinder.

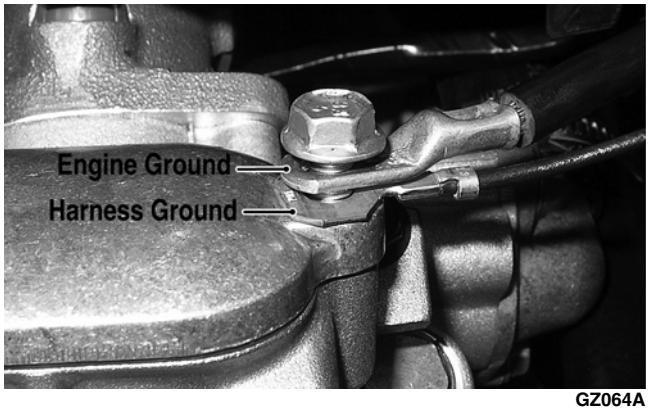


GZ099A

14. Remove the front and rear spark plug wires from the spark plugs; then disconnect the primary wire connectors from the coils and remove the coils from the left side of the frame.

GZ071A

15. Remove the cap screw securing the engine and harness grounds to the engine.

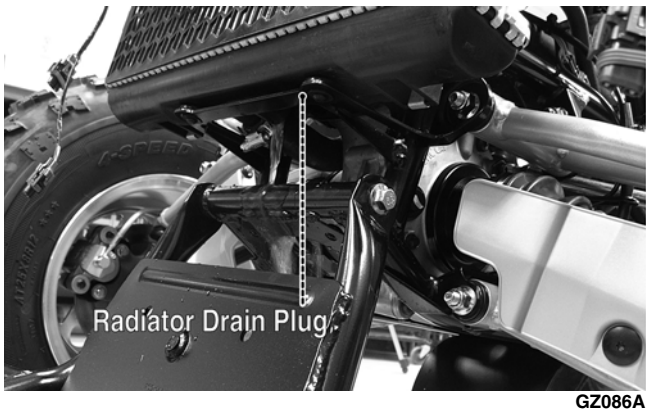


GZ064A

16. Remove the cap screws securing the upper bumper support to the frame and swing the bumper forward allowing access to the radiator drain plug.

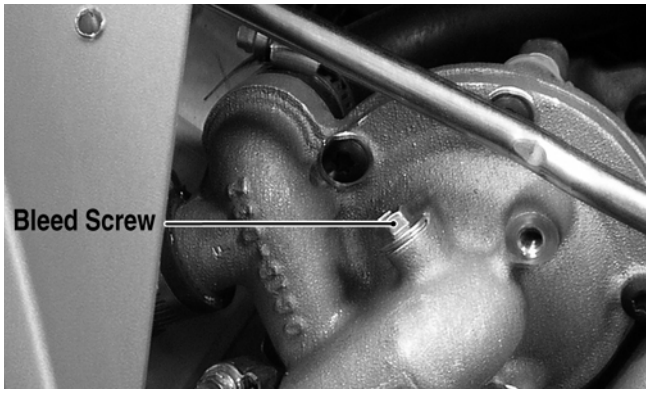
GZ068

17. Place a suitable drain pan under the radiator; then remove the radiator drain plug. Do not loosen the radiator cap at this time.



GZ086A

18. Remove the bleed screw from the water pump; then after coolant has drained, apply compressed air to the bleed opening to purge the remaining coolant from the system. Install the bleed screw and radiator drain plug and tighten securely.



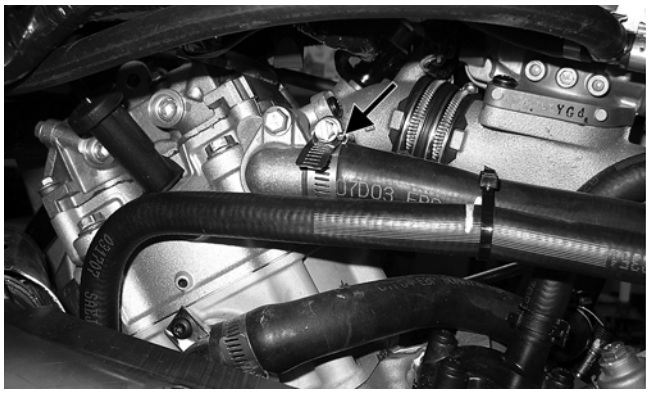
GZ009A

⚠ WARNING

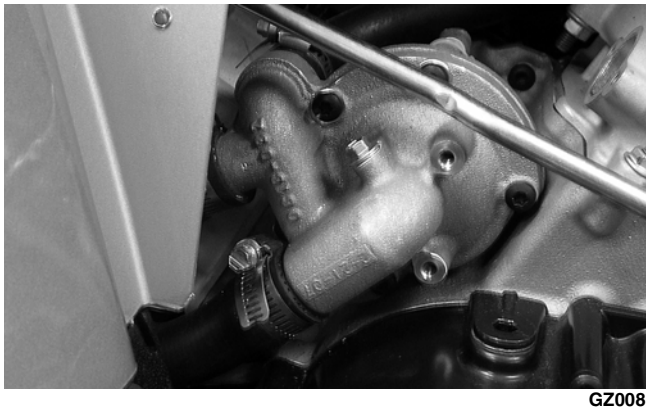
Always wear safety glasses when using compressed air.

19. Remove the coolant hoses from the upper engine coolant outlet pipes; then remove the lower coolant hose from the water pump.

GZ028

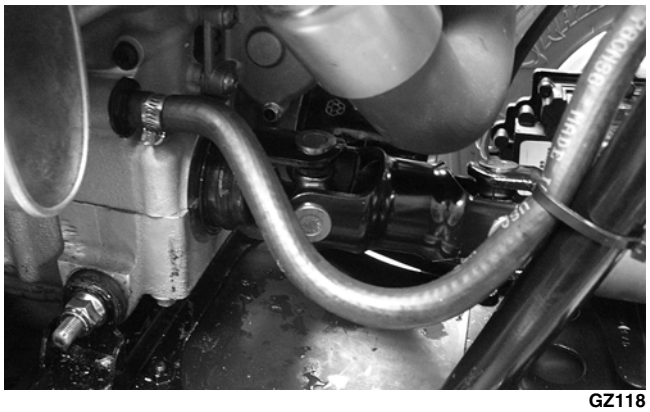


GZ369A

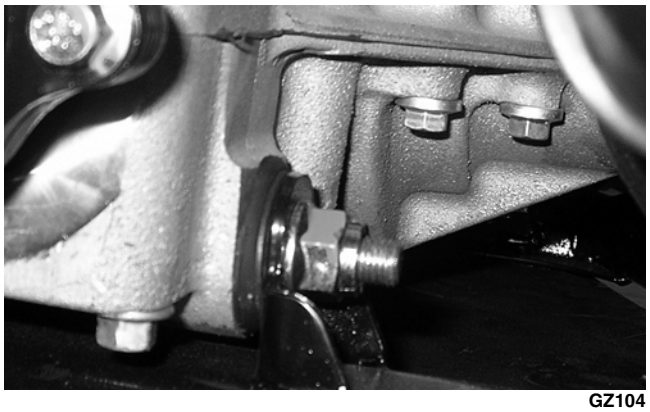


GZ008

20. Remove the flange nuts from the front and rear engine through-bolts; then rock the engine slightly to relieve motor mount pressure and remove the through-bolts.

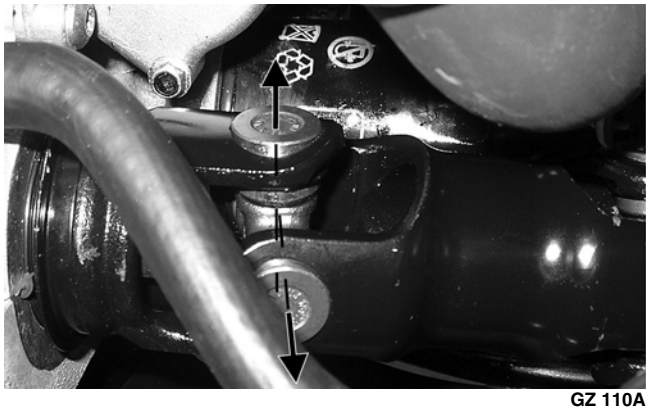


GZ118



GZ104

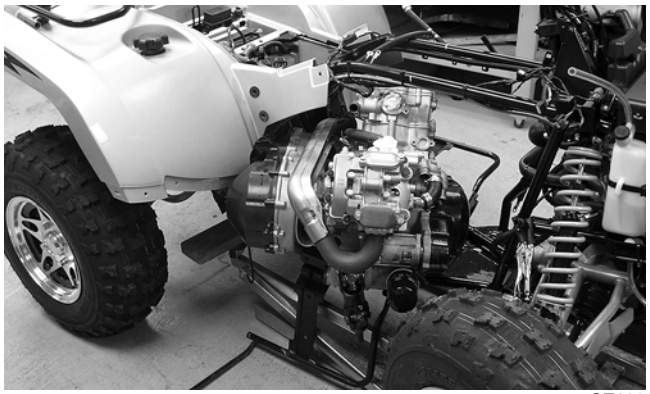
21. Rotate the front driveshaft until the output yoke universal joint is in the vertical plane; then raise the front of the engine/transmission until the front drive splines disengage from the differential.



GZ 110A

GZ117A

22. Fold the front drive line up and secure against the front of the engine; then lift the engine clear of the mountings and remove from the right side of the frame.



GZ123

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 must be removed to service the rear cylinder head, cylinder, and piston.

Removing Top-Side Components

A. Valve Cover/Rocker Arms
B. Cylinder Head/Camshaft

1. Remove the timing inspection plug, spark plugs, and magneto housing cover; then install the 10 mm cap screw (left-hand threads) in the crankshaft and rotate the desired cylinder to top-dead-center of the compression stroke.

GZ027

GZ026

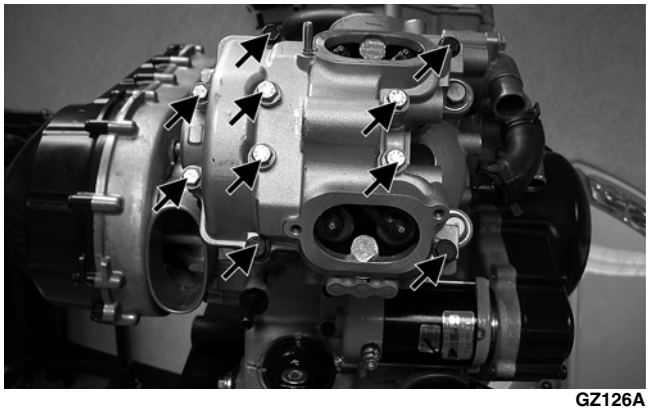
■NOTE: Timing marks on the rotor/flywheel are stamped with an “F” (front cylinder) and “R” (rear cylinder) adjacent to the mark.

GZ063

GZ059

2. Remove the tappet covers on the cylinder being serviced. The tappets should not have pressure on them.

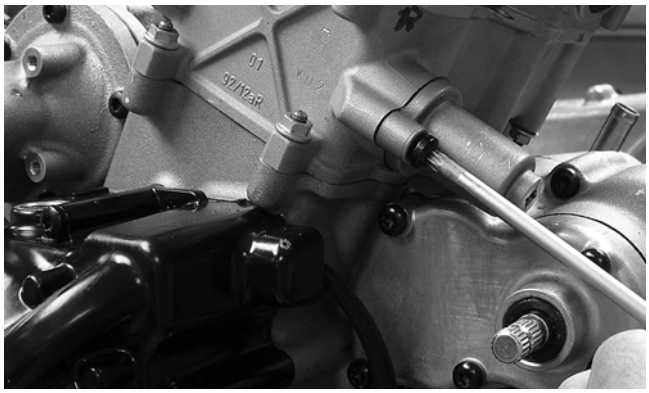
3. Remove the cap screws securing the valve cover to the head; account for the four rubber washers on the top side cap screws. Remove the valve cover. Account for and note the orientation of the camshaft plug. Note the location of two alignment pins.


GZ126A


GZ162


GZ132A

4. Remove the cap screw on the end of the tensioner; then using a screwdriver, turn the tensioner clockwise to remove the tension. Remove the two cap screws securing the tensioner adjuster assembly and remove the assembly. Account for a gasket.

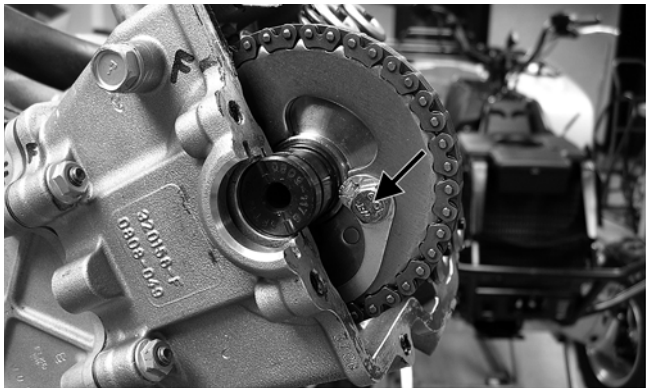

GZ200

5. Using an awl, rotate the C-ring in its groove until it is out of the cylinder head; then remove the C-ring.

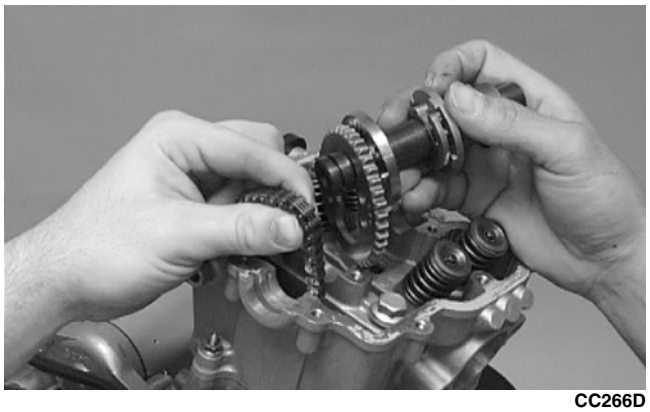
■NOTE: Care should be taken not to drop the C-ring into the crankcase.


GZ155

6. Bend the washer tabs down and remove the two cap screws securing the sprocket to the camshaft; then drop the sprocket off the camshaft.


GZ154A

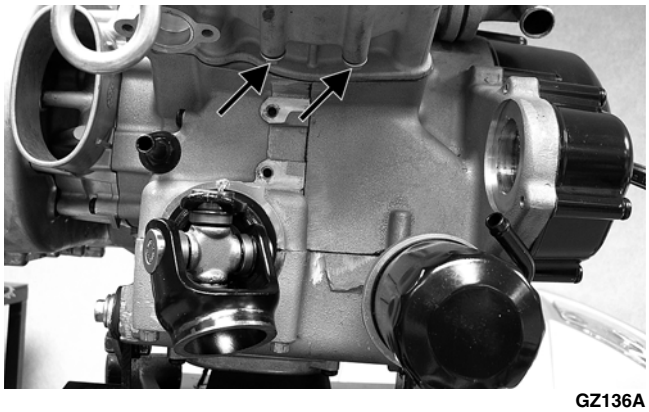
7. While holding the chain, slide the sprocket and camshaft out of the cylinder head.


CC266D

■NOTE: Loop the chain over the cylinder head and secure it to keep it from falling into the crankcase.

8. Remove the five nuts securing the cylinder head to the cylinder; then remove the four cylinder head cap screws and washers.

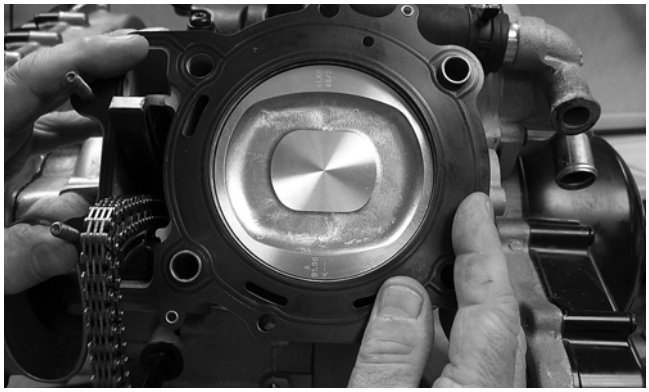
■NOTE: Removing the starter will simplify removal of the front cylinder base nuts.



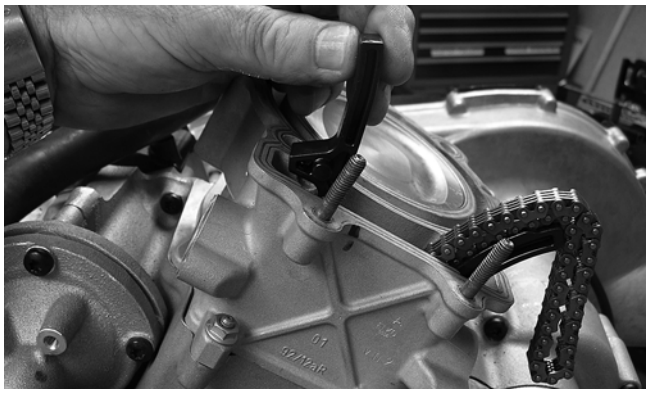
GZ136A

GZ132B

9. Remove the cylinder head from the cylinder, remove the gasket, and account for two alignment pins; then remove the cam chain guide.



GZ151



GZ161

10. If the remaining cylinder head is to be serviced, apply tension to the loose timing chain and rotate the second cylinder to top-dead-center of the compression stroke; then repeat steps 2-10 on the other cylinder head.

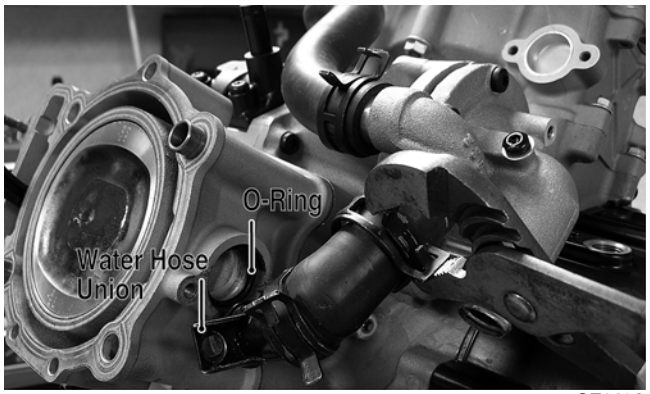
☞ AT THIS POINT
To service valves and cylinder head, see Servicing Top-Side Components sub-section.

☞ AT THIS POINT
To inspect cam chain guide, see Servicing Top-Side Components sub-section.

C. Cylinders
D. Pistons

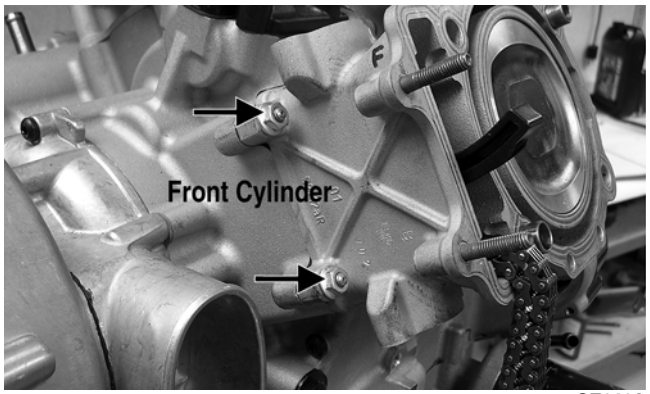
■NOTE: Steps 1-10 in the preceding sub-section must precede this procedure.

11. Remove the cap screws securing the water hose union to the cylinder; then remove the union from the cylinder. Account for an O-ring.

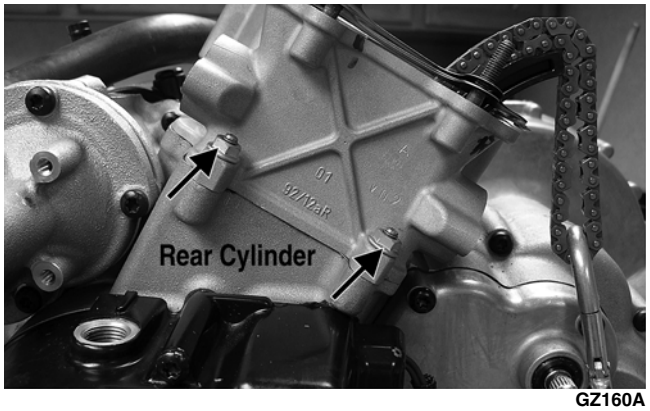


GZ140A

12. Remove the two nuts securing the cylinder to the crankcase.



GZ141A



GZ160A

13. Lift the cylinder off the crankcase taking care not to allow the piston to drop against the crankcase. Account for the gasket and two alignment pins.


GZ142


GZ144

☞ AT THIS POINT

To service cylinder, see Servicing Top-Side Components sub-section.

⚠ CAUTION

When removing the cylinder, be sure to support the piston to prevent damage to the crankcase and piston.

14. Using an awl, remove one piston-pin circlip.


GZ145

15. Using the Piston Pin Puller, remove the piston pin. Account for the opposite-side circlip. Remove the piston.

■NOTE: It is advisable to remove the opposite-side circlip prior to using the puller.

■NOTE: Support the connecting rod with rubber bands or a piece of hose to avoid damaging the rod or install the Connecting Rod Holder.

⚠ CAUTION

Do not allow the connecting rod to go down inside the crankcase. If the rod is down inside the crankcase and the crankshaft is rotated, severe damage will result.

■NOTE: If the existing rings will not be replaced with new rings, note the location of each ring for proper installation. When replacing with new rings, replace as a complete set only. If the piston rings must be removed, remove them in this sequence.

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

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

☞ AT THIS POINT

To service piston, see Servicing Top-Side Components sub-section.

☞ AT THIS POINT

To service center crankcase components only, proceed to Removing Left-Side Components.

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.

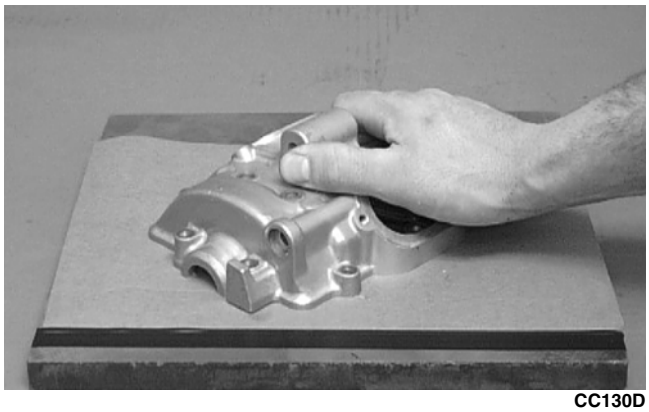
Cleaning/Inspecting Valve Cover

■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 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

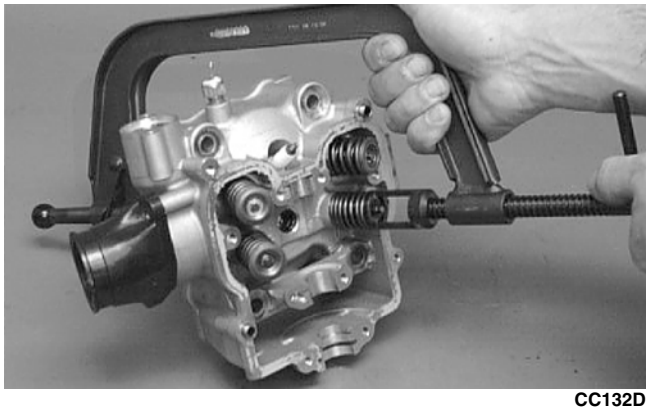
⚠ CAUTION

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

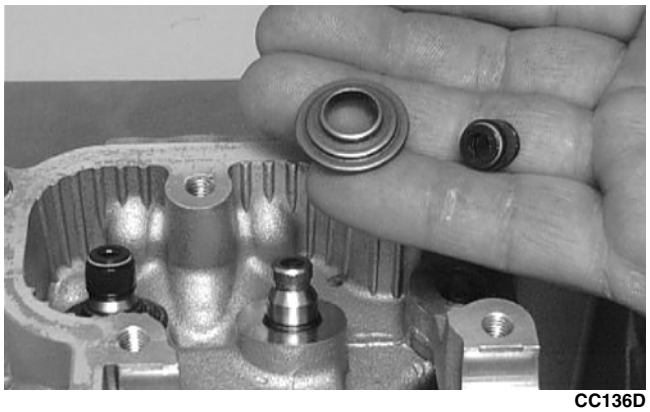
■NOTE: Keep all valves and valve components as a set. Note the original location of each valve set for use during installation. Return each valve set to its original location during installation.

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.



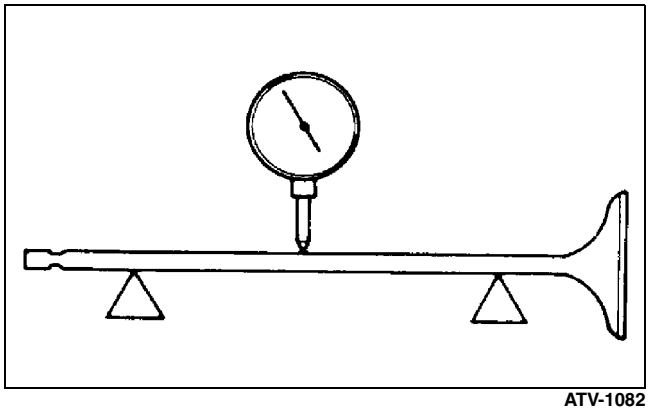
CC136D

■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; then check the valve stem runout using a dial indicator.



ATV-1082

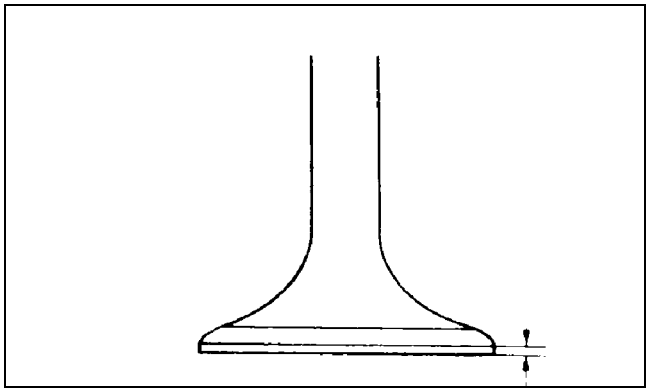
2. Maximum runout must not exceed specifications.

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.

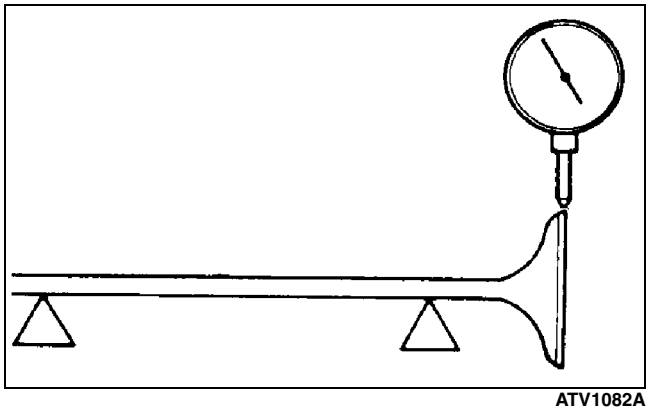


ATV-1004

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.

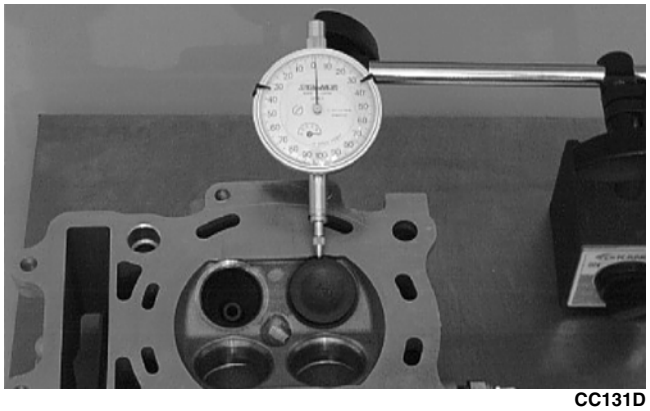


ATV1082A

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.

Servicing Valves/Valve Guides/Valve Seats

If valves, valve guides, or valve seats require servicing or replacement, Arctic Cat recommends that the components be taken to a qualified machine shop for servicing.

⚠ CAUTION

If valves are discolored or pitted or if the seating surface is worn, the valve must be replaced. Do not attempt to grind the valves or severe engine damage may occur.

Measuring Rocker Arm (Inside Diameter)

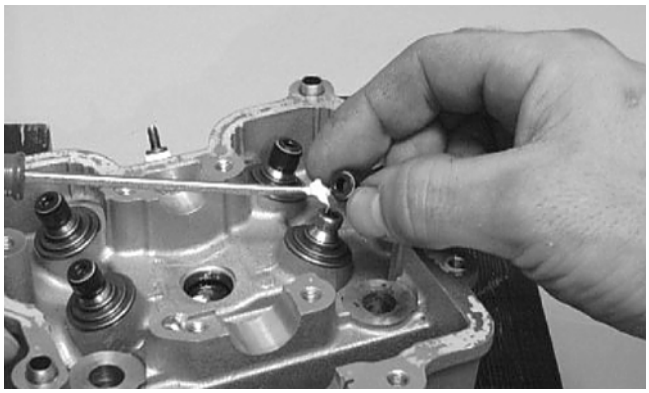
1. Using a dial calipers, measure the inside diameter of the rocker arm.
2. Acceptable inside diameter range must be within specifications.

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

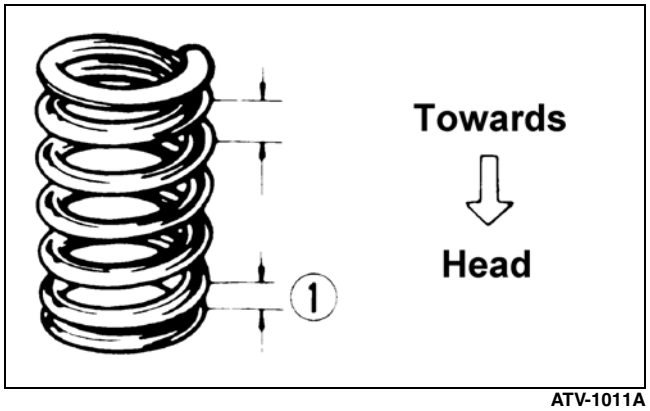
1. Apply grease to the inside surface of the valve seals; then place a lower spring seat and valve guide seal over each valve guide.



CC144D

2. Insert each valve into its original location.
3. Install the valve springs with the painted end of the spring facing away from the cylinder head.

■NOTE: If the paint is not visible, install the ends of the springs with the closest wound coils 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.

PISTON ASSEMBLY

■NOTE: Whenever a piston, rings, or pin are out of tolerance, they 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.

■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

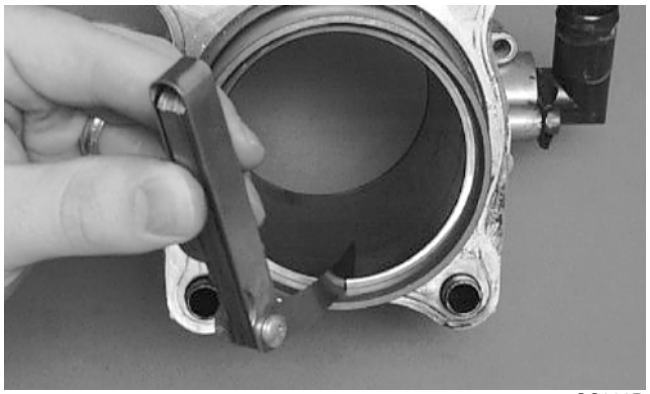
1. Take an old piston ring and snap it into two pieces; then grind the end of the old ring to a 45° angle and to a sharp edge.
2. Using the sharpened ring as a tool, clean carbon from the ring-grooves. Be sure to position the ring with its tapered side up.

⚠ 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)

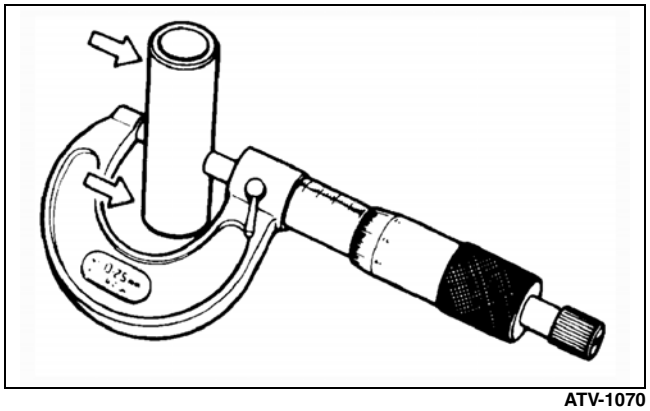
1. Place each compression ring in the wear portion of the cylinder. Use the piston to position each ring squarely in the cylinder.
2. Using a feeler gauge, measure each piston-ring end gap. Acceptable ring end gap must be within specifications.



CC280D

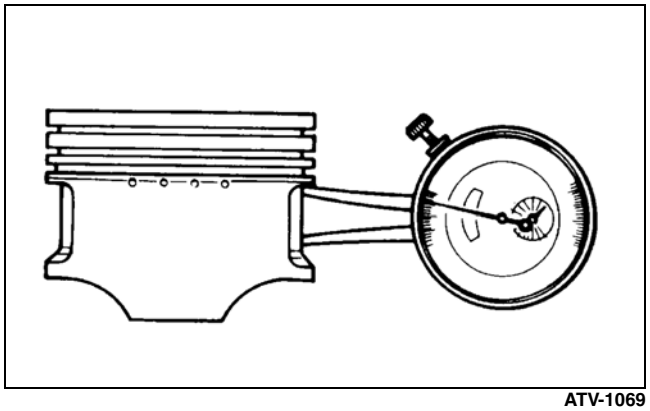
Measuring Piston Pin (Outside Diameter) and Piston-Pin Bore

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

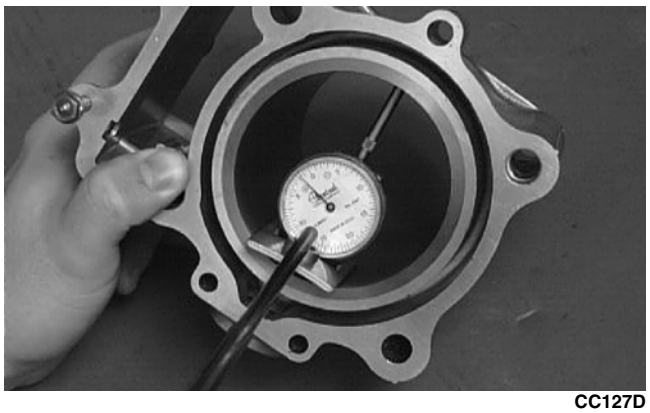
2. Insert an inside dial indicator into the piston-pin bore. The diameter must not exceed specifications. Take two measurements to ensure accuracy.



ATV-1069

Measuring Piston Skirt/ Cylinder Clearance

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

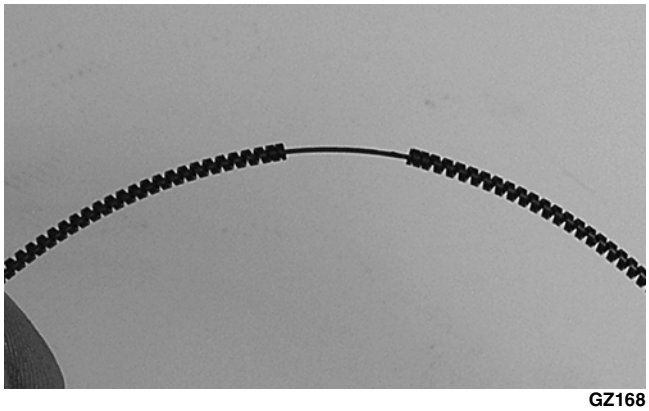


CC127D

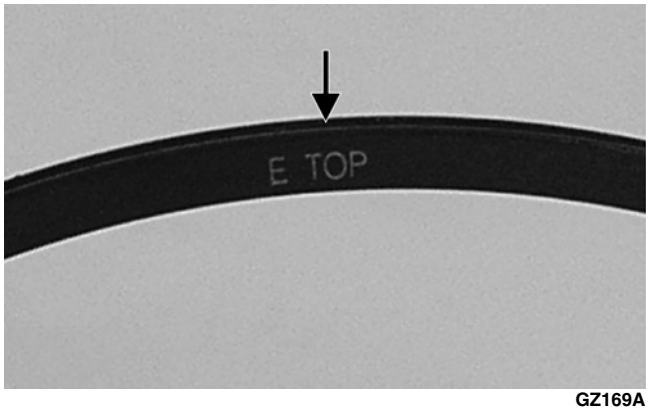
2. Measure the corresponding piston diameter at a point 15 mm (0.6 in.) above the piston skirt at a right angle to the piston-pin bore. Subtract this measurement from the measurement in step 1. The difference (clearance) must be within specifications.

Installing Piston Rings

1. Install the expander spring making sure the ends are aligned on the wire; then install the oil ring with the ring gap 90° from the spring gap and the marking "E TOP" directed toward the top of the piston.



GZ168

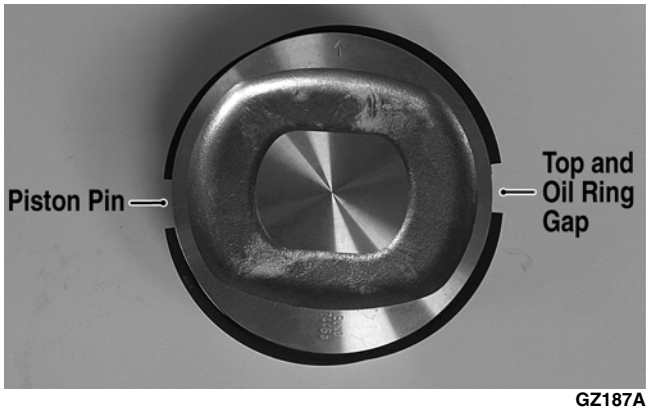


GZ169A

2. Install the second compression ring with the marking "E TOP" directed toward the top of the piston.

GZ167

3. Install the first (unmarked) compression ring; then rotate the rings so the ring gaps are approximately 180° apart and orientated to the piston pin.



GZ187A

⚠ 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.

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.

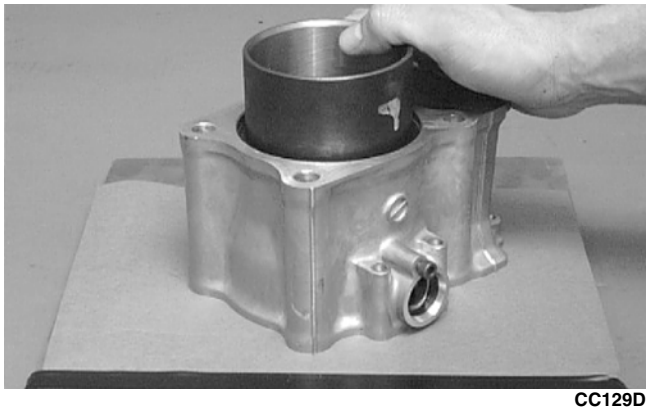
CC141D

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 Inspecting 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.



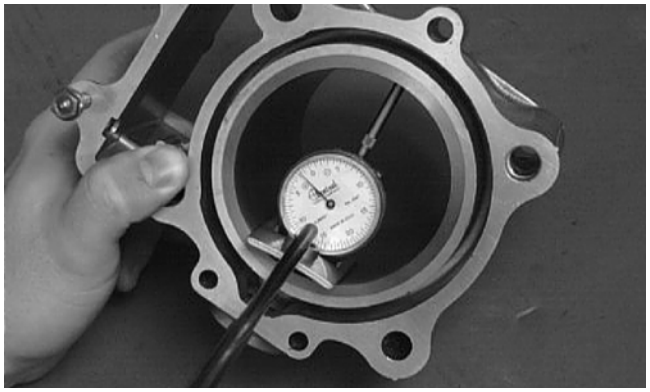
CC129D

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.

Inspecting Cylinder

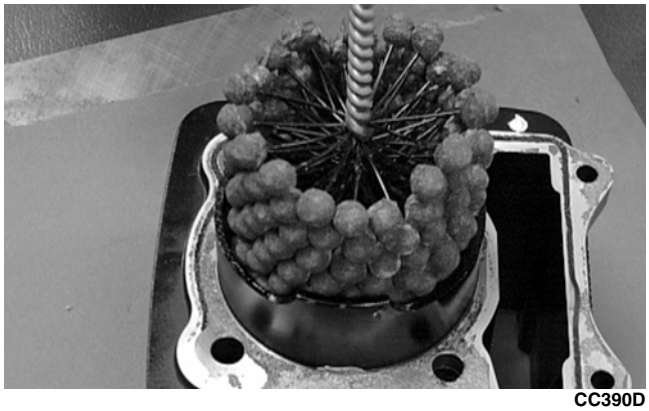
1. Using a slide gauge and a dial indicator or a snap gauge, measure the cylinder bore diameter in three locations from top to bottom and again from top to bottom at 90° from the first measurements for a total of six measurements. The trueness (out-of-roundness) is the difference between the highest 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.



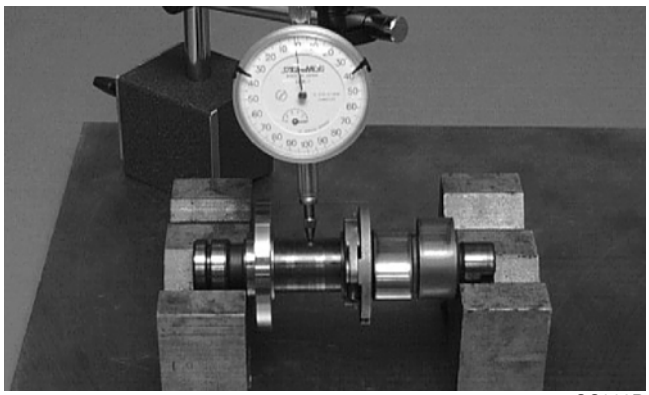
CC390D

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

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.

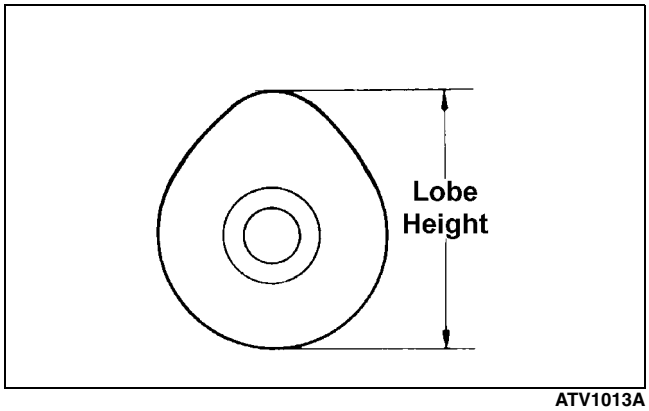


CC283D

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

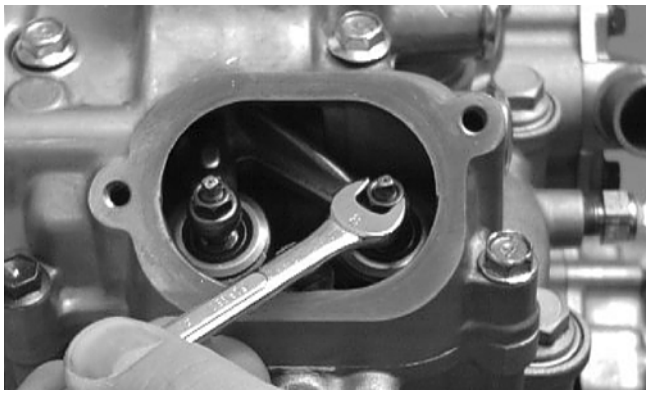
2. The lobe heights must not exceed minimum specifications.

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.

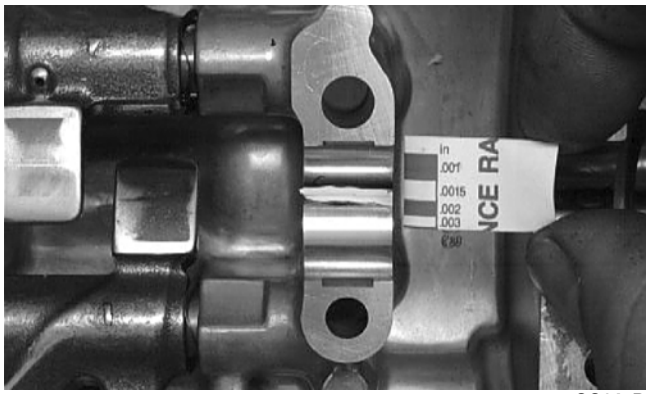


CC005D

2. Place a strip of plasti-gauge 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 securely.

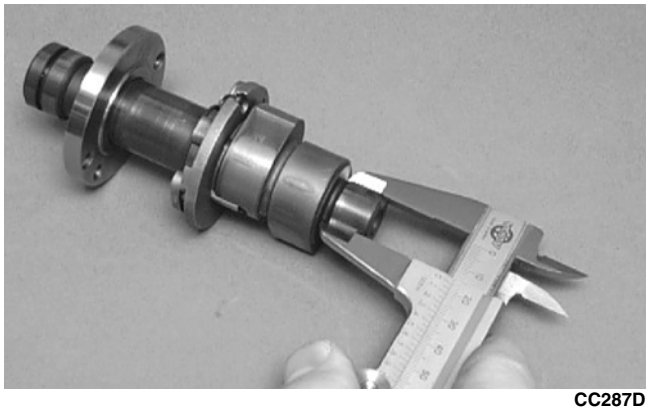
■NOTE: Do not rotate the camshaft when measuring clearance.

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 plasti-gauge with the chart found on the plasti-gauge packaging to determine camshaft to cylinder head and valve cover clearance.



CC145D

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

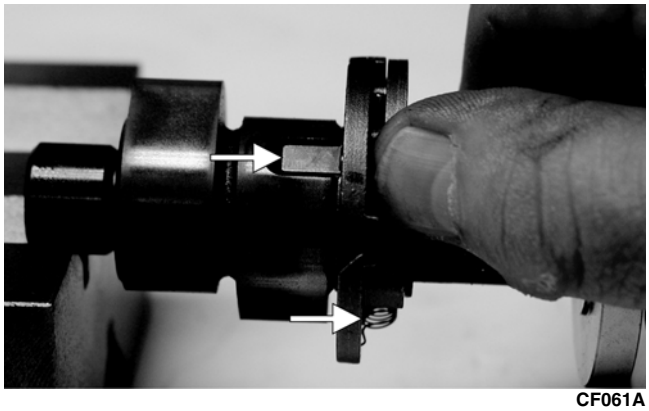


CC287D

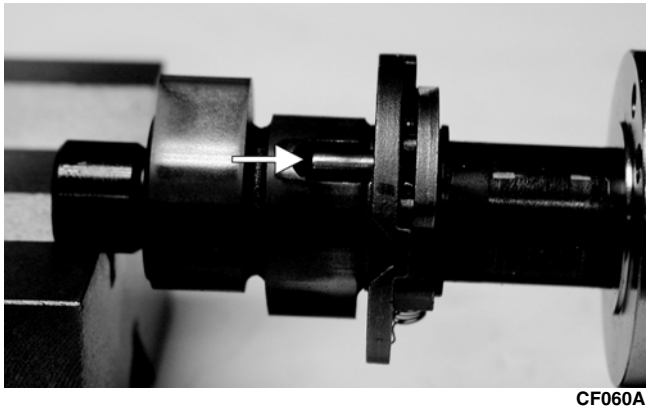
■**NOTE: If the journals are worn, replace the camshaft; then measure the clearance again. If it is still out of tolerance, replace the cylinder head.**

Inspecting Camshaft Spring/Drive Pin (Front Camshaft Only)

1. Inspect the spring and drive pin for damage.



CF061A



CF060A

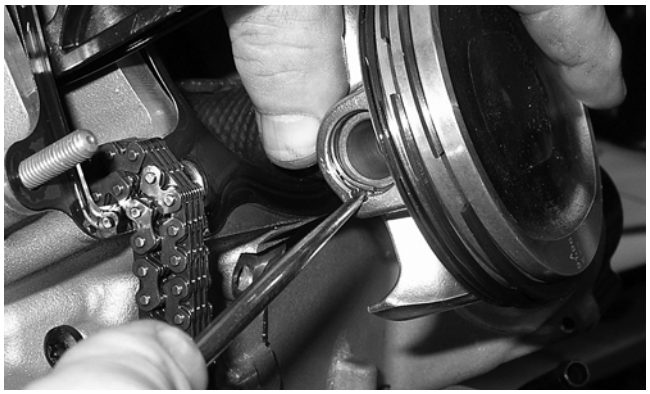
2. If damaged, the camshaft must be replaced.

Installing Top-Side Components

A. Pistons
B. Cylinders

1. Install the piston on the connecting rod making sure there is a circlip on each side and the open end of the circlip faces upwards.

■**NOTE: The piston should be installed so the arrow points toward the exhaust of the respective cylinder.**



GZ166

2. Place the two alignment pins into position. Place the cylinder gasket into position; then place a piston holder (or suitable substitute) beneath the piston skirt and square the piston in respect to the crankcase.

GZ159

3. Lubricate the inside wall of the cylinder; then using a ring compressor, compress the rings and slide the cylinder over the piston. Route the cam chain up through the cylinder cam chain housing; then remove the piston holder and seat the cylinder firmly on the crankcase.

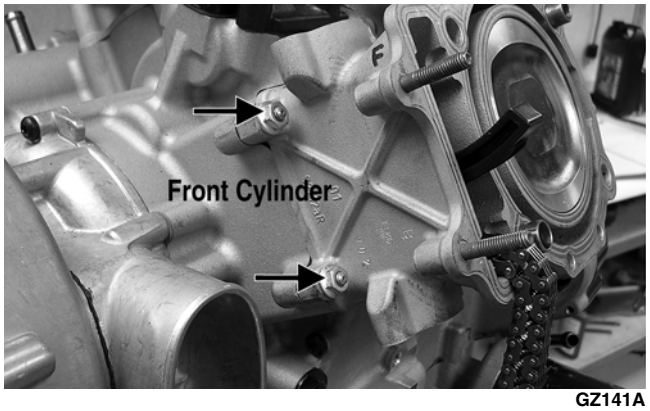
⚠ CAUTION

The cylinder should slide on easily. Do not force the cylinder or damage to the piston, rings, cylinder, or crankshaft assembly may occur.

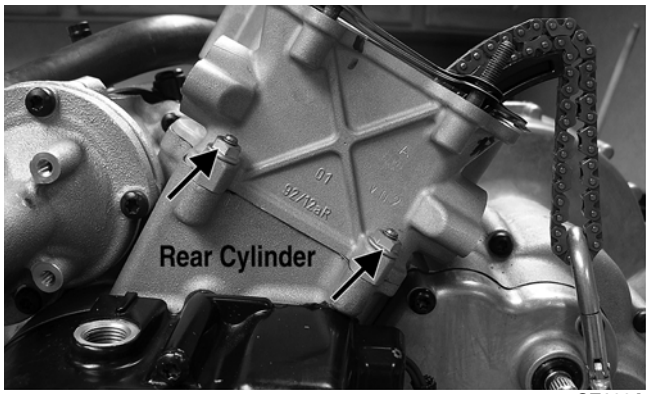

GZ142

4. Loosely install the two nuts securing the cylinder to the crankcase.

■NOTE: The two cylinder-to-crankcase nuts will be tightened in step 10.



GZ141A



GZ160A

5. Install the coolant hose onto the crankcase union and tighten the clamp.

C. Cylinder Head
D. Valve Cover

■NOTE: Steps 1-5 in the preceding sub-section must precede this procedure.

