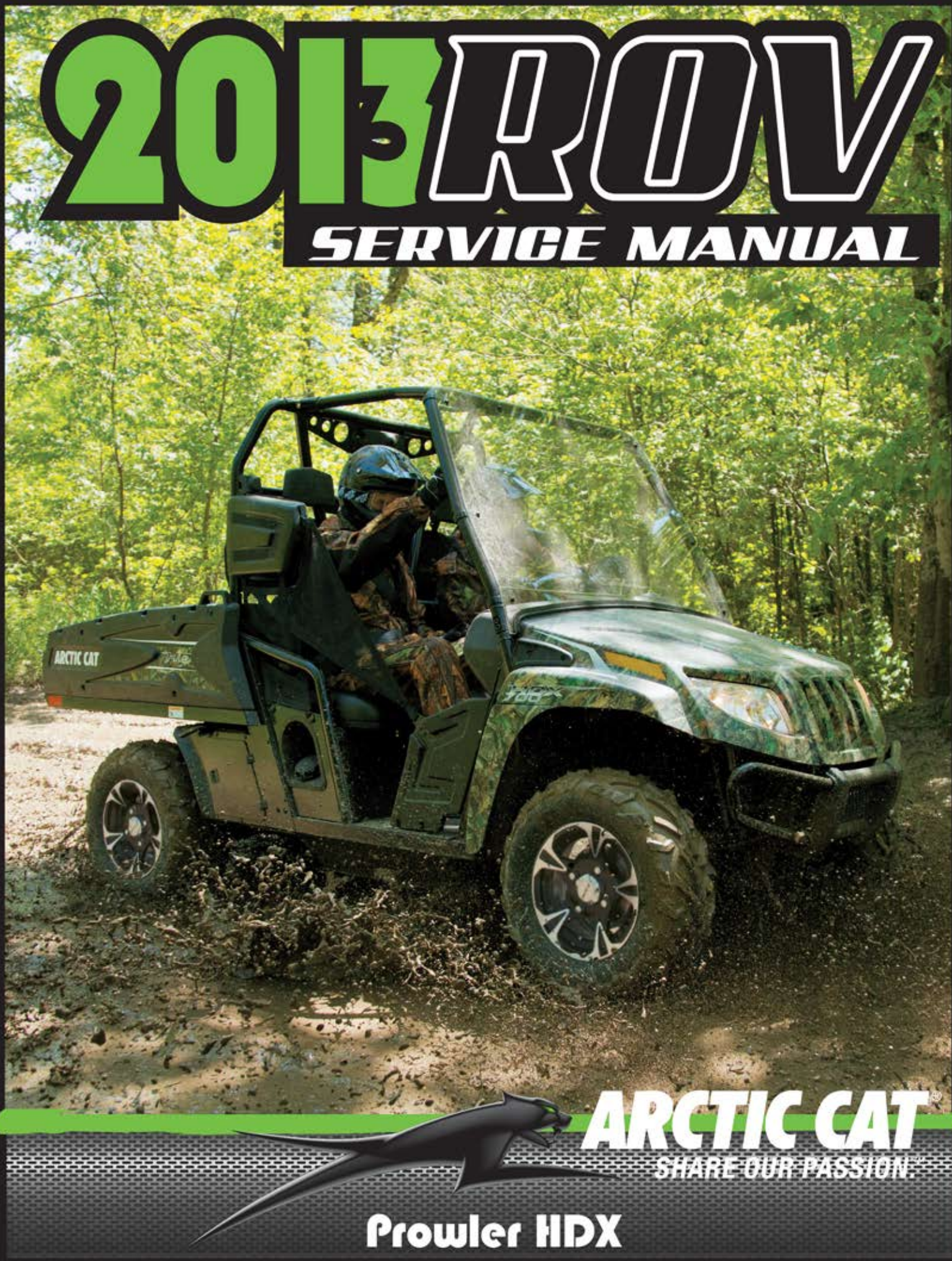
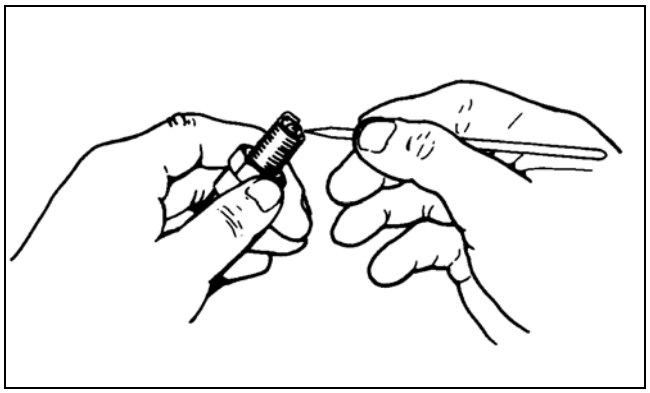
2013 ROV
SERVICE MANUAL



ARCTIC CAT®
SHARE OUR PASSION.™

Prowler HDX

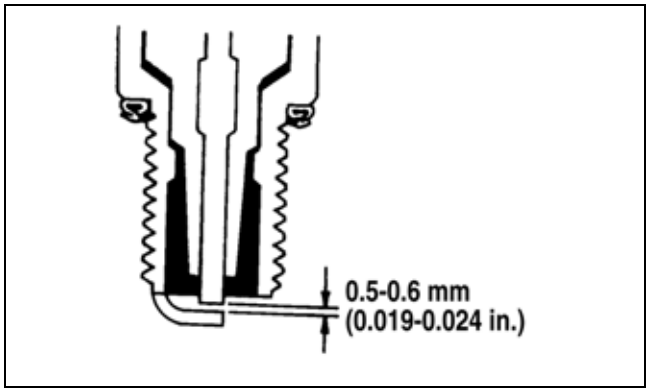


ATV-0051

CAUTION

Before removing the 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 0.5-0.6 mm (0.019-0.024 in.).



ATV0052E

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.

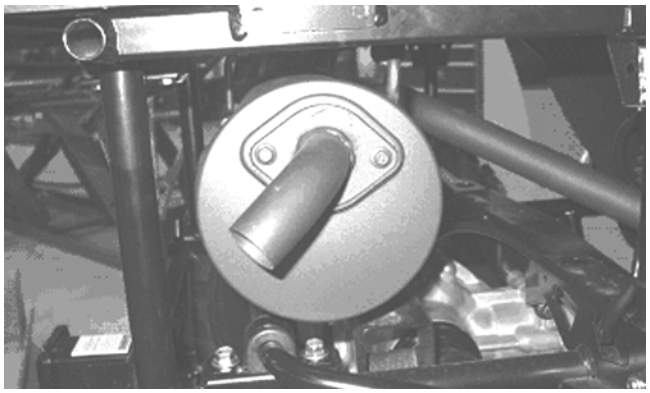
Muffler/Spark Arrester

Clean the spark arrester using the following procedure.

