YAMAHA

SR250G

Service Manual



LIT-11616-01-93

3Y6-28197-10

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 motorcycles have a basic understanding of the mechanical concepts and procedures inherent to motorcycle 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 and emissions. Proper service with the correct tools is necessary to ensure that the motorcycle 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 motorcycle 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.

NOTE:
This Service Manual contains information regarding periodic maintenance to the emission control system for the SR250G. Please read this material carefully.

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

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

CAUTION: A CAUTION indicates special procedure that must be followed to avoid damage to the motorcycle.

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

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

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CHAPTER 1.
GENERAL INFORMATION

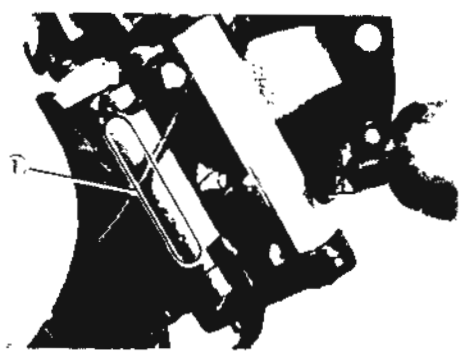
MOTORCYCLE IDENTIFICATION

The frame serial number is located on the right-hand side of the head pipe. The first three digits identify the model. This is following by a dash. The remaining digits identify the production number of the unit.

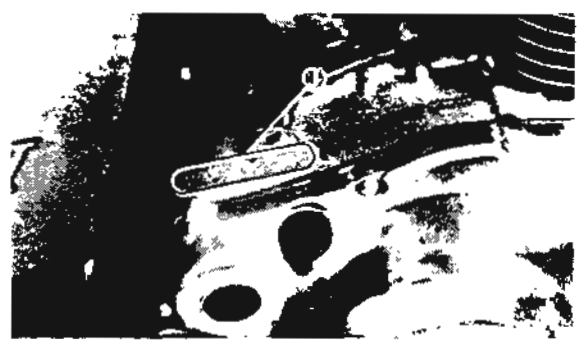
The engine serial number is located on a raised boss on the upper rear, right-hand side of the engine. Engine identification follows the same code as frame identification.

Starting Serial Number

SR250G	3Y6-000101

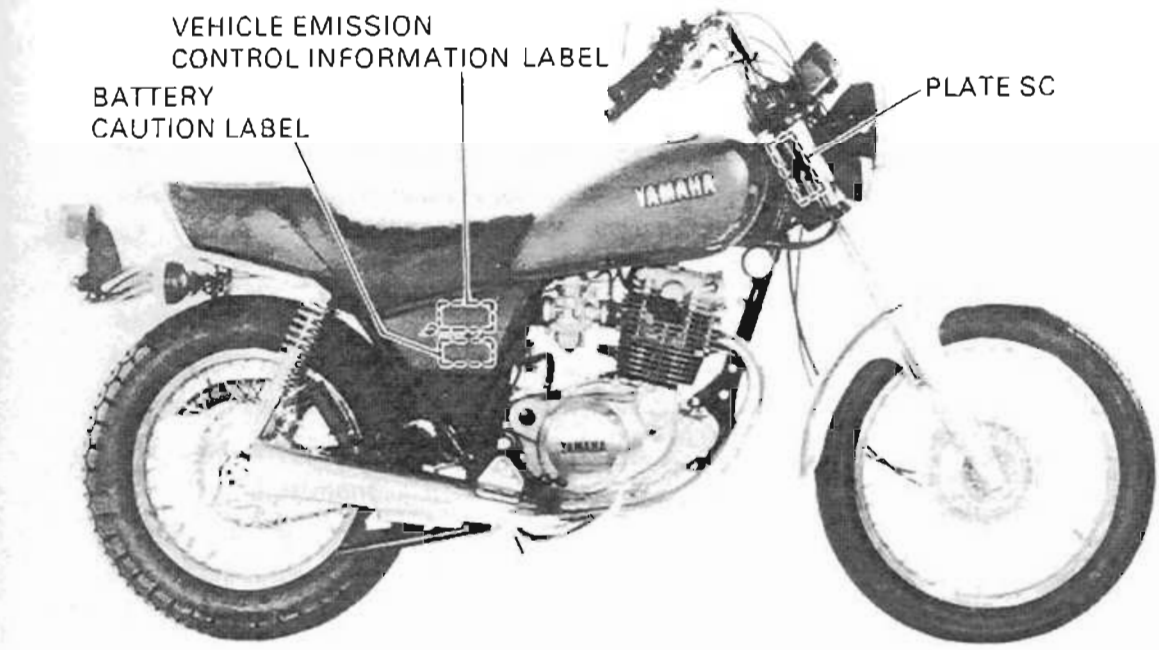


1. Frame serial number



1. Engine serial number

EXTERNAL VIEW



SPECIAL TOOLS

1. Pocket tester (P/No. 90890-03112-00)
2. Electro tester (P/No. 90890-03021-00)
3. Dial gauge (P/No. 90890-03097-00)
4. Rotar holding tool (P/No. 90890-01235-00)
5. Flywheel puller (P/No. 90890-01189-00)
6. Clutch holding tool (P/No. TLM-90910-42-00)
7. Crankcase separating tool (P/No. 90890-01135-00)
8. Tappet adjusting tool (P/No. 90890-01311-00)
9. Front fork cylinder complete holder (P/No. 90890-01294-00)
10. T type handle (P/No. 90890-01301-00)
11. Ring nut wrench (P/No. 90890-01266-00)
12. Spoke wrench (P/No. 90890-05087-00)
13. Valve seat cutter set (P/No. TLM-90910-43-20)
14. Valve guide installer (P/No. 90890-04017-00)
15. Valve guide remover (P/No. 90890-01225-00)
16. Valve spring compressor (P/No. 90890-01253-00)
17. Hand reamer (P/No. 90890-01227-00)
18. Drive chain cutter (P/No. 90890-01286-00)
19. Fuel level gauge (P/No. 90890-01312-00)
20. rocker arm shaft puller bolt (P/No. 90890-01083-00)
21. Rocker arm shaft puller weight (P/No. 90890-01084-00)

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CHAPTER 2.
PERIODIC INSPECTIONS AND ADJUSTMENTS

MAINTENANCE AND LUBRICATION CHART

Introduction

This chapter includes all information necessary to perform recommended inspection and adjustments. These preventative maintenance procedures, if followed, will insure more reliable vehicle operation and a longer service life. The need for costly overhaul work will be greatly reduced. This information applies not only to vehicles already in service, but also to new vehicles that are being prepared for sale. Any service technician performing preparation work should be familiar with this entire chapter.

Maintenance Intervals Charts

Proper periodic maintenance is important. Especially important are the maintenance services related to emissions control. These controls not only function to ensure cleaner air but are also vital to proper engine operation and maximum performance. In the following tables of periodic maintenance, the services related to emissions control are grouped separately.

Periodic Maintenance Emission Control System

No.	Item	Remarks	Initial break-in		Thereafter every	
			1,000 km (600 mi) or 1 month	4,000 km (2,500 mi) or 7 months	3,000 km (2,000 mi) or 6 months	6,000 km (4,000 mi) or 12 months
1*	Cam chain	Check and adjust chain tension.	○	○	○	
2*	Valve clearance	Check and adjust valve clearance when engine is cold.	○	○	○	
3	Spark plug	Check condition. Adjust gap/clean. Replace after initial 7,000 km (4,500 mi).		○	○	Replace
4*	Crankcase ventilation system	Check ventilation hose for cracks or damage. Replace if necessary.		○		○
5*	Fuel line	Check fuel hose for cracks or damage. Replace if necessary.		○		○
6*	Exhaust system	Check for leakage. Retighten as necessary. Replace gasket if necessary.		○	○	
7*	Idle speed	Check and adjust engine idle speed. Adjust cable free play if necessary.		○	○	

* It is recommended that these items be serviced by a Yamaha dealer or other qualified mechanic.

No.	Item	Remarks	Type	Initial break-in		Thereafter every		
				1,000 km (600 mi) or 1 month	4,000 km (2,500 mi) or 7 months	3,000 km (2,000 mi) or 6 months	6,000 km (4,000 mi) or 12 months	15,000 km (9,500 mi) or 24 months
1	Engine oil	Warm-up engine before draining	Yamalube 4-cycle oil or SAE 20W/40 type "SE" motor oil	○	○		○	
2	Oil filter/ Oil strainer	Replace filter element and clean oil strainer	—	○	○		○	
3*	Air filter	Wet-type filter must be washed and damped with oil	Yamalube 2-cycle oil or equivalent	○	○	○		
4*	Brake system	Adjust free play. Replace shoes if necessary.	—	○	○	○		
5*	Clutch	Adjust free play	—	○	○	○		
6	Drive chain	Apply chain lube thoroughly.	Yamaha chain and cable lube or SAE 10W/30 motor oil	Check chain tension and lube every 500 km (300 mi)				
7	Control and meter cable	Apply chain lube thoroughly.	Yamaha chain and cable lube or SAE 10W/30 motor oil	○	○	○		
8*	Rear arm pivot shaft	Apply grease lightly.	Lithium soap base grease					○
9	Brake pedal shaft	Apply chain lube lightly.	Yamaha chain and cable lube or SAE 10W/30 motor oil		○	○		
10	Brake/clutch lever pivot shafts	Apply chain lube lightly.	Yamaha chain and cable lube or SAE 10W/30 motor oil		○	○		
11	Center stand pivot	Apply chain lube lightly.	Yamaha chain and cable lube or SAE 10W/30 motor oil		○	○		
12*	Front fork oil	Drain completely. Refill to specification.	Yamaha fork oil 10Wt or equivalent					○
13*	Steering ball bearing and races	Check bearings assembly for looseness. Moderately repack every 15,000 km (9,500 mi).	Medium weight wheel bearing grease		○	○		Repack
14*	Wheel bearings	Check bearings for smooth rotation. Replace if necessary.	—		○	○		
15	Battery	Check specific gravity. Check breather pipe for proper operation.	—		○	○		

* It is recommended that these items be serviced by a Yamaha dealer or other qualified mechanic.

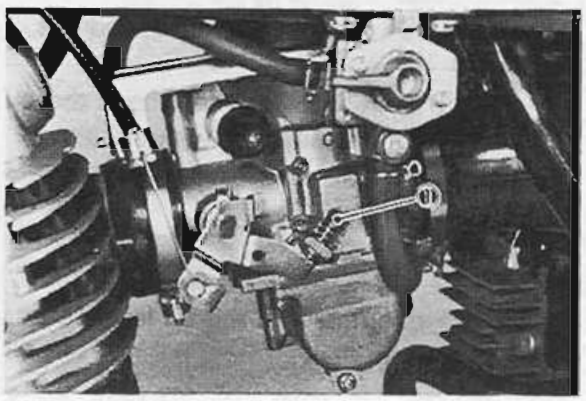
NOTE:

The air filter should be cleaned more often than specified intervals if the motorcycle is operated in extremely dusty area.

Carburetor

1. Idle speed setting procedure
   Start the engine and warm it up for a few minutes. Set the engine idle speed to specified r/min. by turning the throttle stop screw in to increase the engine speed and back off the screw to decrease the engine speed.
   Use a tachometer for checking and adjusting the engine speed.

Idle speed: 1,200 r/min

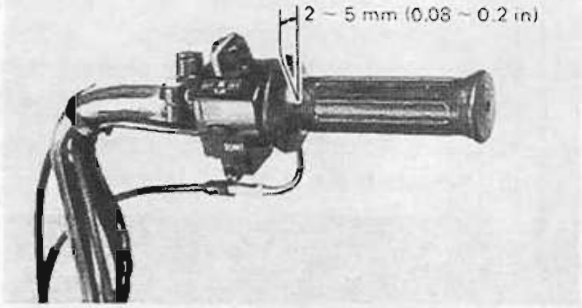


1. Throttle stop screw

2. Idle mixture
   The idle mixture is set at the factory by the use of special equipment. Not attempt should be made by the dealer to change this adjustment.
3. Throttle cable adjustment.

NOTE:
Idle speed should be set before making this adjustment.

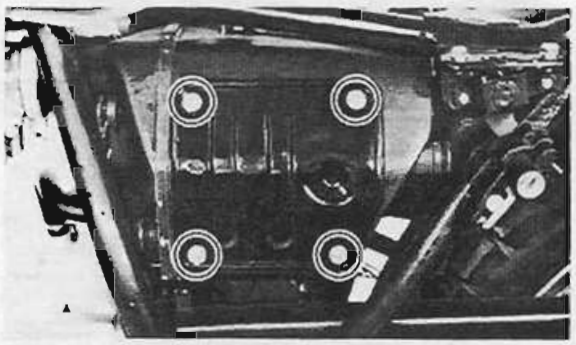
The throttle grip should have a play of 2 ~ 5 mm (0.08 ~ 0.2 in) in the turning direction at the grip flange. If the play is not this range, take the following step for adjustment:
Loosen the adjuster lock nut on the throttle cable, and turn the adjuster in or out so the play is correct. After the adjustment, tighten the lock nut.

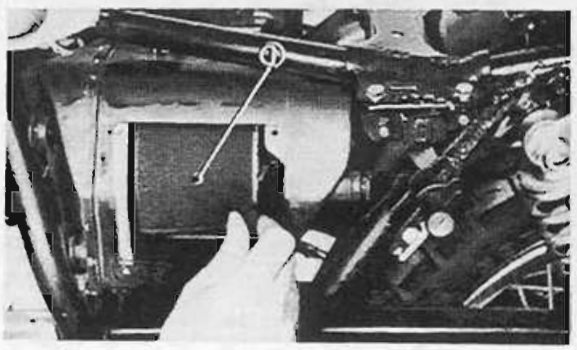


Air Filter

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 element which consists of foam rubber moistened with oil. When this filter element becomes dirty it should be cleaned.

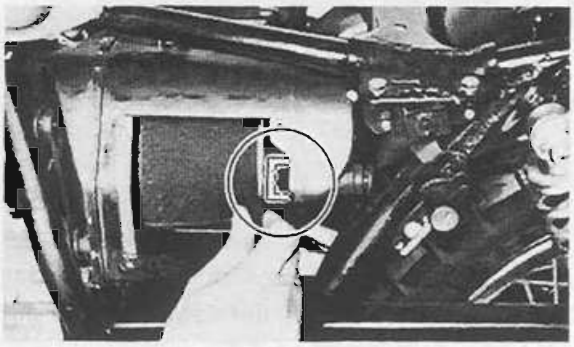
1. Remove the seat and the side cover (left).
2. Remove the air filter element from its case, remove element from guide and clean with solvent. After cleaning, remove the remaining solvent by squeezing the element.



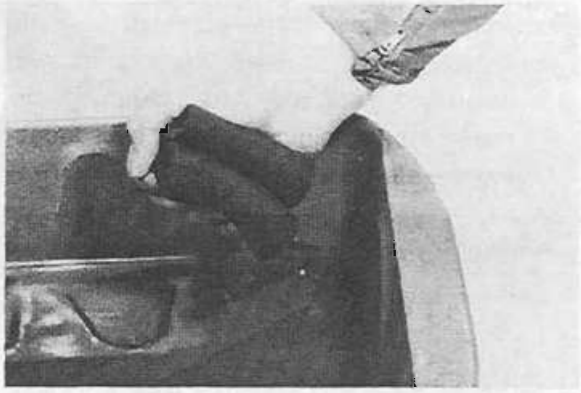


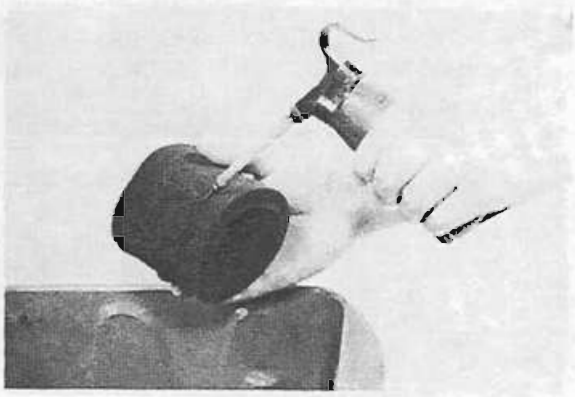
1. Air filter element

3. Then apply Yamalube 2-cycle oil or equivalent to the entire surface and squeeze out the excess oil. Element should be wet but not dripping.
4. When installing the air filter element in its case, be sure its sealing surface matches perfectly the sealing surface of the case so there is not air leakage.



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





CAUTION:

The engine should never be run without the air cleaner element installed; excessive piston and/or cylinder wear may result.

Engine Oil

1. Oil level measurement
   a. Place the motorcycle on a level place and hold it in an upright position. Warm up the engine for several minutes.

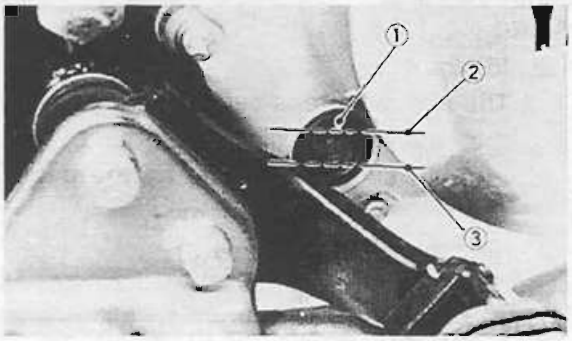
NOTE:

Be sure the motorcycle is positioned straight up when checking the oil level; a slight tilt toward the side can produce false readings.

   b. With the engine stopped, check the oil level through the level window located at the lower part of the right side crankcase cover.

NOTE:

Wait a few minutes until the oil level settles before checking.



1. Level window
2. Maximum mark
3. Minimum mark

2. Oil capacity

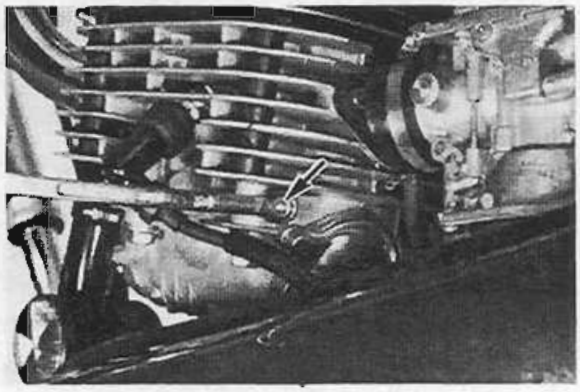
After engine overhaul:
1.6 lit (1.7 US qt)
After oil filter replacement:
1.3 lit (1.4 US qt)

Engine Oil and Oil Filter Replacement

CAUTION:

After replacement of engine oil, be sure to check the oil pressure in the following procedure.

1. **Remove the air bleed screw from oil filter cover, and loosen the check bolt in the cylinder head.**
2. **Start the engine and keep it idle running till oil flows out of the bleed hole, and at the check bolt (see the following photo).**
   The check bolt has a slit for checking oil.
   If no oil comes out even after a lapse of over one minute, cut the engine immediately for fear of seizure.
   Restart the engine after solving the problem(s) and recheck the oil pressure.

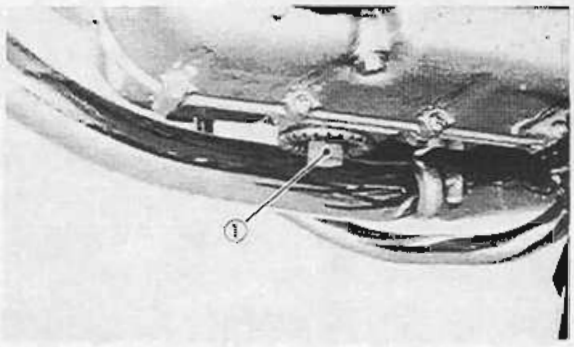


1. Oil filter replacement

NOTE:

When replacing the engine oil after the break-in period, clean the oil strainer at the bottom of the engine.

a. Start the engine. After a few minutes of warm-up stop the engine.
b. Place an oil pan under the engine.

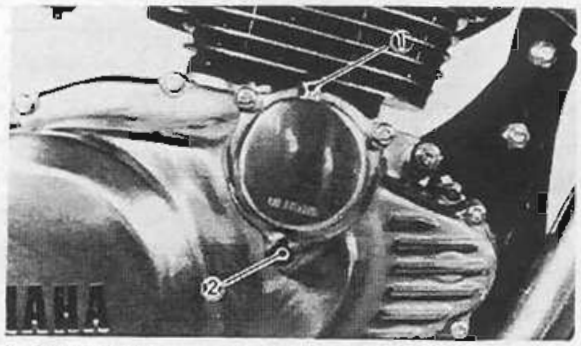


1. Drain plug

c. Remove the oil filler cap, drain plug and air bleed screw attached to the oil filter cover, and drain the engine oil.

NOTE:

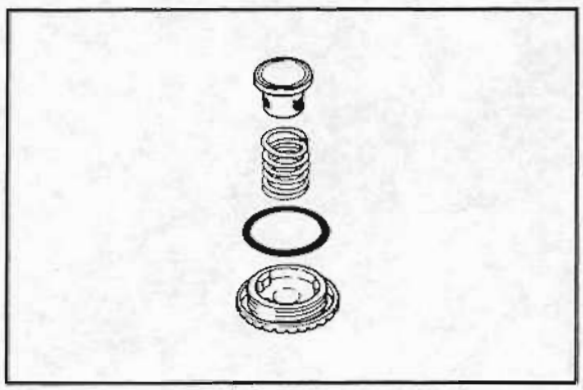
The oil filter cover is secured by three screws. The lower one should be loosened until the threaded portion comes out completely.



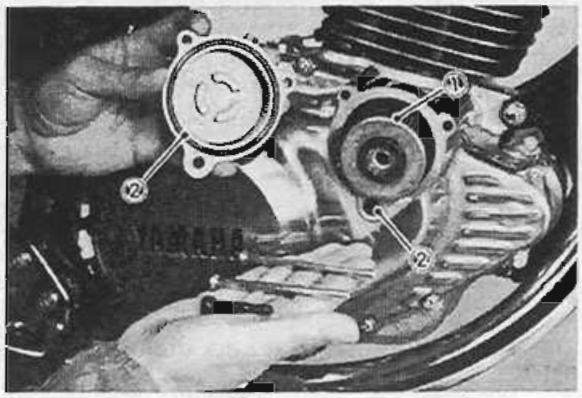
1. Air bleed screw 2. Filter cover screw

CAUTION:

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



d. Remove the oil filter cover, and replace the filter element.



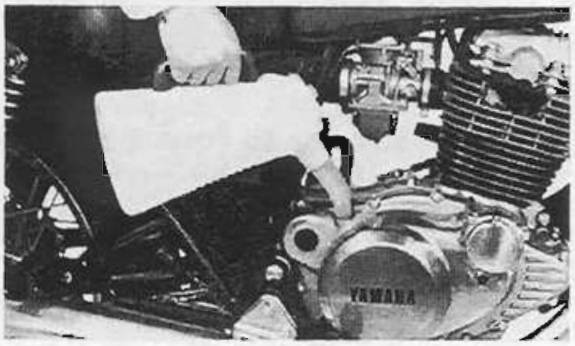
1. Filter element 2. "O" ring

e. Install the drain plug, air bleed screw, oil filter and oil filter cover.

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

Drain plug torque:
3.2 m-kg (23.0 ft-lb)

f. Add 1.3 liters of engine oil. Install the oil filler cap and tighten. Use Yamalube 4-cycle oil or SAE 20W/40 type "SE" oil.



g. 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.
h. After warm up, stop the engine and check the oil level. (Refer to page 2-4, "Engine Oil".)

2. Regular oil replacement (without replacing filter)

a. Start the engine and stop after a few minutes of warm-up.
b. Place an oil receiver under the engine.
c. Remove the oil filler cap, drain plug and air bleed screw attached to the oil filter cover.

NOTE:
The oil filter cover is secured by three screws. The lower one should be removed so that the filter cavity will drain.

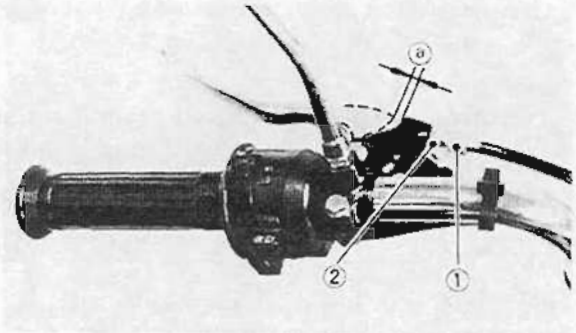
d. Check each O-ring. If damaged replace.
e. Install the drain bolt and the bleed screw.
f. Add 1.3 liters of engine oil. Install the oil filler cap and tighten.
g. Start the engine and allow a few minutes of warm-up.
While warming up, check for oil leakage. If oil leaks, stop the engine immediately, and check for the cause.
h. Stop the engine and check the oil level. (Refer to page 2-4, "Engine Oil".)

Clutch Adjustment

This model has two clutch cable length adjusters and a clutch mechanism adjuster. Cable length adjusters are used to take up slack from cable stretch and to provide sufficient free play for proper clutch operation under various operating conditions. The clutch mechanism adjuster is used to provide the correct amount of clutch "throw" for proper disengagement (see page 3-24). Normally, once the mechanism is properly adjusted, the only adjustment required is maintenance of free play at the clutch handlebar lever.

Free Play Adjustment

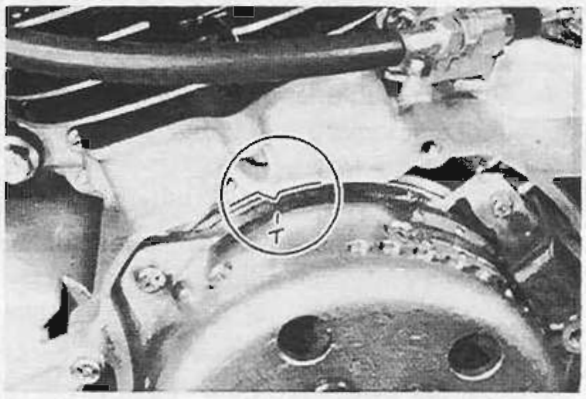
Loosen the handlebar lever adjuster lock nut. Next, turn the length adjuster either in or out until proper lever free play is achieved.



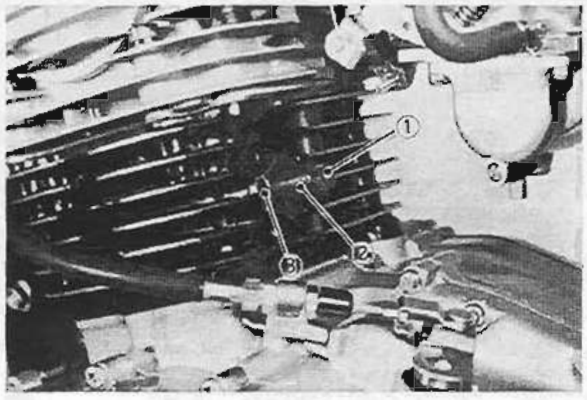
1. Adjuster 2. Lock nut a = 3 ~ 5 mm (0.12 ~ 0.20 in)

Cam Chain Adjustment

1. Remove the left crankcase cover.
2. Rotate crank shaft in a counter-clockwise direction (viewed from the left side of the engine) to place all slack in the area of the chain tensioner.
   Align the "T" mark on the flywheel with the timing mark on the crankcase at the compression stroke.



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



1. Push rod 2. Adjuster 3. Lock nut

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.

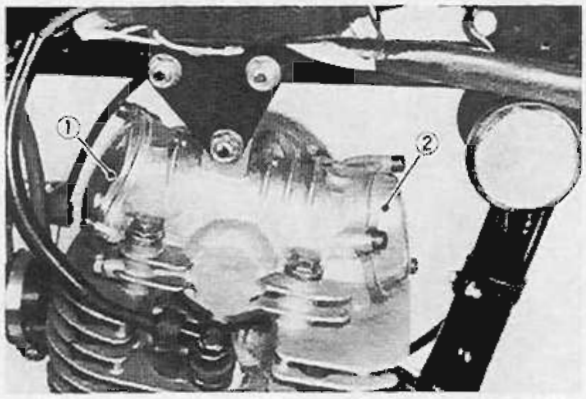
6. Tighten the adjuster lock nut.
7. Install the adjuster cap and the left crankcase cover.

Adjuster lock nut tightening torque: 3.0 m-kg (22 ft-lb)

Adjuster cap tightening torque: 0.5 m-kg (3.6 ft-lb)

Valve Clearance Adjustment

1. Remove the seat.
2. Turn the fuel petcock to "ON" and disconnect the fuel pipe.
3. Remove the bolt securing the fuel tank to the frame and remove the fuel tank.
4. Remove intake and exhaust tappet covers and left crankcase cover.



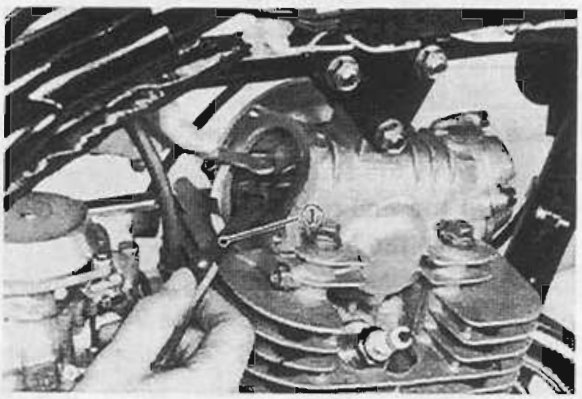
1. Intake tappet cover 2. Exhaust tappet cover

5. Align the "T" mark on the flywheel with the timing mark on the crankcase.
   This places the piston at the top dead center and the valve clearance should be checked and adjusted at T.D.C. on the compression stroke by observing when the valve adjusters have clearance.
6. Use a feeler gauge to determine the clearance.

Intake valve (Cold):
0.05 ~ 0.10 mm (0.002 ~ 0.004 in)
Exhaust valve (Cold):
0.12 ~ 0.17 mm (0.005 ~ 0.007 in)

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

NOTE:
Valve clearance check and adjustment should be done when the engine is cold.



1. Feeler gauge

8. Install the intake and exhaust tappet covers and left crankcase cover.
9. Intall the fuel tank and seat.
10. Connect the fuel pipe.

CHASSIS

Fuel Petcock

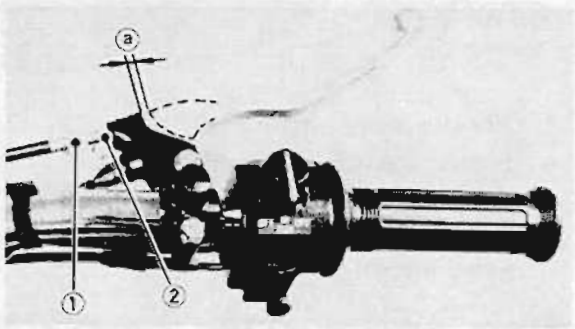
1. First, drain out the fuel tank and remove the fuel pipe.
2. Loosen the fuel cock securing bolts and remove the fuel cock assembly from fuel tank.
3. Clean the attached filter with solvent. Examine the filter and replace if damaged.
4. Inspect the gasket, replace if damaged and install the outlet fitting.

Front Brake and Wheel

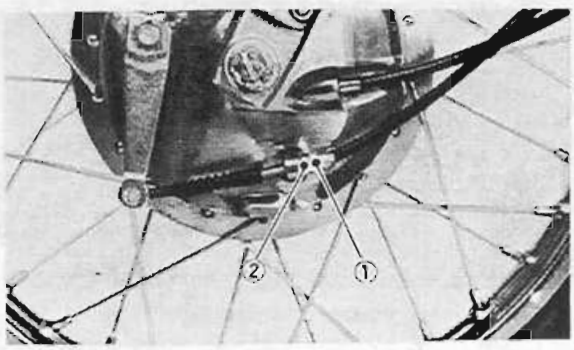
Front Brake Adjustment

The front brake should be adjusted to suit rider preference within a 5 ~ 8 mm (0.2 ~ 0.3 in) free play at the lever pivot side. Adjustment is accomplished at one of two places; either the handlebar lever holder or the front brake hub.

1. Loosen the lock nut.
2. Turn the cable length adjuster in or out until adjustment is suitable.
3. Tighten the lock nut.
4. If proper adjustment can not be obtained at the handlebar lever holder, make a brake hub adjustment.



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

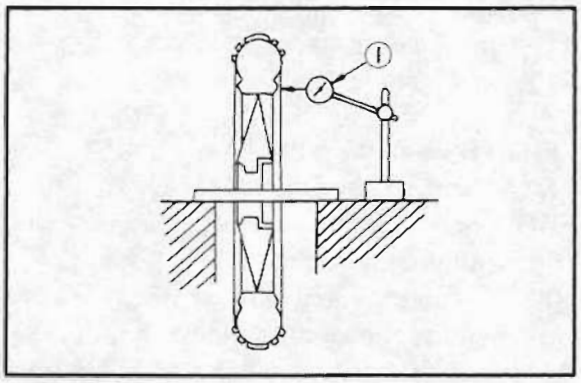


1. Adjuster
2. Lock nut

Spoke Adjustment and Torque

a. Raise the wheel off the ground.
   Spin wheel.
   Check rim run out as shown in illustration.

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



1. Dial gauge

b. Check each spoke for tightness.

Spoke torque:	
Front wheel:	0.3 m-kg (2.2 ft-lb)
Rear wheel:	0.3 m-kg (2.2 ft-lb)

Front Axle

Check axle nut.

Front axle nut torque:
10.7 m-kg (77.5 ft-lb)

Tire Pressure

See page 5-3 "Installation".

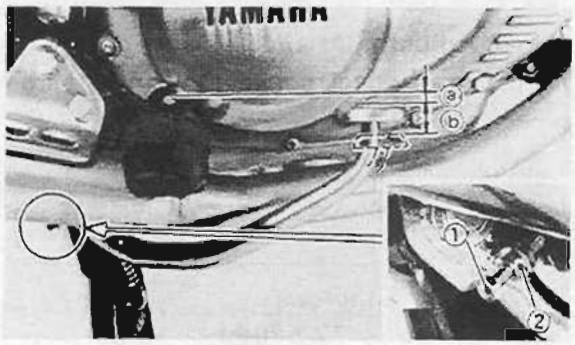
Rear Brake and Wheel

Rear Brake Adjustment

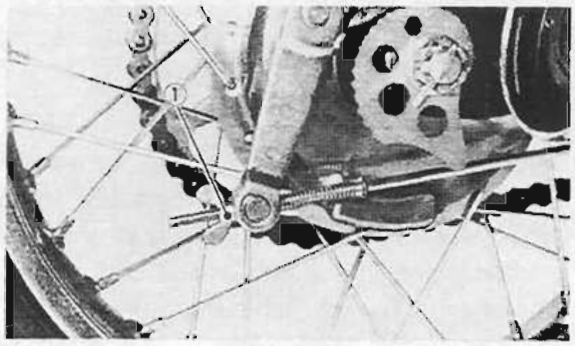
1. Pedal height
   a. Loosen the adjuster lock nut (for pedal height).
   b. By turning the adjuster bolt clockwise or counterclockwise, adjust the brake pedal position so that its top end is approx. 15 mm (0.6 in) below the footrest top end.
   c. Secure the adjuster lock nut.

WARNING:
After adjusting the pedal height, the brake pedal free play should be adjusted.

2. Free play
   Turn the adjuster on the brake rod clockwise or counterclockwise to provide the brake pedal end with a free play of 20 ~ 30 mm (0.8 ~ 1.2 in).



1. Adjuster bolt (For pedal height)
2. Lock nut
a. 15 mm (0.6 in)
b. 20 ~ 30 mm (0.8 ~ 1.2 in)

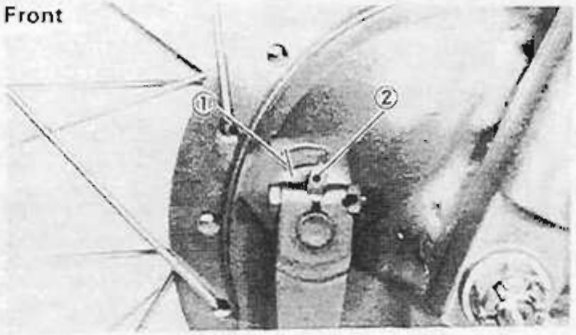


1. Adjuster

Brake Lining Inspection

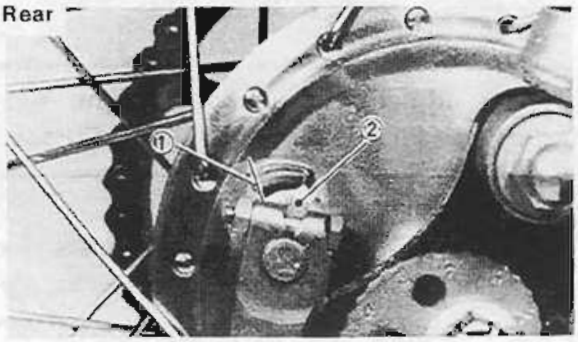
To check, see the wear indicator position while depressing the brake pedal or pulling the brake lever. If the indicator reaches to the wear limit line to replace the shoes.

Front



1. Wear limit 2. Wear indicator

Rear



1. Wear limit 2. Wear indicator

Spoke Adjustment and Tension

Adjust rear wheel spoke tension per front wheel instructions.

Rear Axle

Check axle nut.

Rear axle nut torque:
10.7 m-kg (77.5 ft-lb)

Tire Pressure

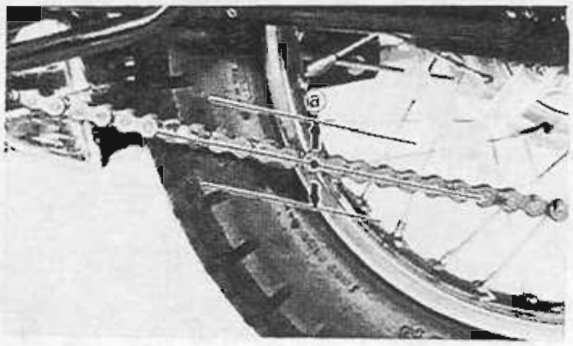
See page 5-3 "Installation".

Drive Chain Tension Check

NOTE:

Before checking and/or adjusting, rotate the rear wheel through several revolutions and check tension at several points to find the tightest point. Check and/or adjust the chain tension with the rear wheel in this "tightest" position.

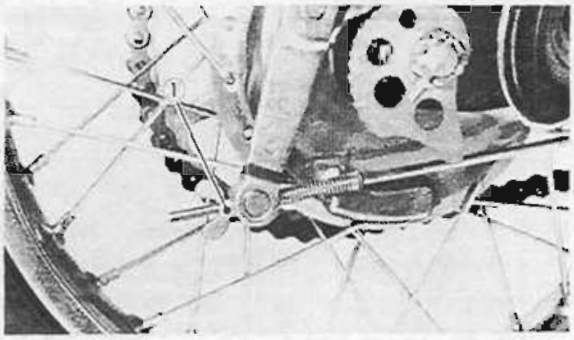
Inspect the drive chain with the center stand put. Check the tension at the position shown in the illustration. The normal vertical deflection is approximately 25 ~ 35 mm (1.0 ~ 1.4 in). If the deflection exceeds 35 mm (1.4 in) adjust the chain tension.



a. 25 ~ 35 mm (1.0 ~ 1.4 in)

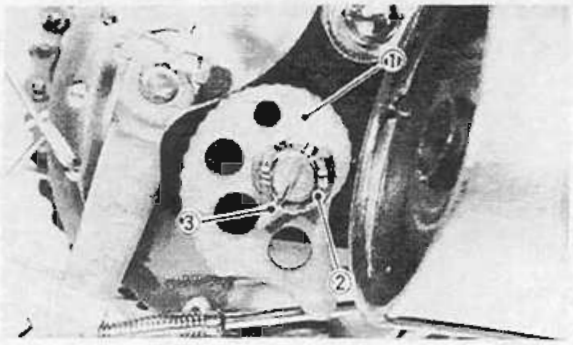
Drive Chain Tension Adjustment

1. Loosen the rear brake adjuster.



1. Rear brake adjuster

2. Remove the cotter pin of the rear wheel axle nut with pliers.
3. Loosen the rear wheel axle nut.
4. Turn the chain puller both left and right until axle is situated in same puller slot position on each side.

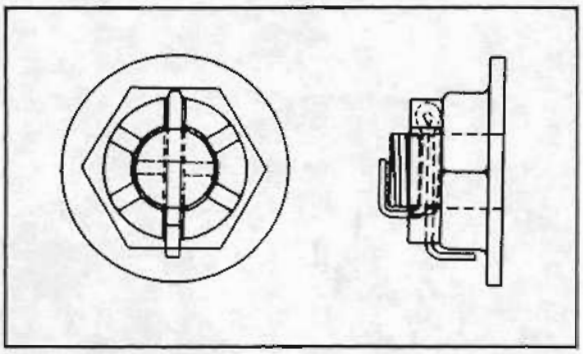


1. Chain puller 2. Axle nut 3. Cotter pin

5. Tighten the rear axle nut.

Axle nut torque:
10.7 m-kg (77.5 ft-lb)

6. Insert the cotter pin into the rear wheel axle nut and bend the end of the cotter pin as shown in the illustration (if the nut notch and the cotter pin hole do not match, tighten the nut slightly to match).
7. In the final step, adjust the play in the brake pedal.



