YAMAHA

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YTM200K

Service Manual

LIT-11616-03-83

YTM200K
SERVICE MANUAL
1st Edition - July 1982
5th Printing - January 1986 - JEM D-159

LIT-11616-03-83

NOTICE

This manual was written by the Yamaha Motor Company primarily for use by Yamaha dealers and their qualified mechanics. It is not possible to put an entire mechanic's education into one manual, so it is assumed that persons using this book to perform maintenance and repairs on Yamaha machines have a basic understanding of the mechanical concepts and procedures inherent to machine repair technology. Without such knowledge, attempted repairs or service to this model may render it unfit to use and/or unsafe.

This model has been designed and manufactured to perform within certain specifications in regard to performance. Proper service with the correct tools is necessary to ensure that the machine will operate as designed. If there is any question about a service procedure, it is imperative that you contact a Yamaha dealer for any service information changes that apply to this model. This policy is intended to provide the customer with the most satisfaction from his machine and to conform with federal environmental quality objectives.

Yamaha Motor Company, Ltd. is continually striving to improve all models manufactured by Yamaha. Modifications and significant changes in specifications or procedures will be forwarded to all Authorized Yamaha dealers and will, where applicable, appear in future editions of this manual.

Particularly important information is distinguished in this manual by the following notations:

NOTE: A NOTE provides key information to make procedures easier or clearer.

A CAUTION indicates special procedures that must be followed to avoid damage to the machine.

WARNING: A WARNING indicates special procedures that must be followed to avoid injury to a machine operator or person inspecting or repairing the machine.

SERVICE DEPT.
INTERNATIONAL DIVISION
YAMAHA MOTOR CO., LTD.

INDEX

Being a Yamaha owner, you obviously prefer a quality product.

gĕn·ū·ĭne

adj. 1. Real 2. Authentic, not artificial 3. Yamaha.

GENUINE **YAMAHA** PARTS & ACCESSORIES

Don't compromise the quality and performance of your Yamaha with off-brand alternatives. You'll be getting exactly what you're paying for.

CHAPTER 1.
GENERAL INFORMATION

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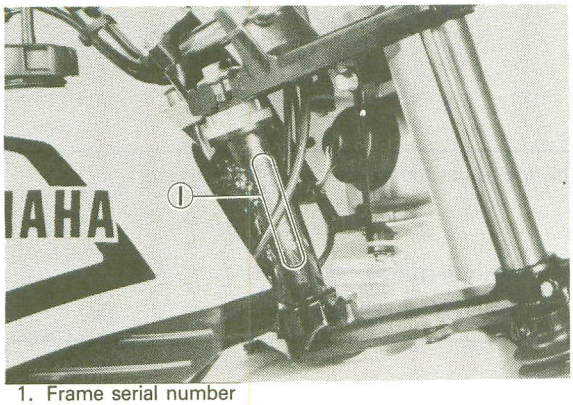
MACHINE IDENTIFICATION

Frame Serial Number

The frame serial number is stamped into the right-side of the steering head pipe.



1. Frame serial number

NOTE:

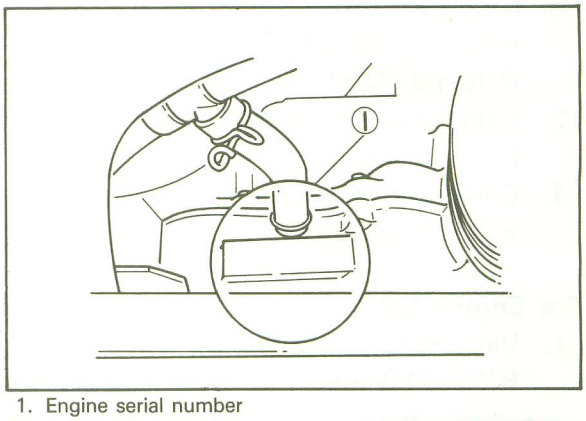
The first three digits of these numbers are for model identification; the remaining digits are the unit production number.

Starting Serial Number:

YTM200K 21V-000101

Engine Serial Number

The engine serial number is stamped into the elevated part of the right rear section of the engine.



1. Engine serial number

SPECIAL TOOLS

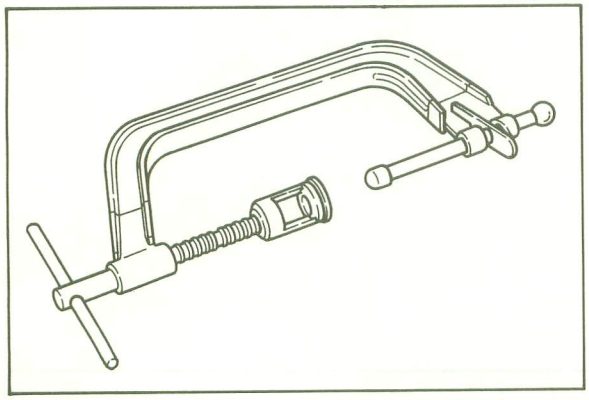
The proper special tools are necessary for complete and accurate tune-up and assembly. Using the correct special tool will help prevent damage caused by the use of improper tools or improvised techniques.

For Tune-up

1. Inductive timing light
   P/N YU-08037
2. Inductive tachometer
   P/N YU-08036
3. Compression gauge
   P/N YU-33223

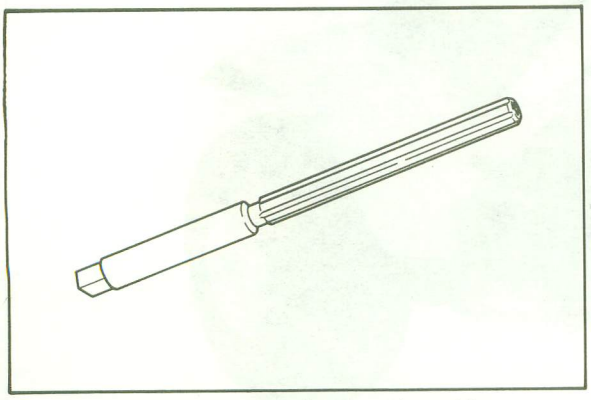
For Engine Service

1. Valve spring compressor
   P/N YM-04019



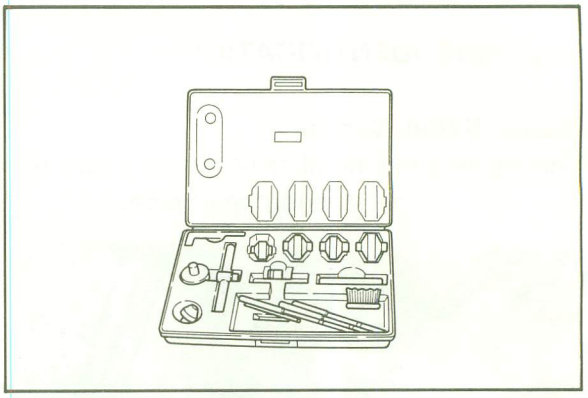
This tool must be used for removing and installing the valve assemblies.

2. Valve guide reamer
   P/N YM-04066



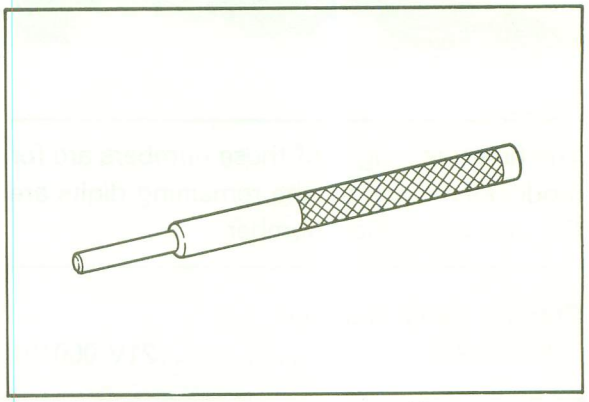
This must be used when replacing the valve guide.

3. Valve seat cutter
   P/N YM-91043



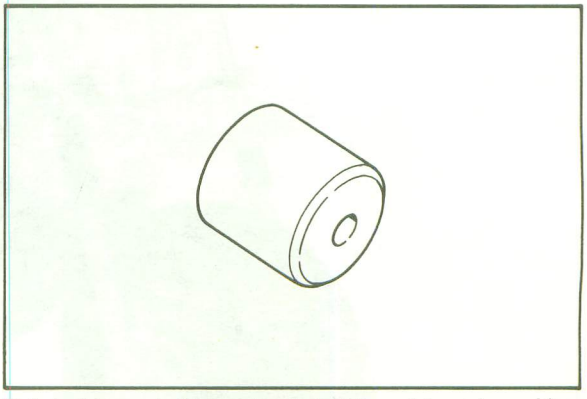
This tool is needed to resurface the valve seat.

4. Valve guide remover
   P/N YM-04064



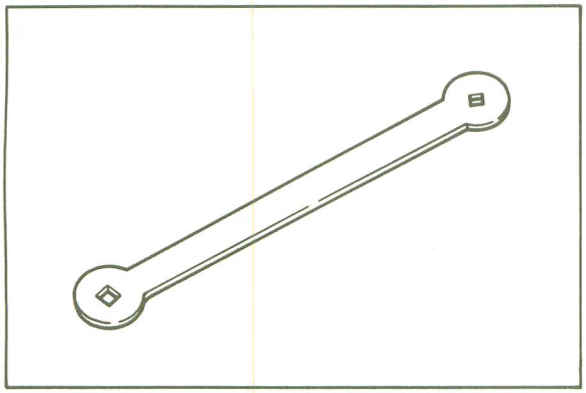
This must be used to remove the valve guides.

5. Valve guide installer
   P/N YM-04065



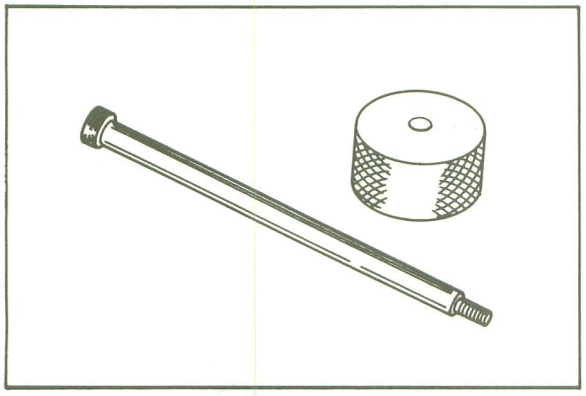
This tool is needed for proper installation of the valve guides.

6. Valve adjusting tool
P/N YM-08035



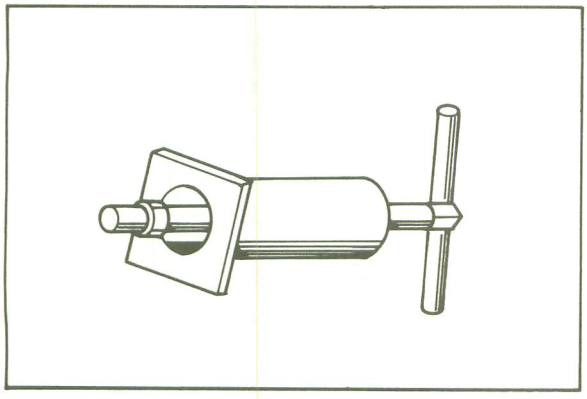
This tool is used when adjusting the valve clearance.

7. Slide hammer
P/N YU-01083



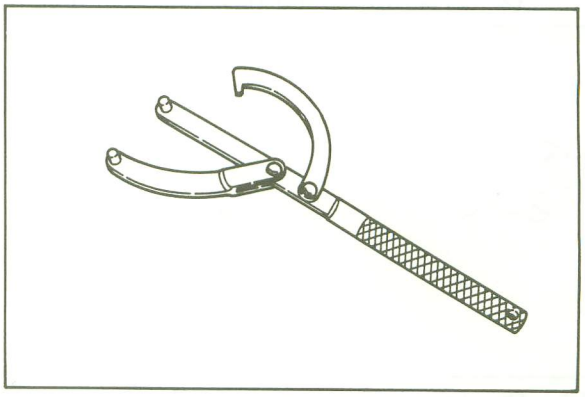
These tools are used when removing the rocker arm shaft.

8. Piston pin puller
P/N YU-01304



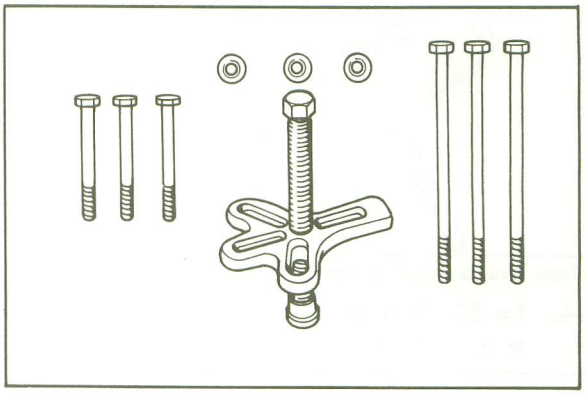
This tool is used when removing the piston pin.

9. Universal rotor holder
P/N YU-01235



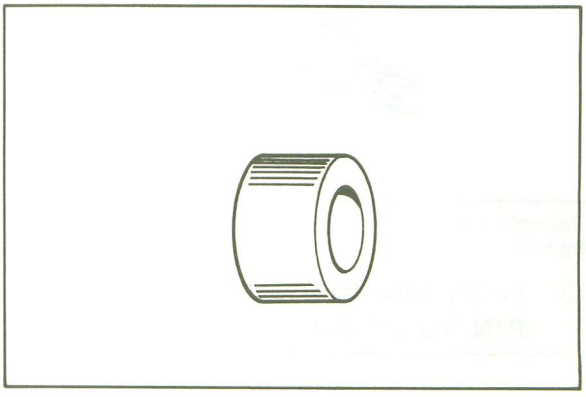
This tool is used to hold the clutch when removing or tightening the clutch boss securing nut, etc.

10. 3-way universal puller
P/N YU-33270



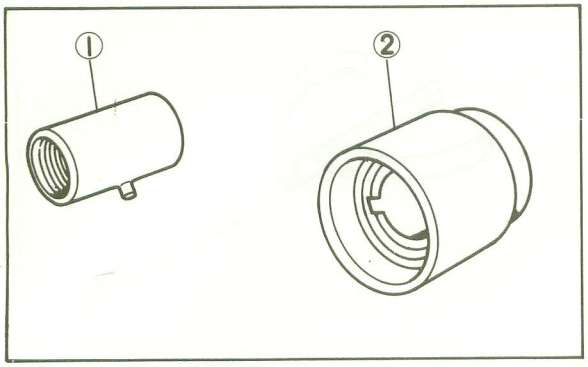
This tool is used for removing the flywheel.

11. Flywheel puller attachment
P/N YM-33278

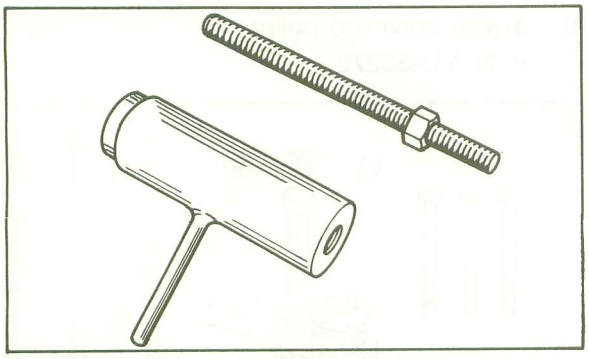


This tool is used to protect the end of the crankshaft when removing the flywheel.

12. Buffer boss installer
    ① P/N YM-33279 (Adapter #11)
    ② P/N YM-33280 (Pot extension)

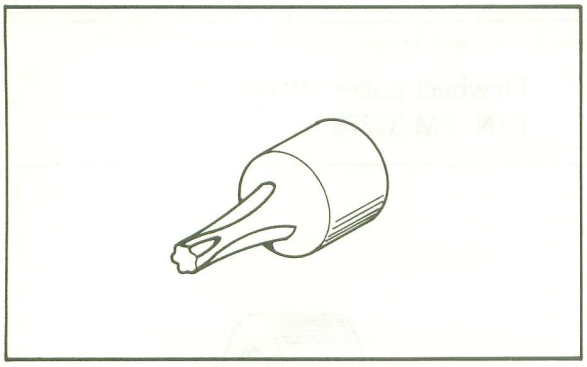


13. Crankshaft installer
    P/N YU-90050



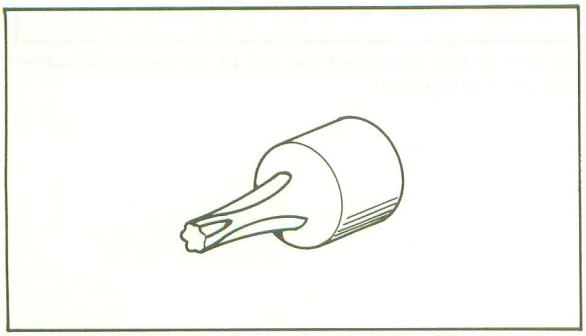
These tools are used to install the buffer boss.

14. (#30) Torx driver
    P/N YU-29843-6



This tool is used to loosen or tighten the shift cam segment securing bolt.

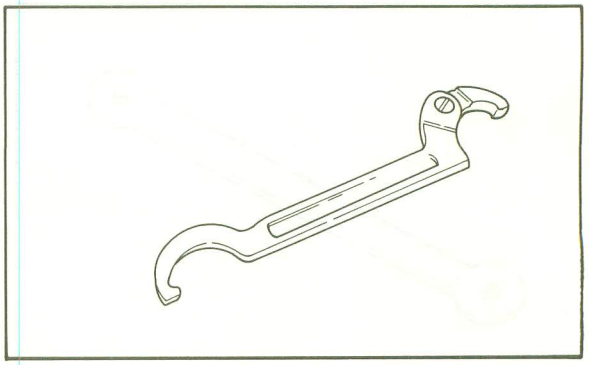
15. (#25) Torx driver
    P/N YU-29843-4



This tool is used to loosen or tighten the bearing retainer securing bolt.

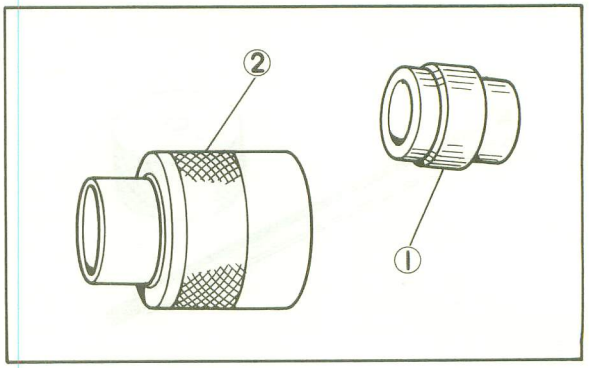
For Chassis Service

1. Ring nut wrench
   P/N YU-01268



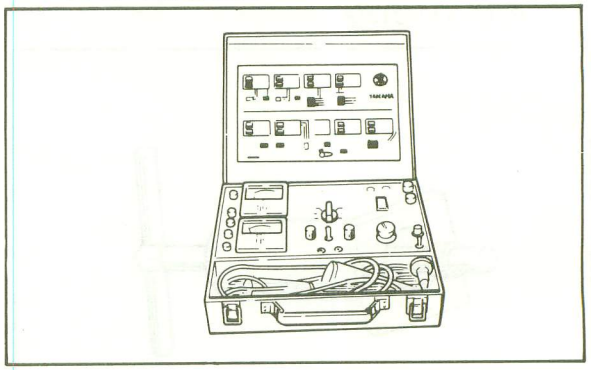
This tool is used to loosen and tighten the ring nut.

2. Fork seal installer
   ① P/N YM-33281 (collar)
   ② P/N YM-08010 (weight)

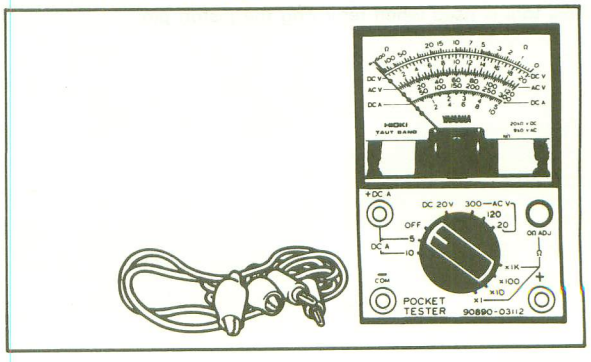


For Electrical Components

1. Electro tester
   P/N YM-33263



2. Pocket tester
   P/N YU-03112



CHAPTER 2.
PERIODIC INSPECTIONS AND ADJUSTMENT

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PERIODIC INSPECTIONS AND ADJUSTMENTS

INTRODUCTION

This chapter includes all information necessary to perform recommended inspections and adjustments. These preventive maintenance procedures, if followed, will ensure more reliable vehicle operation and a longer service life. The need for costly overhaul work will be greatly reduced. This information applies to vehicles already in service and to new vehicles that are being prepared for sale. All service technicians should be familiar with this entire chapter.

MAINTENANCE INTERVALS CHARTS

The following charts should be considered strictly as a guide to general maintenance and lubrication intervals. You must take into consideration that weather, terrain, geographical location, and a variety of individual uses. This time schedule should be altered to match individual owner's requirements. For example, if the machine is continually operated in an area of high humidity, then all parts must be lubricated much more frequently that shown on the chart to avoid damage caused by water to metal parts.

PERIODIC MAINTENANCE

Item	Remarks	Initial			Thereafter every	
		1 Month	3 Months	6 Months	6 Months	1 Year
Cylinder head/Exhaust system/ Spark arrester	Decarbonize		○	○	○	
*Cam chain	Check and adjust chain tension	○		○	○	
*Valve clearance	Check and adjust valve clearance when engine is cold	○		○	○	
*Spark plug	Inspect/Cleaning or replace as required	○	○	○	○	
*Air filter	Wet type-Must be washed and damped with Foam-air-filter oil or SAE 10W30 type SE motor oil		○	○	○	
Carburetor	Check operation/Fittings		○	○	○	
	Clean/Refit/Adjust					○
*Brake system (complete)	Check/Adjust as required-Repair as required	○	○	○	3 Months	
Drive chain	Check/Adjust as required/Replace as required	○	○	○	1 Month	
*Wheels and tires	Check pressure/Wear/Balance/Run out	○	○	○	○	
Fuel cock	Clean/Flush tank as required	○	○	○	○	
*Lights	Check operation/Replace as required	○	○	○	○	
*Fittings/Fasteners	Tighten before each trip and/or...	○	○	○	○	

*Indicates pre-operation check items.

LUBRICATION INTERVALS

Item	Remarks	Type	Initial			Thereafter every	
			1 Month	3 Months	6 Months	6 Months	1 Year
*Engine oil	Replace/Warm engine before draining	Yamalube 4-cycle oil or SAE 20W40 type SE motor oil	○	Check	○	○	
*Oil filter/Oil strainer	Clean	—	○		○		○
*Throttle lever and housing	Apply lightly	Lithium base grease			○	○	
*Brake lever	Apply lightly	Lithium base grease		○	○	○	
Brake camshaft	Apply lightly	Lithium base grease		○	○	○	
*Drive chain	Lubricate chain thoroughly	Heavy-weight motor oil SAE 30 ~ 50	○	○	○	1 Month	
Front forks	Drain completely Check specifications	Yamaha fork oil 10wt or equivalent	○		○		○
Steering bearings	Inspect thoroughly/pack moderately	Medium-weight wheel bearing grease			Check		2 Years
Wheel bearings	Do not over-pack yearly or ...	Medium-weight wheel bearing grease					○

* Indicates pre-operation check items.

ENGINE

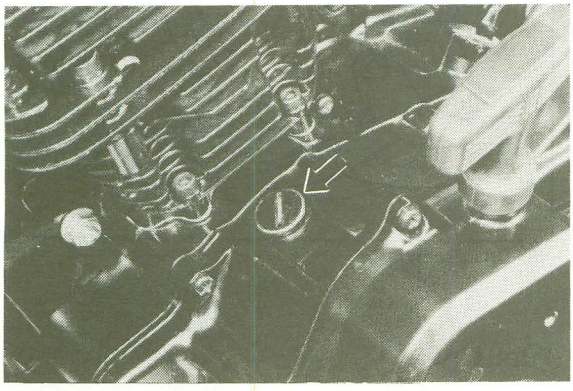
Valve Clearance

Adjust the valve clearance as follows:

NOTE:

Valve clearance must be measured when the engine is cool to the touch.

1. Remove the seat/rear cowling assembly.
2. Remove the intake and exhaust valve covers.
3. Remove the timing window plug from the left-side crankcase cover.



4. Align the "T" mark on the flywheel with the stationary pointer on the crankcase cover by pulling the recoil starter knob. The pointer can be viewed through the timing window in the crankcase cover. When the "T" mark is alinged with the stationary pointer, the piston is at Top Dead Center (TDC). Valve clearance should be checked and adjusted when the piston is at TDC on the compression stroke. The piston is at TDC on compression when there is free play in both valve adjusters.

The flywheel is marked as follows:

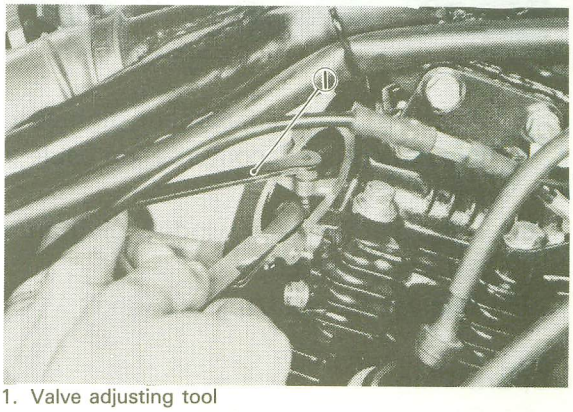
TOP DEAD CENTER

IGNITION TIMING MARK

5. Use a feeler gauge to determine the clearance.

Intake valve (cold): 0.05 ~ 0.09 mm (0.002 ~ 0.004 in) Exhaust valve (cold): 0.11 ~ 0.15 mm (0.004 ~ 0.006 in)

6. Loosen the valve adjuster locknut. Turn the adjuster in or out to obtain the correct clearance. Hold the adjuster to prevent it from moving, and thoroughly tighten the locknut. Recheck the clearance after tightening.



1. Valve adjusting tool

7. Install the intake and exhaust valve covers, the crankshaft end cover, and the timing window.

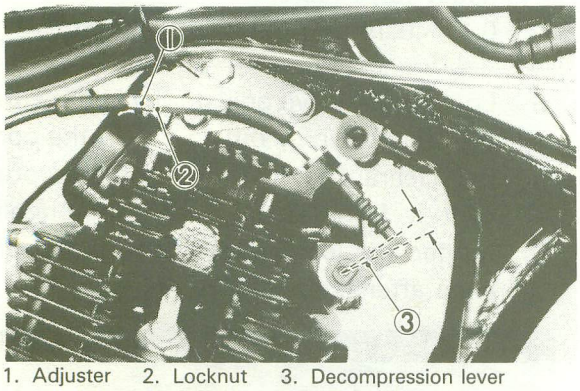
Decompression System

NOTE:

Decompression cable adjustment must follow the valve clearance adjustment.

1. Remove the seat/rear cowling assembly.
2. Remove the timing window plug from the left-side crankcase cover.
3. Align the "T" mark on the flywheel with the timing mark on the crankcase cover by pulling the recoil starter knob. This places the piston at Top Dead Center, and the decompression cable adjustment should be checked and adjusted with the piston at T.D.C. on the compression stroke.

4. Loosen the locknut on the decompression cable adjuster. Then turn the adjuster so 2 ~ 3 mm (0.08 ~ 0.12 in) free play can be provided for the end of the decompression lever.



1. Adjuster 2. Locknut 3. Decompression lever

5. After the above adjustment, tighten the locknut on the decompression cable adjuster.
6. Reinstall the timing window plug on the left crankcase cover.
7. Reinstall the seat/rear cowling.

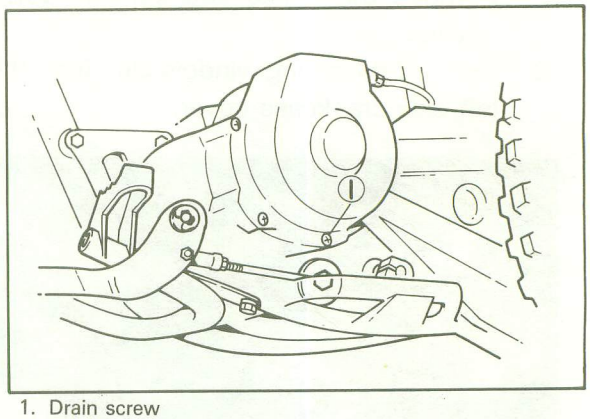
Spark Plug

1. Check electrode condition and wear, insulator color and electrode gap.
2. Clean the spark plug with a spark plug cleaner if necessary.
   Use a wire gauge to adjust the plug gap to the specification.
3. If the electrodes become too worn, replace it.
4. When installing the plug, always clean the gasket surface, wipe off any grime that might be present on the surface of the spark plug, and torque the spark plug properly.

Standard spark plug: D7EA (NGK) or X22ES-U (NIPPONDENSO)
Spark plug gap:
0.6 ~ 0.7 mm (0.024 ~ 0.028 in)
Spark plug tightening torque:
20 Nm (2.0 m · kg, 14 ft · lb)

CAUTION:

After running in the water, be sure to drain the trapped water by removing the drain screw on the left bottom of the recoil starter.
Wash the machine with fresh water if driven in sea water.



1. Drain screw

Fuel Line

Check the fuel hose for cracks or damage; replace if necessary.

Exhaust System

1. Tighten the exhaust pipe flange and muffler securing bolts.

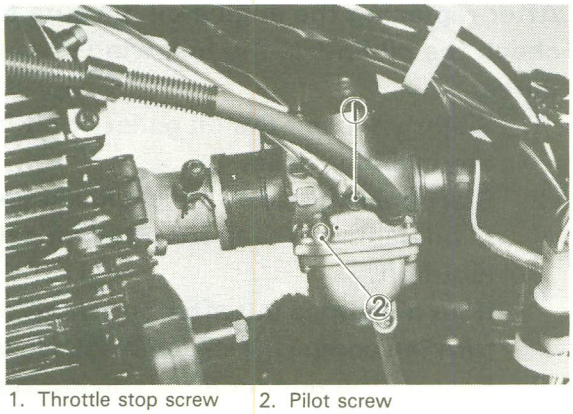
TIGHTENING TORQUE:
Exhaust pipe flange bolt:
10 Nm (1.0 m · kg, 7.2 ft · lb)
Muffler securing bolt:
27 Nm (2.7 m · kg, 19 ft · lb)

2. Replace the exhaust pipe gasket if necessary.

Idle Speed

1. Start the engine, and warm it up for a few minutes.

2. Set the engine idle speed to the specified level by adjusting the throttle stop screw on the carburetor. Turning the throttle stop screw in (clockwise) increases the engine speed; turning it out (counter-clockwise) decreases the engine speed. Use a tachometer for checking and adjusting the engine speed.



1. Throttle stop screw 2. Pilot screw

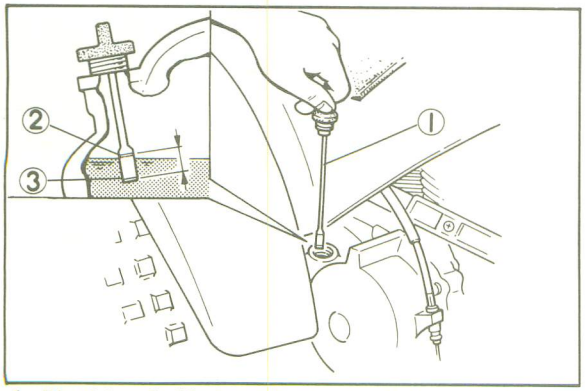
Engine idle: 1,400±50 r/min Pilot screw (turns out): 2 and 1/4±1/2

Engine Oil

1. Oil level measurement
   a. To check the level, warm the engine up for several minutes, screw the dipstick completely out and then just rest the stick in the hole.

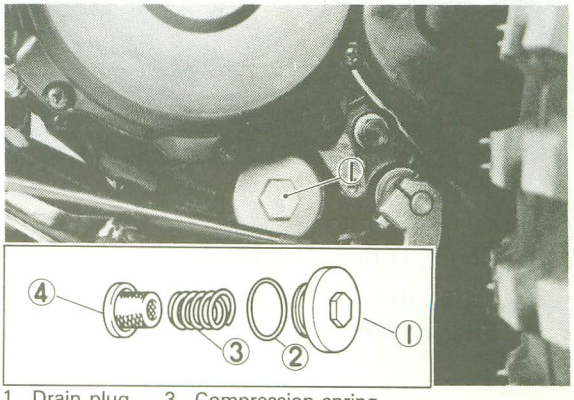
NOTE:

When checking engine oil level with the dipstick, let the unscrewed dipstick just rest on the case threads. Also, be sure the machine is positioned strainght up and on both wheels.

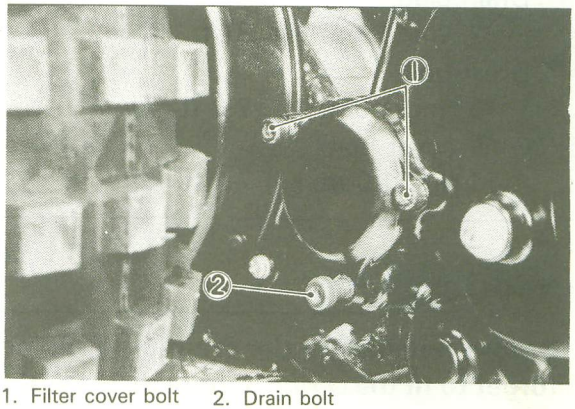


1. Dipstick 2. Maximum level 3. Minimum level

   b. The dipstick has a minimum and a maximum mark, and the oil level should be between the two. If the level is lower, then add sufficient oil to raise it to the proper level.
2. Engine oil replacement
   a. Start the engine. After a few minutes of warm-up stop the engine.
   b. Place a container under the engine.
   c. Remove the dipstick, drain plug, and drain bolt attached to the oil filter cover.



1. Drain plug 3. Compression spring
2. O-ring 4. Oil strainer



1. Filter cover bolt 2. Drain bolt

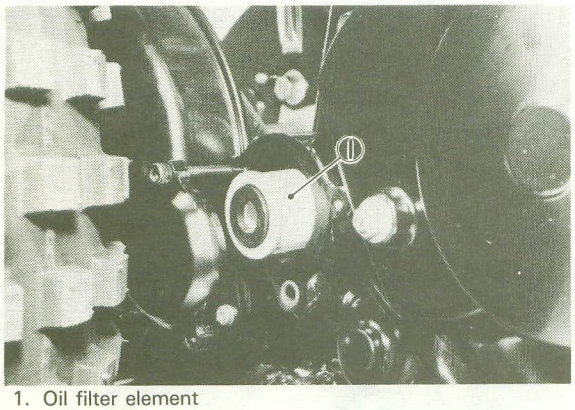
NOTE:

The oil filter cover is secured by two filter cover bolts and the drain bolt. The drain bolt should be loosened until the threaded portion comes out completely.

CAUTION:

When removing the drain plug, the compression spring, oil strainer, and O-ring will fall off. Take care not to lose these parts.

3. Oil filter removal
   a. Remove the oil filter cover and filter element.
   b. Clean the filter element with solvent. Replace it if damaged.



1. Oil filter element

   c. Check O-ring. If damaged, replace.
   d. Install the drain plug, filter element, and filter cover.

TIGHTENING TORQUE:
Drain plug:
43 Nm (4.3 m · kg, 31 ft · lb)
Drain bolt:
10 Nm (1.0 m · kg, 7.2 ft · lb)
Filter cover bolt:
10 Nm (1.0 m · kg, 7.2 ft · lb)

CAUTION:

Before reinstalling the drain plug, do not forget to fit the O-ring, compression spring and oil strainer.

   e. Add engine oil. Install the dipstick and tighten.

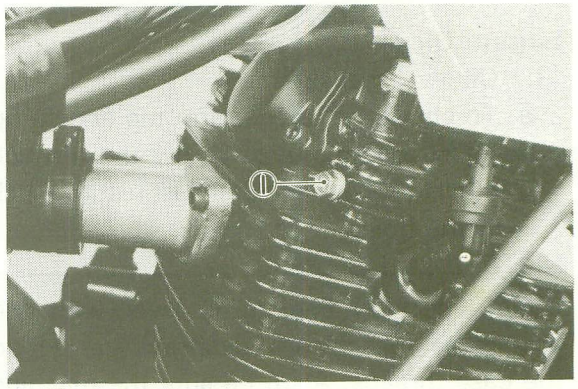
Oil capacity:
Total amount:
1.8 L (1.6 Imp qt, 1.9 US qt)
Periodic oil change:
1.5 L (1.3 Imp qt, 1.6 US qt)
Recommended oil:
Yamalube 4 cycle oil or SAE 20W40 type SE motor oil

   f. Start the engine and allow a few minutes of warm-up.
   While warming up, check for oil leakage. If oil leaks, stop the engine immediately, and check for the cause.
   g. Stop the engine and check the oil level.

CAUTION:

After replacing the engine oil, be sure to check the oil flow in the following procedures:

1. **Slightly loosen the oil gallery bolt in the cylinder head.**
2. **Start the engine and keep it idling until oil begins to seep from the oil gallery bolt.**
   If no oil comes out after one minute, turn the engine off so it will not seize.
3. **Restart the engine after solving the problem(s), and recheck the oil, pressure.**
4. **After checking, tighten the oil gallery bolt to specification.**

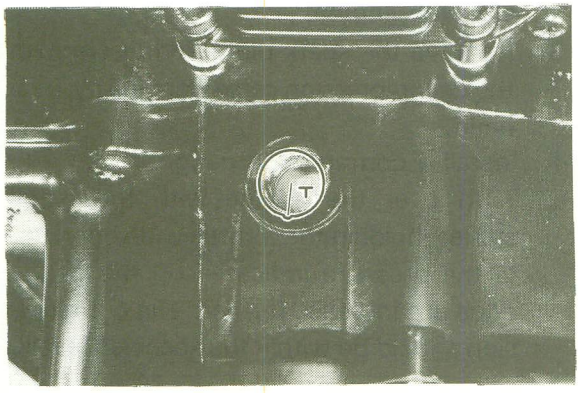


1. Oil gallery bolt

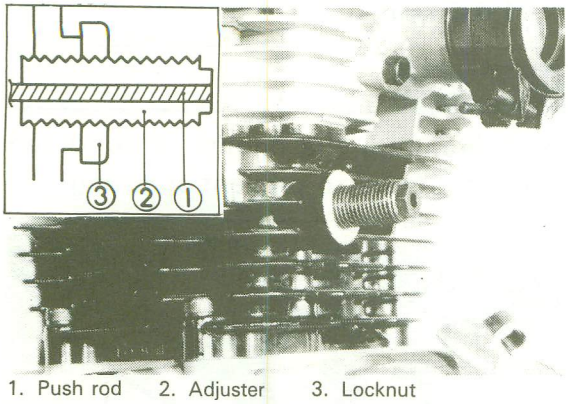
TIGHTENING TORQUE:
Oil gallery bolt:
7 Nm (0.7 m · kg, 5.1 ft · lb)

Cam Chain Adjustment

1. Remove the timing window plug from the left-side crankcase cover.
2. Align the "T" mark on the flywheel with the timing mark on the crankcase by pulling the recoil starter knob.



3. Remove the adjuster cap.
4. Loosen the adjuster locknut.
5. Turn the adjuster in until the push rod (inside the adjuster) is flush with the end of the adjuster.



1. Push rod 2. Adjuster 3. Locknut

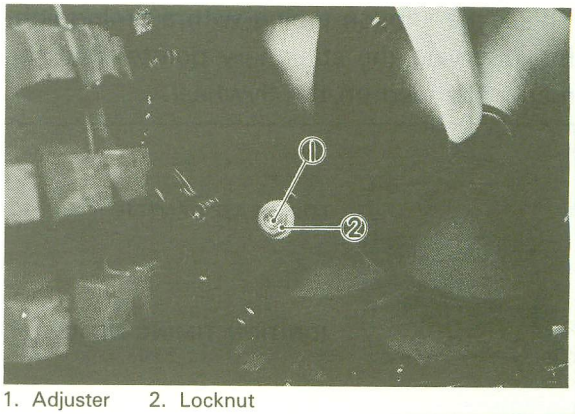
NOTE:

Start the engine. While keeping it idling, check the movement of the push rod. If it moves slightly, the adjustment is correct. If it does not move at all, the adjuster is too tight. Loosen the adjuster so the push rod moves slightly.

6. Tighten the adjuster locknut.
7. Install the adjuster cap and the left crankcase cover.

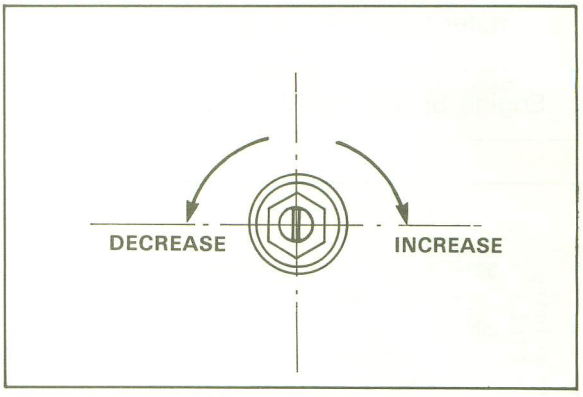
Adjuster locknut tightening torque: 30 Nm (3.0 m · kg, 22 ft · lb) Adjuster cap tightening torque: 5 Nm (0.5 m · kg, 3.6 ft · lb)

Clutch Adjustment



1. Adjuster 2. Locknut

1. Slowly turn the adjuster **counterclockwise** until resistance is felt. This means that the play of the clutch lever is removed. Then, turn it 1/8 **clockwise.**



2. Tighten the adjuster locknut to specification.

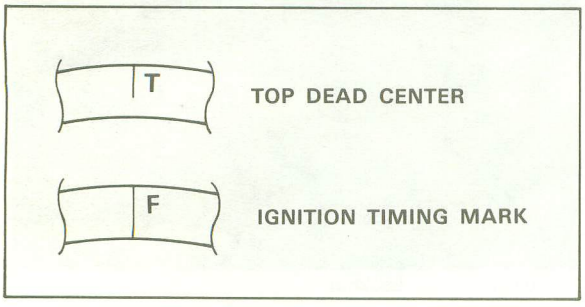
TIGHTENING TORQUE: 15 Nm (1.5 m · kg, 11 ft · lb)

NOTE:

Turn the adjuster counterclockwise to decrease the clutch lever free play and turn it clockwise to increase the free play.

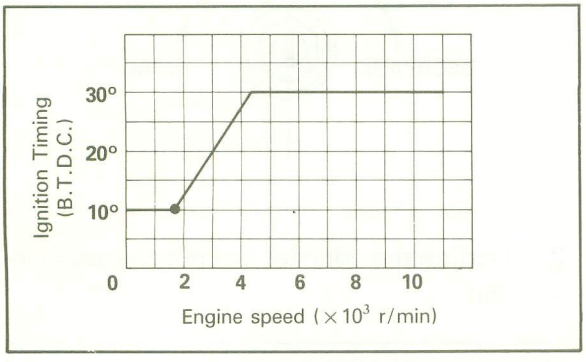
Checking Ignition Timing

Check the ignition timing with a timing light by observing the stationary pointer and the marks stamped on the flywheel.

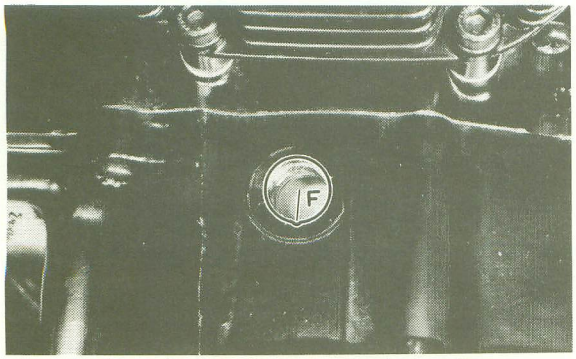


1. Remove the timing window plug.
2. Connect the timing light to the spark plug wire.
3. Start the engine, and keep the engine running at the specified speed. Use a tachometer to check the engine speed.

Engine Speed: 1,400±50 r/min



4. The stationary pointer (in the timing window) should be align with the ignition timing mark on the flywheel. If the pointer is not align with the ignition timing mark, check the flywheel and/or pickup coil assembly for tightness and damage. (See "Chapter 6: Electrical" for further information.)



5. Reinstall the timing window plug.

Compression Pressure Measurement

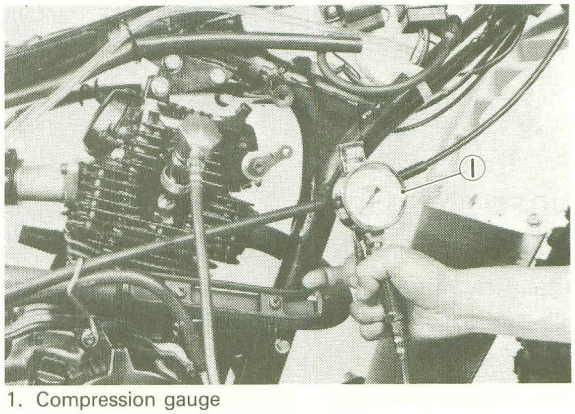
Insufficient compression pressure will result in performance loss and may indicate leaking valves or worn or damaged piston rings.

1. Make sure the valve clearance is correct.
2. Warm up the engine for 2~3 minutes; stop the engine.
3. Remove the spark plug, and disconnect the decompression cable from the cylinder head.
4. Install a compression gauge.
5. Turn over the engine with the recoil starter, holding the throttle wide open until the pressure indicated on the gauge does not increase further. The compression should be within the specified levels.

Compression pressure (at sea level):
Standard:
883 kPa (9 kg/cm^2, 128 psi)
Minimum:
785 kPa (8 kg/cm^2, 114 psi)
Maximum:
1,030 kPa (10.5 kg/cm^2, 149 psi)

WARNING:

When cranking the engine, ground the spark plug wire to prevent sparking.



1. Compression gauge

6. If the pressure is too low, squirt a few drops of oil into the cylinder being measured. Measure compression again. If there is a higher reading than before (without oil), the piston rings may be worn or damaged. If the pressure remains the same after measuring with the oil, one or both rings and valves may be the source of the problem.

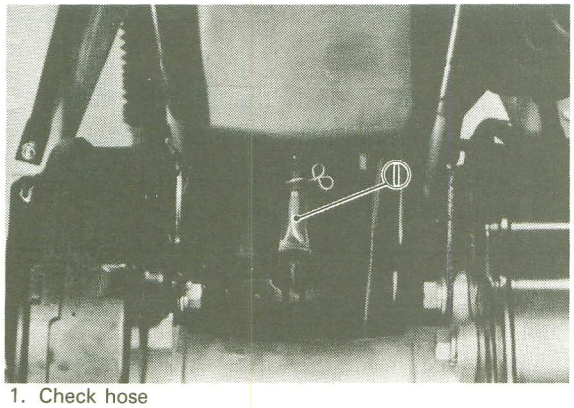
CHASSIS

Air Filter

The air filter protects the engine from dirt which can enter with the intake air and cause rapid engine wear. This dirt is filtered from the air by the air filter element. This model uses a cartridge type air filter elements which consists of foam rubber moistened with oil. When this filter element becomes dirty, it should be cleaned.

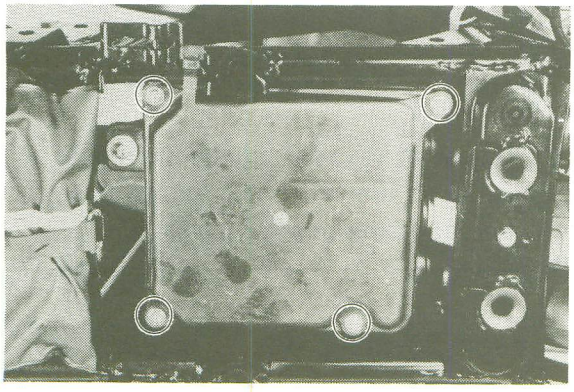
NOTE:

There is a check hose at the bottom of the air filter case. If dust and/or water collects in this hose, clean the air filter element and air filter case.

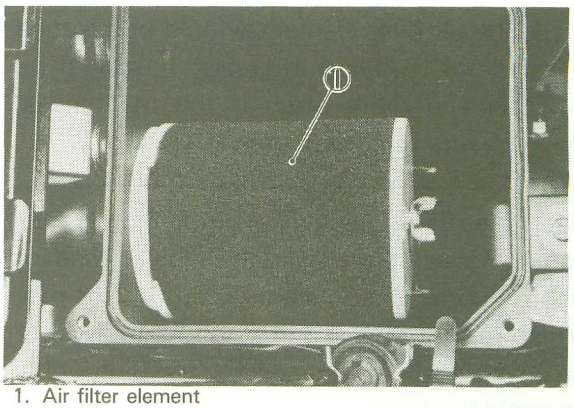


1. Check hose

1. Remove the seat/rear cowling assembly. Remove the filter case cover by removing the four screws.

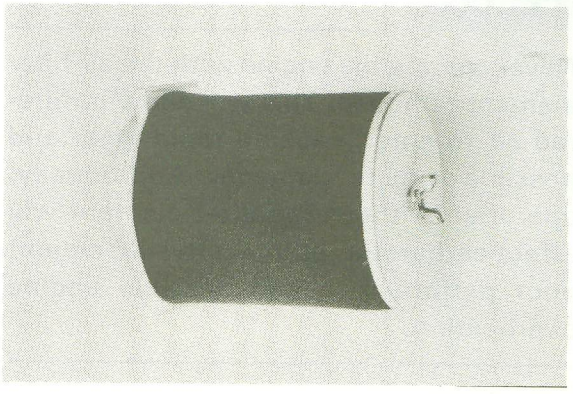


2. Pull out air filter element assembly from the case.

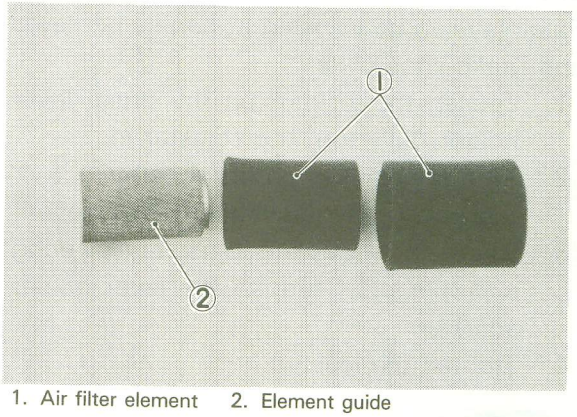


1. Air filter element

3. Remove the wing bolt, element plate, and elements from the element guide.



4. Clean the element with solvent. After cleaning, remove the remaining solvent by squeezing the elements.



1. Air filter element 2. Element guide

5. Then apply foam-air-filter oil or SAE 10W30 type SE motor oil to the entire surface and squeeze out the excess oil. Elements should be wet but not dripping.
6. When installing the air filter element assembly in its case, be sure its sealing surface matches perfectly the sealing surface of the case so there is not air leakage.

7. The air filter element should be cleaned at the specified intervals. It should be cleaned more often if the machine is operated in dusty or wet areas.

NOTE:

Each time filter element maintenance is performed, check the air inlet to the filter case for obstructions. Check the air cleaner joint rubber to the carburetor and manifold fittings for an air-tight seal. Tighten all fittings thoroughly to avoid the posibility of unfiltered air entering the engine.

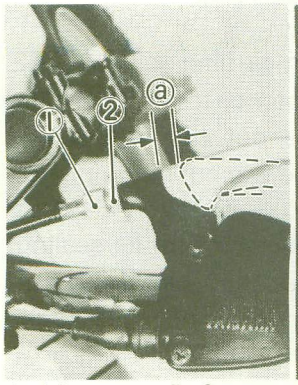
CAUTION:

Never operate the engine with the air filter element removed. This will allow unfiltered air to enter, causing rapid wear and possible engine damage. Additionally, operation without the filter element will affect carburetor jetting with subsequent poor performance and possible engine overheating.

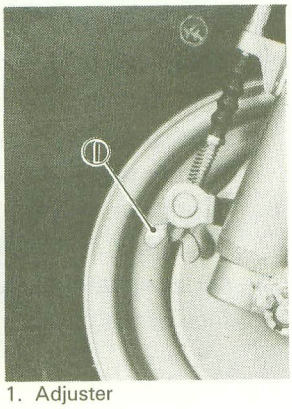
Front Brake Lever

Front brake cable free play can be adjusted to suit rider preference, but a minimum free play of 5 ~ 8 mm (0.2 ~ 0.3 in) should be maintained. Free play can be adjusted at handle bar lever and brake shoe plate.

1. Loosen the locknut on the brake lever holder, fully turn the adjuster in.
2. Turn the adjuster on the shoe plate in or out until proper adjustment is achieved.
3. Unless the shoe plate adjuster helps bring a proper play, turn to the lever holder adjuster.
4. Tighten the locknut.



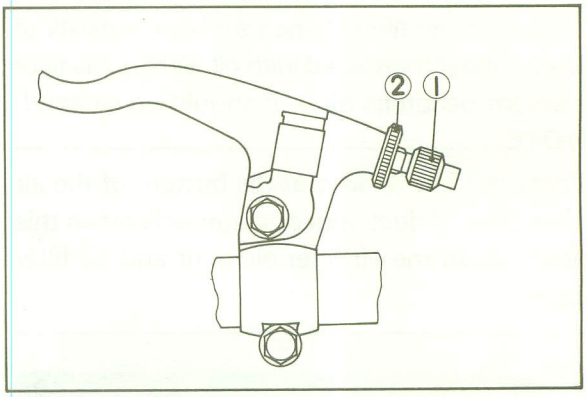
1. Adjuster
2. Locknut
a. 5 ~ 8 mm (0.2 ~ 0.3 in)



1. Adjuster

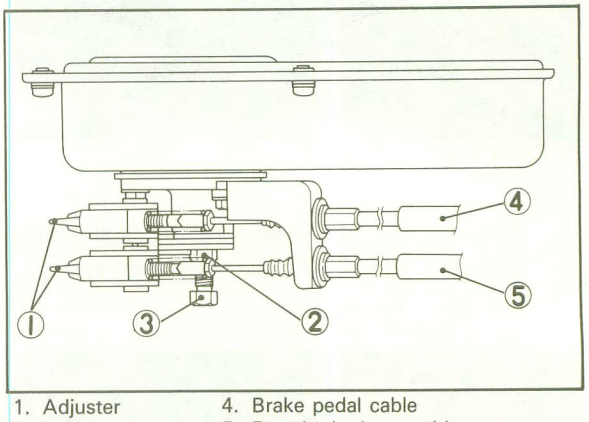
Brake Pedal and Rear Brake Lever Adjustment

1. Pump the brake pedal 2 to 3 times before adjustment.
2. Fully loosen the rear brake lever cable adjuster at the brake lever.



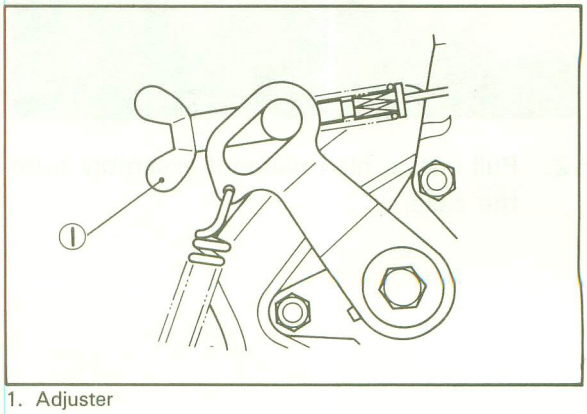
1. Adjuster
2. Locknut

3. Fully loosen both the rear brake lever cable adjuster and the brake pedal cable adjuster at the caliper; then loosen the locknut and adjusting bolt.

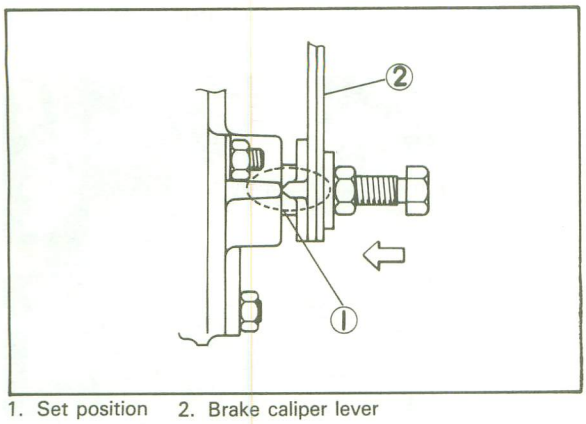


1. Adjuster
2. Locknut
3. Adjusting bolt
4. Brake pedal cable
5. Rear brake lever cable

4. Screw in the rear brake lever cable adjuster so that the brake caliper lever can be set at the position as shown.

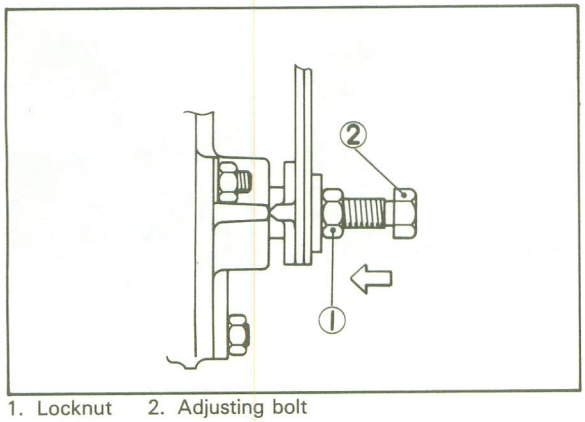


1. Adjuster



1. Set position 2. Brake caliper lever

5. Slowly screw in the adjusting bolt by hand until it feels tight and screw it out 1/4 turn. Then tighten the locknut.

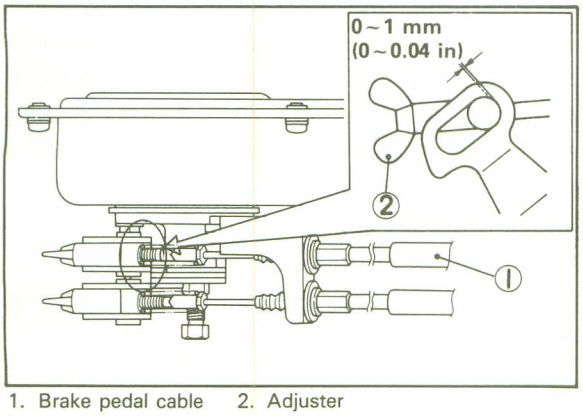


1. Locknut 2. Adjusting bolt

CAUTION:

When tightening the locknut, hold the adjusting bolt with a spanner so that the adjusting bolt is not turned together with the locknut.

6. Screw in the brake pedal cable adjuster to provide a gap of 0 to 1 mm (0 ~ 0.04 in) between the brake caliper lever and the pin.