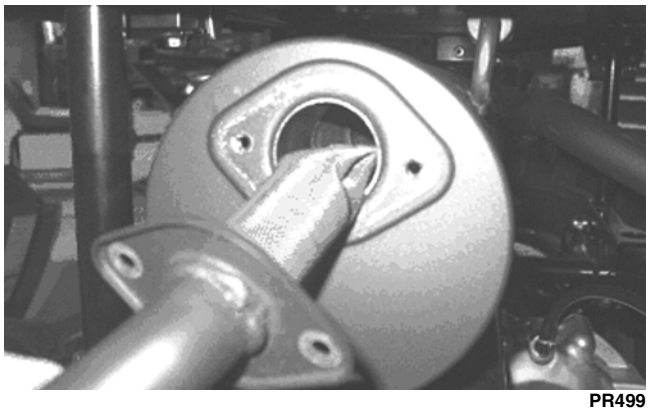
⚠ WARNING

Wait until the muffler cools to avoid burns.

1. Remove the cap screws securing the spark arrester screen assembly to the muffler; then loosen and remove the spark arrester. Account for a gasket.



PR498



PR499

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 and gasket and secure with the cap screws. Tighten the cap screws to 48 in.-lb.

Engine/Transmission Oil - Filter

OIL - FILTER

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

1. Park the vehicle on level ground.
2. Remove the drain plug from the bottom of the engine and drain the oil into a drain pan; then remove the center console, seat, seat back, and seat base.

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 - chipped	5. Replace gears
6. **Splines** worn	6. Replace shaft(s) - gears
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 stator coil
6. **ECM** defective	6. Replace ECM
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** worn	4. Replace cams - arms
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 - prime hose
Problem: Exhaust smoke dirty or heavy	
Condition	**Remedy**
1. **Engine oil** overfilled - contaminated	1. Drain excess oil - change oil
2. **Piston rings - cylinder** worn	2. Replace cylinder - service rings
3. **Valve guides** worn	3. Replace guides
4. **Cylinder wall** scored - scuffed	4. Replace cylinder
5. **Valve stems** worn	5. Replace valves
6. **Stem seals** defective	6. Replace seals
Problem: Engine lacks power	
Condition	**Remedy**
1. **Valve clearance** incorrect	1. Adjust clearance
2. **Valve springs** weak	2. Replace springs
3. **Valve timing** out of adjustment	3. Time camshaft
4. **Piston ring(s) - cylinder** worn	4. Replace cylinder - service rings
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 fuel 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 - sprockets
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/fan relay - replace fan
9. **Fan relay** malfunctioning	9. Replace fan relay
10. **Thermostat** stuck - closed	10. Replace thermostat
11. **Radiator hoses - cap** damaged - obstructed	11. Clear obstruction - replace hoses

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

CC400D

Cleaning/Inspecting Piston

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.

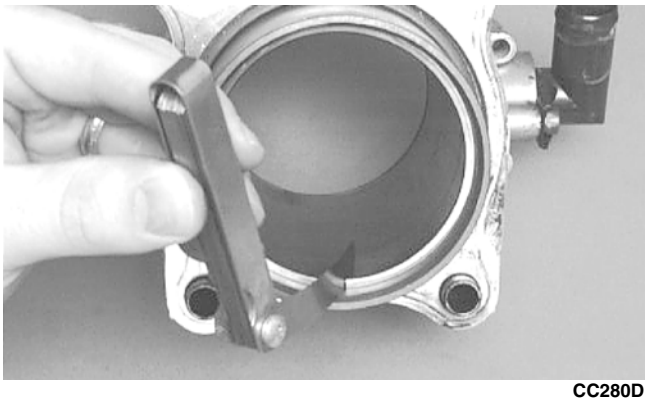
CAUTION

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.

3. Using a non-metallic carbon removal tool, remove any carbon buildup from the dome of the piston.
4. Inspect the piston for cracks in the piston pin, dome, and skirt areas.
5. Inspect the piston for seizure marks or scuffing.
6. Inspect the perimeter of each piston for signs of excessive "blowby." Excessive "blowby" indicates worn piston rings or an out-of-round cylinder.

Measuring Piston-Ring End Gap (Installed)

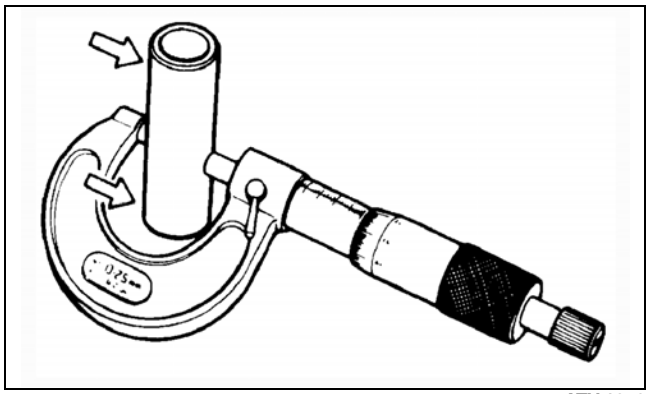
1. Place each compression ring in the wear portion of the cylinder. Use the piston to position each ring squarely in the cylinder.
2. Using a feeler gauge, measure each piston-ring end gap. Acceptable ring end gap must not exceed specifications.



CC280D

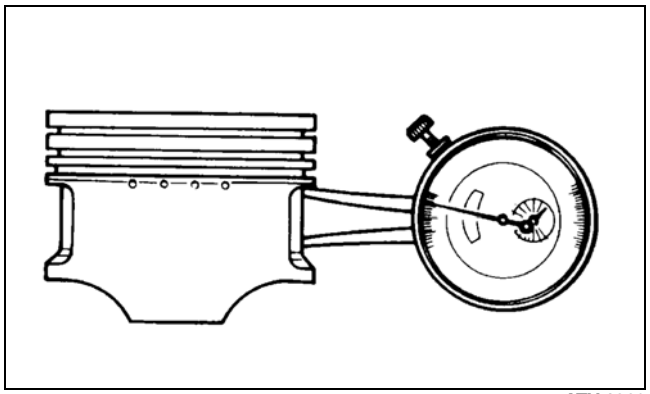
Measuring Piston Pin (Outside Diameter) and Piston-Pin Bore

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



ATV-1070

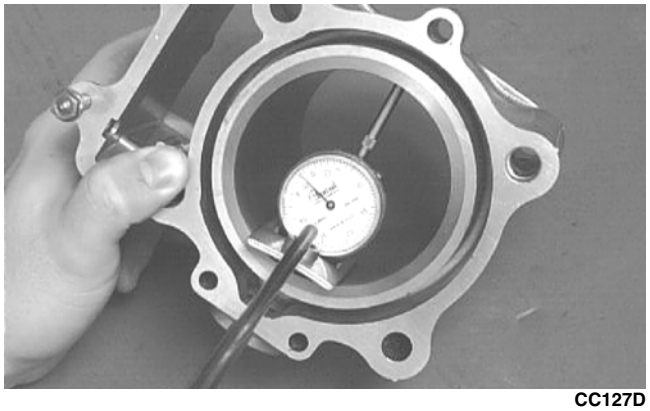
2. Insert an inside dial indicator into the piston-pin bore. The diameter must not exceed specifications. Take two measurements to ensure accuracy.