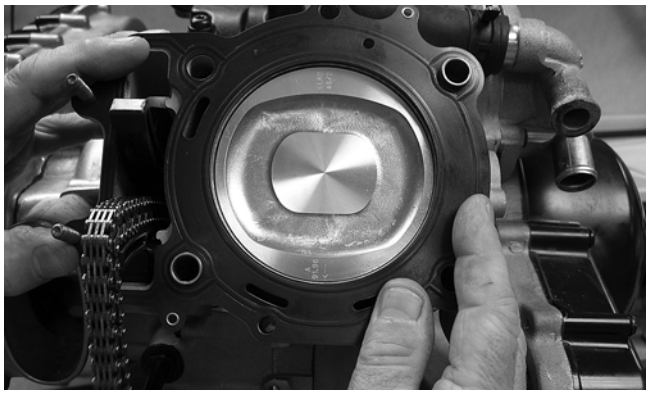
6. Place the chain guide into the cylinder.

⚠ CAUTION

Care should be taken that the bottom of the chain guide is secured in the crankcase boss.

GZ161A

7. Place the head gasket into position on the cylinder. Place the alignment pins into position; then place the head assembly into position on the cylinder while guiding the cam chain through the cylinder head.


GZ151

8. Install the four cylinder head cap screws with washers. Tighten only until snug.


GZ132B

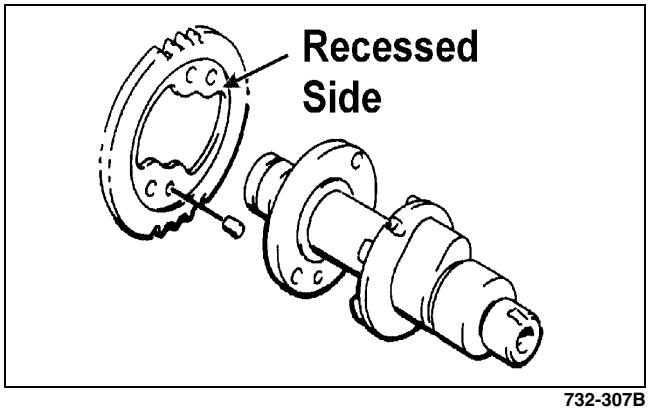
9. Loosely install the five cylinder head nuts.

10. In a crisscross pattern, tighten the four cylinder head cap screws (from step 8) to 40 ft-lb; then tighten the 8 mm nut (from step 9) to 18 ft-lb. Using a crisscross pattern, tighten the 6 mm nuts (from step 9) to 8 ft-lb. Tighten the two cylinder-to-crankcase nuts (from step 4) securely.

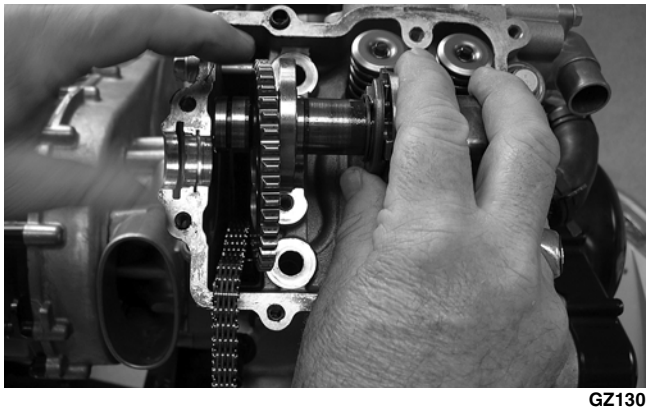
■NOTE: If both cylinders have been removed, repeat steps 1-10 for the remaining cylinder.

11. With the timing inspection plug removed and the chains held tight, rotate the crankshaft until the front piston is at top-dead-center.

12. With the alignment pin installed in the camshaft, loosely place the cam sprocket (with the recessed side facing the cam shaft lobes) onto the camshaft. At this point, do not "seat" the sprocket onto the shaft.



732-307B

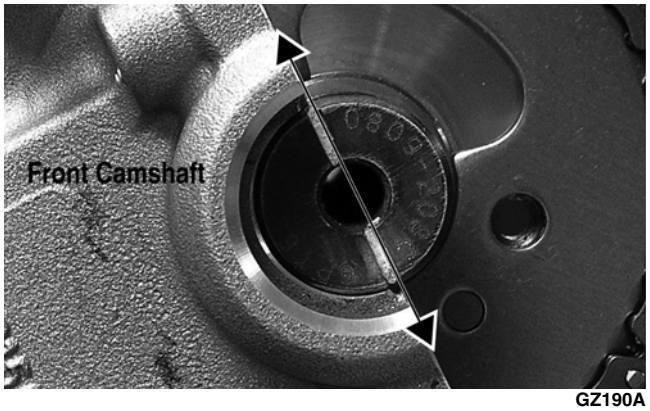


GZ130

■**NOTE: At this point, oil the camshaft bearings, cam lobes, and the three seating journals on the cylinder.**

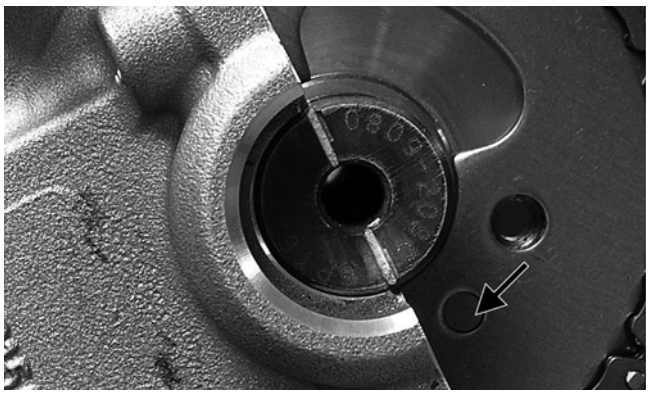
13. With the cam lobes directed down (toward the piston), maneuver the camshaft/sprocket assembly through the chain and towards its seating position; then loop the chain over the sprocket.

■**NOTE: Note the position of the alignment marks on the end of the camshaft. They must be parallel with the valve cover mating surface. If rotating the camshaft is necessary for alignment, do not allow the chain and sprocket to rotate and be sure the cam lobes end up in the down position.**



GZ190A

14. Seat the cam sprocket onto the camshaft making sure the alignment pin in the camshaft aligns with the smallest hole in the sprocket; then place the camshaft/sprocket assembly onto the cylinder ensuring the following.



GZ190B

A. Piston still at top-dead-center.

B. Camshaft lobes directed down (toward the piston).

C. Camshaft alignment marks parallel to the valve cover mating surface.

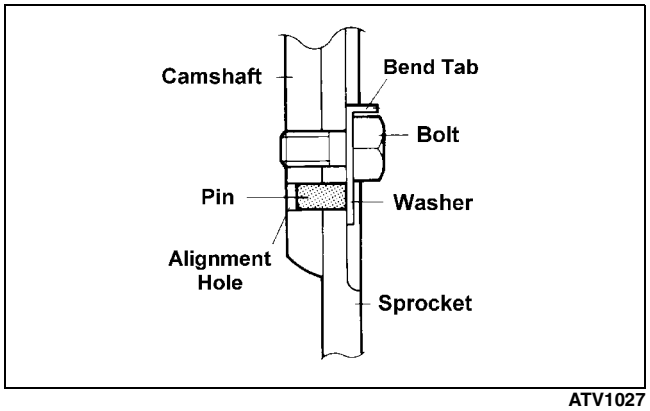
D. Recessed side of the sprocket directed toward the cam lobes.

E. Camshaft alignment pin and sprocket alignment hole (smallest) are aligned.

⚠ CAUTION

If any of the above factors are not as stated, go back to step 11 and carefully proceed.

15. Place the tab-washer onto the sprocket making sure it covers the pin in the alignment hole.

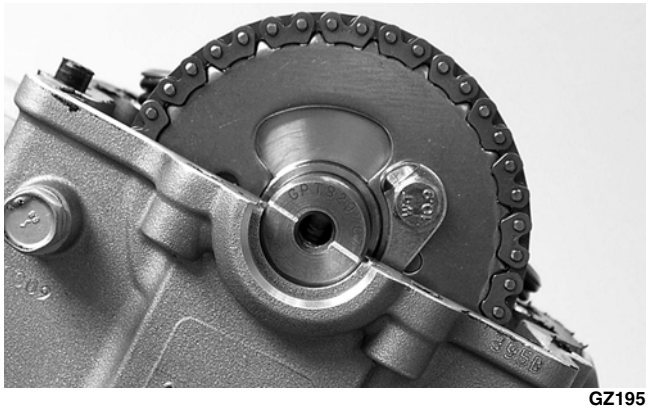


ATV1027

⚠ CAUTION

Care must be taken that the tab-washer is installed correctly to cover the alignment hole on the sprocket. If the alignment pin falls out, severe engine damage will result.

16. Install the first cap screw (threads coated with red Loctite #271) securing the sprocket and tab-washer to the camshaft. Tighten only until snug.



GZ195

17. Keeping tension on the opposite cam chain, rotate the crankshaft until the second cap screw securing the sprocket to the camshaft can be installed; then install the cap screw (threads coated with red Loctite #271) and tighten to 10 ft-lb. Bend the tab to secure the cap screw.

⚠ CAUTION

Failure to keep tension on any loose cam chain may cause severe engine damage.

GZ193

18. Rotate the crankshaft until the first cap screw (from step 17) can be tightened; then tighten to 10 ft-lb. Bend the tab to secure the cap screw.

☞ AT THIS POINT

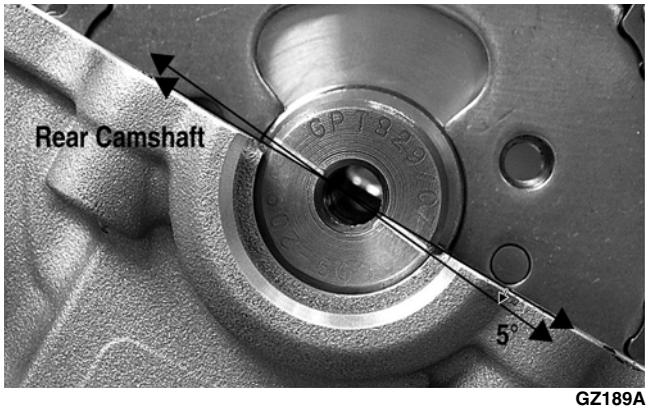
Return the engine to TDC on the front cylinder making sure the cam lobes are directed downward to ensure correct starting point for step 19.

19. Keeping tension on the rear cam chain, rotate the engine forward 270° until rear piston is at TDC indicated by timing mark R.

GZ060

20. With the cam lobes directed down (toward the piston), maneuver the camshaft/sprocket assembly through the chain and towards its seating position; then loop the chain over the sprocket.

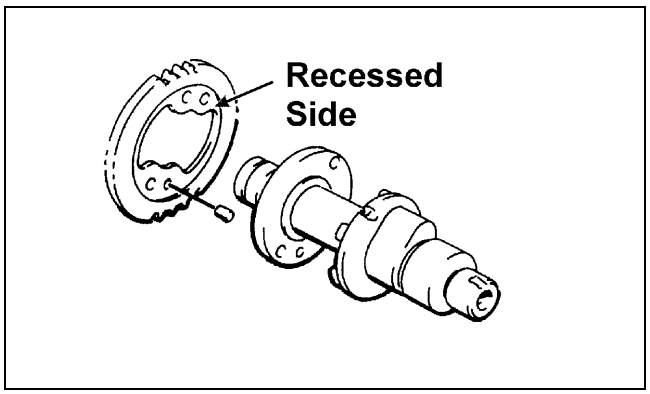
■NOTE: Note the position of the alignment marks on the end of the camshaft. They must NOT be parallel with the valve cover but offset slightly to the rear (approximately 5°). If rotating the camshaft is necessary for alignment, do not allow the chain and sprocket to rotate and be sure the cam lobes end up in the down position.



GZ189A

GZ189B

21. Seat the cam sprocket onto the camshaft making sure the alignment pin in the camshaft aligns with the smallest hole in the sprocket; then place the camshaft/sprocket assembly onto the cylinder ensuring the following.



732-307B

A. Piston still at top-dead-center.

B. Camshaft lobes directed down (toward the piston).

C. Camshaft alignment marks offset 5° from the valve cover mating surface.

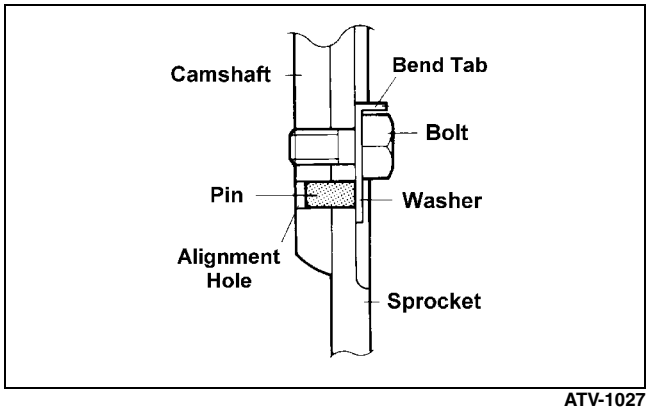
D. Recessed side of the sprocket directed toward the cam lobes.

E. Camshaft alignment pin and sprocket alignment hole (smallest) are aligned.

⚠ CAUTION

If any of the above factors are not as stated go back to step 19 and carefully proceed.

22. Place tab-washer onto the sprocket making sure it covers the pin in the alignment hole.

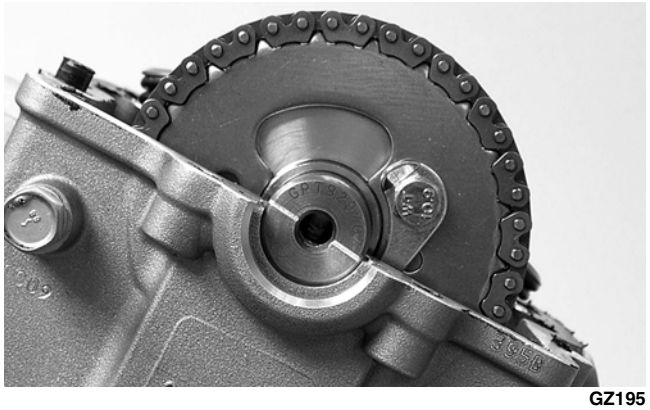


ATV-1027

⚠ CAUTION

Care must be taken that the tab-washer is installed correctly to cover the alignment hole on the sprocket. If the alignment pin falls out, severe engine damage will result.

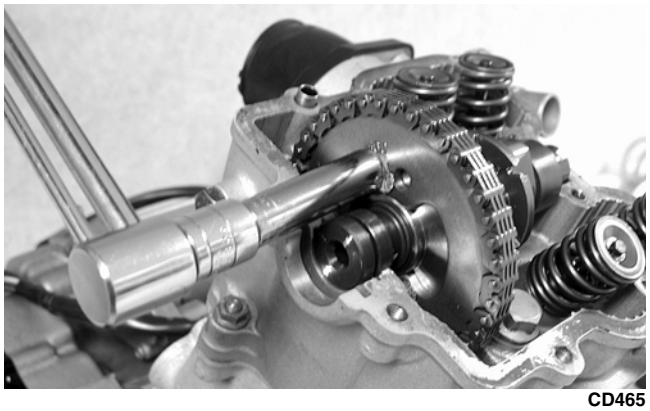
23. Install the first cap screw (threads coated with red Loctite #271) securing the sprocket and tab-washer to the camshaft. Tighten only until snug.



GZ195

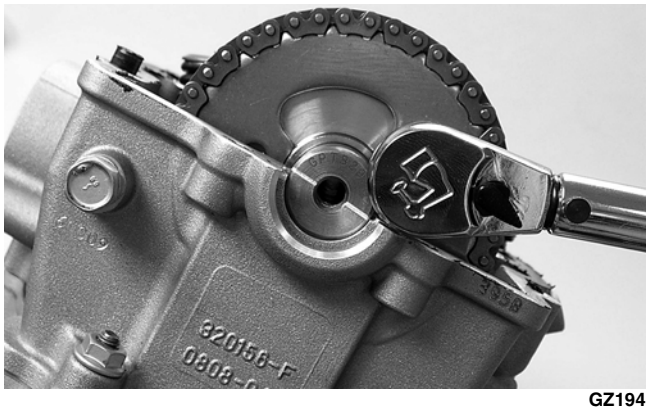
24. Rotate the crankshaft until the second cap screw securing the sprocket to the camshaft can be installed; then install the cap screw (threads coated with red Loctite #271) and tighten to 10 ft-lb. Bend the tab to secure the cap screw.

GZ193



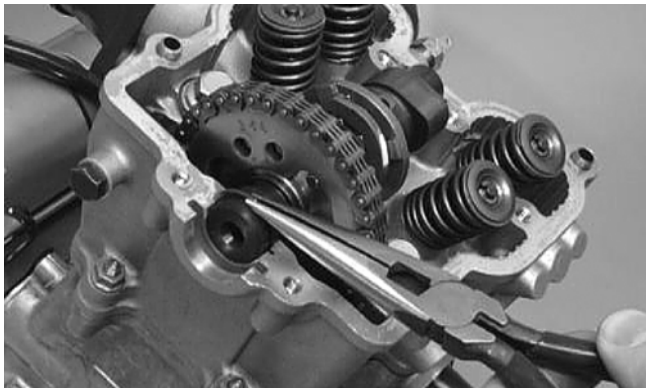
CD465

25. Rotate the crankshaft until the first cap screw (from step 17) can be addressed; then tighten to 10 ft-lb. Bend the tab to secure the cap screw.



GZ194

26. Place the C-rings into position in their grooves in the cylinder heads.



CC012D

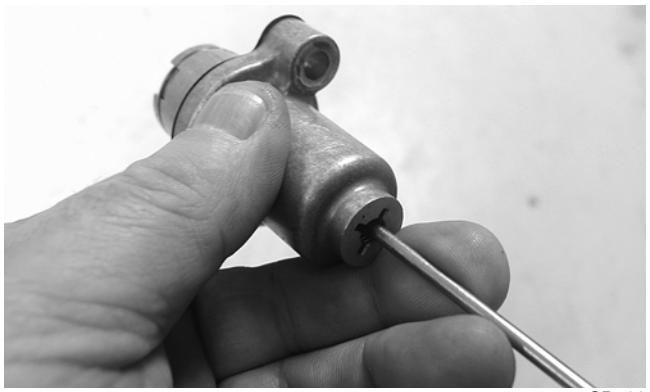
27. Install the cylinder head plugs in the cylinder heads with the open end facing downward and toward the inside.

⚠ CAUTION

The open end of the plug must be positioned downward.

CD468

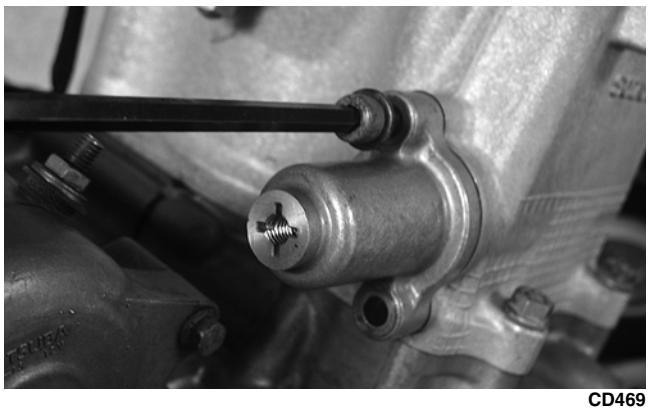
28. Remove the cap screw from the end of the chain tensioner; then using a flat-blade screwdriver, rotate the adjuster screw inside the tensioner clockwise until the screw bottoms.



CD501

■NOTE: The adjuster shaft will be drawn into the tensioner as the adjuster screw is rotated clockwise. The adjuster shaft tension will be released in step 30.

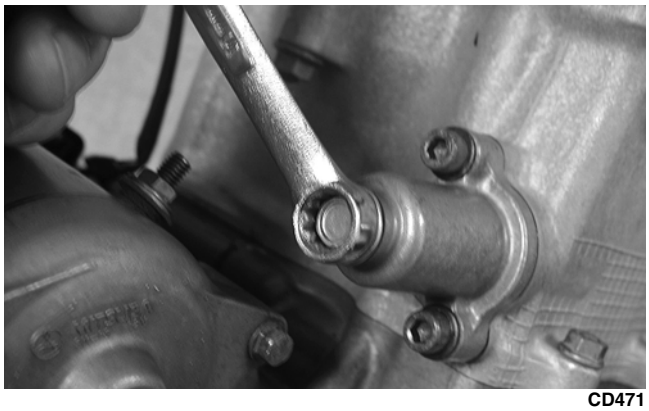
29. Place the chain tensioner adjuster assembly and gasket into position on the cylinder and secure with the two cap screws.



CD469

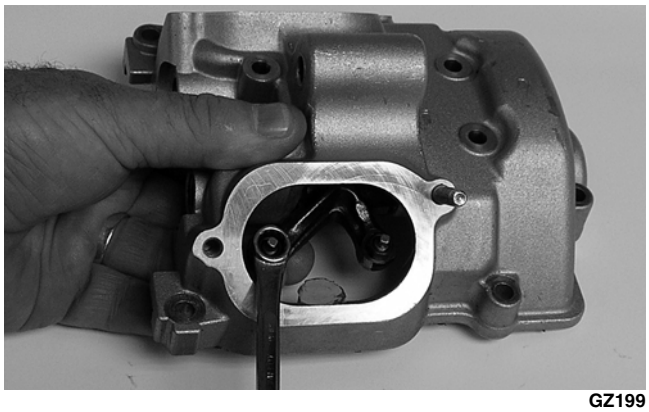
30. Using a flat-blade screwdriver, rotate the adjuster screw inside the tensioner counterclockwise until all tension is released; then install the cap screw into the end of the chain tensioner.

GZ201



CD471

31. Loosen the four adjuster screw jam nuts; then loosen the four adjuster screws on the rocker arms in the valve cover.

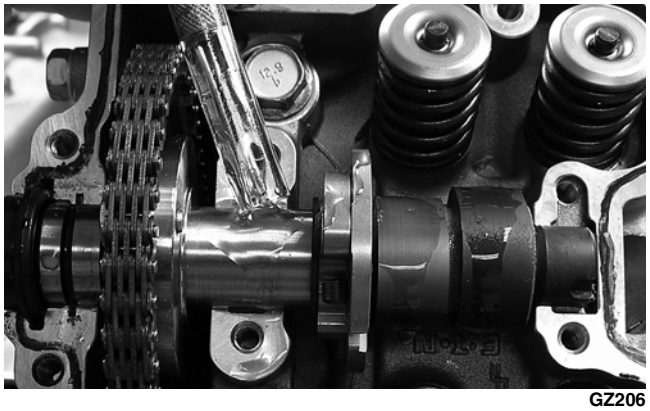


GZ199

32. Apply a thin coat of Three Bond Sealant to the mating surfaces of the cylinder heads.

GZ202

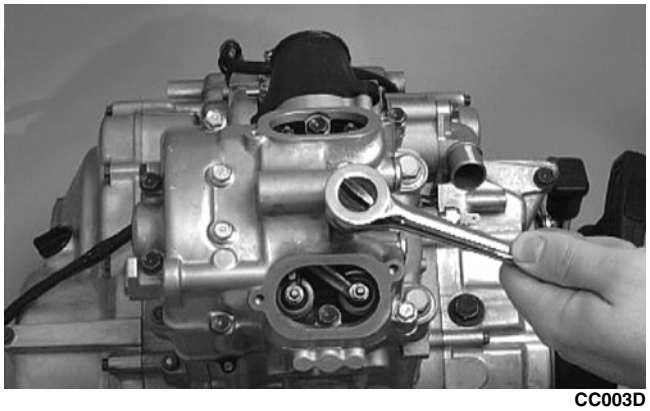
33. Lubricate the camshaft journals and lobes with engine oil; then place the valve cover into position.



GZ206

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

34. Install the top side cap screws with rubber washers; then install the remaining cap screws. Tighten only until snug.



CC003D

35. In a crisscross pattern starting from the center and working outward, tighten the cap screws on both valve covers securely.

36. Adjust valve/tappet clearance (see Section 2).

37. Place the tappet covers into position making sure the O-rings are properly installed. Tighten the cap screws securely.

GZ208

38. If removed, install the spark plugs. Tighten to 11 ft-lb.

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

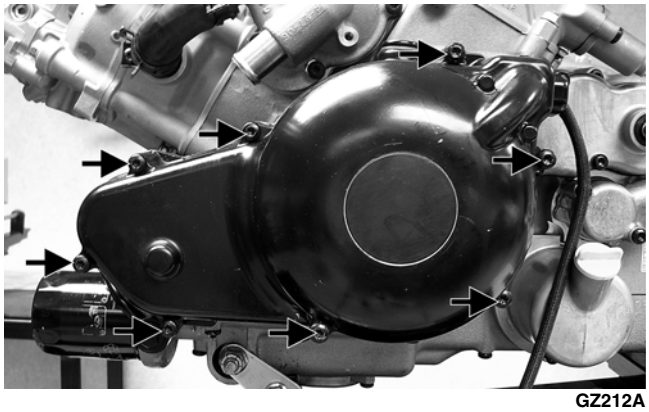
To service any one specific component, only limited disassembly of components may be necessary. Note the AT THIS POINT information in each sub-section.

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

Removing Left-Side Components

A. Magneto Cover/Stator Coils
B. Water Pump
C. Shifter Assembly
D. Rotor/Flywheel/Starter Clutch
E. Speed Sensor/Trigger Assembly

1. Remove the cap screws securing the magneto cover to the crankcase; then remove the magneto cover. Account for the gasket.

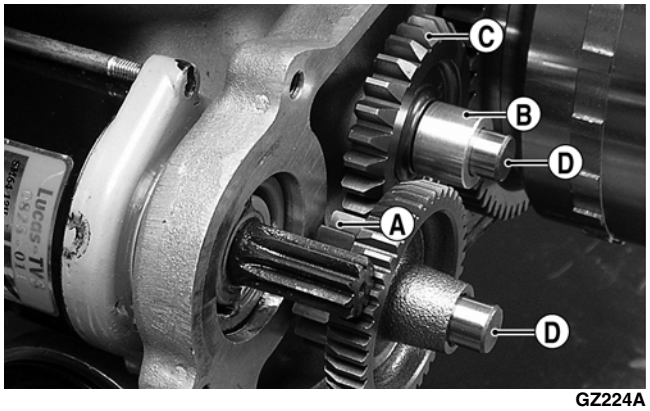


GZ212A

☞ AT THIS POINT

To replace stator coils/crankshaft position sensor, see Section 5.

2. Remove the starter motor, starter driven gear (A), starter countershaft bushing (B), and starter countershaft gear (C); then remove the starter gear shafts (D) noting that the longer shaft is nearest the starter.



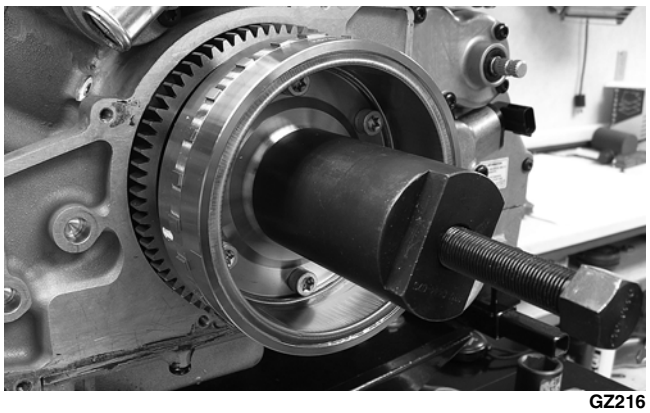
GZ224A

■NOTE: The starter is not serviceable and must be replaced as a complete assembly.

3. Remove the rotor/flywheel nut; then install the appropriate crankshaft protector into the crankshaft.

MD1365

4. Install Magneto Rotor Remover and loosen the rotor/flywheel; then remove the crankshaft protector and rotor/flywheel from the crankshaft. Account for the flywheel key.



GZ216

■NOTE: The puller has left-hand threads.

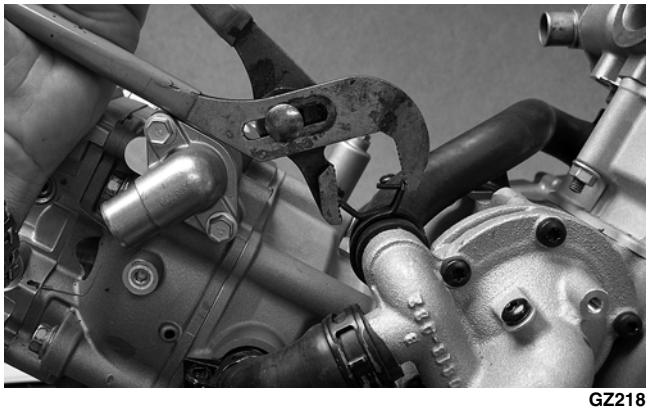
GZ217

5. With the flywheel key removed, remove the starter ring-gear and spacer washer.

GZ226

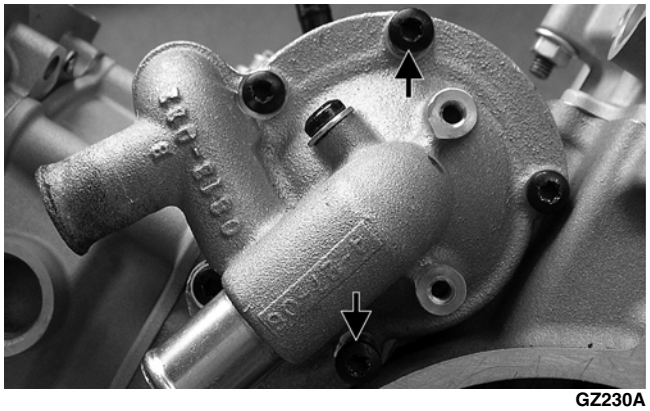
GZ249

6. Remove the hose clamps from the water pump; then remove the coolant hoses from the water pump outlets and coolant pipes



GZ218

7. Remove the two cap screws securing the water pump to the crank case; then remove the water pump. Account for an O-ring.

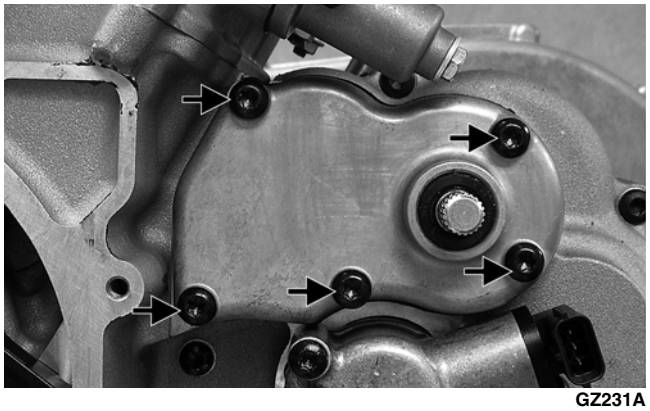


GZ230A

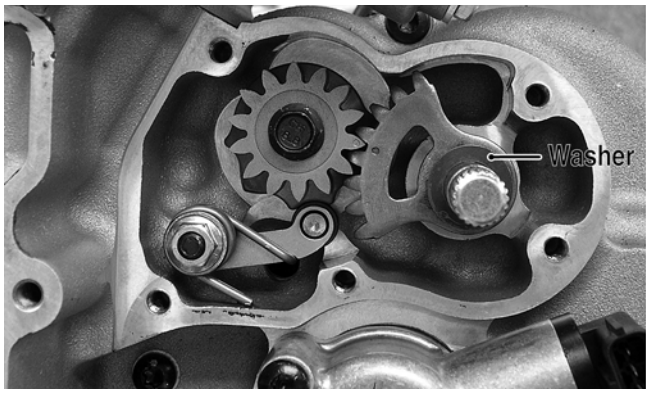
■NOTE: The water pump is a non-serviceable component and must be replaced as a complete assembly.

8. Remove the cap screws securing the gear shift cover to the crankcase; then remove the gear shift cover. Account for a gasket and washer.

■NOTE: Inspect the inside of the left-side cover for any shaft washers that may have come off with the cover. Make sure they are returned to their respective shafts.

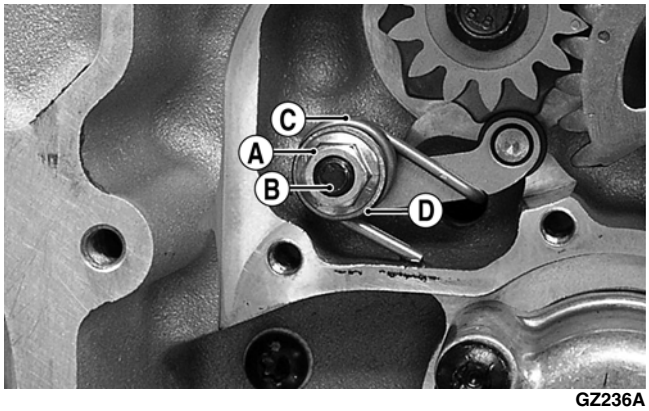


GZ231A



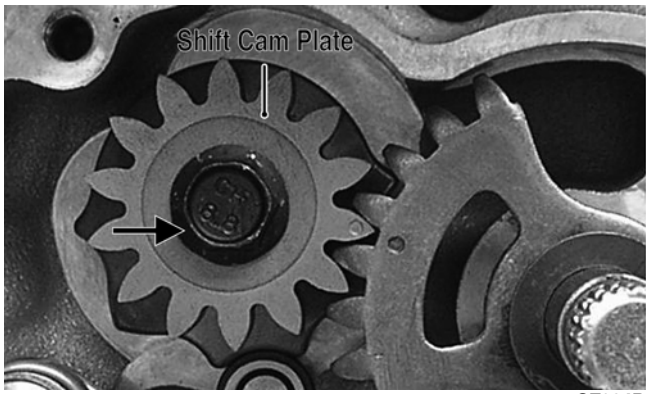
GZ233A

9. Remove the nut (A) from the shift cam stopper bolt (B); then remove the cam stopper spring (C). Account for a flat washer (D).



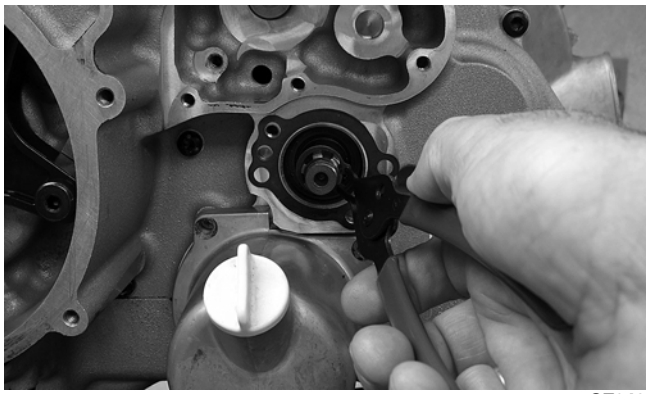
GZ236A

10. Remove the cap screw securing the shift cam plate to the shift cam shaft and remove the shift cam plate; then remove the shift shaft. Account for a washer.



GZ234B

11. Remove the cap screws securing the speed sensor housing to the crankcase and remove the housing assembly; then remove the snap ring securing the speed sensor trigger to the shift and remove the trigger. Account for a gasket.



GZ243

GZ235

12. Remove the cap screws securing the oil filler cover to the crankcase; then remove the cover. Account for an O-ring.

GZ250

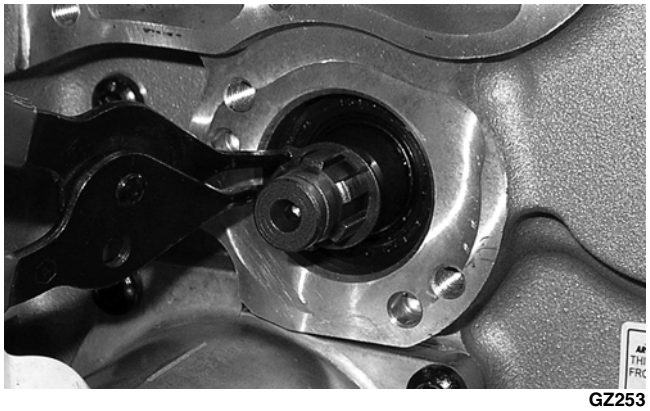
Installing Left-Side Components

1. Thoroughly clean all gasket material and sealant from mating surfaces.

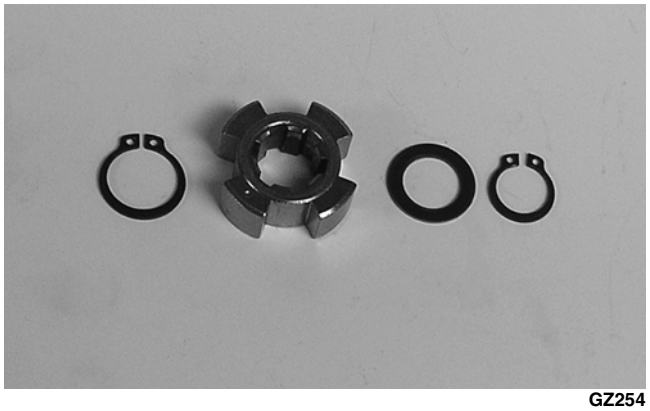
2. Install a new O-ring on the oil filler cover and coat it with clean engine oil; then install the oil filler cover into the crankcase and secure with the cap screws. Tighten to 8 ft-lb.

GZ250

3. Install the inner snap ring onto the countershaft; then install the speed sensor trigger, a flat washer, and the outer snap ring.



GZ253

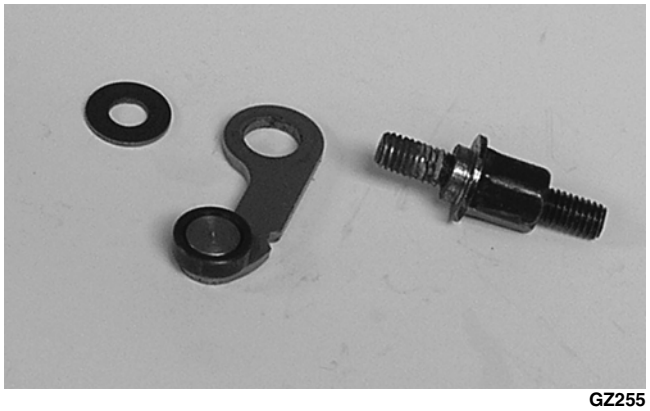


GZ254

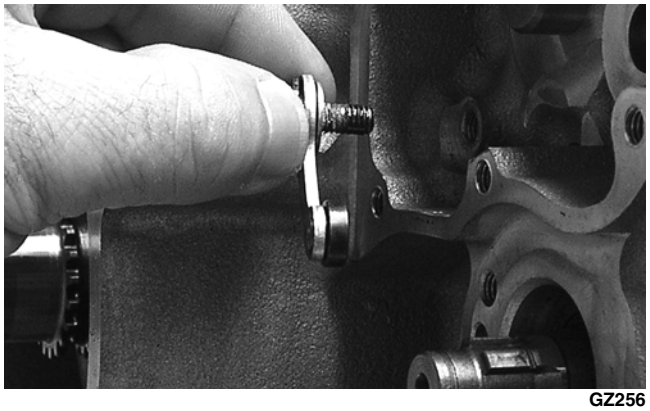
4. Using a new gasket, install the speed sensor housing onto the crankcase and secure with two cap screws. Tighten to 8 ft-lb.

GZ232

5. If removed, install the shift cam stopper on the support; then with the flat washer in place, install the shift cam stopper assembly into the crankcase and tighten to 8 ft-lb.

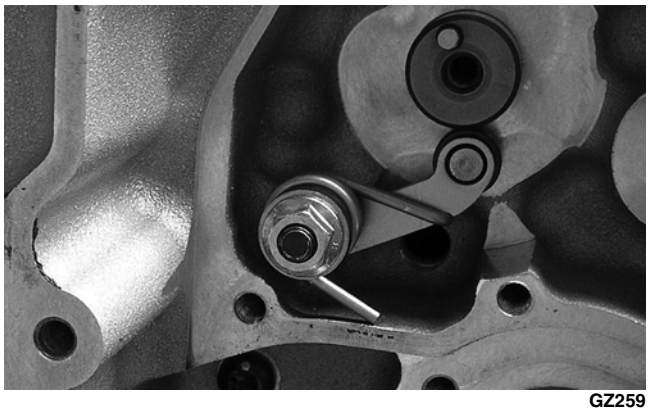


GZ255



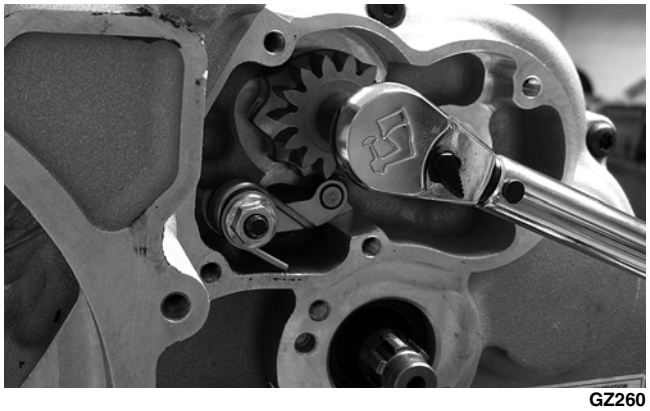
GZ256

6. Install the shift cam stopper spring onto the shift stopper and secure with a flat washer and flange nut. Tighten to 8 ft-lb.



GZ259

7. Install the shift cam plate onto the shift cam shaft and secure with the cap screw. Tighten to 8 ft-lb.



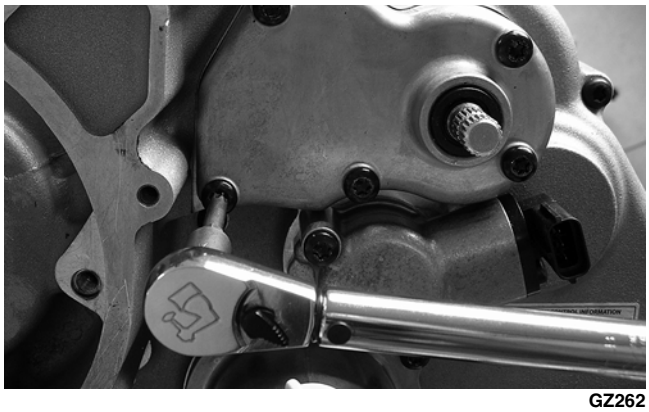
GZ260

8. Install the shift shaft into the crankcase making sure the washers are properly located; then align the timing reference marks and completely seat the shift shaft.

GZ258

GZ261

9. Apply grease to the lips of the shift shaft seal in the shifter housing; then using a new gasket, install the shifter housing and secure with the cap screws. Tighten in a crisscross pattern to 8 ft-lb.



GZ262

10. Install the spacer washer on the crankshaft; then install the starter ring gear.

GZ249

GZ226

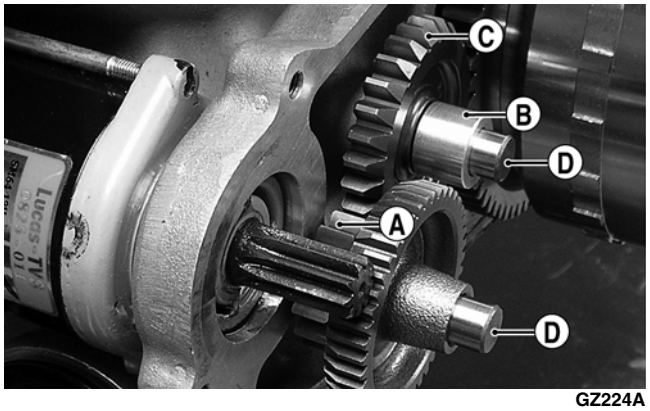
11. Place the key into the keyway in the crankshaft; then wipe all oil from the crankshaft surface and rotor/flywheel bore and install the rotor/flywheel onto the crankshaft aligning the keyway with the key. Secure with the nut and tighten to 107 ft-lb.

GZ225

⚠ CAUTION

Make sure the one-way starter clutch is properly engaged with the starter ring gear before installing and tightening the rotor/flywheel nut or damage to the clutch assembly could occur.

12. Install the starter driven and counter gear shafts (D) into the crankcase (longer shaft to the front); then install the starter countershaft gear (C), starter driven gear (A), and bushing (B) making sure the chamfered gear teeth on the countershaft gear are directed outward.

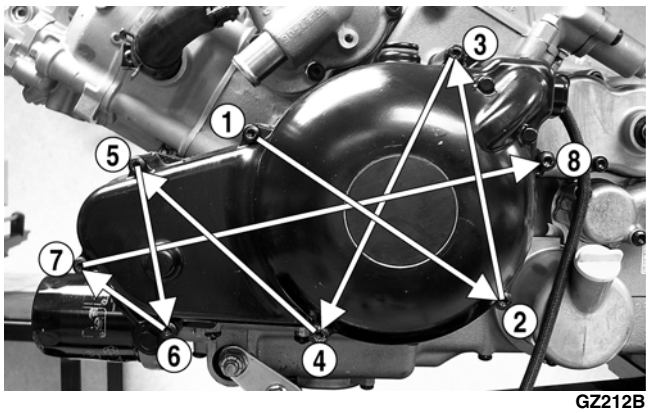


GZ224A

13. Install the starter motor with a new O-ring lightly lubricated with grease; then tighten the mounting cap screws to 8 ft-lb.

GZ251

14. Install the magneto cover using a new gasket and secure with the cap screws. Using the pattern shown, tighten to 8 ft-lb.



GZ212B

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.

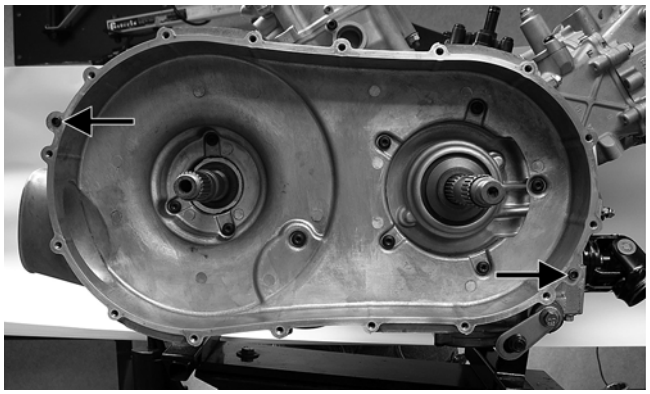
☞ AT THIS POINT
To service any one specific component, only limited disassembly of components may be necessary. Note the AT THIS POINT information in each sub-section.

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

Removing Right-Side Components

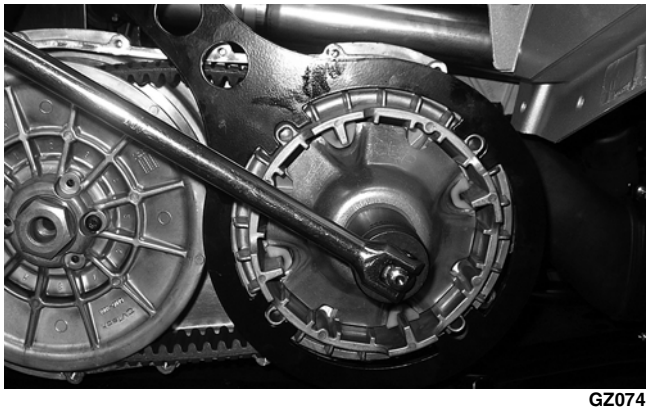
A. V-Belt Cover
B. Driven Pulley
C. Clutch Cover
D. Centrifugal Clutch

1. Remove the cap screws securing the V-belt cover; then using a rubber mallet, gently tap on the cover tabs to loosen the cover. Account for a gasket and two alignment pins.

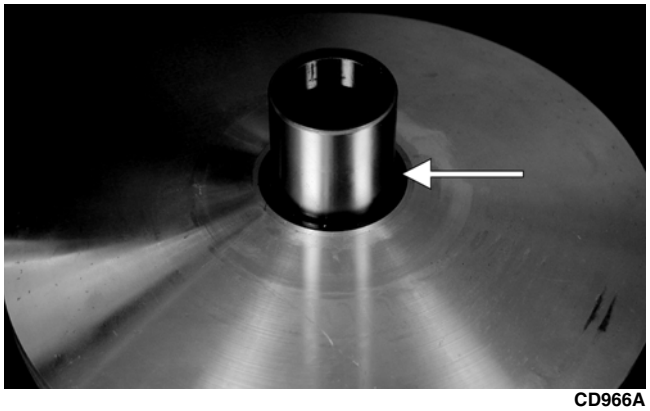


GZ244B

2. Remove the nut securing the movable drive face; then remove the face. Account for a spacer and a flat washer.

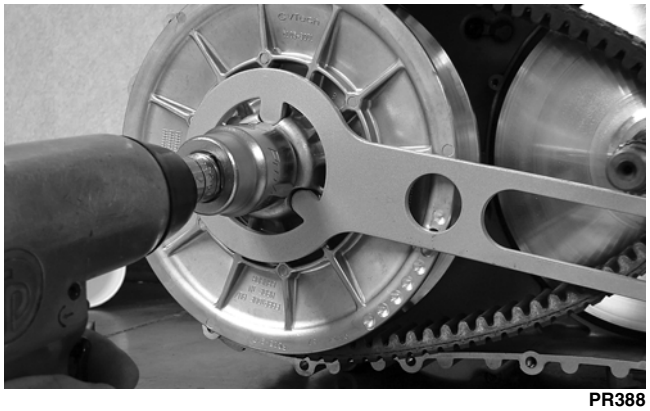


GZ074



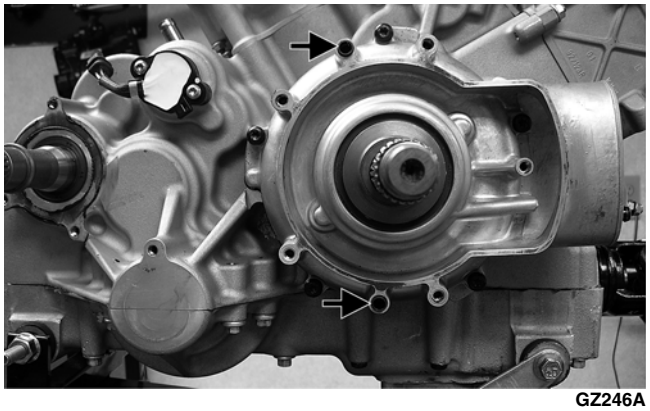
CD966A

3. Remove the V-belt.
4. Remove the nut securing the fixed driven assembly; then remove the assembly.



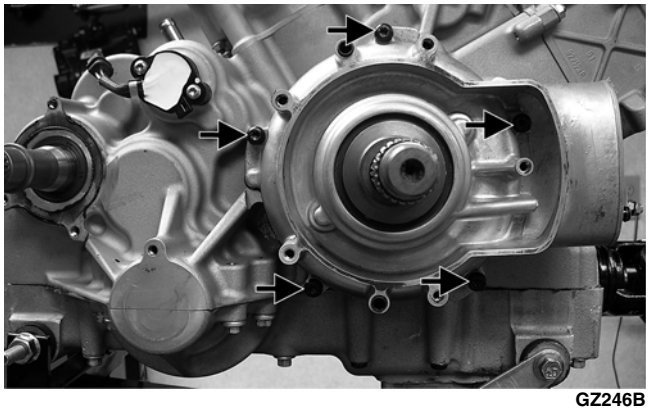
PR388

5. Remove the fixed drive face.
6. Remove the cap screws securing the V-belt housing to the crankcase; then remove the V-belt housing. Account for two alignment pins.