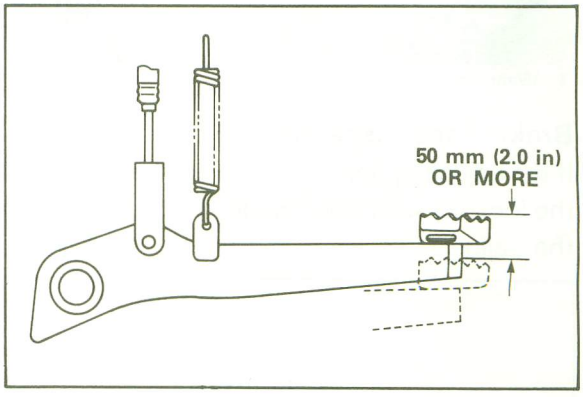


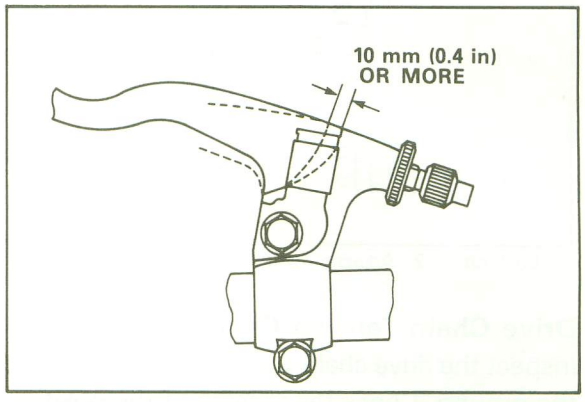
1. Brake pedal cable 2. Adjuster

WARNING:

After this adjustment is performed, block the rear of the machine off the ground, and spin the rear wheels to ensure there is no brake drag. If any brake drag is noticed, perform the above steps again.

7. Adjust the brake when the brake pedal play is over 50 mm (2.0 in) and/or when the rear brake lever play is over 10 mm (0.4 in).



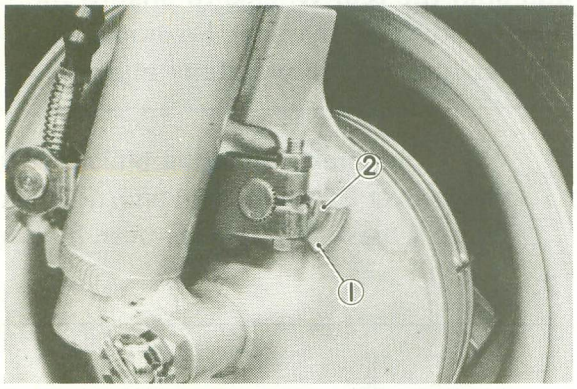


WARNING:

Always adjust both the brake pedal and the brake lever whenever adjusting the rear brake.

Brake Lining Inspection

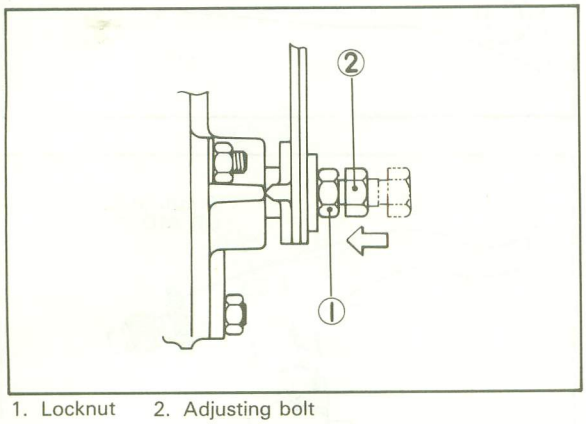
To check, see the wear indicator position while pulling the brake lever. If the indicator reaches to the wear limit line, replace the brake shoes.



1. Wear limit 2. Wear indicator

Brake Pads Inspection

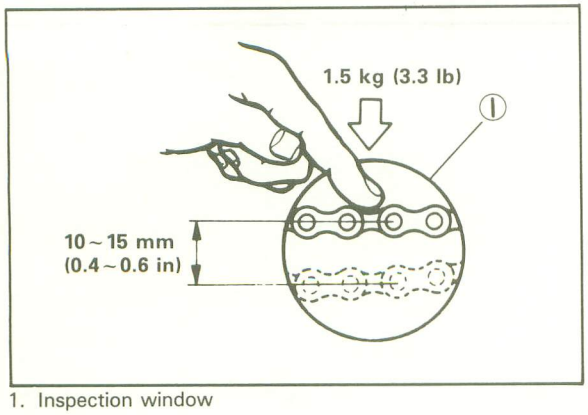
If the adjusting bolt has come so close to touch the locknut with use, replace the both pads in the caliper.



1. Locknut 2. Adjusting bolt

Drive Chain Tension Check

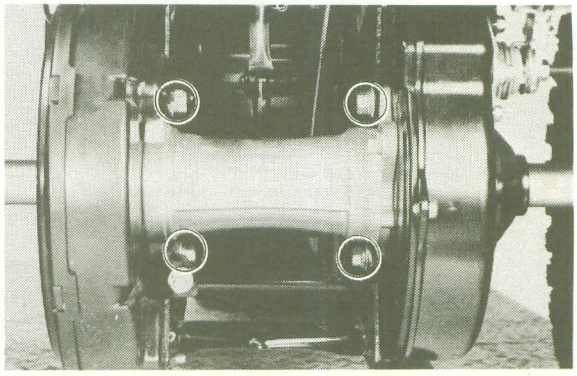
Inspect the drive chain with both tires touching the ground. Check the tension at the position shown in the illustration. The normal vertical deflection is approximately 10 ~ 15 mm (0.4 ~ 0.6 in). If the deflection exceeds 15 mm (0.6 in), adjust the chain tension.



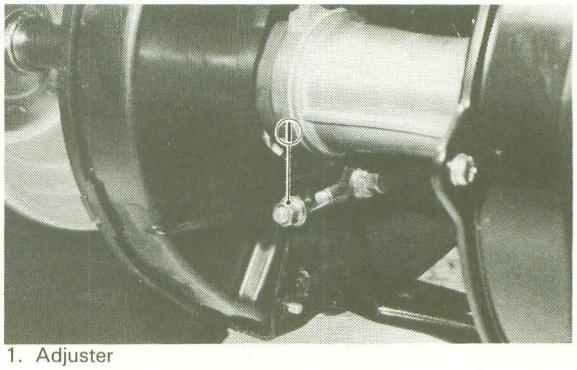
1. Inspection window

Drive Chain Tension Adjustment

1. Loosen the rear wheel hub bolts.

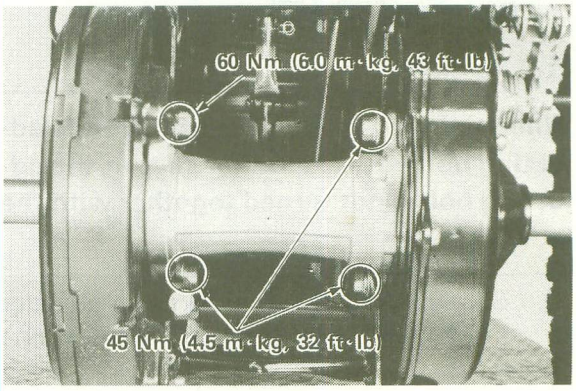


2. Next, adjust chain play to specification by turning the chain puller adjuster.



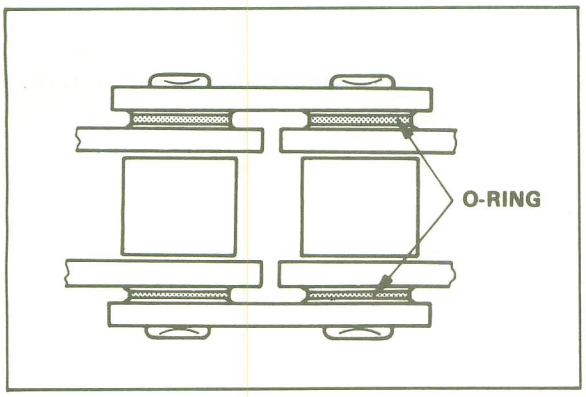
1. Adjuster

3. Tighten the rear wheel hub bolts.



Drive Chain Cleaning and Lubrication

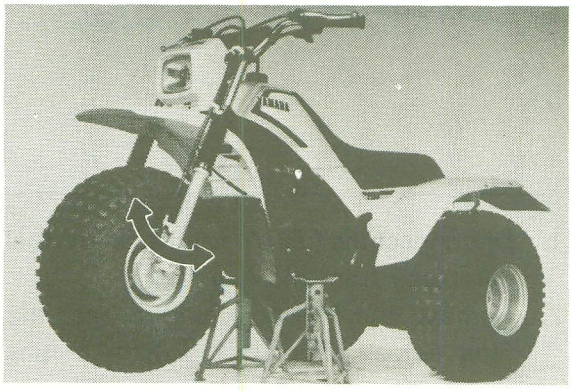
This machine has a drive chain with small rubber O-rings between the chain plates. Steam cleaning, high-pressure washes, and certain solvent can damage these O-rings. Use only kerosene to clean the drive chain. Wipe it dry, and thoroughly lubricate it with SAE 30 ~ 50 motor oil. Do not use any other lubricants on the drive chain. They may contain solvents that could damage the O-rings.



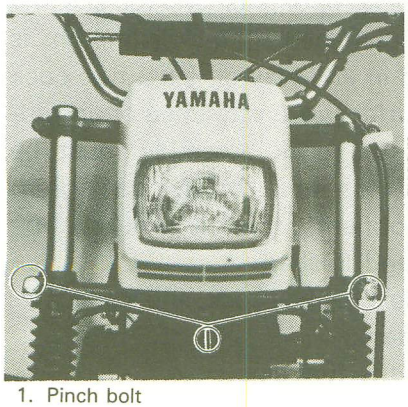
Steering Head Adjustment

The steering assembly should be checked periodically for looseness.

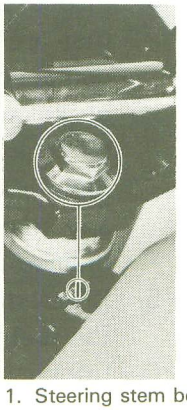
1. Raise the front end of the machine so that there is no weight on the front wheel.
2. Grasp the bottom of the forks and gently rock the fork assembly backward and forward, checking for looseness in the steering assembly bearings.



3. If the steering head is loose, adjust it. Loosen the pinch bolts of the steering crown and loosen the steering stem bolt.

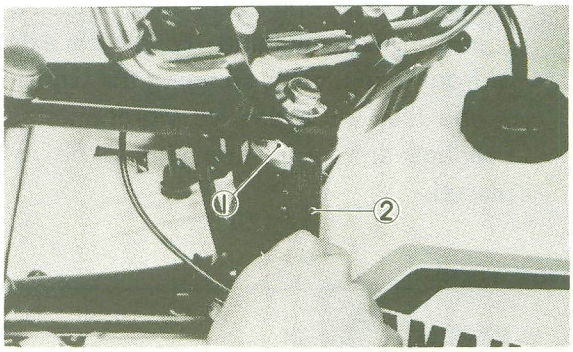


1. Pinch bolt



1. Steering stem bolt

4. Use a ring nut wrench to tighten the steering ring nut until the steering head is tight but does not bind when the forks are turned.



1. Steering ring nut 2. Ring nut wrench

5. Tighten the pinch bolts and steering stem bolt to specification.

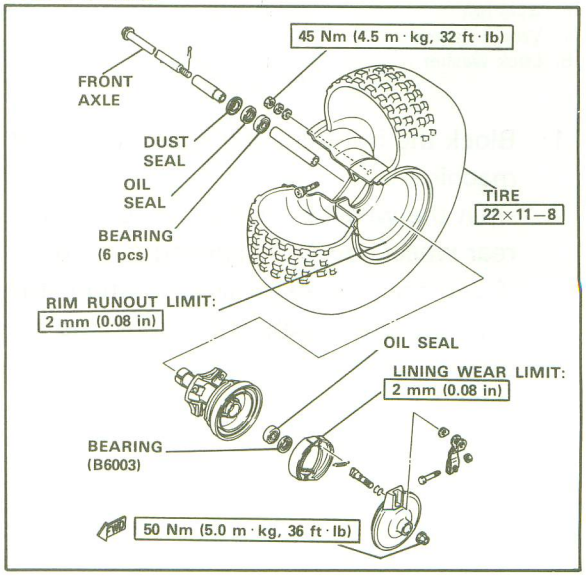
TIGHTENING TORQUE:
Steering stem nut:
90 Nm (9.0 m · kg, 65 ft · lb)
Pinch bolt:
Under bracket:
30 Nm (3.0 m · kg, 22 ft · lb)
Steering crown:
20 Nm (2.0 m · kg, 14 ft · lb)

6. Recheck steering adjustment to make sure there is no binding when the forks are moved from lock to lock. If necessary, repeat the adjustment procedure.

Wheel Bearings

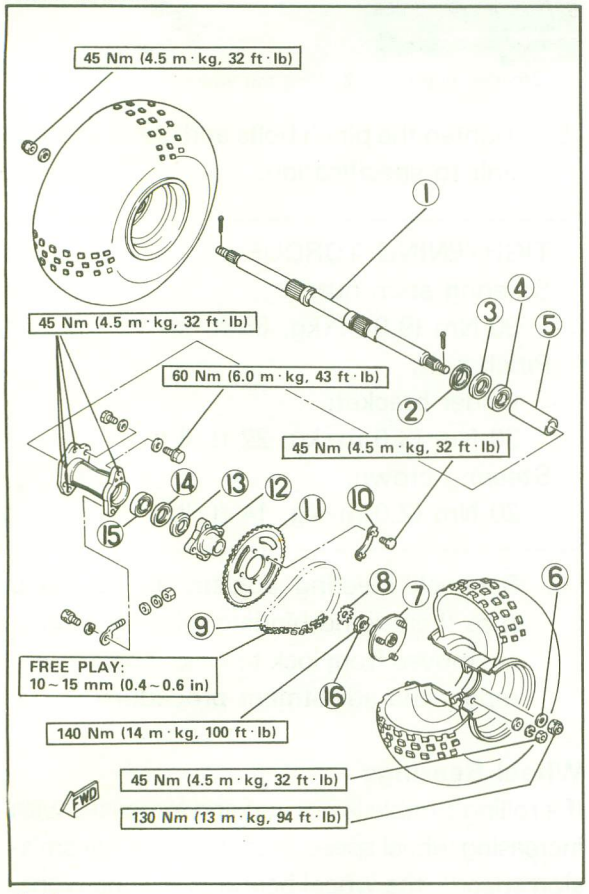
If a rolling rumble is noticed and increases with increasing wheel speed (not engine or transmission speed), the wheel bearings may be worn. Check the wheel bearings for both the front and rear wheels.

Front wheel



1. Raise the front end of the machine, and spin the wheel by hand. Touch the axle or front fender while spinning the wheel. If you feel any excessive vibration, the bearings are rough and should be replaced.

Rear wheel

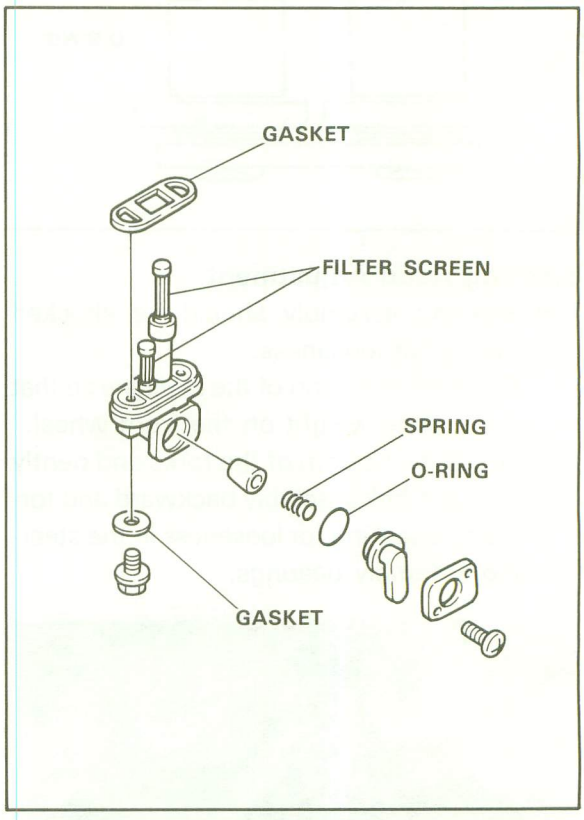


1. Rear axle
2. Dust seal
3. Oil seal
4. Bearing (B6008)
5. Spacer
6. Axle nut
7. Wheel flange
8. Lock washer
9. Drive chain 104 links
10. Lock washer
11. Driven sprocket (42T)
12. Flange
13. Dust seal
14. Oil seal
15. Bearing
16. Ring nut

1. Block the front tire and raise the rear of machine.
2. Spin the wheel by hand and toutch the rear wheel hub while spining the wheel. If you feel any excessive vibration, the bearings are rough and should be replaced.

Fuel Cock

If either fuel cock is leaking or is excessively contaminated, it should be removed from the fuel tank and inspected.



1. Disconnect the fuel pipe and drain the fuel completly from the fuel tank.
2. Remove the fuel cock and inspect the filter screen. Replace the filter if it is seriously contaminated.
3. Remove the screws on the front and rear of the fuel cock; remove the plate, gaskets, lever, and diaphragm.
4. Inspect all components, and replace any that are damaged. If the diaphragm is damaged in any way or if the fuel cock gasket surfaces are scratched or corroded, the fuel cock assembly must be replaced. If there is abrasive damage to any components, the fuel tank must be drained and flushed.
5. Reassemble the fuel cock, and install it on the fuel tank.
6. Connect the fuel pipe.

Tires

WARNING:

This model is equipped with low pressure tires. Pay attention to the following points:
Recommended tire pressure:
14.7 kPa (0.15 kg/cm^2, 2.2 psi)
Vehicle load limit: 100 kg (220 lb)
Tire size: 22 × 11-8

1. **Excessive tire pressure (over 68.6 kPa (0.7 kg/cm^2, 10 psi)) may cause tire to burst. Inflate tires very slowly. Fast inflation could cause tire to burst.**
2. **Too low a pressure (below 11.8 kPa (0.12 kg/cm^2, 1.8 psi)) will cause the rim to dislodge from the tire.**
3. **Put the same pressure in both rear tires. Uneven tire pressure will severely affect the handling.**
4. **Set tire pressures cold.**

How to measure tire pressure
Use an appropriate low-pressure tire gauge. Set tire pressures to the following specifications:

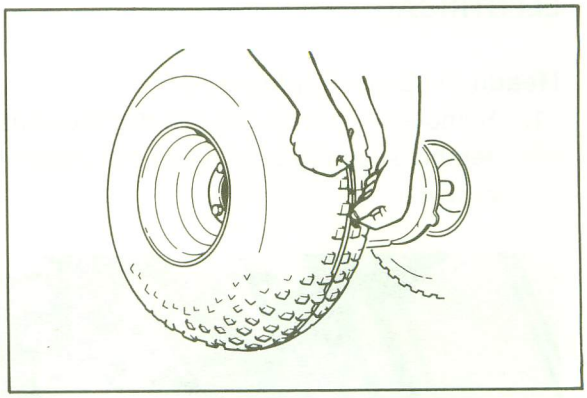
Reference tire pressure:
14.7 kPa (0.15 kg/cm^2, 2.2 psi)
Minimum tire pressure:
11.8 kPa (0.12 kg/cm^2, 1.8 psi)

CAUTION:

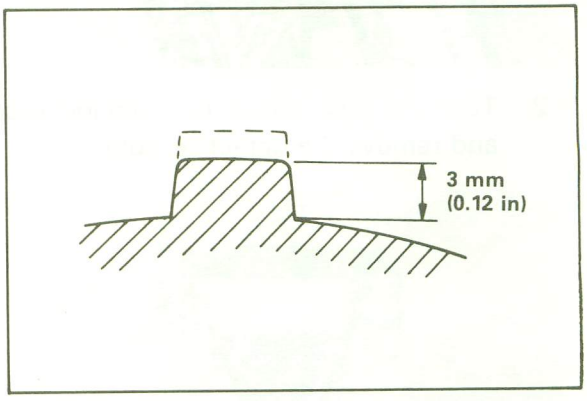
Never use a tire pressure below minimum specification. The tire could separate from the wheel under severe operating conditions.

If the appropriate low-pressure tire gauge is not available, use the following temporary procedure:
Measure the circumference of the tire using an inelastic but flexible strip. Do not measure the tire's circumference on top of the tread blocks.

Standard tire circumference:
1,735 mm (68.3 in)
Minimum tire circumference:
1,725 mm (67.9 in)



Tire wear limit
When the tire groove decreases to 3 mm (0.12 in) due to wear, replace the tire.



Cable Inspection and Lubrication

1. Damage to the outer housing of the various cables may cause corrosion. Often free movement will be obstructed. An unsafe condition may result. Replace such cables as soon as possible.
2. If the inner cables do not operate smoothly, lubricate or replace them.

Recommended lubricant:
Yamaha Chain and Cable Lube or
10W30 motor oil

Brake and Change Pedals/Front and Rear Brake Levers

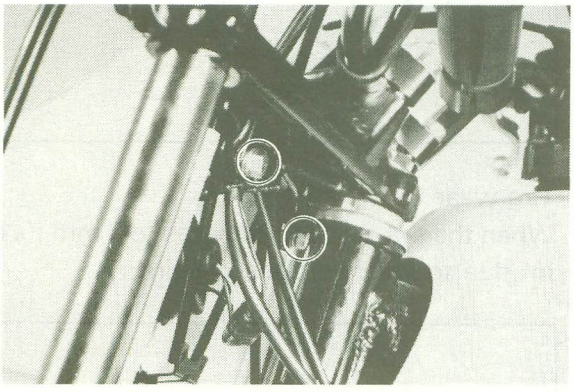
Lubricate the pivoting parts of each lever and pedal.

Recommended lubricant:
Yamaha Chain and Cable Lube or
10W30 motor oil

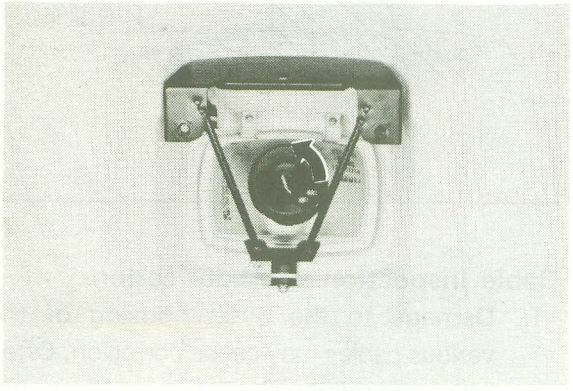
ELECTRICAL

Headlight Bulb Replacement

1. Remove the front panel/headlight unit assembly securing bolts from the steering crown.



2. Turn the bulb holder counterclockwise and remove the defective bulb.



3. Slip a new bulb into position and secure it with the bulb holder.
4. Reinstall the front panel/headlight unit assembly onto the steering crown. Torque the bolt to specification.

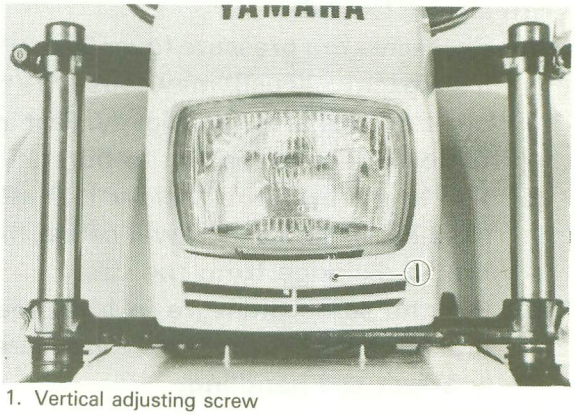
TIGHTENING TORQUE:
15 Nm (1.5 m · kg, 11 ft · lb)

5. Adjust the headlight unit if necessary.

Headlight Beam Adjustment

When necessary, adjust the headlight beam as follows:

1. Vertical adjustment
   To adjust the beam to the upper, turn the adjusting screw clockwise.
   To adjust the beam to the lower, turn the adjusting screw counterclockwise.



1. Vertical adjusting screw

CHAPTER 3.
ENGINE OVERHAUL

CHAPTER 3. ENGINE OVERHAUL

ENGINE REMOVAL

NOTE:

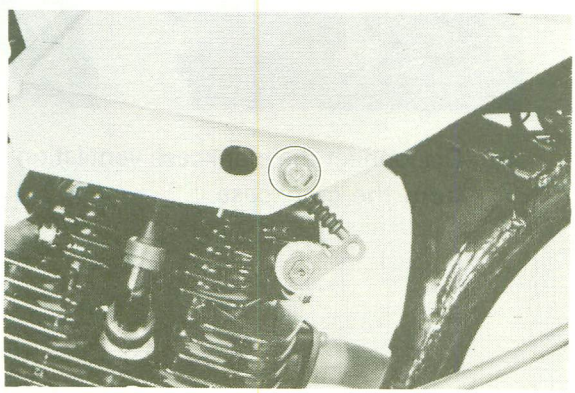
- It is not necessary to remove the engine in order to remove the cylinder and/or the flywheel magneto assembly.
- It is necessary to remove the right-side rear wheel in order to remove the clutch assembly.

Preparation for Removal

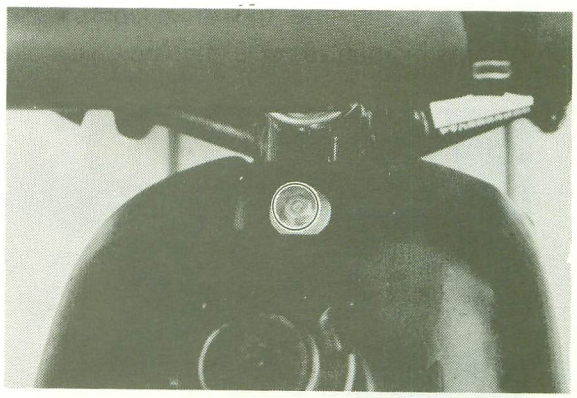
1. All dirt, mud, dust, and foreign material should be thoroughly removed from the exterior of the engine before removal and disassembly. This will prevent any harmful foreign material from entering the interior of the engine assembly.
2. Before engine removal and disassembly, be sure you have proper tools and cleaning equipment so you can perform a clean and efficient job.
3. During disassembly of the engine, clean and place all parts in trays in order of disassembly. This will ease and speed assembly time and insure correct reinstallation of all engine parts.
4. Start the engine and warm it for a few minutes; remove the drain plug, and drain the engine oil.

Seat and Fuel Tank

1. Remove the seat/rear cowling assembly, and remove the fuel tank cover, which is secured by the fuel tank cap and the bracket; see the photograph.



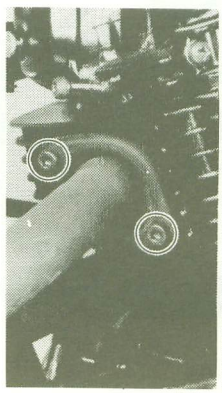
2. Remove the fuel tank holding bolt.

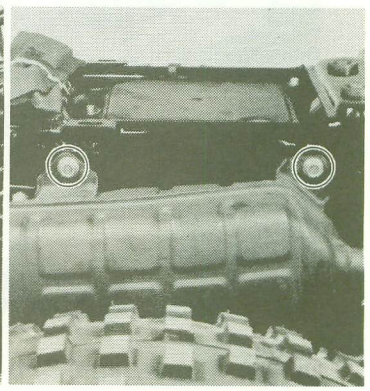


3. Turn the fuel cock to "OFF".
4. Disconnect the fuel lines at the fuel cock and fuel tank, disconnect the rubber retaining band, and remove the fuel tank.

Muffler Assembly

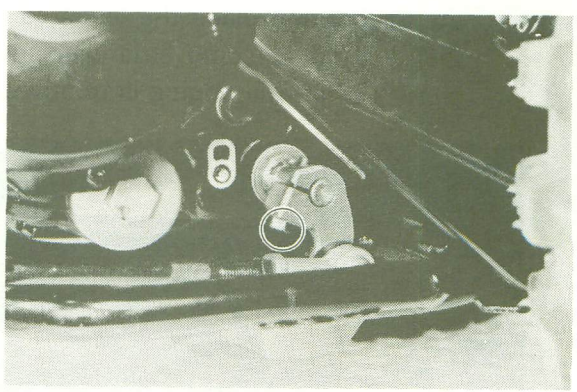
1. Remove the exhaust pipe flange bolts.
2. Remove the muffler securing bolts and remove the muffler assembly.





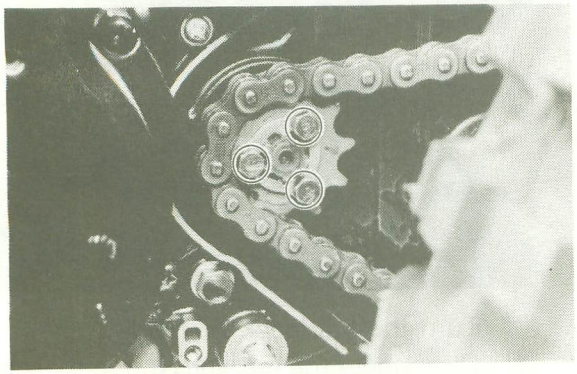
Drive Chain and Shift Linkage

1. Remove the shift linkage at the shift shaft.



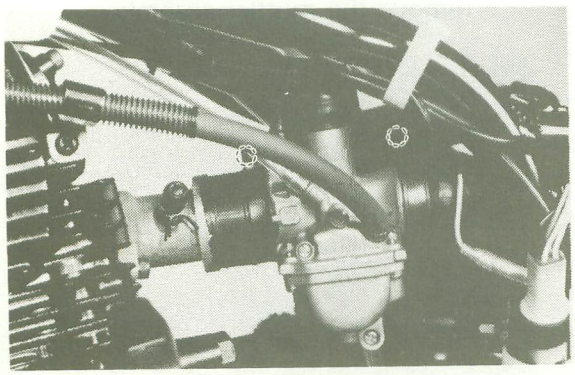
2. Loosen the drive chain tensioner so that the drive chain is completely slack.

3. Remove the three drive sprocket retaining bolts, and the drive sprocket lock plate; then remove the drive sprocket.



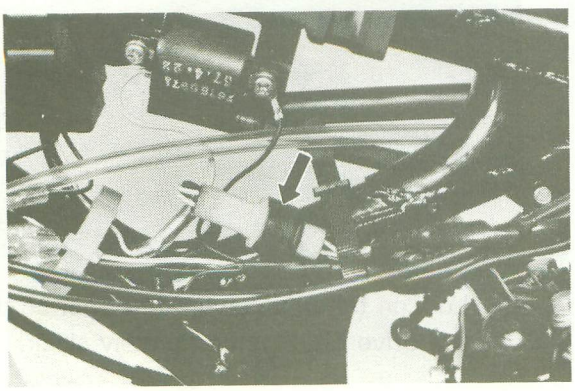
Carburetor

1. Disconnect the carburetor over flow hose from the carburetor.
2. Loosen the carburetor clamp screws and remove the carburetor.

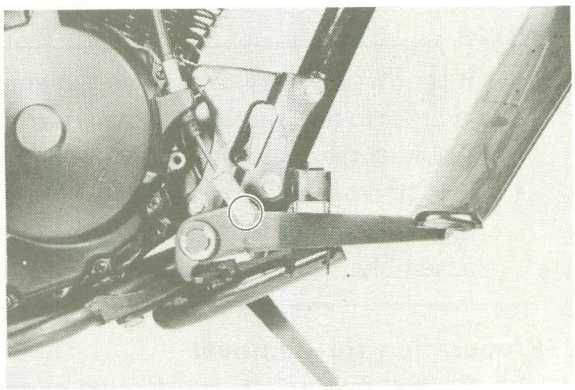


Wires, Pipes, and Cables

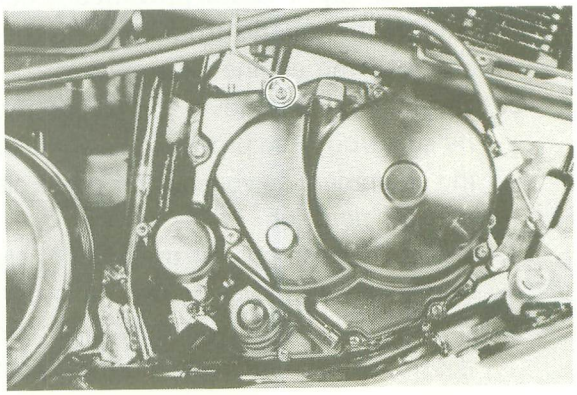
1. Disconnect the spark plug lead.
2. Disconnect the CDI leads at the water proof connector; disconnect the bullet connector. Then remove the leads from the bands, and place the leads so that they will not become entangled in the chassis when the engine is removed.



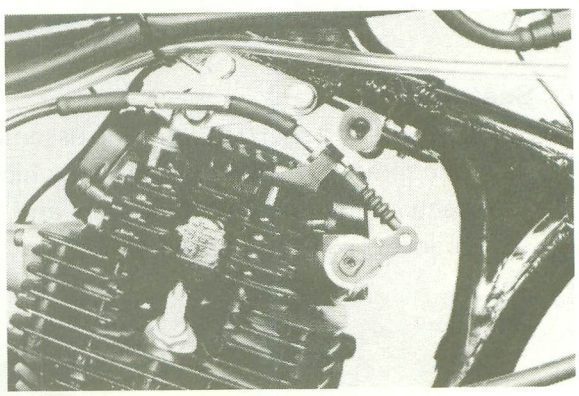
3. Disconnect the foot brake cable at the brake pedal.



4. Remove the rear brake cables holder securing bolt from the clutch cover.



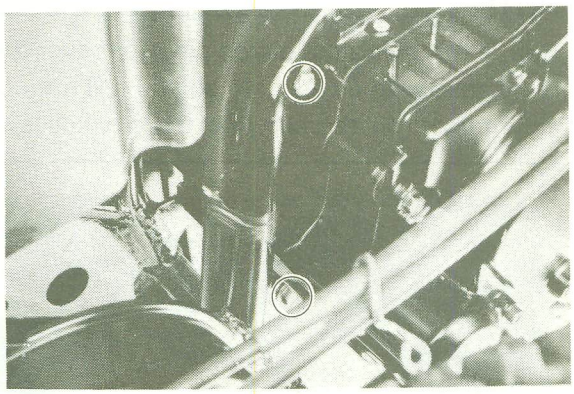
5. Disconnect the decompression cable at the cylinder head.



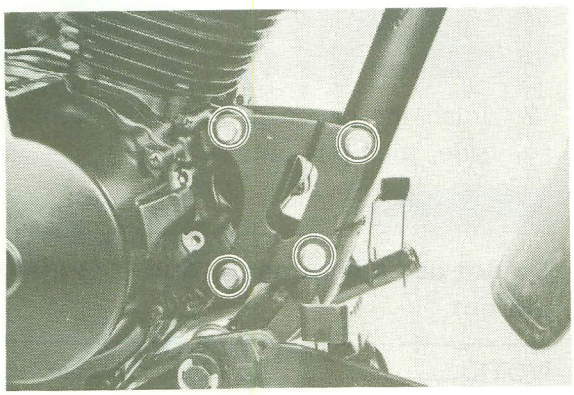
6. Disconnect the crankcase ventilation pipe from the crankcase.

Engine Removal

1. Remove the rear lower and upper engine mounting bolts.



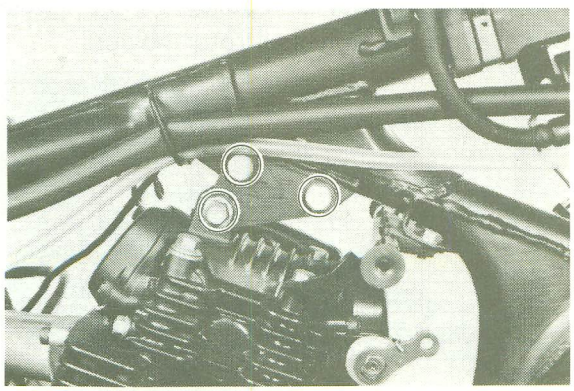
2. Completely remove the front lower engine mounting brackets.



NOTE:

Note the order of installation on the front lower engine mounting brackets for reassembly.

3. Remove the engine stay at the cylinder head.

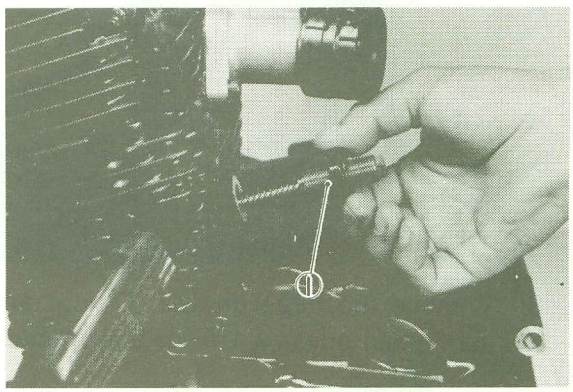


4. Remove the engine from the right side of the chassis.

ENGINE DISASSEMBLY

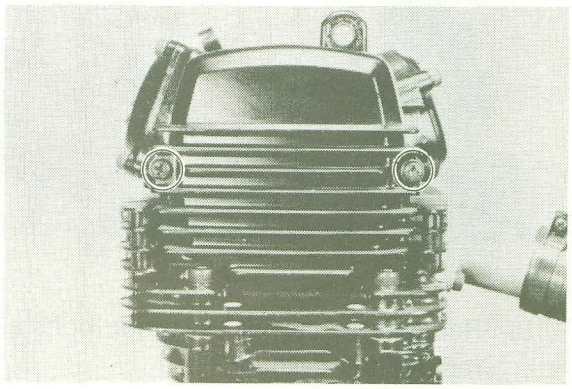
Cylinder Head and Cylinder

1. Remove the cam chain tensioner cap.
2. Loosen the tensioner locknut.
3. Remove the chain tensioner assembly. Note the location of each part.

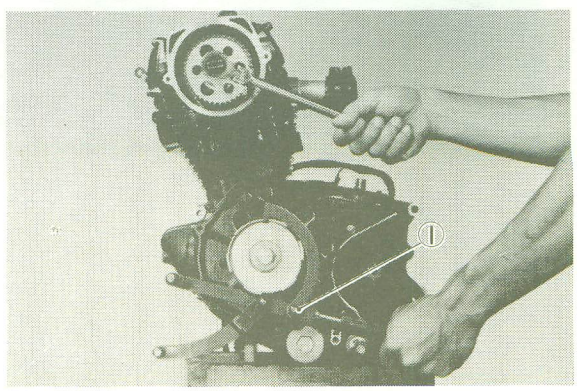


1. Tensioner

4. Remove the cam sprocket cover securing bolts and remove the cover.

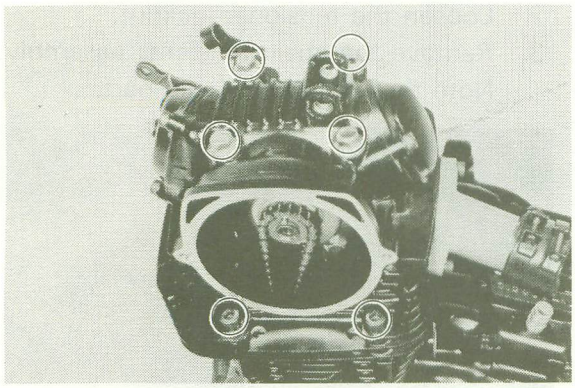


5. Remove the recoil starter assembly and spark plug.
6. Remove the cam sprocket securing bolt from the left side cylinder head. Hold the recoil starter pulley with the universal rotor holder.

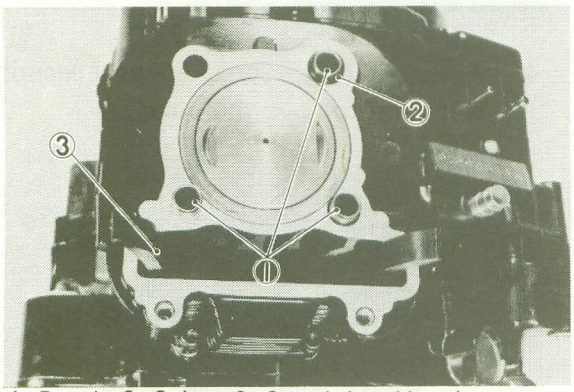


1. Universal rotor holder

7. Remove the cylinder head. Loosen all the cylinder head bolts first. Each bolt must be loose before any one is removed.

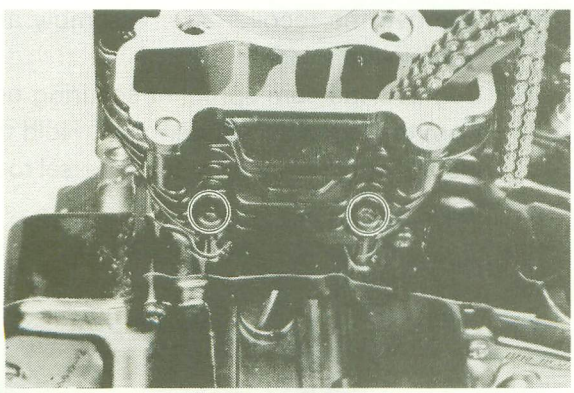


8. Remove the three dowels, O-ring, and cam chain guide #1 from the cylinder.



1. Dowel 2. O-ring 3. Cam chain guide #1

9. Remove the cylinder securing bolts and remove the cylinder.

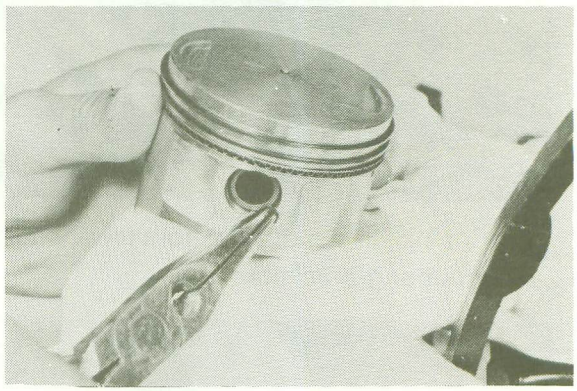


Piston Pin and Piston

1. Remove the piston pin clip from the piston.

NOTE:

Before removing the piston pin clip, cover the crankcase with a clean rag so you will not accidentally drop the clip into the crankcase.



2. Push the piston pin from the opposite side, then pull out.

CAUTION:

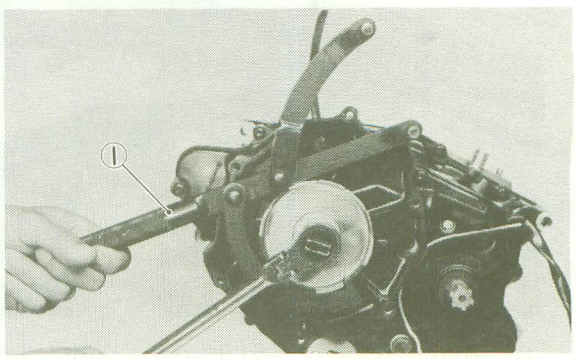
Do not use a hammer to drive the piston pin out.

NOTE:

Before removing the piston pin, deburr the clip groove and pin hole area. If after the piston pin groove is deburred and the piston pin is still difficult to remove, use the piston pin puller.

Crankcase Spacer (Left Side)

1. Remove the recoil starter pulley securing bolt, washer, and pulley. Hold the pulley with the universal rotor holder.

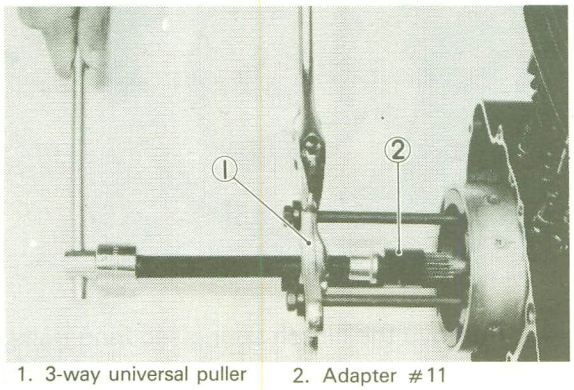


1. Universal rotor holder

2. Remove the left-side crankcase spacer securing bolts and remove the spacer, and two dowels from the crankcase.

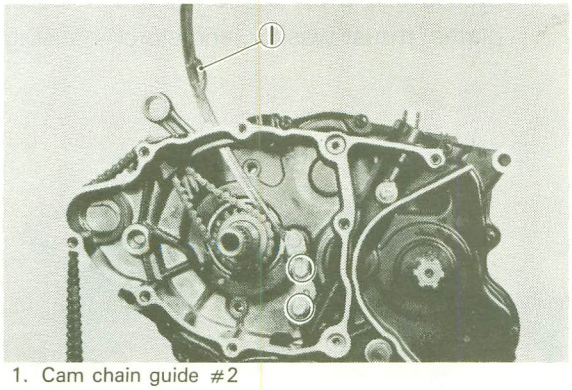
Flywheel Magneto

1. Remove the flywheel magneto. Place the 3-way universal puller attachment on the crankshaft, and remove the flywheel with the puller.



1. 3-way universal puller 2. Adapter #11

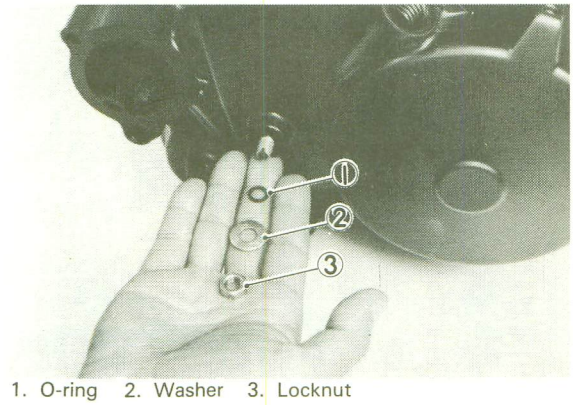
2. Remove the woodruff key from the crankshaft keyway.
3. Remove the cam chain guide #2 securing bolts and remove the cam chain guide #2 and cam chain.



1. Cam chain guide #2

Clutch Cover

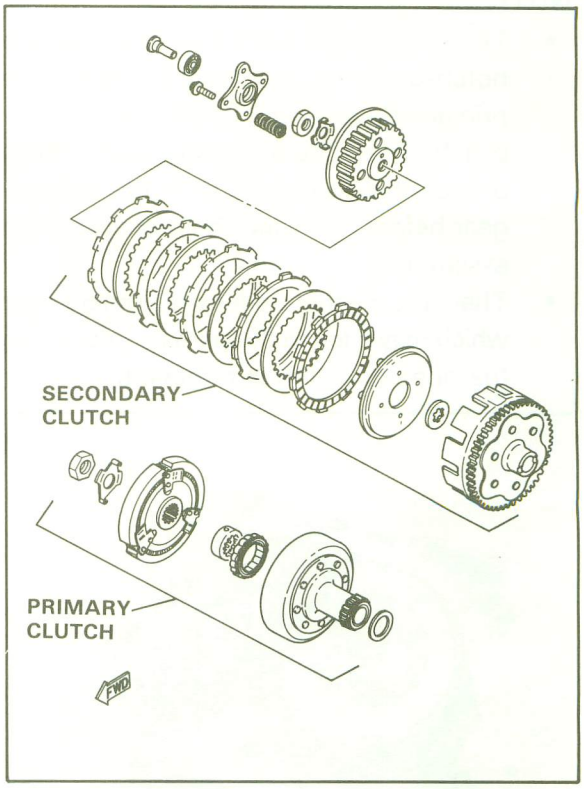
1. Remove the oil filter cover securing bolts and remove the filter cover, filter, and O-rings.
2. Remove the clutch adjuster locknut, washer, and O-ring from the clutch cover.



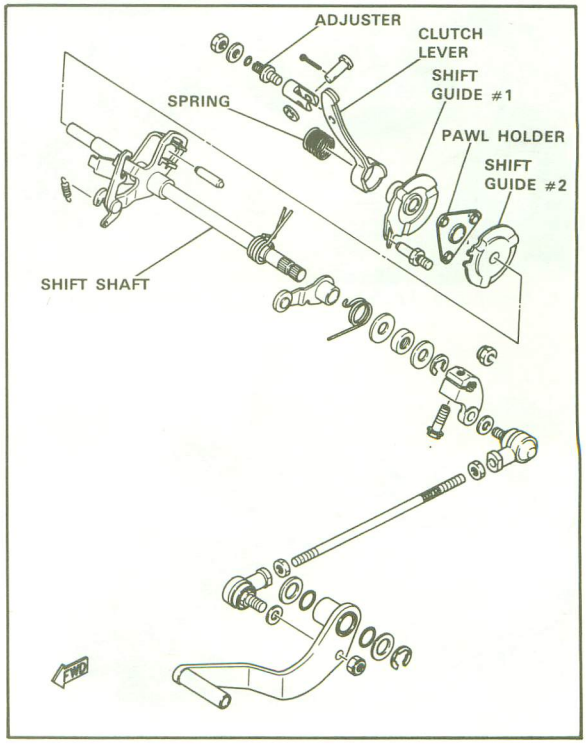
1. O-ring 2. Washer 3. Locknut

3. Remove the clutch cover securing bolts and remove the cover and two dowels from the right-side crankcase.

Primary Clutch and Secondary Clutch



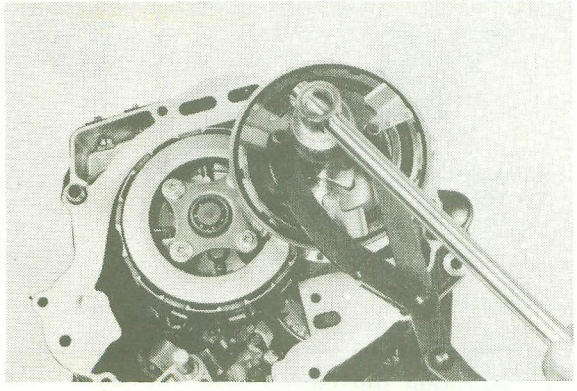
1. Remove the clutch lever spring, clutch lever, shift guide #1, pawl holder, and shift guide #2.

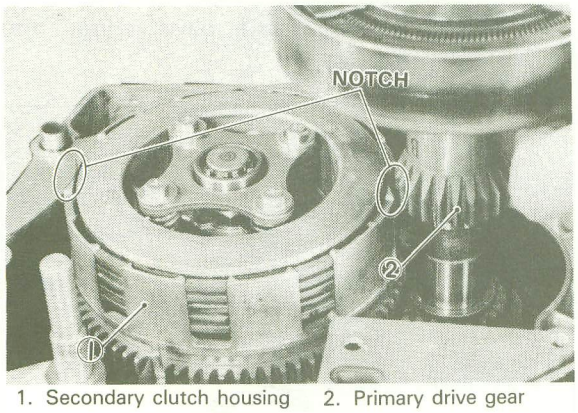


2. Flatten the lock tab on the primary clutch securing nut. Hold the clutch shoe assembly with the universal rotor holder and remove the securing nut, lock washer, and primary clutch assembly.

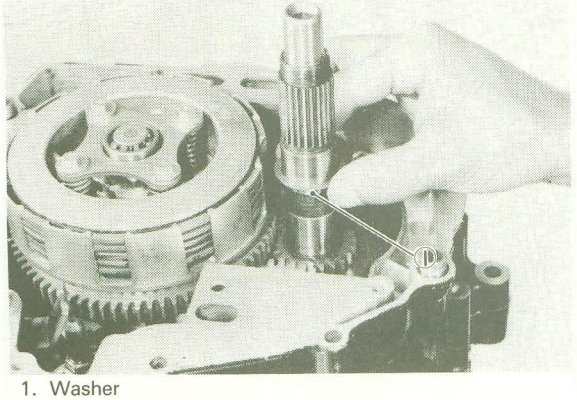
NOTE:

- The secondary clutch housing has two notches machined into it to permit the primary drive gear behind the primary clutch to clear the secondary clutch. Align one of these notches with the primary gear before removing the primary clutch assembly.
- There is a washer under the primary gear which may stick to the primary gear when the primary clutch is removed.



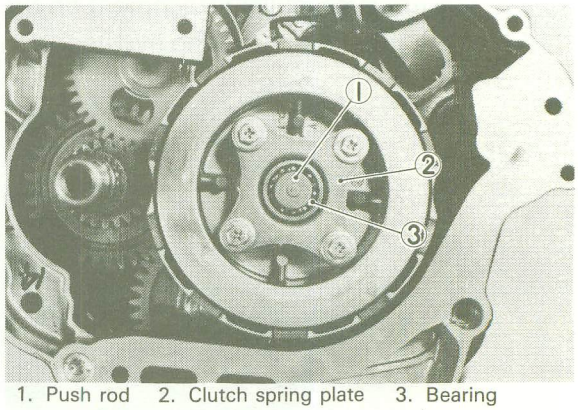


1. Secondary clutch housing 2. Primary drive gear



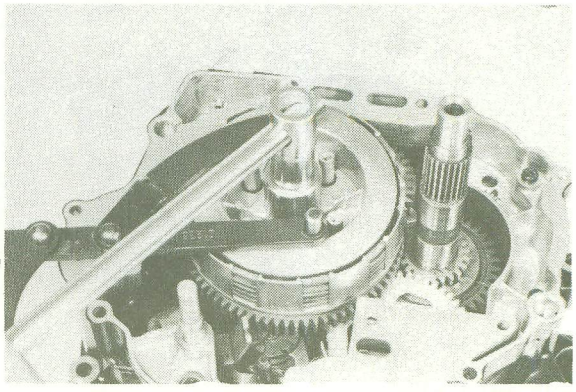
1. Washer

3. Remove the push rod and bearing from the secondary clutch spring plate.



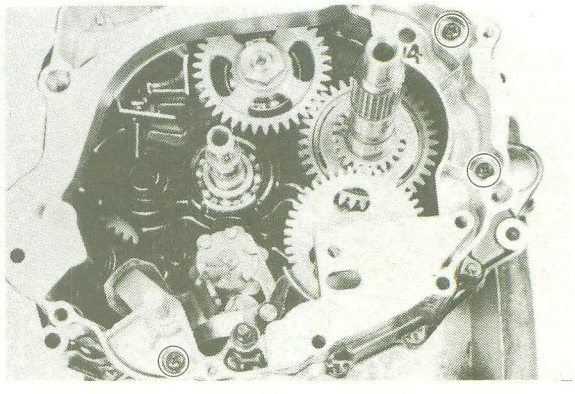
1. Push rod 2. Clutch spring plate 3. Bearing

4. Remove the clutch spring securing bolts, and remove the clutch spring plate and clutch springs.
5. Flatten the lock tab on the clutch boss securing nut. Hold the clutch boss with the universal rotor holder and remove the securing nut, lock washer, clutch boss, pressure plate, friction plates, clutch plates, thrust washer, and clutch housing.



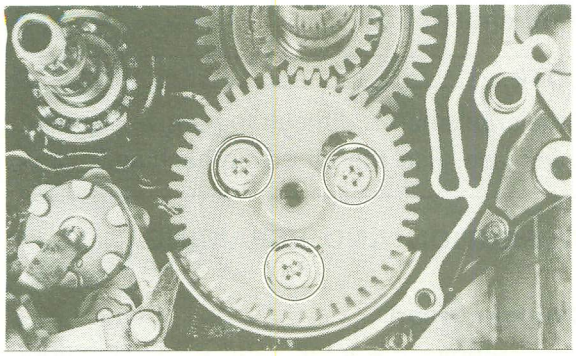
Crankcase Spacer (Right Side)

1. Remove the three bolts securing the crankcase spacer and remove the spacer and two dowels from the crankcase.

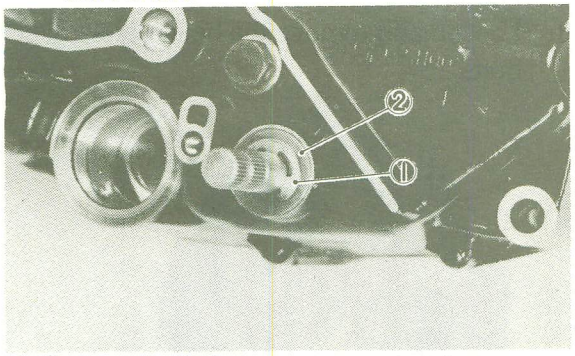


Oil Pump and Shifter

1. Loosen the pump cover securing bolts, and remove the oil pump assembly.

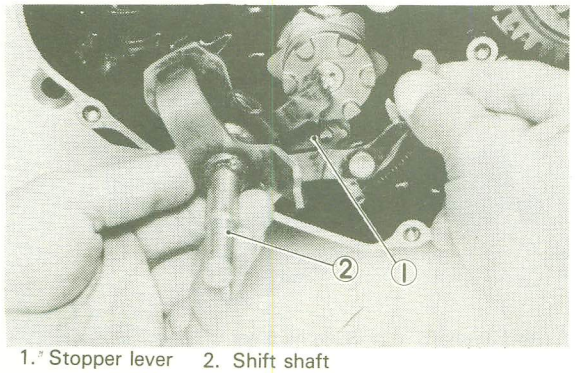


2. Remove the circlip and washer from the shift shaft.



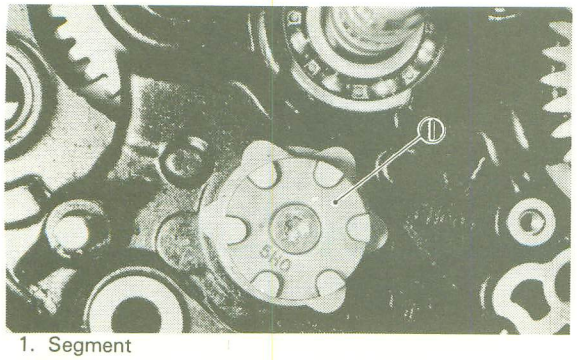
1. Circlip 2. Washer

3. Pull the shift shaft out from the right-hand side.
4. Remove the shift lever assembly, and then remove the stopper-lever assembly with the torsion spring.



1. Stopper lever 2. Shift shaft

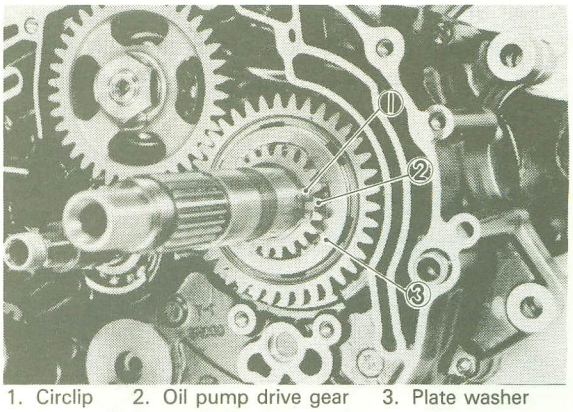
5. Remove the segment from the shift cam. Use the torx driver.



1. Segment

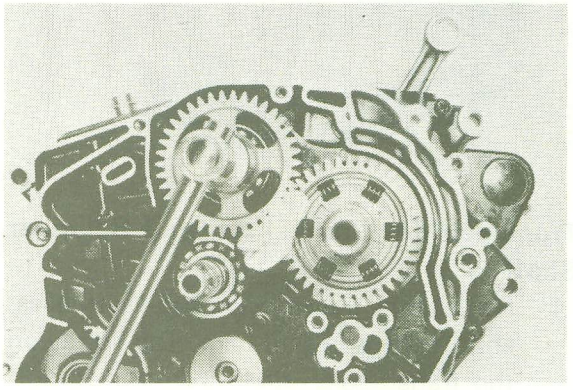
Balancer Drive and Driven Gears

1. Remove the circlip, oil pump drive gear, and plate washer from the crankshaft.



1. Circlip 2. Oil pump drive gear 3. Plate washer

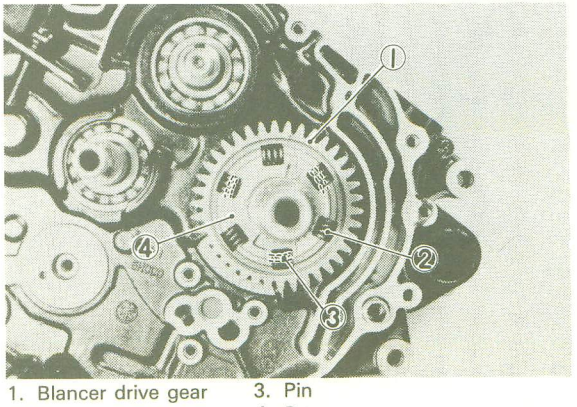
2. Flatten the lock tab on the blancer shaft and remove the securing nut.
3. Place a piece of rolled rag or a piece of lead between the drive and driven gears, and remove the securing nut, lock washer, and straight key.