ATV-1069

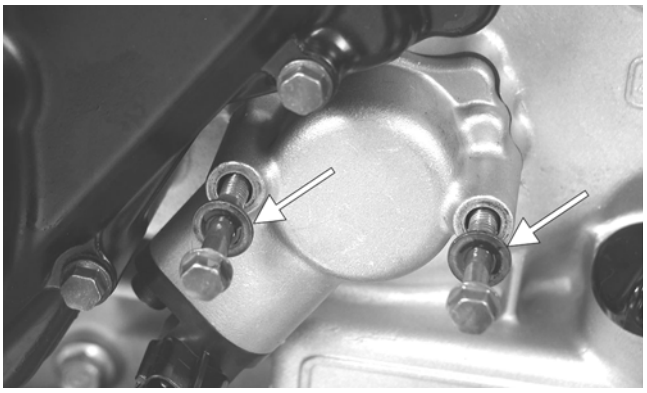
Measuring Piston Skirt/ Cylinder Clearance

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



CC127D

2. Measure the corresponding piston diameter at a point 15 mm 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 not exceed specifications.



CD920A

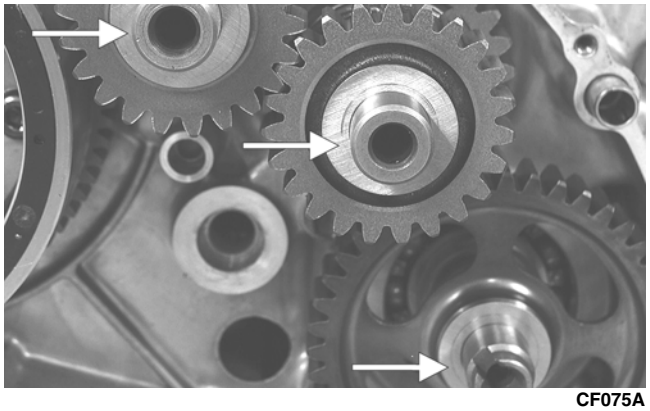
■**NOTE: It may be necessary to use a small two-jaw puller to remove the trigger.**

5. Loosen the clamps securing the coolant hose to the water pump; then remove the crossover tube from the cylinder head. Account for an O-ring.
6. Remove the two cap screws securing the water pump to the engine; then remove the water pump.

■ **NOTE: The water pump is not a serviceable component. If the pump is defective or if the mechanical seal is leaking (coolant dripping from the discharge hole), the water pump must be replaced (see the Fuel/Lubrication/Cooling section).**

7. Remove the cap screws securing the side cover to the crankcase noting the location of the different-sized cap screws for installing purposes.
8. Using a side case puller, remove the side cover. Account for a gasket and two alignment pins.

■**NOTE: Inspect the inside of the right-side cover for any shaft washers that may have come off with the cover. Make sure they are returned to their respective shafts and the starter idler gear spacer is on the shaft or in the cover.**

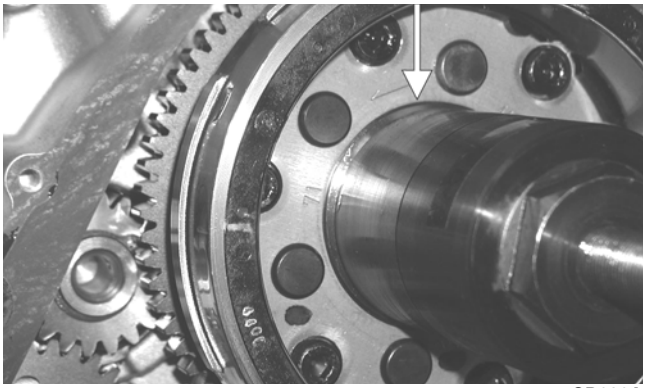


CF075A

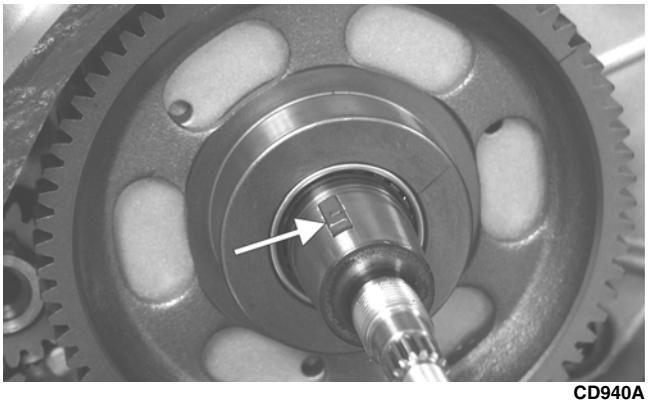
9. Remove the nut securing the magneto rotor to the crankshaft; then install the magneto rotor puller adapter.

■**NOTE: The puller has left-hand threads.**

10. Using Magneto Rotor Remover Set with appropriate crankshaft protector, remove the rotor/flywheel assembly from the crankshaft. Account for the key; then remove the starter clutch gear assembly and washer.

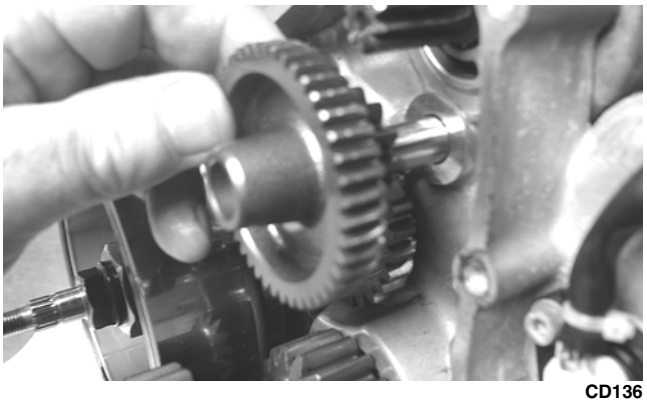


CD939A

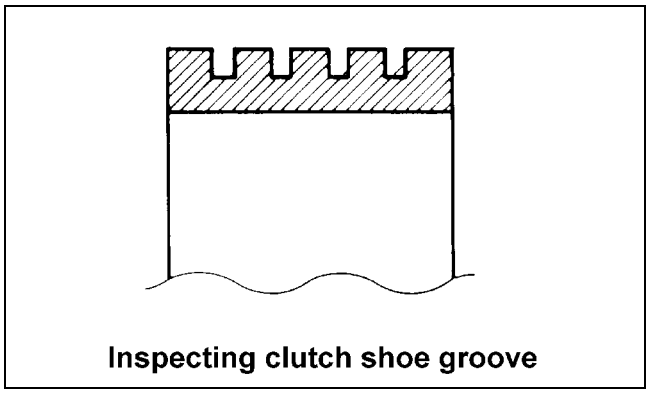


CD940A

11. Remove the two starter gears from the crankcase noting the direction of the beveled side of the gears for installing purposes; then remove the two starter gear shafts.



