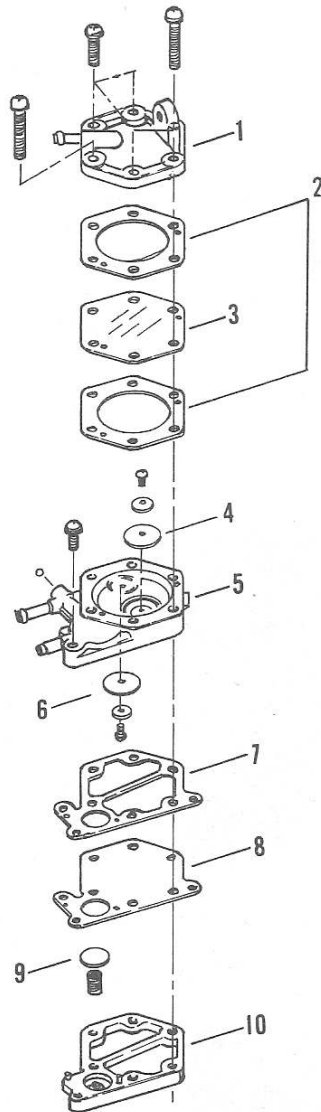


39

### FUEL PUMP (MAGNUM MODELS)



1. Cover
2. Gaskets
3. Diaphragm
4. Check valve
5. Pump body
6. Check valve
7. Gasket
8. Diaphragm
9. Pressure regulator
10. Cover

*Do not use  
new diaphragm  
available.*

11. If service and disassembly procedure.
12. Reassemble the procedure.

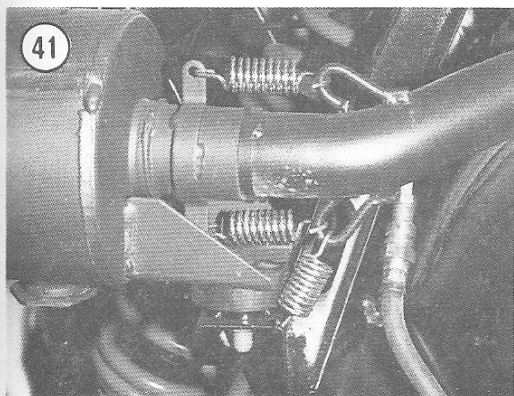
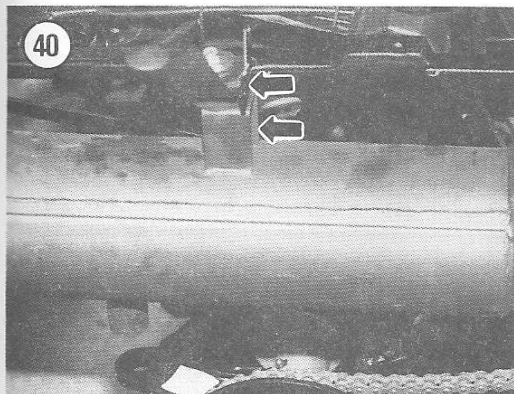
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41

**NOTE**

*Do not disassemble the pump unless new diaphragms, gaskets and valves are available.*

11. If service parts are available, refer to **Figure 39** and disassemble the pump.
12. Reassemble and install the pump by reversing the procedure.

**EXHAUST SYSTEM**

Check the exhaust system for deep dents or fractures and repair or replace parts as required. Check the mounting flanges (**Figure 40**) on the muffler and the frame for fractures. Replace broken or missing springs (**Figure 41**). Replace or tighten any missing or loose bolts. Check the mounting flange attached to the cylinder (2-stroke models) or cylinder head (4-stroke models) for tightness. A loose exhaust pipe connection will cause excessive exhaust noise and reduce engine power.

The stock exhaust system consists of the exhaust pipe, muffler, gaskets and mounting fasteners.

**Removal/Installation**

1. Place the vehicle on level ground and set the parking brake.
2. Remove any interfering panels as described in Chapter Fifteen.
3. Remove attaching springs.
4. Loosen mounting bolts.
5. Loosen or remove any exhaust pipe to muffler clamps.
6. Remove the muffler mounting bolts and remove the muffler.
7. Remove the exhaust pipe.
8. Remove the nuts attaching the exhaust flange to the cylinder or cylinder head and remove the flange.
9. Install by reversing these removal steps, noting the following.
10. Inspect the gasket between the cylinder or cylinder head and the exhaust flange. Replace the gasket if damaged or leaking and always install a new gasket if the flange was removed.
11. After installation is complete, start the engine and make sure there are no exhaust leaks.

**Table 1 is on the following pages.**

Table 1 CARBURETOR SPECIFICATIONS

	Carb. model	Main jet	Needle jet	Jet needle	Pilot jet	Idle needle	Idle rpm
1985							
Scrambler & Trail Boss	VM30SS	155	O-6(169)	5DP7-3	30	1 1/2	800
1986							
Scrambler & Trail Boss	VM30SS	145	O-0(169)	5DP7-3	50	1	800
1987							
Trail Boss	VM30SS	145	O-0(169)	5DP7-3	50	1	800
Cyclone	VM34SS	200	O-4(166)	6DH5-3	40	1	800
Trail Boss 4 x 4	VM30SS	145	O-0(169)	5DP7-3	50	1	800
1988							
Trail Boss 2 x 4 and 4 x 4	VM30SS	145	O-4(169)	5DP7-3	35	1	800
Trail Boss 250 R/ES	VM38SS	230	O-2(247)	6DH4-3	45	1 1/2	800
1989							
All models	VM30SS	145	O-4(169)	5DP7-3	40	1	800
1990							
Trail Blazer, Trail Boss 250, 2 x 4, 4 x 4 and Big Boss 4 x 6	VM30SS	145	O-4(169)	5DP7-3	40	1	700
Trail Boss 2 x 4 350L and 4 x 4 350L	VM34SS	200	O-6(480)	6DH29-2	30	1 1/2	700
1991							
Trail Blazer, Trail Boss 250, 2 x 4, 4 x 4, Big Boss 4 x 6 and 6 x 6	VM30SS	145	O-4(169)	5DP7-3	40	1	700
Trail Boss 2 x 4 350L and 4 x 4 350L	VM34SS	200	O-6(480)	6DH29-3	30	3/4	700
1992							
Trail Blazer, Trail Boss 250, 2 x 4, 4 x 4, Big Boss 4 x 6 and 6 x 6	VM30SS	145	O-4(169)	5DP7-3	40	1	700
Trail Boss 2 x 4 350L and 4 x 4 350L	VM34SS	200	O-6(480)	6DH29-3	30	3/4	700
1993							
Trail Blazer, Trail Boss 250 2 x 4, 250 4 x 4 and 250 6 x 6	VM30SS	145	O-4(169)	5DP7-3	40	1	700
Sportsman 350 2 x 4, 4 x 4 and 6 x 6	VM34SS	200	O-6(480)	6DH29-3	30	3/4	700
1994							
Trail Blazer and Trail Boss	VM30SS	145	O-4(169)	5DP7-3	40	1	700

(continued)

1994 (continued)  
Sport, Sportsman 4 x 4, 4 x 4, 4 x 4, 6 x 6  
300 2 x 4, 4 x 4 and 6 x 6  
1995  
Trail Blazer and Trail Boss  
300 2 x 4, 4 x 4 Scrambler  
400 2 x 4, 6 x 6 Sport, Sportsman 4 x 4 and Trail Blazer  
Magnum 2 x 4 4 x 4

Table 1 CARBURETOR SPECIFICATIONS (continued)

Idle rpm	Carb. model	Main Jet	Needle Jet	Jet needle	Pilot Jet	Idle needle	Idle rpm
800	1994 (continued)						
800	Sport, Sportsman 4 × 4, 400						
800	2 × 4, 4 × 4 and 6 × 6						
800	VM34SS	200	O-6(480)	6DH29-3	30	1 1/2	700
800	300 2 × 4, 4 × 4 and 6 × 6						
800	VM30SS	155	O-4(169)	5DP7-3	40	1 1/2	700
800	1995						
800	Trail Blazer and Trail Boss						
800	VM30SS	145	O-4(169)	5DP7-3	40	1	700
800	300 2 × 4, 4 × 4						
800	VM30SS	155	O-4(169)	5DP7-3	40	1 1/2	700
800	Scrambler						
800	VM34SS	240	O-6(480)	6DH29-2	30	1 1/2	700
800	400 2 × 4, 6 × 6, Sport, Sportsman 4 × 4 and Xplorer						
800	VM34SS	200	O-6(480)	6DH29-3	30	1 1/2	700
800	Magnum 2 × 4 and 4 × 4						
800	CVBST34	140	P-8	5F81-3	42.5	1 3/8	1,200

## CHAPTER SEVEN

## COOLING SYSTEMS

POLARIS VARIABLE TRANSMISSION  
(PVT) COOLING SYSTEM

Air is circulated around the Polaris Variable Transmission (PVT) assembly to cool the primary drive pulley (clutch), belt and driven pulley. Refer to **Figure 1**, **Figure 2** or **Figure 3**. Reasonably clean and dry air from under the fuel tank is drawn into the system to the port in the left side of the crankcase. The fins (**Figure 4**) on the back of the drive pulley act as a centrifugal fan to move the air. The air is finally exhausted from the air outlet duct attached to the clutch outer cover.

For the system to operate properly, all covers, ducting, seals and hoses must be in place and properly attached. The air circulating around the PVT pulleys and belt should be cool and dry. If water

enters the PVT cooling system, shift the transmission to neutral, increase engine speed and allow the system to dry before proceeding.

## Clutch Outer Cover/Ducting

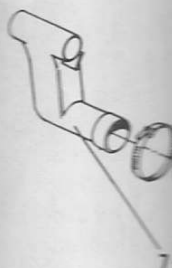
An obstruction in the ducting, missing parts or leaking connections can increase the operating temperature and shorten the life of the pulleys and the belt. Loose connections can also allow water to enter the system. Refer to **Figure 1** for PVT cooling covers and ducts typical of models with round frame tubes. Refer to **Figure 2** for most models with square frame tubes except Magnum. **Figure 3** is typical of PVT cooling system for Magnum models.

①



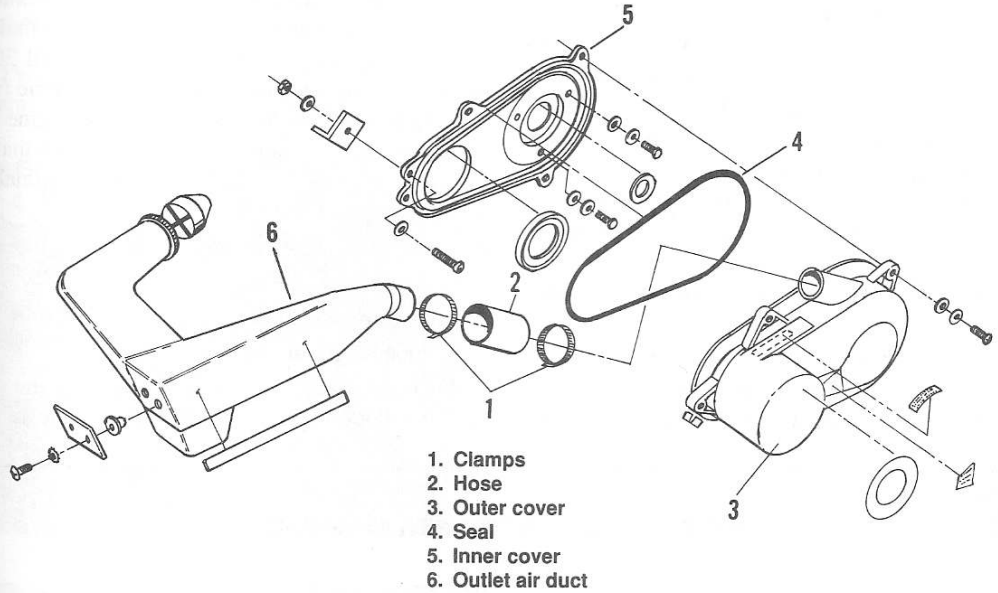
PVT COOLING SYSTEM  
SQUARE FRAME TUBES  
(EXCEPT MAGNUM)

②

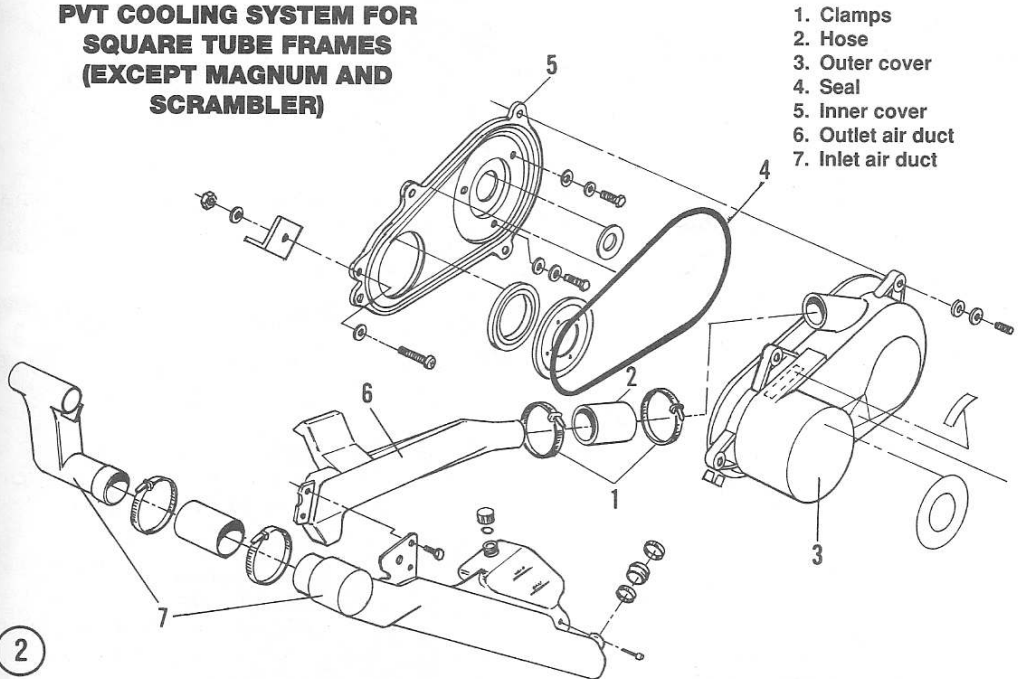


1

**PVT COOLING SYSTEM FOR ROUND TUBE FRAMES**



**PVT COOLING SYSTEM FOR SQUARE TUBE FRAMES (EXCEPT MAGNUM AND SCRAMBLER)**



2

7

shift the transmis-  
speed and allow the

g. missing parts or  
the operating tem-  
the pulleys and the  
allow water to enter  
for PVT cooling  
s with round frame  
models with square  
ure 3 is typical of  
models.

1. Remove any interfering body panels as described in Chapter Fifteen.
2. Loosen clamps (A, **Figure 5**, typical) and slide the connecting hose (B, **Figure 5**) from the clutch cover.
3. Remove the screws (C, **Figure 5**) attaching the clutch cover, then carefully remove the cover.
4. The procedure for removing the ducting depends on the model and type of service required. Refer to **Figure 1**, **Figure 2** or **Figure 3** for typical ducting.
5. The clutch inner cover (5, **Figure 1**, **Figure 2** or **Figure 3**) can be removed after removing the drive and driven pulleys as described in Chapter Eight.
6. Inspect the seal (4, **Figure 1**, **Figure 2** or **Figure 3**) and replace it if damaged.
7. Assemble by reversing the disassembly procedure. Tighten hose clamps and attaching screws securely, but do not damage parts by overtightening.

### ENGINE COOLING (AIR COOLED MODELS)

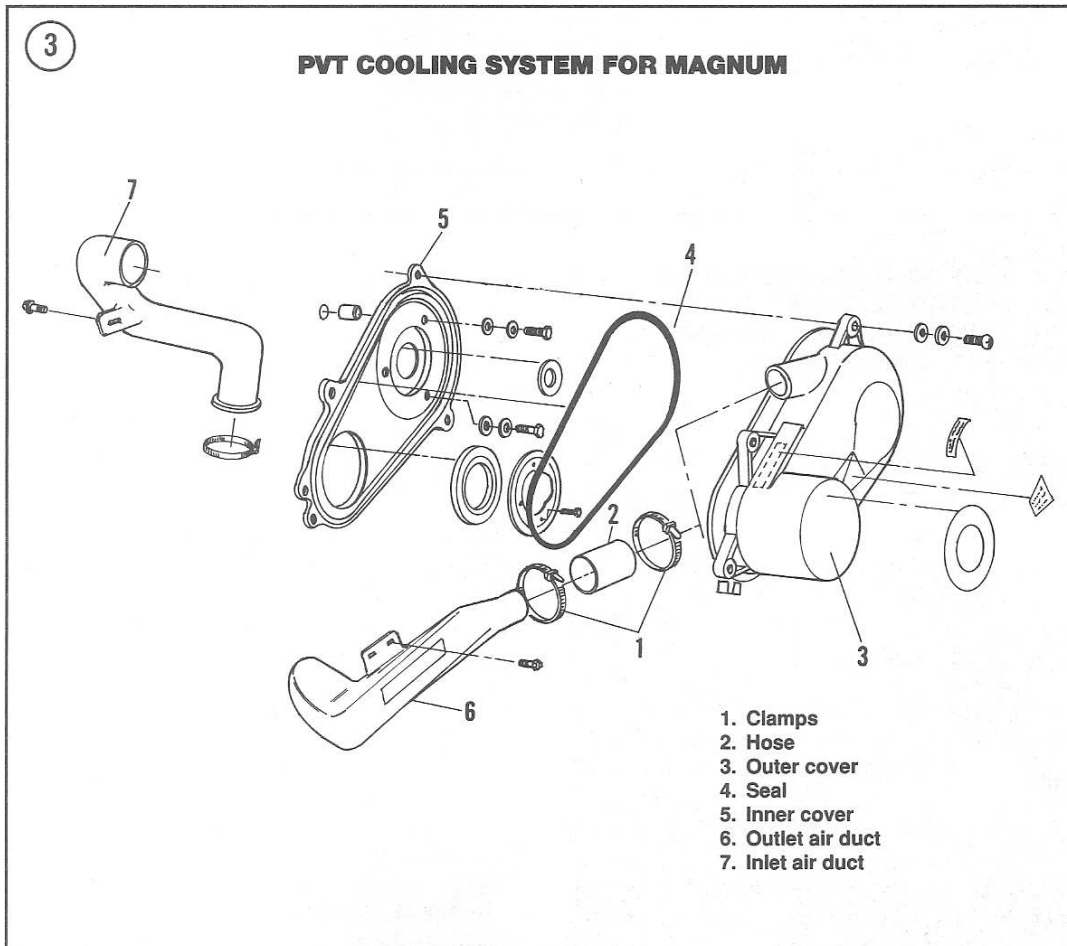
The engine on all 250 and 300 models is cooled by air circulating around the cylinder and cylinder head cooling fins. Some 250 models and all 300 models are originally equipped with an electric fan (**Figure 6**) that circulates air around the engine to assist cooling. The manufacturer recommends that a fan kit be installed on 250 models not originally equipped with a fan if the ATV is operated:

- a. At constant low ground speed.
- b. Pulling heavy loads.
- c. In commercial use.
- d. In agricultural use.

When installing the fan motor, the wiring and the vent line should exit down. Tie the wires to the frame

for the fan motor and that loose wires do not contact the fan blades. raised ribs (B, **Fig** engine.

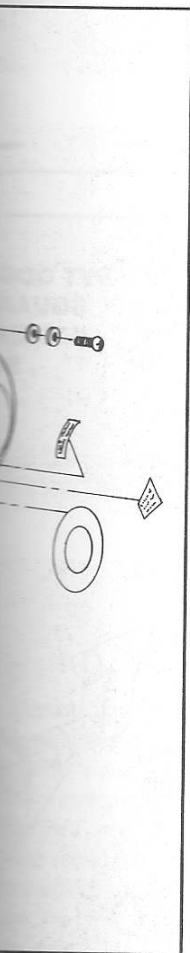
Dirt, dried mud, circulation of air fan



LING  
(MODELS)

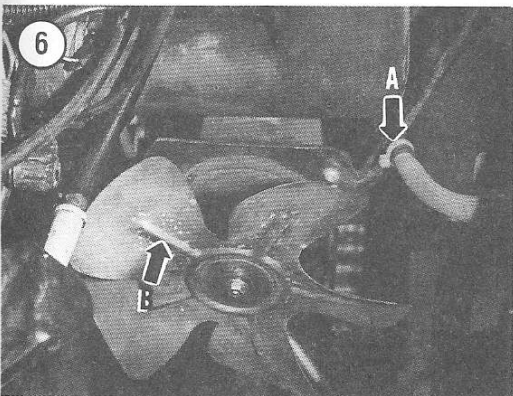
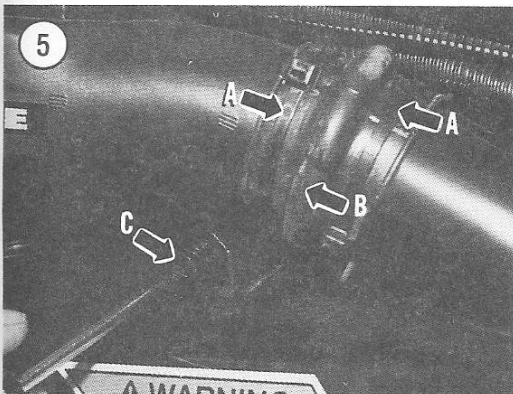
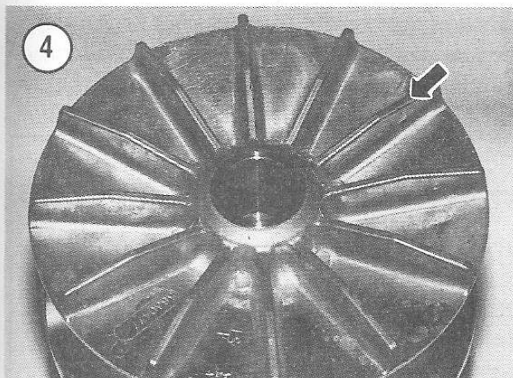
00 models is cooled  
cylinder and cylinder  
models and all 300  
with an electric fan  
around the engine to  
r recommends that a  
models not originally  
is operated:  
speed.

r, the wiring and the  
e wires to the frame



for the fan motor as shown at A, **Figure 6**. Make sure that loose wires, hoses or other objects cannot contact the fan blades. Install the fan blades with their raised ribs (B, **Figure 6**) facing back toward the engine.

Dirt, dried mud or other material can block the circulation of air for cooling. It is suggested that the



engine be cleaned with water and inspected occasionally to assist cooling and to locate broken cooling fins or other problems that would affect cooling.

### ENGINE COOLING (LIQUID COOLED MODELS)

The engines on 350L, 400L and Magnum models are cooled by liquid coolant circulated within the cooling passages inside the cylinder, cylinder head and radiator by an impeller type pump. Refer to **Figure 7**, typical. The coolant pump is mounted on the right side of the engine crankcase. The liquid coolant is a mixture of ethylene glycol antifreeze and water. On Magnum (4-stroke) models, a thermostat is located in the cylinder head, under the outlet housing.

During normal engine operation, the coolant heats and expands. Pressure caused by this expansion is controlled by the radiator cap and excess pressure is released into the coolant recovery tank (A, **Figure 8**). As the engine cools, the pressure decreases and coolant is drawn from the coolant recovery tank back into the engine's cooling system. The amount of pressure maintained in the system, while it is warm, is determined by the radiator cap.

This chapter describes service to the liquid cooling system. Normal maintenance procedures are described in Chapter Three. Service to the engine gaskets, seals and coolant pump is described in Chapter Four (2-stroke engines) or Chapter Five (4-stroke engines).

#### Safety Precautions

Certain safety precautions must be kept in mind to protect yourself from injury and the engine from damage. For your own safety, the cooling system must be cool before removing any part of the system, including the radiator cap.

#### WARNING

*Do not remove the radiator cap when the engine is hot. The coolant is very hot and is under pressure. Severe scalding could result if the coolant comes in contact with your skin.*

To protect the engine cooling system, keep the system filled with a mixture of ethylene glycol anti-



freeze (that is formulated for use in aluminum engines) and distilled water.

**CAUTION**

Never fill the cooling system with water only, even in climates where low (freezing) temperatures do not occur. The aluminum will oxidize and severely damage the engine internally.

**WARNING**

Antifreeze has been classified as an environmental toxic waste by the EPA.

Dispose of it according to local regulations. **ANTIFREEZE IS POISONOUS.** Do not store coolant where it is accessible to children or pets. Open containers of drained antifreeze are especially dangerous.

