SECTION 4 - FUEL/LUBRICATION/COOLING

4

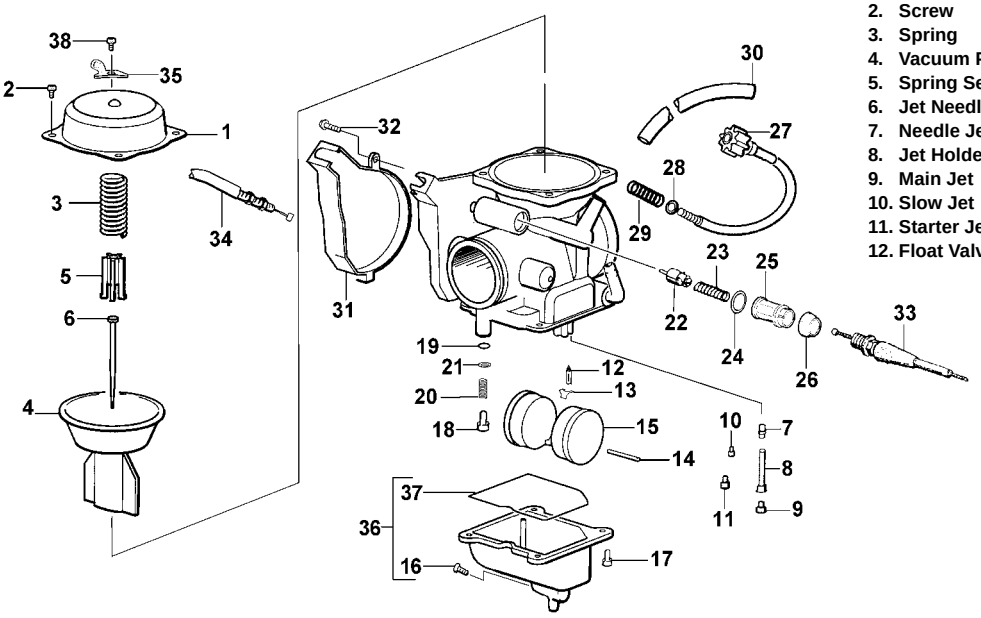
TABLE OF CONTENTS

Carburetor Specifications

ITEM	250	300	400	500
Type	Keihin CVK32	Keihin CVK32	Keihin CVK32	Keihin CVK36
Main Jet	138	135	150	148
Slow Jet	38	38	38	75
Low Speed Fuel Screw Setting (turns)	1 3/4	2 1/4	2 1/8	1 7/8
Needle Jet	4.0/3.4	4.0/3.4	4.0/3.4	6.0/4.0
Jet Needle	N8TT	N8TT	N8TV	N3RS
Idle RPM	1300-1400	1300-1400	1250-1350	1250-1350
Starter Jet	60	65	60	90
Float Arm Height	17 mm (0.7 in.)	17 mm (0.7 in.)	17 mm (0.7 in.)	17 mm (0.7 in.)
Throttle Cable Free-Play (at lever)	3-6 mm (1/8-1/4 in.)	3-6 mm (1/8-1/4 in.)	3-6 mm (1/8-1/4 in.)	3-6 mm (1/8-1/4 in.)

Carburetor Schematics

250/300 (Keihin)

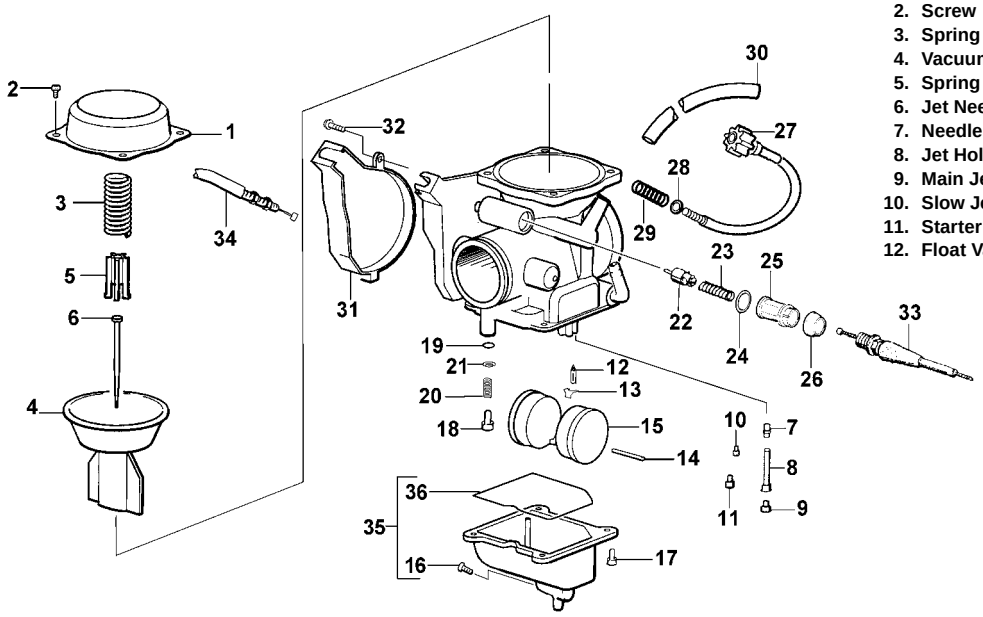


KEY

1. Cover
2. Screw
3. Spring
4. Vacuum Piston
5. Spring Seat
6. Jet Needle
7. Needle Jet
8. Jet Holder
9. Main Jet
10. Slow Jet
11. Starter Jet
12. Float Valve
13. Clip
14. Float Pin
15. Float
16. Drain Plug
17. Screw
18. Low Speed Fuel Screw
19. O-Ring
20. Spring
21. Washer
22. Starter Valve
23. Spring
24. O-Ring
25. Cap
26. Rubber Cap
27. Stop Screw
28. Washer
29. Spring
30. Tube
31. Cover
32. Screw
33. Choke Cable
34. Throttle Cable
35. Idle Adjust Bracket
36. Float Chamber Assy
37. O-Ring
38. Screw

0735-876

400 (Keihin)

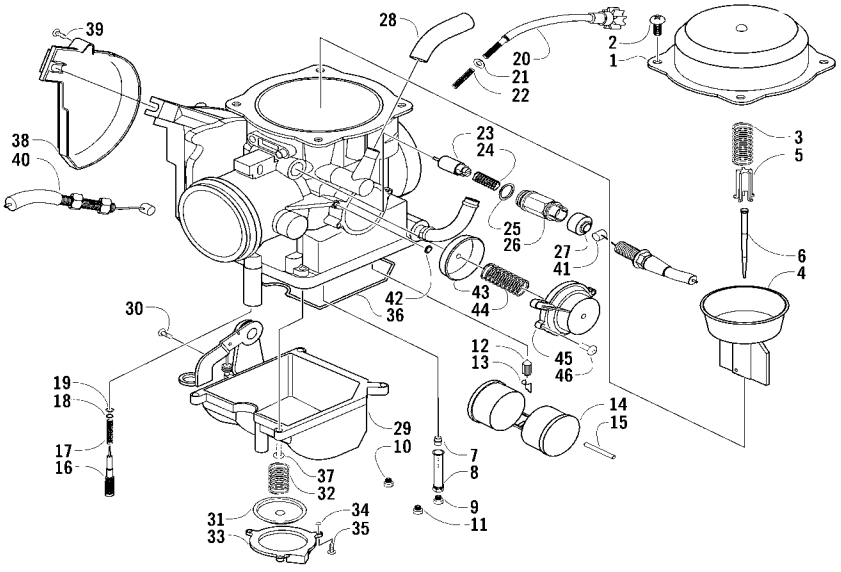


KEY

1. Cover
2. Screw
3. Spring
4. Vacuum Piston
5. Spring Seat
6. Jet Needle
7. Needle Jet
8. Jet Holder
9. Main Jet
10. Slow Jet
11. Starter Jet
12. Float Valve
13. Clip
14. Float Pin
15. Float
16. Drain Plug
17. Screw
18. Low Speed Fuel Screw
19. O-Ring
20. Spring
21. Washer
22. Starter Valve
23. Spring
24. O-Ring
25. Cap
26. Rubber Cap
27. Idle Adjust Screw
28. Washer
29. Spring
30. Tube
31. Cover
32. Screw
33. Choke Cable
34. Throttle Cable
35. Float Chamber Assy
36. O-Ring

0737-813

500 (Keihin)



KEY

1. Cover
2. Screw
3. Spring
4. Vacuum Piston
5. Spring Seat
6. Jet Needle
7. Needle Jet
8. Jet Holder
9. Main Jet
10. Slow Jet
11. Starter Jet
12. Float Valve
13. Clip
14. Float Set
15. Float Pin
16. Low Speed Fuel Screw
17. Spring
18. Washer
19. O-Ring
20. Idle Adjust Screw
21. Washer
22. Spring
23. Starter Valve
24. Spring
25. O-Ring
26. Cap
27. Rubber Cap
28. Tube
29. Float Chamber Assy
30. Drain Plug
31. Diaphragm Assy
32. Spring
33. Pump Housing
34. U-Ring
35. Screw
36. O-Ring
37. Screw
38. Cover
39. Screw
40. Thottle Cable
41. Choke Cable
42. U-Ring
43. Diaphragm Assy
44. Spring
45. Cover
46. Screw

0737-883

Carburetor

⚠ WARNING

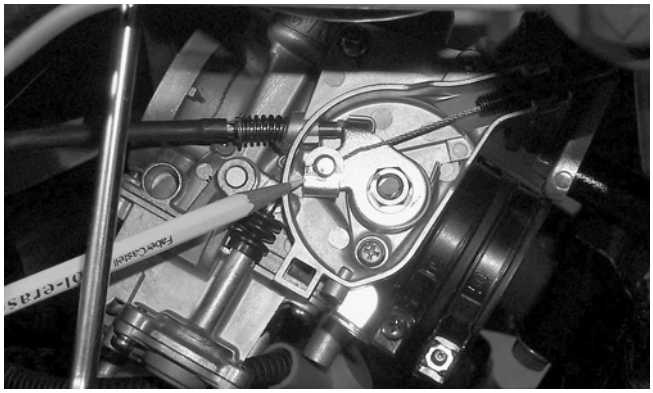
Whenever any maintenance or inspection is performed on the fuel system during which there may be fuel leakage, there should be no welding, smoking, open flames, etc., in the area.

REMOVING

1. Turn the gas tank valve to the OFF position.
2. Remove the seat.
3. Remove the air-intake snorkel (250/300) or the air cleaner housing cover (400/500).
4. Disconnect the hose from the carburetor to the gas tank at the gas tank valve connection.
5. Loosen the flange clamps; then remove the carburetor from the two carburetor boots.
6. Remove the screw securing the throttle actuator cover to the carburetor; then remove the cover.

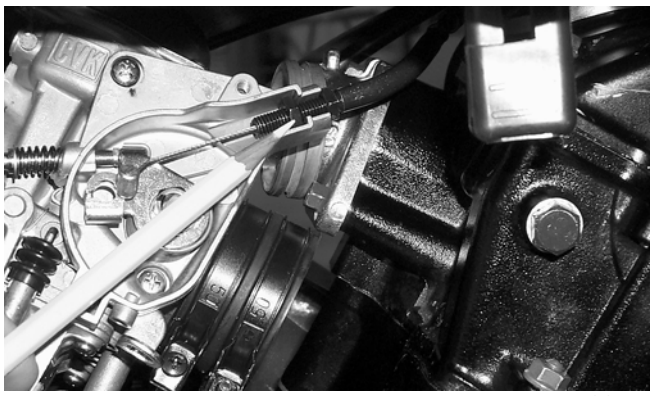
CC743

7. Remove the throttle cable from the actuator arm.



CC742

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



CC741

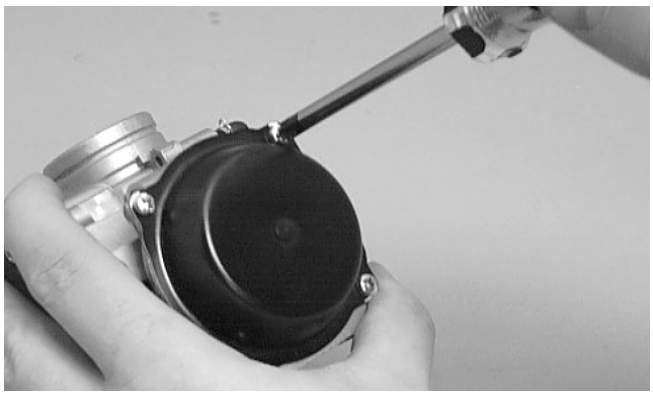
9. By unscrewing the plastic choke cable end, disconnect the choke cable from the carburetor.

CC740A

10. Disconnect the gas and vent hoses; then remove the carburetor.

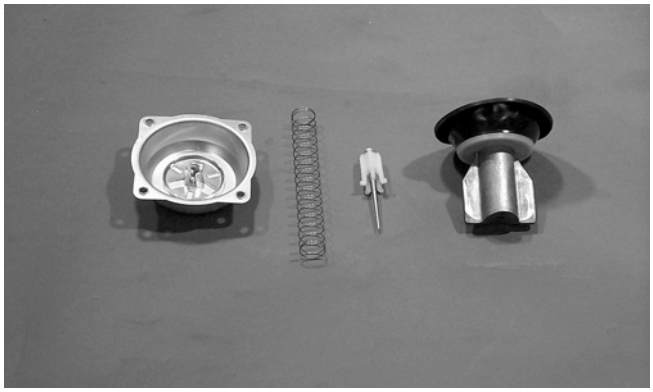
DISASSEMBLING

1. Remove the four Phillips-head screws securing the top cover; then remove the cover.



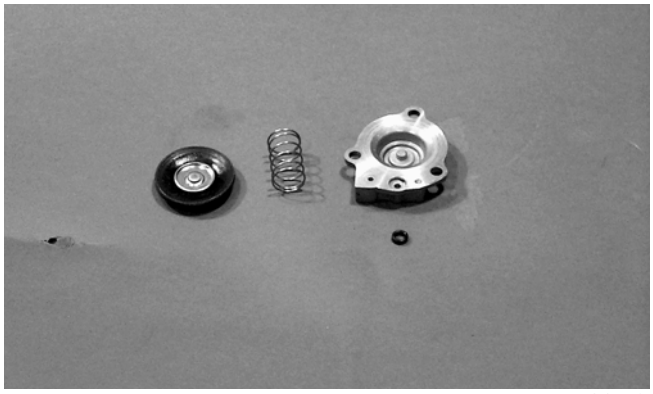
CH015D

2. Remove the vacuum piston assembly from the carburetor body. Account for a spring, spring seat, and the jet needle.



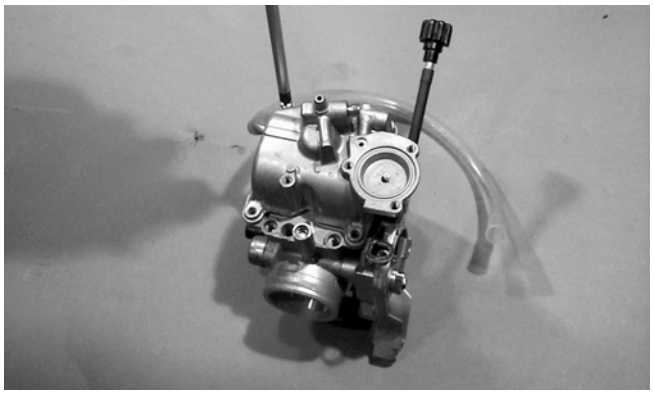
CC746

3. Remove the three screws securing the primer housing. Account for the diaphragm assembly, spring, and U-ring (in the housing).

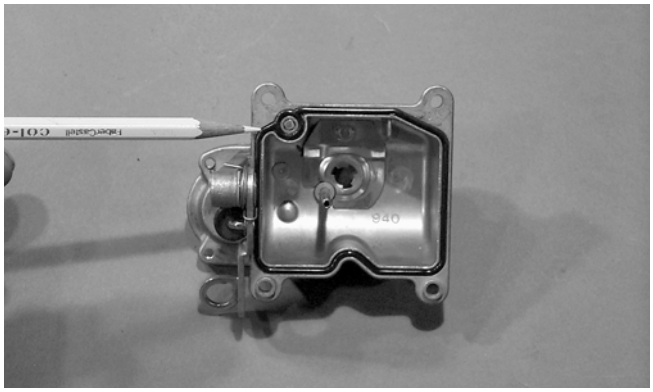


CC748

4. Remove the Phillips-head screws securing the float chamber; then remove the chamber. Account for the O-ring.

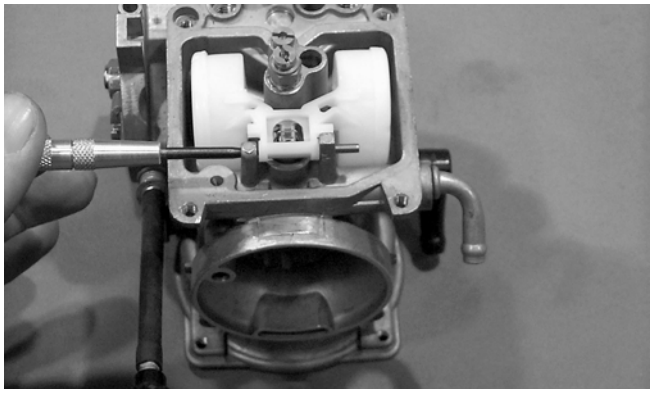


CC749



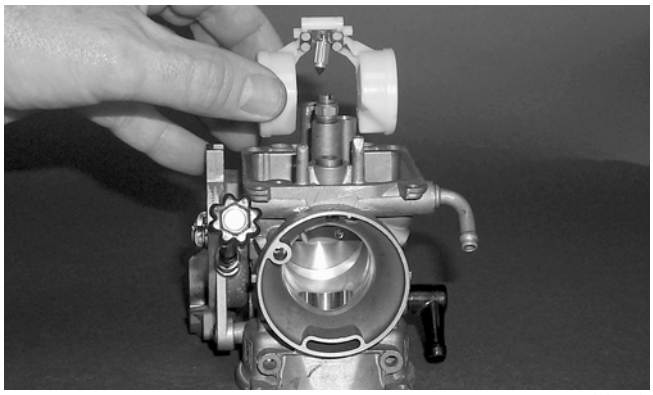
CC750

5. Remove the float pin.



CC752

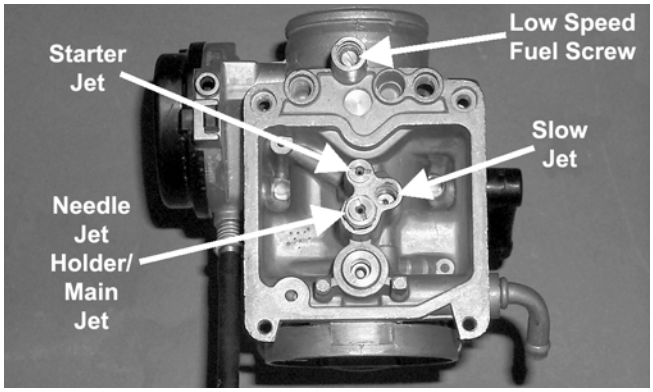
6. Lift the float assembly from the carburetor. Account for the float needle valve.



CC753

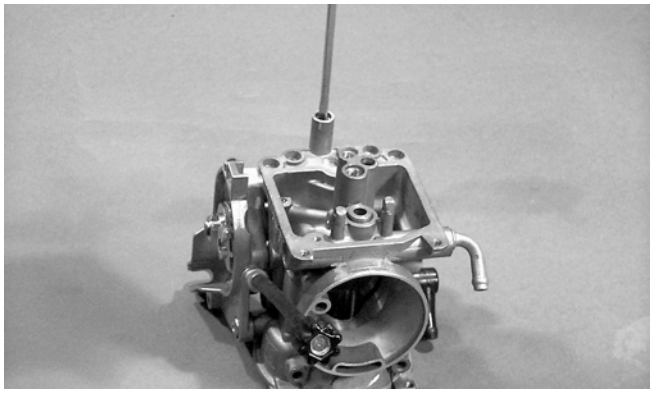
■ **NOTE: Note the locations of the jets, air screw, and holder for disassembling procedures.**

4



CC761A

7. Secure the needle jet holder with a wrench; then remove the main jet.
8. Remove the needle jet holder; then remove the slow jet and the starter jet.
9. Remove the low speed fuel screw.

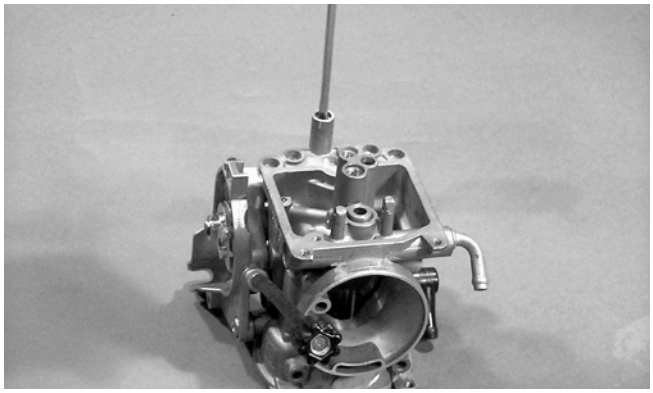


CC758

10. Unscrew and remove the idle speed adjuster assembly. Account for the spring and washer.

ASSEMBLING

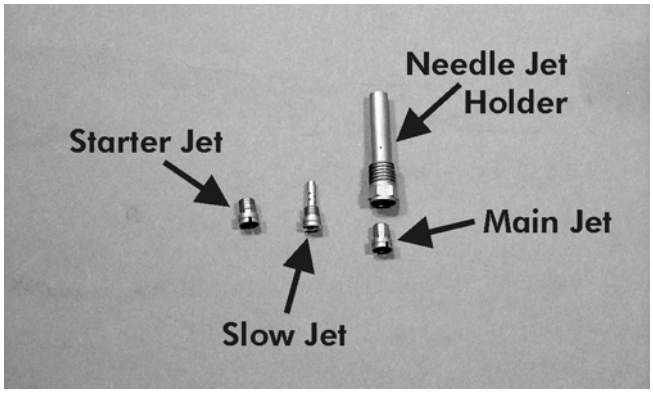
1. Screw the idle speed adjuster into the carburetor making sure the washer and spring are properly positioned.
2. Install the low speed fuel screw.



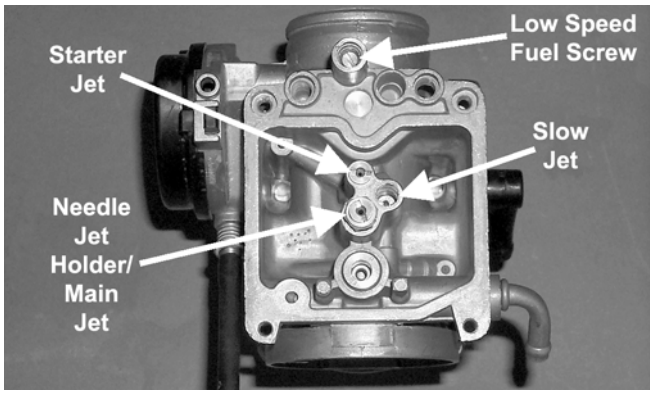
CC758

■ **NOTE: Turn the low speed fuel screw clockwise until it is lightly seated; then turn it counterclockwise the recommended number of turns as an initial setting.**

■ **NOTE: Note the locations of the jets and holder during assembling procedures.**

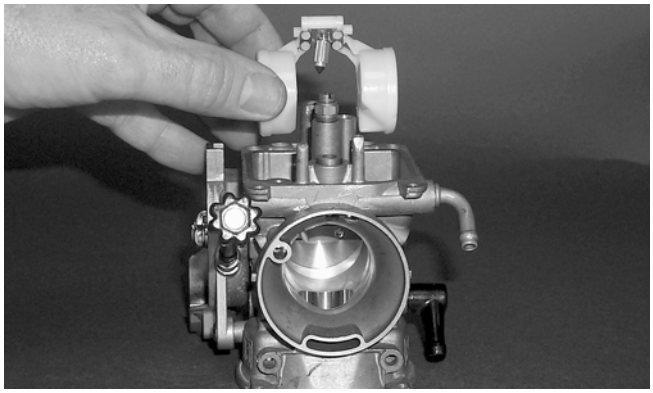


CC759A



CC761A

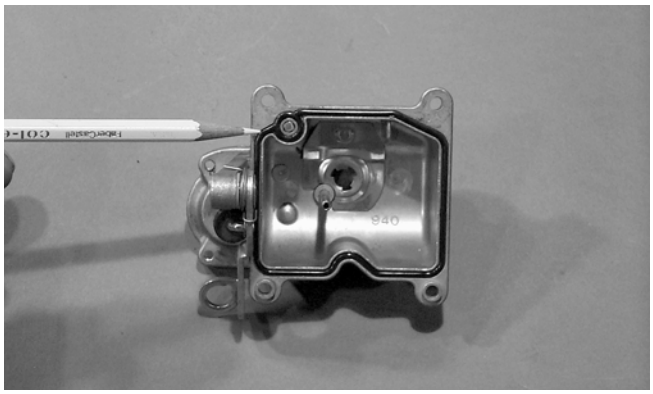
3. Install the slow jet. Tighten securely.
4. Install the main jet into the needle jet holder and tighten securely; then install the needle jet holder assembly into the carburetor and tighten securely.
5. Place the float assembly (with float needle valve) into position and secure to the carburetor with the float pin.



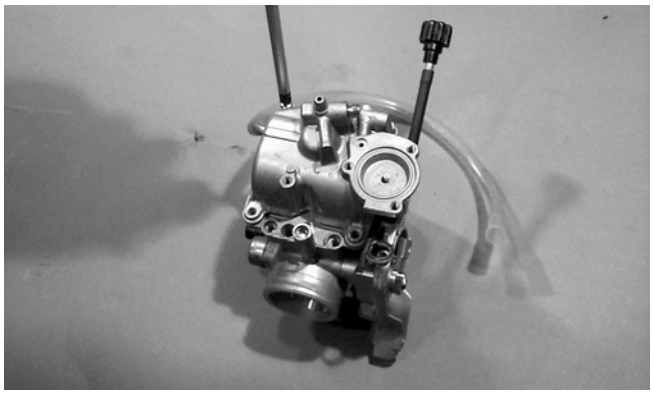
CC753

■ **NOTE: Check float arm height by placing the carburetor on its side w/float contacting the needle; then measure with a caliper the height when the float arm is in contact with the needle valve. Float arm height should be 17 mm (0.7 in.).**

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

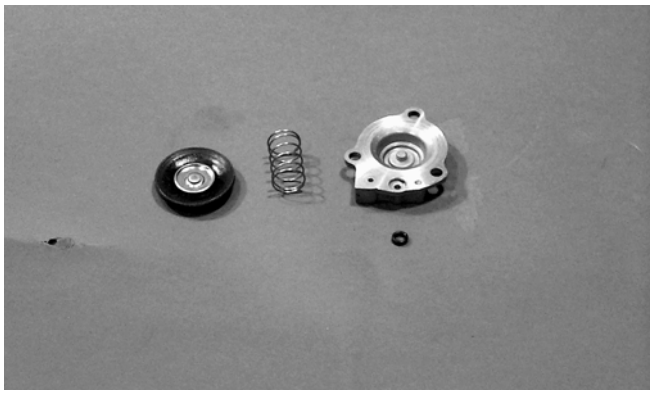


CC750



CC749

7. Place the U-ring into the primer housing. Position the spring and diaphragm assembly (lip toward the carburetor) onto the carburetor; then secure the assembly with the primer housing and three screws. Tighten securely.

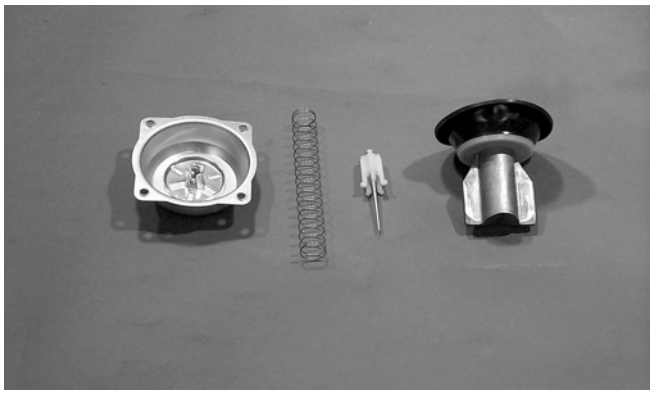


CC748

⚠ CAUTION

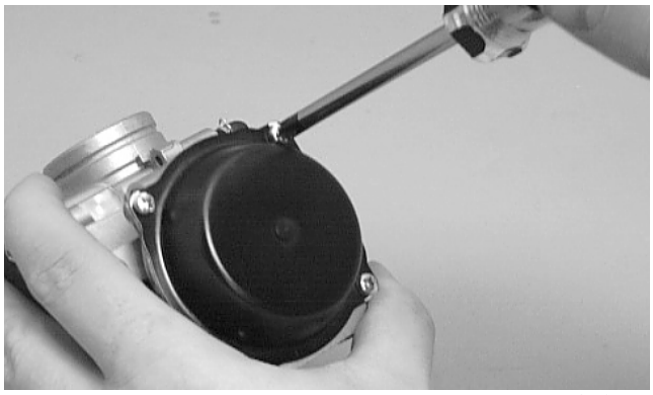
It is important to press down on the primer housing until it contacts the carburetor to make sure the diaphragm lip is properly seated in the groove in the carburetor. If the diaphragm is not properly seated, leakage will occur.

8. Place the jet needle, spring seat, and spring into the vacuum piston; then place the assembly down into the carburetor.



CC746

9. Place the top cover into position; then secure with the Phillips-head screws. Tighten securely.

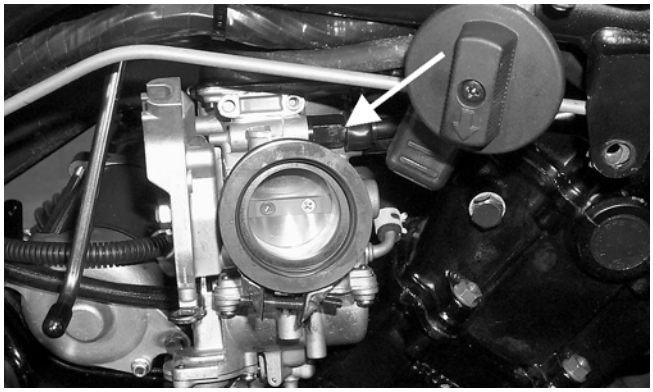


CH015D

INSTALLING

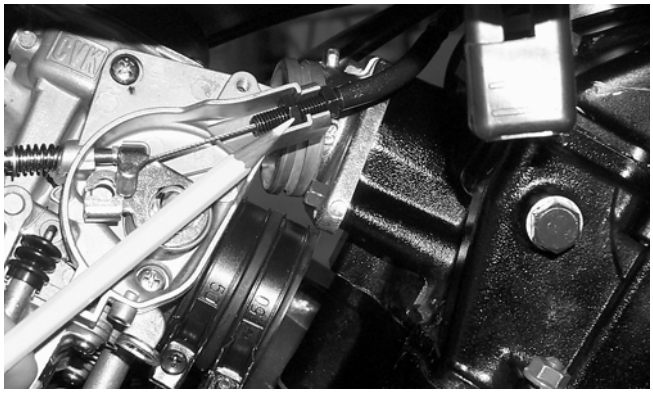
1. Connect the gas and vent hoses onto the carburetor.

2. Connect the choke cable by screwing the plastic choke cable end onto the carburetor.



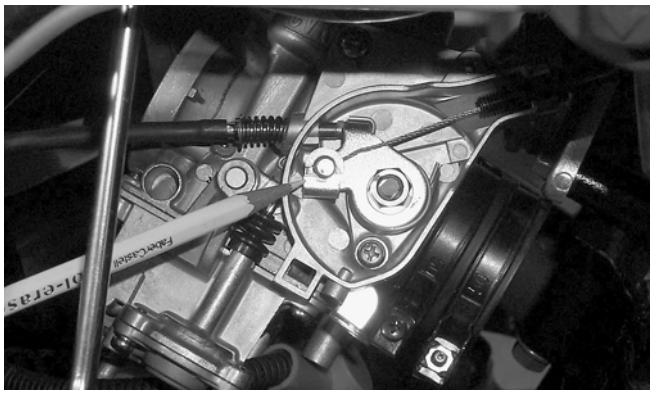
CC740A

3. Place the throttle cable into position and secure by tightening the outer jam nut.



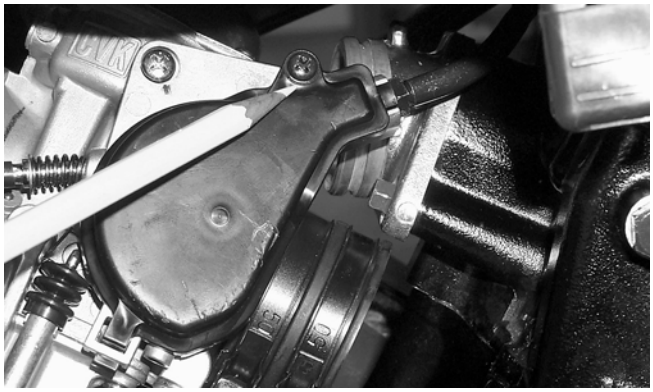
CC741

4. Connect the throttle cable to the actuator arm.



CC742

5. Place the throttle actuator cover into position on the carburetor; then secure with the screw.



CC743

6. Position the carburetor in the air cleaner boot and intake pipe assembly; then secure with the clamps.
7. Connect the hose at the gas tank valve connection.
8. Secure the air-intake snorkel (250/300) or the air cleaner housing cover (400/500).
9. Install the seat; then turn the gas tank valve to the ON position.

Cleaning and Inspecting Carburetor

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

⚠ WARNING

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

⚠ CAUTION

DO NOT place any non-metallic components in parts-cleaning solvent because damage or deterioration will result.

1. Place all metallic components in a wire basket and submerge in carburetor cleaner.
2. Soak for 30 minutes; then rinse with fresh parts-cleaning solvent.
3. Wash all non-metallic components with soap and water. Rinse thoroughly.
4. Dry all components with compressed air only making sure all holes, orifices, and channels are unobstructed.
5. Inspect the carburetor body for cracks, nicks, stripped threads, and any other imperfections in the casting.

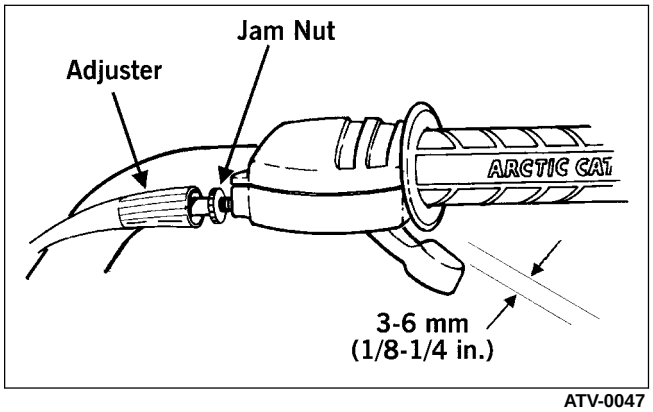
6. Inspect the vacuum piston/diaphragm for cracks, imperfections in the casting, or cracks and tears in the rubber.
7. Inspect float for damage.
8. Inspect gasket and O-rings for distortion, tears, or noticeable damage.
9. Inspect tips of the jet needle, low speed fuel screw, and the inlet needle valve for wear, damage, or distortion.
10. Inspect the slow jet and main jet for obstructions or damage.

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

11. Inspect the plunger assembly/starter valve and seat for wear or damage.
12. Inspect the carburetor mounting flange for damage and tightness.

Throttle Cable Free-Play

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



ATV-0047

Engine RPM (Idle)

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

To adjust idle RPM, use the following procedure.

■ **NOTE: To access the idle adjustment screw, it will be necessary to remove the seat on the 250/300 models. The idle adjustment screw is located on the right-hand side of the carburetor on the 400/500 models.**

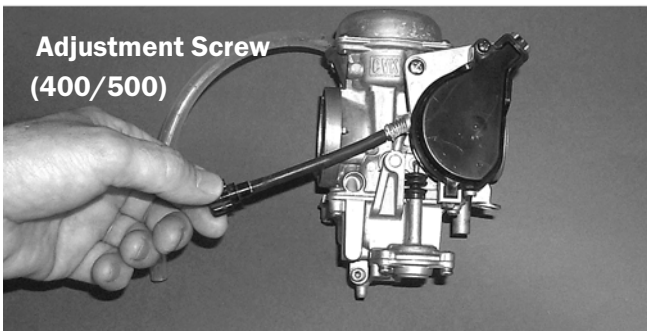
1. Start the engine and warm it up to operating temperature.
2. Turn the idle adjustment screw clockwise or counterclockwise until the engine idles at recommended RPM.

⚠ WARNING

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

Engine Idle RPM	
250/300	1300-1400
400/500	1250-1350

CC795B

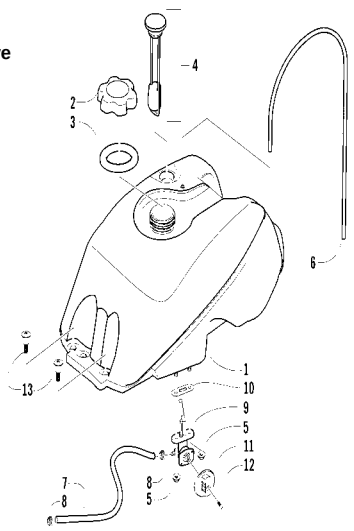


AF920C

4

Gas Tank

KEY
1. Gas Tank Assy
2. Tank Cap
3. Seal
4. Gauge
5. Lock Nut
6. Vent Hose
7. Fuel Hose
8. Hose Clamp
9. Gas Tank Valve
10. Valve Gasket
11. Valve Knob
12. Screw
13. Screw



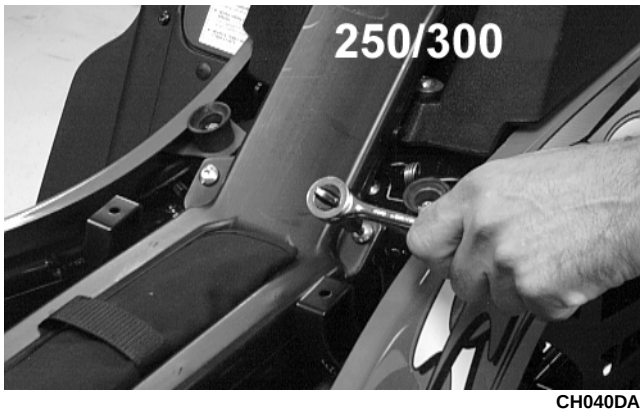
0736-991

⚠ WARNING

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

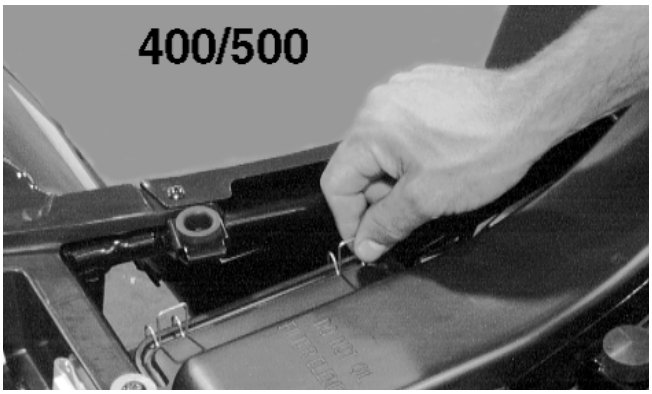
REMOVING

1. Turn the gas tank valve to the OFF position.
2. Remove the seat.
3. Remove the air-intake snorkel (250/300) or the air cleaner housing cover (400/500).



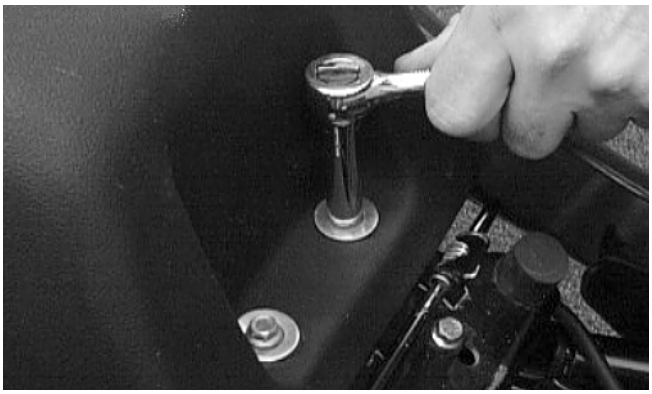
CH040DA

CH041DA



AL645DA

4. Disconnect the hose from the carburetor to the gas tank at the tank connection.
5. Cut the tie-down securing the fuel hose to the cables and hoses.
6. Remove the torx-head screws securing the gas tank to the frame.



AL617D

7. Remove the vent hose; then remove the gas tank.

CLEANING AND INSPECTING

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

1. Clean all gas tank components with parts-cleaning solvent.
2. Inspect all hoses for cracks or leaks.

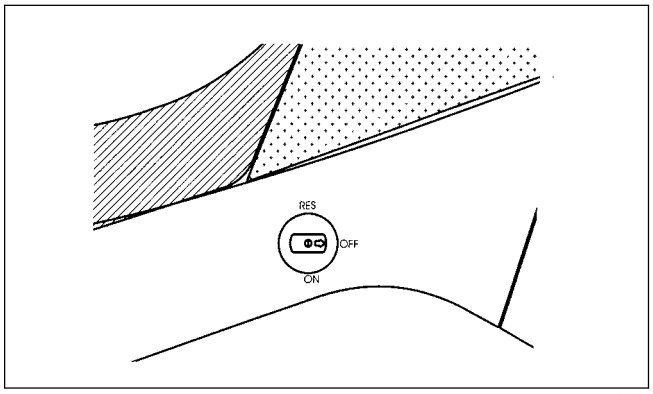
3. Inspect gas tank valve, tank cap, and tank for leaks, holes, and damaged threads.
4. Inspect the gas gauge for proper operation.

INSTALLING

1. Place the gas tank into position on the frame; then install the torx-head screws. Tighten securely.
2. Connect the fuel hose from the carburetor; then secure hose to cables and hoses with a cable tie.
3. Install the air-intake snorkel (250/300) or the air cleaner housing cover (400/500).
4. Install the vent hose; then fill the gas tank with gasoline.
5. Turn the gas tank valve to the ON position and inspect for leakage.
6. Install the seat.

Gas Tank Valve

The ATV has a valve incorporated into the gas tank. There are three positions: ON, RES, and OFF.



ATV-1098

In the OFF position, the valve will not allow gasoline to flow to the carburetor. In the ON position (the normal operating position), gasoline will flow from the tank to the carburetor. In this position 2.46 l (0.65 U.S. gal.) will remain in the tank as a reserve quantity. Moving the valve to the RES position will allow the operator to use the remaining gasoline in the tank. When turning the valve to any of the three positions, be sure the indicator is pointed directly at the position desired.

REMOVING/INSPECTING

⚠ WARNING

Drain the gas tank prior to this procedure.

1. Remove the gas hose from the valve by releasing the spring clamp.
2. Remove the two nuts securing the valve; then remove the valve. Account for the gasket.
3. Inspect the gasket and valve/tank mating surfaces for damage or deterioration.
4. Inspect for and remove any obstructions in the valve.

INSTALLING

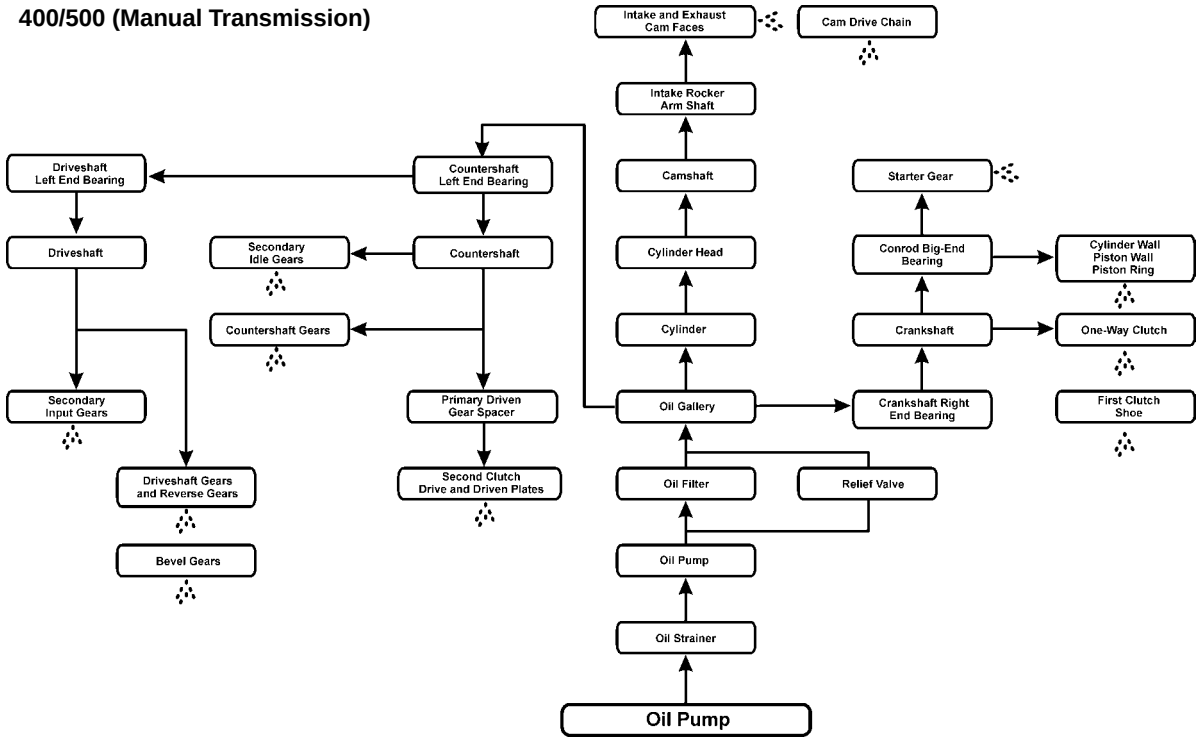
1. Place the valve and gasket into position on the tank and secure with the nuts. Tighten to 0.1 kg-m (1 ft-lb).
2. Install the gas hose onto the valve with the spring clamp.

Gas/Vent Hoses

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

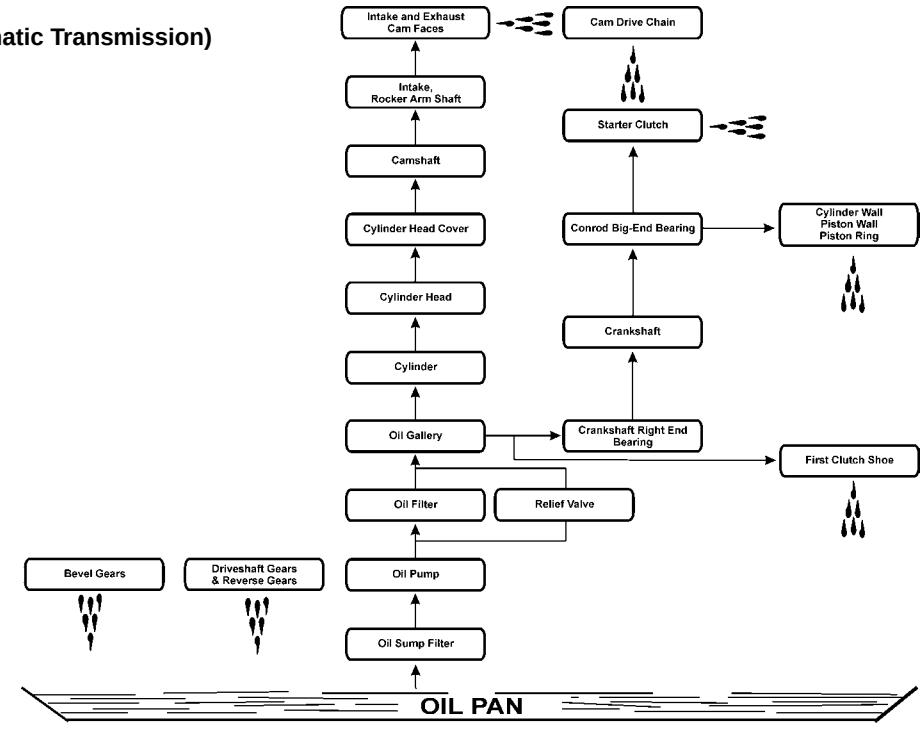
Oil Flow Charts

400/500 (Manual Transmission)

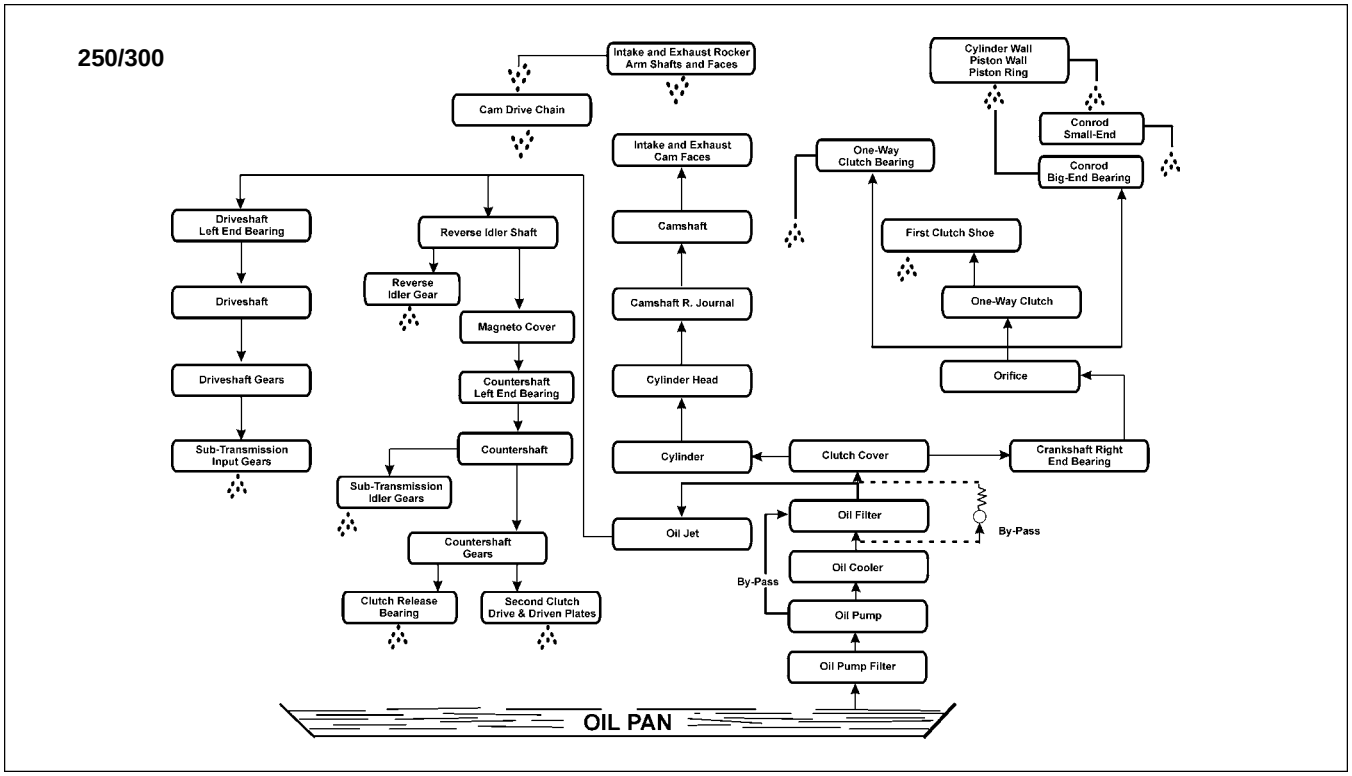


ATV-0111

400/500 (Automatic Transmission)



ATV-1102



ATV-0106

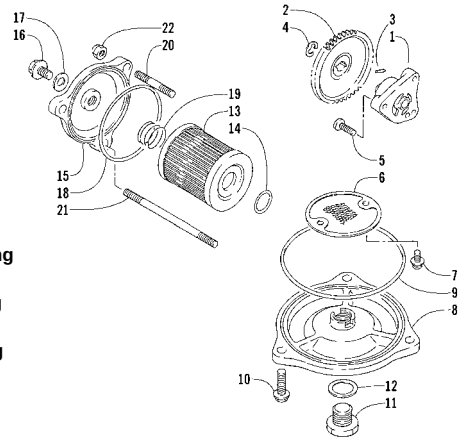
4

Oil Filter/Oil Pump

■ **NOTE: Whenever internal engine components wear excessively or break and whenever oil is contaminated, the oil pump should be disassembled, cleaned and inspected, and serviced as necessary.**

KEY **250/300**

1. Engine Oil Pump
2. Driven Gear
3. Pin
4. Circlip
5. Cap Screw
6. Strainer
7. Cap Screw
8. Cap
9. O-Ring
10. Cap Screw
11. Drain Plug
12. Gasket
13. Filter
14. Filter O-Ring
15. Cap
16. Check Plug
17. Gasket
18. Cap O-Ring
19. Spring
20. Stud Bolt
21. Stud Bolt
22. Nut

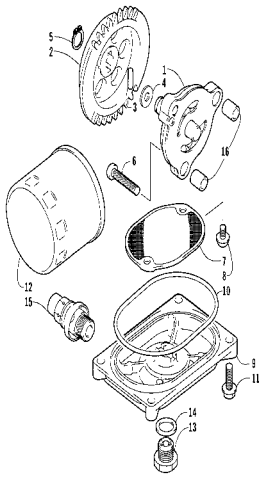


0733-752

400

KEY

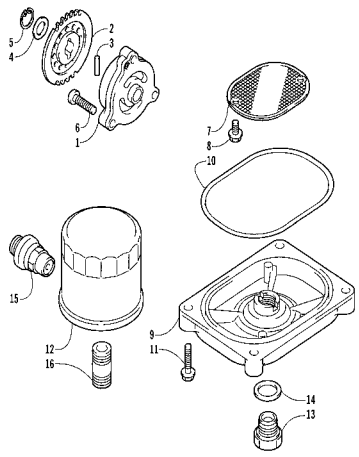
1. Oil Pump
2. Driven Gear
3. Pin
4. Washer
5. Circlip
6. Cap Screw
7. Strainer
8. Cap Screw
9. Cap
10. O-Ring
11. Cap Screw
12. Filter
13. Drain Plug
14. Gasket
15. Oil Relief Valve Assy
16. Pin



0737-035

500

KEY
1. Oil Pump
2. Drive Gear
3. Pin
4. Washer
5. Circlip
6. Cap Screw
7. Strainer
8. Cap Screw
9. Cap
10. O-Ring
11. Cap Screw
12. Filter
13. Drain Plug
14. Gasket
15. Oil Relief Valve Assy
16. Oil Filter Union



0737-765

REMOVING/DISASSEMBLING

1. Remove the oil pump from the engine (see Right-Side Components in Section 3).
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 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 with the Phillips-head screw coated with red Loctite #271.
4. Install the oil pump into the engine (see Right-Side Components in Section 3).

Testing Oil Pump Pressure

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

1. Connect the Arctic Cat Engine Tachometer (p/n 0644-275) to the engine.
2. Connect the Oil Pressure Gauge (p/n 0444-039) to the oil filter drain plug.

■ **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 the specified RPM.
4. The oil pressure gauge must read as specified.

250/300
OIL PRESSURE @ 3000 RPM
0.7-2.8 kg/cm²
(10-40 psi)
Oil Temperature - 60°C (140°F)

400 (Manual Transmission)
OIL PRESSURE @ 3000 RPM
0.6-1.0 kg/cm²
(9-14 psi)
Oil Temperature - 60°C (140°F)

400 (Automatic Transmission)
OIL PRESSURE @ 3000 RPM
1.1-1.5 kg/cm²
(16-21 psi)
Oil Temperature - 60°C (140°F)

500 (Manual Transmission)
OIL PRESSURE @ 3000 RPM
1.2-1.6 kg/cm²
(17-23 psi)
Oil Temperature - 60°C (140°F)

500 (Automatic Transmission)
OIL PRESSURE @ 3000 RPM
1.3-1.7 kg/cm²
(18.8-24.7 psi)
Oil Temperature - 60°C (140°F)

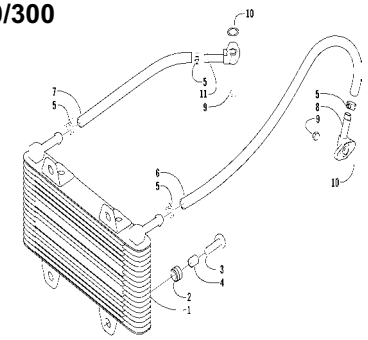
■ **NOTE: If the oil pressure is lower than specified, check for an oil leak, damaged oil seal, or a defective oil pump.**

■ **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.**

Oil Cooler
(250/300/400)

KEY
1. Oil Cooler
2. Grommet
3. Cap Screw
4. Collar
5. Hose Clamp
6. Hose (Input)
7. Hose (Output)
8. Fitting
9. Cap Screw
10. O-Ring
11. Fitting

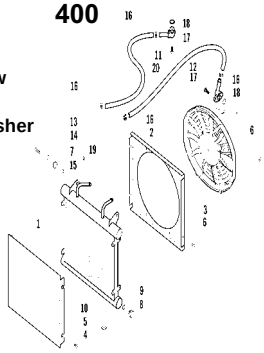
250/300



0737-536

KEY
1. Oil Cooler Assy
2. Shroud
3. Fan
4. Thumb Screw
5. Screen
6. Machine Screw
7. Grommet
8. Drain Plug
9. O-Ring
10. Bushing
11. Fitting
12. Fitting
13. Cap Screw
14. Washer
15. Collar
16. Clamp
17. Cap Screw
18. O-Ring
19. Nut w/Washer
20. Hose

400



REMOVING

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

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

⚠ CAUTION

Elevate and secure the hoses to avoid oil spillage.

2. Remove the cap screws securing the oil cooler to the frame. Account for grommets, collars, and washers.

AL651D

3. Remove the oil cooler from the frame.

INSTALLING

1. Place the collar into position in the frame.
2. Secure the cooler to the frame with the cap screws, washers, collars, and grommets.

AL651D

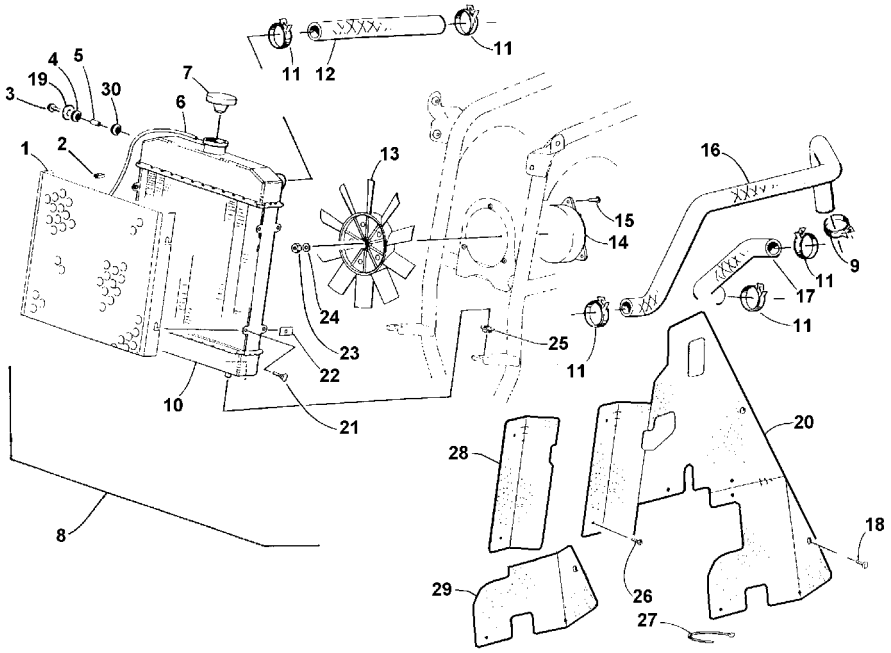
3. Install the hoses onto their respective fittings and secure with the clamps.

4

Liquid Cooling System
(500)

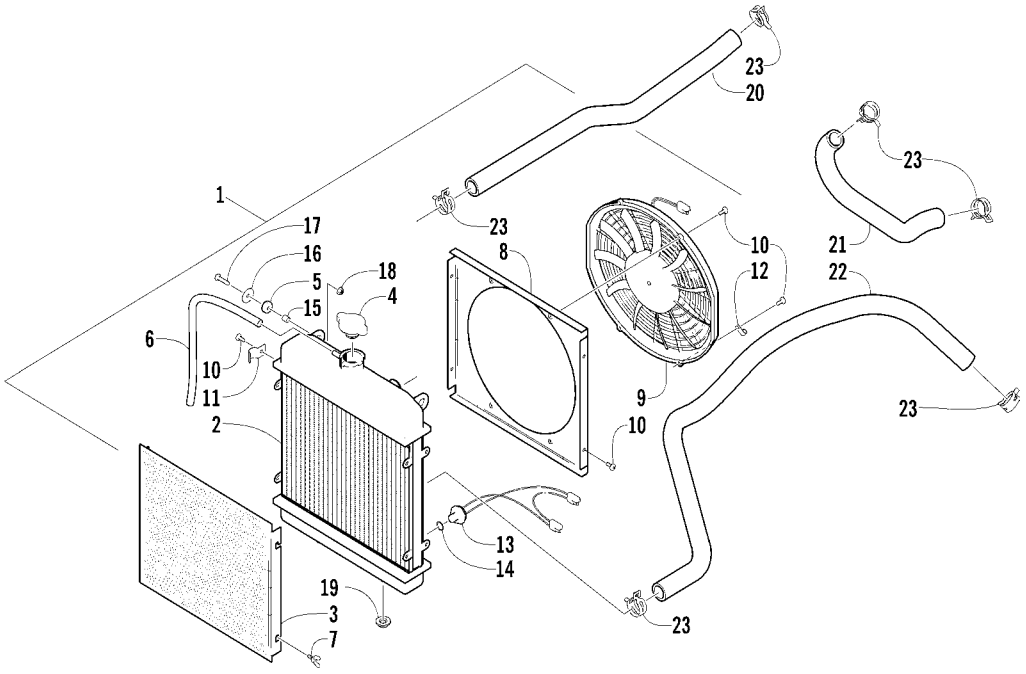
KEY
1. Radiator Screen
2. Wire Clamp
3. Cap Screw
4. Grommet
5. Collar
6. Hose
7. Radiator Cap
8. Radiator Assy
9. Hose Clamp
10. Radiator
11. Hose Clamp
12. Coolant Hose
13. Fan Blade
14. Fan Motor
15. Machine Screw
16. Coolant Hose
17. Coolant Hose
18. Machine Screw
19. Washer
20. Fender Panel
21. Thumb Screw
22. Speed Nut
23. Nut
24. Washer
25. Stem Bushing
26. Machine Screw
27. Cable Tie
28. Fan Shroud
29. Fender Panel
30. Flange Nut

500
(Manual Transmission)



0735-912

500
(Automatic Transmission)



KEY
1. Radiator Assy
2. Radiator
3. Radiator Screen
4. Radiator Cap
5. Grommet
6. Vent Hose
7. Thumb Screw
8. Fan Shroud
9. Fan
10. Machine Screw
11. Clamp
12. Clamp
13. Temperature Sender
14. O-Ring
15. Collar
16. Washer
17. Cap Screw
18. Nut w/Washer
19. Stem Bushing
20. Coolant Hose
21. Coolant Hose
22. Coolant Hose
23. Hose Clamp

0737-884

The cooling system capacity is approximately 2.9 L (3 U.S. qt). The cooling system should be inspected daily for leakage and damage. Also, the coolant level should be checked periodically.