CAUTION:
Excessive chain tension will overload the engine and other vital parts; keep the tension within the specified limits. Also, replace the rear axle cotter pin with a new one.

Drive Chain Lubrication

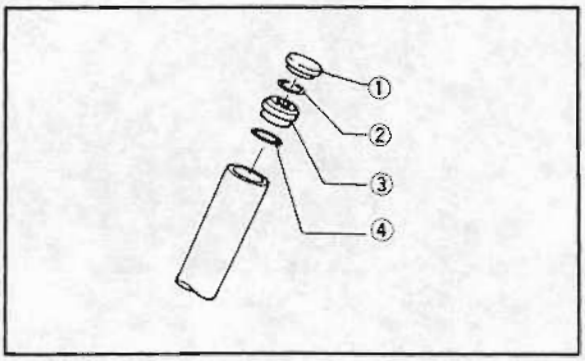
1. First, remove dirt and mud from the chain with a brush or cloth and then spray the lubricant between both rows of side plates and on all center rollers.
2. To clean the entire chain, first remove the chain from the motorcycle, dip it in solvent and clean out as possible. Then take the chain out of the solvent and dry it. Immediately, lubricate the chain to prevent the formation of rust.

Recommended lubricant:
Yamaha chain and cable lube or
SAE 10W/30 motor oil

Front Fork Oil Change

WARNING:
Securely support the motorcycle so there is no danger of it falling over.

1. Raise the motorcycle or remove the front wheel so that there is no weight on the front end of the motorcycle. Remove the handlebar if necessary.
2. Remove the rubber cap from the top of each fork.



1. Cap
2. Stopper ring
3. Spring seat
4. O-ring

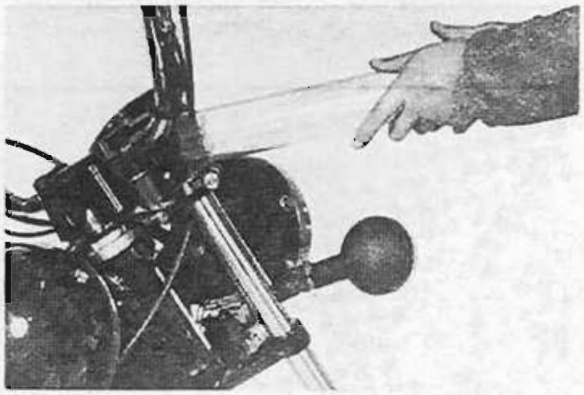
CAUTION:
Always use a new stopper ring (wire circlip).

3. 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.
4. Place an open container under each drain hole. Remove the drain screw from each outer tube.
5. When most of the oil has drained, slowly raise and lower the outer tubes to pump out the remaining oil.
6. Inspect the drain screw gasket. Replace if damaged. Reinsall the drain screw.
7. Pour the specified amount of oil into the fork inner tube.

Recommended oil:
Yamaha fork oil 10Wt or equivalent

Quantity per leg:
168 cc (5.7 oz)

8. After filling, slowly pump the forks up and down to distribute the oil.
9. Inspect the "O" ring on the spring seat. Replace "O" ring if damaged.
10. Reinstall the spring seat, stopper ring and rubber cap.

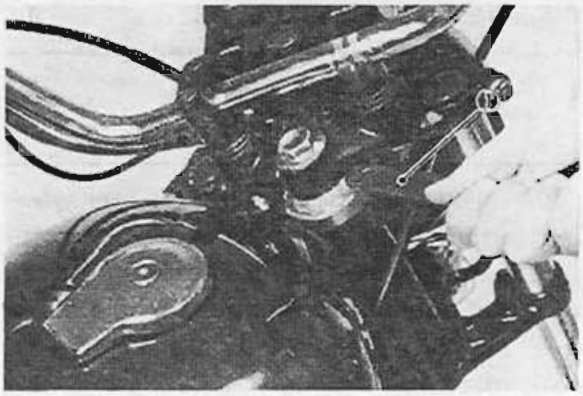


Suspension, Steering and Swing Arm

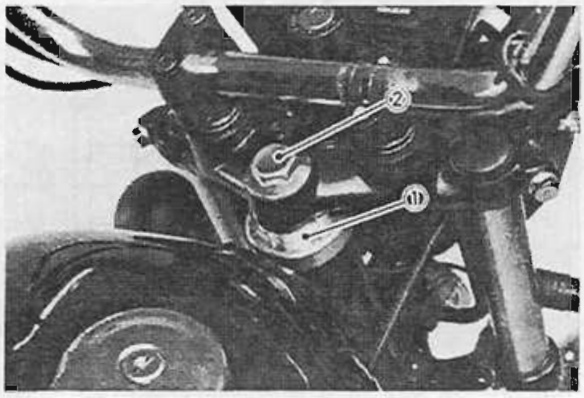
1. Steering head adjustment
   a. Block the motorcycle up so that front wheel is off the ground.
   b. Grasp the bottom of the forks and gently rock fork assembly backward and forward, checking for any looseness in the steering assembly bearing.
   c. If the steering head needs adjustment, remove the handlebar cover and loosen the steering fitting bolt.
   d. Using the ring nut wrench, adjust the steering ring nut until steering head is tight without binding when the forks are turned.

NOTE:

Excessive tightening of this nut will cause rapid wear of the ball bearings and races.
Re-check for looseness and freedom of movement.



1. Ring nut wrench



1. Stearing ring nut 2. Steering fitting bolt

   e. Tighten the steering fitting bolt.

NOTE:

After completing the steering adjustment, make certain forks pivot from stop to stop without binding. If binding is noticed, repeat adjustment.

2. Suspension
   a. Check the all suspension components for proper operation.
   b. Check the all suspension fittings for proper tightness.
3. Swing arm
   a. Check for freedom of up and down movement.
   b. Check side to side freeplay.

Swing arm free play:
1.0 mm (0.04 in) at end of swing arm

   c. Check the all securing bolts for proper tightness.

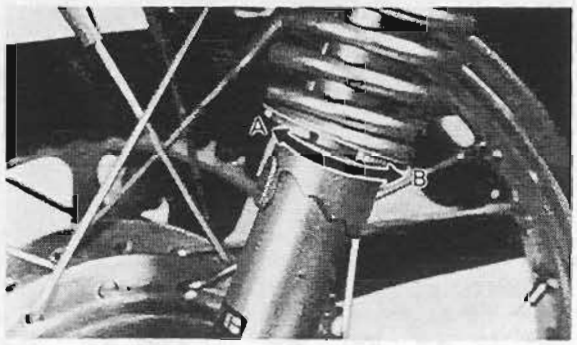
Rear Shock Absorber

See Chapter 5 "Rear Shock Absorber".

The spring preload of the rear shock absorbers can be adjusted to suit rider preference and riding conditions. If the spring seat is raised, the spring becomes stiffer and if lowered the spring becomes softer.

WARNING:

Always adjust the shock absorbers on each side to the same position.
Uneven adjustment can cause poor handling and loss of stability.



A. Stiffer B. Softer

Cable Inspection and Lubrication

1. Damage to the outer housing of the various cables, may cause corrosion and often free movement will be impaired. An unsafe condition may result so replace 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
SAE 10W/30 motor oil

Throttle Cables and Grip Lubrication

The throttle twist grip assembly should be greased at the time that the cables are lubricated, since the grip must be removed to get at the ends of the throttle cables.

Two screws hold the throttle housing to the handlebar. Once these two screws are removed, the ends of the cables can be held high to pour in several drops of lubricant. With the throttle grip disassembled, coat the metal surfaces of the grip assembly with a suitable all-purpose grease to cut down friction.

Lubrication of Levers, Pedals, etc.

1. Lubricate the pivoting parts of the brake and clutch levers with recommended lubricant.

Recommended lubricant:
Yamaha chain and cable lube or
SAE 10W/30 motor oil

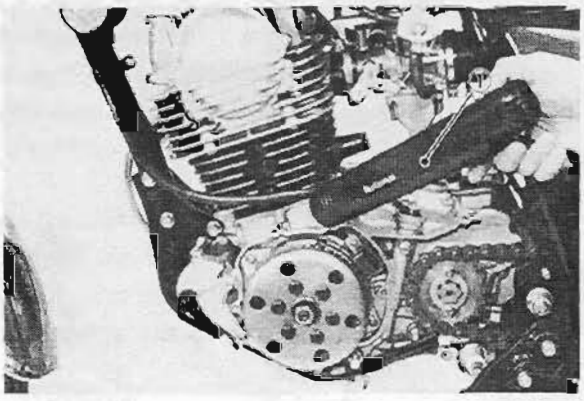
2. Lubricate the shaft of the brake pedal with lithium soap grease.

ELECTRICAL

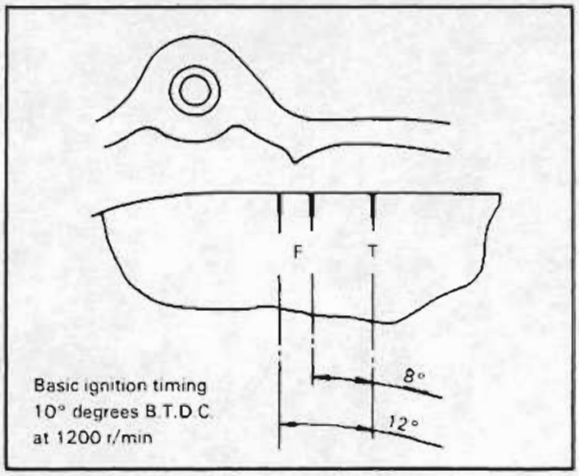
Ignition Timing

1. Checking the ignition timing
   Ignition timing is checked with a timing light by observing the position of the mark on the case and the marks on the rotor.
   a. Remove the crankcase cover (L).
   b. Connect the timing light to the spark plug lead wire.
   c. Start the engine and keep it running at the specified speed.
   d. The index projection on the crankcase must be between the two marks for firing on the rotor.
   If not, refer to Chapter 6 "Ignition System".

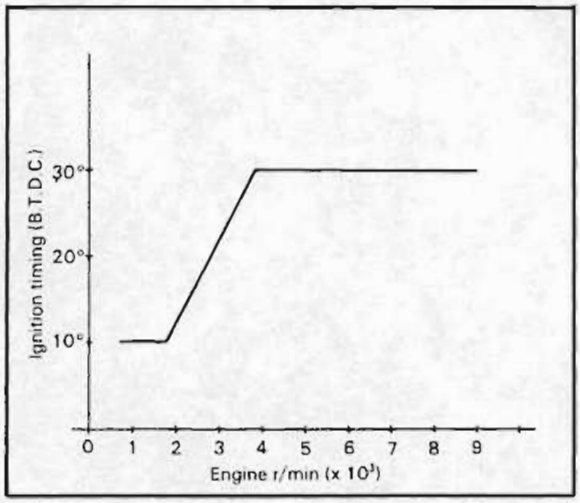
Specified idling speed: 1,200 r/min



1. Timing light



NOTE:
Ignition timing is not adjustable.

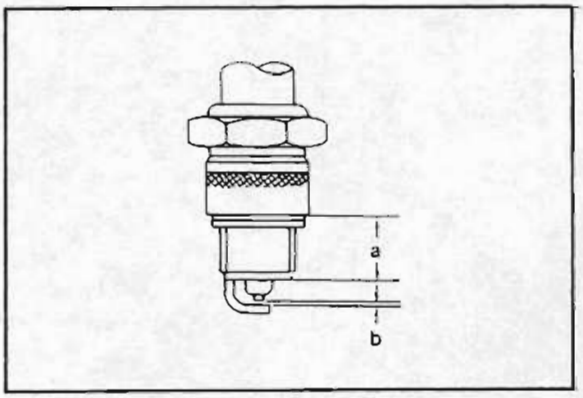


Spark plug

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 plug with new ones of the specified type. It is actually economical to install new plug often since it will tend to keep the engine in good condition and prevent excessive fuel consumption.

1. The spark plug should be inspected and cleaned at the specified intervals.
2. Clean the electrodes of carbon and adjust the electrode gap to the specification.
3. Be sure to use the proper reach, type and electrode gap plug as a replacement to avoid overheating, fouling or piston damage.

Type:
BP7ES (NGK) or W22EP (ND)
Electrode gap:
0.7 ~ 0.8 mm (0.028 ~ 0.031 in)
Tightening torque:
2.0 m-kg (14.5 ft-lb)



a. 19 mm (0.75 in)
b. 0.7 ~ 0.8 mm (0.027 ~ 0.031 in)

CHAPTER 3. ENGINE OVERHAUL

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CHAPTER 3.
ENGINE OVERHAUL

REMOVAL

Preparation for Removal

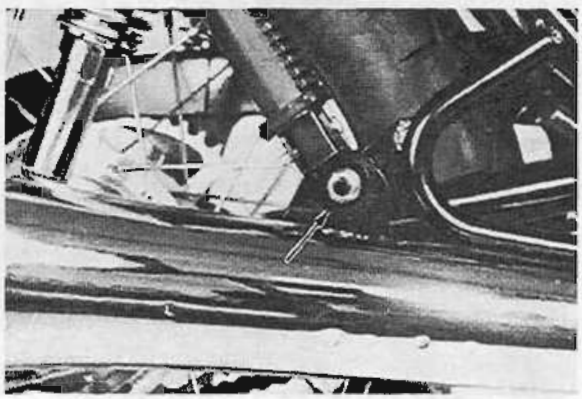
1. All dirt, mud, dust and foreign material should be thoroughly removed from the exterior of the before removal and disassembly. This will prevent any harmful foreign material from entering the interior of engine assembly.
2. Before engine removal and disassembly, be sure you have proper tools and cleaning 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; turn off the drain plug and drain engine oil.

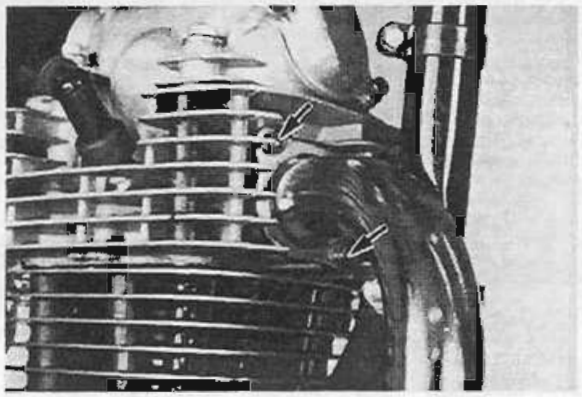
Fuel Tank

1. Remove the seat and fuel tank.
2. Remove the right side cover and disconnect battery wire.

Muffler, Footrest and Brake Pedal

1. Remove the bolts holding the exhaust pipe to the cylinder head.
2. Remove the bolts holding the exhaust pipe to the frame.

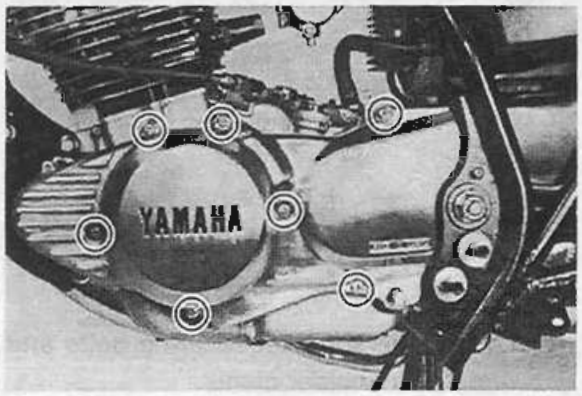




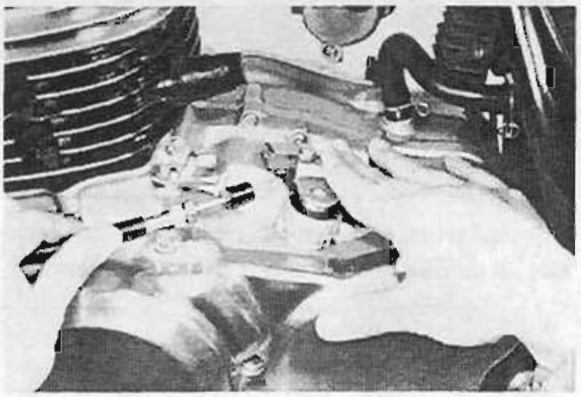
3. Remove the exhaust pipe assembly.
4. Remove the left side footrest.
5. Remove the brake rod wing nut and the return spring.

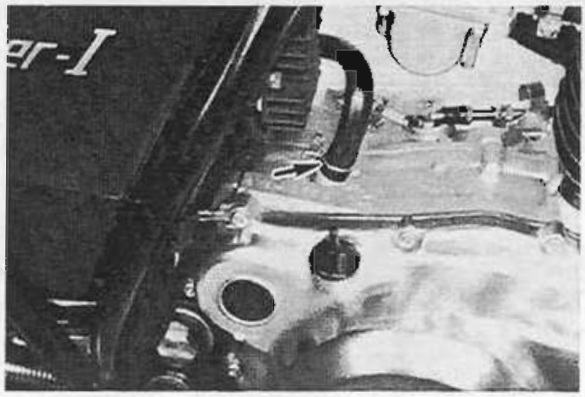
Wiring and Cables

1. Remove the spark plug cap.
2. Remove the change pedal.
3. Remove the left crankcase cover.



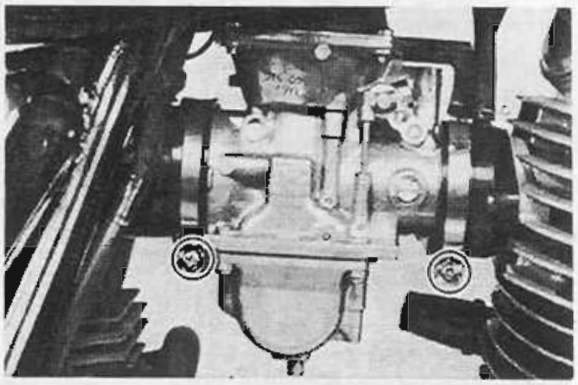
4. Disconnect the magneto lead wire coupler and the band.
5. Disconnect the starter lead wire.
6. Remove the clutch wire at the handlebar lever first and then at clutch push lever. Next, remove the breather pipe.





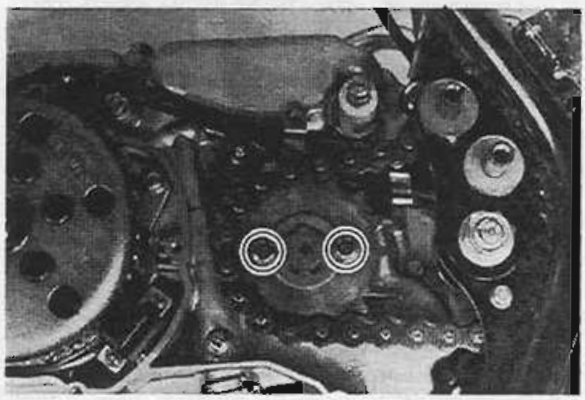
Carburetor

1. Loosen the carburetor hose clamps as shown in the photo.
2. Remove the carburetor assembly while pulling the carburetor body backward.



Drive Chain

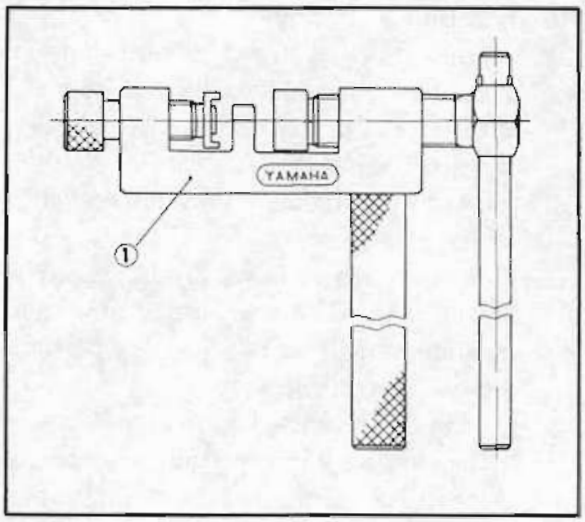
1. Loosen the sprocket securing bolts and remove the holder plate.
2. Remove the drive sprocket.



NOTE:

The following procedure gives an alternative way to remove the chain from the engine.

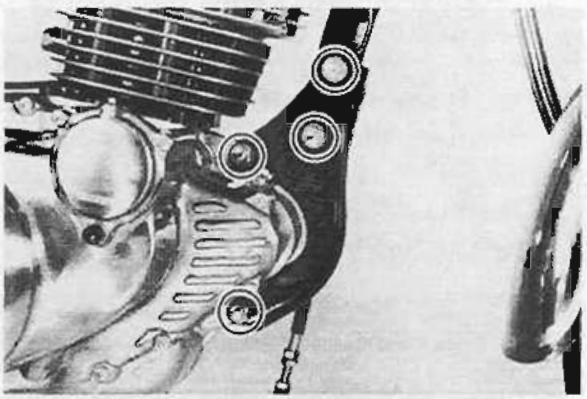
3. Bring the master link clip slightly before the sprocket wheel, and remove the clip.
4. Set the chain cutter (special tool) on the chain, and remove the chain joint plate. Then, separate the chain.

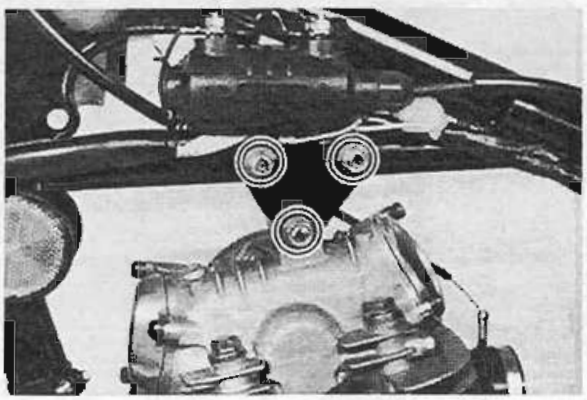


1. Chain cutter

Engine Mounting Bolts

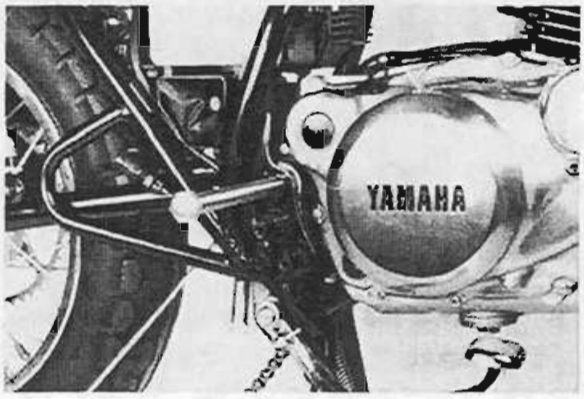
1. Remove the left hand footrest securing bolts.
2. Remove the engine mounting bolts.
3. Remove the engine from the right side of frame.





NOTE:

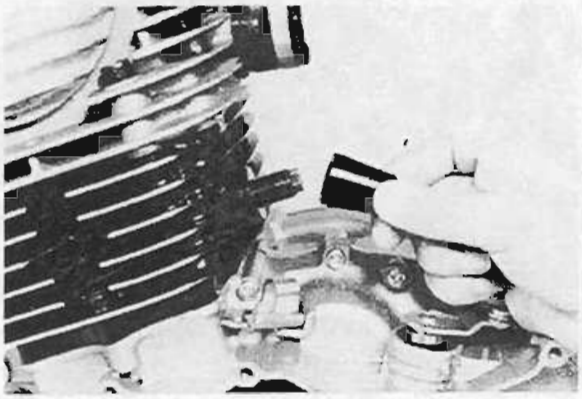
The engine and rear arm are installed using the same pivot shaft. Therefore take care so that the pivot shaft is pulled, not entirely out but further enough to see the engine free.



DISASSEMBLY

Cylinder Head and Cylinder

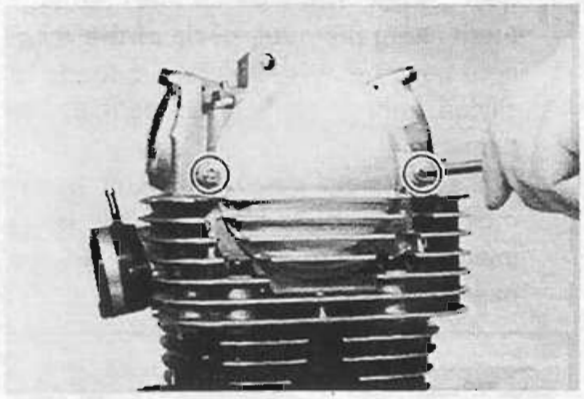
1. Remove the cam chain tensioner cap.
2. Loosen the tensioner lock nut.
3. Remove the chain tensioner assembly. Note the location of each part.

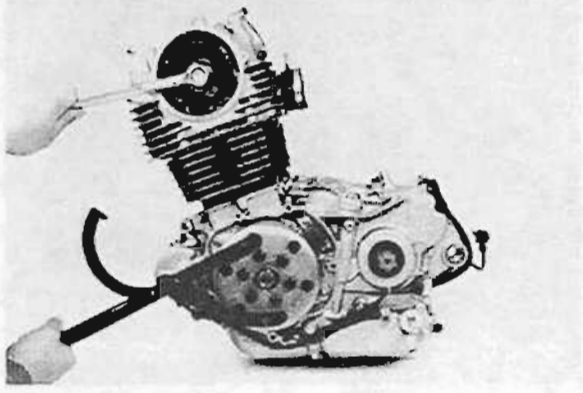


4. Loosen the side cover securing bolts and remove the side cover.
5. Remove the cam sprocket securing bolt (see the following photo). Then remove the flywheel magneto.

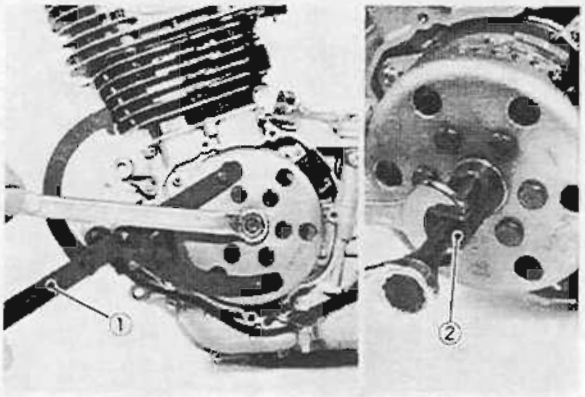
NOTE:

When removing the cam sprocket, it is not necessary to separate the cam chain.





6. Flywheel magneto removal
   a. Remove the flywheel securing nut using the rotor holding tool.



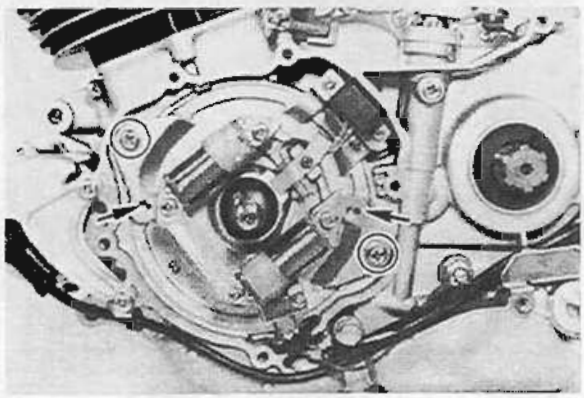
1. Rotor holding tool 2. Flywheel puller

   b. Install the flywheel puller on the flywheel and tighten it.

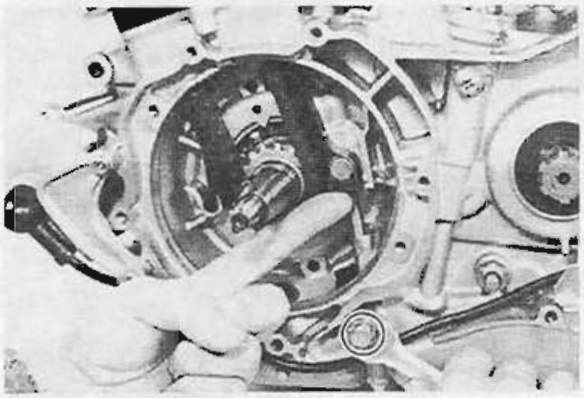
NOTE:
The puller body has a lefthand thread.

   c. While holding the puller body, tighten the push bolt. This will pull the flywheel off the tapered end of the crankshaft.
   d. Remove the magneto base assembly with the lead wire.

NOTE:
1. Pay careful attention to the "O-ring" fitted along the outer circle of the magneto base because this ring is made of silicon rubber and is susceptible to damage.
2. If the magneto base is difficult to remove, screw bolts (M8) into the holes indicated by an arrow to pull out the base with.

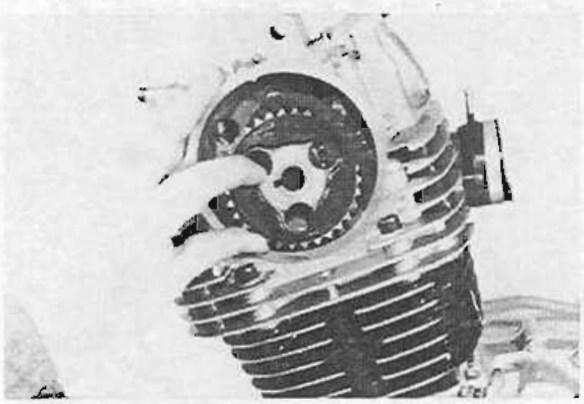


7. Loosen the guide stopper locking nut and bolt.



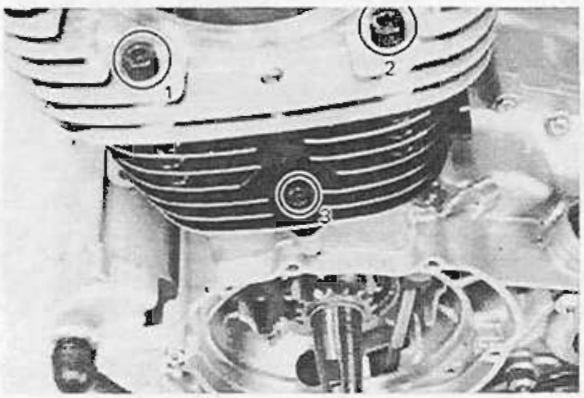
Guide stopper locking nut and bolt

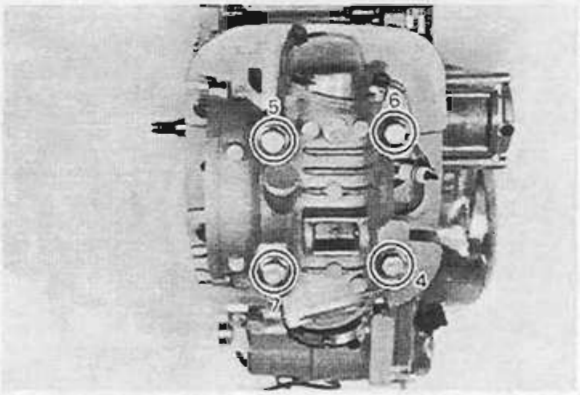
8. Remove the cam chain and cam chain sprocket.



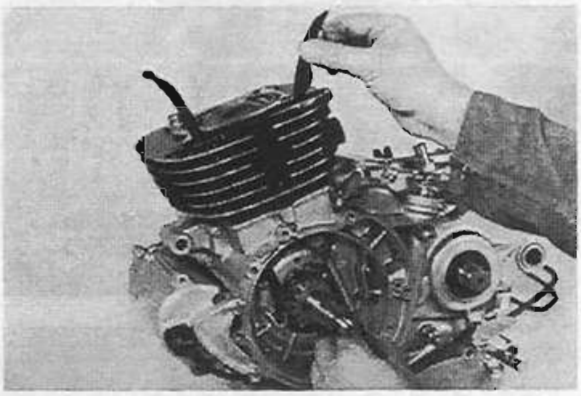
9. Remove the six cylinder head retaining bolts (2 of which are internal hexagon bolts) and the cylinder retaining bolt.

NOTE:
Loosen the bolts in the order indicated in the following photo.





10. Remove the cylinder head and cylinder.
11. Remove the guide stoppers.

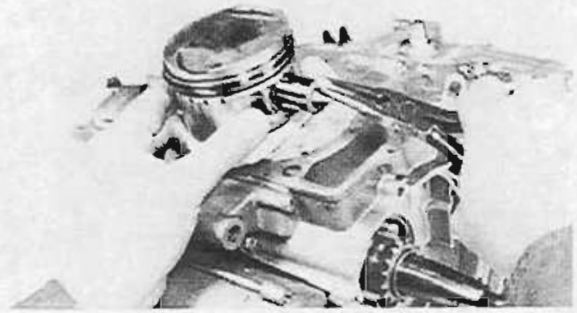


Piston Pin and Piston

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.



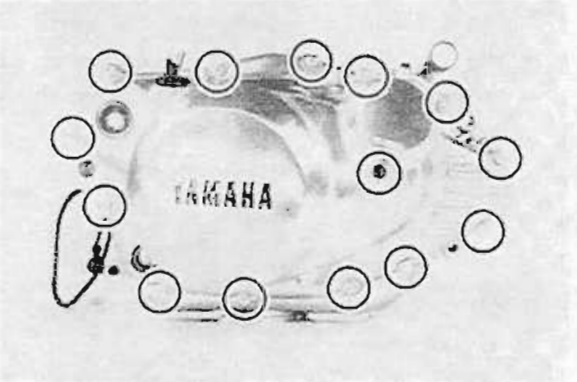


2. Push the piston pin from the opposite side, then pull out.

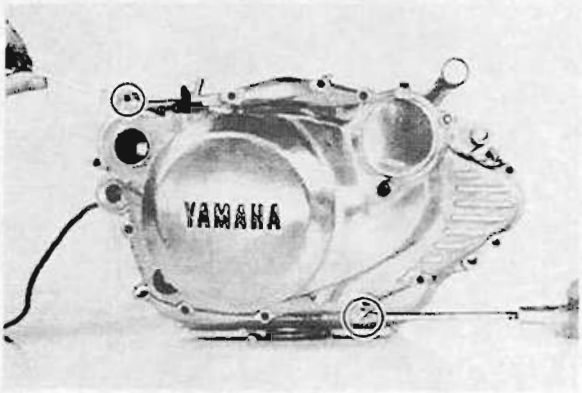
NOTE:
Before removing piston pin, deburr the clip groove and pin hole area.

Crankcase Cover (Right) and Starter Motor

1. Remove the oil filter cover holding bolts and the cover.
2. Remove the oil filter element.
3. Remove the crankcase cover holding bolts and the cover.



NOTE:
For this removal, slits in the crankcase can be used as shown in the photo.

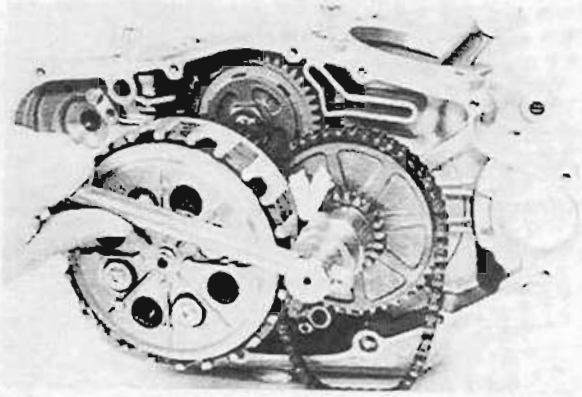


4. Remove starter motor assembly.

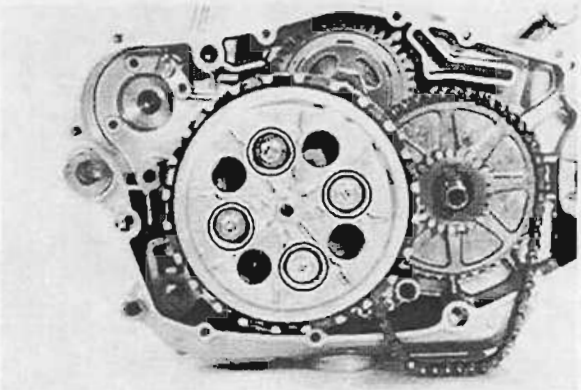


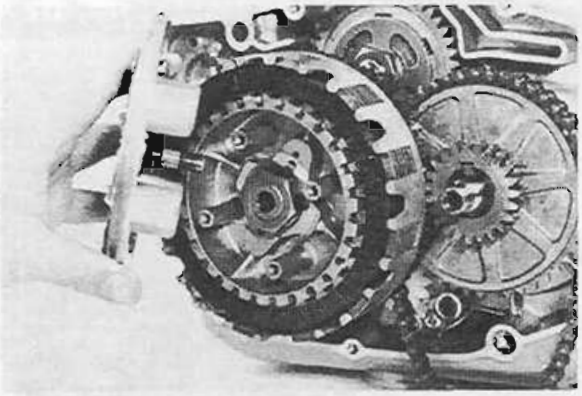
Clutch Assembly and Drive Gear

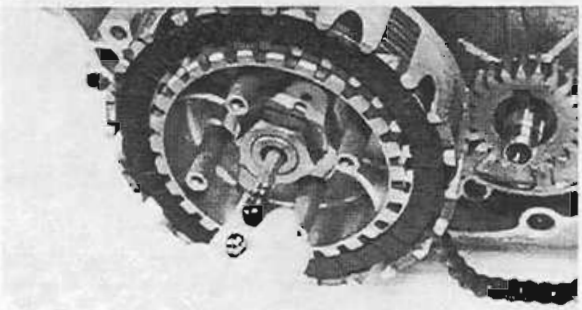
1. Loosen primary drive gear by first placing a folded rag between the teeth of the primary gears to lock them as shown in the photo. Then loosen drive gear nut.
   Remove the nut and washer.



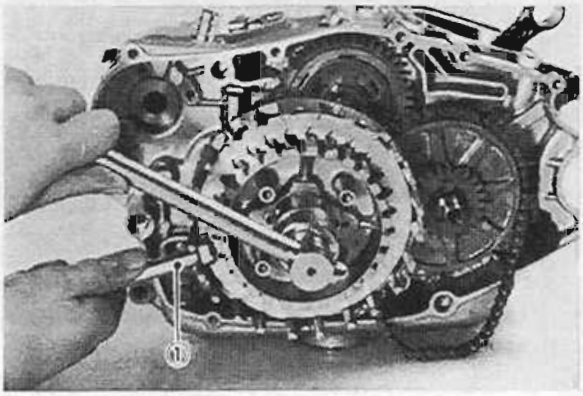
2. Remove the four clutch spring holding screws, pressure plates, clutch plates, friction plates, ball and push rod 2.







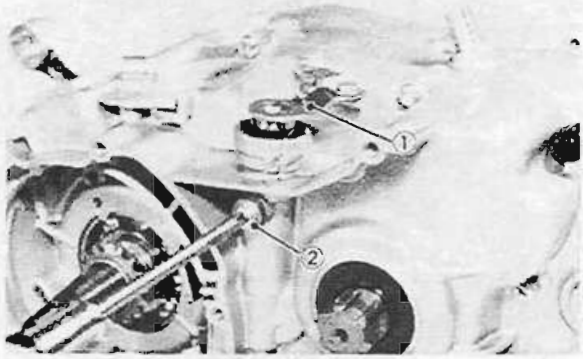
3. Install clutch holding tool on clutch boss. Remove lock nut, washer, clutch boss and housing in that order.



1. Clutch holding tool

Clutch Push Lever Axle

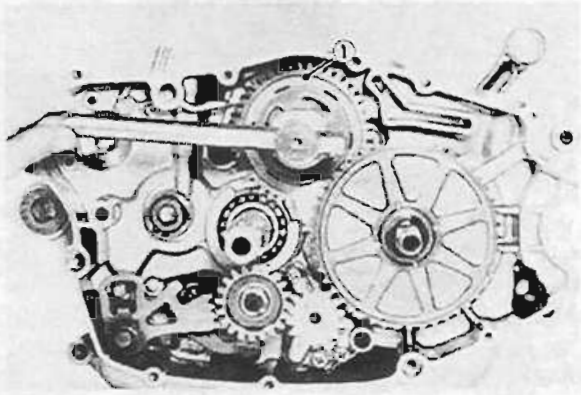
Loosen and remove the set screw, then remove the push lever axle by pulling it up.



1. Push lever 2. Set screw

Balance Gear

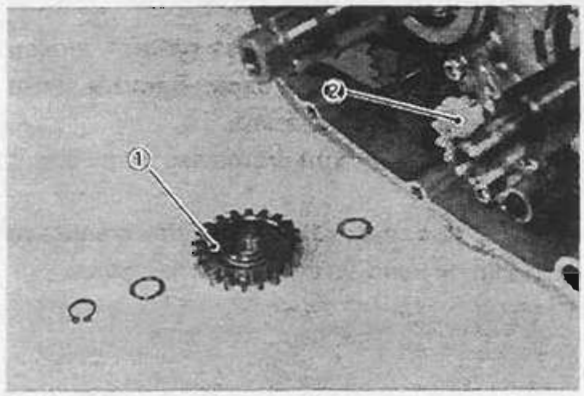
1. Flatten the lock washer.
2. First place a folded rag between the teeth of the drive gear and balancer gear to lock them. Then loosen the balancer gear securing nut.
3. Remove the balancer gear, the washers and the key.
4. Remove the drive gear and key.