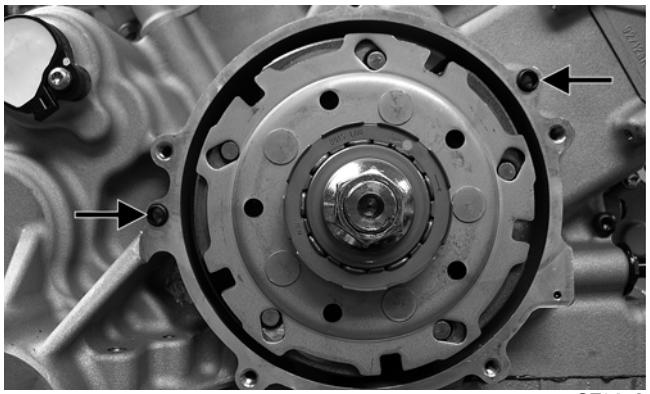


GZ246A

7. Remove the cap screws securing the clutch cover; then using a rubber mallet, carefully remove the cover. Account for two alignment pins.



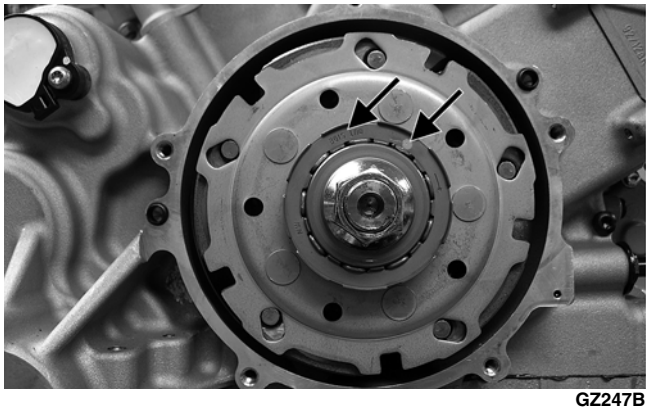
GZ246B



GZ247A

■**NOTE: To aid in installing, it is recommended that the assemblies are kept together and IN ORDER.**

8. Remove the one-way clutch from the centrifugal clutch. Note the location of the green dot (or the word OUTSIDE) for installing purposes.



GZ247B

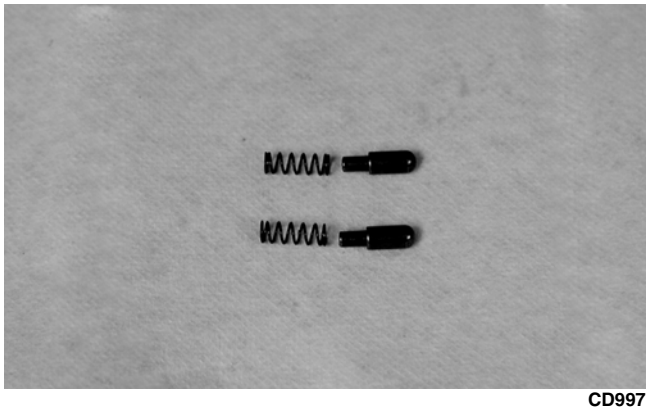
9. Using a hydraulic press, remove the clutch housing assembly from the clutch cover. Account for the left fixed drive spacer and an O-ring inside the fixed drive spacer.

CF085

CC596

■NOTE: Account for and inspect the clutch housing seal.

10. Remove the two cap screws securing the gear shift position switch; then remove the switch. Account for two contact pins and two springs.



CD997

11. Remove the nut (left-hand threads) securing the clutch shoe assembly.

GZ248A

Servicing Right-Side Components

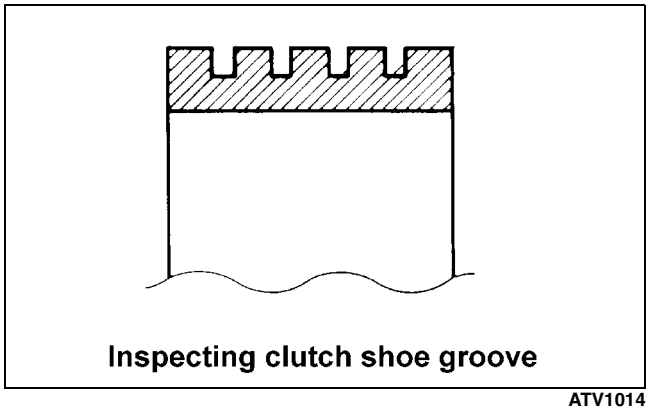
■NOTE: Whenever a part is worn excessively, cracked, damaged in any way, or out of tolerance, replacement is necessary.

INSPECTING CENTRIFUGAL CLUTCH SHOE

1. Inspect the clutch shoes for uneven wear, chips, cracks, or discoloration. If any shoe is damaged, replace the complete set.
2. Inspect the clutch shoes for wear or damage. If any shoe is worn to the bottom of the groove, replace the complete set.

⚠ CAUTION

Always replace the clutch shoes as a complete set or severe imbalance could occur.



Inspecting clutch shoe groove

ATV1014

INSPECTING CLUTCH HOUSING

1. Inspect the clutch housing for burns, grooving, cracks, or uneven wear.
2. If the housing is damaged in any way, the housing must be replaced.

INSPECTING PRIMARY ONE-WAY DRIVE

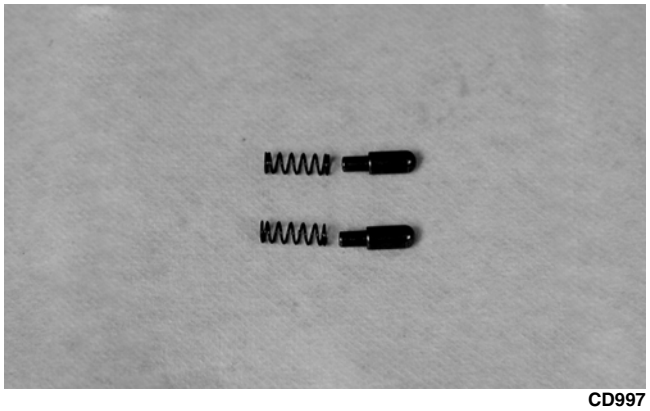
1. Insert the drive into the clutch housing.
2. Rotate the inner race by hand and verify the inner race rotates only one direction.
3. If the inner race is locked in place or rotates both directions, the drive assembly must be replaced.

DRIVEN PULLEY ASSEMBLY

■NOTE: The driven pulley is a non-serviceable component. If the pulley faces, cam ramps, or sheeve bushing are worn or loose, the pulley must be replaced as an assembly. Do not disassemble the driven pulley.

Installing Right-Side Components

1. Install the gear shift position switch making sure the two contact pins and the two springs are properly positioned. Tighten the cap screws securely.



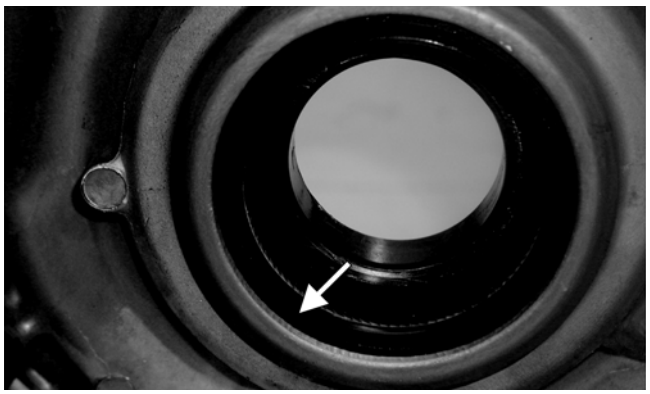
CD997

GZ240

2. Install the clutch shoe assembly and secure with the flange nut (threads coated with red Loctite #271). Tighten to 221 ft-lb.

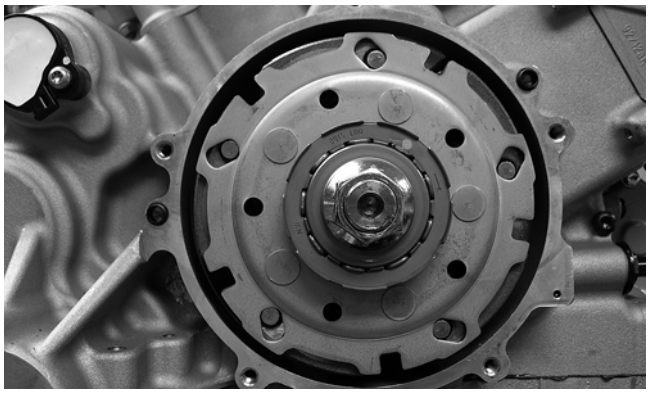
GZ241

3. Lightly grease the clutch housing seal; then insert the left fixed drive spacer.



CF088A

4. Install the clutch cover alignment pins into the crankcase, apply oil to the cover gasket, and install the gasket onto the crankcase.
5. Apply grease to the outer edges of the clutch housing; then from inside the clutch cover, install the clutch housing into the cover.
6. Install the one-way clutch onto the clutch shoe assembly.



GZ247

⚠ CAUTION

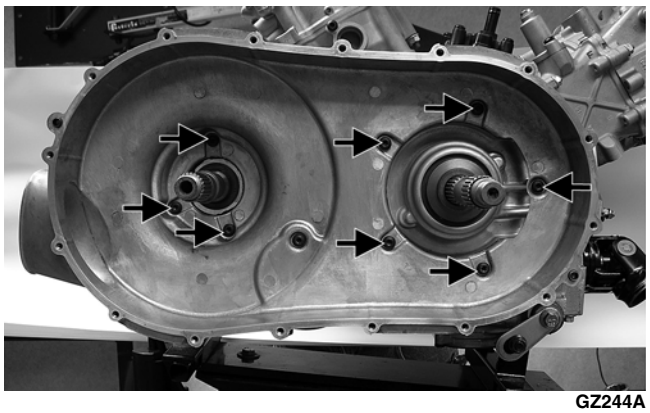
When installed correctly, the green alignment dot (or the word OUTSIDE) on the one-way clutch is visible.

7. Place the clutch cover/clutch housing assembly into position on the crankcase; then secure with the cap screws. Tighten in a crisscross pattern to 8 ft-lb.

GZ246B

8. Making sure the alignment pins are correctly installed, place a bead of silicone sealant on the mating surfaces and install the V-belt housing. Secure with the cap screws tightened to 8 ft-lb.

GZ263

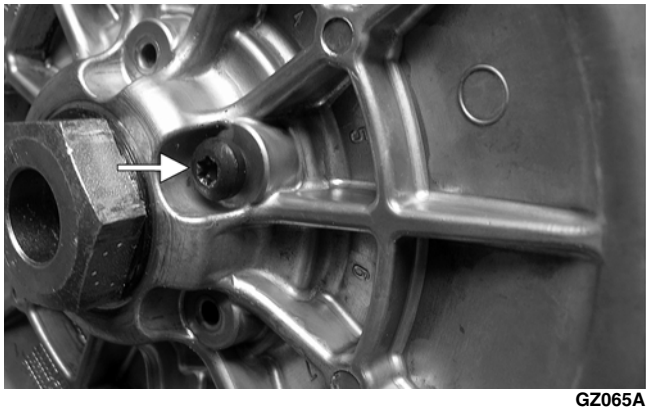


GZ244A

9. Place the driven pulley assembly into position and secure with the nut (coated with red Loctite #271). Tighten to 80 ft-lb.

GZ066

10. Slide the fixed drive face onto the clutch shaft.
11. Spread the faces of the driven pulley by threading in a cap screw; then when the faces are separated, insert the belt and push down between the faces.



GZ065A

12. Place the V-belt into position on the driven pulley and over the front shaft.

GZ085

■NOTE: The arrows on the V-belt should point forward.

13. Pinch the V-belt together near its center and slide the spacer and movable drive face onto the shaft. Secure the drive face with a flat washer and a nut (threads coated with red Loctite #271). Tighten the nut to 165 ft-lb.

GZ075

⚠ CAUTION

Make sure the splines extend beyond the drive face or a false torque reading and spline damage may occur.

PR386

■NOTE: At this point, the cap screw can be removed from between the driven pulley faces.

14. Rotate the V-belt and drive/driven assemblies until the V-belt is flush with the top of the driven pulley.

15. Place the V-belt cover gasket into position; then install the cover and secure with the cap screws. Tighten the cap screws to 8 ft-lb.

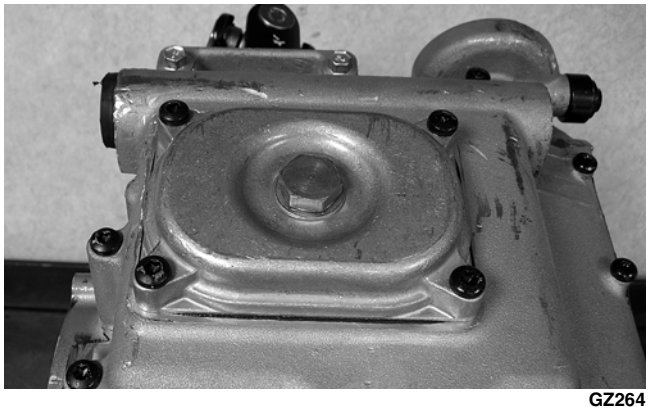
Center Crankcase Components

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

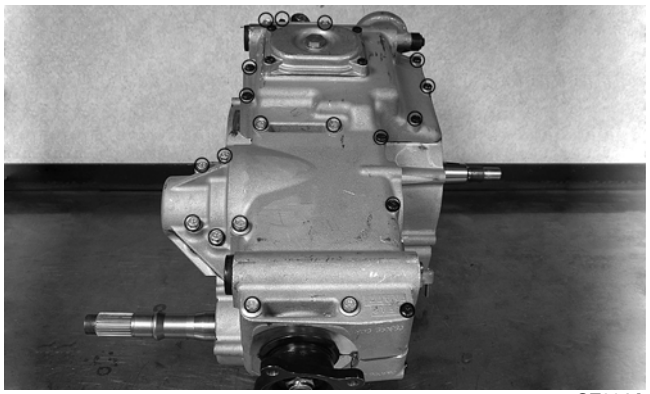
Separating Crankcase Halves

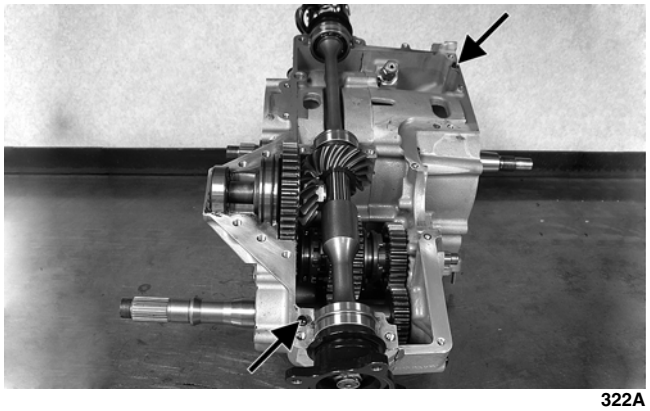
1. Remove the oil strainer cup; then remove the oil strainer.


GZ264

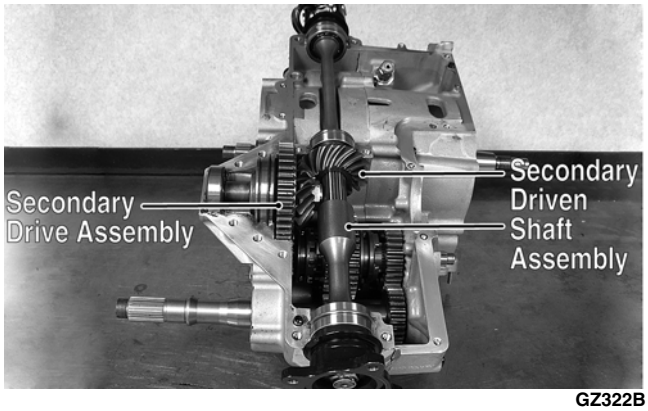

GZ268

2. Remove the cap screws securing the lower crankcase to the upper crankcase halves; then using a rubber hammer, free the lower crankcase and remove. Account for two alignment pins.

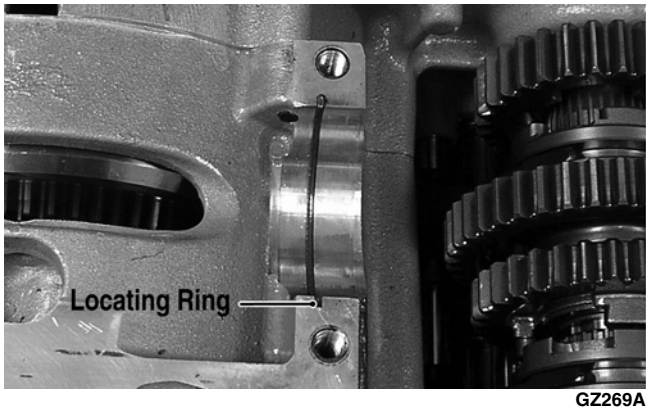

GZ321A


322A

3. Remove the secondary drive assembly; then remove the secondary driven shaft assembly and set aside. Account for one locating ring.



GZ322B

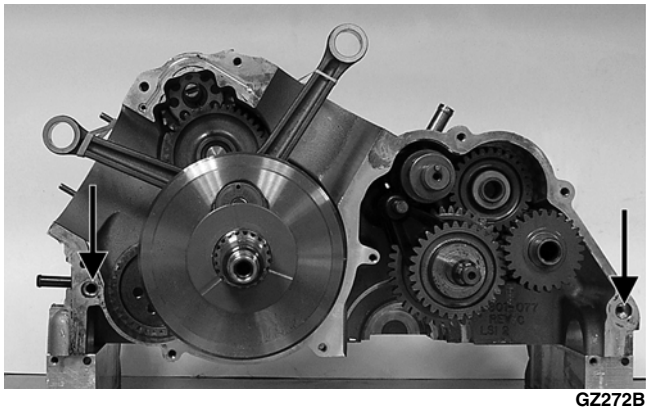


GZ269A

■NOTE: Do not disassemble these assemblies unless service is required. If disassembled, secondary gear sets will have to be reset for backlash and gear contact (see Servicing Crankcase Components in this section).

4. Remove one cap screw from the right-side crankcase and eight cap screws from the left-side crankcase; then using a rubber mallet, separate the crankcase halves leaving all components in the right-side case. Account for a thrust washer on the crankshaft and flat washers on gear shift shaft, countershaft, and reverse idler. Note the location of two alignment pins.

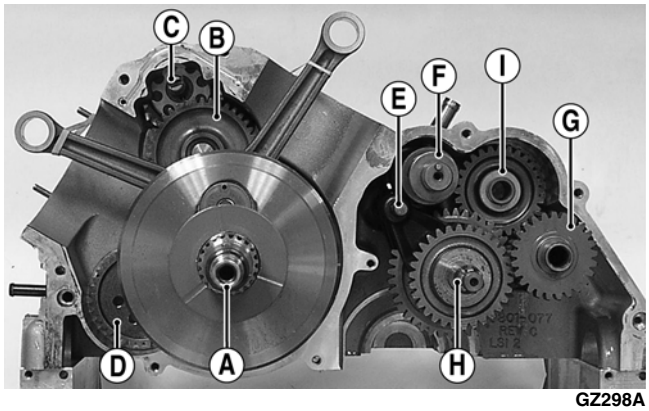

GZ271



GZ272B

Disassembling Crankcase Half

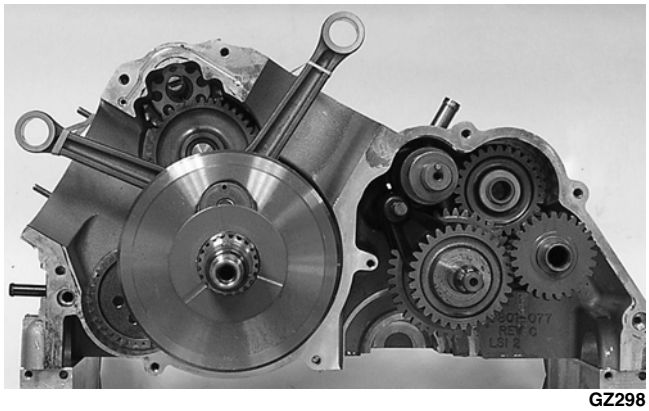
■**NOTE: For steps 1-8, refer to photograph GZ298A.**



GZ298A

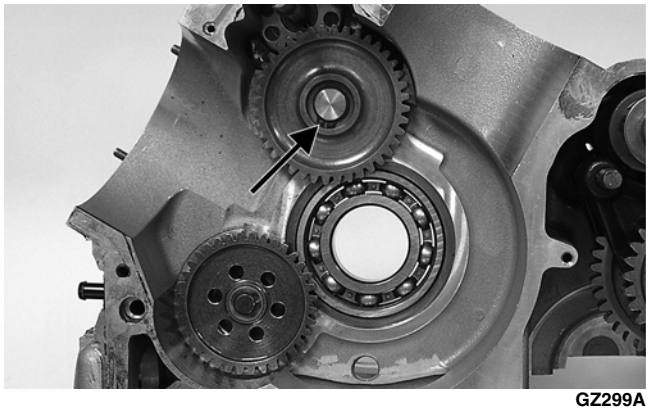
■**NOTE: To aid in installing, it is recommended that the assemblies are kept together and IN ORDER.**

1. Support the right-side crankcase assembly on suitable support blocks; then carefully remove the crankshaft assembly (A) from the crankcase.



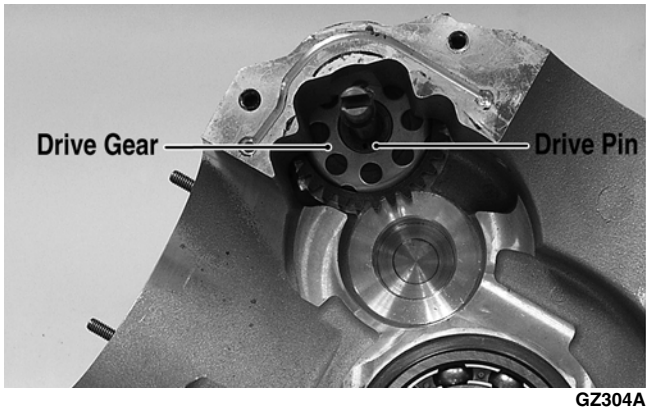
GZ298

2. Remove the snap ring securing the water pump drive idler (B) to the idler shaft; then remove the drive idler.



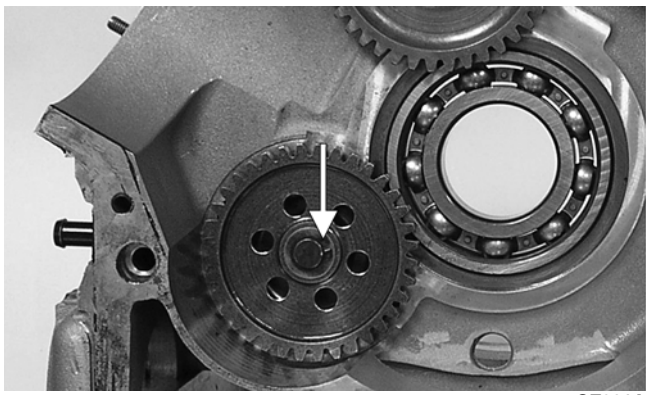
GZ299A

3. Remove the water pump driven shaft (C). Account for the driven gear and drive pin.



GZ304A

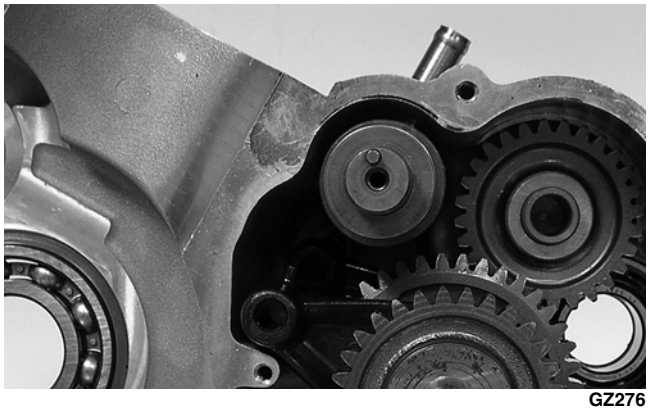
4. Remove the snap ring securing the oil pump driven gear (D) to the oil pump driveshaft; then remove the gear. Account for a drive pin and washer.



GZ301A

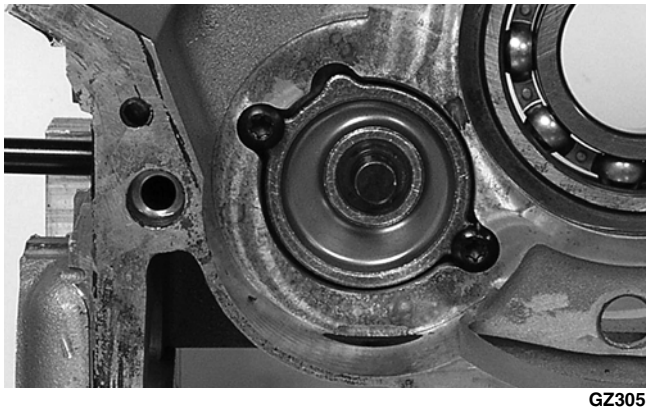
5. Remove the shift fork shaft (E); then remove the gear shift shaft assembly (F). Account for two flat washers.

3



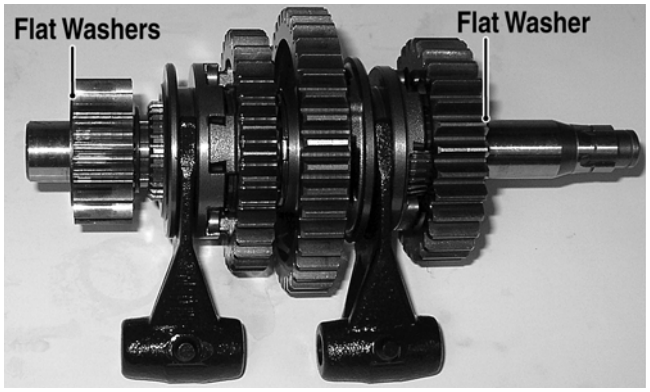
GZ276

6. Remove two cap screws securing the oil pump in the crankcase and remove the oil pump.



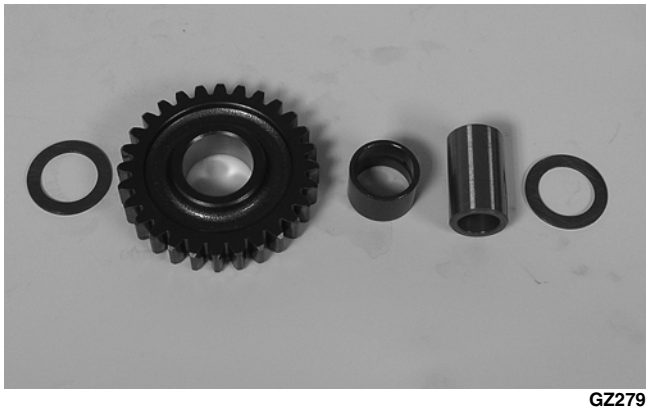
GZ305

7. Remove the driveshaft (G); then remove the countershaft assembly (with shift forks) (H). Account for three flat washers on the countershaft.



GZ280A

8. Remove the reverse idler gear (H), shaft bushing, and two washers.



GZ279

■NOTE: Do not disassemble the countershaft assembly unless necessary. If necessary, see Servicing Center Crankcase Components sub-section.

Servicing Center Crankcase Components

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

SECONDARY GEARS

■NOTE: When checking and correcting secondary gear backlash and tooth contact, the universal joint must be secured to the front shaft or false measurements will occur.

Checking Backlash

■NOTE: The rear shaft and bevel gear must be removed for this procedure. Also, always start with the original shims on the rear shaft.

1. Place the left-side crankcase cover onto the left-side crankcase half to prevent runout of the secondary transmission output shaft.
2. Install the secondary driven output shaft assembly onto the crankcase.
3. Mount the dial indicator so the tip is contacting a tooth on the secondary driven bevel gear.
4. While rocking the driven bevel gear back and forth, note the maximum backlash reading on the gauge.
5. Acceptable backlash range is 0.05-0.33 mm (0.002-0.013 in.).

Correcting Backlash

■NOTE: If backlash measurement is within the acceptable range, no correction is necessary.

1. If backlash measurement is less than specified, remove an existing shim, measure it, and install a new thinner shim.
2. If backlash measurement is more than specified, remove an existing shim, measure it, and install a thicker shim.

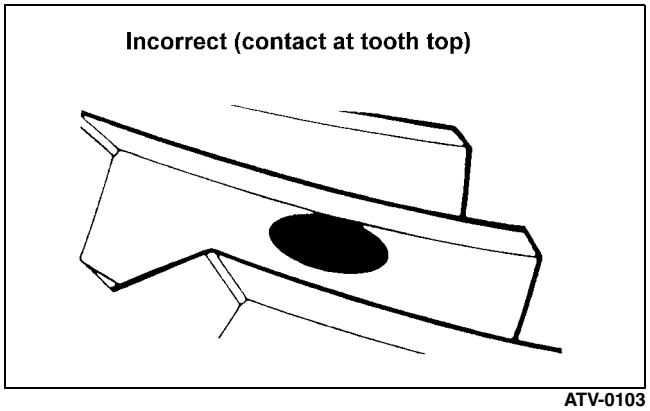
■NOTE: Continue to remove, measure, and install until backlash measurement is within tolerance. Note the following chart.

Backlash Measurement	Shim Correction
Under 0.05 mm (0.002 in.)	Decrease Shim Thickness
At 0.05-0.33 mm (0.002-0.013 in.)	No Correction Required
Over 0.33 mm (0.013 in.)	Increase Shim Thickness

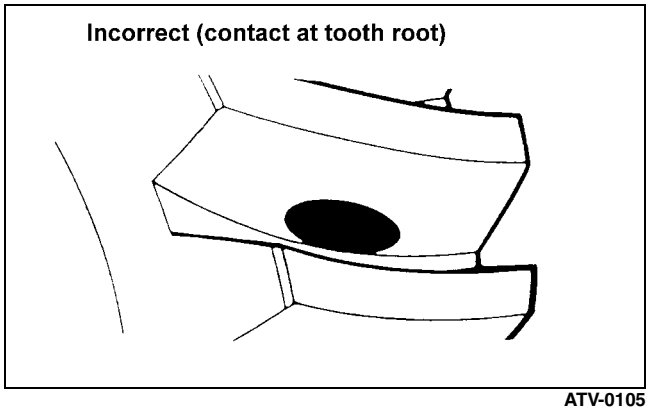
Checking Tooth Contact

■NOTE: After correcting backlash of the secondary driven bevel gear, it is necessary to check tooth contact.

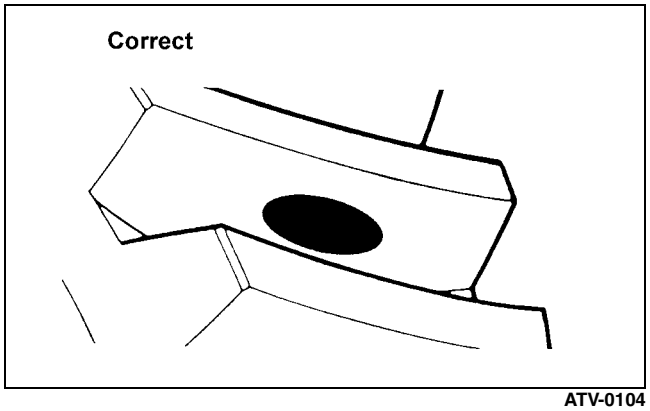
1. Remove the secondary driven output shaft assembly from the left-side crankcase half.
2. Clean the secondary driven bevel gear teeth of old oil and grease residue.
3. Apply a thin, even coat of a machinist-layout dye to several teeth of the gear.
4. Install the secondary driven output shaft assembly.
5. Rotate the secondary driven bevel gear several revolutions in both directions.
6. Examine the tooth contact pattern in the dye and compare the pattern to the illustrations.



ATV-0103



ATV-0105



ATV-0104

Correcting Tooth Contact

■NOTE: If tooth contact pattern is comparable to the correct pattern illustration, no correction is necessary.

If tooth contact pattern is comparable to an incorrect pattern, correct tooth contact according to the following chart.

Tooth Contact	Shim Correction
Contacts at Top	Decrease Shim Thickness
Contacts at Root	Increase Shim Thickness

■NOTE: To correct tooth contact, steps 1 and 2 (with NOTE) of "Correcting Backlash" must be followed and the above "Tooth Contact/Shim Correction" chart must be consulted.

⚠ CAUTION

After correcting tooth contact, backlash must again be checked and corrected (if necessary). Continue the correcting backlash/correcting tooth contact procedures until they are both within tolerance values.

OIL PUMP ASSEMBLY

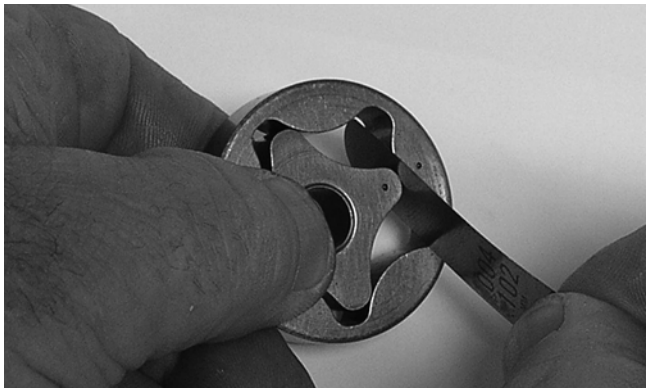
Disassembling and Inspecting

1. Remove the oil pump cover; then remove the gerotor set, shaft, and pin (see Disassembling Crankcase Half in this section).

2. Inspect the crankcase for securing, discoloration, or cracks in the gerotor bore. If scored, crankcase assembly must be replaced.

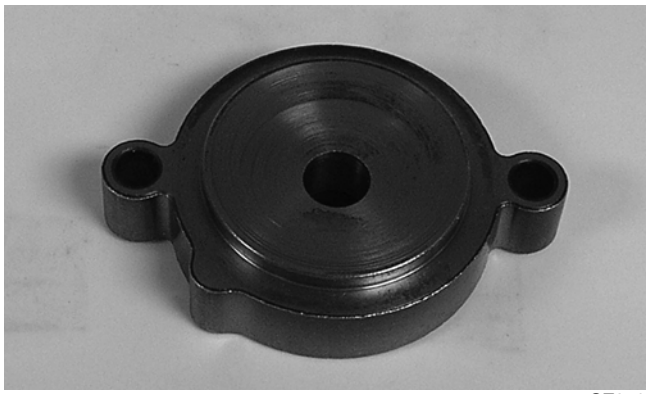
GZ357

3. Inspect the gerotor set for scoring, discoloration, or cracks; then using a feeler gauge, check the inner to outer rotor clearance. If measurements exceed specifications, the gerotor set must be replaced.



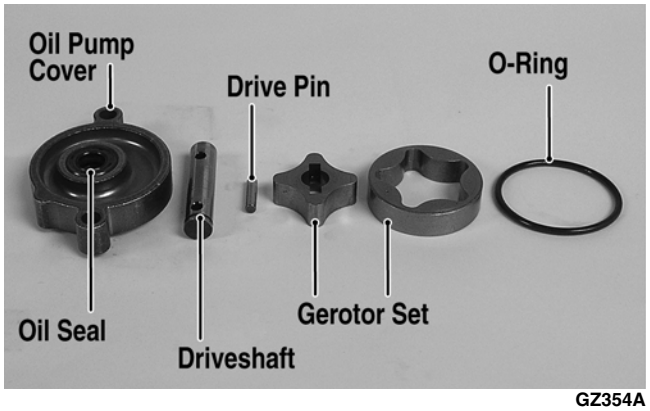
GZ355

4. Inspect the oil pump cover for scoring, discoloration, or cracks. Replace if damaged.



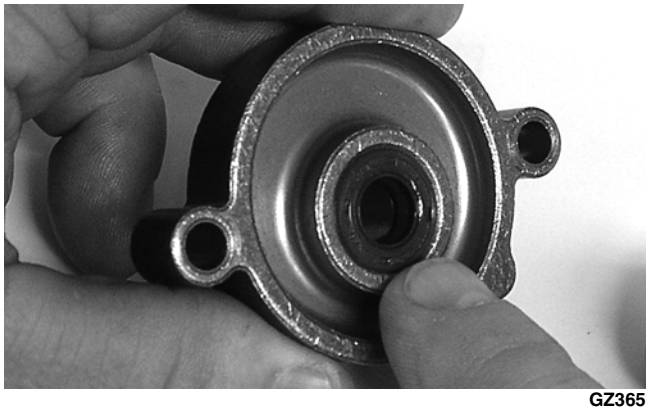
GZ358

5. Inspect the oil pump driveshaft and drive pin for excessive wear or grooving. Replace as required.



GZ354A

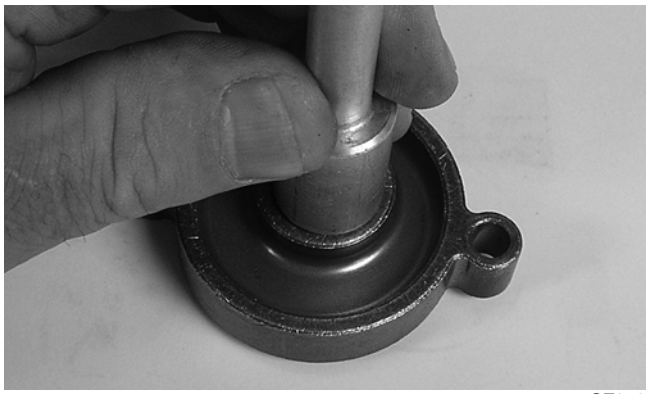
6. Remove the oil seal from the oil pump cover.



GZ365

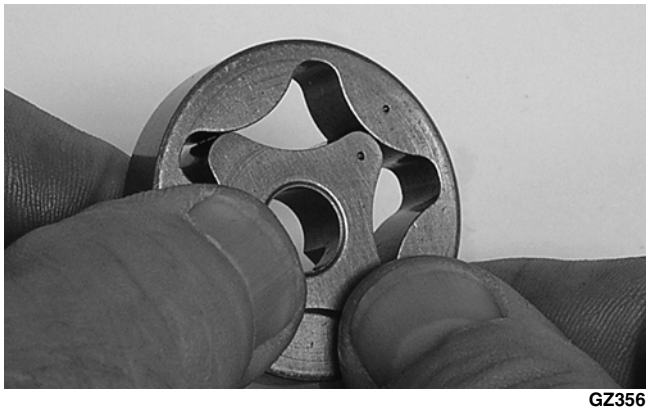
Assembling

1. Install a new oil seal into the oil pump cover; then coat the lips of the seal with grease and install the pump driveshaft from the seal side.

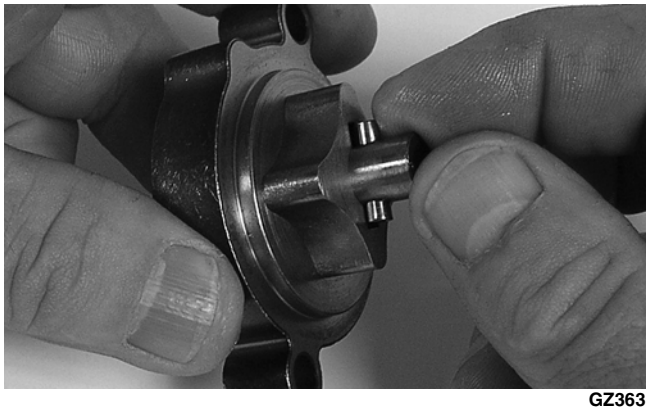


GZ359

2. Noting the reference dots on the gerotor set, separate the inner rotor from the outer rotor and with the reference dot directed toward the oil pump cover, place the rotor on the shaft; then install the drive pin and push the shaft into the rotor.



GZ356



GZ363

3. With the outer rotor reference dot directed toward the oil pump cover, install the rotor onto the inner rotor.

GZ360

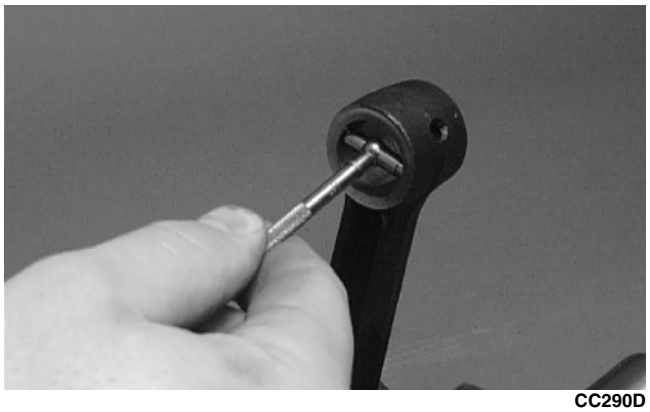
4. Place a new O-ring seal on the outside of the oil pump cover. The oil pump assembly is now ready for assembly into the crankcase.

GZ362

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.

Measuring Connecting Rod (Small End Deflection)

1. Place the crankshaft on a set of V blocks and mount a dial indicator and base on the surface plate. Position the indicator contact point against the center of the connecting rod small end journal.
2. Zero the indicator and push the small end of the connecting rod away from the dial indicator.
3. Maximum deflection must not exceed specifications.

Measuring Connecting Rod (Big End Side-to-Side)

1. Push the lower end of the connecting rod to one side of the crankshaft journal.
2. Using a feeler gauge, measure the gap between the connecting rod and crankshaft journal.
3. Acceptable gap range must be within specifications.

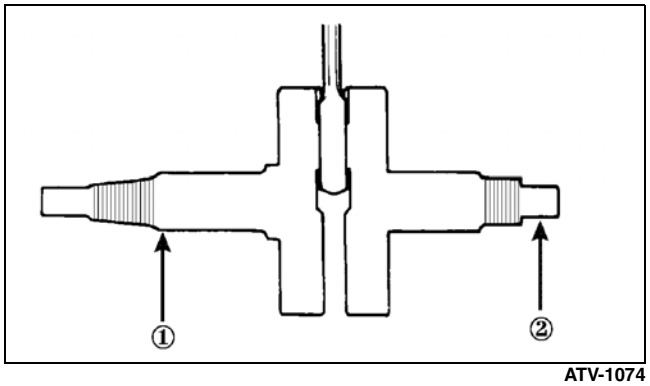
Measuring Connecting Rod (Big End Width)

1. Using a calipers, measure the width of the connecting rod at the big-end bearing.
2. Acceptable width range must be within specifications.

Measuring Crankshaft (Runout)

1. Place the crankshaft on a set of V blocks.

2. Mount a dial indicator and base on the surface plate. Position the indicator contact at point 1 of the crankshaft.



ATV-1074

3. Zero the indicator and rotate the crankshaft slowly.

⚠ CAUTION

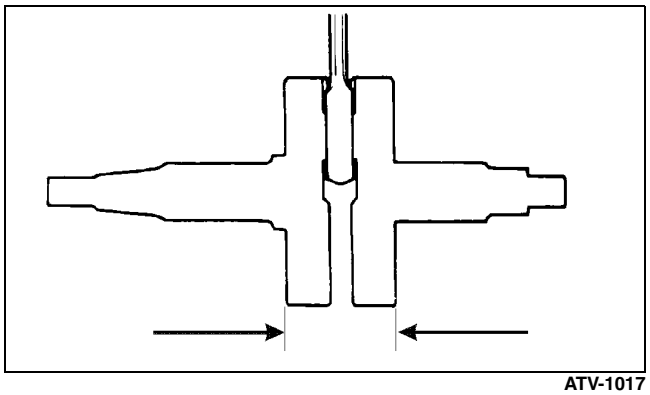
Care should be taken to support the connecting rod when rotating the crankshaft.

4. Maximum runout must not exceed specifications.

■NOTE: Proceed to check runout on the other end of the crankshaft by positioning the indicator contact at point 2 and following steps 3-4.

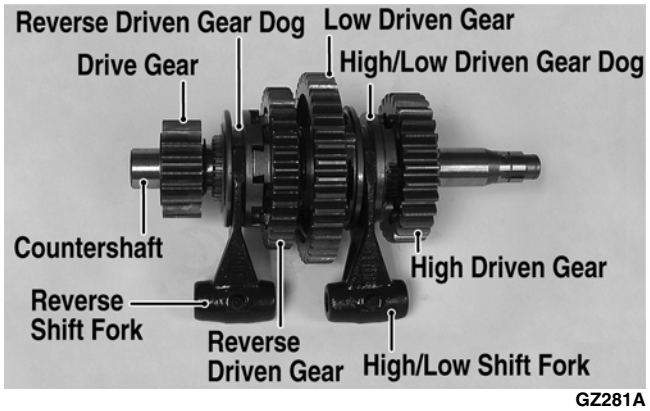
Measuring Crankshaft (Web-to-Web)

1. Using a calipers, measure the distance from the outside edge of one web to the outside edge of the other web.


ATV-1017

2. Acceptable width range must be within specifications.

COUNTERSHAFT



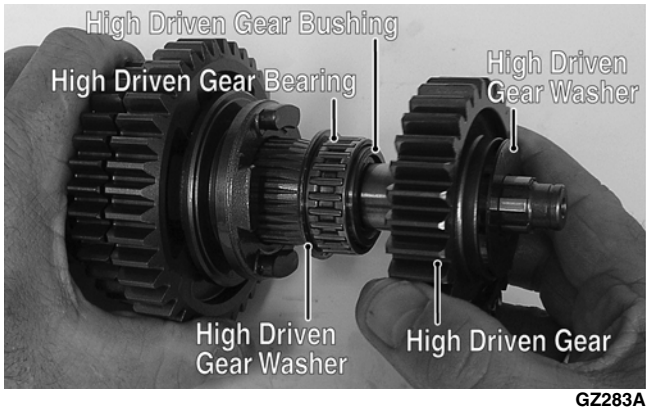
GZ281A

⚠ CAUTION

When disassembling the countershaft, care must be taken to note the direction each major component (dog, gear) faces. If a major component is installed facing the wrong direction, transmission damage may occur and/or the transmission will malfunction. In either case, complete disassembly and assembly will be required.

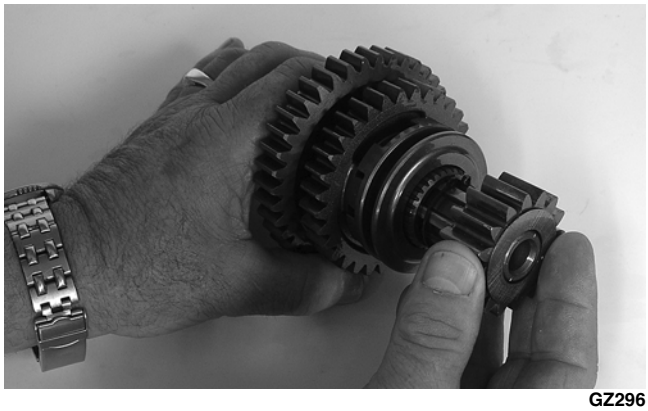
Disassembling

1. Remove the shift forks noting the positions for assembling; then remove the high driven gear outer washer, high driven gear, high driven gear bearing, high driven gear bushing, and high driven gear inner washer.

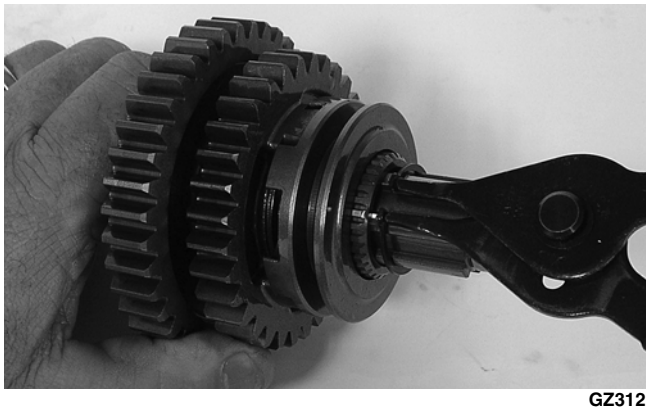


GZ283A

2. Remove the drive gear; then remove the snap ring securing the reverse driven gear dog and bushing to the countershaft.

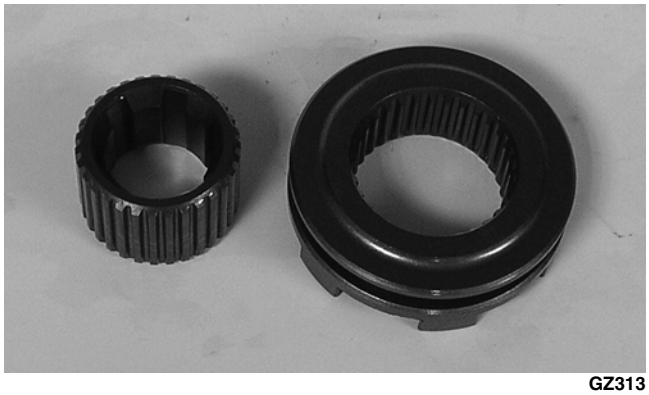


GZ296



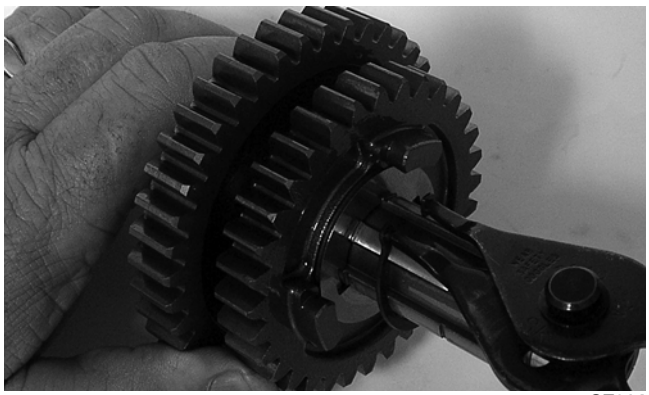
GZ312

3. Remove the reverse driven gear dog and bushing.



GZ313

4. Remove the snap ring securing the reverse driven gear and washer; then remove the washer and gear.

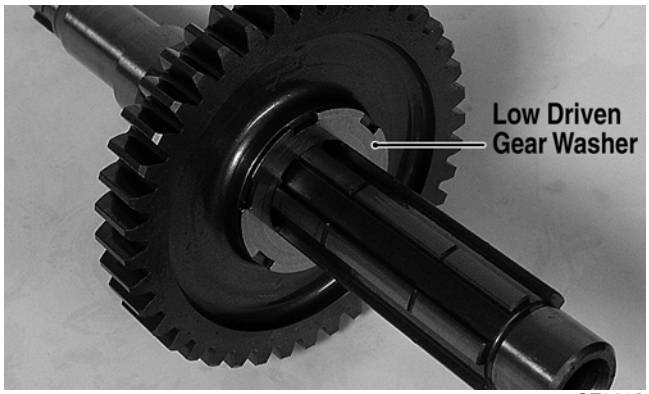


GZ314

5. Remove the reverse driven washer; then remove the low driven gear locking washer.

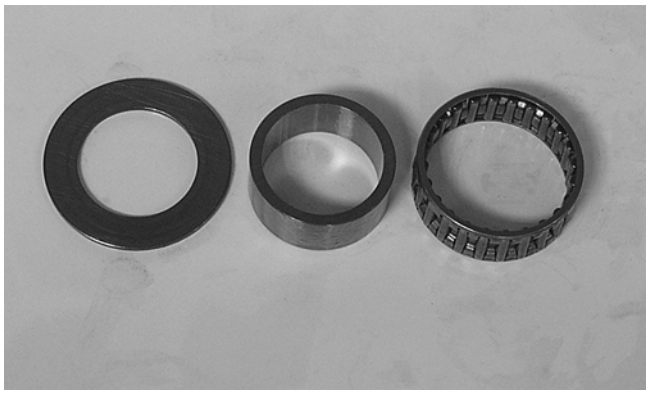
GZ320

GZ319



GZ318A

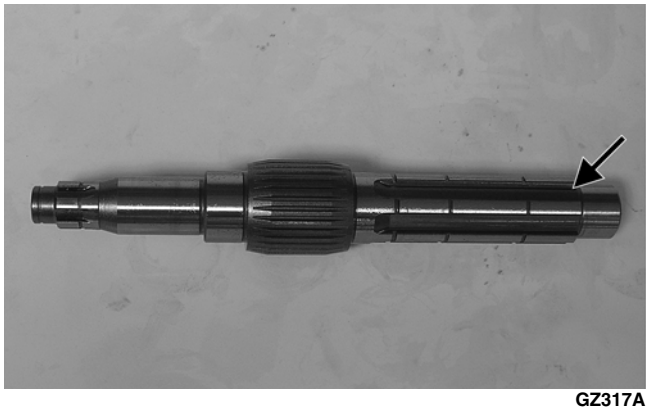
6. Remove the low driven gear. Account for a bearing, bushing, and thrust washer.