**Coolant (Antifreeze)**

The coolant should be maintained at the proper level as described in Chapter Three. The radiator must be full and the coolant level should always be

**COOLING SYSTEM**

between the minimum coolant recovery level. The coolant recovery tank contains only a small amount of coolant. It is important that it be checked.

The manufacturer's instructions for the cooling system be drained of antifreeze and refilled as described in Chapter Three. The type of antifreeze to use in minimum engines, in cold and warm climates.

**Coolant Pump**

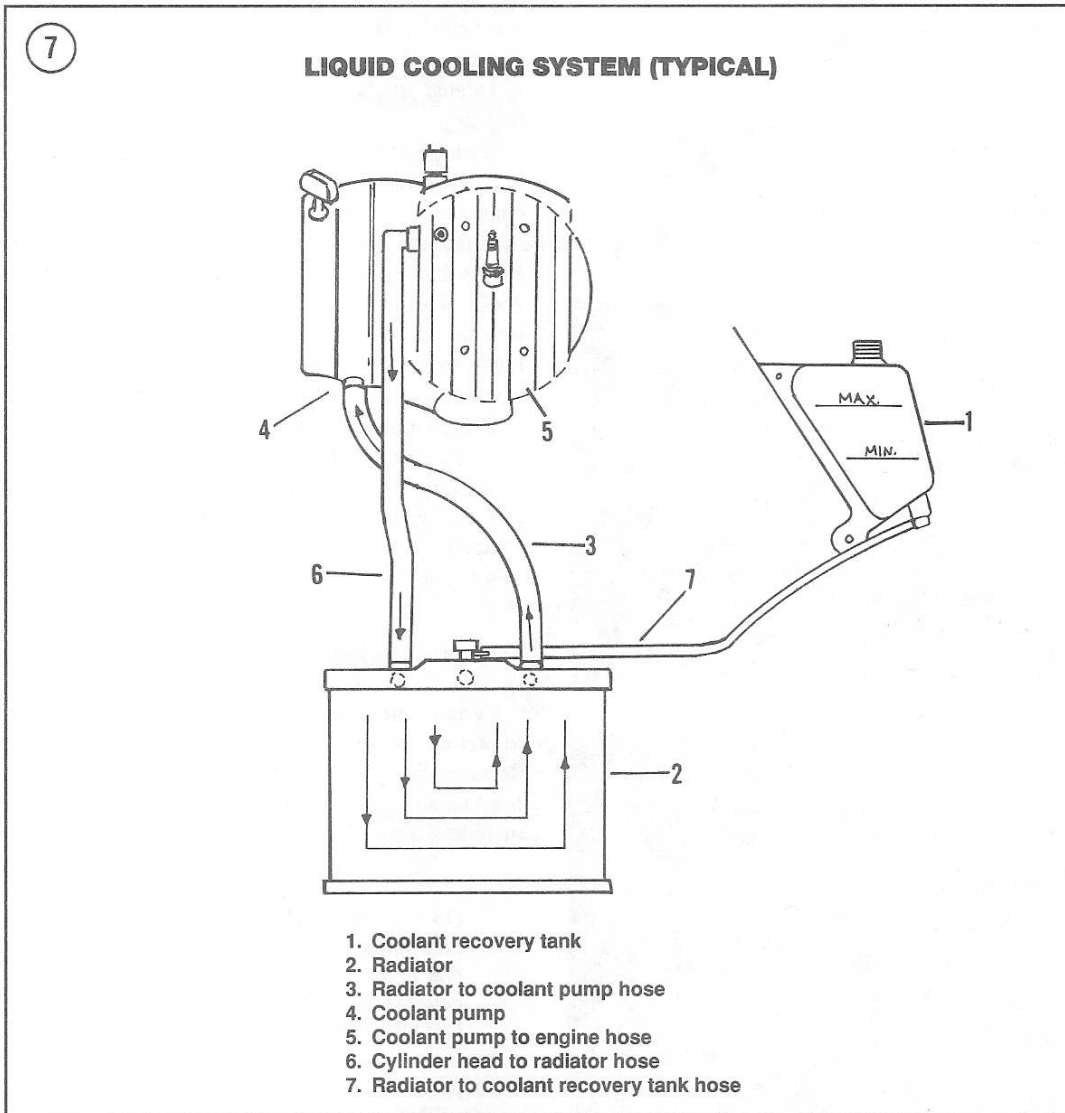
The coolant pump is located on the right side of the engine. It should be removed for inspection. To install new sealant, the pump should be removed and disassembled. See Chapter Four (2-Stroke Models) for details.

The coolant pump should be checked for extension of the belt. To service the belt, see Chapter Five to service the belt.

The coolant pump should be checked for extension of the belt. To service the belt, see Chapter Five to service the belt.

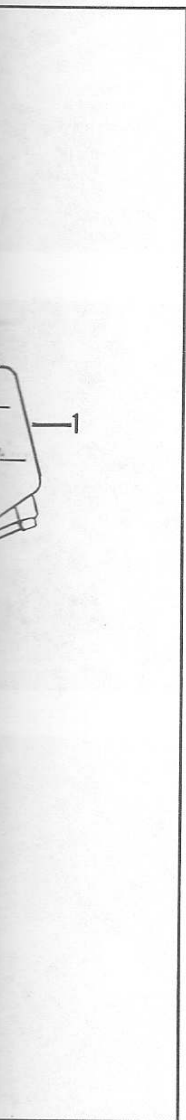
**Hoses**

Coolant is circulated by the pump through the radiator (Figure 7), which is otherwise damaged.



local regula-  
POISONOUS.  
re it acces-  
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ained at the proper  
Three. The radiator  
l should always be



between the minimum and maximum marks on the coolant recovery tank (1, **Figure 7**). The system contains only a small amount of coolant and it is important that it remains filled with the proper solution.

The manufacturer recommends that the cooling system be drained and refilled with a new mixture of antifreeze and water at regular intervals as described in Chapter Three. It is important to use the type of antifreeze for recommended for use in aluminum engines, mixed in the suggested ratio both cold and warm operating environments.

### Coolant Pump

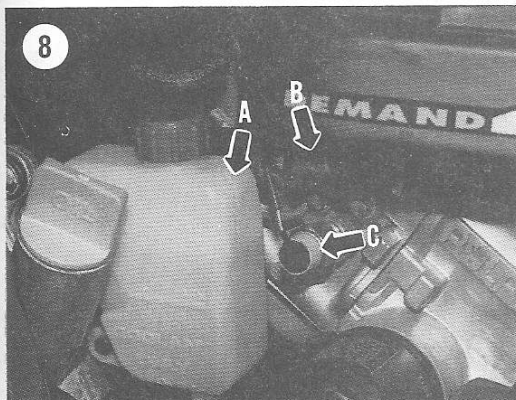
The coolant pump (4, **Figure 7**) is located on the right side of the engine. The pump cover can be removed for inspection and service to the impeller. To install new seals for the coolant pump shaft, remove and disassemble the engine as described in Chapter Four (2-Stroke Models) or Chapter Five (4-Stroke Models).

The coolant pump shaft on 2-stroke engines is an extension of the balance shaft. Refer to Chapter Four to service the balance shaft and bearings.

The coolant pump shaft on 4-stroke engines is an extension of the oil pump shaft. Refer to Chapter Five to service the oil pump.

### Hoses

Coolant is circulated between major components of the cooling system through hoses (3, 5 and 6, **Figure 7**), which can be punctured, cut, chafed or otherwise damaged allowing the coolant to escape.



The hoses may also be damaged while removing the hoses for other service and hoses deteriorate with age. A spray of hot coolant can injure the rider and the loss of the coolant can cause the engine to overheat quickly and damage the engine.

When any component of the cooling system is removed, inspect the connecting hoses and determine if replacement is necessary. If the hose has not been detached for some time, the hose will probably be hardened and a new hose should be installed.

The recommended time interval before routinely installing new hoses depends on many factors, including the heat and humidity of the environment. It is a good practice to test the flexibility of the hoses occasionally before starting the engine. Hardening of the rubber in the hose indicates an early stage of the aging process.

### Engine Gaskets/Seals

A leaking gasket between the cylinder head and the cylinder usually leaks into the cylinder. If a sufficient amount of coolant enters the cylinder, it will be difficult to crank the engine with the starter. White smoke (steam) may be observed at the muffler when the engine is running. Coolant in the cylinder may prevent the engine from starting or make starting difficult. Refer to Chapter Four (2-stroke engines) or Chapter Five (4-stroke engines) to remove the cylinder head and install a new gasket.

A gasket is located between the coolant pump cover and pump body. Refer to Chapter Four (2-stroke engines) or Chapter Five (4-stroke engines) to install a new gasket.

Coolant may leak into the lubricating oil for the counterbalancer on 350L and 400L (2-stroke) engines or the crankcase on Magnum (4-stroke) engines. This mixture of coolant and oil can quickly cause serious damage. It is important to immediately disassemble and clean the engine, then install new seals to correct the leakage. Refer to Chapter Four (2-stroke engines) or Chapter Five (4-stroke engines) to disassemble the engine and install new seals.

### Cooling System Inspection

The cooling system is equipped with a coolant recovery tank (A, **Figure 8**) and the coolant level can

be checked without removing the radiator cap. Coolant is usually added to the coolant recovery tank. If the cooling system requires frequent refilling, there is probably a leak in the system.

If the engine overheats, allow the engine to cool completely, then remove the cap from the radiator and check the fluid level in the radiator. The radiator should always be completely full. If the level of fluid in the radiator is low, refer to Chapter Three for filling and bleeding air from the system.

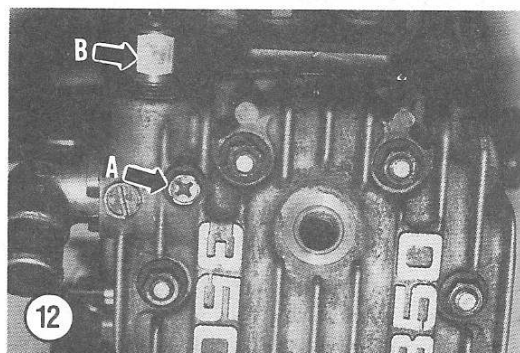
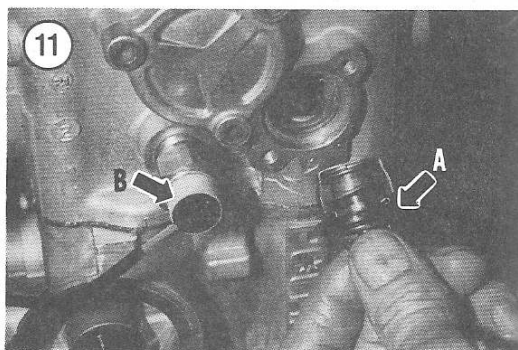
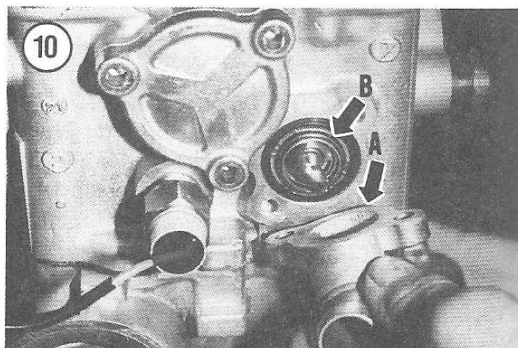
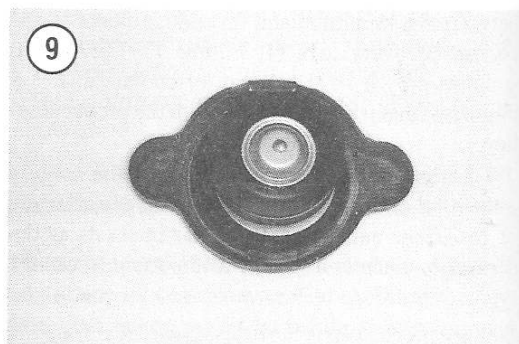
To pressure check the cooling system, proceed as follows:

1. Remove the radiator cap access panel located in front of the headlight housing.
2. Detach the hose (7, **Figure 7**) leading from the radiator (near the cap) to the coolant recovery tank.
3. Attach a hand operated pump such as Mity Vac (part No. 2870975) to the connection on the radiator and pressurize the radiator to 69 kPa (10 psi).
4. Pressure in the cooling system should remain the same for at least five minutes. If a loss of pressure is evident, determine the cause. Some possible sources of leaks are:
  - a. Leaking radiator cap.
  - b. Leaking coolant hose connection.
  - c. Leaking cylinder head gasket.
  - d. Leaking coolant pump shaft seal.
5. Remove the radiator cap (**Figure 9**) and inspect the rubber cap seal for tears or cracks. Check the metal parts of the cap for dents, bends or distortions that could cause leakage. Rinse the cap under warm tap water to flush away loose dirt particles.
6. On Magnum models with the 4-stroke engine, check the thermostat as described in this chapter.

### Thermostat

Magnum (4-stroke) engines are equipped with a thermostat located in the cylinder head under the coolant outlet housing.

1. Drain the cooling system as described in Chapter Three.
2. Loosen the 2 screws attaching the outlet housing (A, **Figure 10**) to the cylinder head and move the housing out of the way.
3. Withdraw the thermostat (A, **Figure 11**) from the cavity in the cylinder head.
4. Check the thermostat for opening temperature by heating in a pan of water while observing the tem-



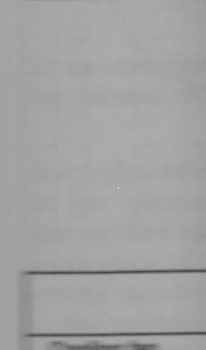
operation. Refer to the specifications.

5. Clean the surface of the outlet housing.

6. Use a screwdriver to loosen the screws that attach the outlet housing to the cylinder head.

7. Install the outlet housing.

8. Reinstall the radiator cap.



Cooling fan  
ON at degrees  
OFF at degrees  
Engine HCT Ign  
ON at degrees  
Radiator cap rel  
Pressure (PSI)  
System capacity  
Thermostat  
Begin opening  
Fully open "C"

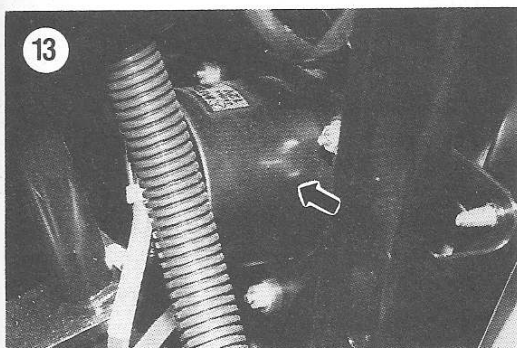
"The valve open"

perature. Refer to **Table 1** for the thermostat opening specifications.

5. Clean the surfaces of the cylinder head and the outlet housing.
6. Use a new seal and install the thermostat. The air bleed hole must be toward the top screw hole as shown at B, **Figure 10**.
7. Install the outlet housing and connect the hose if detached.

#### NOTE

*It is important to bleed all air from the cooling system when filling a system*



*that was drained. Capacity of the cooling system is small and air pockets will result in overheating very quickly.*

8. Fill and bleed the cooling system as described in Chapter Three.

#### Temperature Sensors

On liquid cooled models, a temperature sensor is located on the engine as shown at B, **Figure 11** (for Magnum models with 4-stroke engines) or B, **Figure 12** (for 350L and 400L liquid cooled 2-stroke engines). Refer to **Table 1** for the temperature at which the sensor should close to turn on the engine HOT indicator light.

On liquid cooled models, a temperature sensor is also located on the top of the radiator that controls the operation of the electric fan (**Figure 13**). Refer to **Table 1** for the temperatures at which the sensor should open and close to turn the fan on and off.

On air cooled engines equipped with an electric fan, a sensor is located above the carburetor to control the operation of the electric fan. Refer to **Table 1** for the temperatures at which the sensor should open and close to turn the fan on and off.

**Table 1 COOLING SYSTEM SPECIFICATIONS**

	<b>250/300 Air cooled</b>	<b>350L/400L Liquid cooled</b>	<b>Magnum 4-stroke</b>
<b>Cooling fan</b>			
ON at degrees C (F)	93-104(200-220)	65-71(149-159)	77-82 (170-180)
OFF at degrees C (F)	113 (235)	96 (205)	105 (221)
<b>Engine HOT light</b>			
ON at degrees C (F)	—	96 (205)	105 (221)
<b>Radiator cap relief</b>			
Pressure kPa (psi)	—	90 kPa (13)	90 kPa (13)
System capacity L (qt)	—	1.89 (2)	2.13 (2.25)
<b>Thermostat</b>			
Begin opening C (F)	—	—	80 (176)
Fully open * C (F)	—	—	96 (205)

\* The valve opening is 8 mm (0.315 in.) when the thermostat is fully open.

## CHAPTER EIGHT

# CLUTCH/DRIVE BELT SYSTEM

The drive train includes the clutch/drive belt system, a transmission assembly and a final sprocket/chain drive. The clutch/drive belt system is also called the Polaris variable transmission or PVT. The clutch/drive belt system consists of a drive pulley mounted on the left end of the engine crankshaft, a driven pulley mounted on the left end of the transmission input shaft, and a belt connecting the two pulleys.

This chapter describes the service procedures for the clutch/drive belt system components. Drive belt specifications are listed in **Table 1**. **Tables 1-5** are at the end of the chapter. Service to the chain, gear, or gear and chain transmission assembly is described in Chapter Nine.

### DRIVE UNIT

Torque is transferred from the engine crankshaft to the transmission by the Polaris variable transmission (PVT). The drive unit automatically changes the drive ratio to permit the machine to move from

idle to maximum speed. Major components are the drive pulley assembly, driven pulley assembly and drive belt (**Figure 1**).

The drive and driven pulleys are basically 2 variable diameter pulleys that automatically vary the amount of reduction. Changes in the reduction ratio are possible by moving the sides of the pulleys closer together or further apart. Changing the gap between the sides of the pulley causes the belt to move up or down in the pulley groove, changing the effective diameter of the pulley. These changes in pulley diameter adjust to correspond with the prevailing load and speed conditions. See **Figure 2**.

The shift sequence is determined by a combination of engine torque and engine rpm. When the load (resistance) increases, such as when going up hill, the pulleys change the reduction ratio; engine rpm will remain nearly the same but the vehicle's speed will drop. When the load decreases, the pulleys automatically shift toward a higher ratio; engine rpm remains the same but the vehicle's speed will increase.

Major components are the sliding pulley (sheave), weight. The V-belt connects (Figure 1).

Fixed and Sliding

The sides of the the belt surfaces at taper. The pulley



### DRIVE PULLEY ASSEMBLY

Major components of the drive pulley assembly are the sliding pulley half (sheave), fixed pulley half (sheave), weight levers, spider and primary spring. The V-belt connects the drive and driven pulleys (Figure 1).

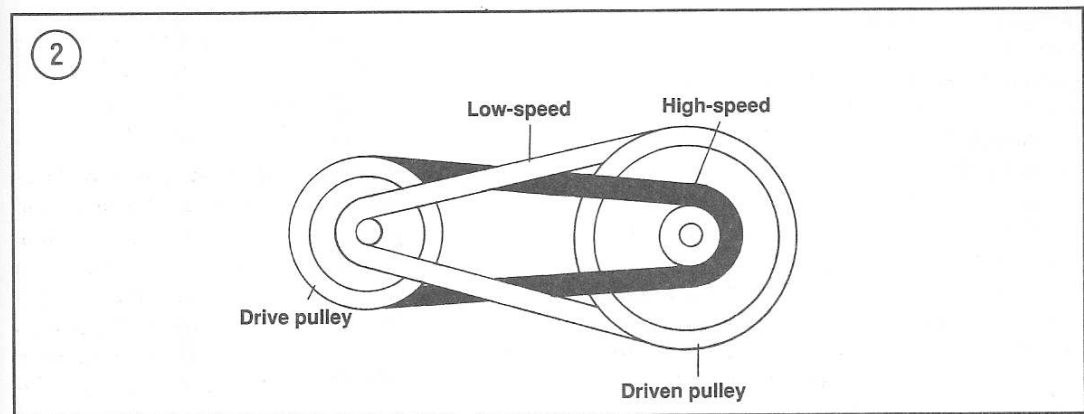
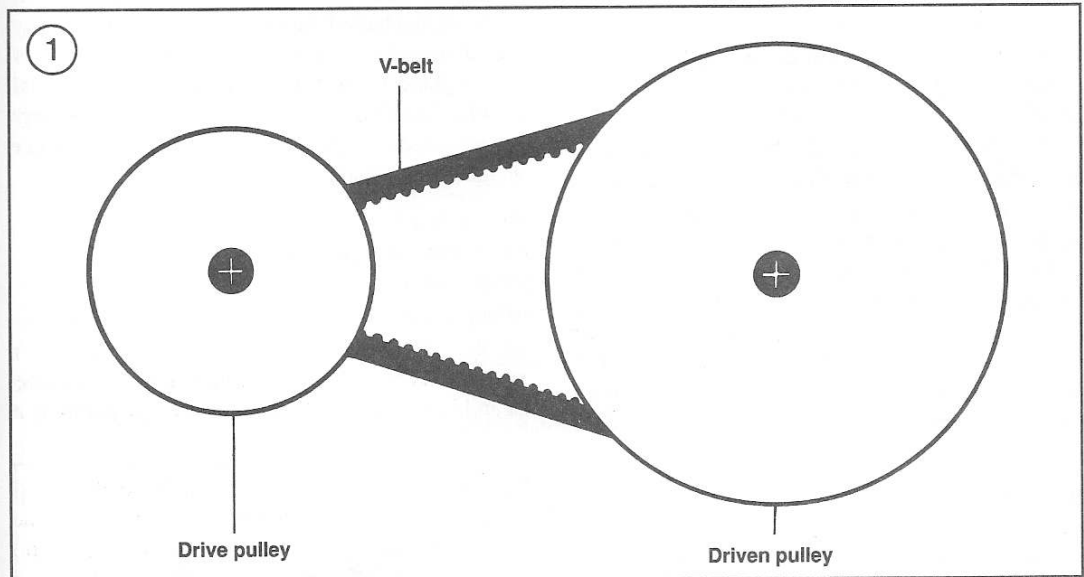
#### Fixed and Sliding Pulley Halves

The sides of the pulley are made of mild steel and the belt surfaces are precision machined to a smooth taper. The pulley is carefully balanced to prevent

vibration. The tapered surfaces of both pulleys match the V-belt gripping surface (Figure 3).

The drive pulley assembly is mounted on the left end of the engine crankshaft. When the engine is at idle or stopped, the fixed and sliding halves of the pulley are held apart by the primary spring. At slow idle speed or when the engine is stopped, the groove should be wide enough for the V-belt to drop down between the sides of the pulley. There is no engagement because the width of the belt is *less* than the space between the sides of the drive pulley.

When the engine speed is increased from idle, centrifugal force causes the weight levers mounted on the sliding half of the drive pulley to swing out.



When centrifugal force of the weights is sufficient to overcome the pressure of the primary spring, the sliding half of the pulley is moved closer to the fixed half. This movement narrows the groove between the pulley halves until the sides of the pulley grip the belt. The point at which the pulley grips the belt is called the engagement rpm. Engagement rpm will vary between models, but will occur at approximately 1,500 engine rpm. At low speed, the belt will be located as shown at the low-speed position in **Figure 2**.

As engine rpm is increased, centrifugal force causes the weights of the drive pulley to swing further out and force the sliding half of the pulley closer to the fixed half. As the groove of the drive pulley becomes narrower, the V-belt is forced upward in the groove toward the outer edge of the pulley. The V-belt is forced deeper into the groove of the driven pulley as indicated by the high-speed position of the belt in **Figure 2**.

Though not part of the drive pulley, it should be noted that the release (secondary) spring of the driven pulley forces the sides of the pulley together. Pressure against the sides of the driven pulley will force the sliding half away from the fixed side. Movement of the weight levers in the drive pulley will force the pulley halves together and the belt will move to the outer diameter of the drive pulley. At the same time the belt will force the sides of the driven pulley apart so that it can operate deeper in the groove.