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

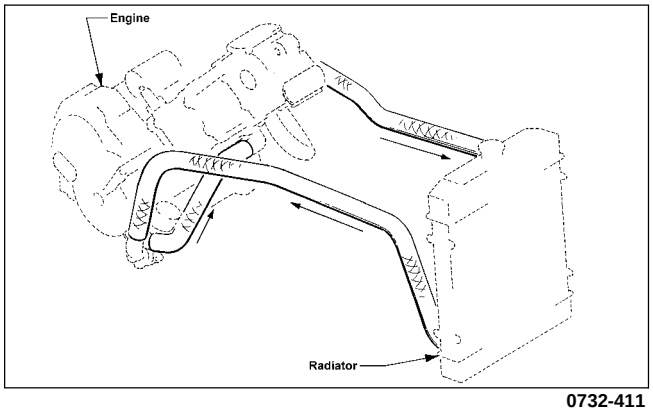
AN604D

⚠ CAUTION

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

Coolant Temperature Switch	
OFF to ON	115° C (239° F) - Approx
ON to OFF	108° C (226° F) - Approx

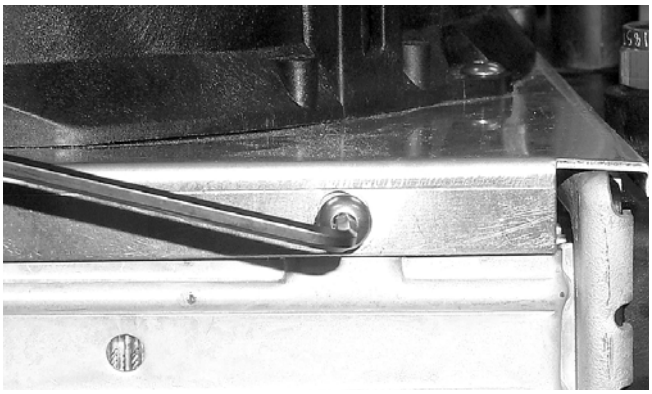
Radiator



0732-411

REMOVING

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



CC863

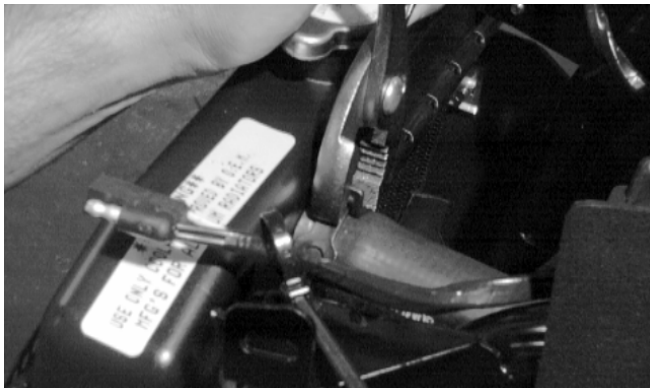
CLEANING AND INSPECTING

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

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

INSTALLING

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



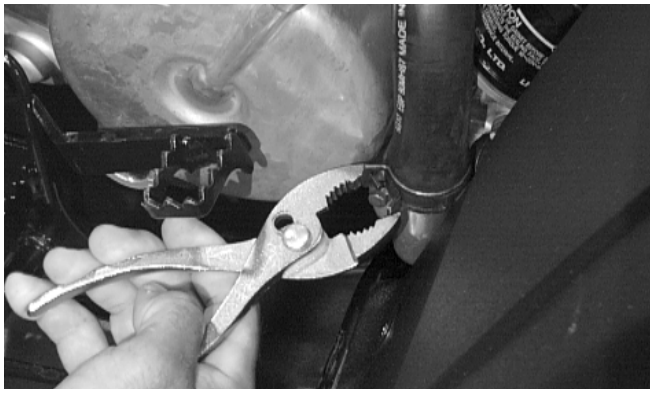
AF734D

4. Install the front bumper and grille assembly (see Section 8).
5. Install the front rack (see Section 8).
6. Fill the cooling system (2.9 L or 3 U.S. qt) with antifreeze. Check for leakage.
7. Connect the fan wiring to the main wiring harness.

Hoses/Thermostat

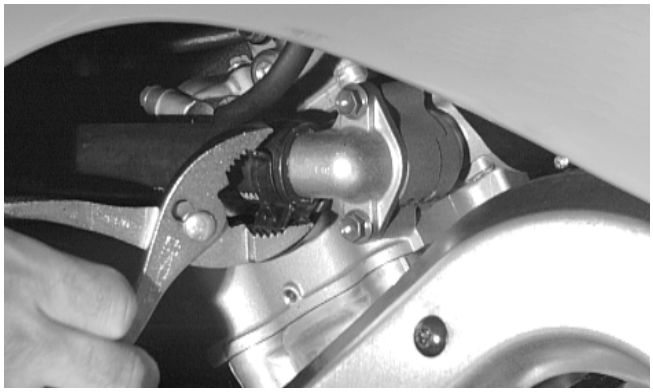
REMOVING

1. Drain the coolant from the cooling system.
2. Remove the hose clamps securing the lower coolant hose to the water pump housing and to the radiator; then remove the lower hose.



CC334D

3. Remove the clamps securing the upper coolant hose to the thermostat housing and to the radiator; then remove the upper hose.



CC335D

4. Remove the clamps securing the crossover coolant hose to the water pump and to the engine water inlet.
5. Remove the two cap screws securing the thermostat housing to the cylinder head. Account for an O-ring and a thermostat.

INSPECTING

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

1. Inspect the thermostat for corrosion, wear, or spring damage.
2. Using the following procedure, inspect the thermostat for proper operation.
   A. Suspend the thermostat in a container filled with water.
   B. Heat the water and monitor the temperature with a thermometer.
   C. The thermostat should start to open at 48.5-51.5°C (119.3-124°F).
   D. If the thermostat does not open, it must be replaced.
3. Inspect all coolant hoses, connections, and clamps for deterioration, cracks, and wear.

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

INSTALLING

1. Place the thermostat and O-ring into the thermostat housing; then secure the thermostat housing to the cylinder head with the two cap screws.
2. Install the crossover coolant hose onto the water pump and engine water inlet. Secure with the two hose clamps.
3. Slide the upper hose onto the thermostat housing and radiator. Secure with the two hose clamps.

4. Install the lower coolant hose onto the water pump housing and radiator. Secure with the two hose clamps.

5. Fill the cooling system (2.9 L or 3 U.S. qt) with antifreeze. Check for leakage.

Fan

REMOVING

1. Remove the radiator (see Radiator in this section).

2. Remove the fan assembly from the radiator.

CC862

INSTALLING

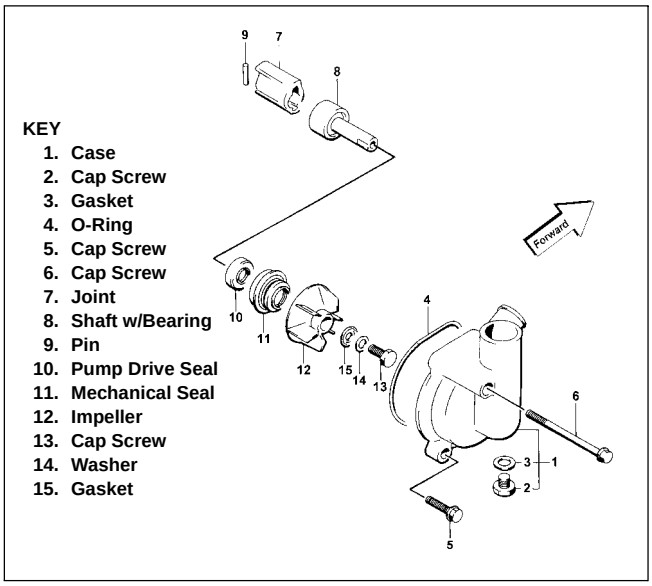
1. Position the fan assembly on the radiator; then secure with existing hardware.

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

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

Servicing Water Pump
(500 - Manual Transmission)

REMOVING/DISASSEMBLING



0732-311

1. Drain the coolant.

2. Remove the three cap screws securing the water pump case. Note the position of the long cap screw and account for the O-ring.

3. Remove the impeller cap screw, washer, and gasket.

4. Remove the mechanical seal using this procedure.

   A. Tap the tip of a small sheet metal screw into the inner-metal edge of the seal.

   B. Grip the screw with a pair of vise-grip pliers and pull the seal out. Account for the pump drive seal.

CLEANING AND INSPECTING

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

1. Clean all pump components in solvent.

2. Inspect the mechanical seal and pump drive seal for damage.

■ NOTE: If the mechanical seal and/or pump drive seal are damaged, they must be replaced as a set.

3. Inspect the impeller for corrosion or damage.

ASSEMBLING/INSTALLING

■ **NOTE: Treat seals and O-rings with clean anti-freeze for initial lubrication.**

1. Press the mechanical seal with pump drive seal into the impeller by hand.
2. Install the mechanical seal assembly onto the water pump shaft and secure with the cap screw, washer, and gasket. Tighten the cap screw securely.
3. Place the water pump case into position and secure with the three cap screws. Note the position of the long cap screw from removal.
4. Fill the cooling system (2.9 l or 3 U.S. qt) with antifreeze.

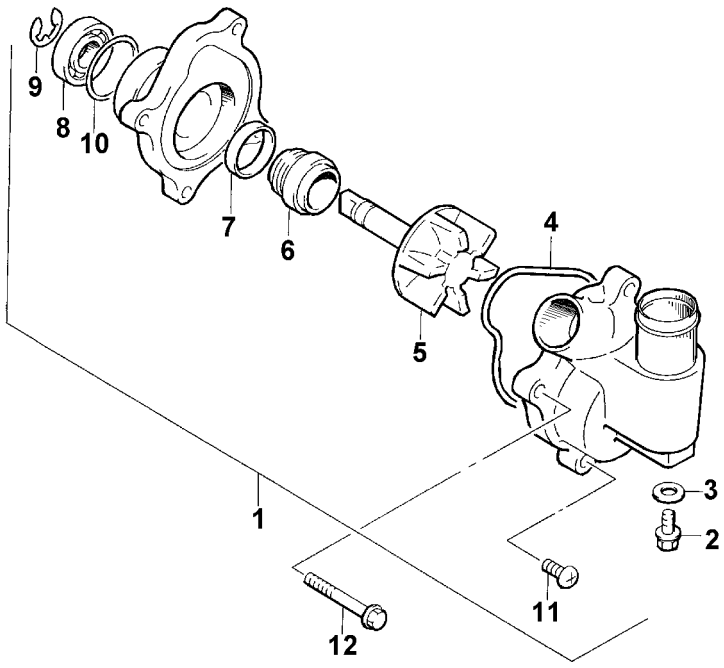
■ **NOTE: While the cooling system is being filled, air pockets may develop; therefore, run the engine for five minutes after the initial fill, shut the engine off, and then fill the cooling system.**

5. Check the entire cooling system for leakage.

Servicing Water Pump
(500 - Automatic Transmission)

■ **NOTE: When servicing the water pump, it will be necessary to install a new Oil Seal (p/n 3402-465) and a new Mechanical Seal (p/n 3005-909).**

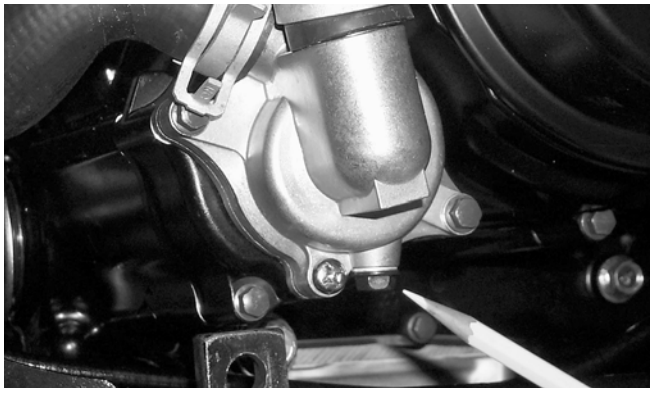
KEY
1. Water Pump Assy
2. Cap Screw (Drain)
3. Gasket
4. O-Ring
5. Impeller/Shaft
6. Mechanical Seal
7. Oil Seal
8. Bearing
9. E-Ring
10. O-Ring
11. Screw
12. Cap Screw



735-616A

REMOVING

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

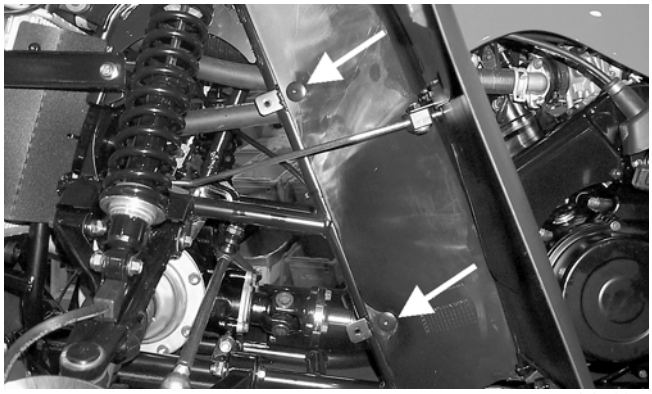


CC789

2. Drain the oil from the engine/transmission.

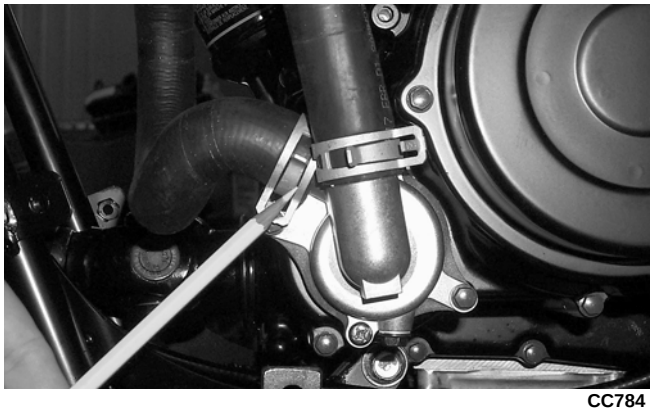
3. Remove the four torx-head cap screws securing the front and rear fenders to the footrest; then remove the four cap screws securing the footrest to the frame. Remove the footrest.

4. From inside the left-front wheel-well, remove the two torx-head cap screws securing the fender to the frame.



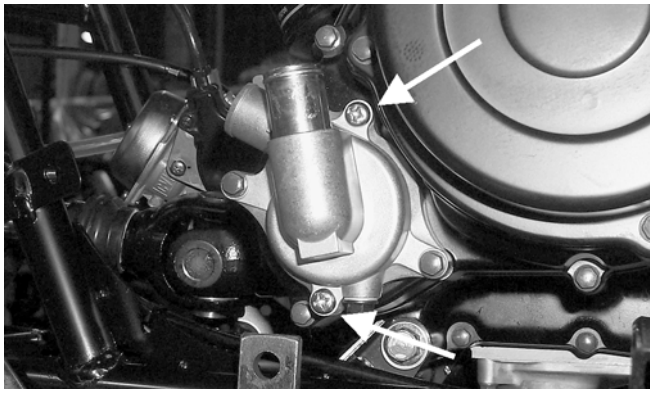
CC788A

5. Compress the tabs on the coolant hose clamps and slide the clamps away from the hose ends approximately 51 mm (2 in.); then remove both hoses from the water pump.



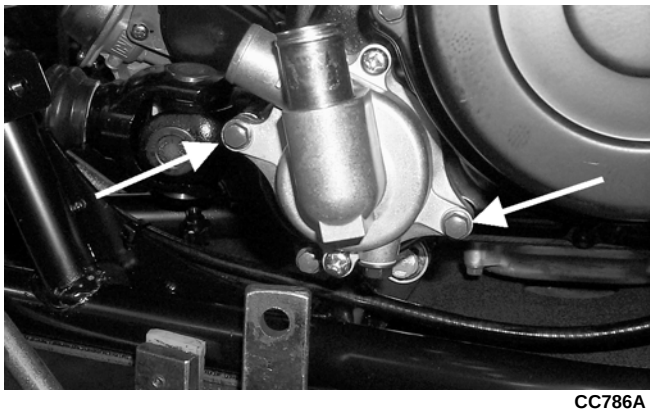
CC784

6. Using an impact driver, loosen but do not remove the two Phillips-head cover screws.



CC785A

7. Remove the two cap screws securing the water pump to the engine; then remove the water pump.



CC786A

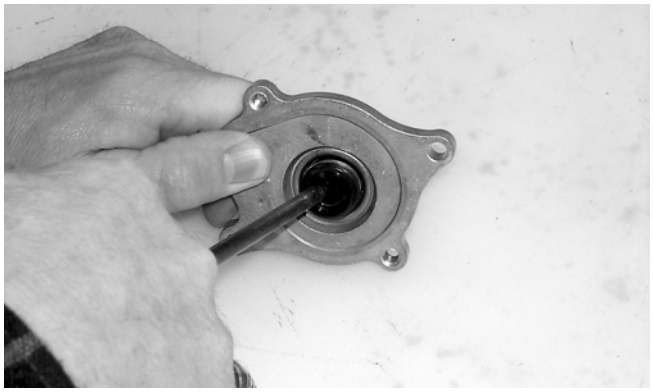
DISASSEMBLING

1. Finish removing the two Phillips-head cap screws securing the cover to the bearing housing; then remove the cover. Account for the O-ring.

2. Remove the E-ring securing the impeller/shaft to the bearing housing; then remove the impeller/shaft.

CC781

3. Using Seal Removal Tool (p/n 0644-072), remove the mechanical seal and the oil seal from the bearing housing.



CC772

CLEANING AND INSPECTING

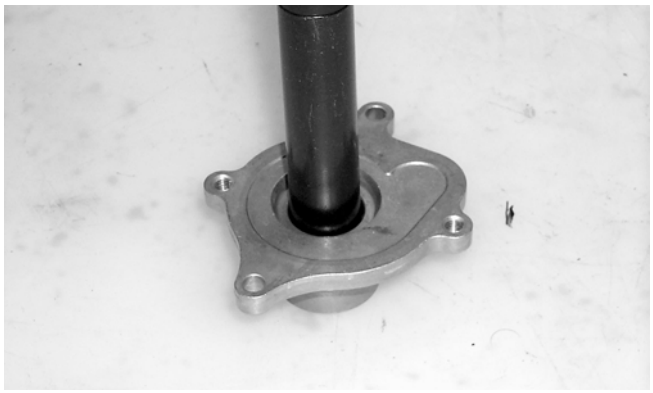
■ **NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.**

1. Clean all oil-pump components in cleaning solvent.

2. Inspect the impeller/shaft for corrosion or damage.

ASSEMBLING

1. Place the new oil seal into the bearing housing; then using a seal driver, gently tap the seal down until it is fully seated.



CC778

2. Place the new mechanical seal into the bearing housing; then tap it down until it is fully seated.

■ **NOTE: A large deep-well socket can be used to drive the seal down evenly.**

3. Install the impeller/shaft assembly into the bearing housing; then secure with the E-ring.

CC781

■ **NOTE: Make sure the E-ring is fully seated and the impeller rotates freely.**

4. While holding the bearing housing assembly in position on the engine, slowly rotate the impeller until the impeller/shaft engages properly with its slot in the driven shaft.

■ **NOTE: The bearing housing will be flush with the engine when the two shafts are properly engaged.**

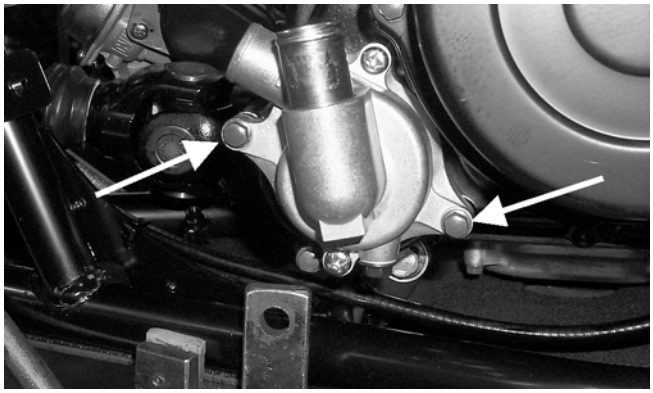
⚠ CAUTION

Failure to properly engage the two shafts could cause serious engine damage.

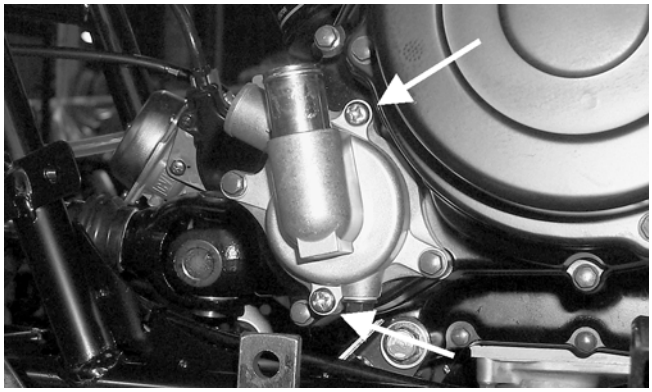
5. With the bearing housing assembly in position on the engine, place the cover (with O-ring installed) into position on the housing; then loosely secure with the two Phillips-head cap screws.

INSTALLING

1. Secure the water pump to the engine with the two cap screws tightened securely; then tighten the two Phillips-head cap screws securely.

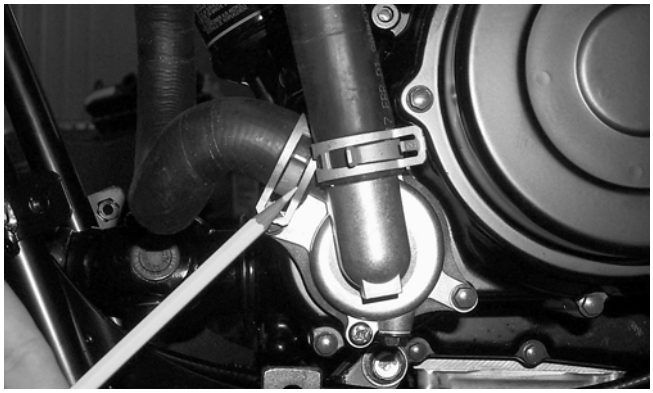


CC786A



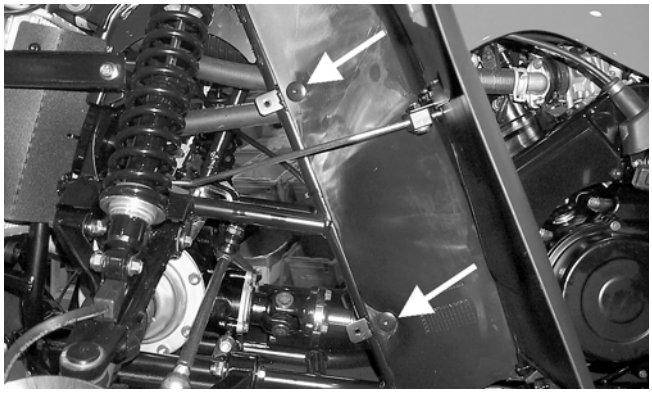
CC785A

2. Connect the two coolant hoses to the water pump and secure with the clamps.



CC784

3. From inside the left-front wheel-well, secure the fender to the frame with the two torx-head cap screws. Tighten securely.



CC788A

4. Place the footrest into position on the frame and loosely secure with four cap screws; then secure the front and rear fenders to the footrest with the four torx-head cap screws. Tighten the four torx-head cap screws securely; then tighten the two 8 mm cap screws to 2.8 kg-m (20 ft-lb) and the two 10 mm cap screws to 5.5 kg-m (40 ft-lb).

5. Fill the engine/transmission with the proper amount of recommended oil.

6. Fill the cooling system with the proper amount of recommended coolant.

AN604D

■ **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.**

7. 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.

SECTION 5 - ELECTRICAL SYSTEM

5

TABLE OF CONTENTS

Specifications

250/300	
IGNITION	
Ignition Timing (250)	5° BTDC below 1800 RPM 35° BTDC above 3800 RPM
Ignition Timing (300)	5° BTDC @ 1800 RPM 30° BTDC @ 3800 RPM
Spark Plug Type	NGK DR7EA
Spark Plug Gap	0.6-0.7 mm (0.024-0.028 in.)
Spark Plug Cap	8000-12,000 ohms
Ignition Coil Resistance (primary) (secondary)	 0.4-0.6 ohm (terminal to ground) 5200-7800 ohms (high tension - plug cap removed - to ground)
Ignition Coil Peak Voltage (primary/CDI)	98.3-147.5 volts (terminal to ground)
MAGNETO	
Magneto Coil Resistance (trigger) (charging)	 84-126 ohms (black/yellow to green/white) 0.44-0.66 ohm (yellow to yellow)
Magneto Coil Peak Voltage (trigger) (charging)	 3.12-4.68 volts (black/yellow to green/white) 30-45 volts (yellow to yellow)
Magneto Output (approx)	220W @ 5000 RPM

400	
IGNITION	
Ignition Timing	10° BTDC @ 3000 RPM
Spark Plug Type	NGK CR7E
Spark Plug Gap	0.7-0.8 mm (0.028-0.032 in.)
Spark Plug Cap	8000-12,000 ohms
Ignition Coil Resistance (primary) (secondary)	 0.4-0.6 ohm (terminal to ground) 5200-7800 ohms (high tension - plug cap removed - to ground)
Ignition Coil Peak Voltage (primary/CDI)	160.8-241.2 volts (terminal to ground)

400 (continued)	
MAGNETO	
Magneto Coil Resistance (trigger) (source) (charging)	 160-240 ohms (green to blue) 0.08-0.12 ohm (yellow to white) 0.32-0.48 ohm (black to black)
Magneto Coil Peak Voltage (trigger) (source) (charging)	 5.04-7.56 volts (green to blue) 0.7-1.05 volts (yellow to white) 12.5-18.6 volts (black to black #1) (black to black #2)
Magneto Output (approx)	220W @ 5000 RPM

500	
IGNITION	
Ignition Timing	10° BTDC @ 1500 RPM
Spark Plug Type	NGK CR6E
Spark Plug Gap	0.7-0.8 mm (0.028-0.032 in.)
Spark Plug Cap	8000-12,000 ohms
Ignition Coil Resistance (primary) (secondary)	 0.4-0.6 ohm (terminal to ground) 5200-7800 ohms (high tension - plug cap removed - to ground)
Ignition Coil Peak Voltage (primary/CDI)	142.4-213.6 volts (terminal to ground)
MAGNETO	
Magneto Coil Resistance (trigger) (source) (charging)	 160-240 ohms (green to blue) 0.08-0.12 ohm (yellow to white) 0.32-0.48 ohm (black to black)
Magneto Coil Peak Voltage (trigger) (source) (charging)	 4.2-6.3 volts (green to blue) 0.40-0.62 volt (yellow to white) 9.44-14.2 volts (black to black #1) (black to black #2)
Magneto Output (approx)	325W @ 5000 RPM

Battery

⚠ WARNING

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

1. Remove the battery from the ATV.

⚠ WARNING

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

⚠ CAUTION

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

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

■ NOTE: Electrolyte should be at room temperature before filling. Do not use water or any other liquid to activate a battery.

⚠ WARNING

Electrolyte is a sulfuric acid solution. Avoid spillage and contact with skin, eyes, and clothing.

3. Allow the battery to stand for 15-30 minutes after filling. Electrolyte level may fall during this time. Refill with electrolyte to UPPER level line.

4. Trickle-charge the battery at 1.4 amps for 8-10 hours.

5. After charging, check electrolyte level and fill with DISTILLED WATER as necessary; then install the vent plugs. Wash off acid spillage with water and dry the battery.

⚠ CAUTION

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

6. Place the battery into position in the ATV and secure; then connect the vent hose to the battery.

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

⚠ CAUTION

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

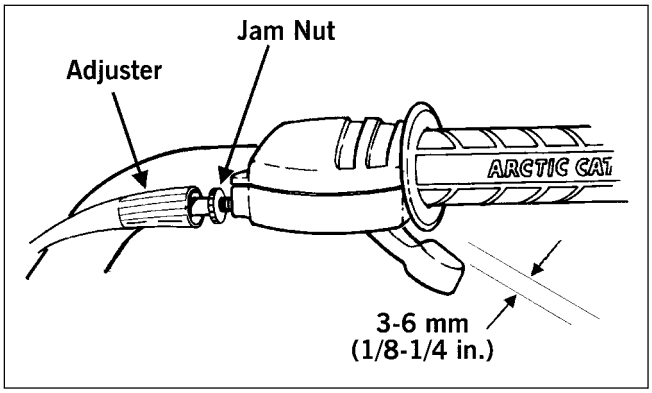
8. Check the vent tube to make sure it is not pinched or obstructed in any way and that it is properly routed down through the frame.

RPM Limiter

The ATV has an RPM limiter system to limit the engine RPM. One way to eliminate the activation of the RPM limiter is to utilize the throttle limiter screw at the throttle lever.

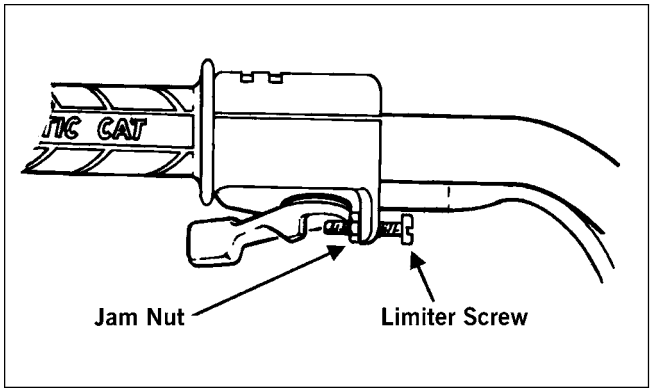
■ NOTE: The ATV is equipped with a CDI unit that retards ignition timing when maximum RPM is approached. When the RPM limiter is activated, it could be misinterpreted as a high-speed misfire.

1. Ensure that the throttle cable is adjusted correctly at 3-6 mm (1/8-1/4 in.) free-play at the lever.



ATV-0047

2. Loosen the jam nut of the limiter screw and rotate the screw clockwise until RPM is limited to under 9000 RPM (250/300) or under 8300 RPM (400/500); then tighten the jam nut.



ATV-0053

Testing Electrical Components

All of the electrical tests should be made using the Fluke Model 73 Multimeter (p/n 0644-191) and when testing peak voltage, the Peak Voltage Reading Adapter (p/n 0644-307) must be used. If any other type of meter is used, readings may vary due to internal circuitry. When troubleshooting a specific component, always verify first that the fuse(s) are good, that the bulb(s) are good, that the connections are clean and tight, that the battery is fully charged, and that all appropriate switches are activated.

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

Accessory Receptacle/Connector (400/500)

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

VOLTAGE

1. Set the meter selector to the D.C. Voltage position.
2. Connect the red tester lead to the red/white wire or the positive connector; then connect the black tester lead to ground.

AR606D

3. The meter must show battery voltage.

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

Brakelight Switch (Auxiliary)

The switch connector is the two-prong connector on the right side of the engine directly above the brake cable adjuster.

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

VOLTAGE (Wiring Harness Side)

1. Set the meter selector to the D.C. Voltage position.
2. Connect the red tester to the orange wire; then connect the black tester lead to ground.

AR627D

3. The meter must show battery voltage.

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

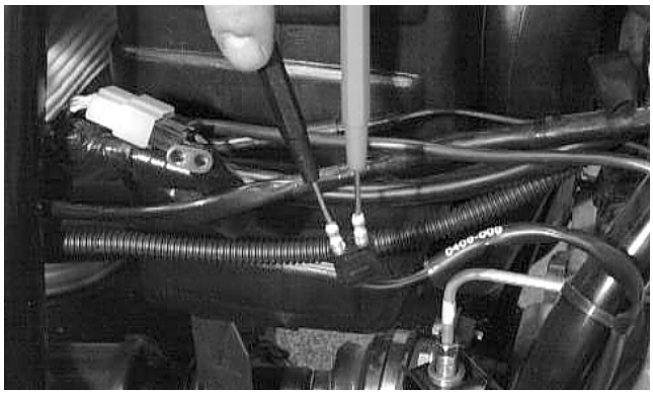
■**NOTE: If the meter shows battery voltage, the main wiring harness is good; proceed to test the switch/component, the connector, and the switch wiring harness for resistance.**

RESISTANCE
(Switch Connector)

⚠ CAUTION

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

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



AR626D

3. When the brake pedal is depressed, the meter must show less than 1 ohm.

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

Brakelight Switch
(Handlebar Control)

The switch connector is the two-prong black connector in front of the steering post. To access the connector, the front rack and front fenders must be removed (see Section 8).

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

VOLTAGE
(Wiring Harness Connector)

1. Set the meter selector to the D.C. Voltage position.
2. Connect the red tester lead to the orange wire; then connect the black tester lead to ground.

AR622D

3. The meter must show battery voltage.

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

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

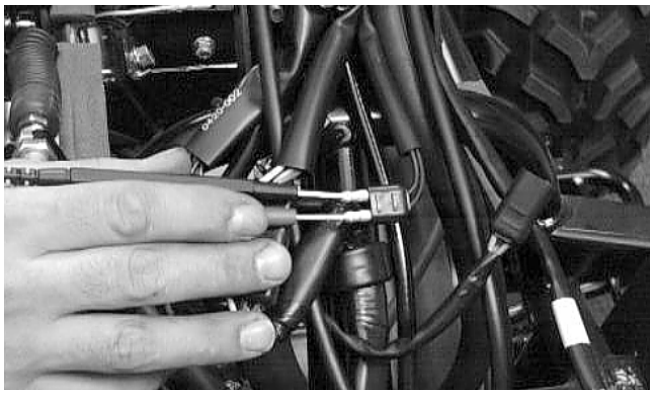
RESISTANCE
(Switch Connector)

⚠ CAUTION

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

■**NOTE: The brake lever must be compressed for this test. Also, the ignition switch must be in the OFF position.**

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



AR621D

3. When the lever is compressed, the meter must show less than 1 ohm.

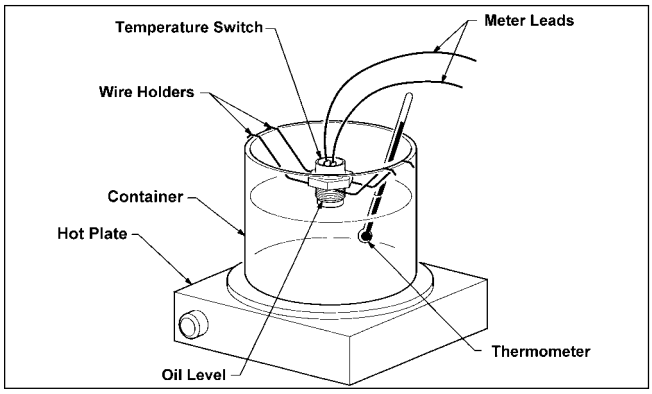
■**NOTE: If the meter shows more than 1 ohm of resistance, troubleshoot or replace the switch/component, the connector, or the switch wiring harness.**

5

Oil Temperature Switch
(250/300/400)

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

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



733-554B

3. When the oil temperature reaches 160° C (320° F), the meter should read a closed circuit.
4. Allow the oil to cool, and when the temperature is at (or just before) a temperature of 140° C (284° F), the meter should read an open circuit.
5. If the readings are not as indicated, the temperature switch must be replaced.
6. Apply teflon tape to the threads of the switch; then install the switch and tighten securely.
7. Connect the temperature switch leads.

Coolant Temperature Switch
(500)

1. Connect the meter leads (selector in the OHMS position) to the temperature switch contacts.
2. Suspend the temperature switch and a thermometer in a container of water; then heat the water.

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

3. When the water temperature reaches 115° C (239° F), the meter should read a closed circuit.
4. Allow the water to cool, and when the temperature is at (or just before) a temperature of 108° C (226° F), the meter should read an open circuit.
5. If the readings are not as indicated, the temperature switch must be replaced.
6. Install the switch and tighten securely.
7. Connect the temperature switch leads.

Fan Motor
(400/500)

To access the connector (located directly behind the fan), the front rack and front fenders must be removed (see Section 8).

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

VOLTAGE (Main Harness Connector to Fan Motor)

1. Set the meter selector to the D.C. Voltage position.
2. Connect the red tester lead to the black/red wire (the black 2-prong at the fan motor); then connect the black tester lead to ground.
3. The meter must show battery voltage.

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

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

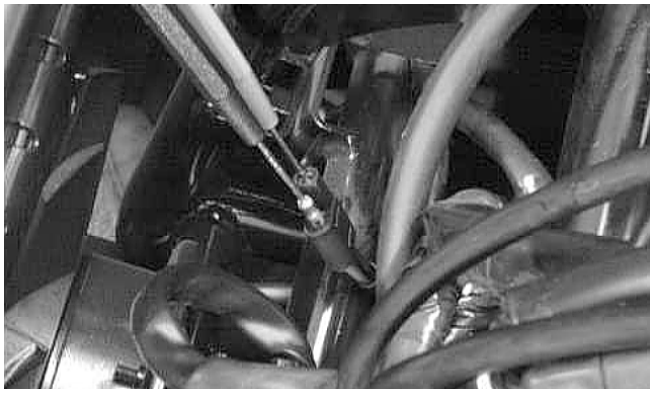
RESISTANCE (Fan Motor Connector)

⚠ CAUTION

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

1. Set the meter selector to the OHMS position.

2. Connect the red tester lead to the blue wire; then connect the black tester lead to the black wire.



AR645D

3. The meter must show less than 1 ohm.

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

■ NOTE: To determine if the fan motor is good, connect the blue wire from the fan connector to a 12 volt D.C. power supply; then connect the black wire from the fan connector to ground. The fan should operate.

⚠ CAUTION

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

Fuse Block

The main (30 Amp) fuse is located in a fuse block on the frame near the right rear tire and protected by a snap-on cover.

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

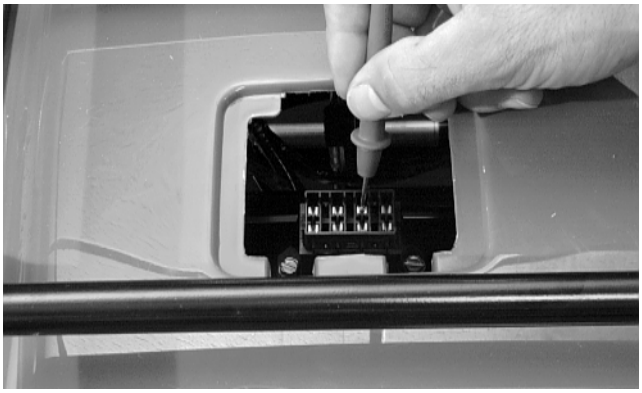
The remaining fuses are located in a fuse block under the center cover in the front fender assembly (on the 250/300) or under the seat (on the 400/500). If there is any type of electrical system failure, always check the fuses first.

■ NOTE: If all voltage is lost at the fuse block, check the condition of the fuses.

250/300	400/500
10 A IGN	10 A LIGHTS
15 A LIGHTS	10 A HI
10 A ACC	10 A LO
10 A SPARE	10 A IGN
	15 A FAN
	15 A ACC

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

1. Remove all fuses from the fuse block.
2. Set the meter selector to the D.C. Voltage position.
3. Connect the black tester lead to ground.
4. Using the red tester lead, contact each end of the fuse holder connector terminals individually.



CH095D

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 an open circuit.

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

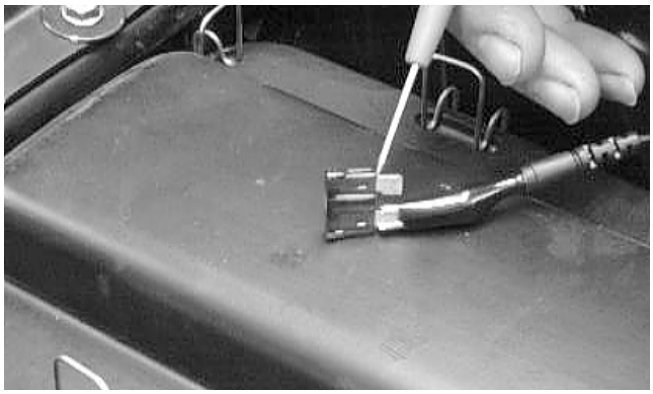
■ NOTE: If the meter shows no battery voltage, troubleshoot the battery, switches, fuse block, or the main wiring harness.

Fuses

⚠ CAUTION

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

1. Set the meter selector to the OHMS position.
2. Connect the red tester lead to one spade end of the fuse; then connect the black tester lead to the other spade end.



AR610D

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 cover for fuse placement.

Ignition Coil

On the 250/300, the ignition coil is attached to the upper frame behind the right-hand side panel. To access the coil, the seat and right-hand side panel must be removed (see Section 8).

On the 400/500, the ignition coil is on top of the engine. To access the coil, the seat and gas tank (see Section 4) must be removed.

VOLTAGE (Primary Side)

■ NOTE: The ignition switch must be in the ON position; the emergency stop switch must be in the RUN position. Also, the white/blue wire must be disconnected from the coil.

1. Set the meter selector to the D.C. Voltage position.
2. Connect the black tester lead to the white/blue wire; then connect the red tester lead to ground.
3. The meter must show 31V ± 20%.
4. With the tester leads connected, depress the starter button.
5. The meter must show 130V ± 20%.

■ NOTE: If the voltage is not as specified in one or both of the above tests, inspect the main wiring harness, connectors, source/charge coil, magneto rotor and magnets, magneto rotor key, or the CDI unit.

RESISTANCE

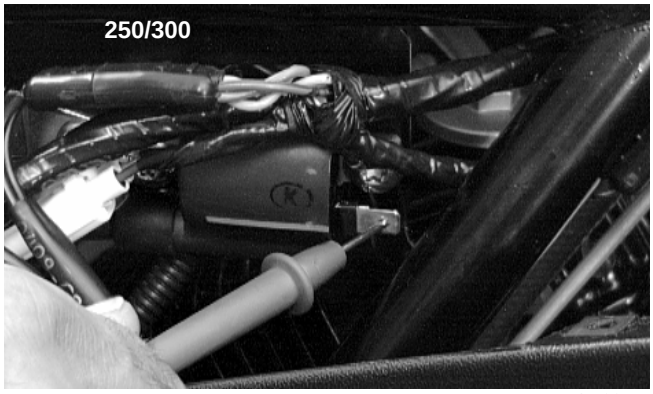
⚠ CAUTION

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

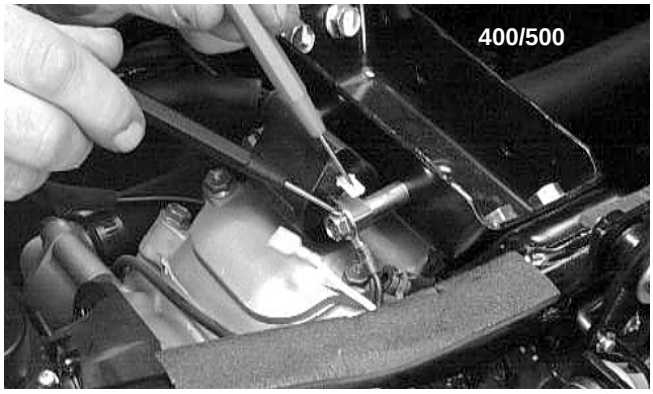
■ NOTE: For these tests, the meter selector should be set to the OHMS position.

Primary Winding

1. Connect the red tester lead to the terminal (with the wire removed); then connect the black tester lead to ground.



CH097D

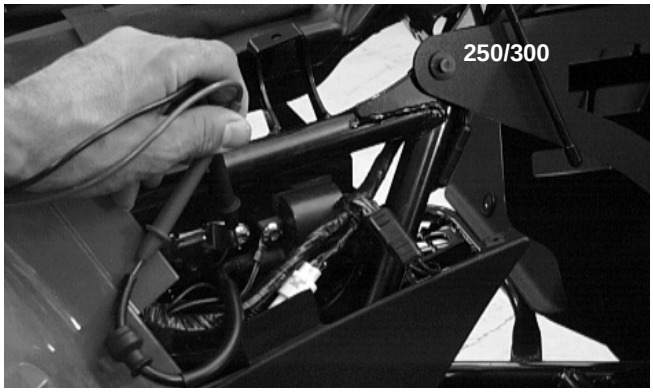


AR615D

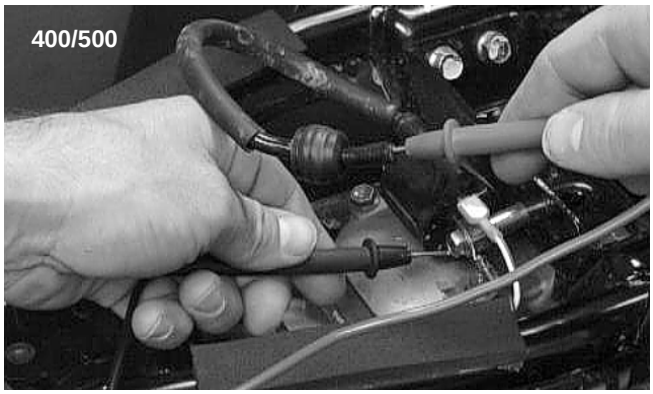
2. The meter reading must be within specification.

Secondary Winding

1. Connect the red tester lead to the high tension lead (plug cap removed); then connect the black tester lead to ground.



CH098D



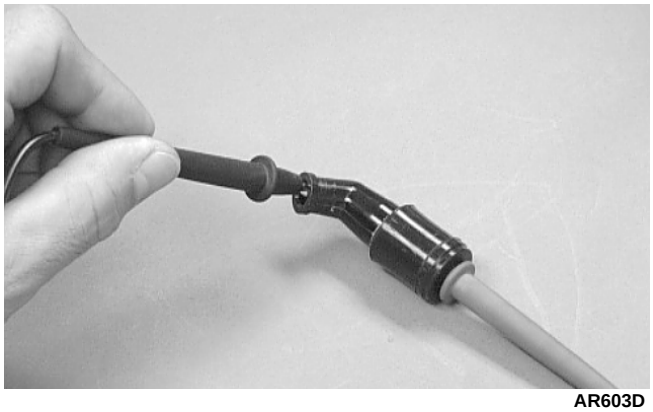
AR601D

2. The meter reading must be within specification.

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

Spark Plug Cap

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


AR603D

2. The meter reading must be within specification.

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

PEAK VOLTAGE (250/300)

■ **NOTE: All of the peak voltage tests should be made using the Fluke Model 73 Multimeter (p/n 0644-191) with Peak Voltage Reading Adapter (p/n 0644-307). If any other type of tester is used, readings may vary due to internal circuitry.**

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

Primary/CDI

■ **NOTE: The CDI is located beneath the right rear fender panel near the battery.**

1. Set the meter selector to the D.C. Voltage position.
2. Connect the red tester lead to the primary coil terminal; then connect the black tester lead to ground.
3. Crank the engine over using the electric starter.
4. The meter reading must be within specification.

PEAK VOLTAGE (400)

■ **NOTE: All of the peak voltage tests should be made using the Fluke Model 73 Multimeter (p/n 0644-191) with Peak Voltage Reading Adapter (p/n 0644-307). If any other type of tester is used, readings may vary due to internal circuitry.**

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

Primary/CDI

■ **NOTE: The CDI is located beneath the seat and fender panel near the battery.**

1. Set the meter selector to the D.C. Voltage position.
2. Connect the red tester lead to the primary coil terminal; then connect the black tester lead to ground.
3. Crank the engine over using the electric starter.
4. The meter reading must be within specification.

PEAK VOLTAGE (500)

■ **NOTE: All of the peak voltage tests should be made using the Fluke Model 73 Multimeter (p/n 0644-191) with Peak Voltage Reading Adapter (p/n 0644-307). If any other type of tester is used, readings may vary due to internal circuitry.**

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

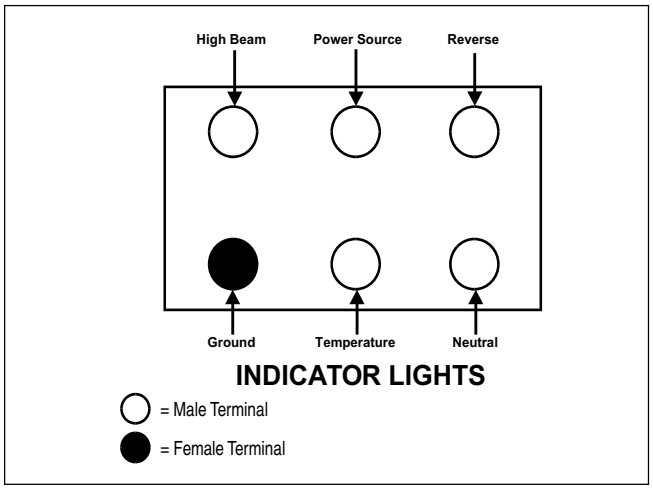
Primary/CDI

■ **NOTE: The CDI is located beneath the seat and fender panel near the battery.**

1. Set the meter selector to the D.C. Voltage position.
2. Connect the red tester lead to the primary coil terminal; then connect the black tester lead to ground.
3. Crank the engine over using the electric starter.
4. The meter reading must be within specification.

Indicator Lights

The Indicator Lights connector being tested is the black six-terminal connector (1 female and 5 male) coming from the indicator light wiring harness.



ATV-IL

To access the indicator light connector for testing purposes, use the following procedure.

1. Remove the three machine screws and key cover securing the instrument pod.
2. Remove the light bar from the instrument pod; then cut the cable tie securing the instrument pod wiring to the steering post.
3. Push the instrument pod wiring with light bar downward to access the indicator light connector; then disconnect the connector from the main wiring harness.

■NOTE: For these tests, a 12-volt power supply "jumper" should be used to supply power.

TEMPERATURE LIGHT

1. Connect the jumper positive wire to the power source terminal on the indicator light connector.
2. Connect the jumper ground wire to the temperature terminal on the indicator light connector.
3. The temperature warning indicator light should illuminate.

NEUTRAL POSITION LIGHT

1. Connect the jumper positive wire to the power source terminal on the indicator light connector.
2. Connect the jumper ground wire to the neutral terminal on the indicator light connector.
3. The neutral position indicator light should illuminate.

REVERSE POSITION LIGHT

1. Connect the jumper positive wire to the power source terminal on the indicator light connector.
2. Connect the jumper ground wire to the reverse terminal on the indicator light connector.
3. The reverse position indicator light should illuminate.

HI BEAM LIGHT

1. Connect the jumper positive wire to the high beam terminal on the indicator light connector.
2. Connect the jumper ground wire to the female terminal on the indicator light connector.
3. The HI beam indicator light should illuminate.

■NOTE: If a light fails to illuminate in any one of the indicator light tests, the connector, wiring harness, or a bulb must be replaced.

After testing procedures are completed, use the following procedure.

1. Connect the indicator light connector to the main wiring harness.
2. Pull the instrument pod wiring with light bar upward and install the light bar into the instrument pod.
3. Secure the instrument pod with existing hardware; then secure the instrument pod wiring to the steering post using a cable tie.

HI BEAM INDICATOR VOLTAGE

■NOTE: The ignition switch must be in the LIGHTS position. Also, the dimmer switch must be in the HI position, and the test must be performed on the lower side of the connector.

1. Set the meter selector to the D.C. Voltage position.
2. Connect the red tester lead to the yellow wire; then connect the black tester lead to the black wire.
3. The meter must show battery voltage.

■ **NOTE: The meter may show less than 12 volts due to the draw from the headlights.**

OIL TEMPERATURE LIGHT VOLTAGE (250/300/400)

■ **NOTE: The ignition switch must be in the ON position, and the test must be performed on the lower side of the switch.**

1. Set the meter selector to the D.C. Voltage position.
2. Disconnect the white oil temperature switch connector from the switch (on the top right side of the engine) and ground the violet wire to the engine. The temperature light should illuminate.
3. Connect the red tester lead to the violet wire (main harness side); then connect the black tester lead to a ground.
4. The meter must show battery voltage.

WATER TEMPERATURE LIGHT VOLTAGE (500)

■ **NOTE: The ignition switch must be in the ON position, and the test must be performed on the lower side of the switch.**

1. Set the meter selector to the D.C. Voltage position.
2. Remove the violet water temperature switch wire connector from the switch (on the left side of the engine below the water hose) and ground it to the engine.
3. Connect the red tester lead to the red/black wire from the fan temperature switch; then connect the black tester lead to the violet wire from the water temperature switch.
4. The meter must show battery voltage.

NEUTRAL POSITION VOLTAGE

■ **NOTE: The ignition switch must be in the ON position. Also, the shifter must be in the NEUTRAL position, and the test must be performed on the lower side of the connection.**

1. Set the meter selector to the D.C. Voltage position.
2. Connect the red tester lead to the red/black wire; then connect the black tester lead to the blue/white wire.
3. The meter must show battery voltage.

REVERSE POSITION VOLTAGE

■ **NOTE: The ignition switch must be in the ON position. Also, the reverse lever must be in the REVERSE position, and the test must be performed on the lower side of the connector.**

1. Set the meter selector to the D.C. Voltage position.
2. Connect the red tester lead to the red/black wire; then connect the black tester lead to the blue wire.
3. The meter must show battery voltage.

■ **NOTE: If the meter fails to show voltage in any of the above tests, the connector, fuse, switch, or wiring harness must be replaced.**

Ignition Switch

The connector is the green one beneath the console. To access the connector, the speedometer and instrument pod must be removed.

VOLTAGE

■ **NOTE: Perform this test on the lower side of the connector.**

1. Set the meter selector to the D.C. Voltage position.
2. Connect the red meter lead to the red wire; then connect the black meter lead to ground.
3. Meter must show battery voltage.

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

RESISTANCE

⚠ CAUTION

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

■ **NOTE: Perform this test on the upper side of the connector.**

1. Turn the ignition switch to the ON position.
2. Set the meter selector to the OHMS position.
3. Connect the red tester lead to the red wire; then connect the black tester lead to the orange wire.
4. The meter must show less than 1 ohm.
5. Turn the ignition switch to the LIGHTS position.
6. Connect the red tester lead to the red wire; then connect the black tester lead to the orange wire.
7. The meter must show less than 1 ohm.
8. Connect the red tester lead to the red wire; then connect the black tester lead to the gray wire.
9. The meter must show less than 1 ohm.

10. With the switch in the OFF position, connect the red tester lead to the red wire and the black tester lead to each of the remaining wires (orange and gray). The meter must show an open circuit on both wires.

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

Handlebar Control Switches

The connector is the yellow one in front of the steering post. To access the connector, the front rack and front fenders must be removed (see Section 8).

■NOTE: These tests should be made on the top side of the connector.

⚠ CAUTION

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

RESISTANCE (HI Beam)

1. Set the meter selector to the OHMS position.
2. Connect the red tester lead to the yellow wire; then connect the black tester lead to the gray wire.
3. With the dimmer switch in the HI position, the meter must show less than 1 ohm.

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

RESISTANCE (LO Beam)

1. Connect the red tester lead to the white wire; then connect the black tester lead to the gray wire.
2. With the dimmer switch in the LO position, the meter must show an open circuit.

■NOTE: If the meter reads resistance, troubleshoot or replace the switch/component, the connector, or the switch wiring harness.

RESISTANCE (Starter Button)

1. Set the meter selector to the Diode position.
2. Connect the red tester lead to the orange/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 ohm.
4. With the starter button released, the meter must show an open circuit.
5. Connect the red tester lead to the yellow/green wire; then connect the black tester lead to the orange/white wire.
6. With the starter button depressed, the meter must show an open circuit.

■NOTE: If the meter does not show as specified, replace the switch/component, connector, or switch harness.

RESISTANCE (Emergency Stop)

1. Set the meter selector to the OHMS position.
2. Connect the red tester lead to the orange wire; then connect the black tester lead to the orange/white wire.
3. With the switch in the OFF position, the meter must show an open circuit.
4. With the switch in the RUN position, the meter must show less than 1 ohm.

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

RESISTANCE (Reverse Override)

The connector is the four-prong white one in front of the steering post. To access the connector, the front rack and front fenders must be removed (see Section 8).

1. Set the meter selector to the OHMS position.
2. Connect the red tester lead to one red/yellow wire (red/white wire on some models); then connect the black tester wire to the other red/yellow wire (red wire on some models). 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 (blue/white wire on some models); then connect the black meter lead to the black wire (blue wire on some models). 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.

Magneto Coils

VOLTAGE (Charging Coil - Output)

1. Set the meter selector to the D.C. Voltage position.
2. Connect the red tester lead to the positive battery post; then connect the black tester lead to the negative battery post.
3. With the engine running at a constant 5000 RPM (with the headlights on), the meter must show 14-15.5 D.C. volts.

⚠ CAUTION

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

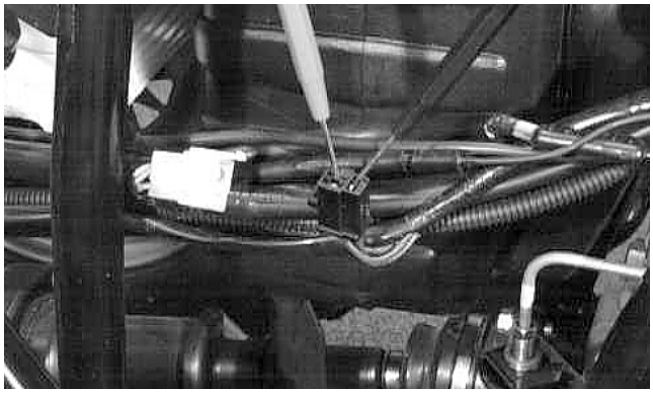
■NOTE: If voltage is lower than specified, test charging coil - no load.

VOLTAGE (Charging Coil - No Load)

The connector is the black and white one on the right side of the engine just above the brake cable adjuster.

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

1. Set the meter selector to the A.C. Voltage position.
2. Test between the three yellow wires (250/300) for a total of three tests or the three black wires (400/500) for a total of three tests.



AR630D

3. With the engine running at a constant 5000 RPM, all wire tests must show 60 A.C. volts.

⚠ CAUTION

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

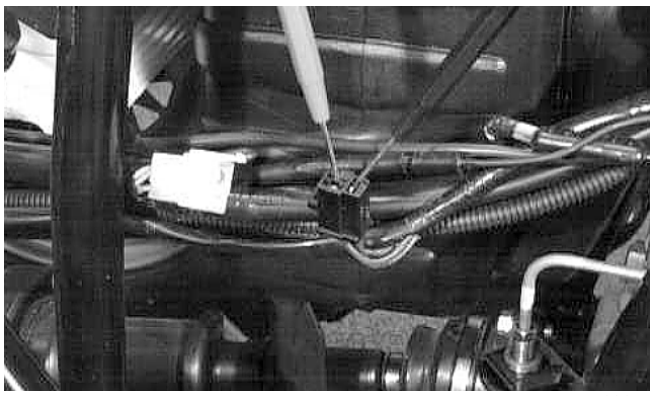
■NOTE: If both charging coil tests failed, check all connections, etc., and test again. If no voltage is present, replace the stator assembly.

RESISTANCE (Charging Coil)

⚠ CAUTION

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

1. Set the meter selector to OHMS position.
2. Test between the three yellow wires (250/300) for a total of three tests or the three black wires (400/500) for a total of three tests.



AR630D

3. The meter reading must be within specification.

RESISTANCE (Trigger Coil)

⚠ CAUTION

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

1. Set the meter selector to the OHMS position.
2. On the 250/300, connect the red tester lead to the black/yellow wire; then connect the black tester lead to the green/white wire. The meter reading must be within specification.
3. On the 400/500, connect the red tester lead to the green wire; then connect the black tester lead to the blue wire. The meter reading must be within specification.

RESISTANCE (Source Coil - 400/500)

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.
3. The meter reading must be within specification.

■NOTE: If the meter shows other than specified in any resistance test, replace the stator assembly.

PEAK VOLTAGE (250/300)

■ **NOTE: All of the peak voltage tests should be made using the Fluke Model 73 Multimeter (p/n 0644-191) with Peak Voltage Reading Adapter (p/n 0644-307). If any other type of tester is used, readings may vary due to internal circuitry.**

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

Magneto Coil (Trigger)

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

Magneto Coil (Charging)

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

PEAK VOLTAGE (400)

■ **NOTE: All of the peak voltage tests should be made using the Fluke Model 73 Multimeter (p/n 0644-191) with Peak Voltage Reading Adapter (p/n 0644-307). If any other type of tester is used, readings may vary due to internal circuitry.**

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

Magneto Coil (Trigger)

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

Magneto Coil (Source)

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

Magneto Coil (Charging)

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

■ **NOTE: Repeat steps 2-4 for black wire #2.**

PEAK VOLTAGE (500)

■ **NOTE: All of the peak voltage tests should be made using the Fluke Model 73 Multimeter (p/n 0644-191) with Peak Voltage Reading Adapter (p/n 0644-307). If any other type of tester is used, readings may vary due to internal circuitry.**

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

Magneto Coil (Trigger)

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

Magneto Coil (Source)

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

Magneto Coil (Charging)

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

■ **NOTE: Repeat steps 2-4 for black wire #2.**

Starter Motor

REMOVING/DISASSEMBLING

1. Disconnect the battery.

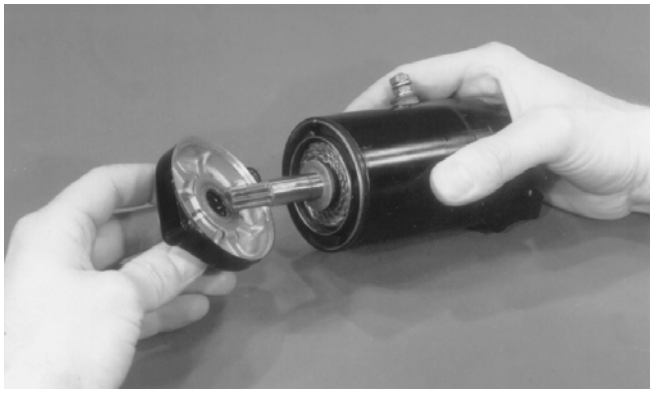
⚠ CAUTION

Always disconnect the negative battery cable from the battery first; then disconnect the positive cable.

2. Remove the nut securing the positive cable to the starter; then remove the cable from the starter.
3. Remove the two cap screws securing the starter to the crankcase; then remove the starter. Account for the wiring forms and an O-ring.
4. For assembly purposes, scribe a line across the outside of the starter assembly.

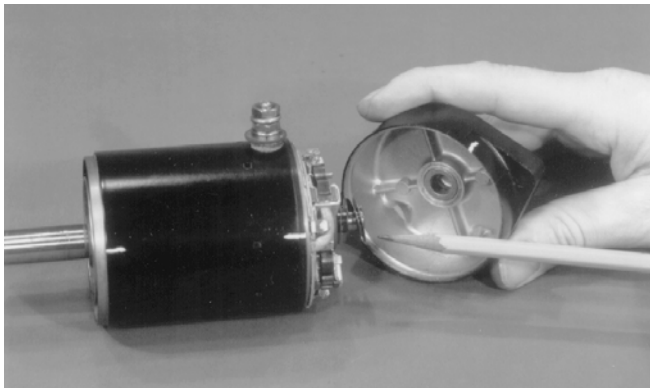
AR652D

5. Remove the two long starter cap screws securing the starter components.
6. Remove the front cover from the starter housing and armature shaft. Account for a seal protector and three washers.



