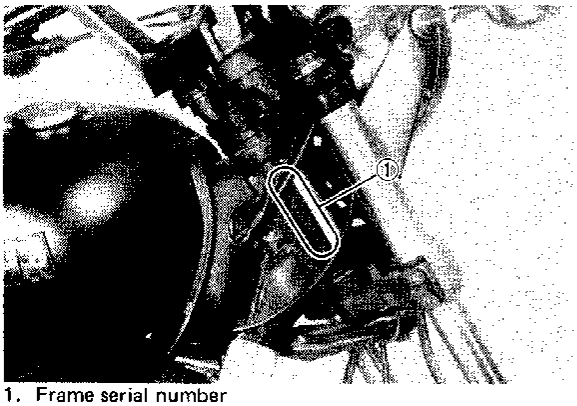
GENERAL INFORMATION

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

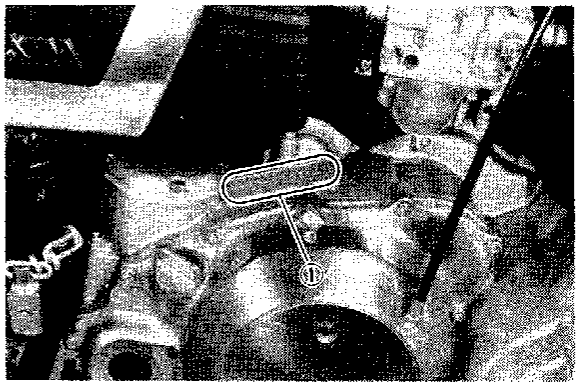
Starting Serial Number:
XJ1100J 10M-000101

B. Engine Serial Number

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

NOTE:

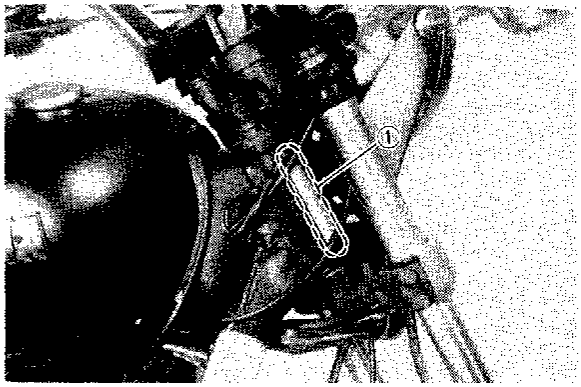
The first three digits of these numbers are for model identification; the remaining digits are the unit production number.



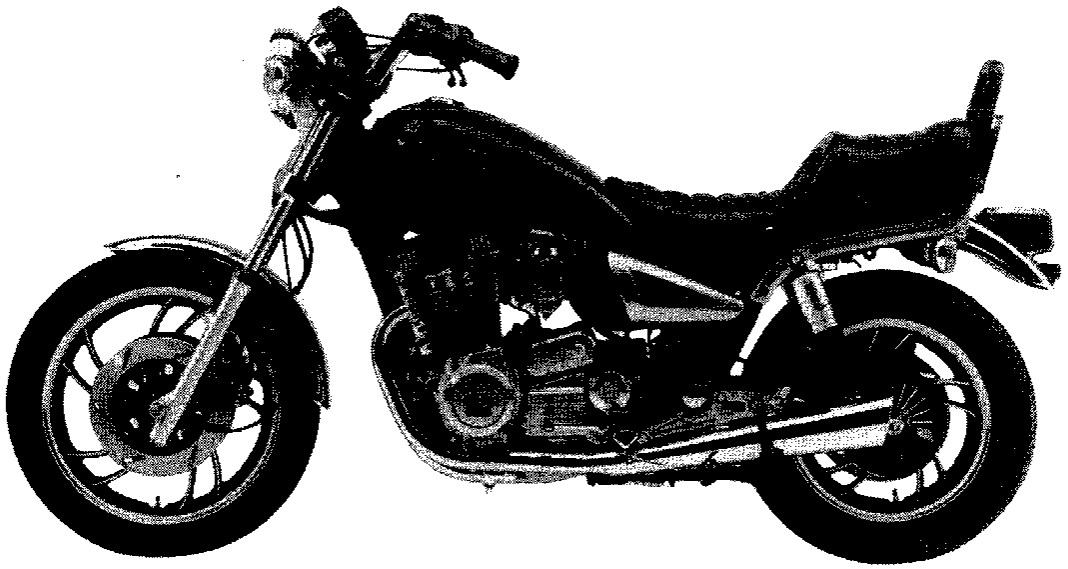
1. Engine serial number

C. Vehicle Identification Number

The vehicle identification number is on the right-side of the steering head pipe.



1. Vehicle identification number

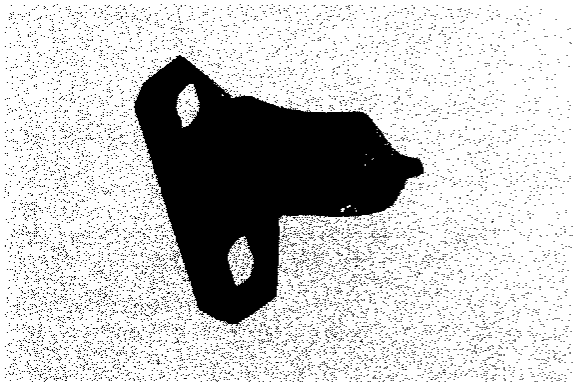


SPECIAL TOOLS

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

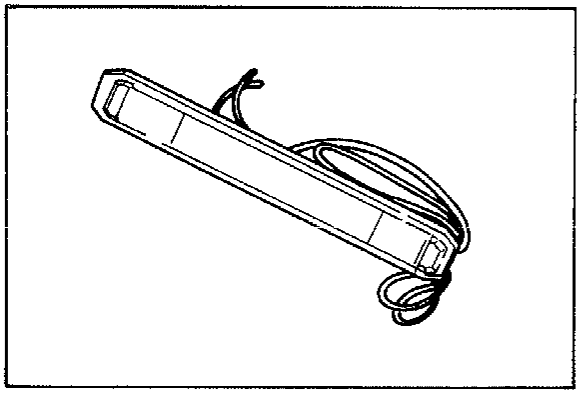
A. For Tune-up

1. Tappet adjusting tool
   P/N YM-01245



This tool is necessary to replace valve adjusting pads. This can also be used for the XJ750.

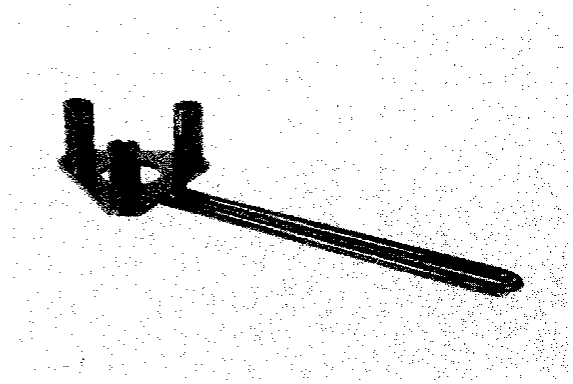
2. Compression gauge
3. Timing light
4. Tachometer
5. Vacuum gauge
   P/N YU-08030



This gauge is needed for carburetor synchronization.

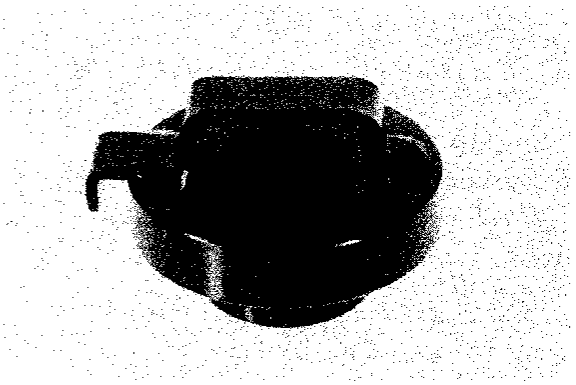
B. For Engine Service

1. Clutch holder
   P/N YM-04007



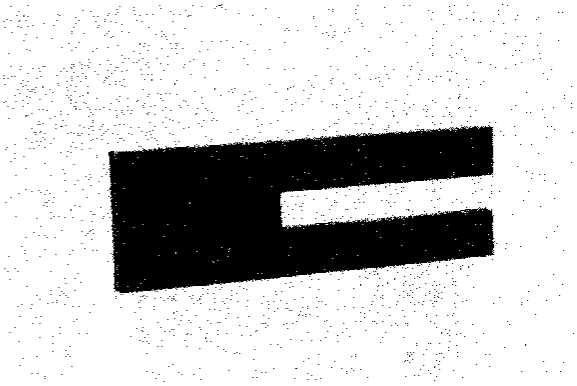
This tool is used to hold the clutch when removing or installing the clutch nut.

2. Drive axle holder
   P/N YM-04009



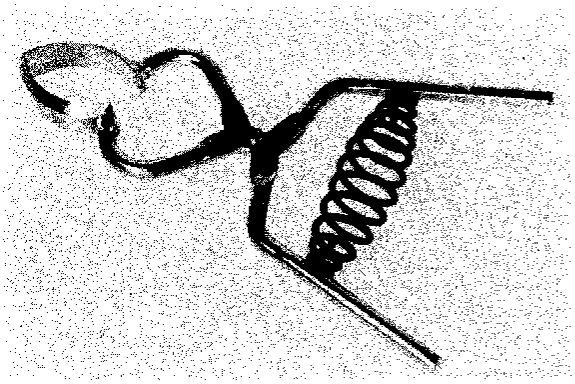
This tool must be used to remove and install the transmission drive axle.

3. Piston base
   P/N YM-01067



Use 4 of these to hold the piston during cylinder installation.

4. Piston ring compressor
P/N YM-04008

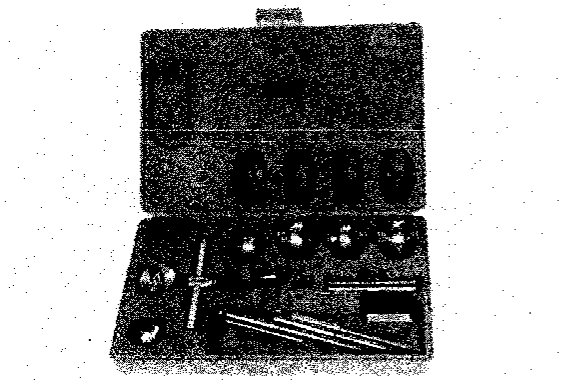


This is used to compress piston rings when installing the cylinder.

5. Valve guide reamer
P/N YM-01225

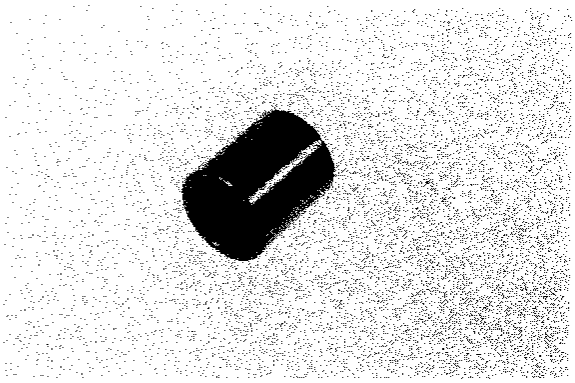
This must be used when replacing the valve guide.

6. Valve seat cutter set
P/N YM-91043



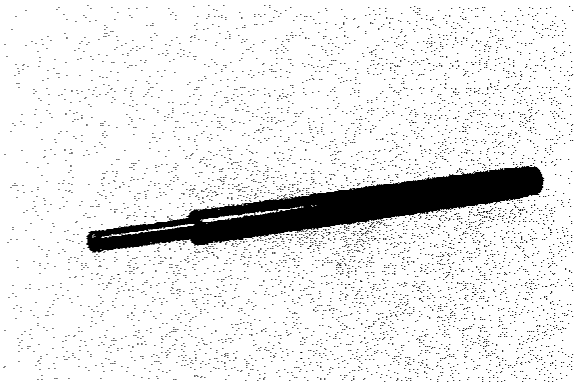
This tool is needed to re-surface the valve seat.

7. Valve guide installer
P/N YM-04017



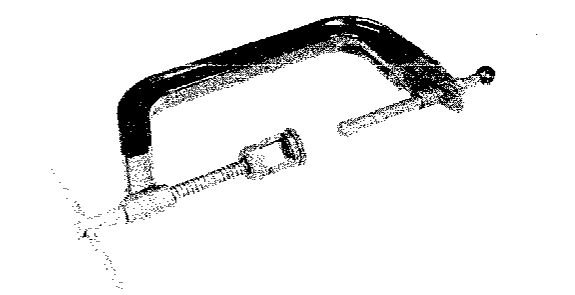
Tool 7 and 8 are used to install the valve guide.

8. Valve guide remover
P/N YM-01225



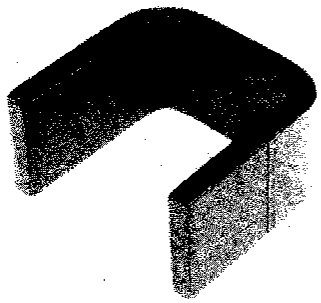
This must be used to remove valve guides.

9. Valve spring compressor
P/N YM-04019



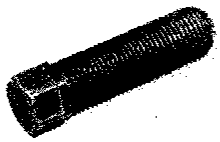
This tool must be used for removing and installing valve assemblies.

10. Damper compressor
P/N YM-04011



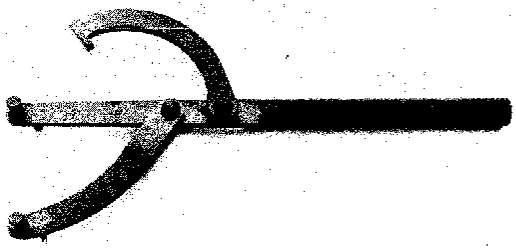
This tool is needed to disassemble ane reassemble the primary shaft damper.

11. Rotor puller
P/N YM-01080



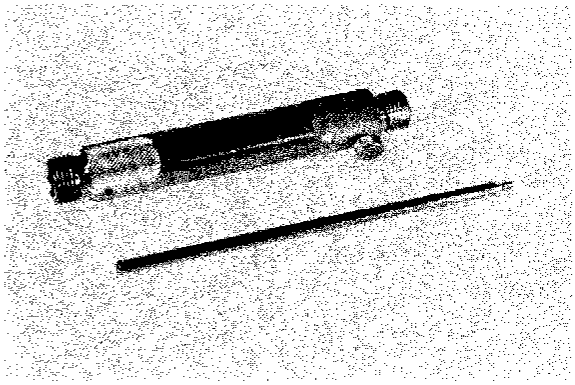
This tool is needed to remove the alternator rotor.

12. Rotor holding tool
P/N YM-01235



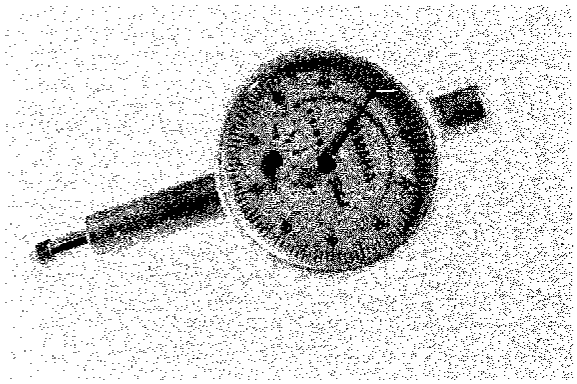
This is used to hold the alternator rotor during removal and installation.

13. Dial gauge stand
P/N YU-01256



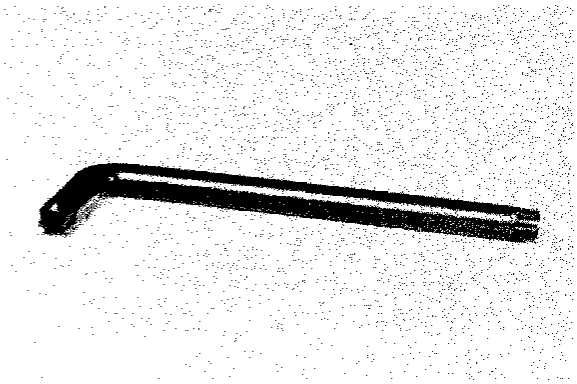
This tool is needed to hold the dial gauge.

14. Dial gauge
P/N YU-03097



This dial gauge is used to determine piston position for correct timing.

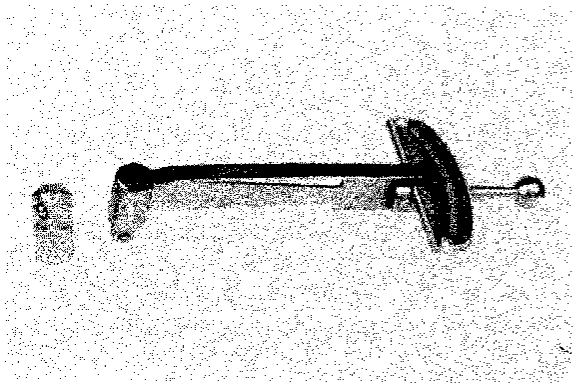
15. Drive axle wrench
P/N YU-05245



This wrench is used to remove the drive shaft bearing housing, special oil nozzle etc.

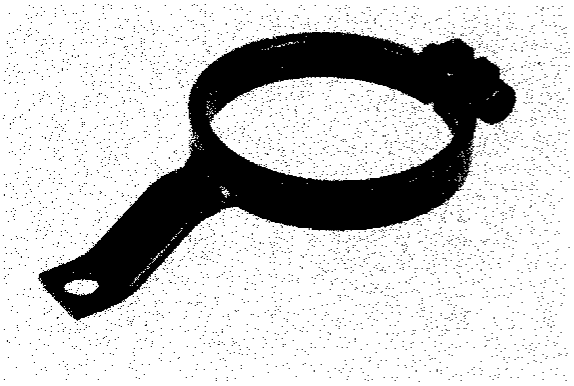
C. For Shaft Drive Service
(See the Shaft Drive Service Manual for use of these tools)

1. Torque wrench (0 ~ 15 cm-kg)
P/N 90890-05244



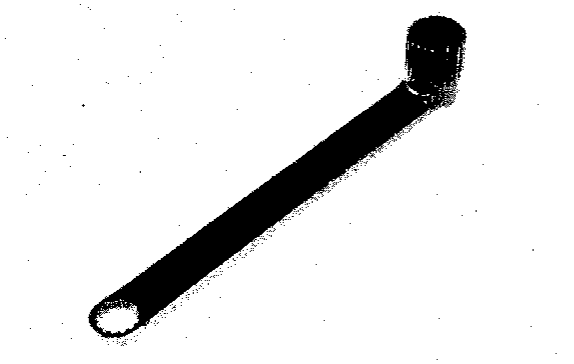
A sensitive torque wrench must be used for measuring bearing preload.

2. Final drive gear holding tool
P/N YM-01254



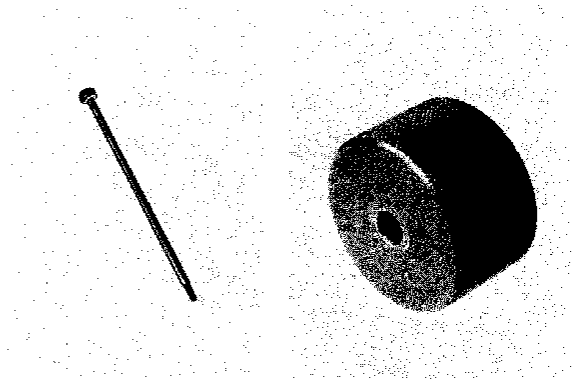
This tool is needed when measuring gear lash.

3. Middle and final gear holding tool
P/N YM-01229



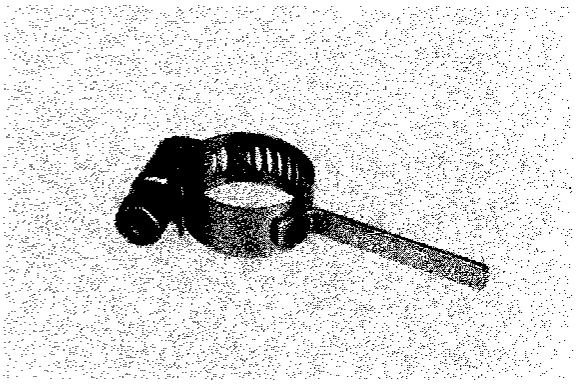
This tool is used when measuring gear lash and tooth contact.

4. Slide hammer
P/N YU-01083, 01084



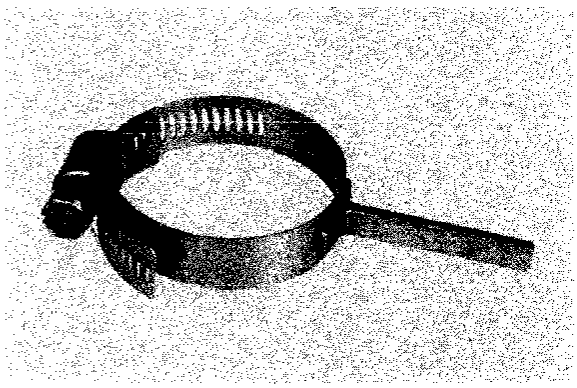
This tool is used to remove the final gear bearing housing and the drive shaft.

5. Gear lash measurement tool (Middle gear)
P/N YM-01231



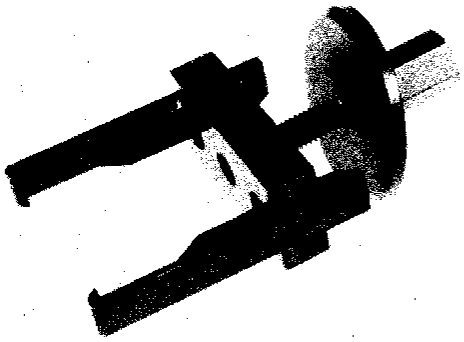
This tool is needed when measuring gear lash for middle gear.

6. Gear lash measurement tool (Final gear)
P/N YM-01230



This tool is needed when measuring gear lash for final gear.

7. Drive shaft puller
   P/N YM-04012

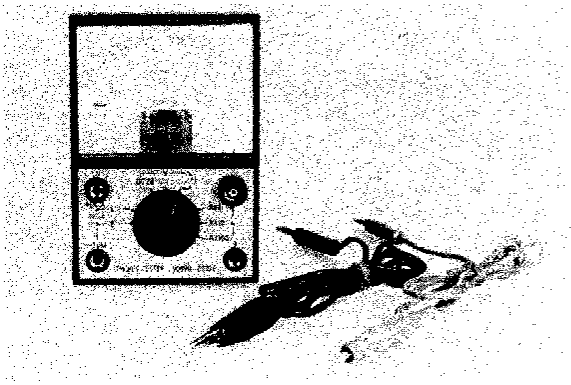


This tool is used to remove the drive shaft.

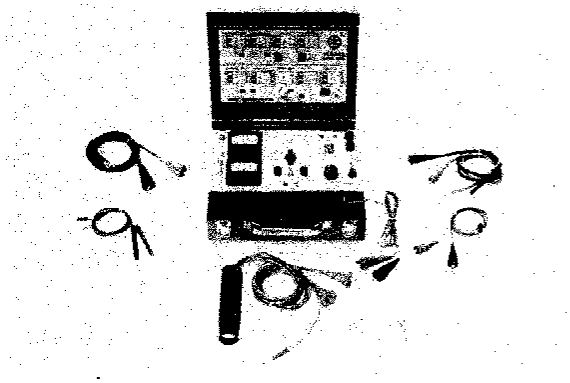
D. For Electrical Components

The uses of these tools are described in Chapter 6.

1. Pocket tester
   P/N YU-03112



2. Electro tester
   P/N YU-03021



PERIODIC INSPECTION AND ADJUSTMENT

INTRODUCTION

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

MAINTENANCE INTERVALS CHARTS

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

PERIODIC MAINTENANCE EMISSION CONTROL SYSTEM

	Item	Remarks	Initial break-in		Thereafter every	
			1,000 km (600 mi) or 1 month	5,000 km (3,000 mi) or 7 months	4,000 km (2,500 mi) or 6 months	8,000 km (5,000 mi) or 12 months
1*	Cam chain	Adjust chain tension	○	○		○
2*	Valve clearance	Check and adjust valve clearance when engine is cold.		○		○
3	Spark plugs	Check condition. Adjust gap/Clean. Replace at 13,000 km (or 18 months) and thereafter every 12,000 km (or 18 months)		○	○	Replace every 12,000 km or 18 months
4*	Crankcase ventilation system	Check ventilation hose for cracks or damage. Replace if necessary.		○		○
5*	Fuel line	Check fuel hose for cracks or damage. Replace if necessary.		○		○
6*	Exhaust system	Check for leakage. Retighten as necessary. Replace gasket(s) if necessary.		○	○	
7*	Carburetor synchronization	Adjust synchronization of carburetors.		○	○	
8*	Idle speed	Check and adjust engine idle speed. Adjust cable free play if necessary.		○	○	

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

GENERAL MAINTENANCE/LUBRICATION

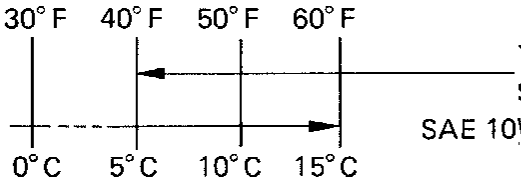
No.	Item	Remarks	Type	Initial break-in		Thereafter every		
				1,000 km (600 mi) or 1 month	5,000 km (3,000 mi) or 7 months	4,000 km (2,500 mi) or 6 months	8,000 km (5,000 mi) or 12 months	16,000 km (10,000 mi) or 24 months
1	Engine oil	Warm-up engine before draining.	Refer to NOTE.	○	○	○		
2	Oil filter	Replace.	—	○	○		○	
3	Middle/Final gear oil	Replace.	Refer to NOTE.	○			○	
4	Air filter	Dry type filter. Clean with compressed air.	—		○		○	

No.	Item	Remarks	Type	Initial break-in		Thereafter every		
				1,000 km (600 mi) or 1 month	5,000 km (3,000 mi) or 7 months	4,000 km (2,500 mi) or 6 months	8,000 km (5,000 mi) or 12 months	16,000 km (10,000 mi) or 24 months
5*	Brake system	Adjust free play. Replace pads if necessary.	–	○	○	○		
6*	Clutch	Adjust free play.	–	○	○	○		
7*	Control and meter cable	Apply cable lube thoroughly.	Yamaha chain and cable lube or SAE 10W30 motor oil.	○	○	○		
8*	Rear arm pivot bearings	Check bearings assembly for looseness. Moderately repack every 16,000 km (10,000 mi).	Medium weight wheel bearing grease.					Repack
9*	Drive shaft joint	Apply 25 ~ 30cm^2 of specified grease.	Molybdenum disulfide grease NLGI-2M.		○	○		
10	Brake pedal shaft	Apply grease lightly.	Lithium soap grease.		○	○		
11	Change pedal shaft/Brake and clutch lever pivot	Apply chain lube lightly.	Yamaha chain and cable lube or SAE 10W30 motor oil.		○	○		
12	Center and sidestand pivots	Apply chain lube lightly.	Yamaha chain and cable lube or SAE 10W30 motor oil.		○	○		
13*	Front fork oil	Drain completely. Refill to specification.	Yamaha fork oil 10Wt or equivalent.					○
14*	Steering ball bearing and races	Check bearings assembly for looseness. Moderately repack every 16,000 km (10,000 mi).	Medium weight wheel bearing grease.		○	○		Repack
15*	Wheel bearings	Check bearings for smooth rotation. Replace if necessary.	–		○	○		
16	Battery	Check specific gravity. Check breather pipe for proper operation.	–		○	○		
17*	A.C. Generator	Replace generator brushers. Replace at initial 13,000 km (8,000 mi) and thereafter every 16,000 km (10,000 mi).	–					Replace

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

NOTE:

Engine oil type:



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

SAE 10W30 type SE motor oil

Middle gear/Final gear oil type:

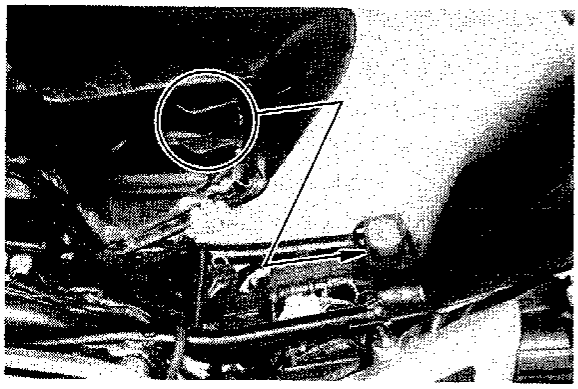
SAE 80 API GL-4 Hypoid gear oil

ENGINE

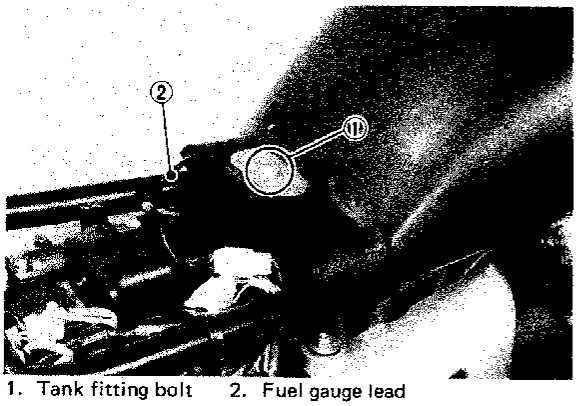
A. Valve Clearance Adjustment

NOTE:
Valve clearance must be measured after the engine cools down so it can be touched with your hand.

1. Remove the seat and fuel tank.
   a. Insert the key in the seat lock and turn it counterclockwise. Then push down the levers on both side.

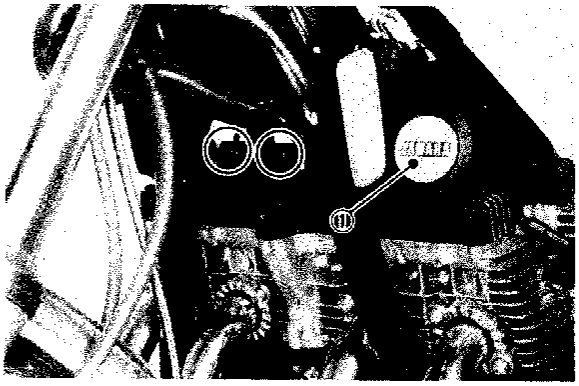


   b. Remove the bolt that holds the fuel tank to the frame and remove the fuel and vacuum pipes. Disconnect the fuel gauge unit lead wires and remove the fuel tank.



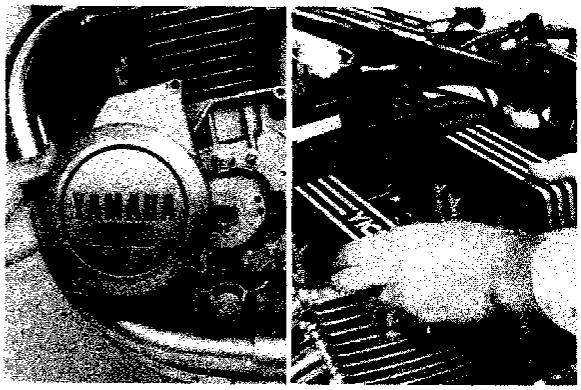
1. Tank fitting bolt 2. Fuel gauge lead

   c. Remove the horn and bracket assembly.



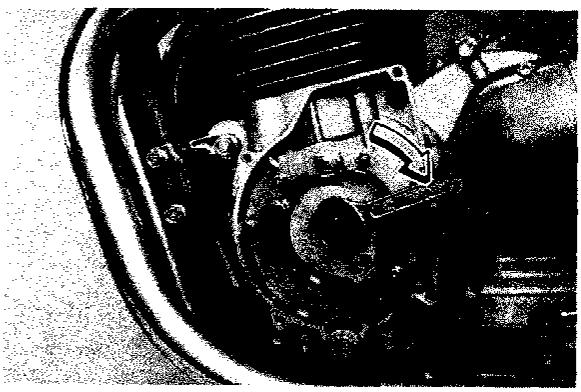
1. Horn

2. Remove the cylinder head cover and the timing plate cover. Care should be taken to not scratch or damage gasket sealing surfaces.



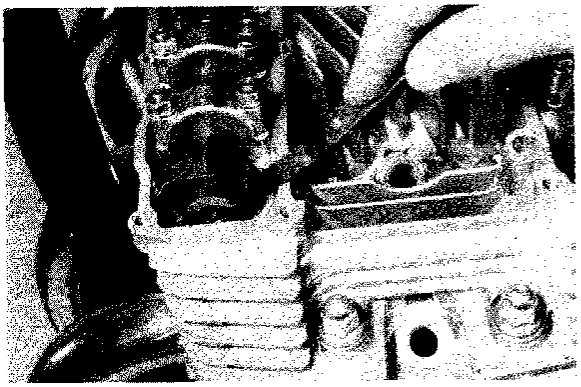
3. The proper cam position when measuring valve clearance is with the cam lobe directly opposite the valve lifter. To position the cams, turn the crankshaft. This will turn the cam chain and the cams.

NOTE:
For easy operation, remove the spark plug(s).



4. Insert a feeler gauge between the valve lifter and the cam heel.

Exhaust valve clearance (cold): 0.21 ~ 0.25 mm (0.008 ~ 0.010 in) Intake valve clearance (cold): 0.11 ~ 0.15 mm (0.004 ~ 0.006 in)



Adjustment:
Valve clearance is adjusted by replacing the adjusting pad on the top of the valve lifter. Adjusting pads are available in 25 thicknesses ranging from No. 200 (2.00 mm) to No. 320 (3.20 mm) in steps of 0.05 mm. The thickness of each pad is marked on the pad face that contacts the valve lifter (not the cam). Adjustment of valve clearance is accomplished as follows:

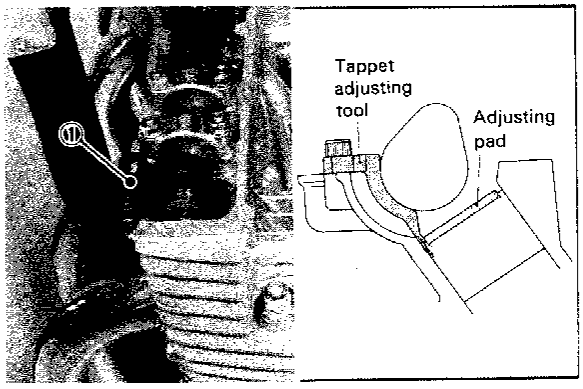
1. Determine valve clearance (feeler gauge measurement.)
2. Remove adjusting pad and note number.
3. Select proper pad from appropriate chart (intake or exhaust chart).
4. Install new pad and check installed clearance.

Procedure:

1. Measure valve clearance. If clearance is incorrect, record the measured amount of clearance. This must be measured carefully.
2. There is a slot in the valve lifter. This slot must be positioned opposite the blade of the tappet adjusting tool before the tool is installed.
3. Turn the cam until the lobe fully depresses the valve lifter and opens the valve. Install the tappet adjusting tool as shown to hold the lifter in this depressed position.

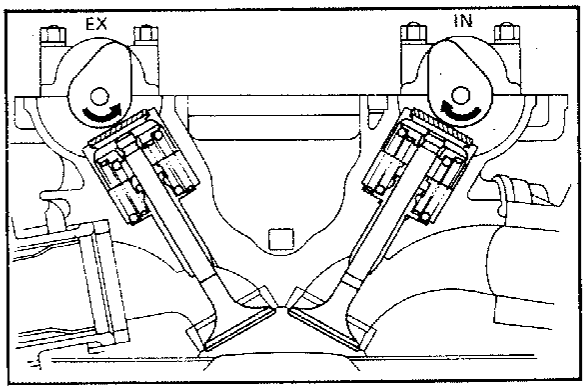
NOTE:
The tappet adjusting tool is fastened to the cylinder head using one allen screw such as one used to install the cylinder head cover. Make sure that the tool contacts the lifter only, and not the pad.

CAUTION:
If the cam lobe touches the tappet adjusting tool, the stress may fracture the cylinder head. DO NOT ALLOW THE CAM LOBE TO CONTACT THE TAPPET ADJUSTING TOOL.

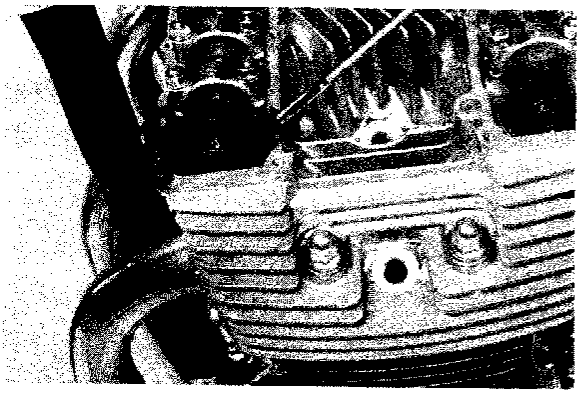


1. Tappet adjusting tool

4. Carefully rotate the cam so that the pad can be removed. To avoid cam touching adjusting tool, turn cams as follows: (view from left side of machine)
   Intake: Carefully rotate **CLOCKWISE.**
   Exhaust: Carefully rotate **COUNTER-CLOCKWISE.**



5. Remove the pad from the lifter. There is a slot in the lifter. Use a small screwdriver or other blade and a magnetic rod to remove the pad. Note the number on the pad.



6. Proper pad selection is made as follows: (Use appropriate chart for exhaust or intake valves.)
   a. Find number of original (installed) pad number on chart. Read down on chart.
   b. Find measured valve clearance (from step 1) on chart. Read across.
   c. At the intersection of installed pad number (down) and measured clearance (across) is a new pad number.

EXAMPLE:
Intake valve, installed pad:
No. 250 (read down)
Measured clearance:
0.32 mm (read across)
New pad number:
No. 270
(intersection of down & across)

NOTE:
The new pad number is to be used as a guide only. Verify the correctness of this choice in the following step(s).

7. Install the new pad in the lifter. Install the pad with the number down.
8. Remove tappet adjusting tool.
9. Turn crankshaft to rotate cam several rotations. This will set the pad in the lifter.
10. Check valve clearance (step 3). If clearance is incorrect, repeat preceding steps until proper clearance is obtained.
11. Inspect head cover gasket. If bent or torn, replace gasket.
12. Reinstall removed parts in reverse order.

INTAKE

MEASURED CLEARANCE	INSTALLED PAD NUMBER																								
	200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320
0.00 ~ 0.05			200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310
0.06 ~ 0.10		200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315
0.11 ~ 0.15																									
1.16 ~ 0.20	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320	
0.21 ~ 0.25	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320		
0.26 ~ 0.30	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320			
0.31 ~ 0.35	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320				
0.36 ~ 0.40	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320					
0.41 ~ 0.45	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320						
0.46 ~ 0.50	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320							
0.51 ~ 0.55	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320								
0.56 ~ 0.60	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320									
0.61 ~ 0.65	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320										
0.66 ~ 0.70	255	260	265	270	275	280	285	290	295	300	305	310	315	320											
0.71 ~ 0.75	260	265	270	275	280	285	290	295	300	305	310	315	320												
0.76 ~ 0.80	265	270	275	280	285	290	295	300	305	310	315	320													
0.81 ~ 0.85	270	275	280	285	290	295	300	305	310	315	320														
0.86 ~ 0.90	275	280	285	290	295	300	305	310	315	320															
0.91 ~ 0.95	280	285	290	295	300	305	310	315	320																
0.96 ~ 1.00	285	290	295	300	305	310	315	320																	
1.01 ~ 1.05	290	295	300	305	310	315	320																		
1.06 ~ 1.10	295	300	305	310	315	320																			
1.11 ~ 1.15	300	305	310	315	320																				
1.16 ~ 1.20	305	310	315	320																					
1.21 ~ 1.25	310	315	320																						
1.26 ~ 1.30	315	320																							
1.31 ~ 1.35	320																								

VALVE CLEARANCE (engine cold) 0.11 ~ 0.15 mm

Example: Installed is 250
Measured clearance is 0.32 mm
Replace 250 pad with 270

Pad number: (example) Pad No. 250 = 2.50 mm
Pad No. 255 = 2.55 mm

Always install pad with number down.

MEASURED CLEARANCE	INSTALLED PAD NUMBER*																						
0.00					200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300
0.06 ~0.10				200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305
0.11 ~0.15			200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310
0.16 ~0.20		200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315
0.21 ~0.25																									
0.26 ~0.30	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320	
0.31 ~0.35	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320		
0.36 ~0.40	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320			
0.41 ~0.45	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320				
0.46 ~0.50	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320					
0.51 ~0.55	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320						
0.56 ~0.60	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320							
0.61 ~0.65	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320								
0.66 ~0.70	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320									
0.71 ~0.75	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320										
0.76 ~0.80	255	260	265	270	275	280	285	290	295	300	305	310	315	320											
0.81 ~0.85	260	265	270	275	280	285	290	295	300	305	310	315	320												
0.86 ~0.90	265	270	275	280	285	290	295	300	305	310	315	320													
0.91 ~0.95	270	275	280	285	290	295	300	305	310	315	320														
0.96 ~1.00	275	280	285	290	295	300	305	310	315	320															
1.01 ~1.05	280	285	290	295	300	305	310	315	320																
1.06 ~1.10	285	290	295	300	305	310	315	320																	
1.11 ~1.15	290	295	300	305	310	315	320																		
1.16 ~1.20	295	300	305	310	315	320																			
1.21 ~1.25	300	305	310	315	320																				
1.26 ~1.30	305	310	315	320																					
1.31 ~1.35	310	315	320																						
1.36 ~1.40	315	320																							
1.41 ~1.45	320																								

VALVE CLEARANCE (engine cold) 0.21 ~0.25 mm

Example: Installed is 250
Measured clearance is 0.32 mm
Replace 250 pad with 260

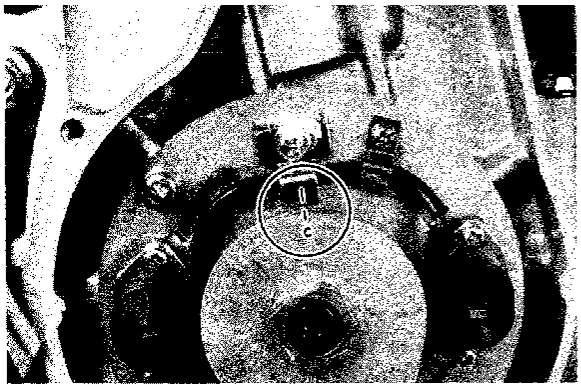
* Pad number: (example) Pad No. 250 = 2.50 mm
Pad No. 255 = 2.55 mm

Always install pad with number down.

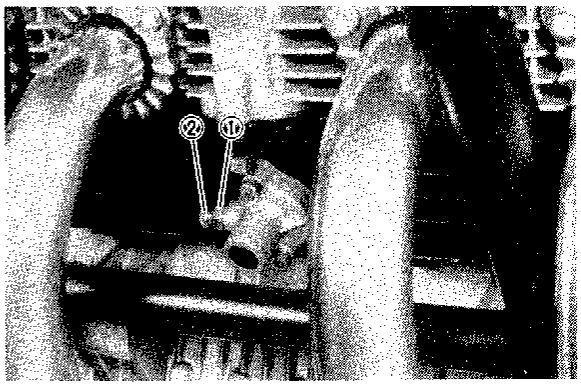
B. Cam Chain Adjustment

The cam chain becomes stretched with use, resulting in improper valve timing and engine noise. To prevent this, the cam chain tensioner must be adjusted regularly.

1. Remove the timing plate cover.
2. Slowly rotate the crankshaft clockwise until the "C" mark on the timing plate aligns with the stationary pointer.



3. Loosen the tensioner lock nut and then loosen the stopper bolt. This release the cam chain tensioner with the proper tension.



1. Lock nut 2. Stopper bolt

4. Tighten the stopper bolt and lock nut.

Stopper bolt torque:
6 Nm (0.6 m·kg, 4.3 ft·lb)
Lock nut torque:
9 Nm (0.9 m·kg, 6.5 ft·lb)

5. Reinstall the timing plate cover.

C. Ignition Timing Check

1. Ignition timing is checked with a timing light by observing the position of the stationary pointer and the marks stamped on the timing plate.

The timing plate is marked as follows:
"⊓" ..... Firing range for No. 1 (L.H.) cylinder
"T" ..... Top Dead Center for No. 1 (L.H.) cylinder

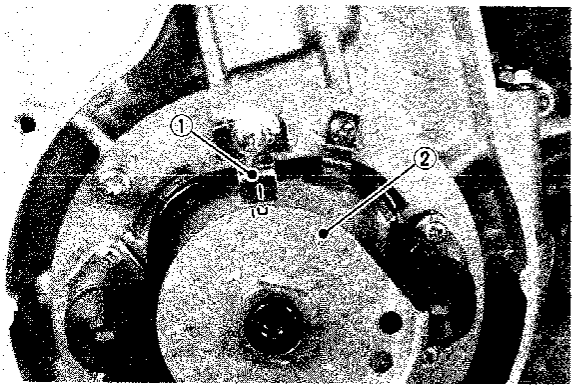
2. Connect the timing light to No. 1 (L.H.) spark plug lead wire.
3. Start the engine and keep the engine speed as specified. Use a tachometer to check the engine speed.

Specified engine speed: 1,100 r/min

4. The stationary pointer should be within the limits of "⊓" on the timing plate. If it exceeds the limits or does not steady, check the timing plate for tightness and/or ignition system for damage.

NOTE:
Ignition timing is not adjustable.

CAUTION:
Never bend the stationary pointer.

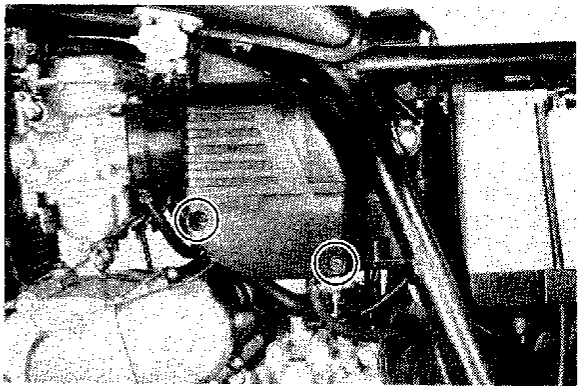


1. Stationary pointer 2. Timing plate

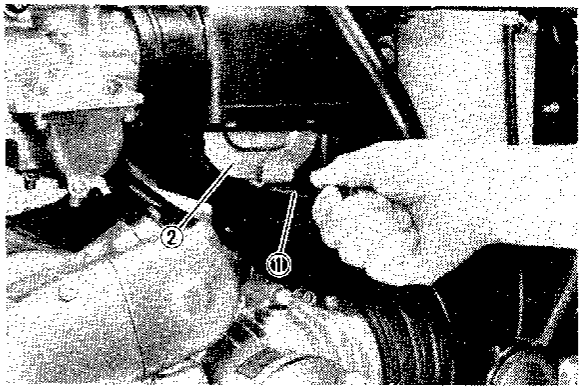
D. Air Filter

1. Removal

a. Remove the seat and left side cover.
b. Remove the air filter case cover by loosening the screws.



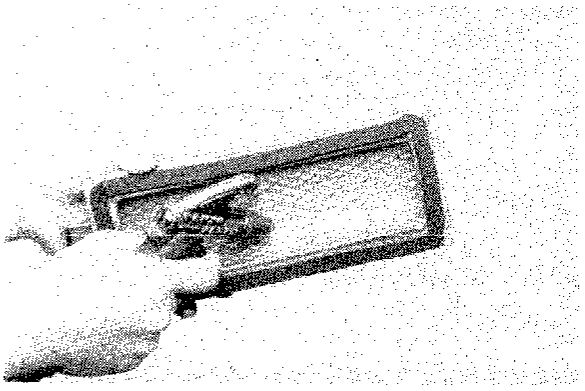
c. Pull out the guide and the element.



1. Guide 2. Element

2. Cleaning method

a. Tap the element lightly to remove most of the dust and dirt; then blow out the remaining dirt with compressed air from the inner surface of the element. If element is damaged, replace it.



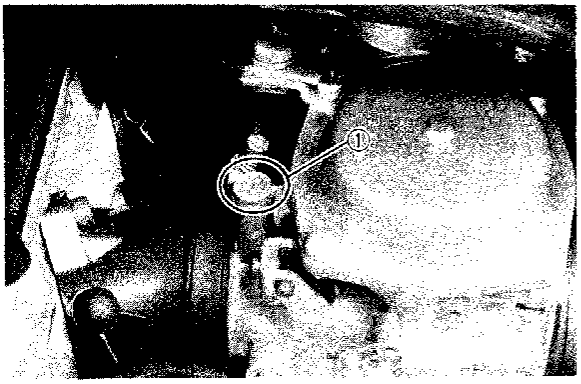
b. The air filter element should be cleaned at the specified intervals.

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

3. Reassembly
   Reassemble by reversing the removal procedure. Check whether the element is seated completely against the case.

E. Idle Mixture

The idle mixture is set at the factory by the use of special equipment. No attempt should be made by the dealer to change this adjustment.



1. Idle mixture screw "Do not adjust".

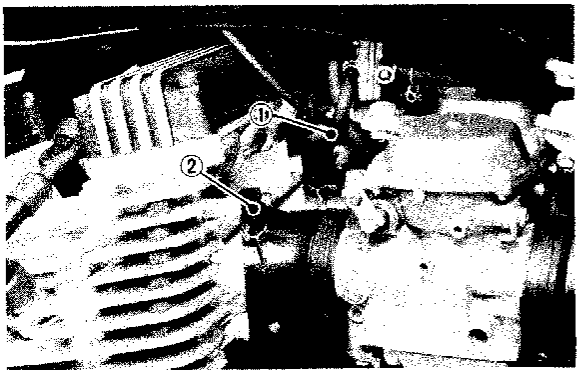
F. Synchronization

The seat must be opened and the rear of the tank elevated to gain access to the vacuum connections and synchronizing screw of the carburetors.

NOTE:
The valve clearances must be set properly before synchronizing the carburetors.

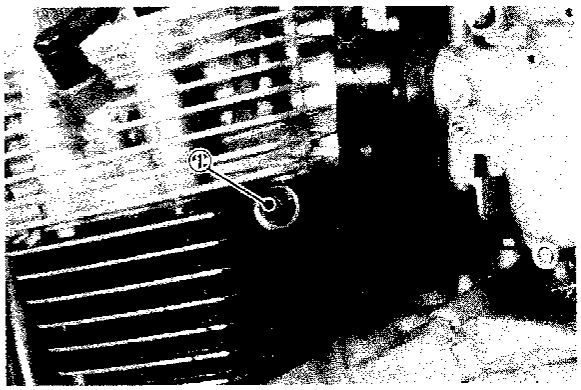
1. Remove the vacuum pipe from the carburetor manifold (No. 2 cylinder) and turn the fuel petcock to "OFF".
2. Remove the rubber caps from the No. 1, 3, and 4 carburetor manifolds.

NOTE:
The carburetors are numbered 1, 2, 3, and 4 from the left when viewed from astride the motorcycle.



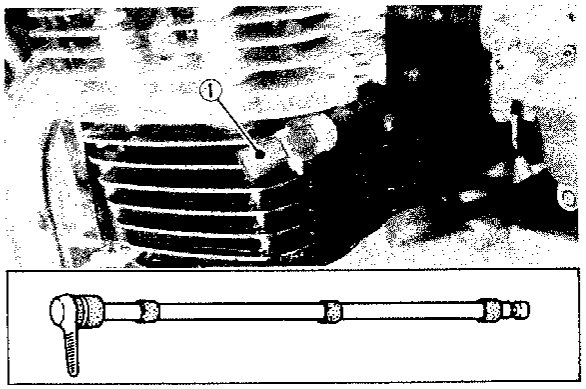
1. Vacuum pipe 2. Rubber cap

3. Remove the blind plug at the end of the YICS (Yamaha Induction Control System) passage in the cylinder.



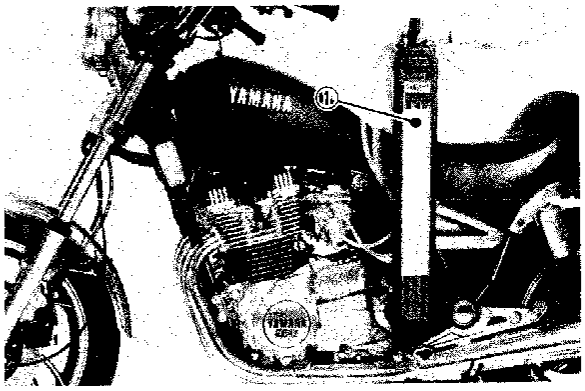
1. Blind plug

4. Insert the YICS shutoff tool (special tool) fully and flip the locking lever.



1. Locking lever

5. Connect each vacuum gauge hose to its proper carburetor.

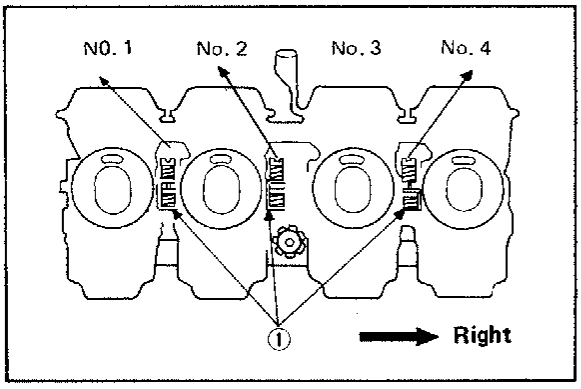


1. Vacuum gauge

6. Start the engine allow it to warm-up for a few minutes. The warm-up is complete when engine responds normally to the throttle opening.
7. Make sure the engine idle speed is 1,100 r/min. If it does not, adjust the idle speed with the throttle stop screw.

NOTE:
With the YICS shutoff tool fitted, the engine speed generally drops a little. Thus, continue with the following steps at idle speed of 1,100 r/min.

8. Each gauge reading will indicate the same if the carburetors are synchronized. The No. 3 carburetor has no synchronizing screw and the other carburetors are to be synchronized to it in order, one at a time.
   First, synchronize carburetor No. 1 to carburetor No. 2 by turning the No. 1 synchronizing screw until both gauges read the same.
   Second, in the same way synchronize carburetor No. 4 to carburetor No. 3.
   Third, by adjusting No. 2 screw to watch No. 3 carburetor reading, No. 1 and No. 2 carburetors will both change to match No. 3 carburetor.



1. Synchronizing screws

9. Remove the YICS shutoff tool and reinstall the blind plug.

Tightening torque:
22 Nm (2.2 m·kg, 16.0 ft·lb)

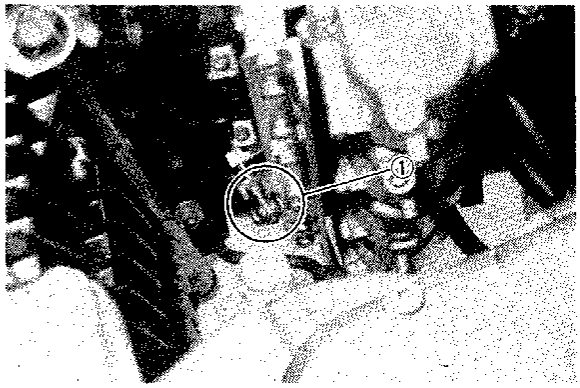
10. Check the idle speed.
    Adjust if necessary.

G. Idle Speed Adjustment

NOTE:
Carburetors must be synchronized before setting final idle speed. The idle speed adjustment is made by turning only one throttle stop screw.

1. The engine must be warmed up before setting idle speed.
2. Set the engine idle speed by turning the throttle stop screw in (to increase engine speed) or out (to decrease engine speed).

Standard idle speed: 1,100 r/min

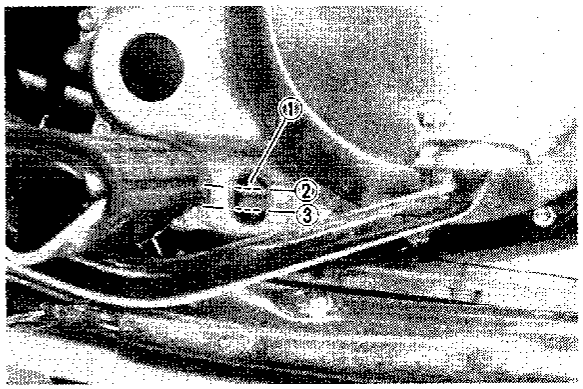


1. Throttle stop screw

H. Engine Oil

1. Oil level measurement
   a. Place the machine on the centerstand. Warm up the engine for several minutes.
   b. With the engine stopped, check the oil level through the level window located at the lower part of the right side crankcase cover.

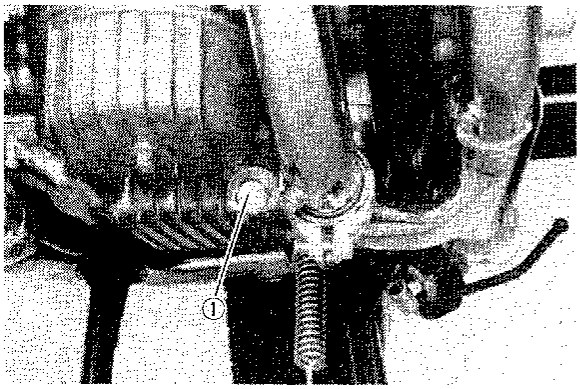
NOTE:
Wait a few minutes until the oil level settles before checking.



1. Level window 2. Maximum 3. Minimum

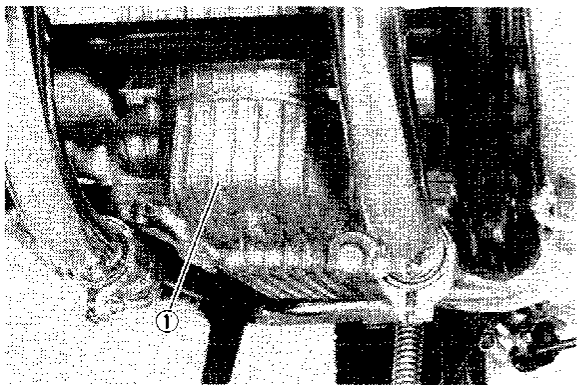
   c. The oil level should be between maximum and minimum marks. If the level is lower, add sufficient oil to raise it to the proper level.

2. Engine oil and oil filter replacement
a. Start the engine and stop it after a few minutes of warm-up.
b. Place an oil pan under the engine and remove the oil filter cap.
c. Remove the drain plug and drain the oil.



1. Drain plug

d. Remove the oil filter bolt and filter element.



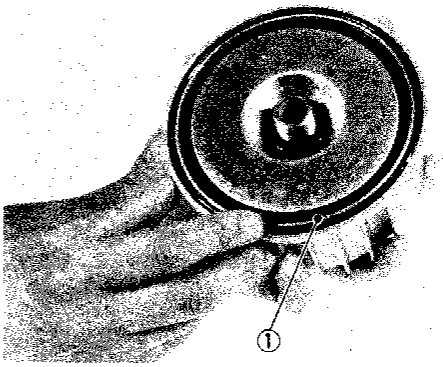
1. Oil filter

e. Reinstall the drain plug and tighten to specification.

Drain plug torque:
43 Nm (4.3 m·kg, 31 ft·lb)

f. Install the new oil filter element, new "O-ring" and filter cover. Tighten the oil filter bolt.

NOTE:
Make sure the "O-ring" is positioned properly.

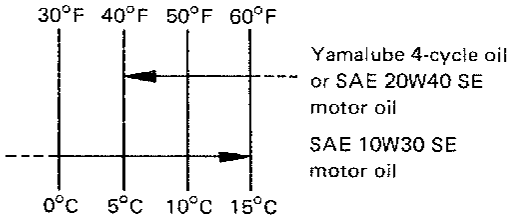


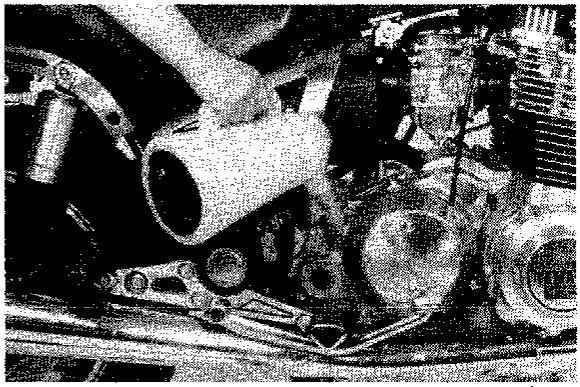
1. "O"-ring

Oil filter bolt torque:
32 Nm (3.2 m·kg, 23 ft·lb)

g. Add oil through the oil filter hole.

Periodic oil change:
3.0 L (2.64 Imp qt, 3.17 US qt)
With oil filter replacement:
3.5 L (3.08 Imp qt, 3.70 US qt)
Recommended oil:





h. After replacement of the engine oil, and/or oil filter, be sure to check the oil pressure and for oil leakage. The oil pressure indicator light should go off after the engine is started.

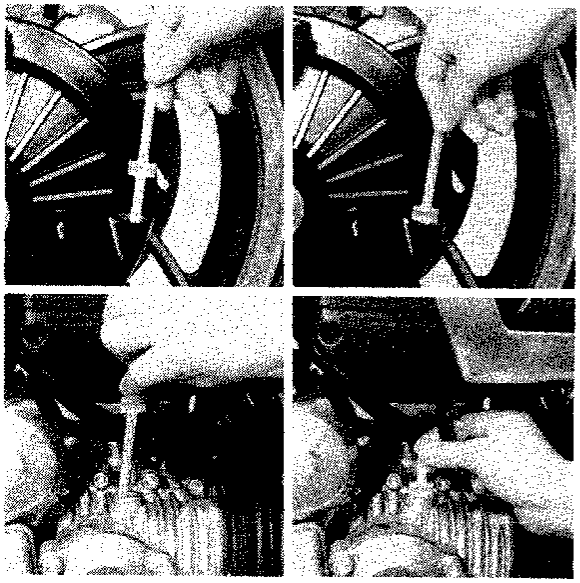
CAUTION:
If the indicator light flickers or remains on, immediately stop the engine. Refer to lubrication information in page 7-17 for corrective action.

I. Middle Gear/Final Gear Oil

1. Oil level measurement

a. Place the machine on the centerstand on a level surface. The engine should be cool (at atmospheric temperature). Allow 2 minutes for oil to drain to bottom of cases.

b. Remove the oil filler cap. Check the oil level with level gauge (from tool kit) as shown. The correct oil level is between the two marks on each end of the level gauge. Use end of gauge marked "REAR" for measuring the rear (final) gear case. Use the end marked "MIDDLE" for measuring the middle gear case.



NOTE:

Middle gear and final gear oil can be checked with same level gauge, which is in the owners tool kit.

CAUTION:

Take care not to allow foreign material to enter the middle and/or final gear case.

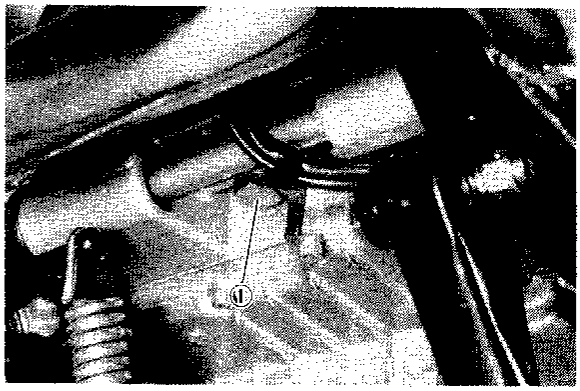
2. Gear oil replacement

a. Place an oil pan under the transmission for the middle gear and under the final gear case.