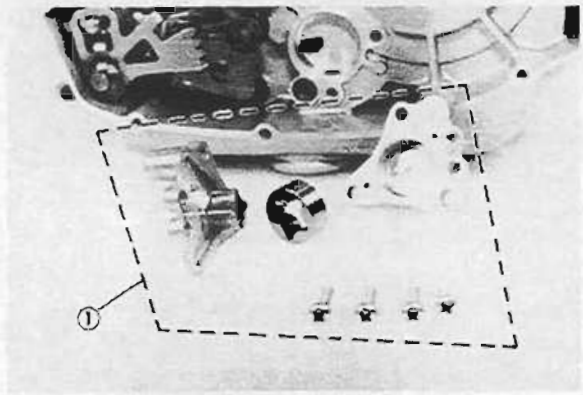
1. Balancer gear

Oil Pump Assembly

Remove the pump idle gear clip and then loosen the pump cover securing bolts and remove the oil pump assembly.



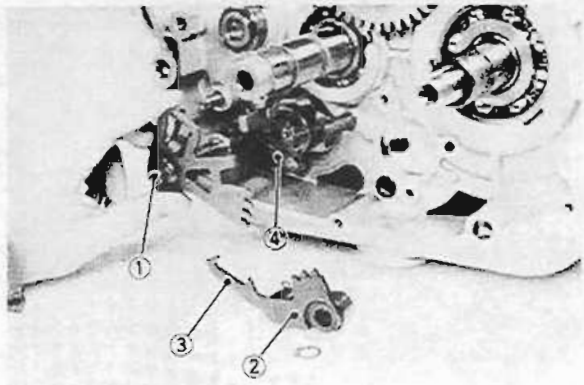
1. Pump idle gear 2. Pump driven gear



1. Pump Assembly

Change Shaft Assembly

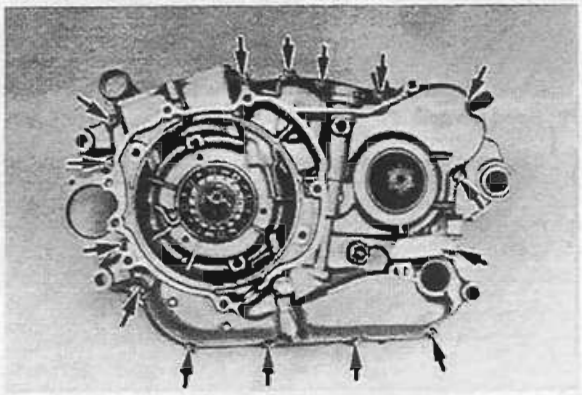
1. Pull the shift shaft out from the right hand side.
2. Remove the shift lever 2 with the shift lever 3 as an assembly, and then remove the stopper lever assembly with the torsion spring.

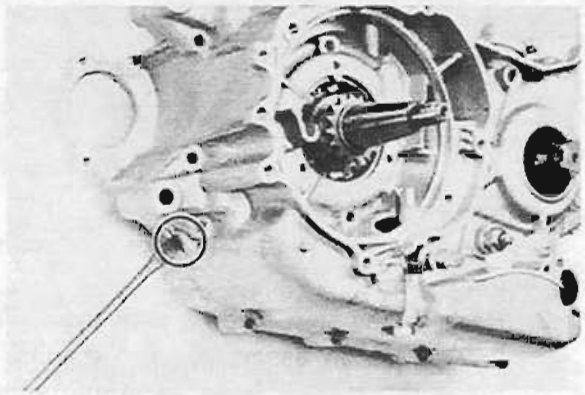


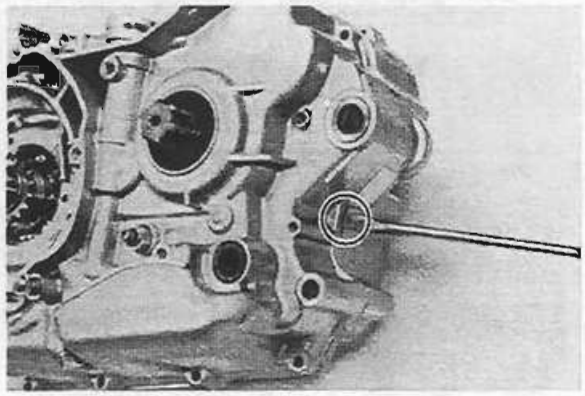
1. Shift shaft 3. Shift lever 3
2. Shift lever 2 4. Stopper lever assembly

Crankcase

1. Working in a crisscross pattern, loosen all bolts 1/4 turn each. Remove them after all area loosened.
2. Remove the right crankcase by pulling it up.
   For this removal, slits in the crankcase can be used as shown in the photo.





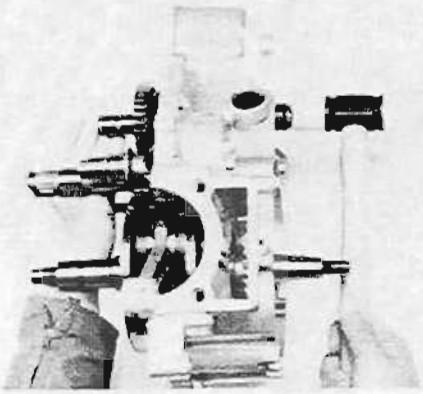


Transmission

Remove the transmission shaft, shift forks and shift cam. Tap lightly on the transmission drive shaft with a soft hammer to remove.

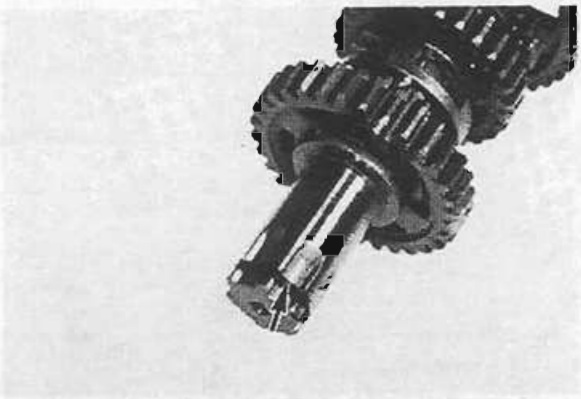
NOTE:

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



NOTE:

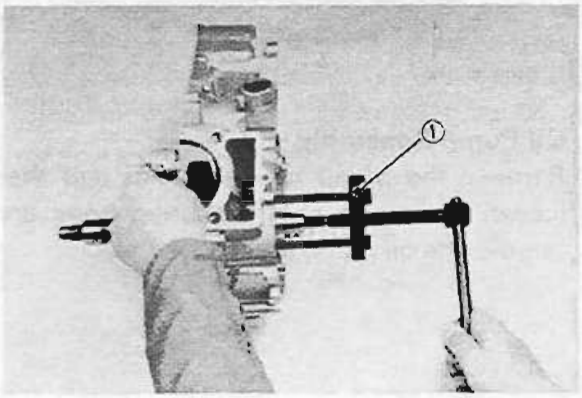
While removing the drive axle from the crankcase, pay careful attention to the oil seal lip. A recommended practice is to fit the "O" ring and to apply grease over the fitted area.



"O" ring

Crankshaft

Remove crankshaft assembly with the crankcase separation tool (Special tool).



1. Crankcase separation tool

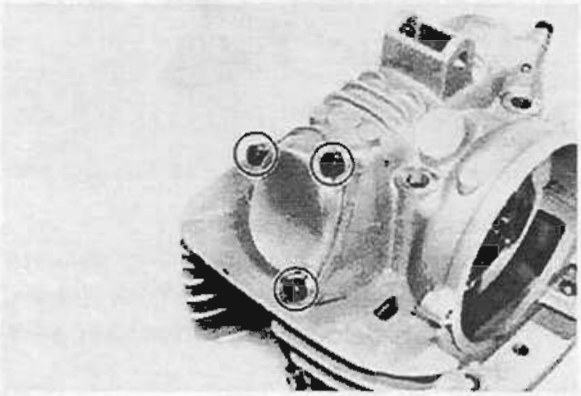
INSPECTION AND REPAIRING

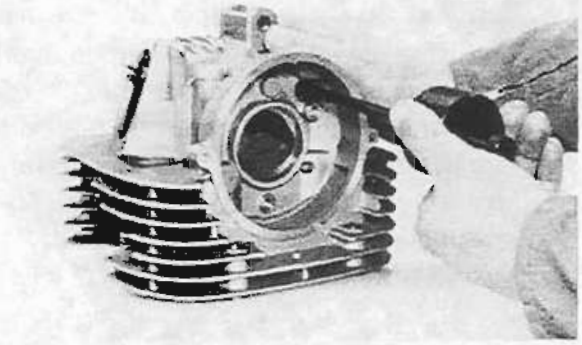
Cylinder Head

1. Remove the intake and exhaust tappet covers.
2. Insert a 6 mm (0.24 in) screw into the rocker shaft, and withdraw the rocker shaft. It should be slide out easily.

NOTE:

If does not slide out easily, use the special tool as shown.





3. Rocker arm and rocker shaft

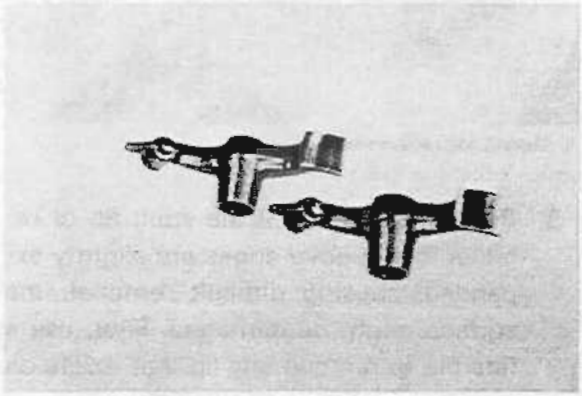
a. The rocker arm usually wears at two locations: (1) at the rocker shaft hole, (2) at the cam lobe contacting surface.

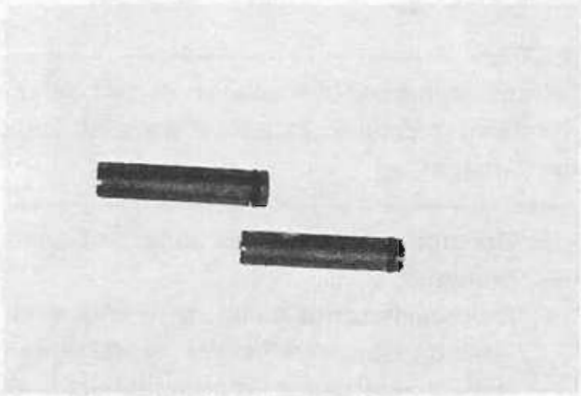
b. Measure the rocker arm inside diameter.

Standard size:
12.000 ~ 12.018 mm
(0.472 ~ 0.473 in)

c. The shaft has been hardened and it should not wear excessively. If a groove has developed in this surface that can be felt, or if it shows a blue discoloration, then the shaft should be replaced and the lubrication system (pump and passages) checked.

Standard shaft diameter:
11.975 ~ 11.990 mm
(0.471 ~ 0.472 in)



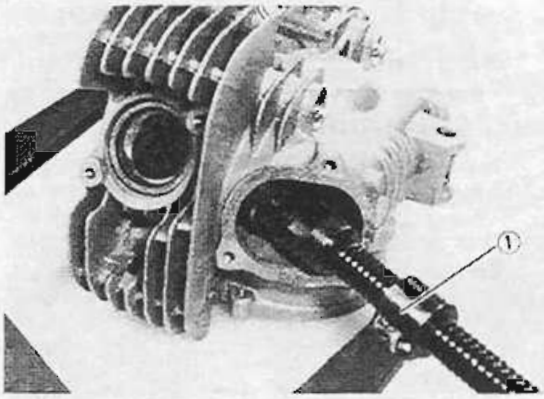


d. Standard clearance between the rocker shaft and hole should be 0.010 ~ 0.043 mm (0.0004 ~ 0.0017 in). If measurement shows more than 0.1 mm clearance, replace either or both parts as necessary.

4. Compress the valve spring and then remove both retainer locks.
   Remove the compressor and lift off the retainer and springs.

NOTE:

The retainer locks might be partially stuck in the retainer. Use a rubber hammer to tap the edge of the retainer a few times to loosen the retainer locks.



1. Valve spring compressor

5. Pull the valve out. If the stem tip or retainer lock groove edges are slightly expanded, causing difficult removal, the surface might be damaged. First, use a fine file to remove any lip that exists on the stem and then remove the valve.

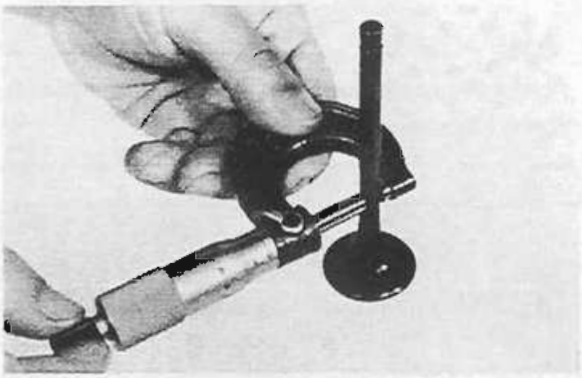
NOTE:
Be sure to remove the valve stem seal before removing the valve. Otherwise the seal could be damaged.

6. Decarbonization of the head and components:
   Carbon deposits build up in the combustion chambers, on the valves, and in the exhaust ports. Thoroughly clean all parts with a blunt scraper, then wash in solvent and dry with compressed air. The parts can then be examined and measured for wear.

Valves, Valve Springs, Valve Guides and Valve Seats

1. Check the intake and exhaust valve stems for bending and grooved wear. And check the stem ends for wear. Measurements should be done in three positions, upper, middle, and lower.

Intake valve stem diameter:
6.975 ~ 6.990 mm
(0.2746 ~ 0.2752 in)
Exhaust valve stem diameter:
6.955 ~ 6.970 mm
(0.2529 ~ 0.2744 in)



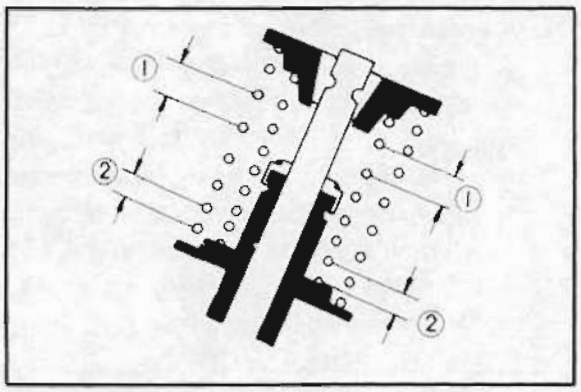
2. Checking the valve springs
   a. This engine use two springs of different sizes to prevent valve float or surging. The chart below shows the basic value characteristics.
   b. Even though the spring is constructed of durable spring steel, it gradually loses some of its tension. This is evidenced one way by a gradual shortening of free length. Use a vernier caliper to measure spring free length. If the free length of any spring has decreased more than 2 mm (0.08 in) from its specification, replace it.



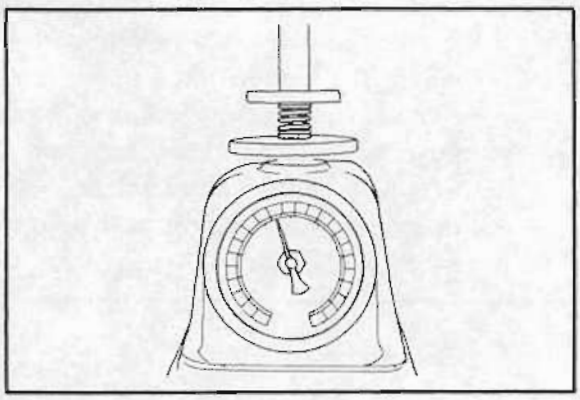
	Outer	Inner
Free length	43.2 mm (1.70 in)	40 mm (1.57 in)
Installed length (Valve closed)	37.1 mm (1.46 in)	34.1 mm (1.34 in)
Installed pressure (Valve closed)	23.7 ± 1.9 kg (52.3 ± 4.2 lb)	12.2 ± 1.0 kg (26.9 ± 2.2 lb)
Compressed length (Valve open)	28.1 mm (1.11 in)	25.1 mm (0.99 in)
Compressed pressure (Valve open)	70.1 ± 4.9 kg (154.6 ± 10.8 lb)	36.6 ± 2.6 kg (80.7 ± 5.7 lb)

c. Another symptom of a fatigued spring is insufficient spring pressure when compressed. This can be checked using a valve spring compression rate gauge.
Test each spring individually. Place it in the gauge and compress the spring first to the specified compressed length with the valve closed (all spring specifications can be found in previous section, Valve Spring) then to the length with the valve open. Note the poundage indicated on the scale at each setting. Use this procedure on the outer springs, then the inner springs.

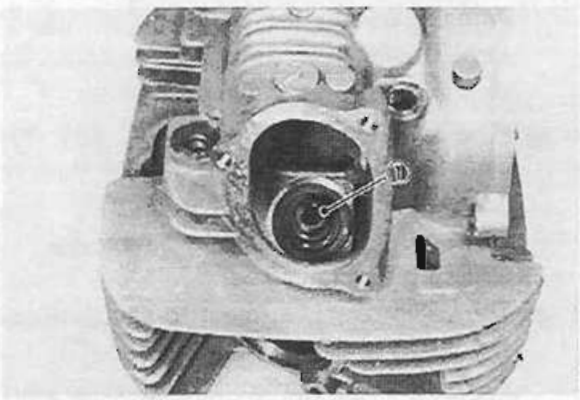
NOTE:
All valve springs must be installed with larger pitch upward as shown below.



1. Larger pitch 2. Smaller pitch



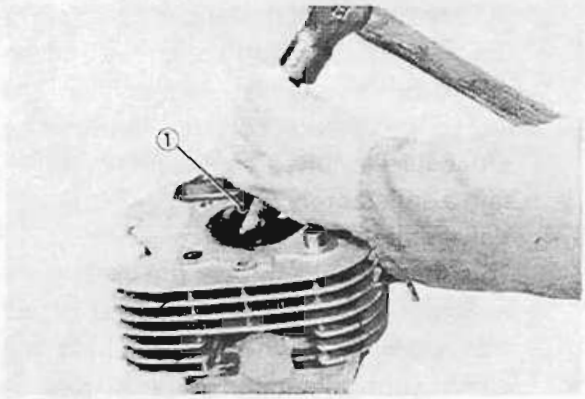
3. Valve leakage check
After all work has been performed on the valve and valve seat, and all head parts have been assembled, check for proper valve/valve seat sealing by pouring solvent into each of the intake ports, then the exhaust ports. There should be no leakage by the seat. If this fluid leaks, disassemble and continue to lap with fine tapping compound. Clean all parts thoroughly, reassemble and check again with solvent. Repeat this procedure as often as necessary to obtain a satisfactory seal.
4. Valve stem seal
This seal slips down over the valve stem to prevent excessive amounts of oil from passing down stem and into the combustion chamber. If this seal is cracked, split, or hardened, replace it.


1. Valve stem seal

5. Valve guide
a. If the valve guide inside diameter is beyond serviceable limits, replace with an oversize valve guide.

	Standard	Limit
Guide diameter (I.D.)	7.00 ~ 7.012 mm (0.2755 ~ 0.2761 in)	7.05 mm (0.278 in)

b. To ease guide removal and reinstallation, and to maintain the correct interference fit, heat the head to 100°C (212°F).
If possible, use an oven to avoid any possibility of head warpage due to uneven heating.
c. Use the appropriate shouldered drive (special tool) to drive the old guide out and the new guide in.



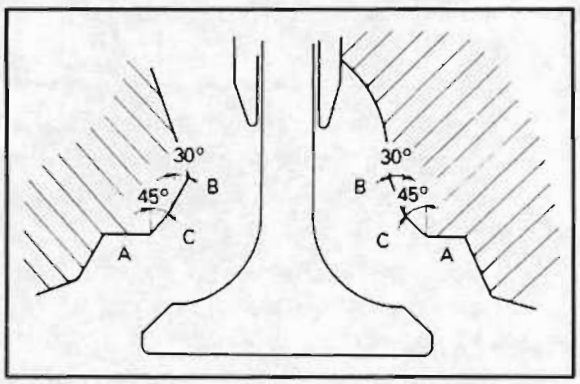
1. Valve guide remover

d. After installing the valve guide, use 7 mm (0.276 in) reamer (special tool) to obtain the proper valve clearance.

e. After fitting the valve guide into the cylinder head, be sure to grind the valve seat, and perform valve lapping. The valve must be replaced by a new one.

6. Grinding the valve seat

a. The valve seat is subject to severe wear similar to the valve face. Whenever the valve face is resurfaced, the valve seat should also be resurfaced at a 45° angle. In addition, if a new valve guide has been installed (without any valve repair), the valve seat should be checked 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, and when twisting the cutter, keep an even downward pressure to prevent chatter marks.

If cutting section "A" of the intake valve seat, use "FLAT" cutter (radius cutter).

If cutting section "A" of the exhaust valve seat, use "FLAT" cutter (also radiused).

If cutting section "B", use the 30° cutter.

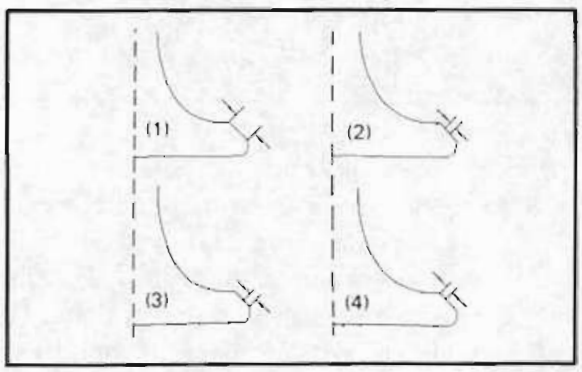
If cutting section "C", use the 45° cutter.

b. Measure valve seat width. Apply mechanic's bluing dye (such as Dykem) to the valve face, apply a very small amount of fine grinding compound around the surface of the valve seat, 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 will have removed the blueing wherever it contacted the valve face.

Measure the seat width with vernier calipers. It should measure approximately 1.1 mm (0.043 in). Also, the seat should be uniform in contact area. If valve seat width varies, or if pits still exist, then continue to cut with the 45° cutter. Remove just enough material to achieve a satisfactory seat.

	Standard width	Wear limit
Seat width	1.1 mm (0.43 in)	1.8 mm (0.071 in)

c. 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 "FLAT", 45°, or 30° cutters to correct the improper seat location in the manner described below:



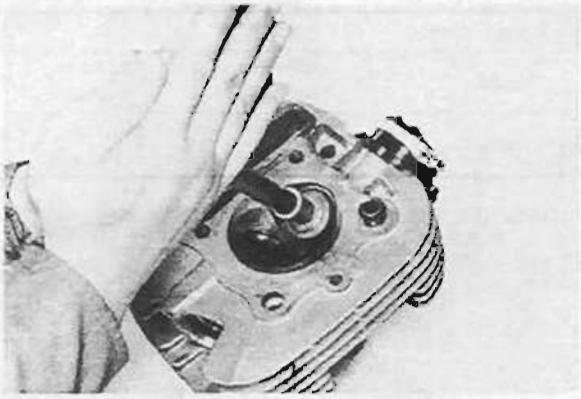
1) If the valve face shows that the valve seat is centered on the valve face, but too wide, then lightly use both the "FLAT" and the 30° cutters to reduce the seat width to 1.1 mm (0.043 in).
2) If the seat shows to be in the middle of the valve face, but too narrow, use the 45° cutter until the width equals 1.1 mm (0.043 in).
3) If the seat is too narrow, and right up near the valve margin, then first use the "FLAT" cutter and then the 45° cutter to get the correct seat width.
4) If the seat is too narrow and down near to bottom edge of the valve face, then first use the 30° cutter and then the 45° cutter.

7. Lapping the valve/valve seat assembly

a. The valve/valve seat assembly should be lapped if, (1) neither the seat or the valve face are severely worn, or: (2) if the valve face and valve seat have been resurfaced and now require a final light grinding operation for perfect sealing.

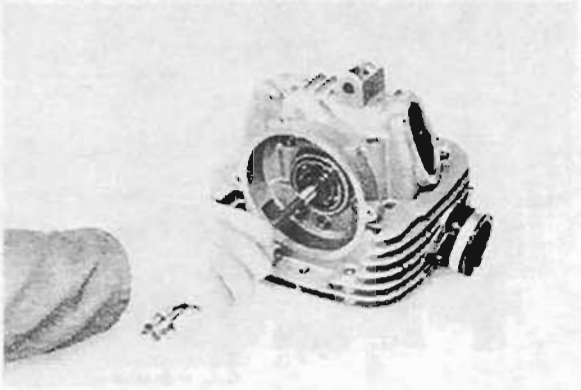
b. Apply a small amount of coarse lapping compound to the valve face. Insert the valve into the head. Rotate the valve until there is a burnished spot all the way around the valve face. Clean off the coarse compound, then follow the same procedure with fine compound. Continue lapping until the valve face shows a complete and smooth surface all the way around. Clean off all compound material.

Apply bluing dye to the valve face and rotate the valve face for full seat contact which is indicated by a shiny surface all around the valve face where the bluing has been rubbed away.



Camshaft and Camshaft Bearing

1. Flatten the lock washer.
2. Loosen and remove the bearing retaining bolts.
3. Insert a 10 mm (0.39 in) screw into the camshaft and withdraw the camshaft.



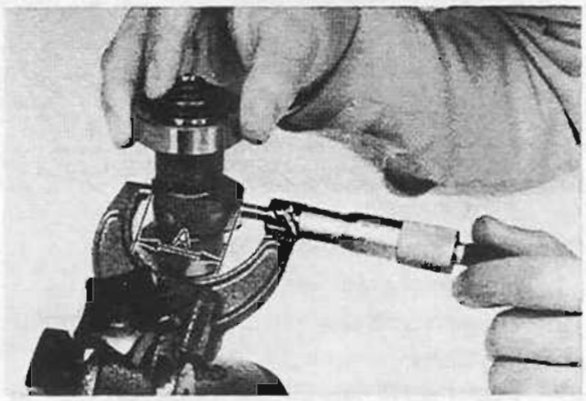
4. Camshaft

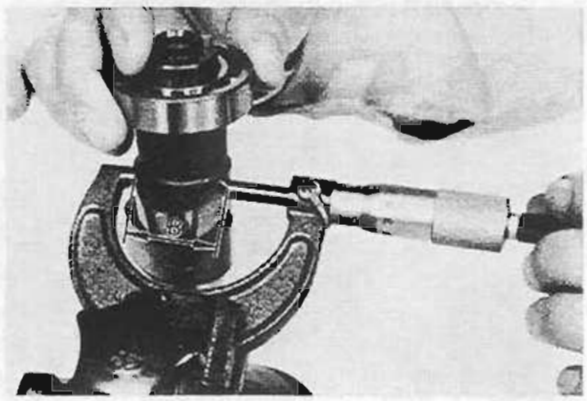
a. The cam lobe metal surface may have a blue discoloration due to excessive friction. The metal surface could also start to flake off or become pitted. This is due to poor lubrication, incorrect clearances, or normal wear.

b. If any of the above wear conditions are readily visible, the camshaft should be replaced.

c. 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 a predetermined amount, valve timing and lift are affected. Replace the camshaft if wear exceeds the limits.

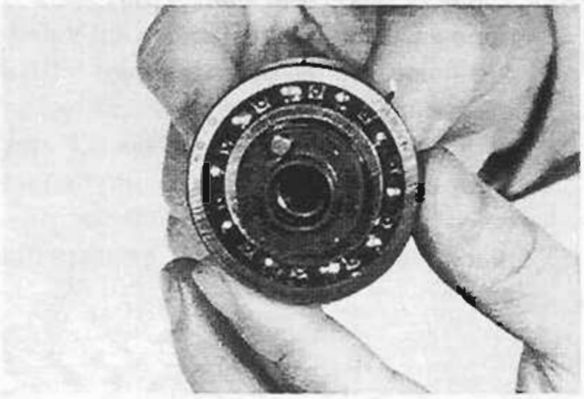
Wear limit	A	B
Intake	40.05 mm (1.576 in)	31.99 mm (1.26 in)
Exhaust	40.10 mm (1.579 in)	31.01 mm (1.221 in)



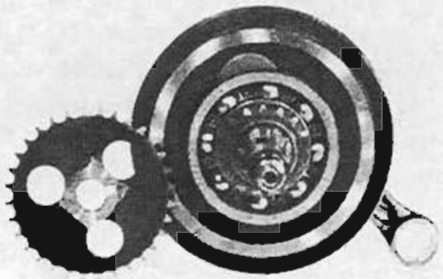


5. Camshaft bearing
   Bearings should be cleaned, dried, and the races visually checked for pits, rust spots or chatter marks where the balls have dragged. If any of these conditions exists the bearings should be replaced.

NOTE:
Lubricate the bearings immediately after examining them to prevent rust formation.

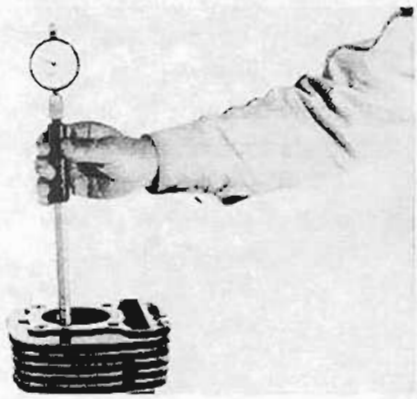


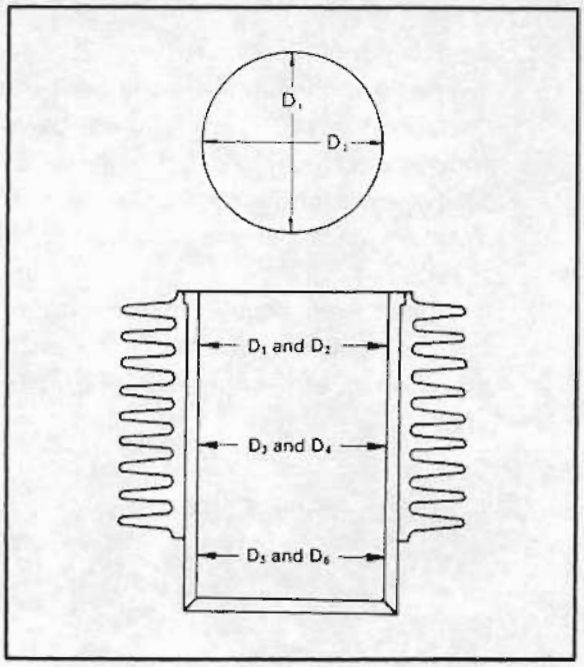
6. Cam sprocket and cam drive sprocket
   Check the cam sprocket and cam drive sprocket for wear.



Cylinder

1. Visually check the cylinder walls for scratches. If vertical scratched are evident, the cylinder wall should be rebored or 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 in parallel to, and at right angles to, the crankshaft. (See the illustration.)
   If the cylinder wall is worn more than wear limit, it should be rebored.





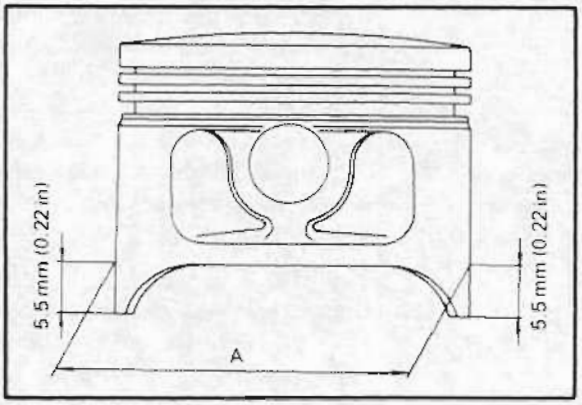
	Standard	Wear limit
Cylinder bore	75.0 ~ 75.02 mm (2.953 ~ 2.954 in)	75.1 mm (2.957 in)
Cylinder taper	—	0.05 mm (0.002 in)

Piston and Piston Rings

1. Piston

a. Using the micrometer, measure the outside diameter of the piston at the piston skirt.
Measurement should be made at a point 5.5 mm (0.22 in) above the bottom edge of the piston by placing the micrometer in parallel to, and at right angles to, the piston pin.

Piston clearance:
0.035 ~ 0.055 mm
(0.0014 ~ 0.0022 in)



	Size A
Standard	75.00 mm (2.953 in)
Oversize 1	75.25 mm (2.963 in)
Oversize 2	75.50 mm (2.972 in)
Oversize 3	75.75 mm (2.982 in)
Oversize 4	76.00 mm (2.992 in)

b. 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. And then the ring should be reinstalled. Use a feeler gauge to measure the gap between the ring and the land.

Side clearance	Top	0.04 ~ 0.08 mm (0.0016 ~ 0.0031 in)
	2nd	0.03 ~ 0.07 mm (0.0012 ~ 0.0028 in)



2. Piston ring

a. The oversize top and middle ring sizes are stamped on top of the ring.

Oversize 1	0.25 mm (0.0098 in)
Oversize 2	0.50 mm (0.0197 in)
Oversize 3	0.75 mm (0.0295 in)
Oversize 4	1.00 mm (0.0394 in)

b. Expander spacer of the bottom ring (oil control ring) is color-coded to identify sizes. The color mark is painted on the expander spacer.

Size	Color
Oversize 1	Brown
Oversize 2	Blue
Oversize 3	Black
Oversize 4	Yellow

c. Insert each ring into the cylinder and push it down approximately 20 mm (0.8 in), using the piston crown so that the ring forms the right angles to the cylinder bore. Measure the end gap of the ring with a feeler gauge.
If the gap is beyond tolerance, replace the whole set of rings.

NOTE:
The end gap on the expander spacer of the oil control ring is unmeasureable. If the oil control ring rails show excessive gap all three components should be replaced.

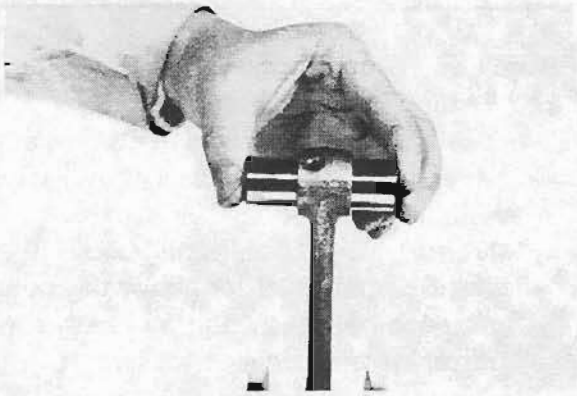
	Standard	Limit
Top/2nd ring	0.2 ~ 0.4 mm (0.0079 ~ 0.0157 in)	0.80 mm (0.0315 in)
Oil control (Rails)	0.3 ~ 0.9 mm (0.0118 ~ 0.0354 in)	—



Piston Pin

1. Apply a light film of oil to pin.
Install in connecting rod small end. Check for play. There should be no noticeale vertical play. If play exists, check connecting rod small end for wear: Replace pin and connecting rod as required.
2. The piston pin should have no noticeable free play in position. If the piston pin is loose, replace the pin and/or the piston.





Crankshaft

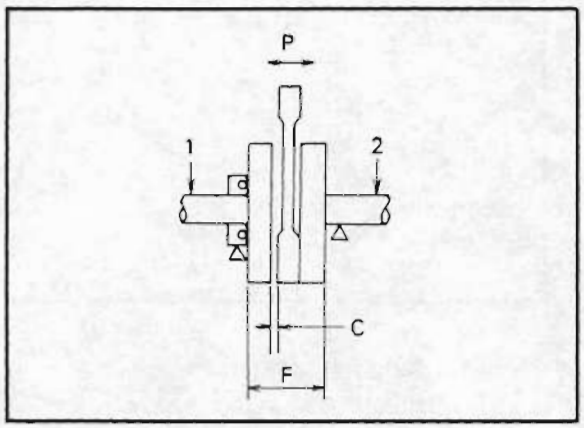
1. Check crankshaft components per chart.

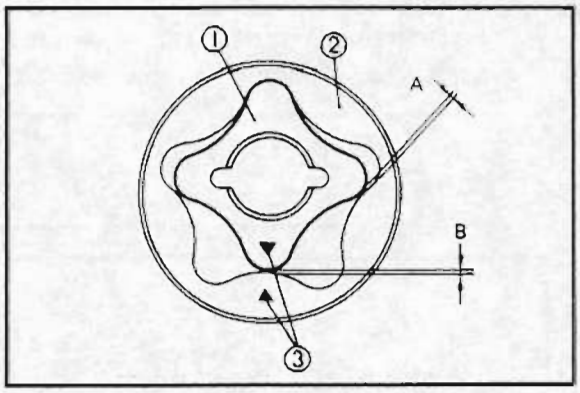
Check connecting-rod axial play at small end (to determine the amount of wear or crank pin and bearing at big end).	Small end play should not exceed 2 mm (0.079 in).	If small end play exceeds 2 mm (0.079 in) disassemble crankshaft, check connecting rod, crank pin and big end bearing. Replace defective parts. 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 any worn parts.
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 Specifictions

Unit: mm (in)

Deflection tolerance		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)

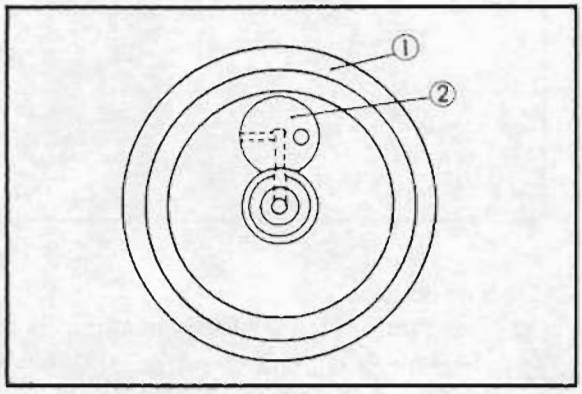




1. Inner rotor 2. Outer rotor 3. Match marks

3. In disassembling and reassembling the crank, follow the illustrated below.

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



1. Crank assembly 2. Crank pin

Oil Pump

1. Trochoid pump rotor width

Delivery pump: 12 mm (0.47 in)

2. Rotor dimensions-inner and outer

Clearance between A and B standard:
0.03 ~ 0.09 mm
(0.0012 ~ 0.0035 in)

Primary Drive

The drive gear is mounted on the crankshaft and the driven gear is integral with the clutch assembly and mounted on the transmission main shaft.

Primary reduction ratio		
No. of teeth		Ratio
Drive	Driven	
23	72	3.130

1. Check the drive gear and driven gear for obvious signs of wear or damage from foreign material within the primary case.
2. If primary drive gears exhibit excessive noise during operation, gear lash may be incorrect.
   Numbers are scribed on the side of each gear. Add these numbers. If their total exceed tolerance, replace with a numbered gear that will bring total within specification.

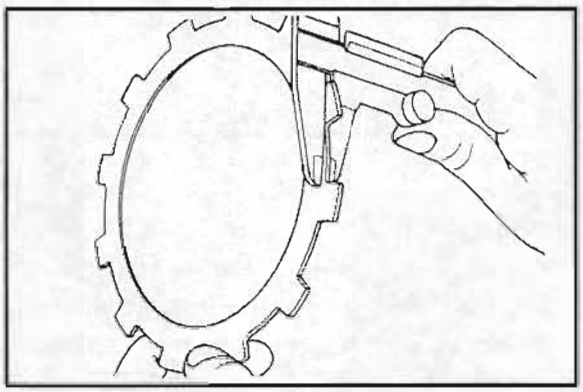
NOTE:
This procedure is rarely required. However, if a gear must be replaced due to damage, it is always advisable to pay strict attention to the lash numbers during replacement.

Lash tolerance	Lash numbers
	183 ~ 185

Clutch

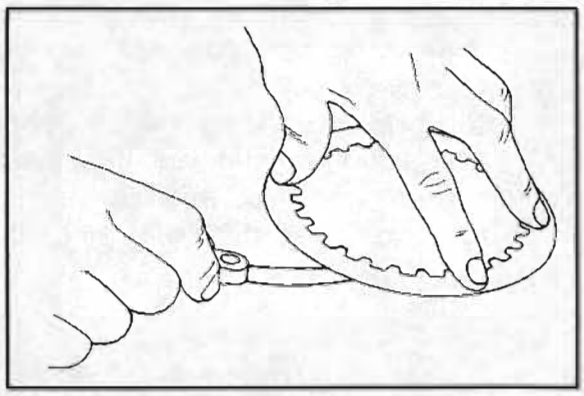
1. Checking friction plates
   The friction plates are liable to wear. The standard thickness of the friction plate is 2.8 mm (0.11 in). If it is worn more than 0.3 mm (0.012 in) or has uneven wear, it should be replaced.