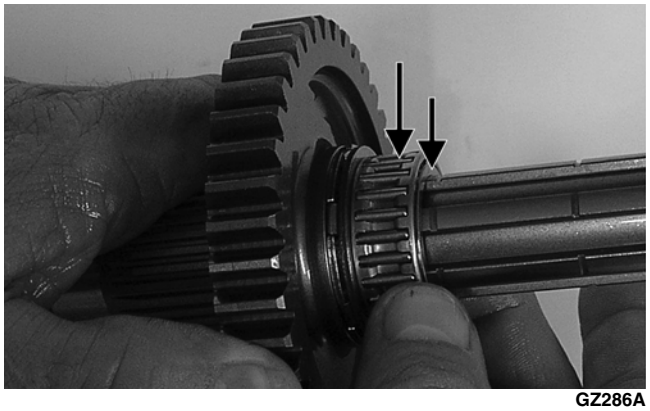


GZ316

Assembling

1. From the drive gear end, install a thrust washer, bushing, and bearing; then install the low driven gear and washer.


GZ317A

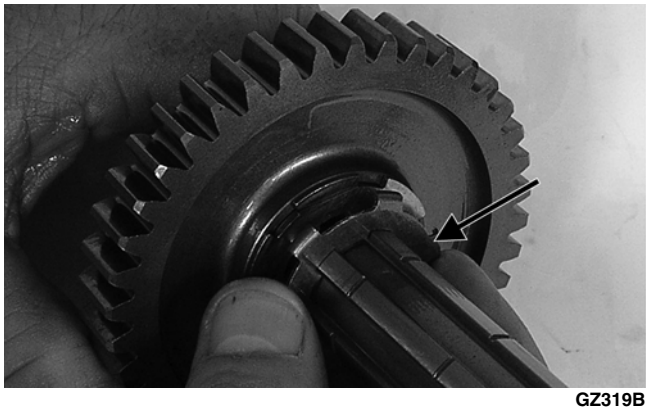

GZ286A

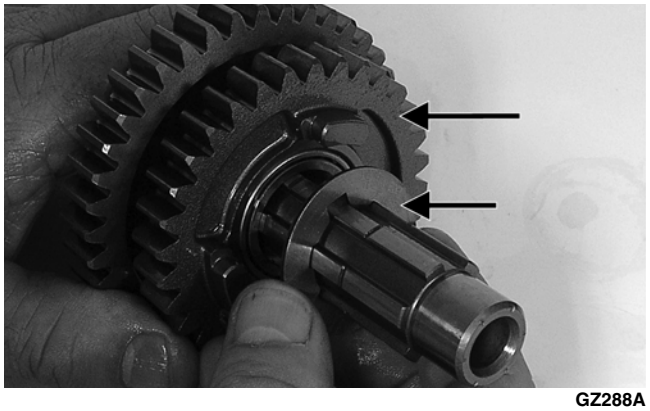

GZ318

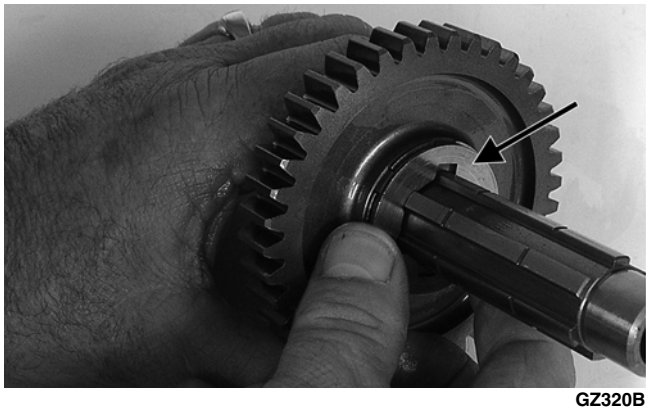
2. Install the low driven gear locking washer; then install the inner reverse driven gear washer.


GZ287

4. Install the outer reverse driven washer; then secure the reverse driven gear assembly with a snap ring.


GZ319B


GZ288A

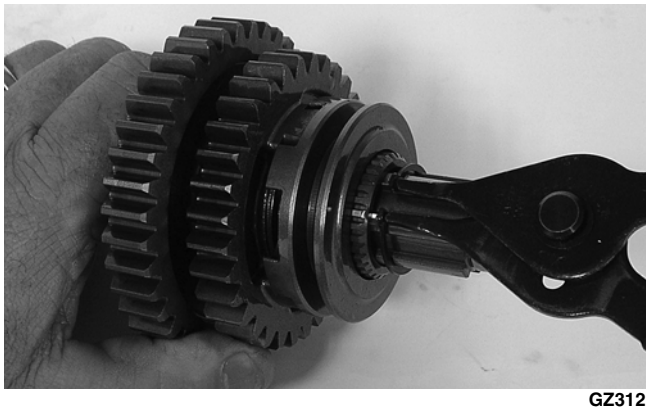

GZ320B

3. Install the reverse driven bushing and bearing; then install the reverse driven gear.


GZ314

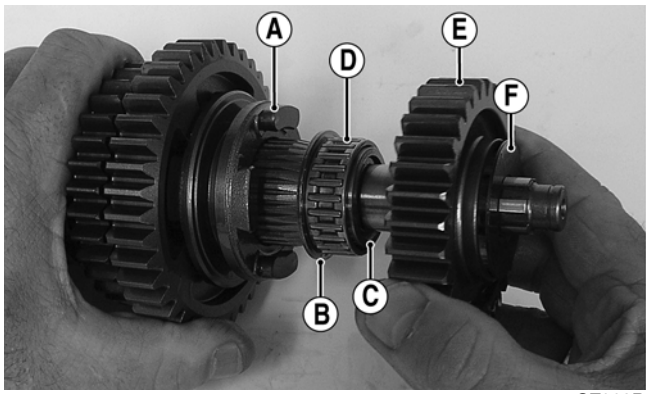
5. Install the reverse driven gear bushing and dog onto the countershaft and secure with a snap ring.

GZ313



GZ312

6. From the opposite end of the countershaft, install the high/low driven gear dog (A), thrust washer (B), bushing (C), bearing (D), high/low driven gear (E), and spacer washer (F).

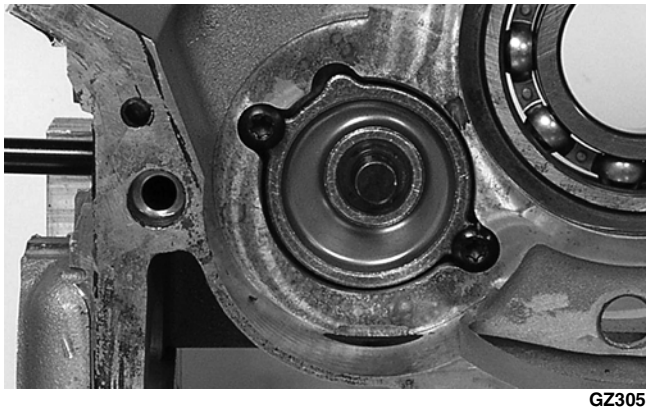


GZ283B

7. Install the two drive gear washers and the shift forks. The countershaft is now ready for installation.

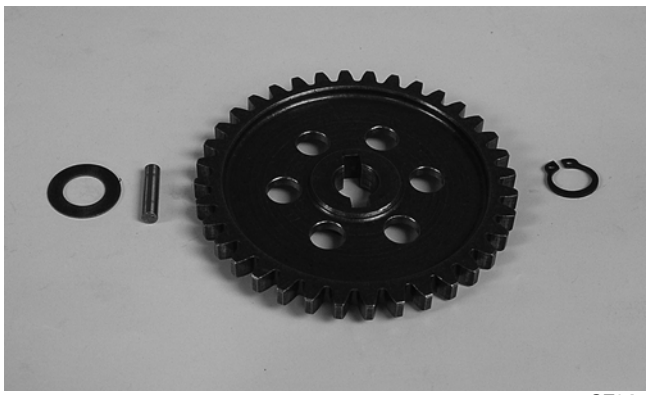
Assembling Crankcase Half

1. Install the oil pump gerotor assembly and oil pump cover in the crankcase and secure with two cap screws. Coat the threads with blue Loctite #243 and tighten securely to 8 ft-lb.



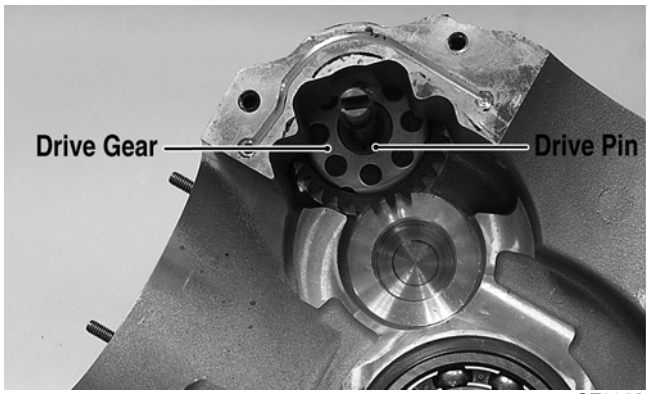
GZ305

2. Install a flat washer, drive pin, and drive gear onto the oil pump shaft; then secure with a snap ring (flat-side away from the gear).

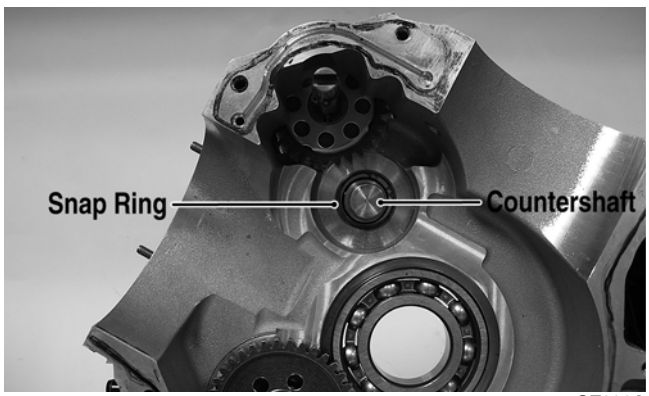


GZ347

3. Install the water pump drive gear, driveshaft, and drive pin; then install the countershaft into the crankcase and secure with a snap ring (flat-side away from the bearing).



GZ304A



GZ328A

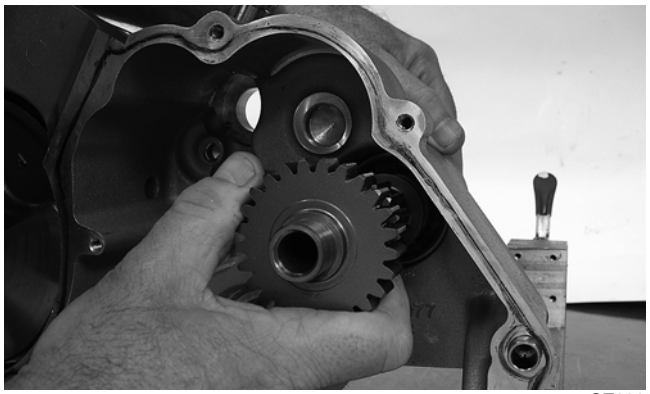
4. Install the countershaft gear onto the countershaft and secure with a snap ring (flat-side away from the gear).

5. Using rubber bands to support the connecting rods, carefully install the crankshaft assembly into the crankcase.

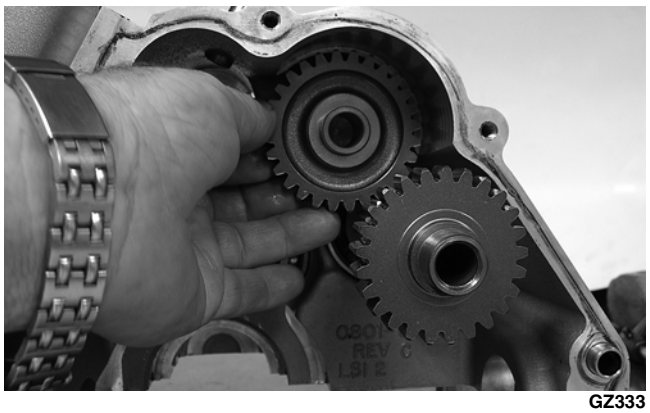
GZ330

■NOTE: It will be necessary to rotate the crankshaft back and forth to engage the teeth of the oil pump and countershaft gears.

6. Install the driveshaft; then with a flat washer on each end of the reverse idler assembly, install into the crankcase.

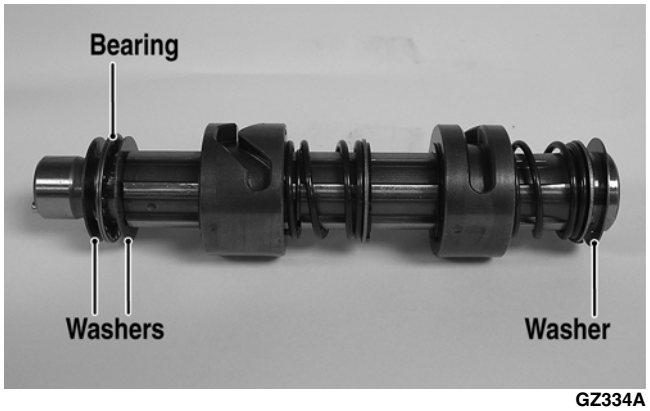


GZ332

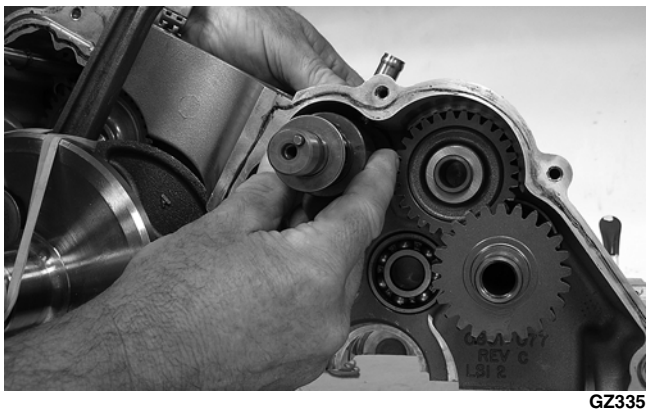


GZ333

7. Install the gear shift shaft into the crankcase making sure the flat washer is in place on the gear shift position switch end and the bearing assembly on the gear shift stop end.

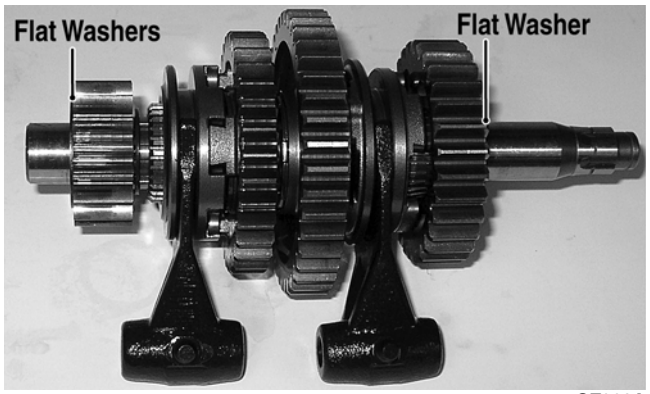


GZ334A

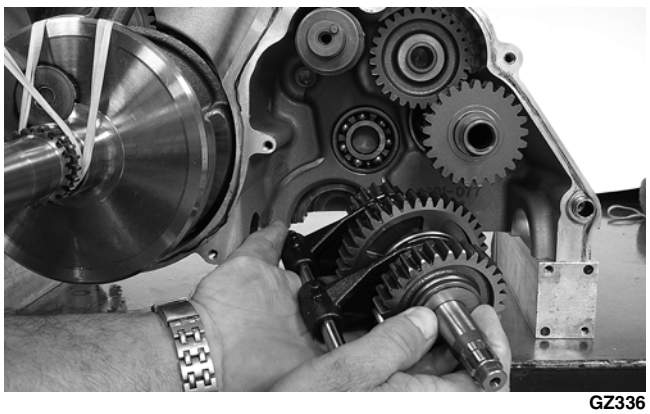


GZ335

8. Place two flat washers on the drive gear end of the countershaft and one flat washer on the high driven gear end; then with shift forks and shift fork shaft, install the countershaft assembly into the crankcase.

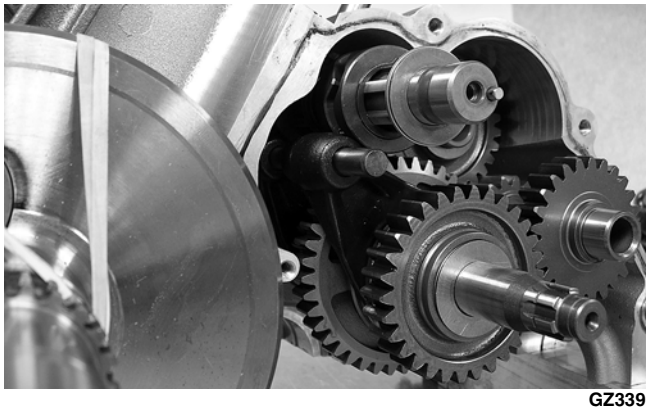


GZ280A



GZ336

9. Engage the shift forks into the gear shift shaft and push the shift fork shaft into the crankcase.



GZ339

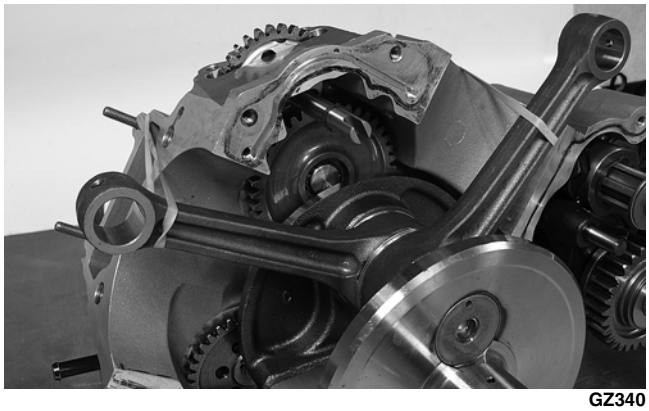
☞ AT THIS POINT

Proper transmission shifting should be verified by turning the gear shift shaft to select High, Low, Neutral, and Reverse while rotating the input shaft and observing the countershaft rotation.

The right-side crankcase is now ready for installation to the left-side crankcase.

Joining Crankcase Halves

1. Using rubber bands, support the connecting rods to align with the cylinder bores.

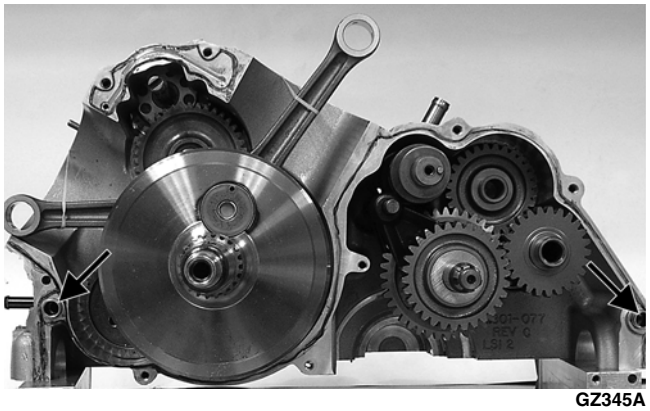


GZ340

2. Install the spacer washer on the crankshaft with the radius directed toward the crankshaft.

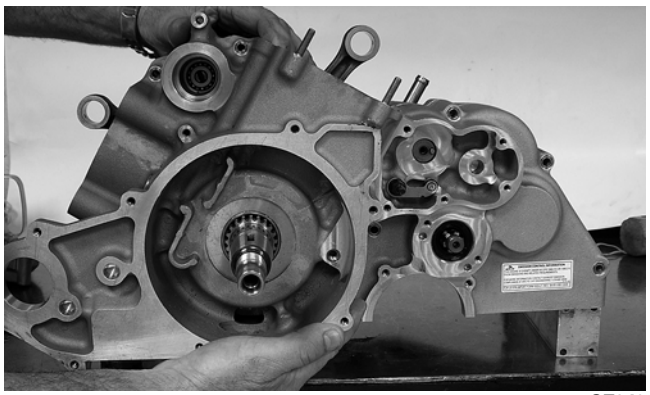
GZ341

3. Install the two alignment pins; then apply a thin bead of silicone sealant to the crankcase mating surface.



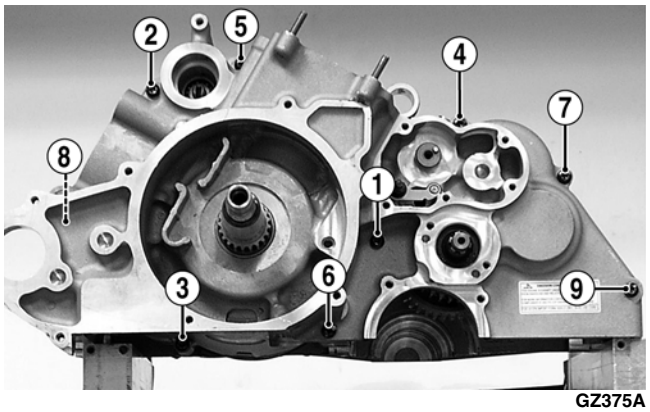
GZ345A

4. Carefully join the crankcase halves by placing the left-side crankcase onto the assembled right side. Secure with the cap screws (eight left side and one right side).



GZ342

5. Tighten the cap screws to 8 ft-lb using the pattern shown and turning the shafts frequently to insure there is no binding.



GZ375A

■NOTE: Cap screw number eight (8) is installed from the right side.

■NOTE: Rotate the shafts back and forth to ensure no binding or sticking occurs.

☞ AT THIS POINT
After completing center crankcase components, proceed to Installing Right-Side Components, to Installing Left-Side Components, and to Installing Top-Side Components.

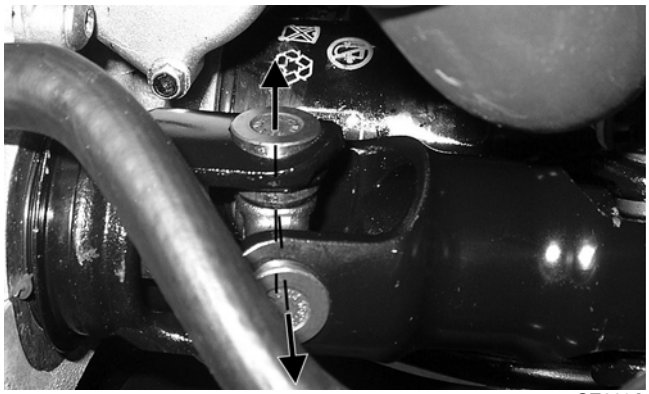
Installing Engine/Transmission

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

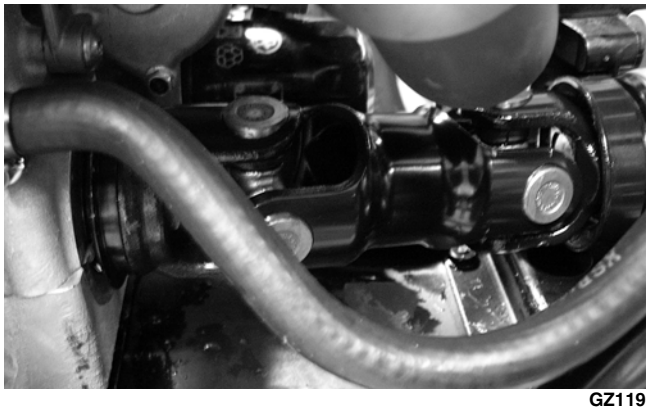
1. Turn the front driveline to place the output drive yoke universal joint in the horizontal plane; then secure the driveshaft to the right and against the engine.

GZ117A

2. Install the engine/transmission into the frame from the right side.
3. Rotate the driveshaft 90°; then lift the front of the engine sufficiently to engage the splined shaft into the front differential. Lower the front of the engine.

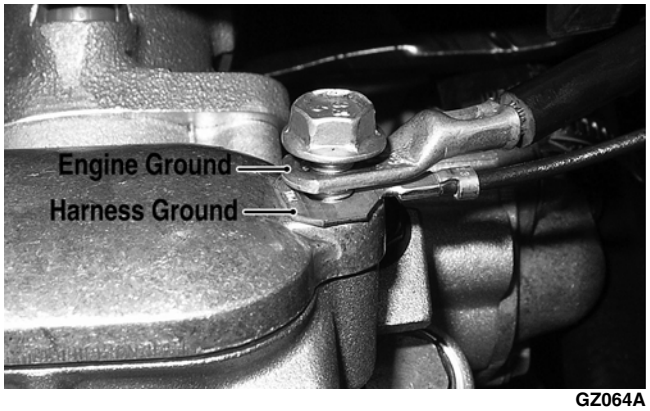


GZ110A



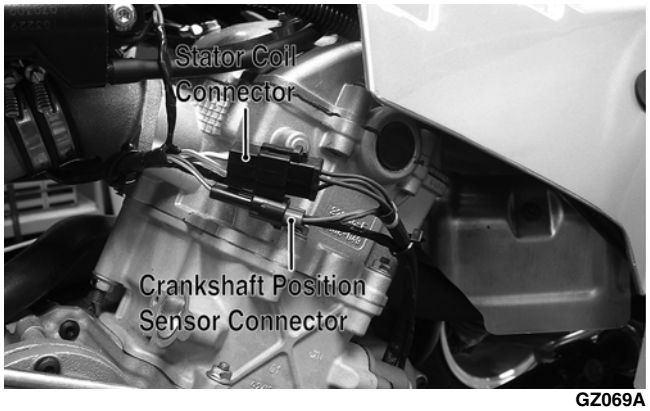
GZ119

4. Align the rear output drive flange and the rear driveshaft yoke flange and install the cap screws. Tighten to 20 ft-lb.
5. Align the engine with the mounting brackets and install the through-bolts with flat washers; then install the flange nuts and tighten to 45 ft-lb.
6. Connect the coolant hose and tighten the clamps securely.
7. Secure the engine and harness grounds to the engine and tighten the cap screw to 8 ft-lb.

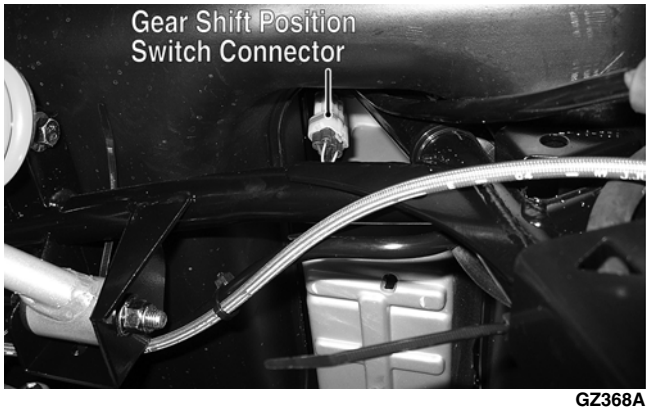


GZ064A

8. Install the ignition coils and tighten the cap screws to 12 ft-lb; then connect the primary wires, grounds, and spark plug caps.
9. Connect the stator coil connector and crankshaft position sensor connector; then connect the gear shift position switch connector.

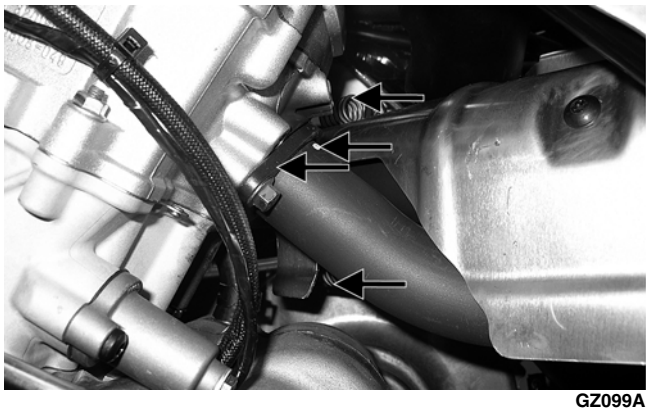


GZ069A

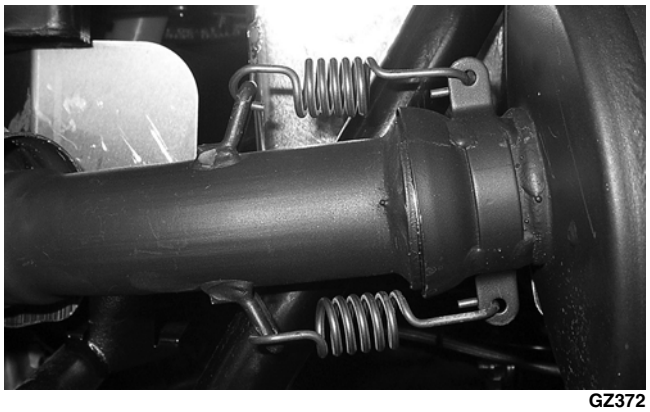


GZ368A

10. Install the front the rear exhaust pipes with new grafoil seals and tighten the retaining nuts to 20 ft-lb; then install the muffler and connect all exhaust juncture springs.



GZ099A

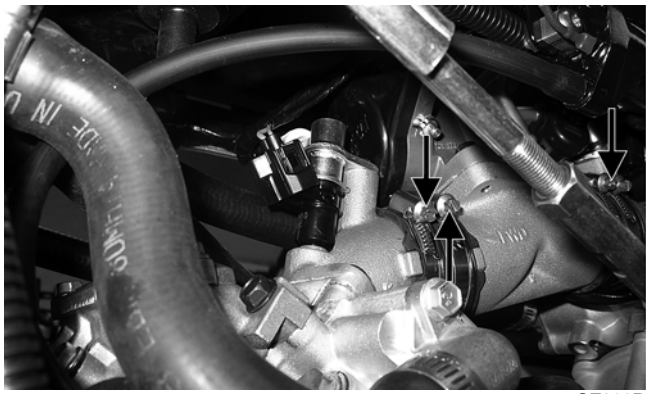


GZ372

11. Install the intake manifolds and tighten to 8 ft-lb; then install the throttle body and secure with the hose clamps.

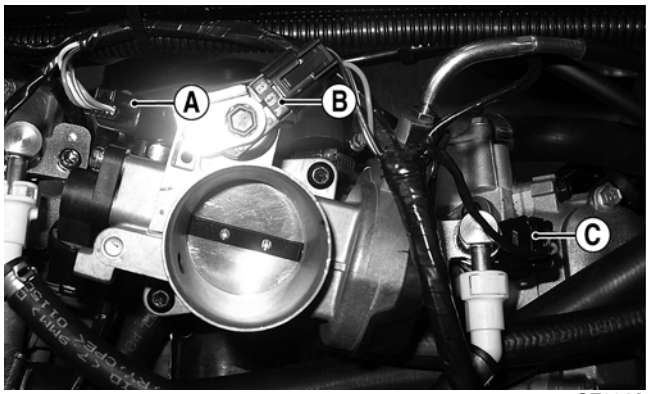
GZ106

GZ107



GZ090B

12. Connect the fuel injector, TPS connector (A), MAP sensor connector (C), and ISC valve connector (B).



GZ094A

13. Install the shift linkage with bushings and secure with E-clips.

14. Connect the gasline hose connectors to the fuel rails; then install any nylon ties that were removed during disassembly.

GZ124

15. Install the air filter housing and secure to the throttle body with a hose clamp; then connect the IAT sensor connector.

GZ013

16. Install the V-belt cooling duct and boots. Tighten securely.
17. Install the front body panel, footrests, foot wells, and front rack; then install the upper bumper support-to-frame cap screws and tighten to 35 ft-lb.
18. Connect the negative battery cable; then secure the battery with the tool tray and install the seat.
19. Pour in the proper quantities of engine/transmission oil and coolant; then start the engine and warm up to operating temperature.
20. Check for fluid leaks; then shut off engine and check fluid levels (see Section 2).

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SECTION 4 - FUEL/LUBRICATION/COOLING

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Fuel/Lubrication/ Cooling

■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.

■NOTE: Critical torque specifications are located in Section 1.

SPECIAL TOOLS

A number of special tools must be available to the technician when performing service procedures in this section.

Description	p/n
Oil Pressure Test Kit	0644-495
Seal Removal Tool	0644-072
Tachometer	0644-275

■NOTE: Special tools are available from the Arctic Cat Service Parts Department.

Electronic Fuel Injection

⚠ 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. Verify that the electric fuel pump is operating by listening for a “whirring” sound for 2-3 seconds after the ignition switch is turned to the ON position. If no sound can be heard, see Electric Fuel Pump/Fuel Level Sensor in this section.
2. Check for a flashing EFI icon on the LCD. If EFI is flashing, see ECU Error Codes in Section 5.
3. Make sure there is sufficient, clean gas in the gas tank.
4. Verify that the battery is sufficiently charged to crank the engine over at normal speed.

■NOTE: A fully-charged battery must read at least 12.5 DC volts - no load. A minimum of 8.5 DC volts under load is necessary for the EFI system to operate.

5. Check the air filter housing and air filter for contamination. Clean or replace as necessary (see Section 2).

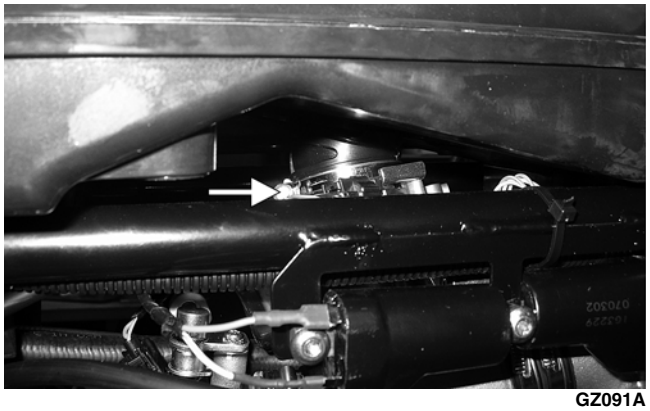
REMOVING

⚠ WARNING

Whenever the gasline hoses are removed (other than for pressure testing), the battery must be disconnected to prevent inadvertent activation of the electronic fuel pump.

1. Remove the front rack and body panel (see Section 8).
2. Disconnect the wires from the IAT sensor; then loosen the clamp and remove the inlet air boot from the air filter housing.

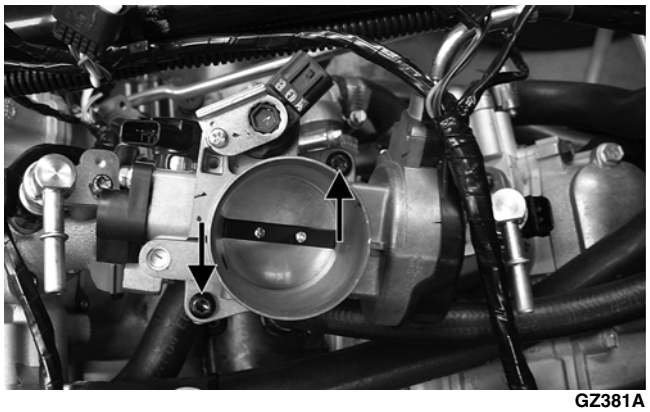
GZ379



GZ091A

3. Loosen the clamp on the throttle body intake boot; then remove the air filter housing from the ATV.
4. Disconnect the three wiring connectors from the sensors on the throttle body; then remove the cap screws securing the throttle body to the intake manifold.

GZ094B



GZ381A

5. Remove the throttle arm cover and disconnect the throttle cable; then remove the throttle body from the ATV.

GZ383A

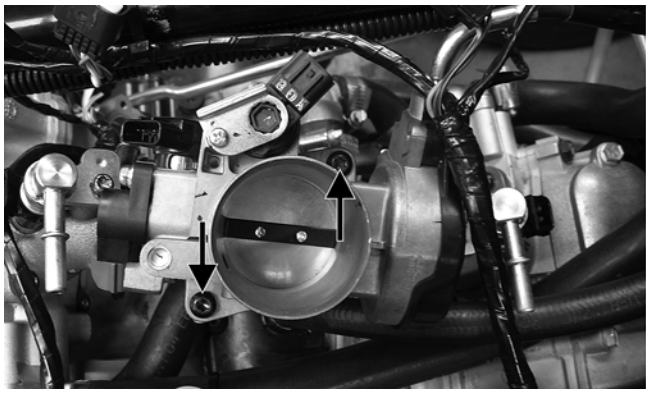
6. Use tape to cover and seal the intake opening.

⚠ CAUTION

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

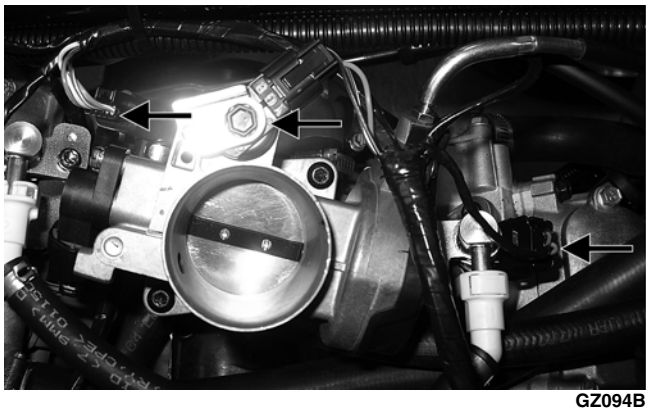
INSTALLING

1. Connect the throttle cable to the throttle body; then remove the tape from the intake manifold and install the throttle body using a new O-ring. Tighten the cap screws securely.

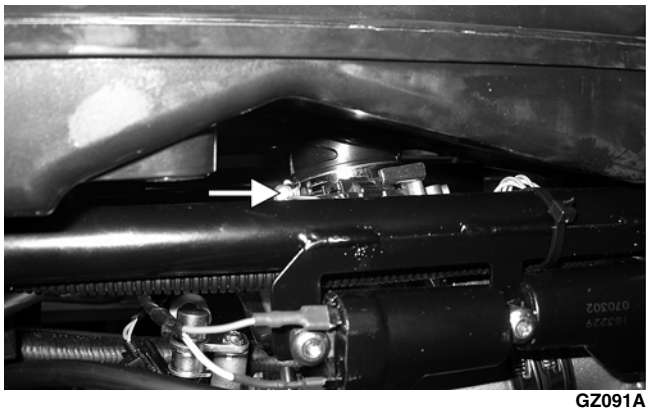


GZ381A

2. Connect the three wiring connectors to the sensors; then install the air filter housing and connect all hoses. Tighten all clamps securely.



GZ094B



GZ091A

3. Connect the wiring connector to the IAT sensor
4. Install the front rack and body panel (see Section 8).
5. Install the seat making sure it locks securely in place.

Throttle Cable Free-Play

To adjust throttle cable free-play, see Section 2.

Gas Tank

⚠ 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. Remove the seat.
2. Remove the rear rack and fenders (see Section 8); then remove the right-rear tire.
3. Disconnect the hose from the fuel pump to the throttle body.
4. Remove the cap screws securing the gas tank to the frame.
5. Disconnect the 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.
4. Remove the fuel level sensor/fuel pick-up assembly and inspect the fuel level sensor and fuel screen.

■NOTE: If the fuel level sensor has failed or may be faulty, see Electric Fuel Pump/Fuel Level Sensor in this section.

INSTALLING

1. Install the fuel level sensor/fuel pump assembly.
2. Place the gas tank into position in the frame; then install the cap screws. Tighten securely.
3. Connect the gas hose from the throttle body; then connect the fuel gauge/fuel pump connector.
4. Install the vent hose; then fill the gas tank with gasoline.
5. Start the engine and inspect for leakage.
6. Install the rear fenders, right-rear tire, and rack; then install the seat making sure it latches securely.

Oil Filter/Oil Pump

■NOTE: Whenever internal engine components wear excessively or break and whenever oil is contaminated, the oil pump should be replaced.

Testing Oil Pump Pressure

■NOTE: The engine must be warmed up to the specified temperature (cooling fan cycling) for this test.

1. Connect Tachometer to the engine or utilize the ATV gauge.
2. Connect the Oil Pressure Test Kit to the oil cooler to oil filter line.

GZ388

■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 3000 RPM. The oil pressure gauge must read 0.7-1.4 km^2 (10-20 psi).

■NOTE: If the oil pressure is lower than specified, check for low oil level, defective oil pump, or restricted oil cooler.

■NOTE: If the oil pressure is higher than specified, check for clogged oil passage, clogged oil filter, or improper installation of the oil filter.

Oil Cooler

REMOVING

■NOTE: It is not necessary to drain the engine oil for this procedure.

1. Remove the input and output hoses from the fittings on the cooler.

⚠ CAUTION

Elevate and secure the hoses to avoid oil spillage.

2. Remove the cap screws securing the oil cooler to the frame. Account for grommets.

AL651D

3. Remove the oil cooler from the frame.

INSTALLING

1. Place the cooler into position in the frame.
2. Secure the cooler to the frame with the cap screws and grommets.
3. Install the hoses onto their respective fittings and secure with the clamps.

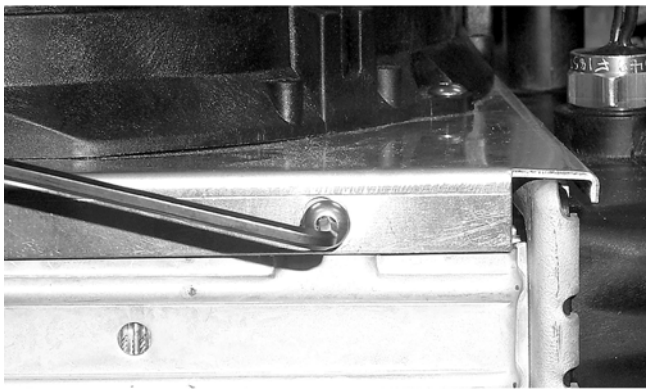
Liquid Cooling System

The coolant level should be checked periodically. To check the cooling system, see Section 2.

Radiator

REMOVING

1. Drain the coolant at the engine.
2. Remove the front rack (see Section 8).
3. Remove the front bumper and front fender panel (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

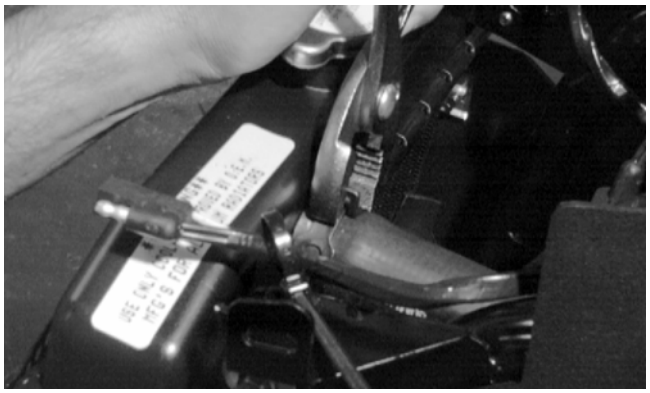
CLEANING AND INSPECTING

■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 front fender panel.
5. Install the front rack.
6. Fill the cooling system with the recommended amount of antifreeze. Check for leakage.
7. Connect the fan wiring to the main wiring harness.

Hoses/Thermostat

REMOVING

■NOTE: The thermostat is located in a housing in-line with the upper radiator hoses under the air filter housing.

GZ036A

1. Drain approximately one quart of coolant from the cooling system.
2. Remove the machine screws securing the thermostat housing together. Remove the thermostat and account for an O-ring.

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 73.5-76.5° C (164-170° 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 O-ring into the thermostat housing; then secure the thermostat housing together with the four machine screws.
2. Fill the cooling system with the recommended amount of antifreeze. Check for leakage.

Fan

REMOVING

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

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.

Water Pump

■NOTE: The water pump is a non-serviceable component. It must be replaced as an assembly.

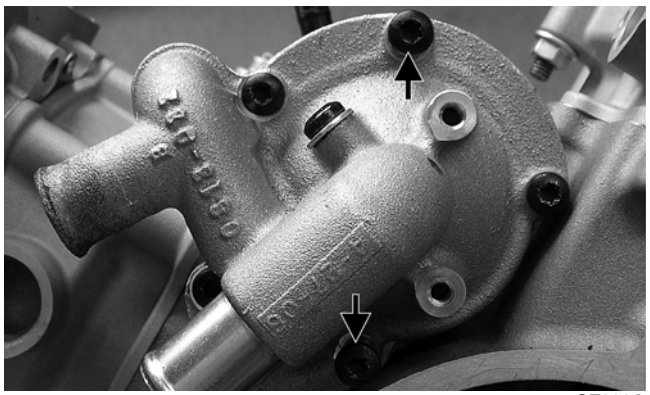
REMOVING

1. Remove the coolant drain plug; then remove the radiator cap and drain the coolant into a suitable container.

GZ093A

■NOTE: Always use a large container and have sufficient floor drying material available when draining the coolant in case of coolant spillage.

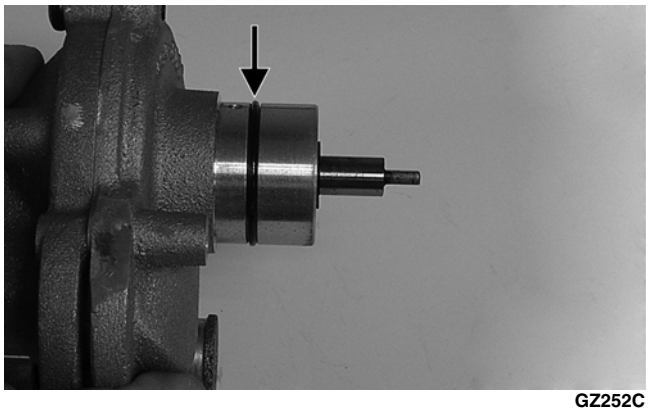
2. Remove the coolant hoses from the water pump; then remove two cap screws securing the water pump to the crankcase.


GZ230A

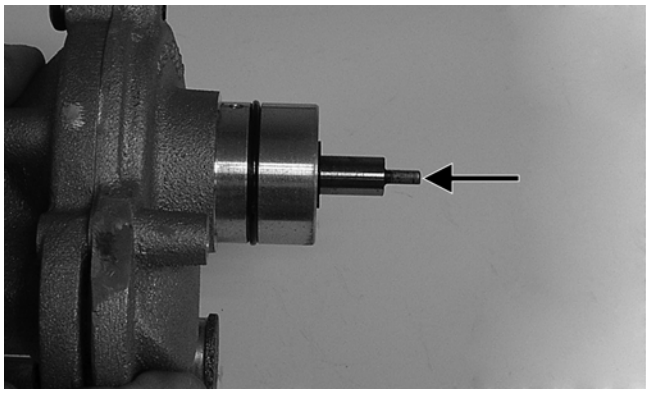
3. Remove the water pump from the engine.

INSTALLING

1. Install a new O-ring onto the water pump and lightly coat with clean engine oil.


GZ252C

2. Install the water pump assembly onto the engine aligning the flat drive on the water pump to the slot in the driveshaft.


GZ252D

⚠ CAUTION

Do not force the water pump housing into the crankcase or sever engine damage may occur.

3. Secure the water pump with the two cap screws and tighten securely; then connect the coolant hoses and secure with hose clamps.

4. Tighten the coolant drain plug securely; then fill the cooling system with appropriate mixed coolant and install the radiator cap.

5. Start the engine and check for coolant leaks; then add coolant if necessary to proper level.

⚠ 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.

4

Electric Fuel Pump/ Fuel Level Sensor

The electric fuel pump and fuel level sensor are not serviceable components. If either component fails, it must be replaced.

■NOTE: The fuel level sensor can be replaced separately from the electric fuel pump (see INSPECTING in this sub-section).

TESTING

⚠ 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.

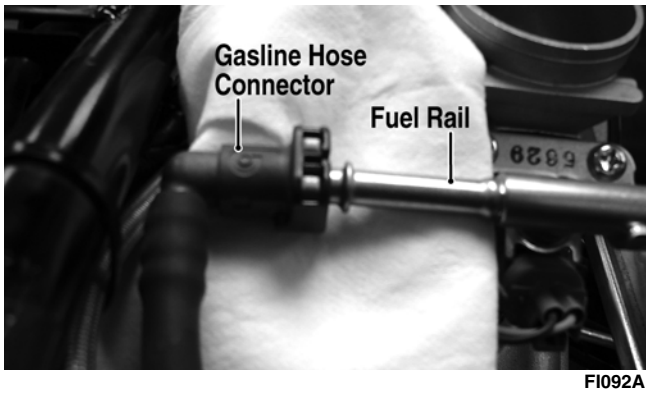
☞ AT THIS POINT

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

1. Turn the ignition switch ON and listen for a momentary "whirring" sound of the pump building pressure. If the sound is heard (2-3 seconds), no electrical checks are necessary. Turn the ignition switch OFF.
2. Disconnect one gasline hose from one of the fuel injectors; then install a suitable pressure gauge on the hose.

⚠ WARNING

Gasoline may be under pressure. Place an absorbent towel under the connector to absorb any gasoline spray when disconnecting.



FI092A

3. Turn the ignition switch to the ON position. The fuel pressure should build until the pump shuts off. Pressure should read 3.0 kg-cm^2 (43 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 red wire and the black tester lead to the black wire; then turn the ignition switch to the ON position. The meter should read 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 ECU and the vehicle tilt sensor.

REMOVING

⚠ WARNING

Whenever the gasline hoses are removed (other than for pressure testing), the battery must be disconnected to prevent inadvertent activation of the electronic fuel pump.

1. Remove the rear rack and fenders (see Section 8); then disconnect the power supply/fuel ok connector.
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.
4. 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.

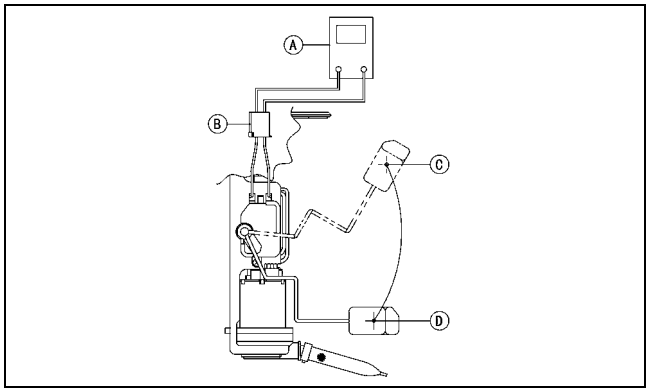
5. Using duct tape or other suitable means, cover the fuel pump opening.

INSPECTING

☞ AT THIS POINT

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

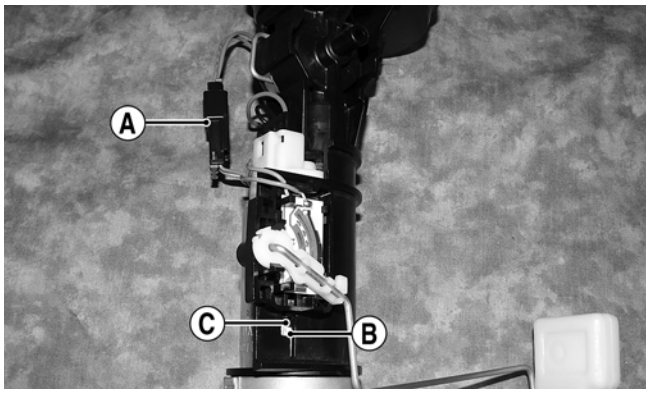
1. Inspect the fuel screen and blow clean with low pressure compressed air.
2. Move the float lever and check for free movement. The float assembly should return to the lower position without force. If not, replace the fuel pump assembly.
3. Test the fuel level sensor by connecting a multimeter (A) to the fuel level sensor leads (B); then select OHMS. The multimeter should show 5 ohms at full fuel position (C) and 95 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 level sensor.

