

NOTE

Use one screwdriver (A, **Figure 46**) to push the shift lock in, then use the second (B, **Figure 46**) to hold the shift lock until the shift rail is installed.

12. Install the high/reverse shift fork and rail. Make sure the pin on the fork is located between the spring ends (A, **Figure 47**). Rotate the internal shift levers out while installing the shift forks and rails.

13. Insert the high/reverse shaft, chain and input shaft into the case as an assembly, while engaging the high/reverse shift fork with the inner shift dog.

NOTE

A separate spacer is located on the rail B, **Figure 48** on early models. The spacer is integral with the high/reverse shift fork on later models.

14. Hold the shift lock for the low range shift rail back using a procedure similar to that used for the high/reverse shift rail.

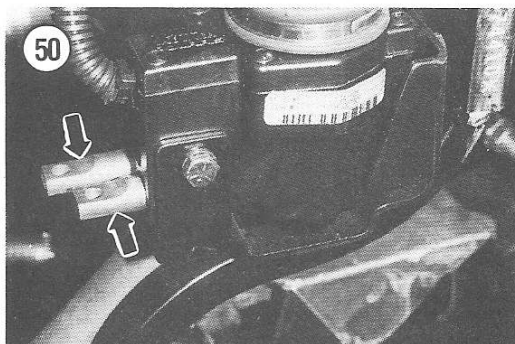
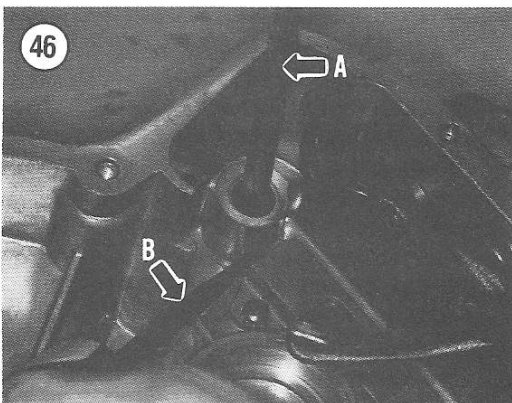
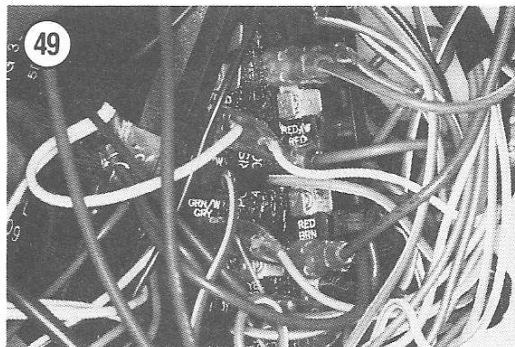
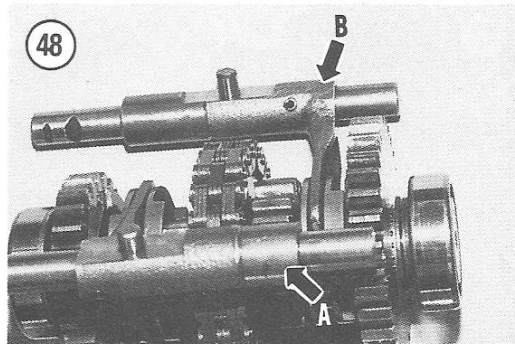
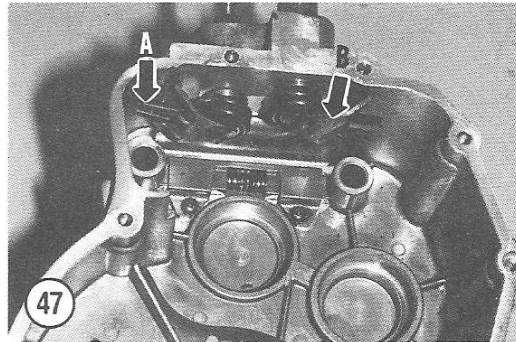
15. Install the low range shift fork and rail, engaging the fork with the shift dog. The pin on the shift fork must be located between the spring ends (B, **Figure 47**). **Figure 48** shows the relative location of the shift forks.

16. Install the output shaft and gear assembly.

17. Install the thrust washer with the *larger* inside diameter, then install the low gear with the engagement dogs toward the inside.

18. Install the needle bearing inside the low gear.

19. Install the thrust washer with the *smaller* inside diameter.



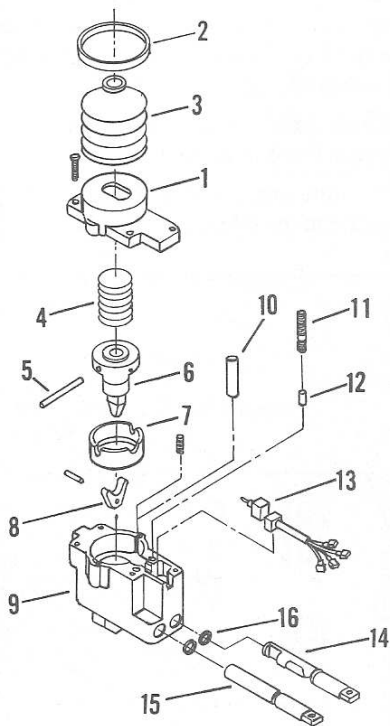
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1. C
2. O
3. B
4. S
5. P
6. S
7. B
8. H
9. H
10. S
11. D
12. D
13. S
14. R
15. L

51

EZ SHIFTER



1. Cover
2. Clamp
3. Boot
4. Spring
5. Pin
6. Striker
7. Bearing cup
8. Interlock butterfly
9. Housing
10. Stop pin
11. Detent spring
12. Detent bullet
13. Switch
14. Right slide (3 notches)
15. Left side (2 notches)

20. Install the bearing on the shaft. When properly assembled, the end of the shaft should be flush with the outside of the bearing race.

21. Clean the mating surfaces of both case halves and coat both surfaces with Loctite 515 gasket eliminator (or equivalent).

22. Make sure the dowel pins are properly installed, then install the left case half. Bump the case halves together, then install the ten screws (Figure 40). Refer to Table 2 for recommended tightening torques.

23. Check transmission operation before installing, by turning the shafts by hand. The shafts should not have end play, but should not bind.

24. Use properly fitting drivers to install the seals flush with case. Grease the shafts and the lips of seals before installing.

EZ Shift Shifter Selector

The shifter is attached to the right side of the frame.

1. To remove the selector assembly, proceed as follows:

- a. Remove the fuel tank cover as described in Chapter Fifteen.
 - b. Remove the cable ties that attach the wiring harness to the frame.
 - c. Detach the wires from the terminal board (Figure 49).
 - d. Pull the wiring harness through to the right side.
 - e. Detach the control rods from the shifter rails (Figure 50).
2. Disassemble the shifter assembly as follows:
- a. Remove the three screws attaching the shifter assembly, then lift the assembly from the mounting bracket.
 - b. Remove the screws attaching the top cover (1, Figure 51), then lift the shift lever and cover from the housing.

NOTE

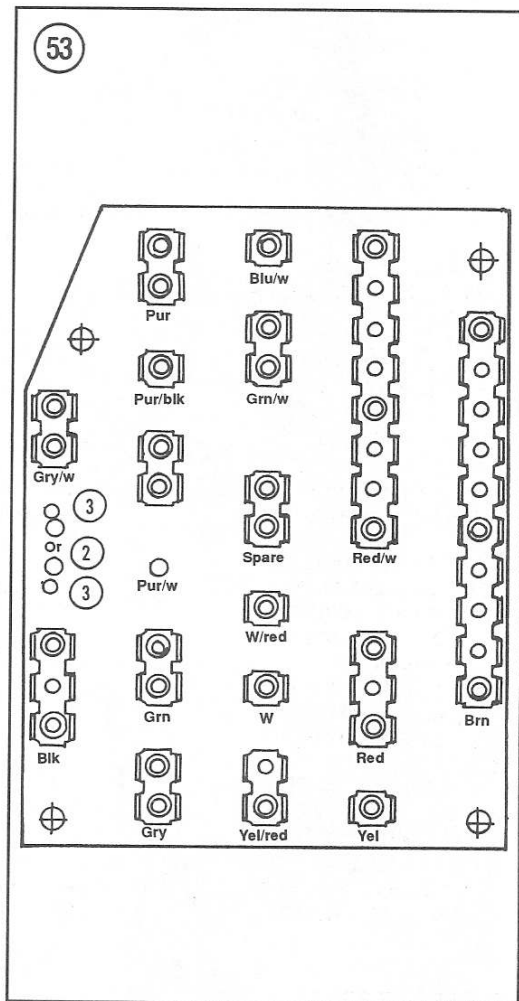
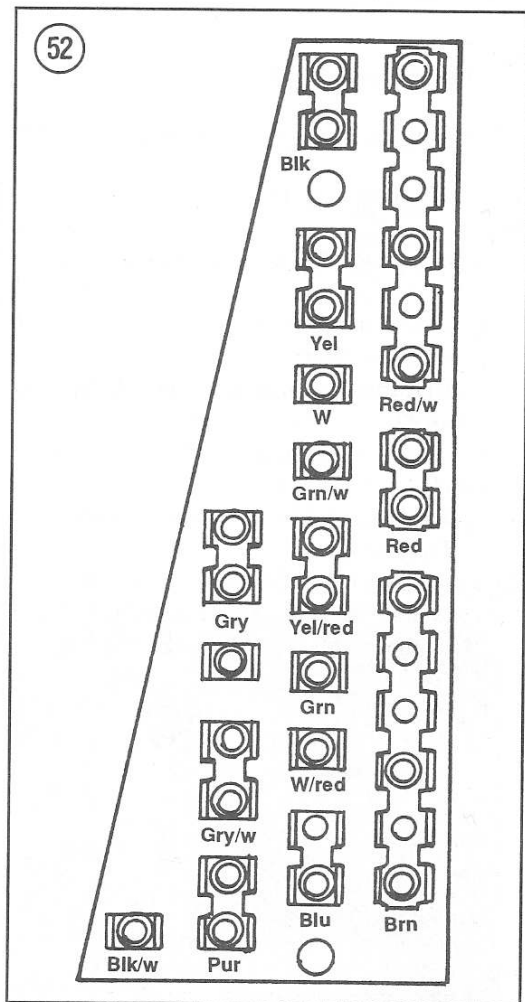
The stop pin (10, Figure 51), spring (11) and detent bullets (12) may fall from the housing if it is turned upside down. Be careful not to lose parts while the cover is removed, especially when dumping oil out of the housing.

- c. Hold the interlock butterfly out and remove the shifter slides (14 and 15, **Figure 51**).
3. Flush the housing and check for moisture. Clean and inspect all parts thoroughly.
4. Assemble by reversing the disassembly procedure. Install the white bearing cup (7, **Figure 51**) after the detent bullets (12, **Figure 51**), spring (11) and stop pin (10) are installed.

NOTE

The wrong type or too much oil could cause shifting problems.

5. Fill the housing half way with 10W-40 oil (part No. 2871271), or equivalent.



- NOTE**
Be careful not to damage the selector switch while assembling.
6. Carefully install the switch (13, **Figure 51**). Position the switch toggle inside the hole in the striker (6, **Figure 51**).
 7. Clean the housing and the cover (1 and 9, **Figure 51**), coat the mating surfaces with Loctite Primer and place a bead of Loctite 515 (or equivalent) completely around the edge of the housing.
 8. Install the cover and tighten the retaining screws to the torque listed in **Table 2**.
 9. Before installing the boot (3, **Figure 51**), apply RTV sealant to the selector shaft to seal the boot to

the shaft. Allow ap
to cure before mov
10. Install the shi
install the three m
11. Reattach the
board. Refer to F

Model No.

1985 and 1986
1987
Trail Boss W87
Cyclone W877
Trail Boss 4 x 4
and W878327
1988
Trail Boss 2 x 4
Trail Boss 4 x 4
Trail Boss 250
W888528
1989
Trail Boss W85
Trail Boss 2 x 4
Trail Boss 4 x 4
Big Boss 4 x 6
W898627
1990
Trail Blazer W5
Trail Boss 250
Trail Boss 2 x 4
T.B. 2 x 4-350L
Trail Boss 4 x 4
T.B. 4 x 4-350L
Big Boss 4 x 6
Big Boss 4 x 6
1991
Trail Blazer W5
Trail Boss 250
Trail Boss 2 x 4
T.B. 2 x 4-350L
Trail Boss 4 x 4
T.B. 4 x 4-350L
Big Boss 4 x 6
Big Boss 6 x 6
1992
Trail Blazer W5
Trail Boss 250
Trail Boss 2 x 4
T.B. 2 x 4-350L
Trail Boss 4 x 4
T.B. 4 x 4-350L

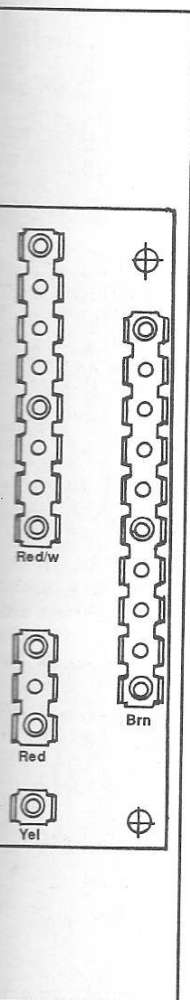
the selector

(13, Figure 51). Po-
the hole in the striker

over (1 and 9, Figure
h Loctite Primer and
or equivalent) com-
housing.

the retaining screws

, Figure 51), apply
it to seal the boot to



the shaft. Allow approximately 12 hours for the RTV to cure before moving the shift lever.

10. Install the shifter in the mounting bracket and install the three mounting screws.

11. Reattach the electrical wires to the terminal board. Refer to Figure 52 for the terminal board on

models with EZ Shift, except 1995 Scrambler and Xplorer models. Refer to Figure 53 for terminal wire connections of 1995 Scrambler and Xplorer models. Attach wires to the frame with cable ties.

12. Attach and adjust the control linkage as described in this chapter.

Table 1 TRANSMISSION APPLICATION

Model No.	Transmission
1985 and 1986	Polaris, Type I, chain is 15 links wide
1987	
Trail Boss W877527	Polaris, Type I, chain is 11 links wide
Cyclone W877828	Polaris, Type I, chain is 11 links wide
Trail Boss 4 × 4 W878027, W878127 and W878327	Gear (ME25P), Type II, Fuji
1988	
Trail Boss 2 × 4 W887527	Gear (ME25PR), Type II, Fuji
Trail Boss 4 × 4 W888127	Gear (ME25P3), Type II, Fuji
Trail Boss 250 R/ES X888528 and W888528	Polaris, Type I, chain is 11 links wide
1989	
Trail Boss W898527	Polaris, Type I, chain is 11 links wide
Trail Boss 2 × 4 W897527	Gear (ME25P6), Type II, Fuji
Trail Boss 4 × 4 W898127	Gear (ME25P3A or ME25P5), Type II, Fuji
Big Boss 4 × 6 X898627 and W898627	Gear (ME25P6), Type II, Fuji
1990	
Trail Blazer W907221	Polaris, Type I, chain is 11 links wide
Trail Boss 250 W908527	Gear (ME25P10), Type II, Fuji
Trail Boss 2 × 4 W907527	Gear (ME25P8), Type II, Fuji
T.B. 2 × 4-350L W907539	Gear (ME25P10), Type II, Fuji
Trail Boss 4 × 4 W908127	Gear (ME25P7), Type II, Fuji
T.B. 4 × 4-350L W908139	Gear (ME35P1), Type II, Fuji
Big Boss 4 × 6 W908627	Gear (ME25P8), Type II, Fuji
1991	
Trail Blazer W917221	Gear (ME25P10), Type II, Fuji
Trail Boss 250 W918527	Gear (ME25P10), Type II, Fuji
Trail Boss 2 × 4 W917527	Gear (ME25P8), Type II, Fuji
T.B. 2 × 4-350L W917539	Gear (ME25P2), Type II, Fuji
Trail Boss 4 × 4 W918127	Gear (ME25P7), Type II, Fuji
T.B. 4 × 4-350L W918139	Gear (ME35P1), Type II, Fuji
Big Boss 4 × 6 W918627	Gear (ME25P8), Type II, Fuji
Big Boss 6 × 6 W918727	Gear (ME35P1), Type II, Fuji
1992	
Trail Blazer W927221	Gear (ME25P10), Type II, Fuji
Trail Boss 250 W928527	Gear (ME25P10), Type II, Fuji
Trail Boss 2 × 4 W927527	Gear (ME25P8), Type II, Fuji
T.B. 2 × 4-350L W927539	Gear (ME25P2), Type II, Fuji
Trail Boss 4 × 4 W928127	Gear (ME25P7), Type II, Fuji
T.B. 4 × 4-350L W928139	Gear (ME35P1), Type II, Fuji

(continued)

Table 1 TRANSMISSION APPLICATION (continued)

Model No.	Transmission
1992 (continued)	
Big Boss 4 × 6 W928627	Gear (ME25P8), Type II, Fuji
Big Boss 6 × 6 W928727	Gear (ME35P1), Type II, Fuji
1993	
Trail Blazer W937221	Gear (ME25P10), Type II, Fuji
Trail Boss W938527	Gear (ME25P10), Type II, Fuji
Sportsman W938039	Type III Gear/chain (1341136)
250 2 × 4 W937527	Gear (ME25P8), Type II, Fuji
350 2 × 4 W937539	Gear (ME25P2), Type II, Fuji
250 4 × 4 W938127	Gear (ME25P7), Type II, Fuji
350 4 × 4 W938139	Gear (ME35P1), Type II, Fuji
250 6 × 6 W938727	Gear (ME35P1), Type II, Fuji
350 6 × 6 W938739	
Without EZ Shift	Gear (ME25P2), Type II, Fuji
With EZ Shift	Type III Gear/chain
1994	
Trail Blazer 2W W947221	Type III Gear/chain (1341124)
Trail Boss 2W W948527	Type III Gear/chain (1341124)
Sport W948540	Type III Gear/chain (1341124)
Sportsman 4 × 4 W948040	Type III Gear/chain (1341136)
300 2 × 4 W947530	Type III Gear/chain (1341125)
400 2 × 4 W947540	Type III Gear/chain (1341123)
300 4 × 4 W948130	Type III Gear/chain (1341136)
400 4 × 4 W948140	Type III Gear/chain (1341146)
300 6 × 6 W948730	Type III Gear/chain (1341136)
400 6 × 6 W948740	Type III Gear/chain (1341146)
1995	
Trail Blazer W957221	Type III Gear/chain (1341124)
Trail Boss W958527	Type III Gear/chain (1341124)
300 2 × 4 W957530	Type III Gear/chain (1341125)
400 2 × 4 W957540	Type III Gear/chain (1341123)
300 4 × 4 W958130	Type III Gear/chain (1341136)
Scrambler W957840	Type III Gear/chain (1341140)
Sport W958540	Type III Gear/chain (1341124)
Sportsman 4 × 4 W958040	Type III Gear/chain (1341146)
Xplorer 4 × 4 W959140	Type III Gear/chain (1341146)
Magnum 2 × 4 W957444	Type III Gear/chain (1341139)
Magnum 4 × 4 W958144	Type III Gear/chain (1341132)
400 6 × 6 W958740	Type III Gear/chain (1341146)

Table 2 TIGHTENING TORQUES

	N-m	ft.-lb.
Type I transmission		
Case halves	5.4	4
Swing arm pivot bolts	74.6	55
Type II transmission		
Case halves	23.0	17
Drain plug	19.0	14
Drive sprocket bolt	23.0	17
Output shaft bearing mounting nuts	16.3	12
Shift lever pivot	19.0	14
Speedometer angle drive	14.9	11

(continued)

Type I transmission
Swing arm pivot
Transmission
Type II transmission
Case halves
Shift lever nut
Drain plug
Speedometer
Transmission
Drive sprocket
Output shaft bearing
mounting nuts
Swing arm pivot
Shift lever nut
Lock nuts
EZ shift cover

Table 2 TIGHTENING TORQUES (continued)

	N·m	ft.-lb.
Type II transmission (continued)		
Swing arm pivot bolts	74.6	55
Transmission mounting	33.9	25
Type III transmission		
Case halves	16.3	12
Shift lever nut	19.0	14
Drain plug	19.0	14
Speedometer angle drive	14.9	11
Transmission mounting	33.9	25
Drive sprocket	23.0	17
Output shaft bearing mounting nuts	16.3	12
Swing arm pivot bolts	74.6	55
Shift rod ends		
Lock nuts	3.95	2.9
EZ shift cover screws	16.3	12

CHAPTER TEN

FRONT DRIVE SYSTEM

The "Demand 4" front drive system is used on some 1987 and later models. This system permits the vehicle to be driven by the rear wheels as long as the front wheels rotate faster than the front drive axle. If the rotational speed of the front wheels slows to less than the speed of the drive axle, the front wheel hubs engage. The front hubs on 1987 and 1988 models are mechanical and the hubs for 1989-on models have electrical engagement control.

NOTE

Tire size is important for proper operation on all models. If the tire size is changed, the engagement of the front drive may be erratic and could result in dangerous control problems. Refer to Table 1 for original tire size for your model. Refer to Chapter Three for proper tire inflation.

