FOREWORD

This Arctic Cat Service Manual contains service, maintenance, and troubleshooting information for the 2010 Arctic Cat 450 ATV. 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. A **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.

November 2009

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ARCTIC CAT®

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2010

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450

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	21.6 L (5.7 U.S. gal.)
Coolant Capacity	2.9 L (3.0 U.S. qt)
Differential Capacity	275 ml (9.3 fl oz)**
Rear Drive Capacity	250 ml (8.5 fl oz)***
Engine Oil Capacity	2.85 L (3.0 U.S. qt) - Overhaul 2.5 L (2.6 U.S. qt) - Change
Gasoline (recommended)	87 Octane Regular Unleaded
Engine Oil (recommended)	Arctic Cat ACX All Weather (Synthetic)
Differential/Rear Drive Lubricant	SAE Approved 80W-90 Hypoid
Drive Belt Width	28.5 mm (1.12 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 Specification

EXHAUST COMPONENTS			
Part	Part Bolted To	Torque ft-lb	Torque N-m
Exhaust Pipe	Engine	20	27
Spark Arrester	Muffler	48 in.-lb	5.5
ELECTRICAL COMPONENTS			
Ground Cable Cap Screw	Crankcase	8	11
Coil	Air Filter Housing	7	10
Fuel Injector	Intake Pipe	8	11
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
Brake Caliper****	Knuckle/Axle Housing	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

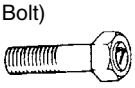
SUSPENSION COMPONENTS (Front)			
Part	Part Bolted To	Torque ft-lb	Torque N-m
A-Arm	Frame	50	68
Shock Absorber	Frame	50	68
Shock Absorber (Lower)	Upper A-Arm	50	68
Knuckle	A-Arm	50	68
SUSPENSION COMPONENTS (Rear)			
Shock Absorber (Upper)	Frame	50	68
Shock Absorber (Lower)	Lower A-Arm	20	27
A-Arm	Frame	50	68
Knuckle	A-Arm	50	68
DRIVE TRAIN COMPONENTS			
Engine Mounting Through-Bolt	Frame	35	47
Front Differential*	Frame/Differential Bracket	38	52
Output Drive Flange	Rear Flange Output Joint	20	27
Pinion Housing	Differential Housing	23	31
Differential Housing Cover***	Differential Housing	23	31
Drive Bevel Gear Nut***	Shaft	72	98
Differential Gear Case***	Hub	19	26
Lock Collar	Differential Housing	125	169
Hub Nut	Shaft/Axle (max)	200	272
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
Rear Drive Input Shaft/Housing	Differential Housing	23	31
Wheel	Hub	40	54
Rear Drive Gear Case	Frame	38	52
Engine Output Shaft **	Rear Gear Case Input Flange	20	27
ENGINE/TRANSMISSION			
Clutch Shoe**	Crankshaft	147	199
Clutch Cover/Housing Assembly	Crankcase	8	11
Magneto Cover	Crankcase	8	11
Crankcase Half (6 mm)	Crankcase Half	10	13.5
Crankcase Half (8 mm)	Crankcase Half	21	28
Cylinder Head (Cap Screw)	Crankcase	28	38
Cylinder Head Nut	Cylinder	8	11
Cylinder Head Nut (Lower)	Cylinder	20	27
Cylinder Head Cover	Cylinder Head	8	11
Oil Pump Drive Gear**	Crankshaft	63	86
Driven Pulley Nut**	Driveshaft	147	199
Ground Cable	Engine	8	11
Output Shaft Flange Nut	Output Shaft	59	80
Magneto Rotor Nut	Crankshaft	107	146
Cam Sprocket**	Camshaft	11	15
Cam Chain Tensioner Guide	Cylinder Head	11	15
Cam Chain Tensioner	Cylinder	10	14
Starter Motor	Crankcase	8	11
V-Belt Cover	Crankcase	8	11
Valve Adjuster Jam Nut	Valve Adjuster	7	9.5
Oil Pump**	Crankcase	8	11
Movable Drive Face Nut**	Clutch Shaft	147	199
Oil Cooler Hose Clamps	Engine/Oil Cooler	30 in.-lb	3.4
Valve Cover (Three Bond)	Cylinder Head	8	11
Tappet Cover	Crankcase	8	11
Water Pump Cover/Housing	Magneto Cover	8	11
Water Pump Drive Gear**	Crankshaft	28	38

* w/Blue Loctite #243
** w/Red Loctite #271
*** w/Green Loctite #609
****w/Patch-Lock

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 (see Periodic Maintenance Chart in Section 2).

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.

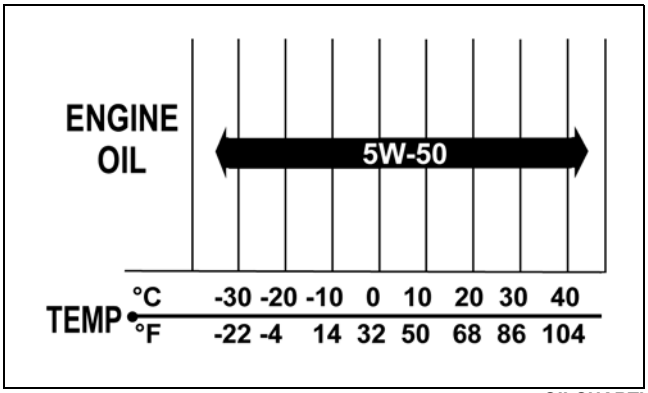
CAUTION
Do not use white gas. Only Arctic Cat approved gasoline additives should be used.

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

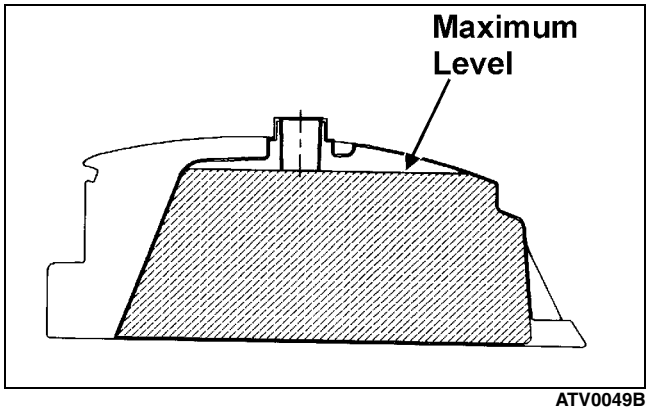
Any lubricant used in place of the recommended lubricant could cause serious front differential/rear drive damage.

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.

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.



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⚠ 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.

⚠ WARNING

Do not over-fill the gas tank.

Tighten the gas tank cap securely after filling the 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**/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		I				T
Ignition Timing						I	
Headlight/Taillight-Brakelight	I	I					R
Switches	I	I					R
Shift Lever					I		A-L
Handlebar Grips		I					R
Handlebar	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.

** When using an API certified SM 5W-50 oil.

*** When using Arctic Cat ACX All Weather synthetic oil, oil change interval and strainer inspection can be increased to every 1,000 miles or every year.

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	0444-255

■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

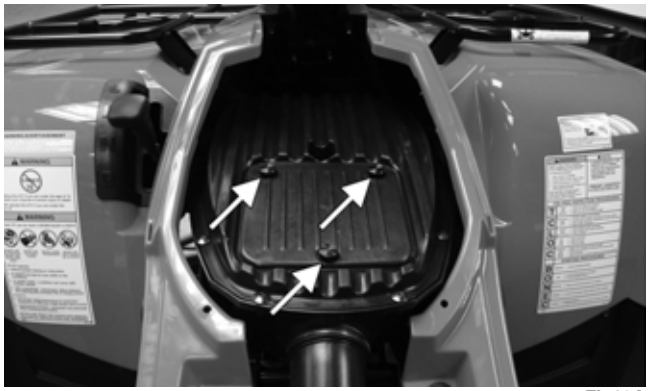
D. Shift Lever Cable End

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 cap screws securing the storage compartment.
2. Raise the storage compartment cover; then slide the cover forward and off the compartment. Remove the storage compartment.
3. Remove three machine screws; then remove the air filter cover.



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4. Remove the air filter element/spring assembly and separate the element from the screen.

FI515

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.

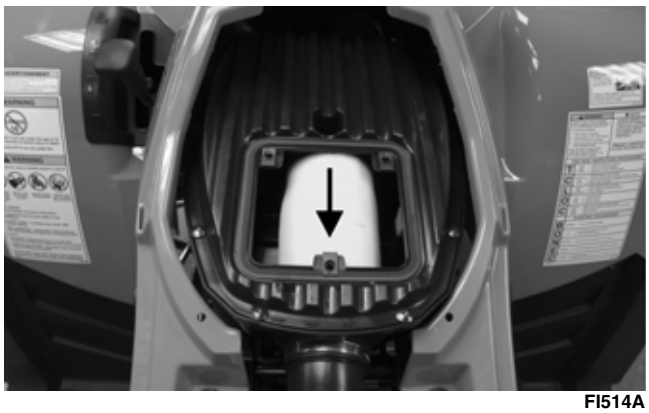
6. Dry the element.
7. Put the element in a plastic bag; then pour in air filter oil and work the oil into the element. Attach the element to the filter screen.

■NOTE: Carefully squeeze excessive oil from the filter element. Do not twist foam to remove oil.

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.
9. Place the filter assembly in the air filter housing making sure it is properly positioned and properly seated.



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10. Install the air filter housing cover and secure with the three machine screws.
11. Install the storage compartment; then secure with the reinstallable rivets.

CHECKING AND CLEANING DRAINS

1. Inspect the drains beneath the front of the main housing for debris and for proper sealing.
2. Wipe any accumulation of oil or gas from the filter housing and drains.

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 and spark plug (for more detailed information, see Section 3 - Servicing Top-Side Components).

■NOTE: Remove the crankshaft end cap and use a socket and ratchet to rotate the engine.

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

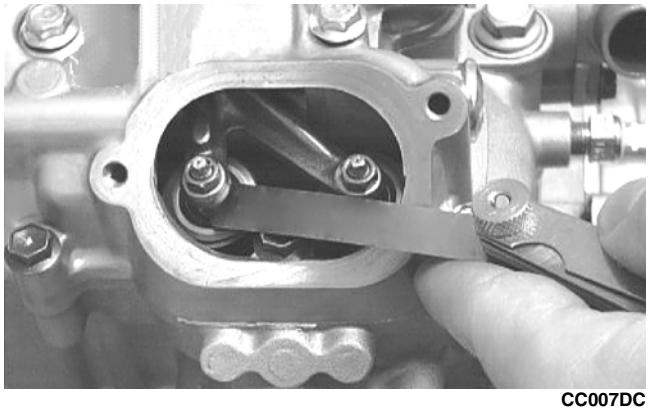
■NOTE: At this point, the rocker arms and adjuster screws must not have pressure on them.

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	0.1 mm (0.0039 in.)
Exhaust	0.17 mm (0.0067 in.)



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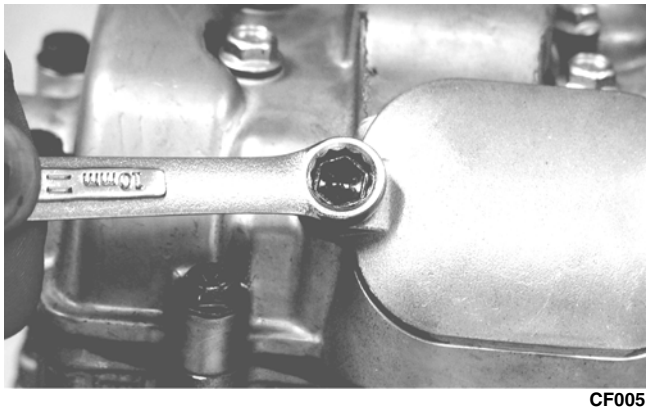
4. Install the timing inspection plug; then install the crankcase end cap.
5. Place the two tappet covers into position making sure the proper cap screws are with the proper cover. Tighten the cap screws securely.
6. Install the spark plug.

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 splash panels must be removed for this procedure.

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



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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.

■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. Place the two tappet covers with O-rings into position; then tighten the covers securely.
9. Install the spark plug; then install the timing inspection plug.

Testing Engine Compression

To test engine compression, use the following procedure.

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

⚠ WARNING

Always wear safety glasses when using compressed air.

3. Remove the spark plug; then attach the high tension lead to the plug and ground the plug on the cylinder head well away from the spark plug hole.
4. Attach the Compression Tester Kit.

■NOTE: The engine should be warm (operating temperature) and the battery full charged for an accurate compression test. Throttle must be in the wide-open throttle (WOT) position.

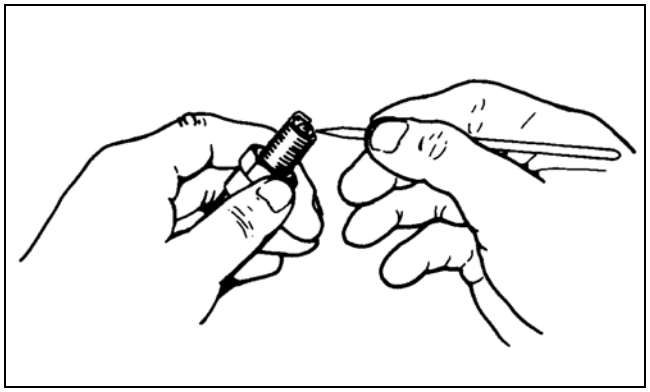
5. While holding the throttle lever in the full-open position, crank the engine over with the electric starter until the gauge shows a peak reading (five to 10 compression strokes). Compression should be 95-115 psi.
6. If compression is abnormally low, inspect the following items.
   A. Verify starter 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 hole, reattach the gauge, and retest compression.
8. If compression is now evident, service the piston rings (see Section 3).

Spark Plug

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

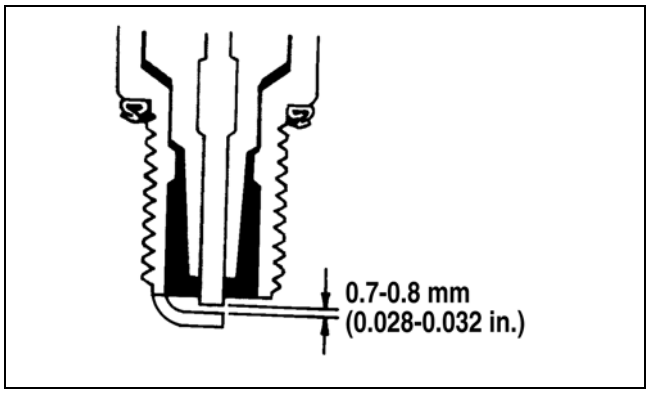


ATV-0051

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.

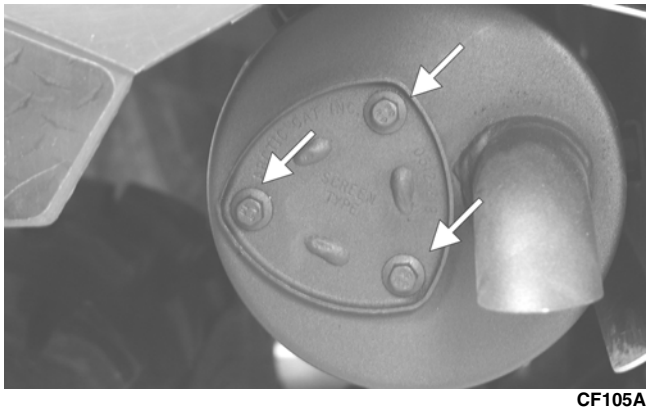
Muffler/Spark Arrester

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.

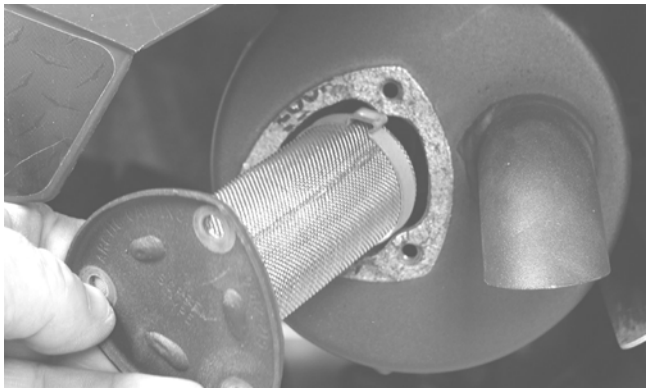


CF105A

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 48 in.-lb.



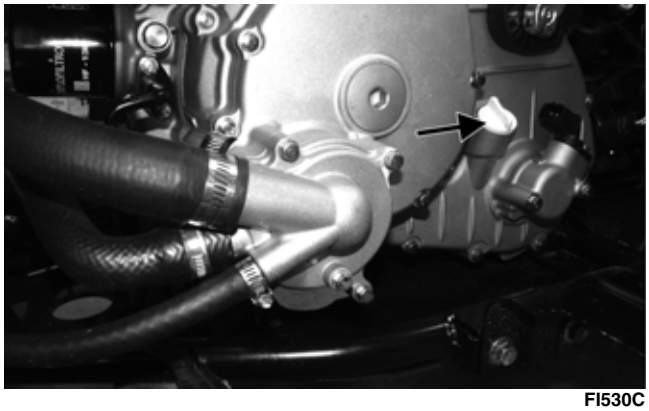
CF104

Engine/Transmission Oil - Filter - Strainer

OIL - FILTER

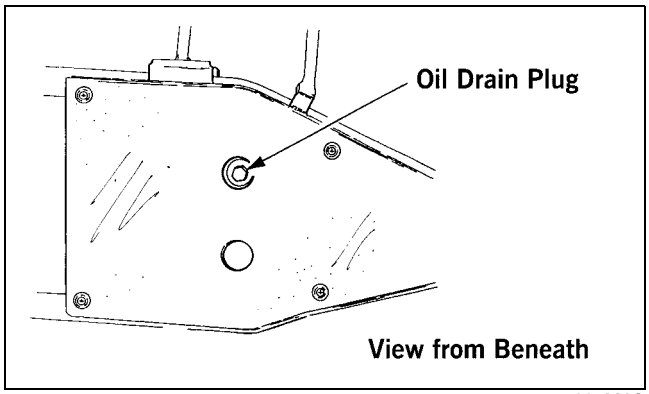
The engine should always be warm when the oil is changed so the oil will drain easily and completely.

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



FI530C

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



733-441A

4. Remove the oil filter plug from the filter mounting boss (located on the front side of the transmission case) and allow the filter to drain completely. Install the plug and tighten securely.

5. 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.

6. Apply oil to a new filter O-ring and check to make sure it is positioned correctly; then install the new oil filter. Tighten securely.

■NOTE: Install a new O-ring each time the filter is replaced.

7. 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.

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

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

10. Remove the oil level stick and wipe it with a clean cloth.

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

12. Remove the oil level stick; the oil level must be within the operating range but not exceeding the upper mark.

GZ461A

CAUTION

Do not over-fill the engine with oil. Always make sure that the oil level is not above the upper mark.

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

STRAINER

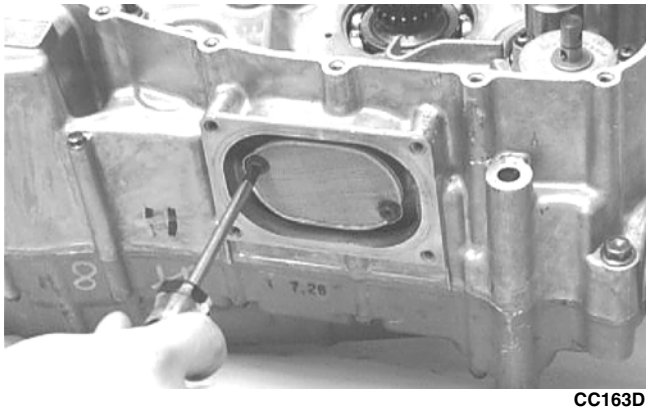
1. Remove the belly panel.

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

CC091D

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

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



CC163D

☞ 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

CAUTION

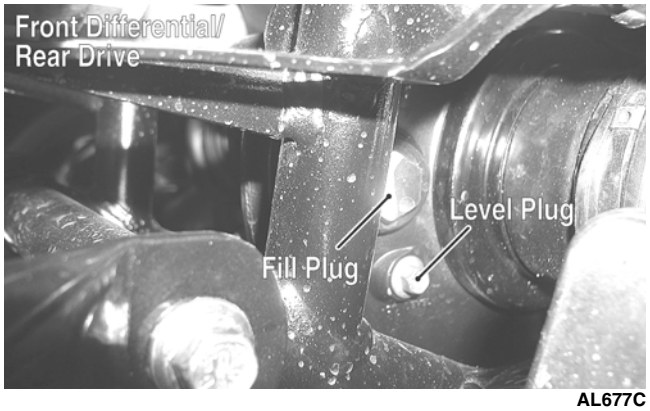
Any lubricant used in place of the recommended gear case lubricant could result in premature failure of the shock limiter. Do not use any lubricant containing graphite or molybdenum additives or other friction-modified lubricants as these may cause severe damage to shock limiter components.

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

To check lubricant, remove the fill 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.

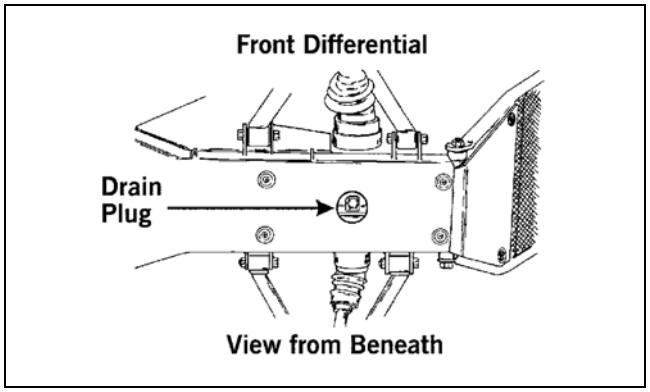
To change the lubricant, use the following procedure.

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

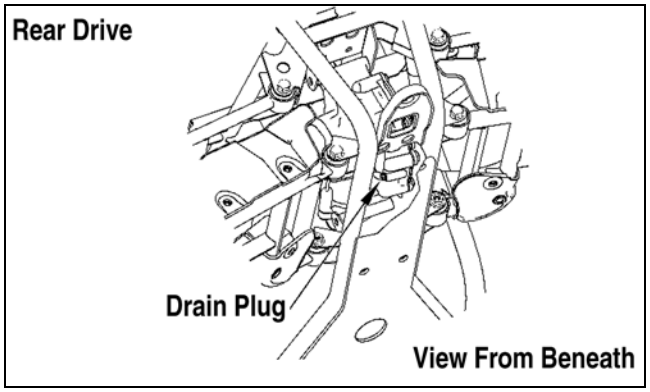


AL677C

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



ATV0082A



737-651B

4. After all the lubricant 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. Tighten to 16 ft-lb.

■NOTE: If the differential/rear drive lubricant is contaminated with water, inspect the drain plug, fill 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.

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.

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).

Headlights/Taillight-Brakelight

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.

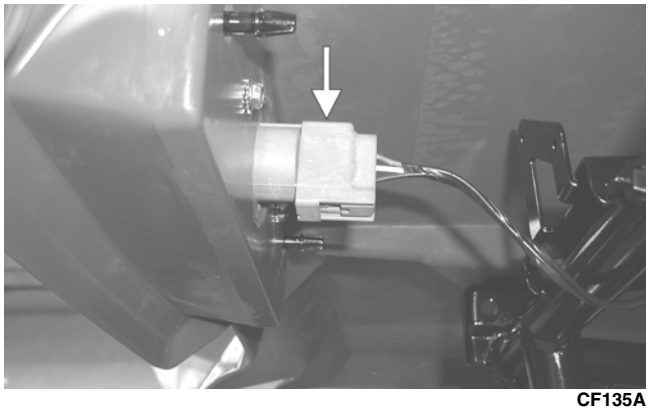
To replace a headlight bulb, use the following procedure.

1. Rotate the bulb assembly counterclockwise and remove from the headlight housing; then disconnect from the wiring harness.
2. Connect the new bulb assembly to the wiring harness connector; then insert into the headlight housing and rotate fully clockwise.

TAILLIGHT-BRAKELIGHT

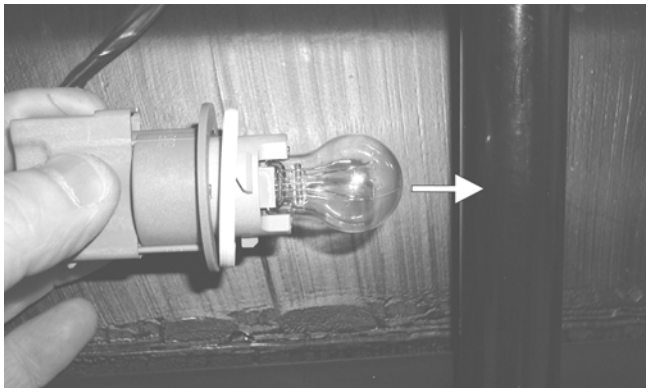
To replace the taillight-brakelight bulb, use the following procedure.

1. Turn the bulb socket assembly counterclockwise and remove from the housing.



CF135A

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



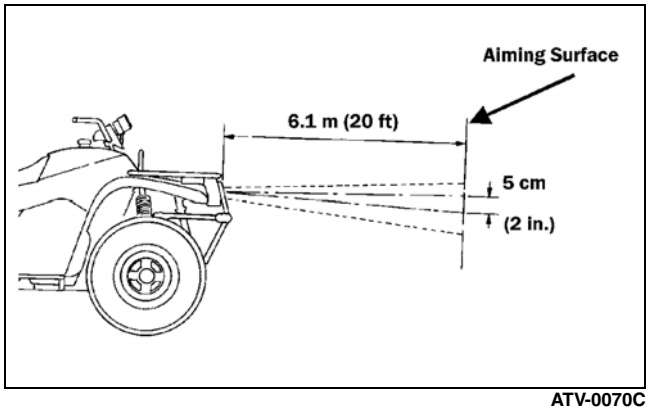
CF132A

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.

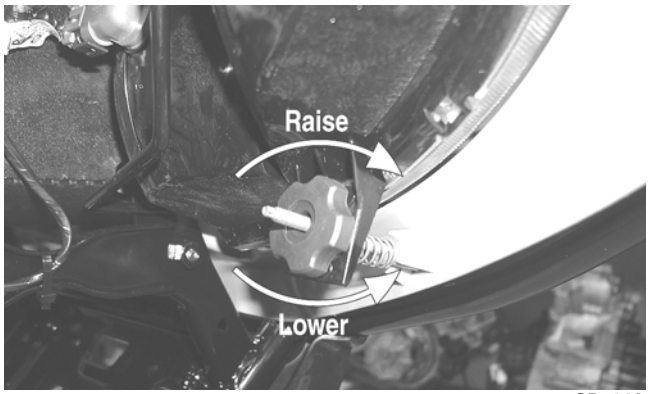
1. Position the ATV on a level floor so the headlights are approximately 6.1 m (20 ft) from an aiming surface (wall or similar aiming surface).



ATV-0070C

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

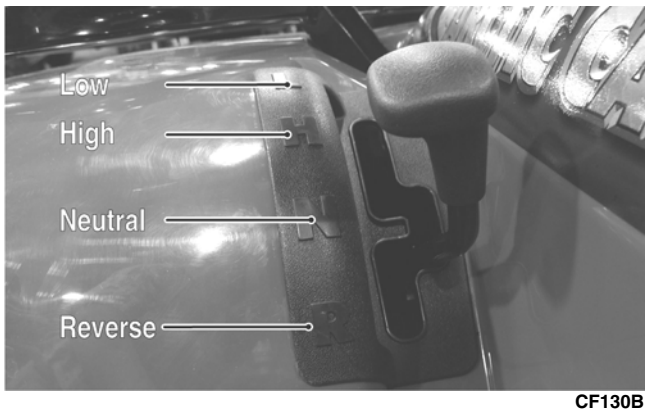
2. Measure the distance from the floor to the mid-point of each headlight.
3. Using the measurements obtained in step 2, make horizontal marks on the aiming surface.
4. Make vertical marks which intersect the horizontal marks on the aiming surface directly in front of the headlights.
5. Switch on the 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.



CD714A

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.

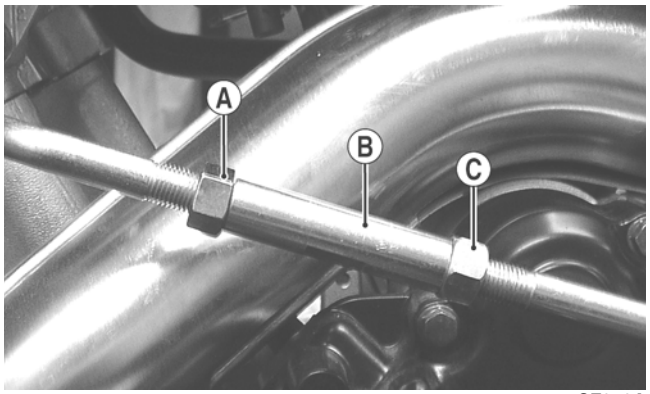
⚠ WARNING

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 switch connector, gear shift position switch, and LCD connector.

Frame/Welds/Racks

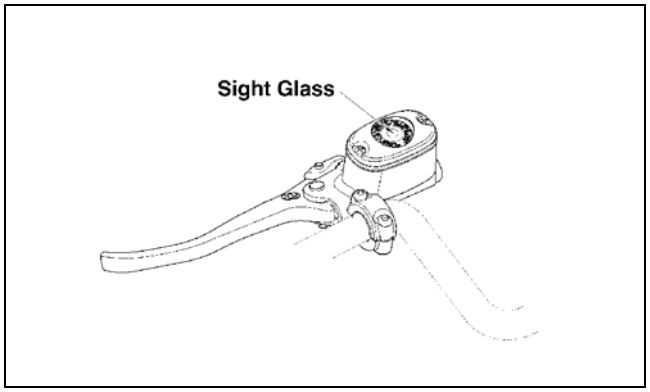
The frame, welds, and racks should be checked periodically for damage, bends, cracks, deterioration, broken components, and missing components. If replacement or repair constitutes removal, see Section 8.

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. On the hand brake if the level in the reservoir is adequate, the sight glass will appear dark. If the level is low, the sight glass will appear clear. On the auxiliary brake, the level must be between the MIN and MAX lines on the reservoir.

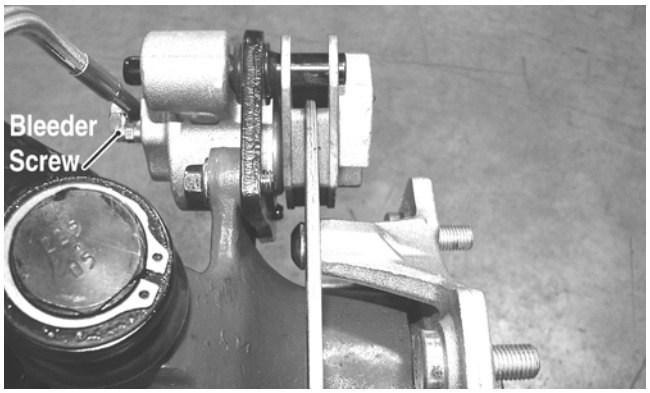


738-420A

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 main 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.

AF637D



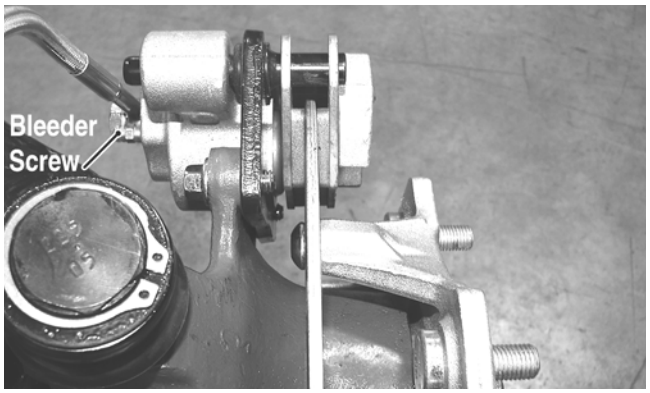
PR377C

■**NOTE: During the bleeding procedure, watch the reservoir/sight glass very closely to make sure there is always a sufficient amount of brake fluid. If low, 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. At this point, perform step B and C on the other FRONT bleeder screw; then move to the REAR bleeder screw and follow the same procedure.
   E. Repeat step D until the brake lever is firm.
4. To bleed the auxiliary 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 pedal several times.

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

AF637D



PR377C

■NOTE: During the bleeding procedure, watch the reservoir/sight glass very closely to make sure there is always a sufficient amount of brake fluid. If low, 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 pedal is firm.

5. 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

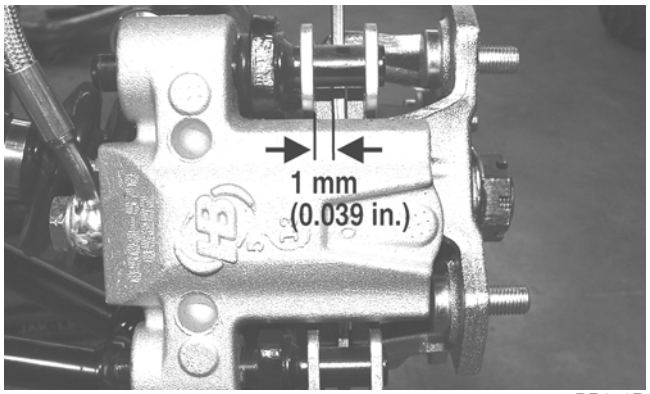
Carefully inspect the hydraulic brake hoses for cracks or other damage. If found, the brake hoses must be replaced.

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.

■NOTE: As brake pads wear, it may be necessary to "top-off" the brake fluid in the reservoir.

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.

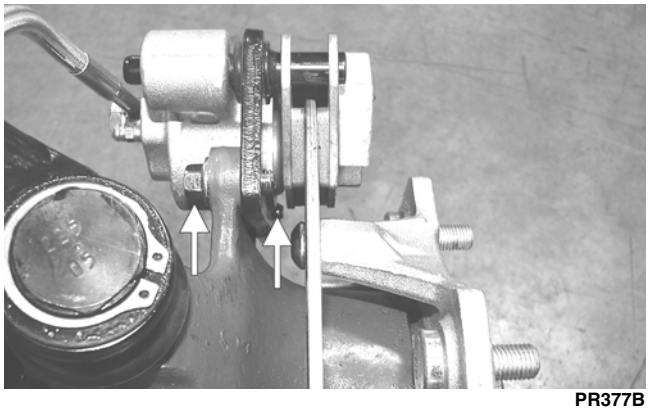
A. Remove the wheel.

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 new "patch-lock" 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

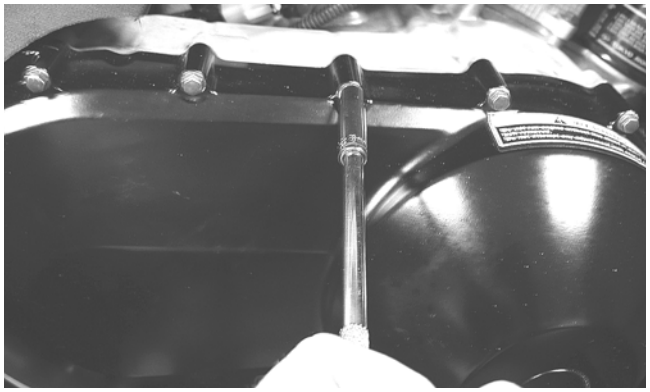
Failure to properly burnish the brake pads could lead to premature brake pad wear or brake loss. Brake loss can result in severe injury.

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.

Checking/Replacing V-Belt

REMOVING

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

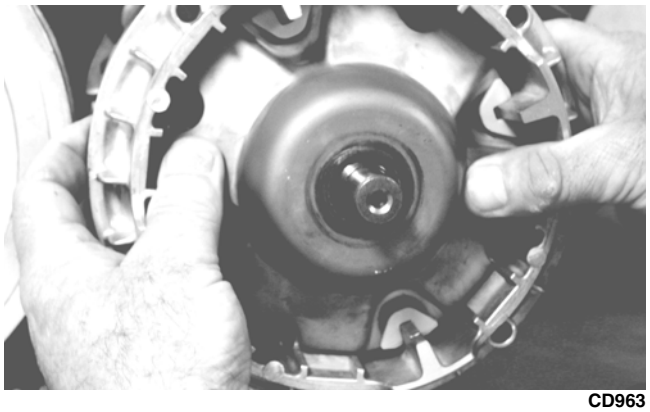


CD078

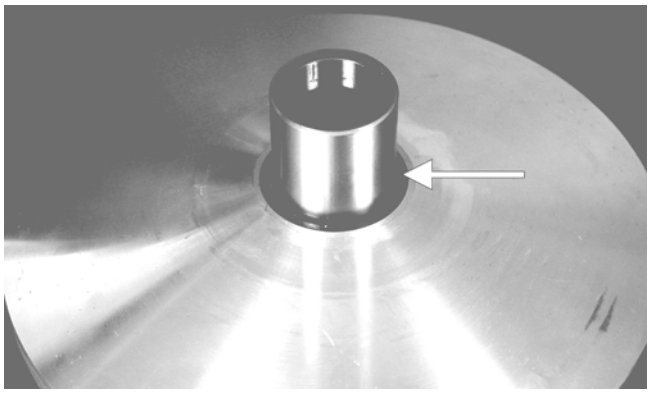
■NOTE: Note the location of the main engine ground wire for installing purposes.

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

■NOTE: Keep the drive face plate in contact with the drive face when removing or installing the drive face to prevent the rollers from falling out.



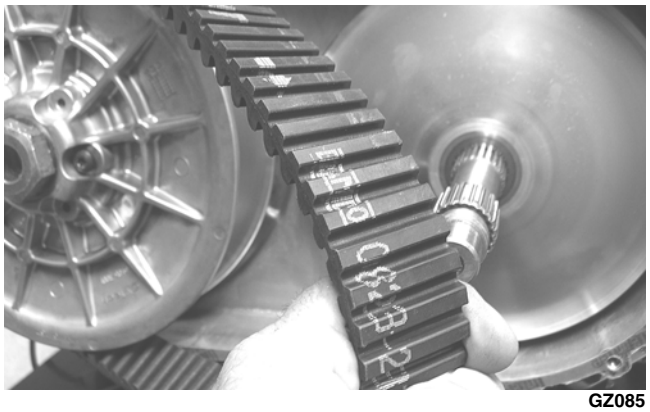
CD963



CD966A

4. Install one of the CVT cover cap screws into the driven pulley fixed face; then turn the cap screw clockwise to spread the pulley faces. Remove the V-belt.

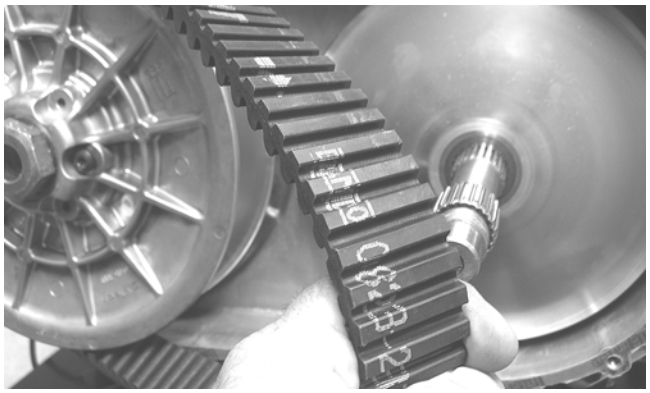
GZ076



GZ085

INSTALLING

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



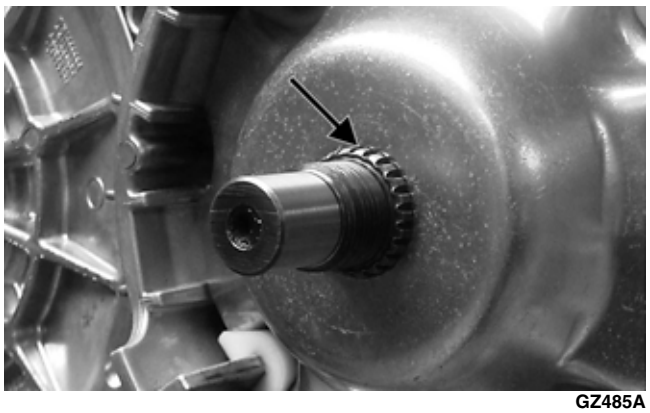
GZ085

■NOTE: The arrows on the V-belt should point in direction of engine rotation (forward).

2. Pinch the V-belt together near its center and slide the spacer and movable drive face onto the drive-shaft. Secure the drive face with a washer and nut (coated with red Loctite #271). Tighten the nut to 147 ft-lb.

CAUTION

Make sure the movable drive face plate is fully engaged onto the splines of the clutch shaft before torquing the nut or false torque readings may occur. This will cause the assembly to loosen damaging the shaft and clutch face plate.

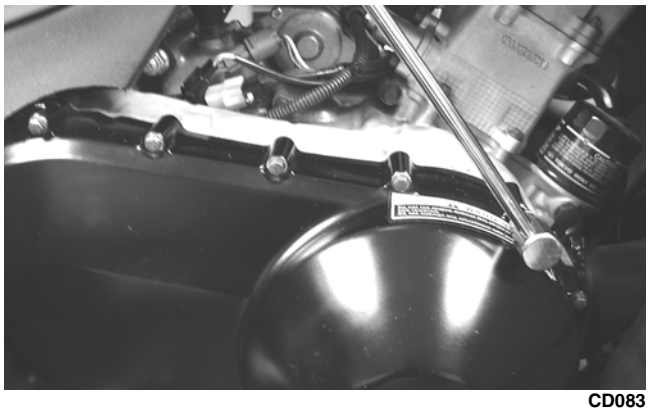


GZ485A

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

3. Rotate the V-belt and clutches until the V-belt is flush with the top of the driven clutch.

4. Place the V-belt cover gasket into position; then install the cover and secure with the cap screws making sure the different-lengthed cap screws are in their proper location. Tighten the cap screws to 8 ft-lb.



CD083

■NOTE: Make sure the main engine ground wire is installed and secured in the proper location.

5. Install the right-side footrest (see Section 8).

6. Secure the front fender to the footrest with the two cap screws. Tighten securely.

SECTION 3 - ENGINE/TRANSMISSION

TABLE OF CONTENTS

Engine/Transmission

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

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

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

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

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

■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. Refer to the current Special Tools Catalog for the appropriate tool description.

Description	p/n
Clutch Sleeve Hub Holder	0444-007
Connecting Rod Holder	0444-006
Crankcase Separator/Crankshaft Remover	0444-152
Driven Pulley Compressor	0444-121
Driven Pulley Compressor	0444-140
Magneto Rotor Remover Set	0444-254
Oil Filter Wrench	0644-389
Piston Pin Puller	0644-328
Spanner Wrench	0444-153
Surface Plate	0644-016
Valve Clearance Adjuster	0444-255
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)	35.0 mm 30.5 mm
Valve/Tappet Clearance (cold engine)	(intake) (exhaust)	0.10 mm 0.17 mm
Valve Guide/Stem Clearance (max)	(intake) (exhaust)	0.1 mm 0.3 mm
Valve Guide Inside Diameter		5.000-5.012 mm
Valve Stem Outside Diameter	(intake) (exhaust)	4.975-4.990 mm 4.955-4.970 mm
Valve Stem Runout	(max)	0.10 mm
Valve Margin (min.)	(intake)	1.1 mm
Valve Face/Seat Width (min)	(intake)	0.99 mm
Valve Seat Angle	(intake/exhaust)	45°-75°
Valve Face Radial Runout	(max)	0.15 mm
Valve Spring Free Length	(min)	44.73 mm
Valve Spring Tension @ 32.5 mm	(outer)	17.23 kg (37.98 lb)
CAMSHAFT AND CYLINDER HEAD		
Cam Lobe Height (min)	(intake) (exhaust)	34.71 mm 34.48 mm
Camshaft Journal/Cylinder Head Clearance	(max)	0.074 mm
Camshaft Journal Holder Inside Diameter	(right & center) (left)	22.01-22.04 mm 17.51-17.54 mm
Camshaft Journal Outside Diameter	(center) (left) (right)	21.959-21.980 mm 17.466-17.480 mm 21.966- 21.980 mm
Camshaft Runout	(max)	0.03 mm
Rocker Arm Inside Diameter		10.00-10.15 mm
Rocker Arm Shaft Outside Diameter		9.972-9.987 mm
Cylinder Head/Cover Distortion	(max)	0.05 mm
CYLINDER, PISTON, AND RINGS		
Piston Skirt/Cylinder Clearance		0.025-0.055 mm
Piston Diameter 8 mm from Skirt End		88.96-89.01 mm
Cylinder Bore		89.005-89.015 mm
Piston Ring Free End Gap (min)	(1st) (2nd)	8.0 mm 8.3 mm
Bore x Stroke		89.0 x 71.12 mm
Cylinder Trueness	(max)	0.01 mm
Piston Ring End Gap - Installed (min)	(1st) (2nd)	0.15 mm 0.30 mm
Piston Ring to Groove Clearance (max)	(1st/2nd)	0.06 mm
Piston Ring Groove Width	(1st) (2nd) (oil)	1.01-1.03 mm 1.21-1.23 mm 2.01-2.03 mm
Piston Ring Thickness	(1st) (2nd)	0.97-0.99 mm 1.17-1.19 mm
Piston Pin Bore	(max)	20.008 mm
Piston Pin	(min)	19.994 mm
CRANKSHAFT		
Connecting Rod (small end)	(max)	20.021 mm
Connecting Rod (big end side-to-side)		0.7 mm
Connecting Rod (small end deflection)	(max)	3.0 mm
Crankshaft (web-to-web)		60.8-60.9 mm
Crankshaft Runout	(max)	0.03 mm

* Specifications subject to change without notice.

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	2. Repair - replace guides
3. **Valves** mistimed	3. Retime engine
4. **Piston rings** worn excessively	4. Replace rings
5. **Cylinder bore** worn	5. Replace - rebore cylinder
6. **Starter motor** cranks too slowly - does not turn	6. 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. **Magneto** defective	3. Replace magneto
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 cylinder head and piston
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. **Main bearing** worn - burned	1. Replace bearing
2. **Lower rod-end bearing** worn - burned	2. Replace crankshaft assembly
3. **Connecting rod side clearance** too large	3. Replace crankshaft assembly
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. **Magneto** defective	5. Replace magneto
6. **ECU** defective	6. Replace ECU
7. **Spark plug** fouled - gap too wide	7. Adjust gap - replace plug
8. **Ignition coil** defective	8. Replace ignition coil
9. **Fuel injector** obstructed	9. 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. **Engine oil** 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. **Engine oil** 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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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 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

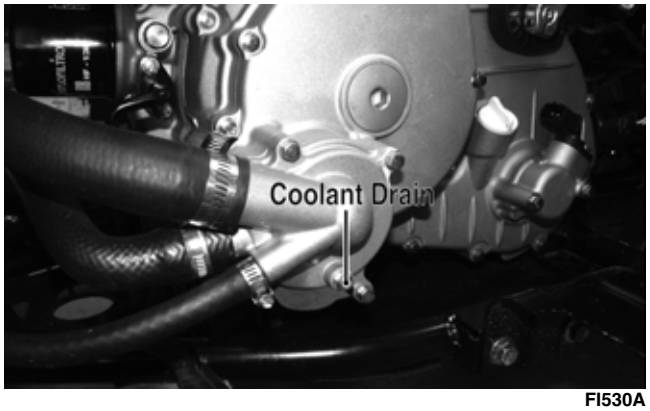
If the technician's objective is to service/replace magneto cover oil seals or the oil strainer (from beneath the engine/transmission), the engine/transmission does not have to be removed from the frame.

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

⚠ WARNING

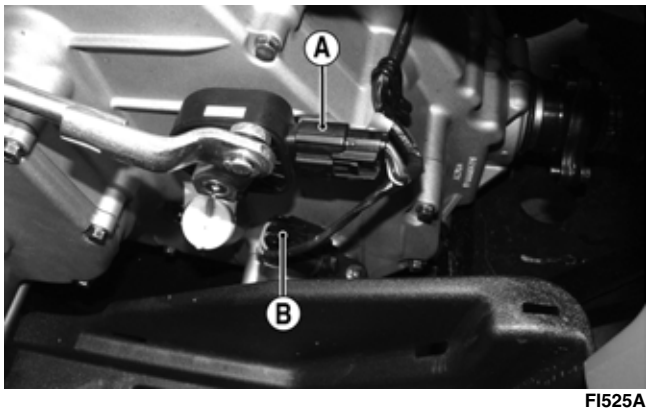
Make sure the ATV is solidly supported on the support stand to avoid injury.

1. Remove the seat and tool tray; then disconnect the negative battery cable.
2. Remove the left footwell, footrest, and footwell support assembly; then drain the coolant into a suitable container.



FI530A

3. From the left side, remove the gear position switch connector (A) and the speed sensor connector (B).



FI525A

4. Drain the engine oil into a suitable container.
5. Remove the storage compartment; then remove the air inlet tube from air filter housing and throttle body.

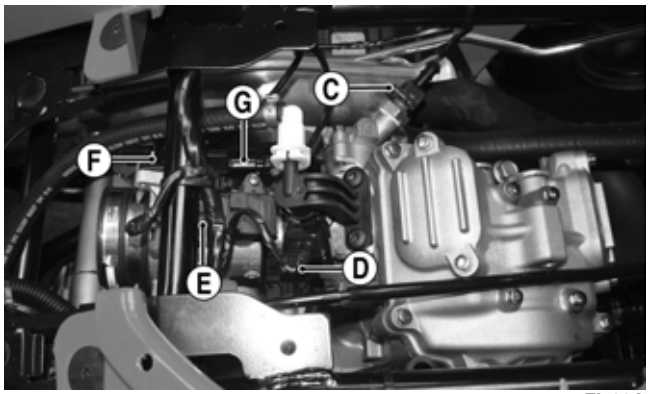
FI516A

6. Remove the air inlet and outlet ducts from the CVT housing.
7. Loosen the clamp securing the air filter housing to the front air inlet duct; then disconnect the coil connector and remove the spark plug cap from the spark plug.

FI519A

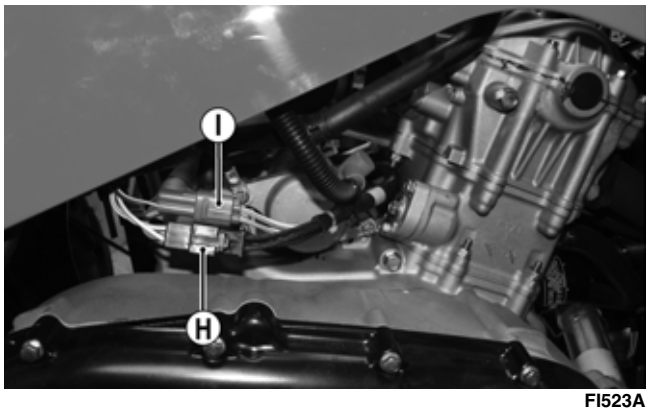
8. Disconnect the crankcase breather hose from the air filter housing and remove the air filter assembly.

9. From the top side, remove the engine coolant temperature (ECT) sensor connector (C), fuel injector connector (D), manifold absolute pressure (MAP) sensor connector (E), idle step control (ISC) connector (F), and throttle position sensor (TPS) connector (G).

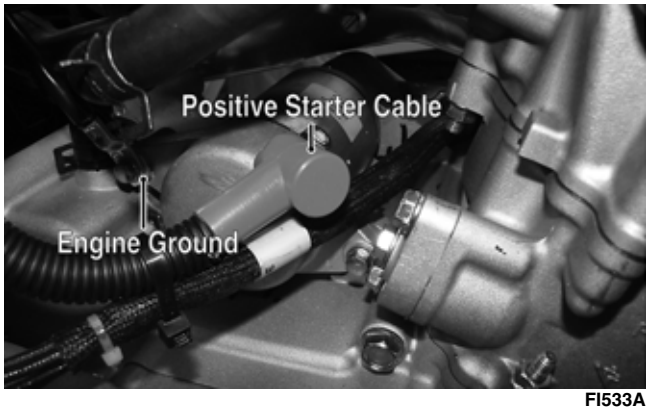


FI522A

10. From the right side, disconnect the stator connector (H) and crankshaft position sensor connector (I) from the main harness; then disconnect the positive cable from the starter motor and the engine ground cable from the starter mounting flange.