4. To replace the fuel level sensor, use the following procedure.
   A. Disconnect the two-wire connector (A); then press the fuel level sensor toward the top of the fuel pump to release it from the mounting slot (B).

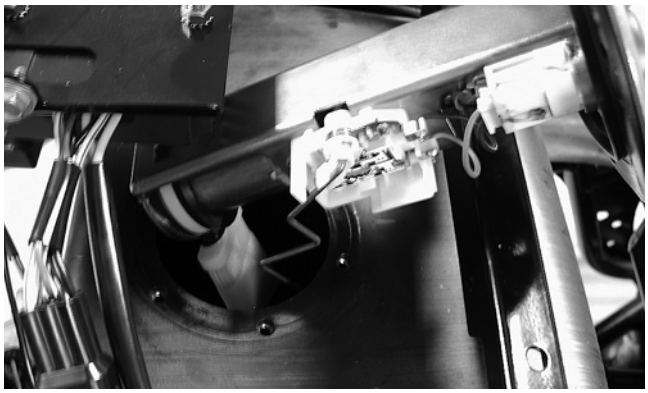


FI460A

B. Engage the tabs (C) of the fuel level sensor into the mounting slot (B) and press toward the bottom of the fuel pump to latch in place; then connect the two-wire connector (A).

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 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.

Troubleshooting

Problem: Starting impaired	
Condition	**Remedy**
1. **Gas** contaminated	1. Drain gas tank and fill with clean gas
Problem: Idling or low speed impaired	
Condition	**Remedy**
1. **TPS** out of adjustment	1. Adjust TPS
Problem: Medium or high speed impaired	
Condition	**Remedy**
1. **High RPM "cut out"** against RPM limiter	1. Decrease RPM speed

SECTION 5 - ELECTRICAL SYSTEM

TABLE OF CONTENTS

Electrical System

This section has been organized into sub-sections which show procedures for the complete servicing of the Arctic Cat ATV electrical system.

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

SPECIAL TOOLS

A number of special tools must be available to the technician when performing service procedures in this section.

Description	p/n
Diagnostic Harness	0486-219
Fluke Model 73 Multimeter	0644-191
MaxiClips	0744-041
Test Plug/Error Code List Kit	0444-216

■NOTE: Special tools are available from the Arctic Cat Service Parts Department.

Specifications

Ignition Timing	N/A
Spark Plug Type	NGK CPR8E (2)
Spark Plug Gap	0.7-0.8 mm (0.028-0.032 in.)
Spark Plug Cap	5000 ohms
Ignition Coil Resistance (primary)	4.8 ohms (terminal (+) to terminal (-))
(secondary)	12k-19k ohms (high tension - plug cap to terminal)
Ignition Coil Primary Voltage	12 DC volts (wire (+) to ground)
Stator Coil Resistance (crankshaft position sensor)	150-250 ohms (blue to green)
(AC generator)	Less than 1 ohm (black to black)
Crankshaft Position Sensor AC Voltage	2.0 AC volts or more (blue to green)
Generator Output (no load)	75 AC volts or more @ 5000 RPM (black to black)

Battery

For battery related information, see Section 2.

RPM Limiter

■NOTE: The ATV is equipped with an ECU that retards ignition timing when maximum RPM is approached. When the RPM limiter is activated, it could be misinterpreted as a high-speed misfire.

Testing Electrical Components

All of the electrical tests should be made using the Fluke Model 73 Multimeter. 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. Turn the ignition switch to the ON position; then set the meter selector to the DC 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.
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 brake switch lead above the transmission.

■NOTE: The ignition switch must be in the ON position.

VOLTAGE (Wiring Harness Side)

1. Set the meter selector to the DC 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.

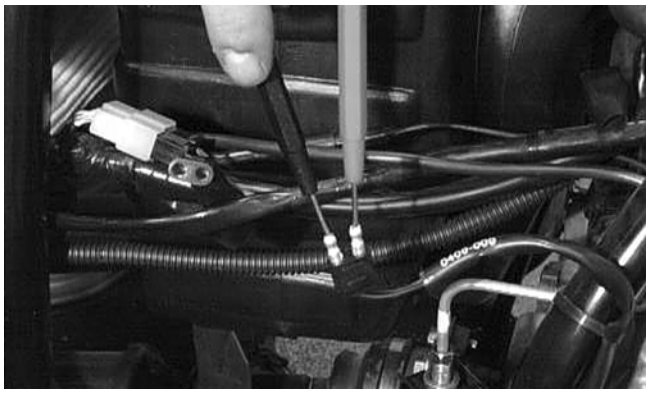
■NOTE: If the meter shows battery voltage, the main wiring harness is good; proceed to test the switch/component, the connector, and the switch wiring harness for resistance.

RESISTANCE (Switch Connector)

⚠ CAUTION

Always disconnect the battery when performing resistance tests to avoid damaging the multimeter.

1. Disconnect the brake switch connector; then 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, replace the switch.

Brakelight Switch
(Handlebar Control)

To access the connector, remove the steering post access panel.

■NOTE: The ignition switch must be in the ON position.

VOLTAGE (Wiring Harness Connector)

1. Disconnect the brake switch connector; then set the meter selector to the DC 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, replace the switch.

Engine Coolant Temperature (ECT) Sensor

■NOTE: The ECT sensor is located on the thermostat housing in front of the engine.

1. Connect the meter leads (selector in OHMS position) to the sensor terminals.
2. Suspend the sensor and a thermometer in a container of cooking oil; then heat the oil.

■NOTE: Neither the sensor nor the thermometer should be allowed to touch the bottom of the container or inaccurate readings will occur. Use wire holders to suspend the sensor and thermometer.

⚠ WARNING

Wear insulated gloves and safety glasses. Heated oil can cause severe burns.

3. On the ECT sensor when the temperature reaches 40° C (104° F), the meter should read approximately 1136 ohms.
4. On the ECT sensor when the temperature reaches 100° C (212° F), the meter should read approximately 155 ohms.
5. If the readings are not as indicated, the sensor must be replaced.
6. Install the sensor and tighten securely.
7. Connect the leads.

Fan Motor

The connector is the black two-prong one located behind the fan assembly.

VOLTAGE (Main Harness Connector to Fan Motor)

1. Set the meter selector to the DC Voltage position.
2. Connect the red tester lead to the black/red wire; then connect the black tester lead to ground.
3. Disconnect the ECT sensor and start the engine.
4. The meter must show battery voltage.

■NOTE: If the meter shows no battery voltage, troubleshoot the battery, fuse, fan relay, ECU, or the main wiring harness.

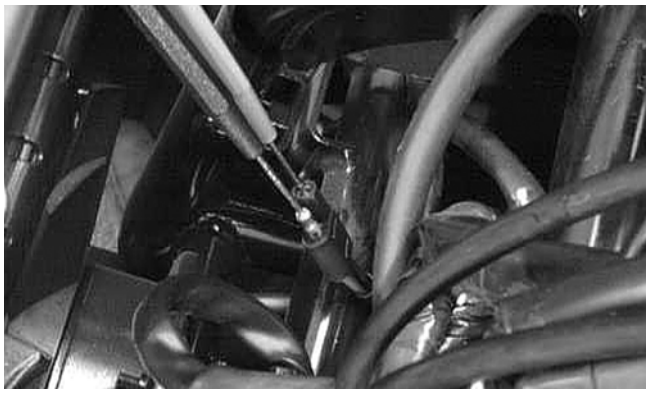
■NOTE: If the meter shows battery voltage, the main wiring harness is good. The connector should be checked for resistance.

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 blue 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 connector or the fan motor.

■NOTE: To determine if the fan motor is good, connect the blue wire from the fan connector to the positive side of a 12 volt DC power supply; then connect the black wire from the fan connector to the negative side. The fan should operate.

⚠ CAUTION

Care should be taken to keep clear of the fan blades.

Fuse Block/Power Distribution Module

The fuses are located in a power distribution module under the seat.

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

■NOTE: The ignition switch must be in the LIGHTS position.

1. Remove all fuses from the distribution module.
2. Set the meter selector to the DC 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 no voltage.

■NOTE: When testing the HI fuse holder, the headlight dimmer switch must be in the HI position; when testing the LIGHTS fuse holder, the headlight dimmer switch can be in either position.

■NOTE: If the meter shows no battery voltage, troubleshoot the battery, switches, distribution module, or the main wiring harness.

Fuses

Fuses may be checked by visually inspecting the fuse element. If the element is broken (burned), replace the fuse.

Ignition Coils

The ignition coils are on the frame above the engine. To access the coils, the left side panel must be removed.

RESISTANCE

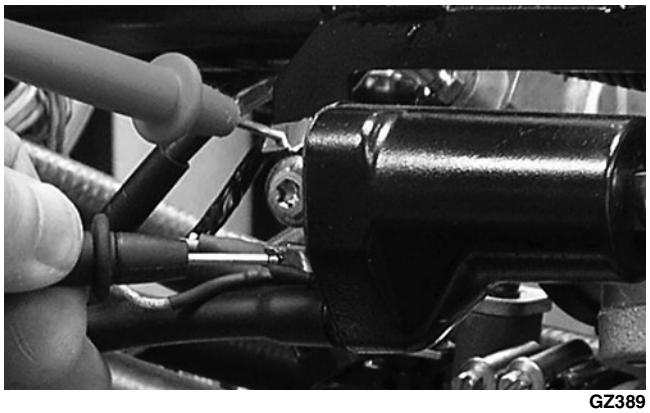
⚠ CAUTION

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 and the primary wire(s) should be disconnected.

Primary Winding

1. Connect the red tester lead to either terminal; then connect the black tester lead to the other terminal.



GZ389

2. The meter reading must be within specification.

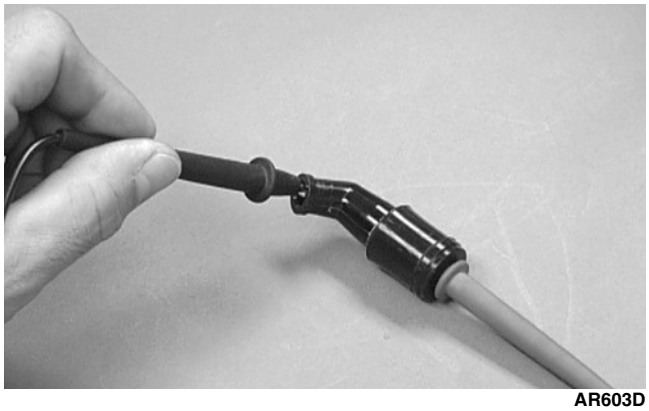
Secondary Winding

1. Remove the plug cap from the high tension lead; then connect the red tester lead to the high tension lead.
2. Connect the black tester lead to either primary connector.
3. 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.

PRIMARY VOLTAGE - ECU

■NOTE: The battery must be at full charge for this test.

■NOTE: The ECU is located beneath the rear fender near the taillight.

1. Set the meter selector to the DC Voltage position; then disconnect the orange primary wire from the coil.
2. Connect the red tester lead to the primary wire; then connect the black tester lead to ground.
3. Turn the ignition switch to the ON position.
4. The meter reading must be within specification.

EFI Sensors/ Components

CRANKSHAFT POSITION (CKP) SENSOR

To test the CKP sensor, see Stator Coil/Crankshaft Position (CKP) Sensor in this section.

MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR

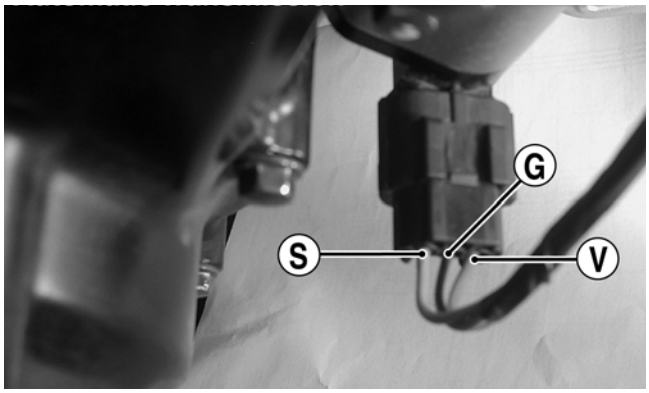
1. Disconnect the MAP connector from the pressure sensor located on top of the throttle body.
2. Select DC Voltage on the tester and turn the ignition switch to the ON position.
3. Connect the black tester lead to the black/green wire and the red tester lead to the orange/blue wire. The meter should read 4.5-5.5 DC volts. If the meter does not read as specified, check the ECU connector or wiring.
4. Connect the MAP to the harness; then using Maxi-Clips, connect the red tester lead to the brown/white wire and the black tester lead to the black/green wire. With the engine running at idle speed, the meter should read approximately 1.5 DC volts.

■NOTE: If the meter does not read as specified, replace the sensor.

Speed Sensor

■NOTE: Prior to testing the speed sensor, inspect the three-wire connector on the speed sensor for contamination, broken pins, and/or corrosion.

1. Set the meter selector to the DC Voltage position.
2. With appropriate needle adapters on the meter leads, connect the red tester lead to the voltage lead (V); then connect the black tester lead to the ground lead (G).



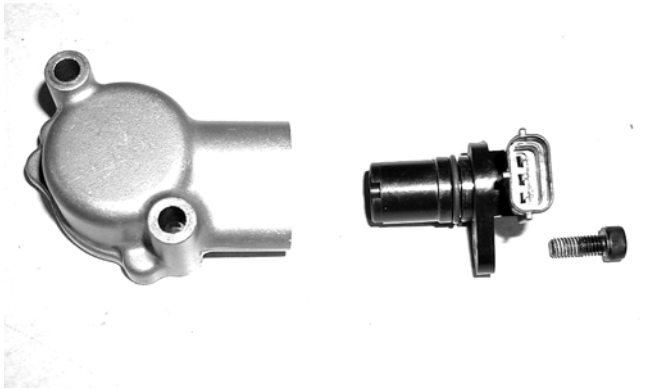
CD885C

3. Turn the ignition switch to the ON position.
4. The meter must show 6-12 DC volts.
5. Leave the black tester lead connected; then connect the red tester lead to the signal lead (S) pin.
6. Slowly move the ATV forward or backward; the meter must show 0 and 6-12 DC volts alternately.

■NOTE: If the sensor tests are within specifications, the speedometer must be replaced (see Section 9).

To replace a speed sensor, use the following procedure.

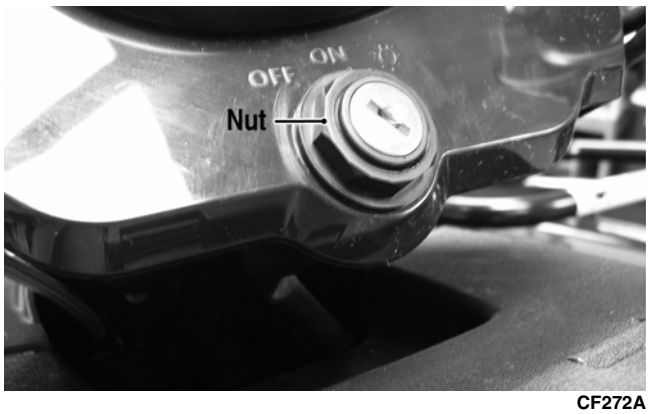
1. Disconnect the three-wire connector from the speed sensor; then remove the Allen-head cap screw securing the sensor to the sensor housing.
2. Remove the sensor from the sensor housing accounting for an O-ring.
3. Install the new speed sensor into the housing with new O-ring lightly coated with multi-purpose grease; then secure the sensor with the Allen-head cap screw (threads coated with blue Loctite #242). Tighten securely.



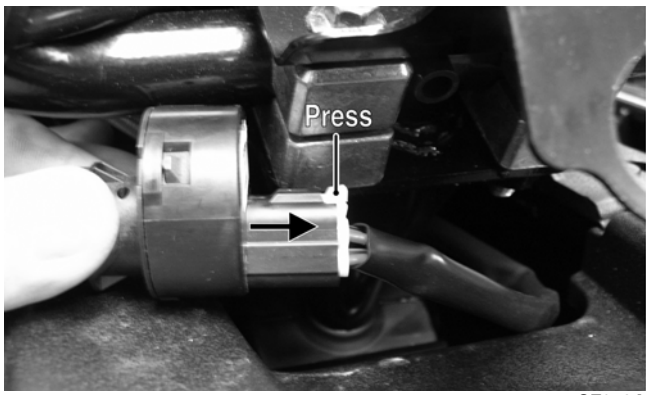
CD071

Ignition Switch

The ignition switch harness connects to the switch with a four-pin connector. To access the connector, remove the ignition switch nut, remove the switch, and press the connector release tab. Pull the connector from the switch.



CF272A



CF273A

VOLTAGE

■NOTE: Perform this test on the harness connector.

1. Set the meter selector to the DC Voltage position.
2. Connect the red meter lead to either 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.

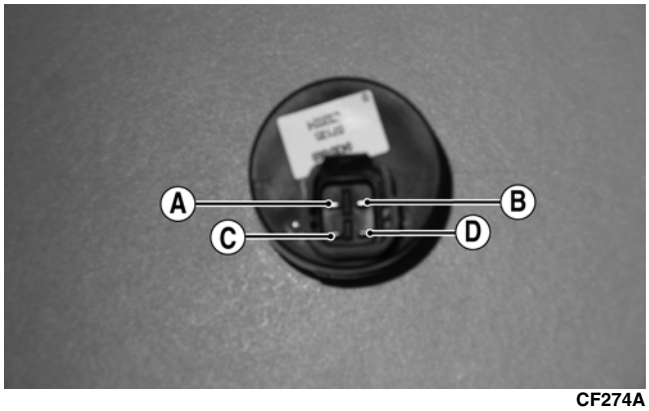
5

RESISTANCE

⚠ CAUTION

Always disconnect the battery when performing resistance tests to avoid damaging the multimeter.

■NOTE: Perform this test on the switch using the following procedure.



CF274A

1. Turn the ignition switch to the ON position.
2. Set the meter selector to the OHMS position.
3. Connect either tester lead to pin C; then connect the other tester lead to pin D.
4. The meter must show less than 1 ohm.
5. Turn the ignition switch to the LIGHTS position.
6. Connect either tester lead to pin A; then connect the other tester lead to pin B.
7. The meter must show less than 1 ohm.
8. Connect either tester lead to pin C; then connect the other tester lead to pin D.
9. The meter must show less than 1 ohm.
10. With the switch in the OFF position, connect the red tester lead and the black tester lead to each of the remaining pins. The meter must show an open circuit on all pins.

■NOTE: If the meter shows more than 1 ohm of resistance, troubleshoot or replace the switch/component or the connector.

Handlebar Control Switches

The connector is the yellow one next to the steering post. To access the connector, the steering post cover and the right-side fender splash shield 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.

DIODE (Starter Button)

■NOTE: If voltage is not as specified, check the condition of the battery in the meter prior to replacing the switch. A low battery will result in a low voltage reading during a diode test.

1. Set the meter selector to the Diode position.
2. Connect the red tester lead to the orange/white wire; then connect the black tester lead to the yellow/green wire.
3. With the starter button depressed, the meter must show 0.5-0.7 DC volts.
4. With the starter button released, the meter must show 0 DC volts.
5. Connect the red tester lead to the yellow/green wire; then connect the black tester lead to the orange/white wire.
6. With the starter button depressed, the meter must show 0 DC volts.

■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 next to 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 wire 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 cover must be removed.

■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 DC Voltage position.
2. Connect the black tester lead to the negative battery terminal.
3. Connect the red tester lead to the red wire on the harness side of the connector.
4. Turn the ignition switch to the RUN position.
5. The meter must show 12 DC 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.

■NOTE: The differential must be in the unlocked position for this procedure.

VOLTAGE

1. Select the 2WD position on the front drive selector switch; then disconnect the 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 DC volts.
4. Connect the red tester lead to the white/red wire in the supply harness. The meter must show 12 DC 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 DC volts.

■NOTE: The 4WD icon on the LCD should illuminate.

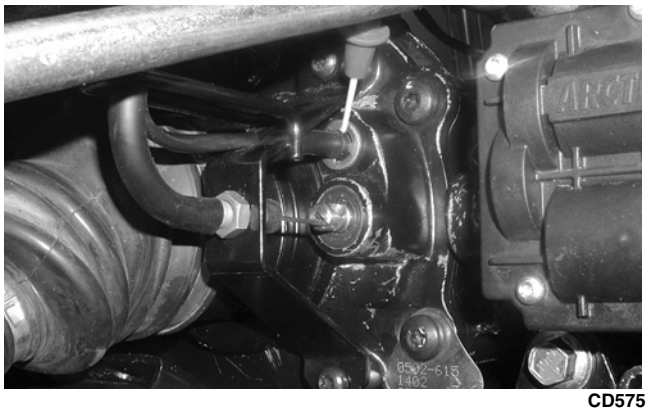
6. Connect the red tester lead to the orange wire in the supply harness. The meter must show 12 DC volts.

■NOTE: If the voltage readings are as specified and the actuator does not function correctly, replace the actuator (see Section 6).

Differential Lock Switch

VOLTAGE

1. Select DC 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.



CD575

2. Turn the ignition switch to the ON position. The meter must show 12 DC volts.

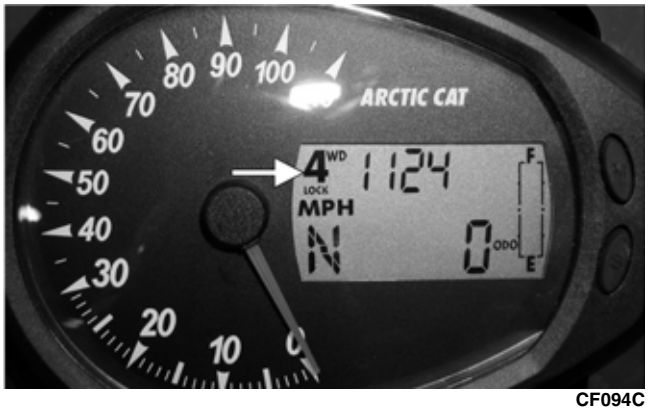
■NOTE: If no voltage is indicated, check the wiring harness, fuse, or battery connections.

3. Select the lock position on the differential. The meter should drop to 0 volts, and the front drive selector actuator switch should operate to engage 4-wheel drive.

■NOTE: It may be necessary to rock the ATV slightly to engage the differential lock fully.

■NOTE: The 4WD and the LOCK icons on the LCD should illuminate.

CD576



CF094C

4. If the differential lock engages (front wheels locked) and the voltage does not drop to 0, the switch is faulty and must be cleaned or replaced.

Stator Coil/Crankshaft Position (CKP) Sensor

VOLTAGE (AC Generator - Regulated Output)

1. Set the meter selector to the DC 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 14-15.5 DC volts.

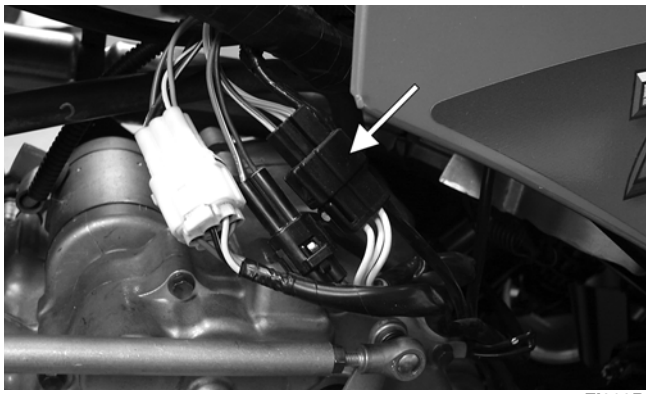
⚠ CAUTION

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 black three-pin one on the left side above the shift lever.



FI083B

■NOTE: Test the connector that comes from the engine.

1. Set the meter selector to the AC Voltage position.
2. Test between the three black wires for a total of three tests.
3. With the engine running at a constant 5000 RPM, all wire tests must be within specifications.

⚠ CAUTION

Do not run the engine at high RPM for more than 10 seconds.

■NOTE: If both stator 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.
3. The meter reading must be within specification.

RESISTANCE (Crankshaft Position Sensor)

⚠ 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 blue wire; then connect the black tester lead to the green wire. The meter reading must be within specification.

AC VOLTAGE

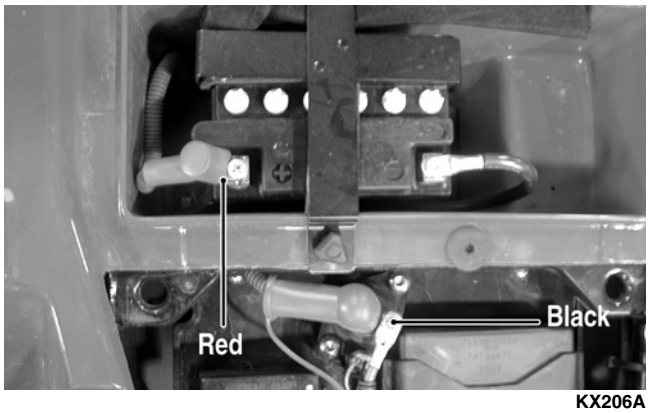
■NOTE: The battery must be at full charge for this test.

Crankshaft Position Sensor

1. Set the meter selector to the AC Voltage position.
2. Connect the red tester lead to the blue wire; then connect the black tester lead to the green wire.
3. Crank the engine over using the electric starter.
4. The meter reading must be within specification.

Starter Relay

1. Remove the seat; then using the multimeter set to the DC 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.



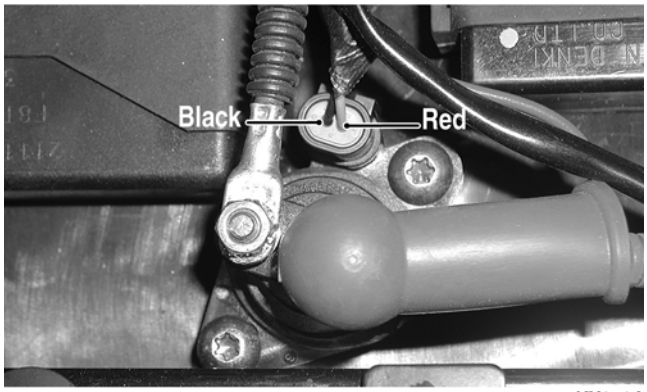
KX206A

■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.

Starter Motor

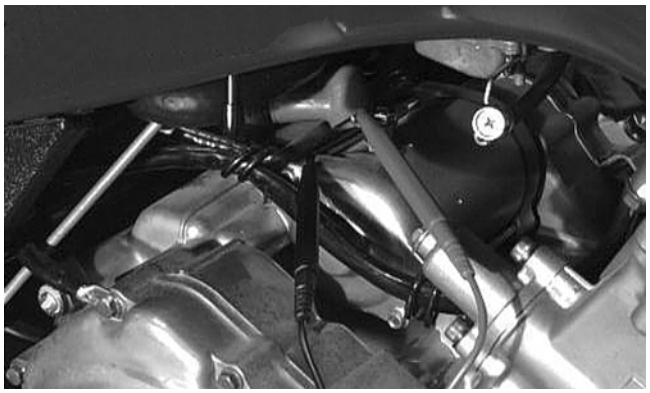
■NOTE: The starter is a non-serviceable component. If the following test does not result as specified, the starter must be replaced.

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 DC 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 approximately 10.0 DC volts and the starter motor should operate.



AR607D

■NOTE: If the meter showed correct voltage but the starter did not operate or operated slowly, the starter motor is defective.

■NOTE: If the meter showed no voltage, inspect the main fuse, ground connections, starter motor lead, battery voltage (at the battery), starter relay, or the neutral start relay.

REMOVING

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.

INSTALLING

1. 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.
2. Secure the positive cable to the starter with the nut.
3. Connect the battery.

Electronic Control Unit (ECU)

The electronic control unit (ECU) is located beneath the seat near the battery.

■NOTE: The ECU is not a serviceable component. If the unit is defective, it must be replaced.

The ECU is rarely the cause for electrical problems; however, if the ECU is suspected, substitute another ECU to verify the suspected one is defective.

Error codes can be cleared by following the procedures located in the ECU Error Codes sub-section in this section.

Regulator/Rectifier

The regulator/rectifier is located under the rear rack and rear fenders.

TESTING

1. Start engine and warm up to normal operating temperatures; then connect a multimeter to the battery as follows.
2. Select the DC 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 DC volts.

■NOTE: If voltage rises above 15.5 DC 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/ 2WD Relays

The relays are identical plug-in type located on the power distribution module. Relay function can be checked by switching relay positions. The relays are interchangeable.

■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-prong 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 with 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 DC 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 middle terminal; then connect the power supply (negative) to the bottom terminal.
2. The taillight should illuminate.
3. With the negative power supply still connected, connect the positive supply wire to the top terminal.
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 DC Voltage position.
2. Connect the red tester lead to the white 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 DC 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 engine timing, see Section 2.

ECU Error Codes

If a sensor fails or an out-of-tolerance signal is sensed by the ECU, an error code will be generated by the ECU. This will result in the analog needle swinging full scale. The EFI icon will flash.

To read the error code(s), use the following procedure.

1. Make sure the ignition switch is in the OFF position; then remove the seat.
2. Locate the diagnostic plug next to the PDM; then remove the black rubber cap.
3. Connect the Diagnostic Harness to the diagnostic plug.

ATV-112

4. Turn the ignition switch to the ON position and read the error code on the LCD. Refer to the following ECU Error Code List to identify the specific problem area.

ECU Error Code List

■NOTE: Each of the following numerical codes will have a two-letter prefix. A prefix of AC (Active Code) or SC (Stored Code) will be displayed. Always correct and clear Active Codes before clearing Stored Codes.

- 00 = No Fault Detected (active code only)
- 12 = CKP (Crankshaft Position) Sensor*
- 13 = MAP (Manifold Absolute Pressure) Sensor
- 14 = TPS (Throttle Position Sensor)
- 15 = ECT (Engine Coolant Temperature) Sensor
- 16 = Speed Sensor
- 21 = IAT (Inlet Air Temperature) Sensor
- 23 = Tilt Sensor*
- 24 = Ignition Coil #1*
- 26 = Ignition Coil #2*
- 32 = Fuel Injector #1*
- 34 = Fuel Injector #2*
- 40 = ISC (Idle Speed Control) Valve
- 41 = Fuel Pump Relay*
- 60 = Cooling Fan Relay
- 95 = Sensor Power
- 96 = Incorrect ECU*
- 97 = ECU Memory Power (constant battery power)
- 98 = UART Comm Link
- 99 = Start/Run Not Possible (active code only)

*Will initiate code 99.

To clear the error code(s), use the following procedure.

■NOTE: The ignition switch should be in the OFF position.

1. With the diagnostic harness connected to the diagnostic plug and the drive select switch in the 4WD position, hold the reverse override switch down and turn the ignition switch to the ON position.
2. After ten seconds, release the reverse override switch and turn the ignition switch to the OFF position; then turn the ignition switch to the ON position. The display should read EC00 (no fault detected).

■NOTE: If the LCD still displays an error code, continue troubleshooting the appropriate component.

3. Disconnect the diagnostic harness; then install the black rubber cap.
4. Install the seat making sure it locks securely in place.

Tilt Sensor

⚠ WARNING

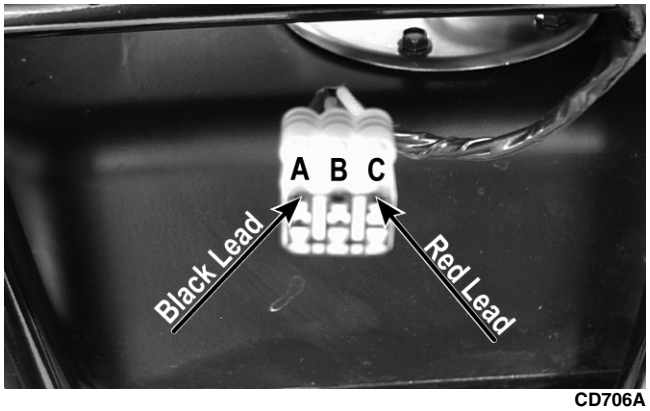
Incorrect installation of the tilt sensor could cause sudden loss of engine power which could result in loss of vehicle control resulting in injury or death.

⚠ CAUTION

Do not drop the tilt sensor as shock can damage the internal mechanism.

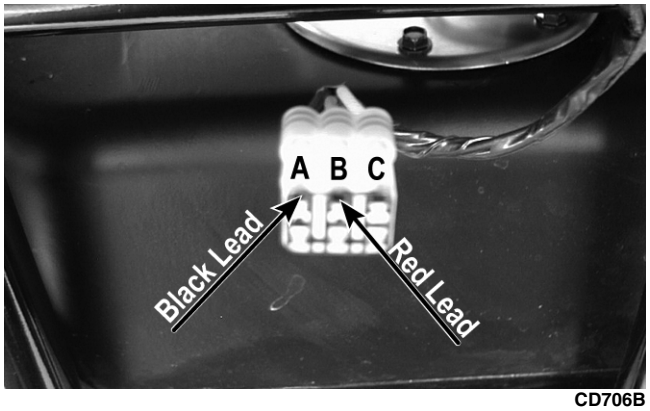
SUPPLY VOLTAGE

1. Disconnect the three-wire connector from the sensor; then select DC Voltage on the multimeter and connect the red tester lead to the orange wire (C) and the black tester lead to the black wire (A).



CD706A

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/brown wire (B). The multimeter should read 0 DC volts. If the specified voltage is not indicated, check wire connections at the CDI or substitute another CDI to verify the test.

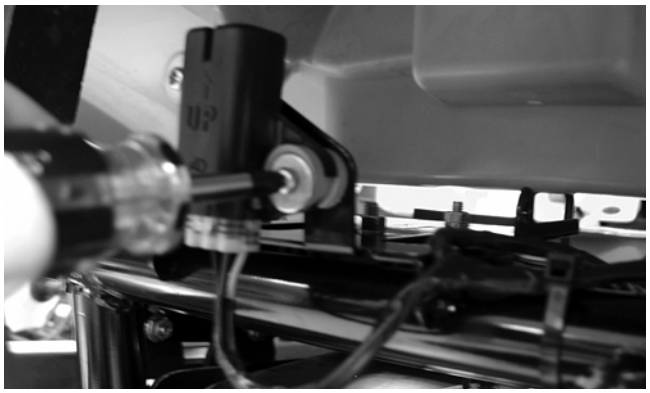


CD706B

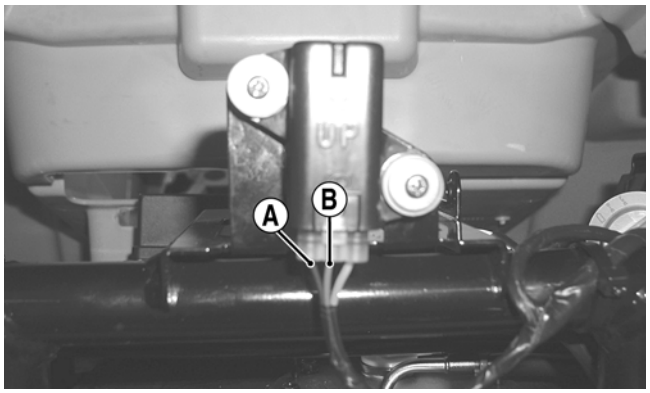
OUTPUT VOLTAGE

■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 plug to the sensor; then remove the right-side mounting screw securing the sensor to the rear frame.

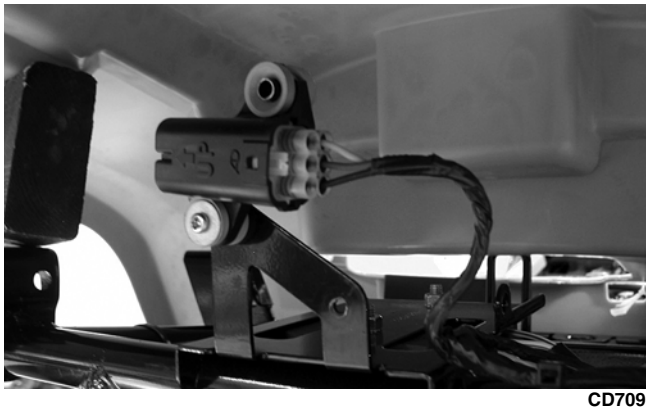

CD707

2. Install the needle adapters to the multimeter leads; then select DC Voltage on the multimeter.
3. Connect the red tester lead to the blue/brown wire (B) and the black tester lead to the black/yellow wire (A); then turn the ignition switch ON and observe the meter. The meter should read 0.8-3.0 DC volts.

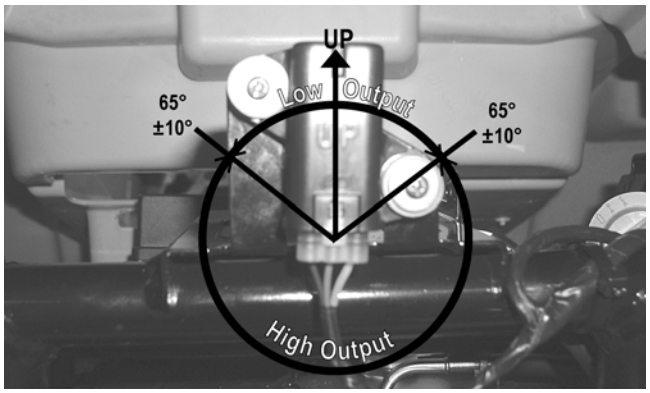


CD705B

4. Tilt the sensor 60° or more to the left and right observing the meter. The meter should read 3-7 DC volts after approximately one second in the tilted position. If the meter readings are not as specified, the tilt sensor is defective.


CD709

■NOTE: When replacing the sensor after testing, make sure the arrow marking is directed up.

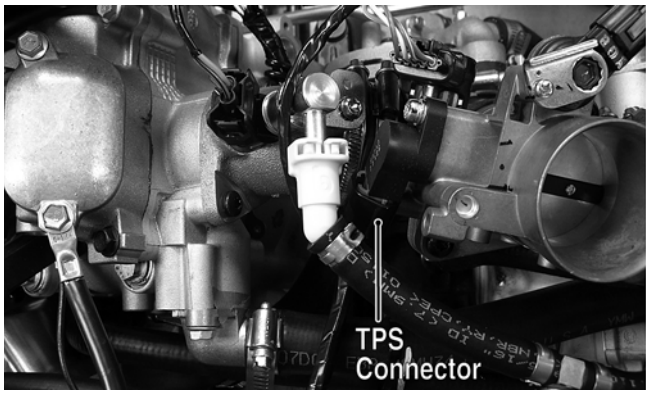


CD705A

Throttle Position Sensor (TPS)

INSPECTING

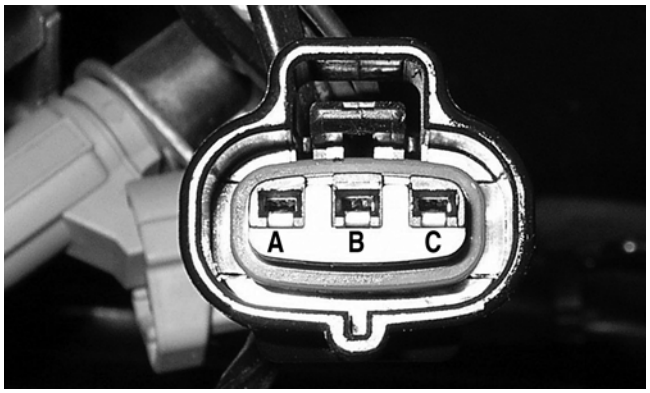
1. Remove the right-side engine cover; then disconnect the three-wire TPS connector plug.



GZ095A

■NOTE: Prior to testing the TPS, inspect the three-wire plug connector on the main harness and the three-pin plug on the TPS for contamination, broken pins, and/or corrosion.

2. Make sure the ignition switch is in the OFF position; then select the DC Voltage position on the meter.
3. Connect the black tester lead to spade terminal C and the red tester lead to spade terminal B. Turn the ignition switch to the ON position. The meter should read 4.5-5.5 DC volts.



FI456A

4. Remove the black tester lead from spade terminal C and connect it to spade terminal A. The meter should read 4.5-5.5 DC volts.

■NOTE: If the meter does not read as specified, check for poor connections at the ECU or open/broken wires in the wiring harness.

⚠ CAUTION

Always make sure the ignition switch is in the OFF position before disconnecting the ECU.

5. Turn the ignition switch to the OFF position; then disconnect the battery (negative cable first).

⚠ CAUTION

Always disconnect the battery when performing resistance tests to avoid damaging the multimeter.

6. Select the OHMS position on the meter; then perform the following resistance tests on the TPS.

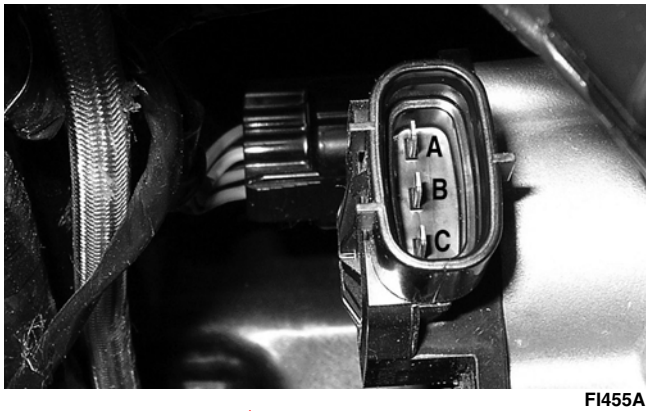
   A. Pin (B) to ground - infinity (open circuit).

   B. Pin (A) to pin (B) - approximately 4.8k ohms (throttle closed).

   C. Pin (A) to pin (B) - approximately 4.8k ohms (throttle full-open).

   D. Pin (B) to pin (C) - approximately 4.8k ohms.

   E. Pin (B) to pin (C) - approximately 1.2k ohms (throttle full-open).



FI455A

■NOTE: If any meter reading is not as specified, replace or adjust the TPS (see INSTALLING/ADJUSTING in this sub-section).

7. Connect the positive lead to the battery; then connect the negative lead.

8. Connect the main harness TPS connector to the TPS; then using MaxiClips, connect the black tester lead to the black/green wire and the red tester lead to the green/black wire.

9. Select the DC Voltage position on the meter and turn the ignition switch to the ON position. The meter should read approximately 1.12 DC volts with the throttle full-open and approximately 4.32 DC volts with the throttle in the closed position.

■NOTE: If the meter readings are as specified, check the main harness connector at the ECU main harness wiring. If the meter readings are not as specified, replace the TPS and adjust to specifications (see INSTALLING/ADJUSTING in this sub-section).

⚠ CAUTION

Always make sure the ignition switch is in the OFF position before disconnecting the ECU.

10. Clear all ECU error codes after servicing is complete (see ECU Error Codes in this section).

REMOVING

1. Remove the right-side engine cover; then disconnect the three-wire TPS connector plug.

FI450A

2. Remove the screw securing the TPS to the throttle body and remove the TPS.

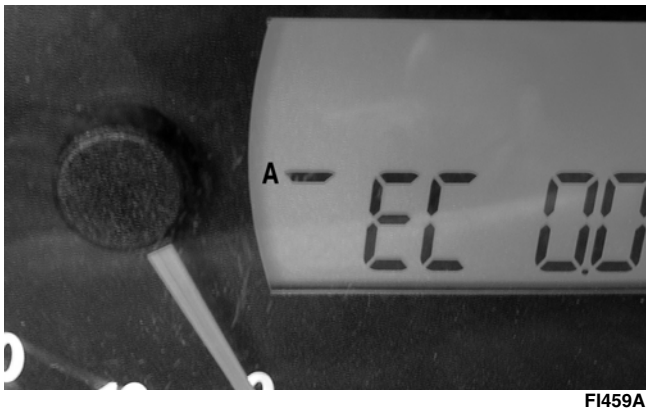
INSTALLING/ADJUSTING

1. Place the TPS into position on the throttle body and secure with the two screws. Do not tighten at this time.

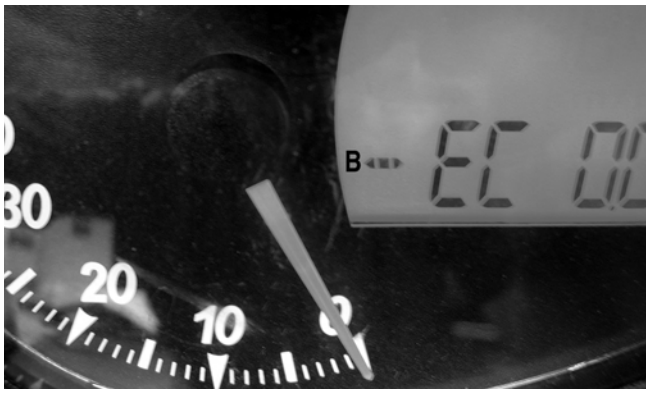
2. Connect the main harness to the TPS.

3. Locate the diagnostic connector under the seat next to the PDM; then install the test plug from Test Plug/Error Code List onto the connector.

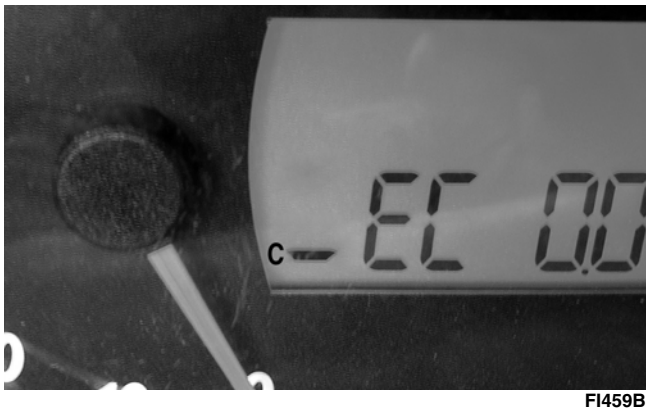
4. Turn the ignition switch to the ON position and note the position of the TPS indicator icon (A, B, or C); then adjust the TPS until the TPS icon appears in the center position (B).



FI459A



FI454A



FI459B

5. Tighten the mounting screws securely; then verify the TPS icon appears in the center position.

6. Remove the test plug; then install the left-side engine cover.

Troubleshooting

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. **ECU** defective	4. Replace ECU
5. **Pick-up coil** defective	5. Replace pick-up coil
Problem: Spark plug fouled with carbon	
Condition	**Remedy**
1. **Gasoline** incorrect	1. Change to correct gasoline
2. **Air cleaner element** dirty	2. Clean element
3. **Spark plug** incorrect (too cold)	3. Replace plug
4. **Valve seals** cracked - missing	4. Replace seals
5. **Oil rings** worn - broken	5. 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
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** defective	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. Charge - 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** insufficient	2. Keep electrolyte to prescribed level
3. **Specific gravity** too low	3. Charge battery - add distilled water
4. **Battery** run-down - damaged	4. Replace battery
5. **Electrolyte** contaminated	5. Replace battery
Problem: Battery discharges too rapidly	
Condition	**Remedy**
1. **Electrolyte** contaminated	1. Replace battery
2. **Specific gravity** too low	2. Charge battery - add distilled water
3. **Charging system** not charging	3. Check magneto - regulator/rectifier - circuit connections
4. **Cell plates** overcharged - damaged	4. Replace battery - correct charging system
5. **Battery** short-circuited	5. Replace battery
6. **Specific gravity** too low	6. Charge battery
Problem: Battery polarity reversed	
Condition	**Remedy**
1. **Battery** incorrectly connected	1. Reverse connections - replace battery - repair damage

SECTION 6 - DRIVE SYSTEM

TABLE OF CONTENTS

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.

■NOTE: Critical torque specifications are located in Section 1.

■NOTE: Specifications regarding 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.)

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.

The "1" or "3.1" on the lower-right corner indicates a 3.1:1 gear set ratio (11:34 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)	8-9.5 ft-lb	6.5-9 ft-lb
M8 (Torx T-40 Recess)	25-31 ft-lb	21-25 ft-lb
M10 (Torx T-50 Recess)	37-45.5 ft-lb	31-38 ft-lb

SPECIAL TOOLS

A number of special tools must be available to the technician when performing service procedures in this section.

Description	p/n
CV Boot Clamp Tool	0444-120
Internal Hex Socket (48 mm)	0444-104
Pinion Gear/Shaft Removal Tool	0444-127
Slide Hammer Kit	0444-225
Seal Installation Tool	0444-224

■NOTE: Special tools are available from the Arctic Cat Service Parts Department.

Front Drive Actuator

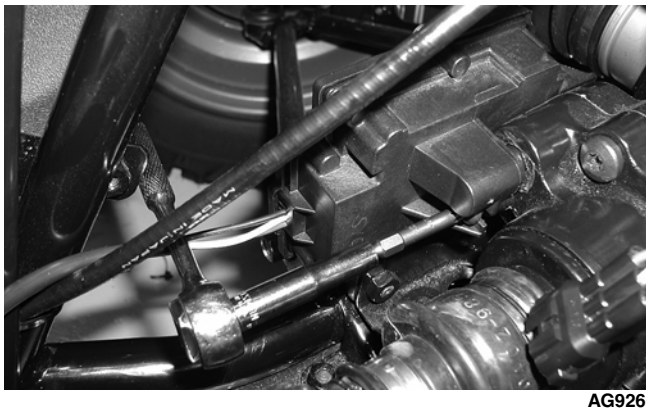
■NOTE: The actuator is not a serviceable component. If it is defective, it must be replaced.

■NOTE: The actuator will operate only when the ignition switch is in the ON position.

The front drive actuator is located on the 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.

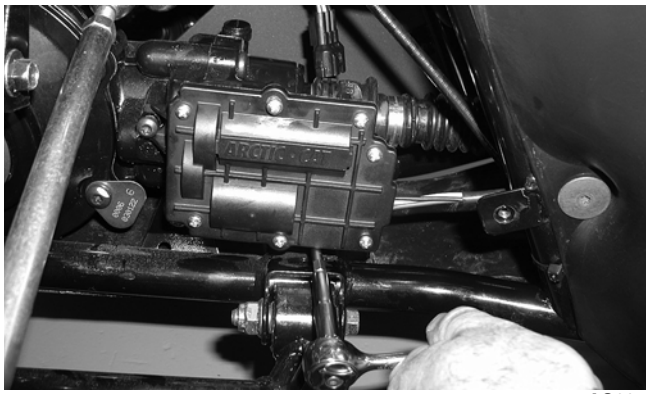
REMOVING

1. Disconnect the connector on the actuator harness.
2. Using a T-30 torx wrench, remove the mounting cap screw from the driveshaft side of the actuator.



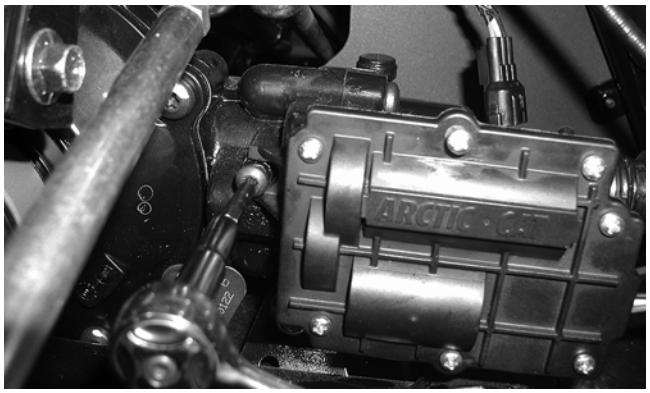
AG926

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.