Clutch friction plate wear limit:
2.5 mm (0.10 in)



2. Measure clutch plates
   Check clutch plate warpage, and if warpage is more than specified, the clutch plate should be replaced.

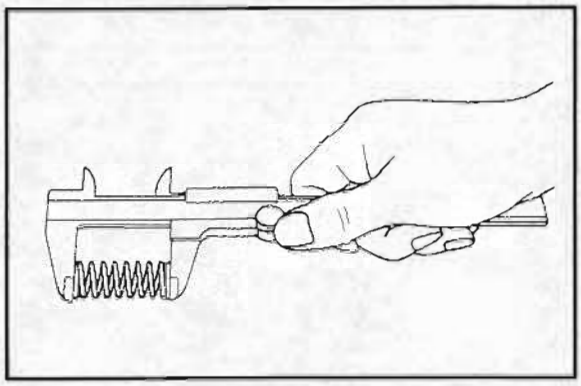
Clutch plate warpage limit:
0.05 mm (0.0020 in)



3. 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.

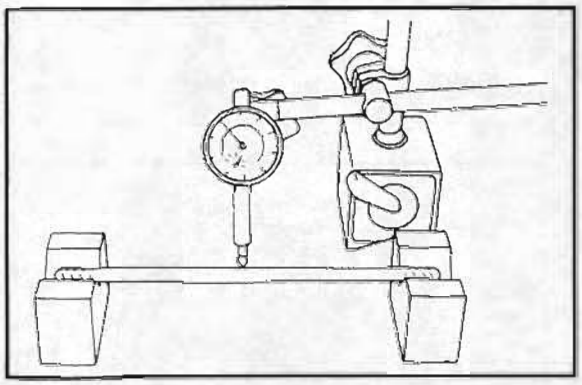
Clutch spring specifications:

Number of springs	4
Free length	34.6 mm (1.36 in)
Spring rate	2.6 kg/mm (145.6 lb/in)



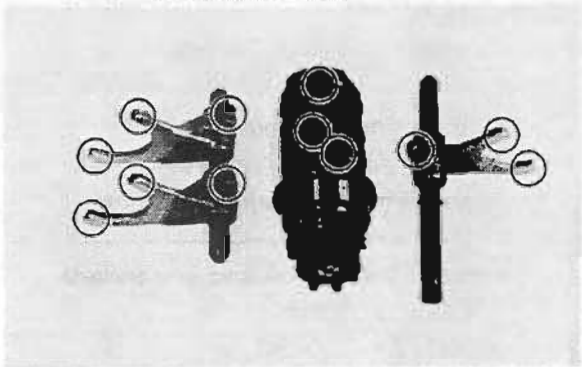
4. Checking the push rod
   By rolling the push rod on the "V" block, and check for bends. If any bend is found, replace the push rod.

Bend limit: 0.5 mm (0.02 in)



Transmission

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



2. Roll the guide bars across a surface plate. If any bar is bent, replace.
3. Check the shift cam grooves for signs of wear or damage. If any profile has excessive wear and/or any damage, replace cam.
4. Check the cam followers on each shift fork wear. The follower should fit snugly into its seat in the shift fork, but not over-tight.
   Check the ends that ride in the grooves in the shift cam. If they are worn or damaged, replace.
5. Check shift cam dowel pins and side plate for looseness, damage, or wear. Repair as required.
6. Check the transmission shafts using a centering device and dial gauge. If any shaft is bent, replace.
7. Carefully inspect each gear. Look for signs of obvious heat damage (blue discoloration). Check the 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 clip 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.

Bearings and Oil Seals

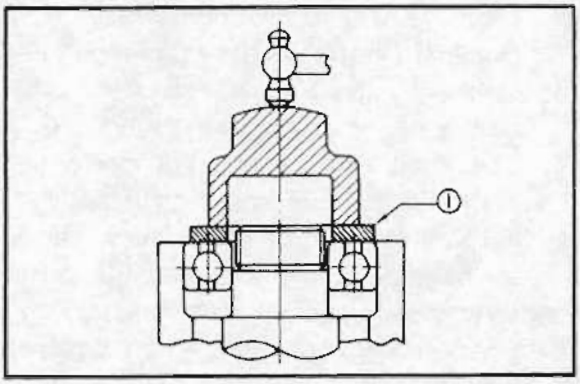
1. Inspection
   a. After cleaning and lubrication bearings, rotate inner race with a finger. If rough spots are noticed, replace the bearing.
   b. Check oil seal lips for damage and wear. Replace as required.
2. Removal
   a. Pry oil seal(s) out of place using a slot head screwdriver.
      Always replace all oil seals when overhauling engine.

NOTE:
Place a piece of wood under the slot head screwdriver to prevent damage to case.

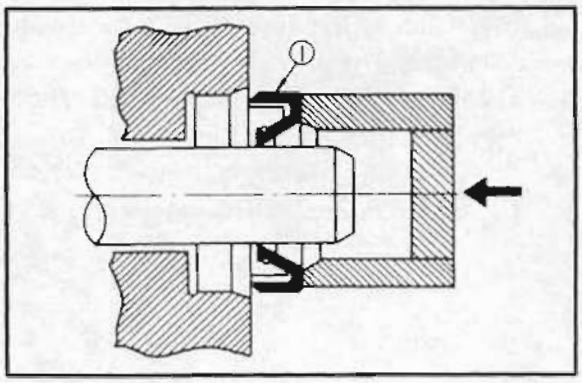
   b. Drive out bearing(s) with socket and hammer.

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

3. Installation
   Install bearing(s) and oil seal(s) with their manufacture's marks or numbers facing outward. (In other words, the stamped letters must be on the side exposed to view.) When installing bearing(s) or oil seal(s), apply a light coating of light-weight lithium base grease to balls and seal lip(s).



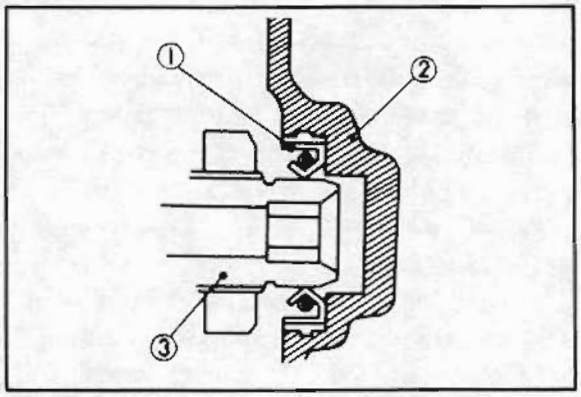
1. Spacer



1. Oil seal

CAUTION:

The crankshaft oil seal (right side) on the crankcase cover right, should be installed in a way reverse to the normal direction as shown.



1. Oil seal 2. Crankcase cover 3. Crankshaft

Crankcase

1. Thoroughly wash the case halves in mild solvent.
2. Clean all gasket mating surfaces and crankcase mating surface thoroughly.
3. Visually inspect case halves for any cracks, road damage, etc.
4. Check all fittings not previously removed for signs of loosening or damage.
5. If bearings have been removed, check their seats for signs of damage (such as the bearing spinning in the seat, etc.).
6. Check oil delivery passages for signs of blockage.
7. If bearings have not been removed, oil them thoroughly immediately after washinng and drying. Rotate the bearing checking for roughness indicating damaged races or balls.
8. Check needle bearing(s) in transmission for damagee Replace as required.

ENGINE ASSEMBLING AND ADJUSTMENT

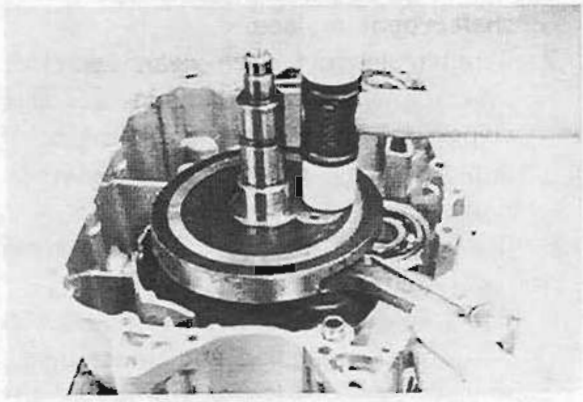
Crankshaft Installation

After all Bearings and seals have been installed in both crankcase halves; install crankshaft as follows:

1. Place the left crankcase underside.
2. Fit the crankshaft onto the left case half by tapping the crankpin area with a soft head hammer while turning the crankshaft. Work slowly and carefully. Make sure the crankshaft is set evenly.

NOTE:

Pay attention to the parallelism between the crankweb and the crankcase surface.

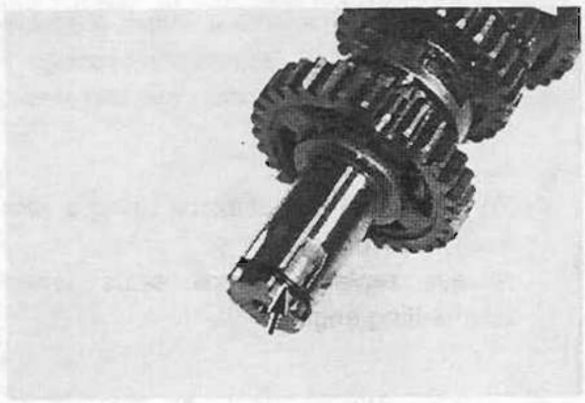


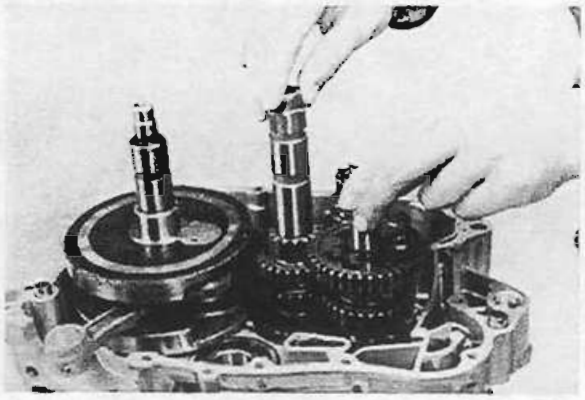
3. Install the drive axle and main axle.

NOTE:

While installing the drive axle into the crankcase, pay careful attention to the oil seal lip.

It is recommended to set a suitable "O-ring" into the drive axle groove.

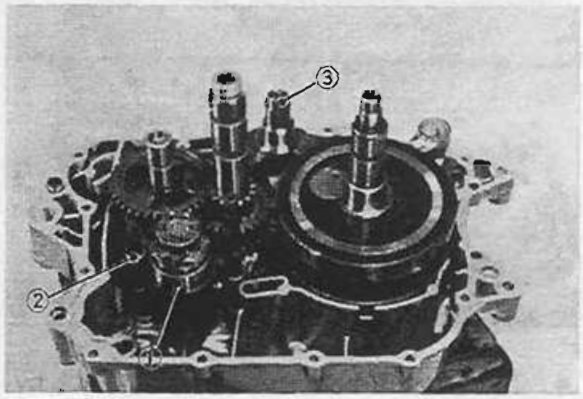




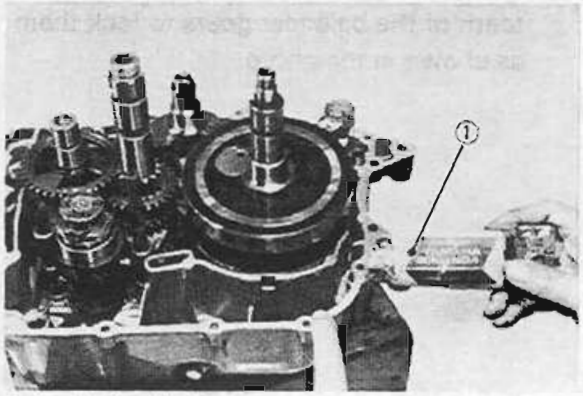
4. Install the shift cam.
5. Install the shift fork 1 and 2.
6. Check to see that all parts move freely prior to installing right case half.
   Check for correct transmission operation and make certain that all loose shims are in place.

NOTE:
Oil each gear and bearing thoroughly.

7. Install the balance weight.
8. Apply Yamaha Bond No. 4 to the mating surfaces of both case halves.
   Apply thoroughly, over all mating surfaces.



1. Shift cam 2. Shift fork 3. Balance weight



1. Yamaha Bond No. 4

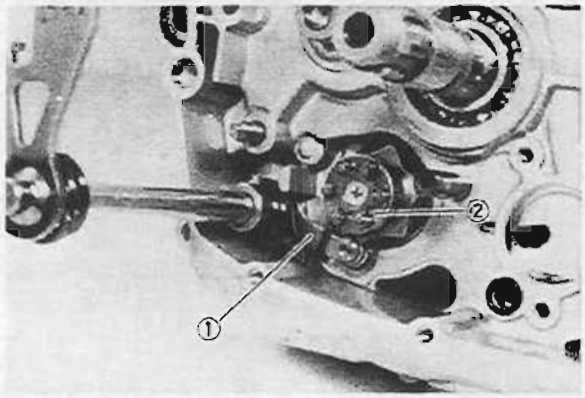
9. Set the crankcase right half onto the shafts and tap lightly on the case with a soft head hammer to assemble.

NOTE:
Do not tap on machined surface or end of crankshaft.

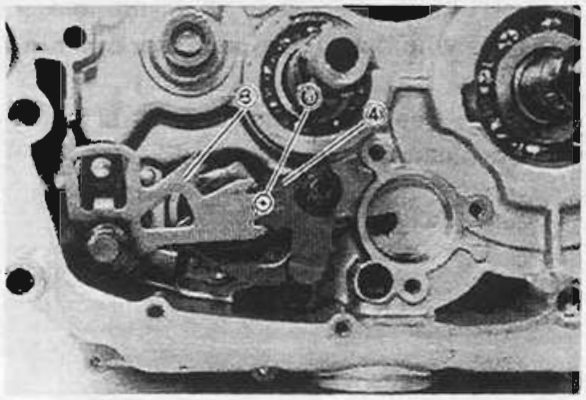
10. Install all crankcase bolts and tighten in stages, using a crisscross pattern.
11. After reassembly, apply a liberal coating of 4-stroke engine oil to the crank pin and bearing.
12. Check crankshaft and transmission shafts for proper operation and freedom of movement.

Shifter

1. Set the stopper lever.
2. During installation, note the index mark on the shift lever 2 and center of shift lever 1. Align.



1. Stopper lever 2. Shift cam



3. Shift lever 1 4. Shift lever 2 a. Align the mark

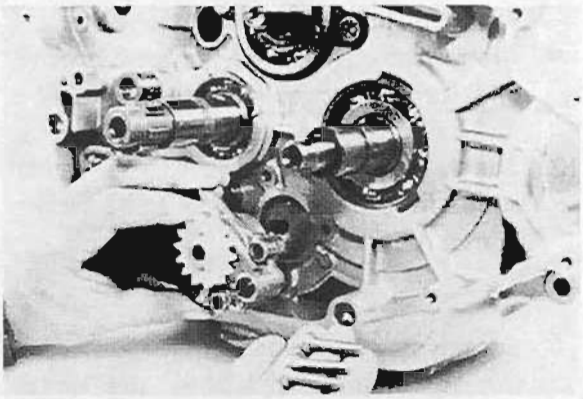
Oil Pump

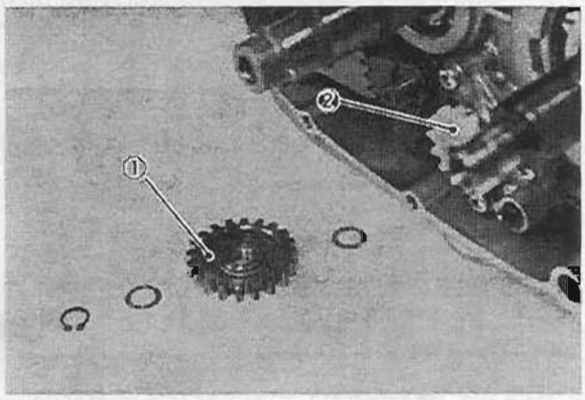
1. Install the delivery pump rotor assembly.

NOTE:

Apply a liberal coating of 4-stroke engine oil to the oil pump rotor.

2. Install the pump cover with driven gear.
3. Install the oil pump idle gear.

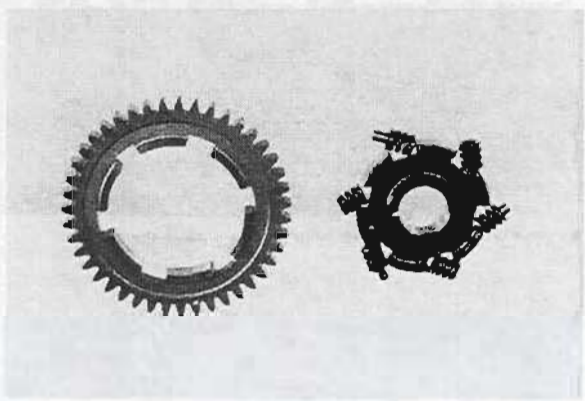


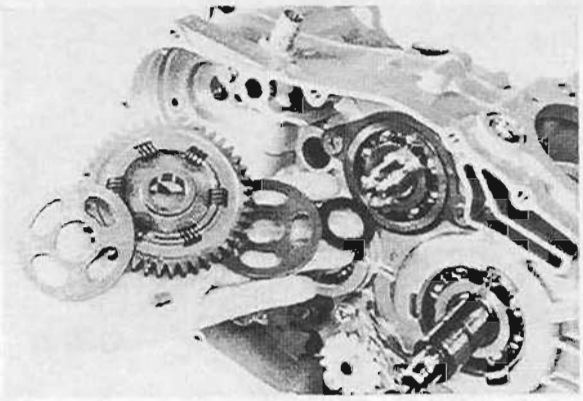


1. Pump idle gear 2. Pump driven gear

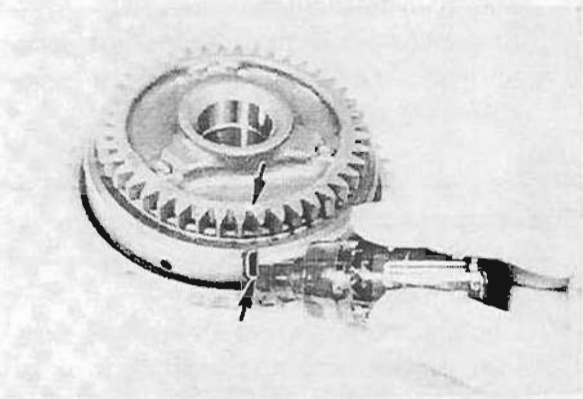
Balancer Drive Gear and Driven Gear

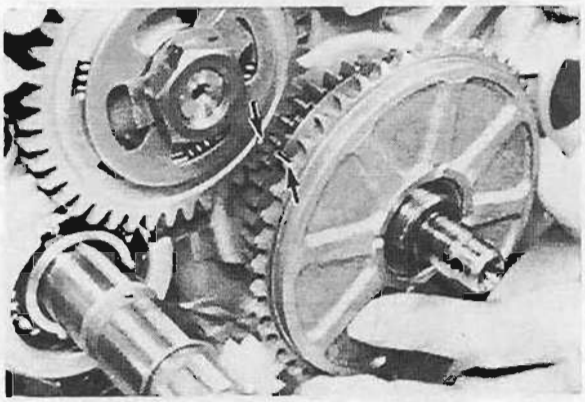
1. Fit into the balancer gear the buffer boss with dowel pins set every other interval.
2. Place bearing covers on both sides of the balancer gear and install.



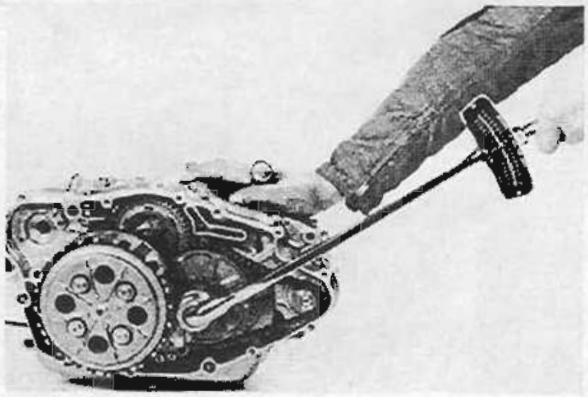


3. Install the keys for the balancer drive and driven gears with the marks in alignment.



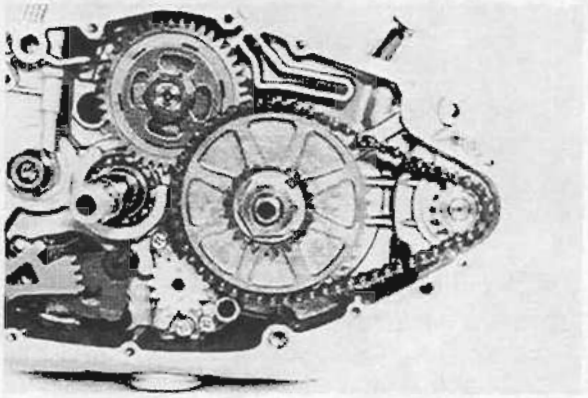


4. Tighten the balancer gear lock nut by first placing a folded rag between the teeth of the balancer gears to lock them as shown in the photo.



Tightening torque:
6.0 m-kg (43.4 ft-lb)

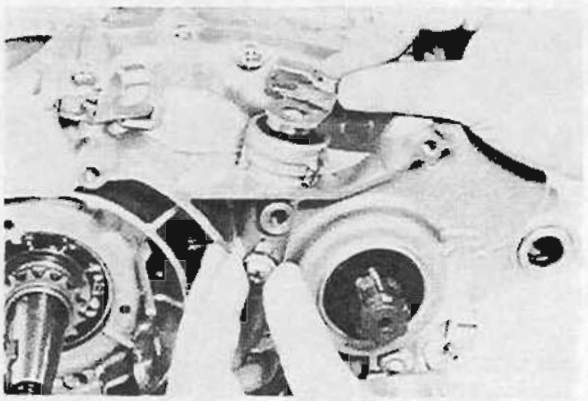
5. Bend the lock washer.
6. Install the starter clutch assembly and the primary drive gear then install the starter motor with the chain.



Push Lever Assembly

1. Install the push lever assembly.
2. Tighten the set screw.

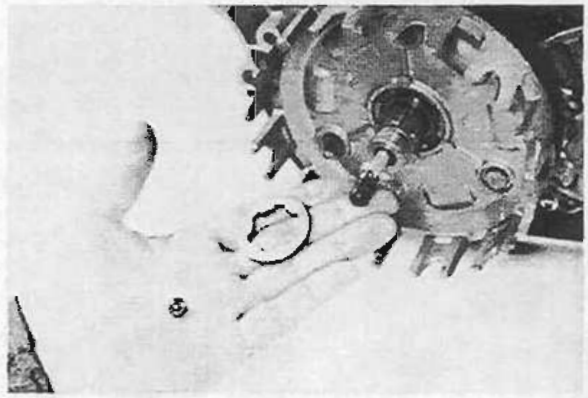
Set screw torque: 1.2 m-kg (8.7 ft-lb)



Clutch

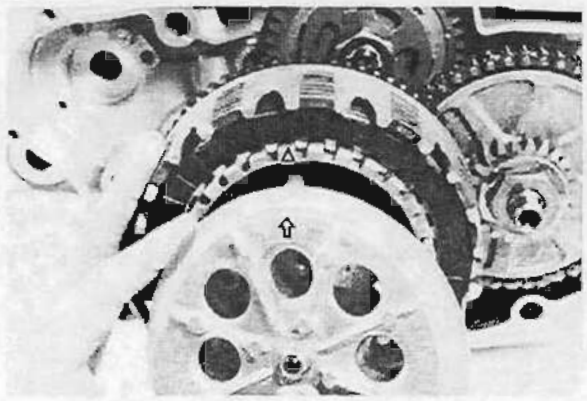
1. First install the primary drive gear.
2. Install the clutch housing, thrust plate, push rod 2, ball and clutch boss in that order.
3. Install clutch holding tool on clutch boss and tighten lock nut.

Clutch lock nut torque:
7.0 m-kg (50.6 ft-lb)



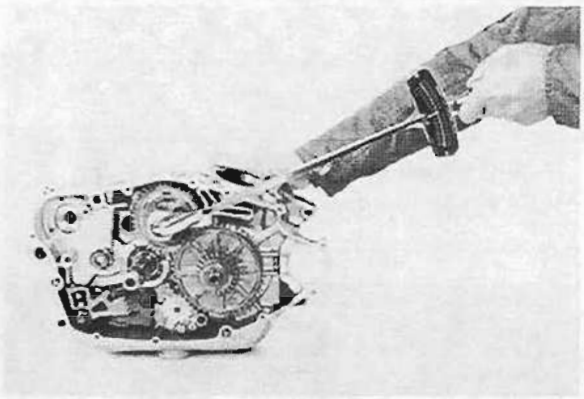
4. Install the push rod 2 and ball into main axle.
5. Install clutch plate and friction plte.
6. Install clutch pressure plate.
7. Continue installation of clutch and friction plates.

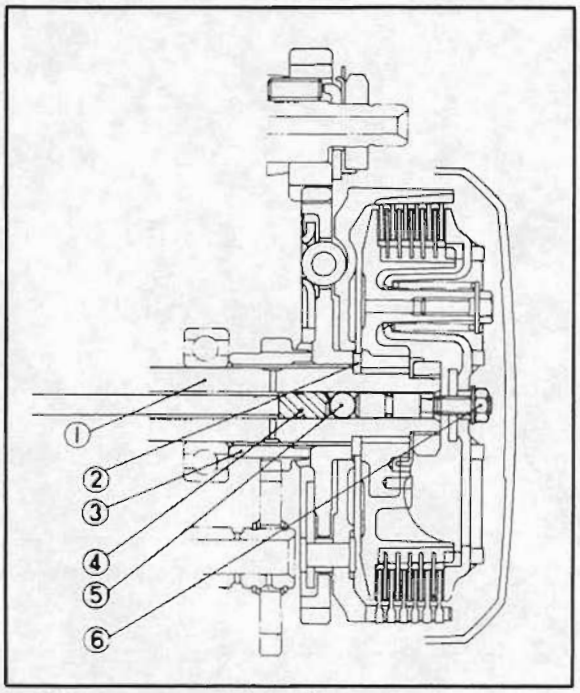
NOTE:
Align the arrow mark on the clutch boss and pressure plate mark.



8. Tighten the primary drive lock nut by first placing a folded rag between the teeth of the primary gears to lock them as shown in the photo.

Primary drive lock nut torque:
7.0 m-kg (50.6 ft-lb)

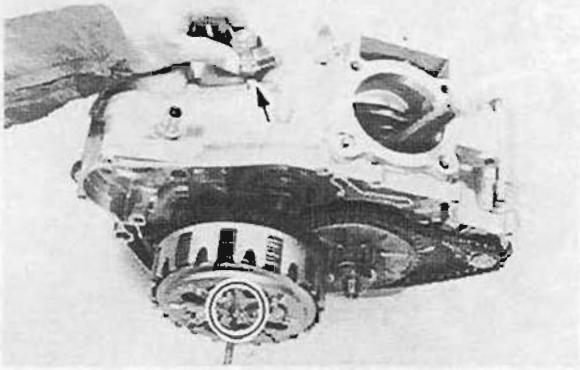




1. Main axle
2. Thrust plate
3. Kick pinion gear
4. Pushrod 2
5. Ball
6. Pushrod 1 lock nut

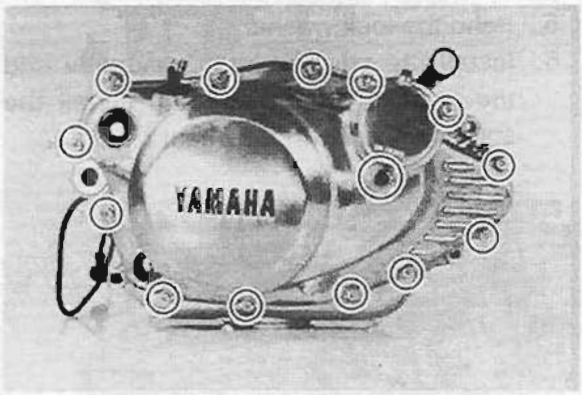
Clutch Adjustment

With the crankcase index mark and the pointed end of the push lever in line with each other, adjust the push rod and then secure it with the lock nut.



Crankcase Cover Right

1. Install the crankcase cover.
2. Install the oil filter element and cover.



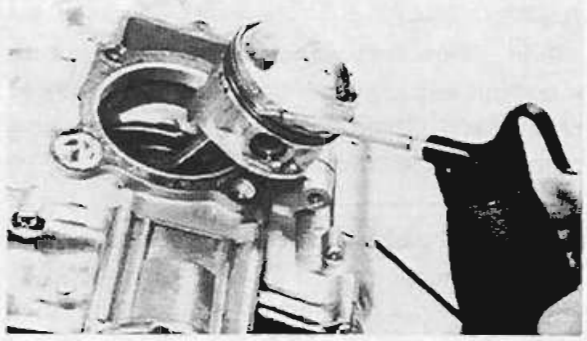
NOTE:
Tighten the screws using crisscross pattern.

Piston

1. Mount the piston (rings installed) onto the connecting rod.
   Be sure the arrow stamped on the piston crown points forward.
2. Install new piston pin clips in their grooves.

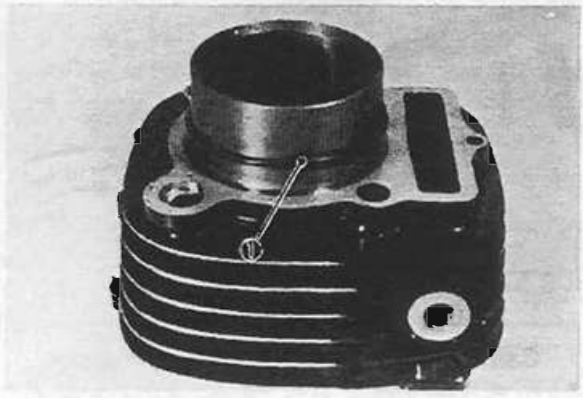


3. During reassembly, coat the piston ring grooves, piston skirt areas, and piston pin with 4-stroke engine oil.



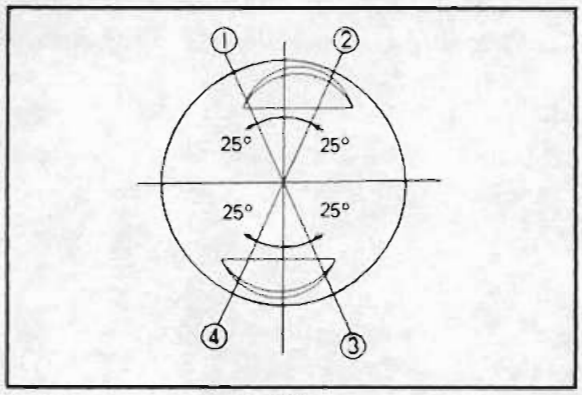
Cylinder

1. Install the cam chain guide to the crank case.
2. Install the new "O-ring" and cylinder base gasket.



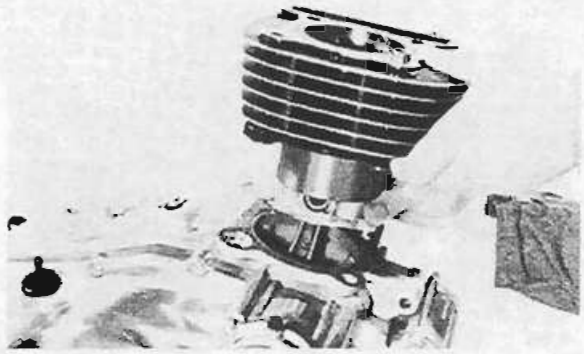
1. O-ring

3. Off-set the three ring end gaps as shown.



1. Top
2. Oil ring (Lower rail)
3. 2nd
4. Oil ring (Upper rail)

4. Install the cylinder with one hand while compressing piston rings with other hand.



5. Install the cylinder holding bolt.

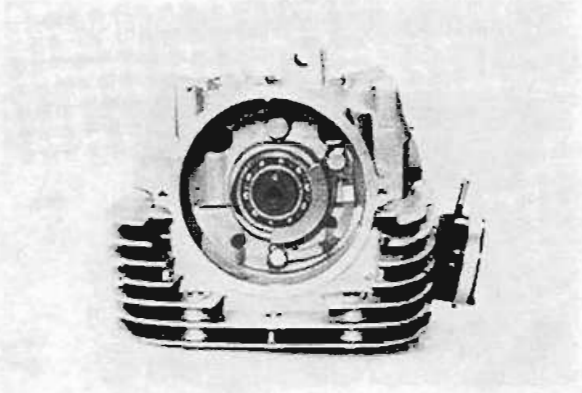
Cylinder Head

1. Install the cylinder head gasket and cylinder head.
2. Tighten the cylinder head temporarily. (final tightening to follow)

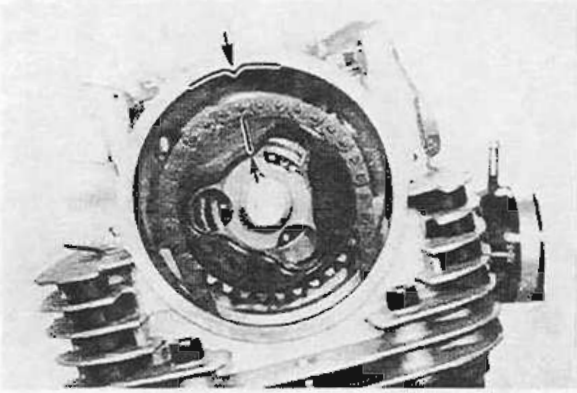
Tightening torque:
10 mm bolt.....4 pcs
3.7 m-kg (26.8 ft-lb)
8 mm bolt.....2 pcs
2.0 m-kg (14.5 ft-lb)
6 mm bolt.....1 pc
0.7 m-kg (5.1 ft-lb)

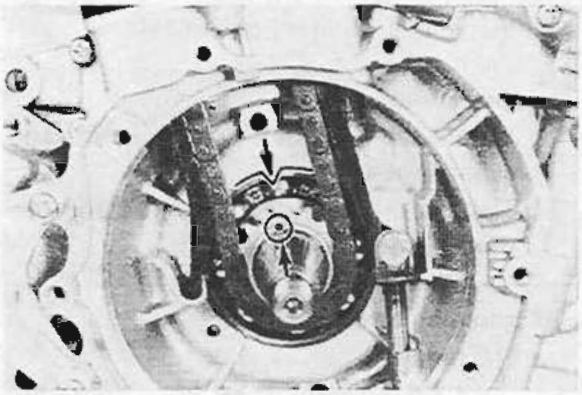
Cam Shaft, Cam Shaft Driven Sprocket, Cam Chain

1. Install the cam shaft, bearing plate and lock washer.
2. Tighten the bolt and bend the lock washer.



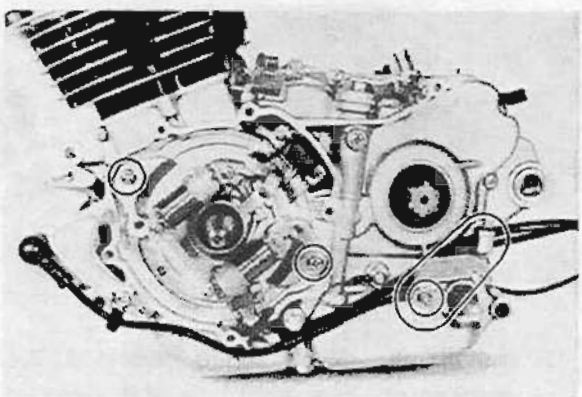
3. Install the chain while aligning the markes on the sprocket and cylinder head and also the marks on the crankshaft and crankcase, as shown in the following photos.





4. Intall the flywheel magneto base to left side of crankcase.

NOTE:
1. If the "O-ring" is defective, swollen or deteriorated, replace it.
2. Apply a thin coat of grease over the "O-ring" and then put the magneto plate in the crank case.
   Pay attention to the parallelism between the plate and the crankcase surface.
3. Install the lead wire grommet properly.



5. Clamp the lead wire to the crankcase.

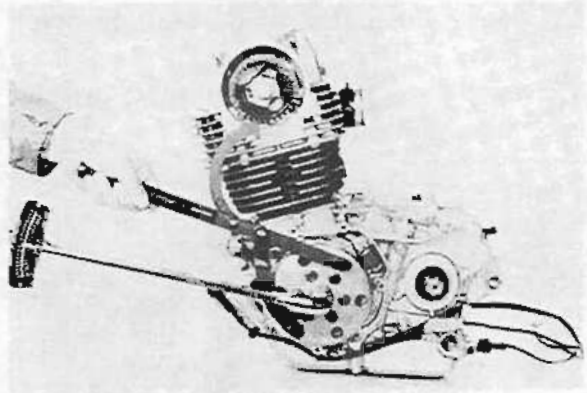
NOTE:
Be sure the lead wire will not become loosen.

6. Install the flywheel.

NOTE:
When installing flywheel, make sure woodruff key is properly seated in keyway of crankshaft. Carefully install flywheel taking care to align with woodruff key.

7. Install plate washer, spring washer and lock nut.

Tightening torque: 8.0 m-kg (57.8 ft-lb)

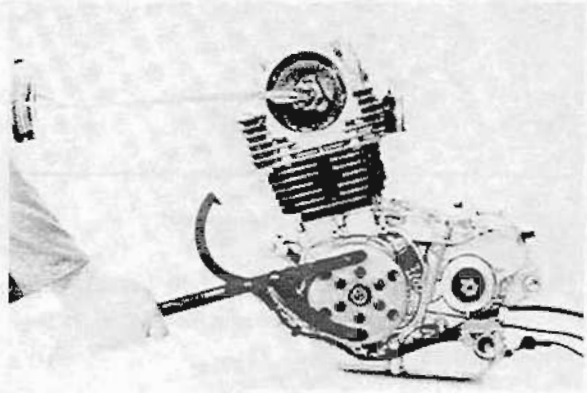


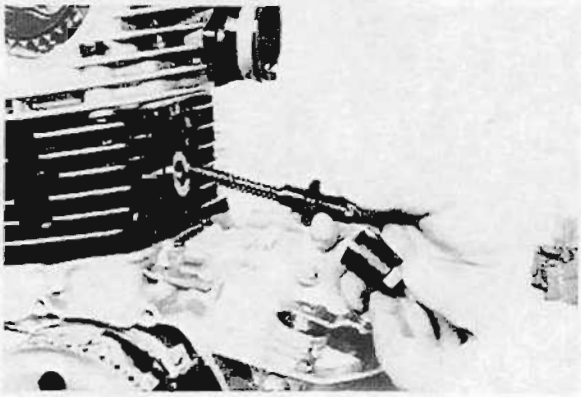
8. Tighten the cam sprocket bolt.

Cam sprocket bolt tightening torque: 5.5 m-kg (39.8 ft-lb)

9. Install the chain tensioner assembly. Adjust the tensioner. (Refer to the Chapter 2. "Cam chain adjustment")
10. Install the adjuster cap and tighten the cap.

Tightening torque: 0.5 m-kg (3.6 ft-lb)





Drain Plug

Install and tighten the drain plug before filling engine oil.

Tightening torque: 3.2 m-kg (23.1 ft-lb)

MOUNTING

Refer to Chapter 3. "Removal" and amount the engine in the frame as follows:

1. Place the engine in the frame from right side.
2. Install engine mounting bolts and nuts with proper tightening torque.

Tightening torque				
Engine mounting bolts	Bolt size	Q'ty	m-kg	ft-lb
Pivot shaft	14 mm	1	6.5	47.0
Front under	8 mm	4	3.2	23.1
Rear under	8 mm	1	3.2	23.1
Rear under	8 mm	2	2.0	14.5
Upper	8 mm	3	3.2	23.1

3. Install the lead wire, plug cap and breather pipe.
4. Install carburetor assembly.
5. Install the drive sprocket with the drive chain and the sprocket holder.
   Tighten the two bolts.

Tightening torque: 1.0 m-kg (7.2 ft-lb)

6. Install the plate washer and spacer over the shift shaft.
7. Install the left crankcase cover and tighten bolts.
8. Install the shift pedal and tighten the bolt.
9. Install and adjust the clutch wire as shown in "Chapter 2".
10. Install the exhaust pipe assembly.
11. Install the fuel tank and seat.
12. Install the brake rod wing nut and the return spring.
13. Start the engine and check oil pressure, oil leakage and cam chain adjustment. See Engine oil checking procedure in Chapter 2.