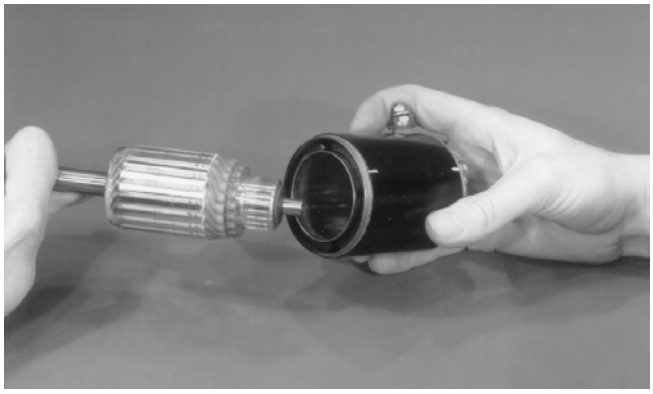
BC003

7. Remove the rear cover.



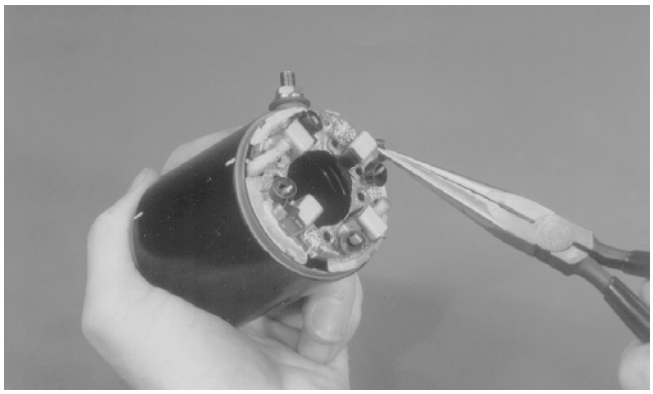
BC005

8. Slide the armature free of the starter housing.



BC006

9. Bend the two positive brushes outward; then remove the brush holder.

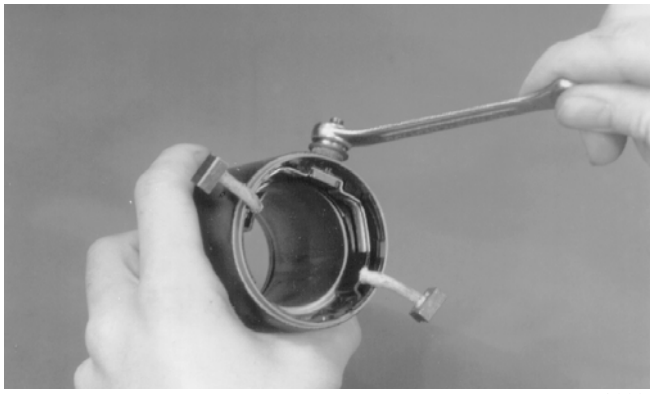


BC007

BC010

5

10. Remove the nut from the positive post. Account for the lock washer, flat washer, a fiber washer, and an O-ring.



BC008

11. Remove the positive brush assembly from the starter housing.

BC009

CLEANING AND INSPECTING

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

1. Thoroughly clean all components except the armature and brushes in parts-cleaning solvent; then dry with compressed air.

⚠ CAUTION

Do not wash the armature and brushes in any kind of solvent. Use only compressed air and a clean dry, lint-free cloth.

2. Inspect all threaded areas for damage or stripped threads.

3. Inspect the brush holder assembly and brushes for damage or wear. Using a caliper, measure the length of the brushes. If brush measurement is less than 10.1 mm (0.40 in.), replace with new brushes and brush springs as a set.

4. Inspect the brush leads for cracks, wear, or fraying. If any of these conditions exist, replace with new brushes and brush springs as a set.

5. Inspect the rear cover bushing for wear.

6. Inspect the front cover bearing for wear.

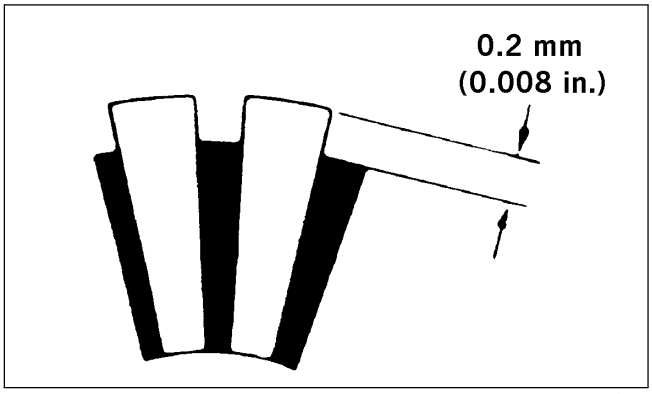
7. Inspect the brass commutator end of the armature for any burned spots or damage. If the commutator is lightly burned or damaged, the armature must be replaced. This is a molded commutator and turning it down in a lathe should not be attempted.

⚠ CAUTION

Do not use emery cloth to clean the commutator as emery particles will become imbedded in the brass commutator resulting in a short circuit. Use only #200 grit sandpaper.

8. Inspect the commutator end of the armature for buildup in the grooves. Carefully remove any buildup by undercutting using a thinly ground hacksaw blade. Do not undercut any deeper than the original groove which can be seen by looking at the end of the commutator.

9. Using a caliper, measure the undercut. Maximum undercut groove must be 0.2 mm (0.008 in.).



ATV-1054

⚠ CAUTION

Buildup in the grooves must be removed to prevent any chance of an electrical arc between individual sections of the commutator.

10. Inspect the commutator for shorting using a multimeter and the following procedure.

    A. Set the selector to the OHMS position.

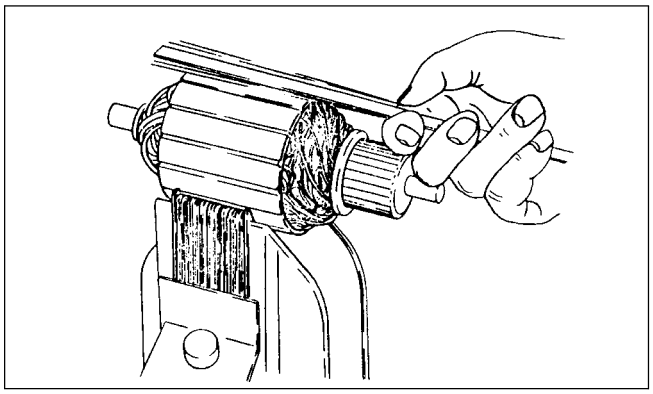
    B. Touch the black lead to the armature shaft.

    C. Using the red tester lead, probe the commutator end of the armature. The meter indicator should not change. If the indicator shows resistance, the armature is shorted and must be replaced.

11. Inspect the armature for shorting using a "growler" and the following procedure.

    A. Place the armature in the "growler."

B. While holding a metal strip on the armature, rotate the armature an entire revolution. If the metal strip vibrates at any point on the armature, the armature is shorted and must be replaced.



0725-653

12. Inspect the ground brushes to make sure they are properly grounded. Use a multimeter and the following procedure.

A. Set the selector to the OHMS position.

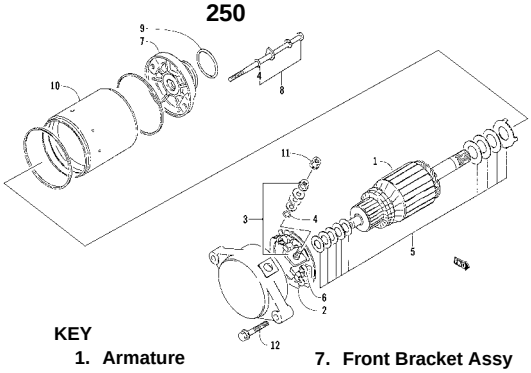
B. Touch the black tester lead to a ground brush.

C. Touch the red tester lead to the brush holder assembly.

■NOTE: If no resistance is indicated, check the ground connection for tightness and for cleanliness. If there is still no meter indication, replace the brush assembly.

ASSEMBLING/INSTALLING

250

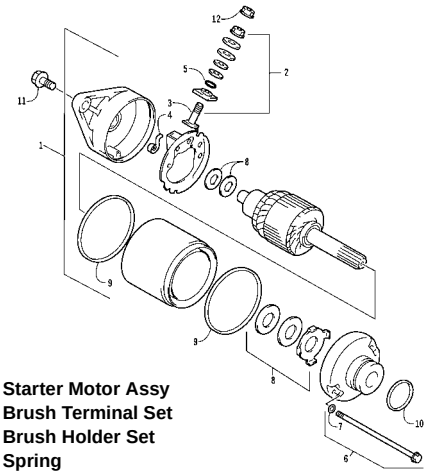


KEY

1. Armature
2. Brush Holder Set
3. Brush Terminal Set
4. O-Ring
5. Washer Set
6. Spring
7. Front Bracket Assy
8. Bolt Set
9. O-Ring
10. O-Ring
11. Nut
12. Cap Screw

0733-760

300

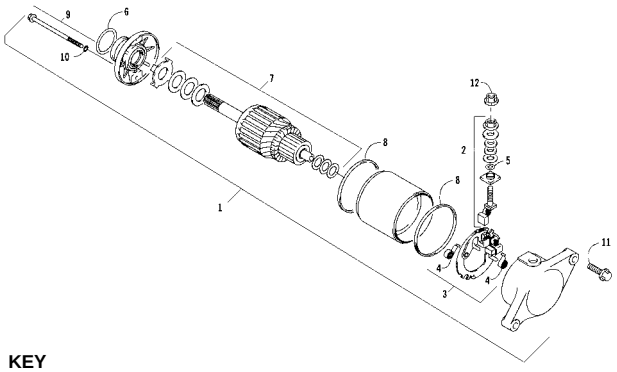


KEY

1. Starter Motor Assy
2. Brush Terminal Set
3. Brush Holder Set
4. Spring
5. O-Ring
6. Through-Bolt
7. O-Ring
8. Washer Set
9. O-Ring
10. O-Ring
11. Cap Screw
12. Nut

0737-853

400

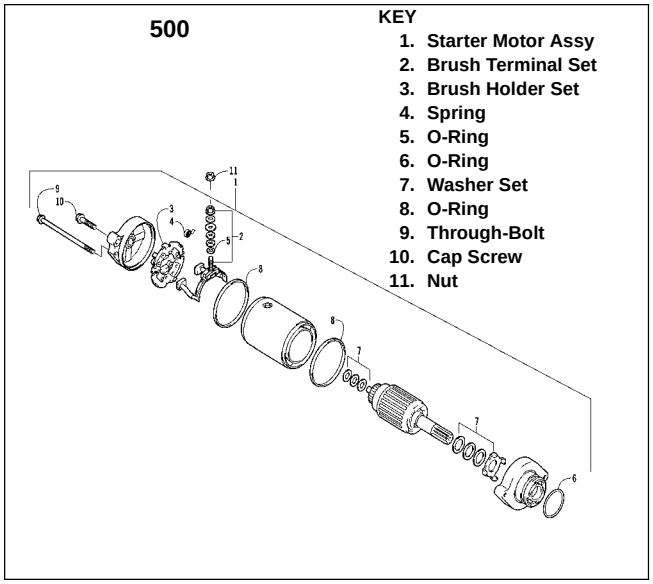


KEY

1. Starter Motor Assy
2. Brush Terminal Set
3. Brush Holder Set
4. Spring
5. O-Ring
6. O-Ring
7. Washer Set
8. O-Ring
9. Through-Bolt
10. O-Ring
11. Bolt
12. Nut

0737-056

5

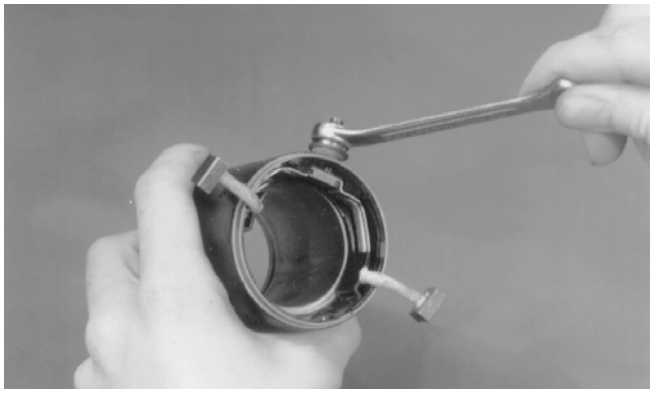


0737-779

1. Install the positive post on the positive brush assembly; then install on the starter housing.

BC009

2. On the positive post, install an O-ring washer, a fiber washer, a flat washer, and a lock washer. Secure with the nut.

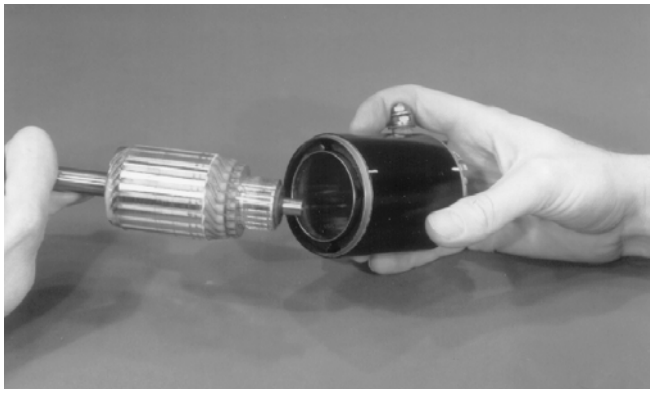


BC008

3. Align the tab on the brush holder with the notch in the starter housing; then install.

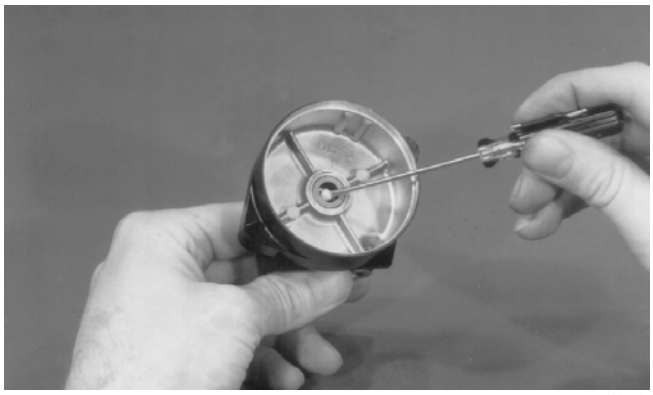
BC010

4. Install the armature into the starter housing; then while holding the brushes out, slide the commutator into the brush holder.



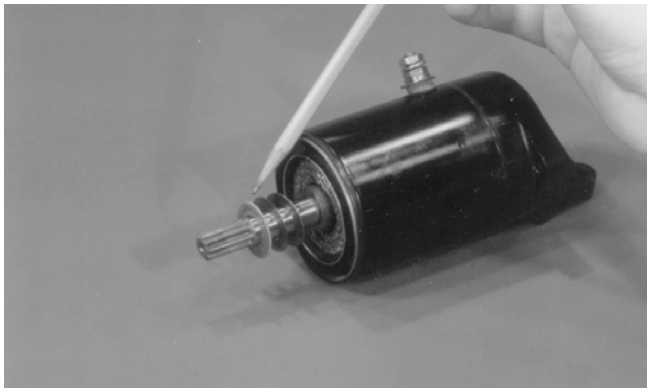
BC006

5. Apply a small amount of grease to the rear cover bushing; then install the cover on the starter housing making sure the reference marks align.



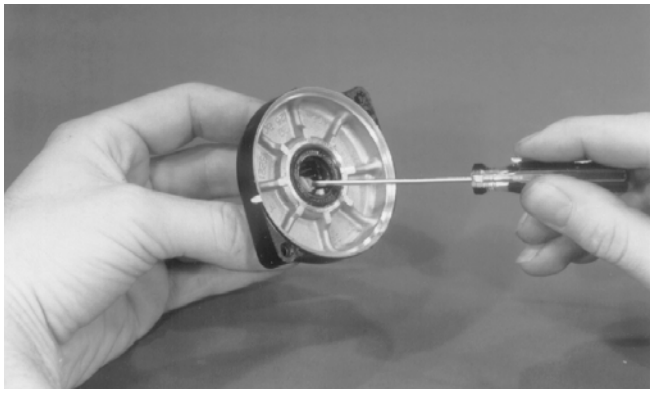
BC013

6. In order, install the thick metal washer, thin metal washer, and the fiber washer on the armature shaft; then install the housing O-ring on the starter housing.

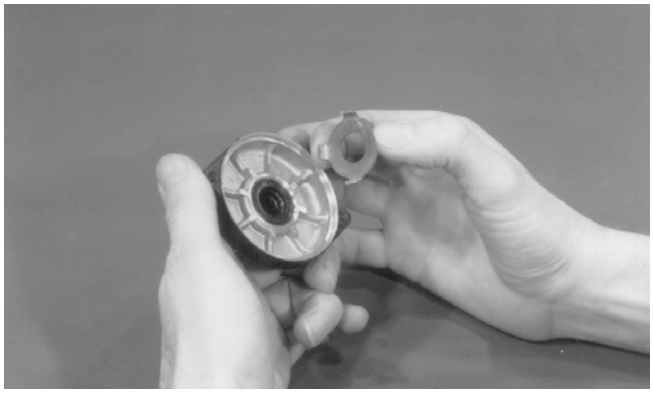


BC014

7. Apply a small amount of grease to the front cover bearing and seal; then install the seal protector.



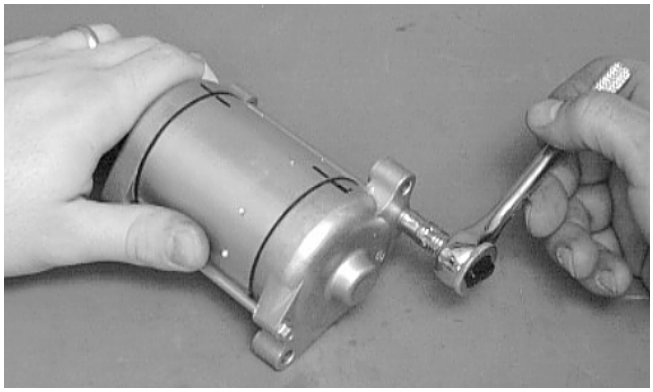
BC015



BC004

8. Place the front cover onto the starter housing making sure it seats properly.

9. Apply red Loctite #271 to the threads of the two long cap screws and install. Tighten to 0.8-1.2 kg-m (6-9 ft-lb).



AR653D

10. Apply a small amount of grease to the O-ring seal on the starter; then install the starter into the crankcase. Secure with two cap screws and wiring forms.

11. Secure the positive cable to the starter with the nut.

12. Connect the battery.

TESTING VOLTAGE

Perform this test on the starter motor positive terminal. To access the terminal, slide the boot away.

■ NOTE: The ignition switch must be in the ON position, the emergency stop switch in the RUN position, the reverse lever (on manual transmission models) in the FORWARD position, and the shift lever (on automatic transmission models) in the NEUTRAL position.

1. Set the meter selector to the D.C. Voltage position.

2. Connect the red tester lead to the starter terminal; then connect the black tester lead to ground.

3. With the starter button depressed, the meter must show battery voltage and the starter motor should operate.

AR607D

■ NOTE: If the meter showed battery voltage but the starter did not operate or operated slowly, inspect battery voltage (at the battery), starter motor condition, and/or ground connections.

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

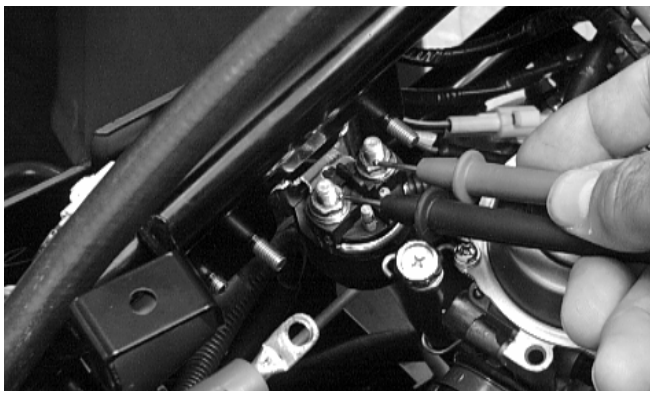
Starter Relay (250/300)

RESISTANCE

⚠ CAUTION

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

1. Disconnect the battery; then verify that the ignition fuse is good. Disconnect all wires from the solenoid.
2. Set the meter selector to the OHMS position.
3. Connect the tester leads to each of the heavy posts of the solenoid.
4. The meter must show an open circuit.



CH099D

■**NOTE: Leave the tester leads connected to the solenoid posts for the following procedure.**

■**NOTE: An external 12-volt power supply "jumper" (positive and negative connections) must be used for this test. Also, it is very important that the meter leads and power supply connections are made to the appropriate terminals of the relay or damage to the multimeter will result.**

5. Connect the power supply leads to each small terminal of the solenoid. There should be an audible "click" from the relay, and the meter must show less than 1 ohm.

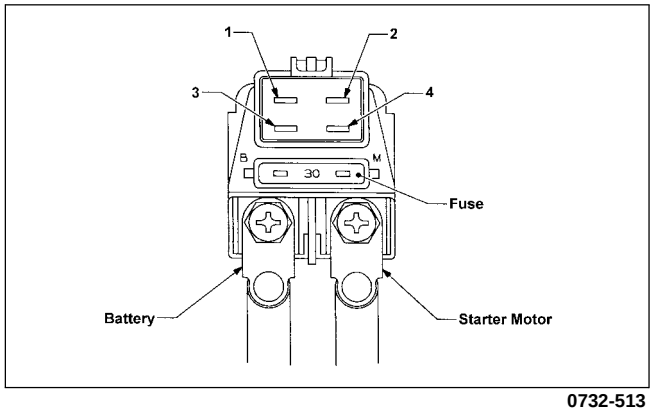
CH100D

■**NOTE: If there was no audible "click" from the relay or if the meter shows more than 1 ohm, it must be replaced. If there was a "click," continue to test resistance.**

6. With the 12-volt power supply still connected, connect the red tester lead to the heavy battery cable terminal; then connect the black tester lead to the heavy starter motor cable terminal.
7. The meter must show less than 1 ohm.
8. With the 12-volt power supply disconnected, connect the tester leads to each small terminal of the solenoid.
9. The meter must show 4.3 ohms ± 20%.

■**NOTE: If the meter shows no resistance, the relay is out of tolerance or it must be replaced.**

Starter Relay (400/500)



0732-513

RESISTANCE

⚠ CAUTION

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

1. Disconnect the battery; then verify that the starter relay 30-amp fuse is good.
2. Set the meter selector to the OHMS position.
3. Connect the red tester lead to terminal #1; then connect the black tester to terminal #2.
4. The meter must show an open circuit.

■ NOTE: Leave the tester leads connected to the terminals for the following procedure.

■ NOTE: An external 12-volt power supply "jumper" (positive and negative connections) must be used for this test. Also, it is very important that the meter leads and power supply connections are made to the appropriate terminals of the relay or damage to the multimeter will result.

5. Connect the power supply (positive) to terminal #3; then connect the power supply (negative) to terminal #4. There should be an audible "click" from the relay, and the meter must show less than 1 ohm.

■ NOTE: If there was no audible "click" from the relay or if the meter shows more than 1 ohm, it must be replaced. If there was a "click," continue to test resistance.

6. With the 12-volt power supply still connected, then connect the red tester lead to the heavy battery cable terminal; then connect the black tester lead to the heavy starter motor cable terminal.
7. The meter must show less than 1 ohm.
8. With the 12-volt power supply disconnected, connect the red tester lead to terminal #3; then connect the black tester lead to terminal #4.
9. The meter must show 3.6 ohms ± 20%.

■ NOTE: If the meter shows no resistance, the relay is out of tolerance or it must be replaced.

CDI Unit
(250/300)

The CDI is located beneath the right rear fender panel near the battery.

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

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

■ NOTE: Prior to replacing the CDI unit to assure the CDI unit is defective, it is advisable to perform a CDI peak voltage test (see Ignition Coil in this section) and/or perform a continuity test of the wiring harness from the CDI connector to the CDI unit.

Regulator/Rectifier
(250/300)

The regulator/rectifier is located near the battery.

RESISTANCE

⚠ CAUTION

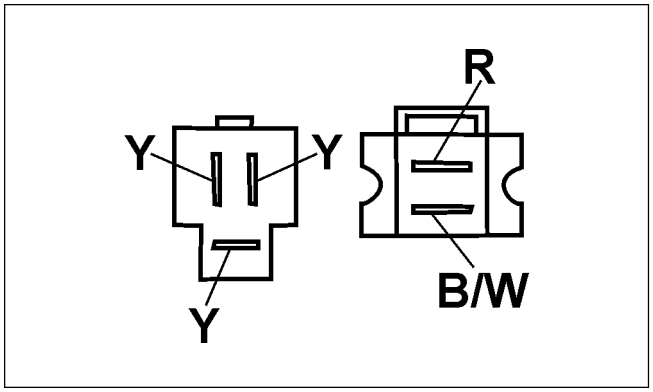
Always disconnect the battery when performing resistance tests to avoid damaging the multimeter.

1. Set the meter selector to the OHMS position.
2. Test each combination as found in the following chart.

■ NOTE: As an example, connect the red tester lead to the R terminal; then connect the black tester lead to a Y terminal. The meter must show 7-k ohms.

⚠ CAUTION

Before determining the regulator/rectifier is defective, perform every test combination shown in the chart.



ATV1087B

REGULATOR/RECTIFIER SPECIFICATIONS (k-ohms)

Negative Meter Lead To:	Positive Meter Lead To: Y	Y	Y	R	B/W
Y	—	∞	∞	7	∞
Y	∞	—	∞	7	∞
Y	∞	∞	—	7	∞
R	∞	∞	∞	—	∞
B/W	7	7	7	30-50	—

∞ = Infinity

CDI Unit
(400/500)

The CDI is located beneath the seat and fender panel near the battery.

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

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

■ NOTE: Prior to replacing the CDI unit to assure the CDI unit is defective, it is advisable to perform a CDI peak voltage test (see Ignition Coil in this section) and/or perform a continuity test of the wiring harness from the CDI connector to the CDI unit.

Regulator/Rectifier
(400/500)

The regulator/rectifier is located beneath the seat near the air-cleaner housing.

RESISTANCE

CAUTION

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

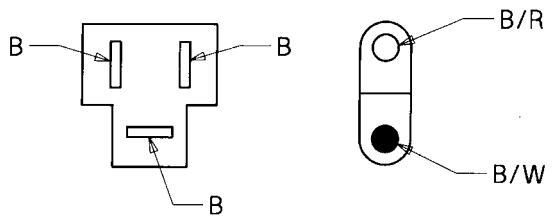
1. Set the meter selector to the OHMS position.
2. Test each combination as found in the following chart.

■ NOTE: As an example, connect the red tester lead to the B/R terminal; then connect the black tester lead to a B terminal. The meter must show 1-10 k-ohms.

⚠ CAUTION

Before determining the regulator/rectifier is defective, perform every test combination shown in the chart.

REGULATOR/RECTIFIER TERMINALS



0735-352

REGULATOR/RECTIFIER SPECIFICATIONS (k-ohms)

Negative Meter Lead To:	Positive Meter Lead To: B/R	B	B	B	B/W	Body
B/R	—	∞	∞	∞	∞	∞
B	1–10	—	∞	∞	∞	∞
B	1–10	∞	—	∞	∞	∞
B	1–10	∞	∞	—	∞	∞
B/W	3-15	1-10	1-10	1-10	—	∞
Body	∞	∞	∞	∞	∞	—

∞ = Infinity

Back Back to TOC Back to Section TOC Next

Neutral Start Relay

The connector is the white 4-prong one near the battery.

VOLTAGE (Connector)

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

1. Set the meter selector to the D.C. Voltage position.
2. Connect the red tester lead to the orange wire; then connect the black tester lead to ground.
3. The meter must show battery voltage.

■NOTE: If the meter shows no battery voltage, inspect the fuses, wiring harness, connectors, or ignition switch.

■NOTE: In the following test, the ignition switch must be in the ON position and the emergency stop switch must be in the RUN position.

4. With the black tester lead still connected to ground, connect the red tester lead to the yellow/green wire.
5. Depress the starter button. The meter must show battery voltage.

■NOTE: If the meter shows no battery voltage, inspect fuses, wiring harness, connectors, and switches.

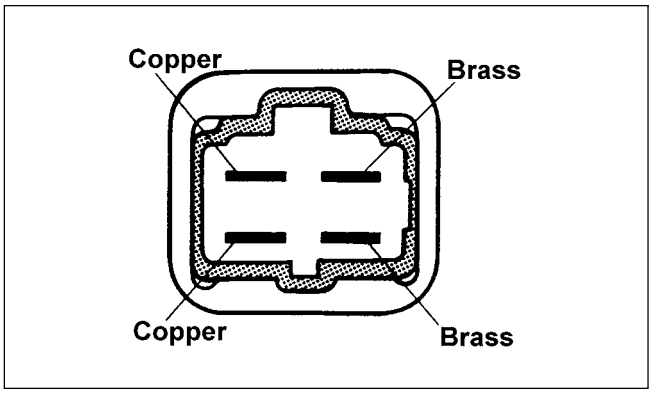
RESISTANCE (Relay - Brass Terminals)

⚠CAUTION

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

■NOTE: An external 12-volt power supply "jumper" (positive and negative connections) must be used for this test. Also, it is very important that the meter leads and power supply connections are made to the appropriate terminals of the relay or damage to the multimeter will result.

1. Set the meter selector to the OHMS position.
2. Connect the power supply (positive) to one copper terminal; then connect the power supply (negative) to the other copper terminal. There should be an audible "click" from the relay.



ATV-1075

■NOTE: If there was no audible "click" from the relay, it must be replaced. If there was a "click," continue to test resistance.

3. Set the meter selector to the OHMS position.
4. With the power supply still connected, connect the red tester lead to one brass terminal; then connect the black tester lead to the other brass terminal.
5. The meter must show less than 1 ohm.

■NOTE: If the meter shows more than 1 ohm (even though the "click" was heard in the power supply test), the relay must be replaced.

RESISTANCE (Relay - Copper Terminals)

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

■NOTE: The external power supply will not be used for this test.

1. Set the meter selector to the OHMS position.
2. Connect the red tester lead to one copper terminal; then connect the black tester lead to the other copper terminal.
3. The meter must show 90 ohms ± 20%.

■NOTE: If the meter shows no resistance, replace the relay.

Headlights

The connectors are the two 3-prong ones secured to the front bumper supports (one on each side) with cable ties.

BULB VERIFICATION (Low and High Beam)

■ **NOTE: Perform this test on each headlight bulb. Also, a 12-volt external power supply w/jumpers will be needed.**

1. Disconnect the wiring harness from the bulb to be tested.
2. Connect the power supply (positive) to one bulb contact; then connect the power supply (negative) to the remaining bulb contact.
3. The bulb should illuminate.
4. If the bulb fails to illuminate, it must be replaced.

VOLTAGE

■ **NOTE: Perform this test in turn on the main harness side of all four connectors. Also, the ignition switch must be in the LIGHTS position.**

■ **NOTE: The LO beam is the inside bulb, and the HI beam is the outside bulb.**

1. Set the meter selector to the D.C. Voltage position.
2. Connect the red tester lead to one wire; then connect the black tester lead to the other wire.
3. With the dimmer switch in the LO position, test the two inside connectors (LO beam). The meter must show battery voltage.
4. With the dimmer switch in the HI position, test the two outside connectors (HI beam). The meter must show battery voltage.

■ **NOTE: If battery voltage is not shown in any test, inspect the fuses, battery, main wiring harness, connectors, or the left handlebar switch.**

Taillight - Brakelight

The connector is the 3-prong one located under the rear fender assembly.

BULB VERIFICATION

■ **NOTE: Perform this test on the taillight-brakelight side of the connector. Also, a 12-volt external power supply (jumper) will be needed.**

1. Connect the power supply (positive) to the yellow wire; then connect the power supply (negative) to the brown wire.
2. The taillight should illuminate.
3. With the negative power supply still connected, connect the positive supply wire to the red wire.
4. The brakelight should illuminate.

■ **NOTE: If either the taillight or brakelight fails to illuminate, inspect the bulb, the connectors, or the component wiring harness.**

VOLTAGE (Taillight)

■ **NOTE: Perform this test on the main harness side of the connector. Also, the ignition switch should be in the LIGHTS position.**

1. Set the meter selector to the D.C. Voltage position.
2. Connect the red tester lead to the pink wire; then connect the black tester lead to the black wire.
3. With the ignition key in the LIGHTS position, the meter must show battery voltage.

■ **NOTE: If the meter shows no voltage, inspect fuses, wiring harness, connectors, and switches.**

VOLTAGE (Brakelight)

■ **NOTE: Perform this test on the main harness side of the connector. Also, the ignition switch should be in the ON position and the brake (either foot pedal or hand lever) must be applied.**

■ **NOTE: Make sure the brake lever (hand) and brake pedal (auxiliary) are properly adjusted for this procedure.**

1. Set the meter selector to the D.C. Voltage position.
2. Connect the red tester lead to the red/blue wire; then connect the black tester lead to the black wire.
3. With either brake applied, the meter must show battery voltage.

■ **NOTE: If the meter shows no voltage, inspect bulb, fuses, wiring harness, connectors, and switches.**

Ignition Timing

The ignition timing cannot be adjusted; however, verifying ignition timing can aid in troubleshooting other components. To verify engine timing, use the following procedure.

1. Attach the engine Timing Light (p/n 0644-197) to the spark plug high tension lead; then remove the timing inspection plug from the left-side crankcase cover.
2. With the Arctic Cat Engine Tachometer (p/n 0644-275) connected, start the engine and run at the specified RPM.
3. Ignition timing should be according to specifications.

Model	Timing
250	5° BTDC below 1800 RPM 35° BTDC above 3800 RPM
300	5° BTDC @ 1800 RPM 30° BTDC @ 3800 RPM
400	10° BTDC @ 3000 RPM
500	10° BTDC @ 1500 RPM

4. Install the timing inspection plug.

If ignition timing cannot be verified, the rotor may be damaged, the key may be sheared, the trigger coil bracket may be bent or damaged, or the CDI unit may be faulty.

SECTION 6 - DRIVE SYSTEM

6

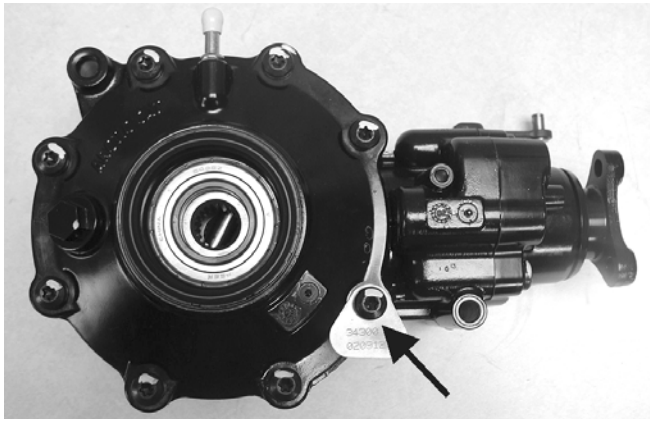
TABLE OF CONTENTS

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.**

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.



CD017A

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

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

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

Size	New Housing	Reassembled Housing
M6 (Torx T-30 Recess)	1.1-1.3 kg-m (8-9.5 ft-lb)	0.9-1.2 kg-m (6.5-9 ft-lb)
M8 (Torx T-40 Recess)	3.5-4.3 kg-m (25-31 ft-lb)	2.9-3.5 kg-m (21-25 ft-lb)
M10 (Torx T-50 Recess)	5.1-6.3 kg-m (37-45.5 ft-lb)	4.3-5.3 kg-m (31-38 ft-lb)

SPECIFICATIONS

Specific specifications regarding the the gear cases (capacities, lubricant type, etc.) can be found in Section 1 of this manual.

Ring Gear Backlash	0.28-0.38 mm (0.011-0.015 in.)
Ring Gear End Play	0.1-0.2 mm (0.004-0.008 in.)

SPECIAL TOOLS

A number of special tools must be available to the technician when servicing the gear case.

Description	p/n
Boot Clamp Pliers	0444-120
Pinion Gear/Shaft Removal Tool	0444-127
Slide Hammer w/CV Joint Attachment	0444-123
CV Joint Attachment (Only)	0444-119
Internal Hex Socket (48 mm)	0444-104

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

TROUBLESHOOTING

If a noise is heard from the gear case area, it can be difficult to locate and/or diagnose. If the noise is related to wheel speed, but not to engine RPM, the problem is probably in the final drive or engine/transmission bevel gear set. When a problem is localized, a number of inspections must be made to pinpoint that problem. The most obvious of the inspections include CV boots, wheel and hub nut tightness, wheel bearing damage, gear case lubricant contamination, low lubricant level, seal leakage at the input shaft, CV joints, or selector arm.

■ **NOTE: Small metallic particles will collect on the magnetic drain plug as a normal part of break-in and will also give a metallic cast to drained lubricant. Contamination would include large particles or water which gives a "milky" look to the lubricant.**

■ **NOTE: Lubricant on a new pinion housing assembly could be grease. If the front of the gear case is leaking at the rear drive boot, wipe excess lubricant from the bottom of the pinion housing; then operate the ATV for a period of time. Inspect the pinion housing area for any signs of leakage. If lubricant is again on the bottom of the pinion housing, the seal must be replaced.**

Additional troubleshooting could include the following.

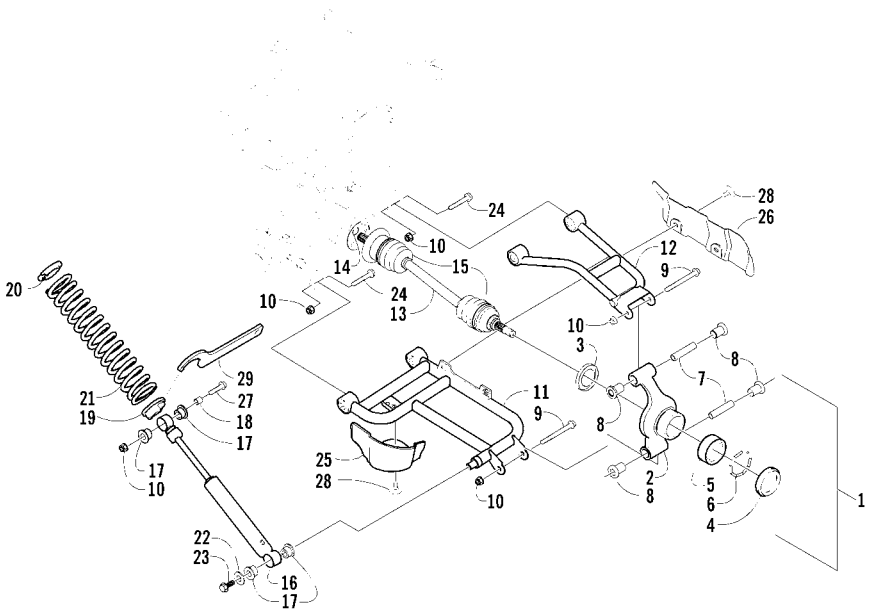
- Binding/abrupt motion: CV boot torn (grease loss, foreign object damage, broken cage); gear lubricant loss or not filled (bearing seizure, broken gear teeth, seal leakage, bladder or hose leakage, missing filler/drain plug).
- Noise from drive system: wheel or gear case bearing damage, improper gear backlash, improper assembly, low or no gear case lubricant.
- Lockup: gear case lubricant loss or not filled, water contamination causing bearing seizure.

Rear Suspension/Rear Drive Assembly Schematics

REAR SUSPENSION/AXLE ASSEMBLY - FULLY INDEPENDENT SUSPENSION

KEY

1. Knuckle
2. Knuckle
3. Seal
4. Seal
5. Wheel Bearing
6. Clip
7. Collar
8. Bushing
9. Cap Screw
10. Lock Nut
11. A-Arm
12. Rear Arm
13. Axle
14. Clip
15. Boot Repair Kit
16. Shock Absorber
17. Bushing
18. Sleeve
19. Adjuster Cam
20. Retainer
21. Spring
22. Washer
23. Cap Screw
24. Cap Screw
25. Boot Guard
26. Boot Guard
27. Cap Screw
28. Body Screw
29. Spanner Wrench

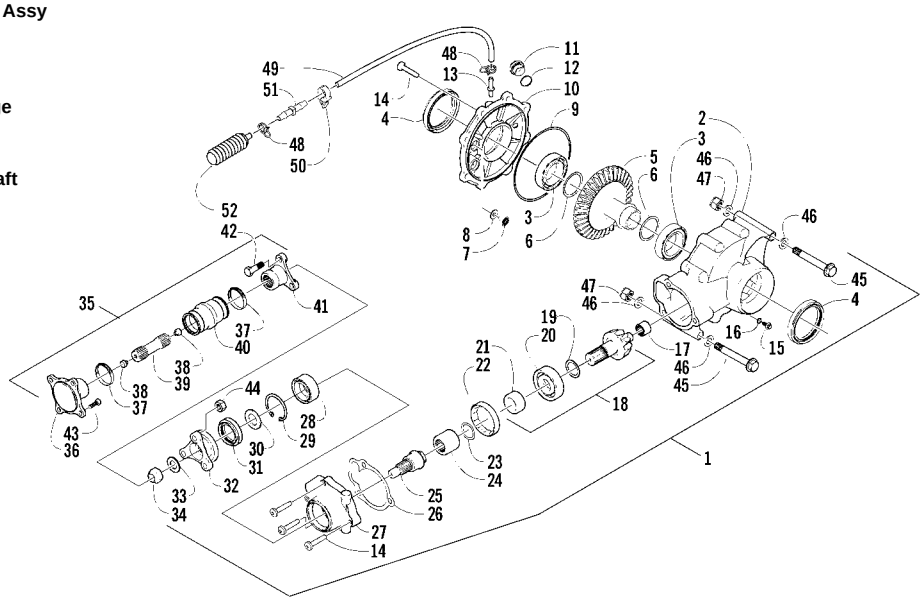


0737-579

REAR DRIVE GEAR CASE ASSEMBLY - FULLY INDEPENDENT SUSPENSION

KEY

1. Gear Case Assy
2. Housing
3. Bearing
4. Seal
5. Ring Gear
6. Shim
7. Thrust Button
8. Shim
9. O-Ring
10. Cover
11. Filler Plug
12. O-Ring
13. Fitting
14. Self-Tapping Screw
15. Magnetic Plug
16. O-Ring
17. Bearing
18. Pinion Gear Assy
19. Shim
20. Bearing
21. Collar
22. Lock Collar
23. Wave Washer
24. Collar
25. Thrust Shaft
26. Gasket
27. Pinion Housing
28. Bearing
29. Retaining Ring
30. Spacer
31. Seal
32. Drive Flange Assy
33. Washer
34. Nut
35. Coupler
36. Output Flange
37. Clamp
38. Bumper
39. Propeller Shaft
40. Boot
41. Input Flange
42. Cap Screw
43. Cap Screw
44. Lock Nut
45. Bolt
46. Washer
47. Lock Nut
48. Clamp
49. Vent Hose
50. Clip
51. Vent Fitting
52. Bladder



0737-708

Front Differential
(FIS Models)

■ **NOTE: To remove the rear gear case on 400/500 FIS models, see Rear Gear Case (400/500 FIS Models) in this section.**

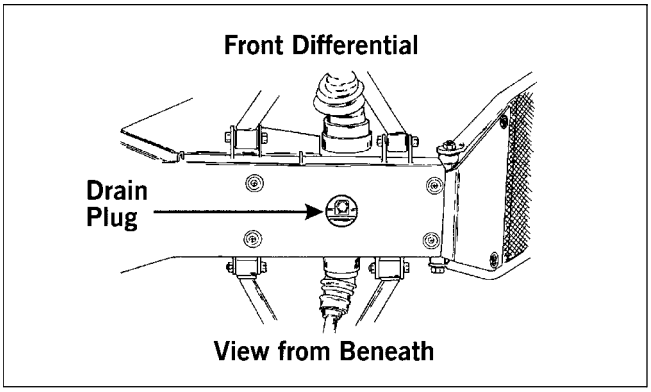
REMOVING DIFFERENTIAL

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.

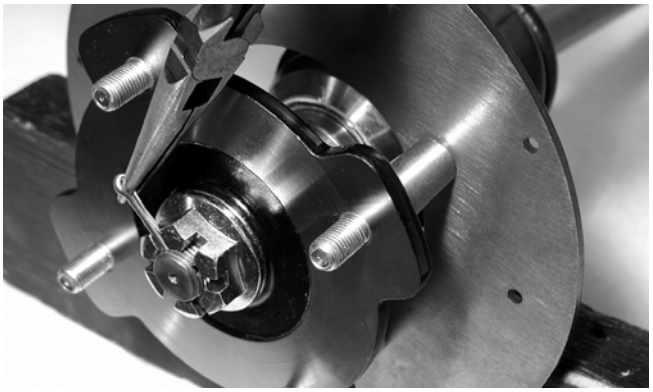


ATV0082A

3. Remove the front wheels.
4. Remove the boot guards.

AF934

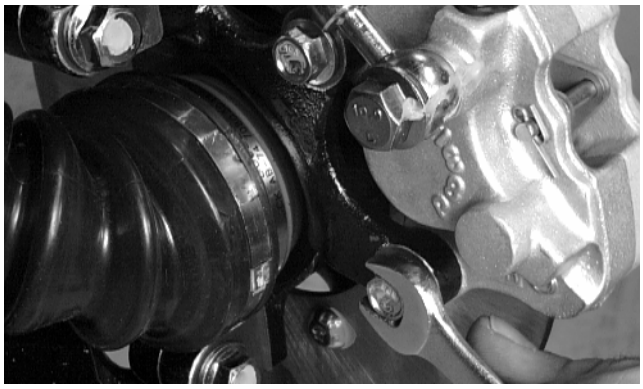
5. Pump up the hand brake; then engage the brake lever lock.
6. Remove the cotter pin securing the hex nut; then remove the hex nut and washer. Release the brake lever lock.



CD008

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

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



AF894D

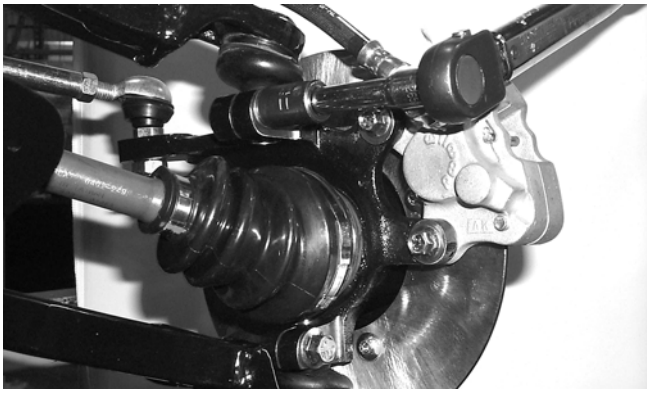
8. Remove the tie rod cotter pins and discard the pins.

AF895D

9. Remove the tie rod lock nuts.

AF896D

10. Remove the upper ball joint cap screws taking care not to strip the threads on the ball joint shaft; then using a rubber mallet, tap the end of the axle and free it from the knuckle assembly.



AF628D

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

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

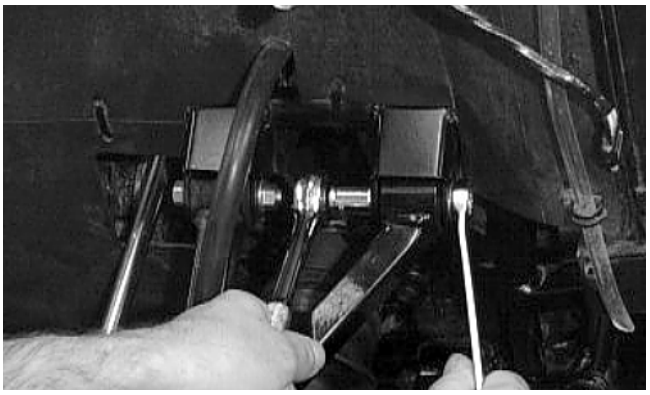
⚠ CAUTION

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.

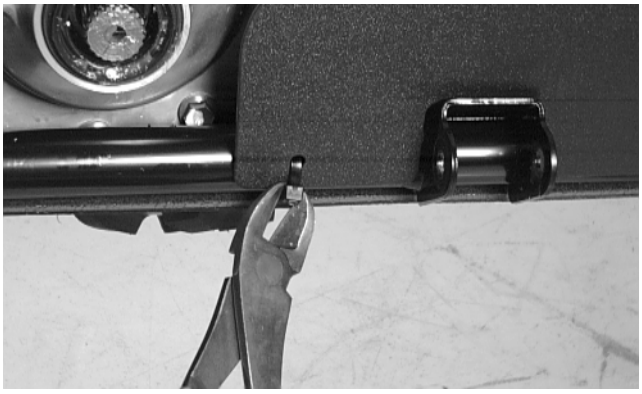


AF610D

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

AF899D

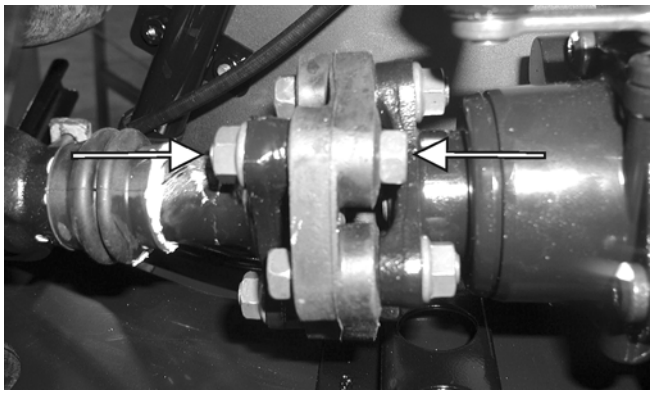
16. Remove the inner fender panels.



AF902D

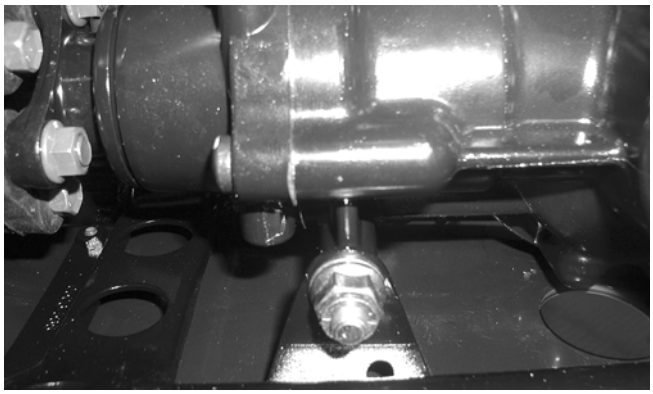
■ NOTE: To remove the panels, there will be a torx-head screw and three cable ties per side.

17. Remove the rubber coupler cap screws. Account for the six cap screws and lock nuts.



CD025A

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



CD026

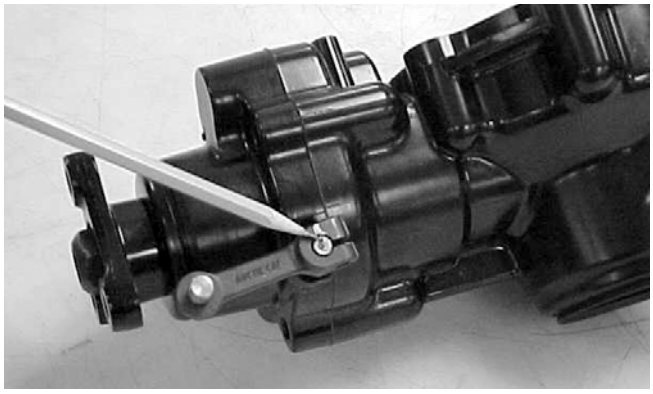
19. Remove the upper differential mounting cap screws.

CD016

20. Remove the differential from the frame.

21. Using an 8 mm wrench, remove the cap screw securing the 4-wheel drive selector arm.

■ NOTE: Prior to removing the selector arm, make a mark on the selector arm and on the splined shaft to ensure that the arm is properly positioned on the shaft during installing.

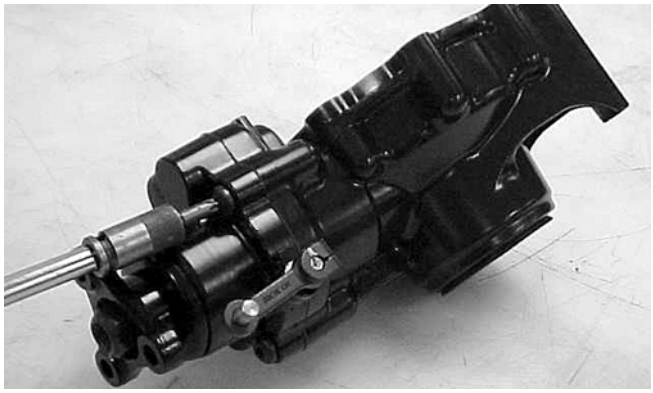


AF976

Disassembling Input Shaft

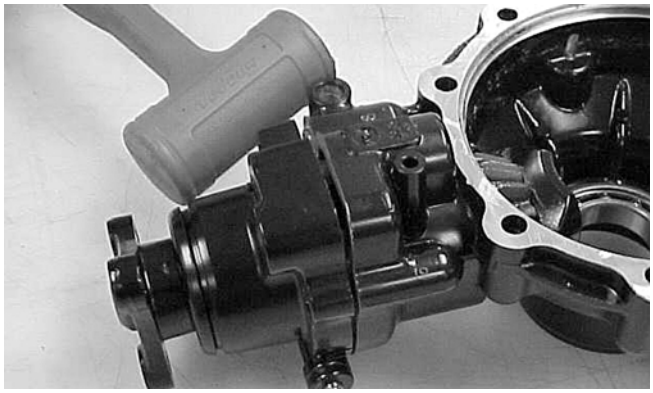
■ NOTE: This procedure can be performed on a rear FIS gear case; however, some components may vary from model to model. The technician should use discretion and sound judgment.

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



AF975

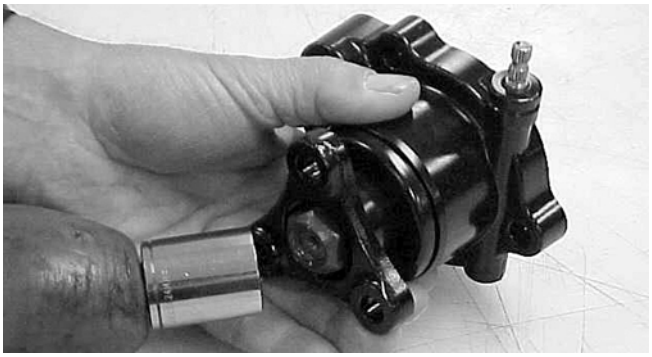
2. Using a rubber mallet, remove the cover. Account for a gasket. Remove the fork, collar, and spring. Note the location of all the components for assembling purposes.



AF977

AF978

3. Using an impact wrench and a 24 mm socket, remove the nut securing the flange to the input shaft.

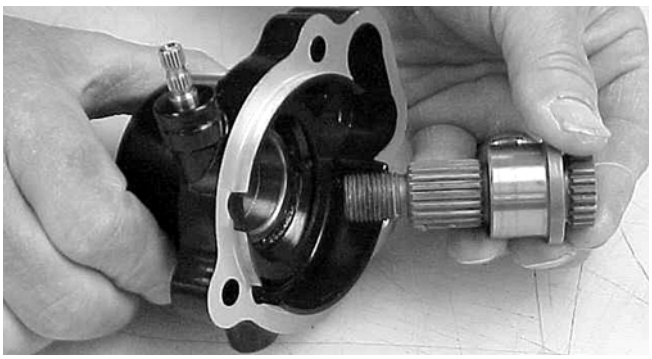


AF979

4. Remove the flange from the input shaft and account for a washer.

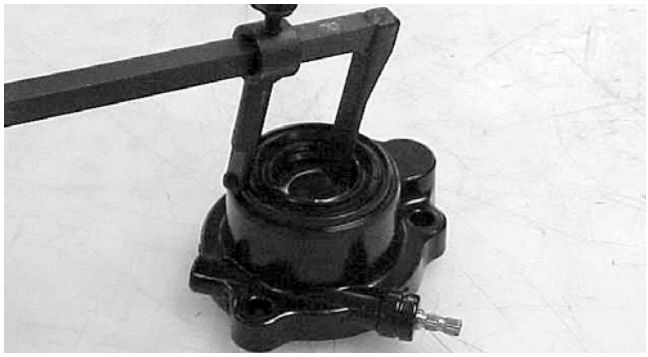
AF980

5. Remove the input shaft from the housing.



AF981

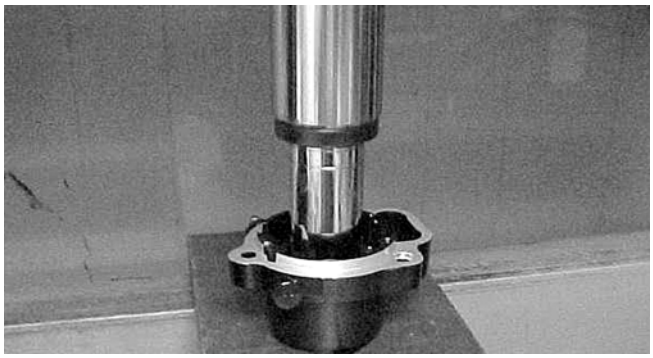
6. Using a seal removal tool, remove the input shaft seal. Account for a spacer.



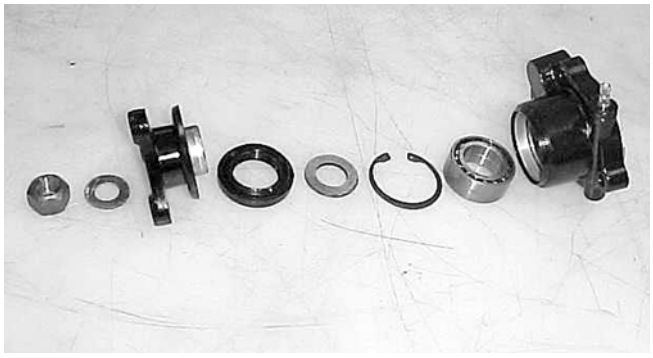
AF982

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

AF983

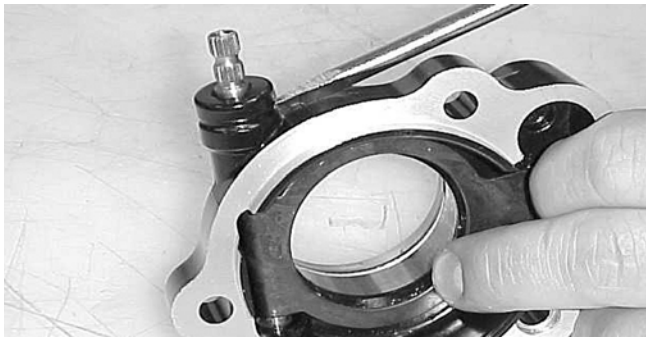


AF984

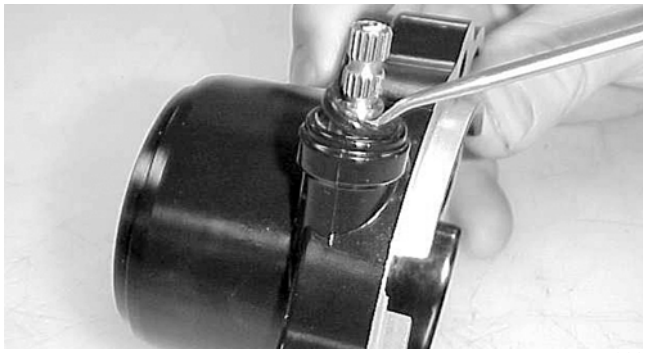


AF986

8. Remove the shift lever seal cover; then using a hook and pick set, remove the shift lever seal.



AF987

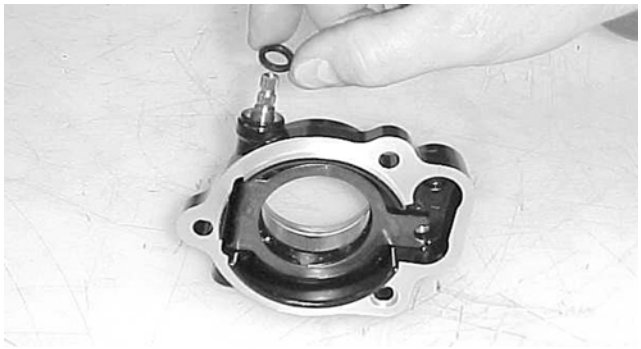


AF988

■ **NOTE: Do not remove the shift lever.**

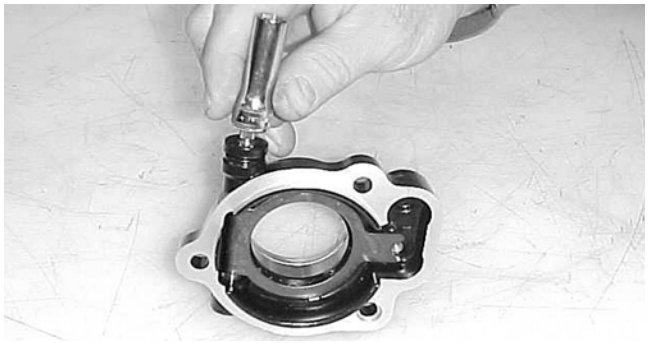
Assembling Input Shaft

1. Apply grease to the lips of the shift lever seal; then install the seal making sure the lipped side faces to the inside.

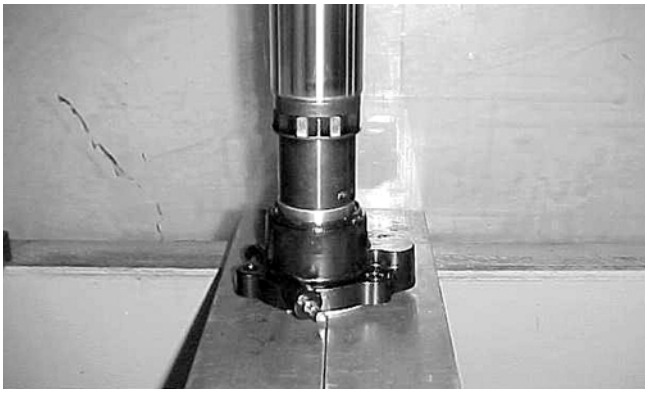


AF990

2. Install the seal cover.



3. Place the input shaft housing in a press and install the input shaft bearing. Secure the bearing with the existing snap ring making sure the sharp edge of the snap ring faces to the outside.



AF993

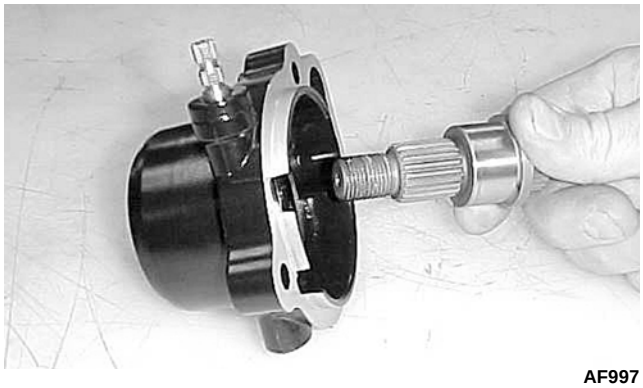
AF994

4. Install the large diameter spacer; then install the input shaft seal making sure it is flush with the edge of the housing.

AF995

AF996

5. Install the input shaft into the housing; then install the input shaft flange.



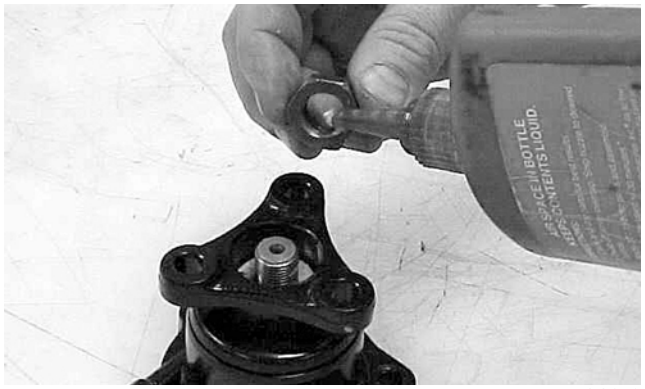
AF997

AF999

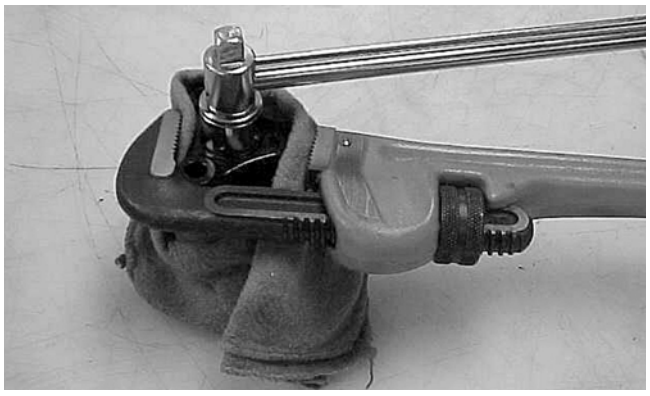
6. Apply Three Bond Sealant 1104 to the inside of the remaining washer; then install the washer onto the input shaft.