CD136



Inspecting clutch shoe groove

ATV1014

INSPECTING CLUTCH HOUSING

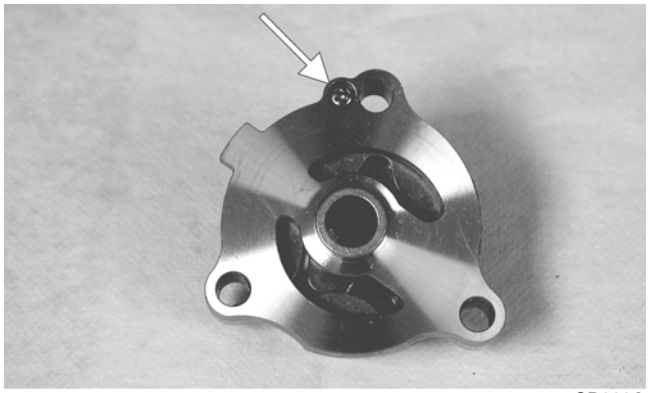
1. Inspect the clutch housing for burns, grooving, cracks, or uneven wear.
2. If the housing is damaged in any way, the housing must be replaced.

INSPECTING PRIMARY ONE-WAY DRIVE

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

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.



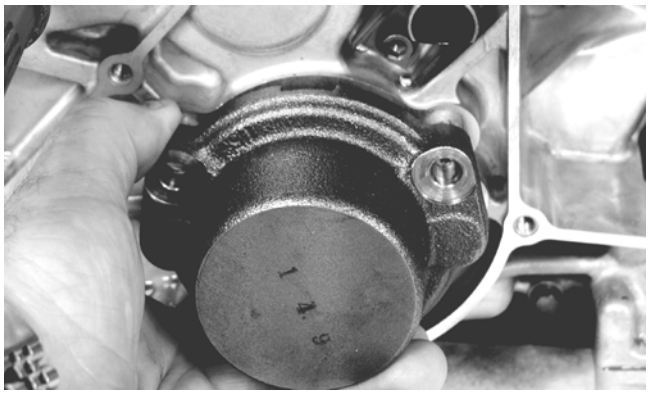
CD988A

DRIVEN PULLEY

■NOTE: The driven pulley is a non-serviceable component. If pulley faces, cam ramps, or sheave bushings are worn, the assembly must be replaced. Do not to disassemble the driven pulley.

Installing Right-Side Components

1. Install the secondary shaft bearing housing making sure the two alignment pins are properly positioned. Tighten the cap screws to 28 ft-lb.

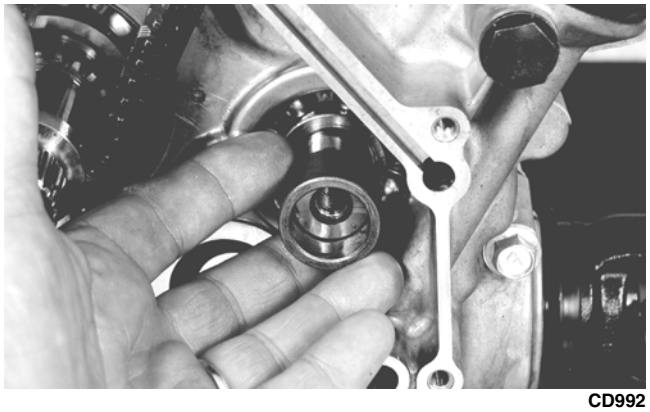


CD999

2. Install the oil pump onto the engine; then tighten the cap screws securely.

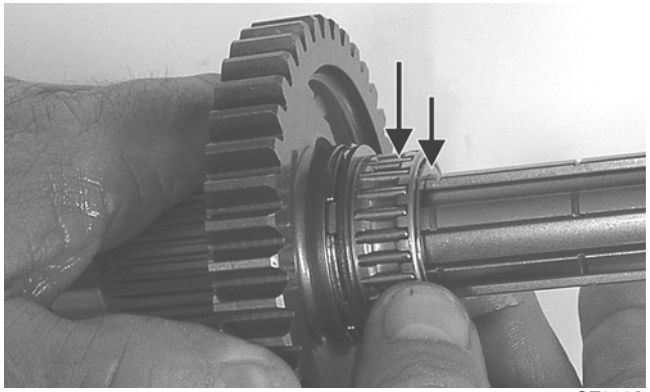
CD988

3. Install the oil pump drive gear spacer onto the crank balancer shaft. Grease the pin and insert it into the shaft; then install the drive gear making sure the raised side of the gear is facing toward the inside. Secure the gear with the cap screw (threads coated with red Loctite #271) and the washer. Tighten the cap screw to 62 ft-lb.



CD992

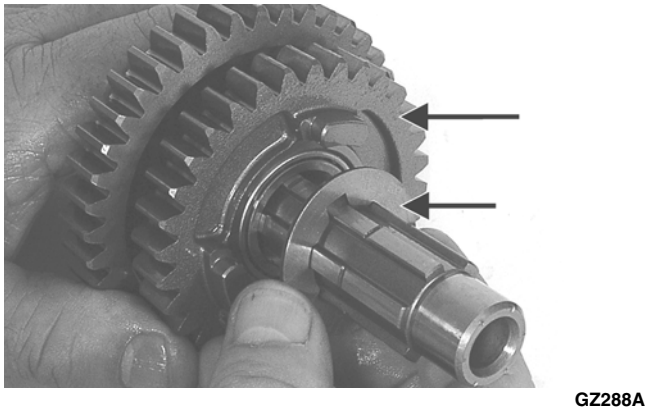
3. Install the reverse driven bushing and bearing; then install the reverse driven gear.



