YAMAHA

TT600K

Service Manual

LIT-11616-03-55

34K-28197-10

TT600K
SERVICE MANUAL

1st Edition - March 1983
2nd Printing - January 1984 JEM D-171

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YAMAHA MOTOR CORPORATION, U.S.A.
CYPRESS, CALIFORNIA 90630

LIT-11616-03-55

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. 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.

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

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

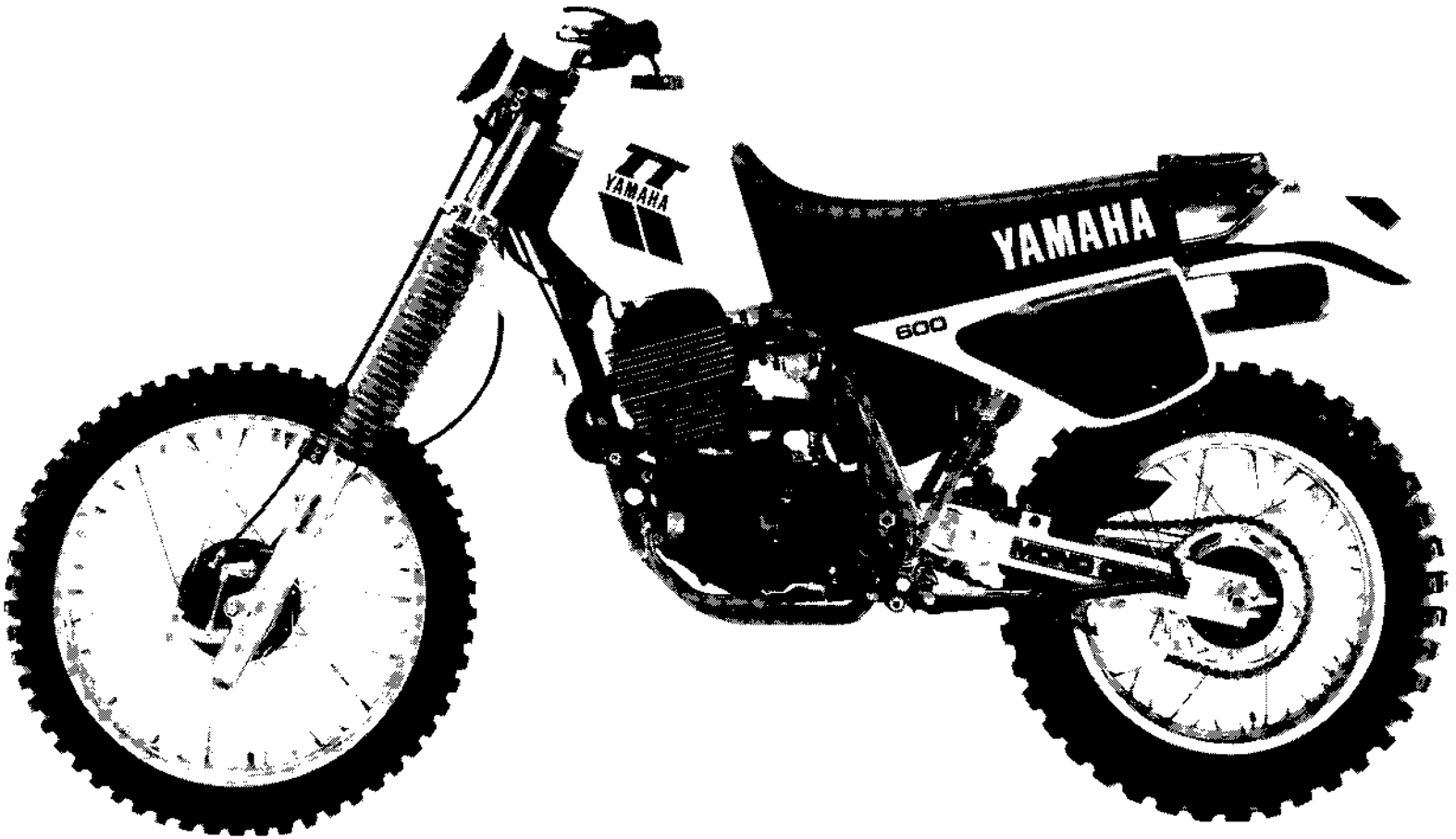
NOTE: A NOTE provides key information to make procedures easier or clearer.

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

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

OVERSEAS SERVICE
OVERSEAS OPERATIONS
YAMAHA MOTOR CO., LTD.

EXTERNAL VIEW



NOTE:

Designs and specifications are subject to change without notice.

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CHAPTER 1 GENERAL INFORMATION

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B. Engine Serial Number 1-1

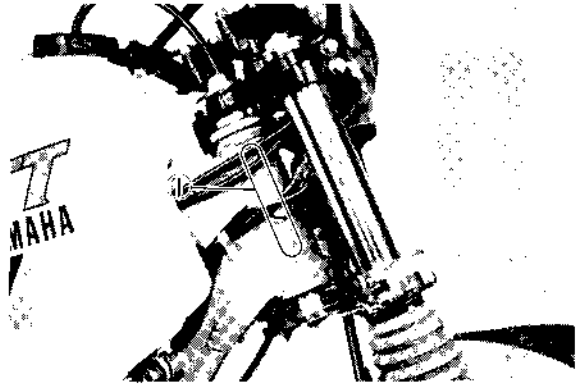
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CHAPTER 1
GENERAL INFORMATION

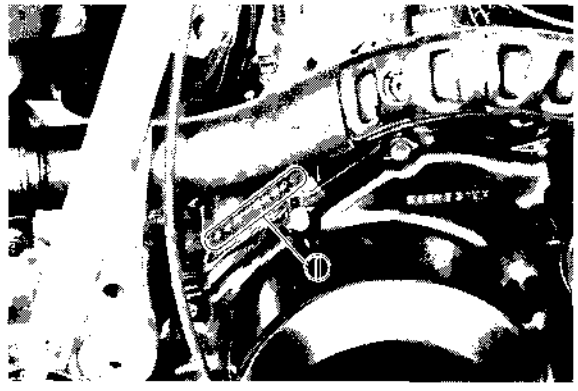
MOTORCYCLE IDENTIFICATION

A. Frame Serial Number
The frame serial number is stamped into the right side of the steering head pipe.



1. Frame Serial Number

B. Engine Serial Number
The engine serial number is stamped into the elevated part of the right section of the engine.

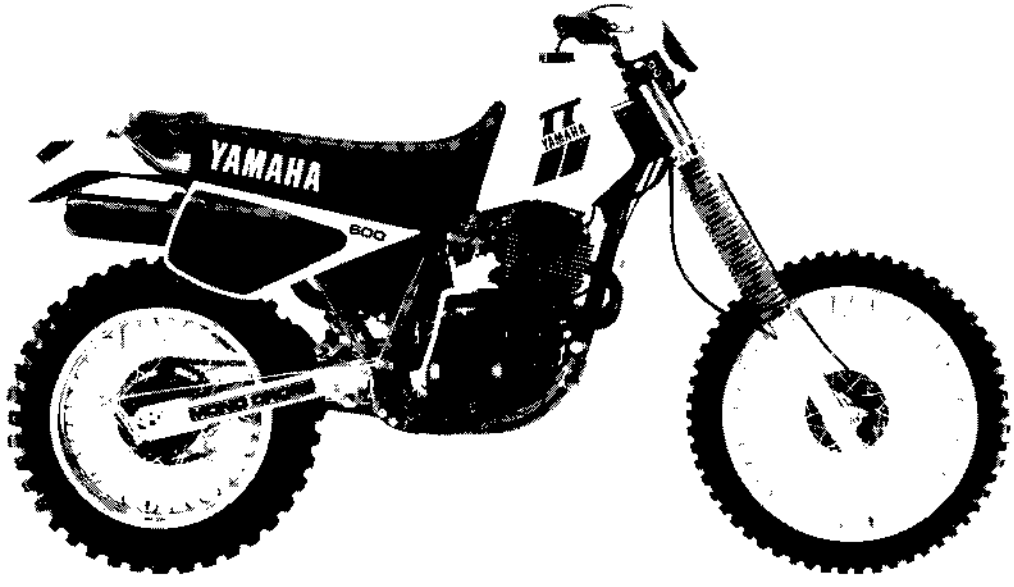


1. Engine Serial Number

NOTE:

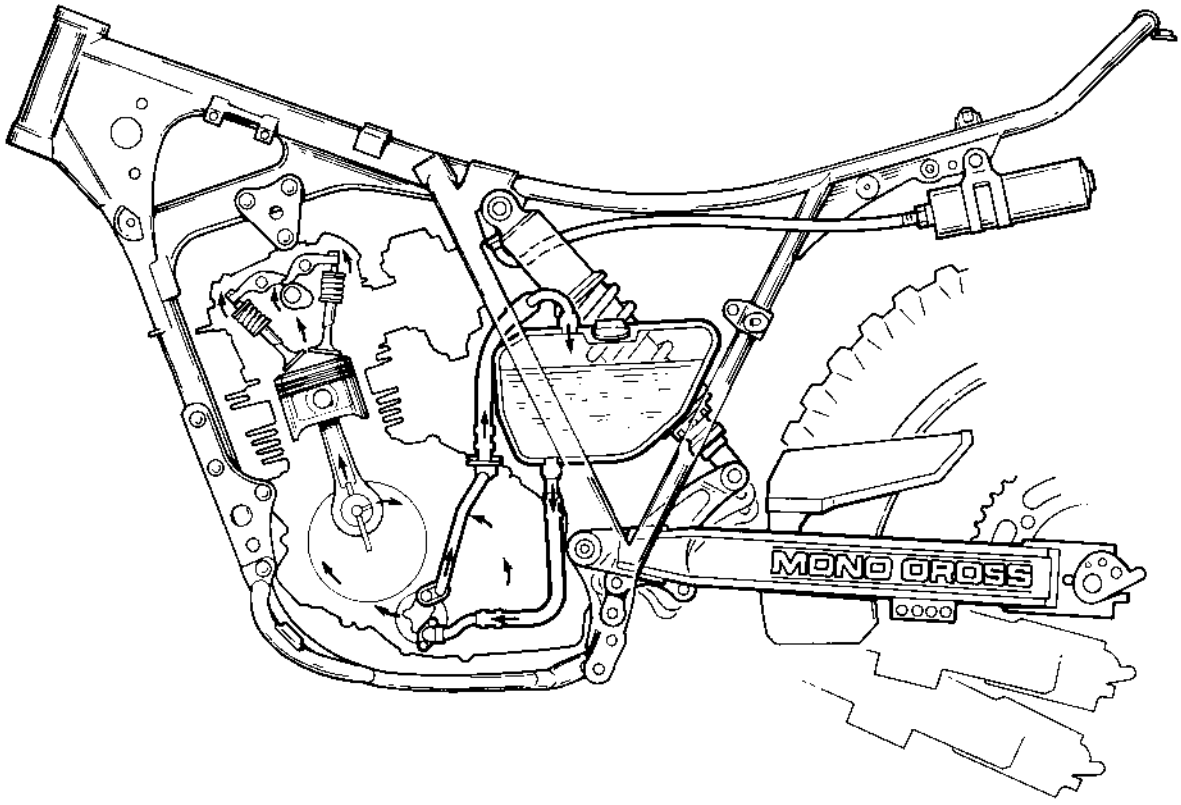
The first three digits of these numbers are for model identification; the remaining digits are the unit production number.

Starting Serial Number:	
TT600K	34K-000101



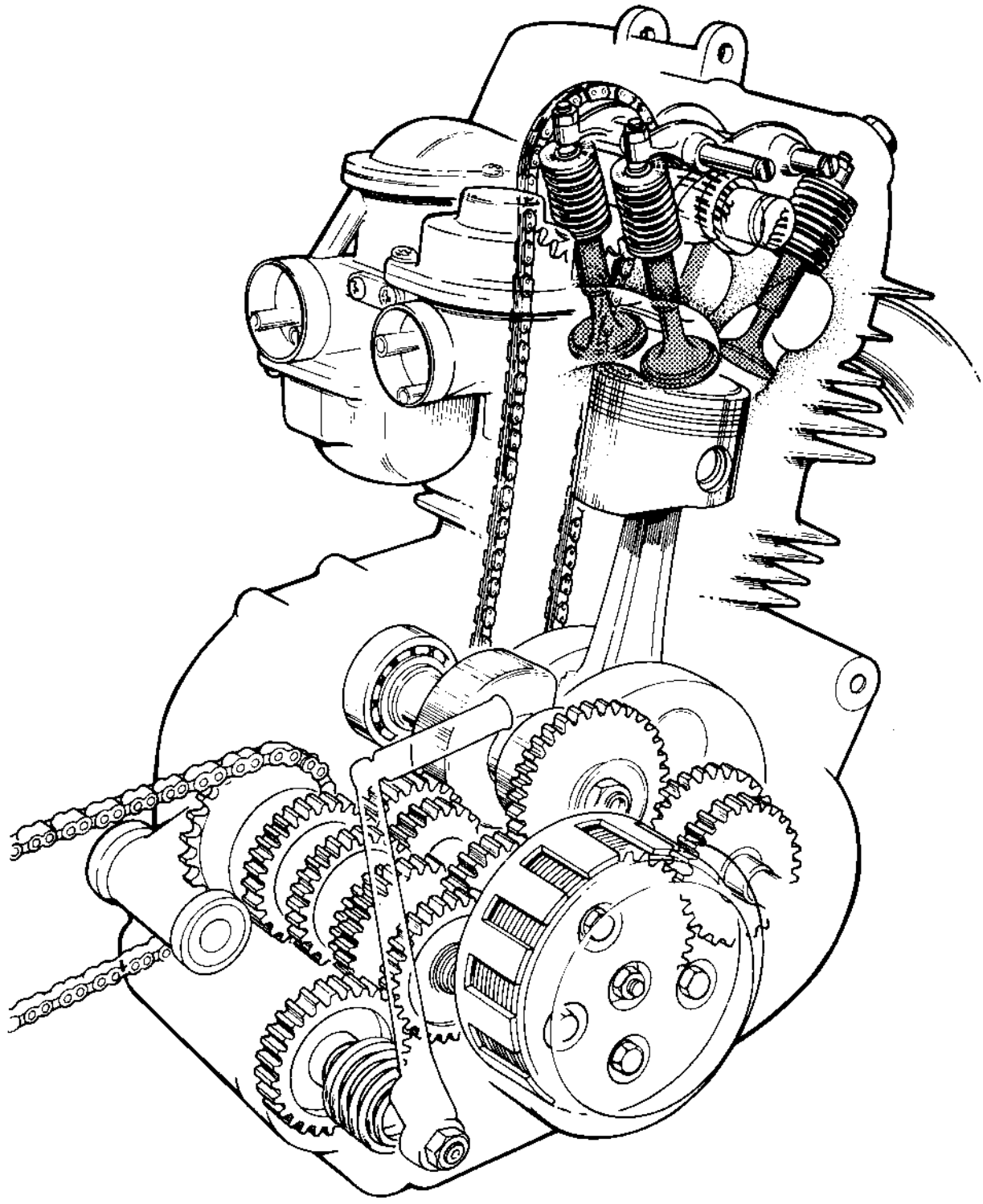
MAJOR FEATURES

A. Dry Sump System and Monocross Suspension



The TT600, which inherits the traditional XT500 dry sump system, features monoshock suspension, light weight, and a new diamond-shaped frame. The oil tank is newly attached behind the left side cover instead of the integrated frame.

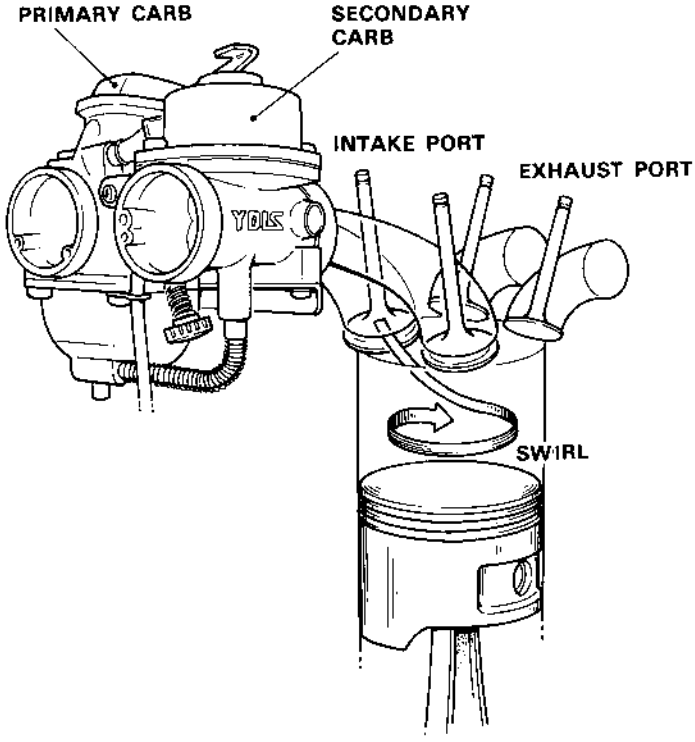
B. Four-Valve Engine

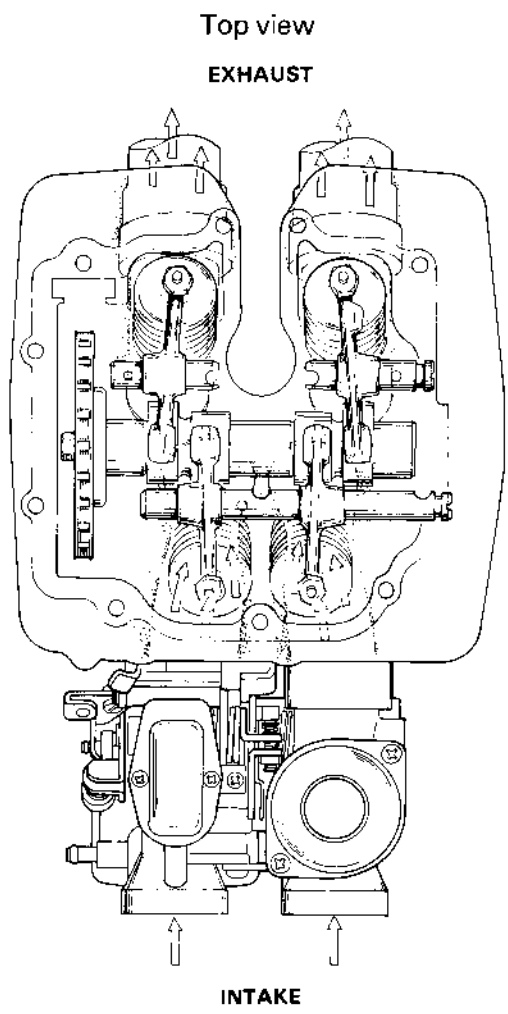


595 cm^3 compact engine equipped with: S.O.H.C., 4-Valve head, Dual intake and dual exhaust ports, gear-driven balancer, Yamaha Duo Intake System (YDIS), and 5-speed transmission.

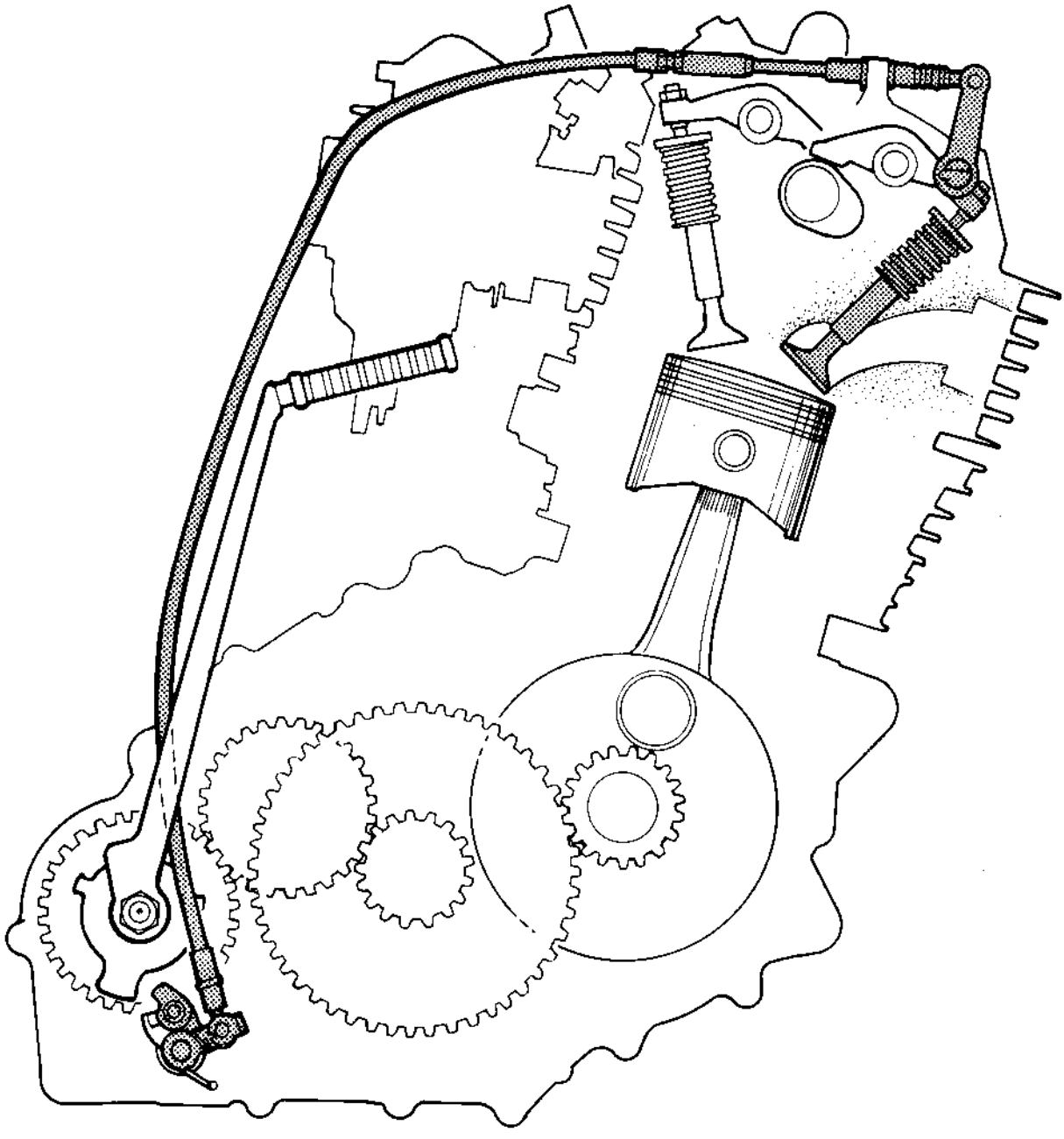
C. Yamaha Duo Intake System (YDIS)

For this system, the primary carburetor and the secondary carburetor are equipped as a unit: A cable-operated-slide type functions as the primary carb, and a vaccum-controlled-slide type provides a secondary bore. The engine has a 4-valve head, and each carb has its own intake port and valve. Although each carb bore and intake port is smaller than that of a more conventional engine, their conbined area is about 20% greater than a single, larger carb and intake layout. Flow efficiency of both the intake and exhaust sides is substantially improved. From idle to about half throttle, the primary carb supplies the air-fuel mixture, and almost the entire intake charge enters through just one valve; since the 4-valve layout offsets the intake ports relative to the cylinder-bore axis, a strong YICS-type swirl is produced in the low-to-medium rpm range. Combustion efficiency is significantly enhanced, resulting in improved fuel economy. In addition, the single small bore provides excellent low- and medium-speed throttle response due to the high air velocity in the venturi. This eliminates the need for a mechanical accelerator pump, allowing minimal carb height and ample room for the Monocross rear suspension. As the throttle is turned from half to wide open, a linkage between the carburetors gradually opens the secondary-carb butterfly. The vaccum-controlled slide in the secondary carb opens as engine demand builds, providing superb mid-range smoothness. With both slides fully open, the engine receives more mixture and produces more power than a regular single-carb machine.





D. Kick Synchronous Automatic Decompression



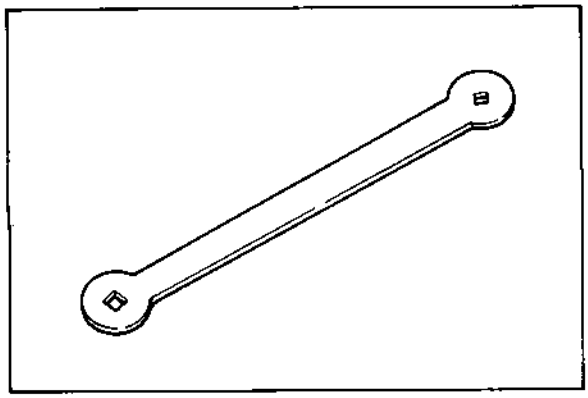
The kick-starting mechanism is interlinked with one of the exhaust valves, thus automatically decompressing the combustion chamber for ease in kick-starting. Combined with electronic advance ignition, kick-starting is free from possible kickback. Correct adjustment is required of this kick-synchronous automatic decompression system for effective performance.

SPECIAL TOOLS

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

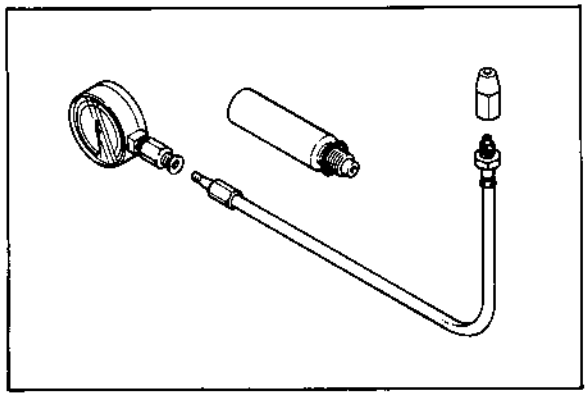
A. For Tune-up

1. Valve adjusting tool
   P/N. YM-08035

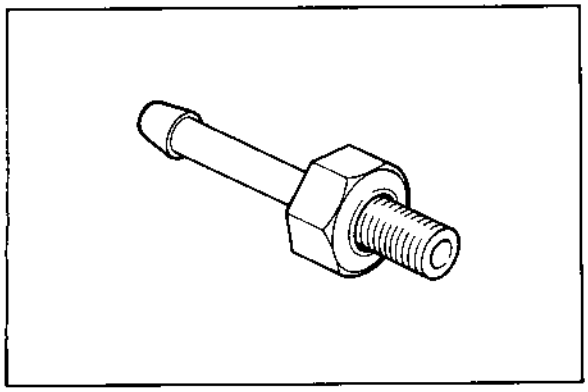


2. Compression gauge set

   Adapter (M12) P/N. YU-33223
   P/N. YU-33223-3

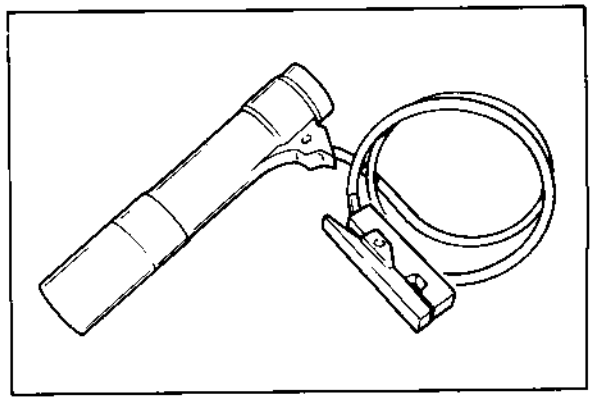


3. Oil pressure gauge adapter
   P/N. YU-08030-1

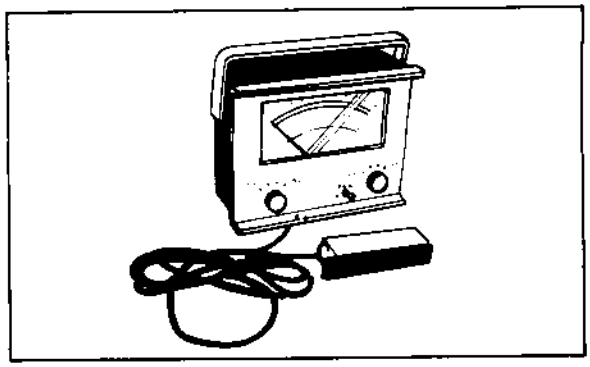


This adapter is attached at the top of the oil filter cover after removing the air bleed screw.

4. Inductive timing light
   P/N. YU-33277

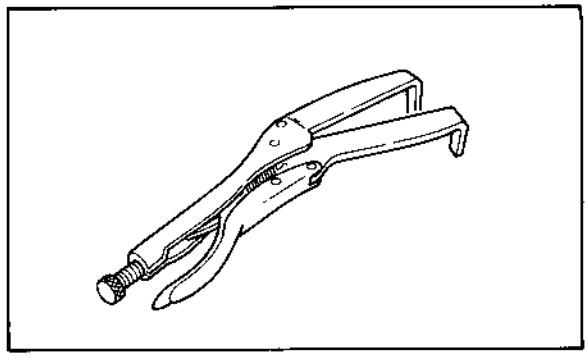


5. Inductive tachometer
   P/N. YU-08036



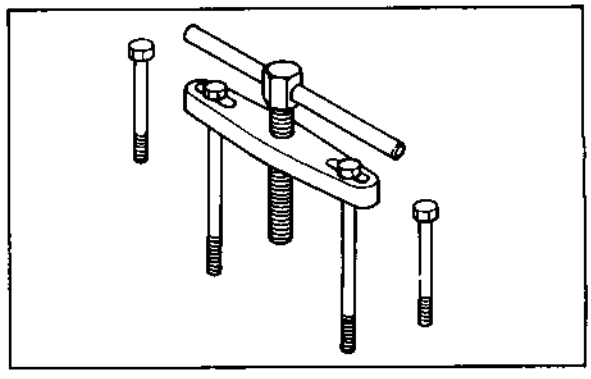
B. For Engine Service

1. Universal clutch holder
   P/N. YM-91042

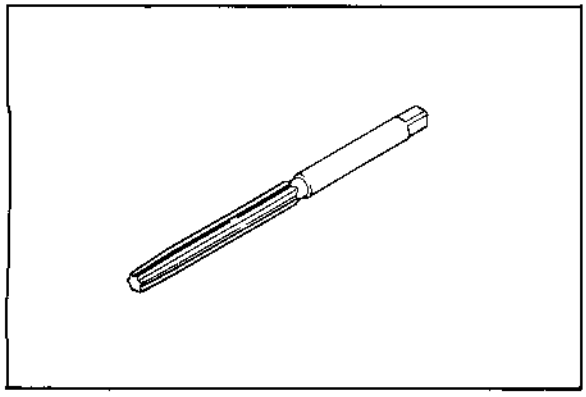


This tool is used to hold the clutch when removing or installing the clutch boss locknut.

2. Crankcase separation tool
   P/N. YU-01135

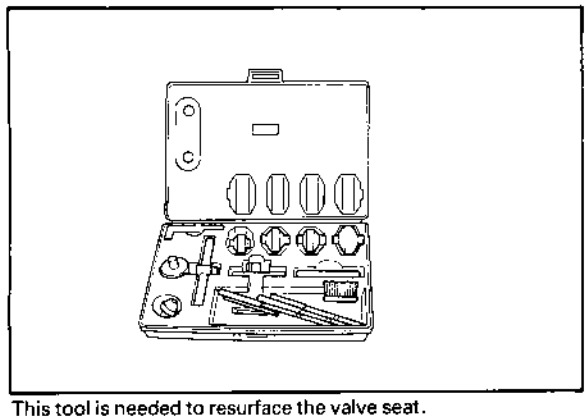


3. Valve guide reamer
P/N. YM-01227



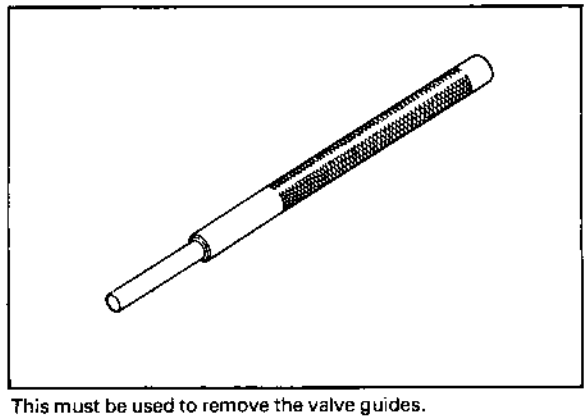
This must be used when replacing the valve guide.

4. Valve seat cutter
P/N. YM-91043



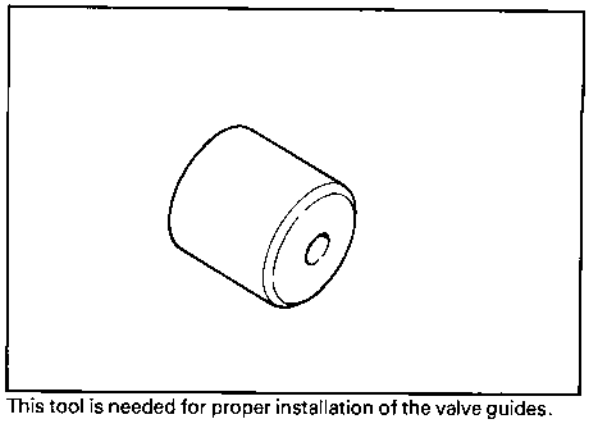
This tool is needed to resurface the valve seat.

5. Valve guide remover
P/N. YM-01225



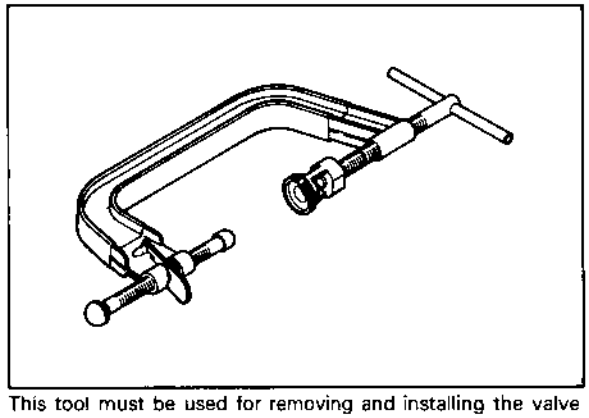
This must be used to remove the valve guides.

6. Valve guide installer
P/N. YM-04017



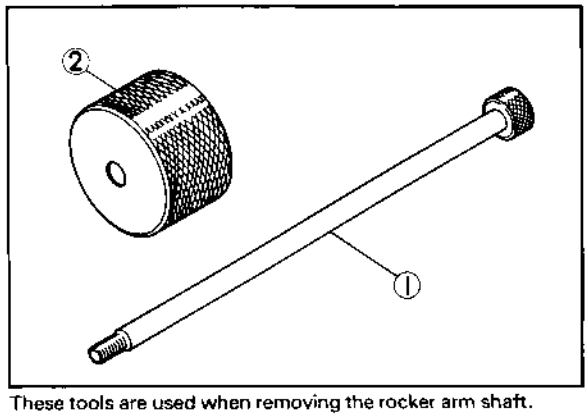
This tool is needed for proper installation of the valve guides.

7. Valve spring compressor
P/N. YM-04019



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

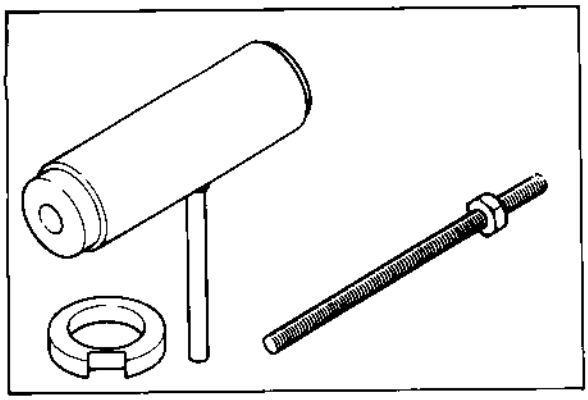
8. Slide hammer set
P/N. YU-01083



These tools are used when removing the rocker arm shaft.

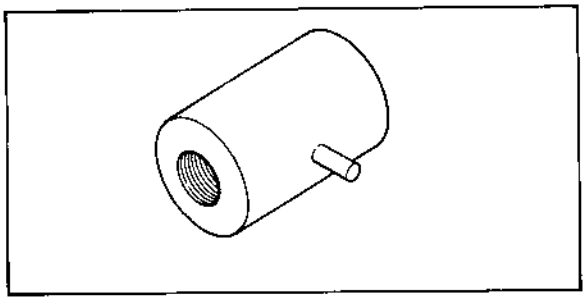
1. Bolt P/N. YU-01083-1
2. Weight P/N. YU-01083-3

9. Crankshaft installing set
P/N. YU-90050



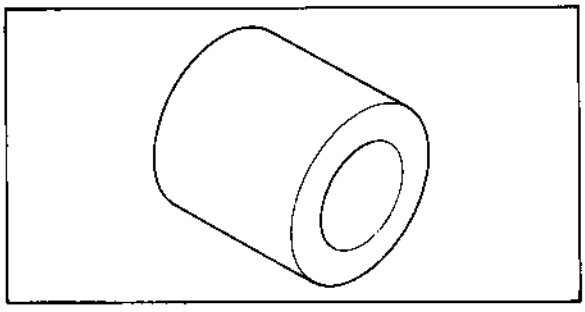
This tool is used when installing the crankshaft.

10. Adapter #10 crankshaft installing bolt (M14)
P/N. YM-90069



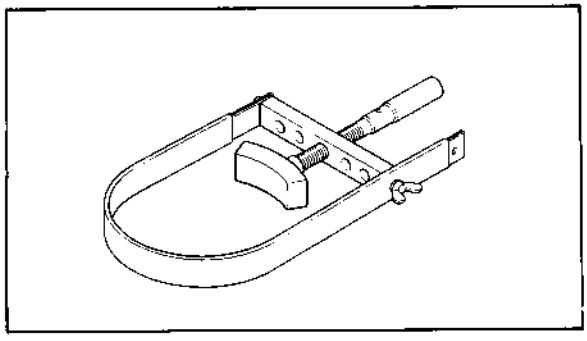
14 mm × 1.5 adapter for installing the crankshaft.

11. Crank pot spacer
P/N. YM-90070A



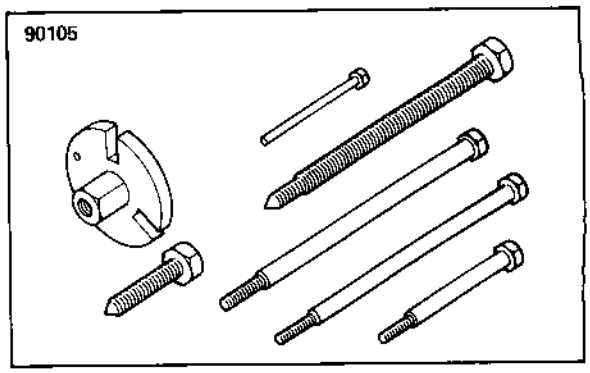
This tool is used when installing the crankshaft.

12. Primary sheave holder
P/N. YU-01701

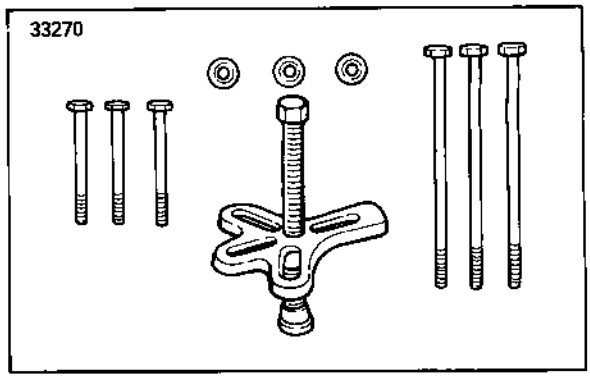


This tool is used for loosening and tightening the CDI rotor securing nut.

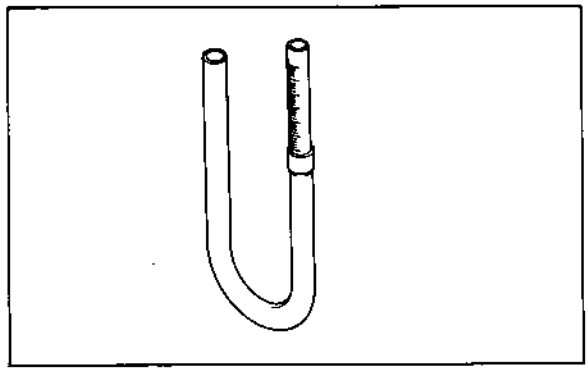
13. Flywheel puller or (Universal puller)
P/N. YU-90105 or YU-33270



This tool is used for removing the CDI rotor.

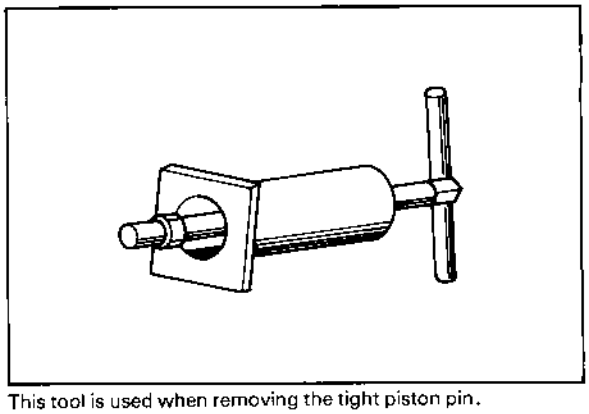


14. Fuel level gauge
P/N. YM-01312



This tool is needed for checking the carburetor fuel level.

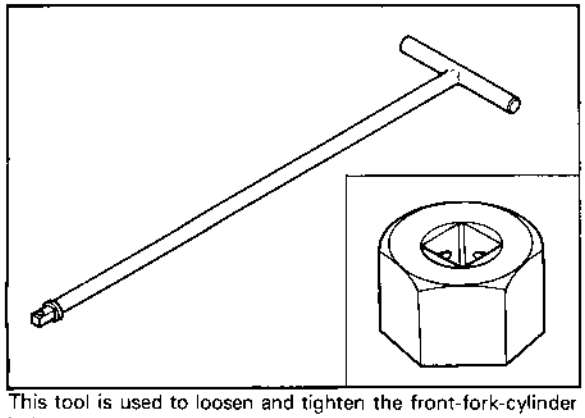
15. Piston pin puller
P/N. YU-01304



This tool is used when removing the tight piston pin.

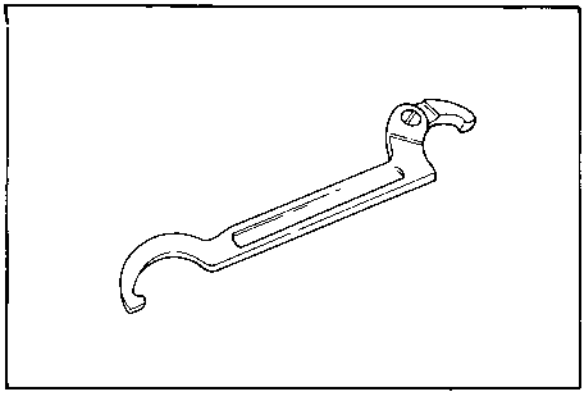
C. For Chassis Service

1. Front-fork-cylinder holder
   P/N. YM-33962
   T-handle
   P/N. YM-01326



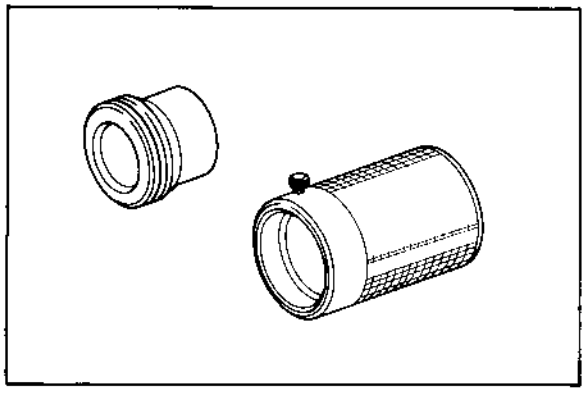
This tool is used to loosen and tighten the front-fork-cylinder bolt.

2. Steering nut wrench
   P/N. YU-01268



3. Drive chain cutter
   Sold on market.

4. Fork seal driver set
   P/N. YM-08020

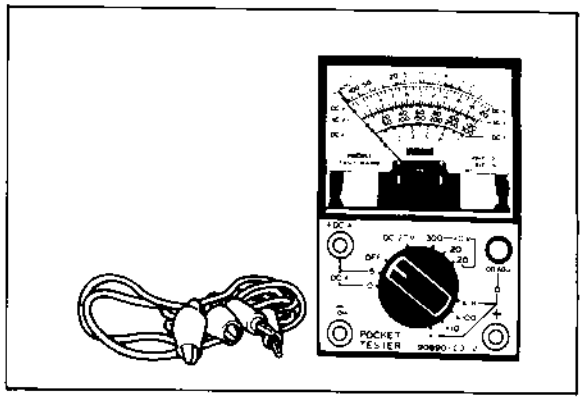


5. Grease gun
   Sold on market.

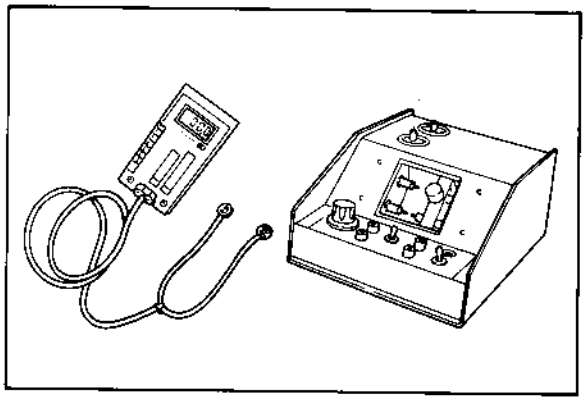
D. For Electrical Components

The uses of these tools are described in Chapter 6.

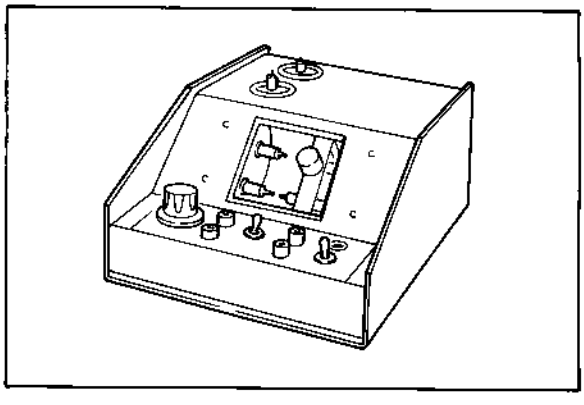
1. Pocket tester
   P/N. YU-03112



2. Electro tester
   P/N. YU-33260



3. Coil tester
   P/N. YU-33261



CHAPTER 2
PERIODIC INSPECTIONS AND ADJUSTMENTS

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CHAPTER 2
PERIODIC INSPECTIONS AND ADJUSTMENTS

INTRODUCTION

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

MAINTENANCE ITERVALS CHARTS

Proper periodic maintenance is important. This controls not only function to ensure cleaner air but is also vital to proper engine operation and maximum performance.

PERIODIC MAINTENANCE/LUBRICATION

Unit: km (miles)

Item	Remarks	Break-in 1,000 (600)	Every	
			6,000 (4,000) or 6 Month	12,000 (8,000) or 12 Month
Valve clearance	Check/Adjust valve clearance.	○	○	○
Spark plug	Check/Clean/Replace if necessary.	○	○	○
Air filter	Clean. Replace if necessary.		○	○
Carburetor	Check/Adjust/idle speed, starter operation.	○	○	○
Fuel line	Check fuel hose for cracks or damage.		○	○
Engine oil	Replace (Warm engine before draining).	○	○	○
Engine oil filter	Replace.	○	○	○
Brake	Check operation/Adjust if necessary.		○	○
Clutch	Check operation/Adjust if necessary.		○	○
Decompression system	Check/Adjust if necessary.		○	○
Rear arm pivot	Check rear arm assembly for looseness. Moderately repack.***	Check	○	○
Relay arm	Check relay arm assembly for looseness/clean and lube.***	Check	○	○
Wheels	Check balance/damage/runout/spoke tightness.		○	○
Wheel bearings	Check bearings assembly for looseness/damage. Replace if damaged.		○	○
Steering bearing	Check bearings assembly for looseness. Moderately repack every 24,000 (16,000) or 24 months.**	Check		Check
Front forks	Check operation/oil leakage.		○	○
Rear shock absorber	Check operation/oil leakage.		○	○
Drive chain	Check and adjust tension/alignment/clean/lube.	Every 500 (300)		
Fittings/Fasteners	Check all chassis fitting and fasteners.	○	○	○
Oil tank strainer	Clean/Replace if necessary.	Every 24 months		

**: Medium weight wheel bearing grease.
***: Lithium base grease.

ENGINE

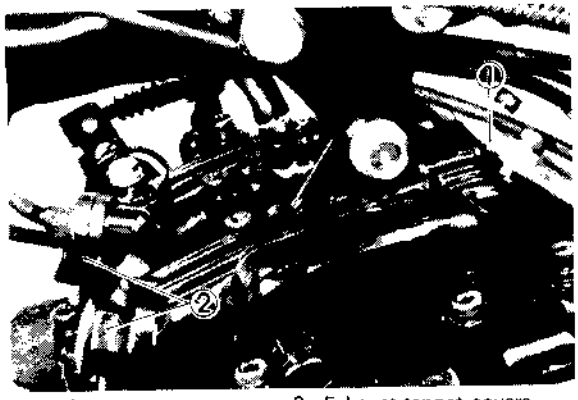
A. Valve Clearance

Adjust the valve clearance as follows:

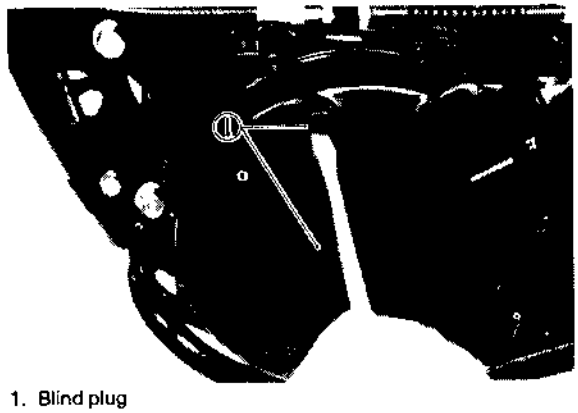
NOTE:

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

1. Remove the side covers, seat and fuel tank.
2. Remove intake and exhaust tappet covers and two blind plugs on the left crankcase cover.



1. Intake tappet cover 2. Exhaust tappet covers



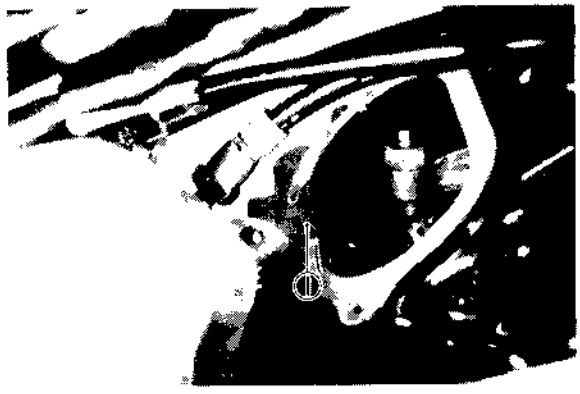
1. Blind plug

3. Align the "T" mark on the flywheel with the timing mark on the crankcase cover. 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.



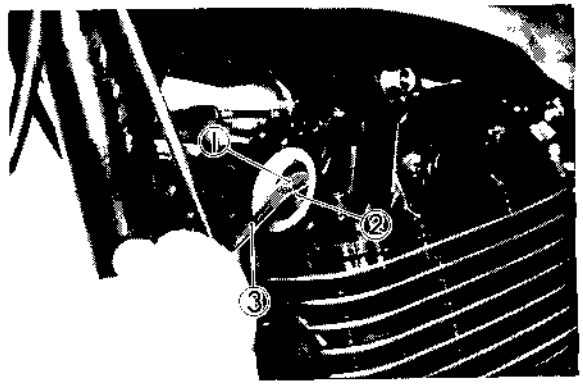
4. Use a feeler gauge to determine the clearance.

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)



1. Feeler gauge

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



1. Adjuster 2. Locknut 3. Valve adjusting tool

6. Reinstall the intake and exhaust tappet covers and two blind plugs on the left crankcase cover.

B. Spark Plug

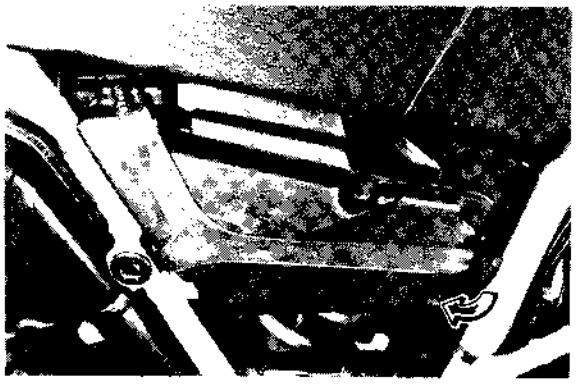
1. Check electrode condition and wear, insulator color and electrode gap.
2. Clean the spark plug with a spark plug cleaner if necessary.
   Use a wire gauge to adjust the plug gap to the specification.
3. If the electrodes become too worn, replace it.
4. When installing the plug, always clean the gasket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

Standard spark plug: DPR7EA (NGK), DP7EA (NGK) *D7EA (NGK) Spark plug gap: 0.8 ~ 0.9 mm (0.031 ~ 0.035 in) *0.6 ~ 0.7 mm (0.024 ~ 0.028 in) Spark plug tightening torque: 20 Nm (2.0 m · kg, 14 ft · lb)

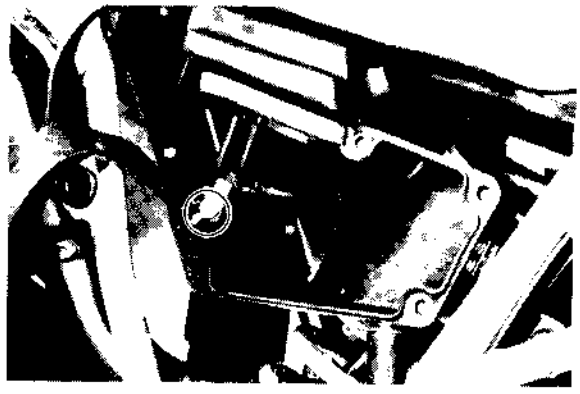
C. Air Filter

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.
When this filter element becomes dirty it should be cleaned.

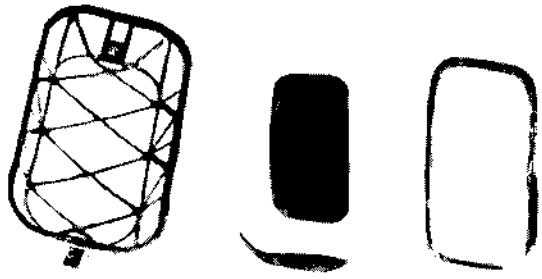
1. Remove the right side cover.
2. Remove the air filter case fitting band and the filter case cover.



3. Remove the wing bolt.



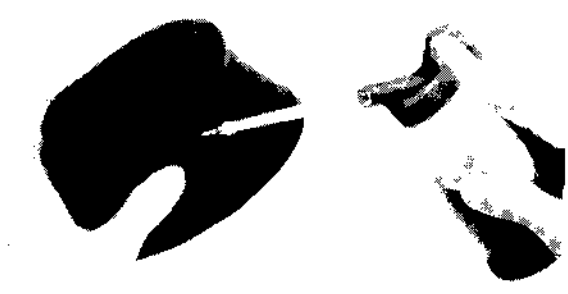
4. Remove the element from the guide.



5. Wash the element gently, but thoroughly, in solvent.
6. Squeeze the excess solvent out of the element and let dry.
7. Pour a small quantity of Yamalube 2-cycle oil onto the filter element and work thoroughly into the porous foam material.

NOTE:

In order to function properly, the element must be damp with oil at all times, but not "dripping" with oil.



8. Reinsert the guide into the element.
9. Coat the mating surface of the filter with all-purpose grease for an airtight seal between the filter case and filter seat.

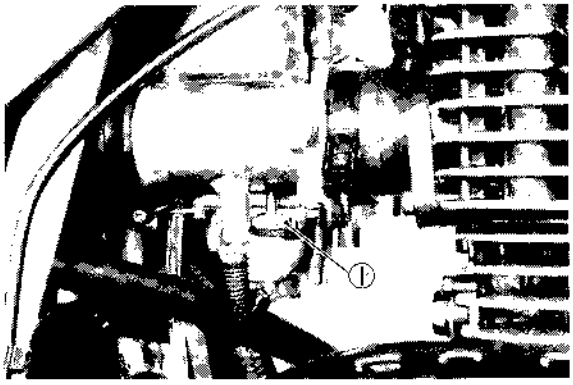


10. Install the filter element into the case.
11. Install the filter case cover.
12. Install the fuel tank, seat and side covers.

D. Idle Speed

1. Start the engine and warm it up for a few minutes.
2. Set the engine idle speed to the specified level by adjusting the throttle stop screw on the carburetor. Turning the throttle stop screw in (clockwise) increases the engine speed; turning it out (counterclockwise) decreases the engine speed. Use an inductive tachometer for checking and adjusting the engine speed.

Engine Idle: 1,300 ~ 1,400 r/min



1. Throttle stop screw

E. Fuel Line

Check fuel pipe from fuel cock to carburetor for cracks or damage; replace if necessary.

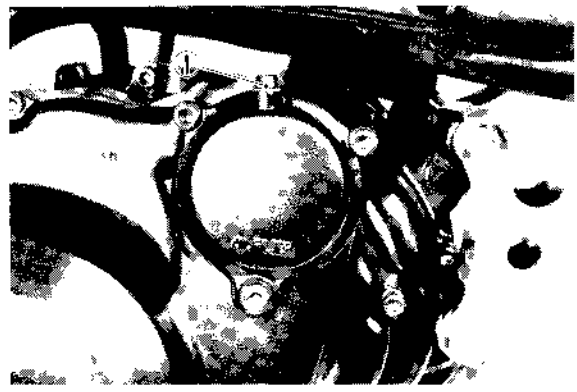
F. Engine Oil

Recommended oil

Yamalube 4-cycle oil or SAE 20W40 type SE motor oil

Oil level measurement

1. Loosen the air bleed screw on the oil filter cover.

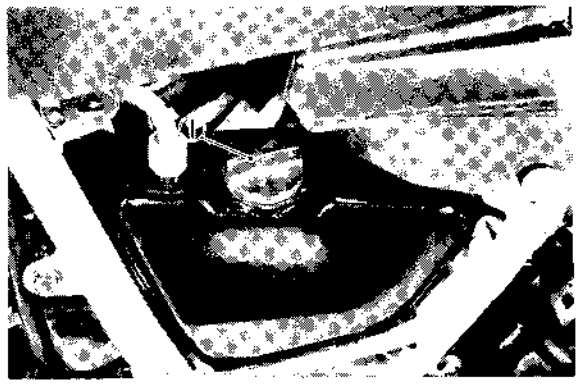


1. Air bleed screw

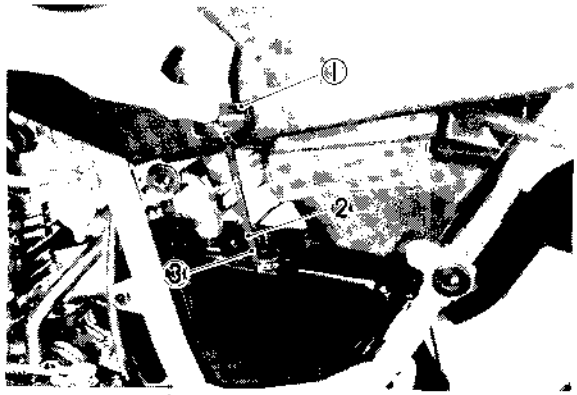
2. Start the engine and let it idle.
3. If no oil comes out of the bleed screw after 30 seconds, immediately turn off the engine and add engine oil.
4. If oil comes out of the bleed screw, tighten the bleed bolt, and warm up the engine for several minutes.
5. Stop the engine, remove the oil filler cap, and check the oil level.

NOTE:

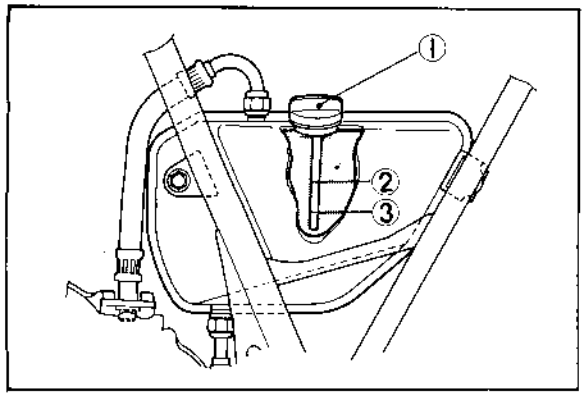
Be sure the motorcycle is positioned straight up when checking the oil level; a slight tilt toward the side can produce false readings.



1. Oil filler cap



1. Oil filler cap 2. Maximum oil level 3. Minimum oil level



1. Oil filler cap 2. Maximum oil level 3. Minimum oil level

6. The oil should be between the maximum and minimum marks on the filler cap gauge.
   If the level is lower, add sufficient oil to raise it to the proper level.

WARNING:

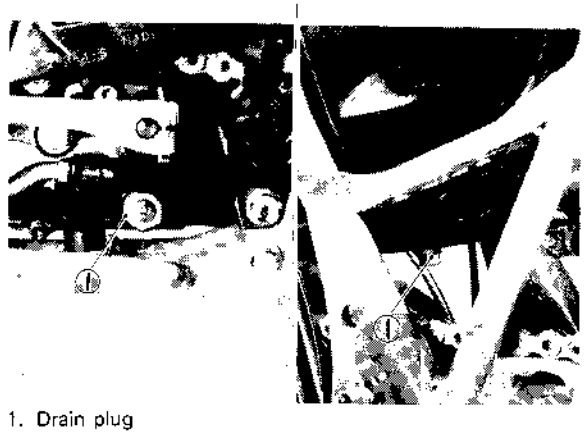
Never attempt to remove the oil tank filler cap just after high speed operation (and/or when engine is running). The heated oil could spout out, causing injury.
Wait until the oil cools down to approximately 50°C (122°F).

Oil capacity

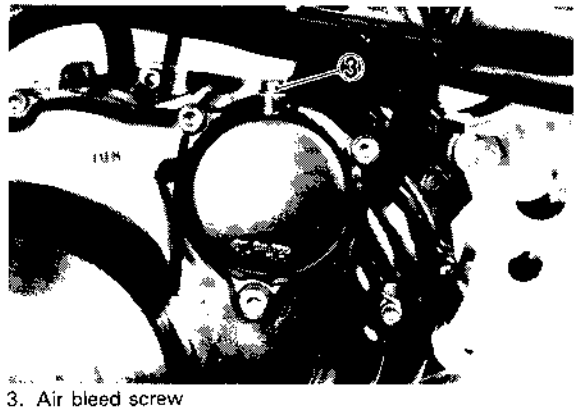
1. Regular oil replacement	2.0 L (1.8 Imp qt, 2.1 US qt)
2. Oil filter replacement	2.1 L (1.85 Imp qt, 2.2 US qt)
3. Total amount	2.4 L (2.1 Imp qt, 2.5 US qt)

Engine oil replacement (without replacing filter)

1. Start the engine and stop after a few minutes of warm-up.
2. Place an oil receiver under the engine.
3. Remove the oil tank filter cap, drain plugs (at two places), and air bleeder screw attached to the oil filter cover.



1. Drain plug



3. Air bleed screw

NOTE:

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

4. Check each O-ring. If damaged, replace.
5. Install the drain bolts (at two places) and the bleed screw, oil filter and filter cover.
6. Fill with 2.0 L (1.8 Imp qt, 2.1 US qt) of engine oil. Install the oil tank filler cap and tighten.

G. Oil Filter Replacement

1. Start the engine. After a few minutes of warm-up, stop the engine.
2. *Place oil pans* under the engine and under the oil tank.
3. Remove the oil tank filler cap, drain plugs (at two places), air bleed screw attached to the oil filter cover, and drain the engine oil.

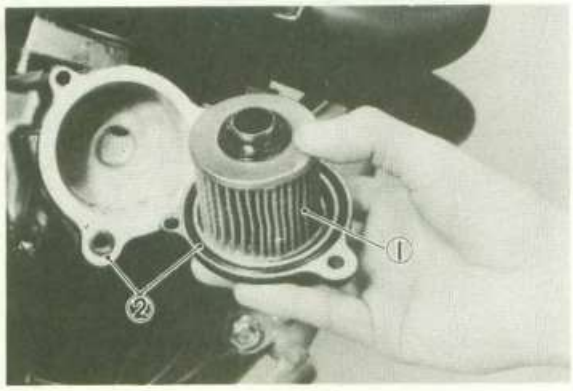
NOTE:

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

NOTE:

When removing the drain plug on the down tube, take care not to get stained by the oil that spouts out.

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



1. Oil filter element 2. "O"-ring

5. Check the O-rings. If damaged, replace.
6. Install the drain bolts, air bleed screw, oil filter, and oil filter cover.
7. Add 2.1 L (1.85 Imp qt, 2.2 US qt) of engine oil. Install the oil tank filler cap and tighten. Use 20W40 type SE oil.

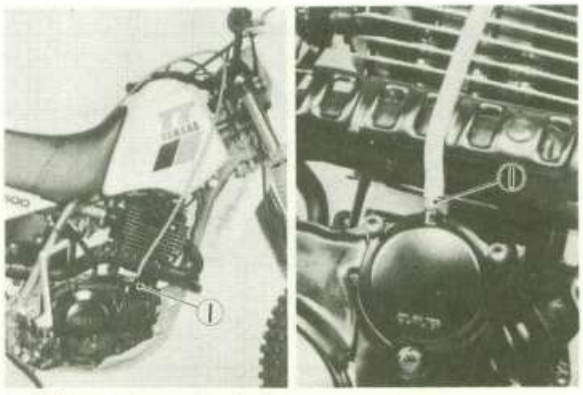


8. Start the engine and allow a few minutes of warm-up. While warming up, check for oil leakage. If oil leaks, stop the engine immediately, and check for the cause.
9. After warm up, stop the engine and check the oil level. (Refer to **"Engine Oil"**.)

H. Oil Pressure Check

Oil pressure can be checked using the following procedure:

1. Start the engine and let it idle for a few minutes.
2. Stop the engine.
3. Remove the air bleed screw from the oil filter cover.
4. Remove the exhaust pipe *protector*.
5. Install the oil pressure gauge adapter (special tool P/N. YU-08030-1).
6. Install a oil pressure gauge or pass a vinyl tube over the handle bar and put it into the oil tank.



1. Oil pressure gauge adapter

7. Start the engine.
8. If oil pressure is below the specified range or if oil does not flow into the oil tank, stop the engine immediately, and check for the cause.

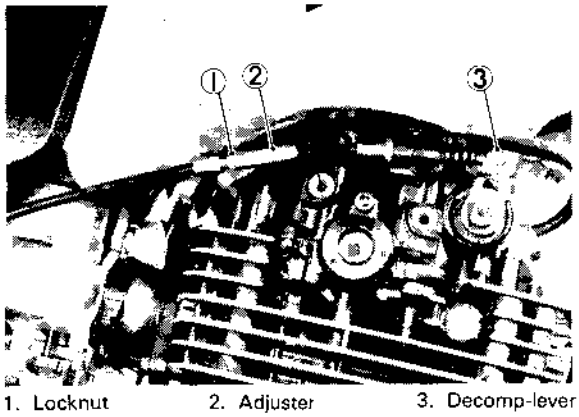
Specified oil pressure: 9.81 ~ 19.6 kPa (0.1 ~ 0.2 kg/cm^2, 1.42 ~ 2.84 psi)

I. Decompression System

NOTE:

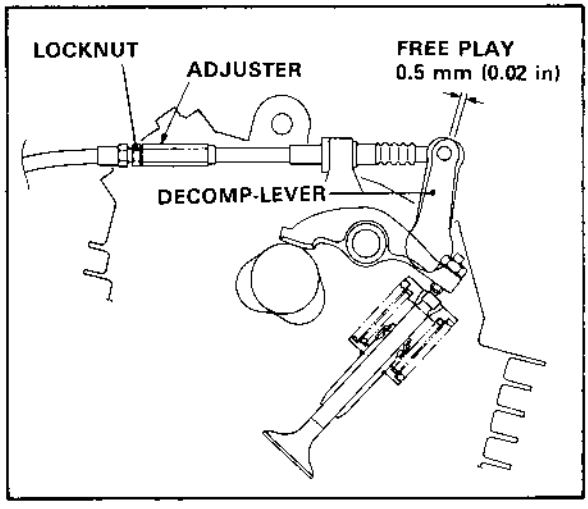
Decomp-cable adjustment must follow the valve clearance adjustment.

1. Remove the two blind plugs on the left crankcase cover.
2. Align the "T" mark on the flywheel with the timing mark on the crankcase cover. This places the piston at Top Dead Center, and the decomp-cable adjustment should be checked and adjusted with the piston at T.D.C. on the compression stroke.



1. Locknut 2. Adjuster 3. Decomp-lever

3. Loosen the locknut on the decompcable adjuster. Then turn the adjuster so 0.5 mm (0.02 in) free play can be provided for the end of the decomp-lever.



4. After the above adjustment, tighten the locknut on the decomp-cable adjuster.
5. Reinstall the two blind plugs on the left crankcase cover.

J. Compression Pressure Measurement

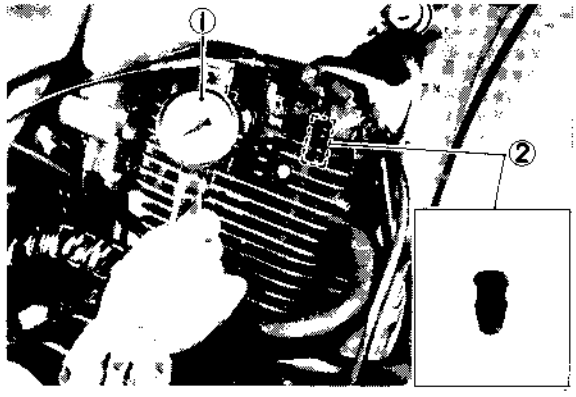
Insufficient compression pressure will result in performance loss and may indicate leaking valves or worn or damaged piston rings.

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

Compression pressure (at sea level):
Standard....
1,079 kPa (11 kg/cm^2, 156 psi)
Minimum....
883 kPa (9 kg/cm^2, 128 psi)
Maximum....
1,177 kPa (12 kg/cm^2, 171 psi)

WARNING:

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



1. Compression gauge set (special tool P/N. YU-33358)
2. Compression gauge adapter (special tool P/N. YU-33358-3)

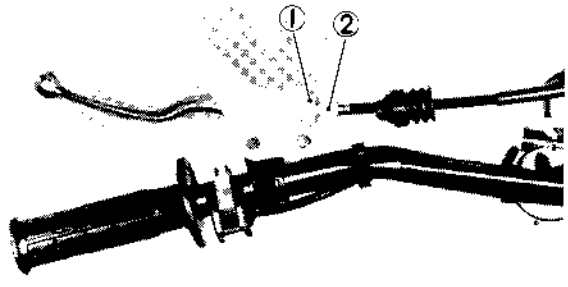
6. If the pressure is too low, squirt a few drops of oil into the cylinder. Measure compression again. If there is a higher reading than before (without oil), the piston rings may be worn or damaged. If the pressure remains the same after measuring with the oil, one or both rings and valves may be the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

K. Clutch Adjustment

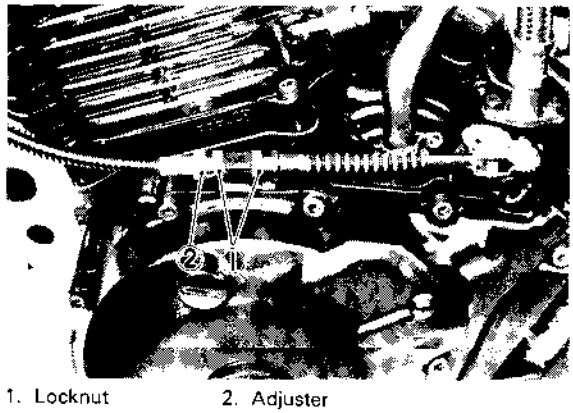
This model has two clutch cable length adjusters and a clutch mechanism adjuster. Cable *length adjusters* are used to take up slack from cable stretch and to provide sufficient free play for proper clutch operation under various operating conditions. The clutch mechanism adjuster is used to provide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

Free play adjustment

Loosen either the handle lever adjuster locknut or the cable in-line length adjuster locknut. Next, turn the length adjuster either in or out until proper lever free play is achieved.