CC872

7. Apply red Loctite #271 to the threads of the input shaft nut; then secure the flange to the input shaft housing. Tighten to 10.4 kg-m (75 ft-lb).



CC873



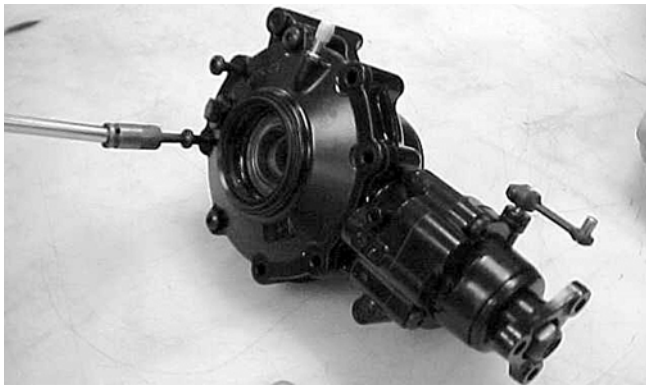
CC874

■NOTE: When using a vise or a pipe wrench to secure the input shaft housing while tightening the nut, make sure to protect the input shaft housing with a rag or suitable substitute.

Disassembling Pinion Gear

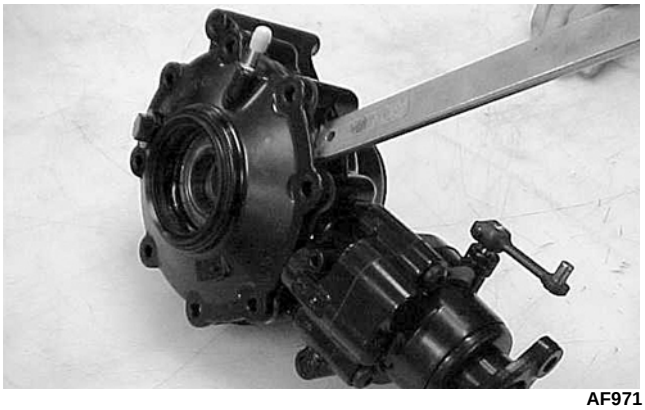
■NOTE: This procedure can be performed on a rear FIS gear case; however, some components may vary from model to model. The technician should use discretion and sound judgment.

1. Using a T-40 torx wrench, remove the cap screws securing the differential cover. Account for and make note of the ID tag location for assembling purposes.

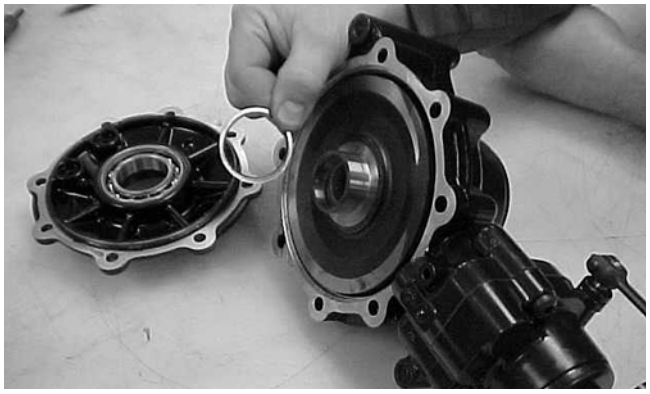


AF970

2. Using a wide pry bar, carefully remove the differential cover. Account for an O-ring and shim. Mark the shim as left-side.



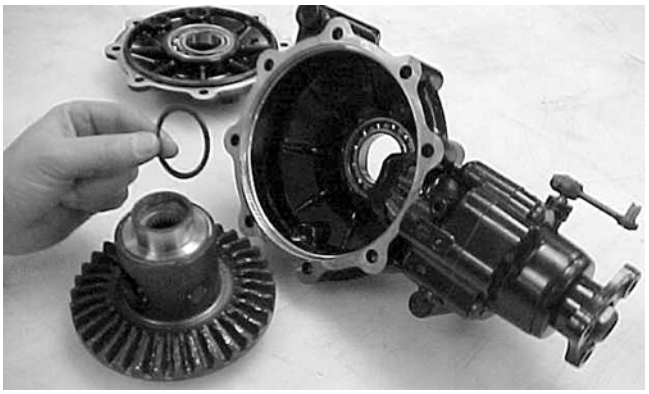
AF971



AF972

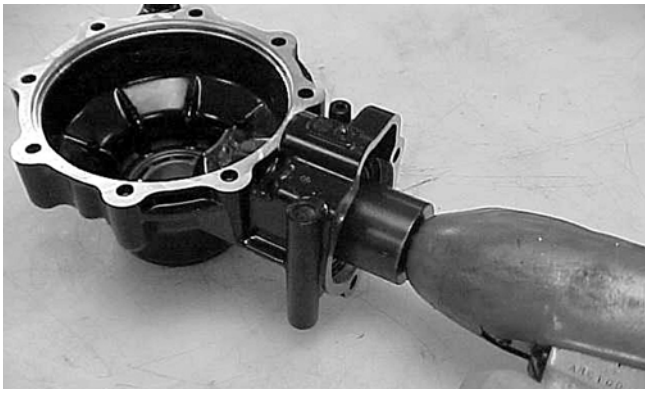
■ **NOTE: If the cover is difficult to remove, pry on the cover in more than one recessed location.**

3. Remove the ring gear spider assembly and account for a shim. Mark the shim as right-side.



AF973

4. Using a T-40 torx driver, remove the input shaft housing.



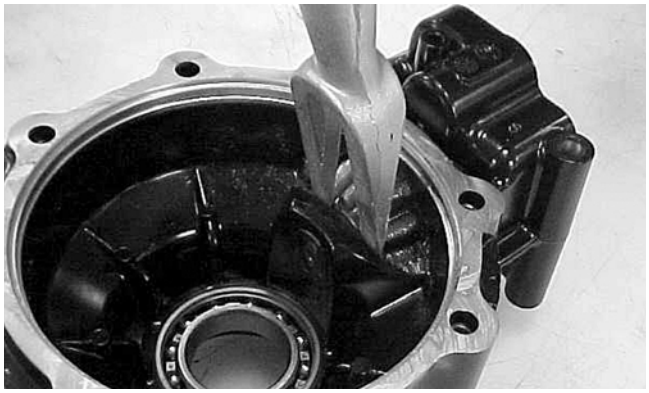
CC875

5. Using the 48 mm Internal Hex Socket (p/n 0444-104), remove the nut securing the pinion gear assembly.

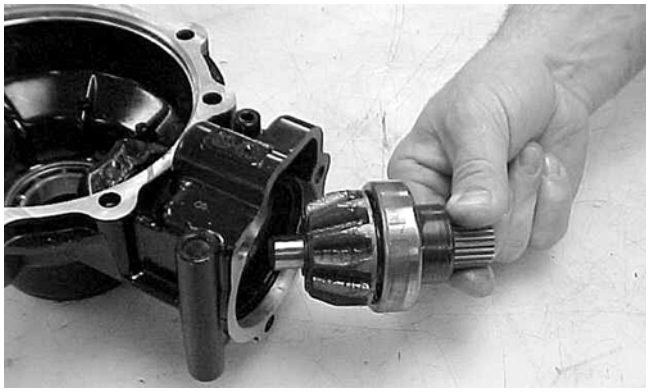
■ **NOTE: On a front differential, the nut has right-hand threads. On a rear gear case, the nut has left-hand threads.**

CC876

6. Using the Pinion Gear/Shaft Removal Tool (p/n 0444-127), and a hammer, remove the pinion gear from the housing.

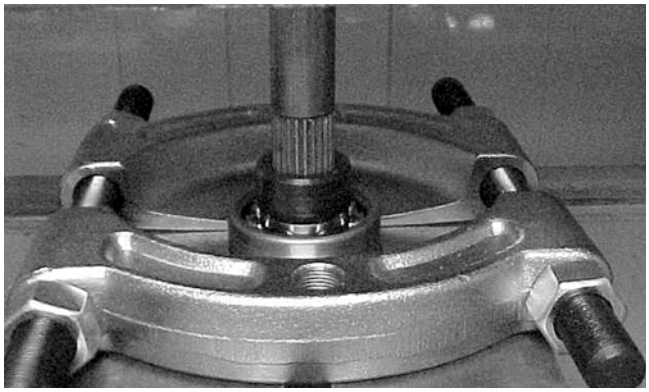


CC877



CC878

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



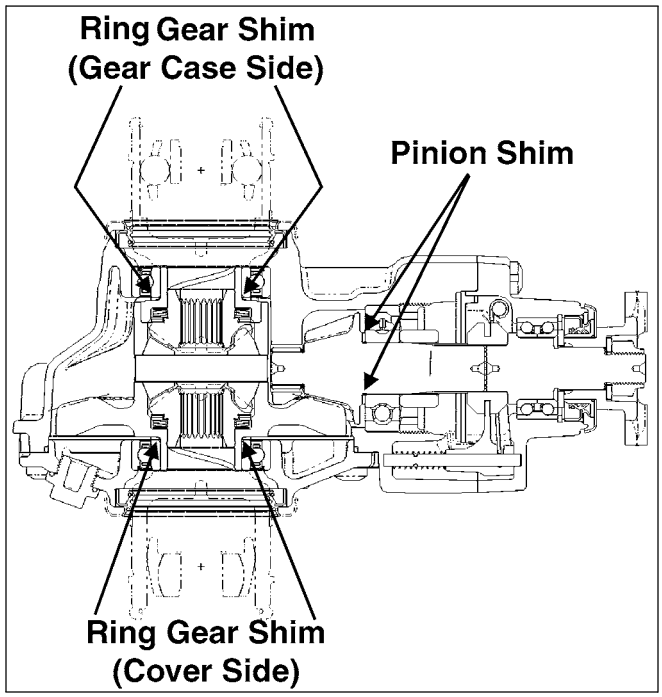
CC879

CC880

■ **NOTE: If gears are being replaced, use the existing shims. The numbers are scribed onto the gears: the ring gear has the number on the opposite side of the gears, and the pinion gear has the number on the end of the pinion gear shaft by the splines. If no number is present, it should be considered as being in the O category.**

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

Shimming Procedure/Shim Selection



502-119A

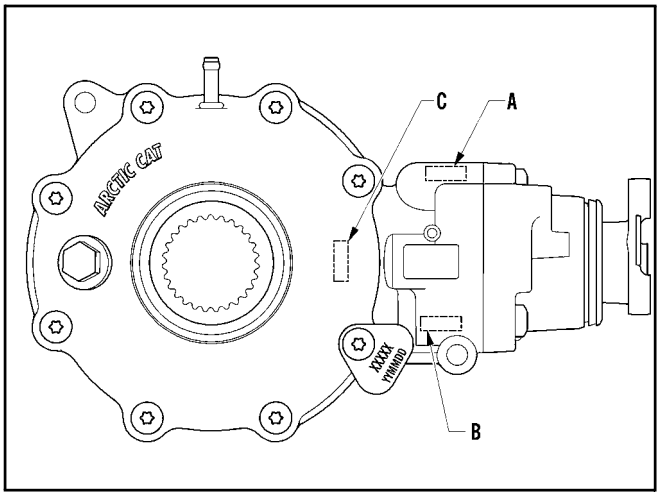
1. Press bearings into bores by outer ring to hard contact with seat.

2. Note the following shim selections (shims are nominally 1.5 mm/0.060 in. thick):

A. Pinion Gear Sub-Assembly - add the value (A) on the gear case housing with 1.5 mm (0.060 in.); then subtract the value on the 10-tooth pinion gear. This will give you the proper shim thickness.

B. Cover Side - add the value (B) on the gear case housing to the value (C) on the gear case cover; then add 1.5 mm (0.060 in.). This will give you the proper shim thickness.

C. Gear Case Side - install a 1.3-1.4 mm (0.050-0.055 in.) shim and tighten the bolts to 3.5-4.3 kg-m (25-31 ft-lb). Verify backlash to be within a range of 0.28-0.38 mm (0.011-0.015 in.) and end-play to be within a range of 0.10-0.20 mm (0.004-0.008 in.). If not within specification range, reselect shim until backlash specification range can be verified.



738-268A

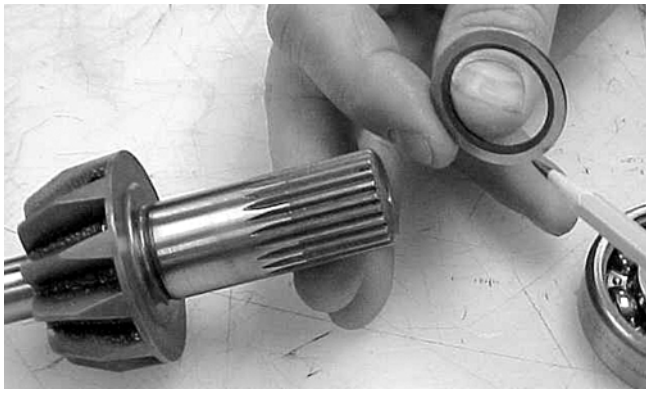
3. Apply molybdenum disulfide grease to all oil seal lips.

4. Prelubricate journal on pinion assembly with SAE 80W-90 hypoid gear lubricant prior to pressing assembly into gear case housing.

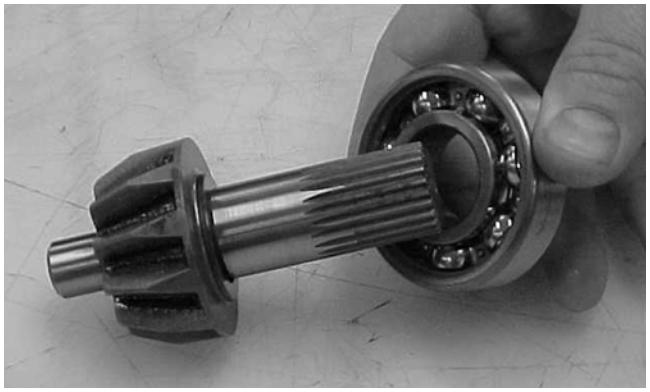
5. Tighten lock collar to 16.6 kg-m (120 ft-lb) and deform/lock edge approximately 1.5 mm (0.060 in.) into lower oil channel.

Assembling Pinion Gear

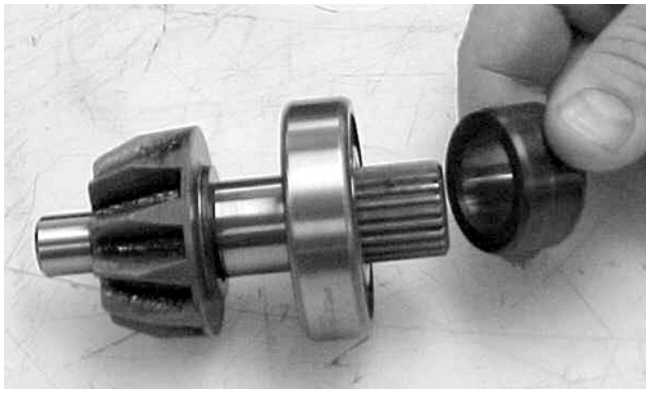
1. Place the shim (with the chamfer side toward the inside) onto the pinion shaft; then install the bearing onto the pinion shaft. Install the pinion shaft collar.



CC881

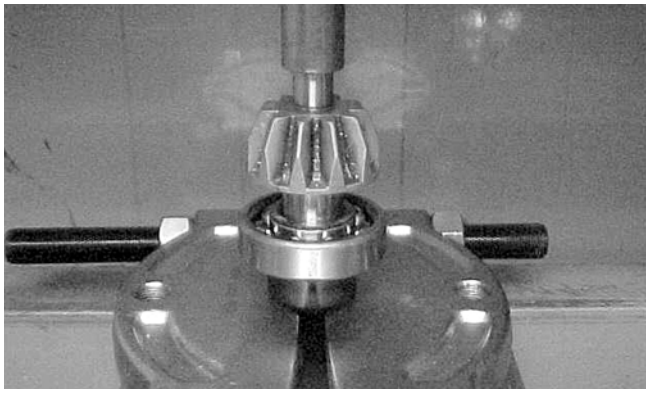


CC882



CC883

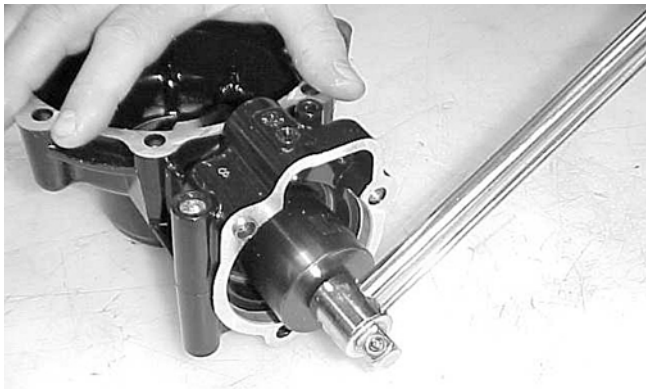
2. Place the pinion assembly in a bearing puller; then install the bearing using a press.



CC884

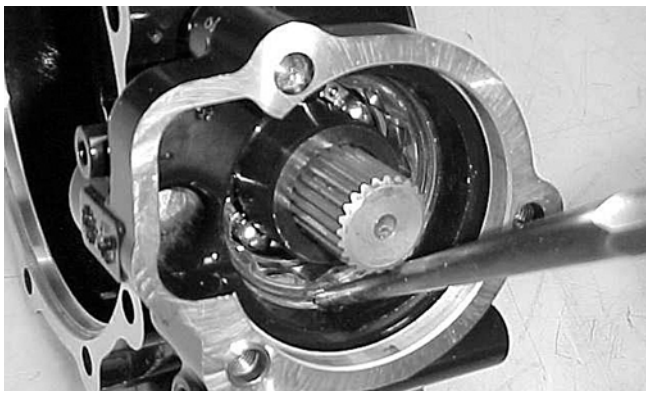
3. Install the pinion gear assembly into the housing. Using the 48 mm Internal Hex Socket (p/n 0444-104), secure the pinion gear assembly with the existing nut. Tighten to 17.3 kg-m (125 ft-lb).

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



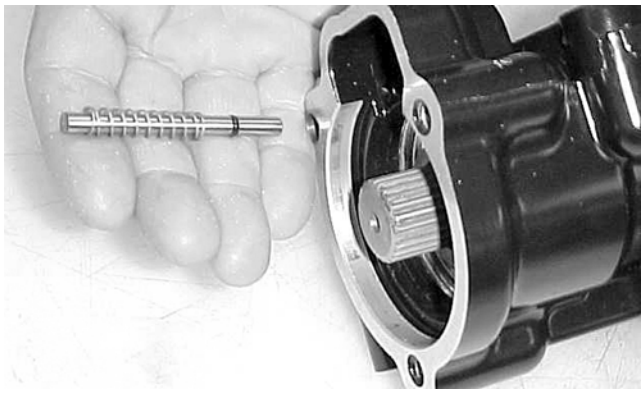
CC890

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



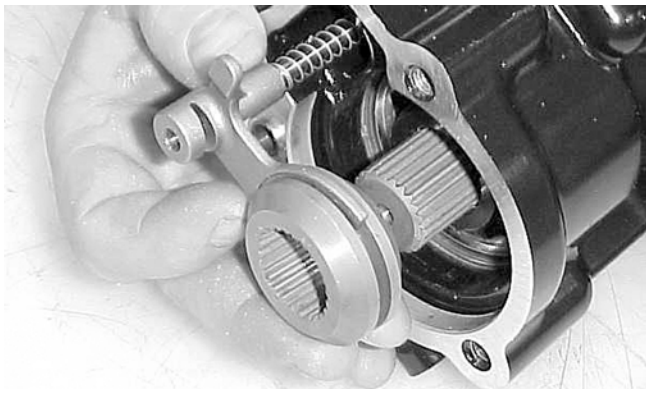
CC891

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



CC892

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

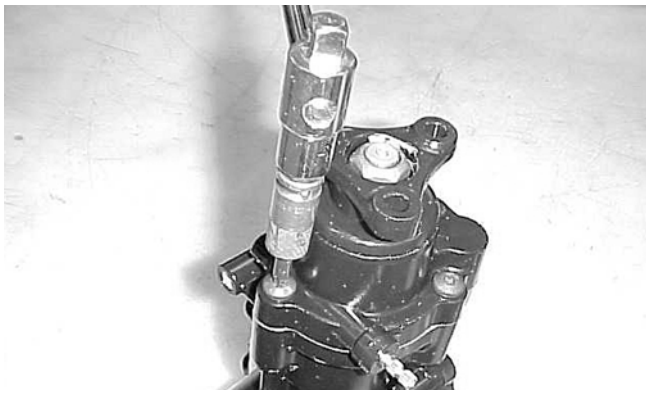


CC893

7. Place the input shaft assembly onto the gear housing; then secure with the existing cap screws. Tighten to 2.9-3.5 kg-m (21-25 ft-lb).

■**NOTE: If a new gear housing is being installed, tighten the cap screws to 3.5-4.3 kg-m (25-31 ft-lb).**

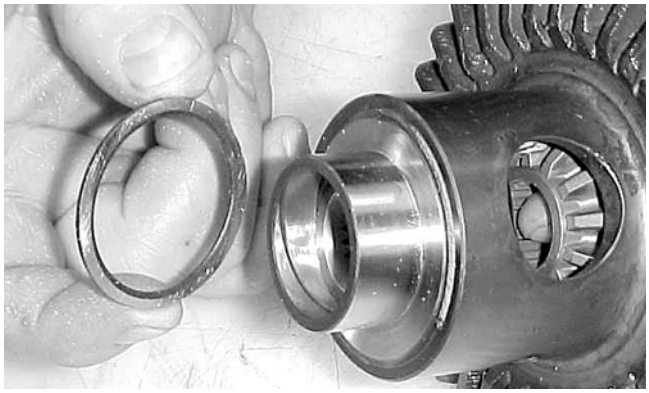
CC894



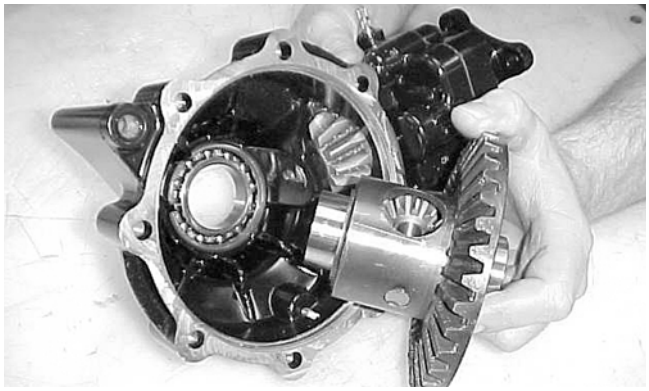
CC895

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.

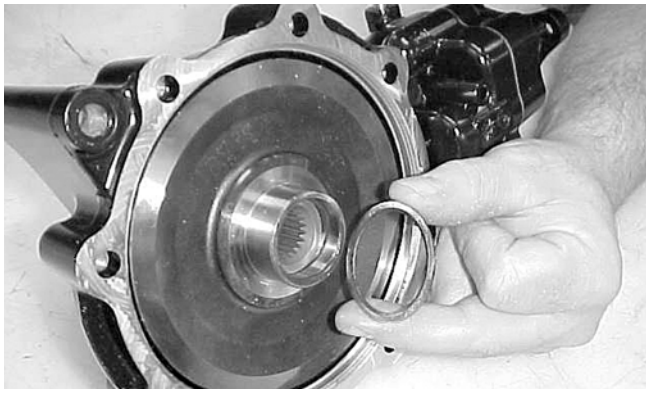
■ **NOTE: The spider and ring gear assembly must be replaced as a complete unit.**



CC896



CC897

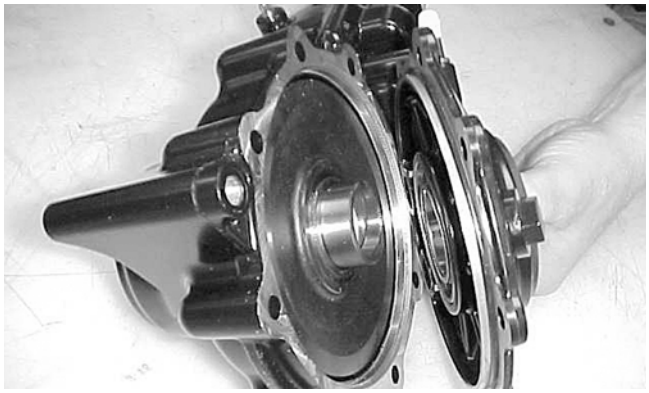


CC898

9. Making sure the O-ring is properly positioned on the differential cover, install the differential cover with existing hardware. Account for the ID tag. Tighten the cap screws to 2.9-3.5 kg-m, (21-25 ft-lb).

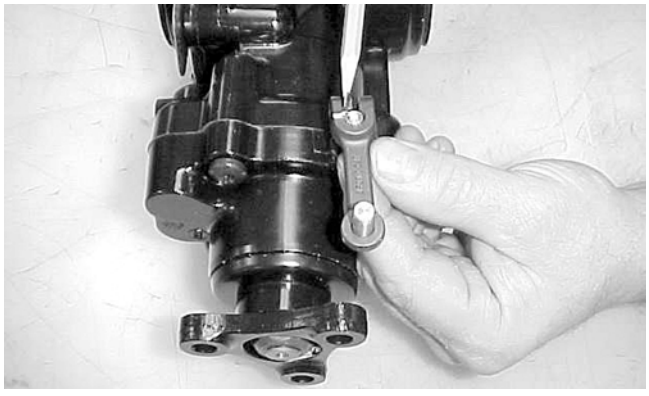
■ **NOTE: Grease can be applied to the O-ring for ease of assembling.**

■ **NOTE: If a new gear housing is being installed, tighten the cap screws to 3.5-4.3 kg-m (25-31 ft-lb).**



CC903

10. Install the selector arm making sure the marks on the splined shaft and the selector arm align. Secure with existing machine screw.



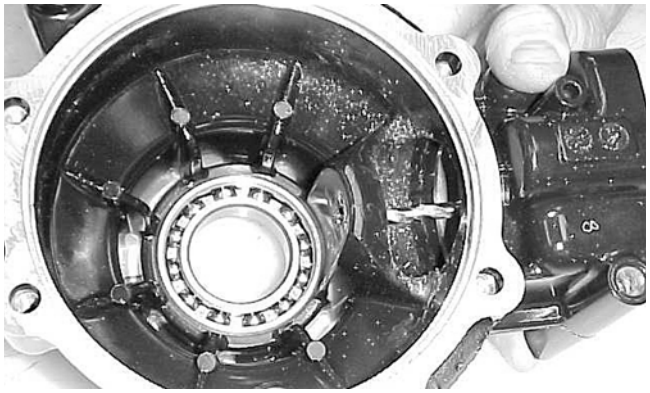
CC904

Removing Needle Bearing

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

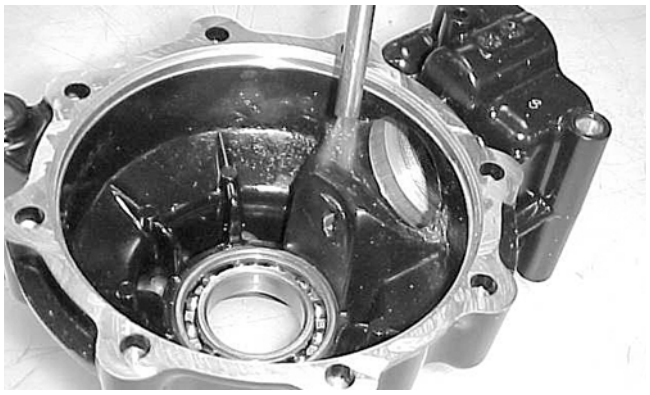
■**NOTE: This procedure can be performed on a rear FIS gear case; however, some components may vary from model to model. The technician should use discretion and sound judgment.**

1. Place a 6.35 mm (1/4 in.) drill bit on the inside surface of the needle bearing (against the bottom side); then drill through the pinion shaft needle bearing housing.



CC885

2. Using a propane torch, heat the area surrounding the needle bearing to approximately 300°.



CC886

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

CC887

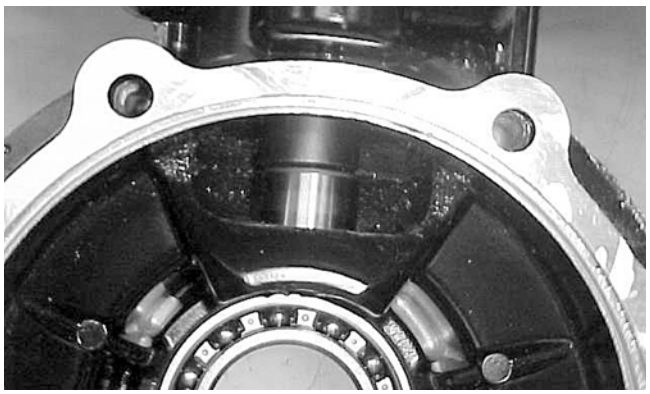
Installing Needle Bearing

1. Place the new bearing into the housing.

CC888

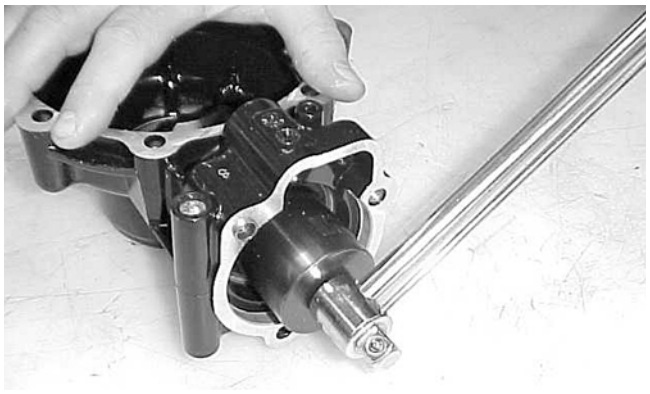
2. Using a suitable driver, install the needle bearing into the housing making sure the bearing is seated.

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



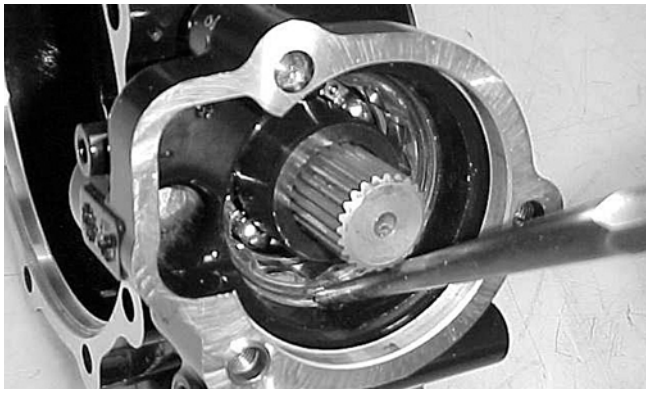
CC889

3. Install the pinion shaft and secure with the existing 48 mm nut. Tighten to 17.3 kg-m (125 ft-lb).



CC890

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



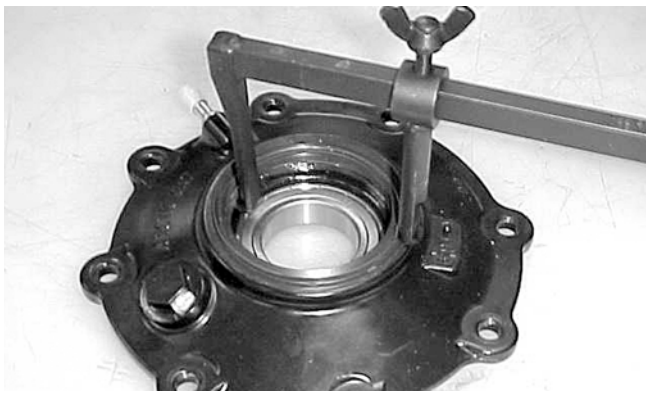
CC891

5. Install the input shaft housing.

Removing/Installing Axle Seal

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

1. Remove the seal using a seal removal tool.

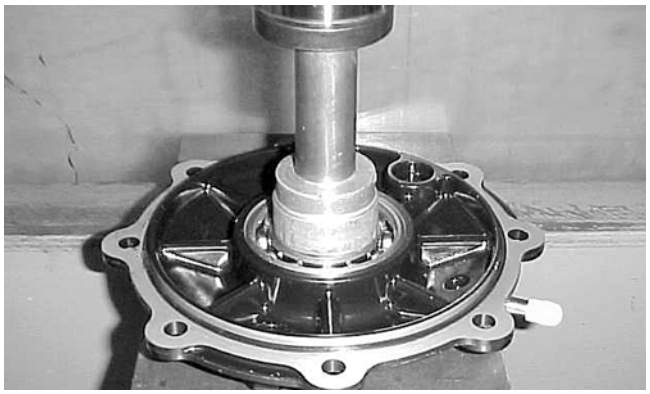


CC899

2. Using a press, remove the bearing.

CC900

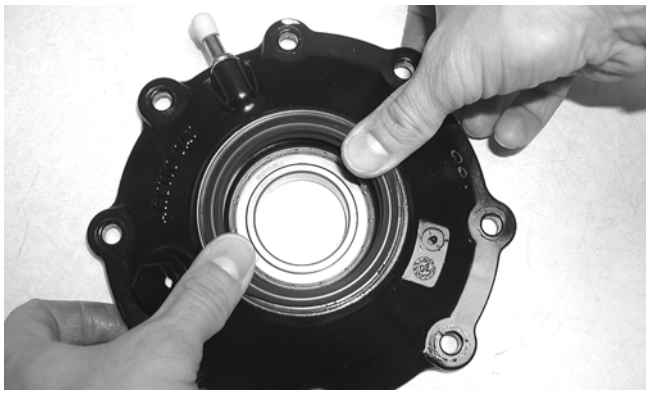
3. Using a press, install the new axle bearing into the housing.



CC901

■NOTE: Prior to installing the seal, apply grease to the seal outside diameter.

4. Install the seal into the housing pressing evenly on the outside edge until the seal is seated.



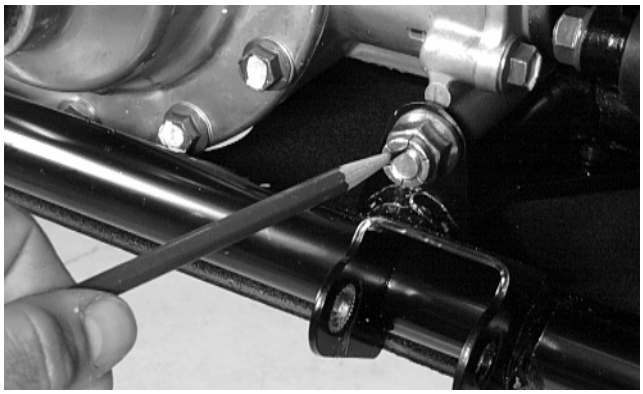
CD018

5. Repeat steps 1-4 for the opposite side.

INSTALLING DIFFERENTIAL

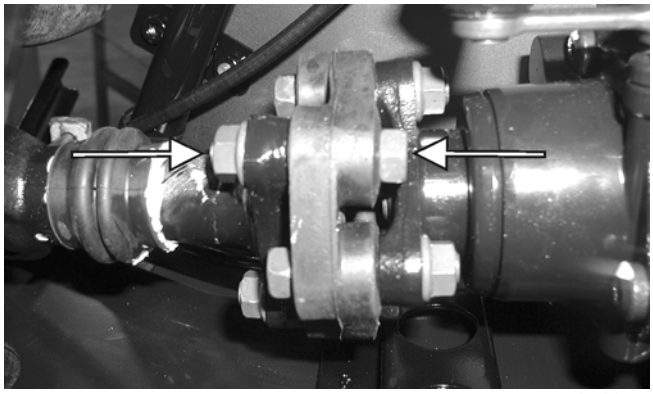
1. Place the differential into position on the frame and install the cap screws, washers, and flex-lock nuts. Tighten to 6.2 kg-m (45 ft-lb).

AF905D



AF904D

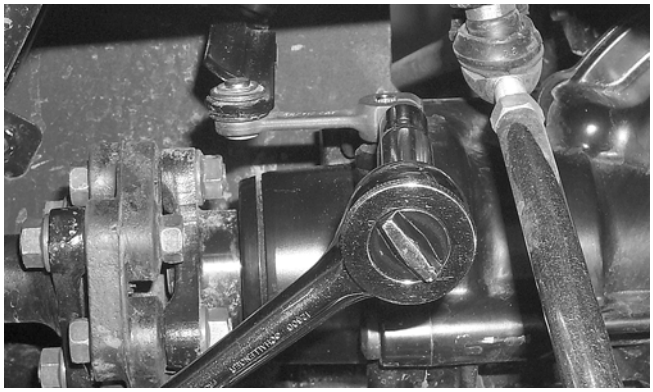
2. Secure the front driveshaft (rubber coupler) with cap screws (coated with red Loctite #271) and lock nuts. Tighten to 5.5 kg-m (40 ft-lb).



CD025A

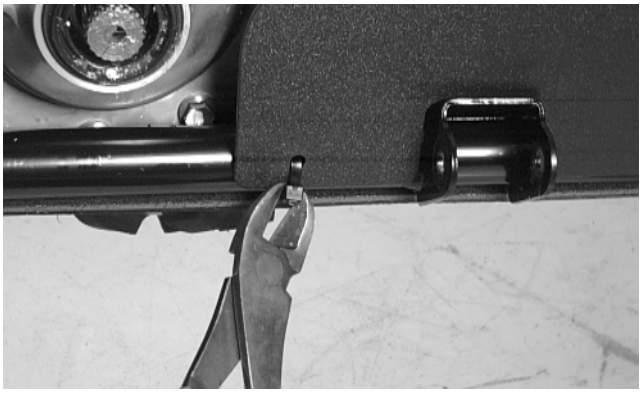
3. Pour 275 ml (9.3 fl oz) of SAE 80W-90 hypoid lubricant into the differential and install the filler plug. Tighten to 2.2 kg-m (16 ft-lb).

4. Install the selector arm making sure the marks made during removing align.



AF930

5. Install the inner fender panels.

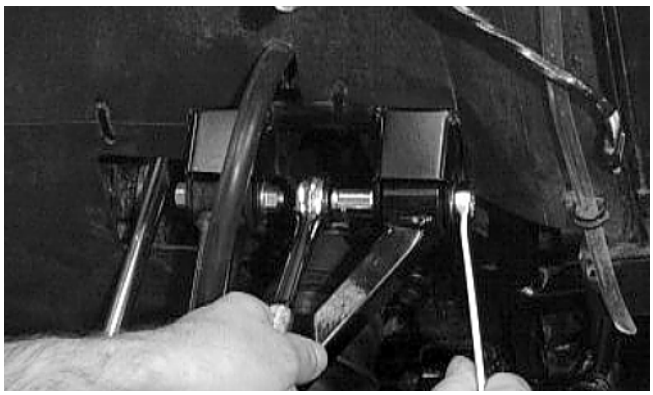


AF902D

■ **NOTE: To secure the side panels, use a torx-head screw and three cable ties per side.**

6. Install the front axles.

7. Secure the upper A-arms with cap screws and lock nuts. Tighten to 4.8 kg-m (35 ft-lb).

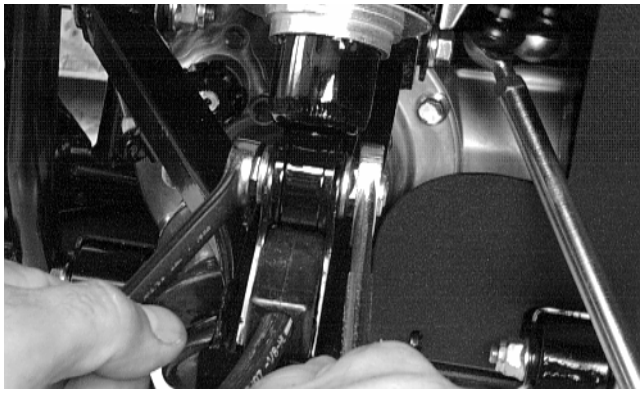


AF610D

8. Install the boot guards.

AF934

9. Secure the lower shock eyelets with cap screws and lock nuts. Tighten to 4.8 kg-m (35 ft-lb).



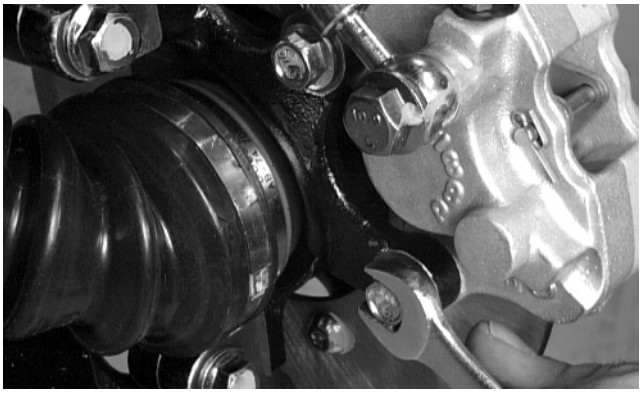
AF897D

10. Secure the tie rods with the lock nuts. Tighten securely; then install and spread the cotter pins.

AF896D

AF895D

11. Install the brake calipers. Secure with the cap screws tightened to 2.8 kg-m (20 ft-lb).



AF894D

12. Install the wheels and tighten to 5.5 kg-m (40 ft-lb).

13. Remove the ATV from the support stand.

Drive Axles

REMOVING REAR DRIVE AXLE (Fully Independent Suspension)

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

⚠ WARNING

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

2. Pump up the hand brake; then engage the brake lever lock.

3. Remove the wheel.

4. Remove the cotter pin securing the hex nut; then remove the hex nut and rubber washer. Release the brake lever lock.

CD008

5. Remove the two brake calipers (right side only).

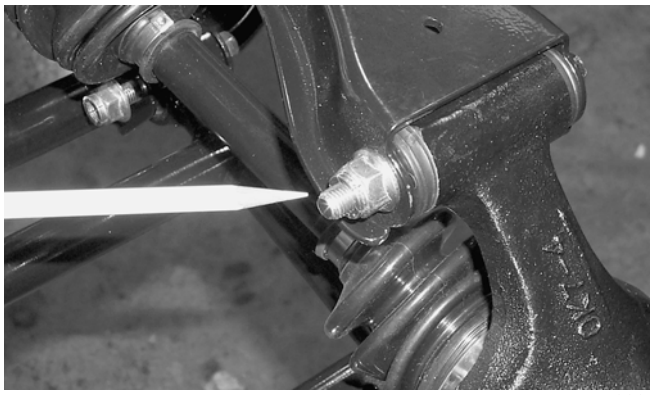
■**NOTE: Do not allow the brake calipers to hang from their cable/hose.**

⚠ 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.



AF936

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

8. While holding the drive axle stationary, pull the top of the knuckle out and down until it is free of the drive axle.

9. Place a drain pan under the ATV to contain any oil leakage; then using a slide hammer, remove the drive axle.

AF935

REMOVING FRONT DRIVE AXLE (4x4 Models)

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

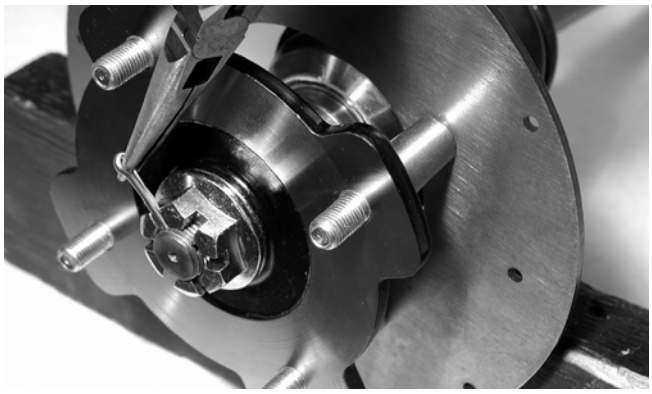
⚠ WARNING

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

2. Pump up the hand brake; then engage the brake lever lock.

3. Remove the wheel.

4. Remove the cotter pin securing the hex nut; then remove the hex nut and washer. Release the brake lever lock.



CD008

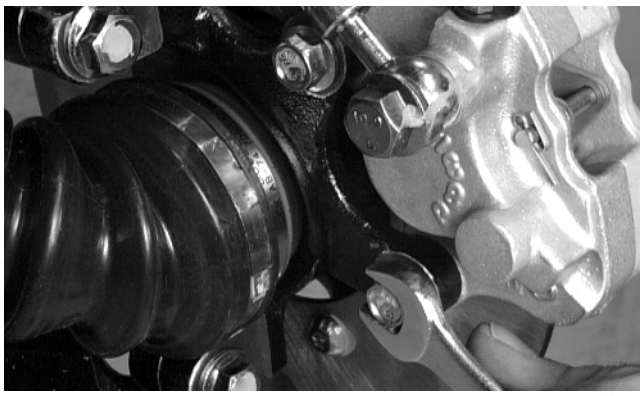
■**NOTE: It is not necessary to remove the brake hose from the caliper for this procedure.**

5. Remove the brake caliper.

■**NOTE: Support the caliper. Do not allow the caliper to hang from its hose.**

⚠ CAUTION

The caliper should be supported. If the caliper is allowed to hang from its hose, damage may occur.



AF894D

6. Slide the hub w/brake disc out of the steering knuckle and set aside.

7. Remove the tie rod from the steering knuckle.

AF896D

8. Remove the cap screw and lock nut securing the lower shock eyelet to the upper A-arm. Discard the lock nut.

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

9. Remove the cap screw securing the upper A-arm ball joint to the steering knuckle; then disengage the ball joint from the knuckle.

10. While holding the drive axle stationary, pull the top of the steering knuckle out and down until it is free of the drive axle.

11. Place a drain pan under the ATV to contain any oil leakage; then using a slide hammer, remove the drive axle.

AF899D

CLEANING AND INSPECTING

■ **NOTE: Always clean and inspect the drive axle components to determine if any service or replacement is necessary.**

1. Using a clean towel, wipe away any oil or grease from the axle components.

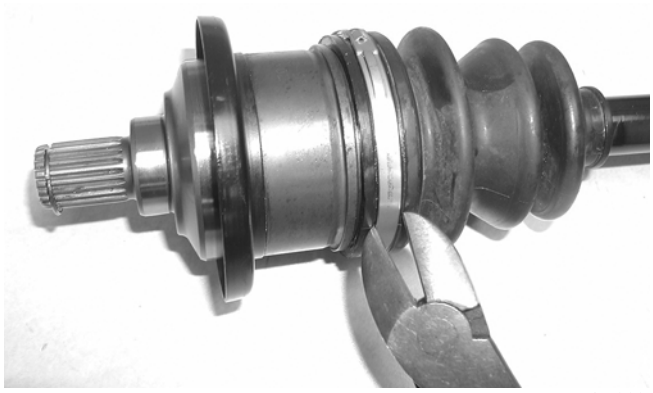
CD019

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

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

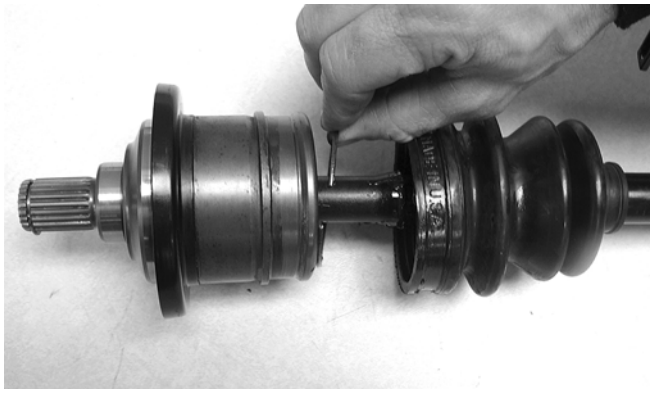
DISASSEMBLING AXLES

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



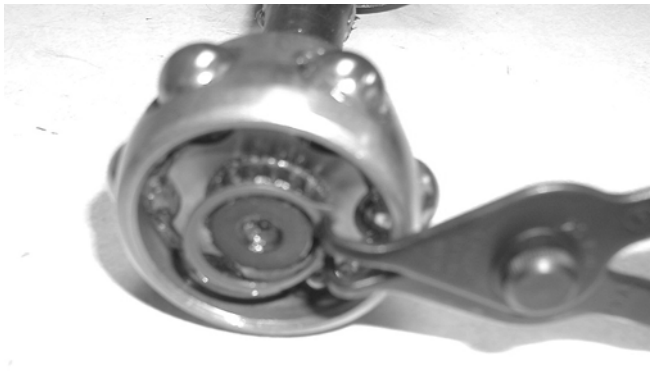
CD020

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



CD021

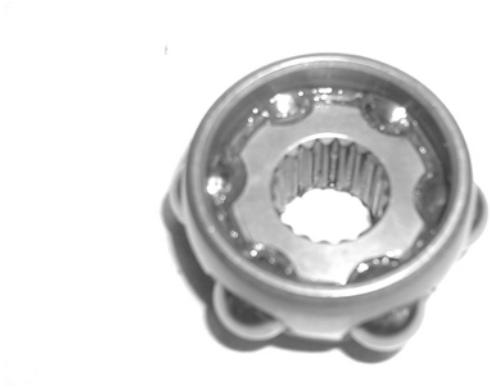
3. Using a snap ring pliers, remove the circlip securing the bearing ring to the shaft. Note the direction of the bearing for assembling purposes.



CD023

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

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

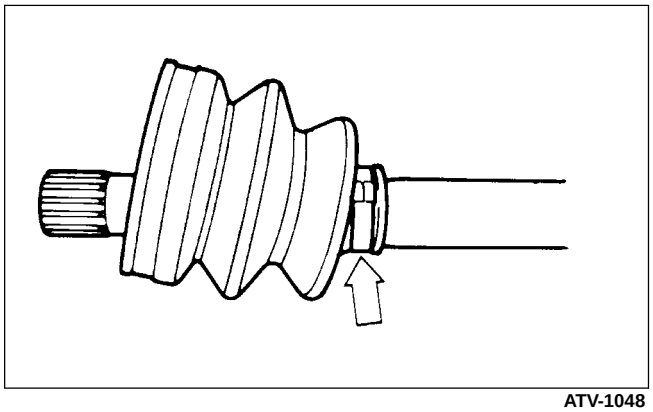


CD022

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

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

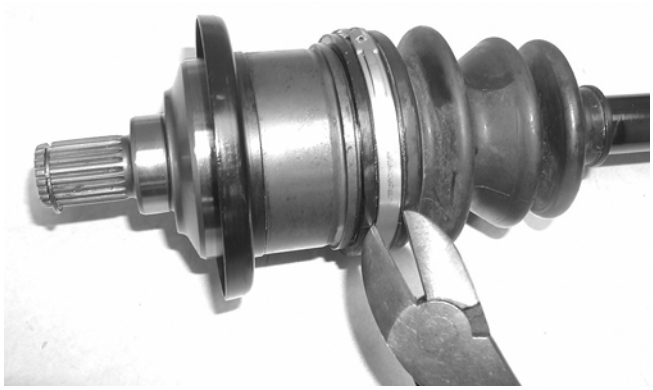
6. Using a side-cutters (or suitable substitute), remove the small clamp from the shaft.



ATV-1048

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

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



CD020

8. Apply grease from the kit into the knuckles and the new outer boot.

■ **NOTE: The large grease pack is for the inner drive axle bearing and boot assembly.**

9. Slide the new outer boot onto the shaft with the new clamps positioned as shown. Note the different-sized clamps from removal.

■ **NOTE: The boot is positioned correctly when the small end of the boot seats down into the recessed groove.**

10. Using Boot Clamp Pliers (p/n 0444-120), secure both outer boot clamps.

⚠ CAUTION

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

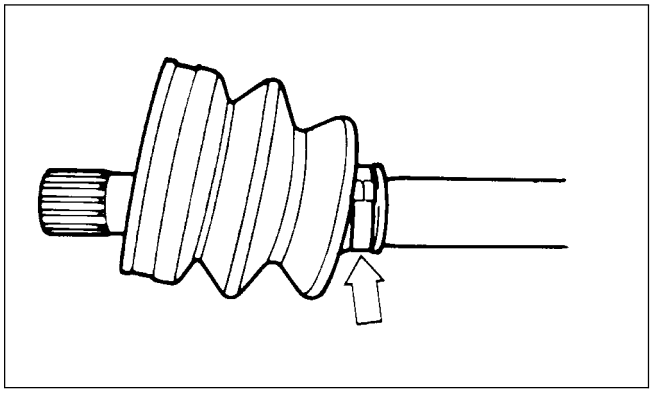
CD024

ASSEMBLING AXLES

1. Install the inner boot with the small clamp making sure the ends of the clamp are positioned correctly.

■ **NOTE: The boot is positioned correctly when the small end of the boot seats down into the recessed groove.**

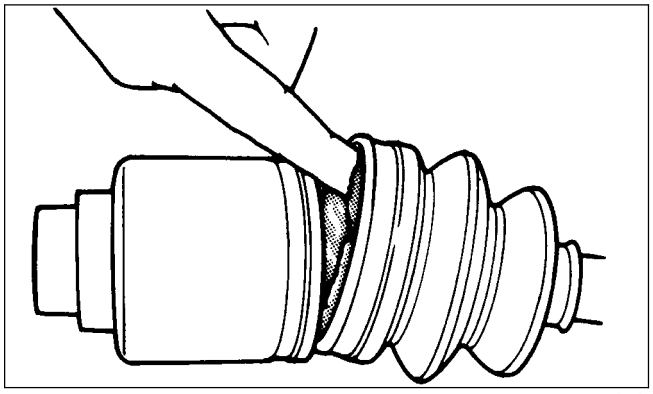
2. Using the boot clamp pliers, secure the small clamp of the inner boot.



ATV-1048

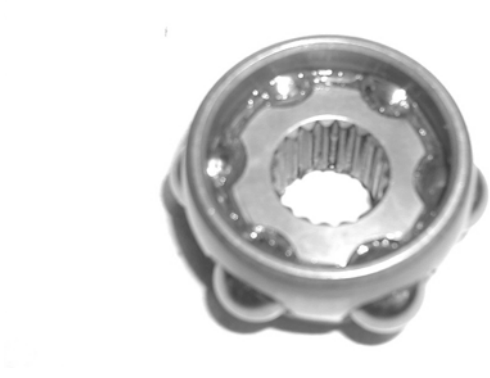
3. Apply grease from the kit onto the bearing ring making sure grease is on both the inner and outer sides; then apply the remainder of the grease into the housing and boot.

■**NOTE: The large grease pack is for the inner drive axle bearing and boot assembly.**



ATV-1052

4. Install the bearing onto the shaft making sure the recess of the bearing is facing the housing.

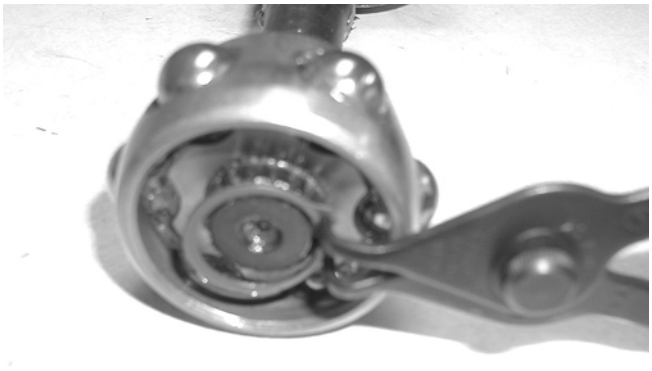


CD022

⚠ CAUTION

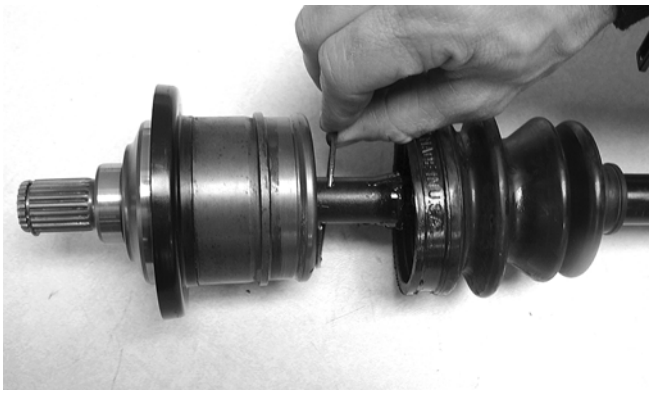
The bearing ring must go onto the shaft with the side without splines facing toward the small clamp of the inner boot or severe damage will result.

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



CD023

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



CD021

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

CD024

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

INSTALLING REAR DRIVE AXLE (Fully Independent Suspension)

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.**

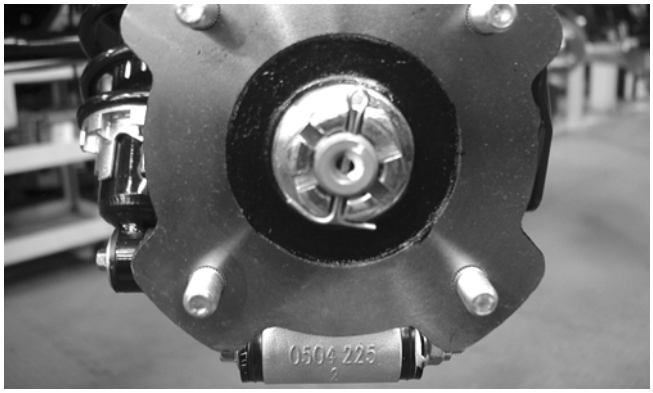
2. Swing the knuckle up and onto the drive axle; then place the knuckle into place in the upper A-arm. Secure the knuckle to the A-arm with a cap screw and a new lock nut. Tighten to 4.8 kg-m (35 ft-lb).

3. Place the hub into position on the axle followed by a washer and hex nut. Tighten the hex nut finger-tight at this time.

4. If the brake calipers were removed, position them on the knuckle and secure with existing cap screws. Tighten the auxiliary brake caliper cap screws to 2.1 kg-m (15 ft-lb). Tighten the hydraulic brake caliper cap screws to 2.8 kg-m (20 ft-lb).

5. Pump up the hand brake lever; then engage the brake lever lock.

6. Tighten the hub hex nut (from step 3) to 10.4 kg-m (75 ft-lb); then install and spread a new cotter pin making sure each side of the pin is flush to the hub nut.



CD027

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

8. Remove the ATV from the support stand and release the brake lever lock.

9. Check the engine/transmission oil level and add oil as necessary.

INSTALLING FRONT DRIVE AXLE (4x4 Models)

1. Position the drive axle in the gear case and steering knuckle; then insert the upper A-arm ball joint into the steering knuckle. Secure with a cap screw tightened to 4.8 kg-m (35 ft-lb).

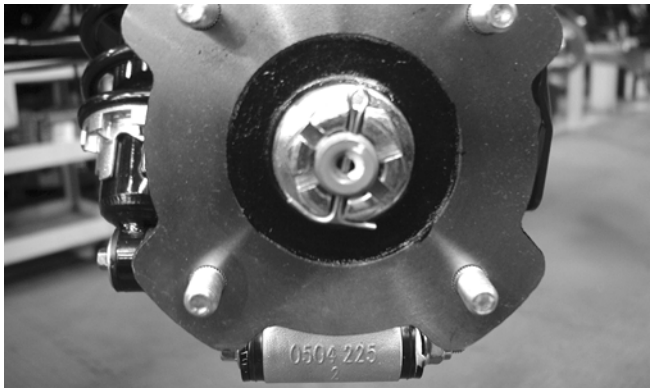
2. Place the brake hose into position on the upper A-arm; then secure the lower shock eyelet to the A-arm with a cap screw and a new lock nut. Tighten to 4.8 kg-m (35 ft-lb).

3. Secure the tie rod to the steering knuckle with a new lock nut. Tighten securely; then install and spread a new cotter pin.

4. Slide the hub w/brake disc into position in the steering knuckle followed by a washer and hex nut. Tighten finger-tight at this time.

5. Install the brake caliper on the steering knuckle. Tighten to 2.8 kg-m (20 ft-lb); then pump up the hand brake lever and engage the brake lever lock.

6. Tighten the hub hex nut (from step 4) to 10.4 kg-m (75 ft-lb); then install and spread a new cotter pin making sure each side of the pin is flush to the hub nut.

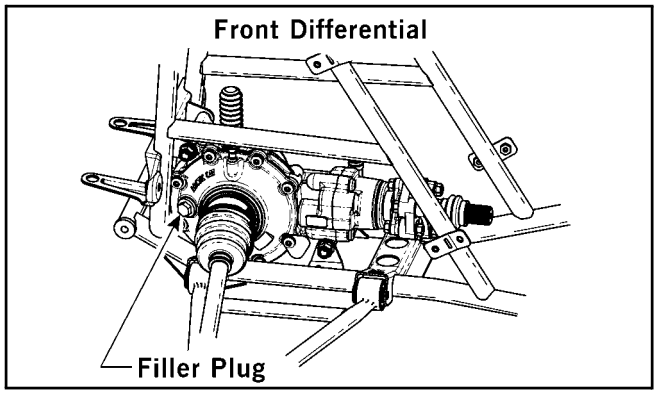


CD027

7. Install the wheel and tighten to 5.5 kg-m (40 ft-lb).

8. Remove the ATV from the support stand and release the brake lever lock.

9. Check the front differential oil level and add oil as necessary.



0736-568

ACT - Rear Suspension

REMOVING

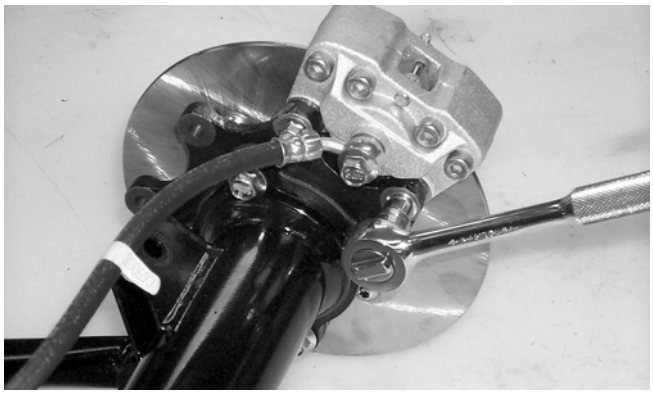
1. Place the ATV on a support stand (positioned just in front of and behind the footrest on each side) so the wheels are off the floor.

⚠ WARNING

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

2. Remove the rear wheels.

3. Remove the cap screws securing the brake calipers to the bearing housing; then remove the calipers and lay aside.



CC783

⚠ CAUTION

Care should be taken not to damage the brake cable/hose when laying the calipers aside. Do not allow the calipers to hang from the brake cable/hose.

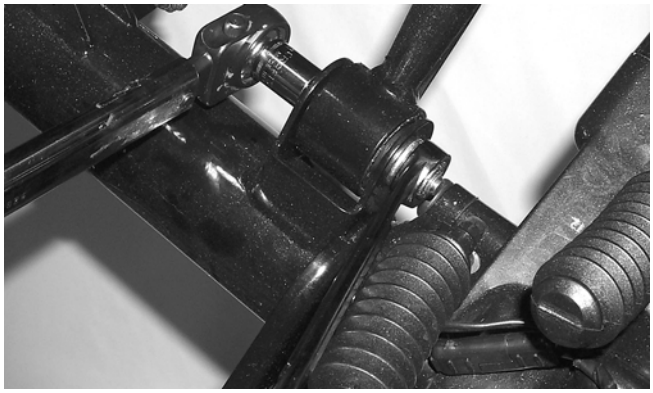
4. Remove the lower shock absorber cap screws and hex nuts; then disengage the shock absorbers from the axle housings.