### Drive Pulley Spring

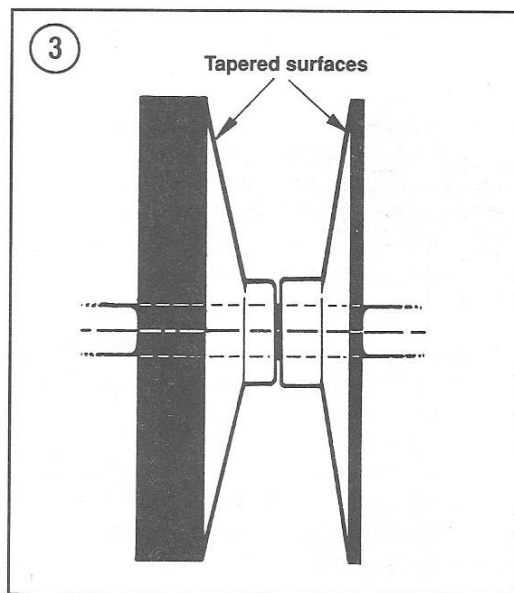
The clutch release spring of the drive pulley controls engagement speed. If a lighter spring is installed (or the weights are too heavy), the drive will upshift too fast and the engine will not be able to reach its operating range of 6,000 rpm. If a heavier spring is installed, the engine speed (rpm) will have to be higher to overcome spring pressure and allow engagement. If the spring is too stiff or the weights too heavy, the drive will not be able to move high enough in the pulley groove to attain high gear. Refer to **Table 2** for the original spring installed for your model. **Table 3** lists specifications for identifying the different springs. Actual performance depends upon a combination of characteristics, but generally, the springs are listed in **Table 3** from the strongest at the top to the least strongest at the bottom of the table.

### Centrifugal Weight Levers

As previously noted, weighted levers in the drive pulley react to engine speed and swing out. The weights attached to the movable sheave press against rollers on the spider to move the sliding half of the drive pulley. Centrifugal force causes the weights to swing out as the speed of the engine increases. Movement of the weighted levers and the sliding half of the pulley is opposed by the pressure of the primary spring. Until engine speed reaches the engagement rpm, the weights have not yet moved the sliding half of the pulley enough to engage the belt. The force exerted by the weighted levers is controlled by engine rpm. The faster the crankshaft rotates, the farther the weights pivot out. Movement of the sliding half of the drive pulley is controlled by the balance of the spring pressure and the weight of the weighted levers. Refer to **Table 4** for the original weights installed in your model. Performance may be improved at higher altitudes by installing lighter weights as indicated in the table.

### DRIVEN PULLEY

Major components of the driven pulley assembly are the sliding half, fixed half, release (secondary) spring and cam (helix). The pulley halves are made of mild steel. The belt surfaces are machined to a



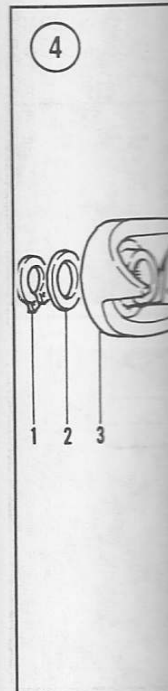
smooth tapered pulley halves (Figure 4).

The driven pulley end of the transmission is stopped or held in its low secondary (release) position.

The driven pulley ATV encounters cam helix forces moving the drive speed of the vehicle continue to run conditions and continue to operate.

### Release Spring

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smooth tapered surface. The tapered surfaces of the pulley halves match the V-belt gripping surface (Figure 4).

The driven pulley assembly is mounted on the left end of the transmission input shaft. When the engine is stopped or at idle, the driven pulley assembly is held in its low speed position by tension from the secondary (release) spring (Figure 4).

The driven pulley is a torque sensitive unit. If the ATV encounters an increased load condition, the cam helix forces the driven pulley to downshift by moving the driven pulley halves closer together. The speed of the vehicle will slow, but the engine will continue to run at a high rpm. By sensing load conditions and shifting accordingly, the engine can continue to operate in its peak power range.

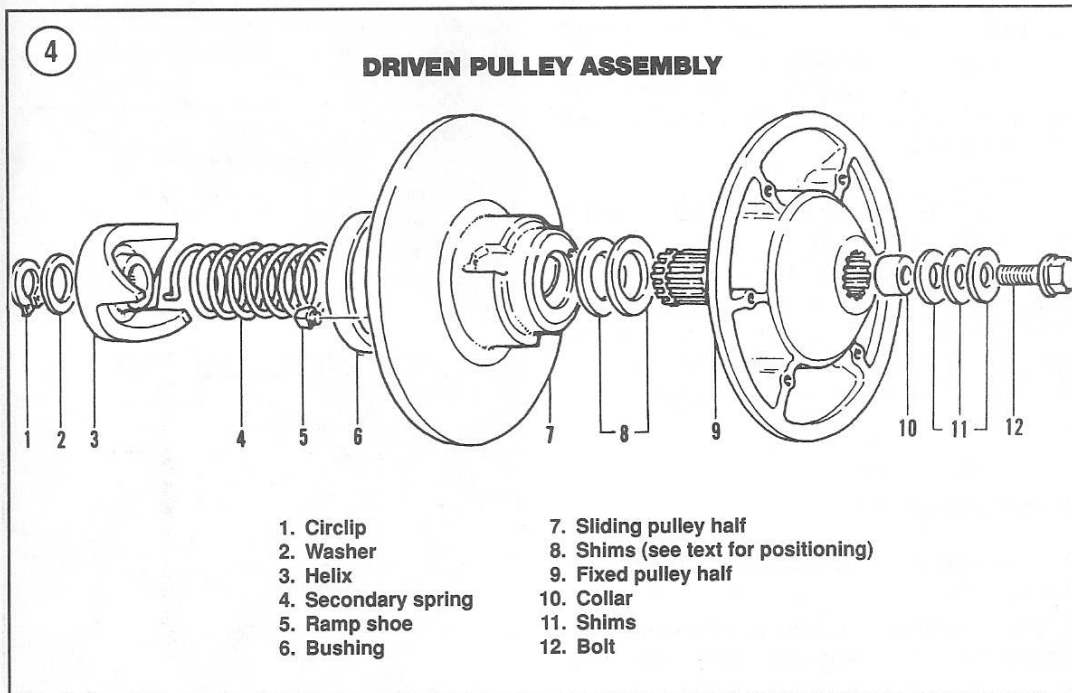
### Release Spring

The release spring located in the driven pulley assembly helps determine the shifting pattern. The spring is also used to keep the torque sensing cam (helix) in contact with the slider buttons. Spring tension can be changed by installing a different

spring or by repositioning the end of the spring in holes drilled in the cam. Observe the following:

- Increasing release spring tension will prevent the belt from moving to a higher speed position until the engine speed is increased. If the drive pulley moves to a faster ratio too soon, engine rpm will drop and the engine will begin to bog down. For peak efficiency, the engine should operate within its optimum peak power range. Increasing spring tension may prevent upshifting too early. By not shifting up, the engine should continue to operate within its peak power range.
- Decreasing secondary spring tension allows the belt to move to a higher speed position at a lower engine rpm. The engine will not operate as efficiently if it is running faster than its peak power range. Decreasing spring tension allows adjustment so that the drive system will shift into a higher ratio sooner to match the engine power.

The torque sensing cam angle will have more affect on the shifting sequence under heavy load than the release spring tension, but both are adjustable.





Refer to **Table 4** for the original position of the spring ends for your model.

### Torque Sensing Cam Angle

The drive pulley spring tension and the cam angle of the torque sensing helix work together to control how easily the driven pulley will shift to a faster speed ratio. The helix cam pushes against the sliding pulley. If the cam angle is steep, the pulleys will shift to a faster speed ratio sooner and will not be as responsive to increases in load. Conversely, low cam angles will exert more side pressure and will slow shifts until the load is reduced and speeds are higher. Refer to **Table 4** for the standard helix (cam) angle.

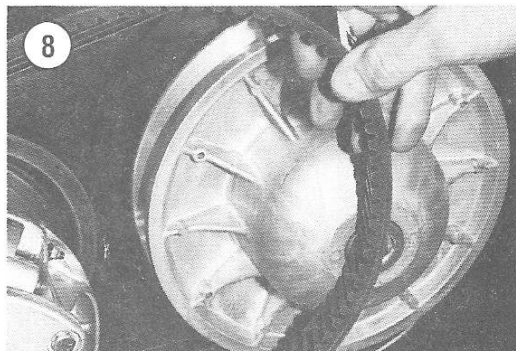
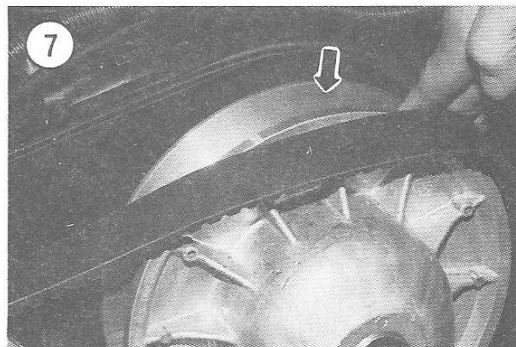
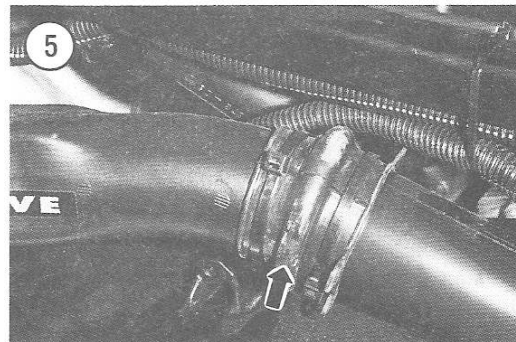
### DRIVE BELT

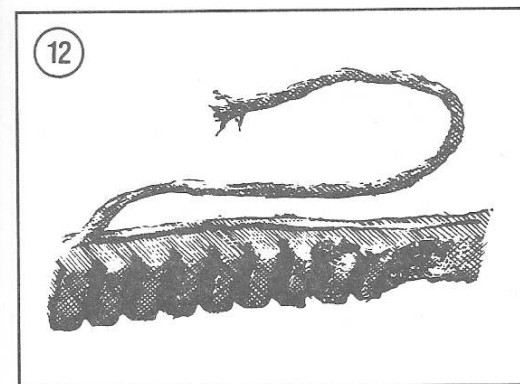
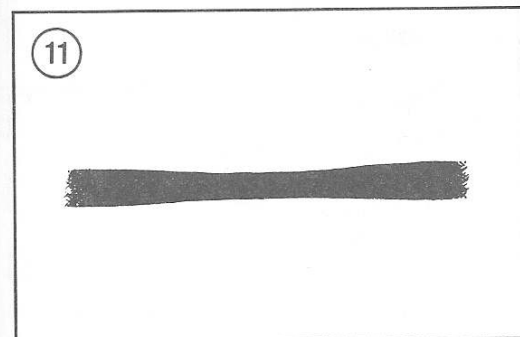
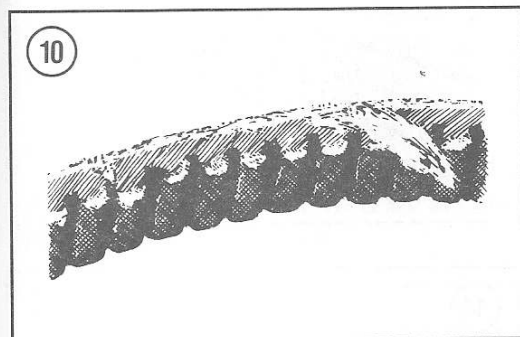
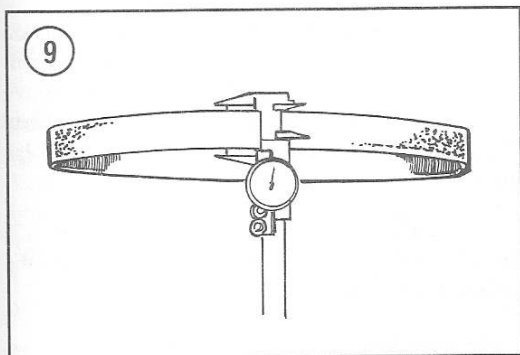
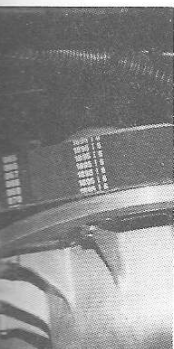
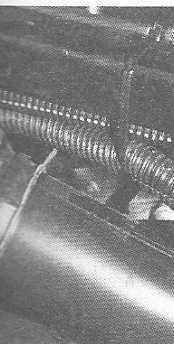
The drive belt transmits power from the drive pulley to the driven pulley. The belt provides a vital link in the operation and performance of the ATV. To insure top performance, the drive pulley, drive belt and driven pulley must be matched to each other and to the vehicle model. The correct size drive belt must be installed, because belt width and length are critical to proper operation. Belt wear affects clutch operation and shifting characteristics. Since normal wear changes the width of the belt, it is important to check the belt frequently and adjust the clutch as described in this chapter. See **Table 1** for the width of a new drive belt.

With general use, there is no specific mileage or time limit on belt life. Belt life is directly related to maintenance and the type of operation. The belt should be inspected at the intervals listed in Chapter Three. Early belt failure is abnormal and the cause should be determined to prevent subsequent damage. For proper belt cooling, it is important for all of the covers to be installed and joints (**Figure 5**) sealed as described in Chapter Seven.

### Removal/Installation

1. Remove the outer cover as described in Chapter Seven.
2. Check the drive belt for manufacturers markings (**Figure 6**) so that during installation it will run in the correct direction. If the belt is not marked, draw





an arrow on the belt facing forward or install a new belt.

3. Push against the inner sheave of the driven pulley (Figure 7) and rotate it clockwise to separate the pulley halves. Then roll the belt out of the pulleys (Figure 8).

4. Inspect the drive belt as described in this chapter.

5. Perform the *Drive Belt Alignment* as described in this chapter.

6. Reverse Steps 1-3 and install the drive belt. If installing the original belt, make sure to install it so that the manufacturer's marks on the belt (or those made before removal) faces in the same direction (forward). When installing a new belt, install it so that you can read the belt identification marks while standing on the left-hand side of the machine as shown in Figure 6.

### Inspection

Inspect the drive belt weekly or every 150 miles (240 km) of operation.

1. Remove the drive belt as described in this chapter.
2. Measure the width of the drive belt at its widest point (Figure 9). Replace the belt if the width is less than the wear limit listed in Table 1.
3. Visually inspect the belt for the following conditions:
  - a. *Frayed edge*—Check the sides of the belt for a frayed edge cord (Figure 10). This indicates drive belt misalignment. Drive belt misalignment can be caused by incorrect pulley alignment and loose engine mounting bolts.
  - b. *Worn narrow in one section*—Examine the belt for a section that is worn narrower in one section (Figure 11). This condition is caused by excessive belt slippage probably due to engine idle speed adjusted too fast.
  - c. *Belt disintegration*—Drive belt disintegration (Figure 12) is caused by severe belt wear or misalignment. Disintegration can also be caused by the use of an incorrect belt.
  - d. *Sheared cogs*—Sheared cogs as shown in Figure 13 are usually caused by violent drive pulley engagement. This is an indication of a defective or improperly installed drive pulley.
4. Replace a worn or damaged belt immediately. It is a good idea to always have a spare belt available for an emergency.

### Drive Belt Deflection

Perform this procedure whenever a new drive belt is installed.

1. Check drive belt alignment as described in this chapter.
2. Position a straight edge across the top of the drive belt.
3. Press the drive belt down in the center and measure the deflection as shown in **Figure 14**. Belt deflection should be within specifications in **Table 1**.
4. If deflection is incorrect, disassemble the driven pulley as described in this chapter, then add or remove shims (**Figure 15**) as necessary. Observe the following.
  - a. To tighten belt tension, remove some thickness from shims (**Figure 15**).
  - b. To loosen belt tension, add thickness to shims (**Figure 15**).

#### NOTE

Always leave at least one shim (**Figure 15**) between the inner and outer sheaves of the driven pulley. If the deflection cannot be set correctly without removing the last shim, check the pulley center-to-center distance and the belt width.

- c. After adjusting belt deflection, rotate driven pulley to help seat the belt in the pulley grooves. Always recheck belt deflection after making any change.

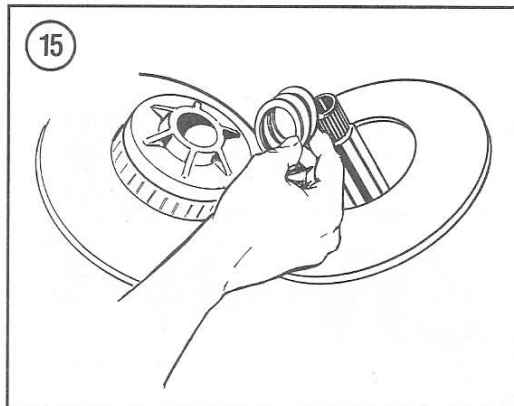
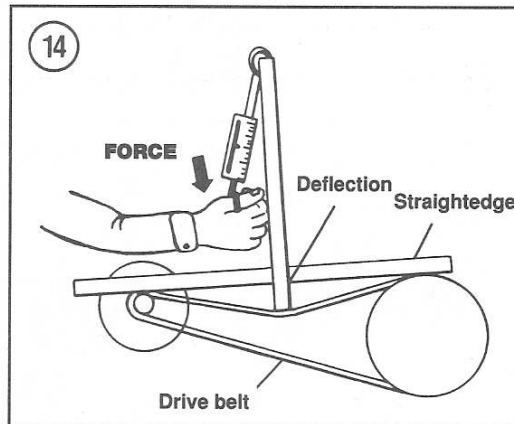
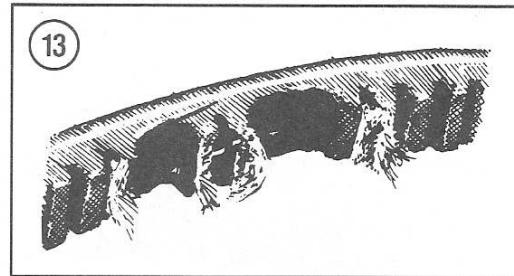
### Drive Belt Alignment

The center-to-center distance (A, **Figure 16**) from the drive pulley to the driven pulley, alignment of the pulleys (**Figure 17**) and the offset of the pulleys (**Figure 18**) must be correctly maintained for good performance and long belt life. Refer to **Table 1** for the recommended pulley center-to-center distance.

Correct center-to-center distance ensures correct belt tension and reduction ratio. If the center-to-center distance (A, **Figure 16**) is too short (or the belt is too long), the shift ratio will be too short. The proper size belt will not engage until it is too fast in the groove of the drive pulley. The engine speed will be too high when it engages, but the reduction ratio will not be high enough to easily start moving the vehicle.

If the centers of the pulleys (A, **Figure 16**) are too far apart (or the belt is too short), the drive belt will be pulled down too deep in the driven pulley groove too soon. The machine will not pull strongly because the pulleys are shifting too quickly towards the 1:1 ratio.

If the pulleys are not properly aligned (**Figure 17**) or if the pulley offset is incorrect (**Figure 18**), the belt will wear out prematurely.



1. Remove the drive belt.

2. Measure the distance between the pulley centers. If the specification lists a range, use the transmission mounting bolts and recheck.

3A. If a Polaris (Part No. 2870654) is available, use it to check alignment as follows:

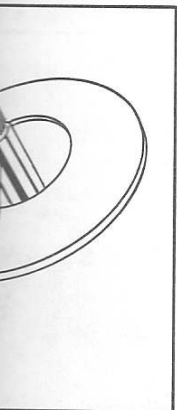
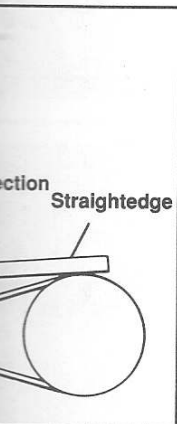
- a. Place the offset gauge between the pulley centers.
- b. Clutch alignment is correct if the edge of the gauge (1/8 in.) clears the pulley as shown.
- c. If alignment is incorrect, adjust the pulley as follows:

3B. If the Polaris gauge is not available, check the alignment as follows:

16

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1. Remove the drive belt as described in this chapter.

2. Measure the distance (A, **Figure 16**) between the pulley centers. If the distance is different from the specification listed in **Table 1**, check the engine and transmission mounting bolts. If loose, tighten the bolts and recheck pulley center-to-center distance.

3A. If a Polaris offset alignment bar (part No. 2870654) is available, check the pulley offset and alignment as follows:

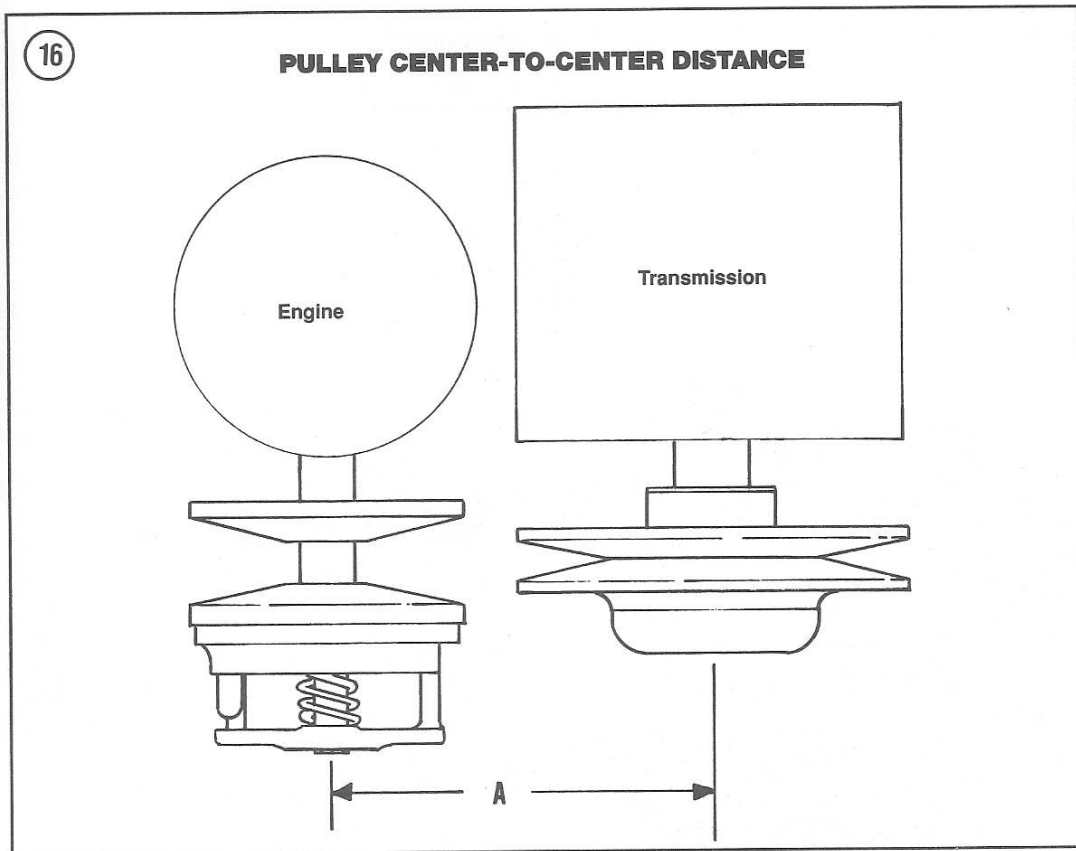
- Place the offset/alignment bar across the drive and driven pulleys as shown in **Figure 17**.
- Clutch alignment is correct when the bar fits easily over the drive pulley, contacts the rear edge of the driven pulley and has 3.2 mm (1/8 in.) clearance at the front edge of the driven pulley as shown at A, **Figure 17**.
- If alignment is incorrect, proceed to Step 4.

3B. If the Polaris alignment bar is *not* available, check the alignment as follows:

- Place a straightedge across the drive pulley making sure that it contacts the rim at both the front and rear of the pulley. See **Figure 18**.
  - Measure the distance between the front and rear edges of the driven pulley and the straightedge.
  - The clearance between the front of the pulley (A, **Figure 18**) and the straightedge should be 3.2 mm (1/8 in.) more than at the rear of the pulley (B, **Figure 18**).
  - If alignment is incorrect, proceed to Step 4.
4. *Pulley Alignment*—If alignment is not correct, proceed as follows to change the alignment.