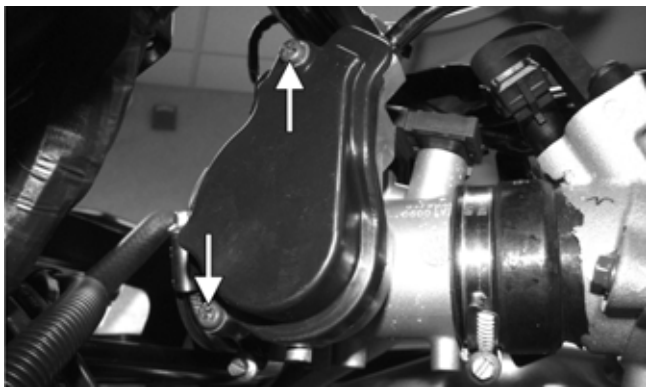


FI523A



FI533A

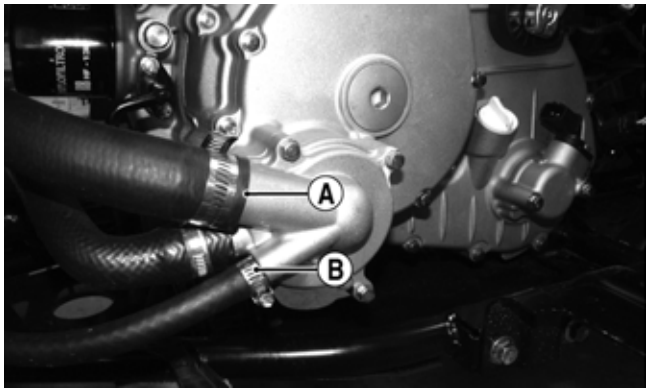
11. Remove the screens securing throttle arm cover to the throttle body; then loosen the throttle cable jam-nut and remove the throttle cable.


FI536A

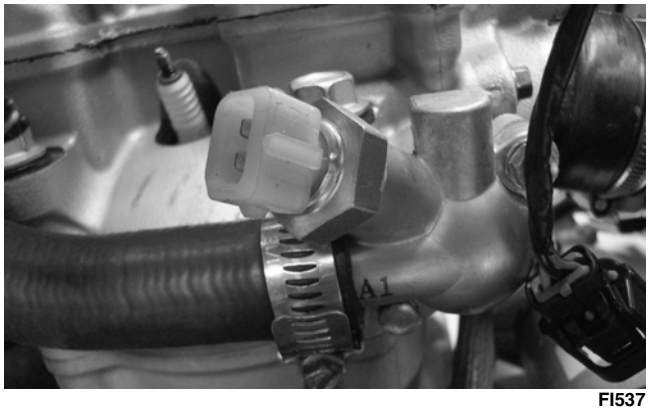
12. Remove the cap screws securing the exhaust pipe to the cylinder head; then remove the springs securing the muffler to the exhaust pipe.

13. Remove the muffler and exhaust pipe. Account for a grafoil seal on each end of the exhaust pipe.

14. Remove coolant hoses (A) and (B) from the water pump; then remove the upper coolant hose from the thermostat housing.



FI530B



FI537

15. Remove the four cap screws securing the rear driveline to the output drive flange.
16. Support the engine and remove the two through bolts securing the engine assembly to the frame; then move the engine rearward sufficiently to disengage the front driveline and remove the engine from the left side.

Top-Side Components

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

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

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

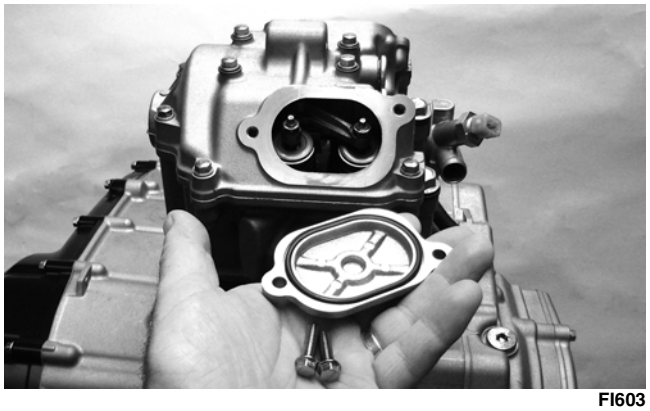
Removing Top-Side Components

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

■NOTE: Remove the spark plug, timing inspection plug, and outer magneto cover; then using an appropriate wrench, rotate the crankshaft to top-dead-center of the compression stroke.

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

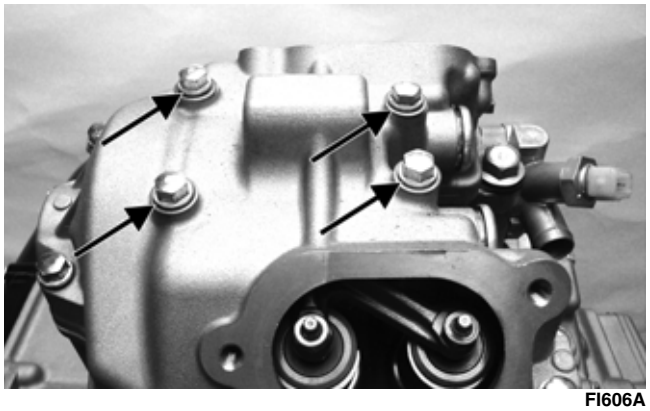
1. Remove the cap screws securing the two tappet covers. Remove the two tappet covers. Account for the O-rings.



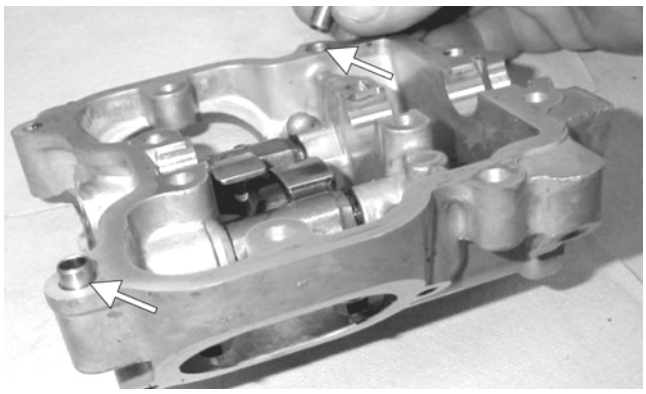
FI603

■NOTE: Keep the mounting hardware with the covers for assembly purposes.

2. Remove the cylinder head cover cap screws. Note the rubber washers on the four top-side cap screws; remove the cylinder head cover. Note the orientation of the cylinder head plug and remove it. Note the location of the two alignment pins.

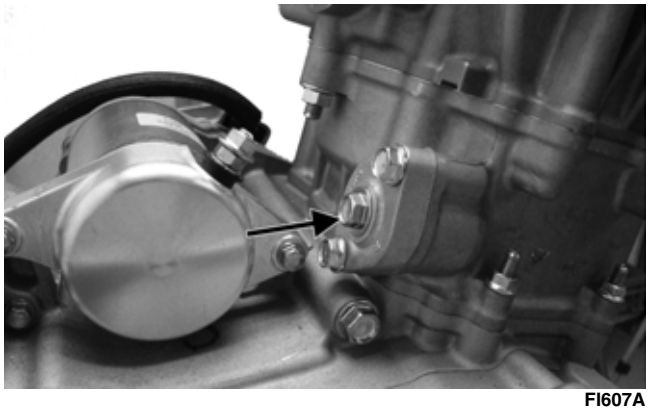


FI606A

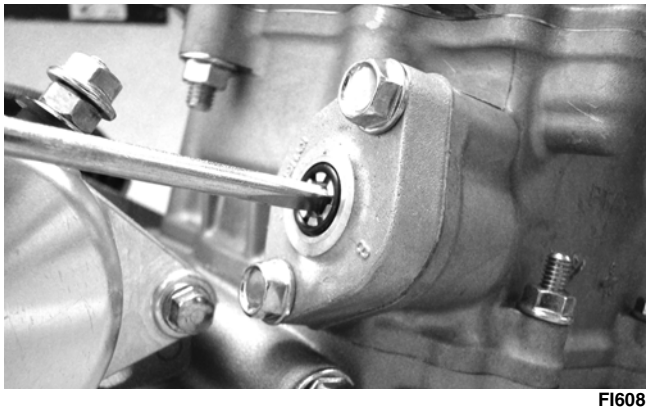


MD1354A

3. Remove the cap screw from the tension adjuster; then using a common screwdriver, relax the cam chain tension by rotating the adjuster screw clockwise until it locks.



FI607A



FI608

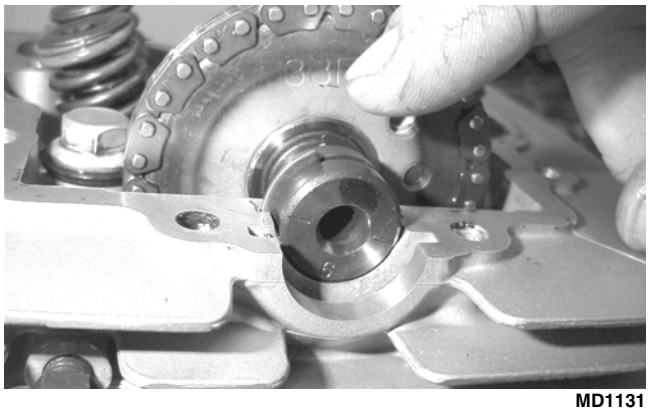
4. Bend the washer tabs and remove the two cap screws securing the sprocket to the camshaft.

FI612

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

FI613

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



MD1131

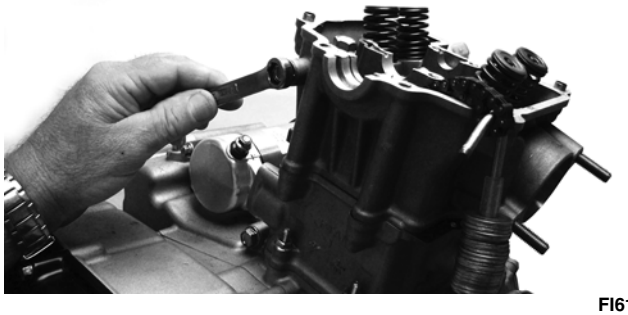
6. Noting the timing marks for installing purposes, drop the sprocket off the camshaft. While holding the cam chain, slide the sprocket and camshaft out of the cylinder head. Account for an alignment pin.

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

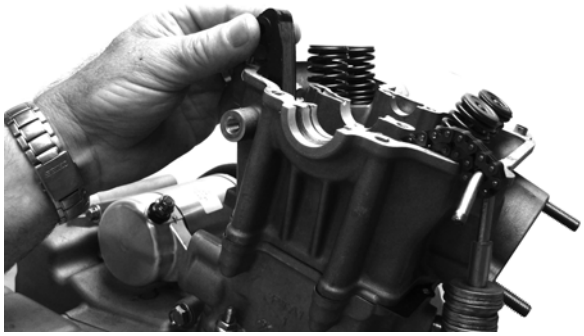
FI620

FI617A

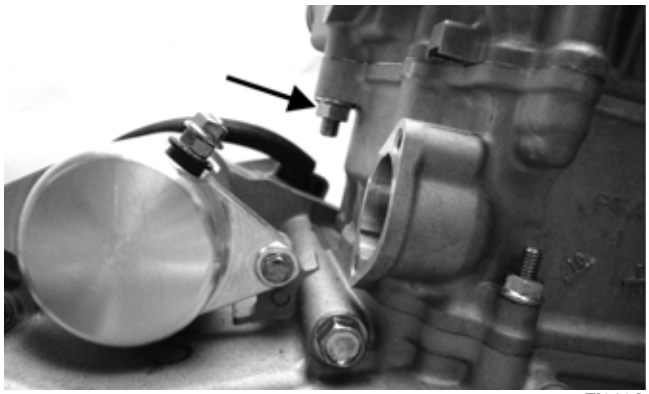
7. Remove the cam chain tensioner pivot bolt and remove the chain tensioner; then remove the two nuts securing the cylinder head to the cylinder.



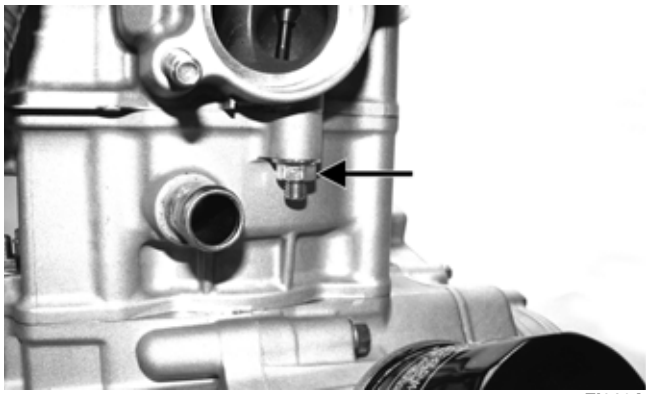
FI616



FI617



FI618A

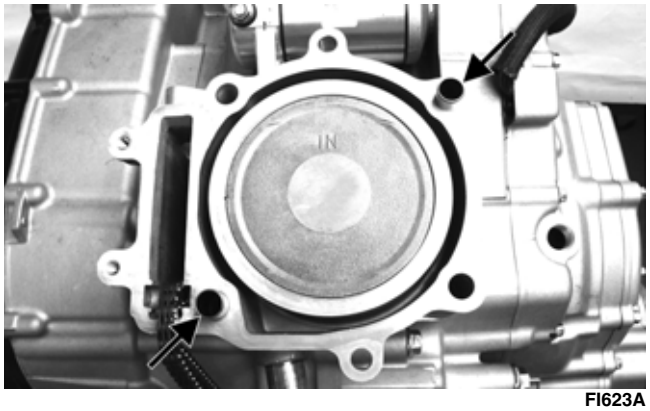


FI619A

8. Remove the four cylinder head cap screws and washers. Note that the two cap screws on the right side of the cylinder head nearest the cam sprocket are longer than the two cap screws on the left (spark plug) side.

CD211

9. Remove the cylinder head from the cylinder, remove the gasket, and account for two alignment pins.



FI623A

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

10. Remove the cam chain guide.

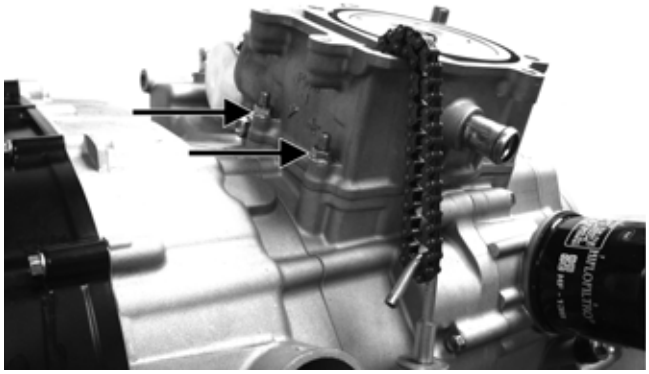
☞ AT THIS POINT
To inspect cam chain guide, see Servicing Top-Side Components sub-section.

FI621

C. Cylinder
D. Piston

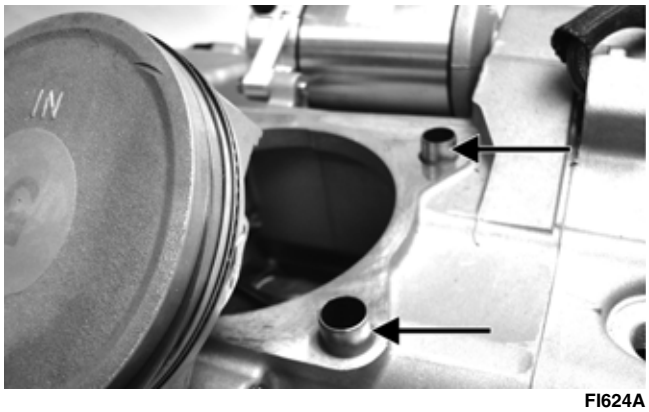
■NOTE: Steps 1-10 in the preceding sub-section must precede this procedure.

11. Remove the two nuts securing the right side of the cylinder to the right-side crankcase half.



FI622A

12. 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.



FI624A

☞ 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.

13. Using an awl, remove one piston-pin circlip. Take care not to drop it into the crankcase.

FI625

14. Using 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.

MD1219

■NOTE: Support the connecting rod with rubber bands to avoid damaging the rod or install a 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.

☞ 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.

3

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 Cylinder Head Cover

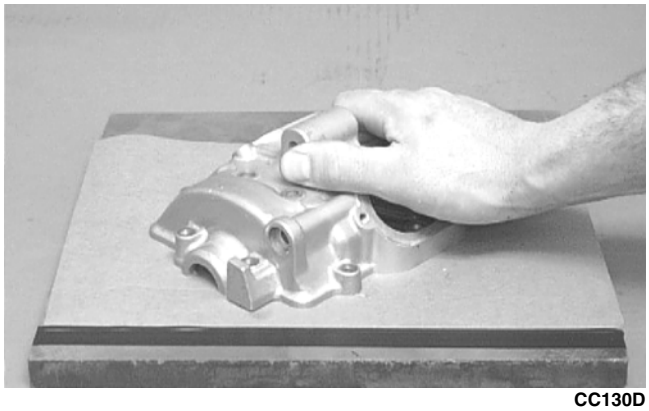
■NOTE: If the cylinder head cover cannot be trued, the cylinder head assembly must be replaced.

1. Wash the cylinder head cover in parts-cleaning solvent.

2. Place the cylinder head cover on the Surface Plate covered with #400 grit wet-or-dry sandpaper. Using light pressure, move the cylinder head 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 cylinder head 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 cylinder head cover.



CC130D

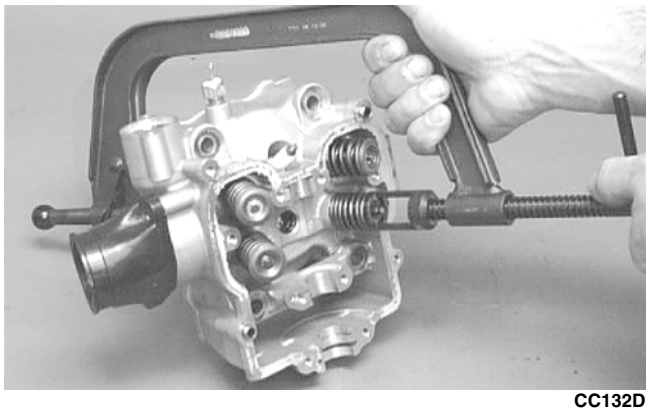
CAUTION

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

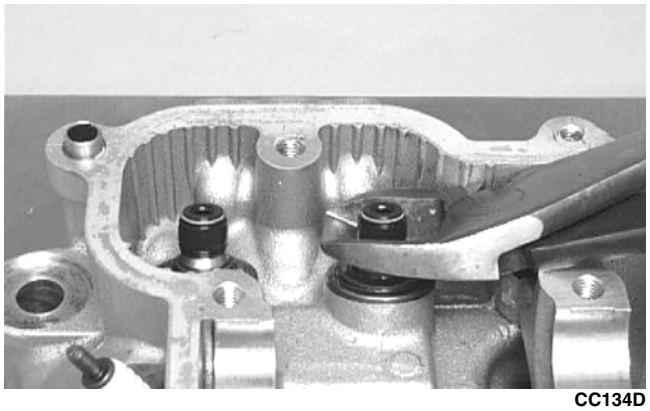
■NOTE: Keep all valves and valve components as a set. Note the original location of each valve set for use during installation. Return each valve set to its original location during installation.

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

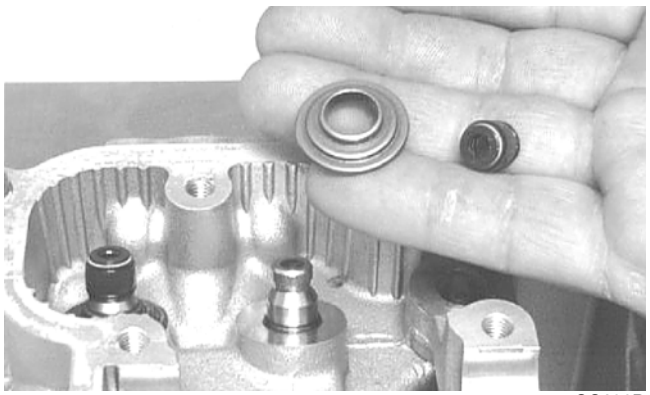


CC132D

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



CC134D



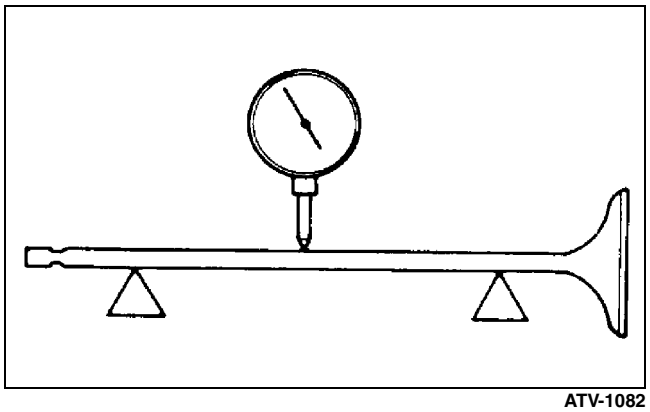
CC136D

■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 ranges must be within specifications.

Measuring Valve Face/Seat Width

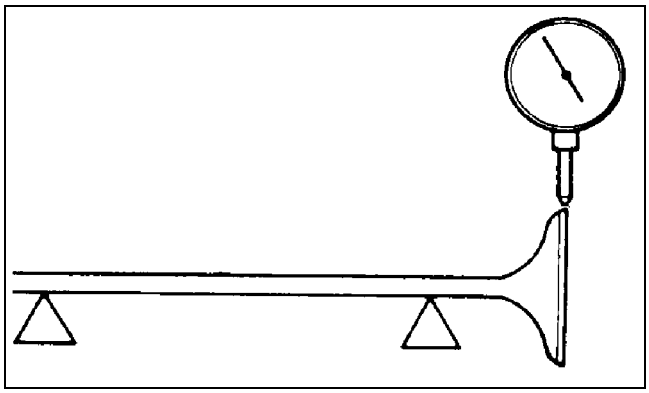
1. Using a calipers, measure the width of the valve face.

FI367

2. Acceptable width must be at or above 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 (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, the cylinder head 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)

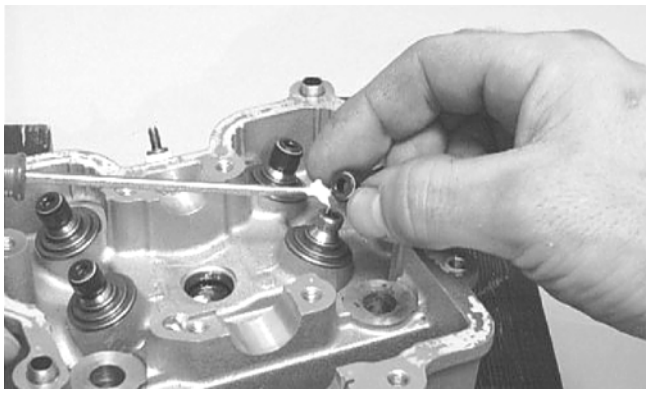
1. Using a dial calipers, measure the inside diameter of the rocker arm.
2. Acceptable inside diameter range must be within specifications.

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

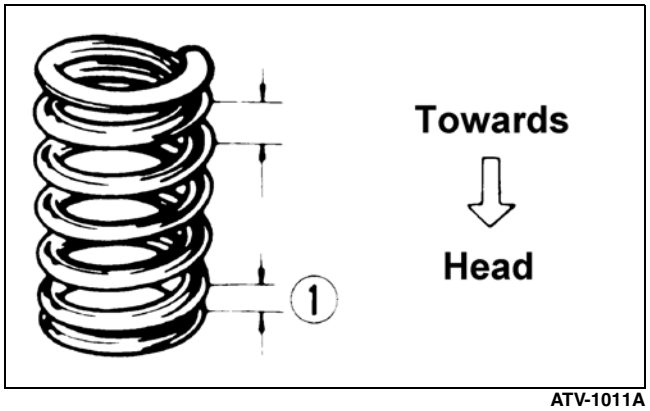
1. Apply grease to the inside surface of the valve seals; then place a lower spring seat and valve guide seal over each valve guide.



CC144D

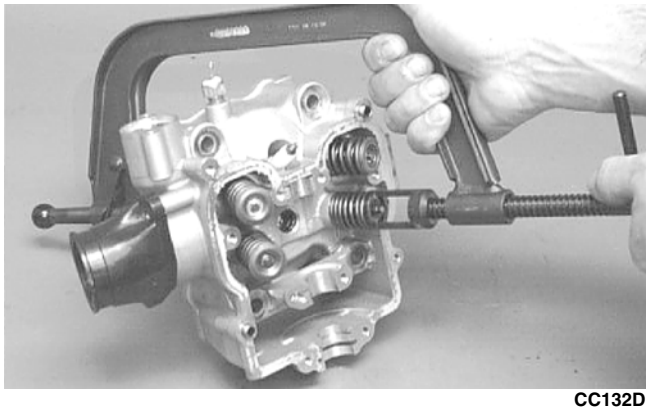
2. Insert each valve into its original valve location.
3. Install the valve springs with the painted end of the spring facing away from the cylinder head.

■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 keepers.



CC132D

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 top of the piston.
2. Inspect the piston for cracks in the piston pin, boss, top, and skirt areas.
3. Inspect the piston for seizure marks or scuffing. If piston is scored or galled, replace it with a new one.
4. Inspect the perimeter of each piston for signs of "blowby" indicated by dark discoloration. "Blowby" is caused by worn piston rings, excessive carbon in ring grooves, 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 top of the piston while rotating it out of the groove.

■NOTE: When installing new rings, install as a complete set only.

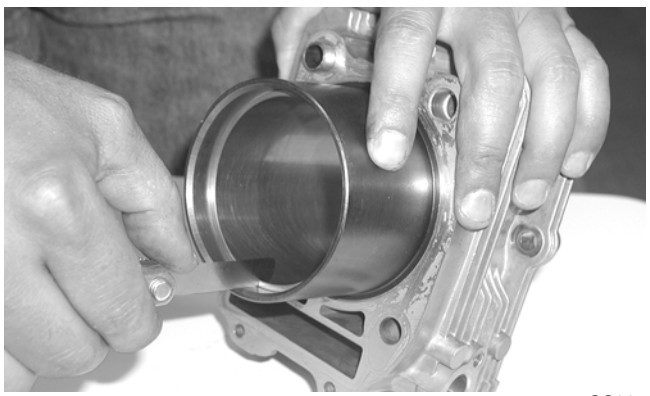
Cleaning/Inspecting Piston Ring Grooves

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

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

Measuring Piston-Ring End Gap (Installed)

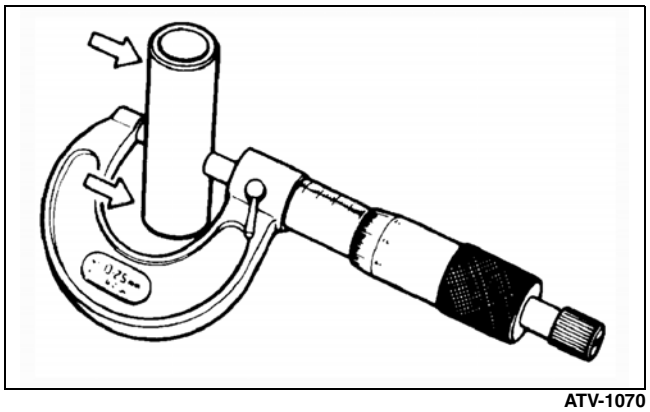
1. Place each piston ring in the wear portion of the cylinder. Use the piston to position each ring squarely in the cylinder.
2. Using a feeler gauge, measure each piston-ring end gap. Acceptable ring end gap must be within specifications.



CC995

Measuring Piston Pin, Connecting Rod Small End, and Piston-Pin Bore

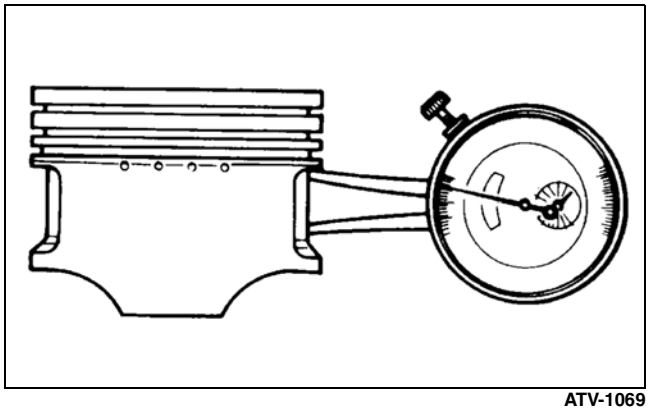
1. Measure the piston pin outside diameter at each end and in the center. If measurement does not meet specifications, the piston pin must be replaced.



ATV-1070

2. Inspect and measure the connecting rod small end. If the measurement exceeds specifications, the connecting rod must be replaced (see Center Crankcase Components in this section).

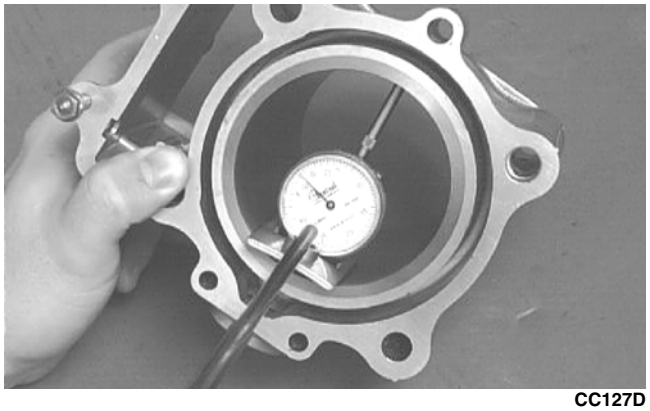
3. Insert an inside dial indicator into the piston-pin bore. Take two measurements to ensure accuracy. The diameter must not exceed specifications. If the diameter exceeds specifications, the piston must be replaced.



ATV-1069

Measuring Piston Skirt/ Cylinder Clearance

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



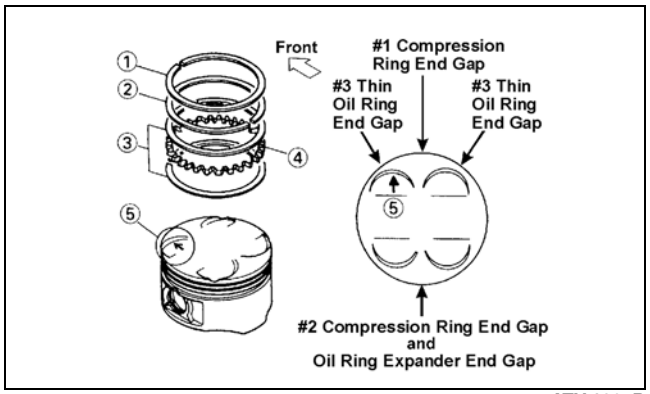
CC127D

2. Measure the corresponding piston diameter at a point 8 mm (0.3 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 ring expander (4) in the bottom groove of the piston; then install the thin oil rings (3) over the expander making sure the expander ends do not overlap. Stagger the end gaps of the upper and lower thin oil rings according to the illustration.

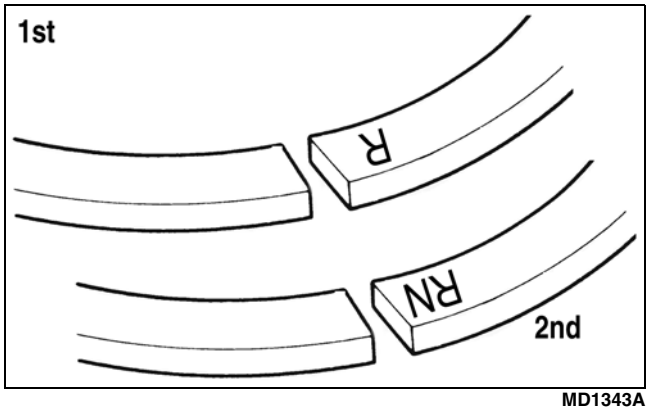
■NOTE: Note the direction of the exhaust side of the piston (5) for correct ring end gap orientation.



ATV-1085B

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

■NOTE: The chrome (silver) ring should be installed in the top position.



MD1343A

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.

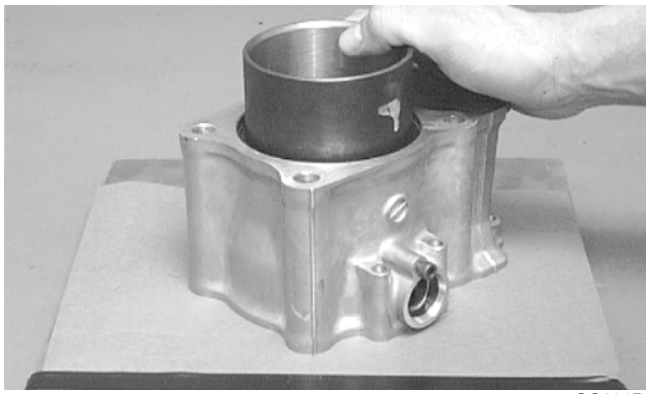

CC141D

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

CAUTION

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

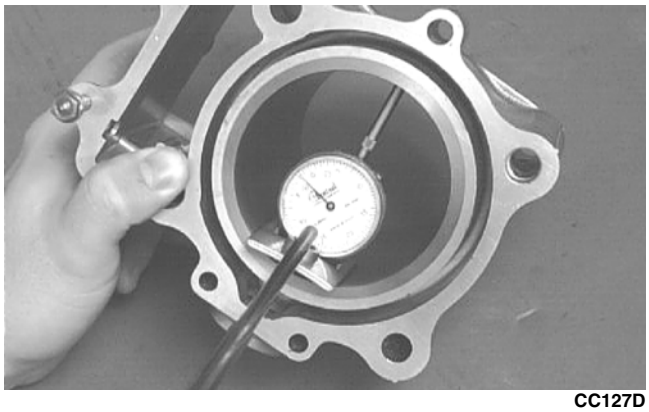

CC129D

Inspecting Cam Chain Guide

1. Inspect cam chain guide for cuts, tears, breaks, or chips.
2. If the chain guide is damaged, it must be replaced.

Honing Cylinder

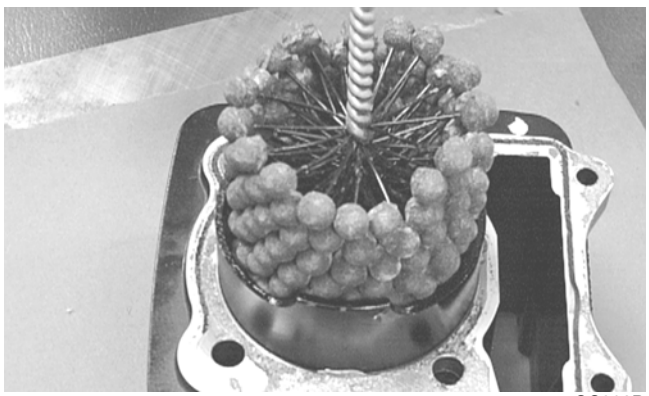
1. Using a slide gauge and a dial indicator or a snap gauge, measure the cylinder bore diameter in three locations from top to bottom and again from top to bottom at 90° from the first measurements for a total of six measurements. The trueness (out-of-roundness) is the difference between the highest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



CC127D

2. Wash the cylinder in parts-cleaning solvent.
3. Inspect the cylinder for pitting, scoring, scuffing, and corrosion. If marks are found, repair the surface using a #320 grit 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.



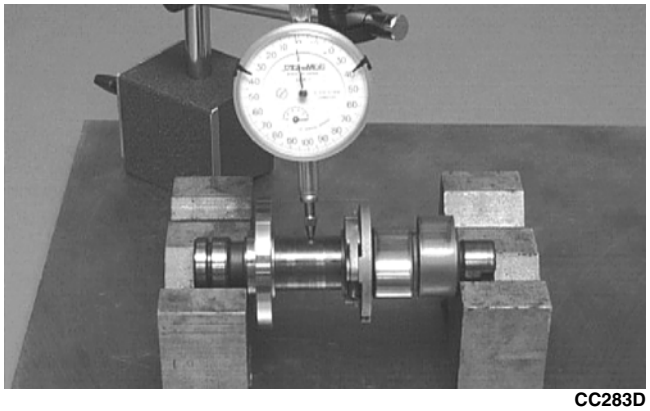
CC390D

4. If any measurement exceeds the limit, bore the cylinder and must be replaced.

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.

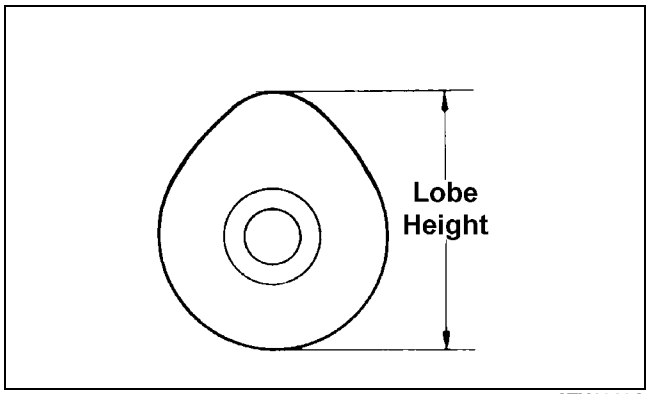


CC283D

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

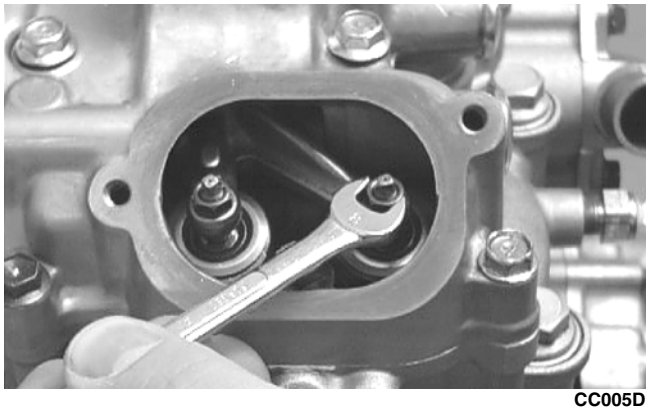
2. The lobe heights must not exceed minimum specifications.

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

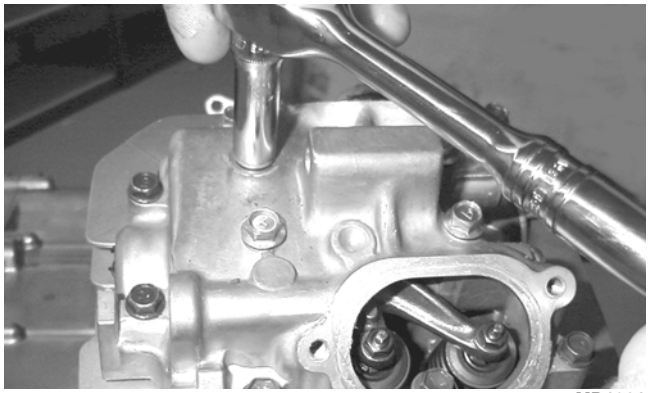
1. Loosen the jam nuts and adjuster screws.


CC005D

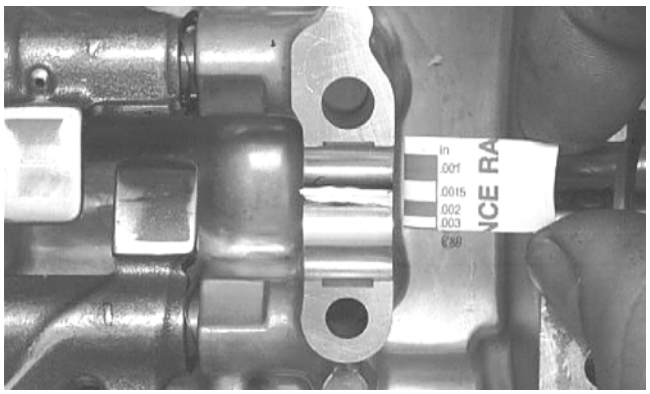
2. Place a strip of plasti-gauge in each of the camshaft lands in the cylinder head.
3. Place the valve cover on the cylinder head and secure with the valve cover cap screws. Tighten securely.

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

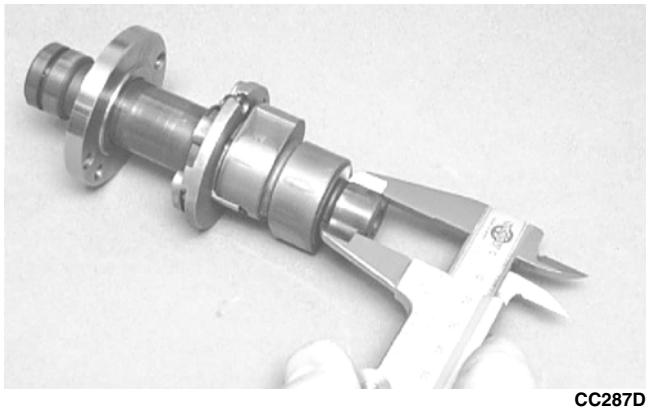
4. Remove the cap screws securing the valve cover to the cylinder; then remove the valve cover and camshaft.


MD1261

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

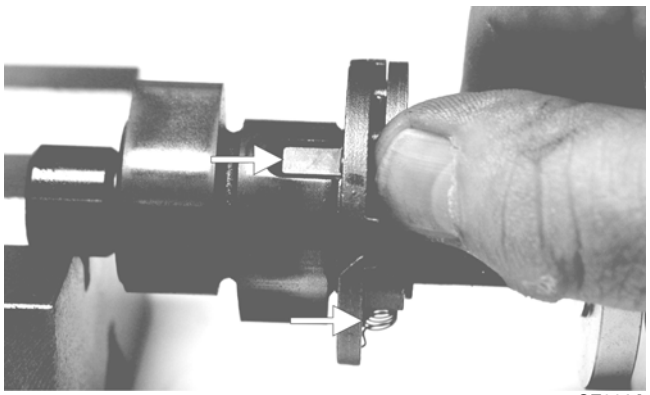
6. If clearance is excessive, measure the journals of the camshaft.


CC287D

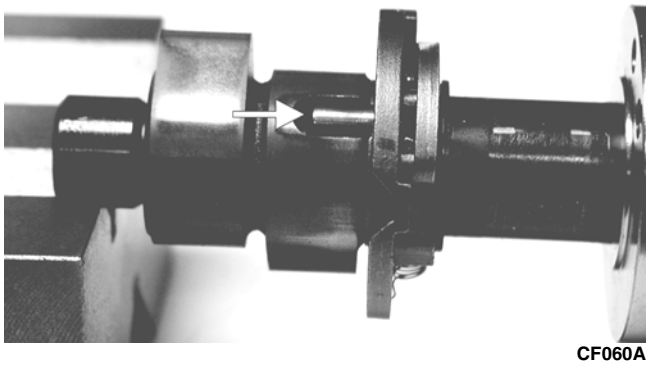
■NOTE: If the journals are worn, replace the camshaft; then measure the clearance again. If it is still out of tolerance, replace the cylinder head.

Inspecting Camshaft Spring/Drive Pin

1. Inspect the spring and unloader pin for damage.


CF061A

■NOTE: With the weight extended, the unloader pin should be flat-side out; with the weight retracted, the unloader pin should be round-side out.


CF060A

2. If damaged, the camshaft must be replaced.

Installing Top-Side Components

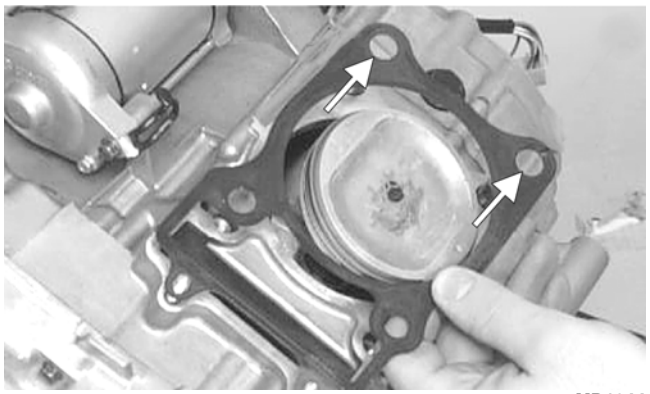
A. Piston
B. Cylinder

1. Lubricate the piston pin, connecting rod, and piston pin bore with motor oil; then install the piston on the connecting rod making sure there is a circlip on each side.

FI626

■NOTE: The piston should be installed so the IN points towards the intake side.

2. Place the two alignment pins into position. Place a new 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.

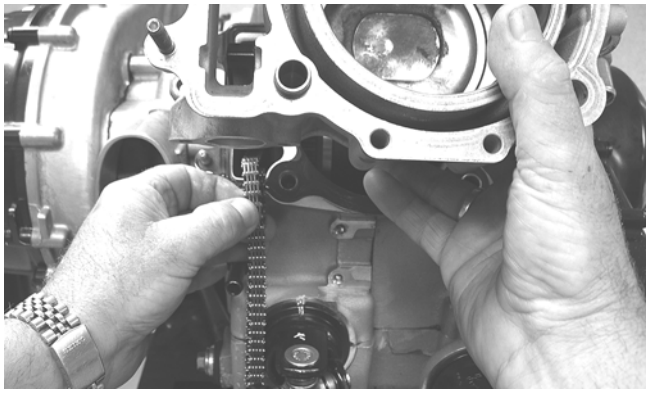


MD1344

3. Lubricate the inside wall of the cylinder; then using a ring compressor or the fingers, 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

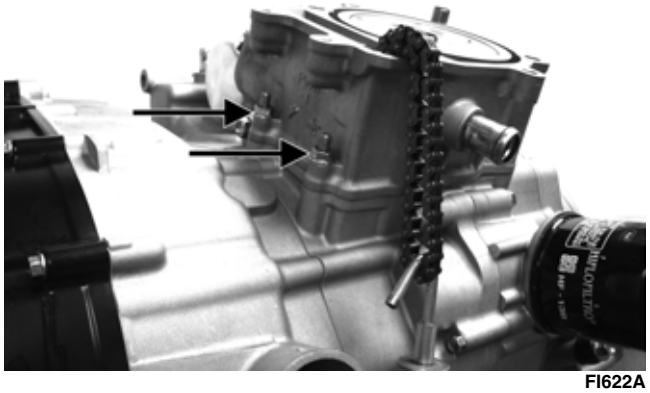
The cylinder should slide on easily. Do not force the cylinder or damage to the piston, rings, cylinder, or crankshaft assembly may occur.



GZ142

4. Loosely install the two nuts securing the cylinder to the right-side crankcase half.

■NOTE: The two cylinder-to-crankcase nuts will be tightened in step 9.



FI622A

C. Cylinder Head/Camshaft
D. Cylinder Head Cover/ Rocker Arms

■NOTE: Steps 1-4 in the preceding sub-section must precede this procedure.

5. While keeping tension on the cam chain, place the front cam chain guide into the cylinder.

CAUTION

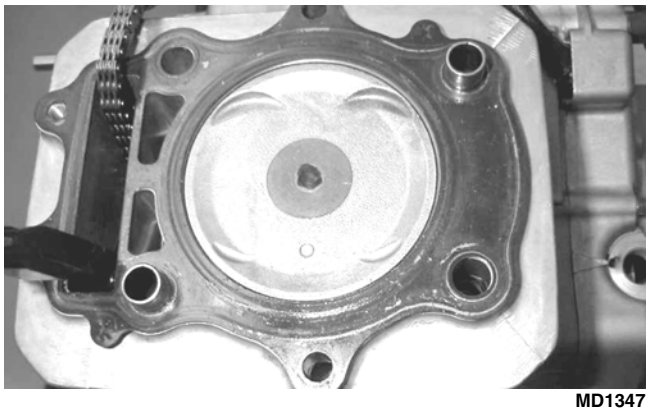
Care should be taken that the bottom of the chain guide is secured in the crankcase boss.

FI621

6. Place a new gasket into position on the cylinder. Place the alignment pins into position; then place the head assembly into position on the cylinder making sure the cam chain is routed through the chain cavity.

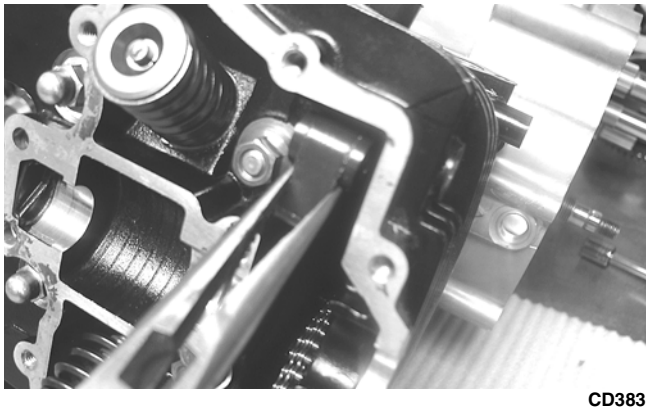
CAUTION

Keep tension on the cam chain to avoid damaging the crankcase boss.



MD1347

7. Install the four cylinder head cap screws with washers. Note that the two cap screws on the right side of the cylinder head nearest the cam sprocket are longer than the two cap screws on the left (spark plug) side. Tighten only until snug.
8. Install the two lower nuts securing the cylinder head to the cylinder, one in front and one in rear.
9. In a crisscross pattern, tighten the four cylinder head cap screws (from step 7) to 28 ft-lb. Tighten the two lower cylinder head nuts (from step 8) to 20 ft-lb and the cylinder-to-crankcase nuts (from step 4) to 8 ft-lb.
10. With the timing inspection plug removed and the cam chain held tight, rotate the crankshaft until the piston is at top-dead-center.
11. While holding the cam chain to the front, install the rear cam chain tensioner guide into the cylinder head. Install the pivot cap screw and washer. Tighten to 11 ft-lb.



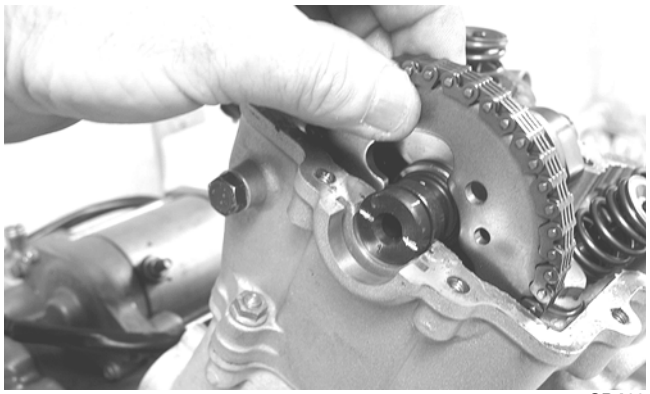
CD383

12. With the alignment pin installed in the camshaft and the cam lobes directed down (toward the piston), place the camshaft in position and verify that the timing mark on the magneto is visible through the inspection plug and that the timing marks on the camshaft sprocket are parallel with the valve cover mating surface.

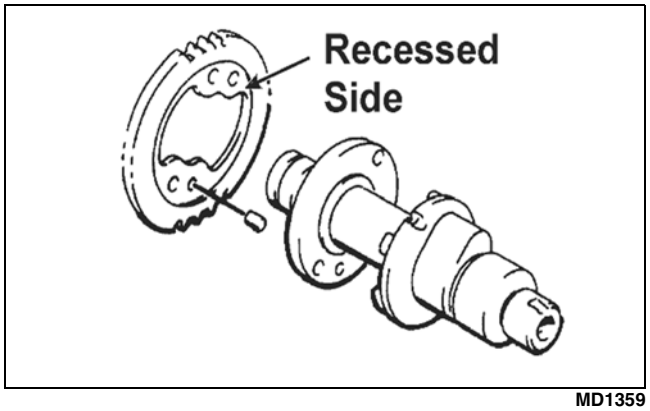
GZ190C

■**NOTE: When the camshaft assembly is seated, make sure the alignment pin in the camshaft aligns with the smallest hole in the sprocket.**

13. With the alignment pin installed in the camshaft, loosely place the cam sprocket (with the recessed side facing the camshaft lobes) onto the camshaft and place it into position with the cam chain over the sprocket.