1. Adjuster locknut 2. Adjuster



1. Locknut 2. Adjuster

Mechanism adjustment

See Chapter 3 "Clutch Mechanical Adjustment"

CHASSIS

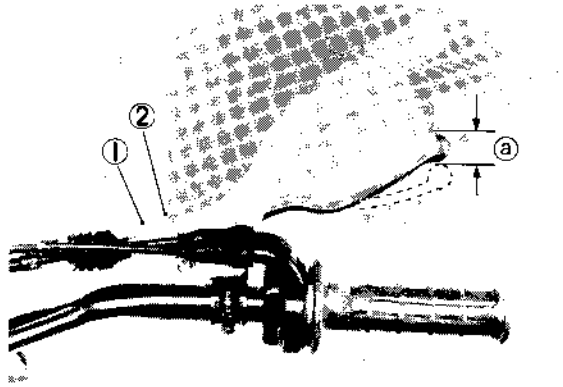
A. Brake

Front-brake-lever free play adjustment

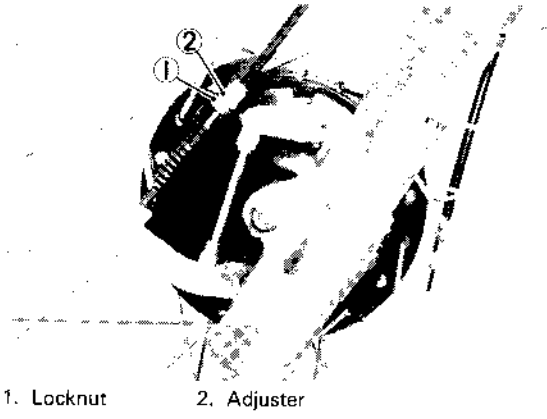
The brake can be adjusted by simply adjusting the free play of the brake lever.

Adjustment is accomplished at one of two places, either the handle lever holder or the front brake hub.

1. Loosen the adjuster locknut.
2. Turn the cable length adjuster in or out until adjustment is suitable.



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



1. Locknut 2. Adjuster

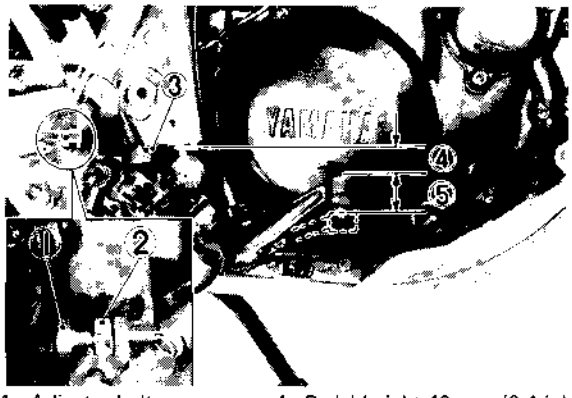
3. Tighten the adjuster locknut.

Rear-brake-pedal height adjustment

1. Loosen the adjuster locknut (for pedal height).
2. By turning the adjuster bolt clockwise or counterclockwise, adjust the brake pedal position so that its top end is flush with the top of the footrest.
3. Secure the adjuster locknut.

WARNING:

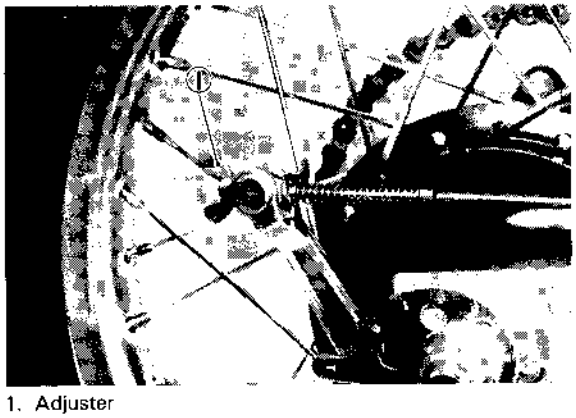
After adjusting the pedal height, the brake-pedal free play should be adjusted.



1. Adjuster bolt (for pedal height)
2. Locknut
3. Footrest
4. Pedal height 10 mm (0.4 in)
5. Free play 20 ~ 30 mm (0.8 ~ 1.2 in)

Rear-brake-pedal free play adjustment

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).

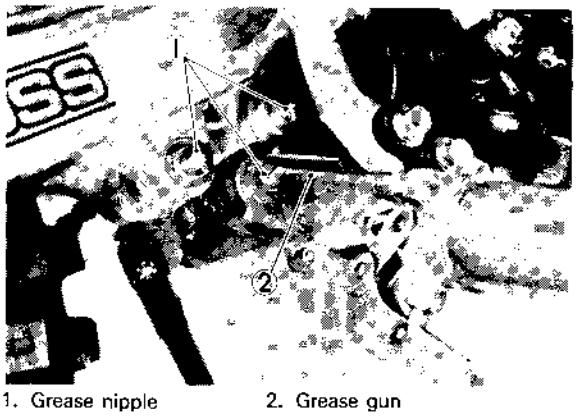


1. Adjuster

B. Swingarm and Relay-Arm Pivot Bearings

The swingarm and relay-arm must pivot freely on its bearings, but not have any excess play. Check swingarm and relay-arm pivot bearing operation according to the PERIODIC MAINTENANCE SCHEDULE.

Using a grease gun, lubricate the swingarm relay pivot points.



1. Grease nipple
2. Grease gun

Recommended lubricant:
Medium weight wheel bearing grease

C. Cable Inspection and Lubrication

The throttle twist grip assembly should be greased when the cable is lubricated, since the grip must be removed to get at the end of the throttle cable. Two screws clamp the throttle housing to the handlebar. Once these two are removed, the end of the cable can be held high to pour in several drops of lubricant. With the throttle grip disassembled, coat the metal surface of the grip assembly with a suitable all-purpose grease to cut down friction.

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

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

D. Levers, Pedals and Sidestand Pivot

Lubricate the pivoting parts of the lever, pedal, and sidestand.

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

E. Tires and Wheels

To insure maximum performance, long service, and safe operation, note the following precautions:

1. Check tire pressure before riding; adjust as necessary.

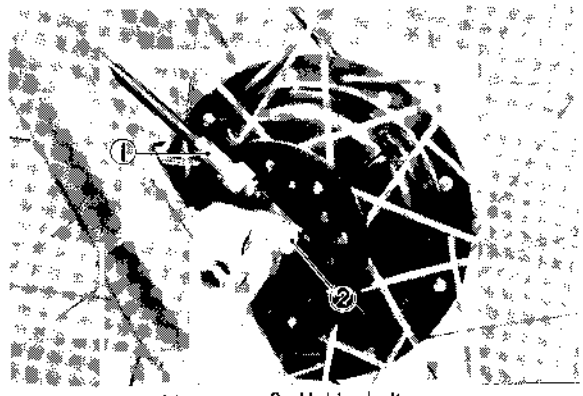
	Front	Rear
Off-road riding	98 kPa (1.0 kg/cm², 14 psi)	98 kPa (1.0 kg/cm², 14 psi)

2. Before operation, always check the tire surfaces for wear and/or damage; look for cracks, glass, nails, metal fragments, stones, etc. Correct any such hazard before riding.
3. Always inspect the wheels before a ride. Place the motorcycle on the sidestand and check for cracks, bends, or warpage of the wheels. Do not attempt even small repairs to the wheel. If a wheel is deformed or cracked, it must be replaced.
4. After installing a tire, ride conservatively to allow the tire to seat itself on the rim properly. Failure to allow proper seating may cause tire failure resulting in damage to the motorcycle and injury to the rider.
5. After repairing or replacing a tire, check to be sure the bead stopper locknut is securely fastened. If not, torque it as specified.

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

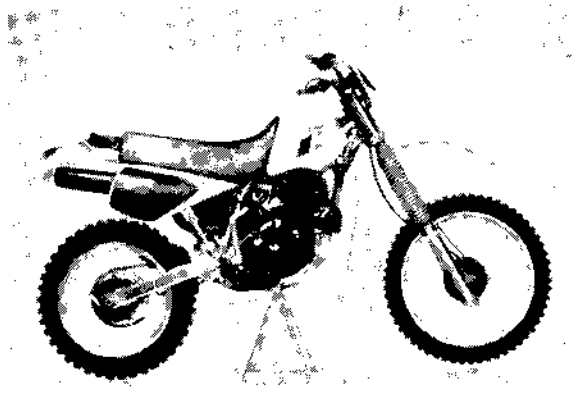
Front wheel removal

1. Loosen and remove the front wheel axle nut.
2. Remove the trip meter cable.
3. Loosen the holder bolt.

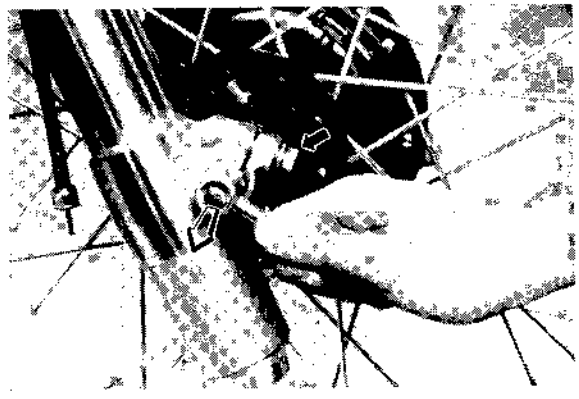


1. Trip meter cable 2. Holder bolt

4. Elevate the front wheel by placing a suitable stand under the engine.



5. Turn and pull out the front wheel axle; the wheel assembly can now be removed.



Front wheel installation

When installing the front wheel, reverse the removal procedure. Pay attention to the following points.

1. Be sure the boss on the outer fork tube correctly engages with the locating slot on the brake shoe plate.



2. Tighten the axle nut and axle holder nut.

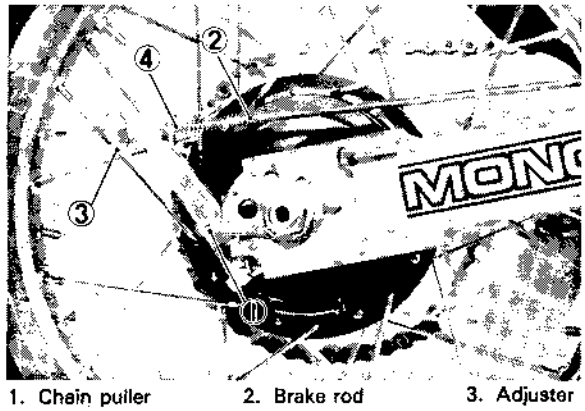
Axle nut torque:
60 Nm (6.0 m · kg, 43 ft · lb)

Axle holder nut torque:
20 Nm (2.0 m · kg, 14 ft · lb)

3. Reinstall the trip meter cable.
4. Adjust the play in the brake lever.

Rear wheel removal

1. Elevate the rear wheel by placing a suitable stand nuder the engine.
2. Remove the brake rod from the brake shoe plate. The brake rod can be removed by moving the spring seat forward.
3. Remove the rear wheel axle nut.
4. The rear wheel assembly, the collar, the chain puller(s), etc., can be removed from the motorcycle by pulling the wheel axle.

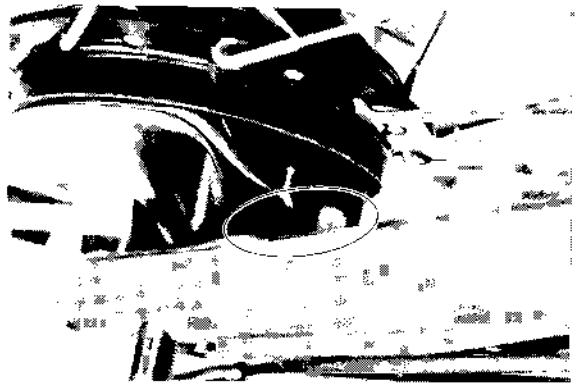


1. Chain puller 2. Brake rod 3. Adjuster
4. Spring seat

Rear wheel installation

When installing the rear wheel, reverse the removal procedure. Pay attension to the following points.

1. Be sure the swingarm boss correctly engages the locating slot on the brake shoe plate.



2. Make sure the chain pullers are installed with the number punched side outward.
3. Adjust the drive chain tension.
4. Tighten the axle nut.

Axle nut torque:
100 Nm (10.0 m · kg, 72 ft · lb)

5. Adjust the rear brake.

F. Wheel Bearings

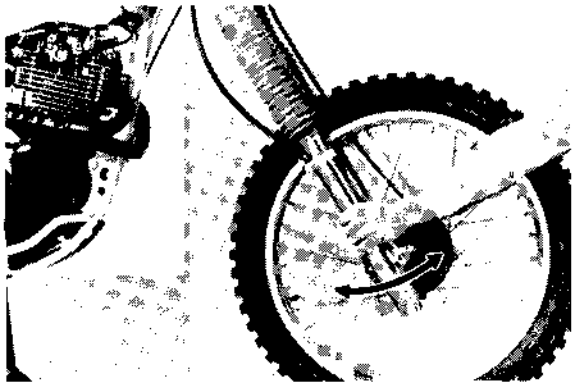
If a rolling rumble is noticed and increases with increasing wheel speed (not engine or transmission speed), the wheel bearings may be worn. Check the wheel bearings on both the front and rear wheels.

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

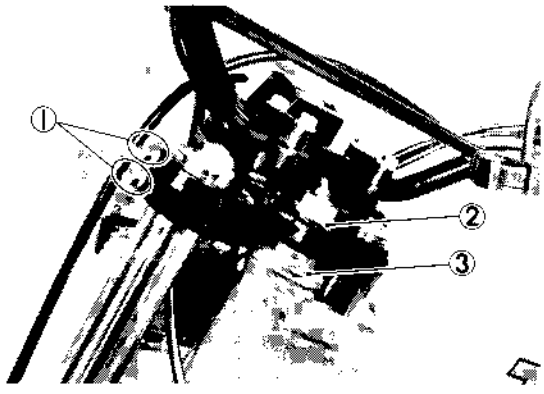
G. Steering Head Adjustment

The steering assembly should be checked periodically for looseness.

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



3. If the steering head is loose, adjust it. Loosen the steering fitting bolt and front fork pinch bolts.

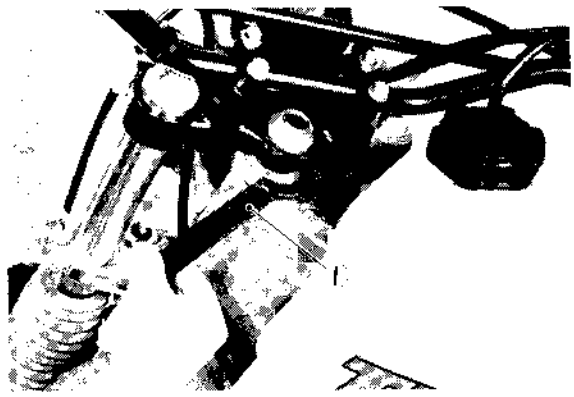


1. Front fork pinch bolt
2. Steering fitting bolt
3. Steering ring nut

4. 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 bearings and races.
Recheck for looseness and freedom of movement.



1. Ring nut wrench

5. Retighten the top steering fitting nut, steering fitting bolt, and steering stem, and the front fork pinch bolts in that order.
6. Recheck steering adjustment to make sure there is no binding when the forks are moved from lock to lock. If necessary, repeat the adjustment procedure.

H. Front Forks

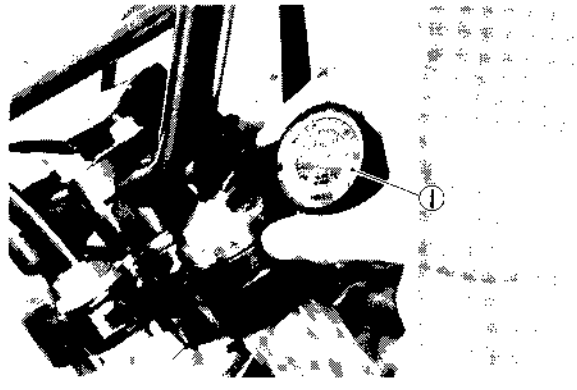
Front fork adjustment

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

NOTE:

When checking and adjusting the air pressure, there should be no weight on the front end of the motorcycle.

2. Remove the air valve caps from the left and right fork cap bolts.
3. Using the air check gauge, check and adjust the air pressure.



1. Air check gauge

NOTE:

An optional air check gauge is available.
P/No. 2X4-2811A-00

If the air pressure is increased, the suspension becomes stiffer and if decreased, it becomes softer.

To increase:

Use a manual air pump or other pressurized air supply.

To decrease:

Release the air by pushing the valve pin.

Standard air pressure:
0 kPa (0 kg/cm^2, 0 psi)
Maximum air pressure:
118 kPa (1.2 kg/cm^2, 17 psi)

CAUTION:

Never exceed the maximum pressure, or oil seal damage may occur.

WARNING:

The difference between both the left and right tubes should be 9.8 kPa (0.1 kg/cm^2, 1.4 psi) or less.

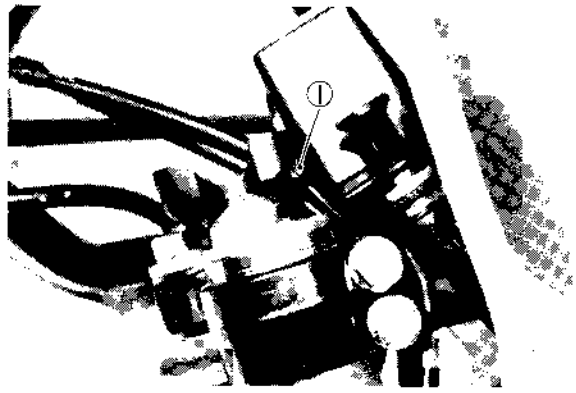
4. Install the air valve caps securely.

Front fork oil change

WARNING:

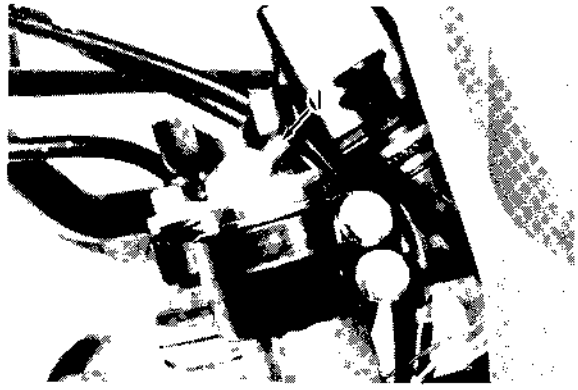
1. **Fork oil leakage can cause loss of stability and safe handling. Have any problem corrected before operating the motorcycle.**
2. **Securely support the motorcycle so there is no danger of it falling over.**

1. Elevate the front wheel by placing a suitable stand under the engine.
2. Remove the handlebar.
3. Remove the air valve caps from the left and right fork cap bolts.

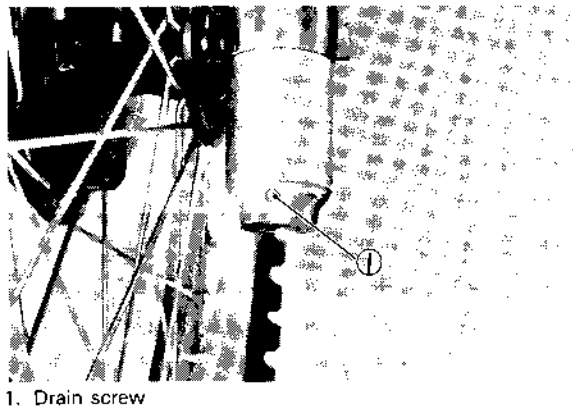


1. Air valve cap

4. Keep the valve open while pressing it for several seconds so that the air can be let out of the inner tube.


1. Push

5. Loosen the fork pinch bolts and remove the cap bolts from inner fork tube.
6. Place open container under each drain hole. Remove the drain screw from each outer tube.

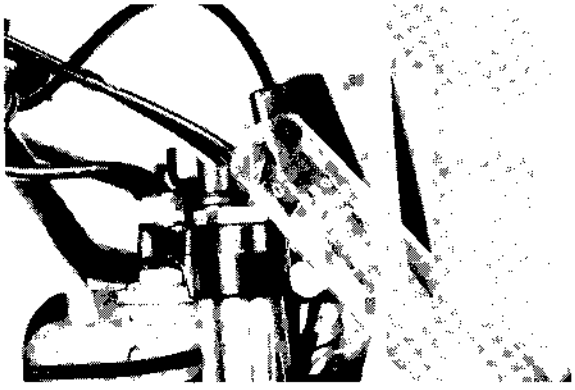


1. Drain screw

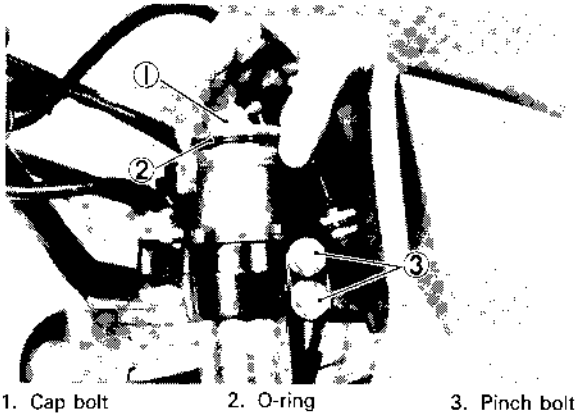
7. When most of the oil has drained, slowly raise and lower the outer tubes to pump out the remaining oil
8. Inspect the drain screw gasket. Replace if damaged. Reinstall the drain screw.

9. Pour specified amount of oil into the fork inner tube.

Front fork oil (each fork):
578 cm^3 (20.3 Imp oz, 19.5 US oz)
Yamaha Fork Oil 10Wt or equivalent



10. After filling, slowly pump the forks up and down to distribute the oil.
11. Inspect the "O-ring" on the cap bolt. Replace "O-ring" if damaged.



1. Cap bolt 2. O-ring 3. Pinch bolt

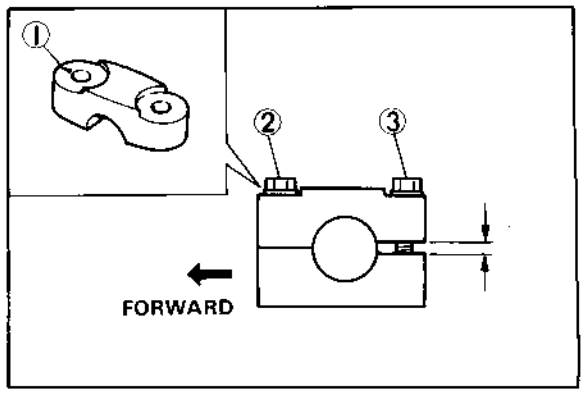
12. Reinstall the cap bolts and tighten the pinch bolts.
13. Reinstall the handlebar.

NOTE:

The upper handlebar holder should be installed with the embossed punched mark forward.

CAUTION:

First tighten the bolts on the front side of the handlebar holder, and then tighten the bolts on the rear side.



1. Punched mark 2. 1st. 3. 2nd.

TIGHTENING TORQUE:
Cap bolt:
23 Nm (2.3 m · kg, 17 ft · lb)
Pinch bolt:
23 Nm (2.3 m · kg, 17 ft · lb)
Handle upper holder pinch bolt:
23 Nm (2.3 m · kg, 17 ft · lb)

14. Fill the fork with air using a manual air pump or other pressurized air supply. Refer to "Front fork adjustment" for proper air pressure adjusting.

Maximum air pressure:
118 kPa (1.2 kg/cm^2, 17 psi)
Do not exceed this limit

I. Rear Shock Absorber

WARNING:

This shock absorber contains highly compressed nitrogen gas.
Read and understand the following information before handling the shock absorber. The manufacturer cannot be held responsible for property damage or personal injury that may result from improper handling.

1. **Do not tamper or attempt to open the cylinder assembly.**
2. **Do not subject shock absorber to an open flame or other high heat. This may cause the unit to explode due to excessive gas pressure.**

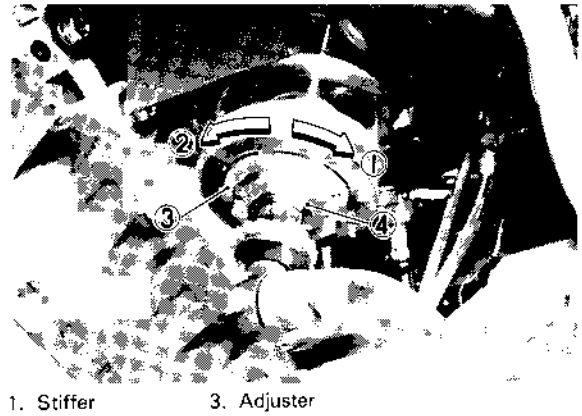
3. **Do not deform or damage the cylinder in any way. Cylinder damage will result in poor damping performance.**

Spring preload adjustment

The spring preload of the rear shock absorber can be adjusted to suit rider's preferance, weight, and the course conditions.

1. Remove the cover from the rear shock absorber.
2. Loosen the locknut.
3. To increase the preload, turn the spring seat clockwise. To decrease the preload, turn the spring seat counterclockwise.
4. The length of the spring (installed) changes 1 mm (0.04 in) per turn of the *adjuster*.

S.T.D. Length	230 mm (9.1 in)
MIN. Length	216 mm (8.5 in)
MAX. Length	241 mm (9.5 in)



1. Stiffer
2. Softer
3. Adjuster
4. Locknut

NOTE:

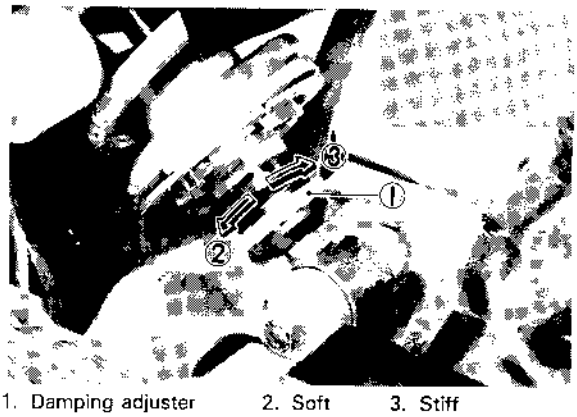
When adjusting, use the special wrench which is included in the owner's tool kit.

CAUTION:

Never attempt to turn the adjuster beyond the maximum or minimum setting.

Damping adjustment

To increase the damping, turn the adjuster clockwise. To decrease the *damping*, turn the adjuster counterclockwise.



1. Damping adjuster
2. Soft
3. Stiff

S.T.D. SETTING	10 clicks out
MIN. SETTING	20 clicks out
MAX. SETTING	0

Don't turn out the adjuster more than 25 clicks from the stiffest position.

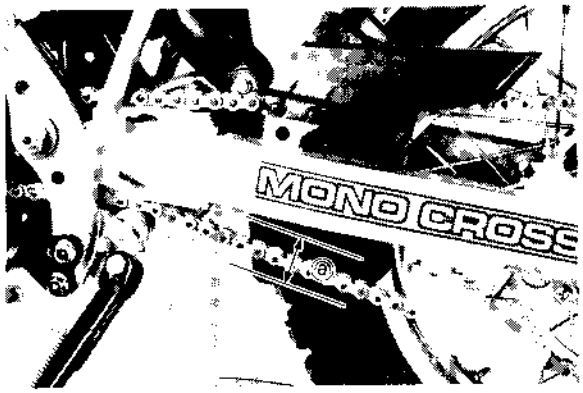
J. Drive Chain

Drive chain tension check

NOTE:

1. Before checking and/or adjusting, rotate the rear wheel through sevel 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.
2. Tension check should be made with the tensioner in the relaxed position (not touching the chain).

To check the chain play, the motorcycle must stand vertically with its both wheels on the ground and without passenger on it. Check the tension at the position shown in the illustration. The normal vertical deflection is approximately 20 ~ 30 mm (0.8 ~ 1.2 in). If the deflection exceeds to 30 mm (1.2 in), adjust the chain tension.



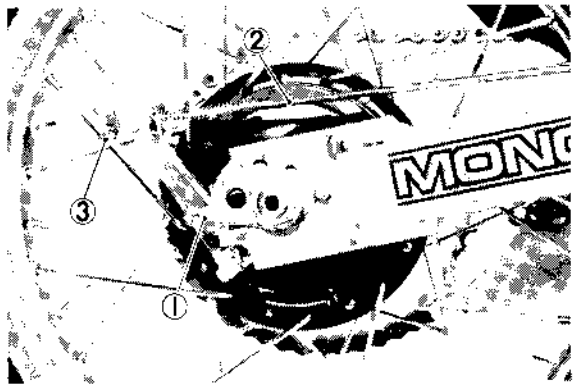
a. 20 – 30 mm (0.8 – 1.2 in)

Drive chain tension adjustment

CAUTION:

Excessive chain tension will overload the engine and other vital parts; keep the tension within the specified limits.

1. Loosen the rear brake adjuster.
2. Loosen the rear wheel axle nut.
3. Turn the chain puller both left and right, until axle is situated in same puller slot position on each side.



1. Chain puller 2. Rod 3. Adjuster

4. Tighten the rear axle nut.

Axle nut torque:
100 Nm (10.0 m · kg, 72 ft · lb)

5. In the final step, adjust the play in the brake pedal.

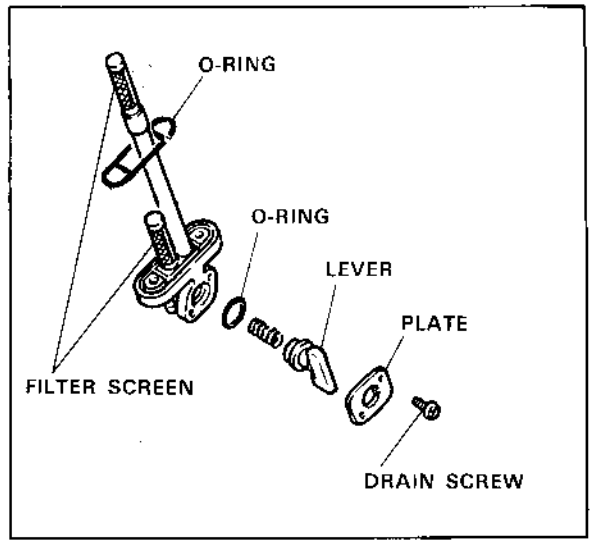
Drive chain lubrication

The chain consists of many parts which work against each other. If the chain is not maintained properly, it will wear out rapidly, therefore, form the habit of periodically servicing the chain. This service is especially necessary when riding in dusty conditions.

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

K. Fuel Cock

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



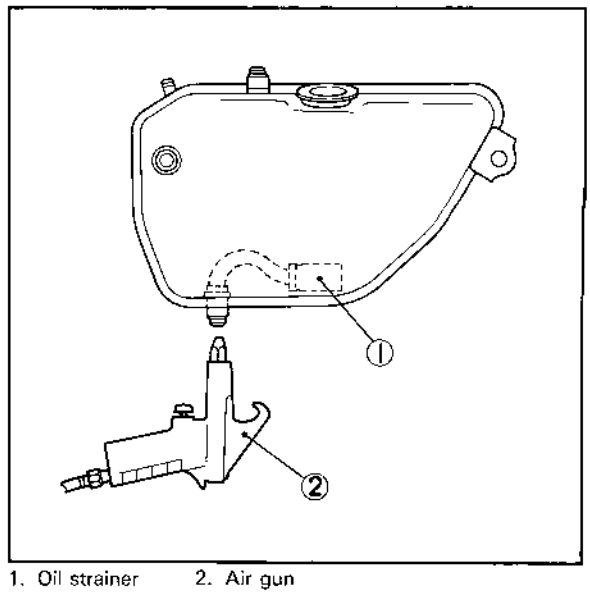
1. Remove the fuel tank and position it so that fuel will not spill when the fuel cock is removed.
2. Remove the fuel cock and inspect the filter screen. Replace the fuel cock assembly if it is seriously contaminated.
3. Remove the screws on the front and rear of the fuel cock; remove the plate, gaskets, lever, and O-rings.

4. Inspect all components, and replace any that are damaged. If the O-rings are damaged in any way or if the fuel cock gasket surfaces are scratched or corroded, the fuel cock assembly must be replaced. If there is abrasive damage to any components, the fuel tank must be drained and flushed.
5. Reassemble the fuel cock, and install it on the fuel tank.

L. Oil Tank Strainer

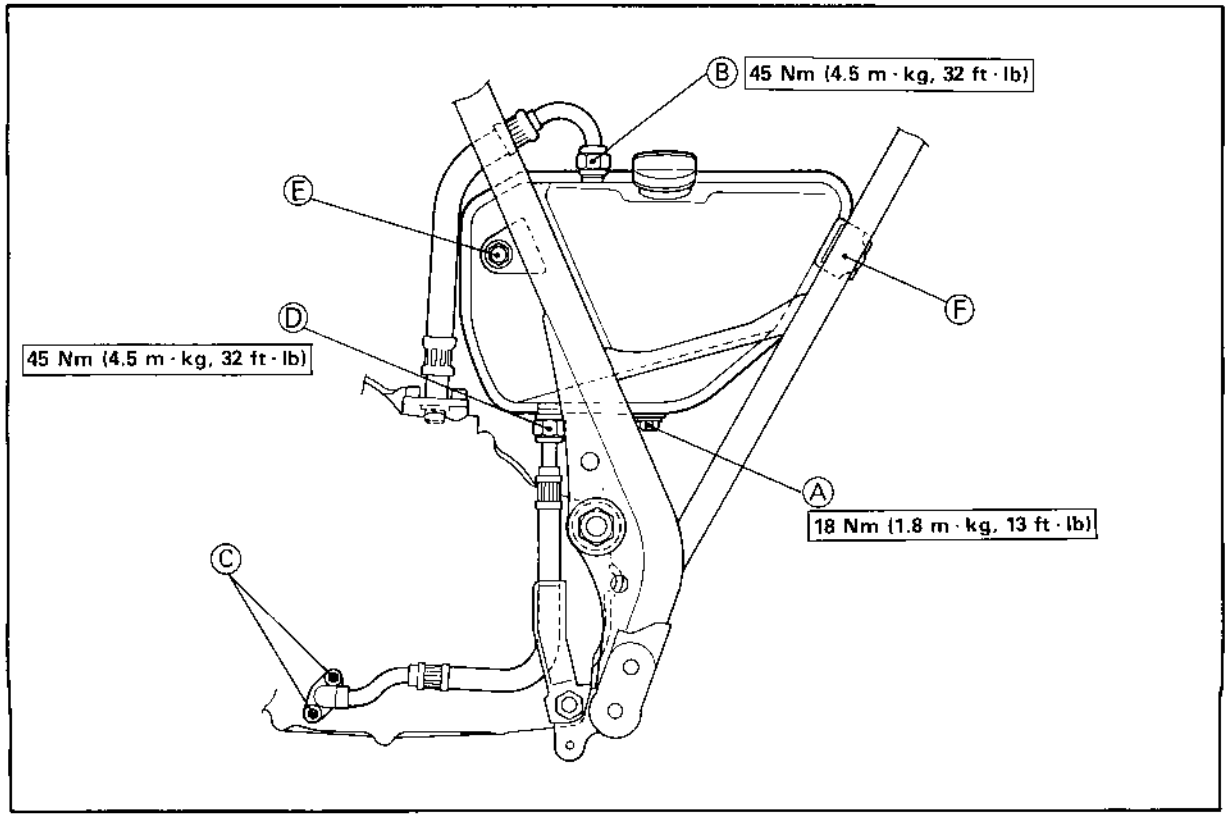
The oil tank strainer is located in the oil tank and can not be removed from the oil tank. The oil tank should be removed to clean the strainer.

1. Remove the drain bolt and drain the oil. (A in the illustration)
2. Place an oil receiver under the oil tank and remove the oil hoses. (B, C & D).
3. Loosen and remove the oil tank securing bolts (E & F).
4. Remove the carburetor.
5. Remove the oil tank from the right-front side of the chassis.
6. Blow the oil strainer using compressed air.



1. Oil strainer 2. Air gun

7. Clean the inside of the oil tank with a cleaning solvent.
8. Remove the cleaning solvent thoroughly.
9. Reverse the removal procedure to install the oil tank.
10. Fill the engine oil. See **"Engine Oil."**



ELECTRICAL

A. Headlight

Headlight bulb replacement

1. Disconnect the lead wires and remove the headlight assembly.



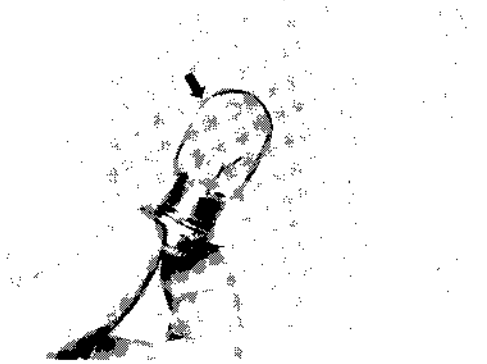
2. Turn the bulb holder counterclockwise and remove the defective bulb.
3. Slip a new bulb into position and secure it with the bulb holder.

CAUTION:

Avoid touching the glass part of the bulb. Also keep it free from oil stains; otherwise, the transparency of the glass, life of the bulb, and luminous flux will be adversely affected. If the glass is oil stained, thoroughly clean it with a clothmoistened with alcohol or lacquer thinner.

WARNING:

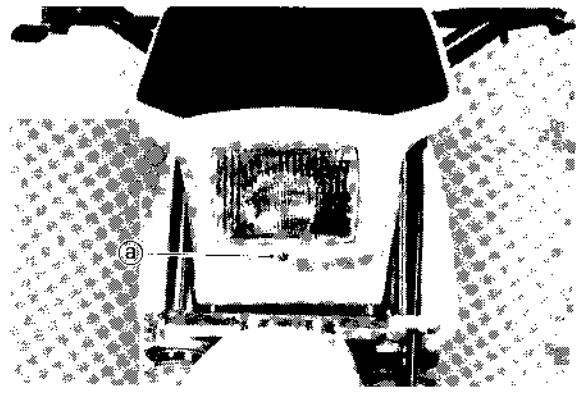
Keep flammable products or your hands away from the bulb while it is on, because it heats up. Do not touch the bulb until it cools down.



4. Reinstall the headlight assembly to the frame. Adjust the headlight beam if necessary.

Headlight beam adjustment

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

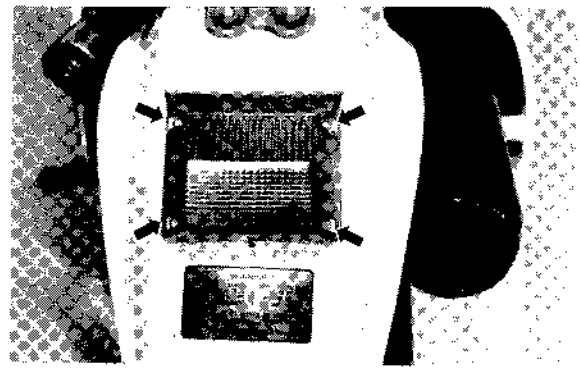


a. Vertical adjusting screw

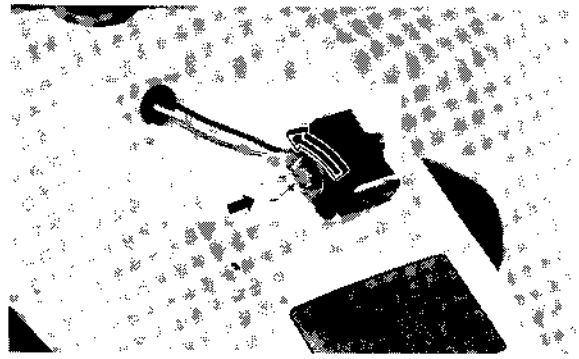
B. Taillight

Taillight bulb replacement

1. Remove the screws from the lens.



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



3. Push a new bulb into position and turn it clockwise.

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ENGINE MOUNTING 3-46

CHAPTER 3
ENGINE OVERHAUL

ENGINE REMOVAL

NOTE:

It is not necessary to remove the engine in order to remove the clutch and/or the AC magneto.

A. Preparation for Removal

1. All dirt, mud, dust, and foreign material must be removed from the engine before removal and disassembly. This will help keep foreign material out of the engine oil.
2. Before engine removal and disassembly, be sure that you have the proper tools and cleaning equipment. With them, you can perform a clean and efficient job.

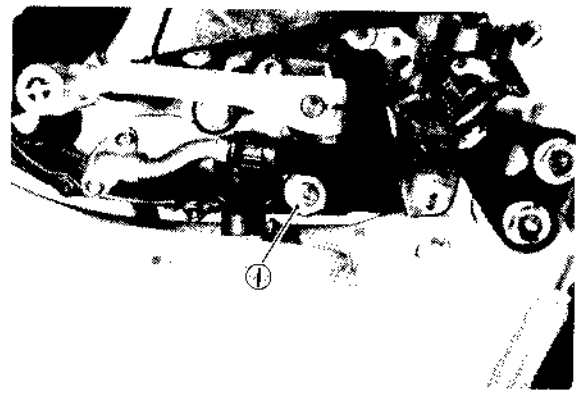
NOTE:

When disassembling the engine, keep mated parts together. This includes gears, cylinders, pistons, and other parts that have been "mated" through normal wear. Mated parts must be reused as an assembly or replaced.

3. During engine disassembly, clean all parts and place them in trays in the order of disassembly. This will speed up assembly time and help assure that all parts are correctly reinstalled in the engine.
4. Start the engine and let it warm-up. Stop the engine and drain the engine oil.



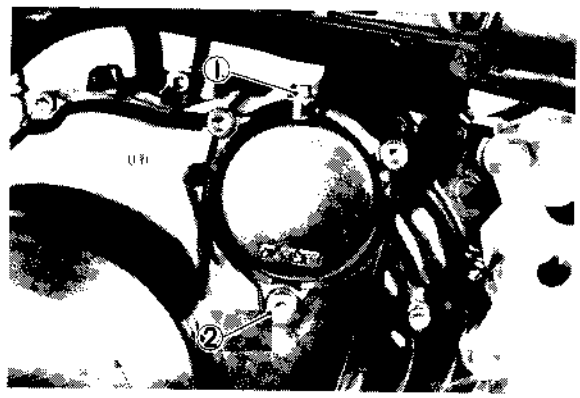
1. Drain bolt



1. Drain bolt

NOTE:

Remove the air bleed screw and then loosen the filter cover screw.

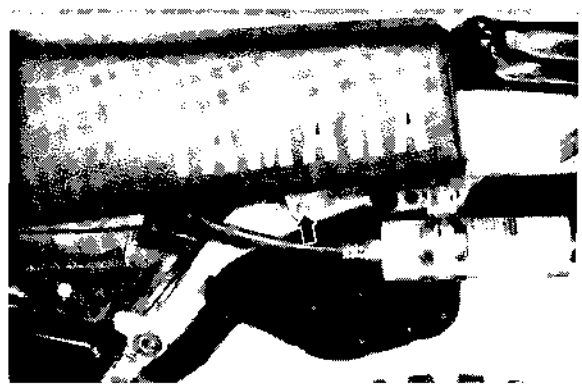


1. Air bleed screw 2. Filter cover screw

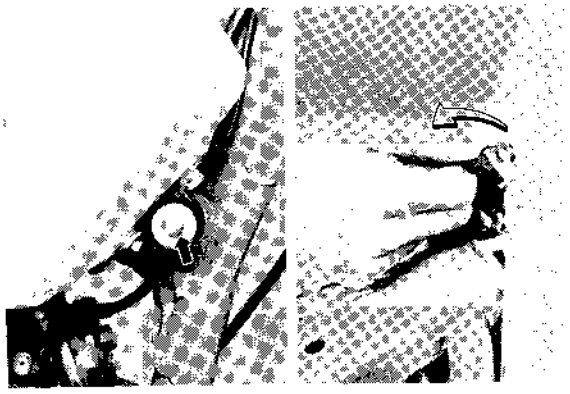
5. Remove the left and right sidecovers.

B. Seat and Fuel Tank

1. Turn the fuel cock to "OFF".
2. Loosen the seat securing bolts and remove the seat.

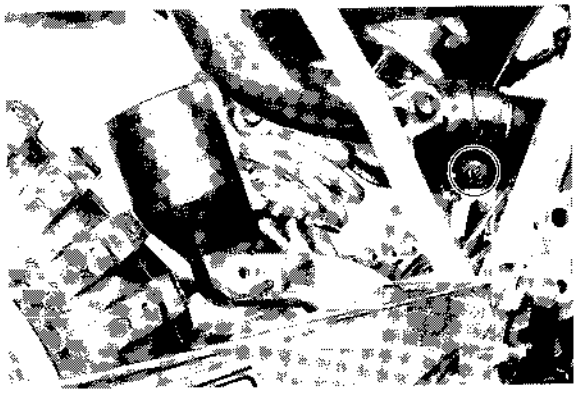


3. Loosen the fuel tank securing bolt and remove the fuel tank.

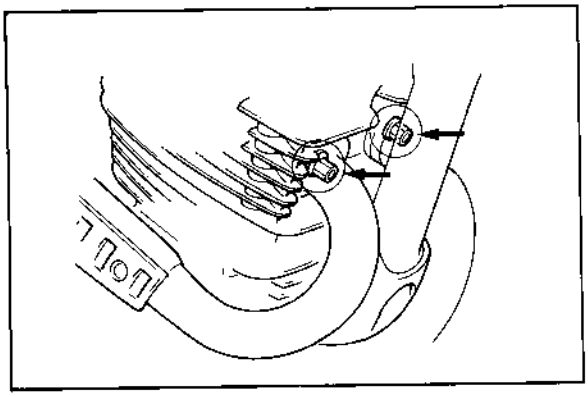


C. Exhaust Pipe and Footrest with Brake Pedal

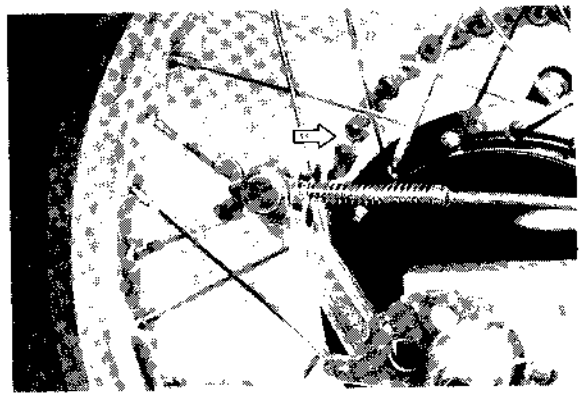
1. Loosen the muffler band bolt.



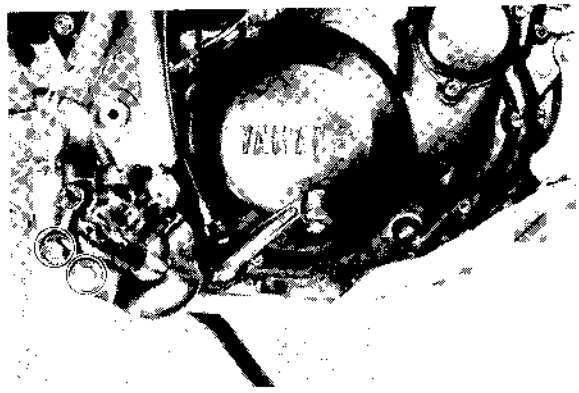
2. Remove the nuts holding the exhaust pipe to the cylinder head.

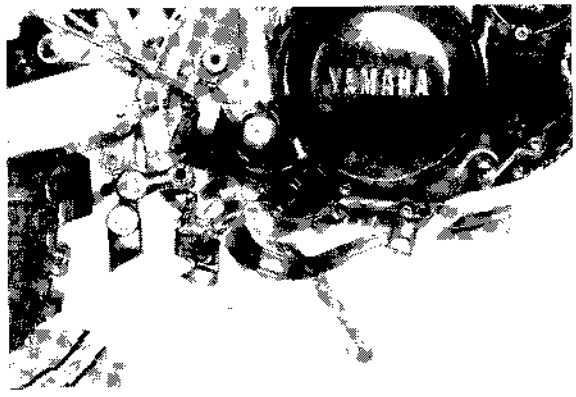


3. Remove the exhaust pipe assembly.
4. Remove the brake rod from the lever.



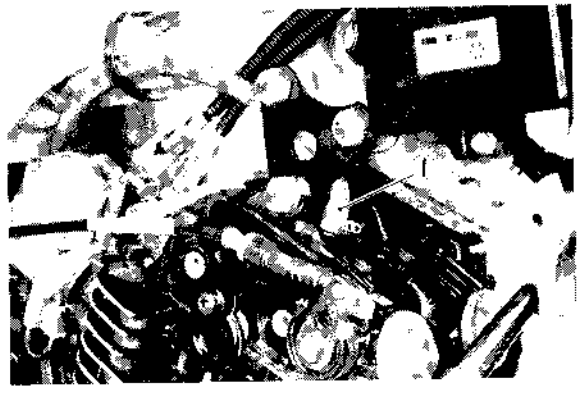
5. Loosen the securing bolts and remove the right side footrest with the brake pedal.





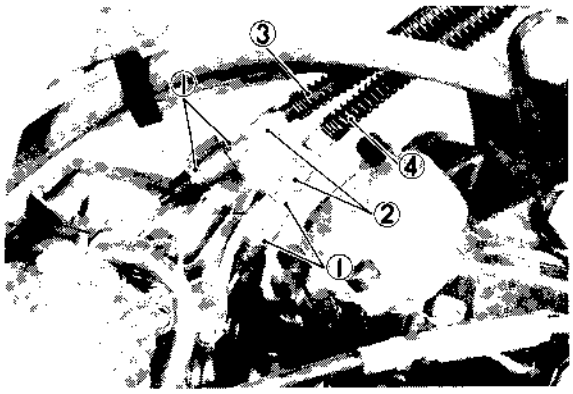
D. Carburetor

1. Remove the breather pipe and ventilation hose.



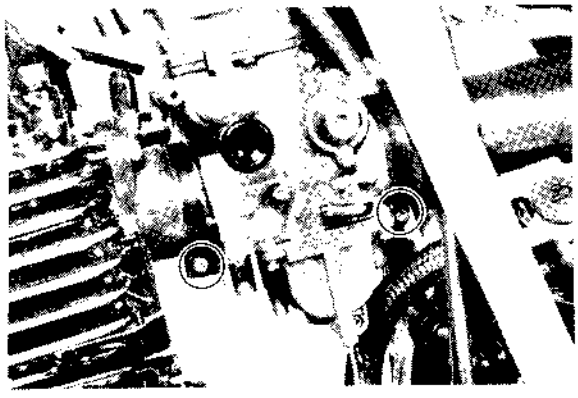
1. Ventilation hose

2. Loosen the locknut and remove the throttle cables.



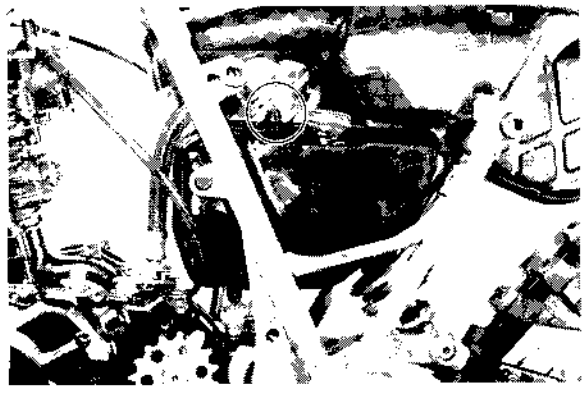
1. Locknut
2. Adjuster
3. Throttle cable
4. Throttle cable (with silver ring)

3. Loosen the hose clamp and remove the carburetor assembly.

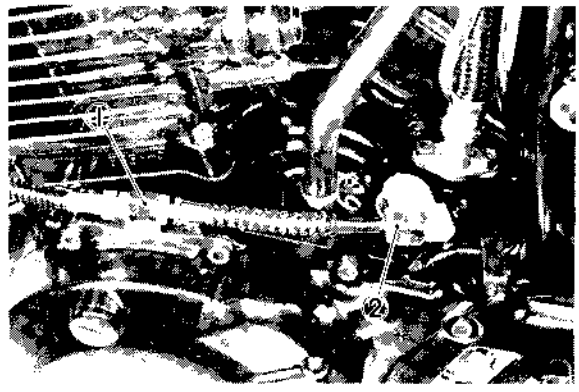


E. Oil Hoses and Clutch Cable

1. Remove the oil hoses.

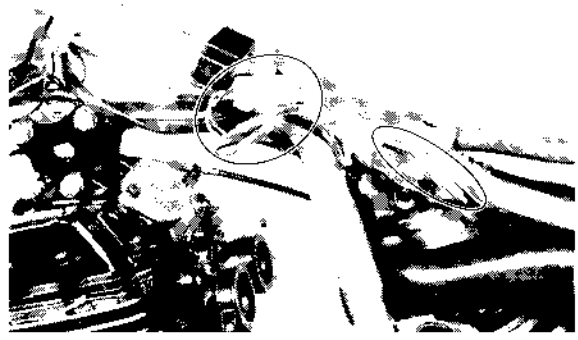


2. Remove the clutch cable at the cable holder first and then at the clutch push lever.



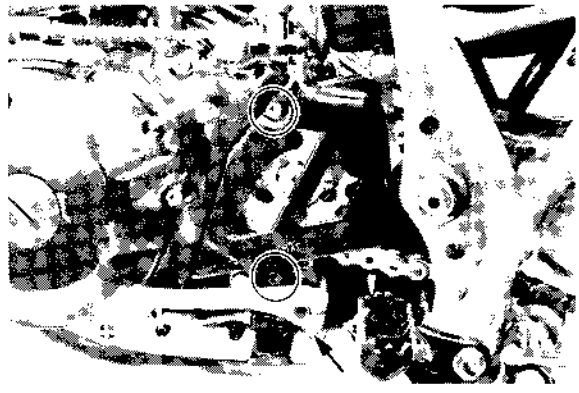
1. Cable holder
2. Clutch push lever

3. Disconnect the connectors.

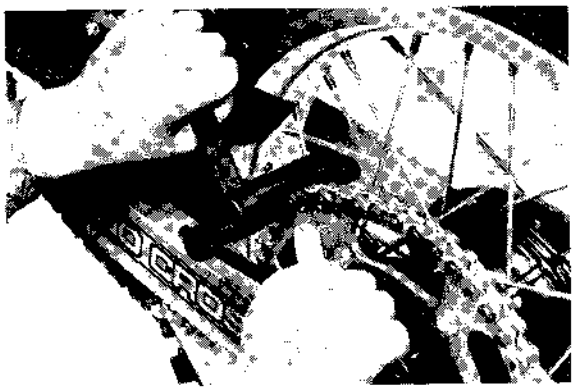


F. Drive Chain

1. Remove the change pedal and case cover.

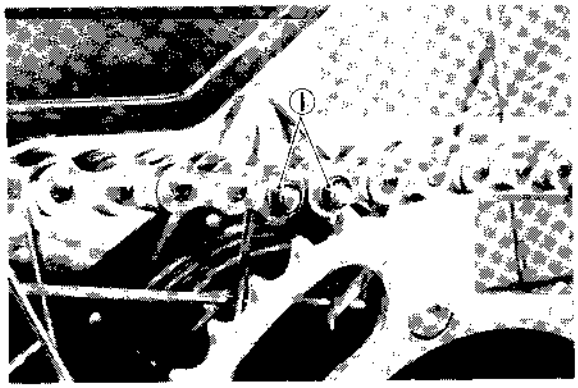


2. Bring the master link clip slightly before the sprocket wheel and remove the chain joint clip.
3. Using a chain cutter, separate the chain.



NOTE:

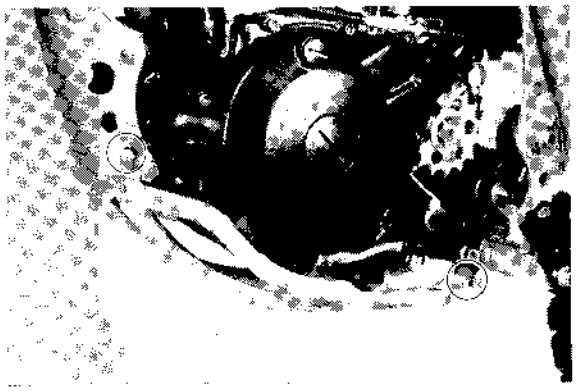
Be careful not to lose the O-rings.



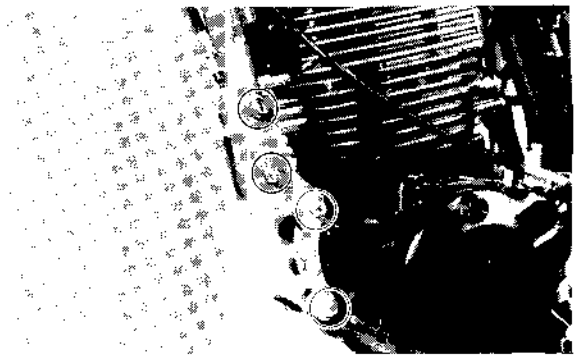
1. O-rings

G. Engine Mounting Bolts

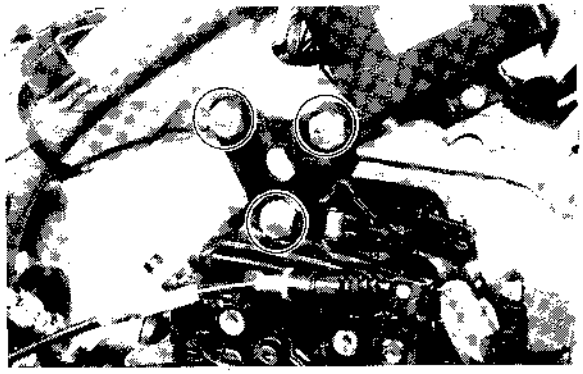
1. Loosen the engine protector securing bolts and remove the engine protector.

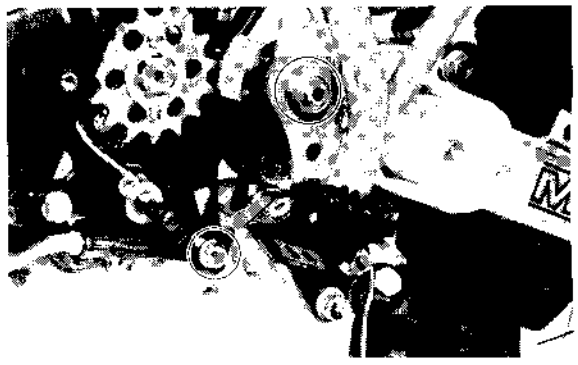


2. Place a suitable stand under the engine.
3. Remove the front bracket.



4. Remove the engine mounting bolts.





NOTE:

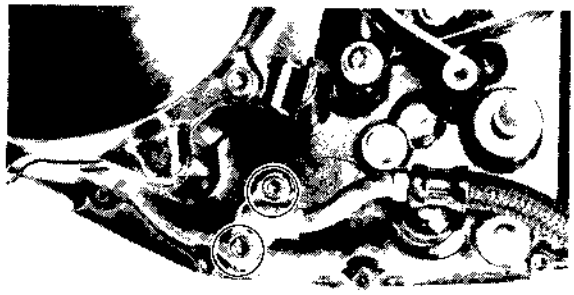
The engine and rear arm are installed using the same pivot shaft. Therefore, take care so that the pivot shaft is not pulled entirely out, but far enough to set the engine free.

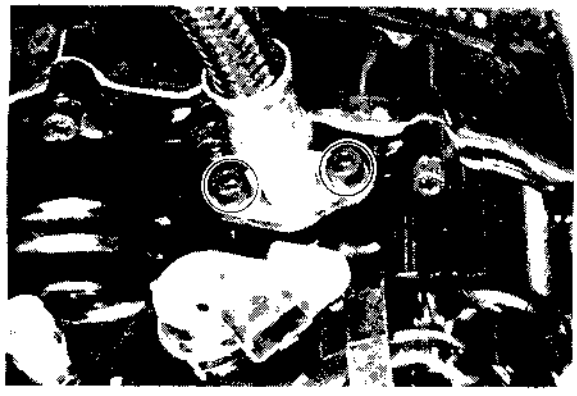
5. Remove the engine from the right side of the frame.



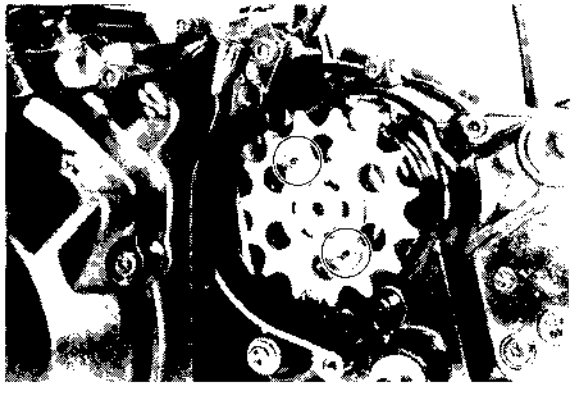
DISASSEMBLY

1. Remove the oil hoses.

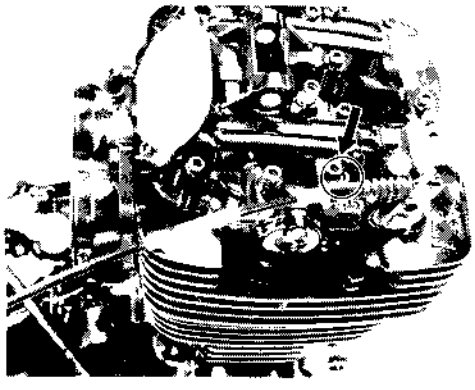


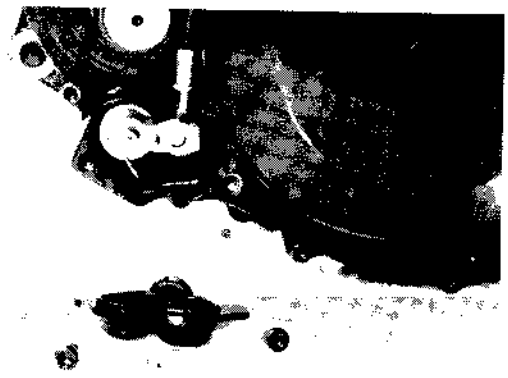


2. Remove the drive sprocket.

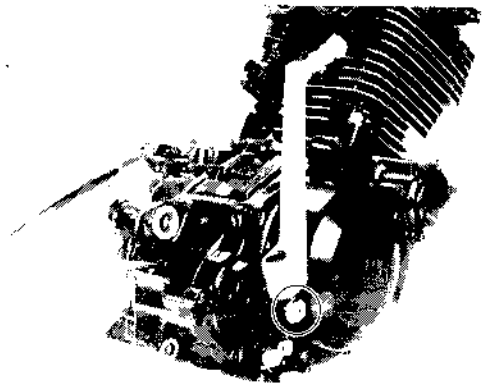


3. Remove the decomp. wire.



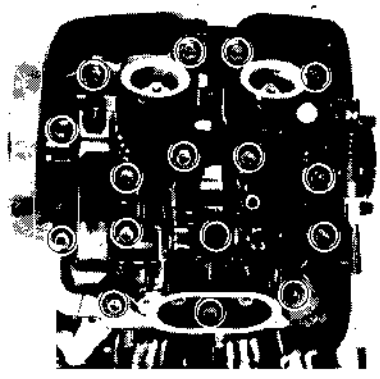


4. Remove the kick crank assembly.



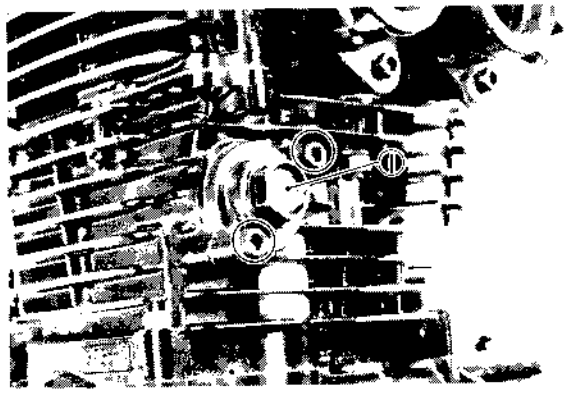
A. Cylinder Head Cover

1. Remove the spark plug.
2. Remove the inlet and exhaust valve covers.
3. Loosen the cylinder head cover securing bolts (16) and remove the cylinder head cover.



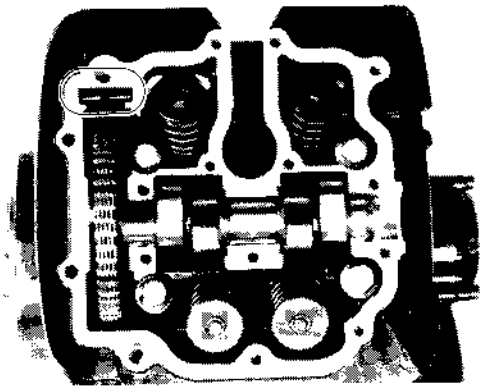
B. Cylinder Head

1. Loosen the cam chain tensioner end plug and tensioner securing bolts, and remove the cam chain tensioner assembly.

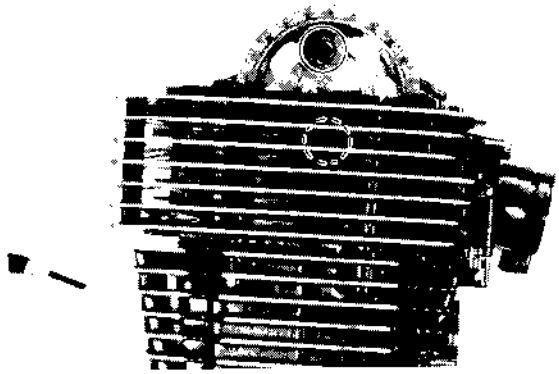


1. End plug

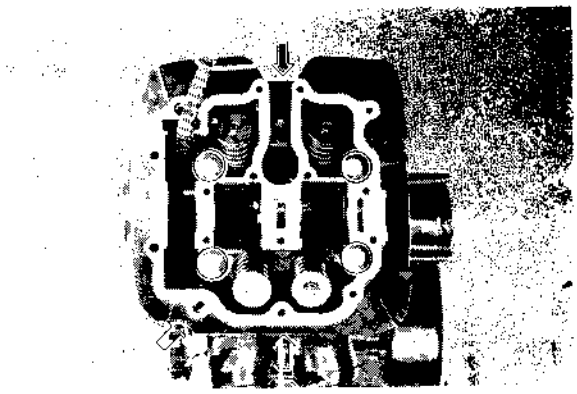
2. Remove the cam chain guide stopper (Front).



3. Loosen the cam sprocket securing bolts (2) and remove the cam sprocket and the cam shaft.

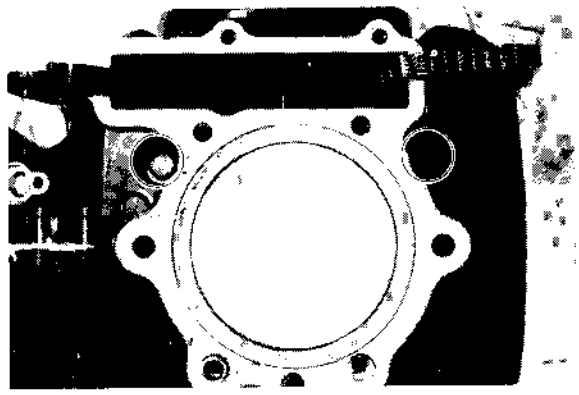


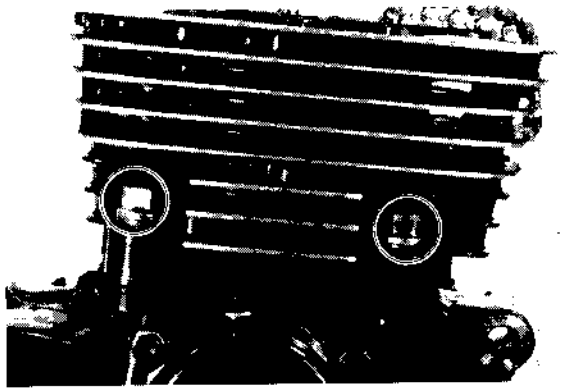
4. Loosen the cylinder head securing bolts (5) and nuts (2) and remove the cylinder head.



C. Cylinder

Remove cylinder holding nuts and bolts and then remove the cylinder.





D. Piston Pin and Piston

1. Remove piston pin clip (1) from 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 piston pin from opposite side, then pull out.
   Recommended practice is to use the piston pin puller (special tool P/N. YU-01304).

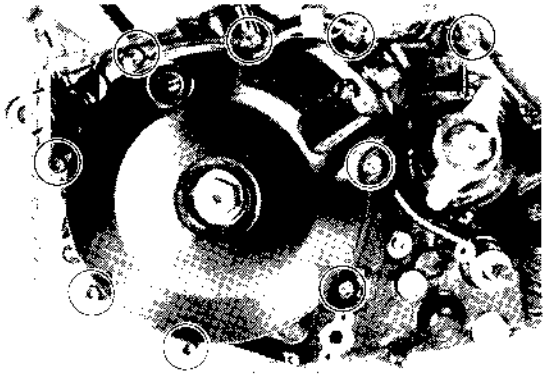
NOTE:

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



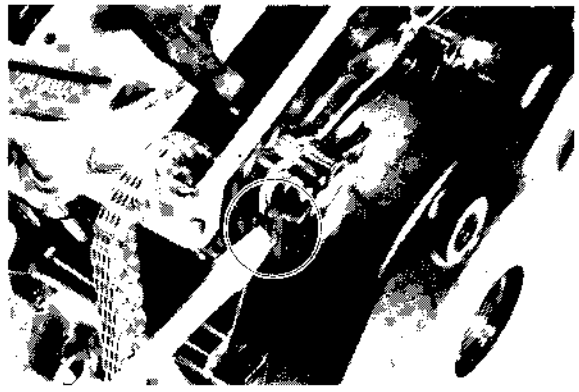
E. C.D.I. Rotor

1. Remove the left case cover.

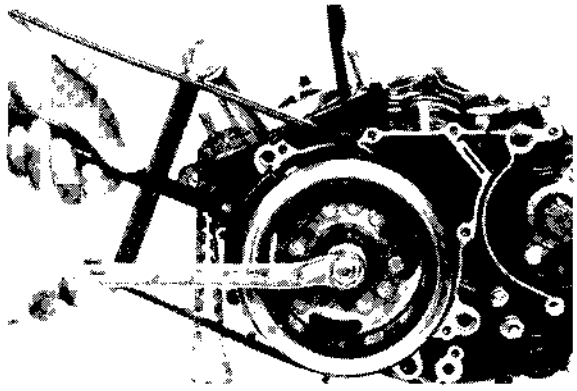


NOTE:

For this removal, slits in the crankcase can be used as shown in the photo.
Be sure not to give damages to the mating surface.



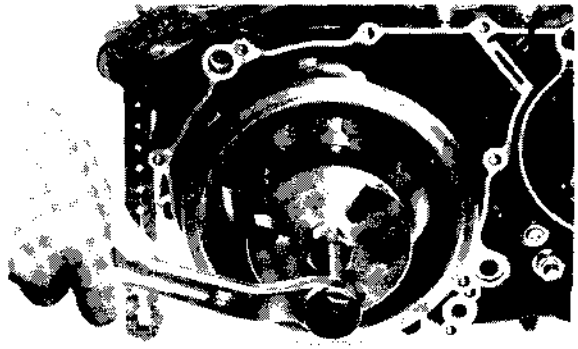
2. Loosen the rotor securing nut by using the rotor holding tool (special tool P/N. YS-01880 (90890-01701)).



NOTE:

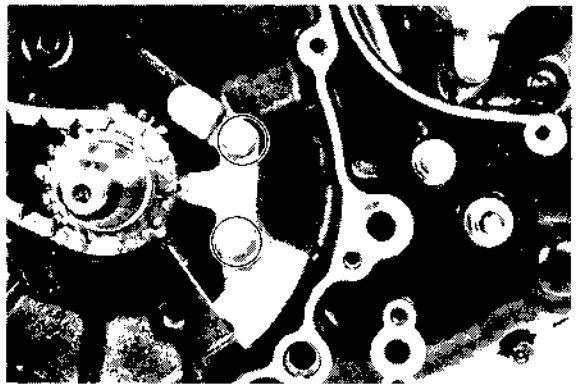
Don't allow the tool to touch the projections.