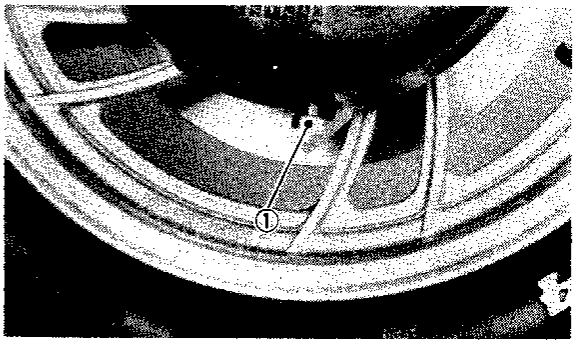
b. Remove the middle and/or final gear oil filler cap(s) and the drain plug(s), and drain the oil.

WARNING:

When draining or filling, take care not to allow foreign material to enter the middle and/or final gear case. Do not allow the gear oil to contact the tire and wheel.



1. Middle drain plug



1. Final drain plug

c. Reinstall the middle and/or final drain plug(s).

d. Fill the gear case(s) up to specified level.

Oil capacity:
  Middle gear case:
    Approx. 0.375 L
      (0.33 Imp qt, 0.396 US qt)
  Final gear case:
    Approx. 0.30 L
      (0.26 Imp qt, 0.32 US qt)
Recommended oil:
  SAE 80 API GL-4 Hypoid gear oil
If desired, an SAE 80W90 hypoid gear oil may be used for all conditions.

NOTE:

"GL-4" is a quality and additive rating. "GL-5" or "GL-6" rated hypoid gear oils may also be used.

e. Reinstall the filler cap(s) securely.

NOTE:
After initial 1,000 km (600 mile) oil change, it is normally not necessary to change middle and final gear oil more frequently than the indicated service interval of 8,000 km (5,000 miles).

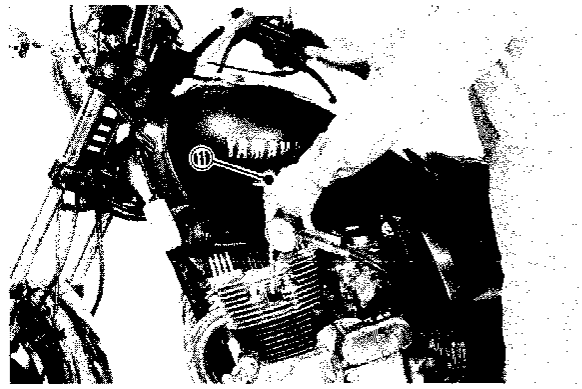
J. Compression Pressure Measurement

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

Procedure:

1. Make sure the valve clearance is correct.
2. Warm-up the engine 2–3 minutes. Stop the engine.
3. Remove the spark plugs.
4. Install a compression check gauge.
5. Turn over the engine with the electric starter (make sure the battery is fully charged) with the throttle wide open until the pressure indicates on the gauge does not increase further.

Compression pressure: (at sea level)	
Standard	980 kPa (10 kg/cm^2, 142 psi)
Minimum	883 kPa (9 kg/cm^2, 128 psi)
Maximum	1079 kPa (11 kg/cm^2, 156 psi)



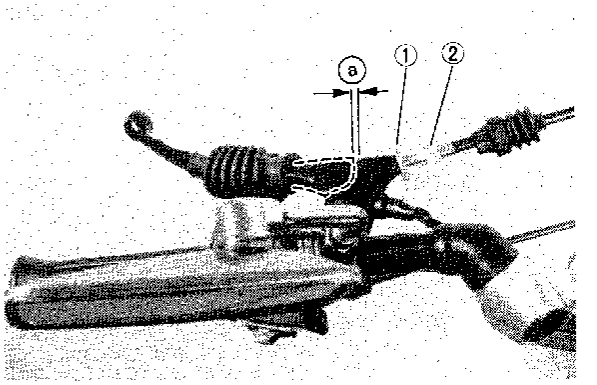
1. Compression gauge

6. If the pressure is too low, squirt a few drops of oil into the cylinder being measured. Measure compression again. If there is a higher reading than before (without oil), the piston rings may be worn or damaged. If the pressure remains the same after measuring with the oil, either or both the rings and valves may be the cause.
7. Check each cylinder. Compression pressure should not vary more than 98 kPa (1 kg/cm^2, 14 psi) from one cylinder to any other cylinder.

K. Clutch Adjustment

This model has a clutch cable length adjuster and a clutch mechanism adjuster. The cable length adjuster is 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 proper disengagement. Normally, once the mechanism is properly adjusted, the only adjustment required is maintenance of free play at the clutch handle lever.

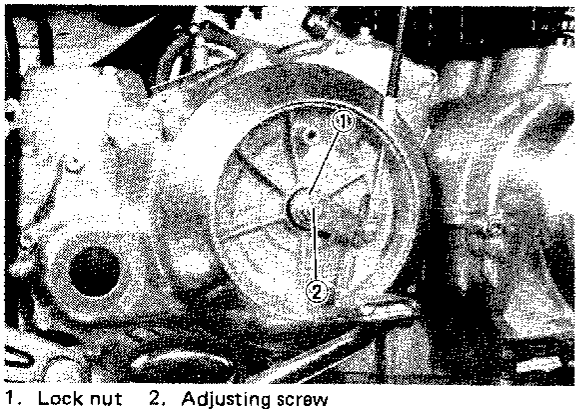
1. Free play adjustment
   a. Loosen the handle lever adjuster lock nut.
   b. Turn the length adjuster either in or out until proper lever free play is achieved.



1. Lock nut 2. Adjuster a. 2 ~ 3 mm (0.08 ~ 0.12 in)

2. Mechanism adjustment
   a. Loosen the adjusting screw lock nut and turn the adjusting screw in (clockwise) until the screw positively but lightly contacts the pressure plate.

NOTE:
There is an "O-ring" on the screw shaft which will cause some resistance. Make sure the screw positively but lightly contacts the pressure plate.



1. Lock nut 2. Adjusting screw

b. Back the screw off (counterclockwise) 1/4 turn, and retighten the lock nut.

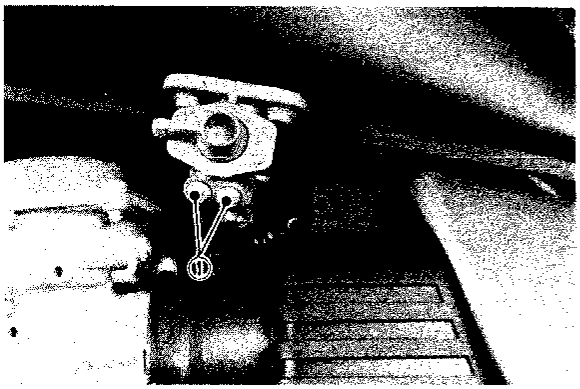
CAUTION:

Do not operate the clutch lever until clutch mechanism adjustment is complete. This could cause dislocation of the steel balls in the adjuster housing. If the balls are out of position in the housing, the clutch will not disengage. To reposition the steel balls in this housing, remove the right side case cover.

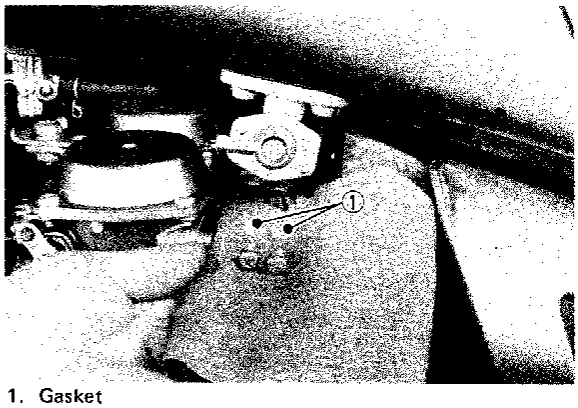
CHASSIS

A. Fuel Cock Cleaning

1. Turn the cock lever to "OFF" position. Remove te fuel pipes.
2. Remove the drain screws and clean it with solvent. If gasket is damaged, replace.



1. Drain screw

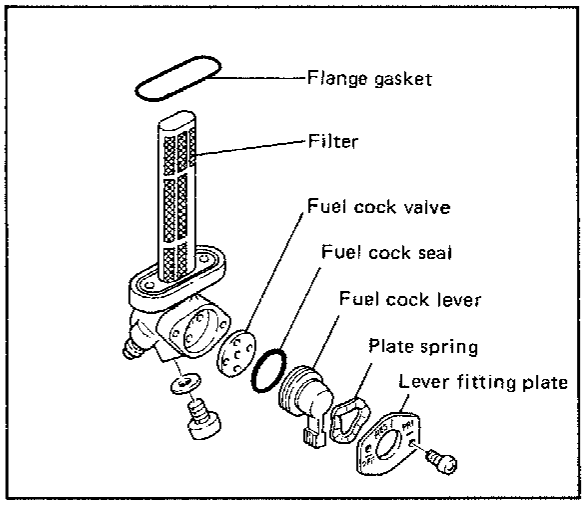


1. Gasket

3. Reinstall the drain screws and fuel pipes.

B. Fuel Cock Disassembly

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



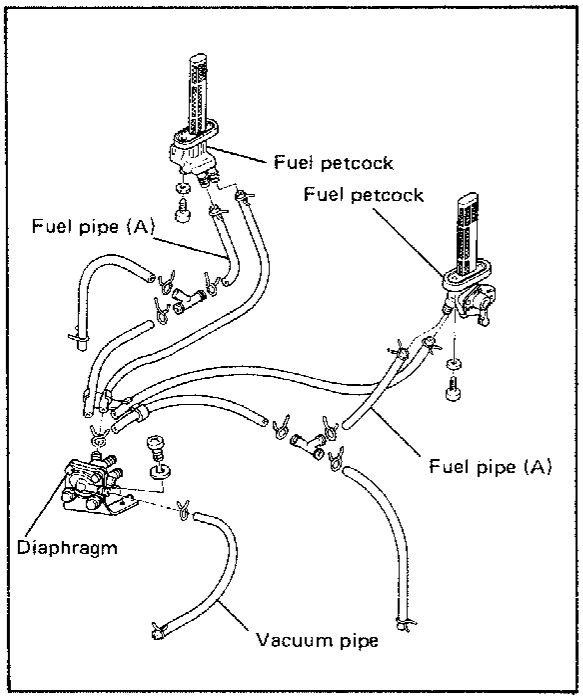
1. Remove the fuel tank and position it so that fuel will not spill when the cock is removed.
2. Remove the cock and inspect the filter screen. Replace the filter if seriously contaminated.
3. Remove the screws on front and rear of petcock and remove the plate, gaskets and lever.
4. Inspect the all components and replace any that are damaged. If the cock body gasket surface scratched or corroded, the cock assembly must be replaced. If there is abrasive damage to any component, the fuel tank must be drained and flushed.

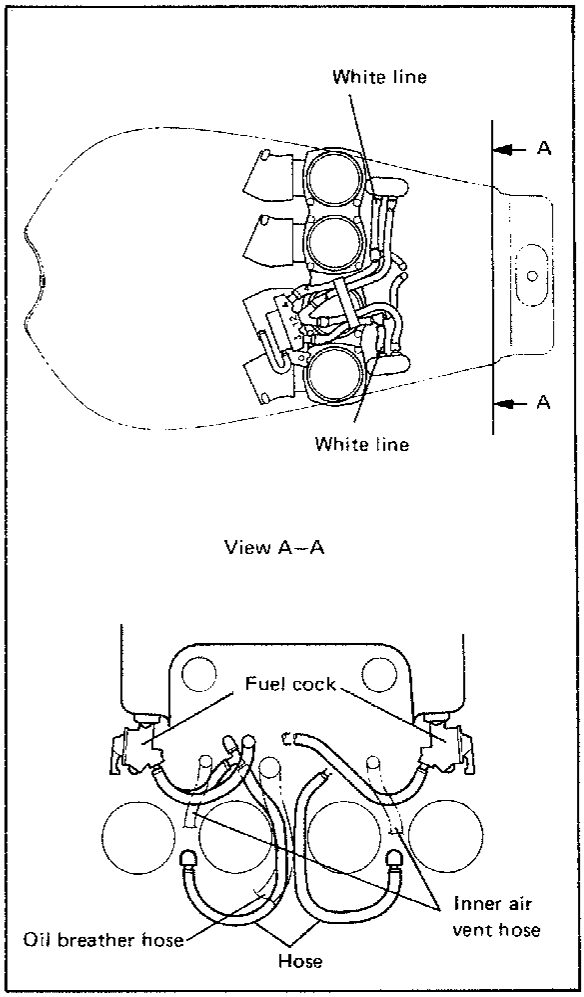
5. Reinstall the diaphragm and connect the fuel hoses.
6. Reassemble the cock and install on the fuel tank.

C. Diaphragm Check

Whether the diaphragm is functioning properly can be determined by the following two checks. If any malfunction is found, replace the diaphragm in an assembly.

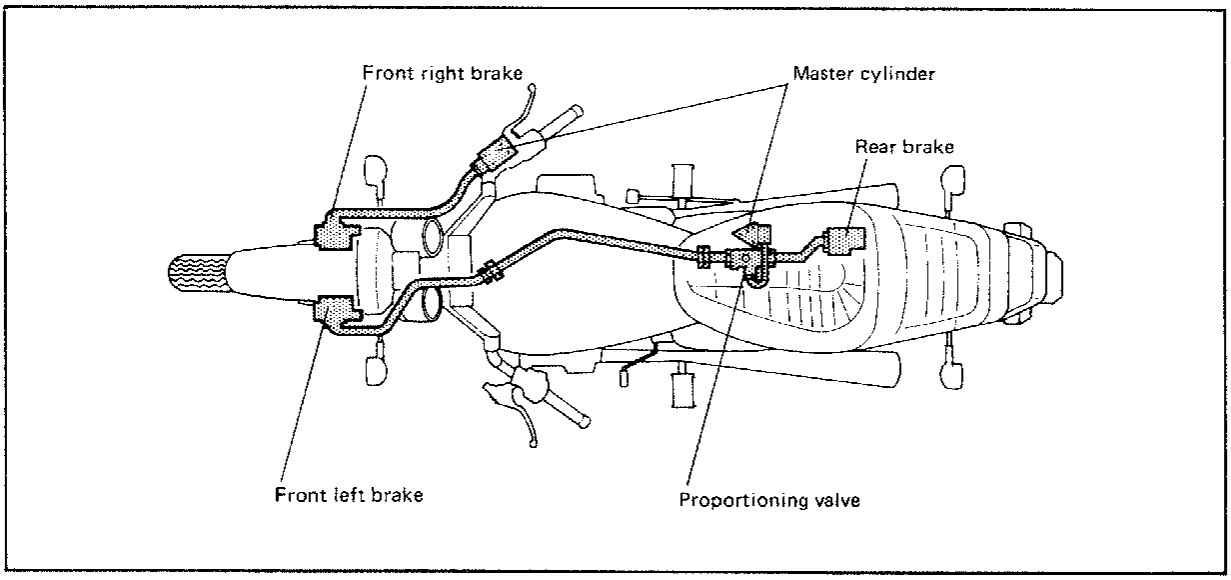
1. With the fuel cock levers positioned to "ON" or "RES", make sure that gasoline does not flow out of the fuel pipes (A) when they are removed from the fuel cocks.
2. Then remove the vacuum pipe and breather in with the tip of the removed pipe in the mouth. Make sure that gasoline flows out of fuel pipes by this procedure.





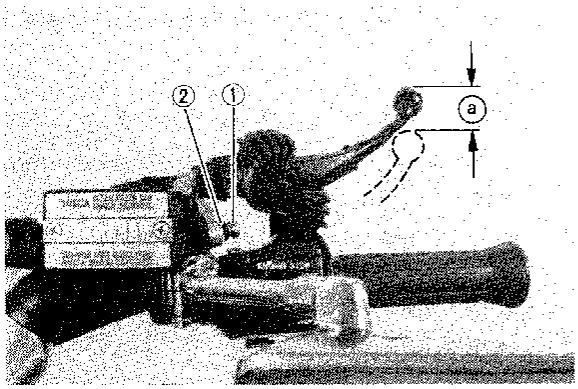
D. Brakes (Front and Rear)

The rear brake and the left-hand front brake are connected to the brake pedal; they are activated at the same time when the brake pedal is applied. The right-hand front brake operates independently; it is activated only by the brake lever. The rear brake and the left-hand front brake provide enough stopping ability for most conditions. However, for maximum stopping ability, apply the right-hand front brake at the same time as the brake pedal is applied.



Front Brake Adjustment

The front brake lever should be so adjusted that it has a free play of 5 ~ 8 mm (0.2 ~ 0.3 in) at the lever end.



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

1. Loosen the lock nut on the brake lever.
2. Turn the adjuster so that the brake lever movement at the lever end is 5 ~ 8 mm (0.2 ~ 0.3 in) before the adjuster contacts the master cylinder piston.
3. After adjusting, tighten the lock nut.

NOTE:

Check for correct play and make sure it is working properly.

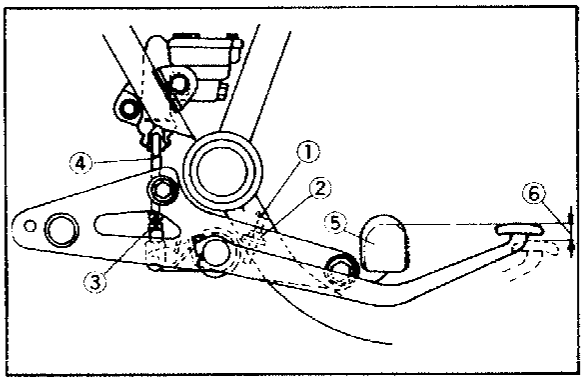
WARNING:

A soft or spongy feeling in the brake lever (and/or brake pedal) can indicate the presence of air in the brake system. This air must be removed by bleeding the brake system before the motorcycle is operated. Air in the system will cause greatly diminished braking capability and can result in loss of control and an accident.

Rear Brake Adjustment

The rear brake pedal should be so adjusted that it has a free play of 13 ~ 15 mm (0.51 ~ 0.59 in) from when the brake pedal is stepped on to when the brake begins to be effected.

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



1. Adjuster bolt (for pedal height)
2. Lock nut
3. Lock nut
4. Brake rod
5. Footrest
6. Free play 13~15 mm (0.51~0.59 in)

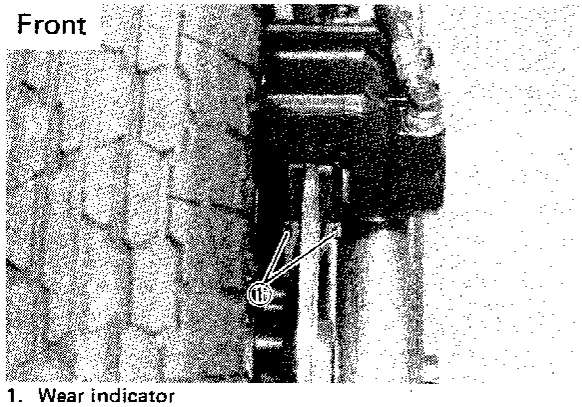
3. Secure the adjuster lock nut.
4. Loosen the brake rod downward until there is noticeable free play between rod and master cylinder.
5. Turn in the brake rod until it lightly touches the master cylinder, then turn it out by approx. 2/5 turns (for proper free play).
6. Tighten the brake rod adjuster lock nut.

CAUTION:

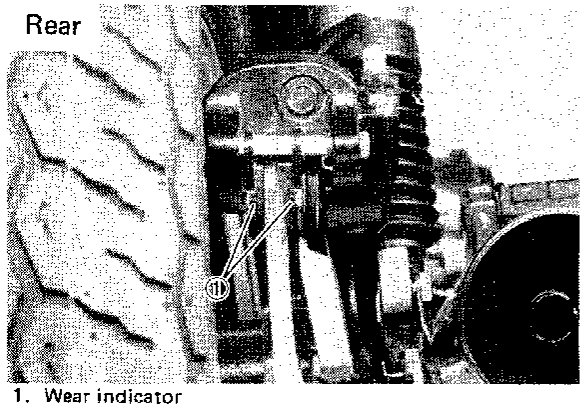
See that the punched mark on the brake rod is not above the top surface of the adjuster lock nut in securing the brake rod adjuster lock nut.

Checking the Brake Pads

To check, look at the pad wear indicator in back of the caliper. If any pad is worn to the wear limit, replace the pad as a set.



1. Wear indicator

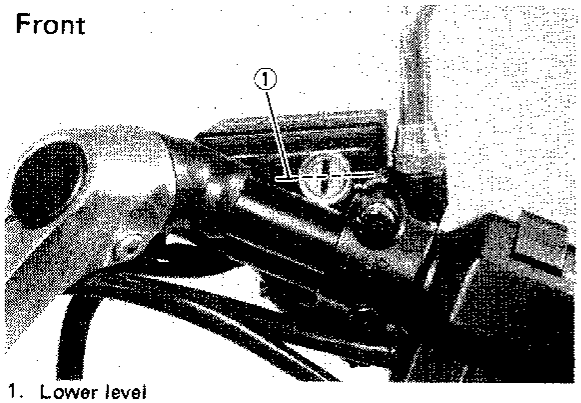


1. Wear indicator

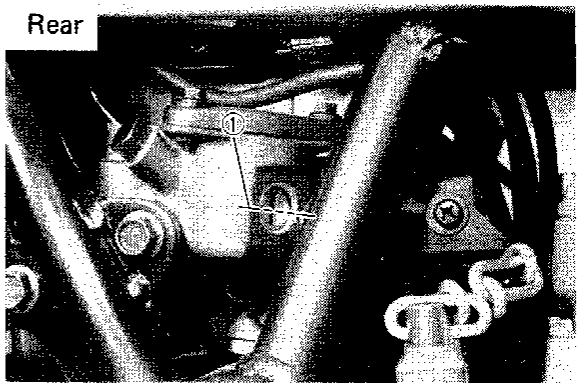
Inspecting the Brake Fluid Level

Insufficient brake fluid may allow air to enter the brake system, possibly causing the brakes to become ineffective.

Before riding, check the brake fluid level and replenish when necessary, and observe these precautions:



1. Lower level



1. Lower level

1. Use only the designated quality brake fluid; otherwise, the rubber seals may deteriorate, causing leakage and poor brake performance.

Recommended brake fluids: DOT #3

2. Refill with the same type of brake fluid; mixing fluids may result in a harmful chemical reaction and lead to poor performance.
3. Be careful that water does not enter the master cylinder when refilling. Water will significantly lower the boiling point and may result in vapor lock.
4. Brake fluid may erode painted surfaces or plastic parts. Always clean up spilled fluid immediately.

Brake Fluid Replacement

1. Complete fluid replacement should be done whenever the caliper cylinder or master cylinder is disassembled, or the fluid becomes seriously contaminated.
2. Replace the following components whenever damaged or leaking. Also:

a. Replace all brake seals every two years.
b. Replace the proportioning valve (P. valve) assembly every two years.
c. Replace all brake hoses every four years.

E. Tubeless Tires and Aluminum Wheels

This motorcycle is equipped with aluminum wheels designed to be compatible with either tube or tubeless tires. Tubeless tires are installed as standard equipment.

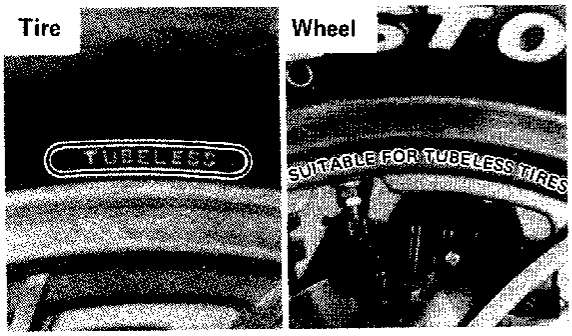
WARNING:

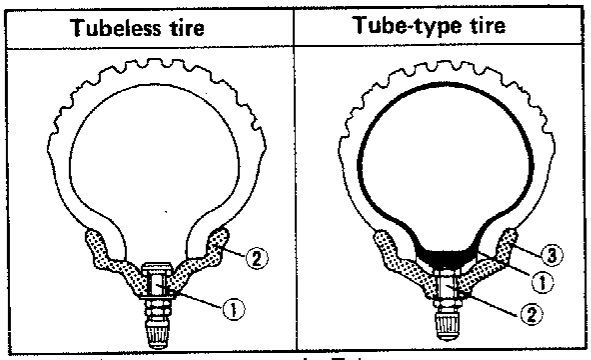
Do not attempt to use tubeless tires on a wheel designed for use only with tube-type tires. Tire failure and personal injury may result from sudden deflation.

Tube-type Wheel →
Tube-type Tire Only
Tubeless-type Wheel →
Tube-type or Tubeless Tires

WARNING:

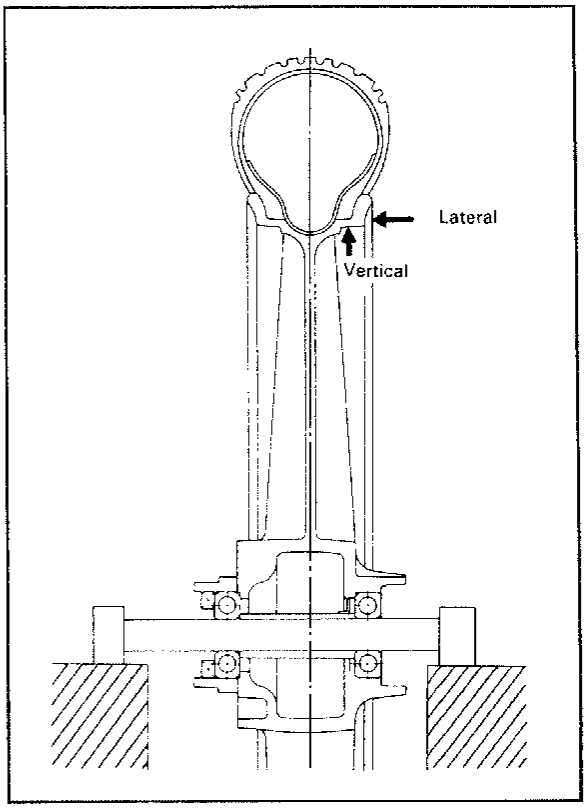
When using tube-type tires, be sure to install the proper tube also.





Refer to "Tubeless Tire and Wheel Manual" for tubeless tire and wheel service.

1. Raise the wheel off the ground. Spin.



Rim runout limits:
Vertical — 2 mm (0.08 in)
Lateral — 2 mm (0.08 in)

2. Front and rear axles

a. Check axle nuts.

Front axle nut torque:
107 Nm (10.7 m·kg, 77.5 ft·lb)
Rear alxe nut torque:
150 Nm (15 m·kg, 108 ft·lb)

b. Check axle pinch bolts.

Front axle pinch bolt:
20 Nm (2.0 m·kg, 14.5 ft·lb)
(See page 5-4 for tightening procedure.)
Rear axle pinch bolt:
6 Nm (0.6 m·kg, 4.3 ft·lb)

3. Tubeless tires

The standard equipment tires originally fitted to the XJ1100J are suited to normal riding and touring. They are not suited to sustained high speed running or racing and must not be used for such purposes. Consider your riding skill, road and weather conditions, and correct weight distribution when loading the motorcycle. Securely pack you heaviest items close to the center of the machine.

IMPORTANT NOTICE:

Proper loading of the motorcycle is important for the handling, braking, and other performance and safety characteristics of the machine. NEVER OVERLOAD THE MOTORCYCLE.

Make sure the total weight of the motorcycle with accessories, rider(s), etc., does not exceed the tire limits.

WARNING:

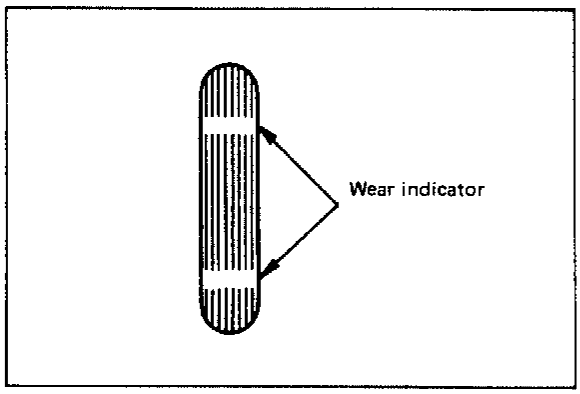
Never overload the motorcycle beyond specified tire limits. Operation of an overloaded tire could cause tire damage, an accident and injury.

	FRONT	REAR
XJ1100J WEIGHT with oil and full fuel tank	128 kg (282 lb)	149 kg (328 lb)
Standard tire	Bridgestone/ Dunlop 3.50H 19-4PR	Bridgestone/ Dunlop 130/90-16 67H
Maximum load limit*	234 kg (516 lb)	307 kg (677 lb)
Cold tire pressure:		
Up to 90 kg (198 lb) load**	177 kPa (1.8 kg/cm², 26 psi)	196 kPa (2.0 kg/cm², 28 psi)
90 kg (198 lb) load ~ 213 kg (407 lb) load** (Maximum load)	196 kPa (2.0 kg/cm², 28 psi)	275 kPa (2.8 kg/cm², 40 psi)
High speed riding	225 kPa (2.3 kg/cm², 32 psi)	245 kPa (2.5 kg/cm², 36 psi)
Minimum tire tread depth	0.8 mm (0.03 in)	0.8 mm (0.03 in)

* Total weight of motorcycle with accessories, etc.

** Total weight of accessoles, etc. excepting motorcycle.

If a tire tread shows crosswise lines, it means that the tire worn to its limit. Replace the tire.

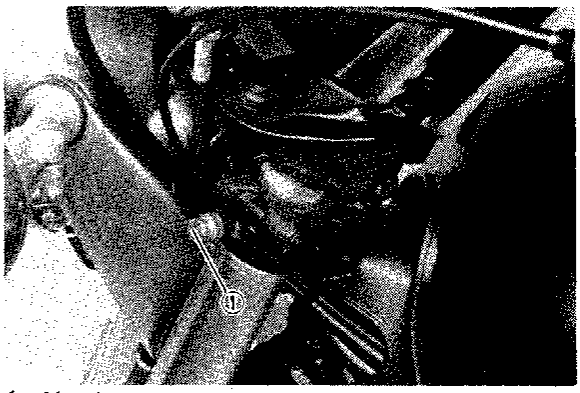


WARNING:

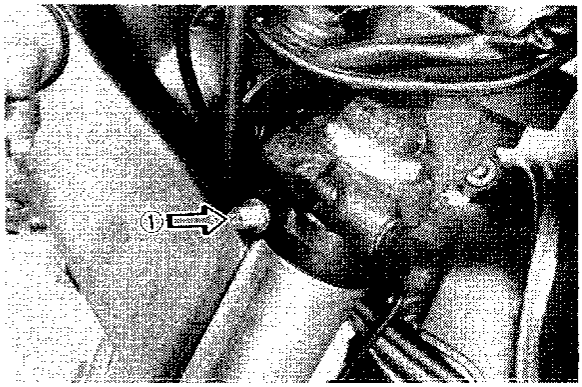
It is dangerous to ride with a worn-out tire. When a tire tread begins to show lines, replace the tire immediately.

F. Front Fork Oil Change

1. Raise the motorcycle or remove the front wheel so that there is no weight on the front end of the motorcycle.
2. Remove the air valve cap from the left fork.
3. Keep the valve open while pressing it for several seconds so that the air can be let out of the inner tube.



1. Air valve cap



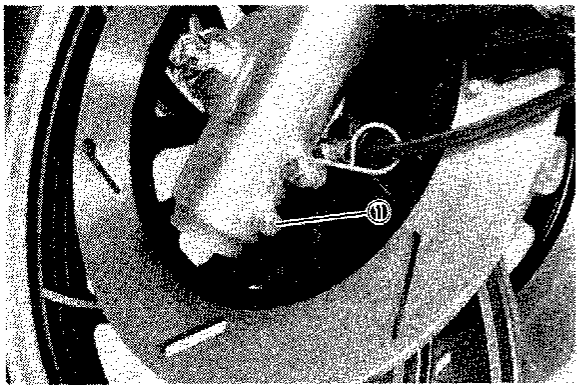
1. Push

4. Loosen the pinch bolts and remove the cap-bolt assemblies from inner fork tubes.

WARNING:

The cap-bolt assembly is furnished with a damping adjustment knob. When removing and reinstalling the cap-bolt assembly, take care not to bend or otherwise damage the adjusting rod; otherwise, it may cause faulty front fork operation.

5. Place an open container under each drain hole. Remove the drain bolt from each outer tube.



1. Drain bolt

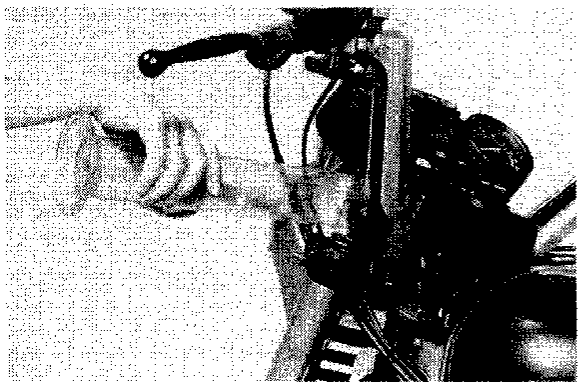
WARNING:

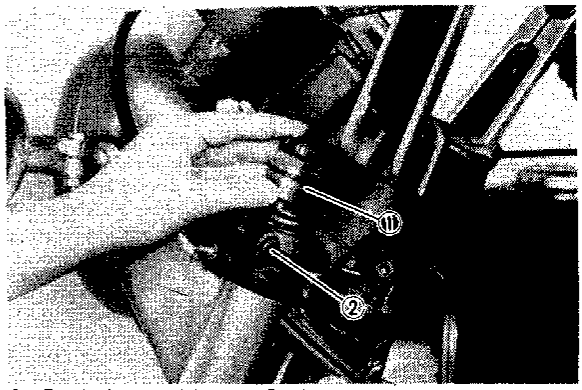
Do not allow oil to contact disc brake components.

6. When most of the oil has drained, slowly raise and lower the outer tubes to pump out the remaining oil.
7. Inspect the drain bolt gasket. Replace if damaged. Reinstall the drain bolt.
8. Pour the specified amount of oil into the fork inner tube.

Front fork oil (each fork):
250 cm³ (8.81 Imp oz, 8.45 US oz)
Yamaha fork oil 10wt or equivalent

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



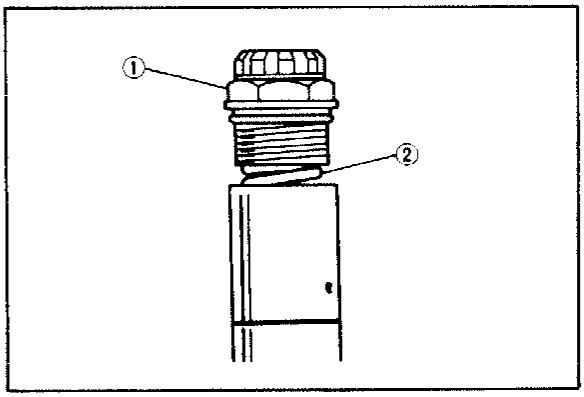


1. Cap-bolt assembly 2. Pinch bolt

11. Reinstall the cap-bolt assemblies and tighten the front fork pinch bolts.

CAUTION:

To tighten the cap-bolt assembly, first make sure the damper adjusting rod fits correctly in the semicircular hole in the top of the damper rod. If the adjusting rod is put in the wrong way, the cap-bolt assembly will not touch the fork spring. If so, turn the cap-bolt assembly until it falls and touched the spring, then you will be able to screw the cap-bolt assembly on. Do not force the cap-bolt assembly, you may damage the adjusting rod and ruin the unit.



1. Cap-bolt assembly 2. Spring

Tightening torque:
Cap-bolt assembly:
30 Nm (3.0 m·kg, 22 ft·lb)
Front fork pinch bolt:
20 Nm (2.0 m·kg, 14 ft·lb)

12. Fill the fork with air using a manual air pump or other pressurized air supply. Refer to "Front fork and rear shock absorber adjustment" for proper air pressure adjusting.

Maximum air pressure:
118 kPa (1.2 kg/cm², 17 psi)
Do not exceed this amount.

CAUTION:

Don't dent the air chamber nor damage the air hose. It will result in an air leakage.

G. Front Fork Air Pressure

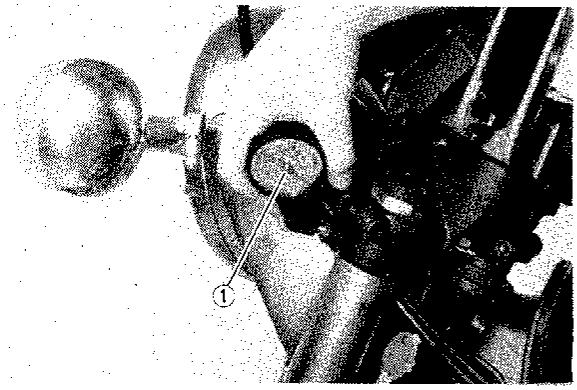
NOTE:
Since the right and left front forks are connected by air hose, there is only one valve where the air pressure is measured and adjusted.

1. Elevate the front wheel by placing the motorcycle on the centerstand.

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 cap from the left fork.
3. Using the air check gauge, check and adjust the air pressure.
   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 decreases:
Release the air by pushing the valve pin.



1. Air check gauge

Standard air pressure:
39.2 kPa (0.4 kg/cm², 5.7 psi)
Maximum air pressure:
118 kPa (1.2 kg/cm², 17 psi)
Minimum air pressure:
39.2 kPa (0.4 kg/cm², 5.7 psi)

WARNING:

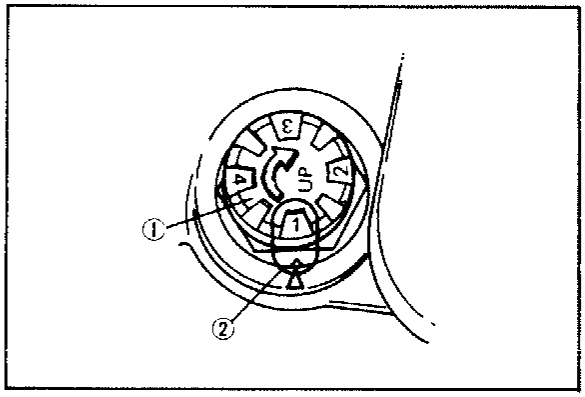
Never pressurize the front fork above the maximum or below the minimum air pressure. It will cause damage to front fork and/or loss of motorcycle control.

4. Install the air valve cap.

H. Damping Adjustment

1. Turn the damping adjuster to increase or decrease the damping.
2. If the damping adjuster is turned toward the "4", the damping becomes harder; if the adjuster is turned toward the "1", damping becomes softer.

Standard position – No. 1
No. 1 – Minimum damping
No. 4 – Maximum damping



1. Damper adjuster 2. Standard position

WARNING:

Always adjust the front forks on each side to the same position. Uneven adjusment will cause an improper riding position.

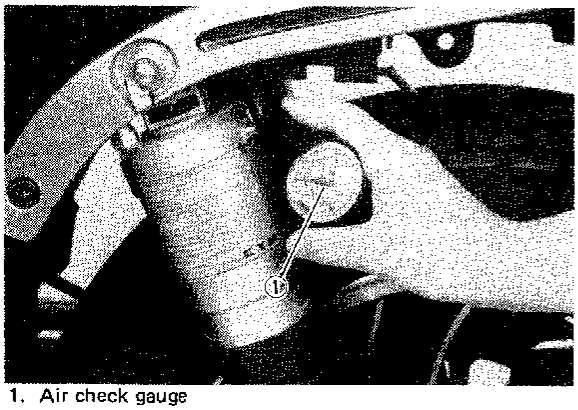
I. Rear Shock Air Pressure

NOTE:
Since the right and left rear shock absorbers are connected by air hose, there is only one valve where the air pressure is measured and adjusted.

1. Elevate the rear wheel by placing the motorcycle on the centerstand.

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

2. Remove the air valve cap.
3. Using the air check gauge, check and adjust the air pressure. If the air pressure is increased, the suspension becomes stiffer, and if decreased, it becomes softer.


1. Air check gauge

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: 98.1 kPa (1.0 kg/cm², 14 psi) Maximum air pressure: 392 kPa (4.0 kg/cm², 57 psi) Minimum air pressure: 98.1 kPa (1.0 kg/cm², 14 psi)

WARNING:

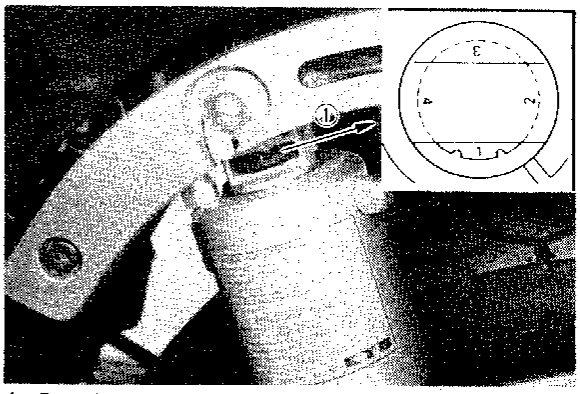
Never pressurize the shock absorber above the maximum or below the minimum air pressure. It will cause damage to rear shock absorber and/or loss of motorcycle control.

4. Install the air valve cap.

J. Damping Adjustment

1. Turn the damping adjuster to increase or decrease the damping.
2. If the damping adjuster is turned toward the "4", the damping becomes harder; if the adjuster is turned toward the "1", damping becomes softer.

Standard position — No. 1 No. 1 — Minimum damping No. 4 — Maximum damping


1. Damping adjuster

WARNING:

Always adjust the shock absorbers on each side to the same position. Uneven adjustment will cause an improper riding position.

K. Recommended Combinations of the Front Fork and the Rear Shock Absorber.

Use this table as guidance to meet specific riding conditions and motorcycle load.

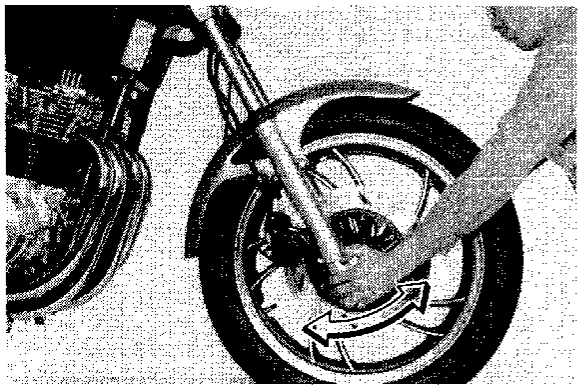
Front fork		Rear shock absorber		Loading condition			
Air pressure	Damping adjuster	Air pressure	Damping adjuster	Solo rider	With passenger	With accessory equipments	With accessory equipments and passenger
39.2 kPa (0.4 kg/cm^2, 5.7 psi)	1	98.1 kPa (1.0 kg/cm^2, 14 psi)	1	○			
58.8 kPa (0.6 kg/cm^2, 8.5 psi)	2	196 kPa (2.0 kg/cm^2, 28 psi)	2	○	○		
78.5 kPa (0.8 kg/cm^2, 11 psi)	3	294 kPa (3.0 kg/cm^2, 43 psi)	3		○	○	
118 kPa (1.2 kg/cm^2, 17 psi)	4	392 kPa (4.0 kg/cm^2, 57 psi)	4			○	○

L. Steering Head Adjustment

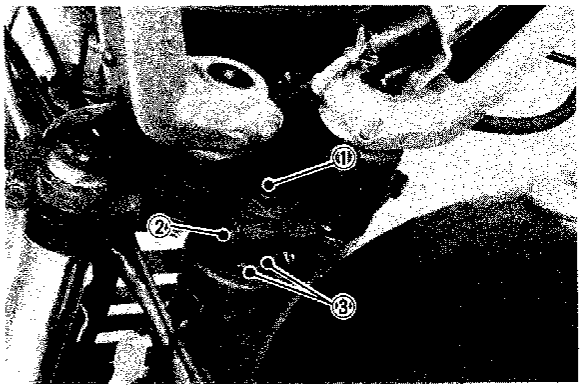
The steering head is fitted with tapered roller bearings. The steering assembly should be checked periodically for looseness.

Procedure:

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

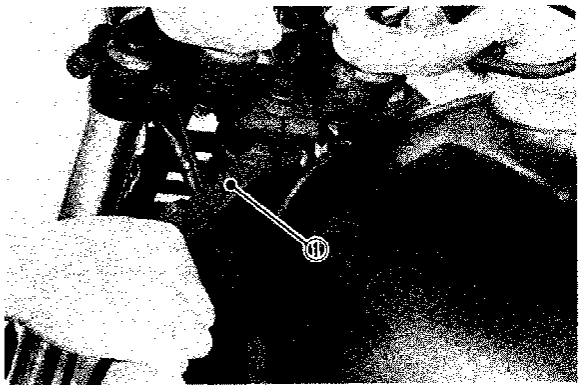


3. If there is looseness in the steering head, loosen the crown pinch bolts and steering fitting bolt.



1. Steering fitting bolt 2. Pinch bolt 3. Ring nuts

4. Use steering nut wrench to loosen top steering fitting nut. The top nut serves as a lock nut.
5. Tighten the lower steering fitting nut until the steering head is tight, but does not bind when forks are turned.

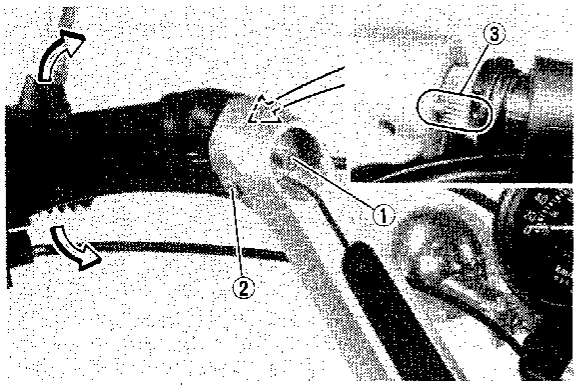


1. Steering nut wrench

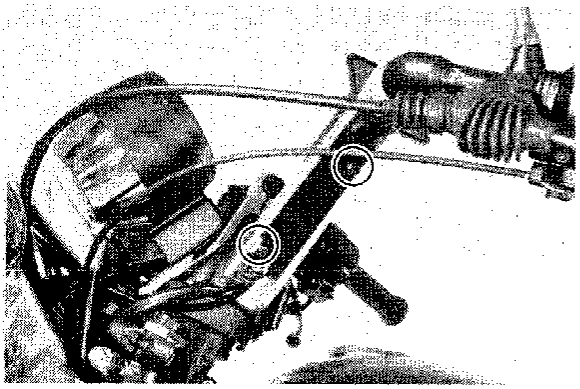
6. Retighten the top steering fitting nut, steering fitting bolt and crown pinch bolts, in that order.
7. Recheck steering adjustment to make sure there is no binding when the forks are moved from lock to lock. If necessary, repeat adjustment procedure.

M. Handlebar Adjustment

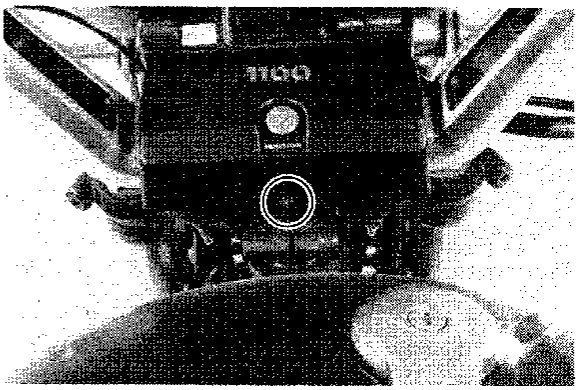
1. Vertical adjustment
   After removing the cap, two bolts, and switch lead holding plate, pull the grip bar as far away from the handlebar as to permit adjustment. Then move the grip bar either up or down by one notch from the standard position (3-stage adjustment being possible.)

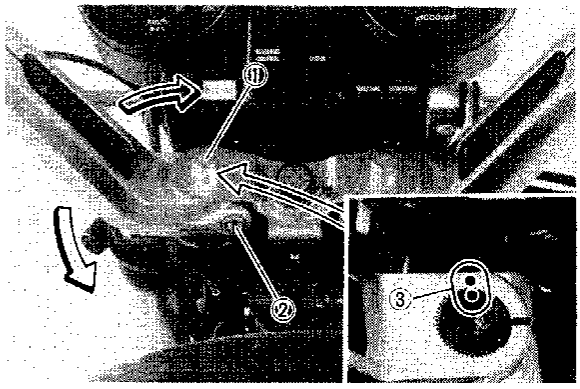


1. Grip bar stopper bolt
2. Grip bar pinch bolt
3. Standard position



2. Horizontal adjustment
   Remove the handlebar cover, handlebar stopper bolt, and pinch bolt. Likewise adjust the handlebar either back or forth by one notch from the standard position (3-stage adjustment being also possible.)





1. Handlebar stopper bolt
2. Handlebar pinch bolt
3. Standard position

The structural design calls for handlebars adjustment, either vertical or horizontal, by not more than 3-stages, Thus, make the adjustment with these 3-stages.

WARNING:

Never tamper with this adjustment device in an attempt at further adjustment.
Otherwise, it may cause:
The handlebar to contact the fuel tank or cables to be pulled tense, and the rider to assume an inappropriate riding position.
Always adjust the handlebars on each side to the same position. Uneven adjustment will cause an improper riding position.

3. Reinstall the handlebars and tighten to specification.

Tightening torque:
- Grip bar stopper bolt:
  13 Nm (1.3 m·kg, 9.4 ft·lb)
- Grip bar pinch bolt:
  13 Nm (1.3 m·kg, 9.4 ft·lb)
- Handlebar stopper bolt:
  19 Nm (1.9 m·kg, 13 ft·lb)
- Handlebar pinch bolt:
  30 Nm (3.0 m·kg, 22 ft·lb)

N. Throttle Cable and Grip Lubrication

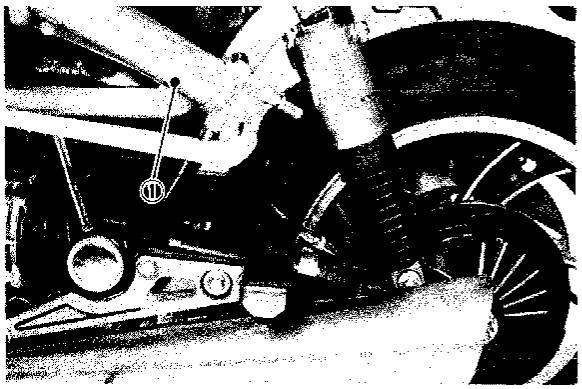
The throttle twist grip assembly should be greased at the time that the cable is lubricated since the grip must be removed to get at the end of the throttle cable. Two screws clamp the throttle housing to the handlebar. Once these two are removed, the end of the cable can be held high to pour in several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

Upon reassembly, make sure the throttle snaps closed automatically when released.

O. Drive Shaft Joint Lubrication

Use a hand-operated grease gun to apply the specified amount of grease to the final drive grease fitting at the specified intervals. (see page 2-3).

Recommended grease:
Molybdenum disulfide grease
(type NLG1-2M)
Quantity:
Approx. 30 cm^3
(1.06 Imp oz, 1.01 US oz)



1. Hand-operated grease gun

P. Lubrication of Levers, Pedals, etc.

1. Lubricate the pivoting parts of the brake and clutch levers.

Recommended lubricants:
Yamaha Chain and Cable Lube or
10W30 Motor Oil

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

ELECTRICAL

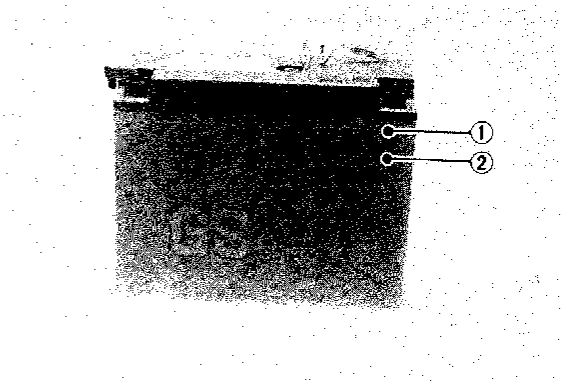
A. Battery

1. This model has been equipped with a long life type battery; however, the battery fluid should be checked at least once a month. The fluid level should be between the upper and the lower level marks.

CAUTION:

Normal tap water contains minerals which are harmful to a battery; therefore, refill only with distilled water.

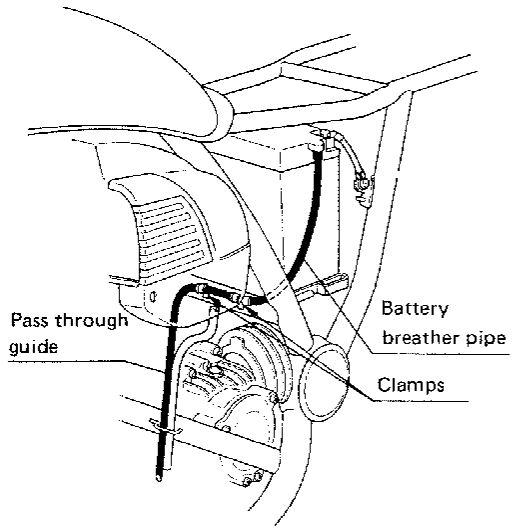
2. Refill the battery as follows:
   a. Remove the seat and left side cover.
   b. Remove the filling plug and slowly put in distilled water. Each individual cell automatically permits no filling above the UPPER LEVEL mark.



1. Upper level 2. Lower level

   c. Stop filling when the excessive distilled water flows out through the breather pipe.
   d. Securely tighten the filling pipe.
   e. Install the seat and side cover.
3. Always make sure the connections are correct when installing the battery. Make sure the breather pipe is properly connected, properly routed, and is not damaged or obstructed.

How to layout the battery breather pipe



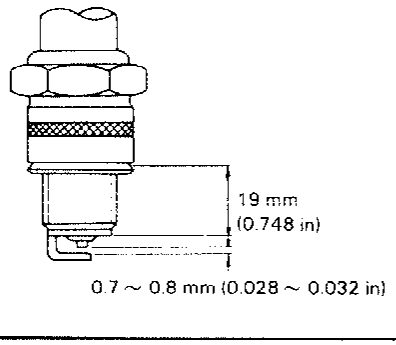
CAUTION:

The battery must be charged before using to insure maximum performance. Failure to properly change the battery before first use, or a low electrolyte level will cause premature failure of the battery.

Charging current: 2.0 amps/10 hrs.

B. Spark Plug

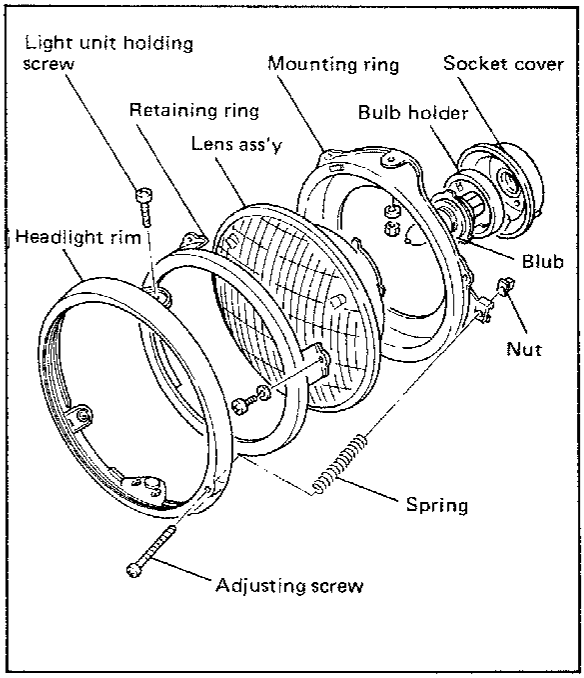
1. Check the electrode condition and wear, insulator color and electrode gap.



2. Use a wire gauge for measuring the plug gap.
3. If the electrodes become too worn, replace the spark plug.
4. When installing the plug, always clean the gasket surface. Wipe off any grime that might be present on the surface of the spark plug, and torque the spark plug properly.

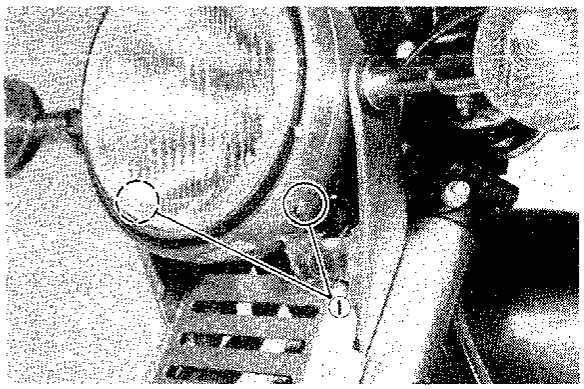
Standard spark plug:
BP6ES (NGK) or
W20EP-U (NIPPONDENSO)
Spark plug gap:
0.7 ~ 0.8 mm (0.028 ~ 0.032 in)
Spark plug tightening torque:
20 Nm (2.0 m·kg, 14.0 ft·lb)

C. Headlight



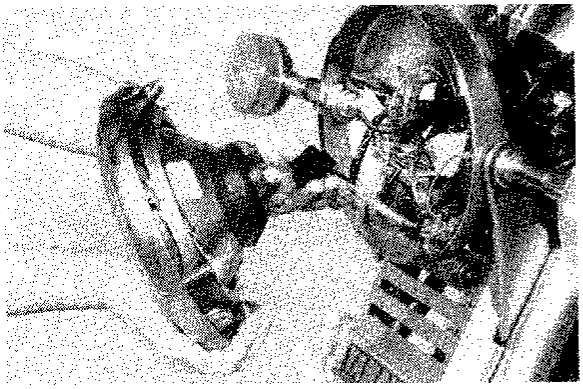
This motorcycle is equipped with a quartz bulb headlight. If the headlight bulb burns out, replace the bulb as follows:

1. Headlight bulb replacement
   a. Remove the 2 screws holding the light unit assembly to the headlight body.

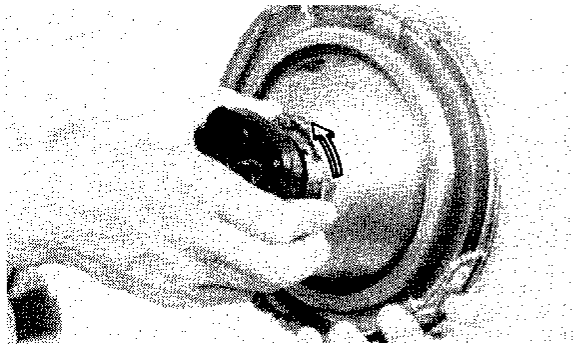


1. Holding screw

   b. Disconnect the lead wires and remove the light unit assembly.



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



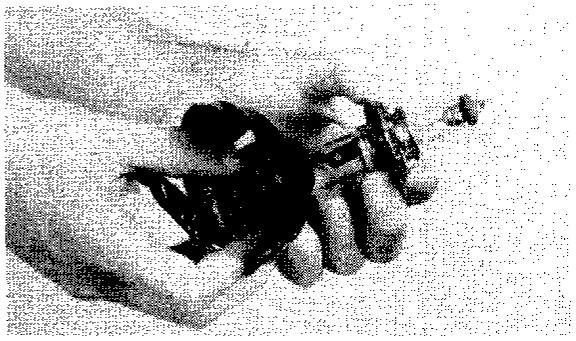
d. Slip a new bulb into position and secure it with the bulb holder.

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 illuminous flux will be adversely affected. If the glass is oil stained, thoroughly clean it with a cloth moistened with alcohol or lacquer thinner.

WARNING:

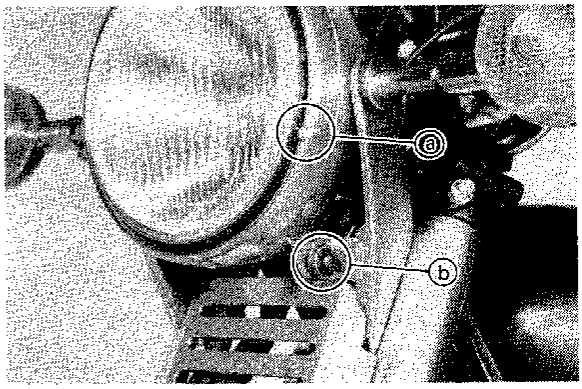
Keep flammable products or your hands away from the bulb while it is on, because it heats up. Do not touch the bulb until it cools down.



e. Reinstall the light unit assembly to the headlight body. Adjust the headlight beam if necessary.

2. Headlight beam adjustment

a. Horizontal adjustment:
To adjust the beam to the right, turn the adjusting screw clockwise.
To adjust the beam to the left, turn the screw counterclockwise.



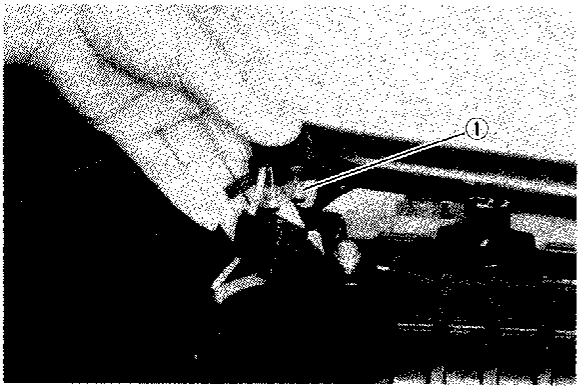
a. Horizontal adjusting screw b. Vertical adjusting screw

b. Vertical adjustment:
Loosen the adjusting screw under the headlight body. Adjust vertically by moving the headlight body. When proper adjustment is determined, retighten the adjusting screw.

D. Fuse

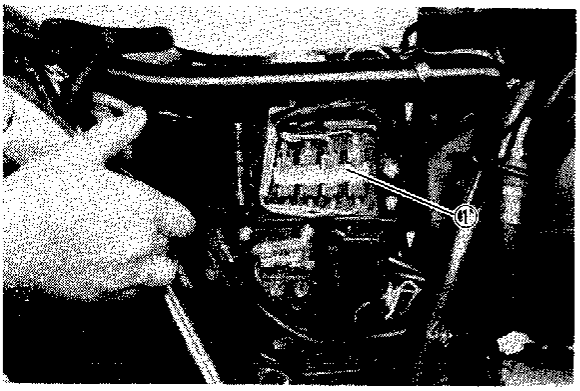
There are two fuse blocks on this model. The main fuse block is located inside the left side cover. The other fuse block is located inside the right side cover.

Main fuse block (under the seat)



1. Main fuse

Other fuse block behind the right side cover (right side cover)



1. Other fuse block

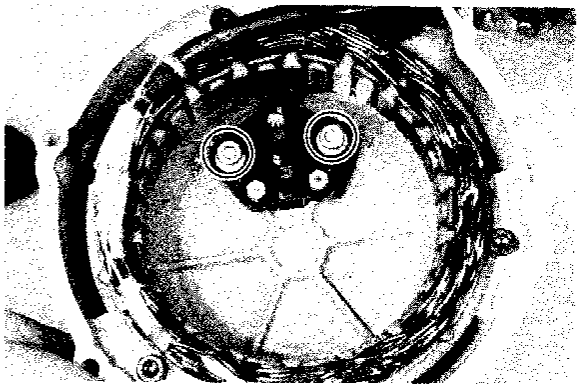
CAUTION:

Do not use fuses of a higher amperage rating then those recommended.

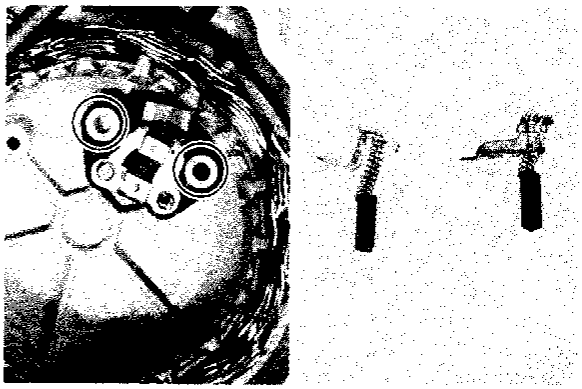
E. Generator Brushes Replacement

The generator carbon brushes require periodical replacement. Replacement is necessary after the first 13,000 km (8,000 mi) and there after, every 16,000 km (10,000 mi).