FRONT HUBS

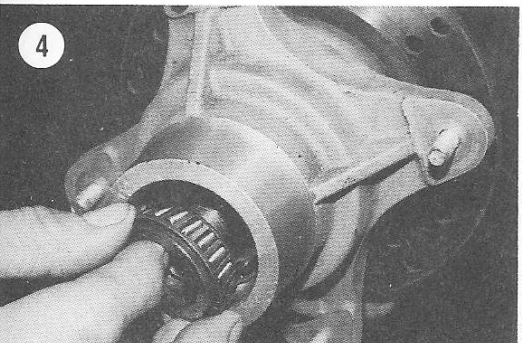
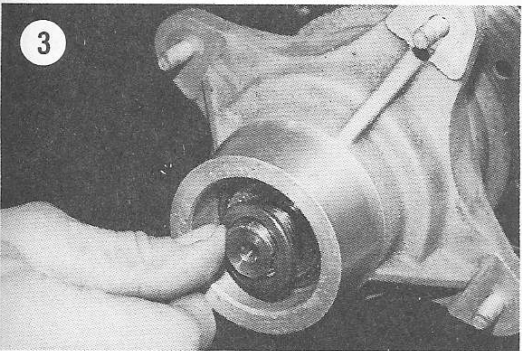
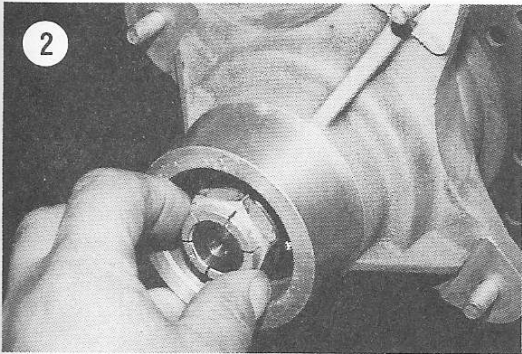
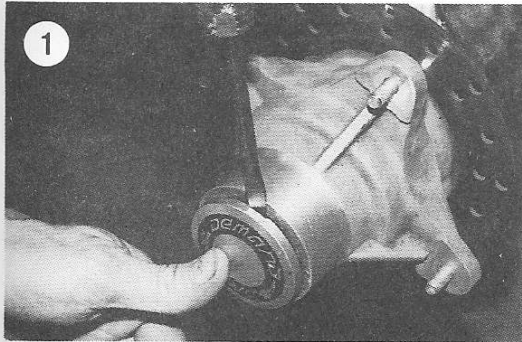
Disassembly/Inspection/Reassembly

1. Place the ATV on a level surface so that all of the wheels can be raised off the ground at the same time.
2. Lift and block both the front and rear of the vehicle so that the front wheels can be removed and the rear wheels can be rotated.
3. Unbolt and remove the front wheels.
4. Clean the front hubs and brake assembly.
5. Unbolt and remove the front brake calipers as described in Chapter Fourteen.
6. Position a pan under the front hub and remove the hub cap. Refer to **Figure 1**.

NOTE

The spindle nut on some 1987 models is locked with safety wire that must be removed before the nut can be removed. Some models may be equipped with a





nut that is staked (bent in) to the keyway of the shaft. Do not attempt to remove the staked area and never reuse a nut that has been staked to the shaft keyway. A self locking FlexLoc nut should be installed on all models except the 1987 W878027 model. The manufacturer suggests that a new locking nut be installed when reassembling after service.

7. Remove the spindle nut (Figure 2). Some 1994 and all later models have a left-hand nut installed on the left axle. Turn the left-hand nut clockwise to remove it.

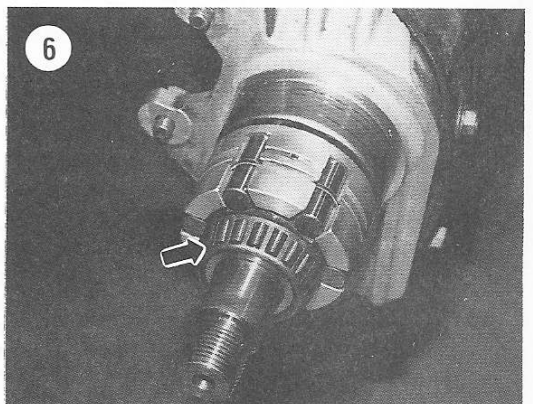
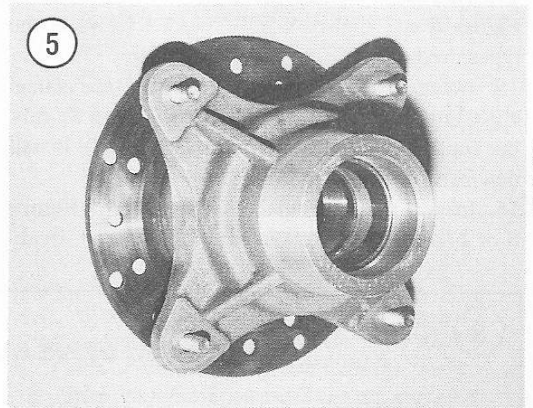
8. Remove the tang washer (Figure 3).

9. Remove the outer bearing (Figure 4).

10. Remove the wheel hub and brake rotor (Figure 5).

11. Remove the inner wheel bearing (Figure 6).

12. Remove the roller clutch assembly (A, Figure 7).



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NOTE

Do not mix the parts of one roller clutch with similar parts from another clutch. The cam (1, **Figure 8** or **Figure 9**) of some models is marked "Left" or "Right" and must be installed on the correct side.

13. Remove the drive key (B, **Figure 7**) on models so equipped.

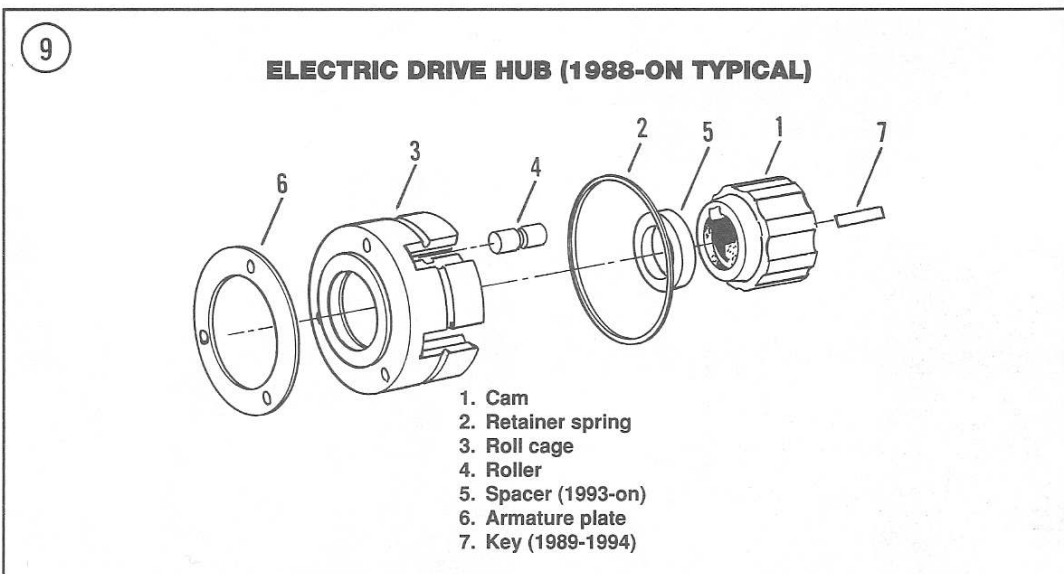
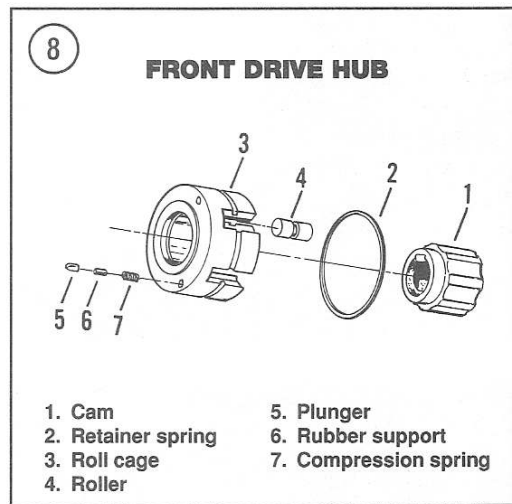
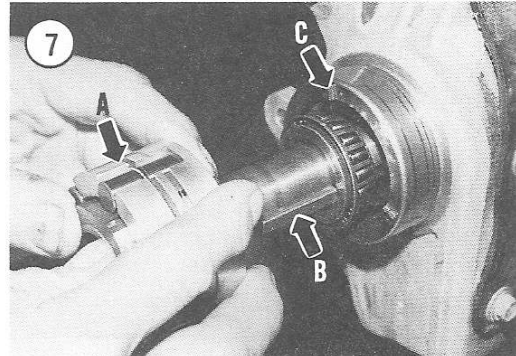
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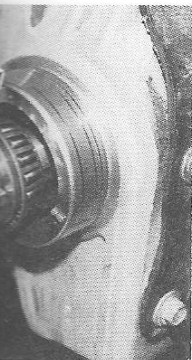
The clutch can usually be cleaned and inspected without removing the spring and rollers (2 and 4, **Figure 8** or **Figure 9**). If the rollers are removed, do not stretch the spring farther than necessary to remove one roller (4, **Figure 8** or **Figure 9**) at a time. If the spring is removed from the cage, it has been stretched far enough that a new spring should be installed.

14. Thoroughly clean the roller clutch. Refer to **Figure 8** and **Figure 9** for exploded views of the types used.

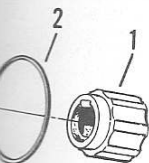
15. On early (1987-1988) models with mechanical engagement, inspect the plunger (5, **Figure 8**), rubber support (6) and compression spring (7). Install new parts as necessary.

16. Inspect the cage and the rollers (3 and 4, **Figure 8** or **Figure 9**). Make sure the rollers move freely





HUB



Hub support
compression spring

within the sliding surfaces of the cage. Small burrs can sometimes be removed using fine emery cloth or small file, but be sure all of the parts are thoroughly clean before assembling.

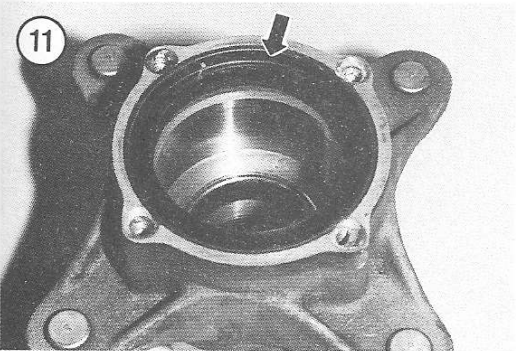
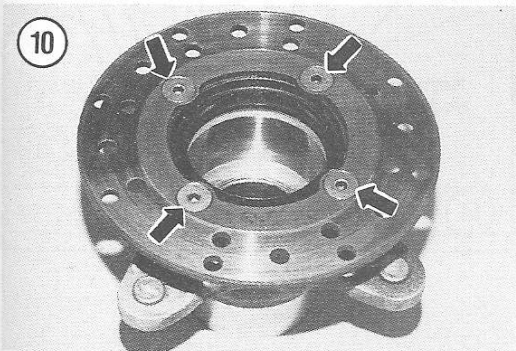
NOTE

The retainer springs on models produced after 1989 are stronger than the spring used on earlier models. Be sure the correct spring is installed. Centrifugal force may engage the front drive at high speed if the spring is not strong enough. Refer to **Table 2** for identification of springs by wire size.

17. Inspect the retainer spring (2, **Figure 8** or **Figure 9**) for irregular gaps, without removing it. Install a new spring if the gaps are not even and whenever the old spring has been removed. The old spring can be removed by cutting.

18. If removed, install the retainer spring using a special tool and the following procedure:

- a. Install the rollers in the cage.
- b. Position the special cone shaped tool (part No. 2870888) over the end of the cage.



- c. Hook the ends of the retainer spring together and carefully roll the spring over the tool. The spring should move evenly onto the cage and into the groove.

NOTE

The cam (1, **Figure 8** or **Figure 9**) on some models is marked "Left" or "Right" and must be installed on the correct side. If the cam is not marked, the cam can be installed on either side.

19. Assemble the engagement cam (1, **Figure 8** or **Figure 9**) to the roller cage. The cam on 1987-1992 models has a shoulder that must be installed toward the inside. A spacer (5, **Figure 9**) is used on 1993 and later models.

20. To remove and install the hub inner seal, proceed as follows:

- a. Remove the four screws (**Figure 10**) attaching the brake rotor to the hub. The screws are installed with threadlocking compound and it is necessary to heat the hub near the threads before removing the screws.
- b. Continue to heat the hub around the seal area of the hub and pry the seal (**Figure 11**) from the hub.

NOTE

On 1987 Model W878027 vehicles, the seal should be recessed 0.2-0.3 mm (0.080-0.110 in.) below flush with the disk brake mounting surface. On all models except 1987 Model W878027, the seal should be flush with the brake disc mounting surface. On all models, make sure the seal is installed straight in the seal bore.

- c. Install the new seal (**Figure 11**) with the spring loaded lip toward the inside.
- d. Clean the brake disc, making sure that all oil, including oil from your hands, is removed from the disc.
- e. Coat the threads of the retaining screws (**Figure 10**) with medium strength threadlocking compound and install the brake disc. Refer to **Table 3** for tightening torque.

21. On 1987-1988 models, inspect the ramps (C, **Figure 7**). Install a new casting if the ramp is worn to less than 1/2 of its original height.

22. On models so equipped, install the key (B, **Figure 7**).

23A. On 1987-1988 models, install the plungers, rubber support and compression spring (**Figure 12**) in the bores of the roll cage.

23B. On 1989-on models, assemble the armature plate (6, **Figure 9**) with tabs in the holes of the roll cage as shown in **Figure 13**.

24A. Install and time the mechanically actuated front drive clutch as described in this chapter.

24B. Install and adjust the electrically engaging front drive clutch as described in this chapter.

Install and time the mechanically actuated front drive clutch

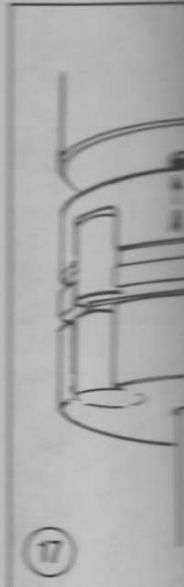
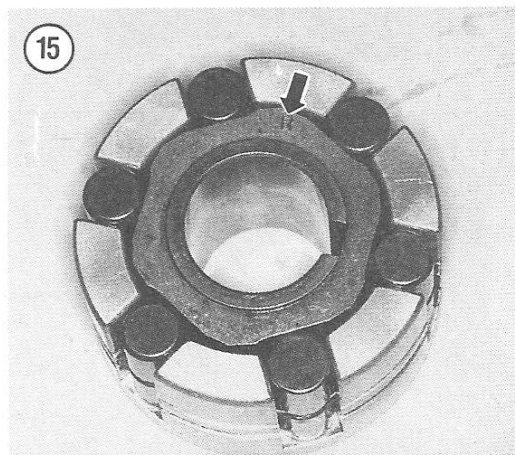
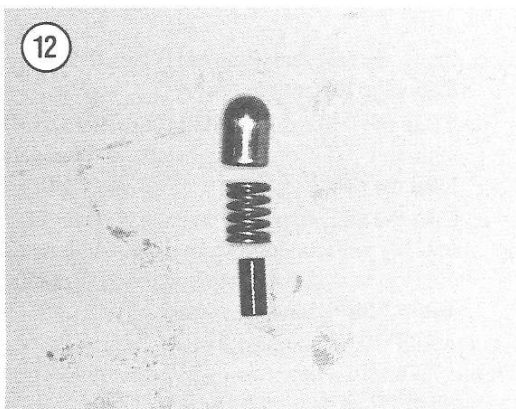
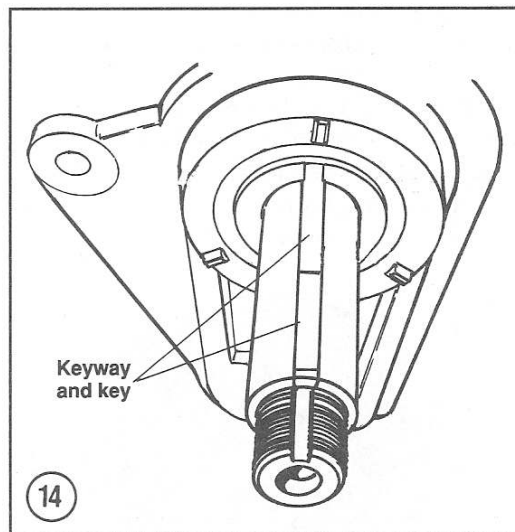
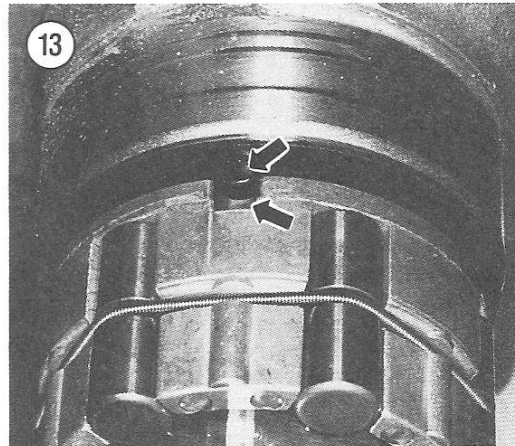
Improper installation and timing may cause loss of vehicle control. The drive clutches must be correctly installed for the front drive to function properly.

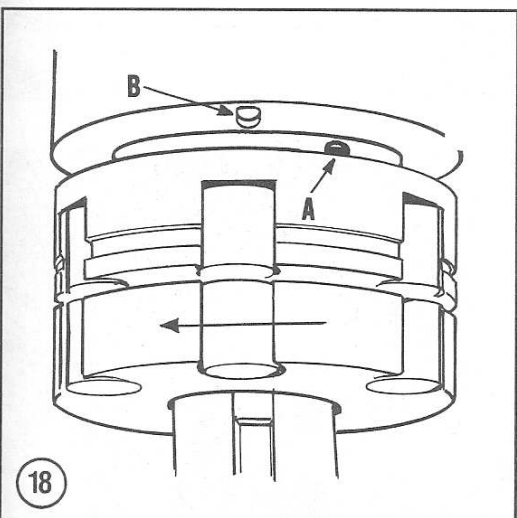
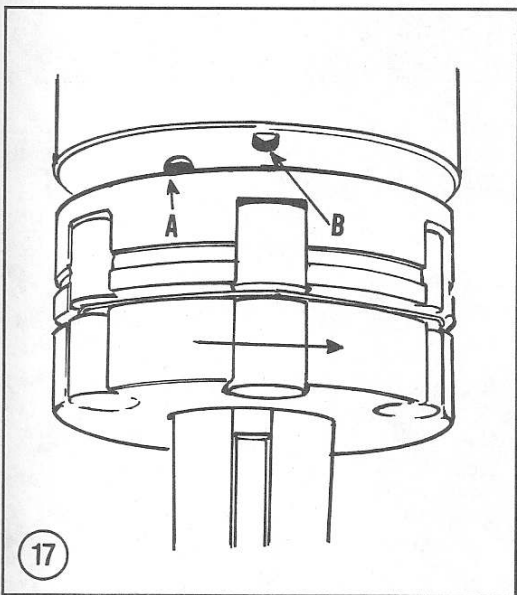
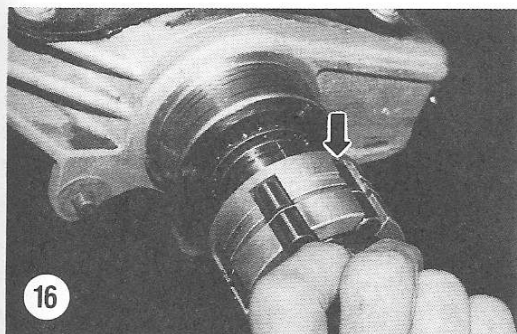
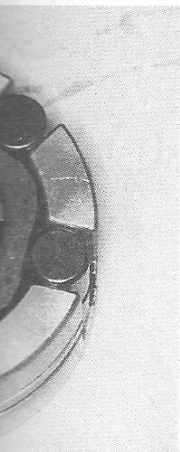
1. Rotate the front axles until the drive key is at the 12 o'clock (straight up) position as shown in **Figure 14**.

NOTE

*The cam on some models is marked "L" or "R" (**Figure 15**) indicating installation on the left or right side of the vehicle. If the cam is not marked, it can be installed on either side.*

2. Coat the drive assembly with Type F automatic transmission fluid and install the assembly (**Figure 16**) on the axle. The roll cage must be free to turn on the axle. The cam (1, **Figure 8**) must be installed with the correct side out.





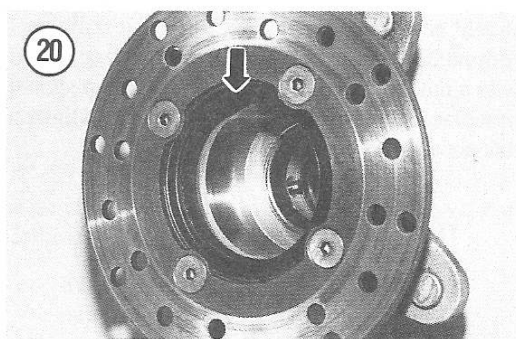
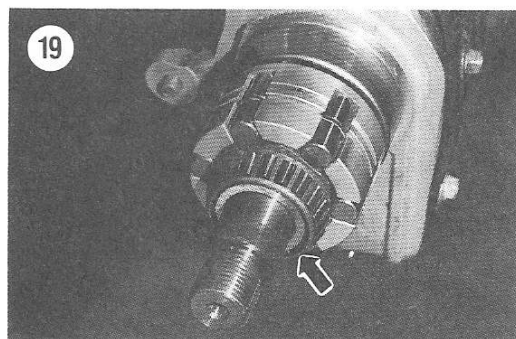
3A. On the right side of the vehicle, position the roll cage so the plunger (A, **Figure 17**) is just about to contact the ramp (B, **Figure 17**) if the cage rotates in the normal direction.

3B. On the left side of the vehicle, position the roll cage so the plunger (A, **Figure 18**) is just about to contact the ramp (B, **Figure 18**).