CHAPTER 4. CARBURETION

AIR FILTER 4-1
CARBURETOR 4-1
Component 4-1
Disassembly 4-2
Fuel Level 4-4
Function 4-5

4

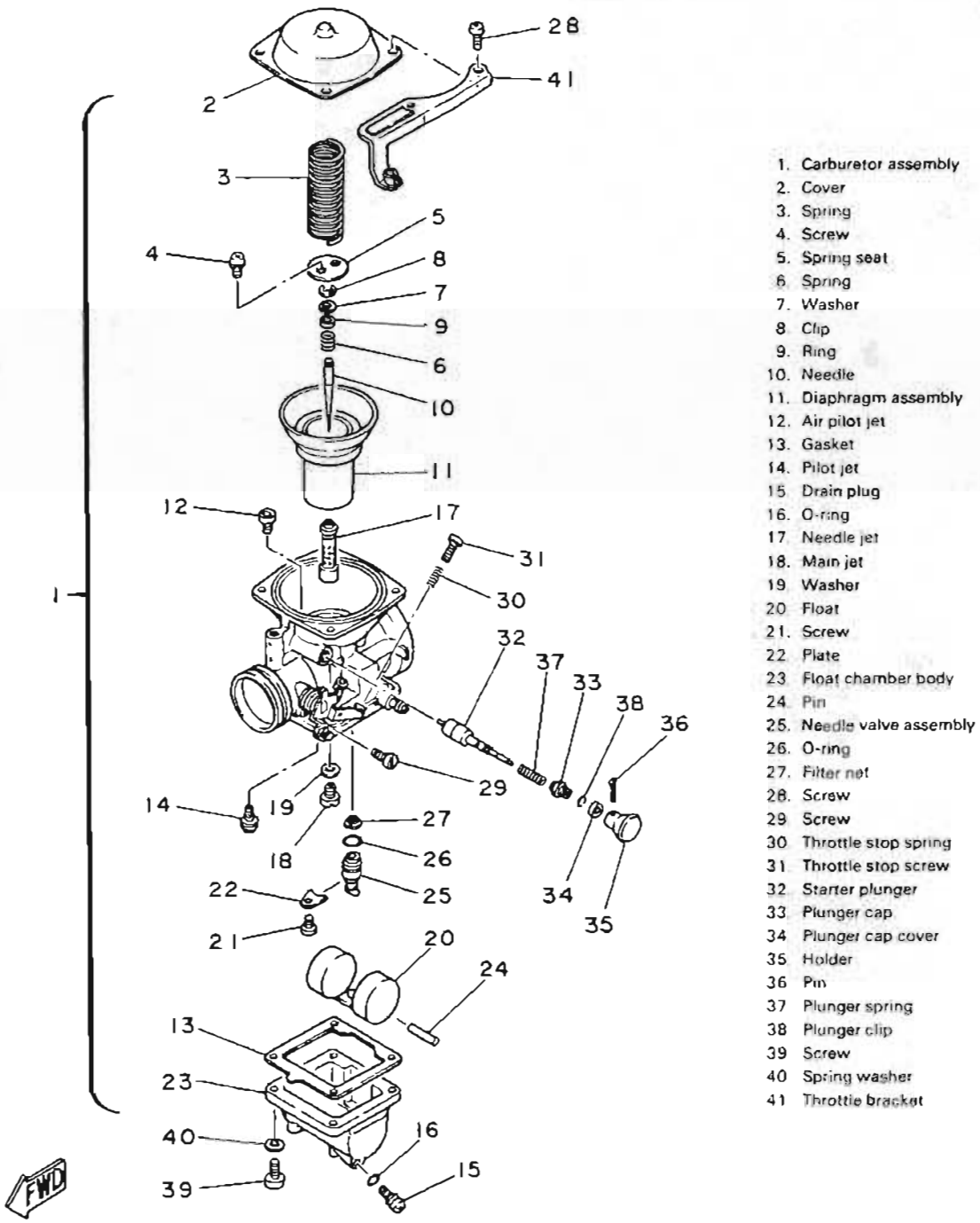
CHAPTER 4.
CARBURETION

AIR FILTER

1. The air filter is housed within a case below the seat.
2. The filter is made of polyurethane foam with a stiff bristle covering.
3. For carburetor to function properly, the filter must be in place and it must be damp with oil to provide adequate protection for vital engine parts.
4. For air filter maintenance see Chapter 2. "Air Filter"

CARBURETOR

Component



1. Carburetor assembly
2. Cover
3. Spring
4. Screw
5. Spring seat
6. Spring
7. Washer
8. Clip
9. Ring
10. Needle
11. Diaphragm assembly
12. Air pilot jet
13. Gasket
14. Pilot jet
15. Drain plug
16. O-ring
17. Needle jet
18. Main jet
19. Washer
20. Float
21. Screw
22. Plate
23. Float chamber body
24. Pin
25. Needle valve assembly
26. O-ring
27. Filter net
28. Screw
29. Screw
30. Throttle stop spring
31. Throttle stop screw
32. Starter plunger
33. Plunger cap
34. Plunger cap cover
35. Holder
36. Pin
37. Plunger spring
38. Plunger clip
39. Screw
40. Spring washer
41. Throttle bracket

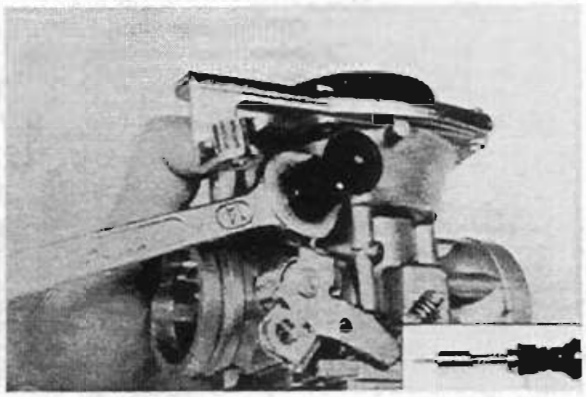
Disassemtly

Remove the following parts as shown

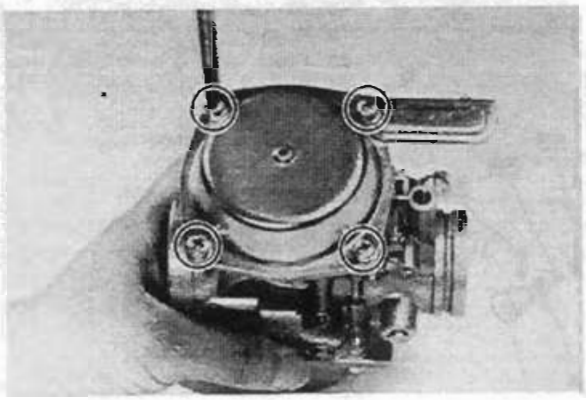
NOTE:

1. Wash the carburetor in petroleum base solvent. Wash all associated parts.
2. Using high pressure air, blow out all passages and jets. Never use high pressure air if float is in place.
3. Inspect the needle and seat for signs of excessive wear or attached foreign particles. Replace as required. Always replace inlet needle and inlet seat as an assembly.

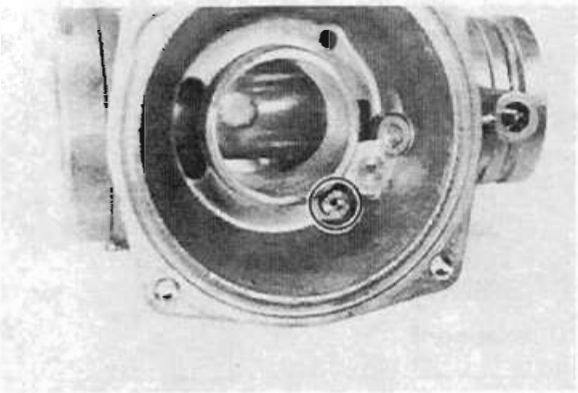
1. Starter assembly



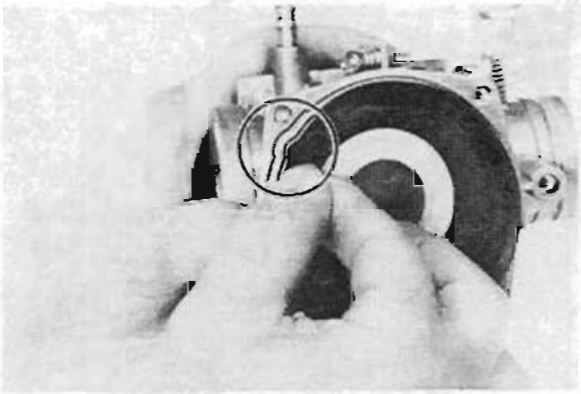
2. Mixing chamber top

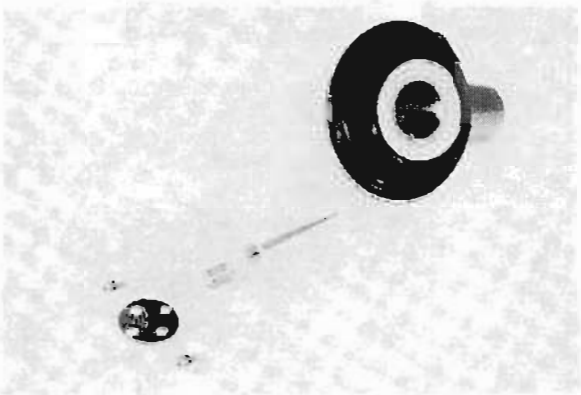


3. Air pilot jet

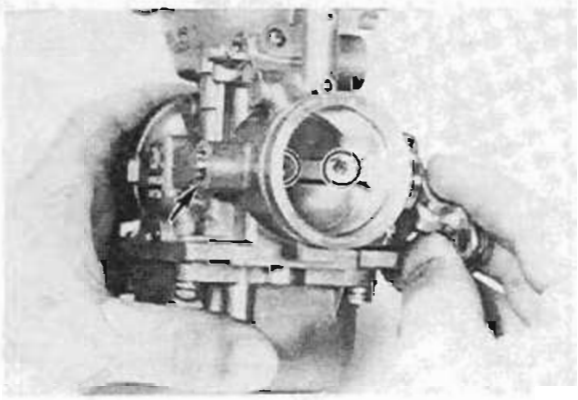


4. Vacuum piston and jet needle

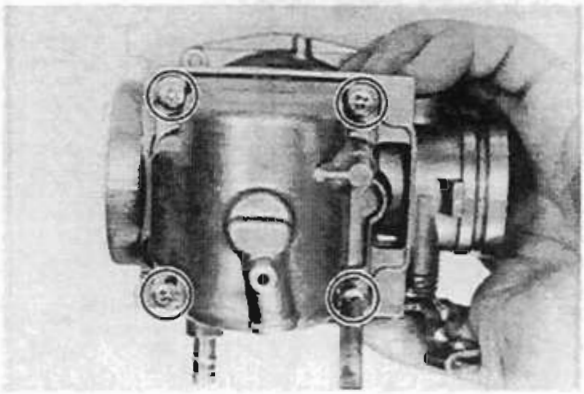




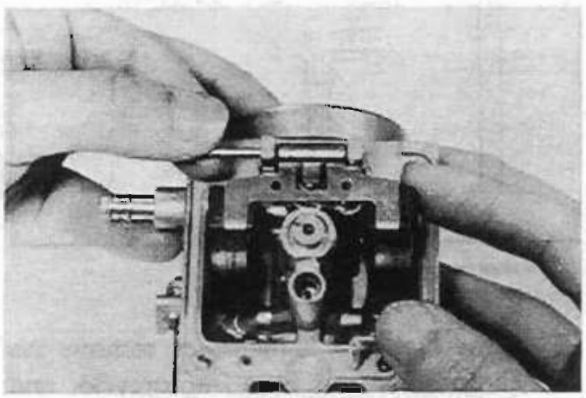
5. Butterfly valve

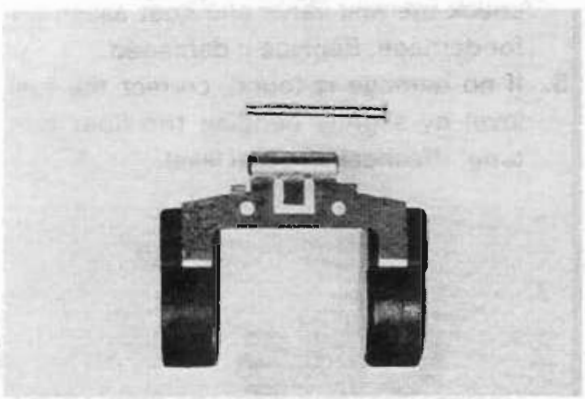


6. Float chamber

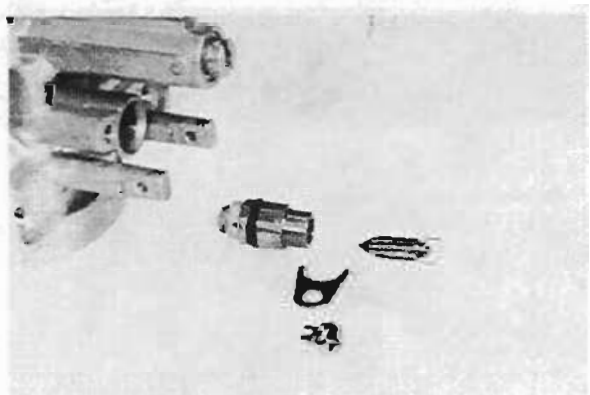


7. Float

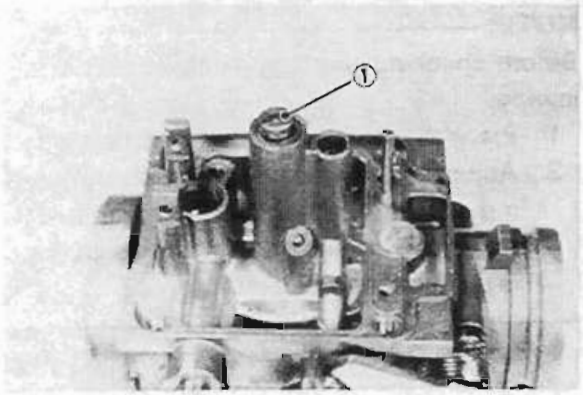


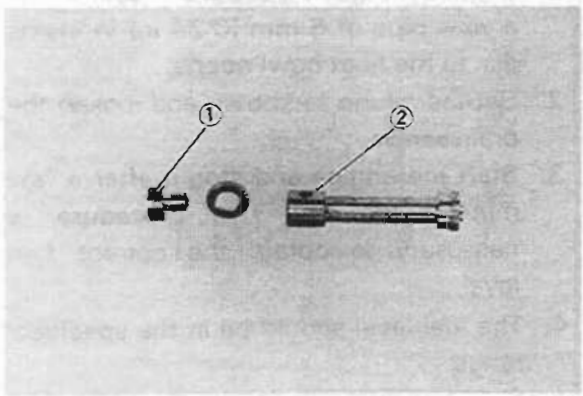


8. Needle valve



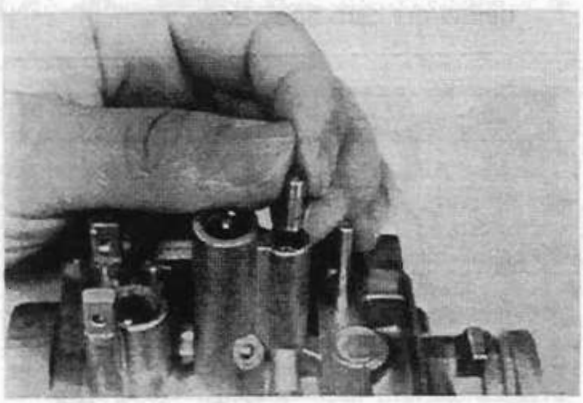
9. Main jet and needle jet





1. Main jet 2. Needle jet

10. Pilot jet



Fuel Level

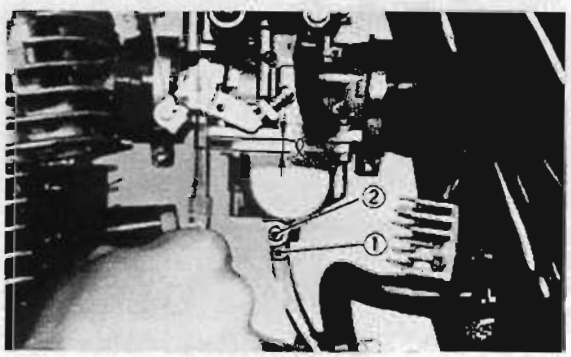
NOTE:

Before checking the fuel level, note the following:

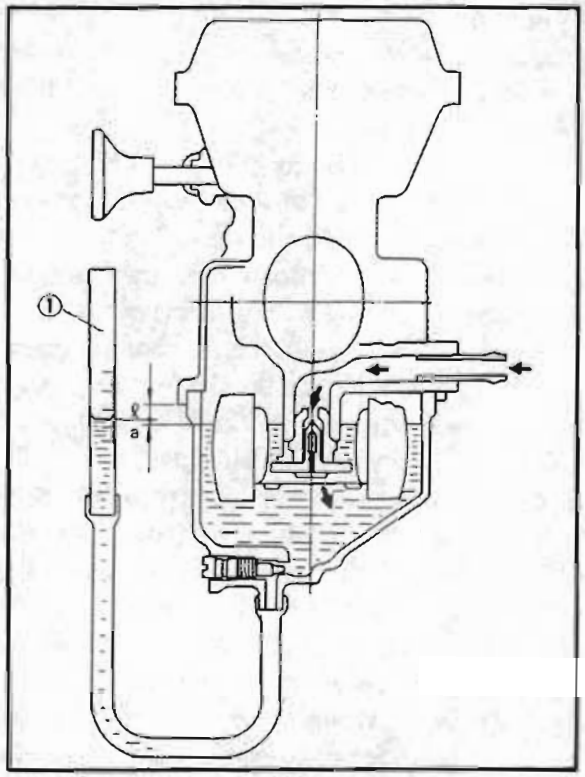
1. Place the motorcycle on a level surface.
2. Adjust the motorcycle position by placing a suitable stand or a garage jack under the engine so that the carburetor is positioned vertically.

1. Connect the level gauge (special tool) or a vinyl pipe of 6 mm (0.24 in) in inside dia. to the float bowl nozzle.
2. Set the gauge as shown and loosen the drain screw.
3. Start the engine and stop it after a few minutes of run. This procedure is necessary to obtain the correct fuel level.
4. The fuel level should be in the specified range.

Specified range:
2 to 4 mm (0.079 ~ 0.148)
below the carb body edge

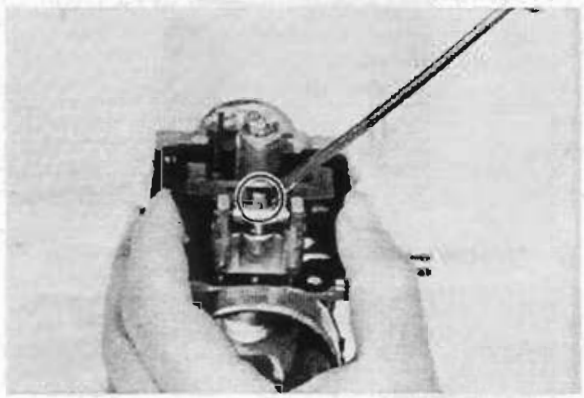


1. Drain nozzle
2. Drain screw
3. Fuel level gauge
ℓ. Fuel level



1. Fuel level gauge
a. Surface tension
ℓ. Fuel level
a. = 2.0 mm (0.08 in)

5. If the fuel level is incorrect, remove the carburetor from the motorcycle and check the fuel valve and float assembly for damage. Replace if damaged.
6. If no damage is found, correct the fuel level by slightly bending the float arm tang. Recheck the fuel level.

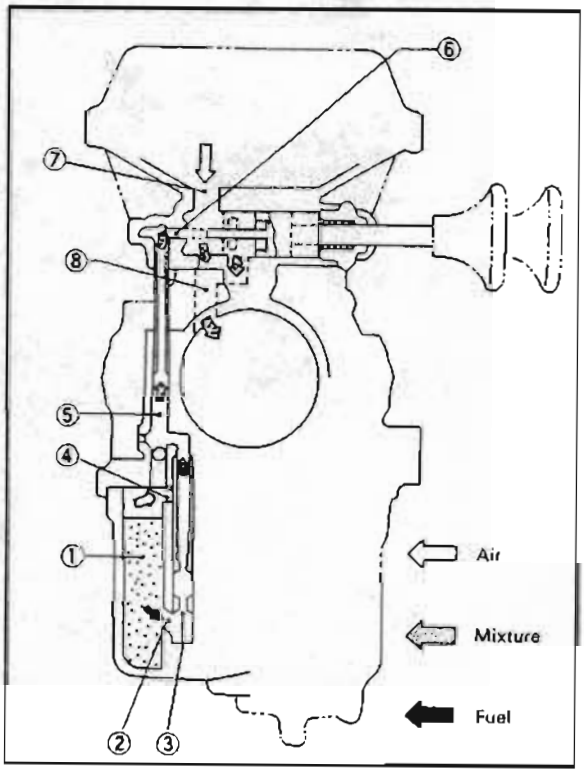


Function

This model is equipped with "constant velocity" (CV) carburetor mounted on rubber intake manifolds.

1. Air flow through the venturi is controlled by a throttle slide (vacuum piston). The slide is raised and lowered by engine vacuum rather than a cable linked directly to the throttle grip. This type of carburetor compensates automatically for atmospheric pressure changes such as those encountered when riding at high altitudes.
2. With a conventional one-position starter jet, the air-fuel ratio remains the same as that required to start the engine (despite the fact that the engine temperature rises gradually) until the engine operating temperature rises to the point at which use of the starter jet is no longer necessary. In other words, beyond a certain point, the air-fuel mixture is too rich until the engine operating temperature rises to a certain point and the starter jet is shut off.
   The newly-adopted two-position type starter jet is designed to supply a mixture of more appropriate richness by switching from one jet to another.

a. Routes of fuel and air



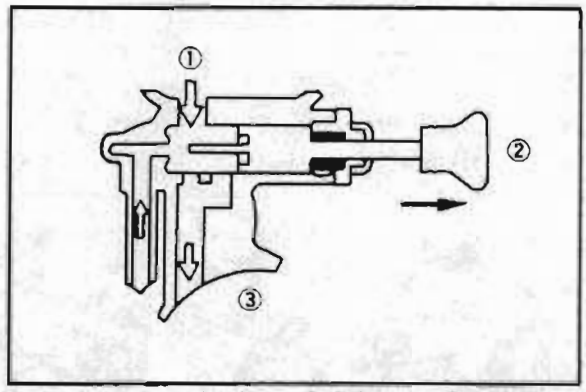
1. Float chamber
2. Fuel inlet
3. Starter jet
4. Bleed air jet
5. Mixture passage
6. Needle jet
7. Air inlet
8. Mixture outlet

The fuel supplied from the float chamber (1) passes through (2) and is metered by (3). Air is supplied from the air chamber in the float chamber and flows through (4). It is then mixed with the metered fuel. The resultant mixture passes through (5) and flows into the two-position starter jet (6), where it is further mixed with air supplied from the diaphragm (7) and streams into the throttle bore out of (8).

b. Operation of two-position starter jet

Full-open:

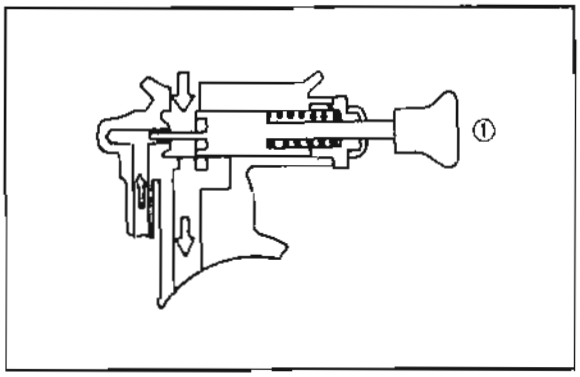
To start a cold engine, a rich mixture is required. To supply a rich mixture, pull the starter lever and the way out so that the needle regulating the fuel flow is set free and the flow rate of incoming fuel is increased to a maximum. The fuel is mixed with the air supplied from the diaphragm lower chamber, and thus a rich mixture is produced.



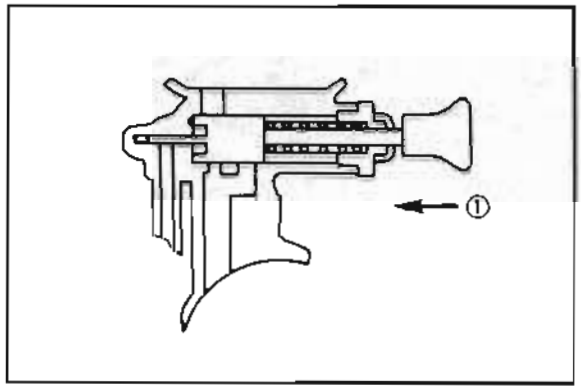
1. Diaphragm lower chamber 2. Full-open 3. Throttle bore

Half-open:

After starting, that is, during warm-up, a slightly rich mixture is required. Push back the starter lever half-way so that the fuel flow is reduced by the needle. The fuel is mixed with the air from the diaphragm lower chamber, and thus a slightly rich mixture is produced.



1. Half-open



1. Full-closed

Full-closed:
When the engine fully warms up, no mixture from the starter circuit is necessary. Push the starter lever all the way in so that the flow of incoming fuel is stopped by the plunger, and thus no mixture enters the throttle bore.

NOTE:
Use of the starter jet in either open position after the engine has warmed up to operating temperature will result in excessive exhaust emissions and poor performance.

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CHAPTER 5. CHASSIS

FRONT WHEEL

Removal

1. Disconnect the brake and speedometer cable at the front brake lever.
2. Remove the cotter pin from the front axle.
3. Remove the front axle nut.
4. Remove the front wheel axle by simultaneously twisting and pulling out on the axle. Then remove the wheel assembly.

NOTE:

Raise the front of the motorcycle by placing a suitable stand under the engine.

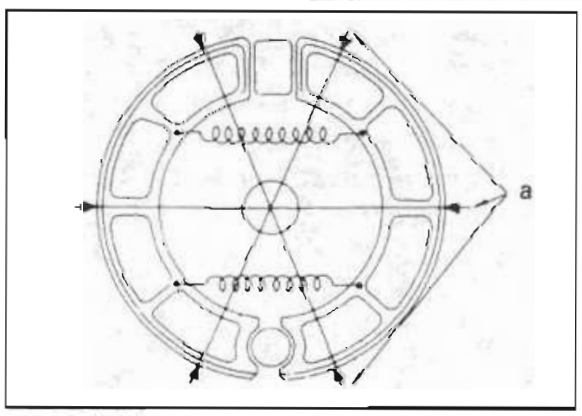
Front Axle

Remove any corrosion from axle with emery cloth. Then place it on a surface plate and check for bending. If bent, replace.

Checking Brake Shoe Wear

1. Measure the outside diameter at the brake shoes with slide calipers.

Front brake shoe diameter:
152 mm (5.98 in)
Replacement limit:
148 mm (5.83 in) min.



a. Measuring points

2. Remove any glazed areas from brake shoes using coarse sand paper.

Brake Drum

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

Brake Shoe Plate

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

NOTE:

Before removing the cam lever, put a match mark on the cam lever and camshaft to indicate their positions for easy assembly.

Replacing Wheel Bearings

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

1. First clean the outside of the wheel hub.
2. Drive the bearing out by pushing the spacer aside (the spacer "floats" between the bearings) and tapping around the perimeter of the bearing inner race with a soft metal drift pin and hammer. Either or both bearings can be removed in this manner.
3. To install the wheel bearing, reverse the above sequence. Be sure to grease the bearing before installation. Use a socket that matches the outside race of the bearing as a tool to drive in the bearing.

Front Wheel Installation

When installing front wheel, reverse the removal procedure taking care of the following points:

1. Check for proper engagement of the boss on the outer fork tube with the locating slot on the brake shoe plate.
2. Always secure the front wheel axle as follows:

a. Torque the axle nut.

Axle nut torque:
10.6 m-kg (77.5 ft-lb)

b. Install a new cotter pin; discard old pin.

REAR WHEEL

Removing the Rear Wheel

1. First remove the adjust nut and return spring from the brake rod; then, remove the brake rod and pin from the cam lever while pulling them apart.
2. Remove the cotter pin from the rear axle and loosen the axle nut.
3. The rear wheel can be removed by not necessarily cutting the chain. If you cut the drive chain, use the chain cutter (special tool). See page 3-2.

Checking Brake Shoe Wear

See front wheel section, "Checking Brake Shoe Wear"

Rear brake shoe diameter:
122 mm (4.80 in)
Replacement limit:
118 mm (4.65 in) min.

Brake Drum

See front wheel section, "Brake Drum".

Replacing Wheel Bearings

See front wheel section, "Replacing Wheel Bearings".

Installing Rear Wheel

The rear wheel can be reassembled by reversing the disassembly procedure. Note the following points.

1. When installing the chain, make certain the closed end of the master link clip is facing direction of rotation.
2. Check for proper engagement of the boss on the swing arm with the locating slot on the brake shoe plate.
3. Make sure the rear wheel axle is inserted on the left-hand side and that the chain pullers are installed with the punched side outward.
4. Make sure the rear wheel axle nut is properly torqued.

Tightening torque.
10.6 m-kg (76.7 ft-lb)

RIMS AND SPOKES (FRONT AND REAR WHEELS)

Checking for Loose Spokes

Loose spokes can be checked by bracing the motorcycle off the ground so that the wheel can spin freely.

Slowly rotate the wheel and at the same time let the metal shaft of a fairly heavy screwdriver bounce off each spoke. If all the spokes are tightened approximately the same, then the sound given off by the screwdriver hitting the spokes should sound the same. If one spoke makes a dull flat sound, then check it for looseness. (See chapter 2, "Front brake and wheel".)

Checking Rim "Run-Out"

See chapter 2, "Front brake and wheel".

TIRES AND TUBES

Removal

1. Remove the valve cap, valve core, and valve stem lock nut.
2. When all air is out of tube, separate tire bead from rim (both sides) by stepping on tire with your foot.
3. Use two tire removal irons (with rounded edges) to work the tire bead over the edge of the rim, starting 180° opposite the tube stem. Take care to avoid pinching the tube as you do this.
4. After you have worked one side of the tire completely off the rim, then you can slip the tube out. Be very careful not to damage the stem while pushing it back out of the rim hole.
5. For tire removal, work the other bead off the rim.

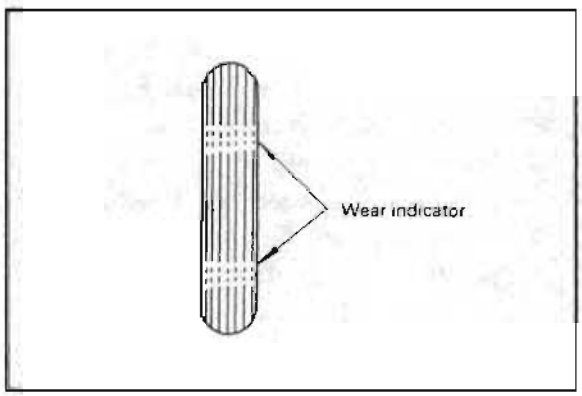
Installation

Reinstalling the tire and tube can be accomplished by reversing the disassembly procedure. The only difference in procedure would be right after the tubes has been installed, but before the tire has been completely slipped onto the rim, momentarily inflate the tube. This removes any creases that might exist. Release the air and continue with reassembly. Also, right after the tire has been completely slipped onto the rim, check to make sure that the stem comes out of the hole in the rim at a right angle to the rim. Finally, inflate the tire.

	FRONT	REAR
Standard tire	Yokohama 3.00-18-4PR	Yokohama 120/90-16.63P
Cold tire pressure Up to 90 kg (198 lb) load* 90 kg (198 lb) load ~ 156 kg (344 lb) load* (Maximum load) High speed riding	1.8 kg/cm² (26 psi) 2.0 kg/cm² (28 psi) 2.0 kg/cm² (28 psi)	2.0 kg/cm² (28 psi) 2.3 kg/cm² (32 psi) 2.3 kg/cm² (32 psi)
Minimum tire tread depth	0.8 mm (0.03 in)	0.8 mm (0.03 in)

* Total weight of accessories, etc. excepting motorcycle

If a tire tread shows cross-wise lines, it means that the tire is worn to its limit. Replace the tire.



DRIVE CHAIN AND SPROCKETS

NOTE:

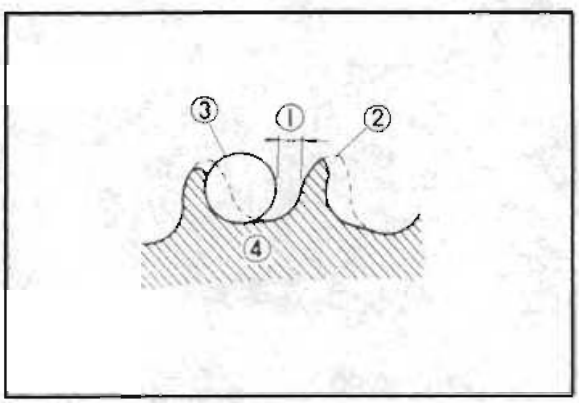
Please refer to General maintenance and Lubrication charts for additional information.

Drive Sprocket

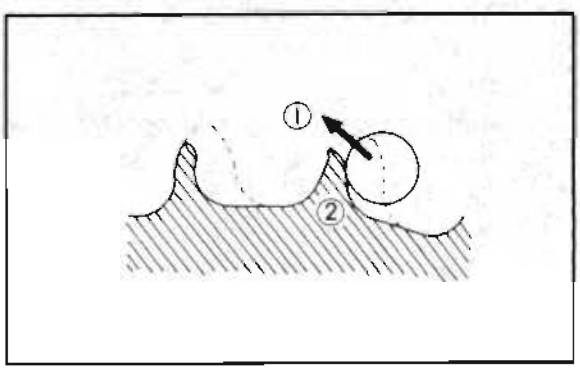
With the left crankcase cover removed proceed as follows:

1. Remove the sprocket securing bolts. Remove the holder plate and drive sprocket.
2. Check sprocket wear. Replace if wear decreases tooth width as shown.
3. Replace if tooth wear shows a pattern such as that in the illustration, or as precaution and common sense dictate.
4. Tighten the securing bolts.

Drive Sprocket
Securing Bolt Torque:
1.0 m-kg (7.2 ft-lb)



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



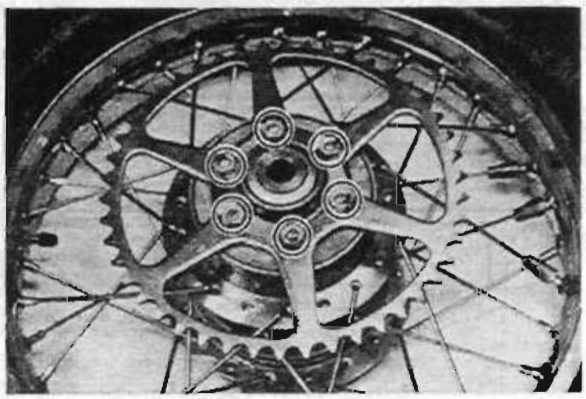
1. Slip off
2. Bent teeth

Driven Sprocket

With the rear wheel removed, proceed as follows:

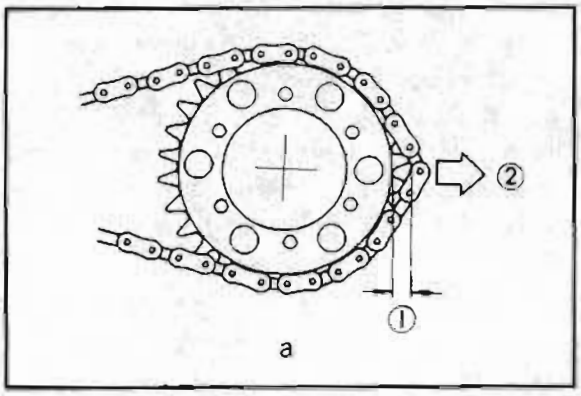
1. Using a blunt chisel, flatten the securing nuts lock washer tabs.
   Remove the securing nuts. Remove the lock washers and sprocket.
2. Check the sprocket wear using procedures for the drive sprocket.
3. Check the sprocket to see that it runs true. If bent, replace.
4. During reassembly, make sure that sprocket and sprocket seat are clean.
   Tighten the securing nuts in a crisscross pattern.
   Bend the tabs of the lock washers fully against the securing nut flats.

Drive Sprocket
Securing Nut Torque:
3.0 m-kg (21.7 ft-lb)

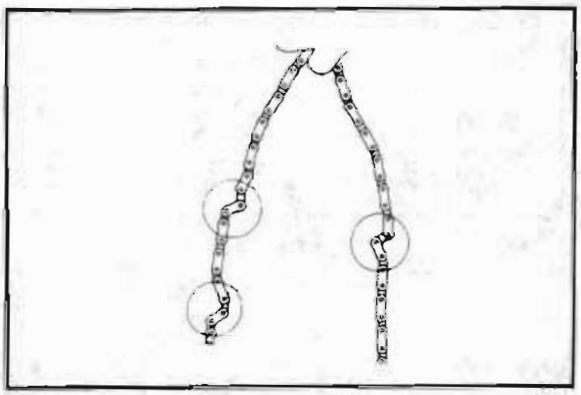


Chain Inspection

1. With the chain installed on the motorcycle, excessive wear may be roughly determined by attempting to pull the chain away from the rear sprocket. If the chain will lift away more than one-half the length of the sprocket teeth, remove and inspect. (See page 3-2 for chain removal.)
   If any portion of the chain shows signs of damage, or if either sprocket shows signs of excessive wear, remove and inspect.
2. Check the chain for stiffness. Hold as illustrated. If stiff, soak in solvent solution, clean with wire brush, dry with high pressure air. Oil chain thoroughly and attempt to work out kinks. If still stiff, replace, chain.
3. Check the side plate for damage. Check to see if excessive play exists in pins and rollers. Check for damaged rollers. Replace as required.



a. Checking for excessively worn chain
1. 1/2 tooth
2. Pull



Chain Maintenance

The chain should be lubricated according to the recommendations given in the General Maintenance/Lubrication charts, or more often if possible. (Preferably after every use.)

1. Wipe off dirt with shop rag. If accumulation is severe, use wire brush, then rag.
2. Apply lubricant between roller and side plates on both inside and outside of chain. Don't skip a portion as this will cause uneven wear. Apply thoroughly. Wipe off excess.

Recommended lubricant:
YAMAHA CHAIN AND CABLE LUBE, or SAE 10W/30 motor oil

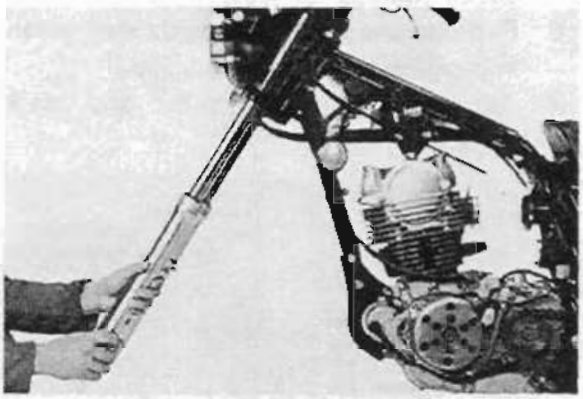
3. Periodically, remove the chain. Wipe and/or brush excess dirt off. Blow off with high pressure air.

4. Soak chain in solvent, brushing off remaining dirt. Dry with high pressure air. Lubricate thoroughly to make sure lubricant penetrates. Wipe off excess. Reinstall.

FRONT FORKS

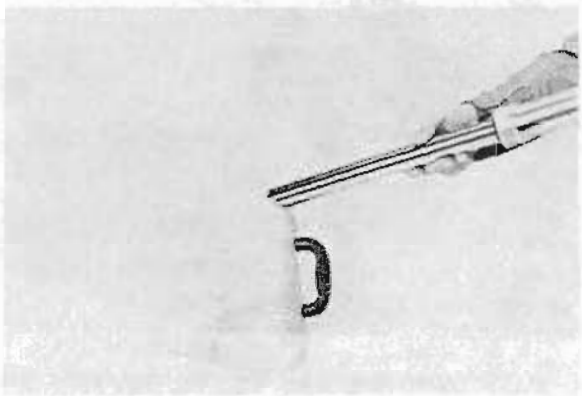
Disassembly

1. With the front wheel and front brake cable removed, the fork legs can be removed from the upper and lower brackets by loosening upper and lower pinch bolts.

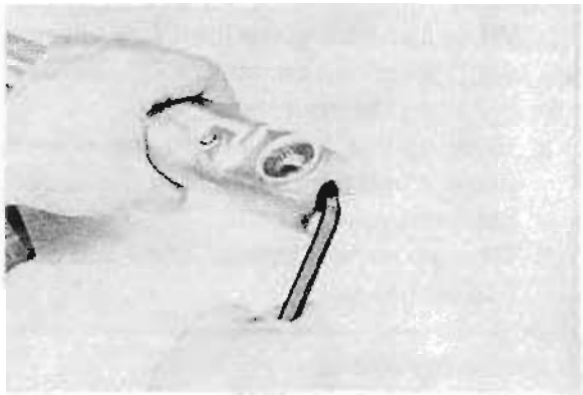


NOTE:
Before loosening the upper and lower pinch bolts, remove the front fork cap bolts.