1. Remove the generator cover screws and the left-side generator cover.
2. Remove the screws and separate the brushes assembly from the cover.



3. Remove the pan-head screws and replace the old brushes to new ones.



ENGINE OVERHAUL

ENGINE REMOVAL

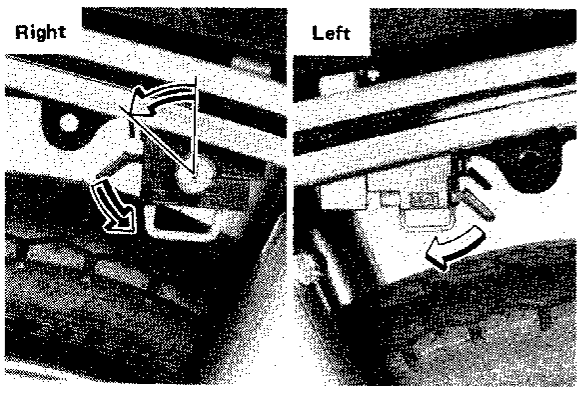
NOTE:
It is not necessary to remove the engine in order to remove the cylinder head, cylinder, or pistons.

A. Preparation for Removal

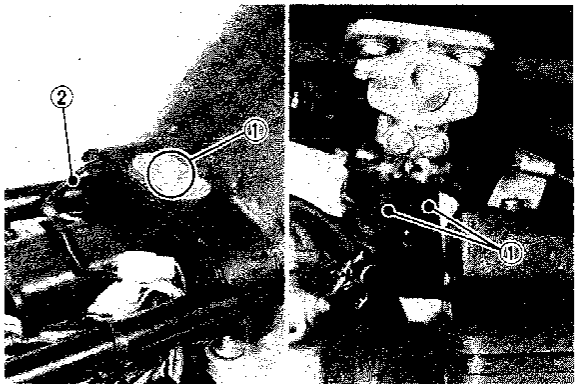
1. All dirt, mud, dust and foreign material should be thoroughly removed from the exterior of the engine before removal and disassembly. This will help prevent any harmful foreign material from entering the engine oil.
2. Before engine removal and disassembly, be sure that you have the proper tools and cleaning equipment so that you can perform a clean and efficient job.
3. During disassembly of the engine, clean and place all of the parts in trays in order of disassembly. This will speed up assembly time and help insure correct reinstall-action of all the engine parts.
4. Place the machine on its centerstand. Start the engine and allow it to warm up. Stop the engine and drain the engine oil.
5. Remove the oil filter element to drain the oil filter.
6. If the middle gear case is to be removed, drain the middle gear oil.

B. Seat, Fuel Tank and Side Covers Removal

1. Insert the key in the lock and turn it counterclockwise. Then push down the levers on both sides. Remove the seat.



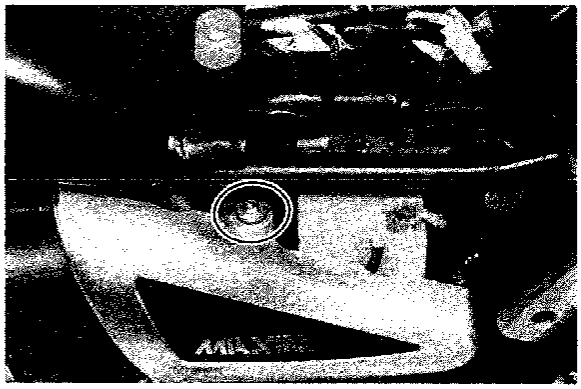
2. Remove the bolt that holds the fuel tank to the frame and remove the pipes. Disconnect the fuel gauge unit lead wires, and remove the fuel tank.

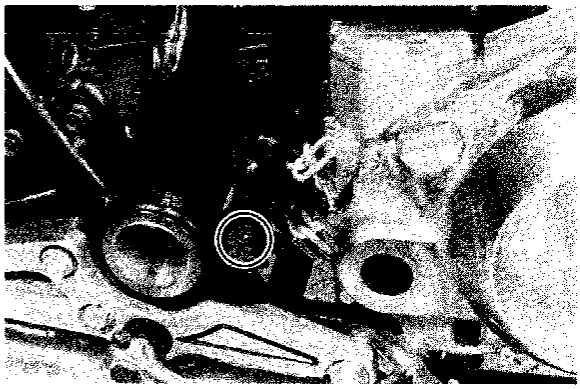


1. Fuel tank holding bolt
2. Fuel gauge unit lead wires

1. Fuel pipes

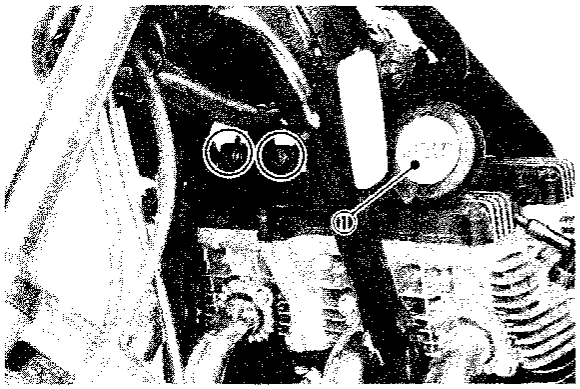
3. Remove the left and right side covers.
4. Insert the key in the lock and turn it clockwise. Remove the theft-protection chain and box.





C. Horn, Muffler, Footrest, Brake Pedal

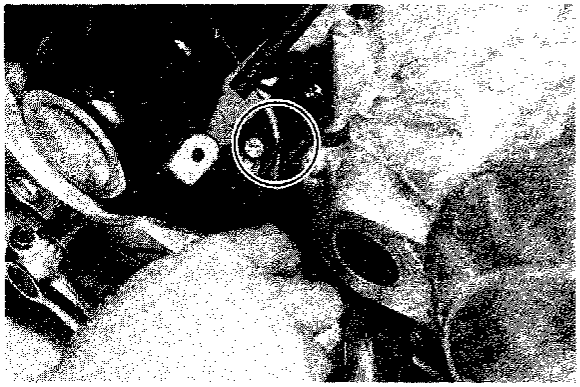
1. Remove the horn and bracket assembly.



1. Horn

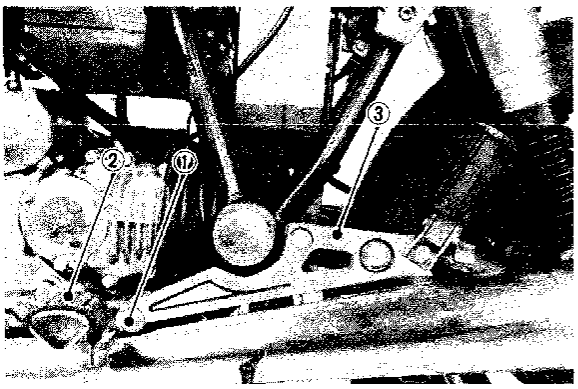
2. The right and left muffler and the footrests.

a. Remove the brake switch spring at the brake pedal.



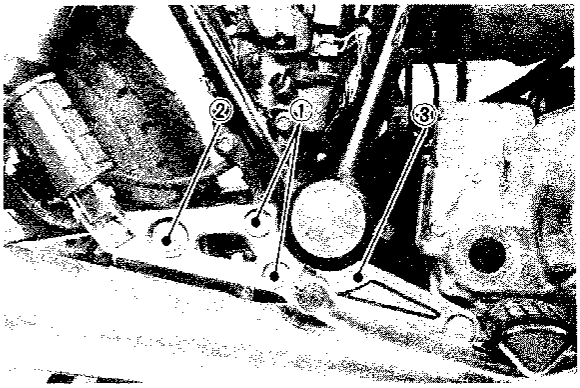
1. Brake switch spring

b. Remove the rear engine mounting through bolt and the footrests.



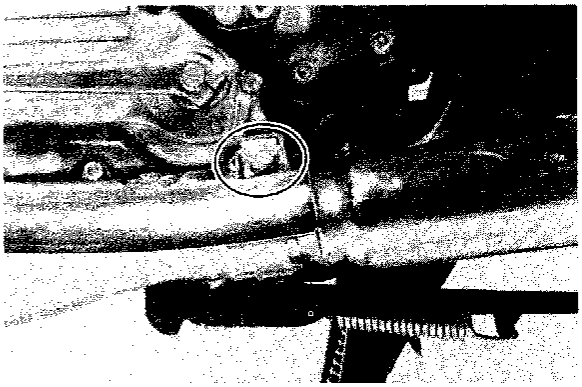
1. Engine mounting bolt 2. Footrest 3. Muffler bracket

c. Remove the bolts holding the muffler brackets to the frame and remove the muffler brackets.

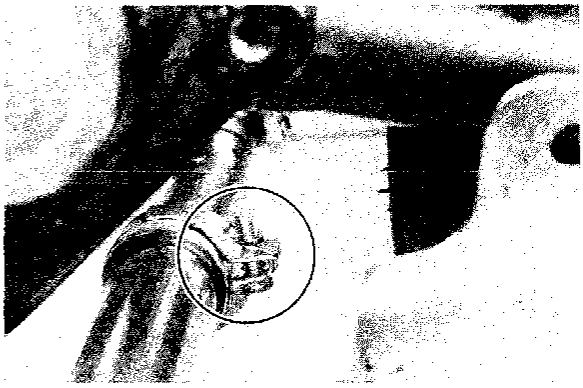


1. Bracket holding bolt 3. Muffler bracket
2. Muffler mounting bolt

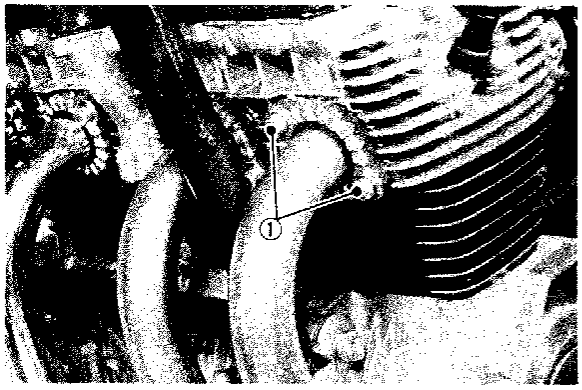
d. Loosen the clamp securing the muffler and exhaust pipe.



e. Loosen the clamp securing the cross over pipe.



f. Remove the exhaust pipe holding nuts from cylinder head.

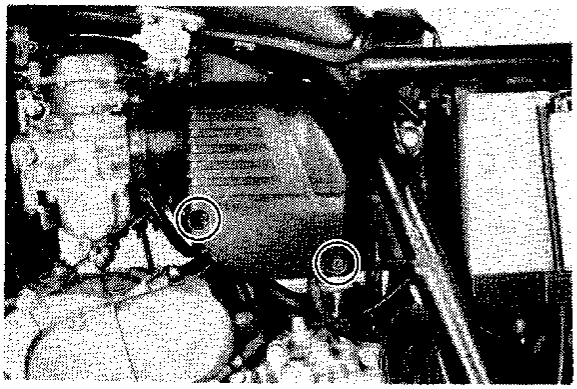


1. Exhaust pipe holding nuts

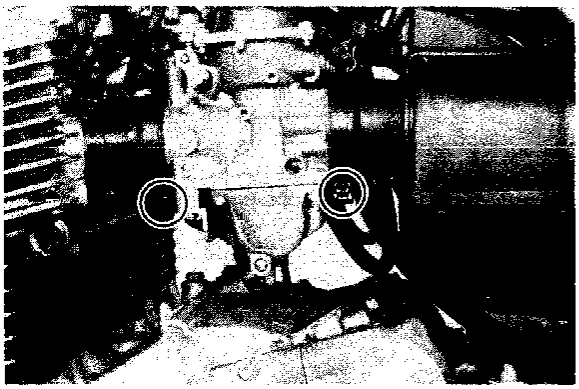
g. Remove the left and right exhaust pipes and mufflers.

D. Air Cleaner Case

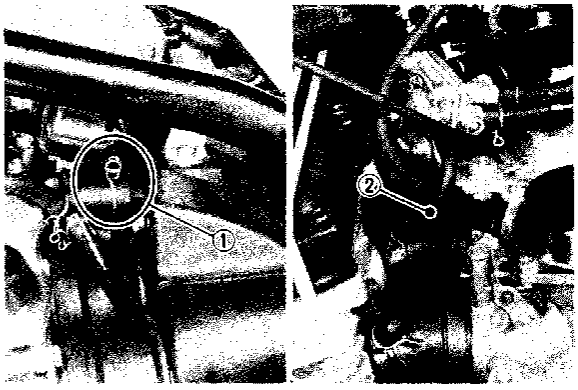
1. Remove the air filter box cover and the filter by loosening the screws.



2. Loosen the clamp holding the carburetors to the air cleaner case and the carburetor joints.

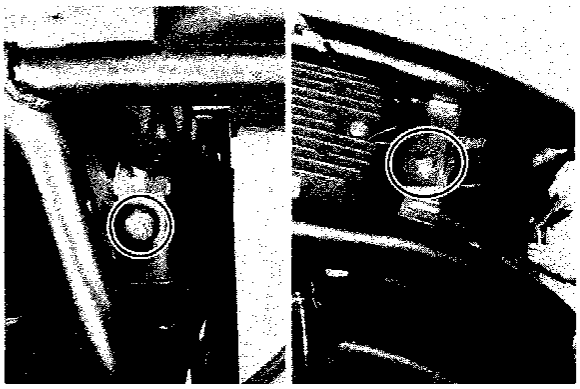


3. Remove the crankcase breather hose at the air cleaner case. Remove the vacuum advancer hose from No. 2 carburetor joint.

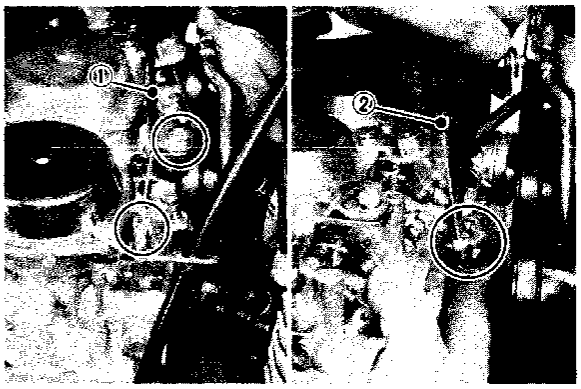


1. Breather hose 2. Vaccum advancy hose

4. Remove the bolts holding the air cleaner case to the frame.



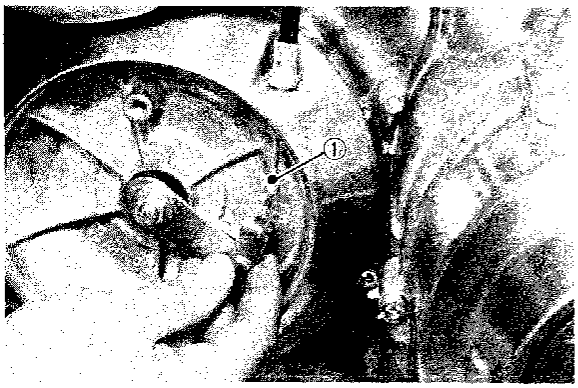
5. Pull the air cleaner case to the rear. Remove the clutch cable from the holder attached to the right carburetor. Loosen the hose clamps and remove the intake joints. Lift the carburetors back and to the left. Remove the throttle cable from the carburetors.



1. Starter cable 2. Throttle cable

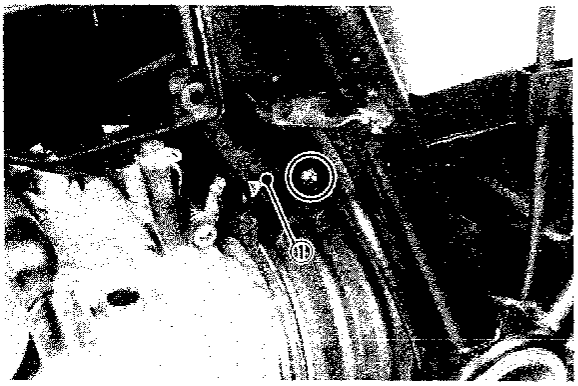
E. Wiring and Cables

1. Disconnect the battery ground wire at the battery terminal.
2. Remove the clutch cover and disconnect the clutch cable at the push lever.



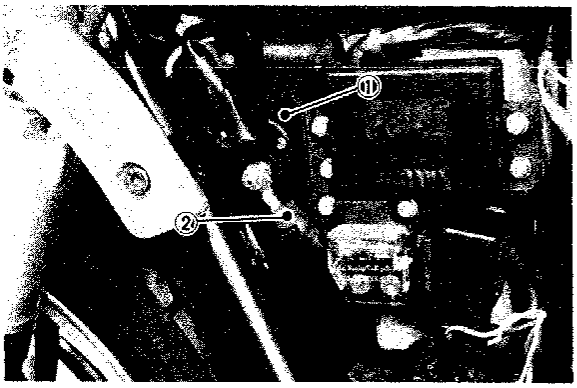
1. Clutch cable

3. Remove the spark plug wires.
4. Disconnect the engine ground wire at the frame side.



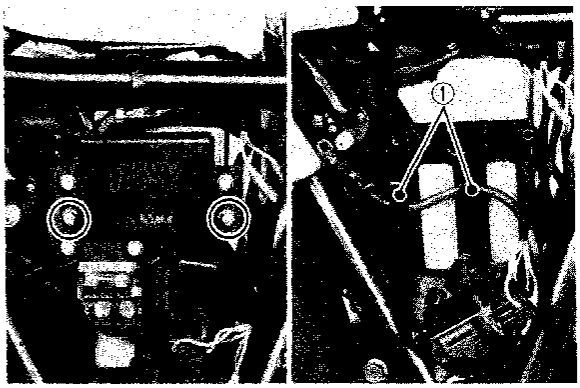
1. Ground wire

5. Disconnect the starter motor cable at the starter solenoid switch.



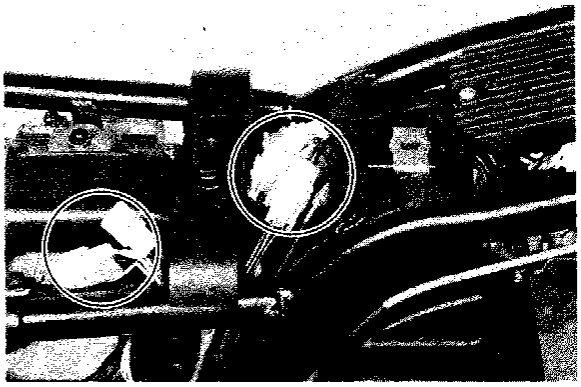
1. Starter solenoid switch 2. Starter motor cable

6. Remove the 2 screws holding the fuse box backing plate to the battery box.



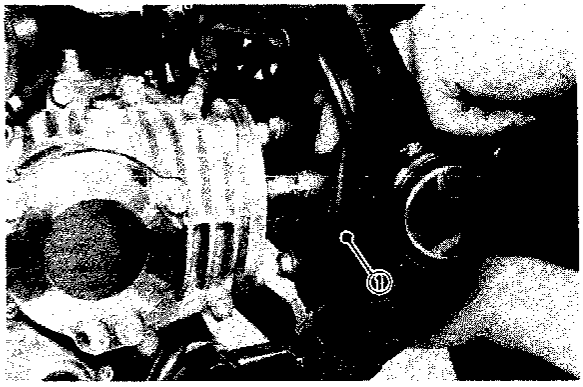
1. Clamp

7. Disconnect the wiring harness couplers. Position the wires so that they can be safely removed.



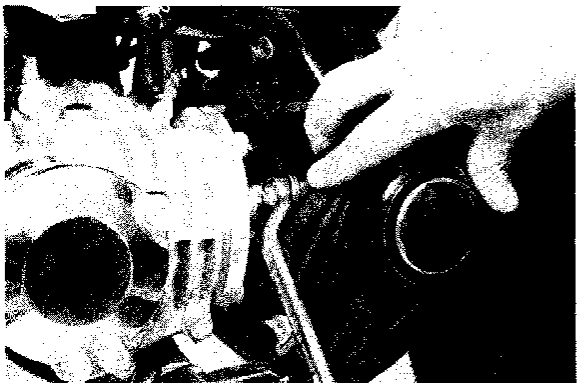
F. Drive Shaft Joint

1. Pull rubber boot from drive shaft coupling to expose 4 bolts.



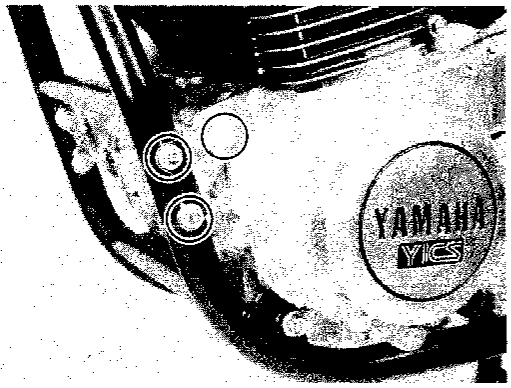
1. Rubber boot

2. Remove the 4 bolts on the drive shaft coupling.

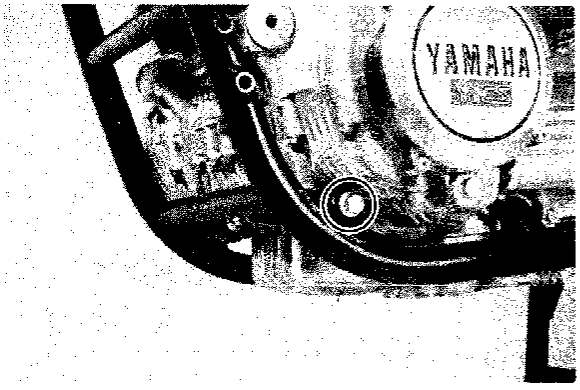


G. Removal

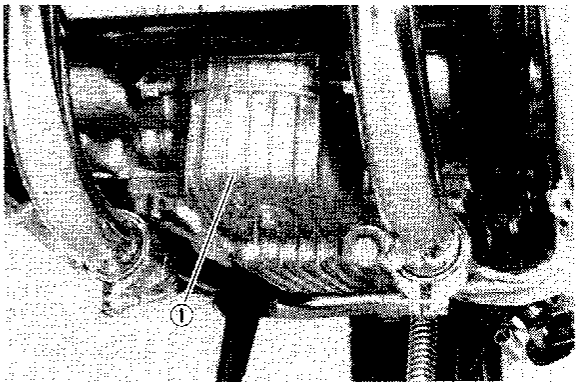
1. Remove the bolts securing the engine bracket to the frame.



2. Remove the 2 engine mounting bolts from the frame.

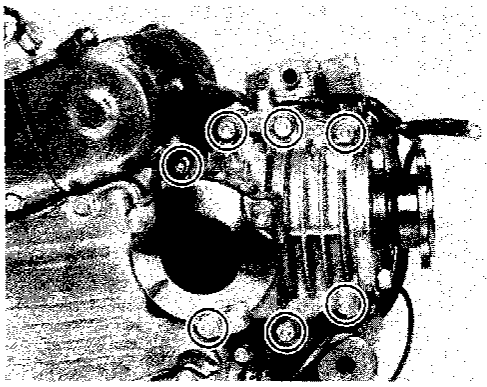


3. Remove the oil filter bolt and filter element.



1. Oil filter

4. Slide the engine forward. Remove the engine to the right. Position a box or other support to the right of the machine for assistance when removing the engine.
5. Remove the 7 middle gear case securing bolts and remove the middle gear case.



6. Remove the crankcase breather hose and ventilation hose.

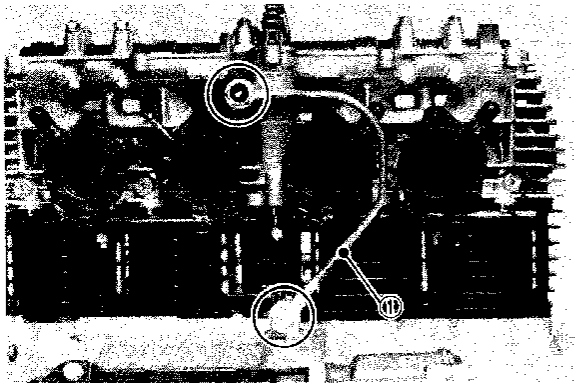
ENGINE DISASSEMBLY

A. Cylinder Head and Cylinder Removal

NOTE:
Cylinder head and cylinder can be removed without removing engine.

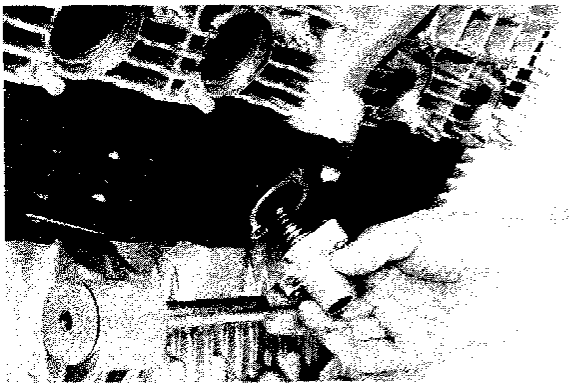
1. Remove the cylinder head cover. Note the location of the throttle cable clip.

2. Remove the oil delivery pipe and copper washers.

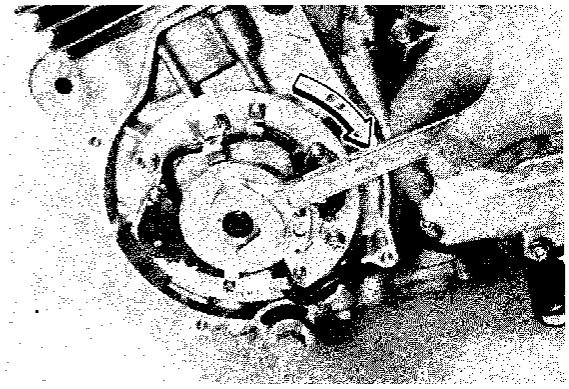


1. Oil delivery pipe

3. Remove the cam chain tensioners from the front of the engine.

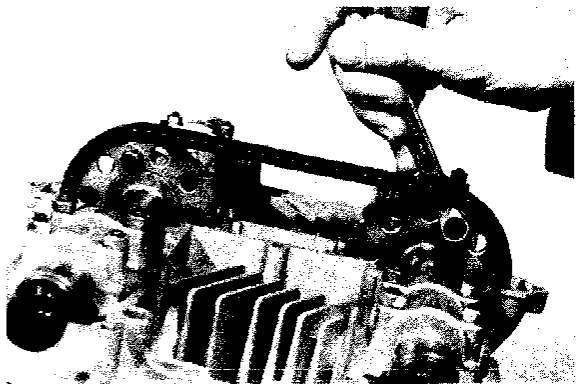


4. Remove the timing cover. Use a 19 mm (0.75 in) wrench on the timing plate flats to rotate the crankshaft clockwise until the engine is at TDC. An important note: This engine rotates in a clockwise direction, contrary to Yamaha engines of the past.



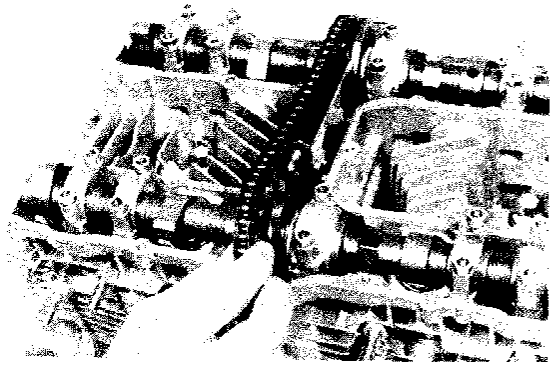
CAUTION:
Never use an allen wrench to rotate the crankshaft. Always use the 19 mm (0.75 in) flats provided on the timing plate to rotate this engine.

5. Remove the four cam sprocket bolts.

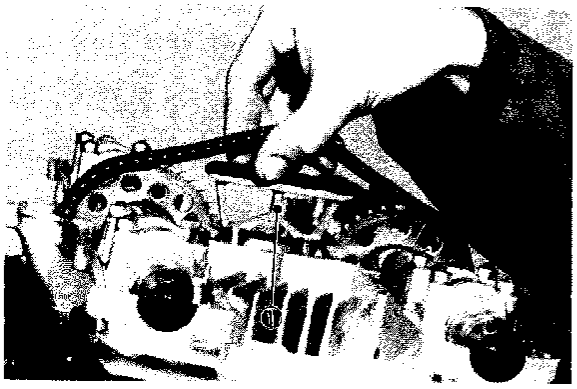


6. Slip each sprocket off its mounting boss on the cam.

CAUTION:
From this point on, do not rotate the cam shaft or valve damage may occur. On the XJ1100J, it is not necessary to break the cam chain. However, it can be broken if so desired. It is easier to disassemble the engine without separating the chain.

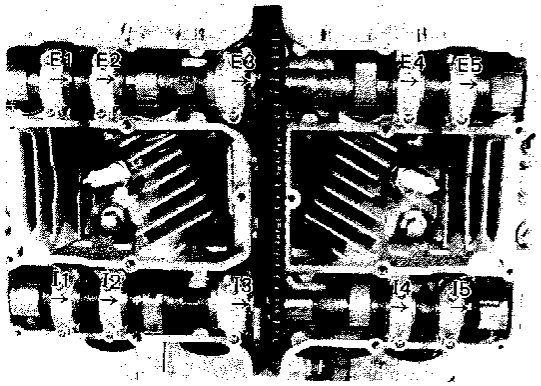


7. Remove the cam chain guide.

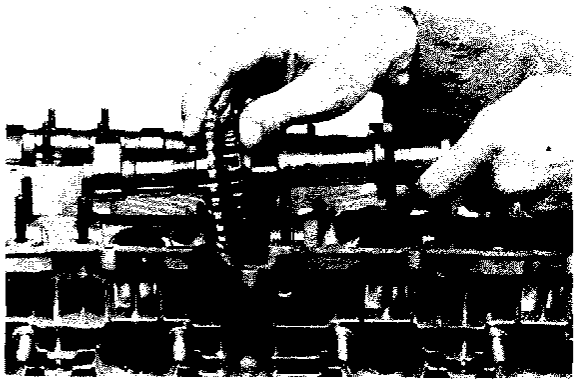


1. Cam chain guide

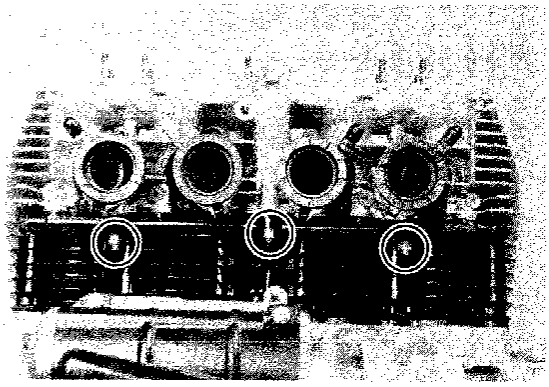
8. Note the location of the cam caps. The caps for the intake cams are identified I-1 through I-5. The exhaust cam caps are identified E-1 through E-5. The center cap for each cam is dowel pinned. Directional arrows are cast on each cap and point toward the alternator and the clutch side of the engine. Use the center caps as a reference.



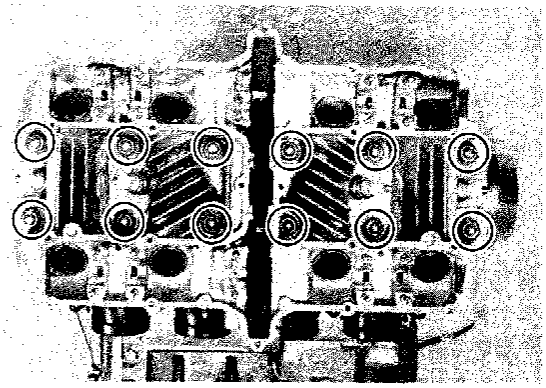
9. Fasten safety wire to the cam chain to prevent its falling into the crankcase cavity.
   Slide the cams and sprockets from under the chain and remove the cams and sprockets.

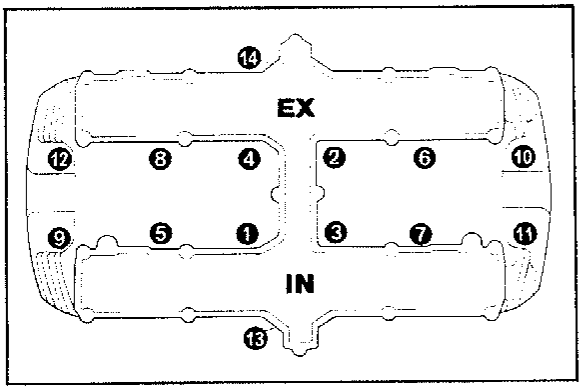


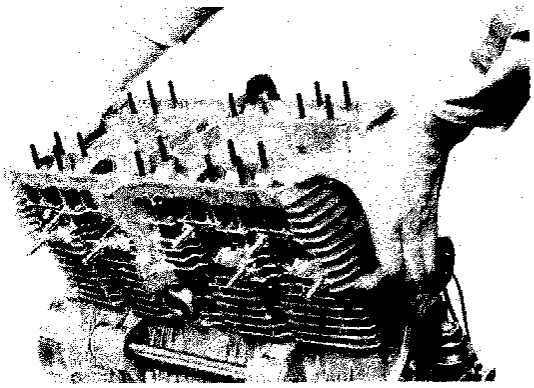
10. Remove the cylinder head nuts located in the front and the rear of the cylinder.

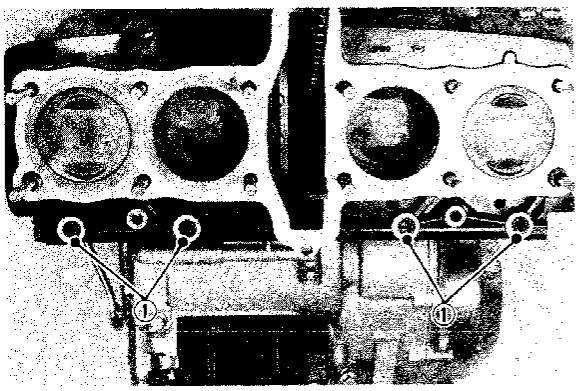


11. Remove the cylinder head nuts in the reverse order of the torque sequence. Start by loosening each nut 1/2 turn until all of the nuts are loose. Then remove the cylinder head.



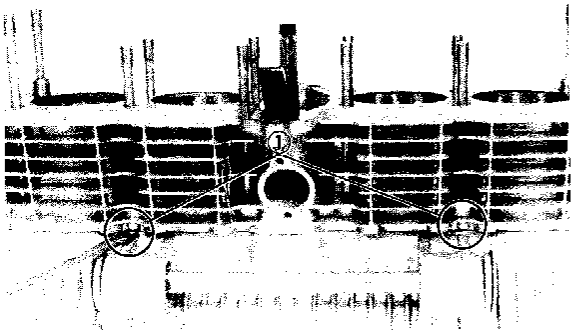






1. O-rings

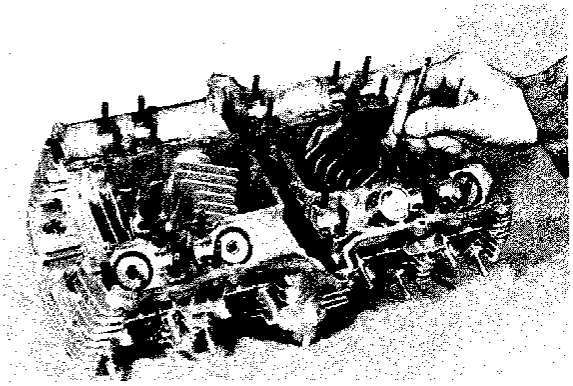
12. Remove the cylinder assembly. It may be necessary to tap the cylinder lightly to loosen it from the base gasket.
    If it is necessary to pry the cylinder loose from the base gasket, carefully use a broad, flat-bladed screw driver at the reinforced points shown.



1. Reinforcement points

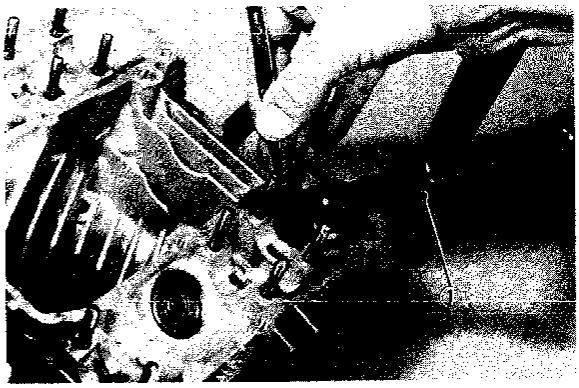
B. Cylinder Head Disassembly

1. Remove the valve lifters and pads. Be careful not to scratch the lifter bodies or lifter bores in the cylinder head.
    Be very careful to identify each lifters position so that it may be returned to its original place.



2. Mount the valve spring compressor on the head and depress each valve spring. Remove the keepers using a magnet and take out the retainer and valve springs with forceps.

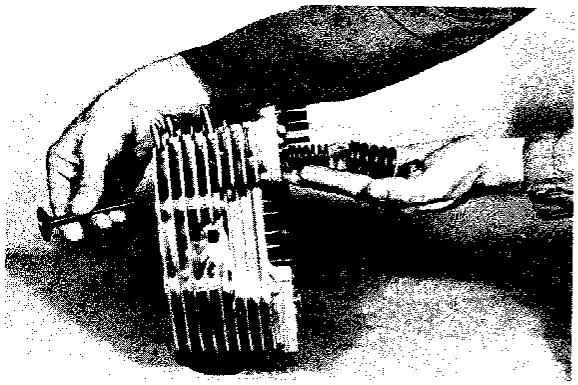
NOTE:
Note that the valve springs are progressively wound with the more tightly wound end facing the cylinder head.

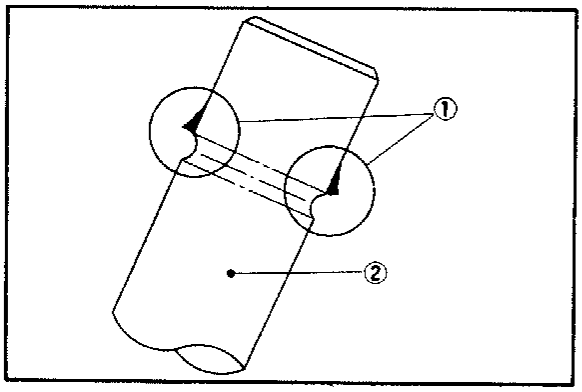


1. Valve spring compressor

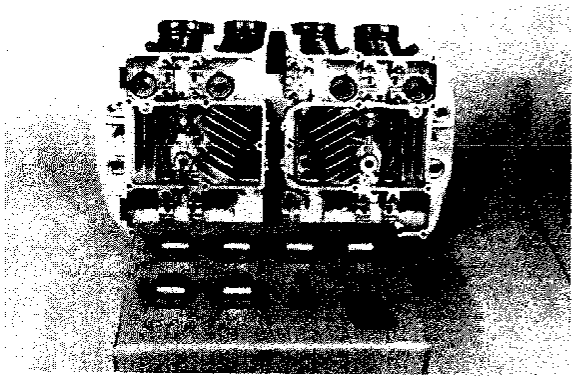
3. Remove valves.

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



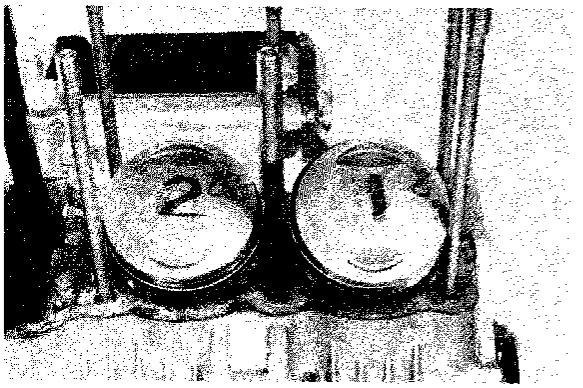


4. Use a small box to hold the parts and identify the original position of each lifter and valve. Be very careful not to mix the location of these components.

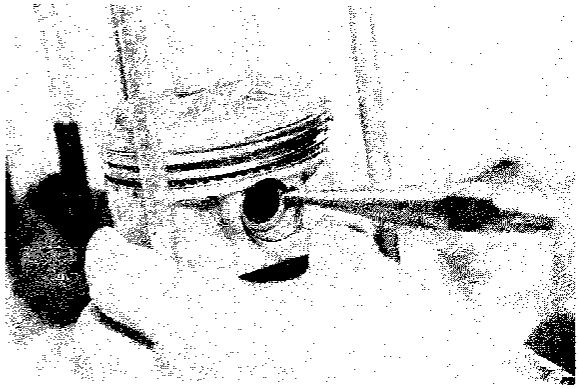


C. Piston and Cam Chain Dampers Removal

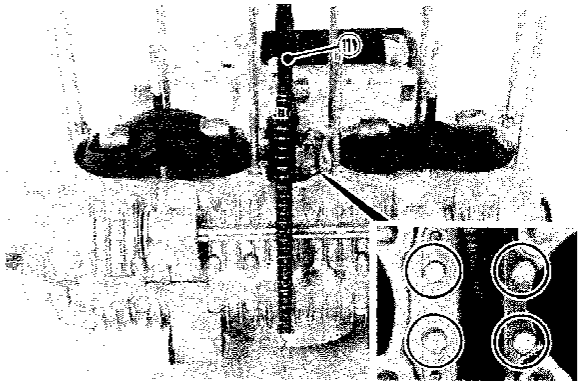
1. Mark each piston to aid in reassembly.



2. Place a clean towel or rag into the crankcase to keep circlips and material from falling into the engine.
3. Remove piston pin clips, piston pins, and pistons.



4. Remove the cam chain dampers.

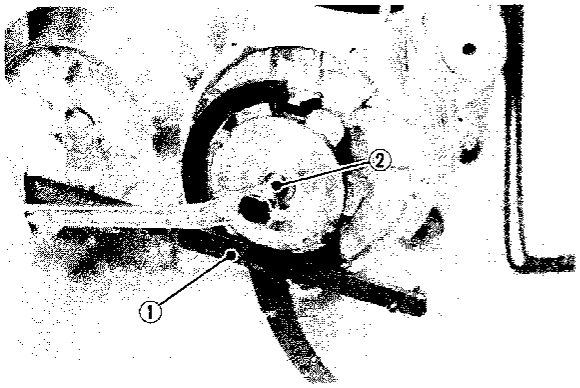


1. Cam chain damper

D. Generator

1. Remove the bolts that hold the generator.
   After the wiring harness has been removed from the clips take off the stator assembly.

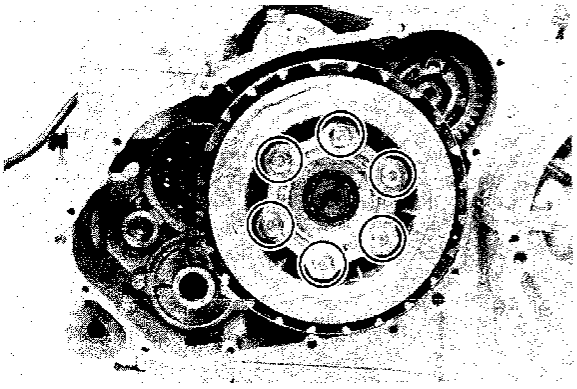
2. Remove the alternator rotor using the universal magneto and rotor holding tool (special tool) and the rotor puller bolt (special tool).



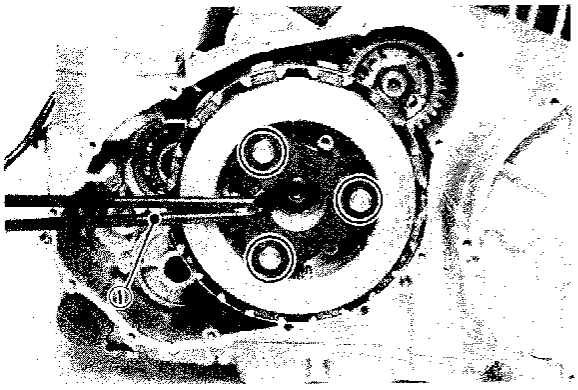
1. Universal magneto and rotor holding tool
2. Rotor puller bolt

E. Clutch and Primary Driven Gear

1. Release the tension evenly on the six 6 mm (0.24 in) bolts and remove clutch pressure plate No. 1 and the six clutch springs.



2. After straightening the lock washer tab on the clutch unit, secure the clutch holding tool (special tool) to the clutch boss using three 6 mm (0.24 in) clutch bolts.



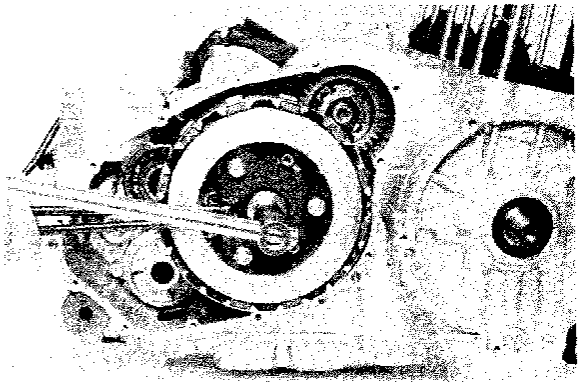
1. Clutch holding tool

CAUTION:

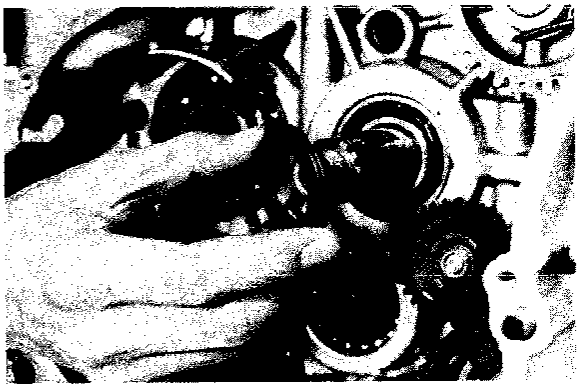
Use a new lock washer during reassembly.

CAUTION:

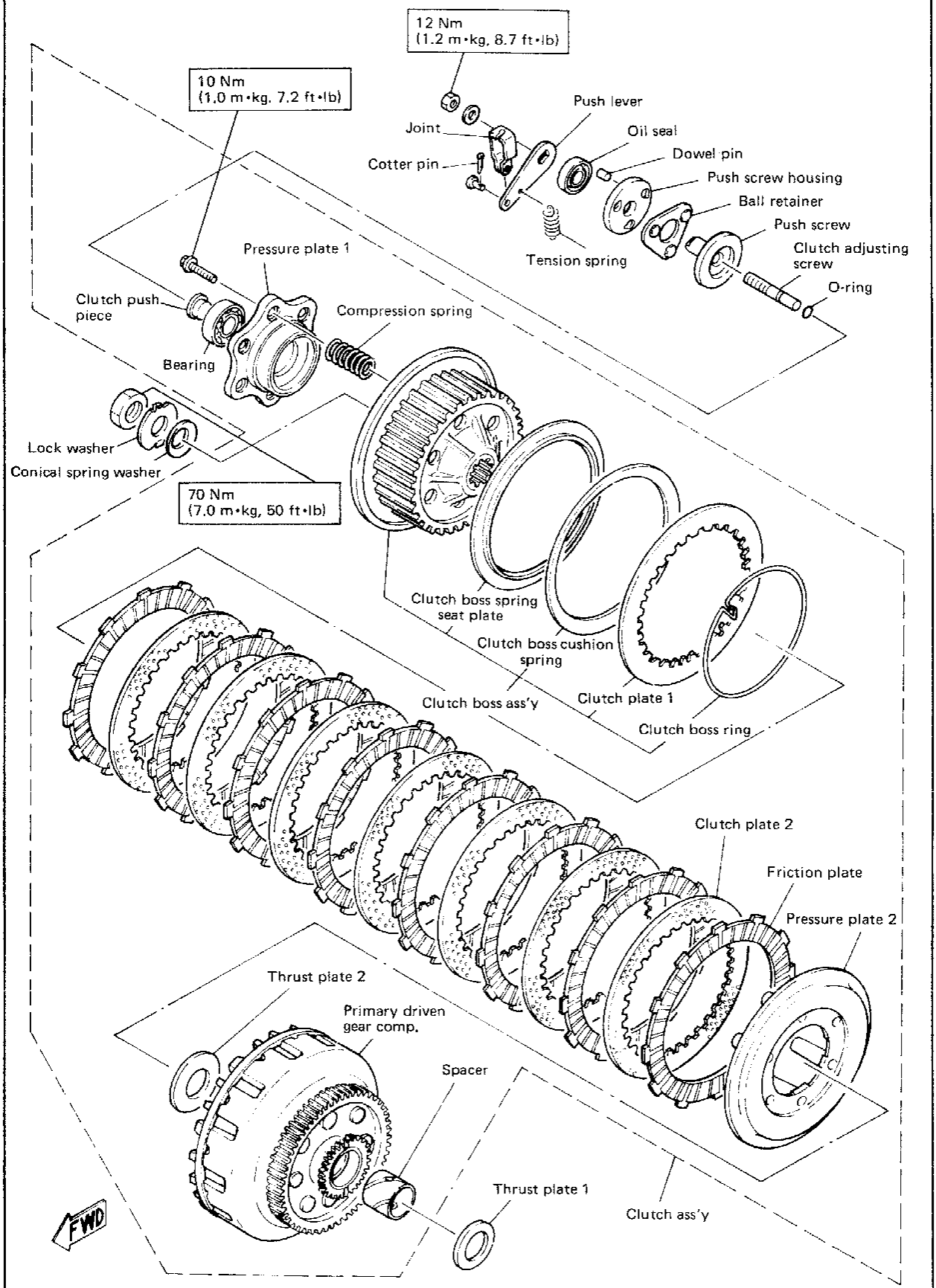
Failure to secure the clutch tool with the bolts could result in a broken clutch boss.



3. Remove the clutch nut.
4. Remove the clutch holding tool along with the clutch boss clutch plates and pressure plate and remove the three clutch bolts from the clutch holding tool.
5. Take off the thrust washer, clutch housing and primary driven gear.
   Remove the thrust washer from the main axle.

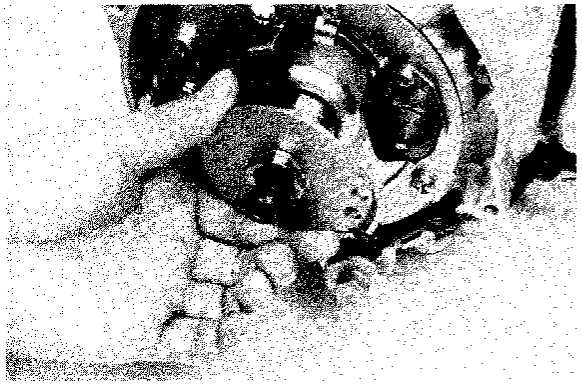


CLUTCH

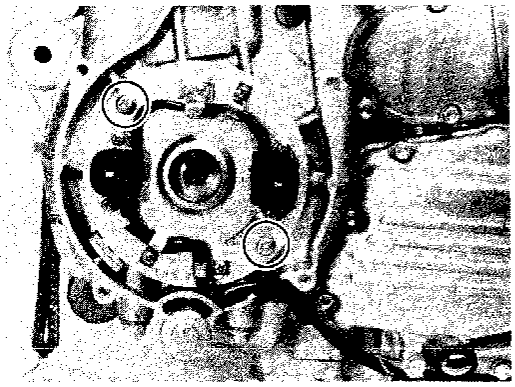

12 Nm
(1.2 m•kg, 8.7 ft•lb)
10 Nm
(1.0 m•kg, 7.2 ft•lb)
Push lever
Joint
Oil seal
Cotter pin
Dowel pin
Push screw housing
Ball retainer
Push screw
Clutch adjusting screw
O-ring
Tension spring
Pressure plate 1
Clutch push piece
Compression spring
Bearing
Lock washer
Conical spring washer
70 Nm
(7.0 m•kg, 50 ft•lb)
Clutch boss spring seat plate
Clutch boss cushion spring
Clutch boss ass'y
Clutch plate 1
Clutch boss ring
Clutch plate 2
Friction plate
Pressure plate 2
Thrust plate 2
Primary driven gear comp.
Spacer
Thrust plate 1
Clutch ass'y
FWD

F. Pick-up Coil Assembly and Oil Level Switch

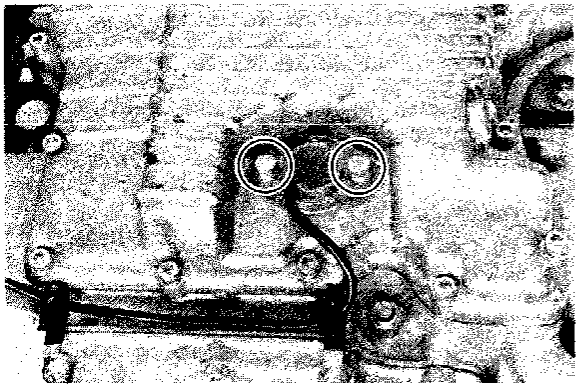
1. Remove the allen bolt that holds the timing plate.



2. Remove the pick-up coil assembly by removing the two Phillips head screws which hold the assembly to the crankcase.

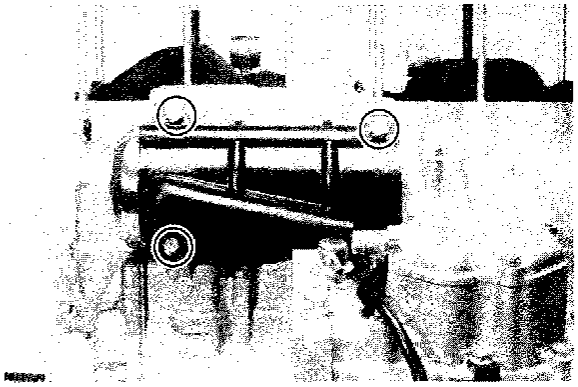


3. Remove the oil level switch assembly.

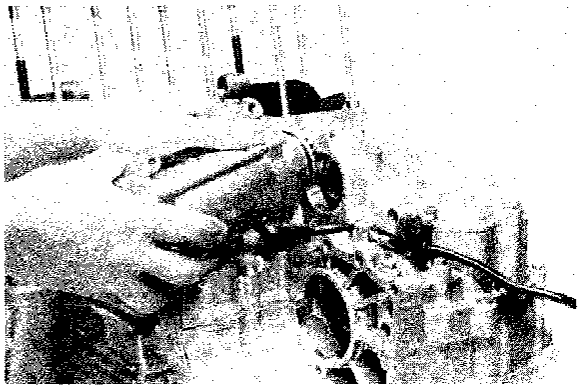


G. Starter Motor Removal

1. Remove the 3 bolts holding the starter motor and cover.

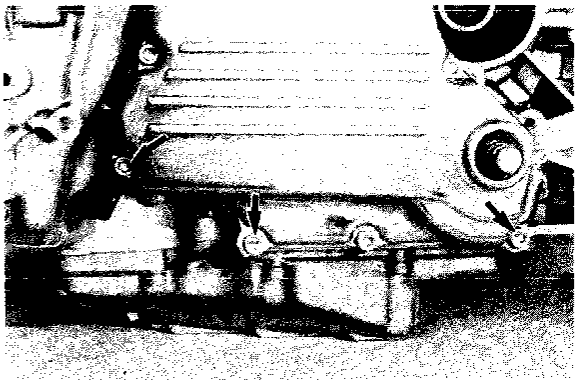


2. Remove the cover and the starter motor.



H. Shifter

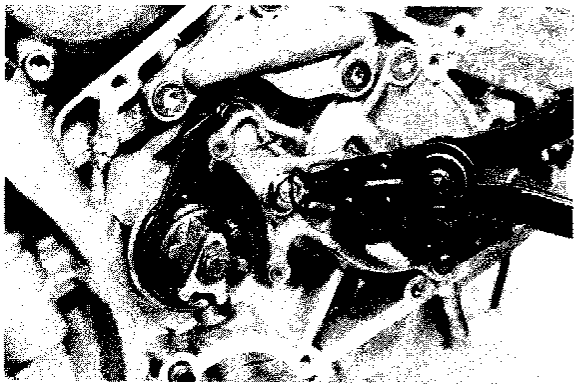
1. Remove the change pedal and the left hand crankcase cover.
   Note the position of the wire harness clips.

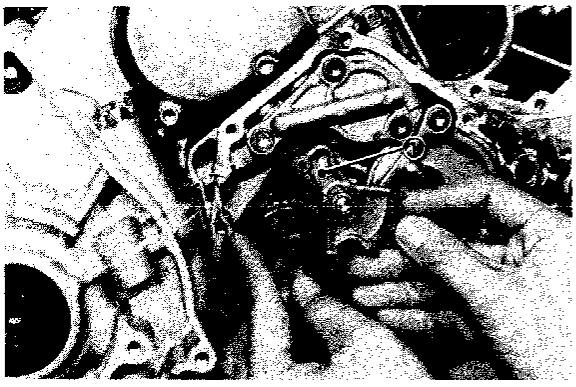


2. Remove the shift shaft assembly.

1. Shift shaft assembly

3. Remove the circlip and shift lever No. 2.



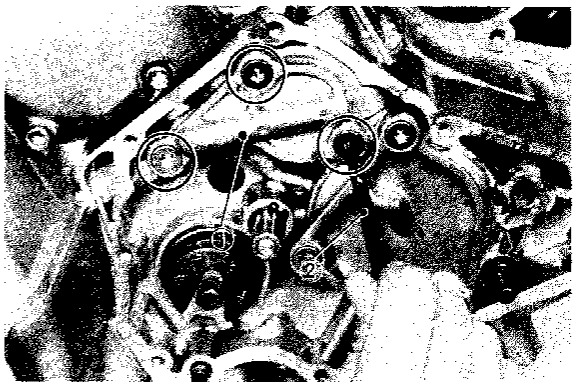


1. Shift lever No. 2

NOTE:

Use a new circlip during reassembly.

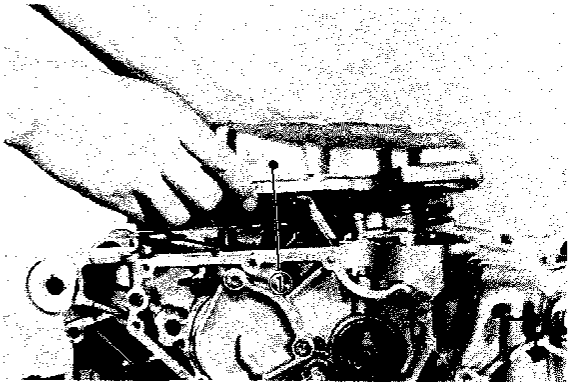
4. Using the drive axle wrench (special tool) remove the three countersunk screws securing the special oil nozzle. Remove the nozzle.



1. Special oil nozzle 2. Drive axle wrench

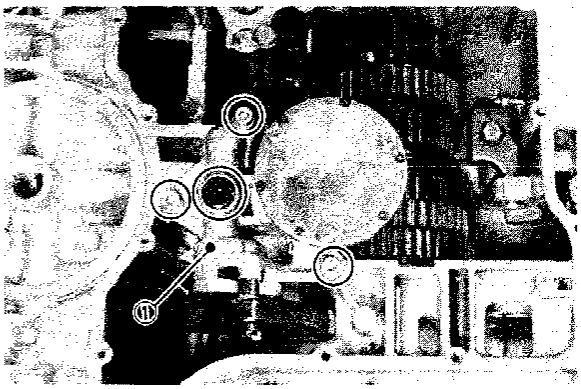
I. Oil Pump Removal and Disassembly

1. Remove the strainer cover.



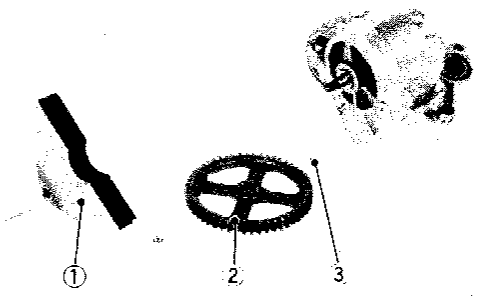
1. Strainer cover

2. Remove the oil pump assembly.



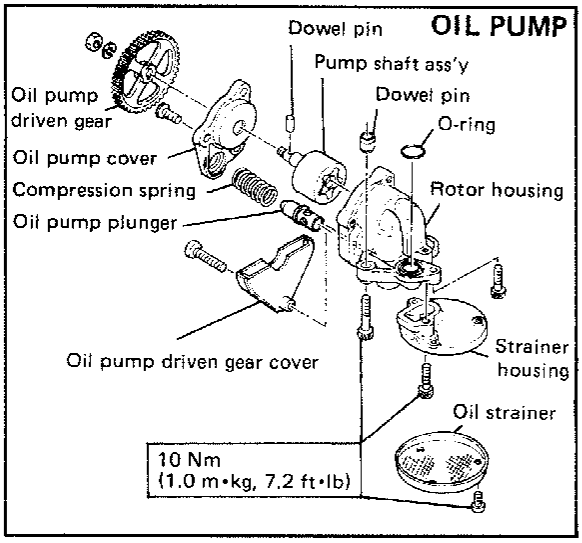
1. Oil pump

3. Remove the driven gear cover, driven gear, and retaining pin.



1. Gear cover 2. Driven gear 3. Retaining pin

4. Remove the oil pump cover, the rotor assembly and the pressure relief valve.

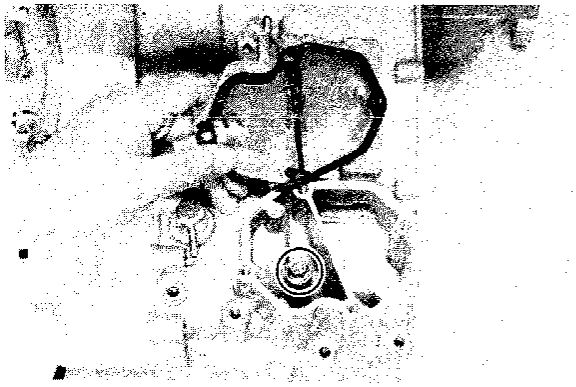


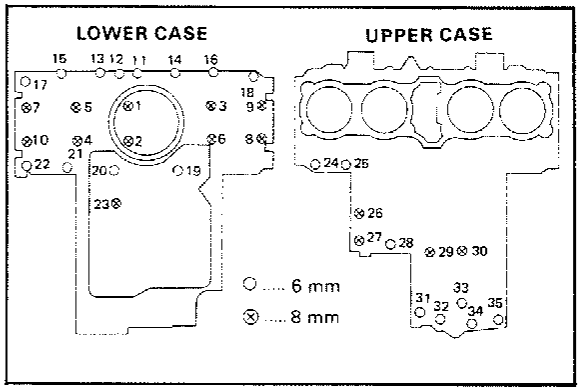
J. Crankcase Disassembly

1. Refer to the illustration for the crankcase bolt removal sequence. Start with the highest numbered bolt. Loosen all bolts 1/2 turn, then remove the bolts. The crankshaft area bolts should be loosened last. Notice that the bolts in the oil filter cavity have no washers, while the other crankshaft area bolts use washers..

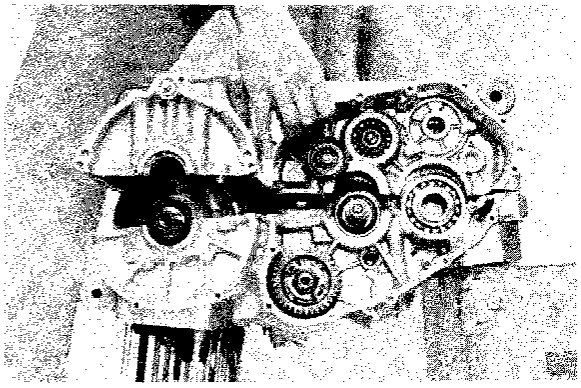
CAUTION:

Before trying to separate the crankcases, remove the crankcase breather cover and remove the hidden bolt located under the cover.