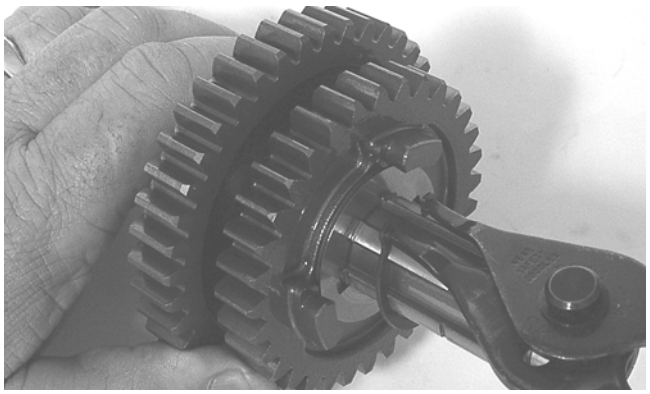
GZ286A

GZ287

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



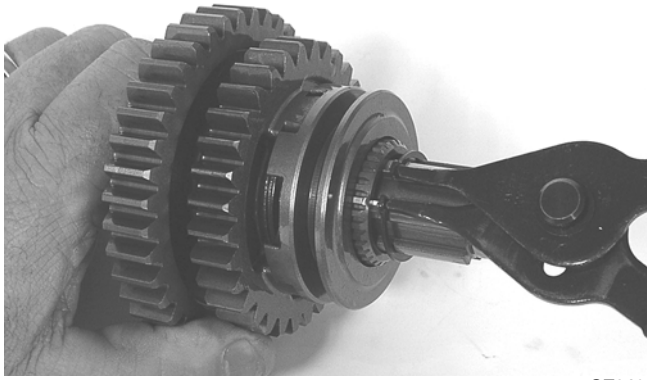
GZ288A



GZ314

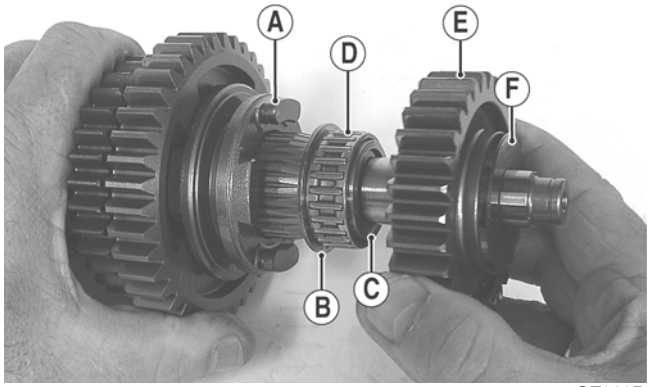
5. Install the reverse driven gear dog onto the countershaft and secure with a snap ring.

GZ313A



GZ312

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



GZ283B

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

■NOTE: When installing the countershaft assembly, account for the washer on each end of the shaft.

Assembling Crankcase Half

1. Install the secondary driven gear assembly.

2. Remove the Phillips-head screw on the back side of the pump and separate the pump housing and cover. Note the position of the inner and outer rotors and alignment pin for assembly.
3. Remove oil pump components.

CLEANING AND INSPECTING

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

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

ASSEMBLING/INSTALLING

1. Place the rotors into the pump housing making sure the alignment pin is in the groove of the rotor.
2. Place the cover onto the pump housing.
3. Secure the pump cover with the Phillips-head screw coated with red Loctite #271. Tighten to 8 ft-lb.
4. Install the oil pump into the engine (see Right-Side Components in the Engine/Transmission section).

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, open the bleed screw on the thermostat housing to allow air to bleed from the cooling system. When clear coolant (no bubbles) is present, tighten the bleed screw securely; then fill the cooling system to the bottom of the stand pipe in the radiator neck. Run the engine for five minutes after the initial fill, shut the engine off, and then "top-off" the cooling system to the bottom of the stand pipe in the radiator neck.

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

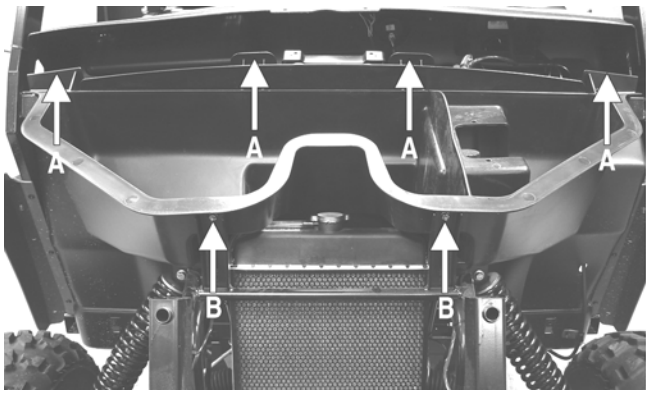
Radiator

REMOVING

1. Remove the two sheet metal screws securing the dash assembly to the frame (center front).

HDX162A

2. Remove four torx-head screws (A) securing the under-hood storage box to the frame; then remove two cap screws with nuts (B) at the front of the storage box.

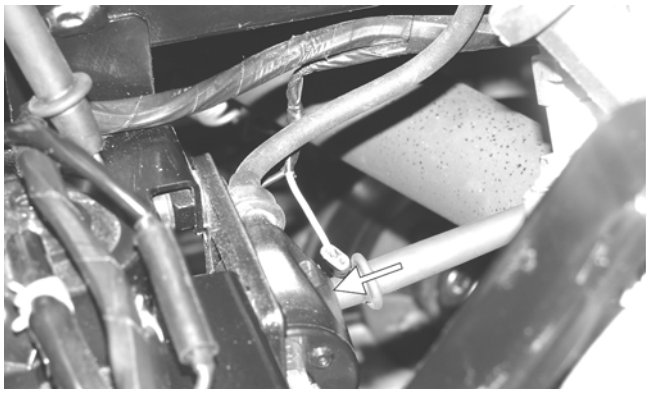


PR182A

3. While lifting up on the front of the storage box, pry the rear center clear of the center dash mount and remove the storage box.

PR186

4. Drain the coolant into a suitable container; then disconnect the cooling fan wire connector from the main harness.



PR278A

2. The meter reading must be within specification.

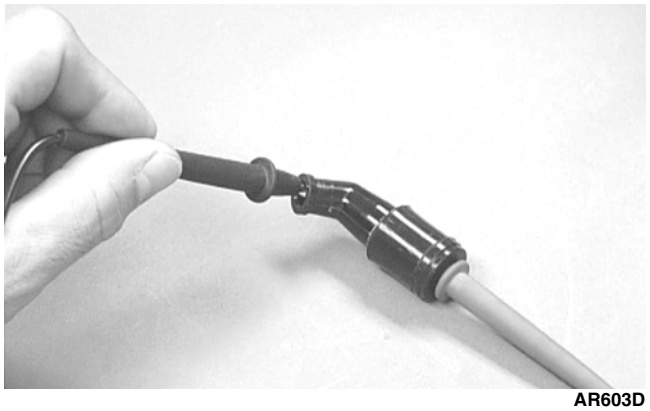
Secondary Winding

1. Connect the red tester lead to the high tension lead (with the plug cap removed); then connect the black tester lead to either primary terminal.
2. The meter reading must be within specification.

■NOTE: If the meter does not show as specified, replace ignition coil.

Spark Plug Cap

1. Connect the red tester lead to one end of the cap; then connect the black tester lead to the other end of the cap.



AR603D

2. The meter reading must be within specification.

■NOTE: If the meter does not show as specified, replace the spark plug cap.