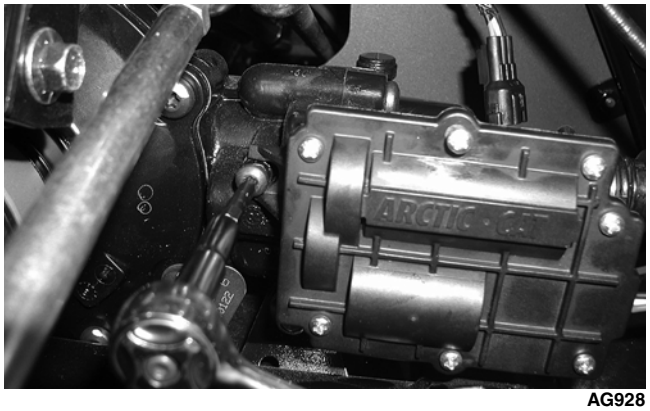
AG928

INSTALLING

1. Lubricate the O-ring on the actuator; then ensure that all mounting surfaces are clean and free of debris.
2. 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.

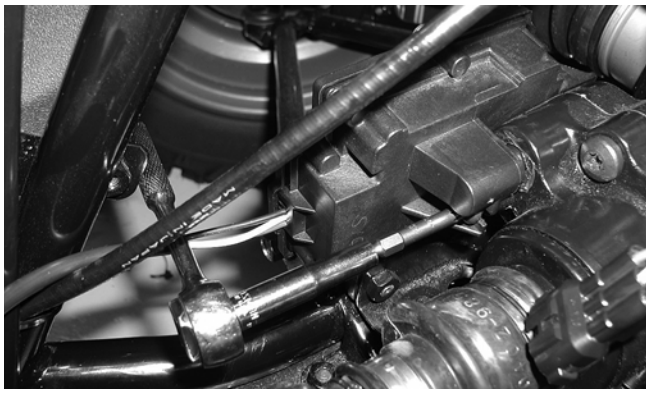
AG925

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.

Front Differential

■NOTE: To remove the rear gear case, see Rear Gear Case in this section.

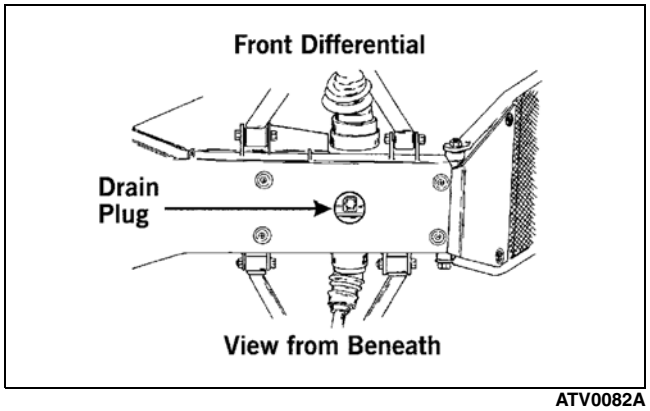
REMOVING DIFFERENTIAL

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 drain plug and drain the gear lubricant into a drain pan; then reinstall the plug and tighten to 45 in.-lb.



ATV0082A

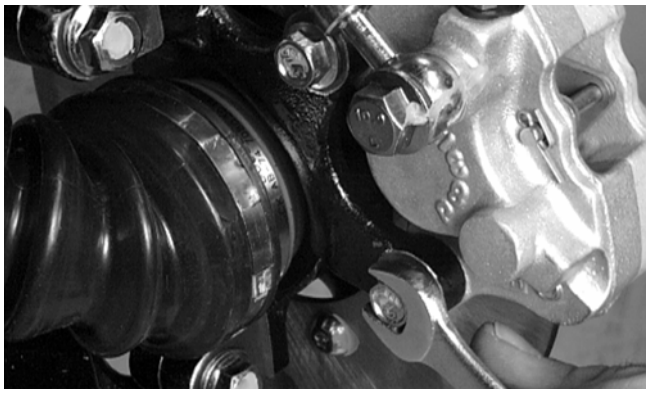
3. Remove the front wheels.
4. Pump up the hand brake; then engage the brake lever lock.
5. Remove the cotter pin securing the hex nut; then remove the hex nut and washer.

KX041

6. Release the brake lever lock.

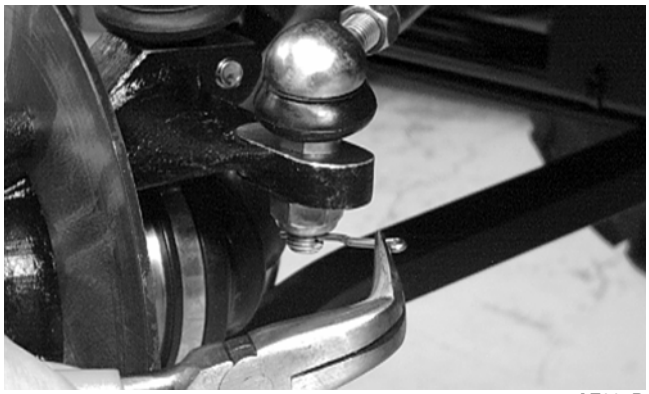
■NOTE: It is not necessary to remove the brake hoses from the calipers for this procedure.

7. Remove the two brake calipers. Account for the four cap screws.



AF894D

8. Remove the tie rod cotter pins and discard the pins.

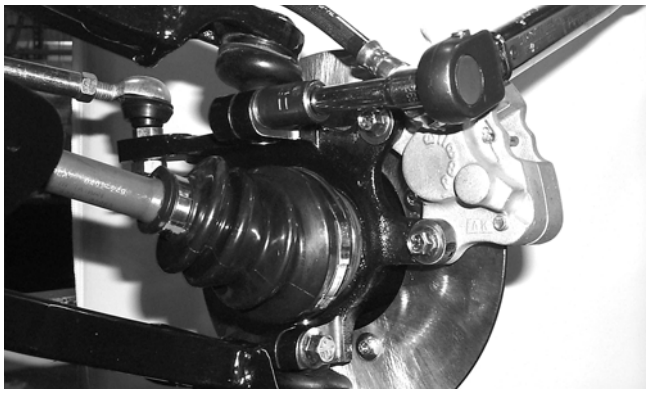


AF895D

9. Remove the tie rod lock nuts.

AF896D

10. 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

11. Pull the steering knuckle away from the axle taking care not to damage the seals with the axle end.

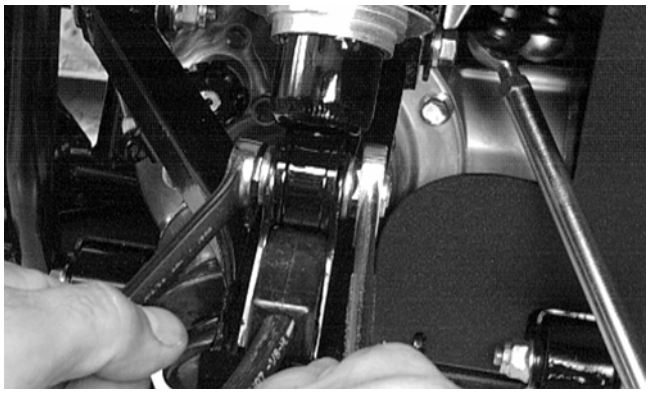
KX151

12. Support the axle to not allow it to drop or hang.

⚠ CAUTION

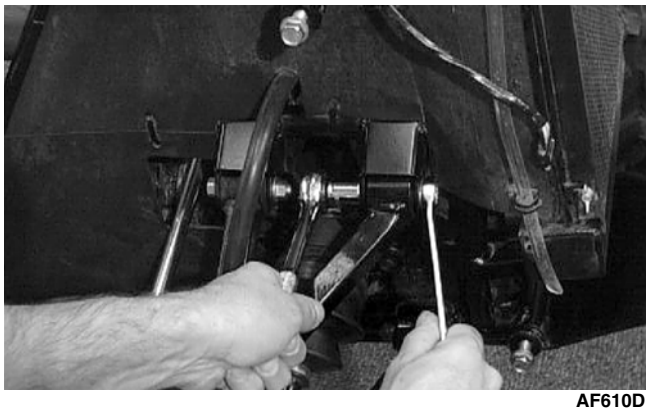
The axle must be supported. If the axle is allowed to drop or hang, damage to the inner CV joint may occur.

13. Remove the lower shock bolts. Account for the lock nuts; then move the shocks aside and secure them with a strap.



AF897D

14. Remove the upper A-arm lock nuts and cap screws; then remove the A-arms.



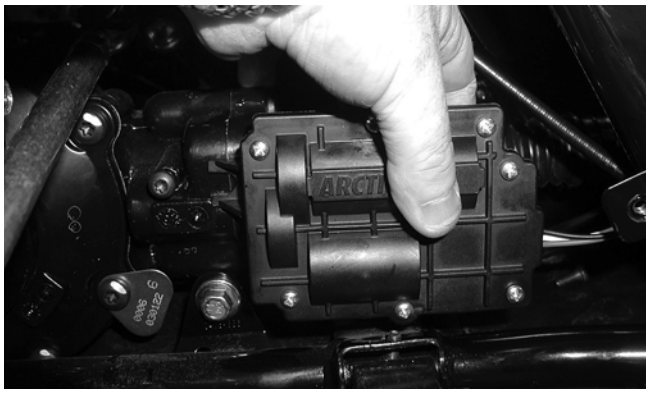
AF610D

15. Using a slide hammer, remove the front axles.

AF899D

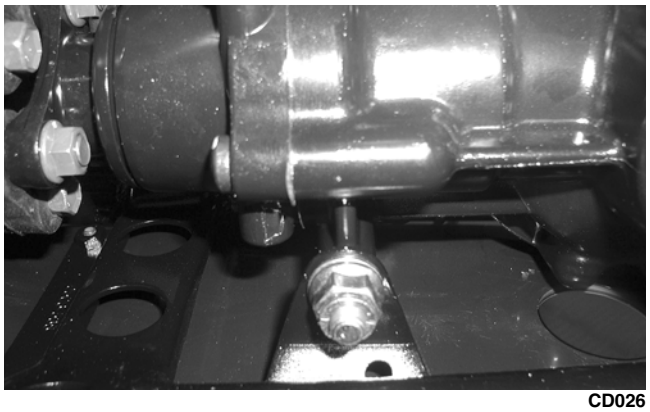
16. Remove the inner fender panels.

17. Using a T-30 torx wrench, remove the three screws securing the front drive actuator to the gear case; then remove the actuator.



AG925

18. Remove the lower differential mounting cap screw. Account for a lock nut and washers.



CD026

19. Remove the upper differential mounting cap screws.

CD016

20. Free the differential assembly from the frame mountings; then shift the differential assembly forward enough to disengage the front driveshaft from the output yoke.


KX161

21. Place the differential on its right side; then remove it from the frame.


KX159

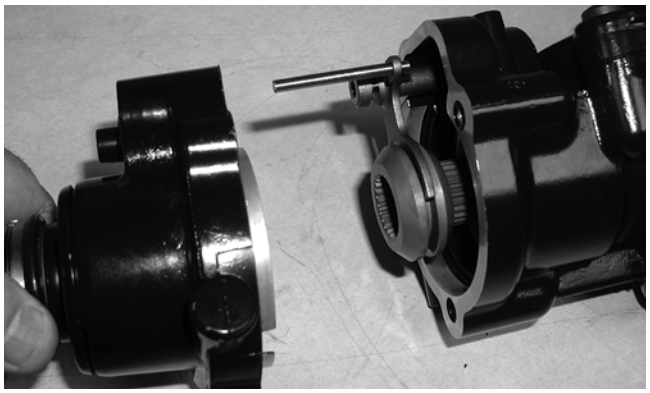
Disassembling Input Shaft

■NOTE: This procedure can be performed on a rear gear case; however, some components may vary. The input shaft on the rear gear case incorporates a clutch pack assembly not utilized on the differential. The assembly is not a serviceable component and must not be disassembled.

1. Using a T-40 torx wrench, remove the cap screws securing the pinion housing.

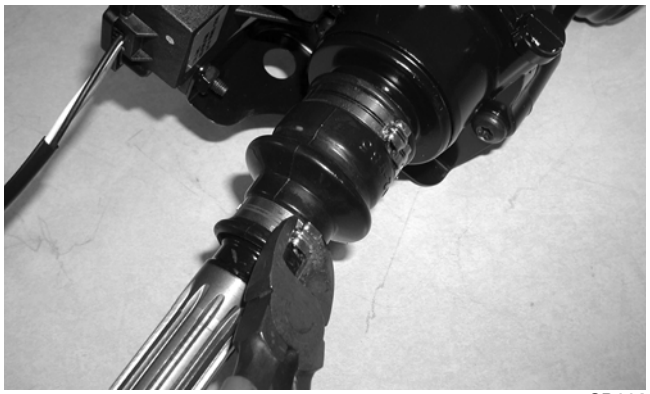

CD102

2. Using a rubber mallet, remove the housing. Account for a gasket. Remove the fork, collar, and spring. Note the location of all the components for assembling purposes.

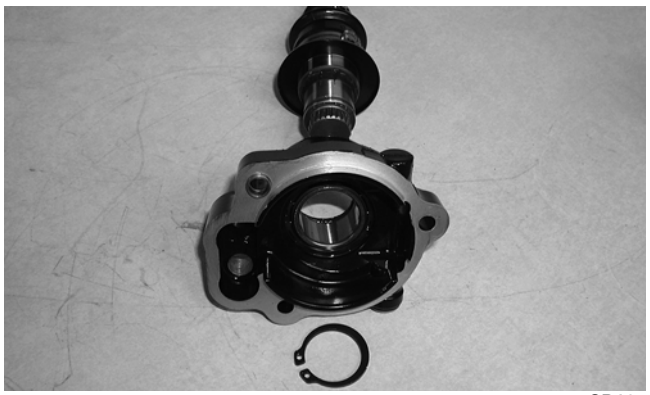

CD103


CD106

3. Using a side-cutter (or suitable substitute), remove the boot clamps; then remove the boots and splined drive from the input shaft.


CD114

4. Remove the input shaft from the pinion housing.

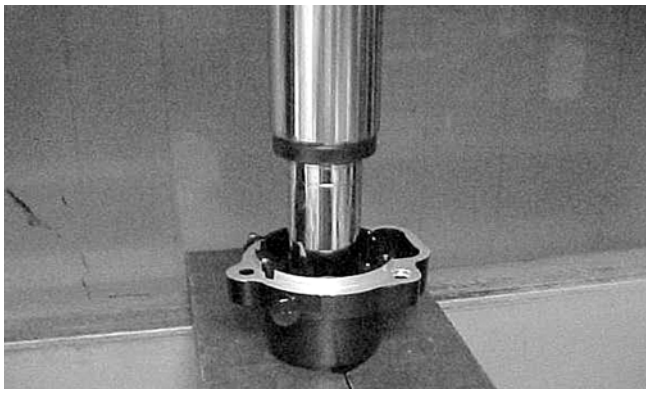

CD107

5. Using a seal removal tool, remove the input shaft seal. Account for a spacer.

AF982

6. Remove the snap ring securing the input shaft bearing; then place the pinion housing in a press and remove the bearing.

AF983



AF984

KX219

Assembling Input Shaft

1. Place the pinion 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.

AF993

AF994

2. Install the input shaft seal making sure it is flush with the edge of the housing.

3. Lubricate the input shaft splines with High-Performance #2 Molybdenum Disulphide Grease.

■NOTE: Any time drive splines are separated, clean all splines with parts-cleaning solvent and dry with compressed air; then lubricate with recommended grease.

KX221

KX222

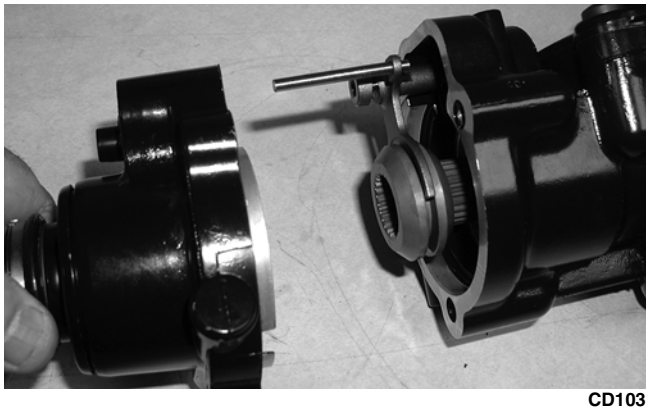
4. Install the input shaft into the housing; then install the front boot and secure with an appropriate boot clamp and the rear boot with an appropriate boot clamp.

CD112

CD099

5. Place the pinion housing with new gasket onto the gear case housing; then secure with the existing cap screws. Tighten to 23 ft-lb.

■NOTE: If a new gear case housing is being installed, tighten the cap screws to 25-31 ft-lb.

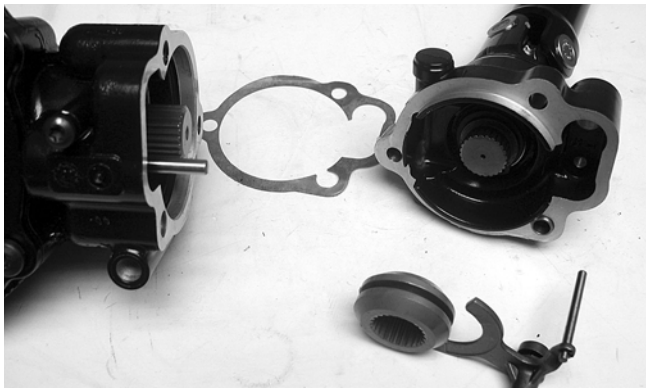


CD103

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 pinion housing. Account for the coupler, fork, and spring.



KX209

2. Using a T-40 torx wrench, remove the cap screws securing the gear case 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. Remove the left gear case bearing flange assembly and account for a shim. Mark the shim as left-side.

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.

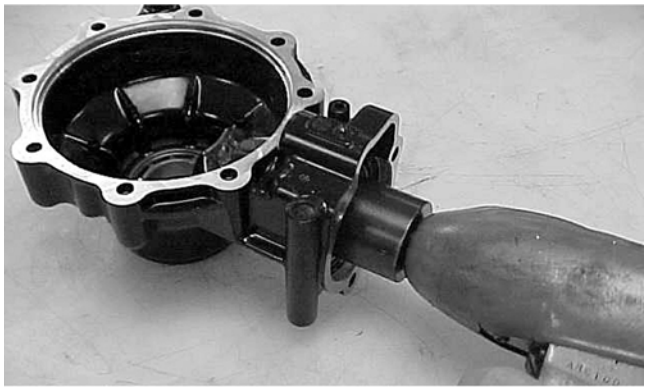
KX179

KX181

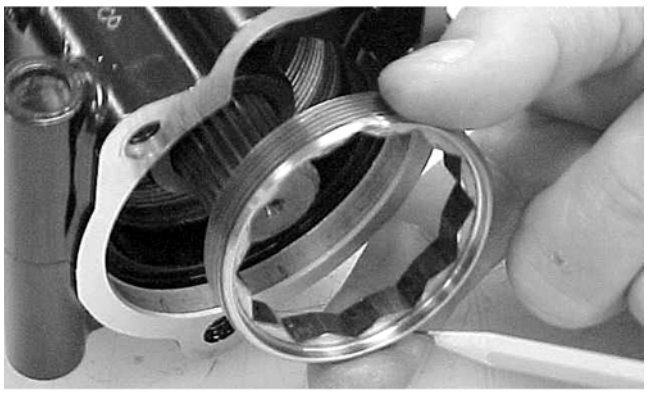
7. Using the 48 mm Internal Hex Socket, remove the lock collar securing the pinion gear assembly.

■NOTE: On a front differential, the lock collar has right-hand threads. On a rear gear case, the lock collar has left-hand threads.

6

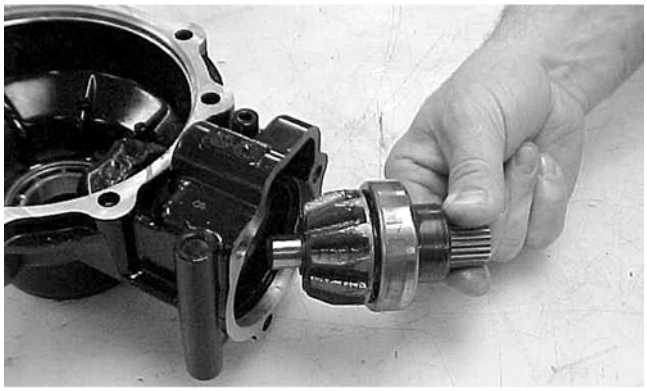


CC875



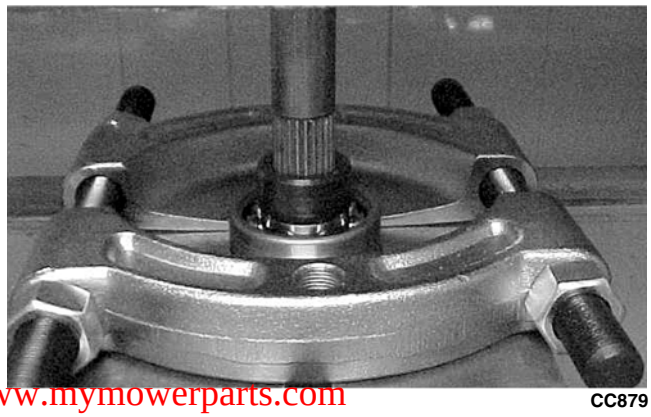
CC876

8. Using the Pinion Gear/Shaft Removal Tool and a hammer, remove the pinion gear from the gear case housing.



CC878

9. Secure the pinion gear in a bearing puller; then remove the pinion bearing using a press. Account for a collar and a bearing.



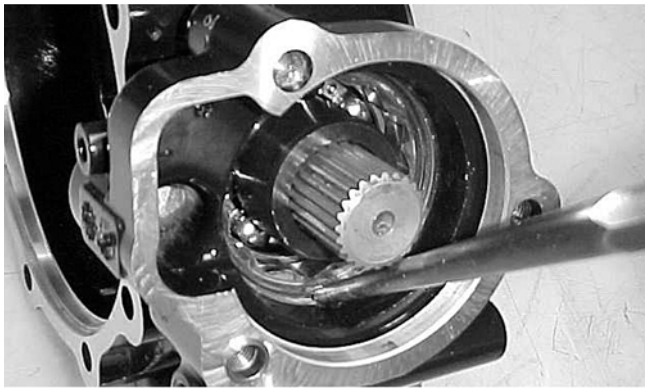
CC879

■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 0 category.

■NOTE: If the gear case housing is being replaced, proceed to the following Shimming Procedure/Shim Selection sub-section.

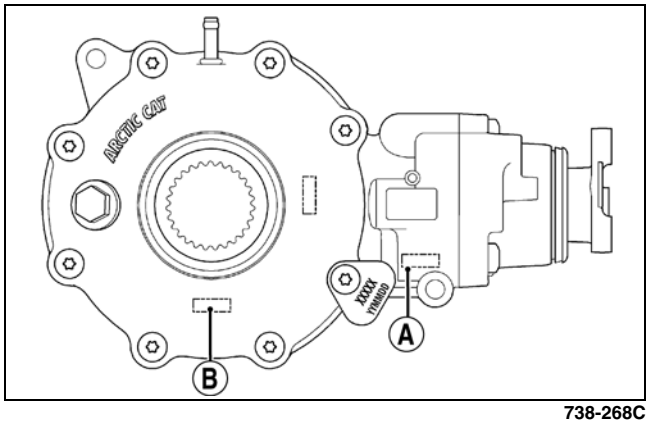
Shimming Procedure/Shim Selection

1. Press bearings into bores by outer ring to hard contact with seat.
2. Install the lock collar and tighten to 125 ft-lb; then on final assembling, stake the lock collar edge approximately 1.5 mm into the lower oil channel.



CC891

3. Note the following shim selections (shims are nominally 1.5 mm thick):



738-268C

A. Cover Side - add value A on the gear case housing to value B on the gear case cover; then add 1.5 mm. This will give you the proper shim thickness.

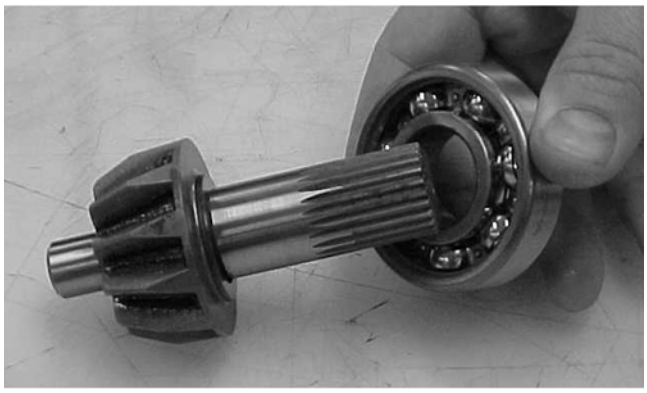
■NOTE: When shimming a rear gear case, add value A to value B.

B. Gear Case Side - install a 1.3-1.4 mm shim and tighten the bolts to 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.

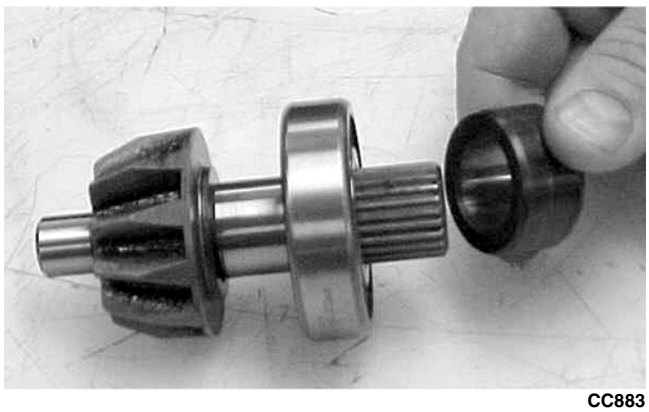
4. Prior to final assembling, apply molybdenum disulfide grease to all oil seal lips.
5. Prior to final assembling, prelubricate journal on pinion assembly with SAE 80W-90 hypoid gear lubricant prior to pressing assembly into gear case housing.

Assembling Pinion Gear

1. Install the bearing onto the pinion shaft. Install the pinion shaft collar.

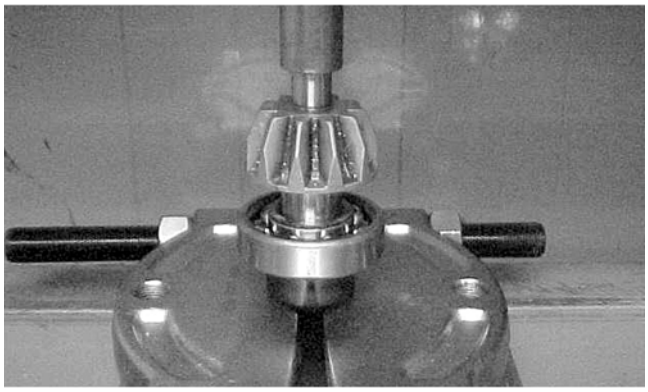


CC882



CC883

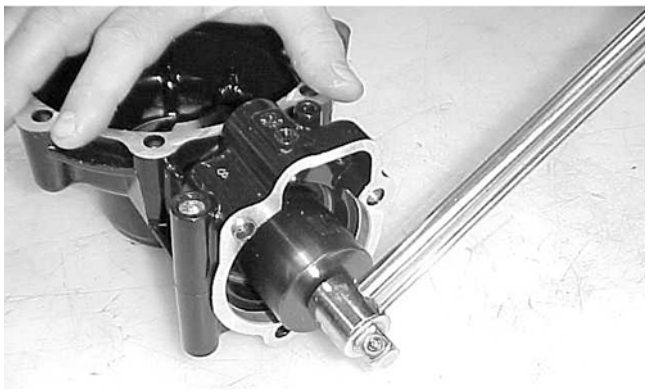
2. Place the pinion assembly in a bearing puller; then install the bearing using a press.



CC884

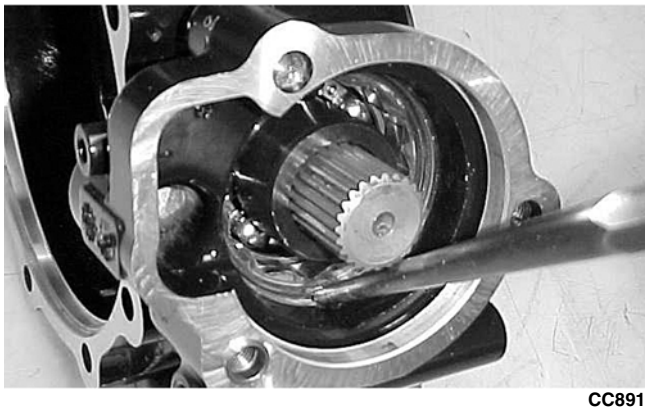
3. Install the pinion gear assembly into the housing. Using the 48 mm Internal Hex Socket, secure the pinion gear assembly with the existing lock collar. Tighten to 125 ft-lb.

■NOTE: On a front differential, the lock collar has right-hand threads. On a rear gear case, the lock collar has left-hand threads.



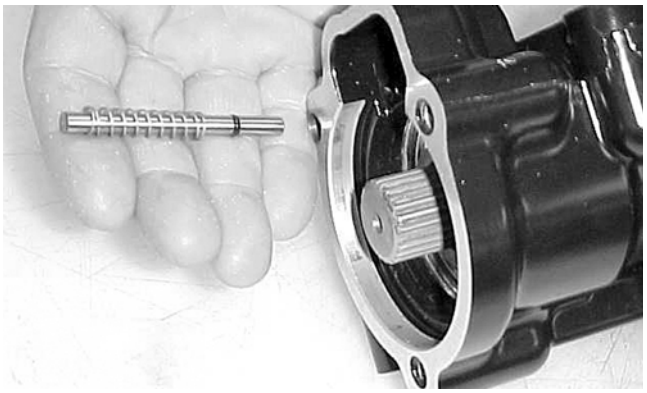
CC890

4. Place a punch on the edge of the lock collar in the oil gallery area; then using a hammer, stake the lock collar to ensure that the collar will remain securely tightened.



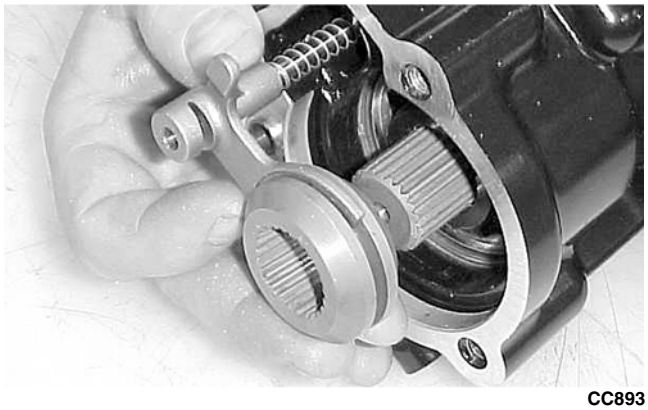
CC891

5. Install the shift fork shaft w/spring into the gear housing making sure the shaft O-ring is positioned to the inside.



CC892

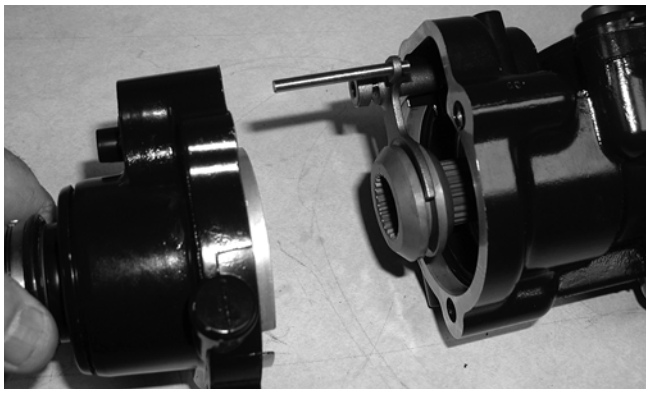
6. Install the shift fork assembly making sure the fork leg is facing upward. Apply a small amount of oil to the gasket; then install the gasket.



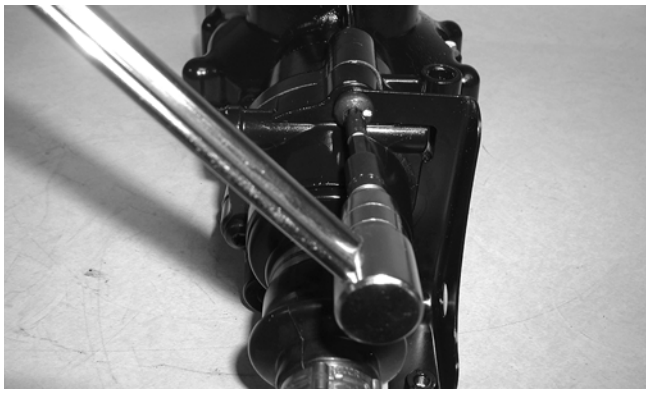
CC893

7. Place the input shaft housing assembly onto the gear housing; then secure with the existing cap screws. Tighten to 23 ft-lb.

■NOTE: If a new gear housing is being installed, tighten the cap screws to 25-31 ft-lb.



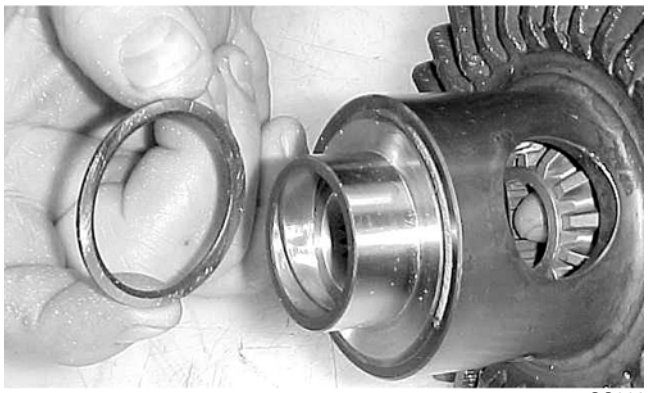
CD103



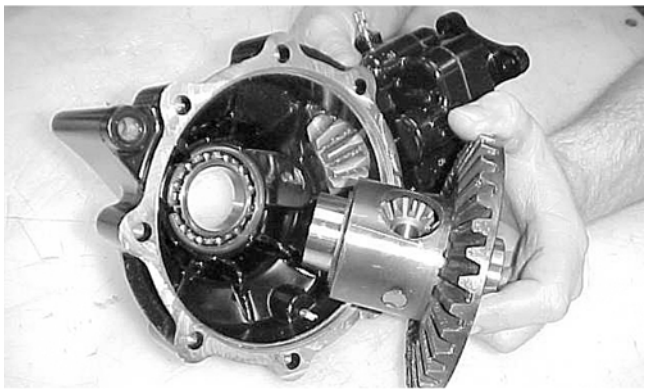
CD110

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.

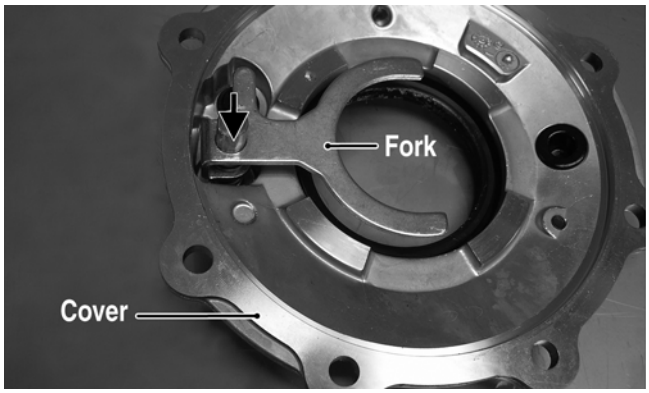


CC896

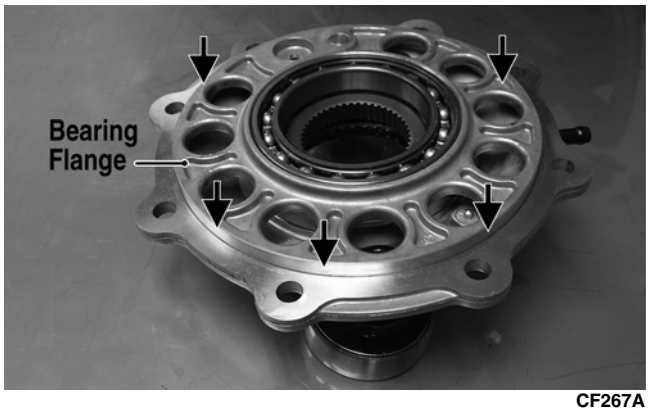


CC897

9. Assemble the fork and sliding collar into the cover assembly; then install left bearing flange/bearing assembly and seat it firmly into the cover.



CF266A



CF267A

10. Apply a liberal amount of grease to the O-ring; then install it on the assembled cover assembly making sure to seat the O-ring down around the circumference of the bearing flange.

11. Making sure the O-ring is properly positioned on the gear case cover assembly, install the cover with existing hardware. Account for the ID tag. Tighten the cap screws to 23 ft-lb.

■NOTE: Grease can be applied to the O-ring for ease of assembling.

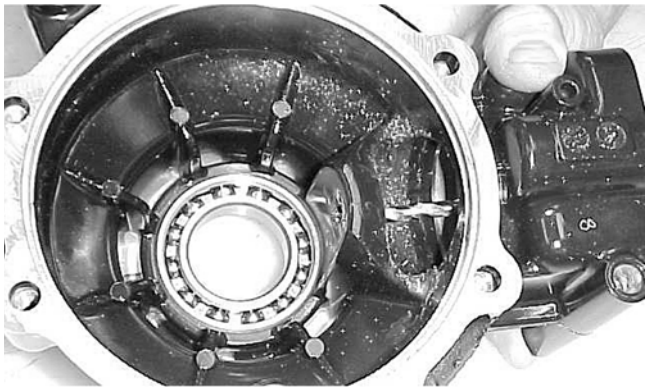
■NOTE: If a new gear case housing is being installed, tighten the cap screws to 25-31 ft-lb.

Removing Needle Bearing

■NOTE: Removing the needle bearing is rarely necessary. Avoid removing the needle bearing unless the bearing is clearly damaged.

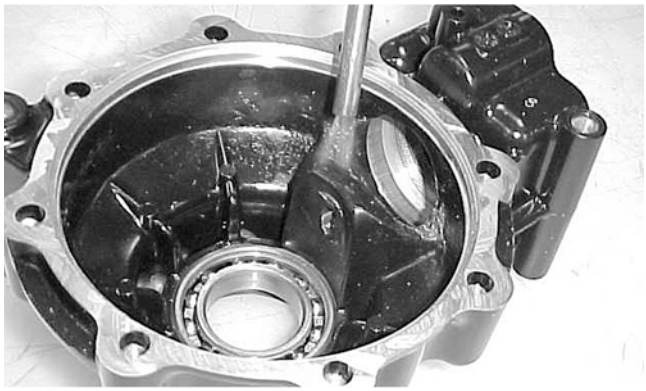
■NOTE: This procedure can be performed on a rear gear case.

1. Place a 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 soften the Loctite.



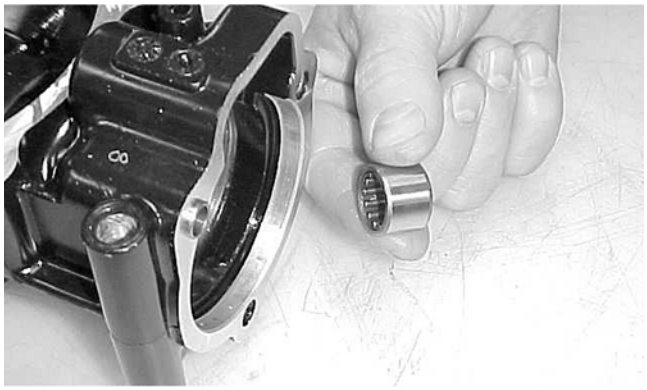
CC886

3. Using a flat-nosed punch, drive the bearing out of the housing.

CC887

Installing Needle Bearing

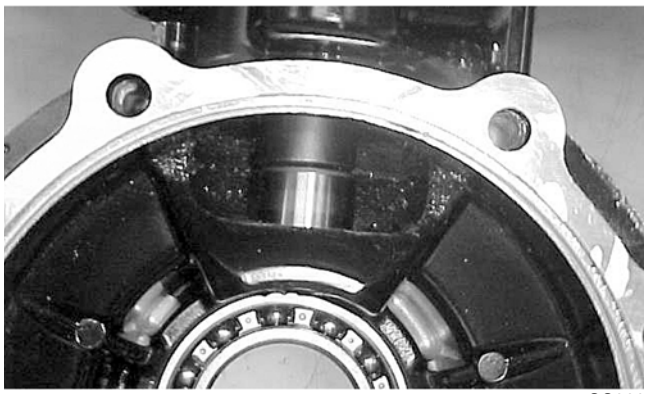
1. Apply green Loctite #609 to the outside of a new bearing; then place the new bearing into the housing.



CC888

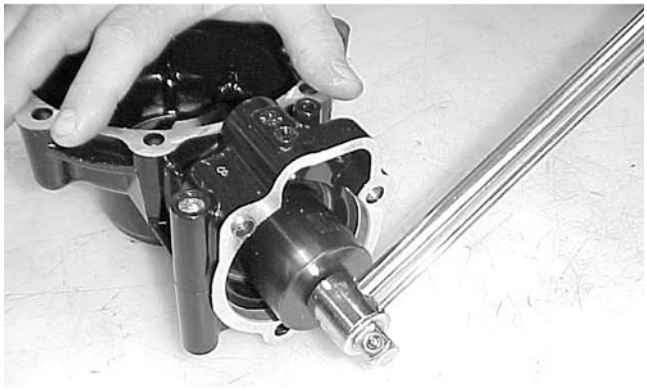
2. Using a suitable driver, install the needle bearing into the gear case housing making sure the bearing is seated.

■NOTE: Do not push the bearing too far into the housing.



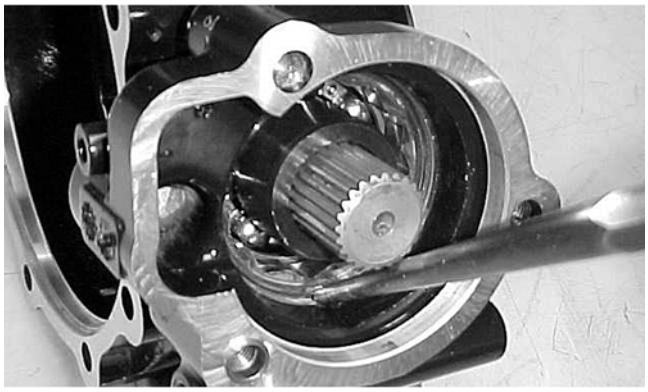
CC889

3. Install the pinion shaft and secure with the existing 48 mm lock collar. Tighten to 125 ft-lb.



CC890

4. Place a punch on the edge of the lock collar in the oil gallery area; then using a hammer, stake the lock collar to ensure that the collar will remain securely tightened.



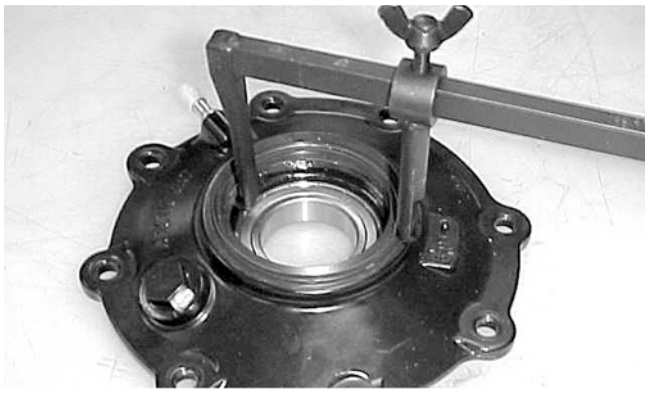
CC891

5. Install the pinion 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.

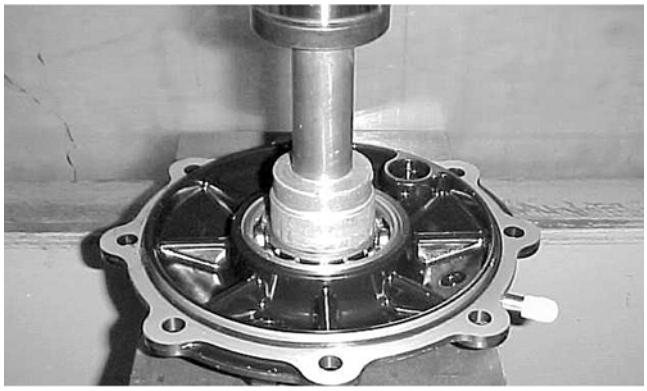


CC899

2. Using a press, remove the bearing.

CC900

3. Using a press, install the new bearing into the housing.



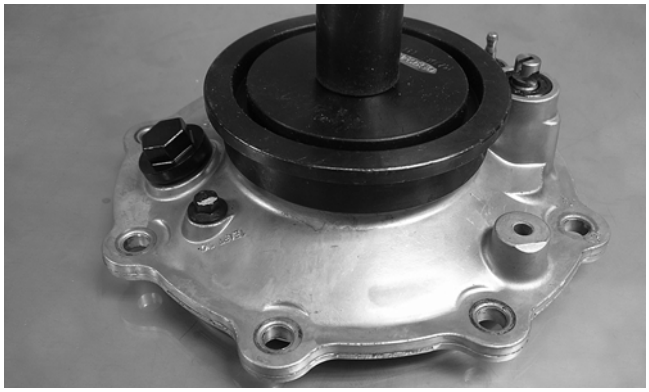
CC901

■NOTE: Prior to installing the seal, apply High Performance #2 Molybdenum Disulphide Grease to the seal outside diameter.

4. Using an appropriate seal installation tool, evenly press the seal into the cover bore until seated.

⚠ CAUTION

Make sure the tool is free of nicks or sharp edges or the seal will be damaged.



CF278

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 38 ft-lb. Make sure the rubber boot is properly seated on the input yoke.

CD857

CD859

2. Pour 275 ml (9.3 fl oz) of SAE 80W-90 hypoid lubricant into the differential and install the filler plug. Tighten to 16 ft-lb.

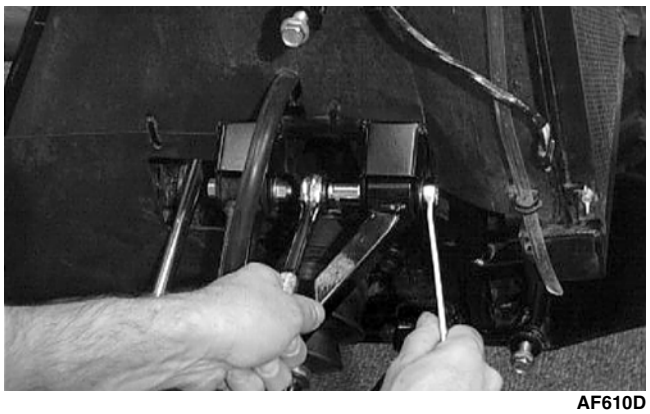
3. Install the front drive actuator with the three torx-head cap screws; then connect the wire connector to the main wiring harness.

AG925

4. Install the inner fender panels.

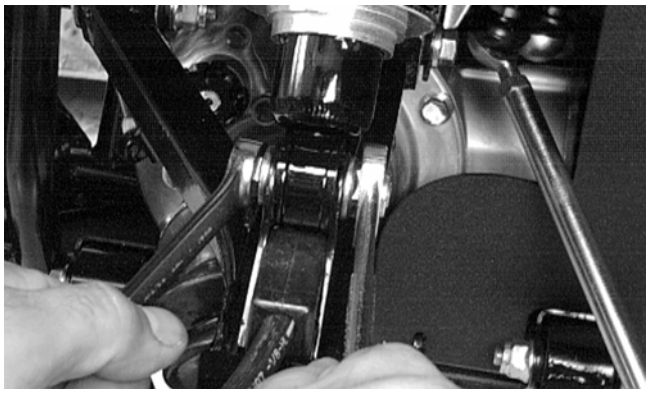
5. Install the front axles (see Drive Axles in this section).

6. Secure the upper A-arms with cap screws and lock nuts. Tighten to 35 ft-lb.



AF610D

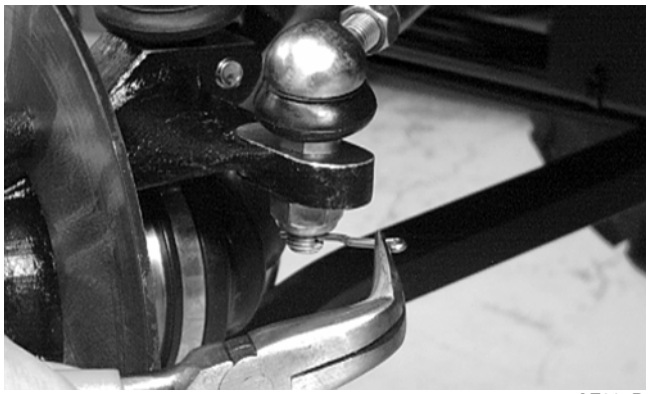
7. Secure the lower shock eyelets with cap screws and lock nuts. Tighten to 35 ft-lb.



AF897D

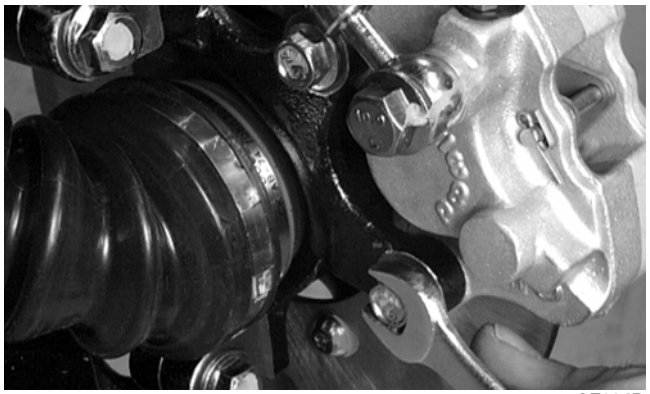
8. Secure the tie rods with the lock nuts (coated with red Loctite #271). Tighten to 30 ft-lb; then install and spread the cotter pins.

AF896D



AF895D

9. Install the brake calipers and secure with the patch-lock cap screws tightened to 20 ft-lb.



AF894D

10. Install the wheels and tighten to 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. 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.

⚠ CAUTION

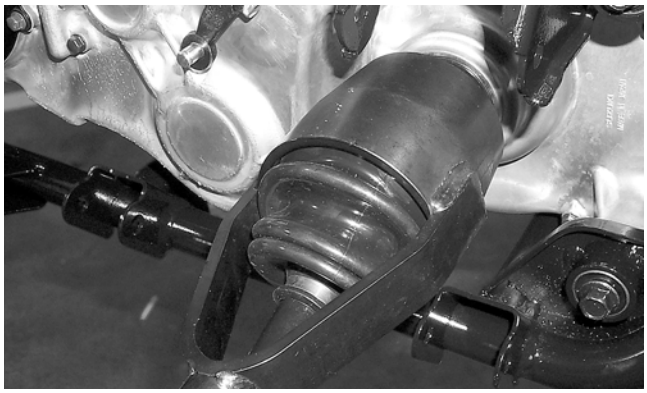
The calipers should be supported. If the calipers are allowed to hang from the cable/hose, damage may occur.

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.

■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.



AF935

REMOVING FRONT DRIVE AXLE

■NOTE: For removing a front drive axle, see Front Differential in this section.

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

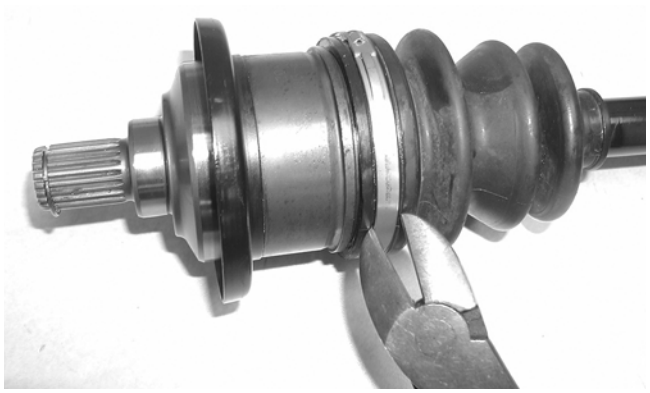
2. Inspect boots for any tears, cracks, or deterioration.