4. Remove the balancer drive gear.

NOTE:

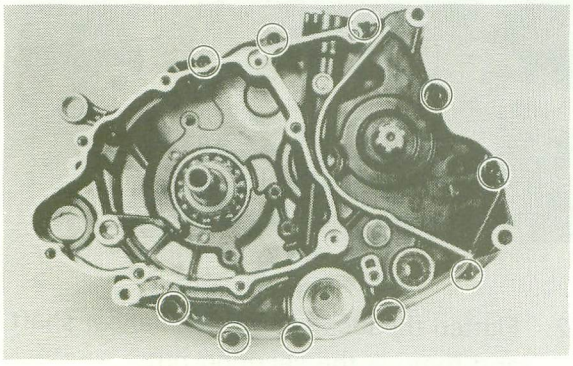
The balancer drive gear has six springs and three pins. Use care so that they don't fall out when removing the balancer drive gear.

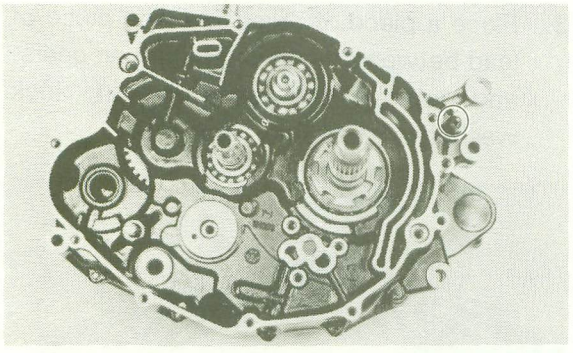


1. Blancer drive gear 3. Pin
2. Spring 4. Boss

Crankcase

1. Working in a crisscross pattern, loosen all bolts 1/4 turn each. Remove them after all are loosened.
2. Remove the left-side crankcase by pulling it up. Remove the two dowels from the right-side crankcase.



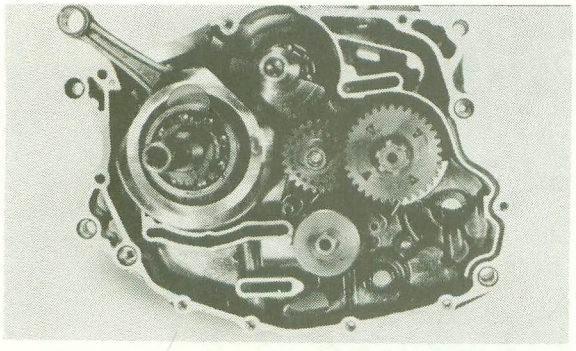


Transmission, Crankshaft, and Balancer Shaft

1. Remove the transmission sub-assemblies, shift forks, and shift cam. Tap lightly on the transmission drive axle with a soft hammer to remove.

NOTE:

Remove assembly carefully. Note the position of each part. Pay particular attention to the location and direction of shift forks.



2. Remove the crankshaft and balancer shaft from the crankcase.

CAUTION:

Do not use a hammer to drive the crankshaft out.

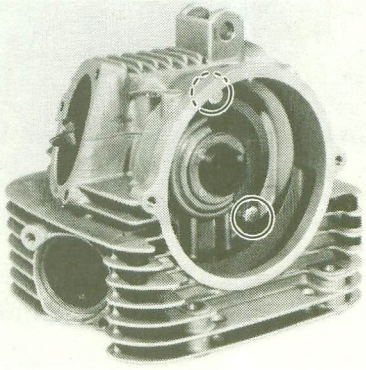
NOTE:

If the crankshaft is difficult to remove from the crankcase, use the oil press machine.

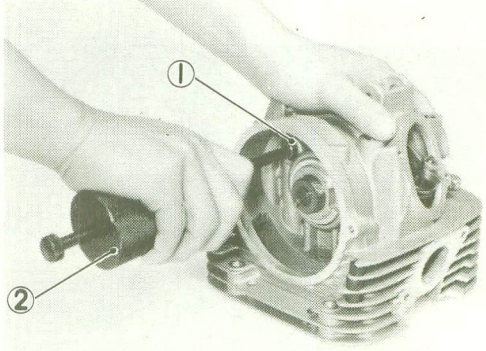
INSPECTION AND REPAIRING

Cylinder Head

1. Remove the intake and exhaust tappet covers.
2. Flatten the lock washer.
3. Loosen and remove the bearing retaining bolts.

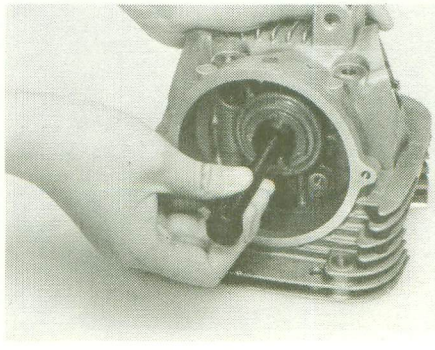


4. Remove each rocker arm shaft with a slide hammer, then remove the rocker.

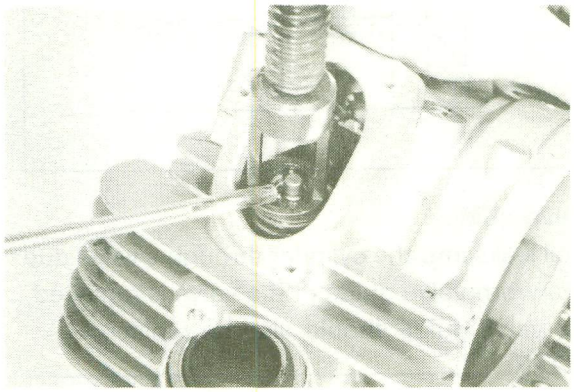


1. Rocker shaft 2. Slide hammer

5. Insert a 10 mm (0.39 in) bolt into the camshaft, and withdraw the camshaft.



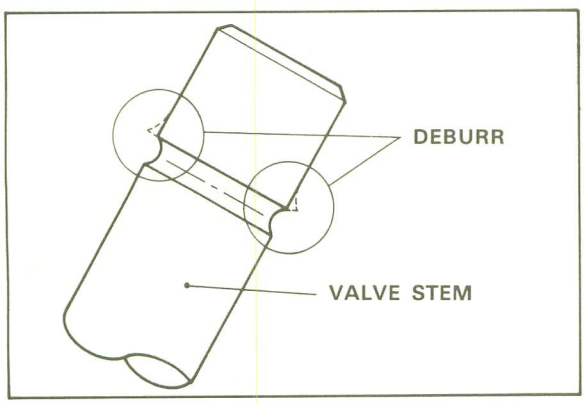
6. Mount the valve spring compressor on the head and depress each valve spring. Remove the valve retainers with a magneto or tweezers, remove the valve springs.



7. Remove the valves.

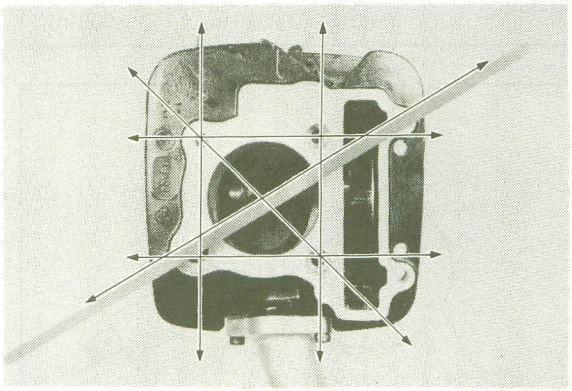
NOTE:

Deburr any deformed valve stem end. Use an oil stone to smooth the stem end. This will help prevent damage to the valve guide during valve removal.



8. Using a rounded scraper, remove the carbon deposits from the combustion chamber. Take care to avoid damaging the spark plug threads and valve seats. Do not use a sharp instrument. Avoid scratching the aluminum.
9. Check the cylinder head warpage with a straightedge as shown.
   The warpage should not exceed the specified limit; if necessary, resurface the cylinder head. If the warpage exceeds allowable limit, the cylinder head should be replaced with a new one.

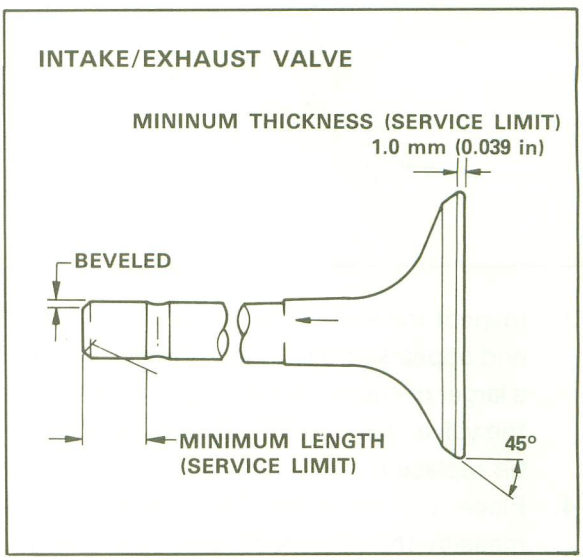
Cylinder head warpage:
Less than 0.03 mm (0.0012 in)



Valves, Valve Guides, Valve Seats, and Valve Springs

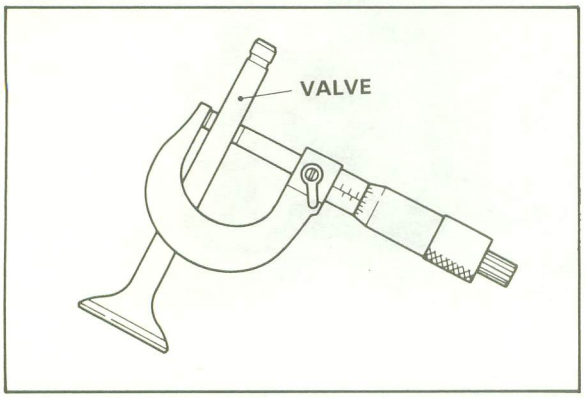
Valves

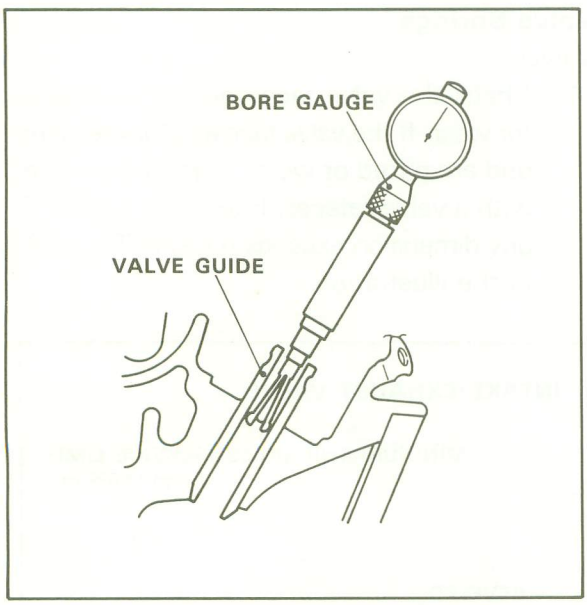
1. Check the valve face and the stem end for wear. If the valve face and/or the stem end are pitted or worn, regrind the valve with a valve refacer. Replace the valve if any dimension exceeds the specifications in the illustration.



2. Valve stem wear must be measured and then combined with valve guide measurements to obtain guide clearance. This clearance must be within tolerances. If it exceeds the maximum limit, then replace either or both valve and guide, as necessary.

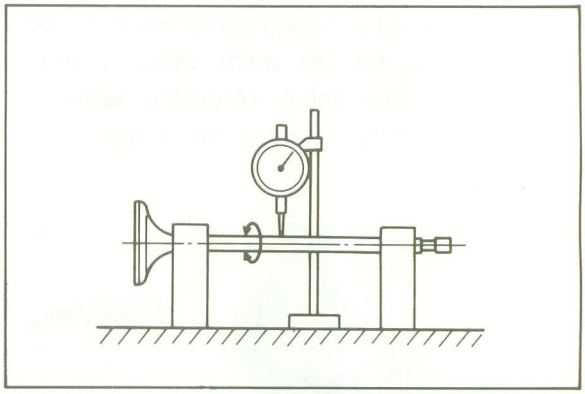
	Valve Stem Clearance	Maximum
Intake	0.010 ~ 0.037 mm (0.0004 ~ 0.0015 in)	0.10 mm (0.004 in)
Exhaust	0.025 ~ 0.052 mm (0.0010 ~ 0.0020 in)	0.12 mm (0.005 in)





3. Inspect the end of the valve stem. If the end appears to be "mushroomed" or has a larger diameter than the rest of the stem, the valve, valve guide, and oil seal should be replaced.
4. Place the valve on "V" blocks, and measure the amount of stem runout with a dial gauge. If it exceeds the maximum limit, replace the valve.

Maximum valve stem runout:
0.03 mm (0.0012 in)



Valve guides

If oil leaks into the cylinder through a valve due to a worn valve guide or if a valve is replaced, the valve guide should also be replaced.

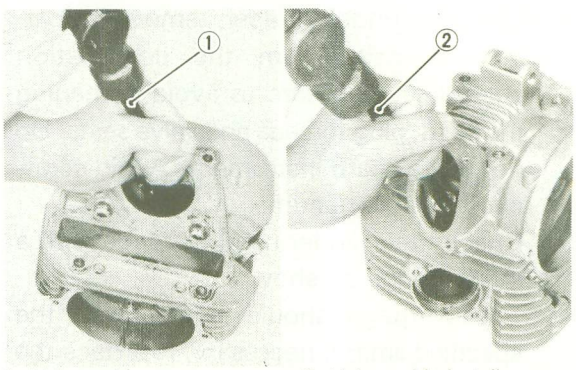
NOTE:

The valve oil seal should be replaced whenever a valve is removed or replaced.

1. Measure the valve guide inside diameter with a small bore gauge. If it exceeds the limit, replace it with an oversize valve guide.

Guide diameter (I.D.):
Limit: 6.1 mm (0.240 in)

2. To ease guide removal and reinstallation and to maintain the correct interference fit, heat the head to 100°C (212°F). Use an oven to avoid any possibility of head warpage due to uneven heating.
3. Use the valve guide remover and valve guide installer to drive the old guide out and drive the new guide in.

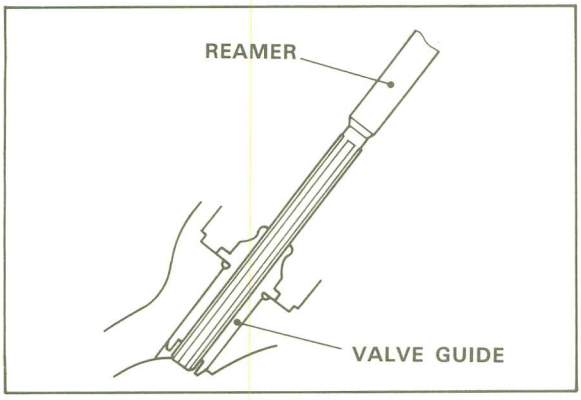


1. Valve guide remover 2. Valve guide installer

NOTE:

The valve guide oil seal should be replaced whenever a valve is removed or replaced.

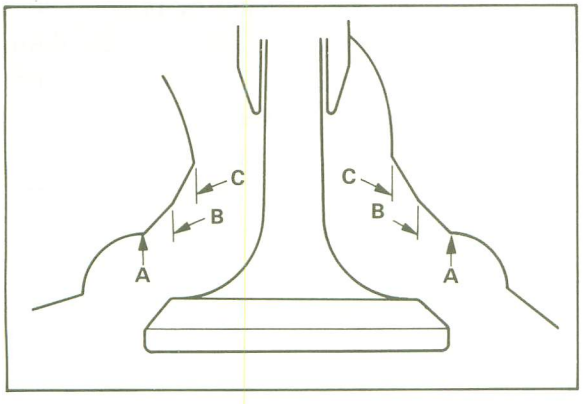
4. After installing the valve guide, use the 6 mm (0.24 in) reamer (special tool) to obtain the proper valve-guide-to-valve-stem clearance.



5. After installing the valve guide in the cylinder head, the valve seat must be recut. The valve should be lapped to the new seat.

Valve seat

1. The valve seat is subject to severe wear. Whenever the valve is replaced or the valve face is resurfaced (see caution), the valve seat should be resurfaced at a 45° angle. If a new valve guide has been installed, the valve seat must be recut to guarantee complete sealing between the valve face and seat.



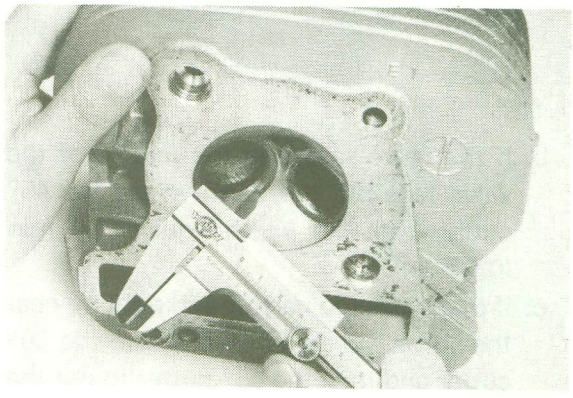
CAUTION:

If the valve seat is obviously pitted or worn, it should be cleaned with a valve seat cutter. Use the 45° cutter. When twisting the cutter, keep an even downward pressure to prevent chatter marks.

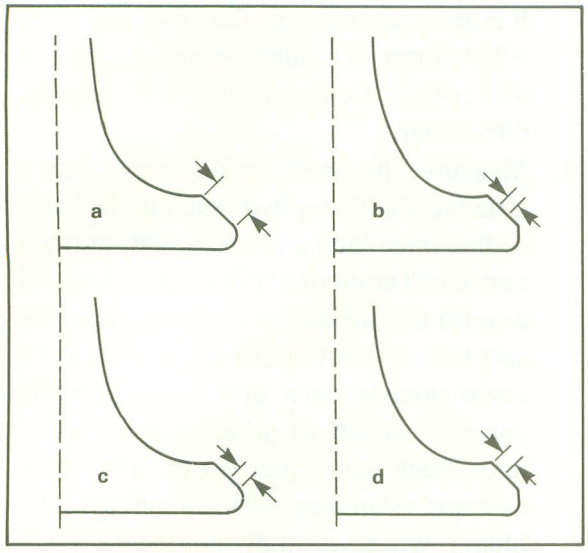
If cutting section A of the valve seat, use a 30° cutter. If cutting section B, use the 45° cutter. If cutting section C, use the 60° cutter.

2. Measure the valve seat width. Apply mechanic's bluing dye (such as Dykem) to the valve face and valve seat, apply a very small amount of grinding compound around the surface of the valve face, insert the valve into position, and spin the valve quickly back and forth. Lift the valve, clean off all grinding compound, and check valve seat width. The valve seat and valve face will have removed the bluing wherever they contacted each other. Measure the seat width with vernier calipers. It should measure approximately 1.0 mm (0.039 in). The valve-seat contact area should be one uniform width. If valve seat width varies or if pits still exist, further cutting will be necessary. Remove just enough material to achieve a satisfactory seat.

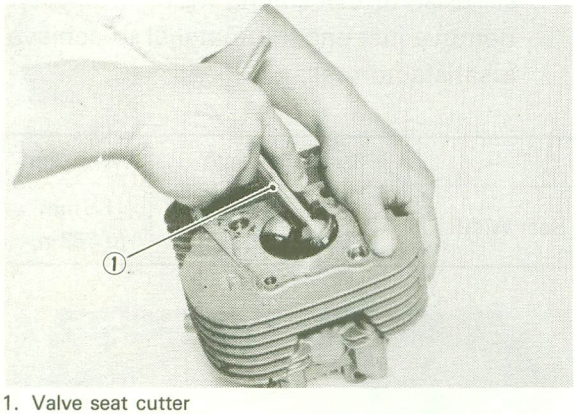
	Standard Width	Wear Limit
Seat Width	1.0 ± 0.1 mm (0.039 ± 0.0039 in)	1.6 mm (0.063 in)



3. If the valve seat is uniform around the perimeter of the valve face but is too wide or not centered on the valve face, it must be altered. Use either the 30°, 45°, or 60° cutters to correct the improper seat location in the manner described below:



a. If the valve face shows that the valve seat is centered on the valve face but is too wide, then lightly use both the 30° and the 60° cutters to reduce the seat width to 1.0 mm (0.039 in).



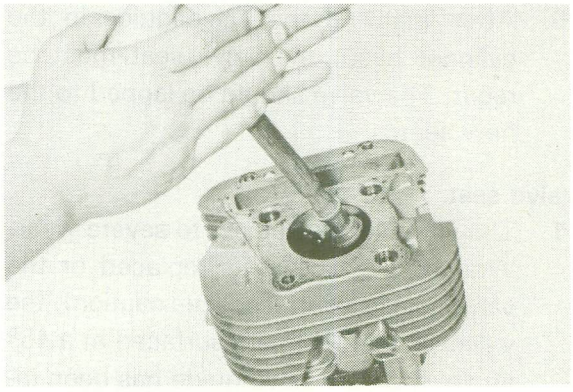
1. Valve seat cutter

b. If the valve seat is in the middle of the valve face but too narrow, use the 45° cutter until the width equals 1.0 mm (0.039 in).
c. If the seat is too narrow and right up near the valve margin, then first use the 30° cutter and then the 45° cutter to get the correct seat width.
d. If the seat is too narrow and down near the bottom edge of the valve face, first use the 60° cutter and then the 45° cutter.

Lapping

The valve/valve seat assembly should be lapped if neither the seat nor the valve face are severely worn.

1. Apply a small amount of coarse lapping compound to the valve face. Insert the valve into the head. Rotate the valve until the valve and valve seat are evenly polished. Clean off the coarse compound, then follow the same procedure with fine compound.
   Continue lapping until the valve face shows a complete and smooth surface all the way around. Clean off the compound material. Apply bluing dye to the valve face and seat, and rotate the valve. Check for full seat contact which is indicated by a grey surface all around the valve face where the bluing has been rubbed away.

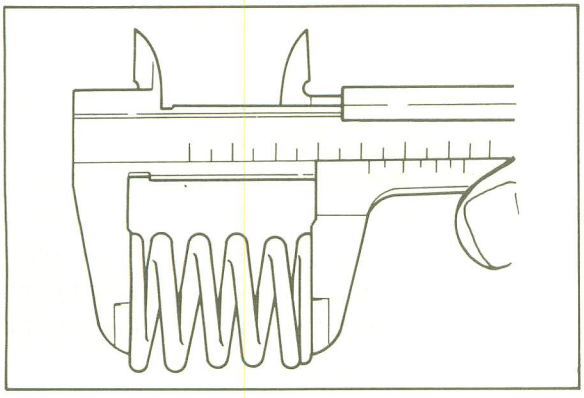


2. After all work has been performed on the valve and valve seat and all head parts have been assembled, check for proper valve/valve seat sealing by pouring solvent into each of the intake ports, then the exhaust ports. There should be no leakage past the seat. If fluid leaks, disassemble and continue to lap with fine lapping compound. Clean all parts thoroughly; reassemble and check again with solvent. Repeat this procedure as often as necessary to obtain a satisfactory seal.

Valve springs

This engine uses two springs of different sizes to prevent valve float or surging. The valve spring specifications show the basic value characteristics.

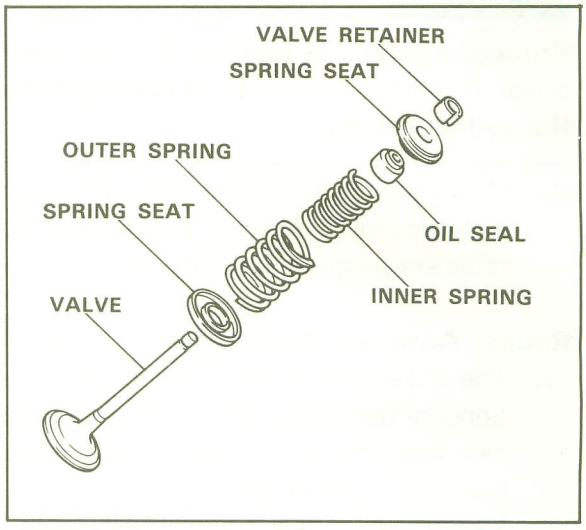
1. Even though the spring is constructed of durable spring steel, it gradually loses some of its tension. This is evidenced by a gradual shortening of free length. Use a vernier caliper to measure spring free length. If any spring has decreased more than 2 mm (0.080 in) from its specification, replace it.



2. Another symptom of spring fatigue is insufficient spring pressure. This can be checked with a valve-spring-compression-rate gauge. Test each spring individually. Place a spring in the gauge and note the spring pressure when the spring is compressed to the installed length (valve closed). If the pressure does not equal the specified value, replace the spring.

Valve Spring Specifications		
	Outer Spring	Inner Spring
Free length	37.2 mm (1.46 in)	35.5 mm (1.40 in)
Installed length (valve closed)	32.0 mm (1.26 in)	30.5 mm (1.20 in)
Installed pressure (valve closed)	18.5 kg (40.8 lb)	9.3 kg (20.5 lb)
Allowable tilt from vertical	2.5°	←

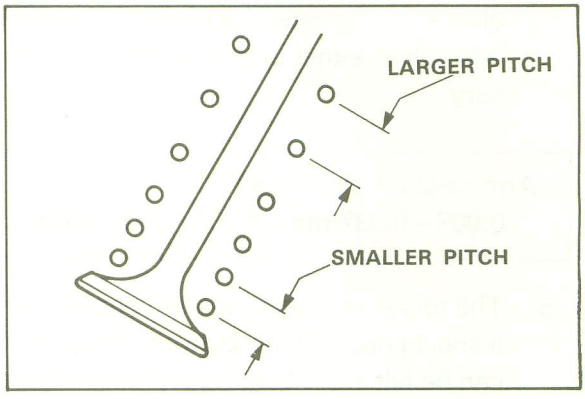
Valve installation



1. Lubricate the valve stem and the oil seal with a high-quality molybdenum disulfide motor oil or molybedenum disulfide grease.
2. Insert the valve in the cylinder head, and install the oil seal. Carefully fit the oil seal over the valve stem and push it into position on top of the valve guide.
3. Install the spring seat, and install both valve springs.

NOTE:

All valve springs must be installed with the greater pitch upward as shown.



4. Install the collar. Be sure it is properly seated on the valve springs.
5. Install the valve spring compressor, and compress the springs.
6. Install the valve retainers. Be sure the retainers properly engage the valve stem.
7. Carefully remove the valve spring compressor.

WARNING:

Proceed slowly. If a retainer has not been properly installed, it could be ejected from the cylinder head.

8. Gently tap the end of the valve stem with a plastic mallet. This will ensure that the retainers are properly seated in the collar.

Rocker Arms and Rocker Arm Shafts

1. The rocker arm usually wears at two locations: at the rocker shaft hole and at the cam-lobe-contact surface. Check these areas for signs of unusual wear.
2. Measure the rocker arm inside diameter. If it exceeds specification, replace the rocker arm.

Wear limit: 12.03 mm (0.474 in)

3. Measure the outside diameter of the rocker arm shaft. If it is less that the specified value, replace the rocker arm.

Wear limit: 11.94 mm (0.470 in)

4. Calculate the clearance by subtracting the rocker-arm-shaft outside diameter from the rocker-arm inside diameter. If this clearance is greater than 0.04 mm (0.0016 in) replace either or both parts as necessary.

Arm-to-shaft clearance:
0.009 ~ 0.037 mm (0.004 ~ 0.0016 in)

5. The rocker arm shaft has been hardened; it should not wear excessively. If a groove can be felt in the bearing surface or if the shaft shows a blue discoloration, the shaft should be replaced and the lubrication system checked.

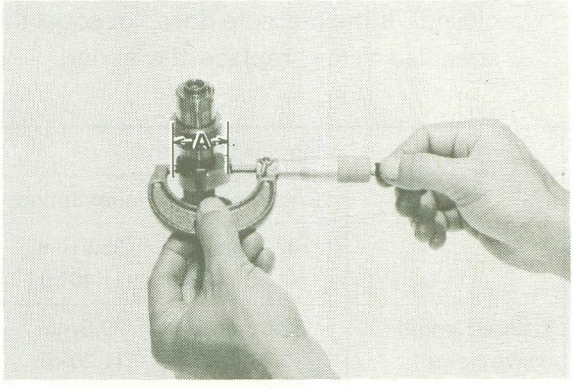
Camshafts, Cam Chains, and Cam Sprockets

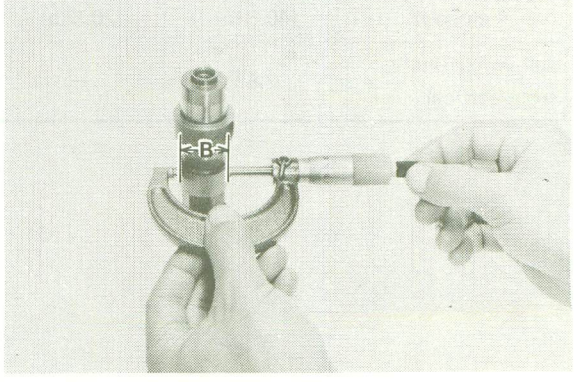
Camshaft

The cam lobe metal suface may have a blue discoloration due to excessive friction. The metal surface could also start to flake off or become pitted.

1. If any of the above wear conditions are readily visible, the camshaft should be replaced.
2. Even though the cam lobe surface appears to be in satisfactory condition, the lobes should be measured with a micrometer. Cam lobe wear can occur without scarring the surface. If this wear exceeds the wear limit, valve timing and lift are affected. Replace the camshaft if wear exceeds the limit.

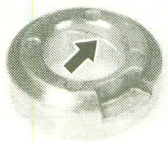
Wear Limit	A	B
Intake	36.58 mm (1.440 in)	30.18 mm (1.188 in)
Exhaust	36.62 mm (1.441 in)	30.26 mm (1.191 in)





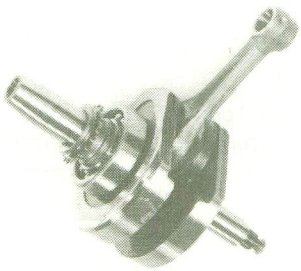
Camshaft bushing

Bushing should be cleaned, dried, and the inner surface visually checked for pits, rust spots, or chatter marks. If any of these conditions exist, the bushing should be replaced.



Cam sprocket and cam drive sprocket

1. Check the cam sprocket and cam drive sprocket for wear.

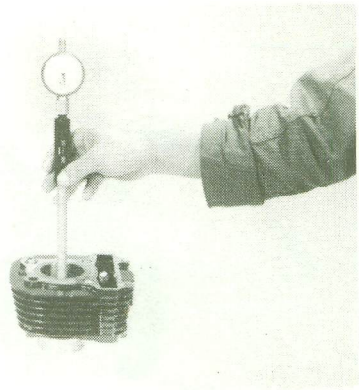


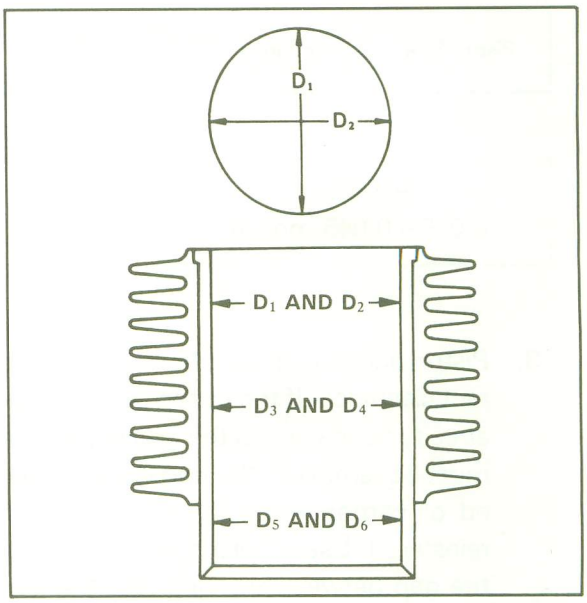
Cylinder

1. Visually check the cylinder walls for scratches. If vertical scratches are evident, the cylinder should be replaced.
2. Measure cylinder wall wear in the manner as shown. If wear is excessive, compression pressure will decrease, and engine trouble will occur. Rebore the cylinder wall, and replace the piston and piston rings.

   Cylinder wear should be measured at three depths by placing the measuring instrument at a right angle to the crankshaft. (See the illustration.)

   If the cylinder wall is worn beyond the wear limit, it should be rebored.



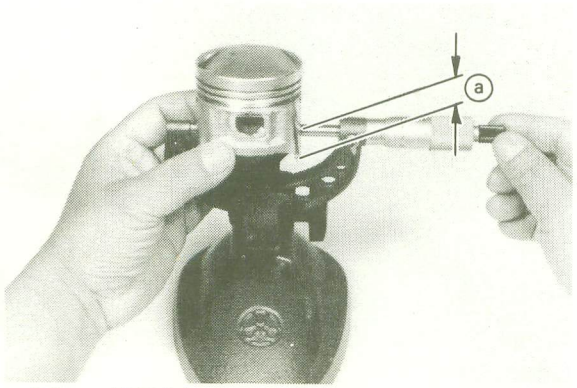


	Standard	Wear Limit
Cylinder bore	$67^{+0.020}_{-0.030}$ mm ($2.64^{+0.0008}_{-0.0012}$ mm)	66.9 mm (2.63 in)
Cylinder taper	—	0.005 (0.0002 in)

Piston and Piston Rings

Piston

1. Visualy check the piston for scraches. If vertical scratches are evident, the piston should be replaced.
2. Using the micrometer, measure the outside diameter of the piston at the piston skirt. Measurement should be made at a point 7.5 mm (0.30 in) above the bottom edge of the piston by placing the micrometer parallel to and at right angles to the piston pin. Replace the piston if wear exceeds the limit.



a. 7.5 mm (0.30 in)

Piston Size	Standard	66.935 ~ 66.985 mm (2.635 ~ 2.637 in)

Piston clearance:
0.025 ~ 0.045 mm (0.0010 ~ 0.0018 in)

3. Piston ring/ring groove fit must have correct clearance. If the piston and ring have already been used in the engine, the ring must be removed, the ring groove cleaned of carbon, then the ring should be reinstalled. Use a feeler gauge to measure the gap between the ring and the land. Replace the piston if wear exceeds the limit.

Side clearance	Top	0.03 ~ 0.07 mm (0.0012 ~ 0.0028 in)
	2nd	0.02 ~ 0.06 mm (0.0008 ~ 0.0024 in)

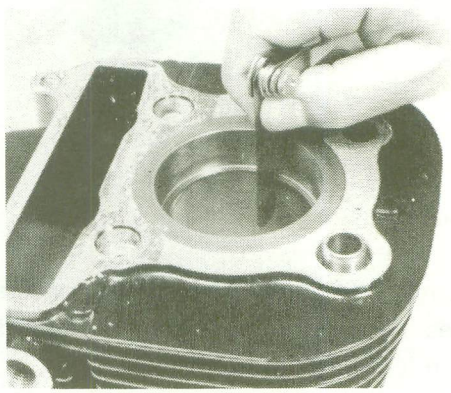
Piston ring

1. Measure the end gap of each piston ring. Insert a ring into the cylinder, and push it approximately 20 mm (0.8 in) into the cylinder. Push the ring with the piston crown so the ring will be at a right angle to the cylinder bore.
2. Measure the ring end gap with a feeler gauge. If the end gap exceeds tolerance, replace the whole set of rings.

NOTE:

You cannot measure the end gap on the expander spacer of the oil control ring. If the oil-control-ring rails show excessive gap, replace all three rings.

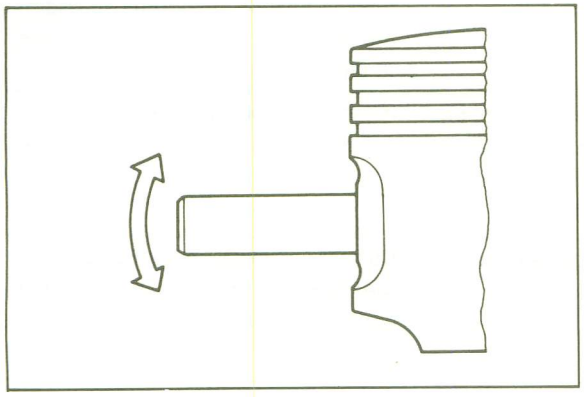
	Standard	Limit
Top ring	0.15 ~ 0.35 mm (0.0059 ~ 0.0138 in)	0.75 mm (0.0295 in)
2nd ring	0.15 ~ 0.35 mm (0.0059 ~ 0.0138 in)	0.75 mm (0.0295 in)
Oil control (Rails)	0.3 ~ 0.9 mm (0.0118 ~ 0.0354 in)	—

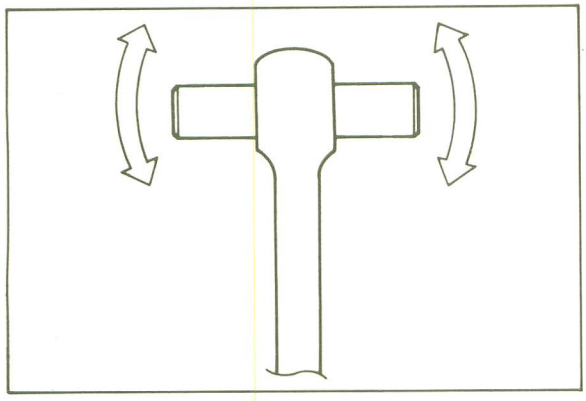


Piston pin

1. Lightly oil the piston pin, and install it in the small end of the connecting rod.
2. Check the free play. There should be no noticeable vertical play. If any free play exists, check the connecting rod for wear. Replace the pin and connecting rod as required.

3. Insert the piston pin in the piston, and check the free play. There should be no noticeable free play when the pin is in place in the piston. If the piston pin is loose, replace the pin and/or the piston as required.





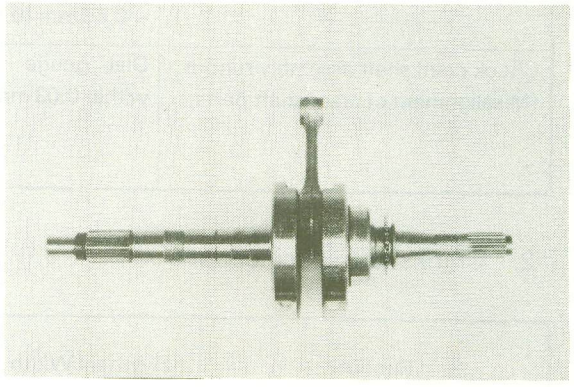
Crankshaft and Connecting Rod

Crankshaft bearing

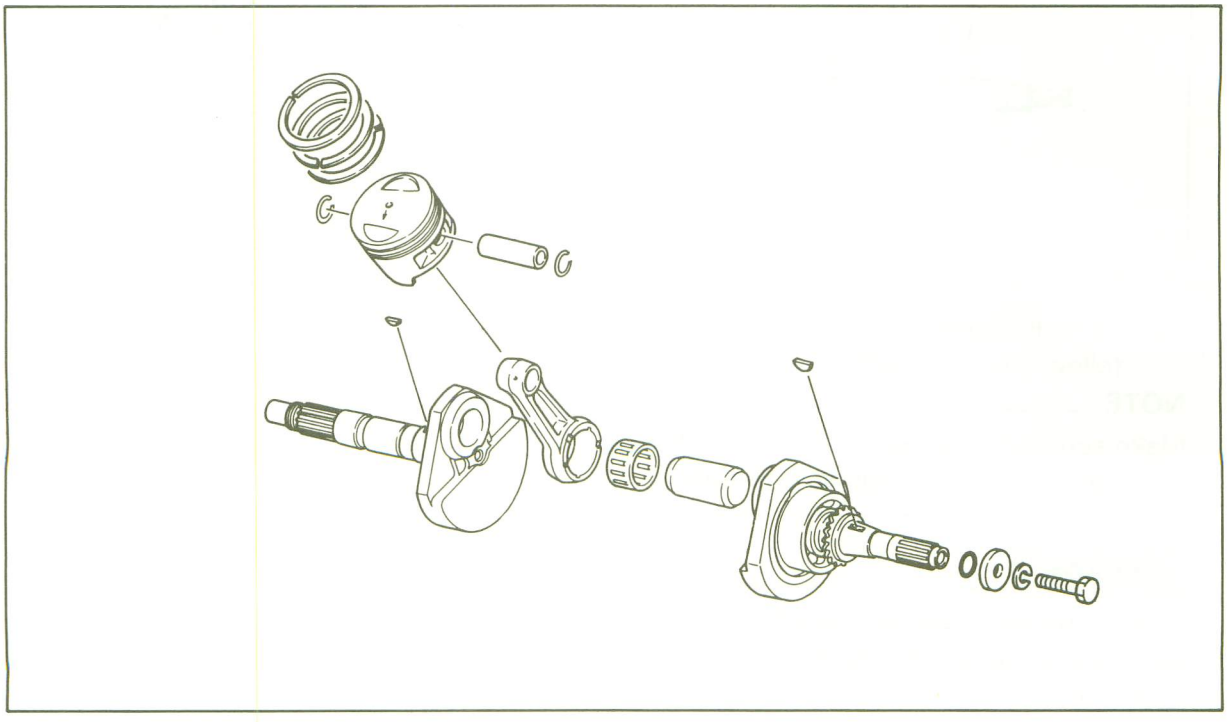
1. Bearings should be cleaned, dried, and the races visually checked for pits, rust spots, or chatter marks where the balls have dragged. If any of these conditions exist, the bearings should be replaced.

NOTE:

Lubricate the bearings immediately after examining them to prevent rust.



Crankshaft and connecting rod



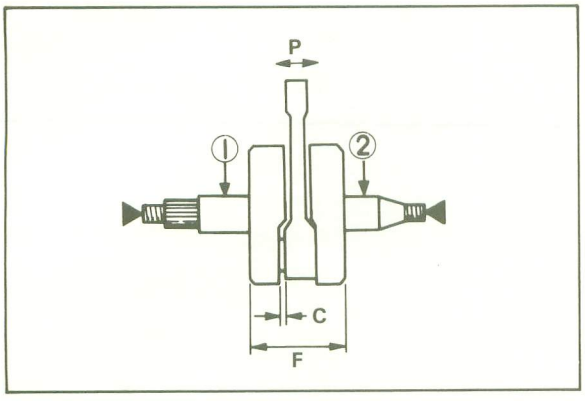
1. Check crankshaft components per chart.

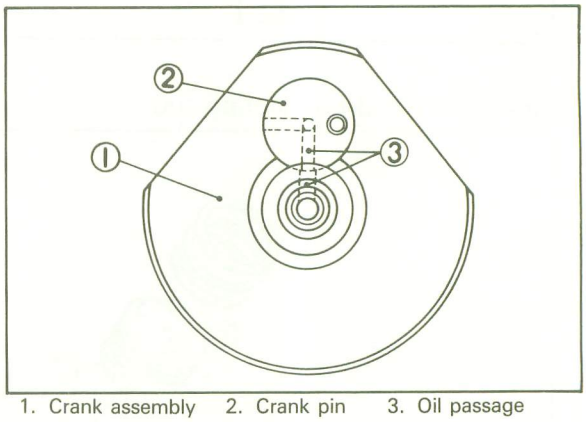
Check connecting-rod axial play at small end (to determine the amount of wear or crank pin and bearing at big end).	Small end play should not exceed 2 mm (0.079 in).	If small end play exceeds 2 mm (0.079 in), replace left crankshaft, connecting rod assembly, buffer boss, and woodruff key. Check right crankshaft bearing. If damaged, replace bearing. Play after reassembly should be within (0.8 ~ 1.0 mm (0.031 ~ 0.039 in)).
Check the connecting rod side clearance at big end.	Move the connecting rod to one side and insert a feeler gauge. Big end axial play should be within 0.35 ~ 0.65 mm (0.014 ~ 0.026 in).	If excessive axial play is present, 0.7 mm (0.028 in) or more, disassemble the crankshaft and replace same parts on above.
Check crankshaft assembly runout. (Misalignment of crankshaft parts.)	Dial gauge readings should be within 0.03 mm (0.00118 in).	Correct any misalignment by tapping the flywheel with a brass hammer and by using a wedge.

2. Crankshaft specifications

Unit: mm (in)

Runout		Flywheel Width	Rod Clearance			
			Axial "P"		Side "C"	
Left side "1"	Right side "2"	"F"	New	Max.	Min.	Max.
0.03 (0.0012)	0.03 (0.0012)	58.95 ~ 59.00 (2.321 ~ 2.323)	0.8 ~ 1.0 (0.03 ~ 0.04)	2.0 (0.08)	0.3 (0.0118)	0.65 (0.0256)





1. Crank assembly 2. Crank pin 3. Oil passage

3. To disassemble and reassemble the crank, follow the illustration.

NOTE:

Make sure the oil passages of the crank and crank pin are lined up during assembly.

CAUTION:

The buffer boss and woodruff key should be replaced when removed them from the crankshaft.

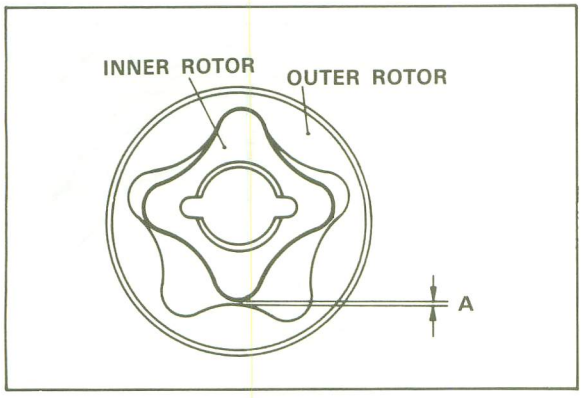
Oil Pump

1. Measure the rotor width on the trochoid pumps. If the measurement exceeds specification, replace the pump.

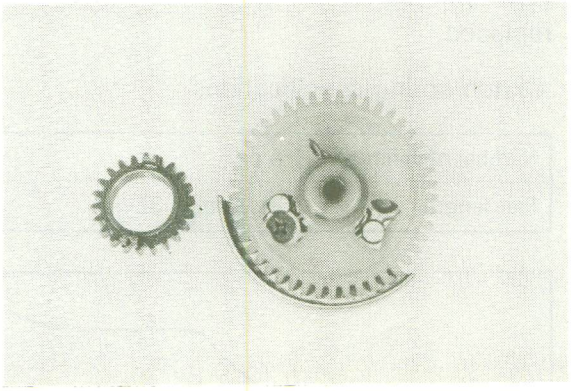
Rotor width:
Crankshaft pump: 6 mm (0.236 in)

2. Measure the inner-outer clearance of each rotor. Replace the pump if the clearance exceeds specifications.

Inner-outer clearance:
0.15 mm (0.0059 in)

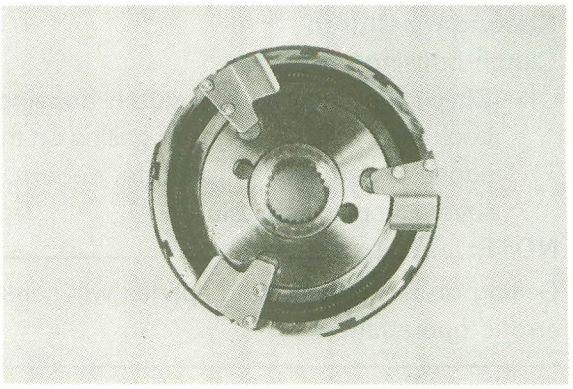


3. Check the drive gear and the driven gear for obvious signs of wear or damage. Replace the gear(s) as required.



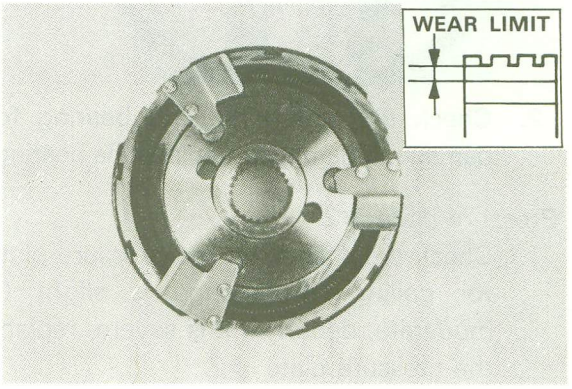
Primary Clutch

1. Check the clutch housing and clutch shoe assembly for heat damage.

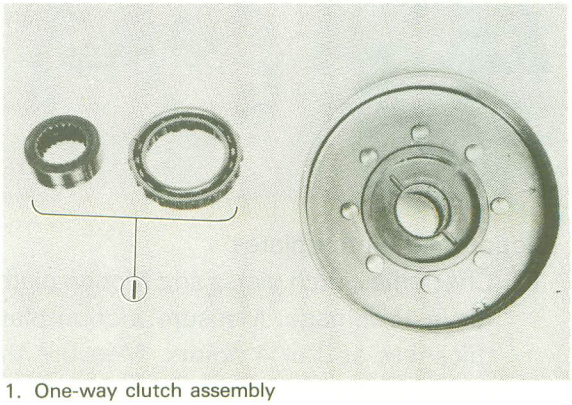


2. Replace clutch shoe assembly if any is faulty or beyond wear limit.

Clutch shoe wear limit:
2.5 mm (0.1 in)



3. Check the primary drive gear for obvious signs of wear or damage. Replace the clutch housing as required.
4. Check the one-way clutch for pitting or other damage. If severe, replace the one-way clutch assembly and clutch housing as a set.



1. One-way clutch assembly

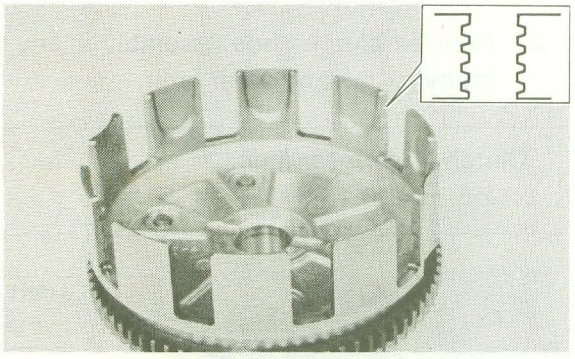
Secondary Clutch

Clutch housing

1. Check the dogs on the clutch housing. Look for cracks and signs of galling on the edges. If damage is moderate, deburr; if severe, replace the clutch.

NOTE:

Galling on the clutch plate splines will cause erratic operation.



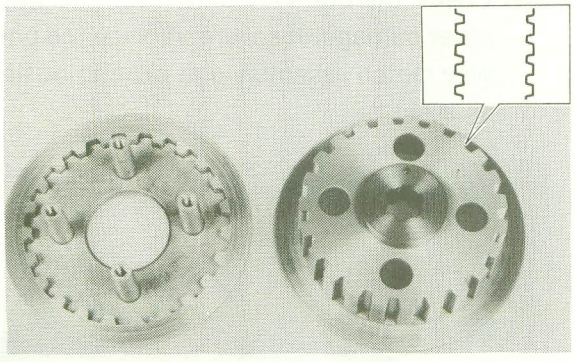
2. Check the clutch housing bearing for damage. If damaged, replace the bearing.

Pressure plate #2

1. Check the splines on the pressure plate for galling. If damage is slight to moderate, deburr; if it is severe, replace the pressure plate #2.

NOTE:

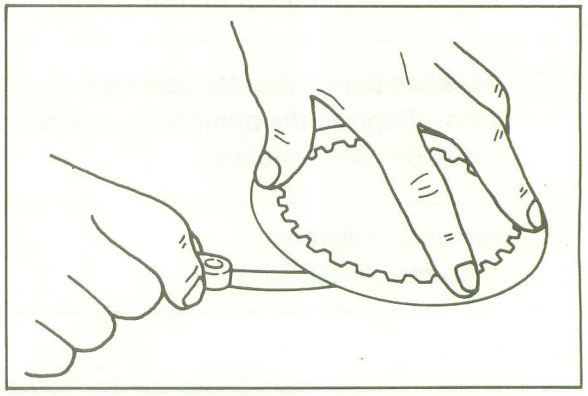
Galling on clutch plate splines will cause erratic operation.

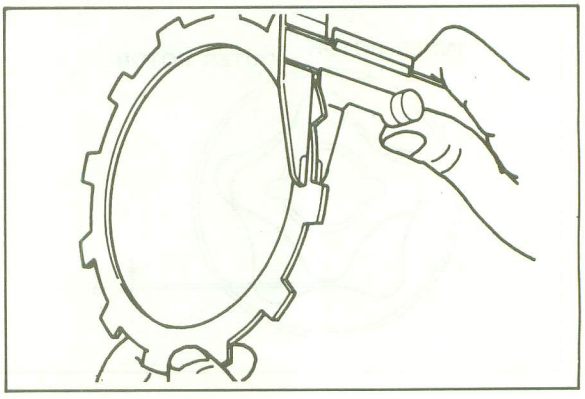


Friction and clutch plates

1. Check the clutch plates and friction plates for heat damage. Measure friction plate thickness at 3 or 4 points. Measure the clutch plates for warpage with a feeler gauge and surface plate. Replace clutch plates or friction plates as a set if any is faulty or beyond wear limits.

	Standard	Wear Limit
Friction plate thickness	3.0 mm (0.12 in)	2.8 mm (0.11 in)
Clutch plate warp limit	—	0.2 mm (0.008 in)



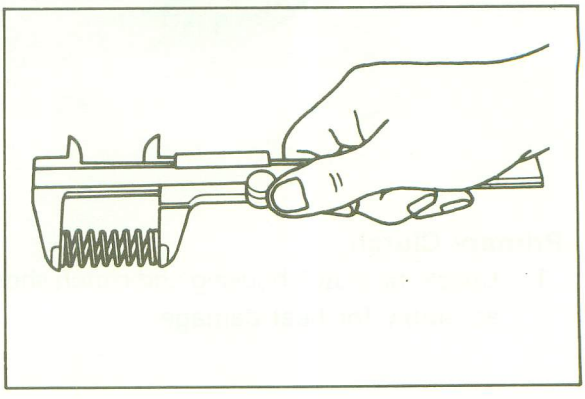


Checking clutch springs

Using the vernier caliper, measure the free length of each spring. If it measures 1.0 mm (0.04 in) less than specified, it should be replaced.

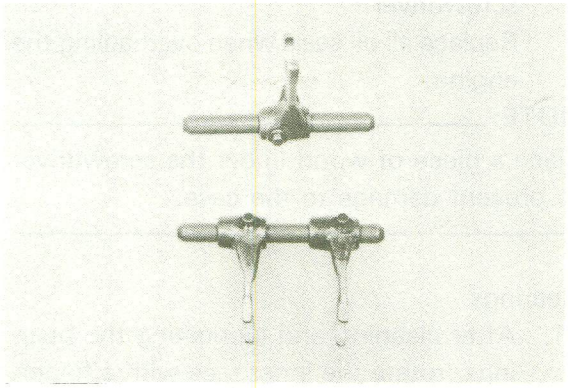
Clutch spring specifications

Number of springs	4 pcs
Free length	34.9 mm (1.37 in)

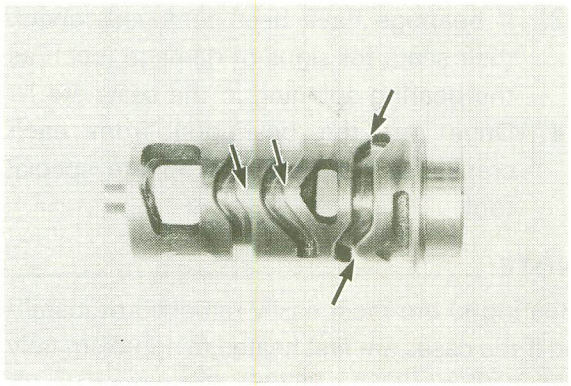


Transmission

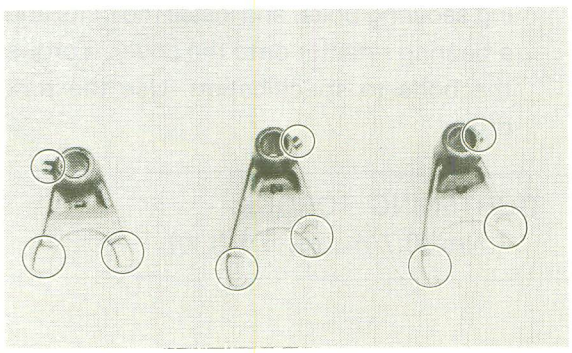
1. Inspect each shift fork for signs of galling on the gear contact surfaces. Check for bending. Make sure each fork slides freely on its guide bar.



2. Roll the guide bar across a surface plate. If the bar is bent, replace it.
3. Check the shift cam grooves for signs of wear or damage. If any profile has excessive wear and/or damage; replace the cam, if it is damaged.



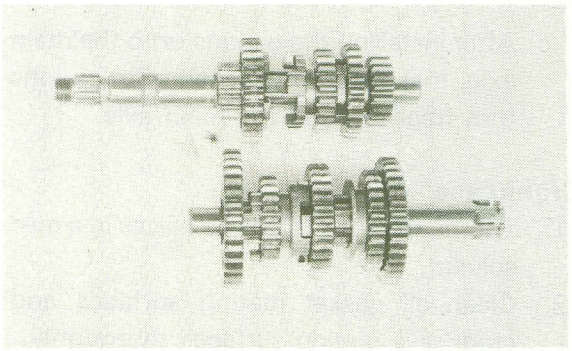
4. Check the cam followers on each shift fork for wear. Check the ends that ride in the grooves in the shift cam. If they are worn or damaged, replace the shift fork.



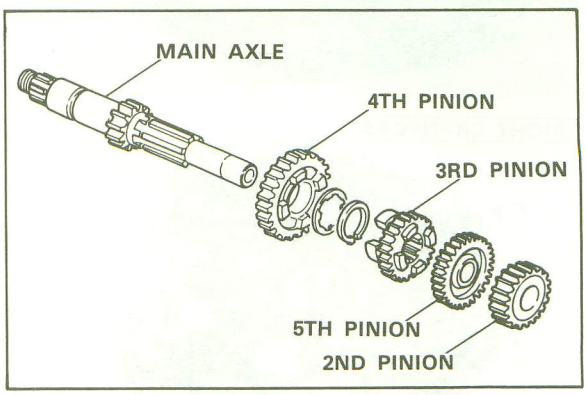
5. Check the shift cam dowel and side plate for looseness, damage, or wear. Replace as required.
6. Check the transmission shafts using a centering device and dial gauge. If any shaft is bent beyond the specified limit, replace the shaft.

Maximum runout: 0.08 mm (0.0031 in)

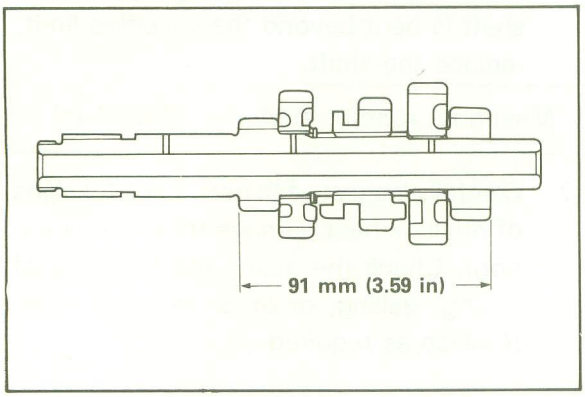
7. Carefully inspect each gear. Look for signs of obvious heat damage (blue discoloration). Check the gear teeth for signs of pitting, galling, or other extreme wear. Replace as required.