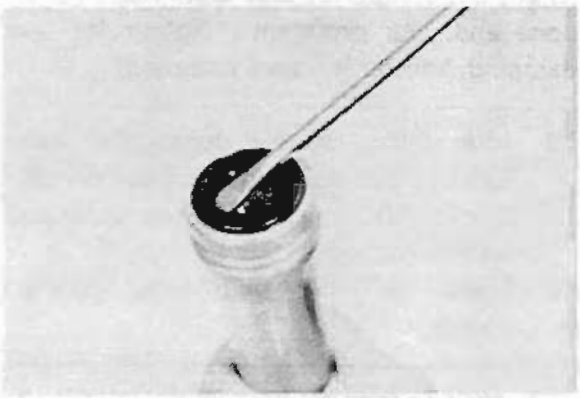
2. Remove the caps and drain the oil from both fork tubes.

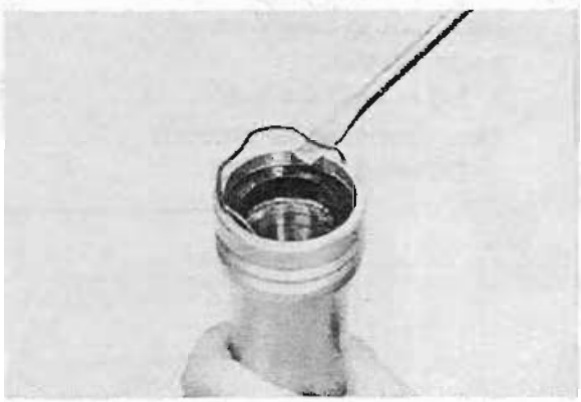


3. Remove the special bolt from bottom of outer tubes.
4. Remove inner tube and damper assembly from outer tube.
5. Pull out damper assembly. Inspect and replace if damaged.



6. To replace the fork seal, remove the dust seal and snap-ring from outer tube.
7. Carefully pry out old seal without damaging fork tube.
8. Insert new seal "open" side down using large socket and steel hammer.





Inspection

Inspect the inner tube for bends or scratches. If the bend is slight, it can be corrected with a press. It is recommended, however, to replace the tube.

Assembly

1. When assembling the front fork, reverse the order of disassembly.
2. Installing the front forks

a. Bring up the front fork to the correct position and partially tighten the under-bracket mounting bolt.

b. Measure correct amount of oil and pour into each leg.

Recommended oil: Yamaha fork oil 10Wt or equivalent

Quantity per leg: 168 cc (5.7 U.S. oz)

NOTE:

Select the weight oil that suits local conditions and your preference (lighter for less damping; heavier for more damping).

3. After filling, slowly pump the outer tubes up and down to distribute the oil.
4. Inspect "O" ring on fork cap bolts and replace if damaged.
5. Tighten all pinch bolts with specified torque.

Tightening torque: Inner tube to handle crown (upper bracket): 2.0 m-kg (14.4 ft-lb) Inner tube to under bracket: 2.0 m-kg (14.4 ft-lb)

STEERING HEAD

Adjustment

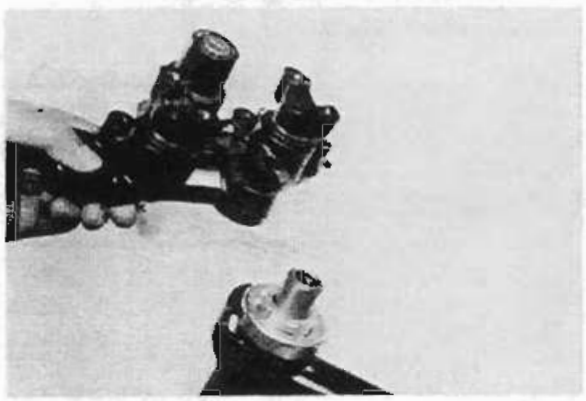
Refer to Chapter 2, Section 2-12, for steering head adjustment procedure.

Disassembly

1. Remove the seat and fuel tank.
2. Remove the front wheel and front fender.
3. Remove the front forks.
4. Remove the headlight stay with headlight, horn and flasher lights and put them aside.
5. Remove the meter bracket with the speedo and tacho-meter.
6. Remove the handlebar with lead wires and cables and put them aside.
7. Remove the upper bracket and main switch.



1. Steering fitting bolt



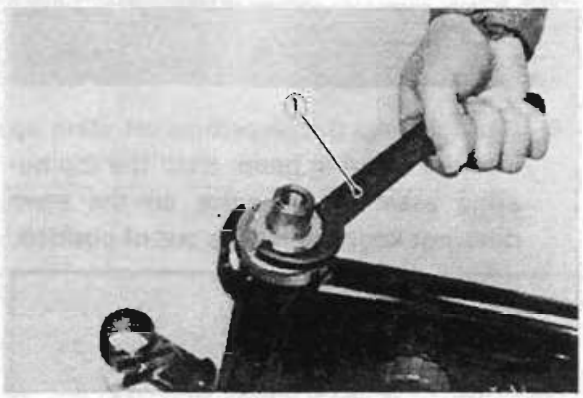
9. Remove the steering ring nut with the steering nut wrench.

NOTE:

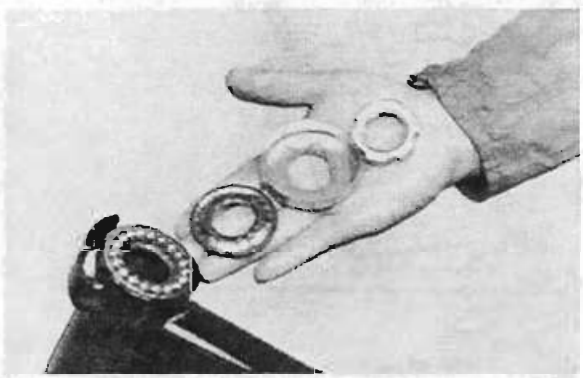
Support the under bracket with one hand to hold the bracket up into the head pipe so that the loose ball bearings will not fall out.

10. While still supporting the under bracket, carefully lift off the upper bearing cover.
11. Lift off the top bearing race and remove all of the ball bearings from the upper bearing assembly.

Ball quantity/size: 19 pcs., 1/4 in



1. Steering nut wrench

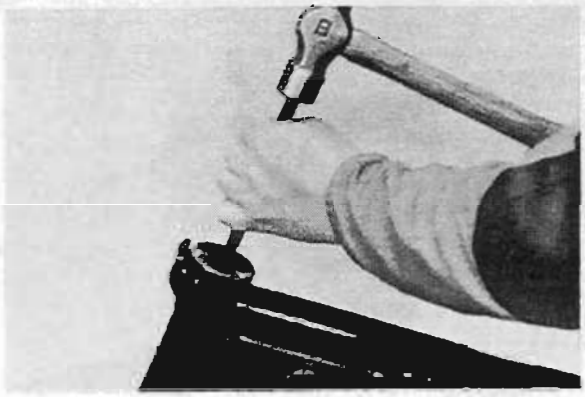


12. Remove the bracket while being very careful not to lose any ball bearings from the lower assembly.

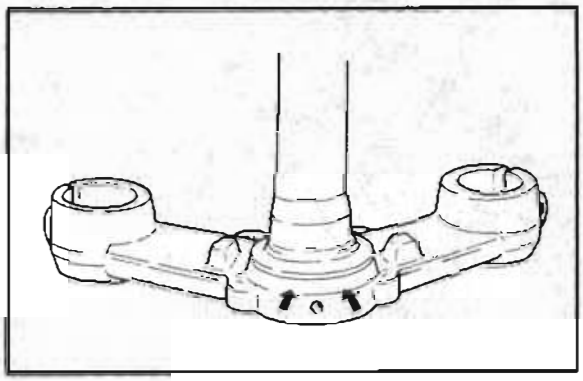
Ball quantity/size: 19 pcs., 1/4 in



13. Remove the bearing races from head pipe using a drift punch and hammer as shown. Work the race out gradually by tapping lightly around its complete diameter.



14. Remove the bearing race from the lower bracket by tapping around its diameter with a drift punch and hammer.



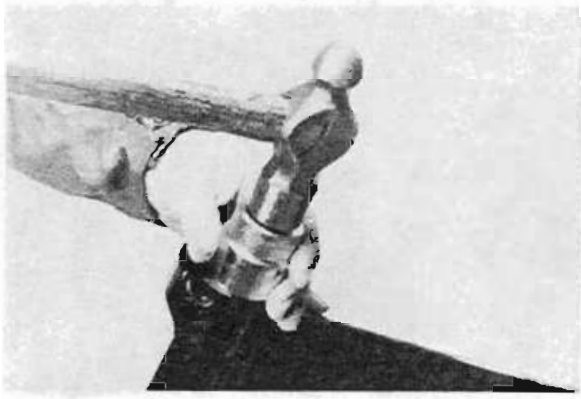
NOTE:
Remove the dust seal.

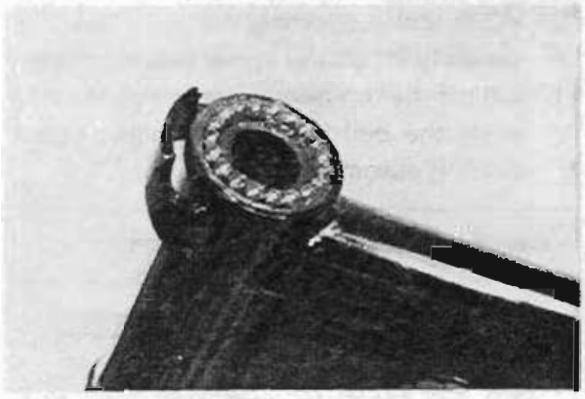
Inspection

1. 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.
2. Examine dust seal under lowest race and replace if damaged.

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.

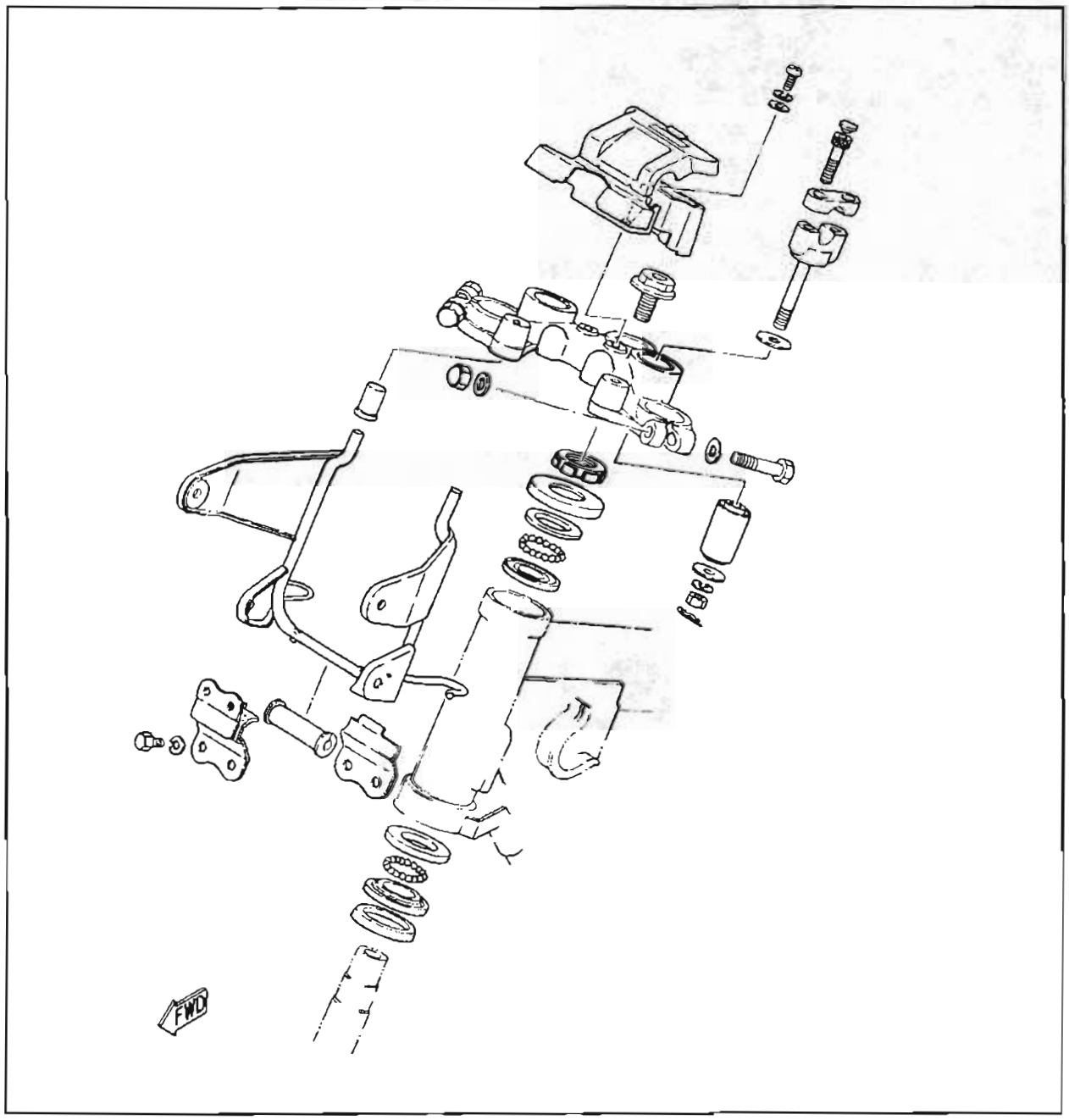




NOTE:

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

4. Carefully slip the underbracket stem up into the steering head. Hold the top bearing assembly in place so the stem does not knock and balls out of position.



5. Set the upper bearing cover on and install the ring nut. Tighten the ring nut so that all freeplay is taken up, but so the bracket can still pivot freely from lock to lock. Recheck for freeplay after the entire fork unit has been installed. (Refer to Chapter 2. "Steering head adjustment".)
6. Install the fork tubes into the underbracket.
7. Install the upper fork bracket. Tighten the steering fitting bolt. Torque to specification.

Tightening torque:
Steering fitting bolt:
5.3 m-kg (38.3 ft-lb)

8. Tighten the upper fork tube pinch bolts and torque to specification.

Upper fork tube pinch bolt torque:
2.0 m-kg (14.4 ft-lb)

NOTE:
Make certain that the tops of fork tubes are adjusted to the same level. If necessary, loosen underbracket pinch bolts and adjust.

9. Install the handlebars and torque to specification.

Handlebar mounting bolt torque:
2.0 m-kg (14.4 ft-lb)

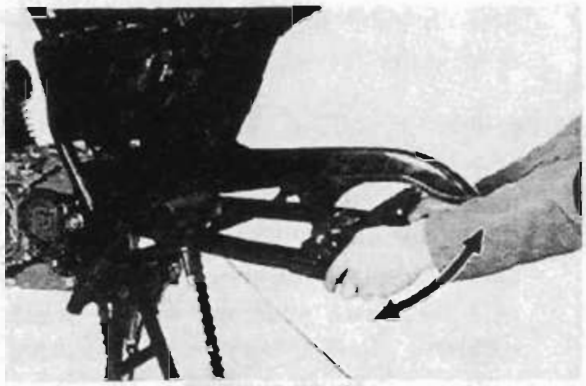
10. Install the front wheel.
11. Reconnect the clutch, front brake and check operation.

SWING ARM

Inspection

1. With the rear wheel and shock absorbers removed, grasp the ends of the arm and move from right to left to check for the freeplay.

Swing arm freeplay:
1.0 mm (0.04 in)



2. If the freeplay is excessive, remove the swing arm and replace the swing arm bushes.

Lubrication

1. This model is equipped with the oilless bushes, but it is recommended to apply grease on the bushes lightly.

Recommended lubricant:
Lithium soap base grease

2. Wipe off excess grease.

Removal

1. Remove the nut on the swing arm pivot shaft and tap out the shaft with a long aluminum or brass rod.

NOTE:
Carefully remove the arm while noting the location of bushes, oil seal and plate washers.

Pivot shaft torque:
6.5 m-kg (47.0 ft-lb)

2. Tap out the old bushes from each side of the pivot using the long rod.
3. Install the new bushes using a press.

NOTE:
Do not hammer in the bushes when installing; it may result in breakage to the bushes.

REAR SHOCK ABSORBER

Removal

1. Remove one rear shock absorber at a time, inspect and reinstall before removing the other.

Inspection

1. Check the rod. If it is bent or damaged, replace the shock absorber.
2. Check for oil leakage. If oil leakage is evident, replace the shock absorber.
3. Operate shock absorber rod to check damping. There should be no noticeable damping as shock extends.
4. Install the shock absorber on the motorcycle.

Rear shock absorber tightening torque:
3.0 m-kg (21.5 ft-lb)

CABLES AND FITTINGS

Cable Maintenance

NOTE:
See General Maintenance/Lubrication Charts for additional information.

Cable maintenance is primarily concerned with preventing deterioration through rust and weathering and providing for proper lubrication to allow the cable to move 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 of paramount importance, 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 vertical position. Apply lubricant to uppermost end of cable. Leave in vertical position until lubricant appears at bottom end. Allow excess to drain and re-install.

Recommended lubricant:
YAMAHA CHAIN AND CABLE LUBE, or SAE 10W/30 motor oil

Throttle Maintenance

1. Remove two Phillips head screws from throttle housing assembly and separate two halves of housing.
2. Disconnect cable end from throttle grip assembly and remove grip assembly.
3. Wash all parts in mild solvent and check contact surfaces for burrs or other damage. (Also clean and inspect righthand end of handlebar.)
4. Lubricate contact surfaces with light coat of lithium soap base grease and reassemble.

NOTE:
Tighten housing screws evenly to maintain an even gap between the two halves.

5. Check for smooth throttle operation and quick spring return when released and make certain that housing does not rotate on handlebar.

Lubrication of Levers, Pedals, etc.

1. Lubricate the pivoting parts of the brake and clutch levers with recommended lubricant.

Recommended lubricant:
YAMAHA CHAIN AND CABLE LUBE, or SAE 10W/30 motor oil

2. Lubricate the shaft of the brake pedal with lithium soap grease.

CHAPTER 6. ELECTRICAL SYSTEM

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SPARK PLUG 6-4

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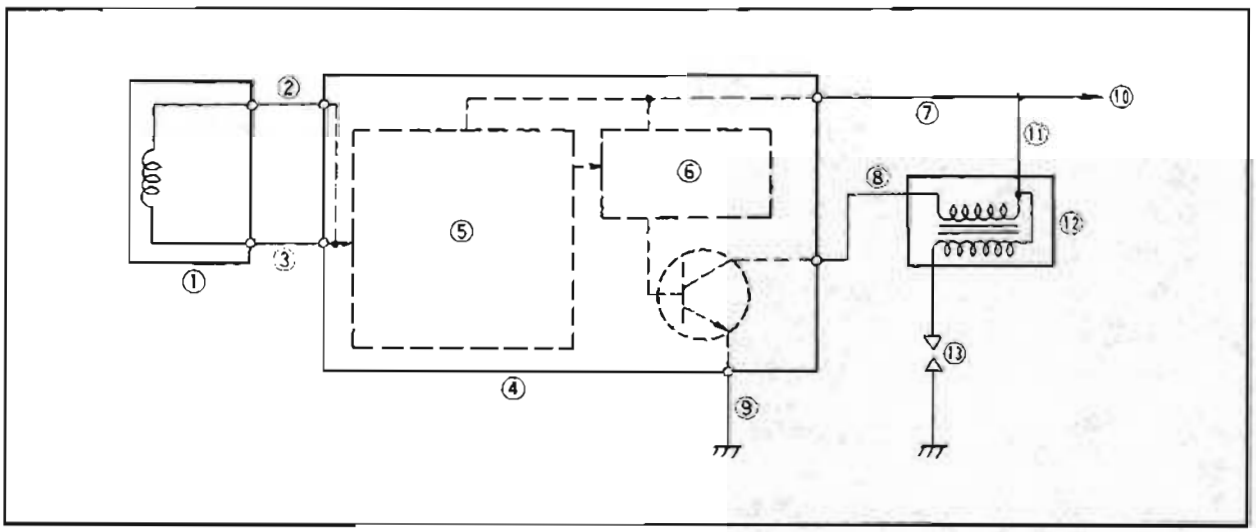
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CHAPTER 6. ELECTRICAL SYSTEM

IGNITION SYSTEM

Block Diagram



1. Pick-up coil
2. White/Red
3. White/Green
4. T.C.I. unit
5. Duty control, ignition advance control, and protective circuit
6. Amplifier
7. Red/White
8. Orange
9. Black
10. To engine stop switch
11. Red/White
12. Ignition coil
13. Spark plug

Description

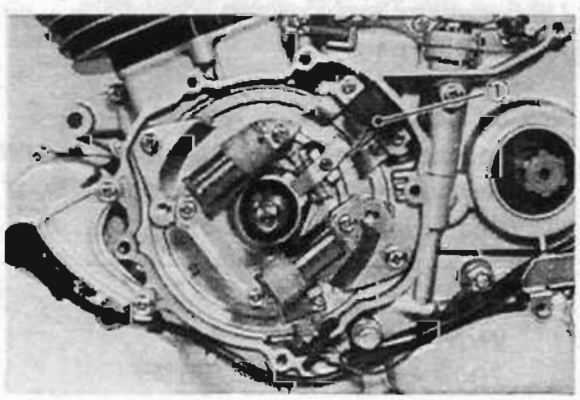
This model is equipped with a battery operated, fully transistorized breakerless ignition system. By using magnetic pick-up coil the need for contact breaker points is eliminated. This adds to the dependability of the system by eliminating frequent cleaning and adjustment of points and ignition timing. This TCI unit incorporates an automatic advance circuit controlled by signals generated by the pick-up coil. This adds to the dependability of the system by eliminating the mechanical advancer. This TCI (Transistor Control Ignition) system consists of two main units; a pick-up unit and an ignitor unit.

Operation

The TCI (Transistor Control Ignition) functions on the same principle as a conventional DC ignition system with the exception of using magnetic pick-up coil and a T.C.I. unit in place of contact breaker points.

a. Pick-up unit

This unit consists of a pick-up coil and a magnet mounted on the generator base. When the rotor projection passes this pick-up coil, the two signals are generated at the pick-up coil and transmitted to the ignitor unit as a signal. The full ignition advance is determined by the length of the rotor projection.

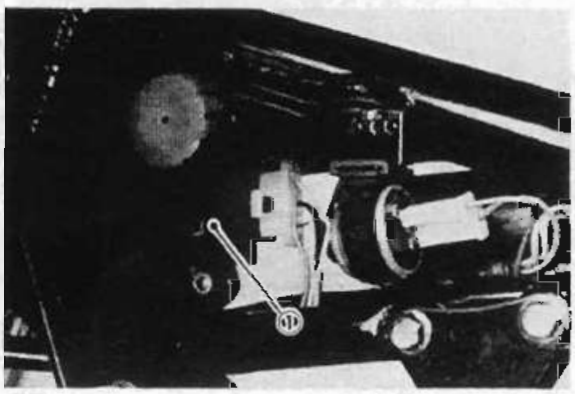


1 Pick-up coil

b. Ignitor Unit (T.C.I.)

This unit has such functions as the change of wave form, duty control, switching, and electrical ignition advance. The ignition timing is advanced electrically using two signals from the pick-up coil.

The duty control circuit is provided to control the on time period of the primary ignition current to reduce the electrical consumption. This unit also incorporates a protective circuit for the ignition coil. If the ignition switch is turned on and the crankshaft is not turned, the protective circuit stops current flow to the primary coil within a few seconds. When the crankshaft is turned over, the current is turned on again by the signals generated by the pick-up coil.



1. Ignitor unit

Ignition Timing

Refer to Chapter 2. "Ignition Timing".

If the ignition timing is not correct, replace the detective part.

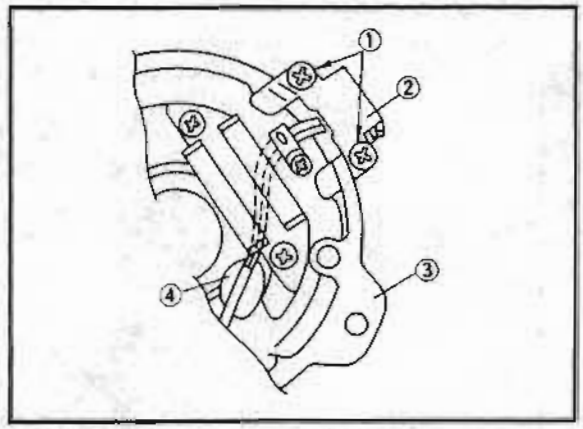
Pick-up Coil Resistance Test

Use a pocket tester or equivalent ohmmeter to determine resistance and continuity of pickup coil windings.

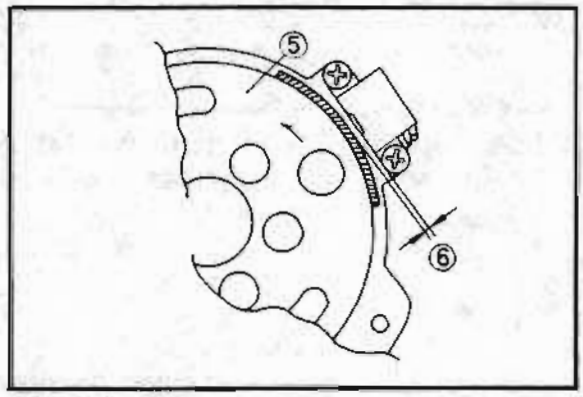
Pickup Coil:
W/R ~ W/G
700Ω ± 10% at 20°C (68°F)

Replacing Procedure of Pickup Coil

1. Take apart a defective pickup by removing the two holding panhead screws.
2. Move the protector tube to expose the solder connected part. Melt the solder to separate the connection.
3. Solder the leads from a new pickup to the above connection part.
4. Temporarily install the new pickup in its location but as far outward of the rotor as possible.
5. Set the rotor so that the projection on it faces the pickup. Supply an air gap of 0.6 mm (0.02 in) between the projection and the pickup, using a feeler gauge. Then tighten up the pickup in place.



1. Panhead screw
2. Pickup coil
3. Base assembly
4. Solder connected part



5. Flywheel magneto
6. Air gap

CAUTION:

The air gap must not be less than 0.6 mm (0.02 in).

Spark Gap Test

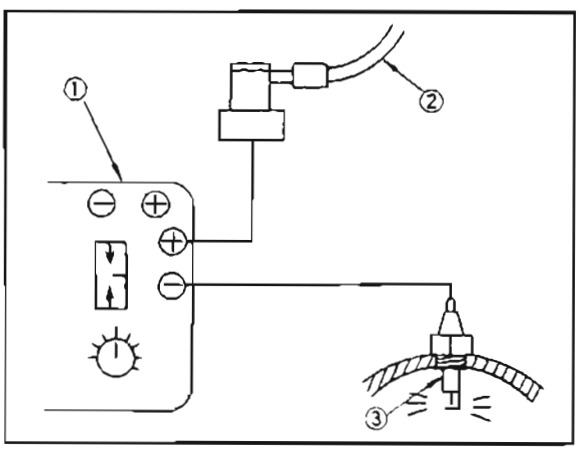
The entire ignition system can be checked for misfire and weak spark using the "Electro Tester"

If the ignition system will fire across a sufficient gap, the entire 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.
3. Start engine and increase spark gap until misfire occurs. (Test at various speed between idle and red line.)

Minimum Spark Gap: 6 mm (0.24 in)



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

CAUTION:

Do not run engine in neutral above 6,000 r/min for more than 1 or 2 seconds.

Ignition Coil Test

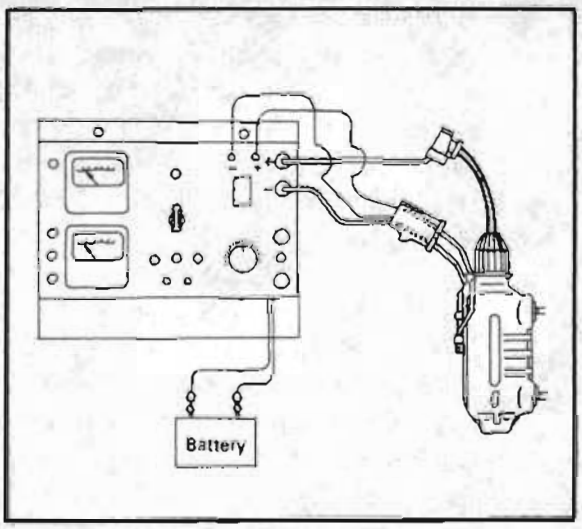
1. Coil spark gap test

a. Remove the fuel tank and disconnect ignition coil from wire harness and the spark plug.

b. Connct the Electro Tester as shown.

c. Connect fully charged 12V battery to tester.

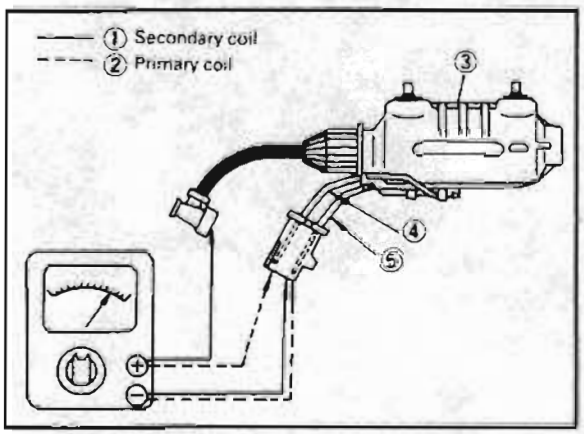
d. Turn on spark gap switch and increase gap until misfire occurs.



Minimum Spark Gap: 6 mm (0.24 in)

2. Coil winding resistance tests

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

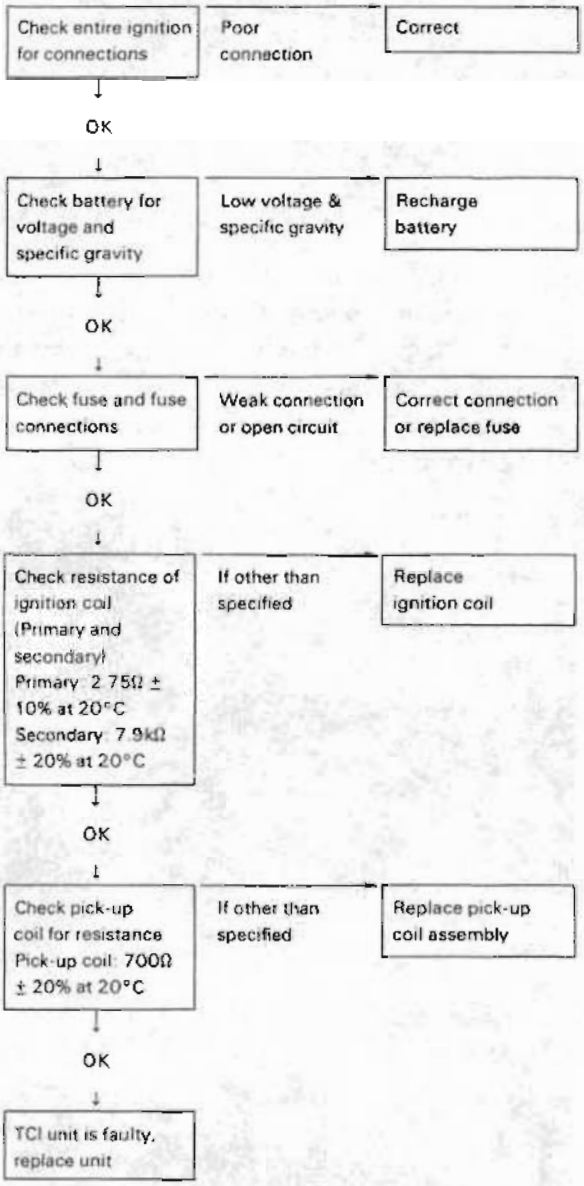


3. Ignition coil 5. Orange
4. Red/White

Primary Coil resistance Use (Ω x 1) scale	Secondary Coil resistance
2.75Ω ± 10% at 20°C	7.9kΩ ±20% at 20°C

Troubleshooting

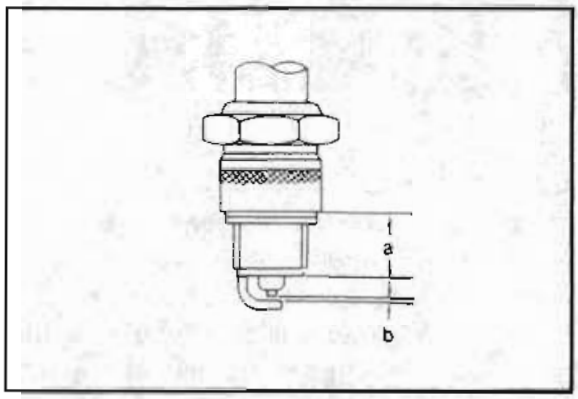
If the ignition system should become inoperative, the following troubleshooting aids will be useful.



SPARK PLUG

1. Check the electrode condition and wear, insulator color and electrode gap.
2. Use a wire gauge for measuring the plug gap.
3. If the electrodes become too worn, replace the spark plug.
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.

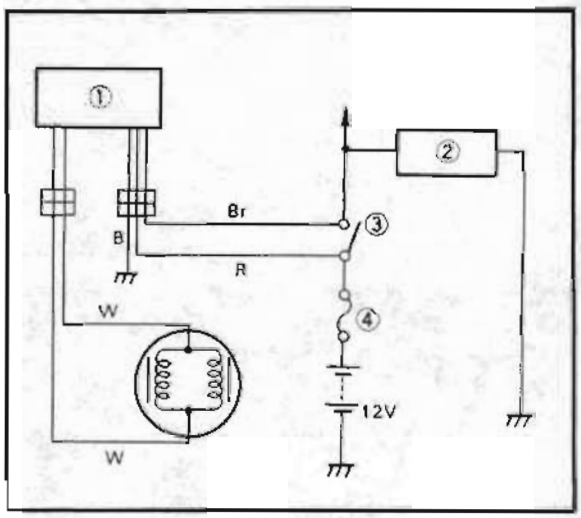
Type:
BP7ES (NGK) or W22EP (ND)
Electrode gap:
0.7 ~ 0.8 mm (0.028 ~ 0.031 in)
Tightening torque:
2.0 m-kg (14.5 ft-lb)



a. 19 mm (0.75 in)
b. 0.7 ~ 0.8 mm (0.027 ~ 0.031 in)

CHARGING SYSTEM

Block Diagram

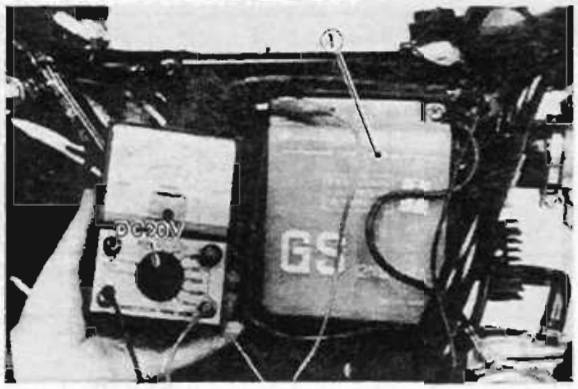


1. I.C. voltage regulator
2. Load
3. Main switch
4. Fuse

A.C. Magneto Generator Output Test

1. Checking method.
   1) Connect D.C. voltmeter to the battery terminals.
   2) Start the engine.
   3) Accelerate engine to approximately 2,000 r/min or more and check generated voltage.

Generated voltage: 14.5 ± 0.5V



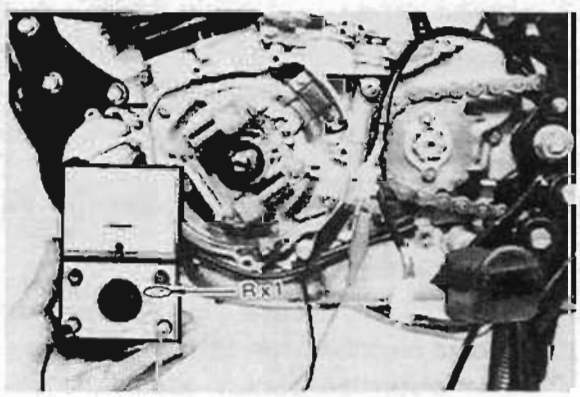
1. Battery

CAUTION:

Never disconnect wires from the battery while the generator is in operation. If the battery is disconnected, the voltage across the generator terminals will increase, damaging the semiconductors.

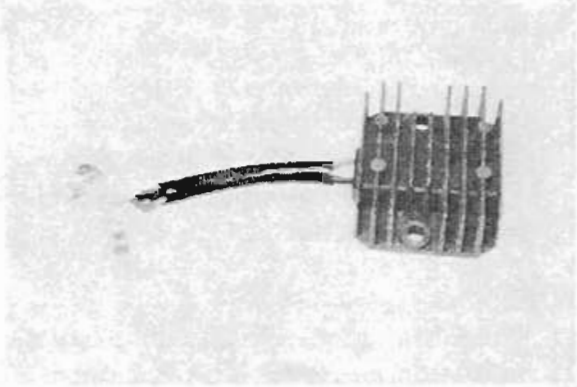
2. Resistance test of charging coil
   Check the resistance between terminals. If resistance is out of specification, check the coil connections. If the coil connections are good, then the coil is broken inside and it should be replaced.

Charging coil resistance:
WHITE ~ WHITE
0.39Ω ± 15% at 20°C (68°F)

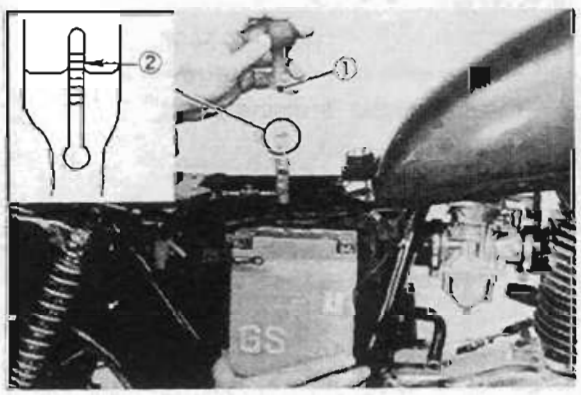


I.C. Voltage Regulator with Rectifier

1. Inspection
   Since I.C. regulator is sealed with a resin, it is impossible to check or replace any of inner parts. If the regulator is found to be defective, it must be replace with a new one.

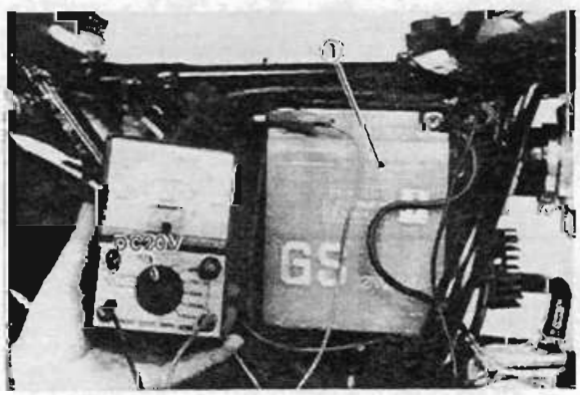


2. Checking method
   a. Measure the specific gravity of the battery fluid. If it is less than 1.260, remove the battery and recharge until it is more than 1.260. (See page 6-7 for charging procedures)



1 Hydrometer
2 Reading

   b. Connect D.C. voltmeter to the battery terminals.



1. Battery

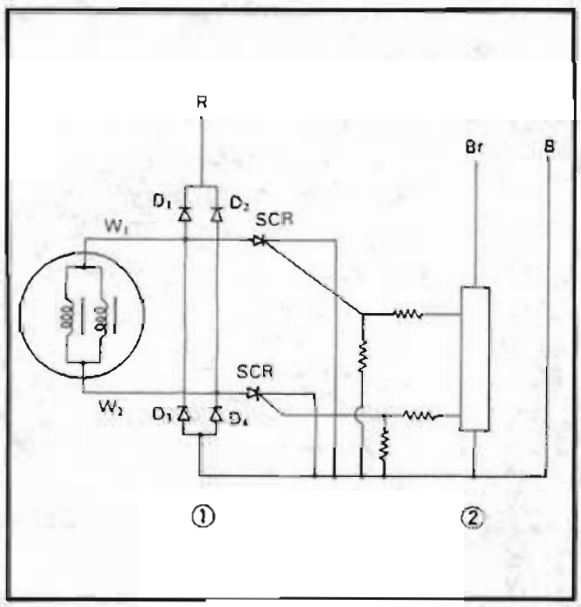
   c. Start engine.
   d. Accelerate engine to approximately 2,000 r/min. or more and check regulated voltage.

Regulated voltage: 14.5 ± 0.5V

e. If voltage is off, check battery and generator. If generator and battery are good, then IC regulator is broken and it should be replaced.

NOTE:

1. Never disconnect wires from the battery while the generator is in operation. If the battery is disconnected, the voltage across the generator terminals will increase, damaging the semiconductors.
2. When checking the regulator being installed on a motorcycle, the battery should not be removed, and it should be fully charged.
3. Never use a high voltage insulation ohmmeter such as a megaohmmeter for such a test. If high voltage is applied to the regulator terminals, the regulator will be damaged.