#### NOTE

*Small corrections in the adjustment may be made by adding or removing washers between the frame and the front, lower left engine mount. Add a washer to increase clearance at A, **Figure 17** or A,*



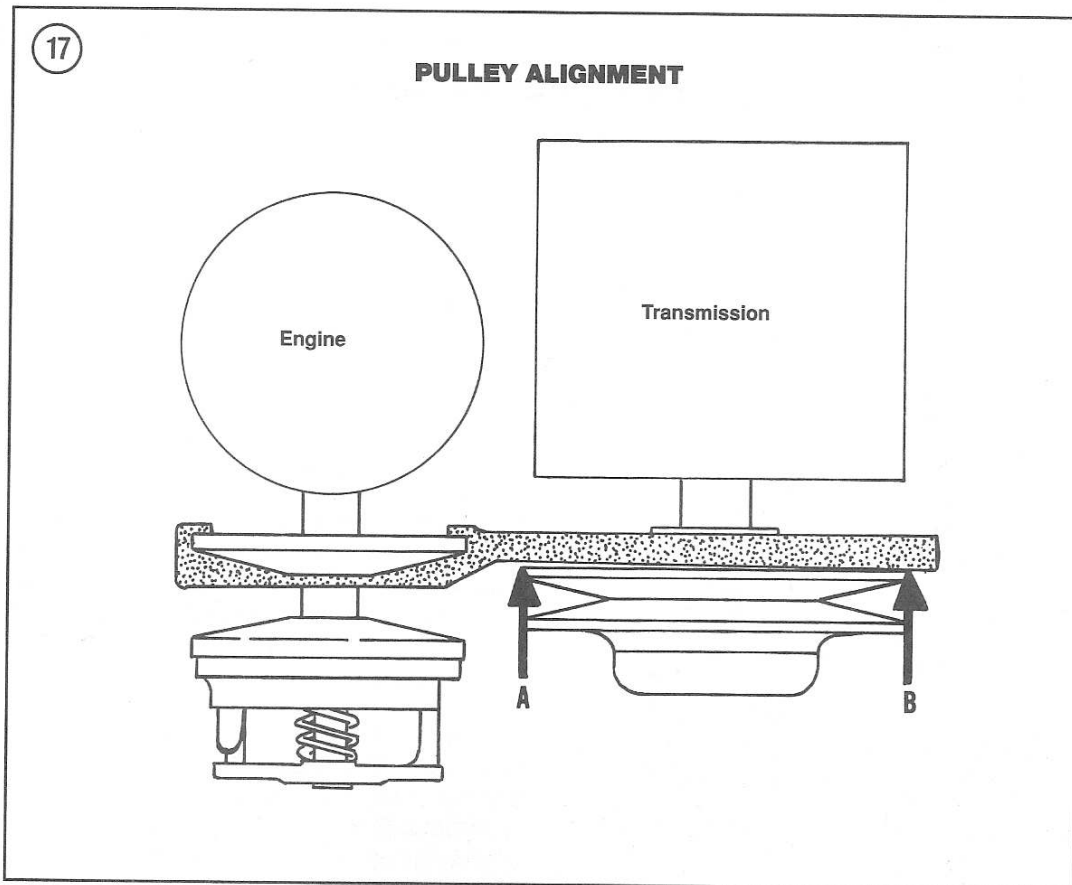
**Figure 18.** If there are washers between the engine mount and the frame, they can be removed to decrease the clearance at A, **Figure 17** or A, **Figure 18**. The normal adjustment procedure should be followed for large adjustments. Be sure that the bolts are tight before checking or changing the adjustment.

- Remove the drive and driven pulleys as described in this chapter.
- Remove the inner clutch cover as described in this chapter.
- Loosen the upper and lower mounts at the front of the engine.
- Loosen the slotted rear mount (**Figure 19**).
- Adjust the position of the engine as necessary to align the pulleys correctly, then tighten the engine mount bolts.

- Temporarily install the pulleys, then refer to Step 3A or 3B to recheck alignment before installing the inner cover.
- Check the pulley offset using the Polaris offset alignment bar (part No. 2870654) as described in Step 5.

**5. Pulley Offset**—To check pulley offset, place the Polaris offset/alignment bar (part No. 2870654) across the drive and driven pulleys as shown in **Figure 17**. Offset is correct if the rear of the tool just contacts the rear of the driven pulley inner half (B, **Figure 17**) and a 1.6-3.2 mm (1/16 to 1/8 in.) gap is present at the front of the pulley inner half (A, **Figure 17**). To adjust offset, remove the driven pulley assembly, and add or remove shims (**Figure 20**).

6. When the offset is correct and the pulleys are properly aligned, reinstall the inner cover as described in this chapter.

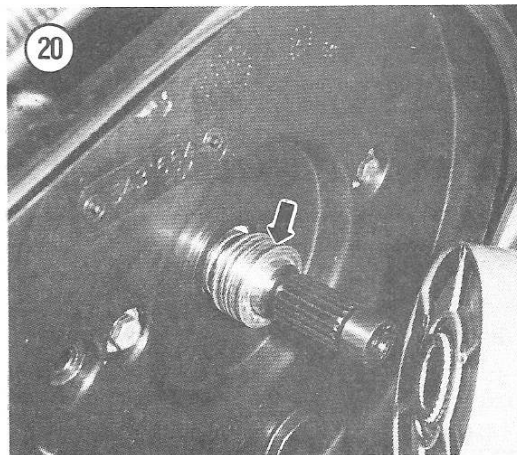
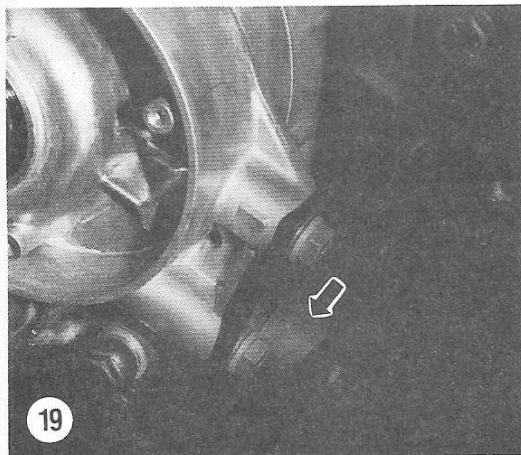
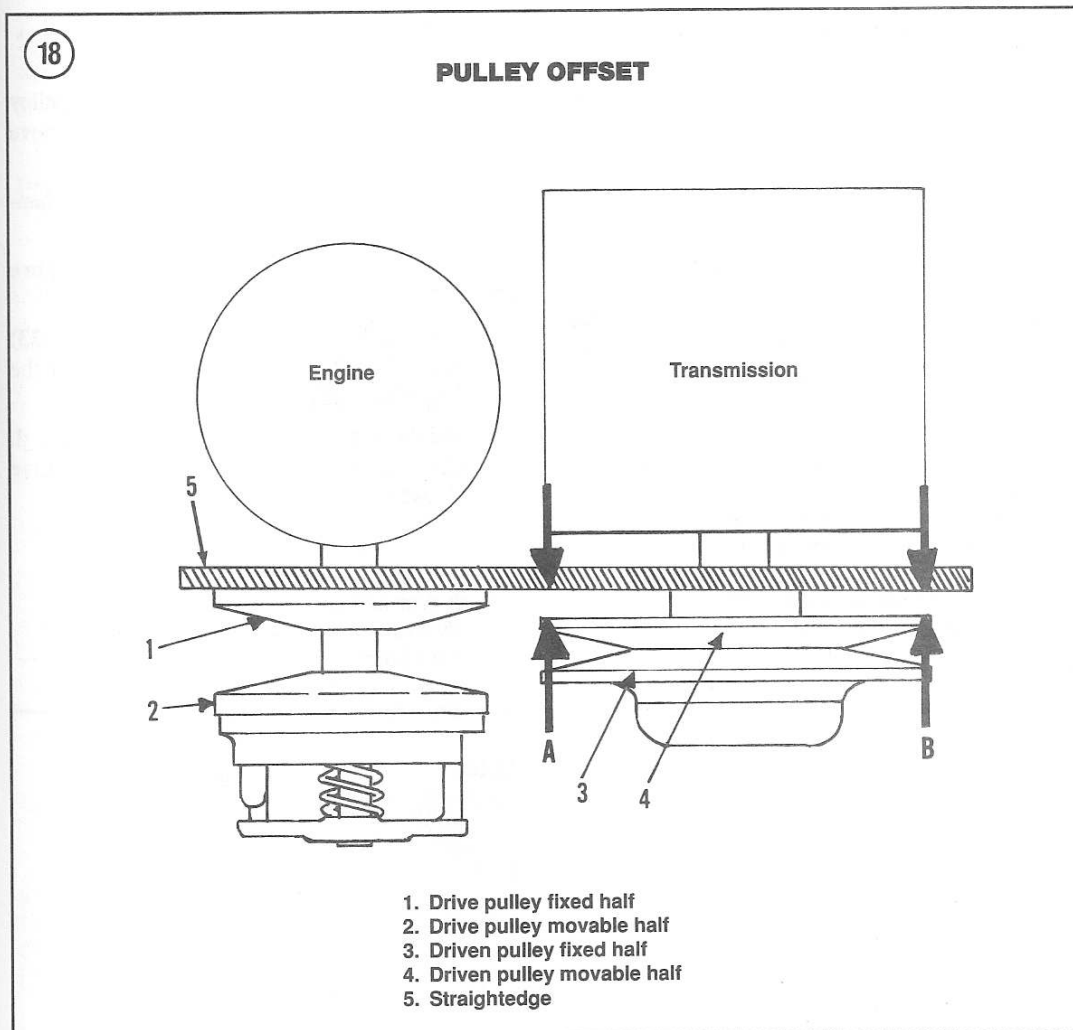


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7. Install the drive and driven pulleys as described in this chapter.
8. Install the drive belt and check deflection as described in this chapter.
9. Install the outer cover. Be sure that the cover is properly sealed.

### DRIVE PULLEY SERVICE

The drive pulley is mounted on the left end of the engine crankshaft. Refer to **Figure 21** when performing procedures in this section.

#### WARNING

*The drive pulley is under spring pressure. Attempting to disassemble or reassemble the drive pulley without the use of the specified special tools may cause severe personal damage. If you do not have access to the necessary tools, have the service performed by a dealer or other ATV mechanic.*

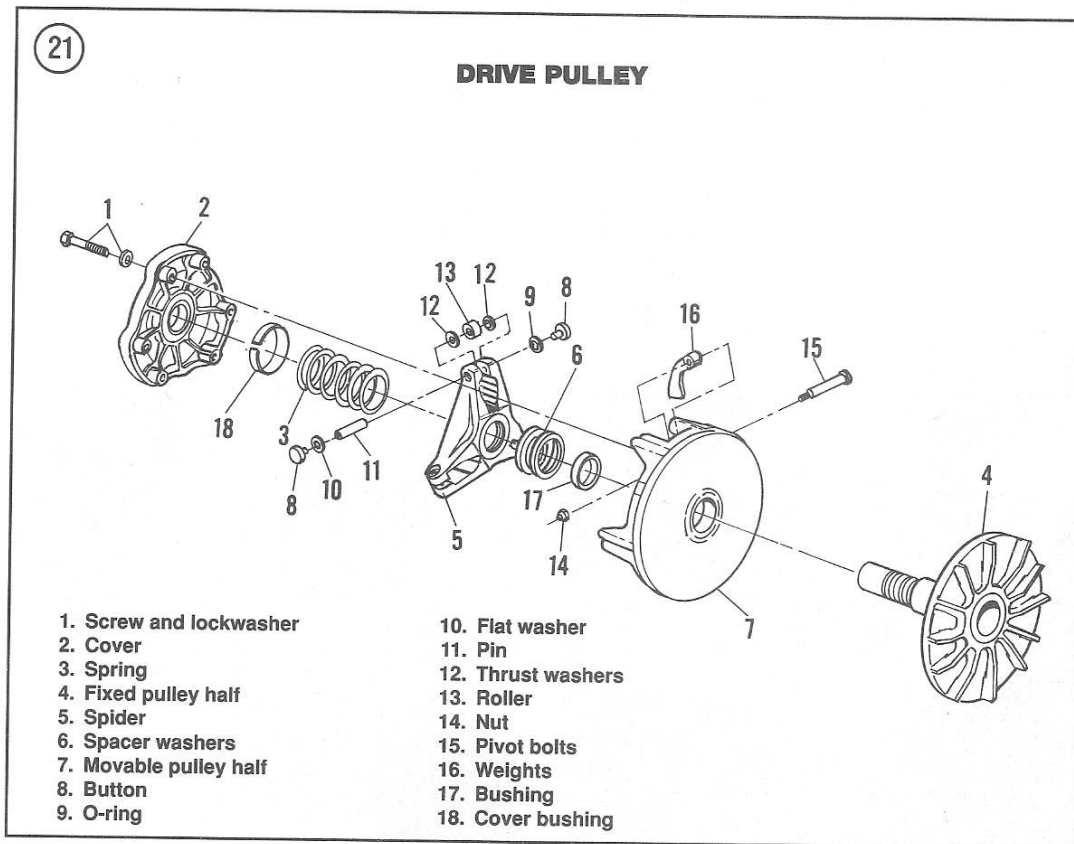
#### Removal

A special clutch holding tool and the drive pulley puller (part No. 2870506) should be used to remove the drive pulley.

1. Remove the drive belt as described in this chapter.
2. Loosen and remove the bolt and washer (**Figure 22**).
3. Use the special clutch holding tool (A, **Figure 23**) or equivalent to hold the drive pulley while using the puller (B, **Figure 23**) in Step 4.
4. Install the special puller (B, **Figure 23**) through the pulley. Tighten the puller screw to break the drive pulley loose from the crankshaft taper.

#### NOTE

*It may be necessary to rap sharply on the head of the puller to shock the drive pulley loose from the crankshaft.*



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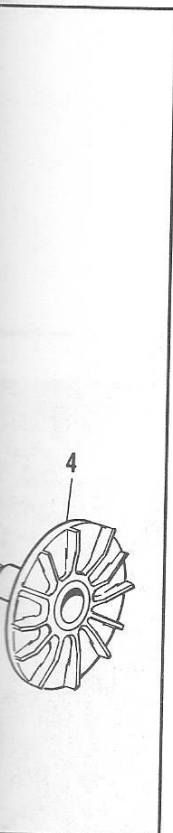
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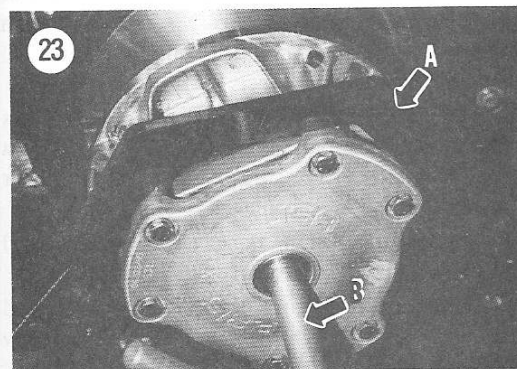
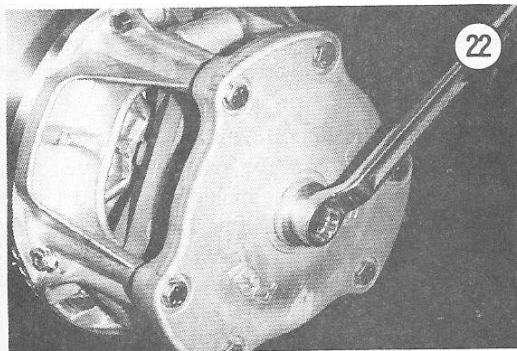


- When the drive pulley is loose, remove the puller screw.
- Remove the drive pulley assembly.

### Disassembly

#### WARNING

Precise balance is critical to the operating safety of the drive pulley and it is important that nothing be done to disturb the balance of the unit. The manufacturer suggests that all disassembly and service be performed by an authorized Polaris dealer who is trained and equipped to disassemble, inspect and assemble the drive pulley. Inspect the drive pulley assembly before beginning to disassemble it to determine if any of the major components requires replacement. Install a new complete service drive clutch if the cover, fixed pulley half, spider or movable pulley half (2, 4, 5 or 7, Figure 21) is damaged. Never replace parts with similar used parts from another assembly.



- Before disassembling, use a felt tip permanent marker to mark the cover, spider, movable sheave and fixed sheave. The drive pulley (Figure 21) is balanced as an assembly and should be assembled in the same alignment as it was originally.
- Loosen screws (1, Figure 21) evenly in a crossing pattern until all six are removed.
- Lift cover (2, Figure 21) from the fixed pulley.
- Remove the spring (3, Figure 21).

#### CAUTION

The remainder of disassembly should not be attempted unless the special holding fixture (part No. 2870547) and spider removal tool (part No. 2870341) are available. The spider is assembled very tightly and parts will probably be damaged if attempts are made to disassemble it without using the special tools. If these tools are not available, have a Polaris dealer disassemble, inspect and reassemble the drive pulley.

- Attach the drive pulley fixed sheave (4, Figure 21) to the holding fixture.
- Loosen the spider (5, Figure 21) using the special tool. Turn the spider counterclockwise to remove.
- Remove all of the spacer washers (6, Figure 21) located between the spider and the movable sheave (7, Figure 21). Separate and identify these spacer washers so that the same washers (or same thickness) can be reinstalled when assembling.

#### NOTE

Several different types of buttons (8, Figure 21) have been used. If the buttons are replaced, make sure that the correct buttons are installed for your model. On some models, an O-ring is installed behind the driving side (9, Figure 21) and a flat rubber washer (10, Figure 21) is installed behind the trailing side buttons. Premature wear and excessive noise will occur if the O-ring and flat washer are improperly assembled.

- Remove the buttons, O-rings and washers (8, 9 and 10, Figure 21).
- If not already separated, separate the pulley fixed sheave (4, Figure 21) from the movable sheave (7, Figure 21).



**NOTE**

Use the special tool (part No. 2870910) or equivalent to remove the pins (11, **Figure 21**). Be careful not to damage the rollers, washers or the pins when removing or installing.

10. Remove one pin (11, **Figure 21**), then lift the two thrust washers and the roller (12 and 13, **Figure 21**) from the spider (5, **Figure 21**). Keep the pin, thrust washers and roller together as a set if they are to be reinstalled. Do not mix rollers and pins from the other two locations.
11. Repeat Step 9 for the other two pins to remove the remaining thrust washers and rollers.
12. Remove nuts and bolts (14 and 15, **Figure 21**) to remove the weights.

**Inspection**

1. Clean all parts thoroughly.
2. Remove all Loctite residue from the threads of all screws.
3. Check the pulley sheaves (4 and 7, **Figure 21**) for cracks or damage.
4. Check the drive belt surfaces of the pulley sheaves (4 and 7, **Figure 21**) for rubber or rust buildup. For proper operation, the surfaces must be *clean*. Remove debris with a fine grade steel wool. Clean with a piece of lint-free cloth.
5. Check the drive pulley spring (3, **Figure 21**) for cracks or distortion. The springs are color coded for correct application. Refer to **Table 2** for original spring application for your model. If the spring appears okay, measure its free length and compare with the free length specification listed in **Table 3**. Replace the spring with one of the same color code.
6. Check the weights (16, **Figure 21**) for:
  - a. Outer surface of the weights for wear, dents or galling.
  - b. Check the pivot bore for scoring or galling.
  - c. Check the complete surface of the weights carefully for cracks, chips or broken ends. Damage to the weights is often an indication that the pin and roller (11 and 13, **Figure 21**) are also damaged.

**WARNING**

Refer to **Figure 24** for the shape and gram weight of the drive pulley weights. It is important that all three weights are

exactly the same. Do not change the shape of the weights without a thorough understanding of PVT operation. Components of the drive and driven pulleys must be carefully matched for proper operation. Before changing the weights in the drive pulley, consult with your Polaris dealer.

7. Install new weights as a set if any are damaged. Weights are marked to indicate their original size and **Table 4** lists original application. It may be necessary to install lighter weights when operating at higher altitudes as indicated in **Table 4**.

**NOTE**

Special tools are required to install the bushings inspected in Steps 8 and 9. If you do not have access to the special tools, have the bushing replaced by a Polaris dealer.

8. Inspect the bushing (17, **Figure 21**) located in the movable sheave (7, **Figure 21**). The bushing is coated with Teflon and a new bushing should be installed if more brass is showing than Teflon. Do not remove the old bushing unless replacement is necessary. The bushing for 1985 and 1986 models is retained in position by a steel retainer that is installed after the bushing.
9. Inspect the bushing (18, **Figure 21**) located in the cover (2, **Figure 21**). The bushing is coated with Teflon and a new bushing should be installed if more brass is showing than Teflon. Do not remove the bushing unless replacement is necessary. The bushing for 1987 and later models is a steel backed split bushing.
10. Check for clearance between the buttons (8, **Figure 21**) installed on the spider and the towers of the movable sheave (7, **Figure 21**). The installation of new O-rings and flat rings (9 and 10, **Figure 21**) should remove all clearance.
11. Check the surfaces of the movable pulley towers contacted by the buttons (8, **Figure 21**). Install a new, complete driven pulley assembly if the spider or movable sheave is damaged.
12. Inspect the bushing contact areas of the fixed sheave (4, **Figure 21**) for wear, nicks or scratches.
13. If rollers (13, **Figure 21**) do not roll freely and smoothly on the pins (11, **Figure 21**), install new pins and rollers.

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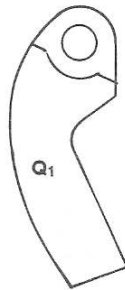
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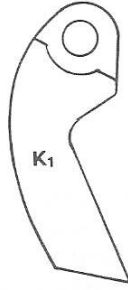
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24

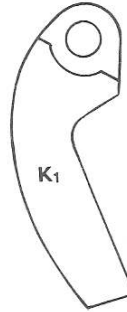
**DRIVE PULLEY WEIGHTS  
(PART NUMBERS AND WEIGHTS IN GRAMS)**



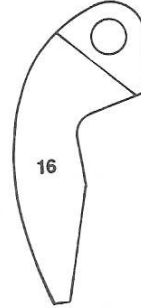
5630295  
35.5 g



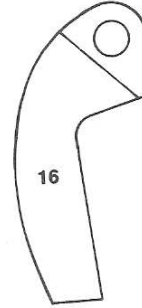
5630292  
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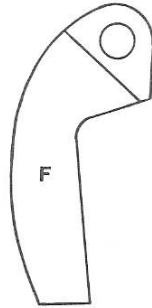
5630144  
39 g



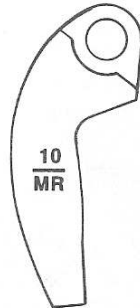
5630280  
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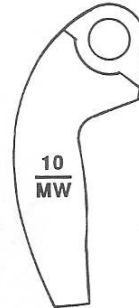
5630279  
43 g



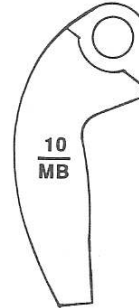
5630515  
45 g  
(high-alt.)



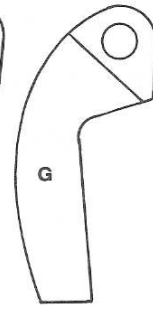
1321530  
44 g  
(high-alt.)



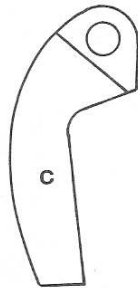
1321527  
46 g  
(high-alt.)



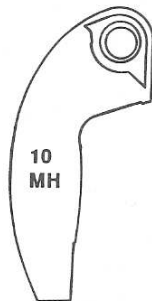
1321529  
47.5 g  
(high-alt.)



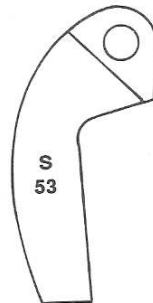
5630514  
48 g



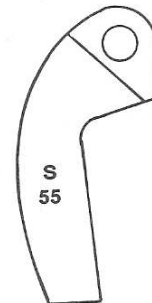
5630418  
50 g  
(high-alt.)



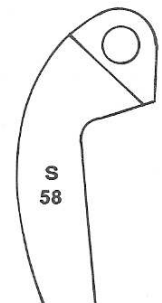
5630513  
50.5 g



5630095  
53 g



5630509  
55 g



5630581  
58 g

14. If there is any doubt as to the condition of any part, replace it with a new one.

### Reassembly

Refer to **Figure 21** for this procedure.

#### CAUTION

*The drive pulley is assembled dry. Do not lubricate any component.*

1. Assemble the rollers (13, **Figure 21**), thrust washers (12) and pins (11) in the spider (15). Make sure that the rollers turn freely on the pins after assembling.
2. Assemble the buttons (8, **Figure 21**), O-ring (9) and flat rubber rings (10). The O-rings *must* be located on the thrust side as shown at 9, **Figure 21**.
3. Assemble the movable sheave (7, **Figure 21**) over the fixed sheave (4, **Figure 21**).
4. Install the same spacer washers (6, **Figure 21**) as were originally installed. Install the washers over the shaft of the fixed sheave before installing the spider.
5. Align the previously affixed mark on the spider with the mark on the movable sheave, then thread the spider onto the fixed sheave.