8. Check to see that each gear moves freely on its shaft.
9. Check to see that all washers and clips are properly installed and undamaged. Replace bent or loose clips and bent washers.
10. Check to see that each gear properly engages its counterpart on the shaft. Check the mating dogs for rounded edges, cracks, or missing portions. Replace as required.
11. When replacing the main axle or pinions, take the following steps:



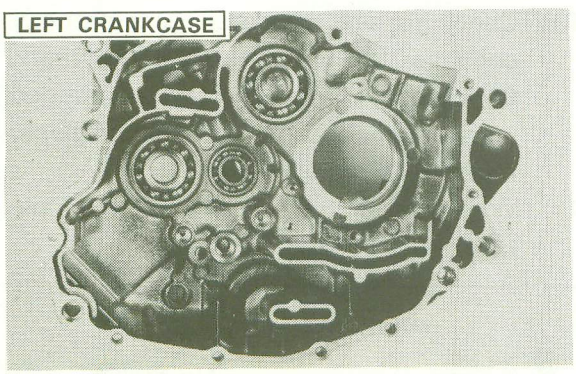
a. Apply molybdenum oil to the 4th and 5th pinion bosses.
b. Using a hydraulic press, force-fit the 2nd pinion to the position specified below.

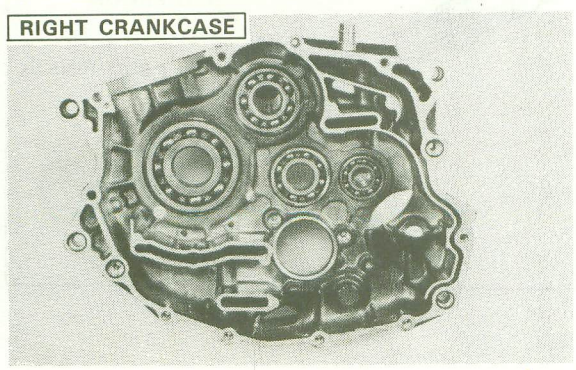


c. After installing the pinions onto the main axle, make sure the 4th and 5th pinions turn freely around the main axle.

Crankcase

1. Thoroughly wash the case halves in a mild solvent.
2. Clean all gasket mating surfaces and crankcase mating surfaces thoroughly.
3. Visually inspect the case halves for any cracks or their damage.
4. Check all fittings not previously removed for signs of looseness or damage.
5. Check oil delivery passages for signs of blockage.





Bearings and Oil Seals

Oil seals

1. Check the oil seal lips for damage and wear. Replace as required.
2. Pry oil seal(s) out of place with a screwdriver.
   Replace all oil seals when overhauling the engine.

NOTE:

Place a piece of wood under the screwdriver to prevent damage to the case.

Bearings

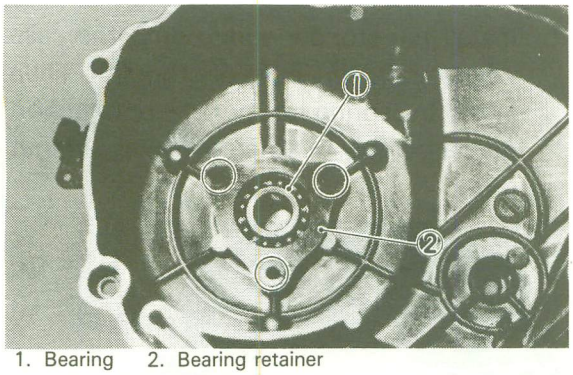
1. After cleaning and lubricating the bearings, rotate the inner race with a finger. If rough spots are noticed, replace the bearing.
2. If bearings have not been removed, oil them thoroughly immediately after washing and drying. Rotate the bearing, and check for roughness indicating damaged races or balls.
3. If bearings have been removed, check their seats for signs of damage (such as the bearing spinning in the seat, etc.).
4. Drive out the bearing(s) from each crankcase. Use the appropriate special tool.

NOTE:

Bearing(s) are most easily removed or installed if the cases are first heated to approximately 95° ~ 125°C (205° ~ 257°F). Bring the case up to proper temperature slowly. Use an oven.

5. After removing the bearing from the clutch cover. Install a new bearing into the cover. Apply Loctite® (red) to the bearing securing bolts, and install the bolts and a bearing retainer onto the cover. Torque the bolts to specification. Use the torx driver.

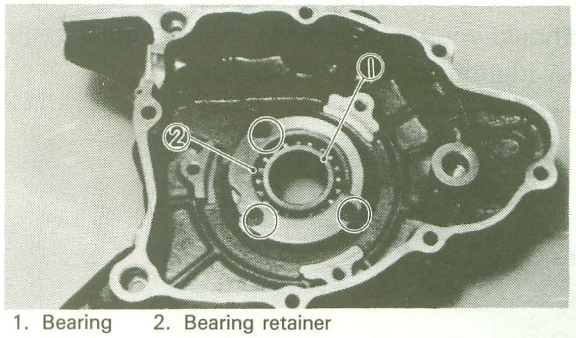
TIGHTENING TORQUE:
7 Nm (0.7 m · kg, 5.1 ft·lb)



1. Bearing 2. Bearing retainer

6. If bearing have been removed from the left-side spacer. Install a new bearing into the spacer. Apply Loctite® (red) to the bearing securing bolts, and install the bolts and a bearing retainer onto the spacer. Torque the bolts to specification.

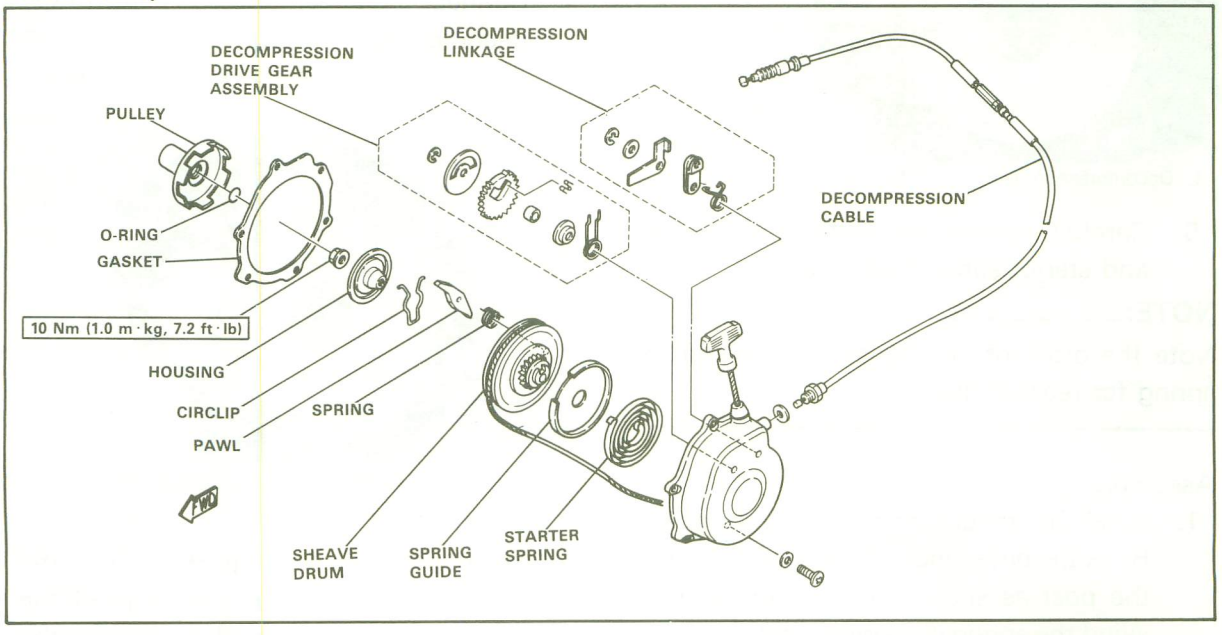
TIGHTENING TORQUE:
7 Nm (0.7 m · kg, 5.1 ft · lb)



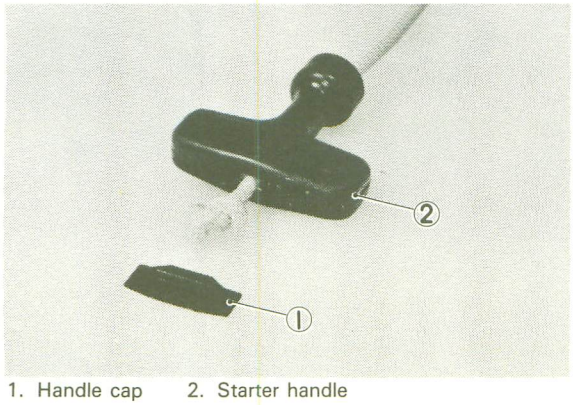
1. Bearing 2. Bearing retainer

Recoil Starter

Disassembly

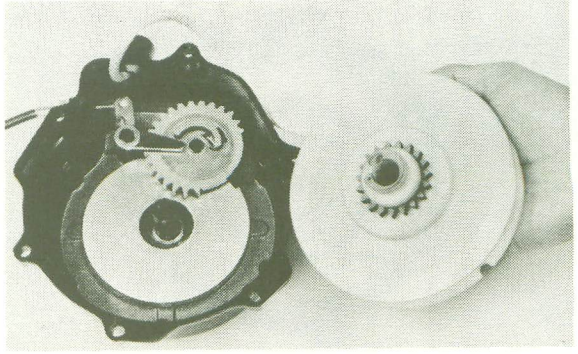


1. Remove the starter handle as a following manner:
   a. Remove the handle cap.
   b. Pull out the rope from the handle and unknot the rope end.
   c. Remove the starter handle.



1. Handle cap 2. Starter handle

2. Remove the drive housing securing nut. Remove the drive housing, drive pawl, and drive-pawl spring in that order, then slowly remove the sheave drum and starter spring guide from the starter case.

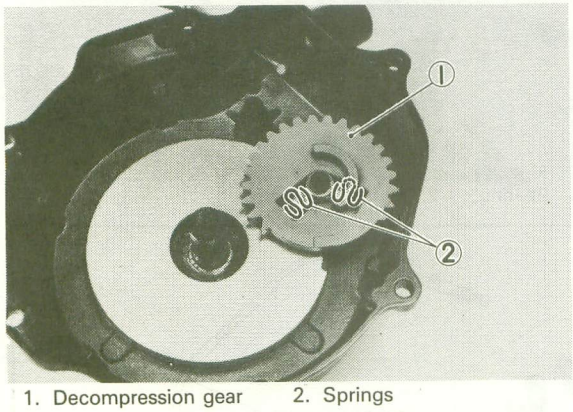


3. Remove the circlip, washer and decompression linkage. Disconnect the decompression cable.

4. Remove the circlip, washer, decompression gear assembly, spring retainer, and stopper spring from the starter case.

NOTE:

There are two kinds of springs installed in the decompression gear as shown photograph. Should you remove these springs, mark each for identification for reinstallation.



1. Decompression gear 2. Springs

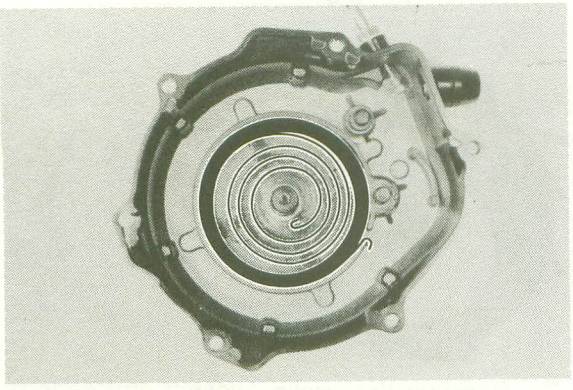
5. Carefully remove the starter spring guide and starter spring from the case.

NOTE:

Note the order of installation on the starter spring for reassembly.

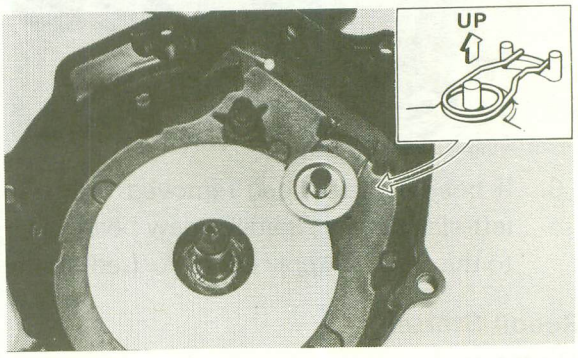
Assembly

1. Install the starter spring in the starter case. Hook the outer hook of the spring around the post as shown in the photograph. Wind the spring clockwise, and carefully fit it into the case. The spring must fit inside the retaining posts. Thoroughly grease the spring with a waterproof gease after it is installed in the starter case.

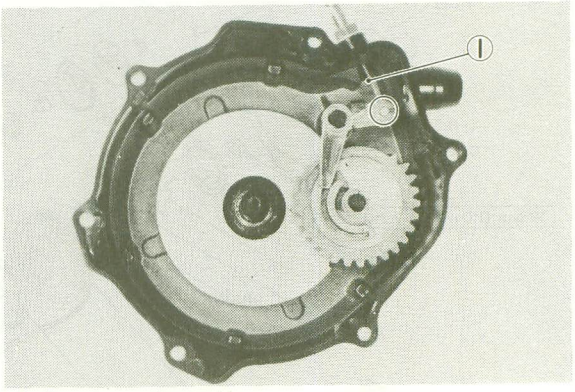


2. Install the starter spring guide.

3. Install the stopper spring onto the case where as shown in the photograph. Then install the spring retainer, decompression gear assembly, washer, and circlip in that order.

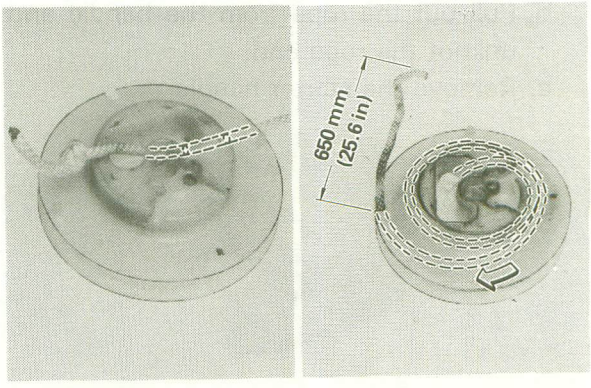


4. Connect the decompression cable to the decompression linkage. Then install the decompression linkage onto the case.

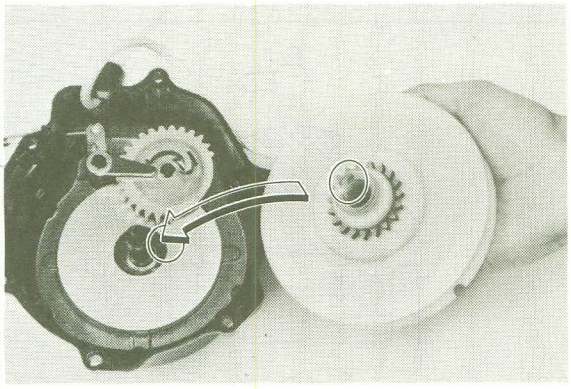


1. Decompression cable

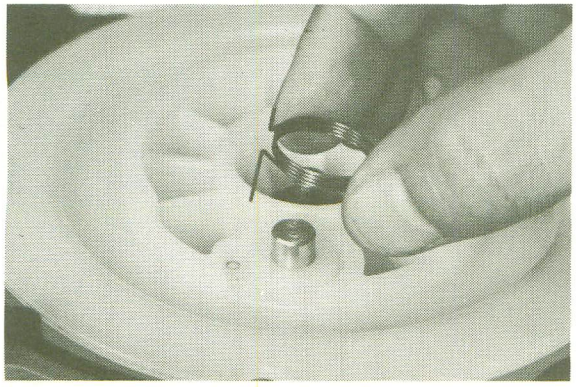
5. Insert one rope end into the hole in the sheave drum, and knot the end of the rope. Fit the knot into the cutout in the sheave drum, and wind the rope clockwise around the sheave drum.

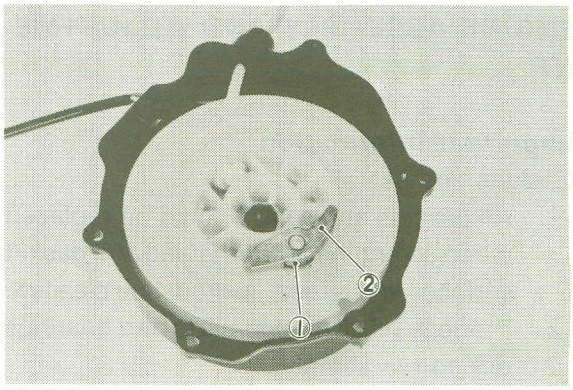


6. Install the sheave drum into the starter case. Be sure the inner hook in the spring engages the cutout in the sheave drum as shown in the photograph. When first placed in the case, the sheave drum will be resting on the spring. Rotate the sheave drum until it drops slightly, then rotate it clockwise until you feel the spring tension.



7. Insert the rope end into the hole in the starter case. Fit the free end through the starter handle, and knot the rope. Install the handle cap onto the handle.
8. Install the drive-pawl spring and the drive pawl as follows: See the photograph.
   a. The longer end of the drive spring should be inserted into the hole in the sheave drum.
   b. Carefully install the drive pawl onto the spring so that the spring end fits a notch in the drive pawl.
   c. Rotate the drive pawl one turn counterclockwise to preload the spring; then push the drive pawl into the cutout in the sheave drum.

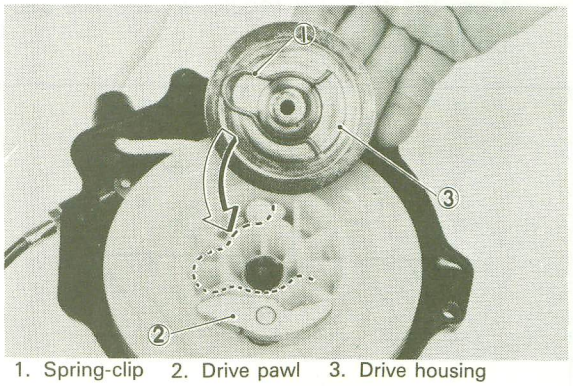




1. Drive-pawl spring 2. Drive pawl

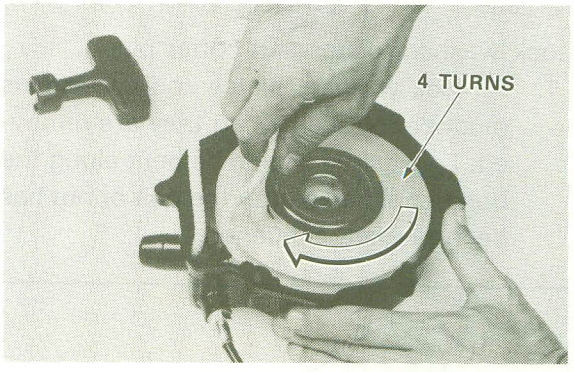
9. Install the spring-clip onto the drive housing as shown in the photograph. Tighten the drive housing securing nut.

TIGHTENING TORQUE:
10 Nm (1.0 m · kg, 7.2 ft · lb)



1. Spring-clip 2. Drive pawl 3. Drive housing

10. Rotate the drum four turns clockwise to preload the spring.



11. Check the movement of the starter. The sheave drum should rotate clockwise and the drive pawl should emerge from the sheave drum when the starter rope is pulled. If the starter does not operate correctly, disassemble the starter and reassemble it correctly.

ENGINE ASSEMBLY AND ADJUSTMENT

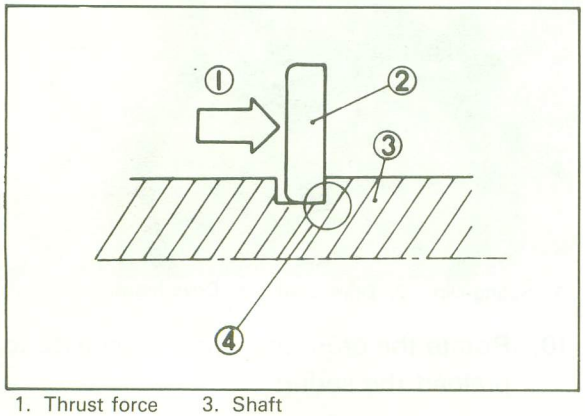
Important Information

Gaskets and seals

1. All gaskets and seals should be replaced when an engine is overhauled. All gasket surfaces and oil seal lips must be cleaned.
2. Properly oil all mating parts and bearings during reassembly.

Circlips

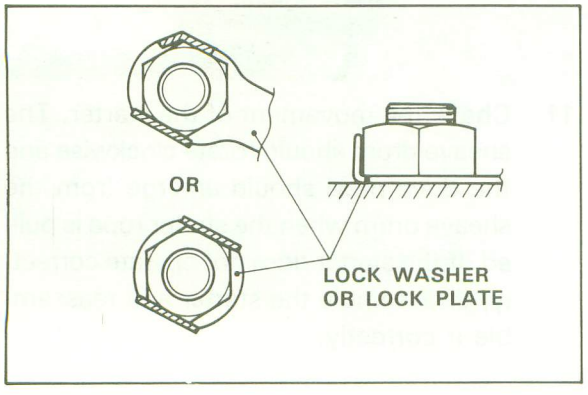
1. All circlips should be inspected carefully before reassembly. Always replace piston pin clips after one use. Replace distorted circlips.
   When installing a circlip, make sure that the sharp edged corner is positioned away from the thrust it receives. See the sectional view below.



1. Thrust force
2. Circlip
3. Shaft
4. Sharp edged corner

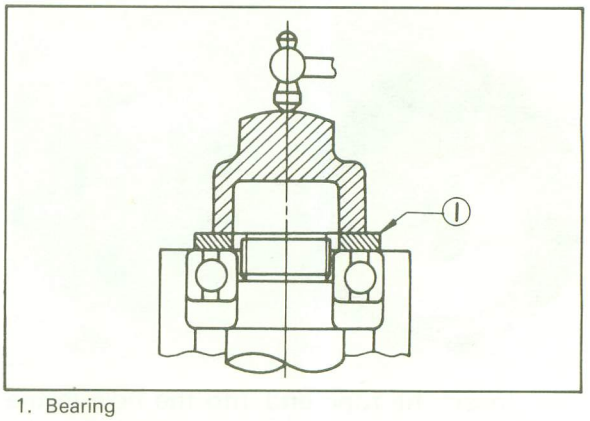
Lock washers/plates and cotter pins

1. All lock washers/plates and cotter pins must be replaced when they are removed. Lock tab(s) should be bent along the bolt or nut flat(s) after the bolt or nut has been properly tightened.

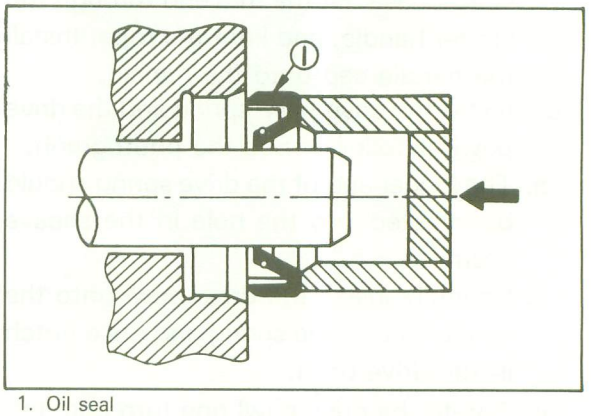


Bearings and oil seals

1. Install the bearing(s) and oil seal(s) with their manufacturer's marks or numbers facing outward. (In other words, the stamped letters must be on the side exposed to view). When installing oil seal(s), apply a light coating of lightweight lithium base grease to the seal lip(s). When installing bearings liberally oil the bearings.

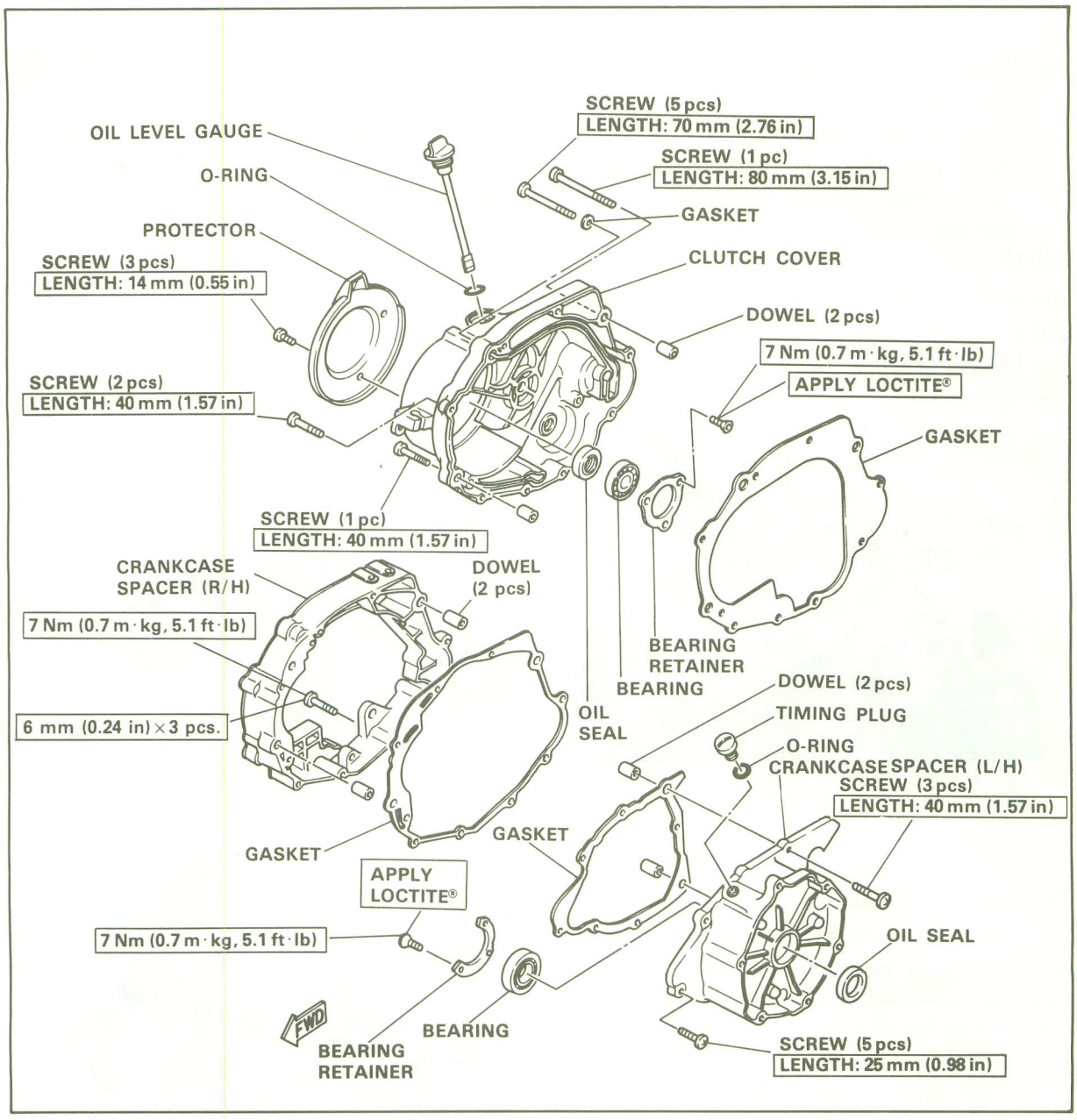


1. Bearing

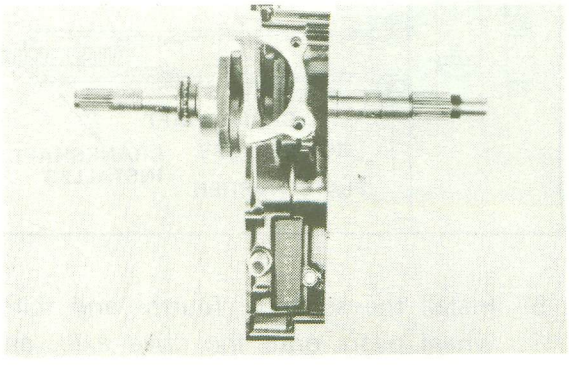


1. Oil seal

Right-Side Crankcase



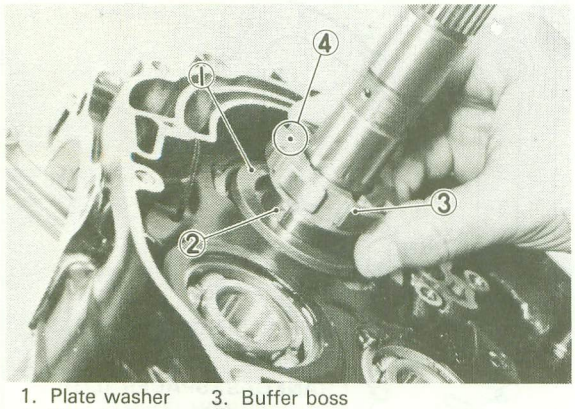
1. Press the crankshaft bearing and both transmission bearings into the right-side crankcase. Liberally oil the bearings before installation. The bearing i.d. marks should face the inside of the crankcase. Push the outer, **not** the inner race.
2. Install the crankshaft, with the longer side of the crankshaft into the right-side of the crankcase.



3. Install the woodruff key into the crankshaft keyway. Apply engine oil to the crankshaft.
4. Install the plate washer and new buffer boss onto the crankshaft. The punch mark on the boss must face outward, away from the main bearing. Install the buffer boss with the buffer boss installing tool.

NOTE:

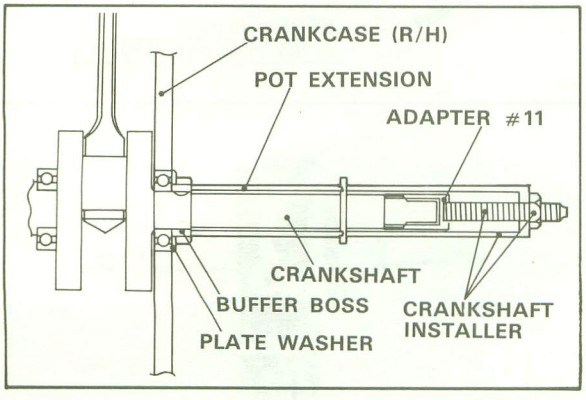
Align the connecting rod with the cylinder sleeve hole. The rod must be in this hole when the boss is properly installed.



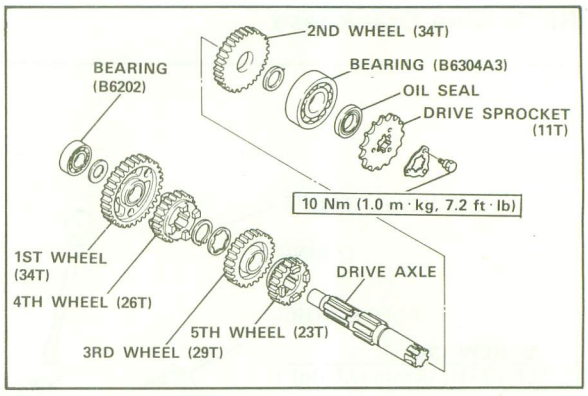
1. Plate washer
2. Woodruff key
3. Buffer boss
4. Punch mark

NOTE:

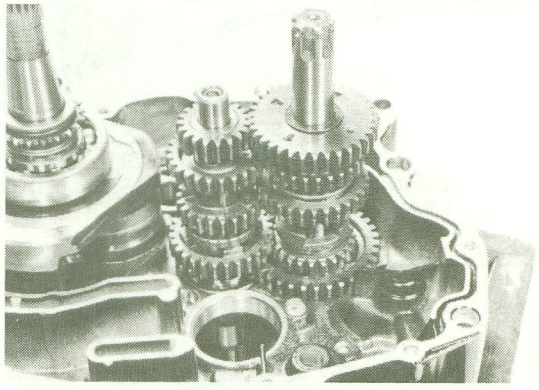
Be sure the woodruff key in the crankshaft should engage the keyway in the buffer boss.



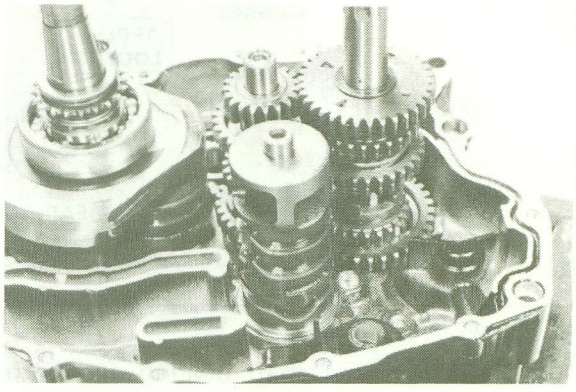
5. Install the second-, fourth- and third-wheel gears onto the drive axle, and assemble the drive axle as shown in the illustration.



6. Install the drive axle and main axle subassembly into the right-side crankcase.



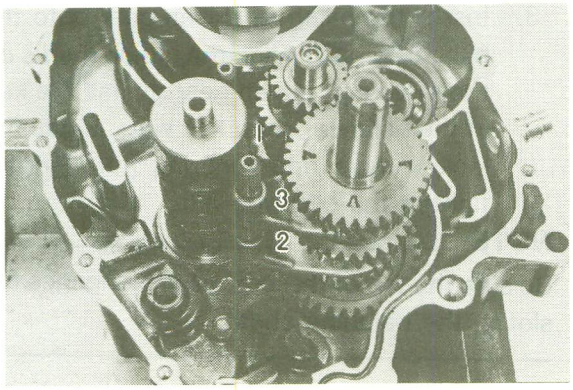
7. Install the shift cam into the right-side crankcase.



8. Install the #1 shift fork onto the second-pinion gear, #2 shift fork onto the fifth-pinion gear, and #3 shift fork onto the fourth-pinion gear.

NOTE:

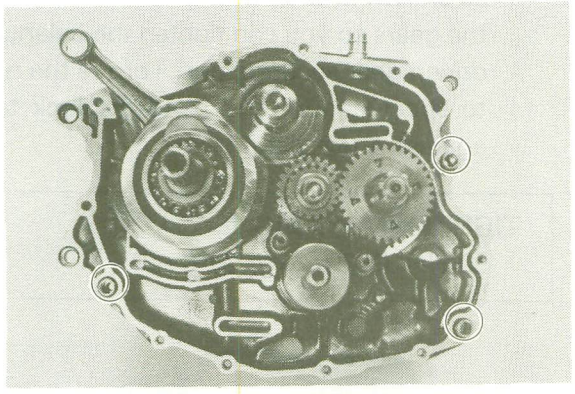
The number forged on the shift fork must always face the left-side crankcase. Be sure that the shift-fork guide pin is properly seated in the shift-cam groove.



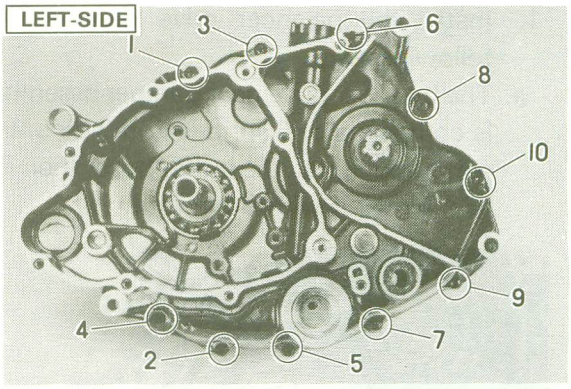
9. Install the shift-fork guide bar into the crankcase. Be sure the guide bar goes through all three shift forks and rests properly in the guide-bar boss in the crankcase.
10. Install the balancer shaft with the non threaded end on the right-side of the crankcase.

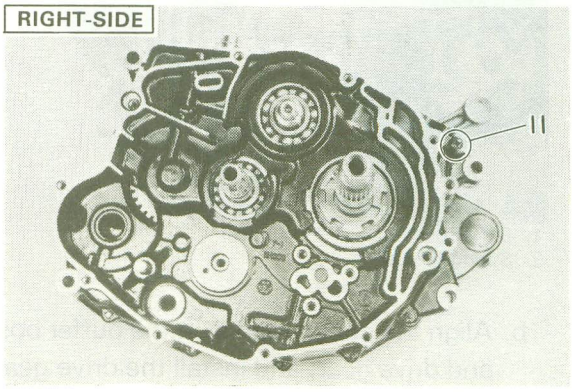
Crankcase Assembly

1. Install the three dowels into the right-side crankcase where in the photograph.

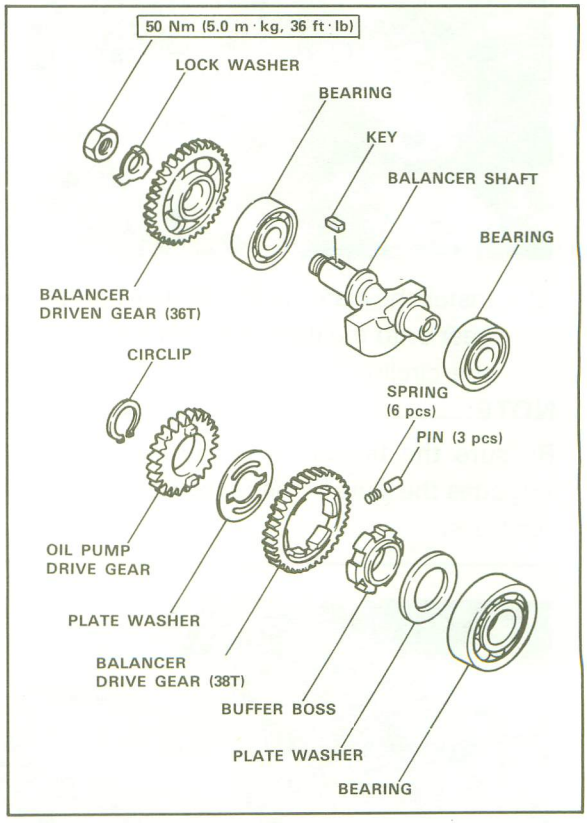


2. Apply Yamaha Bond No. 4 to the mating surfaces of both case halbes.
   Apply thoroughly, over all mating sufaces.
3. Install the left-side crankcase onto the right-side crankcase.
4. Install the crankcase bolts. Tighten the bolts in the tightening sequence shown in the illustration. After all the bolts are tight, torque them to specification. Torque the bolts in the torquing sequence also shown in the illustration.



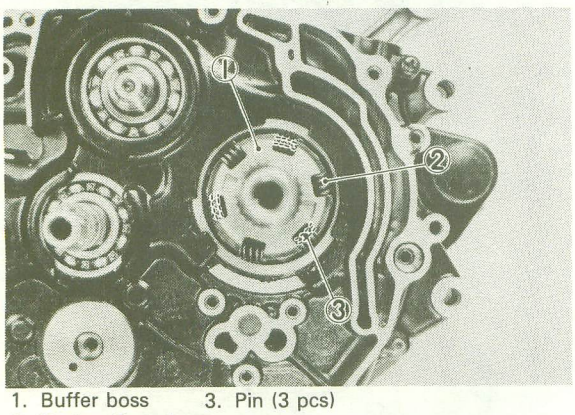


Balancer Drive Gear and Driven Gear



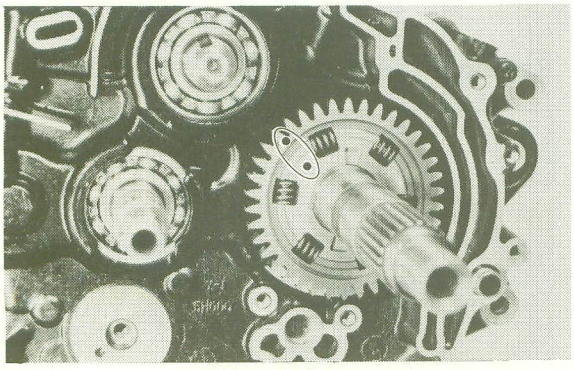
1. Install the balancer drive gear in the following way:

a. The balancer drive gear damper assembly is composed of 6 springs and 3 pins. Insert a spring into the buffer boss, then insert a spring with a pin in it.



1. Buffer boss
2. Spring (6 pcs)
3. Pin (3 pcs)

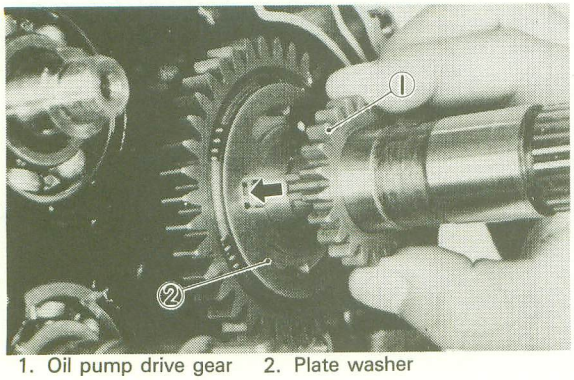
b. Align the punch marks on the buffer boss and drive gear, and install the drive gear.



2. Install the plate washer and oil pump drive gear onto the right-side crankshaft. Install the circlip.

NOTE:

Be sure the tab of the oil pump drive gear engages the slots in the plate washer and buffer boss.

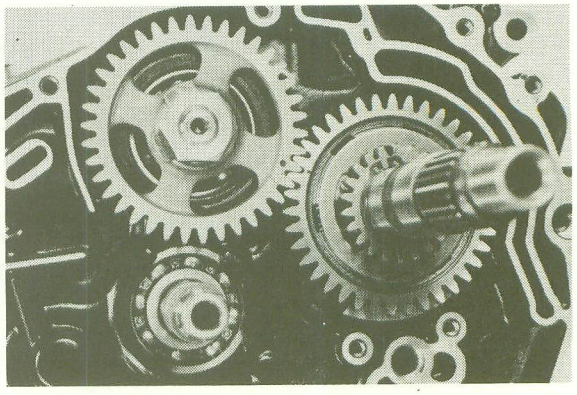


1. Oil pump drive gear
2. Plate washer

3. Install the balancer driven gear onto the balancer shaft. Align the punch marks on the drive and driven gear. Install the key in the balancer shaft key way. Install the lock washer and securing nut. Finger-tighten the securing nut.

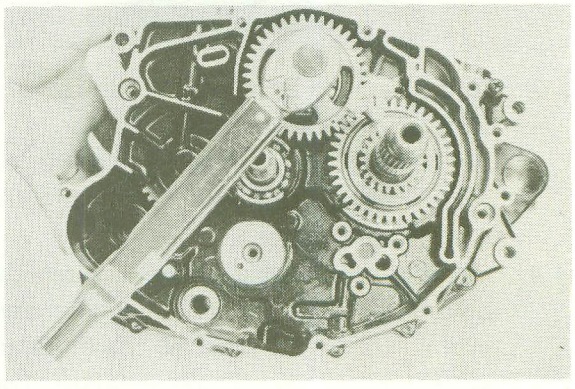
NOTE:

Be sure the tab of the lock washer engages the slot in the balancer shaft.

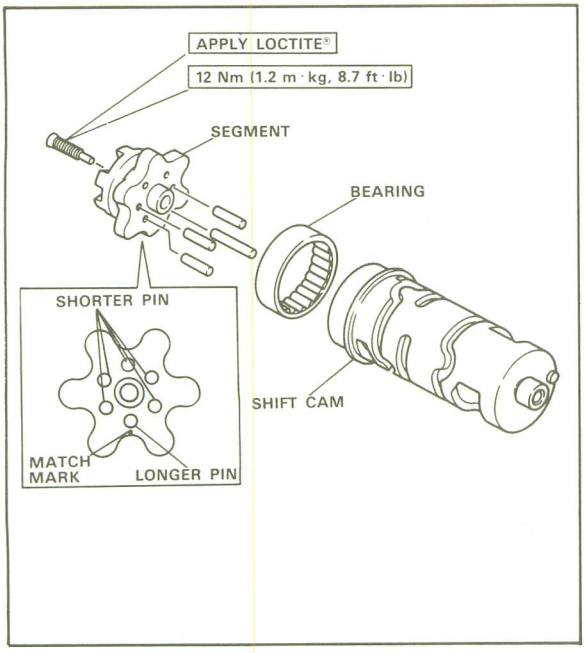


4. Place a small piece of rolled rag or a piece of lead between the drive and driven gears as shown in the photograph. It will hold the gears so you can tighten the balancer driven gear securing nut. Torque the nut to specification, and bend the lock tab against a nut flat.

TIGHTENING TORQUE:
50 Nm (5.0 m · kg, 36 ft · lb)

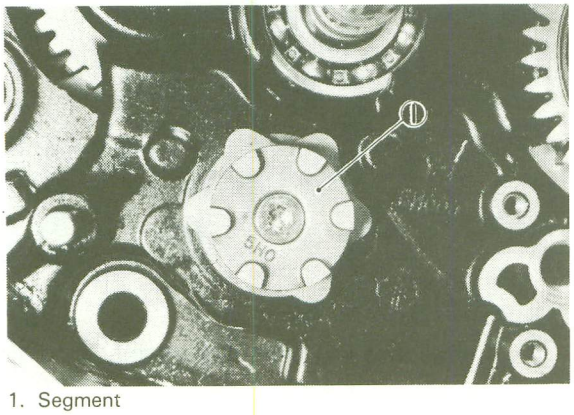


Shifter



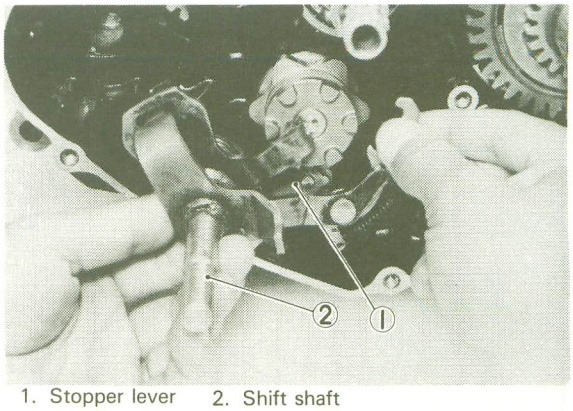
1. Install the segment. Apply Loctite® (red) to the segment securing bolt. Use the torx driver #30 when tightening the bolt.

TIGHTENING TORQUE:
12 Nm (1.2 m·kg, 8.7 ft·lb)



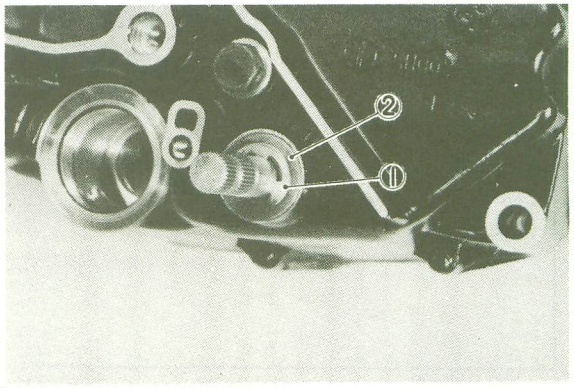
1. Segment

2. Lightly grease the lips of the shift shaft oil seal at the left-side crankcase.
3. Install the shifter into the right-side crankcase. Hook the shift shaft spring beneath the projection in the crankcase. Be sure the shift lever correctly engages the cam shift pins.



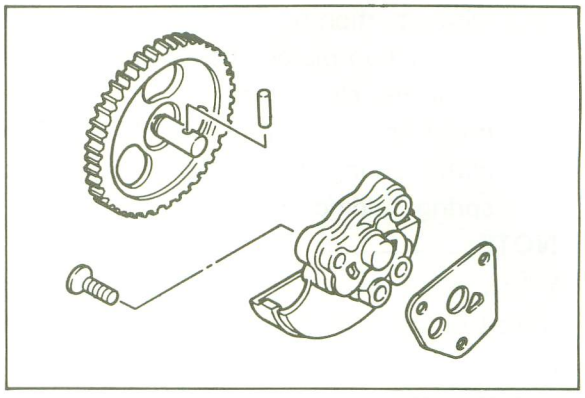
1. Stopper lever 2. Shift shaft

4. Install the washer and circlip onto the shift shaft.



1. Washer 2. Circlip

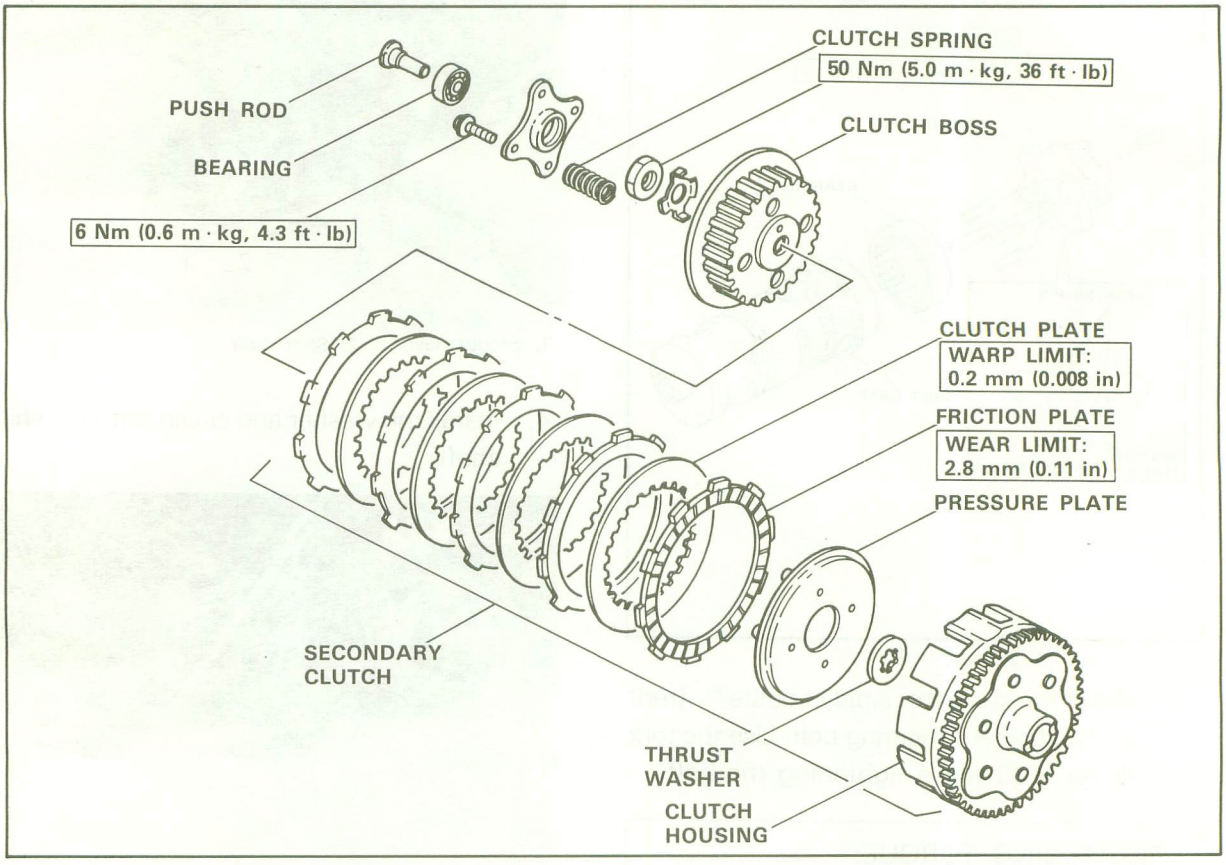
Oil Pump



1. Reassemble the oil pump.
2. Install the oil pump assembly with a new gasket onto the right-side crankcase. Torque the bolts to specification.

TIGHTENING TORQUE:
7 Nm (0.7 m·kg, 5.1 ft·lb)

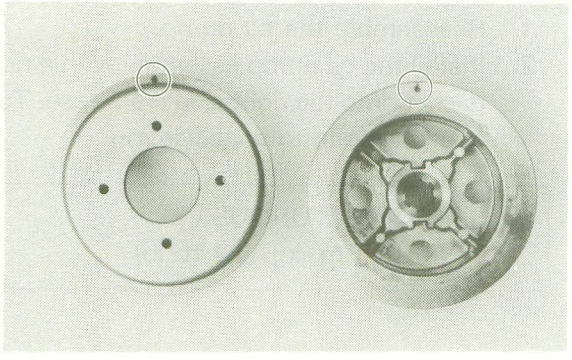
Secondary Clutch

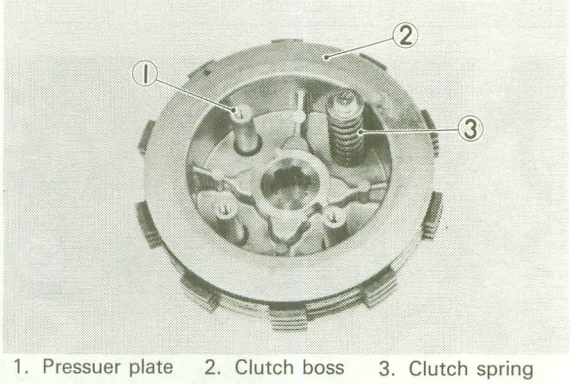


1. Install the clutch housing and thrust washer onto the transmission main axle.
2. Install the friction and clutch plates. Begin with a friction plate and alternate clutch and friction plates until all of the plates are in the clutch boss.
3. Install the clutch pressure plate and the clutch spring. Finger-tighten the clutch spring holding bolt.

NOTE:

When installing the clutch pressuer plate, align the arrow marks on the clutch boss and clutch plate.

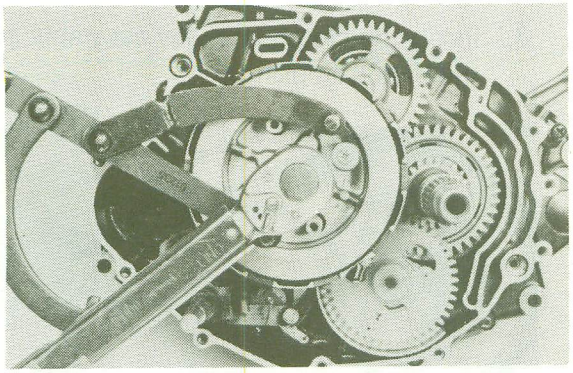




1. Pressuer plate 2. Clutch boss 3. Clutch spring

4. Install the clutch subassembly into the clutch housing.
5. Install a new lock washer onto the transmission main axle. Be sure the tab of the washer engages the slots in the clutch boss.
6. Install the clutch-boss securing nut. Using the universal rotor holding tool, tighten the clutch-boss nut and torque it to specification. Bend a lock tab against a nut flat.

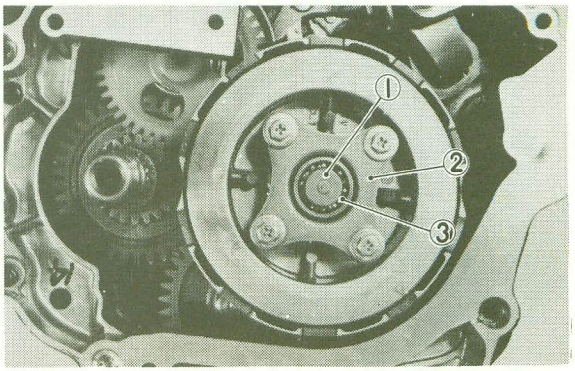
TIGHTENING TORQUE:
50 Nm (5.0 m · kg, 36 ft · lb)



7. Remove the clutch spring holding bolt. Install the three clutch springs and clutch spring plate. Torque the clutch spring holding bolts to specification.

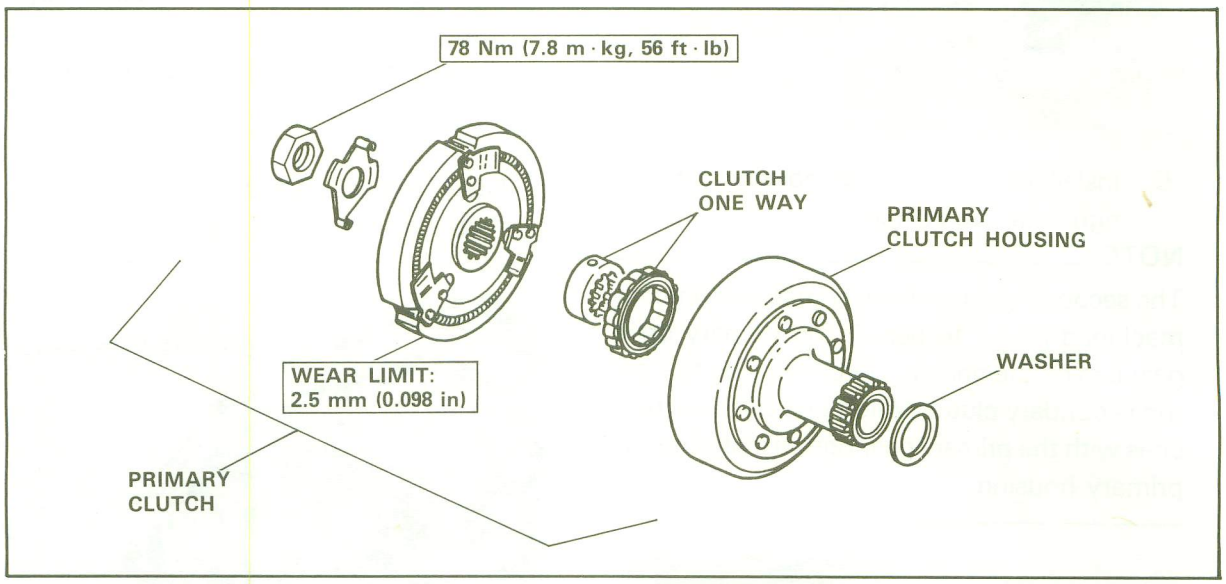
TIGHTENING TORQUE
6 Nm (0.6 m · kg, 4.3 ft · lb)

8. Install the bearing and push rod into the clutch spring plate.

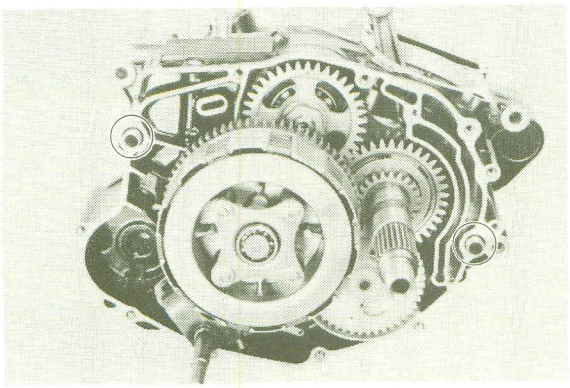


1. Push rod 2. Clutch spring plate 3. Bearing

Crankcase Spacer (Right Side) and Primary Clutch

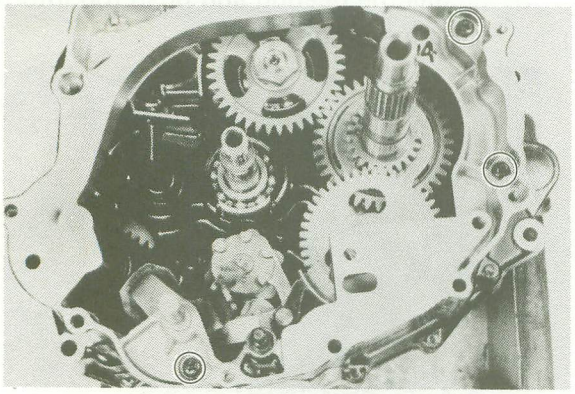


1. Install the two dowels into the right-side crankcase where shown in the photograph.

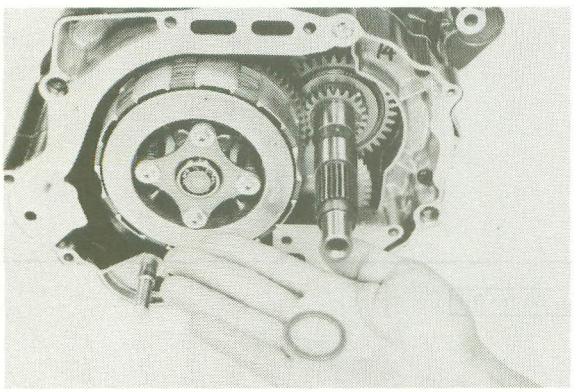


2. Install a new crankcase spacer gasket to the crankcase, and install the right-side crankcase spacer onto the right-side crankcase.
3. Install the three spacer bolts. Tighten the bolts to specification.