CD463



MD1359

14. Place the C-ring into position in its groove in the cylinder head.

FI615

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

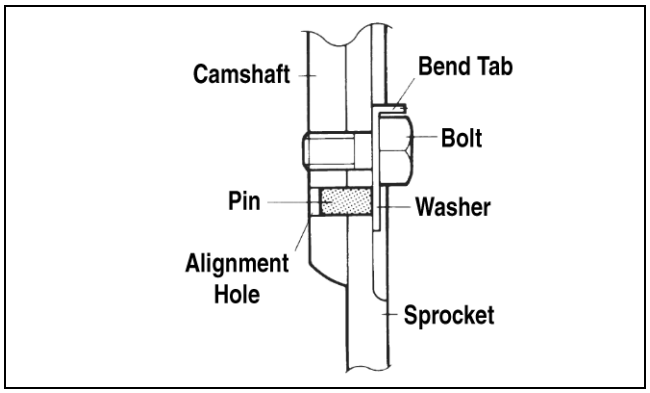
■NOTE: Note the position of the alignment marks on the end of the camshaft. They must be parallel with the valve cover mating surface. If rotating the camshaft is necessary for alignment, do not allow the chain and sprocket to rotate and be sure the cam lobes end up in the down position.

15. When the camshaft assembly is seated, ensure the following.
    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 13 and carefully proceed.

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

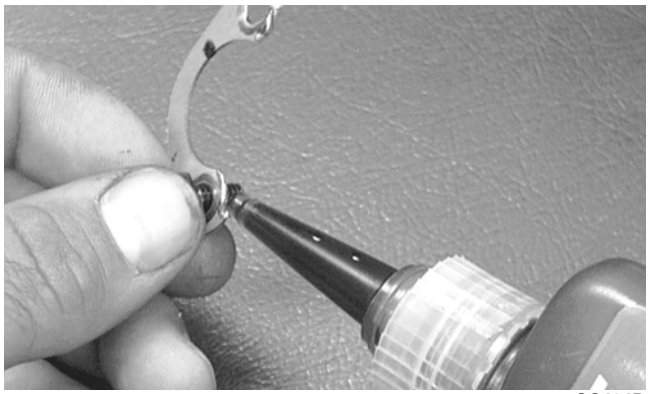


MD1363

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.

17. Apply red Loctite #271 to the first cap screw securing the sprocket and tab washer to the camshaft; then install the cap screw and tab washer. Tighten cap screw only until snug.



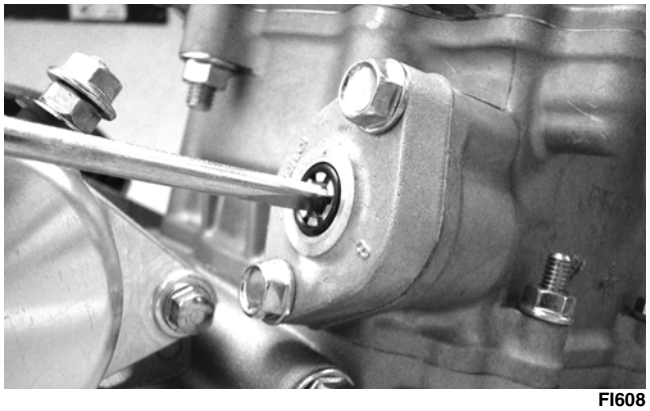
CC404D

FI612

18. 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). Tighten to 11 ft-lb; then bend the tab to secure the cap screw.

3

19. Rotate the crankshaft until the first cap screw (from step 17) securing the sprocket to the camshaft can be addressed; then tighten to 11 ft-lb. Bend the tab to secure the cap screw.
20. Install the cylinder head plug with the cupped end facing the camshaft and the opening directed downwards.
21. Place the cam chain tensioner assembly and gasket into the cylinder. Tighten to 10 ft-lb.
22. Using a flat-blade screwdriver, turn the tensioner screw counterclockwise to apply tension to the cam chain; then install the cap screw plug and washer and tighten securely.

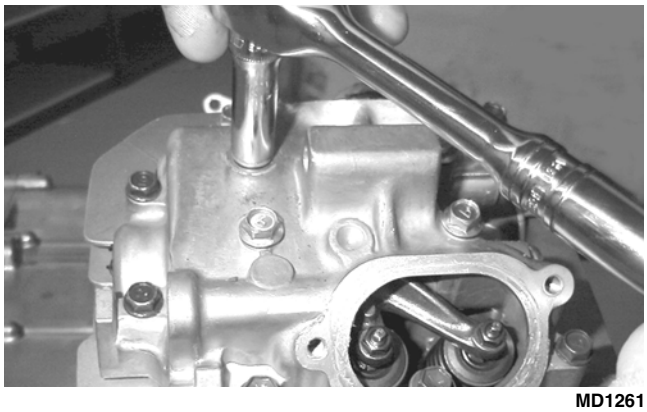


FI608

23. Loosen the adjuster screw jam nuts; then loosen the adjuster screws on the rocker arms in the valve cover.
24. Apply a thin coat of Three Bond Sealant to the mating surface of the valve cover; then place the valve cover into position. Note that the two alignment pins are properly positioned.

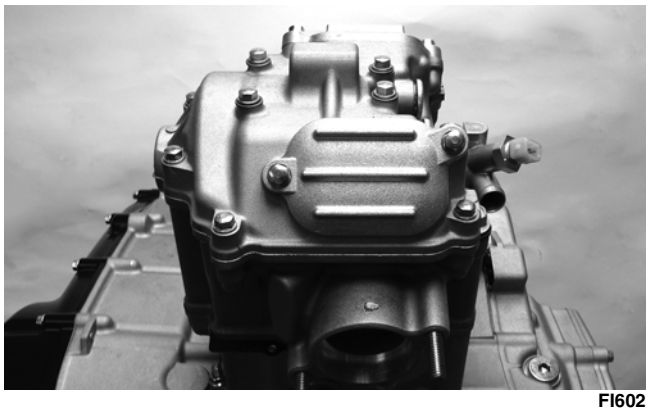
■NOTE: At this point, the rocker arms and adjuster screws must not have pressure on them.

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



MD1261

26. In a crisscross pattern starting from the center and working outward, tighten the cap screws (from step 27) to 8 ft-lb.
27. Adjust valve/tappet clearance (see Section 2).
28. Place the two tappet covers with O-rings into position; then install and tighten the cap screws to 8 ft-lb.



FI602

29. Install the spark plug and tighten securely; then install the timing inspection plug.

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.

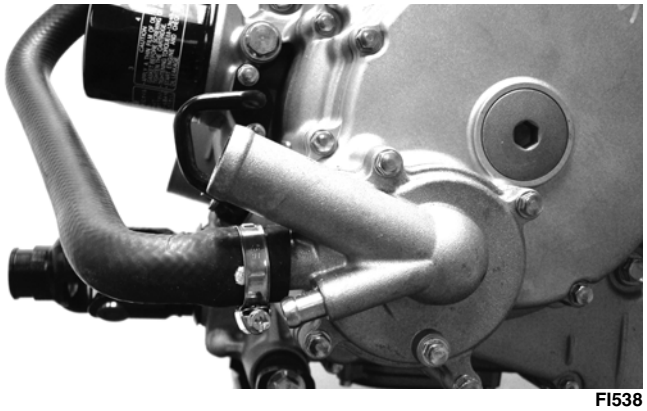
☞ AT THIS POINT
To service any one specific component, only limited disassembly of components may be necessary. Note the AT THIS POINT information in each sub-section.

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

Removing Left-Side Components

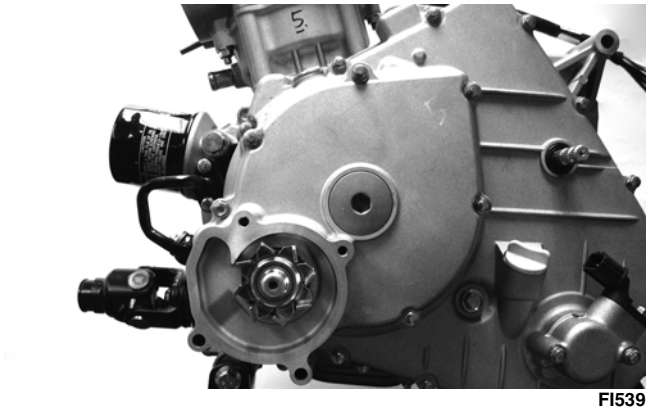
A. Water Pump
B. Speed Sensor
C. Magneto Cover/ Stator Assembly

1. Remove the coolant hose connecting the water pump to the cylinder; then remove the water pump cover.

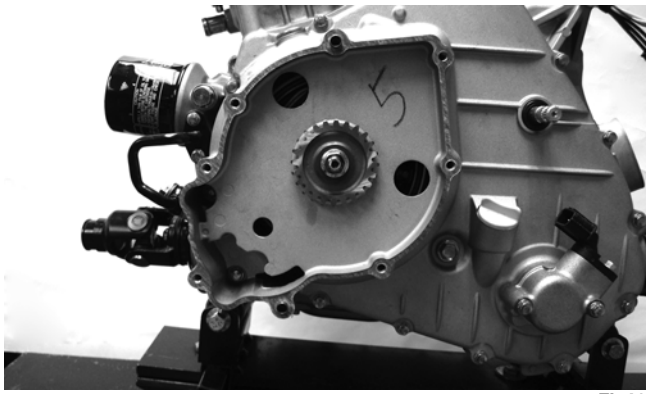


FI538

2. Remove the water pump housing assembly noting the location of the longer cap screw. Account for a gasket and two alignment pins.

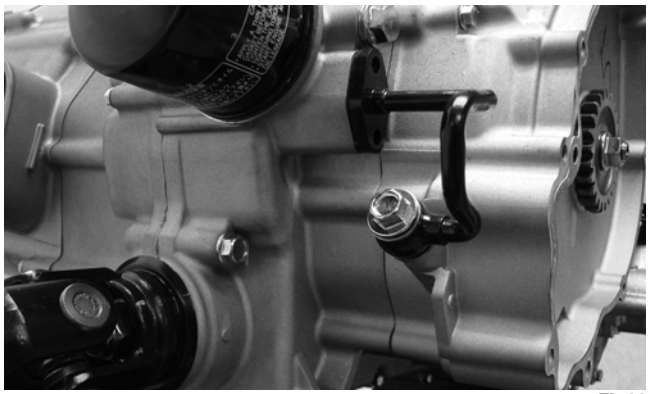


FI539



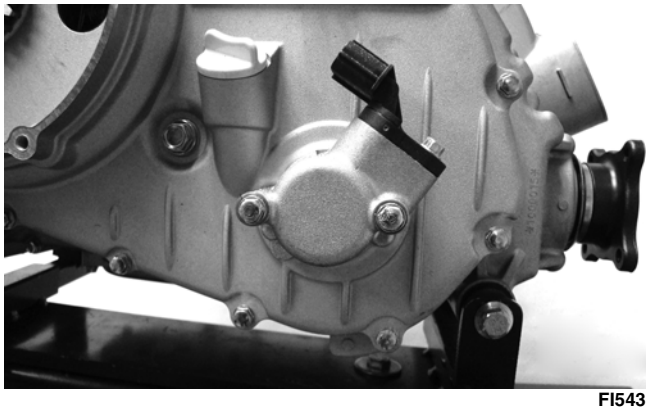
FI541

3. Remove two cap screws and the oil bolt securing the oil pressure relief line to the engine. Account for two crush washers and an O-ring.



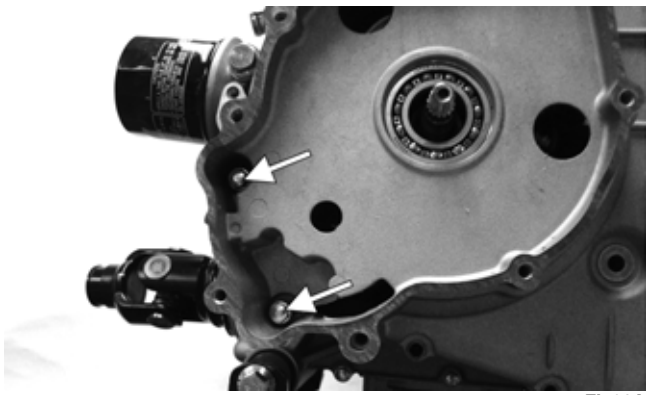
FI544

4. Remove the water pump drive gear; then remove the speed sensor housing assembly. Account for two alignment pins, a gasket, and two seal washers.



FI543

5. Remove the cap screws securing the magneto cover to the crankcase. Note the location of the two internal cap screws and the two longer cap screws.



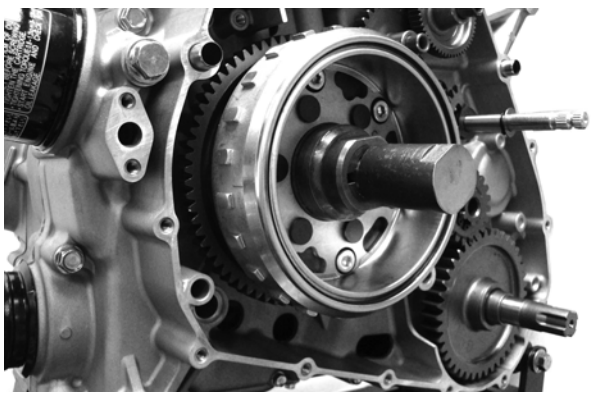
FI596A

6. Remove the magneto cover and account for two alignment pins and the gasket.

D. Rotor/Flywheel
E. Starter Clutch/Gear
F. Starter Motor

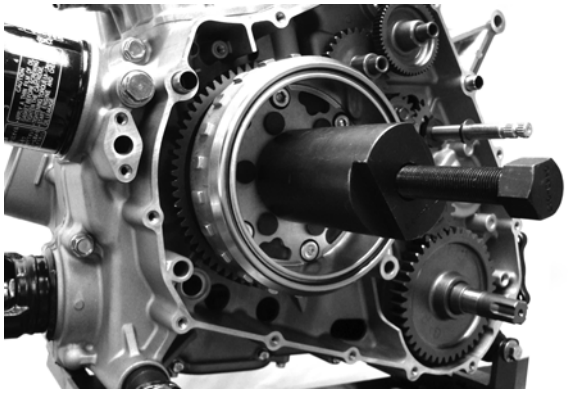
■NOTE: Steps 1-6 in the preceding sub-section must precede this procedure.

7. Remove the nut securing the rotor/flywheel on the crankshaft and install the crankshaft protector.



FI549

8. Using the Magneto Rotor Remover Set, break the rotor/flywheel loose from the crankshaft; then remove the puller and crankshaft protector and remove the rotor/flywheel.

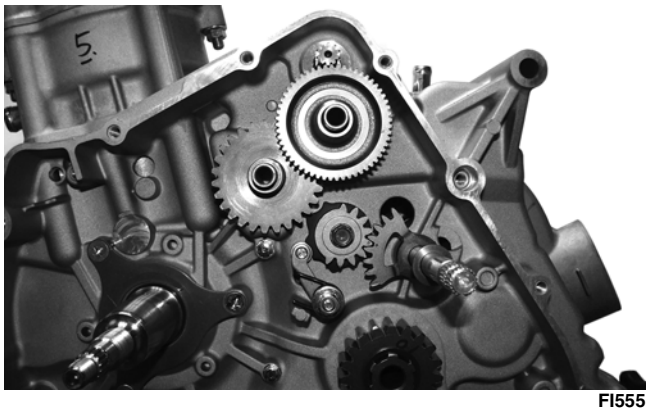


FI550

9. Remove the flywheel key from the crankshaft; then remove the starter clutch gear.

FI551A

10. Remove starter idler gears and their respective shafts; then remove the starter motor. Account for an O-ring on the starter drive housing.



FI555

G. Shift Shaft
H. Drive Gear

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

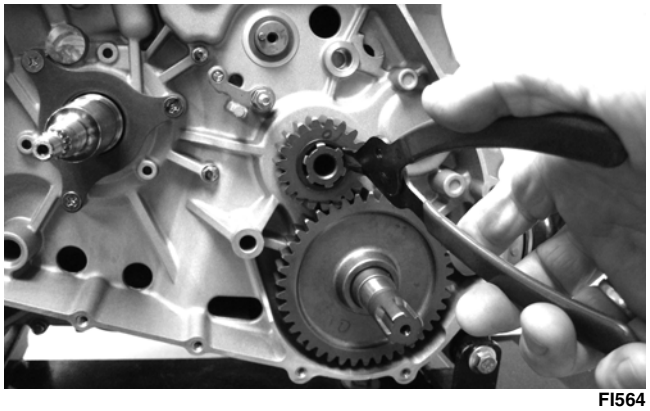
11. Remove the shift shaft noting a washer on each end; then remove the cap screw securing the gear shift cam plate and remove the plate from the shaft.

FI559

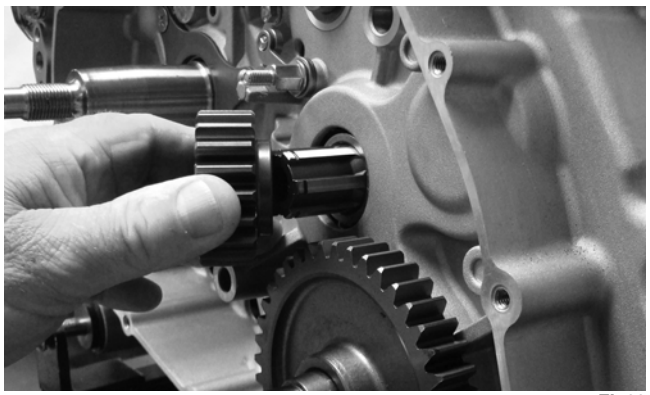
12. Remove the shift detent cam arm and spring.

FI560

13. Remove the snap ring securing the output drive gear to the output shaft and remove the gear noting that the hub flange is directed toward the crankcase.



FI564



FI566

Servicing Left-Side Components

INSPECTING STARTER CLUTCH/GEAR

1. Place the starter clutch gear onto the rotor/flywheel and attempt to rotate the starter clutch gear clockwise. It should lock up to the rotor/flywheel. Rotate the gear counterclockwise and it should turn freely. If it moves or locks up both ways, the starter clutch must be replaced.
2. Inspect the starter clutch gear for chipped or missing teeth or discoloration/scoring of the clutch surface. Inspect the bearing for loose, worn, or discolored rollers. If bearing is damaged, it must be replaced.

FI569

3. Inspect the one-way bearing for chipped surfaces, missing rollers, or discoloration. If any of the above conditions exist, replace the starter clutch assembly.

FI572

REPLACING STARTER CLUTCH ASSEMBLY

1. Remove the cap screws securing the one-way clutch assembly to the flywheel; then remove from the flywheel.

FI570

2. Thoroughly clean the rotor/flywheel; then install the new one-way clutch and secure with the cap screws after applying a drop of red Loctite #271 to the threads. Tighten to 26 ft-lb using a crisscross pattern. Make sure the one-way bearing is installed with the notches directed away from the rotor/flywheel.

FI576A

FI578

REPLACING STARTER GEAR BEARING

1. Support the starter clutch gear in a press making sure to support the hub around the entire circumference; then using a suitable bearing driver, press the bearing from the gear.

FI583

2. Thoroughly clean the gear hub; then apply a drop of green Loctite #620 to the bearing outer race and press into the gear hub until even with the lower chamfer radius.

FI580

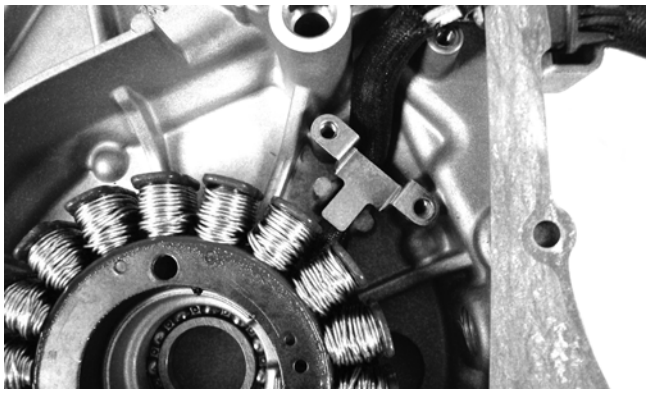
INSPECTING STATOR/MAGNETO COVER ASSEMBLY

1. Inspect the stator for burned or discolored wiring, broken or missing hold-down clips, or loose cap screws.
2. Inspect the bearings in the magneto housing for discoloration, roughness when rotated, and secure fit in bearing bores.
3. Inspect the oil pressure relief valve for evidence of metal chips or contamination. Do not disassemble the valve.

FI588

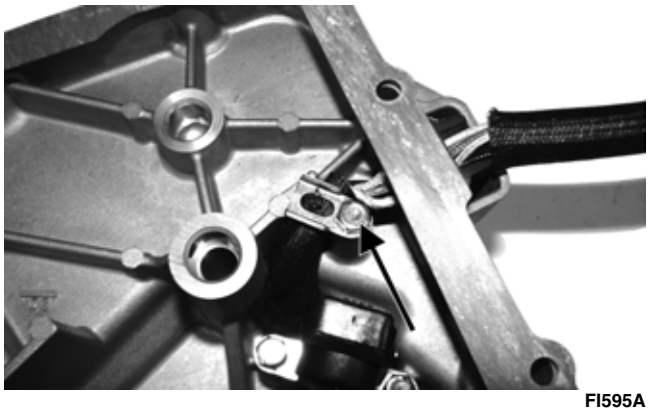
REPLACING STATOR/ CRANKSHAFT POSITION SENSOR

1. Remove the three cap screws securing the stator coil, two cap screws securing the crankshaft position sensor, and one cap screw from the harness hold-down.
2. Lift the rubber grommet out of the housing; then remove the stator coil/crankshaft position sensor. Account for and note the position of the harness hold-down under the crankshaft position sensor.



FI590

3. Install the new stator assembly and secure with three cap screws using a drop of red Loctite #271 on each. Tighten to 8 ft-lb.
4. Place the stator wire harness hold-down into position; then install the crankshaft position sensor and secure with two cap screws. Tighten securely.
5. Install the upper cable hold-down and secure with a cap screw. Tighten securely.



FI595A

REPLACING MAGNETO COVER BEARINGS

1. Using a suitable press and proper support, press the bearing from the housing as indicated (one from outside and one from inside).

FI593

FI594

2. Clean the bearing bores in the housing and inspect closely for cracks or shiny areas indicating bearing movement. Replace the housing if any of the above are evident.
3. With a drop of red Loctite #271 around the bearing bore, press a new bearing into the magneto cover until the bearing is firmly seated in the bearing bore.

Installing Left-Side Components

A. Starter Clutch/Gear
B. Rotor/Flywheel

1. If removed, place the crankshaft bearing retainer into position. Apply red Loctite #271 to the three cap screws. Install and tighten the three cap screws securely.

MD1122

2. Install the starter motor and tighten the two cap screws securely.
3. Install the shift detent cam making sure the washer is installed.

MD1086

4. Install the shift detent cam arm and spring.
5. Install the gear shift shaft assembly and washer making sure to align the alignment marks.

FI559

6. Install starter idler gears (1) and (2).

FI555A

7. Install the starter clutch gear onto the crankshaft; then install the rotor/flywheel key in the crankshaft.

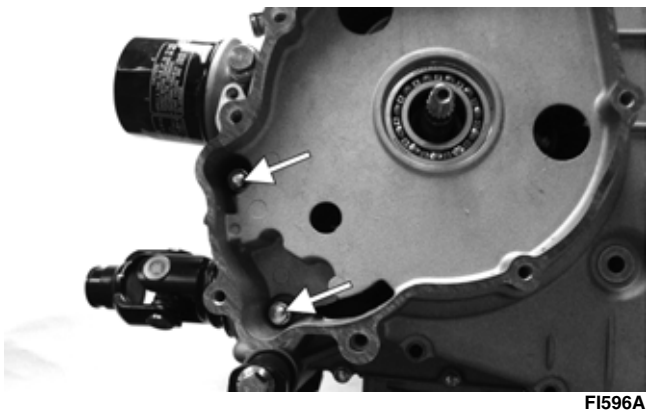

FI551A

8. Install the rotor/flywheel and secure with the flange nut. Tighten to 107 ft-lb.

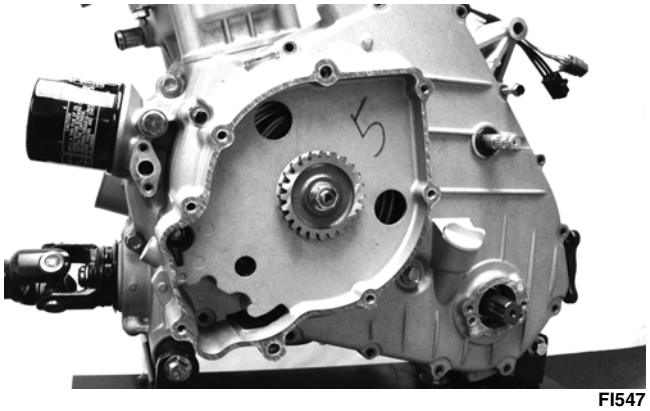
C. Magneto Cover
D. Water Pump

■NOTE: Steps 1-8 in the preceding sub-section must precede this procedure.

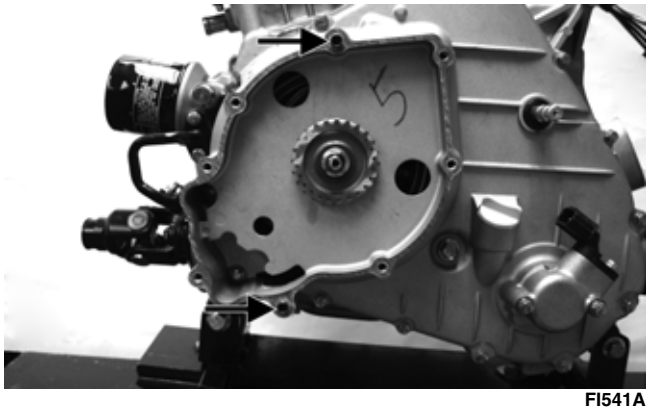
9. Install two alignment pins and place the magneto cover gasket into position. Install the magneto cover. Noting the different-lengthed 6 mm cap screws and the location of the two internal cap screws, tighten cap screws in a crisscross pattern to 8 ft-lb.

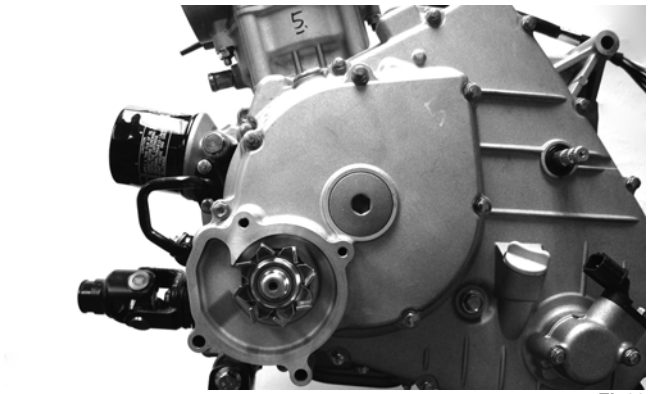

FI596A

10. Install the water pump drive gear and secure with the nut using red Loctite #271. Tighten to 28 ft-lb.

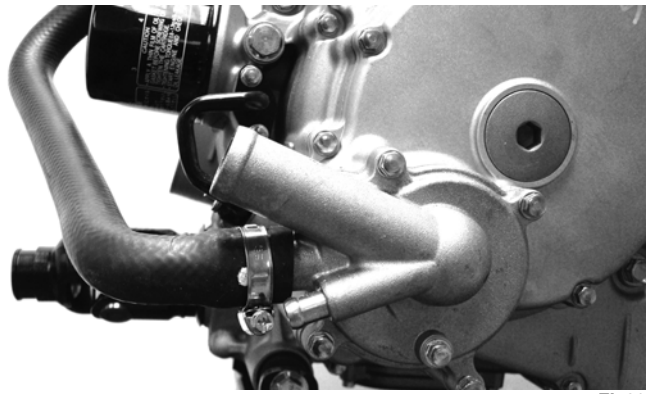

FI547

11. Install two alignment pins and a gasket on the magneto cover; then install the water pump housing assembly. Tighten the cap screws to 8 ft-lb.


FI541A


FI539

12. Install the water pump cover with a new O-ring and secure with the four cap screws. Tighten to 8 ft-lb.


FI538

13. Connect the coolant hoses to the water pump and secure with the hose clamps. Tighten securely.

Right-Side Components

☞ AT THIS POINT

To service center crankcase components only, proceed to Removing 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

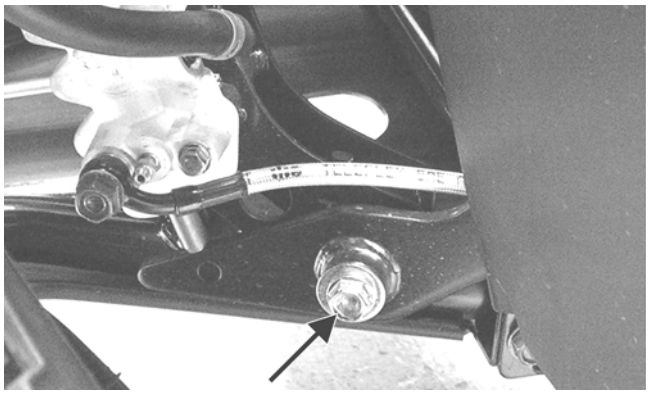
To service any one specific component, only limited disassembly of components may be necessary. Note the AT THIS POINT information in each sub-section.

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

Removing Right-Side Components

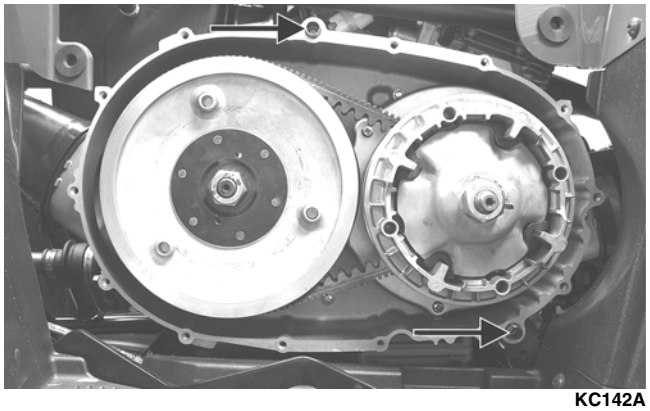
A. V-Belt Cover
B. Driven Pulley
C. Clutch Cover

1. If the engine is still in the frame, remove the cap screw securing the brake pedal to the pivot shaft. Account for a flat washer.



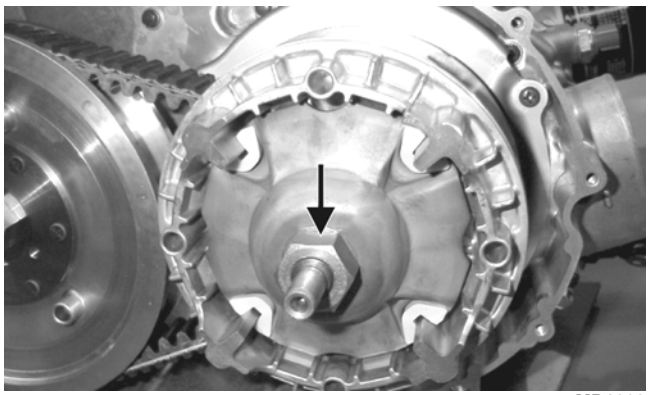
KC149A

2. Remove the cap screws securing the V-belt cover to the clutch cover; then slide the brake pedal outward and remove the V-belt cover. Account for two alignment pins and a gasket.



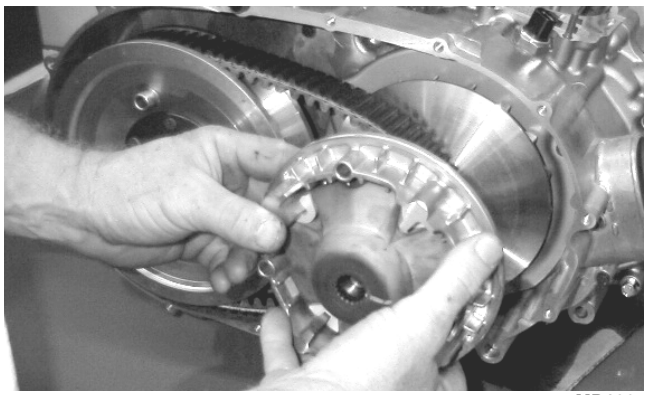
KC142A

3. Mark the movable drive face and the fixed drive face for installing purposes; then remove the nut holding the movable drive face onto the crankshaft.

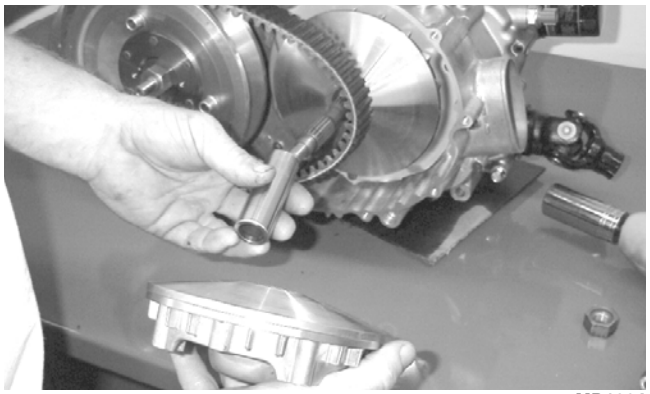


MD1033

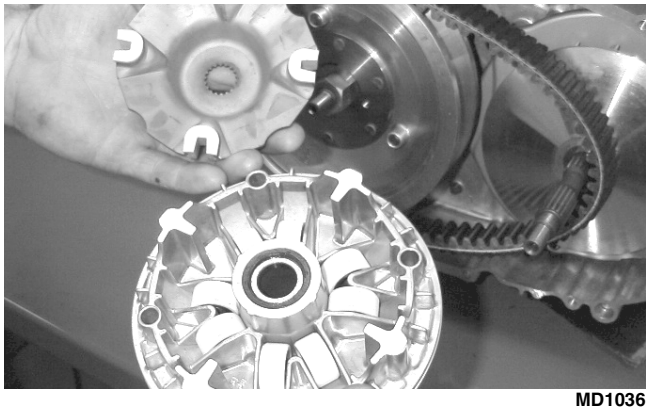
4. Remove the movable drive face and spacer. Account for the movable drive face rollers and outer drive face cover.



MD1035

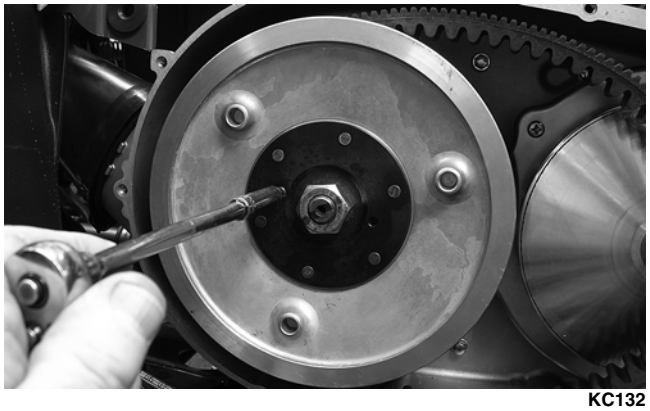


MD1034



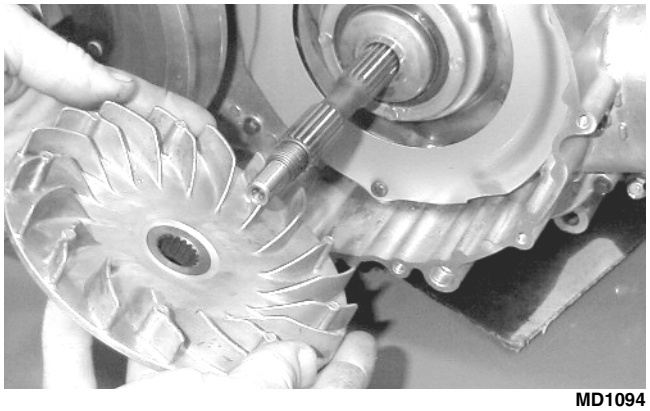
MD1036

5. Using a 6 mm cap screw threaded into the fixed driven face, spread the driven pulley by turning the cap screw clockwise; then remove the V-belt.



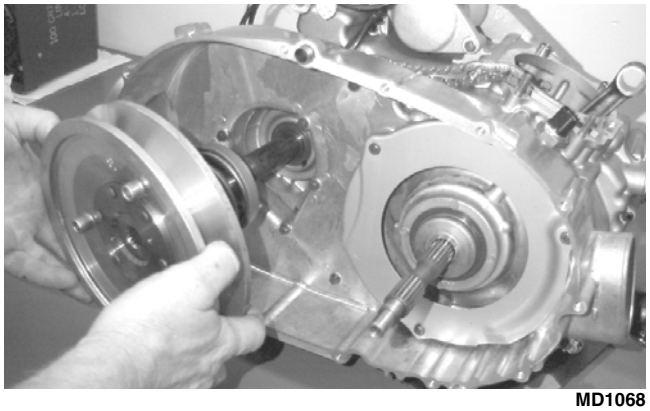
KC132

6. Remove the fixed drive face.



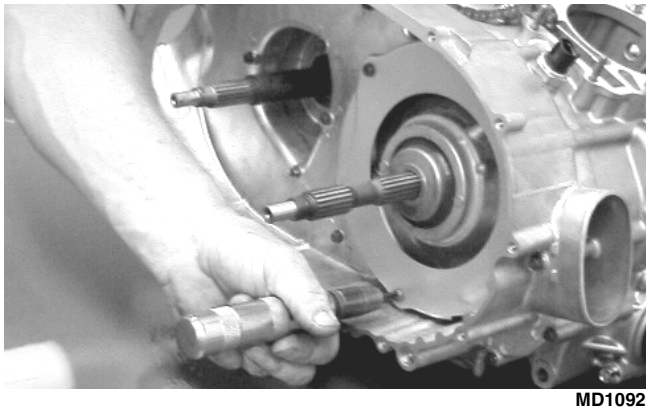
MD1094

7. Remove the nut holding the driven pulley assembly; then remove the driven pulley assembly.



MD1068

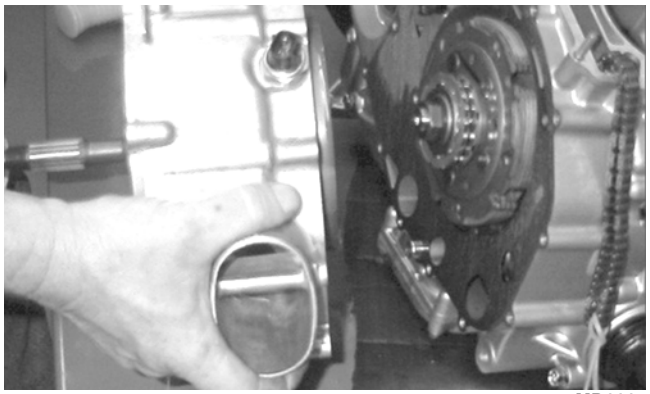
8. Using an impact screwdriver, remove the three Phillips-head cap screws holding the air intake plate. Remove the air intake plate.



MD1092

9. Remove the cap screws holding the clutch cover onto the right-side crankcase half. Note the positions of the different-lengthed cap screws for installing purposes.

10. Using a rubber mallet, loosen the clutch cover; then pull it away from the right-side crankcase half. Account for two alignment pins and gasket.



MD1115

D. Centrifugal Clutch Assembly
E. Oil Pump Drive Gear
F. Oil Pump Driven Gear

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

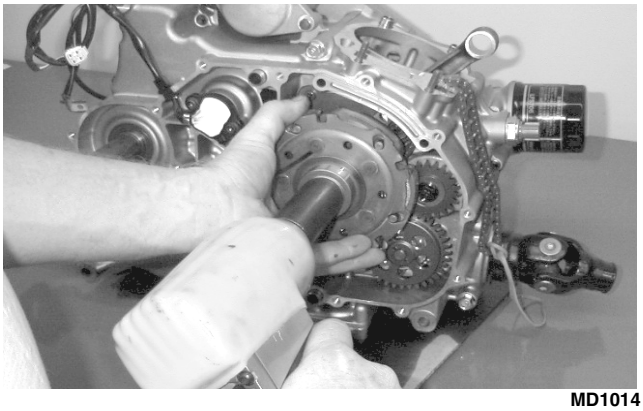
11. Remove the one-way clutch noting the direction of the green dot or the word OUTSIDE for installing purposes.

MD1286

12. Remove the left-hand threaded nut holding the centrifugal clutch assembly.

CAUTION

Care must be taken when removing the nut; it has "left-hand" threads.



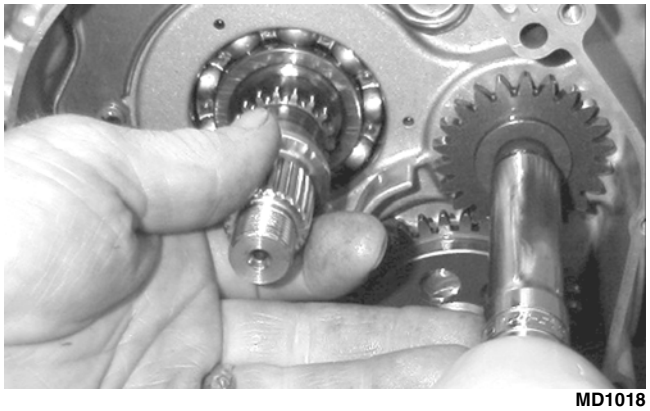
MD1014

MD1016

13. Remove the cam chain.

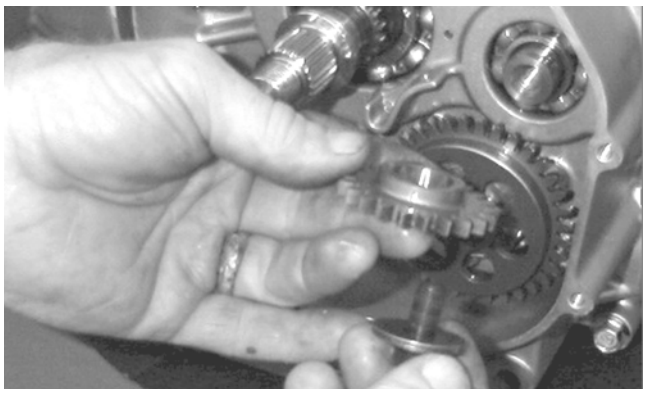
FI630

14. Remove the oil pump drive gear cap screw.



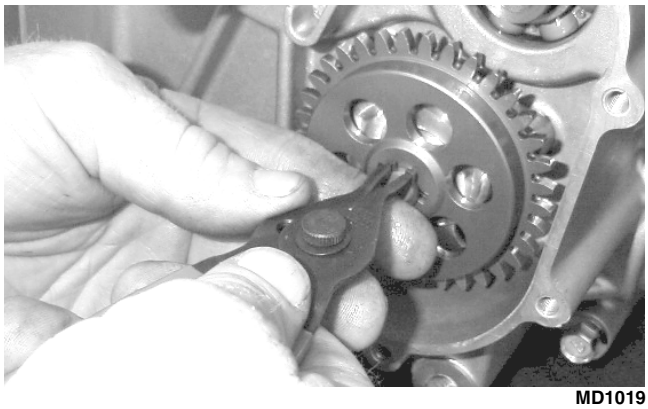
MD1018

15. Remove oil pump drive gear. Account for the pin.



MD1017

16. Remove the snap ring holding the oil pump driven gear.

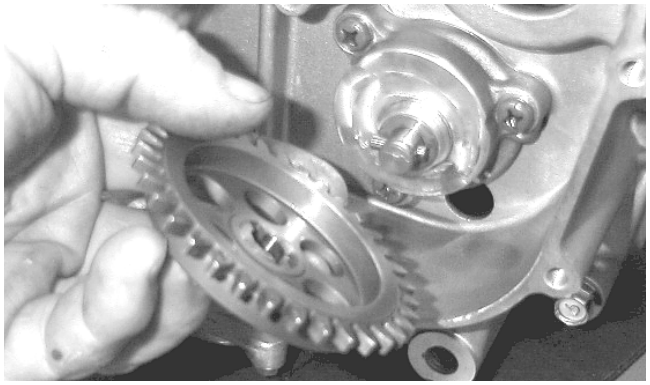


MD1019

3

■NOTE: Always use a new snap ring when installing the oil pump driven gear.

17. Remove oil pump driven gear. Account for the drive pin and thrust washer.



MD1020

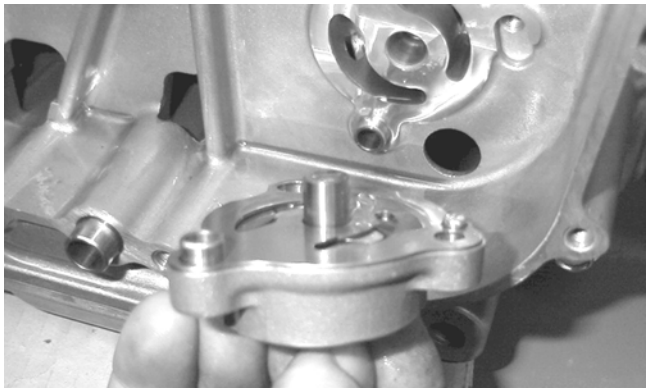
☞ AT THIS POINT

To service clutch components, see Servicing Right-Side Components sub-section.

G. Oil Pump/Oil Strainer

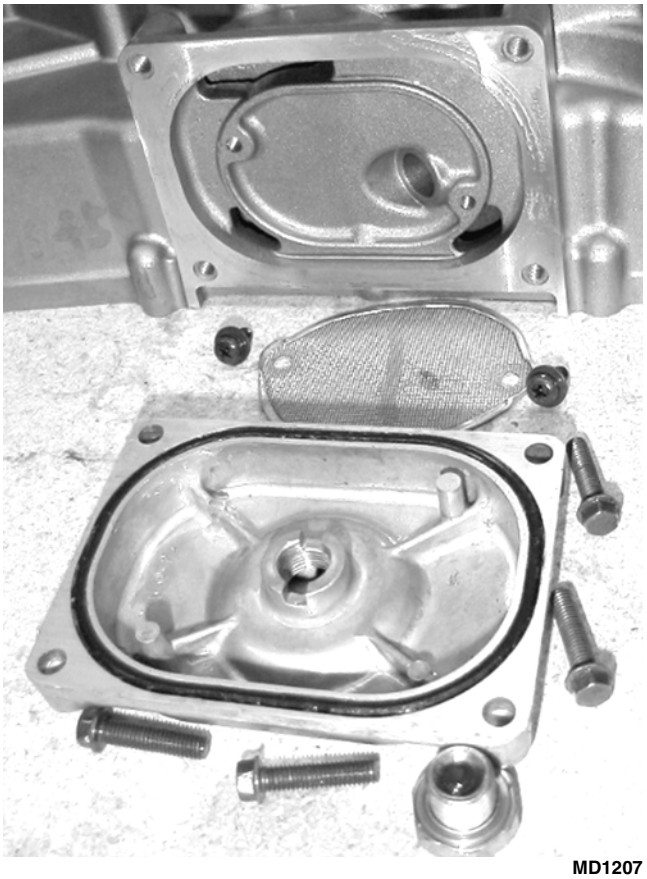
■NOTE: Steps 1-17 in the preceding sub-sections must precede this procedure.

18. Remove three cap screws holding the oil pump and remove the oil pump. Account for two alignment pins.



MD1060

19. Remove the four cap screws securing the oil strainer cap; then remove the Phillips-head screws securing the oil strainer. Account for the O-ring.



MD1207

☞ AT THIS POINT

To service center crankcase components only, proceed to Separating Crankcase Halves.

Servicing Right-Side Components

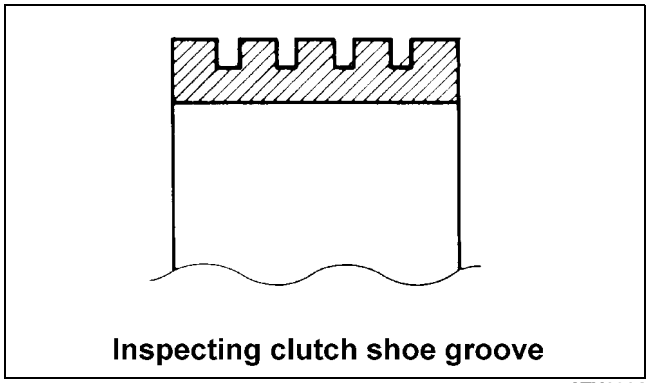
■NOTE: Whenever a part is worn excessively, cracked, damaged in any way, or out of tolerance, replacement is necessary.

INSPECTING CENTRIFUGAL CLUTCH SHOE

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

CAUTION

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



Inspecting clutch shoe groove

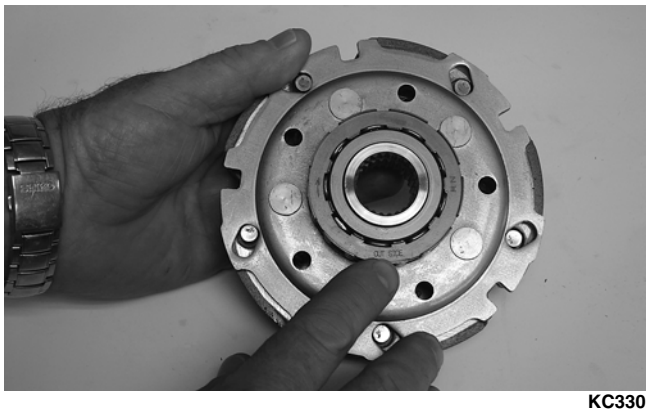
ATV1014

INSPECTING CENTRIFUGAL CLUTCH HOUSING

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

INSPECTING PRIMARY ONE-WAY DRIVE

1. Place the one-way clutch onto the clutch shoe assembly with the green dot or the word "OUTSIDE" directed away from the clutch shoe.



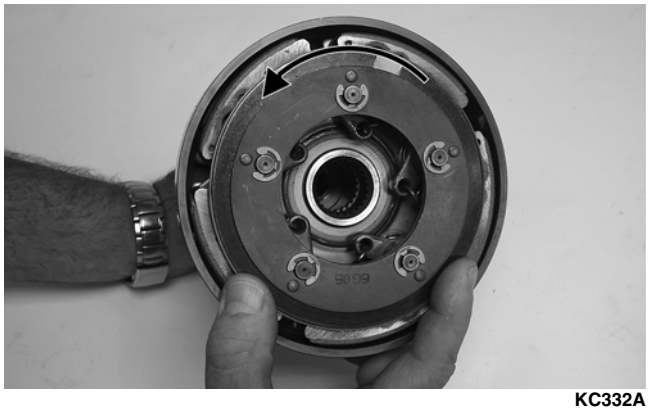
KC330

2. Place the clutch housing onto the clutch shoe/one-way clutch.

■NOTE: It will be necessary to rotate the clutch housing counterclockwise to properly seat the one-way clutch.

KC331A

3. Check that the clutch shoe can only be rotated counterclockwise in respect to the clutch housing. If the clutch shoe locks up or turns in both directions, the one-way clutch must be replaced.



KC332A

INSPECTING OIL PUMP

1. Inspect the pump for damage.
2. It is inadvisable to remove the screw securing the pump halves. If the oil pump is damaged, it must be replaced.