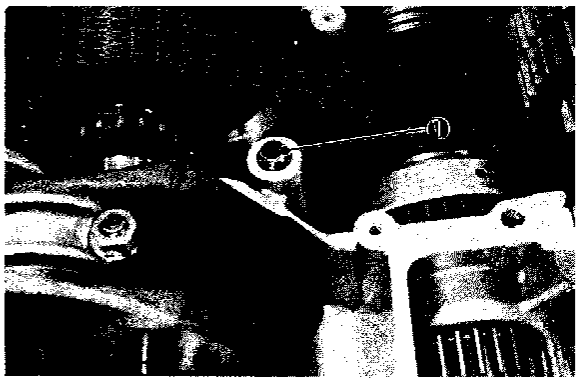




2. Turn the engine upside down and lift off the lower case half. The crankshaft will remain in the upper case half. Prop the engine up to prevent damage to the cylinder studs.

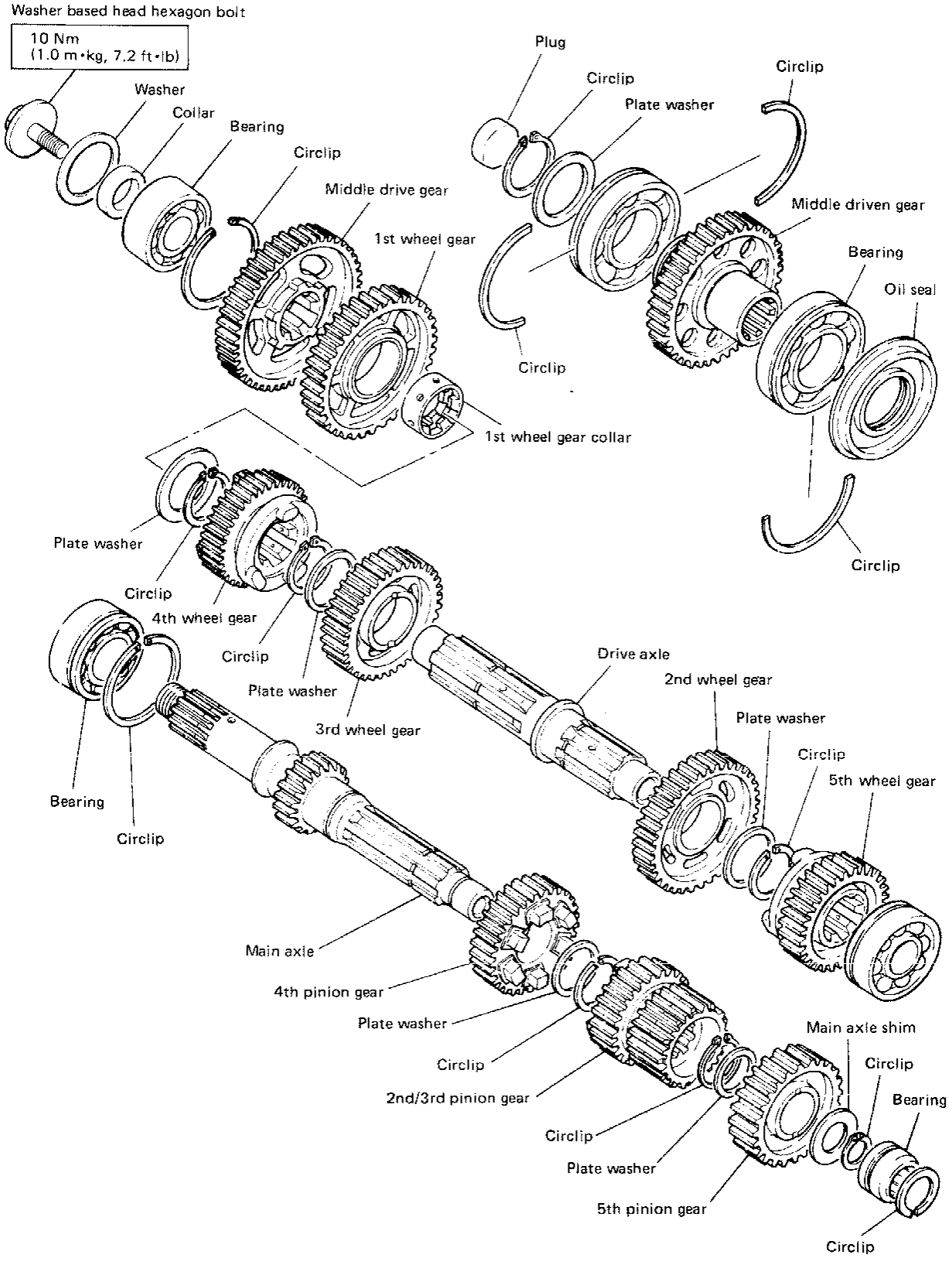


3. The arrow indicates an important "O-ring" and oil passage in the top case half. Take care not to allow any dirt or foreign matter to enter this passage.

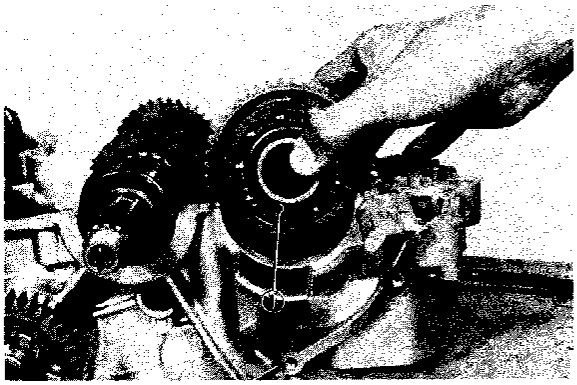


1. "O-ring"

TRANSMISSION



4. Remove the middle driven gear assembly from the upper case half.

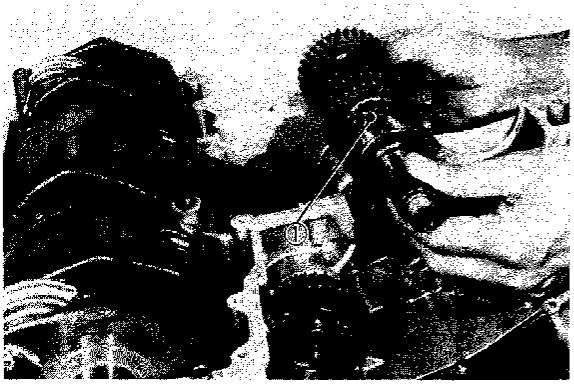


1. Middle driven gear assembly

NOTE:

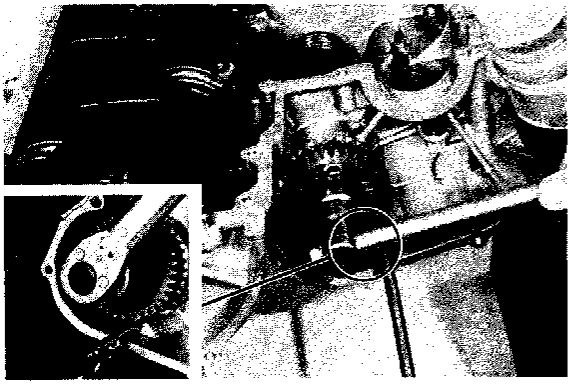
Always use a new oil seal when reassembly.

5. Remove the main axle assembly from the upper case half.



1. Main axle assembly

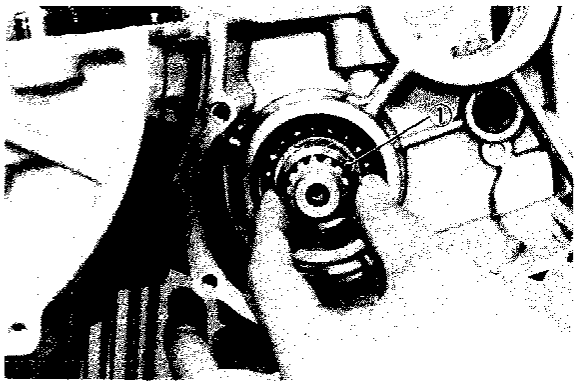
6. Straighten the lockwasher tab and loosen the holding nut. Place a large flat bladed screw driver into the slot provided in the crankcase to prevent the primary drive gear from turning when loosening the nut. Next, take off conical spring washer located under the lock tab and remove the gear.



CAUTION:

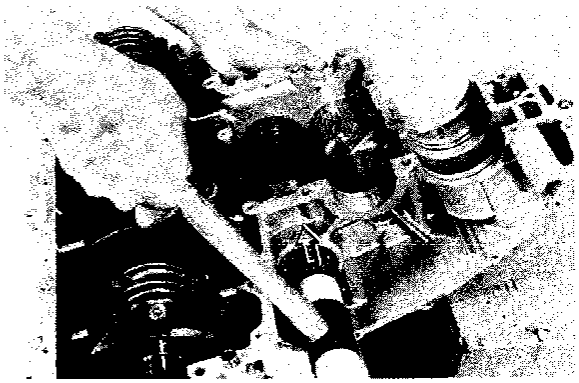
Replace lock washer during reassembly.

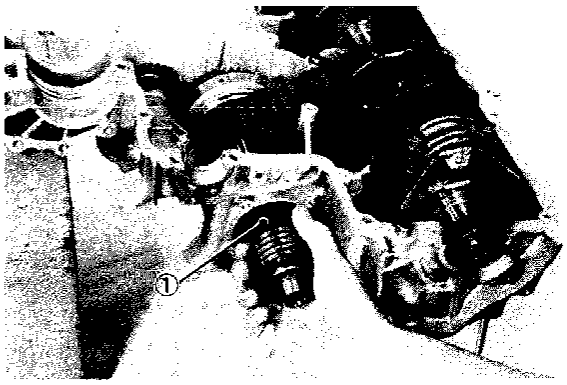
7. Remove the spacer from the primary shaft.



1. Spacer

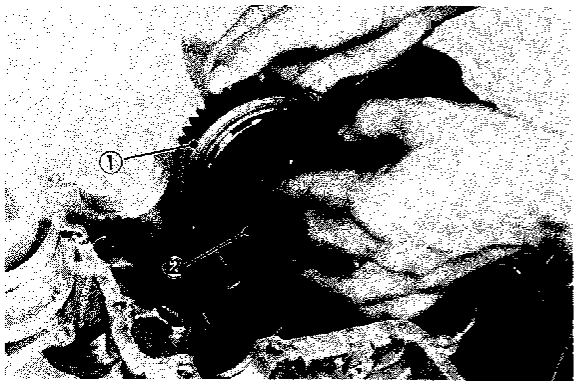
8. Remove the 3 allen screws and lightly tap the right end of primary shaft with a soft faced hammer and then pull out the primary shaft bearing housing.
Remove the primary shaft.





1. Primary shaft

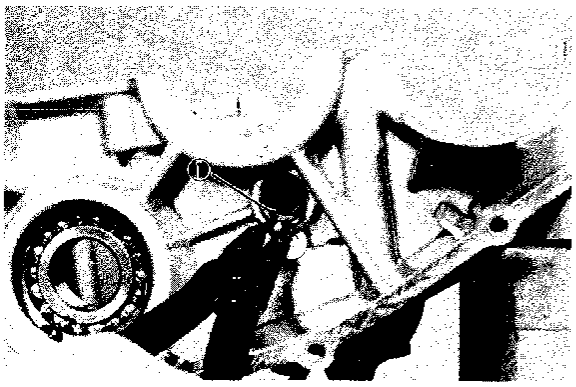
9. With the primary shaft removed, the starter clutch assembly and primary chain gear can be removed.



1. Starter clutch assembly 2. Primary chain gear

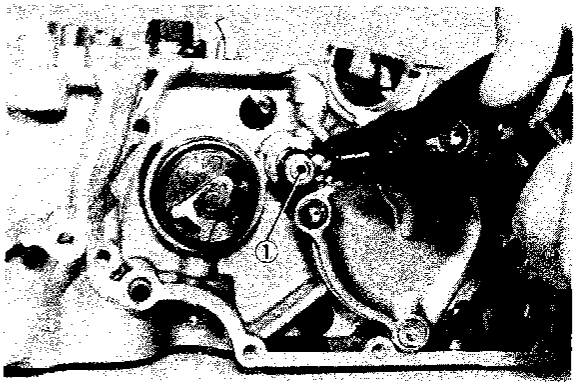
10. Lift the crankshaft with connecting rods from the case.

11. Mark the original location of each connecting rod and cap and then remove the rods.
12. Slip the primary chain and cam chain over the crank webs and remove the chains.
13. Remove the starter idle gear from the upper case half.



1. Starter idle gear shaft

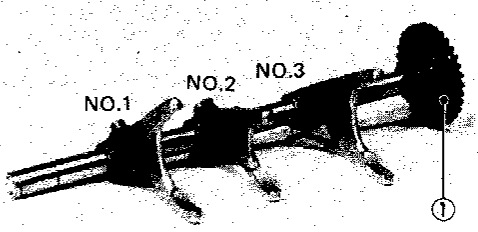
14. Remove the circlip securing the shift fork guide bar and pull out the bar and shift forks. The shift forks are identified by numbers cast on their sides.



1. Shift fork guide bar

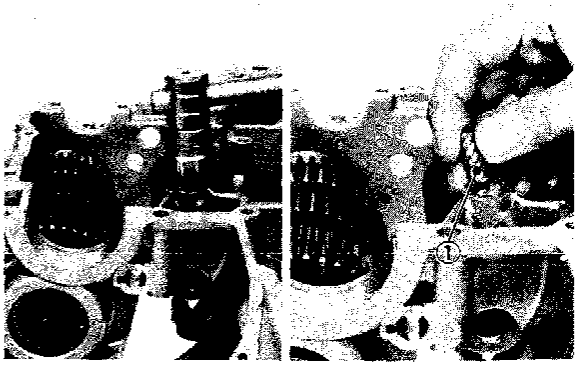
NOTE:

The gear on the end of this shaft is the oil pump idle gear.



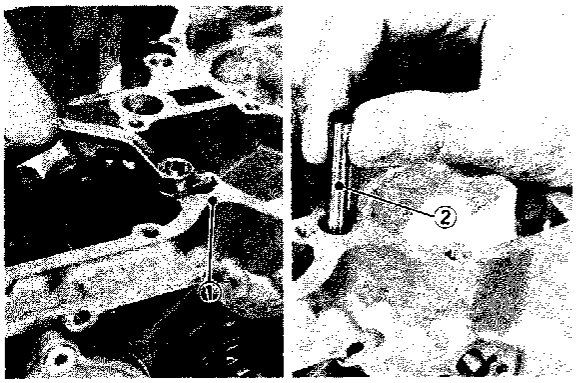
1. Oil pump idle gear

15. Remove the shift cam detent.



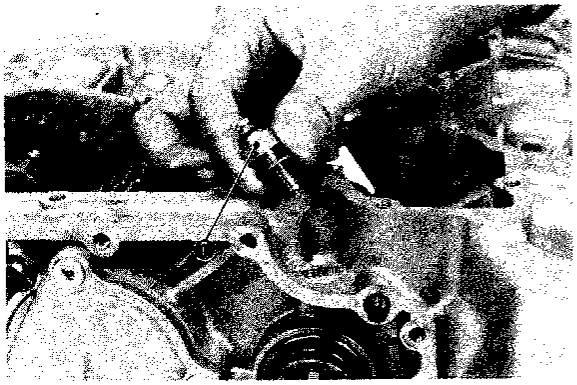
1. Shift cam detent

16. Remove the bolt, retainer and guide pin.



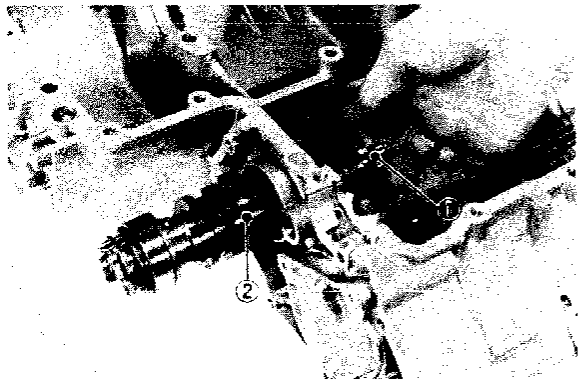
1. Retainer 2. Guide pin

17. Remove the neutral indicator switch.



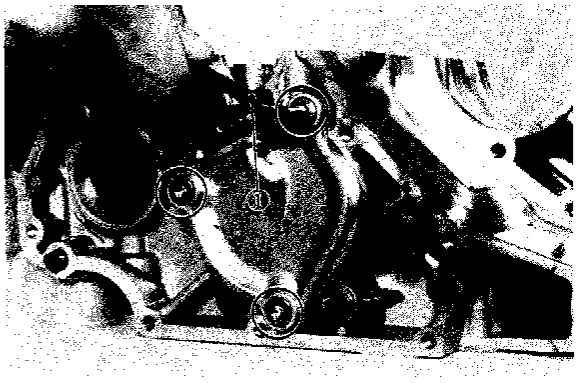
1. Neutral indicator switch

18. Remove the circlip holding the stopper plate to the shift cam and remove the shift cam.



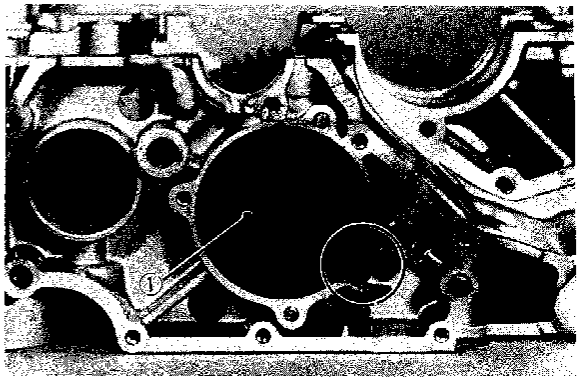
1. Stopper plate 2. Shift cam

19. Remove the three screws holding the drive axle bearing housing and remove the housing.
    Using the drive axle wrench (special tool) remove the three countersunk, Loctited screws securing the drive axle bearing housing.
    Remove the housing.



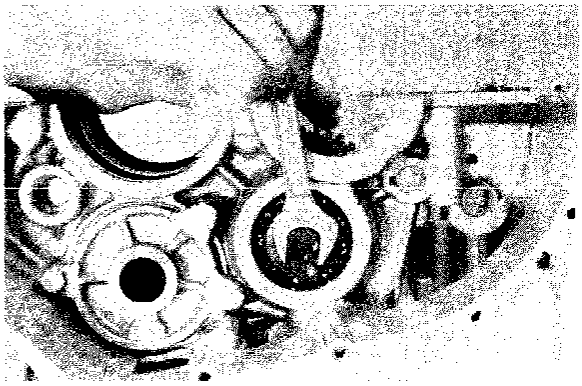
1. Drive axle wrench

20. Mount the drive axle holding tool (special tool) on the end of the drive axle.
21. Place the projection of the tool against the shift lever eccentric screw in the crankcase.

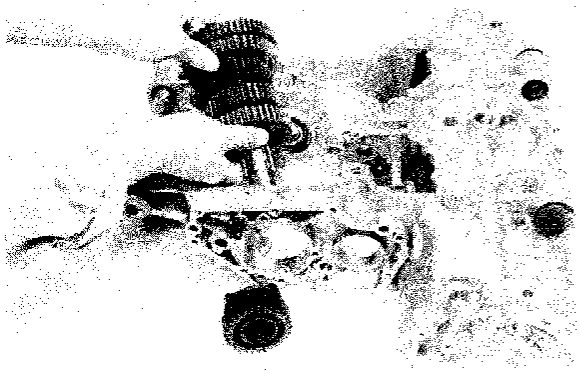


1. Drive axle holding tool

22. Loosen the washer based bolt on the opposite end of the drive axle.

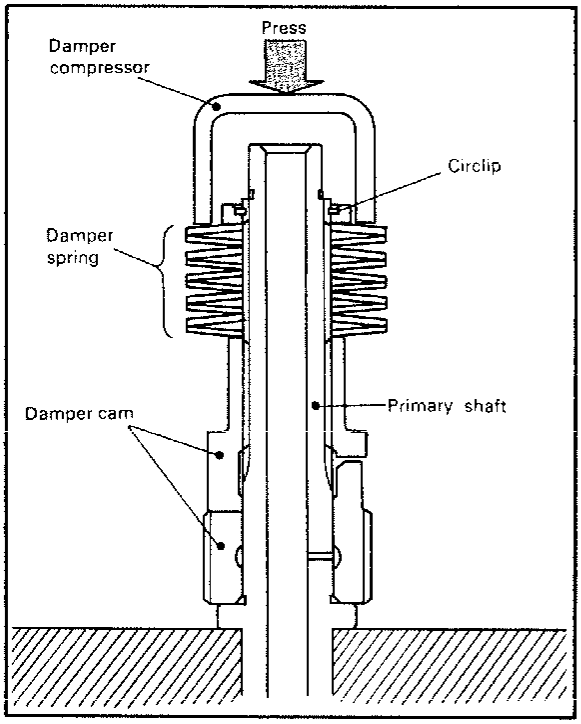


23. To remove the drive axle, tilt it up and pull it out of the lower crankcase.



K. Primary Shaft Disassembly

1. Disassembly of the primary shaft requires the special primary shaft damper tool (special tool) and a hydraulic press. Place the shaft in a press with the special tool in place as shown.



2. Apply minimal hydraulic pressure to the special tool and remove the snap ring. Slowly relieve the hydraulic pressure and remove the tool and primary shaft assembly.

INSPECTION AND REPAIR

A. Cylinder Head Cover

Place head cover on a surface plate. There should be no warpage. Correct by re-surfacing as follows:

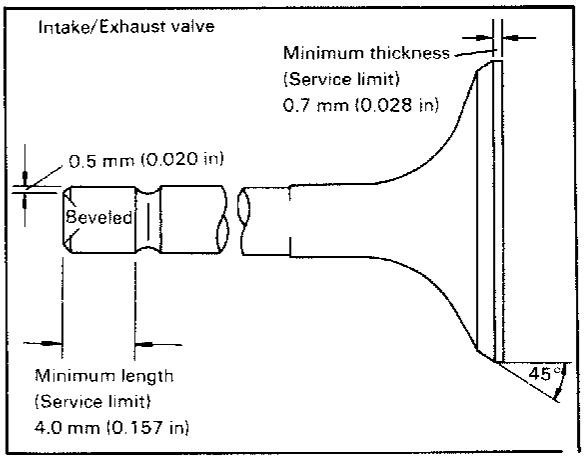
Place No. 400 or No. 600 grit wet sandpaper on surface plate and re-surface head cover using a figure-eight sanding pattern. Rotate head cover several times to avoid removing too much material from one side.

B. Cylinder Head

1. Remove spark plugs.
2. Remove valves.
3. Using a rounded scraper, remove carbon deposits from combustion chamber. Take care to avoid damaging spark plug threads and valve seats. Do not use a sharp instrument. Avoid scratching the aluminum.
4. Place on a surface plate. There should be no warpage. Correct by re-surfacing as follows:
   Place No. 400 or No. 600 grit wet sandpaper on a surface plate and re-surface head using a figure-eight sanding pattern. Rotate head several times to avoid removing too much material from one side.

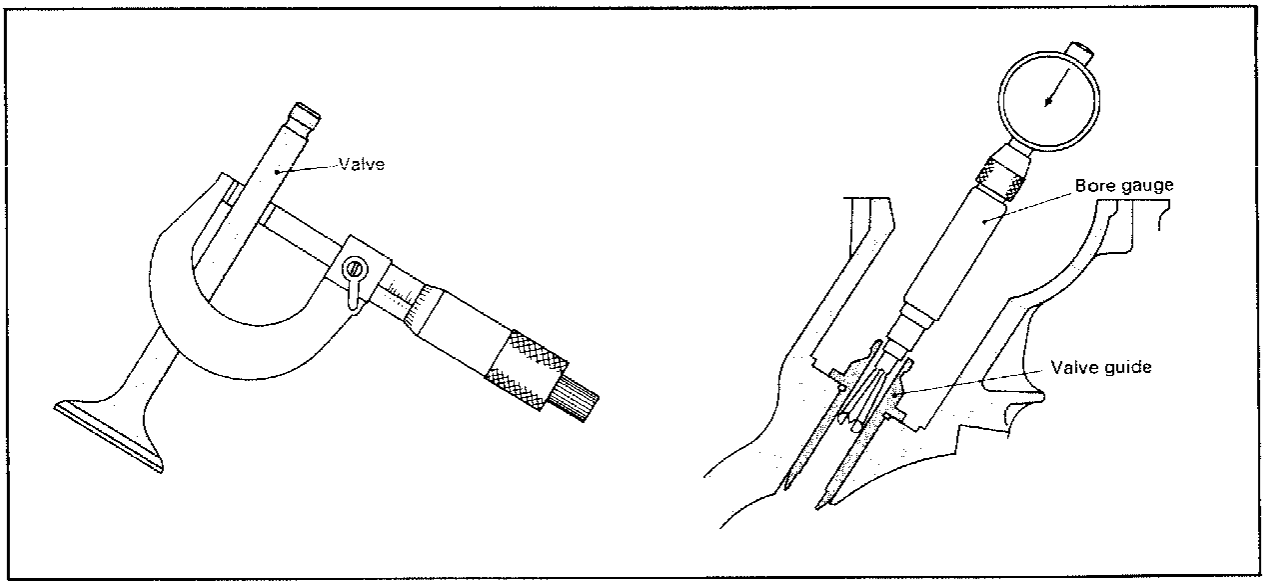
C. Valve, Valve Guide and Valve Seat

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.



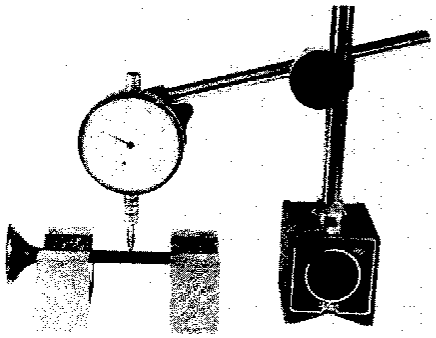
2. Valve stem wear must be measured and then combined with valve guide measurements to guide clearance. This clearance must be within tolerances. If it exceeds the maximum limit, then replace either or both valve and guide, as necessary.

	Valve stem clearance	Maximum
Intake	0.010 ~ 0.040 mm (0.00039 ~ 0.0016 in)	0.10 mm (0.004 in)
Exhaust	0.025 ~ 0.055 mm (0.00098 ~ 0.0022 in)	0.12 mm (0.005 in)



3. Valve stem end
Inspect end of 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. Turn valve on a "V" block and measure the amount of stem runout with a dial gauge. If it exceeds the maximum limit, replace the valve.

Maximum Valve Stem Runout: 0.03 mm (0.0012 in)



5. Valve guide and valve oil seal replacement
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.

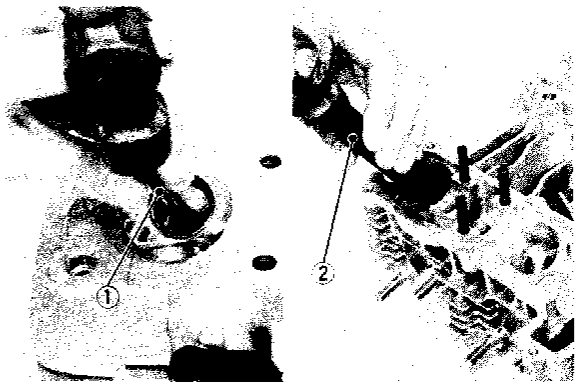
a. Measure valve guide inside diameter with a small bore gauge. If it exceeds the limit, replace with an oversize valve guide.

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

b. 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 posibility of head warpage due to uneven heating.

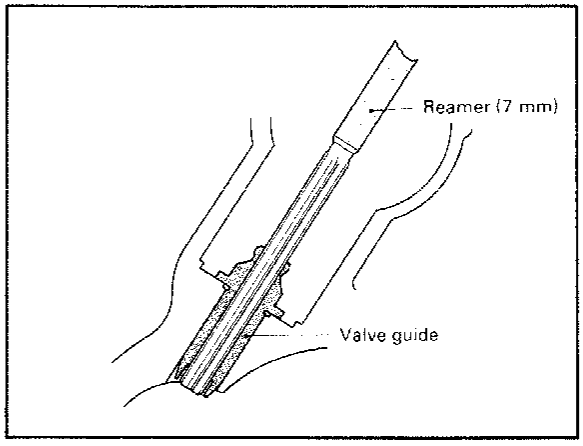
c. Use the appropriate shouldered punch (special tool) to drive the oild guide out and drive the new guide in.

NOTE:
When a valve guide is replaced, the O-ring should also be replaced.

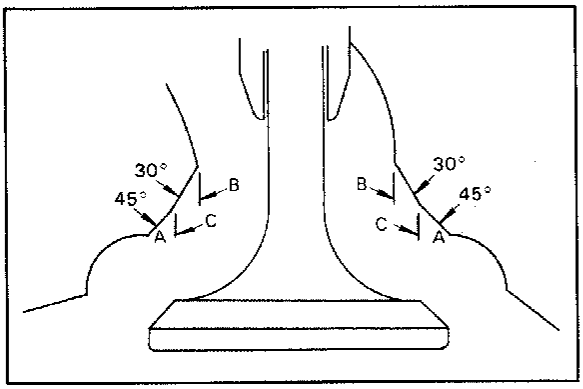


1. Valve guide remover 2. Valve guide installer

d. After installing the valve guide, use the 7 mm (0.28 in) reamer (special tool) to obtain the proper valve guide to valve stem clearance.



e. After installing the valve guide in the cylinder head, the valve seat must be recut. The valve should be lapped to the new seat.
6. Grinding the Valve Seat
a. The valve seat is subject to severe wear. Whenever the valve is replaced or the valve face is re-surfaced (see caution) the valve seat should be re-surfaced at a 45° angle. If a new vlave 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, and when twisting the cutter, keep an even downward pressure to prevent chatter marks.

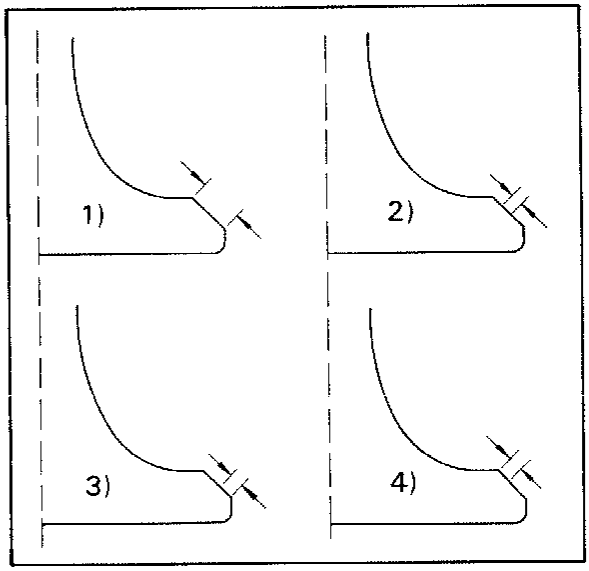
If cutting section "A" of the valve seat, use 30° cutter. If cutting section "B", use the 45° cutter. If cutting section "C" use 60° cutter.

b. Measure 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 bluing wherever they contacted each other. Measure the seat width with vernier calipers. It should measure approximately 1.3 mm (0.05 in). Also, the seat should be uniform in contact area. If valve seat width varies, or if pits still exist, further cutting will be necessary. Remove just enough material to achieve a satisfactory seat.

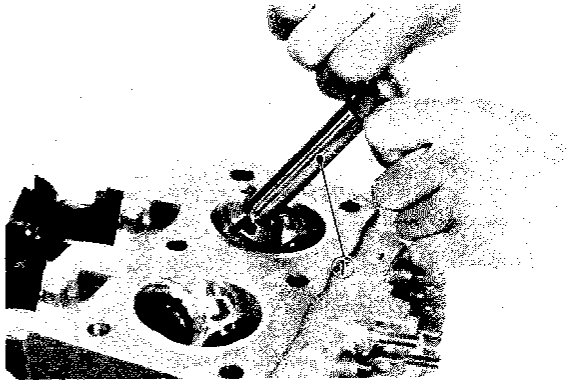
	Standard Width	Wear Limit
Seat width	1.3 mm (0.050 in)	2.0 mm (0.080 in)

a. Seat width

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



1) If the valve face shows that the valve seat is centered on the valve face, but too wide, then lightly use both the 30° and the 60° cutters to reduce the seat width to 1.3 mm (0.05 in).



1. Valve seat cutter

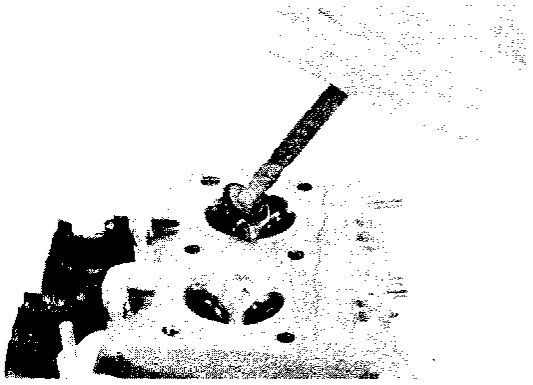
2) If the seat shows to be in the middle of the valve face, but too narrow, use the 45° cutter until the width equals 1.3 mm (0.05 in).
3) If the seat is too narrow and right up near the valve margin, then first use the 30° cutter and then the 45° cutter to get the correct seat width.
4) If the seat is too narrow and down near the bottom edge of the valve face, then first use the 60° cutter and then the 45° cutter.

7. Lapping the valve/valve seat assembly

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

b. Apply a small amount of coarse lapping compound to valve face. Insert the valve into the head. Rotate the valve until the valve and valve seat are evenly polished. Clean off the coarse compound, then follow the same procedure with fine compound.

Continue lapping until the valve face shows a complete and smooth surface all the way around. Clean off the compound material. Apply bluing dye to the valve face and seat and rotate the valve face for full seat contact which is indicated by a grey surface all around the valve face where the bluing has been rubbed away.



c. Valve leakage check

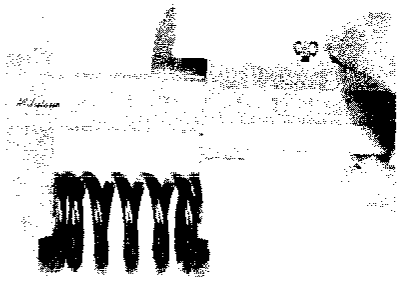
After all work has been performed on the valve and valve seat, and all head parts have been assembled, check for proper valve/valve seat sealing by pouring solvent into each of the intake ports, then the exhaust ports. There should be no leakage past the seat. If fluid leaks, disassemble and continue 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.

D. Valve Spring and Lifters

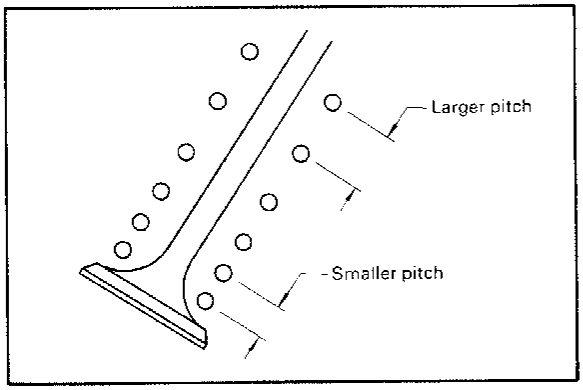
1. Checking the valve springs

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

b. Even though the spring is constructed of durable spring steel, it gradually loses some of it's 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 (0.08 in) from its specification, replace it.



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



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

Valve Spring Specifications		
	OUTER	INNER
Free length	39.9 mm (1.571 in)	35.6 mm (1.402 in)
Installed length (valve closed)	34.5 mm (1.358 in)	31.5 mm (1.240 in)
Installed pressure	16.27 ~ 18.73 kg (35.9 ~ 41.3 lb)	6.75 ~ 8.25 kg (14.9 ~ 18.2 lb)
Compressed length (valve open)	26.0 mm (1.024 in)	23.0 mm (0.908 in)
Compressed pressure	49.29 ~ 56.71 kg (108.7 ~ 125 lb)	25.57 ~ 29.43 kg (56.4 ~ 64.9 lb)
Allowable tilt from vertical	1.6 mm (0.063 in) or 2.5°	–

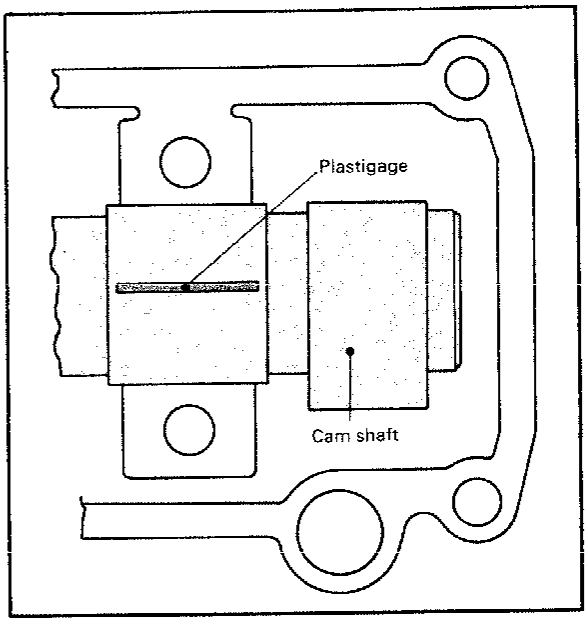
2. Valve lifter
   a. Check each valve lifter for scratches or other damage. If the lifter is damaged in any way, the cylinder head surface in which it rides is probably also damaged. If the damage is severe, it may be necessary to replace both the lifter and the cylinder head.

NOTE:
For proper valve lifter-to-head clearance, always install lifters on their original valves.

E. Camshafts, Cam Chain and Cam Sprockets

1. Camshaft
   a. The cam lobe metal surface may have a blue discoloration due to excessive friction. The metal surface could also start to flake off or become pitted.
   b. If any of the above wear conditions are readily visible, the camshaft should be replaced.
   c. Even though the cam lobe surface appears to be in satisfactory condition, the lobes should be measured with a micrometer. Cam lobe wear can occur without scarring the surface. If this wear exceeds a pre-determined amount, valve timing and lift are affected. Replace the camshaft if wear exceeds the limits.
   d. Install the camshaft on the cylinder head. Place a strip of Plastigage between camshaft and camshaft cap as illustrated (lengthwise along camshaft). Tighten the nuts with specified torque. Remove the camshaft cap and determine. The clearance by measuring the width of the flattened Plastigage®.

Cap nut tightening torque:
10 Nm (1.0 m·kg, 7.2 ft·lb)



NOTE:
Do not turn camshaft when measuring clearance with Plastigage®.

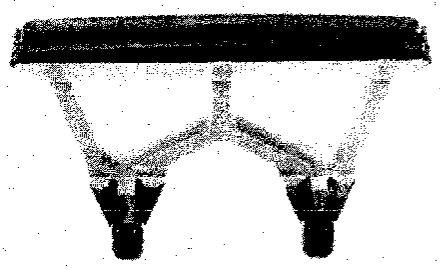
Camshaft-to-cap clearance:
Standard: 0.020 ~ 0.054 mm (0.0008 ~ 0.0021 in)
Maximum: 0.16 mm (0.006 in)

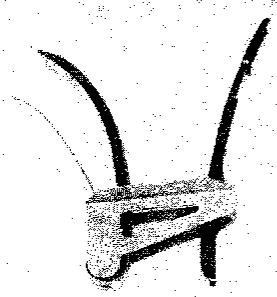
If the camshaft-to-cap clearance exceeds specification, measure camshaft bearing surface diameter.

Bearing surface diameter:
Standard: 24.97 ~ 24.98 mm (0.9830 ~ 0.9835 in)

1) If camshaft diameter is less than specification, causing excessive clearance, replace camshaft.
2) If camshaft is within specification and camshaft-to-cap clearance is excessive, replace cylinder head.

2. Cam chain
Except in cases of oil starvation, the cam chain wears very little. If the cam chain has stretched excessively and it is difficult to keep the proper cam chain tension, the chain should be replaced.
3. Cam sprockets
Check cam sprockets for obvious wear.
4. Cam chain dampers
Inspect the top cam chain damper (stopper guide) and two (2) vertical (slipper-type) dampers for excessive wear. Any that shows excessive wear should be replaced. Worn dampers may indicate an improperly adjusted or worn-out cam chain.

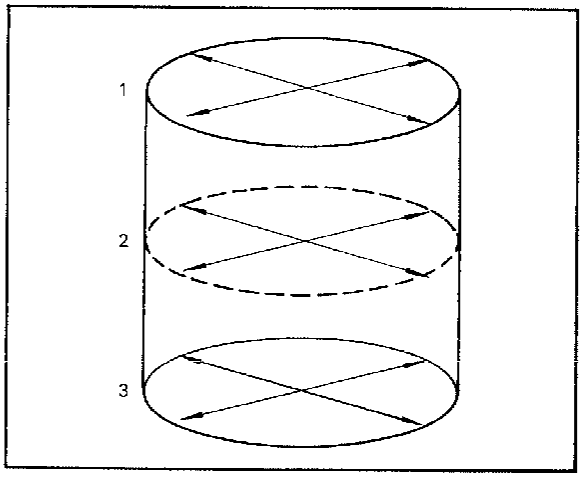




F. Cylinder

1. Inspect the cylinder walls for scratches. If vertical scratches are evident, the cylinder wall should be rebored or the cylinder should be replaced.
2. Measure cylinder wall wear as shown. If wear is excessive, compression pressure will decrease. Rebore the cylinder wall and replace the piston and piston rings.
Cylinder wear should be measured at three depths with a cylinder bore gauge. (See illustration.)

	Standard	Wear Limit
Cylinder bore	71.5 mm (2.815 in)	71.6 mm (2.819 in)
Cylinder taper	–	0.05 mm (0.002 in)
Cylinder out-of-round	–	0.01 mm (0.0004 in)

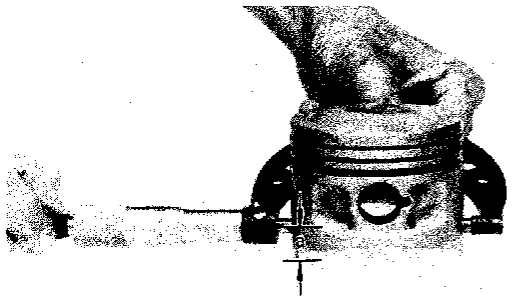


If the cylinder wall is worn more than the wear limit, it should be rebored.

G. Piston and Piston Rings

1. Piston
a. Measure the outside diameter of the piston at the piston skirt.
Measurement should be made at a point 10 mm (0.4 in) above the bottom edge of the piston. Place the micrometer at right angles to the piston pin.

Standard	Size
Oversize 1	71.75 mm (2.8248 in)
Oversize 2	72.00 mm (2.8346 in)
Oversize 3	72.25 mm (2.8445 in)
Oversize 4	72.50 mm (2.8543 in)



a. 10 mm (0.4 in)

b. Determine piston clearance as follows:

Minimum bore measurement − Maximum piston measurement = Piston clearance

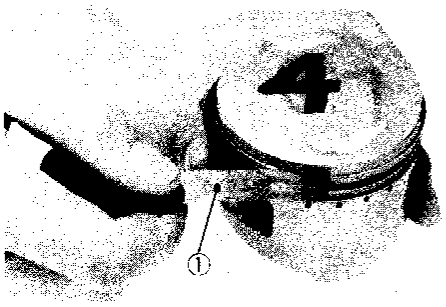
EXAMPLE:

71.51 mm − 71.46 mm = 0.05 mm
(2.8150 in) (2.8134 in) (0.0020 in)
piston clearance

Piston clearance: Standard clearance: Standard: 0.050 ~ 0.055 mm (0.0020 ~ 0.0022 in) Limit: 0.1 mm (0.0039 in)

c. Piston ring/ring groove fit must have correct clearance. If the piston and ring have already been used, the ring must be removed and the ring groove cleaned of carbon. The ring should then 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 ~ 0.003 in)
	2nd	0.03 ~ 0.07 mm (0.0012 ~ 0.0028 in)



1. Feeler gauge

2. Piston ring

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

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

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

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

c. Push the ring into the bore and check end gap clearance with a feeler gauge.

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

	Standard	Limit
Top/2nd ring	0.2 ~ 0.4 mm (0.008 ~ 0.016 in)	1.0 mm (0.039 in)
Oil control (Rails)	0.2 ~ 0.9 mm (0.008 ~ 0.035 in)	1.5 mm (0.059 in)

1. Piston ring 2. Feeler gauge

H. Piston Pin

1. Apply a light film of oil to pin. Install in connecting rod small end. Check for play. There should be no noticeable vertical play. If play exists, check connecting rod small end for wear. replace pin and connecting rod as required.

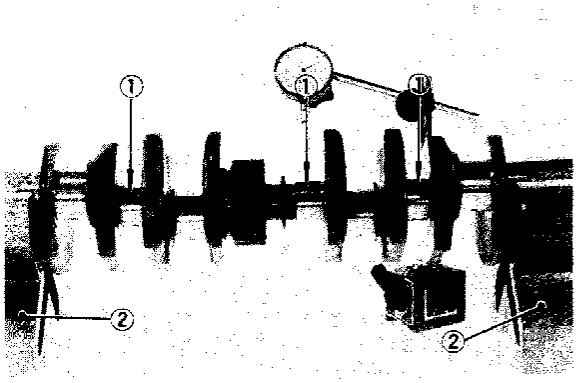
2. The piston pin should have no noticeable free play in piston. If the piston pin is loose, replace the pin and/or the piston.

I. Crankshaft

1. Crankshaft run-out
   Support the crankshaft at both ends on V-blocks. Measure the amount of crankshaft run-out on the main bearing journals with a dial gauge while rotating crankshaft.

Run-out limit: 0.04 mm (0.0016 in)

If run-out exceeds limit, replace crankshaft.

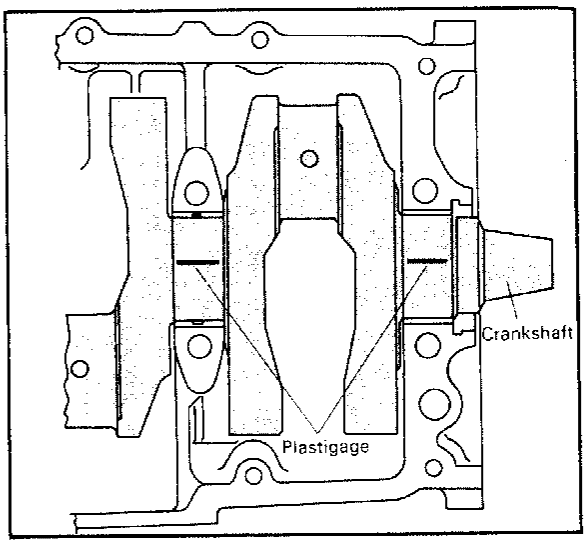


1. Measureing points 2. V-blocks

2. Inspection of inserts
   Check the bearing inserts. If the inner or outer surface is burned, flaked, rough, scratched or worn, the insert should be replaced.
3. Measuring main bearing oil clearance

a. Clean all crankshaft and crankcase journal surfaces.
b. Place upper crankcase half upside-down on a bench. Install bearing inserts into top crankcase.
c. Install crankshaft into upper crankcase.
d. Place Plastigage® on crankshaft journal surface to be inspected.

NOTE:
Do not move crankshaft until clearance check has been completed.

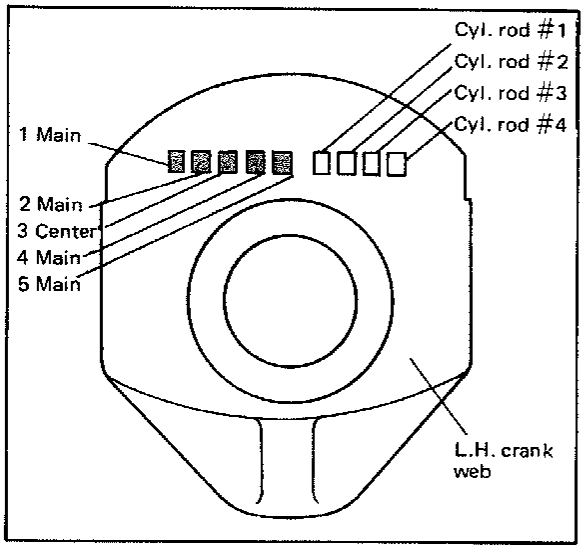


e. Install bearing inserts into bottom crankcase. Carefully, place lower crankcase onto upper crankcase.
f. Install crankcase holding bolts 1 through 10. Tighten to full torque in torque sequence cast on crankcase.
g. Remove bolts in reverse assembly order (10, 9, 8... etc.)
h. Carefully remove lower crankcase. Measure width of Plastigage® on crankshaft journals to determine clearance.

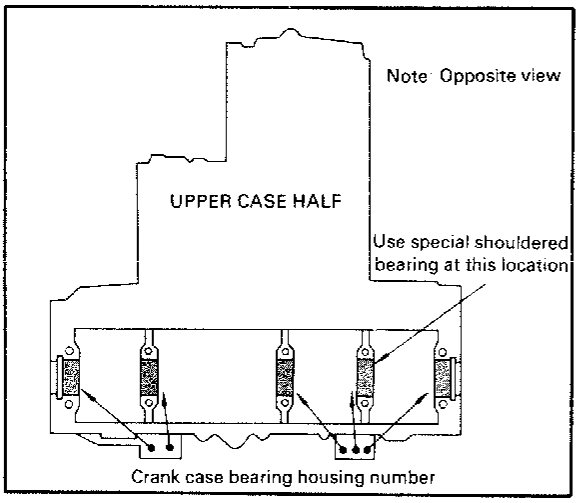
Main bearing oil clearance: 0.035 ~ 0.059 mm (0.0017 ~ 0.0025 in)

4. Crankshaft main bearing selection

a. Numbers used to indicate crankshaft journal sizes are stamped on the L.H. crank web. The first five (5) are main bearing journal numbers, starting with the left journal and proceding to left center, center, right center, and right. The four (4) rod bearing journal numbers follow in the same sequence.



b. Each main bearing journal is numbered 1, 2 or 3. Each crankcase bearing housing is selection is made by subtracting the crankcase number from the crankshaft journal number. The result is the insert size (number).



Use the color code table to choose the proper insert.

INSERT COLOR CODE	
No. 1	Blue
No. 2	Black
No. 3	Brown
No. 4	Green
No. 5	Yellow

EXAMPLE:
Case No. – Journal No. = Insert No.

$$4 - 2 = 2$$

No. 2 insert is black. Use a black main bearing insert.

NOTE:
There is a special thrust bearing (insert) located in the No. 4 main bearing housing in the upper crankcase. The function of this insert is to provide a bearing surface for crankshaft side thrust.

c. When assembling, apply a liberal coat of motor oil to all bearing surfaces.
d. Observe normal crankcase holding bolt torque sequence.

J. Connecting Rod

1. Remove rod cap securing nut. rod cap and inserts.
2. Inspection

a. Examine bearing inserts for scratches, flaking or other obvious signs of wear or damage. If the inner or outer surfaces are worn or damaged, the inserts should be replaced.
b. Examine the connecting rods and crankshaft.

3. Measure rod bearing clearance
Measurement of rod bearing clearance is similar to main bearing clearance measurement.

a. Clean all bearing surfaces.
b. Place a piece of Plastigage on connecting rod cap. Place cap on crankshaft journal. Do not allow the cap to move. Install special bolts and apply molybdenum disulfide grease to the threads. Install rod cap and nuts. Tighten rod caps evenly to specified torque:

Rod cap torque:
39 Nm (3.9 m·kg, 28 ft·lb)

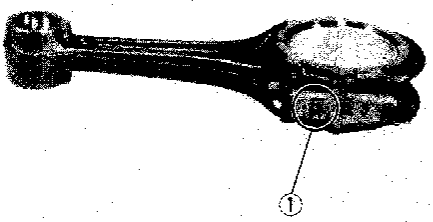
c. Remove connecting rod and cap. Measure width of Plastigage® to determine oil clearance.

Oil clearance (rod):
0.042 ~ 0.064 mm
(0.0017 ~ 0.0025 in)

d. Remove Plastigage® from bearing surfaces.

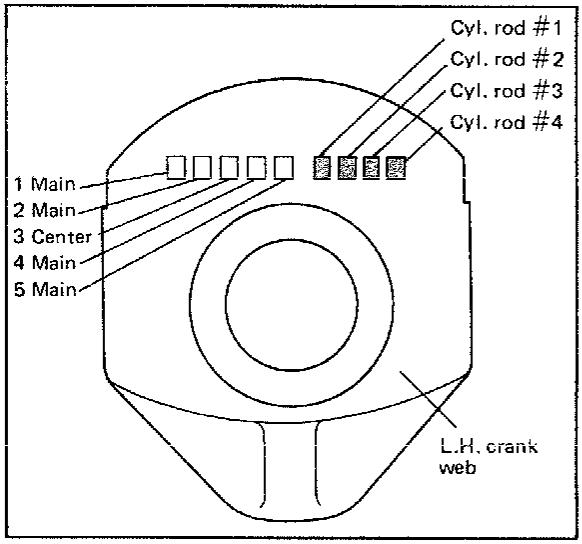
4. Selecting rod bearing inserts

a. Connecting rod size numbers are indicated by 4, 5 or 6 and are marked in ink on the connecting rods and caps.



1. Size number

b. The rod bearing journal size numbers are indicated by 1, 2 or 3 and are stamped on the left end of the crankshaft.



c. The proper insert selection is made by subtracting the crankshaft journal number from the rod size number. Use the color code to choose the proper insert.

EXAMPLE:
Rod No. – Journal No. = Insert No.

5 – 2 = 3

No. 3 insert is brown. Use a brown bearing inserts.

INSERT COLOR CODE	
No. 1	Blue
No. 2	Black
No. 3	Brown
No. 4	Green
No. 5	Yellow

d. When assembling, apply a liberal coat of motor oil to all bearing surfaces.

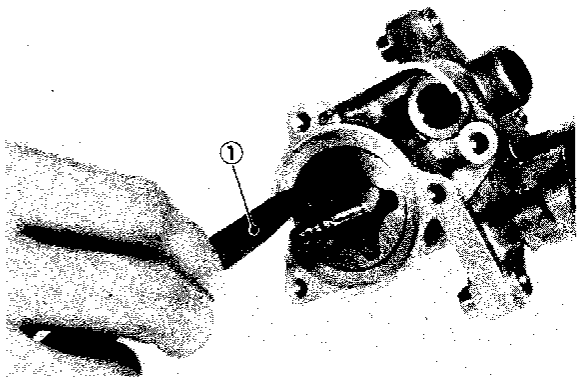
NOTE:
When applying final torque to the rod caps, observe the following procedures:

Apply molybdenum disulfide grease to connecting rod bolt threads. Apply torque evenly to both ends of the cap. While tightening, if a torque of 33 Nm (3.3 m·kg, 24 ft·lb) or more is reached, DO NOT STOP tightening until final torque is reached. If tightening is interrupted between 33 Nm (3.3 m·kg, 24 ft·lb) and 38 Nm (3.8 m·kg, 27 ft·lb), loosen the nut to less than 33 Nm (3.3 m·kg, 24 ft·lb) and start again. Tighten to full torque specification without pausing.

K. Oil Pump

1. Check the clearance between housing and outer rotor.

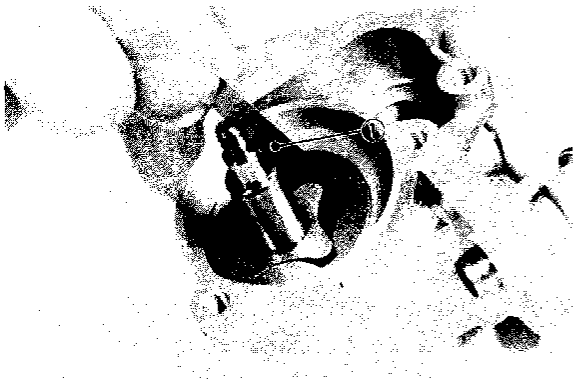
Standard clearance:
0.09 ~ 0.15 mm (0.0035 ~ 0.0059 in)



1. Feeler gauge

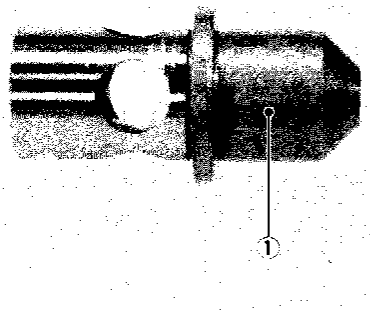
2. Check the clearance between outer rotor and inner rotor.

Standard clearance:
0.12 mm (0.0047 in)



1. Feeler gauge

3. Check the plunger for scratches and wear.



1. Relief valve plunger

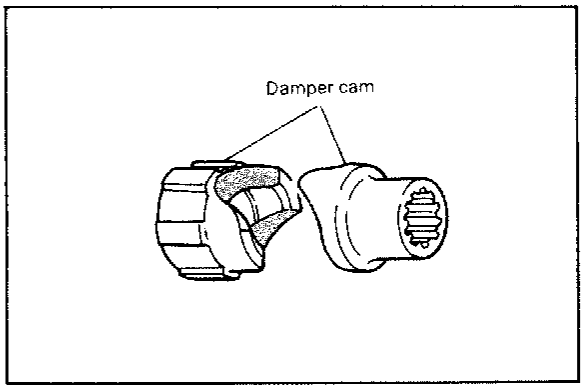
L. Primary Shaft Damper Hy-Vo Chain

1. "Hy-Vo" chain

The "HY-Vo" primary chain is a plate-and-pin type that does not use rollers as in the case of a conventional motorcycle drive chain. The plates of the chain form a mating surface for the primary gear teeth. That is, the primary gears actually mesh with the chain plates. This chain is extremely durable and, under normal conditions, can be expected to last the life of the motorcycle engine. However, if obvious damage is caused through serious oil starvation or abrasive oil contamination, the chain should be replaced.

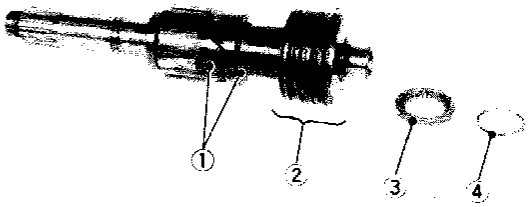
2. Primary shaft damper

a. Inspect the damper cam surfaces. Check for smooth cam action and excessive wear on the cam surface. If cam surface is severely worn, replace damper assembly.



b. Inspect the damper springs for fatigue, wear and damage. Replace as necessary.

c. Primary shaft damper reassembly.



1. Damper cams 2. Damper springs 3. Collar 4. Circlip

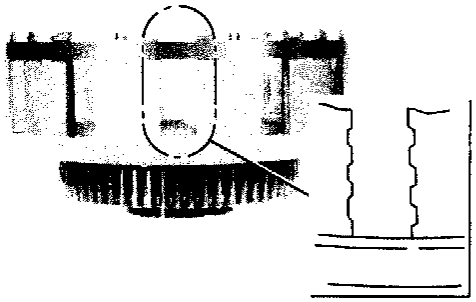
1) Install the damper cams on the primary shaft.
2) Install the damper springs as shown.
3) Install the collar.
4) Use a press and the special tool to install the circlip.

NOTE:
Always install a new circlip.

M. Primary Drive

1. Clutch housing

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



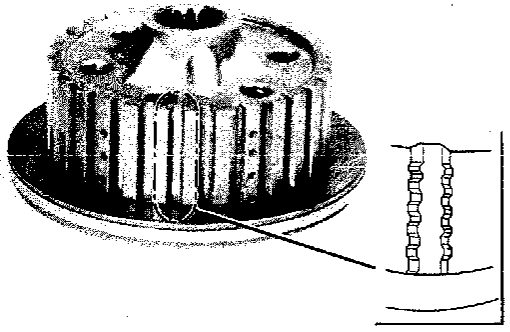
NOTE:
Galling on the friction plate dogs of the clutch housing will cause erratic clutch operation.

b. Apply a thin film of oil to transmission main shaft and inside surface of clutch housing. Slip clutch housing over main shaft.

2. Clutch boss

a. 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.

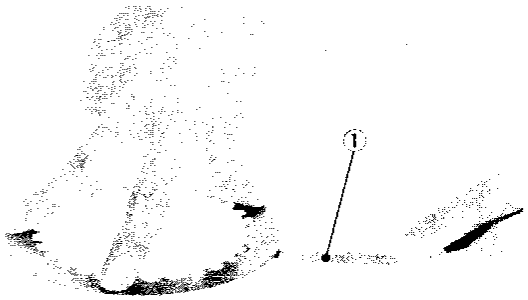
b. Check splines on clutch boss for galling. If damage is slight to moderate, deburr; if it is severe, replace clutch boss.



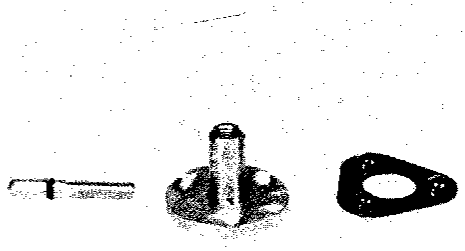
NOTE:
Galling on clutch plate splines will cause erratic operation.

3. Friction and clutch plates
Check clutch steel plates and friction plates for heat damage. Measure friction plate thickness at 3 or 4 points. Measure clutch plates for warpage with a dial gauge and stand. Replace clutch plate or friction plates as a set if any is faulty or beyond wear limits.

	Standard	Wear Limit
Friction plate thickness	3.0 mm (0.12 in)	2.8 mm (0.11 in)
Clutch plate warp limit	–	0.1 mm (0.0039 in)



4. Clutch push screw assembly
Check the end of the clutch push screw for indentation. If severe, clutch adjustment may be difficult. Check for smooth operation of the push screw assembly. If end is indented or operation is not smooth replace the push screw assembly.

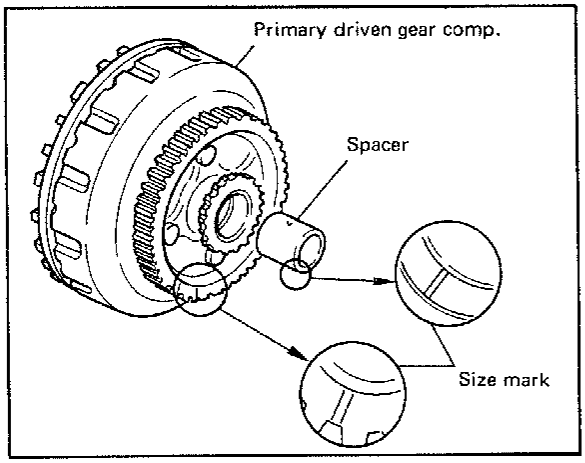


5. Clutch springs
   Measure the clutch spring free length. Replace the springs as a set if any is less than minimum free length.

Clutch spring minimum length: 41.8 mm (1.646 in)

6. When replacing the primary driven gear comp. and/or the spacer, note the following:

a. The spacer and primary driven gear comp. each have a size mark as shown.

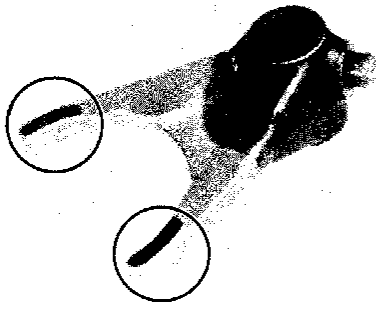


b. When replacing either or both of the spacer and primary driven gear comp., the size marks should be in the following combination.