TIGHTENING TORQUE:
7 Nm (0.7 m · kg, 5.1 ft · lb)



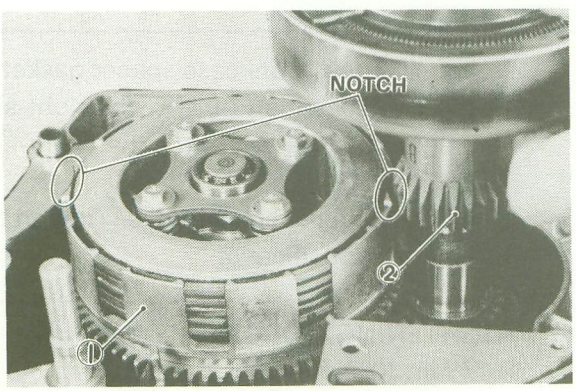
4. Install the washer onto the right-side crankshaft.



5. Install the primary clutch housing onto the right-side crankshaft.

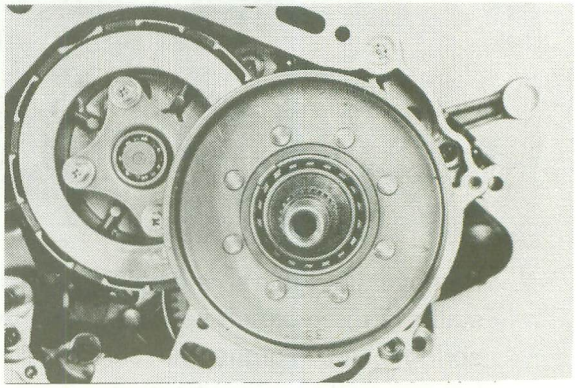
NOTE:

The secondary clutch housing has two notches machined into it to permit the primary drive gear behind the primary clutch housing to clear the secondary clutch. Align one of these notches with the primary gear before installing the primary housing.



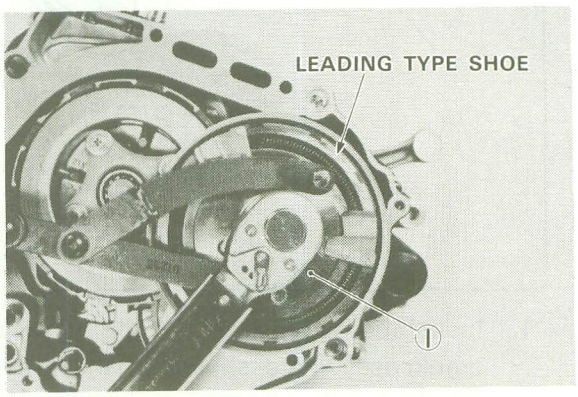
1. Clutch housing 2. Primary drive gear

6. Insert the clutch one-way assembly into the clutch housing.



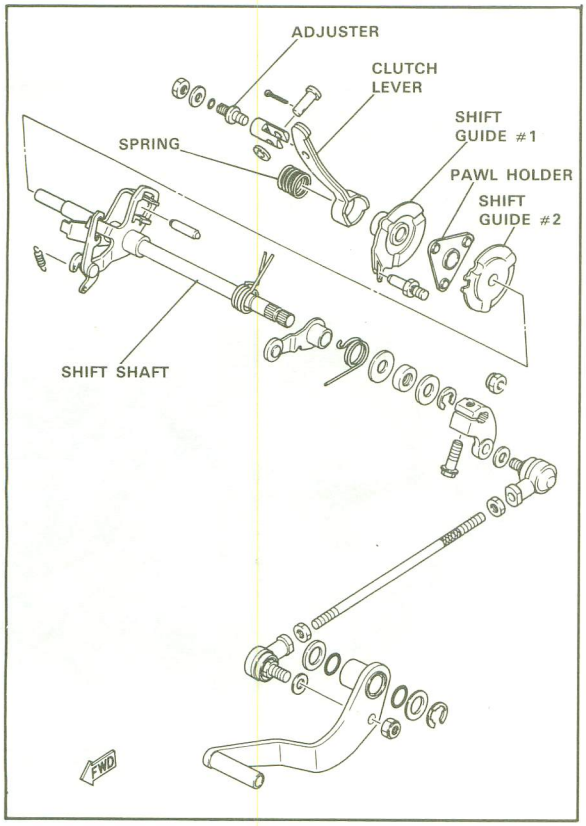
7. Install the clutch shoe assembly into the clutch housing. The four holes side of the clutch assembly must face outward, away from the one-way clutch. Install a new lock washer and primary clutch securing nut.
8. Using the universal rotor holder, tighten the primary clutch securing nut and torque it to specification. Bend a lock tab against a nut flat.

TIGHTENING TORQUE:
78 Nm (7.8 m · kg, 56 ft · lb)

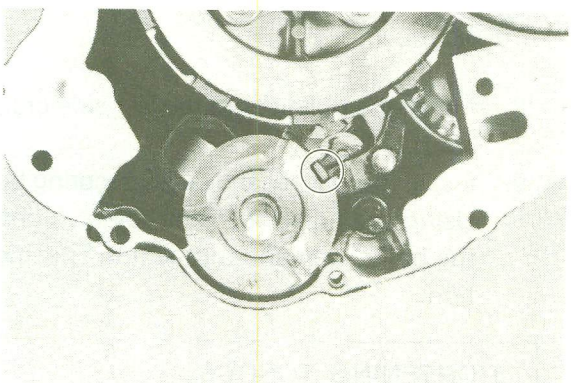


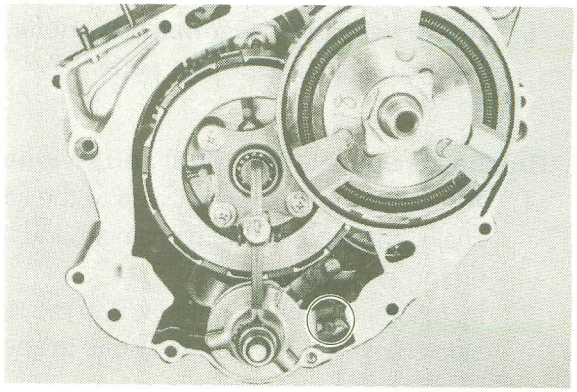
1. Clutch shoe assembly

Clutch Lever and Clutch Cover



1. Install onto the shift shaft the shift guide #2, pawl holder, shift guide #1, clutch lever, and clutch lever spring. The slot in the shift guide #1 must engage the shift shaft projection, and the shift guide #2 slot must engage the projection of the right-side spacer as shown in the photograph.



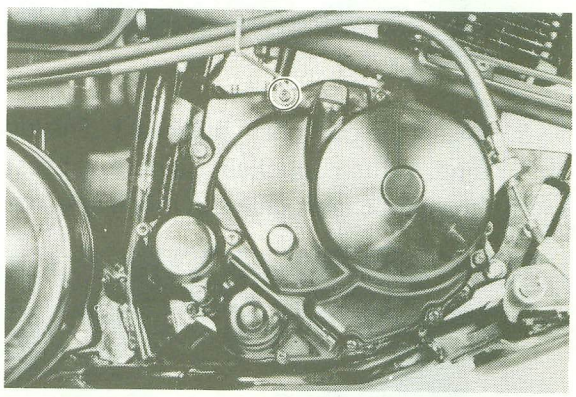


2. Install the two dowels into the right-side spacer.
3. Install the clutch cover with a new gasket, and torque the securing bolts to specification.

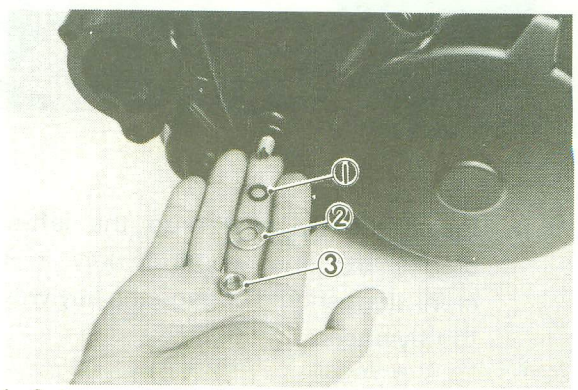
NOTE:

The bolt (with the brake cable) will be installed later (as shown in the photograph).

TIGHTENING TORQUE:
7 Nm (0.7 m · kg, 5.1 ft · lb)



4. Install a new O-ring, washer, and locknut onto the clutch adjuster.



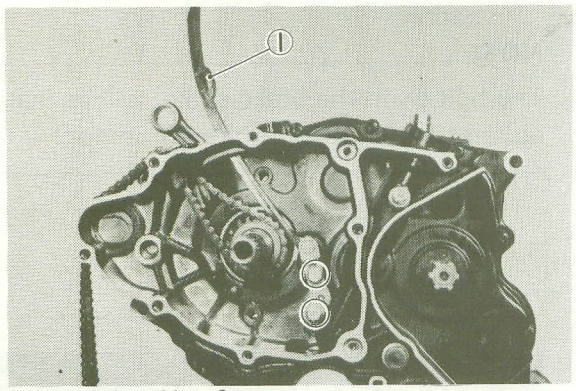
1. O-ring 2. Washer 3. Locknut

5. Adjust the clutch lever free play. Refer to "Clutch Adjustment" on page 2-7.

Crankcase Spacer (Left Side) and Flywheel

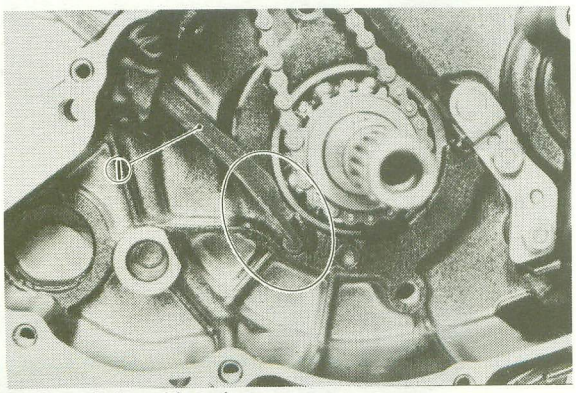
1. Attach a proper length of wire to the cam chain, and place the cam chain around the timing gear sprocket.
2. Install the cam chain guide #2 to the left-side crankcase. Torque the bolts to specification.

TIGHTENING TORQUE:
8 Nm (0.8 m · kg, 5.8 ft · lb)



1. Cam chain guide #2

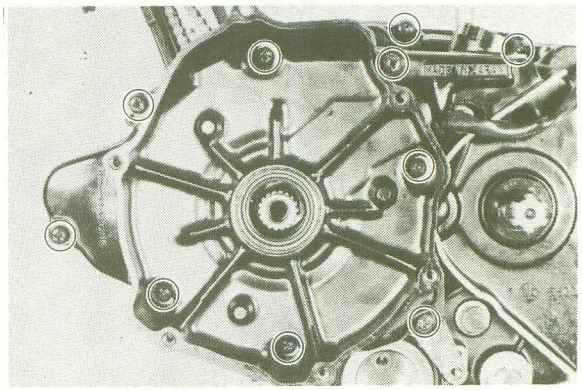
3. Insert the cam chain guide #1. The lower end of the cam chain guide must rest in the cam chain guide slot in the crankcase.



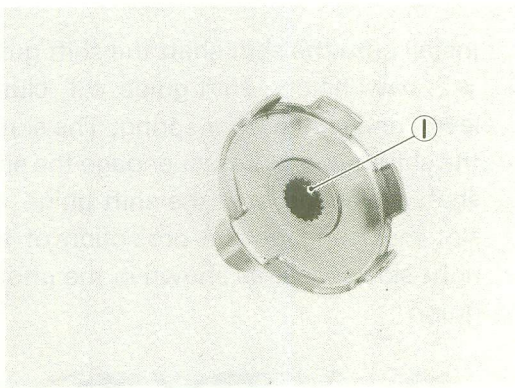
1. Cam chain guide #1

4. Install the flywheel onto the left-side crankshaft. The woodruff key in the crankshaft should engage the key way in the flywheel.
5. Install the two dowels in the left-side crankcase.
6. Install the left side crankcase spacer. Use a new gasket and torque the securing bolts to specification.

TIGHTENING TORQUE:
7 Nm (0.7 m · kg, 5.1 ft · lb)



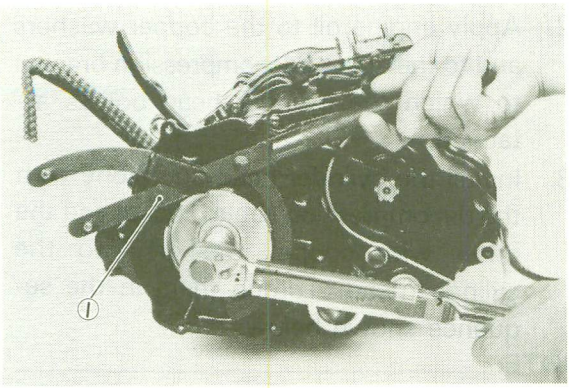
7. Insert a new O-ring into the recoil starter pulley.



1. O-ring

8. Install the pulley onto the left-side crankshaft.
9. Install the washer and pulley securing bolt. Using the universal rotor holder, tighten the pulley bolt and torque it to specification.

TIGHTENING TORQUE:
50 Nm (5.0 m · kg, 36 ft · lb)



1. Universal rotor holder

Piston and Cylinder

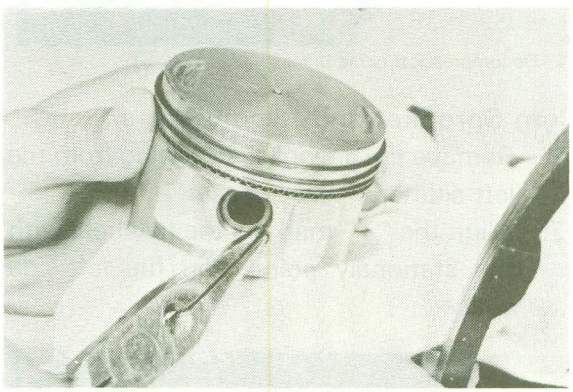
NOTE:

During reassembly, coat the piston ring grooves, piston skirt areas, and piston pin with 4-stroke engine oil.

1. Install the piston on the rod. The arrow mark on the piston should face the front of the engine. Use new piston-pin clips.

NOTE:

Before installing the piston pin clips, cover the crankcase with a clean rag so you will not accidentally drop the clip into the crankcase.



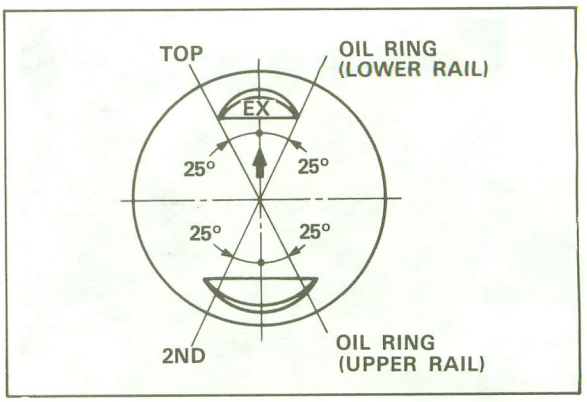
2. Align the piston rings as shown.

CAUTION:

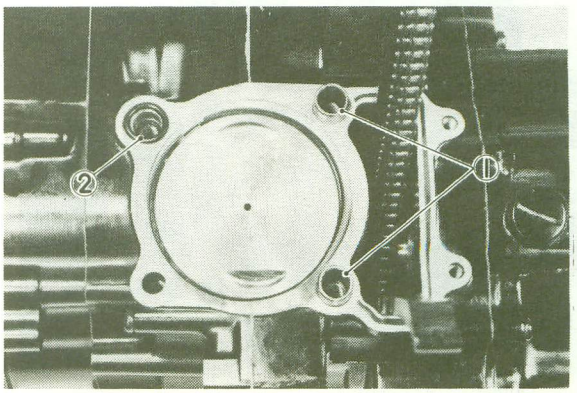
Be sure the ends of the oil ring expanders do not overlap.

NOTE:

The manufacturer's marks or numbers stamped on the rings should be on the top of the rings.



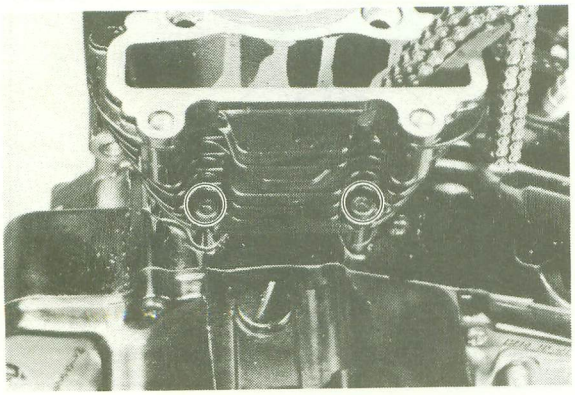
3. Liberally coat the piston with oil, and install the dowels and O-ring onto the crankcase as shown in the photograph.



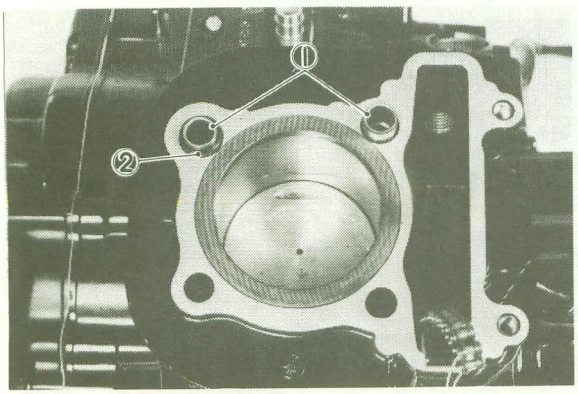
1. Dowels 2. O-ring

4. Install a new cylinder-base gasket to the cylinder.
5. Install the cylinder. Route the cam chain and the cam chain guide through the cam chain journal in the cylinder. You do not need piston ring compress to install the cylinder liner. Simply compress the piston rings with your fingers.
6. Secure the cylinder to the crankcase with the two cylinder-base bolts. Torque the bolts to specification.

TIGHTENING TORQUE:
10 Nm (1.0 m · kg, 7.2 ft · lb)



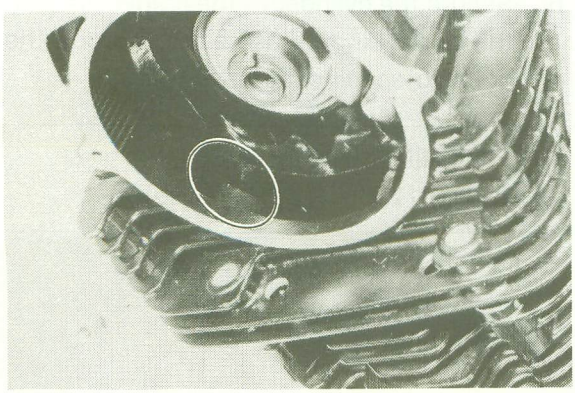
7. Install the two dowels and O-ring onto the cylinder.



1. Dowel 2. O-ring

Cylinder Head

1. Install the cylinder head subassembly onto the cylinder. Route the cam chain through the cam chain journal in the head. The cam-chain guide #1 must be secured in the cam-chain-guide slot in the head.

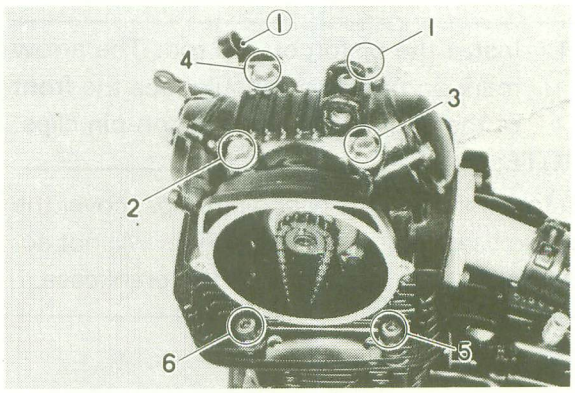


2. Apply engine oil to the copper washers and to the area of decompression bracket to which the cylinder head bolt is attached.
3. Install the cylinder head bolts (one with the decompression cable bracket and the other with copper washer) into the cylinder head. Torque them in the sequence shown below.

NOTE:

Place the bolt with the bracket where shown in the photograph.

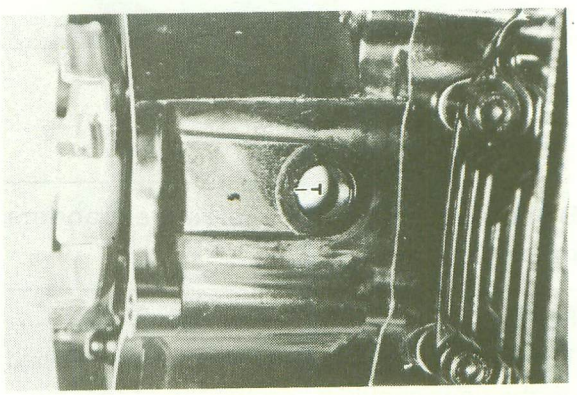
TIGHTENING TORQUE:
22 Nm (2.2 m · kg, 16 ft · lb)



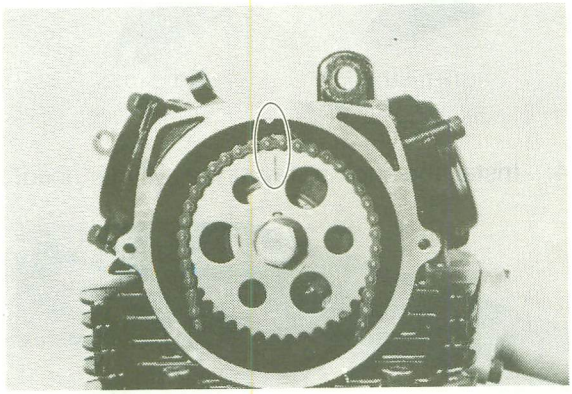
1. Decompression cable bracket

Cam Sprocket and Recoil Starter

1. Remove the timing window plug from the left-side crankcase spaser.
2. Align the "T" mark on the flywheel with the stationaly pointer on the left-side spacer.

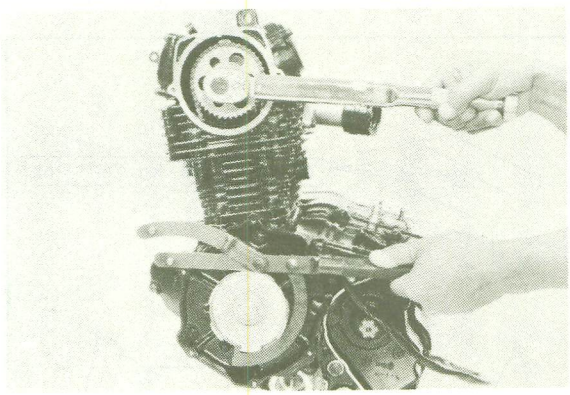


3. Install the cam sprocket onto the camshaft. The timing mark on the sprocket must align with the timing mark on the cylinder head. Pull all the slack from the front side of the cam chain. The front side of the cam chain **must** be taut when the cam chain sprocket is installed.

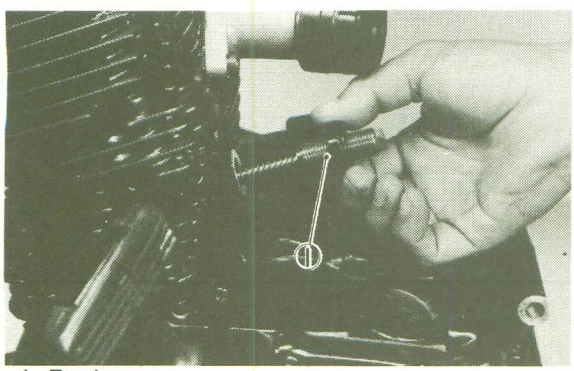


4. Install the cam sprocket securing bolt. Using the universal rotor holder, tighten the cam-sprocket nut and torque it to specification.

TIGHTENING TORQUE:
60 Nm (6.0 m · kg, 43 ft · lb)



5. Install the chain tensioner assembly. Adjust the tensioner. (Refer to Chapter 2, "Cam Chain Adjustment".)



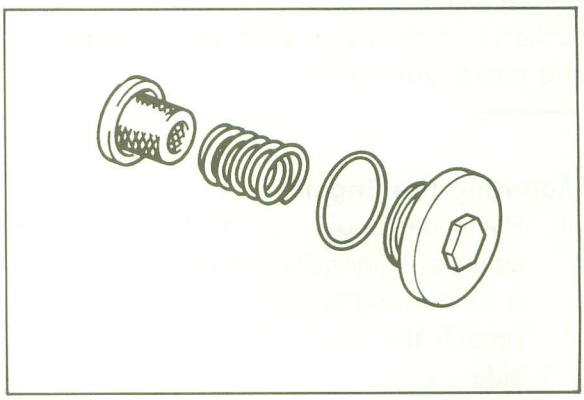
1. Tensioner

6. Install the adjuster cap and tighten the cap.

TIGHTENING TORQUE:
Locknut:
30 Nm (3.0 m · kg, 22 ft · lb)
Adjuster cap:
5 Nm (0.5 m · kg, 3.6 ft · lb)

7. Install and tighten the drain plug before filling the engine with oil.

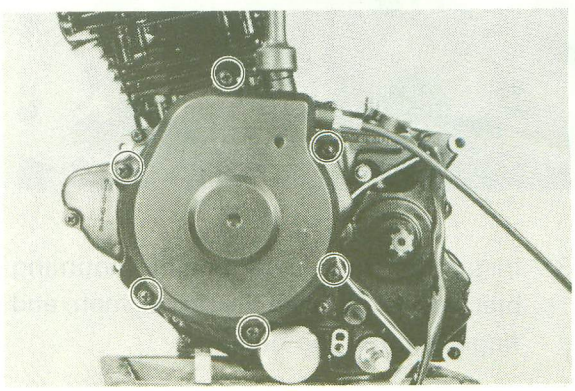
TIGHTENING TORQUE:
7 Nm (0.7 m · kg, 5.1 ft · lb)



8. Install the recoil starter assembly on to the left-side crankcase spacer. Torque the bolts to specification.

TIGHTENING TORQUE:
7 Nm (0.7 m · kg, 5.1 ft · lb)

NOTE:
Do not install the decompression cable at this point.



CAUTION:

Before installing the drain plug, do not forget to fit the O-ring, compression spring, and oil strainer.

9. Adjust the valve clearance. See page 2-3.
10. Install the intake and exhaust valve covers. Torque the bolts to specification.

TIGHTENING TORQUE:
10 Nm (1.0 m · kg, 7.2 ft · lb)

NOTE:

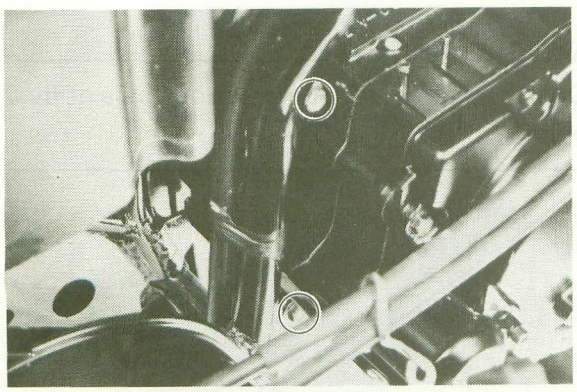
Before installing the covers, apply engine oil to the camshaft, rocker arms, valve assemblies, and rocker arm shafts.

Mounting the Engine

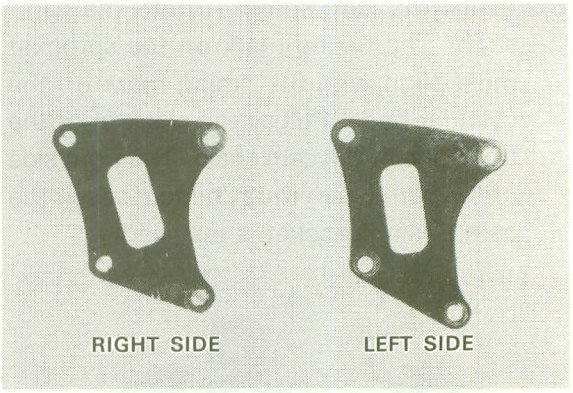
1. Place the engine on a block or other suitable engine stand, and lower the frame over the engine. It is easier if you approach the engine from the right-hand side.
2. Install the rear upper and lower engine mounting bolts. Finger-tighten the mounting nuts; do not torque it at this point.

NOTE:

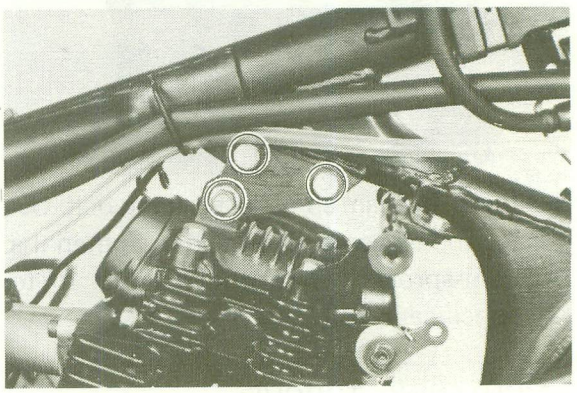
All mounting bolts should be installed from the right of the machine.



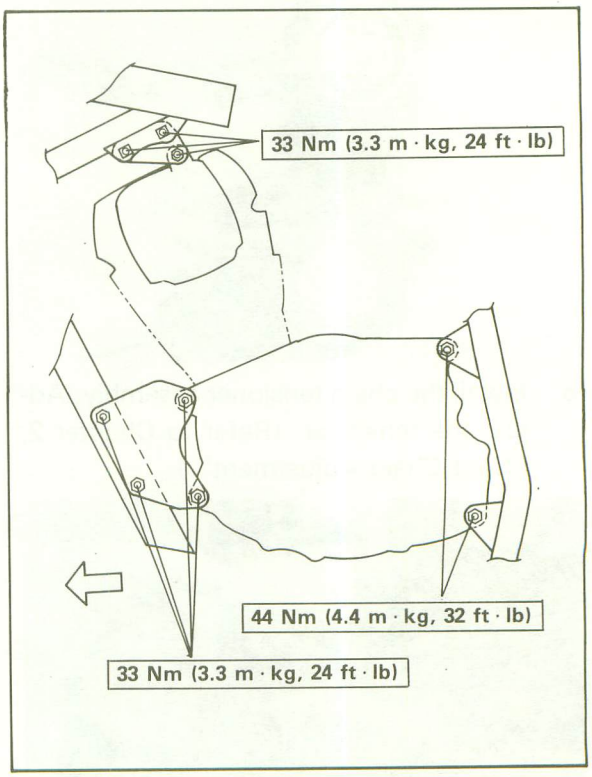
3. Install the front lower engine mounting brackets as shown in the photograph, and finger-tighten the nuts.



4. Install the engine stay at the cylinder head.

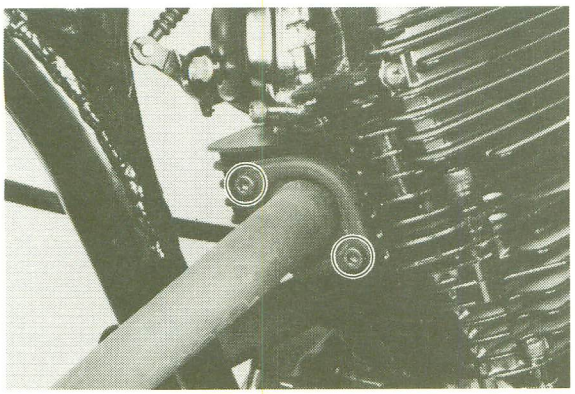


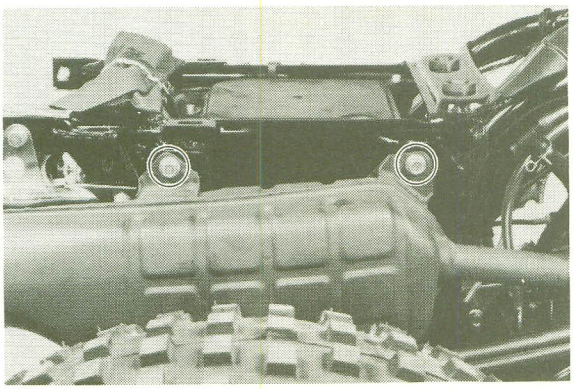
5. Evenly tighten all engine mounting bolts, then torque them to specification.



6. Install the muffler assembly. Use a new gasket, and finger-tighten the exhaust-pipe-flange bolts. Install the muffler securing botls. Tighten all four bolts to specification.

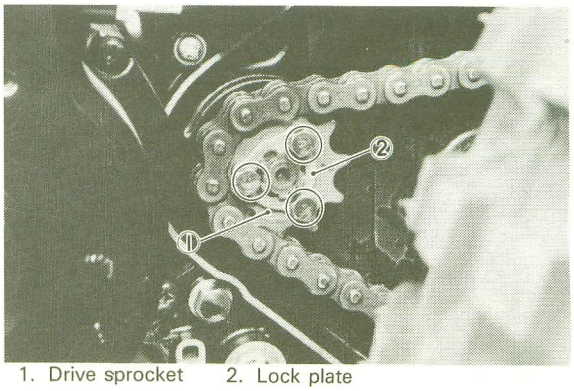
TIGHTENING TORQUE:
Exhaust-pipe-flange bolt:
10 Nm (1.0 m · kg, 7.2 ft · lb)
Muffler securing bolt:
27 Nm (2.7 m · kg, 19 ft · lb)





7. Install the carburetor. Tighten the clamps.
8. Install the drive sprocket and lock plate onto the drive axle. Tighten the drive sprocket retaining bolts to specification. Adjust the drive chain free play. See page 2-12.

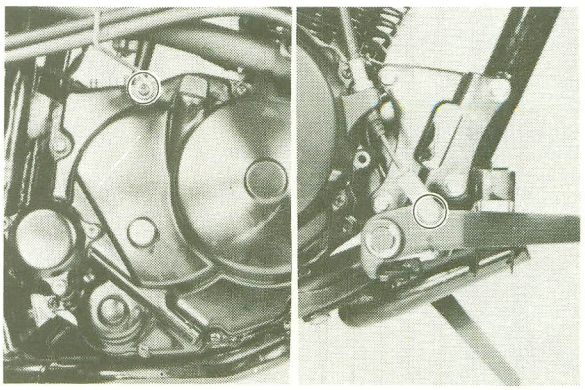
TIGHTENING TORQUE:
10 Nm (1.0 m · kg, 7.2 ft · lb)



1. Drive sprocket 2. Lock plate

9. Install the brake-cables-holder bolt into the clutch cover. Torque the bolt to specification.

TIGHTENING TORQUE:
7 Nm (0.7 m · kg, 5.1 ft · lb)



10. Connect the decompression and rear foot brake cables. Adjust the decompression cable. See the page 2-3 and 2-4.

WARNING:

Always use the new cotter pins.

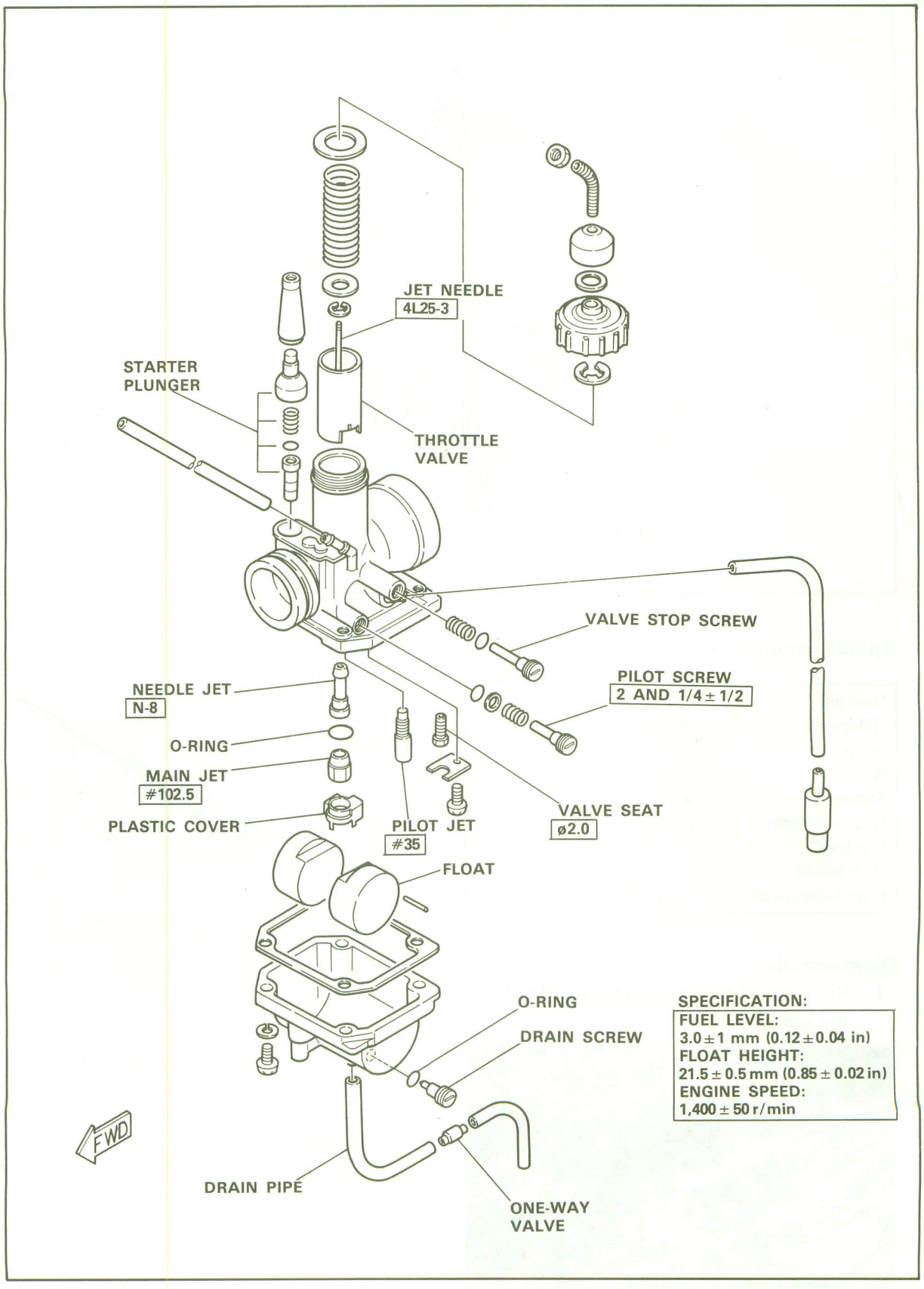
11. Connect the CDI leads, spark plug lead, and crankcase ventilation pipe.
12. Install the fuel tank, fuel tank cover, and seat/rear cowling assembly. Connect the fuel pipes.
13. Add ENGINE oil.

Engine oil capacity:
1.8 L (1.58 Imp qt, 1.90 US qt.)

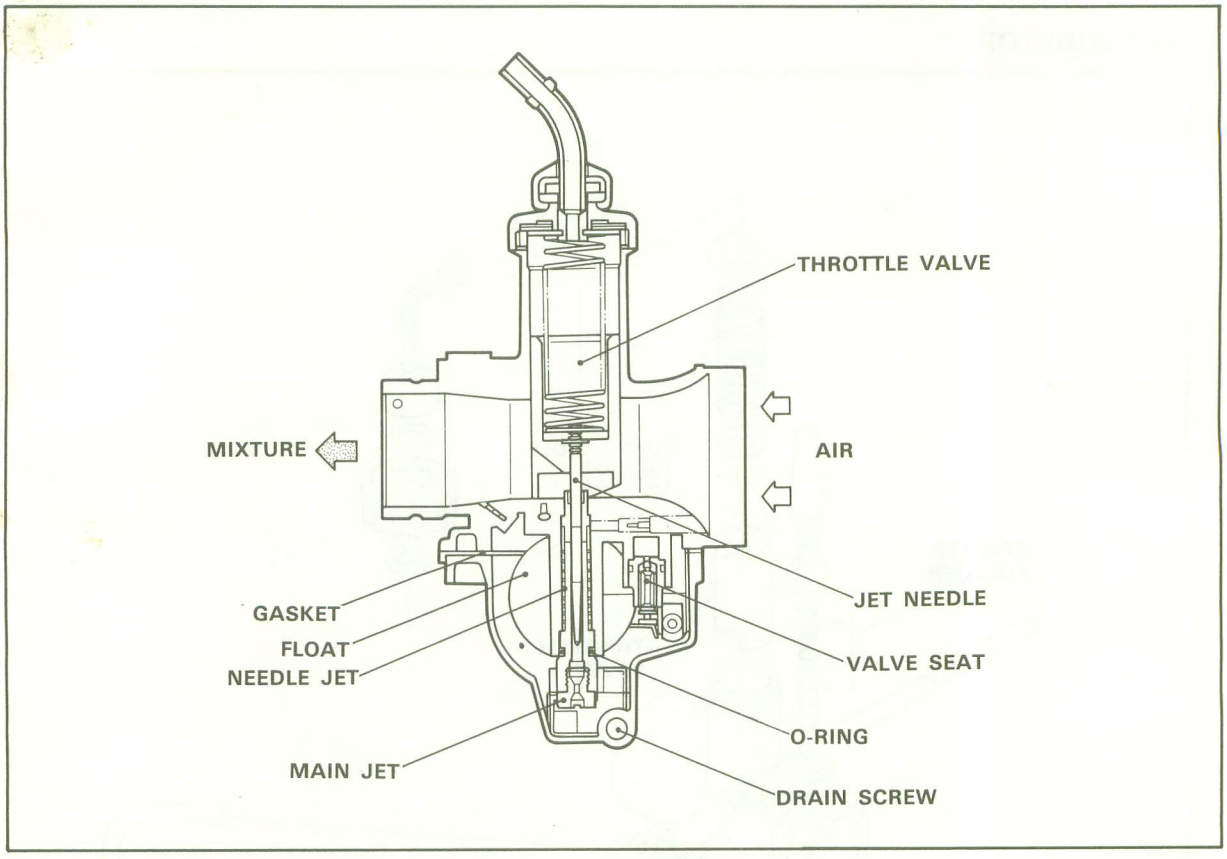
CHAPTER 4.
CARBURETION

CHAPTER 4. CARBURETION

CARBURETOR



Sectional View

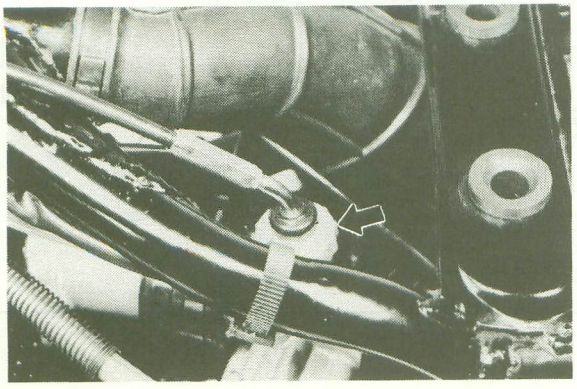


Specifications

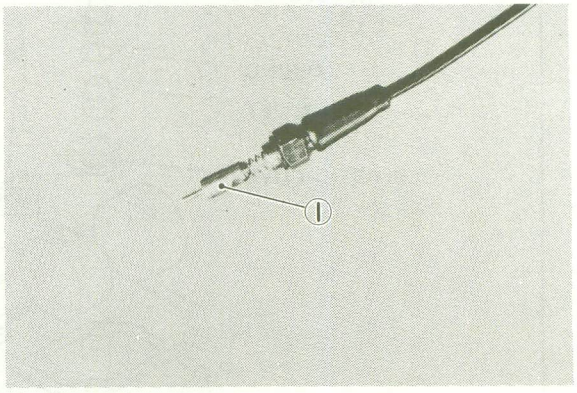
Main jet (Original)	#102.5
Jet needle	4L25-3
Pilot jet	#35
Starter jet	#65
Float valve seat	ø2.0
Fuel level	3.0 mm (0.12 in)
Float height	21.5 mm (0.85 in)
Engine idle speed	1,400 ± 50 r/min

Disassembly

1. Remove the throttle valve assembly from the carburetor.

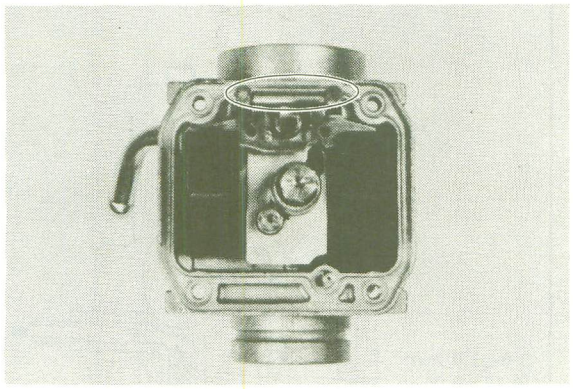


2. Remove the starter plunger from the carburetor body.

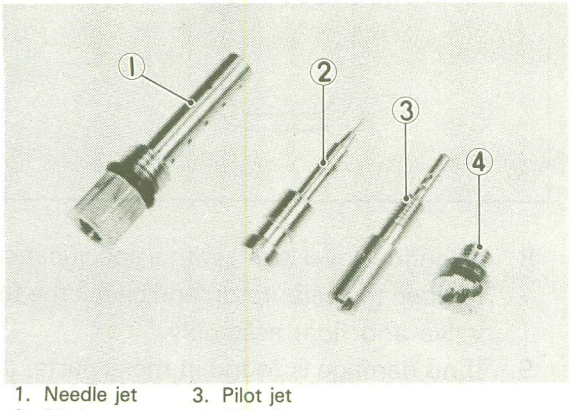


1. Starter plunger

3. Remove the float chamber from the carburetor body.
4. Remove the float pivot pin, and remove the float assembly. Be careful not to close the float valve which is under the float arm.



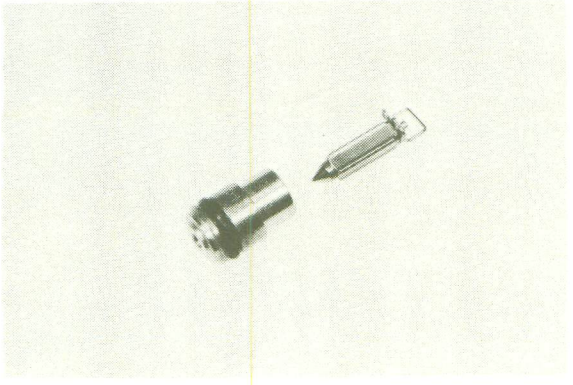
5. Remove the jets, float valve seat, and the main nozzle as necessary.



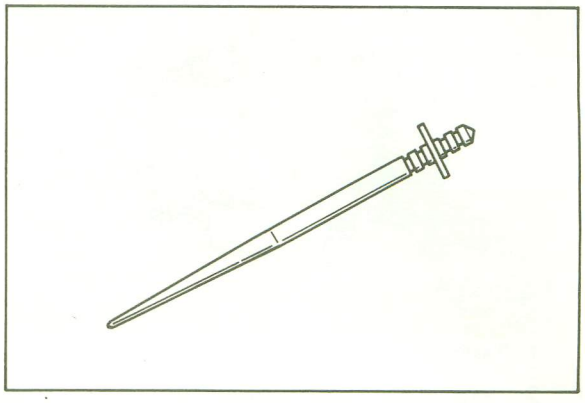
1. Needle jet
2. Pilot screw
3. Pilot jet
4. Main jet

Inspection

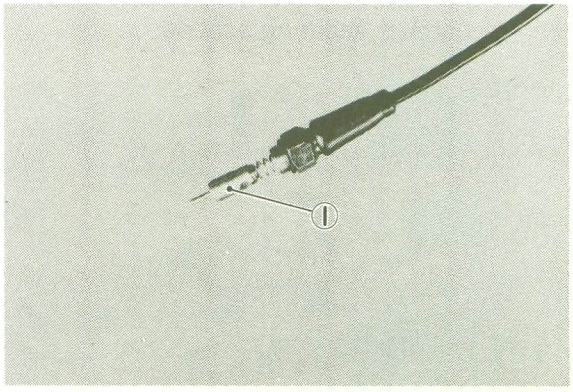
1. Examine the carburetor body and fuel passages. If they are contaminated, wash the carburetor in a petroluem-base solvent. Do not use any caustic carburetor cleaning solutions. Blow out all passages and jets with compressed air.
2. Examine the condition of the floats. If the floats are damaged, they should be replaced.
3. Inspect the float needle valve and seat for wear or contamination. Replace these components as a set.



4. Inspect the jet needle for bends or wear. If the needle is bent or severely worn, replace it.



5. Inspect the starter plunger. If it is worn or damaged, replace it.



1. Starter plunger

Assembly

1. To assemble the carburetors, reverse the desassembly procedures. Pay close attention to the location of each jet.

Adjustment

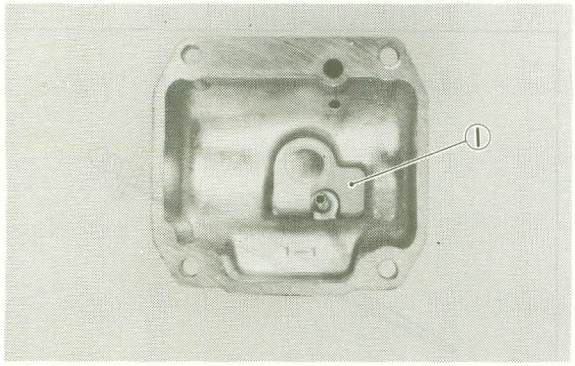
FUEL LEVEL

NOTE:

Before checking the fuel level, note the following:

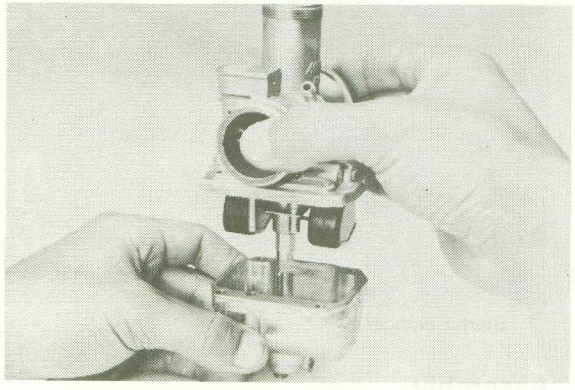
- Place the motorcycle on a level surface.
- Adjust the motorcycle position by placing a suitable stand or a garage jack under the engine so that the carburetor is positioned vertically.

1. Install the plastic cover into the float chamber.



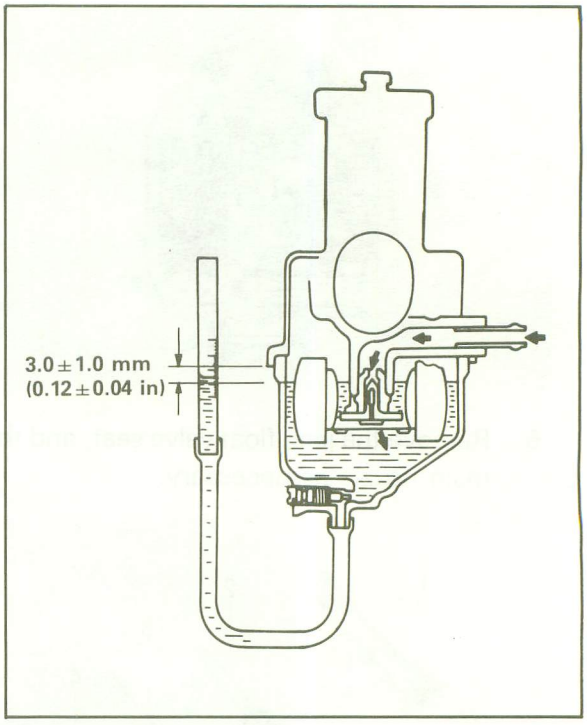
1. Plastic cover

2. Hold the float chamber first, them slowly install the upper body to the float chamber. Be sure the float chamber and upper body fitted snugly. Tighten the float chamber securing screws.

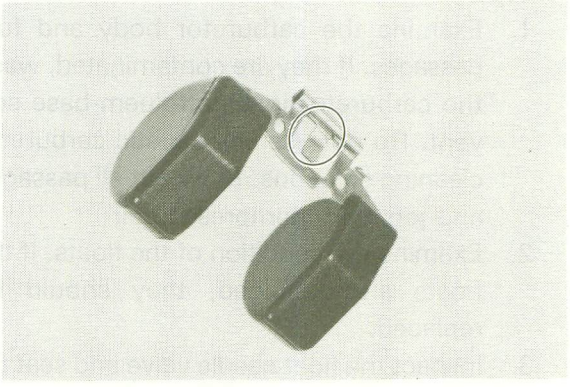


3. Install the carbulator to the machine.
4. Connect the fuel level gauge or a vinyl tube, 6 mm (0.24 in) inside diameter, to the float bowl nozzle on the carburetor.
5. Place the tube next to the throttle stop screw.
6. Set the fuel cock the "ON" and start the engine. Stop it after a few minutes.
7. Check the fuel level. It should be within the specified range.

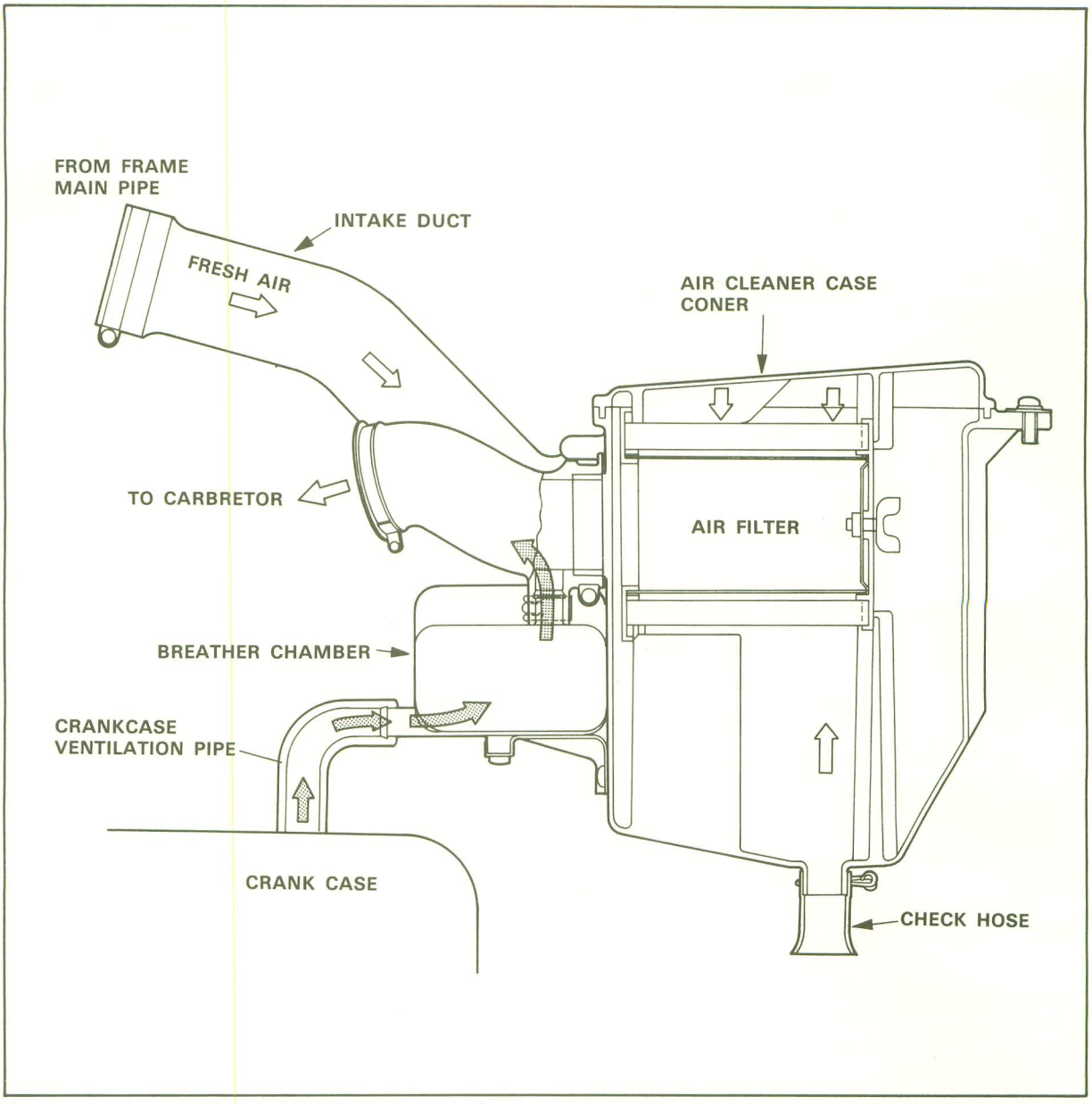
Fuel level:
Carburetor:
3.0±0.1 mm (0.12±0.04 in)
Float height:
21.5±0.5 mm (0.85±0.02 in)
above the carburetor body.



8. If the fuel level is not within specification, remove the carburetor, and check the fuel valve and float assembly.
9. If no damage is found in these parts, adjust the float level by slightly bending the tang on the float. Recheck the fuel level.



AIR CLEANER AND CRANKCASE VENTILATION SYSTEM



Refer to Chapter 2 for the air cleaner maintenance.

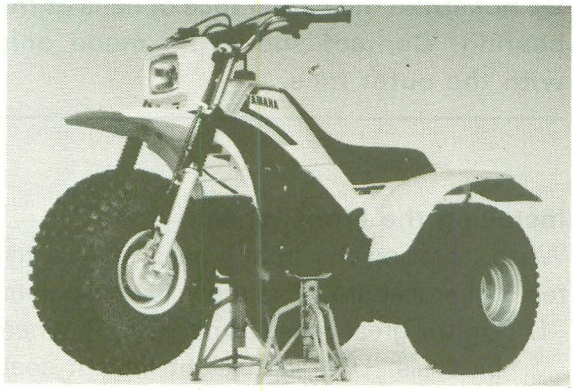
CHAPTER 5.
CHASSIS

CHAPTER 5. CHASSIS

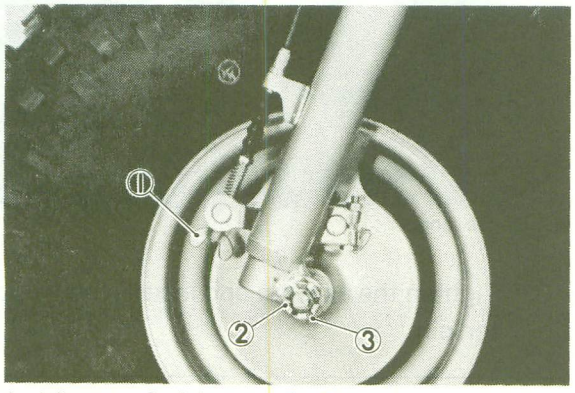
FRONT WHEEL

Removal

1. Elevate the front wheel by placing a suitable stand under the footrest.



2. Remove brake cable. Loosen all cable adjusters and remove cable from handle lever holder. Then remove cable from cam lever at front brake shoe plate.
3. Remove cotter pin from front wheel axle and remove axle nut.
4. Elevate the front wheel by placing a suitable stand under front fork.