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

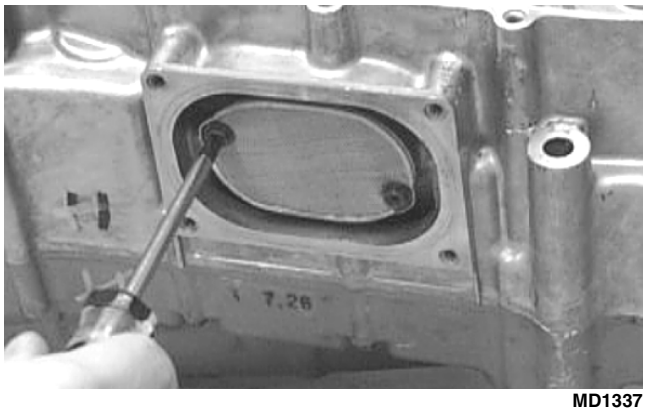
DRIVEN PULLEY ASSEMBLY

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

Installing Right-Side Components

A. Oil Strainer/Oil Pump

1. Place the oil strainer into position beneath the crankcase. Tighten the Phillips-head screws (coated with red Loctite #271) securely.

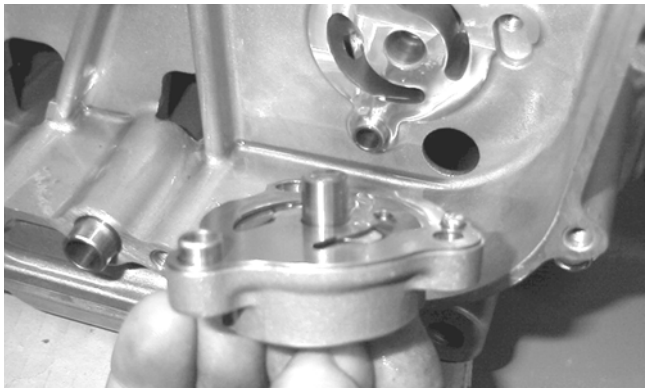


MD1337

2. Place the strainer cap into position on the crankcase making sure the O-ring is properly installed and secure with the four cap screws; then tighten the oil drain plug to 16 ft-lb.

MD1208

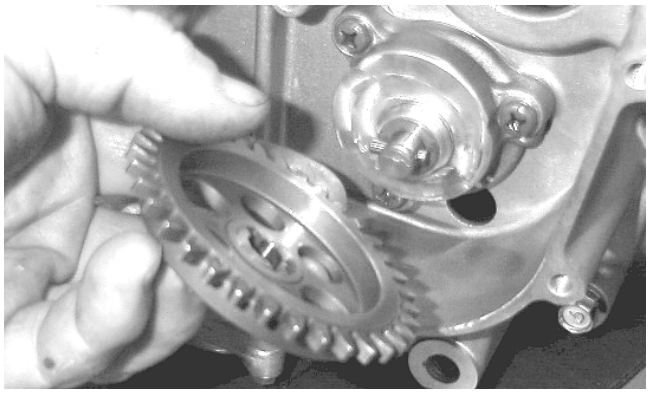
3. Place two alignment pins and the oil pump into position on the crankcase and secure with the Phillips-head screws coated with red Loctite #271. Tighten to 8 ft-lb.



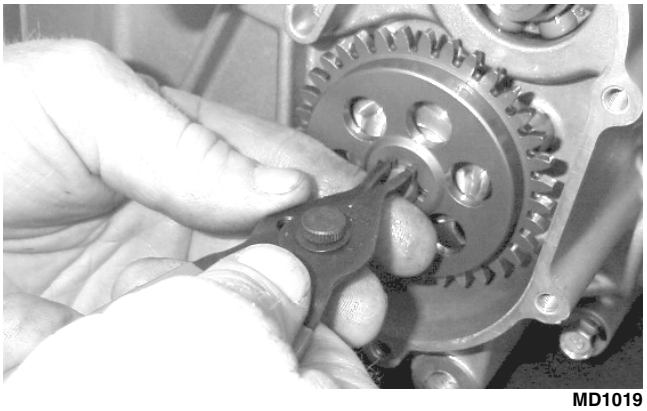
MD1060

4. Place the thrust washer and drive pin into position on the oil pump shaft, install the oil pump driven gear making sure the recessed side of the gear is directed inward, and secure with a new snap ring.

■NOTE: Always use a new snap ring when installing the oil pump driven gear.



MD1020



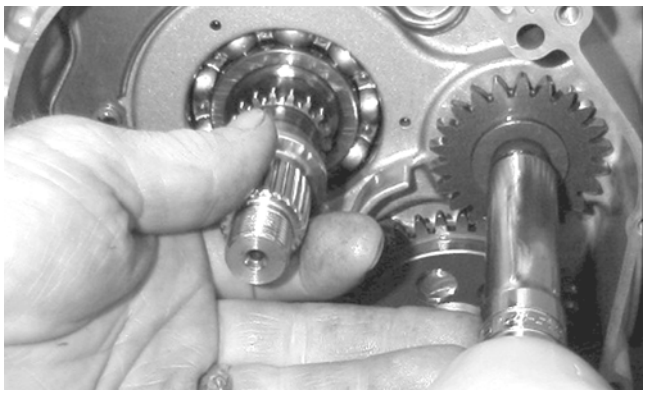
MD1019

5. Install the cam chain.

■NOTE: Keep tension on the cam chain to avoid damaging the crankcase boss.

6. Place the pin into position, install the oil pump drive gear, and tighten the cap screw (coated with red Loctite #271) to 63 ft-lb.

MD1017



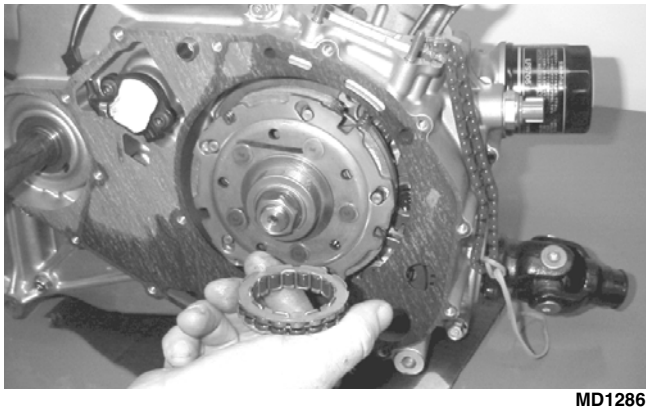
MD1018

7. Install the clutch shoe assembly on the crankshaft; then install the flange nut (left-hand thread) (coated with red Loctite #271). Tighten to 147 ft-lb.

■NOTE: The flat side of the flange nut should be directed towards the clutch shoe.

CAUTION
Care must be taken when installing the flange nut; it has “left-hand” threads.

8. Install the one-way clutch making sure that the green dot or the word OUTSIDE is directed away from the crankcase.

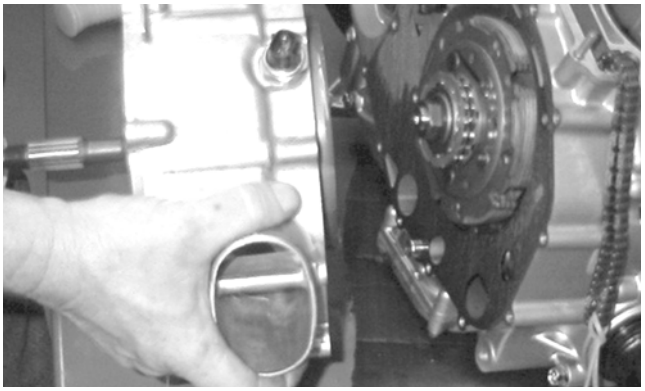


MD1286

B. Clutch Cover
C. Fixed Drive Face
D. Movable Drive Face

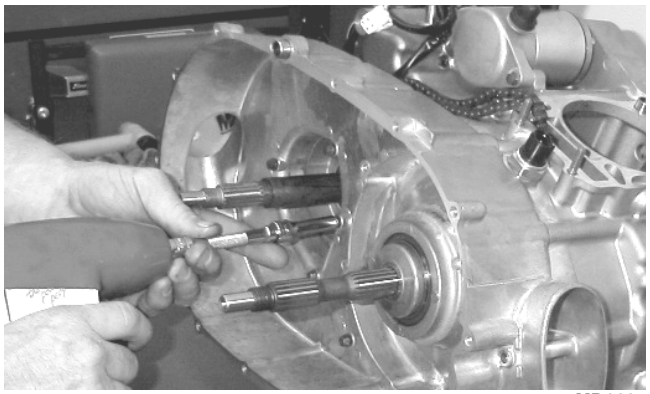
■NOTE: Steps 1-8 in the preceding sub-section must precede this procedure.

9. Install two alignment pins and place the clutch cover gasket into position. Install the clutch cover.



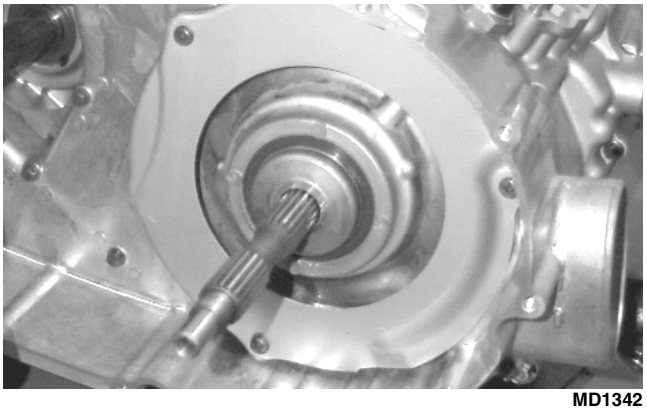
MD1115

10. Tighten the clutch cover cap screws to 8 ft-lb.



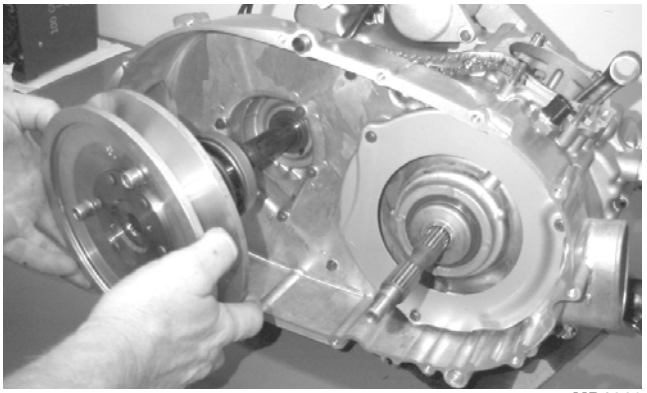
MD1117

11. Install the air intake plate. Apply red Loctite #271 to the threads of the three Phillips-head cap screws; then install and tighten securely.

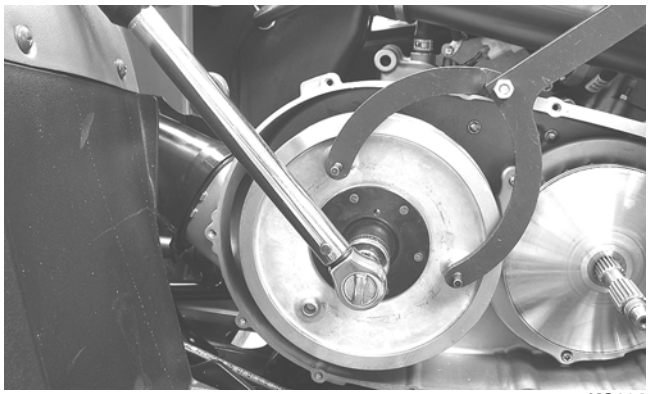


MD1342

12. Place the driven pulley assembly into position and secure with the nut (threads coated with red Loctite #271). Tighten to 147 ft-lb.



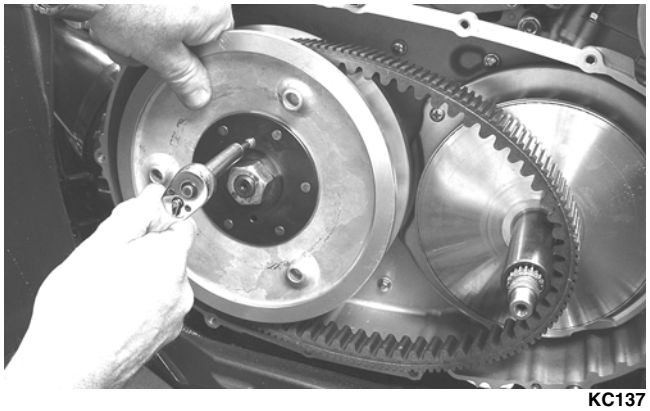
MD1068



KC134

13. Slide the fixed drive face assembly onto the front shaft.

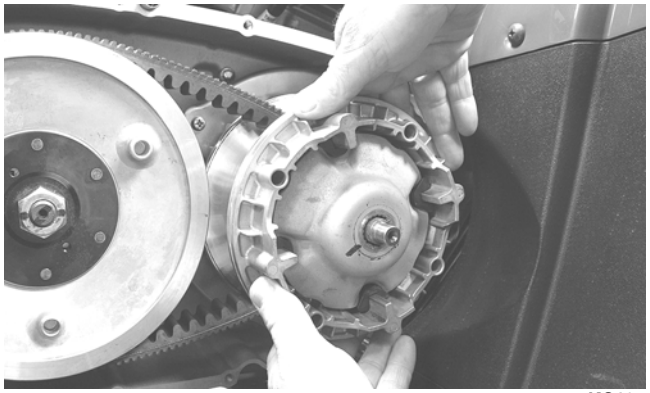
14. Spread the faces of the driven pulley by threading a V-belt cover cap screw into the fixed driven face and tightening until the faces open sufficiently to allow the V-belt to drop into the pulley approximately 3/4 in.



KC137

■NOTE: The arrows on the V-belt should point in direction of engine rotation.

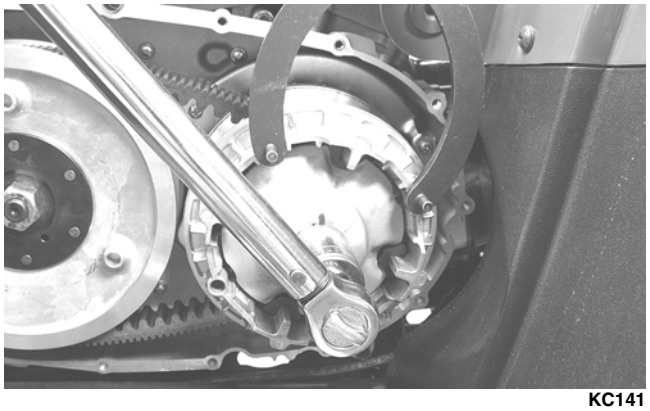
15. Making sure the movable drive face rollers are in position, pinch the V-belt together near its center and slide the spacer and movable drive face onto the shaft.



KC127

16. Coat the threads of the nut with red Loctite #271; then making sure the splines of the clutch shaft protrude through the cover plate, secure with the nut and tighten to 147 ft-lb.

KC138

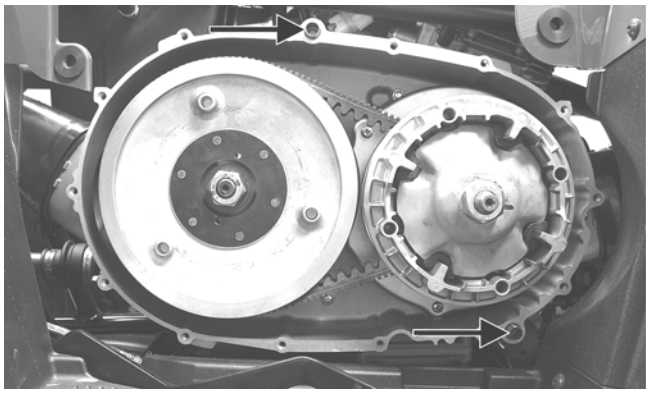


KC141

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

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

18. Install two alignment pins and place a new V-belt cover gasket into position on the clutch cover. In a crisscross pattern, tighten cap screws to 8 ft-lb.



KC142A

Center Crankcase Components

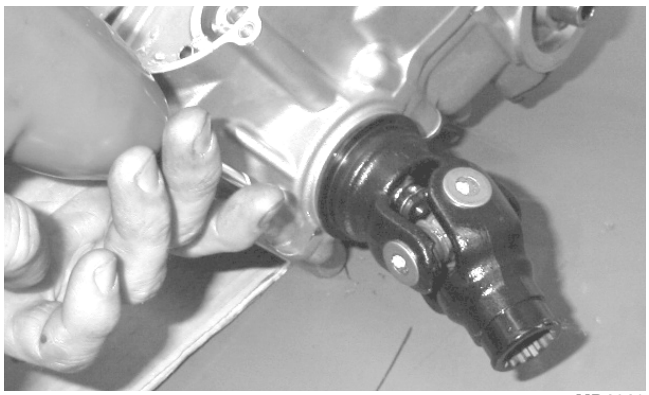
■NOTE: This procedure cannot be done with the engine/transmission in the frame. Complete Removing procedures for Top-Side, Left-Side, and Right-Side must precede this procedure.

■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

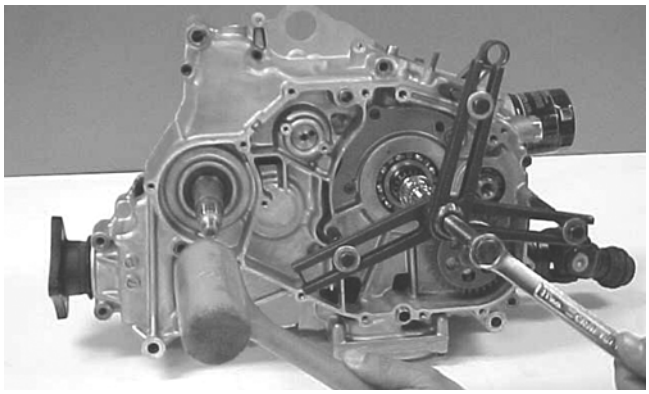
1. Remove the left-side and right-side cap screws securing the crankcase halves noting the position of the different-sized cap screws for joining purposes.

MD1006



MD1012

2. Using Crankcase Separator/Crankshaft Remover and tapping lightly with a rubber mallet, separate the crankcase halves. Account for two alignment pins.



CC869

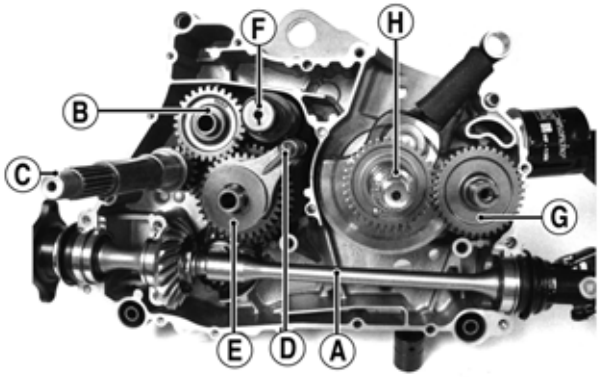
■NOTE: To keep the shaft/gear assemblies intact for identification, tap the shafts toward the left-side crankcase half when separating the halves.

MD1313

Disassembling Crankcase Half

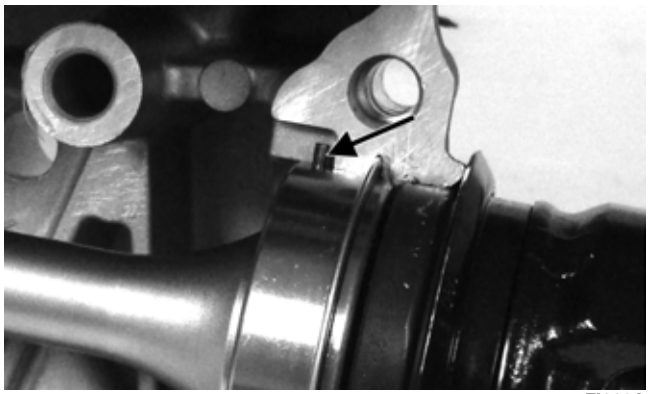
■NOTE: To aid in installing, it is recommended that the assemblies be kept together and in order.

■NOTE: For steps 1-6, refer to illustration FI639A.

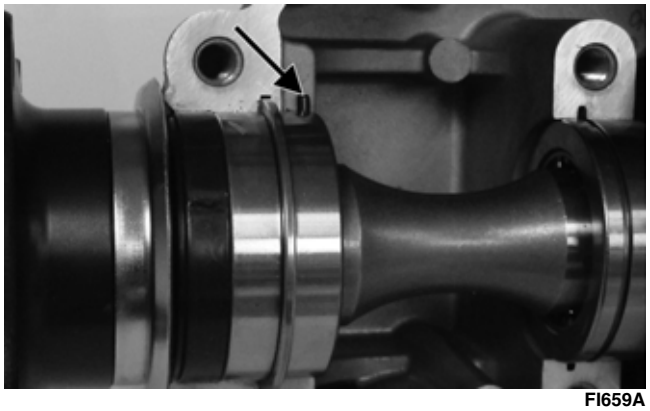


FI639A

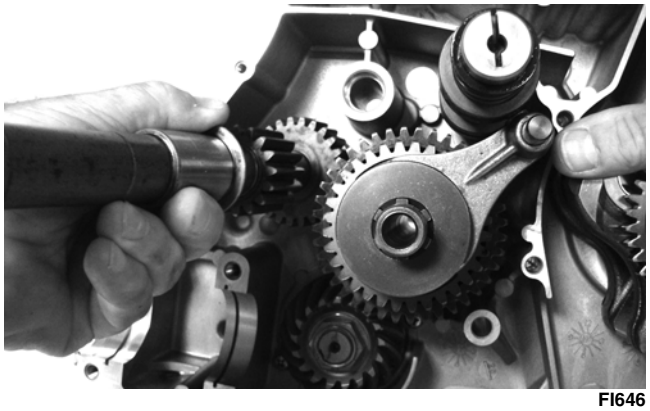
1. Remove the secondary driven shaft assembly (A) noting the location of the front and rear bearing locating pins and the center bearing locating ring.



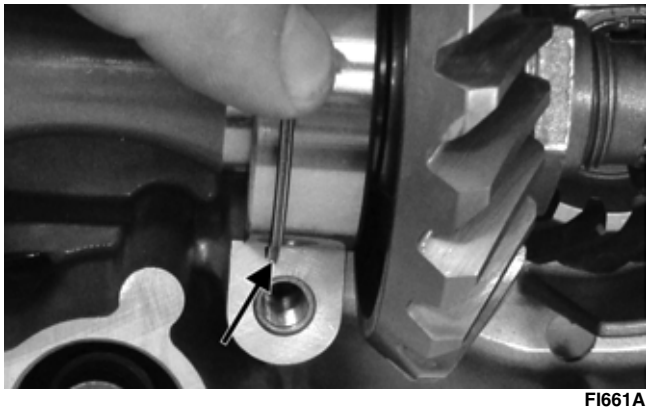
FI660A



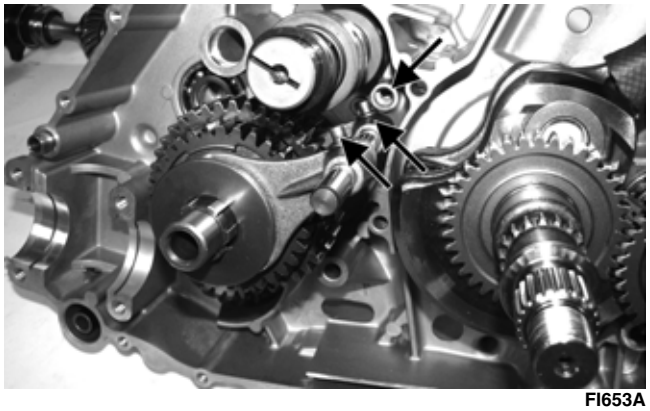
FI659A



FI646

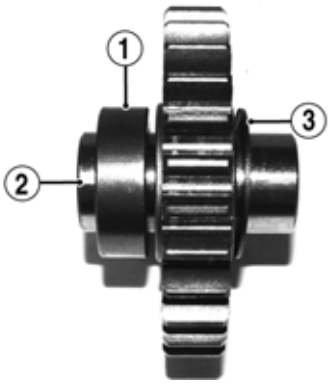


FI661A



FI653A

2. Remove the reverse idler assembly (B). Account for and note the location of the inner bushing (1), idler shaft (2), and outer washer (3).



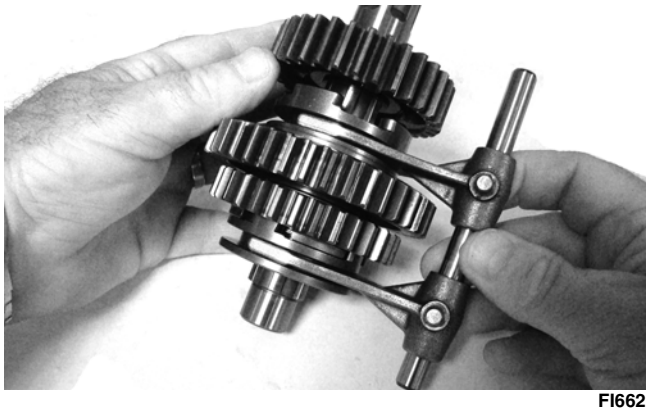
FI641A

3. Remove the driveshaft (C); then pull the shift fork locating shaft (D) out of the crankcase locating boss and allow the shift forks to disengage from the gear shift shaft (F).

4. Remove the gear shift shaft (F) noting the inner and outer washers.

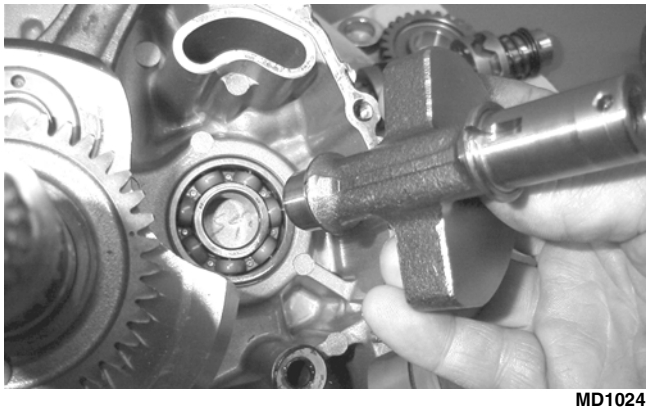
FI650A

5. Remove the countershaft assembly (E) along with the shift fork assembly.



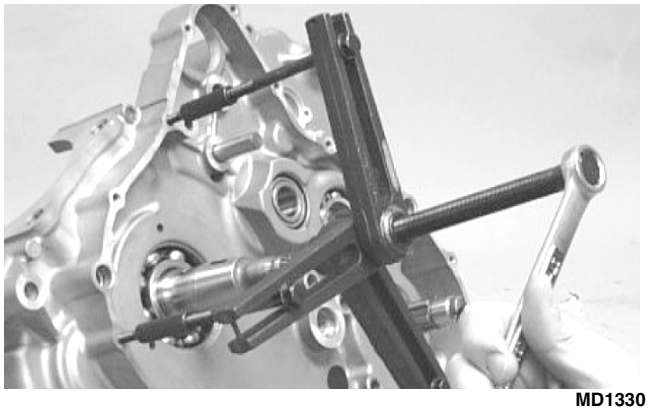
FI662

6. Remove the crank balancer driven gear (G) and account for a key; then remove the crankshaft balancer shaft.



MD1024

7. Using Crankcase Separator/Crankshaft Remover with the appropriate crankshaft protector, remove the crankshaft.



MD1330

CAUTION

Do not remove the remaining output shaft assembly unless absolutely necessary. If the shaft is removed, the shaft nut must be replaced with a new one and the shaft must be re-shimmed.

8. Remove the secondary drive gear/secondary driven gear retaining nut. From inside the crankcase using a rubber mallet, drive out the output shaft assembly. Account for the output shaft, a shim, a washer, and the nut.

☞ AT THIS POINT

To service crankshaft assembly, 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 indicator tip of the dial indicator on the secondary driven bevel gear (centered on the gear tooth).
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.

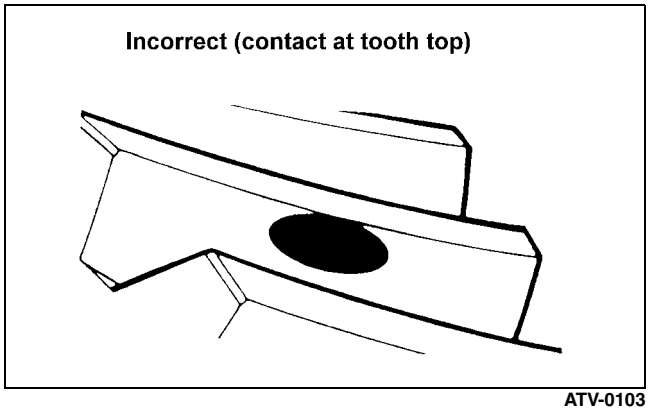
Backlash Measurement	Shim Correction
Under 0.05 mm (0.002 in.)	Decrease Shim Thickness
At 0.05-0.33 mm (0.002-0.013 in.)	No Correction Required
Over 0.33 mm (0.013 in.)	Increase Shim Thickness

Checking Tooth Contact

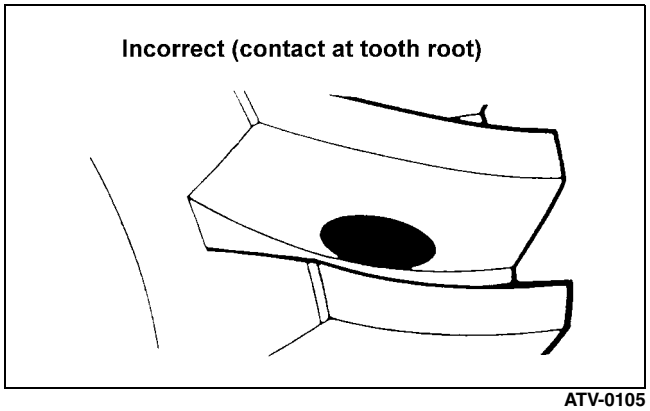
■NOTE: After correcting backlash of the secondary driven bevel gear, it is necessary to check tooth contact.

1. Remove the secondary driven output shaft assembly from the left-side crankcase half.

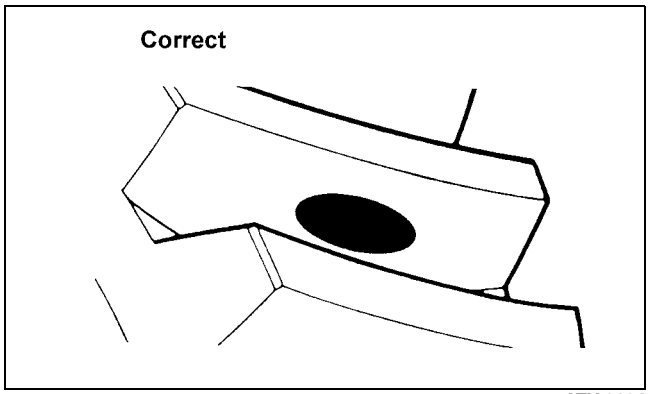
2. Clean the secondary driven bevel gear teeth of old oil and grease residue.
3. Apply a thin, even coat of a machinist-layout dye to several teeth of the gear.
4. Install the secondary driven output shaft assembly.
5. Rotate the secondary driven bevel gear several revolutions in both directions.
6. 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

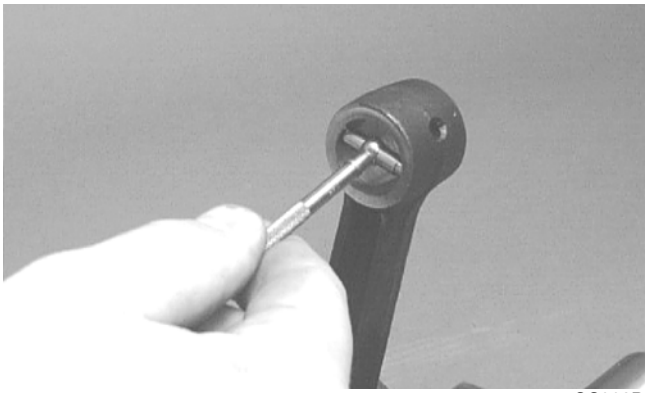
After correcting tooth contact, backlash must again be checked and corrected (if necessary). Continue the correcting backlash/correcting tooth contact procedures until they are both within tolerance values.

CRANKSHAFT ASSEMBLY

■NOTE: The crankshaft and connecting rod is a non-serviceable assembly. If any component is out of specification, the assembly must be replaced.

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

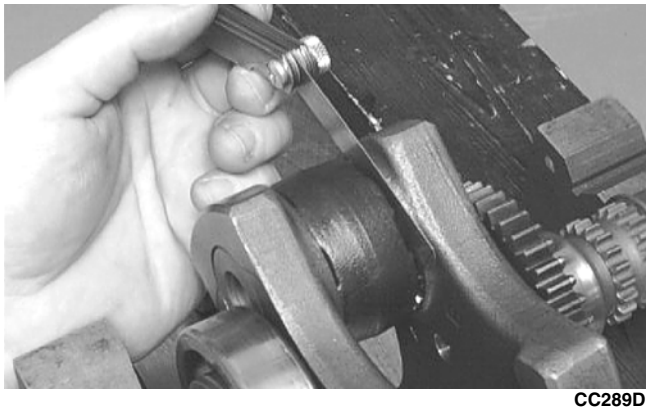
2. Maximum diameter must not exceed specifications.

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.

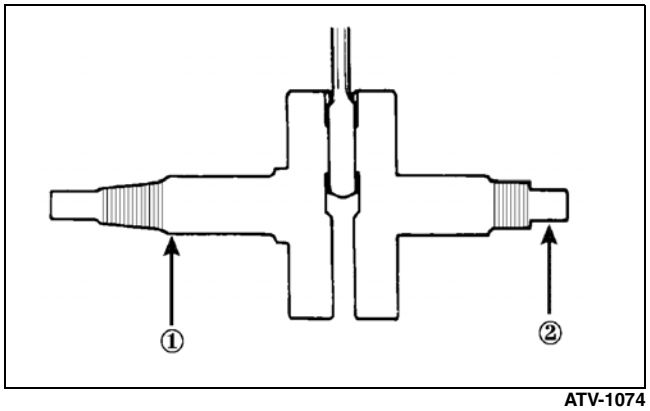


CC289D

3. Acceptable gap 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

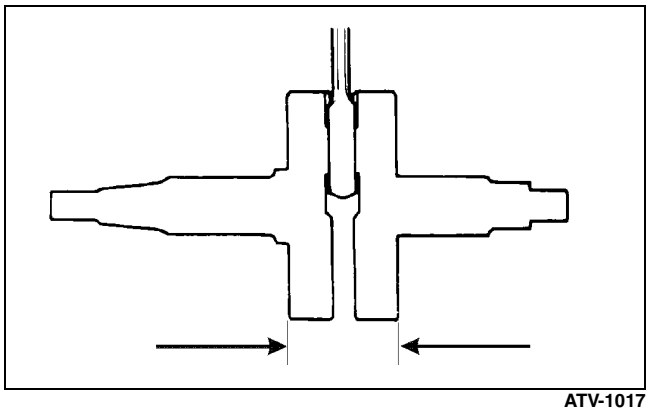
Care should be taken to support the connecting rod when rotating the crankshaft.

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.

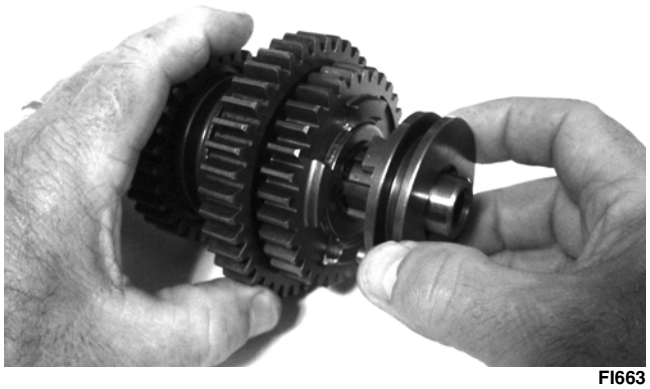
COUNTERSHAFT

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 reverse driven gear dog; then remove the circlip securing the reverse driven gear.



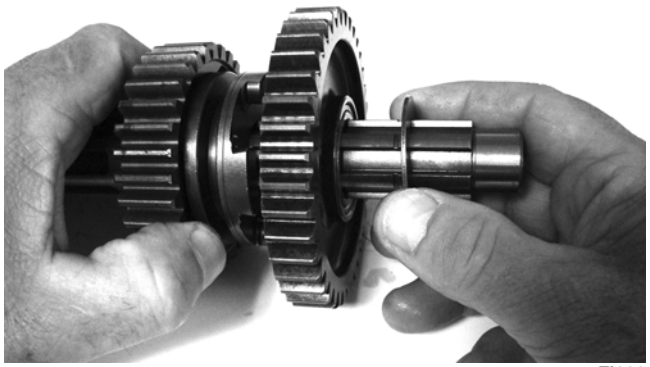
FI663

FI664

2. Remove the splined washer; then remove the reverse driven gear along with the bearing and bushing.

FI665

3. Remove the low driven gear washer; then remove the low driven gear along with the bearing and bushing.

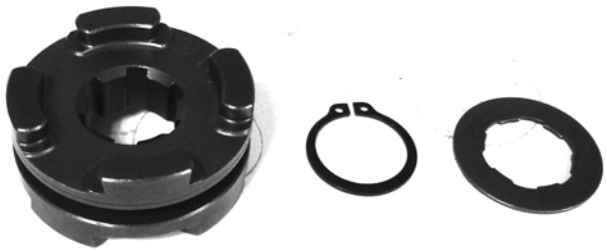


FI666

FI667

4. Remove the splined washer; then remove the circlip securing the high-low sliding dog. Remove the sliding dog.

FI668



FI669

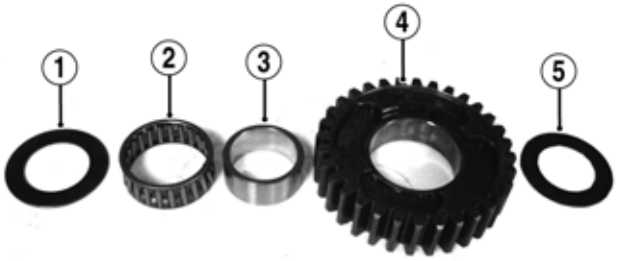
5. Remove the circlip securing the high driven gear; then remove a washer, the high driven gear along with the bearing and bushing, and remove the high driven washer.

FI670

FI671

ASSEMBLING

1. With the high driven washer (1) on the countershaft, install the high driven gear bushing (3), bearings (2), and gear (4) on the countershaft; then install the washers (5) and secure with the snap-ring.



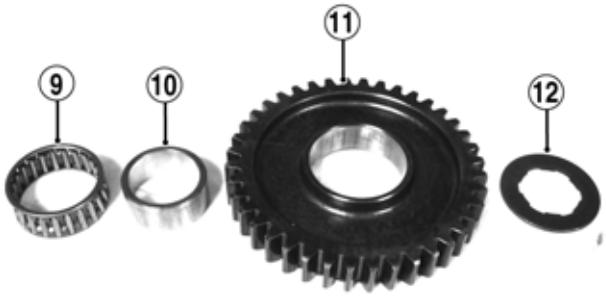
FI671A

FI670

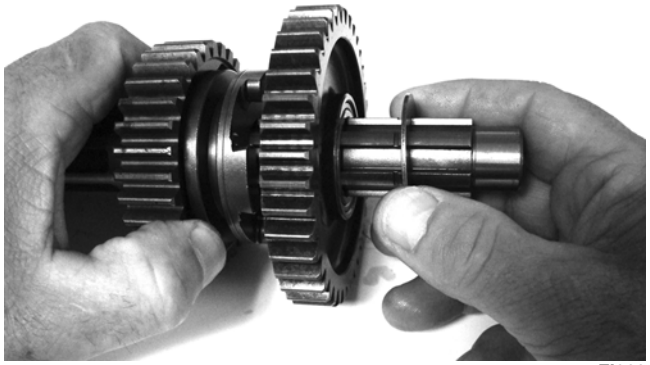
2. Install the high/low shift dog (6) on the countershaft and secure with snap-ring (7); then install the splined washer (8).

FI668A

3. Install the low driven bushing (10), bearing (9) and gear (11) on the countershaft; then install splined washer (12).

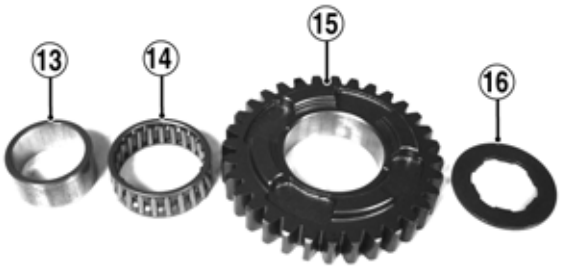


FI667A



FI666

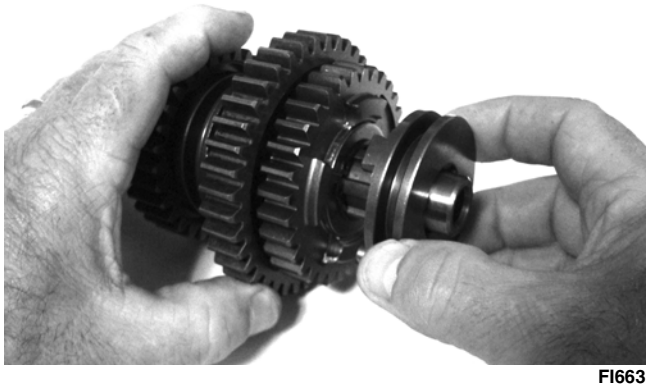
4. Place the reverse driven bushing (13) onto the shaft; then install the bearing (14), gear (15) and splined washer (16). Secure with a snap-ring.



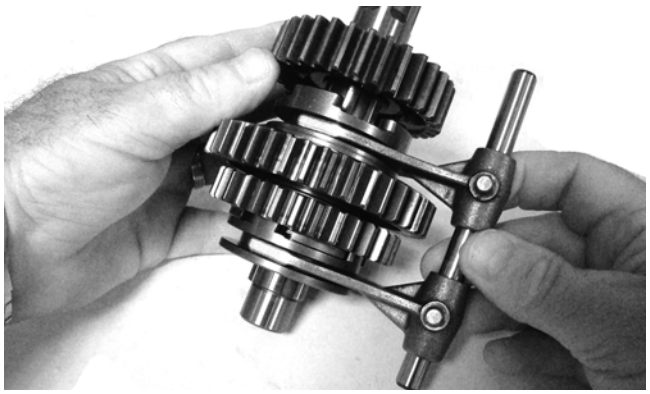
FI665A

FI664

5. Install the reverse dog on the shaft; then place the shift forks and shift shaft into position.



FI663



FI662

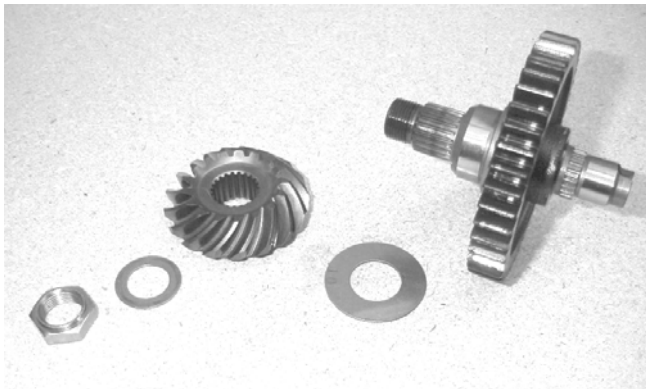
■NOTE: The countershaft assembly is now ready to be installed.

Assembling Crankcase Half

■NOTE: For ease of assembly, install components on the right-side crankcase half.

■NOTE: If the output shaft was removed, make sure that the proper shim is installed.

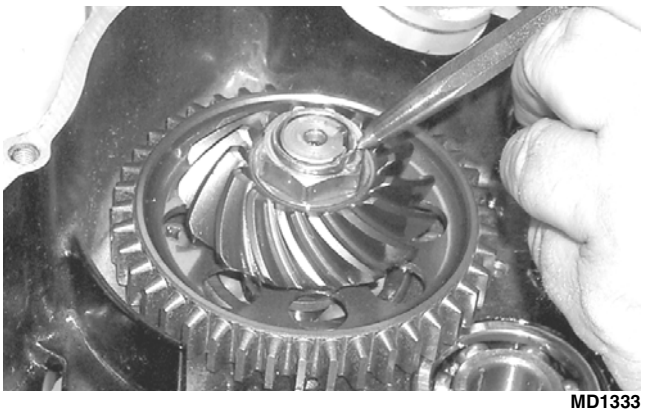
1. Install the output shaft into the crankcase making sure the two gears, shim, washer, and nut are in the correct order.



MD1199

MD1079

2. Install and tighten the output shaft flange nut to 59 ft-lb. Using a punch, peen the nut.



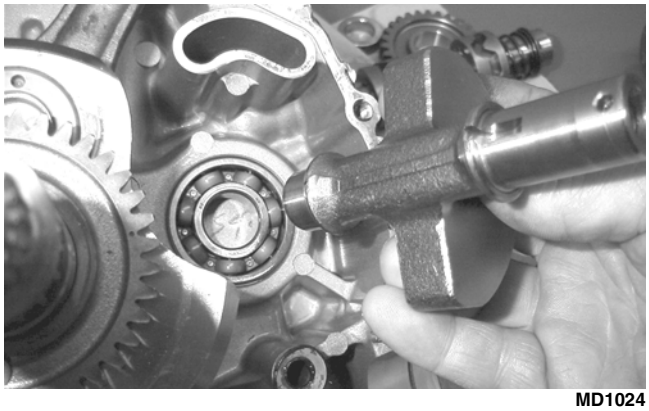
MD1333

3. Apply a liberal amount of oil to the crankshaft bearing. Using a propane torch, heat the bearing until the oil begins to smoke; then slide the crankshaft assembly into place.

MD1334

■NOTE: If heating the bearing is not possible, the crankshaft can be installed using a crankshaft installer.

4. Rotate the crankshaft so the counterweight is toward the rear of the engine. Install the crank balancer shaft.

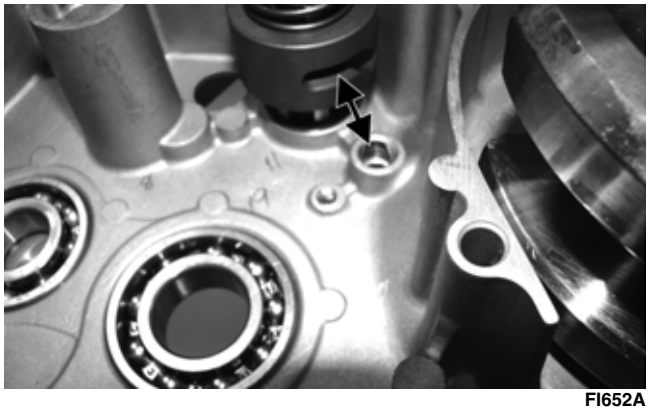


MD1024

5. Install the key in the crank balancer shaft; then install the gear and aligning the timing marks, slide the gear into place.

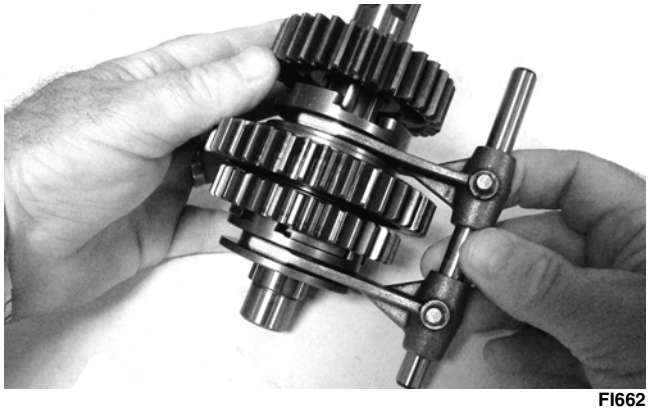
FI658

6. Align the shift cam fork slots with the shift fork shaft locating boss and with a washer on each end, install in the crankcase.

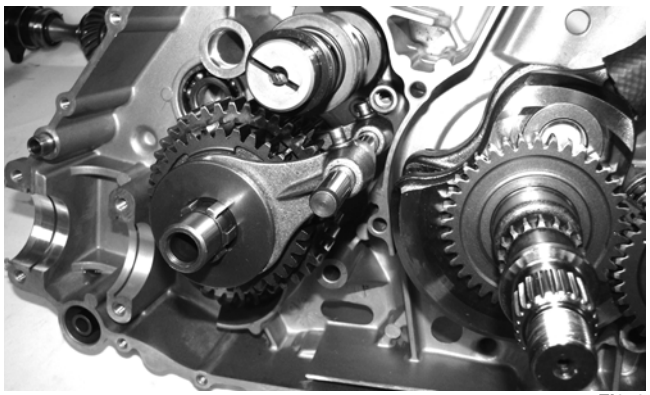


FI652A

7. Place the shift forks into position on the assembled countershaft and install into the crankshaft as an assembly.

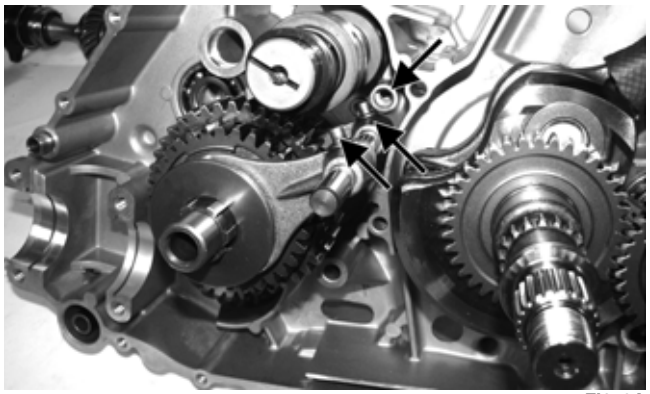


FI662



FI653

8. Align the shift forks to allow engagement with the shift cam; then engage the shift forks and slide the shift fork shaft into the locating boss in the crankcase.

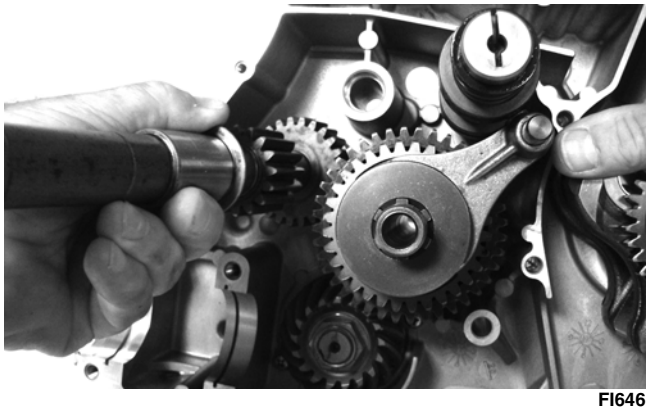


FI653A

3

FI655A

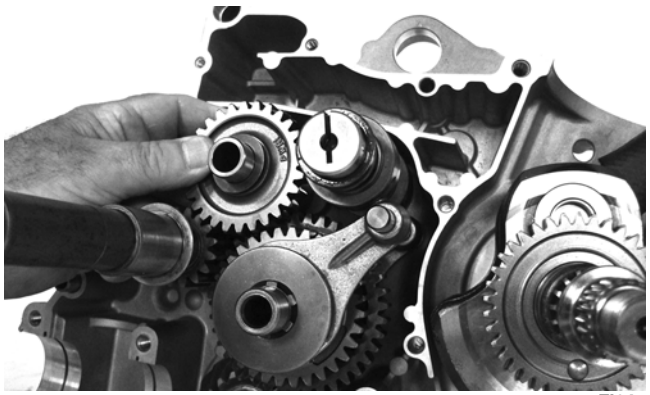
9. Install the input driveshaft.