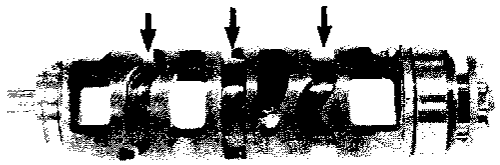
Primary driven gear mark	Spacer mark
I	→ I (or II)
II	→ II only

N. Transmission

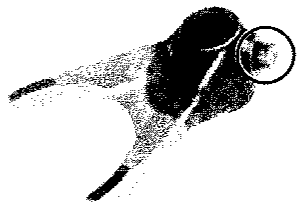
1. Inspect each shift fork for signs of galling on gear contact surfaces. Check for bending. Make sure each fork slides freely on its guide bar.



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

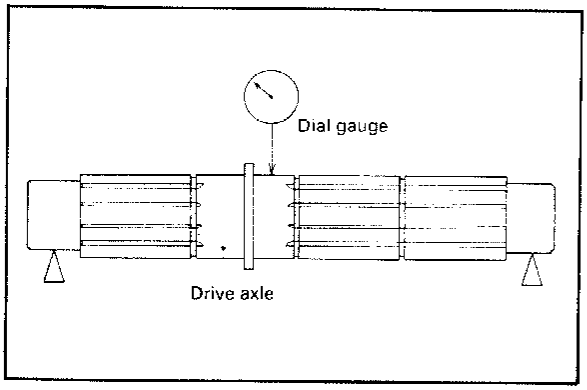


4. Check the cam followers on each shift fork for wear. Check the ends that ride in the grooves in the shift cam. If they are worn or damaged, replace the shift forks.



5. Check shift cam dowel pins and side plate for looseness, damage or wear. Replace as required.
6. Check the shift cam stopper plate and 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 specified limit, replace shaft.

Maximum run-out: 0.08 mm (0.0031 in)

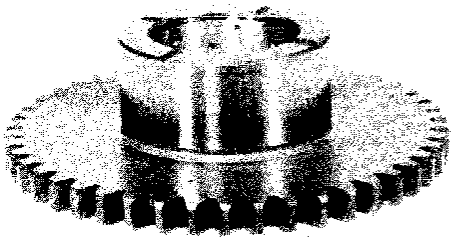


8. Carefully inspect each gear. Look for signs of obvious heat damage (blue discoloration). Check the gear teeth for signs of pitting, galling or other extreme wear. Replace as required.
9. Check to see that each gear moves freely on its shaft.
10. Check to see that all washers and clips are properly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

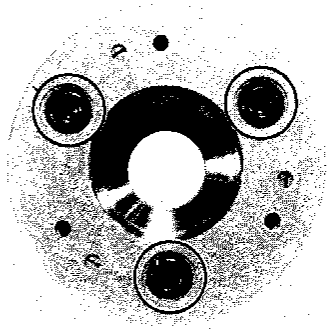
O. Starter Drives

1. Electric starter clutch and gears

a. Check the surface of the idle gear (2) for pitting or other damage. If severe, replace the gear.



b. Check the spring caps and the springs for deformation or damage. If severe, replace as necessary.
c. Check the starter clutch bolt (allen screw) for looseness. If loose, remove the bolt and replace with new bolt. Apply loctite to threads and tighten to specified torque. Stake over the end of the bolts.



Starter clutch bolt torque:
28 ~ 32 Nm
(2.8 ~ 3.2 m·kg, 20 ~ 23 ft·lb)

P. Crankcases and Strainer Cover

1. Check crankcases for cracks or other damage.
2. Clean all oil passages and blow out with compressed air.
3. Strainer cover: Apply loctite to strainer cover bolts during reassembly.

Q. Bearings and Oil Seals

1. After cleaning and lubricating bearings, rotate inner race with a finger. If rough spots are felt, replace the bearing.

NOTE:
Bearings are most easily removed or installed if the housings are first heated to approximately 95° ~ 125°C (200° ~ 250°F). Bring the case up to proper temperature slowly. Use an oven to avoid distortion.

2. Check oil seal lips for damage and wear. Replace as required.

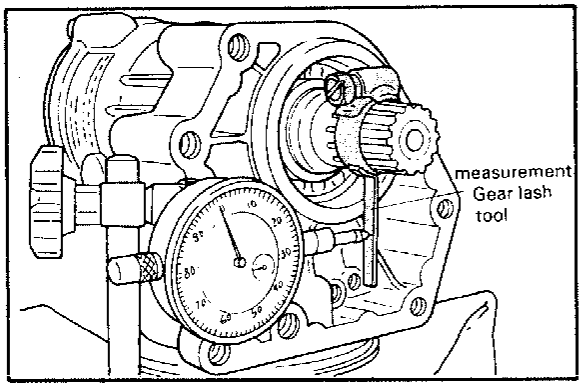
R. Middle Gear Case

NOTE:
This section involves external inspection only. For middle gear case overhaul and adjustment, refer to the Yamaha Shaft Drive Service Manual.

1. Inspect entire exterior for leakage. If leakage is found, the unit should be disassembled.
2. Check middle gear lash as follows:

a. Support gear case in a vise by the output shaft flange. Connect the lash measurement tool to the input shaft as shown.

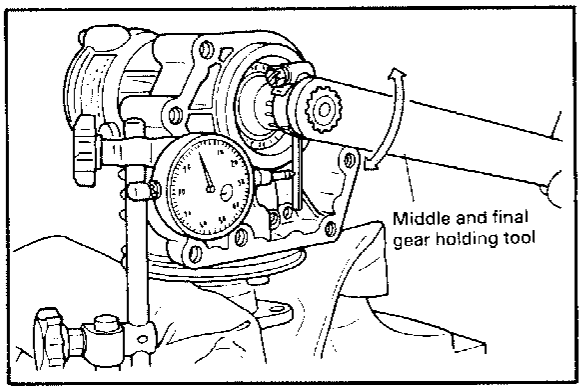
b. Mount a dial gauge against the lash measurement tool at the scribed mark (34 mm (1.34 in) from the center of the shaft).



c. Hold the gear case and rotate the input shaft back and forth using the special wrench. Read the gear lash on the dial gauge.

Middle gear case lash:
0.1 ~ 0.2 mm (0.004 ~ 0.008 in)

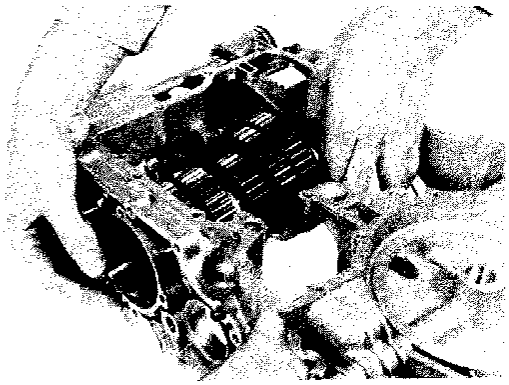
If lash is not within tolerance refer to Shaft Drive Service Manual for adjustment procedure.



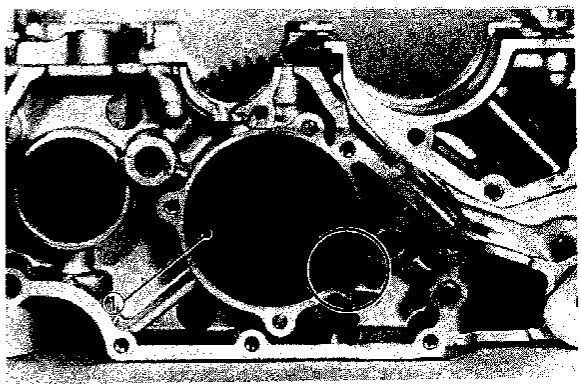
NOTE:
1. All gaskets and seals should be replaced when an engine is overhauled. All gasket surfaces must be cleaned.
2. Properly oil all mating engine and transmission parts during assembly.
3. All circlips should be inspected before assembly. Replace distorted circlips. Always replace cotter pins and piston pin clips after one use.

A. Crankcase

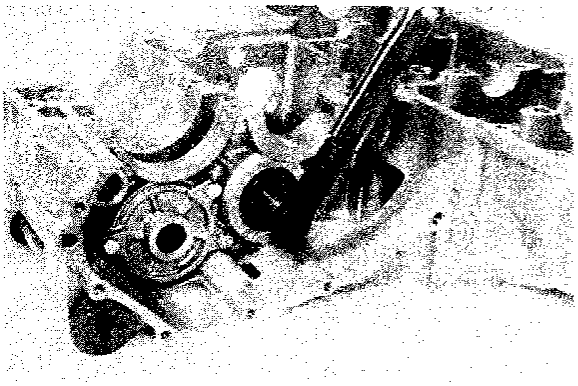
1. Install the drive axle assembly into the lower case as shown.



2. With the drive axle in place, install the special washerbase bolt on the end of the shaft. Place the drive axle special tool over the left end of the drive axle. Note that the projection on the special tool must rest alongside of the shift lever eccentric screw in the crankcase. Tighten the bolt to the specification.

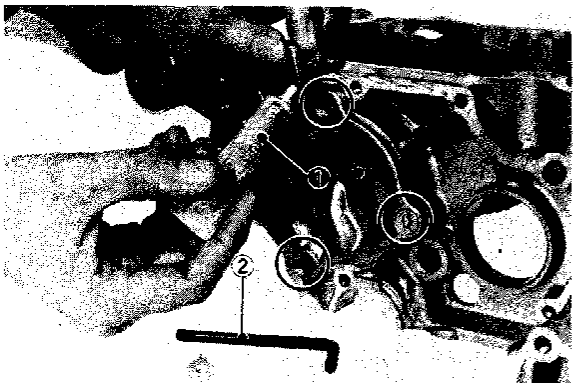


1. Drive axle holder



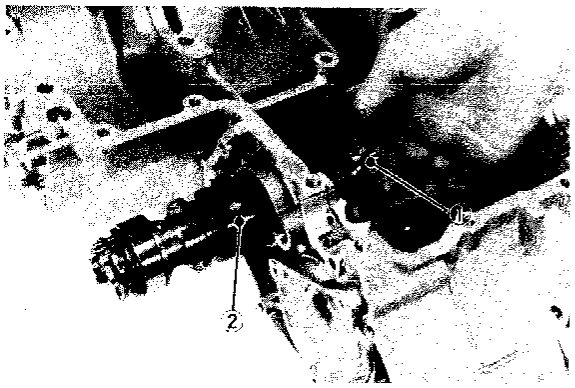
Tightening torque:
70 Nm (7.0 m·kg, 50 ft·lb)

3. Remove the special tool and install the drive axle bearing housing. The bearing housing is held in place with three flat head countersunk screws. Loctite these screws, but do not use the impact driver.



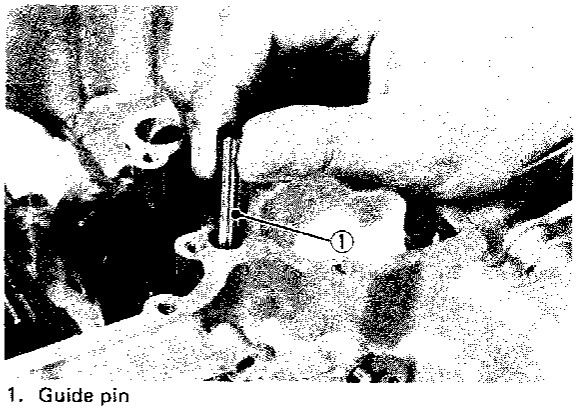
1. Thread locking compound 2. Drive axle wrench

4. Install the shift cam, stopper plate and circlip.



1. Stopper plate 2. Shift cam

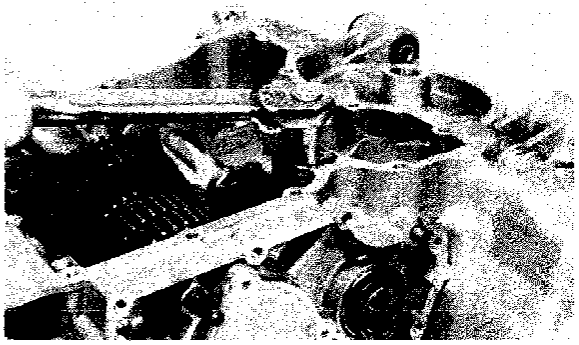
5. Install the shift cam guide pin.



1. Guide pin

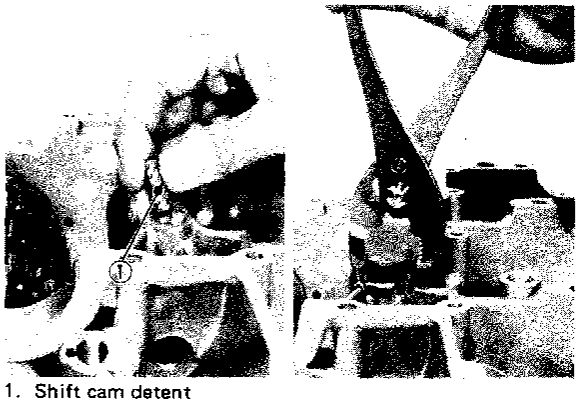
6. Install the retainer, lock washer and bolt. Torque the bolt to the specification and bend over the lock washer.

Tightening torque:
10 Nm (1.0 m·kg, 7.2 ft·lb)



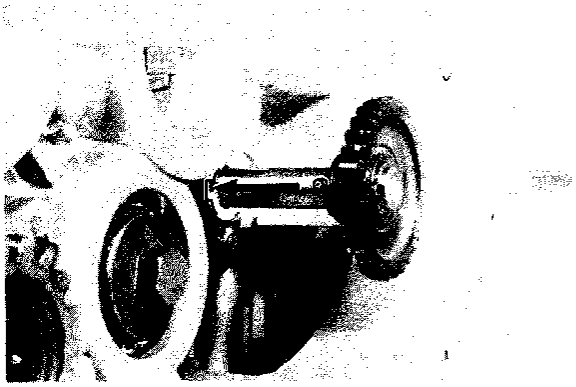
7. Turn the lower crankcase half over and install the shifter detent assembly with lock washer. Torque the bolts to the specification and bend over the lock washer.

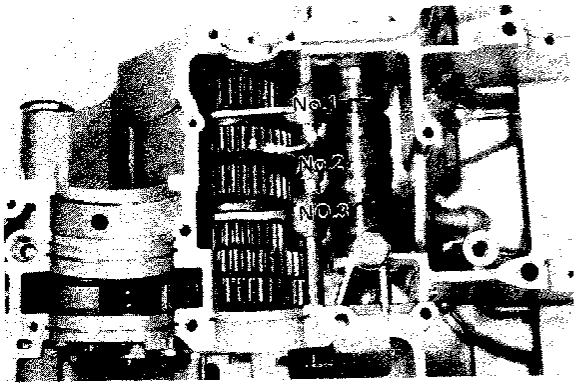
Tightening torque:
20 Nm (2.0 m·kg, 14 ft·lb)



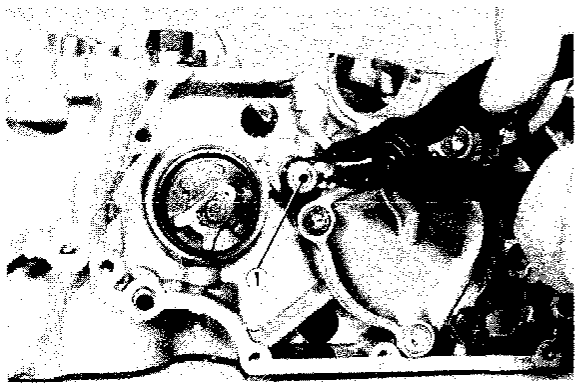
1. Shift cam detent

8. Install the shift fork guide bar and the shift forks. Each shift fork is identified by a number cast on its side.
   Align the pin through the shift fork guide bar with the slot in the case when inserting.



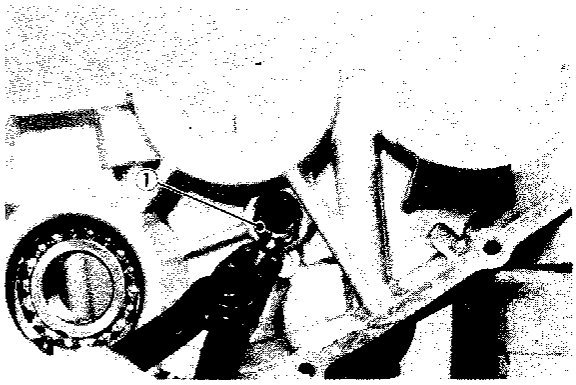


9. Install a new circlip on the end of the shift fork guide bar.



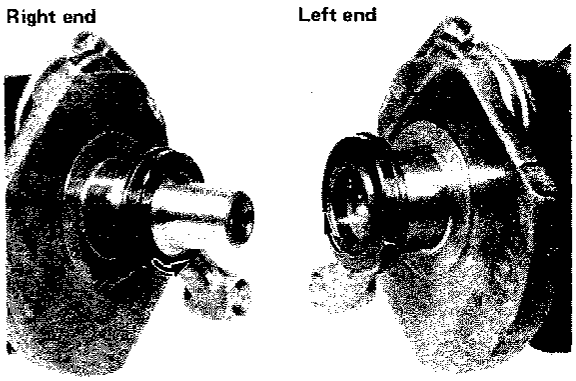
1. Shift fork guide bar

10. Install the starter idle gear.



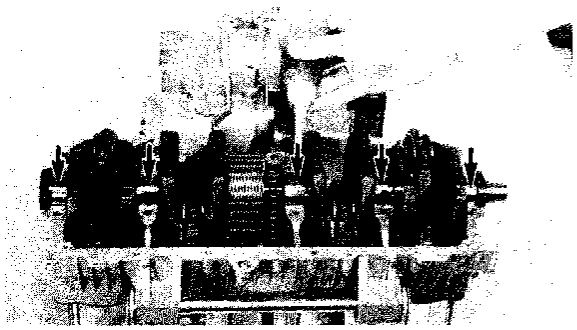
1. Starter idle gear shaft

11. Before installing the crankshaft in the cases, slip the primary chain and cam chain over the crank.
12. Install new crankshaft seals and lube the lips of the seals with a small amount of grease.



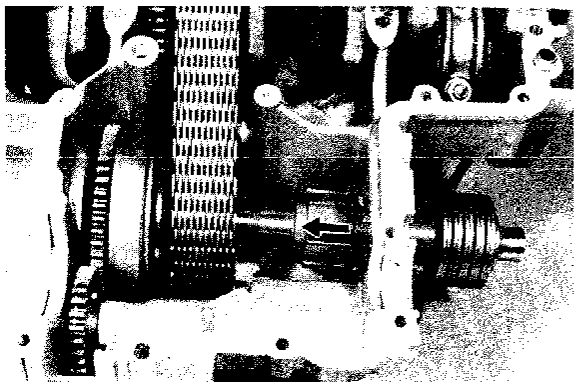
13. Place the crankshaft into the upper case half and be sure the outer lips of the seals fit into the grooves in the case.

14. Apply a liberal amount of Yamaha 4-cycle oil or 20W40 motor oil to the crank journals and insert bearings.

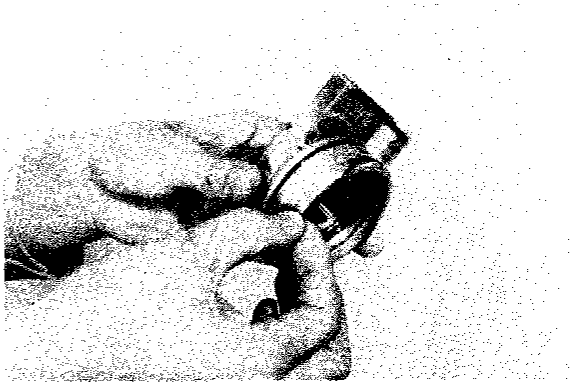


15. Slip the start clutch assembly into the primary chain and lower it into the case.

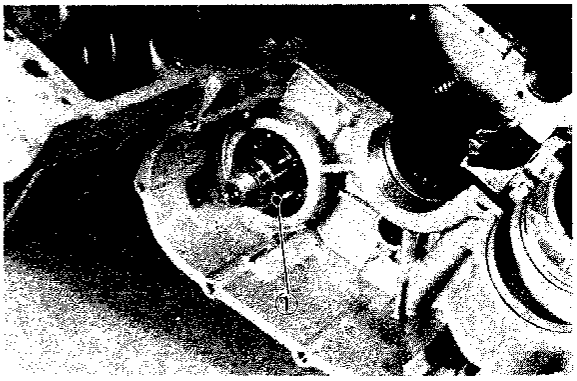
16. Push the primary shaft into the case and slip it through the primary chain and starter clutch assembly.



17. Install new "O-ring" on the primary shaft bearing housing, lubricate thoroughly and tap the housing gently into the case. Install the housing with three allen screws.

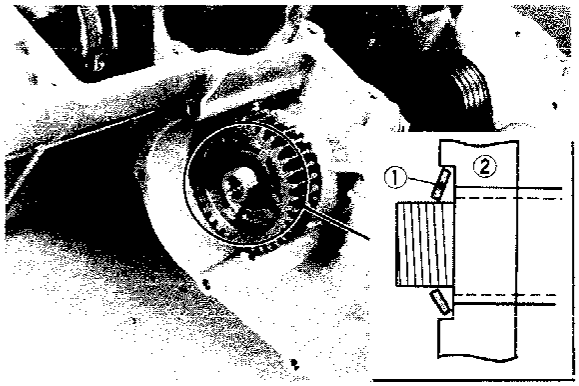


18. Install the spacer on the primary shaft.



1. Spacer

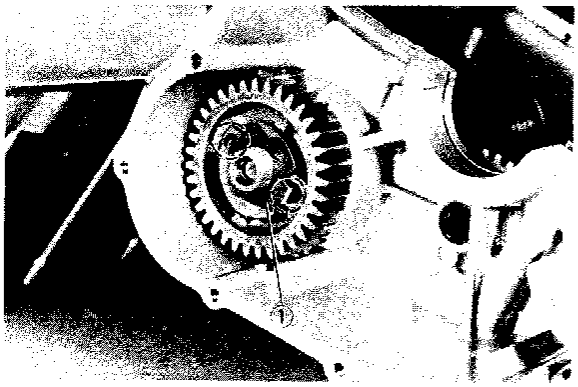
19. Place the primary drive gear and conical washer on the shaft. The cupped side of the washer should face the gear.



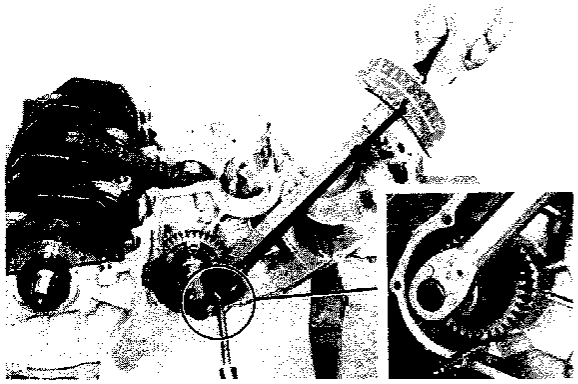
1. Conical washer 2. Primary drive gear

20. Using a new lock washer, install the nut on the primary shaft and torque the nut to the specification. Hold the gear by inserting a large flat blade screwdriver into the slot provided in the crankcase for this purpose.

Tightening torque:
70 Nm (7.0 m·kg, 50 ft·lb)

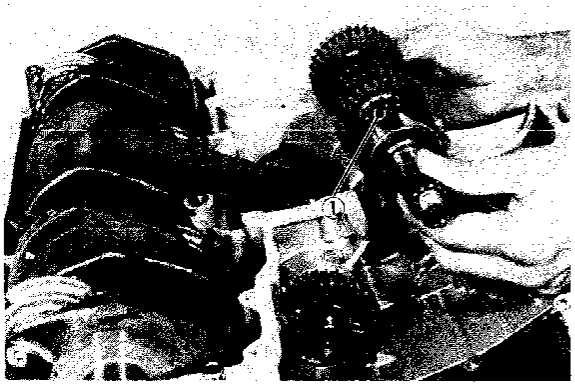


1. Lock washer



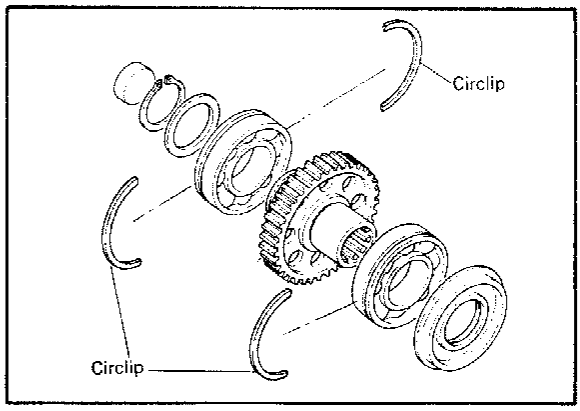
NOTE:
Be sure to use a new lock washer and to bend over the locking tab.

21. Install the main axle in the upper case half. Be sure that the circlips on the bearings fit down into the slot in the crankcase.



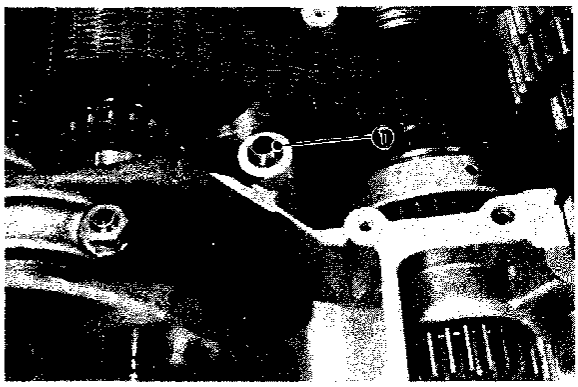
1. Main axle assembly

22. Install the middle driven gear assembly in the upper case half. Lubricate the new seal with grease around its lips.
Be sure that the circlips on the bearings are positioned correctly as shown in the illustration.



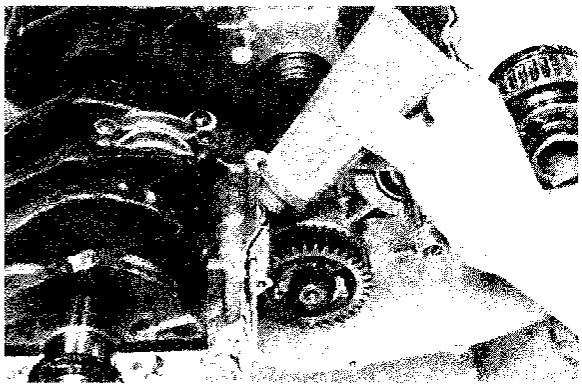
23. Replace the "O-ring" on the crankcase center dowel pin as shown.
This is the main oil gallery and must seal properly to maintain oil pressure.

CAUTION:
Do not use any sealant in this area.



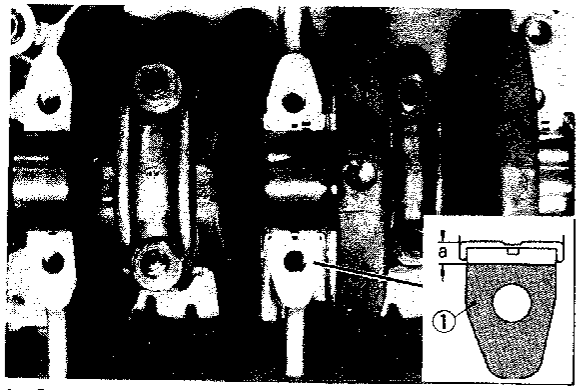
1. "O"-ring

24. Apply Yamabond #4 to the crankcase mating surface. Be very careful not to allow any sealant to come in contact with the oil gallery O-ring or crankshaft bearings. It is extremely important, however, that sealant be applied around the case stud holes. Apply sealant to within 2 ~ 3 mm (0.08 ~ 0.12 in) of the insert bearings as shown.



CAUTION:

Failure to apply sealant here will result in reduced oil pressure and possible crank seizure.

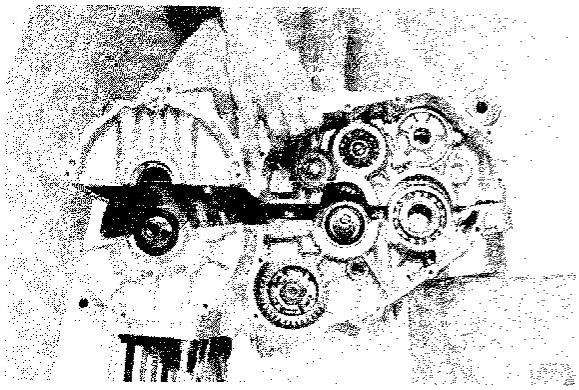


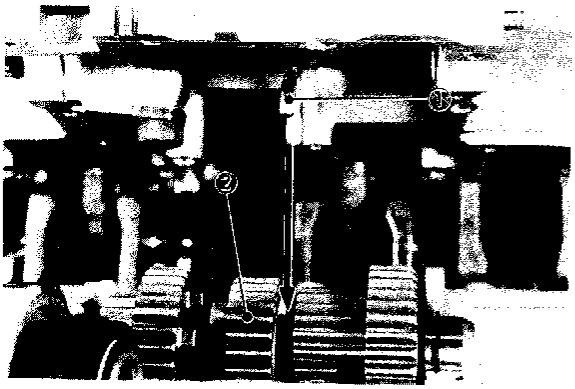
1. Sealant a. 2 ~ 3 mm (0.08 ~ 0.12 in) No sealant

25. The crankcases are assembled by placing the upper case half on the bench and lowering the lower case onto it.

NOTE:

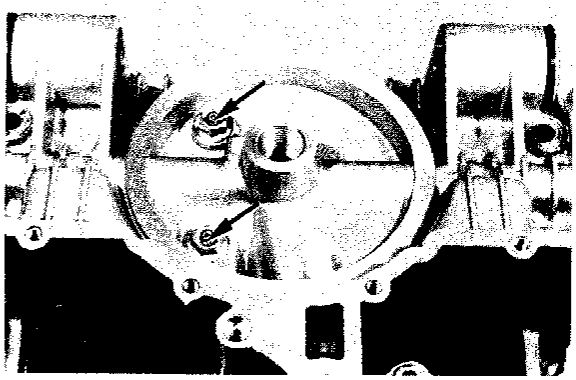
Be sure that shift fork No. 2 engines the groove in the 2nd/3rd pinion.





1. No. 2 shift fork 2. 2nd/3rd pinion gear

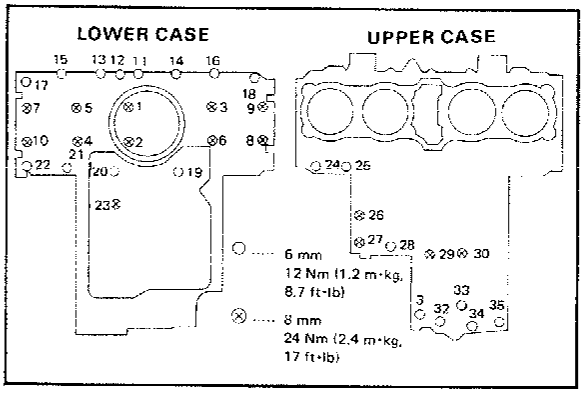
26. Start installation of the crankcase bolts with the center crankshaft area bolts. Place the two bolts without washers in the oil filter area.



27. The crankcase bolts should be torqued in proper sequence. Refer to the tightening sequence in the illustration.

NOTE:

Be sure not to forget the three bolts located inside the sump area. Also, don't forget the bolt located inside the crankcase breather area.



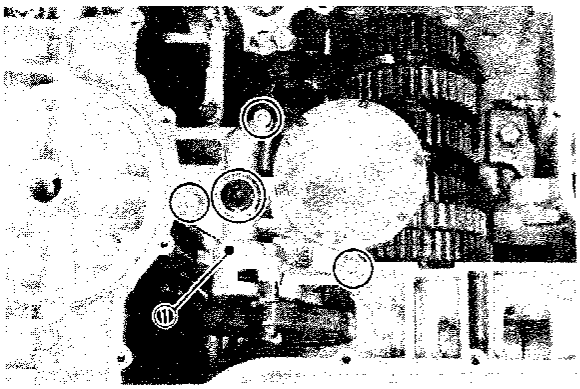
B. Oil Pump and Strainer Cover

1. Install the oil pump and torque the bolts to the specification.

CAUTION:

Failure to properly prime the oil pump will cause extensive engine damage when the engine is started. Fill the oil pump with Yamalube 4-cycle oil.

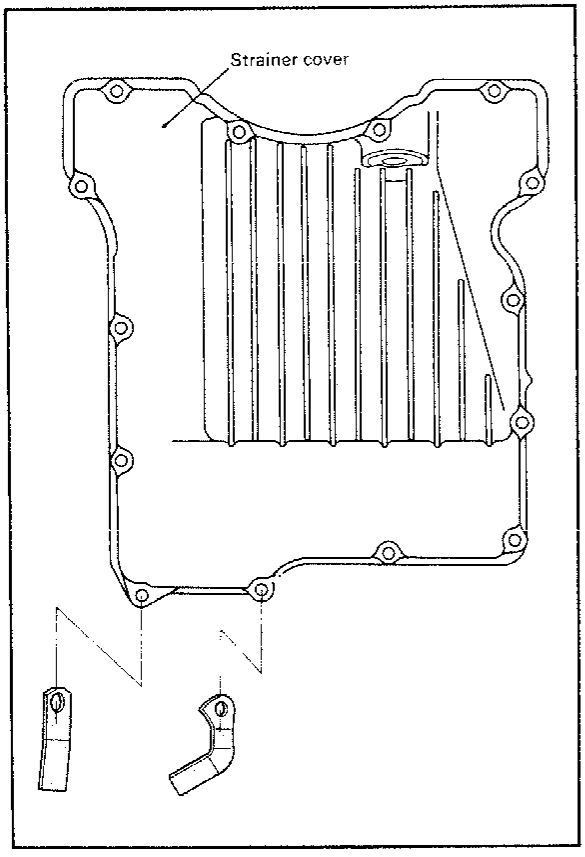
Tightening torque:
10 Nm (1.0 m·kg, 7.2 ft·lb)



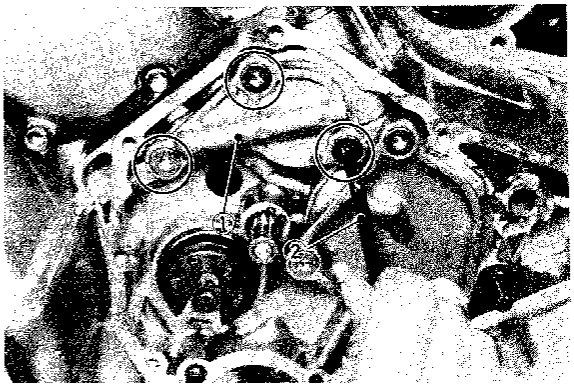
1. Oil pump

2. Install the strainer cover and torque the bolts to the specification. Make sure the wire harness clip is in position. Refer to the wire harness clip illustration.

Tightening torque:
10 Nm (1.0 m·kg, 7.2 ft·lb)



3. Inspect the special oil nozzle, clean the screw holes and install a new O-ring. Use loctite on the screws but do not use an impact drive for these screws.

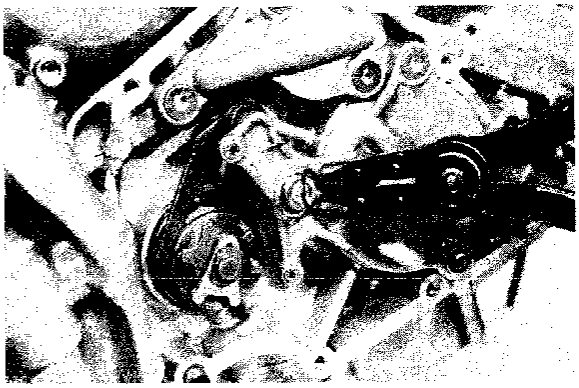


1. Special oil nozzle 2. Drive axle wrench

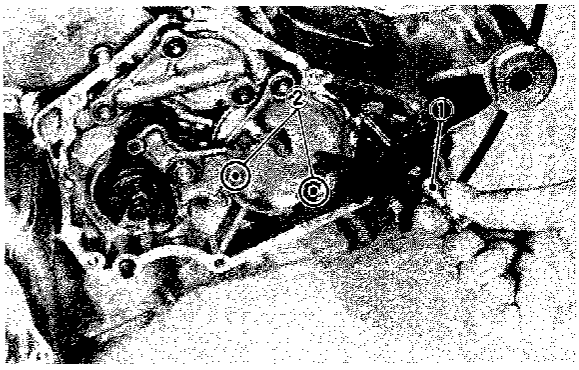
C. Shifter

1. Install the shift lever 2 on the shift fork guide bar.

NOTE:
Use a new circlip.

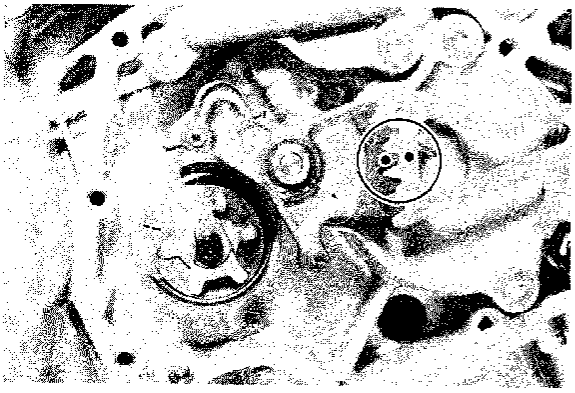


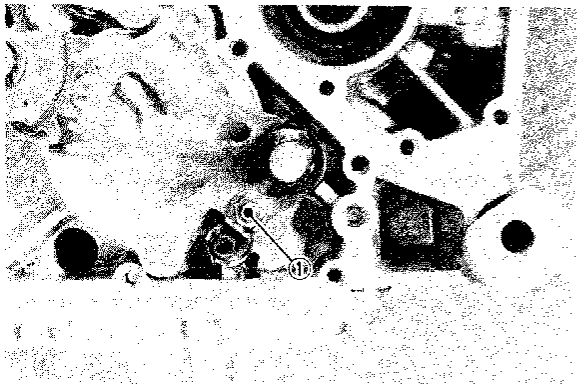
2. Install the shift shaft with the tension spring properly located on the stopper screw. The punch mark on the shift shaft must align with the punch mark on the shift lever 2.



1. Shift shaft assemby 2. Align marks

3. With the transmission in second gear the scribed marks on the shift cam and shift lever No. 3 should be aligned. If not, adjust the eccentric screw until the marks are aligned.

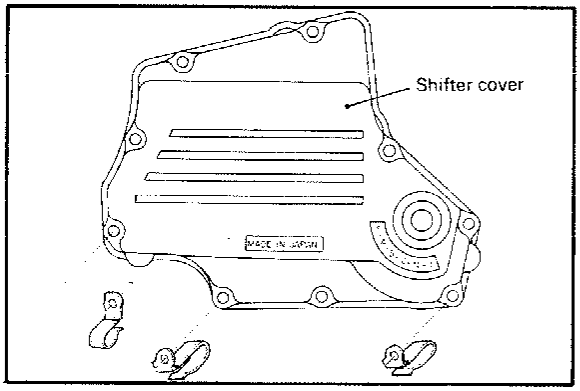




1. Eccentric screw

4. Install the shifter cover using a new gasket. Make sure the wire harness clips are properly positioned.

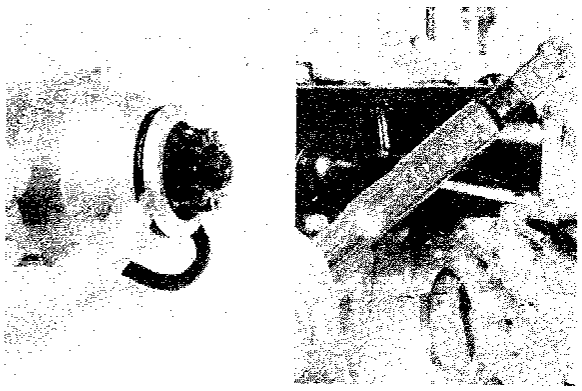
Tightening torque:
10 Nm (1.0 m·kg, 7.2 ft·lb)



D. Starter Motor/Breather Cover

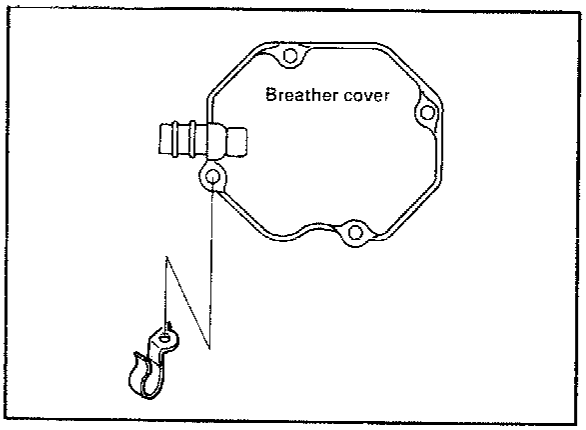
1. Install the starter motor and the starter motor cover.

Tightening torque:
10 Nm (1.0 m·kg, 7.2 ft·lb)



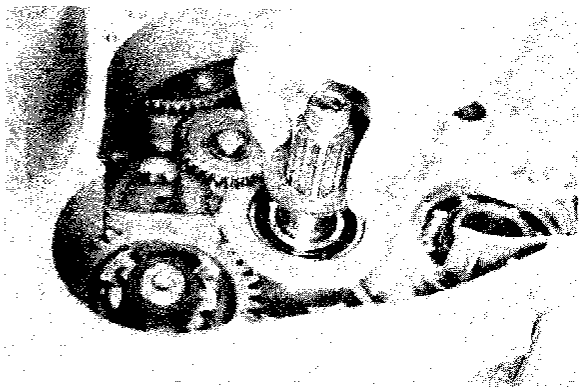
2. Install the breather cover and wire harness clip.

Tightening torque:
10 Nm (1.0 m·kg, 7.2 ft·lb)

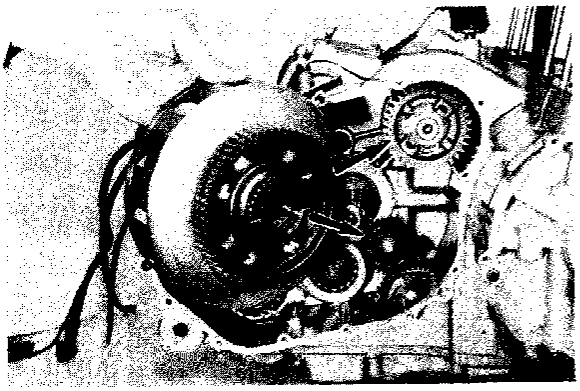


E. Clutch

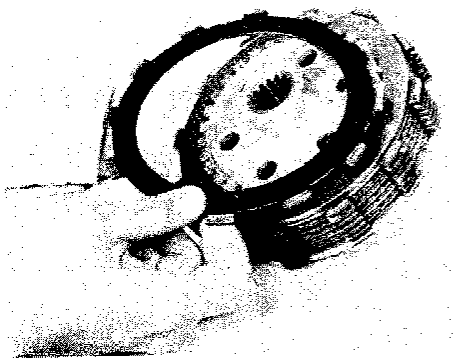
1. Install the thrust washer (2 mm (0.08 in) thickness) or the main axle. This is the thicker of the two clutch washers.



2. Install the clutch primary driven gear and the thinner spacer. Make sure the driven gear is properly engaged on both the primary drive gear and the oil pump drive gear.

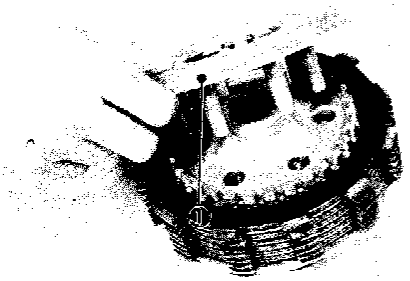


3. Install the 7 clutch plates and 8 friction plates alternately on the clutch boss assembly, starting with a friction plate and ending with a friction plate.

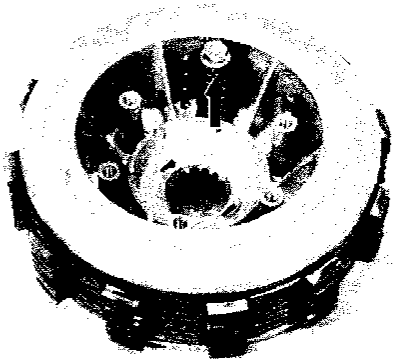


4. Install the pressure plate 2 on the clutch boss assembly.

NOTE:
It may be helpful to install one clutch spring and bolt to help hold this assembly together during installation.

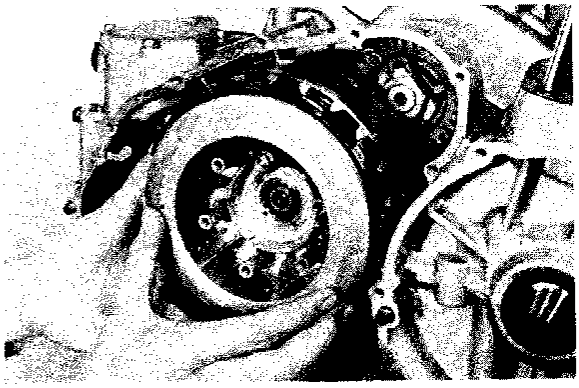


1. Pressure plate 2



5. Install the clutch boss assembly on the primary driven gear.

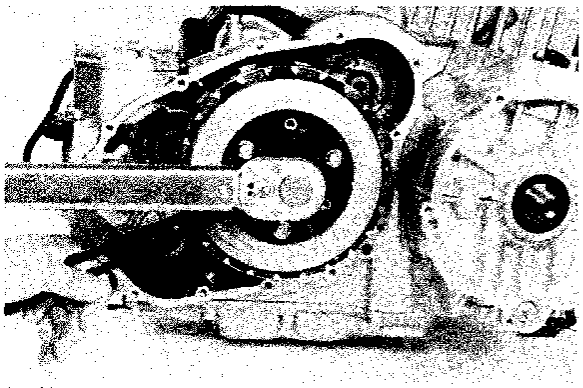
CAUTION:
Be careful not to bend or break the friction plate tabs.



6. Install the spring washer, new lock washer and nut on the main axle. Remove the pressure plate bolt installed previously and install the special clutch holding tool. Secure the special tool to the clutch with three pressure plate bolts and tighten securely. Failure to secure the tool to the clutch with bolts will damage to the pressure plate bosses. Torque the clutch holding nut to the specification and remove the special tool.

Clutch holding nut torque:
70 Nm (7.0 m·kg, 50 ft·lb)

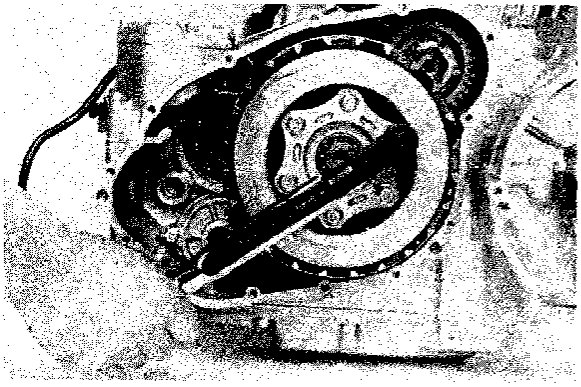
CAUTION:
Don't forget to bend over the lock washer.



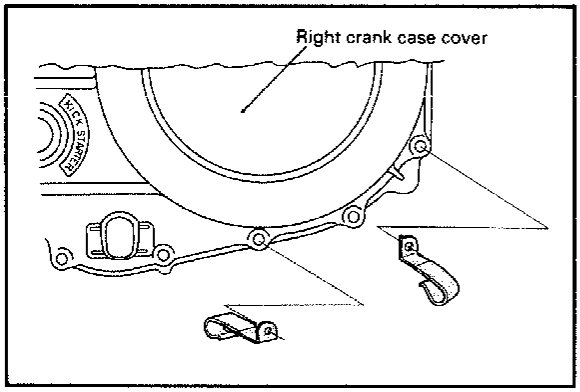
1. Clutch holding tool

7. Install the clutch spring, pressure plate No. 1 and clutch bolts. Tighten the bolts evenly and finally torque to the specification.

Tightening torque: 10 Nm (1.0 m·kg, 7.2 ft·lb)

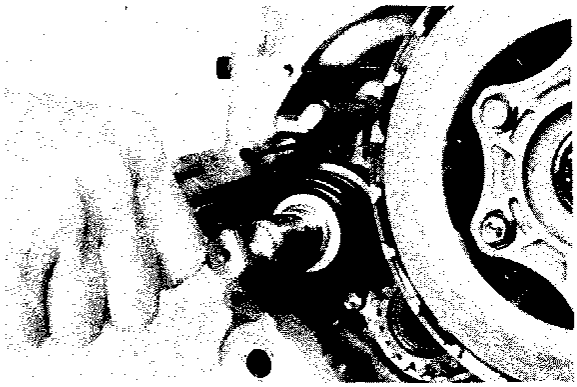


8. Install the right crankcase cover. Remember to properly install all wiring harness clips.



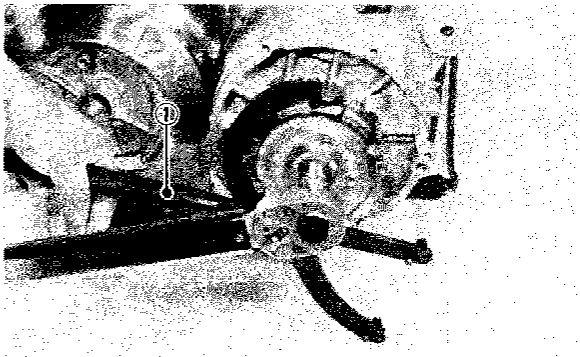
F. Generator (A.C.G.)

1. Install the alternator rotor. Install the spring washer and thick washer on the bolt.



2. Use the universal rotor holding tool (special tool) and torque the bolt to specification.

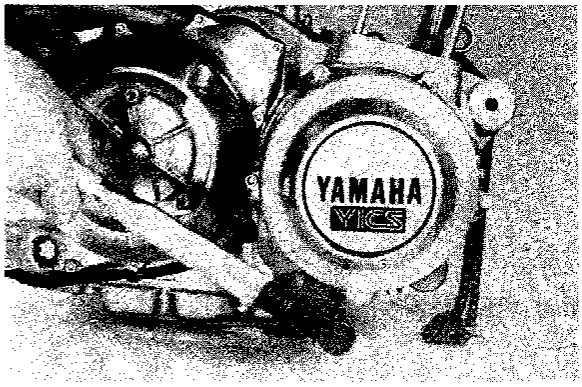
Bolt tightening torque: 65 Nm (6.5 m·kg, 47 ft·lb)



1. Rotor holding tool

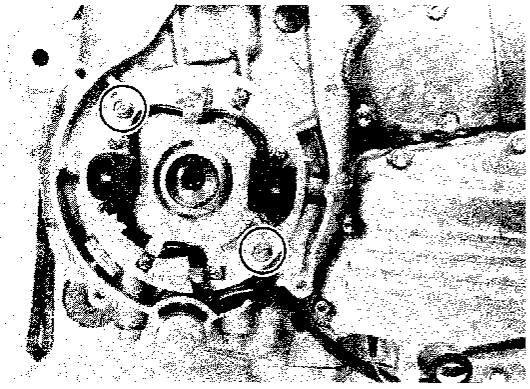
3. Using a new gasket, install the alternator assembly.

Tightening torque: 10 Nm (1.0 m·kg, 7.2 ft·lb)



G. Pick-up Coil Assembly

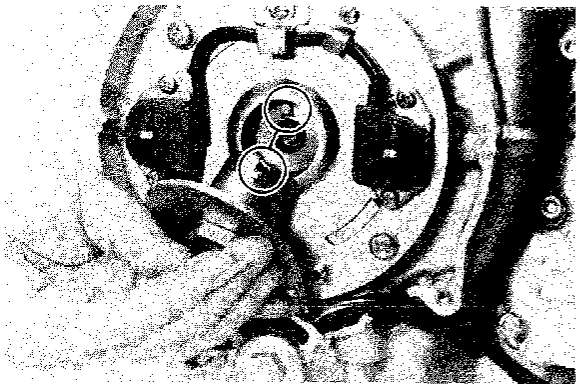
1. Install the pick-up coil assembly over the governor assembly.



2. Install the timing plate.

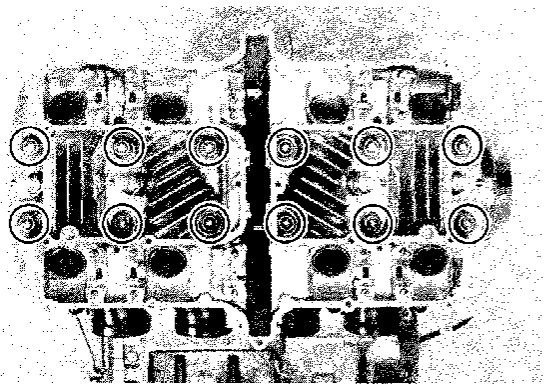
NOTE:

Note that there is a projection on the governor shaft and a corresponding slot in the timing plate which must be aligned to install the plate.



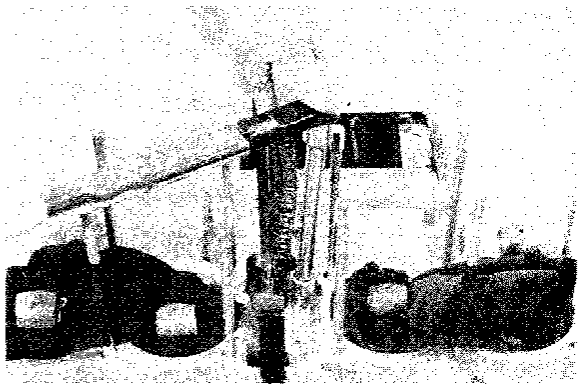
Torque the allen bolt to the specification.

Tightening torque:
20 Nm (2.0 m·kg, 14 ft·lb)

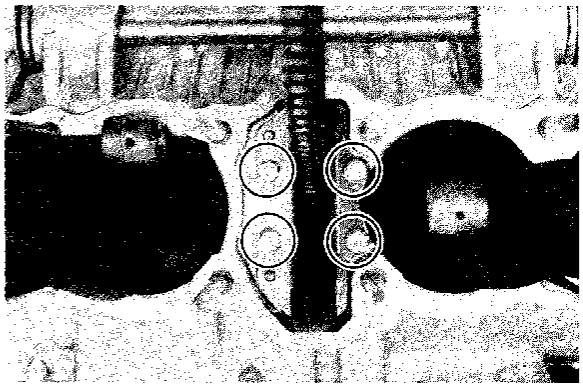


H. Pistons and Cylinder

1. Install the cam chain damper assembly.

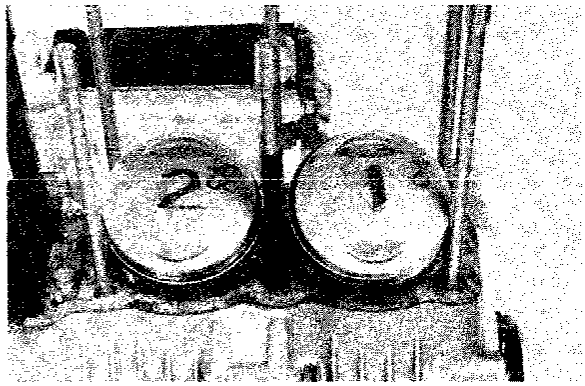


2. Install a new base gasket and make sure the dowels on the two outside rear studs are in place.

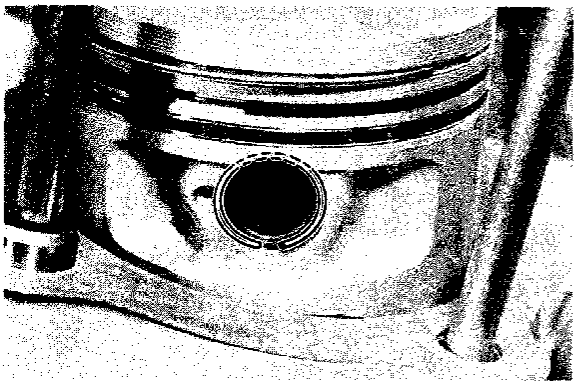


1. Dowel pin

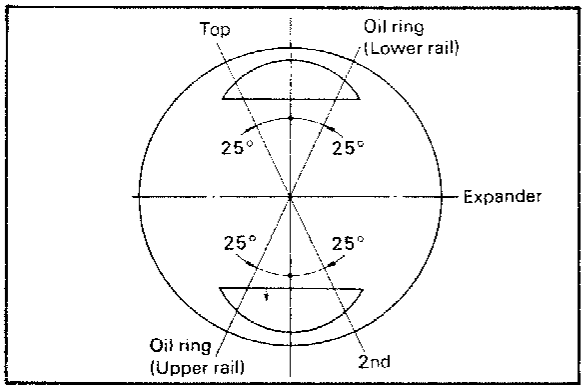
3. Install the pistons on the proper rods with the arrow on the piston crowns pointing toward the front of the engine.



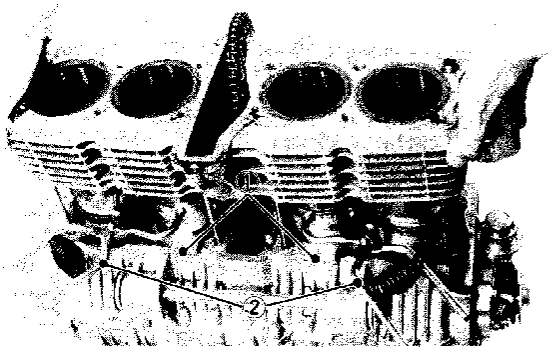
4. Install new piston pin circlips and locate the end gap of the circlips at the 6 o'clock position to prevent them from vibrating loose or breaking.



5. Position the piston ring end gaps as shown. Lubricate the pistons, rings and cylinder walls liberally with Yamalube 4-stroke oil or 20W30 motor oil.



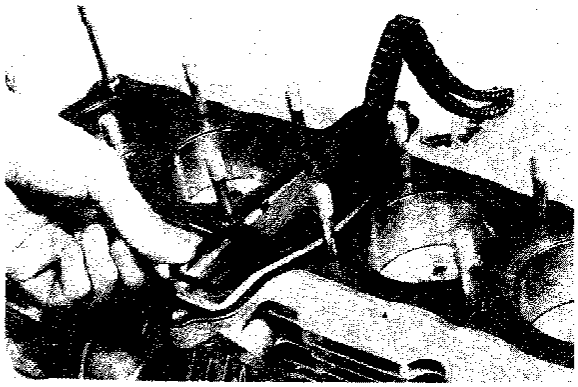
6. Tie the cam chain with a piece of mechanic's wire and feed it through the chain opening. With pistons 2 and 3 up, install the ring compressors as shown. Place two piston support plated beneath these two pistons. Carefully lower the cylinder onto the pistons. Remove the ring compressors and plates and repeat this procedure for pistons 1 and 4.



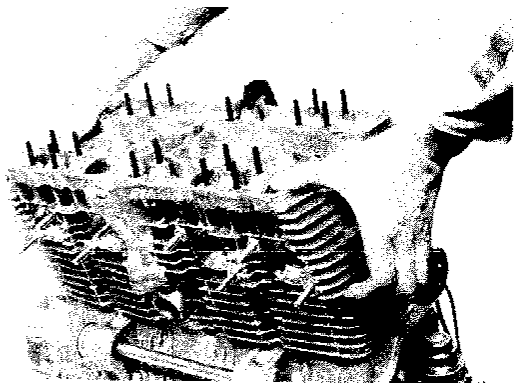
1. Piston support plated 2. Piston ring compressors

I. Cylinder Head and Cam Shafts

1. Install the cylinder head gasket. Locate the cam chain cavity cylinder seal with the tabs down. Make sure the two dowel pins on outside rear studs are properly positioned.



2. Install the cylinder head onto the cylinder. Pull the cam chain through the cylinder head as it is installed. Tie the cam chain so that it does not fall into the crankcases.

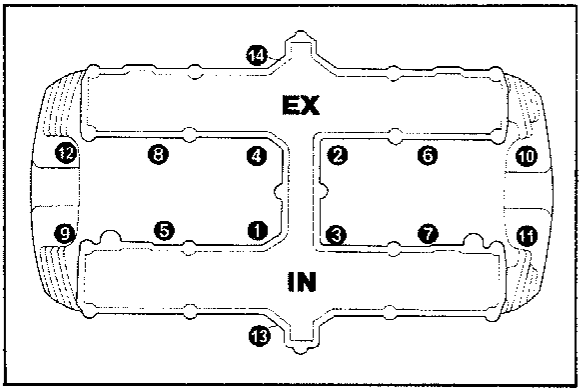


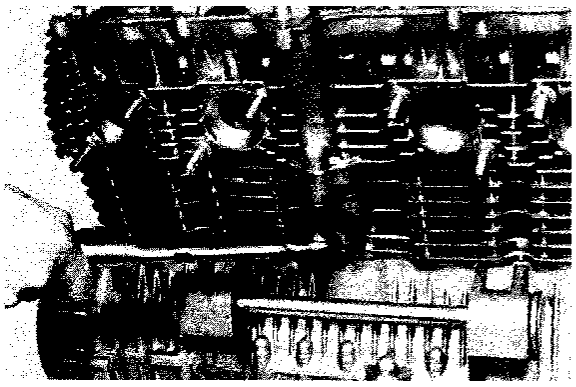
3. Place the upper cylinder head nuts and washers in place. Follow the illustration for the proper tightening sequence. Torque all nuts in two stages and final torque the upper nuts to the specification.

Tightening torque:
35 Nm (3.5 m·kg, 25 ft·lb)

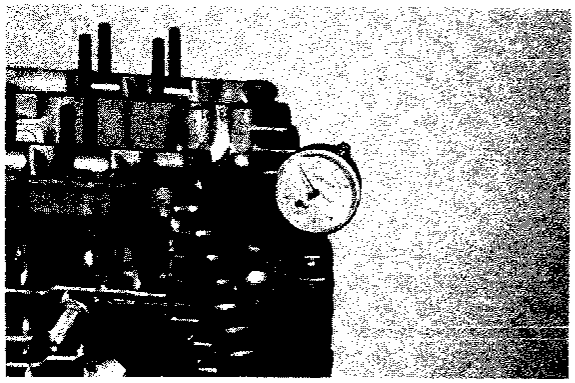
4. Don't forget the lower nuts on the front and rear of the cylinder head. Torque to the specification.

Tightening torque:
20 Nm (2.0 m·kg, 14 ft·lb)

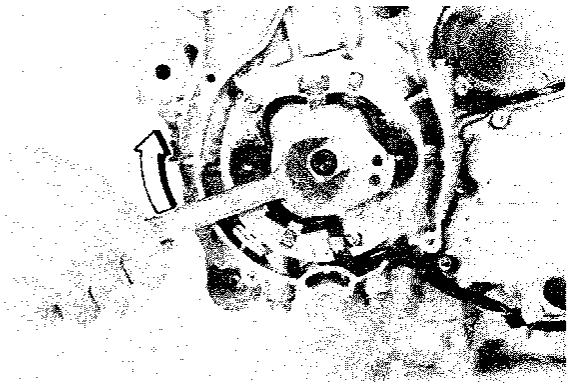




5. To start the valve timing sequence, install a dial indicator in cylinder No. 1.



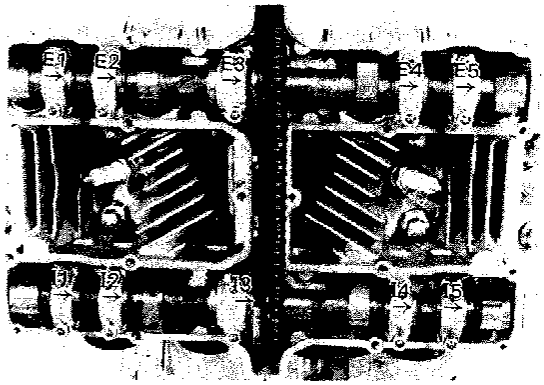
6. Rotate the engine in a clockwise direction until top dead center is found for cylinders No. 1 and No. 4.
7. With cylinders 1 and 4 at the top dead center, loosen the screw on the crankcase pointer and align the pointer with the "T" mark on the timing plate. Recheck the top dead center and alignment of the pointer and "T" mark. When all are aligned, tighten the screw.