1. Adjuster 2. Axle nut 3. Cotter pin

5. Remove the front wheel axle, collar, and front wheel assembly from the front fork.

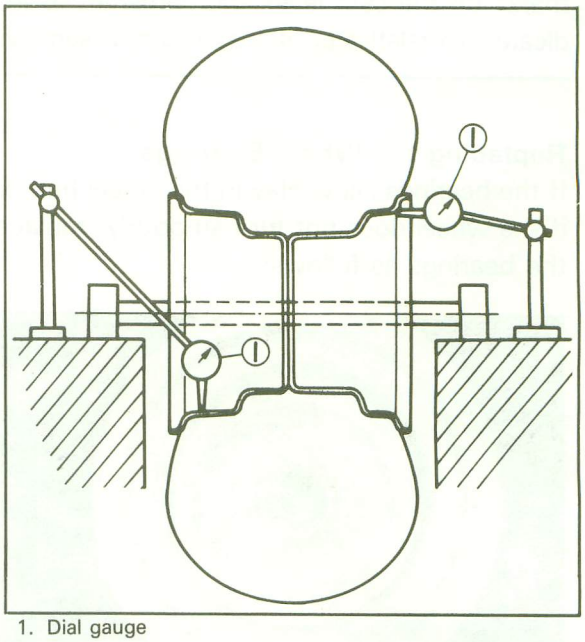
Front Axle Inspection

Remove any corrosion from the axle with emery cloth. Place the axle on a surface plate and check for bent. If bent, replace the axle. Do not attempt to straighten a bent.

Front Wheel Inspection

1. Check for cracks, bends or warpage of the wheels. If a wheel is deformed or cracked, it must be replaced.
2. Check wheel runout.
   If deflection exceeds tolerance below, check the wheel bearing or replace wheel as required.

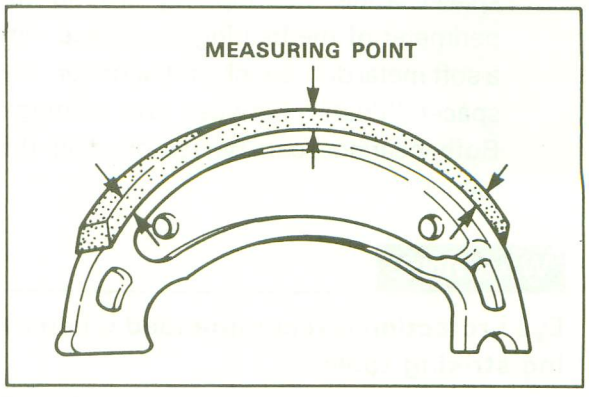
Rim runout limits:
Vertical — 2.0 mm (0.08 in)
Lateral — 2.0 mm (0.08 in)



1. Dial gauge

Checking Brake Shoe Wear

1. Check the brake linings for damage and wear. If the thickness is less than the specified value, replace the brake shoe as a set.



Wear limit: 2 mm (0.08 in)

Brake Drum

Oil or scratches on the inner surface of the brake drum will impair braking performance or result in abnormal noises. Remove oil by wiping the brake drum with a rag soaked in lacquer thinner or solvent. Remove scratches by lightly and evenly polishing the brake drum with emery cloth.

Brake Shoe Plate

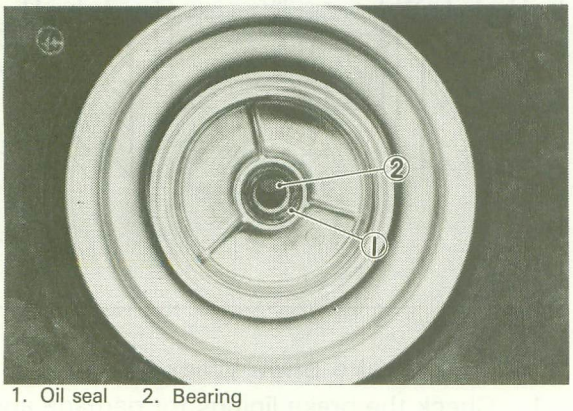
Remove the camshaft, and grease it. If the cam face is worn, replace the camshaft.

NOTE:

Before removing the cam lever, put alignment marks on the cam lever and camshaft to indicate their relative positions for easy assembly.

Replacing the Wheel Bearings

If the bearings allow play in the wheel hub or if the wheel does not turn smoothly, replace the bearings as follows:



1. Oil seal 2. Bearing

1. Clean the outside of the wheel hub.
2. Drive the bearing out by pushing the spacer aside and tapping around the perimeter of the bearing inner race with a soft metal drift punch and hammer. The spacer "floats" between the bearings. Both bearings can be removed in this manner.

WARNING:

Eye protection is recommended when using striking tools.

3. To install the wheel bearing, reverse the above sequence. Use a socket that matches the outside diameter of the race of the bearing to drive in the bearing.

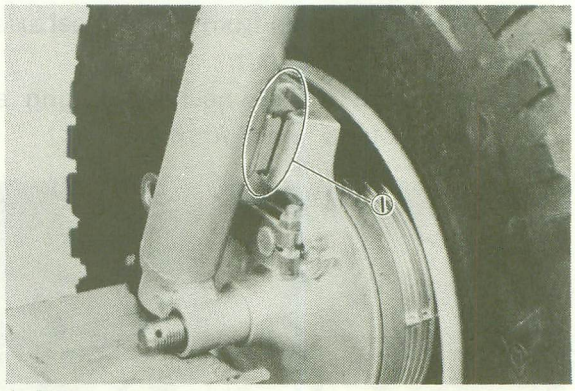
CAUTION:

Do not strike the center race or balls of the bearing. Contact should be made only with the outer race.

Installing the Front Wheel

When installing the front wheel, reverse the removal procedure. Note the following points.

1. Lightly grease the lips of the front wheel oil seals. Use lightweight lithium soap base grease.
2. Make sure the projecting portion (torque stopper) of the brake shoe plate is positioned correctly.



1. Torque stopper

3. Tighten the axle nut and install a new cotter pin.

TIGHTENING TORQUE:
50 Nm (5.0 m · kg, 36 ft · lb)

WARNING:

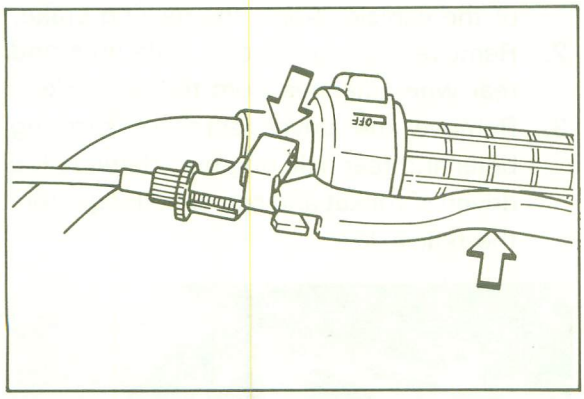
Always use a new cotter pin on the axle nut.

4. Install the brake cable.
5. Adjust the brake.
   Refer to "Front Brake Lever" on page 2-10.

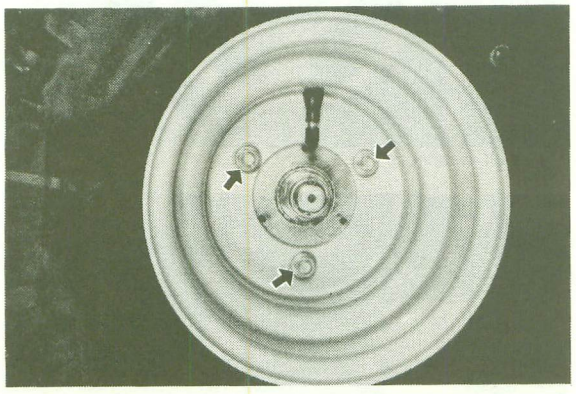
REAR WHEEL

Removal

1. Block the front tire and juck up the rear of the vehicle. Apply the parking brake.



2. Remove the nuts from rear wheel panel.
3. Remove the rear wheel assembly.



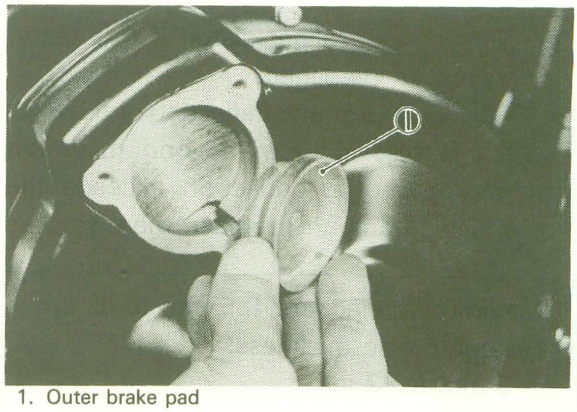
Rear Wheel Inspection

See "Front Wheel Inspection" on page 5-1.

REAR BRAKE

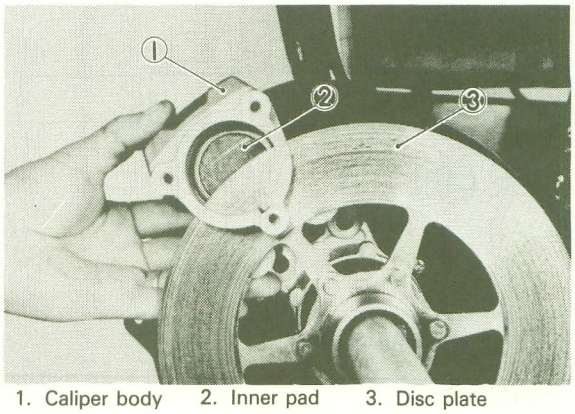
Brake Pads Removal

1. Block the front tire and raise the rear of the machine.
2. Disconnect the rear brake cables and springs from the rear caliper lever.
3. Remove the rear brake caliper securing nuts, and remove the caliper lever assembly and outer pad from the caliper body.



1. Outer brake pad

4. Remove the rear brake cover securing screws, remove the brake cover.
5. Remove the rear brake caliper securing bolts. Pull out the disc plate, and remove the caliper body from the rear wheel hub.

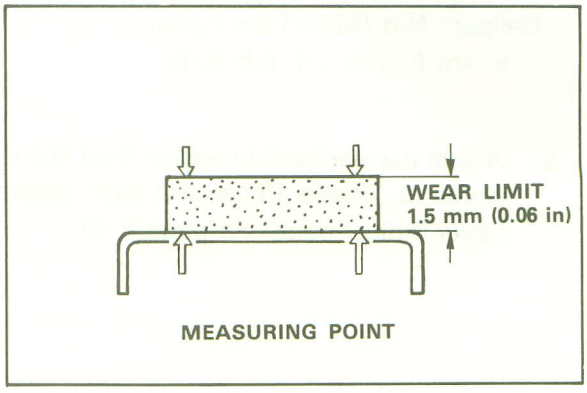


1. Caliper body 2. Inner pad 3. Disc plate

Rear Brake Inspection

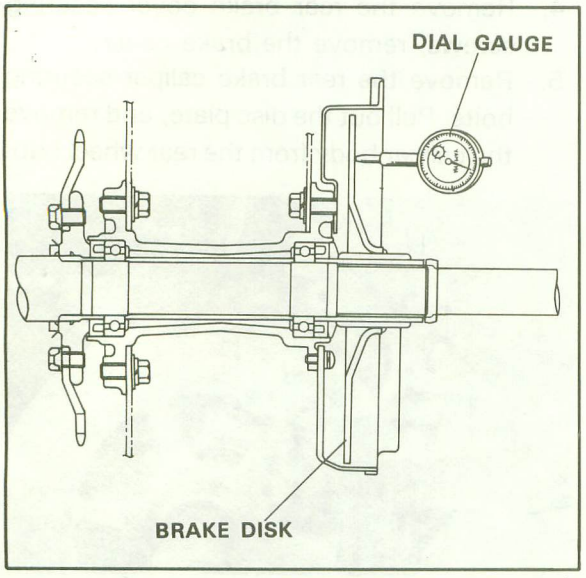
1. Replace any brake pad that is worn beyond limits. Always replace the brake pads as a set.

Wear limit: 1.5 mm (0.06 in)



2. Replace the caliper piston if it is rasty, frayed, or damaged.
3. Check for wear and deflection of the disc. If the disc is worn beyond minimum thickness or if deflection exceeds the specified amount, replace the disc.

Maximum deflection: 0.5 mm (0.02 in)
Minimum disc thickness:
3 mm (0.12 in)



Assembly

1. To assemble the rear brake, reverse the disassembly procedures. Torque the caliper securing bolts and nuts to specification.

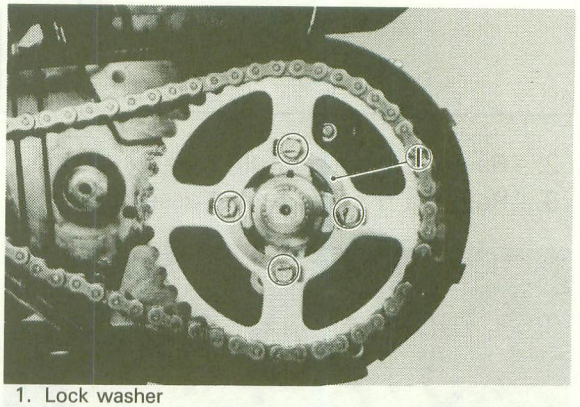
TIGHTENING TORQUE:
Caliper body: Bolt (M10 × 1.25 × 2 pcs)
45 Nm (4.5 m · kg, 32 ft · lb)
Caliper: Nut (M6 × 1.0 × 3 pcs)
9 Nm (0.9 m · kg, 6.5 ft · lb)

2. Adjust the rear hand brake and foot brake. Refer to "Brake Pedal and Rear Brake Lever Adjustment" on page 2-10.

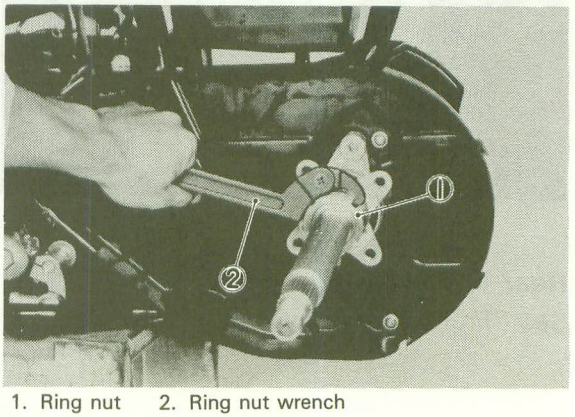
Replacing the Wheel Bearings

If the bearings allow play in the wheel hub or if the wheel does not turn smoothly, replace the bearings as follows:

1. Block the front tire and juck up the rear of the vehicle. Apply the parking brake.
2. Remove the rear wheels, axle nuts and rear wheel flanges from the rear axle.
3. Remove the driven sprocket securing bolts and rear axle ring nut. Remove the driven sprocket and sprocket flange from the rear axle.

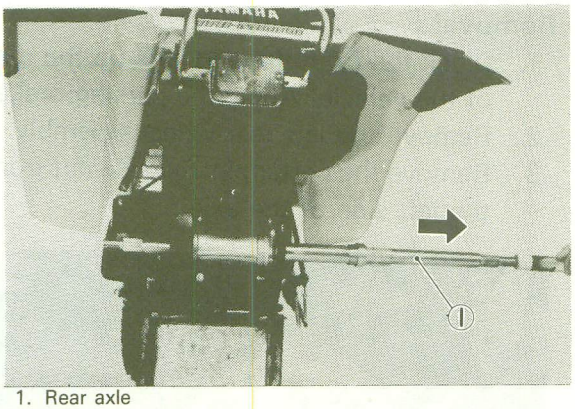


1. Lock washer



1. Ring nut 2. Ring nut wrench

4. Disconnect the rear brake cables from the caliper lever. Remove the rear brake assembly and disc plate.
5. Remove the rear axle from the rear wheel hub by tapping the left end axle with a plastic hammer.

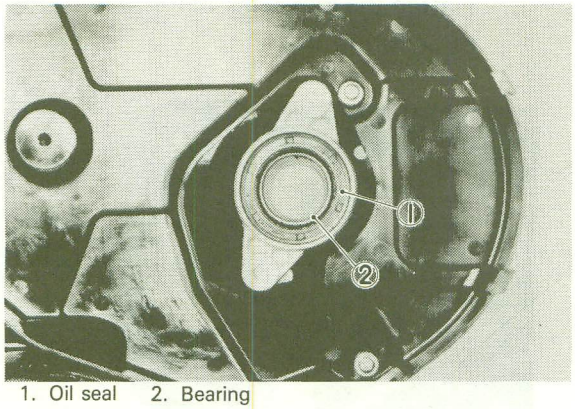


1. Rear axle

6. Clean the outside of the wheel hub.
7. Drive the bearing out by pushing the spacer aside and tapping around the perimeter of the bearing inner race with a soft metal drift punch and hammer. The spacer "floats" between the bearings. Both bearings can be removed in this manner.

WARNING:

Eye protection is recommended when using striking tools.



1. Oil seal 2. Bearing

8. To install the wheel bearing, reverse the above sequence. Use a socket that matches the outside diameter of the race of the bearing to drive in the bearing.

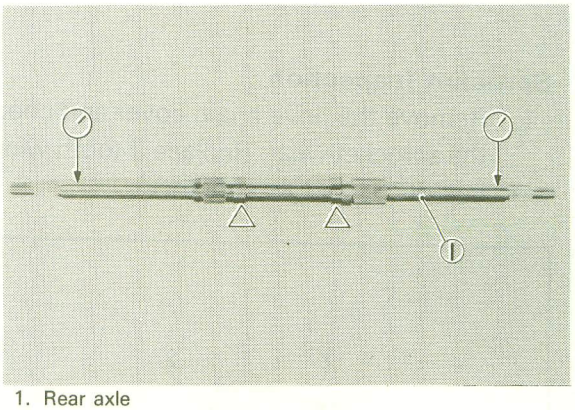
CAUTION:

Do not strike the center race or balls of the bearing. Contact should be made only with the outer race.

9. Install the new oil seals into the rear wheel hub.

Checking the Rear Axle

1. As shown below, support the rear axle by placing V-blocks under the bearing mounting positions and check for the rear axle at both ends.



1. Rear axle

Rear axle runout limit:
1.5 mm (0.06 in)

2. If the runout exceeds 1.5 mm (0.06 in), replace the rear axle with a new one.

Assembly

1. When installing the rear axle, brake caliper assembly, driven sprocket, and wheels, reverse the removal procedure.
- Always use the new cotter pins and lock washers.
- Torque the bolts and/or nuts to specification.

TIGHTENING TORQUE:
Ring nut:
140 Nm (14 m · kg, 100 ft · lb)
Brake caliper body:
45 Nm (4.5 m · kg, 32 ft · lb)
Driven sprocket:
45 Nm (4.5 m · kg, 32 ft · lb)
Rear axle nut:
130 Nm (13.0 m · kg, 94 ft · lb)

2. Adjust the drive chain. Refer to "Drive Chain Tension Adjustment" on page 2-12.
3. Adjust the rear hand brake and foot brake. Refer to "Brake Pedal and Rear Brake Lever Adjustment" on page 2-10.

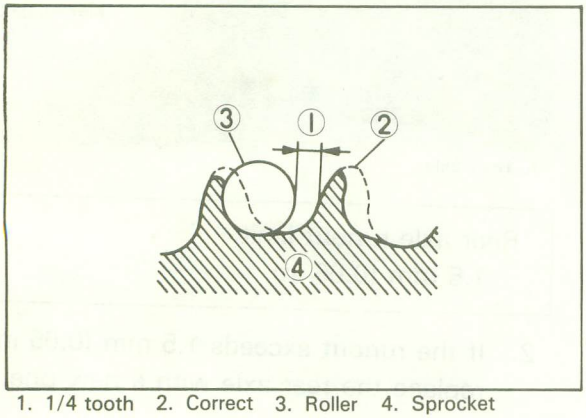
DRIVE CHAIN AND SPROCKETS

Adjustment

Refer to "Drive Chain Tension Adjustment" on page 2-12.

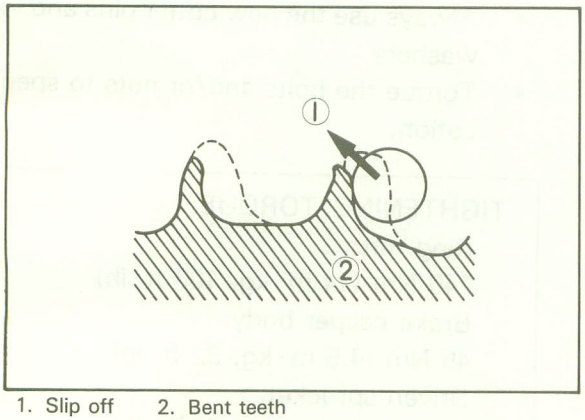
Sprocket Inspection

1. Remove the drive chain cover and check the sprocket wear. Replace if tooth width has decreased as shown.



1. 1/4 tooth 2. Correct 3. Roller 4. Sprocket

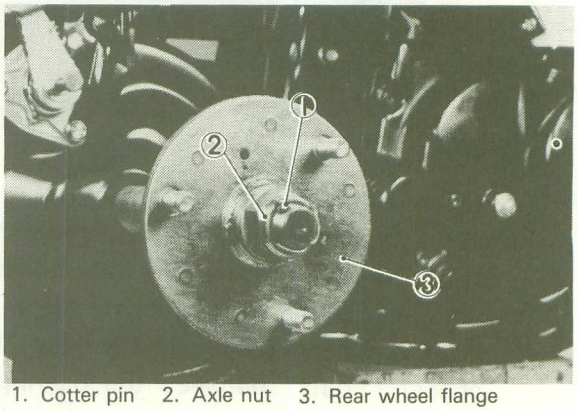
2. Replace if tooth wear shows a pattern such as that in the illustration or similar wear.



1. Slip off 2. Bent teeth

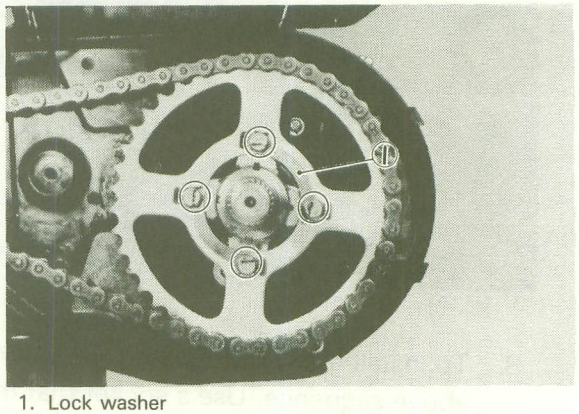
Removal

1. Block the front tire and juck up the rear of the vehicle. Apply the parking brake.
2. Remove the left rear wheel assembly.
3. Remove the cotter pin and axle nut from the left side of the axle.



1. Cotter pin 2. Axle nut 3. Rear wheel flange

4. Loosen the drive chain tensioner so that the drive chain is completely slack.
5. Remove the drive chain cover, the 3 drive sprocket retaining bolts, and the drive sprocket lock plate; then remove the drive sprocket and drive chain.
6. Flatten the lock tabs on the driven sprocket securing nuts.



1. Lock washer

7. Remove the driven sprocket securing nuts, lock washers, and driven sprocket.

Drive Chain Cleaning and Lubrication

See "Drive Chain Cleaning and Lubrication" on page 2-12.

Assembly

1. Install the driven sprocket onto the driven sprocket flange.
2. Install the new lock washers on securing bolts. Torque the bolts to specification.

TIGHTENING TORQUE:
45 Nm (4.5 m · kg, 32 ft · lb)

WARNING:

Always use the new lock washer on the driven sprocket.

3. Install the drive chain, drive sprocket, and lock plate. Torque the drive sprocket securing bolts to specification.

TIGHTENING TORQUE:
10 Nm (1.0 m · kg, 7.2 ft · lb)

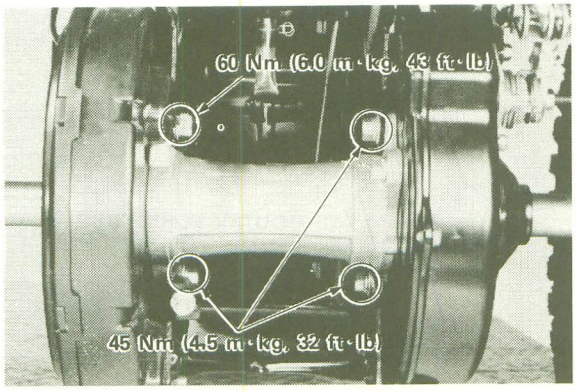
4. Install the rear wheel flange and axle nut onto the rear axle. Torque the axle nut to specification.

TIGHTENING TORQUE:
130 Nm (13.0 m · kg, 94 ft · lb)

WARNING:

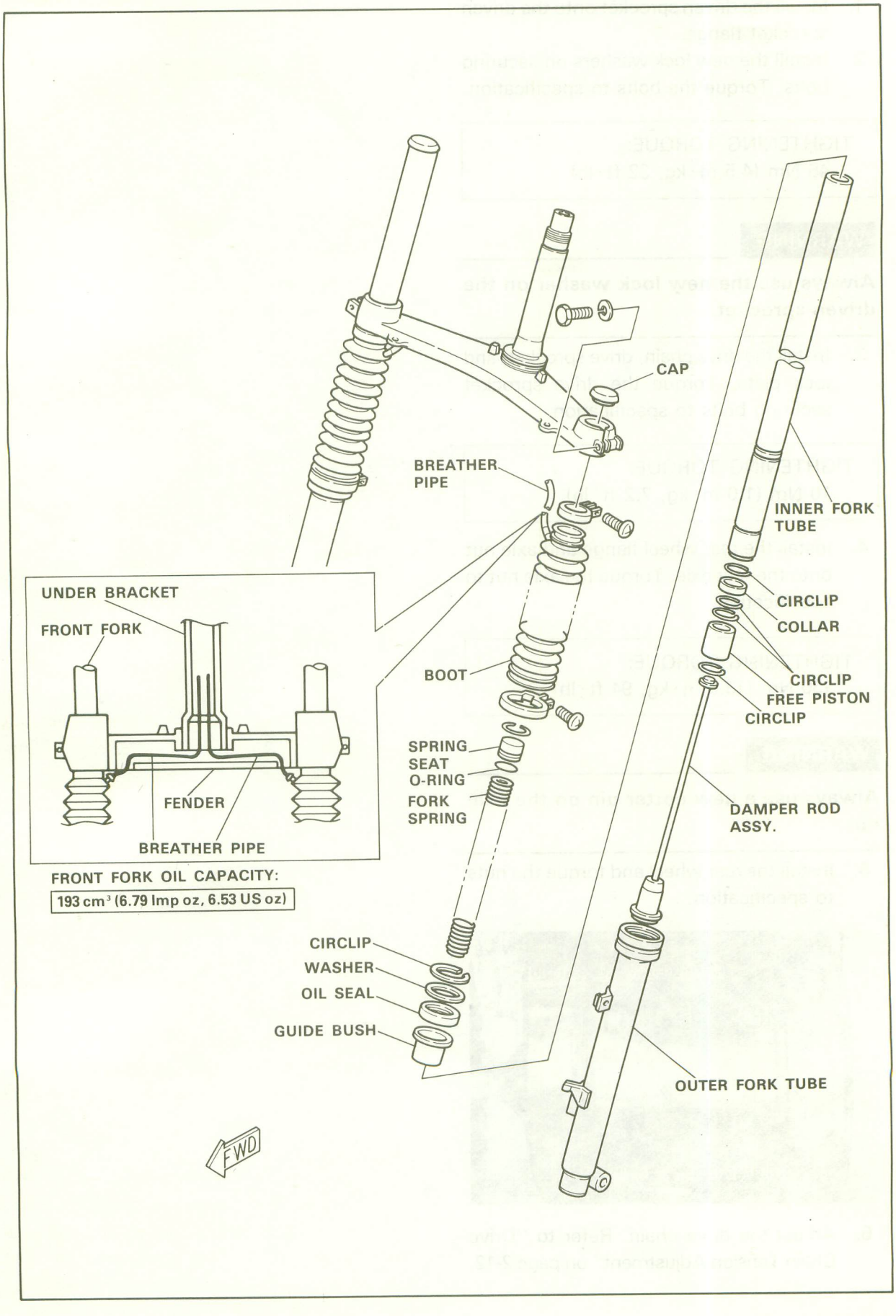
Always use a new cotter pin on the axle nut.

5. Install the rear wheel and torque the nuts to specification.



6. Adjust the drive chain. Refer to "Drive Chain Tension Adjustment" on page 2-12.

FRONT FORK

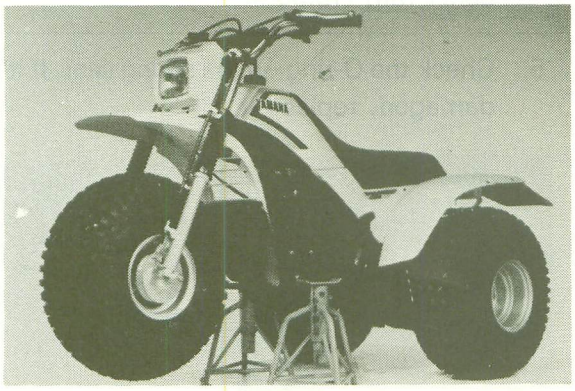


FRONT FORK OIL CAPACITY:

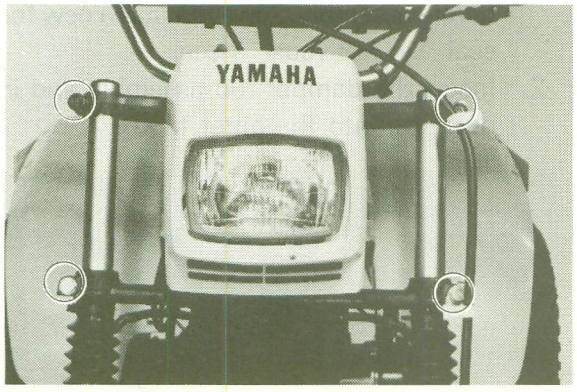
193 cm³ (6.79 Imp oz, 6.53 US oz)

Removal and Disassembly

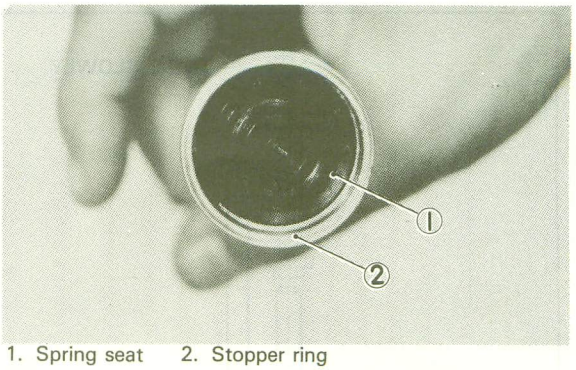
1. Raise the front wheel by placing the suitable stand under each footrest.



2. Remove the front wheel assembly. Refer to "Front Wheel Removal" on page 5-1.
3. Loosen the pinch bolts and remove the brake cable holder securing bolts. Remove the fork(s).



4. Loosen the dust-boot-clamp screws, and remove the dust boot from each fork.
5. Remove the rubber cap and stopper ring (Spring wire circlip) from the top of the each fork.
6. The spring seat and fork spring are retained by a stopper ring (Spring wire circlip). It is necessary to depress the spring seat and fork spring to remove the stopper ring. Remove the stopper ring by carefully prying out one end with a small screwdriver.



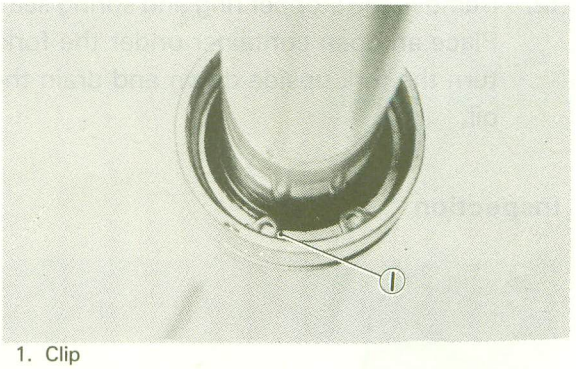
1. Spring seat 2. Stopper ring

7. Remove the fork spring from the inner fork tube.

NOTE:

Do not drain the fork oil.

8. Remove the oil seal retaining clip and washer from the outer tube.



1. Clip

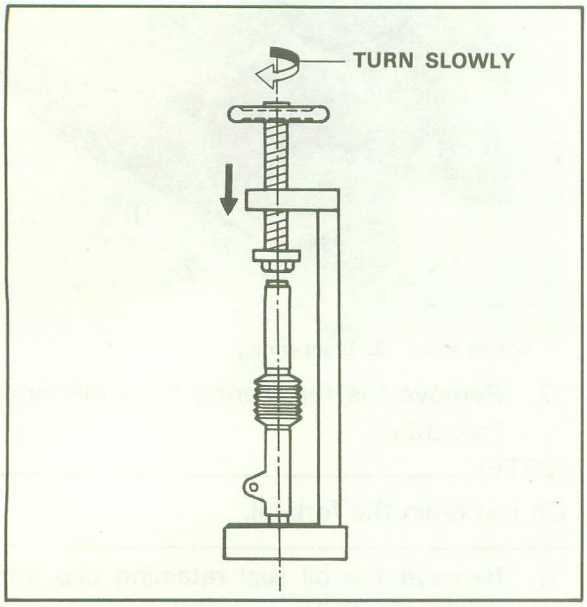
9. Set the inner fork tube with approximately 50 mm (2 in) travel at the end and completely fill with fork oil.

Front fork oil:
Yamaha Fork Oil 10wt or
SAE 10W30 type SE motor oil

10. Reinstall the spring seat and stopper ring into the inner tube.
11. Using a press, slowly press the inner tube into the outer fork tube until the oil seal comes out or until oil leaks from the outer portion of the oil seal, remove the oil seal, guide bush, and inner tube from the outer tube.

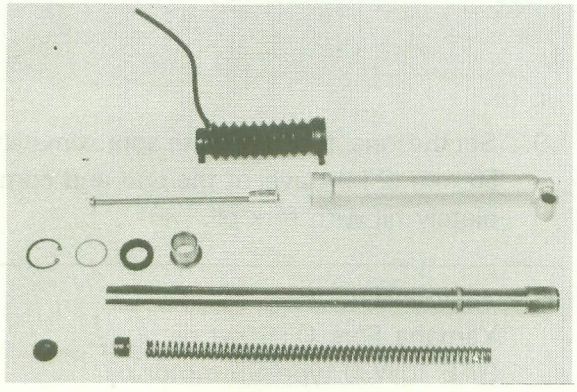
CAUTION:

If the inner fork tube is abruptly contracted, oil may spurt out or the oil seal may spring out. Wrap a rag arround the end of the outer fork tube so oil will not spill all over the shop.



12. Remove the stopper ring and spring seat. Place an open container under the fork, turn the fork upside down and drain the oil.

Inspection



1. Examine the inner fork tube. If the tube is severely scratched or bent, it should be replaced.

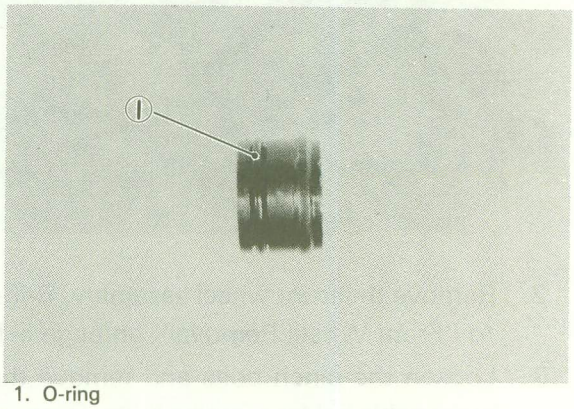
WARNING:

Do not attempt to straighten a bent fork tube; this may dangerously weaken the tube.

2. Inspect the outer surface of the fork seal seat in the outer fork tube. If this surface is damaged, replace the outer fork tube. If it is not damaged, replace the fork seal.
3. Check the outer fork tubes for bents. Replace the tube if it is bented.
4. Check the free length of the springs.

Fork spring free length:
395.1 mm (15.56 in)

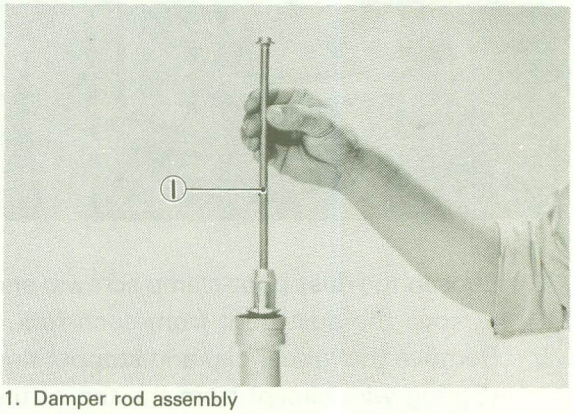
5. Check the O-ring on the spring seat. If it's damaged, replace it.



1. O-ring

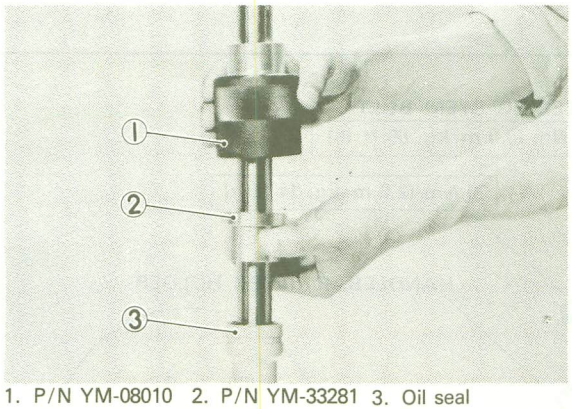
Assembly

1. Make sure all components are clean before assembly. Always install a new fork seal. Do not reuse a seal.
2. Insert the damper rod assembly and inner tube into the outer tube.



1. Damper rod assembly

3. Install the guide bush and oil seal onto the inner tork tube. Place the oil seal installer (Special tool) on the oil seal, and use the large part of the tool (Special tool) to drive in the oil seal.



1. P/N YM-08010 2. P/N YM-33281 3. Oil seal

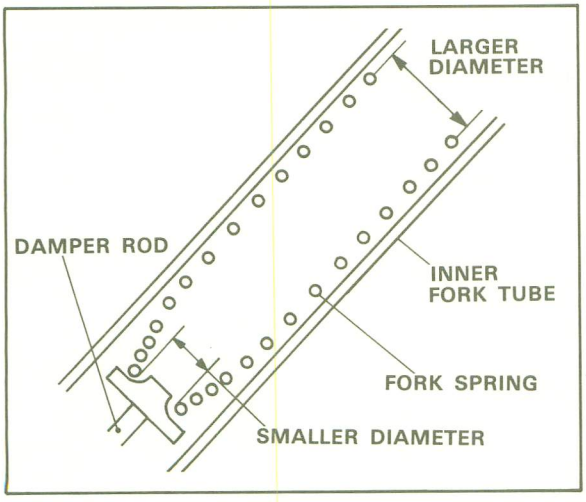
4. Install the washer and oil seal retaining clip.
5. Pour the specified amount of the recommended fork oil into the inner fork tube.

Fork oil capacity:
193 cm^3 (6.79 Imp oz, 6.53 US oz)
Recommended oil:
Yamaha Fork Oil 10wt or equivalent

6. Install the fork spring, spring seat, and stopper ring into the inner tube.

NOTE:

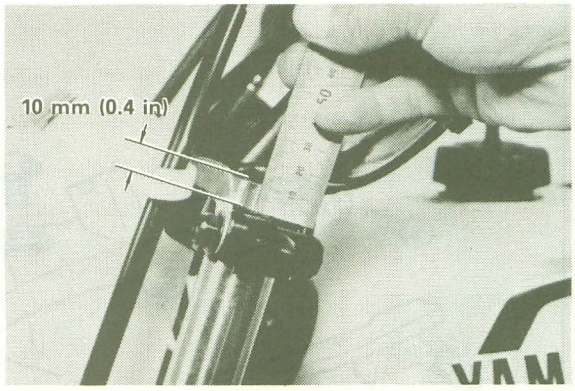
The fork spring must be installed with larger diameter upward as shown.



CAUTION:

- **Always use a new stopper ring (Spring wire circlip).**
- **Be sure the stopper ring is properly seated in the groove in the fork tube.**

7. Install the dust boot onto the outer tube. Do not tight the screws at this point.
8. Install the fork into the brackets. Set the top of the inner fork tube 10 mm (0.4 in) above from the top of the steering crown.



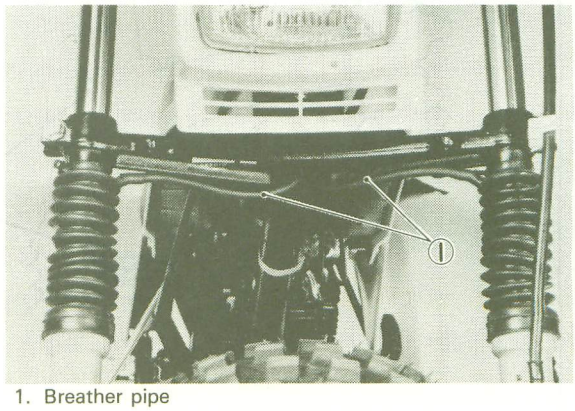
9. Tighten the pinch bolts to specification.

TIGHTENING TORQUE:
Under bracket & Inner fork tube:
30 Nm (3.0 m · kg, 22 ft · lb)
Steering crown & Inner fork tube:
20 Nm (2.0 m · kg, 14 ft · lb)

10. Reinstall the front fender and front wheel. Refer to "Installing the Front Wheel" on page 5-2.

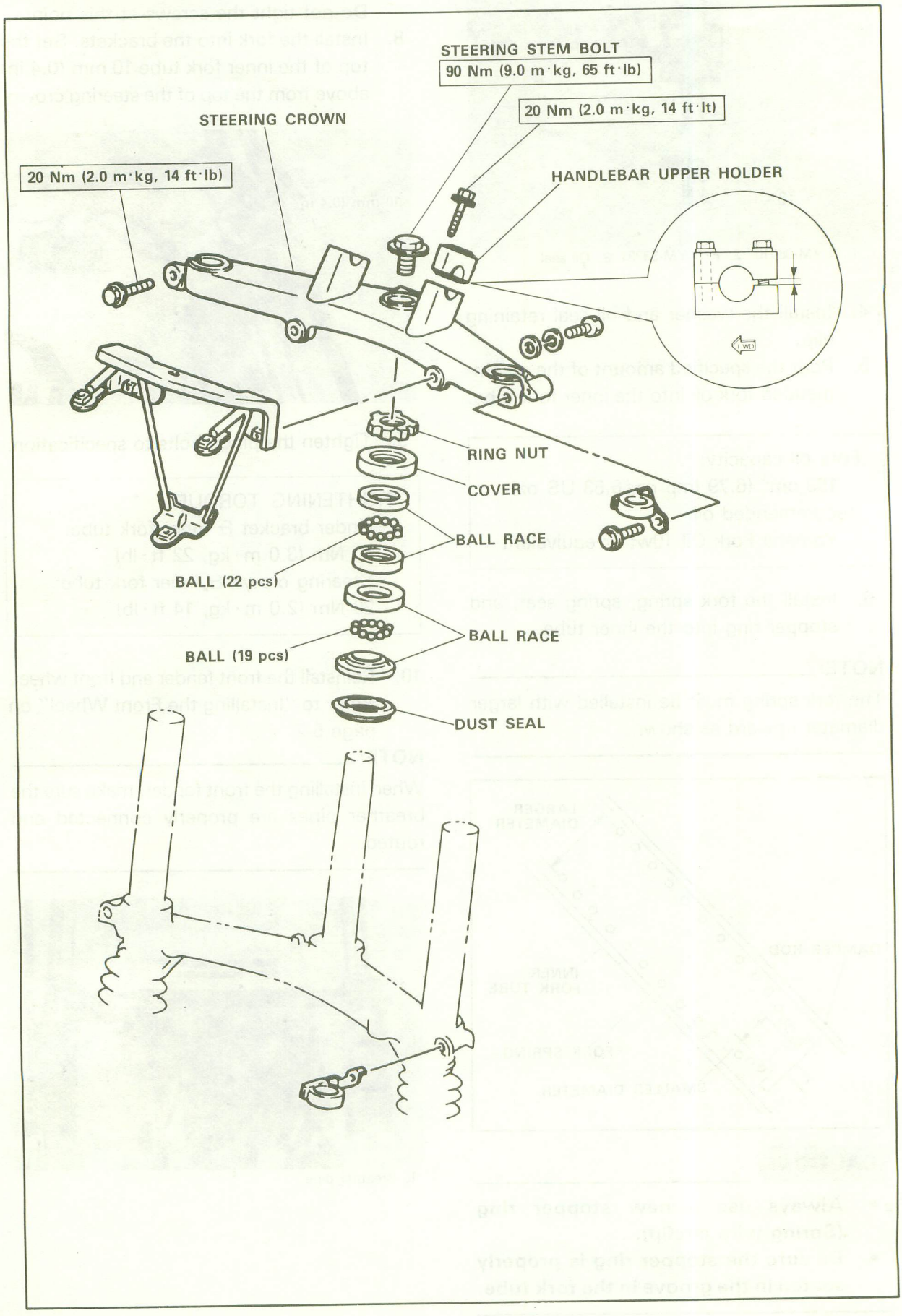
NOTE:

When installing the front fender, make sure the breather pipes are properly connected and routed.



1. Breather pipe

STEERING HEAD

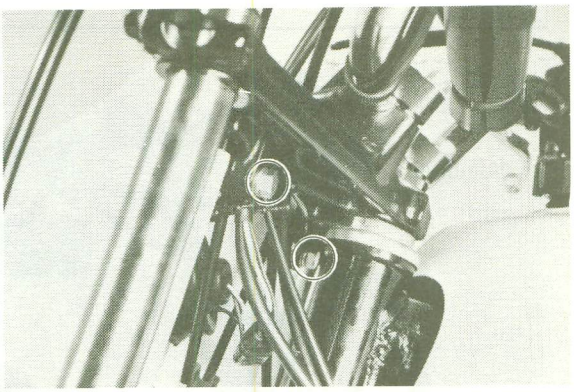


Adjustment

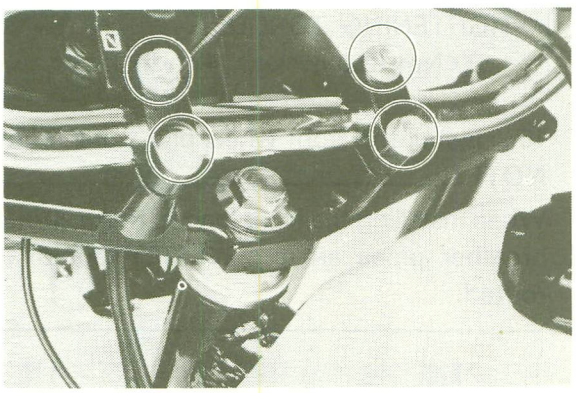
Refer to "Steering Head Adjustment" for steering head adjustment procedures on page 2-13.

Removal

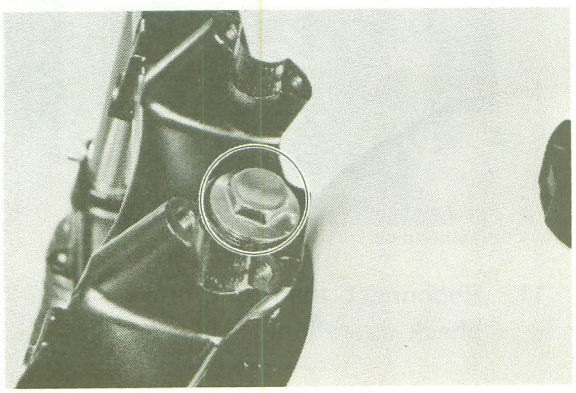
1. Remove the front panel/headlight unit assembly securing bolts. Disconnect the headlight connector.



2. Remove the front wheel, front fender, and forks.
3. Remove the handlebar holder bolts and handlebar.



4. Remove the steering stem bolt and remove the steering crown.



5. Support the steering stem, and remove the ring nut, ball race cover, ball race, and balls.

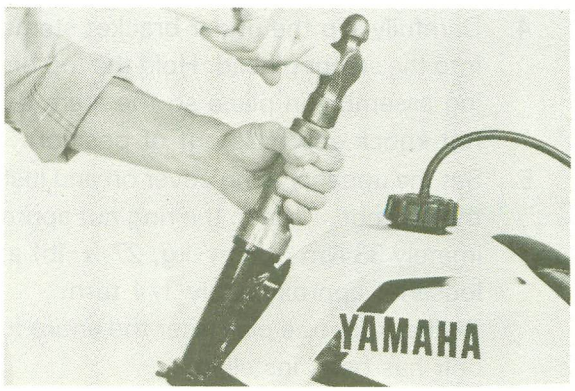
Ball quantity:
Upper: 22 pcs (1/4 in)
Lower: 19 pcs (3/16 in)

Inspection

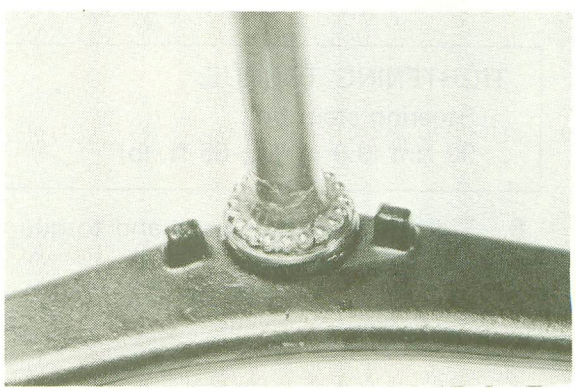
Examine all the balls for pits or partial flatness. If any one is found defective, the entire set (including both races) should be replaced. If either race is pitted, shows rust spots, or is damaged in any way, replace both races and all balls.

Installation

1. If pressed-in races have been removed, tap in new races.



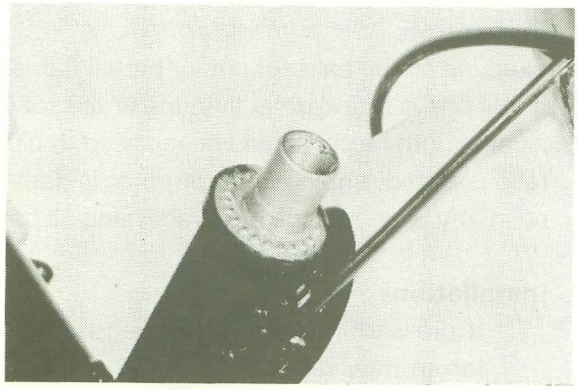
2. Grease the lower ball race of the bottom assembly and arrange the balls around it. Then apply more grease.



3. Grease the lower ball race of the upper assembly and arrange the balls around it. Then apply more grease and set the top race into place.

NOTE:

Use medium-weight wheel bearing grease of quality manufacture, preferably waterproof.



4. Carefully slip the under bracket stem up into the steering head. Hold the top bearing assembly in place so the stem does not knock any balls out of position.
5. Set the upper bearing cover on and install the ring nut. Tighten the ring nut approximately 38 Nm (3.8 m · kg, 27 ft · lb) and loosen it approximately 1/4 turn. Recheck for free play after the entire fork unit has been installed.
6. Install the fork tubes into the under bracket.
7. Install the steering crown. Tighten the steering stem bolt. Torque to specification.

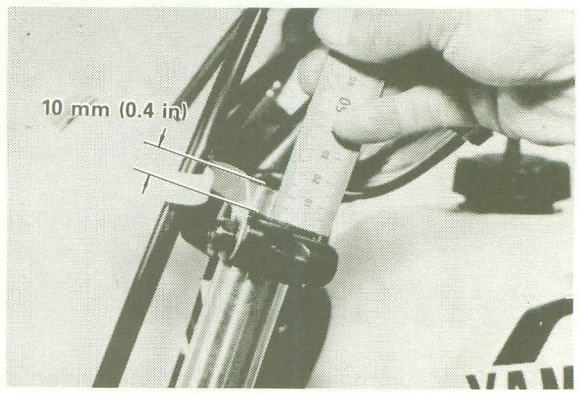
TIGHTENING TORQUE:
Steering stem bolt:
90 Nm (9.0 m · kg, 65 ft · lb)

8. Tighten the pinch bolts and torque the bolt to specification.

TIGHTENING TORQUE:
Steering crown & Inner fork tube:
20 Nm (2.0 m · kg, 14 ft · lb)
Under bracket & Inner fork tube:
30 Nm (3.0 m · kg, 22 ft · lb)

NOTE:

Set the top of the inner fork tube 10 mm (0.4 in) above from the top of the steering crown.



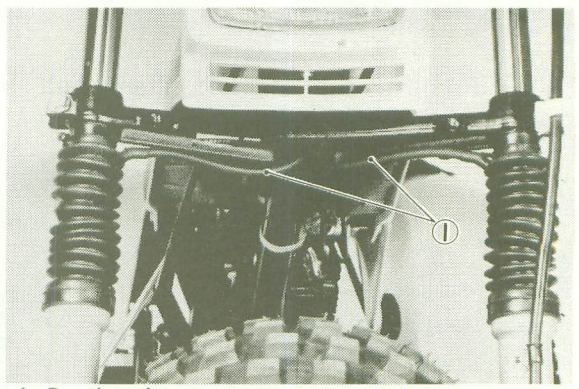
9. Install handlebars and torque to specification.

TIGHTENING TORQUE:
20 Nm (2.0 m · kg, 14 ft · lb)

10. Install the front wheel and front fender.

NOTE:

When installing the front fender, make sure the breather pipes are properly connected and routed.



1. Breather pipe

11. Reconnect the front brake cable and check operation.

CABLES AND FITTINGS

Cable Maintenance

NOTE:

See maintenance and Lubrication Interval Charts for additional information.

Cable maintenance is primarily concerned with preventing deterioration through rust and weathering; and assuring that the cable moves freely within its housing.

Cable removal is straightforward and uncomplicated. Removal will not be discussed within this section. For details, see the individual maintenance section for which the cable is an integral part.

Cable routing is very important however. For details of cable routing, see the cable routing diagrams at the end of this manual.

1. Remove the cable.
2. Check for free movement of cable within its housing. If movement is obstructed, check for fraying or kinking of the cable strands. If damage is evident, replace the cable assembly.
3. To lubricate cable, hold in a vertical position. Apply lubricant to uppermost end of cable. Leave in a vertical position until lubricant appears at bottom end. Allow excess to drain and re-install.

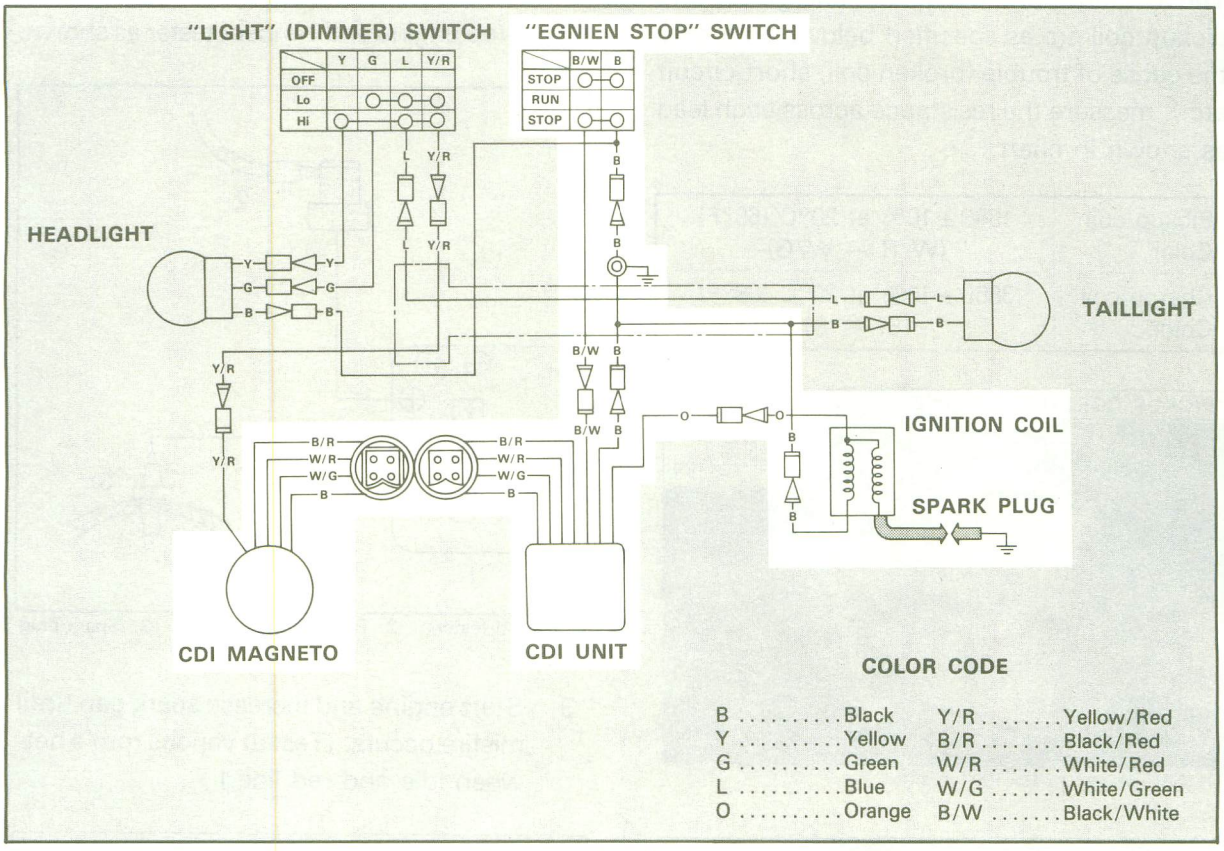
NOTE:

Choice of lubricant depends upon conditions and preference. However, a semi-drying chain and cable lubricant will probably perform adequately under most conditions.