VOLTAGE

Primary Coil

1. Set the meter selector to the DC Voltage position; then disconnect the two wires from the coil.

■NOTE: The coil is located to the right of the engine and may be accessed from behind the right-side seat with the cargo box raised.

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.

Manifold Absolute Pressure (MAP) Sensor

■NOTE: Preliminary checks may be performed on this component using the diagnostic mode on the LCD gauge (see EFI Diagnostic System in this section).

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

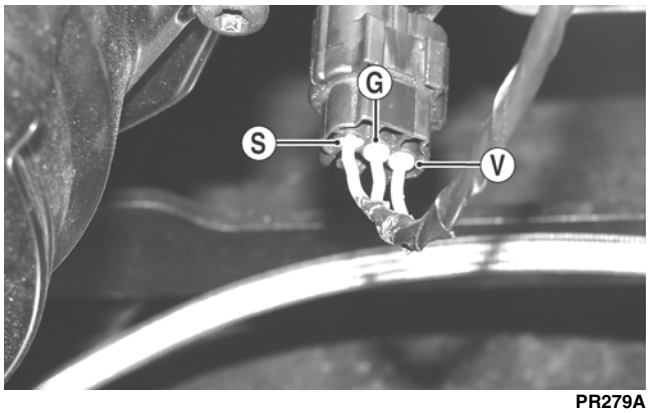
■NOTE: If the meter does not read as specified, replace the sensor.

Speed Sensor

■NOTE: Preliminary checks may be performed on this component using the diagnostic mode on the LCD gauge (see EFI Diagnostic System in this section).

■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).



PR279A

Battery (bAtt) Diagnostic Mode

EFI004

Display: System DC voltage.

DTC: P0562, P0563, P2531, P2532

Usage: Verify system voltage under following conditions.

1. Battery voltage with engine and accessories off (>12.2 VDC for fully charged).
2. Battery voltage with engine running (charging = 13.8 VDC or greater).
3. Battery voltage with electrical accessories operating, engine idling (13.5 VDC or greater).
4. Battery voltage starter cranking (10.5-11.5 VDC).

DIAGNOSTIC TROUBLE CODES (DTC)

If an EFI or related chassis component fails or an out-of-tolerance signal is detected by the ECM, a diagnostic trouble code (DTC) will be generated in the ECM and displayed on the LCD. The DTC will be displayed alternately with a wrench icon or malfunction indicator light (MIL). The DTC will continue to flash, until the malfunction is corrected and the code cleared.

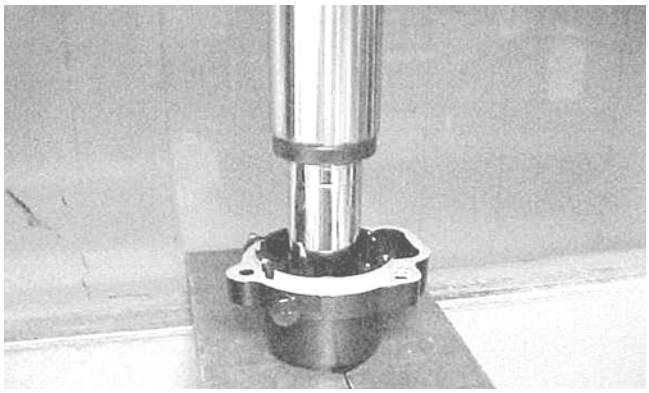
Code List

■NOTE: Each of the following numerical codes will have a one-letter prefix of C, P, or U. A “C” prefix denotes a chassis malfunction, a “P” prefix denotes a power train malfunction, and a “U” prefix denotes a loss of communication with the gauge.

■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.

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

GC011



AF984

KX219

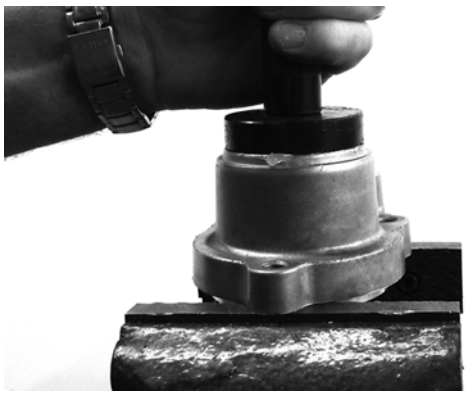
Assembling Input Shaft

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.

GC012

GC011

2. Install the input shaft seal making sure it is fully seated in the edge of the housing.

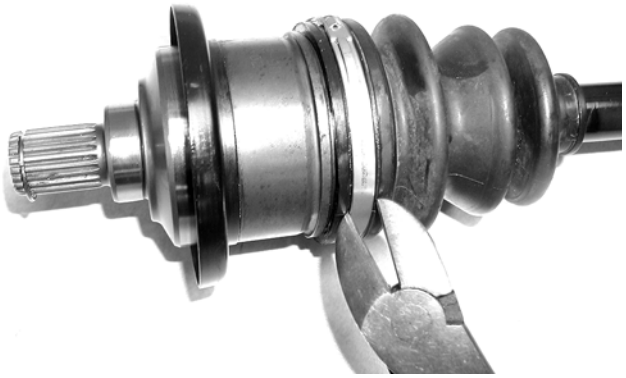


GC014

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.

4. Install the input shaft into the pinion housing; then secure the bearing with a circlip.



CD020

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

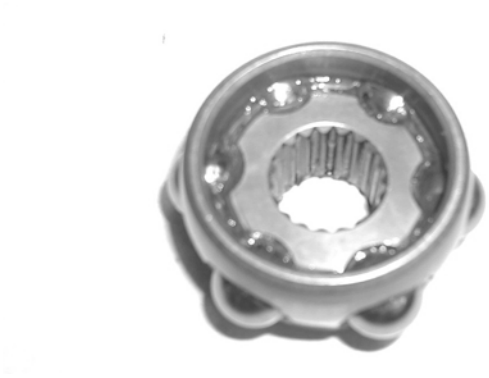
CD021

3. Using a snap ring pliers, remove the snap ring securing the bearing ring to the shaft. Note the direction of the bearing for assembling purposes.

CD023

4. Note the difference inside each bearing ring end for assembling purposes; then remove the bearing ring.

■NOTE: The recess of the bearing must face toward the housing.



CD022

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

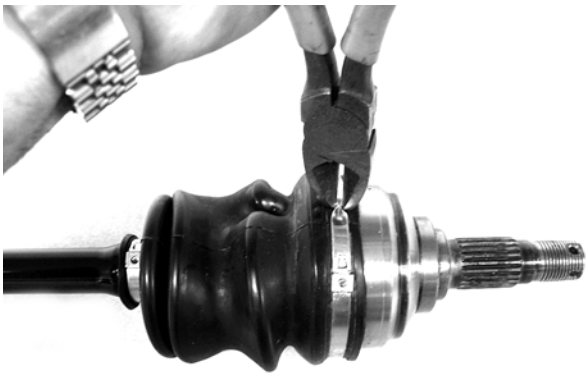
■NOTE: If any damage is apparent to the splines, the bearing ring, and/or the housing, the drive axle must be replaced as an assembly.