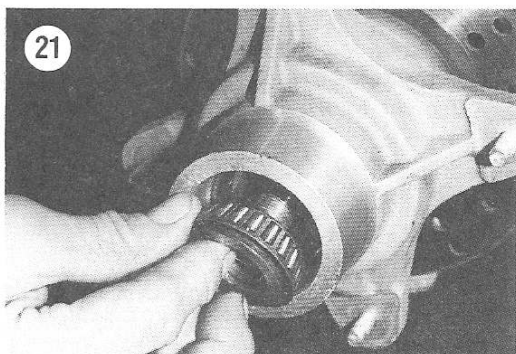
4. Install inner wheel bearing (**Figure 19**).

5. Coat the seal (**Figure 20**) with grease, then install wheel hub over the clutch. Be careful not to damage the seal.

6. Install the outer wheel bearing (**Figure 21**).



10



7. Install the tang washer (**Figure 22**) with tang engaging the keyway.

NOTE

The axle nut on some 1987 models is locked with safety wire that must be installed after tightening the nut. Some models are equipped with a nut that is locked by staking (bending) the nut into the keyway of the shaft. Never reuse a nut that has been staked to the shaft keyway. Other models are equipped with a self-locking FlexLoc nut that must not be reused.

8A. On 1987 W878027 models with the nut drilled for safety wire, install and tighten the nut as follows.

- a. Install the axle nut and tighten to 11.3 N·m (100 in.-lb.) torque.
- b. Rotate the wheel hub several revolutions. The front hub can be rotated by rotating the rear wheel.
- c. Tighten the axle nut to 8.47 N·m (75 in.-lb.) torque.
- d. Install safety wire to keep the nut from loosening.

8B. All 1987-1988 models except W878027, should be equipped with FlexLoc self-locking nuts (**Figure 23**). Some models were originally equipped with a nut that required staking, but this nut should be replaced by a new FlexLoc nut. Install and tighten this nut as follows:

NOTE

The FlexLoc nut requires some force to turn on the thread before it is tightened. It is this force of 8.5-45.2 N·m (75-400 in.-lb.) torque that locks the nut to the threaded axle shaft. If this torque is less than 8.5 N·m (75 in.-lb.), install a new nut.

- a. Measure and record the torque required to turn the nut before it tightens against the tang washer.
- b. Continue tightening the axle nut against the tang washer until the torque is 45.2 N·m (400 in.-lb.) torque more than the torque measured in sub-step a.
- c. Rotate the wheel hub several revolutions. The front hub can be rotated by rotating the rear wheel.

d. Retighten the axle nut as described in sub-step b.

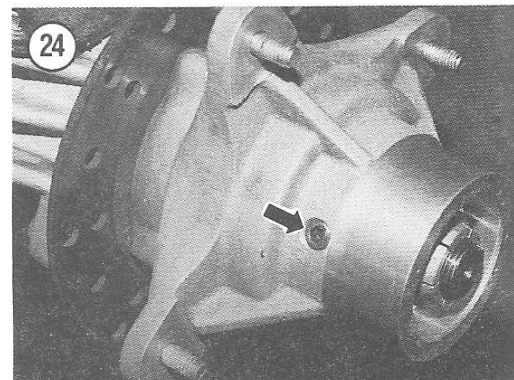
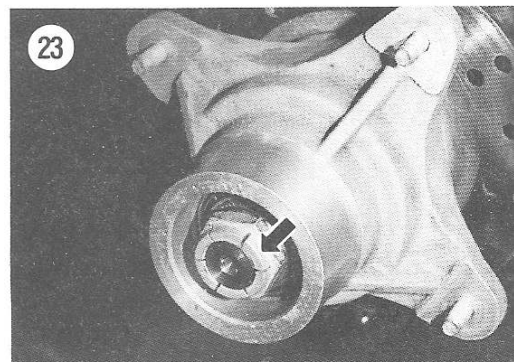
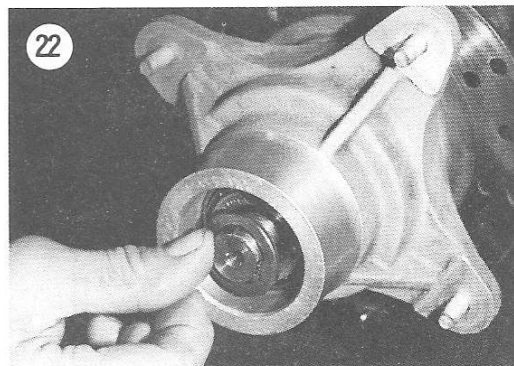
9. Install the hub cap.

10. Remove the fill plug (**Figure 24**).

11. Refer to Chapter Three to fill the hub with the proper quantity and type of lubricant.

12. Reinstall the plug (**Figure 24**).

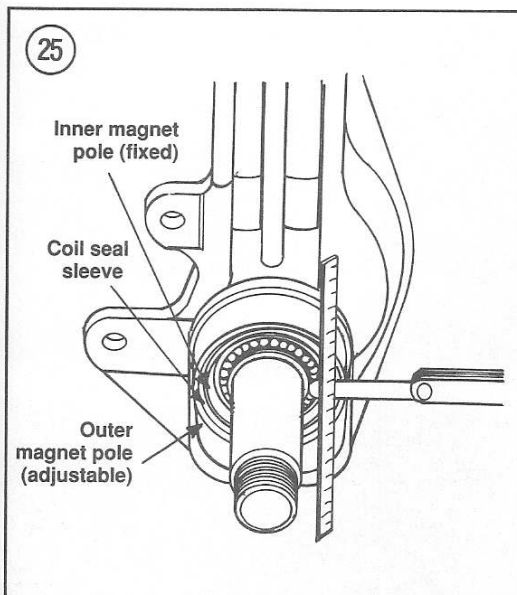
13. Install front wheels. Refer to **Table 3** for tightening torque.



scribed in sub-step

24).
l the hub with the
ant.

Table 3 for tight-



Install and adjust the electrically-engaged front drive clutch

Improper installation and adjustment can result in a dangerous lack of vehicle control. The drive clutches must be correctly installed for the front drive to function properly.

1. Before installing the drive clutch, check for electrical problems as described in Chapter Eleven.
2. Use a depth gauge or a straightedge and feeler gauge to measure the distance from the outer pole (seal sleeve) to the inner pole as shown in **Figure 25**. Measure the pole gap in at least 3 locations and compare with the specification in **Table 2**.
3. If the pole gap measured in Step 2 is incorrect, move the outer magnet pole (seal sleeve) by tapping the seal sleeve.
4. Be sure the tabs of the armature plate are still engaging the holes in the roll cage as shown in **Figure 26**.
5. Install inner wheel bearing.
6. Coat the seal (**Figure 27**) with grease, then install the wheel hub over the clutch. Be careful not to damage the seal.
7. Install the outer wheel bearing.
8. Install the tang washer with the tang engaging the keyway.

NOTE

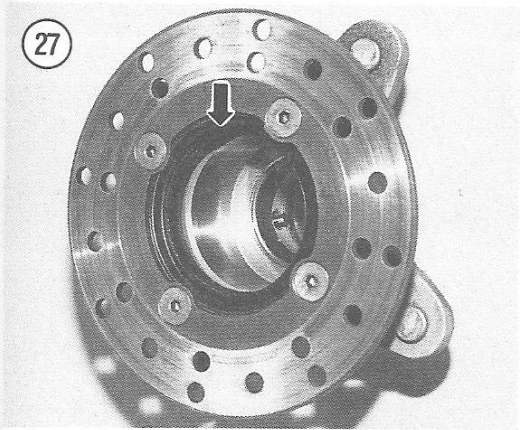
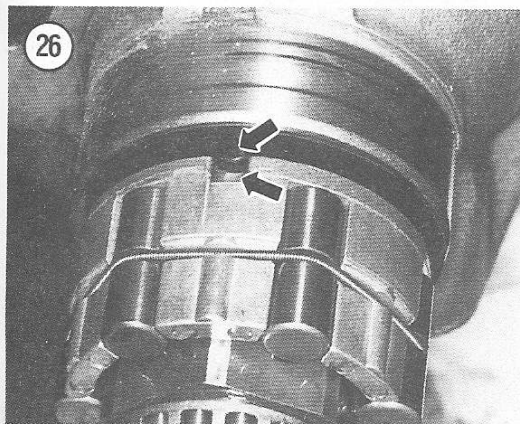
Replace the self-locking FlexLoc nut during reassembly.

9. All models are equipped with FlexLoc self-locking nuts (**Figure 23**). Install and tighten this nut as follows:

NOTE

The FlexLoc nut requires some force to turn on the thread before it is tightened. It is this force of 8.5-45.2 N·m (75-400 in.-lb.) torque that locks the nut to the threaded axle shaft. If this torque is less than 8.5 N·m (75 in.-lb.), install a new nut.

- a. Measure and record the torque required to turn the nut before it tightens against the tang washer.
- b. Continue tightening the axle nut against the tang washer until the torque is 45.2 N·m (400 in.-lb.) torque more than the torque measured in sub-step a.



- c. Rotate the wheel hub several revolutions. The front hub can be rotated by rotating the rear wheel.
 - d. Retighten the axle nut as described in sub-step b.
10. Install the hub cap.
 11. Remove the fill plug (**Figure 24**).
 12. Refer to Chapter Three to fill the hub with the proper quantity and type of lubricant.
 13. Reinstall the plug (**Figure 24**).
 14. Install front wheels. Refer to **Table 3** for tightening torque.

FRONT DRIVE SHAFT BOOTS AND CV JOINTS

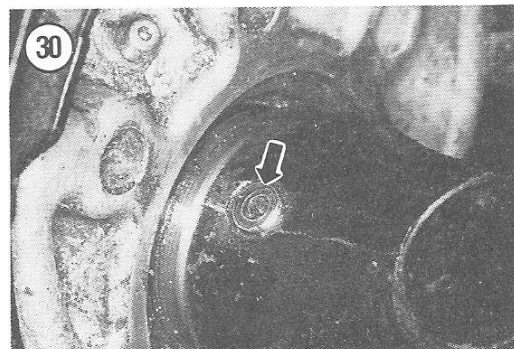
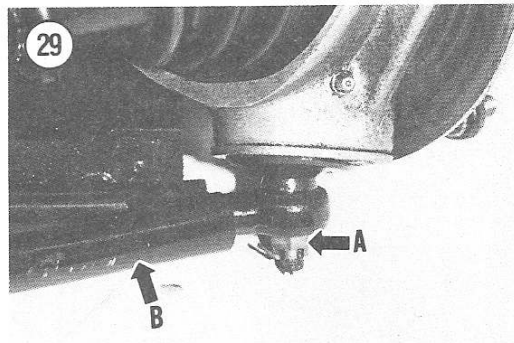
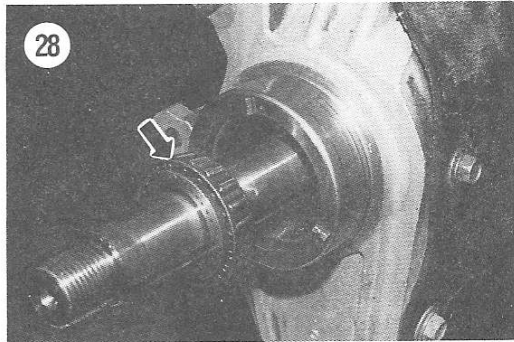
The front drive shafts connect the front drive eccentric shaft and the drive clutches located in the front wheel hubs. Service to the shafts is usually limited to installing new seal boots or installing the complete shaft and universal joints.

Replacement front drive shaft boots for 1987-1988 models are split and can be installed without disassembling the drive shaft. The boot kit (part No. 3260108) includes instructions for installation. It is important to keep any grease or oil from the splice area of the replacement boot. The splice is coated with an adhesive and will not hold together if contaminated.

On 1989-on models, the drive shaft boots can be replaced using the type originally installed. Remove the drive shaft as described, install a new boot, then reinstall the drive shaft.

Removal/Installation

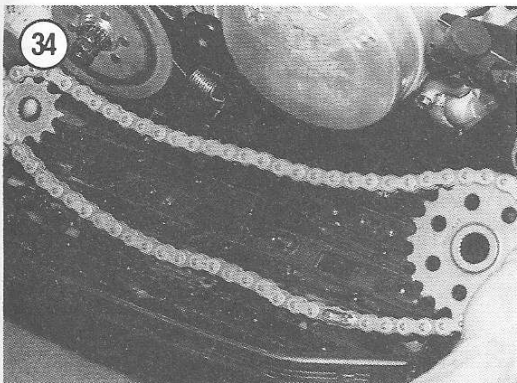
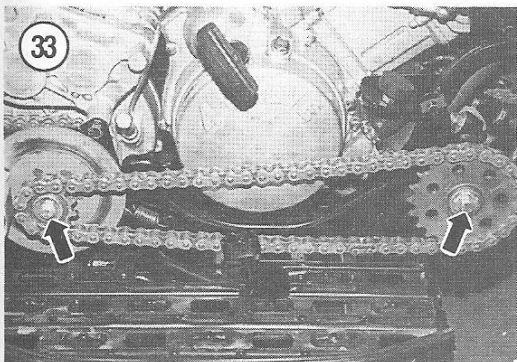
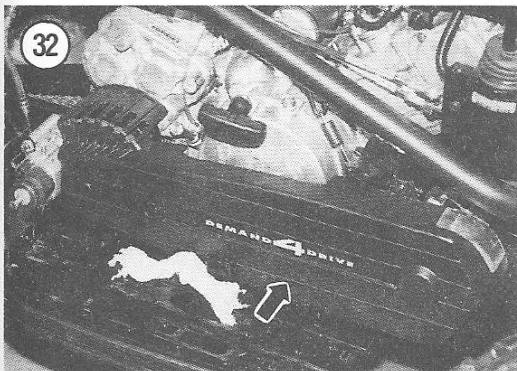
1. Place the ATV on a level surface so that all of the wheels can be raised off the ground at the same time.
2. Lift and block both the front and rear of the vehicle so that the front wheels can be removed and the rear wheels can be rotated.
3. Unbolt and remove the front wheels from the hubs.
4. Clean the front hubs and brake assembly.
5. Unbolt and remove the front brake calipers as described in Chapter Fourteen.
6. Remove the front wheel drive hubs as described in this chapter.
7. Remove the outer bearing (**Figure 28**).
8. Remove the cotter pin and nut (A, **Figure 29**).



9. Detach the lower A frame (B, **Figure 29**) from the strut.

NOTE

It may be necessary to detach the steering rod from the strut and the top of the strut from the frame on some models. Be very careful not to damage the electrical wires to the front wheel drive engagement coils on 1989 and later models.



10. Carefully pull the strut out of the way while withdrawing the drive shaft from the strut.

11. The inner end of the drive shaft can be detached after removing the roll pin (**Figure 30** or **Figure 31**). The inner universal joint is splined to the front drive eccentric shaft.

12. Remove the clamps from the boot covering the CV joint. Be careful not to pull the splined end from the CV joint.

13. Slide the boot back onto the drive shaft, then pull the CV joint from the drive shaft.

14. Remove the boot from the drive shaft.

15. Clean the areas of the drive shaft and CV joint where the boot is attached.

16. Inspect the grease on the CV joint for contamination. If the boot has been damaged or if the CV joint is worn, the grease will indicate contamination. To clean and lubricate the CV joint, proceed as follows:

- a. Clean the CV joint using special cleaner (part No. 2870770) available from your Polaris dealer.
- b. After the CV joint is thoroughly clean, assemble the joint using special grease (part No. 3260110) available from your Polaris dealer. The grease will help to hold the parts of the CV joint in place while assembling.

17. Slide the small end of the boot over the drive shaft.

18. Slide the CV joint onto the splined end of the drive shaft.

19. Install the large end of the boot over the CV joint.

20. Install both clamps on the boot. Make sure that clamps are tight, but do not cut the rubber boot.

21. Reassemble by reversing the removal procedure. Refer to **Table 2** for tightening torques.

10

CENTER CHAIN AND SPROCKETS

1. Unbolt and remove the cover (**Figure 32**) from the chain.
2. Remove the retaining screws and washers (**Figure 33**).
3. Slide the sprockets from the shafts and remove the sprockets with the chain as shown in **Figure 34**.
4. Inspect the chain for wear or damage. A section of twenty pitches of the 520 chain should measure 32 cm (12.5 in.) when new. Install a new chain if any twenty pitches is more than 32.7 cm (12.875 in.).

Also check the chain for loose side plates, damaged O-rings, twists or other damage that would indicate replacement is necessary.

5. Check the sprockets for “hooked” or otherwise damaged teeth. Install new sprockets if the chain can be pulled 6 mm (0.25 in.) away from the sprocket. Always install new sprockets if installing a new chain.

6. Install the sprockets and chain by reversing the removal procedure. Install the *closed end* of the drive chain master link toward the direction of travel as shown at A, **Figure 35**.

7. Adjust center and front drive chains as described in Chapter Three.

FRONT CHAIN AND SPROCKETS

1. Loosen the front chain adjustment as described in Chapter Three, then remove the front chain.

2. To remove the front sprocket, it is necessary to remove the front drive axles as described in this chapter.

3. To remove the center sprocket, remove the center eccentric shaft.

4. Inspect the chain for wear or damage. Any section of twenty pitches of the 520 chain should measure 32 cm (12.5 in.) when new. Install a new chain if any twenty pitches is more than 32.7 cm (12.875 in.). Also check the chain for loose side plates, damaged O-rings, twists or other damage that would indicate that replacement is necessary.

5. Check the sprockets for “hooked” or otherwise damaged teeth. Install new sprockets if the chain can be pulled 6 mm (0.25 in.) away from the sprocket. Always install new sprockets if installing a new chain.

6. Adjust center and front drive chains as described in Chapter Three.

Eccentric Shafts

The center eccentric shaft and housing can be removed after removing the drive chains and the clamp bolts (B, **Figure 35**). To remove the front eccentric shaft, it is first necessary to remove the front drive axles as described in this chapter.

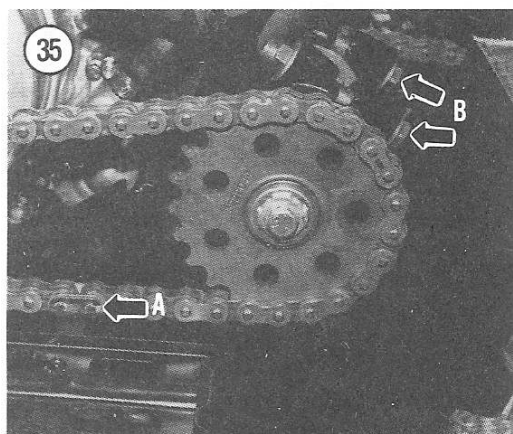


Table 1 TIRE SIZE AND PRESSURE

	Front tires kPa (psi)	Rear tires kPa (psi)
1987		
Trail Boss 4 × 4 W878027		
Size	22 × 8.00 × 10	22 × 11.00 × 10
Pressure	27.6 (4)	20.7 (3)
Trail Boss 4 × 4 W878127		
Size	22 × 8.00 × 10	22 × 11.00 × 10
Pressure	27.6 (4)	20.7 (3)
Trail Boss 4 × 4 W878327		
Size	22 × 8.00 × 10	22 × 11.00 × 10
Pressure	27.6 (4)	20.7 (3)

(continued)

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from the sprocket.
f installing a new

chains as described

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ve chains and the
remove the front
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his chapter.