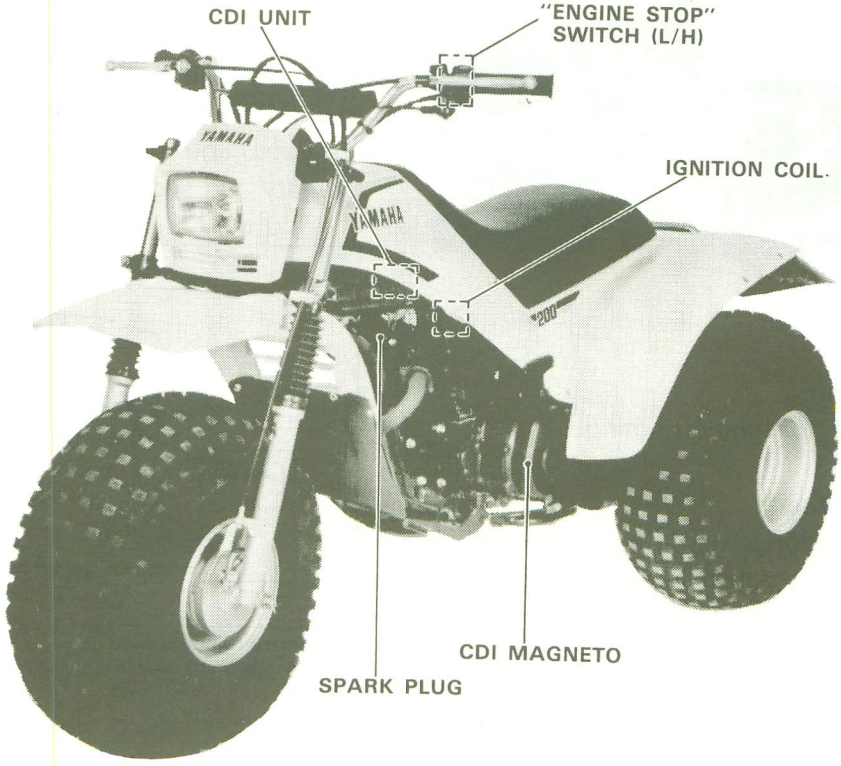
CHAPTER 6.
ELECTRICAL

CHAPTER 6. ELECTRICAL

IGNITION SYSTEM



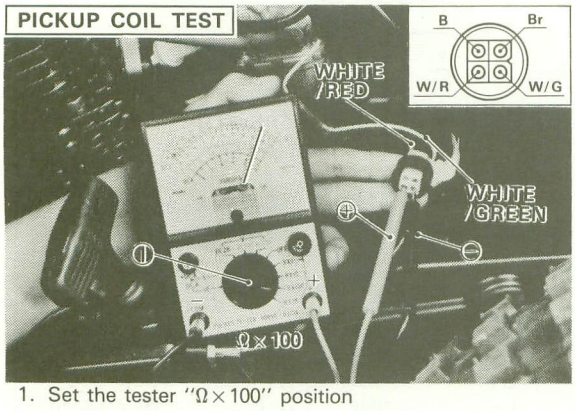
This circuit diagram shows only the lighting circuit in the wiring diagram.



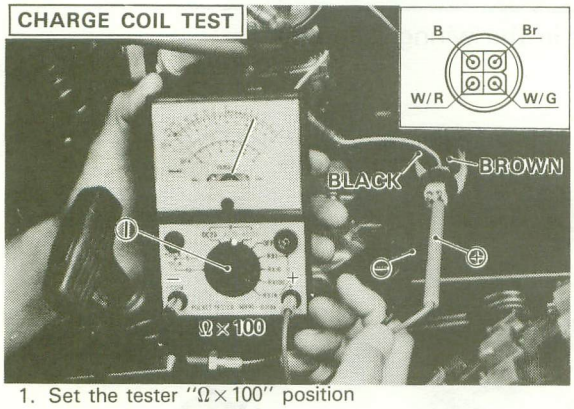
Checking the Magneto Charge Coil and Pickup Coil

The resistance of the magneto charge coil and pickup coil are as specified below. To locate the cause of trouble (broken coil, short-circuit etc.), measure the resistance across each lead as shown in chart.

Pickup coil Color	196Ω ± 10% at 20°C (68°F) (W/R — W/G)
Charge coil Color	386Ω ± 10% at 20°C (68°F) (Br — B)



1. Set the tester "Ω × 100" position



1. Set the tester "Ω × 100" position

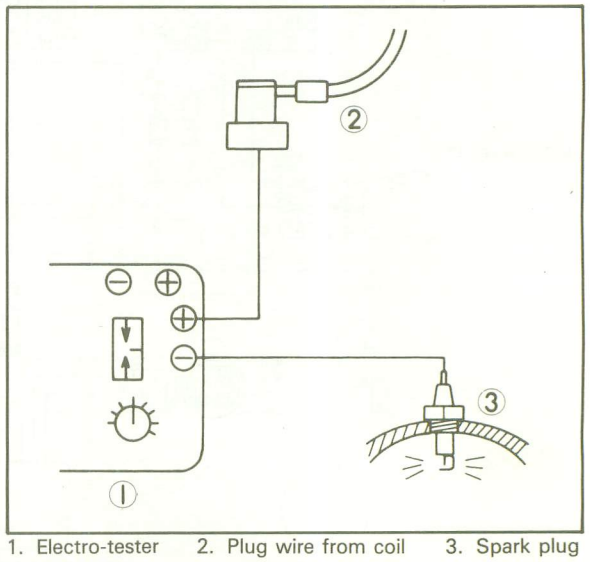
Ignition Timing

See page 2-8 for Ignition timing.

Spark Gap Test

The entire ignition system can be checked for misfire and weak spark using the Electro Tester. If the ignition system will fire across a sufficient gap, the engine ignition system can be considered good. If not, proceed with individual component tests until the problem is found.

1. Warm up engine thoroughly so that all electrical components are at operating temperature.
2. Stop engine and connect tester as shown.



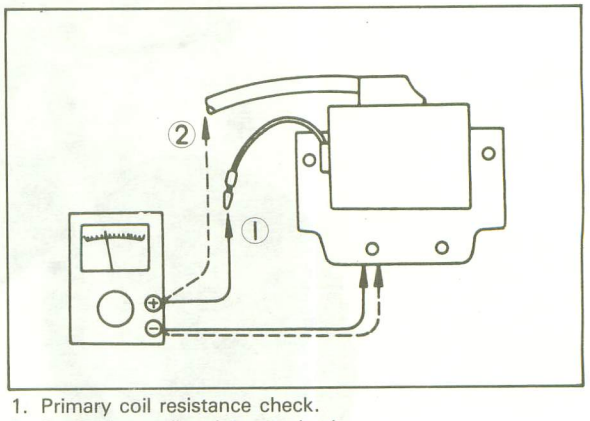
1. Electro-tester 2. Plug wire from coil 3. Spark plug

3. Start engine and increase spark gap until misfire occurs. (Test at various rpm's between idle and red line.)

Minimum spark gap: 6 mm (0.24 in)

Ignition Coil Resistance Test

Use a Pocket Tester or equivalent ohmmeter to determine resistance and continuity of primary and secondary coil windings.



1. Primary coil resistance check.
2. Secondary coil resistance check.

Primary coil resistance	Secondary coil resistance
Set the tester "Ω × 1" position	Set the tester "Ω × 100" position
0.85Ω ± 15% at 20°C (68°F)	5.9KΩ ± 15% at 20°C (68°F)

Spark Plug

The life of a spark plug and its discoloring vary according to the habits of the rider. At each periodic inspection, replace burned or fouled plugs with suitable ones determined by the color and condition of the bad plugs. One machine may be ridden only in urban areas at low speeds; another may be ridden for hours at high speed. Confirm what the present plugs indicate by asking the rider how long and how fast the rides. Recommend a hot, standard, or cold plug type accordingly. It is actually economical to install new plugs often since it will tend to keep the engine in good condition and prevent excessive fuel consumption.

1. How to "read" a spark plug (condition)
   a. Best condition: When the porcelain around the center electrode is a light tan color.
   b. If the electrodes and porcelain are black and somewhat oily, replace the plug with a hotter type for low speed riding.
   c. If the porcelain is burned or glazed white and/or the electrodes are partially burned away, replace the plug with a colder type for high speed riding.

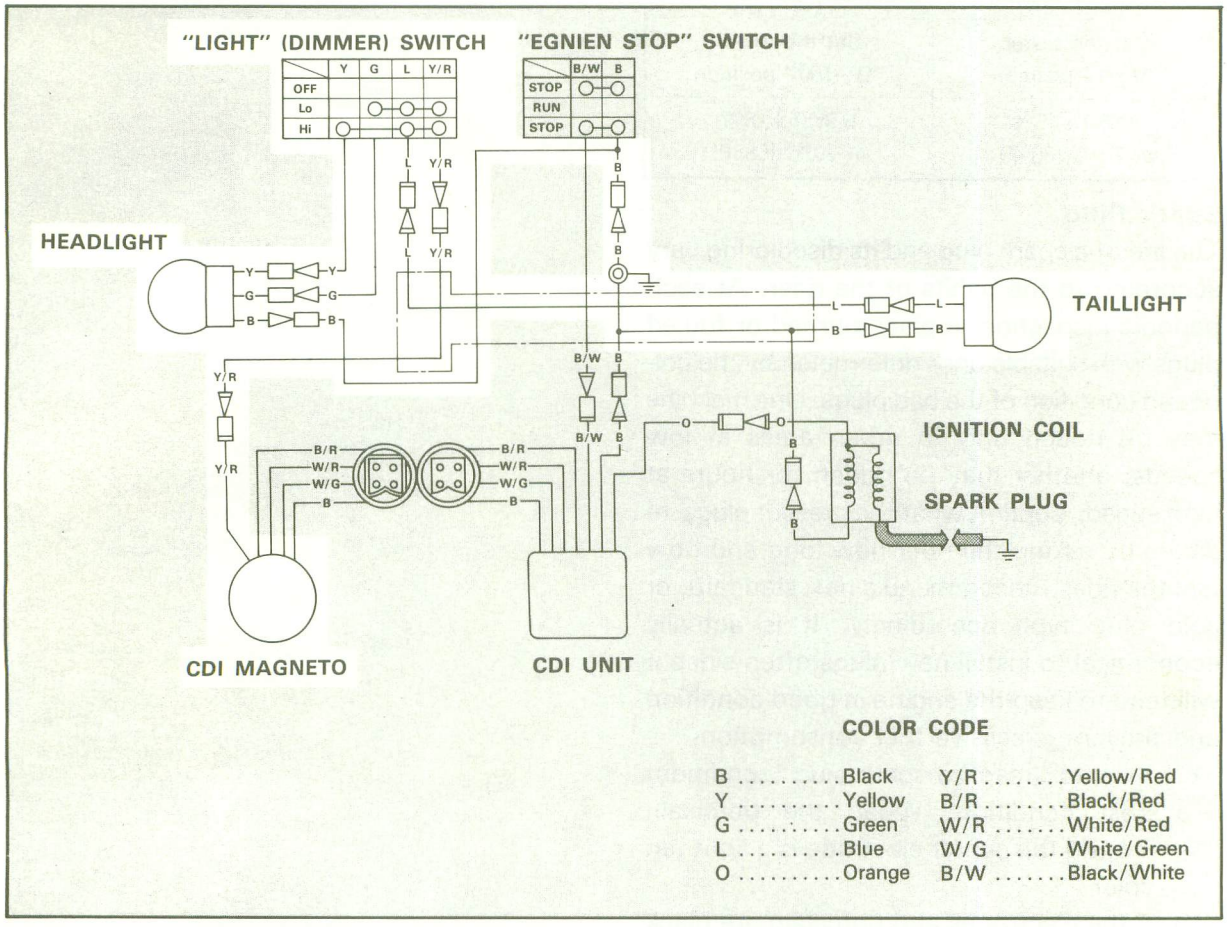
NOTE:

First check for ignition timing and intake air leaks before changing spark plug types.

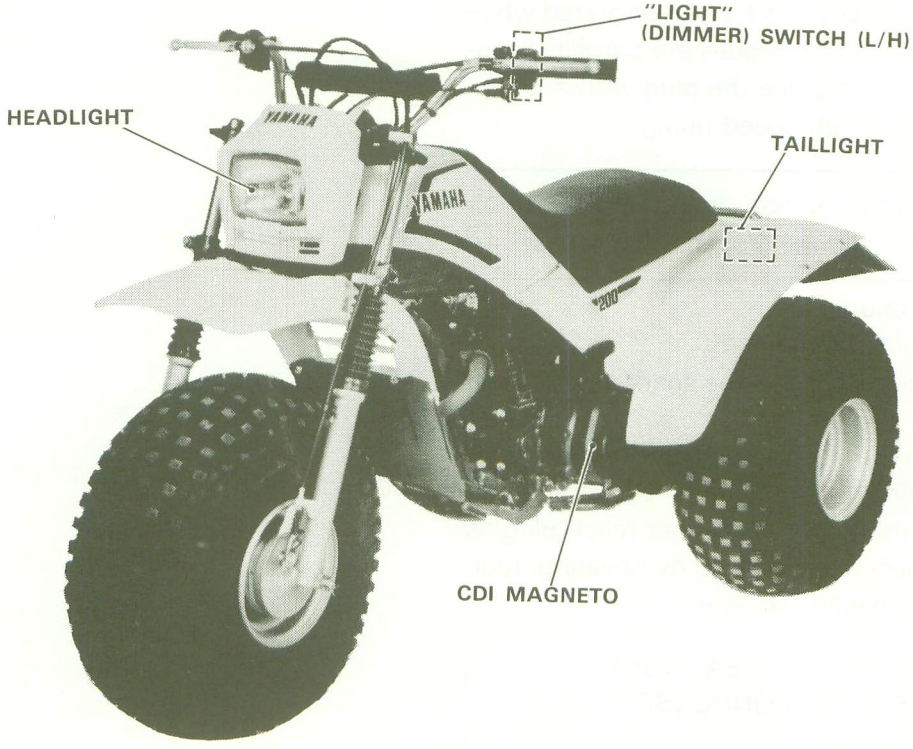
2. Inspection
   Instruct the rider to:
   a. Inspect and clean the spark plug at least every 6 months.
   b. Clean the electrodes of carbon and adjust the electrode gap.
   c. Be sure to use the proper reach plug as a replacement to avoid overheating, fouling or piston damage.

Spark plug type: D7EA (NGK) X22ES-U (NIPPONDENSO)
Spark plug gap: (use wire gap gauge) 0.6 ~ 0.7 mm (0.024 ~ 0.028 in)

LIGHTING SYSTEM

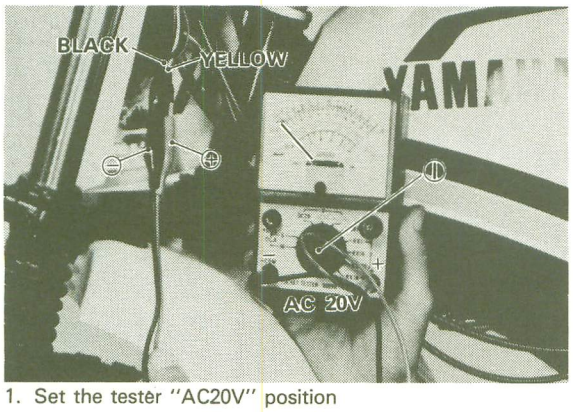


This circuit diagram shows only the ignition circuit in the wiring diagram.



A.C. Circuit Output Test

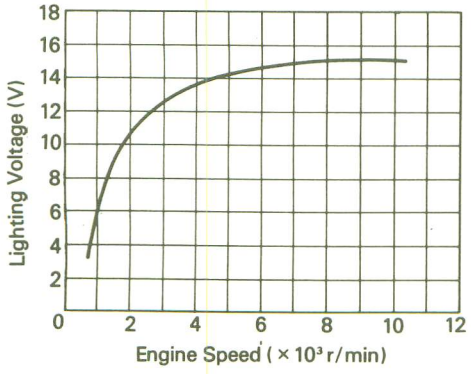
1. Disconnect the headlight unit connector.
2. Connect positive (+) test lead to Yellow connection and negative (−) test lead to a black lead.



1. Set the tester "AC20V" position

3. Start the engine and turn the light switch to the "Hi" position.
4. Check the voltage at each engine speed. If measured voltage is too high or too low, check for bad connections, damaged wires, burned out bulbs or bulb capacities that are too large throughout the A.C. lighting circuit.

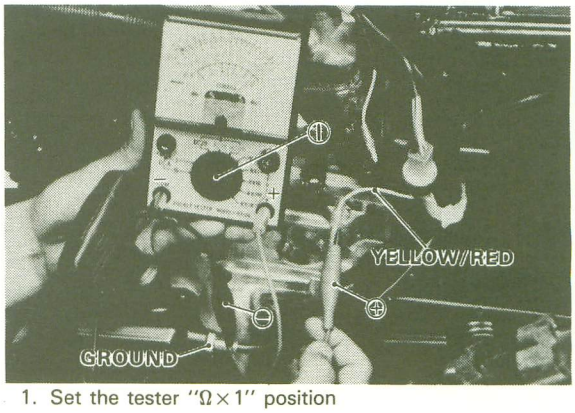
Output voltage:
12V or more/3,000 r/min
18V or less/8,000 r/min
Color (Yellow — Black)



Lighting Coil Resistance Check

If voltage is incorrect in A.C. lighting circuit, check the resistance of the Yellow lead windings of the lighting coil.

1. Remove the seat/rear cowling assembly.
2. Switch Pocket Tester to "× 1Ω" position and zero meter.
3. Connect positive (+) test lead to Yellow/Red wire from magneto and negative (−) test lead to good ground on engine. Read the resistance on ohms scale.



1. Set the tester "Ω × 1" position

Lighting coil resistance:
0.78Ω ± 10%/20°C (68°F)
Color: (Yellow/Red — Good Ground)

Switches

Switch may be checked for continuity with a pocket tester on the ohm × 1 scale.

1. Engine stop switch

	B/W	B
STOP	○	○
RUN		
STOP	○	○

2. "Light" (Dimmer) switch

	Y	G	L	Y/R
OFF				
LO		○	○	○
HI	○		○	○

CHAPTER 7.
APPENDICES

CHAPTER 7. APPENDICES

SPECIFICATIONS

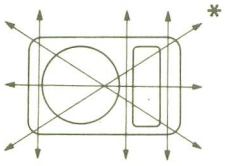
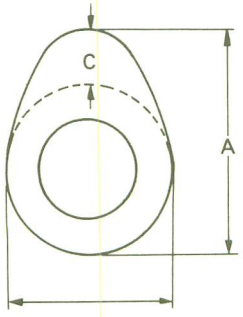
I. GENERAL SPECIFICATIONS

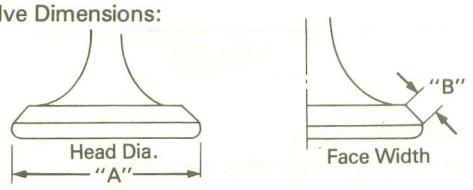
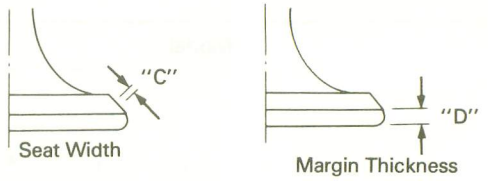
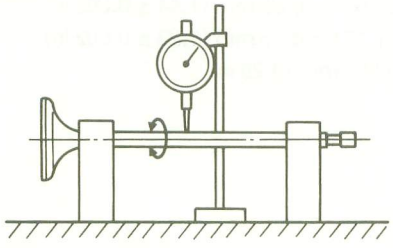
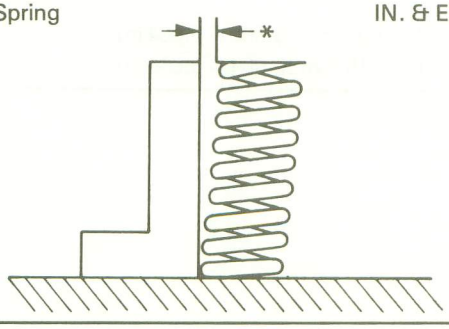
Model	YTM200K
Model Code Number	21V
Frame Starting Number	21V-000101
Engine Starting Number	21V-000101
Dimensions:	
Overall Length	1,815 mm (71.5 in)
Overall Width	990 mm (39.0 in)
Overall Height	960 mm (37.8 in)
Seat Height	707 mm (27.8 in)
Wheelbase	1,120 mm (44.1 in)
Minimum Ground Clearance	120 mm (4.7 in)
Basic Weight:	
With Oil and Full Fuel Tank	132 kg (291 lb)
Minimum Turning Radius:	2,200 mm (87 in)
Engine:	
Engine Type	4-stroke, gasoline, SOHC
Cylinder Arrangement	Single cylinder
Displacement	196 cm^3
Bore × Stroke	67.0 × 55.7 mm (2.6 × 2.2 in)
Compression Ratio	8.5 : 1
Compression Pressure	883 kPa (9 kg/cm^2, 128 psi)
Starting System	Recoil starter
Lubrication System:	Wet sump
Oil Type or Grade:	
Engine oil	Yamalube 4-cycle oil or SAE 20W 40 type SE motor oil
Oil Capacity:	
Engine Oil	
Periodic Oil Change	1.5 L (1.3 Imp qt, 1.6 US qt)
Total Amount	1.8 L (1.6 Imp qt, 1.9 US qt)
Air Filter	Wet type element
Fuel:	
Type	Regular gasoline
Tank Capacity	9.0 L (2.0 Imp gal, 2.4 US gal)
Carburetor:	
Type/Manufacturer	VM22/MIKUNI
Spark Plug:	
Type/Manufacturer	D7EA (NGK), X22ES-U (NIPPONDENSO)
Gap	0.6 ~ 0.7 mm (0.024 ~ 0.028 in)
Clutch Type:	Wet, multiple-disc, Centrifugal automatic
Transmission:	
Primary Reduction System	Gear
Primary Reduction Ratio	73/22 (3.318)
Secondary Reduction System	Chain drive
Secondary Reduction Ratio	42/11 (3.818)
Transmission Type	Constant mesh, 5-speed
Operation	Left foot operation

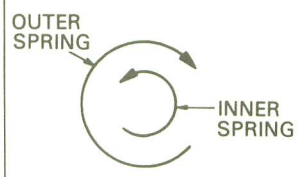
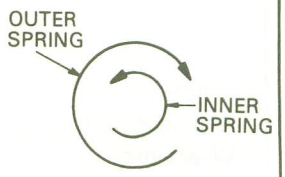
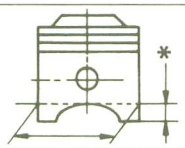
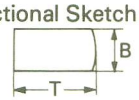
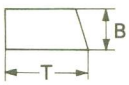
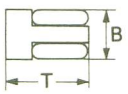
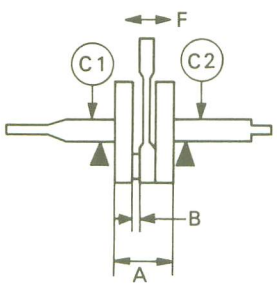
Model	YTM200K
Gear Ratio	
1st	34/12 (2.833)
2nd	34/19 (1.789)
3rd	29/22 (1.318)
4th	26/25 (1.040)
5th	23/28 (0.821)
Chassis:	
Frame Type	Tubular, Semi double cradle
Caster Angle	20°30′
Trail	60 mm (2.36 in)
Tire:	
Type	Tubeless
Size (F)	22 × 11-8
Size (R)	22 × 11-8 (2 pcs)
Tire Pressure (Cold tire):	
Front and Rear:	
Standard	14.7 kPa (0.15 kg/cm², 2.2 psi)
Minimum	11.8 kPa (0.12 kg/cm², 1.8 psi)
Maximum	68.6 kPa (0.7 kg/cm², 10 psi)
Standard tire circumference	1.735 mm (68.3 in)
Minimum tire circumference	1.725 mm (67.9 in)
Brake:	
Front Brake Type	Drum brake
Operation	Right hand operation
Rear Brake Type	Single disc brake
Operation	Left hand operation, Right foot operation
Suspension:	
Front Suspension	Telescopic fork
Shock Absorber:	
Front Shock Absorber	Coil spring, Oil damper
Wheel Travel:	
Front Wheel Travel	100 mm (4.0 in)
Electrical:	
Ignition System	C.D.I. Magneto
Generator System	Flywheel magneto
Headlight Type:	Semi-sealed beam
Bulb Wattage × Quantity:	
Headlight	45 W/45W × 1
Taillight	8 W × 1

II. MAINTENANCE SPECIFICATIONS

A. Engine

Model	YTM200K
Cylinder Head:	
Warp Limit 	<0.03 mm (0.0012 in)> *Lines indicate straightedge measurement.
Cylinder:	
Bore Size	$67^{+0.020}_{-0.030}$ mm ($2.64^{+0.0008}_{-0.0012}$ in)
Taper Limit	<0.005 mm (0.0002 in)>
Out-of-round Limit	<0.01 mm (0.0004 in)>
Camshaft:	
Drive Method	Chain
	Left
Camshaft Bearing (Cylinder)	$25^{+0.021}_{0}$ mm ($0.98^{+0.0008}_{0}$ in), $20^{+0.021}_{0}$ mm ($0.79^{+0.0008}_{0}$ in)
Camshaft Outside Diameter	$25^{-0.020}_{-0.040}$ mm ($0.98^{-0.0008}_{-0.0016}$ in), $20^{-0.020}_{-0.040}$ mm ($0.79^{-0.0008}_{-0.0016}$ in)
Shaft-to-cap Clearance	0.020 ~ 0.061 mm (0.0008 ~ 0.0024 in)
Cam Dimensions	
Intake  "A"	36.587 ± 0.05 mm (1.44 ± 0.002 in)
"B"	31.181 ± 0.05 mm (1.23 ± 0.002 in)
"C"	6.587 mm (0.26 in)
Exhaust "A"	36.627 ± 0.05 mm (1.44 ± 0.002 in)
"B"	30.264 ± 0.05 mm (1.19 ± 0.002 in)
"C"	6.627 mm (0.26 in)
Camshaft Runout Limit	<0.03 mm (0.0012 in)>
Cam Chain Type/Number of Links	DID25SH/104 Links
Cam Chain Adjustment Method	Manual
Rocker Arm/Rocker Arm Shaft:	
Rocker Arm Inside Diameter	$12^{+0.018}_{0}$ mm ($0.47^{+0.0007}_{0}$ in)
<Limit>	<12.03 mm (0.474 in)>
Shaft Outside Diameter	$12^{-0.009}_{-0.015}$ mm ($0.47^{-0.0004}_{-0.0006}$ in)
<Limit>	<11.94 mm (0.470 in)>
Arm-to-shaft Clearance	0.009 ~ 0.037 mm (0.0004 ~ 0.0016 in)
Valve, Valve Seat, Valve Guide:	
Valve Clearance (Cold)	
IN.	0.05 ~ 0.09 mm (0.002 ~ 0.004 in)
EX.	0.11 ~ 0.15 mm (0.004 ~ 0.006 in)

Model		YTM200K
Valve Dimensions:  		
"A" Head Dia.	IN.	34 ± 0.1 mm (1.34 ± 0.004 in)
	EX.	28.5 ± 0.1 mm (1.12 ± 0.004 in)
"B" Face Width	IN.	2.26 mm (0.09 in)
	EX.	2.26 mm (0.09 in)
"C" Seat Limit Width	IN.	1.0 ± 0.1 mm (0.04 ± 0.004 in)
	EX.	1.0 ± 0.1 mm (0.04 ± 0.004 in)
"D" Margin Thickness Limit		
	IN.	1 ± 0.2 mm (0.04 ± 0.008 in)
	EX.	1 ± 0.2 mm (0.04 ± 0.008 in)
Stem Outside Diameter	IN.	$6^{-0.010}_{-0.025}$ mm ($0.24^{-0.0004}_{-0.0010}$ in)
	EX.	$6^{-0.025}_{-0.040}$ mm ($0.24^{-0.0010}_{-0.0016}$ in)
Guide Inside Diameter	IN.	$6^{+0.012}_{0}$ mm ($0.24^{+0.0005}_{0}$ in)
	EX.	$6^{+0.012}_{0}$ mm ($0.24^{+0.0005}_{0}$ in)
Stem-to-guide Clearance	IN.	0.010 ~ 0.037 mm (0.0004 ~ 0.0015 in)
	EX.	0.025 ~ 0.052 mm (0.0010 ~ 0.0020 in)
Stem Runout Limit 		
Valve Seat Width Standard		1.0 ± 0.1 mm (0.039 ± 0.0039 in)
Valve Spring:		
Free Length		
Inner Spring	IN.	35.5 mm (1.40 in)
	EX.	35.5 mm (1.40 in)
Outer Spring	IN.	37.2 mm (1.46 in)
	EX.	37.2 mm (1.46 in)
Compressed Length (Valve Closed)		
Inner Spring	IN.	30.5 mm (1.20 in)
	EX.	30.5 mm (1.20 in)
Outer Spring	IN.	32.0 mm (1.26 in)
	EX.	32.0 mm (1.26 in)
Tilt Limit*:		
Inner Spring	IN. & EX.	2.5° or 1.6 mm (0.063 in)
Outer Spring	IN. & EX.	2.5° or 1.6 mm (0.063 in)
		

Model		YTM200K	
Direction of Winding (Top view)		IN	EX
			
Piston: Piston Size/Measuring Point* Piston Clearance		$67^{-0.015}_{-0.065}$ mm ($2.6^{-0.0006}_{-0.0026}$ in)/7.5 mm (0.30 in) (From bottom line of piston skirt) 0.025 ~ 0.045 mm (0.0010 ~ 0.0018 in)	
Piston Ring: Sectional Sketch	Top Ring	Plain B = $1.2^{-0.01}_{-0.03}$ mm ($0.05^{-0.0004}_{-0.0012}$ in) T = 2.7 ± 0.1 mm (0.11 ± 0.004 in)	
	2nd Ring	Taper B = $1.2^{-0.01}_{-0.03}$ mm ($0.05^{-0.0004}_{-0.0012}$ in) T = 2.7 ± 0.1 mm (0.11 ± 0.004 in)	
	Oil Ring	B = $2.5^{+0.03}_{+0.01}$ mm ($0.10^{+0.0012}_{+0.0004}$ in) T = 2.8 ± 0.1 mm (0.11 ± 0.004 in)	
			
End Gap (Installed)	Top Ring	0.15 ~ 0.35 mm (0.0059 ~ 0.0138 in)	
	2nd Ring	0.15 ~ 0.35 mm (0.0059 ~ 0.0138 in)	
	Oil Ring	0.3 ~ 0.9 mm (0.0118 ~ 0.0354 in)	
<Limit>	Top Ring	<0.75 mm (0.0295 in)>	
	2nd Ring	<0.75 mm (0.0295 in)>	
	Oil Ring	<— mm (— in)>	
Side Clearance	Top Ring	0.03 ~ 0.07 mm (0.0012 ~ 0.0028 in)	
	2nd Ring	0.02 ~ 0.06 mm (0.0008 ~ 0.0024 in)	
	Oil Ring	0 mm (0 in)	
<Limit>	Top Ring	<0.1 mm (0.004 in)>	
	2nd Ring	<0.9 mm (0.035 in)>	
	Oil Ring	<— mm (— in)>	
Crankshaft:			
Crank Width "A"		$56^{0}_{-0.05}$ mm ($2.20^{0}_{-0.002}$ in)	
Big End Side Clearance "B"		0.35 ~ 0.65 mm (0.014 ~ 0.026 in)	
Runout Limit "C1"		<0.03 mm (0.0012 in)>	
"C2"		<0.65 mm (0.0256 in)>	
Small End Free Play "F"			
<Limit>		<2.0 mm (0.08 in)>	
Balancer Drive Method:		Gear	

Model	YTM200K
Primary Clutch:	
Shoe Thickness/Quantity	3 mm (0.118 in)/3
Wear Limit	2.5 mm (0.098 in)
Secondary Clutch:	
Friction Plate Thickness/Quantity	3.0 mm (0.12 in)/5
Wear Limit	<2.8 mm (0.11 in)>
Clutch Plate Thickness/Quantity	1.6 mm (0.06 in)/4
Warp Limit	<0.2 mm (0.008 in)>
Clutch Spring Free Length/Quantity	34.9 mm (1.37 in)/4
Clutch Release Method	Outer push
Transmission:	
Main Axle Deflection Limit	<0.08 mm (0.0031 in)>
Drive Axe Deflection Limit	<0.08 mm (0.0031 in)>
Shifter:	
Shifter Type	Guide bar
Decompression Device	
Type	Recoil starter synchronous
Cable Free Play	2.0 ~ 3.0 mm (0.079 ~ 0.12 in)
Air Filter Oil Grade (Oiled Filter)	Foam-air-filter oil or SAE 10W30 type SE motor oil
Carburetor:	
Type/Manufacturer/Quantity	VM22/MIKUNI/1
I.D. Mark	21V00
Main Jet (M.J.)	#102.5
Main Air Jet (M.A.J.)	ø1.5
Jet Needle-clip Position (J.N.)	4L25-3
Needle Jet (N.J.)	N-8
Cutaway (C.A.)	3.5
Pilot Jet (P.J.)	#35
Pilot Air jet (P.A.J.)	#1.3
Pilot Screw (P.S.)	2 and 1/4 ± 1/2
Valve Seat (V.S.)	ø2.0
Starter Jet (G.S.)	ø65
Fuel Level (F.L.)	3.0 ± 1.0 mm (0.12 ± 0.04 in)
Float Height (F.H.)	21.5 ± 0.5 mm (0.85 ± 0.02 in)
Engine Idling Speed	1,400 ± 50 r/min
Lubrication System:	
Oil Filter Type	Wire mesh
Oil Pump Type	Trochoid pump
Tip Clearance	0.15 mm (0.0059 in)
Side Clearance	0.03 ~ 0.09 mm (0.0012 ~ 0.0035 in)
Bypass Valve Setting Pressure	98 ± 19.6 kPa (1.0 ± 0.2 kg/cm², 14 ± 2.8 psi)

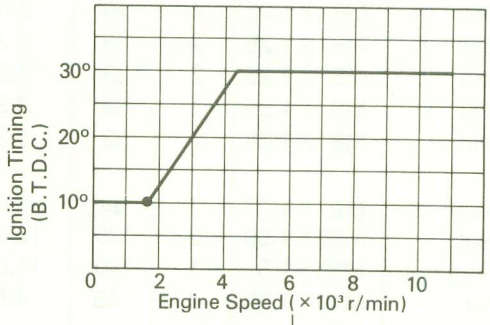
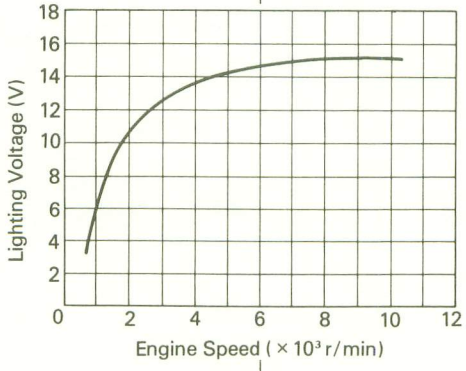
Tightening torque:		Size × Q'ty	Nm	m·kg	ft·lb	Remarks
Oil gallery bolt	Bolt	M6 × 1	7	0.7	5.1	
Cylinder head	Bolt	M8 × 4	22	2.2	16.0	Apply engine oil to the washers
Cylinder head	Bolt	M8 × 2	22	2.2	16.0	
Cam sprocket cover	Screw	M6 × 2	7	0.7	5.1	
Tappet cover	Bolt	M6 × 5	10	1.0	7.2	
Rocker arm shaft stopper	Bolt	M6 × 2	8	0.8	5.8	Use lock washer
Spark plug	—	M12 × 1	20	2.0	14.0	
Cylinder body	Bolt	M6 × 2	10	1.0	7.2	
Balancer shaft	Nut	M14 × 1	50	5.0	36.0	Use lock washer
Recoil starter pulley	Bolt	M10 × 1	50	5.0	36.0	
Valve adjuster lock	Nut	M6 × 2	14	1.4	10.0	
Sprocket cam	Bolt	M10 × 1	60	6.0	43.0	
Chain tensioner	Nut	M14 × 1	30	3.0	22.0	
Tensioner cap	Cap nut	M14 × 1	5	0.5	3.6	
Chain guide #2 stopper	Bolt	M6 × 2	8	0.8	5.8	
Oil pump assembly	Screw	M6 × 3	7	0.7	5.1	
Drain plug	Plug	M35 × 1	43	4.3	31.0	
Filter cover	Bolt	M6 × 2	10	1.0	7.2	
Filter cover drain	Bolt	M6 × 1	10	1.0	7.2	
Carburetor joint	Bolt	M6 × 2	12	1.2	8.7	
Exhaust pipe flange	Bolt	M6 × 2	10	1.0	7.2	
Muffler assembly	Bolt	M8 × 2	27	2.7	19.0	
Exhaust pipe protector	Screw	M6 × 2	7	0.7	5.1	Apply LOCTITE®
Exhaust outlet pipe	Screw	M6 × 1	10	1.0	7.2	
Crankcase	Screw	M6 × 12	7	0.7	5.1	
Crankcase spacer (L/H)	Screw	M6 × 8	7	0.7	5.1	
Bearing retainer (L/H)	Screw	M5 × 3	7	0.7	5.1	Apply LOCTITE®
Crankcase spacer (R/H)	Screw	M6 × 3	7	0.7	5.1	
Bearing retainer (R/H)	Screw	M6 × 3	7	0.7	5.1	Apply LOCKTITE®
Clutch cover	Screw	M6 × 9	7	0.7	5.1	
Clutch cover protector	Screw	M6 × 3	7	0.7	5.1	
Recoil starter	Screw	M6 × 6	7	0.7	5.1	
Primary clutch	Nut	M22 × 1	78	7.8	56.0	Use lock washer
Clutch spring	Screw	M5 × 4	6	0.6	4.3	
Clutch boss	Nut	M14 × 1	50	5.0	36.0	Use lock washer
Cam shift segment	Screw	M6 × 1	12	1.2	8.7	Apply LOCTITE®
Clutch adjuster	Nut	M8 × 1	15	1.5	11.0	
Drive sprocket	Bolt	M6 × 3	10	1.0	7.2	
Shift rod (Joint)	Bolt	M6 × 1	10	1.0	7.2	
CDI magneto base	Screw	M6 × 3	7	0.7	5.1	

B. Chassis

Model		YTM200K
Steering System:		
Steering Bearing Type		Ball Bearing
No./Size of Steel Balls	Upper	22 pcs/1/4 in
	Lower	19 pcs/3/16 in
Front Suspension:		
Front Fork Travel		100 mm (3.94 in)
Fork Spring Free Length		405.1 mm (15.95 in)
<Limit>		<395.1 mm (15.56 in)>
Spring Rate/Stroke		K_1 = 12.16 N/mm (1.24 kg/mm, 69.42 lb/in) 0 ~ 70 mm (0 ~ 2.76 in) K_2 = 19.06 N/mm (1.944 kg/mm, 108.83 lb/in) 70 ~ 120 mm (2.76 ~ 4.72 in)
Optional Spring		No.
Oil Capacity or		193 cm^3 (6.79 Imp oz, 6.53 Us oz)
Oil Level		311 mm (12.2 in) (From top of inner tube fully compressed without spring.)
Oil Grade		Yamaha fork oil 10 wt or equivalent
Wheel:		
Front Wheel Type		Disc Wheel
Rear Wheel Type		Disc Wheel
Front Rim Size/Material		8.25 × 8/Steel
Rear Rim Size/Material		8.25 × 8/Steel
Rim Runout Limit	Vertical	<2.0 mm (0.08 in)>
	Lateral	<2.0 mm (0.08 in)>
Drive Chain:		
Type/Manufacturer		520/DIDO
Number of Links		60 links
Chain Free Play		10 ~ 15 mm (0.4 ~ 0.6 in)
Drum Brake:		
Type	Front	Leading and trailing
Drum Inside Dia		
<Limit>		110 mm (4.33 in) <111 mm (4.37 in)>
Lining Thickness		
<Limit>		4.0 mm (0.16 in) <2.0 mm (0.08 in)>
Shoe Spring Free Length	Front	34.5 mm (1.36 in)
Disc Brake:		
Type	Rear	Single disc
Outside Dia × Thickness		224 × 4 mm (8.82 × 0.16 in)
Pad Thickness		
<Limit>	Inner	8.0 mm (0.31 in) <1.5 mm (0.06 in)>
	Outer	8.0 mm (0.31 in) <1.5 mm (0.06 in)>
Brake Lever & Brake Pedal:		
Brake Lever Free Play Limit		<10 mm (0.4 in)> at lever pivot
Brake Pedal Free Play Limit		<50 mm (2.0 in)>

Tightening torque:		Thread size	Q'ty	Nm	m·kg	ft·lb	Remarks
Front axle shaft	Nut	M14×1.5	1	50	5.0	36	
Wheel panel (Front and rear)	Nut	M10×1.25	9	45	4.5	32	
Front brake cam	Bolt	M6 ×1.0	1	9	0.9	6.5	
Under bracket & inner fork tube	Bolt	M10×1.25	2	30	3.0	22	
Steering crown & inner fork tube	Bolt	M8 ×1.25	2	20	2.0	14	
Steering stem	Bolt	M14×1.25	1	90	9.0	65	
Steering shaft ring nut	Nut	M25×1.0	1	38	3.8	27	
Handlebar upper holder	Bolt	M8 ×1.25	4	20	2.0	14	
Engine front bracket & Engine	Bolt	M8 ×1.25	2	33	3.3	24	
Engine front bracket & Frame	Nut	M8 ×1.25	2	33	3.3	24	
Upper engine bracket & Engine	Nut	M8 ×1.25	1	33	3.3	24	
Upper engine bracket & Frame	Nut	M8 ×1.25	2	33	3.3	24	
Engine rear upper and lower & Frame	Nut	M8 ×1.25	2	44	4.4	32	
Rear axle shaft	Nut	M20×1.50	2	130	13.0	94	
Rear axle shaft	Ring nut	M38×1.5	1	140	14.0	100	
Driven sprocket	Nut	M10×1.25	4	45	4.5	32	Use lock washer
Rear hub & Frame (Left-upper)	Bolt	M10×1.25	1	60	6.0	43	
Rear hub & Frame (Others)	Bolt	M10×1.25	3	45	4.5	32	
Rear brake caliper body	Bolt	M10×1.25	2	45	4.5	32	
Rear brake caliper	Nut	M6 ×1.0	3	9	0.9	6.5	
Brake pad adjuster locknut	Nut	M8 ×1.25	1	16	1.6	11	
Footrest & Frame	Bolt	M8 ×1.25	4	33	3.3	24	
Fuel tank & Fuel cock	Screw	M6 ×1.0	2	5	0.5	3.6	

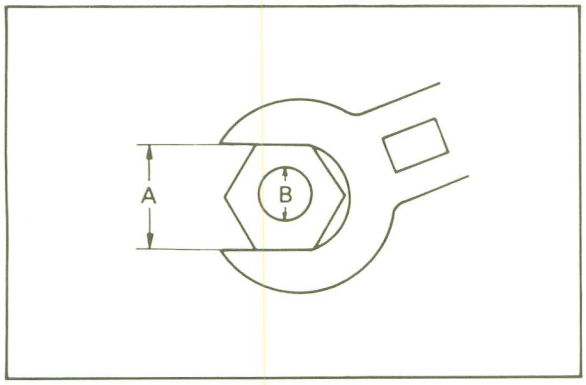
C. Electrical

Model	YTM200K
Voltage	12V
Ignition System:	
Ignition Timing (B.T.D.C.)	10° at 1,000 r/min
Advanced Timing (B.T.D.C.)	30° at 4,250 r/min
Advancer Type	Electrical
	
C.D.I.:	
Magneto-Model/Manufacturer	F3T159/MITSUBISHI
Pickup Coil Resistance (Color)	196Ω ± 10% at 20°C (68°F) (W/R — W/G)
Charging Coil Resistance (Color)	386Ω ± 10% at 20°C (68°F) (Br — B)
C.D.I. Unit-Model/Manufacturer	F8T063/MITSUBISHI
Ignition Coil:	
Model/Manufacturer	F006T/MITSUBISHI
Minimum Spark Gap	18kV or more at 500 r/min
	17 kV or less at 8,000 r/min
	6 mm (0.24 in)
Primary Winding Resistance	0.85Ω ± 15% at 20°C (68°F)
Secondary Winding Resistance	5.9KΩ ± 15% at 20°C (68°F)
Charging System/Type	Flywheel magneto
F.W. Magneto:	
Lighting Voltage	12V or more at 3,000 r/min
	18V or less at 8,000 r/min
Lighting Coil Resistance (Color)	0.78Ω ± 10% at 20°C (68°F) (Y/R — B)
	

GENERAL TORQUE SPECIFICATIONS

This chart specifies torque for standard fasteners with standard I.S.O. pitch threads. Torque specifications for special components or assemblies are included in the applicable sections of this book. To avoid warpage, tighten multi-fastener assemblies in a crisscross fashion, in progressive stages, until full torque is reached. Unless otherwise specified, torque specifications call for clean, dry threads. Components should be at room temperature.

A (Nut)	B (Bolt)	General torque specifications		
		Nm	m·kg	ft·lb
10 mm	6 mm	6	0.6	4.3
12 mm	8 mm	15	1.5	11
14 mm	10 mm	30	3.0	22
17 mm	12 mm	55	5.5	40
19 mm	14 mm	85	8.5	61
22 mm	16 mm	130	13.0	94



A: Distance across flats
B: Outside thread diameter

DEFINITION OF UNITS

Unit	Read	Definition	Measure
mm cm	millimeter centimeter	10^{-3} meter 10^{-2} meter	Length Length
kg	kilogram	10^{3} gram	Weight
N	Newton	1 kg × m/sec^{2}	Force
Nm m·kg	Newton meter Meter kilogram	N × m m × kg	Torque Torque
Pa N/mm	Pascal Newton per millimeter	N/m^{2} N/mm	Pressure Spring rate
L cm^{3}	Liter Cubic centimeter	———	Volume or Capacity
r/min	Rotation per minute	———	Engine Speed

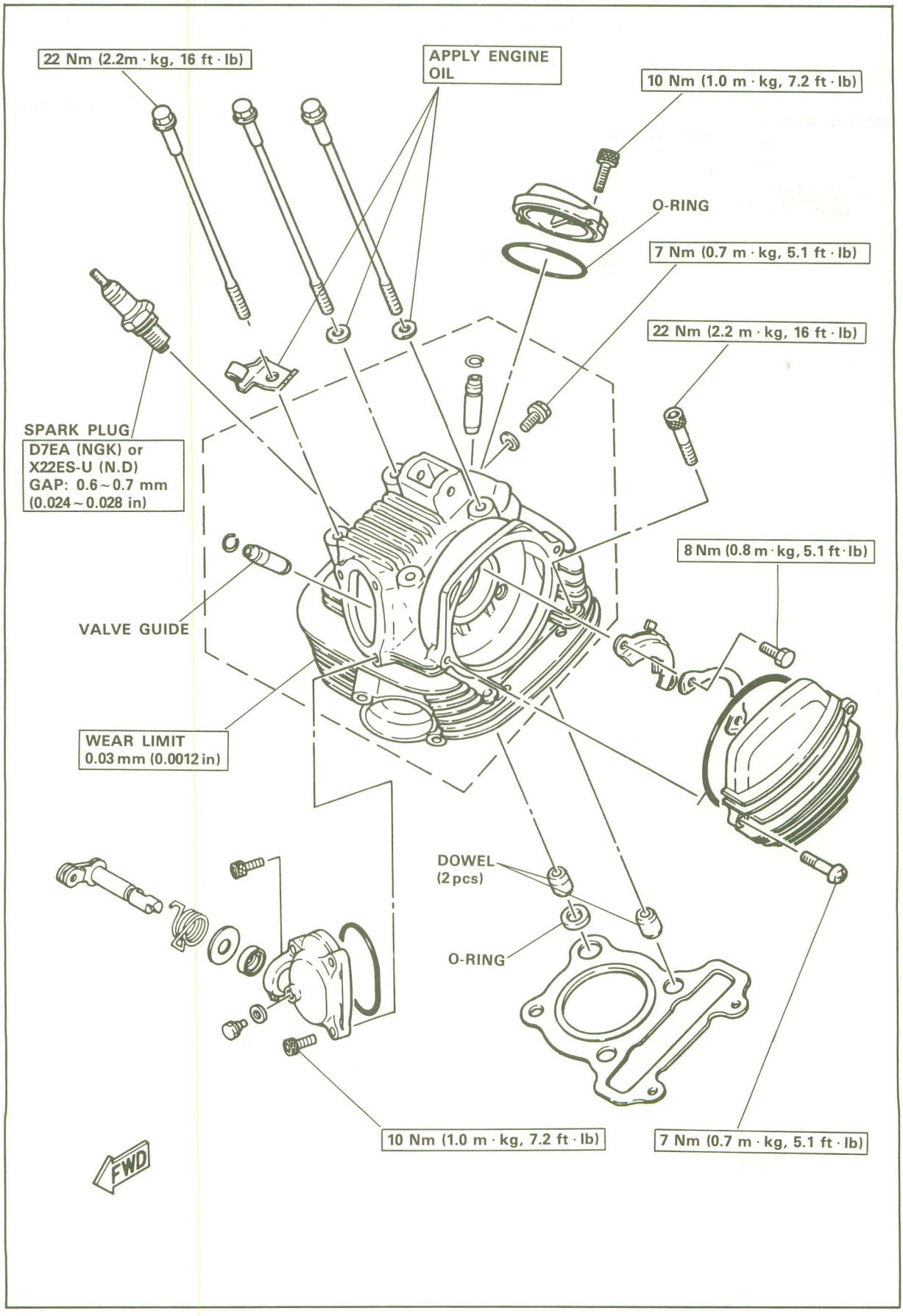
CONVERSION TABLES

Metric to inch system		
Known	Multiplier	Result
m · kg	7.233	ft · lb
m · kg	86.80	in · lb
cm · kg	0.0723	ft · lb
cm · kg	0.8680	in · lb
kg	2.205	lb
g	0.03527	oz
km/lit	2.352	mpg
km/hr	0.6214	mph
km	0.6214	mi
m	3.281	ft
m	1.094	yd
cm	0.3937	in
mm	0.03937	in
cc (cm^3)	0.03382	oz (US liq)
cc (cm^3)	0.06102	cu in
lit (liter)	2.1134	pt (US liq)
lit (liter)	1.057	qt (US liq)
lit (liter)	0.2642	gal (US liq)
kg/mm	56.007	lb/in
kg/cm^2	14.2234	psi (lb/in^2)
Centigrade (°C)	9/5 (°C) + 32	Fahrenheit (°F)

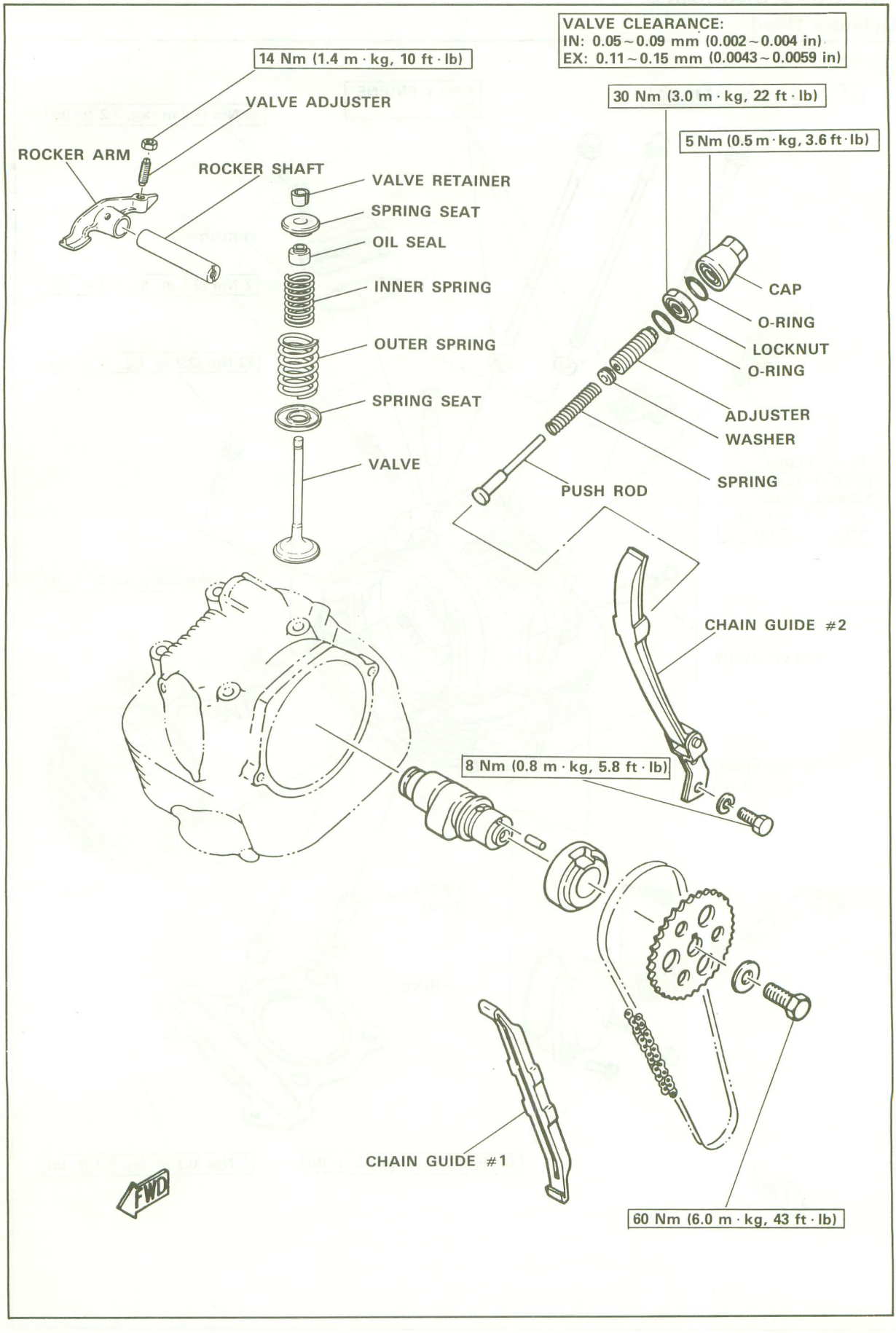
Inch to metric system		
Known	Multiplier	Result
ft · lb	0.13826	m · kg
in · lb	0.01152	m · kg
ft · lb	13.831	cm · kg
in · lb	1.1521	cm · kg
lb	0.4535	kg
oz	28.352	g
mpg	0.4252	km/lit
mph	1.609	km/hr
mi	1.609	km
ft	0.3048	m
yd	0.9141	m
in	2.54	cm
in	25.4	mm
oz (US liq)	29.57	cc (cm^3)
cu in	16.387	cc (cm^3)
pt (US liq)	0.4732	lit (liter)
qt (US liq)	0.9461	lit (liter)
gal (US liq)	3.785	lit (liter)
lb/in	0.017855	kg/mm
psi (lb/in^2)	0.07031	kg/cm^2
Fahrenheit (°C)	5/9 (°F − 32)	Centigrade (°F)