#### CAUTION

*Make sure that the spacer washers (6, **Figure 21**) remain in the recess of the spider while tightening. Misalignment will disturb the unit's balance.*

6. Tighten the spider to the torque listed in **Table 5**.
7. Assemble the weights (16, **Figure 21**) and pivot screws (15) in the movable sheave. The weights should move easily on the pivot screws after assembling.
8. Install the clutch spring (3, **Figure 21**).
9. Align the previously affixed mark on the cover (2, **Figure 21**) with marks on spider and movable pulley, then install the cover. Tighten the screws (1, **Figure 21**) retaining the cover evenly, in a crossing pattern until they all reach the final torque listed in **Table 5**.

### Installation

#### CAUTION

*Do not apply antiseize lubricant or any other lubricant onto the crankshaft taper when installing the drive pulley assembly.*

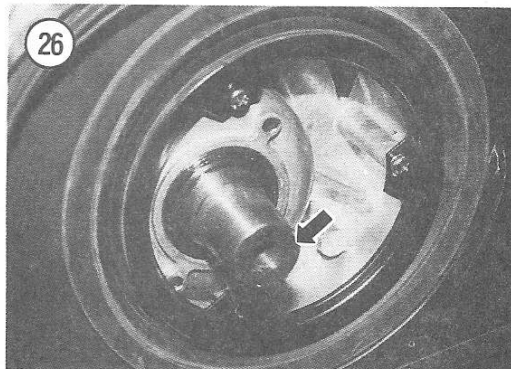
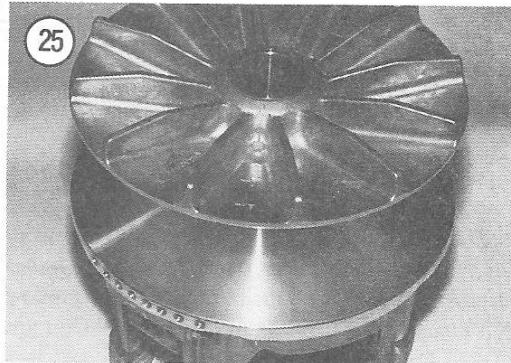
1. Clean the crankshaft taper with lacquer thinner or electrical contact cleaner.
2. Slide the drive pulley (**Figure 25**) onto the crankshaft (**Figure 26**).
3. Install the drive pulley retaining screw and lock-washer. Tighten the retaining screw to the torque listed in **Table 5**.
4. Install the drive belt as described in this chapter.
5. Check the outer cover seals and install as described in Chapter Three.

### DRIVEN PULLEY SERVICE

The driven pulley is mounted onto the left-hand side of the transmission input shaft.

#### Removal

1. Remove the drive belt as described in this chapter.
2. Loosen and remove the driven pulley retaining screw (**Figure 27**).
3. Slide the driven pulley from the splined shaft.



*The shim is  
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the pulley  
shims unless  
Be sure to  
reinstall*

#### Installation

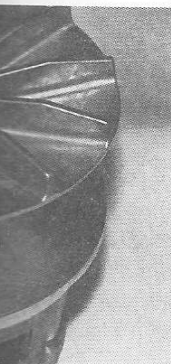
1. Make sure the  
the transmission i
2. Clean the splin  
and apply a light  
the splines.
3. Slide the drive  
master splines of
4. Install the screw  
torque listed in T
5. Check the pull  
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h lacquer thinner or  
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## SERVICE

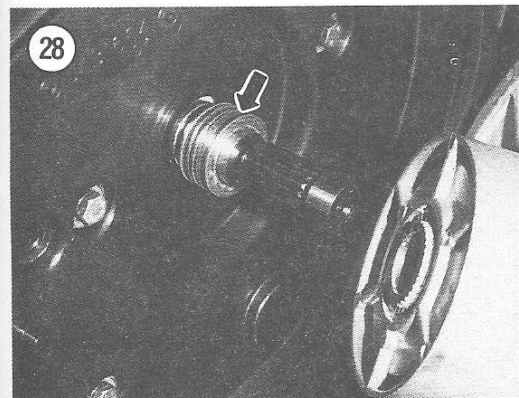
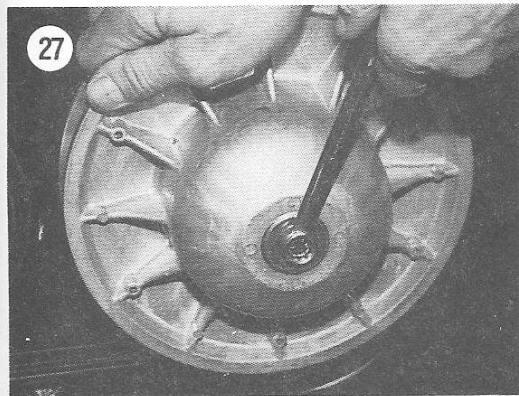
onto the left-hand  
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 n pulley retaining  
 e splined shaft.



**NOTE**  
*The shim(s) (Figure 28) installed behind the driven pulley are used to adjust the pulley offset. Do not remove the shims unless required for other service. Be sure to install the same shims before reinstalling the driven pulley.*

## Installation

1. Make sure the shims (Figure 28) are installed on the transmission input shaft.
2. Clean the splines on the transmission input shaft and apply a light film of low temperature grease to the splines.
3. Slide the driven pulley onto the shaft, aligning the master splines of the shaft and pulley.
4. Install the screw retaining the driven pulley to the torque listed in Table 5.
5. Check the pulley offset as described in this chapter.



6. Install the drive belt as described in this chapter.
7. Check the drive belt deflection as described in this chapter.
8. Check the outer cover seals and install as described in Chapter Three.

## Disassembly

1. Before disassembling driven pulley, locate the end of the spring in one of the two holes in helix (2, Figure 29). Mark the hole for identification of original setting.

### WARNING

*Wear eye protection and hold the helix cam securely when removing the snap ring in Step 2.*

2. Set the driven pulley on a workbench with the outer sheave of the pulley down, push the helix (2, Figure 29) down and remove the snap ring (3, Figure 29). Slowly release the helix, allowing it to come up and turn.
3. Carefully remove the helix cam (2, Figure 29) from the spring, but leave the spring in the pulley.
4. Note the location of the end of the spring in the pulley movable half, then remove the spring. Mark the spring location in the movable half for identification of original setting. Suggested initial setting for new springs is listed in Table 4.

### NOTE

*The spacer washers (9, Figure 29) located between the halves of the sheaves are used to adjust belt deflection. Do not lose or damage these spacer washers. At least one spacer should always be located between the sheaves.*

5. Slide the movable pulley half (7, Figure 29) from the fixed sheave (8, Figure 29).
6. The wear buttons (5, Figure 29) can be removed after removing the Torx screws (6, Figure 29).

## Inspection

1. Clean all parts thoroughly.
2. Check the pulley halves (7 and 8, Figure 29) for cracks or damage.
4. Check the drive belt surfaces of the pulley halves (7 and 8, Figure 29) for rubber or rust buildup. For proper operation, the surfaces must be *clean*. Re-

move debris with a fine grade steel wool. Clean with a piece of lint-free cloth.

**NOTE**

*Weakening of the driven pulley spring may be metal fatigue resulting from the constant twisting action. The driven pulley will open quicker than it should if the spring has weakened. This condition can be noticed when riding up steep grades or with a heavy load; the vehicle will be slower and have much less pulling power than normal. It is difficult to gauge spring wear, so you may choose to replace the spring when the unit is disassembled for service.*

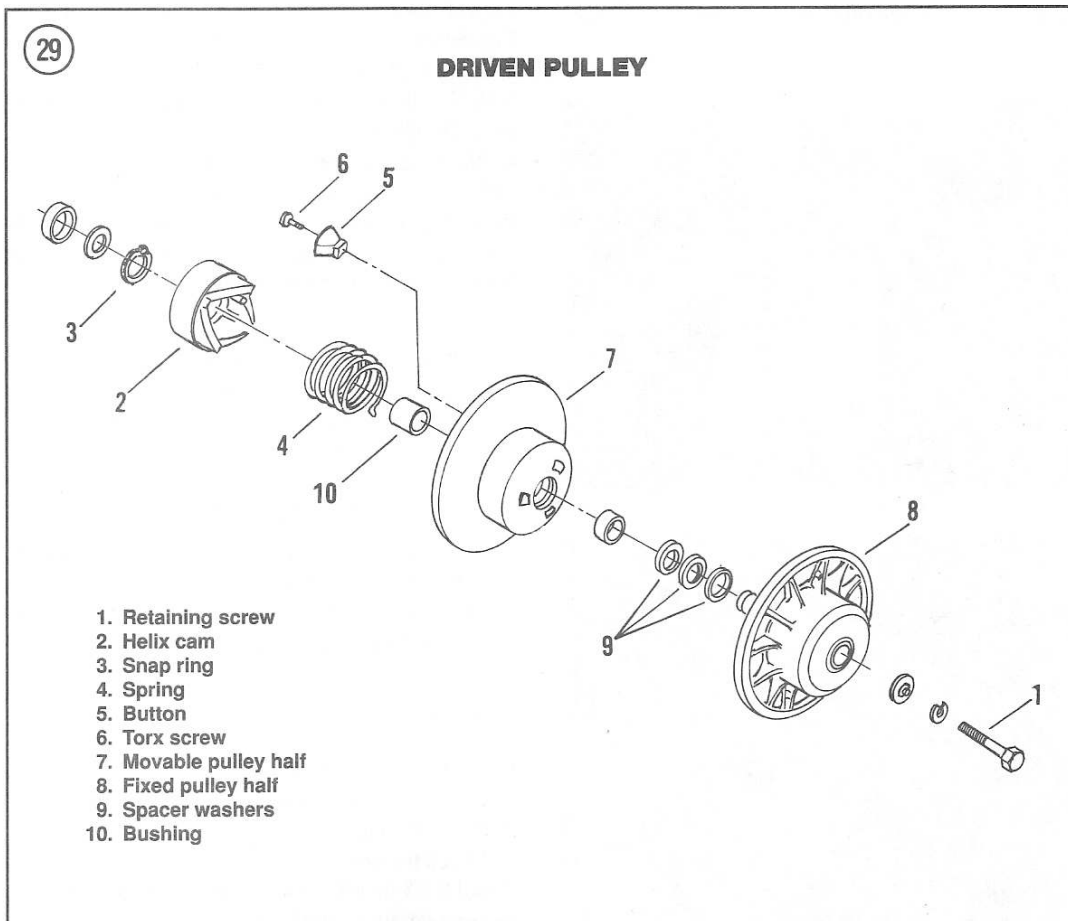
5. Check the driven pulley spring (4, **Figure 29**) for cracks or distortion. Check the alignment of the ends of the spring as shown in **Figure 30**. The ends of the

spring are aligned when new. Replace the spring if necessary.

6. Check the wear buttons (5, **Figure 29**) for wear or damage. The wear buttons provide a sliding surface between the helix cam (2, **Figure 29**) and the movable pulley half (7, **Figure 29**). The buttons rub against aluminum and wear is usually minimal. The wear buttons can be reversed if the original wear surface is worn. When both sides are worn, install new wear buttons as a set.

7. Check the cam ramps on the helix (2, **Figure 29**) for scoring, gouging or other signs of damage. Smooth the ramp area with a #400 wet-or-dry sandpaper. If the ramp area is severely damaged, replace the helix.

8. Inspect the bushing (10, **Figure 29**) located in the movable sheave. The bushing is coated with Teflon and a new bushing should be installed if more brass



is showing that the  
unless replacement  
9. Inspect the  
pulley half (8, F  
scratches.

10. If there is any  
part, replace it with

**Assembly**

1. Place the fixed
- workbench so the
2. Install the spacer
- shaft. The spacer
- deflection and sev
- should always be
- sheaves.

**30**

**31**

replace the spring if

(**Figure 29**) for wear  
provide a sliding sur-  
(**Figure 29**) and the  
(**29**). The buttons rub  
usually minimal. The  
if the original wear  
es are worn, install

helix (**2, Figure 29**)  
signs of damage.  
00 wet-or-dry sand-  
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(**29**) located in the  
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is showing than Teflon. Do not remove the bushing unless replacement is necessary.

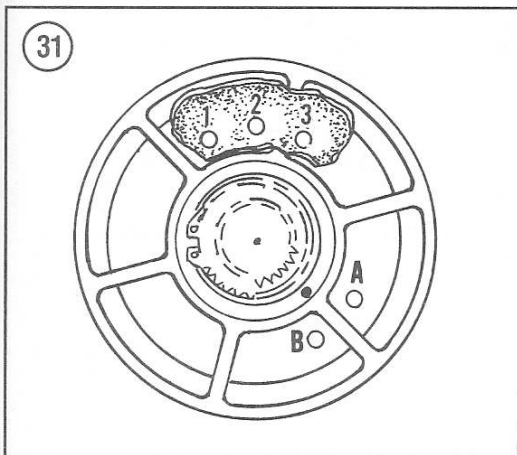
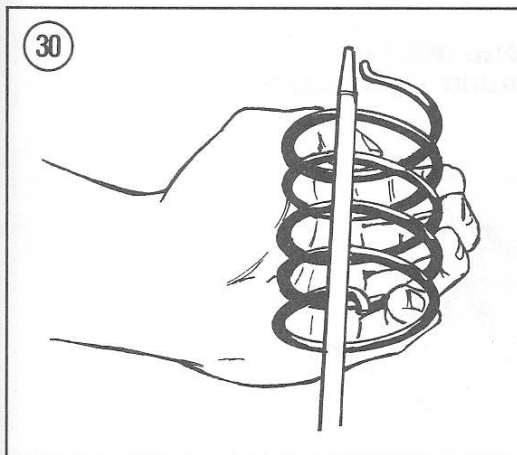
9. Inspect the bushing contact areas of the fixed pulley half (**8, Figure 29**) for wear, nicks or scratches.

10. If there is any doubt as to the condition of any part, replace it with a new one.

### Assembly

1. Place the fixed pulley half (**8, Figure 29**) on the workbench so the shaft faces up.

2. Install the spacer washers (**9, Figure 29**) over the shaft. The spacer washers are used to adjust belt deflection and several may be installed, but there should always be at least one spacer between the sheaves.



3. Install the movable pulley half (**7, Figure 29**) onto the fixed half so the belt surfaces face together.

### NOTE

*The positioning of the ends of the spring will determine the shifting pattern. The greatest amount of spring tension will cause the engine rpm to be higher during upshift and will cause the unit to downshift sooner when the load is increased, such as going up a hill. Less spring tension will upshift faster and downshift slower. The actual position of the spring ends may be different from those listed in **Table 4** to suit the driver's preference. This is especially true for a spring that has been in service for some time. The spring tension should also be increased for operation at high altitudes.*

4. Install the spring (**4, Figure 29**) with one end in the hole (**1, 2 or 3, Figure 31**) marked during disassembly. Refer to **Table 4** to determine which of the three holes in the pulley was used on original assembly. The first part No. in the *Clutch Spring Position* column is the suggested hole in the movable pulley.

5. Install the helix (**2, Figure 29**) with the end of the spring in the hole marked during disassembly. Refer to **Table 4** to determine which of the two holes was used on original assembly. The second part No. is the hole in the helix suggested for the spring.

6. Install the helix and preload the spring approximately 1/3 turn as follows:

- Align up the master splines of the helix (**2, Figure 29**) and the shaft and push the helix partly onto the spline.
- Twist the movable pulley half (**Figure 32**) counterclockwise approximately 1/3 turn (120°). The location of the cam surfaces on the helix and the buttons (**5, Figure 29**) will determine actual position.
- Push the helix down onto splines against spring pressure, then install the snap ring (**3, Figure 29**).
- Make sure the snap ring is completely seated in the pulley shaft groove.

### CLUTCH INNER COVER

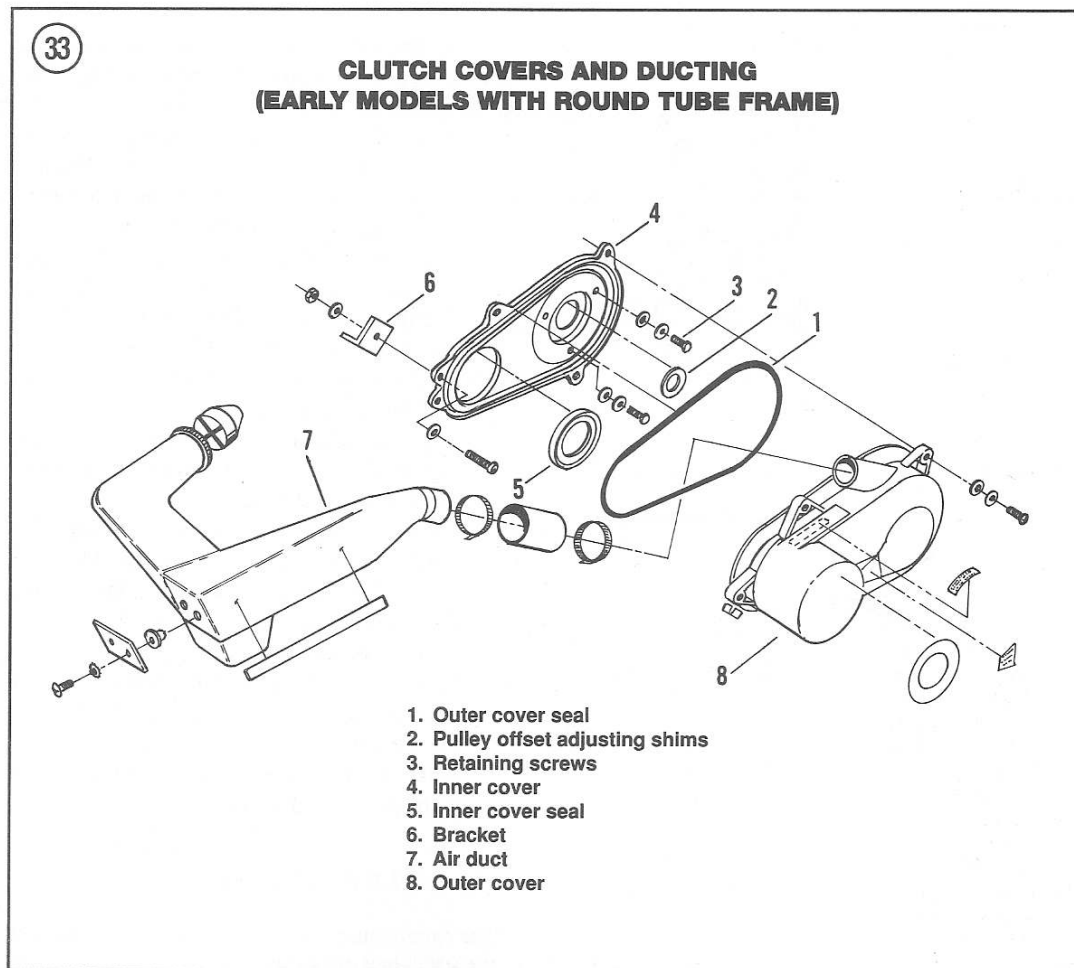
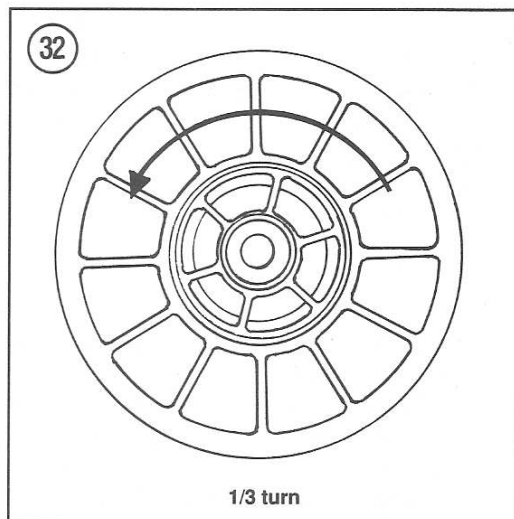
The clutch inner cover is an important component of the PVT (belt drive) cooling system. The belt and

other drive components can be quickly damaged by heat generated by normal operation if not properly cooled. Slippage caused by mud, water or oil entering the system can also quickly damage the drive system components. Refer to Chapter Seven for additional service to the system.

### Removal/Installation

The clutch inner cover, outer cover and ducts are shown in **Figure 33**, **Figure 34** and **Figure 35** typical of all models.

1. Remove the outer cover (A, **Figure 33**, **Figure 34** or **Figure 35**) as described in Chapter Seven.
2. Remove the drive belt as described in this chapter.



34

(MODELS WITH

1. Outer cover seal
2. Pulley offset adjusting shim
3. Retaining screws
4. Inner cover
5. Inner cover seal
6. Retainer
7. Bracket
8. Air duct
9. Outer cover
10. Air duct



35

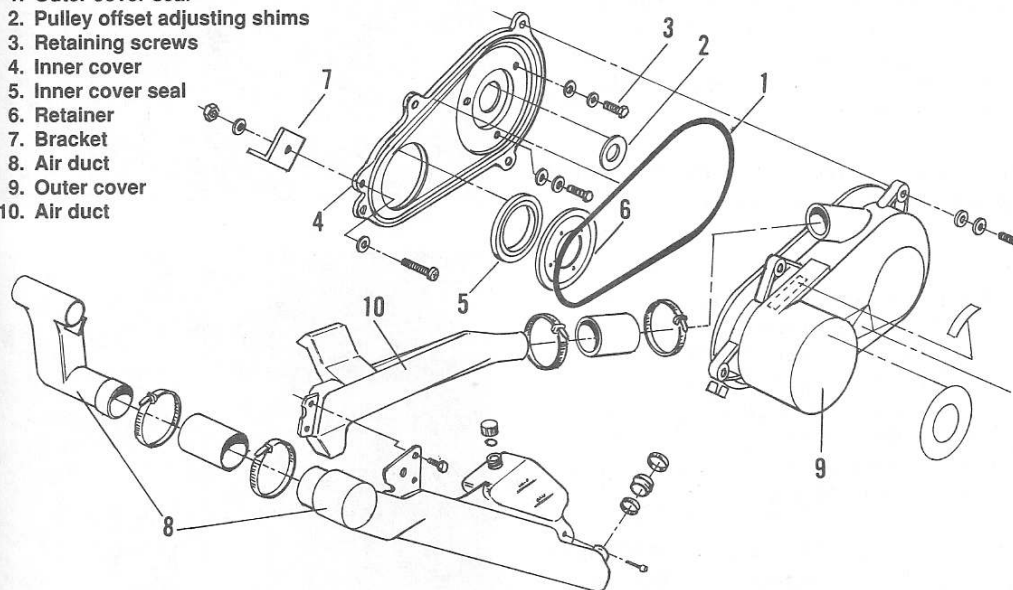


1. Outer cover seal
2. Pulley offset adjusting shim
3. Retaining screws
4. Inner cover
5. Inner cover seal
6. Retainer
7. O-ring
8. Spacer
9. Outlet air duct
10. Inlet air duct
11. Outer cover

34

### CLUTCH COVERS AND DUCTING (MODELS WITH SQUARE TUBE FRAMES EXCEPT MAGNUM AND SCRAMBLER)

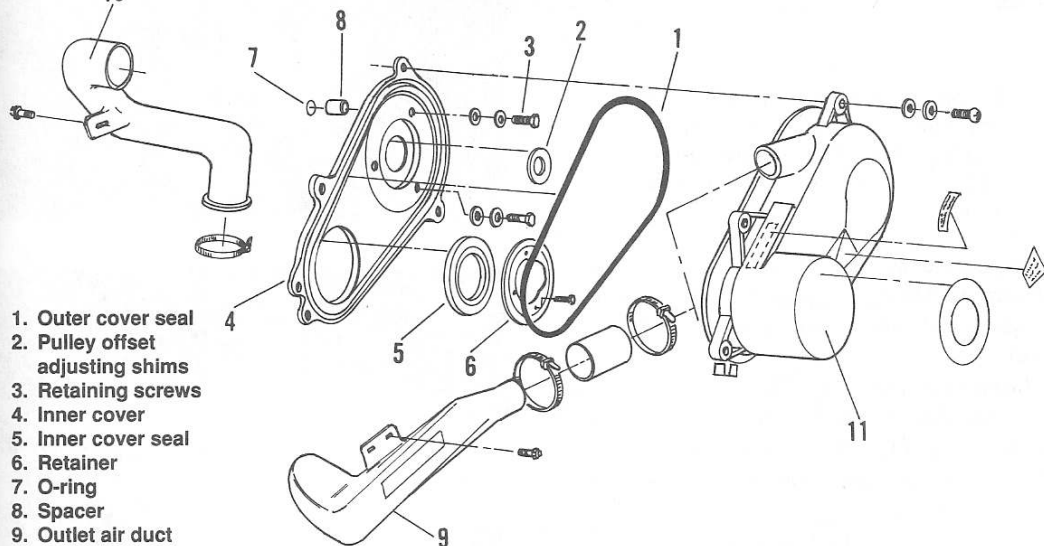
1. Outer cover seal
2. Pulley offset adjusting shims
3. Retaining screws
4. Inner cover
5. Inner cover seal
6. Retainer
7. Bracket
8. Air duct
9. Outer cover
10. Air duct



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### CLUTCH COVERS AND DUCTING (MAGNUM MODELS)

1. Outer cover seal
2. Pulley offset adjusting shims
3. Retaining screws
4. Inner cover
5. Inner cover seal
6. Retainer
7. O-ring
8. Spacer
9. Outlet air duct
10. Inlet air duct
11. Outer cover





- Remove the drive and driven pulleys as described in this chapter.