Table 1 TIRE SIZE AND PRESSURE (continued)

	Front tires kPa (psi)	Rear tires kPa (psi)
1988		
Trail Boss 4 × 4 W888127		
Size	22 × 8.00 × 10	22 × 11.00 × 10
Pressure	27.6 (4)	20.7 (3)
1989		
Trail Boss 4 × 4 W898127		
Size	22 × 8.00 × 10	22 × 11.00 × 10
Pressure	27.6 (4)	20.7 (3)
1990		
Trail Boss 4 × 4 W908127		
Size	22 × 8.00 × 10	24 × 11.00 × 10
Pressure	27.6 (4)	20.7 (3)
Trail Boss 4 × 4 - 350L W908139		
Size	25 × 8.00 × 12	25 × 12.00 × 10
Pressure	27.6 (4)	20.7 (3)
1991		
Trail Boss 4 × 4 W918127		
Size	22 × 8.00 × 10	24 × 11.00 × 10
Pressure	27.6 (4)	20.7 (3)
Trail Boss 4 × 4 - 350L W918139		
Size	25 × 8.00 × 12	25 × 12.00 × 10
Pressure	27.6 (4)	20.7 (3)
Big Boss 6 × 6 W918727		
Size	22 × 8.00 × 10	22 × 11.00 × 10
Pressure	34.5 (5)	34.5 (5)
1992		
Trail Boss 4 × 4 W928127		
Size	22 × 8.00 × 10	24 × 11.00 × 10
Pressure	27.6 (4)	20.7 (3)
Trail Boss 4 × 4 - 350L W928139		
Size	25 × 8.00 × 12	25 × 12.00 × 10
Pressure	27.6 (4)	20.7 (3)
Big Boss 6 × 6 W928727		
Size	22 × 8.00 × 10	22 × 11.00 × 10
Pressure	34.5 (5)	34.5 (5)
1993		
Sportsman W938039		
Size	25 × 8.00 × 12	25 × 12.00 × 10
Pressure	27.6 (4)	20.7 (3)
250 4 × 4 W938127		
Size	22 × 8.00 × 10	24 × 11.00 × 10
Pressure	27.6 (4)	20.7 (3)
350 4 × 4 W938139		
Size	25 × 8.00 × 12	25 × 12.00 × 10
Pressure	27.6 (4)	20.7 (3)
250 6 × 6 W938727		
Size	22 × 8.00 × 10	22 × 11.00 × 10
Pressure	34.5 (5)	34.5 (5)
350 6 × 6 W938739		
Size	25 × 8.00 × 10	25 × 12.00 × 10
Pressure	34.5 (5)	34.5 (5)
1994		
Sportsman 4 × 4 W948040		
Size	25 × 8.00 × 12	25 × 12.00 × 10
Pressure	27.6 (4)	20.7 (3)

(continued)

Table 1 TIRE SIZE AND PRESSURE (continued)

	Front tires kPa (psi)	Rear tires kPa (psi)
1994 (continued)		
300 4 × 4 W948130		
Size	22 × 8.00 × 10	24 × 11.00 × 10
Pressure	20.7 (3)	20.7 (3)
400 4 × 4 W948140		
Size	25 × 8.00 × 12	25 × 12.00 × 10
Pressure	27.6 (4)	20.7 (3)
300 6 × 6 W948730		
Size	22 × 8.00 × 10	22 × 11.00 × 10
Pressure	34.5 (5)	34.5 (5)
400 6 × 6 W948740		
Size	25 × 8.00 × 12	25 × 12.00 × 10
Pressure	34.5 (5)	34.5 (5)
1995		
300 4 × 4 W958130		
Size	22 × 8.00 × 10	24 × 11.00 × 10
Pressure	27.6 (4)	20.7 (3)
Scrambler W957840		
Size	23 × 7.00 × 10	22 × 11.00 × 10
Pressure	27.6 (4)	20.7 (3)
Sportsman 4 × 4 W958040		
Size	25 × 8.00 × 12	25 × 12.00 × 10
Pressure	27.6 (4)	20.7 (3)
Xplorer 4 × 4 W959140		
Size	25 × 8.00 × 12	25 × 12.00 × 10
Pressure	27.6 (4)	20.7 (3)
Magnum 4 × 4 W958144		
Size	25 × 8.00 × 12	25 × 12.00 × 10
Pressure	27.6 (4)	20.7 (3)
400 6 × 6 W958740		
Size	25 × 8.00 × 12	25 × 12.00 × 10
Pressure	34.5 (5)	34.5 (5)

Table 2 FRONT WHEEL DRIVE HUB SPECIFICATIONS

	mm (In.)
Mechanically-engaged units	
1987-1988	
Retainer spring	
Part No.	3250021
Wire diameter mm (in.)	0.30 (0.012)
Free length, inside hooks	173 (6.85)
Electro-mechanical units	
1989-1994	
Retainer spring	
Part No.	3250022
Wire diameter	0.38 (0.015)
Free length, inside hooks	168 (6.63)
Pole gap (outer to inner)	0.05-0.1 (0.002-0.004)
1995-on	
Retainer spring	
Part No.	3250032
Wire diameter	0.45 (0.018)
Free length, inside hooks	177 (6.968)
Pole gap (outer to inner)	0-0.025 (0-0.001)

Ball-joint to A-trim
1987-1988 models
1989-on models
Brake disc screws
Chain adjuster
Center
Front
Front drive sprocket
Middle sprocket
Drive
Driven
Wheel nuts
Front
Rear

* Listed torque is
required to move
correct torque in
installed each time
new.

Model No.

1987
Trail Boss 4 × 4
Trail Boss 4 × 4
Trail Boss 4 × 4
1988
Trail Boss 4 × 4
1989
Trail Boss 4 × 4
1990
Trail Boss 4 × 4
T.B. 4 × 4-350L
1991
Trail Boss 4 × 4
T.B. 4 × 4-350L
Big Boss 6 × 6
1992
Trail Boss 4 × 4
T.B. 4 × 4-350L
Big Boss 6 × 6
1993
Sportsman WS
250 4 × 4 W938
350 4 × 4 W938
250 6 × 6 W938
350 6 × 6 W938
1994
Sportsman 4 × 4
300 4 × 4 W948
400 4 × 4 W948
300 6 × 6 W948
400 6 × 6 W948

Table 3 TIGHTENING TORQUES

Ball-joint to A frame	
1987-1988 models	94.9 (70)
1989-on models	33.9 (25)
Brake disc screws	24.4 (18)
Chain adjuster eccentric pinch bolts*	
Center	65.1 (48)
Front	65.1 (48)
Front drive sprocket	40.7 (30)
Middle sprocket	
Drive	23.0 (17)
Driven	40.7 (30)
Wheel nuts	
Front	20.3 (15)
Rear	67.8 (50)

* Listed torque value does not include the torque required to move the self-locking nut. Measure the torque required to move the self-locking nut before the nut is tight, then add this to the value listed to determine the correct torque indicated by the torque wrench. The manufacturer recommends that new self-locking nuts be installed each time the nut is removed. The locking integrity of a used self-locking nut is not the same as when new.

Table 4 FRONT DRIVE CHAIN AND SPROCKETS

Model No.	Center sprockets	Center chain	Front sprockets	Front chain
1987				
Trail Boss 4 × 4 W878027	11/22	76 pitch	11/24	64 pitch
Trail Boss 4 × 4 W878127	11/22	76 pitch	11/24	64 pitch
Trail Boss 4 × 4 W878327				
1988				
Trail Boss 4 × 4 W888127	11/22	76 pitch	11/22	64 pitch
1989				
Trail Boss 4 × 4 W898127	11/22	70 pitch	11/22	64 pitch
1990				
Trail Boss 4 × 4 W908127	11/22	70 pitch	11/22	64 pitch
T.B. 4 × 4-350L W908139	11/22	70 pitch	12/22	64 pitch
1991				
Trail Boss 4 × 4 W918127	11/22	70 pitch	11/22	64 pitch
T.B. 4 × 4-350L W918139	11/22	70 pitch	12/22	64 pitch
Big Boss 6 × 6 W918727	11/24	72 pitch	11/22	64 pitch
1992				
Trail Boss 4 × 4 W928127	11/22	70 pitch	11/22	64 pitch
T.B. 4 × 4-350L W928139	11/22	70 pitch	12/22	64 pitch
Big Boss 6 × 6 W928727	11/24	72 pitch	11/22	64 pitch
1993				
Sportsman W938039	11/22	70 pitch	12/22	64 pitch
250 4 × 4 W938127	11/22	70 pitch	11/22	64 pitch
350 4 × 4 W938139	11/22	70 pitch	12/22	64 pitch
250 6 × 6 W938727	11/22	70 pitch	11/22	64 pitch
350 6 × 6 W938739	11/22	70 pitch	11/22	64 pitch
1994				
Sportsman 4 × 4 W948040	11/22	70 pitch	12/22	64 pitch
300 4 × 4 W948130	11/22	70 pitch	11/22	64 pitch
400 4 × 4 W948140	11/22	70 pitch	12/22	64 pitch
300 6 × 6 W948730	11/22	70 pitch	11/22	64 pitch
400 6 × 6 W948740	11/22	70 pitch	12/22	64 pitch

(continued)

Table 4 FRONT DRIVE CHAIN AND SPROCKETS (continued)

Model No.	Center sprockets	Center chain	Front sprockets	Front chain
1995				
300 4 × 4 W958130	11/22	70 pitch	12/22	64 pitch
Scrambler W957840	11/22	70 pitch	12/22	64 pitch
Sportsman 4 × 4 W958040	11/22	70 pitch	13/22	64 pitch
Xplorer 4 × 4 W959140	11/22	70 pitch	13/22	64 pitch
Magnum 4 × 4 W958144	11/22	70 pitch	11/22	68 pitch
400 6 × 6 W958740	11/22	70 pitch	12/22	64 pitch

This chapter covers the electrical system for all electrical systems. It offers explanations of the electrical system under seven conditions: electrical connection, dielectric grease, stores) to all electrical connections. It also covers the electrical system and helps prevent the terminals. Do not use grease on the electrical system and actually connect the electrical system. Information regarding the electrical system is covered in Chapter 10.

The electrical system is covered in Chapter 10.

- a. Charging system
- b. Ignition system
- c. Starting system
- d. Lighting system
- e. Other electrical systems

Front chain

64 pitch
64 pitch
64 pitch
64 pitch
68 pitch
64 pitch

CHAPTER ELEVEN

ELECTRICAL SYSTEM

This chapter contains service and test procedures for all electrical and ignition components. ATV's are often exposed to moisture and water while operating under severe conditions, so it is important to keep all electrical connections firmly attached. Also, apply dielectric grease (available from automotive parts stores) to all electrical connectors before they are connected. Dielectric grease helps seal out moisture and helps prevent corrosion of the electrical connector terminals. Do not substitute another material such as grease or silicone sealant that can trap water and actually contribute to corrosion.

Information regarding the battery and spark plugs are covered in Chapter Three.

The electrical system includes the following systems:

- Charging system.
- Ignition system.
- Starting system.
- Lighting system.
- Other electrical systems and components.

Tables 1-4 are at the end of this chapter.

CHARGING SYSTEM

Models without electric start may use a charging system to operate lights, but are designed to operate without a battery or rectifier. As shown in **Figure 1**, a typical system consists of an alternator and the regulator unit.

CAUTION

Models designed to have a battery will almost certainly damage any lights turned on while the engine is running, if the battery is not installed. Other components may also be damaged. The battery is needed to control the electrical system and helps dampens voltage surges.

The charging system on models with electric starting typically consists of the battery, alternator, circuit

breaker and a voltmeter. Alternating current can be rectified to direct current in the battery. The voltage at a low engine speed is regulated by the voltage regulator and battery. The voltage at a constant engine speed is regulated by the engine speed and ignition.

Charging System

If charging system is not working, the battery is full before going any further as described under Make sure all electrical system are tight, corrosion. To test:

1. If the electrical battery cable or breaker which is the main circuit step.

2. Test the battery under Battery Testing following:

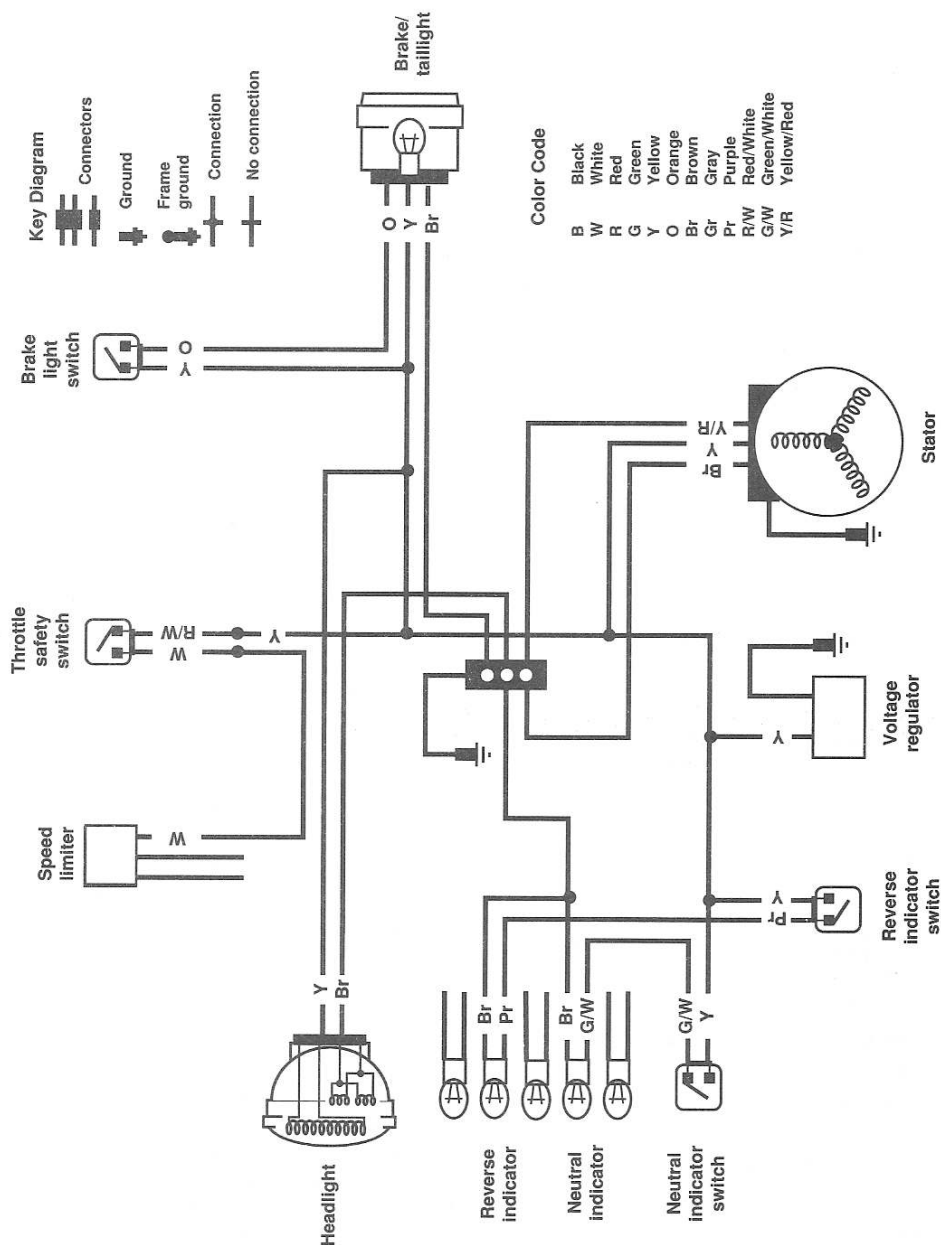
- If the specified time to Start.
- If the specified time as required will not hold.

3. Connect a 0.001 ohms. Connect spark plug follow 4. Start the engine at 4,000 rpm. Read meter. It should be following:

- Charging system is open.
 - Charging system is closed.
- Stator in the engine if faulty. If Step 5.
5. Check the electrical connectors for dirt.

1

CHARGING SYSTEM—WITHOUT BATTERY



breaker and a voltage regulator/rectifier (Figure 2). Alternating current generated by the alternator must be rectified to direct current before it can be stored in the battery. The voltage regulator maintains the voltage at a level that will not harm the battery or other electrical components. The alternator, rectifier, regulator and battery combine to provide direct current at a constant voltage regardless of variations in engine speed and electrical loads such as lights and ignition.

Charging System Output Test

If charging system trouble is suspected, make sure the battery is fully charged and in good condition before going any further. Clean and test the battery as described under *Battery Testing* in Chapter Three. Make sure all electrical connectors in the charging system are tight, making good contact and free of corrosion. To test the system, proceed as follows.

1. If the electrical system seems to be dead, check battery cable connections and the main circuit breaker which is located adjacent to the battery. If the main circuit breaker is okay, proceed to the next step.
2. Test the battery specific gravity as described under *Battery Testing* in Chapter Three. Note the following:
 - a. If the specific gravity reading is correct, continue to Step 3.
 - b. If the specific gravity reading is not within the specified range, clean and recharge the battery as required. If it is physically damaged or if it will not hold a charge, install a new battery.
3. Connect a 0-20 DC voltmeter to the battery terminals. Connect an inductive tachometer to the spark plug following its manufacturer's instructions.
4. Start the engine and increase engine speed to 4,000 rpm. Read the voltage indicated on the voltmeter. It should be between 13-14.6 volts. Note the following:
 - a. Charging voltage correct: The charging system is operating properly.
 - b. Charging voltage incorrect: Test the stator charge coils as described under *Alternator Stator* in this chapter. Replace the stator coils if faulty. If the charging coils are okay, perform Step 5.
5. Check the charging system wiring harness and connectors for dirty or loose-fitting terminals; clean

and repair as required. If the wiring harness and connectors are okay, and you have not found the problem after performing the previous tests, the regulator/rectifier is probably faulty. Install a regulator/rectifier unit that is known to be in working order, then retest the charging system.

NOTE

Most ATV dealers and parts suppliers will not accept the return of any electrical part. If you are unable to determine the cause of the charging system malfunction, have a Polaris dealer retest the charging system to verify your test results. If you purchase a new regulator/rectifier, install it, and then find that the charging system still does not work properly, you will, in most cases, be unable to return the unit for a refund. Note also that service specifications for testing the regulator/rectifier unit are not available.

6. After the test is completed, disconnect the voltmeter and tachometer.

ALTERNATOR STATOR (CHARGING OR LIGHTING COIL)

Procedures for removing and installing the alternator rotor (engine flywheel) and stator assembly (Figure 3 or Figure 4) are covered in Chapter Four (2-stroke models) and Chapter Five (4-stroke Magnum models).

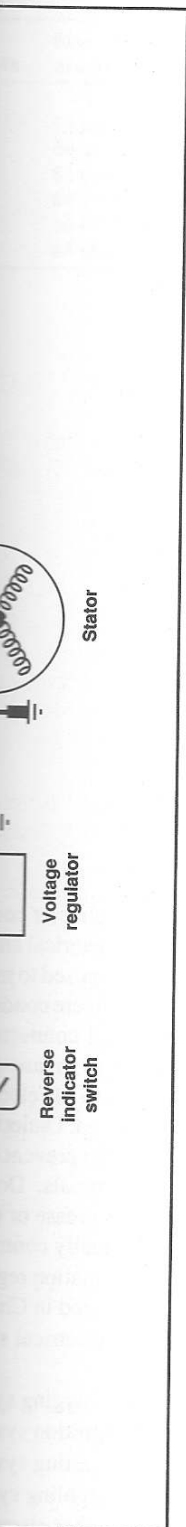
Stator (Charging or Lighting) Coil Testing

It is not necessary to remove the stator coil to perform the following tests. To get accurate resistance measurements the stator assembly and coil must be approximately 20° C (68° F).

1. Remove necessary covers to locate the wires leading from the engine. Locate the connector containing the yellow and yellow/red wires.

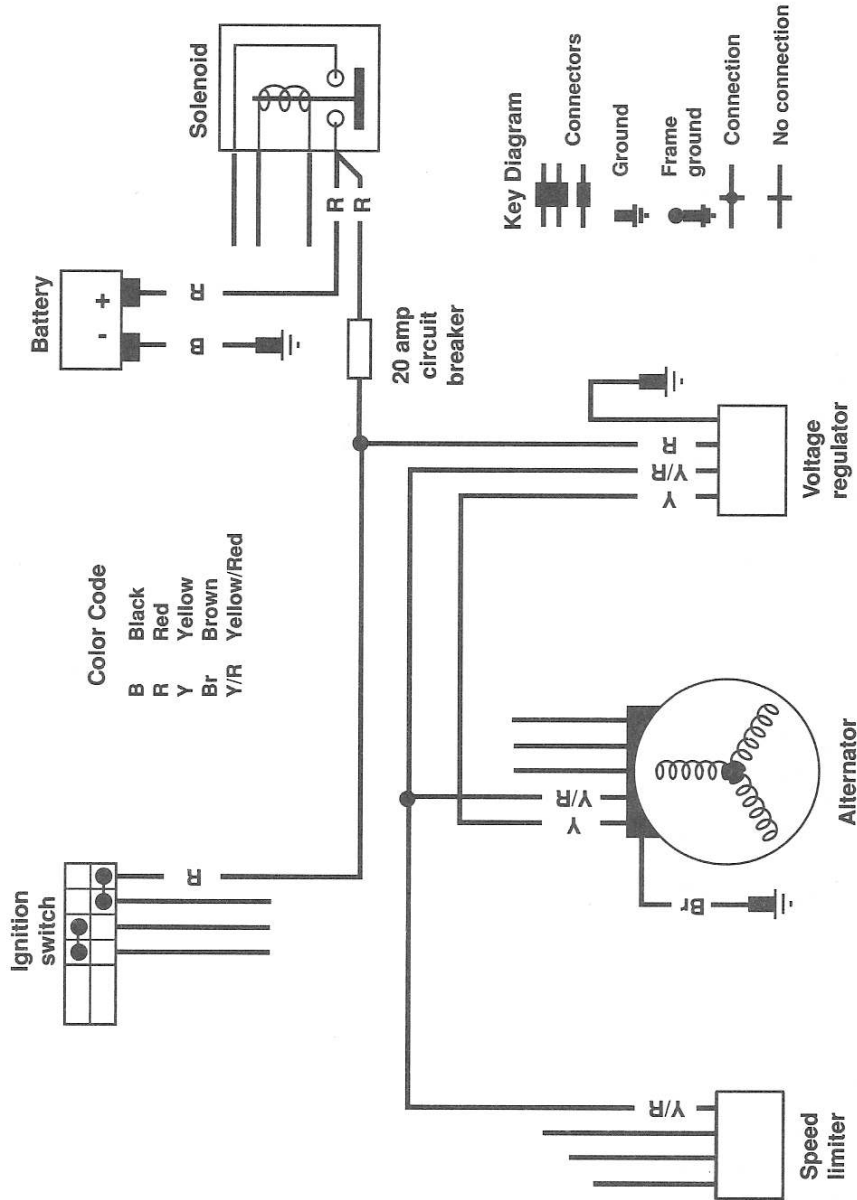
NOTE

Models without a battery do not have the yellow/red wire. An additional yellow/brown wire is also used by the alternator on some later models.