⚠ CAUTION

Ensure that the rear gear case is properly supported BEFORE removing the shock absorber assemblies.

AF772D

5. Remove the four cap screws and nuts securing the rear of the swing arm(s) to the axle housing.

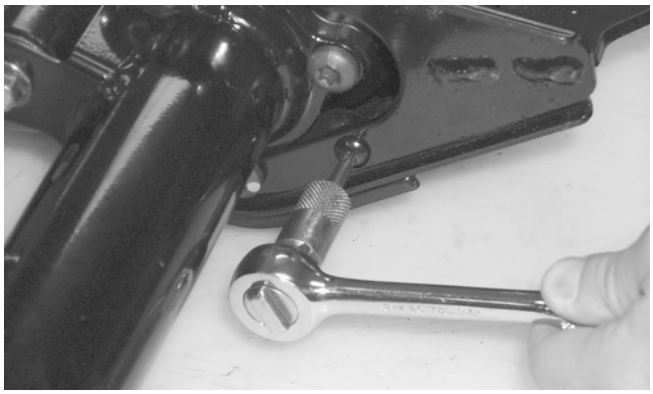


AF697D

6. Maneuver the axle assembly rearward allowing the propeller shaft to disengage and the final drive boot to separate from the drive housing.

DISASSEMBLING

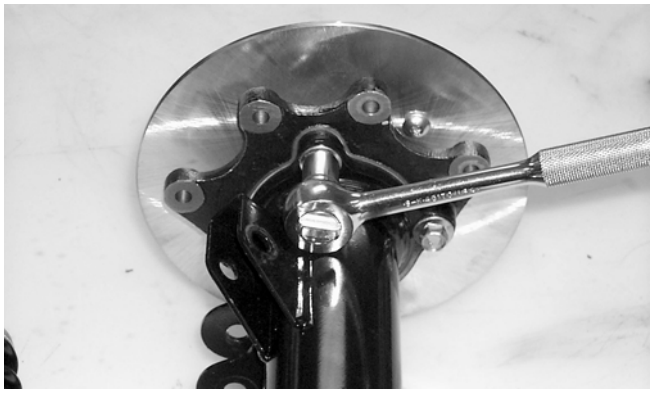
1. Remove the cap screws securing the gear case panel; then remove the panel from the gear case.



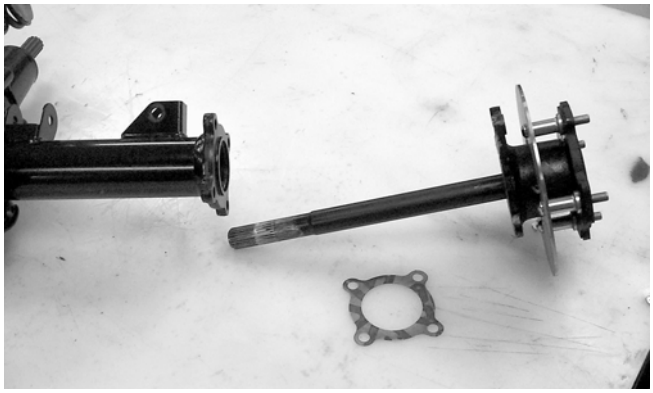
CC762

CC763

2. Remove the cap screws securing the axle assembly to the axle housing; then remove the axle assembly from the housing. Account for a gasket.

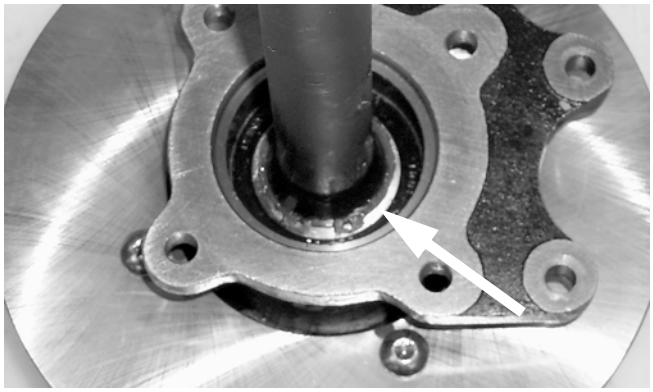


CC764



CC765

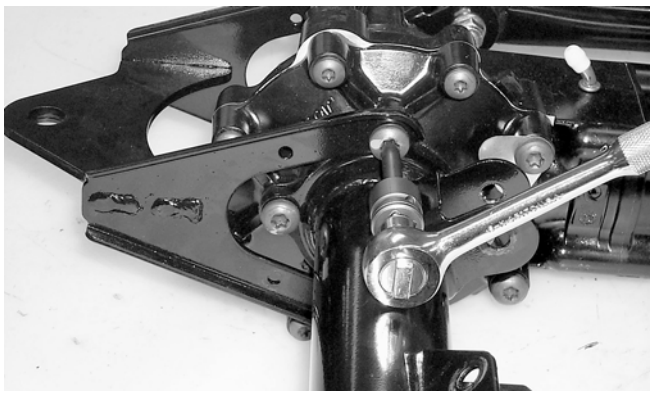
3. Remove the snap ring securing the bearing housing to the axle shaft; then slide the bearing housing off the shaft.



CC768A

4. Remove the four cap screws securing the hitch to the gear case; then remove the hitch.

■ **NOTE: Note that these cap screws are 37 mm (1.5 in.) in length for installing purposes.**



CC769

5. Remove the two cap screws securing each axle housing to the gear case.

■ **NOTE: Note that these cap screws are 33 mm (1.3 in.) in length for installing purposes.**

CC770

6. Remove the axle housing from the gear case. Account for a gasket.

CC771

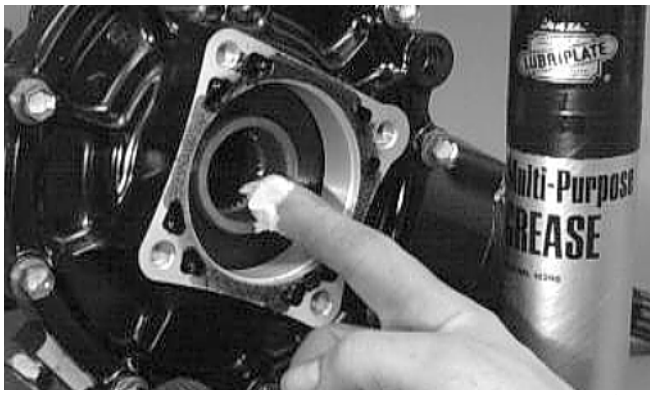
CLEANING AND INSPECTING

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

1. Clean all external components.
2. Inspect the case for leaks or damage.
3. Inspect splines for wear.
4. Inspect the seal for damage.
5. Inspect housing mounting bosses for wear or elongated holes.
6. Inspect the frame welds for cracking or bending.
7. Inspect the rear drive and plug threads for stripping or damage.
8. Inspect the axle bearings. Rotate the bearings by hand, and if any roughness or binding is noted, replace the bearings.

ASSEMBLING

1. Grease the splines of the ring gear.



AF705D

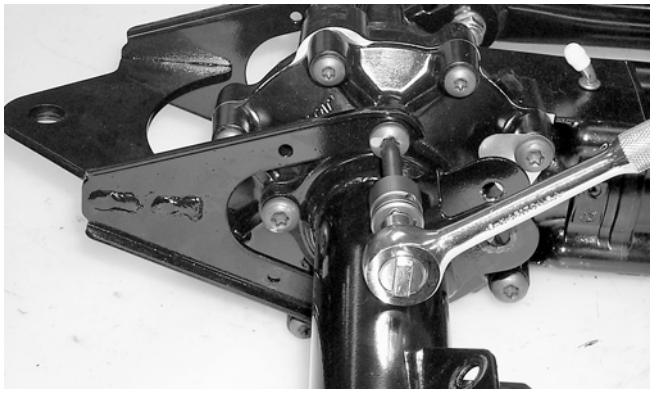
2. Make sure the rear gear case/axle housing O-ring is properly positioned; then secure the axle housing to the rear gear case with two 33 mm (1.3 in.) cap screws. Tighten to 4.3-5.3 kg-m (31-38 ft-lb).

■ **NOTE: If a new gear housing is being installed,tighten the cap screws to 5.1-6.3 kg-m (37-45.5 ft-lb).**

CC770

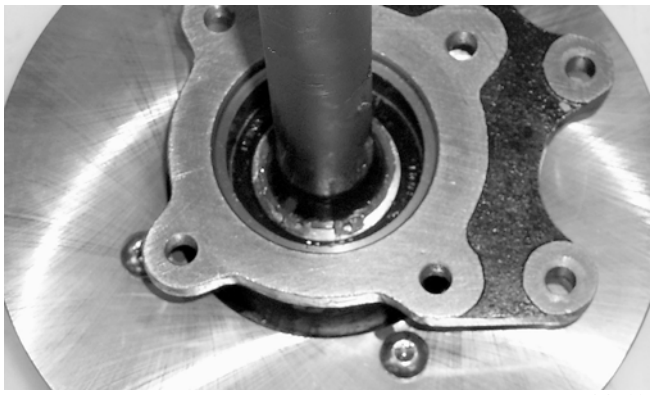
3. Secure the axle housing to the rear gear case with four 37 mm (1.5 in.) cap screws. Tighten to 4.3-5.3 kg-m (31-38 ft-lb).

■ **NOTE: If a new gear housing is being installed, tighten the cap screws to 5.1-6.3 kg-m (37-45.5 ft-lb).**



CC769

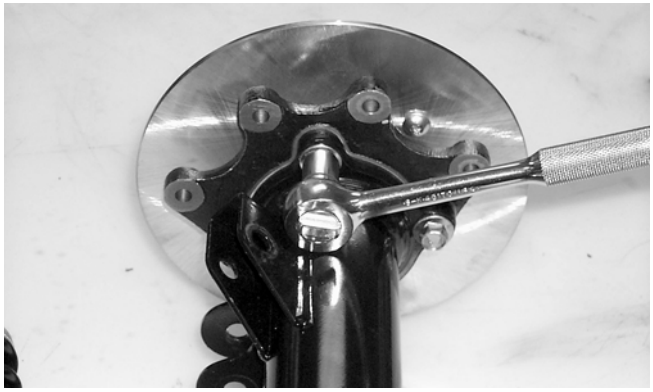
4. Lightly grease the bearing housing seal; then slide the bearing housing onto the axle shaft. Secure with the snap ring.



CC768

5. Place the axle gasket on the axle housing. Rotate the axle shaft slightly to ensure proper engagement with the gear case splines.

6. Rotate the bearing housing until the brake caliper mounting holes are on the top side; then secure the axle retainer assembly/axle assembly to the axle housing with four cap screws. Tighten to 5.5 kg-m (40 ft-lb).

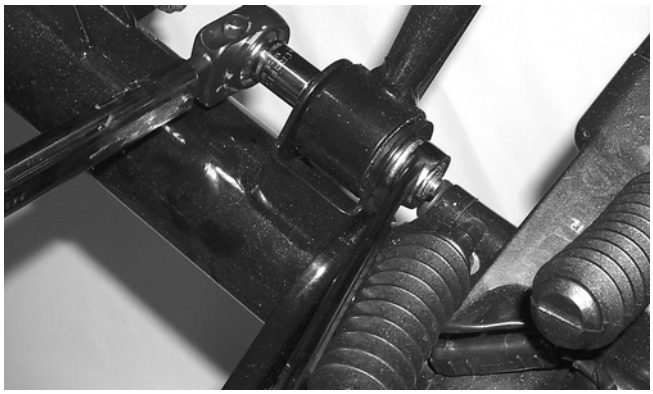


CC764

INSTALLING

1. Maneuver the axle assembly forward making sure propeller shaft splines engage properly and the final drive boot is positioned over the drive housing.

2. Place the rear of the swing arm(s) into position on the axle housings and case; then secure with four cap screws and hex nuts. Tighten to 4.8 kg-m (35 ft-lb).



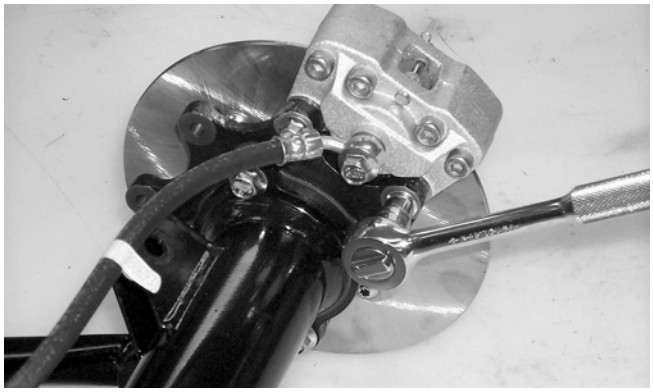
AF697D

3. Place the shock absorber into the frame mounts and secure using the cap screws and hex nuts tightened to 4.8 kg-m (35 ft-lb).

⚠ CAUTION

Do not tighten nuts beyond the 4.8 kg-m (35 ft-lb) specification or the shock eyelet or mount WILL be damaged.

4. Place the brake calipers into position on the axle retainer assembly; then secure with the cap screws. Tighten the auxiliary caliper to 2.1 kg-m (15 ft-lb) and the hydraulic caliper to 2.8 kg-m (20 ft-lb).

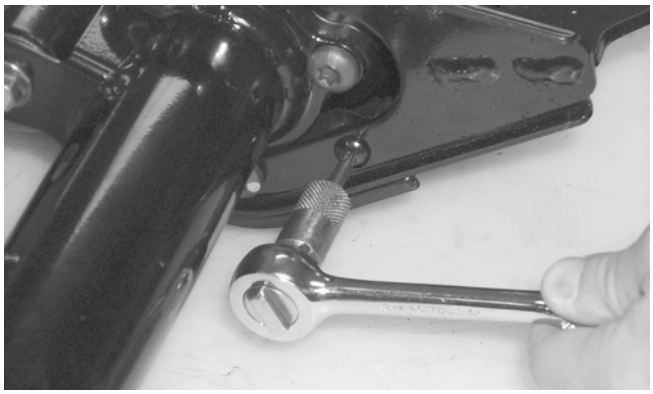


CC783

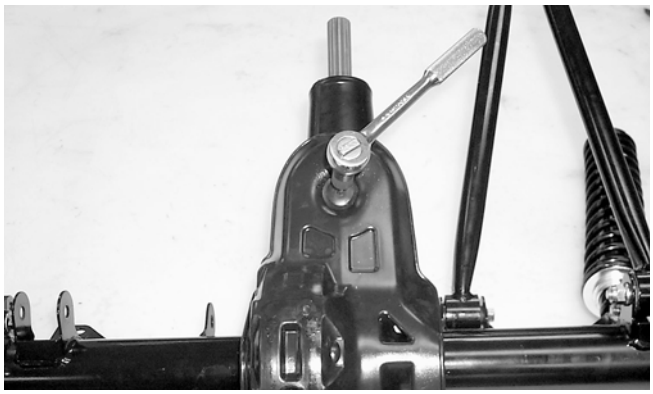
⚠ CAUTION

Care should be taken not to damage or kink the brake cable/hose when installing the calipers.

5. Place the gear case panel into position and secure with the three cap screws. Tighten securely.



CC762



CC763

6. Install the wheels and tighten to 5.5 kg-m (40 ft-lb).

7. Remove the ATV from the support stand.

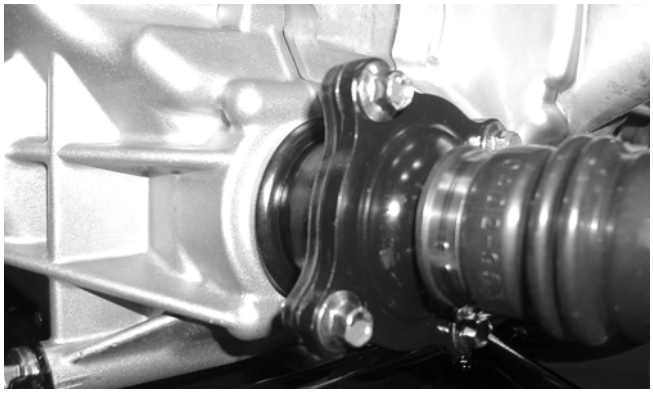
■ **NOTE: Check all fasteners for tightness and check the brakes for proper operation before test riding.**

6

Rear Gear Case
(400/500 FIS Models)

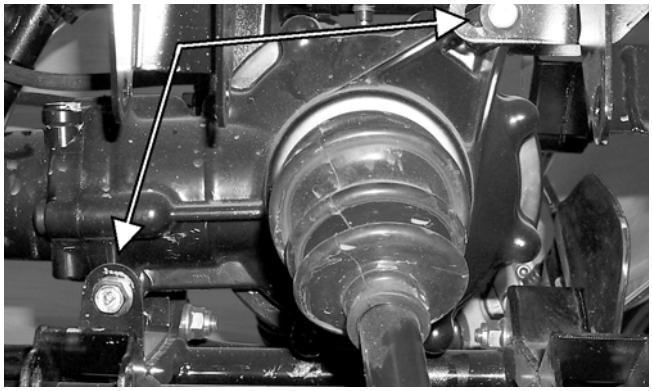
REMOVING

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 on FIS models, see Front Differential (FIS Models) in this section.

INSTALLING

1. Slide the gear case into position through the left side of the frame; then secure it to the frame with cap screws and lock nuts. Tighten to 4.3-5.3 kg-m (31-38 ft-lb).

■ NOTE: If a new gear housing is being installed, tighten the cap screws to 5.1-6.3 kg-m (37-45.5 ft-lb).

2. Secure the engine output shaft to the rear gear case input flange with three cap screws (coated with red Loctite #271) and lock nuts. Tighten to 4.8 kg-m (35 ft-lb).
3. Install the rear drive axles (see Drive Axles in this section).
4. Install the left-side rear A-arms (see Rear A-Arms in Section 7).

Hub

REMOVING

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

⚠ WARNING

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

2. Remove the cotter pin from the nut.

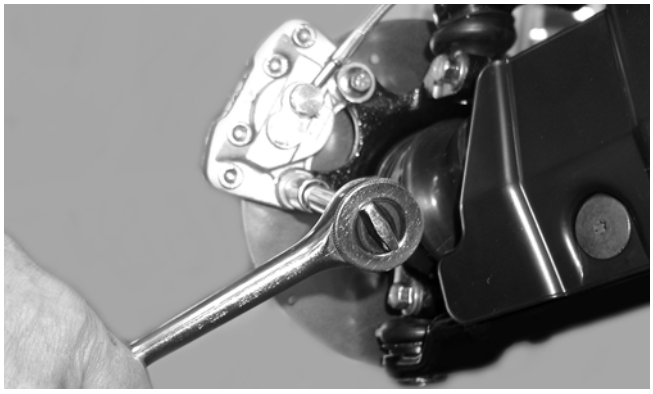
■ NOTE: During assembly, new cotter pins should be installed.

CD008

3. Remove the nut securing the hub. Account for a washer and a hub seal.

CD010

4. Remove the brake caliper.



CD007

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

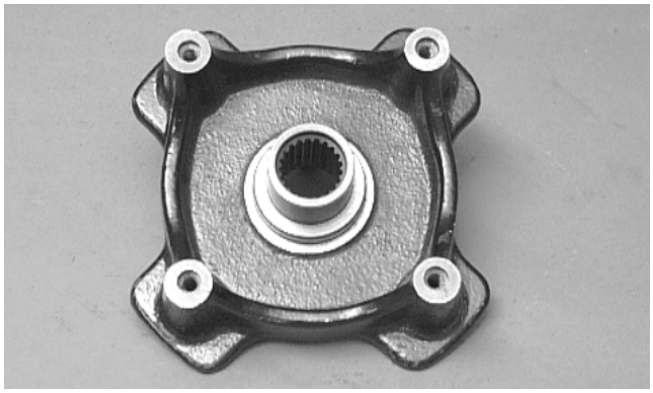
CLEANING AND INSPECTING

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

1. Clean all hub components.
2. Inspect all threads for stripping or damage.
3. Inspect the brake disc for cracks or warping.
4. Inspect the sealing area of the hub for pits.
5. Inspect the hub splines for signs of wear.
6. Inspect the hub for cracks.

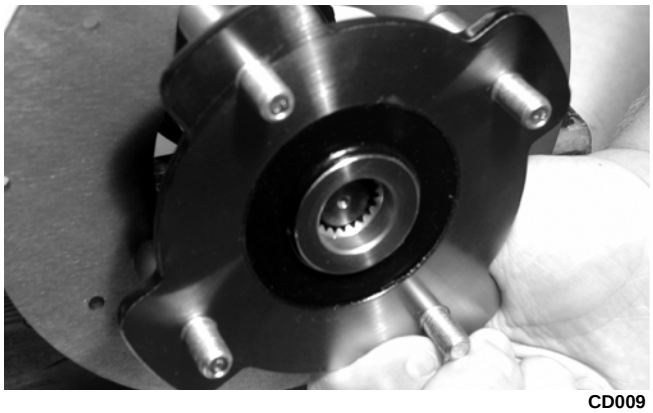
INSTALLING

1. Secure the brake disc to the hub with the four cap screws coated with blue Loctite #243. Tighten to 2.1 kg-m (15 ft-lb).
2. Apply grease to hub sealing area and on the splines.



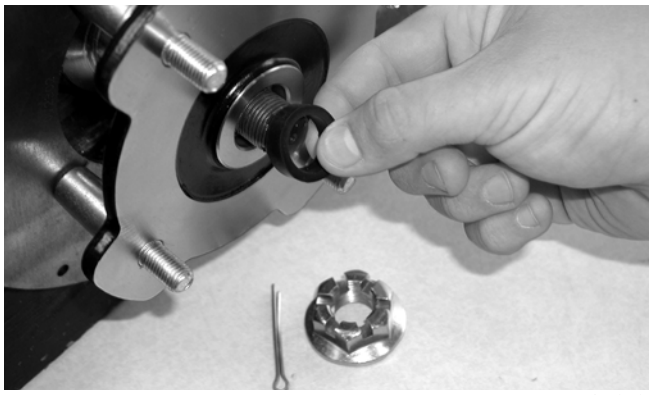
AF736D

3. Install the hub assembly onto the splines of the shaft.



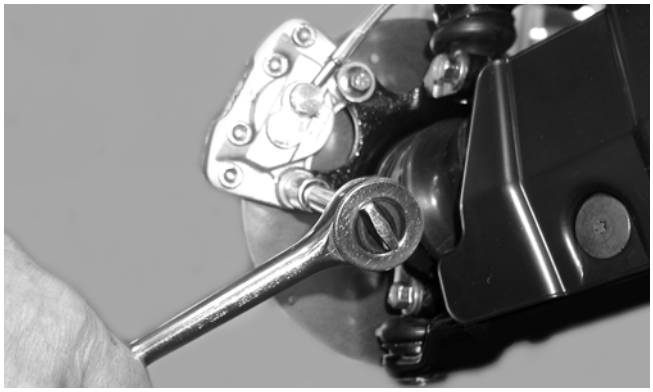
CD009

4. Insert the hub seal onto the shaft; then position it into the hub.



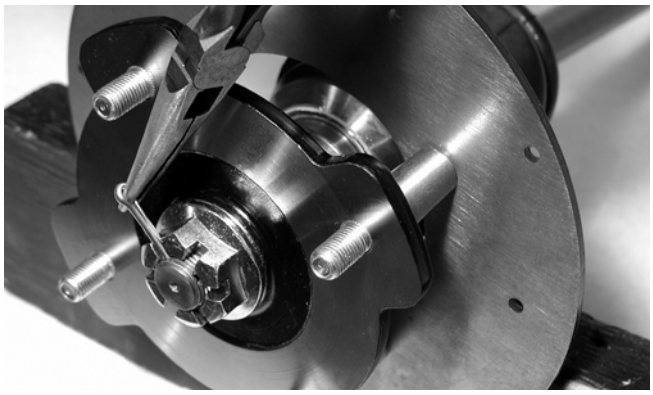
CD010

5. Place the washer onto the shaft; then secure the hub assembly with the nut. Tighten only until snug.
6. Secure the brake caliper to the knuckle with the two cap screws. Tighten the auxiliary caliper to 2.1 kg-m (15 ft-lb). Tighten the hydraulic caliper to 2.8 kg-m (20 ft-lb).



CD007

7. Tighten the hub nut (from step 5) to 10.4 kg-m (75 ft-lb); then install and spread a new cotter pin making sure each side of the pin is flush to the hub nut.



CD008

8. Install the wheel and tighten to 5.5 kg-m (40 ft-lb).

CD006

9. Remove the ATV from the support stand.

Hydraulic Brake Caliper

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

REMOVING/DISASSEMBLING

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

⚠ WARNING

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

2. Drain the brake fluid from the entire hydraulic system (reservoir, hoses, and caliper).

AF637D

⚠ CAUTION

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

3. Remove the brake hose from the caliper; then remove the caliper.

AF636D

CLEANING AND INSPECTING

1. Clean all caliper components (except the brake pads) with parts-cleaning solvent.
2. Inspect the brake pads for damage and excessive wear.

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

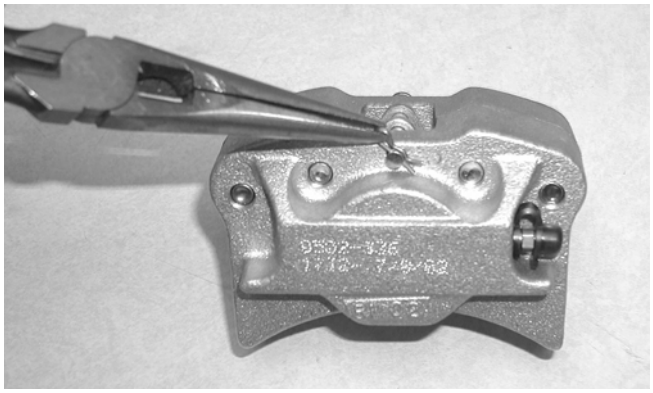
ASSEMBLING/INSTALLING

1. Push the pistons into the caliper as far as they will go to allow clearance for the brake pads.

⚠ CAUTION

Care should be taken that the piston and cylinder are not scratched.

2. Install the brake pads and secure with the pin and cotter pin.



CD029

3. Place the brake caliper assembly into position and secure with the cap screws. Tighten the caliper to 2.8 kg-m (20 ft-lb).

4. Place a new crush washer on each side of the brake hose fitting and install it on the caliper. Tighten to 4.2 kg-m (30 ft-lb).

5. Fill the reservoir; then bleed the brake system (see Section 2).

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

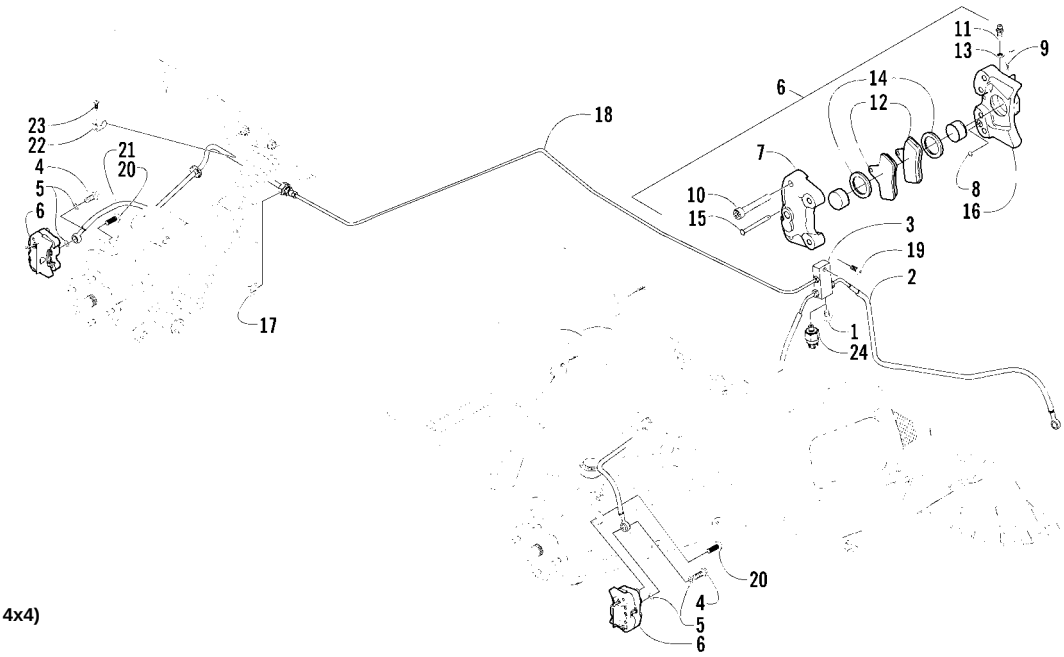
CD006

7. Remove the ATV from the support stand and verify brake operation.

Hydraulic Brake Assembly Schematics

250/300

KEY
1. Plug (250/300 2x4)
2. Hose - Front
3. Junction Block
4. Oil Bolt
5. Crush Washer
6. Caliper
7. Housing
8. O-Ring
9. Cotter Pin
10. Socket-Head Screw
11. Bleeder Valve Cap
12. Brake Pad
13. Bleeder Valve
14. O-Ring
15. Pin
16. Housing
17. Clip
18. Tube - Rear
19. Machine Screw
20. Cap Screw
21. Hose - Rear
22. Clamp
23. Machine Screw
24. Pressure Switch (300 4x4)

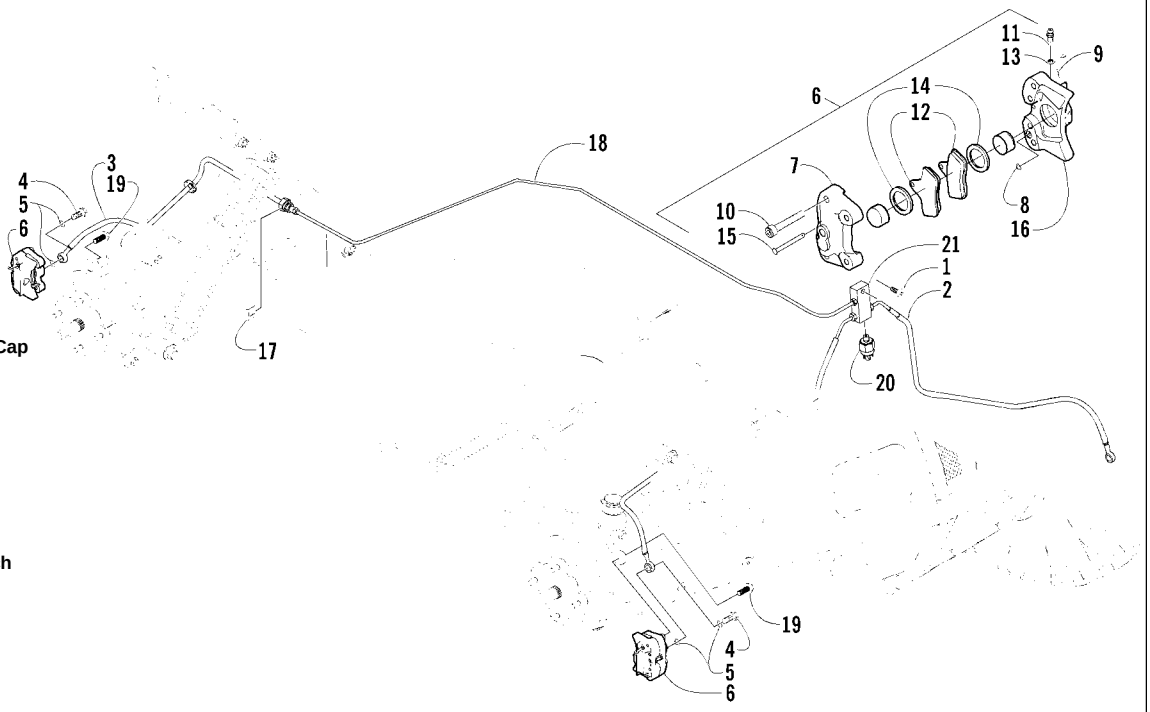


0737-751

400/500 FIS

KEY

1. Cap Screw
2. Hose - Front
3. Hose - Rear
4. Oil Bolt
5. Crush Washer
6. Caliper
7. Housing
8. O-Ring
9. Cotter Pin
10. Cap Screw
11. Bleeder Valve Cap
12. Brake Pad
13. Bleeder Valve
14. O-Ring
15. Pin
16. Housing
17. Clip
18. Tube - Rear
19. Cap Screw
20. Pressure Switch
21. Junction Block

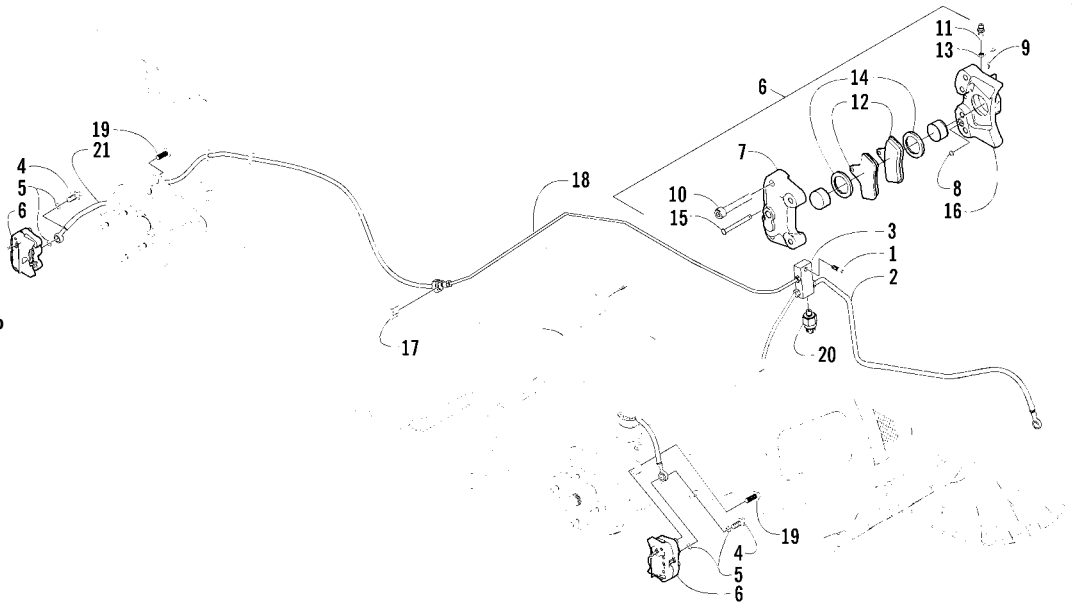


0737-869

400/500 ACT

KEY

1. Cap Screw
2. Front Hose
3. Junction Block
4. Oil Bolt
5. Crush Washer
6. Caliper Assy
7. Housing
8. O-Ring
9. Cotter Pin
10. Cap Screw
11. Bleeder Valve Cap
12. Brake Pad
13. Bleeder Valve
14. O-Ring
15. Pin
16. Housing
17. Clip
18. Rear Tube
19. Cap Screw
20. Pressure Switch
21. Rear Hose



0737-568

SECTION 7 - SUSPENSION

7

TABLE OF CONTENTS

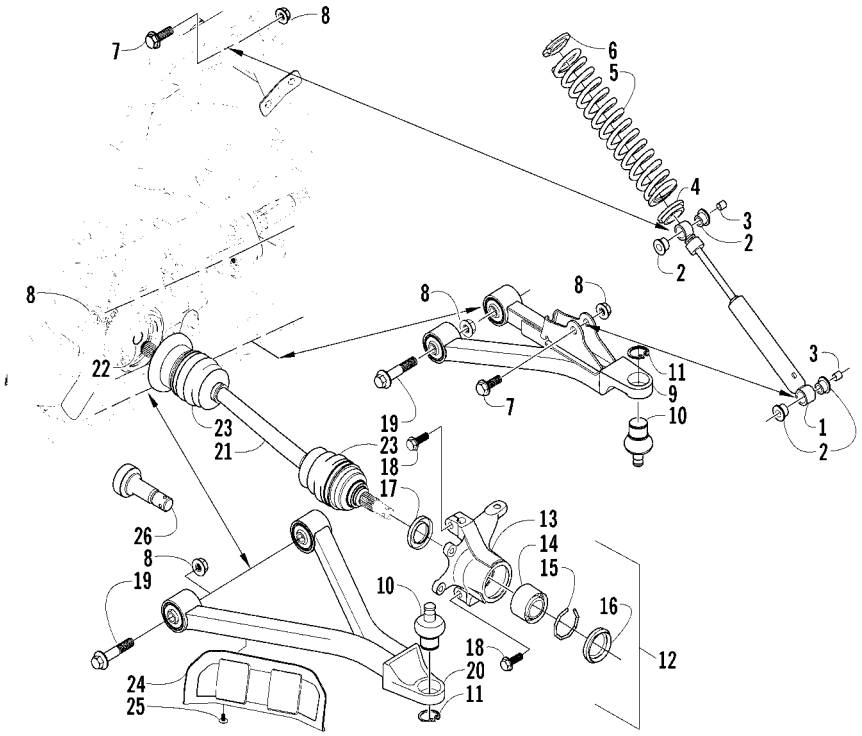
Back to TOC

Front and Rear Suspension Assembly Schematics

250/300 - FRONT

KEY

1. Shock Absorber
2. Bushing
3. Sleeve
4. Retainer
5. Spring
6. Retainer
7. Cap Screw
8. Lock Nut
9. A-Arm Assy
10. Ball Joint
11. Ball Joint Clip
12. Knuckle Assy
13. Knuckle
14. Bearing
15. Bearing Clip
16. Seal
17. Seal
18. Cap Screw
19. Cap Screw
20. A-Arm
21. Drive Axle (4x4)
22. Clip (4x4)
23. Boot Repair Kit (4x4)
24. Boot Guard (4x4)
25. Body Screw
26. Stub Axle (2x4)

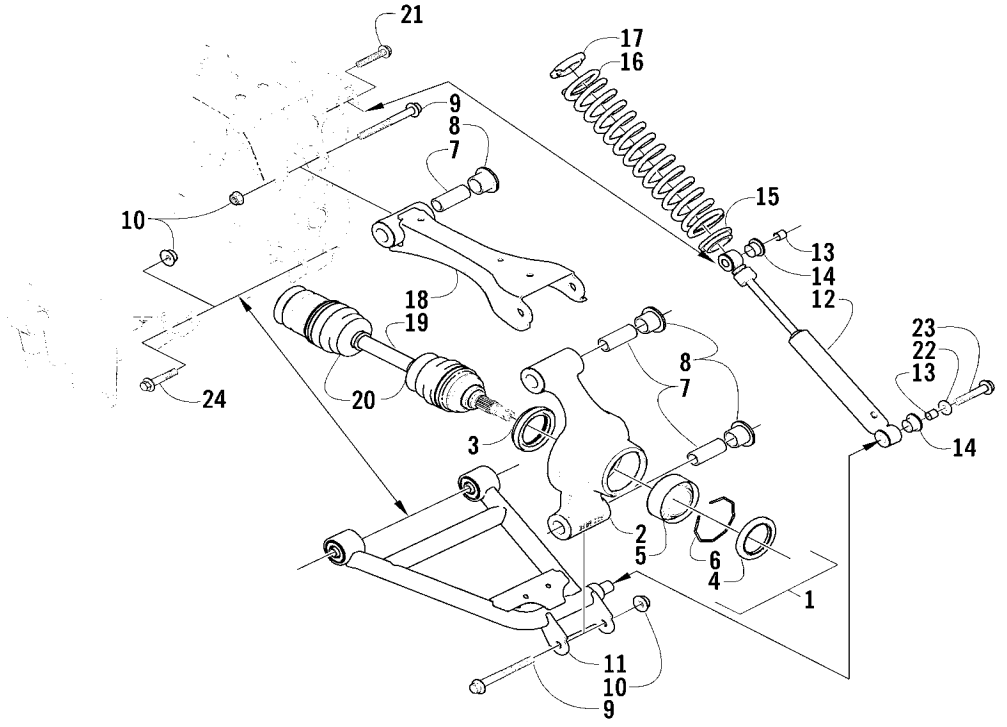


0737-469

250/300 - REAR

KEY

1. Knuckle Assy
2. Knuckle
3. Seal
4. Seal
5. Wheel Hub Bearing
6. Bearing Clip
7. Collar
8. Bushing
9. Cap Screw
10. Lock Nut
11. A-Arm
12. Shock Absorber
13. Sleeve
14. Bushing
15. Spring Retainer
16. Spring
17. Retainer
18. Rear Arm
19. Drive Axle
20. Boot Repair Kit
21. Cap Screw
22. Washer
23. Cap Screw
24. Cap Screw



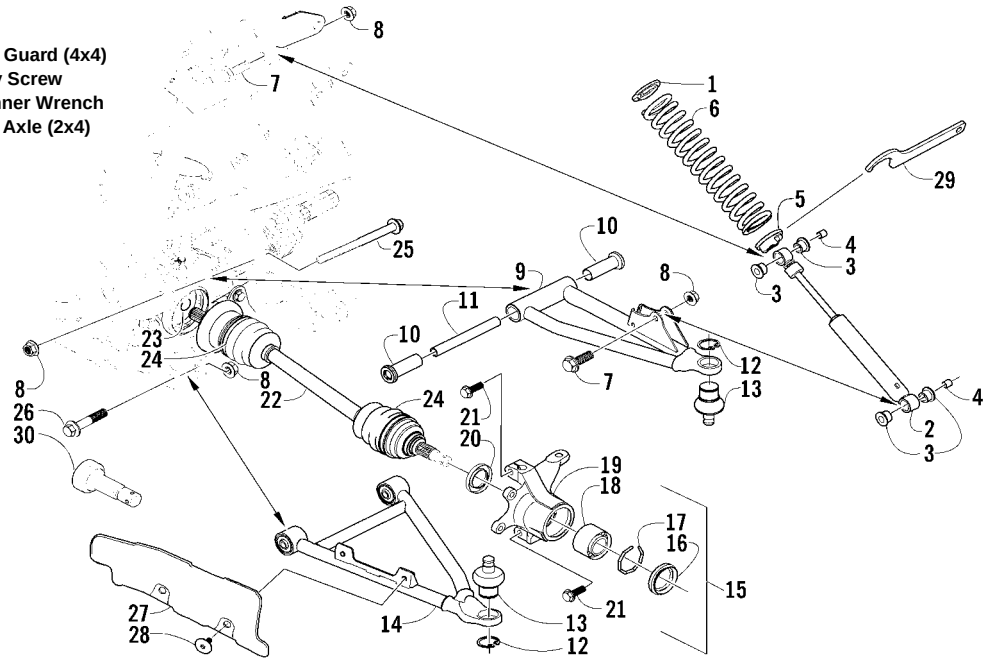
0737-498

Back to TOC Back to Section TOC Next

400/500 - FRONT

KEY

1. Retainer
2. Shock Absorber
3. Bushing
4. Sleeve
5. Adjuster Cam
6. Spring
7. Cap Screw
8. Lock Nut
9. A-Arm Assy
10. Bushing
11. Collar
12. Ball Joint Clip
13. Ball Joint
14. A-Arm
15. Knuckle Assy
16. Seal
17. Bearing Clip
18. Wheel Hub Bearing
19. Knuckle
20. Seal
21. Cap Screw
22. Drive Axle (4x4)
23. Clip (4x4)
24. Boot Repair Kit (4x4)
25. Cap Screw
26. Cap Screw
27. Boot Guard (4x4)
28. Body Screw
29. Spanner Wrench
30. Stub Axle (2x4)

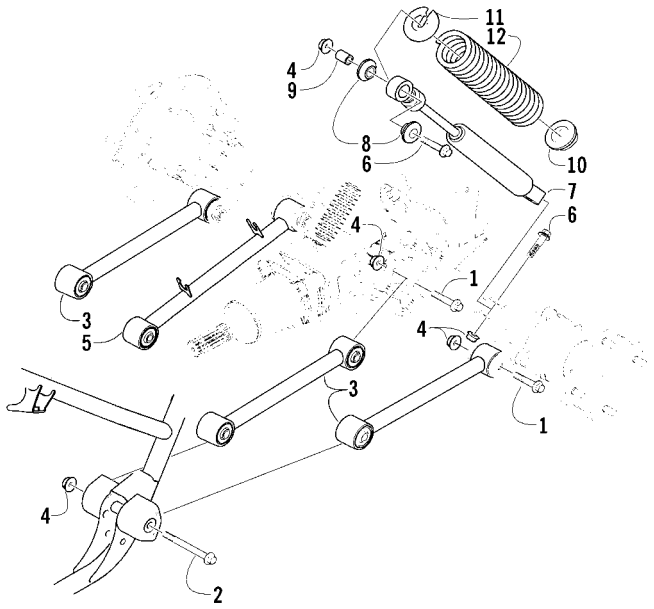


0737-578

ACT - REAR SUSPENSION

KEY

1. Cap Screw
2. Cap Screw
3. Swing Arm
4. Lock Nut
5. Swing Arm
6. Cap Screw
7. Shock Absorber
8. Bushing
9. Sleeve
10. Adjuster Cam
11. Retainer
12. Spring

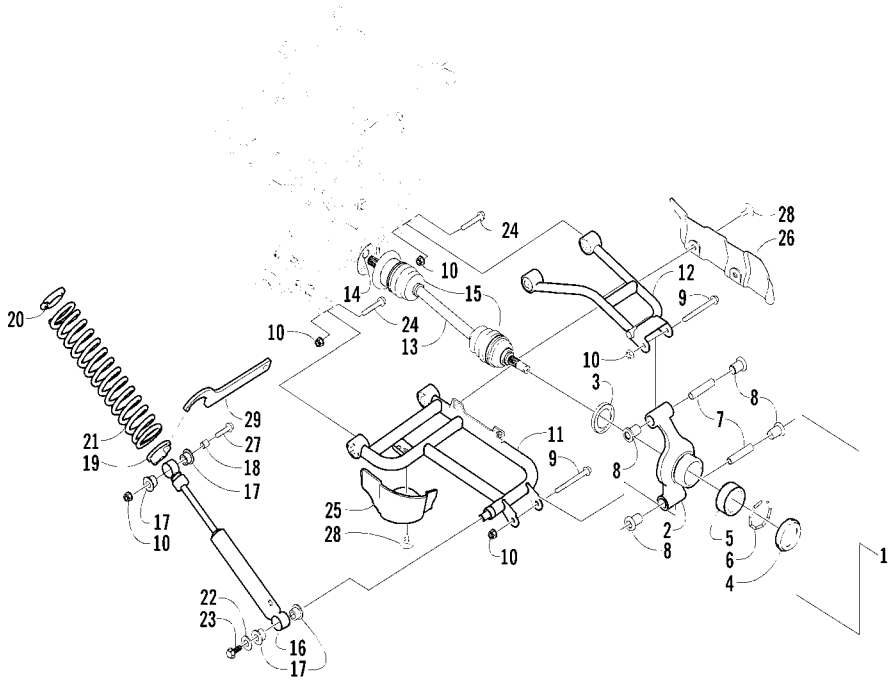


0737-585

KEY

1. Knuckle Assy
2. Knuckle
3. Seal
4. Seal
5. Bearing
6. Clip
7. Collar
8. Bushing
9. Cap Screw
10. Lock Nut
11. A-Arm
12. A-Arm
13. Drive Axle
14. Clip
15. Boot Repair Kit
16. Shock Absorber
17. Bushing
18. Sleeve
19. Adjuster Cam
20. Retainer
21. Spring
22. Washer
23. Cap Screw
24. Cap Screw
25. Boot Guard
26. Boot Guard
27. Cap Screw
28. Body Screw
29. Spanner Wrench

FIS - REAR SUSPENSION



0737-579

Shock Absorbers

REMOVING

1. Secure the ATV on a support stand to elevate the wheels and to release load on the suspension.

⚠ WARNING

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

2. Remove the two cap screws and nuts securing each front shock absorber to the frame. Account for bushings and sleeves from each.

AF605D

⚠ CAUTION

On the FIS style rear suspension, additional support stands are necessary to support the rear axle when the shock absorbers are removed or damage may occur.

3. Remove the two cap screws and nut securing each rear shock absorber to the frame and rear suspension. Account for bushings and sleeves from each.

AF626D

4. Compress the shock absorber spring, remove the retainer, and remove the spring.

AF730D

CLEANING AND INSPECTING

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

1. Clean all shock absorber components in parts-cleaning solvent.
2. Inspect each shock rod for nicks, pits, rust, bends, and oily residue.
3. Inspect all springs, spring retainers, shock rods, dampers, bushings, shock bodies, and eyelets for cracks, leaks, and bends.

INSTALLING

1. Place the shock absorber spring over the shock absorber, compress the spring, and install the retainer.
2. Place bushings and sleeves (where appropriate) into shock eyelet; then install shock with two cap screws and nuts. Tighten all nuts to 4.8 kg-m (35 ft-lb).

⚠ CAUTION

Do not tighten the nuts beyond the 4.8 kg-m (35 ft-lb) specification or the shock eyelet or mount WILL be damaged.

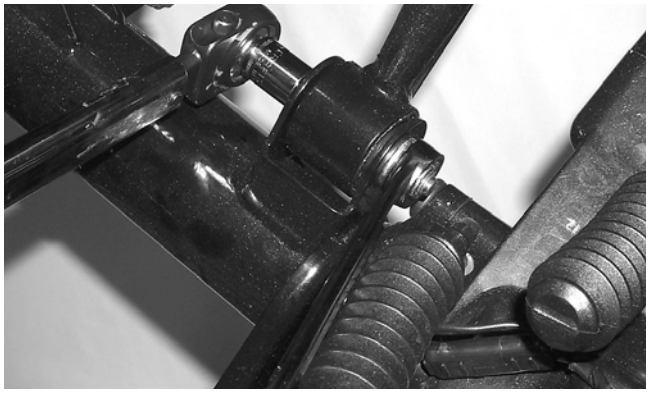
■NOTE: On the fully independent rear suspension models, the rear shock absorber-to-lower A-arm torque factor is 2.8 kg-m (20 ft-lb).

3. Remove the ATV from the support stand.

Swing Arms
(ACT - Rear Suspension)

REMOVING

1. Remove the cap screws and lock nuts securing the front of the swing arms to the frame brackets.
2. On the left side, remove the cap screws and lock nuts securing the rear of the swing arms to the axle housing; then remove the swing arms.



AF697D

3. On the right side, remove the cap screw and lock nut securing the outer swing arm to the axle housing; then remove the cap screw and lock nut securing the inner swing arm to the axle housing. Remove the hose grommets from the hose guides.
4. Remove the swing arms and note the location of the hose guides on the inner swing arm (for installing purposes).

CLEANING AND INSPECTING

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

1. Clean all swing arm components in parts-cleaning solvent.
2. Inspect all swing arm weldments for cracks or unusual bends.
3. Inspect all tubing for cracks or unusual bends.

INSTALLING

1. On the right side, place the inner swing arm into position and secure it to the axle housing with a cap screw and lock nut. Do not tighten at this time.
2. On the right side, place the outer swing arm into position and secure to the axle housing with a cap screw and lock nut. Do not tighten at this time.

3. Secure the two right side swing arms to the frame brackets with cap screws and hex nuts. Do not tighten at this time.

4. On the left side, secure the swing arms to the axle housing and frame brackets with cap screws and hex nuts; then tighten all fasteners to 4.8 kg-m (35 ft-lb).

Swing Arms
(TBX Model)

REMOVING

1. Secure the ATV on a support stand to elevate the wheels and to release the load on the suspension.

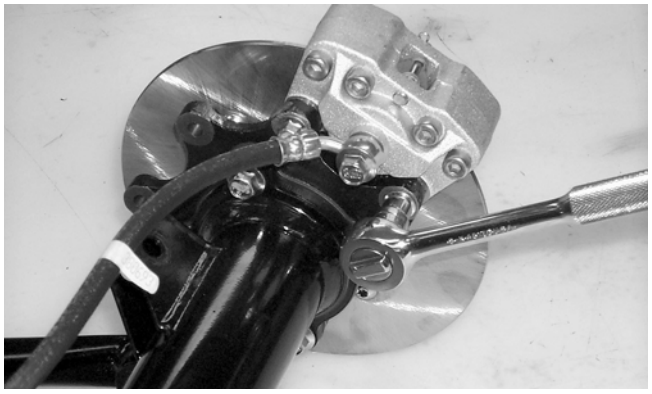
⚠ WARNING

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

2. Place a floor jack under the rear gear case to support the gear case once the shock absorber has been removed.

3. Remove the rear wheels.

4. Remove both brake calipers. Ensure that the hydraulic brake hose is free from the swing arm.



CC783

■NOTE: Note the routing of the brake hose for installing purposes.

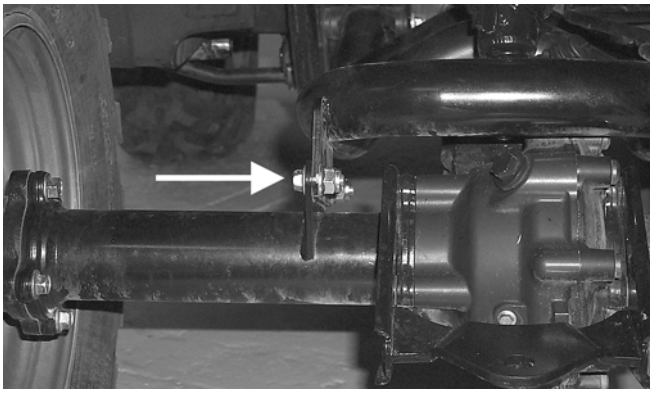
⚠ CAUTION

Care should be taken not to damage or kink the brake cable/hose.

5. Remove the three cap screws securing the rear gear case U-joint to the driveshaft.

6. Remove the cap screw and lock nut securing the shock assembly to the swing 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.



CC867A

7. Remove the two cap screws and lock nuts securing the swing arm to the frame. Discard the lock nuts.

CC864

8. Lower the floor jack and remove the swing arm/rear drive assembly.

9. Remove the four cap screws and lock nuts securing the swing arm to the axle housing; then remove the swing arm.

CLEANING AND INSPECTING

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

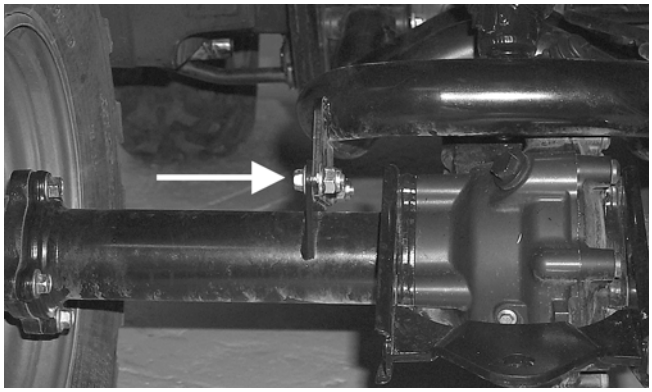
1. Clean all swing arm components in parts-cleaning solvent.

2. Inspect all swing arm weldments for cracks or unusual bends.

3. Inspect all tubing for cracks or unusual bends.

INSTALLING

1. Place the swing arm into position on the axle housing; then secure with cap screws and new lock nuts. Tighten to 4.8 kg-m (35 ft-lb).



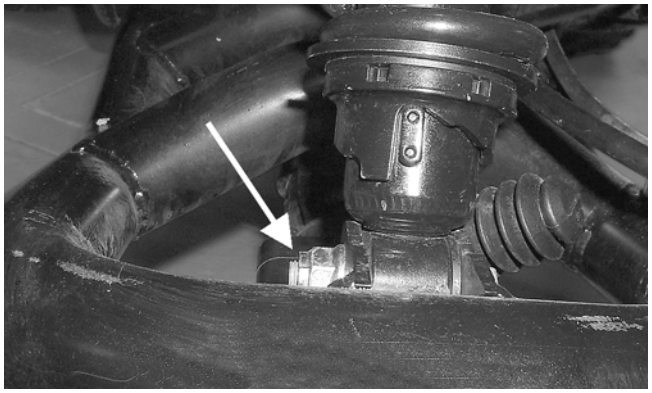
CC867A

2. Place the axle housing/swing arm assembly on a floor jack and maneuver the assembly into position in the frame.

3. Secure the swing arm to the frame with cap screws and new lock nuts. Tighten to 5.5 kg-m (40 ft-lb).

CC864

4. Secure the shock absorber to the swing arm with a cap screw and new lock nut. Tighten to 4.8 kg-m (35 ft-lb).

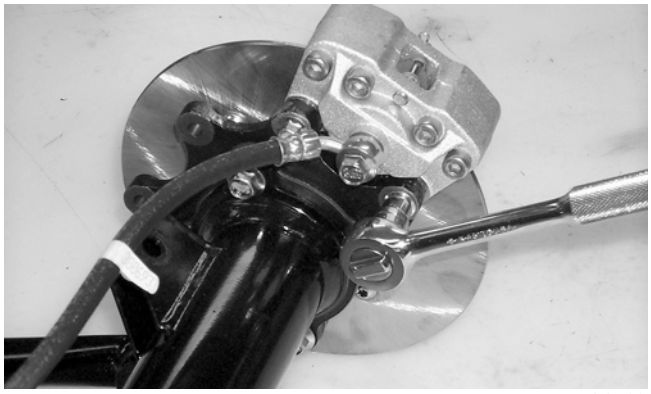


CC868A

5. Secure the rear gear case U-joint to the driveshaft with three cap screws coated with red Loctite #271. Tighten to 5.5 kg-m (40 ft-lb).

6. Secure the brake calipers to the bearing housing with existing hardware. Tighten the mechanical caliper to 2.1 kg-m (15 ft-lb) and the hydraulic caliper to 2.8 kg-m (20 ft-lb).

■ **NOTE: Ensure that the brake hose is properly routed and secured on the swing arm as noted during removing.**



CC783

7. Install the wheels and tighten to 5.5 kg-m (40 ft-lb).

8. Remove the ATV from the support stand.

Front A-Arms

REMOVING

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

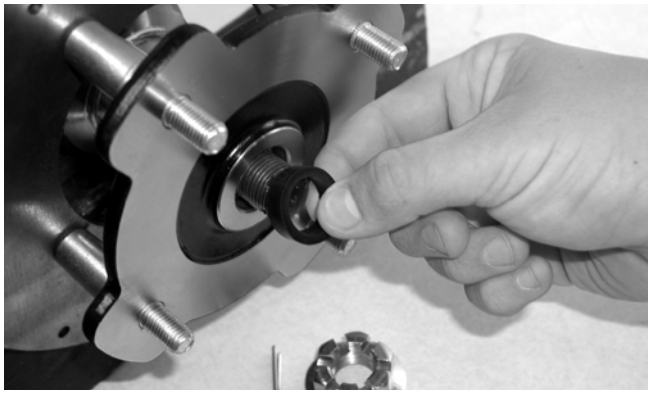
⚠ WARNING

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

2. Remove the wheel cap from the hub; then remove the cotter pin from the nut.

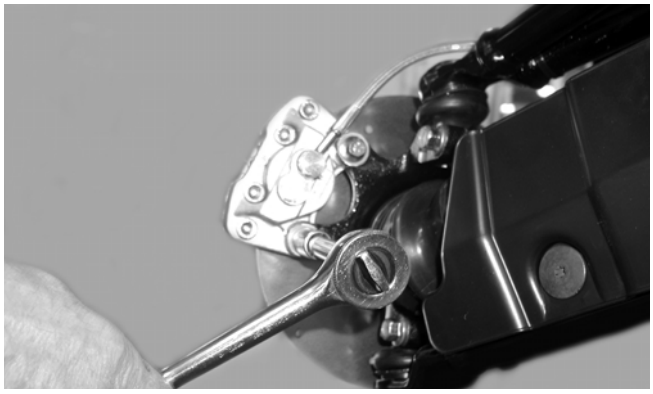
CD008

3. Remove the nut securing the hub. Account for a washer and a hub seal.



CD010

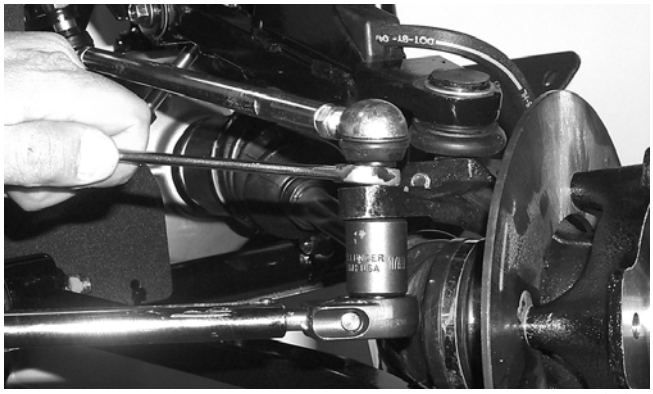
4. Remove the brake caliper.



CD007

5. Remove the hub assembly.

6. Remove the cotter pin and slotted nut securing the tie rod end to the knuckle; then remove the tie rod end from the knuckle.



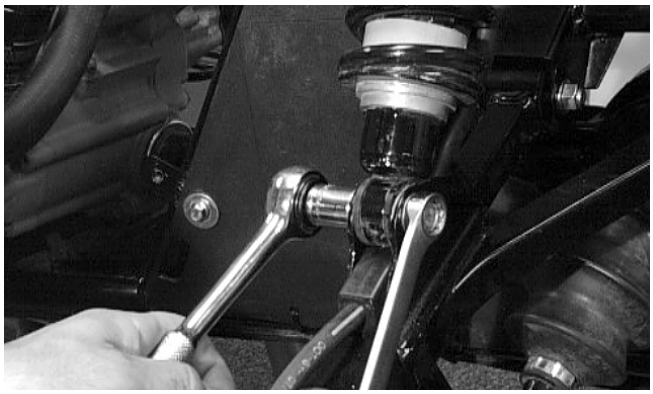
AF618D

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

AF628D

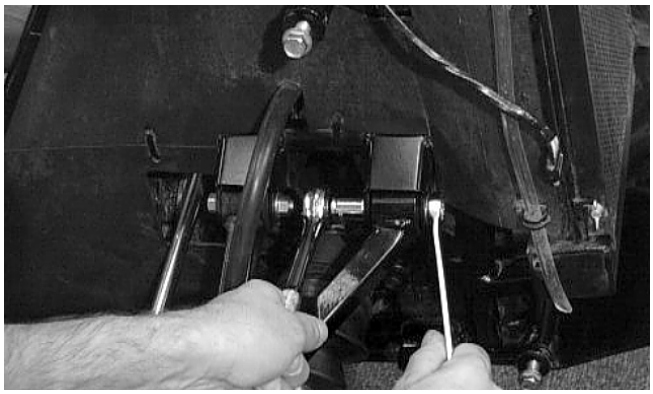
8. Tap the ball joints out of the knuckle; then remove the knuckle.

9. Remove the lower shock absorber eyelet from the upper A-arm.



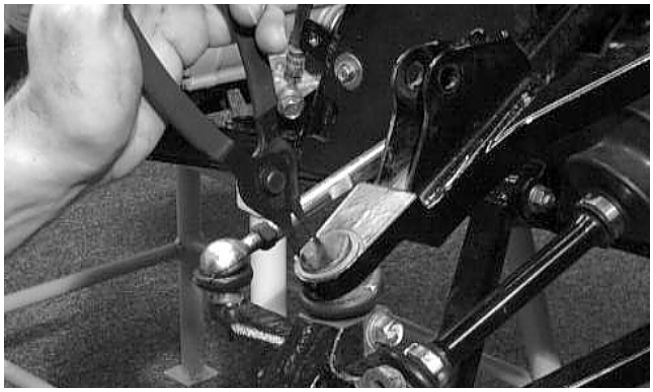
AF626D

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



AF610D

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



AF616D

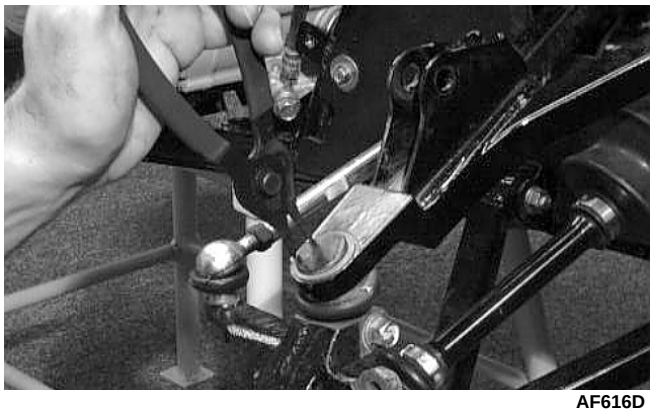
CLEANING AND INSPECTING

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

1. Clean all A-arm components in parts-cleaning solvent.
2. Clean the ball joint mounting hole of all residual Loctite, grease, oil, or dirt for installing purposes.
3. Inspect the A-arm for bends, cracks, and worn bushings.
4. Inspect the ball joint mounting holes for cracks or damage.
5. Inspect the frame mounts for signs of damage, wear, or weldment damage.