3. Remove the rotor by using the rotor puller (special tool P/N. YU-90105 or YU-33270).



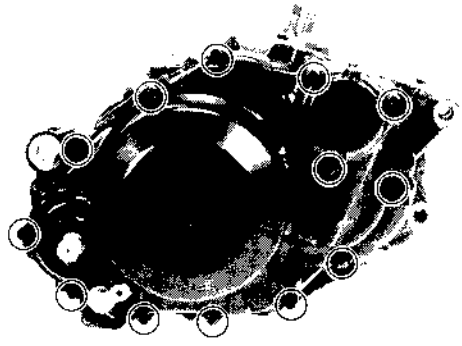
F. Cam Chain and Guide Stopper

Loosen the guide stopper securing bolts and remove the guide stopper, baffle plate, and cam chain.



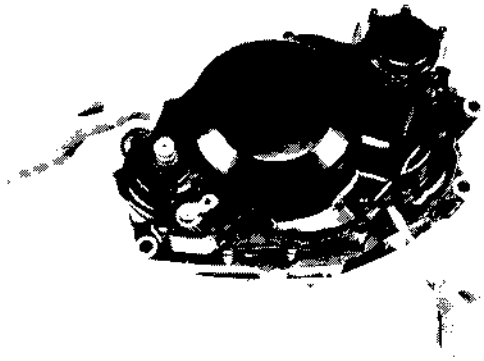
G. Crankcase Cover (Right)

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



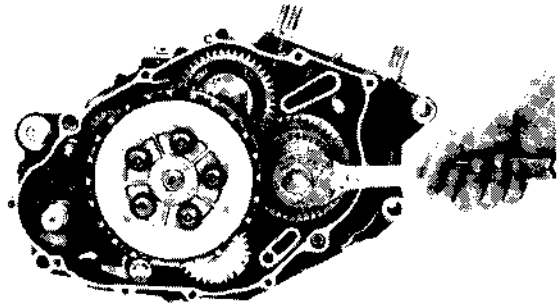
NOTE:

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

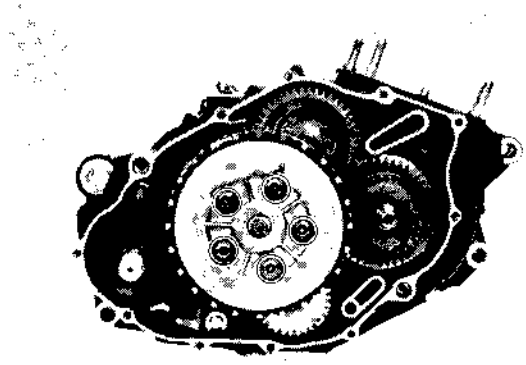


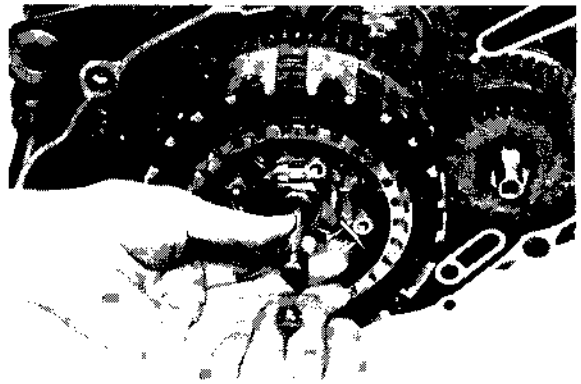
H. Clutch Assembly and Drive Gear

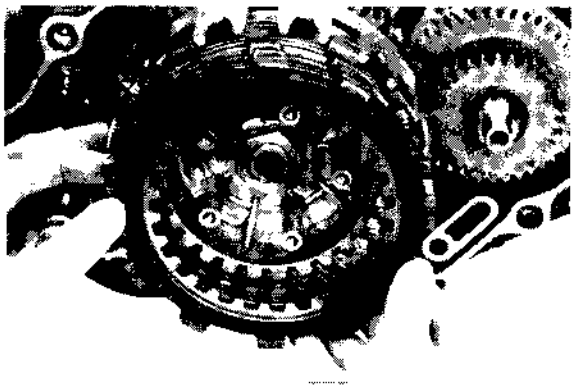
1. Flatten the lock washer on the primary drive gear.
2. Loosen primary drive gear by first placing a folded rag between the teeth of the primary gears to lock them as shown in the photo. Then loosen drive gear nut. Remove the nut and washer.



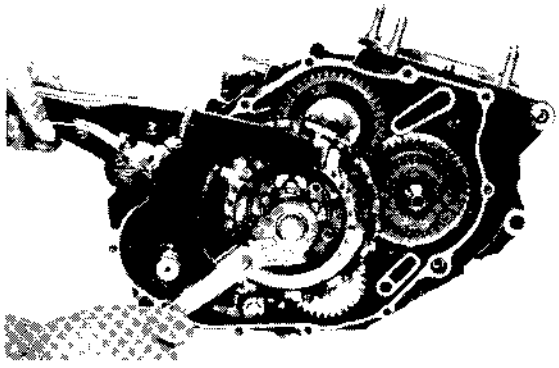
3. Remove the five clutch spring holding screws, pressure plates, clutch plates, friction plates, ball and push rod 2.





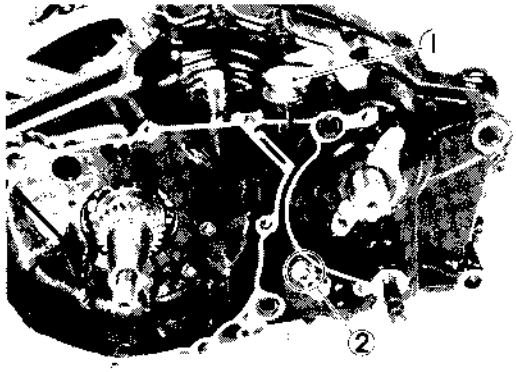


4. Flatten the lock washer on the clutch boss securing nut.
5. Install clutch holding tool (special tool P/N. YM-91042) on clutch boss.
   Loosen the locknut.
   Remove the locknut, washer, clutch boss and housing in that order.



I. Clutch Push Lever Axle

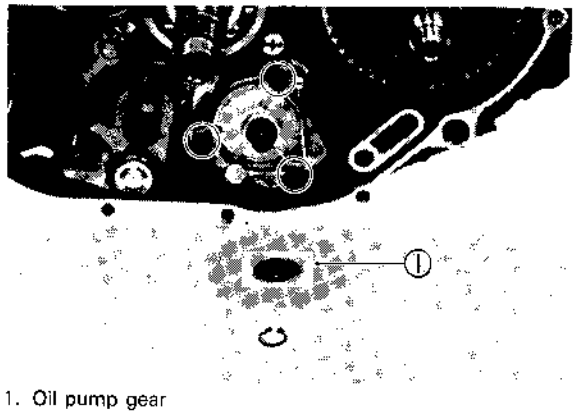
Remove the push lever axle by pulling it up.



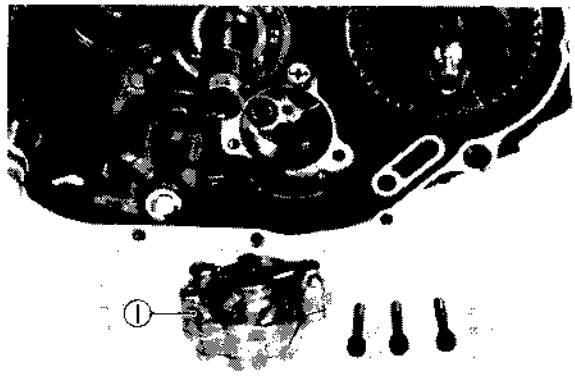
1. Push lever 2. Set screw

J. Oil Pump Assembly

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



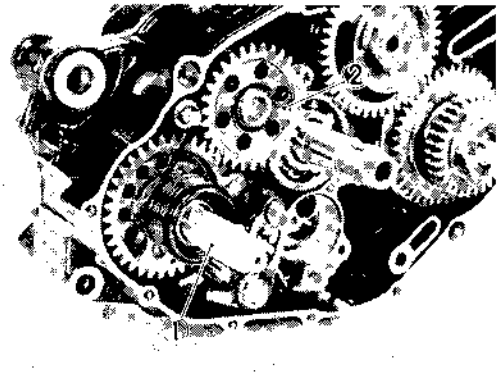
1. Oil pump gear



1. Oil pump assembly

K. Kick Axle Assembly

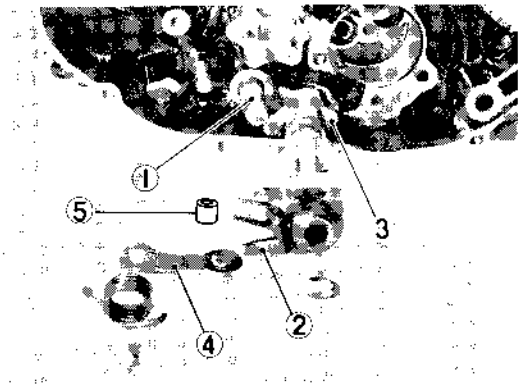
1. Remove the kick axle assembly by pulling toward you.
2. Remove the kick idle gear.



1. Kick axle assembly 2. Kick idle gear

L. 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 lever stopper with the torsion spring.



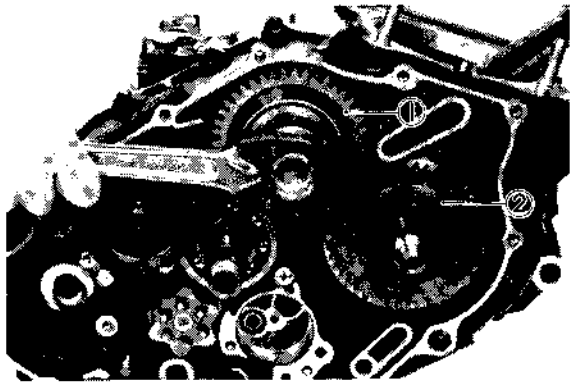
1. Shift shaft
2. Shift lever 2
3. Shift lever 3
4. Lever stopper
5. Spacer

NOTE:

Be careful not to lose the spacer.

M. Balancer Gear

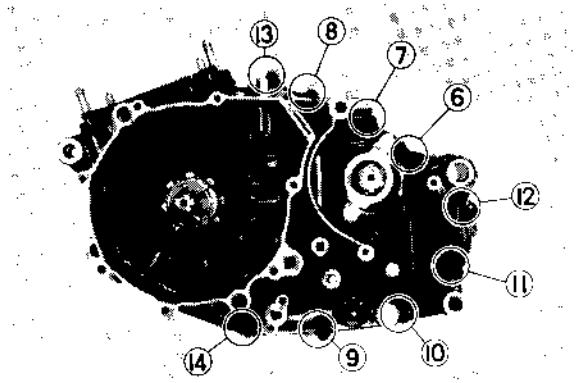
1. Flatten the lock washer on the balancer gear shaft.
2. First place a folded rag between the teeth of the drive gear and balancer gear to lock them. Then loosen the balancer gear securing nut.
3. Remove the balancer gear, the washers, and the key.
4. Remove the drive gear and the key.

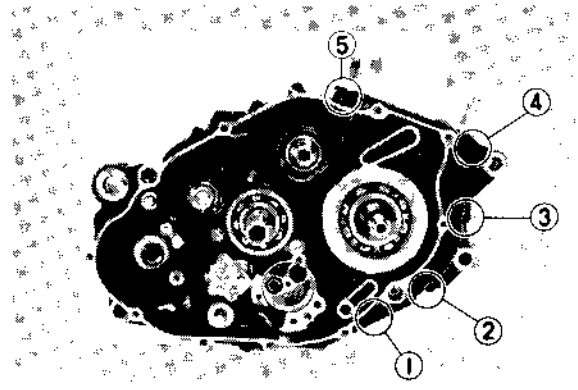


1. Balancer gear
2. Drive gear

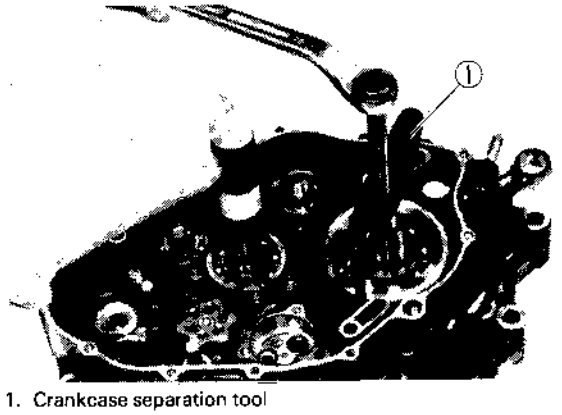
N. Crankcase

1. Working in a crisscross pattern, loosen hexagon bolts 1/4 turn each. Remove them after all are loosened.





2. Remove the right crankcase with the crankcase separation tool. (Special tool P/N. YU-01135).



1. Crankcase separation tool

NOTE:

Fully tighten the tool securing bolts, but make sure the tool body is parallel with the case. If necessary, one screw may be backed out slightly to level tool body.

3. As pressure is applied, alternately tap on the front engine mounting boss, the transmission shafts, and the shift drum.

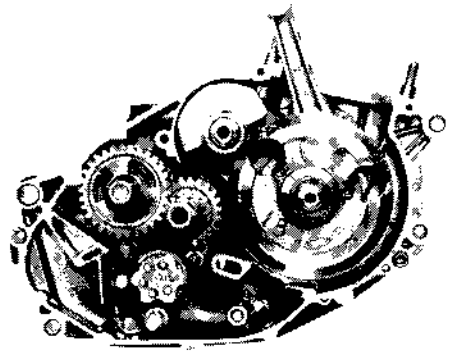
CAUTION:

Use soft hammer to tap on the case half. Tap only on reinforced portions of case. Do not tap on gasket mating surface. Work slowly and carefully. Make sure the case halves separate evenly. If one end "hangs up," take pressure off the push screw, realign, and start over. If the cases do not separate, check for a remaining case screw or fitting.
Do not force.

NOTE:

For this removal, slits in the crankcase can be used as shown in the photo.
Be careful not to damage the mating surface.



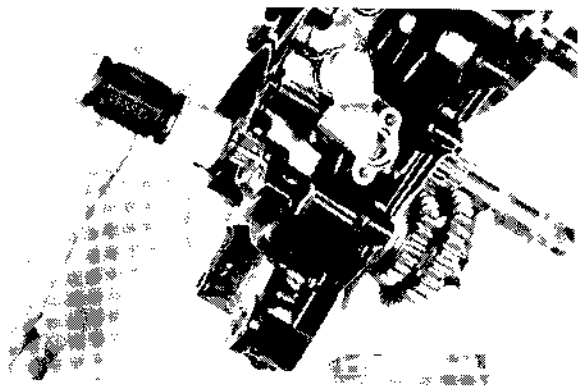


O. Transmission

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

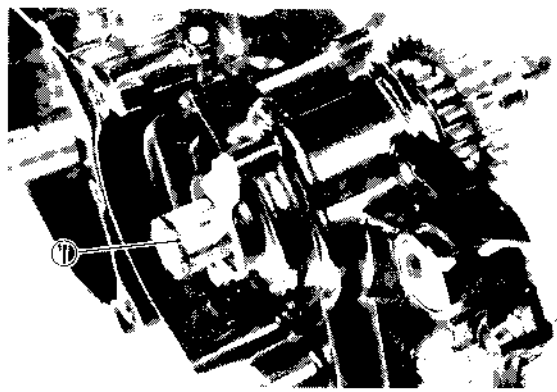
NOTE:

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



NOTE:

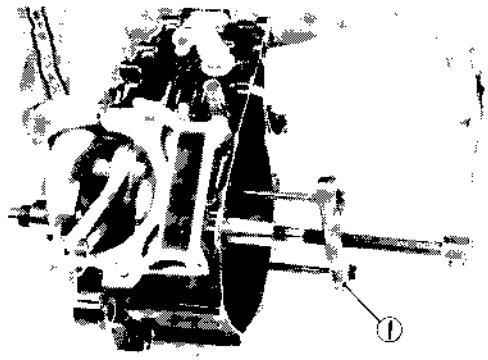
While removing the drive axle from the crankcase, pay careful attention to the oilseal lip. A recommended practice is to fit a suitable O-ring and to apply grease over the fitted area.



1. O-ring

P. Crankshaft

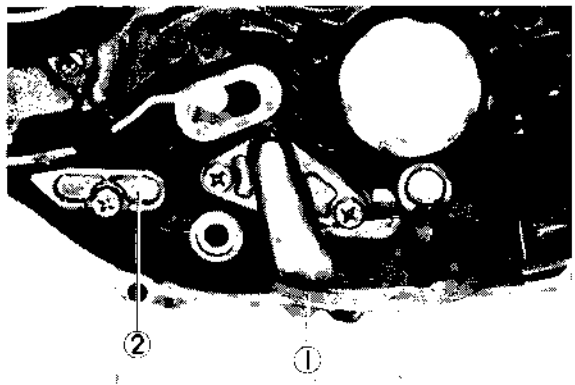
Remove crankshaft assembly with the crankcase separation tool. (Special tool P/N. YU-01135).



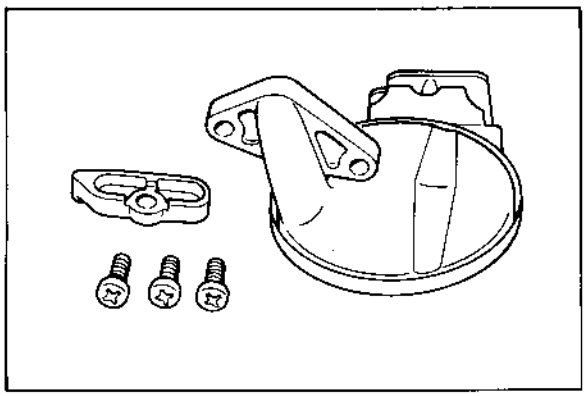
1. Crankcase separation tool

Q. Oil Strainer Assembly

Remove the oil strainer and oil passage cover.



1. Oil strainer 2. Oil passage cover



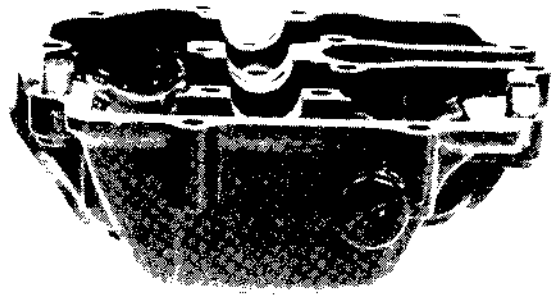
NOTE:

It is recommended that the oil strainer be replaced whenever the engine is disassembled.

INSPECTION AND REPAIRING

A. Cylinder Head Cover

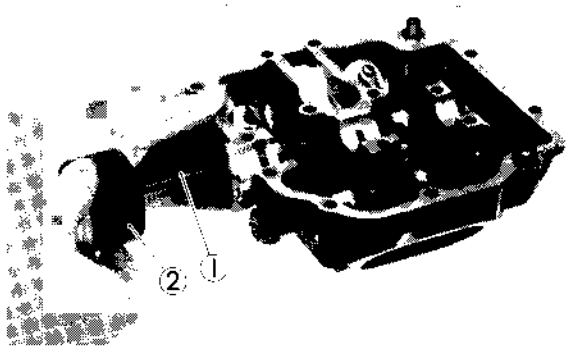
1. Remove two rocker shaft covers.



2. Insert a 6 mm (0.24 in) screw into the rocker shaft, and withdraw the rocker shaft. It should slide out easily.

NOTE:

If the rocker shaft does not slide out easily, use the slide hammer (special tool P/N. YU-01083).



1. Bolt P/N YU-01083-1 2. Weight P/N YU-01083-3

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 shaft hole in the rocker arm.

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.

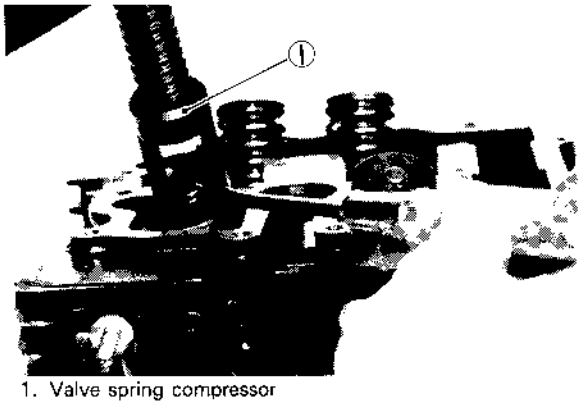
Standard shaft diameter:
11.98 ~ 11.99 mm (0.4717 ~ 0.4720 in)





B. Cylinder Head

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

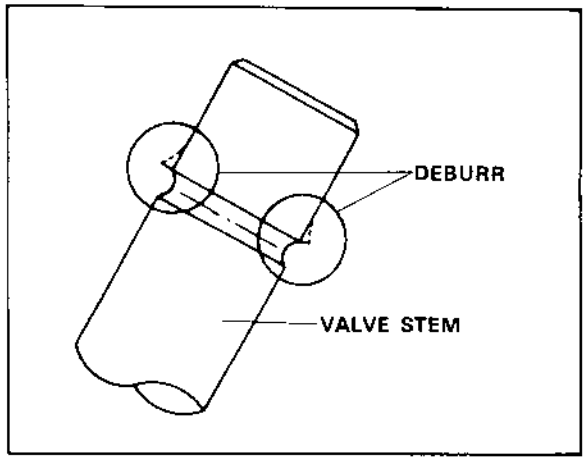


1. Valve spring compressor (P/N. YM-04019)

2. Remove the valves. Mark each valve so it will be reinstalled in the same cylinder head.

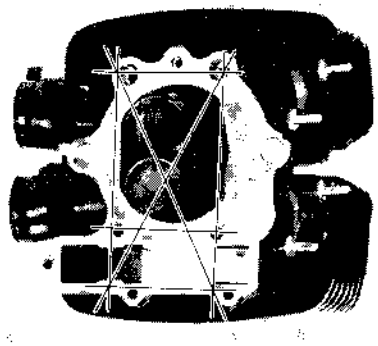
NOTE:

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



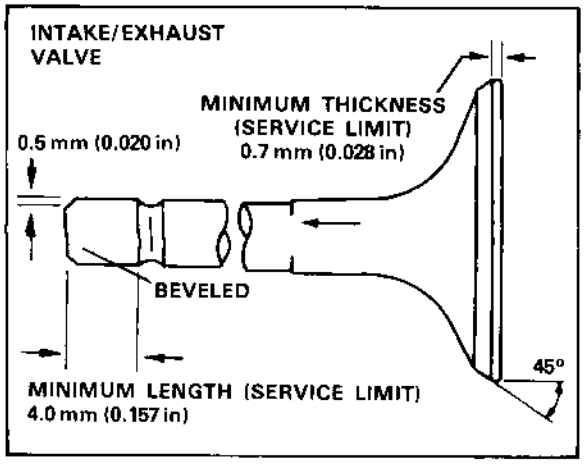
3. Using a rounded scraper, remove the carbon deposits from the combustion chamber. Take care to avoid damaging the spark plug threads and valve seats. Do not use a sharp instrument. Avoid scratching the aluminum.
4. Check the cylinder head warpage with a straightedge as shown.
   The warpage should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

Cylinder head warpage:
less than 0.03 mm (0.0012 in)
Allowable limit: 0.25 mm (0.010 in)



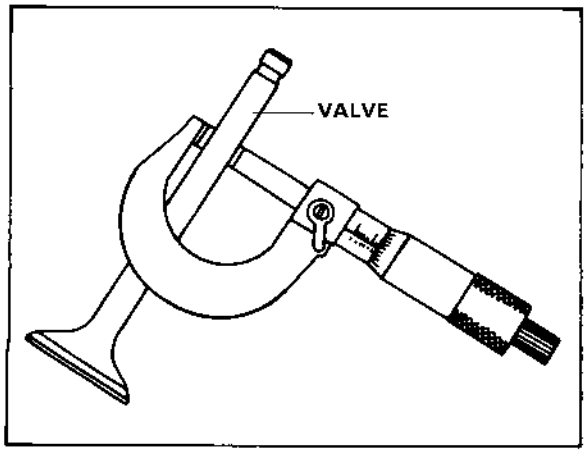
C. Valves, Valve Guides, Valve Seats, and Valve Springs

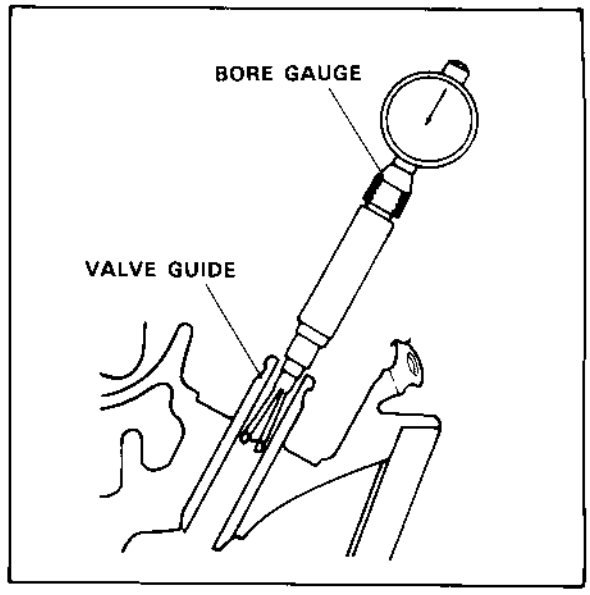
1. Check the valve face and the stem end for wear. If the valve face and/or the stem end are pitted or worn, regrind the valve with a valve refacer. Replace the valve if any dimension exceeds the specifications in the illustration.



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

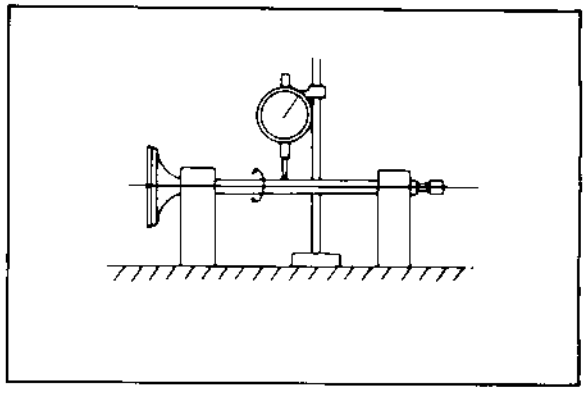
	Valve Stem Clearance	Maximum
Intake	0.010 ~ 0.037 mm (0.0004 ~ 0.0015 in)	0.10 mm (0.004 in)
Exhaust	0.030 ~ 0.057 mm (0.0012 ~ 0.0022 in)	0.12 mm (0.005 in)





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

Maximum valve stem runout:
0.01 mm (0.0004 in)



Valve guides

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

NOTE:

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

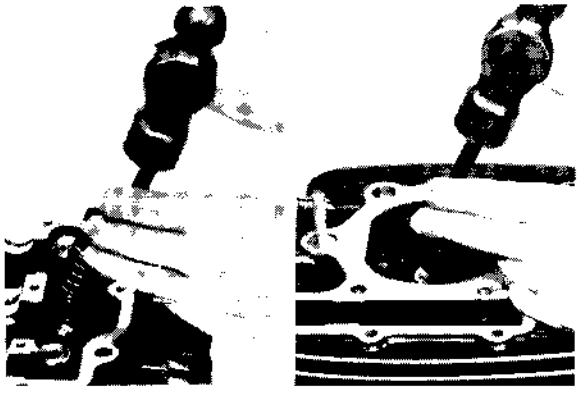
1. Measure the valve guide inside diameter with a small bore gauge. If it exceeds the limit, replace it with an oversize valve guide.

Guide diameter (I.D.):
Limit: 7.10 mm (0.280 in)

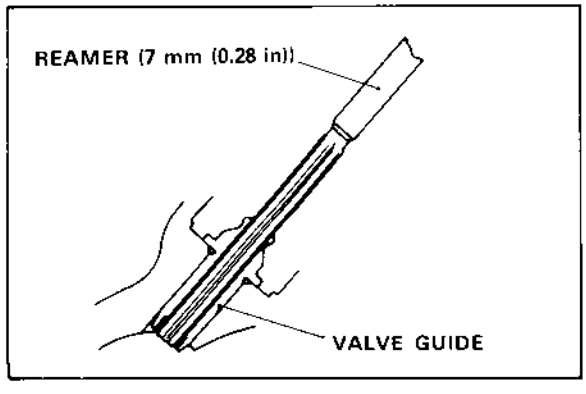
2. To ease guide removal and reinstallation and to maintain the correct interference fit, heat the head to 100°C (212°F). Use an oven to avoid any possibility of head warpage due to uneven heating.
3. Use the valve guide remover and valve guide installer to drive the old guide out and drive the new guide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

NOTE:

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



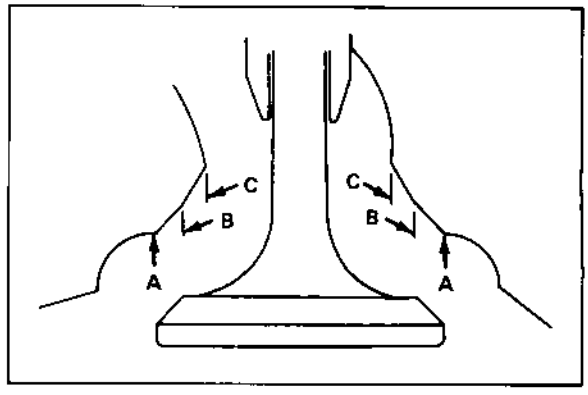
4. After installing the valve guide, use the 7 mm (0.28 in) reamer (special tool P/N. YM-01227) to obtain the proper valve-guide-to-valve-stem clearance.



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

Valve seat

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



CAUTION:

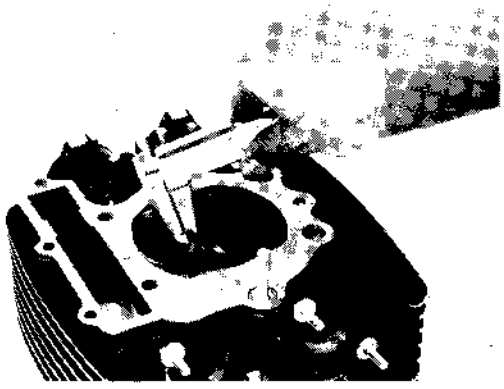
If the valve seat is obviously pitted or worn, it should be cleaned with a valve seat cutter. Use the 45° cutter. When twisting the cutter, keep an even downward pressure to prevent chatter marks.

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

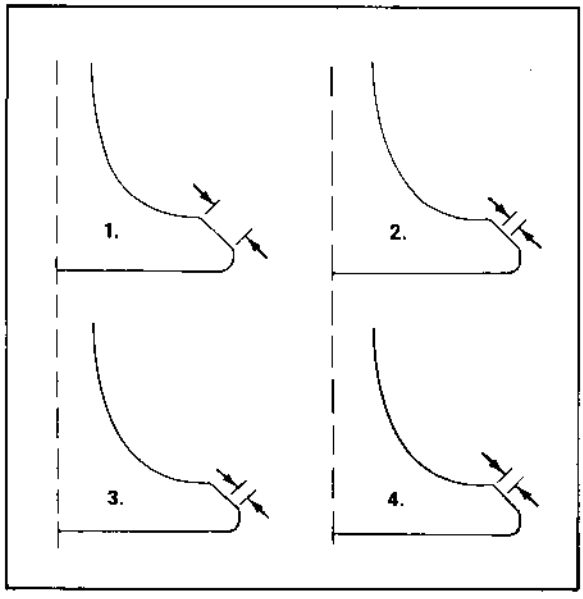
2. Measure the valve seat width. Apply mechanic's bluing dye (such as Dykem) to the valve face and valve seat, apply a very small amount of fine grinding compound around the surface of the valve face, insert the valve into position, and spin the valve quickly back and forth. Lift the valve, clean off all grinding compound, and check valve seat width. The valve seat and valve face will have removed the bluing wherever they contacted each other. Measure the seat width with vernier calipers. It should measure approximately 1.3 mm (0.051 in). The valve-seat contact area should be one uniform width. If valve seat width varies or if pits still exist, further

cutting will be necessary. Remove just enough material to achieve a satisfactory seat.

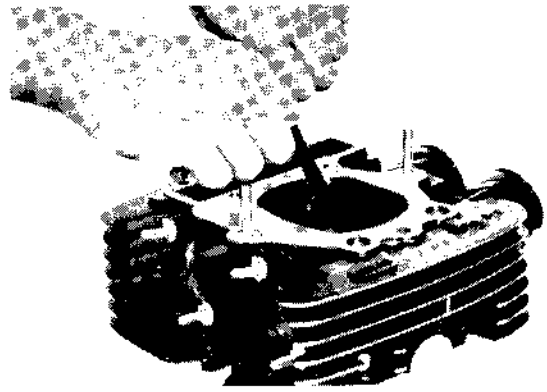
	Standard Width	Wear Limit
Seat width	1.3 ± 0.1 mm (0.051 ± 0.0039 in)	2.0 mm (0.080 in)



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



- If the valve face shows that the valve seat is centered on the valve face but is too wide, then lightly use both the 30° and the 60° cutters to reduce the seat width to 1.3 mm (0.051 in).

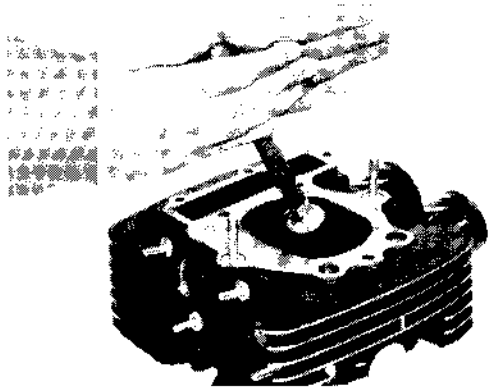


- If the seat shows to be in the middle of the valve face but too narrow, use the 45° cutter until the width equals 1.3 mm (0.051 in).
- If the seat is too narrow and right up near the valve margin, then first use the 30° cutter and then the 45° cutter to get the correct seat width.
- If the seat is too narrow and down near the bottom edge of the valve face, then first use the 60° cutter and then the 45° cutter.

Lapping

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

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

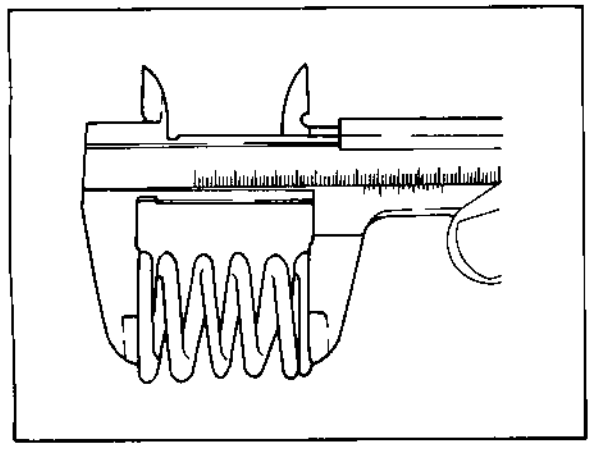


2. After all work has been performed on the valve and valve seat and all head parts have been assembled, check for proper valve/valve seat sealing by pouring solvent into each of the intake ports, then the exhaust ports. There should be no leakage past the seat. If fluid leaks, disassemble and continue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

Valve springs

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

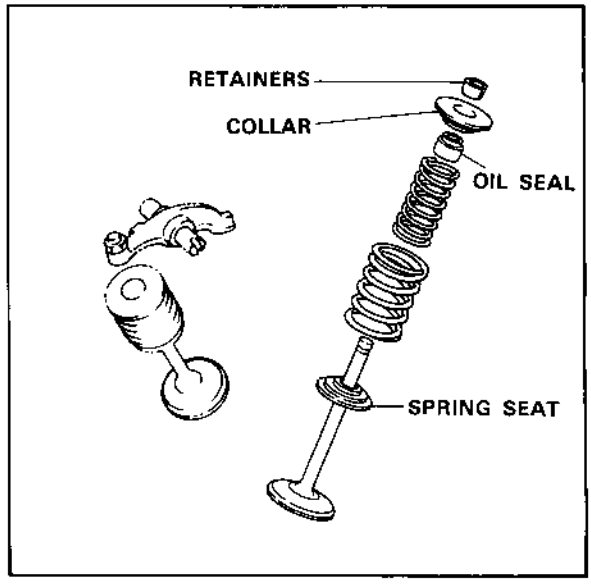
1. Even though the spring is constructed of durable spring steel, it gradually loses some of its tension. This is evidenced by a gradual shortening of free length. Use a vernier caliper to measure spring free length. If the free length of any spring has decreased more than 2 mm (0.080 in) from its specification,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



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

Valve Spring Specifications		
	Outer Spring	Inner Spring
Free length	43.8 mm (1.72 in)	40.1 mm (1.58 in)
Installed length (valve closed)	34.2 mm (1.346 in)	31.2 mm (1.228 in)
Installed pressure (valve closed)	16.0 kg (37.3 lb)	8.1 kg (17.9 lb)
Allowable tilt from vertical	2.5° (1.9 mm (0.075 in))	2.5° (1.7 mm (0.067 in))

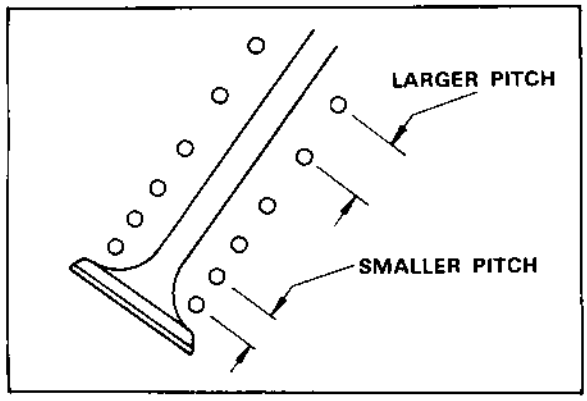
Valve installation



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

NOTE:

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



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

WARNING:

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

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

D. Rocker Arms and Rocker Arm Shafts

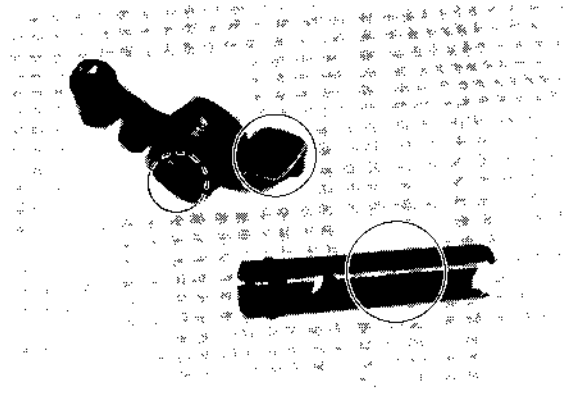
1. The rocker arm usually wears at two locations: at the rocker shaft hole and at the cam-lobe-contact surface. Check these areas for signs of unusual wear.
2. Measure the rocker arm inside diameter. If it exceeds specification, replace the rocker arm.

Maximum inside diameter:
12.05 mm (0.474 in)

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

Minimum outside diameter:
11.95 mm (0.470 in)

4. Calculate the clearance by subtracting the rocker-arm-shaft outside diameter from the rocker-arm inside diameter. If this clearance is greater than 0.1 mm (0.0039 in) replace either or both parts as necessary.



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

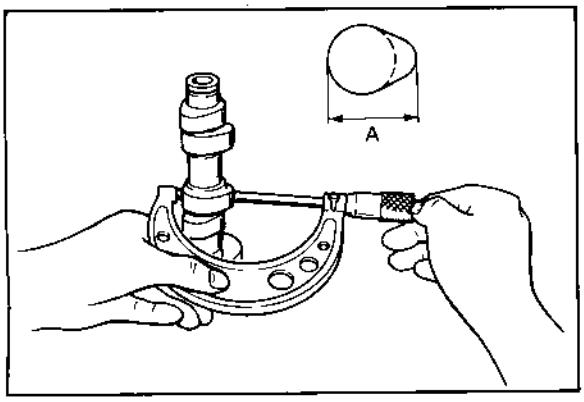
E. Camshafts, Cam Chains, and Cam Sprockets

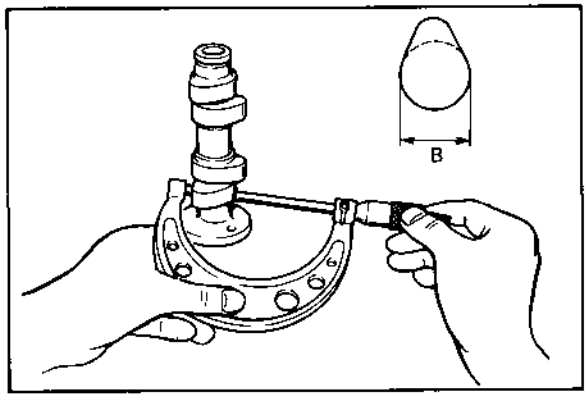
Camshaft

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.

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

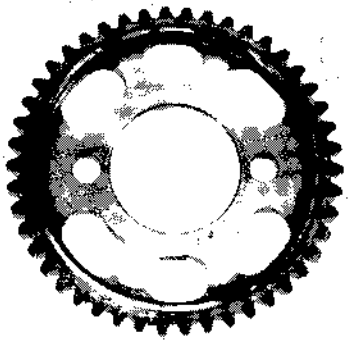
Wear Limit	A	B
Intake	36.40 mm (1.4331 in)	28.97 mm (1.1405 in)
Exhaust	36.57 mm (1.4398 in)	28.99 mm (1.1413 in)

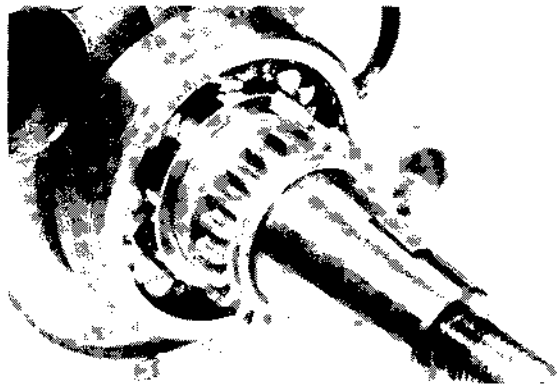




Cam sprocket and cam drive sprocket

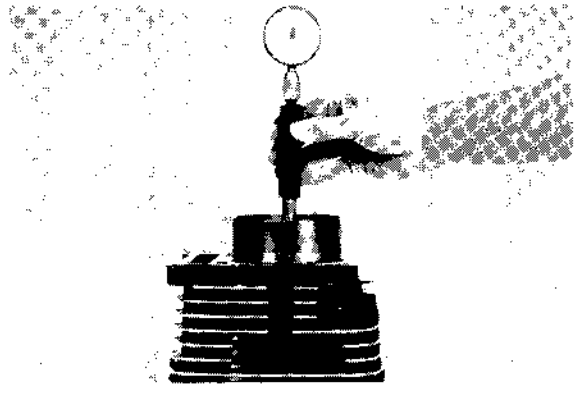
1. Check the cam sprocket and cam drive sprocket for wear.

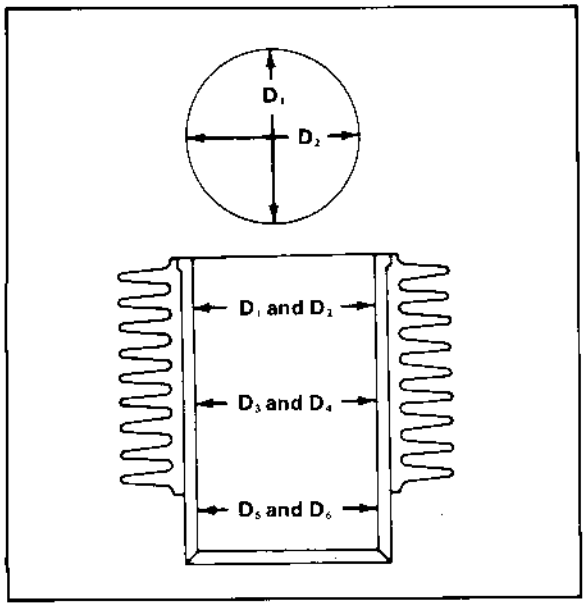




F. Cylinder

1. Visually check the cylinder walls for scratches. If vertical scratches are evident, the aluminium sleeve 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.
   Cylinder wear should be measured at three depths by placing the measuring instrument parallel to and at right angles to the crankshaft. (See the illustration.)
   If the cylinder wall is worn beyond the wear limit, the aluminum sleeve should be replaced.





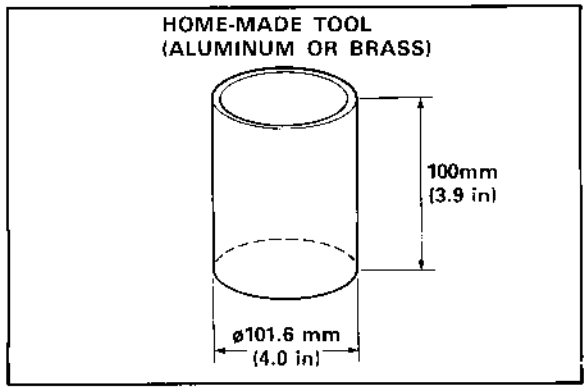
	Standard	Wear limit
Cylinder bore	95.0 mm (3.740 in)	95.1 mm (3.744 in)
Cylinder taper	—	0.005 mm (0.0002 in)

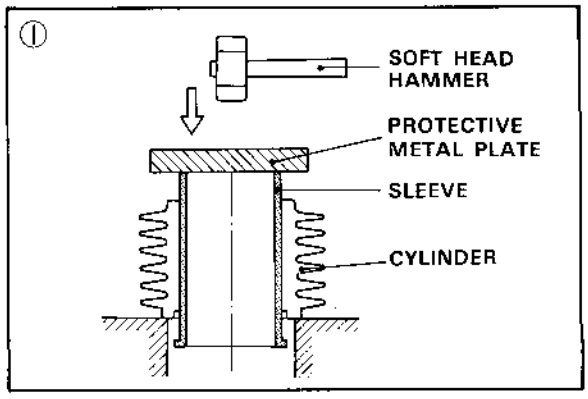
Aluminum sleeve cylinder

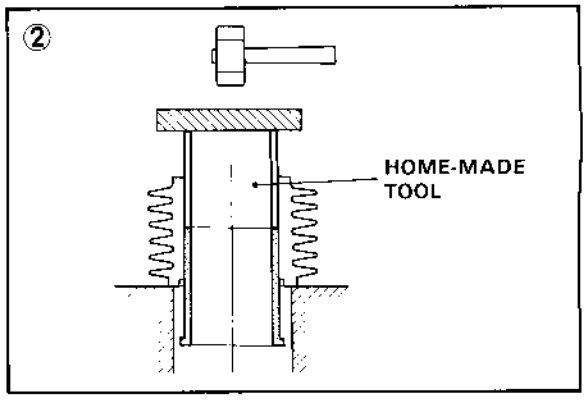
1. Aluminum sleeve removal
   Tap the sleeve at the bottom using a soft head hammer.

NOTE:

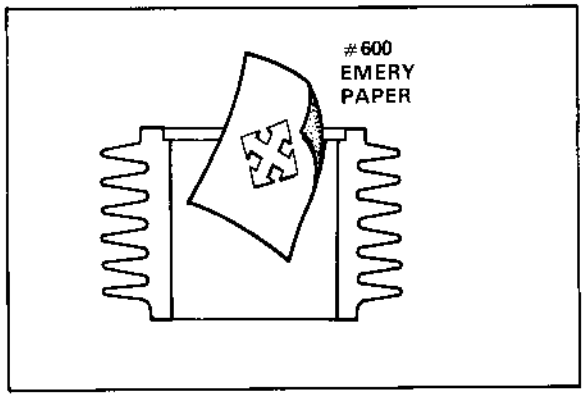
Do not use a press to remove the sleeve, or the cylinder may be scratched on its inner surface.



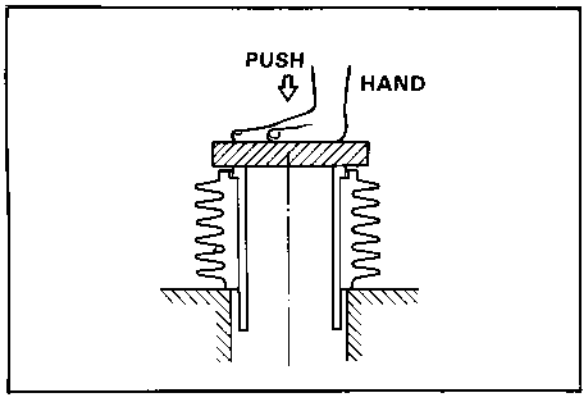




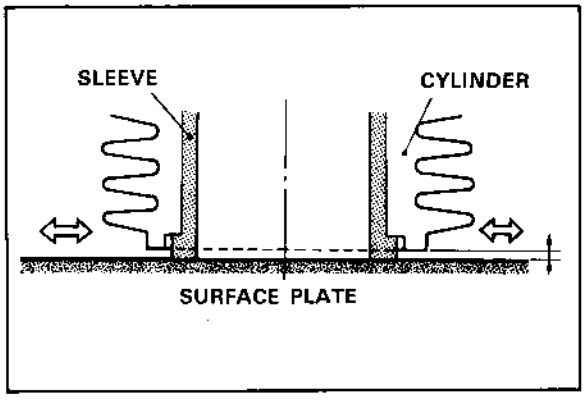
2. Inner surface polishing
   Polish the inner surface of the cylinder with #600 emery paper to remove the carbon buildup or burrs.



3. Shrinkage fitting of sleeve
   1) Heat the cylinder to 70~80°C (158~176°F) in hot water or in an oven.
   2) Install the cold sleeve from the top of the cylinder.
   3) Push down the sleeve fully by hand for approx. 30 seconds so that the flange bottom of the sleeve can have close contact with the cylinder.



4. Top surface flattening
   Grind the top surface of the sleeve first using #200 emery paper and then #800 for finish on a surface plate until the sleeve top can be flat with the cylinder top.

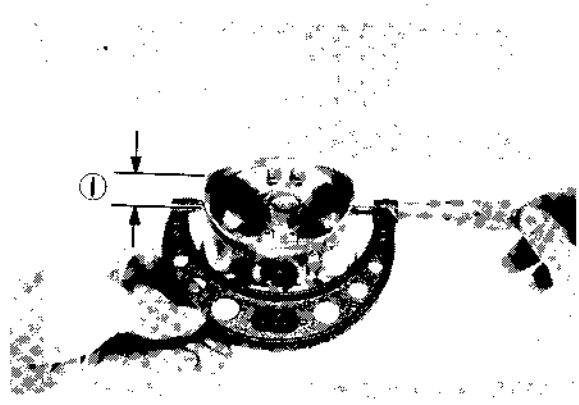


G. Piston and Piston Rings

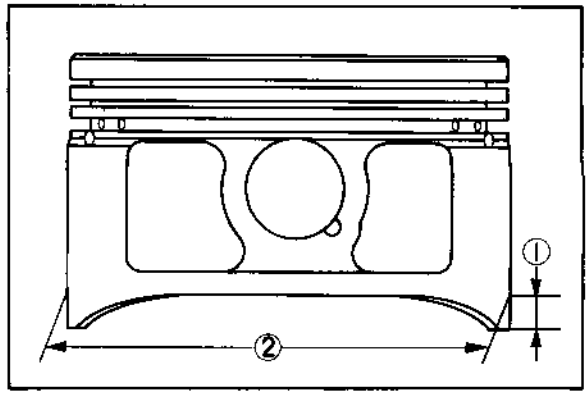
Piston

1. Using the micrometer, measure the outside diameter of the piston at the piston skirt. Measurement should be made at a point 6.0 mm (0.24 in) above the bottom edge of the piston by placing the micrometer parallel to and at right angles to the piston pin.

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



1. 6.0 mm (0.236 in)



1. 6.0 mm (0.236 in)
2. 94.935 ~ 94.985 mm (3.738 ~ 3.740 in)

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

Side clearance	Top	0.04 ~ 0.08 mm (0.0016 ~ 0.0031 in)
	2nd	0.03 ~ 0.07 mm (0.0012 ~ 0.0028 in)
	Oil ring	0.02 ~ 0.06 mm (0.0008 ~ 0.0024 in)

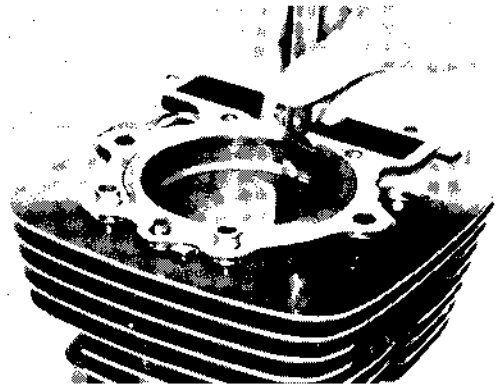


1. Measure the end gap of each piston ring. Insert a ring into the cylinder, and push it approximately 20 mm (0.8 in) into the cylinder. Push the ring with the piston crown so the ring will be at a right angle to the cylinder bore.
2. Measure the ring end gap with a feeler gauge. If the end gap exceeds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

NOTE:

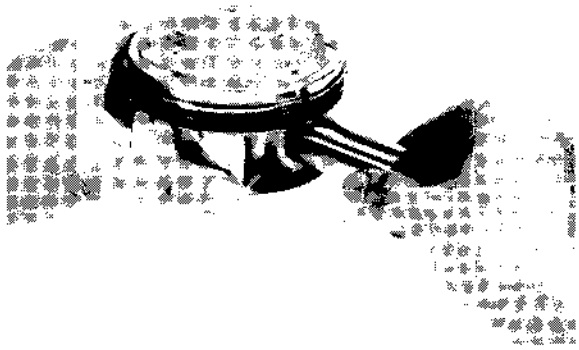
You cannot measure the end gap on the expander spacer of the oil control ring. If the oil-control-ring rails show excessive gap, replace all three rings.

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



Piston pin

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





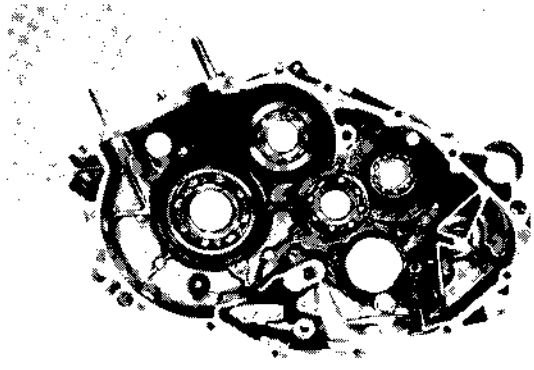
H. Crankshaft and Connecting Rod

Crankshaft bearing

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

NOTE:

Lubricate the bearings immediately after examining them to prevent rust.



Crankshaft

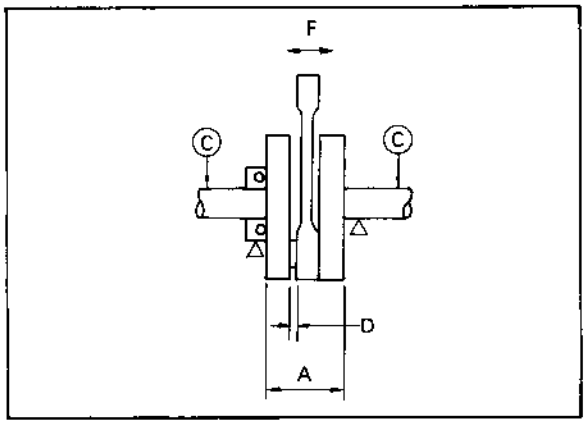
1. Check crankshaft components per chart.

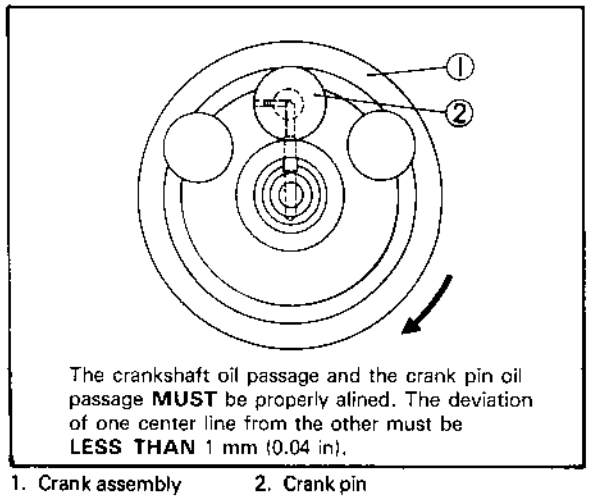
Check connecting rod axial play at small end (to determine the amount of wear of crank pin and bearing at big end).	Small end play should not exceed 2 mm (0.079 in).	If small end play exceeds 2 mm (0.079 in) disassemble crankshaft, check connecting rod, crank pin and big end bearing. Replace defective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

Crankshaft Specifications

Unit: mm (in)

Runout limit	Assembly width	Rod clearance			
		Axial "F"		Side "D"	
C	A	Min.	Max.	Min.	Max.
0.03 (0.0012)	74.95 ~ 75.00 (2.951 ~ 2.953)	0.8 (0.03)	2.0 (0.08)	0.3 (0.0118)	0.65 (0.0256)





The crankshaft oil passage and the crank pin oil passage **MUST** be properly alined. The deviation of one center line from the other must be **LESS THAN** 1 mm (0.04 in).

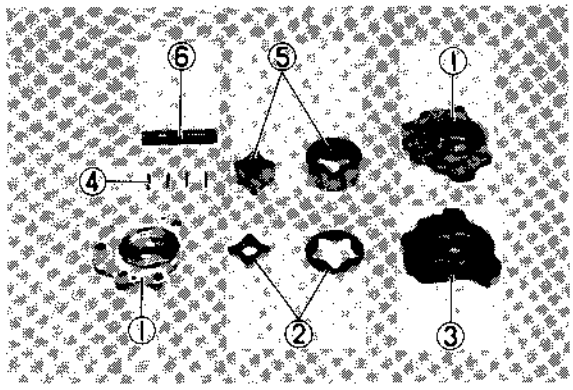
1. Crank assembly 2. Crank pin

2. In disassembling and reassembling the crank, follow the illustration.

NOTE:

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

I. Oil Pump



1. Pump cover
2. Feed pump rotor
3. Rotor housing
4. Dowel pin
5. Scavenger pump rotor
6. Pump shaft

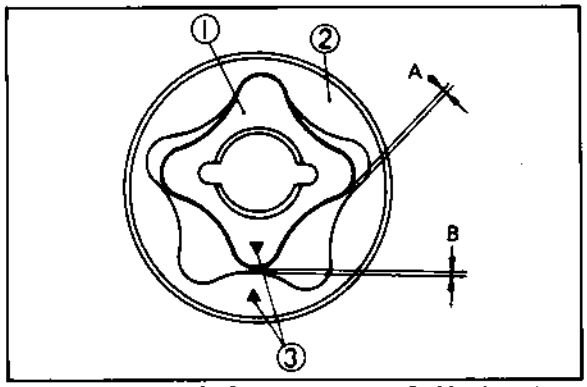
1. Oil Pump Rotor Width

Feed pump: 4 mm (0.16 in)
Scavenger pump: 18 mm (0.71 in)

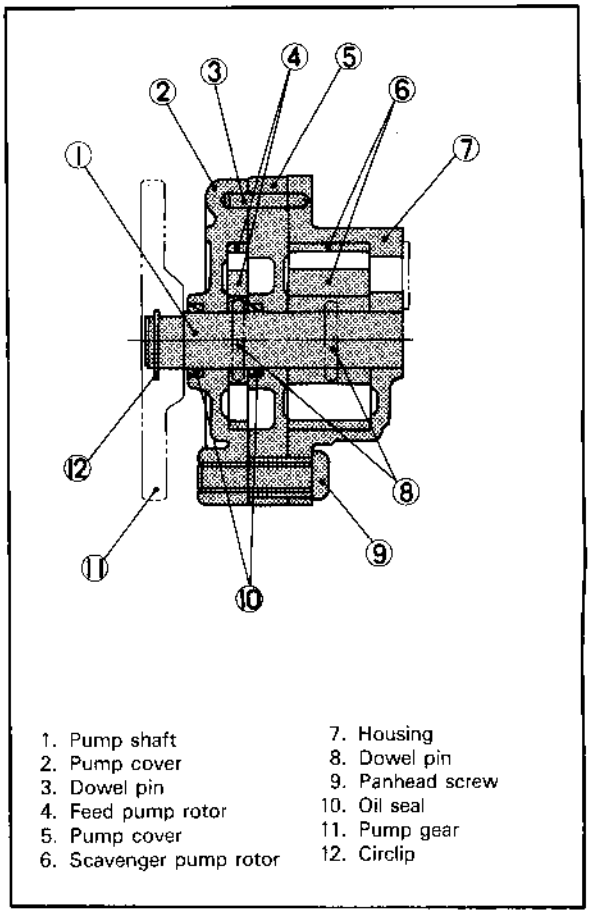
Thrust clearance:
0.03 ~ 0.08 mm (0.0012 ~ 0.0031 in)

2. Inner and Outer Rotor Dimensions

Clearance between "A" and "B"
Standard:
0.09 ~ 0.15 mm (0.0035 ~ 0.0059 in)
Limit: 0.15 mm (0.006 in)



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



1. Pump shaft
2. Pump cover
3. Dowel pin
4. Feed pump rotor
5. Pump cover
6. Scavenger pump rotor
7. Housing
8. Dowel pin
9. Panhead screw
10. Oil seal
11. Pump gear
12. Circlip

J. Primary Drive

The drive gear is mounted on the crankshaft; the driven gear is mounted on the transmission and is integrated with the clutch assembly.

1. Check the drive gear and the driven gear for obvious signs of wear or damage from foreign material within the primary case.
2. If the primary drive is excessively noisy during operation, replace both the drive and the driven gears.

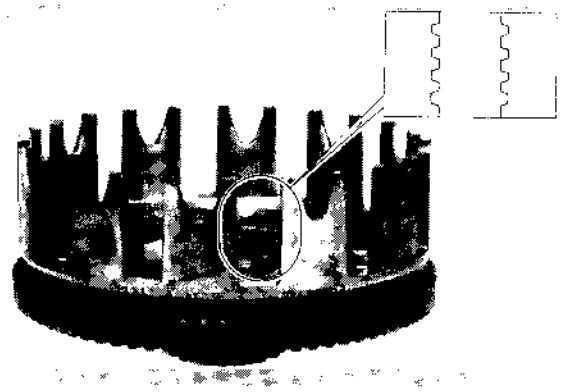
K. Clutch

Clutch housing

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

NOTE:

Galling on the clutch plate splines will cause erratic operation.



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

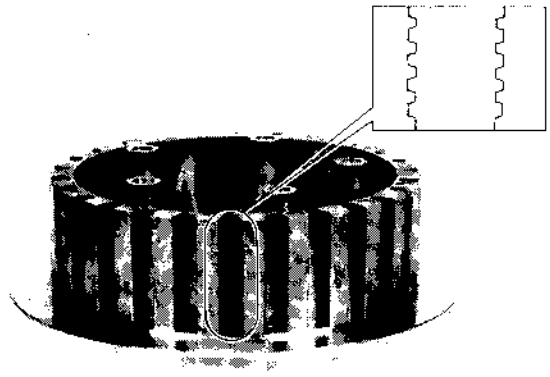
Clutch boss

The clutch boss contains a built-in damper beneath the first clutch plate (clutch plate 2). It is not normally necessary to remove the circlip and disassemble the built-in damper unless there is serious clutch chattering.

1. Check the splines on the clutch boss for galling. If damage is slight to moderate, deburr; if it is severe, replace the clutch boss.

NOTE:

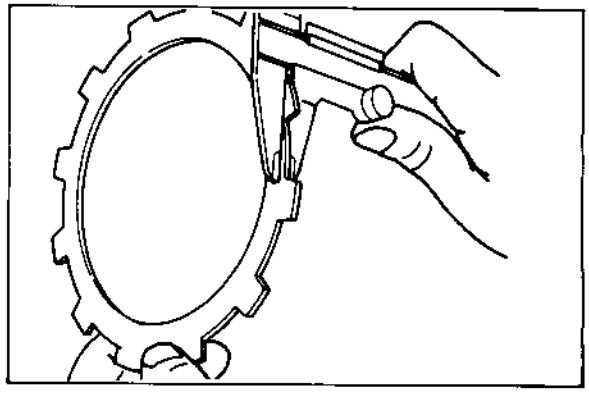
Galling on clutch plate splines will cause erratic operation.

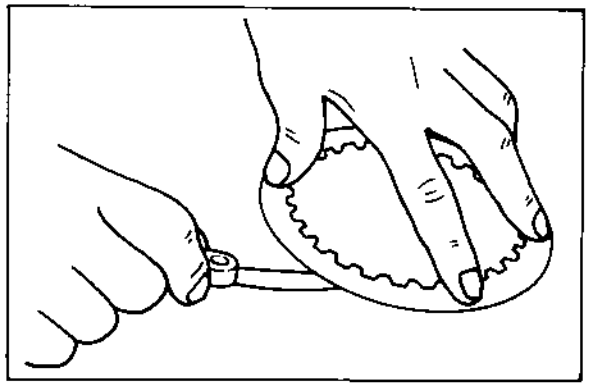


Friction and clutch plates

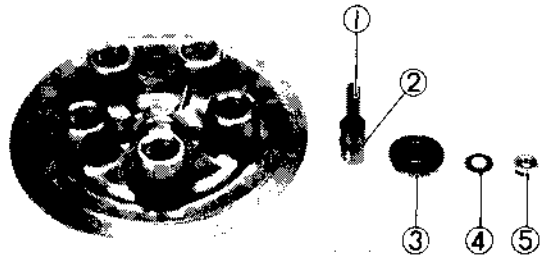
1. Check the clutch plates and friction plates for heat damage. Measure friction plate thickness at 3 or 4 points. Measure the clutch plates for warpage with a feeler gauge and surface plate. Replace clutch plates or friction plates as a set if any is faulty or beyond wear limits.

	Standard	Wear limit
Friction plate thickness	3.0 ± 0.1 mm (0.12 ± 0.004 in)	2.8 mm (0.11 in)
	2.8 ± 0.08 mm (0.11 ± 0.003 in)	2.6 mm (0.10 in)
Clutch plate warp limit	—	0.2 mm (0.008 in)





Clutch actuating mechanism

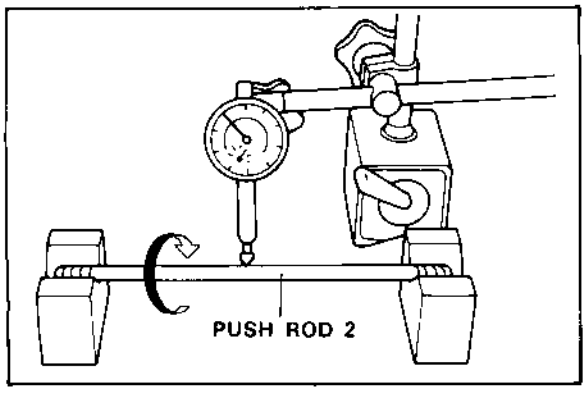


1. Push rod 1
2. O-ring
3. Push plate
4. Plain washer
5. Locknut

1. Check the push rod 1 for wear and damage; replace if damaged.
2. Check the short-push-rod thrust bearing for damage; replace if damaged.

3. By rolling the push rod 2 on the blocks, check for bends. If any bend is found, replace the push rod.

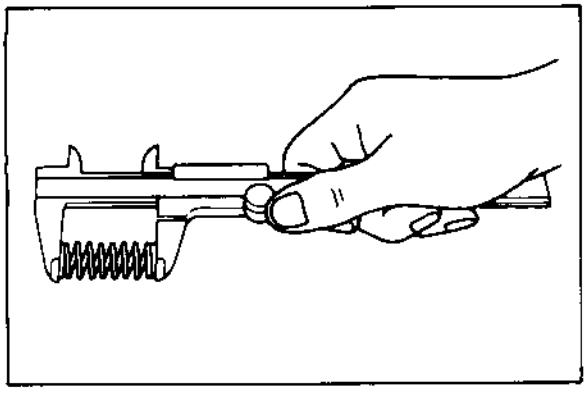
Bend limit: 0.5 mm (0.02 in)



Clutch springs

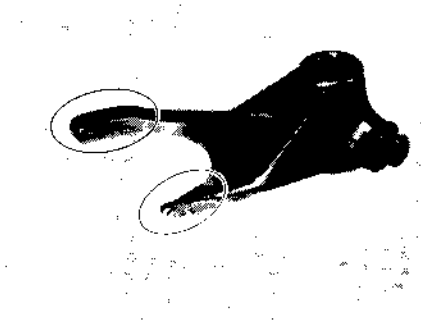
1. Measure the clutch spring free length. Replace the springs as a set if any is less than minimum free length.

Clutch spring minimum length: 40.2 mm (1.583 in)

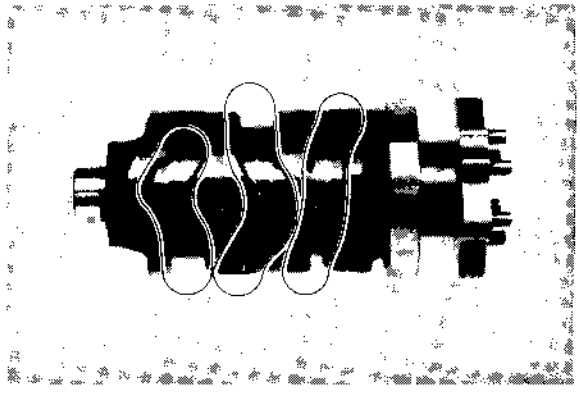


L. Transmission

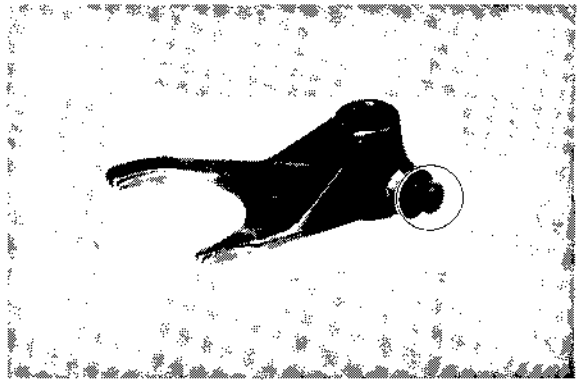
1. Inspect each shift fork for signs of galling on the gear contact surfaces. Check for bending. Make sure each fork slides freely on its guide bar.



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



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

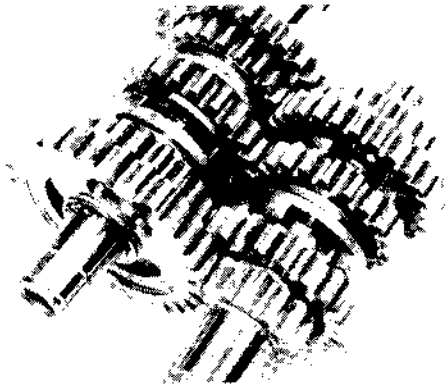


5. Check the shift cam dowel and side plate for looseness, damage, or wear. Replace as required.

6. Check the shift-cam stopper plate, circlip, and stopper for wear. Replace as required.
7. Check the transmission shafts using a centering device and dial gauge. If any shaft is bent beyond the specified limit, replace the shaft.

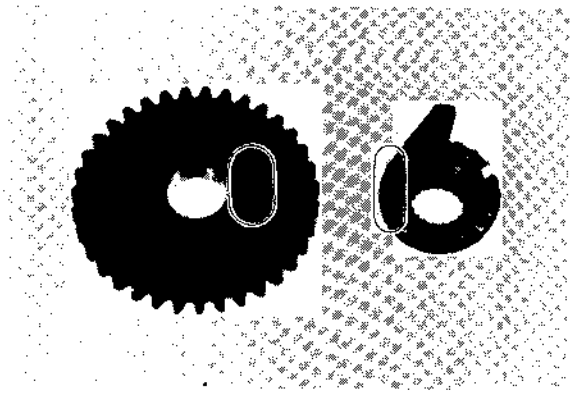
Maximum runout: 0.08 mm (0.0031 in)

8. Carefully inspect each gear. Look for signs of obvious heat damage (blue discoloration). Check the gear teeth for signs of pitting, galling, or other extreme wear. Replace as required.
9. Check to see that each gear moves freely on its shaft.
10. Check to see that all washers and clips are properly installed and undamaged. Replace bent or loose clips and bent washers.
11. 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.



M. Kick Starter

1. Check the ratchet teeth on the kick gear and ratchet wheel. The mating edges should fit flush against each other. If there is severe rounding off, replace as a set.