2

CHARGING SYSTEM—WITH BATTERY

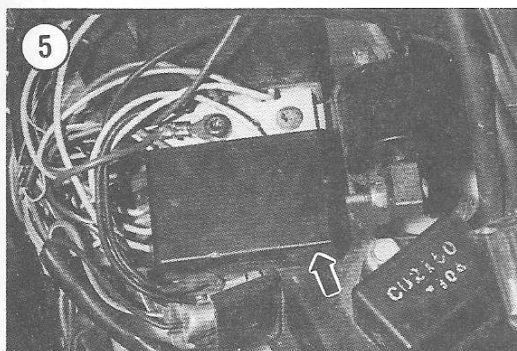
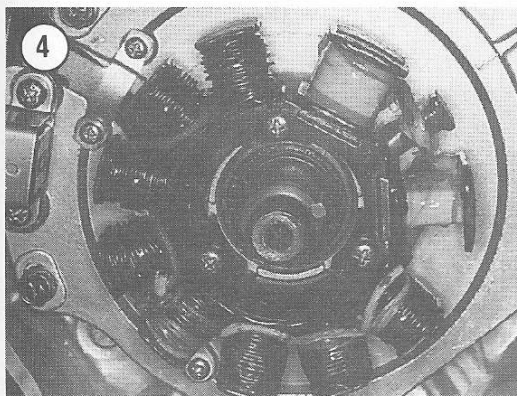
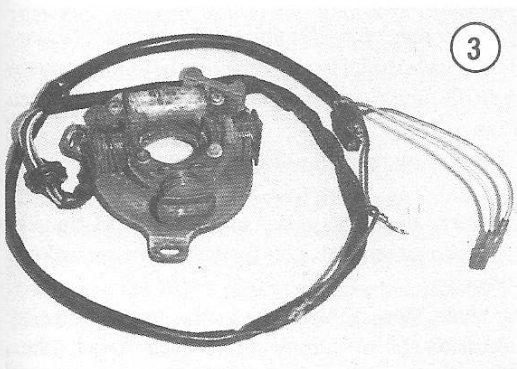


2A. On models with a battery, separate the electrical connector containing the yellow and yellow/red wires from the alternator.

2B. On models without a battery, separate the electrical connectors containing the yellow wire and the brown wire from the alternator.

NOTE

Check resistance on the engine (alternator) side of the connectors.



3A. On models without a battery, check the resistance between the yellow and brown wires from the alternator.

3B. On models with a battery, check the resistance between the yellow wire and the yellow/red wires from the alternator.

4. The specified resistance is listed in **Table 2**. If there is continuity (indicated resistance) and it is within the specified resistance, the coil is good. If there is no continuity (infinite resistance) or the resistance is less than specified, the coil is defective and the stator assembly must be replaced (the individual coil cannot be replaced).

5. Apply dielectric grease (available from an automotive parts store) to the electrical connector prior to reconnecting it. This will help seal out moisture.

6. Make sure the electrical connectors are clean, free of corrosion and completely coupled.

VOLTAGE REGULATOR/RECTIFIER

Testing

Service specifications are not available for testing the voltage regulator/rectifier. To determine if the voltage regulator (**Figure 5**) is faulty, proceed as follows.

1. First check the condition of the battery.
2. Perform the *Charging System Output Test* as described in this chapter.
3. If the charging system output is determined to be low, check the resistance of the charging coils, described as *Stator (Charging or Lighting) Coil Testing* in this chapter. Before removing and installing the voltage regulator, it is advisable to check electrical connections. If all other possible sources of problems are eliminated, it is logical to suspect the voltage regulator.

Removal/Installation

1. Place the vehicle on level ground and set the parking brake.
2. Remove the covers necessary to locate the voltage regulator/rectifier. On most 1989 and later models, it is located under the headlight cover.

CAUTION

Do not attempt to detach any electrical connections with the engine running or

Voltage regulator

Alternator

Speed limiter

with the battery connected. Modern electrical components can be destroyed instantly by improper testing, servicing or handling. Dealers and parts suppliers will usually not accept the return of any electrical part.

3. Disconnect the ground (negative) cable from the battery.
4. Detach electrical connectors, remove attaching screws and remove the voltage regulator/rectifier unit.
5. Install by reversing these removal steps, noting the following.
6. Apply dielectric grease to the electrical connectors prior to reconnecting them. This helps seal out moisture.
7. Make sure all electrical connectors are clean, free of corrosion and completely attached.

CAPACITOR DISCHARGE IGNITION

All models are equipped with a capacitor discharge ignition (CDI) system, a solid-state system that uses no breaker points.

CDI Precautions

Certain precautions should be taken to reduce the chance of damaging the capacitor discharge ignition system. Instantaneous damage to the solid state components of the system may occur if the following precautions are not observed.

1. Never disconnect any electrical connection while the engine is running.
2. Apply dielectric grease to all electrical connectors (**Figure 6**) before connecting to help seal out moisture.
3. Make sure all electrical connections are clean, free of corrosion and completely attached.
4. The CDI unit is mounted within a rubber vibration isolator. Always be sure that the isolator is in place when installing the unit.

CDI Troubleshooting

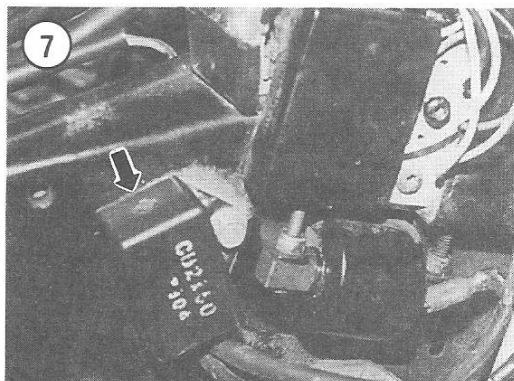
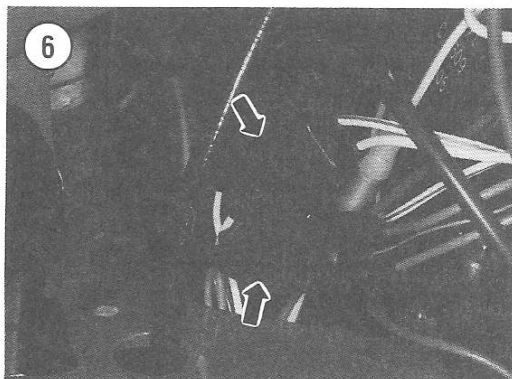
Refer to Chapter Two.

CDI Unit Testing

Service specifications for testing the CDI unit are not available. Test all other ignition components and troubleshoot the CDI unit using a process of elimination.

CDI Unit Replacement

1. Place the vehicle on level ground and set the parking brake.
2. Disconnect the CDI unit electrical connectors.
3. Remove the CDI unit mounting bolts and remove the CDI unit from underneath the rear fender; see **Figure 7**.
4. Install by reversing these steps, plus the following.
5. Apply dielectric grease to the electrical connectors prior to reconnecting them. This helps seal out moisture.
6. Make sure all electrical connectors are free of corrosion and are completely coupled to each other.



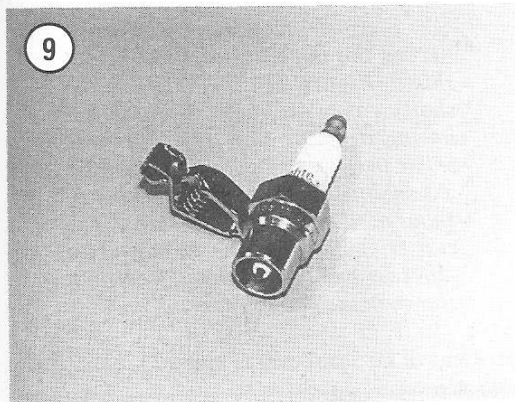
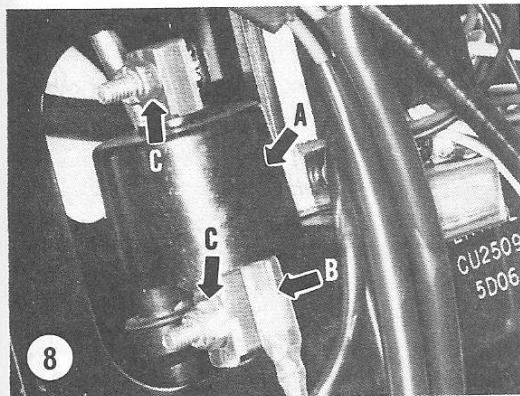
IGNITION HIGH TENSION COIL

Testing

The ignition high tension coil (**Figure 8**) is a form of transformer which develops the high voltage required to jump the spark plug gap. The only maintenance required is that of keeping the electrical connections clean and tight and occasionally checking to see that the coil is mounted securely.

Comprehensive resistance tests of the coil's windings are described in Chapter Two. If the condition of the system is doubtful, the following quick check may help identify if the ignition is delivering a spark.

1. Disconnect the high voltage lead from the spark plug.
2. Remove the spark plug from the cylinder head.
3. Attach a test plug (**Figure 9**), a new spark plug or a used spark plug that is known to be good to the high voltage lead. Connect the spark plug base to a good ground like the engine cylinder head and position the plug so you can see the electrodes.



WARNING

If it is necessary to hold the high voltage lead, do so with an insulated pair of pliers. The high voltage generated by the CDI could produce serious or fatal shocks.

4. Turn the ignition ON and crank the engine with the electric or recoil starter while observing the spark plug electrodes.

NOTE

If the test plug electrodes are in too much light, it may be difficult to see the spark, but a snapping sound may be heard.

5. If a fat blue spark occurs between the electrodes of the test plug, the ignition is delivering a spark and the coil is in good condition. Failure to start or run may be a result of the spark occurring at the wrong time or may be caused by a problem in another system, such as the fuel system. Reinstall the spark plug in the cylinder head.

NOTE

Make sure that you are using a good spark plug for this test. If the test is conducted with a damaged, used spark plug, the test results may be incorrect.

6. If there is no spark at the test plug, check the emergency shut-off and safety switches. Additional tests of the ignition exciter, pulser and high tension coils are described in Chapter Two.

Removal/Installation

1. Place the vehicle on level ground and set the parking brake.
2. Locate the ignition high tension coil (A, **Figure 8**). It is attached to the frame above the engine. The coil is located under the headlight cover on late models.
3. Disconnect the black/yellow or black/white primary connector (B, **Figure 8**) from the high tension coil.
4. Disconnect the spark plug cap (secondary lead) from the spark plug.
5. Remove nuts (C, **Figure 8**) from the mounting screws, then remove the ignition coil from the frame.
6. Install by reversing the removal steps. Make sure all electrical connections are tight and free of corro-

sion. Apply dielectric grease to the electrical connectors before reconnecting, to help seal out moisture.

IGNITION STATOR COILS (EXCITER AND PULSER)

The ignition exciter and pulser coils are located under the flywheel on all models, except 400L and 4-stroke models. See **Figure 10**, **Figure 11** and **Figure 12**. The pulser coil (2, **Figure 10**) is separate from the exciter coil (13, **Figure 10**) on 2-stroke models produced before 1988. On 1988 250 cc models and all 300 and 350L models, the exciter/pulser coil is a 1-piece assembly. On 400L models, and all 4-stroke models, the exciter coil is part of the stator assembly. See 2, **Figure 11** (400L models) or 2, **Figure 12** (4-stroke models). On these models, the pulser coil (**Figure 13**) is mounted outside the flywheel.

Procedures for removing the alternator rotor (flywheel) and stator assembly (**Figure 3** or **Figure 4**) are covered in Chapter Four (2-stroke models) or Chapter Five (4-stroke models). It is not necessary to remove the stator coils to test the exciter and pulser coils. Refer to Chapter Two for testing procedures.

ELECTRIC STARTING SYSTEM

The starting system consists of the starter motor, starter gears, solenoid and the handlebar mounted starter button (**Figure 14**).

An electrical diagram of the starting system is shown in **Figure 15**. When the starter button is pressed, it engages the starter solenoid switch that completes the circuit allowing electricity to flow from the battery to the starter motor.

CAUTION

Do not operate the starter for more than 5 seconds at a time. Let it rest approximately 10 seconds, then use it again.

Troubleshooting

Refer to Chapter Two.

Starter Removal/Installation

1. Place the vehicle on level ground and set the parking brake.

2. Disconnect the negative (ground) lead (**Figure 16**, typical) from the battery.
3. On 2-stroke engines, remove the recoil starter as described in Chapter Four.
4. On 2-stroke engines, remove the two screws (**Figure 17**).
5. On 2-stroke engines, remove the belt drive and inner cover as described in Chapter Eight.
6. Pull back the rubber boot from the electrical connector and detach the starter cable (**Figure 18**, typical).
7. On Magnum models, remove screw (A, **Figure 19**) and detach the starter ground cable from the starter.
- 8A. On 2-stroke engines, remove the two screws (**Figure 20**).
- 8B. On Magnum models, remove screw (B, **Figure 19**) securing the starter to the crankcase.
9. Pull the starter toward the left side and remove it from the engine. The starter gear can be removed as shown in **Figure 21**.
10. Install by reversing these removal steps.
- 11A. On 2-stroke models, be sure to install the drive gears and the gasket (**Figure 22**).
- 11B. On Magnum models, install and lubricate the O-ring (**Figure 23**) before installing.

Disassembly

Refer to **Figure 24** for this procedure.

1. If not already marked (**Figure 25**), scribe an alignment mark across both end covers and the armature housing for reference during reassembly.
2. Remove the 2 screws (**Figure 26** or **Figure 27**), washers, lockwashers and O-rings.

NOTE

*Record the thickness and number of shims (**Figure 28**) installed on the shaft as they are removed in the following steps. Be sure to install these shims in their same position when reassembling the starter. The number of shims used in each starter varies. The starter you are working on may use a different number of shims from that shown in the photographs.*

3. Remove the rear cover (**Figure 29**, typical) and rear shim(s).

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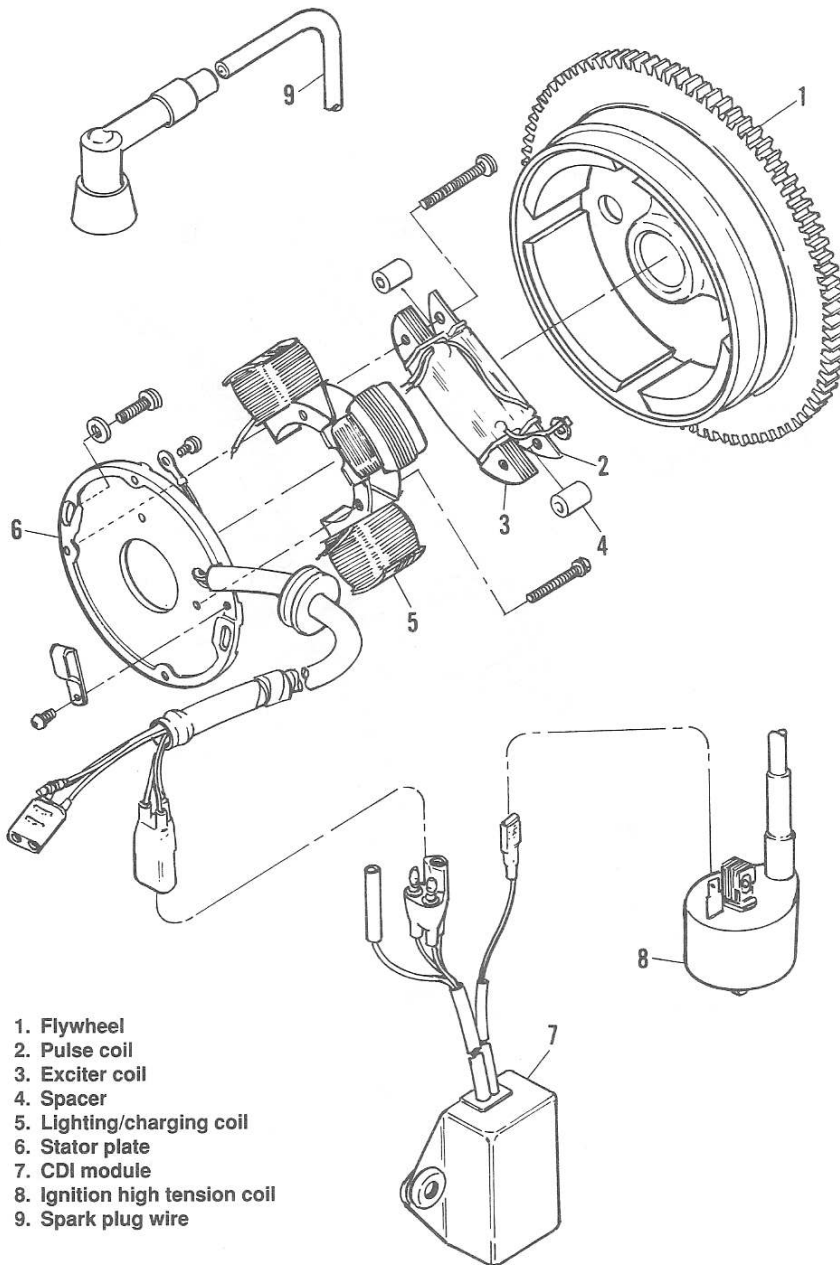
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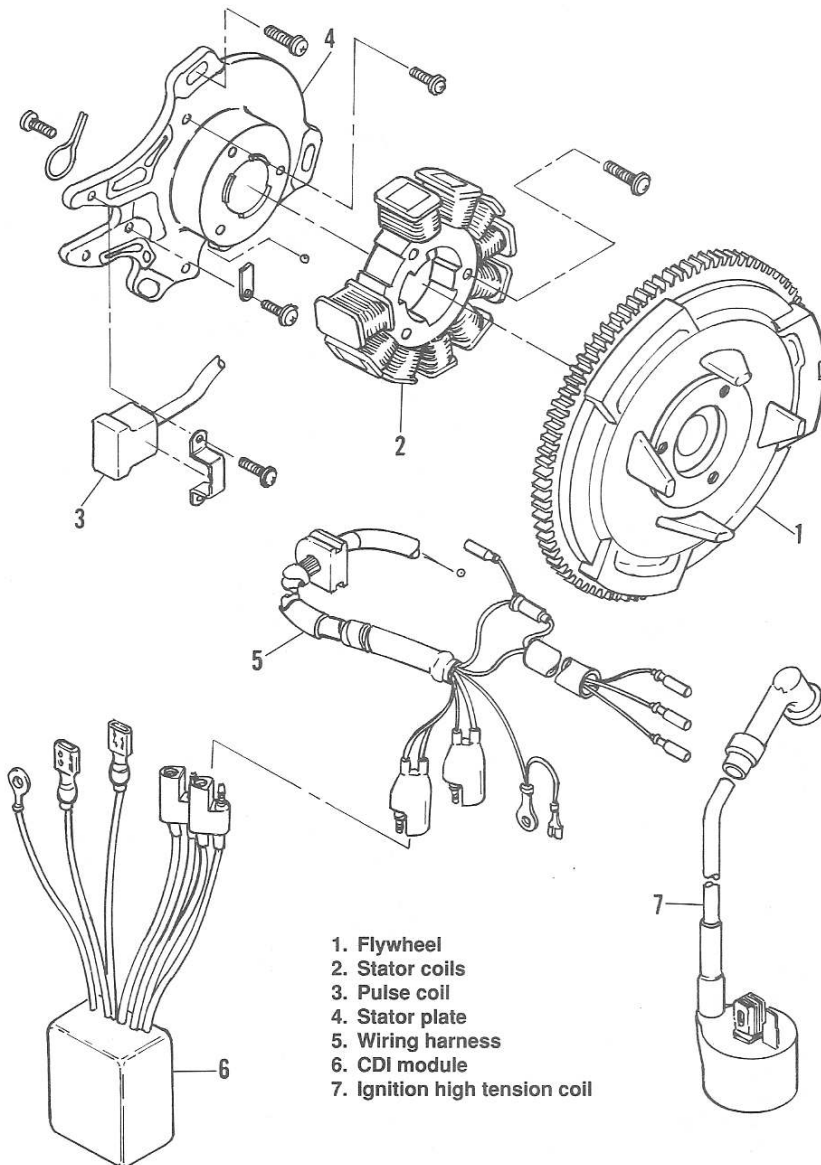
**IGNITION (TYPICAL)
1985-1988 250, 300 AND 350L MODELS**



1. Flywheel
2. Pulse coil
3. Exciter coil
4. Spacer
5. Lighting/charging coil
6. Stator plate
7. CDI module
8. Ignition high tension coil
9. Spark plug wire

11

IGNITION 400L



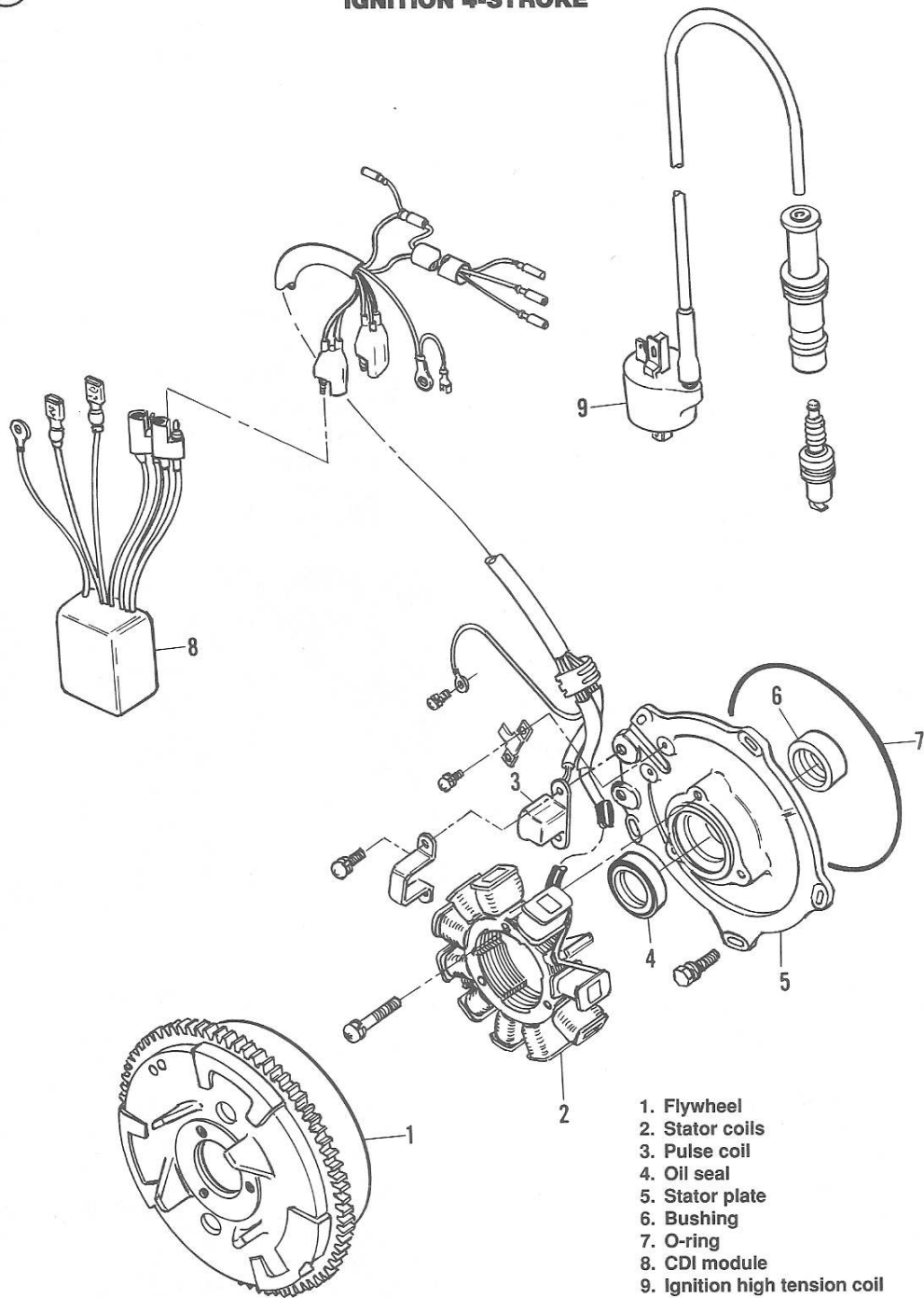
1. Flywheel
2. Stator coils
3. Pulse coil
4. Stator plate
5. Wiring harness
6. CDI module
7. Ignition high tension coil

12



12

IGNITION 4-STROKE



1. Flywheel
2. Stator coils
3. Pulse coil
4. Oil seal
5. Stator plate
6. Bushing
7. O-ring
8. CDI module
9. Ignition high tension coil

11

4. Slide the front cover (**Figure 30**, typical) from the armature. Remove the shim(s).

NOTE

Some starters have 2 brushes, while other starters have 4 brushes. Some starters may be slightly different from those shown.