■NOTE: If a boot is damaged in any way, it must be replaced with a boot kit.

3. Inspect the gear case seals for nicks or damage.

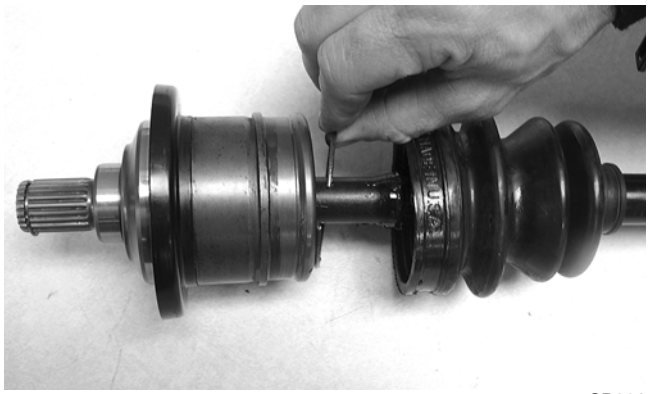
DISASSEMBLING AXLES

1. Using a side-cutters (or suitable substitute), remove the large clamp from the boot.



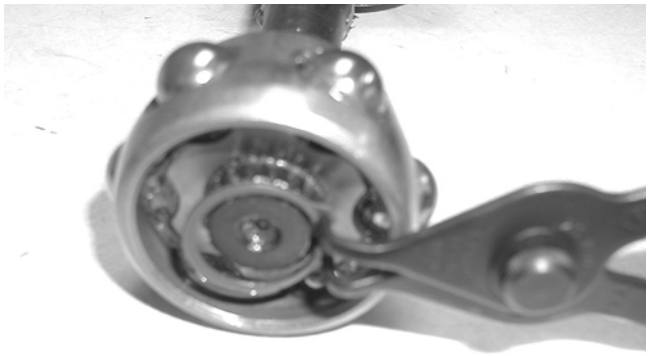
CD020

2. Wipe away excess grease to access the retaining ring. Using an awl, remove the circlip.



CD021

3. Using a snap ring pliers, remove the snap ring 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.

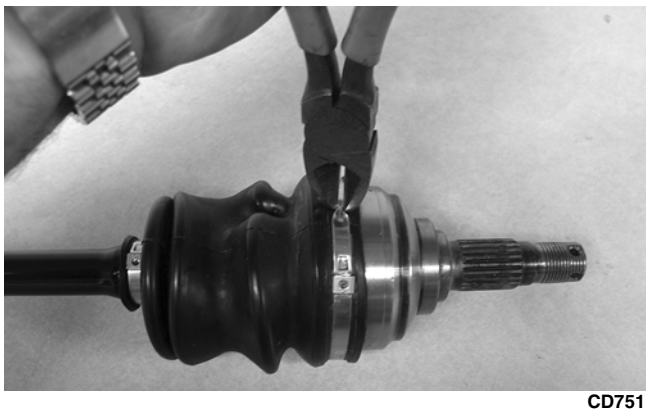
■NOTE: If any damage is apparent to the splines, the bearing ring, and/or the housing, the drive axle must be replaced as an assembly.

6. Using a side-cutters (or suitable substitute), remove the small clamp from the shaft.

CD752

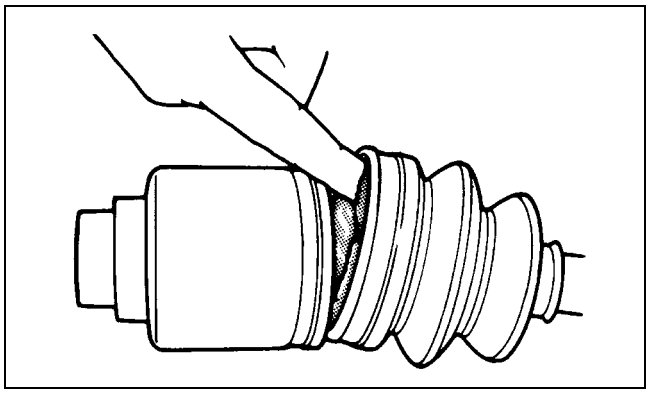
■NOTE: At this point if the outside boot is damaged, continue with step 7.

7. Using a side-cutters (or suitable substitute), remove both outside boot clamps from the shaft. Note the position of the different-sized clamps for assembling purposes.



CD751

8. Apply 40 grams (1/3 of contents) of grease from the Grease Pack into the knuckles and the new outside boot.



ATV-1052

■NOTE: Grease Pack contains 120 grams of grease. The inside joint (double-offset) requires approximately 70-90 grams of grease and the outside (bell-type) requires approximately 35-55 grams. When replacing boots, use 2/3 of the pack for inside boots and 1/3 of the pack for outside boots.

⚠ CAUTION

Do no over-fill the joint as boot damage may occur resulting in joint failure.

9. Slide the new outside 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.

CD754

10. Using the CV Boot Clamp Tool, secure both outside boot clamps.

⚠ CAUTION

It is important that the clamps are positioned correctly or they may loosen when in motion.

CD024

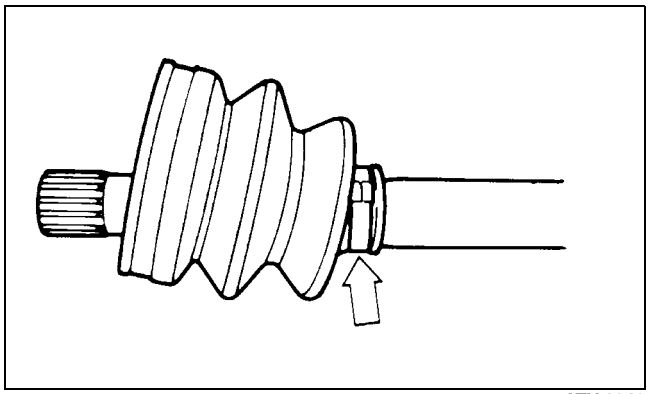
ASSEMBLING AXLES

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.

CD754

2. Using the boot clamp pliers, secure the small clamp of the inner boot.



ATV-1048

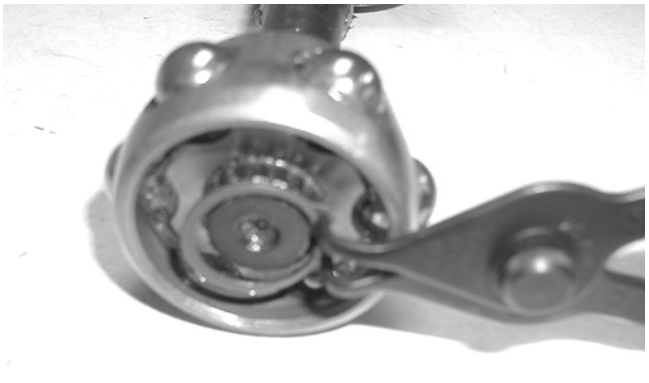
3. Apply 80 grams (2/3 of contents) of grease from the pack into the bearing housing.
4. Install the bearing onto the shaft making sure the recess of the bearing is facing the housing.

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.

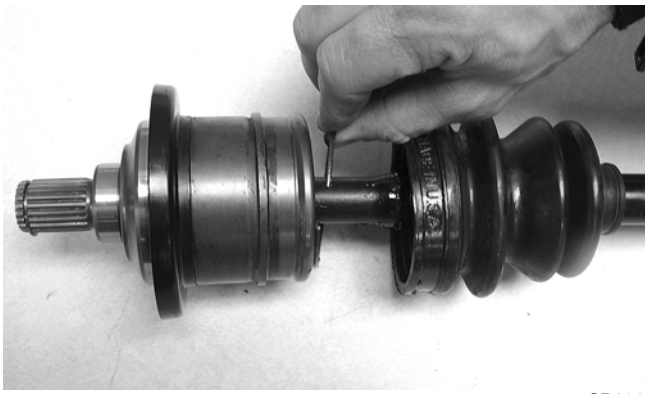
5. Secure the bearing ring with the snap ring making sure the sharp side of the snap ring faces away from the boot.



CD023

6. Making sure the marks made during disassembling align, slide the housing over the bearing ring; then completely seat the bearing ring into the housing and install the circlip.

■NOTE: Pull the bearing ring out of the housing until it contacts the circlip; then slide the ring in half way. This will purge air from the housing and ensure the bearing is packed properly.



CD021

7. Slide the boot over the housing; then using the boot clamp pliers, secure the boot with the clamp.

6

CD024

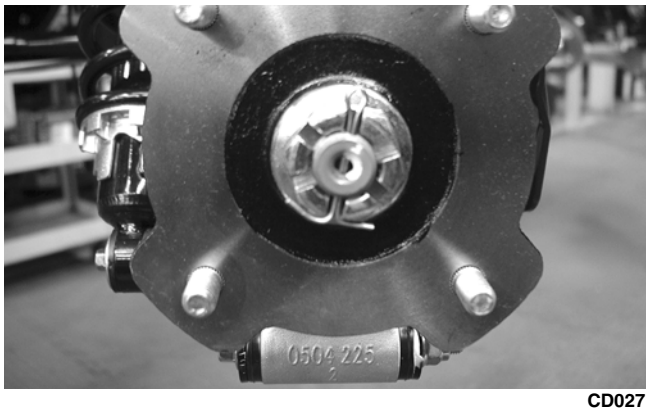
8. Inspect the axle components for correct positioning of the four clamps. Also, inspect the boots for being correctly positioned on the shaft.

INSTALLING REAR DRIVE AXLE

1. 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 35 ft-lb.
3. Place the hub into position on the axle followed by a 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 20 ft-lb. Tighten the hydraulic brake caliper cap screws to 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 200 ft-lb; then install and spread a new cotter pin making sure each side of the pin is flush to the hub nut.

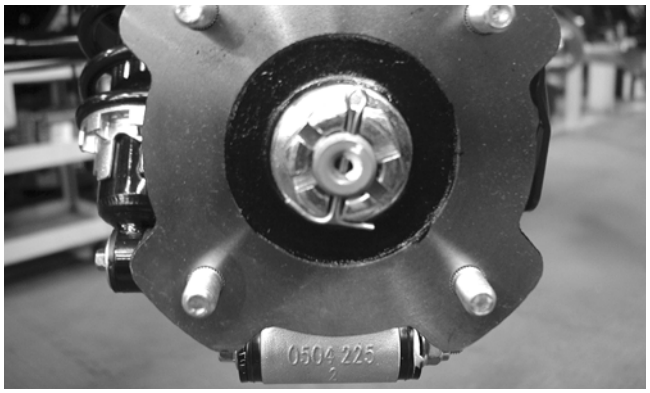


CD027

7. Install the wheel. Tighten to 40 ft-lb.
8. Remove the ATV from the support stand and release the brake lever lock.

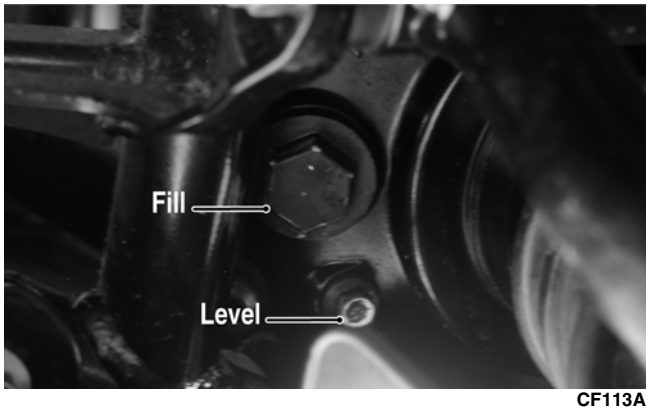
INSTALLING FRONT DRIVE AXLE

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 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 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 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 200 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 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.

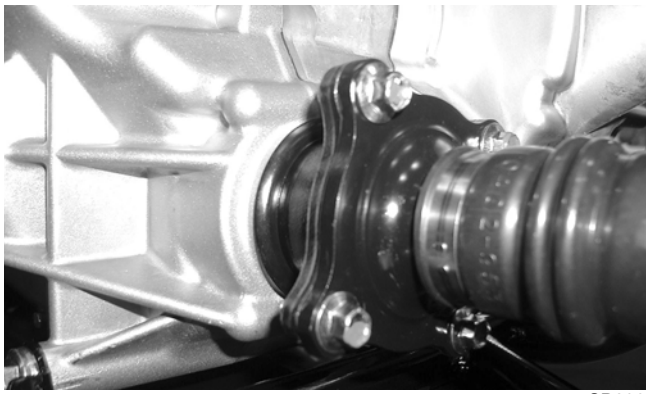


CF113A

Rear Gear Case

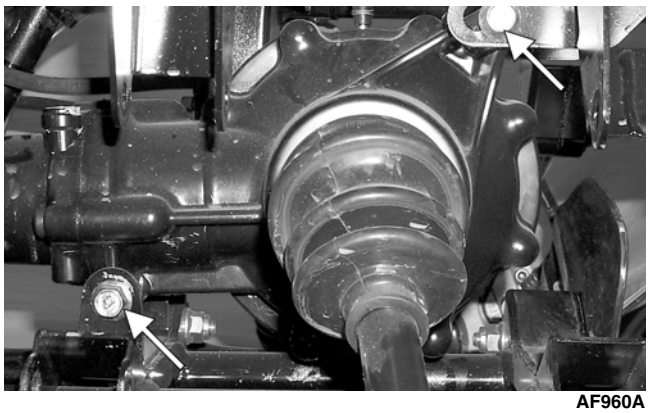
REMOVING

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 four cap screws securing the engine output shaft to the rear gear case input flange.



CD028

4. Remove the two cap screws and lock nuts securing the rear gear case to the frame; then remove the gear case through the left side.



AF960A

☞AT THIS POINT

For servicing the pinion gear, needle bearing, and axle seal, see Front Differential in this section.

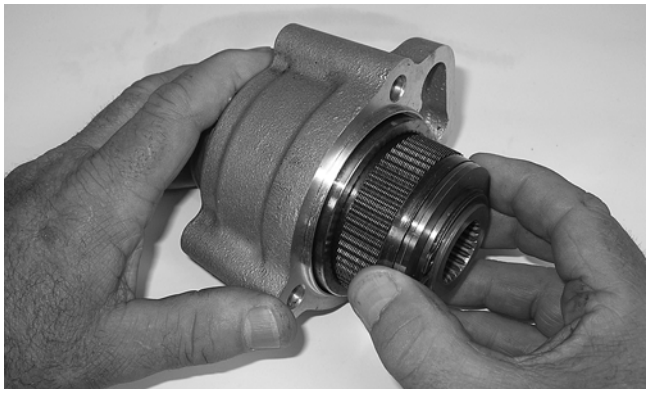
REAR DRIVE INPUT SHAFT/HOUSING

Removing/Disassembling

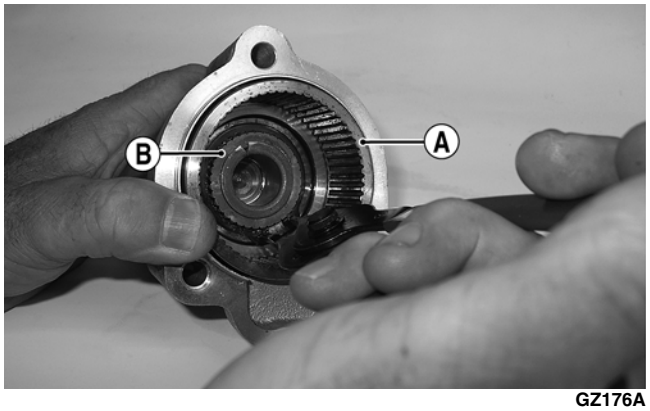
1. Remove the cap screws securing the rear drive input shaft/housing to the rear gear case; then remove the input housing assembly.

GZ183

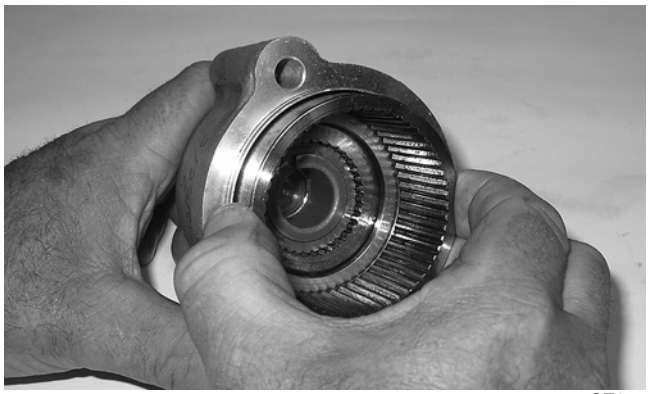
2. Remove the clutch pack from the clutch basket; then remove the snap ring securing the clutch basket (A) to the input shaft (B) and remove the clutch basket.



GZ392



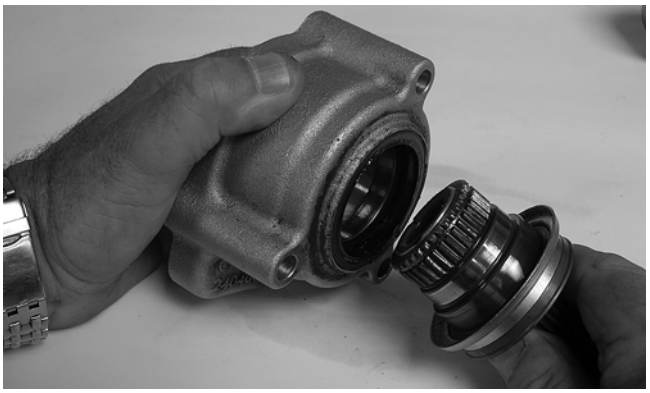
GZ176A



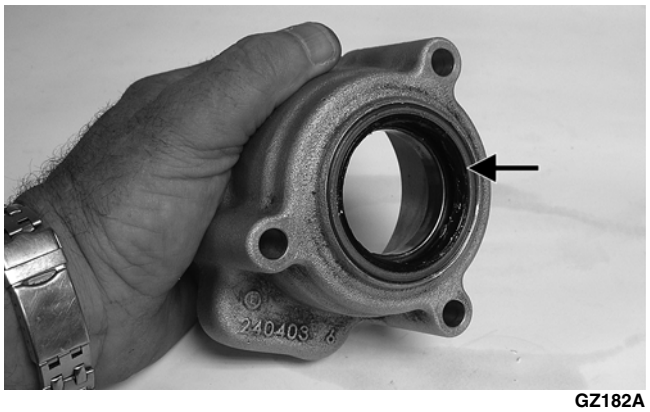
GZ177

3. Remove the input shaft from the input housing; then remove the oil seal.

6



GZ180



GZ182A

4. Remove the snap ring retaining the input bearing and using an appropriate bearing driver, press the bearing from the housing.

GZ184A

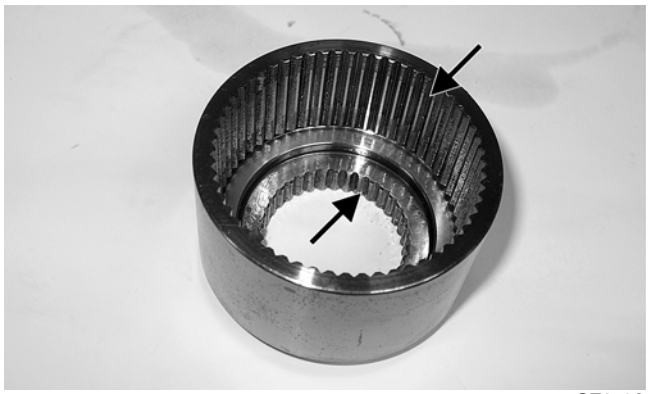
Cleaning and Inspecting

1. Wash all parts in parts cleaning solvent and dry with compressed air.

⚠ WARNING

Always wear safety glasses when working with compressed air.

2. Clean all gasket material and sealant from mating surfaces.
3. Inspect bearings, shafts, and housing for excessive wear, cracks, or discoloration.
4. Inspect the clutch basket for wear in splines or cracks in the housing.



GZ178A

5. Inspect the clutch pack for signs of discoloration.

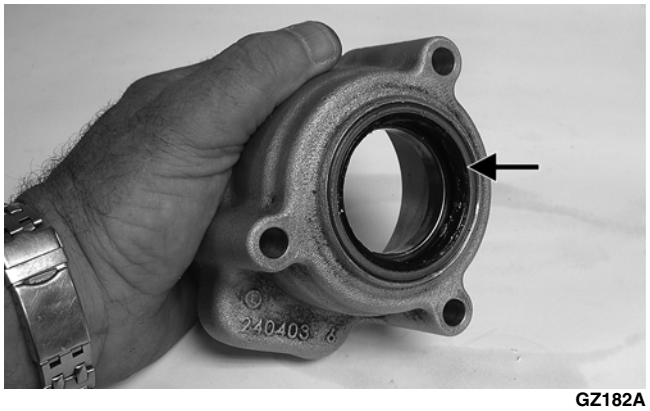
■NOTE: The clutch pack is not a serviceable component. If worn, discolored, or damaged in any way, it must be replaced.

Assembling/Installing

1. Install either the existing or a new bearing into the input housing and secure with the snap ring (flat side directed away from bearing).

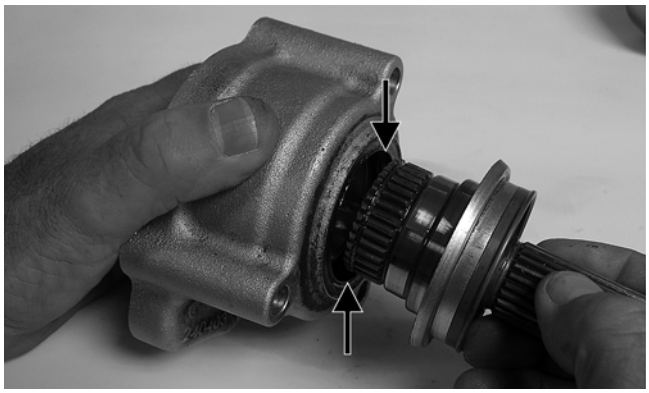
GZ184

2. Using a suitable seal driver, install a new oil seal into the front of the input housing until the seal flush with the housing.



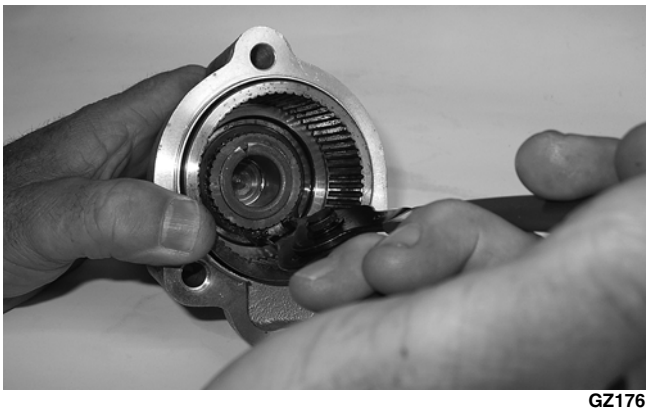
GZ182A

3. Apply grease to the lips of the oil seal; then install the input shaft into the input bearing and housing.



GZ179A

4. Install the clutch basket onto the input shaft and secure with the snap ring (flat side directed outward); then install the clutch pack into the basket.



GZ176

5. Using a new gasket, install the assembled rear drive input shaft/housing onto the rear drive gear case and secure with the three cap screws. Tighten to 23 ft-lb.

INSTALLING

1. Slide the gear case into position through the left side of the frame; then secure it to the frame with cap screws and lock nuts. Tighten to 38 ft-lb.
2. Secure the engine output shaft to the rear gear case input flange with four cap screws (coated with red Loctite #271) and lock nuts. Tighten to 20 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

REMOVING

1. Secure the ATV on a support stand to elevate the wheel; then remove the wheel.

⚠ WARNING

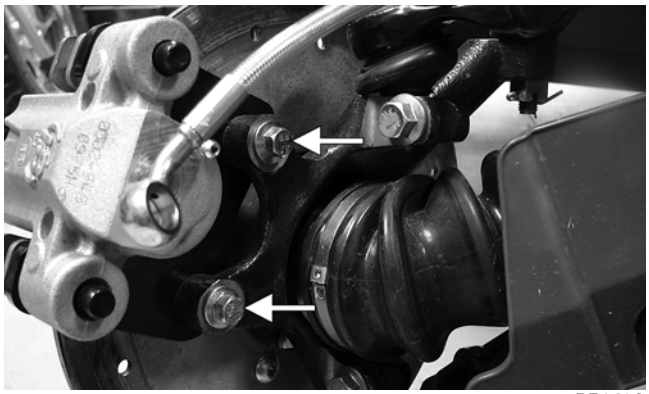
Make sure the ATV is solidly supported on the support stand to avoid injury.

2. Remove the cotter pin from the nut.

■NOTE: During assembly, new cotter pins should be installed.

KX041

3. Remove the flange nut securing the hub.
4. Remove the brake caliper.



PR243A

5. Remove the hub assembly.
6. Remove the four cap screws securing the brake disc.

CLEANING AND INSPECTING

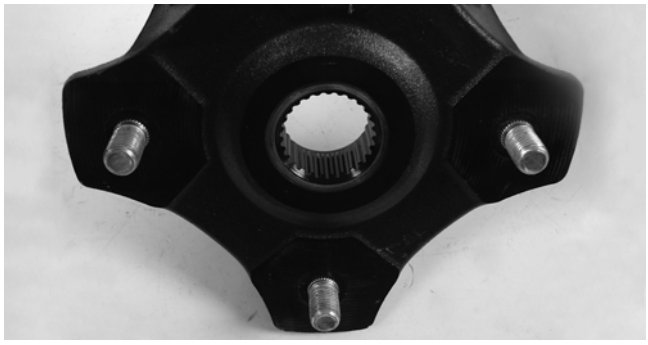
■NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

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 hub for pits, cracks, loose studs, or spline wear.

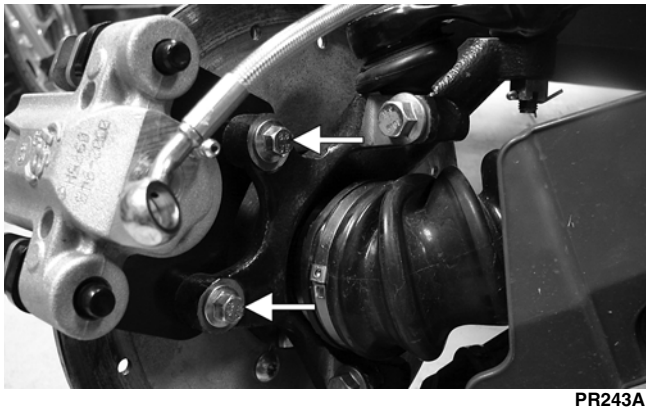
INSTALLING

1. Secure the brake disc to the hub with the four cap screws coated with blue Loctite #243. Tighten to 15 ft-lb.
2. Apply grease to the splines in the hub.
3. Install the hub assembly onto the shaft.



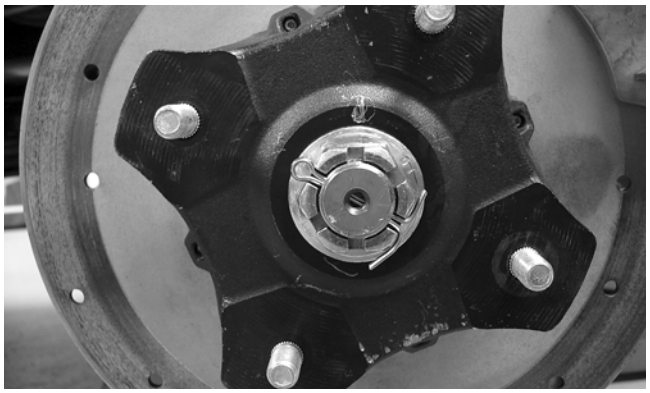
PR290

4. Secure the hub assembly with the nut. Tighten only until snug.
5. Secure the brake caliper to the knuckle with the two cap screws. Tighten the auxiliary caliper to 20 ft-lb. Tighten the hydraulic caliper to 20 ft-lb.



PR243A

6. Tighten the hub nut (from step 4) to 200 ft-lb; then install and spread a new cotter pin making sure each side of the pin is flush to the hub nut.



PR260

7. Install the wheel and tighten to 40 ft-lb.
8. Remove the ATV from the support stand.

Hydraulic Brake Caliper

■NOTE: The brake calliper is a non-serviceable component; it must be replaced as an assembly.

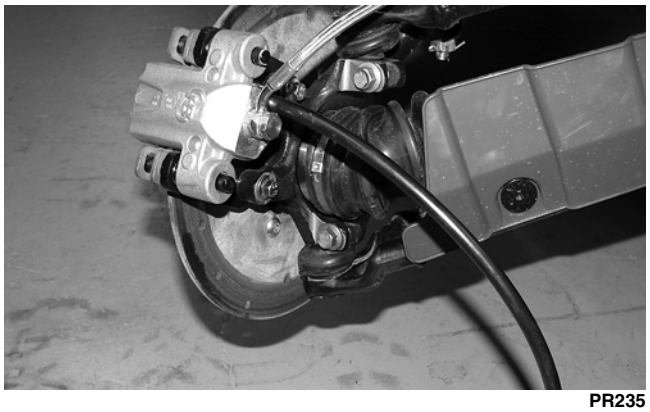
REMOVING/DISASSEMBLING

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 caliper, hose, and master cylinder.



PR235

⚠ CAUTION

Brake fluid is highly corrosive. Do not spill brake fluid on any surface of the ATV and do not reuse brake fluid.

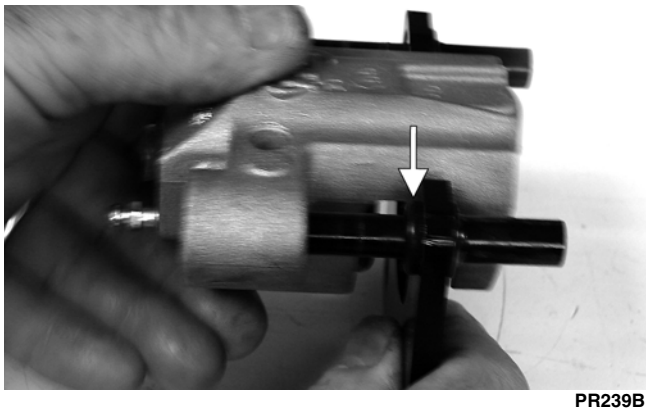
3. Remove the brake hose from the caliper; then remove the caliper and plug the brake fluid port.

4. Compress the caliper holder against the caliper and remove the outer brake pad; then remove the inner brake pad.

PR237

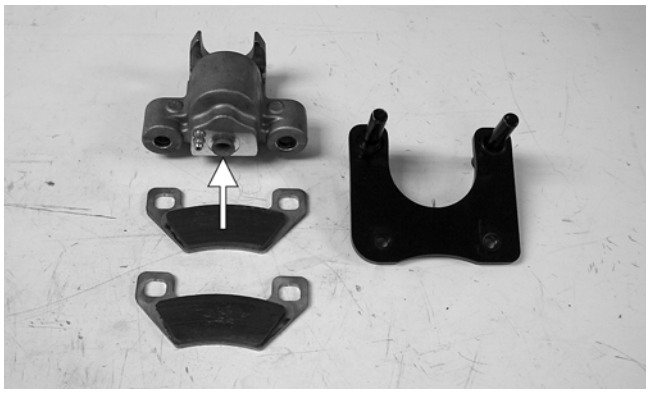
PR238

5. Remove the caliper holder from the caliper and account for the brake caliper O-ring. Do not remove the piston from the caliper.



PR239B

6. Plug the fluid port with a suitable plug to prevent contamination during cleaning.



PR240A

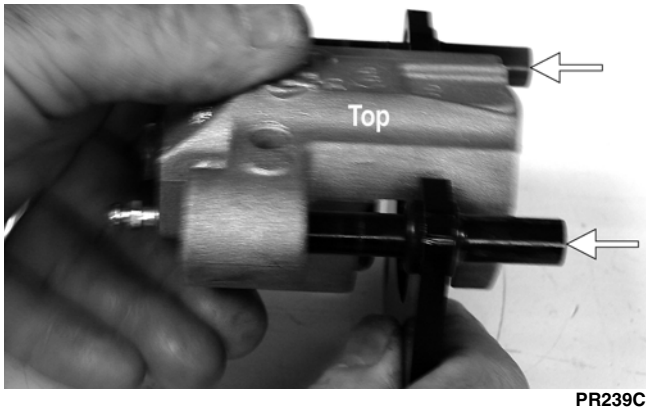
CLEANING AND INSPECTING

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

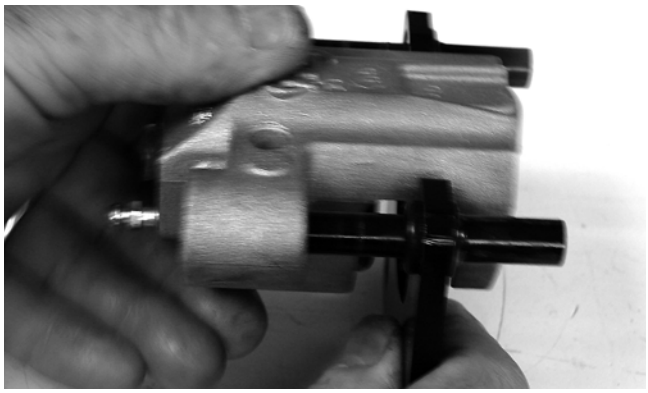
1. Install the caliper onto the caliper holder making sure the caliper is correctly oriented on the holder.



PR239C

2. Compress the caliper holder toward the caliper and install the inner brake pad; then install the outer pad.

PR238



PR239

3. Place the brake caliper assembly into position and secure with the cap screws. Tighten the caliper to 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 20 ft-lb.
5. Fill the reservoir; then bleed the brake system (see Section 2).
6. Install the wheel. Tighten to 40 ft-lb.
7. Remove the ATV from the support stand and verify brake operation.

Troubleshooting Drive System

Problem: Power not transmitted from engine to wheels	
Condition	**Remedy**
1. **Rear axle shafts 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 dogs/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

Troubleshooting Brake System

Problem: Braking poor	
Condition	**Remedy**
1. **Pad** worn	1. Replace pads
2. **Pedal free-play** excessive	2. Replace pads
3. **Brake fluid** leaking	3. Repair - replace hydraulic system component(s)
4. **Hydraulic system** spongy	4. Bleed hydraulic system - correct or repair leaks
5. **Master cylinder/brake cylinder seal** worn	5. Replace master cylinder
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. Drain system - replace with correct fluid
4. **Piston seal - cup** worn	4. Replace master cylinder
Problem: Brake fluid leaking	
Condition	**Remedy**
1. **Connection joints** loose	1. Tighten joint
2. **Hose** cracked	2. Replace hose
3. **Piston seal** worn	3. Replace brake caliper

SECTION 7 - SUSPENSION

TABLE OF CONTENTS

Suspension

■**NOTE: Critical torque specifications are located in Section 1.**

Shock Absorbers

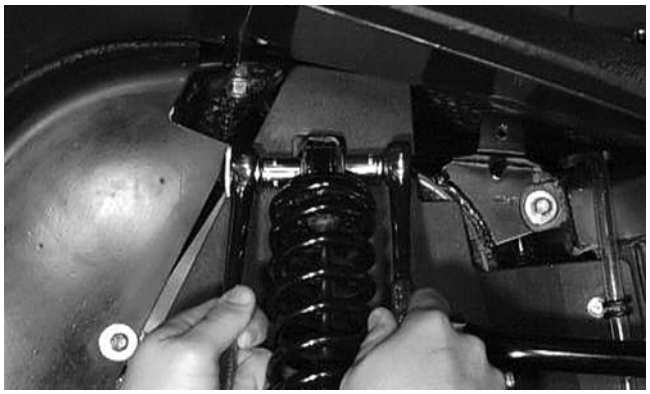
REMOVING

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 and the upper A-arm. Account for bushings and sleeves from each.

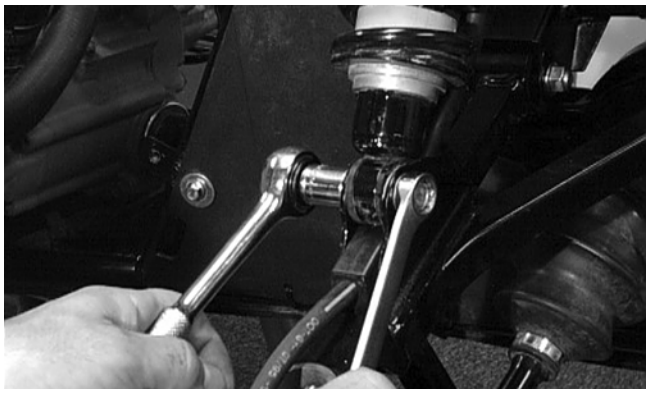


AF605D

⚠ CAUTION

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 lower A-arm. 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 using a pressure washer.
2. Inspect each shock rod for nicks, pits, rust, bends, and oily residue.
3. Inspect all springs, spring retainers, shock rods, sleeves, 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 50 ft-lb.

⚠ CAUTION

Do not tighten the nuts beyond the 50 ft-lb specification or the shock eyelet or mount WILL be damaged.

■**NOTE: The rear shock absorber-to-lower A-arm torque factor is 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 front wheels; then remove the wheels.

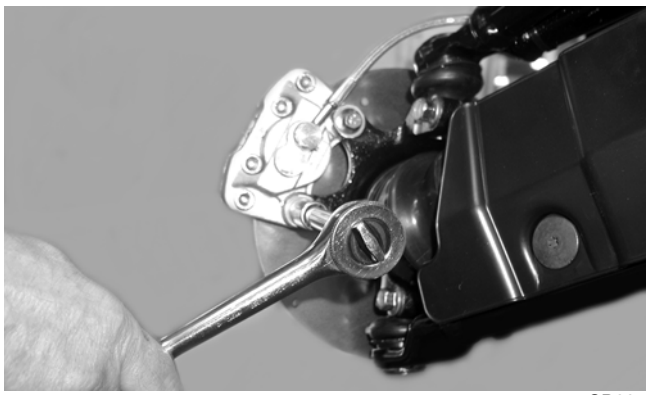
⚠ WARNING

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

2. Remove the cotter pin from the nut. Discard the cotter pin.

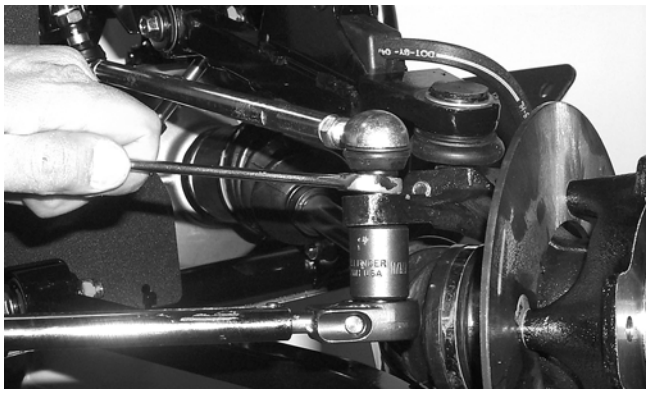
CD008

3. Remove the nut securing the hub.
4. Remove the brake caliper. Account for two cap screws.



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.

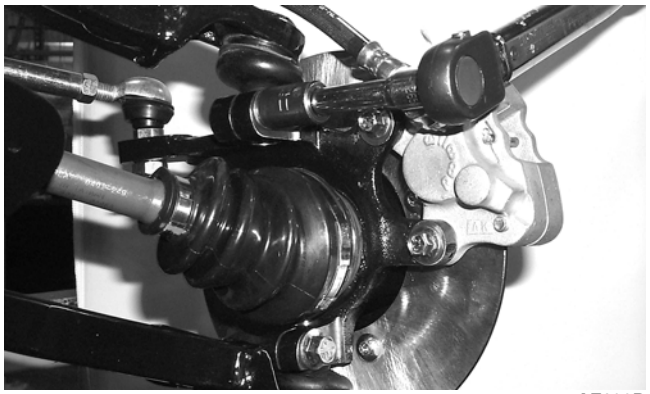


AF618D

7. Remove the cap screws securing the ball joints to the knuckle.

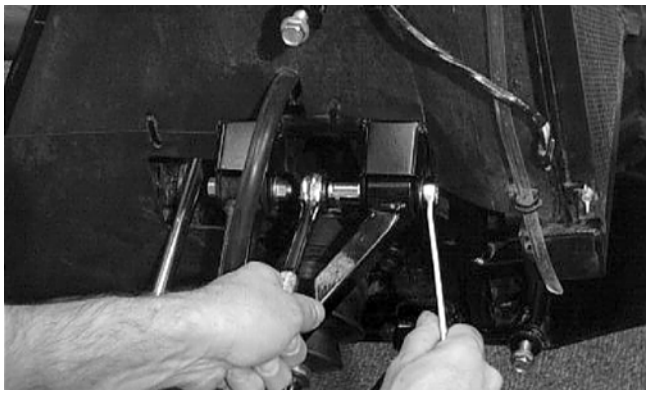
⚠ CAUTION

Support the knuckle when removing the cap screws or damage to the threads will occur.



AF628D

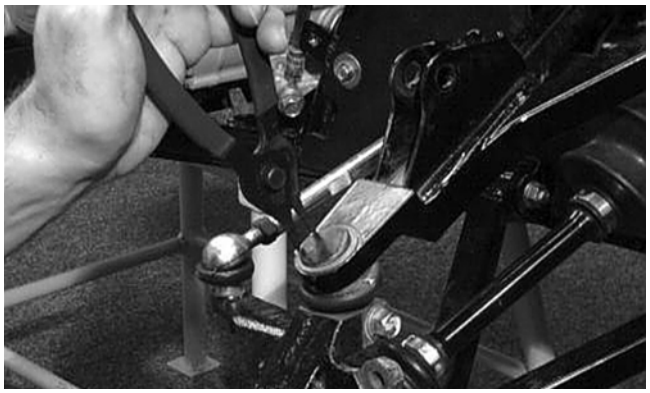
8. Tap the ball joints out of the knuckle; then remove the knuckle.
9. Remove the lower shock absorber eyelet from the upper A-arm.
10. Remove the cap screws securing the A-arms to the frame.



AF610D

11. Remove the circlip from the ball joint; then remove the ball joint from the A-arm.

7



AF616D

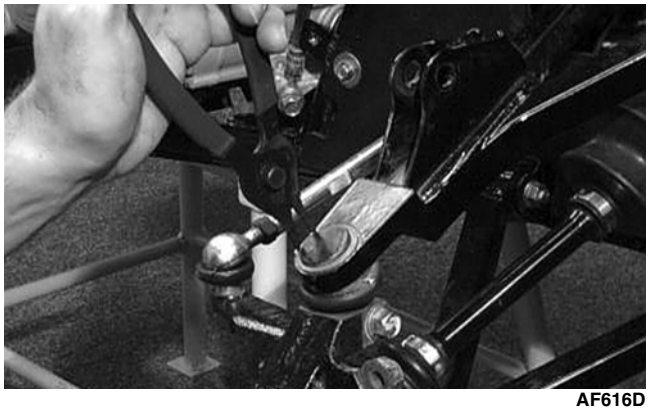
CLEANING AND INSPECTING

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

1. Clean all A-arm components using a pressure washer.
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.

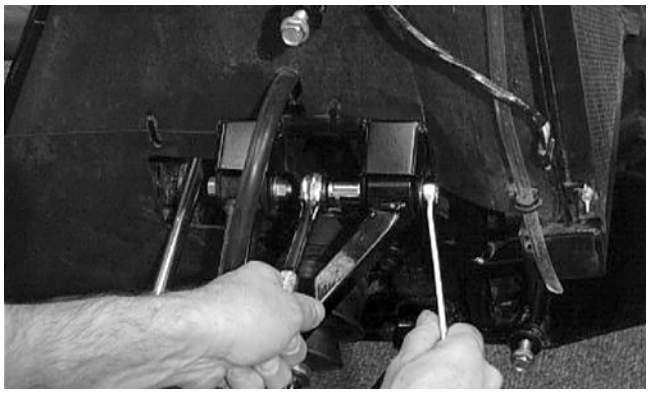
INSTALLING

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 snap ring.



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; then secure the hose to the A-arm with a cable tie and grommet.

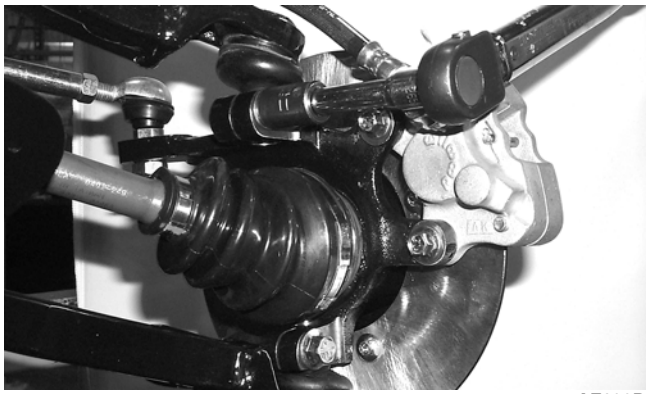
DE054A

4. Secure the lower eyelet of the shock absorber to the upper A-arm. Tighten nut to 50 ft-lb.
5. Secure the A-arm assemblies to the frame mounts (from step 2). Tighten the cap screws to 50 ft-lb.

⚠ CAUTION

Do not tighten the nut beyond the 50 ft-lb specification or the shock eyelet or mount WILL be damaged.

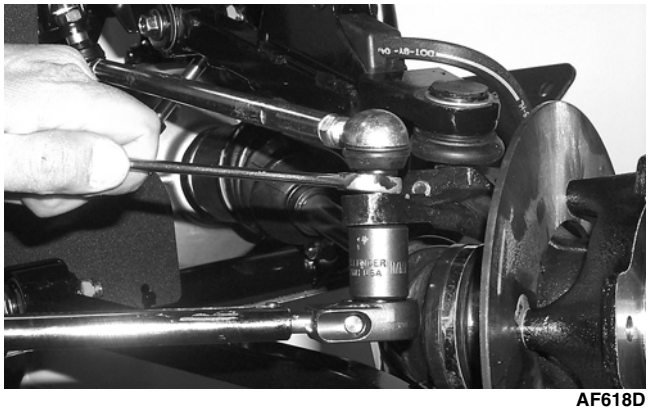
6. Install the knuckle assembly onto the ball joints and secure with cap screws. Tighten to 35 ft-lb.



AF628D

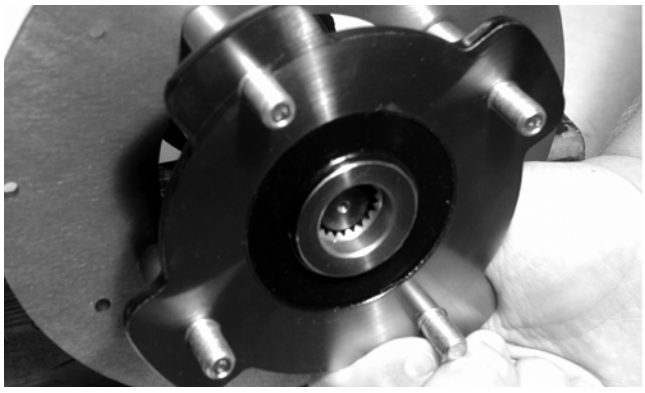
7. Install the tie rod end and secure with the nut (coated with red Loctite #271). Tighten to 30 ft-lb; then install a new cotter pin and spread the pin to secure the nut.

■NOTE: During assembly, new cotter pins should be installed.



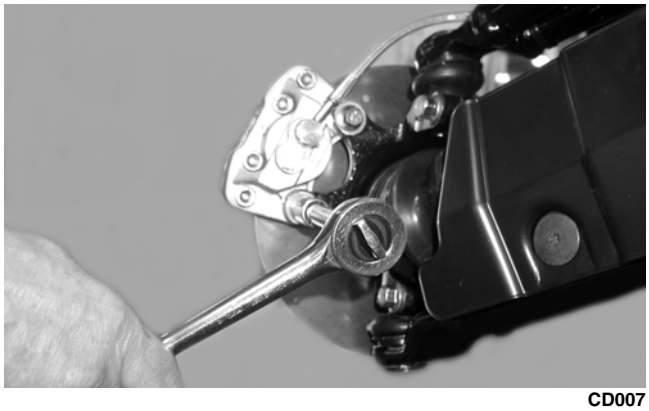
AF618D

8. Apply grease to the hub and drive axle splines; then install the hub assembly onto the drive axle.



CD009

9. Secure the hub assembly with the nut. Tighten only until snug.
10. Secure the brake caliper to the knuckle with the two patch-lock cap screws. Tighten to 20 ft-lb.



CD007

11. Secure the hub nut (from step 9) to the shaft/axle. Tighten to 200 ft-lb.
12. Install a new cotter pin and spread the pin to secure the nut.

CD008

13. Install the wheel and tighten to 40 ft-lb.
14. 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.
4. Remove the cotter pin securing the hex nut; then remove the hex nut. Release the brake lever lock.
5. Remove the caliper (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.

7

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.

■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 from the A-arm.

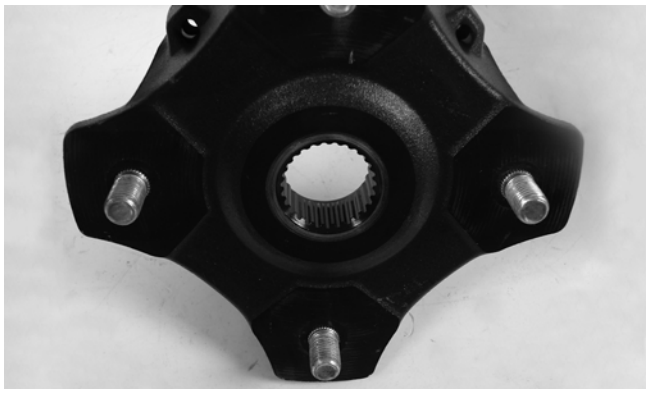
CLEANING AND INSPECTING

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

1. Clean all A-arm components using a pressure washer.
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 50 ft-lb.
3. Tighten the hardware securing the A-arms to the frame mounts (from step 1) to 50 ft-lb.
4. Apply grease on the drive axle splines; then install the hub assembly onto the drive axle.



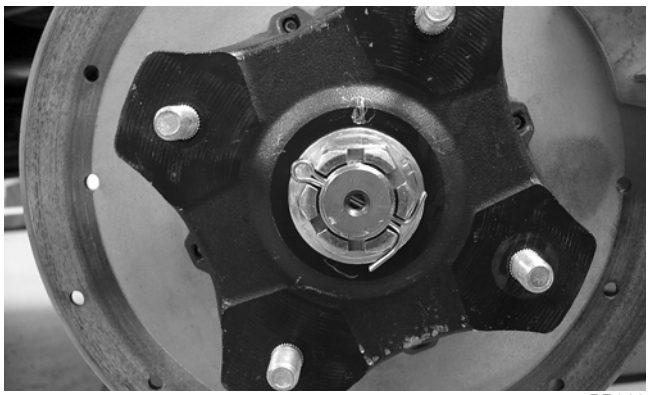
PR290

5. Secure the hub assembly with the nut. Tighten only until snug.
6. Secure the brake caliper to the knuckle with the two “patch-lock” cap screws (right side only). Tighten the caliper to 20 ft-lb.

■NOTE: Ensure that the brake hose is properly routed and secured to the upper A-arm.

DE054A

7. Compress the hand brake lever and engage the brake lever lock; then secure the hub nut (from step 5) to the drive axle. Tighten to 200 ft-lb.
8. Install a new cotter pin and spread the pin to secure the nut.