EXPLODED DIAGRAMS

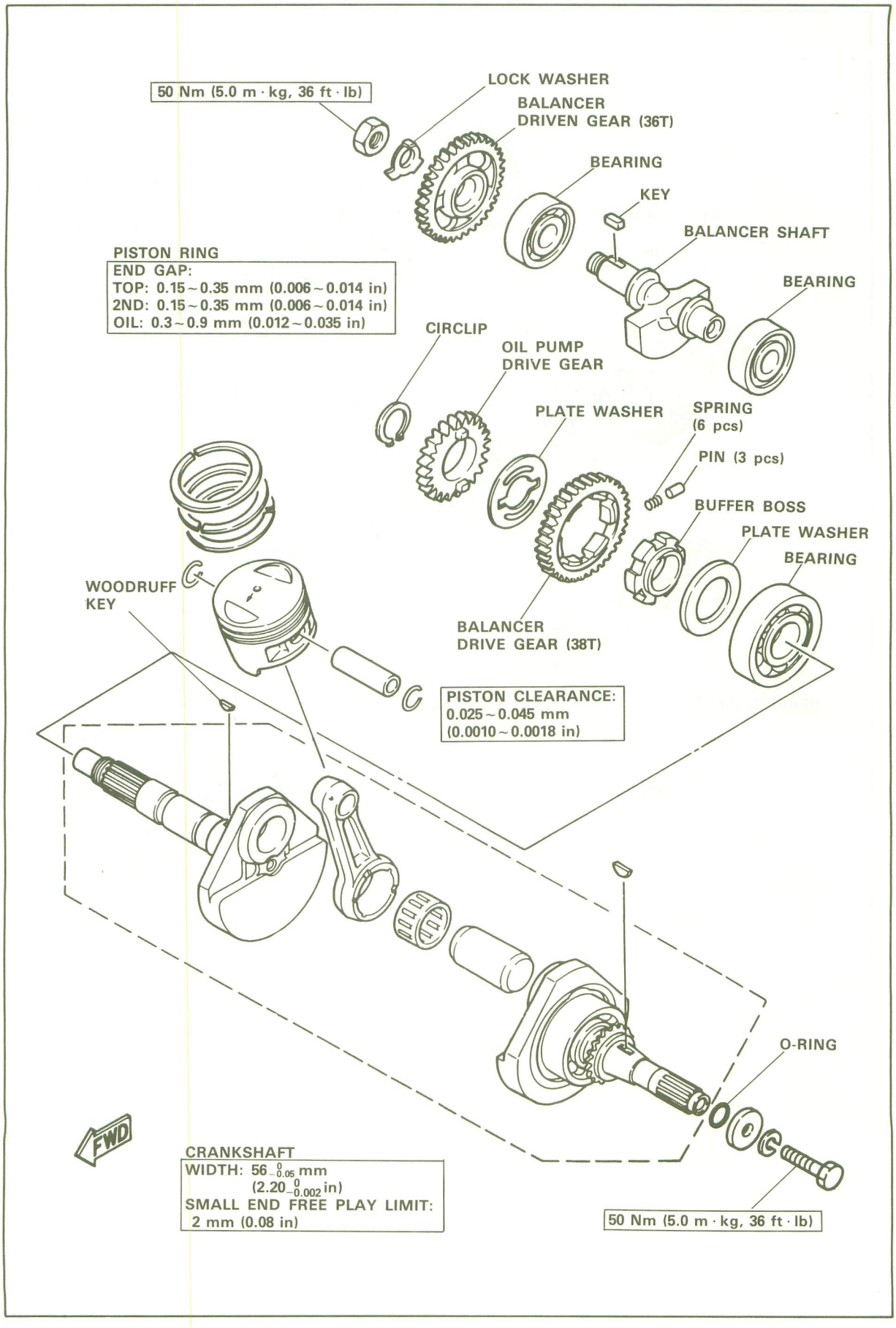
Cylinder Head



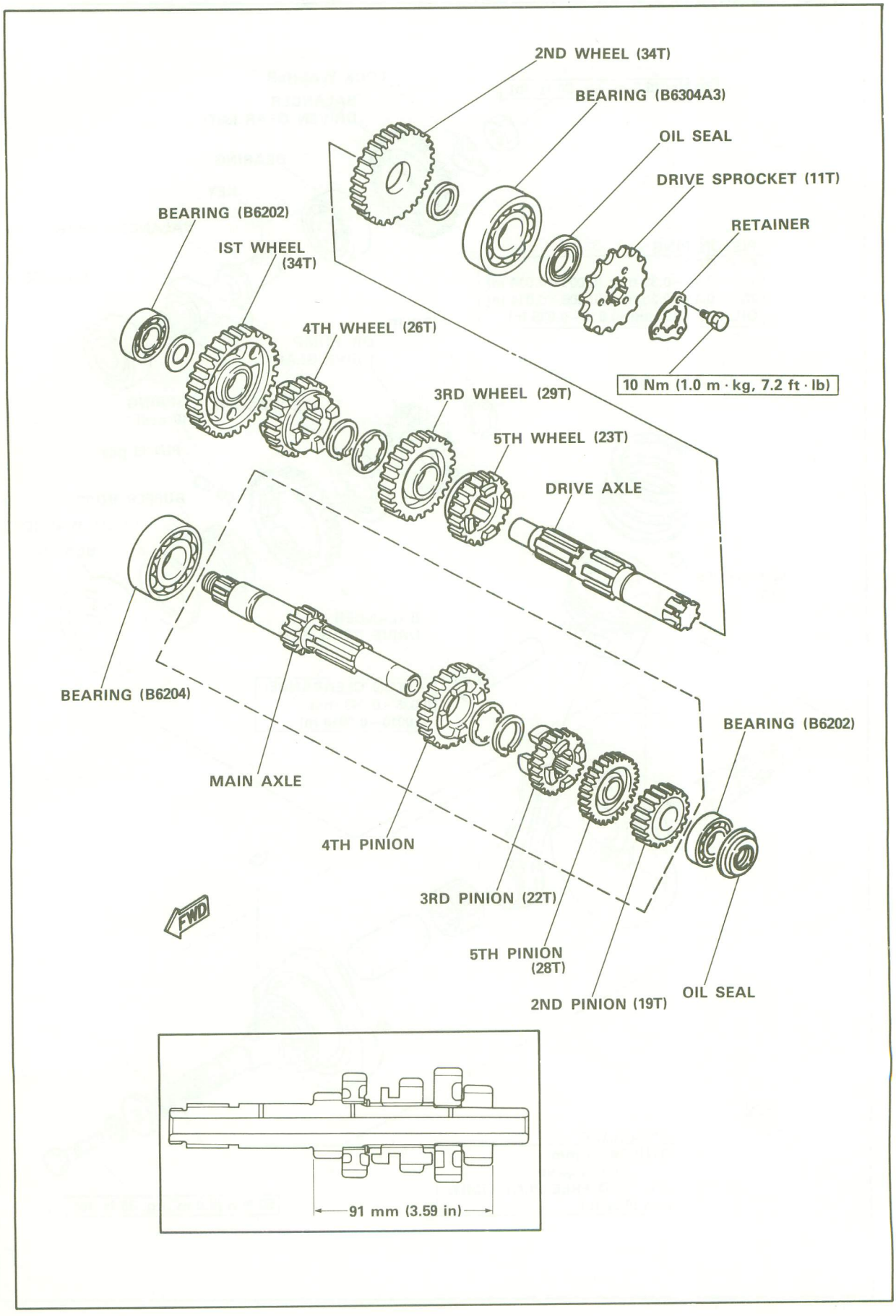
Valve/Cam Chain



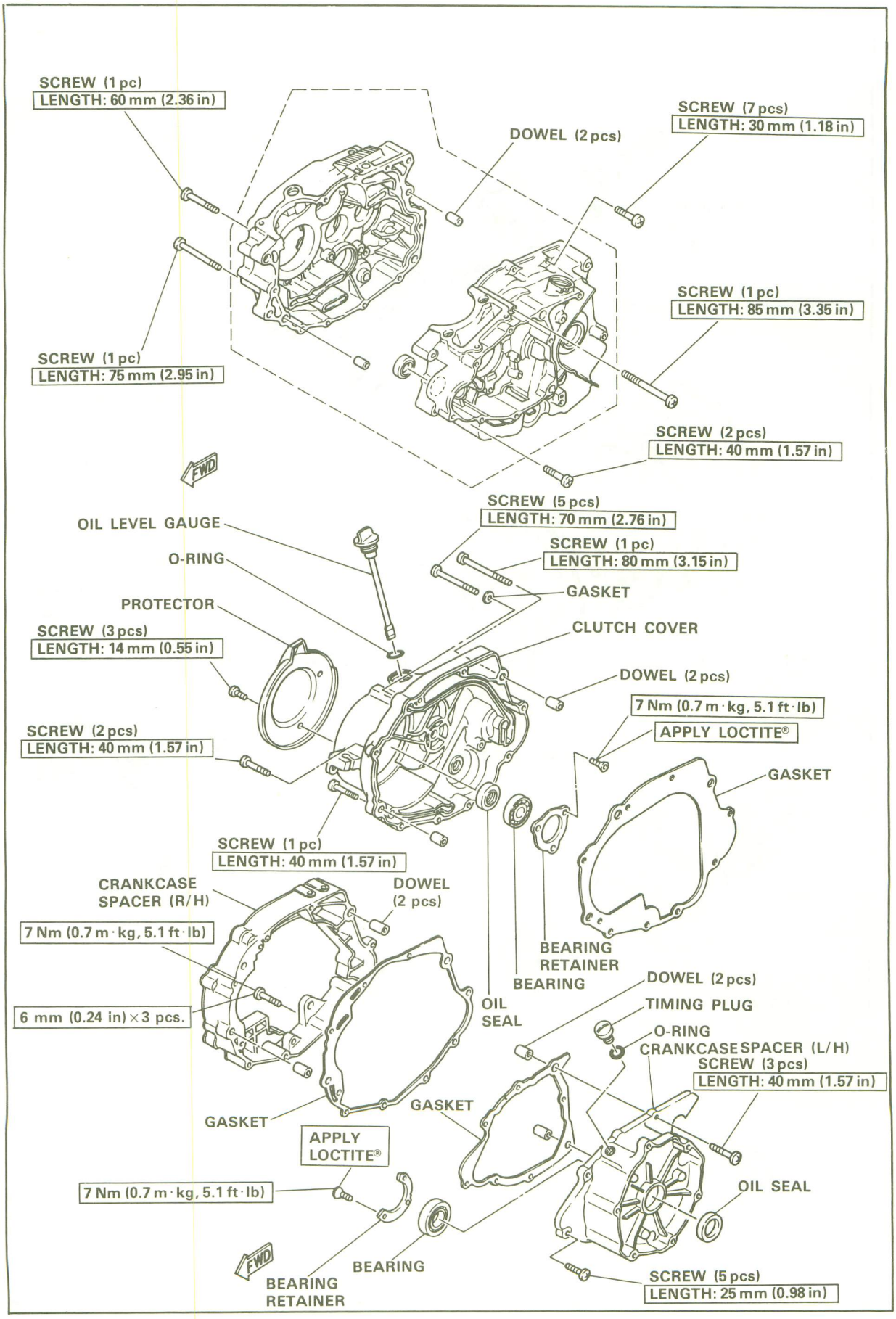
Crankshaft Assembly/Piston/ Balancer Shaft



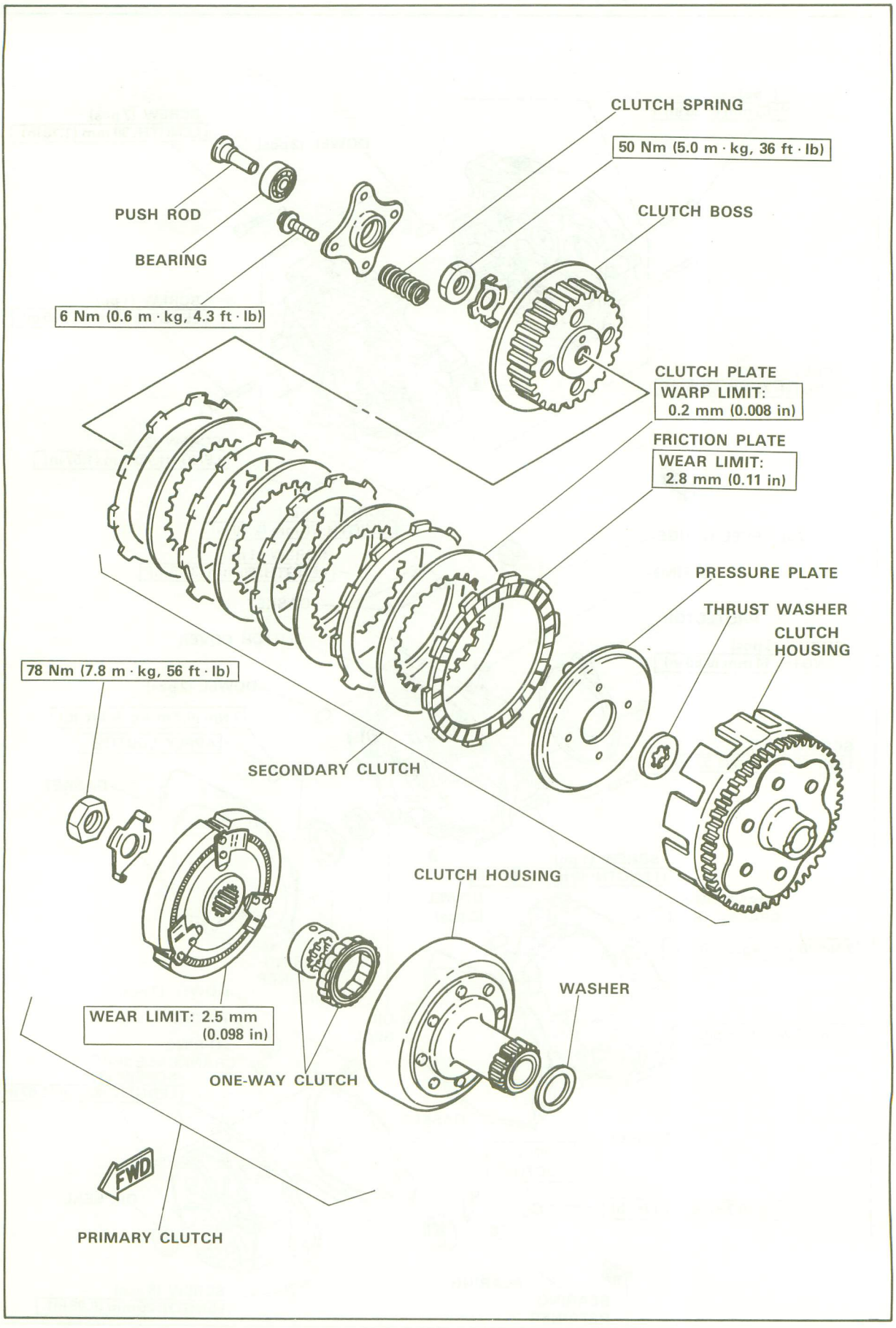
Transmission



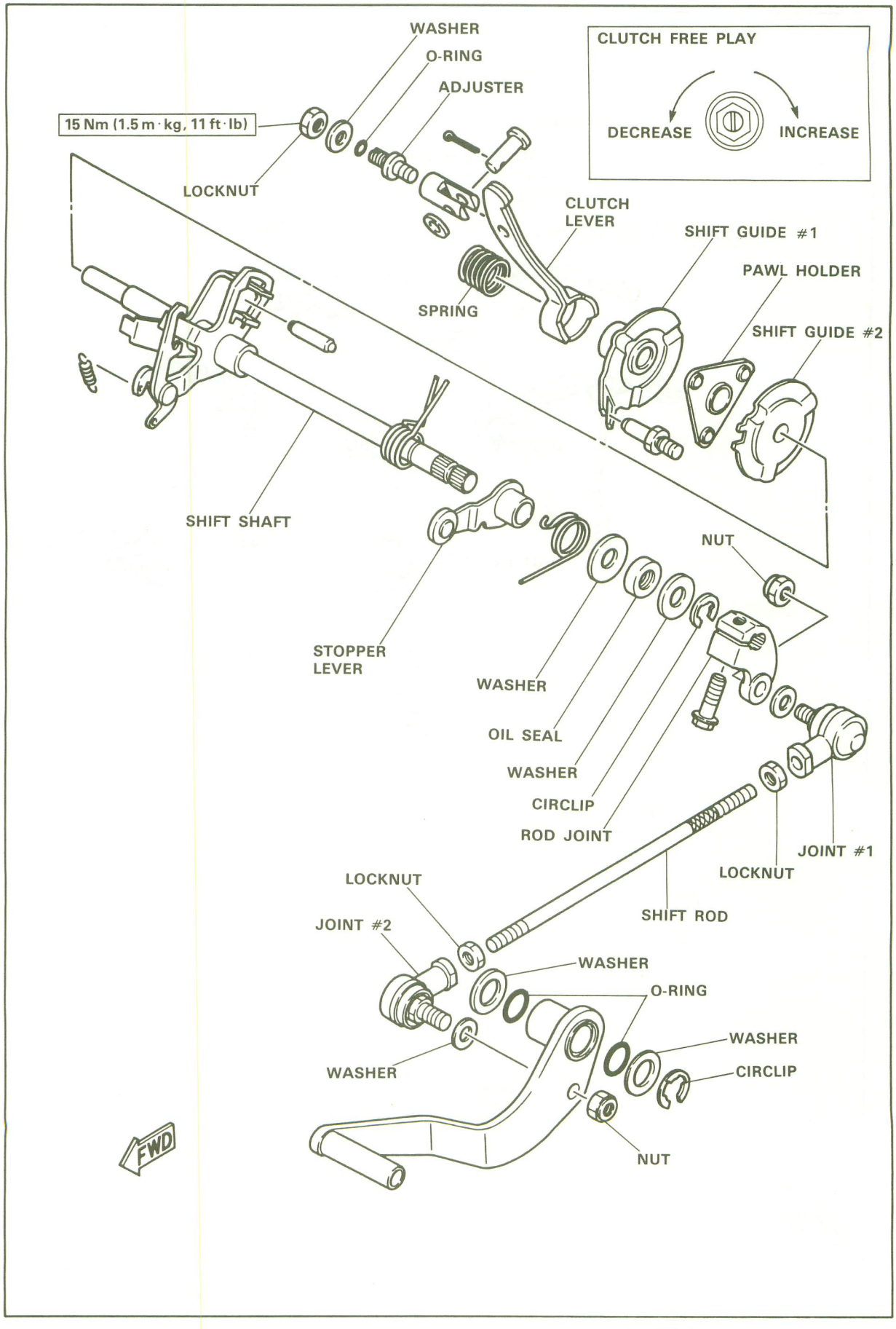
Crankcase/Crankcase Spacer/ Clutch Cover

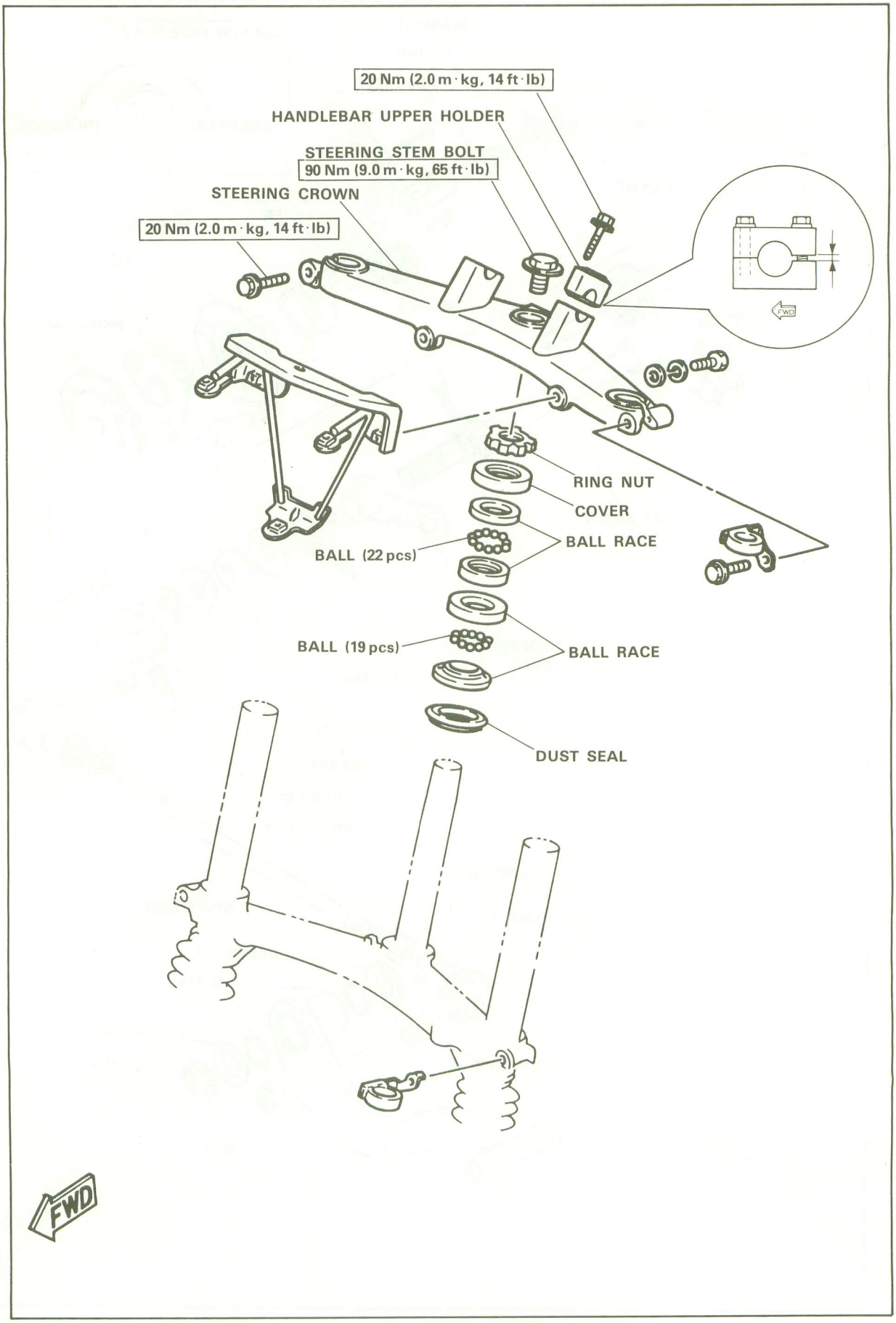


Clutch

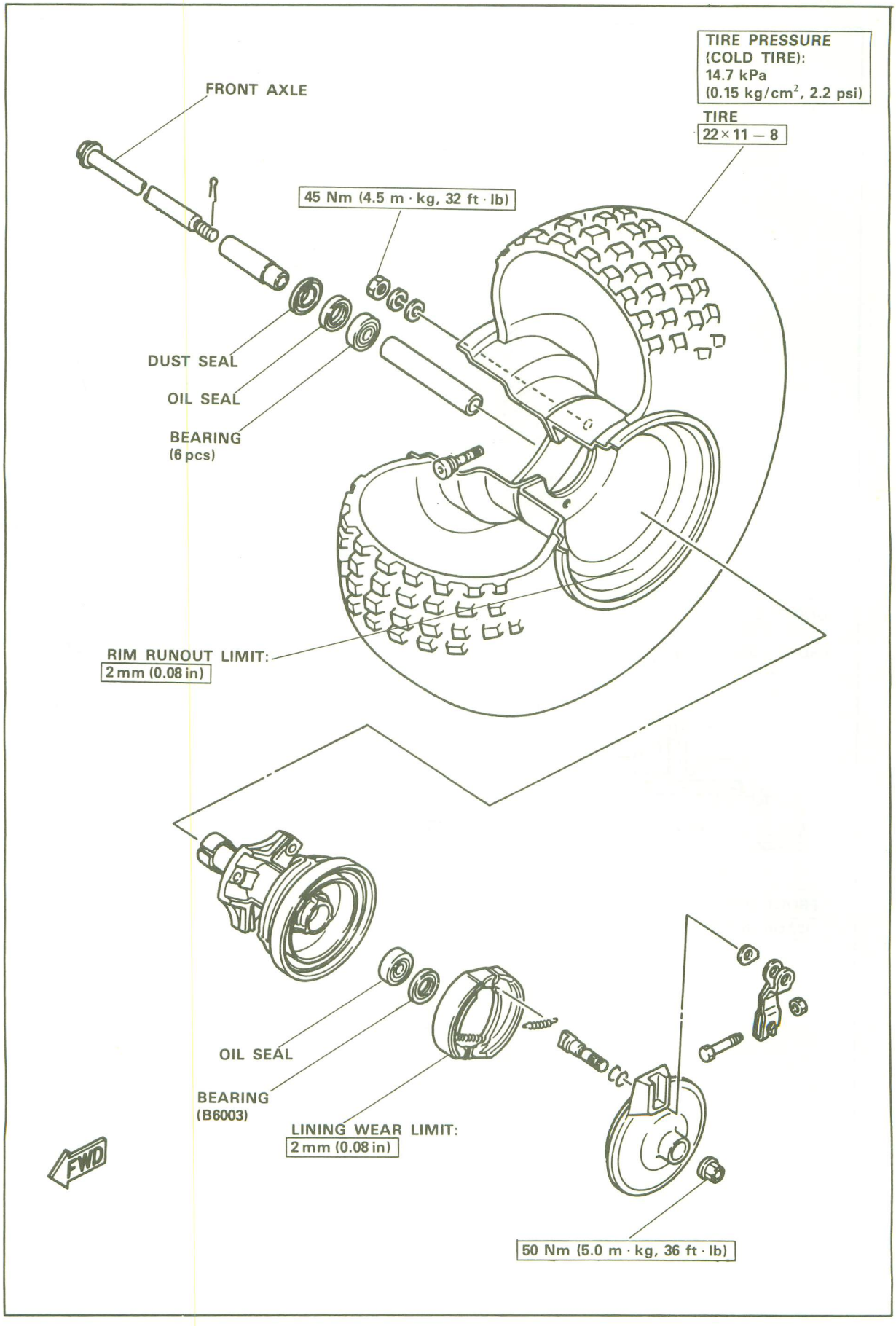

CLUTCH SPRING
50 Nm (5.0 m · kg, 36 ft · lb)
PUSH ROD
BEARING
CLUTCH BOSS
6 Nm (0.6 m · kg, 4.3 ft · lb)
CLUTCH PLATE
WARP LIMIT:
0.2 mm (0.008 in)
FRICTION PLATE
WEAR LIMIT:
2.8 mm (0.11 in)
PRESSURE PLATE
THRUST WASHER
CLUTCH HOUSING
78 Nm (7.8 m · kg, 56 ft · lb)
SECONDARY CLUTCH
CLUTCH HOUSING
WASHER
WEAR LIMIT: 2.5 mm
(0.098 in)
ONE-WAY CLUTCH
FWD
PRIMARY CLUTCH

Shift Shaft/Change Pedal

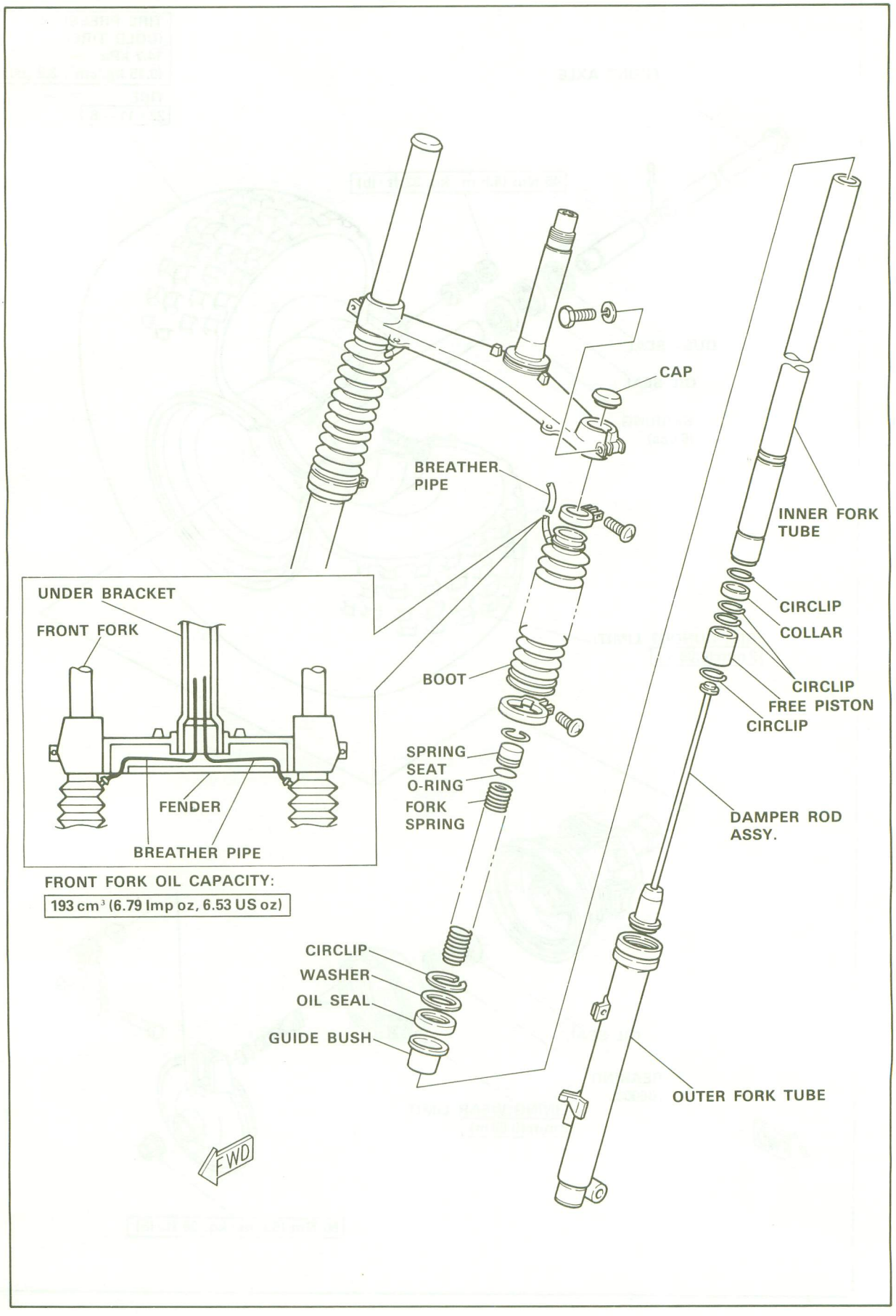



20 Nm (2.0 m · kg, 14 ft · lb)
HANDLEBAR UPPER HOLDER
STEERING STEM BOLT
90 Nm (9.0 m · kg, 65 ft · lb)
STEERING CROWN
20 Nm (2.0 m · kg, 14 ft · lb)
FWD
RING NUT
COVER
BALL RACE
BALL (22 pcs)
BALL (19 pcs)
BALL RACE
DUST SEAL
FWD

Front Wheel


TIRE PRESSURE
(COLD TIRE):
14.7 kPa
(0.15 kg/cm², 2.2 psi)
FRONT AXLE
TIRE
22 × 11 – 8
45 Nm (4.5 m · kg, 32 ft · lb)
DUST SEAL
OIL SEAL
BEARING
(6 pcs)
RIM RUNOUT LIMIT:
2 mm (0.08 in)
OIL SEAL
BEARING
(B6003)
LINING WEAR LIMIT:
2 mm (0.08 in)
FWD
50 Nm (5.0 m · kg, 36 ft · lb)

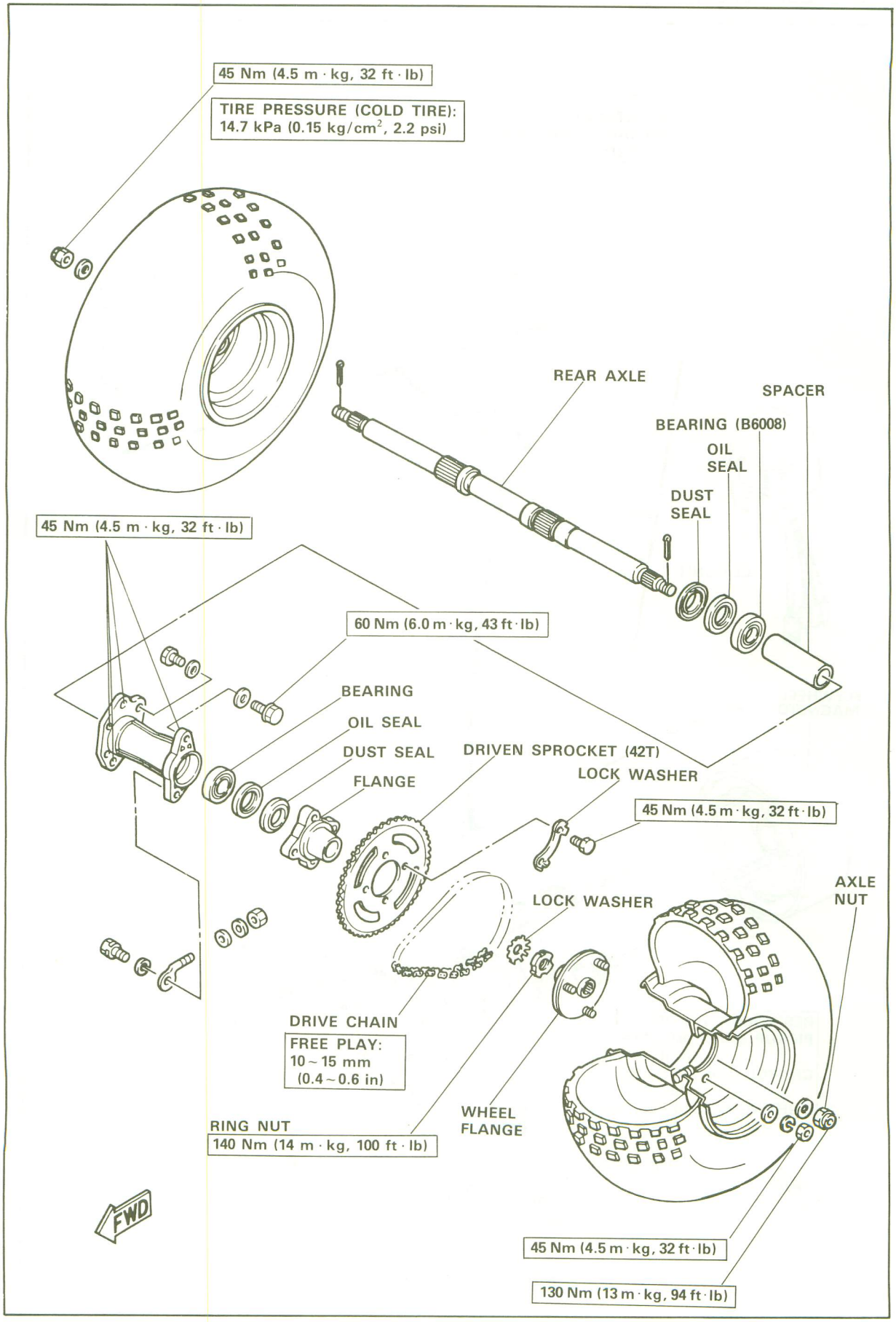
Front Fork

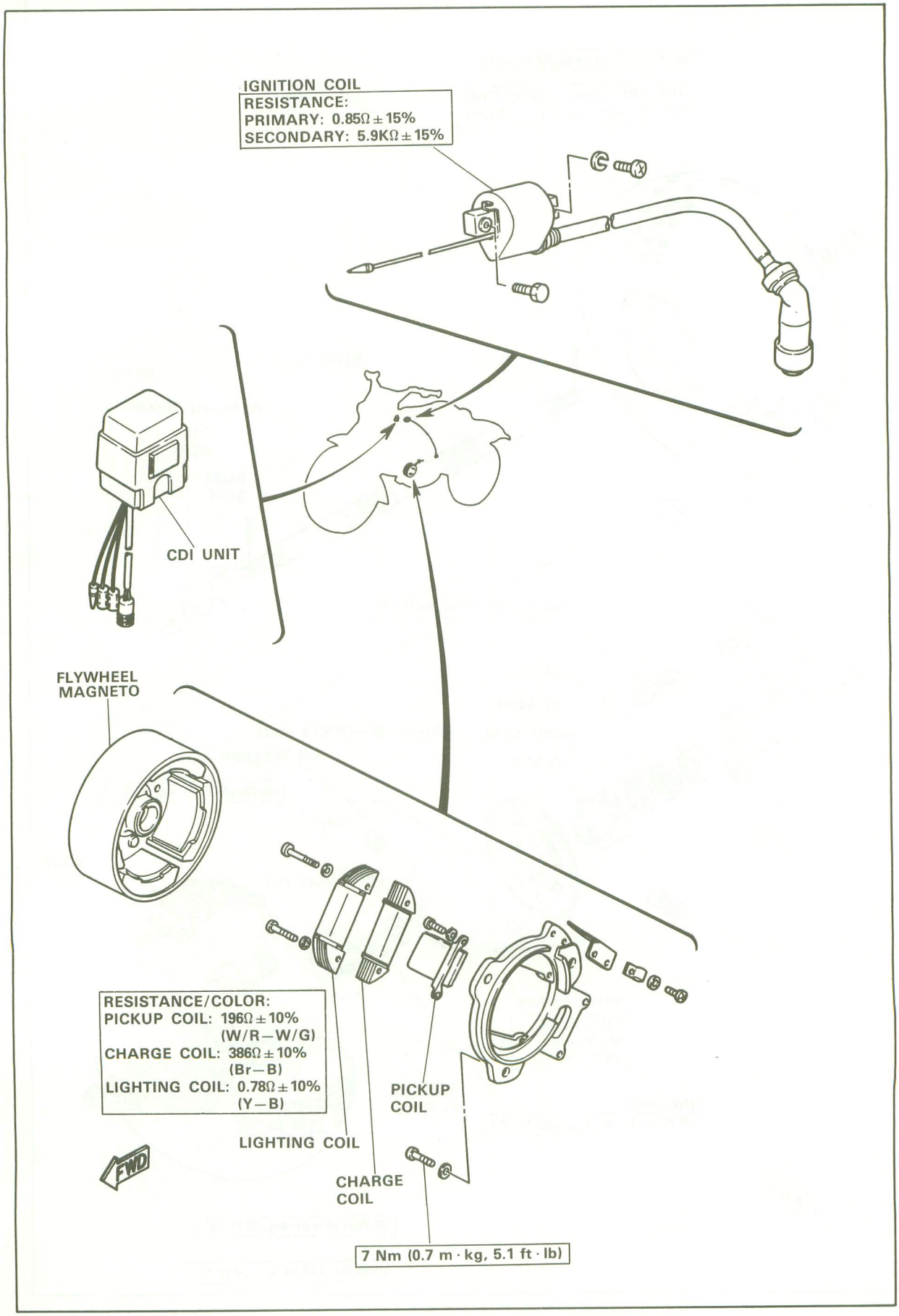


FRONT FORK OIL CAPACITY:

193 cm³ (6.79 Imp oz, 6.53 US oz)

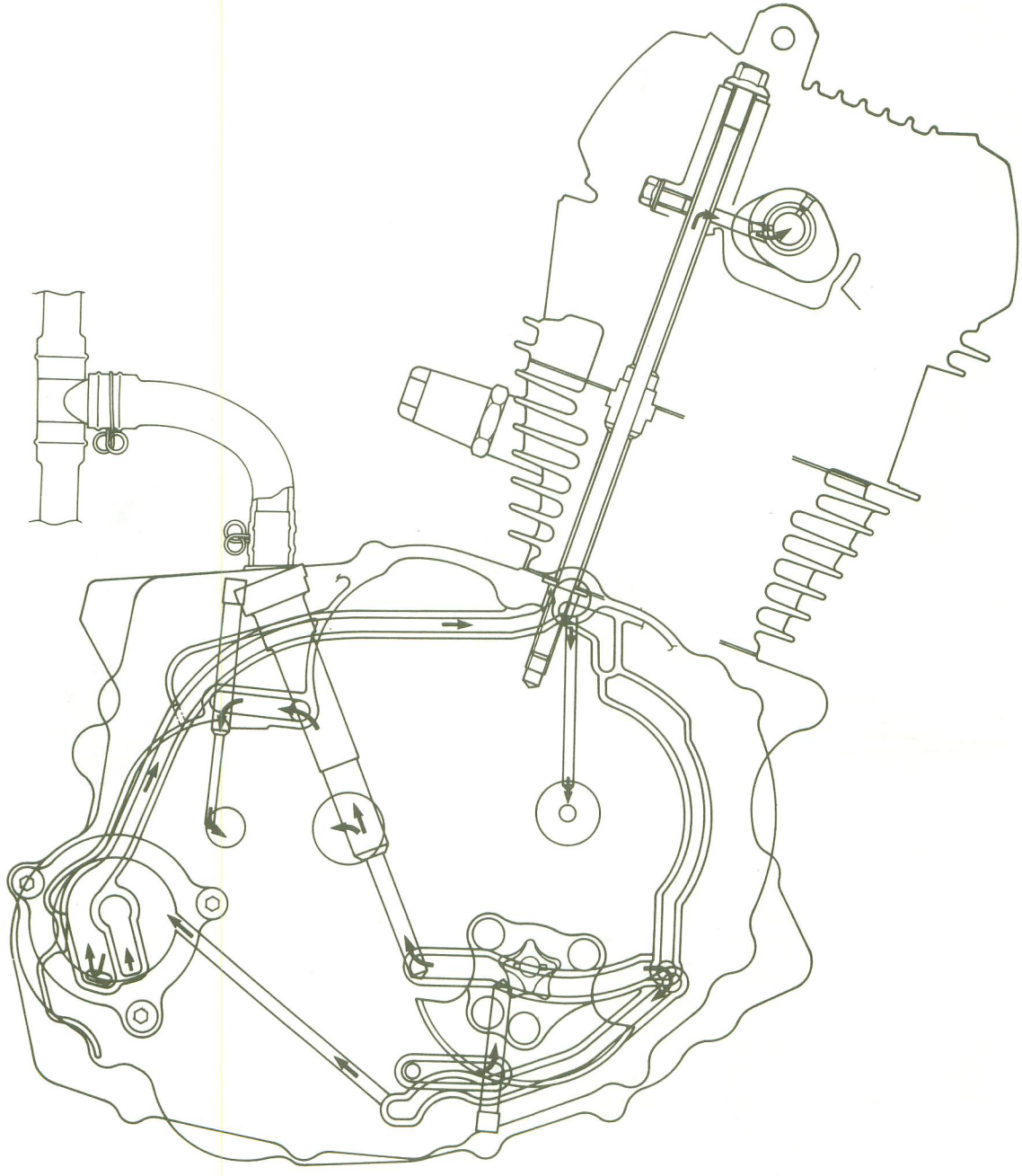
Rear Wheel


45 Nm (4.5 m · kg, 32 ft · lb)
TIRE PRESSURE (COLD TIRE):
14.7 kPa (0.15 kg/cm², 2.2 psi)
REAR AXLE
SPACER
BEARING (B6008)
OIL SEAL
DUST SEAL
45 Nm (4.5 m · kg, 32 ft · lb)
60 Nm (6.0 m · kg, 43 ft · lb)
BEARING
OIL SEAL
DUST SEAL
FLANGE
DRIVEN SPROCKET (42T)
LOCK WASHER
45 Nm (4.5 m · kg, 32 ft · lb)
LOCK WASHER
AXLE NUT
DRIVE CHAIN
FREE PLAY:
10 ~ 15 mm
(0.4 ~ 0.6 in)
WHEEL FLANGE
RING NUT
140 Nm (14 m · kg, 100 ft · lb)
FWD
45 Nm (4.5 m · kg, 32 ft · lb)
130 Nm (13 m · kg, 94 ft · lb)

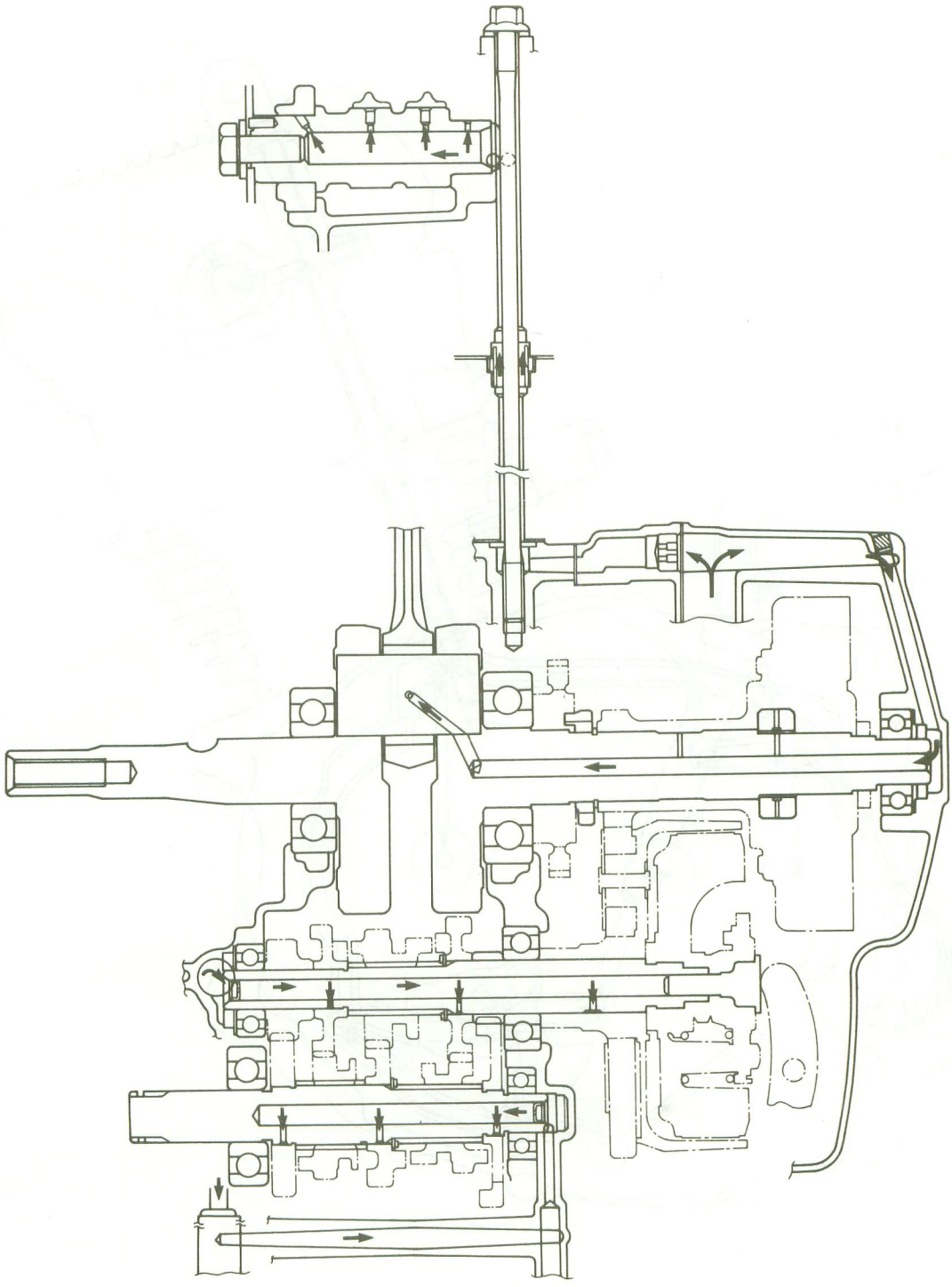

IGNITION COIL
RESISTANCE:
PRIMARY: 0.85Ω ± 15%
SECONDARY: 5.9KΩ ± 15%
CDI UNIT
FLYWHEEL MAGNETO
RESISTANCE/COLOR:
PICKUP COIL: 196Ω ± 10% (W/R—W/G)
CHARGE COIL: 386Ω ± 10% (Br—B)
LIGHTING COIL: 0.78Ω ± 10% (Y—B)
PICKUP COIL
LIGHTING COIL
CHARGE COIL
FWD
7 Nm (0.7 m · kg, 5.1 ft · lb)

LUBRICATION DIAGRAMS

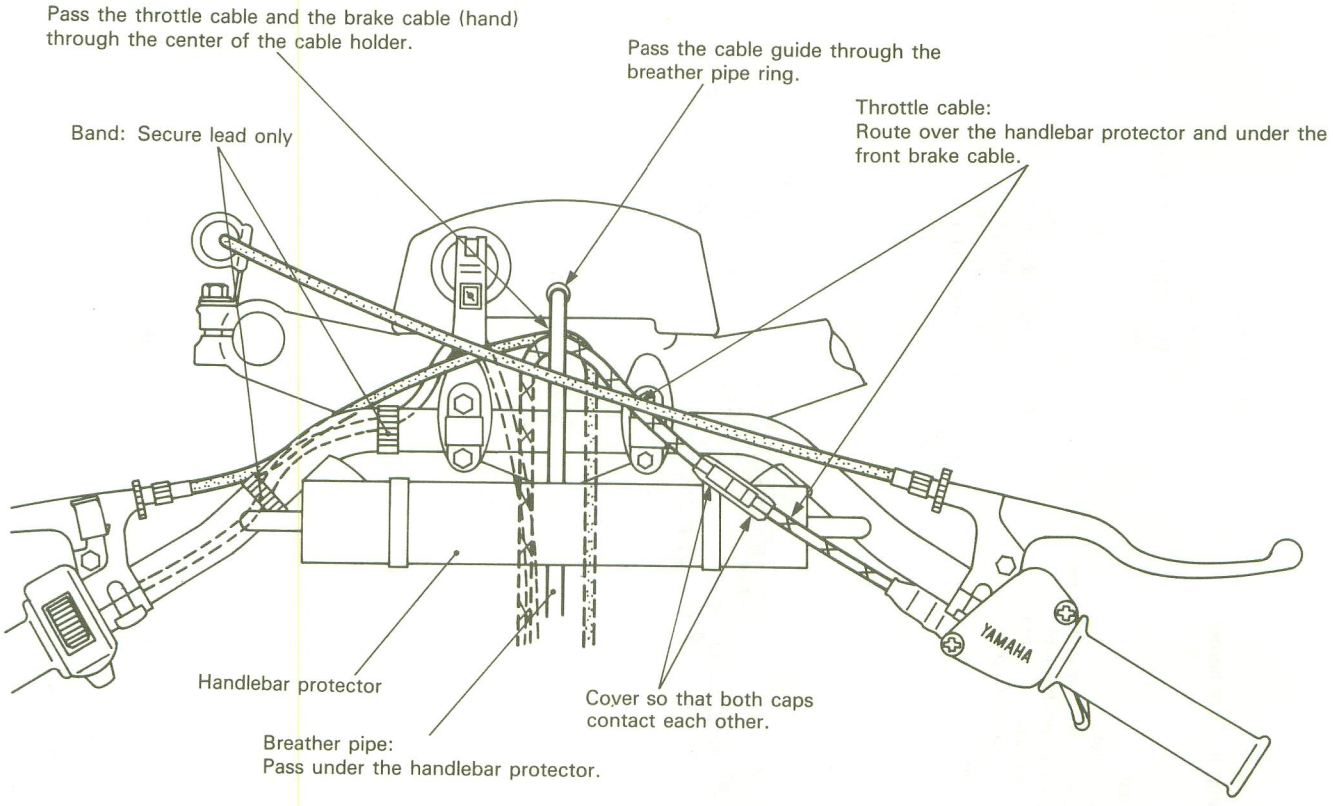
Lubrication Diagram (1)

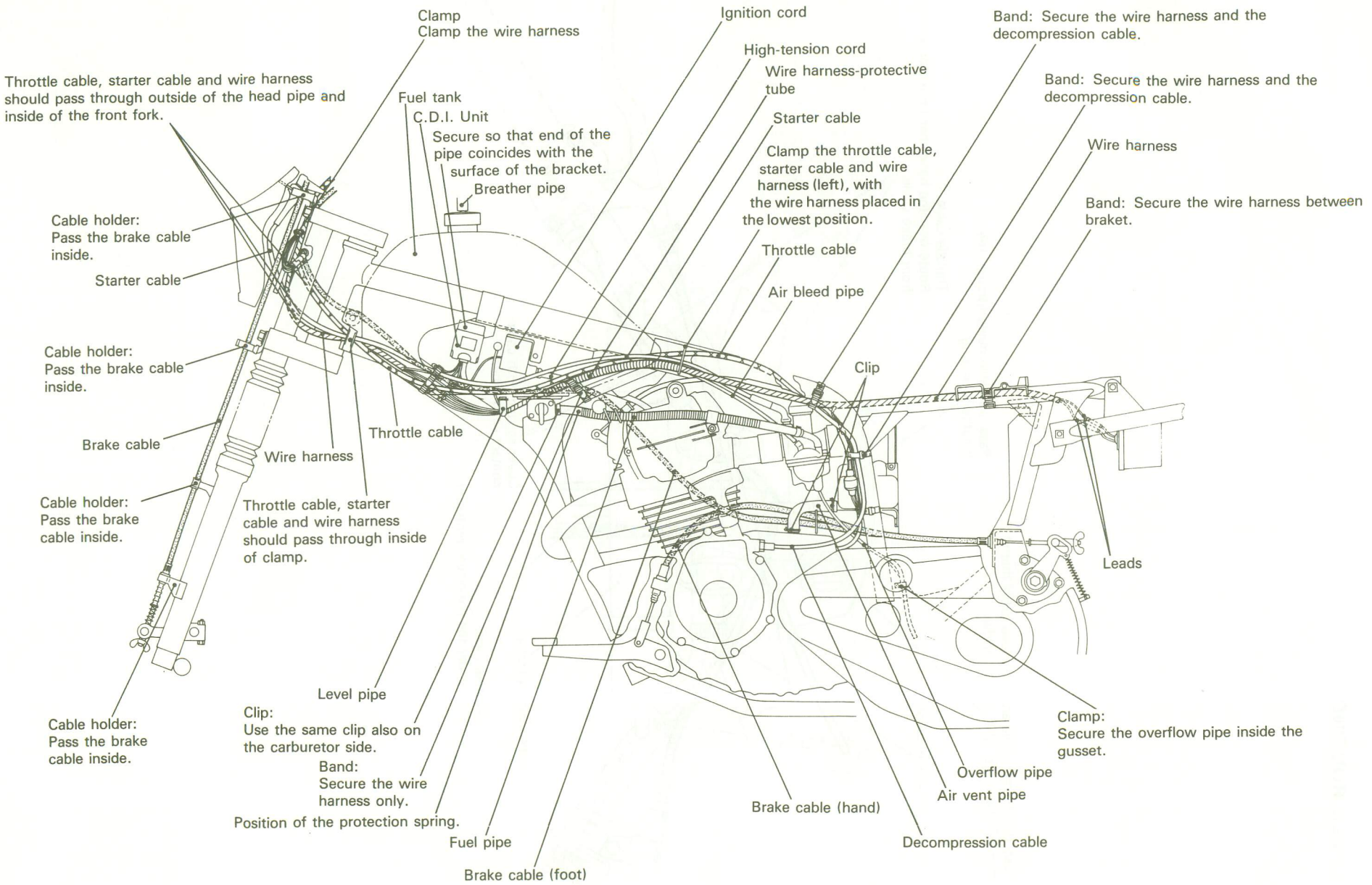


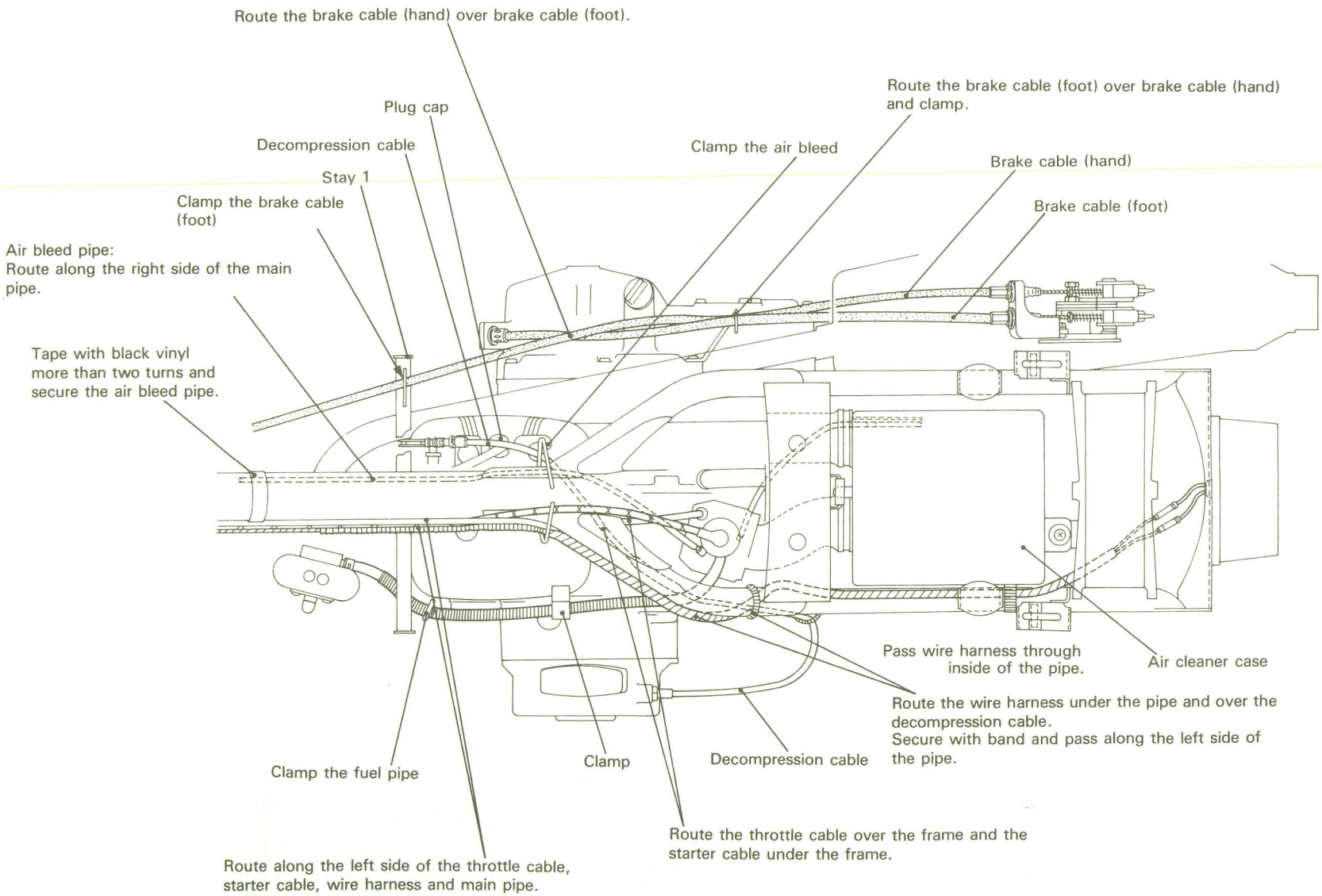
Lubrication Diagram (2)



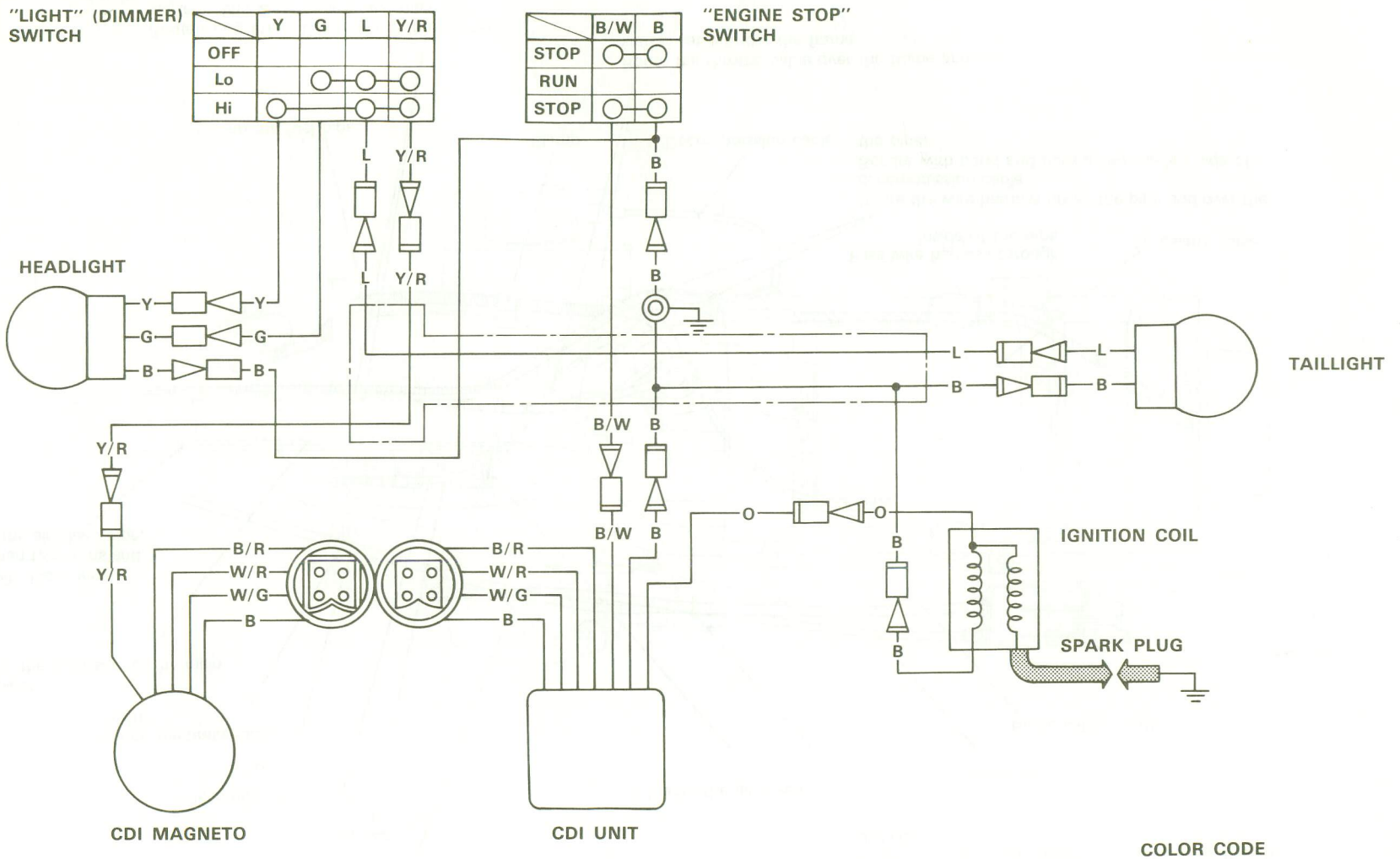
CABLE ROUTING




Clamp
Clamp the wire harness
Ignition cord
Band: Secure the wire harness and the decompression cable.
High-tension cord
Wire harness-protective tube
Throttle cable, starter cable and wire harness should pass through outside of the head pipe and inside of the front fork.
Fuel tank
C.D.I. Unit
Secure so that end of the pipe coincides with the surface of the bracket.
Breather pipe
Starter cable
Clamp the throttle cable, starter cable and wire harness (left), with the wire harness placed in the lowest position.
Band: Secure the wire harness and the decompression cable.
Wire harness
Band: Secure the wire harness between braket.
Cable holder: Pass the brake cable inside.
Starter cable
Throttle cable
Air bleed pipe
Clip
Cable holder: Pass the brake cable inside.
Brake cable
Wire harness
Throttle cable
Cable holder: Pass the brake cable inside.
Throttle cable, starter cable and wire harness should pass through inside of clamp.
Leads
Level pipe
Clip: Use the same clip also on the carburetor side.
Band: Secure the wire harness only.
Position of the protection spring.
Fuel pipe
Brake cable (foot)
Cable holder: Pass the brake cable inside.
Clamp: Secure the overflow pipe inside the gusset.
Overflow pipe
Air vent pipe
Brake cable (hand)
Decompression cable


Route the brake cable (hand) over brake cable (foot).
Plug cap
Decompression cable
Stay 1
Clamp the brake cable (foot)
Air bleed pipe:
Route along the right side of the main pipe.
Tape with black vinyl more than two turns and secure the air bleed pipe.
Route the brake cable (foot) over brake cable (hand) and clamp.
Clamp the air bleed
Brake cable (hand)
Brake cable (foot)
Pass wire harness through inside of the pipe.
Air cleaner case
Route the wire harness under the pipe and over the decompression cable.
Secure with band and pass along the left side of the pipe.
Clamp the fuel pipe
Clamp
Decompression cable
Route the throttle cable over the frame and the starter cable under the frame.
Route along the left side of the throttle cable, starter cable, wire harness and main pipe.

YTM200K WIRING DIAGRAM



COLOR CODE

B	Black	Y/R	Yellow/Red
Y	Yellow	B/R	Black/Red
G	Green	W/R	White/Red
L	Blue	W/G	White/Green
O	Orange	B/W	Black/White

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