FI646

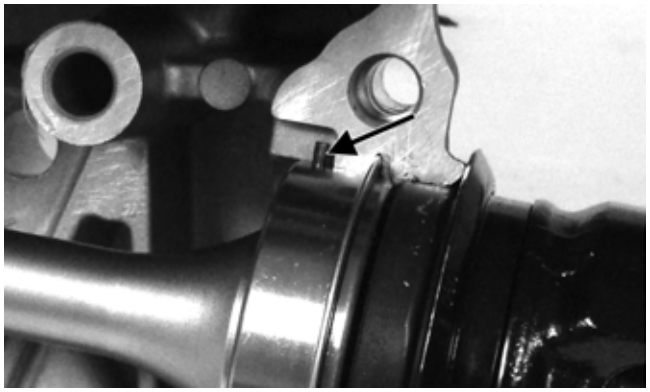
10. Install the spacer (1), shaft (2), reverse idler gear, and washer (3).

FI641A

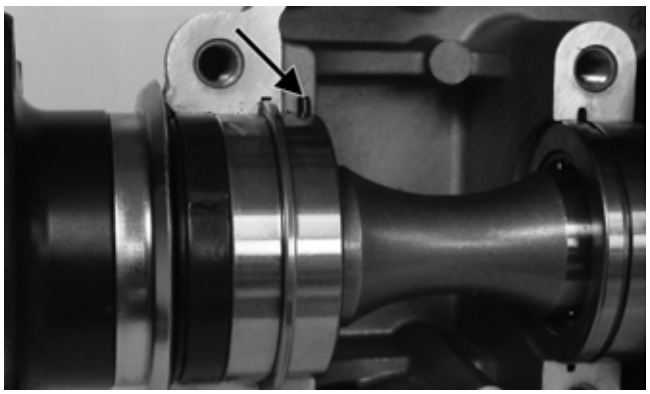


FI645

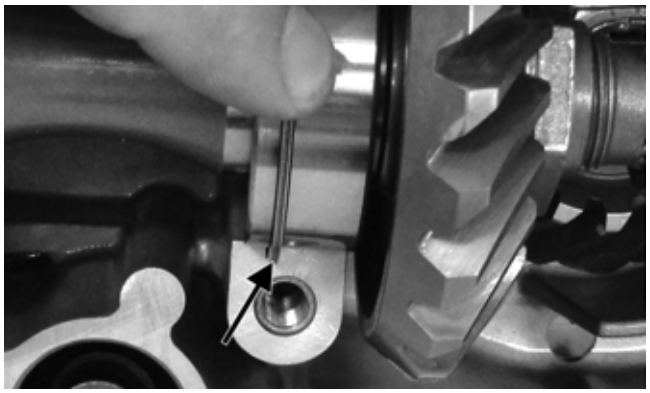
11. Install the secondary output driveshaft assembly into the crankcase half making sure the front and rear bearing alignment pins are seated in the recesses; then install the center carrier bearing alignment C-ring.



FI660A



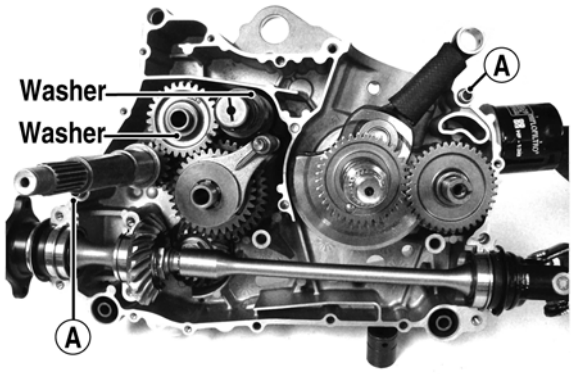
FI659A



FI661A

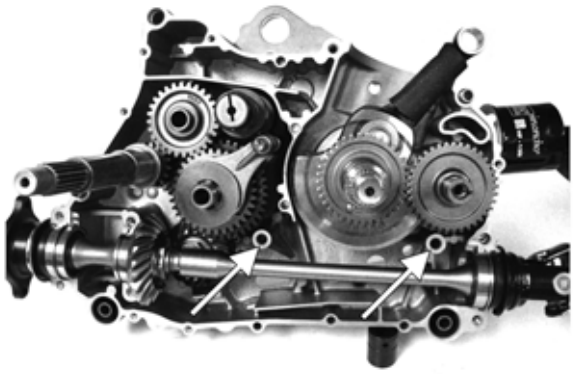
Joining Crankcase Halves

1. Verify that the two alignment pins (A) are in place and that both case halves are clean and grease free. Apply Three Bond Sealant to the mating surfaces. Place the right-side half onto the left-side half.



FI639B

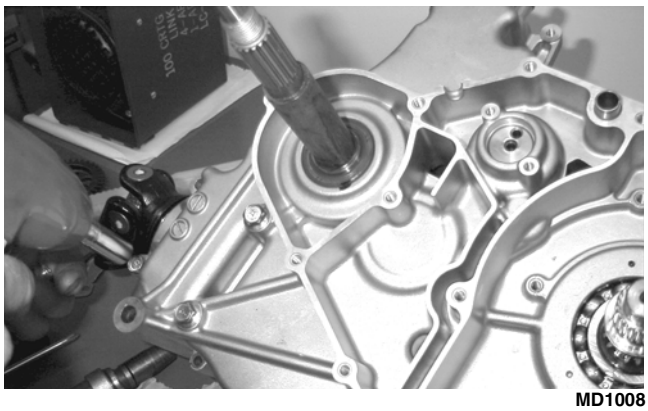
■**NOTE: Be sure to apply sealant to the inside radius of all cap screw locations and the entire surface of the internal cap screw bosses.**



FI639C

2. Using a plastic mallet, lightly tap the case halves together until cap screws can be installed.
3. From the right side, install the crankcase cap screws noting the location of the different-sized cap screws; then tighten only until snug.

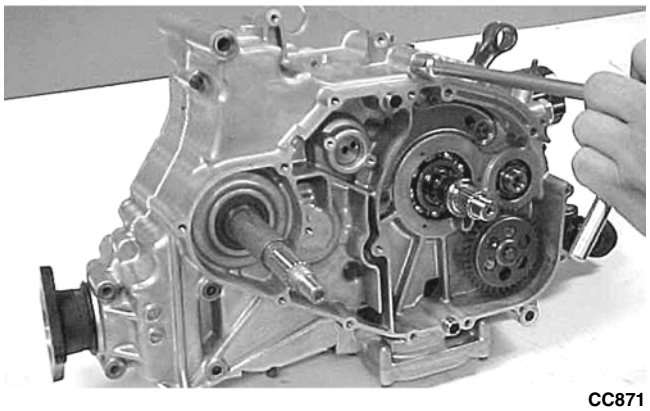
■**NOTE: Rotate the shafts back and forth to ensure no binding or sticking occurs while tightening the cap screws.**



MD1008

4. From the left side, install the remaining crankcase cap screws; then tighten only until snug.

■**NOTE: Rotate the shafts back and forth to ensure no binding or sticking occurs while tightening the cap screws.**



CC871

5. In a crisscross pattern, tighten the 8 mm cap screws until the halves are correctly joined; then tighten to 21 ft-lb.

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

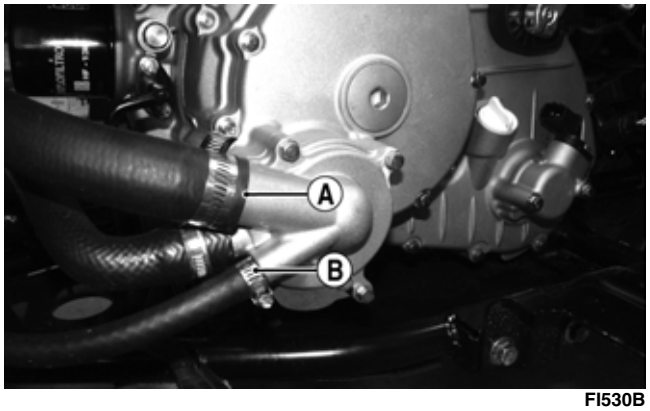
6. In a crisscross pattern, tighten the 6 mm cap screws to 10 ft-lb.

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

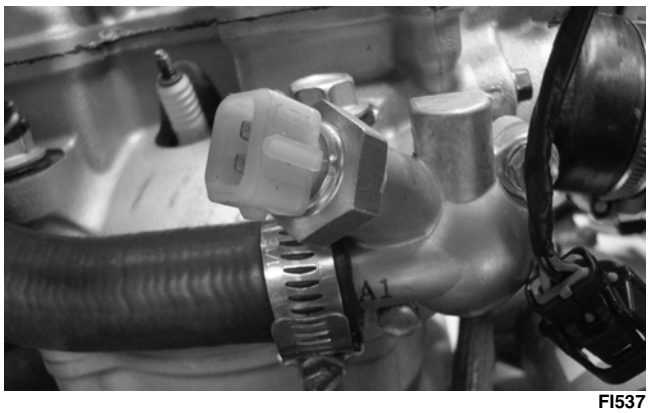
☞ AT THIS POINT
After completing center crankcase components, proceed to Installing Right-Side Components, to Installing Left-Side Components, and to Installing Top-Side Components.

Installing Engine/Transmission

1. From the left side, place the engine into the frame (rear of engine first) tilting the rear up to allow cylinder head to clear frame.
2. With engine moved rearward, engage the splines of the front driveline into the front output drive yoke; then move into position and install the two through-bolts. Secure with lock nuts and tighten to 35 ft-lb.
3. Install the four cap screws securing the rear driveline to the output drive flange and tighten to 20 ft-lb.
4. Connect coolant hoses (A) and (B) to the water pump and connect the upper coolant hose to the thermostat housing. Tighten all clamps securely.



FI530B


FI537

5. Install the exhaust pipe using a new seal at the cylinder head and loosely install the retaining cap screws; then install the muffler with a new grafoil seal and secure with two springs. Tighten the exhaust pipe retainer cap screws to 20 ft-lb.

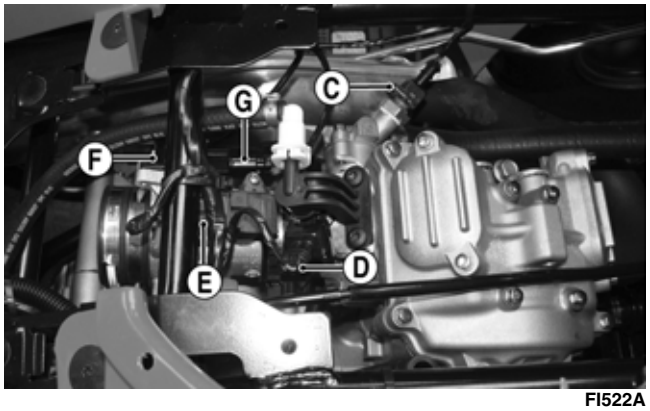
6. Connect the throttle cable and adjust free-play to specifications (see Section 4); then tighten the jam-nut securely and install the cover. Tighten the screws securely.

7. Connect the stator connector (H) and crankshaft position sensor connector (I) to the main harness; then connect the positive cable to the starter motor and tighten securely.

FI534A

8. Connect the engine ground cable to the starter mounting flange and secure with a cap screw tightened to 8 ft-lb.

9. From the top side, install the ECT sensor connector (C), fuel injector connector (D), MAP sensor connector (E), ISC connector (F), and the TPS connector (G).



FI522A

10. Place the air filter assembly into position and connect the crankcase breather securing with the clamp, then connect the front air inlet duct and secure with a hose clamp.

11. Install the harness connector onto the coil and install the spark plug cap.

12. Connect the air ducts to the CVT housing and tighten the clamps securely; then connect the air duct to the air filter housing and the throttle body and secure with the clamps.

13. Install the storage compartment and connect the negative battery cable; then install the tool tray.

14. Pour the specified amount of coolant into the radiator and the specified amount and grade of oil into the engine.

15. Install the left footwell support assembly, footwell, and footrest. Tighten all fasteners securely.

16. Install the seat making sure it locks securely in place; then start the engine and allow to warm up while checking for leaks.

17. Shut engine off and inspect coolant and oil levels. Add fluids as required.

SECTION 4 - FUEL/LUBRICATION/COOLING

TABLE OF CONTENTS

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. Refer to the current Special Tools Catalog for the appropriate tool description.

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

When troubleshooting to determine the cause of starting or running problems, the technician should use discretion and sound judgment.

1. Make sure there is sufficient, clean gasoline in the gas tank.
2. Verify the battery is sufficiently charged to crank the engine over at normal speed. EFI systems are extremely sensitive to voltage.
3. Check for a flashing or steady Malfunction Indicator Light (MIL) on the LCD along with the malfunction code.

■NOTE: The MIL is a small wrench icon, and the codes are four digits preceded by a letter C (chassis) or P (power train).

4. Check the air filter and air intake system for contamination or restrictions. Clean or repair as necessary (see Section 2).
5. Verify the electric fuel pump is operating by listening for a momentary “whirring” sound when the ignition switch is turned to the ON position. If no sound is heard, refer to Power Distribution Module (PDM) in Section 5 or Electric Fuel Pump/Fuel Level Sensor in this section.

Throttle Body

The throttle body houses several EFI components including the throttle valve, Inlet Air Temperature/Manifold Absolute Pressure sensor (IAT/MAP), Idle Speed Control (ISC) valve, and Throttle Position Sensor (TPS). The fuel injector is housed in the intake pipe attached to the cylinder head. The components housed in the throttle body are easily replaced with the throttle body removed.

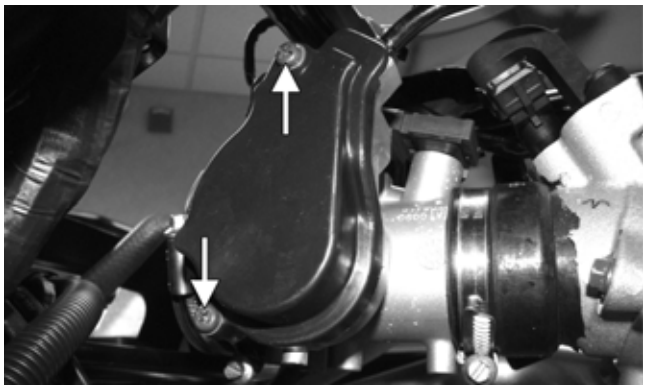
REMOVING

1. Turn the ignition switch to the OFF position; then remove the ignition switch key.
2. Remove the seat.
3. Remove the storage compartment cover and storage compartment.
4. Loosen the clamps securing the air inlet to the throttle body and air filter housing; then remove the air inlet pipe.
5. Loosen the clamp securing the air filter housing to the front air inlet duct; then disconnect the coil and remove the spark plug cap from the spark plug.

FI519A

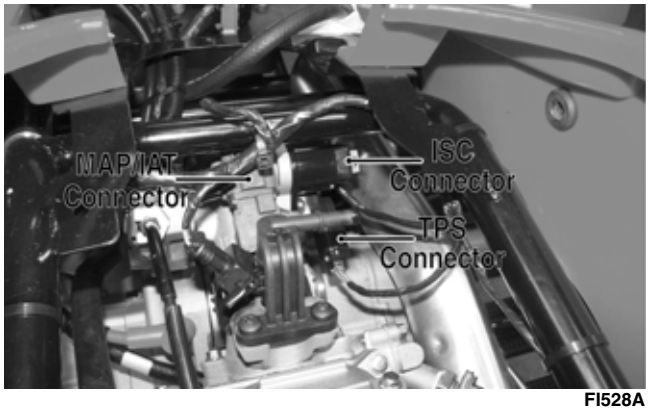
6. Pull the air filter housing assembly to the rear and disconnect the crankcase breather hose from the housing; then remove from the ATV.

7. Remove the screws securing the throttle actuator cover to the throttle body; then remove the cover.



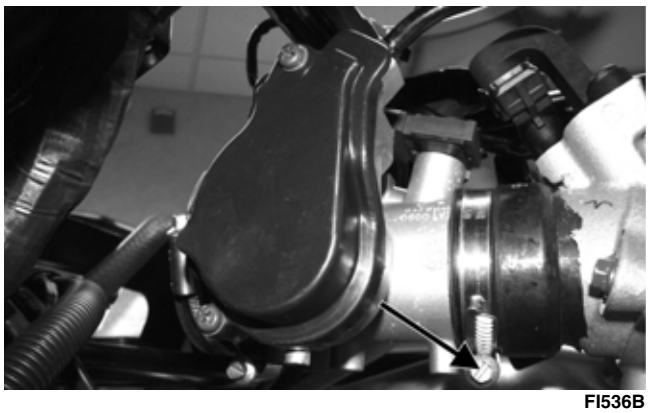
FI536A

8. Remove the throttle cable from the actuator arm.
9. Loosen the outer jam nut securing the throttle cable to the throttle body; then route the cable out of the way.
10. Remove the three electrical connectors from the throttle body components.



FI528A

11. Loosen the clamp at the front of the throttle body and remove the assembly from the intake boot.



FI536B

12. 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.

■NOTE: None of the EFI components housed in the throttle body are serviceable and must be replaced if out of tolerance as indicated by trouble-shooting or malfunction indicator light codes (see ECU Malfunction Codes in Section 5).

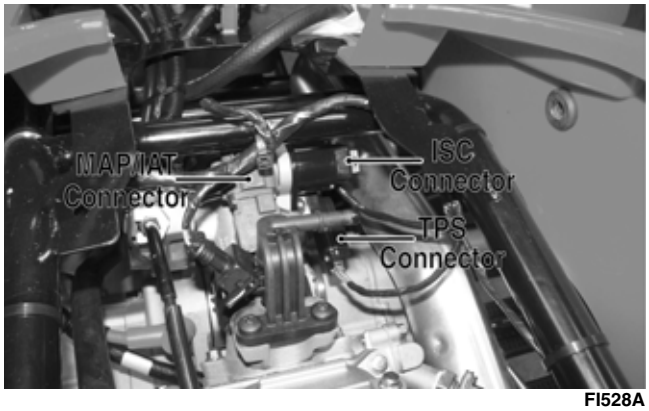
INSTALLING

1. Install the throttle body into the intake boot and secure with the clamp. Tighten securely.
2. Connect the throttle cable to the throttle body and adjust throttle free-play (see Section 2).
3. Connect the three electrical connectors to the throttle body components.
4. Install the air filter housing assembly and connect and secure the inlet duct boot and crankcase breather hose; then connect the coil and main harness connector and connect the spark plug cap to the spark plug.

FI519A

5. Install the air inlet duct connecting the air filter housing to the throttle body and secure with hose clamps; then connect the three electrical connectors.

FI516A



FI528A

6. Install the storage compartment, storage compartment cover, and seat making sure the seat locks securely.

Fuel Injector

REPLACING

1. Turn the ignition switch to the OFF position and remove the key; then disconnect the negative battery cable from the battery.

⚠ WARNING

Always disable the electrical system when the gasline hoses will be disconnected. Inadvertent activation of the electric fuel pump will force gasoline from the gasline hose causing a fire or explosion hazard.

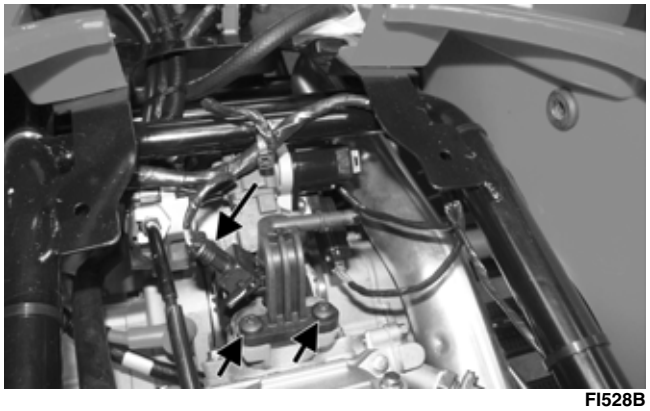
2. Remove the air filter housing assembly (see Throttle Body - REMOVING - steps 1-6 in this section).
3. Remove the gasline connector from the fuel rail.

FI527A

⚠ WARNING

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

4. Remove the fuel injector electrical connector; then remove the two cap screws securing the fuel infector to the intake pipe.



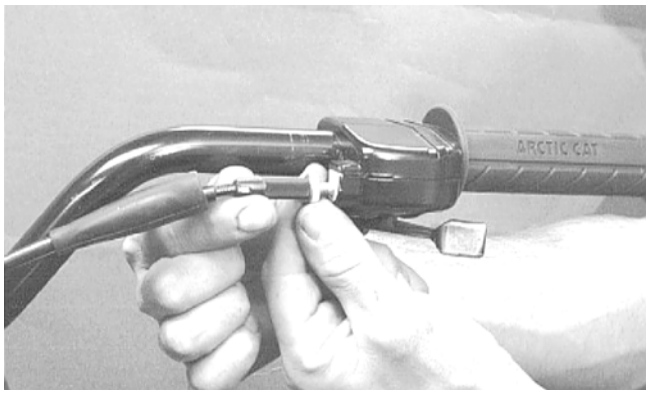
FI528B

5. Remove the fuel injector from the intake pipe.
6. Place the new fuel injector into the intake pipe; then secure with two cap screws. Tighten to 8 ft-lb.
7. Connect the harness connector to the fuel injector; then connect the gasline hose.
8. Install the air filter housing assembly (see Throttle Body - INSTALLING - steps 4-7 in this section).
9. Connect the negative battery cable to the battery.

Throttle Cable Free-Play

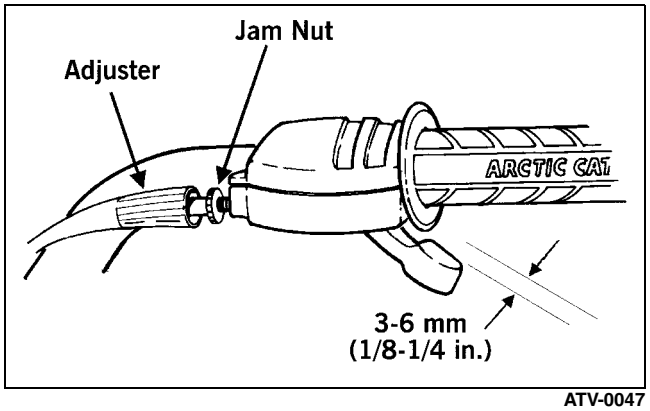
To adjust the throttle cable free-play, follow this procedure.

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.

Engine RPM (Idle)

■NOTE: The idle RPM is not adjustable on this model.

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; then disconnect the negative batttery cable.

⚠ WARNING

Always disable the electrical system when the gasline hoses will be disconnected. Inadvertent activation of the electric fuel pump will force gasoline from the gasline hose causing a fire or explosion hazard.

2. Remove the rear rack and fenders (see Section 8).
3. Disconnect the gasline hose connector from the fuel pump outlet; then disconnect the electrical connector.
4. Remove the cap screws securing the gas tank to the frame and 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 pump 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.
2. Place the gas tank into position in the frame; then install the cap screws. Tighten securely.
3. Connect the gasline hose connector to the fuel pump outlet; then connect the fuel pump/fuel level sensor 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 and rack; then install the seat making sure it latches securely.

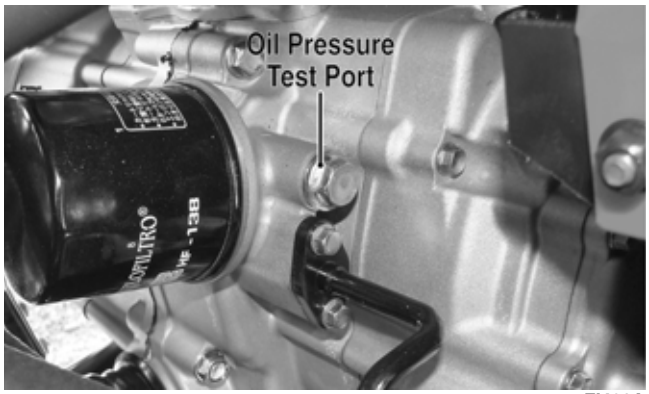
Oil Filter/Oil Pump

■NOTE: Whenever internal engine components wear excessively or break and whenever oil is contaminated, the oil pump should be replaced. The oil pump is not a serviceable component.

Testing Oil Pump Pressure

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

1. Connect the Tachometer to the engine or utilize the LCD tachometer (if equipped).
2. Connect the Oil Pressure Test Kit to the oil pressure test port.



FI486A

■**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. With the oil temperature at 60° C (140° F), the oil pressure gauge must read 0.6-0.7 kg/cm² (8.5-10 psi).

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

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

Liquid Cooling System

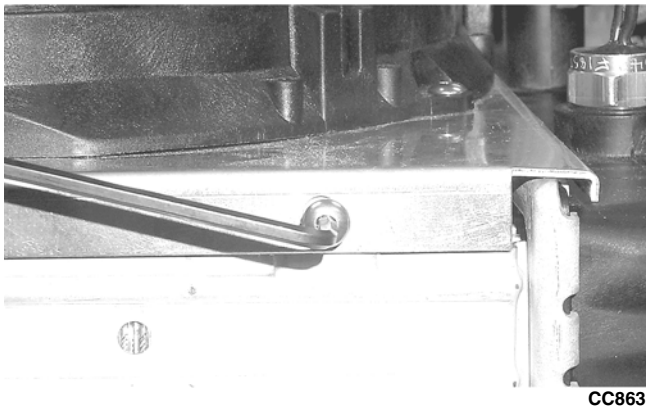
When filling the cooling system, use premixed Arctic Cat Antifreeze. While the cooling system is being filled, air pockets may develop; therefore, run the engine for five minutes after the initial fill, shut the engine off, and then fill the cooling system to the bottom of the stand pipe in the radiator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

RADIATOR

Removing

1. Remove the radiator cap; then drain the coolant from the radiator by removing the plug on the lower left corner of the radiator.
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

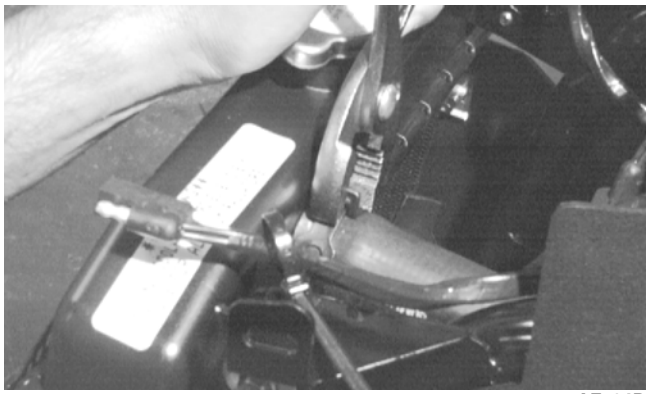
Cleaning and Inspecting

■**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.

THERMOSTAT

Removing

■NOTE: The thermostat housing is located behind the radiator on the left side near the top of the radiator.

1. Drain approximately one quart of coolant from the cooling system.
2. Remove the cap screws securing the cover to the thermostat housing and remove the thermostat cover and thermostat. 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 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 80-84° C (176-183° 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

Place the thermostat and O-ring into the thermostat housing; then secure the thermostat housing cover to the housing with the cap screws.

COOLING FAN

Removing

1. Remove the radiator (see Liquid Cooling System 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.

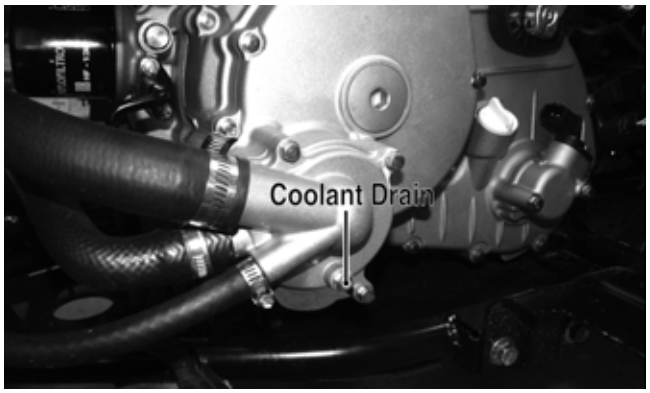
2. Install the radiator.

WATER PUMP

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

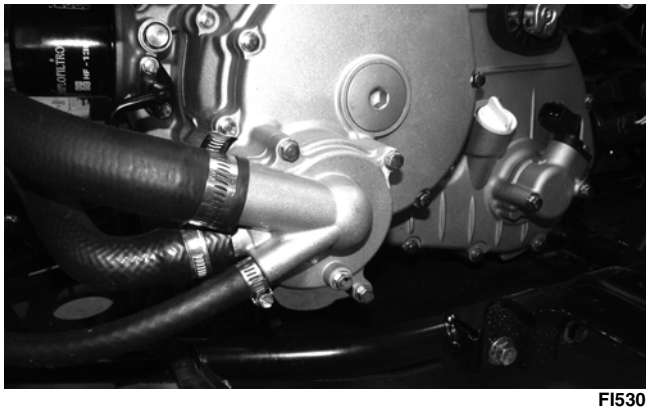
Removing

1. Remove the radiator cap; then remove the water pump drain and drain the coolant.



FI530A

2. Drain the oil from the engine/transmission.
3. Remove four cap screws securing the water pump cover to the water pump housing; then leaving the hoses connected, remove the water pump cover and lay aside.


FI530

4. Remove the six remaining cap screws securing the water pump housing to the magneto cover; then remove the water pump housing. Account for a gasket and two alignment pins.

Installing

1. Using a new gasket, install the two alignment pins and gasket onto the magneto cover; then install the water pump housing and secure with the six cap screws. Finger-tighten only at this time.
2. Install the water pump cover with a new O-ring and secure with four cap screws.
3. Tighten the cap screws from steps 1 and 2 using a crisscross pattern to 8 ft-lb.
4. Fill the engine/transmission with the proper amount of recommended oil.
5. Fill the cooling system with the proper amount of recommended coolant.

■NOTE: 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.

6. Check the entire cooling system for leakage.

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.

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.

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 (10 seconds), no electrical checks are necessary. Turn the ignition switch OFF.
2. Disconnect the gasline hose from the body; then install a suitable pressure gauge.

⚠ WARNING

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

FI527A

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

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

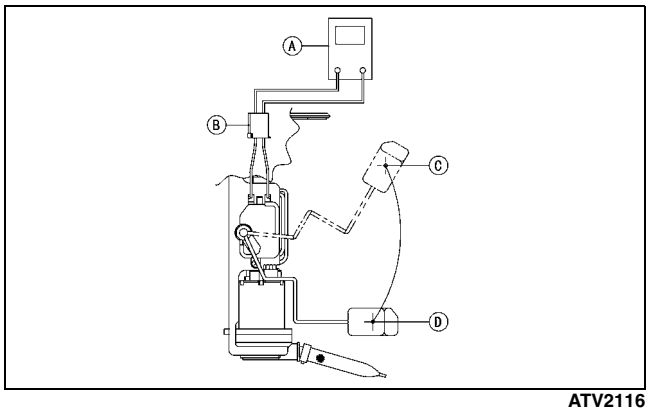
Take care not to damage the float or float arm or replacement of the entire assembly will be necessary.

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.

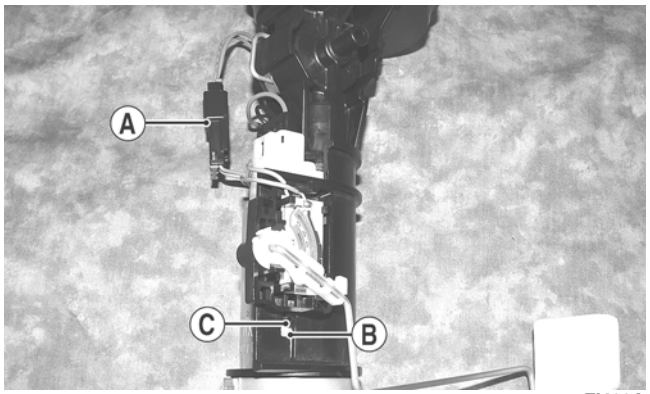
1. Inspect the fuel screen and blow clean with low pressure compressed air.
2. Move the float lever and check for free movement. The float assembly should return to the lower position without force. If not, replace the fuel pump assembly.
3. Test the fuel level sensor by connecting a multimeter (A) to 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).

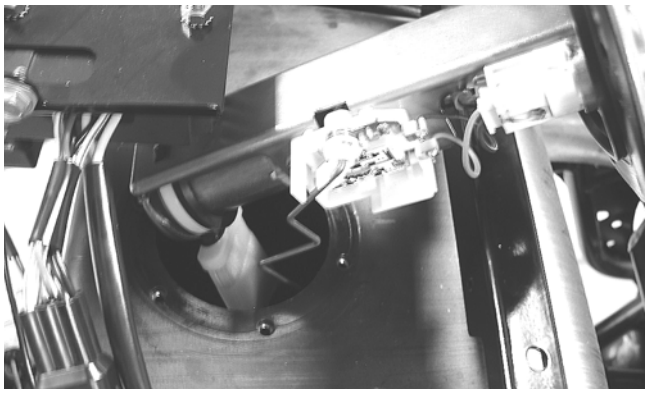


FI460A

   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

5

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. Refer to the current Special Tool Catalog for the appropriate tool description.

Description	p/n
Diagnostic Harness	0486-219
Fluke Model 77 Multimeter	0644-559
MaxiClips	0744-041
Peak Voltage Reading Adapter	0644-307
Tachometer	0644-275
Test Plug/Error Code List	0444-216
Timing Light	0644-296
TPS Adjustment Tool Kit	3639-891

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

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.

Specifications

Ignition Timing		10° BTDC @ 1500 RPM
Spark Plug Type		NGK CPR8E
Spark Plug Gap		0.7-0.8 mm (0.028-0.032 in.)
Spark Plug Cap		5000 ohms
Ignition Coil Resistance	(primary)	Less than 1 ohm (terminal (+) to terminal (-))
	(secondary)	12k-19k ohms (high tension - plug cap to terminal (+))
Ignition Coil Peak Voltage	(primary)	Battery Voltage (orange (+) to blue/white(-))
Stator Coil Resistance (crankshaft position sensor)		150-250 ohms (yellow to white)
	(AC generator)	Less than 1 ohm (yellow to yellow)
Crankshaft Position Sensor AC Voltage		5.0 volts or more (blue to green)
AC Generator Output	(no load)	75 AC volts @ 5000 RPM (yellow to yellow)

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 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 handling a battery. When servicing battery in enclosed space, keep the area well-ventilated. Make sure battery venting is not obstructed.

1. Remove the battery hold-down; then disconnect the battery cables (negative cable first).
2. Disconnect the vent hose (lead-acid battery).
3. 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.

4. Using a wire brush, clean the battery posts and cable ends removing all corrosive buildup. Replace damaged cables or cable ends.
5. Add clean distilled water to bring fluid level to the UPPER level line (lead-acid battery).

■NOTE: This ATV may be equipped with a sealed battery. Do not attempt to add electrolyte to these batteries.

⚠ WARNING

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

CAUTION

Never use electrolyte (sulfuric acid) to "top off" the battery. Use only distilled water or severe battery damage may occur.

6. 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).

7. 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.

8. After charging the battery for the specified time, remove the battery charger and allow the battery to sit for 1-2 hours.

9. 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 (lead-acid battery) and the battery is ready for service.

10. 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.

11. 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.

■NOTE: Arctic Cat highly recommends all ATV batteries be connected to a maintenance charger during storage or any extended period of non-use. This charger MUST have an automatic float, storage-safe, or pulse maintenance mode to avoid battery damage due to long-term overcharging. To connect the maintenance charger, use any of the following procedures.

A. Remove the battery cover; then connect the charger leads (positive cable first) directly to the battery.

B. Locate the rear accessory connector and connect the charger leads (positive cable first) directly to the connector.

C. Using an appropriate adapter, connect the charger to any DC power outlet.

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 77 Multimeter and when testing peak voltage, the Peak Voltage Reading Adapter must be used. If any other type of meter is used, readings may vary due to internal circuitry. When troubleshooting a specific component, always verify first that the fuse(s) are good, that the bulb(s) are good, that the connections are clean and tight, that the battery is fully charged, and that all appropriate switches are activated.

■NOTE: For absolute accuracy, all tests should be made at room temperature of 68° F.

Accessory Receptacle/Connector

■NOTE: This test procedure is for either the receptacle or the connector.

VOLTAGE

1. 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 gas tank on the right side.

■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 the red/blue wire.

FI510

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)

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.

FI502

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 access panel.

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

VOLTAGE (Wiring Harness Connector)

1. Disconnect the switch connector from the main harness; 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 the red/blue wire.

FI489

3. The meter must show battery voltage.

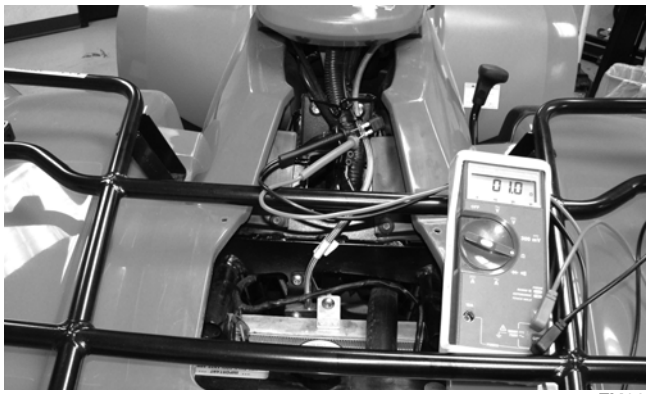
■NOTE: If the meter shows no battery voltage, troubleshoot the battery, fuse, or the main wiring harness.

■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)

■NOTE: The brake lever must be compressed for this test.

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 brown wire.



FI490

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

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 60° C (140° F), the meter should read approximately 700 ± 40 ohms.
4. On the ECT sensor when the temperature reaches 90° C (194° F), the meter should read approximately 200 ± 15 ohms.
5. On the ECT sensor when the temperature reaches 120° C (248° F), the meter should read approximately 111 ± 7 ohms.
6. If the readings are not as indicated, the sensor must be replaced.
7. Install the sensor and tighten securely.
8. Connect the leads.

Fan Motor

The connector is the black two-prong one located above the oil cooler/radiator.

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

RESISTANCE (Fan Motor Connector)

1. Set the meter selector to the OHMS position.
2. Connect the red tester lead to the red wire; then connect the black tester lead to the black wire.

FI501A

3. The meter must show less than 1 ohm.

■NOTE: If the meter shows more than 1 ohm of resistance, troubleshoot or replace the fan motor.

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

⚠ WARNING

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

Power Distribution Module (PDM)

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.

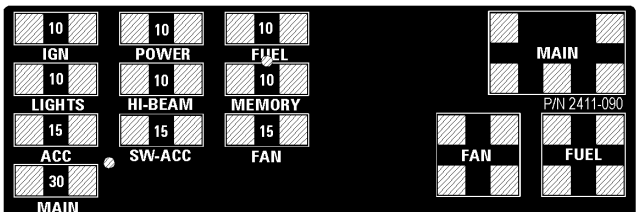
■NOTE: Battery voltage will be indicated from only one side of the fuse holder connector terminal; the other side will show no voltage.

■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

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



2411-090

CAUTION

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

CAUTION

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

1. Set the meter selector to the OHMS position.
2. Connect the red tester lead to one spade end of the fuse; then connect the black tester lead to the other spade end.
3. The meter must show less than 1 ohm resistance. If the meter reads open, replace the fuse.

■NOTE: Make sure the fuses are returned to their proper position according to amperage. Refer to the fuse block decal for fuse placement.

RELAYS

The 4-pin relays are identical plug-in type. 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.

Ignition Coil

The ignition coil is on the front of the air filter housing behind the steering post.

RESISTANCE

■NOTE: For these tests, the meter selector should be set to the OHMS position and the primary wire should be disconnected.

Primary Winding

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

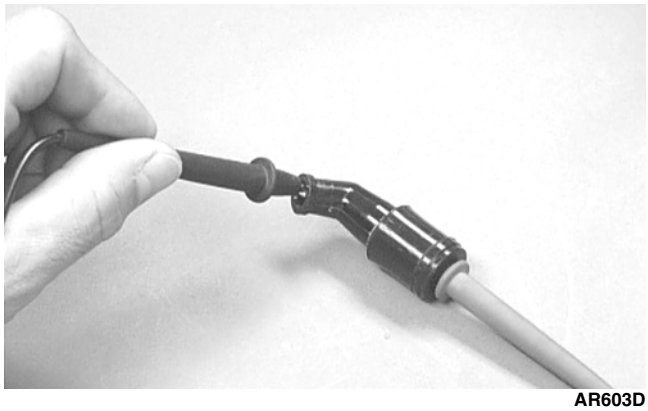
FI519B

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.

PEAK VOLTAGE

■NOTE: All of the peak voltage tests should be made using the Fluke Model 77 Multimeter with Peak Voltage Reading Adapter. If any other type of tester is used, readings may vary due to internal circuitry.

■NOTE: The battery must be at full charge for these tests.

Primary Voltage - ECU

1. Set the meter selector to the DC Voltage position; then disconnect the two wires from the coil.
2. Connect the red tester lead to the orange wire and the black tester lead to the blue/white wire.
3. Turn the ignition switch to the ON position. The meter must show battery voltage.

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/ INLET AIR TEMPERATURE (MAP/IAT) SENSOR

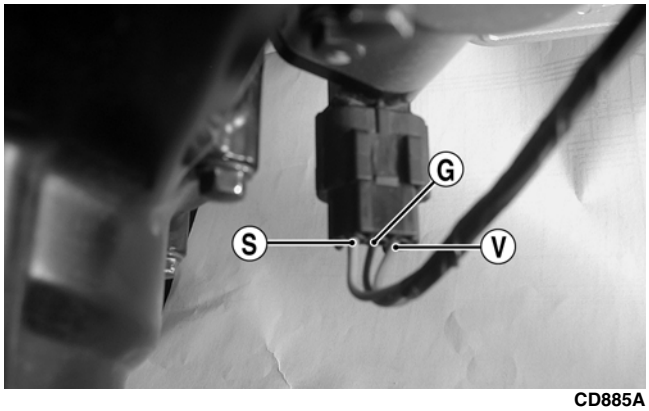
1. Disconnect the MAP/IAT connector from the sensor located on top of the throttle body.
2. Select DC Voltage on the tester and turn the ignition switch to the ON position.
3. Connect the black tester lead to the black/pink wire and the red tester lead to the orange/blue wire. The meter should read 4.5-5.5 DC volts. If the meter does not read as specified, check the ECU connector or wiring.
4. Connect the MAP/IAT to the harness; then using MaxiClips, connect the red tester lead to the brown/white wire and the black tester lead to the black/pink wire. With the engine running at idle speed, the meter should read approximately 2.5 DC volts (MAP sensor signal).
5. Connect the red tester lead to the green/red wire. With the engine at idle and at room temperature (approximately 60° F), the meter should read approximately 2.9 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).



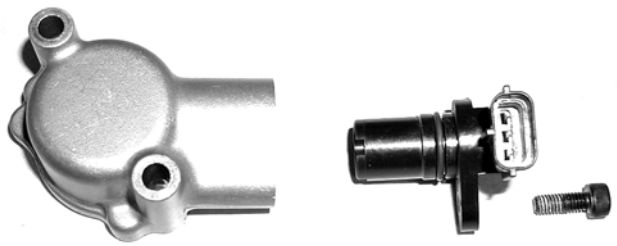
CD885A

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.

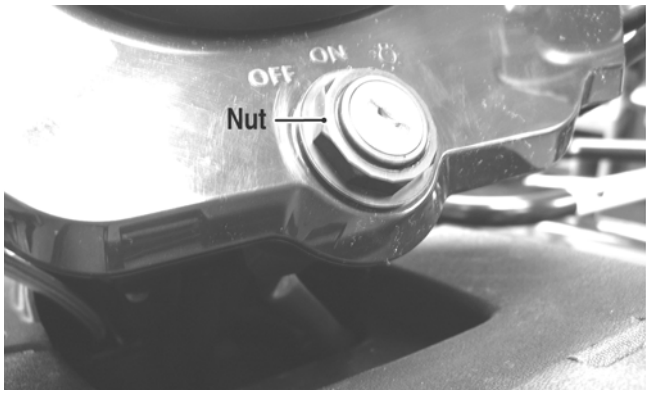
1. Disconnect the three-wire connector from the speed sensor harness or from the speed sensor; then remove the Allen-head cap screw securing the sensor to the sensor housing.
2. Remove the sensor from the sensor housing accounting for an O-ring.
3. Install the new speed sensor into the housing with new 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.



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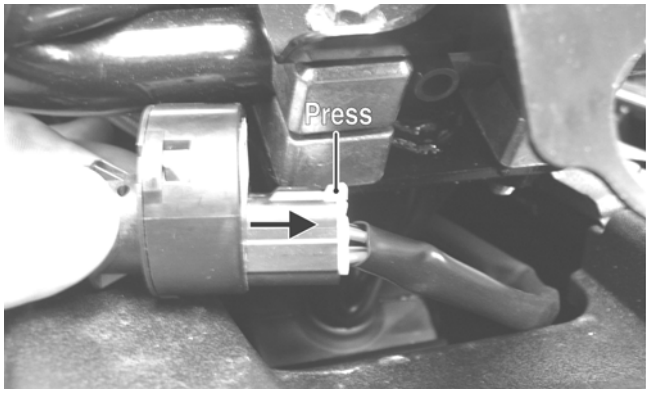


CF273A

VOLTAGE

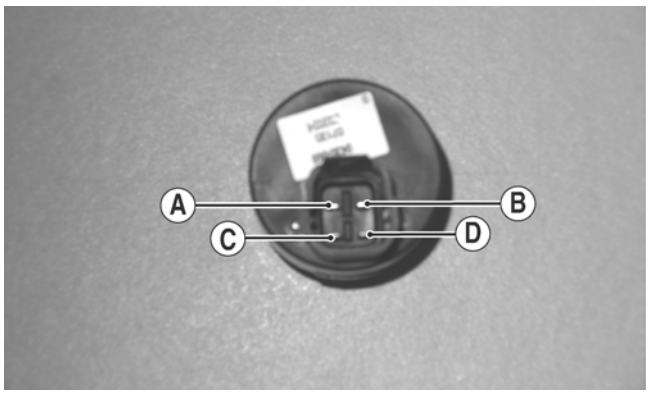
■NOTE: Perform this test on the harness connector.

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.

RESISTANCE

■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.

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.

Drive Select 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

1. Set the meter selector to the OHMS position.
2. Connect the red tester lead to the white/green wire; then connect the black tester lead to the black wire.
3. With the selector switch in the 4WD position, the meter must show less than 1 ohm.
4. Connect the red tester lead to the white/orange wire; then select the 4WD Lock position. The meter must show less than 1 ohm.

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

■NOTE: If the meter shows other than specified, check the harness, connector, 30 amp fuse, and battery connections.

Front Drive/Differential Lock Actuator Power

■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 drive select 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/orange wire in the supply harness. The meter must show approximately 12 DC volts.
5. Connect the red tester lead to the white/green wire in the supply harness. The meter must show approximately 12 DC volts.
6. Select the 4WD position on the front drive selector switch; then connect the red tester lead to the white/orange wire in the supply harness. The meter must show approximately 12 DC volts.

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

7. Connect the red tester lead to the white/green wire in the supply harness. The meter must show 0 DC volts.

8. Select Differential Lock on the front drive actuator switch; then connect the red tester lead to the white/orange wire in the supply harness. The meter must show 0 DC volts.
9. Connect the tester lead to the white/green wire in the supply harness. The meter must show 0 DC volts.

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

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

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.

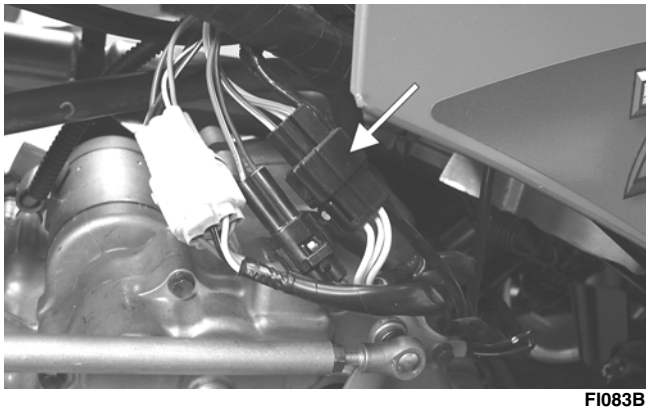
CAUTION

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

■NOTE: If voltage is lower than specified, test AC Generator - No Load.

VOLTAGE (AC Generator - No Load)

The connector is a three-pin one in the harness coming from the generator.



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 yellow wires for a total of three tests.
3. With the engine running at a constant 5000 RPM, all voltage tests must be within specification.

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 (AC Generator)

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 yellow 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 yellow wire; then connect the black tester lead to the white wire. The meter reading must be within specification.

AC VOLTAGE

■NOTE: The battery must be at full charge for these tests.

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.

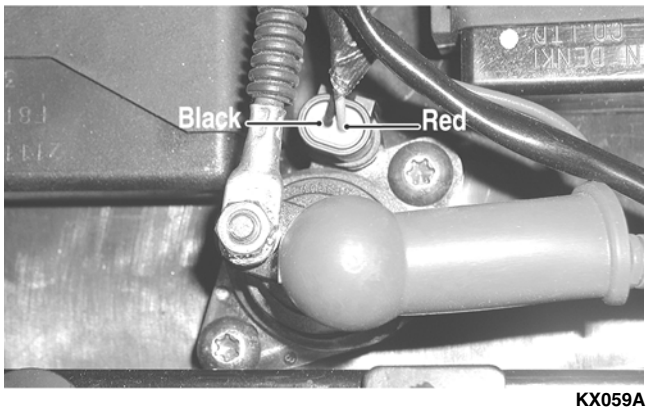
FI496

■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 more than 1 volt 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.



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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 Power Distribution Module (PDM) check.

Starter Motor

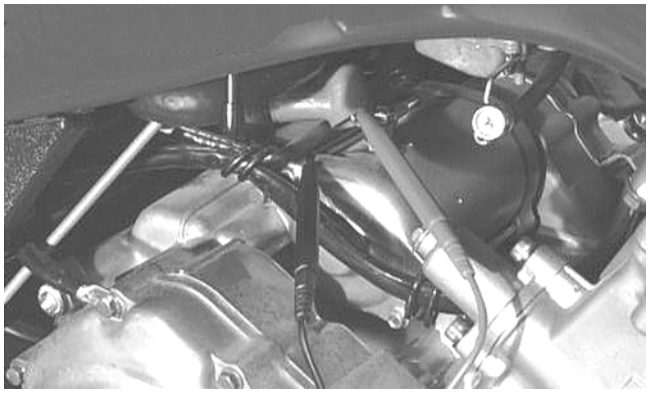
■NOTE: The starter is a non-serviceable component. If the following test does not result as specified, the starter must be replaced.

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.



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■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 machine 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 of the same part number to verify the suspected one is defective.

Error codes can be cleared by following the procedures located in the ECU Malfunction 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 in this section. If charging coil voltage is normal, replace the regulator/rectifier.

Headlights

The connectors are the four 2-prong ones plugged into the headlight bulbs (two on each side).

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 LIGHTS fuse, 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.

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 ignition timing, use the following procedure.

1. Attach the Timing Light to the 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.

ECU Malfunction Codes

If an EFI or related chassis component fails or an out-of-tolerance signal is detected by the ECU, a malfunction code will be generated in the ECU and displayed on the LCD. For the first thirty seconds, the LCD will go blank and the malfunction code will be displayed alternately with a wrench icon or malfunction indicator light (MIL). After thirty seconds, the digital display will return to normal; however, the MIL and malfunction code will continue to flash. On models equipped with the analog gauge, the needle will swing full-scale for thirty seconds; then return to normal with the MIL and code continuing to flash.

Code List

■NOTE: Each of the following numerical codes will have a one-letter prefix of C or P. A "C" prefix denotes a chassis malfunction and a "P" prefix denotes a power train malfunction.

■NOTE: Normal malfunction codes are cleared from the LCD when the component is replaced or the malfunction is corrected; however, intermittent codes must be cleared as noted in the code chart.