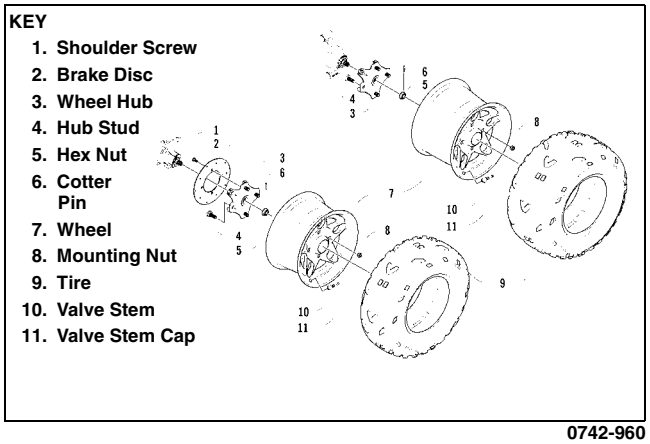


PR260

9. Secure the shock absorber to the frame with a cap screw and new lock nut. Tighten to 50 ft-lb.
10. Secure the shock absorber to the lower A-arm with a cap screw and new lock nut. Tighten to 20 ft-lb.

11. Secure the boot guard to the lower A-arm with the two cap screws. Tighten securely.
12. Install the wheel and tighten to 40 ft-lb.
13. Remove the ATV from the support stand.

Wheels and Tires



0742-960

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 in Section 1. 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.

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 using a pressure washer.
2. Inspect each wheel for cracks, dents, or bends.
3. Inspect each tire for cuts, wear, missing lugs, and leaks.

INSTALLING

Install each wheel on its hub. Tighten to 40 ft-lb.

■NOTE: Make sure each wheel is installed on its proper hub as noted in removing (the "rotation arrow" (if applicable) must indicate forward direction of rotation).

AF612D

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.
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.

Troubleshooting

Problem: Suspension too soft	
Condition	**Remedy**
1. **Spring(s)** weak	1. Replace spring(s)
2. **Shock absorber** damaged	2. Replace shock absorber
3. **Shock absorber preload** too low	3. Adjust shock absorber preload
Problem: Suspension too stiff	
Condition	**Remedy**
1. **A-arm-related bushings** worn	1. Replace bushing
2. **Shock absorber preload** too high	2. Adjust shock absorber preload
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. **Axle shaft nut** loose (manual transmission)	5. Tighten nut (manual transmission)
6. **Auxiliary brake** adjusted incorrectly	6. Adjust brake
7. **Rear suspension arm-related bushing** worn	7. Replace bushing
8. **Rear shock absorber** damaged	8. Replace shock absorber
9. **Rear suspension arm nut** loose	9. Tighten nut

SECTION 8 - STEERING/FRAME

TABLE OF CONTENTS

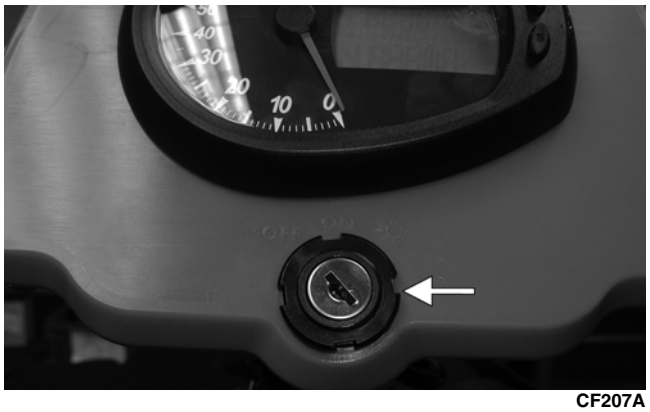
Steering/Frame

■**NOTE: Critical torque specifications are located in Section 1.**

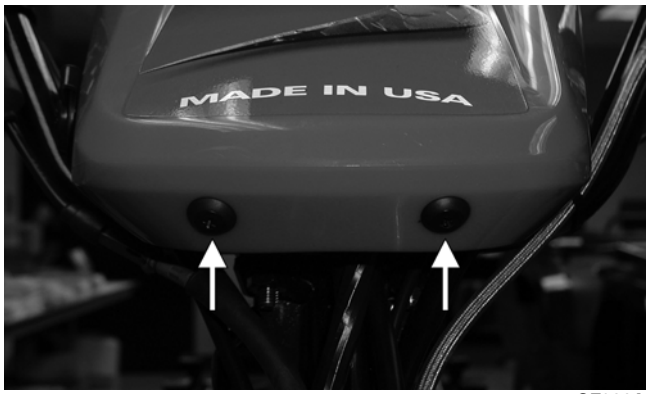
Steering Post/Tie Rods

REMOVING

1. Remove the ignition switch retaining ring; then remove the reinstallable rivets securing the instrument pod to the mounting bracket and remove the pod and LCD gauge.



CF207A



CF206A

2. Remove the reinstallable rivets securing the radiator access cover and remove the cover.

CD666

3. Remove four reinstallable rivets securing the steering post cover and remove the cover.
4. Unlatch the storage compartment lid; then slide the storage compartment cover assembly forward and lift off.

CD669

5. Remove the storage compartment.

CD671

6. Remove the four cap screws securing the handlebar caps and speedometer bracket to the steering post; then move the handlebar and speedometer out of the way. Account for four handlebar caps.

Back to TOC Back to Section TOC Next

CD762

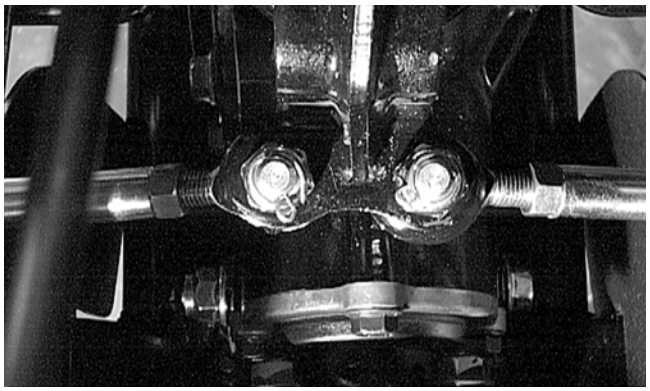
7. Remove two cap screws securing the upper steering post bearing to the frame. Account for two bearings and two housings.

CD760

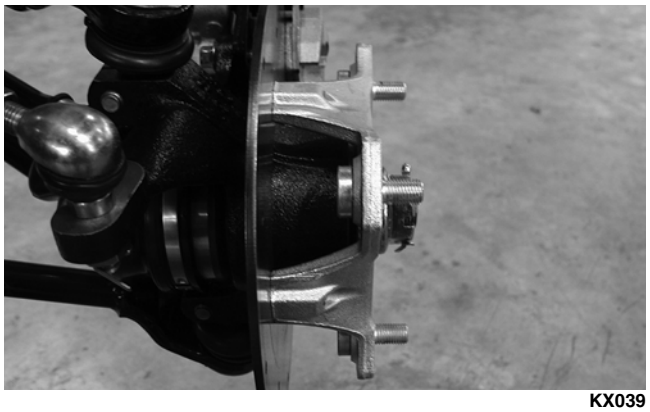
8. Using a suitable lift stand, raise the ATV enough to remove the front wheels.

CD685

9. Remove the cotter pins and lock nuts from the inner and outer tie rod ends; then remove the tie rods from the steering post arm and the left-side and right-side steering knuckles.

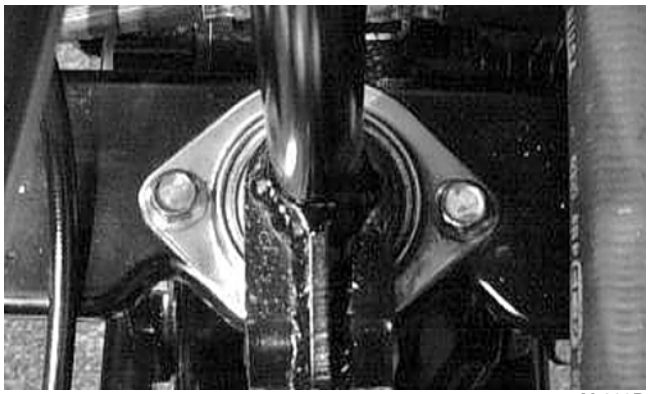


AF778D



KX039

10. Remove two cap screws securing the lower steering post bearing flange to the frame; then remove the steering post.



AL600D

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

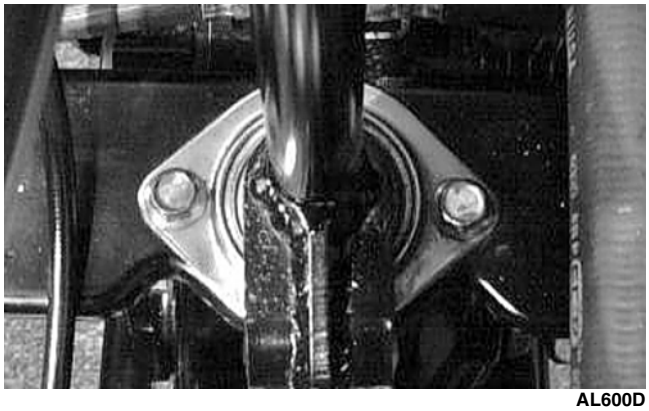
Always wear safety glasses when using compressed air.

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 secure the lower bearing flange to the frame with two cap screws. Tighten to 20 ft-lb.



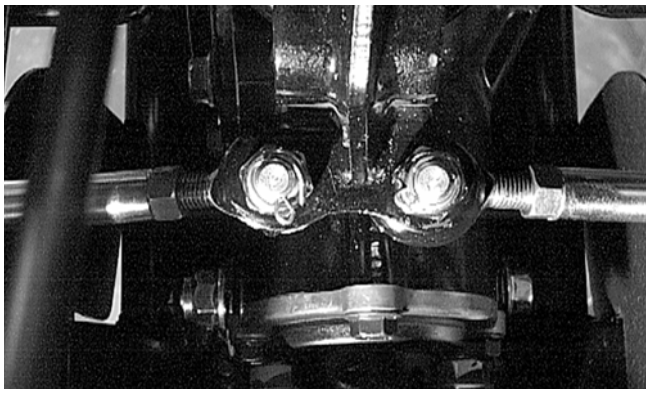
AL600D

2. Place the upper steering post bearings into the housings; then position on the steering post and secure the housings to the frame with two cap screws. Tighten to 20 ft-lb.

CD760

3. Install the tie rods and secure with the lock nuts (threads coated with red Loctite #271). Tighten to 30 ft-lb; then install new cotter pins.

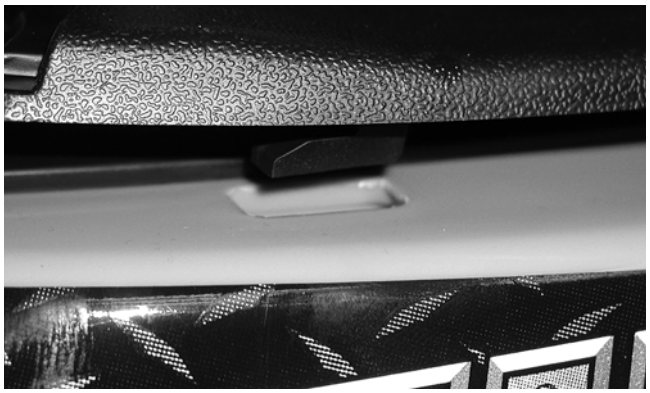
■NOTE: If the slots do not align with the holes in the tie rod ends, tighten the nuts just enough to allow installation of the cotter pins.



AF778D

4. Install the front wheels and tighten to 40 ft-lb using a crisscross pattern.
5. Lower the ATV and place the handlebar and caps into position on the steering post; then position the speedometer on top of the caps and secure with the four cap screws. Tighten securely.
6. Install the storage compartment box; then attach the storage compartment cover assembly by engaging the lugs into the slots and sliding rearward. Lock the storage compartment lid to hold the assembly in place.

CD671



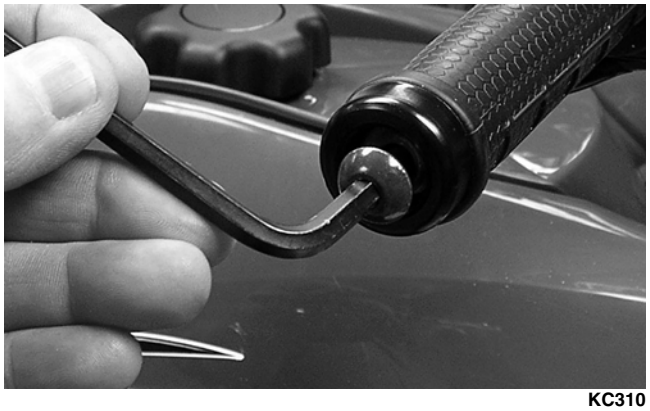
CD670

7. Place the instrument pod into position; then secure with two reinstallable rivets and the ignition switch retaining ring.
8. Install the steering post access cover and secure with four reinstallable rivets; then install and secure the radiator access cover.

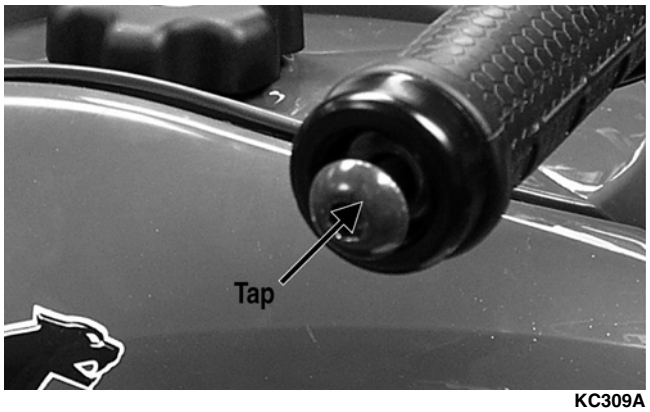
Handlebar Grip

REMOVING

1. Loosen but do not remove the cap screws in the end of the handlebar; then tap lightly on the head to dislodge the handlebar plug.



KC310



KC309A

2. Grasp the end and remove the cap screw, plug, and end cap.

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 to the inside of the grip.
2. Slide the grip onto the handlebar until it is fully seated with the smooth part of the grip facing up.
3. Wipe off any excess glue; then secure the grip with the handlebar end-cap.

Steering Knuckles

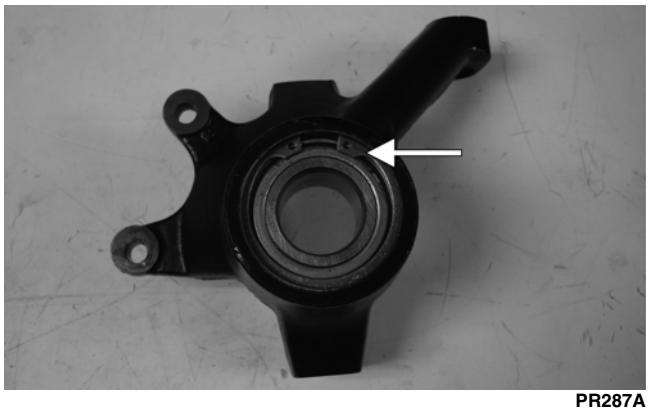
REMOVING AND DISASSEMBLING

1. Secure the ATV on a support stand to elevate the wheel; then remove the wheel.

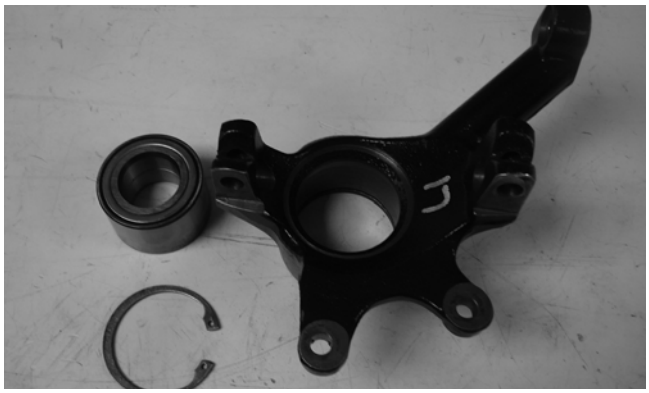
⚠ WARNING

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.
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 snap ring from the knuckle; then remove the bearing.



PR287A



PR288

⚠ 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.

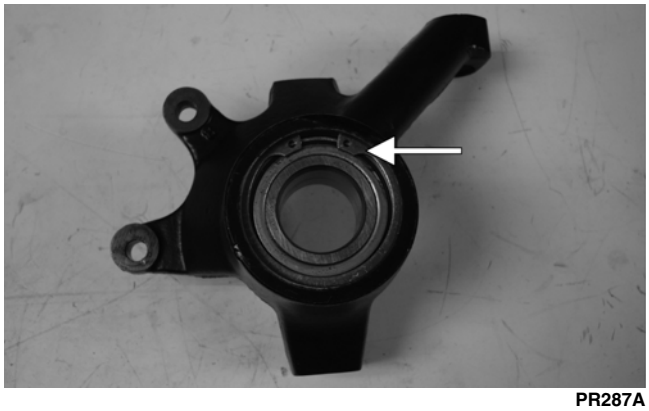
CLEANING AND INSPECTING

■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.

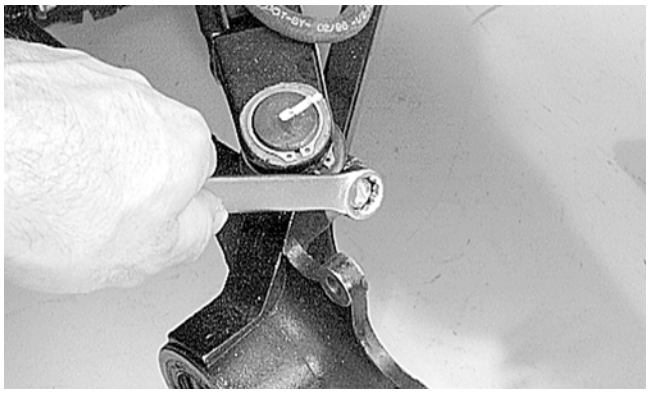
ASSEMBLING AND INSTALLING

1. Install the bearing; then install the snap ring making sure it seats into the knuckle.



PR287A

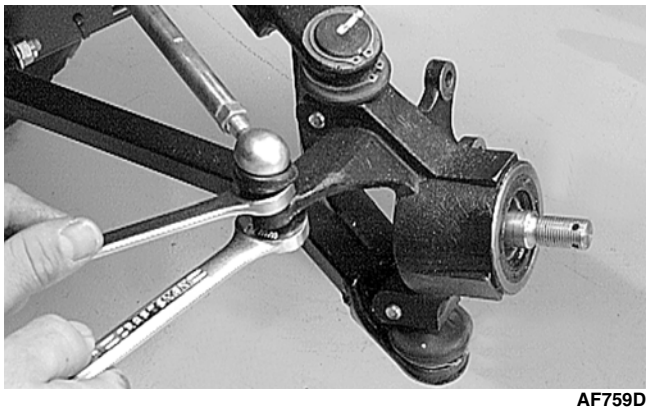
2. Install the knuckle to the upper and lower ball joints and secure with the two cap screws. Tighten to 35 ft-lb.



AF760D

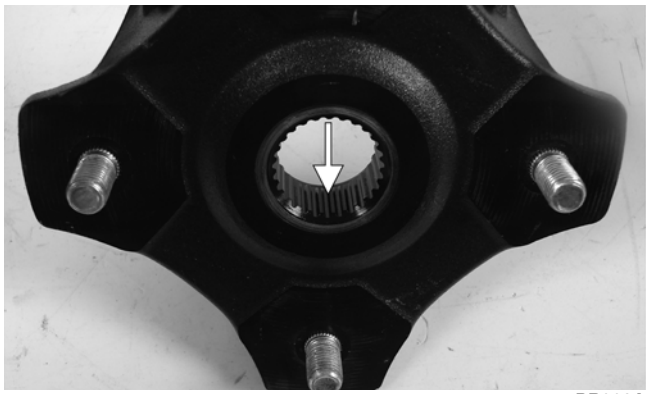
3. Install the tie rod end and secure with the nut (threads coated with red Loctite #271). Tighten to 30 ft-lb; then install a new cotter pin and spread the pin.

■NOTE: During assembling, new cotter pins should be installed.



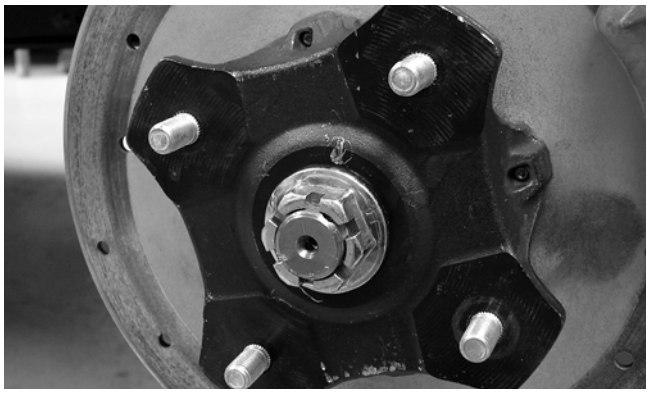
AF759D

4. Apply a small amount of grease to the hub splines.



PR290A

5. Install the hub assembly onto the splines of the shaft.
6. Secure the hub assembly with the nut. Tighten only until snug.



PR257

7. Secure the brake caliper to the knuckle with the patch-lock screws. Tighten to 20 ft-lb.

PR264A

8. Pump the hand brake lever; then engage the brake lever lock.
9. Secure the hub nut (from step 6) to the shaft. Tighten to 200 ft-lb.
10. Install a new cotter pin and spread the pin to secure the nut.
11. Install the wheel; then using a crisscross pattern, tighten to 40 ft-lb.
12. Remove the ATV from the support stand.

Measuring/ Adjusting Toe-In

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.

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 equal reference points on each.

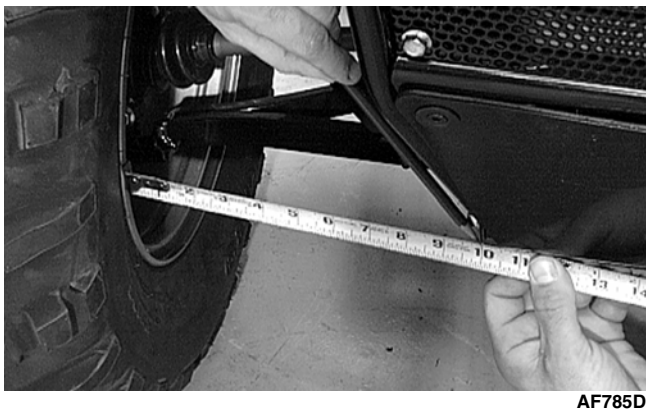
DE047A

5. Adjust the handlebar direction until the two measurements are equal; then secure the handlebar to the rear rack using tie-down straps.

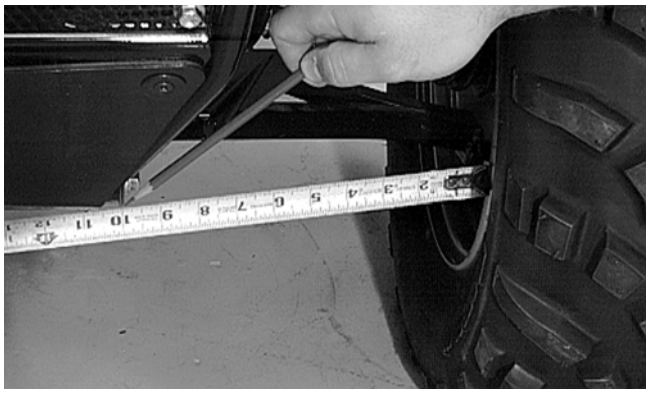
■NOTE: Care must be taken not to allow the handlebar to turn while securing it.

CD014

6. Measure the distance from the inside of each front rim to the lower frame tube.



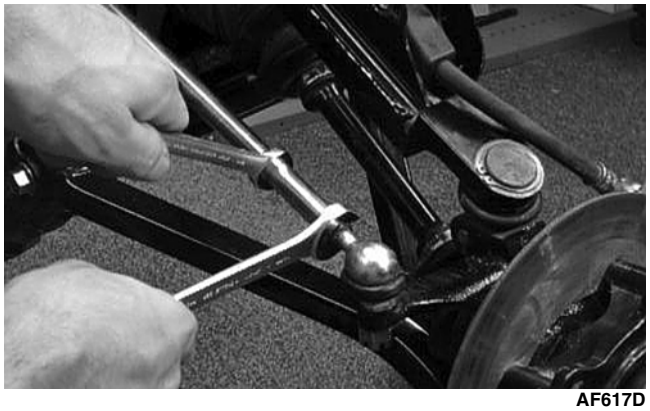
AF785D



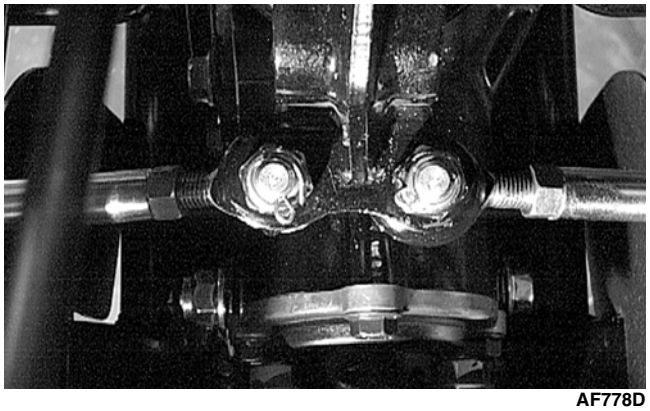
AF786D

■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

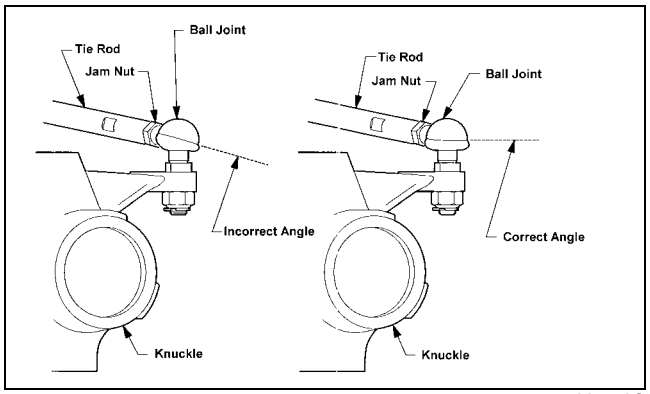
■NOTE: The front wheels do not have to be removed to adjust the tie rod. Also, care should be taken not to disturb the handlebar position.

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 distance between the marks (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 distance between the marks.
11. The difference in the measurements must show 1/8-1/4 in. toe-in (the front measurement 1/8-1/4 in. less than the rear measurement).
12. If the difference in the measurements is not within specifications, adjust both tie rods equally until within specifications.

■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

Front Rack

REMOVING

1. Remove the cap screws and lock nuts securing the rack to the frame and front fender panel.
2. 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 using a pressure washer.
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 front fender panel. Install the cap screws and lock nuts and finger-tighten only.
2. Install the two cap screws and lock nuts securing the rack to the fenders. Tighten all hardware securely.

Front Bumper Assembly

REMOVING

1. Remove the two flange bolts and lock nuts securing the upper bumper supports to the bumper.
2. Remove the through-bolt and lock nut securing the bumper to the frame; then remove the bumper.

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.

INSTALLING

1. Place the front bumper assembly into position and install the through-bolt. Start the lock nut and finger-tighten only.
2. Install the two flange bolts and lock nuts on the upper supports. Tighten all hardware securely.

Front Body Panel/ Side Panels

REMOVING

1. Remove the reinstallable rivets securing the radiator access cover and remove the cover; then remove four reinstallable rivets securing the steering post cover and remove the cover.

CD666

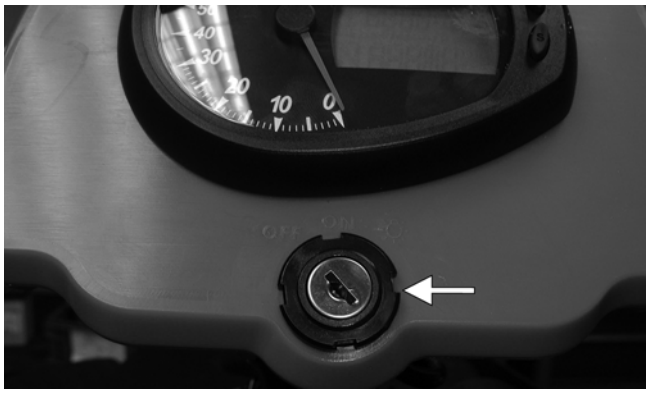
2. Unlock the storage compartment lid; then slide the storage compartment cover assembly forward and lift off the storage compartment.

CD669

3. Remove the storage compartment box; then remove the seat.

CD671

4. Remove the ignition switch retaining ring and two reinstallable rivets securing the instrument pod; then remove the instrument pod.



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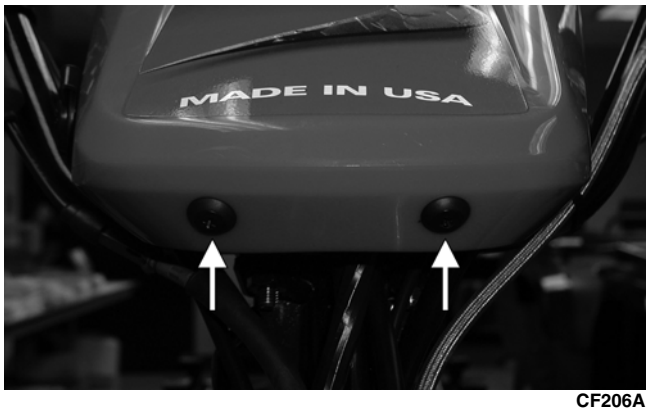
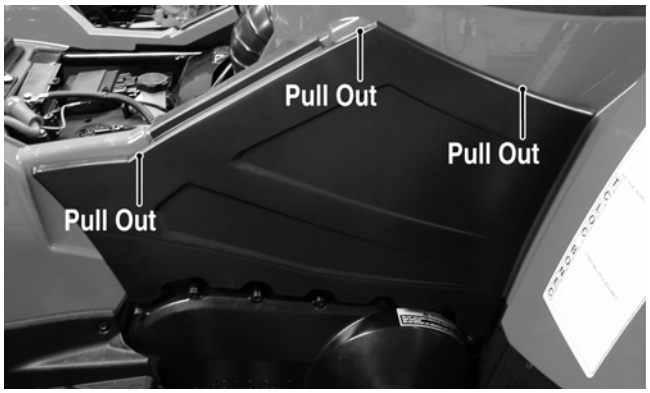


CF206A

5. Remove the cap screws and lock nuts securing the front rack to the frame; then remove the front rack. Account for the grommets and bushings.

GZ067

6. Remove the side panels; then remove the fasteners securing the rear of the front fender panel to the frame.



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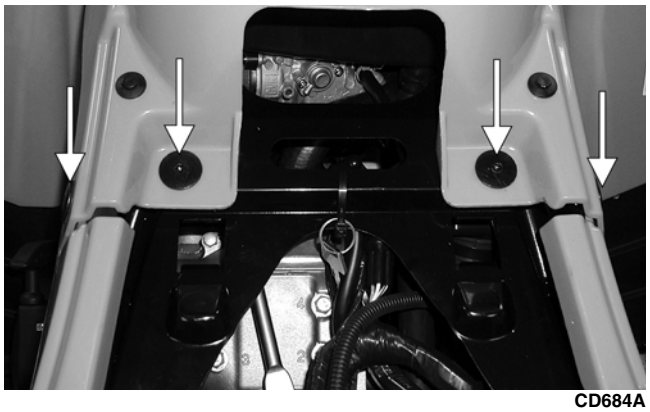
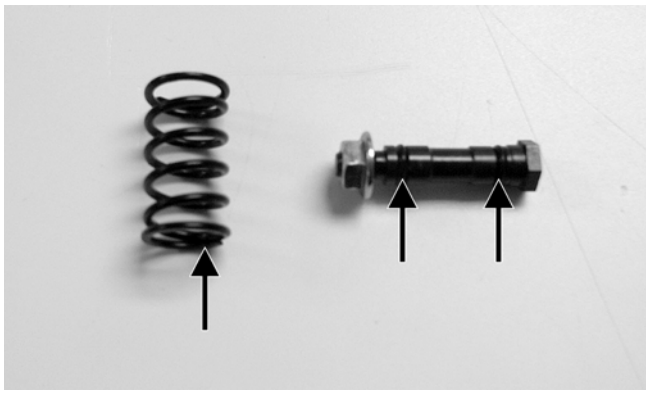


CD684A

7. Remove the left and right footwells; then remove the shift knob. Remove the shift lever pivot axle nut and remove the axle and shift lever. Account for a spring and two O-rings.

CD779

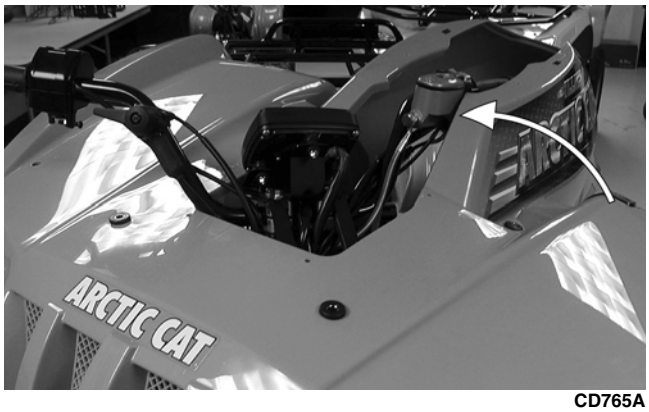


CD780A

8. Disconnect four headlight connectors and secure the wires out of the way; then disconnect the wires to the front accessory plug.

CD681

9. Rotate the handlebar to the full-left position; then lift and slide the panel to the rear and lift the rear up to clear the handlebar.



CD765A

■NOTE: It may be necessary to rotate the body panel to the right to align the opening with the handlebar.

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 warm soap and water.
2. Inspect fenders for cracks and/or loose rivets.
3. Inspect for any missing decals.

INSTALLING

1. Rotate the handlebar to the full-left position; then place the front body panel over the handlebar and rotate and lower into position.

CD765

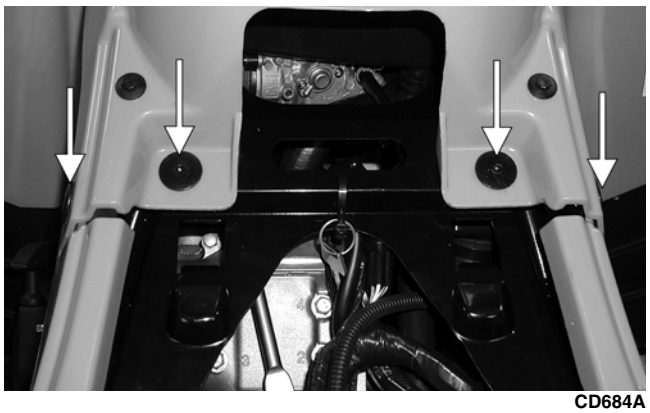
2. Connect the headlight connectors to the appropriate headlights and the front accessory plug wires to the accessory plug.

CD681

3. Make sure the rubber grommets and bushings are in place; then place the front rack into position and secure with the cap screws and lock nuts. Tighten securely.
4. Install footwells and footrests. Tighten securely.

■NOTE: If the footwells have been removed, see Footrests in this section.

5. Install four cap screws securing the front body panel to the frame and rear panel.



CD684A

6. Install the shift lever spring, shift lever, and pivot axle; then tighten the axle nut securely.

CD779

7. Install the instrument pod and ignition switch; then secure with two reinstallable rivets and the ignition switch retaining ring.
8. Set the storage compartment box into position; then install the storage compartment cover making sure the mounting lugs engage the slots. Slide rearward to secure and lock by engaging the lid lock.
9. Install the steering post cover and secure with the reinstallable rivets; then install and secure the radiator access panel.

GZ014

10. Install the left and right side panels.

CF237

Footrests

REMOVING

1. Remove the machine screws and flange nuts securing the front and rear fenders to the footwells.

CD691A

2. Remove the screws securing the foot pegs to the footrests; then remove the foot pegs and footwells.
3. Remove the cap screws and flange nuts securing the footrests to the frame; then remove the footrests.

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. Secure the footrests to the frame with four cap screws and two flange nuts; then tighten securely.
2. Place the footwells onto the footrests; then put the foot pegs in position and secure with two cap screws.
3. Install the machine screws and flange nuts securing the front and rear fenders to the footwells.

Belly Panel

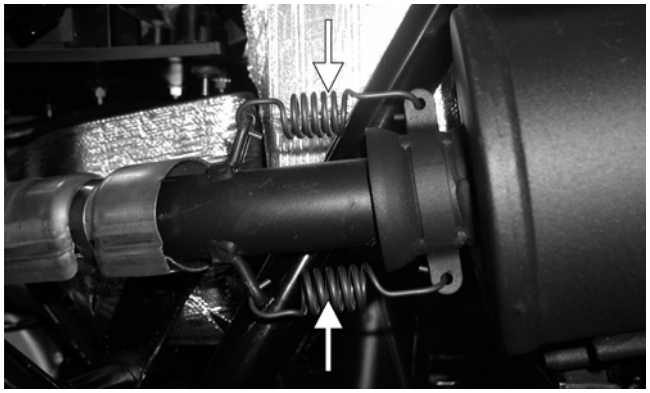
REMOVING/INSTALLING

1. Remove the machine screws and shoulder washers securing the belly panel to the underside of the frame; then remove the belly panel.
2. Place the belly panel into position on the underside of the frame; then install the machine screws and shoulder washers. Tighten securely.

Exhaust System

REMOVING MUFFLER

1. Remove the two exhaust springs at the muffler/exhaust pipe juncture.



CF138A

2. Slide the muffler rearward to clear the mounting lugs and remove the muffler.

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. Place the muffler into position engaging the mounting lugs into the grommets; then slide the muffler forward.
2. Install the two exhaust springs.

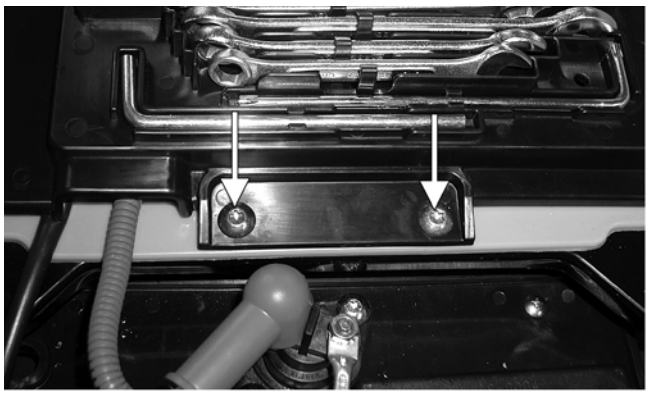
Rear Body Panel/Rack

REMOVING

1. Remove the cap screws and lock nuts securing the rear rack; then remove the rear rack. Account for the bushings.
2. Remove one shoulder screw and lock nut and three plastic rivets (on each side) securing the rear body panel to the footwells.

CD691A

3. Remove two machine screws securing the battery cover and remove the cover.



CD687A

4. Disconnect the battery (negative cable first); then remove the battery.
5. Disconnect the taillight/brakelight; then remove the gas tank cap and lift off the rear body panel. Install the gas tank cap.

■NOTE: If the front body panel has not been removed, the left-side and right-side panels and the two machine screws must be removed (see Front Body Panel/Side Panels in this section).

CLEANING AND INSPECTING

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

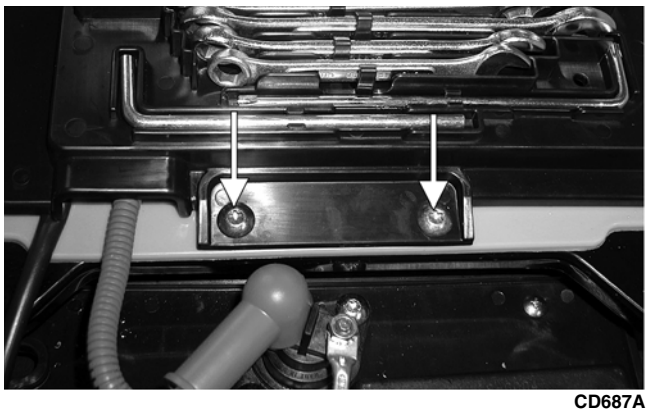
1. Clean all rear body panel components with warm soap and water.
2. Inspect side panels and rear body panel for cracks and loose rivets.
3. Inspect threaded areas of all mounting bosses for stripping.
4. Inspect for missing decals.

INSTALLING

1. Remove the gas tank cap and set the rear body panel in position; then install the cap and connect the taillight/brakelight connector.
2. Place the rear rack in position with the bushings and secure with the cap screws and lock nuts. Tighten securely.
3. Install one shoulder screw and three plastic rivets (on each side) to secure the front of the rear body panel to the footwells.

CD691

4. Place the battery into the battery box; then connect the battery (positive cable first) and secure with the battery cover.



CD687A

5. Secure the front and rear panels with two machine screws; then install the left and right side panels.

■NOTE: If the front body panel has not been installed, see Front Body Panel/Side Panels in this section.

6. Place the seat into position making sure it locks securely.

Taillight Assembly

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

1. To remove the seat, lift up on the latch release (located at the rear of the seat). Raise the rear of the seat and slide it rearward.
2. To lock the seat into position, 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.

Troubleshooting

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** low	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: Tire wear rapid or uneven	
Condition	**Remedy**
1. **Wheel hub bearings** worn - loose	1. Replace bearings
2. **Front wheel alignment** incorrect	2. Adjust alignment
3. **Tire inflation pressure** incorrect	3. Adjust pressure
Problem: Steering noise	
Condition	**Remedy**
1. **Cap screws - nuts** loose	1. Tighten cap screws - nuts
2. **Wheel hub bearings** broken - damaged	2. Replace bearings
3. **Lubrication** inadequate	3. Lubricate appropriate components

SECTION 9 - CONTROLS/INDICATORS

TABLE OF CONTENTS

Hand Brake Lever/ Master Cylinder Assembly

■NOTE: The master cylinder is a non-serviceable component; it must be replaced as an assembly.

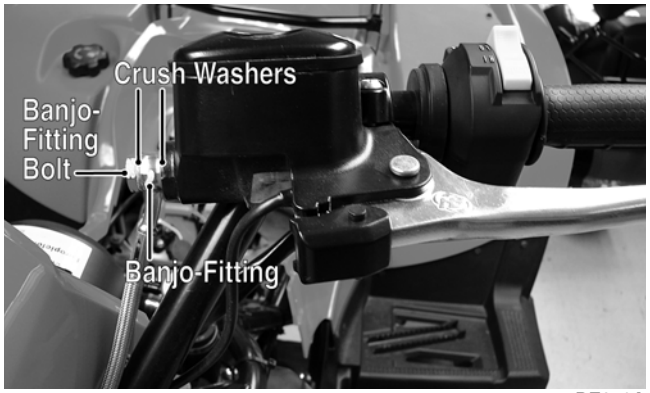
REMOVING

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 banjo-fitting from the master cylinder. Account for two crush washers and a banjo-fitting bolt.



DE059A

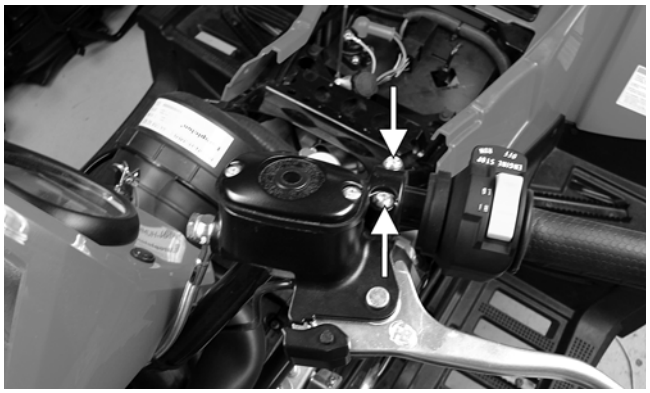
⚠ CAUTION

Brake fluid is highly corrosive. Do not spill brake fluid on any surface of the ATV.

3. Remove the snap ring 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.



DE058A

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 banjo-fitting 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.

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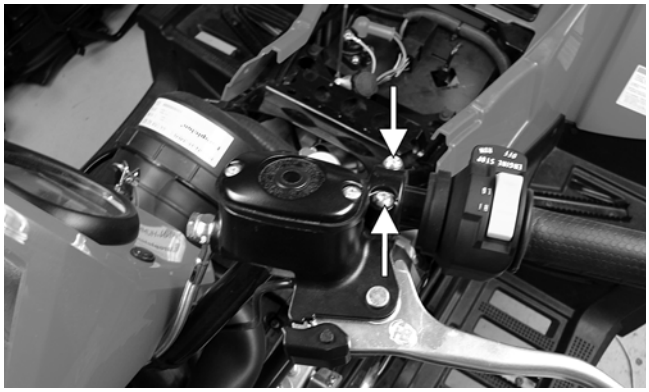
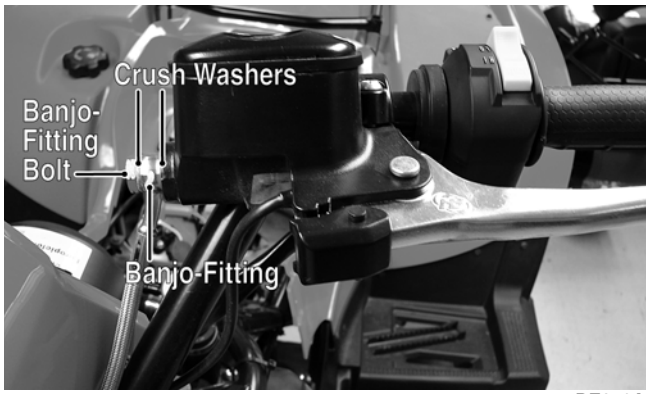
INSTALLING

1. Position the brake housing on the handlebar. Secure with clamp screws; then tighten to 6 ft-lb.



DE058A

2. Using two new crush washers, connect the banjo-fitting to the master cylinder; then secure with the banjo-fitting bolt. Tighten to 20 ft-lb.



DE059A

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 snap ring.

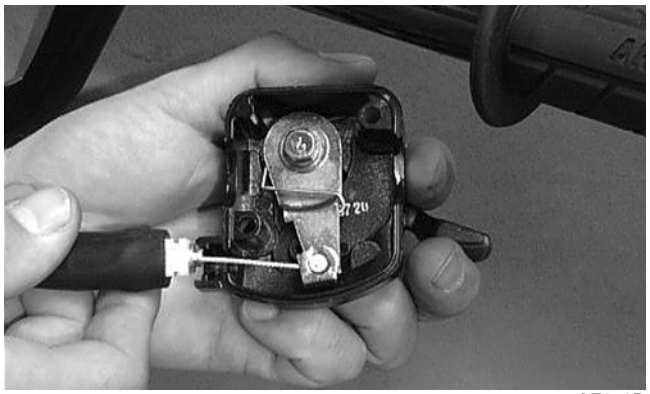
BC206

4. Bleed the brake system (see Section 2).

Throttle Control

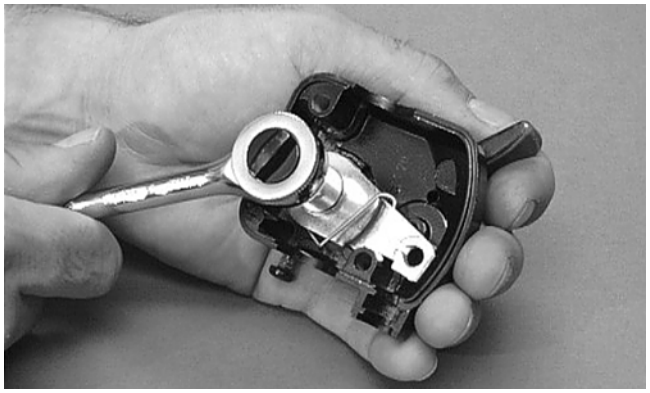
REMOVING

1. Remove the two machine screws securing the throttle control to the handlebar.
2. Slide the grommet out of the lower half of the throttle control; then remove the cable from the actuator arm.



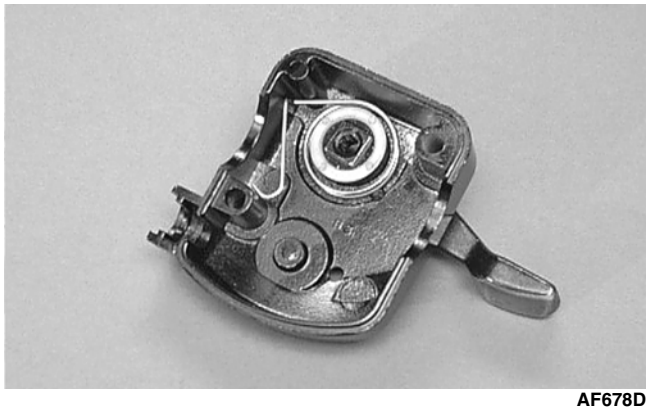
AF676D

3. Remove the cap screw, lock washer, and washer securing the actuator arm to the throttle control lever.



AF677D

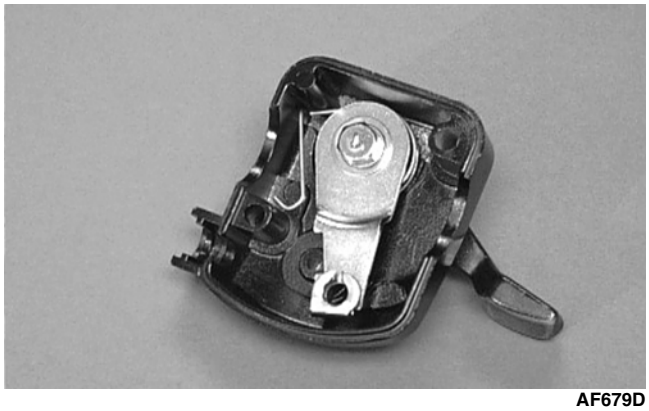
4. Remove the actuator arm and account for a bushing. Note the position of the return spring for installing purposes.



AF678D

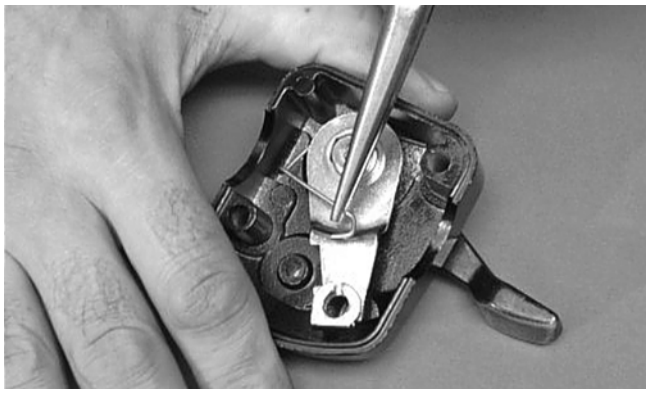
INSTALLING

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.

ADJUSTING

To adjust throttle cable free-play, see Section 2.

Front Differential Lock

To adjust the differential lock cable free-play, see Section 2.

Shift Lever

REMOVING

1. Remove the E-clip securing the shift rod to the shift lever.
2. Remove two cap screws, two self-tapping screws, and three nylon ties securing the left-side splash panel and remove the panel.
3. Remove the axle and nut securing the shift lever to the upper shift arm; then remove the shift lever. Account for a spring and two O-rings.

INSTALLING

1. 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.
2. Place the shift rod into position on the shift lever and secure with the existing E-clip.
3. Check shift lever adjustment (see Section 2); then tighten jam nut(s) securely.
4. Install the left-side splash panel.

Speedometer/ Tachometer/LCD

REPLACING

To replace the speedometer, use the following procedure.

1. Remove the two reinstallable rivets securing the instrument pod; then remove the ignition switch retaining ring.
2. Remove the two nuts securing the mounting studs; then remove the speedometer and disconnect the multi-pin connector.
3. Mount the speedometer and secure with the two nuts; then connect the multi-pin connector.
4. Install the instrument pod and secure with the reinstallable rivets.
5. Secure the ignition switch with the retaining ring.

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