8. Slip cam chain over the sprockets.
9. Lubricate all cam caps and cam bearings surfaces liberally with oil.

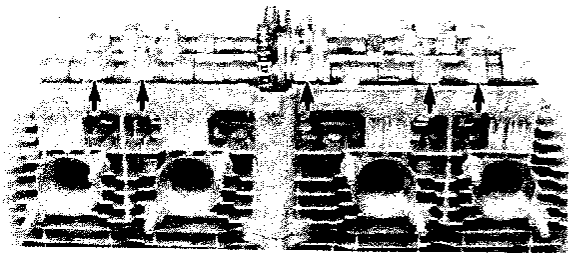
NOTE:
Place the camshaft in the cylinder head, with the dot (•) mark facing upward.

10. Place the cam caps in their proper positions. The caps are identified "I-1" through "I-5" for intake and "E-1" through "E-5" for exhaust. Place the center dowel pinned caps in position first and then position the remaining caps. Install the nuts and washers only finger tight.



CAUTION:

The cam caps must be tightened evenly or damage to the cylinder head, cam caps and cam will result. The spaces between the caps and cylinder head should be equal.



11. Torque the cam caps nuts in two stages and final torque to the specification.

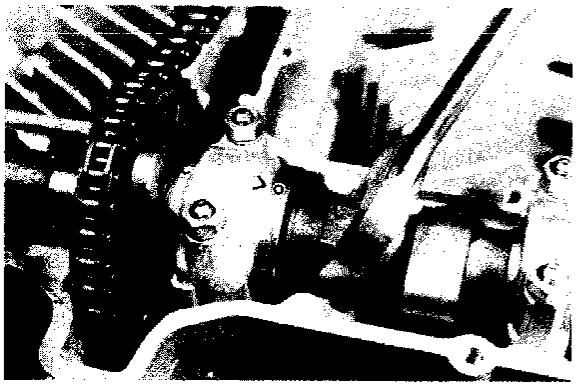
Tightening torque: 10 Nm (1.0 m·kg, 7.2 ft·lb)

J. Cam chain, Cam Sprockets and Chain Tensioner

1. Rotate each cam shaft until the dot on the cam is aligned with the arrow on the center cam cap.

CAUTION:

Use extreme caution when rotating the cams. Two possible dangers exist. First, the wrench may contact the head and fracture it. Or second, a valve may become bent if the cam is turned the wrong way.

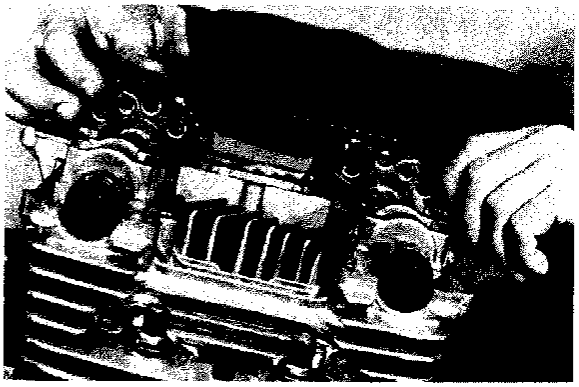


2. Carefully lift the cam chain from the intake cam sprocket and pull upward to remove any slack in the chain between the crankshaft and the intake cam sprocket. With all slack removed, place the chain back on the cam sprocket.
3. Grip each sprocket simultaneously and place them on the crankshaft shoulders while continuing to keep tension on the chain from the crankshaft to the intake sprocket.

CAUTION:

Use only the special hardened shouldered bolts to install the cam chain sprockets to the cams.

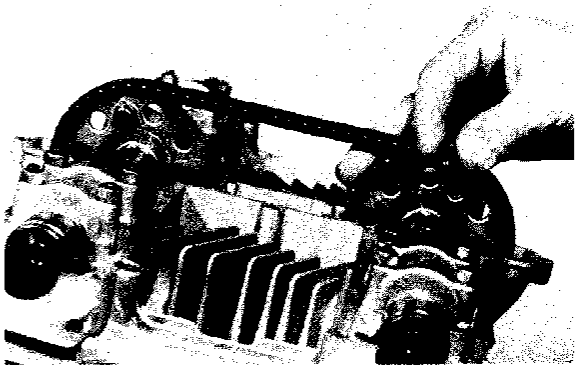
Make sure the rollers of the cam chain are centered on both chain tensioning slippers.



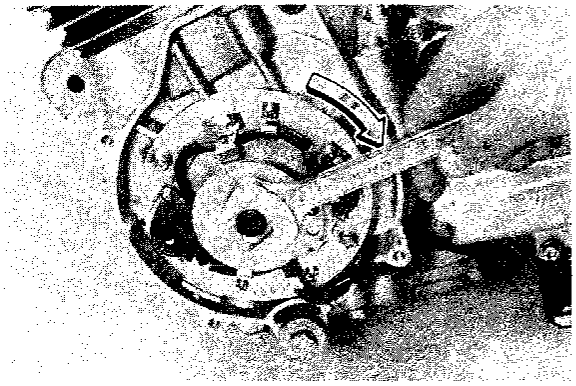
4. Rotate the sprockets slightly to align the bolt holes and insert one special bolt in each sprocket.

NOTE:

Tighten only finger tight at this time.

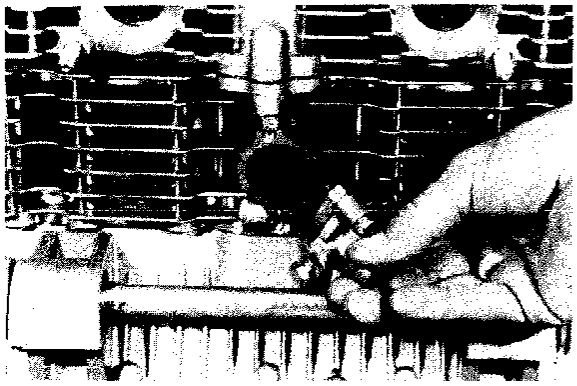


5. Install the guide stopper.
6. Rotate the crankshaft approximately 45° and align the "C" mark on the timing plate with the timing pointer.



7. Compress the cam chain tensioner and lock in the retracted position.
8. Install the chain tensioner to the engine and torque the bolts to the specification.

Tightening torque:
10 Nm (1.0 m·kg, 7.2 ft·lb)



9. Release the tensioner holding bolt, an audible click will be heard when the tensioner is released.
10. Torque the holding bolt and the lock nut to the specifications.

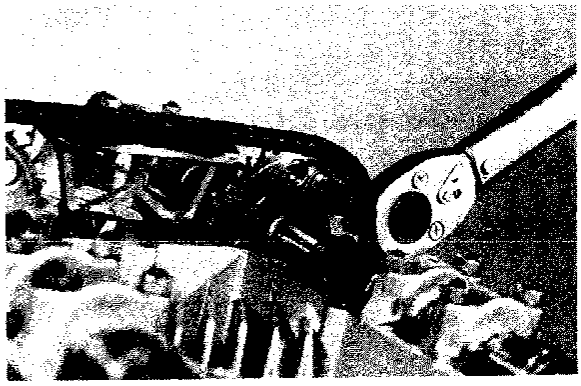
Holding bolt torque:
6 Nm (0.6 m·kg, 4.3 ft·lb)
Lock nut torque:
9 Nm (0.9 m·kg, 6.5 ft·lb)

11. Rotate the crankshaft more than one full revolution and align the "T" mark on the timing plate with the timing pointer. With the crankshaft at the "T" mark, the dots on the cams should be aligned with the raised arrows on the center cam caps. If they are not aligned, disassembled the sprockets and chain tensioner and repeat above procedures.
12. Rotate the crankshaft and install the two remaining shoulder bolts into the cam sprockets. Torque all four sprocket holding bolts to the specification.

CAUTION:

Be sure to attain the specified torque value to avoid the possibility of these bolts coming loose and causing serious damage to the engine.

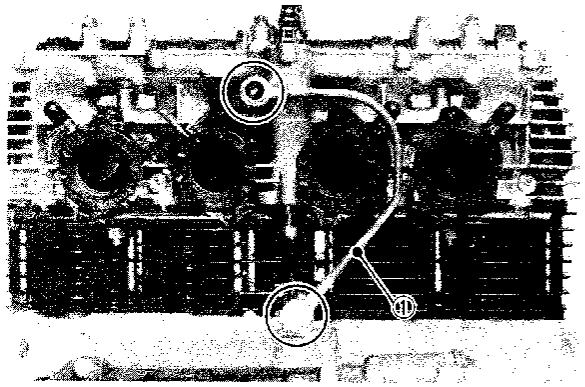
Tightening torque:
20 Nm (2.0 m·kg, 14 ft·lb)



K. Oil Delivery Pipe and Cylinder Head Cover

1. Install the overhead oil lines using the special bolts with a new copper washer on each side of the banjo fittings. These two bolts are not identical (the larger bolt with the dished head goes in the top).

Tightening torque:
20 Nm (2.0 m·kg, 14 ft·lb)



1. Oil delivery pipe 2. Dished head bolt

2. Adjust all valves as described in the "PERIODIC INSPECTIONS AND ADJUSTMENTS" (Page 2-4).
3. Install the cylinder head cover with a new gasket.
4. Install the timing cover with a new gasket.
5. Install the middle gear case with a new gasket.

Torque:
24 Nm (2.4 m·kg, 17 ft·lb)

REMOUNTING ENGINE

A. Remounting Engine

1. Refer to page 3-1 for engine removal. Reverse the applicable removal steps.

CAUTION:

Always use new bolts in the drive shaft coupling.

2. Install and tighten the engine mounting bolts.

Engine mounting bolt torque:
10 mm bolt:
Upper:
55 Nm (5.5 m·kg, 40 ft·lb)
Lower:
67 Nm (6.7 m·kg, 48 ft·lb)
12 mm bolt:
100 Nm (10.7 m·kg, 72 ft·lb)

3. Fill the oil filter with approx. 0.5 L (0.44 Imp qt, 0.53 US qt) engine oil and install oil filter.

CAUTION:

The filter must be filled with the specified amount of oil to prime the oil pump of an overhauled engine.

4. Tighten engine oil drain plug, oil filter mounting bolt, and middle drain plug.

Torque:
Engine oil drain plug:
43 Nm (4.3 m·kg, 31 ft·lb)
Oil filter mounting bolt:
32 Nm (3.2 m·kg, 23 ft·lb)
Middle gear drain plug:
23 Nm (2.3 m·kg, 17 ft·lb)

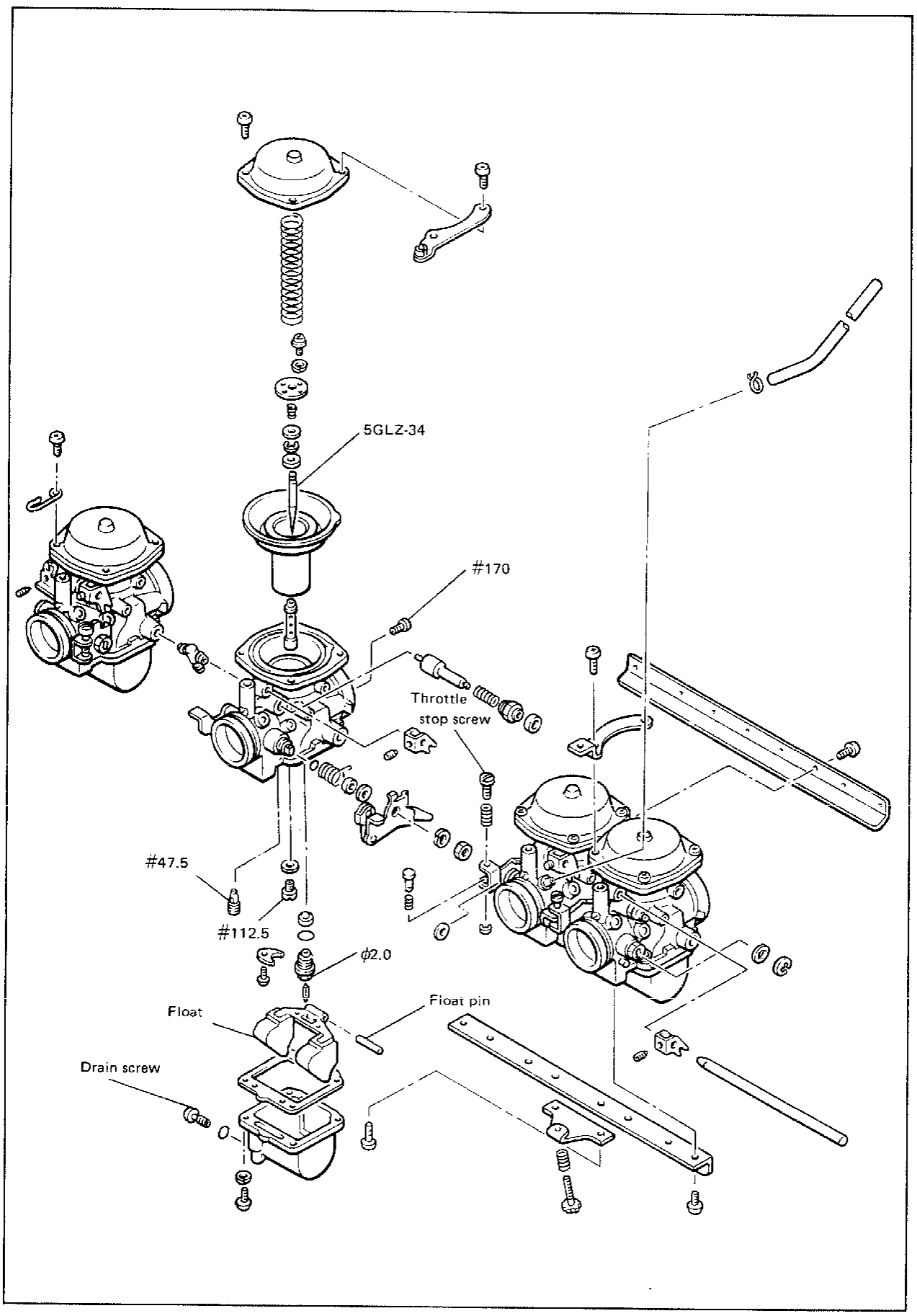
5. Add oil to engine and middle gear case.

Engine oil:
4.0 L (3.5 Imp qt, 4.2 US qt)
Middle gear oil:
0.375 L (0.33 Imp qt, 0.40 US qt)

NOTE:

These oil quantities are for an overhauled engine. Observe oil filter filling procedure.

CARBURETION



CARBURETOR

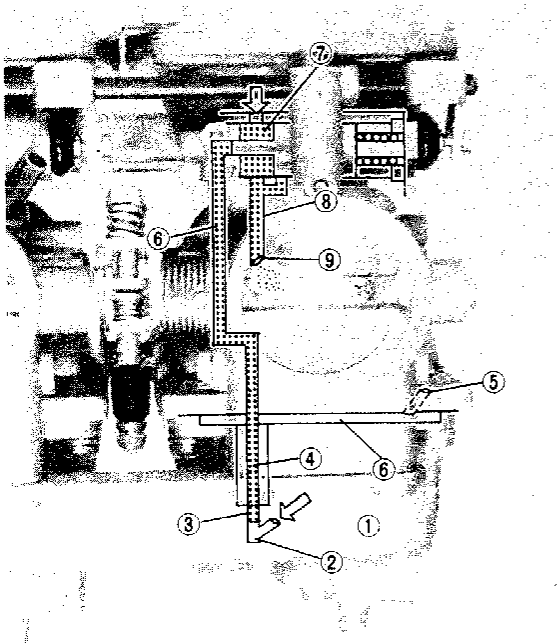
A. Description

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

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

   The newly-adopted two-position type starter jet is designed to supply a mixture of more appropriate richness by switching from one jet to another.

a. Routes of fuel and air

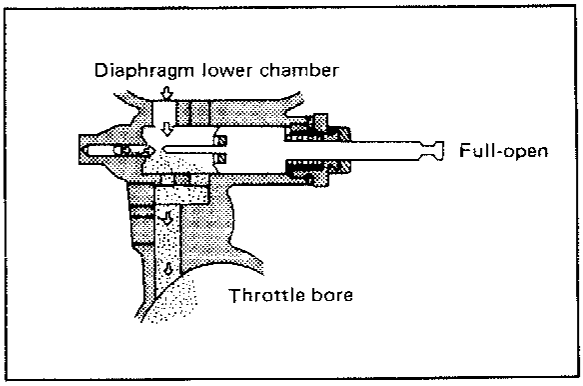


The fuel supplied from the float chamber (1) passes through (2) and is metered by (3). Air is supplied from the air chamber in the float chamber and flows through (5) and (6). It is then mixted with the metered fuel. The resultant mixture passes through (4) and (6) and flows into the two-position starter jet (7), where it is further mixed with air supplied from the diaphragm (8) and streams into the throttle bore out of (9).

b. Operation of two-position starter jet

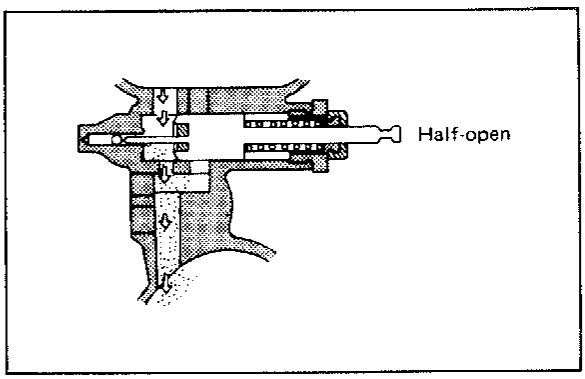
Full-open:

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



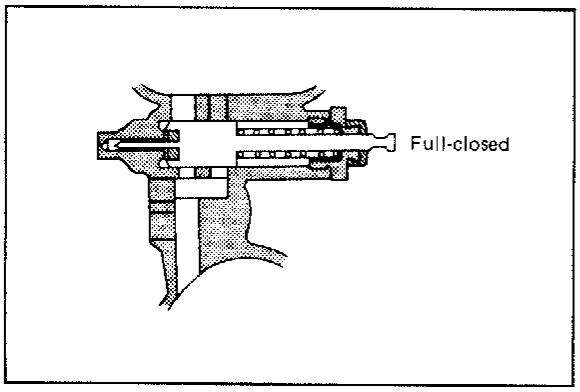
Half-open:

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



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

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



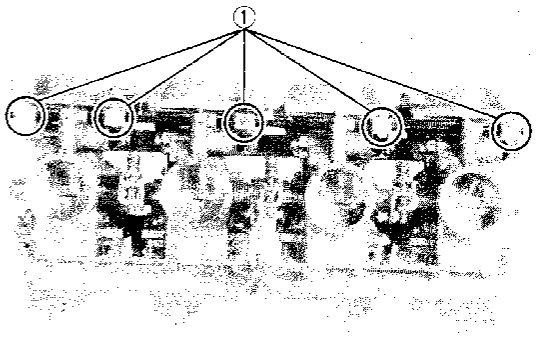
B. Specifications

Main jet	#112.5
Jet needle	5GLZ – 34
Needle jet	X-2
Starter jet	#25
Fuel level	3 ± 1 mm (0.12 ± 0.04 in)020 in)
Pilot jet	#47.5
Pilot screw	Present
Fuel valve seat	2.0 mm (0.079 in)
Engine idle speed	1,100 r/min

NOTE:
The idle mixture screw settings are adjusted for maximum performance at the factory with the use of specialized equipment. Do not attempt to change these settings.
If all other engine systems are functioning correctly, any changes will decrease performance and cause increased exhaust emissions.

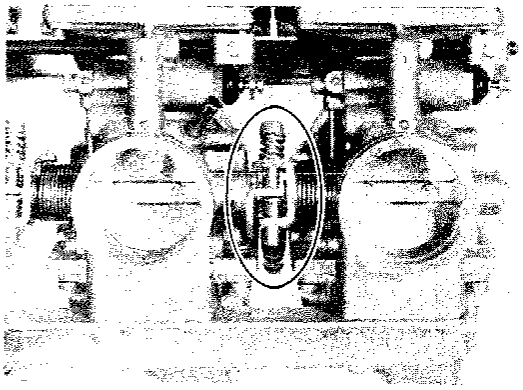
C. Disassembly

1. Prepare to separate the carburetor to be worked on. (Separation of the carburetors is not necessary if only float level adjustment or throttle slide inspection is to be performed). Remove the four screws holding the starter jet shaft to the carburetor.

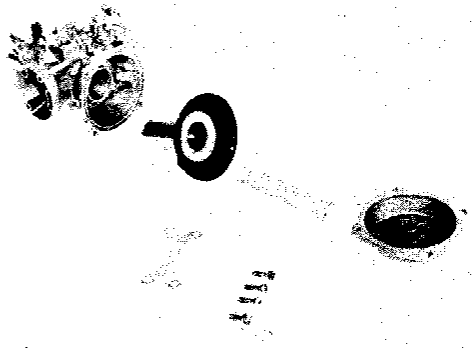


1. Holding screw

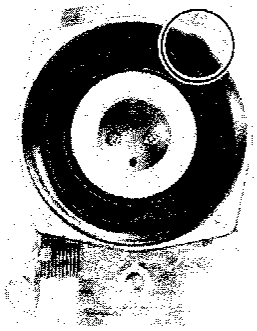
2. Remove upper and lower brackets.
Note position of synchronizing screws for guidance in reassembly. Separate carburetors.



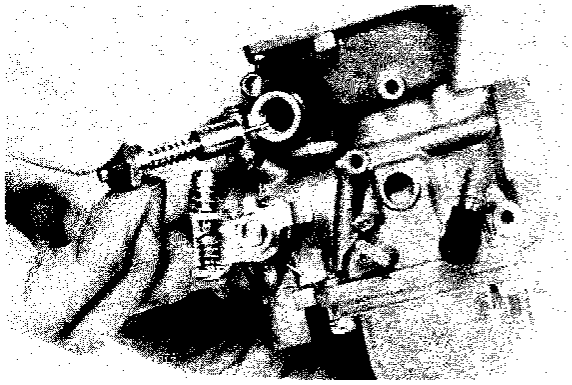
3. Remove vacuum chamber cover. Remove the spring, needle fitting plate, jet needle and diaphragm (vacuum piston).



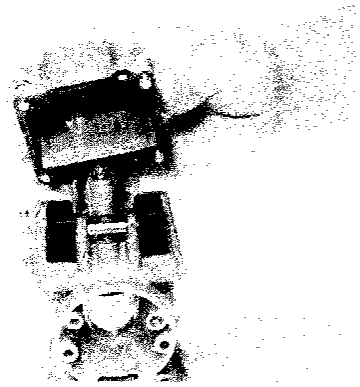
4. Note that there is a tab On the rubber diaphragm. There is a matching reacess in the carburetor body for the diaphragm tab.



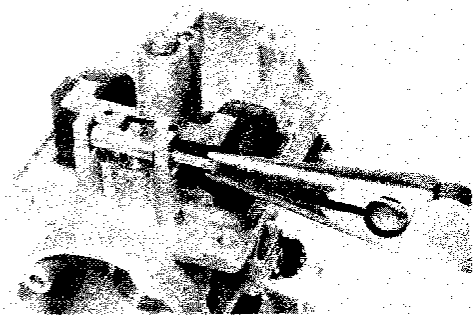
5. To inspect the starter jet, remove the starter assembly to the left side of the carburetor.

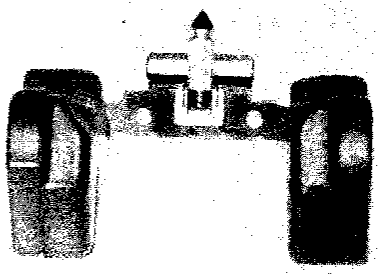


6. Remove the four screws holding the float bowl cover. Remove the float bowl cover. The main jet is located under a cover in the float bowl.



7. Pull out the float pivot pin. Remove the float assembly. Be careful not to lose the float valve needle located under the float level adjustment tang. Remove the needle jet.





8. Reassemble in reverse order. Pay close attention to the installation of the vacuum piston diaphragm.

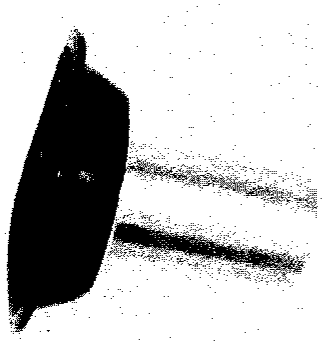
D. Inspection

1. Examine the carburetor body and fuel passages. If contaminated, wash the carburetor in a petroleum-based solvent. Blow out all passages and jets with compressed air.

CAUTION:

Do not use caustic carburetor cleaning solutions.

2. Examine the condition of the floats. If the floats are damaged, they should be replaced.
3. Inspect the vacuum piston and rubber diaphragm. If the piston is scratched or the diaphragm is torn, the assembly must be replaced.
4. Inspect the vacuum piston and rubber diaphragm. If the piston is scratched or the diaphragm is torn, the assembly must be replaced.
5. Inspect the starter plunger assembly for damage. If damaged, replace.



E. Fuel Level Measurement

NOTE:

Before checking the fuel level, not the following:

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

1. Connect the level gauge (special tool) or a vinyl pipe of 6 mm (0.24 in) in inside diameter to the float bowl nozzle left or right side carburetor.
2. Set the gauge as shown and loosen the drain screw.

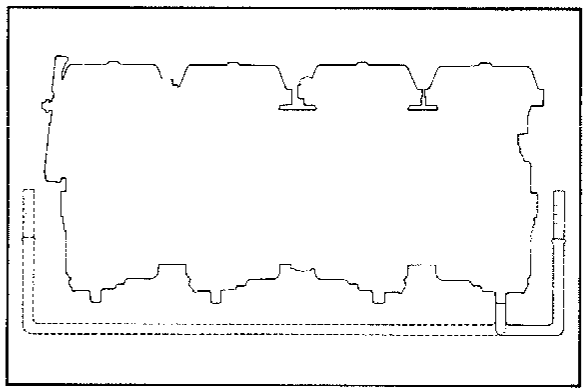
1. Drain screw 2. Level gauge

3. Start the engine and stop it after a few minutes of run. This procedure is necessary to obtain the correct fuel level.

NOTE:

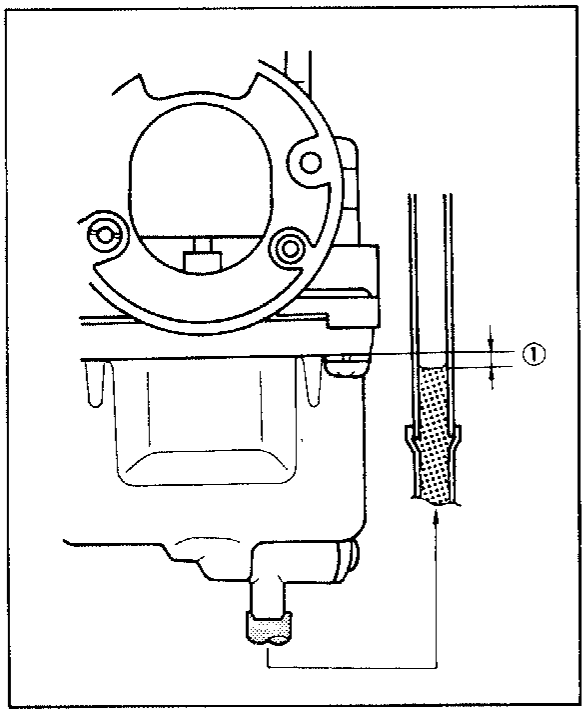
Make sure the fuel petcock is "ON" or "RES" position.

4. Note the fuel level and bring the gauge to the other end of the carburetor line and repeat step 3 above. Not the fuel level again and compare it with the previous gauge reading. They should be equal. If not, place a suitable size of wooden piece or the like under the centerstand and adjust.



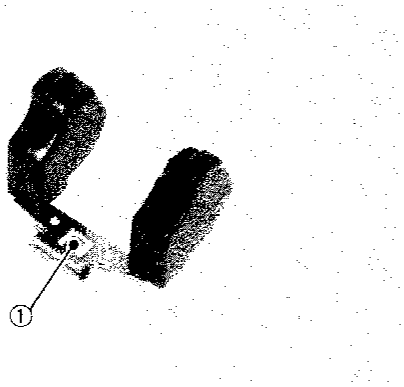
5. Check the fuel level one by one. The level should be in the specified range.

Fuel level:
3 ± 1 mm (0.12 ± 0.04 in) below from the carburetor mixing chamber body edge.



1. Full level

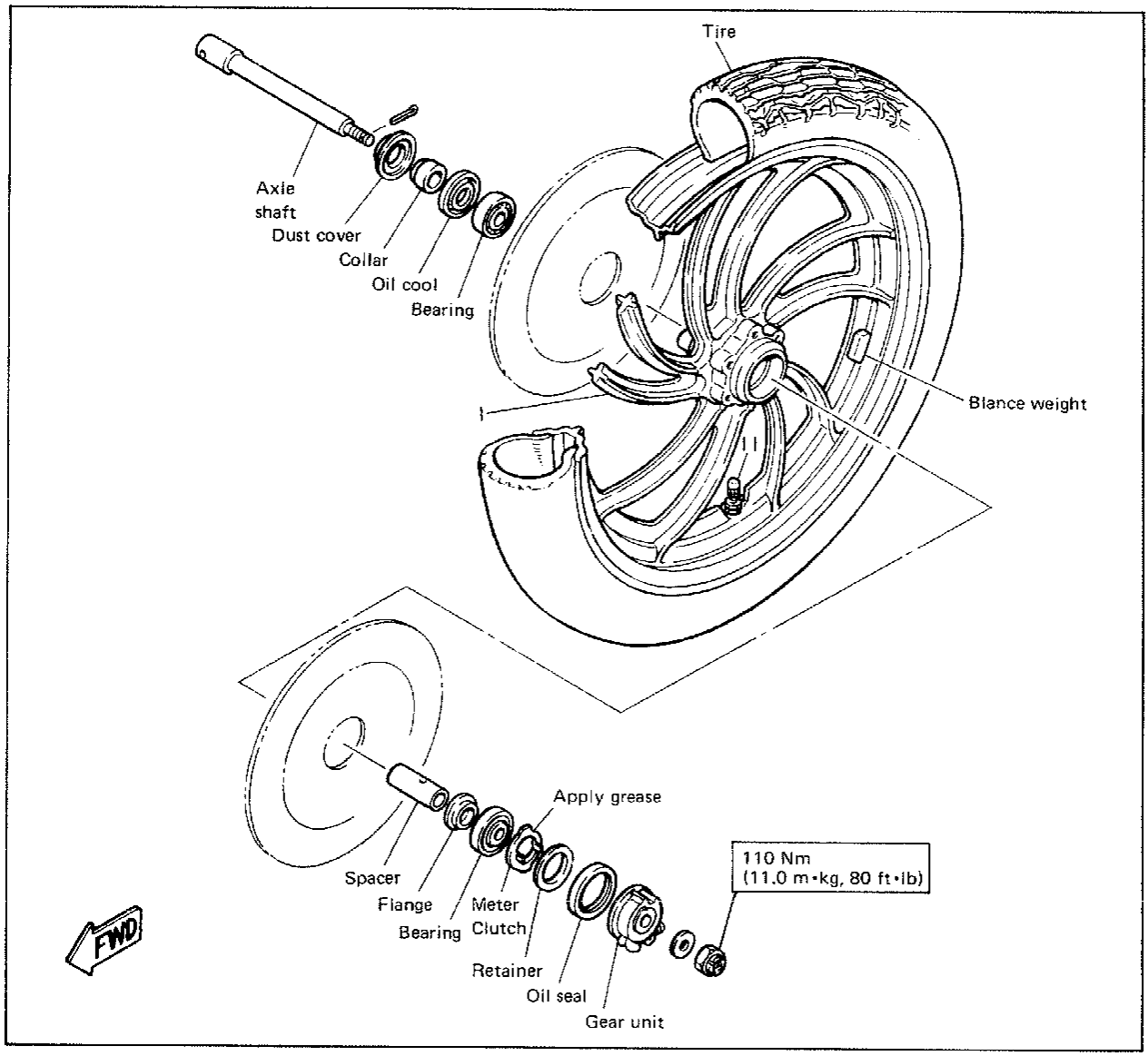
6. If the fuel level is incorrect, remove the carburetor assembly from the motorcycle and check the fuel valve(s) and float assembly(s) for damage.
7. If no damage is found, correct the fuel level by slightly bending the float arm tang. Recheck the fuel level.



1. Float arm tang

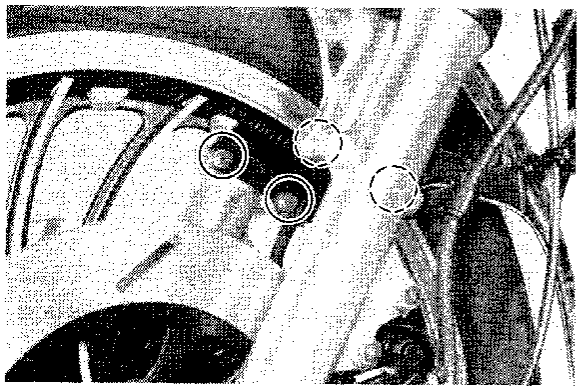
CHASSIS

FRONT WHEEL

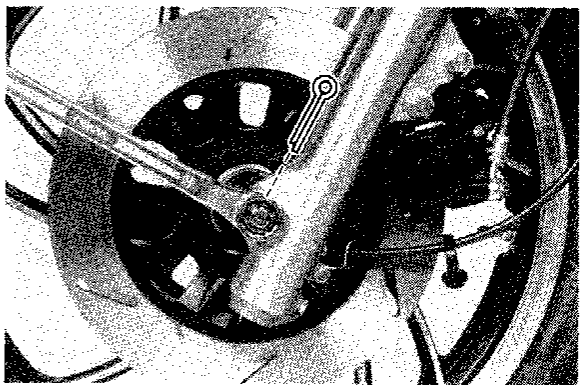


A. Removal

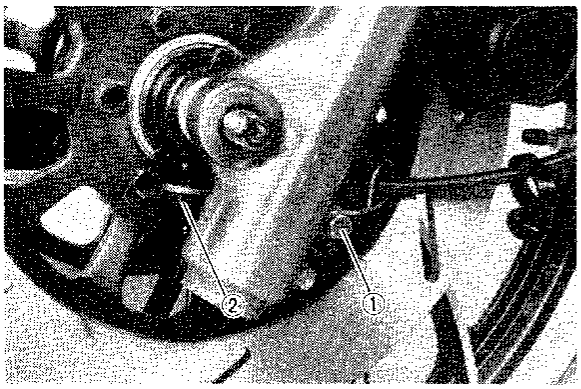
1. Place the machine on the centerstand.
2. Remove the front fender securing bolts and remove the fender.



3. Remove the cotter pin and wheel axle nut.



4. Remove the speedometer cable holder securing bolt.

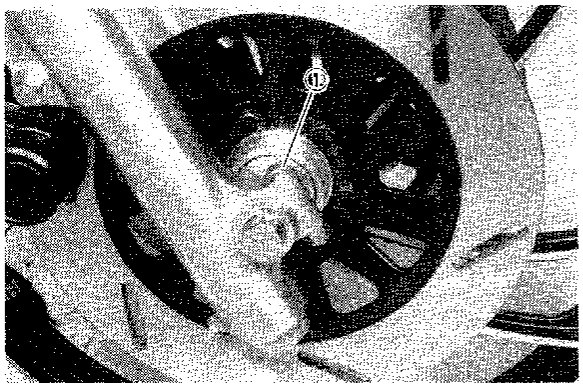


1. Cable holder securing bolt 2. Cable securing bolt

NOTE:

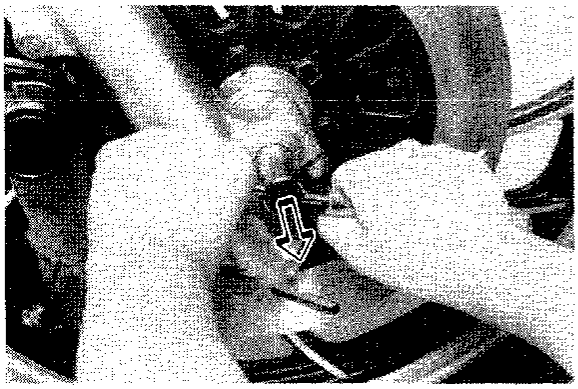
Support the engine with a proper stand to keep the engine from declining forward.

5. Loosen the pinch bolt securing the axle.



1. Pinch bolt

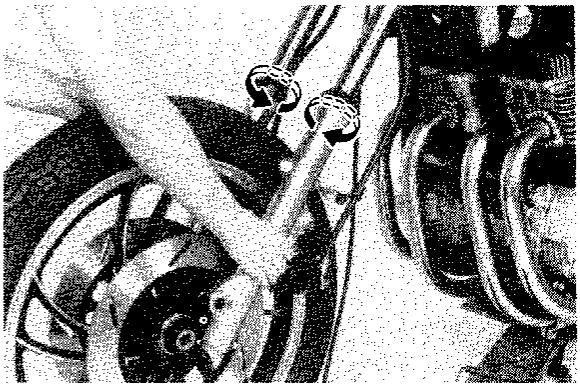
6. Remove the axle shaft. In this case, make sure the machine is properly supported.



NOTE:

Do not depress the brake lever when the wheel is off the machine as the brake pads will be forced to shut.

7. Lower the wheel until the discs come off the calipers. Then turn the calipers outward to the extent of causing no obstacle to wheel removal and remove the wheel.



NOTE:

Do not squeeze the brake lever while the wheel is off the machine, as the brake caliper piston will be forced out of the cylinder, making reassembly difficult. Placement of a wooden wedge between the brake pads may be helpful.

B. 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 axle. Do not attempt to straighten a bent axle.

C. Front Wheel Inspection

1. Check for cracks, bends or warpage of 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 wheel bearings or replace the wheel as required.

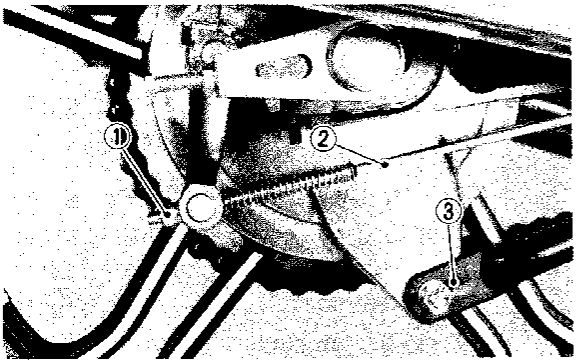
Rim run-out limits:
Vertical – 2 mm (0.08 in)
Lateral – 2 mm (0.08 in)

3. Check wheel balance. Rotate the wheel lightly several times and observe resting position. If the wheel is not statically balanced, it will come to rest at the same position each time. Install an appropriate balance weight at lightest position (at top).

REAR WHEEL

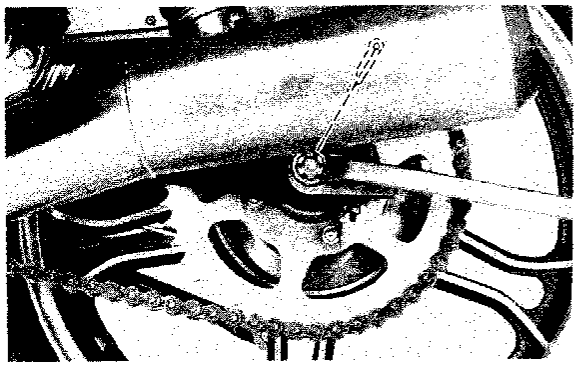
A. Removal

1. Place the motorcycle on the center stand.
2. Remove the tension bar and the brake rod from the brake shoe plate. The tension bar can be removed by removing the cotter pin and nut from the tension bar bolt. The brake rod can be removed by removing the adjuster.

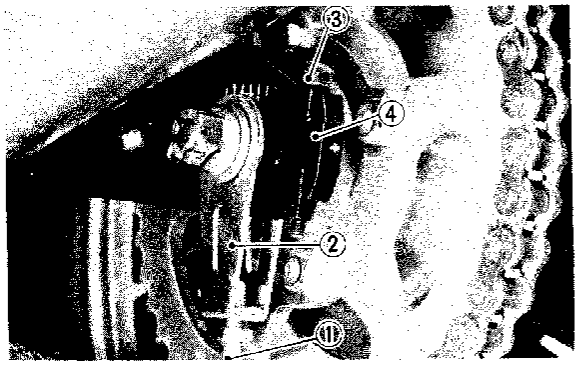


1. Adjuster 3. Tension bar
2. Brake rod

3. Remove the axle nut cotter pin and loosen the axle nut.

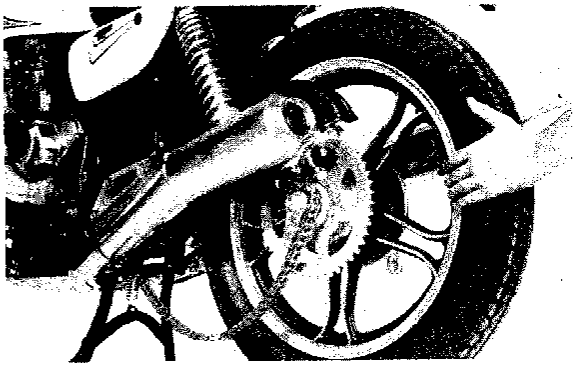


4. Loosen the adjusting bolt and let the chain puller down as in the photo.



1. Adjusting bolt 2. Chain puller 3. Pinch bolt
4. Rear arm end

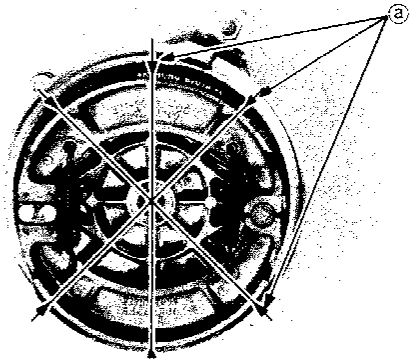
5. Remove the pinch bolt and chain puller attachment.
6. Push the rear wheel forward and remove the drive chain.
7. The rear wheel can be removed by pulling the wheel axle, backward.



B. Checking brake shoe wear

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

Front brake shoe diameter:
160 mm (6.30 in)
Replacement limit:
156 mm min. (6.14 in)



a. Measuring points

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

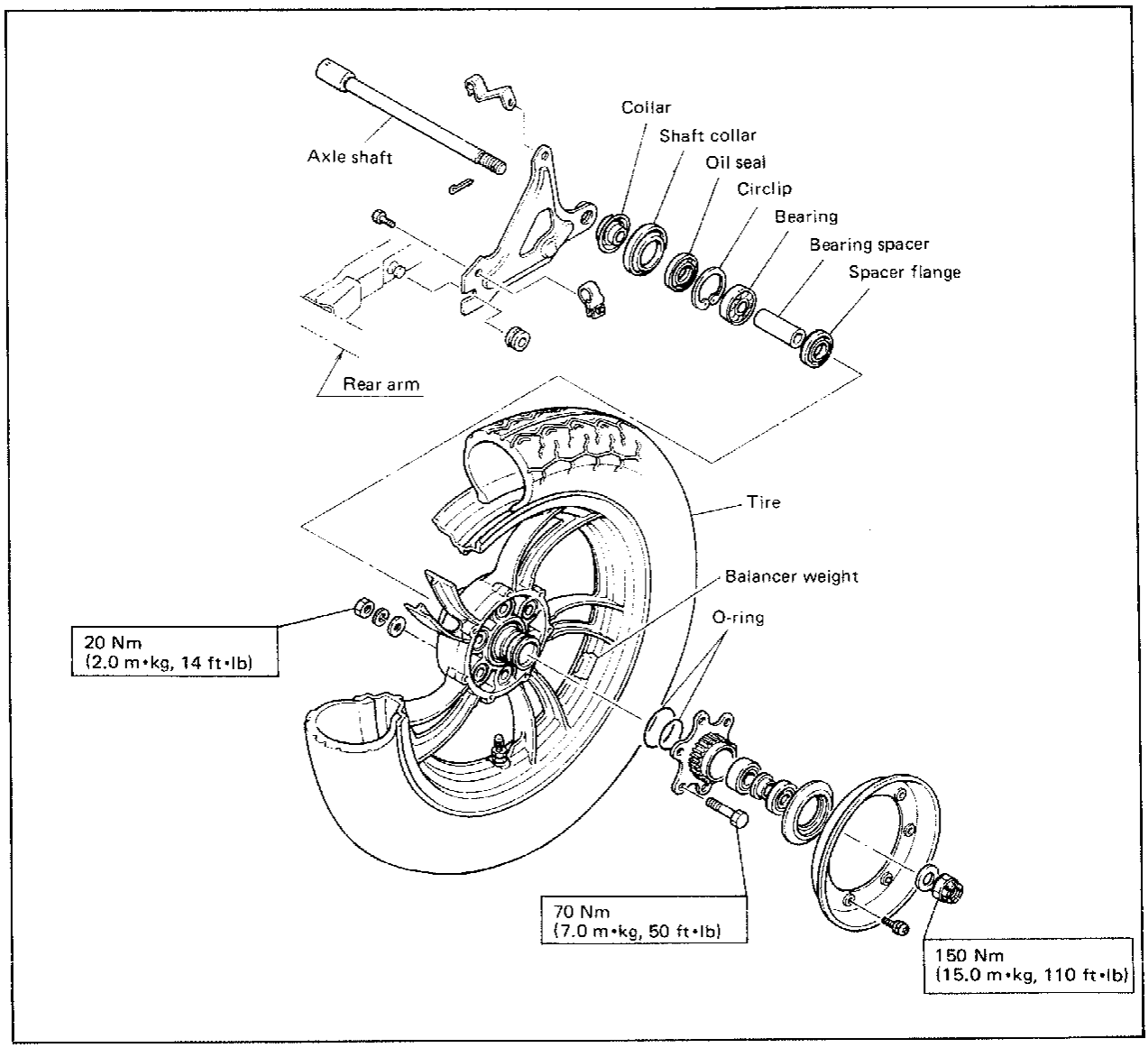
C. Brake drum

Oil or scratches on the inner surface or 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

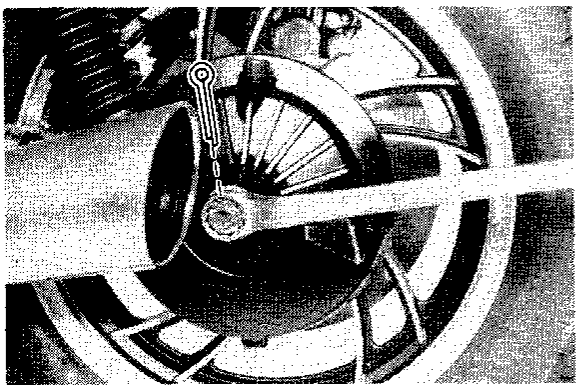
Remove the camshaft and grease. If the cam face is worn, replace.

REAR WHEEL

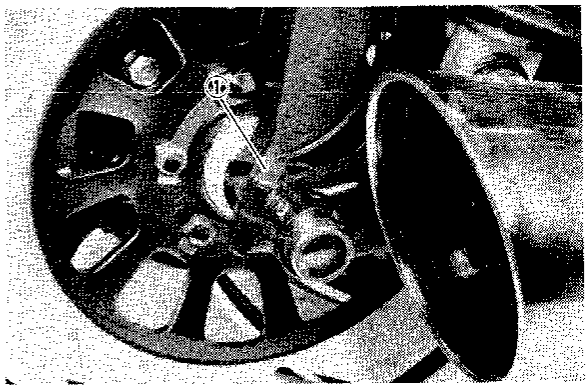


A. Removal

1. Place the motorcycle on the centerstand.
2. Remove the axle nut cotter pin and axle nut.

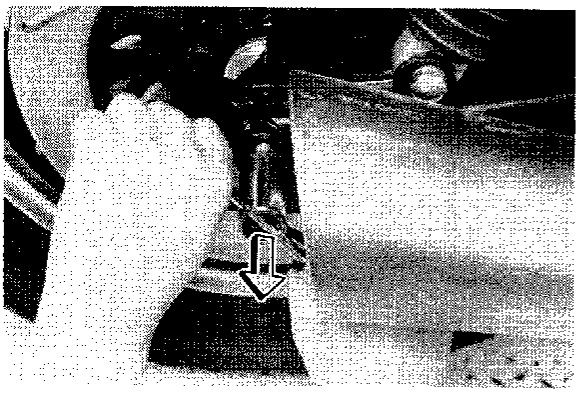


3. Loosen the rear axle pinch bolt.

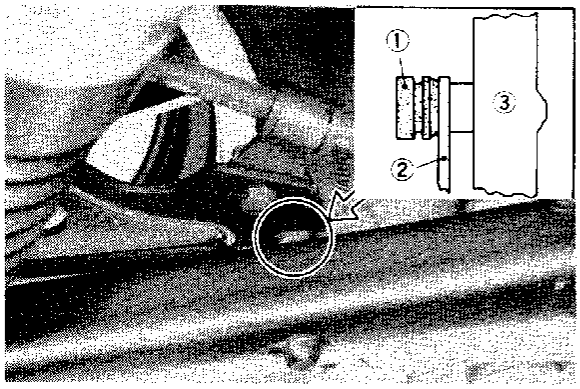


1. Pinch bolt

4. While supporting the brake caliper, pull out the rear axle.



5. Pull out the rear brake torque stopper plate from where it is retained on the rear arm.

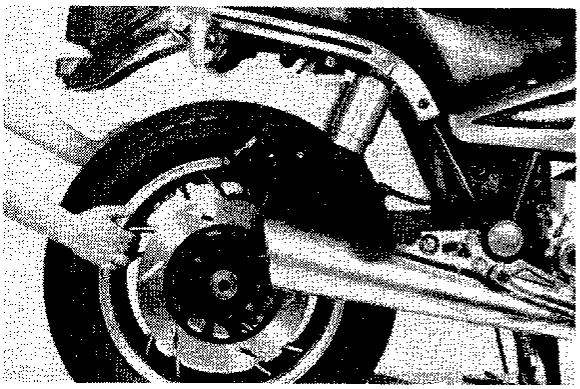


1. Rubber retainer
2. Torque stopper plate
3. Rear arm

6. Move the wheel to the right side to separate it from the final gear cases and remove the rear wheel.

NOTE:

Do not depress the brake pedal when the wheel is off the motorcycle as the brake pads will be forced to shut.



B. Rear Axle Inspection

(See Front Wheel, Axle Inspection Procedures).

C. Replacing Wheel Bearings

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

D. Rear Wheel Inspection

(See Front Wheel, Inspection Procedures).

E. Rear Wheel Installation

1. Lightly grease lips of rear wheel oil seals.
2. Make sure there is enough gap between the brake pads before inserting the brake disc.
3. Install the rear wheel assembly and wheel axle.

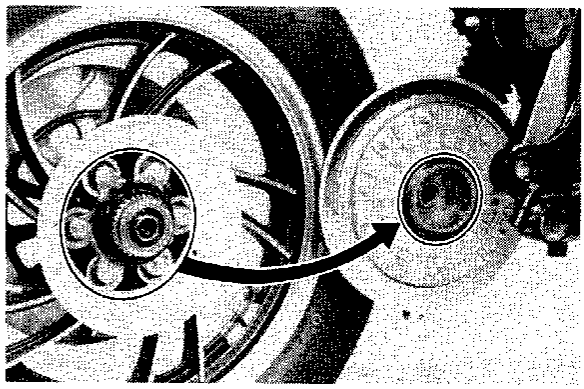
NOTE:

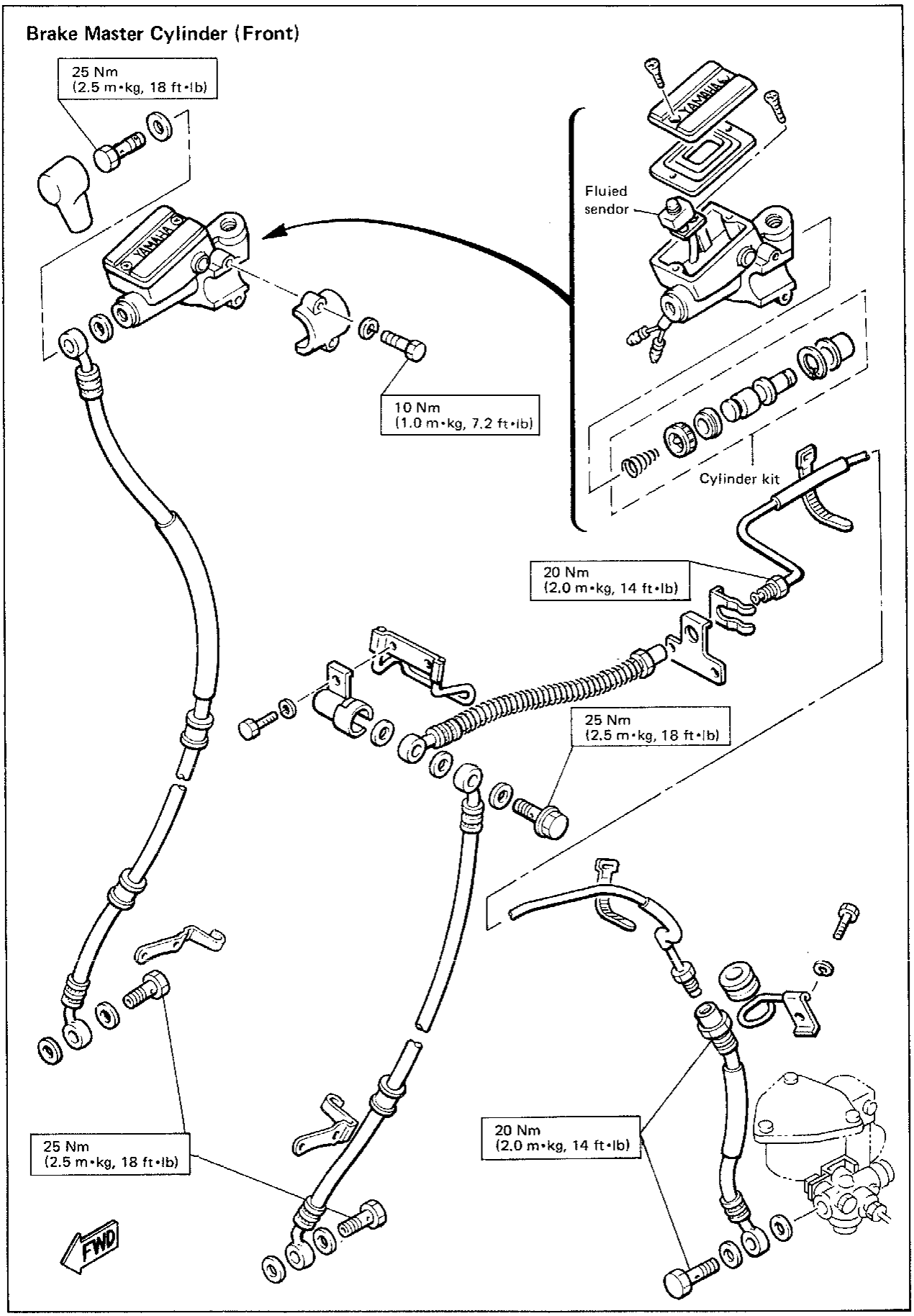
Before installing the rear wheel, apply a light coating of lithium base grease ot the final gear case splines. When installing the rear wheel, be sure the splines on the wheel hub fit into final gear case.

CAUTION:

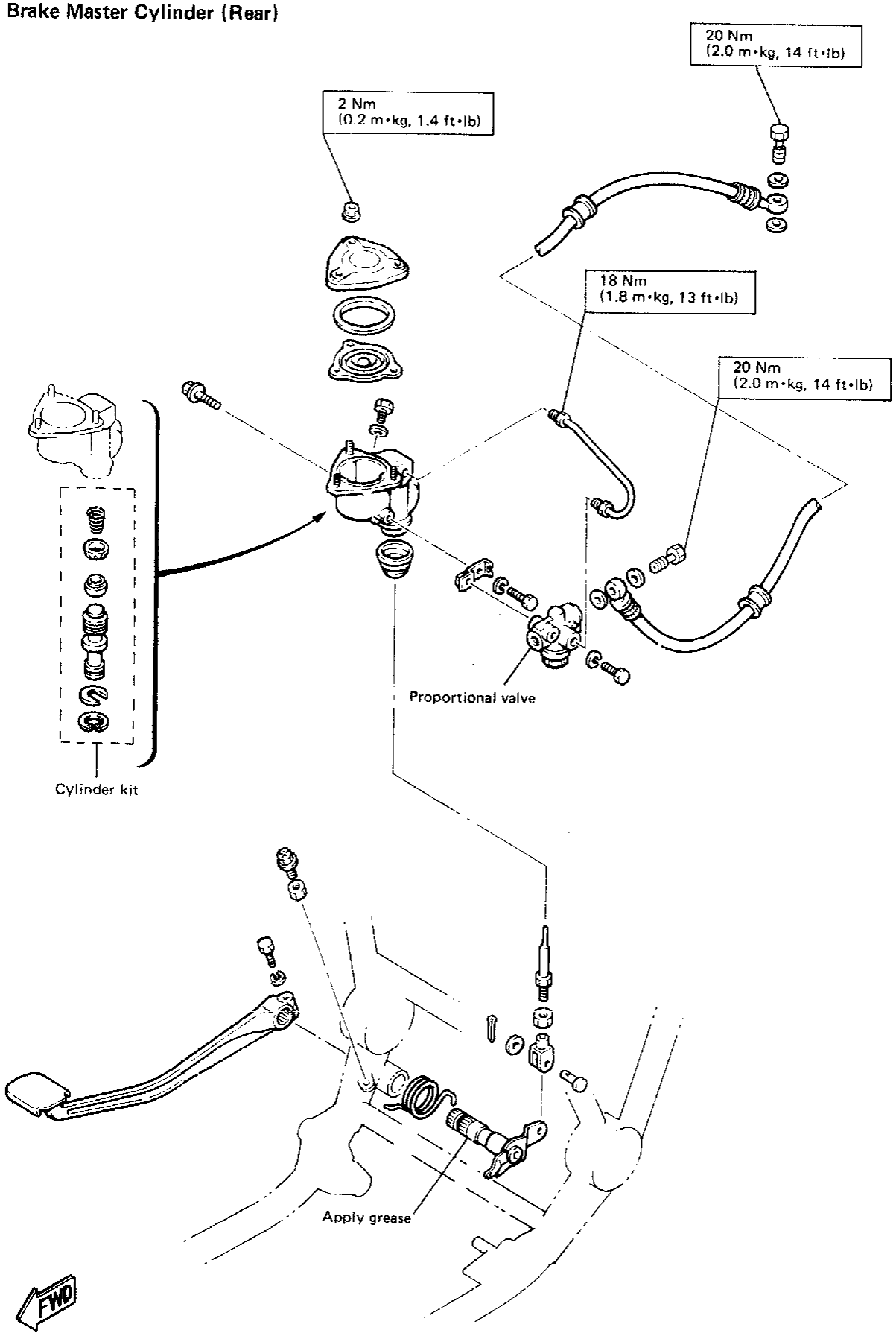
Always use a new cotter pin on the rear axle nut.

Tightening torque:
Axle nut:
150 Nm (15.0 m·kg, 110 ft·lb)
Axle pinch bolt:
6 Nm (0.6 m·kg, 4.3 ft·lb)




Brake Master Cylinder (Front)
25 Nm
(2.5 m•kg, 18 ft•lb)
10 Nm
(1.0 m•kg, 7.2 ft•lb)
Fluied
sendor
Cylinder kit
20 Nm
(2.0 m•kg, 14 ft•lb)
25 Nm
(2.5 m•kg, 18 ft•lb)
25 Nm
(2.5 m•kg, 18 ft•lb)
20 Nm
(2.0 m•kg, 14 ft•lb)
FWD

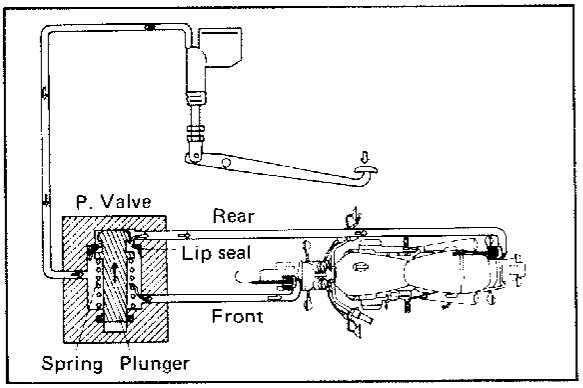
Brake Master Cylinder (Rear)



OPERATION:

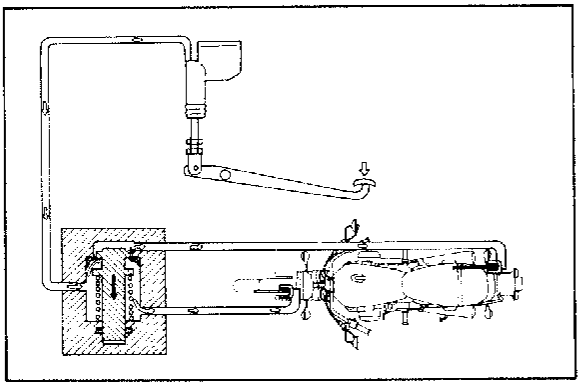
1. When the brake fluid pressure in master cylinder is lower than 1961 kPa (20 kg/cm², 285 psi).

Position of plunger:	Pushed up by the return spring.
Brake fluid pressure:	Equal in master cylinder and caliper cylinders (front and rear).



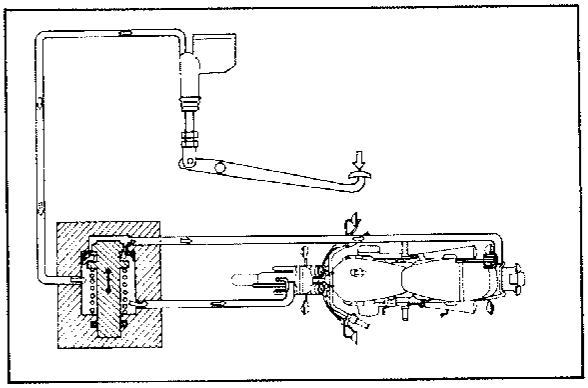
2. When the brake fluid pressure reaches 1961 kPa (20 kg/cm², 285 psi).

Position of plunger:	Fluid pressure on top of the plunger increases and moves the plunger downward. Fluid passage closure brings a state of equilibrium to the system.
Brake fluid pressure:	Fluid pressure both in front and rear caliper is 1961 kPa (20 kg/cm², 285 psi).



3. When the brake fluid pressure is over 1961 kPa (20 kg/cm², 285 psi).

Position of plunger:	Upward force balances with fluid pressure on the top of the plunger as plunger moves up and down.
Brake fluid pressure:	Plunger opens and closes fluid passage so fluid pressure in rear caliper is lower than in the front caliper.



SYMPTOM:

A damaged or malfunctioning proportioning valve may cause overly sensitive rear braking. Should you notice this symptom during normal braking, take care not to apply strong pressure to the brake pedal.

WARNING:

Never disassemble or adjust the proportioning valve. Brake performance could be adversely affected.