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

CD752

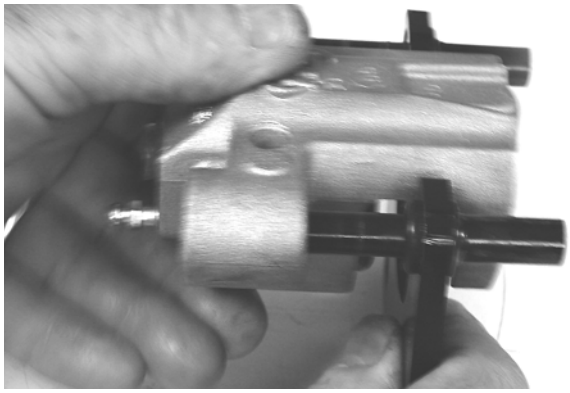
■NOTE: At this point if the outside boot is damaged, continue with step 7.

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



CD751

8. Apply 40 grams (1/3 of contents) of grease from the grease pack included in Front Axle Boot Repair Kit into the knuckles and the new outside boot.



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 Periodic Maintenance section).

⚠ 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 in 20 ft-lb increments to 80 ft-lb.
10. Remove the vehicle from the support stand and verify brake operation.

MASTER CYLINDER ASSEMBLY

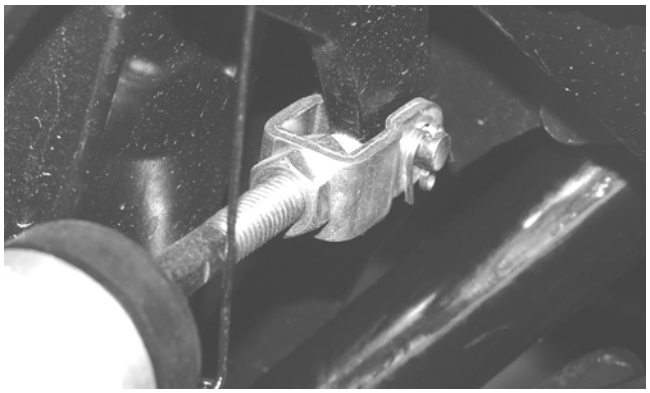
■NOTE: The master cylinder is a non-serviceable component; it must be replaced as an assembly.

Removing

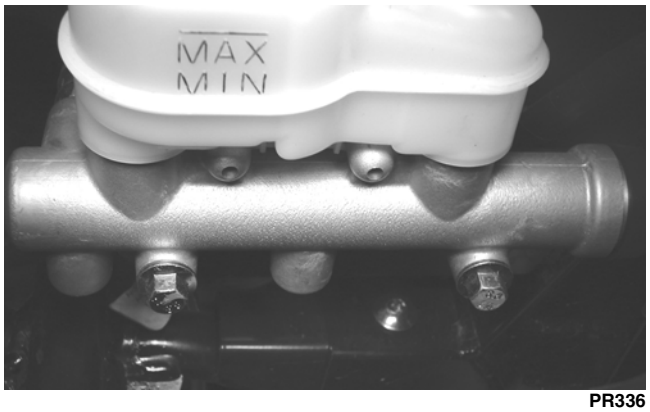
1. Slide a piece of flexible tubing over one of the wheel bleeder valves and direct the other end into a container. Remove the reservoir cover; then open the bleeder valve. Allow the brake fluid to drain until the reservoir is empty.

AF637D

2. Remove the cotter pin and pivot pin from the yoke; then remove two cap screws and flange nuts securing the master cylinder assembly to the frame.



PR338



PR336

3. Remove the oil bolt securing the banjo-fittings to the master cylinder; then remove the master cylinder. Discard the three crush washers.

CAUTION

Brake fluid is highly corrosive. Do not spill brake fluid on any surface of the vehicle.

Inspecting

1. Inspect the master cylinder push rod and clevis for wear, bending, or elongation of clevis holes.
2. Inspect the push rod boot for tears or deterioration.
3. Inspect the reservoir for cracks and leakage.
4. Inspect the brake hose for cracks and deterioration and the condition of the banjo-fittings.

Installing

1. Place the master cylinder into position; then using three new crush washers, secure the two banjo-fittings to the master cylinder. Tighten to 20 ft-lb.
2. Secure the master cylinder assembly to the frame with two cap screws and two flange nuts. Tighten to 25 ft-lb.
3. Install the pivot pin and secure with a new cotter pin.
4. Fill the master cylinder and bleed the brake system (see Hydraulic Brake System in the Periodic Maintenance section).

21. Install the valve cap.

FS174

22. Install the spring using an appropriate spring compressor and secure with the retaining ring.

INSTALLING

1. Install the shock absorber (valve stem at the top) and secure with the cap screws. Tighten new lock nuts to 35 ft-lb.
2. Lower the vehicle to the ground.

Front A-Arms

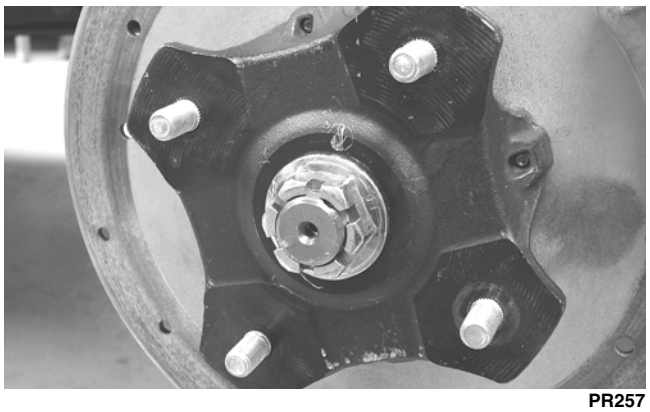
REMOVING

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

⚠ WARNING

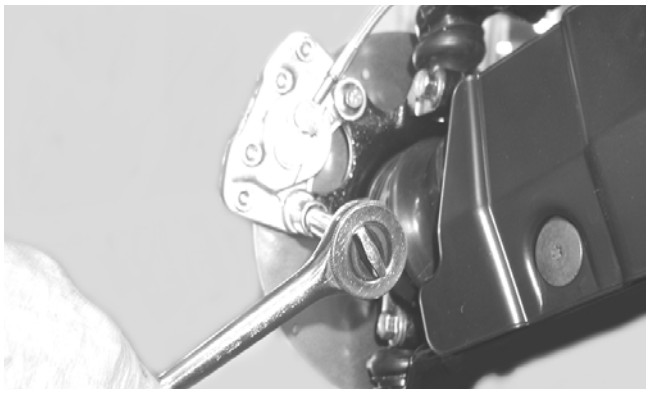
Make sure the vehicle is solidly supported on the support stand to avoid injury.