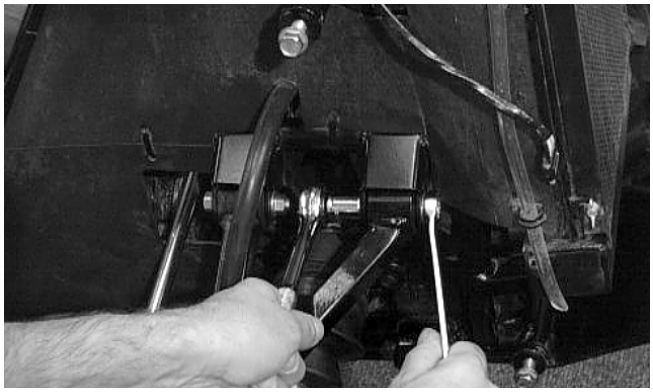
INSTALLING

1. Apply green Loctite #609 to the entire outside diameter of the ball joint; then install the ball joint into the A-arm and secure with the circlip.



AF616D

2. Install the A-arm assemblies into the frame mounts and secure with the cap screws. Only finger-tighten at this time.



AF610D

3. Route the brake hose through the upper A-arm shock absorber mount.

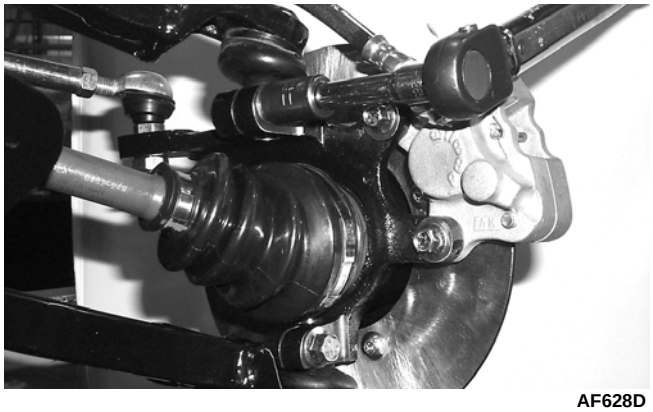
AF627D

4. Secure the lower eyelet of the shock absorber to the upper A-arm. Tighten nut to 4.8 kg-m (35 ft-lb).
5. Secure the A-arm assemblies to the frame mounts (from step 2). Tighten the cap screws to 4.8 kg-m (35 ft-lb).

⚠ CAUTION

Do not tighten the nut beyond the 4.8 kg-m (35 ft-lb) specification or the shock eyelet or mount WILL be damaged.

6. Install the knuckle assembly onto the ball joints and secure with cap screws. Tighten to 4.8 kg-m (35 ft-lb).

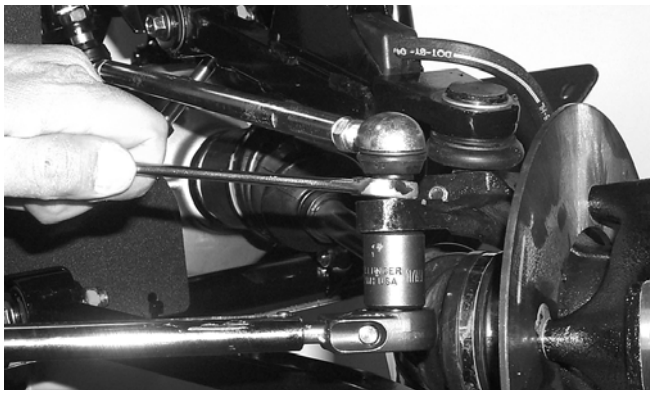


AF628D

7

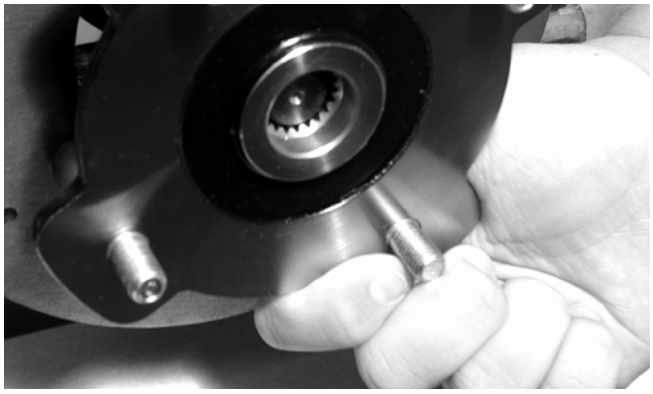
7. Install the tie rod end and secure with the nut. Tighten to 4.2 kg-m (30 ft-lb); then install a new cotter pin and spread the pin to secure the nut.

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



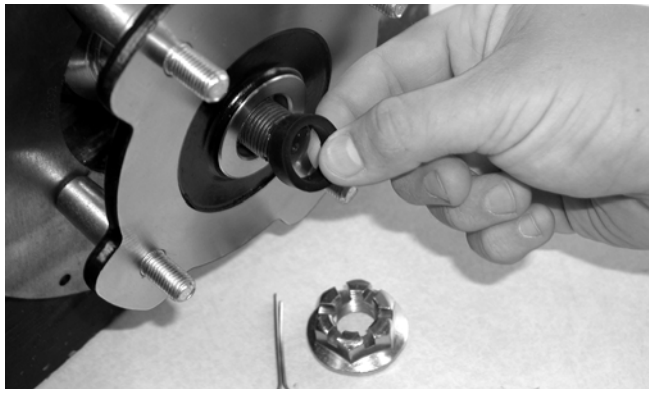
AF618D

8. Apply grease to hub sealing area and on the drive axle splines; then install the hub assembly onto the drive axle.



CD009

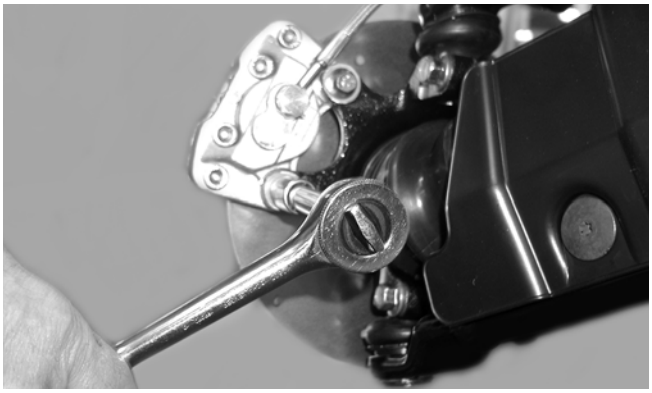
9. Insert the hub seal onto the drive axle; then position it into the hub.



CD010

10. Place the washer onto the shaft; then secure the hub assembly with the nut. Tighten only until snug.

11. Secure the brake caliper to the knuckle with the two cap screws. Tighten to 2.8 kg-m (20 ft-lb).



CD007

12. Secure the hub nut (from step 10) to the shaft/axle. Tighten to 10.4 kg-m (75 ft-lb).

13. Install a new cotter pin and spread the pin to secure the nut.

CD008

14. Install the wheel cap.

15. Install the wheel and tighten to 5.5 kg-m (40 ft-lb).

CD006

16. Remove the ATV from the support stand.

Rear A-Arms
(FIS - Rear Suspension)

REMOVING

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

⚠ WARNING

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

2. Pump up the hand brake; then engage the brake lever lock.
3. Remove the wheel and rubber wheel cap.
4. Remove the cotter pin securing the hex nut; then remove the hex nut and washer. Release the brake lever lock.

CD008

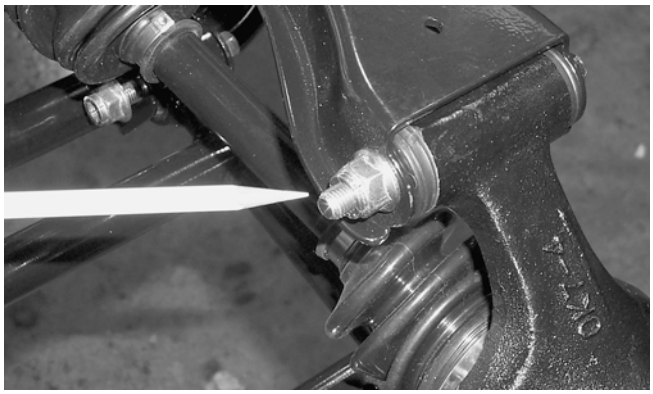
5. Remove the two brake calipers (right side only).

■ NOTE: Do not allow the brake calipers to hang from their cable/hose.

6. Remove the cap screws and lock nut securing the shock absorber to the frame and lower A-arm; then remove the shock absorber.
7. Remove the cap screws securing the boot guard to the lower A-arm.

AF934

8. Slide the hub out of the knuckle and set aside.
9. Remove the cap screws and lock nuts securing the knuckle to the A-arms. Discard the lock nuts.



AF936

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

10. Remove the cap screws and lock nuts securing the A-arms to the frame; then remove the A-arms.

■ NOTE: If removing the upper right A-arm, it will be necessary to disconnect the brake hose and brake cable from the A-arm.

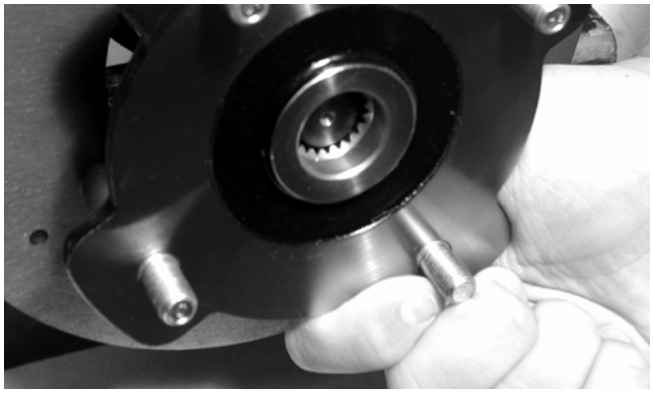
CLEANING AND INSPECTING

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

1. Clean all A-arm components in parts-cleaning solvent.
2. Inspect the A-arm for bends, cracks, and worn bushings.
3. Inspect the frame mounts for signs of damage, wear, or weldment damage.

INSTALLING

1. Install the A-arm assemblies into the frame mounts and secure with the cap screws and new lock nuts. Only finger-tighten at this time.
2. Slide the knuckle onto the drive axle and into position on the A-arms; then secure the knuckle to the A-arms with cap screws and new lock nuts. Tighten to 4.8 kg-m (35 ft-lb).
3. Tighten the hardware securing the A-arms to the frame mounts (from step 1) to 4.8 kg-m (35 ft-lb).
4. Apply grease to hub sealing area and on the drive axle splines; then install the hub assembly onto the drive axle.



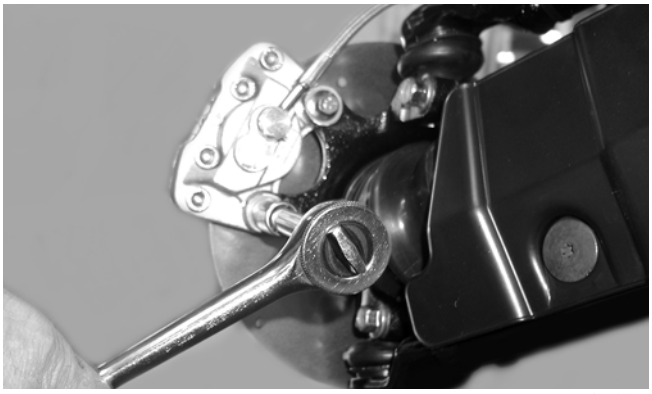
CD009

5. Insert the hub seal onto the shaft; then position it into the hub.

CD010

6. Place the washer onto the drive axle; then secure the hub assembly with the nut. Tighten only until snug.
7. Secure the brake caliper to the knuckle with the two cap screws (right side only). Tighten the mechanical caliper to 2.1 kg-m (15 ft-lb). Tighten the hydraulic caliper to 2.8 kg-m (20 ft-lb).

■ **NOTE: Ensure that the brake hose and brake cable are properly routed and secured to the upper A-arm.**



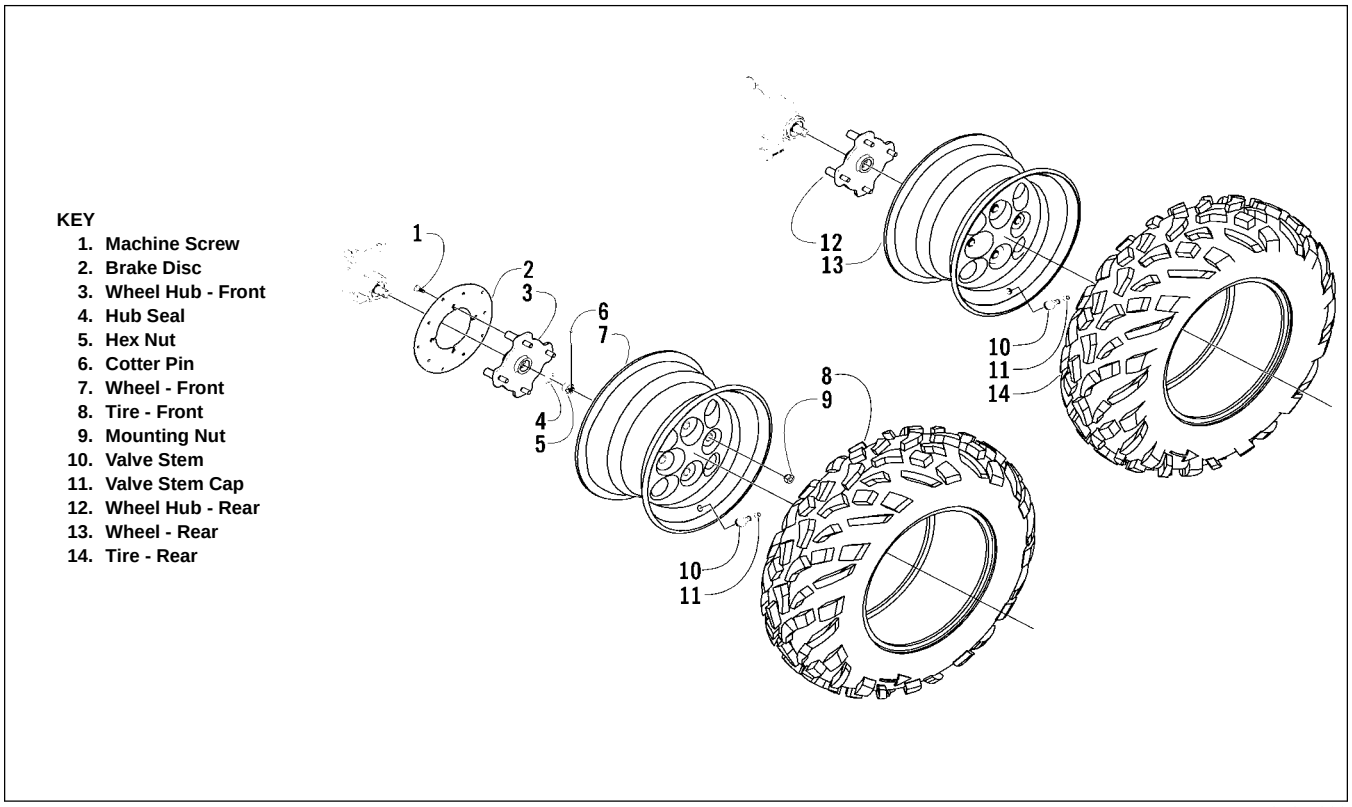
CD007

8. Secure the hub nut (from step 6) to the drive axle. Tighten to 10.4 kg-m (75 ft-lb).
9. Install a new cotter pin and spread the pin to secure the nut.

CD008

10. Secure the shock absorber to the frame with a cap screw and new lock nut. Tighten to 4.8 kg-m (35 ft-lb).
11. Secure the shock absorber to the lower A-arm with a cap screw and new lock nut. Tighten to 2.8 kg-m (20 ft-lb).
12. Secure the boot guard to the lower A-arm with the two cap screws. Tighten securely.
13. Install the wheel cap.
14. Install the wheel and tighten to 5.5 kg-m (40 ft-lb).
15. Remove the ATV from the support stand.

Wheels and Tires



0737-698

TIRE SIZE

⚠ WARNING

Use only Arctic Cat approved tires when replacing tires. Failure to do so could result in unstable ATV operation.

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

⚠ WARNING

Do not mix tire tread patterns. Use the same pattern type on front and rear. Failure to heed warning could cause poor handling qualities of the ATV and could cause excessive drive train damage not covered by warranty.

TIRE INFLATION PRESSURE

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

REMOVING

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

⚠ WARNING

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

2. Remove the wheels.

■ NOTE: Keep left-side and right-side wheels separated for installing them on their proper sides.

CD006

7

CLEANING AND INSPECTING

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

1. Clean the wheels and hubs with parts-cleaning solvent.
2. Clean the tires with soap and water.
3. Inspect each wheel for cracks, dents, or bends.
4. Inspect each tire for cuts, wear, missing lugs, and leaks.

INSTALLING

1. Install each wheel on its hub.

CD006

■ **NOTE: Make sure each wheel is installed on its proper hub as noted in removing (the "rotation arrow" must indicate forward direction of rotation).**

AF612D

2. Tighten to 5.5 kg-m (40 ft-lb).

CHECKING/INFLATING

1. Using an air pressure gauge, measure the air pressure in each tire. Adjust the air pressure as necessary to meet the recommended inflation pressure.

CD005

2. Inspect the tires for damage, wear, or punctures.

⚠ WARNING

Do not operate the ATV if tire damage exists.

■ **NOTE: If repair is needed, follow the instructions found on the tire repair kit or remove the wheel and have it repaired professionally.**

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

3. Check the front wheel toe-in and toe-out and adjust as necessary (see Section 8).
4. Test drive the ATV on a dry, level surface and note any pulling to the left or right during acceleration, deceleration, and braking.

■ **NOTE: If pulling is noted, measure the circumference of the front and rear tires on the pulling side. Compare the measurements with the tires on the opposite side. If pulling is noted during braking only, check and adjust the brakes as necessary and recheck operation (see Section 2).**

5. Increase the air pressure in the tires with the smallest circumference measurement until all tires are equal in circumference.
6. Repeat steps 4-5 as necessary to ensure proper handling.

SECTION 8 - STEERING/FRAME

TABLE OF CONTENTS

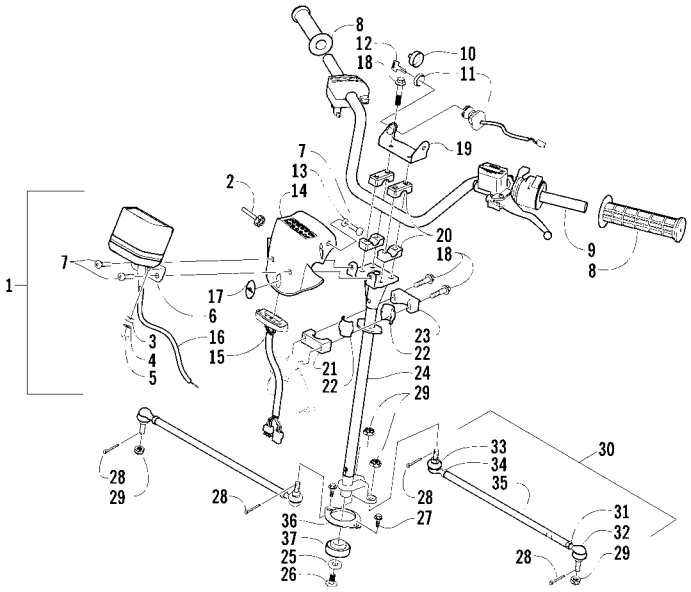
Back to TOC

Steering Post/ Tie Rods

KEY

1. Speedometer*
2. Knob*
3. Rubber Mount*
4. Washer*
5. Retainer Pin*
6. Bracket*
7. Machine Screw
8. Handlebar Grip
9. Handlebar
10. Key Cover
11. Ignition Switch Assy
12. Key
13. Body Collar
14. Instrument Pod
15. LED Panel
16. Speedometer Cable*
17. Plug**
18. Cap Screw
19. Bracket
20. Cap
21. Bearing Housing
22. Bearing
23. Bearing Housing
24. Steering Post
25. Washer
26. Cap Screw
27. Cap Screw
28. Cotter Pin
29. Lock Nut

250/300



30. Tie Rod Assy
31. Nut
32. Ball Joint
33. Ball Joint
34. Nut
35. Tie Rod
36. Bearing Flange
37. Bearing w/Oil Seal

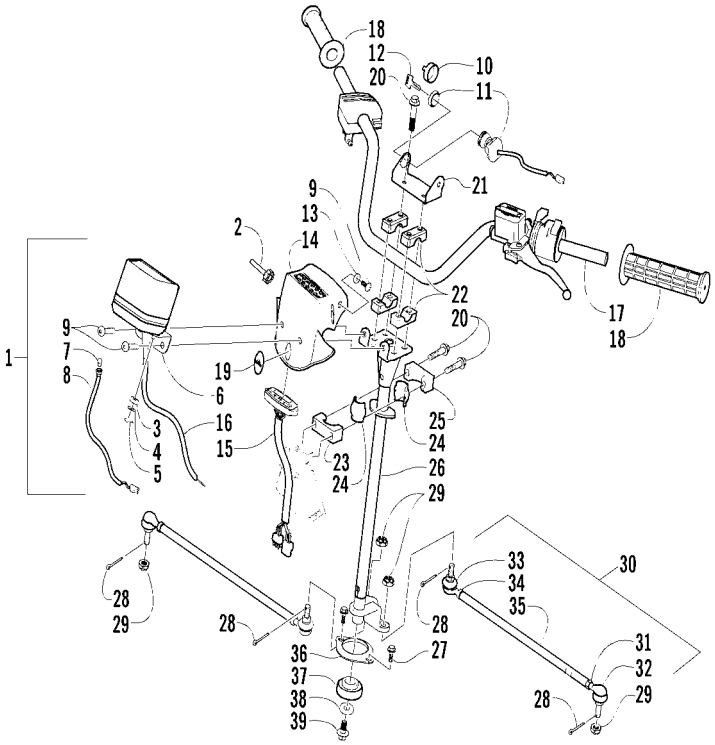
* 300 4x4 ** 2x4 Models

0737-835

KEY

1. Speedometer*
2. Knob*
3. Rubber Mount*
4. Washer*
5. Retainer Pin*
6. Bracket*
7. Bulb*
8. Harness*
9. Machine Screw
10. Key Cover
11. Ignition Switch
12. Key
13. Body Collar
14. Instrument Pod
15. LED Panel
16. Speedometer Cable*
17. Handlebar
18. Handlebar Grip
19. Plug**
20. Cap Screw
21. Bracket
22. Cap
23. Bearing Housing
24. Bearing
25. Bearing Housing
26. Steering Post
27. Cap Screw
28. Cotter Pin
29. Lock Nut

400/500



30. Tie Rod Assy
31. Nut
32. Ball Joint
33. Ball Joint
34. Nut
35. Tie Rod
36. Bearing Flange
37. Bearing w/Oil Seal
38. Washer
39. Cap Screw

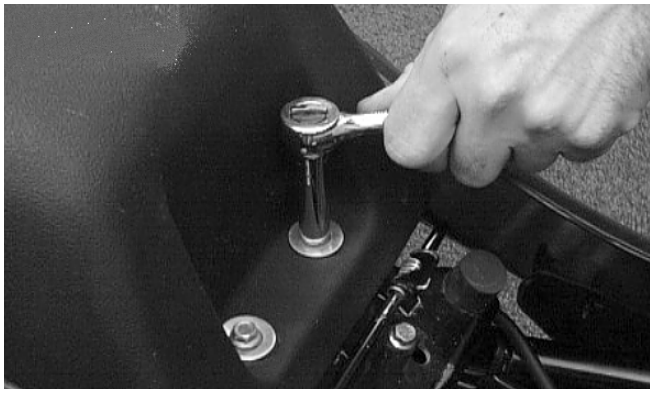
* 4x4 Models ** 2x4 Models

0737-562

Back to TOC Back to Section TOC Next

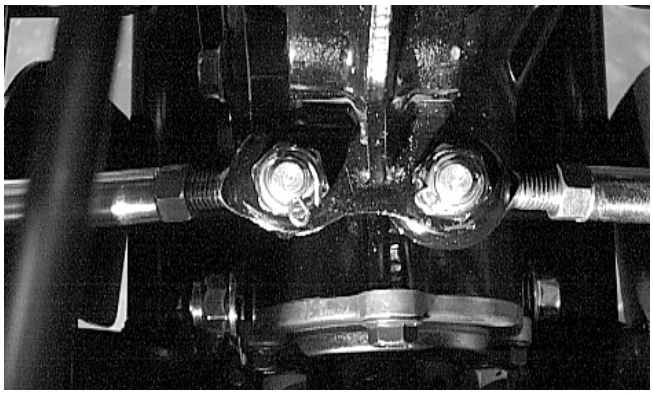
REMOVING

1. Remove the seat (see Seat in this section).
2. Turn the gas tank valve to the OFF position; then remove the left-side panel (see Front Fender/Side Panels in this section).
3. Disconnect the fuel hose to the carburetor.
4. Remove the screws and washers securing the gas tank.



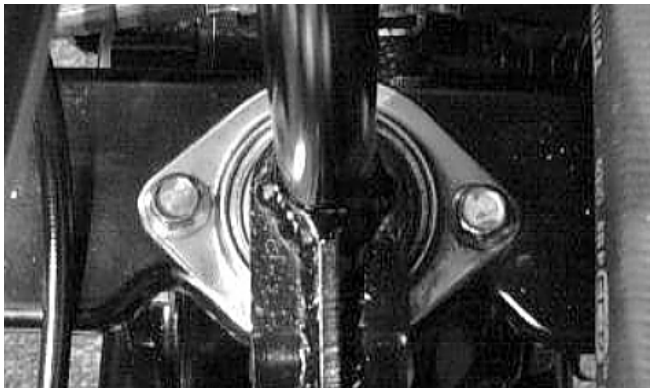
AL617D

5. Remove the cotter pin and slotted nut securing each tie rod end to the steering post arm. Remove the tie rod ends from the arm.



AF778D

6. Remove the cotter pin and slotted nut securing the side tie rod ends to the knuckles. Remove the tie rod ends from the knuckles; then remove the tie rods.
7. Remove the cap screws securing the steering post bearing flange.

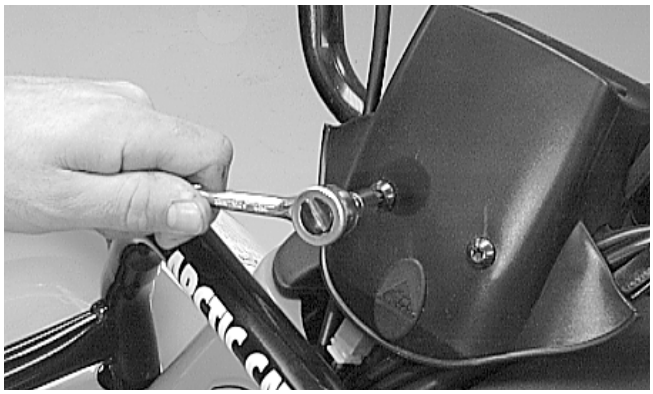


AL600D

8. On the 250/300 models, remove the screws securing the console. Account for a spacer.

CH084D

9. On the 400/500 models, remove the cap screws securing the instrument pod.

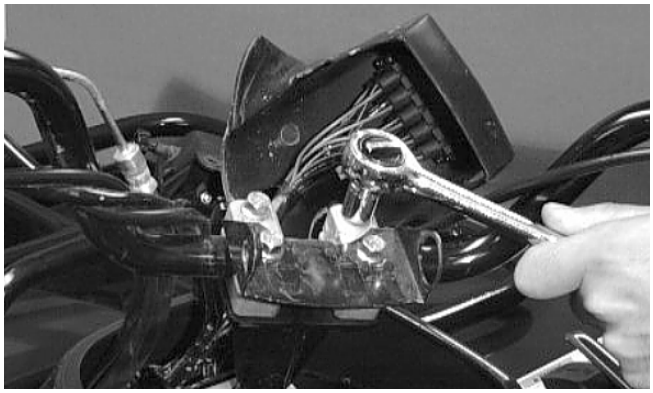


AL647D

10. Remove the retaining ring securing the ignition switch; then remove the machine screw (opposite the retaining ring). Account for a body collar.

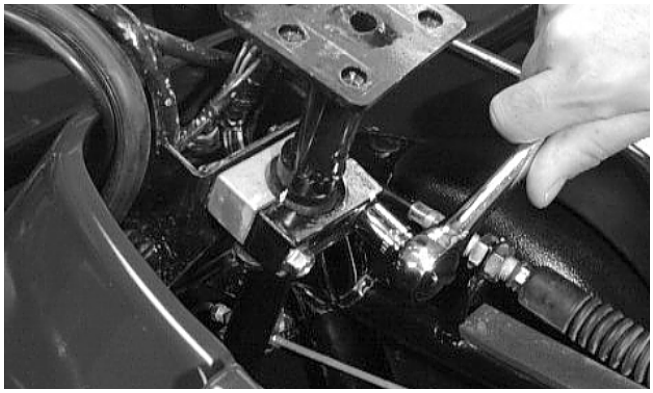
AF757D

11. Remove the four cap screws securing the handlebar caps (blocks) to the steering post; then move the handlebar out of the way.



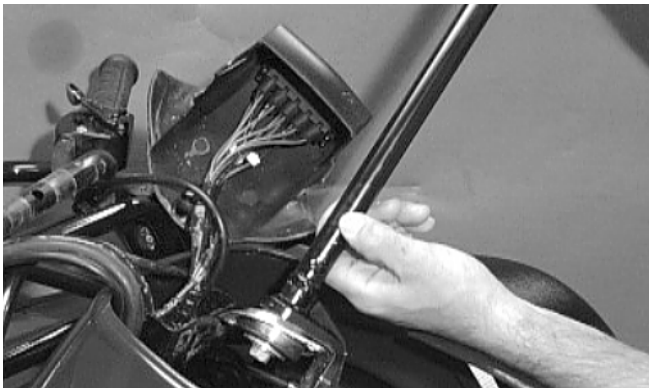
AL614D

12. Remove the two cap screws securing the upper steering post bearing housings to the frame.



AL619D

13. Remove the steering post.



AL618D

CLEANING AND INSPECTING

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

1. Wash the tie rod ends in parts-cleaning solvent. Dry with compressed air. Inspect the pivot area for wear. Apply a low-temperature grease to the ends.

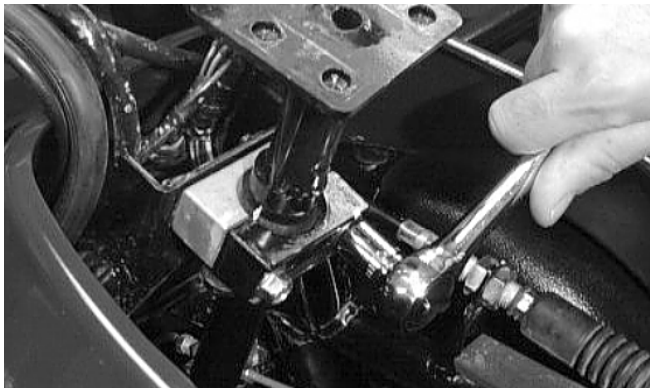
⚠ WARNING

Always wear safety glasses when using compressed air.

2. Inspect the tie rods for damaged threads or wear.
3. Inspect the tie rods for cracks or unusual bends.
4. Inspect all welded areas for cracks or deterioration.
5. Inspect the steering post and steering-post brackets for cracks, bends, or wear.
6. Inspect the bearing halves, bearing caps, and bearing housings for cracks or wear.
7. Inspect the handlebar tube for cracks, wear, or unusual bends.
8. Inspect the handlebar grips for damage or wear.

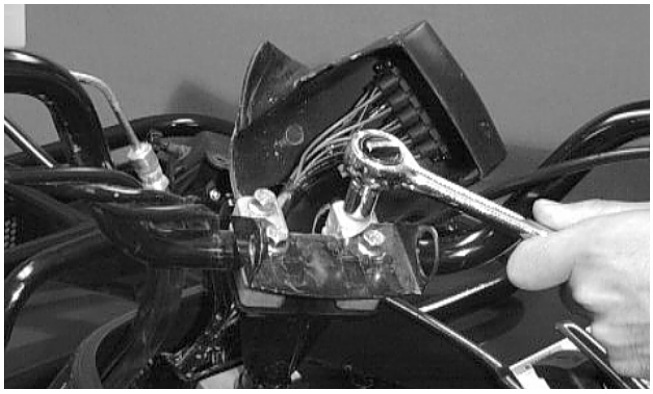
INSTALLING

1. Place the steering post into position; then place the upper steering post bearings and housings on the steering post and install the two cap screws through the housings and into the frame. Tighten the cap screws to 2.8 kg-m (20 ft-lb).



AL619D

2. Place the handlebar into position and secure with the handlebar caps (blocks). Tighten the four cap screws to 2.8 kg-m (20 ft-lb).



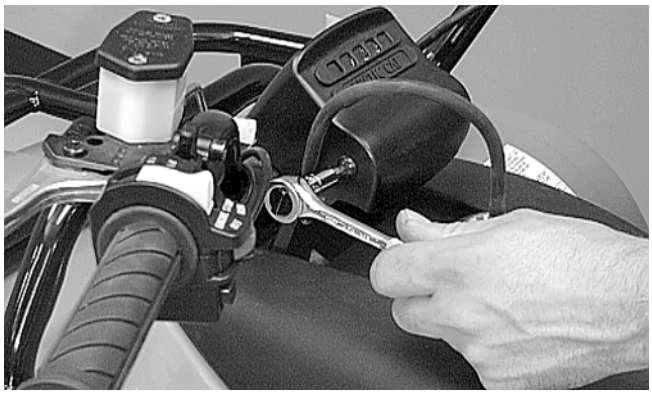
AL614D

3. On the 250/300 models, place the ignition switch into position; then place the console in position and secure with the screws, a spacer, and the retaining ring (opposite the screw).

CH087D

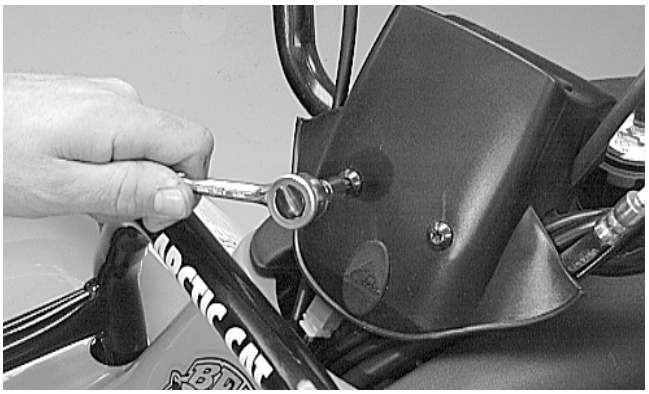
CH084D

4. On the 400/500 models, place the ignition switch into position; then place the instrument pod into position and secure with the machine screw, body collar, and the retaining ring (opposite the screw).



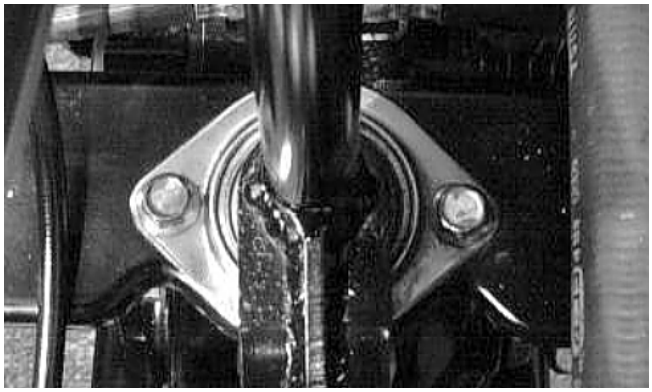
AF757D

5. On the 400/500 models, secure the front of the instrument pod with cap screws.



AL647D

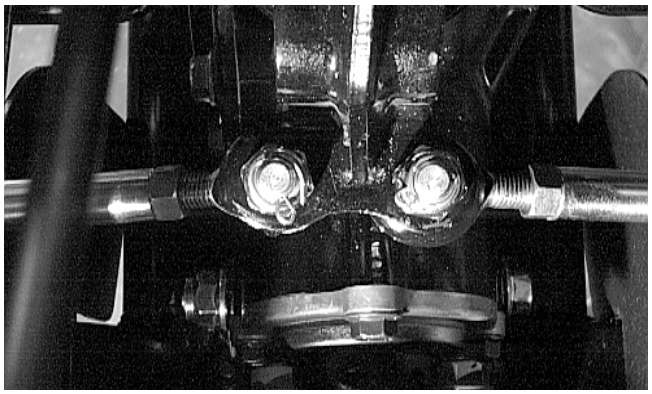
6. Place the steering post bearing flange into position. Secure with the cap screws tightened to 2.8 kg-m (20 ft-lb).



AL600D

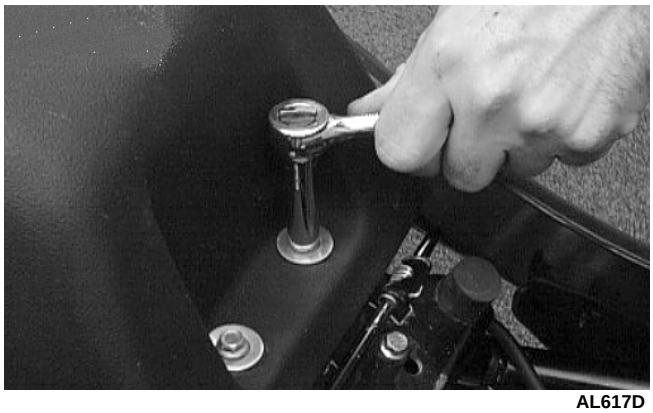
7. Insert the tie rod ends into the knuckles; then install the slotted nuts and tighten to 4.2 kg-m (30 ft-lb). Lock the nuts with new cotter pins.

8. Insert the tie rod ends into the steering post arm; then install the slotted nuts and tighten to 4.2 kg-m (30 ft-lb). Lock the nuts with new cotter pins.



AF778D

9. Place the gas tank into position. Secure with screws and washers.



AL617D

10. Connect the fuel hose to the carburetor.

11. Install the left-side panel (see Front Fender/Side Panels in this section); then install the seat (see Seat in this section).

■ NOTE: Turn the gas tank valve to the ON position only if starting the engine.

Handlebar Grip

REMOVING

1. Remove the plug from the head of the rivet.

2. Using a 1/8-in. drill bit, drill out the rivet.

3. Using compressed air between the grip and the handlebar, twist the grip back and forth until it slides free of the handlebar.

INSPECTING

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

1. Inspect the grip for wear, cuts, or cracks.

2. Inspect the grip for deterioration.

INSTALLING

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

1. Apply a liberal amount of Handlebar Grip Adhesive (p/n 0636-071) to the inside of the grip.

2. Align the rivet hole in the grip with the rivet hole in the handlebar; then align the notch (inside the grip) with the slot in the handlbar and slide the grip onto the handlebar until it is fully seated.

3. Wipe off any excess glue; then secure the grip with a new rivet.

4. Install the plug on the head of the rivet.

Steering Knuckles

REMOVING AND DISASSEMBLING

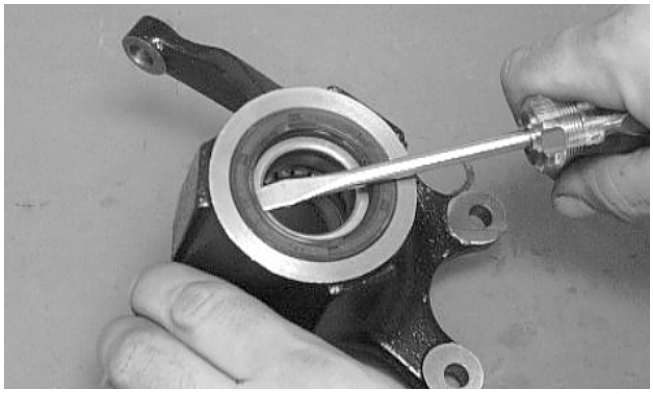
1. Secure the ATV on a support stand to elevate the wheel; then remove the wheel.

⚠ WARNING

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

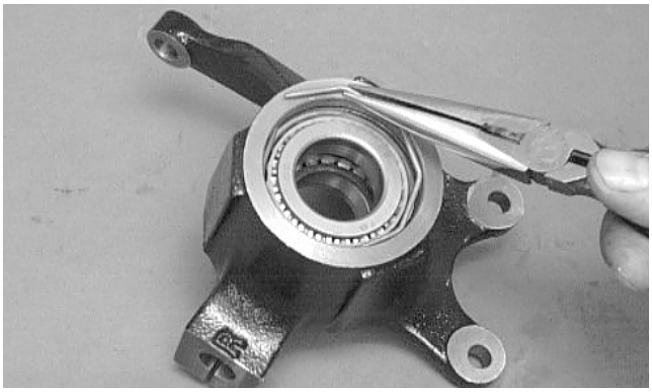
2. Remove the wheel cap from the hub; then remove the cotter pin from the nut.

3. Remove the nut securing the hub. Account for a washer and a hub seal.
4. Remove the brake caliper.
5. Remove the hub assembly.
6. Remove the cotter pin from the tie rod end and remove the tie rod end from the knuckle.
7. Remove the two cap screws securing the ball joints in the knuckle.
8. Tap the ball joint end out of the knuckle; then remove the knuckle.
9. Remove the seal from the knuckle.



AF725D

10. Remove the bearing retainer.



AF726D

11. Remove the bearings.

⚠ CAUTION

Use extreme care when removing the bearing. If the bearing is allowed to fall, it will be damaged and will have to be replaced.

CLEANING AND INSPECTING

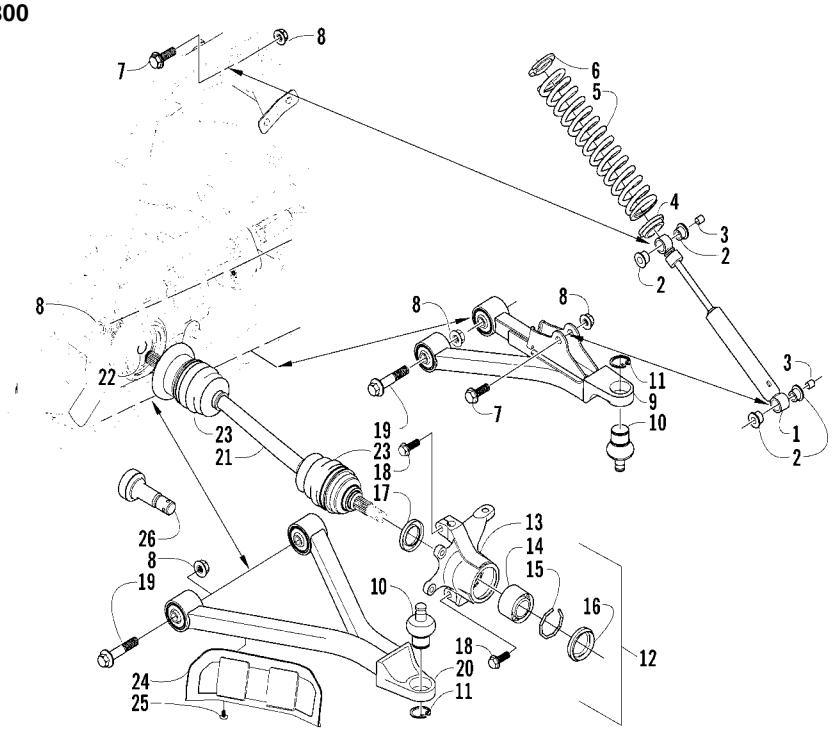
■NOTE: Whenever a part is worn excessively, cracked, or damaged in any way, replacement is necessary.

1. Clean all knuckle components.
2. Inspect the bearing for pits, gouges, rusting, or premature wear.
3. Inspect the knuckle for cracks, breaks, or porosity.
4. Inspect threads for stripping or damage.

ASSEMBLING AND INSTALLING

FRONT - 250/300

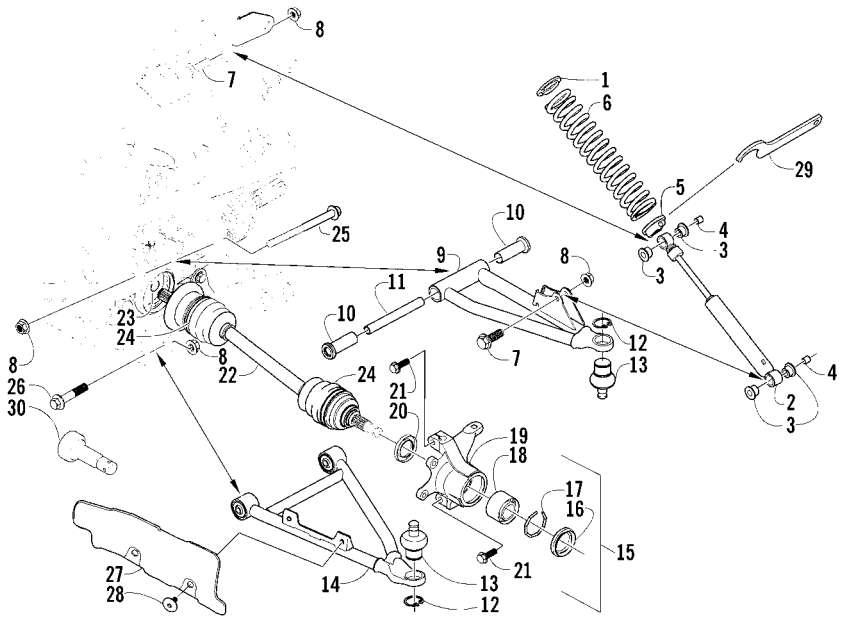
KEY
1. Shock Absorber
2. Bushing
3. Sleeve
4. Retainer
5. Spring
6. Retainer
7. Cap Screw
8. Lock Nut
9. A-Arm Assy
10. Ball Joint
11. Ball Joint Clip
12. Knuckle Assy
13. Knuckle
14. Bearing
15. Bearing Clip
16. Seal
17. Seal
18. Cap Screw
19. Cap Screw
20. A-Arm
21. Drive Axle (4x4)
22. Clip (4x4)
23. Boot Repair Kit (4x4)
24. Boot Guard (4x4)
25. Body Screw
26. Stub Axle (2x4)



0737-469

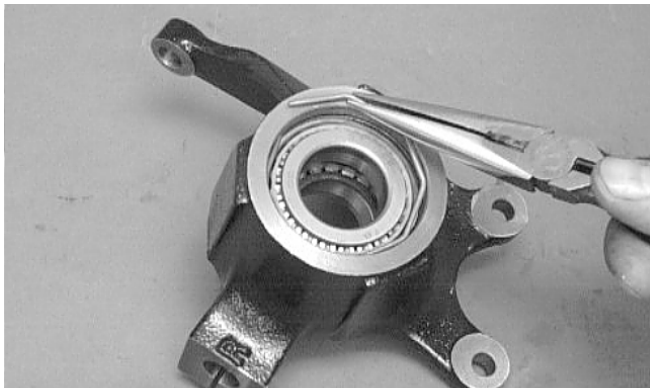
FRONT - 400/500

KEY
1. Retainer
2. Shock Absorber
3. Bushing
4. Sleeve
5. Adjuster Cam
6. Spring
7. Cap Screw
8. Lock Nut
9. A-Arm Assy
10. Bushing
11. Collar
12. Ball Joint Clip
13. Ball Joint
14. A-Arm
15. Knuckle Assy
16. Seal
17. Bearing Clip
18. Wheel Hub Bearing
19. Knuckle
20. Seal
21. Cap Screw
22. Drive Axle (4x4)
23. Clip (4x4)
24. Boot Repair Kit (4x4)
25. Cap Screw
26. Cap Screw
27. Boot Guard (4x4)
28. Body Screw
29. Spanner Wrench
30. Stub Axle (2x4)



0737-578

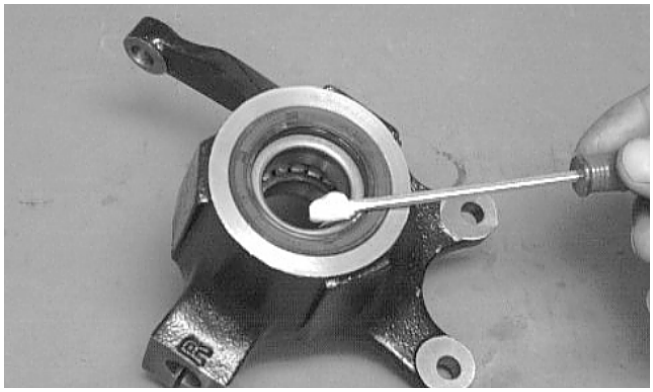
1. Install the bearing.
2. Install the bearing retainer.



AF726D

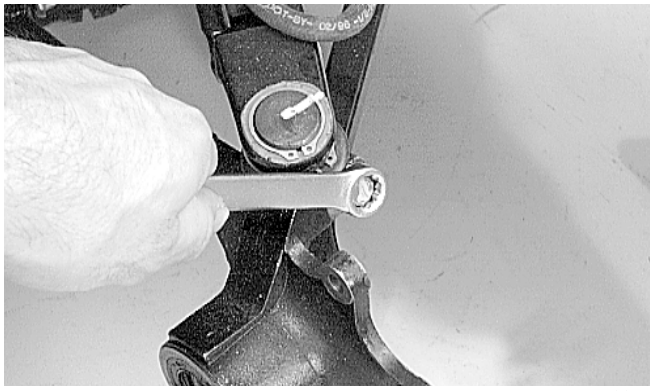
3. Install a new seal into the knuckle making sure the seal is flush with the knuckle.

4. Apply grease to the seal.



AF724D

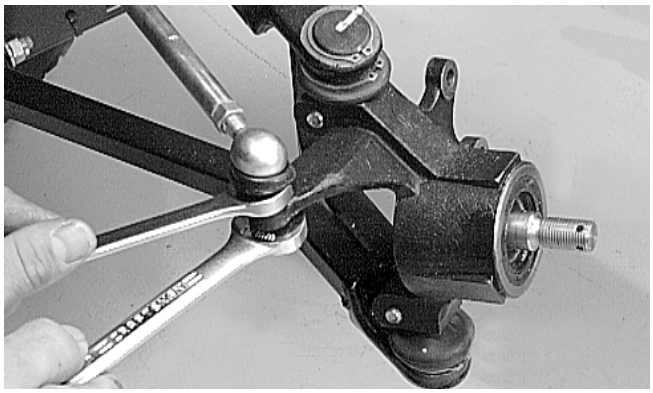
5. Install the knuckle to the upper and lower ball joints and secure with the two cap screws. Tighten to 4.8 kg-m (35 ft-lb).



AF760D

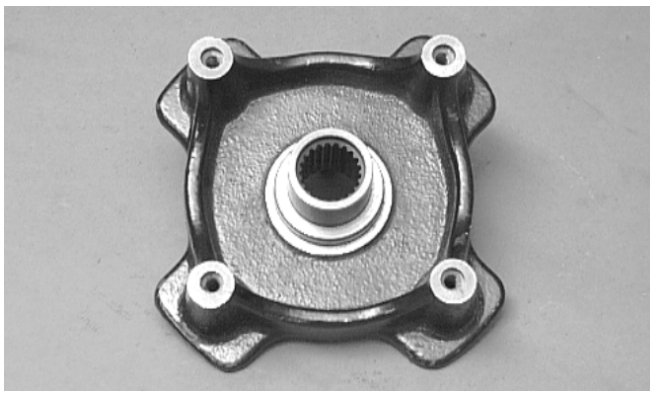
6. Install the tie rod end and secure with the nut. Tighten to 4.2 kg-m (30 ft-lb); then install a new cotter pin and spread the pin.

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



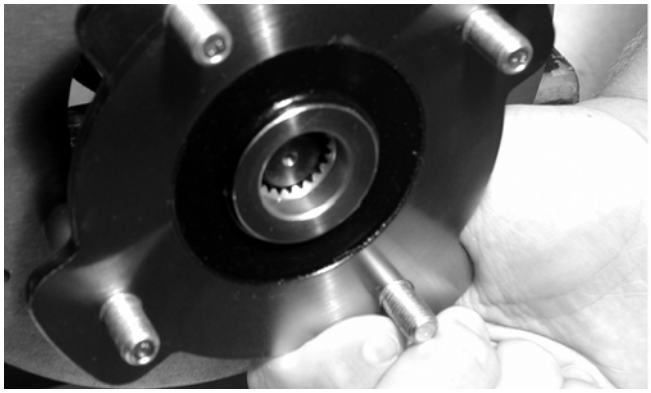
AF759D

7. Apply a small amount of grease to the hub sealing area and on the splines.



AF736D

8. Install the hub assembly onto the splines of the shaft.



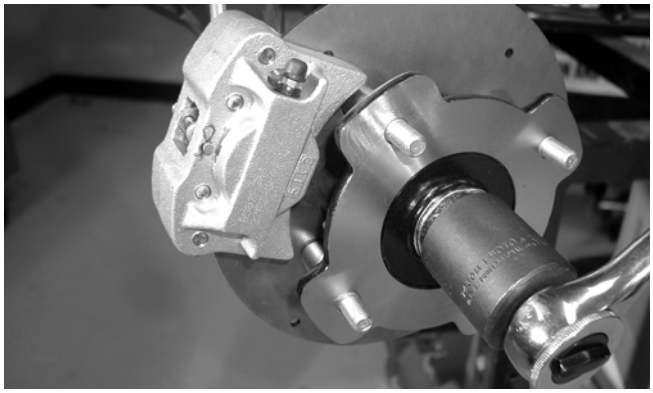
CD009

9. Insert the hub seal onto the shaft; then position it into the hub.

8

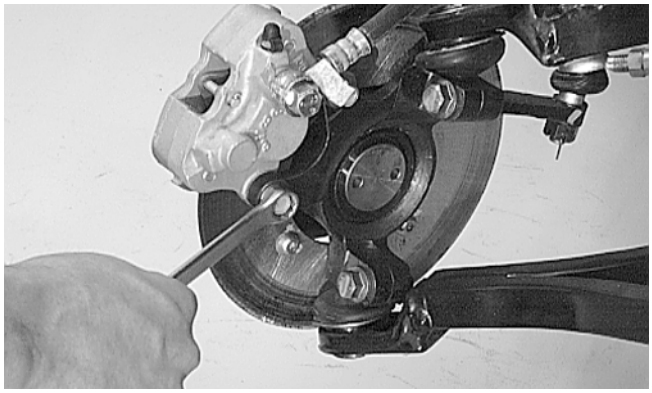
CD010

10. Place the washer onto the shaft; then secure the hub assembly with the nut. Tighten only until snug.



CD015

11. Secure the brake caliper to the knuckle with the two cap screws. Tighten to 2.8 kg-m (20 ft-lb).



AF746D

12. Secure the hub nut (from step 10) to the shaft. Tighten to 10.4 kg-m (75 ft-lb).
13. Install a new cotter pin and spread the pin to secure the nut.
14. Install the wheel cap.
15. Install the wheel and tighten to 5.5 kg-m (40 ft-lb).

CD006

16. Remove the ATV from the support stand.

Measuring/Adjusting Toe-In/Toe-Out

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

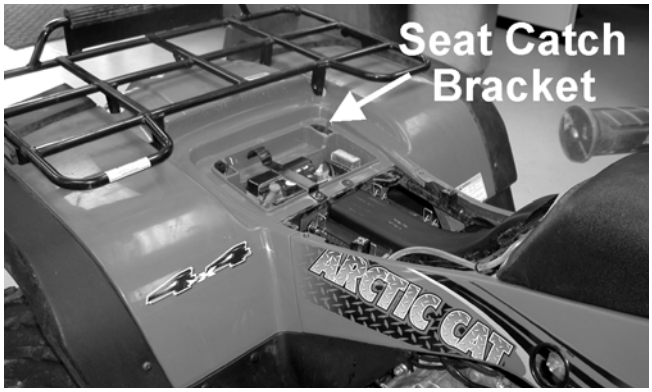
■ NOTE: Ensure the inflation pressure is correct in the tires or inaccurate measurements can occur.

CD005

3. Place the ATV in a level position taking care not to push down or lift up on the front end; then turn the handlebar to the straight ahead position.

■ NOTE: When measuring and adjusting, there should be a normal operating load on the ATV (without an operator but with Arctic Cat approved accessories).

4. Measure the distance from the outside edge of each handlebar grip to the seat catch brackets.



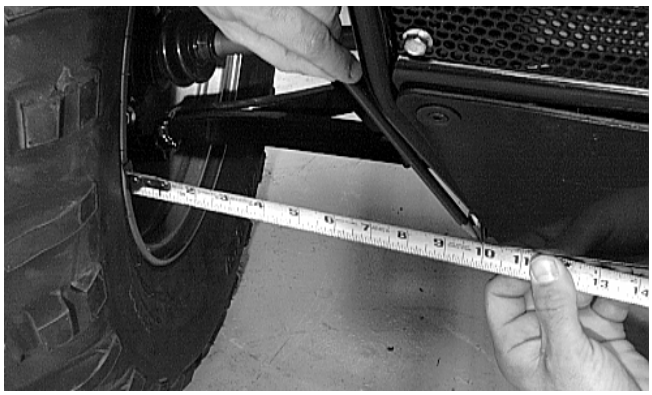
CD012A

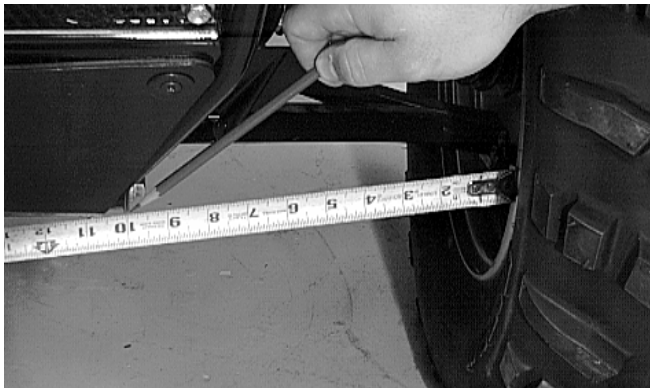
5. Adjust the handlebar direction until the two measurements are equal; then secure the handlebar to the rear rack using tie-down straps.

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

CD014

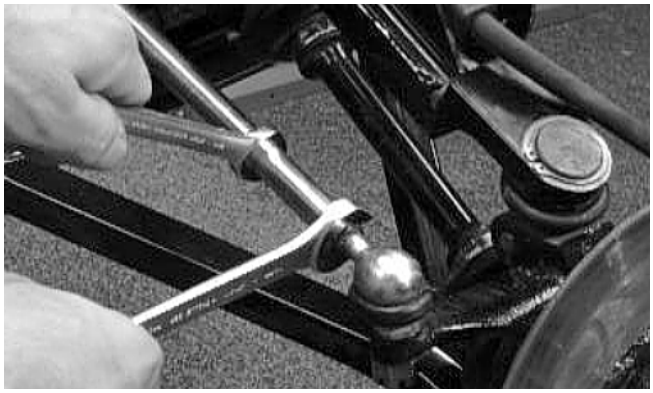
6. Measure the distance from the inside of each front rim to the lower frame tube.

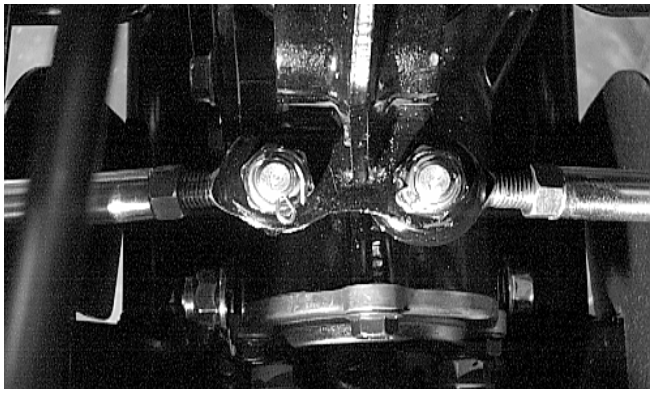

AF785D


AF786D

■ **NOTE: The distances from the inside rims to the frame tubes should be equal. If the measurements are equal, proceed to step 8; if the measurements are not equal, proceed to step 7.**

7. To make the measurements equal, loosen the appropriate tie rod jam nuts and adjust accordingly; then proceed to step 8.


AF617D


AF778D

■ **NOTE: The front wheels do not have to be removed to adjust the tie rod. Also, care should be taken not to disturb the handlebar position.**

8. Using a permanent marker of some type, mark the center of each front tire (at a height parallel to the belly panel).

AF789D

9. Measure the overall width of the front tires (at a height parallel to the belly panel) at the front side; then record the measurement.

10. Push the ATV forward until the marks are parallel to the belly panel on the back side; then measure the overall width of the front tires at the rear side.

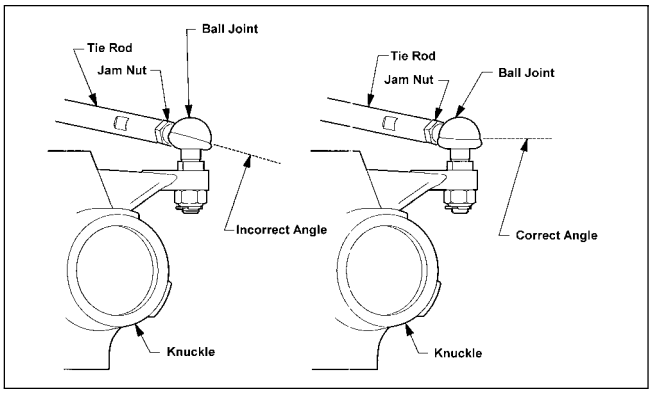
CD013

11. The difference in the measurements must show 6.4 mm (1/4 in.) toe-in (the front measurement 6.4 mm (1/4 in.) less than the rear measurement).

■ NOTE: The 6.4 mm (1/4 in.) toe-in difference is per side.

12. If the difference in the measurements does not show a 6.4 mm (1/4 in.) toe-in, adjust both tie rods equally in until within specification.

■ NOTE: Prior to locking the jam nuts, make sure the ball joints are at the center of their normal range of motion and at the correct angle.