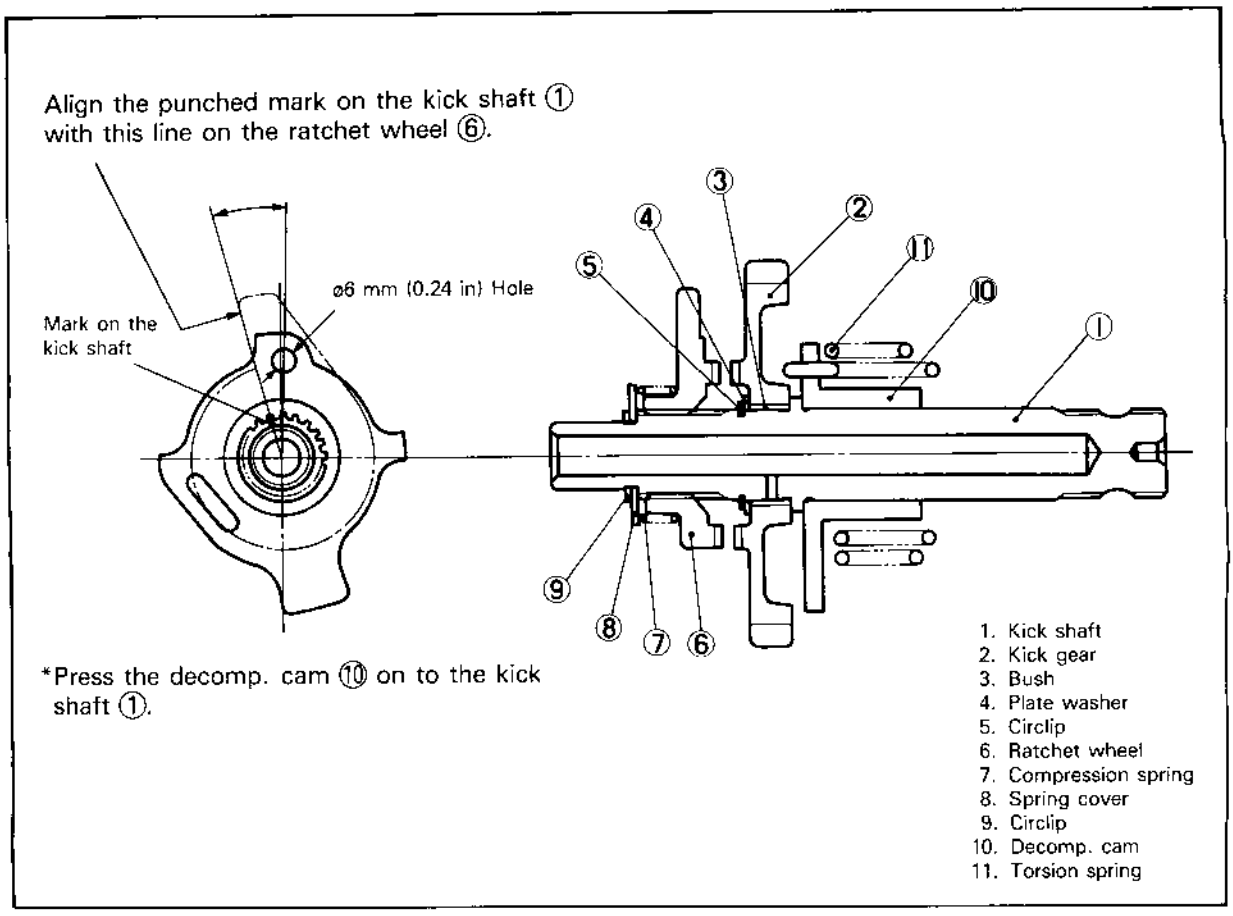


2. Check to see that the kick gear spins freely on the kick axle. If not, replace either or both as required. Replace if any signs of galling are found.
3. Check to see that the ratchet wheel (splined) slides freely on the kick axle. Check for burrs or other damage. Replace as required.
4. Check axle and wheel splines for wear. The ratchet wheel is a fairly loose fit on splines. However, if the wheel is so loose it catches on the shaft keeping the ratchet wheel spring from forcing it out, replace the wheel.
5. Check the ratchet wheel spring for fatigue. If the free length shows the spring has collapsed beyond specification, replace the spring.

Ratchet wheel spring free length	
Standard	Minimum
17.2 mm (0.677 in)	15.0 mm (0.591 in)



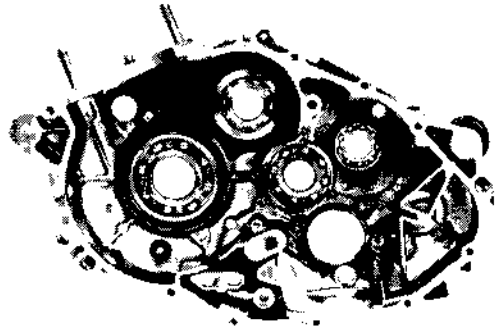
6. When reassembling the kick starter, align the mark on the ratchet wheel with the one on the kick axle as shown.



N. Bearings and Oil Seals

Inspection

1. After cleaning and lubricating the bearings, rotate the inner race with a finger. If rough spots are noticed, replace the bearing.
2. Check the oil seal lips for damage and wear. Replace as required.



Removal

1. Pry oil seal(s) out of place with a screwdriver.
   Replace all oil seals when overhauling the engine.

NOTE:

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

2. Drive out the bearing(s) with a socket and hammer or with a hydraulic press.

NOTE:

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

O. Installation

See next ENGINE ASSEMBLY "Important Information."

CAUTION:

The right side crankshaft oil seal in the right crankcase cover must be installed with the guide plate side facing in toward the engine.

ENGINE ASSEMBLY AND ADJUSTMENT

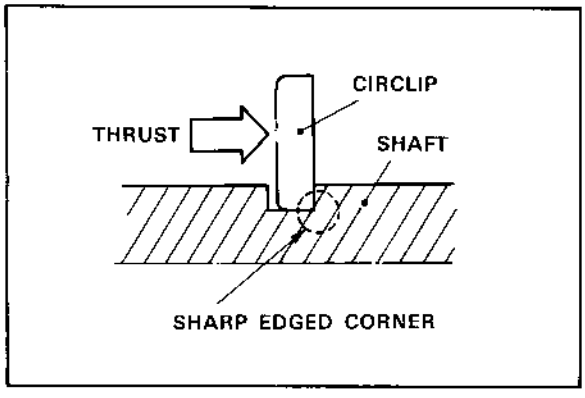
A. Important Information

Gaskets and seals

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

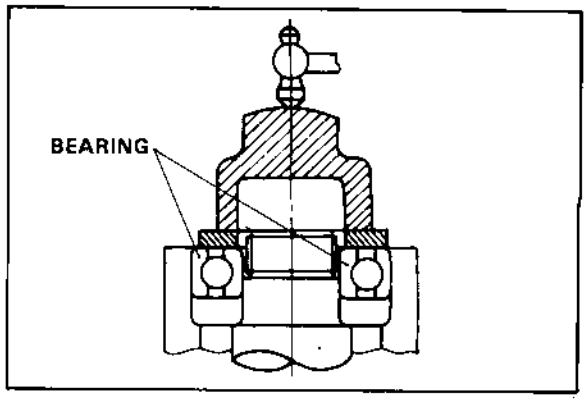
Circlips

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



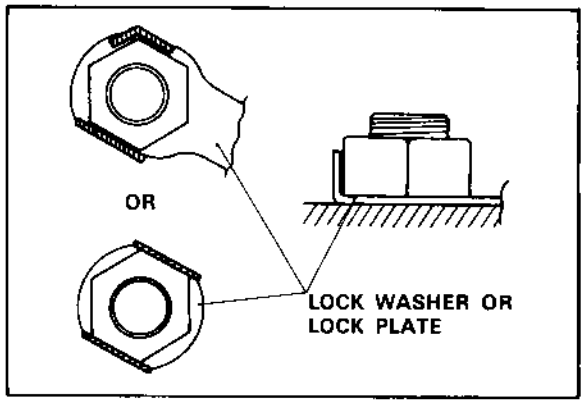
Bearings and oil seals

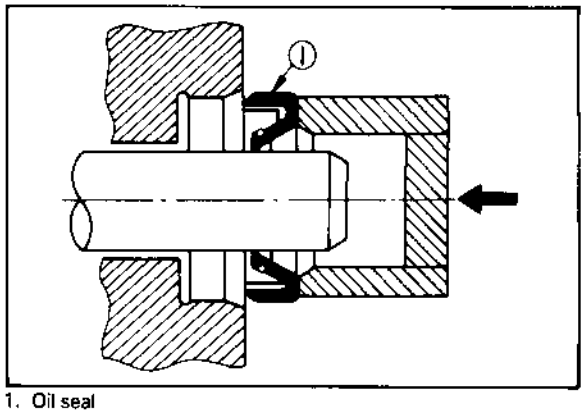
1. Install the bearing(s) and oil seal(s) with their manufacturer's marks or numbers facing outward. (In other words, the stamped letters must be on the side exposed to view.) When installing oil seal(s), apply a light coating of lightweight lithium base grease to the seal lip(s). When installing bearings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



Lock washers/plates and cotter pins

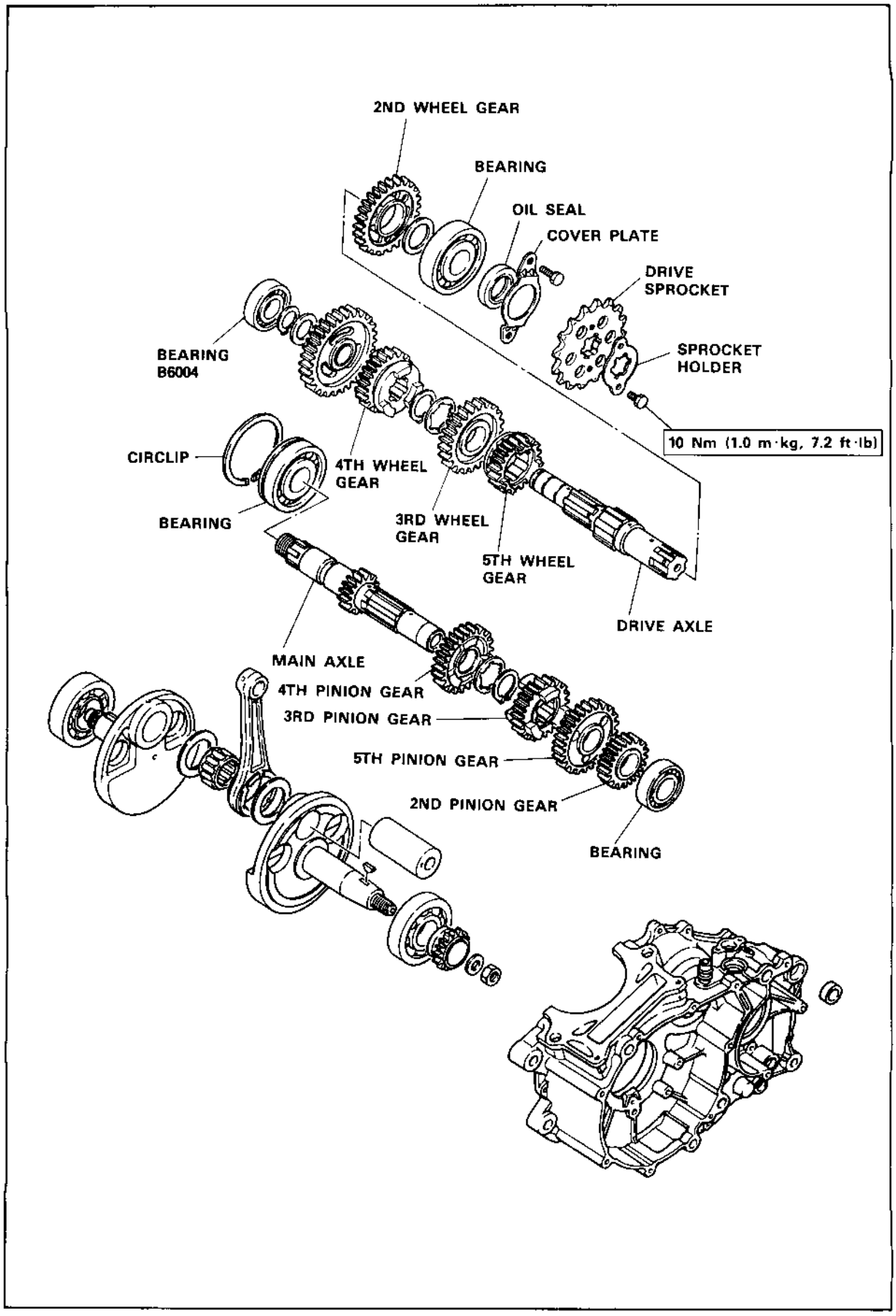
1. All lock washers/plates and cotter pins must be replaced when they are removed. Lock tab(s) should be bent along the bolt or nut flat(s) after the bolt or nut has been properly tightened.





1. Oil seal

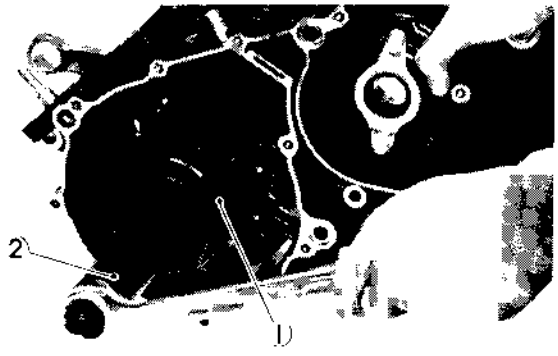
B. Left-Side Crankcase



C. Crankshaft Installation

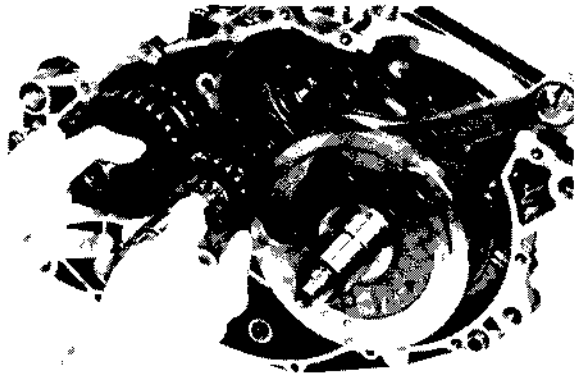
After all bearings and seals have been installed in both crankcase halves, install crankshaft as follows:

1. Set the crankshaft into left case half using the crankshaft installing tool (special tool P/N. YU-90050, YM-90069) and pot spacer (P/N. YM-90070A).



1. Pot spacer 2. Crankshaft installing set

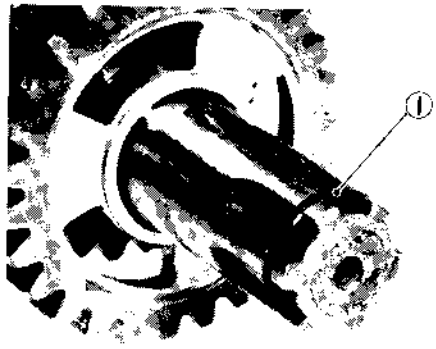
2. Hold the connecting rod at top dead center with one hand while turning the handle of the installing tool with the other. Operate tool until crankshaft bottoms against bearing.
3. Install the transmission assembly.



NOTE:

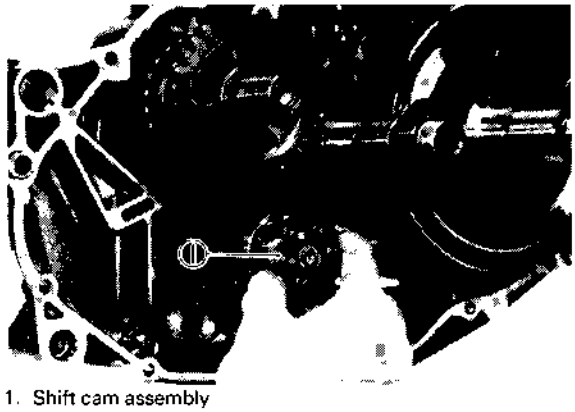
While installing the drive axle into the crankcase, pay careful attention to the oil seal lip.

It is recommended to set a suitable O-ring into the drive axle groove and apply grease over the fitted area.



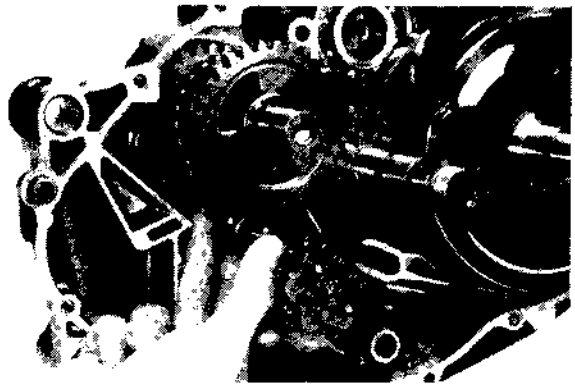
1. O-ring

4. Install the shift cam.



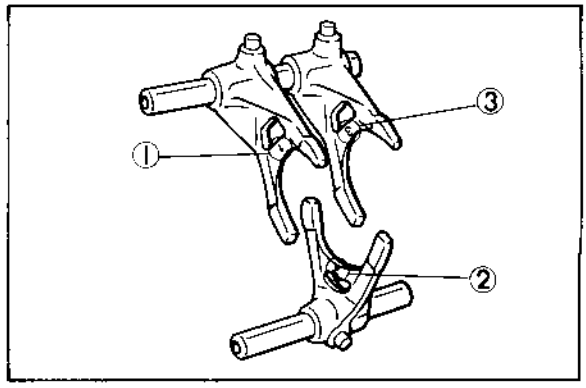
1. Shift cam assembly

5. Install the shift forks 1, 2 and 3.



NOTE:

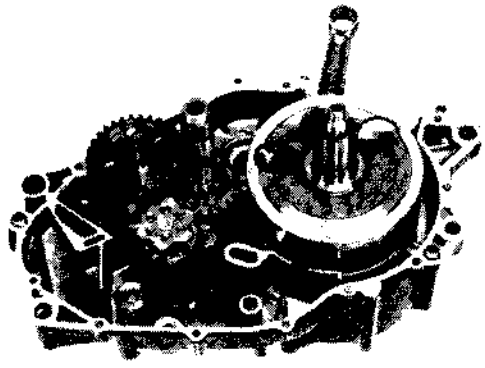
The figure on the shift forks is the location sequence from left to right.



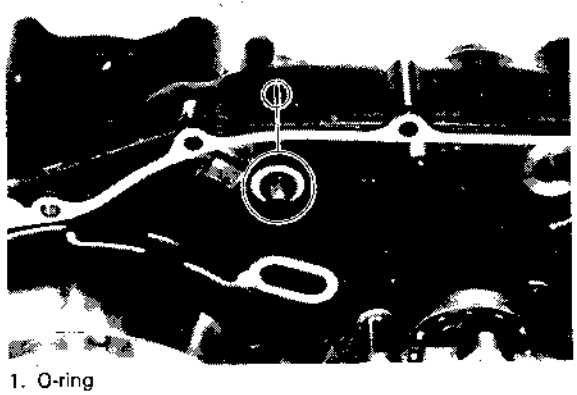
1, 2, 3.: Location sequence

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.

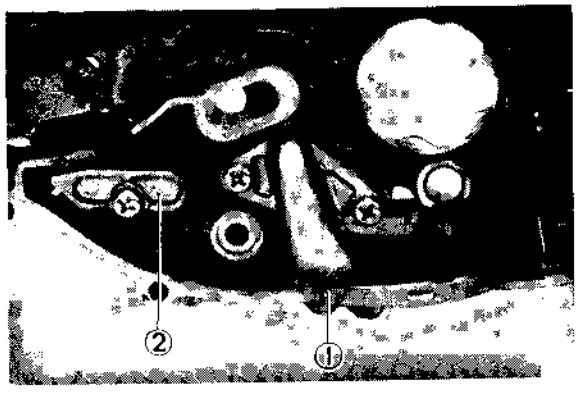


7. Install the O-ring to the inlet oil passage and engine mount spacer.



1. O-ring

8. Install the oil strainer and oil passage cover to the right crankcase.



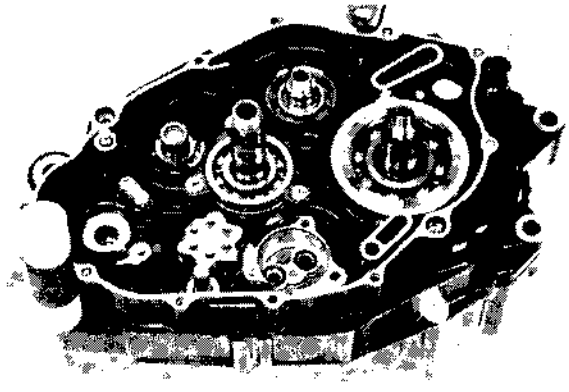
1. Oil strainer 2. Oil passage cover

NOTE:
It is recommended that the oil strainer be replaced whenever the engine is disassembled.

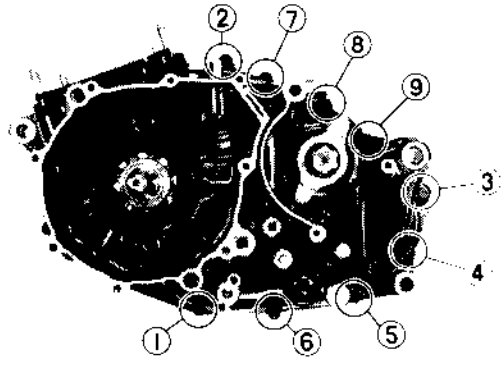
9. Apply Yamaha Bond No. 4 to the mating surfaces of both case halves.
   Apply thoroughly over all case mating surfaces.

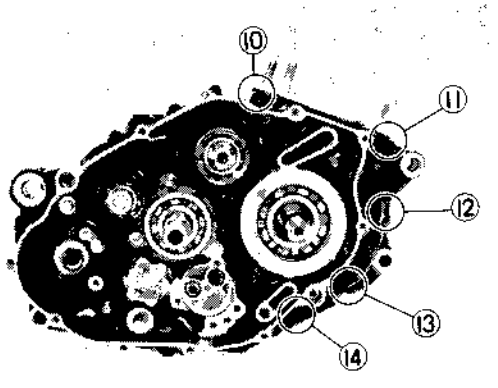
10. Set the right half crankcase onto the shafts, and tap lightly on the case with a soft hammer to assemble.

NOTE:
1. Shifter drum should be set in the neutral position to pass the flower shape stopper through the right crankcase.
2. Do not tap on machined surface or end of crankshaft.
3. Work slowly and carefully while making sure of the parallelism of the mating surface of the left half with that of the right half.



11. Install all crankcase bolts and tighten in stages, using a crisscross pattern.





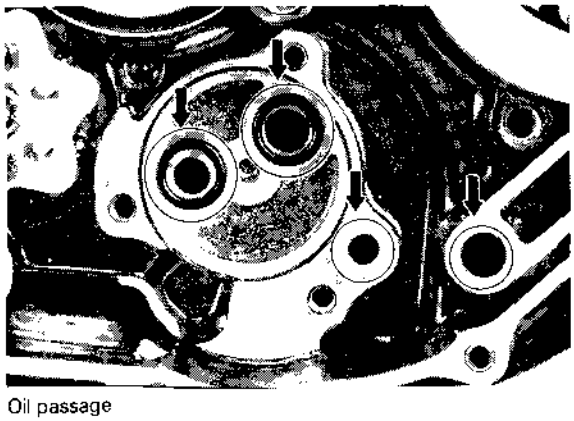
12. Check crankshaft and transmission shafts for proper operation and freedom of movement.
13. Apply a liberal coating of 4-stroke engine oil to the crank pin and bearing.

D. Oil Pump

CAUTION:

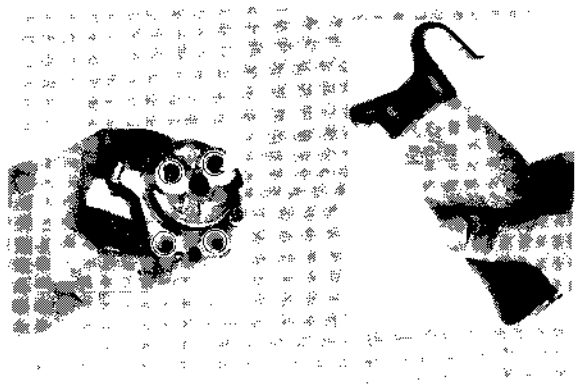
Apply a liberal amount of 4-stroke engine oil to the oil pump passages in the crankcase or the engine may be damaged.

1. Install the two O-rings.
   Apply a liberal amount of 4-stroke engine oil to the oil passages.



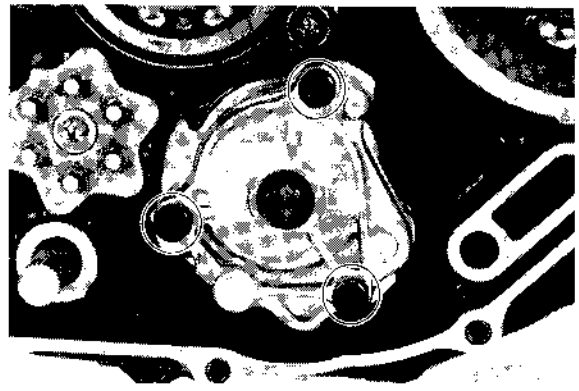
Oil passage

2. Apply a liberal amount of 4-stroke engine engine oil to both the scavenger pump and feed pump rotor assemblies.

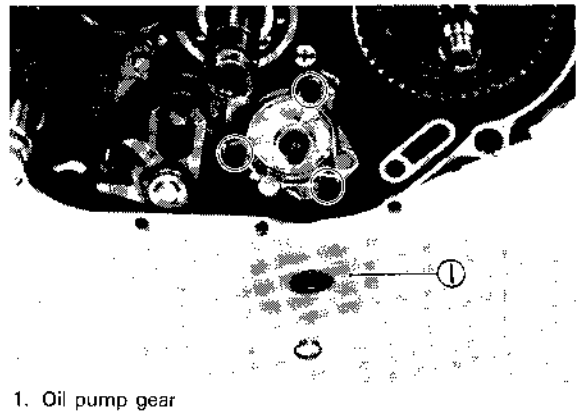


Oil passage

3. Install the oil pump assembly.



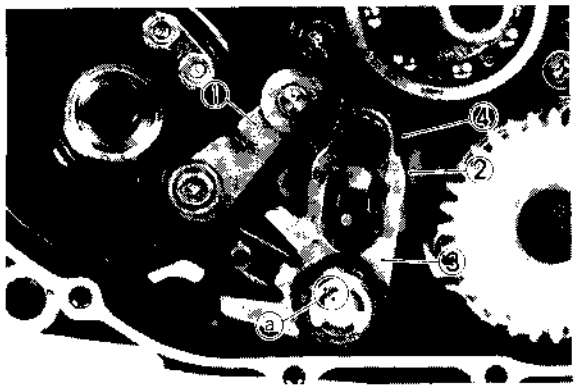
4. Install the oil pump gear.



1. Oil pump gear

E. Shifter

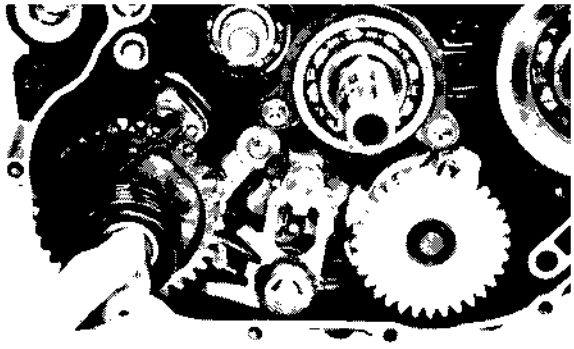
1. Set the stopper lever and then install the change shaft assembly.
2. During installation, note the index mark on shift lever 2 and center of shift lever 1. Align.
3. Be sure the stopper lever can move against the return spring as shown in the photo.



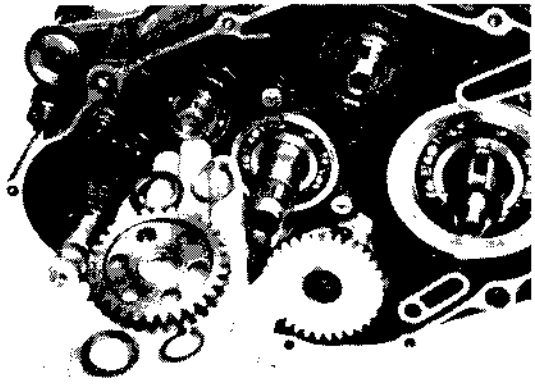
1. Stopper lever
2. Shift cam
3. Shift lever 1.
4. Shift lever 2.
a. Align the mark.

F. Kick Starter

1. While pushing the kick starter assembly straight in, rotate kick axle counter-clockwise slightly from its home position and engage the stopper to the ratchet wheel guide.

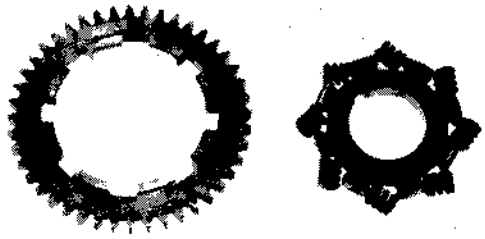


2. Hook the spring to the spring hook.
3. Install the kick idle gear.

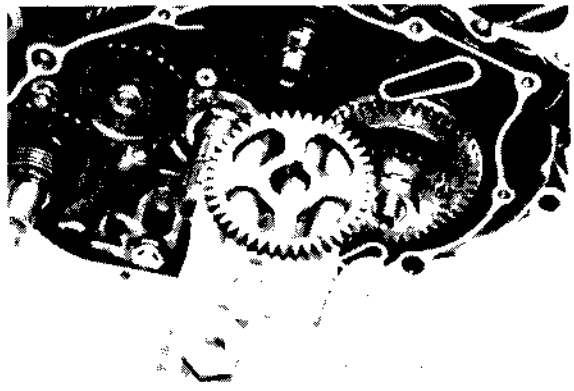


G. Balancer Drive Gear and Driven Gear

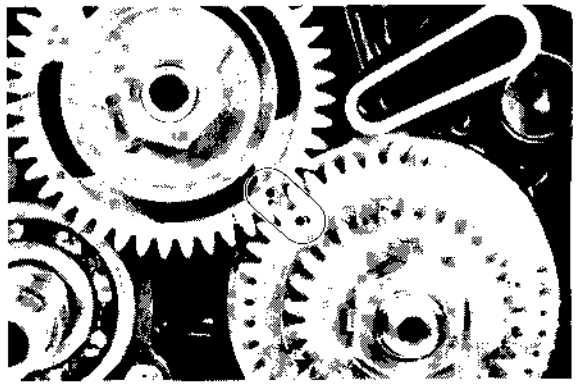
1. Install the damper assembly into the balancer gear.



2. Place bearing covers on both sides of the balancer gear and install.

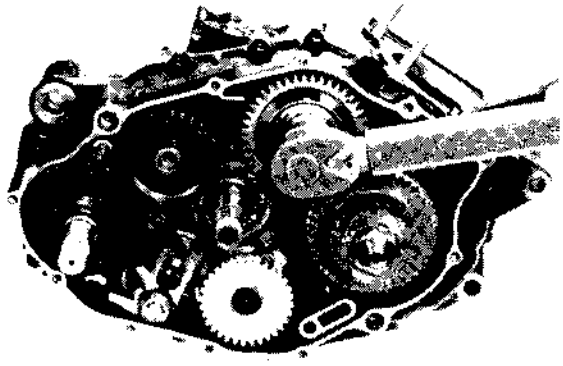


3. Install the keys for the balancer drive and driven gears with the marks in alignment.



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

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

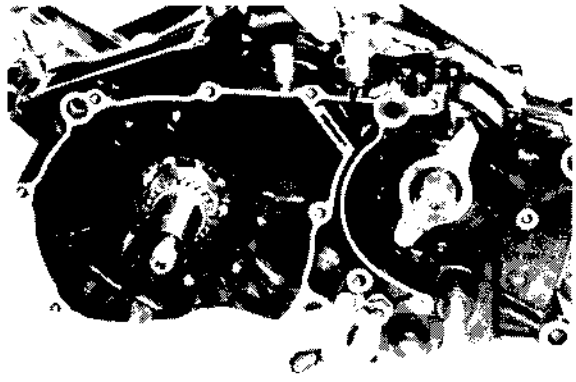


5. Bend the lock washer.

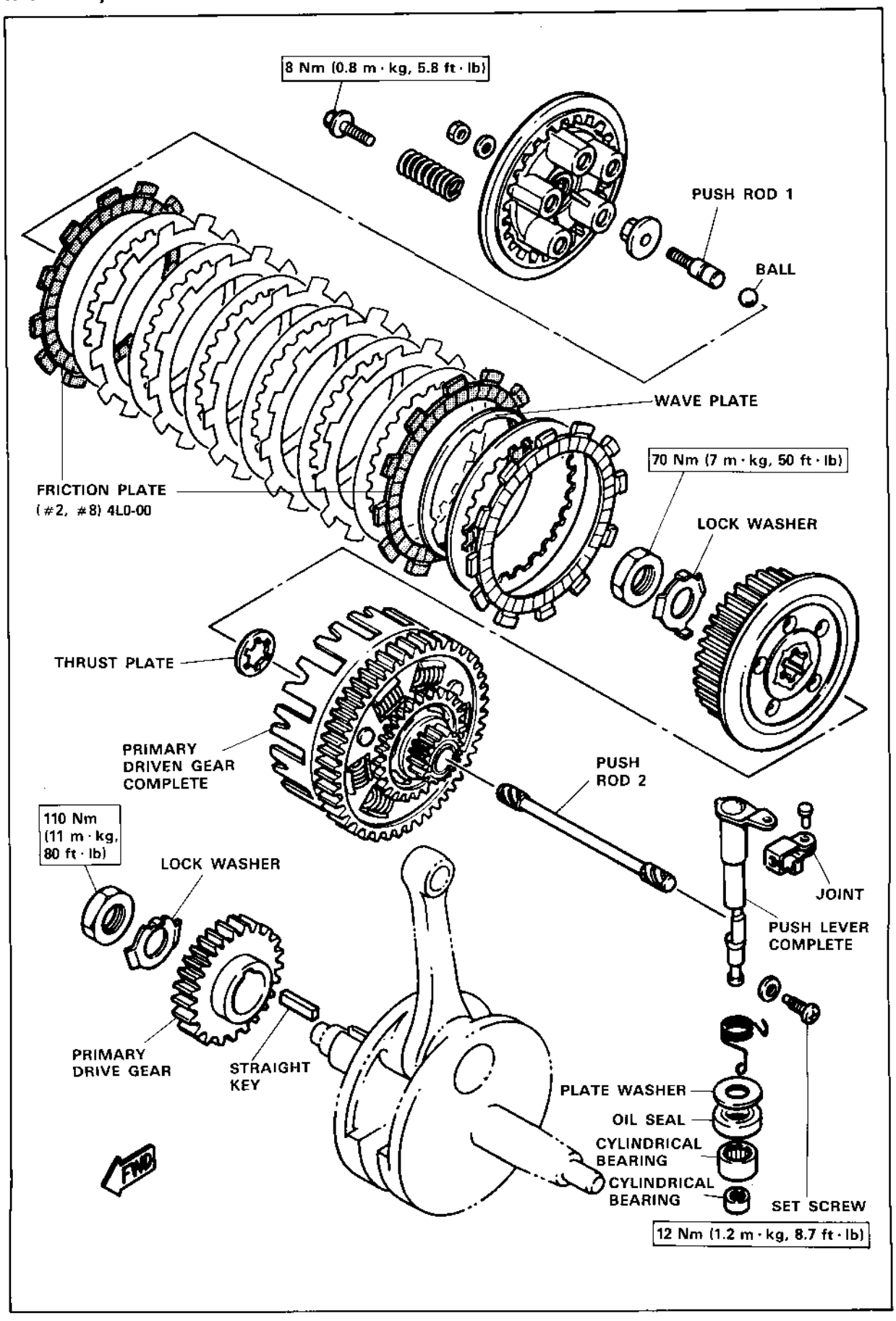
H. Push Lever Assembly

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

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

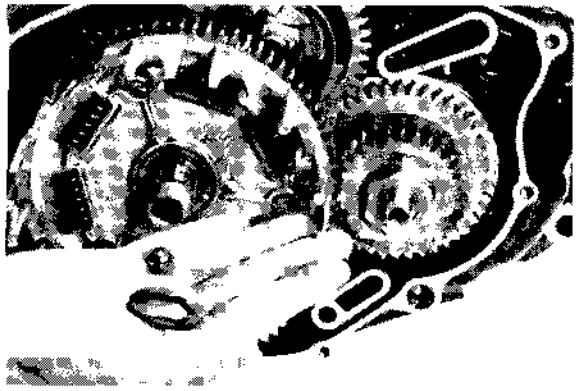


I. Primary Gears and Clutch



J. 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.

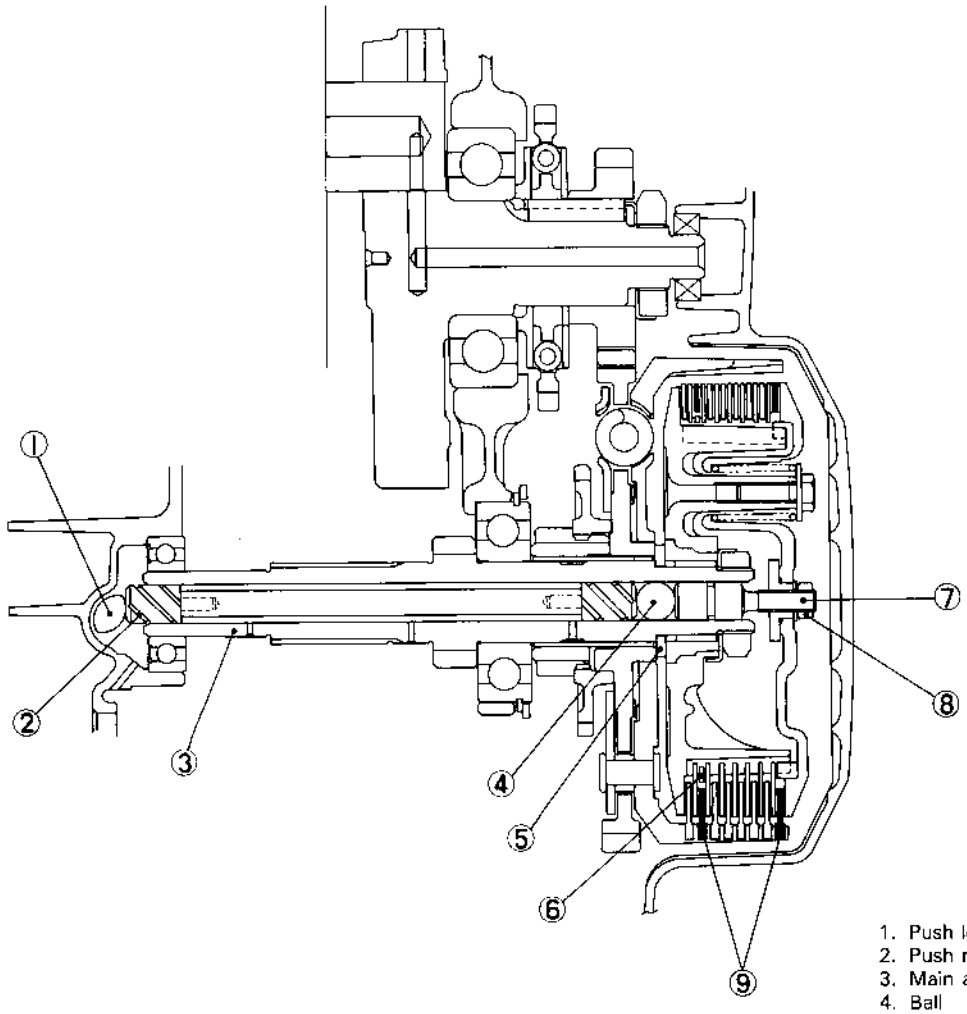


NOTE:

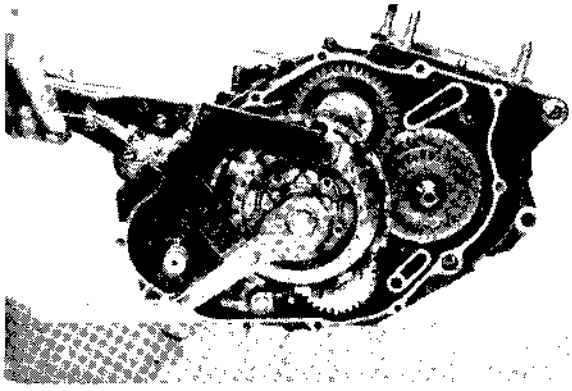
Install the clutch housing while turning the kick idle gear, pump gear, balancer gear.

3. Install the lock washer and locknut.
4. Install the clutch holding tool (special tool P/N. YM-91042) on clutch boss and tighten locknut.

TIGHTENING TORQUE:
70 Nm (7.0 m·kg, 50 ft·lb)



1. Push lever
2. Push rod 2
3. Main axle
4. Ball
5. Thrust plate
6. Wave plate
7. Push rod 1
8. Locknut
9. Friction plate (4L0-00)



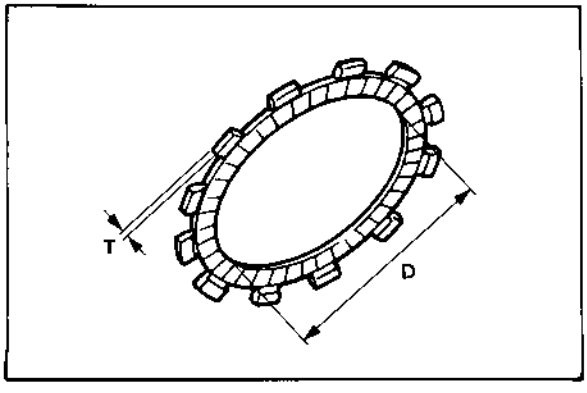
5. Bend the lock tab.
6. Install clutch plate and friction plate.
7. Install clutch pressure plate.
8. Continue installation of clutch and friction plates.

CAUTION:

When installing the friction plates, pay careful attention to the inside diameter.

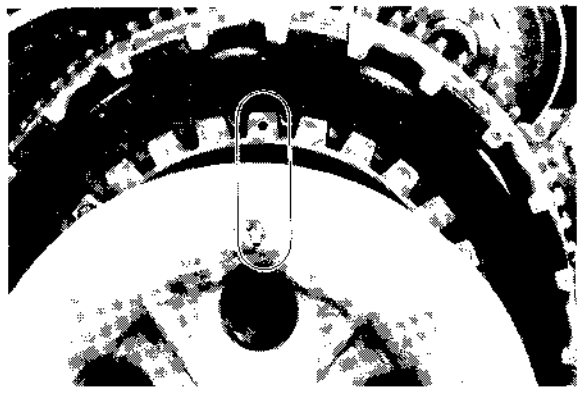
1. **The friction plate with the larger of the inside diameters must be installed in the second and last places.**
2. **The wave plate must be placed on the inside of the second friction plate.**

	Quantity	Inside dia. (D)	Thickness (T)
Friction plate #2 and #8 (4L0-00)	2 pcs.	116 mm (4.57 in)	3.0 mm (0.12 in)
The other friction plate (583-00)	6 pcs.	113 mm (4.45 in)	2.8 mm (0.11 in)



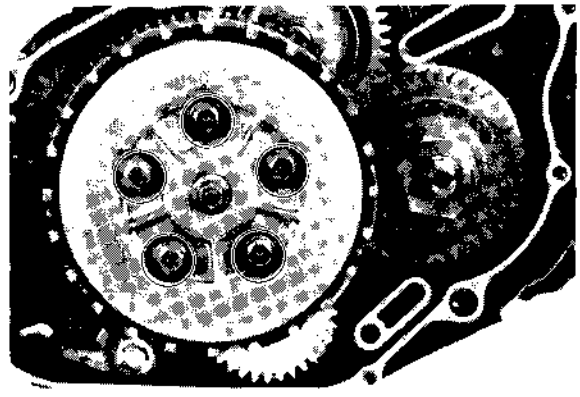
NOTE:

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



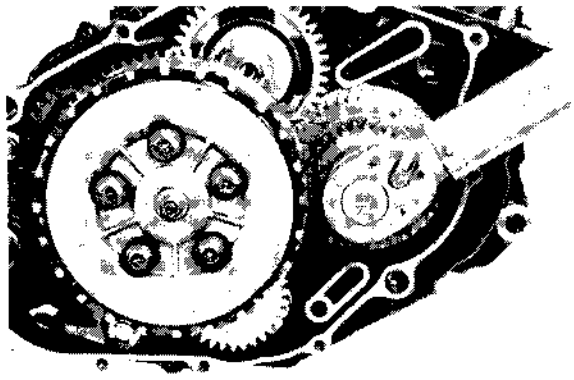
9. Install the clutch pressure plate and the five clutch springs. Torque the clutch plate bolts to specification.

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



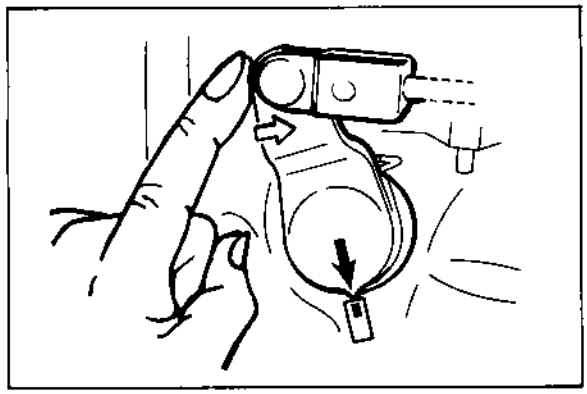
10. Place a small piece of rolled rug or a piece of lead between the primary drive gears as shown in the photograph. It will hold the gears so you can tighten the primary-drive securing nut. Torque the nut to specification, and bend the lock tab against a nut flat.

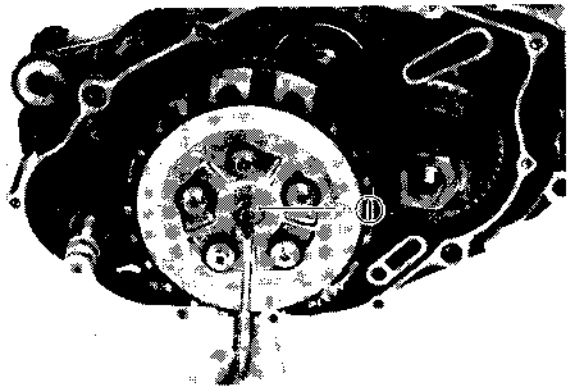
TIGHTENING TORQUE:
110 Nm (11.0 m·kg, 80 ft·lb)



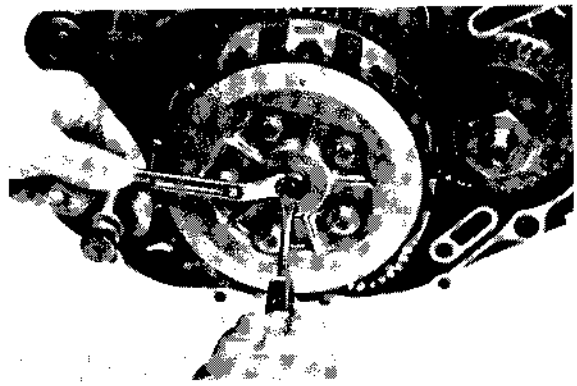
K. Clutch Mechanical Adjustment

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



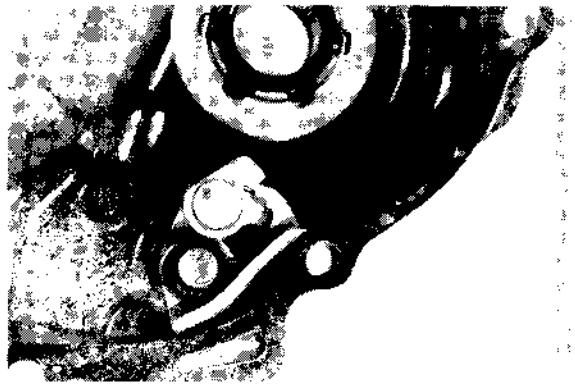


1. Locknut

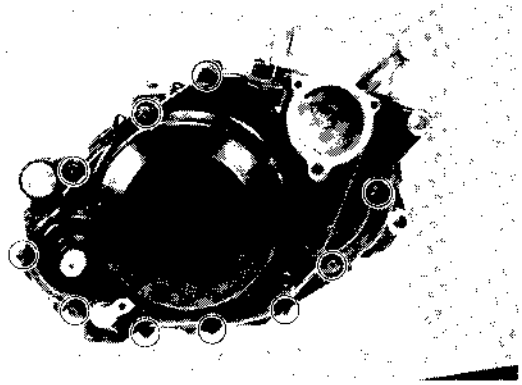


L. Crankcase Cover Right

1. Before installing the crankcase cover, place the decompression lever as shown in the photo.



2. Install the crankcase cover.
3. Install the oil filter element and cover.
4. Check to see the decompression lever assembly moves freely prior to tightening the bolts.



NOTE:

Tighten the screws using a crisscross pattern.

M. Kick Crank Assembly

Install the kick crank assembly and tighten the securing bolt.

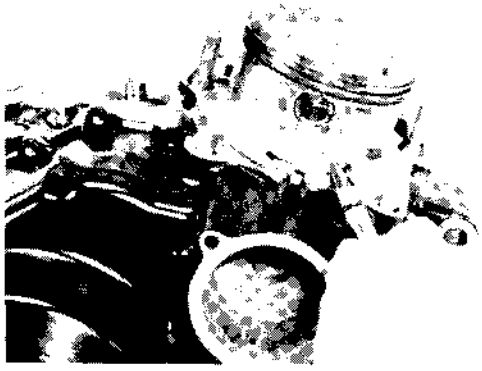
TIGHTENING TORQUE:
7 Nm (0.7 m·kg, 5.1 ft·lb)

N. Piston and Piston Ring

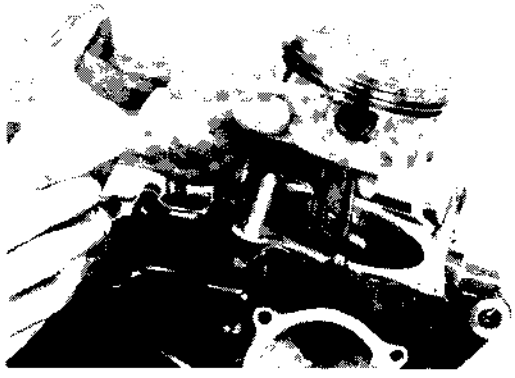
1. Mount the piston (rings installed) onto the connecting rod.
   Be sure the arrow stamped on the piston crown points forward.
2. Install new piston pin clips in their grooves.

NOTE:

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



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



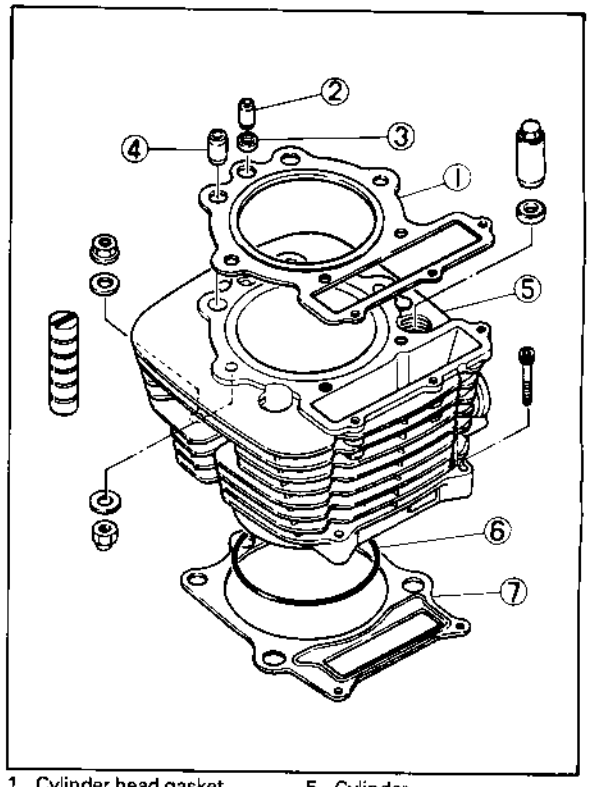
CAUTION:

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

NOTE:

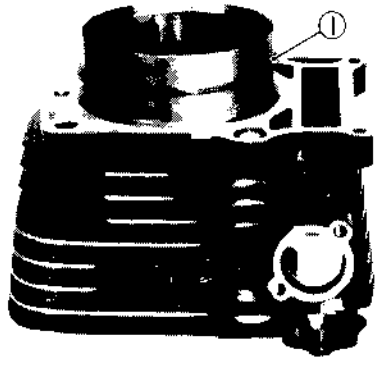
The manufacturer's marks or numbers stamped on the rings should be on the top of the rings.

O. Cylinder



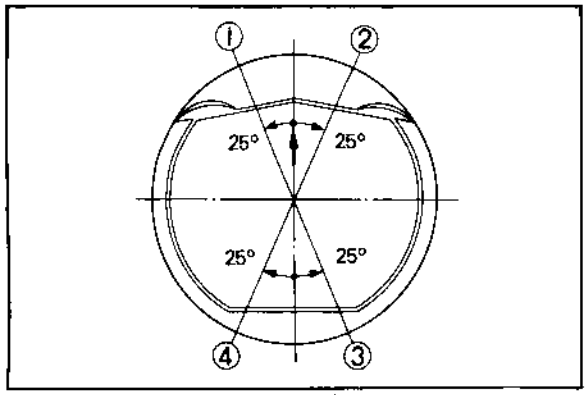
1. Cylinder head gasket
2. Dowel pin
3. Rubber seal
4. Dowel pin
5. Cylinder
6. O-ring
7. Cylinder gasket

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



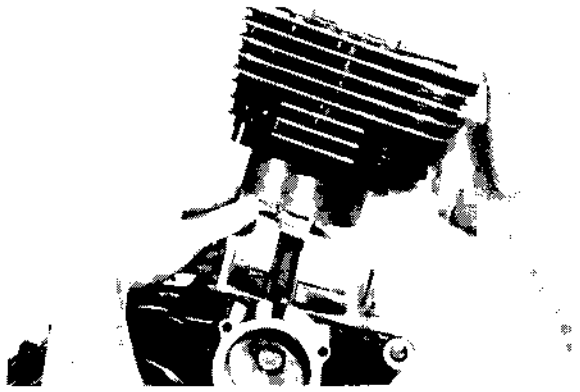
1. O-ring

3. Offset the three ring end gaps as shown.



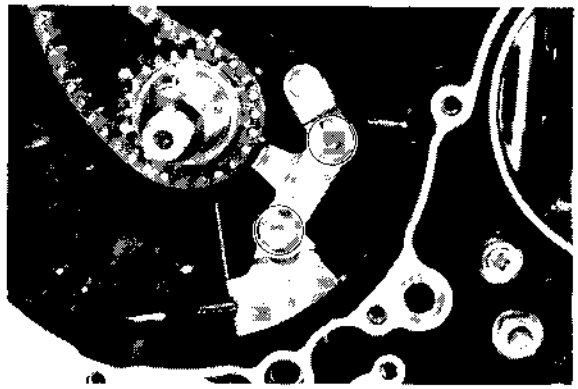
1. Top
2. Oil ring (Lower rail)
3. 2nd
4. Oil ring (Upper rail)

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

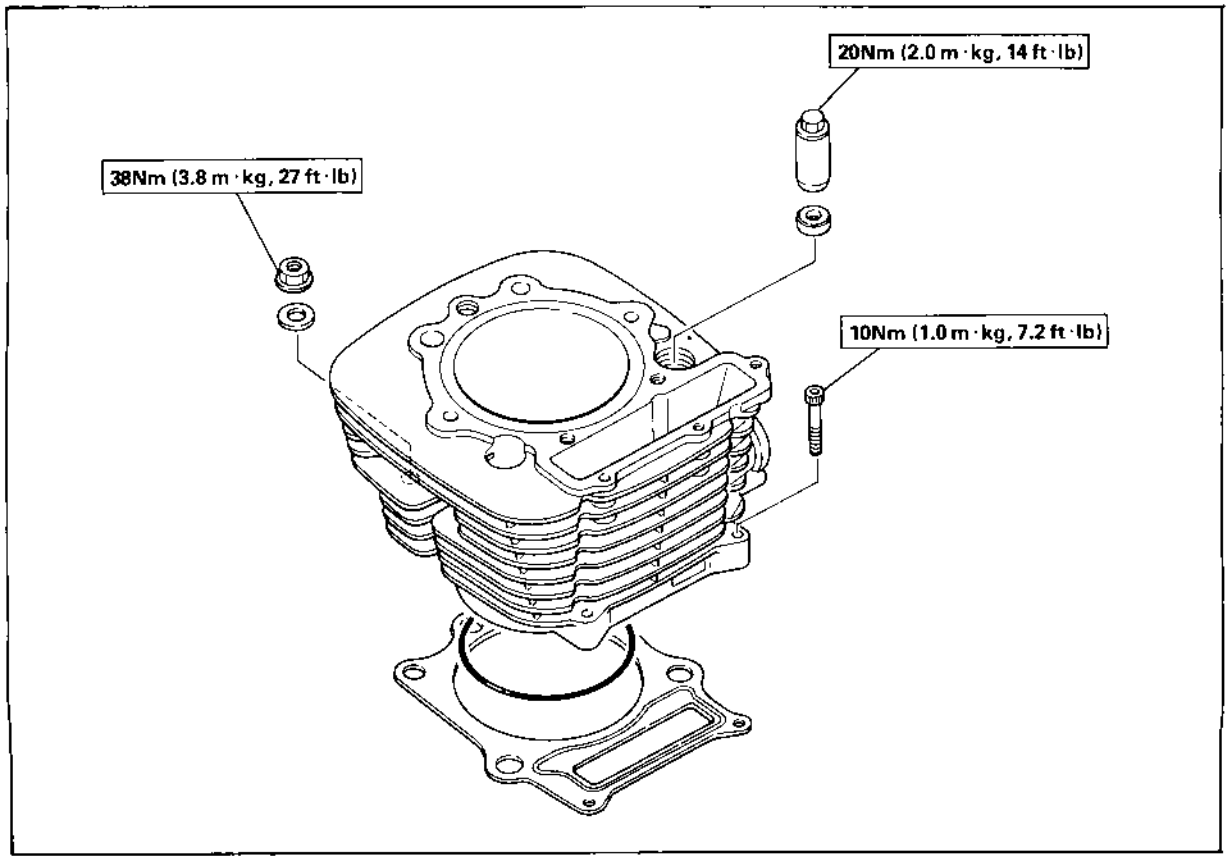


5. Install the cam chain with a wire installed.
6. Install the guide stopper and tighten the securing bolts.

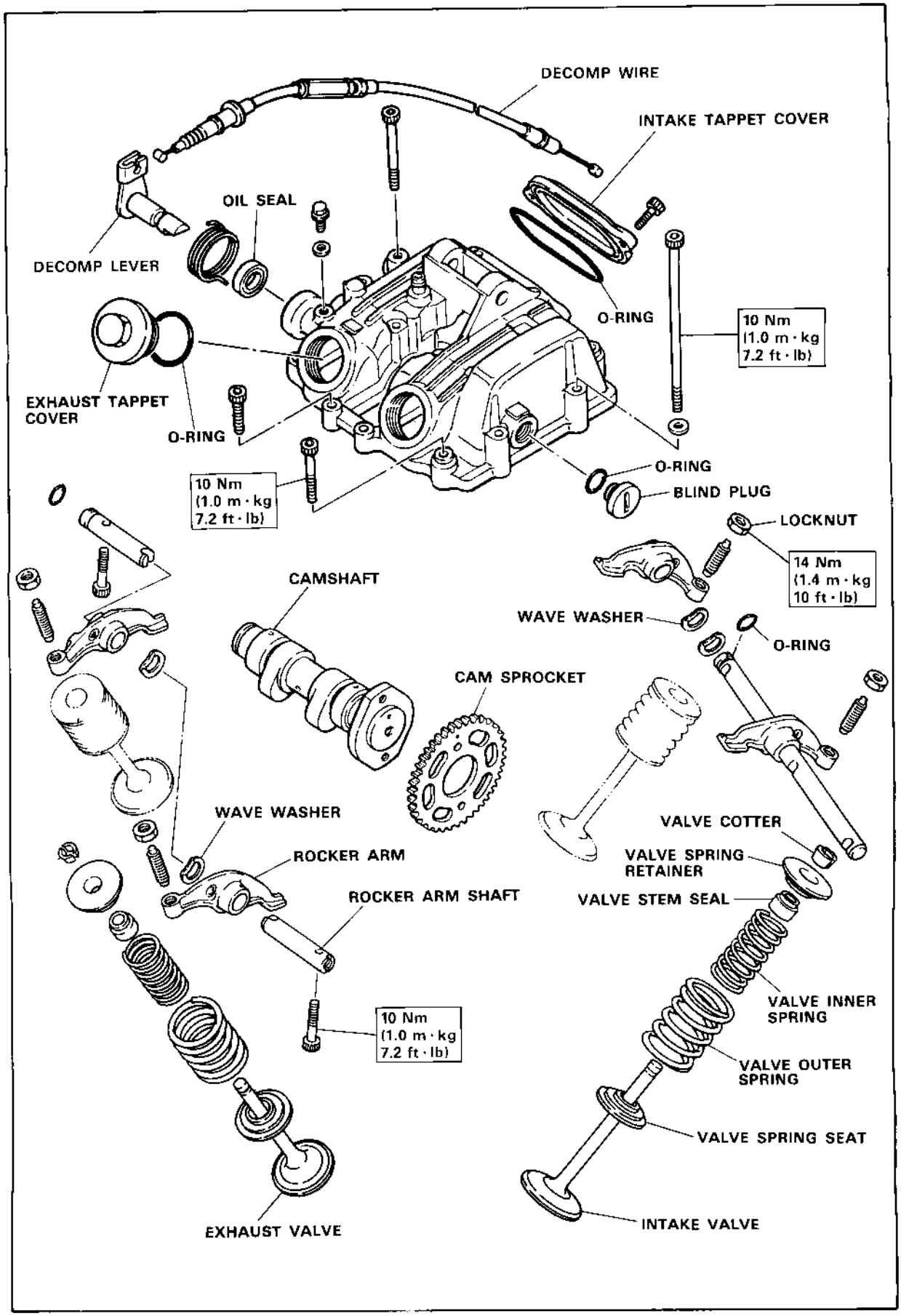
TIGHTENING TORQUE:
8 Nm (0.8 m·kg, 5.8 ft·lb)



7. Tighten the cylinder securing nuts and bolts.

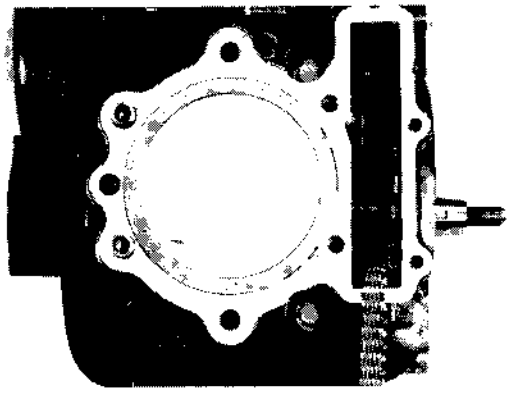


P. Cylinder Head, Rocker Arm, and Camshaft

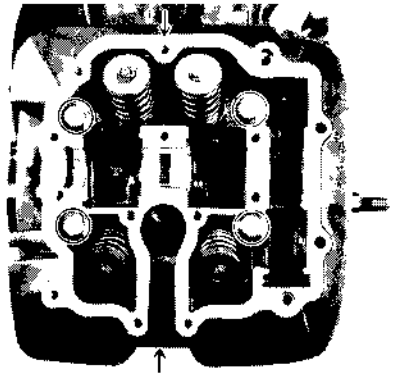


Q. Cylinder Head

1. Install the two dowels and O-ring in the cylinder.

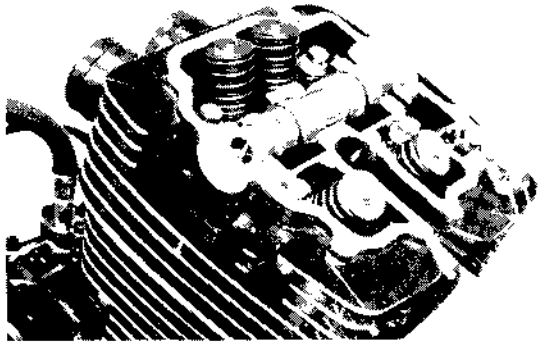


2. Use a new gasket and tighten the securing bolts and nuts.

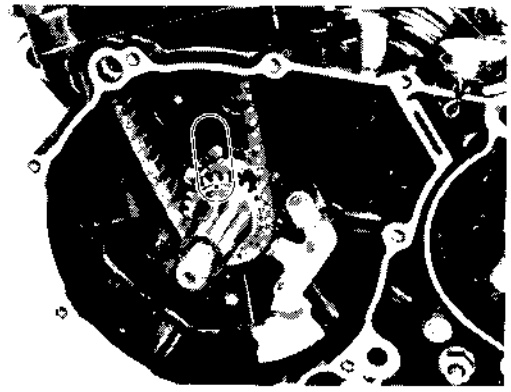


R. Camshaft, Cam Sprocket, Cam Chain

1. Install the camshaft onto the cylinder head as shown in the photograph (Compression stroke)

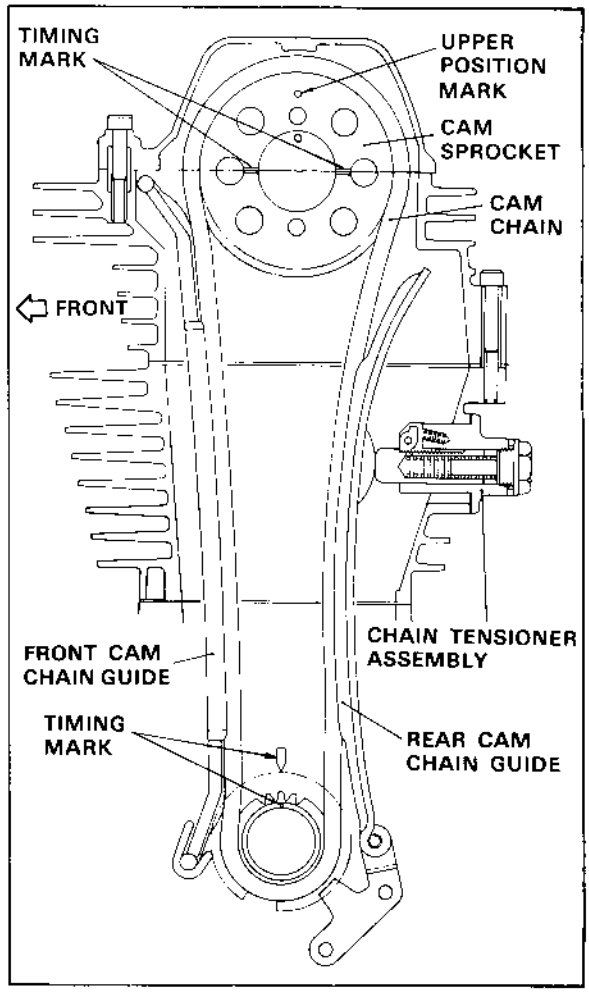


2. Install the chain while aligning the marks on the crankshaft sprocket and crankcase, as shown in the following photo.

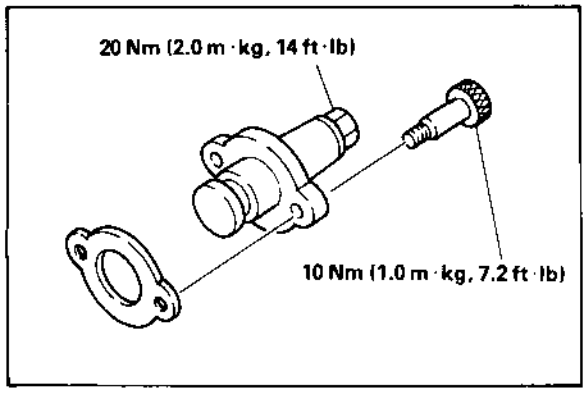


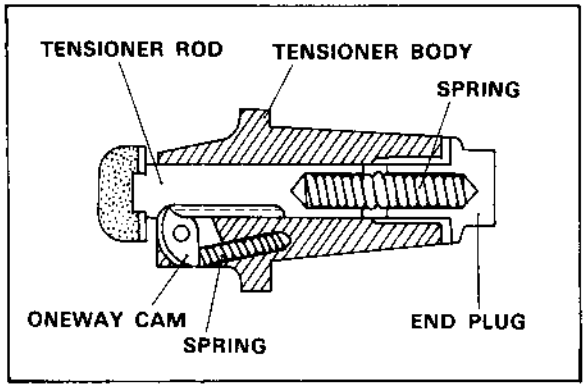
3. Install the cam sprocket onto the camshaft. The timing mark on the sprocket must be aligned as shown in the illustration, while pulling all the slack from the front side of the cam chain. The front side of the cam chain must be taut when the cam chain sprocket is installed.

CAMSHAFT INSTALLATION



S. Cam Chain Tensioner





1. Insert the front cam chain guide in the cylinder.
2. Install the cam chain tensioner. First tighten the securing bolts. Then install and tighten the center bolt.
3. Install the tensioner to the cylinder and torque the bolts to the specification.

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

4. Reinstall the spring and end plug with the gasket. Torque the end plug to the specification.

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

T. Cylinder Head Cover

1. Install the O-ring and two dowels in the cylinder.
2. Use a new gasket and tighten the securing bolts.

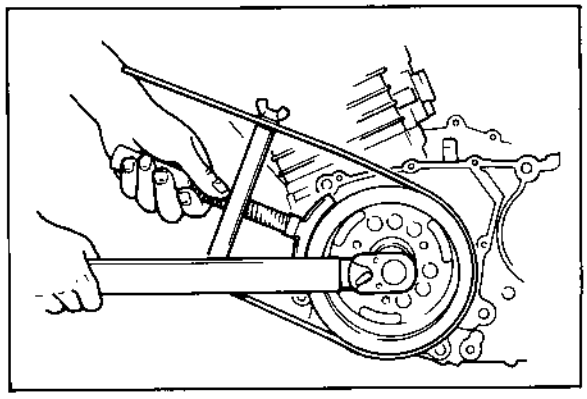
TIGHTENING TORQUE:
10 Nm (1.0 m·kg, 7.2 ft·lb)

3. Adjust the valve clearance. (Refer to Chapter 2 "Valve Clearance".)
4. Install the intake and exhaust tappet covers.

U. Flywheel

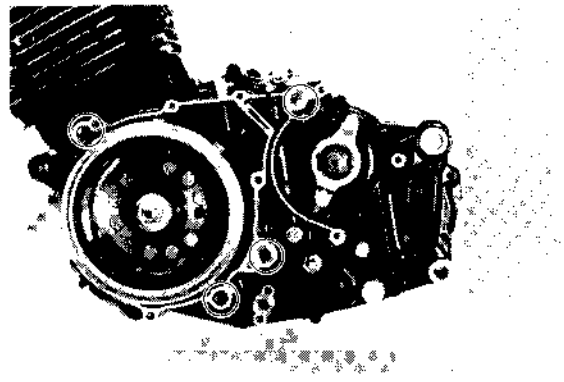
1. Install the woodruff key into the crankshaft keyway.
2. Install the flywheel assembly onto the crankshaft. The key in the crankshaft should engage the keyway in the flywheel.
3. Install the washer and the flywheel securing nut onto the crankshaft.
4. Install the rotor holding tool (special tool P/N. YU-01701 and tighten the securing bolt.

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

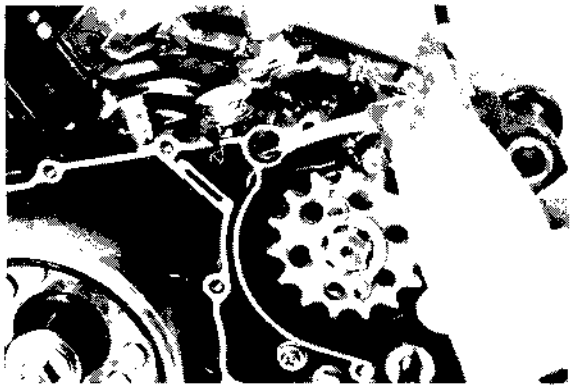


V. Crankcase Cover

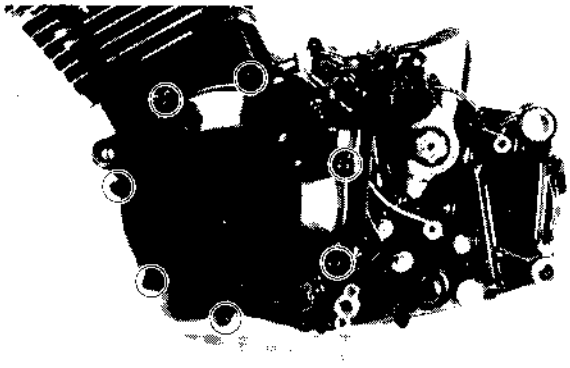
1. Install the two dowels and two O-rings in the left side crankcase as shown in the photograph.