5. Remove the nut, washers, insulators (**Figure 31**, typical) and O-ring (**Figure 32**, typical), then remove the brush plate (**Figure 33**).

6. Slide armature from the housing.

7. Clean all grease, dirt and carbon from the armature, case and end covers.

CAUTION

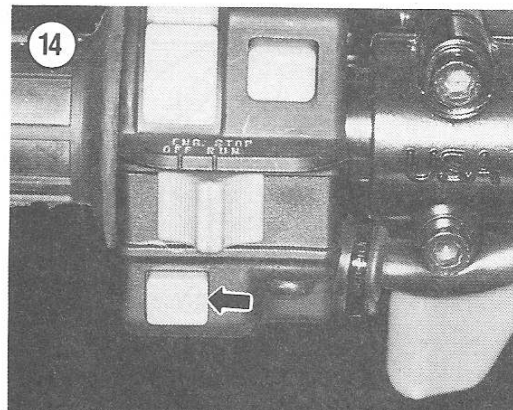
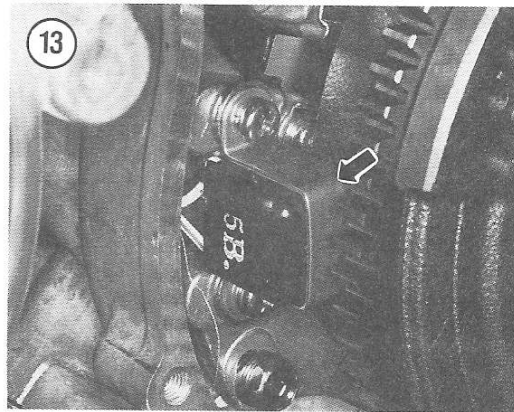
Be extremely careful when selecting a solvent to clean electrical components. Do not immerse any of the wire windings in solvent, because the insulation may be damaged. Wipe the windings with a cloth lightly moistened with solvent, then allow the solvent to dry thoroughly.

Inspection

Starter motor specifications are listed in **Table 3**.

1. Pull the spring away from each brush and pull the brushes (**Figure 33**) from their guides.
2. Measure the length of each brush (**Figure 34**). If the length is equal to or less than the limit in **Table 3**, replace the brushes as a set.
3. Inspect the brush springs for damage or weakness. Replace springs if necessary.
4. Inspect the commutator (A, **Figure 35**). The mica should be below the surface of the copper commutator segments (**Figure 36**). If the commutator segments are worn to the same level as the mica insulation, have the commutator serviced by a dealer or electrical repair shop.
5. Inspect the commutator copper segments for discoloration. If the commutator segments are rough, discolored or worn, have the commutator serviced by a dealer or electrical repair shop.
6. Use an ohmmeter and perform the following:
 - a. Check for continuity between the commutator bars (**Figure 37**); there should be continuity (indicated resistance) between pairs of bars.

- b. Check for continuity between the commutator bars and the shaft (**Figure 38**); there should be no continuity (infinite resistance).
 - c. If the unit fails either of these tests, the starter assembly must be replaced. The armature cannot be replaced individually.
7. Use an ohmmeter to check for continuity between the starter cable terminal and the brushes. There should be continuity. Refer to **Table 3** for minimum measured resistance.
8. Inspect the bearing and seal (**Figure 39**) in the front cover for wear or damage.
9. Inspect the bushing (**Figure 40**) in the rear cover for wear or damage.
10. Inspect the starter housing for cracks or other damage.
11. Inspect inside the starter housing for loose, chipped or damaged magnets.
12. Inspect all the starter O-rings for deterioration, flat spots or other damage. Replace as required.

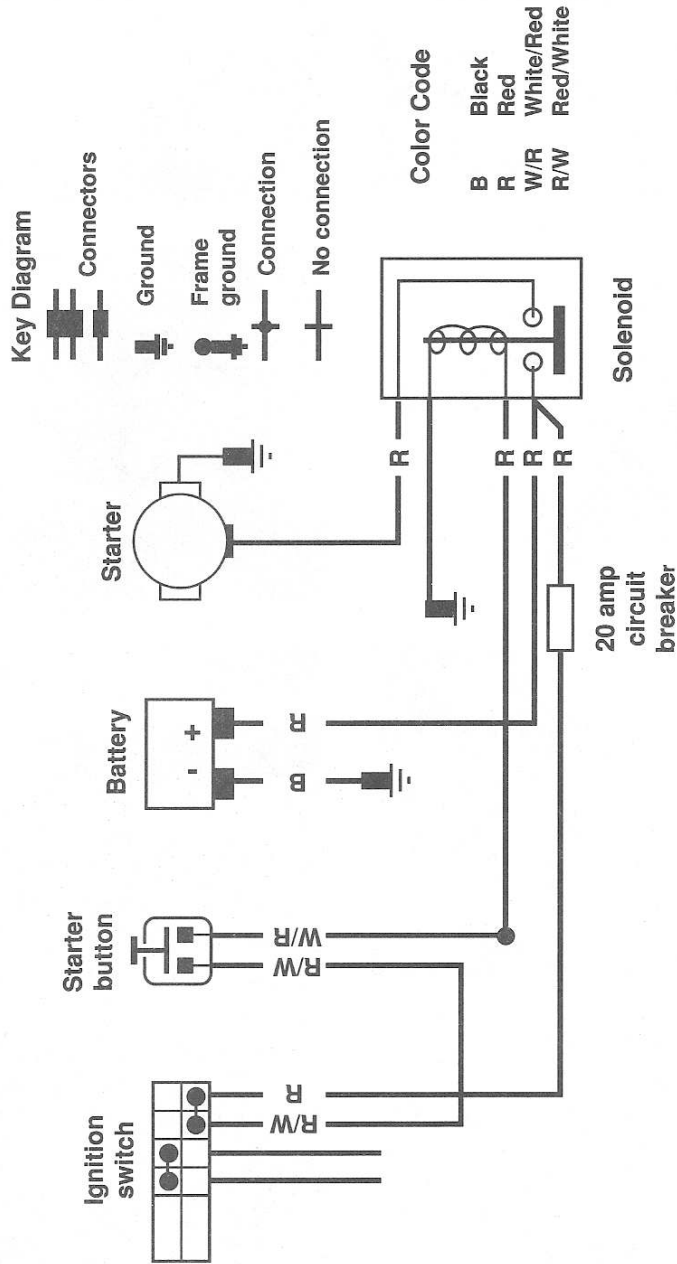


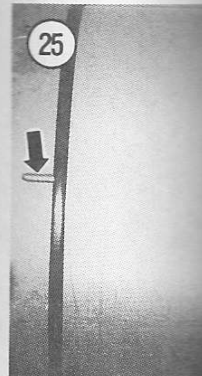
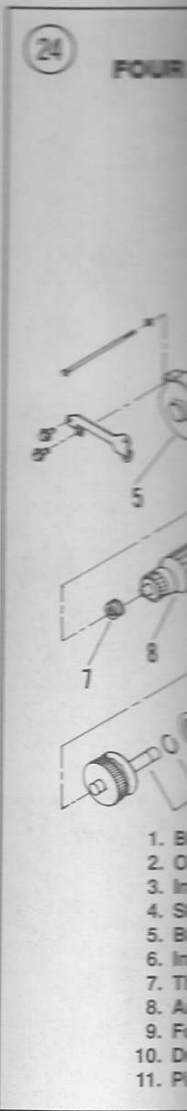
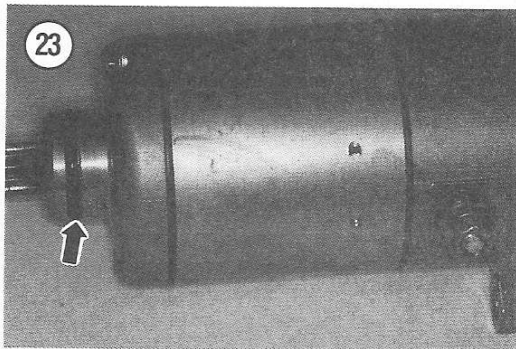
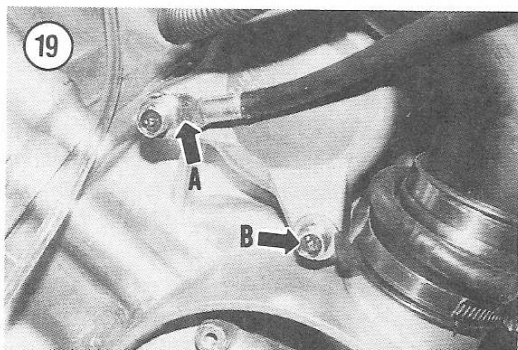
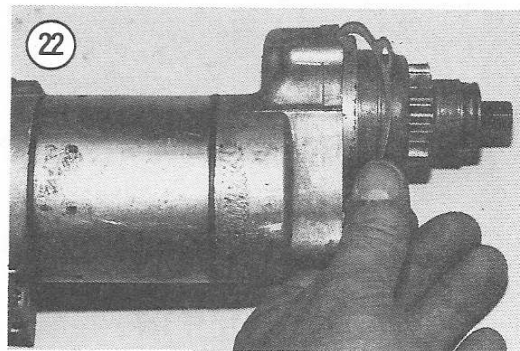
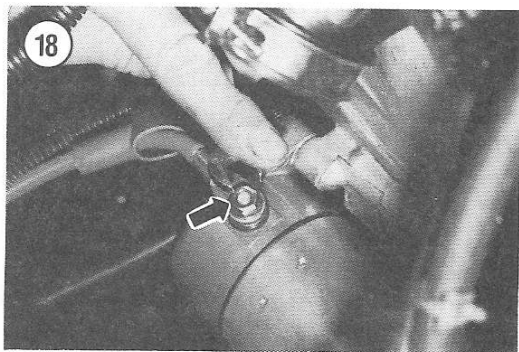
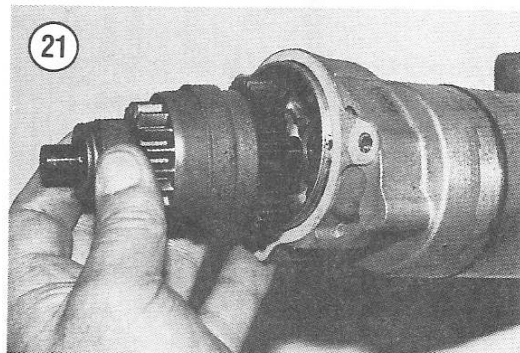
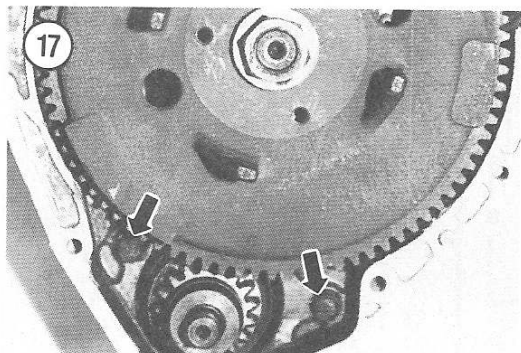
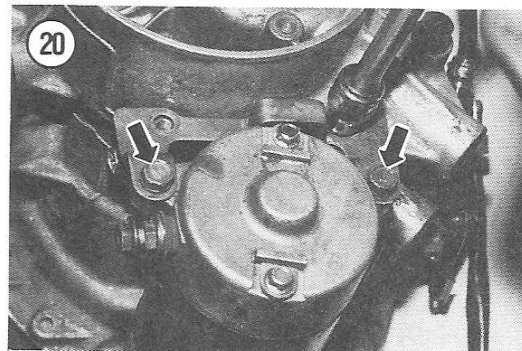
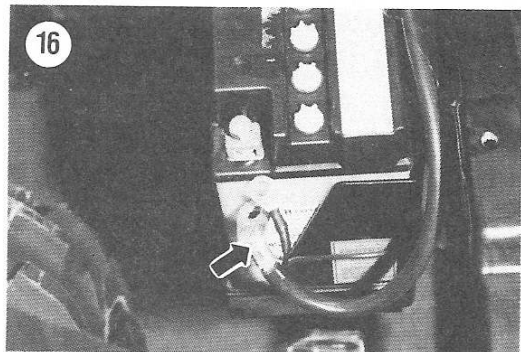
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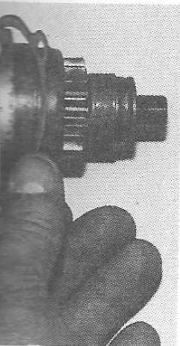
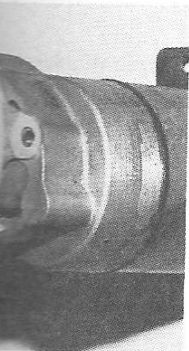
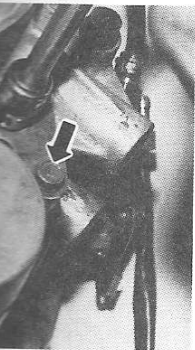


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STARTER CIRCUIT

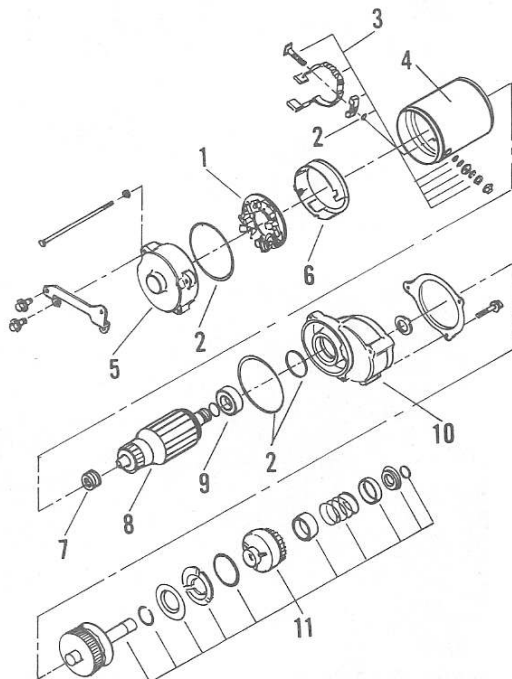






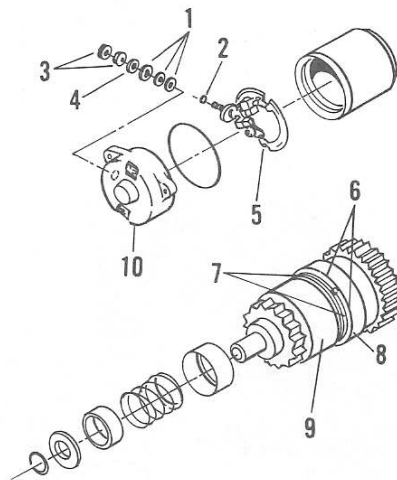
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FOUR BRUSH STARTER



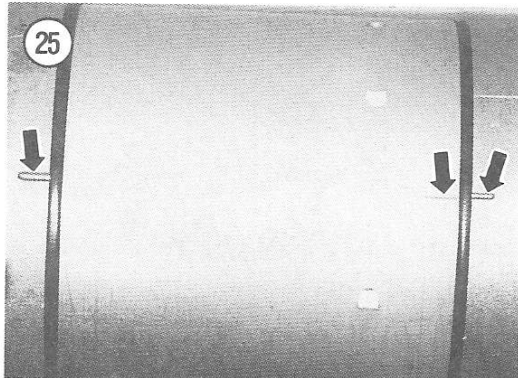
- 1. Brush plate
- 2. O-ring
- 3. Insulated brush assembly
- 4. Starter housing
- 5. Brush end frame
- 6. Insulator
- 7. Thrust washers
- 8. Armature
- 9. Forward bearings
- 10. Drive end frame
- 11. Pinion gear assembly

TWO BRUSH STARTER

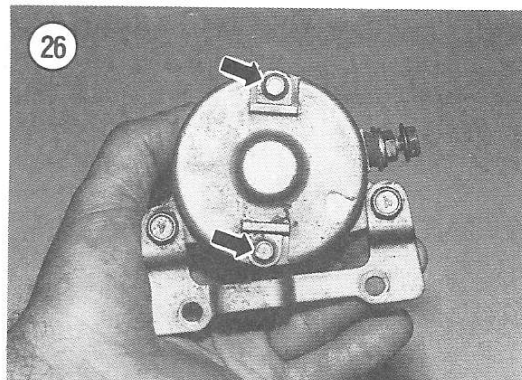


- 1. Washer (insulating)
- 2. O-ring
- 3. Nut
- 4. Washer (metal)
- 5. Brush plate
- 6. Anti-kick out shoes
- 7. Alignment pins
- 8. Garter spring
- 9. Overrun clutch
- 10. Brush end frame

25

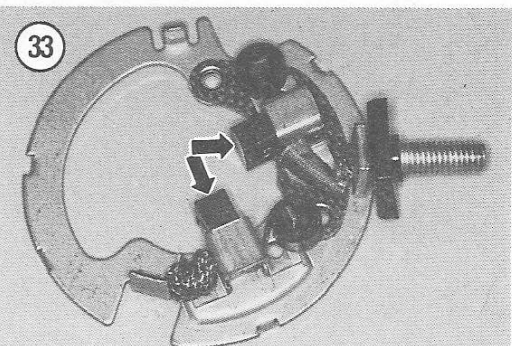
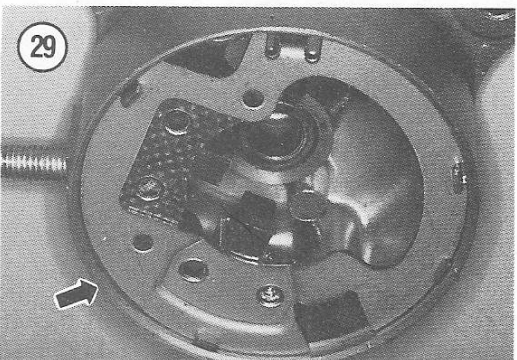
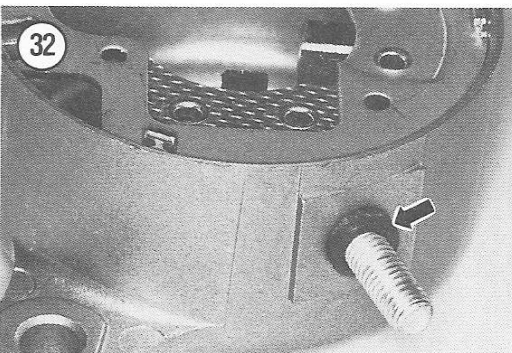
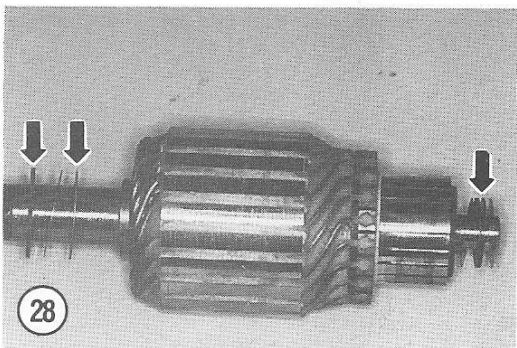
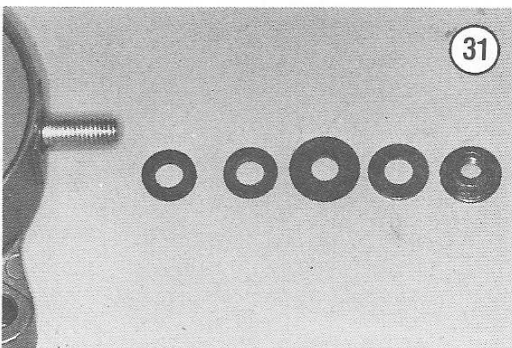
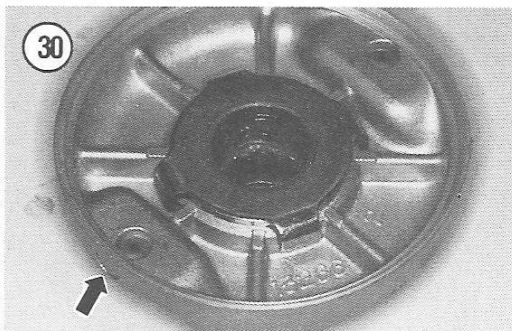
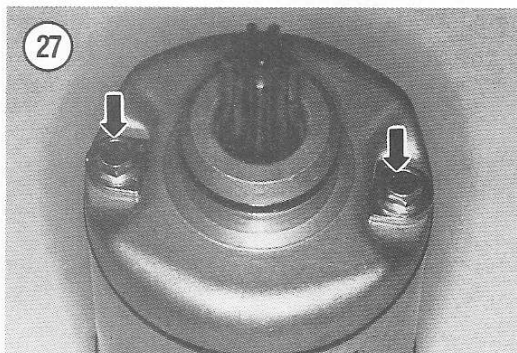