733-559A

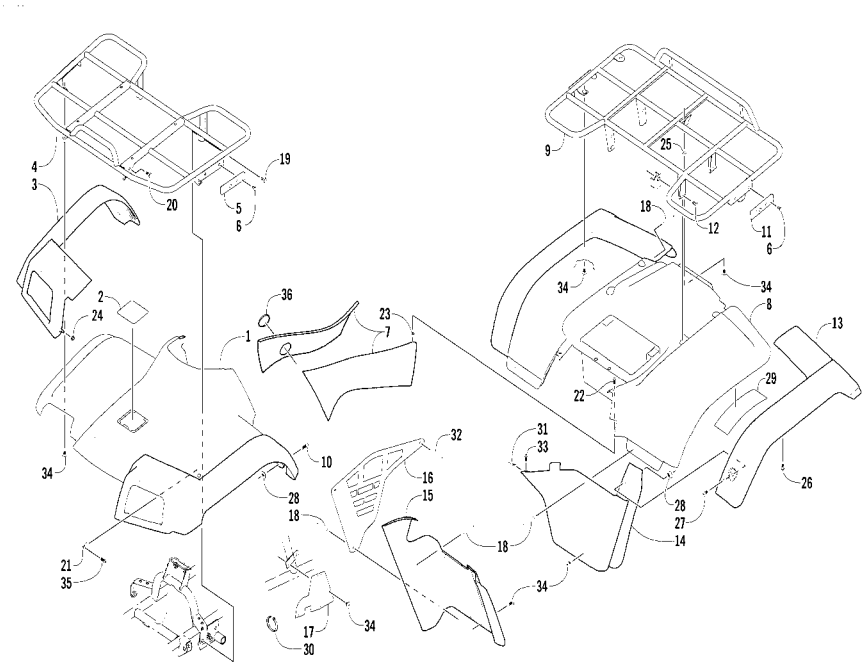
Body Panel Assembly Schematics

■ **NOTE: Some components may vary from model to model. The technician should use discretion and sound judgment.**

250/300

KEY

1. Fender Panel
2. Access Cover
3. Flare*
4. Rack
5. Reflector
6. Clip
7. Side Panel
8. Fender Panel
9. Rack
10. Screw
11. Reflector
12. Screw
13. Flare*
14. Fender Extension
15. Kick Panel
16. Deflector Panel
17. Fender Panel*
18. Rivet
19. Screw
20. Screw
21. Speed Nut
22. Screw
23. Expansion Nut
24. Stamped Nut
25. Rubber Washer
26. Screw*
27. Screw
28. T-Nut
29. Foil Tape
30. Cable Tie*
31. Clip
32. Plastic Rivet
33. Screw
34. Screw
35. Screw
36. Grommet



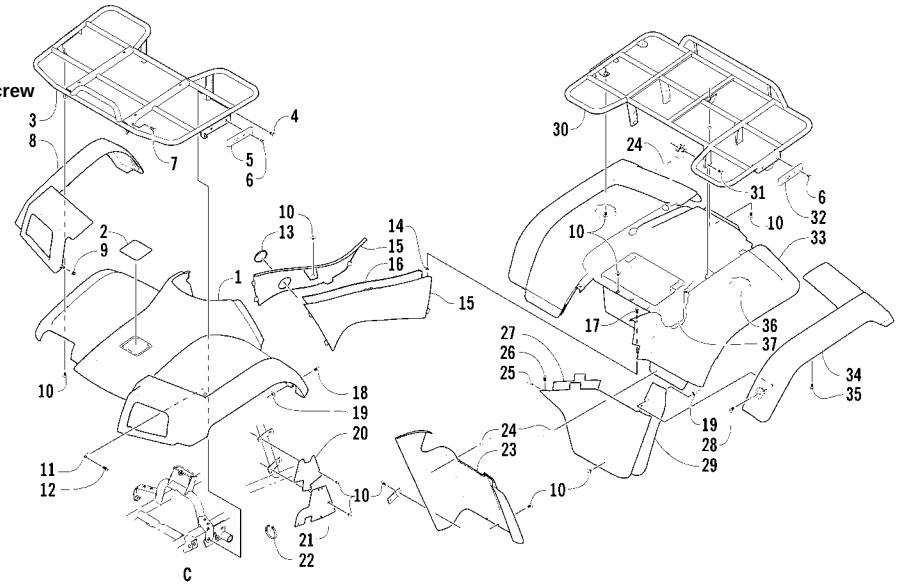
* 4x4 Models

0737-605

KEY

1. Fender Panel
2. Access Cover
3. Rack
4. Cap Screw
5. Reflector
6. Clip
7. Cap Screw
8. Flare*
9. Stamped Nut*
10. Body Screw
11. Speed Nut
12. Machine Screw
13. Grommet
14. Expansion Nut
15. Side Panel
16. Heat Shield
17. Machine Screw
18. Screw
19. T-Nut w/Teeth
20. Fender Panel
21. Fender Panel
22. Cable Tie
23. Kick Panel
24. Plastic Rivet
25. Clip
26. Self-Tapping Screw
27. Heat Shield
28. Screw
29. Fender Extension
30. Rack
31. Cap Screw
32. Reflector
33. Fender Panel
34. Flare
35. Self-Tapping Screw
36. Heat Shield
37. Heat Shield

400/500



* 4x4 Models

0737-567

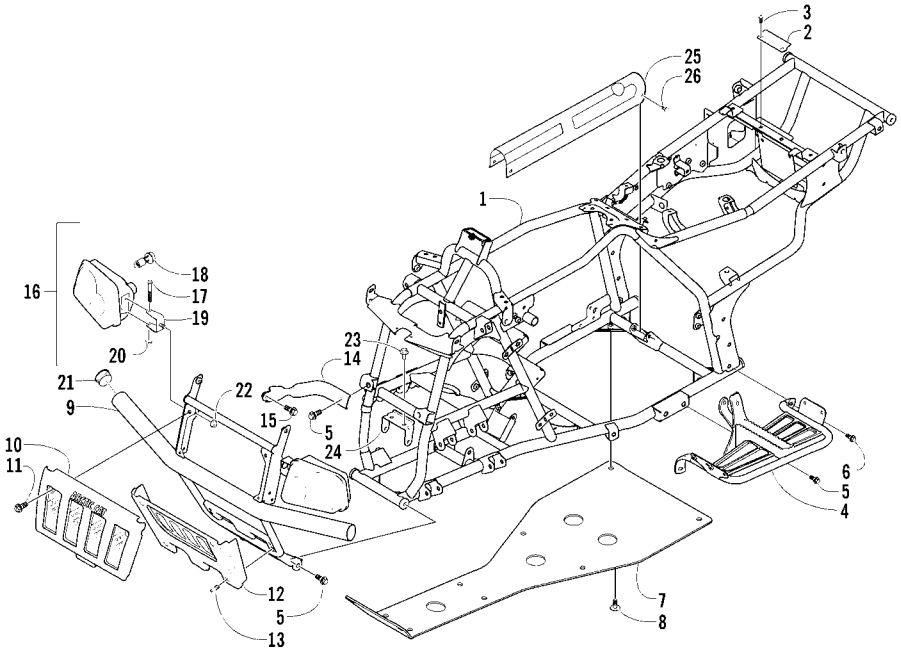
8

Frame/Exhaust Assembly Schematics

■NOTE: Some components may vary from model to model. The technician should use discretion and sound judgment.

KEY
1. Main Frame
2. Bracket
3. Machine Screw
4. Footrest
5. Cap Screw
6. Cap Screw
7. Belly Panel
8. Body Screw
9. Bumper
10. Grille
11. Machine Screw
12. Grille
13. Machine Screw
14. Bumper
15. Cap Screw
16. Headlight Assy
17. Cap Screw
18. Bulb
19. Bracket
20. Nut
21. Bumper Cap (300 4x4)
22. Nut
23. Cap Screw*
24. Bracket*
25. Driveshaft Cover*
26. Cap Screw*

250/300

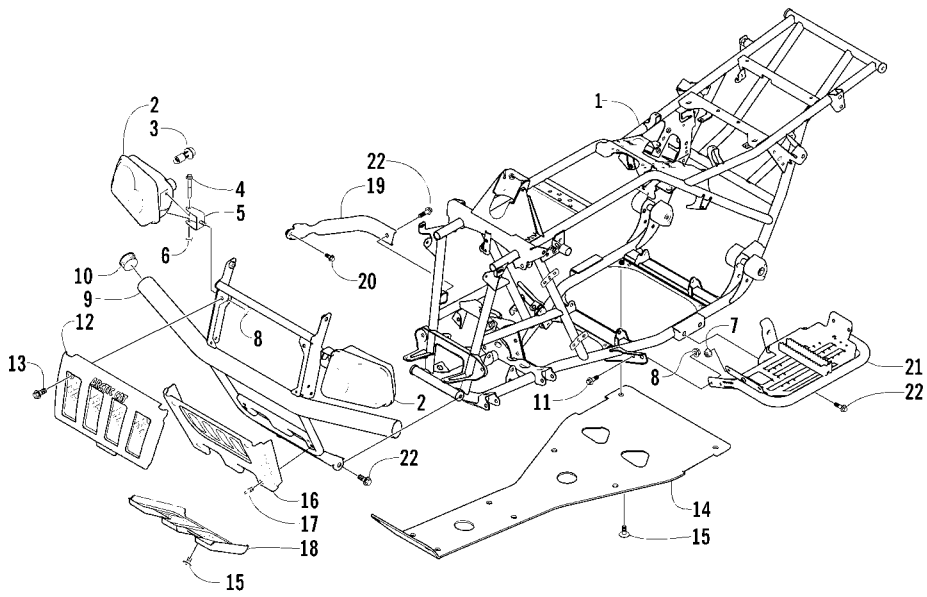


* 4x4 Models

0737-752

KEY
1. Main Frame
2. Headlight Assy
3. Bulb
4. Cap Screw
5. Bracket
6. Nut
7. Nut
8. Nut
9. Bumper
10. Cap
11. Cap Screw
12. Grille
13. Machine Screw
14. Belly Panel
15. Body Screw
16. Grille
17. Machine Screw
18. Skid Plate
19. Mounting Channel
20. Cap Screw
21. Footrest
22. Cap Screw

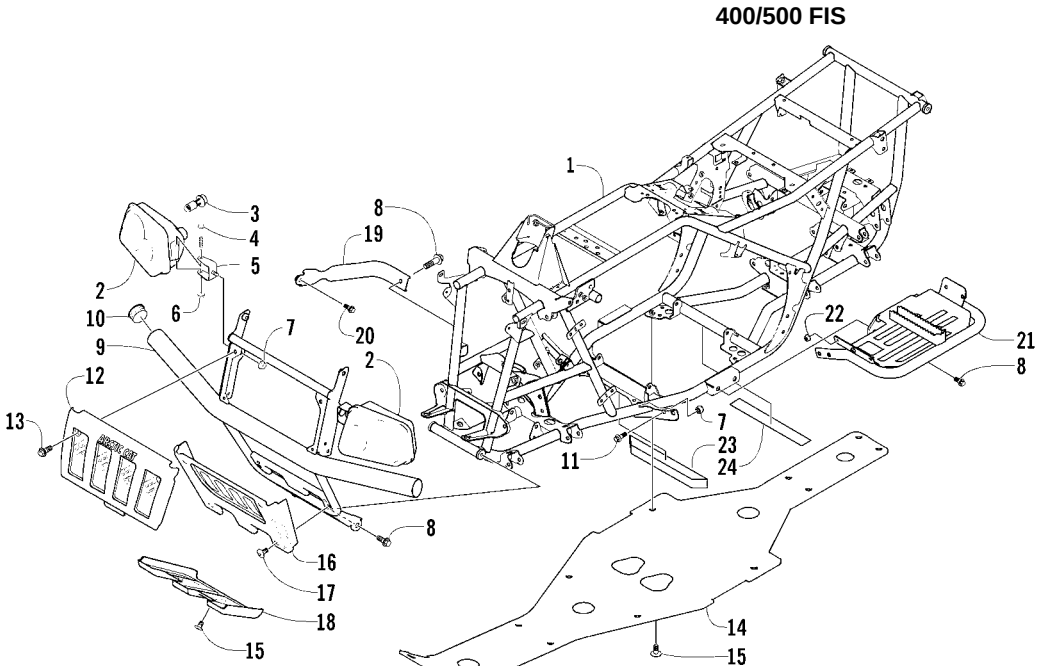
400/500 ACT



0737-594

KEY

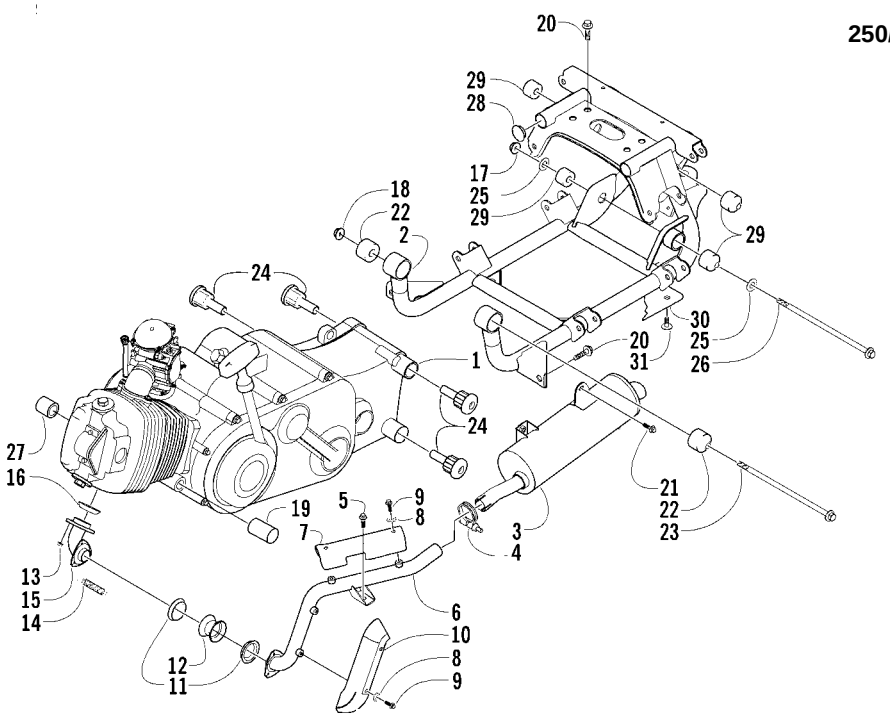
1. Main Frame
2. Headlight Assy
3. Bulb
4. Cap Screw
5. Bracket
6. Nut
7. Nut
8. Cap Screw
9. Bumper
10. Cap (4x4)
11. Cap Screw
12. Grille
13. Machine Screw
14. Belly Panel
15. Body Screw
16. Grille
17. Screw
18. Skid Plate
19. Mounting Channel
20. Cap Screw
21. Footrest
22. Nut



0737-584

KEY

1. Engine
2. Sub-Frame
3. Muffler
4. Clamp
5. Cap Screw
6. Exhaust Pipe
7. Cover
8. Lock Washer
9. Cap Screw
10. Cover
11. Gasket
12. Coupler
13. Nut
14. Extension Spring
15. Header Pipe
16. Seal
17. Nut
18. Nut
19. Spacer
20. Cap Screw
21. Cap Screw
22. Engine Mount
23. Cap Screw
24. Engine Mount
25. Washer
26. Cap Screw
27. Spacer
28. Cap
29. Engine Mount
30. Belly Panel*
31. Body Screw*



0737-750

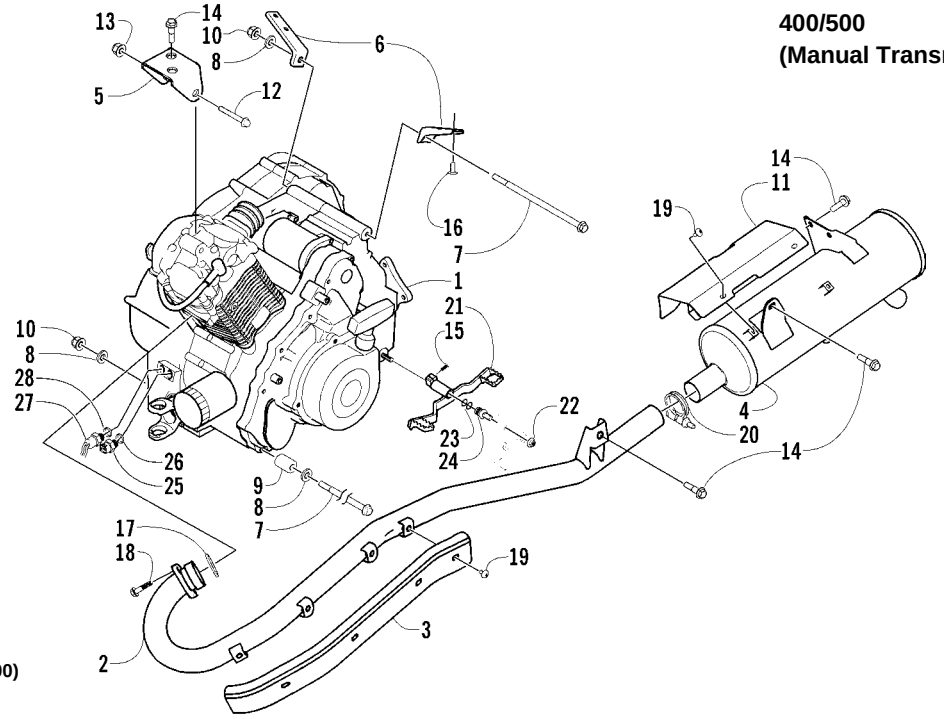
* 300 4x4

8

KEY

1. Engine
2. Exhaust Pipe
3. Cover
4. Muffler
5. Engine Bracket
6. Bracket
7. Cap Screw
8. Washer
9. Spacer
10. Lock Nut
11. Cover
12. Cap Screw
13. Nut
14. Cap Screw
15. Machine Screw
16. Screw
17. Exhaust Seal
18. Cap Screw
19. Machine Screw
20. Clamp
21. Shift Lever
22. Nut
23. O-Ring
24. Pin
25. Fan Switch (400)
26. Gasket (400)
27. Oil Light Switch (400)
28. Gasket (400)

400/500 (Manual Transmission)

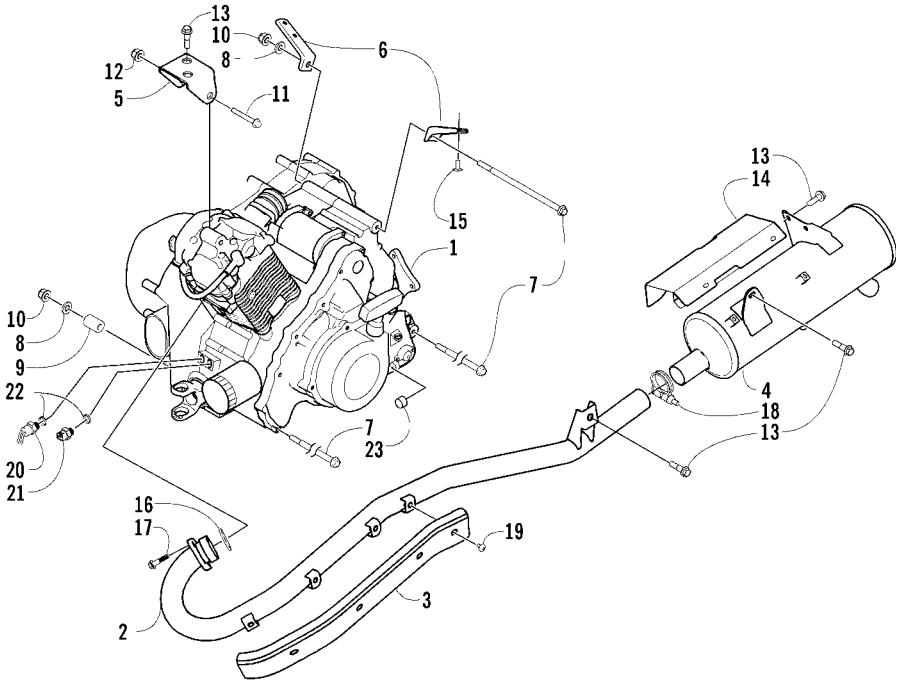


0737-597

KEY

1. Engine
2. Exhaust Pipe
3. Cover
4. Muffler
5. Upper Bracket
6. Bracket
7. Cap Screw
8. Washer
9. Spacer
10. Lock Nut
11. Cap Screw
12. Nut
13. Cap Screw
14. Cover
15. Cap Screw
16. Exhaust Seal
17. Cap Screw
18. Clamp
19. Machine Screw
20. Fan Switch
21. Oil Light Switch
22. Gasket
23. Cap (2x4)

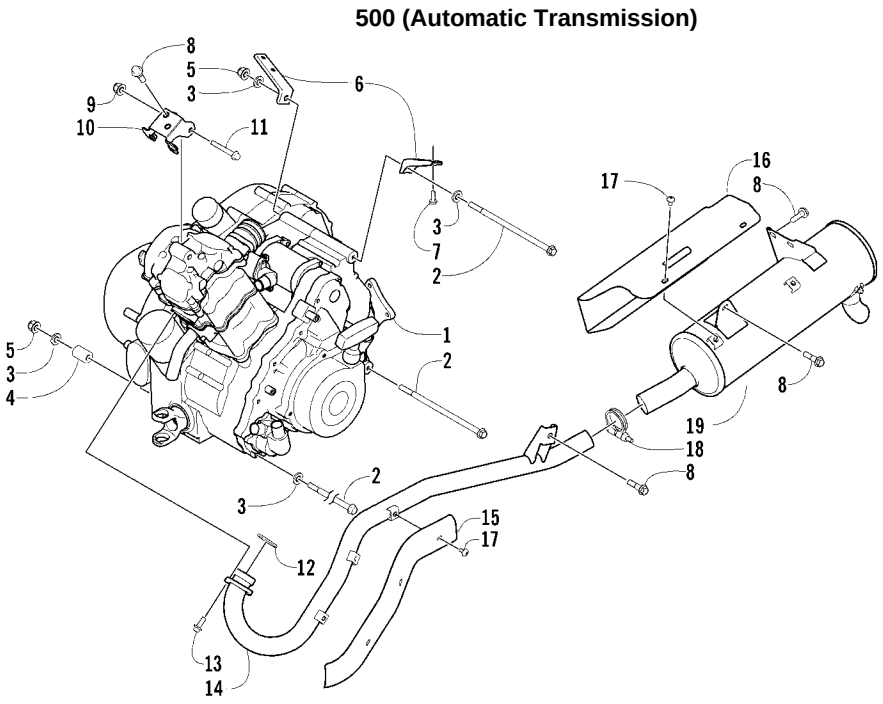
400 (Automatic Transmission)



0737-595

KEY

1. Engine
2. Cap Screw
3. Washer
4. Spacer
5. Lock Nut
6. Bracket
7. Cap Screw
8. Cap Screw
9. Nut
10. Bracket
11. Cap Screw
12. Seal
13. Cap Screw
14. Exhaust Pipe
15. Cover
16. Cover
17. Machine Screw
18. Clamp
19. Muffler

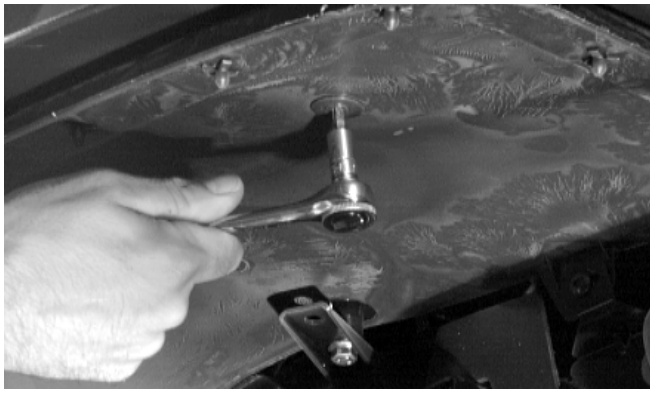


0737-700

Front Rack

REMOVING

1. Remove the two cap screws securing the fenders to the rack.



AF600DA

2. Remove the cap screws securing the rack to the frame and front bumper assembly.
3. Remove the front rack from the ATV.

CLEANING AND INSPECTING

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

1. Clean all rack components with parts-cleaning solvent.
2. Inspect all welds for cracking or bending.
3. Inspect threaded areas of all mounting bosses for stripping.
4. Inspect for missing decals and/or reflectors.

INSTALLING

1. Place the rack into position on the frame and bumper. Start the cap screws and finger-tighten only.
2. Install the two cap screws securing the rack to the fenders. Tighten all hardware securely.

Front Bumper Assembly

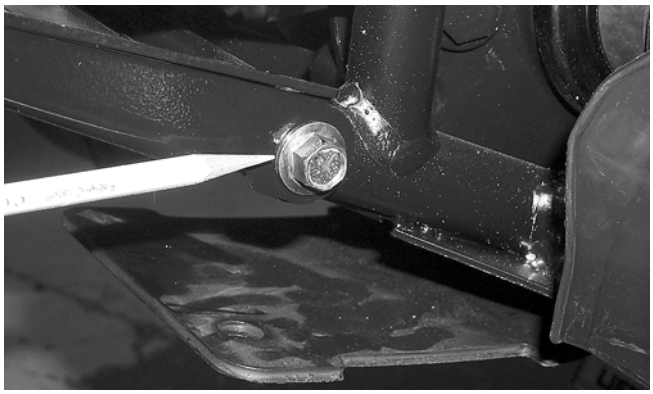
REMOVING

■**NOTE: Remove the headlights with the front bumper.**

1. Remove the main wiring harness connectors from the four headlights.
2. Remove the two screws securing the grille to the front bumper.
3. Remove the two push nuts securing the fender extension to the front bumper. Push the fender extension studs out of the front bumper.

CC856

4. Remove the four cap screws securing the front skid plate to the front bumper.
5. Remove the two cap screws securing the front bumper to the frame.



CC858

6. Remove the two cap screws securing the front bumper to the front bumper supports.

CC857

7. Remove the front bumper with headlights.

CLEANING AND INSPECTING

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

1. Clean all bumper components with parts-cleaning solvent.
2. Inspect all welds for cracking or bending.
3. Inspect threaded areas of all mounting bosses for stripping.
4. Inspect the wiring harness and headlights for damage.
5. Inspect the screen for damage or air-flow obstructions.

INSTALLING

1. Place the front bumper assembly into position on the frame and secure with four cap screws. Tighten securely.
2. Secure the front skid plate to the front bumper with the four cap screws. Tighten securely.
3. Place the two fender extension studs through the front bumper and secure with the existing push nuts.

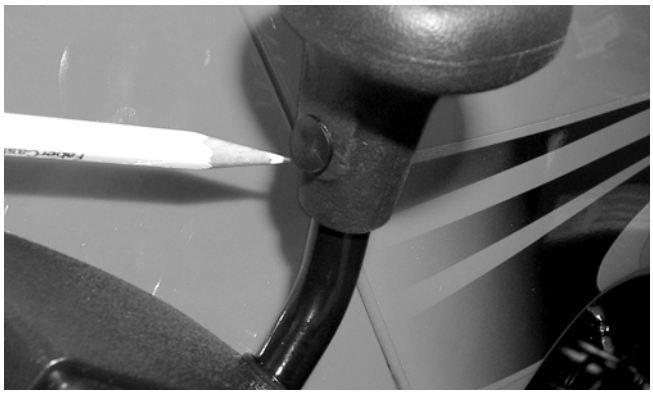
CC856

4. Position the grille in the front bumper and secure.
5. Connect the wiring to each of the headlights.

Front Fender/ Side Panels

REMOVING

1. Remove the front rack (see Front Rack in this section).
2. Remove the three cap screws securing the two side panels to the frame and rear fenders; then remove the side panels.
3. Using a small flat-blade screwdriver, carefully remove the retaining pin securing the gear shift knob to the shift lever; then remove the knob from the lever.



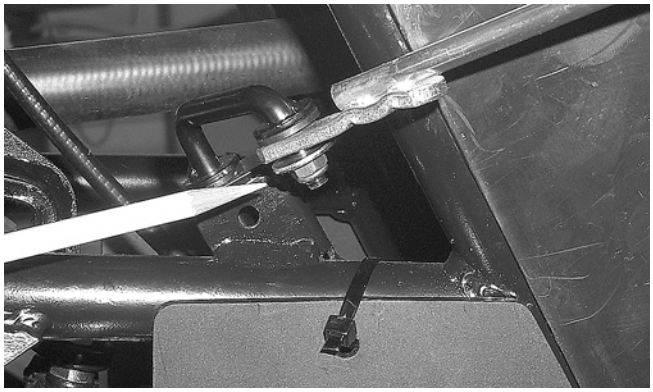
CC852

4. Remove the three machine screws securing the gear shift linkage cover to the fender and remove the cover.

■**NOTE: The cover is located inside the left-front wheel well.**

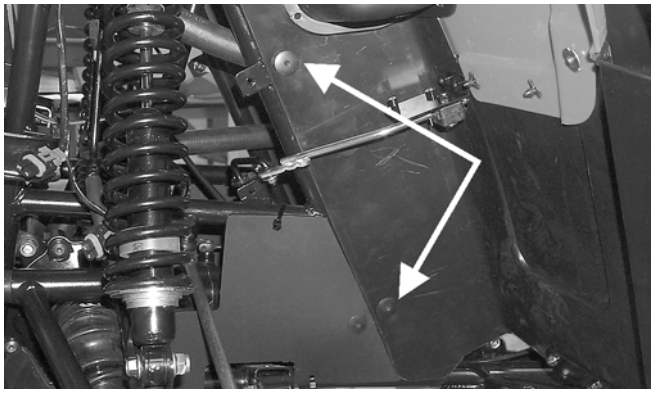
CC851

5. Remove the nut securing the drive selector linkage. Account for a washer and bushing.

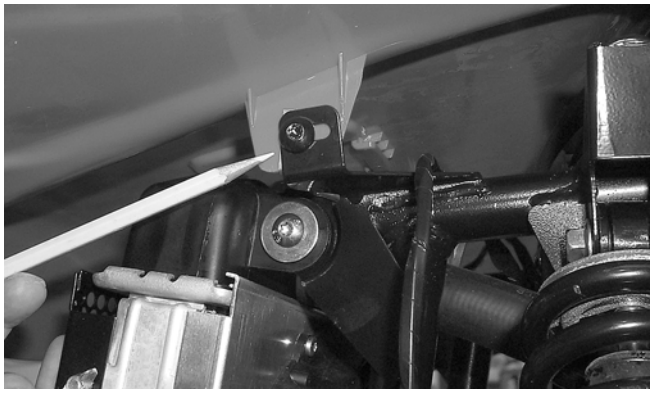


CC853

6. Remove the six cap screws securing the fender to the frame.

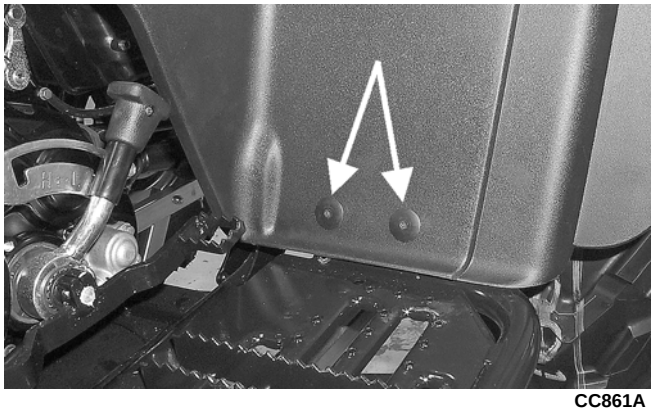


CC854A



CC855

7. Remove the four cap screws and nuts securing the fender to the footrests.



CC861A

8

8. Disconnect the wires from the accessory plug (if equipped); then remove the accessory plug from the fender.

9. Remove the fenders from the ATV.

CLEANING AND INSPECTING

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

1. Clean all fender components with part-cleaning solvent and soap and water.

2. Inspect fenders for cracks and/or loose rivets.

3. Inspect for any missing decals.

INSTALLING

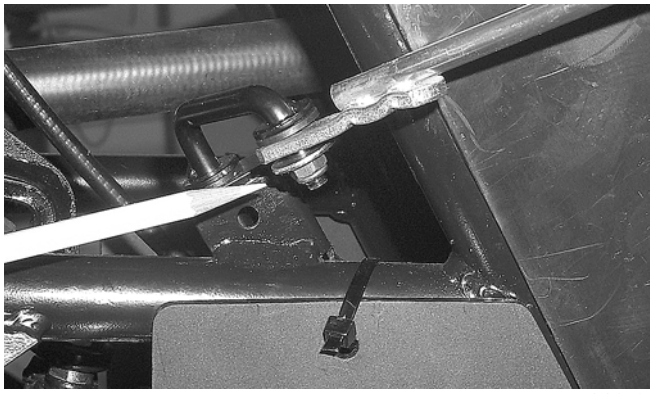
1. Place the fenders into position on the ATV.

2. Install the accessory plug (if equipped) into the fender; then connect the two accessory plug wires.

■ NOTE: The accessory plug red wire goes on the center connector.

3. Install the cap screws (five per side) securing the fenders to the frame and footrests and finger-tighten; then tighten the ten fasteners securely.

4. Connect the drive selector linkage using existing hardware. Tighten securely.



CC853

5. Install the gear shift linkage cover in the left-front fender well. Tighten securely.

CC851

6. Place the gear shift knob into position on the shift lever and secure with the retaining pin.

7. Place the side panels into position and secure.

8. Install the front rack (see Front Rack in this section).

Fender Flares/ Extensions

REMOVING

1. Using a side-cutter, remove the appropriate plastic rivets.

■ NOTE: To remove a front extension, first remove the grille; then remove the push nuts securing the extension to the bumper.

2. Remove the cap screws securing the extensions or flares to the frame and footrest.

3. Remove the self-tapping screws securing the extension to the fender.

INSTALLING

1. Place the flare or extension into position. Using the Plastic Rivet Setter (p/n 0444-056), secure with Plastic Rivets (p/n 0423-046) or suitable substitute.

2. Secure the extensions or flares with the cap screws and self-tapping screws.

Footrests

REMOVING

1. Remove the cap screws securing the fender extension to the footrest. Account for all cap screws and one nut.

■ NOTE: It will be easiest to remove the front inner cap screw by removing the nut from inside the wheel well.

2. On the right-side footrest, disconnect the foot brake switch from the main wiring harness.

3. Remove the cap screws securing the footrest to the frame; then remove the footrest.

■ NOTE: On the right-side footrest, it will be necessary to remove the foot brake cable from the brake pedal.

CLEANING AND INSPECTING

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

1. Clean the footrest in parts-cleaning solvent.

2. Inspect the footrest weldments for cracks or unusual bends.

3. Inspect all tubing for cracks or unusual bends.

INSTALLING

1. Connect the foot brake cable to the brake pedal (right-side footrest).

2. Place the footrest into position on the frame and loosely secure with the four cap screws.

3. Secure the fender extension to the footrest with existing hardware. Tighten securely.

4. Tighten the 10 mm footrest cap screws (from step 2) to 5.5 kg-m (40 ft-lb); then tighten the 8 mm cap screws (from step 2) to 2.8 kg-m (20 ft-lb).

5. Connect the foot brake switch to the main wiring harness. Ensure that the harness is properly secured to the frame and away from any moving parts.

Belly Panel

REMOVING

1. Remove the machine screws and shoulder washers securing the belly panel to the underside of the frame.

2. Remove the belly panel.

INSTALLING

1. Place the belly panel into position on the underside of the frame.

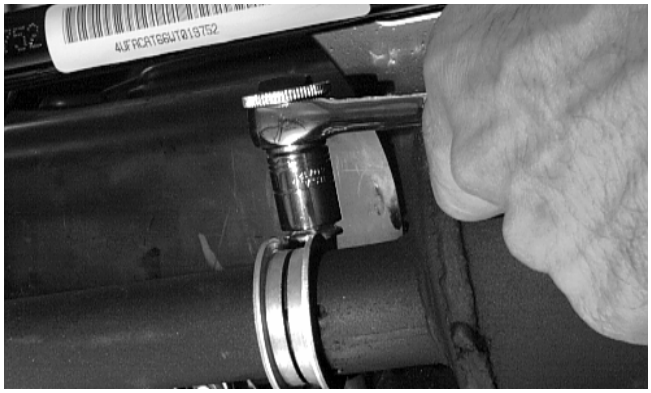
2. Install the machine screws and shoulder washers. Tighten securely.

Exhaust System

REMOVING MUFFLER

1. Remove the cap screws securing the muffler to the frame and account for all mounting hardware.

2. Loosen the clamp at the muffler/exhaust pipe juncture; then remove the muffler.



CH056D

INSPECTING MUFFLER

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

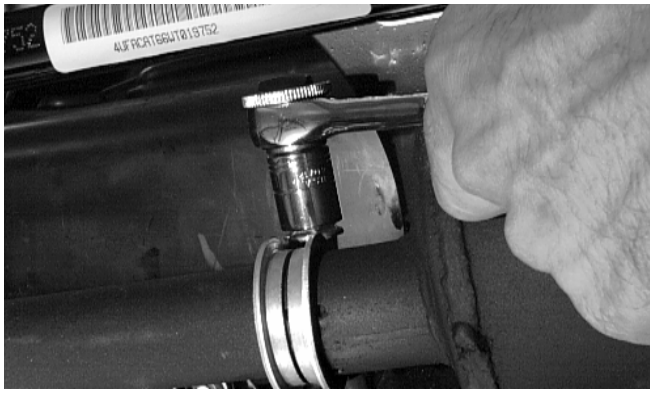
1. Inspect muffler externally for cracks, holes, and dents.

2. Inspect the muffler internally by shaking the muffler back and forth and listening for rattles or loose debris inside the muffler.

■ NOTE: For additional details on cleaning the muffler/spark arrester, see Section 2.

INSTALLING MUFFLER

1. Install the muffler on the frame and into the muffler/exhaust pipe juncture accounting for all mounting hardware.
2. Tighten cap screws securely; then tighten the juncture clamp.



CH056D

Rear Rack

REMOVING

1. Remove the cap screws securing the rear rack to frame and rear fenders. Account for any washers.
2. Lift the rack upward and remove from the frame.

CLEANING AND INSPECTING

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

1. Clean all rear rack components with parts-cleaning solvent.
2. Inspect all welds for cracking or bending.
3. Inspect threaded areas of all mounting bosses for stripping.
4. Inspect for missing decals and/or reflectors.

INSTALLING

1. Place the rack into position on the frame; then install the cap screws and any washers.
2. Tighten all fasteners securely.

Rear Fender

REMOVING

1. Remove the seat (see Seat in this section).
2. Remove the rear rack (see Rear Rack in this section).
3. Remove side panels (see Front Fender/Side Panels in this section).
4. Remove the cap screws and washers securing the fender to the frame and footrests.
5. On the 400/500 models:
   A. Remove the battery hold-down and tool kit and disconnect the battery cables (negative cable first) and the vent hose; then remove the battery.
   B. Remove the two screws securing the fuse panel to the fender; then disconnect all wires from the back of the panel.
   C. Route the battery cables, fuse panel wiring, and vent hose out of the fender through the hole at the bottom of the battery compartment.
6. Disconnect the taillight wiring harness three-prong connector; then remove the fender.

CLEANING AND INSPECTING

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

1. Clean all rear fender components with parts-cleaning solvent and soap and water.
2. Inspect side panels, fender extensions, and rear fenders for cracks and loose rivets.
3. Inspect threaded areas of all mounting bosses for stripping.
4. Inspect for missing decals.

INSTALLING

1. Place the fender into position on the frame.
2. On the 400/500 models:
   A. Route the battery cables, fuse panel wiring, and vent hose into the fender through the hole at the bottom of the battery compartment.
   B. Using the cover of the fuse panel and the appropriate wiring diagram (see Section 5) as guides, connect the fuse panel wires.

C. Secure the fuse panel to the fender with the two screws. Tighten securely.

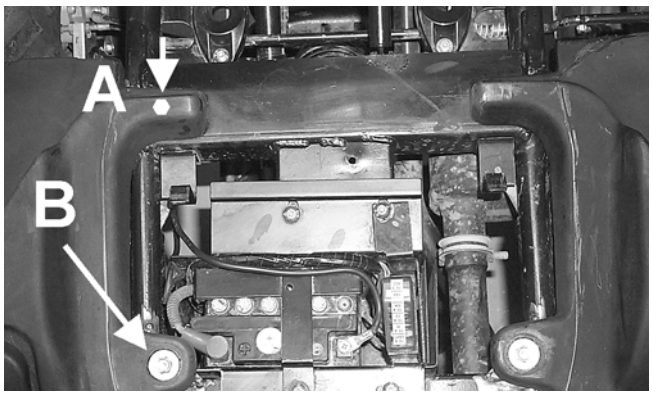
3. Secure the fender to the frame and footrests with existing cap screws and washers. Tighten securely.
4. On the 400/500, place the battery in position in the compartment; then install the vent hose, battery cables (positive cable first), the tool kit, and the battery hold-down.
5. Route the taillight wiring harness over the rear frame; then connect the three-prong connector.
6. Install the side panels (see Front Fender/Side Panels in this section).
7. Install the rear rack (see Rear Rack in this section).
8. Install the seat (see Seat in this section).

Side Box
(TBX Model)

REMOVING

1. Pull the cargo box release lever (located on the left side between the cargo box and the rear tire) and fully raise the cargo box.
2. Pull the seat lock lever forward (located below the right side of the seat), raise the front end of the seat, and slide it forward and off the ATV.
3. Remove the two cap screws (located inside the side box) securing the side box to the footrest.
4. Remove the screw securing the side box to the side panel.
5. Remove the two cap screws (A and B) securing the side box to the frame.

■NOTE: Cap screw (A) is in the position shown and is accessed from under the frame.



CC865A

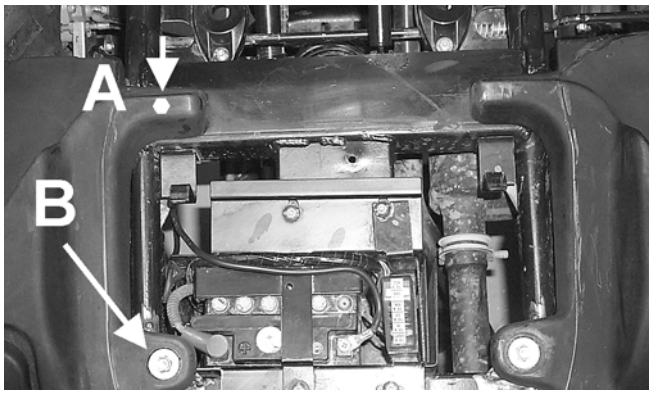
CLEANING AND INSPECTING

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

1. Clean all side box components with soap and water.
2. Inspect the side box for cracks, tears, and loose mounting hardware.
3. Inspect the side box hatch O-ring seals for cuts or tears.

INSTALLING

1. Place the side box into position on the frame; then secure with the two cap screws (A and B). Tighten cap screw (A) to 2.5 kg-m (18 ft-lb) and cap screw (B) to 2.8 kg-m (20 ft-lb).



CC865A

2. Secure the side box to the side panel with the existing screw.
3. Secure the side box to the footrest with existing hardware. Tighten securely.
4. Install the seat.
5. Lower and latch the cargo box.

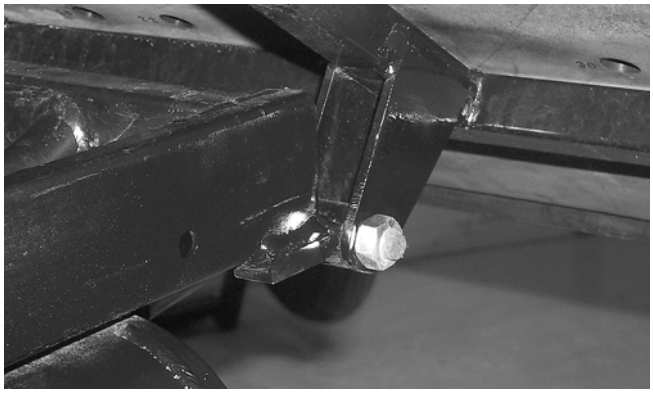
Cargo Box
(TBX Model)

REMOVING

1. Pull the cargo box release lever (located on the left side between the cargo box and the rear tire) and fully raise the cargo box.
2. Remove the hairpin clip and clevis pin securing the cargo box support arm to the cargo box frame; then lower the cargo box.

3. Remove the two cap screws and lock nuts securing the cargo box to the frame; then remove the cargo box and 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.



CC866

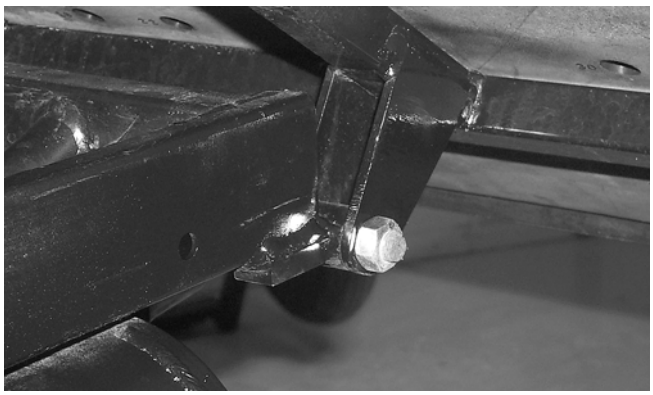
CLEANING AND INSPECTING

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

1. Clean all cargo box components with soap and water.
2. Inspect the cargo box for cracks, tears, and loose mounting hardware.
3. Inspect the welds of the cargo box frame for cracking or bending.
4. Inspect the cargo box gate latches for smooth operation.

INSTALLING

1. Place the cargo box into position on the frame. Secure with cap screws and new lock nuts. Tighten to 4.8 kg-m (35 ft-lb).



CC866

2. While an assistant holds the cargo box in the raised position, secure the cargo box support arm to the cargo box frame with a clevis pin and hair-pin clip.
3. Lower and latch the cargo box.

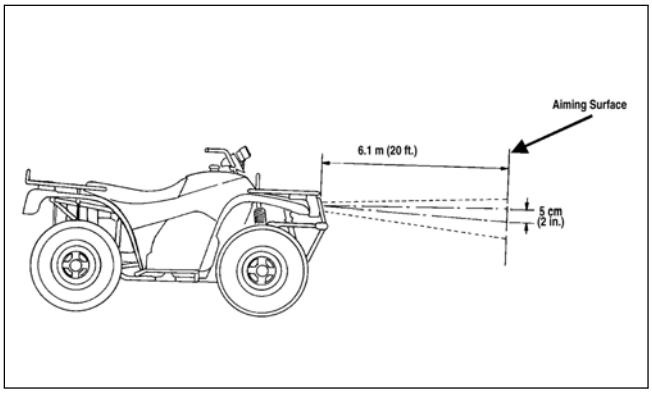
Adjusting Headlight

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

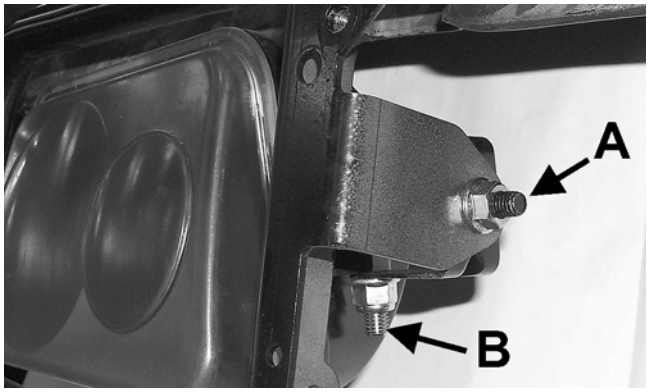
1. Position the ATV on a level floor so the headlights are approximately 6.1 m (20 ft) from an aiming surface (wall or similar aiming surface).

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

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



ATV-0070



AF926A

7. Adjust each headlight until correct aim is obtained.

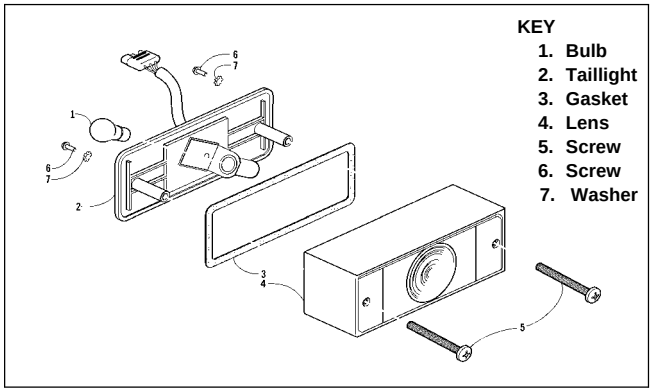
   A. Horizontal - Loosen nut (A) and adjust for proper aiming. Tighten the nut securely.

   B. Vertical - Loosen nut (B) and adjust for proper aiming. Tighten the nut securely.

⚠ WARNING

Do not operate the ATV unless the headlight beam is adjusted properly. An incorrectly adjusted beam will not provide the operator the optimum amount of light.

Taillight Assembly



0732-336

REMOVING

1. Unplug the three-prong connector and free the taillight wiring harness from the frame.
2. Remove the torx-head cap screws securing the taillight assembly to the frame. Account for any washers.
3. Remove the taillight assembly.

INSPECTING

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

1. Inspect wiring harness, three-prong connector, lens, base, cap screws, and socket for damage.
2. Inspect all wires for corroding, pinching, and cracking.
3. Inspect the bulb for wattage, voltage, and proper operation.

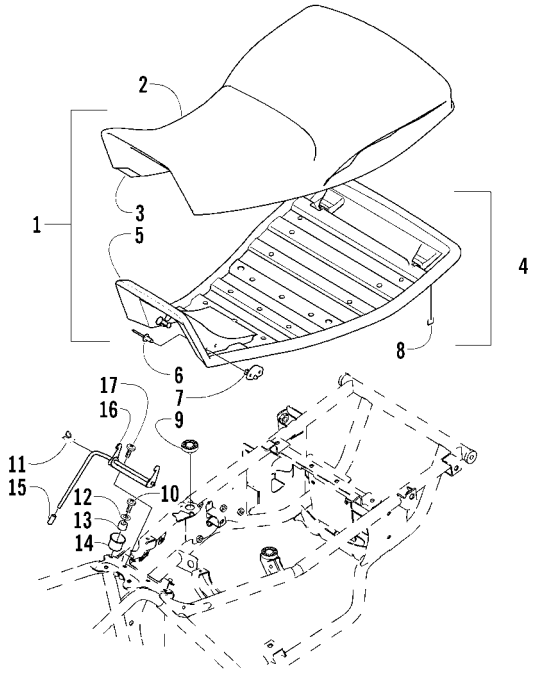
INSTALLING

1. Place the assembly into position on the frame and secure with torx-head cap screws and any washers.
2. Tighten the cap screws securely.
3. Route the wiring harness over the rear frame; then connect the three-prong connector.

Seat

REMOVING/INSTALLING (250/300)

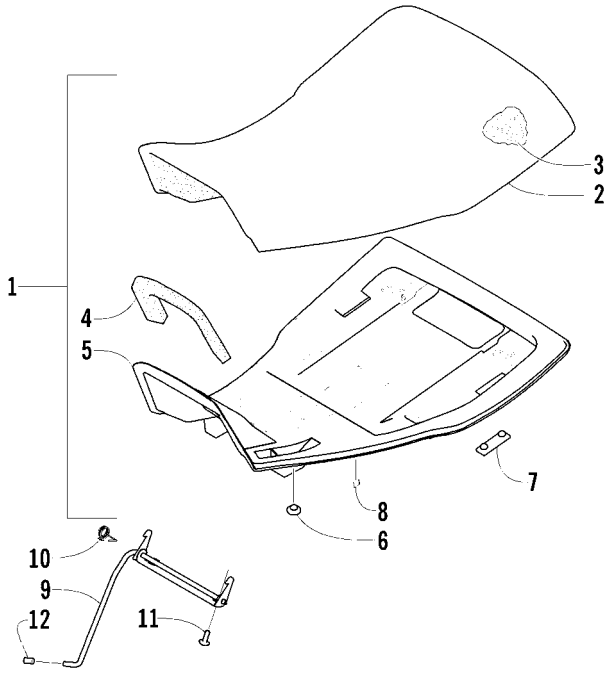
KEY
1. Seat Assy
2. Cover
3. Foam
4. Base Assy
5. Base
6. Rivet
7. Base Pin
8. Staple
9. Grommet
10. Cap Screw
11. Spring
12. Washer
13. Collar
14. Base Bumper
15. Protector Cap
16. Seat Latch Assy
17. Machine Screw



0737-462

REMOVING/INSTALLING (500 TBX)

KEY
1. Seat Assy
2. Cover
3. Foam
4. Foam
5. Base Assy
6. Base Bumper
7. Base Bumper
8. Staple
9. Seat Latch
10. Spring
11. Screw
12. Protector Cap

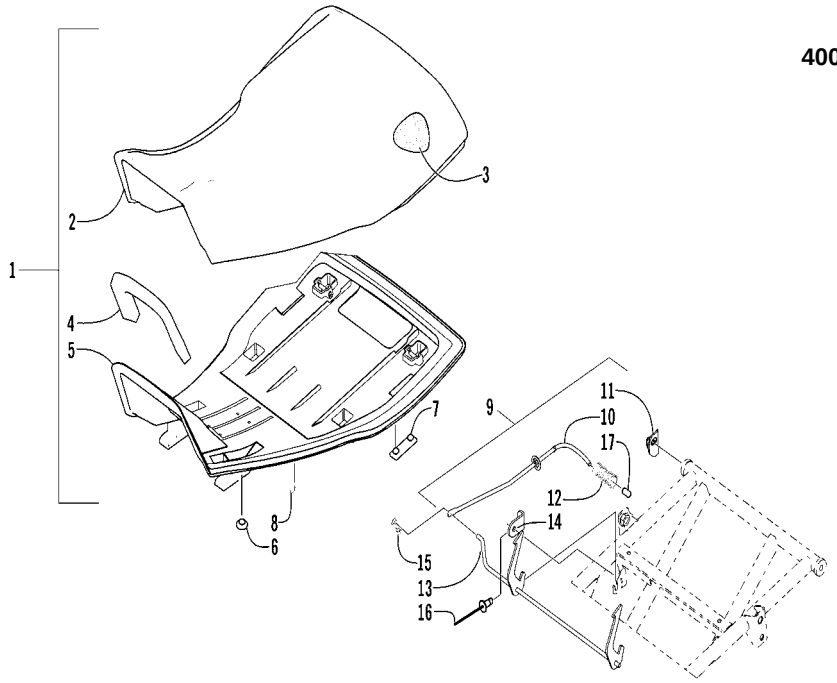


737-906A

1. To remove the seat, pull the seat lock lever forward (located below the right side of the seat). Raise the front end of the seat and slide it forward.
2. To lock the seat into positon, slide the front of the seat into the seat retainers and push down firmly on the rear of seat. The seat should automatically lock into position.

REMOVING/INSTALLING (400/500)

KEY
1. Seat Assy
2. Cover
3. Foam
4. Foam
5. Base Assy
6. Base Bumper
7. Base Bumper
8. Staple
9. Release Rod Assy
10. Release Rod
11. Bracket
12. Spring
13. Seat Latch
14. Plate
15. Clip
16. Rivet
17. Protector Cap



0737-561

1. To remove the seat, pull the seat lock lever backward (located under the rear rack between the storage compartment and the frame). Raise the rear of the seat and slide it rearward.

2. To lock the seat into positon, slide the front of the seat into the seat retainers and push down firmly on the rear of seat. The seat should automatically lock into position.

SECTION 9 - CONTROLS/INDICATORS

9

TABLE OF CONTENTS

Back to TOC

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.

AF637D

2. Place an absorbent towel around the connection to absorb brake fluid. Remove the brake hose from the master cylinder.

AF774D

⚠ CAUTION

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

3. Remove the clamp screws securing the brake assembly to the handlebar; then remove the assembly from the handlebar.

AF656D

DISASSEMBLING

1. Remove the lever mounting bolt and lock nut securing the brake lever to the master cylinder.
2. Remove the two screws securing the reservoir to the master cylinder; then remove the reservoir. Account for the gasket, the cover, and the O-ring.

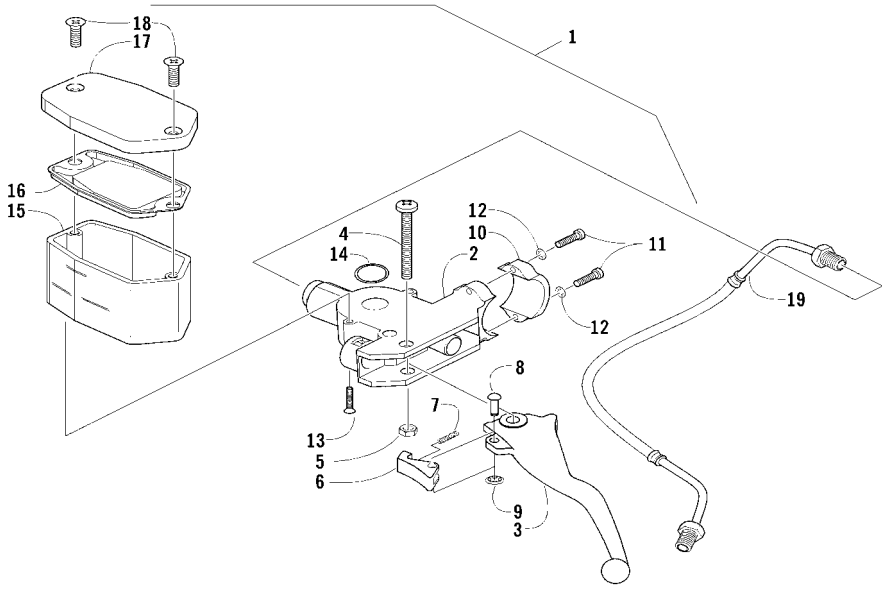
INSPECTING

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

1. Inspect the bolt securing the brake lever for wear and for cracked, stretched, or damaged threads.
2. Inspect the O-ring for deterioration and distortion.
3. Inspect the reservoir for cracks and leakage.
4. Inspect the brake hose for cracks and deterioration and the condition of the fittings (threaded and compression).

ASSEMBLING

KEY
1. Brake Assy
2. Master Cylinder
3. Brake Lever
4. Screw
5. Lock Nut
6. Brake Lever Lock
7. Spring
8. Pin
9. Nut
10. Clamp
11. Machine Screw
12. Lock Washer
13. Screw
14. O-Ring
15. Reservoir
16. Cover
17. Cover
18. Screw
19. Hose



0737-682

1. Install the O-ring, reservoir, gasket, and cover on the master cylinder. Tighten the two screws to 0.03 kg-m (10 in.-lb).

2. Install the brake lever onto the master cylinder and secure with the lever mounting bolt and new lock nut. Tighten the lock nut just to the point of ensuring free brake lever movement.

⚠ WARNING

Do not over-tighten the lock nut. Over-tightening the lock nut will cause the brake lever to bind. The lever must work freely and fully return to its stop after installation.

⚠ WARNING

A new lock nut must be used to secure the brake lever.

INSTALLING

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

AF656D

2. Install the brake hose on the master cylinder. Tighten to 0.8 kg-m (6 ft-lb).

AF774D

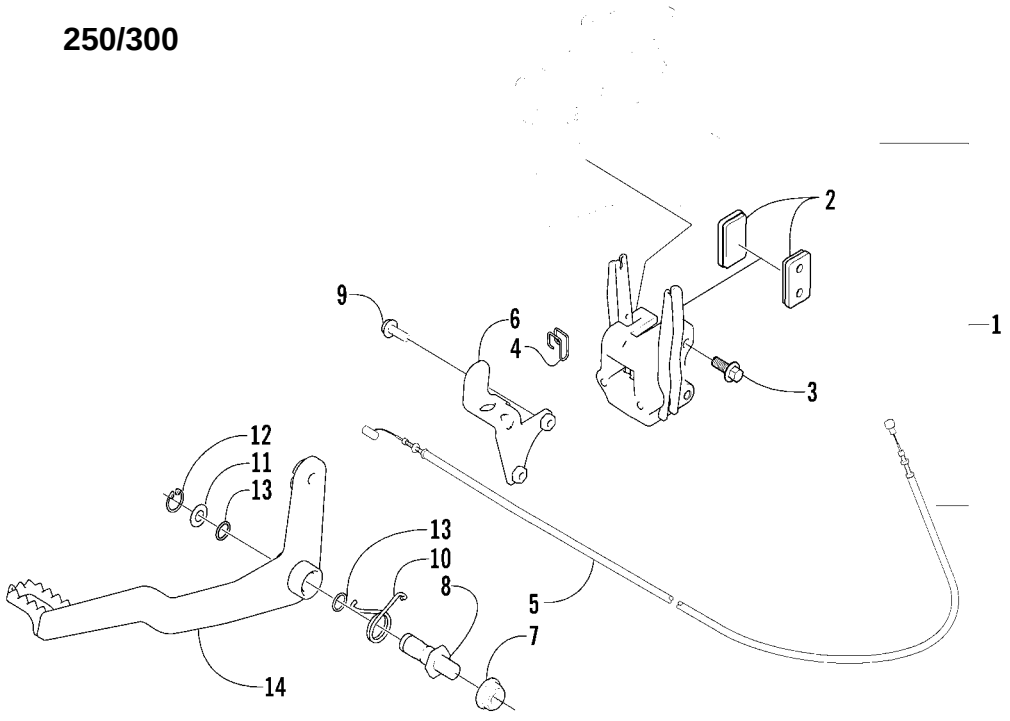
3. Bleed the brake system (see Section 2).

Auxiliary Brake Assembly Schematics

Pressing the auxiliary brake pedal downward will apply the auxiliary brake to the rear wheels.