2. Oil the inlet oil passage.

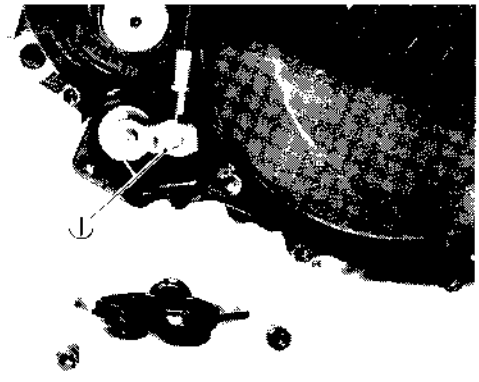


3. Install the left crankcase cover. Use a new gasket, and tighten the securing bolts.

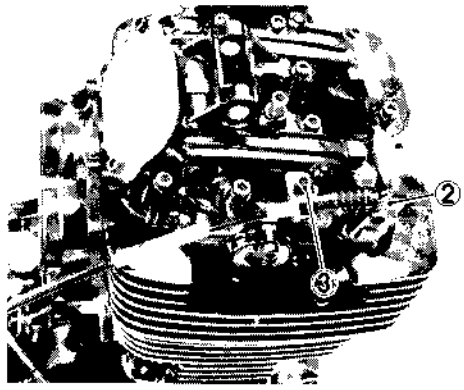


W. Decompression Cable

1. First install the decompression cable to the decompression levers. (1 and 2 in the photo.)
2. Then install the cable holder. (3 in the photo.)

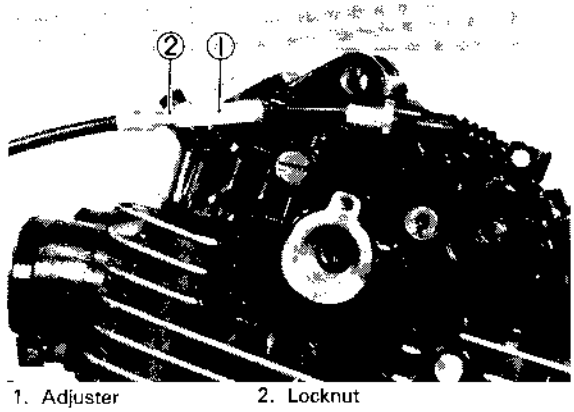


1. Decompression lever

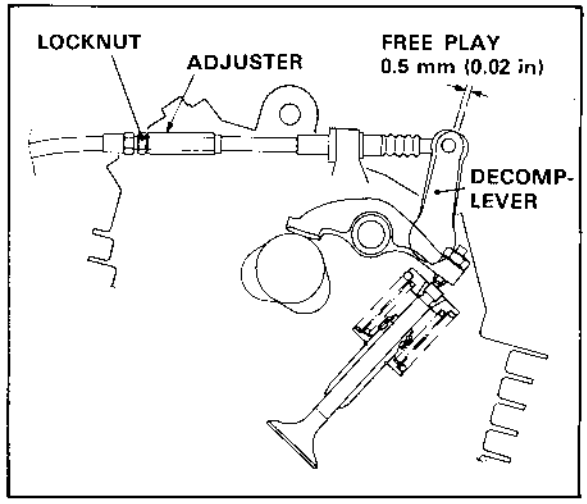


2. Decompression lever 3. Cable holder

3. Adjust the decompression cable free play. See CHAPTER 2 "Decompression System".



1. Adjuster 2. Locknut

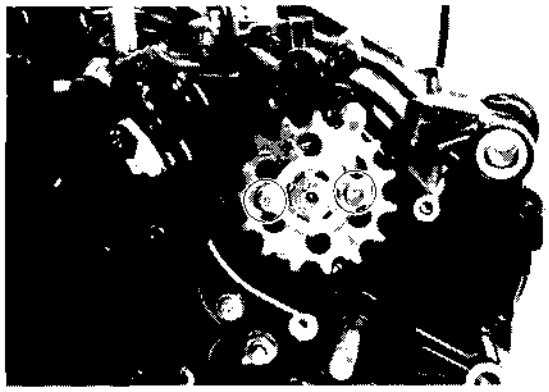


Decompression cable free play:
0.5 mm (0.02 in)

X. Drive Sprocket

Install the collar, drive sprocket, and sprocket holder. Tighten the securing bolts.

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

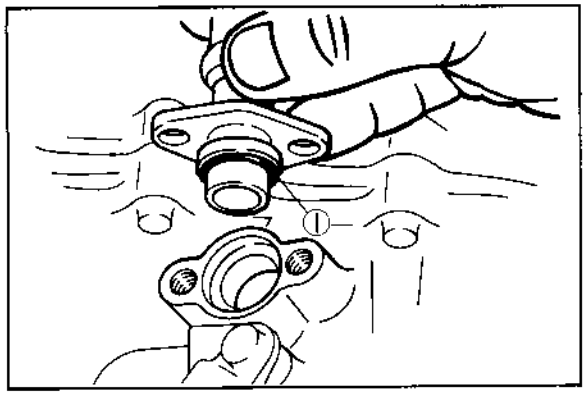


Y. *Oil Delivery Pipe*

Install the oil delivery pipe onto the crankcase.
Install and finger tighten the securing bolts.

NOTE:

If the O-ring is deteriorated, replace it.

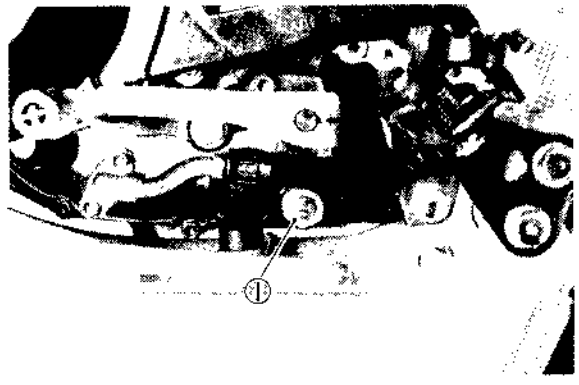


1. O-ring

Z. Drain Bolt

Install the drain bolt using new gasket.

TIGHTENING TORQUE:
30 Nm (3.0 m · kg, 22 ft · lb)



1. Drain bolt

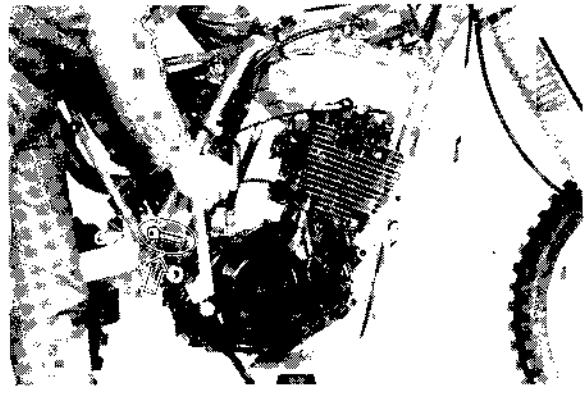
ENGINE MOUNTING

Refer to "ENGINE REMOVAL".
Reverse the engine removal procedure.

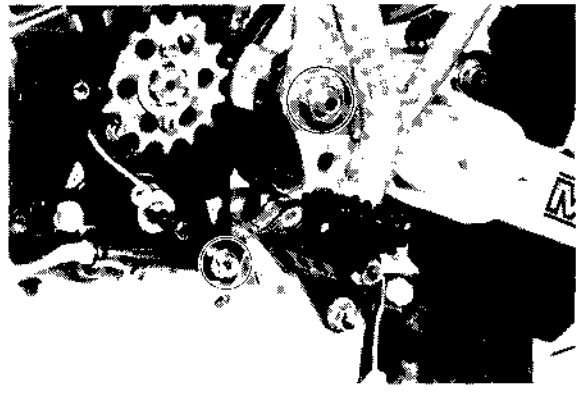
1. Mount the engine in the frame from the right side.

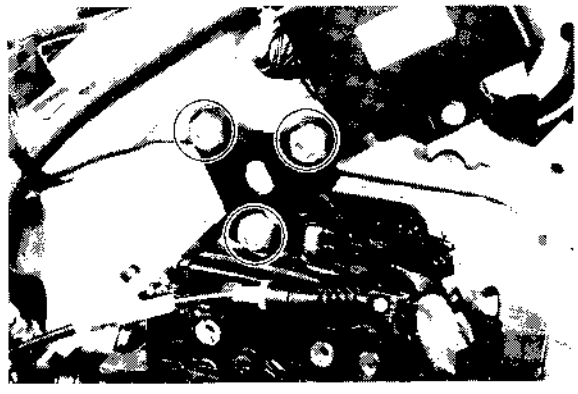
NOTE:

Place suitable stand under the engine.

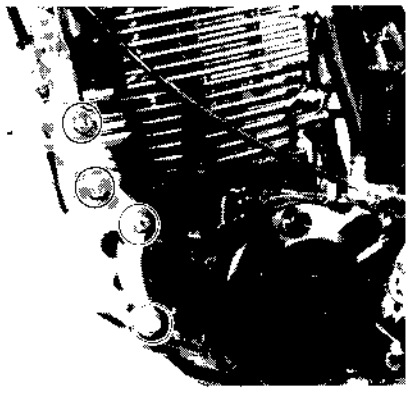


2. Install the engine mounting bolts and nuts.

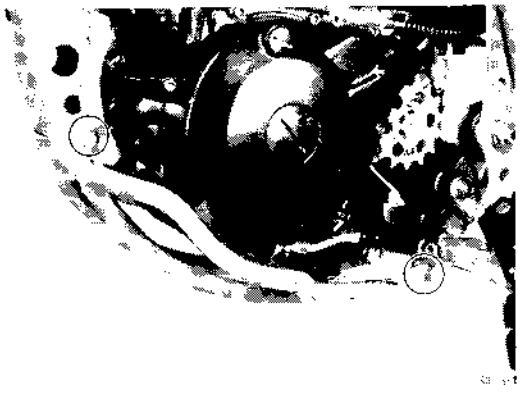




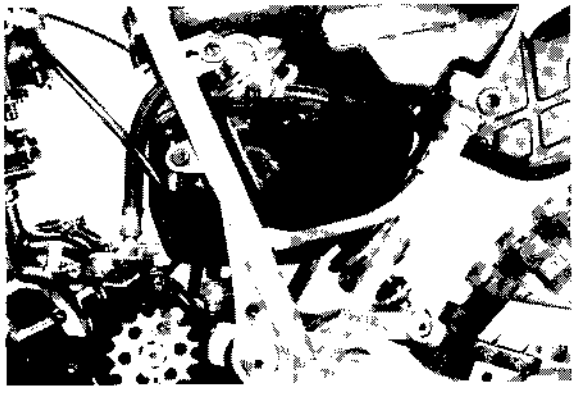
3. Install the front bracket.



4. Tighten all nuts holding the bolt.
5. Install the engine protector and tighten the securing bolts.



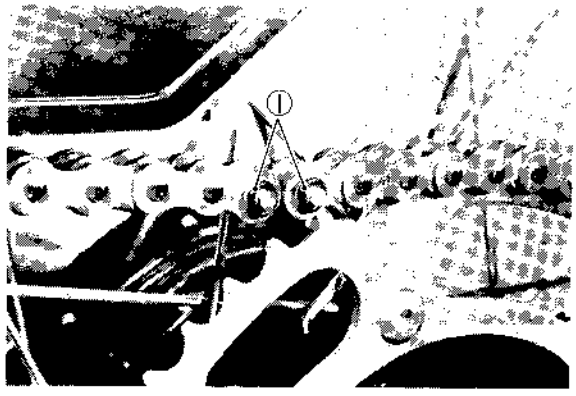
6. Install the inlet and outlet hose and tighten the securing bolts and nuts.



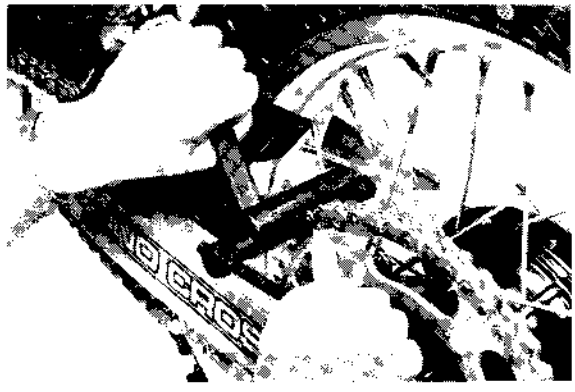
7. Using a chain cutter, joint the chain and install the chain joint clip.

NOTE:

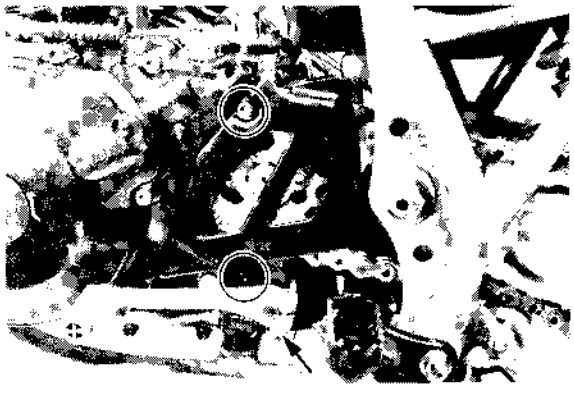
Be careful not to lose the O-rings.



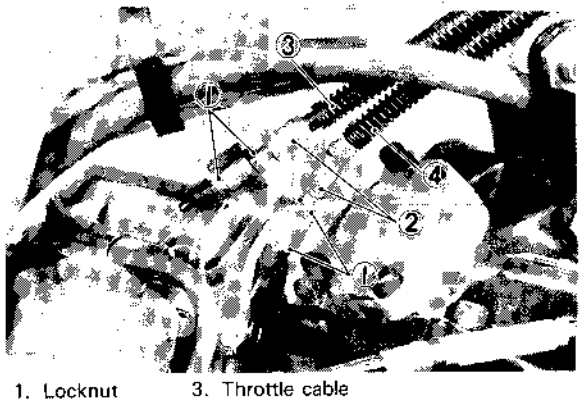
1. O-rings



8. Install the case cover and change pedal.



9. Install the carburetor assembly and secure the hose clamps. Adjust the throttle cable and tighten the locknut.



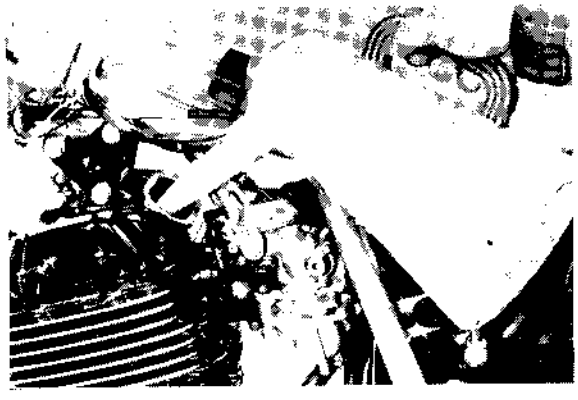
1. Locknut
2. Adjuster
3. Throttle cable
4. Throttle cable with silver ring

10. Install the exhaust pipe and tighten the securing bolt and nuts.

Tightening torque

Size	Nm	m · kg	ft · lb
M8 Hex. bolt	20	2.0	14
M6 Nut	10	1.0	7.2

11. Fill the engine with 1.0 L (0.9 Imp qt, 1.1 US qt) of engine oil.



12. Fill the oil tank with 1.4 L (1.2 Imp qt, 1.5 US qt) of engine oil.
13. Connect the connectors, plug cap clutch cable, breather pipe and ventilation hose.
14. Clamp the decomp cable to the frame.
15. Install the fuel tank, seat and side covers.
16. Start the engine and check oil pressure and oil leakage.
    Refer to Chapter 2, "Engine Oil".

CHAPTER 4.
CARBURETION

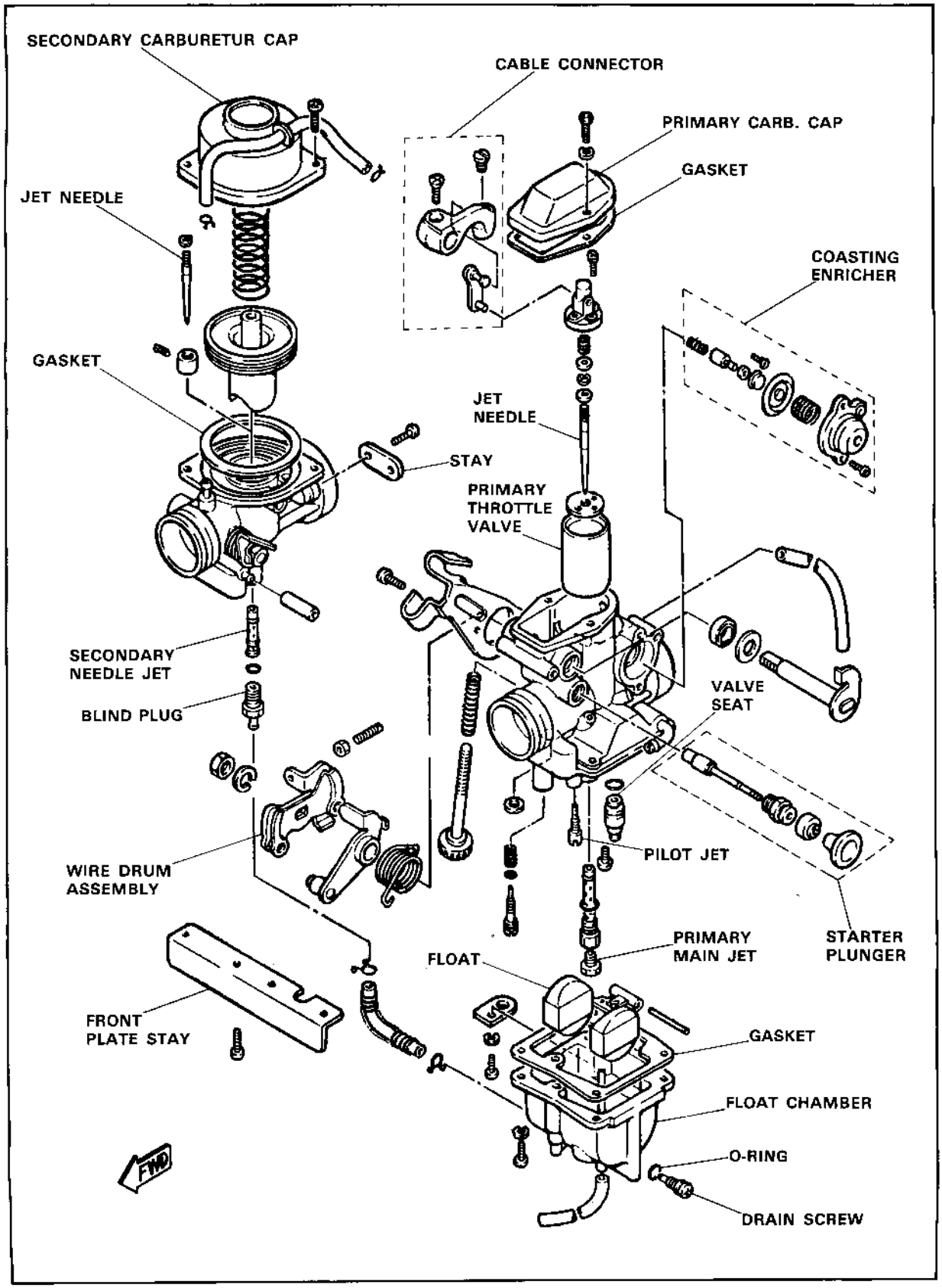
CARBURETOR 4-1

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B. Coasting Enricher 4-3
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E. Inspection 4-5
F. Assembly 4-6
G. Adjustment 4-6

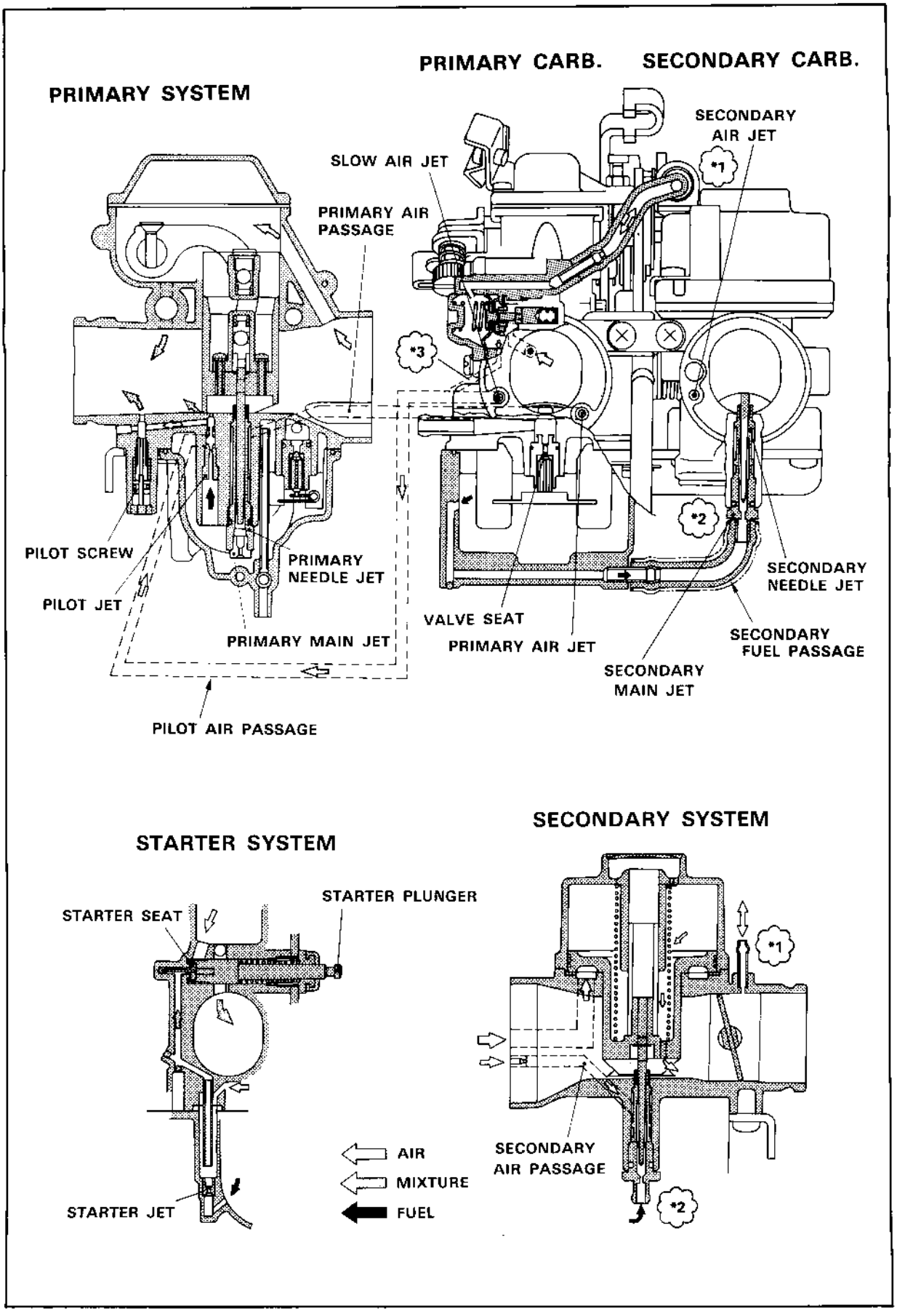
4

CHAPTER 4
CARBURETION

CARBURETOR



A. Sectional View



B. Coasting Enricher

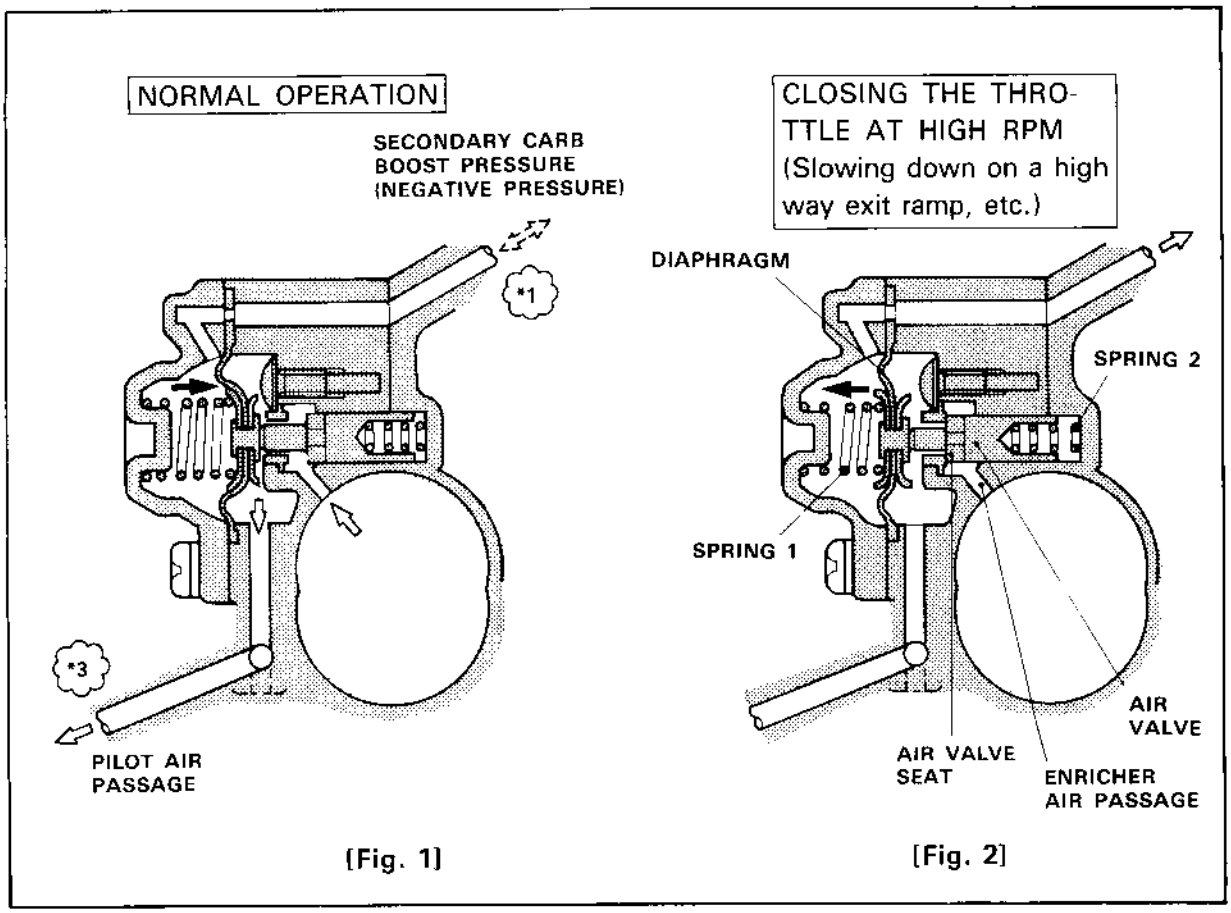
This model is equipped with an afterburning protection device (coasting enricher).

Afterburning is a phenomenon typical of the internal combustion engine. If throttle is precipitously closed on an engine revolving at high speed, a large amount of air mixed fuel spurts out of the pilot outlet (P.O), resulting in incomplete burning in the combustion chamber. Such unburned elements are expelled together with exhaust gases and build up in the exhaust pipe or muffler. These elements, accumulated to the point of being inflammable, suddenly gets ignited and burned in contact with expelled gases of high temperature.
This phenomenon is refferred to "afterburning", which is basically accompanied with a loud explosive sound.

Operation of enricher

In the illustration, the air valve is pulled left by the negative pressure developed as the result of the sudden closing of the throttle valve.
Thus, the enricher air passage is closed at the air valve seat and the air which flows into the pilot air passage is stopped, enabling only the air from the slow air jet to flow into the pilot air passage.
This makes the air-fuel mixture flow to the pilot outlet and bypass port now relatively richer.

Coasting enricher



[Fig. 1]

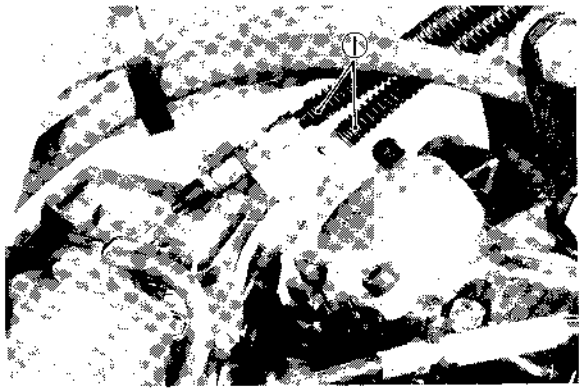
[Fig. 2]

C. Specifications

	Primary Carb	Secondary Carb
Main jet	#135	#135
Jet needle	5C37-3/5	4A70-3/5
Starter jet (GS_1)	ø0.64	-
(GS_2)	ø0.56	—
Pilot screw	1 and 1/2±1/2	—
Float valve seat	ø2.5	—
Engine idle speed	1,350±50 r/min	

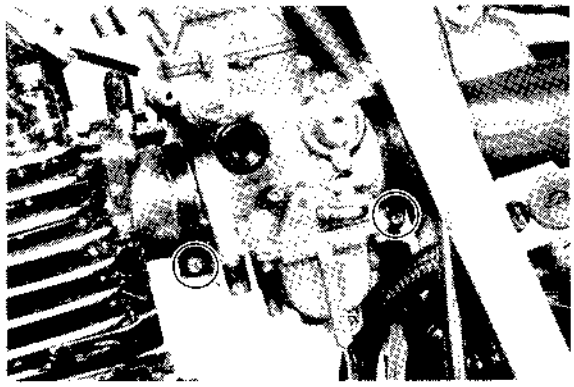
D. Disassembly

1. Remove the seat.
2. Turn the fuel cock to "OFF", and remove the fuel hose, from the carburetor.
3. Remove the fuel tank.
4. Remove the throttle cables.

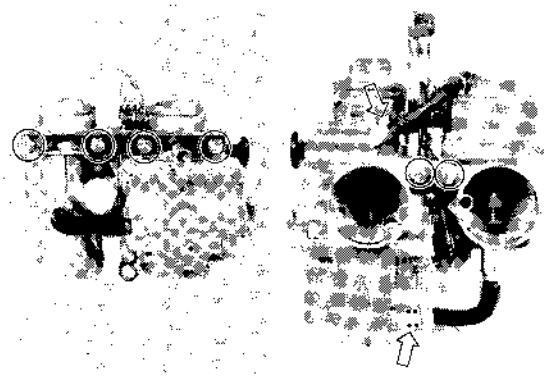


1. Throttle cable

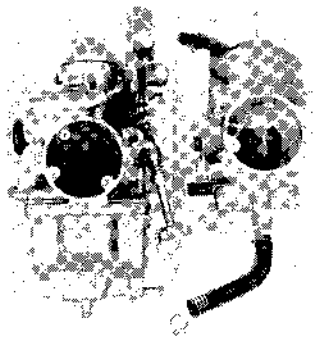
5. Loosen the four bolts securing the rubber joint band.



6. Remove the carburetor.
7. Remove the front and rear plate stays and pipes from the carburetors.



8. Separate the primary carburetor and the secondary carburetor.

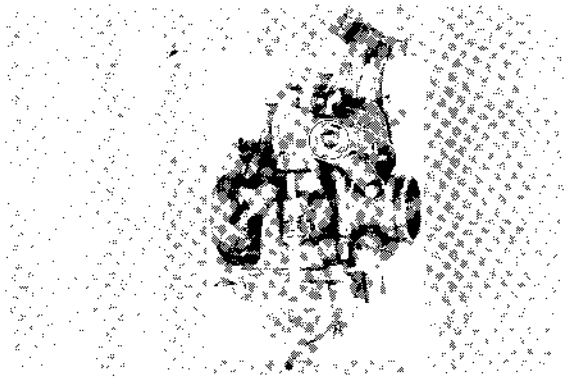


NOTE:

The primary and secondary carburetors are connected by a rubber balance pipe and a metal fuel line. To separate the carburetors, pull them apart, applying an equal amount of force on each carburetor; see the photograph.

Primary carburetor

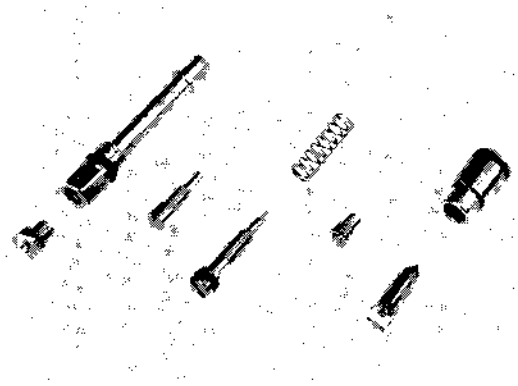
1. Remove the starter plunger.
2. Remove the primary carb. cap.
3. Remove the shaft securing nut.



NOTE:

Pay attention when removing the shaft securing bolts, pressing the springs with one hand as they will turn.

4. Remove the drum wire assembly.
5. Remove the wire holder springs.
6. Pull out the shaft, and remove the piston.
7. Remove the float chamber.
8. Remove the valve seat, the needle jet, the main jet, and the pilot jet.



Secondary carburetor

1. Remove the secondary carb. cap.
2. Remove the secondary piston.

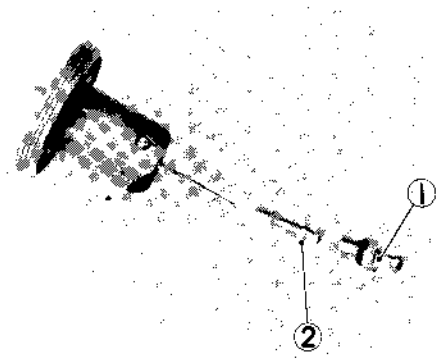


3. Remove the needle jet out of the suction piston.

NOTE:

1. Loosen the jet needle tightening screw and pull out the jet needle, then they can be pulled out with the needle holder.
2. Pay close attention to the small spring supporting the jet needle; it may jump out when the jet needle is removed from the secondary piston.

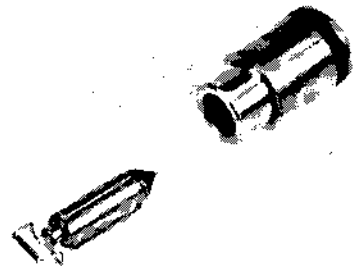
4. Assemble the secondary carb. cap and the secondary piston, then move and inspect them.
5. Remove the main jet and the needle jet.



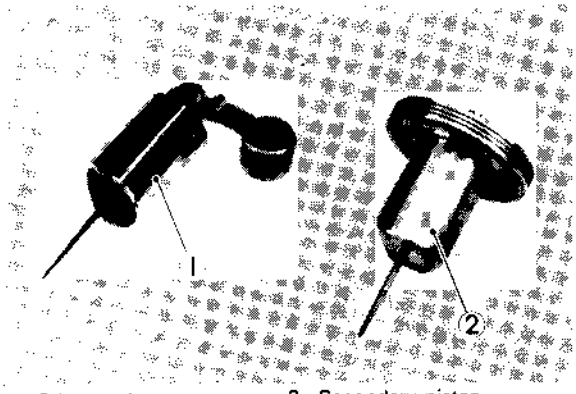
1. Main jet 2. Needle jet

E. Inspection

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

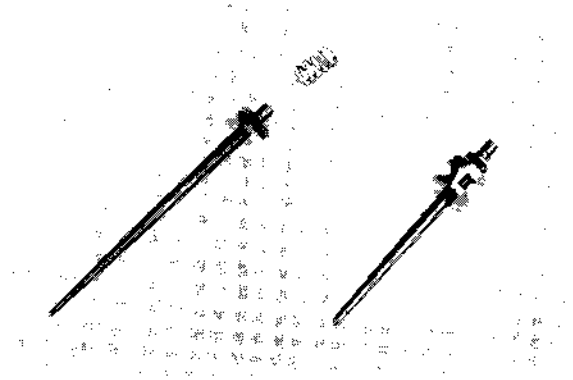


4. Inspect the primary and secondary pistons. If the piston is scratched, it must be replaced.



1. Primary piston 2. Secondary piston

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



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



Coarsting enricher

Disassembly and inspection

1. Remove the diaphragm cover and inspect the air passage. If the dust exists, clean the cover with compressed air.



2. Inspect the diaphragm assembly. If the diaphragm is torn or the spring is damaged, replace as a set.
3. Check the movement of the plunger rod by pushing it. Then set the plunger free and check the seal by blowing the enricher-air-jet.
4. If the plunger does not move smoothly or seal properly, remove the plunger and inspect it. If necessary, repair or replace.

F. Assembly

1. To assemble the carburetors, reverse the disassembly procedures.

NOTE:

1. The suction top has no set direction.
2. When tightening the secondary cap securing panhead screws, make sure that the suction piston moves smoothly. Gradually tighten the two screws, alternating between them. Move the piston while the screws are tightened, ensuring that the piston does not bind.
3. Be sure that the suction piston moves smoothly after tightening the screws.

G. Adjustment

Fuel level

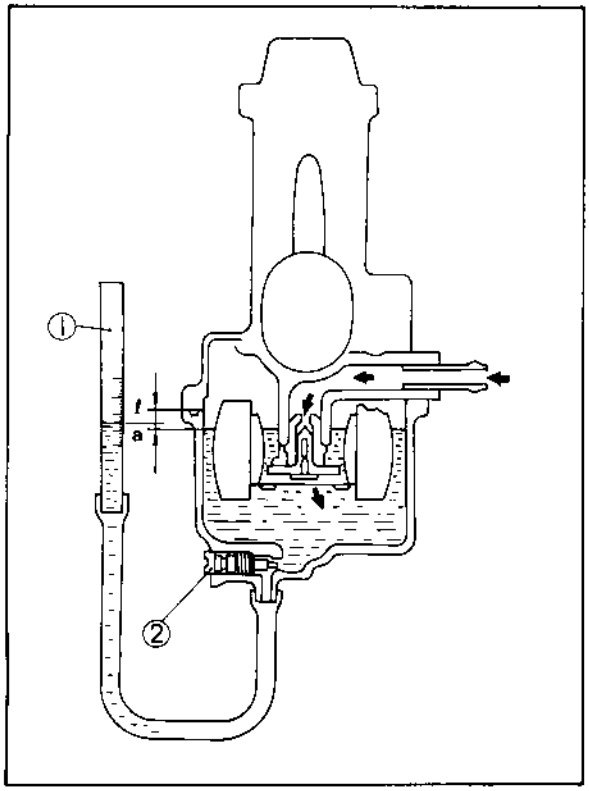
NOTE:

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.

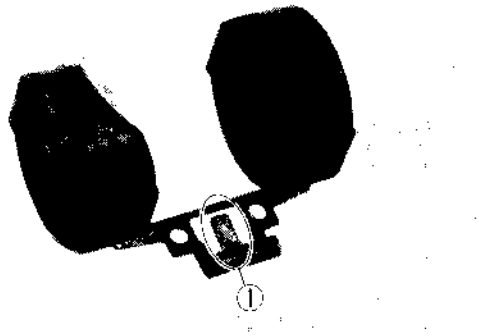
1. Connect the level gauge (special tool P/N. YM-01312) or a vinyl pipe of 6 mm (0.24 in) in inside diameter to the float bowl nozzle on the carburetor.
2. Set the gauge as shown and loosen the drain screw.
3. Start the engine and stop it after a few minutes. This procedure is necessary to obtain the correct fuel level.
4. The fuel level should be in the specified range.

Fuel level:
7.0 ± 1 mm (0.28 ± 0.04 in)
below the carb body edge



1. Fuel level gauge
2. Drain screw
ℓ. Fuel level (7.0 mm, 0.28 in)
a. Surface tension (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.

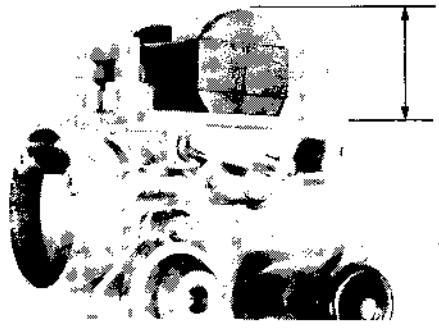


1. Float arm tang

7. Check the float height for reference. Using a vernier caliper, measure the distance from the top of the float chamber gasket seat (with the gasket removed) to the top of the float; see the photograph.

Float level:
26.0 ± 2.5 mm (1.02 ± 0.10 in)

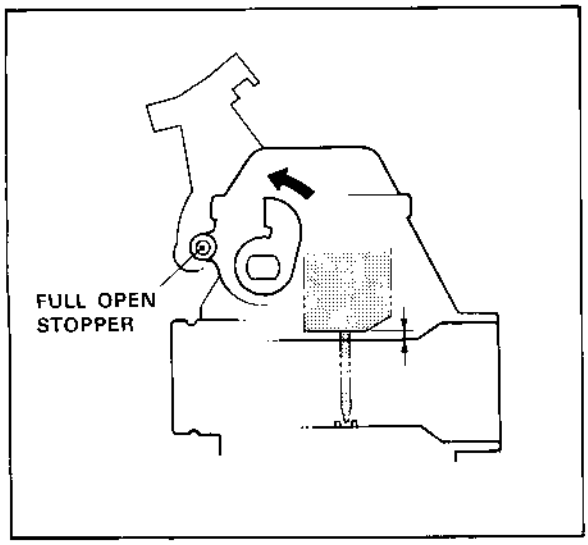
NOTE:
The float should be just resting on, but not depressing, the spring-loaded inlet needle.



8. Recheck the fuel level.

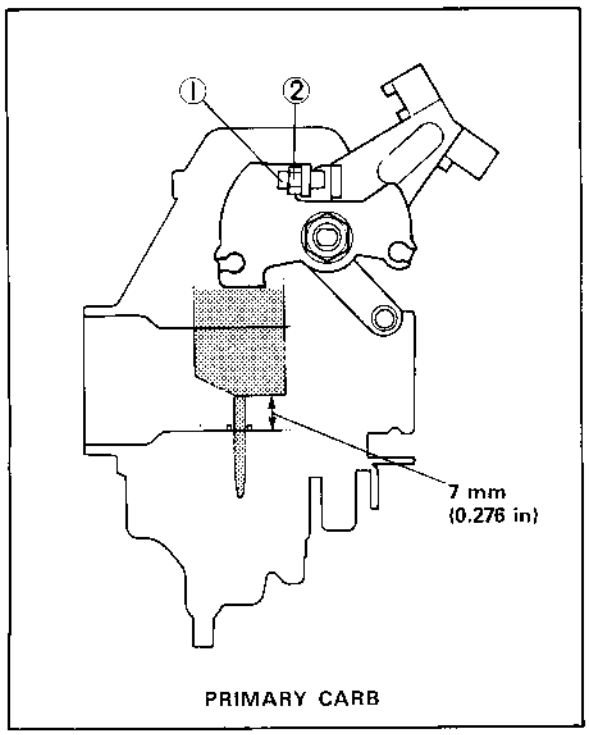
Primary carb full-open stopper

Turn the grip to move the drum-wire assembly to the full-throttle position. Check the carb valve bottom is positioned within the limits as specified.



Secondary carb synchronization

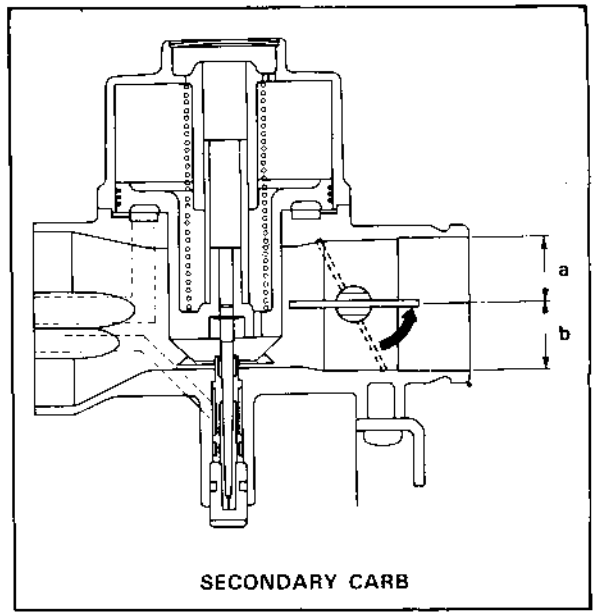
Raise the primary carb valve to a height of 7 mm (0.276 in) as indicated. Then adjust the synchronizing screw so the secondary throttle shaft just contacts the secondary throttle push lever.



PRIMARY CARB

1. Synchronizing screw 2. Locknut

As the primary carb valve is further opened, the secondary butterfly valve will finally be opened to its full horizontal position. (a = b)



SECONDARY CARB

CHAPTER 5 CHASSIS

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CHAPTER 5
CHASSIS

FRONT WHEEL

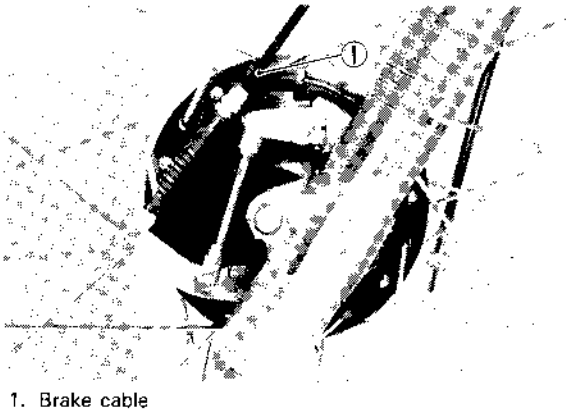
A. Front Wheel Removal

1. Elevate the front wheel by placing a suitable stand under the engine.
2. Remove the speedometer cable from the speedometer gear unit.



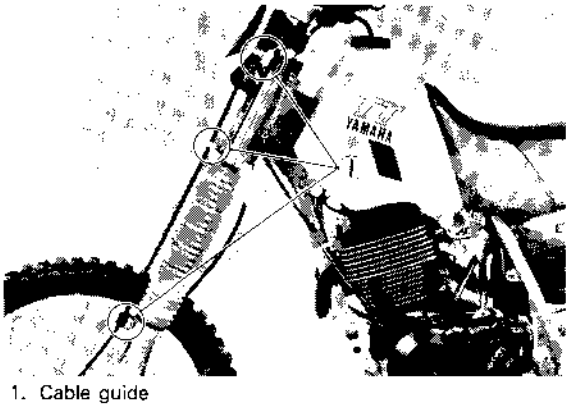
1. Speedometer cable

3. Remove the brake cable; loosen all cable adjusters and remove the cable from the handlebar lever holder.



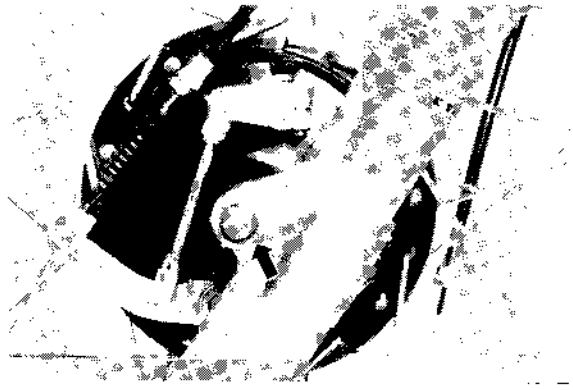
1. Brake cable

4. Remove the brake cable clamp installation bolt and remove the cable from the cable guides.

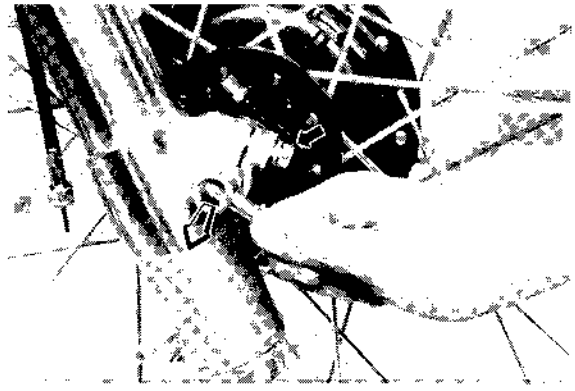


1. Cable guide

5. Remove the axle nut.



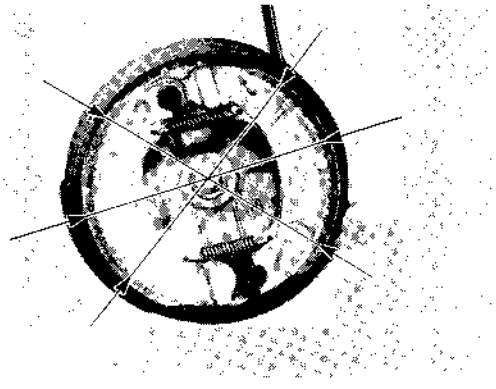
6. Loosen the axle holder nut.
7. Turn and pull out the front wheel axle; the wheel assembly can now be removed.



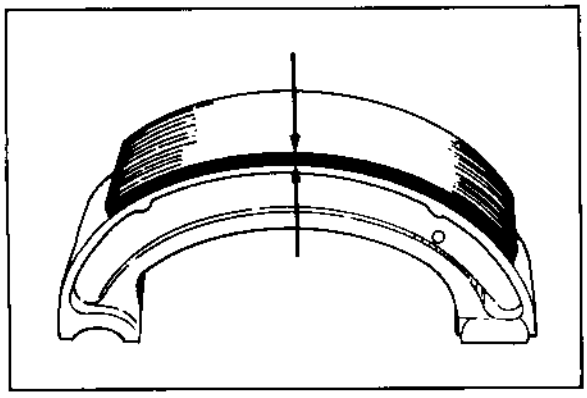
B. Brake Shoe Inspection

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

Brake shoe diameter: 129 mm (5.08 in) Replacement limit: 125 mm (4.92 in)

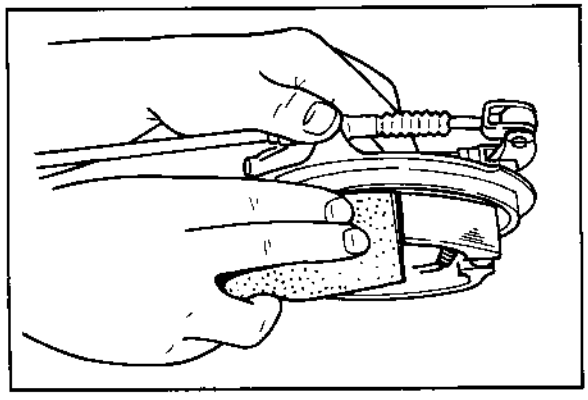


2. Measure the shoe thickness with slide calipers.
   If they measure less than replacement limit, replace them. Smooth out any rough spots on shoe surface with sandpaper.



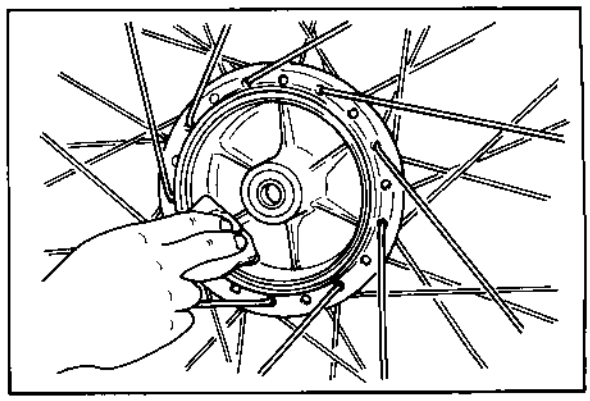
Standard thickness	Min. allowable thickness
4 mm (0.16 in)	2 mm (0.08 in)

3. Remove any glazing from the brake shoes with coarse sandpaper.



C. Brake Drum

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

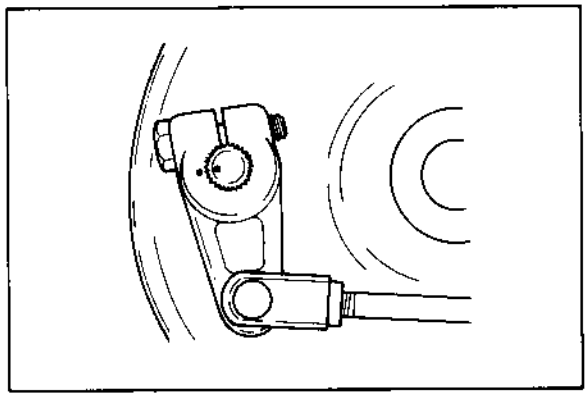


D. Brake Shoe Plate

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

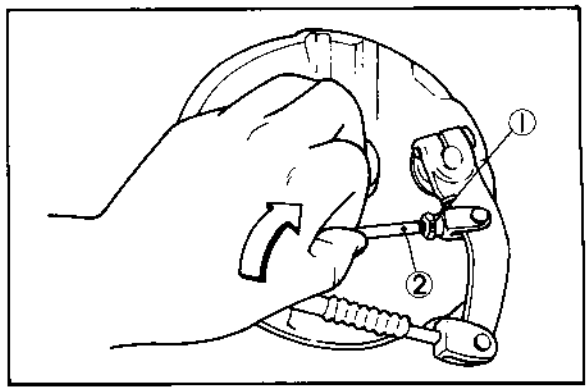
NOTE:

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

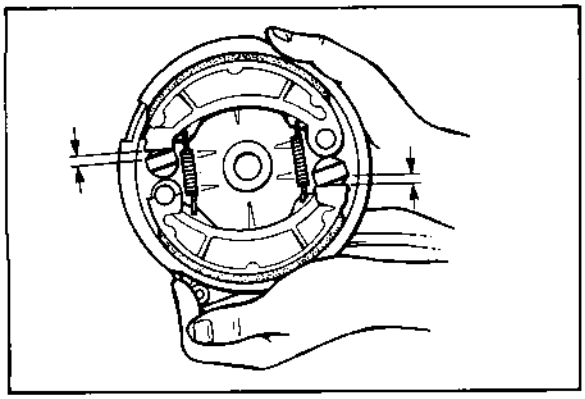


Brake shoe adjustment

On the two-leading shoe brake, the cam lever should be so installed that when the brake is applied, the two cams push the brake shoes evenly and simultaneously. This adjustment should be done by turning the adjuster and locknut.



1. Locknut 2. Adjuster



E. Front Axle Inspection

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

F. Replacing Wheel Bearings

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

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

WARNING:

Eye protection is recommended when using striking tools.

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

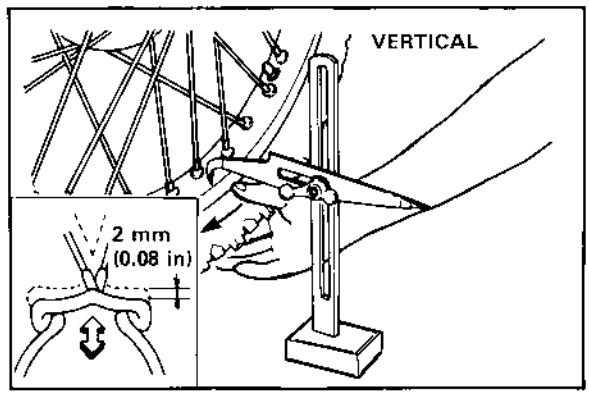
CAUTION:

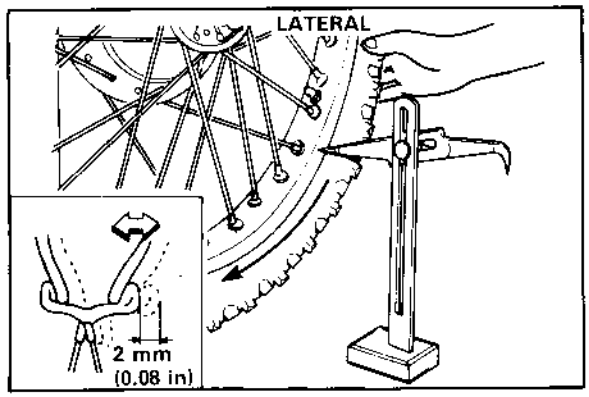
Do not strike the center race or balls of the bearing. Contact should be made only with the outer race.

G. Front Wheel Inspection

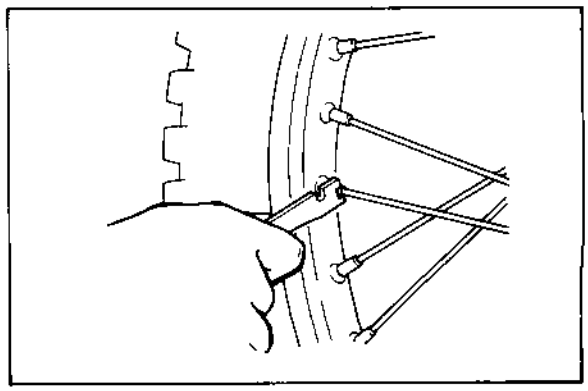
1. Check for cracks, bends, or warpage of the wheels. If a wheel is deformed or cracked, it must be replaced.
2. Check wheel run-out. If the deflection exceeds the tolerance below, check the spoke-tension, rim deformation, and wheel bearings. Replace the wheel as required.

Rim run-out limits:
Vertical: 2 mm (0.08 in)
Lateral: 2 mm (0.08 in)





3. Tap each spoke with a spoke wrench to determine if any spokes are loose; tighten all loose spokes and replace bent spokes.



NOTE:

The spoke wrench must be of the correct size. Take care not to over-tighten.

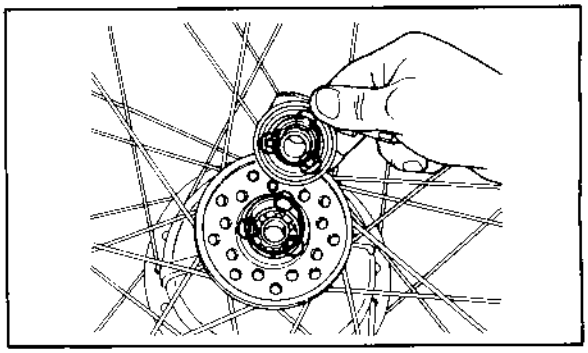
4. If a rim is severely "dinged" or bent, replace the rim.
5. After repairing or replacing a tire, check to be sure the valve-stem locknut is securely fastened. If not, torque it as specified.

TIGHTENING TORQUE:
1.5 Nm (0.15 m · kg, 1.1 ft · lb)

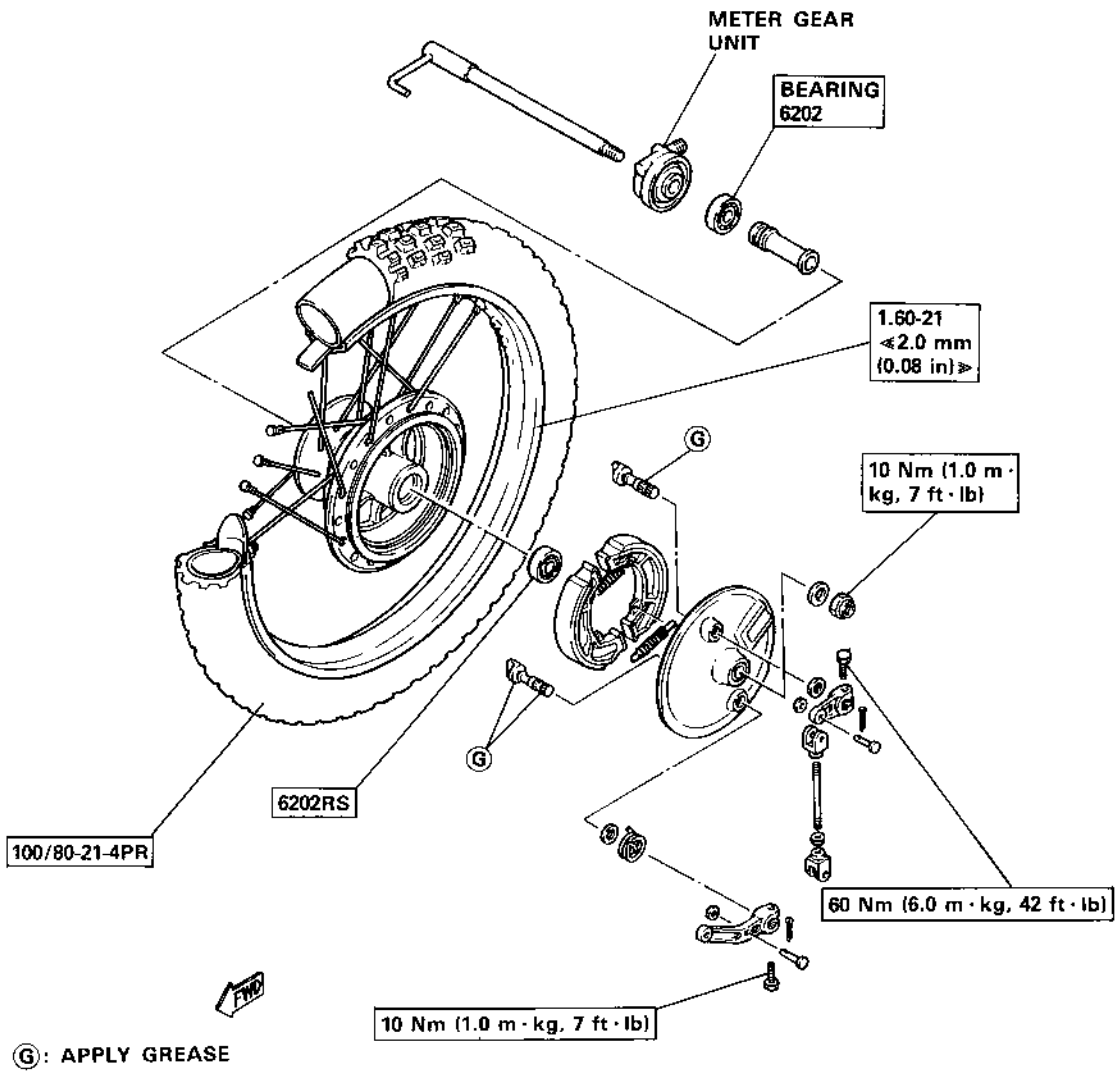
H. Front Wheel Installation

When installing the front wheel, reverse the removal procedure. Pay attention to the following points.

1. Make sure the three slots in the wheel hub are meshed with the three projections in the speedometer gear unit.



FRONT WHEEL



2. Be sure the boss on the outer fork tube correctly engages with the locating slot on the brake shoe plate.



3. Be sure the flat part on the gear unit assembly correctly engages with the front fork.



4. Tighten the axle nut and axle pinch bolt.

Axle nut torque: 60 Nm (6.0 m · kg, 43 ft · lb) Axle pinch bolt torque: 20 Nm (2.0 m · kg, 14 ft · lb)

5. Reinstall the brake cable and trip meter cable.
6. Adjust the play in the brake lever.

NOTE:

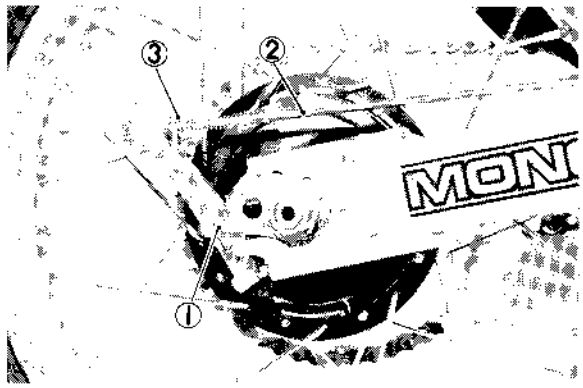
Always perform the following procedures when installing the front wheel shaft.

1. Tighten the front wheel shaft.
2. Lock the motorcycle by the front brake and push/pull the front forks several times by the handlebars, so that the forks will move smoothly.
3. Tighten the axle pinch bolt.

REAR WHEEL

A. Rear Wheel Removal

1. Elevate the rear wheel by placing a suitable stand under the engine.
2. Remove the brake rod from the brake shoe plate. The brake rod can be removed by moving the spring seat forward.
3. Remove the rear wheel axle nut.
4. The rear wheel assembly, the collar, the chain puller(s), etc., can be removed from the motorcycle by pulling the wheel axle.

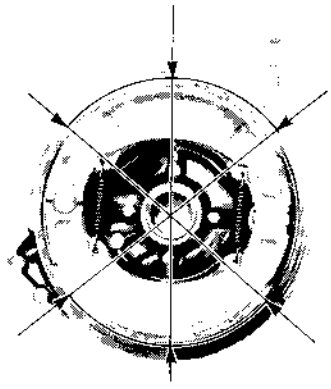


1. Chain puller 2. Brake rod 3. Spring seat

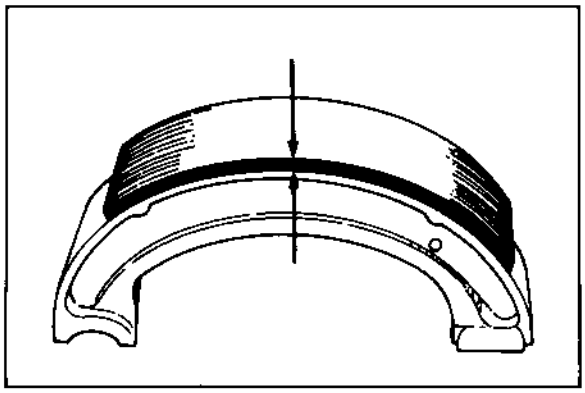
B. Brake Shoe Inspection

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

Brake shoe diameter: 129 mm (5.08 in) Replacement limit: 125 mm (4.92 in)

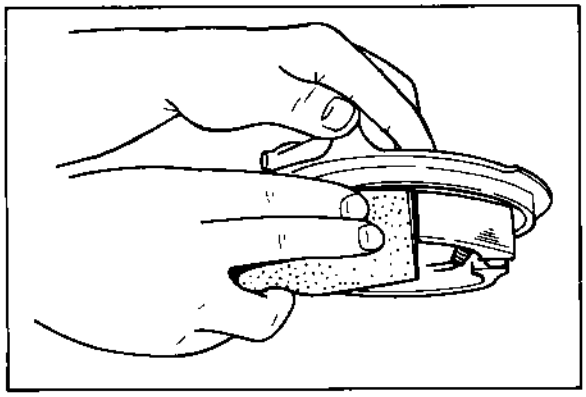


2. Measure the shoe thickness with slide calipers.
   If they measure less than replacement limit, replace them. Smooth out any rough spots on shoe surface with sandpaper.



Standard thickness	Min. allowable thickness
4 mm (0.16 in)	2 mm (0.08 in)

3. Remove any glazing from the brake shoes with coarse sandpaper.

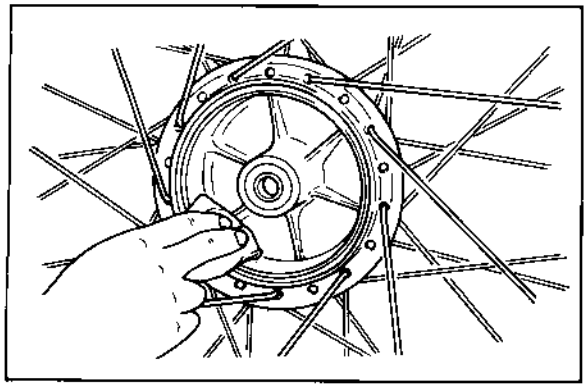


C. Brake Drum

Oil or scratches on the inner surface of the brake drum will impair braking performance or result in abnormal noises.

Remove oil by wiping with a rag soaked in lacquer thinner or solvent.

Remove scraches by lightly and evenly polishing with emery cloth.



D. Brake Shoe Plate

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

NOTE:

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

E. Rear Axle Inspection

Refer to "Front Axle Inspection".

F. Replacing Wheel Bearings

Rear wheel bearing replacement is similar to the procedure for the front wheel bearings.

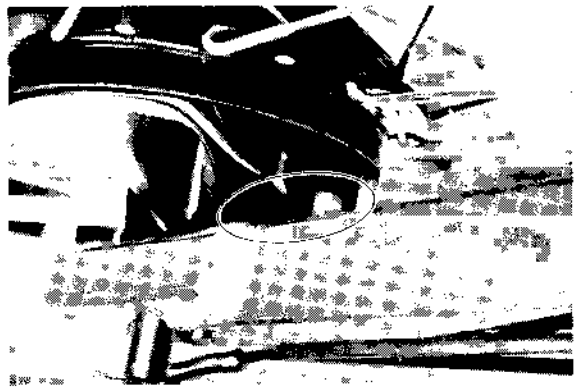
G. Rear Wheel Inspection

See "Front Wheel Inspection".

H. Installing Rear Wheel

When installing the rear wheel, reverse the removal procedure. Pay attention to the following points.

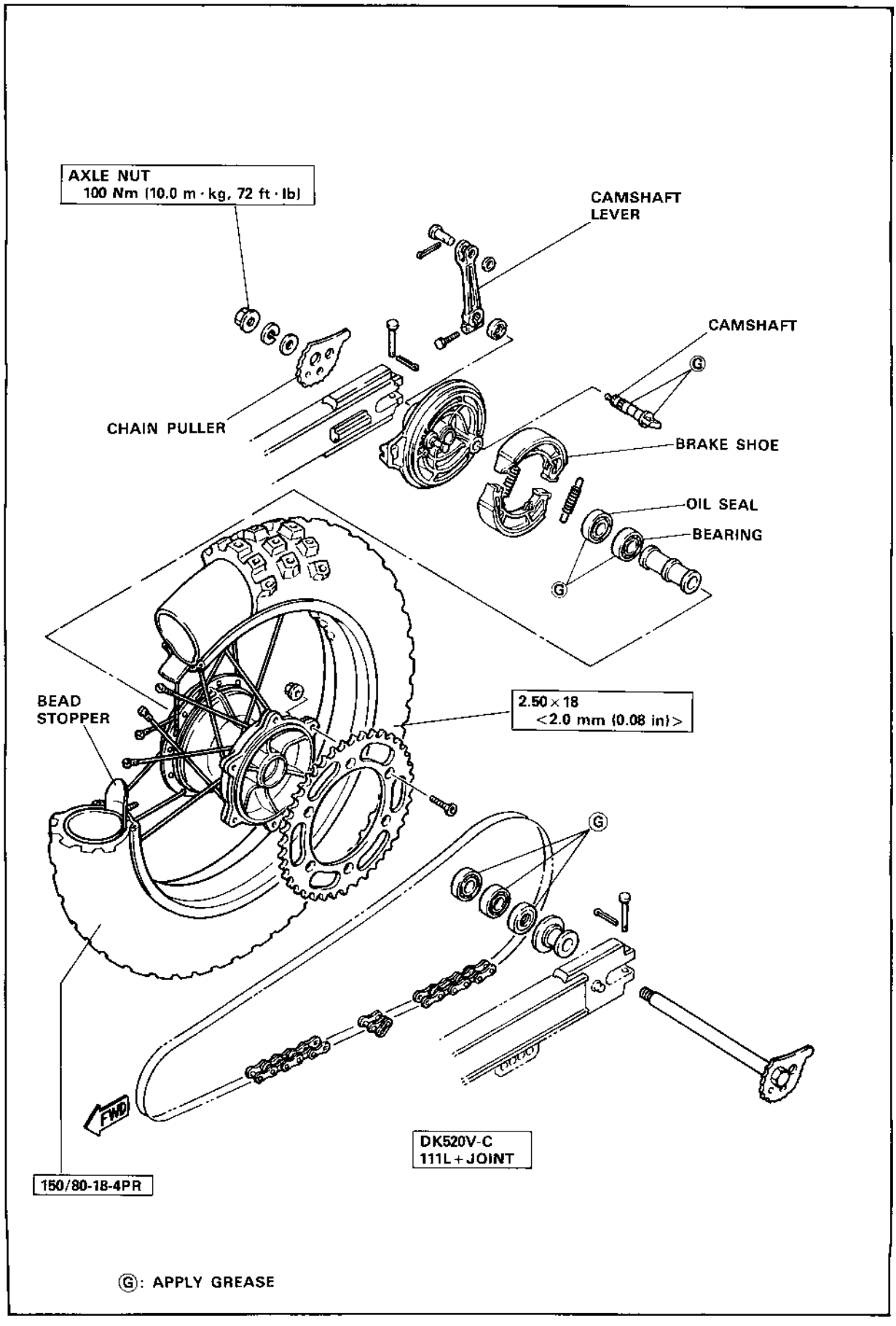
1. Be sure the swingarm boss correctly engages the locating slot on the brake shoe plate.