Code	ECU PIN	Description	Problem
C0063	D2	Tilt Sensor Circuit High	
C0064	D2	Tilt Sensor Circuit Low	SG/Open
P0107	F2	MAP Sensor Circuit Low	SG/Open
P0108	F2	MAP Sensor Circuit High	SP
P0112	F3	IAT Sensor Circuit Low	SG
P0113	F3	IAT Sensor Circuit High	Open
P0114[1]	F3	IAT Sensor Circuit Intermittent	
P0116	F4	ECT Sensor Circuit Range/Performance	
P0117	F4	ECT Sensor Circuit Low	SG
P0118	F4	ECT Sensor Circuit High	Open/SP
P0119[1]	F4	ECT Sensor Circuit Intermittent	
P0121	G3	TPS Range/Performance	
P0122	G3	TPS Circuit Low	SG
P0123	G3	TPS Circuit High	
P0219	N/A	Engine Over-Speed Condition	
P0231	J1	Fuel Pump Relay Circuit Low	SG/Open
P0232	J1	Fuel Pump Relay Circuit High	
P0233	J1	Fuel Pump Relay Circuit	
P0264[2]	K4	Cylinder Injector Circuit Low/SG	SG
P0265[2]	K4	Cylinder Injector Circuit High	
P0266[2]	K4	Cylinder Injector Balance	Open
P0336[1]	D1/E1	CKP Sensor Synchronization	
P0337[1]	D1/E1	CKP Sensor Circuit	SG
P0339[1]	D1/E1	CKP Sensor Intermittent/Erratic	
P0480	K2	Fan Relay Control Circuit	
P0484	K2	Fan Relay Control Circuit High	
P0485	K2	Fan Relay Control Circuit Low	SG/Open
P0500		Vehicle Speed Sensor	
P0508	C4/D3/ D4/E4	Idle Air Control System Circuit Low	SG
P0509	C4/D4	Idle Air Control System Circuit High	Open
P0562	L1	System Voltage Low	
P0563	L1	System Voltage High	
P0601	N/A	ECU Memory Check-Sum Error	
P0615[1]	L3	Starter Relay Circuit	
P0616	L3	Starter Relay Circuit Low	
P0617	L3	Starter Relay Circuit High	
P0630	N/A	VIN Not Programmed or Incompatible	
P0642	A1	Sensor Power Circuit Low	
P0643	A1	Sensor Power Circuit High	
P2303[2]	M2	Ignition Coil Primary Circuit Low	Open
P2304[2]	M2	Ignition Coil Primary Circuit High	
P2531	A4	Ignition Switch Circuit Low	
P2532	A4	Ignition Switch Circuit High	
U0155	B1/C1	LCD Gauge Communication Lost	
*FUEL OFF		*Tilt Sensor Activation Operator-Code	

High — Signal Level too High (Possible Short-to-Battery (+))
Low — Signal Level too Low (Possible Short-to-Ground or Short-to-Chassis)
SG — Possible Short-to-Ground or Short-to-Chassis
Open — Open-Circuit (Possible Broken-Wire or No-Connection)
1 — These codes cleared by one complete power-cycle only (key-off, key-on)
2 — These codes cleared by one complete starting-cycle only (key-off, key-on, start, key-off, key-on)

Tilt Sensor

⚠ WARNING

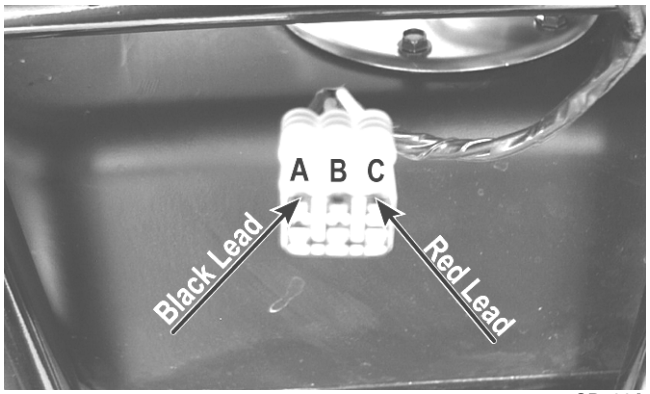
Incorrect installation of the tilt sensor could cause sudden loss of engine power which could result in loss of vehicle control resulting in injury or death.

CAUTION

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

SUPPLY VOLTAGE

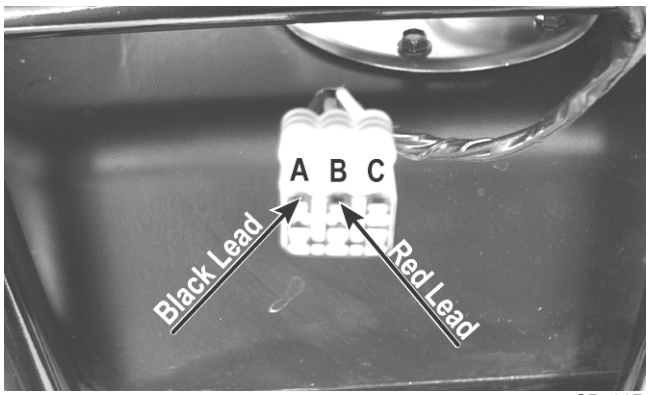
1. Disconnect the three-wire connector from the sensor; then select DC Voltage on the multimeter and connect the red tester lead to the orange wire (C) and the black tester lead to the black wire (A).



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 main and 10-amp ignition fuses, wiring harness, or the ignition switch.

3. Remove the red tester lead and connect to the blue/brown wire (B). The multimeter should read approximately 2.5 DC volts. If the specified voltage is not indicated, check wire connections at the ECU or substitute another ECU to verify the test.



CD706B

OUTPUT VOLTAGE

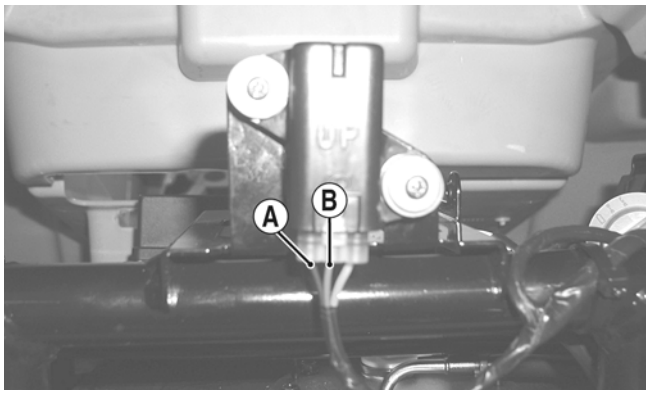
■NOTE: Needle adapters will be required on the multimeter leads as the following tests are made with the sensor connected.

1. Connect the three-wire plug to the sensor; then remove the right-side mounting screw securing the sensor to the rear frame.

CD707

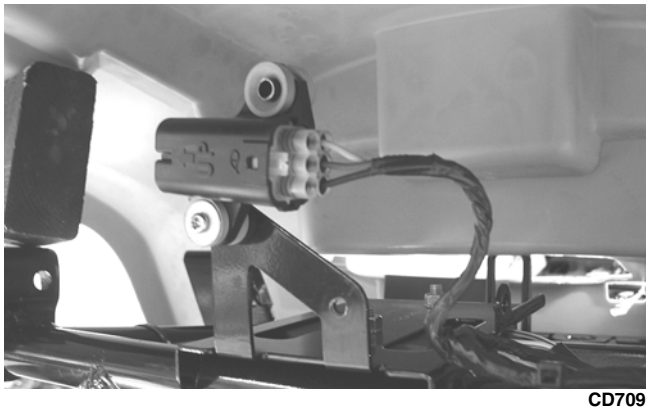
2. Install the needle adapters to the multimeter leads; then select DC Voltage on the multimeter.

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

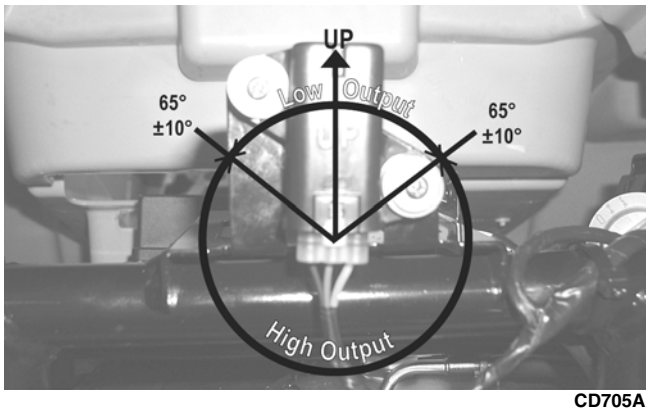
4. Tilt the sensor 60° or more to the left and right observing the meter. The meter should read 4.0-8.0 DC volts after approximately one second in the tilted position. If the meter readings are not as specified, the tilt sensor is defective.



CD709

5

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

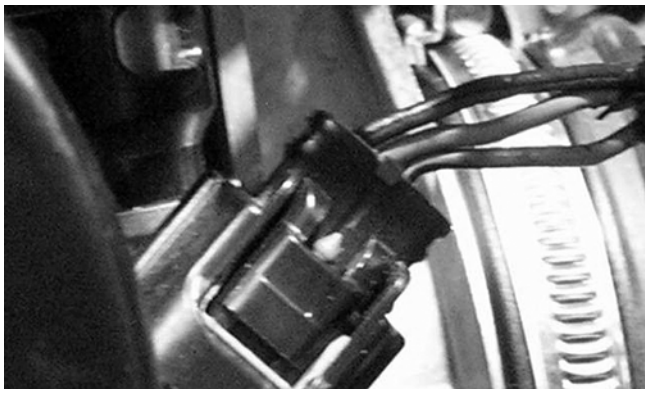


CD705A

Throttle Position Sensor (TPS)

INSPECTING

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

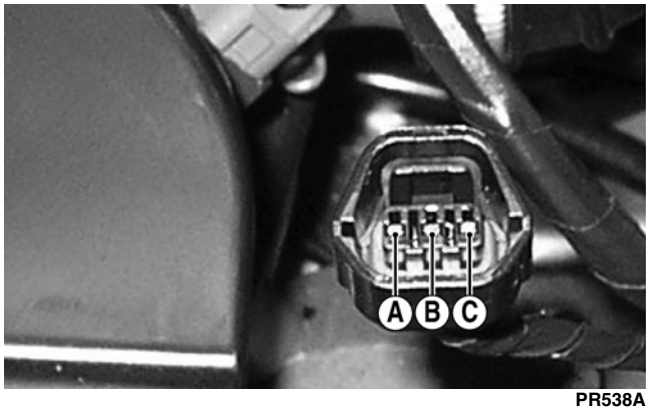


PR544

■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 terminal B and the red tester lead to terminal A. Turn the ignition switch to the ON position. The meter should read approximately 5.0 DC volts.



PR538A

■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.

4. Turn the ignition switch to the OFF position.

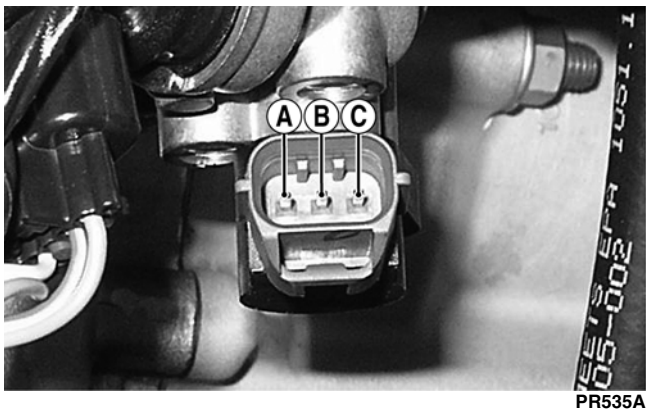
5. Select the OHMS position on the meter; then perform the following resistance tests on the TPS.

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

   B. Pin (A) to pin (B) - approximately 1.22k ohms (throttle closed).

   C. Pin (A) to pin (B) - approximately 4.5k ohms (throttle full-open).

   D. Pin (A) to pin (C) - approximately 5.5k ohms.

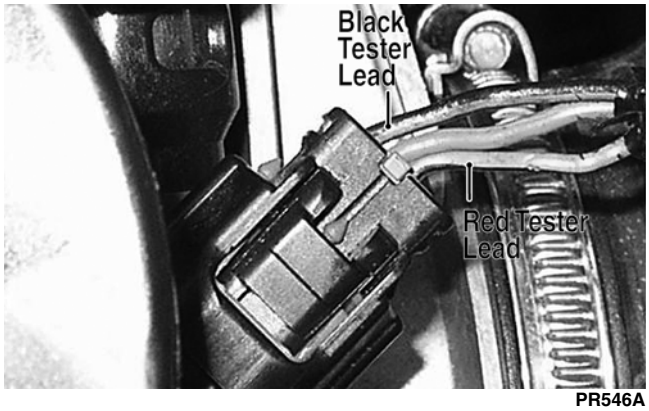


PR535A

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

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

7. 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.



PR546A

8. Select the DC Voltage position on the meter and turn the ignition switch to the ON position. The meter should read approximately 4.5 DC volt with the throttle closed and approximately 1.5 DC volts with the throttle in the full-open position.

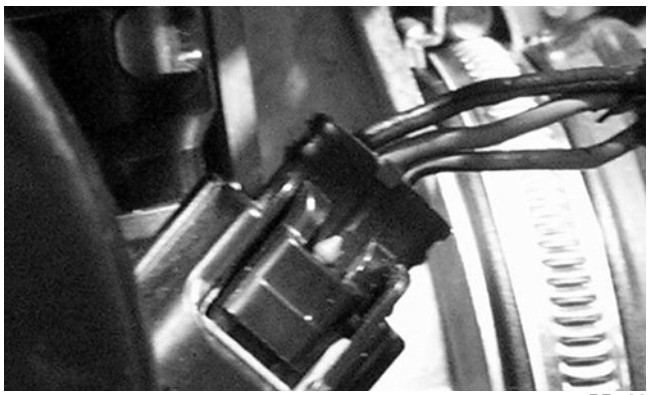
■NOTE: If the meter readings are as specified, check the main harness connector at the ECU main harness wiring. If the meter readings are not as specified, replace the TPS and adjust to specifications (see INSTALLING/ADJUSTING in this sub-section).

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

9. Verify all malfunction codes are closed after servicing is complete (see ECU Malfunction Codes in this section).

REMOVING

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


PR544

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 screw. Do not tighten at this time.

2. Connect the TPS Multi-Analyzer Harness connector #8 to the TPS; then connect the harness to the TPS Analyzer Tool.


FI672

3. Using a multimeter, connect the black tester lead to the black socket (GND) on the analyzer and the red tester lead to the white socket (VAR); then select the Voltage position.

FI673A

4. Adjust the TPS until a reading of 0.68 DC volts is obtained; then tighten the screw securely. Open and close the throttle and determine the reading returns to 0.68 DC volts. Readjust as necessary.

FI674

5. Disconnect the harness from the analyzer; then disconnect the harness from the TPS and reconnect the TPS main harness connector.

6. Tighten the mounting screw securely.

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 relay** defective	3. Replace relay
4. **Emergency stop - ignition switch** off	4. Turn on switches
5. **Wiring connections** loose - disconnected	5. 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 2. **Battery electrolyte** insufficient 3. **Specific gravity** too low 4. **Battery** run-down - damaged 5. **Electrolyte** contaminated	1. Replace battery 2. Keep electrolyte to prescribed level 3. Charge battery - add distilled water 4. Replace battery 5. Replace battery
Problem: Battery discharges too rapidly	
Condition	**Remedy**
1. **Electrolyte** contaminated 2. **Specific gravity** too low 3. **Charging system** not charging 4. **Cell plates** overcharged - damaged 5. **Battery** short-circuited 6. **Specific gravity** too low	1. Replace battery 2. Charge battery - add distilled water 3. Check magneto - regulator/rectifier - circuit connections 4. Replace battery - correct charging system 5. Replace battery 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.

A. A "6" or "3.6" on the lower-right corner indicates a 3.6:1 gear set ratio (10:36 teeth).

B. A "1" or "3.1" on the lower-right corner indicates a 3.1:1 gear set ratio (11:34 teeth).

C. A "4.0" on the lower-right corner indicates a 4.0:1 gear set ratio (9:36 teeth).

The die-cast aluminum housings have been assembled with thread-rolling screws (trilobular). When assembling with these screws, start the screws carefully into the housing; then use the following torque values.

Size	New Housing	Reassembled Housing
M6 (Torx T-30 Recess)	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	0444-104
Pinion Gear/Shaft Removal Tool	0444-127
Slide Hammer Kit	0444-225
Gear Case Seal Installation Tool	0444-224

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

Front Drive Actuator/Electronic Differential Lock

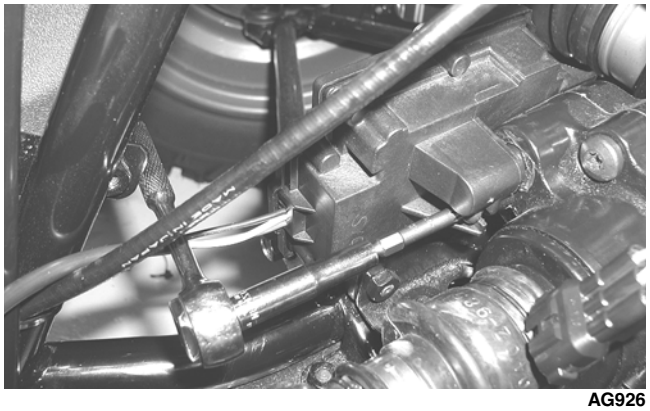
■NOTE: The actuator is not a serviceable component. If it is defective, it must be replaced.

■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 electronic differential lock is activated. If no sound is heard, see Section 5. If the actuator runs constantly or makes squealing or grinding sounds, the actuator must be replaced.

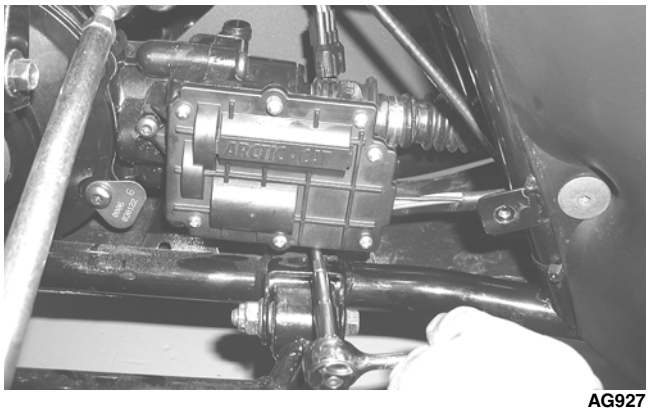
REMOVING

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.



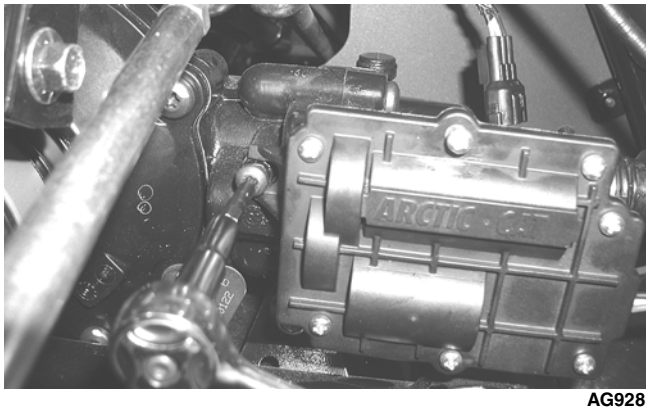
AG926

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.

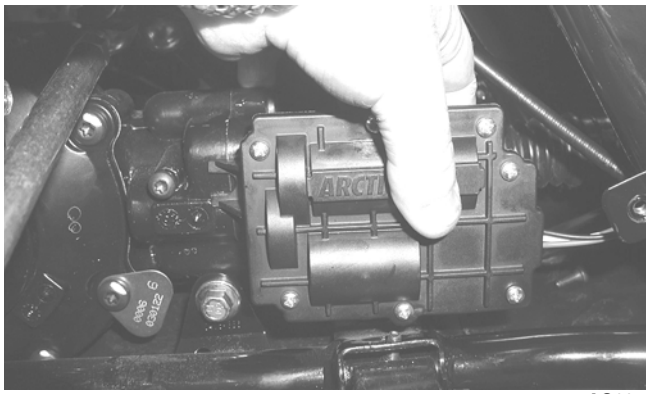


AG928

INSTALLING

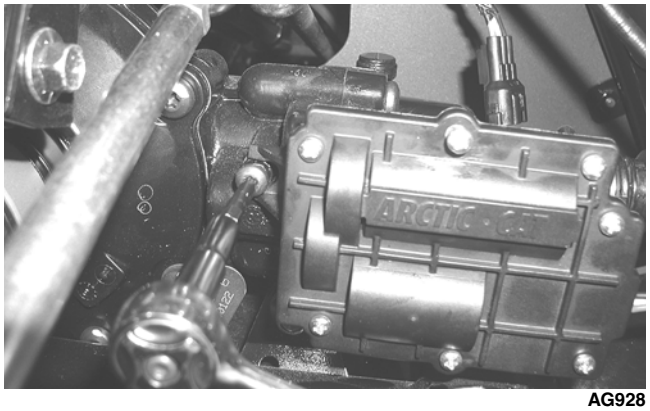
■NOTE: Make sure to properly align the differential lock actuator lever with the hole in the differential lock plunger.

1. Lubricate the O-rings 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.



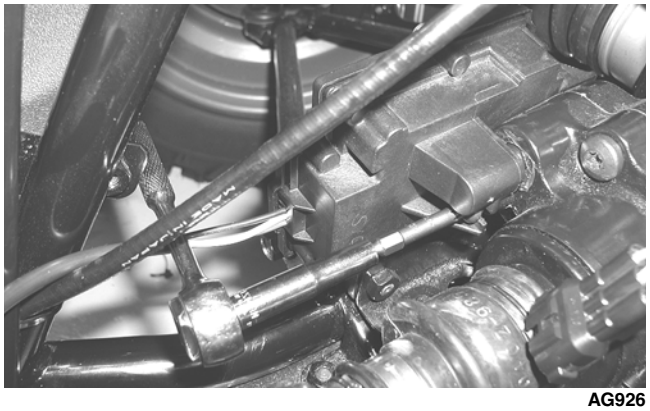
AG925

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.

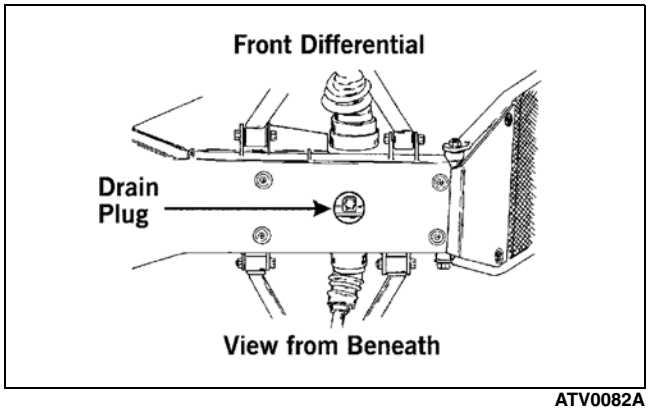
REMOVING DIFFERENTIAL

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

⚠ WARNING

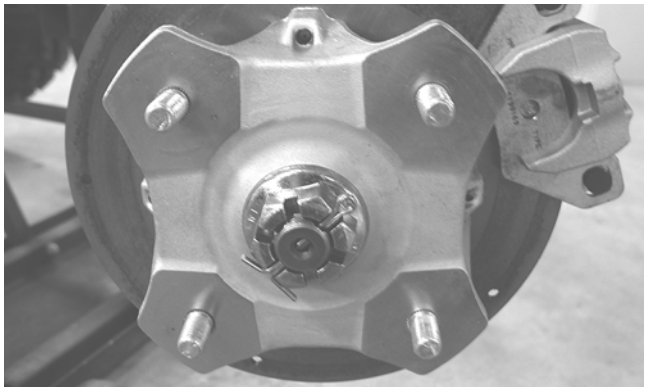
Make sure the ATV is solidly supported on the support stand to avoid injury.

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.

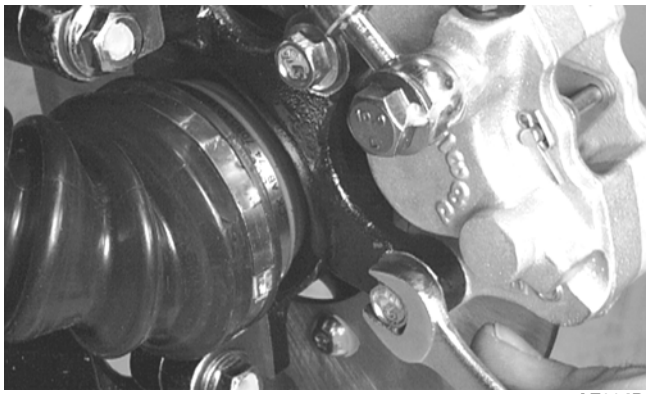


KX041

6. Release the brake lever lock.

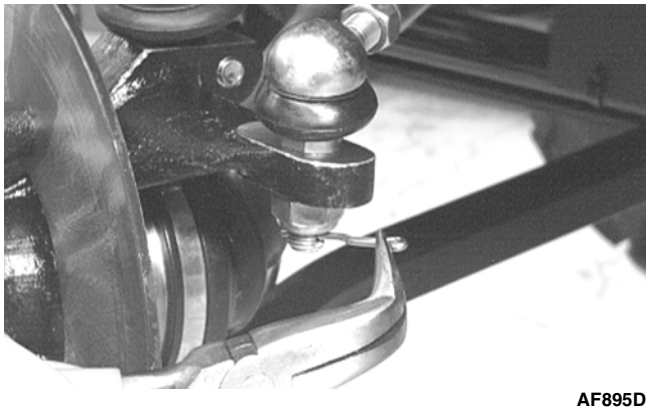
■NOTE: It is not necessary to remove the brake hoses from the calipers for this procedure.

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



AF894D

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

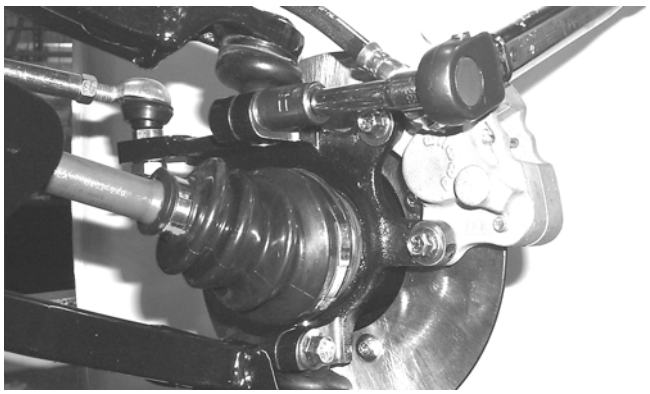


AF895D

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.

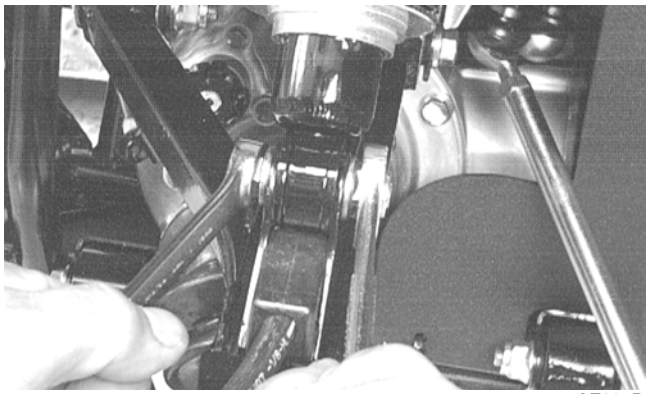
KX151

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

CAUTION

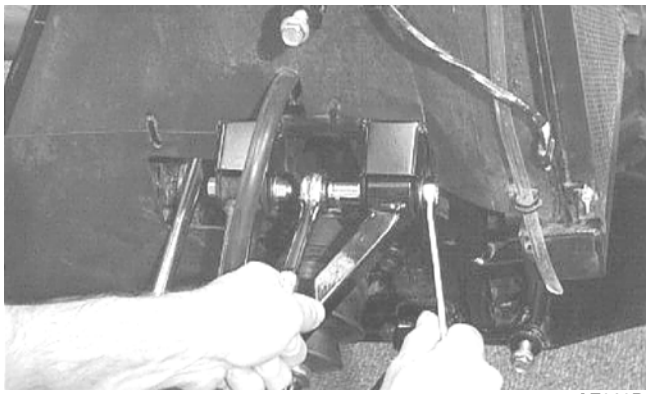
The axle must be supported. If the axle is allowed to drop or hang, damage to the inner CV joint may occur.

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



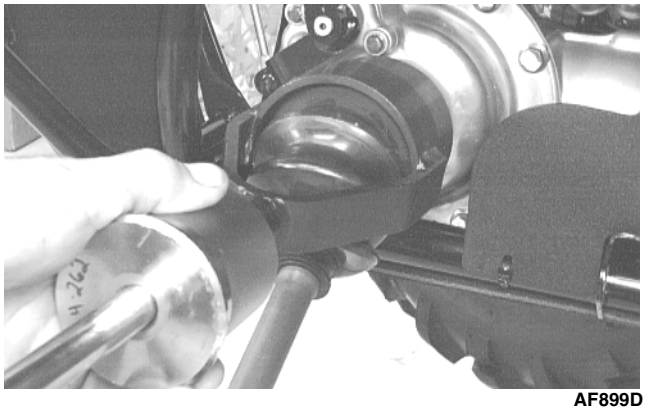
AF897D

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



AF610D

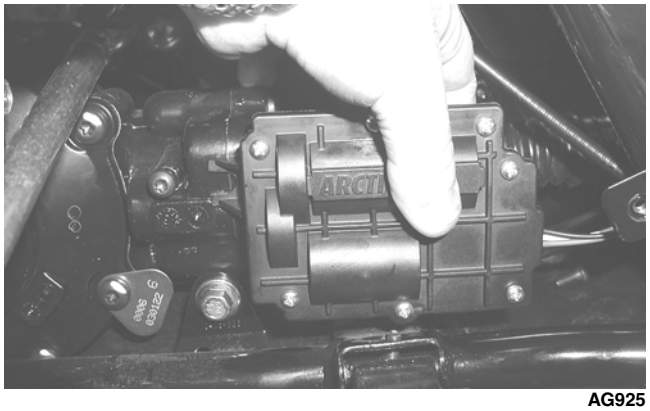
15. Using a slide hammer, remove the front axles.



AF899D

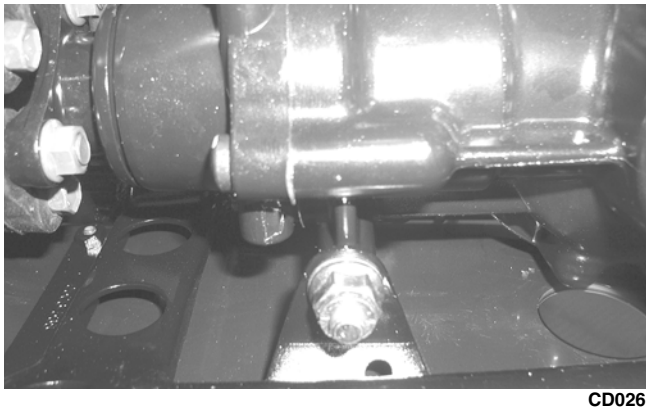
16. Remove the inner fender panels.

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

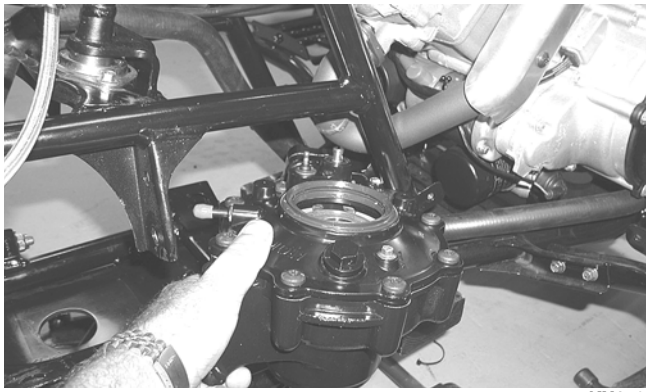
19. Remove the upper differential mounting cap screws.

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

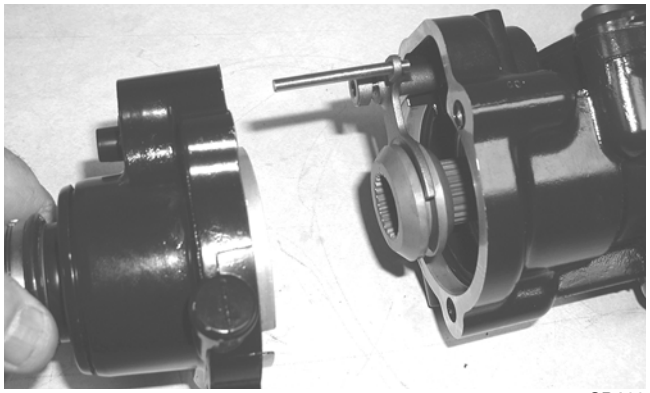
Disassembling Input Shaft

■NOTE: This procedure can be performed on a rear gear case; however, some components may vary. The technician should use discretion and sound judgment.

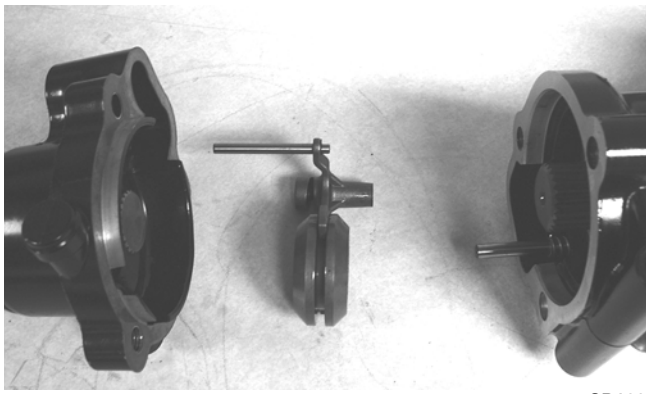
1. Using a T-40 torx wrench, remove the cap screws securing the pinion housing.

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.



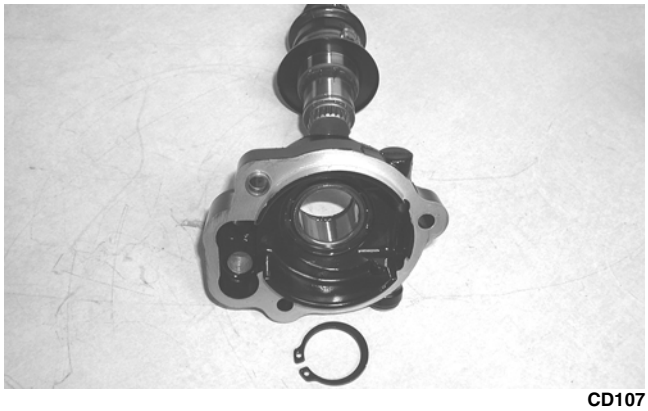
CD103



CD106

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

4. Remove the input shaft from the pinion housing.



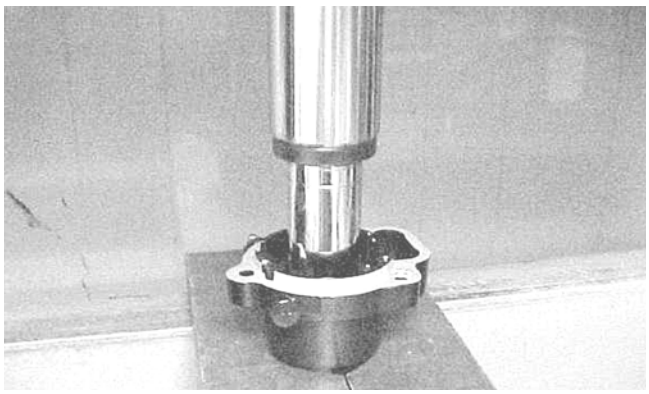
CD107

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

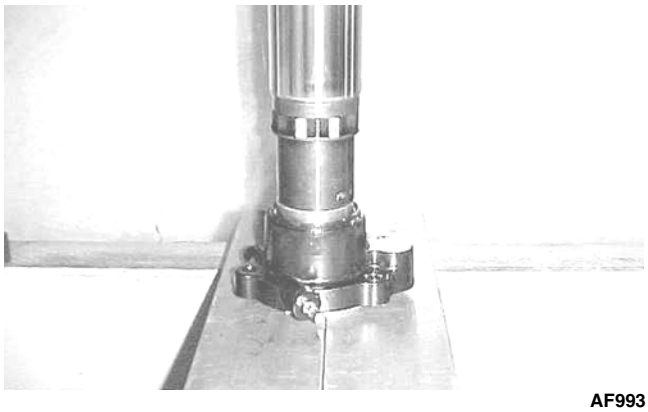


AF984

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 with High-Performance #2 Molybdenum Disulphide Grease packing the boot ribs and splines; then assemble allowing excess grease to freely escape. Slight pressure on the boot will be present during assembly. Secure with new clamps.

■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

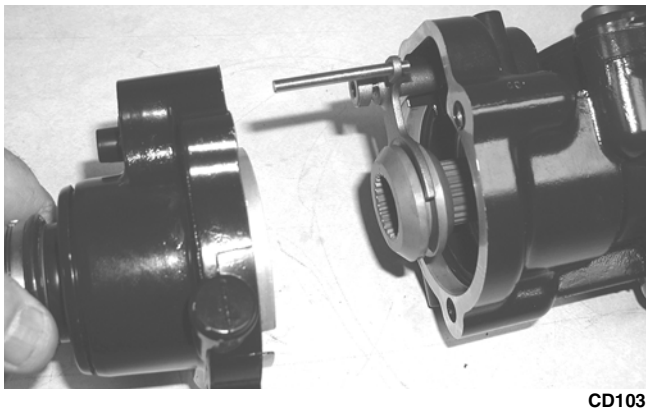
4. Install the input shaft into the pinion housing; then install the front boot and secure with an appropriate boot clamp and the rear boot with an appropriate boot clamp.

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.

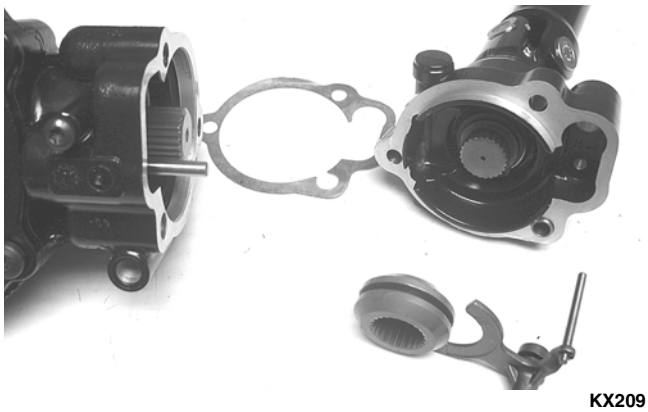


CD103

Disassembling Pinion Gear

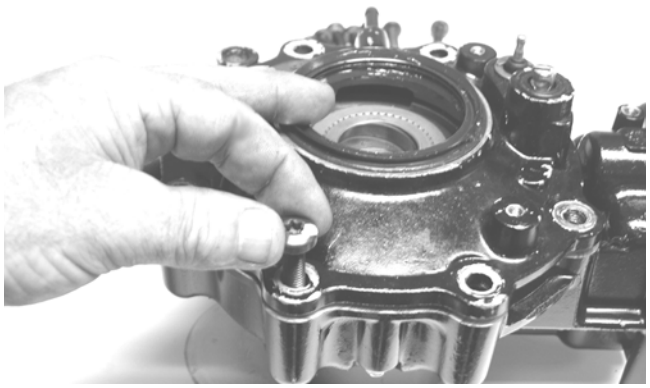
■NOTE: This procedure can be performed on a rear gear case.

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.



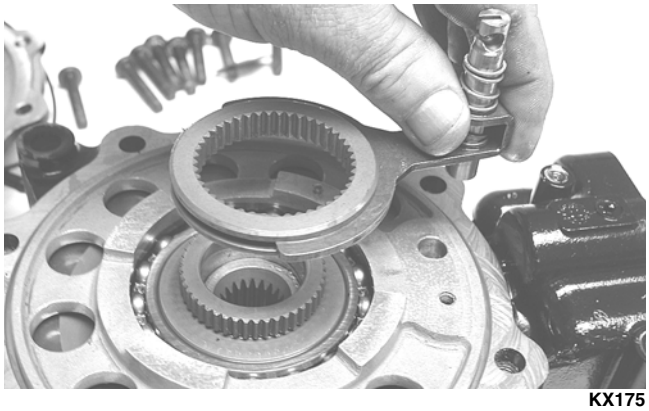
KX173

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

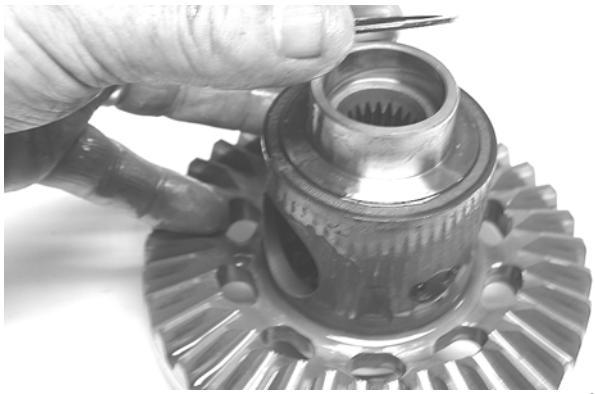
5. Remove the left gear case bearing flange assembly and account for a shim. Mark the shim as left-side.

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

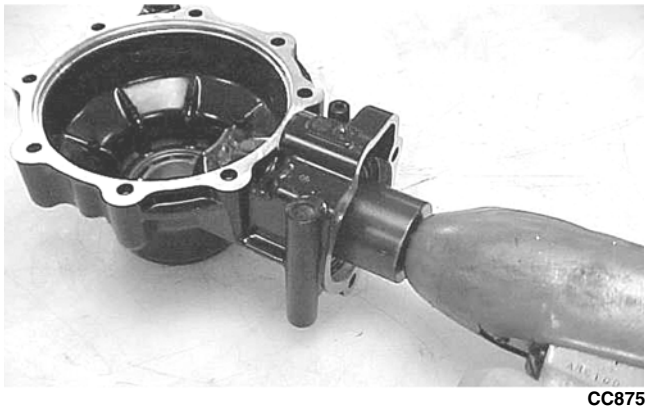


KX181

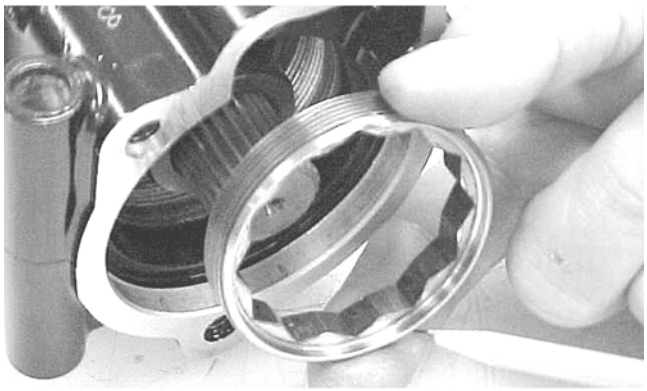
7. Using the 48 mm Internal Hex Socket, remove the lock collar securing the pinion gear assembly.

■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

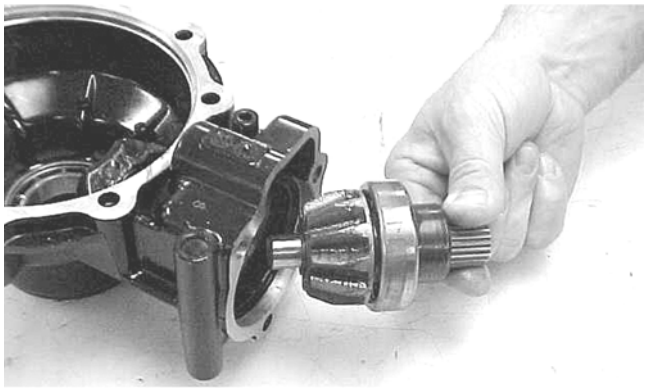


CC875



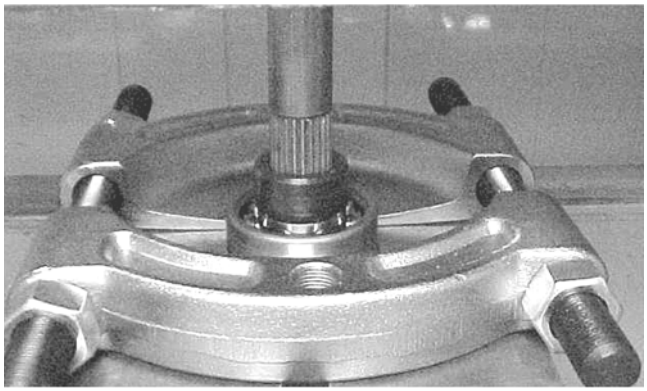
CC876

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.



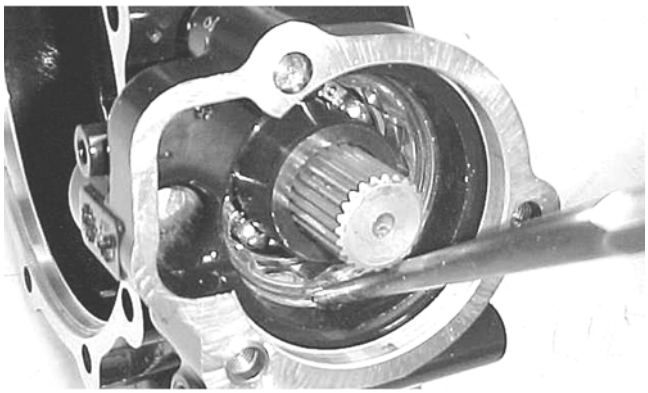
CC879

■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.

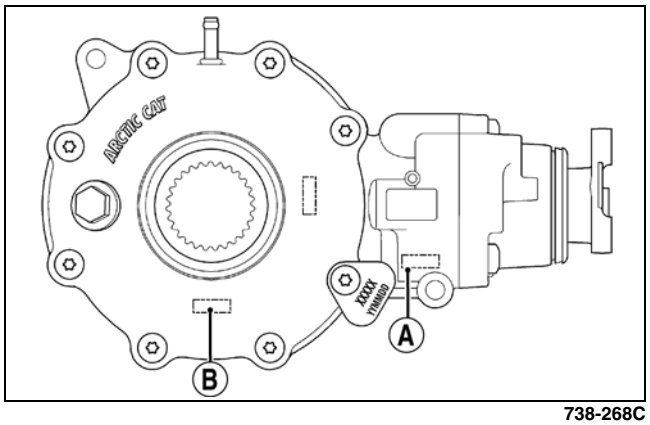
Shimming Procedure/Shim Selection

1. Press bearings into bores by outer ring to 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.

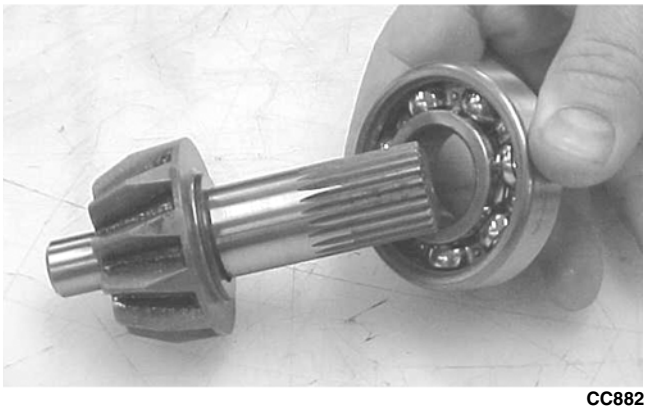
B. Gear Case Side - install a 1.3-1.4 mm shim and tighten the bolts to 28 ft-lb. Verify backlash to be within a range of 0.28-0.38 mm (0.011-0.015 in.) and end-play to be within a range of 0.10-0.20 mm (0.004-0.008 in.). If not within specification range, reselect shim until backlash specification range can be verified.

4. Prior to final assembling, apply molybdenum disulfide grease to all oil seal lips.

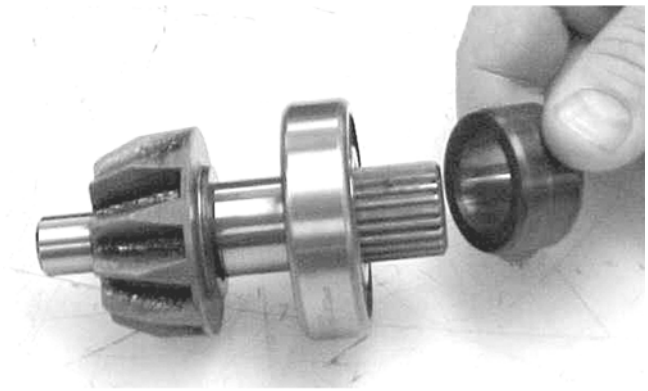
5. Prior to final assembling, prelubricate journal on pinion assembly with SAE 80W-90 hypoid gear lubricant prior to pressing assembly into gear case housing.

Assembling Pinion Gear

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

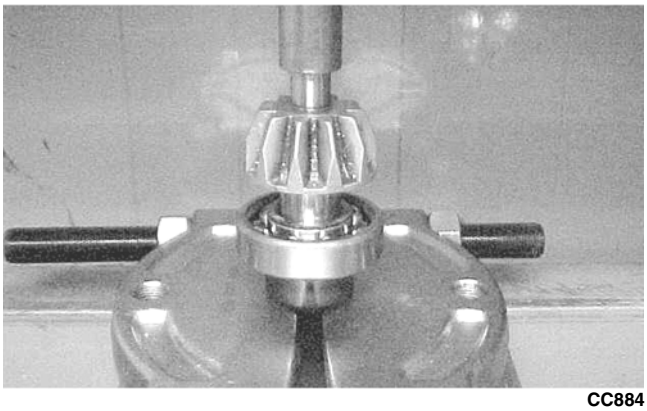


CC882



CC883

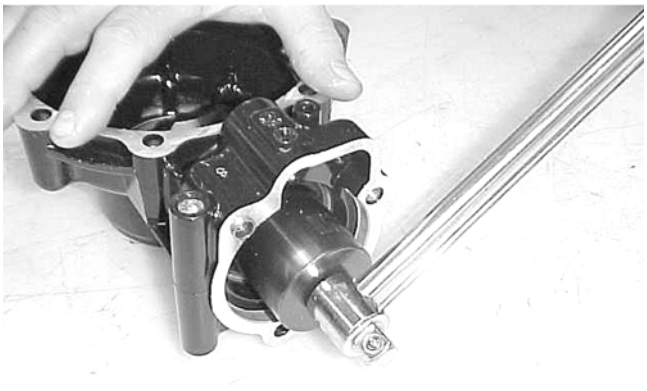
2. Place the pinion assembly in a bearing puller; then install the bearing using a press.



CC884

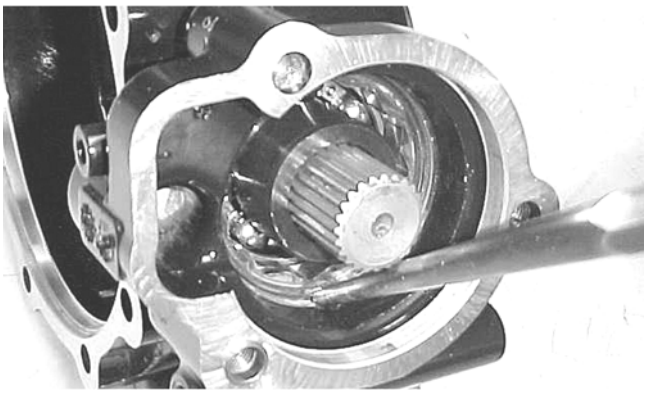
3. Install the pinion gear assembly into the housing. Using the 48 mm Internal Hex Socket, secure the pinion gear assembly with the existing lock collar. Tighten to 125 ft-lb.