**NOTE**

Some models are not equipped with the retainer removed in Step 4. The screws attaching the inner cover vary and may be different from those shown in the illustrations.

- Remove the screws attaching the front retainer (**Figure 36**) on models so equipped.

**NOTE**

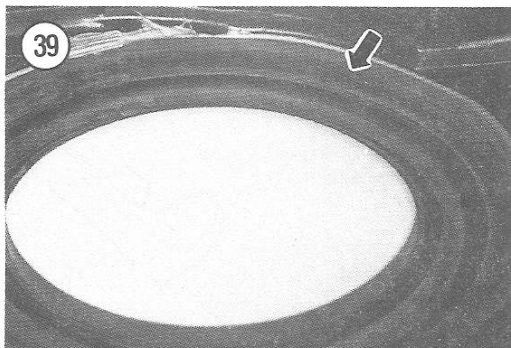
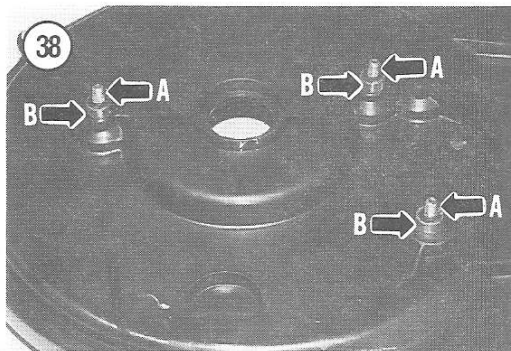
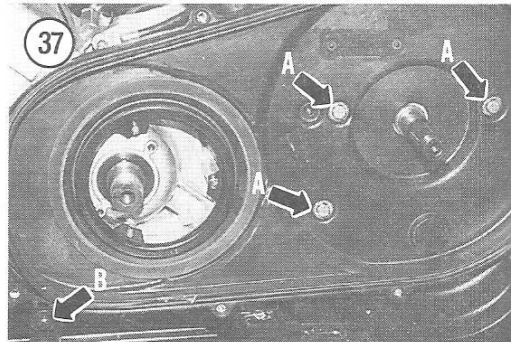
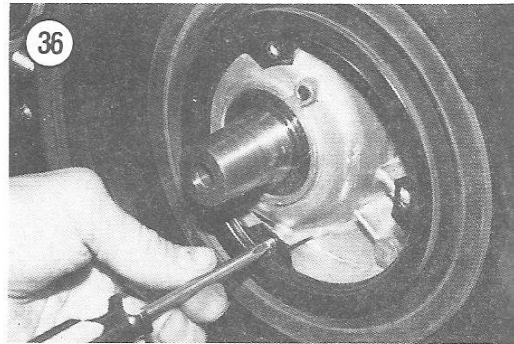
Screws (A, **Figure 37**) should be completely removed from the threads of the transmission housing, but do not lose the O-rings (A, **Figure 38**) and spacers (B). The O-rings (A, **Figure 38**) are used to hold the spacers (B) and bolts together to prevent their loss and to assist installation of the inner cover.

- Loosen the screws (A, **Figure 37**) attaching the inner cover to the transmission.
- Check for any other screws (B, **Figure 37**) or bolts attaching the inner cover to brackets (6, **Figure 33** or 7, **Figure 34**). Remove any additional attaching screws.
- Remove the inner cover after making sure all of the attaching screws are removed.

**NOTE**

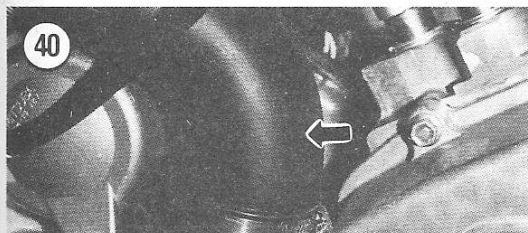
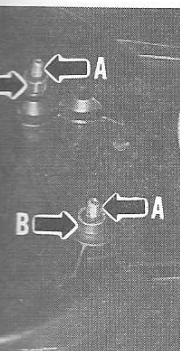
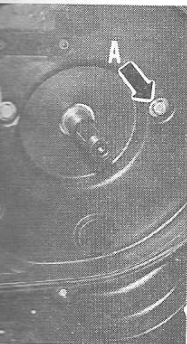
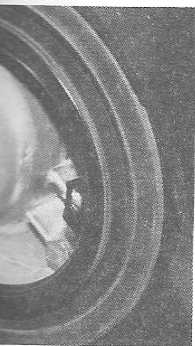
Proper sealing of the clutch cover is important to prevent the entrance of water and to properly direct the flow of fresh air for cooling the belt drive system.

- Inspect the inner cover and the seals (**Figure 39**) for damage. Make sure the front seal is attached to the cover with silicone sealer before installing the cover.
- Inspect the inlet ducting for proper sealing. See **Figure 40**. Repair or replace any loose, damaged or missing parts of the PVT cooling system.
- Position the inner cover and install the screws (A, **Figure 37**) loosely.
- Make sure that the front of the inner cover is properly located and install the retainer (6, **Figure 34** or 6, **Figure 35**), if so equipped.



Belt deflection  
Belt width  
New  
Wear limit  
Pulley center-to-

Model No.
1985 Scrambler W67 Trail Boss W67
1986 Scrambler W67 and Trail Boss
1987 Trail Boss W67 4 x 4 W67/127 Cyclone W67/127
1988 Trail Boss 2 x 4 4 x 4 W68/127 Trail Boss 250 R W68/127



12. Install and tighten any screws attaching the inner cover before tightening the screws (A, Figure 37) attaching the cover to the transmission housing.

13. Tighten the screws (A, Figure 37) to the torque listed in Table 5.

14. Complete assembly by reversing the removal procedure.

**Table 1 DRIVE BELT AND PULLEY SPECIFICATIONS**

	cm	in.
Belt deflection	2.9-3.2	1 1/8-1 1/4
Belt width		
New	3.02	1.188
Wear limit	2.86	1.125
Pulley center-to-center distance	24.9-25.9	9.81-10.19

**Table 2 OPERATING RPM AND DRIVE SPRING SPECIFICATIONS**

Model No.	Operating RPM	Drive pulley spring color
1985 Scrambler W857027 and Trail Boss W857527	5,800-6,200	Blue/green
1986 Scrambler W867027, Trail Boss W867527 and Trail Boss W867627	5,800-6,200	Blue/green
1987 Trail Boss W877527, 4 × 4 W878027, 4 × 4 W878127 and 4 × 4 W878327 Cyclone W877828	5,800-6,200 6,800-7,200	Blue/green Brown
1988 Trail Boss 2 × 4 W887527 and 4 × 4 W888127 Trail Boss 250 R/ES X888528 and W888528	5,800-6,200 6,400-6,800	Blue/green Yellow

(continued)

Table 2 OPERATING RPM AND DRIVE SPRING SPECIFICATIONS (continued)

Model No.	Operating RPM	Drive pulley spring color
1989		
All models	5,800-6,200	Blue/green
1990		
Trail Blazer W907221	5,800-6,200	Blue/green
Trail Boss 250 W908527, 2 × 4 W907527 and 4 × 4 W908127	5,800-6,200	Blue/green
Trail Boss 2 × 4-350L W907539 and 4 × 4-350L W908139	5,600-6,000	Blue/green
Big Boss 4 × 6 W908627	5,800-6,200	Blue/green
1991		
Trail Blazer W917221	5,800-6,200	Blue/green
Trail Boss 250 W918527, 2 × 4 W917527 and 4 × 4 W918127	5,800-6,200	Blue/green
Trail Boss 2 × 4-350L W917539 and 4 × 4-350L W918139	5,600-6,000	Blue/green
Big Boss 4 × 6 W918627 and 6 × 6 W918727	5,800-6,200	Blue/green
1992		
Trail Blazer W927221	5,800-6,200	Blue/green
Trail Boss 250 W928527, 2 × 4 W92752 and 4 × 4 W928127	5,800-6,200	Blue/green
Trail Boss 2 × 4-350L W927539 and 4 × 4-350L W928139	5,600-6,000	Blue/green
Big Boss 4 × 6 W928627 and 6 × 6 W928727	5,800-6,200	Blue/green
1993		
Trail Blazer W937221	5,800-6,200	Blue/green
Trail Boss 250 W938527, 2 × 4 W937527, 4 × 4 W938127 and 6 × 6 W938727	5,800-6,200	Blue/green
Sportsman W938039	5,600-6,000	Blue/green
350 2 × 4 W937539, 4 × 4 W938139 and 6 × 6 W938739	5,600-6,000	Blue/green
1994		
Trail Blazer 2W W947221	5,800-6,200	Blue/green
Trail Boss 2W W948527	5,800-6,200	Blue/green
Sport W948540 and Sportsman 4 × 4 W948040	5,500-5,900	Blue/green
300 2 × 4 W947530, 4 × 4 W948130 and 6 × 6 W948730	5,400-5,800	Blue/green
400 2 × 4 W947540, 4 × 4 W948140 and 6 × 6 W948740	5,500-5,900	Blue/green
1995		
Trail Blazer W957221 and Trail Boss W958527	5,800-6,200	Blue/green
300 2 × 4 W957530 and 300 4 × 4 W958130	5,400-5,800	Blue/green
400 2 × 4 W957540, Sport W958540 and Sportsman 4 × 4 W958040	5,500-5,900	Blue/green
Xplorer 4 × 4 W959140 and 400 6 × 6 W958740	5,500-5,900	Blue/green
Scrambler W957840	5,800-6,200	White
Magnum 2 × 4 W957444 and Magnum 4 × 4 W958144	5,800-6,200	Blue/green

## Color

Blue/green  
Gold  
Silver  
Red  
Red/white  
Brown  
Orange  
Pink  
Yellow  
Green  
Purple  
White  
Plaid  
Blue/green  
Black

## Model

1988  
Scrambler W907221  
Trail Boss W907527  
1989  
Scrambler W907221  
Trail Boss W907527  
1990  
Trail Boss W907527, 4 × 4 W908127 and 4 × 4 W908139  
Cyclone W907527  
1991  
Trail Boss 2 × 4 W917527, 4 × 4 W918127 and 4 × 4 W918139  
Trail Boss 250 W917527 and W918127  
1992  
All models  
1993  
Trail Blazer W927221  
Trail Boss 250 W927527, W928127 and W928139  
Trail Boss 2 × 4 W927539 and 4 × 4 W928139  
Big Boss 4 × 6 W928627 and 6 × 6 W928727  
1994  
Trail Blazer W937221  
Trail Boss 250 W937527, W938127 and W938727  
Sportsman W938039  
350 2 × 4 W937539, 4 × 4 W938139 and 6 × 6 W938739  
1995  
Trail Blazer W947221  
Trail Boss 2W W948527  
Sport W948540 and Sportsman 4 × 4 W948040  
300 2 × 4 W947530, 4 × 4 W948130 and 6 × 6 W948730  
400 2 × 4 W947540, 4 × 4 W948140 and 6 × 6 W948740  
1996  
All models  
1997  
Trail Blazer W957221  
Trail Boss 250 W957527 and W958130  
Trail Boss 2 × 4 W957530 and 4 × 4 W958130  
Big Boss 4 × 6 W958627 and 6 × 6 W958727  
1998  
Trail Blazer W959140  
Trail Boss 250 W957527 and W958130  
Trail Boss 2 × 4 W957530 and 4 × 4 W958130

Table 3 DRIVE PULLEY SPRING SPECIFICATIONS

Color	Wire diameter		Free length		Part No.
	mm	in.	mm	in.	
Blue/gold	5.26	0.207	85.9-92.2	3.38-3.63	7041080
Gold	5.26	0.207	79.5-85.9	3.13-3.38	7041148
Silver	5.28	0.208	76.2-82.6	3.00-3.25	7041062
Red	4.88	0.192	92.7-99.1	3.65-3.90	7041083
Red/white	4.88	0.192	88.1-94.5	3.47-3.72	7041150
Brown	5.08	0.200	74.7-81.0	2.94-3.19	7041061
Orange	4.98	0.196	82.6-88.9	3.25-3.50	7041060
Pink	4.50	0.177	116.1-122.4	4.57-4.82	7041065
Yellow	4.88	0.192	71.1-77.5	2.80-3.05	7041102
Green	4.05	0.177	74.4-80.8	2.93-3.18	7041168
Purple	4.27	0.168	107.9-114.3	4.25-4.50	7041063
White	4.05	0.177	71.1-77.5	2.80-3.05	7041032
Plain	3.99	0.157	108.2-114.6	4.26-4.51	7041021
Blue/green	4.05	0.177	61.0-67.6	2.40-2.66	7041157
Black	3.56	0.140	104.8-111.1	4.13-4.38	7041022

Table 4 SHIFT WEIGHTS AND DRIVEN PULLEY SPECIFICATIONS

Model	Shift weights I.D. mark/weight		Driven pulley Helix angle	Spring position*
	Original production	Above 6,000 ft		
1985 Scrambler W857027 and Trail Boss W857527	5/45 g	16/40 g	40°	3-B
1986 Scrambler W867027 and Trail Boss W867627	16/43 g	16/40 g	40°	3-B
1987 Trail Boss W877527, 4 × 4 W878027, 4 × 4 W87812 and 4 × 4 W878327 Cyclone W877828	16/43 g 16/43 g	16/40 g —	40° 44-36°	3-B 3-B
1988 Trail Boss 2 × 4 W887527 and 4 × 4 W888127 Trail Boss 250 R/ES X888528 and W888528	16/43 g 16/43 g	16/40 g 16/40 g	40° 44-36°	2-B 2-B
1989 All models	16/43 g	16/40 g	40°	2-B
1990 Trail Blazer W907221 Trail Boss 250 W908527, 2 × 4 W907527 and 4 × 4 W908127 Trail Boss 2 × 4-350L W907539 and 4 × 4-350L W908139 Big Boss 4 × 6 W908627	16/43 g 16/43 g S/53 g 16/43 g	16/40 g 16/40 g — 16/40 g	40° 40° 40° 40°	2-B 2-B 2-B 2-B
1991 Trail Blazer W917221 Trail Boss 250 W918527, 2 × 4 W917527 and 4 × 4 W918127 Trail Boss 2 × 4-350L W917539 and 4 × 4-350L W918139	16/43 g 16/43 g S/53 g	16/40 g 16/40 g —	40° 40° 40°	2-B 2-B 2-B

(continued)

**Table 4 SHIFT WEIGHTS AND DRIVEN PULLEY SPECIFICATIONS (continued)**

Model	Shift weights I.D. mark/weight		Driven pulley	
	Original production	Above 6,000 ft	Helix angle	Spring position*
<b>1991 (continued)</b>				
Big Boss 4 × 6 W918627 and 6 × 6 W918727	16/43 g	16/40 g	40°	2-B
<b>1992</b>				
Trail Blazer W927221	16/43 g	16/40 g	40°	2-B
Trail Boss 250 W928527, 2 × 4 W927527 and 4 × 4 W928127	16/43 g	16/40 g	40°	2-B
Trail Boss 2 × 4-350L W927539 and 4 × 4-350L W928139	S/53 g	C/50 g	40°	2-B
Big Boss 4 × 6 W928627 and 6 × 6 W928727	16/43 g	16/40 g	40°	2-B
<b>1993</b>				
Trail Blazer W937221	16/43 g	16/40 g	40°	2-B
Trail Boss 250 W938527, 2 × 4 W937527, 4 × 4 W938127 and 6 × 6 W938727	16/43 g	16/40 g	40°	2-B
Sportsman W938039	S/53 g	C/50 g	40°	2-B
350 2 × 4 W937539, 4 × 4 W938139 and 6 × 6 W938739	S/53 g	C/50 g	40°	2-B
<b>1994</b>				
Trail Blazer 2W W947221	16/43 g	16/40 g	40°	2-B
Trail Boss 2W W948527	16/43 g	16/40 g	40°	2-B
Sport W948540 and Sportsman 4 × 4 W948040	S/55 g	S/53 g	44-36°	-
300 2 × 4 W947530, 4 × 4 W948130 and 6 × 6 W948730	G/48 g	F/45 g	44-36°	-
400 2 × 4 W947540, 4 × 4 W948140 and 6 × 6 W948740	S/55 g	S/53 g	44-36°	-
<b>1995</b>				
Trail Blazer W957221 and Trail Boss W958527	16/43 g	16/40 g	40°	2-B
300 2 × 4 W957530 and 300 4 × 4 W958130	G/48 g	F/45 g	44-36°	-
400 2 × 4 W957540, Sport W95854 and Sportsman 4 × 4 W958040	S/55 g	S/53 g	44-36°	-
Xplorer 4 × 4 W959140 and 400 6 × 6 W958740	S/55 g	S/53 g	44-36°	-
Scrambler W957840	S/55 g	S/53 g	40°	2-B
Magnum 2 × 4 W957444 and Magnum 4 × 4 W958144	10MH 50.5 g	10MW 46 g	40°	2-B
* The first number is the recommended position of the spring in the movable sheave and the second number is the location number of the hole in the cam helix.				

**Table 5 TORQUE SPECIFICATIONS**

	N-m	ft.-lbs.
Drive pulley screw	54.2	40
Driven pulley screw	23.1	17
Inner cover screws	16.3	12
Drive pulley cover screws	10.2	7.5
Spider to fixed sheave	271	200

Three different transfer to Table 1 for the in your model. If the for the various models types may be to listed in Table 1.

TRAN

Oil contained indicates the chain and is recommended for (Type I) than for (Type II) or gear/ch to Chapter Three for and maintenance p

Continued)

Pulley  
Spring  
position\*

2-B

2-B

2-B

2-B

2-B

2-B

2-B

2-B

2-B

2-B

2-B

-

-

-

2-B

-

-

2-B

2-B

second number

## CHAPTER NINE

## TRANSMISSION SYSTEM

Three different transmissions have been used. Refer to **Table 1** for the type of transmission installed in your model. If the service procedures are different for the various models, reference to the different types may be to "Type I, Type II," or "Type III" as listed in **Table 1**.

## TRANSMISSION OIL

Oil contained in the transmission housing lubricates the chain and sprockets or gears. Different oil is recommended for models with chain transmission (Type I) than for models with gear transmission (Type II) or gear/chain transmission (Type III). Refer to Chapter Three for recommended lubricant types and maintenance procedures.

## TYPE I TRANSMISSION

The Type I transmission is a chain type that is used on all 1985-1986 models and some 1987-1990 models. Refer to **Table 1** for application.

## Removal/Installation

1. Place the ATV on a level surface and block the wheels to keep it from rolling.
2. Remove the rear rack, cowling and fenders as described in Chapter Fifteen.
3. Remove the PVT outer cover as described in Chapter Seven.
4. Remove the drive belt, drive pulley, driven pulley and inner cover as described in Chapter Eight.
5. Loosen the rear chain adjuster as described in Chapter Three.

6. Remove the master link clip and master link from the rear drive chain, then remove the rear drive chain.

7. Loosen the swing arm bolts (A, **Figure 1**) on the left and right of the transmission enough to remove the transmission.

8. Remove the 2 attaching screws (B, **Figure 1**) from the left side of the transmission.

9. Remove the attaching screw from the bottom of the transmission.

10. Remove the disk brake cover, brake disc and caliper from the right side of the transmission as described in Chapter Fourteen.

11. Detach the air box from the carburetor and the frame tube, then remove the air box.

12. Lift the transmission from the frame.

13. Reverse the removal procedure to reinstall the transmission. Refer to **Table 2** for the recommended torque when tightening the swing arm transmission support bolt. Be sure to bend the locking tabs (**Figure 2**) around the screw heads after tightening.

14A. Adjust the optional torque stop available on 1985-1986 models as follows.

- Adjust the length of the stop (**Figure 3**) until it just contacts the transmission.
- Lengthen the stop 1 1/2 turns, then tighten the locknuts.

14B. Adjust the torque stop on 1987-on models as follows.

- Adjust the length of the stop until it just contacts the transmission.
- Lengthen the stop 1/2 turn, then tighten the lock nut.

### Disassembly/Inspection/Reassembly

1. Remove the transmission as described in this chapter.

2. Drain oil from the transmission.

3. Remove the set screw, detent spring and ball (**Figure 4**).

4. Remove the reverse switch.

5. Remove the chain and sprocket guard (**Figure 5**).

6. Remove the output sprocket.

7. Remove the screws attaching the case halves and carefully separate the case halves (**Figure 6**).

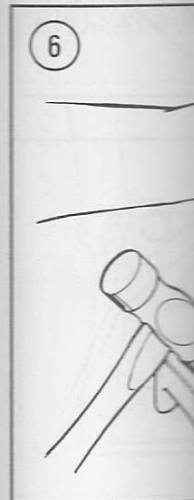
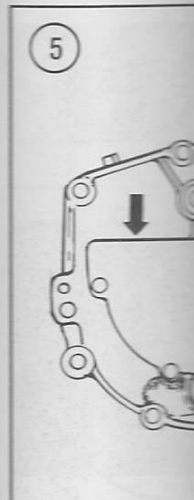
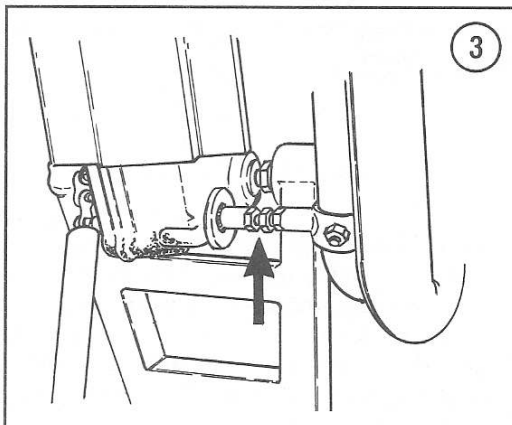
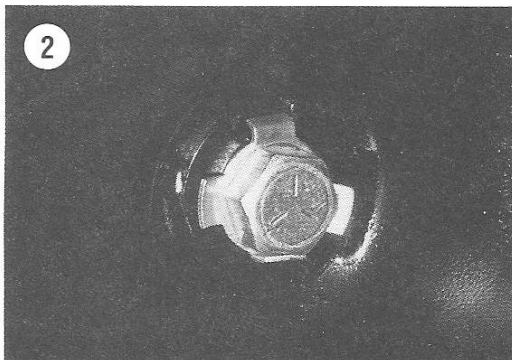
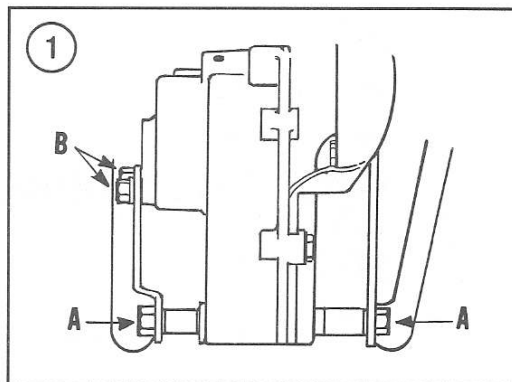
8. Remove the shafts, sprockets and chain (**Figure 7**).