2. Make sure the right chain puller is installed with the number punched side outward.
3. Adjust the drive chain tension.
4. Tighten the axle nut.

Axle nut torque:
100 Nm (10.0 m · kg, 72 ft · lb)

5. Adjust the rear brake.



Ⓖ: APPLY GREASE

TIRES AND TUBES

A. Removal

1. Remove valve cap, valve core, and valve stem locknut. Loosen bead spacer(s), (rim locks).
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.

NOTE:

If you are changing the tire itself, then finish the removal by working the second bead off the rim.

B. Installation

Reinstalling the tire and tube can be accomplished by reversing the disassembly procedure. The only difference in procedure would be right after the tube has been installed. 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 Tire Pressure:

Off-Road Riding	98.1 kPa (1.0 kg/cm^2, 14 psi)

Rear Tire Pressure:

Off-Road Riding	98.1 kPa (1.0 kg/cm^2, 14 psi)

SPROCKETS AND DRIVE CHAIN

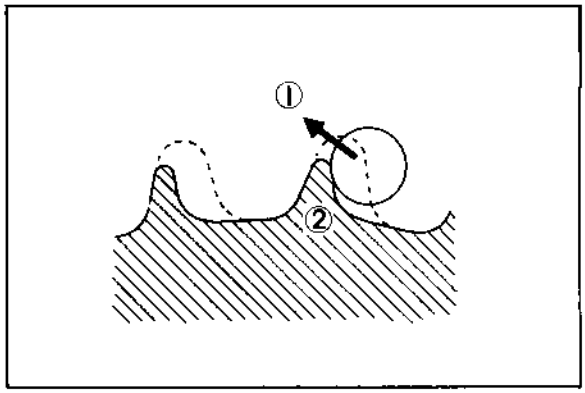
NOTE:

Please refer to Maintenance Interval and Lubrication Interval charts for additional information.

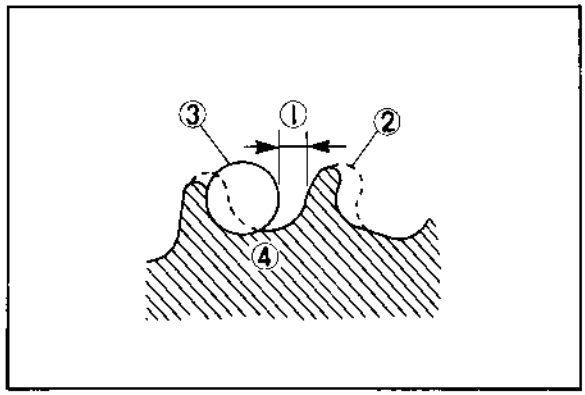
A. Drive Sprocket

With the left crankcase cover removed proceed as follows:

Inspect the teeth on the sprocket; if they are worn as shown in the illustrations below, replace the sprockets and chain as a set.



1. Slip off 2. Bend teeth

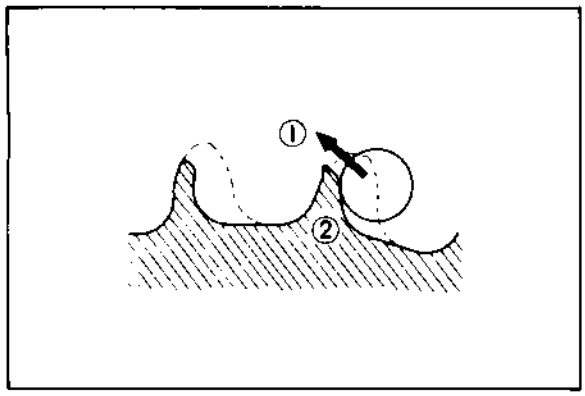


1. 1/4 tooth 2. Correct 3. Roller 4. Sprocket

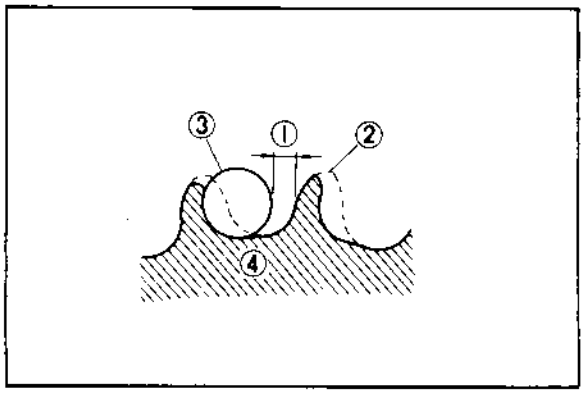
Drive Sprocket Securing Bolt Torque:
10 Nm (1.0 m · kg, 7.2 ft · lb)

B. Driven Sprocket

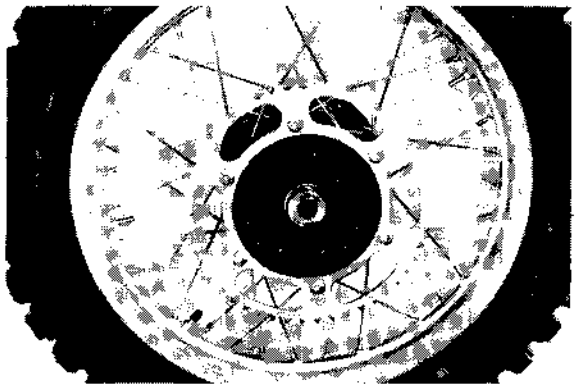
Inspect the teeth on the sprocket; if they are worn as shown in the illustration below, replace the sprockets and chain as a set.



1. Slip off
2. Bent teeth



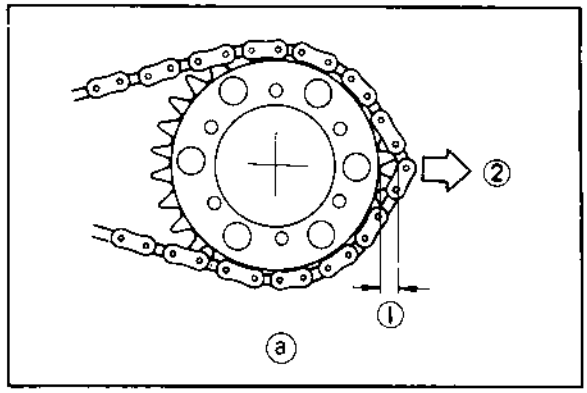
1. 1/4 tooth
2. Correct
3. Roller
4. Sprocket



Driven Sprocket Securing Bolt Torque:
30 Nm (3.0 m · kg, 2.2 ft · lb)

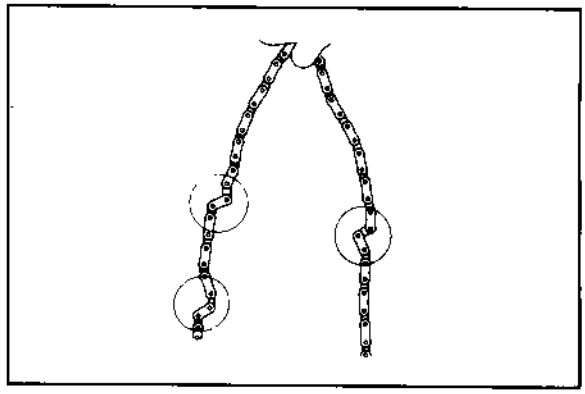
C. Chain Inspection

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.

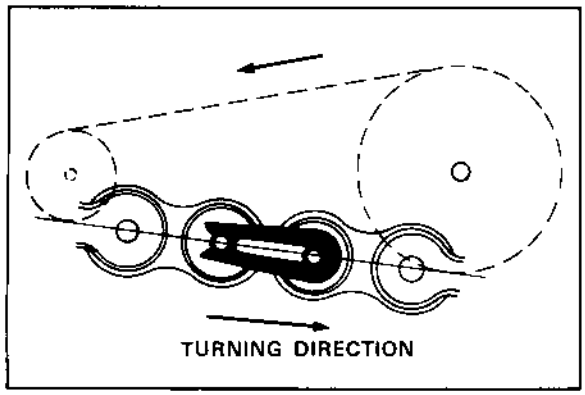


a. Checking for excessively worn chain
1. 1/2 tooth
2. Pull

2. Check the chain for stiffness. Hold as illustrated. If stiff, soak in solvent solution, clean with wire brush and dry with high pressure air. Oil chain thoroughly and attempt to work out kinks. If still stiff, replace.



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.
4. During reassembly, the master link clip must be installed with the rounded end facing the direction of travel.



D. Chain Maintenance

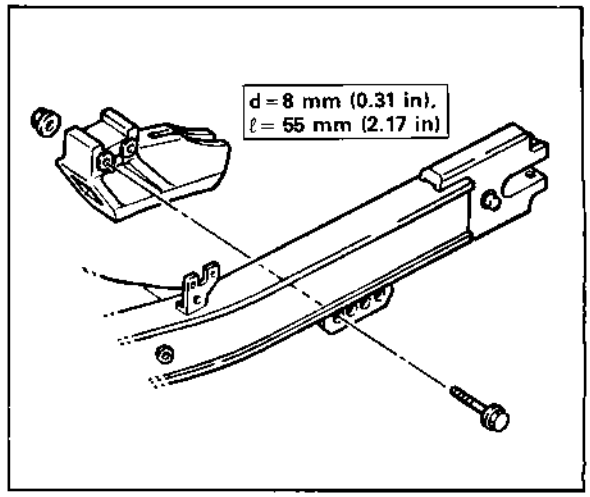
The chain should be lubricated according to the recommendations given in the Maintenance and Lubrication Interval charts, or more often if possible. (Preferably after every use.) See "Chassis and Suspension, Swingarm", for additional information regarding chain guide.

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.

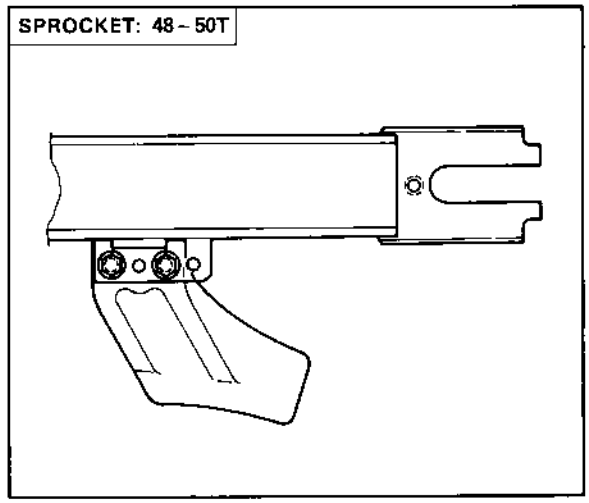
Recommended lubricant:
YAMAHA CHAIN AND CABLE LUBE, or SAE 10W30 type SE motor oil

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.

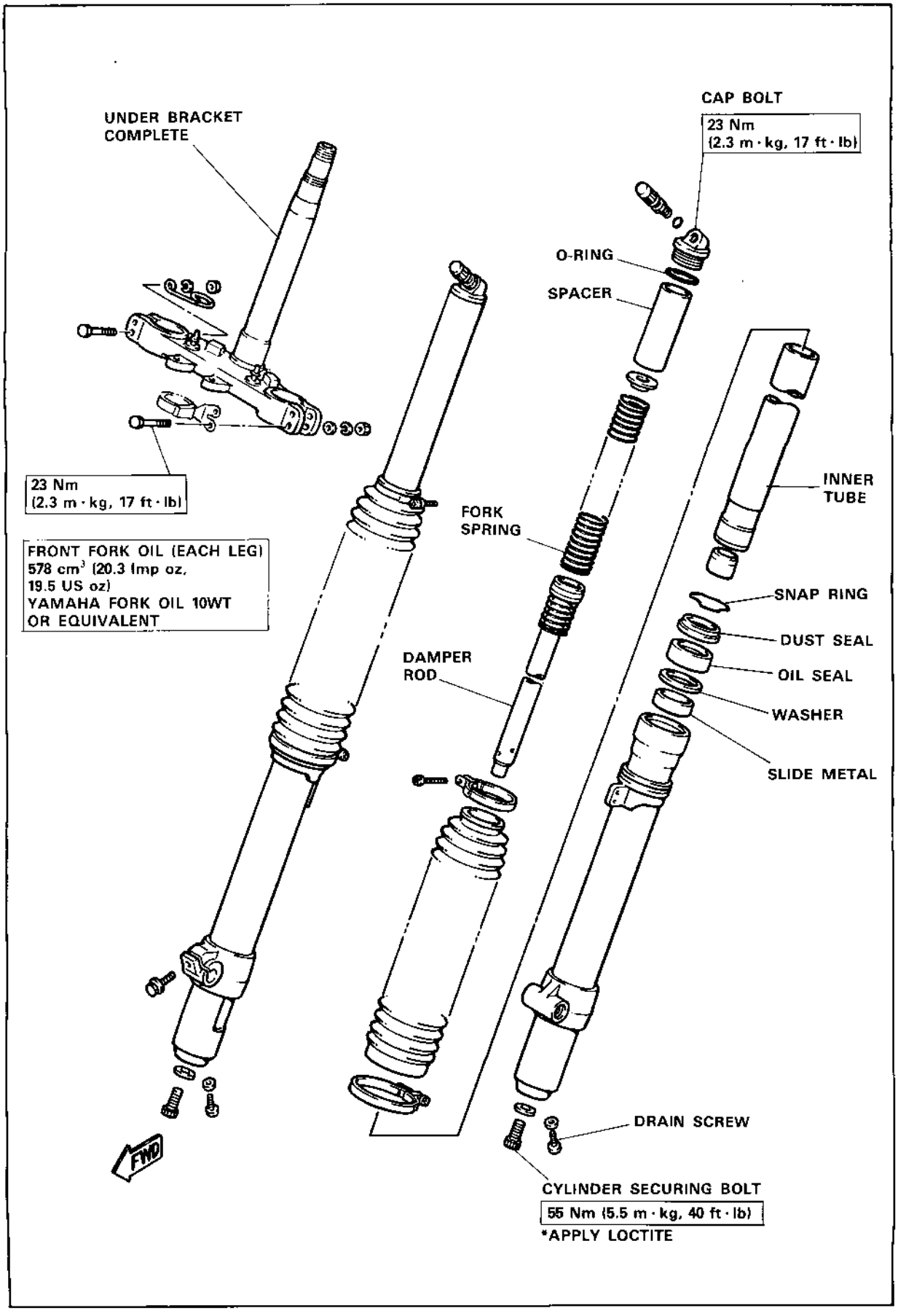
E. Chain Support Installation



The chain support position should be properly changed depending on the sprocket size.



FRONT FORK

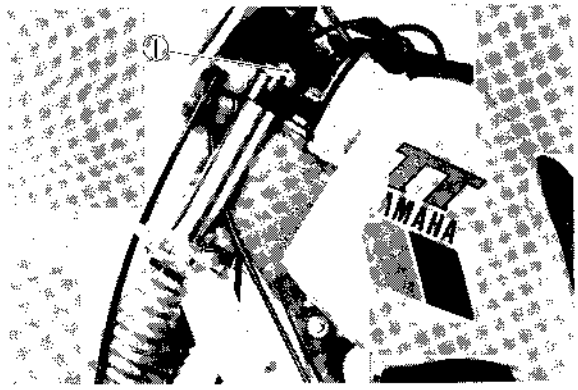

UNDER BRACKET COMPLETE
CAP BOLT
23 Nm (2.3 m · kg, 17 ft · lb)
O-RING
SPACER
23 Nm (2.3 m · kg, 17 ft · lb)
FRONT FORK OIL (EACH LEG)
578 cm³ (20.3 Imp oz, 19.5 US oz)
YAMAHA FORK OIL 10WT OR EQUIVALENT
FORK SPRING
INNER TUBE
SNAP RING
DUST SEAL
OIL SEAL
WASHER
SLIDE METAL
DAMPER ROD
DRAIN SCREW
FWD
CYLINDER SECURING BOLT
55 Nm (5.5 m · kg, 40 ft · lb)
*APPLY LOCTITE

A. Removal and Disassembly

WARNING:

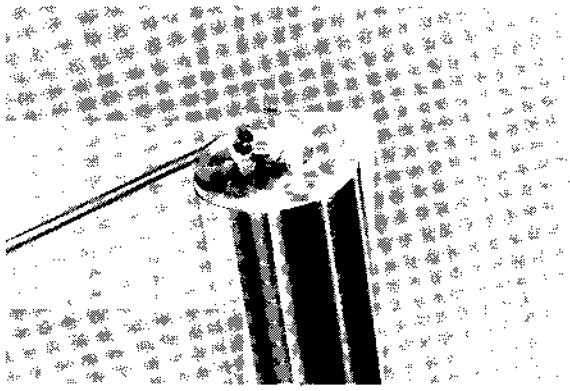
Securely support the motorcycle so there is no danger of it falling over.

1. Disconnect the trip meter cable. Remove the brake drum and the front wheel.
2. Loosen the cap bolt and fork pinch bolts.



1. Cap bolt

3. Remove the forks pulling downward.
4. Remove the rubber boot.
5. Keep the air valve open by pressing it for several seconds so that the air can be let out of the inner fork tube.



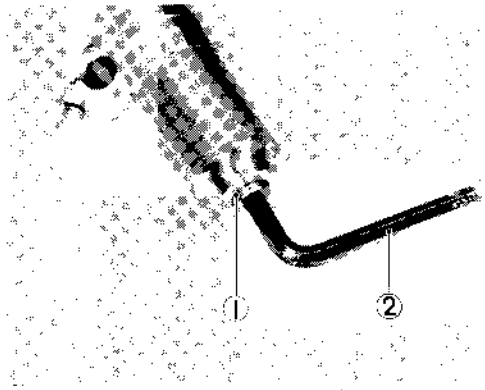
6. Remove the cap bolt and drain the oil.

NOTE:

Be careful not to allow the cap bolt jumps out of the fork tube, when loosening it.

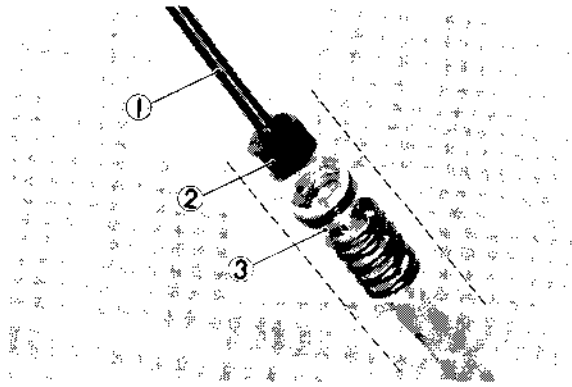


7. Remove the cylinder securing bolt from the bottom of the fork assembly. Hold the inner tube with the front-fork-cylinder holder (special tool P/N. YM-33962). Pull the inner fork tube from the outer fork tube.



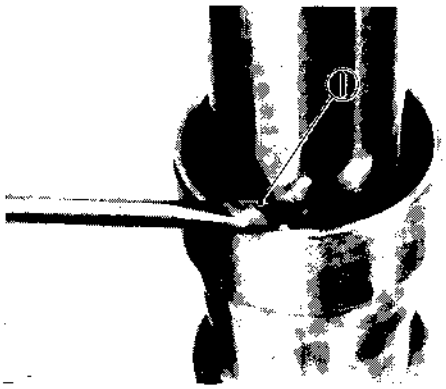
1. Cylinder securing bolt 2. Hex. wrench

(Inner view)

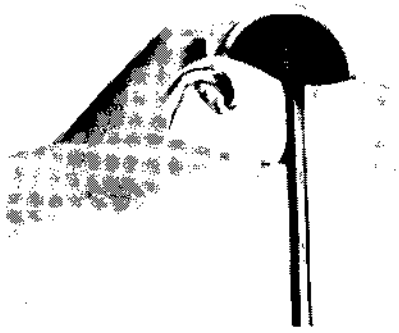


1. T-handle (P/N. YM-01326)
2. Front fork cylinder holder (P/N. YM-33962)
3. Front fork cylinder (Damper rod)

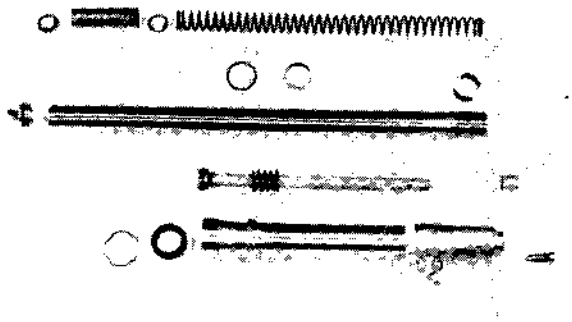
8. Remove the snap ring from the outer fork tube, and pry out the fork seal. Be careful not to damage the fork tube surface.



1. Snap ring



B. Inspection



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

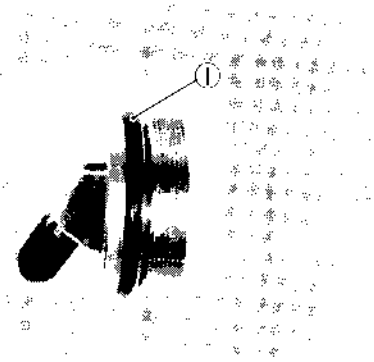
WARNING:

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

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

Fork spring free length:
527 mm (20.7 in)

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



1. O-ring

C. Reassembly

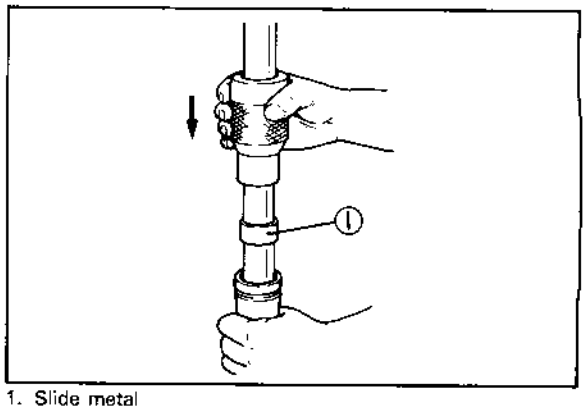
The assembly procedure is the reverse of the disassembly procedure.

Pay attention to the following points.

1. Make sure all components are clean before assembly. Always install a new fork seal. Do not re-use a seal.
2. Apply Loctite to the threads of the cylinder securing bolt, and reinstall the bolt. Using the front fork cylinder holder (P/N. YM-33962), torque the securing bolt to specification.

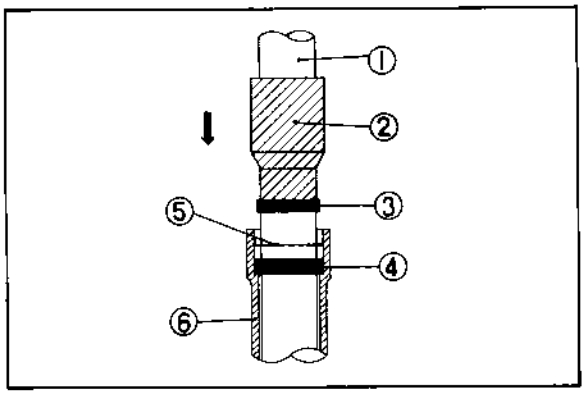
Securing bolt torque:
55 Nm (5.5 m·kg, 40 ft·lb)

3. Install the slide metal using the fork seal driver set (P/N. YM-08020).



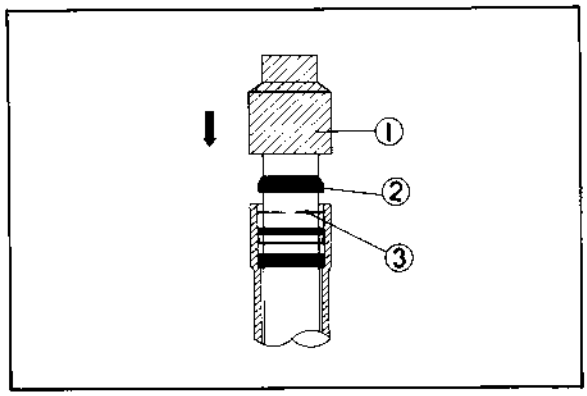
1. Slide metal

4. Install a new seal spacer, making sure the beveled edge faces upward.
5. Oil and install a new oil seal in the top of the slider with the special tool; see illustration.



1. Inner tube
2. Special tools
3. Oil seal
4. Slide metal
5. Washer
6. Outer tube

6. Install the circlip, and gently tap the dust seal into place with the special tool; see illustration.



1. Special tool
2. Dust seal
3. Circlip

7. Measure the correct amount of oil and pour it into each leg. After filling, allow it a few minutes and slowly pump the inner tube up and down 2 or 3 times so that air can be extracted from the oil.

Recommended oil:
SAE 20W40 type SE motor oil
Oil quantity:
578 cm^3 (20.3 Imp oz, 19.5 US oz)

8. Reinstall the spring , spring seat, spacer, seat and cap bolt in that order, and tighten the cap bolt.

NOTE:

When installing the fork spring, be sure that the spring seat attached end is at the bottom.

TIGHTENING TORQUE:
23 Nm (2.3 m·kg, 17 ft·lb)

9. Fill the fork with air using a manual air pump or a pressurized air supply.

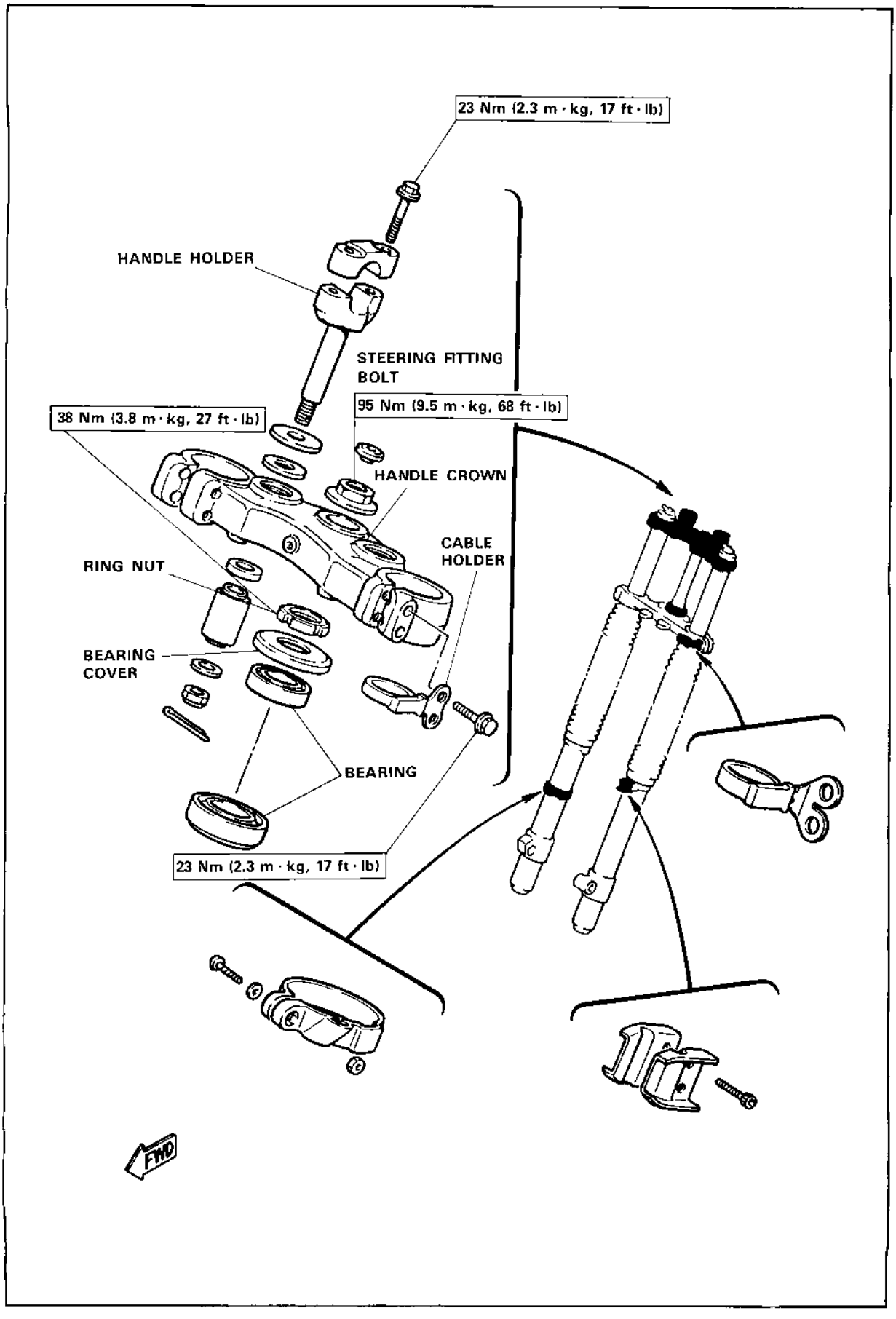
Standard air pressure:
0 kPa (0 kg/cm^2, 0 psi)
Maximum air pressure:
117.6 kPa (1.2 kg/cm^2, 17.1 psi)
Do not exceed this amount.

10. Check all suspension components for proper operation.
11. Check all suspension fittings for proper tightness.

Front spring

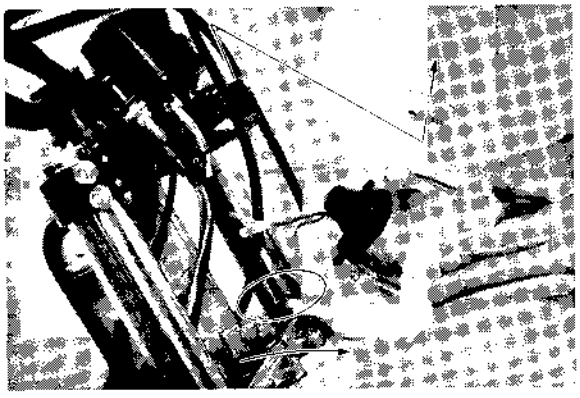
STD	Spring	K = 2.84 N/mm (0.29 kg/mm, 16.2 lb/in) L = 528 mm (20.8 in)
	Collar	L = 110 mm (4.33 in) (5X6-23118-M0)

STEERING HEAD

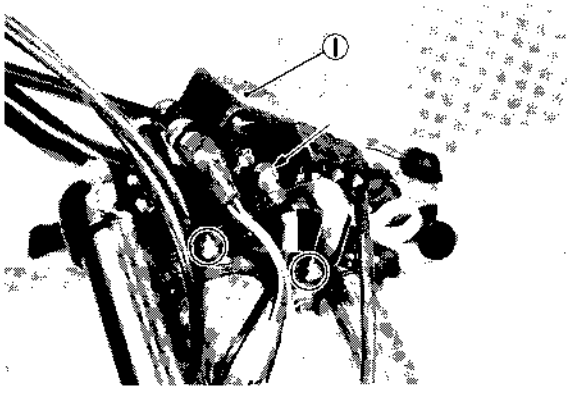


A. Removal

1. Disconnect the lead wires and remove the headlight assembly.

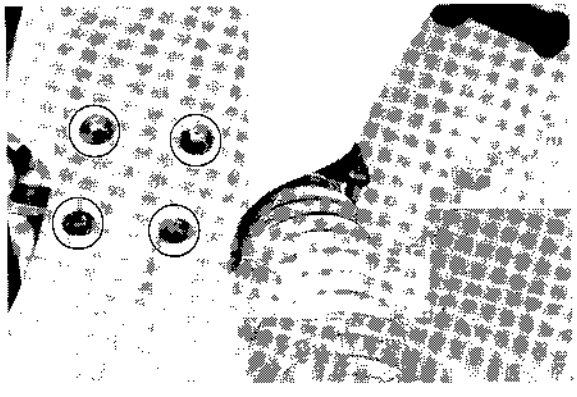


2. Remove the trip meter and meter cable.

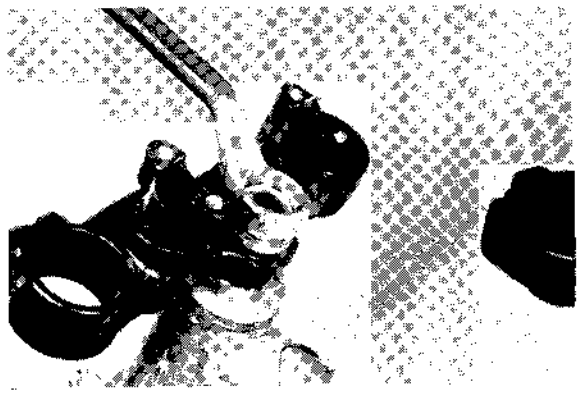


1. Trip meter

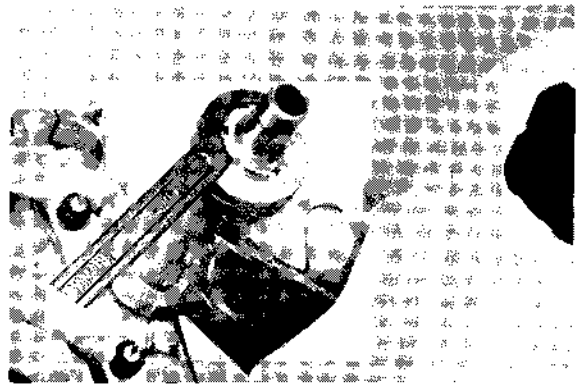
3. Remove the front wheel.
4. Remove the front fender.



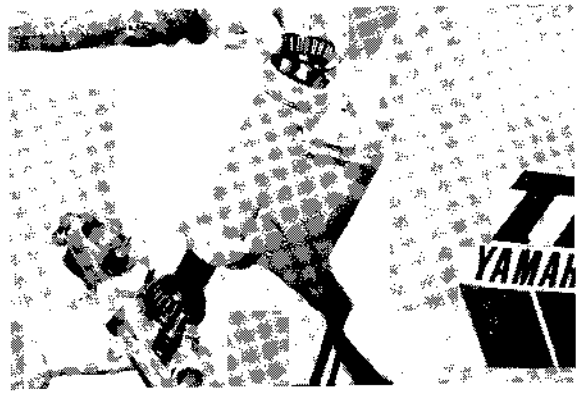
5. Remove the handlebars.
6. Remove the front fork assembly.
7. Remove the steering fitting bolt, and remove the handle crown.



8. Remove the ring nut, supporting the under bracket so that it may not fall down.



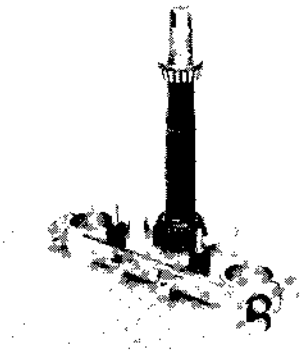
9. Remove the bearing cover and the upper and lower bearings.



B. Inspection

1. Wash the bearings in solvent.
2. Inspect the bearings for pitting or other damage. Replace the bearings if pitted or damaged. Replace the races when bearings are replaced.
3. Clean and inspect the bearing races. If races are damaged, replaces the races and bearings.

4. Install the bearings in the races. Spin the bearings by hand. If the bearings hang up or are not smooth in their operation in the races, replace bearings and races.

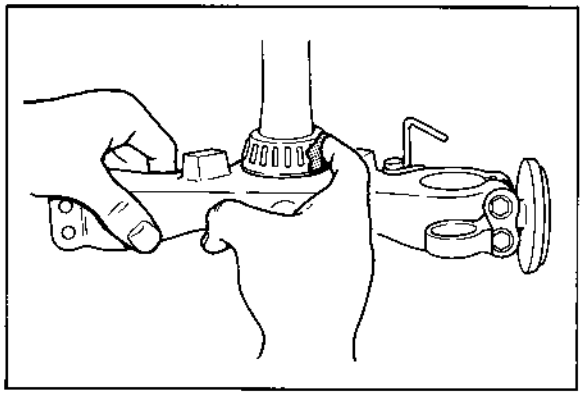


C. Assembly

The assembly procedure is the reverse of the removal procedure.

Pay attention to the following point.

1. Grease the bearings and races with wheel bearing grease.



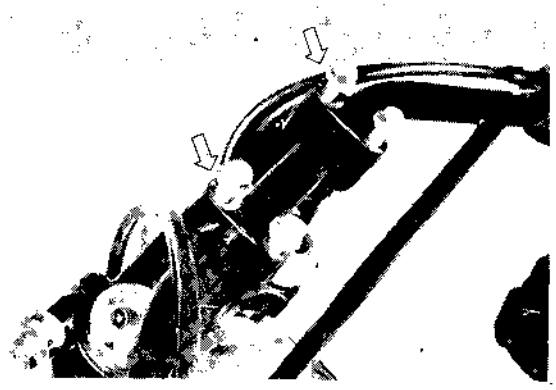
2. Tighten the steering ring nut.

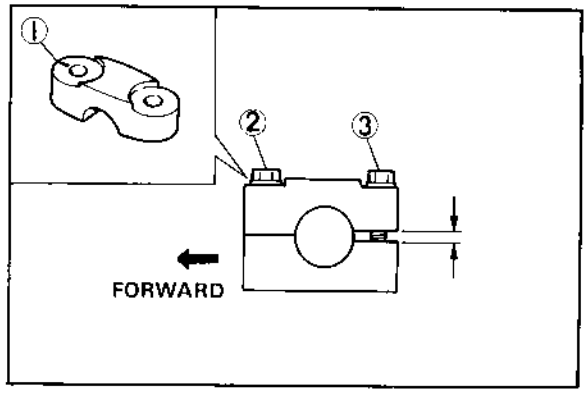
TIGHTENING TORQUE:
38 Nm (3.8 m · kg, 27 ft · lb)

3. When assembly is complete, check the under bracket by turning it from lock to lock. If there is any binding or looseness, readjust the tightness of the under bracket.

TIGHTENING TORQUE:
Front fork pinch bolt:
23 Nm (2.3 m · kg, 17 ft · lb)
Steering fitting bolt:
95 Nm (9.5 m · kg, 68 ft · lb)

4. Install the handle upper holder with the punched mark forward and tighten the front bolts first.

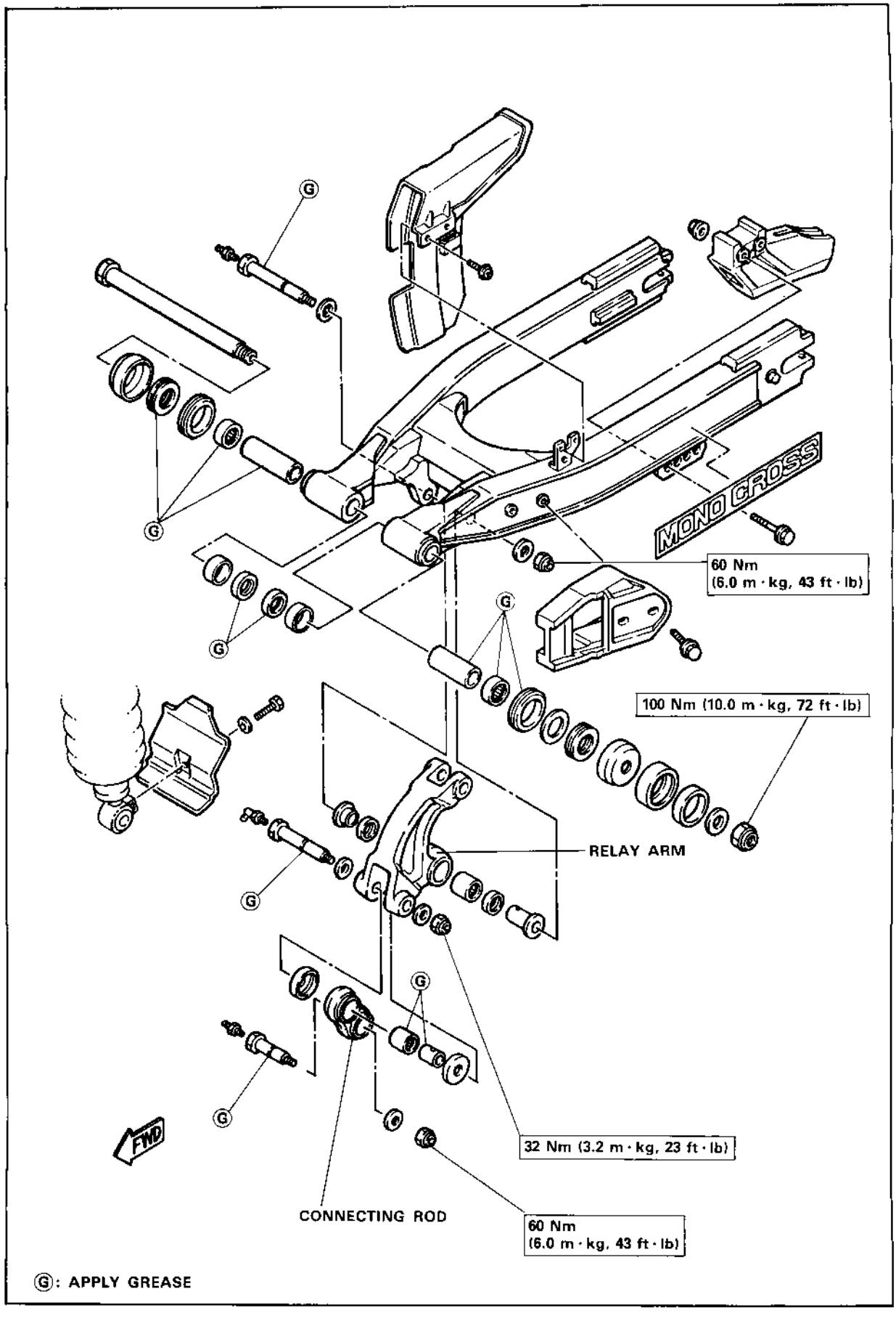




1. Punched mark 2. 1st 3. 2nd

TIGHTENING TORQUE:
23 Nm (2.3 m · kg, 17 ft · lb)

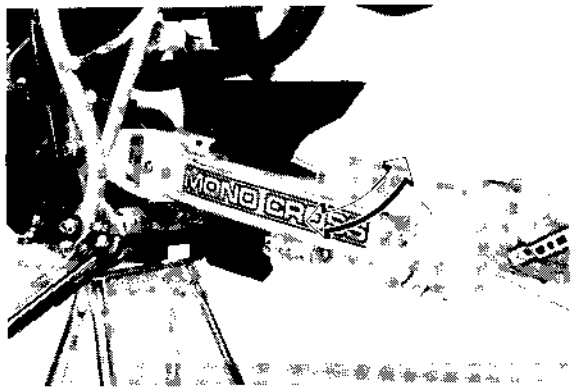
SWINGARM


MONO CROSS
60 Nm
(6.0 m · kg, 43 ft · lb)
100 Nm (10.0 m · kg, 72 ft · lb)
RELAY ARM
32 Nm (3.2 m · kg, 23 ft · lb)
CONNECTING ROD
60 Nm
(6.0 m · kg, 43 ft · lb)
FWD
Ⓖ: APPLY GREASE

A. Free Play Inspection

1. Remove the rear wheel and the shock absorber. Grasp the swingarm and try to move it from side to side as shown. Check for free play.

Swingarm free play: 0 ~ 1.0 mm (0 ~ 0.04 in) at end of swingarm

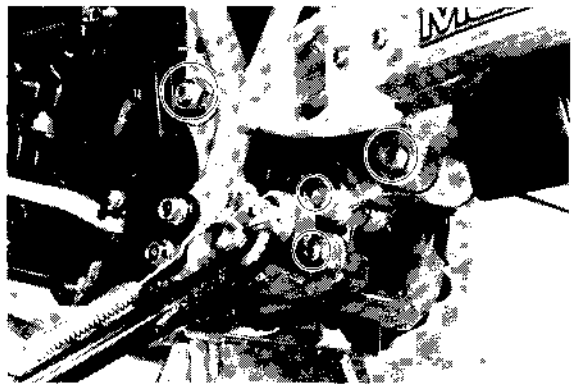


2. If free play is excessive, remove the swingarm and replace the bushings or bearings. Replace the thrust cover or oil seals if necessary.
3. The swingarm is mounted on needle bearings and bushings. Move the swingarm up and down as shown. The swingarm should move smoothly, without tightness, binding, or rough spots that could indicate damaged bearings.

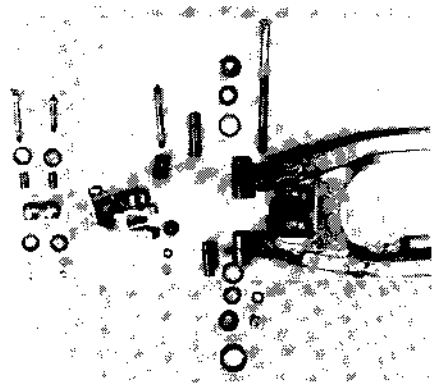


B. Removal

1. Remove the seat and the rear wheel.
2. Loosen and remove the all bolts securing the swingarm and relay arm.

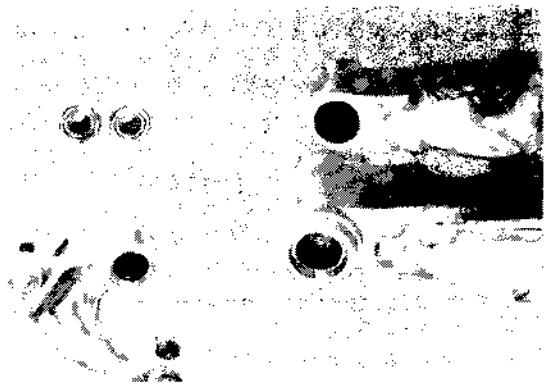


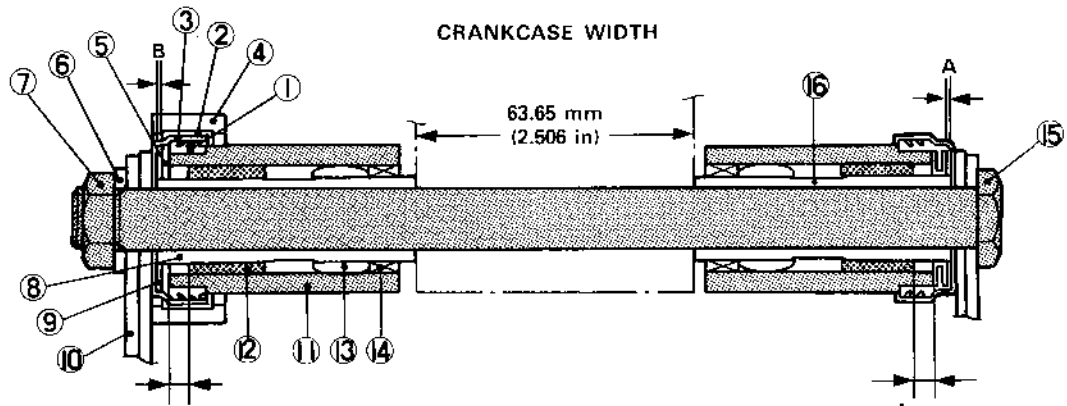
3. Remove the swingarm and relay arm.



C. Inspection and Lubrication

1. Examine the thrust covers and oil seals. Replace if they are damaged.
2. Inspect the bearings and bushings in the swingarm member for scratches on other damage.
   Make sure that the needle bearing rolls freely.
   If the bearings or bushings are damaged, they should be replaced.





1. Oil seal
2. Collar
3. Dust cover
4. Guard seal
5. Bearing
6. Plane washer
7. Self-locking nut
8. Solid bush
9. Shim
10. Frame
11. Swingarm
12. Bearing
13. Solid bush
14. Oil seal
15. Pivot shaft
16. Solid bush

NOTE:

When pressing the new bearings and bushings, pay attention to the following:

1. Bearings should be exactly located as shown in the illustration. [4 mm (0.16 in) from each side]
2. Grease them liberally with lithium-base waterproof wheel bearing grease.

3. Measure the swingarm/side clearance "A + B".

Specified clearance:
A + B = 0.1 ~ 0.3 mm
(0.004 ~ 0.012 in)

4. Use shims to adjust the clearance if necessary.

NOTE:

When using shims to adjust the clearance, they should be installed on the left side.

If the side clearance is not within specification, adjust it by means of shims.
If only one shim is used, install it on the right side. Two shims must be installed on both sides.

Swingarm side clearance:
0.1 ~ 0.3 mm (0.004 ~ 0.012 in)

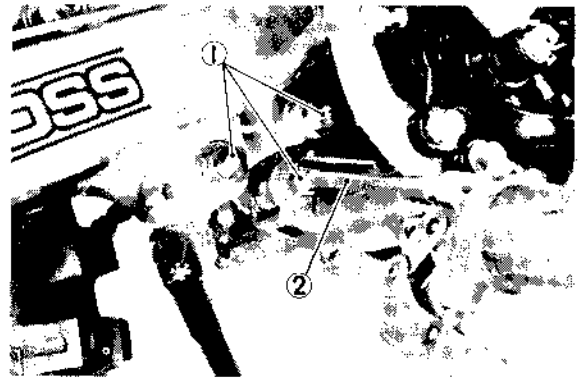
5. Grease the swingarm periodically.

D. Assembly

1. Assemble the swringarm by reversing the removal procedures. Torque the swingarm and relay arm pivot bolt to specification.

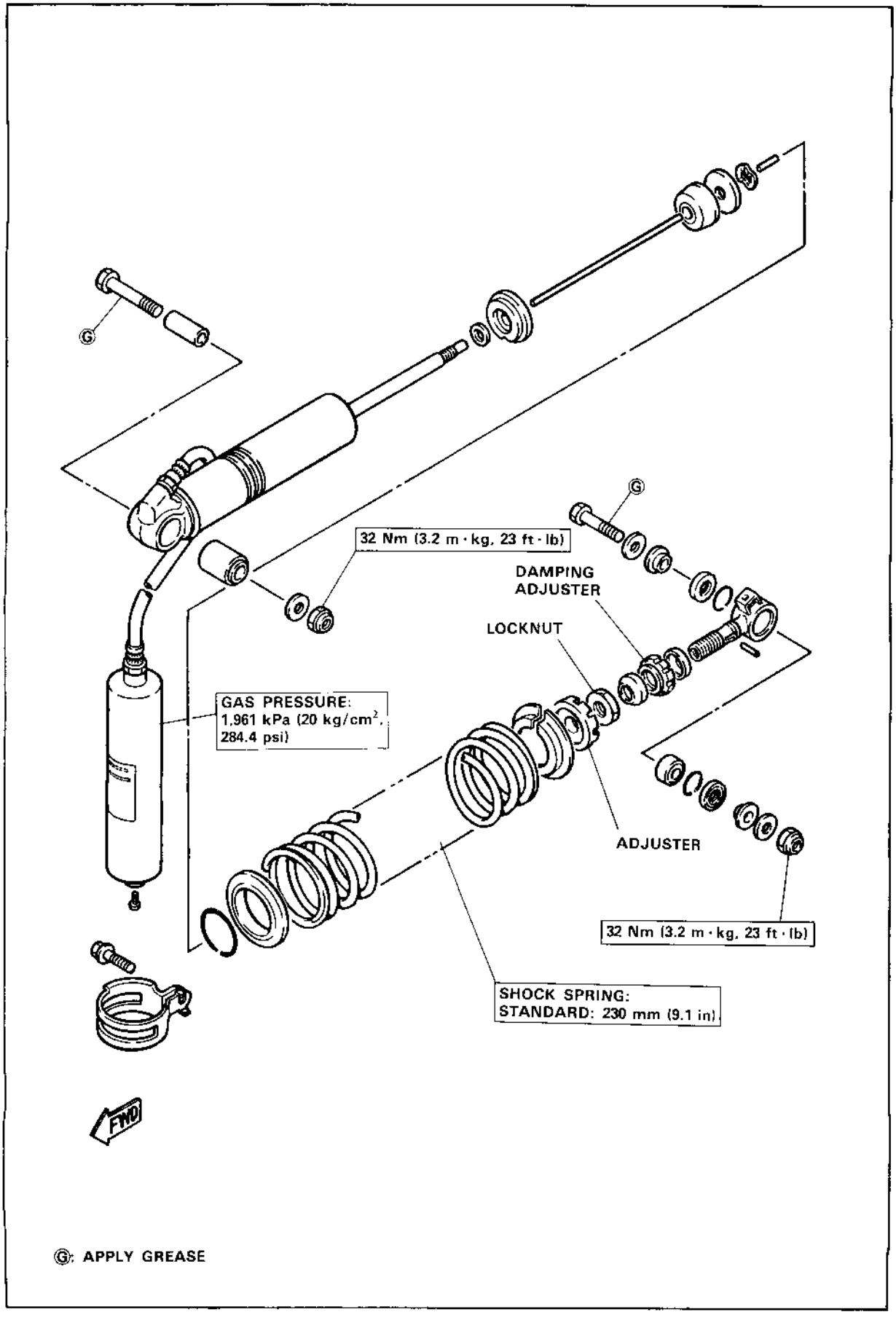
	Nm	m · kg	ft · lb
M10 bolt	32	3.2	23
M12 bolt	59	5.9	43
Pivot Shaft	100	10.0	72

2. Using a grease gun, lubricate the relay arm pivot points.



1. Grease nipple 2. Grease gun

REAR SHOCK ABSORBER

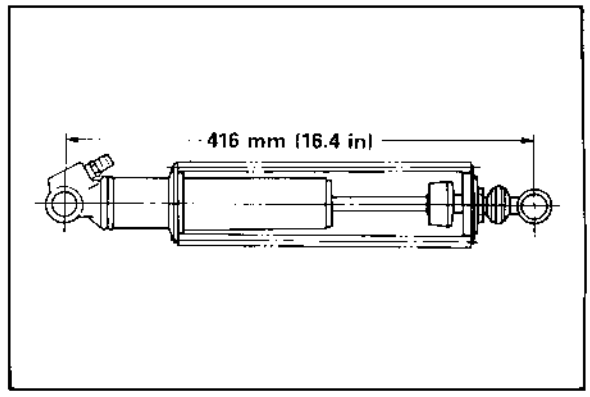


Handling notes

WARNING:

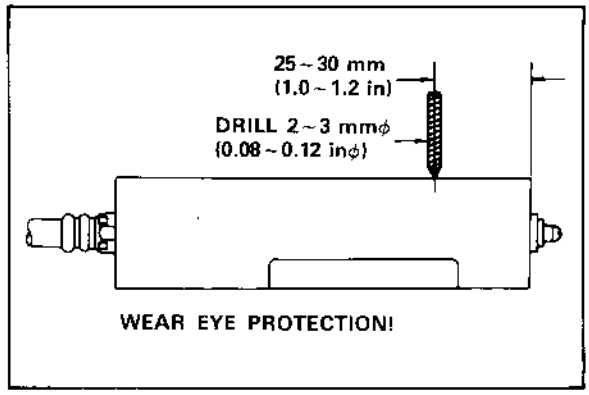
This shock absorber is provided with a separate type tank filled with high pressure nitrogen gas. To prevent the danger of explosion, read and understand the following information before handling the shock absorber.
The manufacturer can not be held responsible for property damage or personal injury that may result from improper handling.

1. **Never tamper or attempt to disassemble the cylinder or the tank. Never tamper with the nut securing the hose to the cylinder assembly; otherwise, oil will spurt from the cylinder due to the high pressure in the nitrogen gas tank.**
2. **Never throw the shock absober into an open flame or other high heat. The shock absorber may explode as a result of nitrogen gas expansion and/or damage to the hose.**
3. **Be careful not to damage any part of the gas tank. A damaged gas tank will impair the damping performance or cause a malfunction.**
4. **Take care not to damage any part of the hose. Any break in the hose may result in a spurt of oil under highpressure.**
5. **Take care not to scratch the contact surface of the piston rod with the cylinder; or oil could leak out.**
6. **Never attempt to remove the plug at the bottom of the nitrogen gas tank. It is very dangerous to remove the plug.**
7. **When scrapping the shock absorber, follow the instructions on disposal.**
8. **Don't use on this motorcycle any suspension whose free length exceeds 416 mm (16.4 in). Such unit causes malfunctioning suspension.**



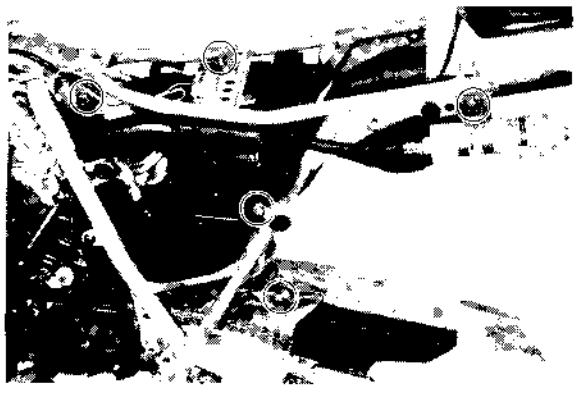
Notes on disposal

Before disposing the shock absorber, be sure to extract the nitrogen gas. To do so, drill a 2 or 3 mm (0.08 ~ 0.12 in) hole through the tank at a position 25 ~ 30 mm (1.0 ~ 1.2 in) from the bottom end of the tank. At this time, wear eye protection to prevent eye damage from escaping gas and/or metal clips.

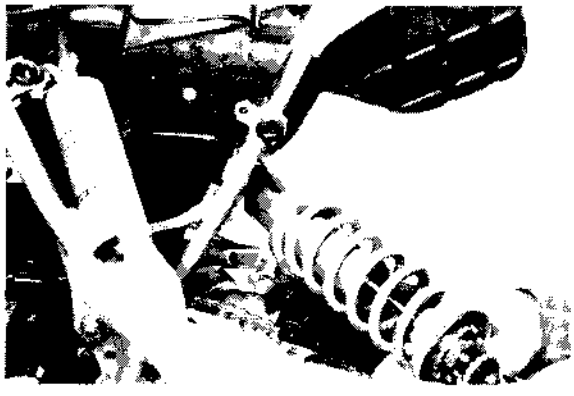


A. Removal

1. Remove the seat and the fuel tank.
2. Remove the rear wheel.
3. Loosen and remove the bolts as shown below.

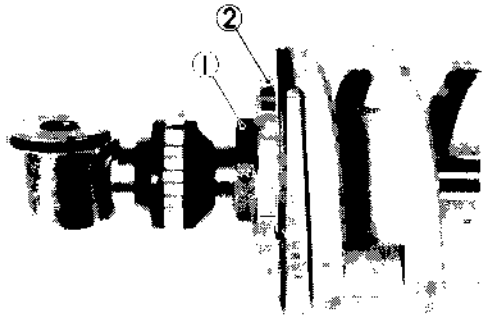


4. Carefully remove the shock absorber from the frame; take care to avoid damaging the rubber hose or the shock reservoir.



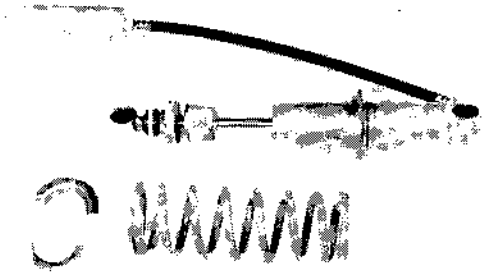


5. Loosen the locknut and loosen the adjuster. This will make it easy to remove the spring.



1. Locknut 2. Adjuster

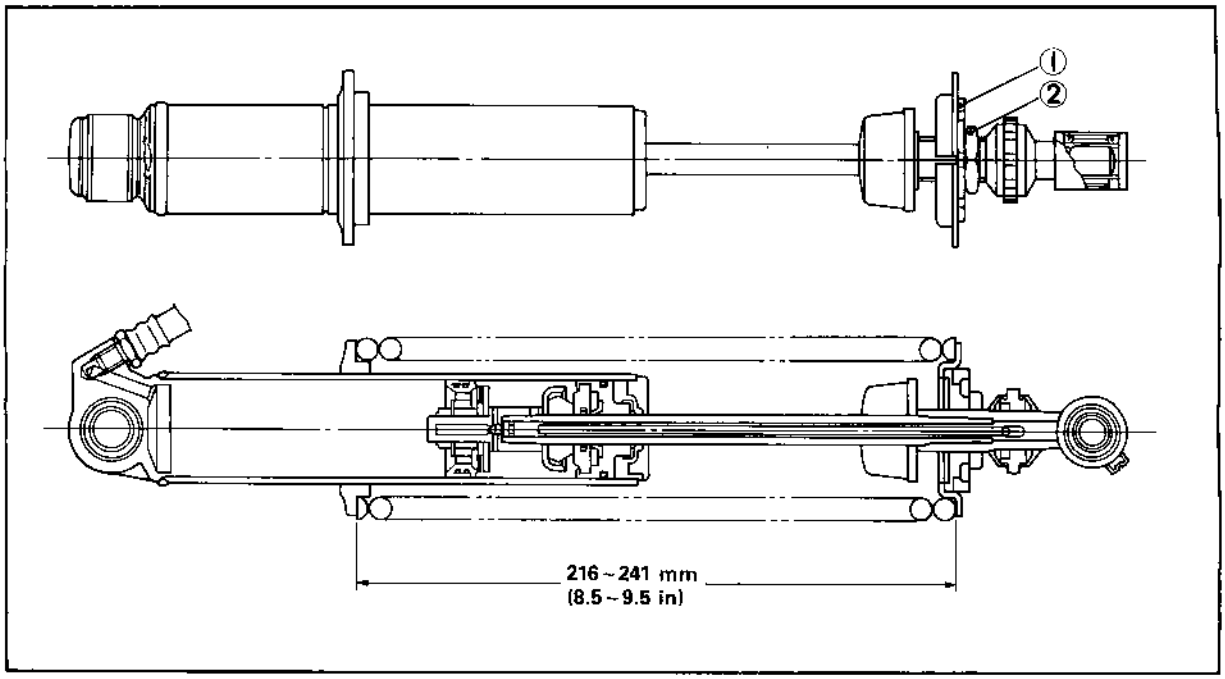
6. Push down the spring, remove the spring retainer, and remove the spring.



B. Inspection

1. Check the rod, and 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. By moving the spring, check to see if it has proper damping effect. Slight resistance should be felt on the compression (down) stroke and considerable resistance should be felt on the return (up) stroke.

C. Installation and Adjustment



1. Adjuster 2. Locknut

1. Install the spring and spring retainer, and turn to set the adjuster as shown in the illustaration.

Standard	230 mm (9.1 in)
Minimum	216 mm (8.5 in)
Maximum	241 mm (9.5 in)

The length of the spring (installed) changes 1 mm (0.04 in) per turn of the adjuster.

CAUTION:

Never attempt to turn the adjuster beyond the maximum or minimum setting.

2. Tighten the locknut.

TIGHTENING TORQUE: 55 Nm (5.5 m · kg, 40 ft · lb)

3. Apply grease to the pivot shafts.

CAUTION:

Wipe off any excessive grease, and avoid getting grease on the brake shoes.

4. Install the shock absorber on the motorcycle.
5. Tighten the nut to specification.

Upper bolt: 32 Nm (3.2 m · kg, 23 ft · lb)
Lower bolt: 32 Nm (3.2 m · kg, 23 ft · lb)

CABLES AND FITTINGS

A. Cable Maintenance

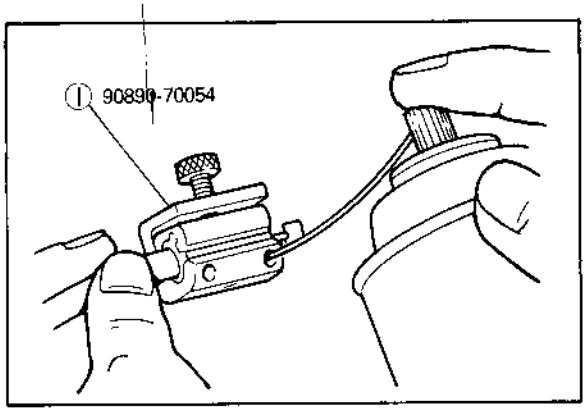
NOTE:

See "Maintenance and Lubrication" interval charts. Cable maintenance is primarily concerned with preventing deterioration and providing proper lubrication to allow the cable to move freely within its housing. Cable removal is straightforward and uncomplicated. Removal is not discussed within this section.

WARNING:

Cable routing is very important. For details of cable routing, see the cable routing diagrams at the end of this manual. Improperly routed or adjusted cables may make the motorcycle unsafe for operation.

1. Remove the cable.
2. Check for free movement of the cable within its housing. If movement is obstructed, check for frayed strands or kinking of the cable. If damage is evident, replace the cable.
3. Apply oil between the inner wire and outer cable.



1. Power cable injector

NOTE:

Choice of a lubricant depends upon conditions and preferences. However, a Yamaha chain and cable lubricant or its equivalent will perform adequately under most conditions.

B. Throttle Maintenance

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

NOTE:

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

5. Check for smooth throttle operation and quick spring return. Make certain that the housing does not rotate on the handlebar.

NOTE:

The starter lever has been installed on the lever holder with Loctite. When reinstalling the starter lever screw, always use a new screw.
Remove the old Loctite in the lever holder screw hole by using a 6 mm (0.24 in) screw tap.

C. Lubrication of Levers, Pedals, etc.

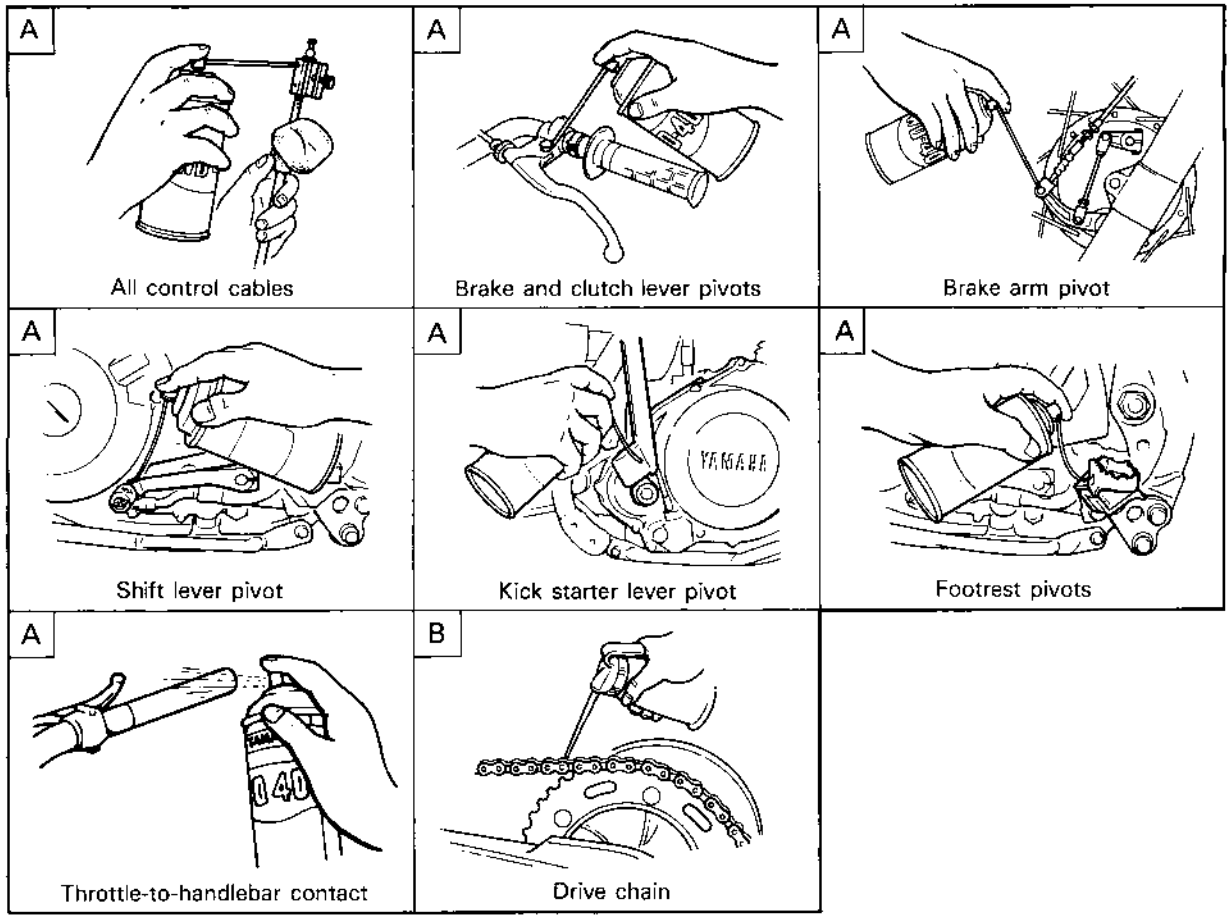
1. Lubricate the pivoting parts of the brake and clutch levers with motor oil (10W30).
2. Lubricate the shaft of the brake pedal with lithium grease.

LUBRICATION

To ensure smooth operation of all components, lubricate your motorcycle during setup, after break-in, and after every race.
Before lubricating, thoroughly clean the motorcycle of sand, dirt and water.

A. Use Yamaha cable lube or WD-40 on these areas.

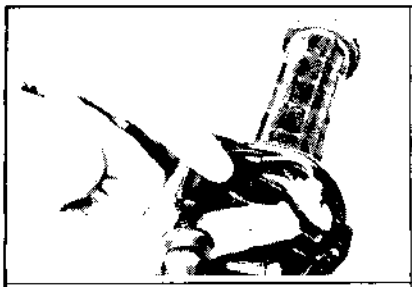
B. Use racing chain lube.



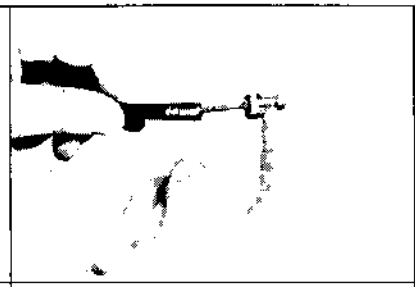
c. Lubricate the following areas with high-quality, *lithium* base grease:

CAUTION:

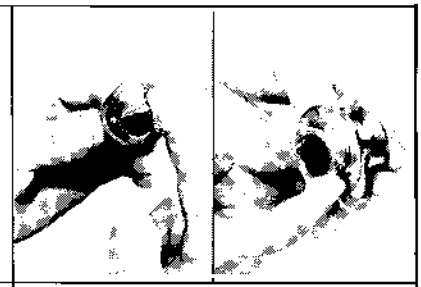
Wipe off any excessive grease, and avoid getting grease on the brake shoes.