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



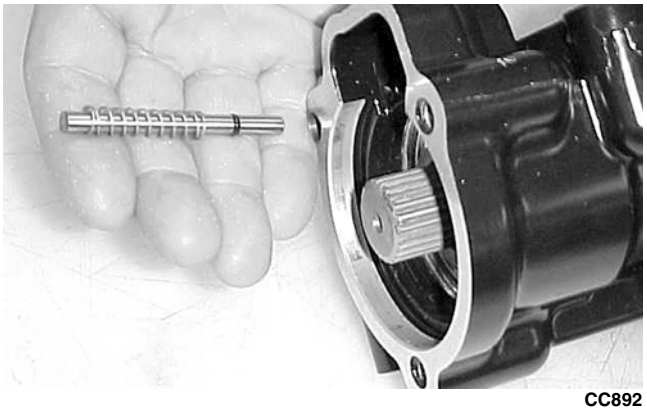
CC890

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.



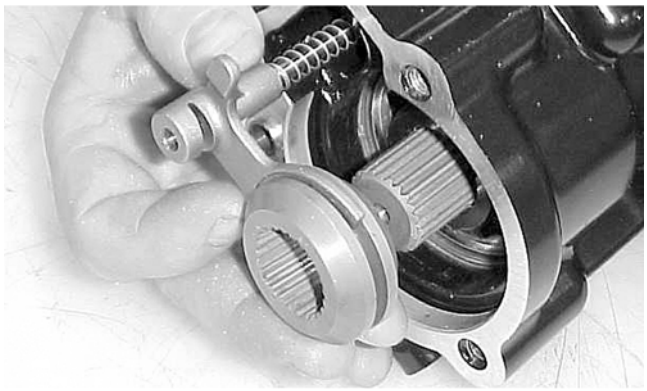
CC891

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



CC892

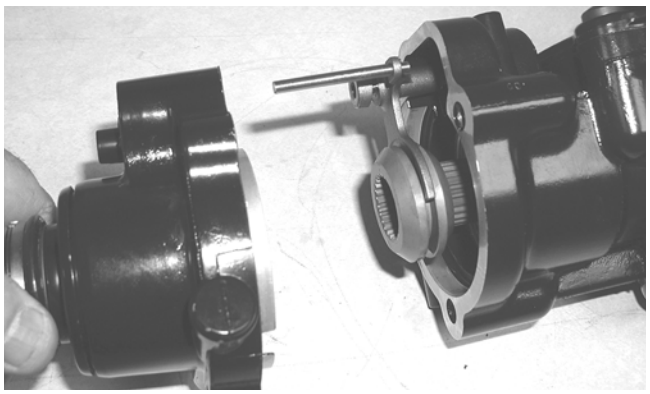
6. Install the shift fork assembly making sure the fork leg is facing upward. Apply a small amount of oil to the gasket; then install the gasket.



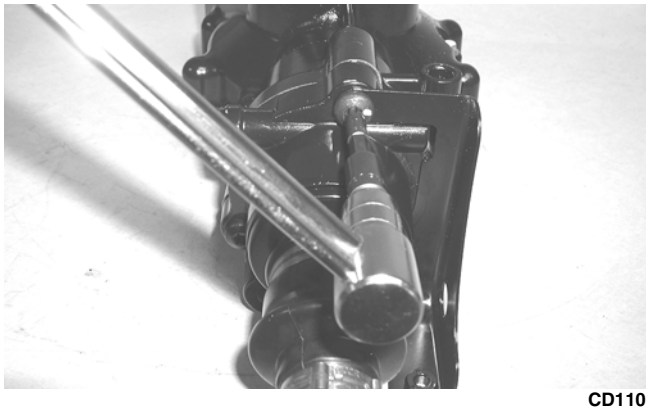
CC893

7. Place the pinion 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.



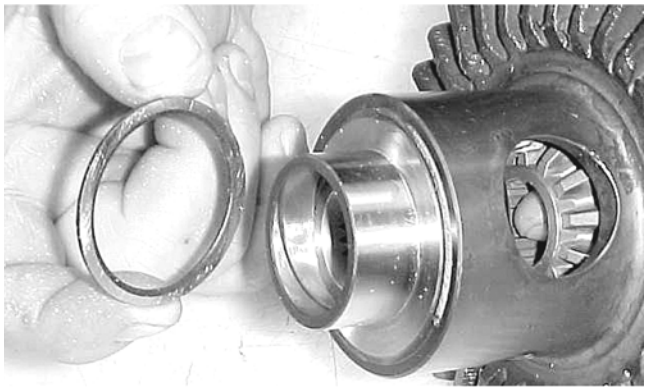
CD103



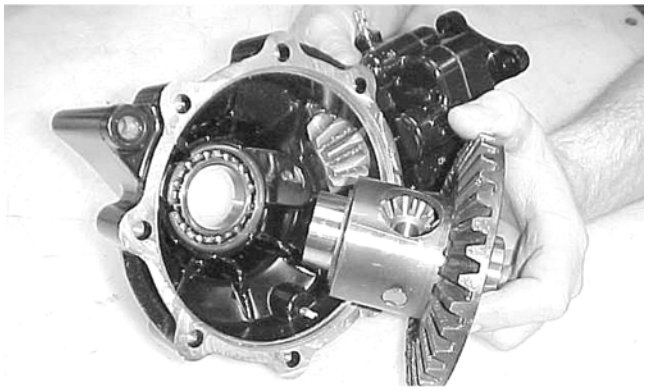
CD110

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.

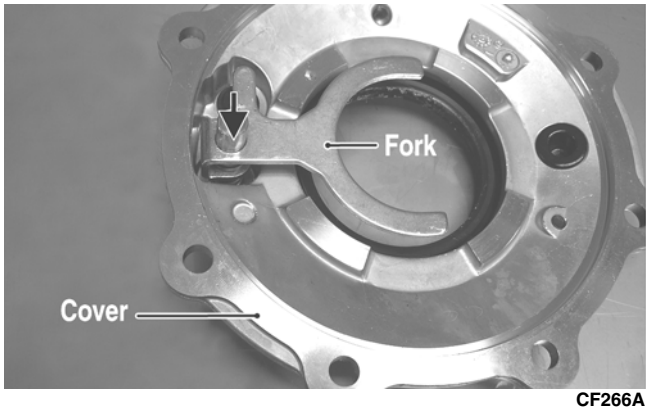


CC896

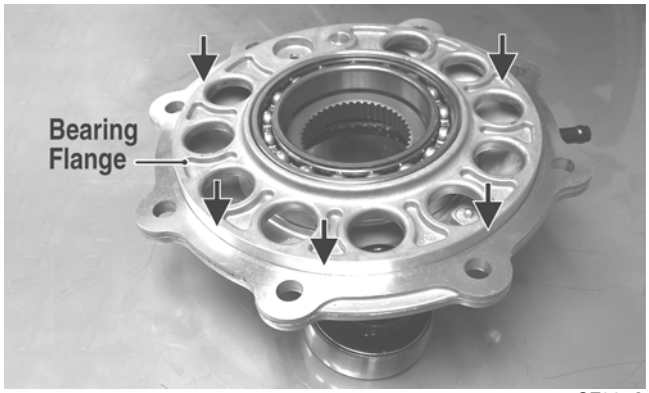


CC897

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 differential/gear case cover assembly, install the cover with existing hardware. Account for the ID tag. Tighten the cap screws (coated with green Loctite #609) to 23 ft-lb.

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

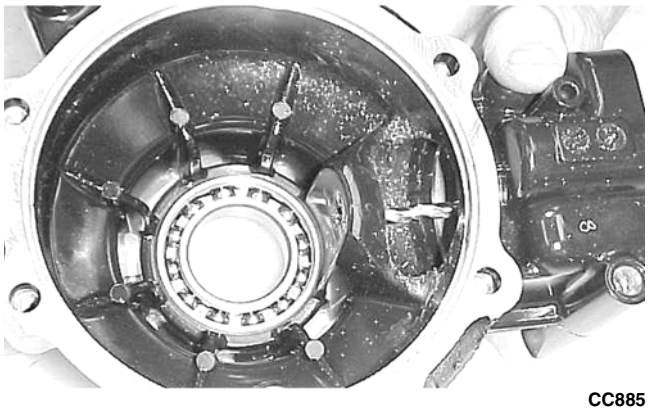
■NOTE: If a new gear case housing is being installed, tighten the cap screws to 25-31 ft-lb.

Removing Needle Bearing

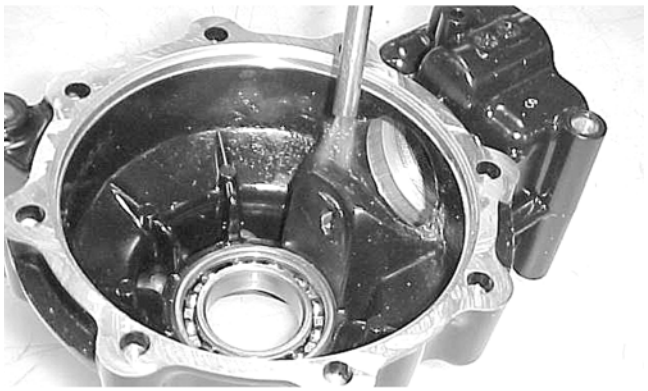
■NOTE: Removing the needle bearing is rarely necessary. Avoid removing the needle bearing unless the bearing is clearly damaged.

■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

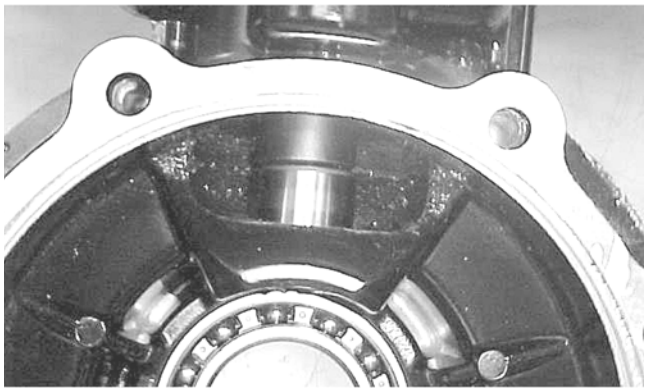
Installing Needle Bearing

1. Apply red Loctite #271 to the outside of a new bearing; then place the new bearing into the housing.

CC888

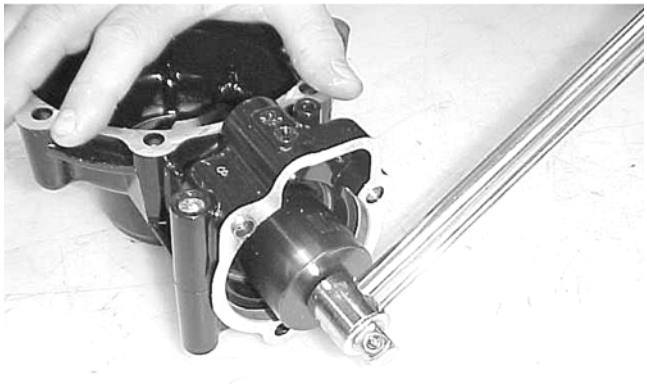
2. Using a suitable driver, install the needle bearing into the gear case housing making sure the bearing is seated.

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



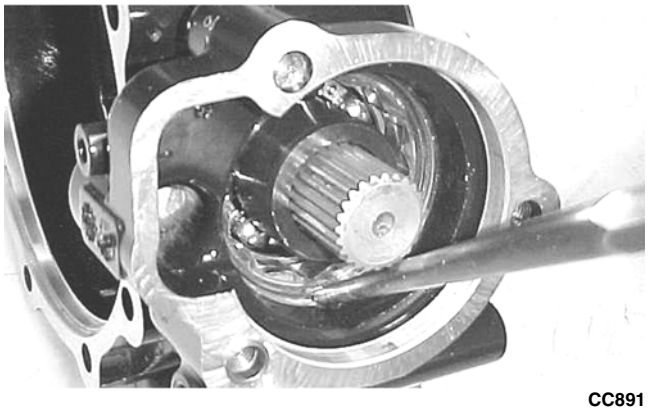
CC889

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.



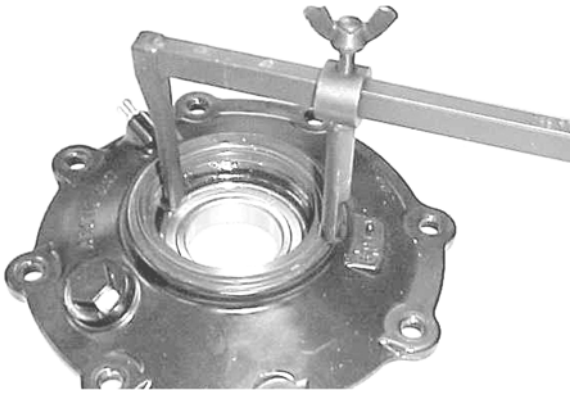
CC891

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.

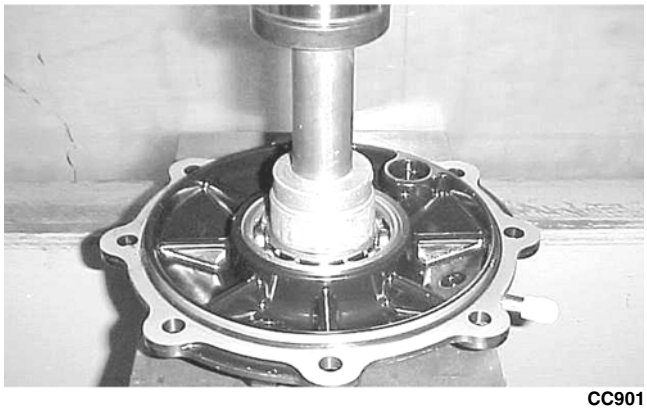


CC899

2. Using a press, remove the bearing.

CC900

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



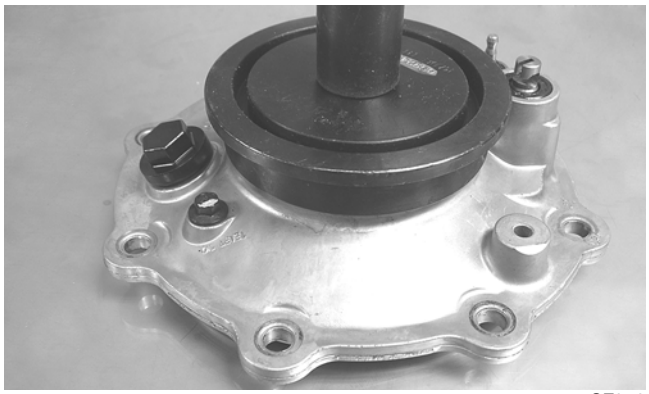
CC901

■**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.

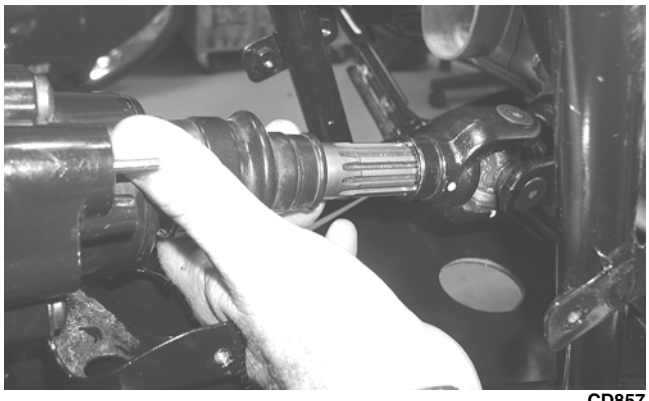


CF278

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.

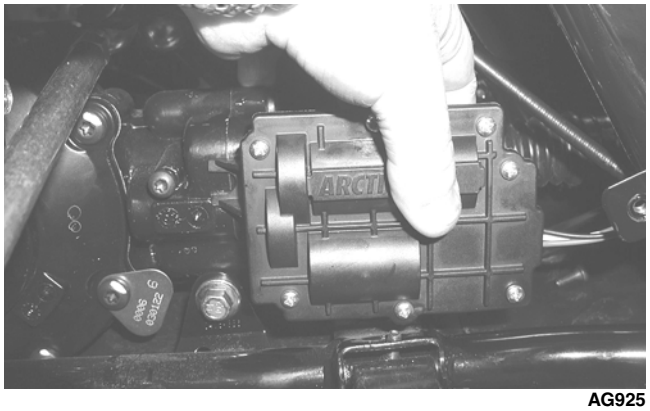


CD857

CD859

2. Pour 275 ml (9.3 fl oz) of SAE 80W-90 hypoid gear lubricant into the differential and install the fill 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.

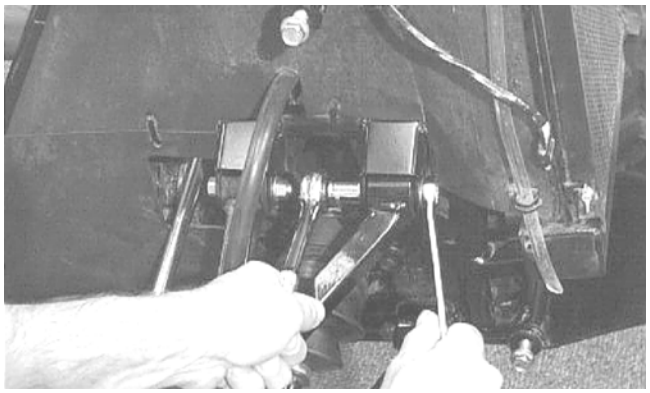


AG925

4. Install the inner fender panels.

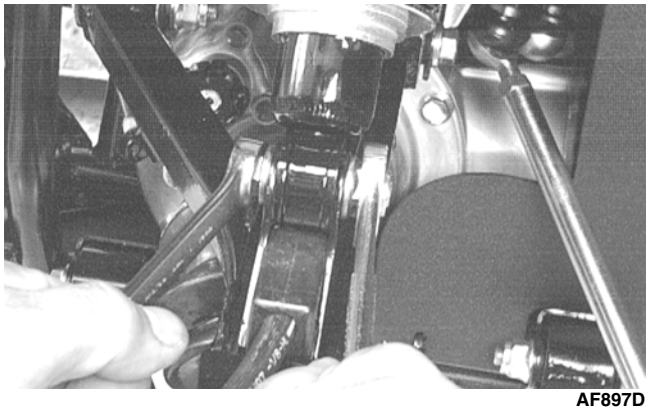
5. Install the front axles (see Drive Axles in this section).

6. Secure the upper A-arms with cap screws and lock nuts. Tighten to 50 ft-lb.



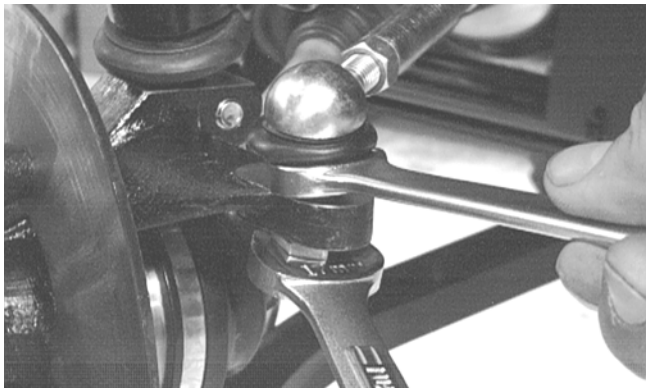
AF610D

7. Secure the lower shock eyelets with cap screws and lock nuts. Tighten to 50 ft-lb.

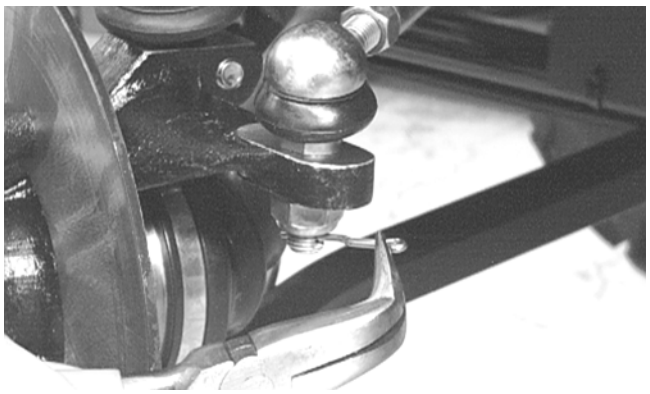


AF897D

8. Secure the tie rods with the lock nuts. Tighten to 30 ft-lb; then install and spread the cotter pins.

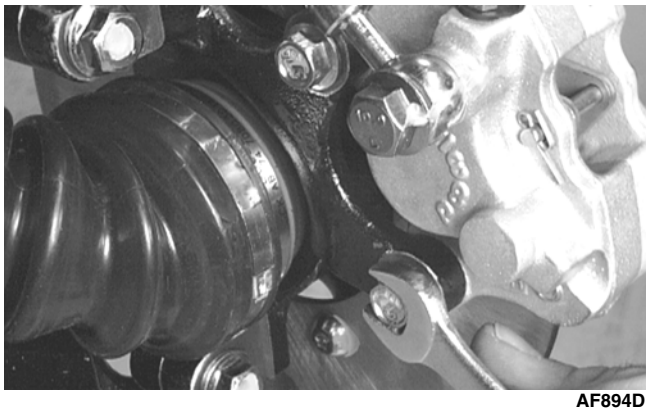


AF896D



AF895D

9. Install the brake calipers and secure with new "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

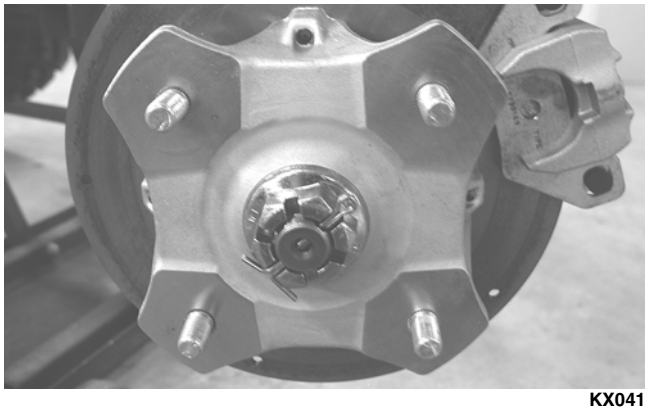
REMOVING REAR DRIVE AXLE

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

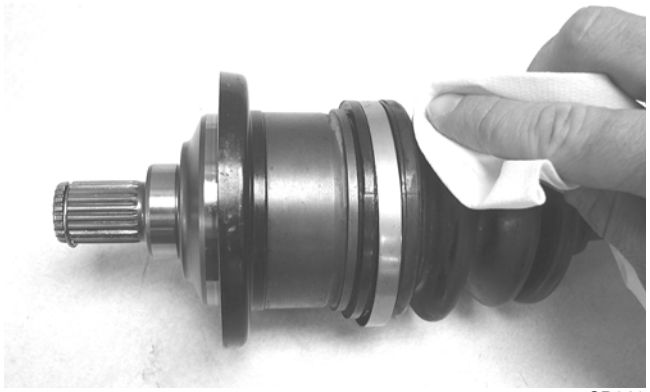
REMOVING FRONT DRIVE AXLE

■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

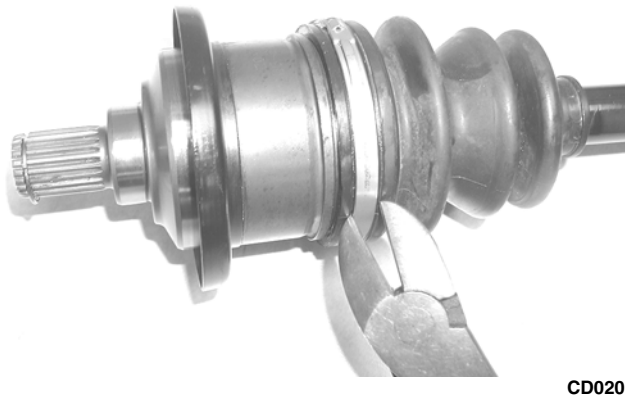
2. Inspect boots for any tears, cracks, or deterioration.

■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.

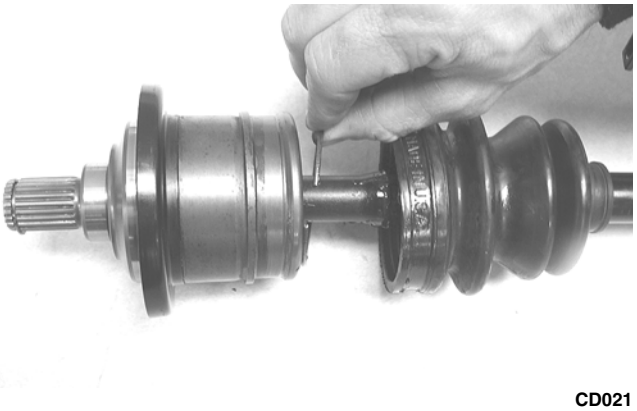
DISASSEMBLING AXLES

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



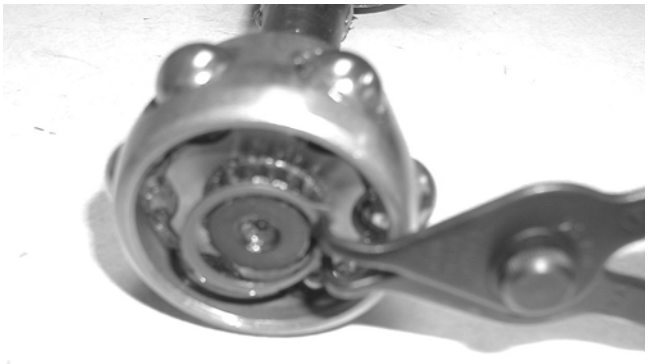
CD020

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.

6

CD022

5. Inspect the splines of the shaft, the bearing ring, and the housing for damage.

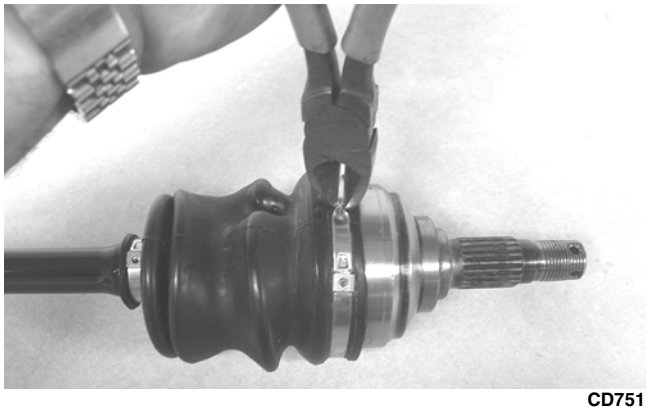
■NOTE: If any damage is apparent to the splines, the bearing ring, and/or the housing, the drive axle must be replaced as an assembly.

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

CD752

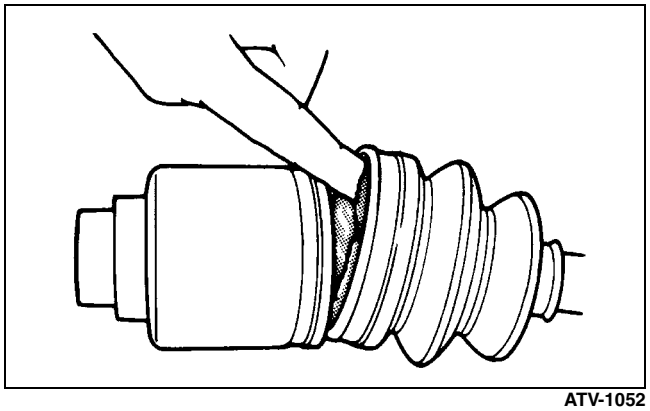
■NOTE: At this point if the outside boot is damaged, continue with step 7.

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

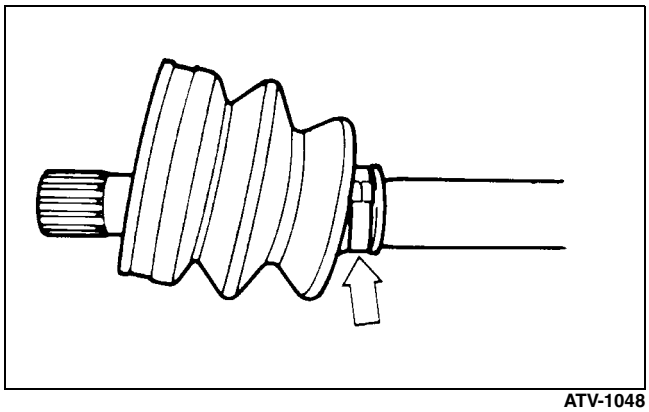
ASSEMBLING AXLES

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

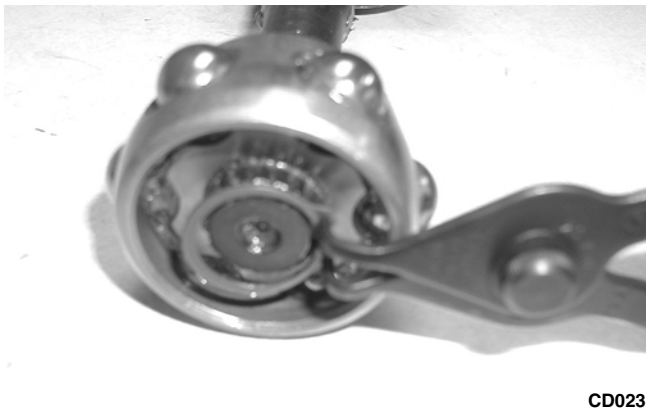
3. Apply 80 grams (2/3 of contents) of grease from the pack into the bearing housing.
4. Install the bearing onto the shaft making sure the recess of the bearing is facing the housing.

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.

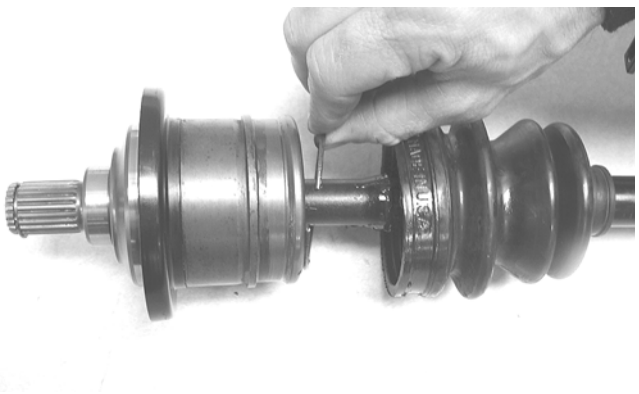
5. Secure the bearing ring with the snap ring making sure the sharp side of the snap ring faces away from the boot.



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

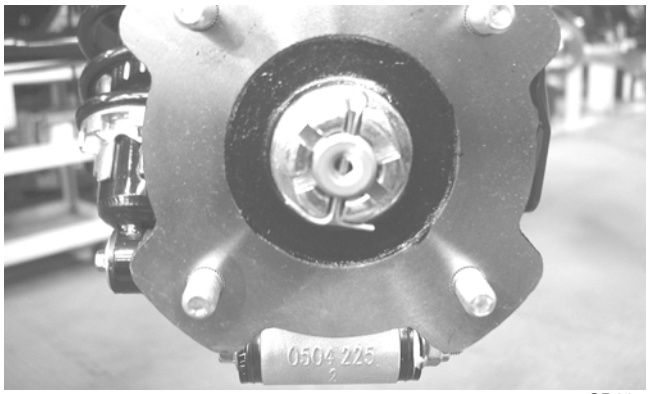
8. Inspect the axle components for correct positioning of the four clamps. Also, inspect the boots for being correctly positioned on the shaft.

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 50 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 new "patch-lock" 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.

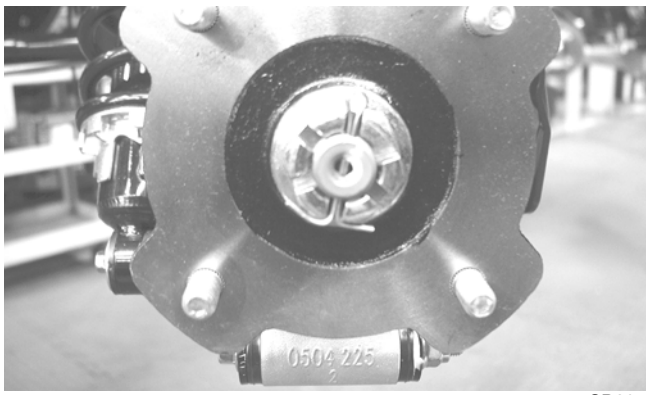


CD027

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

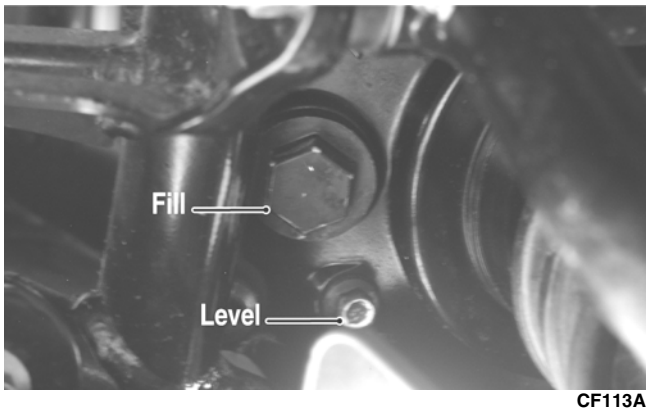
INSTALLING FRONT DRIVE AXLE

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 50 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 50 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 using new "patch-lock" cap screws. 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.

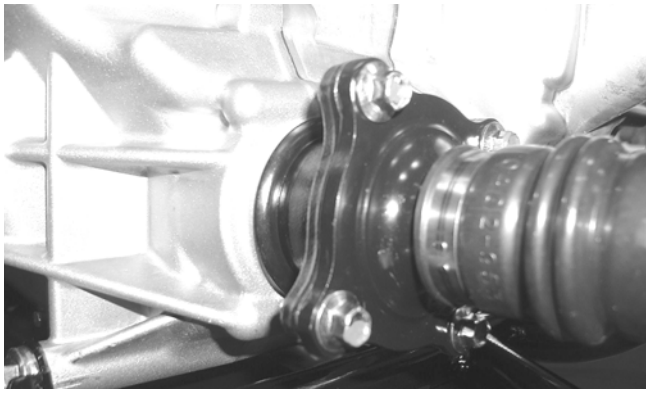


CF113A

Rear Gear Case

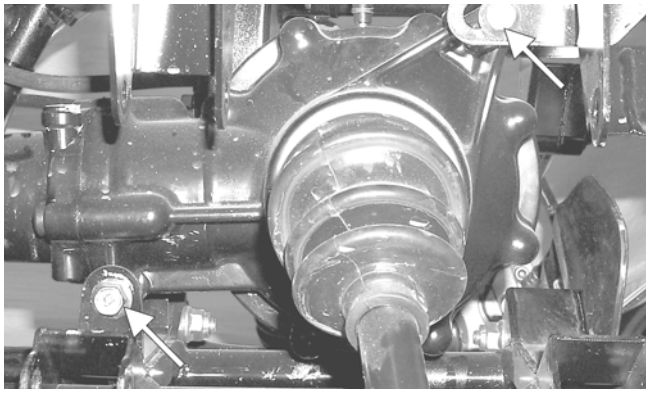
REMOVING

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 input shaft, pinion gear, needle bearing, and axle seal, see Front Differential in this section.

Hub

REMOVING

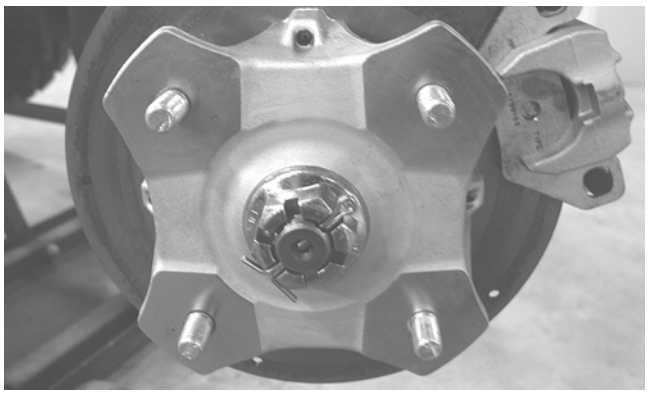
1. Secure the ATV on a support stand to elevate the wheel; then remove the wheel.

⚠ WARNING

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

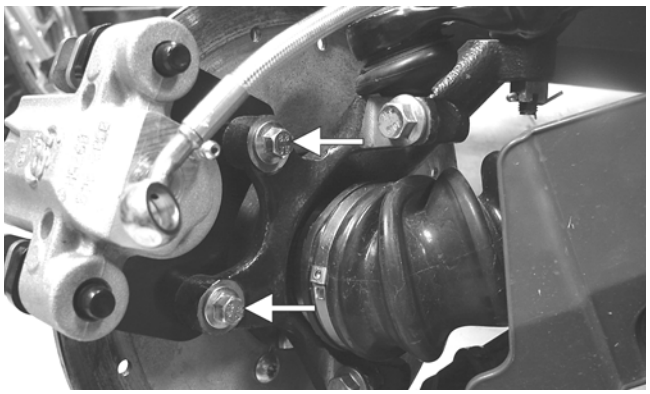
2. Remove the cotter pin from the nut.

■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.

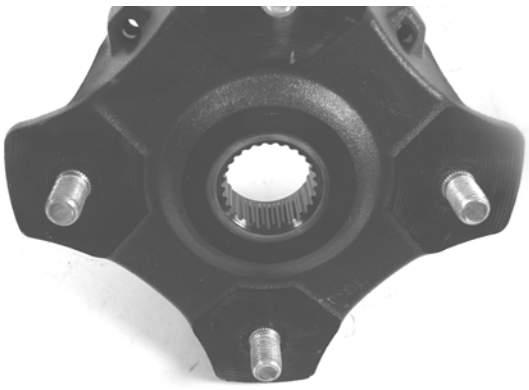
CLEANING AND INSPECTING

■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.

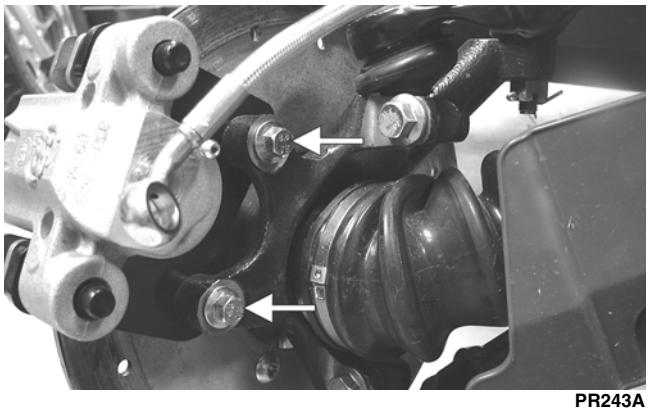
INSTALLING

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 two new “patch-lock” 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.

■NOTE: If the cotter pin does not line up, always tighten to the next alignment.

PR260

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

Hydraulic Brake Caliper

⚠ WARNING

Arctic Cat recommends that only authorized Arctic Cat ATV dealers perform hydraulic brake service. Failure to properly repair brake systems can result in loss of control causing severe injury or death.

REMOVING/DISASSEMBLING

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

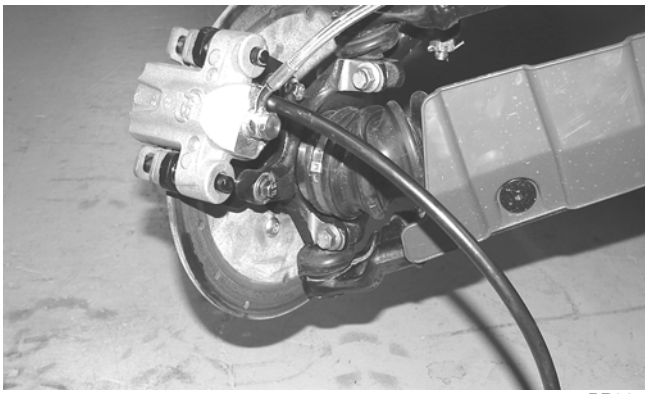
⚠ WARNING

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

⚠ WARNING

Never let brake fluid contact the eyes. Damage to the eyes will occur. Always wear appropriate protective safety goggles and latex gloves when handling brake fluid.

2. Drain the brake fluid from the caliper, hose, and master cylinder through the bleed screw by pumping the brake lever/pedal.



PR235

CAUTION

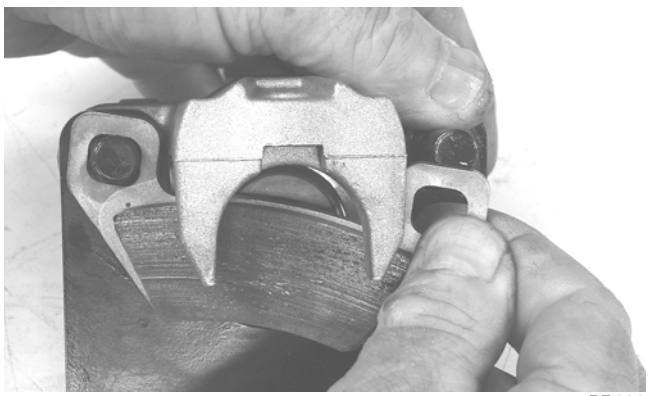
Brake fluid is highly corrosive. Do not spill brake fluid on any surface of the ATV and do not reuse brake fluid.

■NOTE: Whenever brake components are removed, disassembled, or repaired where brake fluid is exposed to air, drain all fluid and replace with new DOT 4 brake fluid from an unopened container. Brake fluid readily absorbs moisture from the air significantly lowering the boiling point. This increases the chance of vapor lock reducing braking power and increasing stopping distance.

3. Remove the brake hose from the caliper and close the bleed screw; then remove the caliper.
4. Compress the caliper holder against the caliper (opposite the O-ring side) and remove the outer brake pad; then remove the inner brake pad.

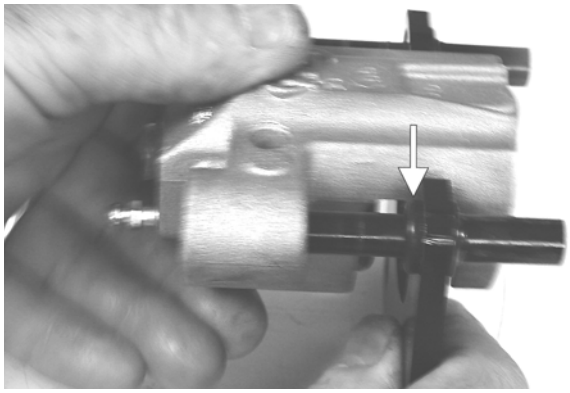
■NOTE: If brake pads are to be returned to service, do not allow brake fluid to contaminate them.

PR237A



PR238

5. Remove the caliper holder from the caliper and discard the O-ring.



PR239B

■NOTE: The O-ring is used for shipping purposes and provides no function in operation.

6. Cover the piston end of the housing with a shop towel; then keeping fingers clear of piston travel, apply compressed air to the fluid port to blow the piston free of the housing. Account for two seal rings in the housing.

PR713A

PR715

⚠ WARNING

Make sure to hold the towel firmly in place or the piston could be ejected from the housing causing injury.

7. Using an appropriate seal removal tool, carefully remove the seals from the brake caliper housing; then remove four O-rings from the brake caliper housing noting the location of the different sized O-rings. Discard all seals, O-rings, and crush washers.

CLEANING AND INSPECTING

1. Clean all caliper components (except the brake pads) with DOT 4 brake fluid. Do not wipe dry.
2. Inspect the brake pads for damage and excessive wear.

■**NOTE: For measuring brake pads, see Section 2.**

3. Inspect the brake caliper housings for scoring in the piston bores, chipped seal ring grooves, or signs of corrosion or discoloration.
4. Inspect the piston surface for scoring, discoloration, or evidence of binding or galling.
5. Inspect the caliper holder for wear or bending.

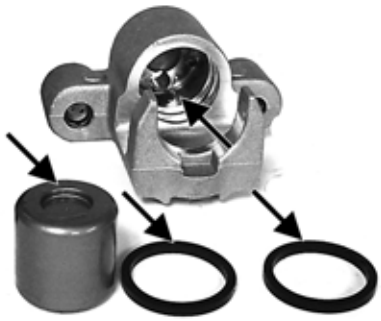
ASSEMBLING/INSTALLING

1. Install new seals into the brake caliper housing and apply a liberal amount of DOT 4 brake fluid to the cylinder bore of the housing, seals, and brake piston.

CAUTION

Make sure the seals are properly in place and did not twist or roll during installation.

PR715



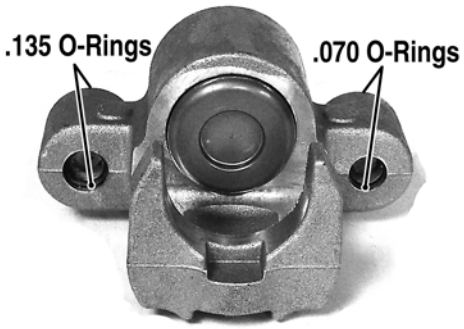
PR717A

2. Press the piston into the caliper housing using hand pressure only. Completely seat the piston; then wipe off any excessive brake fluid.

PR711A

PR712

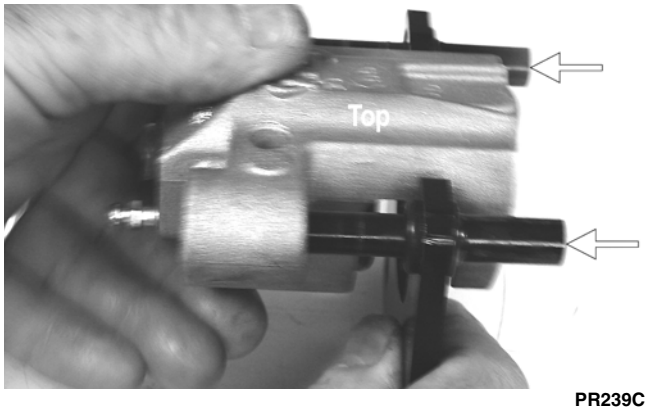
3. Apply high-temperature silicone grease (supplied with the O-ring kit) to the inside of the caliper holder bores and O-rings; then install the four O-rings into the caliper.



PR719C

4. Install the caliper onto the caliper holder making sure the caliper and holder are correctly oriented.

■**NOTE: It is very important to apply silicone grease to the O-rings and caliper bores prior to assembly.**

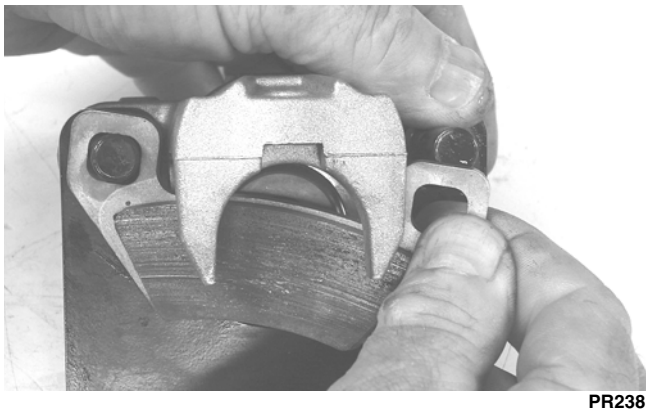


PR239C

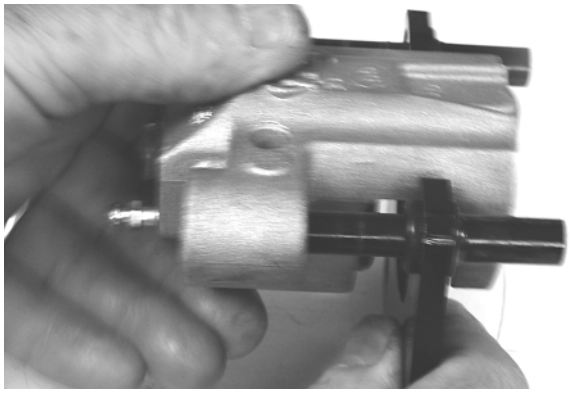
5. Making sure brake fluid does not contact the brake pads, compress the caliper holder toward the caliper and install the inner brake pad; then install the outer pad.

CAUTION

If brake pads become contaminated with brake fluid, they must be thoroughly cleaned with brake cleaning solvent or replaced with new pads. Failure to do so will result in reduced braking and premature brake pad failure.



PR238



PR239

6. Place the brake caliper assembly into position and secure with new "patch-lock" cap screws. Tighten the caliper to 20 ft-lb.
7. Place a new crush washer on each side of the brake hose fitting and install it on the caliper. Tighten to 20 ft-lb.
8. Fill the reservoir; then bleed the brake system (see Section 2).

⚠ WARNING

Never use brake fluid from an open container or reuse brake fluid. Moisture-contaminated brake fluid could cause vapor build-up (expansion) during hard braking resulting in greatly increased stopping distance or loss of control leading to injury or death.

9. Install the wheel. Tighten to 40 ft-lb.
10. 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

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Suspension

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.

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

Shock Absorbers

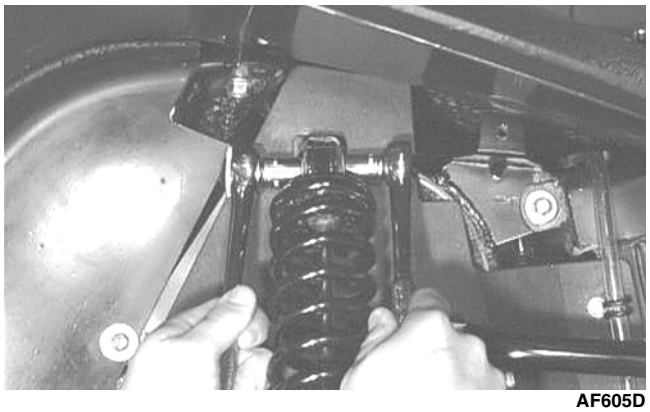
REMOVING

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.

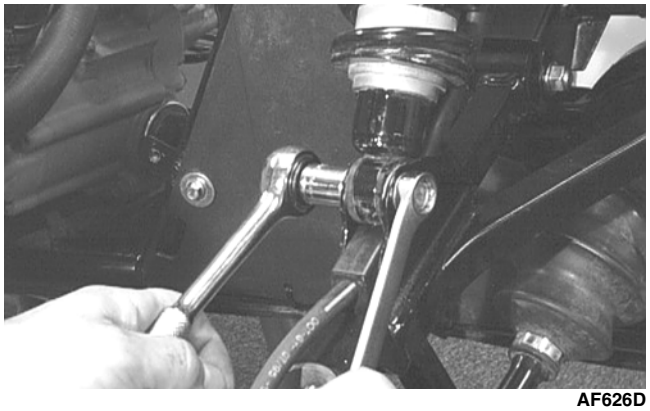


AF605D

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 shocks with two cap screws and nuts. Tighten front shock mounting nuts to 50 ft-lb. Tighten rear shock-to-frame nuts to 50 ft-lb and rear shock-to-lower A-arm nuts to 20 ft-lb.

CAUTION

Do not tighten the nuts beyond the recommended specification or the shock eyelet or mount WILL be damaged.