CAUTION:

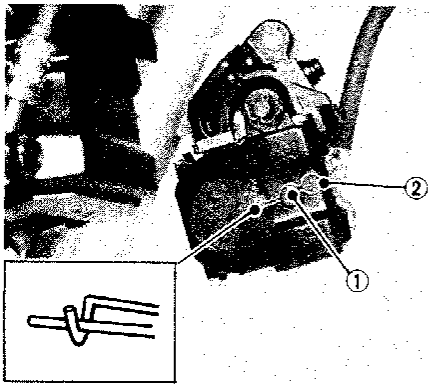
Disc brake components rarely require disassembly. Do not disassemble components unless absolutely necessary. If any hydraulic connection in the system is opened, the entire system should be disassembled, drained, cleaned and then properly filled and bled upon reassembly. Do not use solvents on brake internal components. Solvents will cause seals to swell and distort. Use only clean brake fluid for cleaning. Use care with brake fluid. Brake fluid is injurious to eyes and will damage painted surfaces.

A. Caliper Pad Replacement

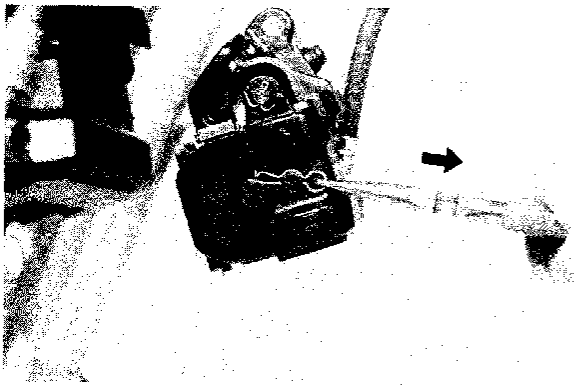
It is not necessary to disassemble the brake caliper and brake hose to replace the brake pads.

FRONT:

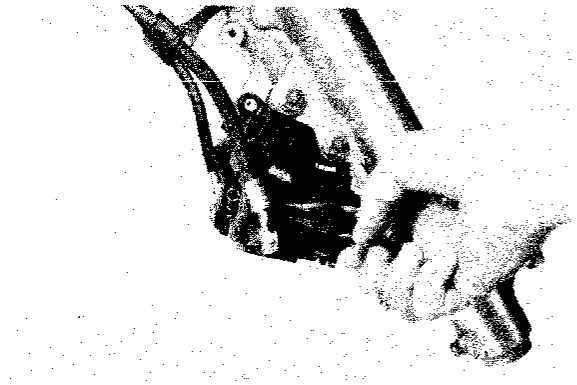
1. Remove the front fender and front wheel.
2. Unhook the pad retaining pin clip and remove the clip.



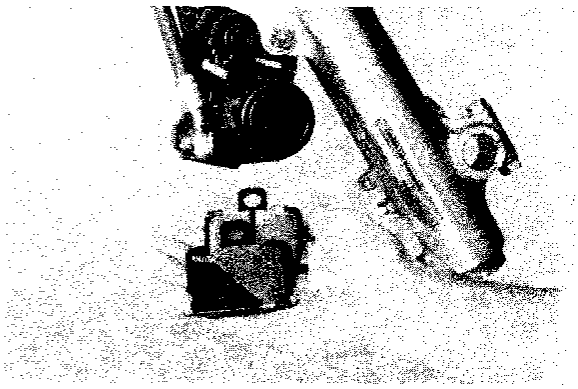
1. Pad retaining pin 2. Clip



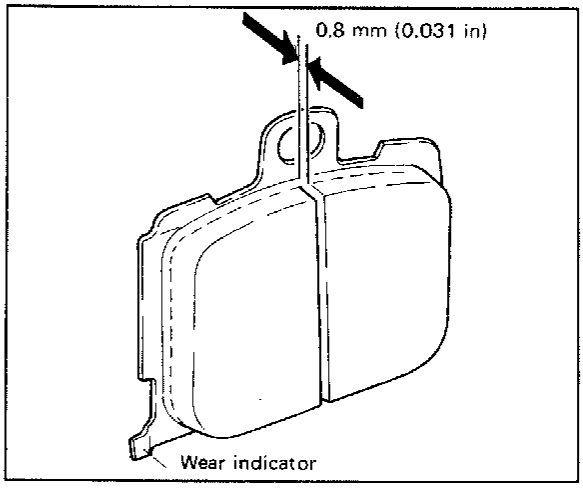
3. Pull out the pad retaining pin.



4. Remove the pads.

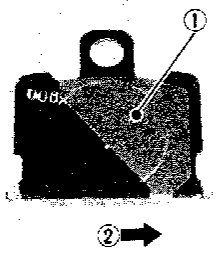


Pad wear limit: 0.8 mm (0.031 in)

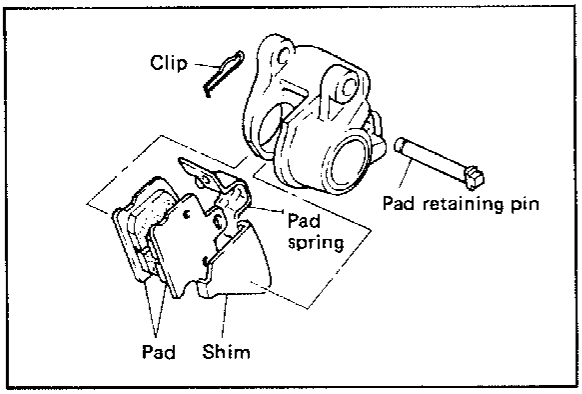


5. Install the new brake pads and shims. Before installing the pads, install the shim on the back plate which faces the caliper piston, as shown. Also replace the following parts if pad replacement is required.
   a. Pad spring
   b. Shim
   c. Pad retaining pin
   d. Clip

NOTE:
Replace the pads as a set if either is found to be worn to the wear limit.

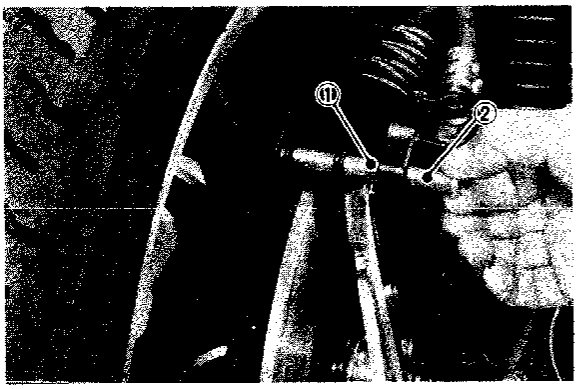


1. Shim 2. Disc rotating direction



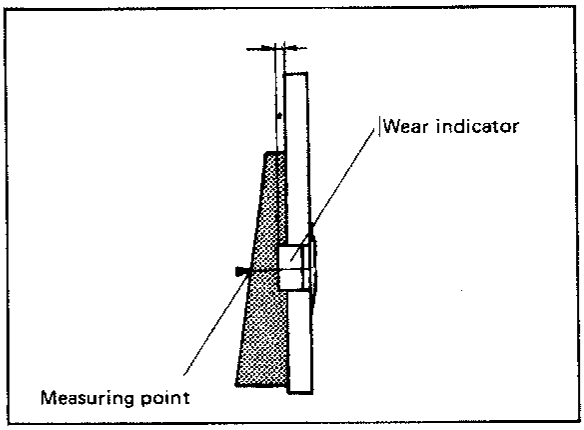
REAR:

1. Pull out the pad retaining pin while pinching the coil spring clip ends with pliers.



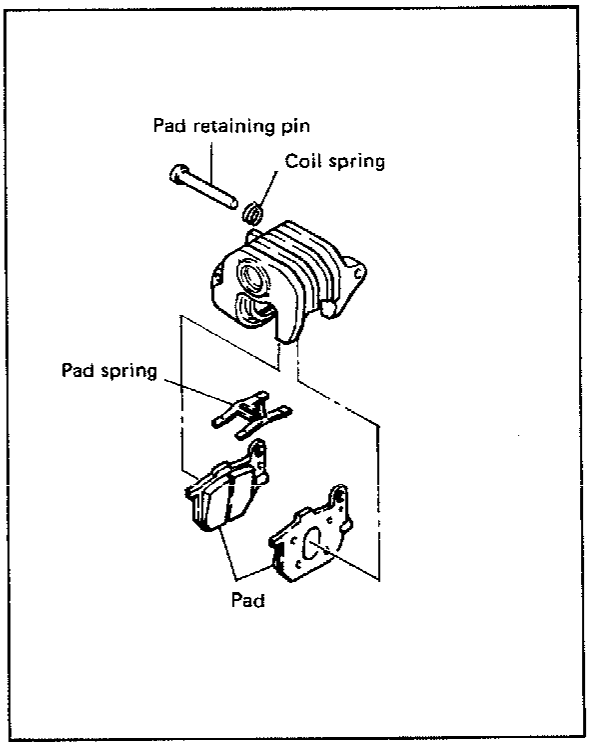
1. Coil spring clip 2. Pad retaining pin

Pad wear limit: 1.2 mm (0.047 in)

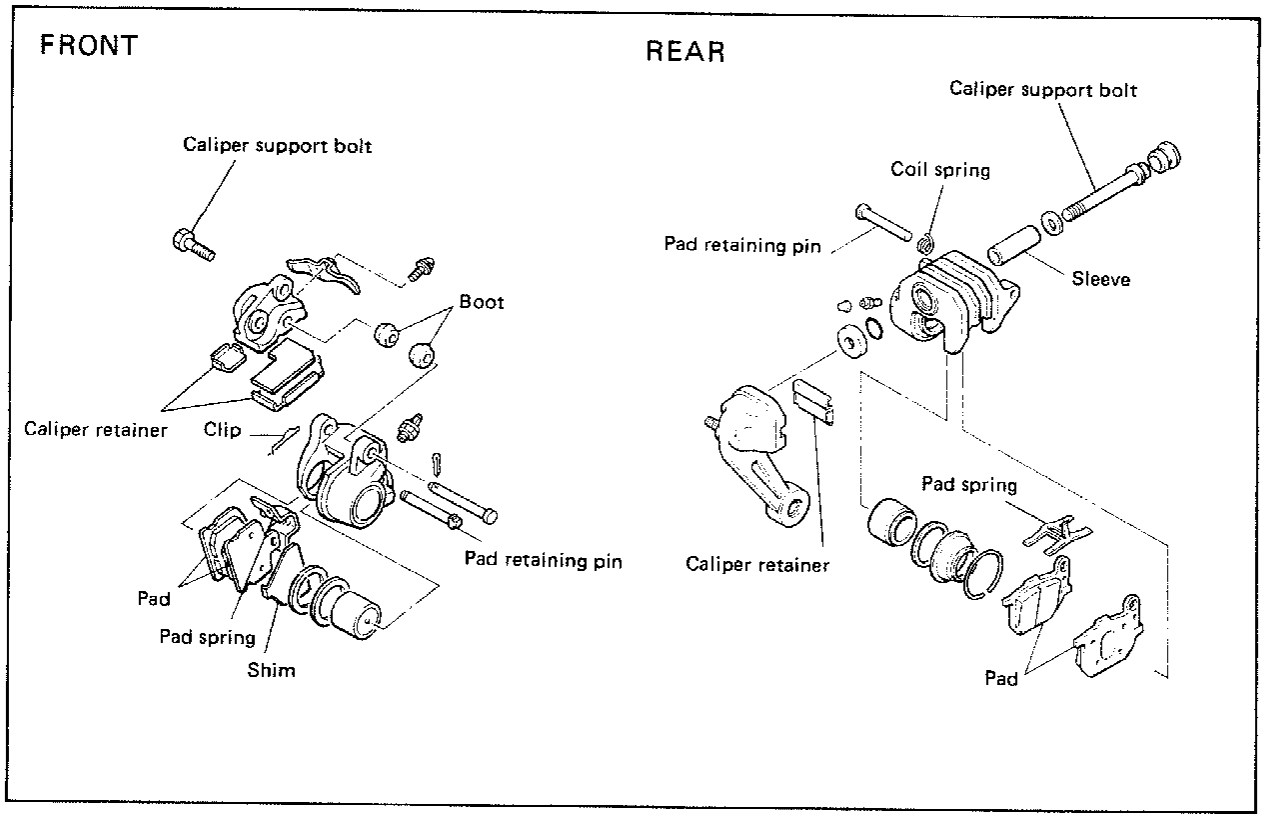


2. Install the new brake pads. Also replace the following parts if pad replacement is required.
   a. Coil spring
   b. Pad spring
   c. Pad retaining pin
   d. Coil spring

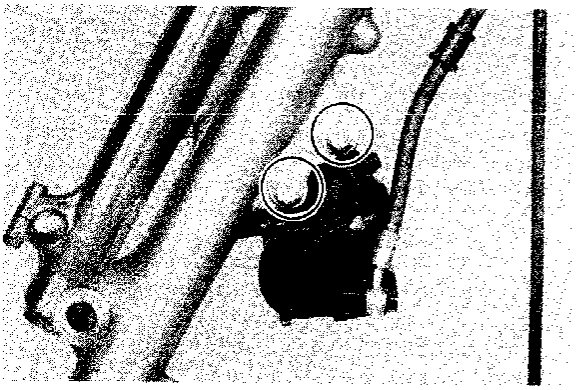
NOTE:
Replace the pads as a set if either is found to be worn to the wear limit.

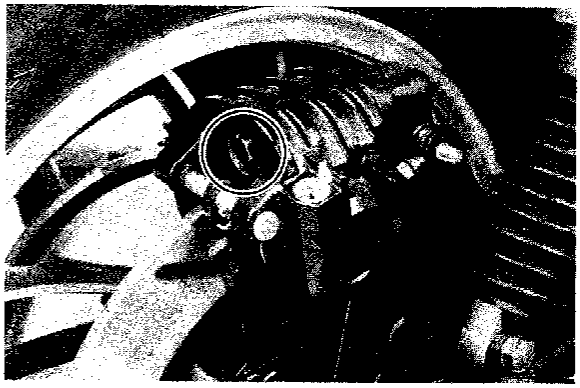


B. Caliper Disassembly

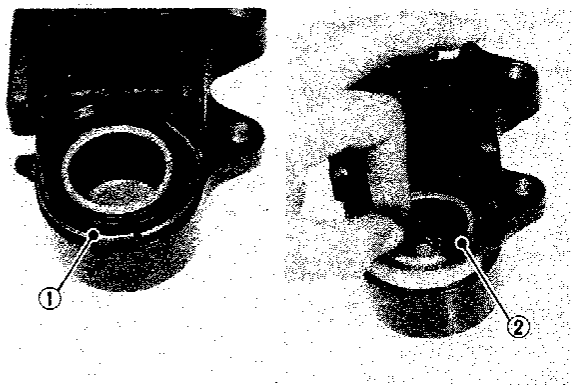


1. Remove the caliper brake hose. Allow fluid in the caliper assembly to drain into a container.
2. Place the open hose end into the container and pump the old fluid out carefully.
3. Remove the caliper support bolt and the pad retaining pin as described in the Caliper Pad Replacement procedure (page 5-9).





4. Remove the caliper assembly from the caliper frame.
5. Remove the retaining ring and the dust seal.



1. Retaining ring
2. Dust seal

6. Remove the piston.

CAUTION:

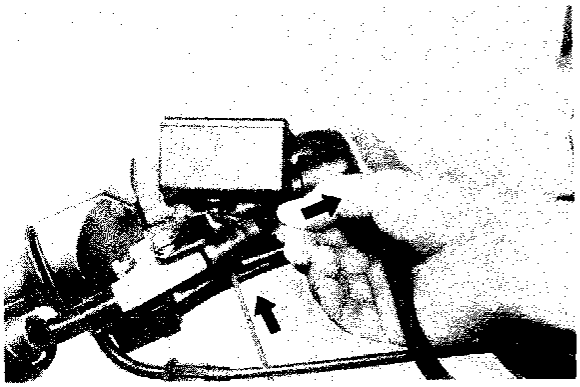
Cover the piston with a rag. Use care so that the piston does not cause injury as it is expelled from the cylinder.

7. Remove the piston seal.

C. Master Cylinder Disassembly

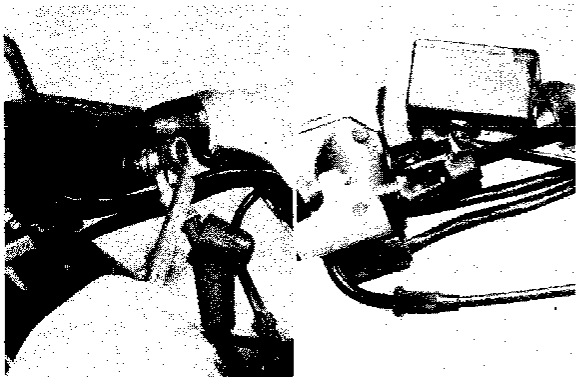
1. Front master cylinder

a. Remove the brake light switch.

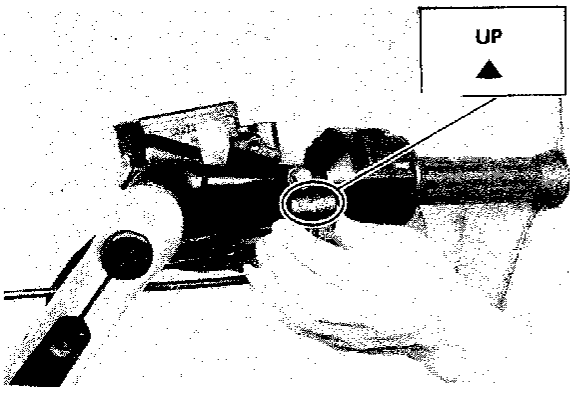


b. Remove the brake hose.

c. Remove the brake lever and spring.

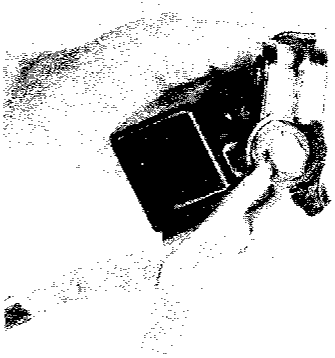


d. Remove the master cylinder from the handlebar. Remove the cap and drain the remaining fluid.



e. Remove the master cylinder dust boot.

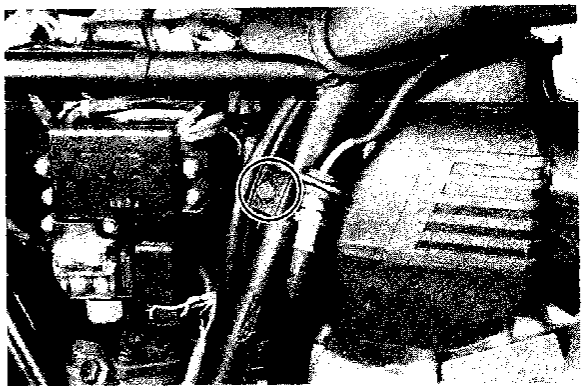
f. Remove the snap ring.



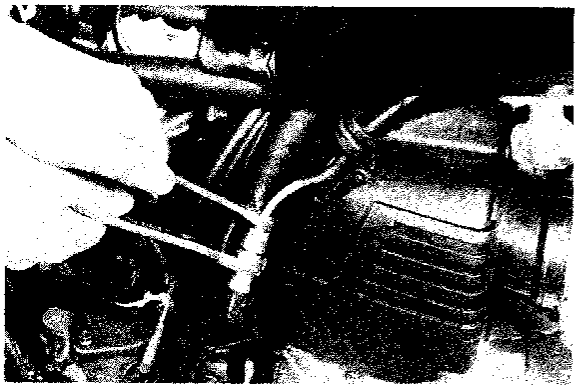
g. Remove the master cylinder cup assembly. Note that the cylinder cups are installed with the larger diameter (lips) inserted first.

2. Rear master cylinder

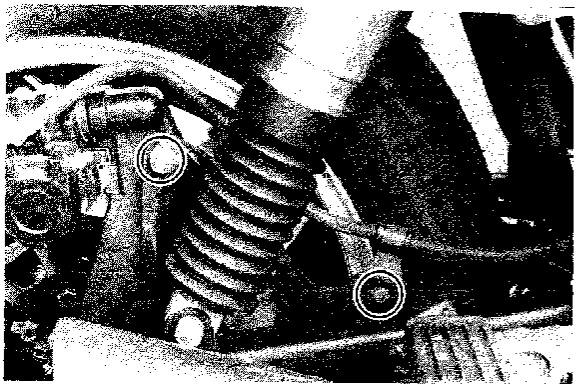
a. Remove the brake hose clamp and pull up the clamp together with the rubber grommet.



b. Remove the brake pipe flare nut while holding the brake hose with a wrench and disconnected the brake pipe and hose.

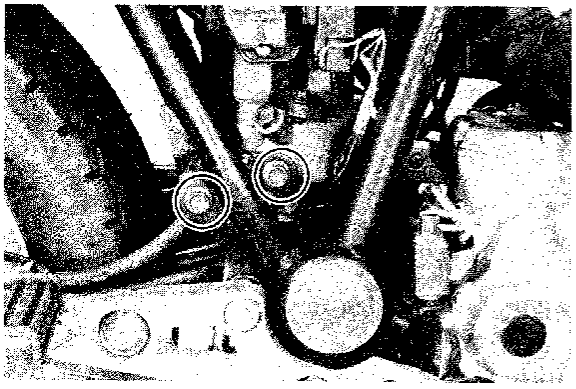


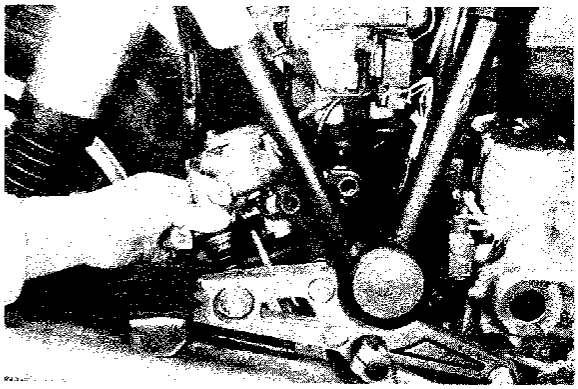
c. Remove the union bolt and hose clamp and remove the brake hose.



d. Pry out the right side of the mud guard from the frame.

e. Remove the rear master cylinder holding bolts and remove the master cylinder together with the proportioning valve.



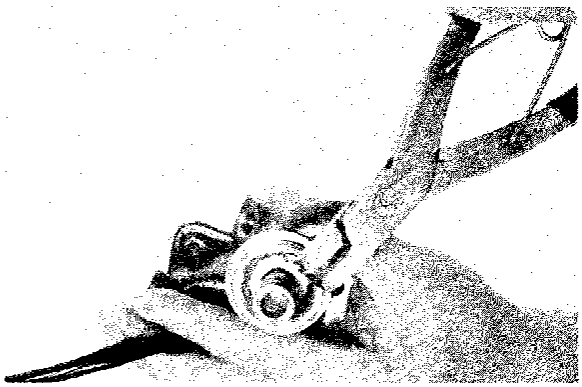


f. Remove the brake hoses and pipe from the proportioning valve. Remove the proportioning valve.

g. Remove the cap and drain the remaining fluid.

h. Remove the master cylinder dust boot.

i. Remove the snap ring.

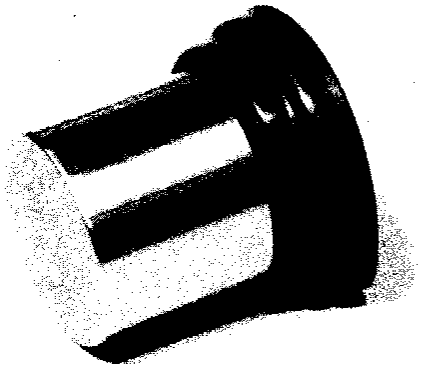


j. Remove the master cylinder cup assembly.

D. Brake Inspection and Repair

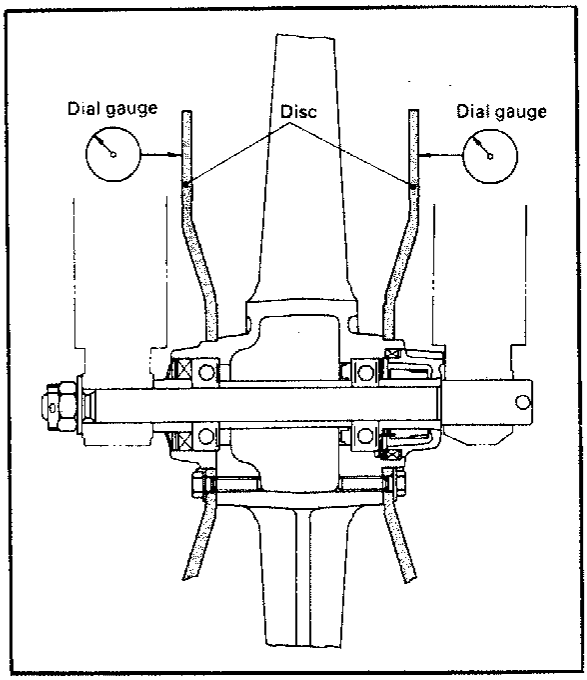
Recommended brake component replacement schedule:
- Brake pads. . . . . As required
- Piston seal, dust seal . . . . . Every two years
- Brake hoses . . . . Every four years
- Brake fluid . . . . Replace only when brakes are disassembled

1. Replace the caliper piston if it is scratched.



2. Replace any brake pad worn beyond limits. Always replace the brake pads as a set.
3. Replace piston and dust seals if damaged. Replace seals every two years.
4. Inspect master cylinder body. Replace if scratched. Clean all passages with new brake fluid.
5. Inspect the brake hoses. Replace every four years or immediately if cracked, frayed, or damaged.
6. Check for wear and deflection of disc.

Maximum deflection (front and rear):
0.15 mm (0.006 in)
Minimum disc thickness (front and rear):
6.5 mm (0.26 in)

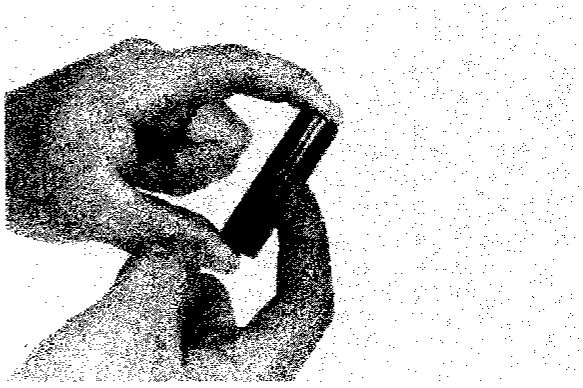


If disc is worn beyond minimum thickness or deflection exceeds specified amount, replace disc.

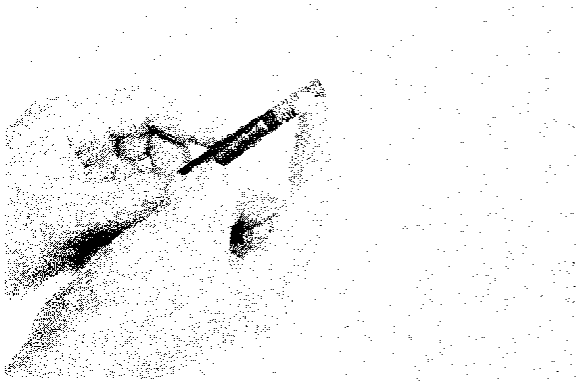
E. Brake Reassembly

1. All internal parts should be cleaned in new brake fluid only. Internal parts should be lubricated with brake fluid when installed.
2. Caliper Reassembly
   Replace the following parts whenever a caliper is disassembled: bleed screw and cap, boot bushing, piston seal, dust seal, and retaining ring.
   a. Install the piston seal and piston. Place the caliper cylinder into the caliper frame.

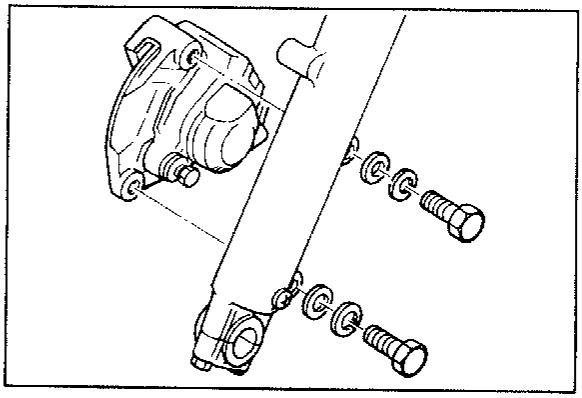
NOTE:
1. Grease the rear caliper sleeve before installing it.



2. Coat the rear caliper holding bolt with a tread-locking compound such as Locktite®.



b. Install the pad spring, shims and pads.
c. Install the support bolt and remount the caliper on the brackets (rear brake).
d. Install the caliper assembly on the front fork (front brake).

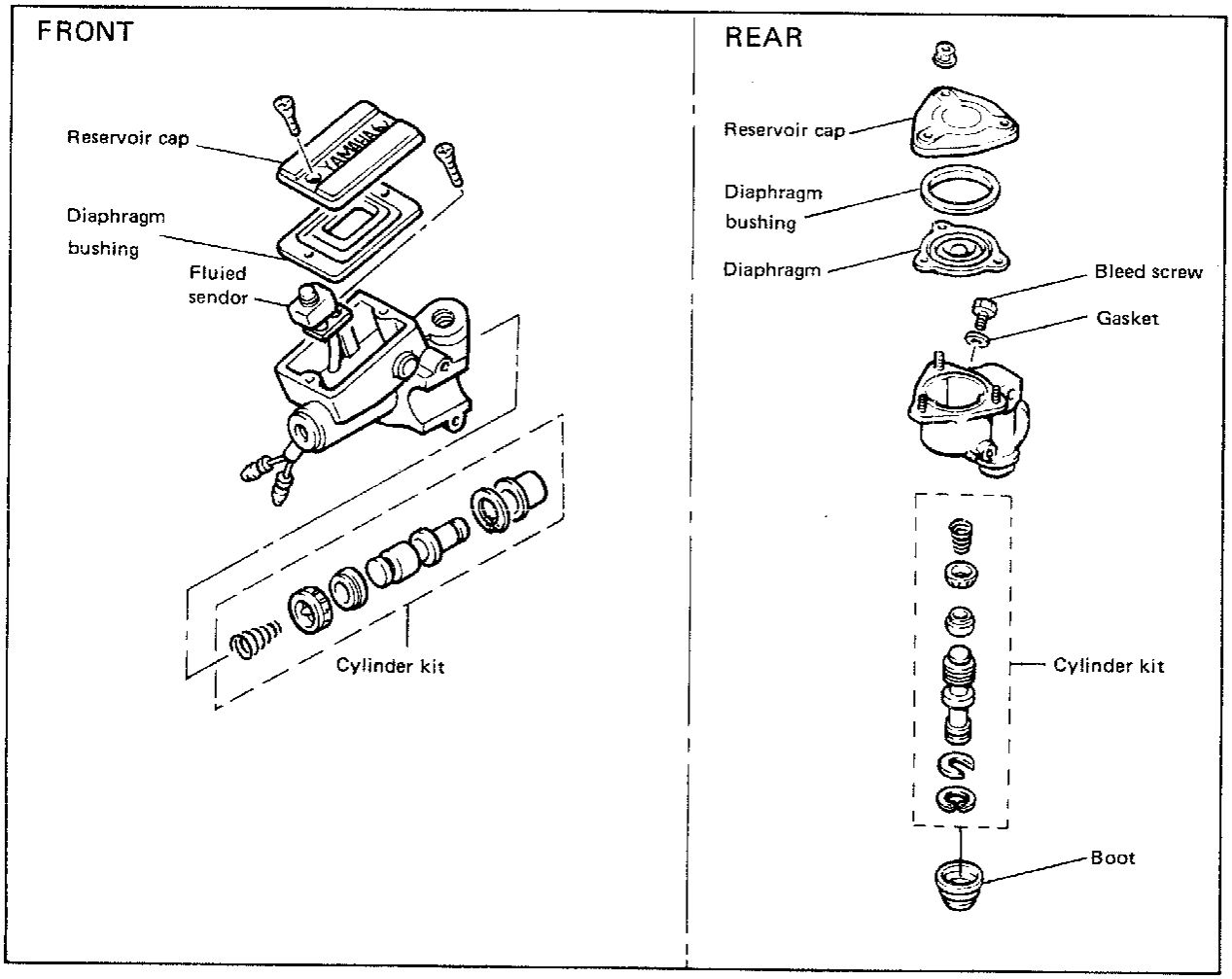


Support bolt (caliper cylinder) torque:
18 Nm (1.8 m·kg, 13 ft·lb)
Support bolt (caliper bracket) torque:
45 Nm (4.5 m·kg, 32 ft·lb)

3. Attach the brake hoses (front and rear).

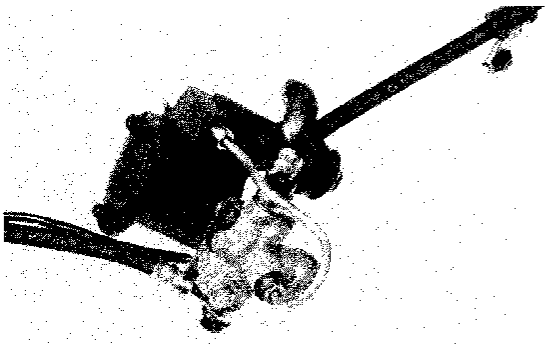
Brake hose torque:
26 Nm (2.6 m·kg, 19 ft·lb)

4. Master cylinder reassembly



Reassemble master cylinder as shown in illustration.

a. Install a new proportioning valve on the rear master cylinder and brake pipe to the porportioning valve.



Proportioning valve mounting bolt torque: 19 Nm (1.9 m·kg, 13 ft·lb) Union bolt torque: 26 Nm (2.6 m·kg, 19 ft·lb) Flare nut torque: 19 Nm (1.9 m·kg, 13 ft·lb)

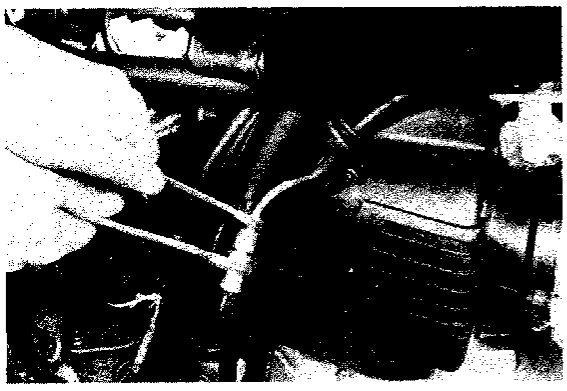
b. Install the master cylinder on the frame.

Mounting bolt torque: 23 Nm (2.3 m·kg, 17 ft·lb)

c. Install the brake hose to the master cylinder.

Brake hose torque (all brake union bolts): 26 Nm (2.6 m·kg, 19 ft·lb)

d. Connect the brake hose and pipe and install the hose clamp.



Flare nut torque: 26 Nm (2.6 m·kg, 19 ft·lb)

5. Brake disc assembly
If the brake disc has been removed from the hub or is loose, tighten the bolts. Use new locking washers and bend over the locking tabs after the bolts are tightened.

Disc bolt torque: 20 Nm (2.0 m·kg, 14 ft·lb)

6. Air bleeding

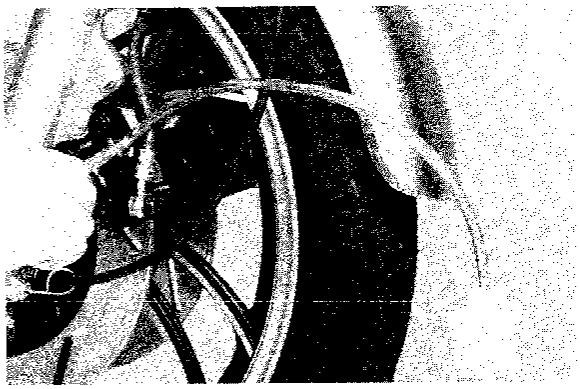
WARNING:

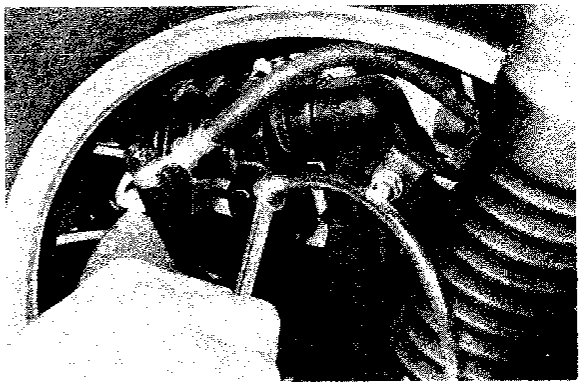
If the brake system is disassembled or it any brake hose has been loosened or removed, the brake system must be bled to remove air from the brake fluid. If the brake fluid level is very low or brake operation is incorrect, bleed the brake system.

Failure to bleed the brake system properly can result in a dangerous loss of braking performance.

a. Add proper brake fluid to the reservoir. Install the diaphragm, being careful not to spill or overflow the reservoir.

b. Connect the clear plastic tube of 4.5 mm (3/16 in) inside diameter tightely to the caliper bleed screw. Put the other end of the tube into a container.





c. Slowly apply the brake lever or pedal several times. Pull in lever (push down pedal). Hold lever or pedal in "on" position. Loosen bleed screw. Allow the pedal or lever to travel slowly toward its limit. When the limit is reached, tighten bleed screw. The release lever (or pedal).
d. Repeat step "c" procedure until all air bubbles are removed from system.

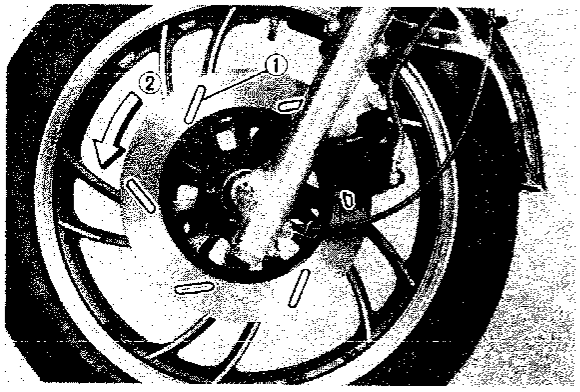
NOTE:
If bleeding is difficult, it may be necessary to let the brake fluid system stabilize for a few hours. Repeat the bleeding procedure when the tiny bubbles in the system settle out.

F. Brake Disc Installation

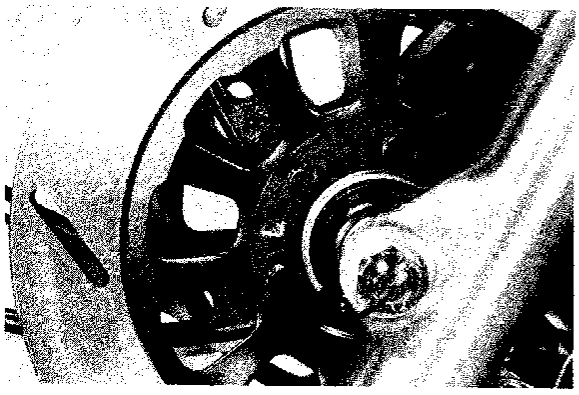
1. When installing the brake disc(s), the slots on the disc should be positioned as shown.

NOTE:
Make sure the directions in which front discs are installed. For this purpose an identification mark is stamped on the brake disc.

Left side disc..... "L"
Right side disc..... "R"



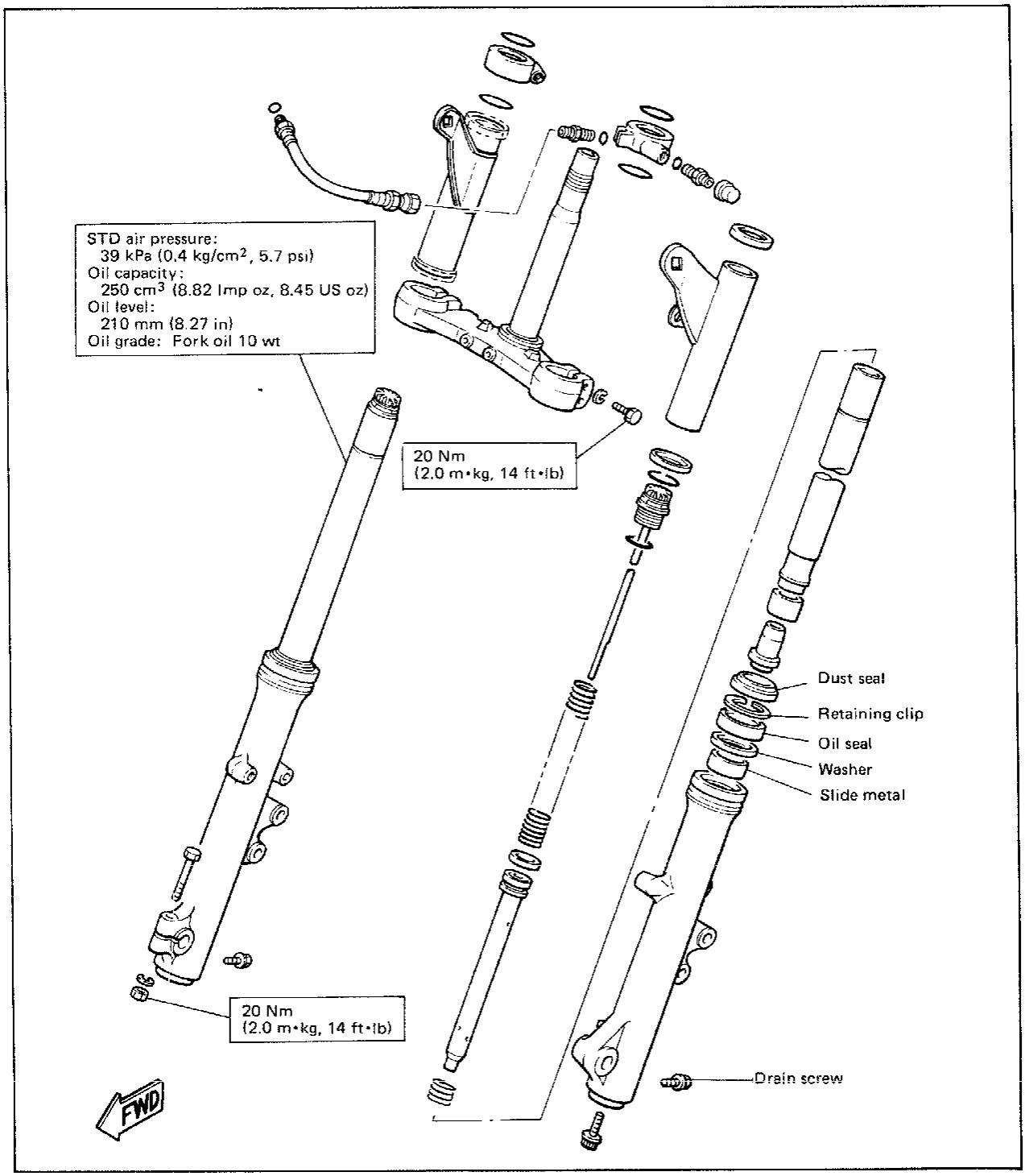
1. Slot 2. Rotating direction



1. Identification mark

WHEELS, TIRES, TUBES

Refer to "Tubeless Tire and Wheel Manual" for tubeless tire and wheel service.



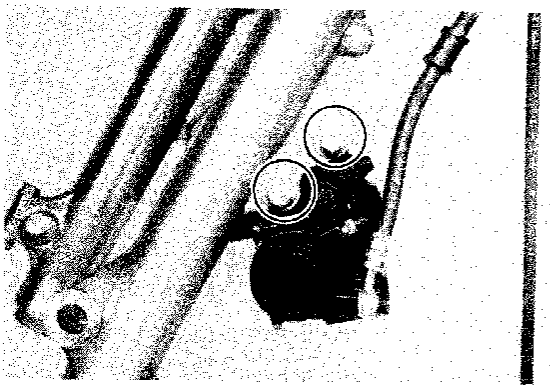
A. Removal and Disassembly

WARNING:

Securely support the motorcycle so it won't fall over when the front wheel and front forks are removed.

1. Remove the front wheel.
   Refer to "FRONT WHEEL" on page 5-1.

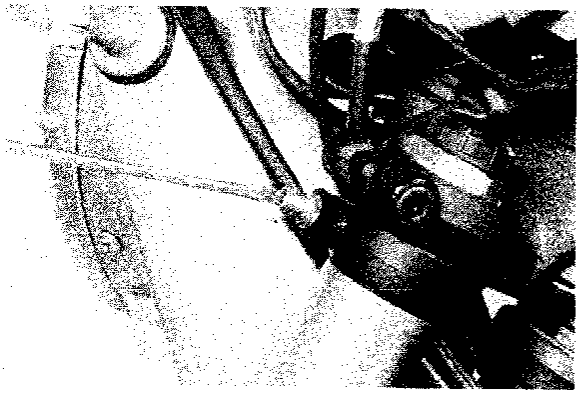
2. Remove the caliper cylinder securing bolts.



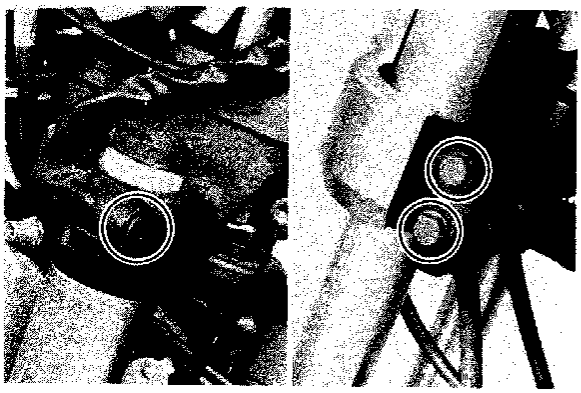
NOTE:

Do not depress the brake lever when the wheel is off the motorcycle as the brake pads will be forced shut.

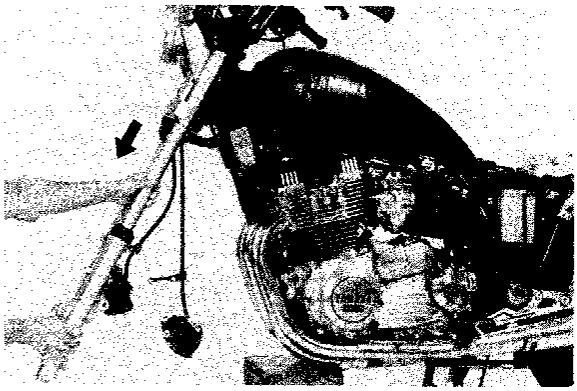
3. Remove the fork air valve cap and depress the valve until the air pressure escapes completely from both forks.



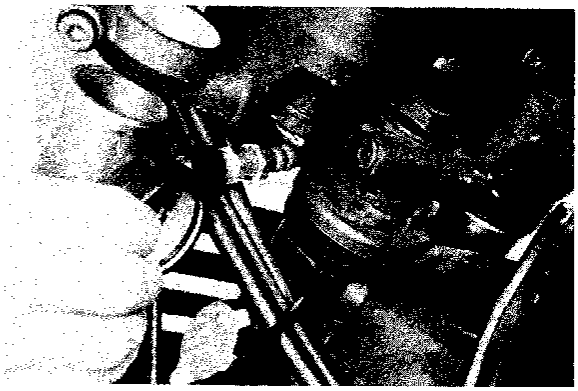
4. Loosen the complete fork cap bolt one (1) turn.
5. Loosen the fork pinch bolts in the handle crown and underbracket.



6. Slide the inner fork tube out of the handle crown and under bracket. Remove the front fork.



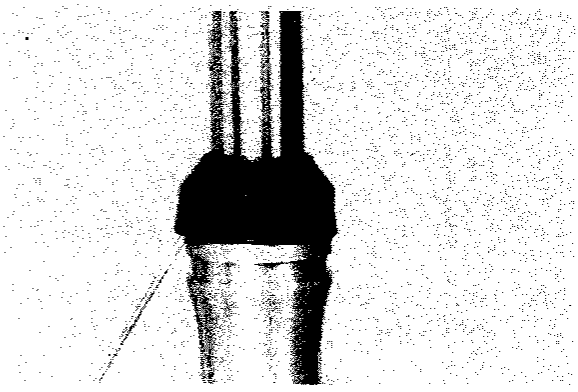
7. Remove the air joint pipe.



NOTE:

Since the right and left front forks are connected by on air hose, there is only one valve where the air pressure is measured and adjusted.

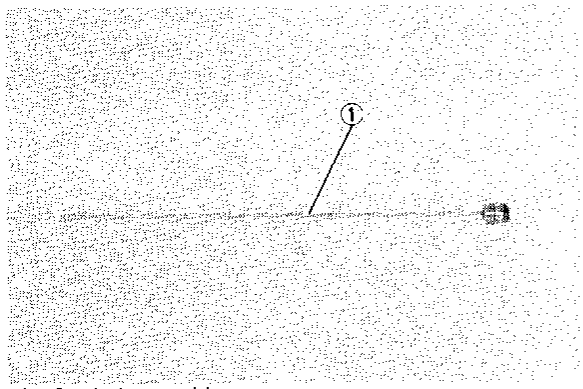
8. Remove the dust seal with a thin screwdriver. Take care not to scratch the inner fork tube. Discard the dust seal.



9. Remove the cap bolt assembly and fork spring.

WARNING:

The cap bolt assembly includes a damping adjustment knob. When removing and reinstalling the cap bolt, assembly take care not to bend or otherwise damage the adjusting rod; a damaged adjusting rod it may cause faulty front fork operation.



1. Cap-bolt assembly

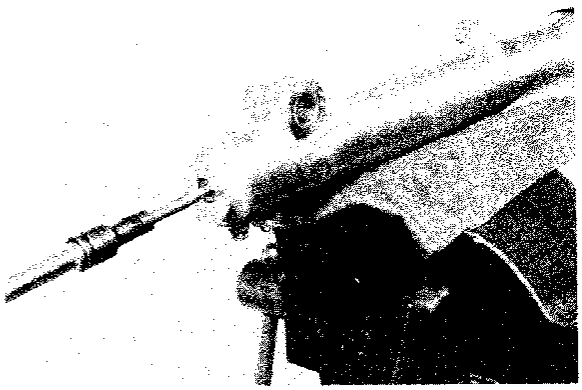
10. Place and open container under the fork and turn the fork upside down and drain the oil.

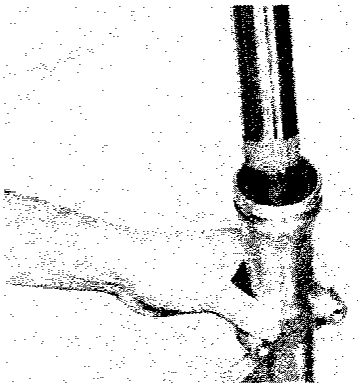
NOTE:

Do not remove the drain bolt from outer fork tube, the cylinder securing bolt can not be removed unless the drain bolt is in place.

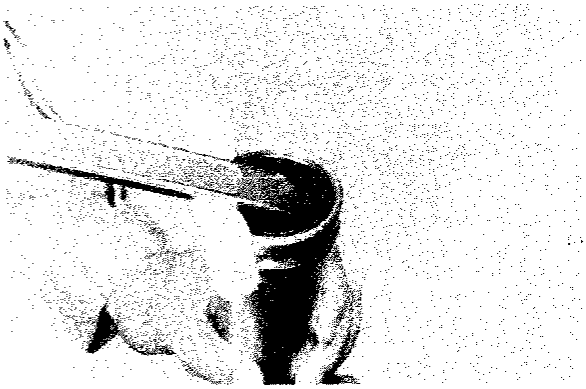
11. Remove the oil seal retaining clip.

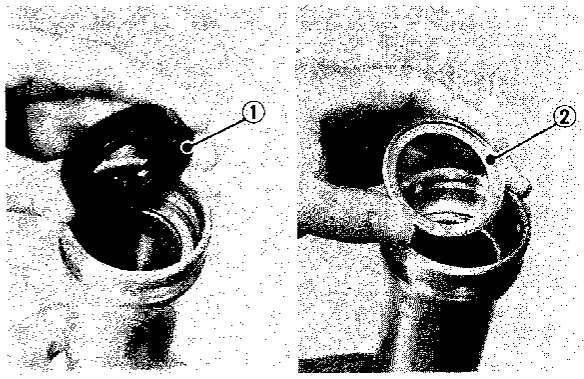
12. Remove the cylinder securing bolt from the bottom of the outer fork tube.





13. Pry out the fork seal. Be careful not to damage the fork tube surface.





1. Oil seal
2. Oil seal washer

B. Inspection Note

Clean and inspect all front fork components. Replace any worn or damaged components prior to reassembly.

1. Examine the inner fork tube and replace if the tube is badly scratched or bent.

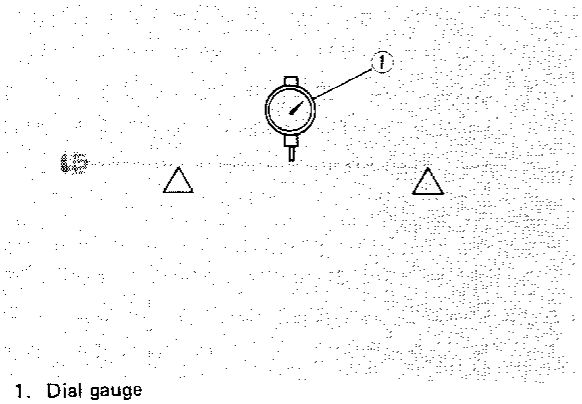
WARNING:

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

2. Inspect the outer surface of the fork seal seat and outer surface of the guide bushing seat in the outer fork tube. If these surfaces are damaged, replace the outer fork tube.
3. Check the outer fork tube for dents. Replace the tube it for necessary.
4. Check the free length of the fork spring.

Fork spring free length: 599.2 mm (23.6 in)

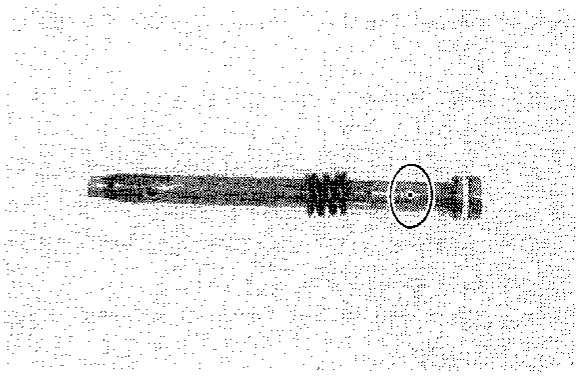
5. Check the O-ring of the cap bolt assembly, air joint pipe bolt, and air joint cover. Replace any damaged O-ring.
6. Check the damping adjuster rod runout. If runout exceeds specification or is severely scratched or dented, replace cap bolt assembly.



1. Dial gauge

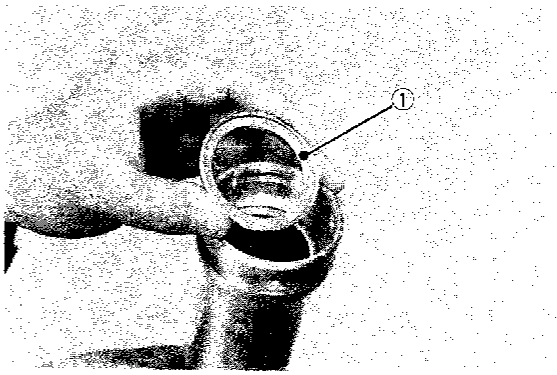
Runout: 1 mm (0.04 in)

7. Check the oil seal spacer. If the seat is damaged or replace it.
8. Check the damper rod for wear, damage, or contamination. Blow out all oil passages with compressed air. If it is worn or damaged, replace it.



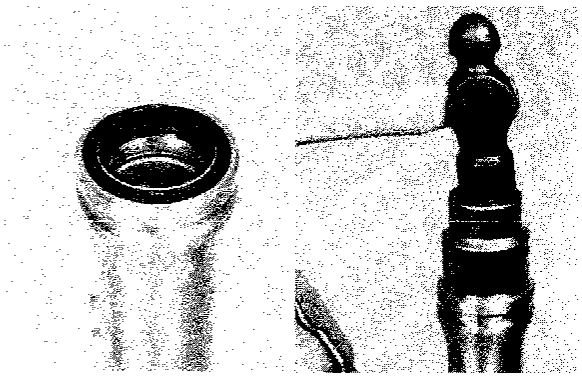
C. Assembly

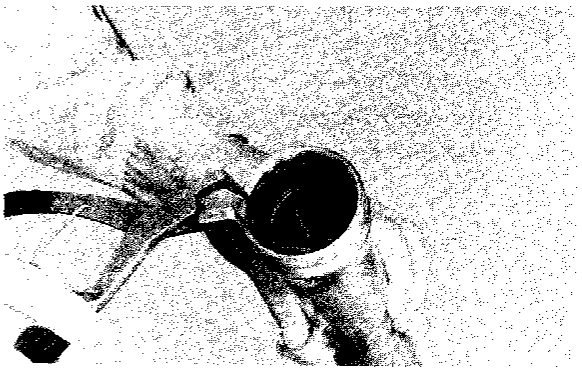
1. Make sure all components are clean before assembly. Always install a new fork seal. Do not reuse a seal.
2. Install a new seal spacer, making sure the beveled edge faces upward.



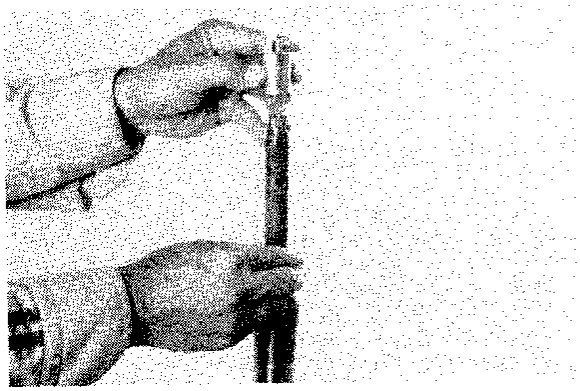
1. Oil seal washer

3. Apply oil to the fork seal, and install the fork seal by pressing it in with a large socket. Install the retaining clip.

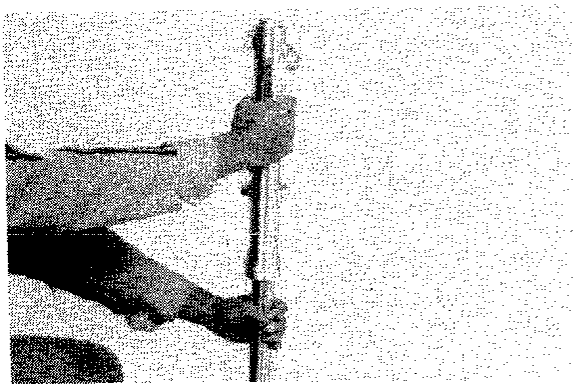




4. Install the rebound spring on the damper rod.
5. Install the slide bushing on the inner tube.
6. Install the damper rod in the inner fork tube, and allow it to slide slowly down the tube until it protrudes from the bottom. Install the fork spring.
7. Hold the inner fork tube and upside down.
8. Put the taper spindle on the damper rod, then slowly turn the taper spindle until it is snugly fitted in the damper rod.



9. Hold one hand over the top of the inner fork tube, and carefully install the outer fork tube over the taper spindle. Slowly turn the outer fork tube until it is snugly fitted with the taper spindle.

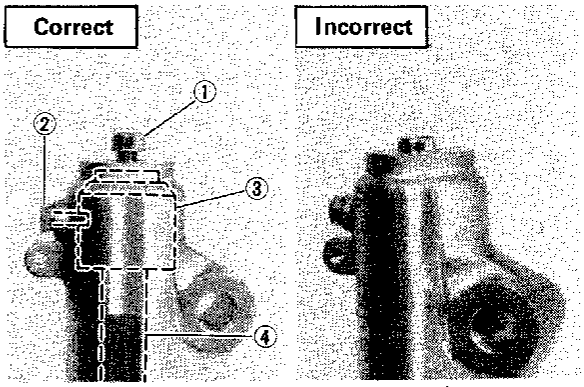


10. Apply a thread-locking compound such as Loctite® to the threads of the cylinder securing bolt, install the bolt in the damper rod, and torque it to specification.

Tightening torque:
20 Nm (2.0 m·kg, 14 ft·lb)

CAUTION:

Before tightening the cylinder securing bolt, make sure the damper rod, taper spindle and outer fork tube are fitted properly.



1. Cylinder securing bolt
2. Drain bolt
3. Taper sprincle
4. Damper rod

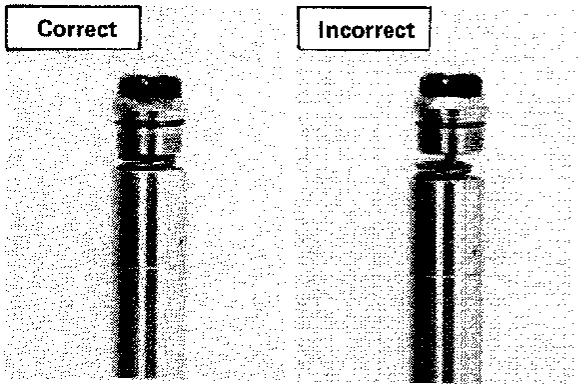
11. Pour the specified amount of recommended fork oil into the inner fork tube.

Fork oil capacity:
250 cm³ (8.82 Imp oz, 8.45 US oz)
Fork oil level:
210 mm (8.27 in)
(From top of inner tube fully compressed without spring.)
Recommended oil:
Yamaha Fork Oil 10wt or equivalent

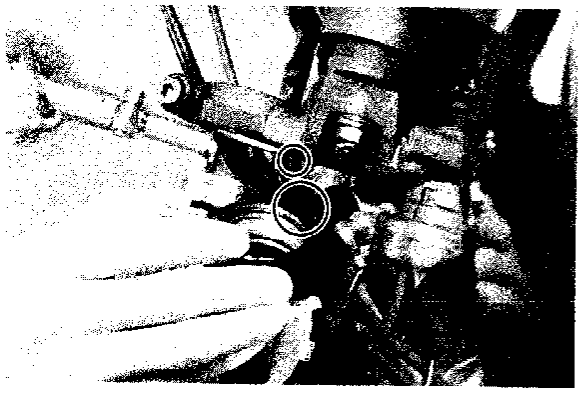
12. Install the fork spring and the cap-bolt assembly. Temporarily tighten the cap-bolt assembly.

CAUTION:

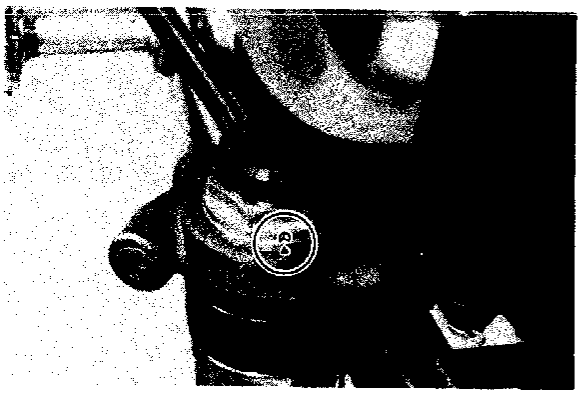
To tighten the cap-bolt assembly first make sure the damper adjustment rod fits correctly in the semicircular hole in the top of the damper rod. If the adjusting rod is put in the wrong way, the cap-bolt assembly will not touch the fork spring. If this is the case, turn the complete fork cap-bolt assembly until it falls and touches the fork spring then you will be able to screw the complete fork cap-bolt on. Do not force the complete fork cap-bolt, you may damage the adjusting rod and ruin the unit.



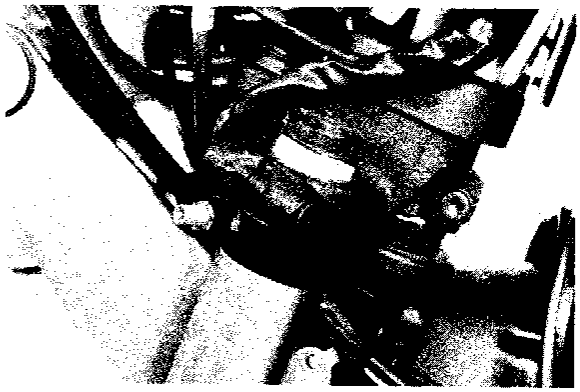
13. Slide the fork into the under bracket.
14. Apply a light coat of lithium soap base grease to the O-rings in the air joint bracket. Install the air joint bracket over the inner fork tube.
15. Slide the fork into the handle crown in the following way.
    a. Make sure the projecting portion (stopper) of the air joint bracket is positioned correctly.



    b. Align the arrow mark of the handle crown and the top end of the inner fork tube.



    c. Make the bottom of the flange of the cap-bolt assembly level with the top of the handle crown.