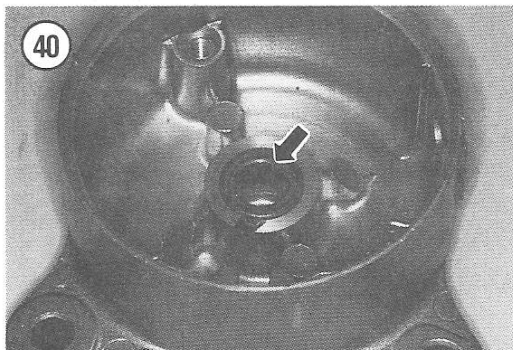
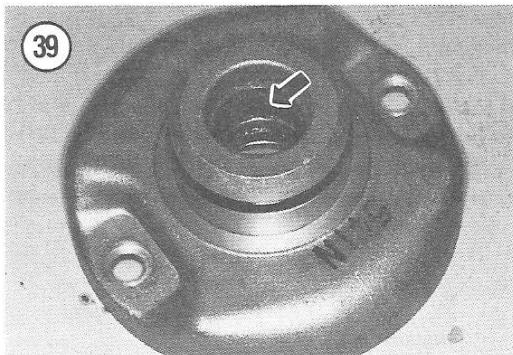
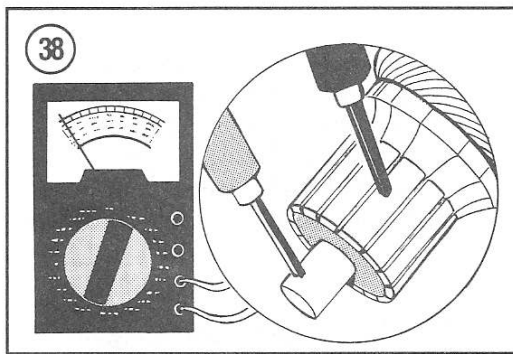
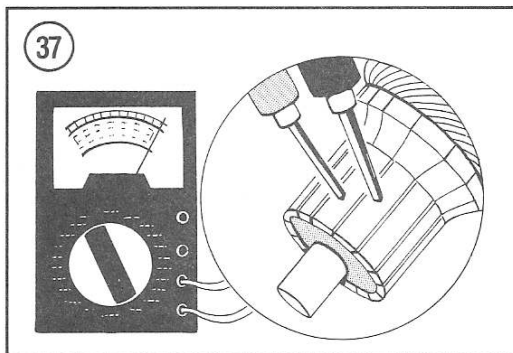
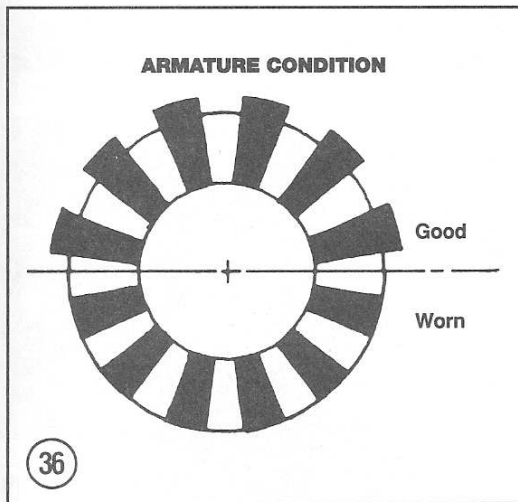
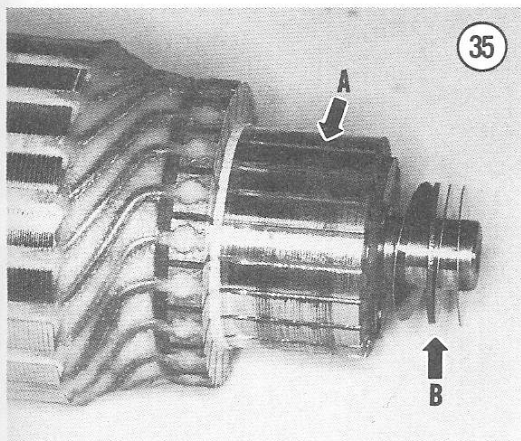
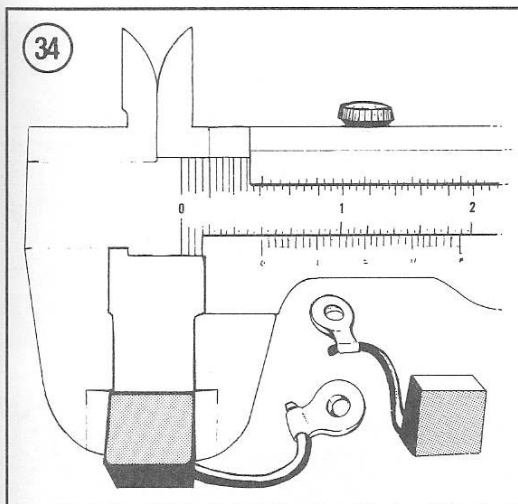
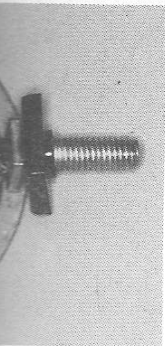
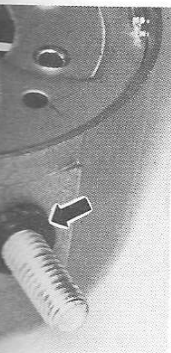
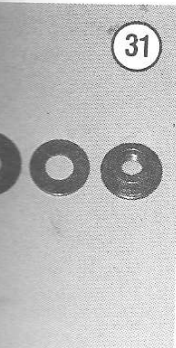
26



Assembly

1. If removed, install the brushes into their holders and secure the brushes with the springs.
2. Assemble the brushes, brush plate and end cover (**Figure 29**). Cover the threads of the terminal stud temporarily with plastic electrical tape when installing the O-ring (**Figure 32**) to keep from damaging the O-ring. Remove the tape after O-ring is installed.
3. Install the shims (B, **Figure 35**) over the armature shaft.





NOTE

Lubricate the end bushing with a silicone (nonpetroleum) grease before installing the end cover.

4. Compress the brushes against their springs, slide the brush plate over the commutator, then release the brushes (**Figure 41**).

NOTE

Before installing the end frame, lubricate the large O-rings (**Figure 42**). Make sure that the O-rings are not twisted when installing the end covers.

5. Assemble the end frame over the armature (**Figure 43**), aligning the mark on the cover with the matching mark on the housing (**Figure 44**). The tab (**Figure 45**) on the brush plate must also align with the notch in the brush end frame.
6. Install the previously used shim washers (**Figure 46**).

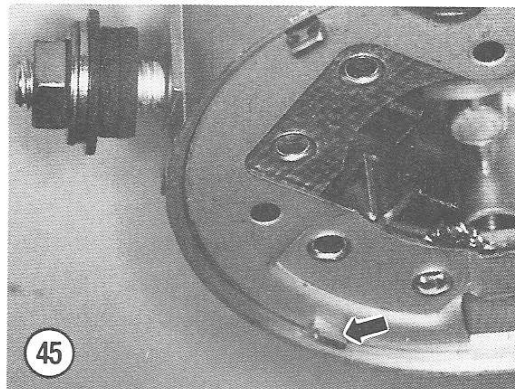
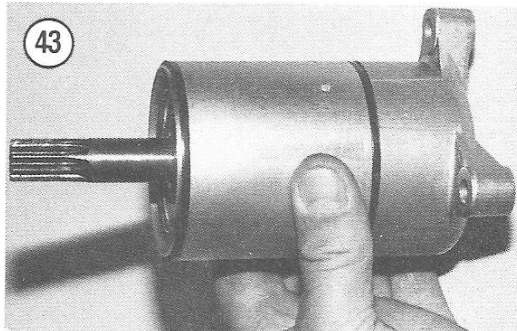
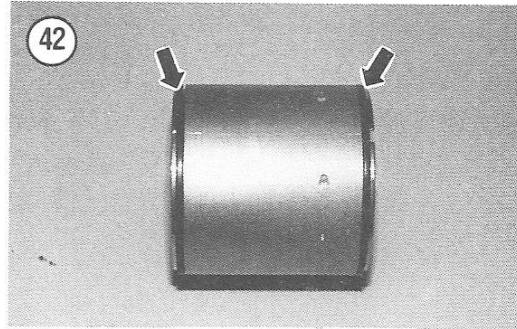
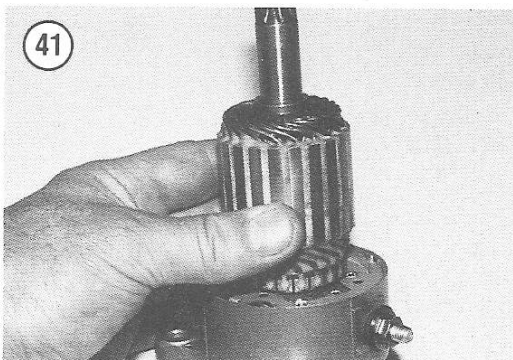
NOTE

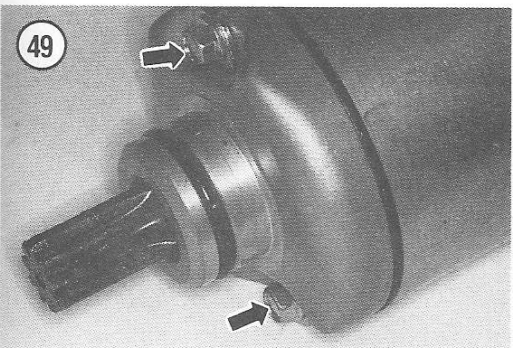
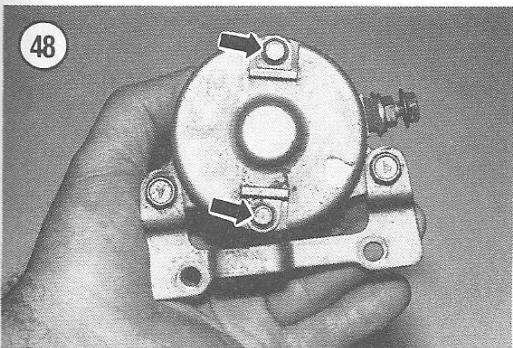
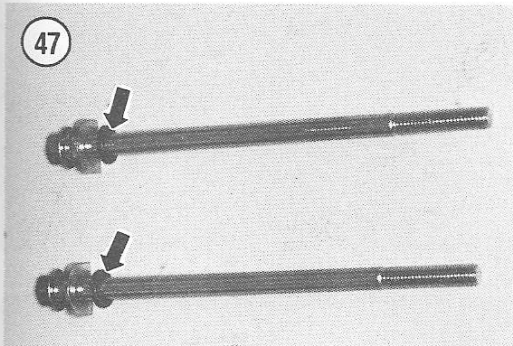
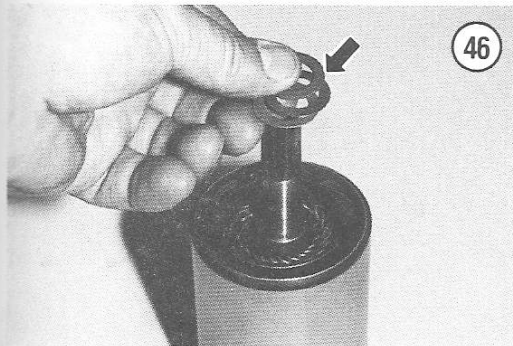
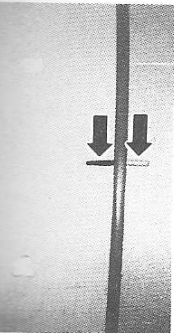
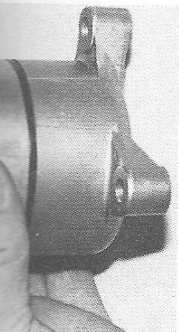
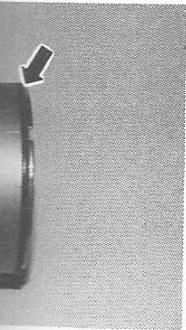
Lubricate the end bearing with a silicone (nonpetroleum) grease before installing the end cover. Lubricate the large O-ring sealing the case before installing it. Make sure that the O-ring is not twisted when installing the end cover.

7. Install the drive end frame the armature, aligning the marks on the end frame and housing (**Figure 44**).

NOTE

Make sure the O-rings are installed on the through bolts (**Figure 47**) before installing.





8A. On 2-stroke engines, hold the end frames in place, align the marks (Figure 44, typical) and install the through bolts (Figure 48). If the bolts will not pass through the starter motor, the end frames and/or brush plate are installed incorrectly. Tighten the bolts securely.

8B. On Magnum models, hold the end frames in place, align marks (Figure 44) and install the through bolts (Figure 49). If the bolts will not pass through the starter motor, the end frames and/or brush plate are installed incorrectly. Tighten the bolts securely.

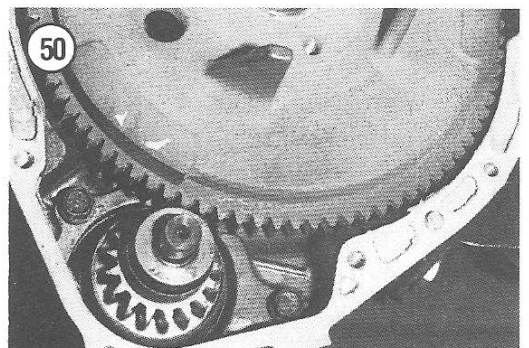
STARTER DRIVE GEARS

The electric starter operates through a set of reduction gears and an overrunning clutch. The starter pinion at the end of the armature shaft meshes with the larger gear. The larger starter drive gear engages the overrunning clutch, which drives the smaller of the two gears. The smaller drive gear engages the flywheel ring gear to start the engine.

On 2-stroke engines, the starter drive gears (Figure 50) are located between a bearing in the starter end frame and a bearing in the recoil starter housing. The starter drive gear and starter clutch assembly can be removed after removing the starter as described in this chapter.

On Magnum models, the starter drive gears (Figure 51) are located between a bearing in the crankcase and a bearing in the recoil starter housing. The starter drive gear and starter clutch assembly can be removed after removing the recoil starter as described in Chapter Five.

On some models, the garter spring is exposed and can be removed and a new spring installed. If the spring is damaged, the starter drive may not return



properly and drag on the flywheel. A replacement spring is available as a service part for these models.

When installing, be sure to lubricate and install the thrust washers (Figure 52).

STARTER SOLENOID

The starter solenoid (A, Figure 53) is mounted in front of the battery on the left-hand side.

Starter Solenoid Resistance Test

Test the starter solenoid with an ohmmeter as follows.

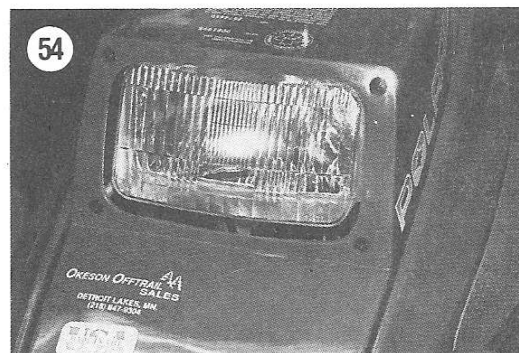
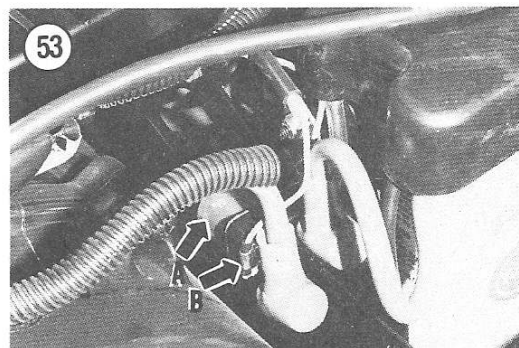
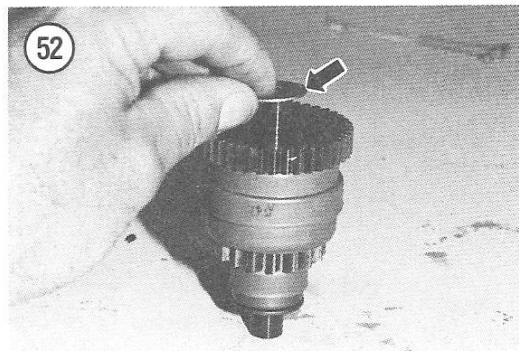
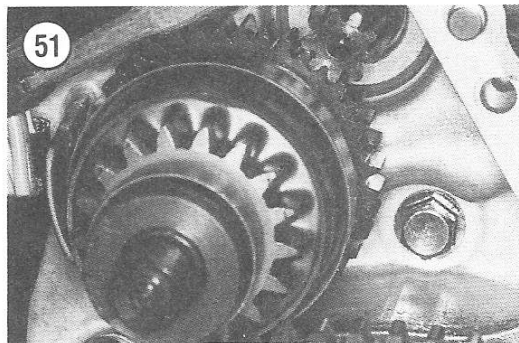
1. Turn the ignition switch OFF.
2. Separate the connector (B, Figure 53) of the small white/red wire attached to the starter solenoid.
3. Switch the ohmmeter to $R \times 1$ and connect one lead to the small red wire attached to the solenoid and ground the other ohmmeter lead to the vehicle frame.
4. Measured resistance should be approximately 3.4 ohms.
5. Replace the starter solenoid if the resistance reading is too high.
6. Reconnect the solenoid electrical connector.

Removal/Installation

1. Remove the necessary covers to gain access to the solenoid (A, Figure 53).
2. Disconnect the battery negative (ground) lead.
3. Disconnect the battery cables and starter control wire from the starter solenoid electrical connectors.
4. Unbolt the solenoid from the frame.
5. Replace by reversing these removal steps, noting the following.
6. Attach both starter cables to the solenoid and tighten the nuts securely.
7. Make sure all of the electrical connectors are on tight and that the rubber boots are properly installed to keep out moisture.

LIGHTING SYSTEM

The lighting system consists of a headlight, tail-light and instrument lights. Table 4 lists replacement bulbs for these components.



Always use the
larger wattage bulb
smaller wattage bulb

Headlight Bulb

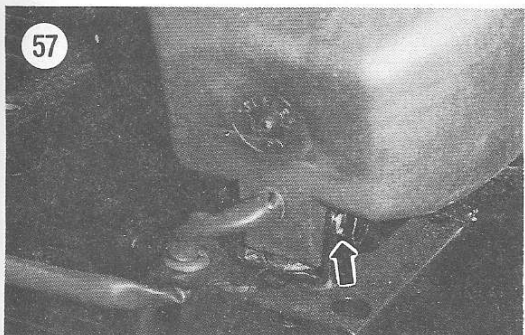
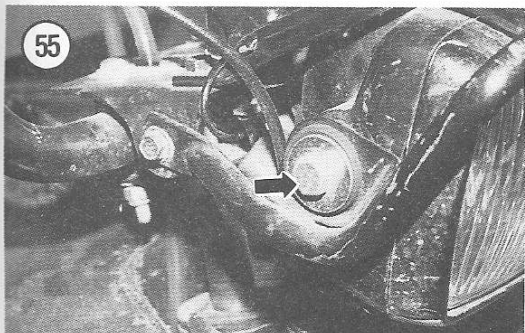
Several different
used. Refer to Figure



Always use the correct wattage bulb. The use of a larger wattage bulb will give a dim light and a smaller wattage bulb will burn out prematurely.

Headlight Bulb Replacement

Several different headlight configurations have been used. Refer to **Figure 54**, **Figure 55** or **Figure 56**.



- WARNING**
If the headlight has just burned out or turned off, it will be hot! Do not touch the bulb until it cools off.
1. Remove the headlight guard or paneling, if so equipped.
 - 2A. If so equipped, remove the screws from the trim or retaining ring.
 - 2B. On some models, the headlight is held in place by a rubber retaining ring, that can be pulled back while pulling the headlight from its housing.
 3. Remove the bulb.
 4. Install by reversing these steps.

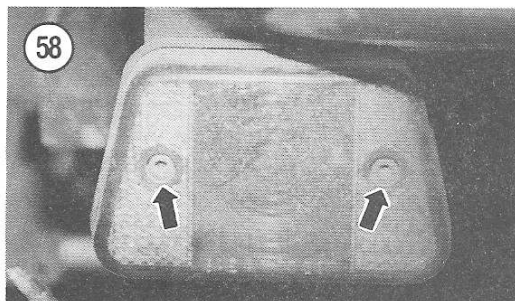
Headlight Adjustment

The headlight on some models is equipped with a vertical adjust screw located at the base of the headlight below the grille. To adjust the headlight vertically, turn the screw counterclockwise to move the light up and clockwise to move the light down.