250/300

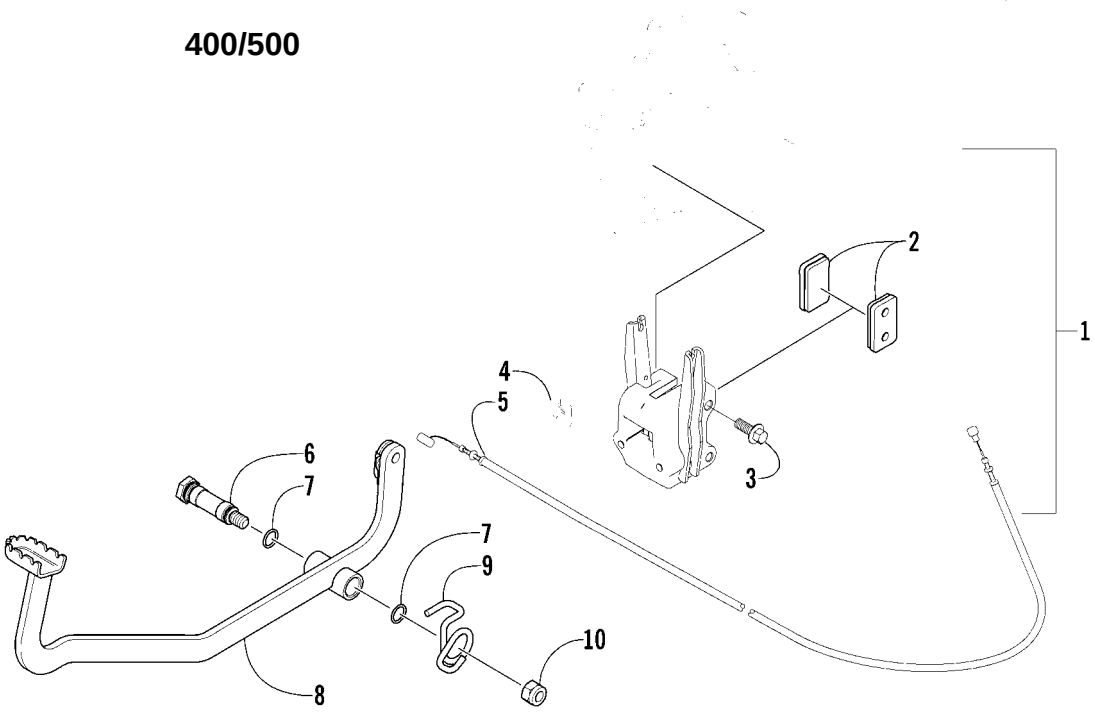
KEY
1. Brake Assy
2. Pad
3. Cap Screw
4. Wire Form
5. Cable
6. Bracket
7. Nut
8. Axle
9. Cap Screw
10. Spring
11. Washer
12. Snap Ring
13. O-Ring
14. Brake Lever



0737-504

400/500

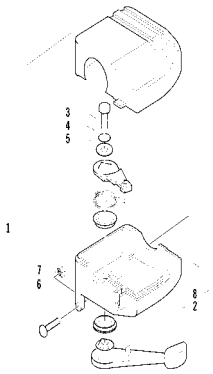
KEY
1. Brake Assy
2. Pad
3. Cap Screw
4. Wire Form
5. Cable
6. Axle
7. O-Ring
8. Brake Lever
9. Spring
10. Nut



0737-565

Throttle Control

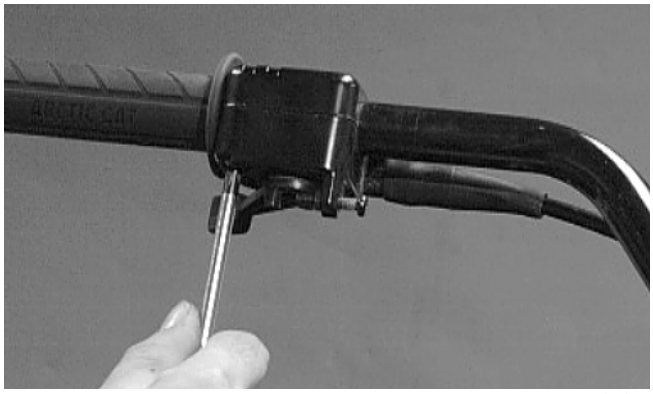
KEY
1. Throttle Case Assy
2. Lever
3. Cap Screw
4. Lock Washer
5. Washer
6. Screw
7. Nut
8. Screw



0737-633

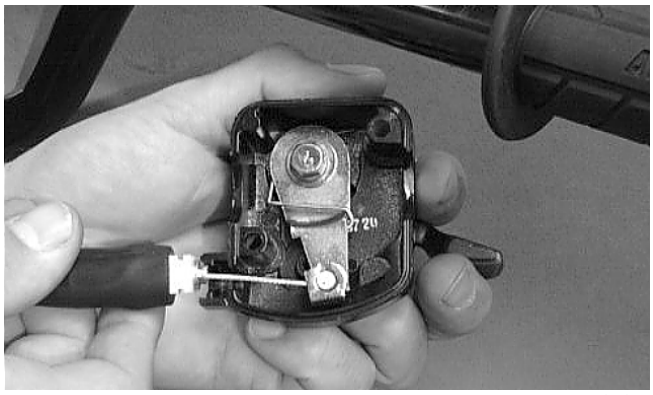
REMOVING

1. Remove the two machine screws securing the throttle control to the handlebar.



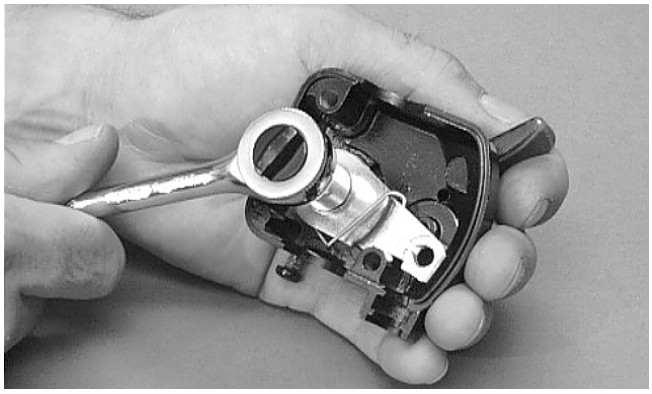
AL610D

2. Slide the grommet out of the lower half of the throttle control; then remove the cable from the actuator arm.



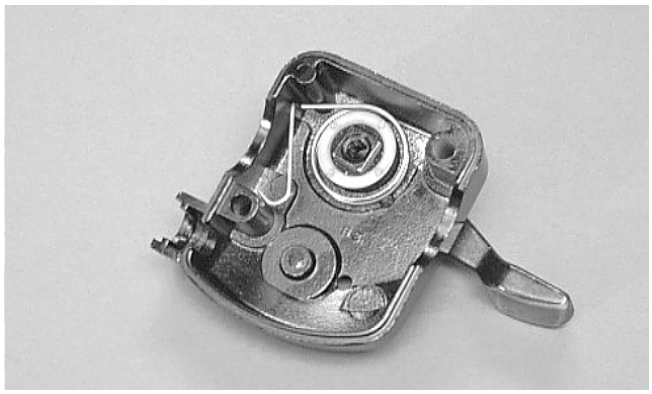
AF676D

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



AF677D

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



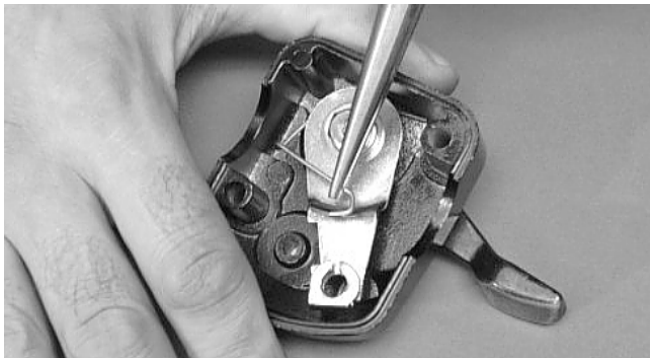
AF678D

INSTALLING

1. Place the return spring into the throttle control; then place the bushing and actuator arm into position. Secure with the cap screw, lock washer, and washer.

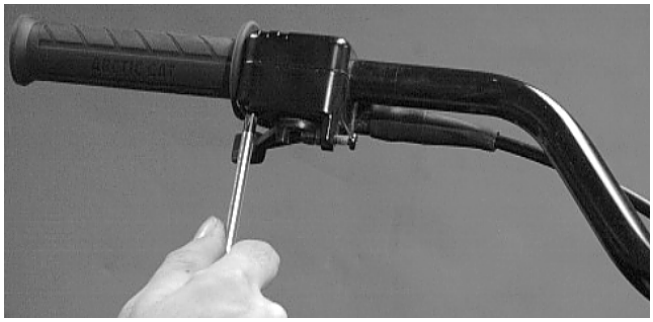
AF679D

2. Using a pair of needle-nose pliers, place the spring into position on the actuator arm.



AF680D

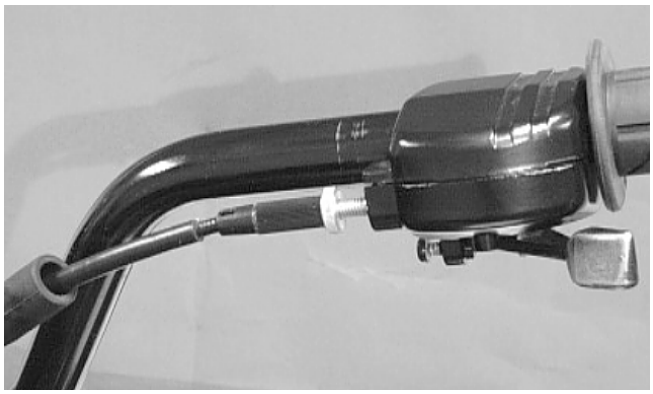
3. Place the two halves of the throttle control onto the handlebars and secure with the two machine screws.



AL610D

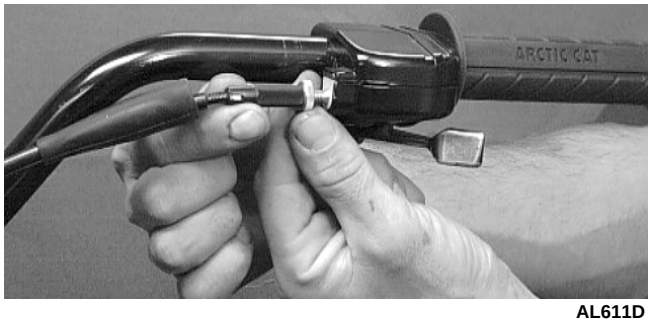
ADJUSTING

1. Slide the boot back to reveal the jam nut; then loosen the jam nut.



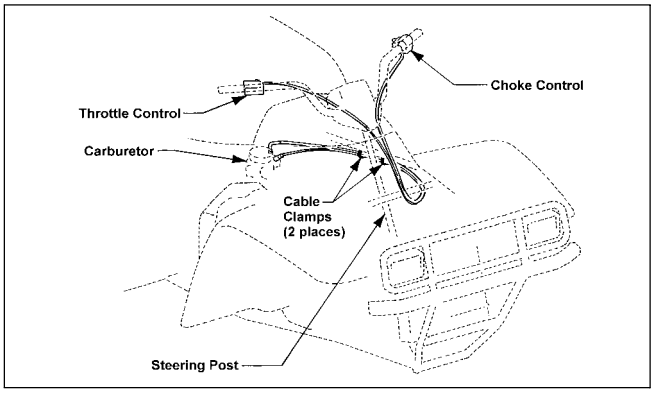
AF682D

2. Rotate the adjuster sleeve until 0.5-1.0 mm (0.02-0.04 in.) is attained.



AL611D

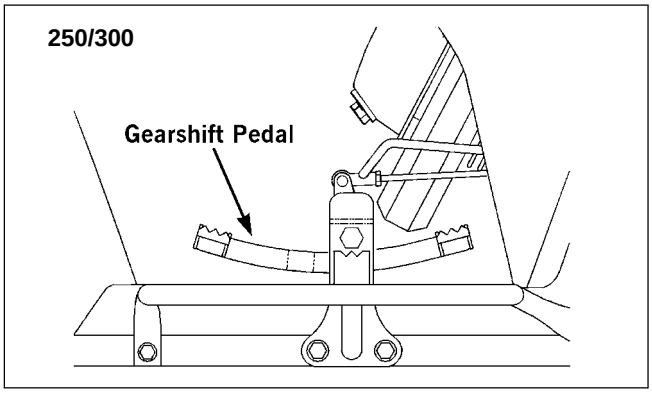
3. Secure the adjustment by tightening the jam nut; then slide the boot over the jam nut.



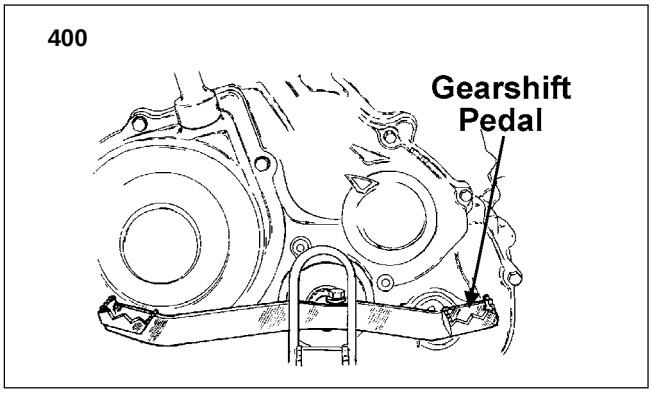
0732-412

Gearshift Pedal
(Manual Transmission)

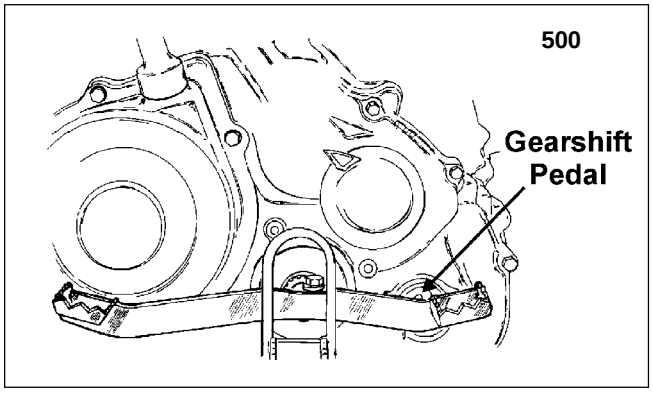
The gearshift pedal is attached to a ratchet mechanism in the transmission. Each time a gear is selected, the gearshift pedal will return to its normal position ready to select the next gear. To return to neutral, press down repeatedly (once for each gear) on the front of the pedal. Shift into gears by pressing down on the back of the pedal once for each gear. The ratchet mechanism makes it impossible to upshift or downshift more than one gear at a time.



736-567B



ATV0078C

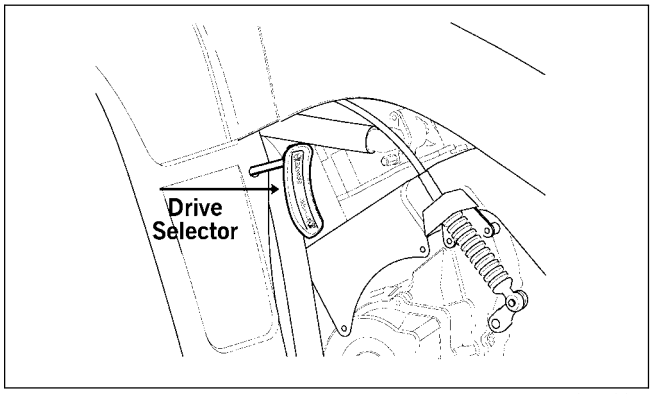


ATV0078B

Drive Selector
(300/400 4x4 Models/500)

The mechanical drive selector allows the operator to operate in either 2-wheel drive (rear wheels) or 4-wheel drive (all wheels). For normal riding on flat, dry, hard surfaces, 2-wheel drive should be sufficient. In situations of aggressive trail conditions, 4-wheel drive would be the desired choice.

To either engage or disengage the front wheels, come to a complete stop; then either push in (to engage) or pull out (to disengage) the front wheel differential. Apply slight throttle until positive engagement of the differential has been observed.



735-508A

⚠ CAUTION

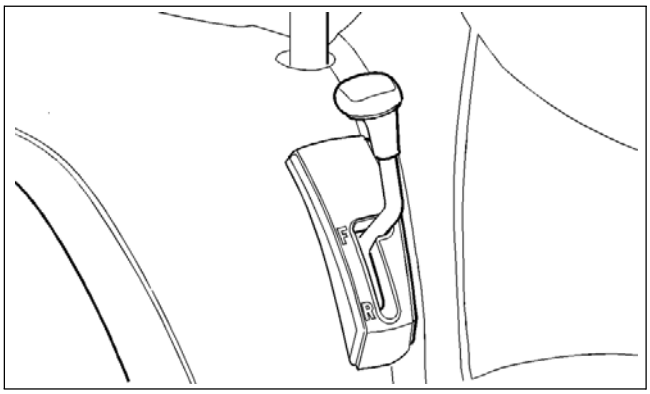
Do not attempt to either engage or disengage the front differential while the ATV is moving.

Reverse Shift Lever
(Manual Transmission)

To shift into reverse gear, stop the ATV completely and shift the transmission into neutral. Pull the reverse shift lever fully rearward to the "R" position. When the ATV is in reverse gear, the gearshift pedal will not function.

⚠ WARNING

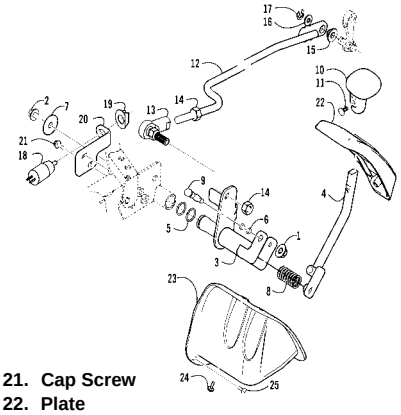
Never shift the ATV into reverse gear when the ATV is moving as it could cause the ATV to stop suddenly throwing the operator from the ATV.



0736-566

KEY

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

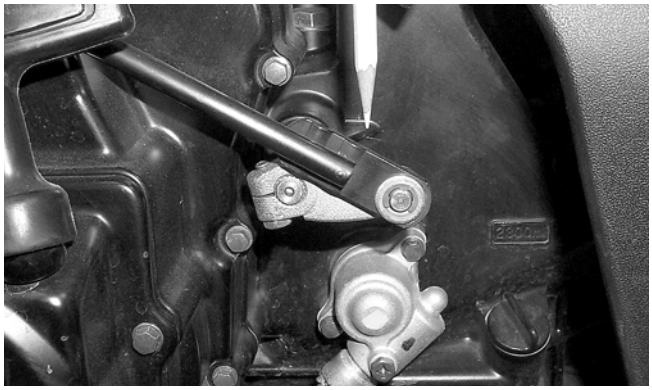


0736-908

REMOVING

1. Remove the seat (see Section 8).
2. Remove the gas tank (see Section 4).
3. Remove the three machine screws securing the left-side panel to the frame and rear fender; then remove the left-side panel.
4. Remove the E-clip securing the shift rod to the engine shift arm.

9



AF942

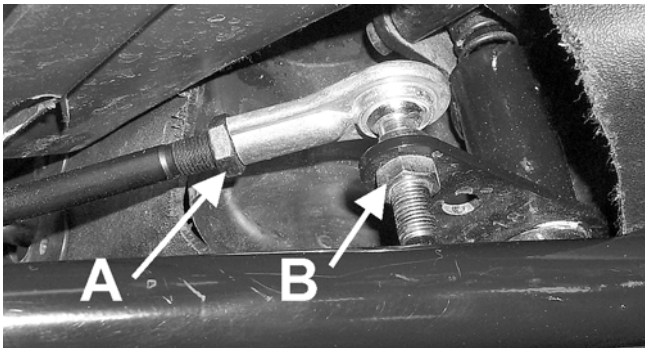
5. Remove the three machine screws securing the gear shift linkage cover to the fender and remove the cover.

■**NOTE: The cover is located inside the left-front wheel well.**

CC851

6. Remove the axle and nut securing the shift lever to the upper shift arm; then remove the shift lever. Account for the spring and two O-rings on the axle.

7. Using two open-end wrenches, remove the lock nut (B) securing the shift rod to the upper shift arm. Remove the shift rod and discard the lock nut.

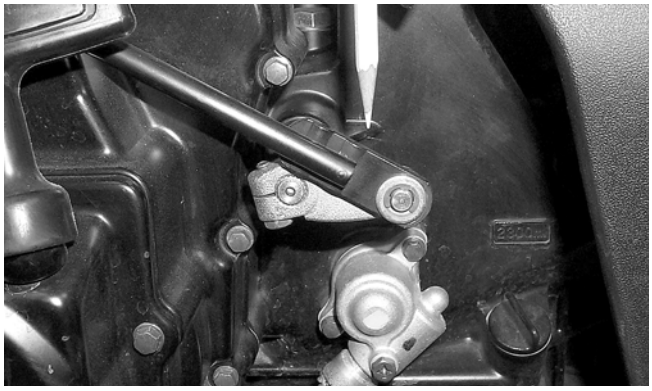


AF941A

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

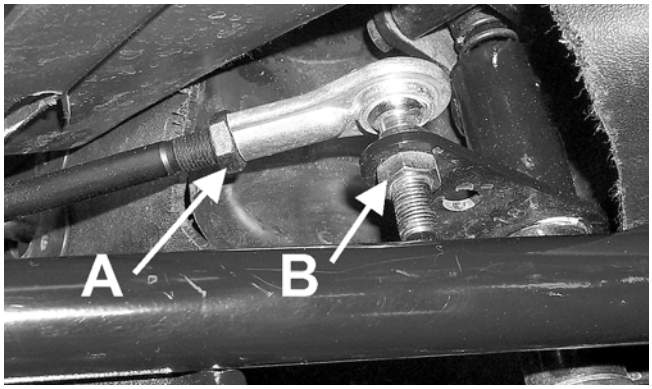
INSTALLING

1. Place the shift rod into position on the engine shift arm and secure with the existing E-clip.



AF942

2. Using a new lock nut, secure the shift rod to the upper shift arm; then using two open-end wrenches, tighten securely.



AF941A

3. Place the spring into position between the upper shift arm and shift lever; then making sure the O-rings are in place on the axle, secure the shift lever to the arm with the existing axle and nut.

4. Install the gas tank (see Section 4); then install the seat (see Section 8).

5. Place the left-side panel into position on the frame and secure with the three machine screws.

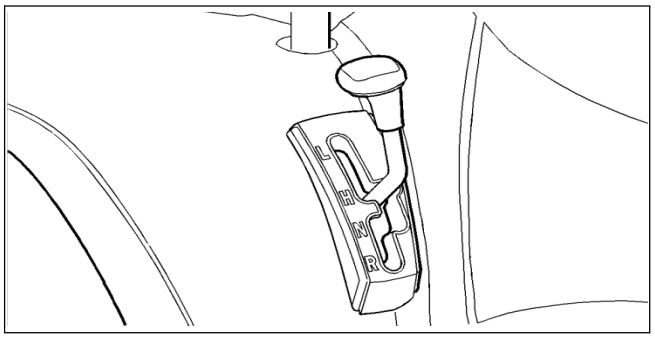
6. Install the gas tank (see Section 4); then install the seat (see Section 8).

7. Check shift lever adjustment (see Section 2).

Shift Lever
(Automatic Transmission)

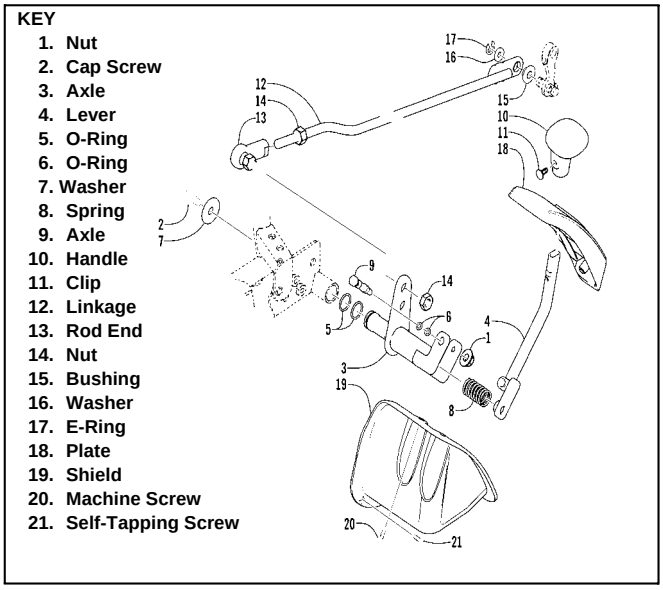
The Arctic Cat ATV with an automatic transmission has a dual-range transmission with reverse. To shift the ATV, follow these steps:

1. To engage the high range from neutral, move the shift lever forward.
2. To engage the low range from high range, move the shift lever outward and forward.



0736-565

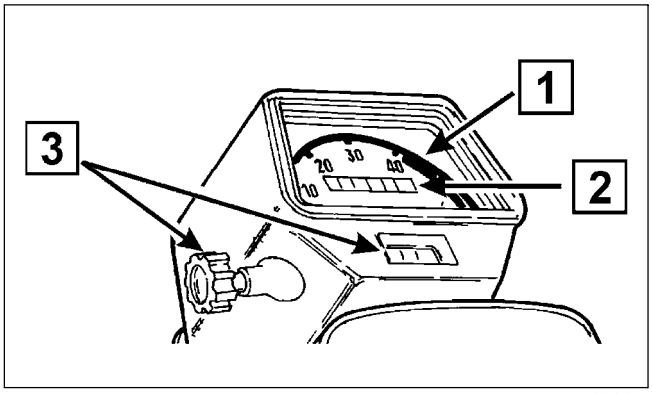
3. To engage reverse gear from neutral, move the shift lever outward and rearward into the R position.



0737-070

Speedometer/Indicator Lights

SPEEDOMETER

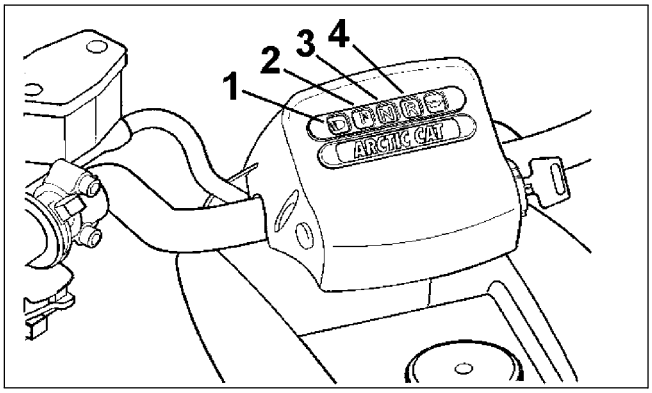


ATV0086E

1. **Speedometer** - The speedometer shows approximate speed.
2. **Odometer** - The odometer shows the total distance traveled.
3. **Trip Meter** - The trip meter is an odometer which can be reset. It can be used to show the distance traveled on short trips or between gas stops. Turning the knob counterclockwise resets the trip meter to zero.

INDICATOR LIGHTS

■ **NOTE: The number and functions of indicator lights will vary from model to model.**



733-707B

1. **High Beam Indicator** - A blue light will illuminate when the lights are on high beam. The light will not be illuminated when the lights are switched to low beam.

9

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

⚠ CAUTION

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

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

■NOTE: Debris in front of the engine (or packed between the cooling fins of the radiator on the 500 or packed between the oil cooler cooling fins on the 250/300/400) can reduce cooling capability. Using a hose, pressure-wash the radiator (on the 500) engine and oil cooler (on the 250/300/400) to remove any debris preventing air flow.

Coolant Temperature Switch	
OFF to ON	115° C (239° F) - Approx
ON to OFF	108° C (226° F) - Approx

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

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

SECTION 10 - AIDS FOR MAINTENANCE

TABLE OF CONTENTS

Torque Specifications
(250/300)

DRIVE TRAIN COMPONENTS			
Part	Part Bolted To	Torque kg-m	Torque ft-lb
Front Driveshaft (Coupler)**	Flange	4.2	30
Engine	Sub-Frame (Front/Rear)	5.5	40
Engine/Sub-Frame	Frame	5.5	40
Frame*	Front Diff Bracket/Upper	4.2	30
Front Differential*	Frame/Diff Bracket/Lower	5.5	40
Diff Housing Cover***	Diff Housing	2.6	19
Drive Bevel Gear Nut***	Shaft	11-13	79.5-94
Differential Gear Case***	Hub	2.3-3	16.5-22
Hub Nut	Front/Rear Shaft/Axle (max)	10.4	75
Oil Drain Plug	Front Diff	0.5	3.5
Oil Fill Plug	Front Diff	2.2	16
Oil Drain Plug	Engine	2.2	16
Oil Fittings*	Engine	1.1	8
Shift Arm	Engine	1.4	10
High/Low Shift Arm	Engine	1.1	8
2W/4W Shift Arm	Front Diff	1.1	8
Wheel	Hub	5.5	40

EXHAUST COMPONENTS			
Part	Part Bolted To	Torque kg-m	Torque ft-lb
Header Pipe	Engine	1.1	8

ELECTRICAL COMPONENTS			
Part	Part Bolted To	Torque kg-m	Torque ft-lb
Ground Cable	Engine	1.1	8

STEERING COMPONENTS			
Part	Part Bolted To	Torque kg-m	Torque ft-lb
Handlebar Block	Steering Post	2.8	20
Steering Post Bearing Housings	Frame	2.8	20
Steering Post Bearing Flange	Frame	2.8	20
Lower Steering Bearing Washer Cap Screw***	Steering Post	5.5	40
Tie Rod End	Knuckle/Steering Post	4.2	30

BRAKE COMPONENTS			
Part	Part Bolted To	Torque kg-m	Torque ft-lb
Brake Disc*	Hub	2.1	15
Brake Hose	Caliper	4.2	30
Brake Hose	Master Cylinder	0.8	6
Auxiliary Brake Lever	Frame	9.7	70
Master Cylinder Cover	Master Cylinder	.03	10 in.-lb
Brake Pressure Switch	Front Brake Block	2.1	15
Hydraulic Caliper	Knuckle	2.8	20
Auxiliary Caliper	Knuckle	2.1	15

CHASSIS COMPONENTS			
Part	Part Bolted To	Torque kg-m	Torque ft-lb
Sub-Frame	Frame	5.5	40
Footrest	Frame (8 mm)	2.8	20
Footrest	Frame (10 mm)	5.5	40
Foot Shift Lever	Footrest	9.7	70
Gas Tank Valve	Gas Tank	0.1	1
Reverse Shift Lever *	Frame	2.8	20

SUSPENSION COMPONENTS (Front)			
Part	Part Bolted To	Torque kg-m	Torque ft-lb
A-Arm (All)	Frame	4.8	35
Ball Joint Cap Screw	Knuckle	4.8	35
Shock Absorber	Frame	4.8	35
Shock Absorber	Upper A-Arm	4.8	35

SUSPENSION COMPONENTS (Rear)			
Part	Part Bolted To	Torque kg-m	Torque ft-lb
Rear Shock	Sub-Frame	4.8	35
Rear Shock	Lower A-Arm	2.8	20
A-Arms (All)	Sub-Frame	4.8	35
Rear Knuckles	A-Arms	4.8	35

ENGINE/TRANSMISSION			
Part	Part Bolted To	Torque kg-m	Torque ft-lb
Air Cleaner Assy	Frame	1.1	8
Clutch Shoe	Crankshaft	11	79.5
Clutch Sleeve Hub	Countershaft	8	58
Crankcase Half (6 mm)	Crankcase Half	0.9-1.3	6.5-9.5
Crankcase Half (8 mm)	Crankcase Half	2-2.4	14.5-17
Cylinder Head Cap Nuts/Nut	Cylinder	2.5	18
Cylinder Head/Crankcase	Cylinder	1.1	8
Hi/Lo Shifter Arm	Shifter Arm Shaft	1.1	8
Left-Side Cover	Crankcase Half	0.9-1.3	6.5-9.5
Oil Pump*	Crankcase	1	7
Recoil Starter	Left-Side Cover	0.8	6
Reverse Gear Shaft	Reverse Shift Shaft	1.1	8
Right-Side Cover	Crankcase Half	0.9-1.3	6.5-9.5
Magneto Rotor Nut	Crankshaft	16	116
Shifter Arm	Shifter Arm Shaft	1.1	8
Cam Sprocket	Camshaft	1.15	8.5
Starter Cup	Crankshaft	3.5	25
Valve Cover	Cylinder	1	7
Spark Plug	Engine	1.7	12

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

Back to TOC Back to Section TOC Next

Torque Specifications
(400/500 - Manual Transmission)

DRIVE TRAIN COMPONENTS			
Part	Part Bolted To	Torque kg-m	Torque ft-lb
Front Driveshaft (Coupler)**	Rubber Coupler	5.5	40
Rubber Coupler**	Front Diff/Drive Flange	5.5	40
Engine (Lower Rear/Front)	Frame	5.5	40
Engine (Upper Front Inside Bracket/Topside)	Frame Bracket	2.8	20
Engine Mount (Left-Side Upper Rear)	Frame	1.7	12
Engine (Left-Side Upper Rear)	Mount	5.5	40
Front Differential*	Frame/Diff Bracket	5.5	40
Bearing Housing/Axle Assy	Axle Housing	5.5	40
Diff Housing Cover***	Diff Housing	2.6	19
Drive Bevel Gear Nut***	Shaft	11-13	79.5-94
Differential Gear Case***	Hub	2.3-3	16.5-22
Hub Nut	Front/Rear Shaft/Axle (max)	10.4	75
Oil Drain Plug	Front Diff/Rear Dr	0.5	3.5
Oil Fill Plug	Front Diff/Rear Dr	2.2	16
Oil Drain Plug	Engine	2.2	16
Inspection Plug	Rear Dr	0.5	3.5
2W/4W Shift Arm	Front Diff	1.1	8
Wheel	Hub	5.5	40

EXHAUST COMPONENTS			
Part	Part Bolted To	Torque kg-m	Torque ft-lb
Exhaust Pipe	Engine/Frame	2.8	20

ELECTRICAL COMPONENTS			
Part	Part Bolted To	Torque kg-m	Torque ft-lb
Coil*	Head Bracket	1.7	12
Ground Wire	Engine	1.1	8

STEERING COMPONENTS			
Part	Part Bolted To	Torque kg-m	Torque ft-lb
Handlebar Block	Steering Post	2.8	20
Steering Post Bearing Housings	Frame	2.8	20
Steering Post Bearing Flange	Frame	2.8	20
Lower Steering Bearing Washer Cap Screw***	Steering Post	5.5	40
Tie Rod End	Knuckle/Steering Post	4.2	30

BRAKE COMPONENTS			
Part	Part Bolted To	Torque kg-m	Torque ft-lb
Brake Disc*	Hub	2.1	15
Brake Hose	Caliper	4.2	30
Brake Hose	Master Cylinder	0.8	6
Master Cylinder Cover	Master Cylinder	.03	10 in.-lb
Brake Pressure Switch	Front Brake Block	2.1	15
Auxiliary Brake Lever	Footrest	9.7	70
Hydraulic Caliper	Knuckle/Axle Retainer Assy	2.8	20
Auxiliary Caliper	Knuckle/Axle Retai	2.1	15

CHASSIS COMPONENTS			
Part	Part Bolted To	Torque kg-m	Torque ft-lb
Footrest	Frame (8 mm)	2.8	20
Footrest	Frame (10 mm)	5.5	40
Gas Tank Valve	Gas Tank	0.1	1
Reverse Shift Lever*	Frame	2.8	20

SUSPENSION COMPONENTS (Front)			
Part	Part Bolted To	Torque kg-m	Torque ft-lb
A-Arm (All)	Frame	4.8	35
Ball Joint Cap Screw	Knuckle	4.8	35
Shock Absorber	Frame	4.8	35
Shock Absorber	Upper A-Arm	4.8	35

SUSPENSION COMPONENTS (Rear)			
Part	Part Bolted To	Torque kg-m	Torque ft-lb
Axle Retainer Assy	Axle Housing	5.5	40
Axle Housing/Hitch	Rear Gear Case	4.8	35
Axle Housing/Hitch	Rear Gear Case (New)	5.5	40
Shock Absorber	Axle Housing/Frame	4.8	35
Swing Arms	Axle Housing	4.8	35
Swing Arms **	Frame	4.8	35

ENGINE/TRANSMISSION			
Part	Part Bolted To	Torque kg-m	Torque ft-lb
Clutch Shoe	Crankshaft	13	94
Clutch Sleeve Hub	Countershaft	10	72
Crankcase Half (6 mm)	Crankcase Half	0.9-1.3	6.5-9.5
Crankcase Half (8 mm)	Crankcase Half	2-2.4	14.5-17
Cylinder Head (Cap Screws)	Cylinder	3.8	27.5
Cylinder Head (6 mm Nuts)	Cylinder	1.1	8
Cylinder Head (8 mm Nut)	Cylinder	2.5	18
Left-Side Cover	Crankcase Half	0.9-1.3	6.5-9.5
Mechanical Water Pump Impeller	Pump Shaft	1.05	7.5
Oil Pump Drive Gear	Crank Balancer Shaft	8	58
Oil Pump*	Crankcase	1	7
Output Shaft Gear	Output Shaft	10	72
Rear Output Shaft	Output Joint	2.8	20
Recoil Starter	Left-Side Cover	0.8	6
Reverse Cam Stopper Housing	Crankcase	2.3	16.5
Right-Side Cover	Crankcase	0.9-1.3	6.5-9.5
Magneto Rotor Nut	Crankshaft	16	116
Shift Stop Housing	Crankcase	2.3	16.5
Cam Sprocket	Camshaft	1.5	11
Starter Cup	Crankshaft	3.5	25
Spark Plug	Engine	1.7	12

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

Torque Specifications

(400/500 - Automatic Transmission)

DRIVE TRAIN COMPONENTS			
Part	Part Bolted To	Torque kg-m	Torque ft-lb
Front Driveshaft (Coupler)**	Rubber Coupler	5.5	40
Rubber Coupler**	Front Diff/Drive Flange	5.5	40
Engine Mount (Front Upper)	Frame	2.8	20
Engine Bracket (Upper)	Engine	2.8	20
Engine Mounting Through-Bolts	Frame	5.5	40
Engine Mount (Upper Rear)	Frame	1.7	12
Front Differential*	Frame/Diff Bracket	5.5	40
Rear Output Joint Assy	Engine	2.8	20
Bearing Housing/Axle Assy	Axle Housing	5.5	40
Diff Housing Cover***	Diff Housing	2.6	19
Drive Bevel Gear Nut***	Shaft	11-13	79.5-94
Differential Gear Case***	Hub	2.3-3	16.5-22
Hub Nut	Front/Rear Shaft/Axle (max)	10.4	75
Oil Drain Plug	Front Diff/Rear Dr	0.5	3.5
Oil Fill Plug	Front Diff/Rear Dr	2.2	16
Oil Drain Plug	Engine	2.2	16
Inspection Plug	Rear Drive	0.5	3.5
2W/4W Shift Arm	Front Diff	1.1	8
Wheel	Hub	5.5	40

EXHAUST COMPONENTS			
Part	Part Bolted To	Torque kg-m	Torque ft-lb
Exhaust Pipe	Engine/Frame	2.8	20

ELECTRICAL COMPONENTS			
Part	Part Bolted To	Torque kg-m	Torque ft-lb
Coil*	Head Bracket	1.7	12
Ground Wire	Engine	1.1	8

STEERING COMPONENTS			
Part	Part Bolted To	Torque kg-m	Torque ft-lb
Handlebar Block	Steering Post	2.8	20
Steering Post Bearing Housings	Frame	2.8	20
Steering Post Bearing Flange	Frame	2.8	20
Lower Steering Bearing Washer Cap Screw***	Steering Post	5.5	40
Tie Rod End	Knuckle/Steering Post	4.2	30

BRAKE COMPONENTS			
Part	Part Bolted To	Torque kg-m	Torque ft-lb
Brake Disc*	Hub	2.1	15
Brake Hose	Caliper	4.2	30
Brake Hose	Master Cylinder	0.8	6
Master Cylinder Cover	Master Cylinder	.03	10 in.-lb
Brake Pressure Switch	Front Brake Block	2.1	15
Auxiliary Brake Lever	Footrest	9.7	70
Hydraulic Caliper	Axle Retainer Assy	2.8	20
Auxiliary Caliper	Axle Retainer Assy	2.1	15

CHASSIS COMPONENTS			
Part	Part Bolted To	Torque kg-m	Torque ft-lb
Footrest	Frame (8 mm)	2.8	20
Footrest	Frame (10 mm)	5.5	40
Gas Tank Valve	Gas Tank	0.1	1
Reverse Shift Lever*	Frame	2.8	20

SUSPENSION COMPONENTS (Front)			
Part	Part Bolted To	Torque kg-m	Torque ft-lb
A-Arm (All)	Frame	4.8	35
Ball Joint Cap Screw	Knuckle	4.8	35
Shock Absorber	Frame	4.8	35
Shock Absorber	Upper A-Arm	4.8	35

SUSPENSION COMPONENTS (Rear)			
Part	Part Bolted To	Torque kg-m	Torque ft-lb
Axle Retainer Assy	Axle Housing	5.5	40
Axle Housing/Hitch	Rear Gear Case	4.8	35
Axle Housing/Hitch	Rear Gear Case (New)	5.5	40
Swing Arms	Axle Housing	4.8	35
Swing Arms**	Frame	4.8	35
Shock Absorber	Axle Housing/Frame	4.8	35

SUSPENSION COMPONENTS (Rear) TBX Model			
Part	Part Bolted To	Torque kg-m	Torque ft-lb
Axle Retainer Assy	Axle Housing	5.5	40
Axle Housing	Rear Gear Case	4.8	35
Axle Housing	Rear Gear Case (New)	5.5	40
Swing Arm	Frame	5.5	40
Shock Absorber	Frame	4.8	35
Shock Absorber	Swing Arm	4.8	35
Cargo Box Frame	ATV Frame	4.8	35
Cargo Box (Plastic)	Cargo Box Frame	1.7	12
Axle Housing	Swing Arm	4.8	35
Side Box (Upper)	Frame	2.8	20
Side Box (Lower)	Frame	2.5	18
Rear Gear Case U-Joint**	Driveshaft	5.5	40

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

ENGINE/TRANSMISSION			
Part	Part Bolted To	Torque kg-m	Torque ft-lb
Clutch Shoe	Crankshaft	13	94
Clutch Cover/ Housing Assy	Crankcase	1.1	8
Crankcase Half (6 mm)	Crankcase Half	0.9-1.3	6.5-9.5
Crankcase Half (8 mm)	Crankcase Half	2-2.4	14.5-17
Cylinder Head (Cap Screws)	Crankcase	3.8	27.5
Cylinder Head (6 mm)	Cylinder	1.1	8
Cylinder Head (8 mm)	Cylinder	2.5	18
Fixed Driven	Clutch Shaft	10.4-11.8	75-85
Ground Wire	Engine	1.1	8
Magneto Cover	Crankcase	1.1	8
Mechanical Water Pump Impeller	Pump Shaft	1.05	7.5
Movable Drive Face	Driveshaft	10.4-11.8	75-85
Oil Pump Drive Gear	Crank Balancer Shaft	5	36
Output Shaft Gear	Output Shaft	10	72
Recoil Starter	Left-Side Cover	0.8	6
Magneto Rotor Nut	Crankshaft	16	116
Cam Sprocket	Camshaft	1.5	11
Starter Cup	Crankshaft	3.5	25
V-Belt Cover	Crankcase	1.1	8
Plenum***	Engine	1.1	8
Spark Plug	Engine	1.7	12

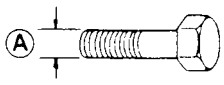
* w/Blue Loctite #243
** w/Red Loctite #271
*** w/Green Loctite #609

Torque Conversions

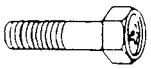
ft-lb	kg-m	ft-lb	kg-m	ft-lb	kg-m	ft-lb	kg-m	ft-lb	kg-m
1	0.1	21	2.9	41	5.7	61	8.4	81	11.2
2	0.3	22	3.0	42	5.8	62	8.6	82	11.3
3	0.4	23	3.2	43	5.8	63	8.7	83	11.5
4	0.6	24	3.3	44	6.1	64	8.9	84	11.6
5	0.7	25	3.5	45	6.2	65	9.0	85	11.8
6	0.8	26	3.6	46	6.4	66	9.1	86	11.9
7	1.0	27	3.7	47	6.5	67	9.3	87	12.0
8	1.1	28	3.9	48	6.6	68	9.4	88	12.2
9	1.2	29	4.0	49	6.8	69	9.5	89	12.3
10	1.4	30	4.2	50	6.9	70	9.7	90	12.5
11	1.5	31	4.3	51	7.1	71	9.8	91	12.6
12	1.7	32	4.4	52	7.2	72	10.0	92	12.8
13	1.8	33	4.6	53	7.3	73	10.1	93	12.9
14	1.9	34	4.7	54	7.5	74	10.2	94	13.0
15	2.1	35	4.8	55	7.6	75	10.4	95	13.1
16	2.2	36	5.0	56	7.7	76	10.5	96	13.3
17	2.4	37	5.1	57	7.9	77	10.7	97	13.4
18	2.5	38	5.3	58	8.0	78	10.8	98	13.6
19	2.6	39	5.4	59	8.2	79	10.9	99	13.7
20	2.8	40	5.5	60	8.3	80	11.1	100	13.8

Tightening Torque
(General Bolts)

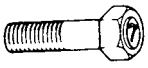
Type of Bolt	Thread Diameter Ⓐ (mm)	Tightening Torque	
		kg-m	ft-lb
(Conventional or 4 Marked Bolt)	5	0.2-0.4	1.5-3.0
	6	0.4-0.7	3.0-5.0
	8	1.0-1.6	7.0-11.5
	10	2.2-3.5	16.0-25.5
(7 Marked Bolt)	5	0.3-0.6	2.0-4.5
	6	0.8-1.2	6.0-8.5
	8	1.8-2.8	13.0-20.0
	10	4.0-6.0	29.0-43.5



Conventional Bolt



4 Marked Bolt



7 Marked Bolt

SECTION 11 - TROUBLESHOOTING

TABLE OF CONTENTS

11

Engine

■ **NOTE: A Condition/Remedy marked with an asterisk (*) is for manual transmission models only.**

Problem: Engine will not start or is hard to start (Compression too low)	
Condition	**Remedy**
1. **Valve clearance** out of adjustment	1. Adjust clearance
2. **Valve guides** worn - seated poorly	2. Repair - replace guides
3. **Valves** mistimed	3. Adjust valve timing
4. **Piston rings** worn excessively	4. Replace rings
5. **Cylinder bore** worn	5. Replace - rebore cylinder
6. **Spark plug** seating poorly	6. Tighten plug
7. **Starter motor** cranks too slowly - does not turn	7. See Electrical in this section
Problem: Engine will not start or is hard to start (No spark)	
Condition	**Remedy**
1. **Spark plug** fouled	1. Clean - replace plug
2. **Spark plug** wet	2. Clean - dry plug
3. **Magneto** defective	3. Replace magneto
4. **CDI unit** defective	4. Replace CDI unit
5. **Ignition coil** defective	5. Replace ignition coil
6. **High-tension lead** open - shorted	6. Replace high tension lead
Problem: Engine will not start or is hard to start (No fuel reaching the carburetor)	
Condition	**Remedy**
1. **Gas tank vent hose** obstructed	1. Clean vent hose
2. **Carburetor inlet needle** defective	2. Replace needle
3. **Fuel hose** obstructed	3. Clean - replace hose
4. **Fuel screens** obstructed	4. Clean - replace inlet screen - valve screen
Problem: Engine stalls easily	
Condition	**Remedy**
1. **Spark plug** fouled	1. Clean plug
2. **Magneto** defective	2. Replace magneto
3. **CDI unit** defective	3. Replace CDI unit
4. **Carburetor jets** obstructed	4. Clean jets
5. **Valve clearance** out of adjustment	5. Adjust clearance
Problem: Engine noisy (Excessive valve chatter)	
Condition	**Remedy**
1. **Valve clearance** too large	1. Adjust clearance
2. **Valve spring(s)** weak - broken	2. Replace spring(s)
3. **Rocker arm** - **rocker arm shaft** worn	3. Replace arm - shaft
4. **Camshaft** worn	4. Replace camshaft

Problem: Engine noisy (Noise seems to come from piston)	
Condition	**Remedy**
1. **Piston - cylinder** worn	1. Replace - service piston - cylinder
2. **Combustion chamber carbon** buildup	2. Clean chamber
3. **Piston pin - piston pin bore** worn	3. Replace - service pin - bore
4. **Piston rings - ring groove(s)** worn	4. Replace rings - piston
Problem: Engine noisy (Noise seems to come from timing chain)	
Condition	**Remedy**
1. **Chain** stretched	1. Replace chain
2. **Sprockets** worn	2. Replace sprockets
3. **Tension adjuster** malfunctioning	3. Repair - replace adjuster
Problem: Engine noisy (Noise seems to come from clutch)	
Condition *	**Remedy ***
1. **Crankshaft splines - bearings** worn	1. Replace crankshaft - bearings
2. **Countershaft - hub splines** worn	2. Replace countershaft - hub
3. **Clutch plate teeth** worn	3. Replace clutch plate(s)
4. **Driven - drive clutch plates** distorted - broken	4. Replace clutch plate(s)
5. **Clutch dampers** weak	5. Replace dampers
Problem: Engine noisy (Noise seems to come from crankshaft)	
Condition	**Remedy**
1. **Bearing** worn - burned	1. Replace bearing
2. **Lower rod-end bearing** worn - burned	2. Replace bearing
3. **Connecting rod side clearance** too large	3. Replace thrust washer(s)
Problem: Engine noisy (Noise seems to come from transmission)	
Condition	**Remedy**
1. **Gears** worn - rubbing	1. Replace gears
2. **Splines** worn	2. Replace shaft(s)
3. **Primary gears** worn - rubbing	3. Replace gears
4. **Bearings** worn	4. Replace bearings
5. **Bushing** worn	5. Replace bushing
Problem: Engine noisy (Noise seems to come from secondary-transmission/left-side cover)	
Condition *	**Remedy ***
1. **Gears - shaft(s)** worn	1. Replace gears - shafts
2. **Bearing(s)/bushing(s)** damaged	2. Replace bearing(s)/bushing(s)
Problem: Engine noisy (Noise seems to come from secondary bevel gear and final driven shaft)	
Condition	**Remedy**
1. **Drive - driven bevel gears** damaged - worn	1. Replace gears
2. **Backlash** excessive	2. Adjust backlash
3. **Tooth contact** improper	3. Adjust contact
4. **Bearing** damaged	4. Replace bearing
5. **Gears** worn - rubbing	5. Replace gears
6. **Splines** worn	6. Replace shaft(s)
7. **Final driven shaft thrust clearance** too large	7. Replace thrust washer(s)

Problem: Clutch slipping	
Condition *	**Remedy ***
1. **Release roller** out of adjustment - loss of freeplay	1. Adjust clutch bolts 1 & 2
2. **Clutch springs** weak	2. Replace springs
3. **Clutch shoes** worn	3. Replace shoes
4. **Pressure disc** worn - distorted	4. Replace disc
5. **Clutch plates (driven - drive)** distorted	5. Replace plates
Problem: Clutch dragging	
Condition *	**Remedy ***
1. **Clutch release roller** out of adjustment - too much freeplay	1. Adjust clutch bolts 1 & 2
2. **Clutch springs** weak	2. Replace springs
3. **Pressure disc - clutch plates** distorted	3. Replace disc - plates
4. **Clutch release mechanism** worn - damaged	4. Adjust - replace mechanism
Problem: Transmission will not shift	
Condition *	**Remedy ***
1. **Gearshift cam** broken	1. Replace cam
2. **Gearshift forks** distorted	2. Replace forks
3. **Gearshift shaft** worn	3. Replace shaft
4. **Clutch release mechanism** worn - damaged	4. Adjust - replace mechanism
5. **Reverse cable** adjusted improperly	5. Adjust cable
6. **Gearshift cable** adjusted improperly	6. Adjust cable
Problem: Transmission will not shift back	
Condition *	**Remedy ***
1. **Reverse shift cam** broken	1. Replace cam
2. **Shift shafts** rubbing - sticking	2. Repair shafts
3. **Gearshift forks** distorted - worn	3. Replace forks
4. **Gearshift lever return spring** broken - damaged	4. Replace spring
Problem: Transmission jumps out of gear	
Condition *	**Remedy ***
1. **Shifting gears (driveshaft - countershaft)** worn	1. Replace gears
2. **Gearshift forks** distorted - worn	2. Replace forks
3. **Cam stopper spring (gearshift cam)** weak	3. Replace spring
4. **Gearshift lever stopper pin** worn	4. Replace pin
Problem: Secondary-transmission will not shift or shift back	
Condition *	**Remedy ***
1. **Sliding dog** broken - worn	1. Replace dog
2. **Gearshift fork** broken - worn	2. Replace fork
3. **Hi/Low shift lever** out of adjustment	3. Adjust lever
4. **Gearshift cam** worn	4. Replace cam
5. **Cam stopper spring** weak	5. Replace spring
6. **Gearshift fork shaft** worn	6. Replace shaft

Problem: Engine idles poorly	
Condition	**Remedy**
1. **Valve clearance** out of adjustment	1. Adjust clearance
2. **Valve seating** poor	2. Replace - service seats - valves
3. **Valve guides** defective	3. Replace guides
4. **Rocker arms - arm shaft** worn	4. Replace arms - shafts
5. **Magneto** defective	5. Replace magneto
6. **CDI unit** defective	6. Replace CDI unit
7. **Spark plug** fouled - **gap** too wide	7. Adjust gap - replace plug
8. **Ignition coil** defective	8. Replace ignition coil
9. **Float** out of adjustment	9. Adjust float height
10. **Jets** obstructed	10. Clean jets
11. **Pilot screw setting** improper	11. Adjust pilot screw
Problem: Engine runs poorly at high speed	
Condition	**Remedy**
1. **High RPM "cut out"** against RPM limiter	1. Shift into higher gear - decrease speed
2. **Valve springs** weak	2. Replace springs
3. **Valve timing** out of adjustment	3. Adjust timing
4. **Cams - rocker arms** worn	4. Replace cams - arms
5. **Spark plug gap** too narrow	5. Adjust gap
6. **Ignition coil** defective	6. Replace ignition oil
7. **Float level** too low	7. Adjust float height
8. **Air cleaner element** obstructed	8. Clean element
9. **Fuel hose** obstructed	9. Clean - prime hose
Problem: Exhaust smoke dirty or heavy	
Condition	**Remedy**
1. **Oil (in the engine)** overfilled - contaminated	1. Drain excess oil - replace oil
2. **Piston rings - cylinder** worn	2. Replace - service rings - cylinder
3. **Valve guides** worn	3. Replace guides
4. **Cylinder wall** scored - scuffed	4. Replace - service cylinder
5. **Valve stems** worn	5. Replace valves
6. **Stem seals** defective	6. Replace seals

Problem: Engine lacks power	
Condition	**Remedy**
1. **Valve clearance** incorrect	1. Adjust clearance
2. **Valve springs** weak	2. Replace springs
3. **Valve timing** out of adjustment	3. Adjust timing
4. **Piston ring(s) - cylinder** worn	4. Replace - service rings - cylinder
5. **Valve seating** poor	5. Repair seats
6. **Spark plug** fouled	6. Clean - replace plug
7. **Rocker arms - shafts** worn	7. Replace arms - shafts
8. **Spark plug gap** incorrect	8. Adjust gap - replace plug
9. **Carburetor jets** obstructed	9. Clean jets
10. **Float level** out of adjustment	10. Adjust float height
11. **Air cleaner element** obstructed	11. Clean element
12. **Oil (in the engine)** overfilled - contaminated	12. Drain excess oil - change oil
13. **Intake manifold** leaking air	13. Tighten - replace manifold
14. **Cam chain** worn	14. Replace cam chain
Problem: Engine overheats	
Condition	**Remedy**
1. **Carbon deposit (piston crown)** excessive	1. Clean piston
2. **Oil** low	2. Add oil
3. **Octane** low - **gasoline** poor	3. Drain - replace gasoline
4. **Oil pump** defective	4. Replace pump
5. **Oil circuit** obstructed	5. Clean circuit
6. **Gasoline level (in float chamber)** too low	6. Adjust float height
7. **Intake manifold** leaking air	7. Tighten - replace manifold
8. **Coolant level** low	8. Fill - examine system for leaks
9. **Fan** malfunctioning	9. Check fan fuse - replace fan
10. **Fan switch** malfunctioning	10. Replace fan switch
11. **Thermostat** stuck - closed	11. Replace thermostat
12. **Radiator hoses - cap** damaged - obstructed	12. Clear obstruction - replace hoses

Drive

Problem: Power not transmitted from engine to wheels	
Condition	**Remedy**
1. **Rear axle shaft serration** worn - broken	1. Replace shaft
Problem: Power not transmitted from engine to either front wheel	
Condition	**Remedy**
1. **Secondary drive - driven gear teeth** broken	1. Replace gear(s)
2. **Propeller shaft serration** worn - broken	2. Replace shaft
3. **Coupling** damaged	3. Replace coupling
4. **Coupling joint serration** worn - damaged	4. Replace joint
5. **Front drive - driven bevel gears** broken - damaged	5. Replace gear(s)
6. **Front differential gears/pinions** broken - damaged	6. Replace gears - pinions
7. **Sliding dog/shaft/fork** worn - damaged	7. Replace gear(s)
8. **Front drive axle** worn - damaged	8. Replace axle
9. **Front drive axle serration** worn - damaged	9. Replace axle

Problem: Starting impaired	
Condition	**Remedy**
1. **Starter jet** obstructed	1. Clean jet
2. **Starter jet passage** obstructed	2. Clean passage
3. **Starter body - carburetor** leaking air	3. Tighten - adjust - replace gasket
4. **Starter valve** not operating properly	4. Check - adjust valve
Problem: Idling or low speed impaired	
Condition	**Remedy**
1. **Slow jet** obstructed - loose	1. Clean - tighten jet
2. **Slow jet outlet** obstructed	2. Clean outlet
3. **Low speed fuel screw setting** incorrect	3. Adjust screw
4. **Starter valve** not fully closed	4. Adjust valve
5. **Float height** incorrect	5. Adjust float height
Problem: Medium or high speed impaired	
Condition	**Remedy**
1. **High RPM "cut out"** against RPM limiter	1. Shift into higher gear - decrease RPM speed
2. **Main jet** obstructed	2. Clean main jet
3. **Needle jet** obstructed	3. Clean needle jet
4. **Throttle vacuum piston** not operating properly	4. Check piston operation
5. **Filter** obstructed	5. Clean filter
6. **Float height** incorrect	6. Adjust float height
7. **Starter valve** not fully closed	7. Adjust valve
Problem: Overflow and fuel level fluctuations	
Condition	**Remedy**
1. **Float valve** worn - damaged	1. Replace valve
2. **Float valve spring** broken	2. Replace spring
3. **Float** not working properly	3. Adjust float height - replace float
4. **Float valve** dirty	4. Clean valve
5. **Float height** too high - too low	5. Adjust float height

Problem: Spark absent or weak	
Condition	**Remedy**
1. **Ignition coil** defective	1. Replace ignition coil
2. **Spark plug** defective	2. Replace plug
3. **Magneto** defective	3. Replace magneto
4. **CDI unit** defective	4. Replace CDI unit
5. **Pick-up coil** defective	5. Replace pick-up coil
Problem: Spark plug fouled with carbon	
Condition	**Remedy**
1. **Mixture** too rich	1. Adjust carburetor
2. **Idling RPM** too high	2. Adjust carburetor
3. **Gasoline** incorrect	3. Change to correct gasoline
4. **Air cleaner element** dirty	4. Clean element
5. **Spark plug** incorrect (too cold)	5. Replace plug
Problem: Spark plug electrodes overheat or burn	
Condition	**Remedy**
1. **Spark plug** incorrect (too hot)	1. Replace plug
2. **Engine** overheats	2. Service cooling system
3. **Spark plug** loose	3. Tighten plug
4. **Mixture** too lean	4. Adjust carburetor
Problem: Magneto does not charge	
Condition	**Remedy**
1. **Lead wires/connections** shorted - loose - open	1. Repair - replace - tighten lead wires
2. **Magneto coils** shorted - grounded - open	2. Replace magneto coils
3. **Regulator/rectifier** shorted - punctured	3. Replace regulator/rectifier
Problem: Magneto charges, but charging rate is below the specification	
Condition	**Remedy**
1. **Lead wires** shorted - open - loose (at terminals)	1. Repair - tighten lead wires
2. **Stator coils (magneto)** grounded - open	2. Replace stator coils
3. **Regulator/rectifier** defective	3. Replace regulator/rectifier
4. **Electrolyte** low	4. Add distilled water
5. **Cell plates (battery)** defective	5. Replace battery

Problem: Magneto overcharges	
Condition	**Remedy**
1. **Internal battery** short circuited	1. Replace battery
2. **Regulator/rectifier resistor** damaged - defective	2. Replace resistor
3. **Regulator/rectifier** poorly grounded	3. Clean - tighten ground connection
Problem: Charging unstable	
Condition	**Remedy**
1. **Lead wire** intermittently shorting	1. Replace lead wire
2. **Magneto** internally shorted	2. Replace magneto
3. **Regulator/rectifier** defective	3. Replace regulator/rectifier
Problem: Starter button not effective	
Condition	**Remedy**
1. **Battery charge** low	1. Recharge - replace battery
2. **Switch contacts** defective	2. Replace switch
3. **Starter motor brushes** not seating	3. Repair - replace brushes
4. **Starter relay** defective	4. Replace relay
5. **Emergency stop - ignition switch** off	5. Turn on switches
6. **Wiring connections** loose - disconnected	6. Connect - tighten - repair connections
Problem: Battery "sulfation" (Acidic white powdery substance or spots on surfaces of cell plates)	
Condition	**Remedy**
1. **Charging rate** too low - too high	1. Replace battery
2. **Battery electrolyte** excessive - insufficient	2. Keep electrolyte to prescribed level
3. **Specific gravity** too high - too low	3. Charge battery - add distilled water
4. **Battery** run-down - damaged	4. Replace battery
5. **Electrolyte** contaminated	5. Recharge - replace battery
Problem: Battery discharges too rapidly	
Condition	**Remedy**
1. **Electrolyte** contaminated	1. Replace battery
2. **Specific gravity** too high	2. Charge battery - add distilled water
3. **Charging system (charging operation)** not set properly	3. Check magneto - regulator/rectifier - circuit connections - adjust for specified charging operation
4. **Cell plates** overcharged - damaged	4. Replace battery - correct charging system
5. **Battery** short-circuited	5. Replace battery
6. **Specific gravity** too low	6. Recharge battery
7. **Electrolyte** contaminated	7. Replace battery
Problem: Battery polarity reversed	
Condition	**Remedy**
1. **Battery** incorrectly connected	1. Reverse connections - replace battery

Problem: Handling too heavy or stiff	
Condition	**Remedy**
1. **Front wheel alignment** incorrect	1. Adjust alignment
2. **Lubrication** inadequate	2. Lubricate appropriate components
3. **Tire inflation pressure** incorrect	3. Adjust pressure
4. **Tie rod ends** seizing	4. Replace tie rod ends
5. **Linkage connections** seizing	5. Repair - replace connections
Problem: Steering oscillation	
Condition	**Remedy**
1. **Tires** inflated unequally	1. Adjust pressure
2. **Wheel(s)** wobbly	2. Replace wheel(s)
3. **Wheel hub cap screw(s)** loose - missing	3. Tighten - replace cap screws
4. **Wheel hub bearing** worn - damaged	4. Replace bearing
5. **Tie rod ends** worn - loose	5. Replace - tighten tie rod ends
6. **Tires** defective - incorrect	6. Replace tires
7. **A-arm bushings** damaged	7. Replace bushings
8. **Bolts - nuts (frame)** loose	8. Tighten bolts - nuts
Problem: Steering pulling to one side	
Condition	**Remedy**
1. **Tires** inflated unequally	1. Adjust pressure
2. **Front wheel alignment** incorrect	2. Adjust alignment
3. **Wheel hub bearings** worn - broken	3. Replace bearings
4. **Frame** distorted	4. Repair - replace frame
5. **Shock absorber** defective	5. Replace shock absorber
Problem: Steering impaired	
Condition	**Remedy**
1. **Tire pressure** too high	1. Adjust pressure
2. **Steering linkage connections** worn	2. Replace connections
3. **Cap screws (suspension system)** loose	3. Tighten cap screws
Problem: Tire wear rapid or uneven	
Condition	**Remedy**
1. **Wheel hub bearings** worn - loose	1. Replace bearings
2. **Front wheel alignment** incorrect	2. Adjust alignment
Problem: Steering noise	
Condition	**Remedy**
1. **Caps screws - nuts** loose	1. Tighten cap screws - nuts
2. **Wheel hub bearings** broken - damaged	2. Replace bearings
3. **Lubrication** inadequate	3. Lubricate appropriate components

Problem: Suspension too soft	
Condition	**Remedy**
1. **Spring(s)** weak	1. Replace spring(s)
2. **Shock absorber** damaged	2. Replace shock absorber
Problem: Suspension too stiff	
Condition	**Remedy**
1. **A-arm-related bushings** worn	1. Replace bushing
Problem: Suspension noisy	
Condition	**Remedy**
1. **Cap screws (suspension system)** loose	1. Tighten cap screws
2. **A-arm-related bushings** worn	2. Replace bushings
Problem: Rear wheel oscillation	
Condition	**Remedy**
1. **Rear wheel hub bearings** worn - loose	1. Replace bearings
2. **Tires** defective - incorrect	2. Replace tires
3. **Wheel rim** distorted	3. Replace rim
4. **Wheel hub cap screws** loose	4. Tighten cap screws
5. **Axle shaft nut** loose (Manual Transmission)	5. Tighten nut (Manual Transmission)
6. **Auxiliary brake** adjusted incorrectly	6. Adjust brake
7. **Rear suspension arm-related bushing** worn	7. Replace bushing
8. **Rear shock absorber** damaged	8. Replace shock absorber
9. **Rear suspension arm nut** loose	9. Tighten nut

Brakes

Problem: Braking poor	
Condition	**Remedy**
1. **Pad** worn	1. Replace pads
2. **Pedal free-play** excessive	2. Adjust free-play
3. **Brake fluid** leaking	3. Repair - replace hydraulic system
4. **Hydraulic system** leaking air	4. Bleed hydraulic system
5. **Master cylinder/brake cylinder seal** worn	5. Replace seal(s)
Problem: Brake lever travel excessive	
Condition	**Remedy**
1. **Hydraulic system** entrapped air	1. Bleed hydraulic system
2. **Brake fluid** low	2. Add fluid to proper level
3. **Brake fluid** incorrect	3. Replace with correct fluid
4. **Piston seal - cup** worn	4. Replace seal - cup
Problem: Brake fluid leaking	
Condition	**Remedy**
1. **Connection joints** loose	1. Tighten joints
2. **Hose** cracked	2. Replace hose
3. **Piston seal** worn	3. Replace seal