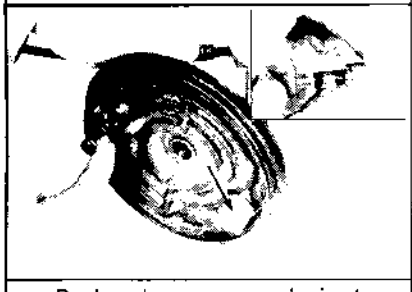
Throttle guide and wire end



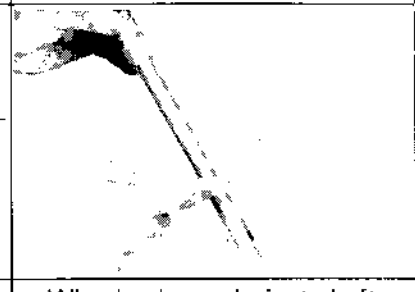
Brake and clutch wire ends



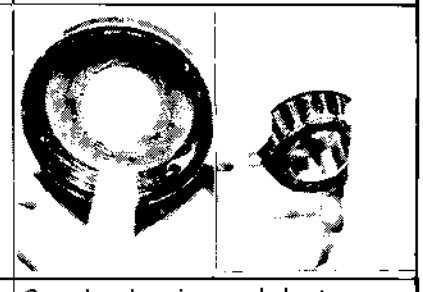
Wheel axle collar



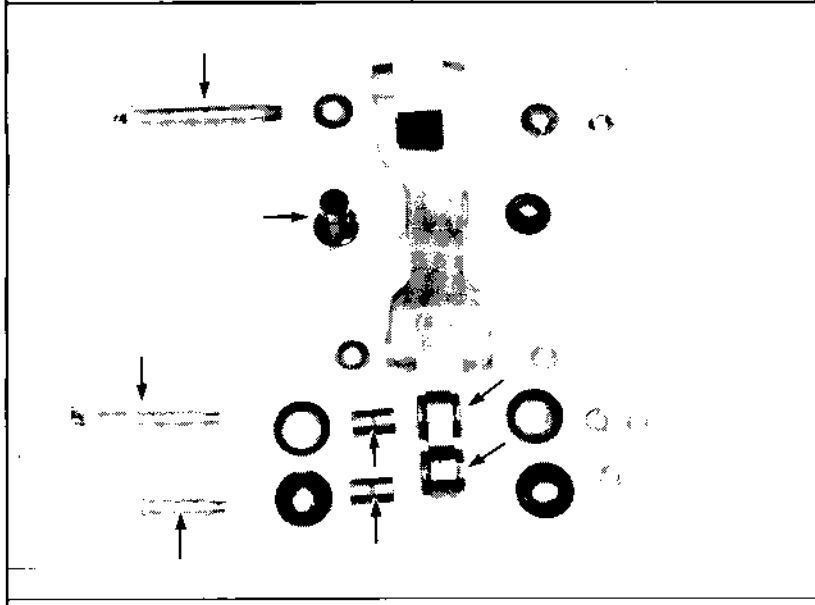
Brake shoe cam and pivot



Wheel axles and pivot shaft



Steering bearing and dust cover



Relay arm bearing and oil seal
Connecting rod bearing and oil seal



Rear brake backing plate bushing



Rear shock pivot (upper and lower)

CHAPTER 6 ELECTRICAL

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C. C.D.I. Unit Test 6-5
D. Troubleshooting 6-6

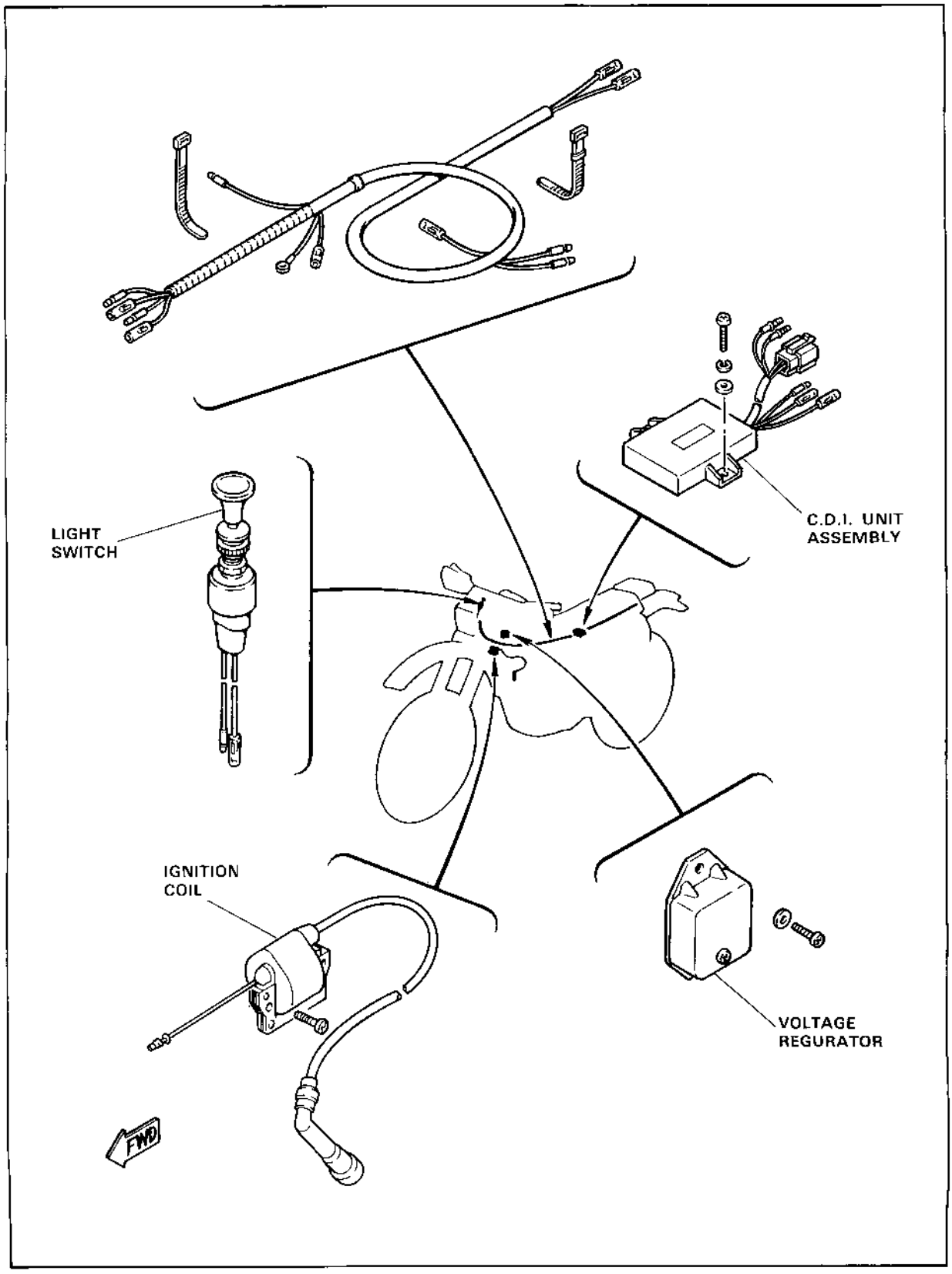
LIGHTING SYSTEM 6-9

A. Lighting Tests and Checks 6-10

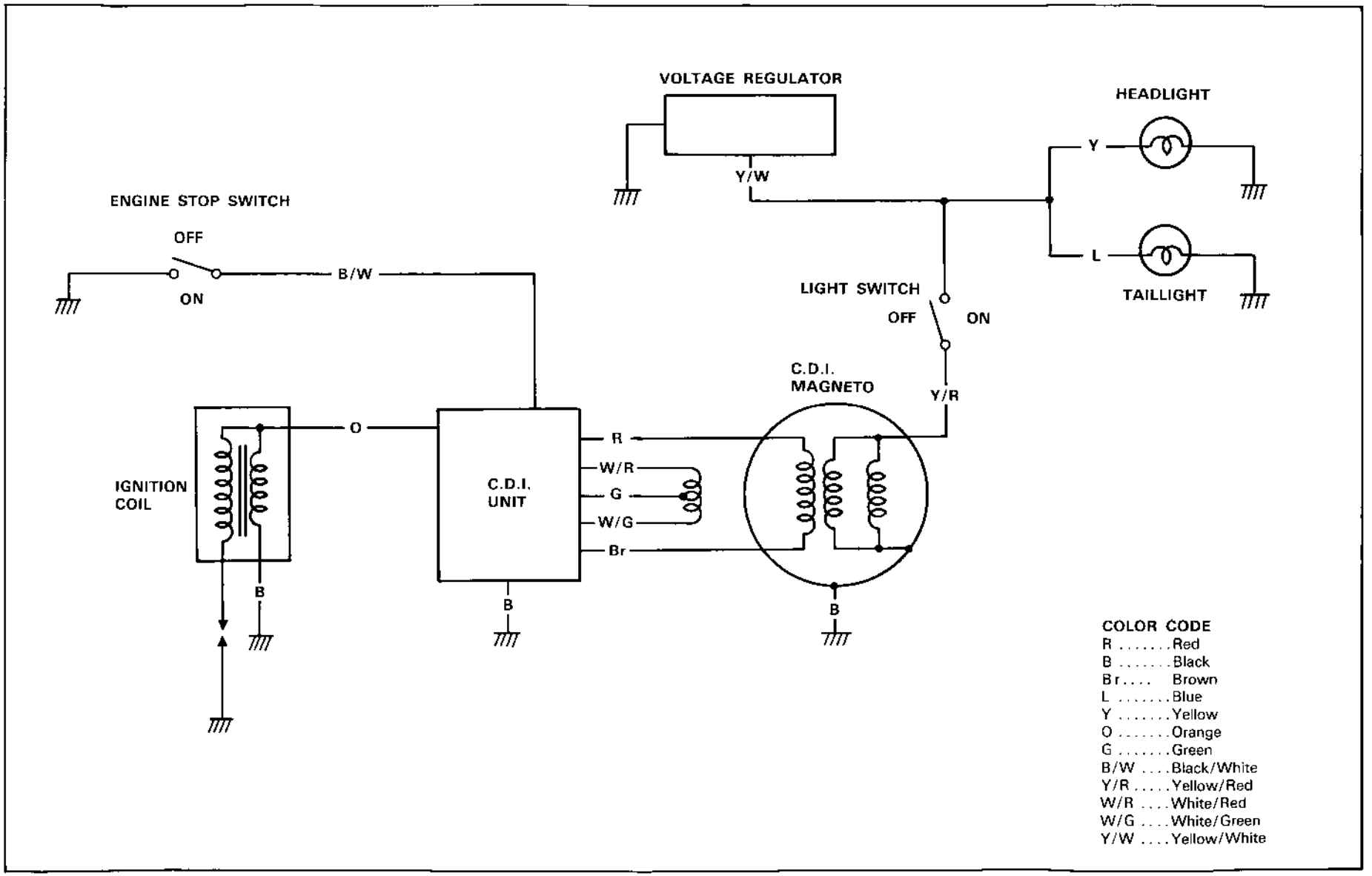
6

CHAPTER 6
ELECTRICAL

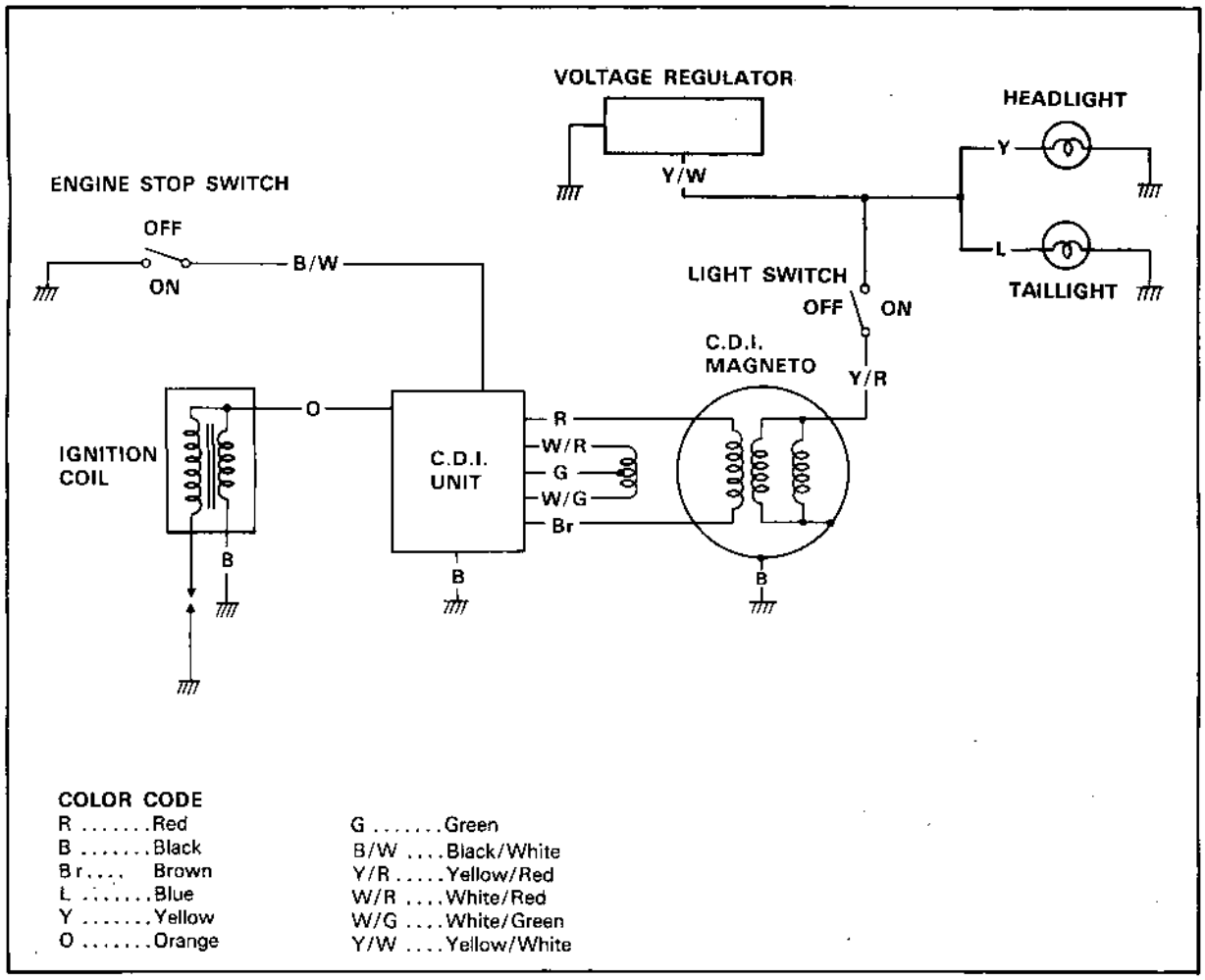
ELECTRICAL COMPONENTS



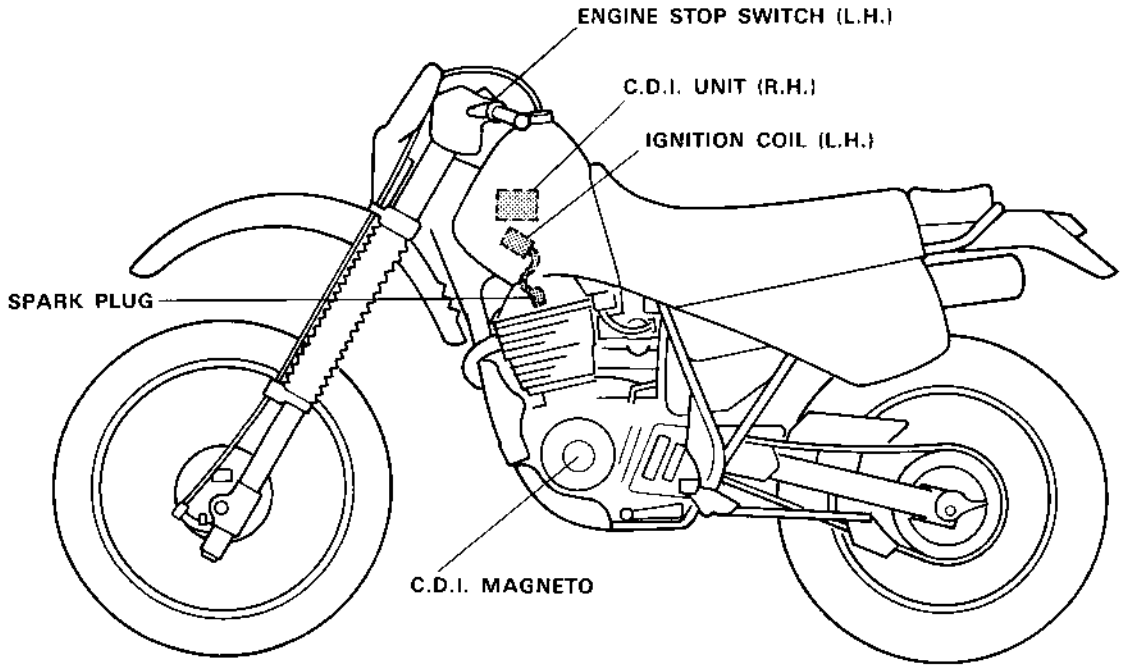
TT600K WIRING DIAGRAM



IGNITION SYSTEM



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

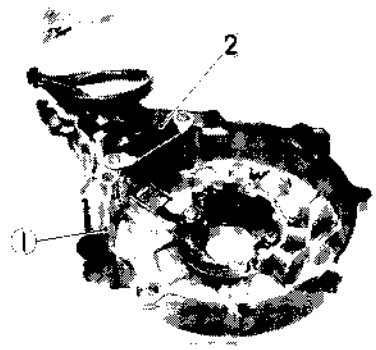


A. Description

The ignition system for this model is equipped with a C.D.I. (Capacitor Discharge Ignition) system. This C.D.I. ignition system is composed of a C.D.I. magneto, C.D.I. unit, and ignition coil. The voltage generated by the charge coil is stored in a condenser.

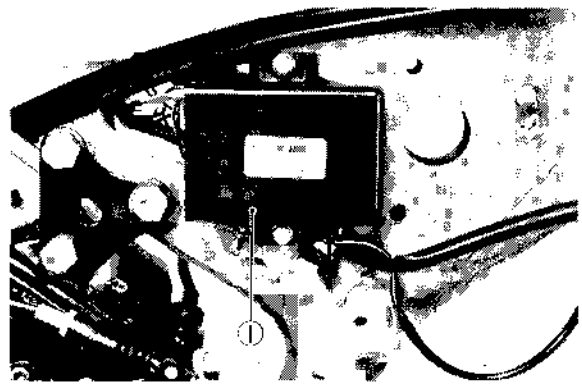
The signal generated by the pickup coil is introduced to switch circuit, causing the charged condenser to discharge its stored current through the primary winding of the ignition coil, thereby generating a high surge of voltage in the secondary winding of the ignition coil, which causes a spark to jump.

1. C.D.I. magneto
   The C.D.I. magneto is composed of the charge coil for the condenser and the pickup coil for the triggering signal of the C.D.I. unit.



1. Crankcase cover (left) 2. Pickup coil

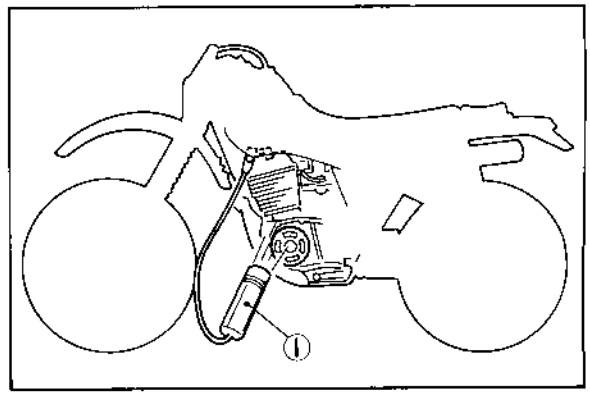
2. C.D.I. unit
   The C.D.I. unit is formed by a condenser, wave form circuit of signal from pickup coil on C.D.I. magneto, an advance circuit for ignition timing according its signal from the pickup coil, and a switching circuit for discharging the condenser.



1. C.D.I. unit

B. Ignition Timing

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

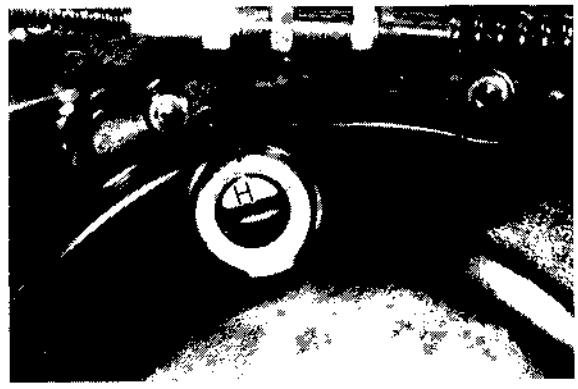


1. Timing light

1. Remove the upper blind plug on the left crankcase cover.
2. Connect the timing light to the spark plug wire.
3. Start the engine, and keep the engine running at the specified speed. Use a tachometer to check the engine speed.

Engine Speed: 1,300 ~ 1,400 r/min

4. The stationary pointer (in the timing window) should be within the firing range shown on the flywheel. If the pointer is not within the range or if it is not steady, check the flywheel and/or pickup assembly for tightness and/or damage.



5. Reinstall the blind plug.

C. C.D.I. Unit Test

1. The C.D.I. unit can be checked for misfire and weak sparks by using a Yamaha Pocket Tester.
2. The table shows representative figures obtained by tester checks. These figures may vary to some extent with the tester and C.D.I. unit employed because of the internal resistance inherent in the tester or the internal characteristics of the C.D.I. unit.

NOTE:

The table shows representative figures obtained by tester checks. These figures may vary to some extent with the tester and C.D.I. unit employed because of the internal resistance inherent in the tester and/or the internal characteristic of the C.D.I. unit.

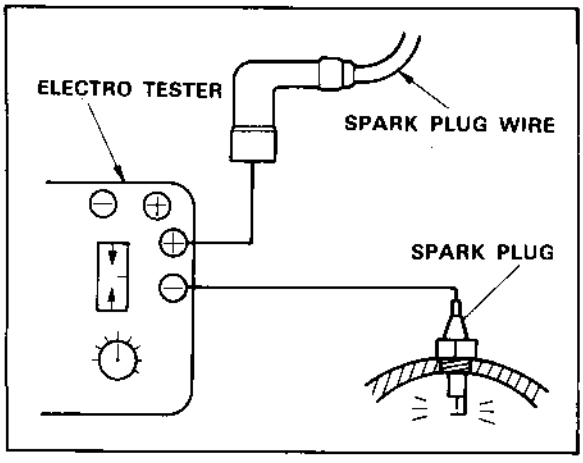
×1KΩ range

Tester lead wire ⊖		Tester lead wire ⊕						
			Condenser charge	Pickup senser			Ignition coil	Engine stop switch
			R	Br	WR	WG	G	O	BW
Condenser charge	R			150KΩ ~ 30KΩ	200KΩ ~ 50KΩ	∞	70KΩ ~ 15KΩ	∞	0
	Br		100KΩ ~ 20KΩ		200KΩ ~ 50KΩ	∞	40KΩ ~ 8KΩ	∞	100KΩ ~ 20KΩ
Pickup senser	WR		∞	∞		∞	∞	∞	∞
	WG		50KΩ ~ 10KΩ	50KΩ ~ 10KΩ	150KΩ ~ 30KΩ		20KΩ ~ 4KΩ	∞	50KΩ ~ 10KΩ
	G		10KΩ ~ 2KΩ	10KΩ ~ 2KΩ	50KΩ ~ 10KΩ	∞		∞	10KΩ ~ 2KΩ
Ignition coil	O		30KΩ ~ 6KΩ	30KΩ ~ 6KΩ	150KΩ ~ 30KΩ	∞	10KΩ ~ 2KΩ		30KΩ ~ 6KΩ
Engine stop switch	BW		0	150KΩ ~ 30KΩ	200KΩ ~ 50KΩ	∞	70KΩ ~ 15KΩ	∞	

D. Troubleshooting

The entire ignition system can be checked for misfire and weak spark by using the Electro Tester. If the ignition system will fire across a specified gap, the entire ignition system is good. If it will not fire across the gap, proceed with the individual component tests until the source of the problem is located.

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



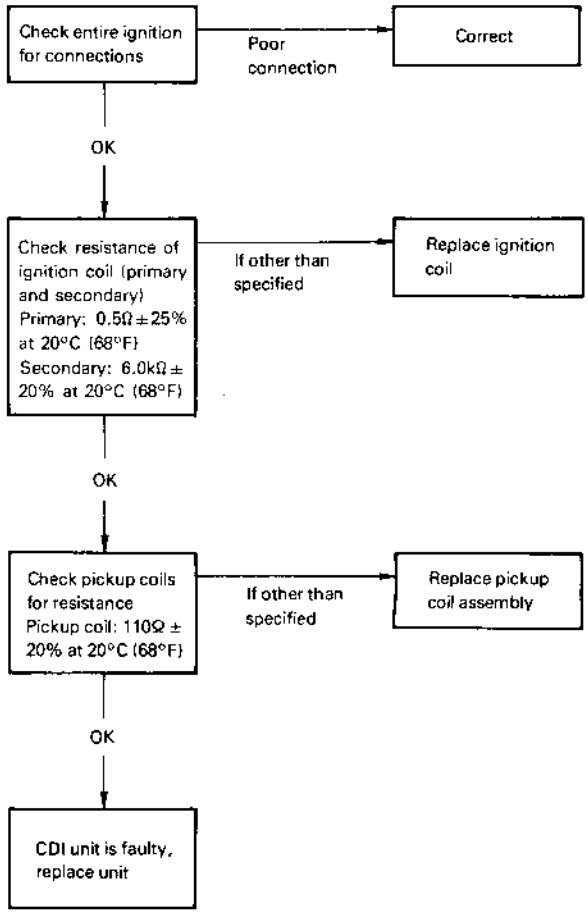
3. Start the engine, and increase the spark gap until a misfire occurs. (Test at various rpm between idle and red line.)

Minimum spark gap: 6 mm (0.24 in)

CAUTION:

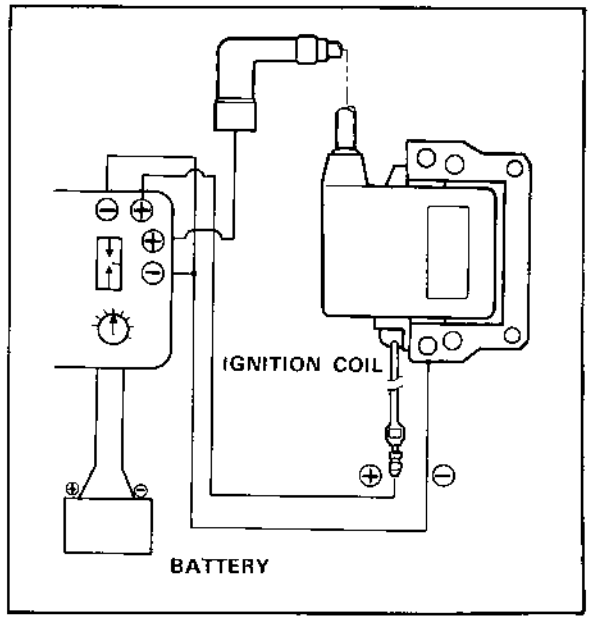
Do not run the engine in neutral above 6,000 r/min for more than 1 or 2 seconds.

If the ignition system becomes inoperative or if the engine misfires at the minimum spark gap or at a smaller gap, there is a problem in the ignition system. Follow the troubleshooting chart until the source of the problem is located.



Ignition spark gap test

1. Disconnect the ignition coil wires from the wiring harness and from the spark plug.
2. Connect the Electro Tester as shown.



3. Connect a fully charged battery to the tester.

4. Turn on the spark gap switch, and increase the gap to maximum unless a misfire occurs first.

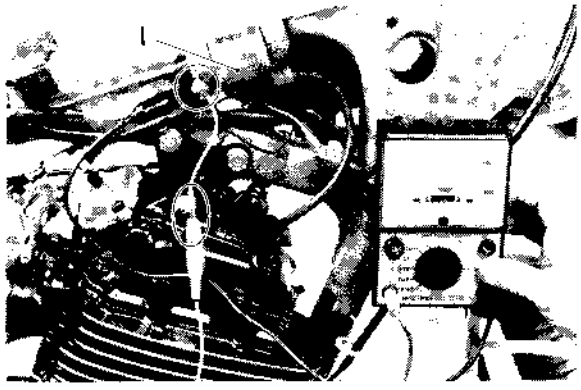
Minimum spark gap: 6 mm (0.24 in)

Direct current resistance test

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

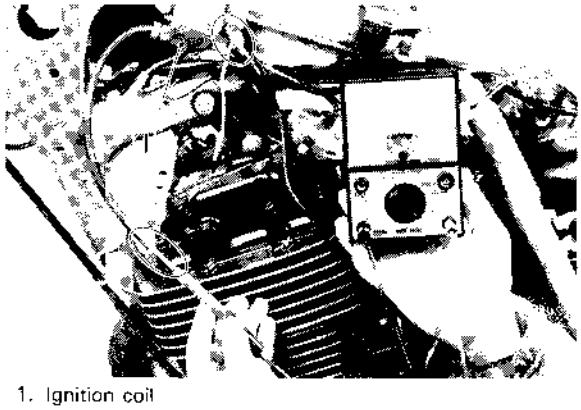
Standard value: Primary coil resistance: 0.5Ω ± 25% at 20°C (68°F) Secondary coil resistance: 6.0kΩ ± 20% at 20°C (68°F) Spark plug cap resistance: 10kΩ ± 20%

PRIMARY COIL CHECK



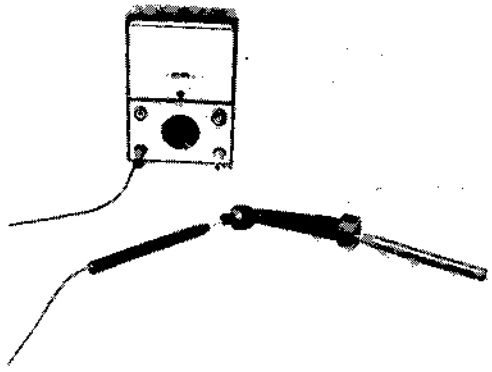
1. Ignition coil

SECONDARY COIL CHECK



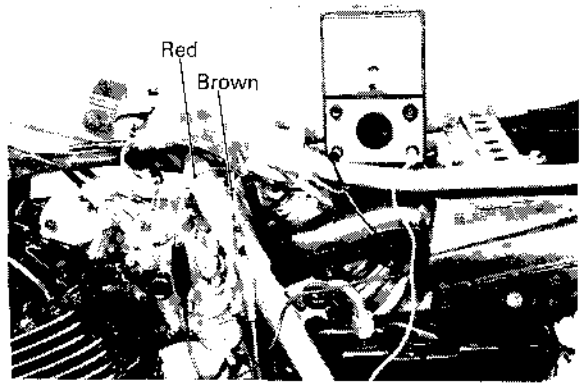
1. Ignition coil

PLUG CAP CHECK



Charge coil resistance

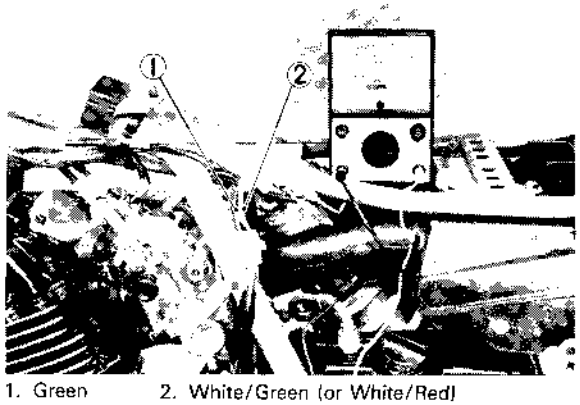
Check the charge coil resistance using a pocket tester.



Charge coil resistance: 90 ~ 150Ω at 20°C (68°F) Color: Brown — Red

Pickup coil resistance

Check the pickup coil resistance using a pocket tester.



1. Green 2. White/Green (or White/Red)

Pickup coil resistance:
90 ~ 130Ω at 20°C (68°F)
Color: Green — White/Green
Green — White/Red

Spark plug

The life of a spark plug and its discoloring vary according to the habits of the rider. At each periodic inspection, replace burned or fouled plugs with new ones of the specified type. It is actually economical to install new plugs often since it will tend to keep the engine in good condition and prevent excessive fuel consumption.

1. Inspect and clean the spark plug every 6,000 km (4,000 mi).
2. Clean the electrodes of carbon, and adjust the electrode gap to the specification. Be sure to use a spark plug with the correct reach, electrode gap, and heat range to avoid overheating, fouling, or piston damage.

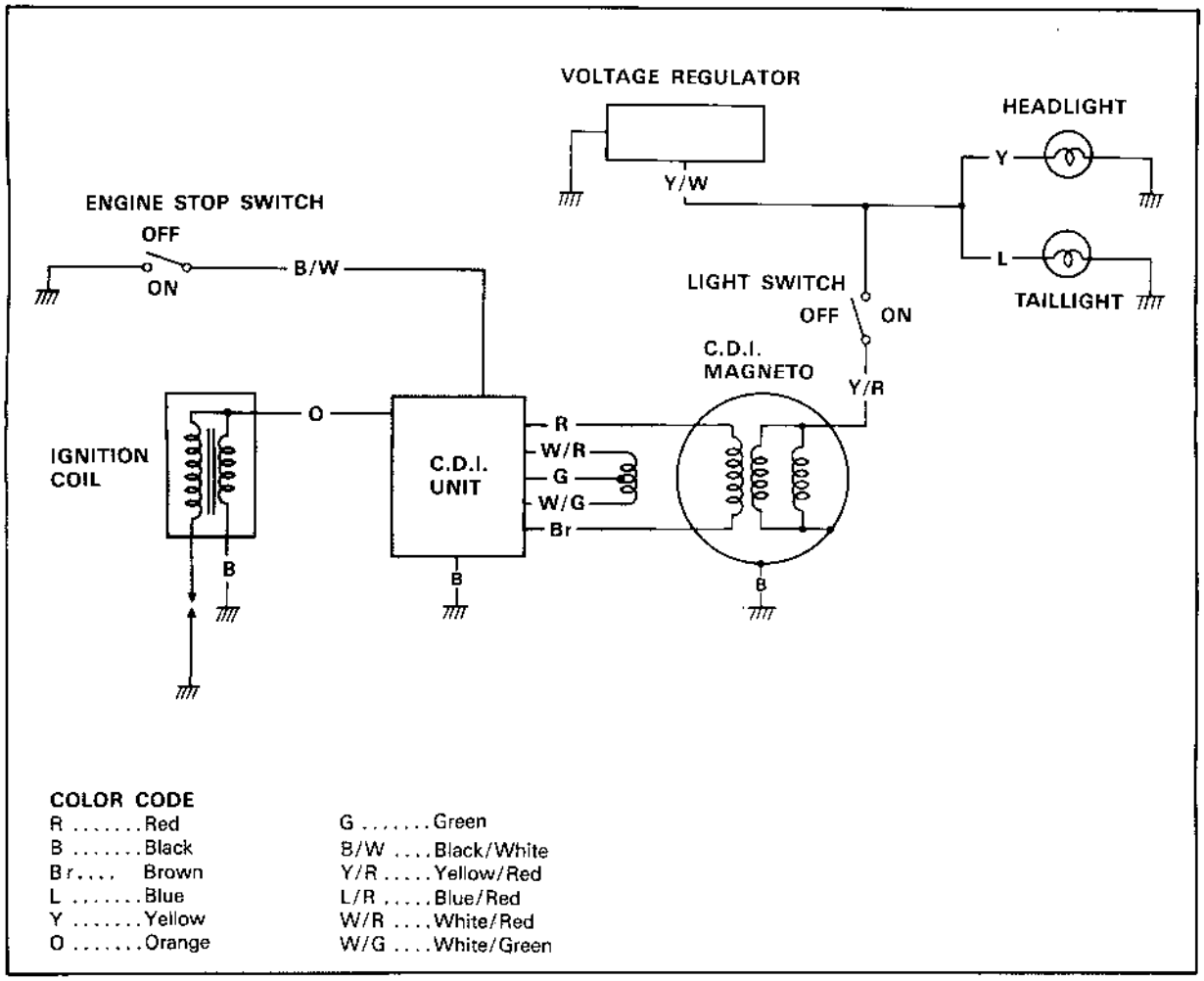
Type:
DPR7EA (NGK), DP7EA (NGK)
*D7EA (NGK)
Electrode gap:
0.8 ~ 0.9 mm (0.031 ~ 0.035 in)
*0.6 ~ 0.7 mm (0.024 ~ 0.028 in)
Tightening torque:
20 Nm (2.0 m · kg, 14 ft · lb)

Engine stop switch

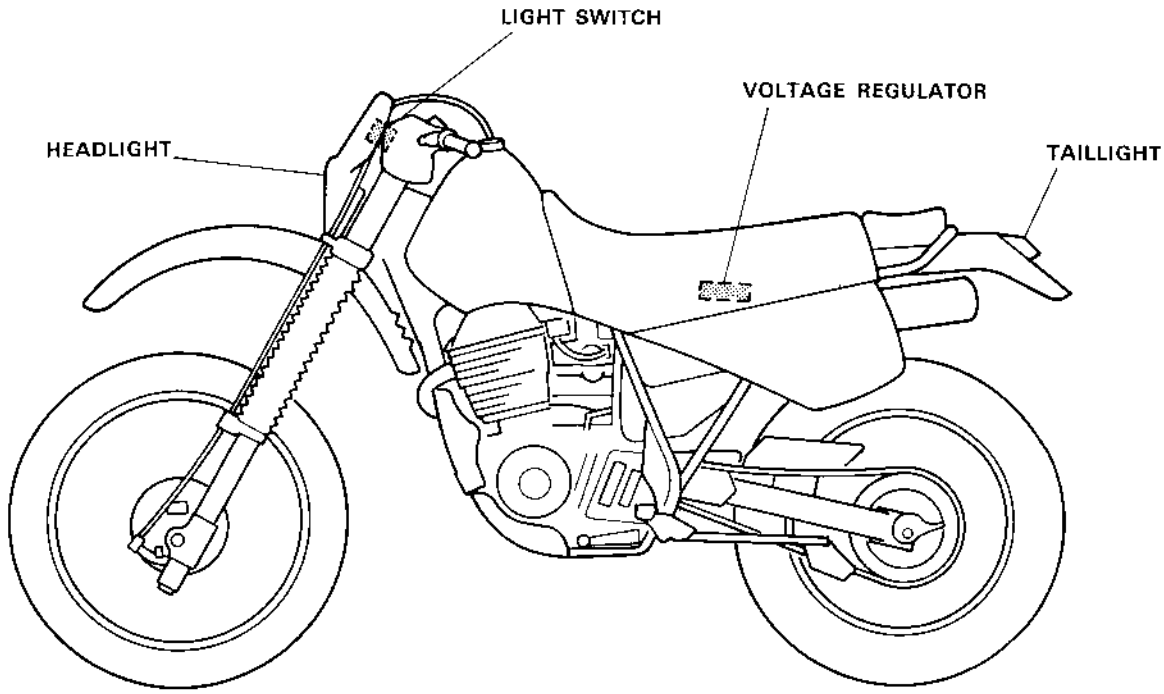
The switch can be checked for continuity with a pocket tester on the ohm × 1 scale.

	B/W	B
PUSH	○———	———○
RUN		

LIGHTING SYSTEM



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

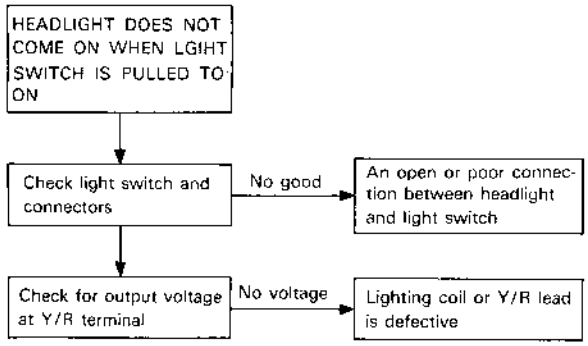


A. Light Tests and Checks

Headlight check

NOTE:

Check the headlight bulb filament first before performing the following check.

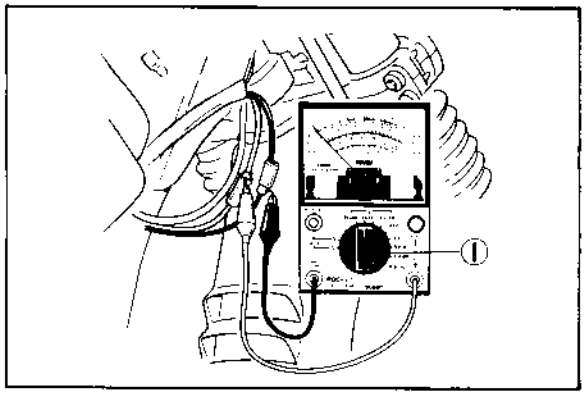


Taillight does not work:

- Check the bulb.
- Check for output voltage on the blue wire.
- Check for ground on black wire to taillight.

A.C. circuit output test

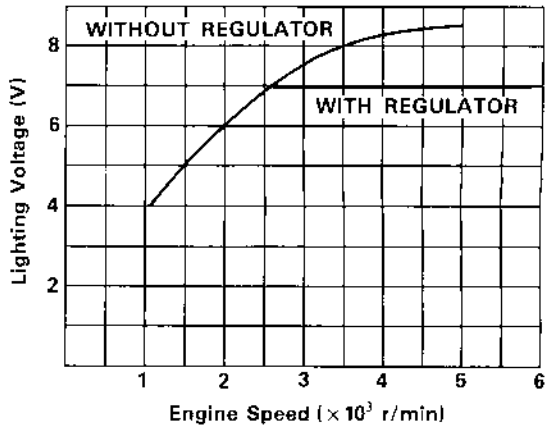
1. Disconnect the headlight unit connector.
2. Connect positive (+) test lead to Yellow connection and negative (−) test lead to a black lead.



1. Set the tester "AC20V" position

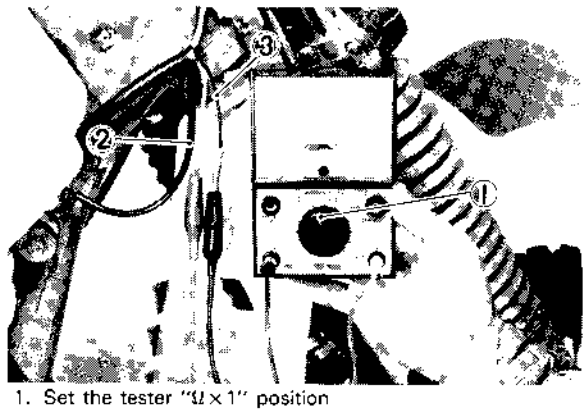
3. Start the engine and turn the light switch to the "Hi" position.
4. Check the voltage at each engine speed. If measured voltage is too high or too low, check for bad connections, damaged wires, burned out bulbs or bulb capacities that are too large throughout the A.C. lighting circuit.

Output voltage:
5.5V or more/3,000 r/min
7.5V or less/8,000 r/min
Color (Yellow — Black)



Lighting coil resistance check

Check the lighting coil resistance using a pocket tester.



1. Set the tester "Ω × 1" position
2. Yellow/Red
3. Black

Lighting coil resistance:
0.1 ~ 0.3Ω at 20°C (68°F)
Color: (Yellow/Red — Black)

Light switch

The switch can be checked for continuity with a pocket tester on the ohm × 1 scale.

	Y/R	L
PULL	○	○
OFF		

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CHAPTER 7
APPENDICES

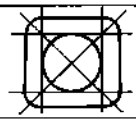
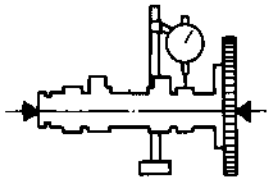
SPECIFICATIONS

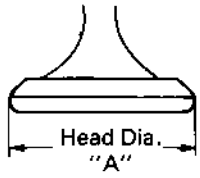
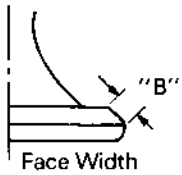
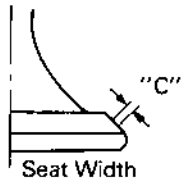
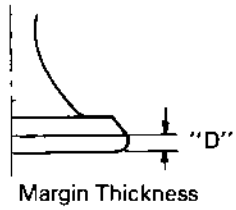
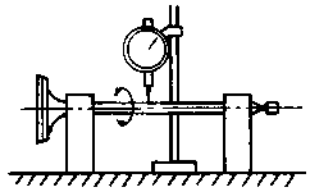
1. GENERAL SPECIFICATIONS

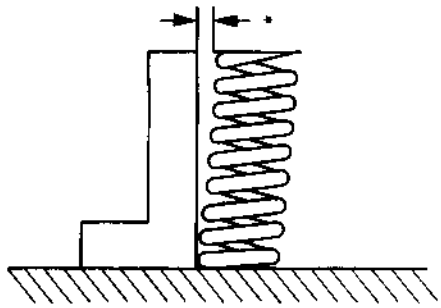
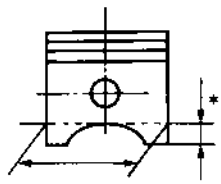
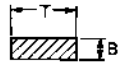
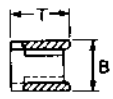
Model	TT600K
Model Code Number	34K
Federal V.I.N. Number	—
Frame Starting Number	34K-000101
Engine Starting Number	34K-000101
Dimensions:	
Overall Length	2,180 mm (85.8 in)
Overall Width	870 mm (34.3 in)
Overall Height	1,270 mm (50.0 in)
Seat Height	935 mm (36.8 in)
Wheelbase	1,485 mm (58.5 in)
Minimum Ground Clearance	300 mm (11.8 in)
Basic Weight:	
With Oil and Full Fuel Tank	132 kg (291 lb)
Minimum Turning Radius	2,300 mm (90.6 in)
Engine:	
Engine Type	Air cooled 4-stroke, SOHC
Cylinder Arrangement	Single cylinder
Displacement	595 cm^3
Bore × Stroke	95.0 × 84.0 mm (3.740 × 3.307 in)
Compression Ratio	8.5 : 1
Compression Pressure	1,079 kPa (11 kg/cm^2, 156 psi)
Starting System	Kick starter
Lubrication System	Dry sump
Oil Type or Grade	
Engine Oil	Yamalube 4-cycle oil or SAE 20W40 type SE motor oil
Oil Capacity:	
Engine Oil	
Periodic Oil Change	2.0 L (1.8 Imp qt, 2.1 US qt)
With Oil Filter Replacement	2.1 L (1.85 Imp qt, 2.2 US qt)
Total Amount	2.4 L (2.1 Imp qt, 2.5 US qt)
Air Filter	Wet type element
Fuel:	
Type	Regular gasoline
Tank Capacity	11.0 L (2.4 Imp gal, 2.9 US gal)
Reserve Amount	3.0 L (0.7 Imp gal, 0.8 US gal)
Carburetor:	
Type/Manufacturer	Y27PV/TK-KIKAKI
Spark Plug:	
Type/Manufacturer	DPR7EA (NGK), DP7EA (NGK) *D7EA (NGK)
Gap	0.8 ~ 0.9 mm (0.031 ~ 0.035 in) *0.6 ~ 0.7 mm (0.024 ~ 0.028 in)

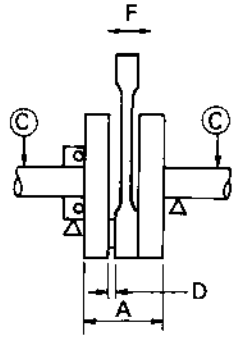
Model	TT600K					
Clutch Type	Wet, multiple-disc					
Transmission: Primary Reduction System	 Spur gear					
Primary Reduction Ratio Secondary Reduction System Secondary Reduction Ratio Transmission Type Operation Gear Ratio 1st 2nd 3rd 4th 5th	74/31 (2.387) Chain drive 50/14 (3.571) Constant mesh, 5-speed Left foot operation 30/13 (2.307) 27/16 (1.687) 24/20 (1.200) 21/22 (0.954) 21/27 (0.777)					
Chassis: Frame Type Caster Angle Trail	 Diamond 28° 118 mm (4.65 in)					
Tire: Type Size (F) Size (R)	 With tube 100/80-21-4PR 150/80-18-4PR					
Tire Pressure (Cold tire)	Front Tire			Rear Tire		
	kPa	kg/cm²	psi	kPa	kg/cm²	psi
Off-Road Riding	98.1	1.0	14	98.1	1.0	14
Brake: Front Brake Type Operation Rear Brake Type Operation	 Drum brake Right hand operation Drum brake Right foot operation					
Suspension: Front Suspension Rear Suspension	 Telescopic fork (Pneumo-mechanical) Swingarm, (Monocross suspension)					
Shock Absorber: Front Shock Absorber Rear Shock Absorber	 Air & Coil spring, Oil damper Gas & Coil spring, Oil damper					
Wheel Travel: Front Wheel Travel Rear Wheel Travel	 300 mm (11.8 in) 270 mm (10.6 in)					
Electrical: Ignition System Generator System	 C.D.I. Flywheel magneto					
Headlight Type	Bulb type					
Bulb Wattage/Quantity: Headlight Taillight	 25W/25W 5.3W					

II. MAINTENANCE SPECIFICATIONS
A. ENGINE

Model		TT600K
Cylinder Head Warp Limit		<0.03 mm (0.0012 in)> *Lines indicate straightedge measurement.
Cylinder: Bore Size Taper Limit		$95.0\ ^{+0.02}_{0}$ mm ($3.7\ ^{+0.007}_{0}$ in) <0.005 mm (0.0002 in)>
Camshaft Drive Method Cam Cap Inside Diameter Camshaft Outside Diameter <Cap Clearance Limit> Cam Dimensions		Chain (Left) $\phi 23^{+0.021}_{0}$ mm (ø0.91 + 0.0008 in) $\phi 23^{-0.020}_{-0.033}$ mm ($\phi 0.91^{-0.0008}_{-0.0013}$ in) <0.020 ~ 0.054 mm (0.0008 ~ 0.002 in)>
Intake	"A" <Limit> "B" <Limit> "C"	36.55 ± 0.05 mm (1.44 ± 0.002 in) <36.40 mm (1.4331 in)> 30.12 ± 0.05 mm (1.19 ± 0.002 in) <28.97 mm (1.1405 in)> 6.55 mm (0.26 in)
Exhaust	"A" <Limit> "B" <Limit> "C"	36.74 ± 0.05 mm (1.4464 ± 0.002 in) <36.57 mm (1.4398 in)> 30.17 ± 0.05 mm (1.1878 ± 0.002 in) <28.99 mm (1.1413 in)> 6.74 mm (0.2654 in)
Camshaft Runout Limit		<0.03 mm (0.001 in)>
Cam Chain Type/Number of Links Cam Chain Adjustment Method		75-010/126 Links Automatic
Rocker Arm/Rocker Arm Shaft Bearing Inside Diameter <Limit> Shaft Outside Diameter <Limit> Arm-to-shaft Clearance		$12^{+0.018}_{0}$ mm ($0.47^{+0.0007}_{0}$ in) <12.05 mm (0.47 in)> $12^{-0.009}_{-0.024}$ mm ($0.47^{-0.0004}_{-0.009}$ in) <11.95 mm (0.47 in)> 0.009 ~ 0.042 mm (0.0004 ~ 0.002 in)
Valve, Valve Seat, Valve Guide Valve Clearance (Cold) IN. EX.		 0.05 ~ 0.10 mm (0.002 ~ 0.004 in) 0.12 ~ 0.17 mm (0.005 ~ 0.007 in)

Model		TT600K
Valve Dimensions		
   		
"A" Head Dia.	IN.	36 ± 0.1 mm (1.42 ± 0.004 in)
	EX.	31 ± 0.1 mm (1.22 ± 0.004 in)
"B" Face Width	IN.	2.26 mm (0.09 in)
	EX.	2.26 mm (0.09 in)
"C" Seat Limit Width	IN.	1.1 ± 0.1 mm (0.04 ± 0.004 in)
	EX.	1.1 ± 0.1 mm (0.04 ± 0.004 in)
"D" Margin Thickness Limit		
	IN.	1.2 ± 0.2 mm (0.05 ± 0.008 in)
	EX.	1 ± 0.2 mm (0.04 ± 0.008 in)
Stem Outside Diameter		
	IN.	$7^{-0.010}_{-0.025}$ mm ($0.28^{-0.0004}_{-0.001}$ in)
	EX.	$7^{-0.030}_{-0.045}$ mm ($0.28^{-0.001}_{-0.002}$ in)
Guide Inside Diameter		
	IN.	$7^{+0.012}_{0}$ mm ($0.276^{+0.0005}_{0}$ in)
<Limit>		<7.10 mm (0.280 in)>
	EX.	$7^{+0.012}_{0}$ mm ($0.276^{+0.0005}_{0}$ in)
		<7.10 mm (0.280 in)>
Stem-to-guide Clearance		
	IN.	0.010 ~ 0.037 mm (0.0004 ~ 0.0015 in)
	EX.	0.030 ~ 0.057 mm (0.001 ~ 0.002 in)
Stem Runout Limit		<0.01 mm (0.0004 in)>
		
Valve Seat Width Standard		1.3 ± 0.1 mm (0.051 ± 0.004 in)
Valve Spring		
Free Length		
Inner Spring	IN.	40.1 mm (1.58 in)
	EX.	40.1 mm (1.58 in)
Outer Spring	IN.	43.8 mm (1.72 in)
	EX.	43.8 mm (1.72 in)

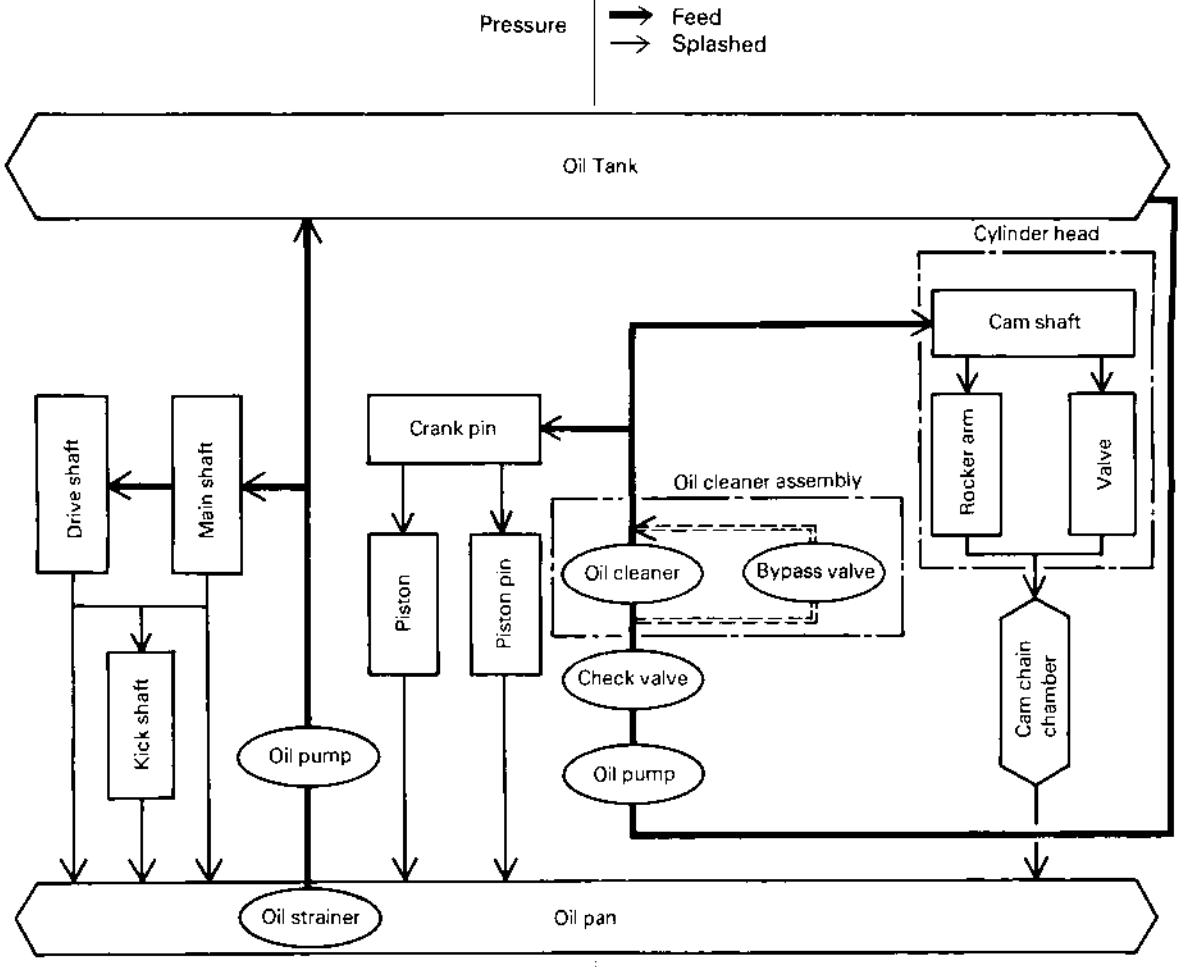
Model		TT600K
Compressed Length (Valve Closed)		
Inner Spring	IN.	22.7 mm (0.89 in)
	EX.	22.7 mm (0.89 in)
Outer Spring	IN.	25.7 mm (1.01 in)
	EX.	25.7 mm (1.01 in)
Tilt Limit*		
Inner Spring	IN. & EX.	2.5° or 1.7 mm (0.067 in)
Outer Spring	IN. & EX.	2.5° or 1.9 mm (0.074 in)
		
Direction of Winding (Top view)		Inner Spring: Left / Outer Spring: Right
 		
Piston		
Piston Size/ Measuring Point*		$95^{-0.015}_{-0.065}$ mm ($3.74^{-0.0006}_{-0.0026}$ in)/ *6 mm (0.24 in) (From bottom line of piston skirt)
Piston Clearance		0.045 ~ 0.065 mm (0.0018 ~ 0.0026 in)
Oversize	1st	—
	2nd	—
	3rd	—
	4th	—
Piston Ring		
Sectional Sketch		
Top Ring		Plain B = $1.2^{-0.01}_{-0.03}$ mm ($0.05^{-0.0004}_{-0.001}$ in) T = 3.4 ± 0.1 mm (0.13 ± 0.004 in)
2nd Ring		Plain B = $1.2^{-0.01}_{-0.03}$ mm ($0.05^{-0.0004}_{-0.001}$ in) T = 3.8 ± 0.1 mm (0.15 ± 0.004 in)
Oil Ring		Expander B = $3.0^{+0.03}_{+0.01}$ mm ($0.12^{+0.001}_{+0.0004}$ in) T = 3.4 ± 0.2 mm (0.13 ± 0.008 in)

Model	TT600k
End Gap (Installed)	
Top Ring	0.2 ~ 0.4 mm (0.008 ~ 0.016 in)
2nd Ring	0.2 ~ 0.4 mm (0.008 ~ 0.016 in)
Oil Ring	0.3 ~ 0.9 mm (0.01 ~ 0.035 in)
Side Clearance	
Top Ring	0.04 ~ 0.08 mm (0.0016 ~ 0.0031 in)
2nd Ring	0.03 ~ 0.07 mm (0.001 ~ 0.003 in)
Oil Ring	0.02 ~ 0.06 mm (0.0008 ~ 0.002 in)
Crankshaft	
	
Crank Width "A"	$75^{0}_{-0.05}$ mm ($2.95^{0}_{-0.002}$ in)
Assembly Width "B"	74.95 ~ 75.00 mm (2.951 ~ 2.953 in)
Runout Limit "C"	<0.03 mm (0.001 in)>
Small End Free Play "F"	0.8 mm (0.031 in)
Balancer Drive Method	Gear
Clutch	
Friction Plate Thickness/Quantity	0.1 mm (0.004 in)/1 2.8 ± 0.08 mm (0.11 ± 0.003 in)/7
Wear Limit	<2.8 mm (0.11 in)> <2.6 mm (0.10 in)>
Clutch Plate Thickness/Quantity	1.2 mm (0.05 in)/7
Warp Limit	<0.2 mm (0.008 in)>
Clutch Spring Free Length/Quantity	34.6 mm (1.36 in)/5
Clutch Spring Minimum Length	
Primary Reduction Gear	
Backlash Tolerance	7 ~ 71 μ
Clutch Release Method	Inner push (Cam push)
Push Rod Bending Limit	<0.5 mm (0.02 in)>
Kick Starter	
Kick Starter Type	Ratchet type
Decompression Device	
Type	Kick synchronous
Cable Free Play	0.5 mm (0.02 in)
Air Filter Oil Grade (Oiled Filter)	SAE 10W30 SE motor oil
Carburetor	
Type/Manufacturer/Quantity	Y27PV/TEIKEI KIKAKI/1
I.D. Mark	34K00
	Primary carb. / Secondary carb.
Main Jet (M.J.)	#135 / #135
Main Air Jet (M.A.J.)	ø0.8 / ø0.8
Jet Needle-clip Position (J.N.)	5C37-3/5 / 4A70-3/5
Needle Jet (N.J.)	ø2.60 / ø2.60

Model		TT600K
Cutaway	(C.A.)	#4.5
Pilot Jet	(P.J.)	#48
Pilot Air Jet	(P.A.J.)	ø0.5
Enricher Air Jet	(E.A.J.)	ø1.3
Pilot Screw	(P.S.)	1 and 1/2 ± 1/2
Valve Seat	(V.S.)	ø2.5
Starter Jet	($G.S._1$)	ø0.64
	($G.S._2$)	ø0.56
Fuel Level	(F.L.)	7.0 ± 1 mm (0.28 ± 0.04 in)
Float level		26.0 ± 2.5 mm (1.02 ± 0.10 in)
Float valve seat		ø2.5
Engine Idling Speed		1,350 ± 50 r/min
Vacuum Pressure at Idling Speed		26.6 kPa (200 mm Hg, 7.9 in Hg) or more
Lubrication System:		
Oil Filter Type		Paper, Wire mesh
Oil Pump Type		Trochoid pump
Tip Clearance		
<Limit>		<0.12 mm (0.005 in)>
Side Clearance		0.03 ~ 0.08 mm (0.001 ~ 0.003 in)
Bypass Valve Setting Pressure		98.07 ± 19.6 kPa (1.0 ± 0.2 kg/cm², 14.22 ± 2.84 psi)
Relief Valve Operating Pressure		98.07 ± 19.6 kPa (1.0 ± 0.2 kg/cm², 14.22 ± 2.84 psi)

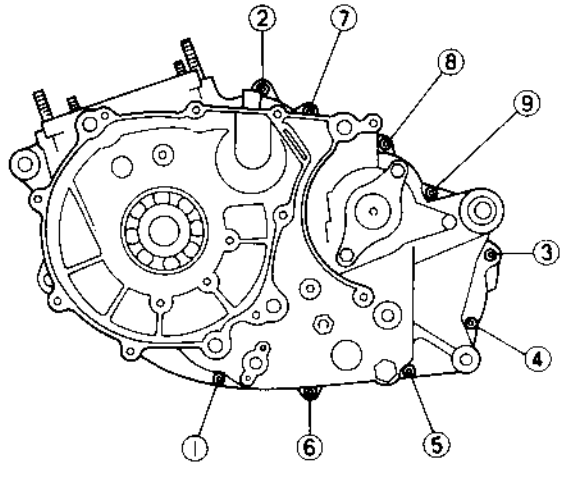
Model	TT600K

Lubrication Chart

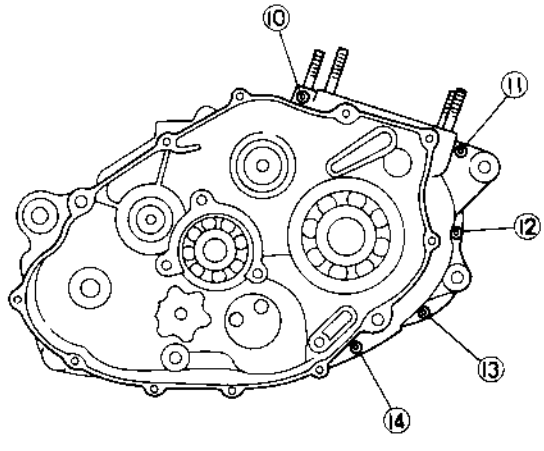


Crankcase Tightening Sequence

Left Side



Right Side



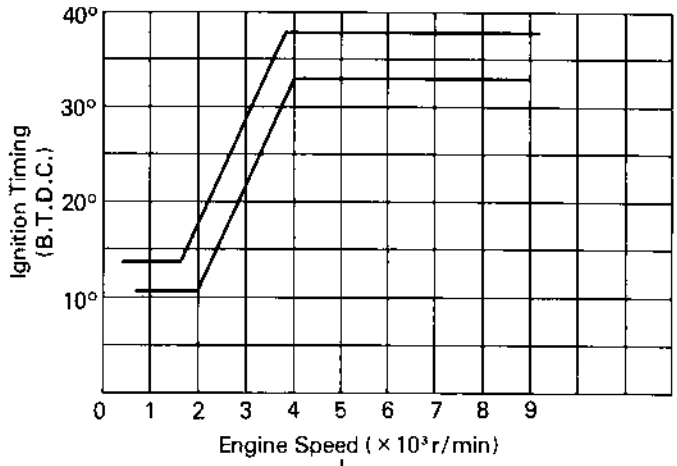
II. MAINTENANCE SPECIFICATIONS
B. CHASSIS

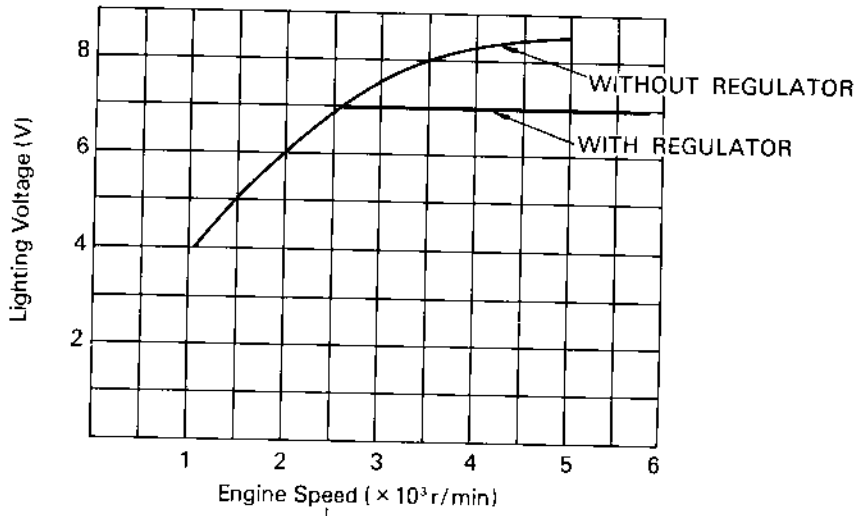
Model		TT600K
Steering System:		
Steering Bearing Type		Taper roller bearing
Front Suspension:		
Front Fork Travel		300 mm (11.8 in)
Fork Spring Free Length		527 mm (20.7 in)
Spring Rate/Stroke		2.84 N/mm (0.29 kg/cm, 16.2 lb/in) 0 ~ 300 mm (0 ~ 12 in)
Oil Capacity or Oil Level		578 cm^3 (20.4 Imp oz, 19.5 US oz) 150 mm (5.9 in) (From top of inner tube fully compressed without spring.)
Oil Grade		
Enclosed Air Pressure	STD	0 kPa (0 kg/cm^2, 0 psi)
	MAX	117.6 kPa (1.2 kg/cm^2, 17 psi)
Rear Suspension:		
Shock Absorber Travel		99 mm (3.89 in)
Spring Free Length		246 mm (9.69 in)
<Limit>		<230 mm (9.06 in)>
Fitting Length		230 mm (9.31 in)
Spring Rate/Stroke		K_1 = 44.1 N/mm (4.5 kg/mm, 251.9 lb/in)
Enclosed Gas Pressure		1,961 kPa (20 kg/cm^2, 284.4 psi)
Rear Arm:		
Swingarm Free Play Limit		
End		<1.0 mm (0.04 in)>
Side		<0.2 mm (0.008 in)>
Wheel:		
Front Wheel Type		Spoke Wheel
Rear Wheel Type		Spoke Wheel
Front Rim Size/Material		1.60 × 21/Aluminum
Rear Rim Size/Material		2.50 × 18/Aluminum
Rim Runout Limit		
Vertical		<2.0 mm (0.08 in)>
Lateral		<2.0 mm (0.08 in)>
Drive Chain:		
Type/Manufacturer		520V-C/DAIDO
Number of Links		111 links + Joint
Chain Free Play		20 ~ 30 mm (0.8 ~ 1.2 in)
Drum Brake:		
Type	Front	Two leading
	Rear	Leading and trailing
Drum Inside Dia		
<Limit>	Front	130 mm (5.12 in) <131 mm (5.16 in)>
	Rear	130 mm (5.12 in) <131 mm (5.16 in)>
Lining Thickness		4 mm (0.16 in)
<Limit>		<2 mm (0.08 in)>

Model	TT600K
Brake Lever & Brake Pedal: Brake Lever Free Play/position Brake Pedal Position Brake Pedal Free Play	 10 ~ 20 mm (0.39 ~ 0.79 in)/at lever end 10 mm (0.4 in) 20 ~ 30 mm (0.8 ~ 1.2 in) (Vertical height below footrest top.)
Clutch Lever Free Play/position	2 ~ 3 mm (0.08 ~ 0.12 in)/at lever pivot

II. MAINTENANCE SPECIFICATIONS
C. ELECTRICAL

Model	TT600K
Voltage	6V
Ignition System Ignition Timing (B.T.D.C.) Advanced Timing (B.T.D.C.) Advancer Type	 12° at 1,600 r/min 36° at 4,500 r/min Electrical
C.D.I.: Magneto-Model/Manufacturer Pickup Coil Resistance (Color) Charge Coil Resistance (Color) C.D.I. Unit-Model/Manufacturer	 34K-85500-50/NIPPONDENSO 90 ~ 130Ω at 20°C (68°F) (G — W/G) (G — W/R) 90 ~ 150Ω at 20°C (68°F) (Br — R) 5Y3-85540-50/NIPPONDENSO
Ignition Coil: -Model/Manufacturer Minimum Spark Gap Primary Winding Resistance Secondary Winding Resistance Spark Plug Cap Resistance	 34K-82310-51/NIPPONDENSO 6 mm (0.24 in) 0.5Ω ± 25% at 20°C (68°F) 6.0kΩ ± 20% at 20°C (68°F) 10 kΩ
Charging System	A.C. Magneto Generator
F.W. Magneto: Lighting Voltage -DC Lighting	 5.5V or more at 3,000 r/min 7.5V or less at 8,000 r/min



Model	TT600K
Lighting Coil Resistance (Color)	0.2Ω ± 50% at 20°C (68°F) (B — Y/R)
	
Voltage Regulator: -Type -Model/ Manufacturer -No Load Regulated Voltage	Semi conductor type TS6HPY-L/ MITSUBISHI 6.8 ~ 7.2V

TIGHTENING TORQUE

ENGINE

Tightening torque	Q'ty	Thread size	Nm	m·kg	ft·lb
Cylinder head: Flange bolt	2	M8×1.25	25	2.5	18
: Flange bolt	2	M8×1.25	25	2.5	18
: Stud bolt	2	M10×1.25	20	2.0	14
: Internal hex. bolt	1	M6	10	1.0	7.2
: Stud bolt	4	M6	7	0.7	5.1
Spark plug	1	M12×1.25	18	1.8	13
Cylinder head cover: Internal hex. bolt	2	M6	10	1.0	7.2
: Internal hex. bolt	4	M6	10	1.0	7.2
: Internal hex. bolt	3	M6	10	1.0	7.2
: Internal hex. bolt	7	M6	10	1.0	7.2
Rocker shaft stud bolt: Straight screw plug	1	M14×1.25	—	—	—
Cylinder head side cover 2: Internal hex. bolt	2	M6	10	1.0	7.2
Cap (stud): Internal hex. bolt	1	M6	10	1.0	7.2
Cylinder body: Cap nut	2	M8×1.25	20	2.0	14
: Nut	2	M10×1.25	38	3.8	27
: Nut	2	M10×1.25	38	3.8	27
: Internal hex. bolt	2	M6	10	1.0	7.2
Balance weight gear: Nut	1	M16×1.0	60	6.0	43
A.C.G. Rotor: Nut	1	M14×1.5	90	9.0	65
Valve clearance: Nut	4	M6	14	1.4	10
Stopper guide 2: Hexagon bolt	2	M6	8	0.8	5.8
Cam sprocket: Flange bolt	2	M7	20	2.0	14
Tensioner assembly: Internal hex. bolt	2	M6	10	1.0	7.2
Decompression cam: Bolt	1	M6	8	0.8	5.8
Rocker shaft stopper bolt	2	M6	10	1.0	7.2
Oil pump assembly: Internal hex. bolt	3	M6	10	1.0	7.2
Cover 2: Panhead screw	1	M6	7	0.7	5.1
Strainer housing: Panhead screw	2	M6	7	0.7	5.1
Drain plug: Straight screw plug	1	M14×1.5	30	3.0	22
Element cover: Internal hex. bolt	1	M6	10	1.0	7.2
: Internal hex. bolt	2	M6	10	1.0	7.2
Element cover stud bolt: Bind screw	1	M5	5	0.5	3.6
Oil hose 1: Internal hex. bolt	2	M6	10	1.0	7.2
: Union nut	1	M16×1.5	50	5.0	36