1 Rectifier
2 Regulator

3. Checking the silicon rectifier
a. Check the silicon rectifier as specified using the Yamaha pocket tester.
b. Even if only one of the elements is broken, replace the entire assembly.

Checking element	Pocket test connecting point (+) (red)	Pocket test connecting point (−) (black)	Good	Replace (element shorted)	Replace (element opened)
D_1	R	W_1	○	○	×
	W_1	R	×	○	×
D_2	R	W_2	○	○	×
	W_2	R	×	○	×
D_3	W_1	B	○	○	×
	B	W_1	×	○	×
D_4	W_2	B	○	○	×
	B	W_2	×	○	×

○ Continuity ..... Resistance is approx. 10Ω
× Discontinuity (∞)

NOTE:

In the above table, symbols W_1 and W_2 are provided just for checking purposes; these are not shown on the actual motorcycle.

CAUTION:

The silicon rectifier can be damaged if subjected to overcharging. Special care should be taken n to avoid a short circuit and/or incorrect connection of the positive and negative leads at the battery. Never connect the rectifier directly to the battery to make a continuity check.

LIGHTING SYSTEM

Lighting Circuit

See Chapter 7. "Wiring Diagram"

Battery

The battery fluid should be checked at specified intervals.

1. Checking
a. If sulfation (white accumulations) occurs on plates due to lack of battery electrolyte, the battery should be replaced.
b. If the bottom of the cells are filled with corrosive material falling off plates, the battery should be replaced.
c. If the battery shows the following defects, it should be replaced.
1) The voltage will not rise to a specific value even after long hours charging.
2) No gassing occurs in any cell.

2. Service life
The service life of a battery is usually 2 to 3 years, but lack of care as described below will shorten the life of the battery.
a. Negligence in keeping battery topped off with distilled water.
b. Battery being left discharged.
c. Over-charging by rushing charge.
d. Freezing.
e. Filling with water or sulfuric acid containing impurities.
f. Improper charging voltage/current on new battery.

Battery type	12V, 12AH
Electrolyte	Specific gravity: 1.280 Quantity: 800 cm^3
Re-charging current	1.2 Amperes/10 hours (or unit specific gravity reaches 1.280)
Re-fill fluid	Distilled water to maximum level line
Re-fill period	Check once per month or more often as required.

3. Storage
If the motorcycle is not used for a long time, remove the battery and have it stored by a battery service shop. The following instructions should be observed by shops equipped with charger.
a. Recharge the battery.
b. Store the battery in a cool, by place, and avoid temperatures below 0°C (32°F).
c. Recharge the battery before reinstallation.

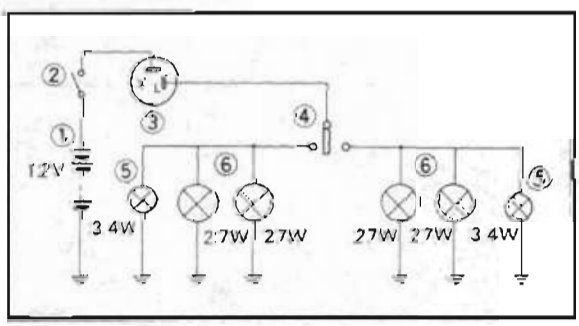
Lighting Tests and Checks

The 12V battery provides power for operation of the horn, taillight, brakelight, neutral light and flasher lights, etc. If none of the above operate, always check battery voltage before proceeding further. Low battery voltage indicates either a faulty battery, low battery water, or a defective charging system. See Charging system, for checks of battery and charging system.

1. Horn does not work.
a. Check for 12V on brown wire to horn.
b. Check for good grounding of horn (pink wire) when horn button is pressed.
2. Brakelight does not work.
a. Replace bulb.
b. Check for 12V on yellow wire to brakelight.
c Check for 12V on brown wire to each brake switch (front brake and rear brake switches)
d. Check for ground on black wire to tail/brakelight assembly.
3. Taillight does not work.
a. Replace bulb.
b. Check for 12V on blue wire.
c. Check for ground on black wire to tail/brakelight assembly.
4. Flasherlight(s) do not work.
a. Replace bulb.
b. Right circuit.
1) Check for 12V on dark green wire to light.
2) Check for ground on black wire to light assembly.
c Left circuit
1) Check for 12V on dark brown wire to light.
2) Check for ground on black wire to light assembly.
d. Right and left circuits do not work.
1) Check for 12V on brown wire to flasher switch on left handlebar.
2) Check for 12V on brown wire to flasher relay.
3) Replace flasher relay.
4) Replace flasher switch.

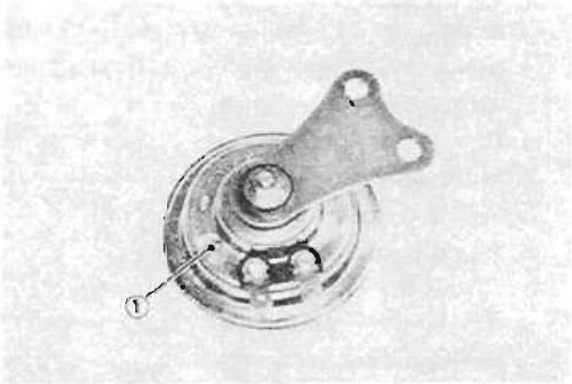
Flasher Relay and Horn

1. Flasher relay:
The flasher relay is employed 12V, heat ribbon type.



1. Battery
2. Main switch
3. Flasher relay
4. Flasher switch
5. Flasher indicator light
6. Flasher light

2. Horn:
The horn is a 12V, plane type, and has a tone volume adjusting screw on its back.



1. Adjusting screw

Switches

The main switch and right and left handlebar switches may be checked for continuity or shorts with a Pocket Tester on the (Ω — 1) scale.

1. Main switch

	R	Br	L/R		
ON	○	○	○		
OFF				•	
LOCK				•	••
P	○		○	•	••

• The key can be removed in this position.
•• The handlebar can be locked in this position.

2. Engine stop switch

	Br	R/W
OFF		
RUN	○	○
OFF		

3. Dimmer switch

	Y	L/B	G
HI	○	○	
LO		○	○

4. Flasher switch

	Og	Br/W	Ch
R	○	○	
N			
L		○	○

5. Horn button

	P	Ground
OFF		
PUSH	○	○

6. "Start" botton

	Br	L/B	L/W	Ground
	○	○		
PUSH			○	○

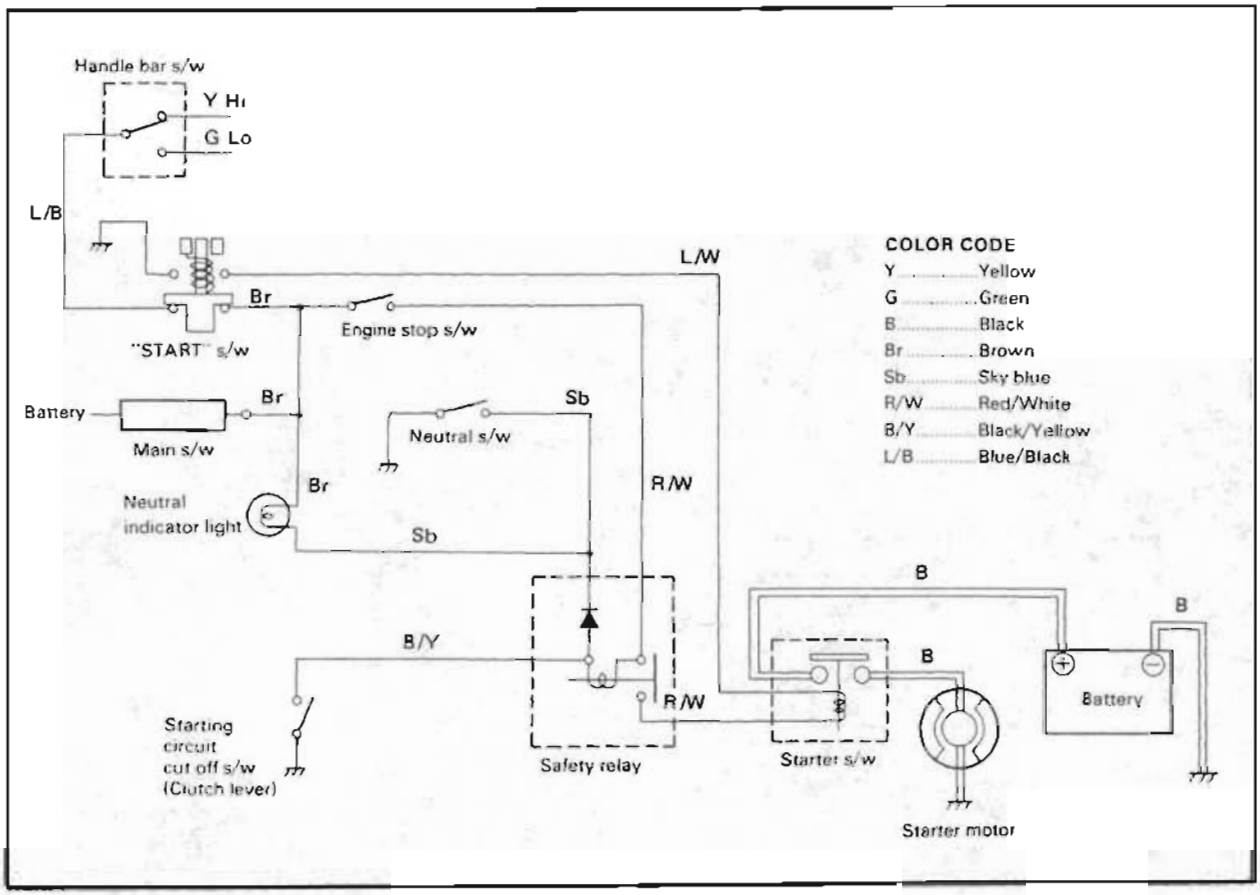
STARTING SYSTEM

Description

This model is equipped with a starting circuit cut-off switch. The starter motor is so designed that it can be started only when the transmission is in Neutral or the clutch is disengaged.

Accordingly, the starter motor will not start when the transmission is shifted into any position other than neutral, unless the clutch lever is pulled in.

In addition, the starter switch is so constructed that when the "START" switch is turned on, the headlight goes off.



Function of the Diode in the Relay

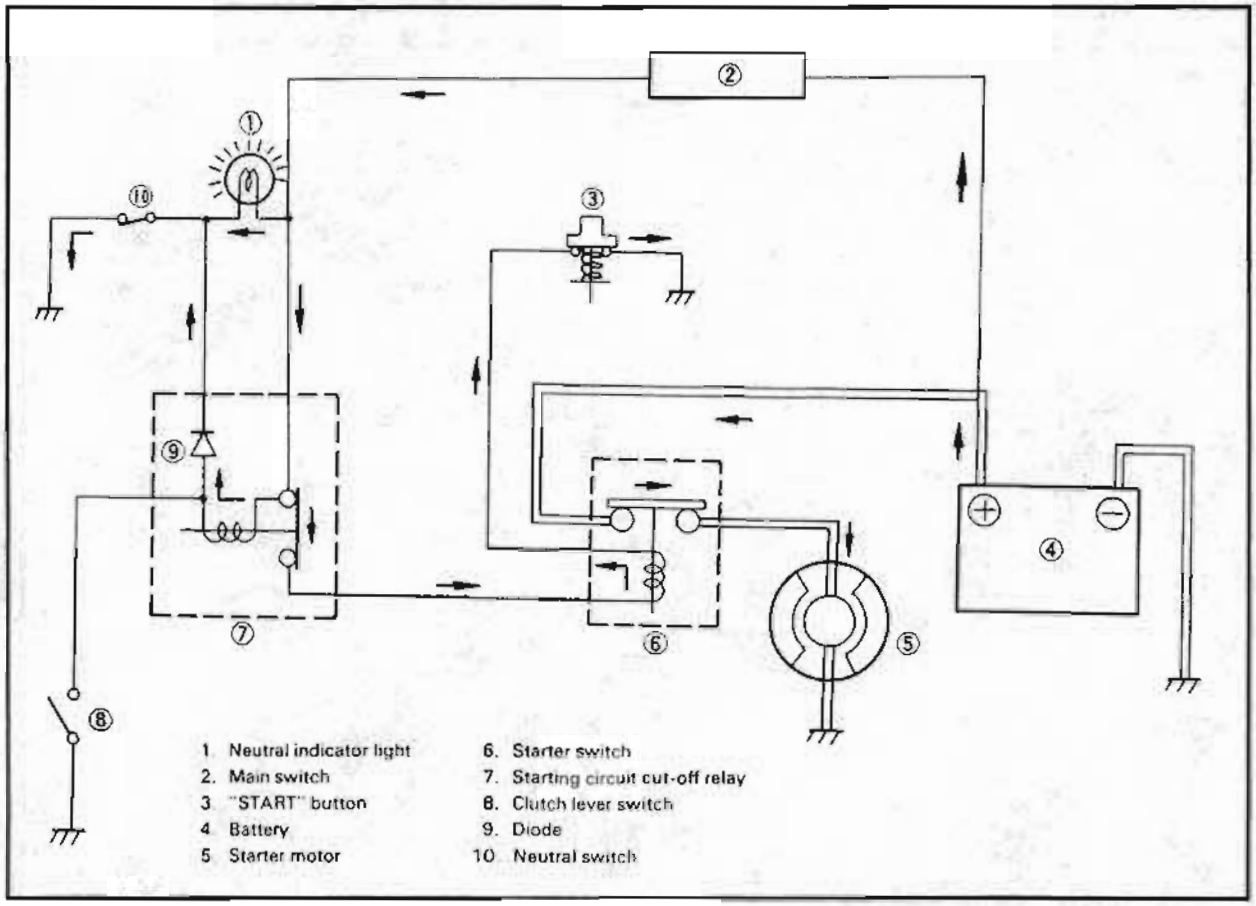
When the transmission is in a position other than Neutral:

Turning on the clutch lever switch (Clutch is disengaged by pulling the clutch lever) makes the safety relay to turn on.

In this case, the diode interrupts the flow of current from the main switch to the neutral indicator light and to the relay, and thus the light will not come on.

Operation

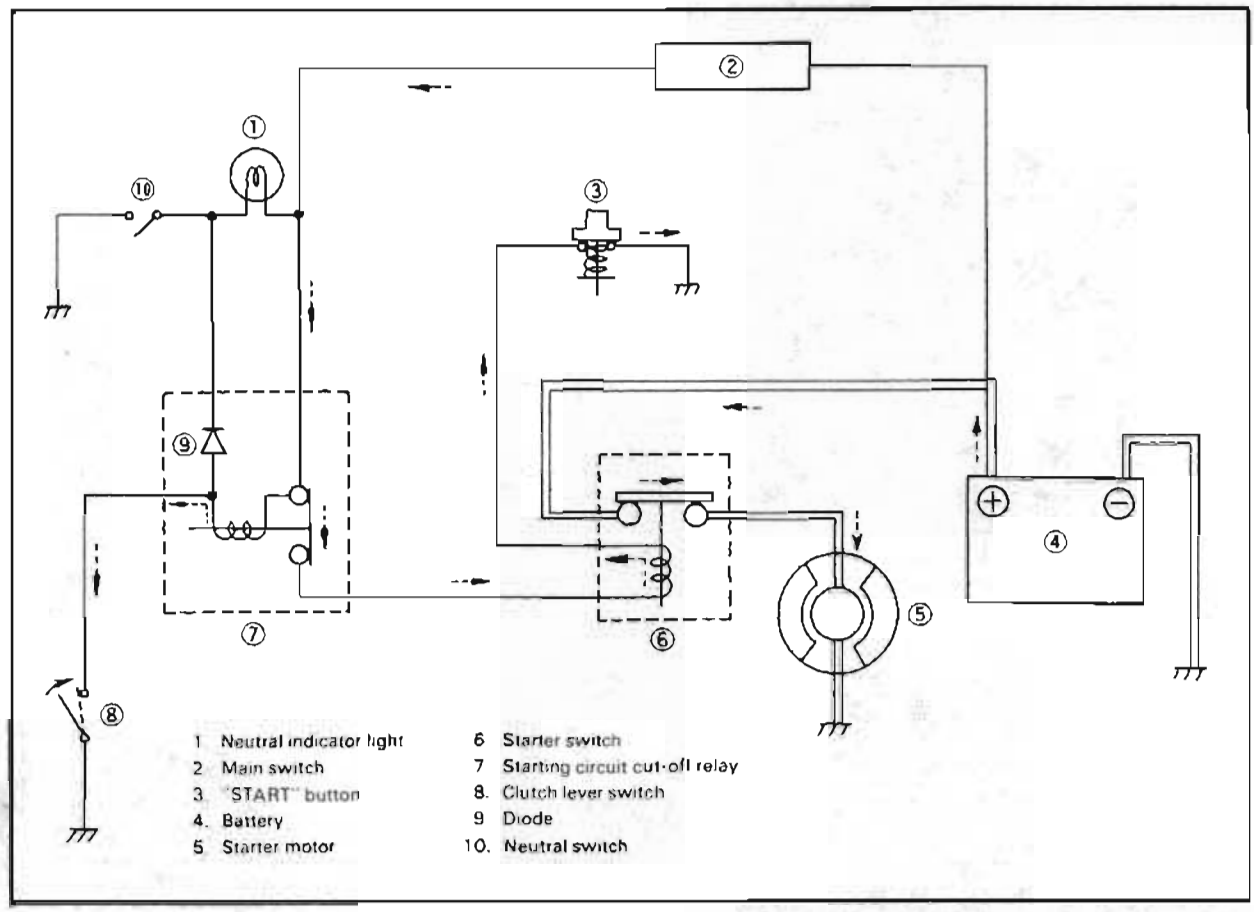
a) When the transmission is in Neutral:
Neutral switch .....ON
Clutch lever switch .....OFF or ON
○ When the main switch is turned on while the transmission is in neutral the starting circuit cut-off relay circuit is closed and the relay is actuated.



○ When the "START" button is pressed, the circuit from the main switch to the relay — starter switch assembly — "START" (button) is closed, and the starter switch assembly is turned on, thus causing the starter motor to start.

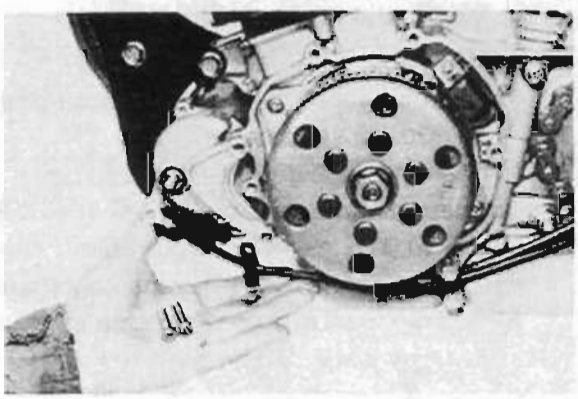
b) When the clutch lever is released while the transmission is in position other than neutral:
Neutral switch.....OFF
Clutch lever switch.....OFF
○ Since the starting circuit cut-off is kept open, the relay is not actuated, and it is impossible to turn on the starter switch assembly by pushing the "START" button.
As a result, the starter motor does not run.

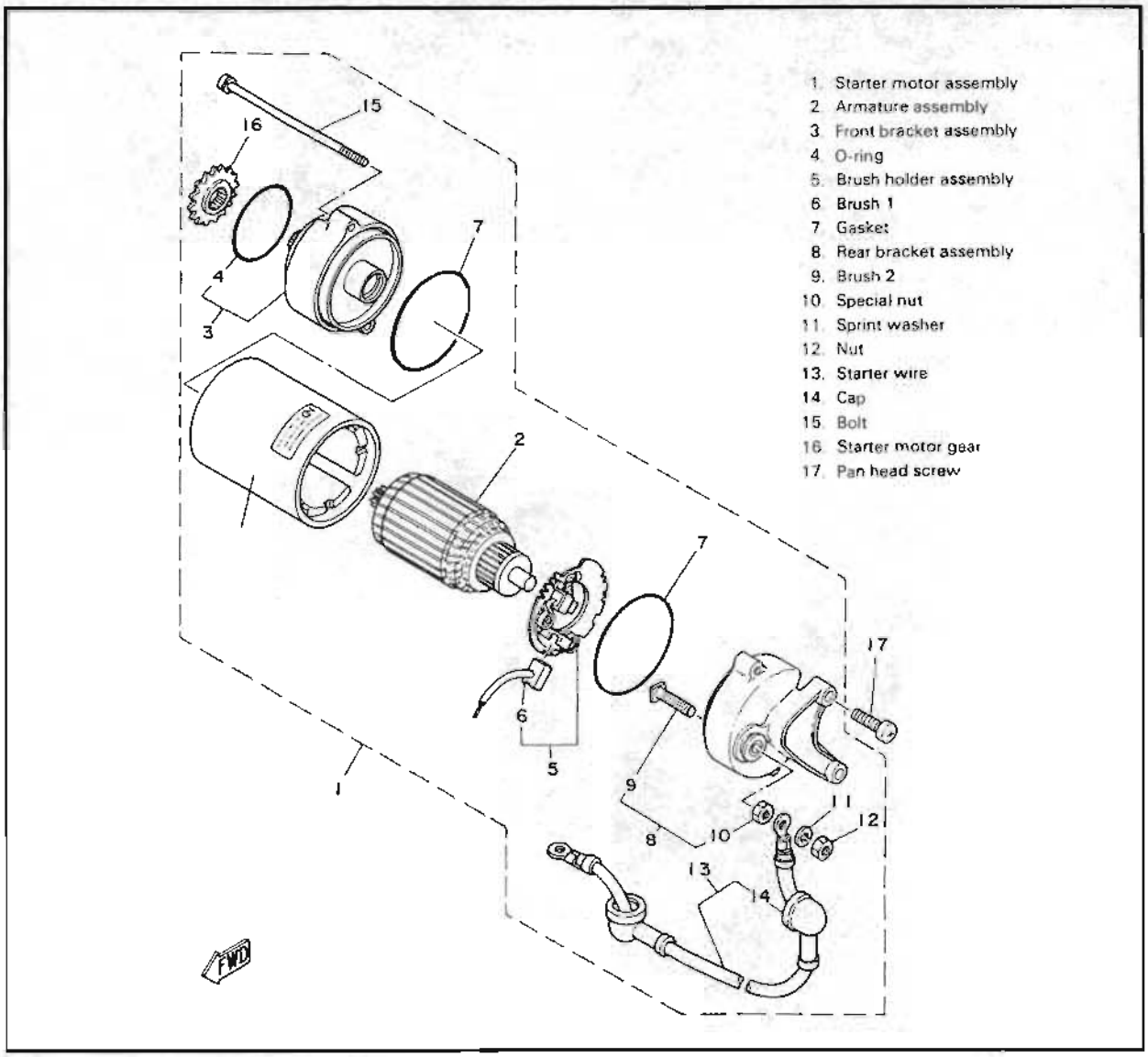
c) When the clutch lever is disengaged by pulling in the clutch lever while the transmission is in a position other than neutral:
Neutral switch.....OFF
Clutch lever switch .....ON
Since the clutch lever switch is on while the neutral switch is off, the following circuit — main switch — starting circuit cut off relay — clutch lever switch is closed and the relay is actuated.
The subsequent operation is the same as a).



Starter Motor Removal

1. Disconnect the wires from the battery. Remove the negative wire first.
2. Remove the left crankcase cover.
3. Disconnect the wires from the starter motor.
4. Remove the starter motor by loosening two securing bolts.
5. Place an oil pan under the engine, and drain the engine oil.
6. Remove the right crankcase cover.



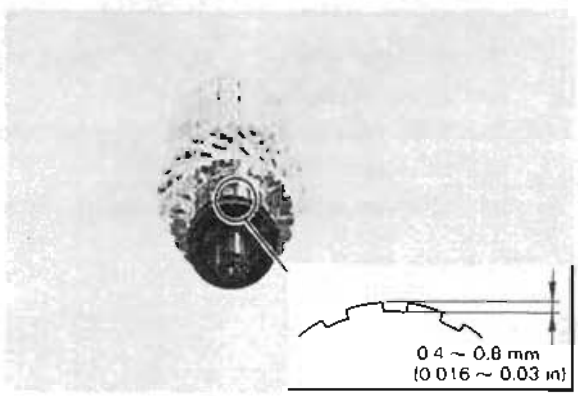


Starter Motor Inspection

1. Check the outer surface of the commutator. If its surface is dirty, clean with No. 600 grit sand paper.
2. The mica insulation between commutator segments should be 0.4 ~ 0.8 mm (0.016 ~ 0.03 in) below the segment level. If not, scrape to proper limits with appropriately shaped tool. (A hack saw blade can be ground to fit.)

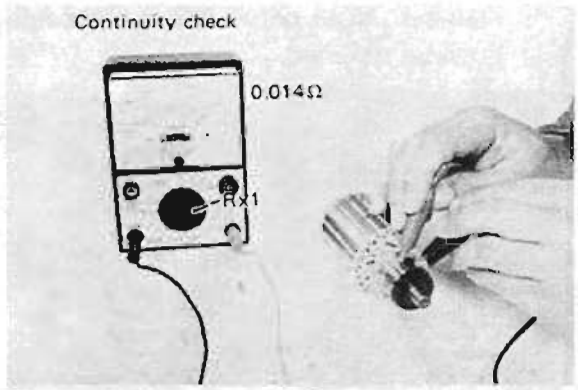
NOTE:

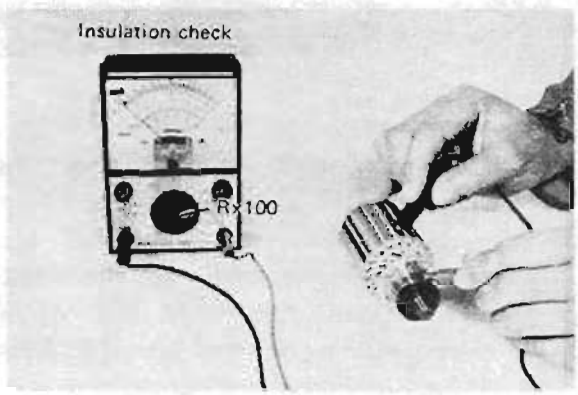
Mica insulation of commutator must be undercut to ensure proper operation of commutator.



3. The starter's armature should be checked with an ohm meter for insulation breakdown (shorting to each other or to ground) and for continuity. Reference figure is given below.

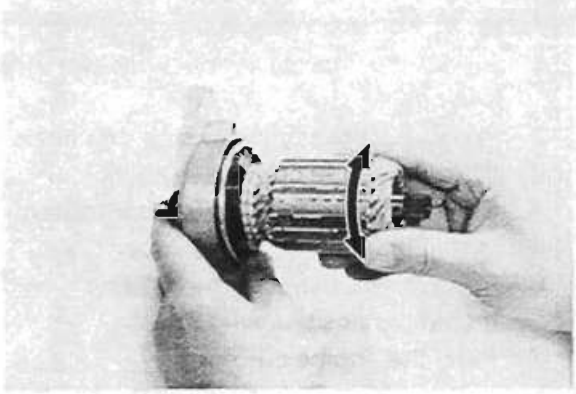
Coil resistance:
Armature coil: 0.014Ω (20°C)





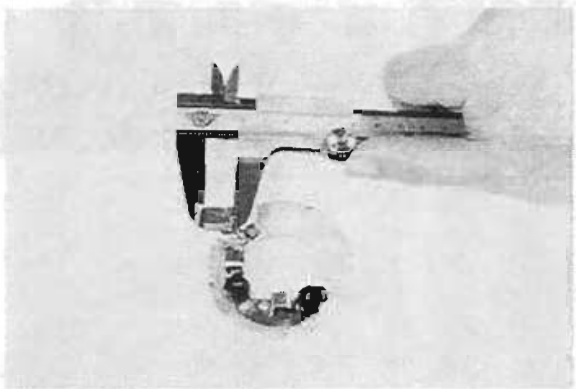
4. Check the front and rear cover bushes for damage. If damaged, the starter assembly must be replaced.





5. Check brush length. Replace brush if at, or near, limits.

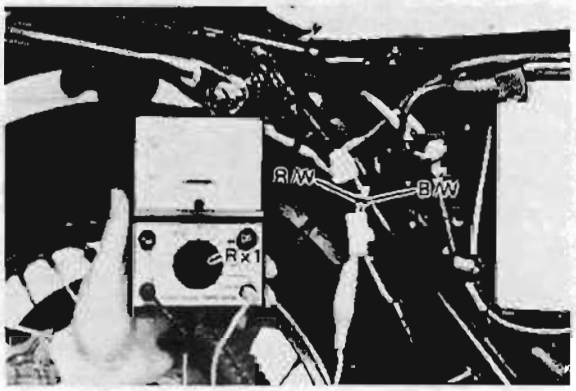
Minimum brush length:
8.5 mm (0.33 in)



6. Check brush spring pressure. Compare it with a new spring. Replace the old spring if it is weak.

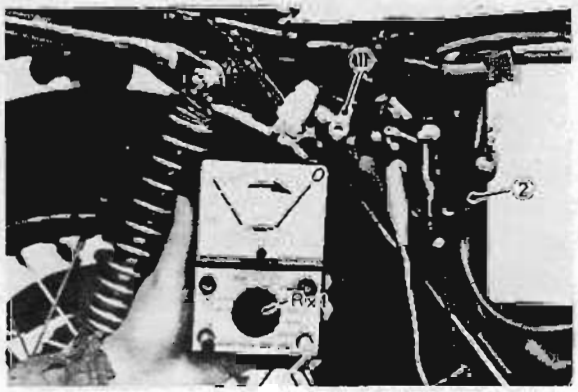
Starter Motor Installation

1. Install the starter motor with the gear and chain.
2. Install the starter motor securing bolts.
3. Install the right crankcase cover.
4. Connect the wire to the starter motor.
5. Install the left crankcase cover.
6. Connect the wires to the battery. Install the positive wire first.
7. Refill the engine oil.



Starter Relay Switch Inspection

1. Disconnect starter relay leads at the relay.
2. Connect pocket tester leads to the relay terminals (ohms x 1 scale).
3. Turn ignition to "ON" position and engine stop switch to "RUN".
4. Push the starter button. The relay should click once and the scale should read zero does not read zero, the relay must be replaced.



1. Battery lead wire (+)
2. Starter motor lead wire

5. If the relay does not click, check the wires from the starter button and from the battery. Turn the ignition off. Use (ohms x 1) scale on tester. The resistance between (red/white, blue/white) wires should be no more than 3.5 ohms. If there is more resistance, the relay should be replaced.

CHAPTER 7. APPENDICES

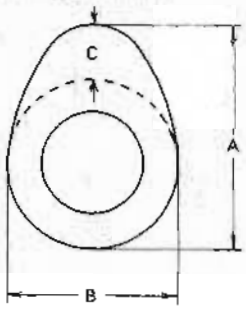
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SPECIFICATIONS

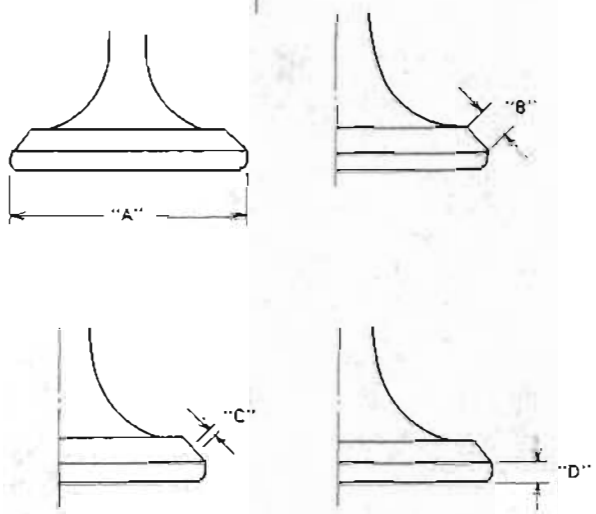
General Specifications

Item	Required ≪Allowance≫
Model:	
I.B.M. No.	3Y6
Frame I.D. and starting number	3Y6-000101
Engine I.D. and starting number	3Y6-000101
Dimension:	
Overall length	2,005 mm (78.9 in)
Overall width	815 mm (32.1 in)
Overall height	1,125 mm (44.3 in)
Wheelbase	1,335 mm (52.6 in)
Minimum ground clearance	145 mm (5.7 in)
Weight:	
Net weight	121 kg (267 lb)
Performance:	
Climbing ability	30°
Minimum turning radius	2,300 mm (90.6 in)
Brake distance	14m (45.9 ft) at 50 km/h (31 mph)

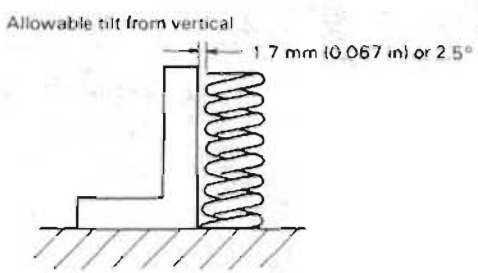
Engine Specifications

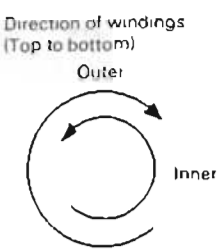
Item	Required ≪Allowance≫
Description:	
Engine type	Air cooled 4-stroke, forward incline, single, S.O.H.C.
Engine model	3Y6
Displacement	249 cm^3 (15.19 cu.in)
Bore x stroke	75 x 56.5 mm (2.953 x 2.224 in)
Compression ratio	9.2 : 1
Starting system	Electric starter
Ignition system	Battery ignition (Full transistor ignition)
Lubrication system	Pressure lubricated, wet sump
Cylinder head:	
Combustion chamber type	Sphere + Squish
Combustion chamber volume (with BP7ES or W22EP)	30.4 cm^3 (1.85 cu.in)
Head gasket thickness	1.0 mm (0.039 in)
Camshaft:	
Cam drive type	Drive chain (left side drive)
Camshaft bearing type (left)	Ball bearing
(right)	Needle bearing
Cam chain type and No. of links	BF05M, 90L
Vam dimensions:	
 A (Cam height) IN.	40.20 ± 0.05 mm ≪40.05 mm≫
	(1.583 ± 0.002 in ≪1.576 in≫)
EX.	40.25 ± 0.05 mm ≪40.10 mm≫
	(1.585 ± 0.002 in ≪1.579 in≫)
B (Base circle) IN.	32.14 ± 0.05 mm ≪31.99 mm≫
	(1.265 ± 0.002 in ≪1.260 in≫)
EX.	32.16 ± 0.05 mm ≪31.07 mm≫
	(1.266 ± 0.002 in ≪1.221 in≫)
C (Cam lift) IN.	8.20 mm (0.323 in)
EX.	8.25 mm (0.325 in)

Item	Required ≪Allowance≫
Camshaft runout limit	≪0.1 mm (0.0039 in)≫
Valve timing:	
Intake open	BTDC 28°
Intake close	ABDC 68°
Duration	276°
Exhaust open	BBDC 64°
Exhaust close	ATDC 32°
Exhaust duration	276°
Valve over lap	60°
Rocker arm and rocker shaft:	
Rocker arm bearing dia. (I.D.)	12.00 ~ 12.02 mm ≪12.05 mm≫ (0.4724 ~ 0.4732 in ≪0.4744 in≫)
Rocker arm shaft dia. (O.D.)	11.98 ~ 11.99 mm ≪11.96 mm≫ (0.4714 ~ 0.4720 in ≪0.4709 in≫)
Clearance	0.01 ~ 0.04 mm ≪0.11 mm≫ (0.0004 ~ 0.0016 in ≪0.0043 in≫)
Valve, valve seat and valve guide:	
Valve clearance (cold): IN.	0.05 ~ 0.10 mm (0.0020 ~ 0.0039 in)
EX.	0.12 ~ 0.17 mm (0.0047 ~ 0.0067 in)
No. of valves per cylinder	2 pcs.
Dimensions:	

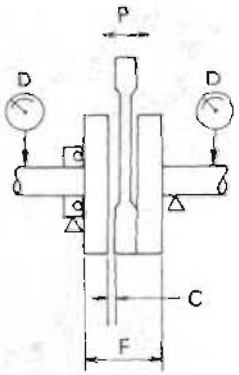


Item	Required ≪Allowance≫
Valve head dia. (A): IN.	38 mm (1.496 in)
EX.	32 mm (1.260 in)
Valve face width (B): IN.	2.26 mm (0.089 in)
EX.	2.26 mm (0.089 in)
Valve seat width (C): IN.	1.1 mm (0.043 in)
EX.	1.1 mm (0.043 in)
Valve margin thickness (D): IN.	1.2 mm (0.047 in)
EX.	1.0 mm (0.039 in)
Valve stem outside dia.: IN.	7 $^{-0.010}_{-0.025}$ mm (0.276 $^{-0.0004}_{-0.0010}$ in)
EX.	7 $^{-0.030}_{-0.045}$ mm (0.276 $^{-0.0012}_{-0.0018}$ in)
Valve guide inside dia.: IN.	7 $^{+0.012}_{0}$ mm (0.276 $^{-0.005}_{0}$ in)
EX.	7 $^{+0.012}_{0}$ mm (0.276 $^{+0.005}_{0}$ in)
Valve stem to guide clearance: IN.	0.010 ~ 0.037 mm ≪0.07 mm≫ (0.0004 ~ 0.0015 in ≪0.0028 in≫)
EX.	0.030 ~ 0.057 mm ≪0.1 mm≫ (0.0012 ~ 0.0022 in ≪0.0039 in≫)
Valve springs:	
Free length: Inner	40 mm ≪38.8 mm≫ (1.57 in ≪1.528 in≫)
Outer	43.2 mm ≪41.9 mm≫ (1.70 in ≪1.650 in≫)
Spring rate: Inner	K_1 = 2.07 kg/mm (115.9 lb/in)
	K_2 = 2.71 kg/mm (151.8 lb/in)
Outer	K_1 = 3.90 kg/mm (218.4 lb/in)
	K_2 = 5.16 kg/mm (289.0 lb/in)
Installed length (valve closed): Inner	34.1 mm (1.34 in)
Outer	37.1 mm (1.46 in)
Installed pressure (valve closed): Inner	12.19 kg (26.88 lb)
Outer	23.72 kg (52.30 lb)
Compressed length (valve open): Inner	25.1 mm (0.988 in)
Outer	28.1 mm (1.11 in)
Compressed pressure (valve open): Inner	36.57 kg (80.64 lb)
Outer	70.13 kg (154.64 lb)
Wire diameter: Inner	3.0 mm (0.118 in)
Outer	4.2 mm (0.165 in)
Winding outside diameter: Inner	21.8 mm (0.858 in)
Outer	31.1 mm (1.224 in)
Tilt limit from vertical: Inner	1.7 mm (0.067 in) or 2.5°
Outer	1.7 mm (0.067 in) or 2.5°





Item	Required ≪Allowance≫
Cylinder:	
Material	Aluminum alloy with special cast iron sleeve
Bore size	75.00 ~ 75.02 mm ≪75.1 mm≫ (2.9528 ~ 2.9536 in ≪2.9567 in≫
Taper limit	≪0.05 mm≫ (≪0.0020 in≫)
Out of round limit	≪0.01 mm≫ (≪0.0004 in≫)
Piston:	
Piston clearance	0.035 ~ 0.055 mm (0.0014 ~ 0.0022 in)
Piston clearance measuring position (from piston skirt bottom)	5.5 mm (0.22 in)
Piston pin bore size	20.004 ~ 20.015 mm (0.7876 ~ 0.7880 in)
Piston pin outside diameter	19.995 ~ 20.000 mm (0.7872 ~ 0.7874 in)
Piston pin length	65 mm (2.56 in)
Over size piston diameter: 1st	75.25 mm (2.963 in)
2nd	75.50 mm (2.972 in)
3rd	75.75 mm (2.982 in)
4th	76.00 mm (2.992 in)
Piston ring:	
Piston ring dimension: Top ring B x T	1.2 x 2.9 mm (0.047 x 0.114 in)
2nd ring B x T	1.5 x 3.3 mm (0.059 x 0.130 in)
Oil ring B x T	2.8 x 3.4 mm (0.110 x 0.134 in)
Ring end gap (installed): Top ring	0.2 ~ 0.4 mm ≪0.7 mm≫ (0.0079 ~ 0.0157 in ≪0.028 in≫)
2nd ring	0.2 ~ 0.4 mm ≪0.7 mm≫ (0.0079 ~ 0.0157 in ≪0.028 in≫)
Oil ring	0.3 ~ 0.9 mm ≪1.0 mm≫ (0.012 ~ 0.035 in ≪0.038 in≫)
Ring groove side clearance: Top ring	0.04 ~ 0.08 mm ≪0.15 mm≫ (0.0016 ~ 0.0031 in ≪0.0059 in≫)
2nd ring	0.03 ~ 0.07 mm ≪0.15 mm≫ (0.0012 ~ 0.0028 in ≪0.0059 in≫)
Oil ring	N.A.
Over size piston ring: 1st	75.25 mm (2.963 in)
2nd	75.50 mm (2.972 in)
3rd	75.75 mm (2.982 in)
4th	76 mm (2.992 in)