9. Clean the case, shafts, chain, sprockets and all other parts carefully.

10. Inspect the bearings, shift dogs, sprockets and chain carefully, and install new parts as necessary.

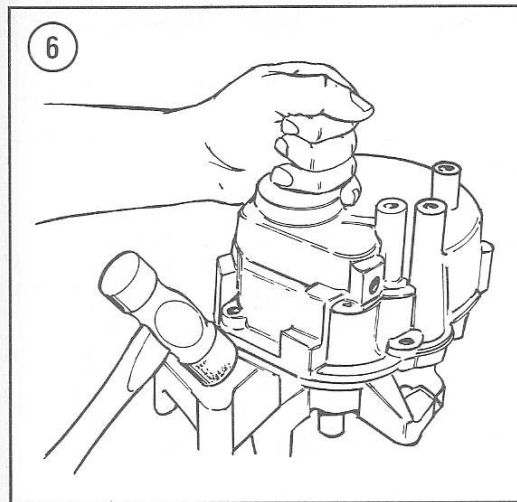
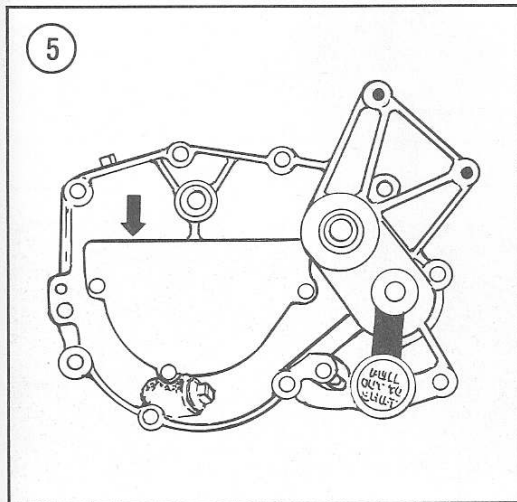
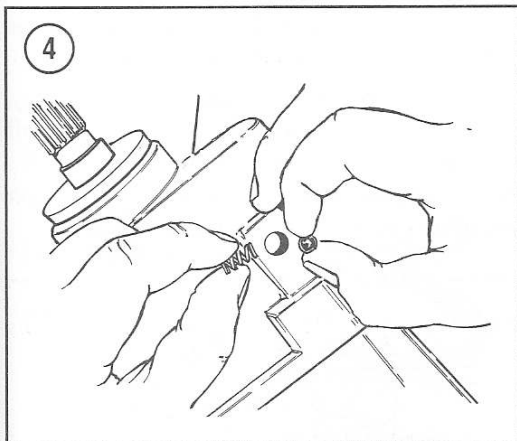
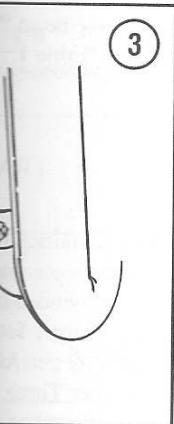
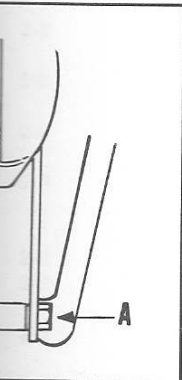
#### NOTE

*Several changes have been made to this transmission, the most obvious is the change from a chain that is 15 links wide to a chain that is 11 links wide. Always*



logs, sprockets and  
parts as necessary.

made to this  
obvious is the  
15 links wide  
wide. Always

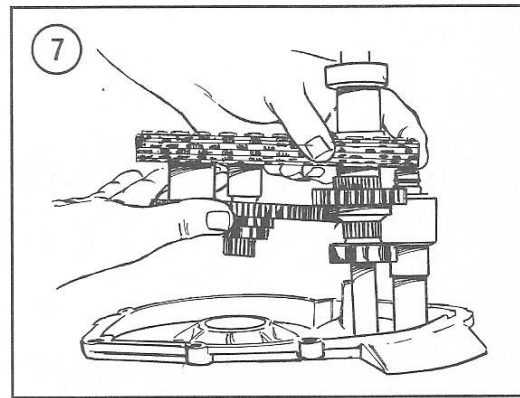


*be sure to install parts that are correct  
for the transmission being serviced.*

11. Reassemble the output shaft, gears, sprocket and bearings. Always install bearings onto shafts using drivers that contact the inner race.
12. Install the shifter shaft, input shaft, output shaft and chain in the right side of the case at the same time as shown in **Figure 7**.
13. Coat the mating surface of the right side case half with Loctite 515 Gasket Eliminator, or equivalent.
14. Install the left case half, making sure that the bearings are seated in their bores.
15. Install and tighten the screws attaching case halves together. Refer to **Table 2** for recommended tightening torque.
16. Install the detent ball, spring and set screw (**Figure 4**).
17. Install the reverse switch.
18. Install the shift handle.
19. Install the shaft seals as follows:
  - a. Grease the shafts to prevent damage to the seals.
  - b. Install the seals over the shafts by hand, being careful not to damage the lip of the seal.
  - c. Seat the seal in case bore using the correct size driver that contacts the outer edge of the seal.
20. Fill the transmission with the correct type and quantity of lubricant as described in Chapter Three.

### TYPE II TRANSMISSION

The Type II transmission is a gear type that is used on some 1987-1993 models. Refer to **Table 1** for application.



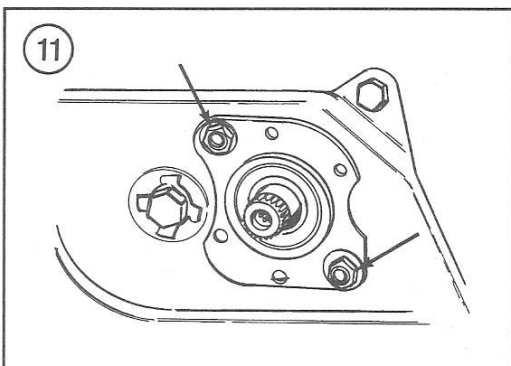
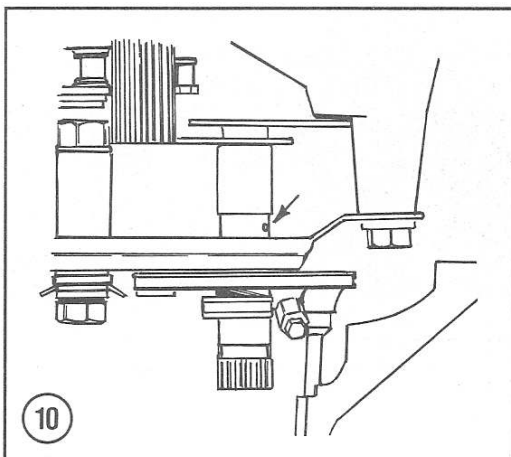
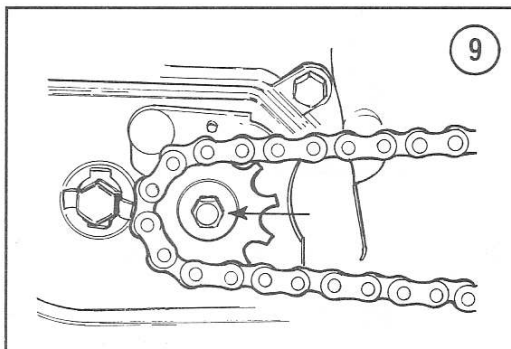
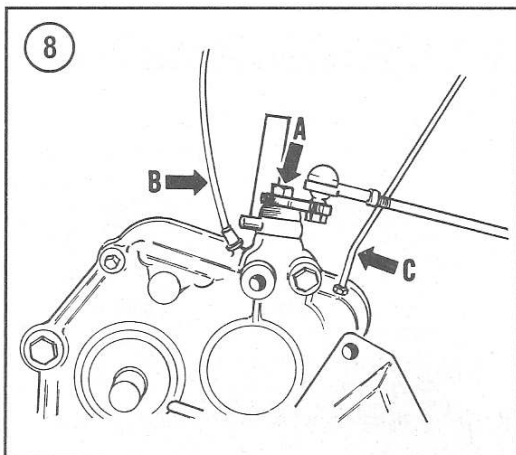


### Removal/Installation

1. Place the ATV on a level surface and block the wheels to keep it from rolling.
2. Remove the seat.
3. Remove the rear rack, cowling and fenders as described in Chapter Fifteen.
4. Remove the air filter and silencer/air box.
5. Remove the shields from the exhaust, then remove the exhaust pipe and muffler as described in Chapter Six.
6. Remove the brake caliper and disc as described in Chapter Fourteen.
7. Remove the nut attaching the external shift arm (A, **Figure 8**) to the shift shaft, then pull the lever from the shift shaft. Move the lever and connecting rod out of the way.
8. Detach the wire (B, **Figure 8**) from the neutral light switch.
9. Detach the vent hose (C, **Figure 8**).
- 10A. On models with front wheel drive (4-wheel drive), proceed as follows.
  - a. Unbolt and remove the front drive chain guard and the foot pad from the right side.
  - b. Remove the screw and washers (**Figure 9**) attaching the front drive sprocket to the transmission output shaft.
  - c. Slide the front drive sprocket from the output shaft.
  - d. On early models equipped with a locking collar, loosen the set screw (**Figure 10**) in the collar, then rotate the collar out away from the inner race. Later models use a bushing carrier instead of the locking collar.

- e. Remove the bolts (**Figure 11**) attaching the outboard bearing flange to the frame plate.
- f. Clean the front drive output shaft thoroughly, then slide the bearing and flange from the shaft and the frame.

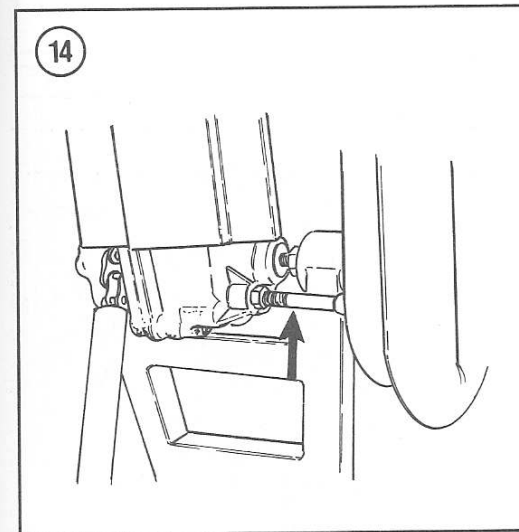
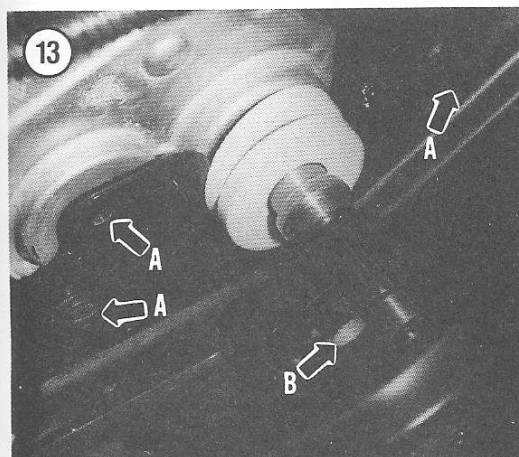
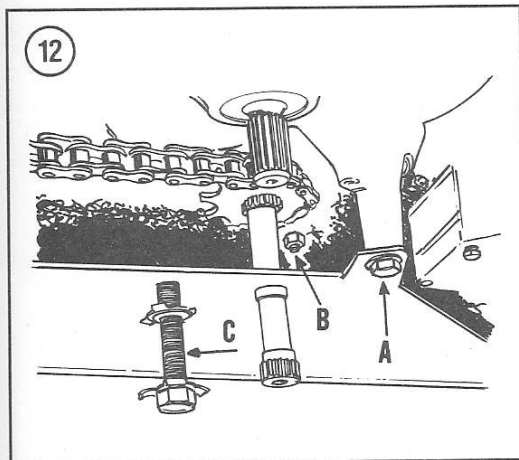
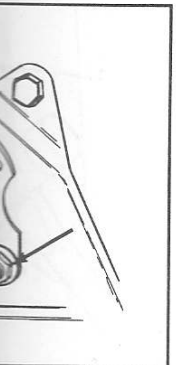
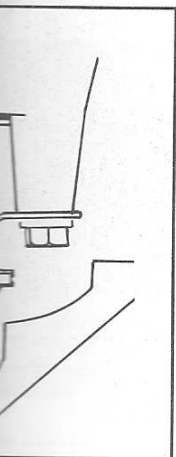
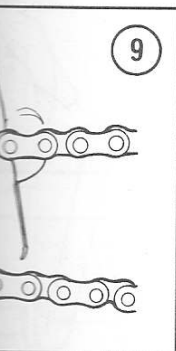
10B. On models with only rear-wheel drive, unbolt and remove the foot pad from the right side.



11) attaching the  
the frame plate.

shaft thoroughly,  
ange from the shaft

wheel drive, unbolt  
right side.

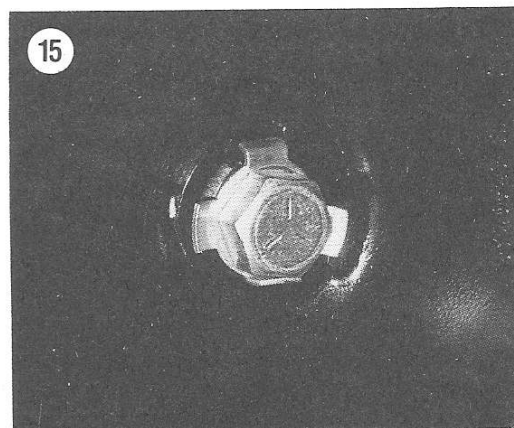


11. Remove the rear chain guard.
12. Loosen the rear drive chain and roll the chain off the transmission sprocket.
13. Remove the mounting screws (A and B, **Figure 12**).
14. Loosen the swing arm bolt (C, **Figure 12**) and pull the bolt part of the way out. Do not remove the swing arm bolt.
15. Remove the PVT outer cover as described in Chapter Seven.

#### CAUTION

*Be careful not to lose or damage the spacer washers located behind the driven pulley. These spacers are used to adjust the pulley offset and should be reinstalled.*

16. Remove the drive belt, drive pulley, driven pulley and inner cover as described in Chapter Eight.
17. Remove the 3 screws from their locations, A, **Figure 13**.
18. Loosen the swing arm bolt (B, **Figure 13**) enough to slide it outward part of the way. Do not remove the swing arm bolt.
19. Slide the transmission from the lower mounting brackets and sit it on the right side of the frame.
20. Loosen the locknut then remove the torque stop bolt (**Figure 14**).
21. Reverse the removal procedure to reinstall the transmission. Refer to **Table 2** for the recommended torque when tightening the swing arm pivot bolts and the transmission mounting bolts. Be sure to bend the locking tabs (**Figure 15**) around the bolt heads after tightening.
22. Adjust the torque stop as follows:



- a. Adjust the length of the stop (**Figure 14**) until it just contacts the frame.
  - b. Lengthen the stop 1/2 turn, then tighten the lock nut.
23. Adjust the controls as described in this chapter.

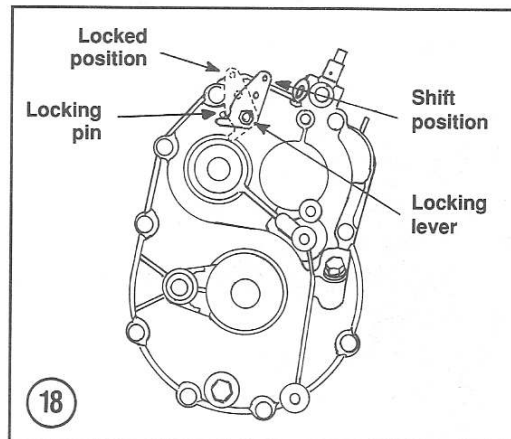
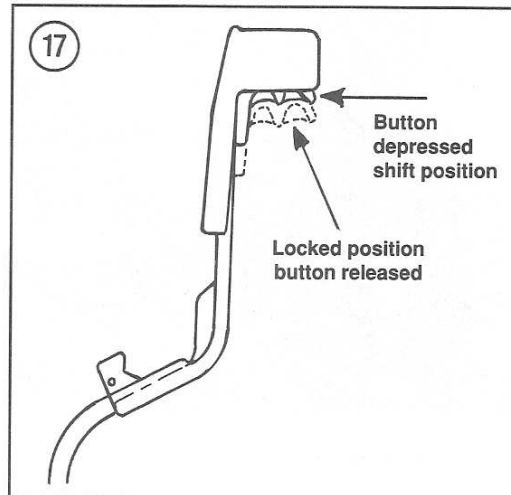
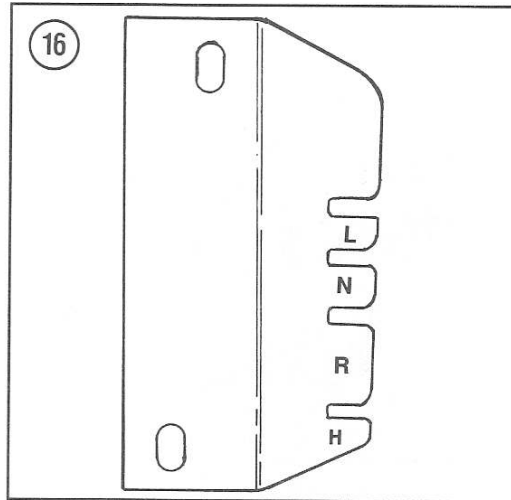
### Adjusting Controls

1A. On 1987-1988 models with Hi/Lo shift transmissions, adjust the shift linkage as follows:

- a. If linkage is attached to the shift levers, detach the tie rod from the transmission shift lever.
- b. Shift the shift lever on the transmission to NEUTRAL.
- c. Move the hand shift lever to the NEUTRAL (N, **Figure 16**) position.
- d. Adjust the length of the shift rod so that it can be connected without moving either lever, then attach the rod.

1B. On 1989-1993 models with Hi/Lo shift transmissions, adjust the shift linkage as follows:

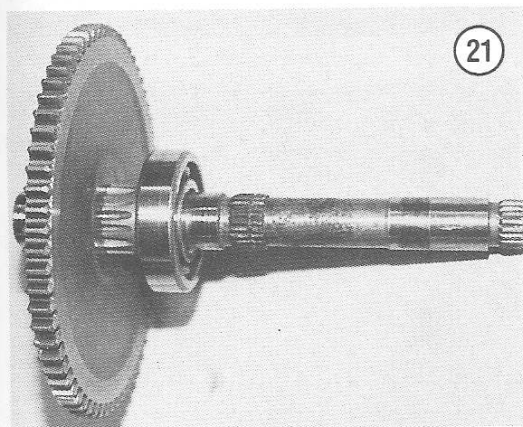
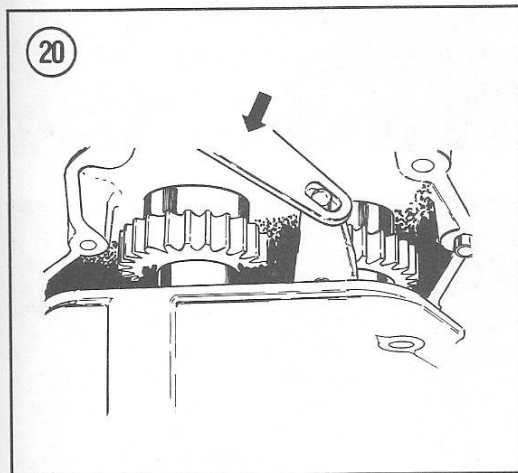
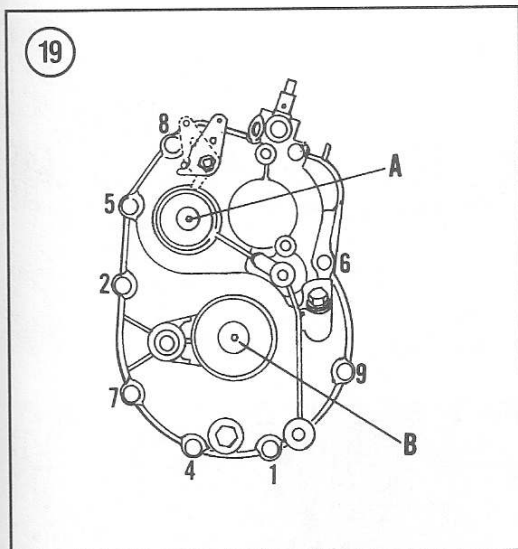
- a. Make sure that the hand shift lever is in NEUTRAL (N, **Figure 16**) and start the engine.
- b. Slowly move the shift lever from the NEUTRAL position toward the "L" position until the gears just begin to clash, then return the lever to the "N" position. Note the location of the hand lever where the gears begin to clash.
- c. Move the hand shift lever toward the "R" position until the gears just begin to clash, note the position of the hand lever, then return the lever to "N" position.
- d. Adjust the length of the shift rod so the gears begin to clash equal distances from the "N" position (**Figure 16**).



#### CAUTION

*The transmission gears may be damaged by improper adjustment of the shift lock mechanism. Damage may also result from not lubricating the control cable properly.*

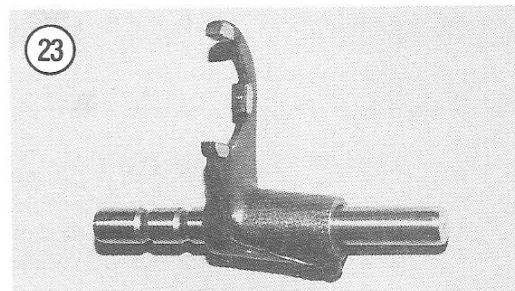
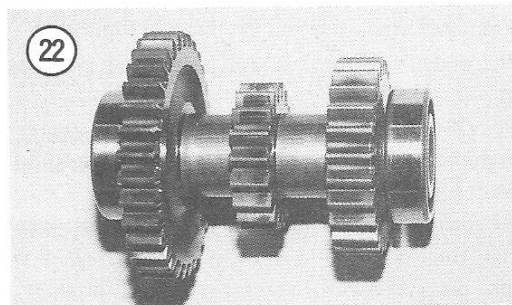
2. Models with a shift locking button on the hand lever (**Figure 17**) should be adjusted as follows:
  - a. Depress the shift lever button on the hand control lever.
  - b. Observe the position of the locking lever on the transmission. The lever on the transmission should be pulled forward in the shift position (**Figure 18**) and should be contacting the pin.



- c. Release the button on the hand control lever and make sure that the lever returned to the locked position (Figure 18).
- d. Adjust the cable as necessary to make sure that the locking lever releases fully when button is depressed and engages quickly and completely when the button is released. It is important to lubricate the cable frequently to keep it from catching in the housing.

#### Disassembly/Inspection/Reassembly

1. Remove the snap ring retaining the output sprocket, then slide the sprocket from the shaft.
2. Remove the nine bolts (Figure 19) that attach the case halves together.
3. Begin to separate the case halves by bumping the brake and output shafts (A and B, Figure 19) with a soft faced hammer while lifting the right half.
4. When the case halves have separated slightly, move the case half to disconnect the inner shift arm (Figure 20) from the shift fork pin, then complete removal of the right case half.
5. Lift the large output gear and shaft (Figure 21) from the case.
6. Remove the forward gear cluster (Figure 22).
7. Remove the shift fork and support shaft (Figure 23).