Tightening torque	Q'ty	Thread size	Nm	m·kg	ft·lb
Oil hose 2: Internal hex. bolt	2	M6	10	1.0	7.2
: Union nut	1	M6	10	1.0	7.2
Carburetor joint: Internal hex. bolt	4	M6	10	1.0	7.2
Carburetor assembly: Hose clamp	2	M4	2	0.2	1.4
Exhaust pipe: Nut	4	M6	10	1.0	7.2
Exhaust pipe protector: Bind screw	2	M6	7	0.7	5.1
Outlet pipe: Panhead W/W screw	1	M6	7	0.7	5.1
Exhaust pipe muffler joint: Hexagon bolt	1	M8 × 1.25	20	2.0	14
Muffler mounting: Flange bolt	1	M8 × 1.25	27	2.7	19
Case 1 and 2: Internal hex. bolt	9	M6	10	1.0	7.2
: Internal hex. bolt	4	M6	10	1.0	7.2
: Internal hex. bolt	1	M6	10	1.0	7.2
Crankcase 1: Stud bolt	2	M10 × 1.25	20	2.0	14
Clamp (lead): Panhead screw	1	M6	7	0.7	5.1
Crankcase 2: Stud bolt	2	M10 × 1.25	20	2.0	14
Crankcase cover 1: Internal hex. bolt	6	M6	10	1.0	7.2
: Internal hex. bolt	1	M6	10	1.0	7.2
: Internal hex. bolt	1	M6	10	1.0	7.2
: Internal hex. bolt	1	M6	10	1.0	7.2
Cap: Crankside hole cap	1	M36	—	—	—
Plug: Straight screw plug	1	M14	—	—	—
Crankcase cover 2: Internal hex. bolt	2	M6	10	1.0	7.2
Crankcase cover 3: Internal hex. bolt	7	M6	10	1.0	7.2
: Internal hex. bolt	1	M6	10	1.0	7.2
: Internal hex. bolt	2	M6	10	1.0	7.2
Cover 1: Internal hex. bolt	2	M6	10	1.0	7.2
Bridge plate cover: Flat head screw	3	M6	7	0.7	5.1
Ratchet wheel guide: Hexagon bolt	2	M6	10	1.0	7.2
Wire lever: Hexagon nut	1	M6	8	0.8	5.8
Clutch spring: W/W screw	5	M6	8	0.8	5.8
Clutch boss: Nut	1	M20 × 1.0	7	7.0	5.1
Primary drive gear: Nut	1	M20 × 1.0	110	11.0	80
Push lever assembly stopper: Screw	1	M8 × 1.0	12	1.2	8.7
Push lever positioning: Nut	1	M6	8	0.8	5.8
Drive sprocket: Hexagon bolt	2	M6	10	1.0	7.2
Oil seal cover: Hexagon bolt	2	M6	10	1.0	7.2

Tightening torque	Q'ty	Thread size	Nm	m·kg	ft·lb
Stopper lever: W/W screw	1	M6	10	1.0	7.2
Shift pedal: Bolt	1	M6	10	1.0	7.2
Coil: Panhead screw W/W screw	4	M6	7	0.7	5.1
Pulser: Panhead W/W screw	2	M6	7	0.7	5.1
Neutral switch: Neutral switch assembly	1	M10×1.25	20	2.0	14
Cylinder head side cover 1	2	M32×1.5	12	1.2	8.7
Tensioner spring retainer: Plug	1	M16×1.0	20	2.0	14
Kick crank: Screw	1	M6	7	0.7	5.1

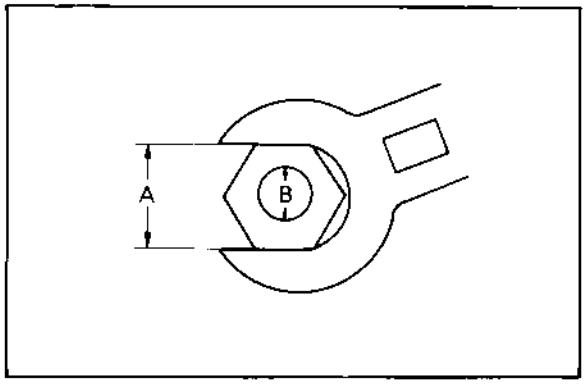
CHASSIS

Tightening torque	Q'ty	Thread size	Nm	m·kg	ft·lb
Front wheel shaft and nut	1	M14×P1.5	60	6.0	43
Handle crown and inner tube	4	M8×P1.25	23	2.3	17
Handle crown and steering shaft	1	M22×P1.0	85	8.5	61
Handle crown and handle holder	4	M8×P1.25	23	2.3	17
Steering bearing nut	1	M25×P1.0	10	1.0	7.2
Front engine stay and engine (frame)	4	M10×P1.25	60	6.0	43
Top engine stay and engine (frame)	3	M10×P1.25	60	6.0	43
Rear engine and frame	1	M10×P1.25	50	5.0	36
Oil hose 1 and oil tank	1	M16×P1.5	45	4.5	33
Oil hose 2 and oil tank	1	M16×P1.5	45	4.5	33
Oil tank drain plug	1	M8×P1.5	18	1.8	13
Rear wheel shaft and nut	1	M18×P1.5	128	12.8	94
Sprocket wheel and hub (Taper bolt)	6	M8×P1.25	30	3.0	22
Front fork and axle holder	1	M8×P1.25	20	2.0	14
Rear shock absorber and frame	1	M10×P1.25	32	3.2	23
Pivot shaft and frame	1	M16×P1.5	100	10.0	72
Front brake cam lever bolt	2	M6×P1.0	10	1.0	7.2
Rear brake cam lever bolt	1	M6×P1.0	10	1.0	7.2
Relay-arm and rear arm	1	M12×P1.25	60	6.0	43
Relay-arm and rear shock absorber	1	M10×P1.25	32	3.2	23
Relay-arm and connecting rod	1	M10×P1.25	32	3.2	23
Frame and connecting rod	1	M10×P1.25	60	6.0	43
Footrest bracket and frame	4	M10×P1.25	45	4.5	33

GENERAL TORQUE SPECIFICATIONS

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

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



A: Distance across flats
B: Outside thread diameter

COLOR CODE

R . . . . . Red	B/W . . . . . Black/White
B . . . . . Black	Y/R . . . . . Yellow/Red
Sb . . . . . Sky blue	B/Y . . . . . Black/Yellow
Br. . . . . Brown	G/Y . . . . . Green/Yellow
Ch . . . . . Chocolate	L/W. . . . . Blue/White
Dg . . . . . Dark green	Br/W . . . . . Brown/White
L . . . . . Blue	R/W . . . . . Red/White
Y . . . . . Yellow	L/B . . . . . Blue/Black
O . . . . . Orange	L/Y . . . . . Blue/Yellow
G . . . . . Green	L/R . . . . . Blue/Red
P . . . . . Pink	W/R . . . . . White/Red
W. . . . . White	W/G . . . . . White/Green

DEFINITION OF UNITS

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

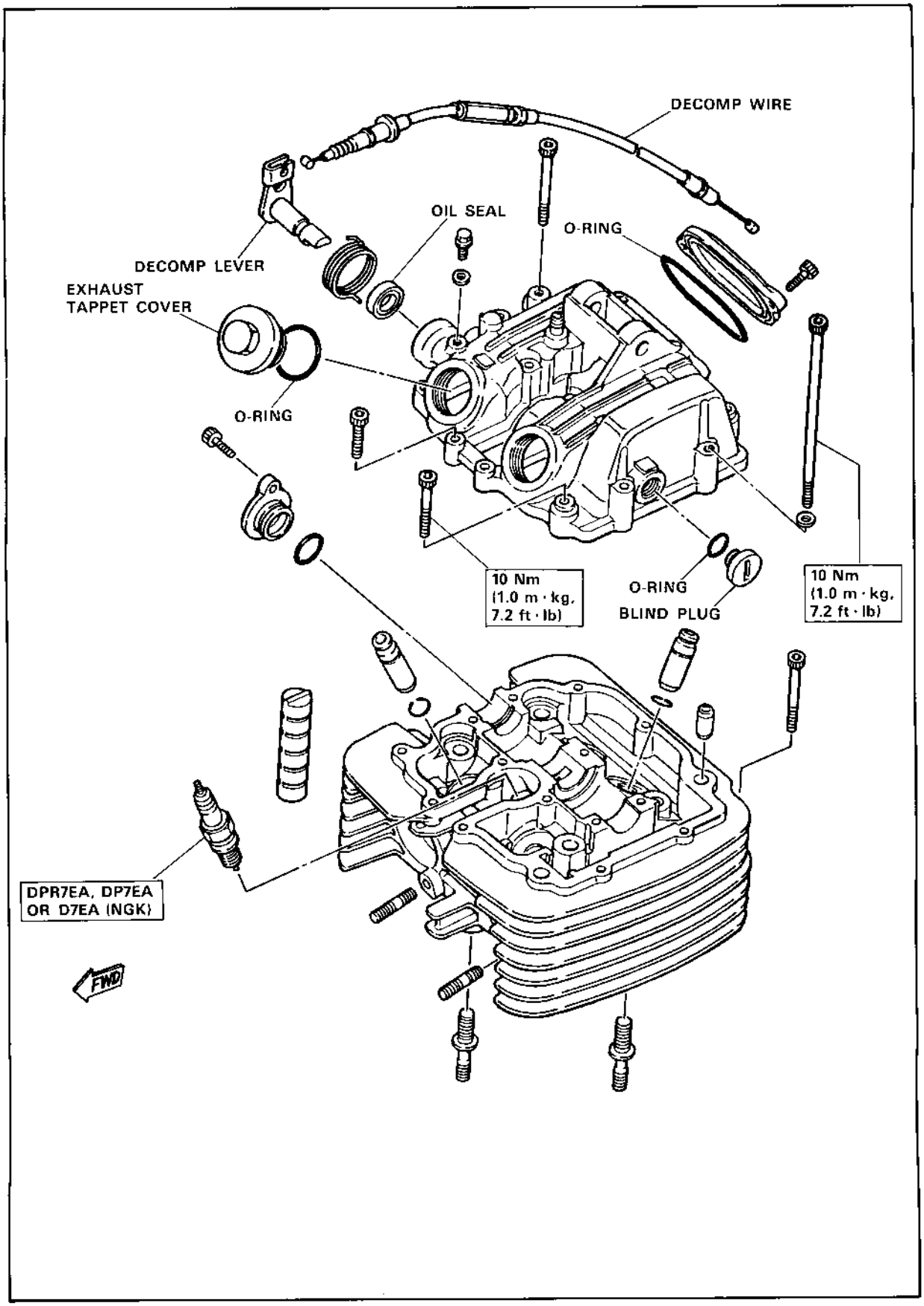
CONVERSION TABLES

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

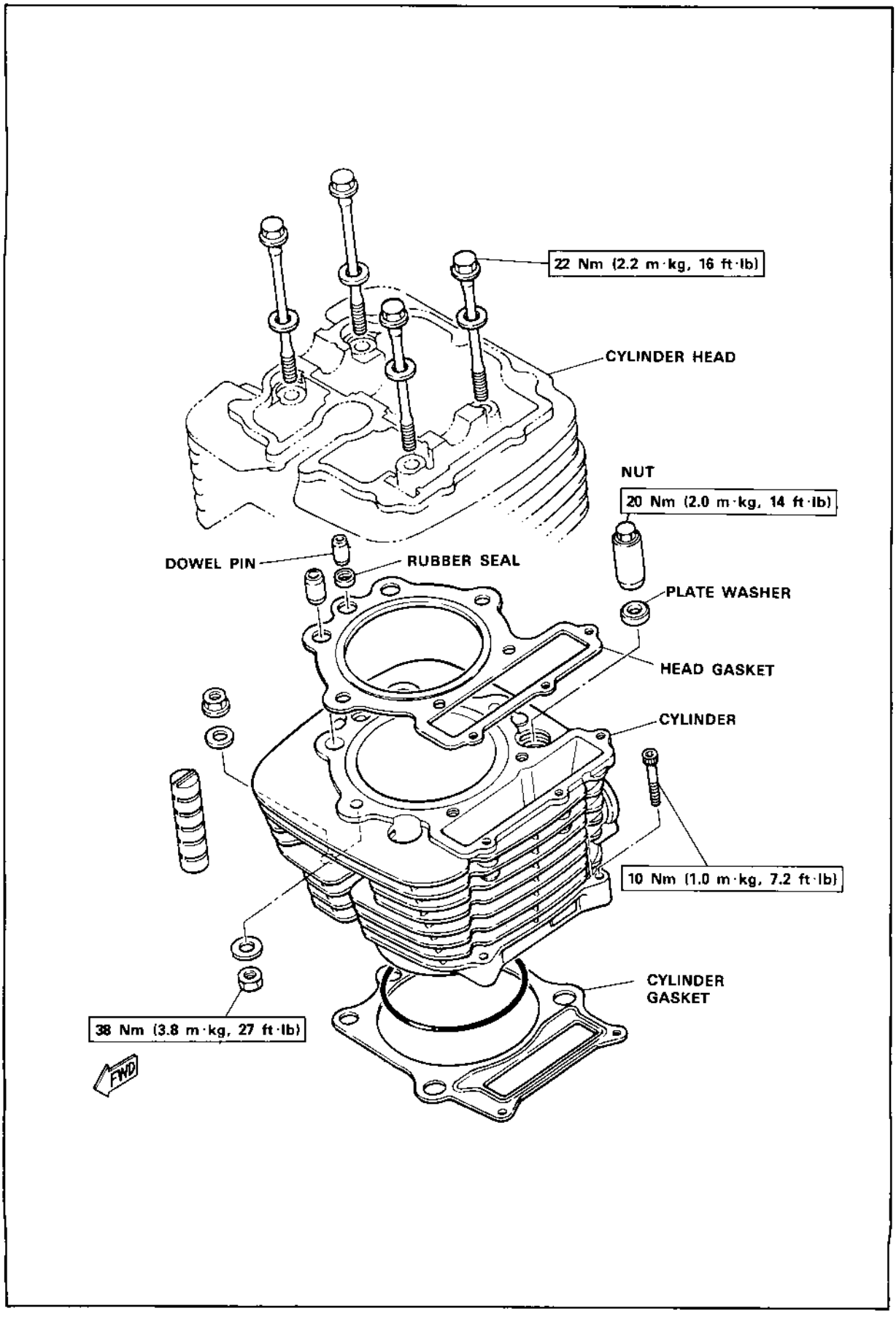
Inch to metric system		
Known	Multiplier	Result
ft·lb	0.13826	m·kg
in·lb	0.01152	m·kg
ft·lb	13.831	cm·kg
in·lb	1.1521	cm·kg
lb	0.4535	kg
oz	28.352	g
mpg	0.4252	km/lit
mph	1.609	km/hr
mi	1.609	km
ft	0.3048	m
yd	0.9141	m
in	2.54	cm
in	25.4	mm
oz (US liq)	29.57	cc (cm^3)
cu in	16.387	cc (cm^3)
pt (US liq)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

EXPLODED DIAGRAMS

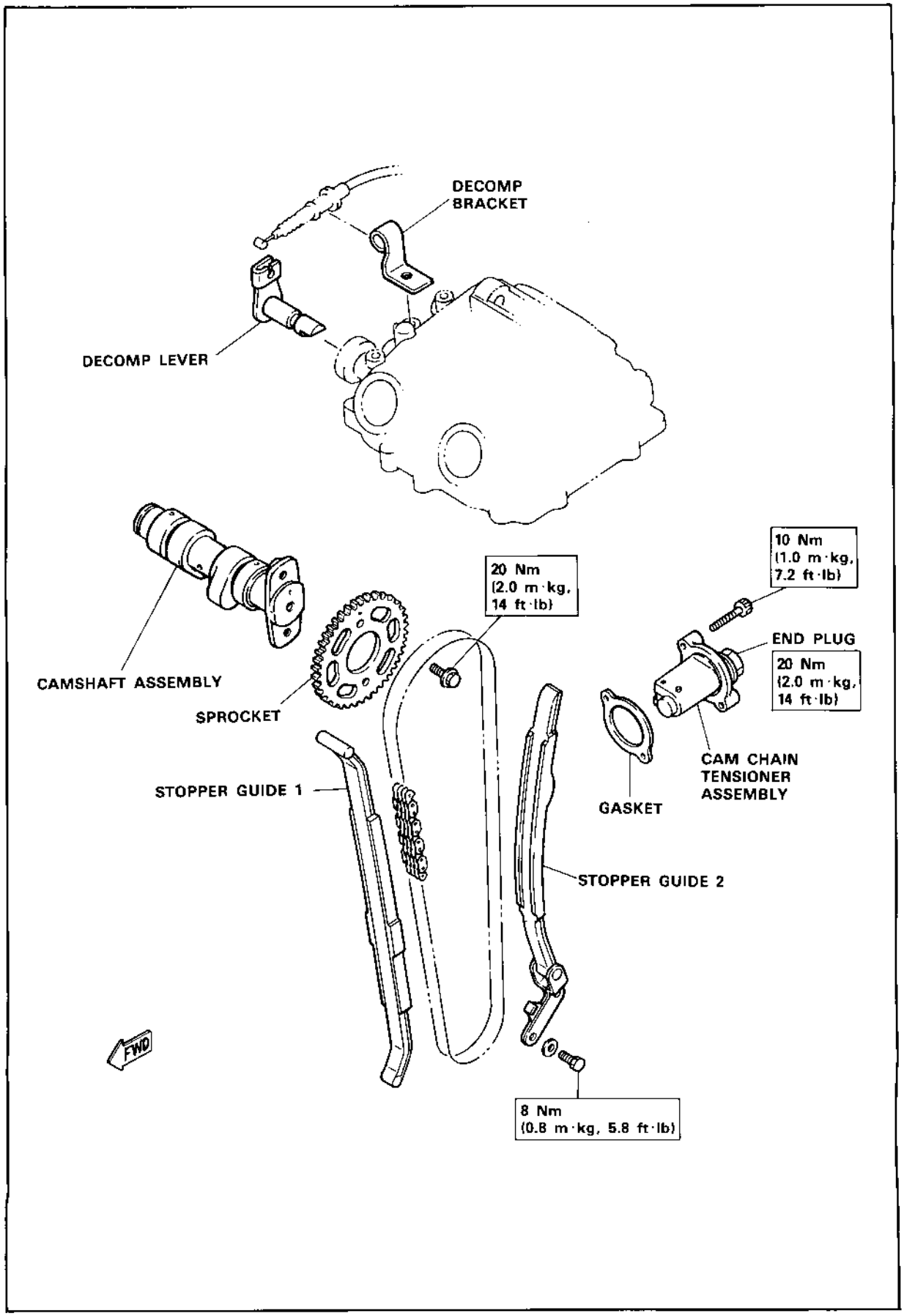
CYLINDER HEAD



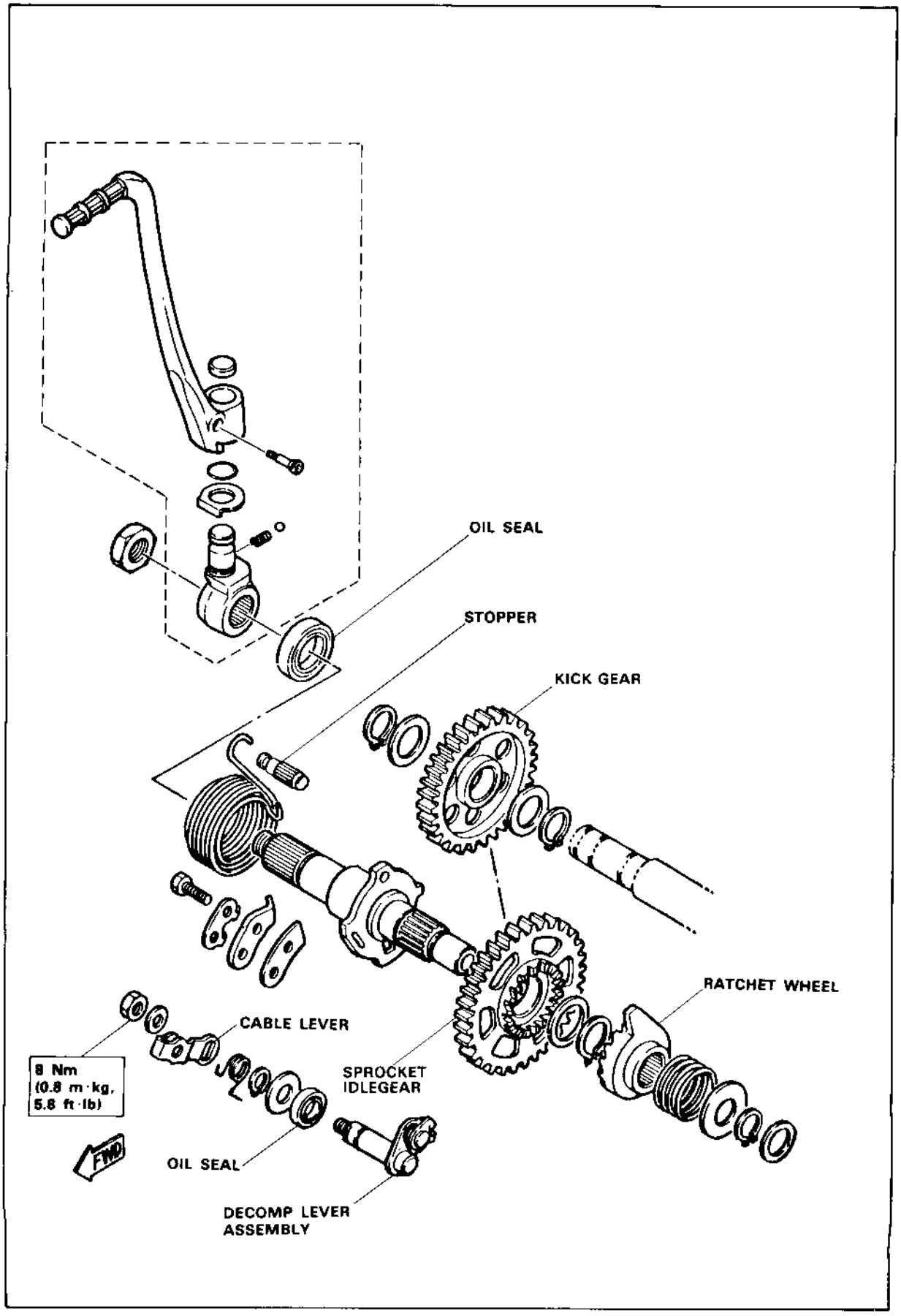
CYLINDER


22 Nm (2.2 m·kg, 16 ft·lb)
CYLINDER HEAD
NUT
20 Nm (2.0 m·kg, 14 ft·lb)
DOWEL PIN
RUBBER SEAL
PLATE WASHER
HEAD GASKET
CYLINDER
10 Nm (1.0 m·kg, 7.2 ft·lb)
CYLINDER GASKET
38 Nm (3.8 m·kg, 27 ft·lb)
FWD

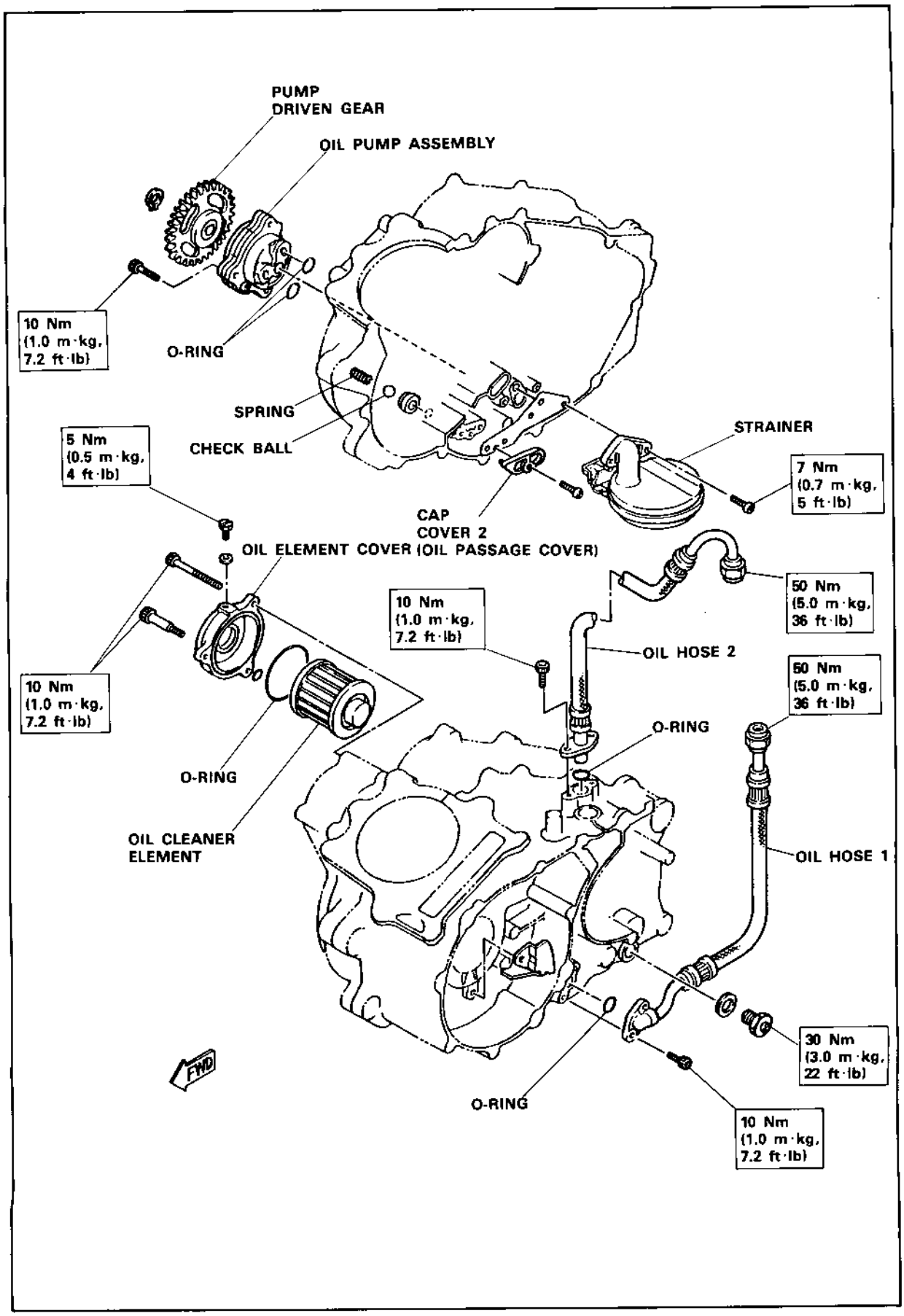
CAMSHAFT/CHAIN

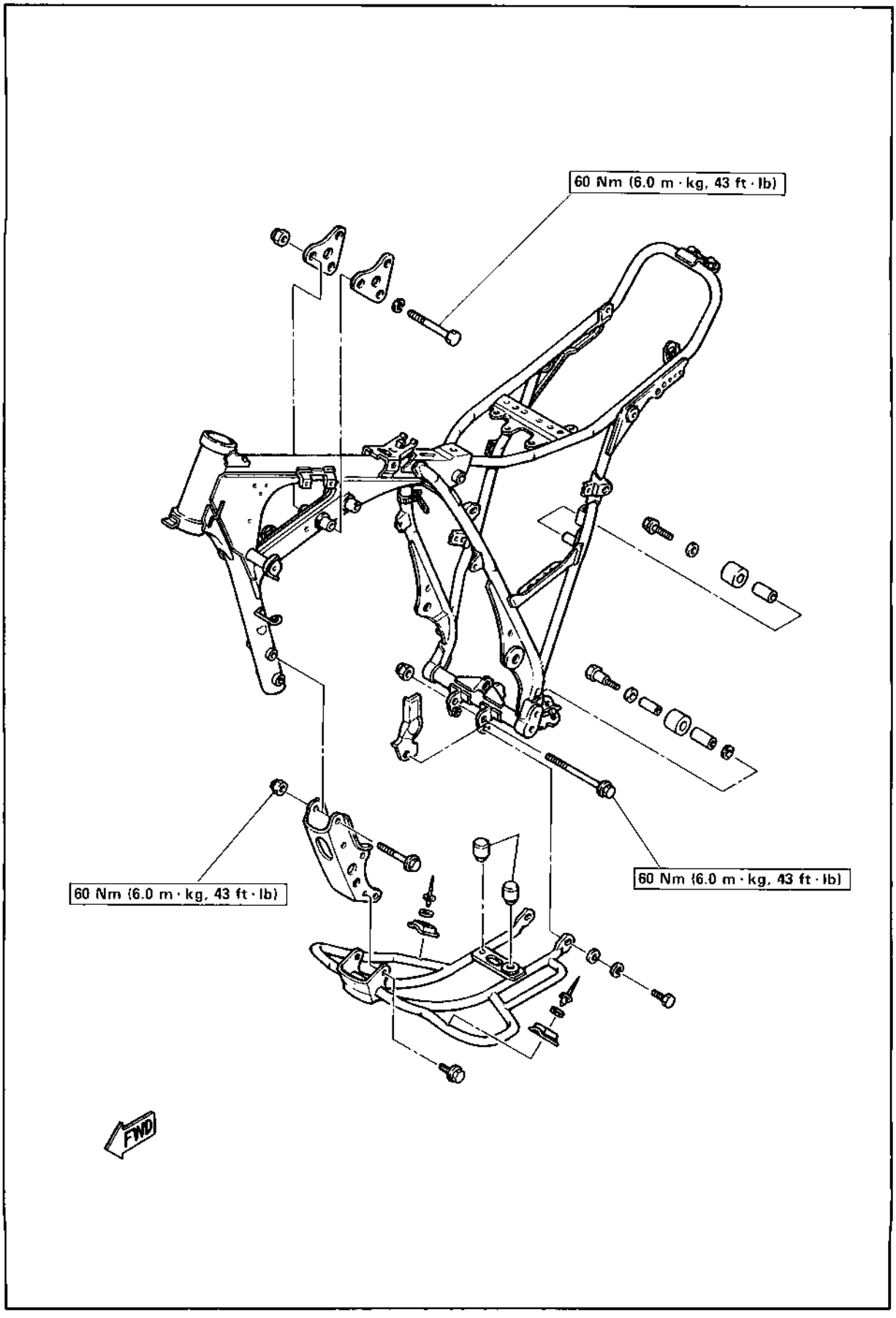


KICK STARTER

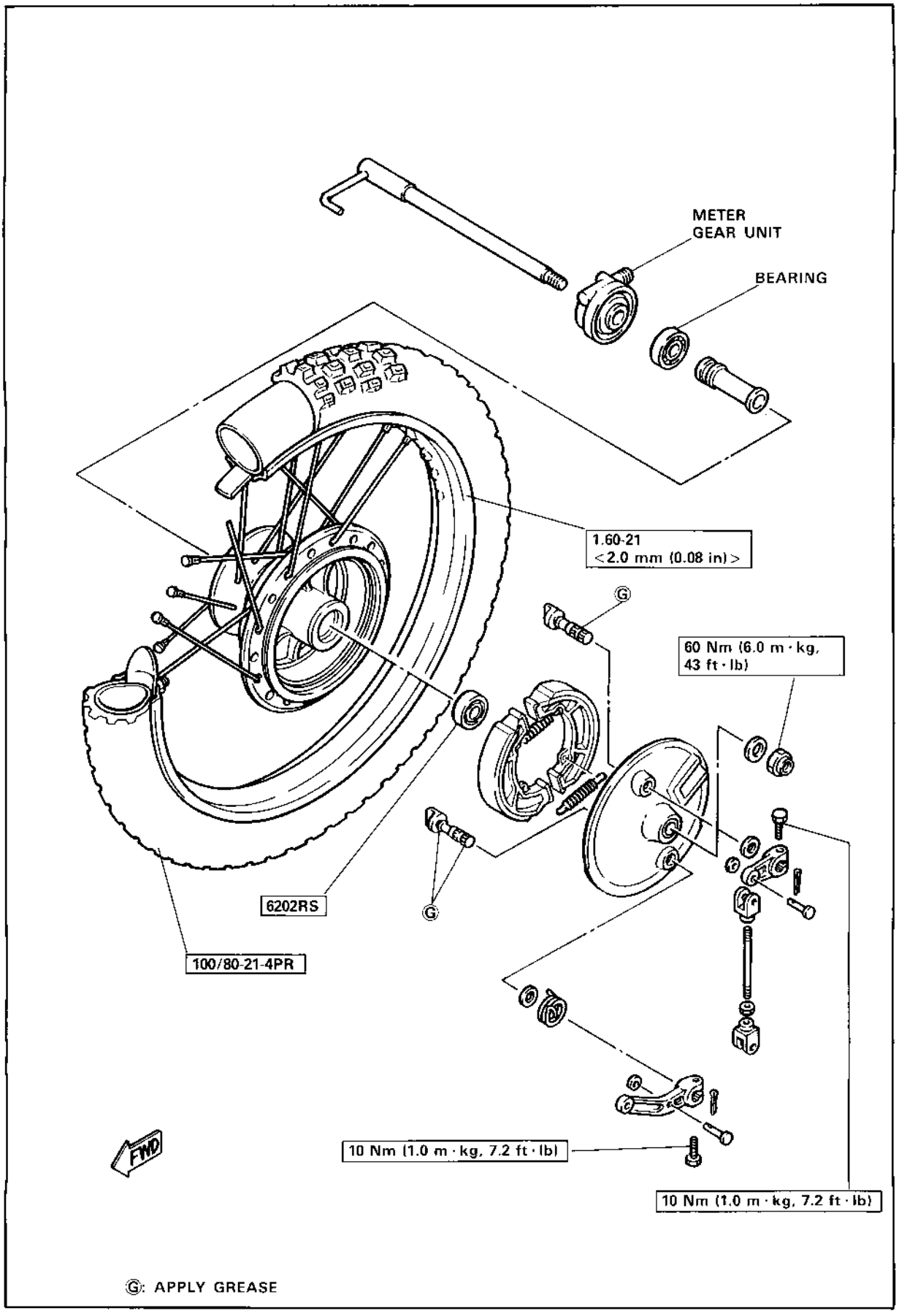


OIL PUMP/OIL CLEANER

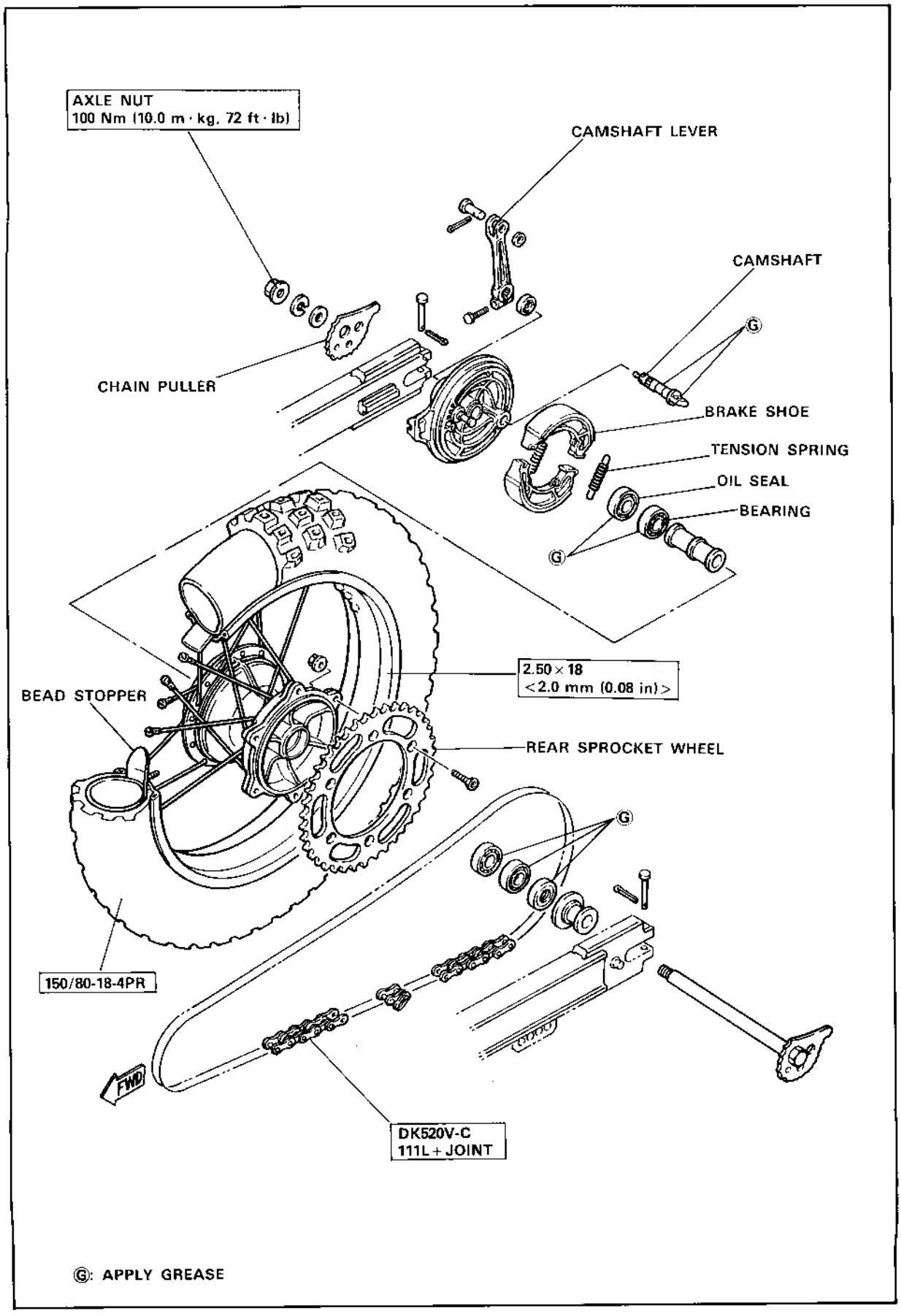



60 Nm (6.0 m · kg, 43 ft · lb)
60 Nm (6.0 m · kg, 43 ft · lb)
60 Nm (6.0 m · kg, 43 ft · lb)
FWD

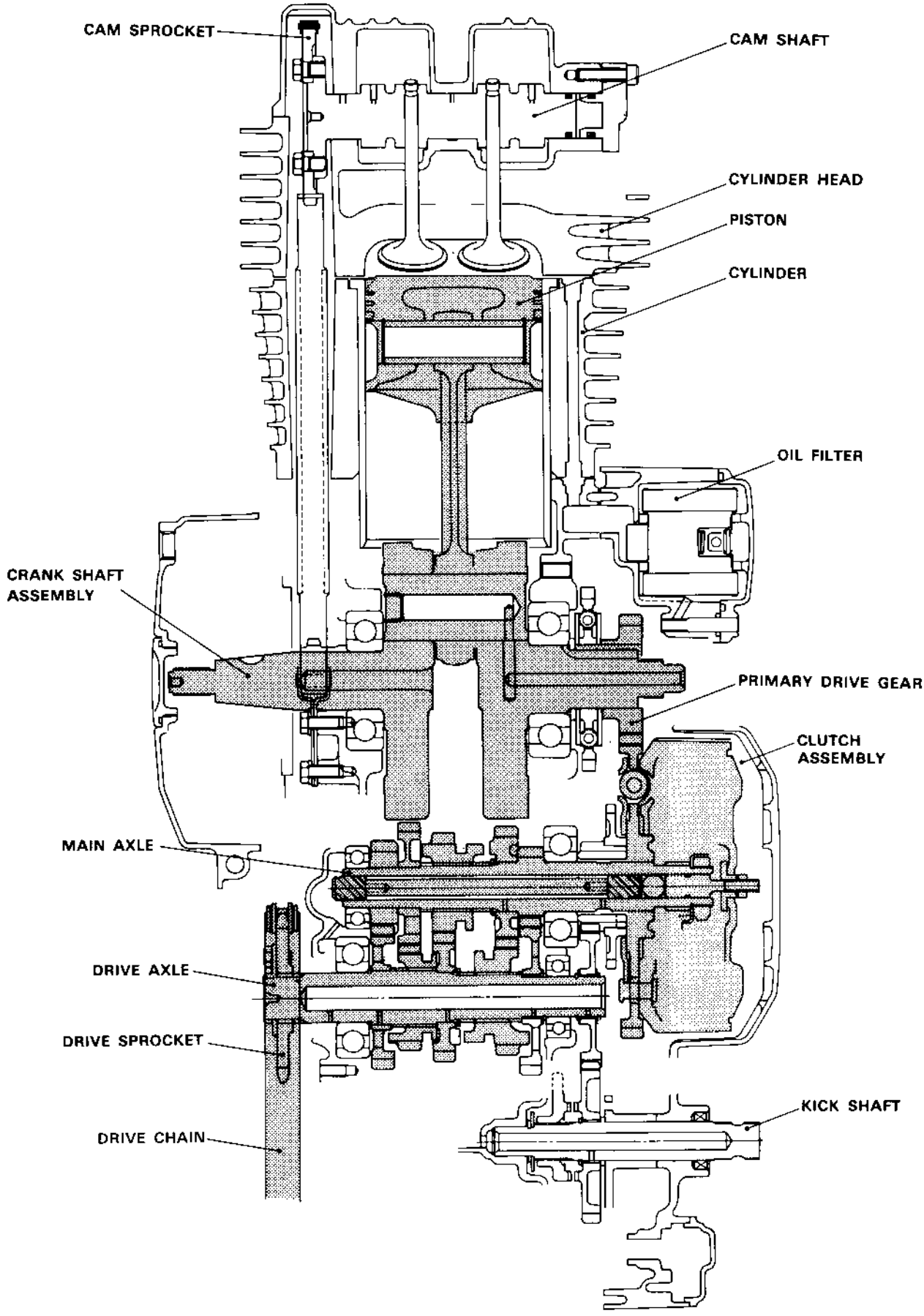
FRONT WHEEL


METER
GEAR UNIT
BEARING
1.60-21
<2.0 mm (0.08 in)>
G
60 Nm (6.0 m · kg,
43 ft · lb)
6202RS
G
100/80-21-4PR
FWD
10 Nm (1.0 m · kg, 7.2 ft · lb)
10 Nm (1.0 m · kg, 7.2 ft · lb)
G: APPLY GREASE

REAR WHEEL


AXLE NUT
100 Nm (10.0 m · kg, 72 ft · lb)
CAMSHAFT LEVER
CAMSHAFT
Ⓖ
CHAIN PULLER
BRAKE SHOE
TENSION SPRING
OIL SEAL
BEARING
Ⓖ
2.50 × 18
<2.0 mm (0.08 in)>
BEAD STOPPER
REAR SPROCKET WHEEL
Ⓖ
150/80-18-4PR
FWD
DK520V-C
111L + JOINT
Ⓖ: APPLY GREASE

POWER FLOW CHART

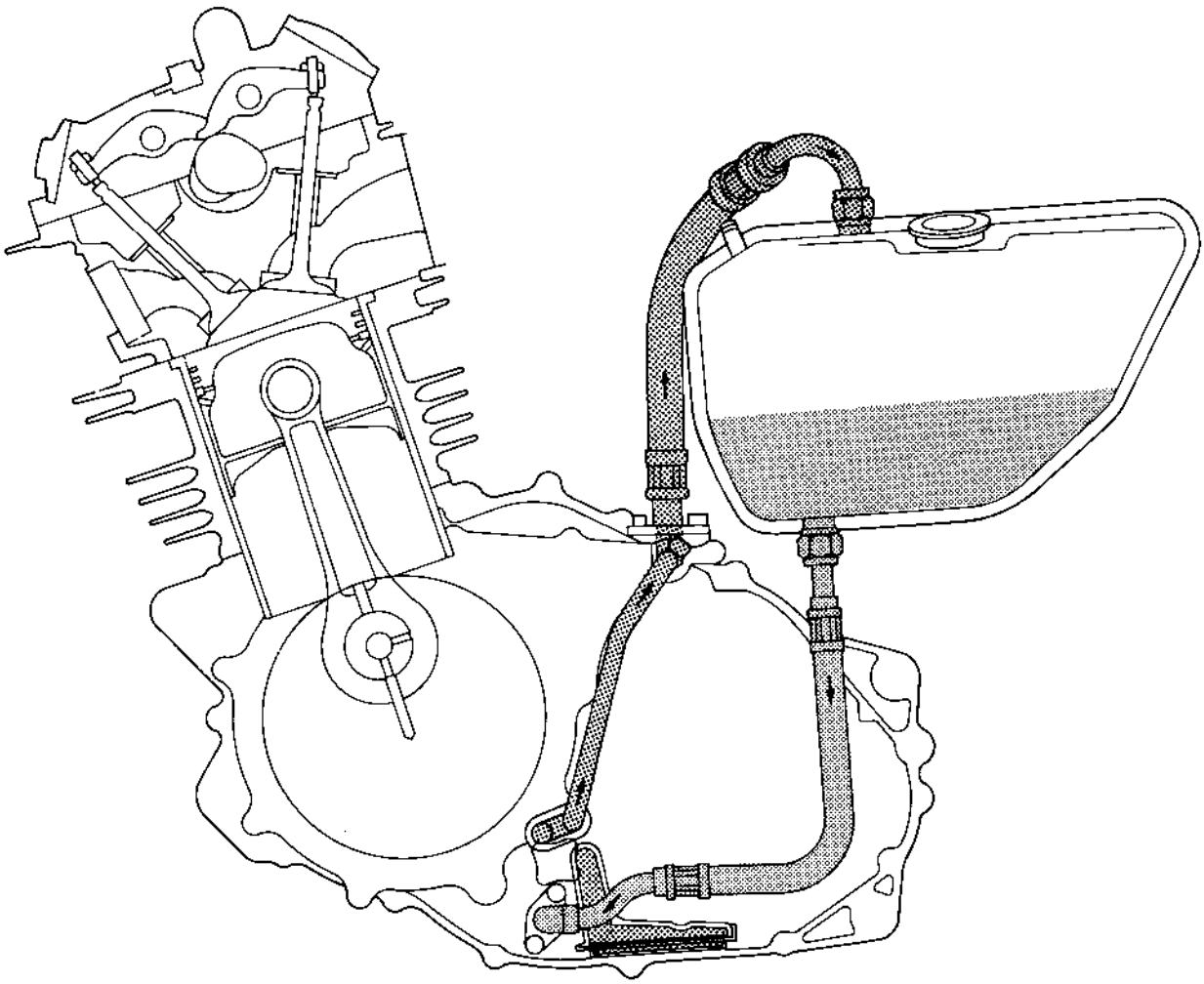


LUBRICATION CHARTS

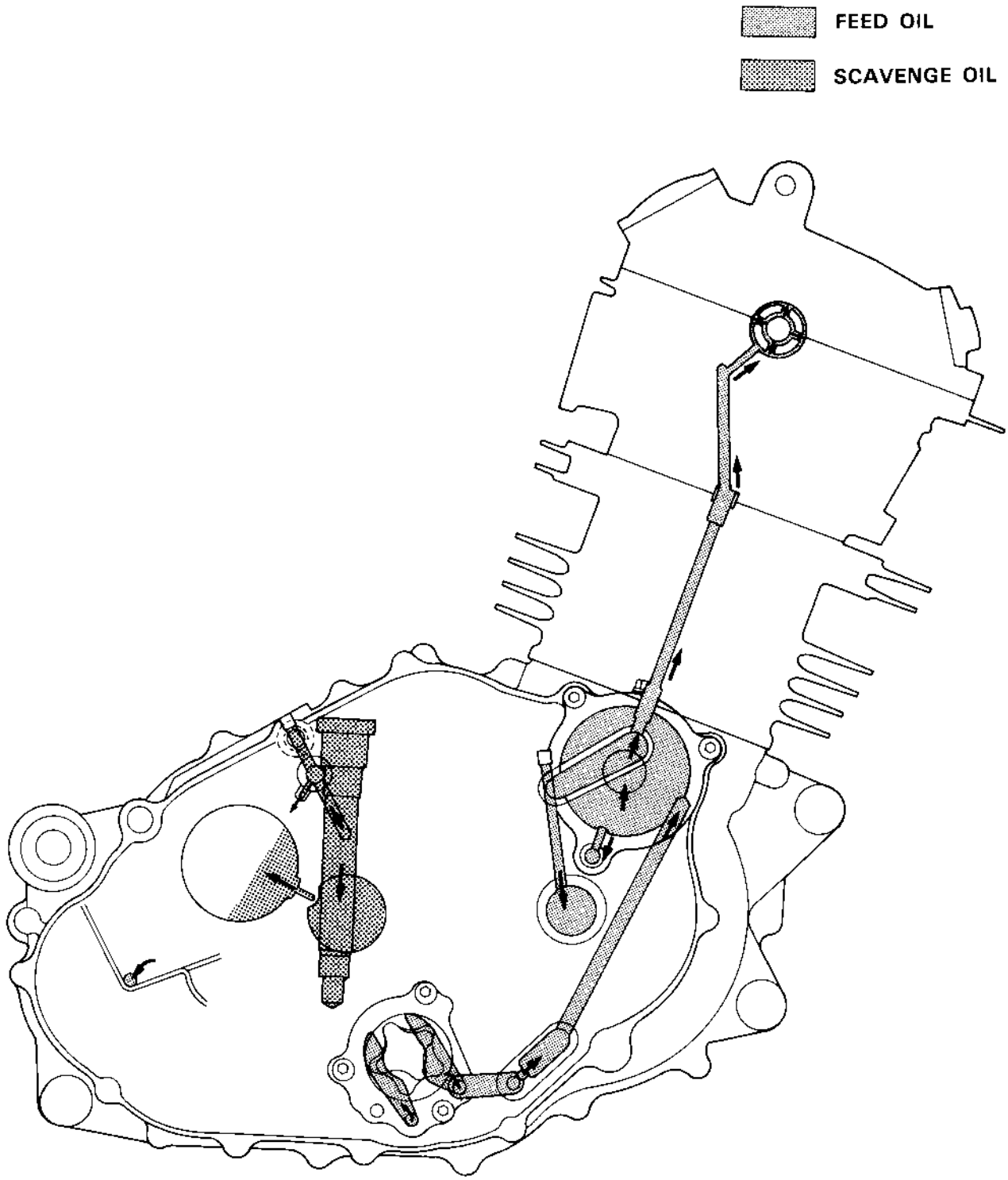
LUBRICATION CHART (1)

FEED OIL

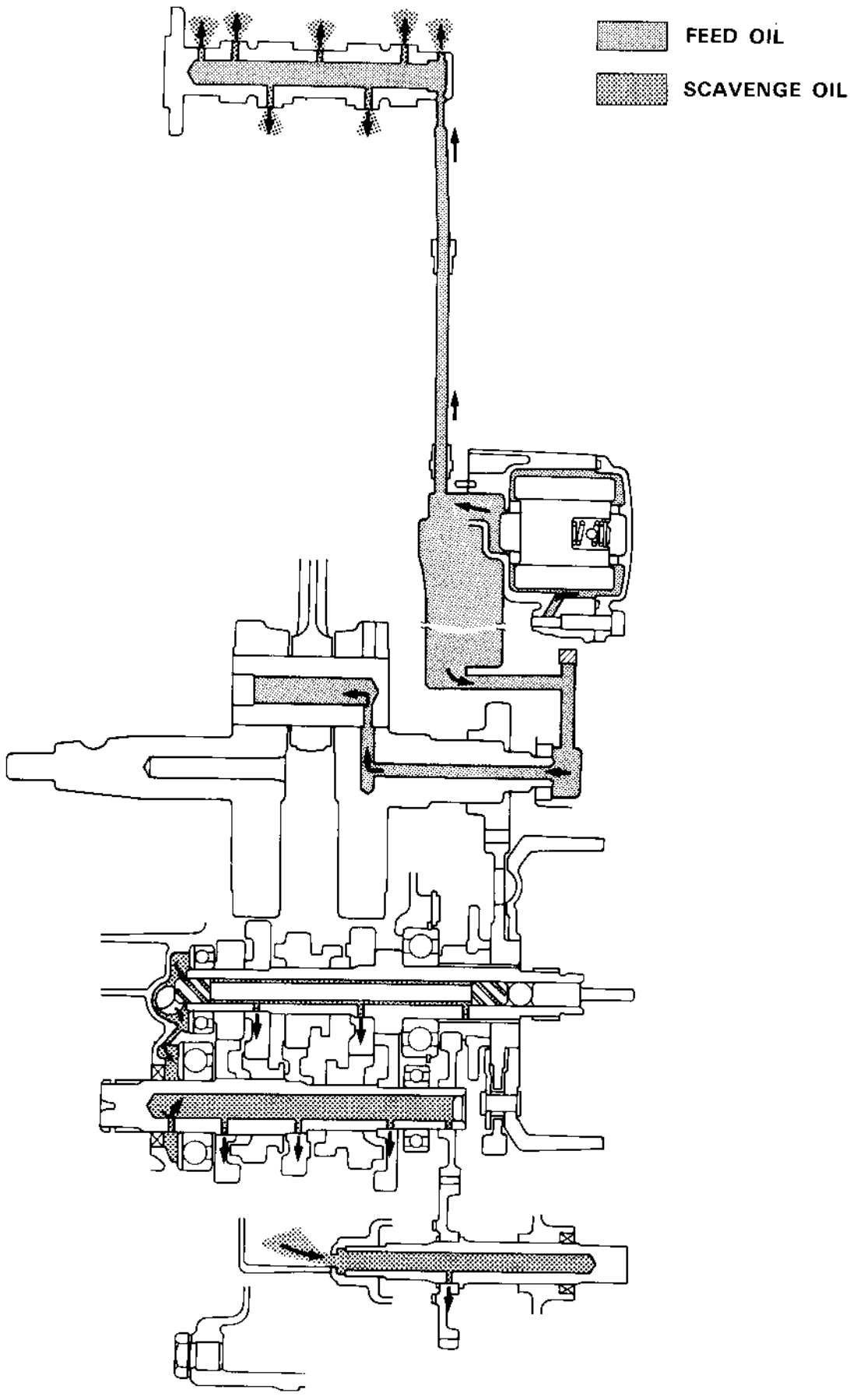
SCAVENGE OIL



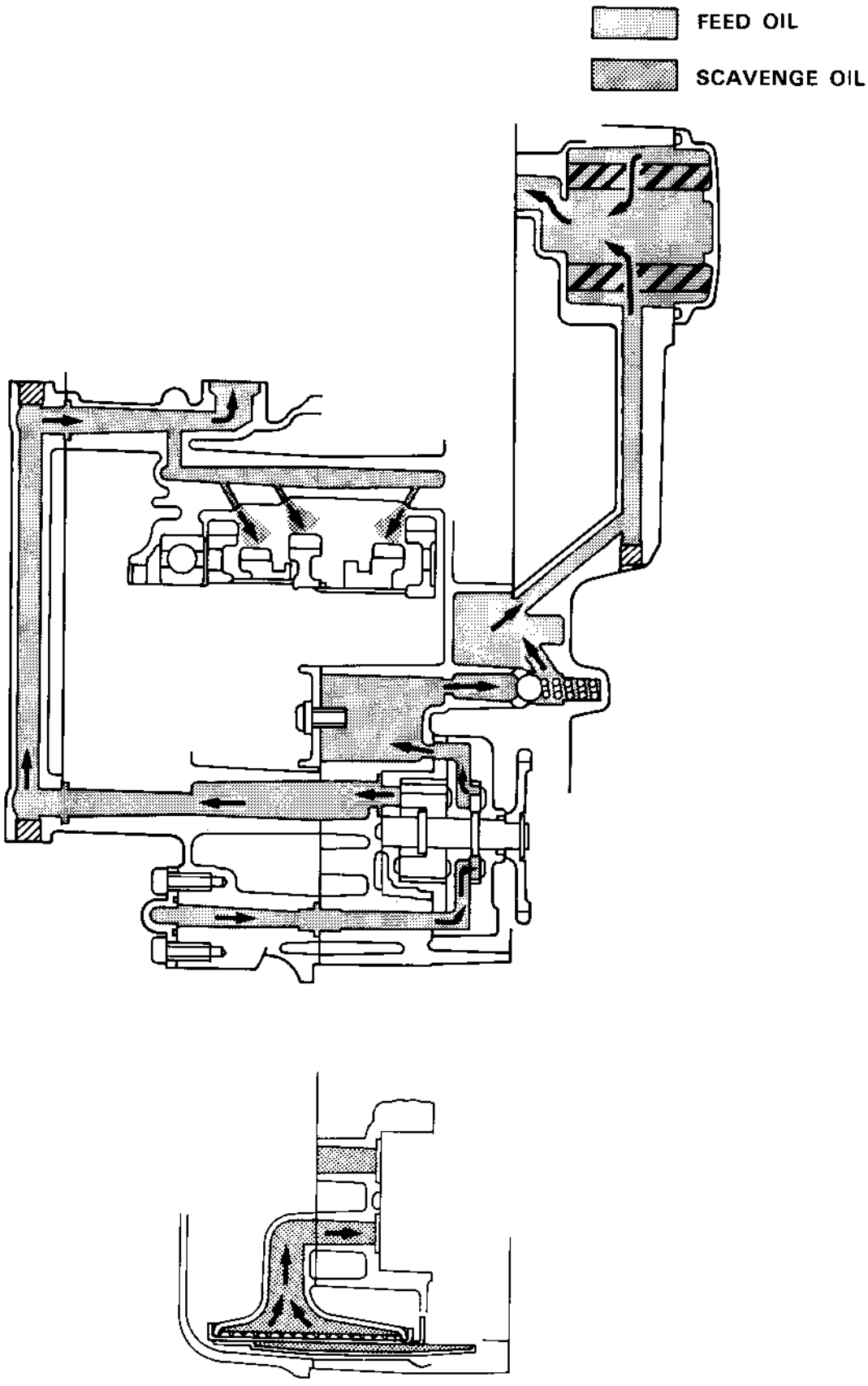
LUBRICATION CHART (2)



LUBRICATION CHART (3)

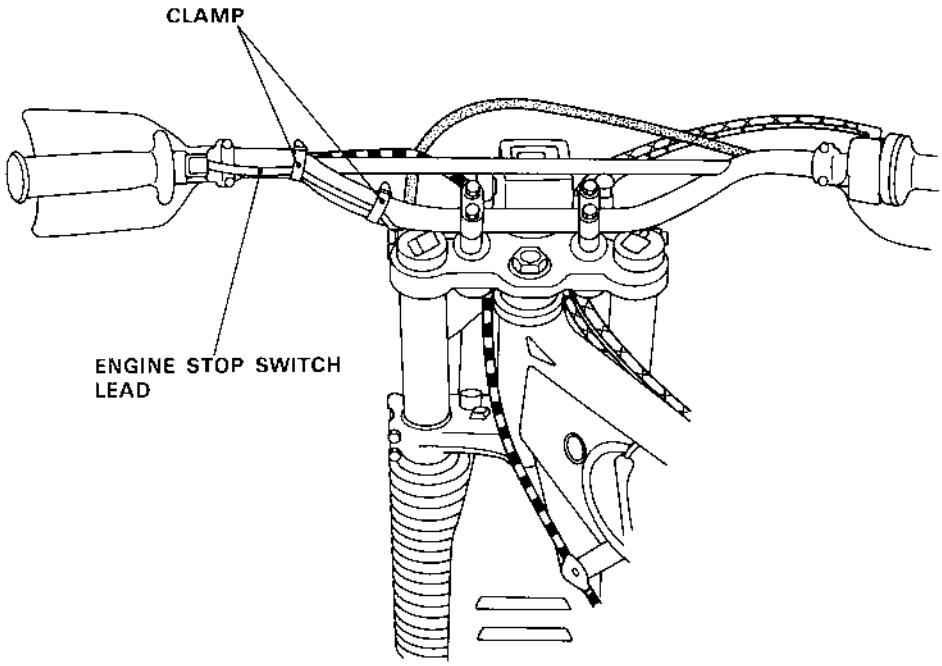


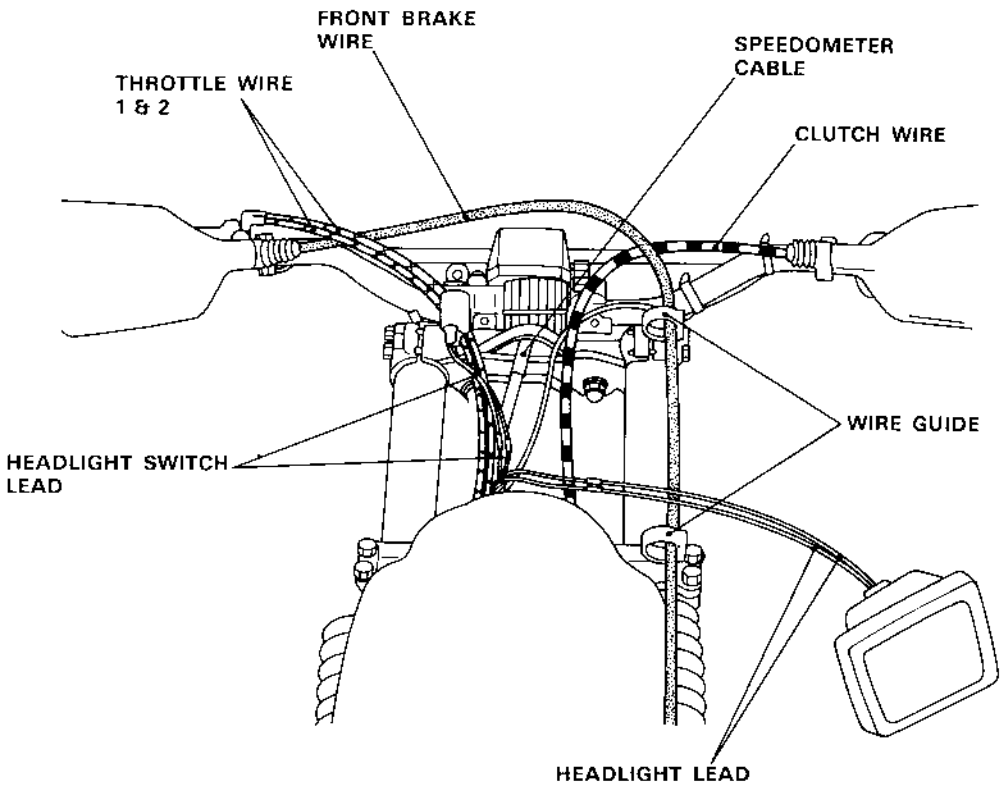
LUBRICATION CHART (4)



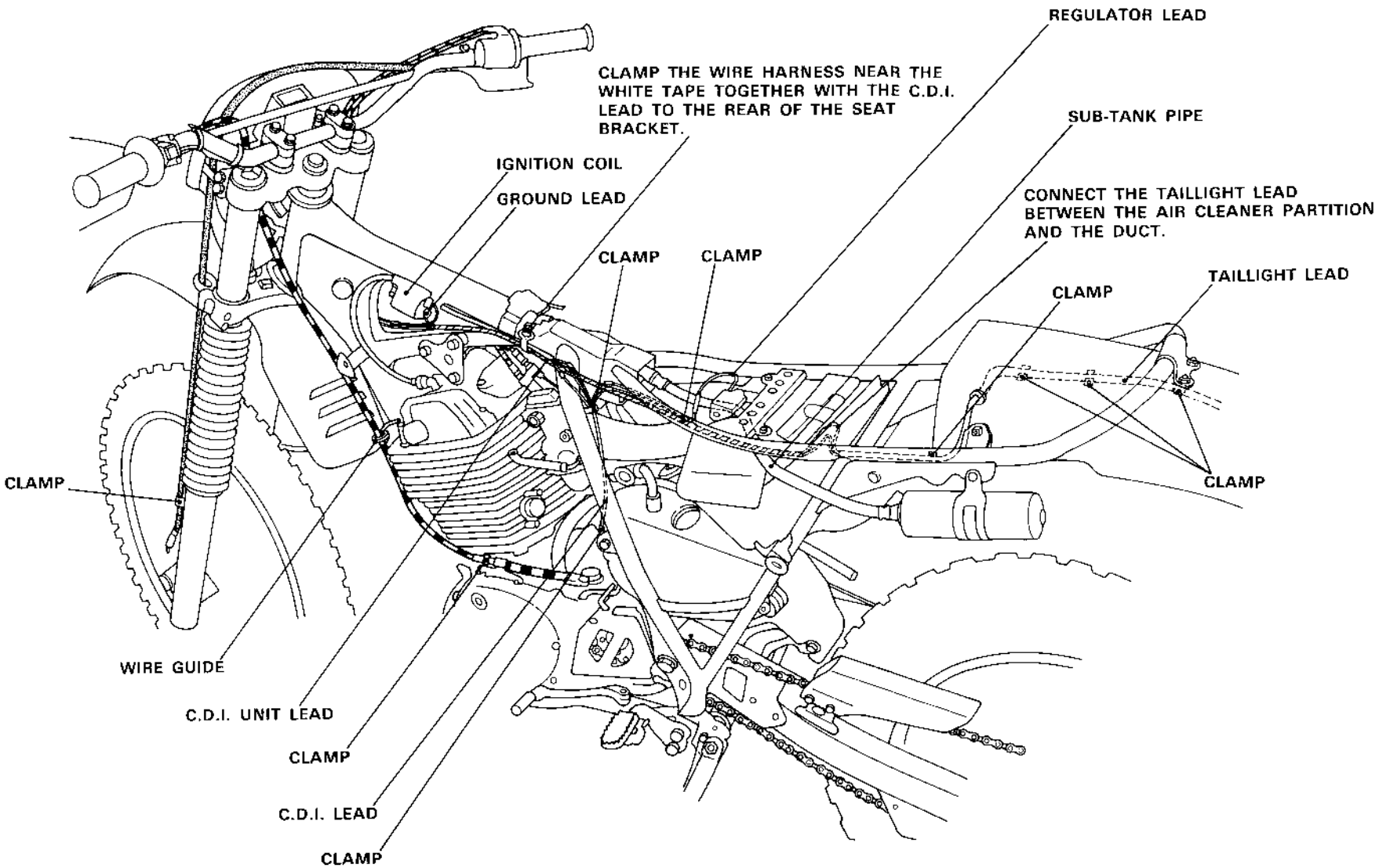
CABLE ROUTING DIAGRAMS

CABLE ROUTING DIAGRAM (1)

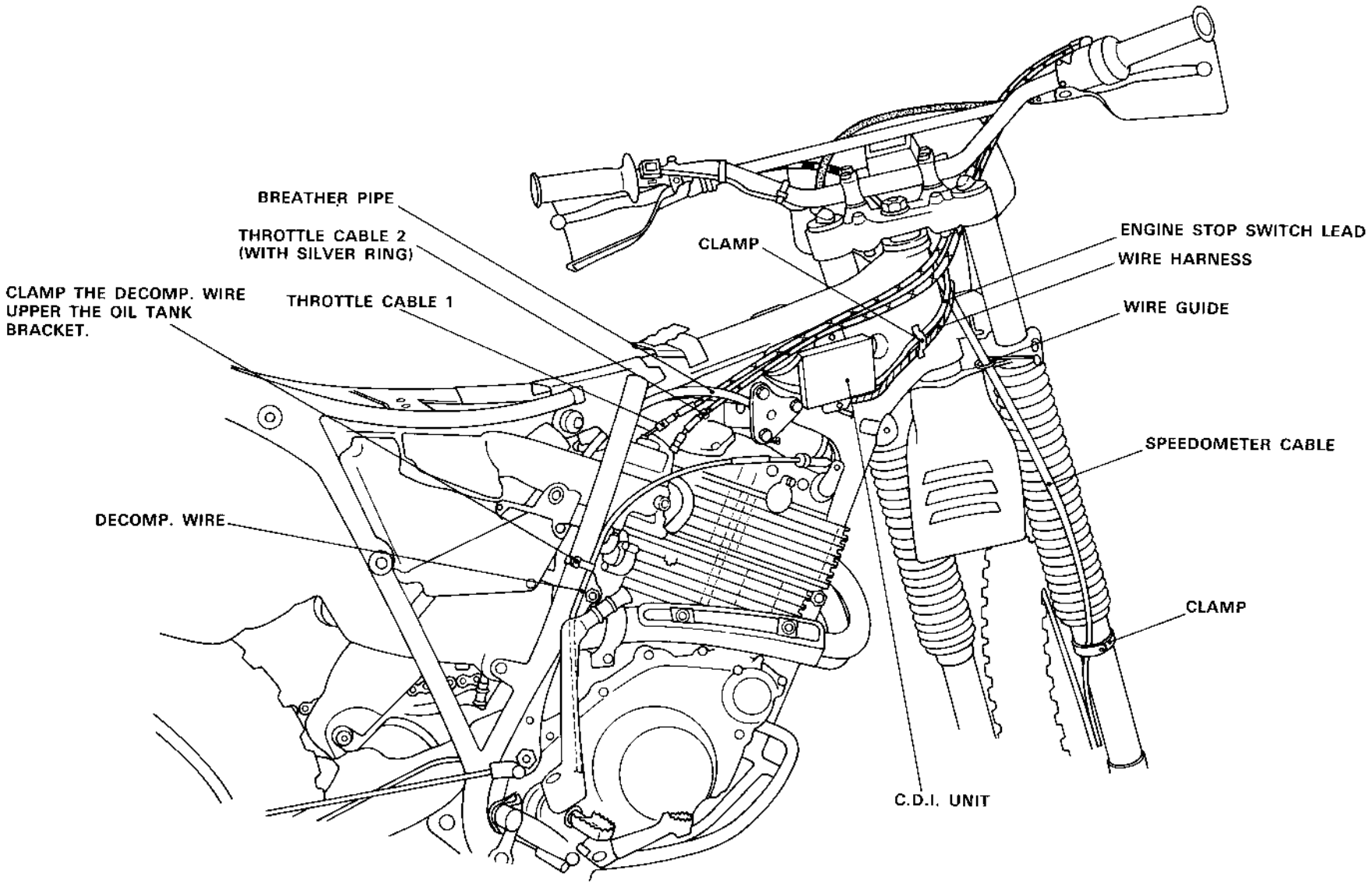




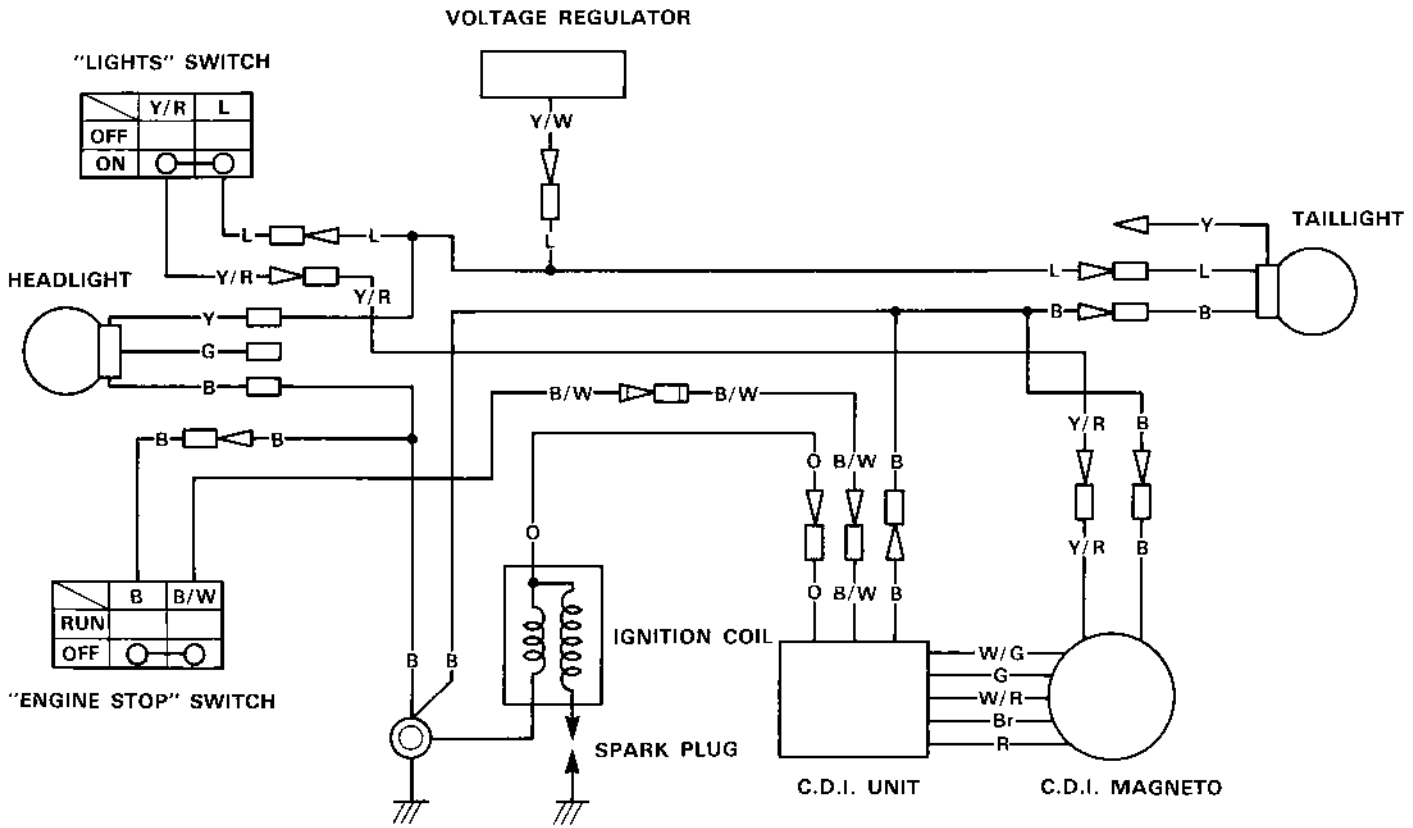
CABLE ROUTING DIAGRAM (2)



CABLE ROUTING DIAGRAM (3)



TT600K WIRING DIAGRAM



COLOR CODE
B .....Black
L .....Blue
G .....Green
Y .....Yellow
O .....Orange
R .....Red
Y/R ....Yellow/Red
W/G ....White/Green
B/W ....Black/White
Br.....Brown