Item	Required ≪Allowance≫
Big end bearing:	
Type	Needle bearing
Inside dia. x outside dia. x width	31 x 41 x 22 mm (1.22 x 1.61 x 0.87 in)
Needle dia. x length/quantity	5 x 17.8 mm (0.20 x 0.70 in)/14 pcs
Crankshaft:	
Crankshaft assembly width (F)	58.95 ~ 59.00 mm (2.3208 ~ 2.3228 in)
Crankshaft deflection (D)	≪0.03 mm (0.0012 in) or less≫
Connecting rod large end side clearance (C)	0.35 ~ 0.65 mm (0.0138 ~ 0.0256 in)
Connecting rod small end deflection (P)	0.8 ~ 1.0 mm ≪2.0 mm≫ (0.0315 ~ 0.0394 in ≪0.079 in≫)
	
Crank pin outside dia. x length	31 x 58 mm (1.22 x 2.28 in)
Crank bearing type: Left	6306RP—9—ST
Right	6307SH2—9—C4 with special heat treatment
Crank oil seal type: Left	SD—25—40—6 KS
right	S7—14—27—6 HS
Clutch:	
Clutch type	Wet, multiple disc type
Clutch push mechanism	Inner push, cam axle type
Primary reduction ratio and method	72/23 (3.130)
Primary reduction gear back lash number	183 ~ 185
Primary drive gear back lash number	15.81 $^{+0.01}_{-0.03}$ mm (3 Teeth)
Primary driven gear back lash number	40.03 $^{+0.01}_{-0.03}$ mm (7 Teeth)
Friction plate: Thickness/quantity	2.8 mm ≪2.5 mm≫/6 pcs. (0.110 in ≪0.098 in≫
Clutch plate: Thickness/quantity	1.2 mm/5 pcs. (0.047 in/5 pcs.)
Warp limit	≪0.05 mm (0.0020 in)≫
Clutch spring: Free length/quantity	34.6 mm ≪33.56 mm≫/4 pcs. (1.362 in ≪1.321 in≫/4 pcs.)
Spring set weight	20.65 kg/27 mm (45.53 lb/1.063 in)
Spring rate	2.6 kg/mm (145.6 lb/in)
Clutch housing thrust clearance	0.10 ~ 0.35 mm (0.004 ~ 0.014 in)
Push rod bending limit	≪0.2 mm (0.0079 in) or less≫
Push lever axle: Bearing type and size	Needle bearing (14—20—12)
Oil seal type and size	SD—14—26—6 HS
Transmission:	
Type	Constant mesh, 5 speed
Gear ratio: 1st	37/14 (2.642)
2nd	32/19 (1.684)
3rd	29/23 (1.260)
4th	26/26 (1.000)
5th	23/28 (0.821)

Item	Required ≪Allowance≫
Bearing type: Main axle (Left)	6003
Main axle (right)	6205
Drive axle (Left)	6305
Drive axle (right)	6004
Oil seal type: Drive axle (Left)	SD—25—45—6—L
Main axle (Left)	S—17—28—3.5
Secondary reduction ratio and method	46/16 (2.875), chain
Shifting mechanism:	
Operation system	Return type, left foot operation
Shifting type	Guide bar type, cam drum system
Oil seal type: Change lever	SD—12—22—5—HS
Air cleaner:	
Type/quantity	Oiled, form rubber/1 pc.
Carburetor:	
Type and manufacture/quantity	SOLEX B534-III MIKUNI/1 pc.
I.D. mark	3Y600
Main jet (M.J.)	#122.5
Main air jet (M.A.J.)	#100
Pilot air jet (P.A.J.)	#160
Jet needle: Clip position (J.N.)	5GP25
Needle jet (N.J.)	Y-5
Pilot jet (P.J.)	#47.5
Mixture screw turns out	Preset
Starter jet (G.S.)	#32.5
Fuel level	3 ± 1 mm (0.12 ± 0.04 in)
Idling engine speed	1,200 r/min
Lubrication:	
Transmission gear and engine sump oil	
Quantity	Total amount: 1.6 liter (1.69 US qt) Exchange with oil filter: 1.3 liter (1.37 US qt)
Type	Yamalube 20W/40 motor oil or equivalent
Oil pump	
Type	Trochoid pump
Housing inside diameter	29.10 ~ 29.13 mm ≪29.28 mm≫ (1.1457 ~ 1.1467 in ≪1.152 in≫)
Housing depth (delivery)	12.03 ~ 12.07 mm ≪12.10 mm≫ (0.474 ~ 0.475 in ≪0.476 in≫)
Rotor diameter	28.98 ~ 29.00 mm ≪28.93 mm≫ (1.141 ~ 1.142 in ≪1.139 in≫)
Rotor thickness (delivery)	11.98 ~ 12.0 mm ≪11.95 mm≫ (0.4716 ~ 0.4724 in ≪0.4705 in≫)
Outer rotor and housing clearance	
Top clearance	0.1 ~ 0.15 mm ≪0.35 mm≫ (0.0039 ~ 0.0059 in ≪0.014 in≫)
Side clearance	0.03 ~ 0.09 mm ≪0.14 mm≫ (0.0012 ~ 0.0035 in ≪0.0055 in≫)
Tip clearance	0.15 mm or less ≪0.35 mm≫ (0.006 in ≪0.00138 in≫)
Relief valve opening pressure	1.0 ± 0.2 bar (1.0 kg/cm^2) (14.2 lb/in^2)
Oil cleaner type	Paper and iron net

Chassis Specifications

Item	Required ≪Allowance≫
Frame:	
Frame design	Tubular steel diamond frame
Steering system:	
Caster	29.45°
Trail	121 mm (4.8 in)
Number and size of balls in steering head:	
Upper race	19 pcs., 1/4 in
Lower race	19 pcs., 1/4 in
Lock to lock angle	L.R. 43°
Front suspension:	
Type	Telescopic fork
Front fork cushion travel	140 mm (5.5 in)
Front fork spring:	
Free length	530 mm (20.87 in)
Set length	499 mm (19.65 in)
Wire dia. x winding dia.	3.4 x 22.5 mm (0.13 x 0.89 in)
Spring constant	K_1 = 0.284 kg/mm (0 ~ 100 mm) (15.9 lb/in (0 ~ 3.94 in)) K_2 = 0.38 kg/mm (100 ~ 140 mm) (21.3 lb/in (3.94 ~ 5.51 in))
Inner tube outside diameter	32 mm (1.26 in)
Front fork oil: Quantity	168 cm^3 (5.68 oz)
Type	Yamaha fork oil 10 wt
Rear suspension:	
Type	Swing arm
Damper type	Oil damper
Rear shock absorber travel	70 mm (2.95 in)
Rear wheel travel	85 mm (3.35 in)
Rear shock absorber spring:	
Free length	188 mm (7.40 in)
Set length (soft position)	168 mm (6.61 in)
Wire dia. x winding dia.	6.5 x 56 mm (0.26 x 2.20 in)
Spring constant	K_1 = 1.4 kg/mm (0 ~ 50 mm) (78.4 lb/in (0 ~ 1.97 in)) K_2 = 2.0 kg/mm (50 ~ 70 mm) (112.0 lb/in (1.97 ~ 2.76 in))
Swing arm free play (limit)	≪1 mm (0.039 in)≫
Pivot shaft:	
Outside dia.	16 mm (0.63 in)
Bearing type and size	oil less Bush
Dust seal type and size	MHA22-28-4-A
Fuel tank:	
Capacity	10.7 liter (2.8 US. gal)/Reserve 1.3 liter
Fuel grade	Regular gasoline
Wheel:	
Type	Spoke
Tire size: Front	3.00—18—4PR Yokohama
Rear	120/90—16 63P
Rim type: Front	1.60—18/steel
Rear	2.15—16/steel
Rim runout (limit): Front/Rear	≪2.0 mm≫ (≪0.08 in≫)
Rim hopping (limit): Front/Rear	≪2.0 mm≫ (≪0.08 in≫)

Item	Required ≪Allowance≫
Bearing type:	
Front wheel (Left)	6202—RS
Front wheel (Right)	6202/3A
Rear wheel (Left)	6203LU
Rear wheel (Right)	6203
Oil seal type:	
Front wheel (Left)	SDD—50—62—7
Front wheel (Right)	SD—20—35—7
Meter gear	SO—7—14—7
Rear wheel (Left)	.....
Rear wheel (Right)	SD—28—47—7
Secondary drive chain:	
Type	520DS
Number of links	102L
Chain pitch	15.875 mm (0.625 in)
Chain free play	25 ~ 35 mm (0.98 ~ 1.38 in)
Front brake:	
Type	Drum brake (Leading trailing)
Drum inside dia. ≪wear limit≫	160 mm ≪162 mm≫ (6.30 in ≪6.38 in≫)
Shoe dia. x width	152 x 25 mm (5.98 x 0.98 in)
Shoe spring free length	68 mm (2.68 in)
Lining thickness ≪wear limit≫	4 mm ≪2 mm≫ (0.16 in ≪0.08 in≫)
Rear brake:	
Type	Drum brake (leading trailing)
Drum inside dia. ≪wear limit≫	130 mm ≪132 mm≫ (5.12 in ≪5.20 in≫
Shoe dia. x width	122 x 28 mm (4.80 x 1.10 in)
Shoe spring free length	36.5 mm (1.44 in)
Lining thickness ≪wear limit≫	4 mm ≪2 mm≫ (0.16 in ≪0.08 in≫)

Electrical Specifications

Item	Required ≪Allowance≫
Voltage:	12V
Ignition system:	
Type	Battery ignition (Full transistor ignition)
Pulser coil resistance	
(White/Red—White/Green)	700Ω ± 10% at 20°C (68°F)
Ignition advancer:	BTDC10°/1,200 r/min
Advance type	Electrical
Advance angle	22°
Advance starting engine speed	2,050 r/min
Full advance engine speed	3,750 r/min
Ignition coil:	
Model/Manufacturer	CM11—55 HITACHI
Spark gap	≪6 mm (0.24 in)/500 r/min≫
Primary winding resistance	2.75Ω ± 20% at 20°C (68°F)
Secondary winding resistance	7.9Ω ± 20% at 20°C (68°)
Spark plug:	
Type	BP7ES (N.G.K.) or W22EP (NIPPON DENSO)
Spark plug gap	0.7 ~ 0.8 mm (0.028 ~ 0.031 in)
T.C.I. unit	HITACHI

Item	Required ≪Allowance≫
Charging system:	
A.C. magneto generator	
Model/Manufacturer	F170—56/HITACHI
Rotor puller thread size	M27 x P1.0
Output	14V—8A/4,000 r/min
Lighting coil resistance	
White—White	0.39Ω ± 15% at 20°C (68°F)
Rectifier with regulator	
Model/Manufacturer	SH222—12C/SHINDENGEN
(Rectifier)	
Type	I.C. type, full wave
Capacity	12A
Withstand voltage	200V
Withstand voltage	200V
(Regulator)	
Type	I.C. type
Regulating voltage	14.5 ± 0.5V
Allowable amperage	12A
Battery:	
Model/Manufacturer	12N 12A 4A/G.S.
Capacity	12V, 12AH
Charging rate	1.2A x 10 hours
Specific gravity	1.280
Starting system:	
Starter motor	
Type	Constant mesh type
Manufacturer	NIPPON DENNSO
Model	ADB4D3
Output	0.5 kW
Armature coil resistance	0.014Ω ± 6% at 20°C (68°F)
Field coil resistance	.....
Brush size/Quantity	12 x 9 x 6 mm (0.47 x 0.35 x 0.24 in)/2 pcs.
Wear limit	8.5 mm (0.33 in)
Spring pressure	800 g (28.2 oz)
Commutator O.D./Wear limit	28 mm (1.10 in)/27 mm (1.06 in)
Mica undercut	0.6 mm (0.02 in)
Starter switch	
Manufacturer	HITACHI
Model	A104-70
Amperage rating	Max. 4A
Cut-in voltage	Max. 6.5V
Winding resistance	.....
Lighting system:	
Headlight type	Sealed beam
Bulb wattage/quantity:	
Headlight	12V, 50W/35W x 1
Taillight	12V 3CP (8W) x 1
Brake light	12V 32CP (27W) x 1
Flasher light	12V 32CP (27W) x 4
Turn indicator light	12V 3.4W x 2
Meter light	12V 3.4W x 1
High beam indicator light	12V 3.4W x 1
Neutral indicator light	12V 3.4W x 1

Item	Required ≪Allowance≫
Horn:	
Model/Manufacturer	MF---12/NIKKO HORN
Winding resistance	4.8Ω ± 10% at 20°C (68°F)
Amperage	1.5A
Flasher relay:	
Type	Heat ribbon type
Model/Manufacturer	FR9T21/MITSUBA
Flasher frequency	90 ± 9 cycle/min
Capacity	12V 27W x 2 + 3.4W
Fuse:	
Rating	20A

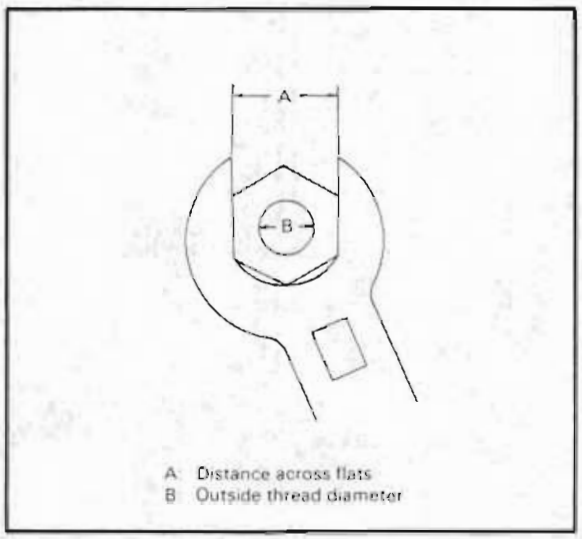
Torque Specifications

Part to be tightened	Thread and part name	Tightening torque	
		m-kg	ft-lb
Engine:			
Cylinder head, cylinder	M10 Hex bolt	3.75	27.1
	M8 Internal hex bolt	2.0	14.5
	M6 Internal hex bolt	1.0	7.2
Cylinder head cover	M6 Internal hex bolt	1.0	7.2
	M6 Pan head screw	0.7	5.1
Camshaft bearing plate	M6 Hex bolt	0.8	5.8
Oil checking screw	M6 Hex bolt	0.7	5.1
Spark plug	M14 Hex nut	2.0	14.5
Balancer boss	M16 Hex nut	6.0	43.4
Flywheel magneto	M12 Hex nut	8.0	57.9
Valve clearance	M6 Hex nut	1.35	9.8
Cam sprocket	M10 Bolt	5.5	39.8
Chain tensioner	M6 Bolt	0.8	5.8
	M6 Nut	1.2	8.7
Oil pump	M6 Pan head screw	0.7	5.1
Drain plug	M40	3.2	23.1
Filter cover	M6 Internal hex bolt	1.0	7.2
	M6 Pan head screw	0.7	5.1
Bleed bolt	M5 Hex bolt	0.5	3.6
Carburetor manifold	M6 Internal hex bolt	1.2	8.7
Carburetor clamp hose	M5 Pan head screw	0.2	1.5
Air cleaner case cover	M6 Pan head screw	0.5	3.6
Air cleaner case	M6 Hex bolt	0.7	5.1
Exhaust pipe assembly	M6 Internal hex bolt	1.2	8.7
	M8 Hex bolt	2.0	14.5
Crankcase, Casecover	M6 Pan head screw	0.7	5.1
Balancer bearing plate	M6 Flat head screw	0.7	5.1
Chain tensioner plug	M10 Hex bolt	3.0	21.7
Clutch spring	M6 Hex bolt	0.8	5.8
Clutch boss	M20 Hex nut	0.7	5.1
Primary drive gear	M16 Hex nut	0.7	5.1
Push lever stopper	M8 Hex bolt	1.2	8.7
Push rod adjustment	M6 Hex nut	0.8	5.8
Drive sprocket	M6 Hex bolt	1.0	7.2
Shift cam	M5 Flat khead screw	0.37	2.7
Shift pedal	M6 Hex bolt	0.8	5.8
Magneto base	M6 Pan head screw	0.7	5.1

Part to be tightened	Thread and part name	Tightening torque	
		m-kg	ft-lb
Neutral switch	M10	2.0	14.5
Tappet cover positioning bolt	M6 Internal hex bolt	1.0	7.2
Chassis:			
Engine mounting	M8 Hex bolt, nut	3.2	23.1
Engine adjusting plate	M8 Hex bolt, nut	2.0	14.5
Handle crown and inner tube	M8 Hex bolt, nut	2.0	14.5
Handle crown and handle holder	M8 Hex bolt	2.0	14.5
Front fork cap bolt	M30 Hex bolt	2.2	15.9
Under bracket and inner tube	M12 Hex bolt	3.7	26.8
Front wheel shaft	M14 Shaft, nut	10.6	76.7
Pivot shaft	M14 Shaft, nut	6.5	47.0
Rear wheel shaft	M16 Shaft, nut	10.6	76.7
Sprocket wheel	M8 Hex bolt	3.0	21.7
Rear shock absorber	M10 Hex bolt	3.0	21.7
Foot rest	M8 Hex bolt	2.0	14.5
Camshaft lever	M6 Hex bolt, nut	0.8	5.8
Front fork cylinder and outer tube	M10 Socket head bolt	2.3	16.6
Steering ring nut	M25	3.7	26.8
Steering fitting bolt	M14 Hex bolt	5.3	38.3
Spoke	----------	0.2	1.4
Seat belt	M8 Hex bolt	1.5	10.8
Grab bar	M8 Hex bolt	1.5	10.8
Rear foot rest	M10 Flange nut	4.5	32.5

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 criss-cross fashion, in progressive stages, until full torque is reached. Unless otherwise specified, torque specifictions call for clean, dry threads. Components should be at room temperature.



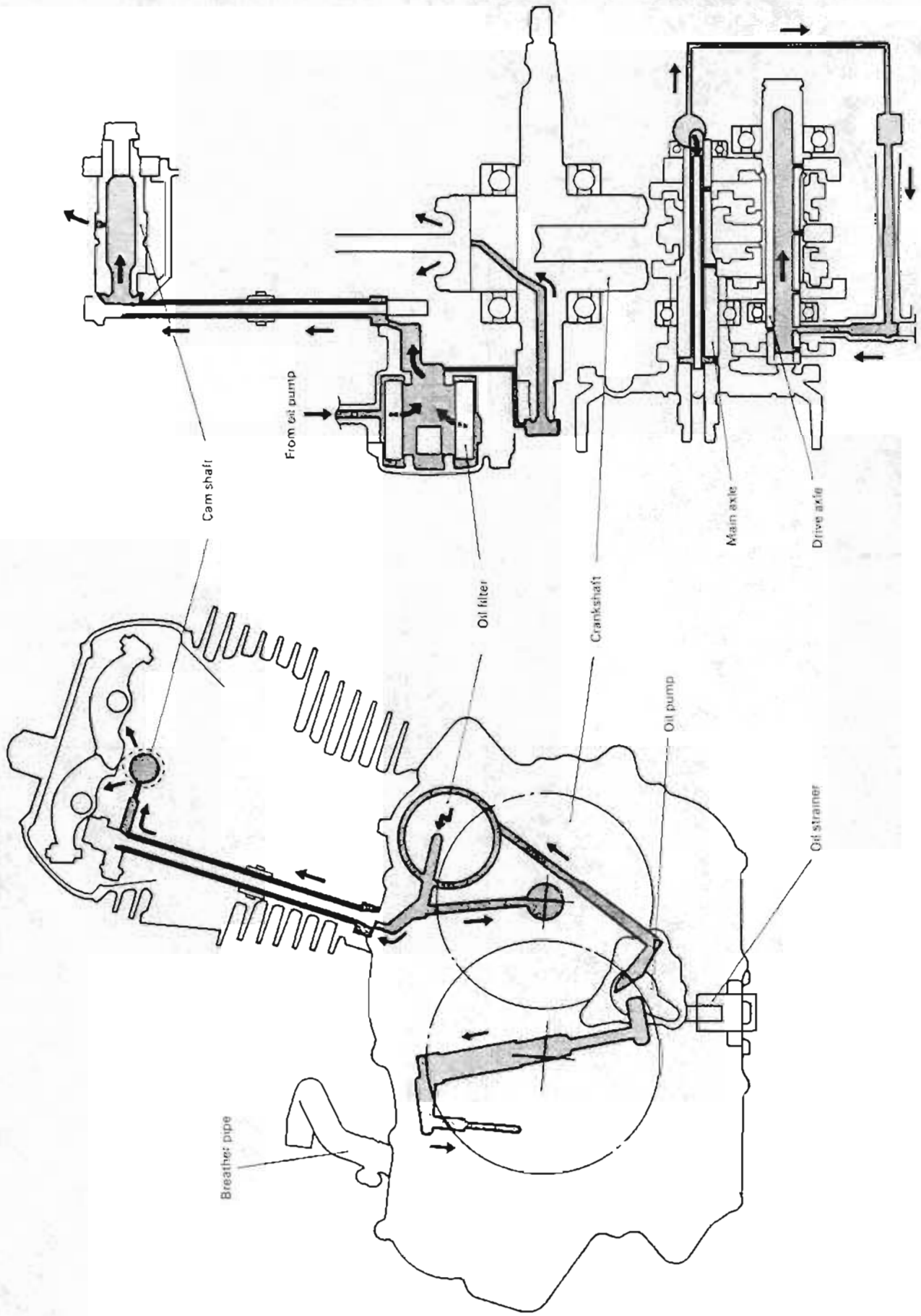
A Distance across flats
B Outside thread diameter

A	B	Torque specification		
		m-kg	ft-lb	in-lb
10 mm	6 mm	1.0	7.2	85
12 mm	8 mm	2.0	15	175
14 mm	10 mm	3.5 ~ 4.0	25 ~ 29	300 ~ 350
17 mm	12 mm	4.0 ~ 4.5	29 ~ 33	350 ~ 400
19 mm	14 mm	4.5 ~ 5.0	33 ~ 36	400 ~ 440
22 mm	16 mm	5.5 ~ 6.5	41 ~ 49	480 ~ 570
24 mm	18 mm	5.8 ~ 7.0	42 ~ 50	500 ~ 600
27 mm	20 mm	7.0 ~ 8.3	50 ~ 60	600 ~ 700

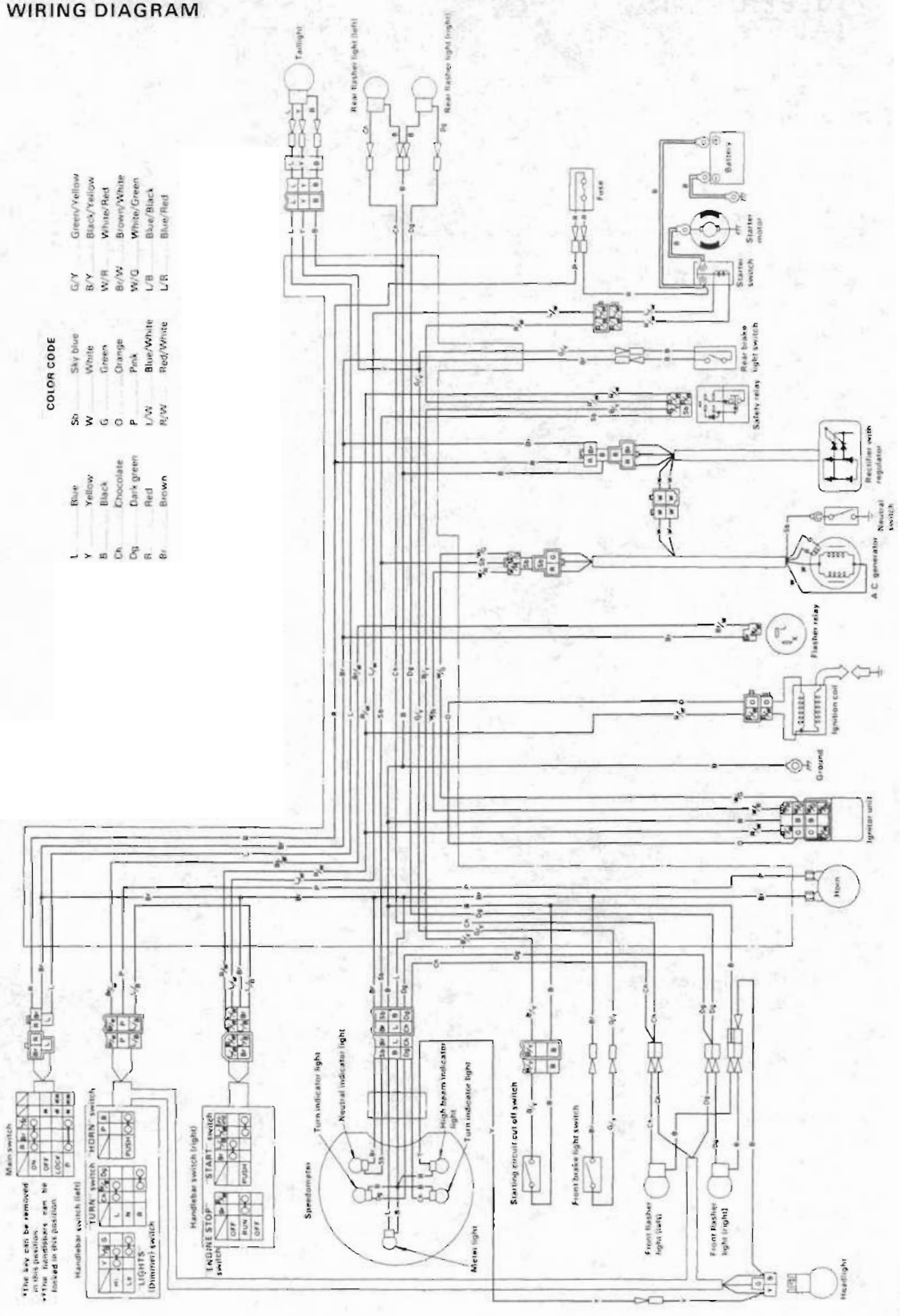
Conversion Tables

METRIC TO INCH SYSTEM			
	KNOWN	MULTIPLIER	RESULT
TORQUE	m-kg	7.233	ft-lb
	m-kg	86.80	in-lb
	cm-kg1	0.0723	ft-lb
	cm-kg	0.8680	in-lb
WT	kg	2.205	lb
	g	0.03527	oz
FLOW/DISTANCE	km/l	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
VOL./CAPACITY	cc (cm^3)	0.03382	oz (US liq)
	cc (cm^3)	0.06102	cu.in
	l (liter)	2.1134	pt (US liq)
	l (liter)	1.057	qt (US liq)
	l (liter)	0.2642	gal (US liq)
MISC.	kg/mm	56.007	lb/in
	kg/cm^3	14.2234	psi (lb/in^3)
	Centigrade(°C)	9/5(°C) + 32	Fahrenheit(°F)

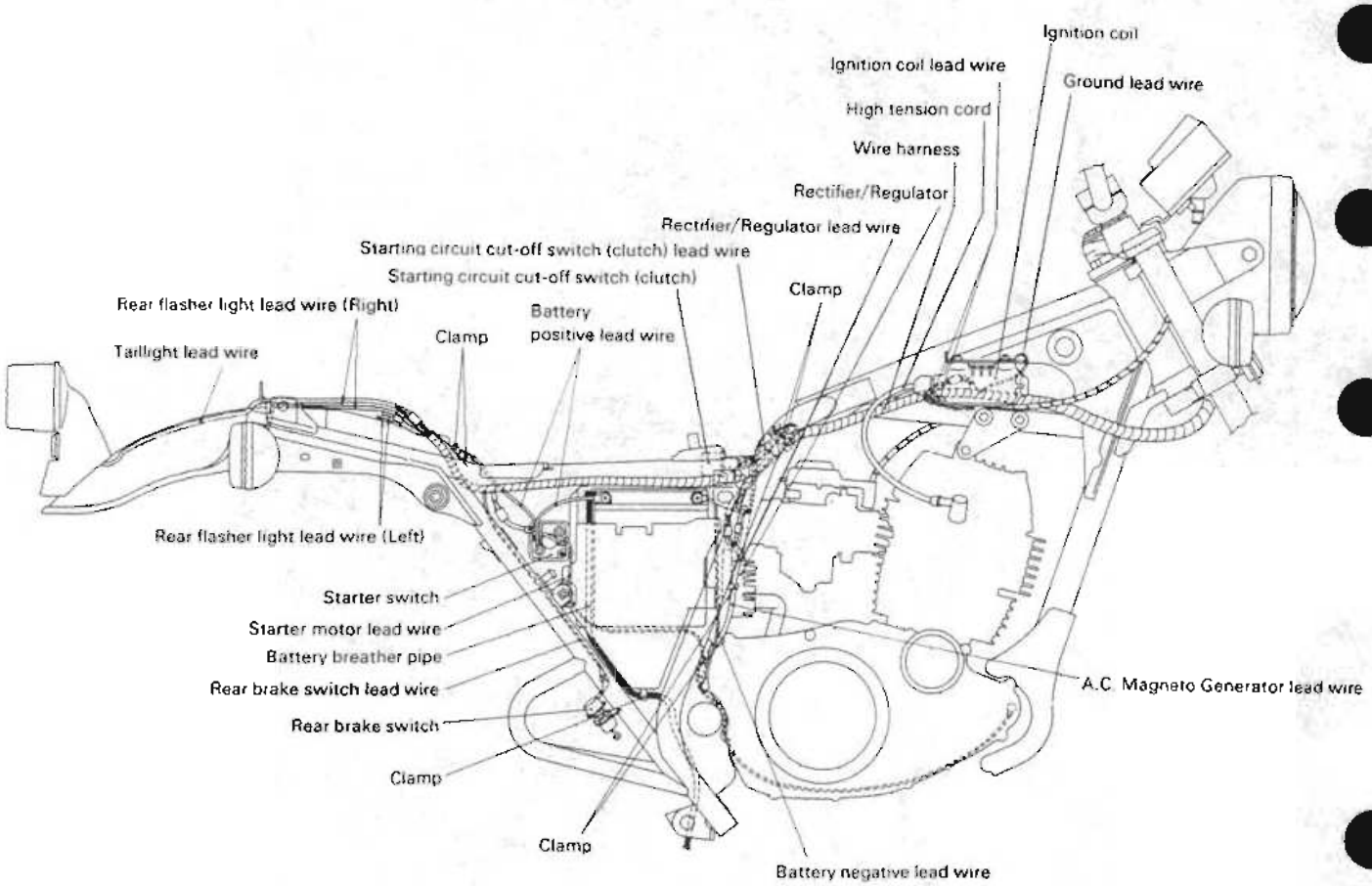
INCH TO METRIC SYSTEM			
	KNOWN	MULTIPLIER	RESULT
TORQUE	ft-lb	0.13826	m-kg
	in-lb	0.01152	m-kg
	ft-lb	13.831	cm-kg
	in-lb	1.1521	cm-kg
WT	lb	0.4535	kg
	oz	28.352	g
FLOW/DISTANCE	mpg	0.4252	km/l
	mph	1.609	km/hr
	mi	1.609	km
	ft1	0.3048	m
	yd	0.9141	m
	in	2.54	cm
	in	25.4	mm
VOL./CAPACITY	oz (US liq)	29.57	cc (cm^3)
	cu.in	16.387	cc (cm^3)
	pt (US liq)	0.4732	l (liter)
	qt (US liq)	0.9461	l (liter)
	gal (US liq)	3.785	l (liter)
MISC.	lb/in	0.017855	kg/mm
	psi (lb/in^3)	0.07031	kg/cm^3
	Fahrenheit(°C)	5/9(°F − 32)	Centigrade(°F)

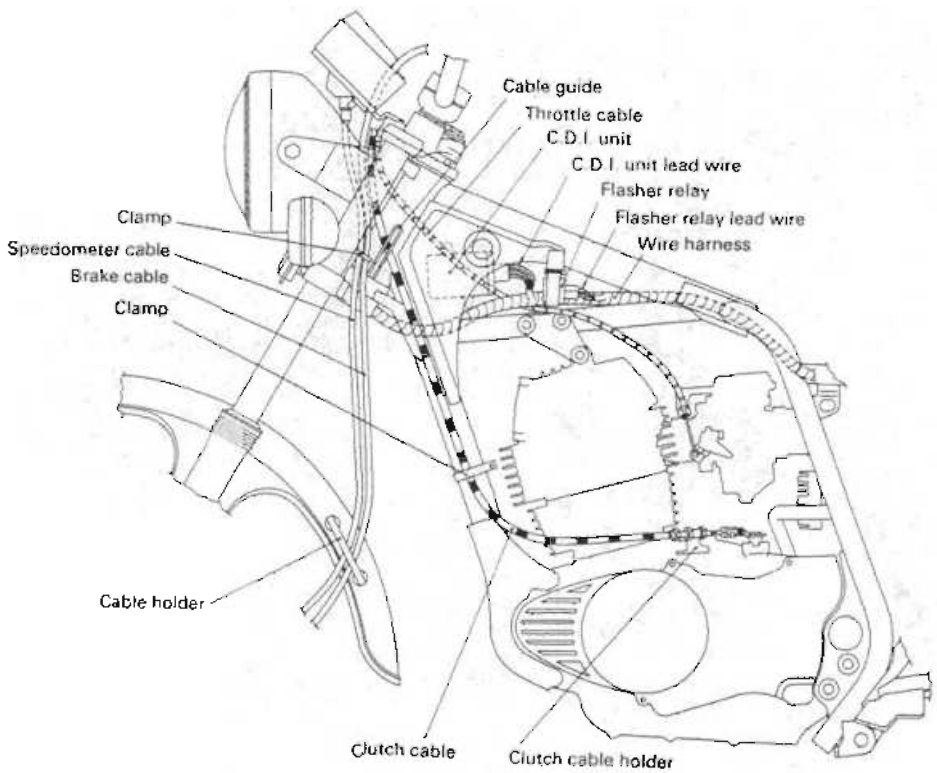

From oil pump
Cam shaft
Oil filter
Crankshaft
Main axle
Drive axle
Oil pump
Oil strainer
Breather pipe

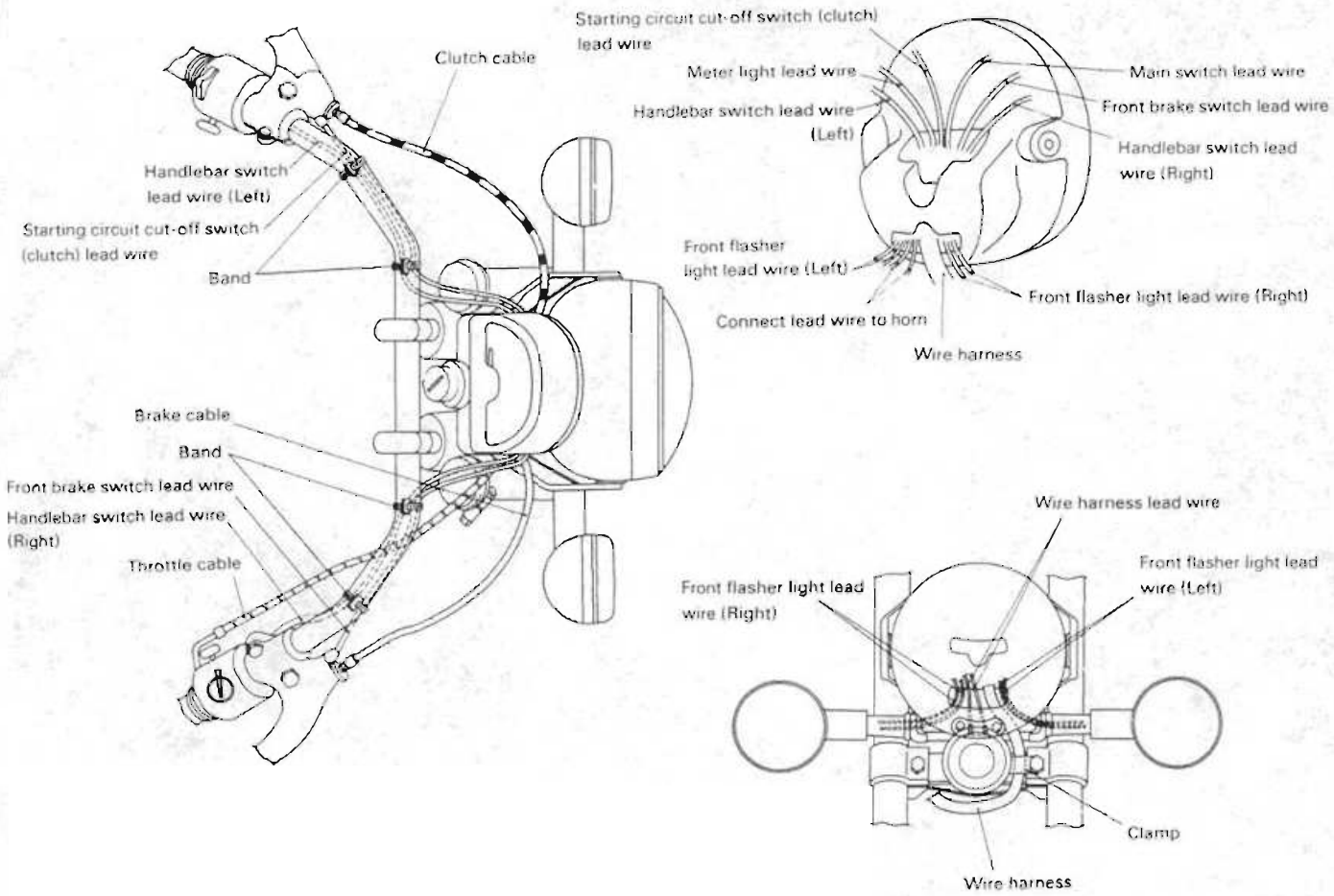
WIRING DIAGRAM

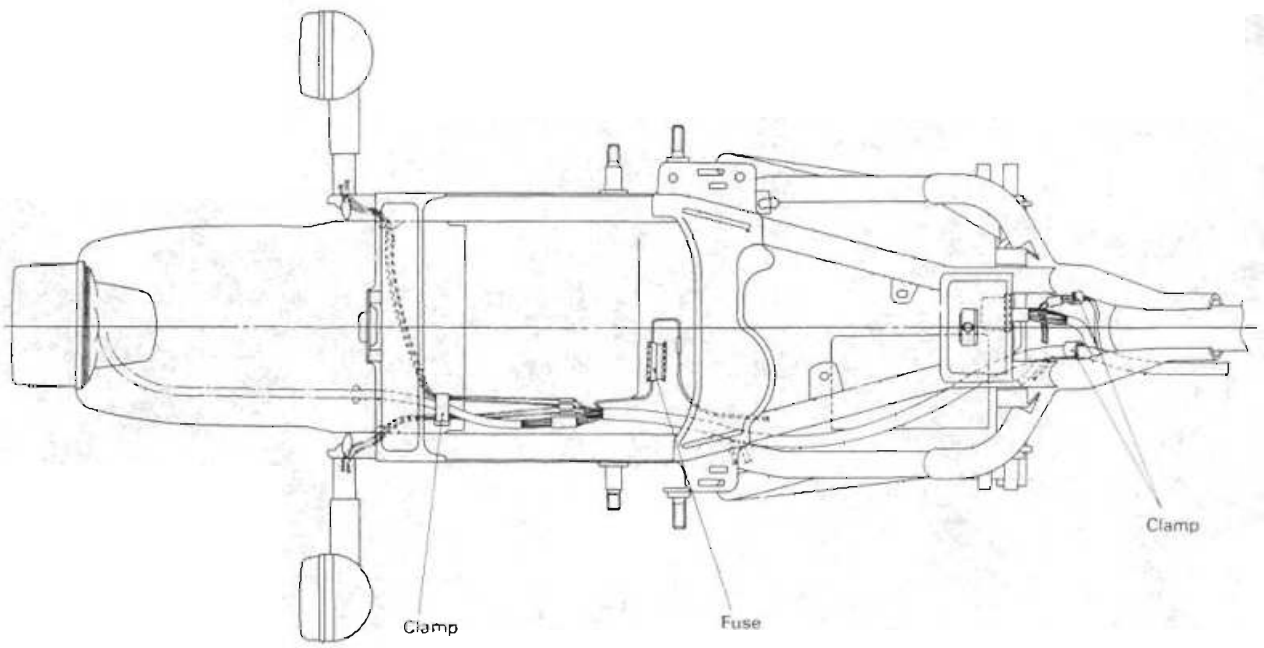


CABLE ROUTING






Starting circuit cut-off switch (clutch) lead wire
Clutch cable
Meter light lead wire
Main switch lead wire
Handlebar switch lead wire (Left)
Front brake switch lead wire
Handlebar switch lead wire (Right)
Handlebar switch lead wire (Left)
Starting circuit cut-off switch (clutch) lead wire
Band
Front flasher light lead wire (Left)
Front flasher light lead wire (Right)
Connect lead wire to horn
Wire harness
Brake cable
Band
Front brake switch lead wire
Handlebar switch lead wire (Right)
Throttle cable
Wire harness lead wire
Front flasher light lead wire (Right)
Front flasher light lead wire (Left)
Clamp
Wire harness


Clamp
Fuse
Clamp

SR250G
SERVICE MANUAL
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