The headlights on some models are adjusted by loosening the fasteners (**Figure 55**, **Figure 56** or **Figure 57**), repositioning the light, then tightening the fasteners. Vertical adjustment is accomplished with the bolt (**Figure 55** or **Figure 57**). Horizontal adjustment can be accomplished after loosening the nut (**Figure 56**).

Taillight Bulb and Lens Replacement

- Refer to **Figure 58** for this procedure. Be sure that the connector (**Figure 59**) is securely attached and that electrical current is delivered to connector at the proper times.
1. Remove the 2 screws (**Figure 58**) and pull the lens from its housing.
 2. After removing the lens, the bulb can be removed.



3. Replace the bulb with the type listed in **Table 4**.
4. Install by reversing these steps, noting the following.
5. Make sure the rubber gasket seal is seated all the way around the lens when assembling.

Instrument (Panel) Lights Lamp Replacement

Reverse and neutral indicator lights (**Figure 60** or **Figure 61**) are used on most models. Bulbs can be changed after removing the covers. On some models it is necessary to remove some panels to access the bulbs. Carefully remove the blown bulb, install the new bulb then install the bulb cover. Check that all wires are routed properly and connectors are securely fastened.

SWITCHES

Testing

Test switches for continuity using an ohmmeter (see Chapter One) or a self-powered test light at the switch connector plug by operating the switch in each of its operating positions and comparing results with its switch operating diagram. For example, **Figure 62** shows a continuity diagram for the starter switch. It shows which terminals should show continuity when the switch is in a given position.

When the starter switch is in the ON position, there should be continuity between the white/red and red/white terminals. This is indicated by the line on the continuity diagram. An ohmmeter connected between these 2 terminals should indicate little or no resistance, or a test light should light. When the starter switch is OFF, there should be no continuity between the same terminals.

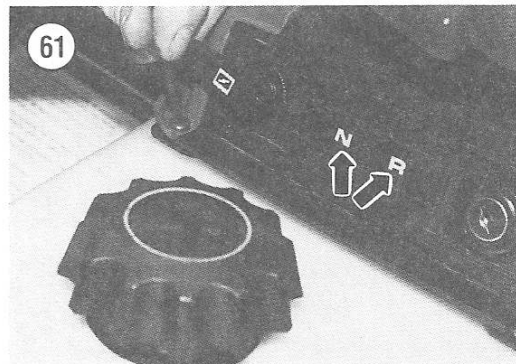
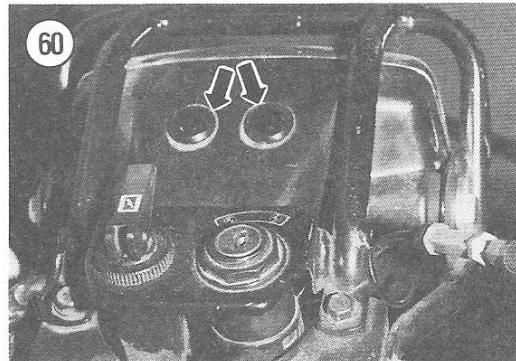
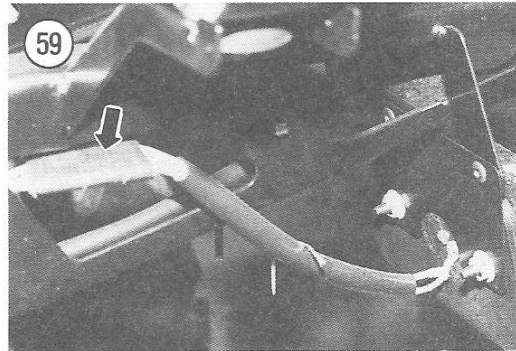
When testing switches, note the following:

- a. Check the battery as described under *Battery* in Chapter Three; if necessary, charge or replace the battery.
- b. Disconnect the battery negative (ground) cable from the battery before checking the continuity of any switch.
- c. Detach all connectors located between the switch and the electrical circuit.

CAUTION

Do not attempt to start the engine with the battery disconnected.

- d. When separating 2 connectors, pull on the connector housings and not the wires.
- e. After locating a defective circuit, check the connectors to make sure they are clean and properly connected. Check all wires going into a connector housing to make sure each wire is properly positioned and that the wire end is not loose.
- f. To reconnect connectors properly, push them together until they click or snap into place.



62		STA
Position	Color	
FREE		
PUSHED		

63		
Position	Color	Bl
OFF		
ON		

64		HEAD
Position	Color	Bl
OFF		
LO		
HI		

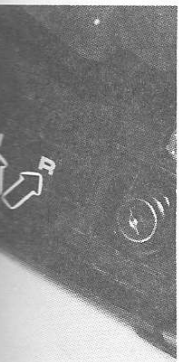
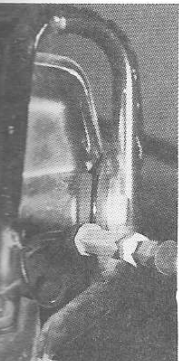
65		ENGINE
Position	Color	
OFF		
RUN		

66		ALL W
Position	Color	Gre
AWD OFF Button out		
AWD ON Button IN		

ctors, pull on the
t the wires.

circuit, check the
hey are clean and
k all wires going
o make sure each
and that the wire

properly, push them
snap into place.



62 STARTER SWITCH

Color Position	Red/white	White/red
FREE		
PUSHED	●—————●	

63 KEY SWITCH

Color Position	Black	Brown	Red/ white	Red
OFF	●—————●			
ON			●—————●	

64 HEADLIGHT SWITCH

Color Position	Red/ white	Green	Yellow
OFF			
LO	●—————●		
HI	●		●

65 ENGINE SHUT-OFF SWITCH

Color Position	Black	Brown
OFF	●—————●	
RUN		

66 ALL WHEEL DRIVE SWITCH

Color Position	Grey/ white	Grey	Demand light	Brown
AWD OFF Button out				
AWD ON Button IN	●—————●		●—————●	

If the switch or button does not perform properly, replace it. Refer to the following typical diagrams when testing the switches:

- a. Starter switch: **Figure 62.**
- b. Key switch: **Figure 63.**
- c. Light switch: **Figure 64.**
- d. Shut off switch: **Figure 65.**
- e. All wheel drive switch: **Figure 66.**
- f. Electronic throttle control switch: **Figure 67.**
- g. Transmission switch: **Figure 68.**
- h. Override switch: **Figure 69.**

67 ELECTRONIC THROTTLE CONTROL

Color Position	Red/ white	White
NORMAL		
FAULT	●—————●	

68 TRANSMISSION SWITCH

Color Position	Red/ white	Grey/ white	Green/ white	Purple
FWD	●—————●			
N	●—————●			
REV	●—————●			

69 OVERRIDE SWITCH

Color Position	Purple	Grey/ white	Green
FREE	●—————●		
PUSHED	●—————●		

Right-hand Handlebar Switch Housing Replacement

The right-hand handlebar switch housing (**Figure 70**) is equipped with the following switches:

- a. All wheel drive switch (A, **Figure 70**).
- b. Electronic throttle control switch (B, **Figure 70**).

NOTE

The switches mounted in the right-hand handlebar switch housing may not be available separately. If one switch is damaged, it may be necessary to replace the housing as an assembly.

1. Remove any interfering panels as described in Chapter Fifteen.
2. Remove any clamps securing the switch wiring harness to the handlebar.
3. Disconnect the right-hand switch electrical connector.
4. Detach the throttle control cable as described in Chapter Six.
5. Remove the screws securing the switch to the handlebar and remove the switch and throttle control assembly (**Figure 71**).
6. Install by reversing these steps. Adjust the throttle cable as described in Chapter Three.

Key Switch Replacement

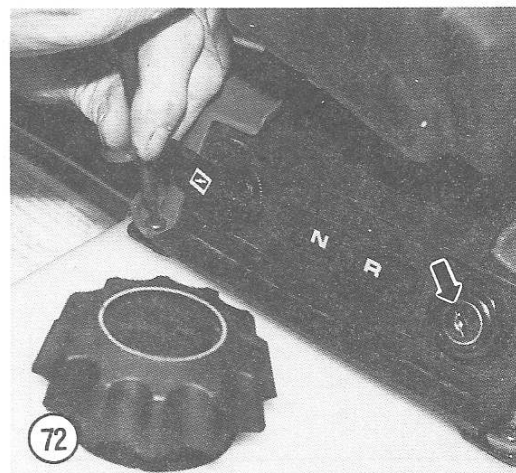
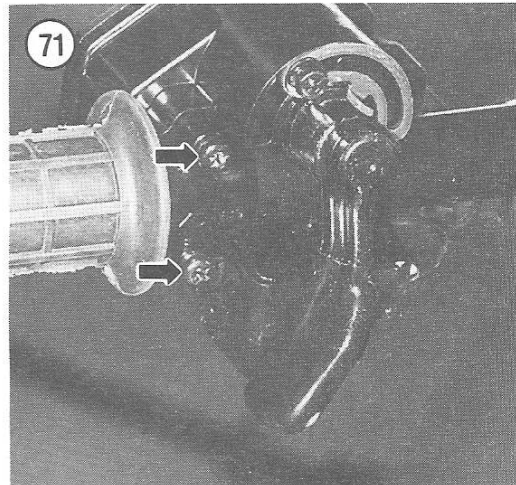
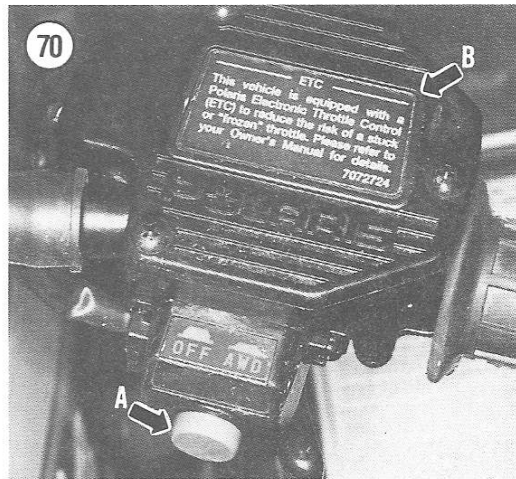
The key switch is mounted in the front panel.

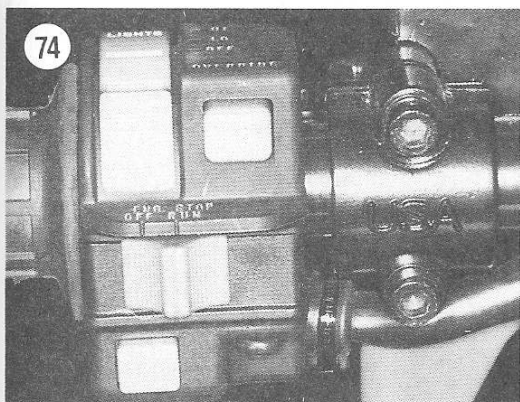
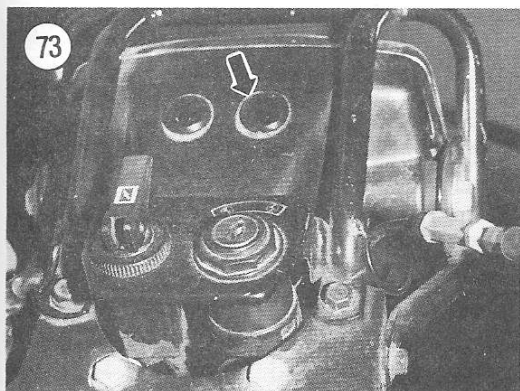
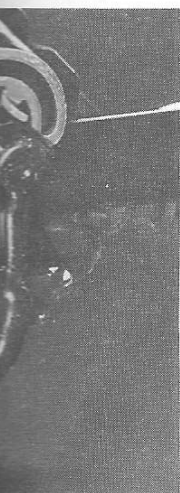
1. Remove necessary covers (**Figure 72**).
2. Loosen the large plastic nut surrounding the key switch (**Figure 72** or **Figure 73**).
3. Disconnect the key switch electrical connector and remove the switch.
4. Install a new main switch by reversing these removal steps.

Left-hand Handlebar Switch Housing Replacement

The left-hand handlebar switch housing (**Figure 74**) is equipped with the following switches:

- a. Light switch.
- b. Override switch.
- c. Engine shut off switch.
- d. Starter switch.





NOTE

The switches mounted in the left-hand handlebar switch housing may not be available separately. If one switch is damaged, it may be necessary to replace the housing as an assembly.

1. Remove any interfering panels as described in Chapter Fifteen.
2. Remove any clamps securing the switch wiring harness to the handlebar.
3. Disconnect the electrical connectors from the left-hand switch.
4. Remove the screws securing the switch to the handlebar and remove the switch (Figure 74).
5. Install by reversing these steps.

Transmission (Forward/Neutral/Reverse) Switches

The transmission switch of late models is mounted in the EZ shift control housing. Refer to Chapter Nine for service.

WIRING DIAGRAMS

Wiring diagrams for all models are located at the end of this book.

Tables 1-4 are on the following pages.

Table 1 CHARGING SYSTEM AND BATTERY SPECIFICATIONS

Model No.	Alternator output	Battery (amp hr.)
1985-1986 Scrambler, Trail Boss	100 Watt	12V (14)
1987 Cyclone	100 Watt	none
Trail Boss	100 Watt	12V (14)
1988 Trail Boss	100 Watt	12V (14)
Trail Boss 250 R/ES	100 Watt	12V (14)
1989 All models	* 150 Watt	12V (14)
1990-1992 Trail Blazer	* 150 Watt	none
Trail Boss 250	* 150 Watt	12V (14)
Trail Boss 350L	* 150 Watt	12V (14)
Big Boss	* 150 Watt	12V (14)
1993 Trail Blazer	* 150 Watt	none
Trail Boss	* 150 Watt	12V (14)
Sportsman	* 150 Watt	12V (14)
250 & 350	* 150 Watt	12V (14)
1994 Trail Blazer	* 150 Watt	none
Trail Boss	* 150 Watt	12V (14)
Sport	* 150 Watt	12V (14)
Sportsman	* 200 Watt	12V (14)
300 models	* 150 Watt	12V (14)
400 models	* 200 Watt	12V (14)
1995 Trail Blazer	* 150 Watt	none
Trail Boss	* 150 Watt	12V (14)
300 models	* 150 Watt	12V (14)
400 models	* 200 Watt	12V (14)
Scrambler and Sport	* 150 Watt	12V (14)
Sportsman and Xplorer	* 200 Watt	12V (14)
Magnum	* 200 Watt	12V (14)
* Output with engine operating at 4,000 rpm.		

Table 2 CHARGING/LIGHTING COIL RESISTANCE SPECIFICATIONS

1985-1988 with 100 watt alternator	
Models without battery (yellow to yellow/red or brown)	0.45-0.60 ohms
Models with battery (yellow/red to yellow)	0.45-0.60 ohms
1989-on with 150 watt alternator	
250, 300, 350 & 400 engines (yellow/red to yellow)	0.25-0.35 ohms
400 & 425 engines with 200 watt alternator (yellow/red to yellow)	0.34 ohms
(yellow/brown to yellow)	0.17 ohms

Resistance tests

Between two armatures
Across the starter
Between starter input
Between any component
Brush wear limit

Model No.

1985-1987

1988

Trail Boss

Trail Boss 250 R/ES

1989-on

Table 3 STARTER SPECIFICATIONS

Resistance tests	
Between two armature commutator segments	less than 0.3 ohm
Across the starter solenoid pull-in coil	3.4 ohms
Between starter input terminal and brushes	less than 0.3 ohm
Between any commutator segment and armature ground	infinite
Brush wear limit	0.8 mm (5/16 in.)

Table 4 LIGHTS

Model No.	Headlight	Taillight	Instruments
1985-1987	45 Watts 45/45 Stanley	5 Watts GE 168	- -
1988 Trail Boss	45 Watts 45/45 Stanley	5 Watts GE 168	- -
Trail Boss 250 R/ES	60 Watts 60/60 Stanley	5 Watts GE 168	- -
1989-on	60 Watts 60/60 Stanley	5 Watts GE 168	2 Watts Sylvania 12 POL

CHAPTER TWELVE

FRONT SUSPENSION AND STEERING

This chapter describes repair and maintenance of the front wheels, nondriving hubs, front suspension arms and steering components. Refer to Chapter Ten for service to the front drive hubs.

Refer to **Tables 1** for drive type and general front suspension specifications. **Tables 1-4** are located at the end of this chapter.

FRONT WHEEL (4-WHEEL MODELS)

Removal/Installation

1. Place the vehicle on level ground and set the parking brake.
2. Mark the front tires with an "L" (left side) or "R" (right side) so that they can be installed onto the same side of the vehicle from which they were removed. If the tire is to be removed from the rim, also mark the tire with an arrow indicating the direction of rotation when traveling forward.
3. Loosen but do not remove the lug nuts (**Figure 1**) securing the wheel to the front hub.

4. Raise the front of the vehicle with a small hydraulic or scissor jack. Place the jack under the frame with a piece of wood between the jack and the frame.
5. Place block(s) under the frame to support the vehicle securely with the front wheels off the ground.
6. Remove the wheel nuts (loosened in Step 3) and remove the front wheel.
7. Clean the lug nuts in solvent and dry thoroughly.
8. Inspect the wheel for cracks, bending or other damage. If damage is severe, replace wheel as described under *Tires and Wheels* in this chapter.
9. Install the washers and nuts (**Figure 1**). Finger tighten the nuts until the wheel is positioned squarely against the front hub.

WARNING

Always tighten the lug nuts to the correct torque specification or the nuts may work loose and the wheel could fall off.

10. Use a torque wrench and tighten the lug nuts in a crisscross pattern to the torque specification listed in **Table 2**.

11. After the wheel is secured, apply the front brake. The wheel rotates freely and correctly.
12. Measure wheel alignment as described under *Alignment*.
13. Raise the front of the vehicle with the wooden blocks.
14. Let the jack and wooden blocks.

FRONT WHEEL (3-WHEEL MODELS)

Removal/Installation

Refer to **Figure 1**.

1. Place the vehicle on level ground and set the parking brake.
2. Loosen but do not remove the lug nuts (the wheel to the front hub).
3. Loosen the front suspension arms and detach the lower control arm operating lever.
4. Use a small jack to raise the front of the vehicle.
5. Place block(s) under the frame to support the vehicle securely with the front wheels off the ground.
6. Remove the castor adjustment screw and remove the castellated nut.
7. Withdraw the front hub.
8. Remove the spindle nut and washer from the wheel hub.



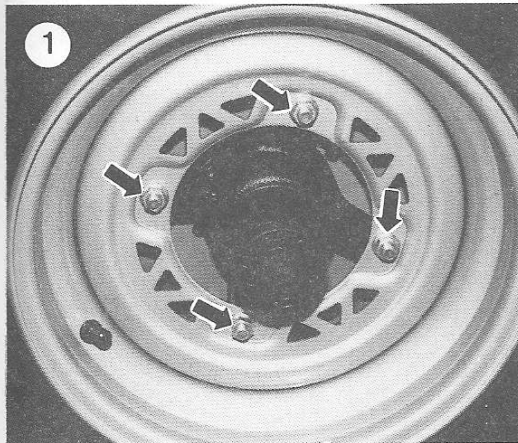
11. After the wheel is installed completely, rotate it; apply the front brake several times to make sure that the wheel rotates freely and that the brake is operating correctly.
12. Measure wheel runout with a dial indicator as described under *Front Hub* in this chapter.
13. Raise the front of the vehicle a little and remove the wooden block(s).
14. Let the jack down and remove the jack and wooden blocks.

FRONT WHEEL (3-WHEEL SCRAMBLER MODEL)

Removal/Installation

Refer to **Figure 2** for this procedure.

1. Place the vehicle on level ground and block the rear wheels.
2. Loosen but do not remove the lug nuts securing the wheel to the front hub.
3. Loosen the front brake adjuster (**Figure 3**), then detach the lower end of the cable from the brake operating lever.
4. Use a small jack to lift the front of the vehicle off the ground.
5. Place block(s) under the frame to support the vehicle securely with the front wheel off the ground.
6. Remove the cotter pin from the axle nut, then remove the castellated axle nut and washer.
7. Withdraw the front axle from the fork tubes and the front hub.
8. Remove the spacer from the right side of the wheel hub.



9. Lower the wheel, hub and brake assembly away from the fork tubes.
10. Separate the brake hub from the brake drum.
11. Remove the lug nuts and separate the wheel from the hub.
12. Check the operation and condition of the front brake before assembling. Refer to Chapter Fourteen to service the brake.
13. Install the front wheel and hub by reversing the removal procedure. Make sure that the notch in the brake hub engages the lug on the left fork tube correctly.
14. Install the flat washer onto the axle.
15. Install the castellated axle nut, then tighten the nut to the torque specification in **Table 2**.
16. Check that one pair of openings in the castellated nut is aligned with the cotter pin hole in the axle. If not, align opening by tightening the axle nut. Do not loosen the axle nut to align the openings.

WARNING

Always install a new cotter pin.

17. Insert the new cotter pin through openings in the castellated nut and axle hole. Bend the cotter pin as shown in **Figure 4** to lock the nut.
18. Adjust the brake cable as described in Chapter Three.

FRONT HUB (4-WHEEL MODELS WITHOUT ALL-WHEEL DRIVE)

The nondriving front hub consists of 2 sealed bearings and a center hub spacer. On models with a drum type front brake, the drum is integral with the front hub. On models with a disc type front brake, the disc is bolted to the front hub.

Inspection (Hub Installed)

Inspect the bearings for each wheel before removing bearings from the wheel hub.

CAUTION

Do not remove the wheel bearings for inspection, because the bearings may be damaged during the removal process. Remove the wheel bearings only if they are to be replaced.