Button  
depressed  
shift position

position  
released

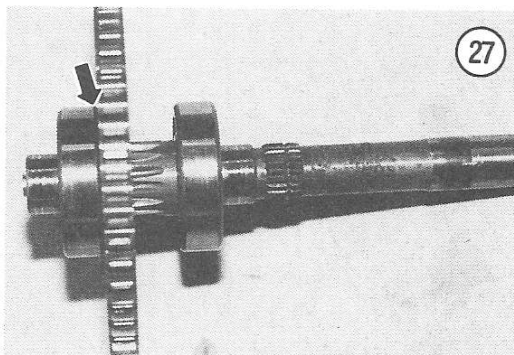
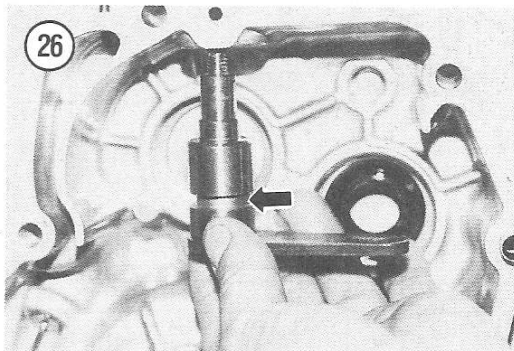
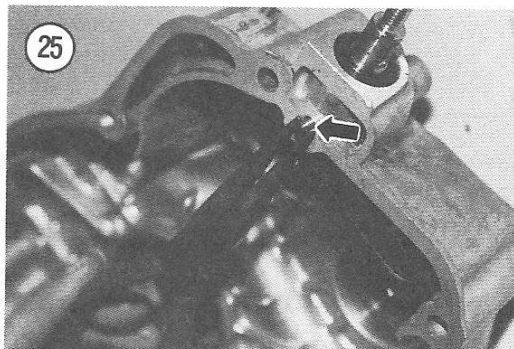
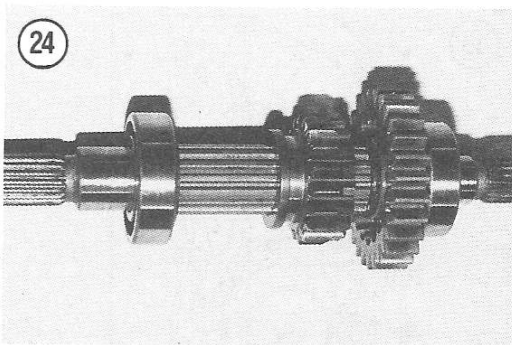
Shift  
position

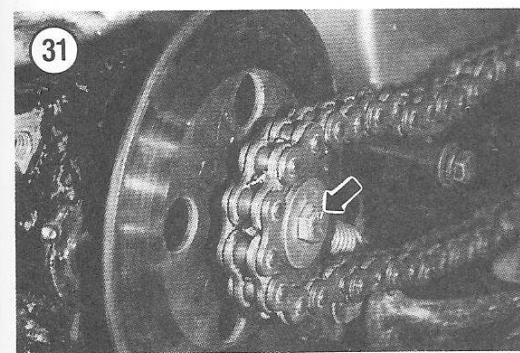
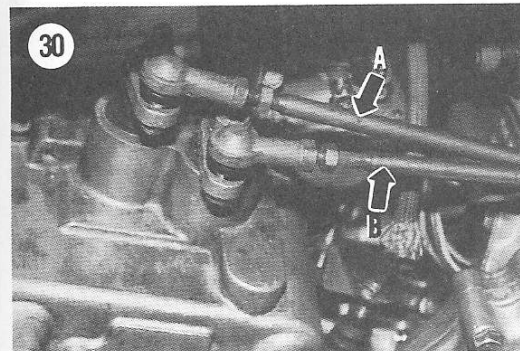
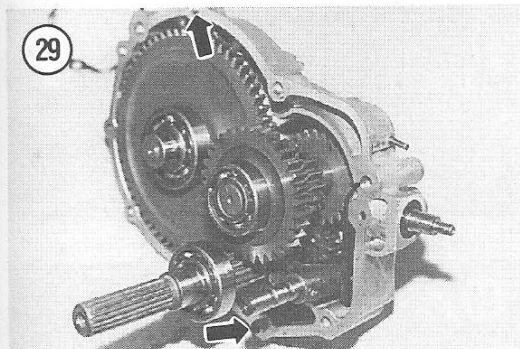
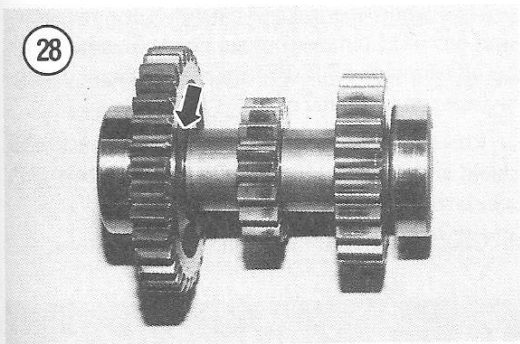
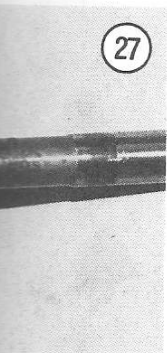
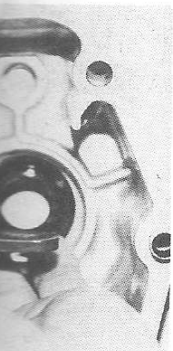
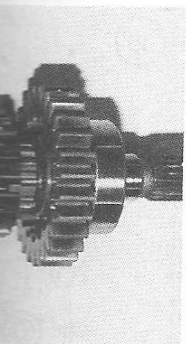
Locking  
lever

8. Remove the input shaft and sliding gear assembly (**Figure 24**).
9. If the shift lever and shaft must be removed from the case, it is necessary to first remove the pin (**Figure 25**). The pin fits in the groove in the shift shaft (**Figure 26**).
10. Clean the case halves and all parts thoroughly.
11. The output shaft should not have any side play in the case. Check the removed assembly for clearance between the gear and bearing on the short end of the shaft. Add shims between the left side bearing and the gear (**Figure 27**) if necessary to eliminate end play. Do not install too many shims or case will not close properly.
12. The forward cluster gear (**Figure 22**) should not have any side play in the case. Check the removed assembly with a feeler gauge for clearance between the collar and gear (**Figure 28**). Add shims between the bearing and gear at either end of the shaft to eliminate end play. Do not install too many shims or case will not close properly.
13. Inspect all parts for visible damage and install new parts as necessary.
14. Use properly fitting drivers to install seals and bearings. Install all seals flush with the case. Grease the shafts and the lips of seals before installing the shafts.
15. Assemble the shafts, gears, bearings and shift fork in the right case half as shown in **Figure 29**.
16. Make sure the 2 dowel pins are at locations indicated in **Figure 29**.
17. Clean the mating surfaces of both case halves and coat both surfaces with Loctite 515 gasket eliminator (or equivalent).
18. Install a new gasket and install the other case half. Bump the case halves together, then install the nine bolts (**Figure 19**). Refer to **Table 2** for recommended tightening torques.
19. Check transmission operation before installing, by turning the shafts by hand. The shafts should not have end play, but should not bind.

### TYPE III TRANSMISSION

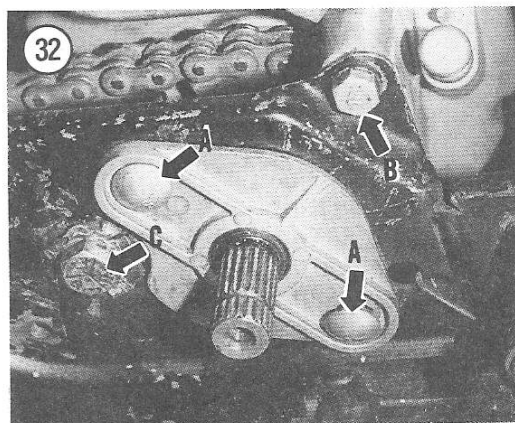
The Type III EZ Shift transmission is a gear/chain type and is used on some 1993 models and all 1994-on models. Refer to **Table 1** for application.





### Removal/Installation

1. Place the ATV on a level surface and block the wheels to keep it from rolling.
2. Remove the seat.
3. Remove the rear rack, cowling and fenders as described in Chapter Fifteen.
4. Remove the air filter and silencer/air box.
5. Remove the shields from the exhaust, then remove the exhaust pipe and muffler as described in Chapter Six.
6. Remove the brake caliper and disc as described in Chapter Fourteen.
7. Remove the nut attaching the external shift arms (A and B, **Figure 30**) to the shift shaft, then pull the levers from the shafts. Move the levers and connecting rods out of the way.
8. Disconnect the speedometer cable.
9. On models with front-wheel drive (4-wheel drive), proceed as follows:
  - a. Unbolt and remove the front drive chain guard from the right side.
  - b. Remove the screw and washers (**Figure 31**) attaching the front drive sprocket to the transmission output shaft.
  - c. Slide the front drive sprocket from the output shaft.
10. Remove the brake caliper and disc as described in Chapter Fourteen.
11. Remove the bolts (A, **Figure 32**) attaching the outboard bearing flange to the frame plate.
12. Clean the front drive output shaft thoroughly, then slide the bearing and flange from the shaft and the frame.
13. Remove the rear chain guard.



14. Loosen the rear drive chain and roll the chain off the transmission sprocket.
15. Remove the mounting screw (B, **Figure 32**).
16. Remove the lower mounting screw using a socket and extension as shown in **Figure 33**.
17. Release the locking tab, loosen the swing arm bolt (C, **Figure 32**) and pull the bolt part of the way out. It is not necessary to remove the swing arm bolt.
18. Remove the PVT outer cover as described in Chapter Seven.

#### CAUTION

*Be careful not to lose or damage the spacer washers located behind the driven pulley. These spacers are used to adjust the pulley offset and should be reinstalled.*

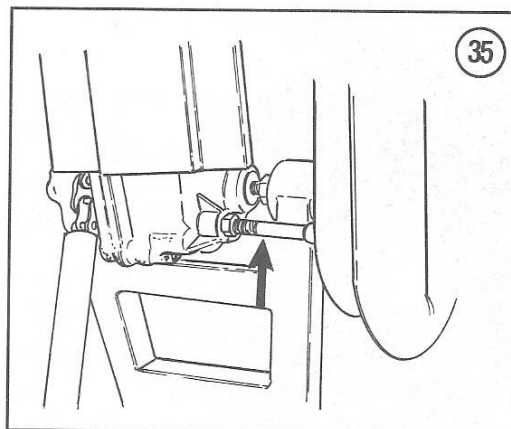
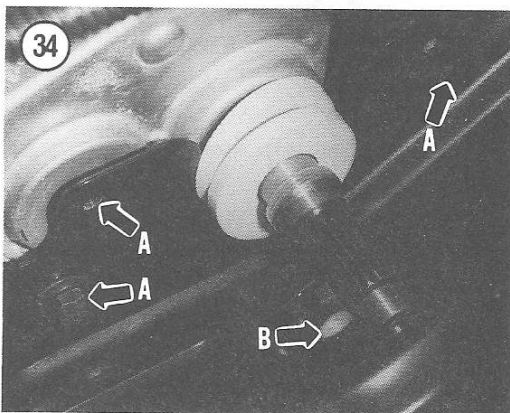
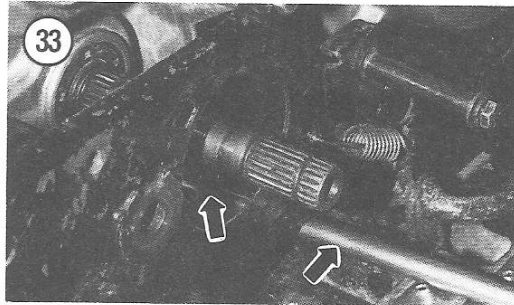
19. Remove the drive belt, drive pulley, driven pulley and inner cover as described in Chapter Eight.
20. Remove the 3 screws from their locations, A, **Figure 34**.
21. Release the locking tab, loosen the swing arm bolt (B, **Figure 34**) enough to slide it outward part of the way. It is not necessary to remove the swing arm bolt.
22. Slide the transmission from the lower mounting brackets and sit it on the right side of the frame.
23. Loosen the locknut then remove the torque stop bolt (**Figure 35**).
24. Reverse the removal procedure to reinstall the transmission. Refer to **Table 2** for the recommended torque when tightening the swing arm pivot bolts and the transmission mounting bolts. Be sure to bend locking tabs around screw heads (C, **Figure 32** and B, **Figure 34**) after tightening.
25. Adjust the torque stop as follows:
  - a. Adjust the length of the stop (**Figure 35**) until it just contacts the frame.
  - b. Lengthen the stop 1/2 turn, then tighten the lock nut.
26. Adjust the controls as described in this chapter.

#### Adjusting Control Linkage

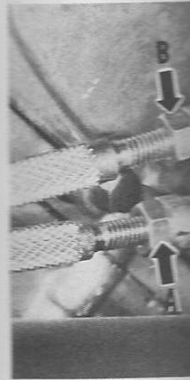
Adjust the shift linkage as the first step to correct transmission or shifting problems. Improper linkage adjustment may cause gears to clash, jump out of gear, gear noise when slowing down and prevent the use of a gear.

Also, adjust the linkage whenever the transmission has been removed or serviced. Always check the adjustment of both control rods, because changing one can affect the other.

1. Remove necessary body panels, exhaust heat shield and exhaust pipe from the right side to gain access to the shift controls.
2. Check and adjust the torque stop as follows:



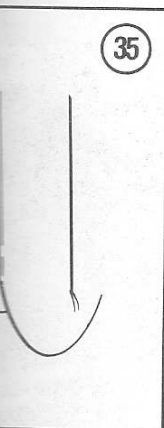
- a. Adjust the length of the stop until it just contacts the frame.
  - b. Lengthen the stop 1/2 turn, then tighten the lock nut.
3. Before adjusting the linkage, check for wear or improper adjustment.
    - a. Check the end of the rod for looseness. Bend the rod until it just contacts the frame.
    - b. Check to be sure the rod is attached to the rear of the cover of the transmission. On a Magnum 4 × 4, the rod end is attached to the front rod end of the shift lever, except for the attached end of the rod which is attached to the



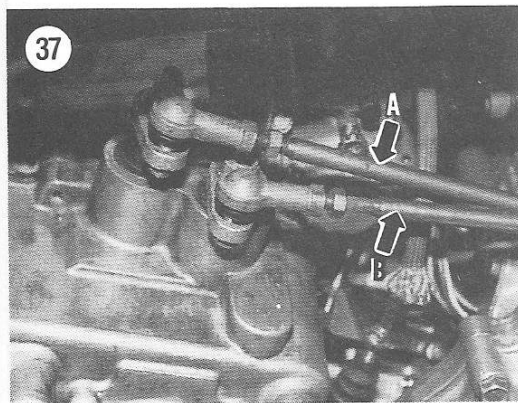
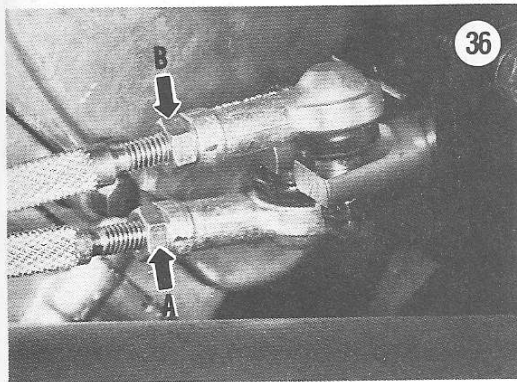
ever the transmis-  
ed. Always check  
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right side to gain

op as follows:



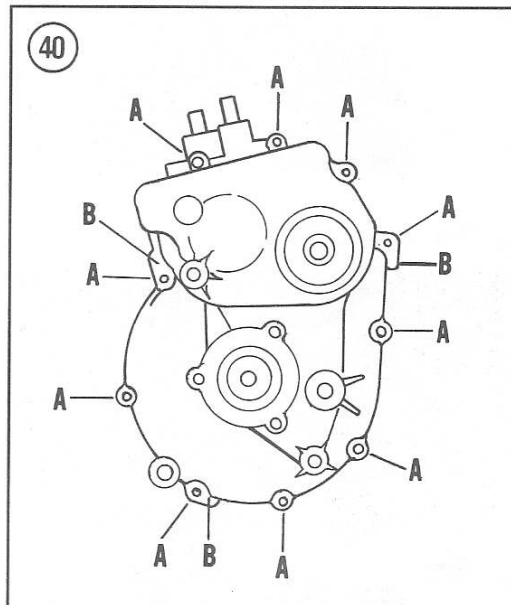
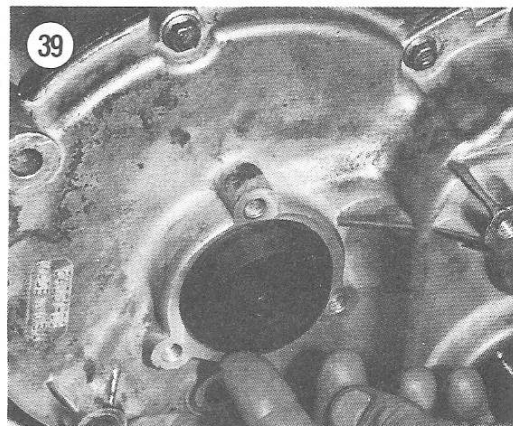
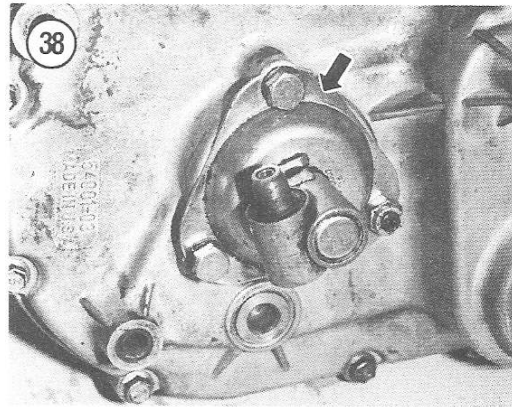
- a. Adjust the length of the stop (**Figure 35**) until it just contacts the frame.
  - b. Lengthen the stop 1/2 turn, then tighten the lock nut.
3. Before adjusting the shift control rods, check for wear or improper installation as follows:
    - a. Check the ends of the shift control rods for looseness. Be sure that fasteners are tight and that rod ends are not worn.
    - b. Check to be sure that the control rods are attached correctly. The clevis or rod ends at the rear of the control rods should be on top of the transmission levers on all models. On 300 and Magnum 4 × 4 models, the inside rod end is attached under the shifter slide and the outside rod end is attached above the slide as shown in **Figure 36**. On Magnum 2 × 4 models, the front rod ends of both rods are attached to the top of the shifter slides. On 350 and 400 models, except 400 Sport, the outer rod end is attached under the slide and the inner rod end is attached above the slide. Sport 400 models

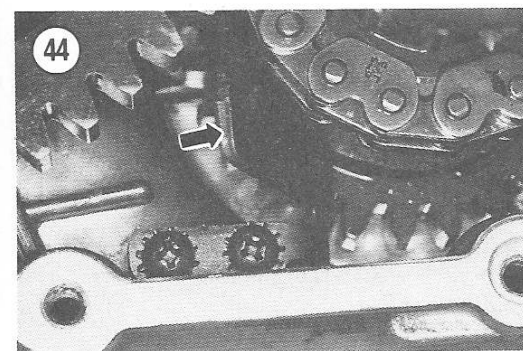
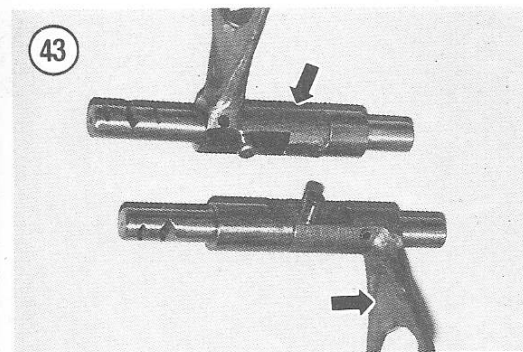
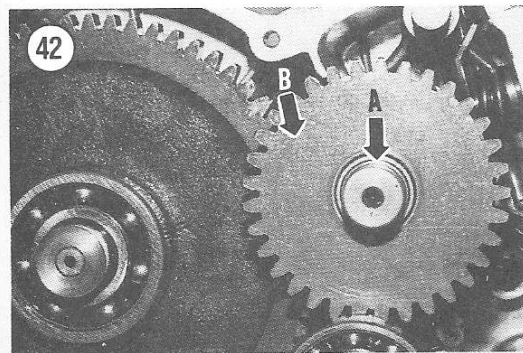
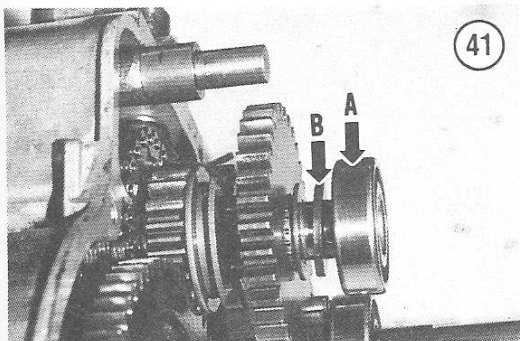
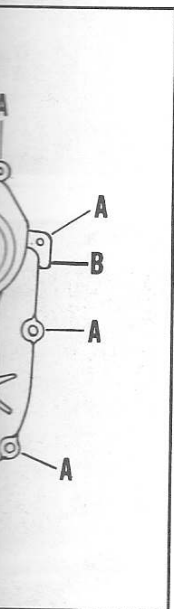
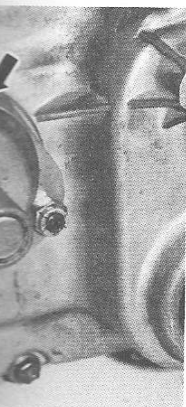


- have only one control rod (forward/reverse) and the rod end is attached above the shifter slide.
  - c. Check to be sure that the shifter control is mounted solidly and that all of the attaching screws are tight.
  - d. Lubricate the rod ends with Polaris Cable Lube (part No. 2870510).
4. Loosen the locknuts at each rod end (**Figure 36** and **Figure 37**).
  5. Detach both rod ends from the transmission levers (**Figure 37**).
  6. Shift the hand lever to NEUTRAL and check the ends of the shift rails (**Figure 36**). When the control is in NEUTRAL, the rails will be even.
  7. Shift both transmission levers to NEUTRAL (**Figure 37**). When the transmission is in NEUTRAL, the shift controls will be in a detent position and the levers will be perpendicular to the transmission parting line.
  8. Change the length of the inside (Lo Range) control rod (A, **Figure 36** and A, **Figure 37**) if necessary to attach the rod to the rearmost shift lever. Attach the rod end to the lever and install the attaching nut. Leave the locknuts on the rod loose.
  9. Adjust the length of the connecting control rod (A, **Figure 36** and A, **Figure 37**) as follows:
    - a. Turn the connecting rod clockwise until resistance increases slightly.
    - b. Mark the control rod with a line on the top to identify its position.
    - c. Count the turns of the rod while turning it counterclockwise until the same slight increase in resistance is felt. Count the turns of the rod by observing the mark while adjusting.
    - d. Turn the connecting rod clockwise again 1/2 the number of turns observed in sub-step 9c.
    - e. Tighten both rod end locknuts after setting the correct rod length. The two rod ends should be parallel after tightening the locknuts. Binding can occur if the rod ends are not straight. Check by rotating the control rod. Rod should rotate freely without binding.
  10. Change the length of the outside (High/Reverse) control rod (B, **Figure 36** and B, **Figure 37**) if necessary to attach the rod to the rearmost shift lever. Attach the rod end to the lever and install the attaching nut. Leave the locknuts on the rod loose.
  11. Adjust the length of the connecting control rod (B, **Figure 36** and B, **Figure 37**) as follows:



- a. Turn the connecting rod clockwise until resistance increases slightly.
  - b. Mark the control rod with a line on the top to identify its position.
  - c. Count the turns of the rod while turning it counterclockwise until the same slight increase in resistance is felt. Count the turns of the rod by observing the mark while adjusting.
  - d. Turn the connecting rod clockwise again 1/2 the number of turns observed in sub-step 11c.
  - e. Tighten both rod end locknuts after setting the correct rod length. The two rod ends should be parallel after tightening the locknuts. Binding can occur if the rod ends are not straight. Check by rotating the control rod. Rod should rotate freely without binding.
12. If shifting difficulty is still encountered after adjusting, check the shifting effort required as follows.
- a. Disconnect the shift control rods from the transmission shift levers (**Figure 37**).
  - b. Attach a torque wrench to the nut holding the levers (**Figure 37**) to the transmission shift shafts.
  - c. Make sure that both shift levers are in NEUTRAL. Both levers will be perpendicular to the parting line of the transmission case.
  - d. Roll the vehicle forward slowly, while shifting the transmission rear lever to forward gear using the torque wrench. Observe the torque required to shift the transmission.
  - e. Shift the transmission to NEUTRAL.
  - f. Roll the vehicle backward slowly, while shifting the transmission rear lever to REVERSE gear using the torque wrench. Observe the torque required to shift the transmission.
  - g. Check the torque required to shift the front (Lo Range) shift lever following a similar procedure.
  - h. If more than 13.6 N·m (10 ft.-lbs.) is required to shift the transmission, problems are indicated.
  - i. Reattach the control rods when testing is finished.
13. Check the distance the shifter slides move when changing gears. The shifter should move 7.6 mm (0.30 in.) each way from the center position. Total movement is 15.2 mm (0.60 in.) from the fully in to the fully extended position. Less than specified movement may indicate wear in the shifter assembly.





### Disassembly/Inspection/Reassembly

1. Drain oil from the transmission and remove the dipstick.
2. Remove the output sprocket if not already removed.
3. Unbolt and remove the speedometer drive (Figure 38), then remove the seal (Figure 39).
4. Remove the ten screws (A, Figure 40) that attach the case halves together.
5. Separate the case halves by bumping the case at the three bosses (B, Figure 40) with a soft-faced hammer.
6. Remove the bearing (A, Figure 41) and thrust washer (B). It may be necessary to use a puller to remove the bearing from the shaft.
7. Use a dental pick or similar tool to remove the needle bearing (A, Figure 42), then remove gear (B, Figure 42) and thrust washer. This second thrust washer has a larger inside diameter than the first, removed in Step 6.
8. Turn the external shift shafts while removing the high/reverse (A, Figure 43) and low (B, Figure 43) shift rail and fork assemblies.
9. Remove the large output gear and output shaft assembly.

#### NOTE

*The input shaft must be moved slightly to clear the oil deflector (Figure 44) while removing it. DO NOT remove or bend the oil deflector.*

10. Remove the input shaft, high/reverse shaft and chain together (Figure 45).
11. Clean and inspect all parts thoroughly. Remove the shaft seals if replacement is necessary; however install the seals after the transmission is reassembled.