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



PR257

3. Remove the nut securing the hub.
4. Remove the brake caliper. Account for two cap screws.

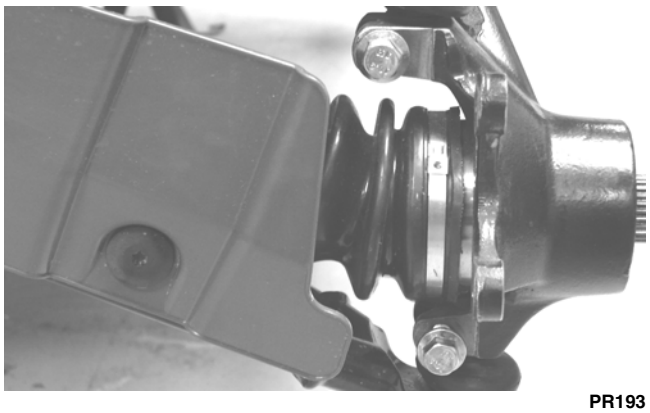


CD007

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

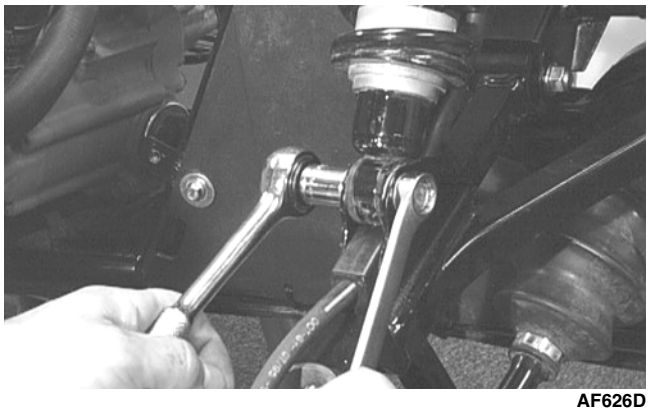
CAUTION

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



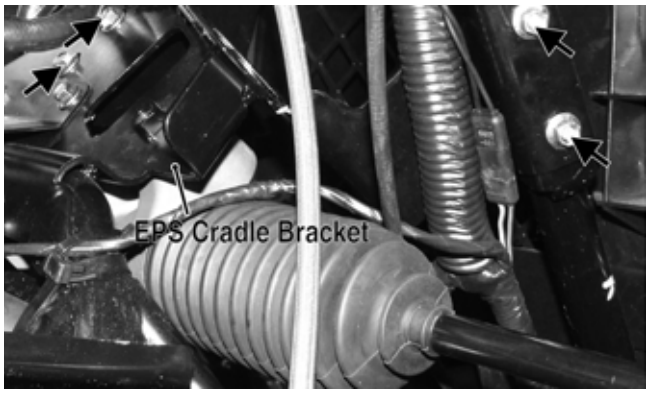
PR193

8. Tap the ball joints out of the knuckle; then remove the knuckle.
9. Remove the lower shock absorber eyelet from the upper A-arm.



AF626D

10. Remove the cap screws securing the A-arms to the frame.



PR773A

3. Place the tie rod ends into the knuckles and secure with the castle nuts (coated with red Loctite #271). Tighten to 30 ft-lb; then install new cotter pins.

■NOTE: If the slots in the castle nut are not aligned with the hole in the tie rod end, tighten until the cotter pin can be installed.

4. Install the EPS assembly (see Installing EPS Assembly sub-section in this section); then tighten the cap screws (from step 2) to 20 ft-lb.
5. Install the wheel and tighten to 80 ft-lb.

Steering Wheel

REMOVING

1. Remove the steering wheel cover; then match mark the steering shaft and steering wheel.

■NOTE: Any time steering components are disassembled, all connecting components should be marked for proper alignment during assembling.

2. Remove the lock clip from the steering shaft; then remove the nut securing the steering wheel and remove the steering wheel.

INSPECTING

1. Inspect the steering wheel for cracks, missing padding, or broken spokes.
2. Inspect the splines for wear.
3. Check that the steering wheel is not bent.

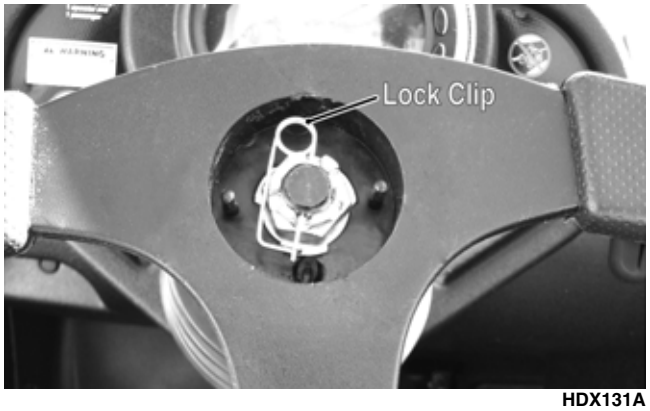
INSTALLING

1. Install the steering wheel aligning the two match marks; then apply a drop of red Loctite #271 to the threads of the nut and secure the steering wheel. Tighten to 25 ft-lb.

■NOTE: If a new steering wheel is being installed, mark the wheel as close as possible to the old wheel mark; then check for proper positioning with the front wheels straight forward.

2. Install the lock clip on the steering shaft.

■NOTE: If the hole in the steering shaft does not align with the slots in the castle nut, tighten the nut slightly until the next slot aligns with the hole.



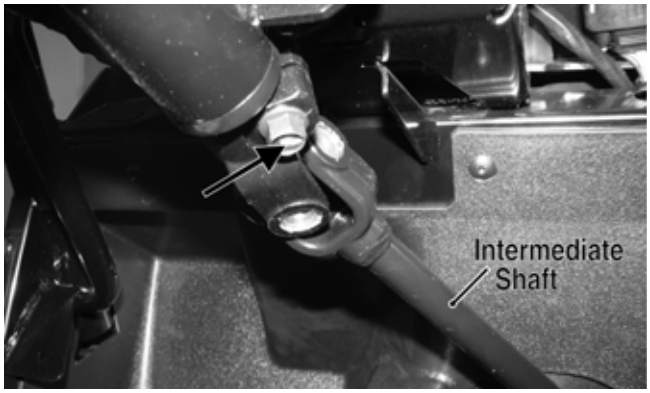
HDX131A

Upper Steering Shaft

REMOVING

1. Remove the dashboard (see Dashboard in this section).
2. Remove the four cap screws and nuts securing the steering shaft housing to the steering support; then remove the cap screw securing the intermediate shaft yoke to the steering shaft.

PR764A



PR765A

3. Remove the steering shaft housing and shaft from the steering support and intermediate shaft; then remove the intermediate shaft from the EPS input shaft.