3. Remove the ATV from the support stand.

Front A-Arms

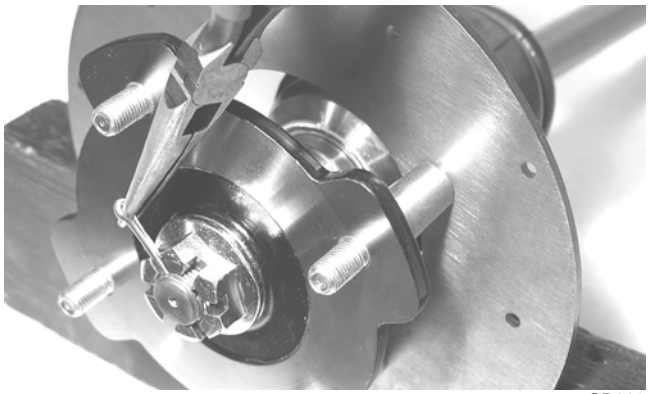
REMOVING

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

⚠ WARNING

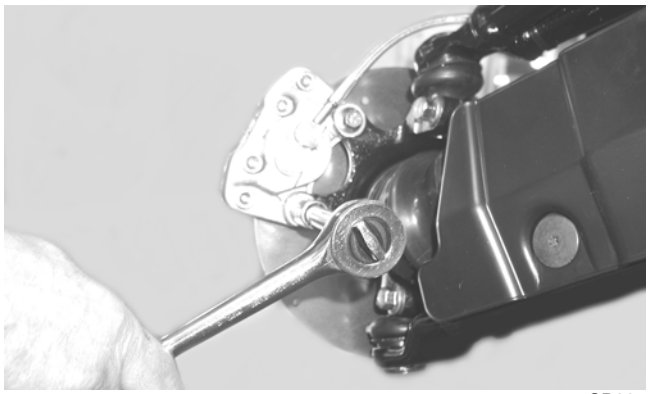
Make sure the ATV is solidly supported on the support stand to avoid injury.

2. Remove the cotter pin from the nut. Discard the cotter pin.



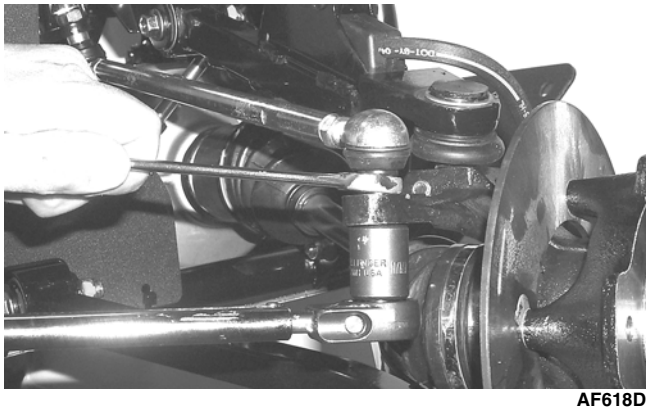
CD008

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.

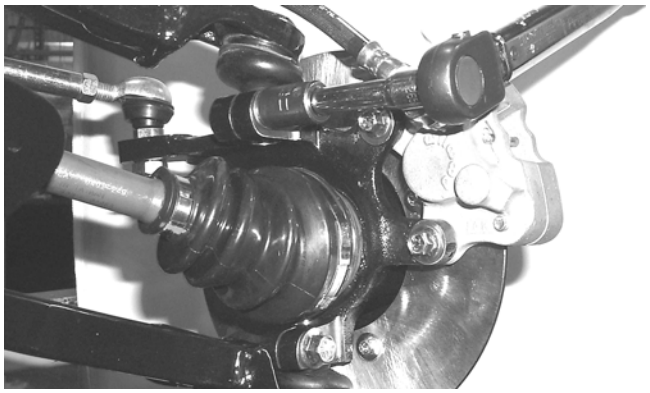


AF618D

7. Remove the cap screws securing the ball joints to the knuckle.

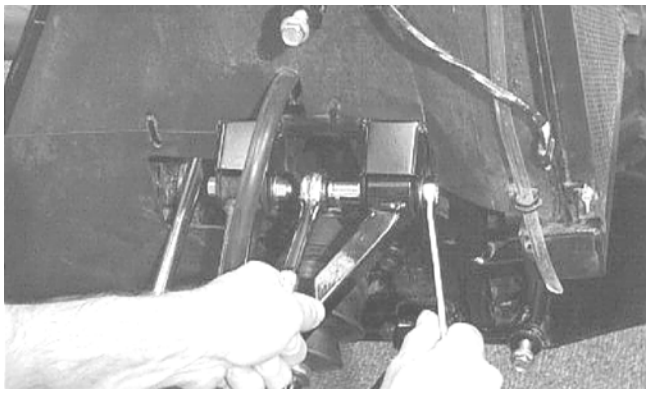
CAUTION

Support the knuckle when removing the cap screws or damage to the threads will occur.



AF628D

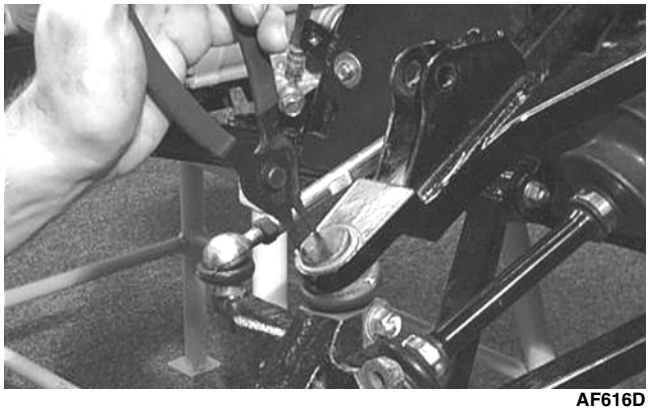
8. Tap the ball joints out of the knuckle; then remove the knuckle.
9. Remove the lower shock absorber eyelet from the upper A-arm.
10. Remove the cap screws securing the A-arms to the frame.



AF610D

11. Remove the circlip from the ball joint; then remove the ball joint from the A-arm.

7



AF616D

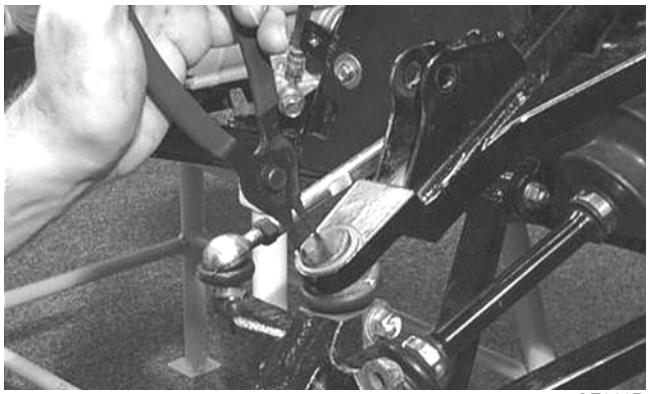
CLEANING AND INSPECTING

■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.

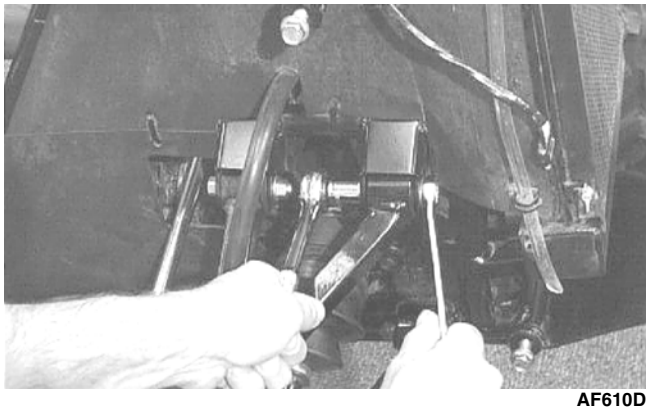
INSTALLING

1. Apply Loctite Primer "T" to the arm socket; then apply green Loctite #609 to the entire outside diameter of the ball joint. 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.

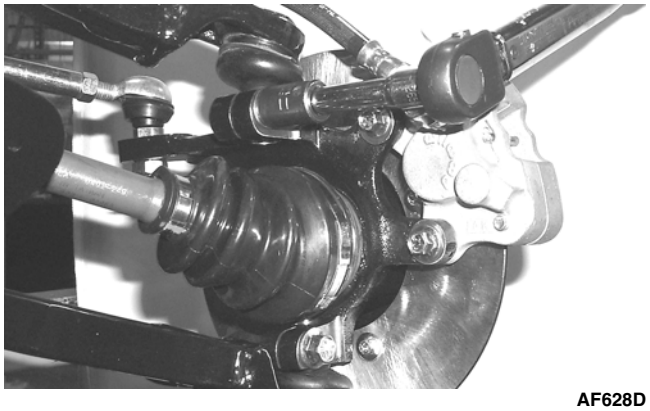
DE054A

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.

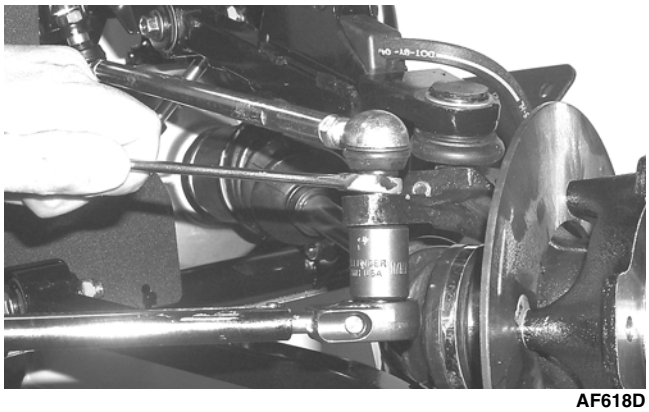
6. Install the knuckle assembly onto the ball joints and secure with cap screws. Tighten to 30 ft-lb.



AF628D

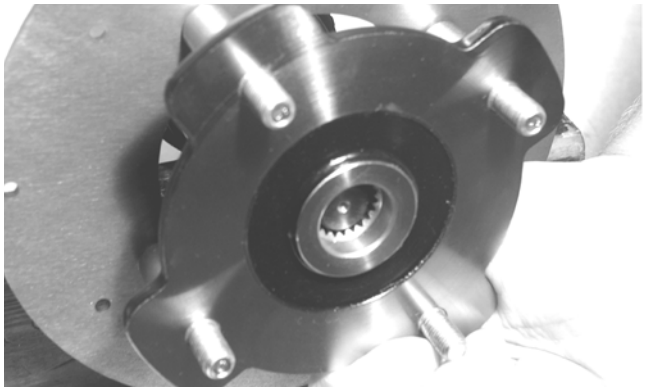
7. Install the tie rod end and secure with the nut. Tighten to 30 ft-lb; then install a new cotter pin and spread the pin to secure the nut.

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



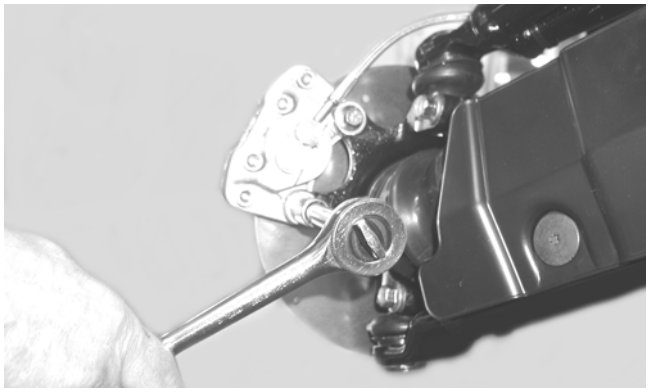
AF618D

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 two new “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.

■NOTE: If the cotter pin does not line up, always tighten to the next alignment.

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.

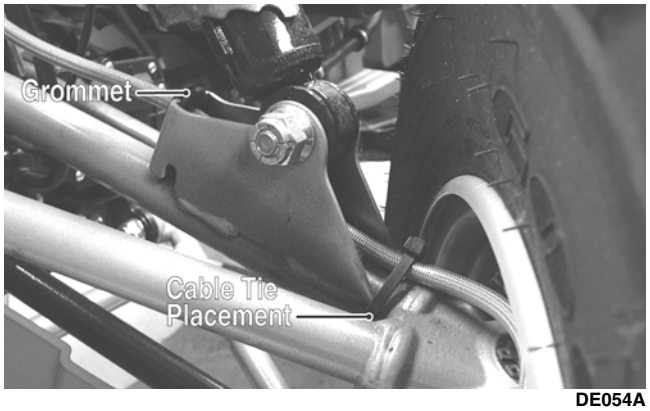
INSTALLING

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 two new “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.

■NOTE: If the cotter pin does not line up, always tighten to the next alignment.

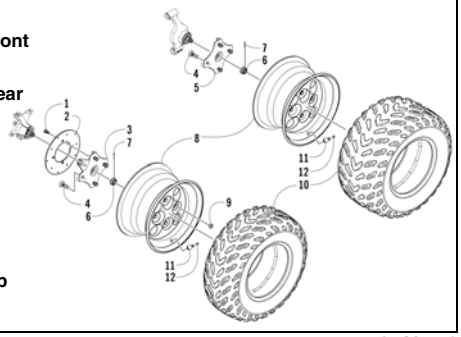
PR260

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

KEY
1. Shoulder Screw
2. Brake Disc
3. Wheel Hub - Front
4. Hub Stud
5. Wheel Hub - Rear
6. Hex Nut
7. Cotter Pin
8. Wheel
9. Mounting Nut
10. Tire
11. Valve Stem
12. Valve Stem Cap



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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: Be sure all tires are the specified size and have identical tread pattern.

■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).

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. **Auxiliary brake** adjusted incorrectly	5. Adjust brake
6. **Rear suspension arm-related bushing** worn	6. Replace bushing
7. **Rear shock absorber** damaged	7. Replace shock absorber
8. **Rear suspension arm nut** loose	8. Tighten nut
Problem: Vehicle pulling or steering erratic	
Condition	**Remedy**
1. **Vehicle steering** is erratic on dry, level surface	1. Check front wheel alignment and adjust if necessary (see Section 8)
2. **Vehicle** pulls left or right on dry, level surface	2. Check air pressure in tires and adjust to specifications

SECTION 8 - STEERING/FRAME

TABLE OF CONTENTS

Steering/Frame

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.

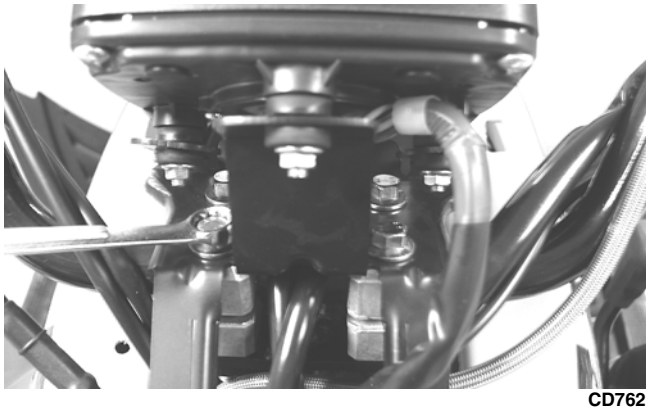
G. Cotter pins not damaged or missing.

■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.
2. Remove the cap screws securing the radiator access cover and remove the cover.
3. Remove two 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.
5. Remove the storage compartment.
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.

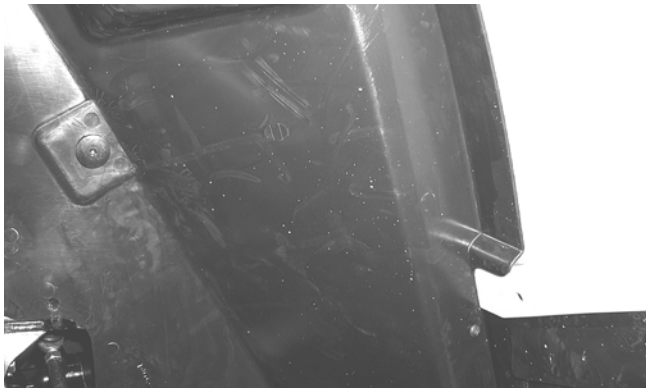


CD762

7. Remove two cap screws securing the upper steering post bearing to the frame. Account for two bearings and two housings.

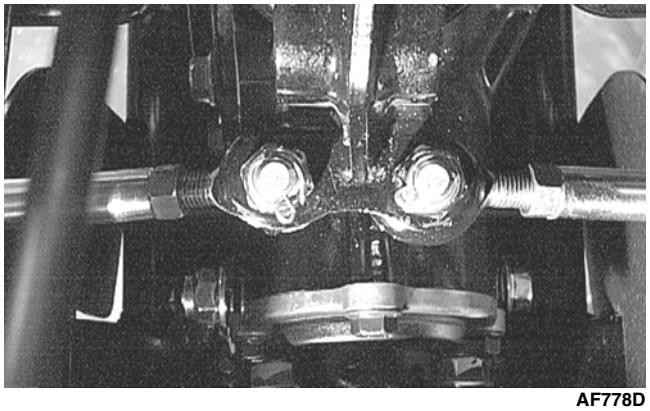
CD760

8. Using a suitable lift stand, raise the ATV enough to remove the front wheels.



CD685

9. Remove the cotter pins and slotted 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.



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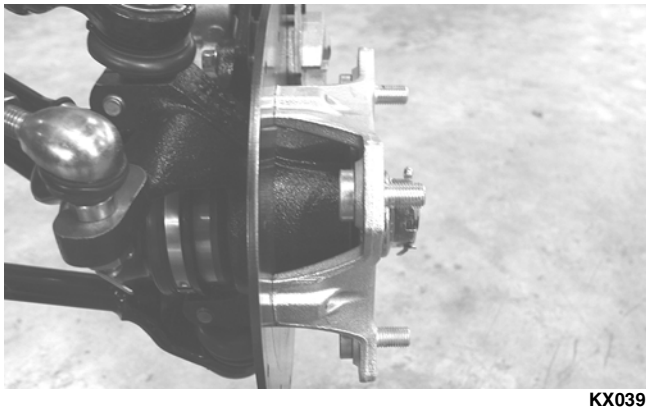

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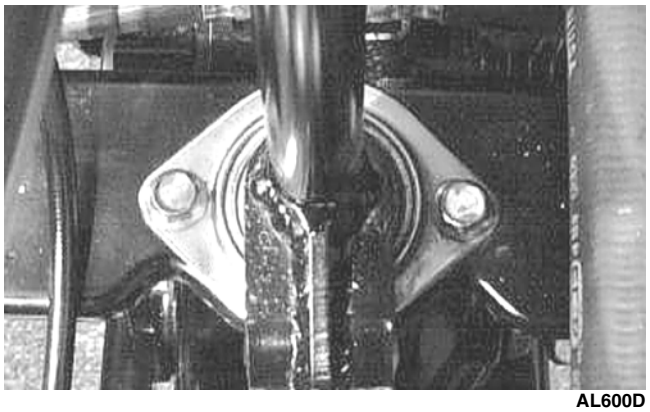
10. Remove two cap screws securing the lower steering post bearing flange to the frame; then remove the steering post.



AL600D

CLEANING AND INSPECTING

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

1. Clean and inspect the pivot area for wear. Apply a low-temperature grease to the ends.

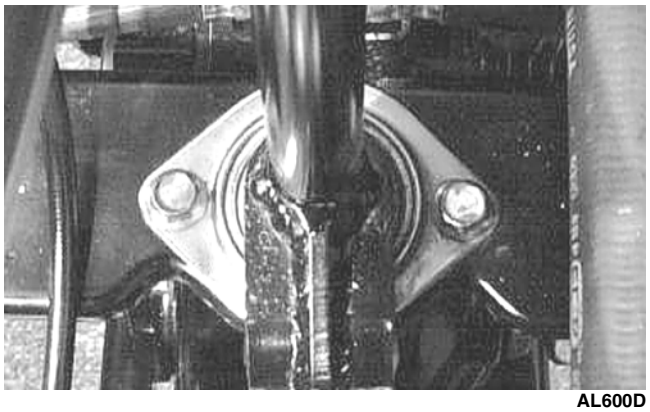
⚠ WARNING

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

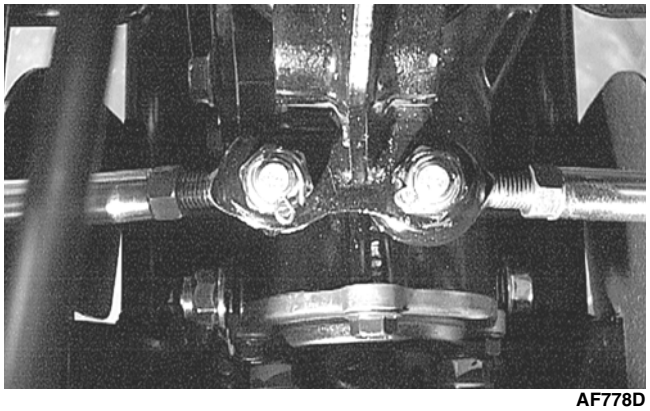
2. Place the upper steering post bearings into the housings; then position on the steering post and secure the housings to the frame with two cap screws. Tighten to 20 ft-lb.

CD760

3. Install the tie rods and secure with the slotted nuts. 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.

8



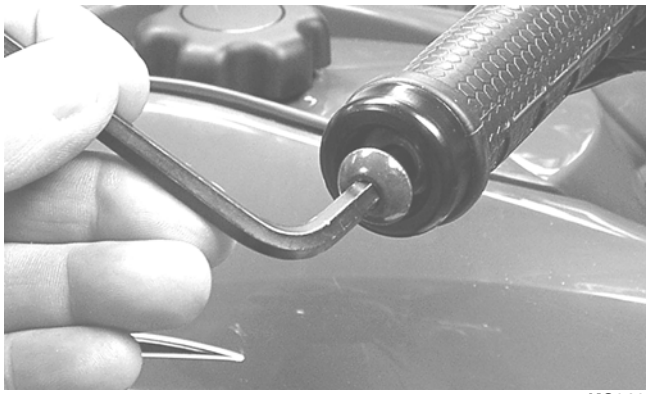
AF778D

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 tabs into the slots and sliding rearward. Lock the storage compartment lid to hold the assembly in place.
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 two reinstallable rivets; then install and secure the radiator access cover.

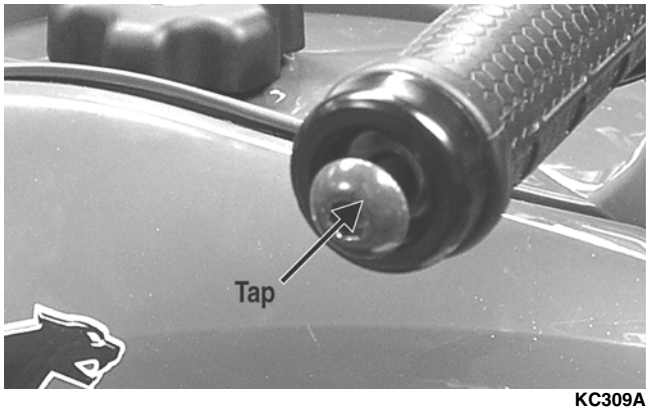
Handlebar Grip

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.
3. If a grip is damaged, cut the grip lengthwise using a sharp knife or box cutter; the peel off the grip.

INSTALLING

■NOTE: Before installing a grip, use contact spray or alcohol to clean the handlebar of glue residue, oil, or any other contaminant.

1. Apply a liberal amount of Handlebar Grip Adhesive to the inside of a new 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

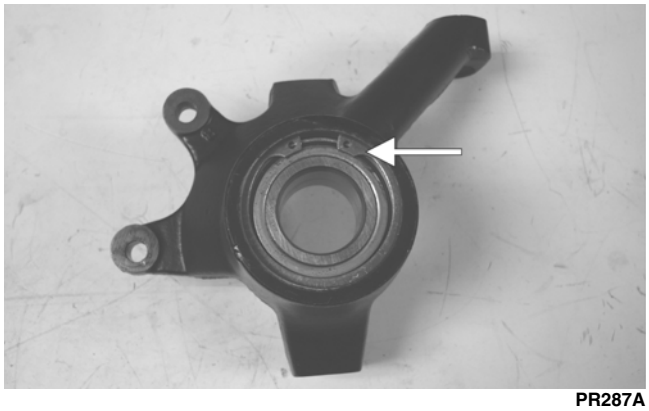
1. Secure the ATV on a support stand to elevate the wheel; then remove the wheel.

⚠ WARNING

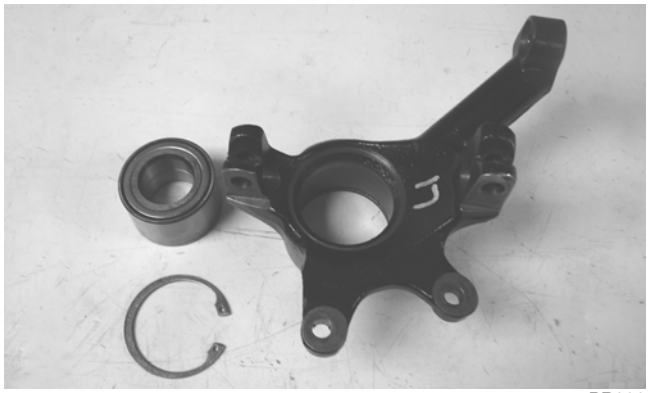
Make sure the ATV is solidly supported on the support stand to avoid injury.

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.

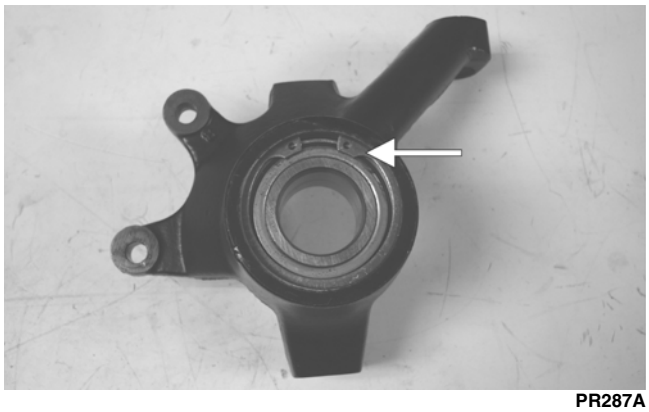
CLEANING AND INSPECTING

■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.

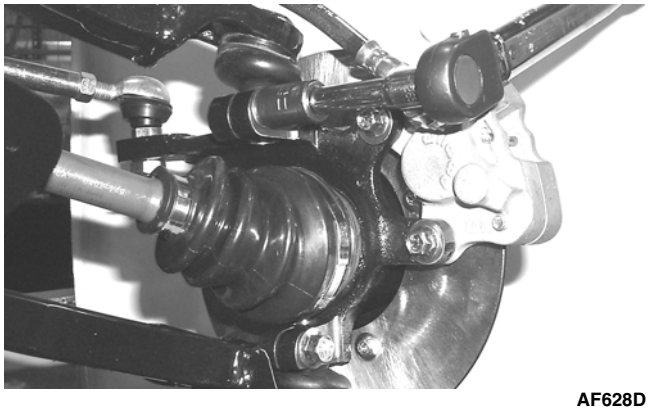
ASSEMBLING AND INSTALLING

1. Install the bearing; then install the snap ring making sure it seats into the knuckle.



PR287A

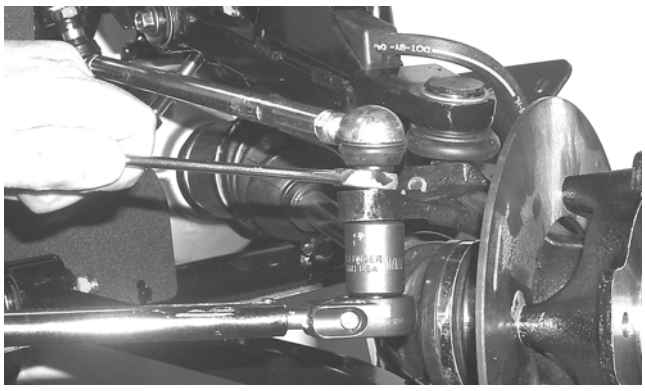
2. Install the knuckle to the upper and lower ball joints and secure with the two cap screws. Tighten to 35 ft-lb.



AF628D

3. Install the tie rod end and secure with the nut. Tighten to 50 ft-lb; then install a new cotter pin and spread the pin.

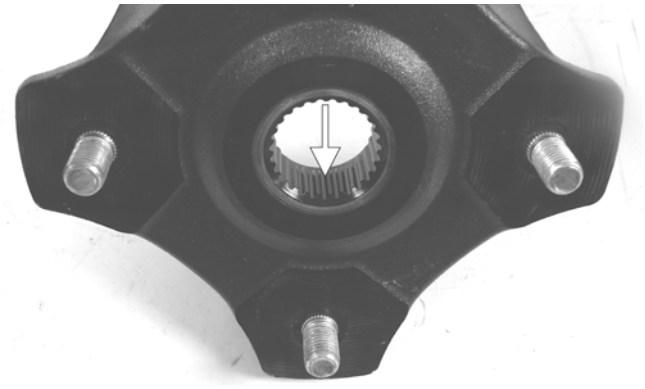
■NOTE: During assembling, new cotter pins should be installed.



AF618D

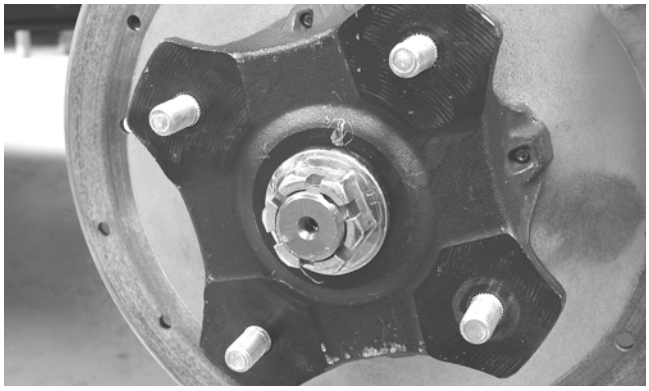
4. Apply a small amount of grease to the hub splines.

8



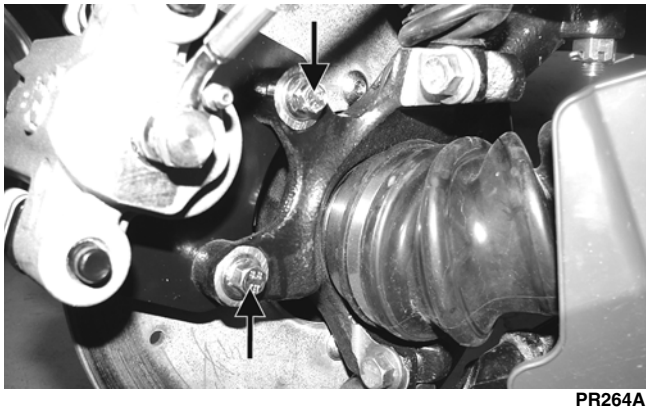
PR290A

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 two “patch-lock” cap 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

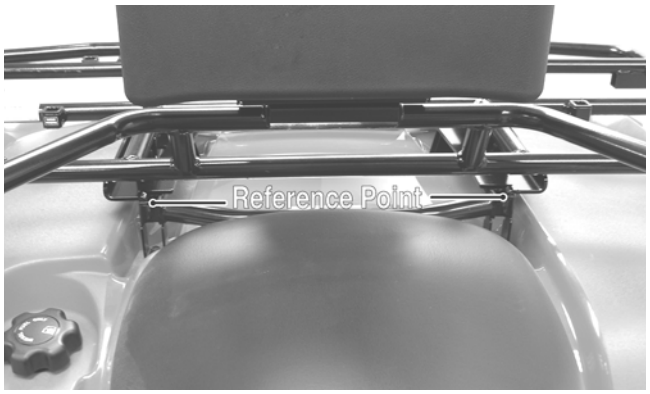
1. Thoroughly wash the ATV to remove excess weight (mud, etc.).
2. Refer to the specifications and ensure the tires are properly inflated to the recommended pressure.

■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).

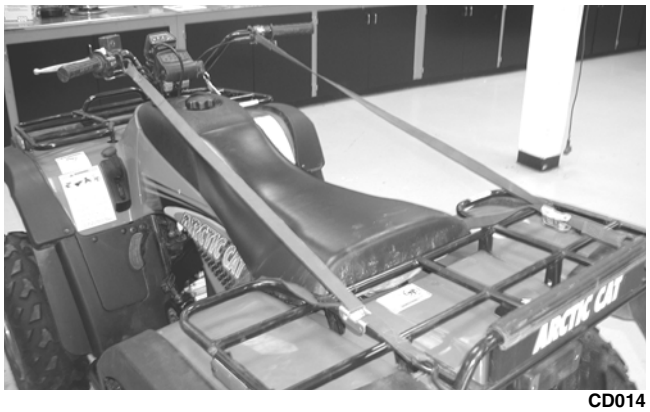
4. Measure the distance from the outside edge of each handlebar grip to equal reference points on each.



DE047A

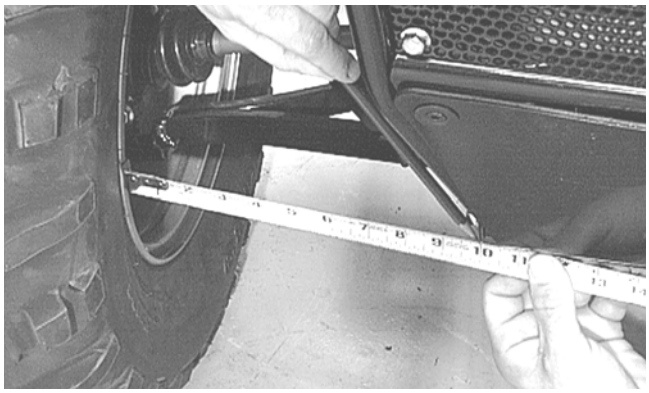
5. Adjust the handlebar direction until the two measurements are equal; then secure the handlebar to the rear rack using tie-down straps.

■NOTE: Care must be taken not to allow the handlebar to turn while securing it.

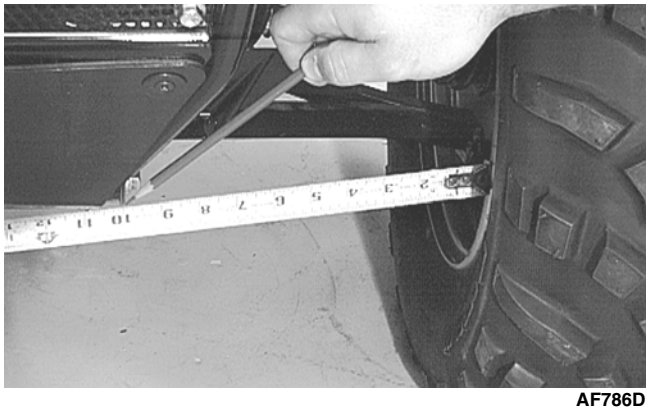


CD014

6. Measure the distance from the inside of each front rim to the lower frame tube.



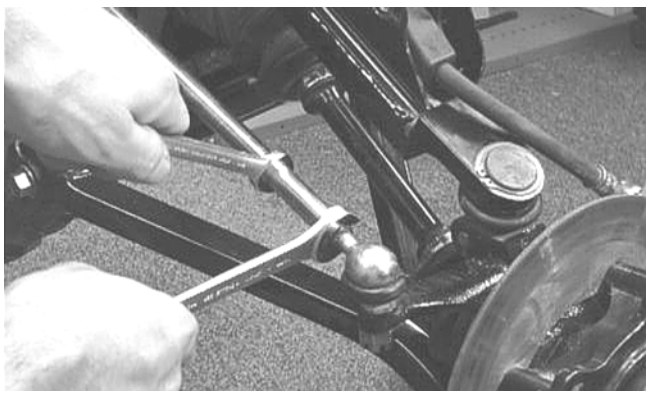
AF785D



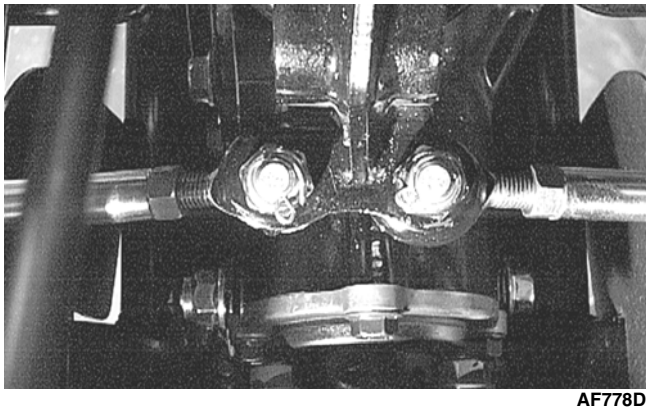
AF786D

■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

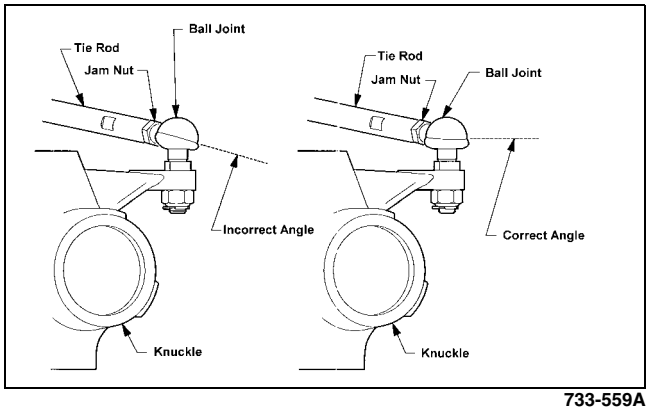
9. Measure the distance between the marks (at a height parallel to the belly panel) at the front side; then record the measurement.

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

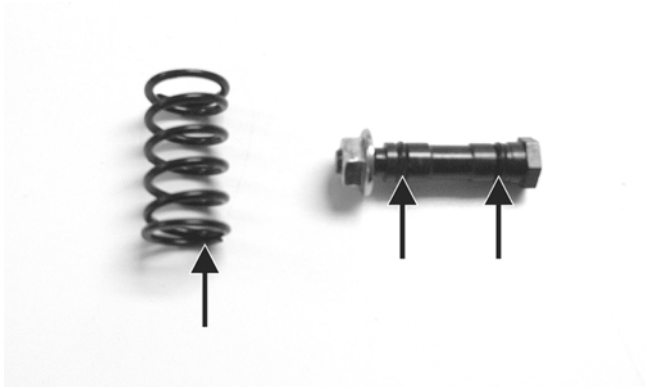
1. Place the front bumper assembly into position and install the through-bolt. Start the lock nut and finger-tighten only.
2. Install the two flange bolts and lock nuts on the upper supports. Tighten all hardware securely.

Front Body Panel/ Side Panels

REMOVING

1. Remove the cap screws securing the radiator access cover and remove the cover; then remove two reinstallable rivets securing the steering post cover and remove the cover.
2. Unlock the storage compartment lid; then slide the storage compartment cover assembly forward and lift off the storage compartment.
3. Remove the storage compartment box; then remove the seat.
4. Remove the ignition switch retaining ring and two reinstallable rivets securing the instrument pod; then remove the instrument pod.
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.
6. Remove the side panels by pulling on them to release the tabs from the body; then remove the screws securing the rear of the front panel to the frame.
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.

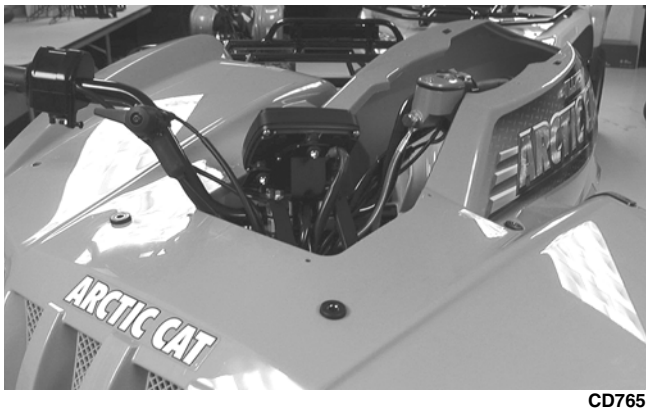
CLEANING AND INSPECTING

■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.



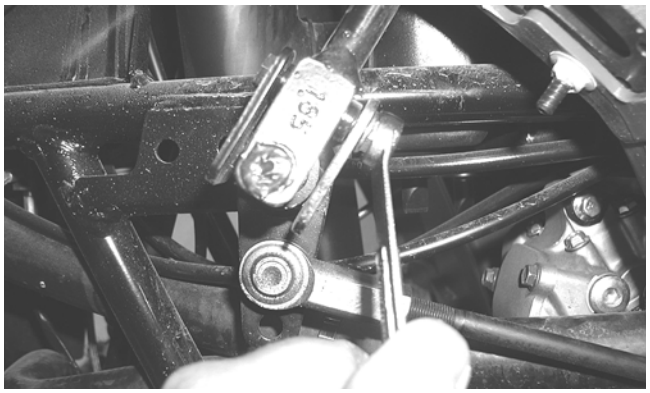
CD765

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 the footwells and foot rests. Tighten securely.
5. Install the cap screws securing the front body panel to the frame and rear panel.

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 tabs engage the slots. Slide rearward to secure and lock by engaging the lid lock.
9. Install the steering post cover and secure with the cap screws; then install and secure the radiator access panel.
10. Install the side panels.

Footrests

REMOVING

1. Remove the machine screws and flange nuts securing the front and rear fenders to the footwells.
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 the 8 mm hardware to 20 ft-lb and the 10 mm hardware to 40 ft-lb.
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

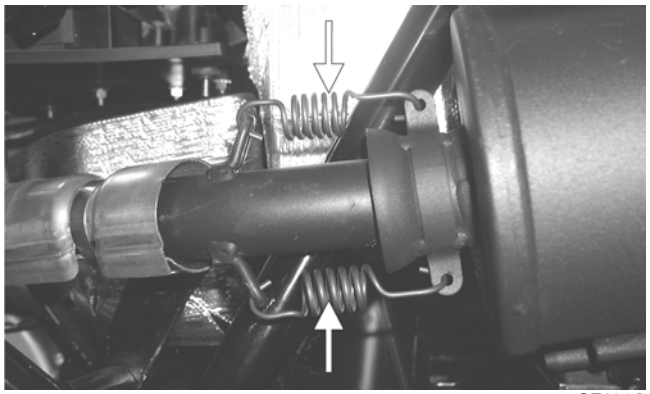
REMOVING/INSTALLING

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.

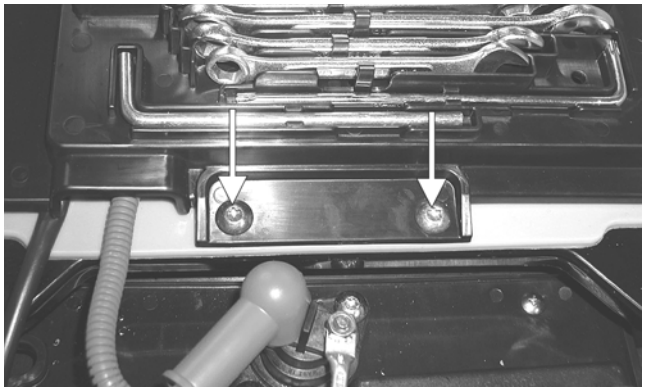
INSTALLING MUFFLER

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.
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.

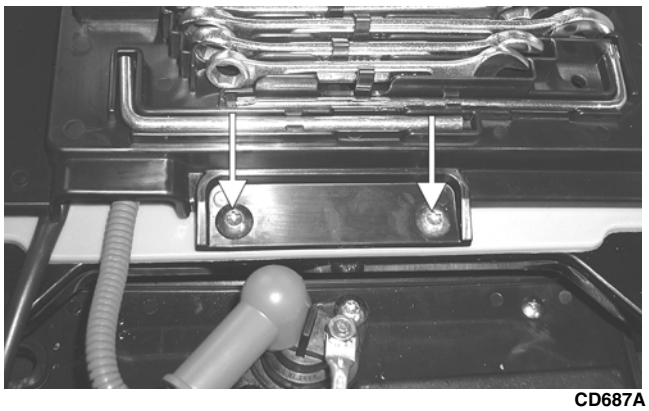
1. Clean all rear body panel components with warm soap and water.
2. Inspect side panels and rear body panel for cracks and loose rivets.
3. Inspect threaded areas of all mounting bosses for stripping.
4. Inspect for missing decals.

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.

8

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.

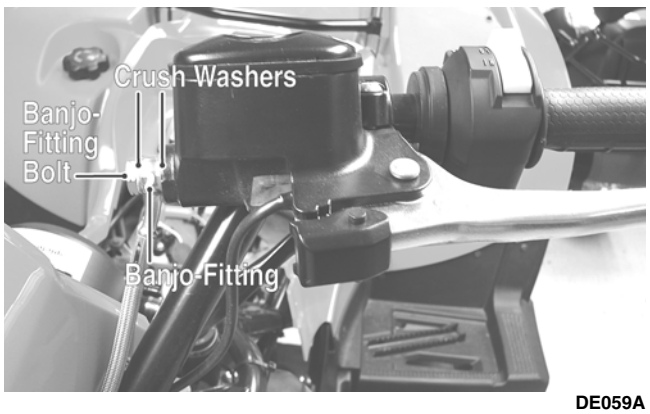
REMOVING

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

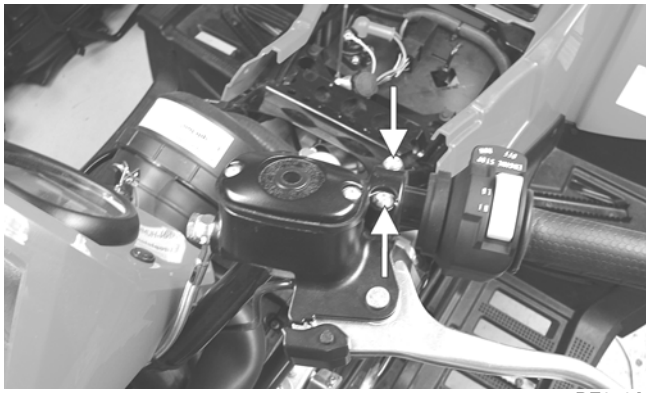
CAUTION

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.

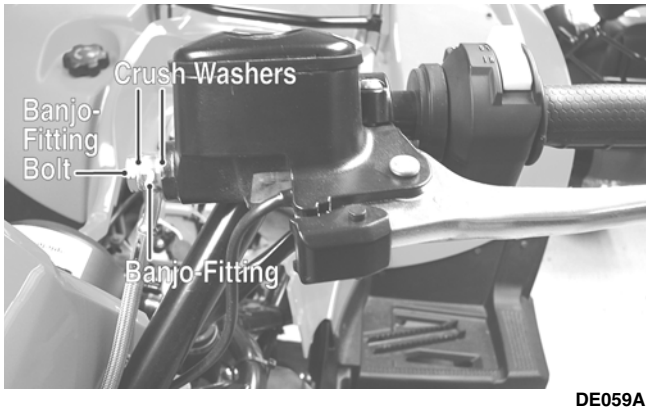
■NOTE: If the brakelight switch is determined to be not serviceable, see Section 5.

INSTALLING

1. Position the brake housing on the handlebar. Secure with clamp screws; then tighten securely.

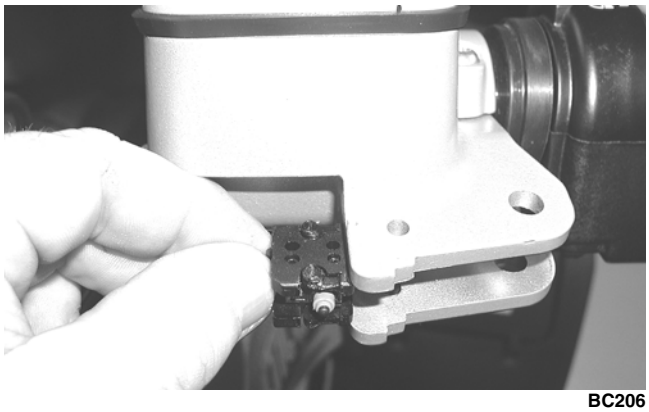
DE058A

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.



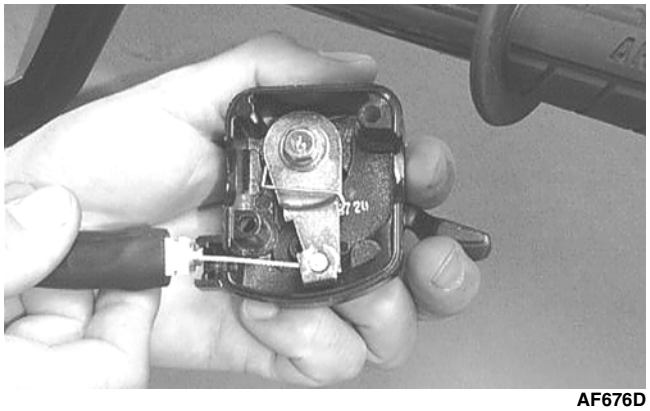
BC206

4. Bleed the brake system (see Section 2).

Throttle Control

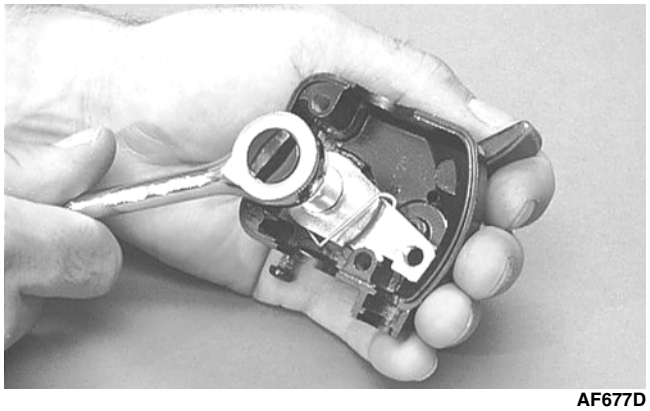
REMOVING

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.



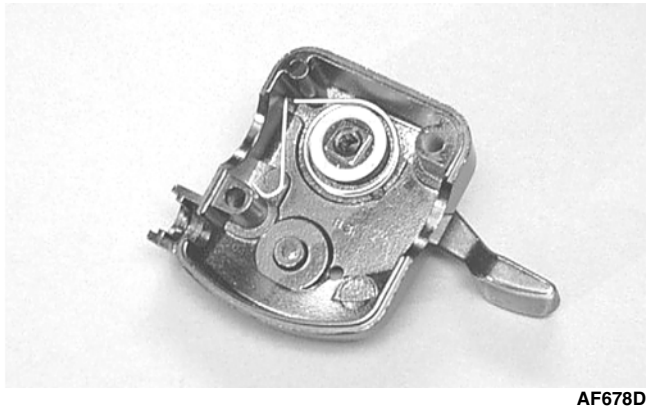
AF676D

3. Remove the cap screw, lock washer, and washer securing the actuator arm to the throttle control lever.



AF677D

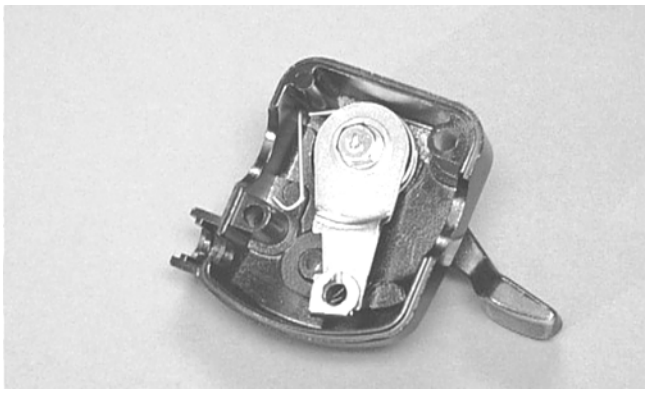
4. Remove the actuator arm and account for a bushing. Note the position of the return spring for installing purposes.



AF678D

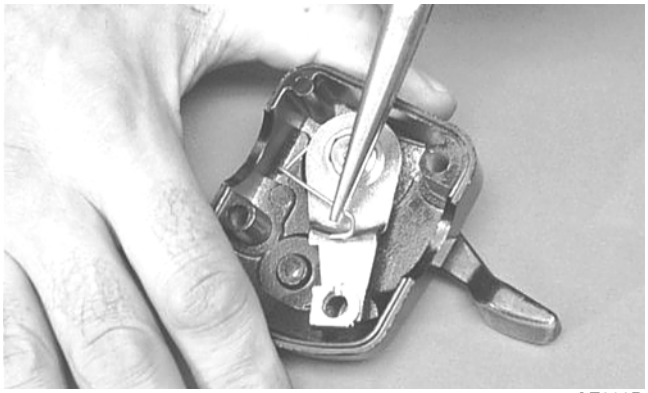
INSTALLING

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 handlebar and secure with the two machine screws.

ADJUSTING

To adjust throttle cable free-play, see Section 4.

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.