16. Tighten the pinch bolts at the under bracket.

Tightening torque: 20 Nm (2.0 m·kg, 14 ft·lb)

17. Tighten the cap-bolt assembly to specification.

Tightening torque: 30 Nm (3.0 m·kg, 22 ft·lb)

18. Tighten the pinch bolt at the handle crown.

Tightening torque: 20 Nm (2.0 m·kg, 14 ft·lb)

19. Slowly pump the outer fork tube up and down to distribute the oil.
20. Install the proper amount of air in the forks. Take care not to exceed the maximum allowable air pressure.

Maximum air pressure: 118 kPa (1.2 kg/cm², 17 psi) Do not exceed this amount.

21. Install the air valve cap.
22. Install the front wheel, front fender and brake caliper cylinders.

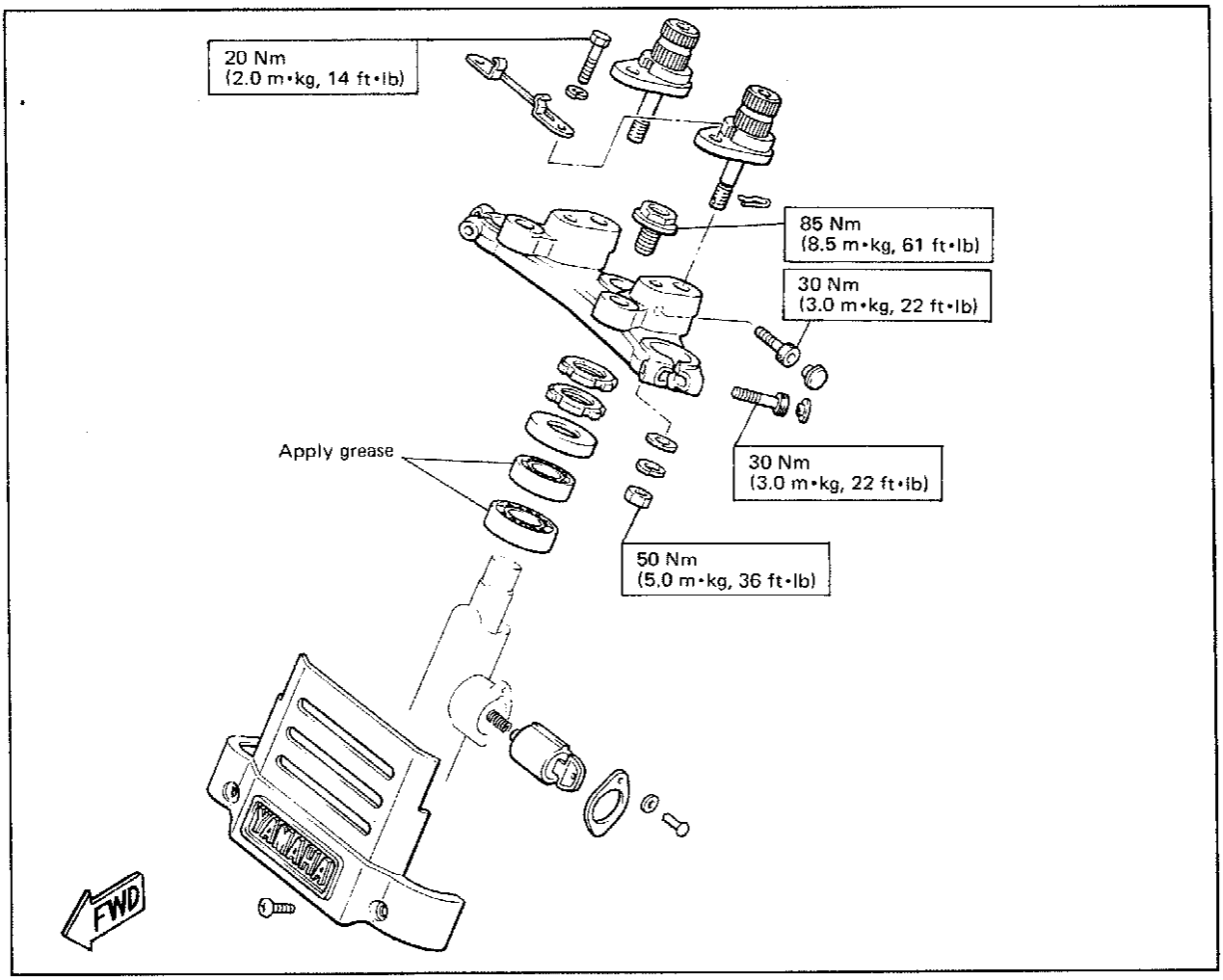
Front axle tightening torque: 110 Nm (11 m·kg, 80 ft·lb) Brake caliper cylinder tightening torque: 40 Nm (4.0 m·kg, 29 ft·lb)

23. Connect the speedometer cable to the drive unit, and check the operation of the motorcycle.

C. Adjustment

(See Chapter 2 for Front Fork Adjustment.)

STEERING HEAD

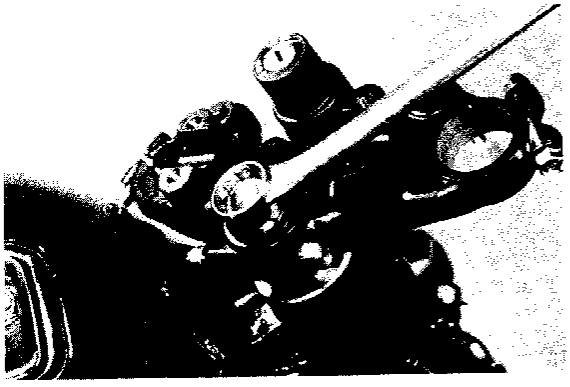


A. Adjustment

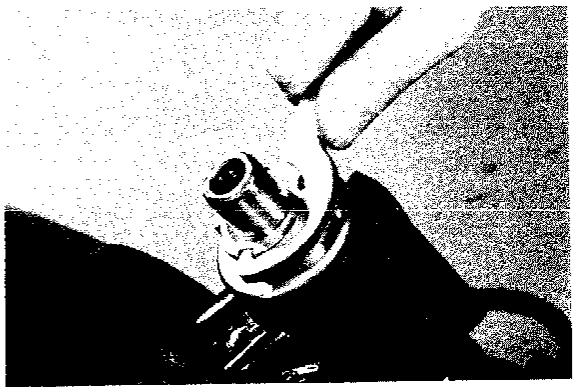
(See Chapter 2 for Steering Head Adjustment.)

B. Removal

1. Remove the front wheel, front forks and handlebars.
2. Remove the front brake pipe junction.
3. Loosen the steering stem (upper bracket) pinch bolt. Remove the stem bolt and washer.



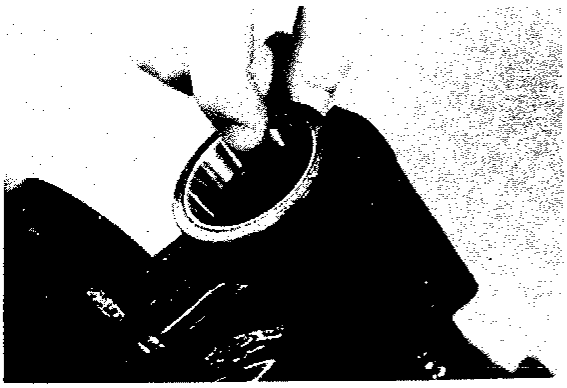
4. Remove the steering crown.
5. Remove the top fitting nut (ring nut).



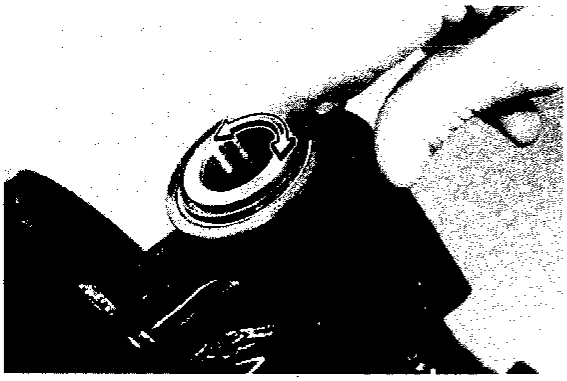
6. Support the steering stem (under-bracket) and remove the bottom fitting nut (ring nut).
7. Remove the bearings.

C. 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 the inspect the bearing races. If races are damaged, replace the bearings.



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



D. Reassembly

1. Grease the bearings and races with wheel bearings grease.
2. Install the steering stem (underbracket) and bearings.
3. Install the bottom fitting nut. Tighten it to approximately 10 ~ 12 Nm (1.0 ~ 1.2 m·kg, 7.2 ~ 8.7 ft·lb). Do not overtighten it. Tighten the top fitting nut.
4. Continue reassembly in the reverse of assembly order.
5. When assembly is complete, check the steering stem by turning it from lock to lock. If there is any binding or looseness, readjust the steeing stem tightness.

Pinch bolt torque: 20 Nm (2.0 m·kg, 14 ft·lb) Steering stem bolt torque: 85 Nm (8.5 m·kg, 61 ft·lb)

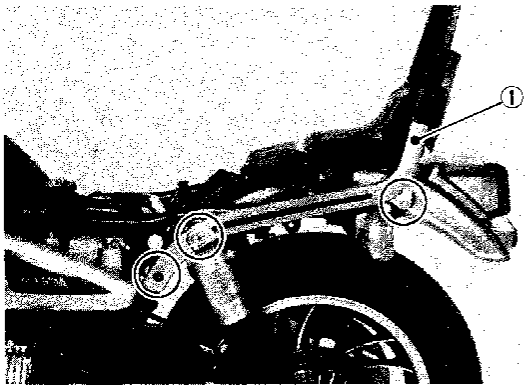
REAR SHOCK ABSORBER

A. Removal

NOTE:

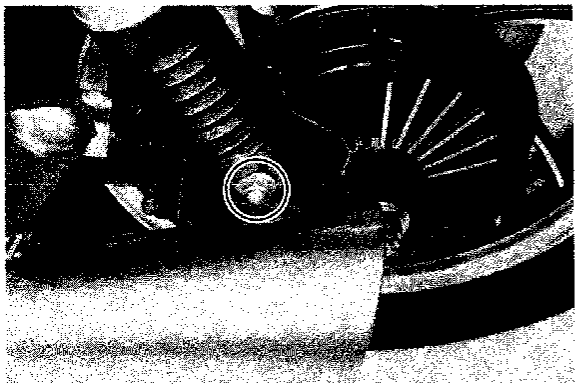
Always replace both right and left rear shock absorbers as a set when either of them is replaced.

1. Remove the seat and grab bar.

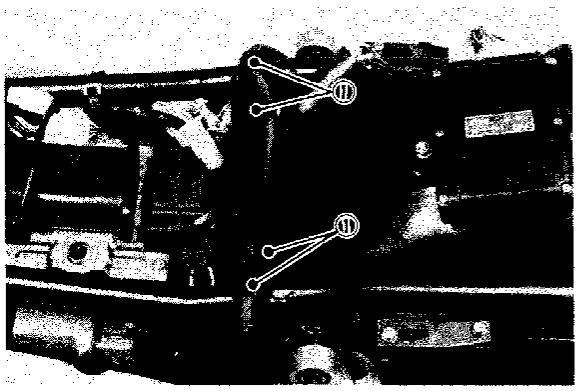


1. Grab bar

2. Remove the rear shock mounting nuts and pull out the shock absorber from the frame.



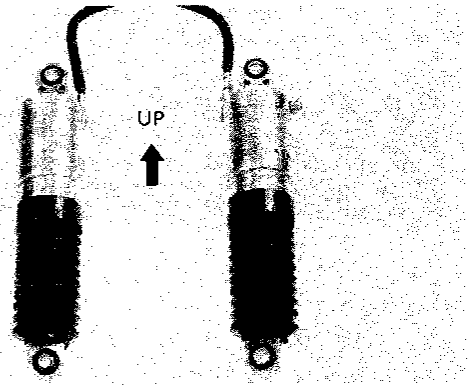
3. Remove the joint pipe from the clamp. Next, remove the rear shock absorber.



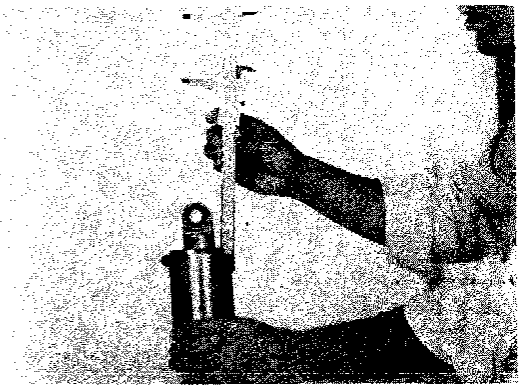
1. Clamp

B. Handling Notes

1. When stroring away the suspension, be careful not to place it in an inverted position.



2. When replacing a shock absorber, use care so that no oil spills or no foreign substance enters. Should the oil spill, measure the oil level using. Vernier calipers and add oil, as required.

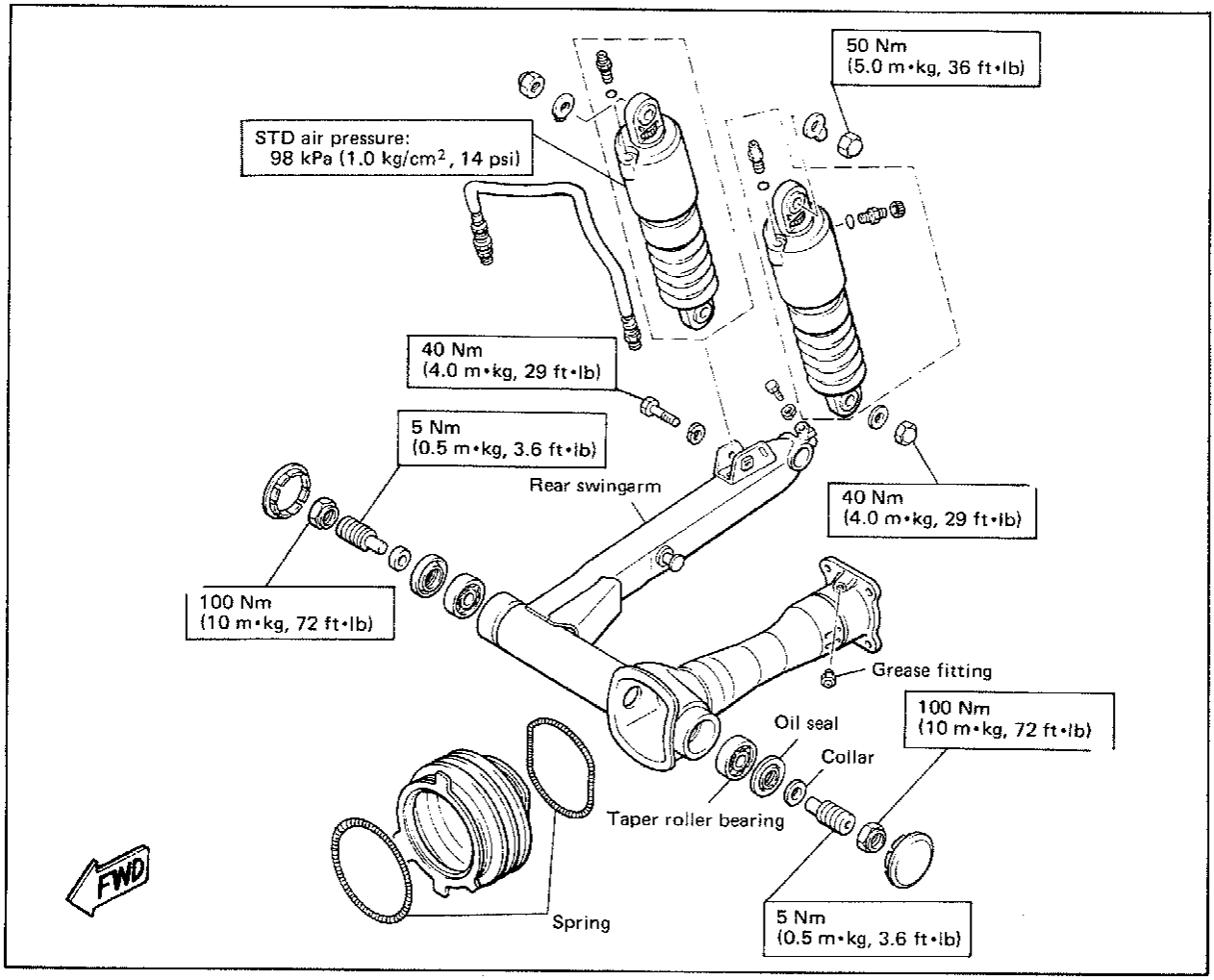


Oil level: 75 mm (2.95 in)
Recommended oil: G-5 (SAE 5W)

3. Make sure there is no air leakage from air valves or hoses. If air leaks, replace air valves or hoses.
4. Check for oil leakage. If oil leakage is evident, replace the shock absorber.
5. For installation, reverse the procedure for removal. When installing, observe the specified tightening torque.

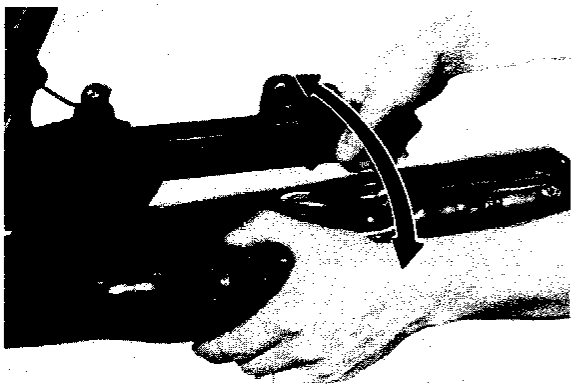
Upper (right and left side):
32 Nm (3.2 m·kg, 23 ft·lb)
Bottom (right side):
42 Nm (4.2 m·kg, 30 ft·lb)
Bottom (left side):
32 Nm (3.2 m·kg, 23 ft·lb)

SWINGARM

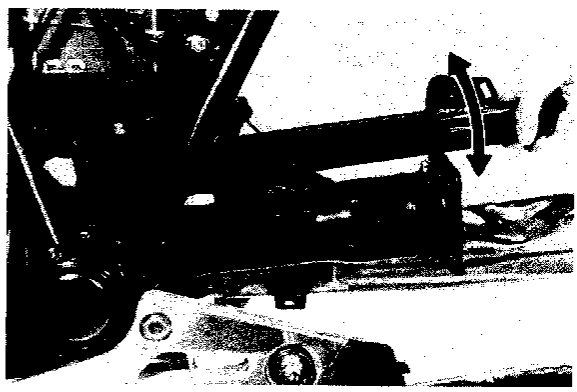


A. Inspection

1. Free play inspection
   Remove the rear wheel and both shock absorbers. Grasp the swingarm and try to move it from side to side as shown. There should be not noticeable side play.



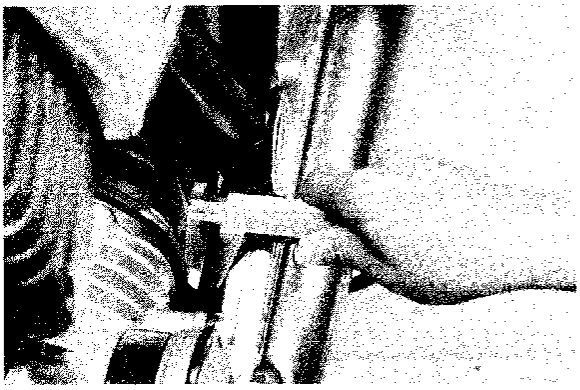
2. The swingarm is mounted on tapered bearings. Move the swingarm up and down as shown. The swingarm should move smoothly, without tightness, binding or rough spots that could indicate damaged bearings.

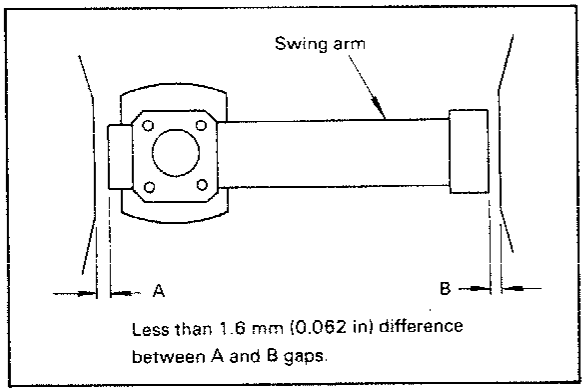


B. Adjustment

1. Measure the gap between the frame and the swingarm on the left and right sides. There should be not more than 1.6 mm (0.062 in) difference between the left and right gaps.

NOTE:
It may be easier to inspect the gaps with the rear wheel removed; however, such removal is not necessary.

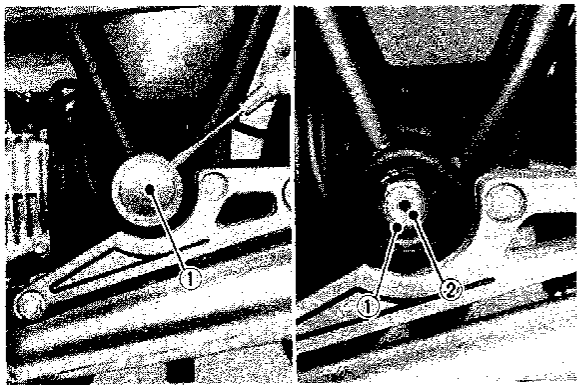




Less than 1.6 mm (0.062 in) difference between A and B gaps.

2. If the left and right gaps differ by more than the limit [1.6 mm (0.062 in)] adjust as follows:

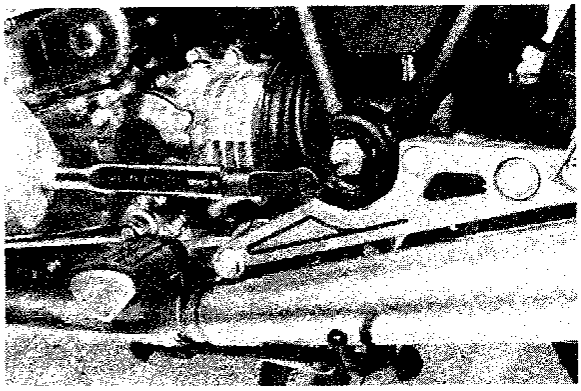
a. Remove the pivot shaft caps from the left and right sides of the swingarm.



1. Pivot shaft cap
1. Lock nut
2. Pivot shaft

b. Loosen both the left and right pivot shafts lock nuts.

c. Loosen the pivot shaft on the side of the greater swingarm/frame gap. Loosen only slightly (counterclockwise, approximately one-half turn). After loosening, tighten the opposite pivot shaft (clockwise) to 5 ~ 6 Nm (0.5 ~ 0.6 m·kg, 3.6 ~ 4.3 ft·lb).



d. Measure the gap again between the frame and the swingarm. If the left and right gaps are not within 1.6 mm (0.062 in) of each other, repeat step (c).

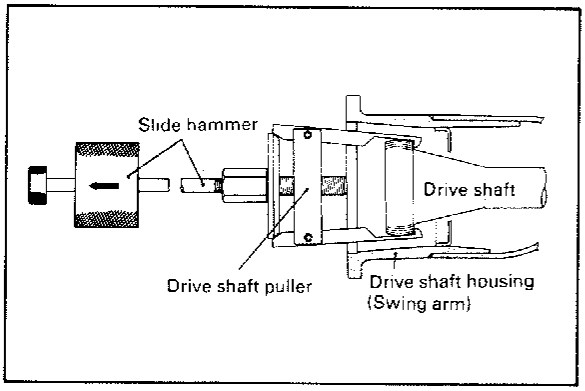
e. When the left and right gaps are adjusted properly, tighten the pivot shaft lock nut.

NOTE:
Do not allow the pivot shaft to turn while tightening the lock nut.

Pivot shaft lock nut torque:
100 Nm (10 m·kg, 72 ft·lb)

C. Removal

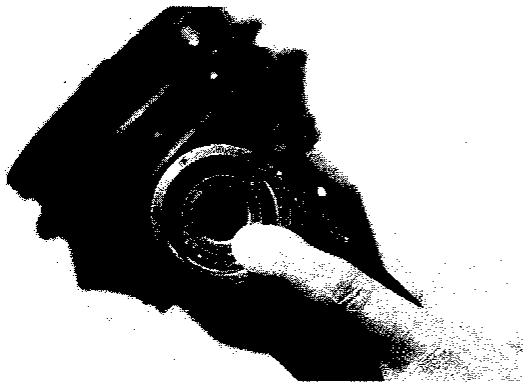
1. Remove the middle gear flange holding bolt.
2. Remove the rear wheel and shock absorbers. Remove the rear brake assembly.
3. Remove the final gear assembly.
4. Install the drive shaft puller attachment (special tool) on the slide hammer (special tool). Insert the 2 arms of the puller into the mouth of drive shaft housing. Tighten the 2 arms around the toothed flange of the drive shaft. Use the slide weight to pull the drive shaft out of the universal joint. Remove the drive shaft from the housing.



5. Remove the swing arm pivot caps, the pivot shafts and the swingarm.

D. Inspection and Lubrication

1. Remove the oil seals and the bearings. Inspect the bearings for pitting or other damage. Make sure that the bearings roll freely. If a bearing is damaged, both bearings and both sets of inner and outer bearing races should be replaced.



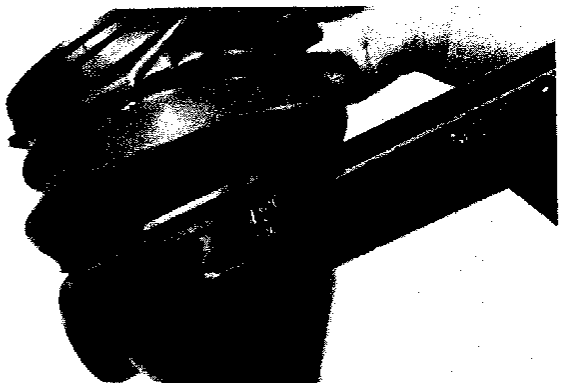
CAUTION:

Do not use compressed air to spin the bearings dry. This causes damage to the bearing surfaces.

NOTE:

When installing new bearings, grease liberally with lithium base, waterproof wheel bearing grease.

2. Always replace the grease seals when bearings are removed.
3. Examine the rubber boot for damage. Replace if damaged.



E. Installation

Installation of the swingarm can be accomplished by reversing the removal procedure. Observe adjustment procedures for obtaining equal frame/swingarm spacing.

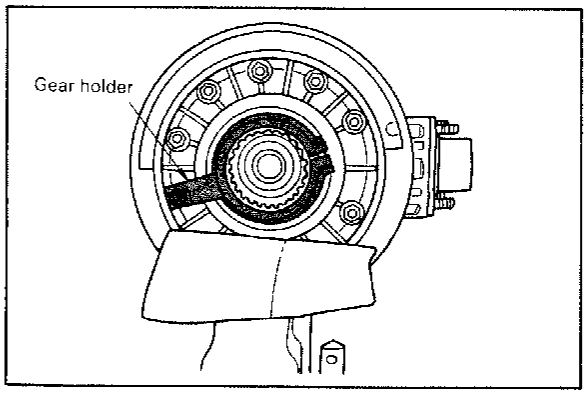
FINAL DRIVE GEAR

NOTE:

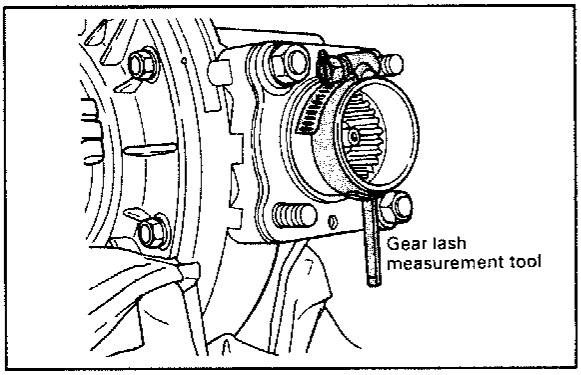
This section describes external inspection only. See the Yamaha Shaft Drive Section Manual for overhaul and adjustment of the final drive gear.

1. Inspect the exterior for leakage. Refer to the Shaft Drive Service Manual for correction of leakage.
2. Check the final drive gear lash as follows:

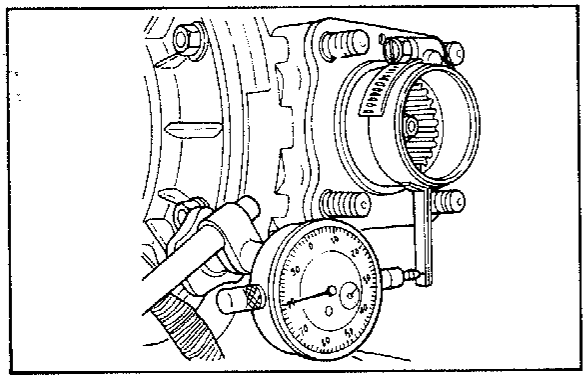
a. Remove the final drive gear case.
b. Place the gear case in a vise or other support.
c. Remove one nut from a final drive case stud bolt. Place the gear holder (special tool) over the ring gear surface and stud bolt. Tighten the holder on the gear. Tighten the holder to the stud bolt with nut.



d. Install the final gear lash measurement tool on the gear coupling (input side).



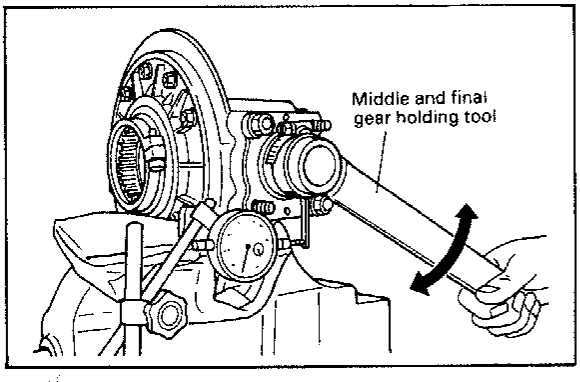
e. Place a dial gauge and stand as shown to measure gear lash (movement). Gear lash is the measurement from gear engagement to gear engagement as the gear coupling is rotated. The measurement point on the tool is 36 mm (1.42 in) from the surface of the gear coupling.



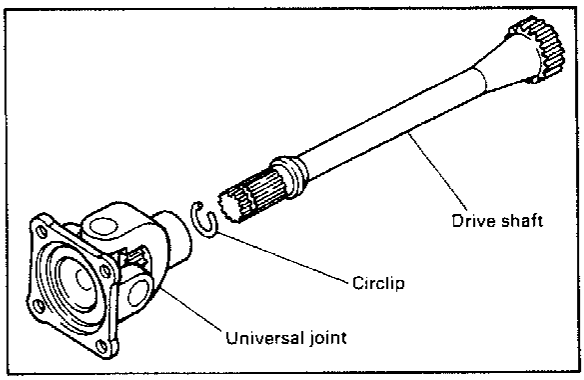
f. Use the special wrench to gently rotate the gear coupling from engagement to engagement. Note the lash measurement on the dial gauge.

Final gear lash:
0.25 ~ 0.50 mm (0.010 ~ 0.020 in)

If lash is not within tolerance, refer to Shaft Drive Service Manual for adjustment procedure.



DRIVE SHAFT/JOINT



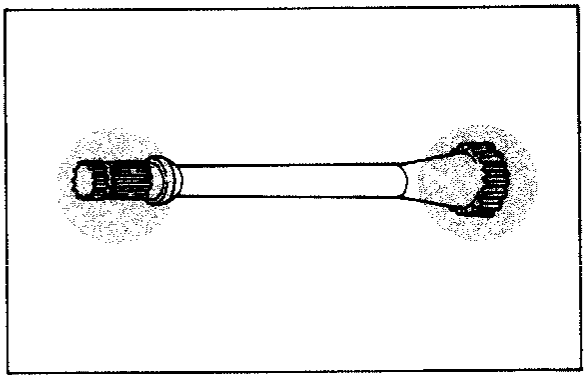
A. Removal

1. Remove the rear wheel. Refer to "REAR WHEEL, A. Removal." on page. 5-4.
2. Remove the final gear case assembly.
3. Remove the drive shaft as shown.
4. To remove the universal joint, it is necessary to remove the middle gear assembly or to remove the swingarm. Remove the universal joint assembly.

B. Inspection

1. Drive shaft
   Inspect the shaft splines for wear and/or damage. If excessive, replace the drive shaft.

NOTE:
When installing the drive shaft, lubricate splines with molybdenum disulfied grease.



2. Universal joint

a. There should be no noticeable play in the universal joint bearings. If there is any play in the bearing, replace the universal joint assembly.

b. Move the universal joint up and down and from side to side. The universal joint should move smoothly, without tightness, binding or rough spots that could indicate damaged bearings. If damaged, replace the universal joint assembly.

CABLES AND FITTINGS

A. Cable Maintenance

NOTE:

See Maintenance and Lubrication intervals charts. Cable maintenance is primarily concerned with preventing deterioration through rust and weathering and providing proper lubrication to allow the cable to move freely within its housing. Cable removal is straight forward and uncomplicated. Removal will not be 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 vehicle unsafe for operation.

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

NOTE:

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

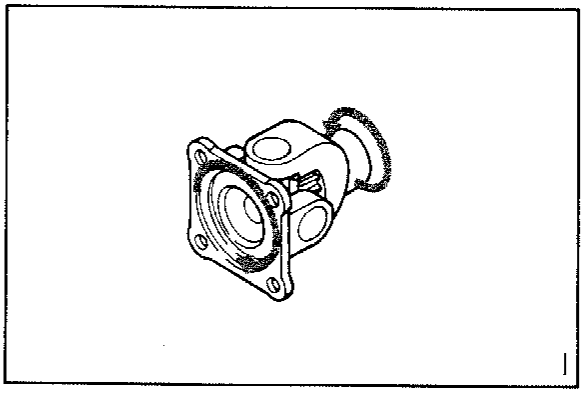
B. Throttle Maintenance

1. Remove the Phillips head screws from throttle housing assembly and separate the two halves of 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 righthand end of the handlebar.)
4. Lubricate all contact surfaces with a light coat of lithium soap base grease and reassemble.

NOTE:

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

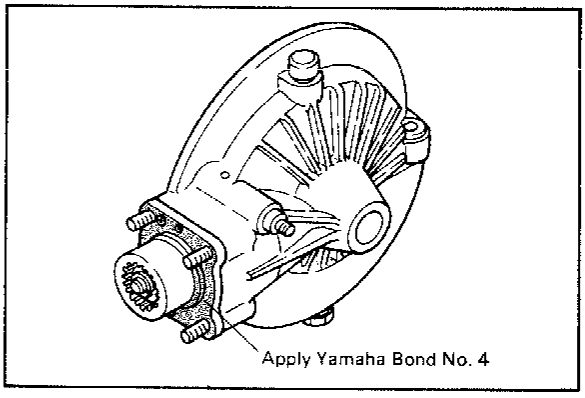
5. Check for smooth throttle operation and quick spring return when released and make certain that the housing does not rotate on the handlebar.



C. Reinstallation

When installing the drive shaft and the universal joint, reverse the removal procedure. Note the following points:

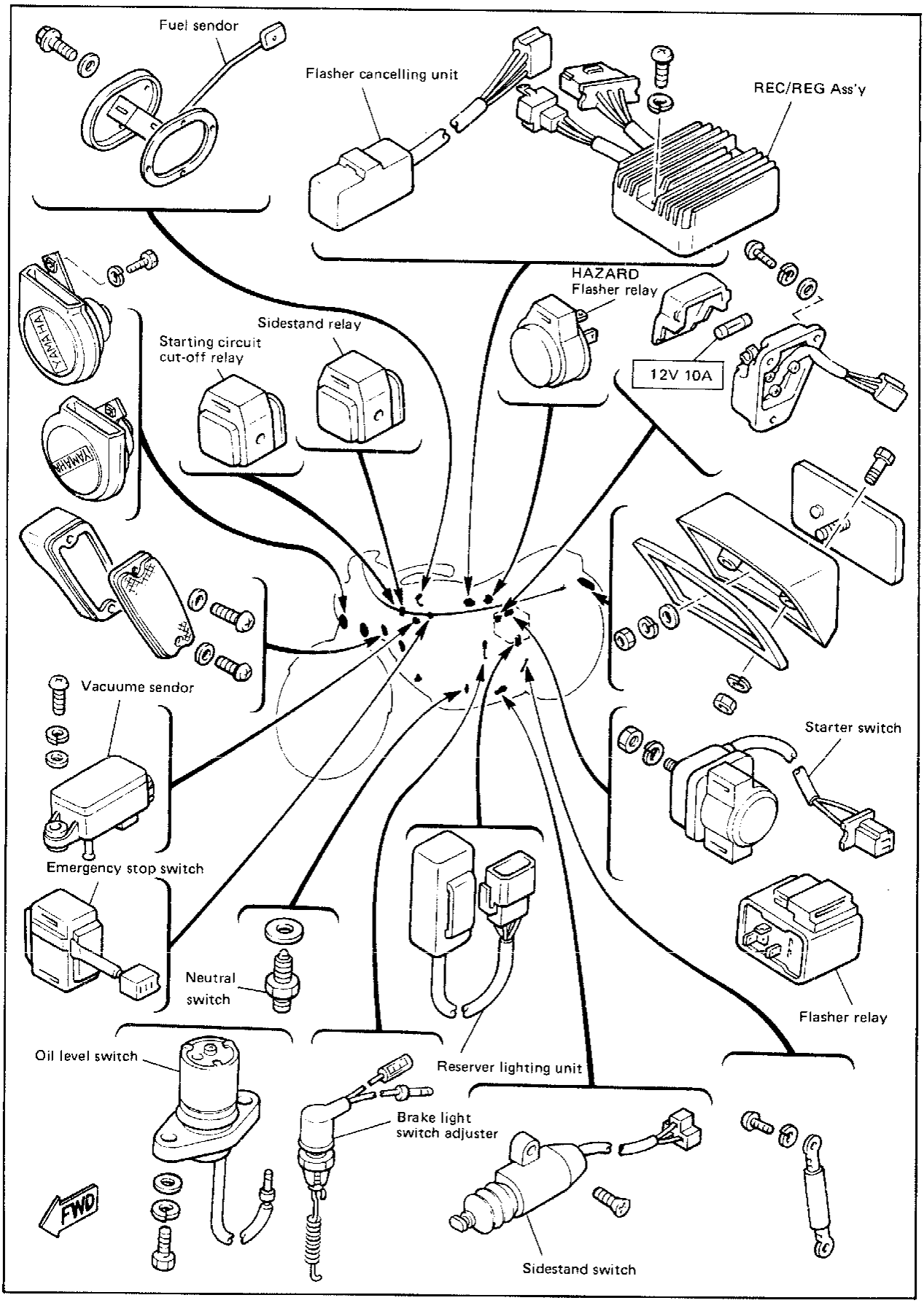
1. Lubricate the shaft splines with molybdenum disulfied grease.
2. Before installing the final gear case, clean the mating surfaces with solvent and apply Yamaha Bond No. 4 as shown.

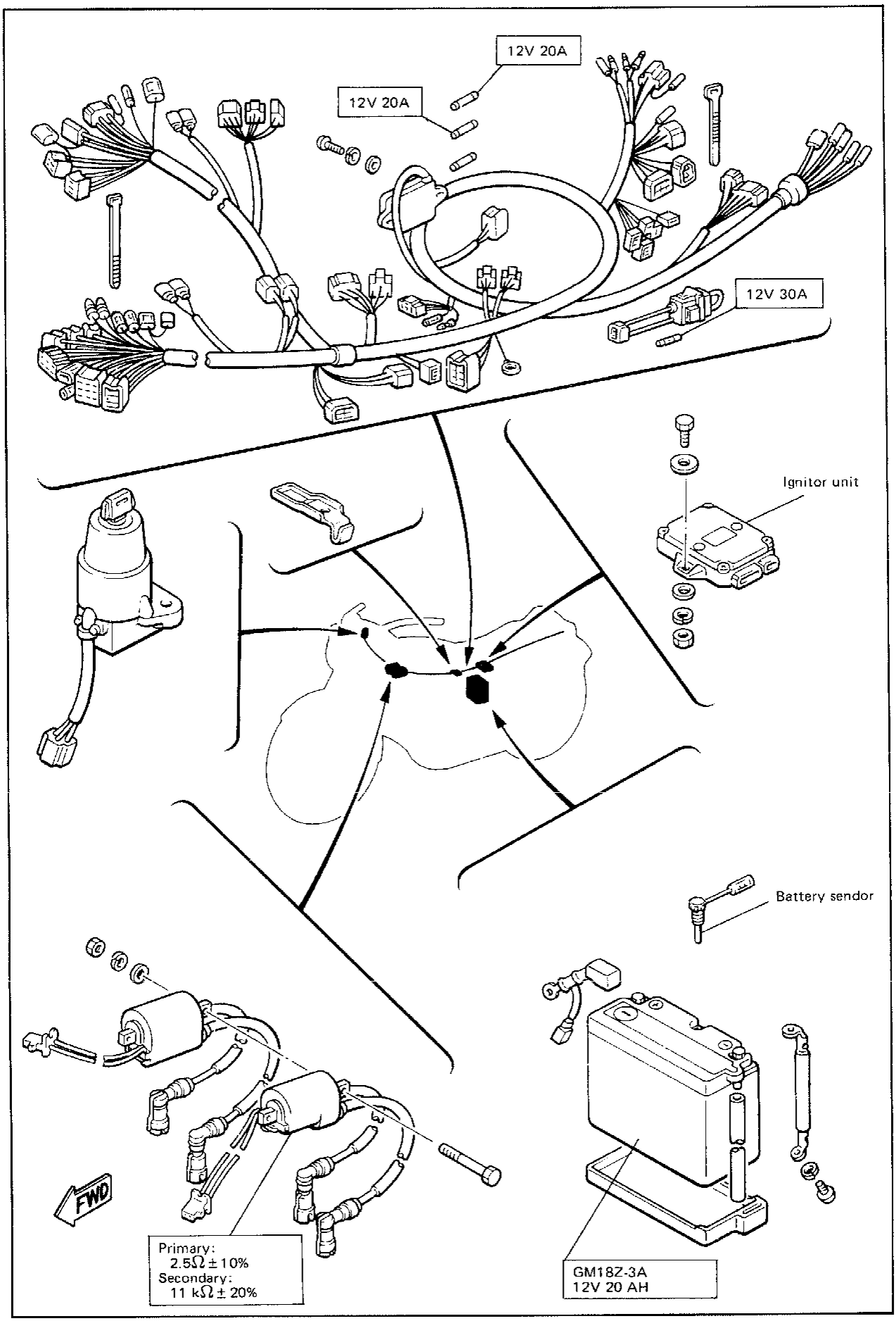


Final gear case tightening torque:
42 Nm (4.2 m·kg, 30 ft·lb)
Universal joint tightening torque:
44 Nm (4.4 m·kg, 32 ft·lb)

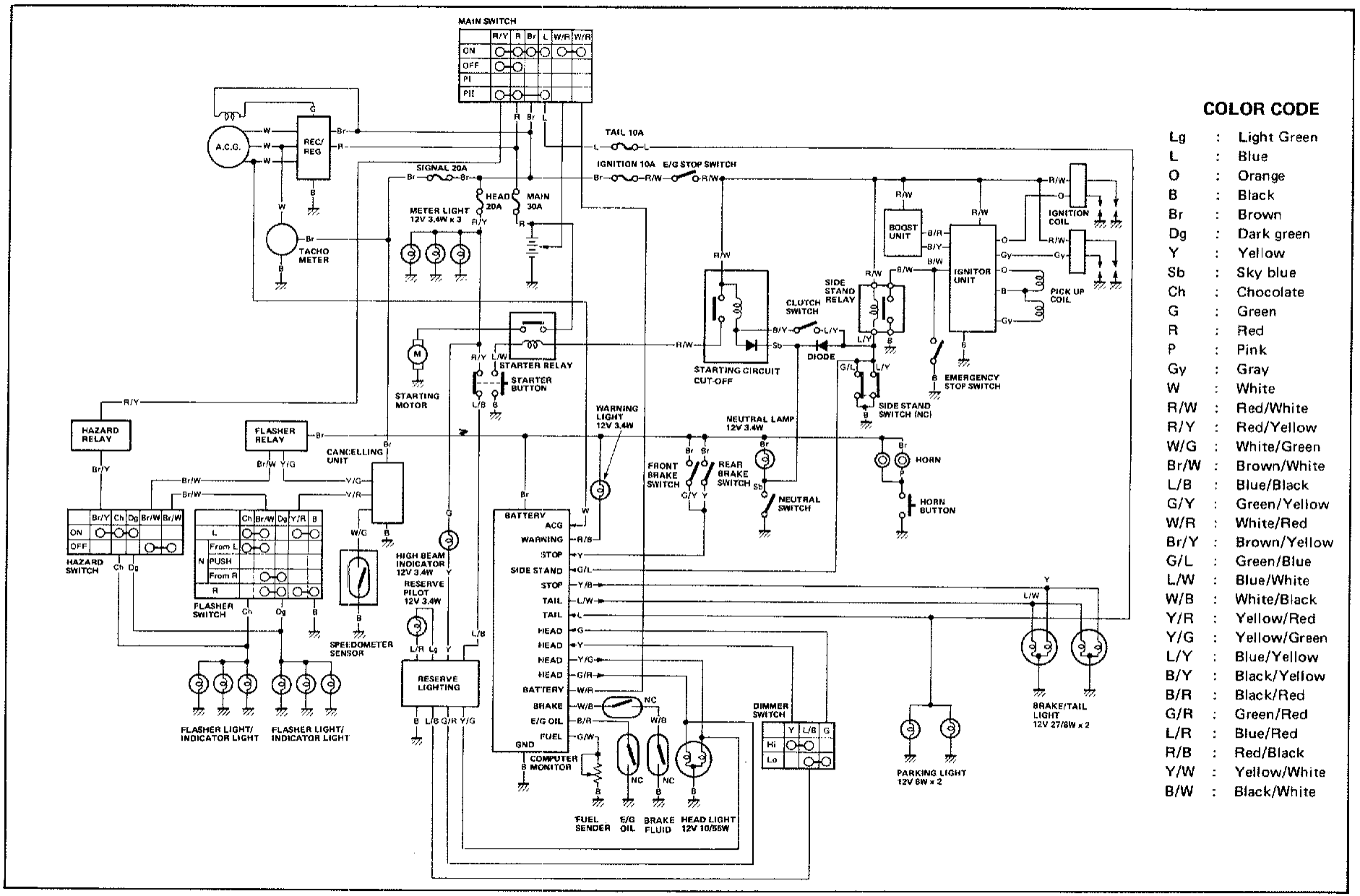
ELECTRICAL

ELECTRICAL COMPONENTS




12V 20A
12V 20A
12V 30A
Ignitor unit
Battery sendor
FWD
Primary:
2.5Ω ± 10%
Secondary:
11 kΩ ± 20%
GM18Z-3A
12V 20 AH

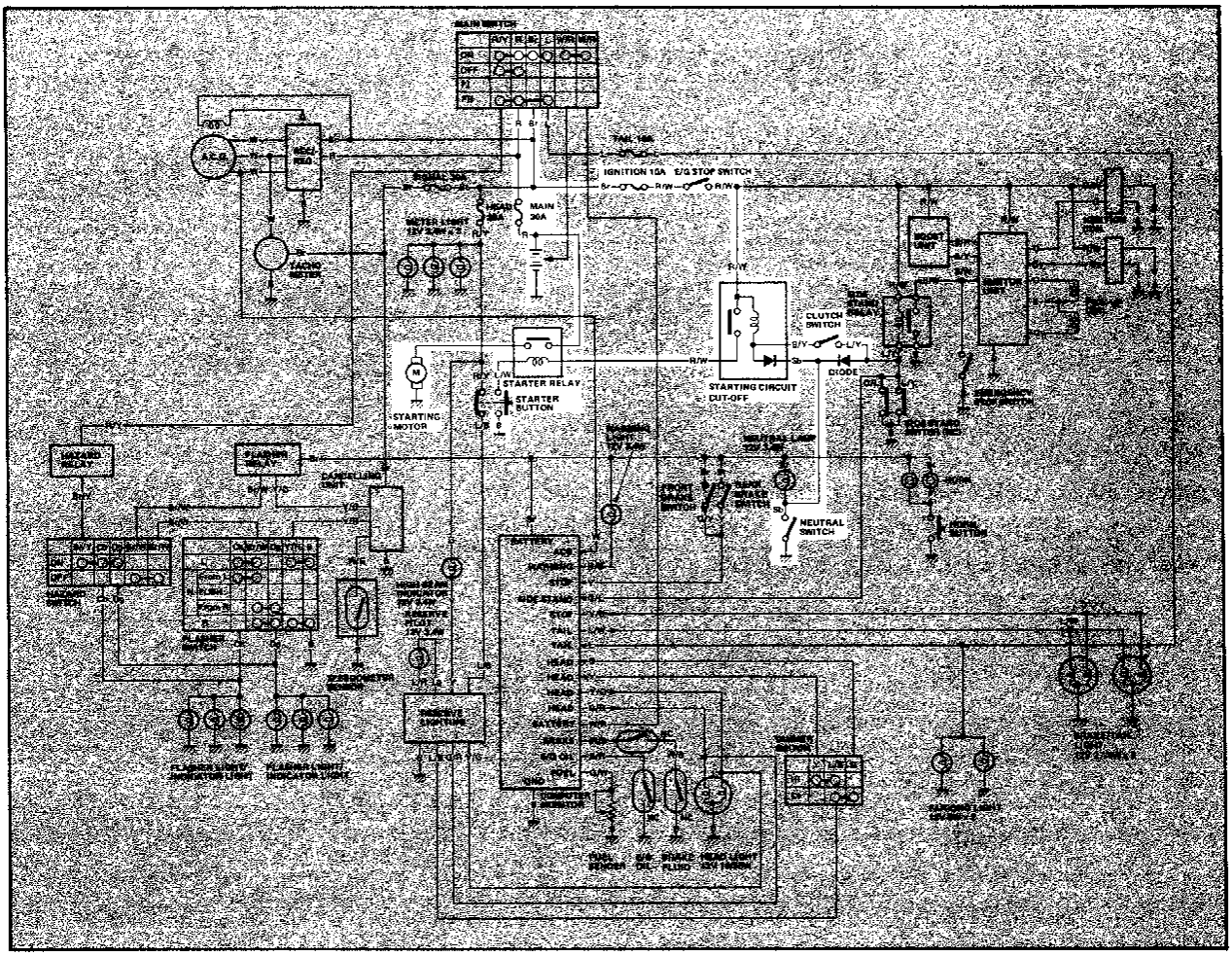
XJ1100J WIRING DIAGRAM



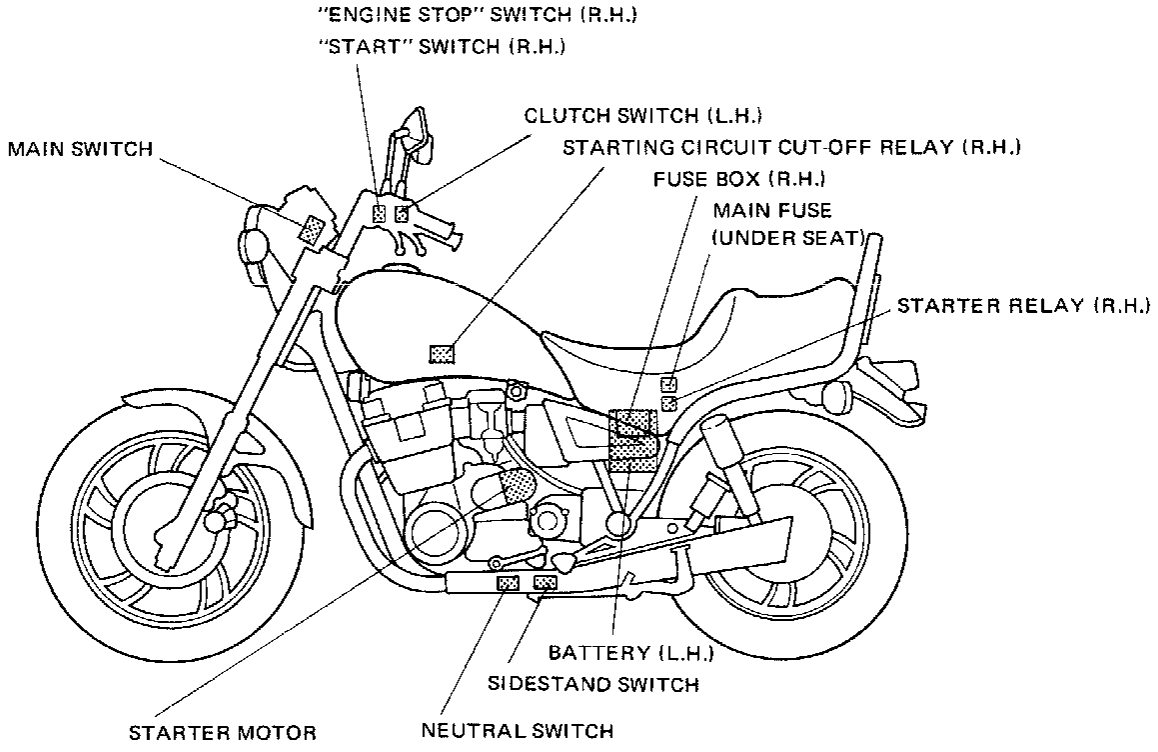
COLOR CODE

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

ELECTRIC STARTING SYSTEM



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



A. Starting Circuit Cut-Off System

The starting circuit cut-off system is employed. Hence, the following description.

Starting Circuit Operation

The starting circuit on this model consists of the starter motor, starter relay, and the starting-circuit cut-off relay. If the engine stop switch and the main switch are both on, the starter motor can operate only if:

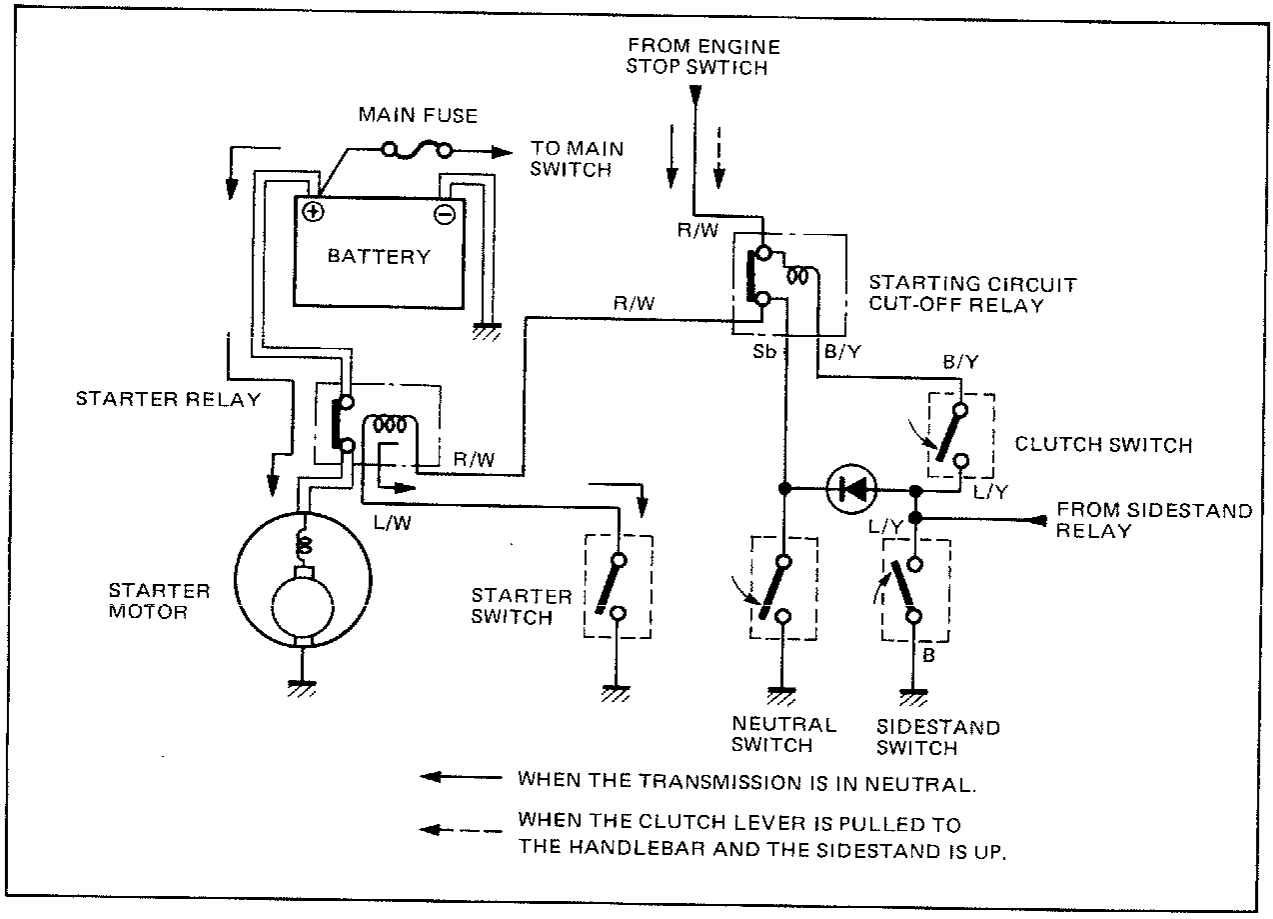
a. The transmission is in neutral (the neutral switch is on).

or if

b. The clutch lever is pulled to the handlebar (the clutch switch is on) and the sidestand is up (the sidestand switch is on.)

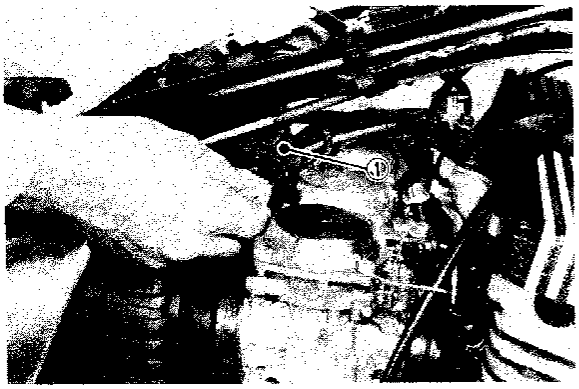
The starting-circuit cut-off relay prevents the starter from operating when neither of these conditions has been met. In this instance, the starting-circuit cut-off relay is off so current cannot reach the starter motor.

When one or both of the above conditions have been met, however, the starting-circuit cut-off relay is on, and the engine can be started by pressing the starter switch.



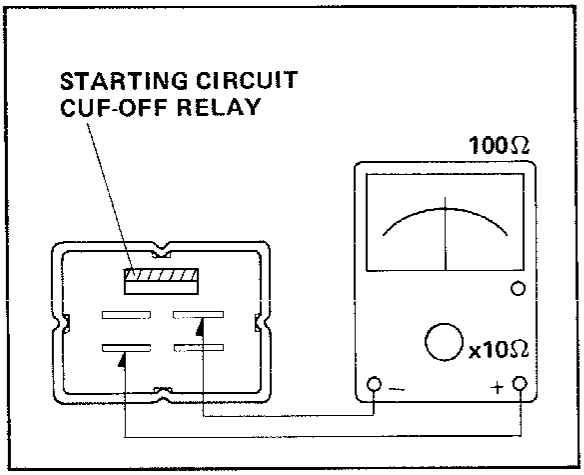
Starting-circuit Cut-off Relay Inspection

1. Remove the seat and the fuel tank.
2. Remove the starting-circuit cut-off relay from the frame, and disconnect the connector.

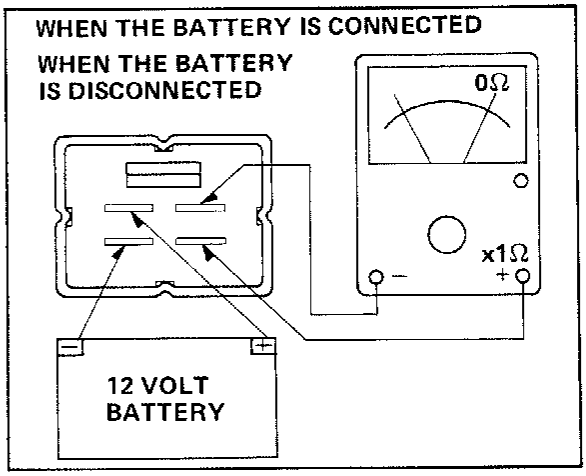


1. Starting circuit cut-off relay

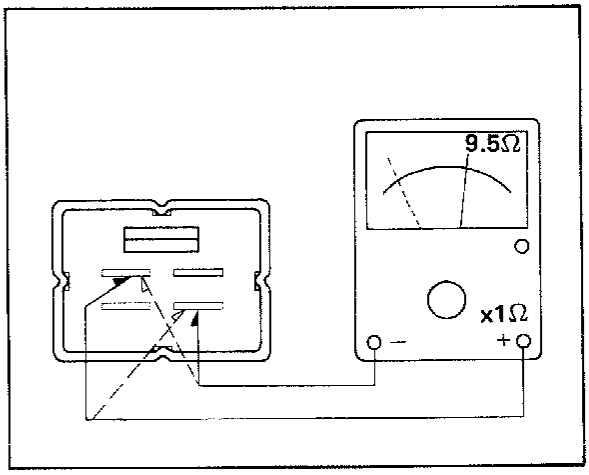
3. Check the resistance of the relay coil windings with the pocket tester. If the resistance is not within specification, replace the relay.



4. Check the relay function with a 12 volt battery and the pocket tester. Connect the leads as shown in the illustration. If the resistance readings do not equal those shown in the illustration, replace the relay.



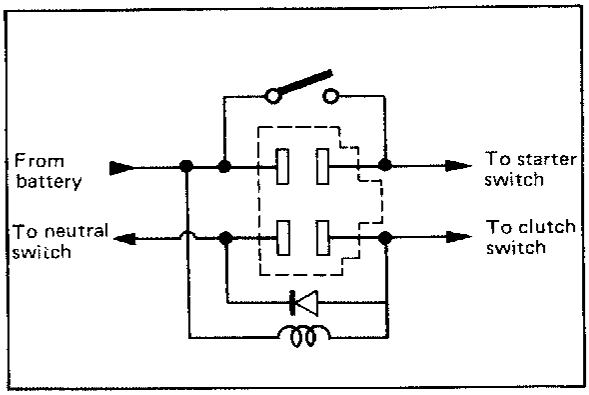
5. Check the diode in the headlight relay with the pocket tester as shown in the illustration. Replace the relay if the diode is damaged.



NOTE:

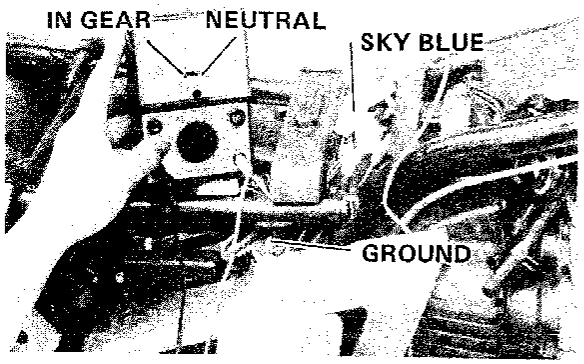
Only the Yamaha Pocket Tester will give a 9.5Ω reading when testing continuity. The particular characteristics of other testers will vary the continuity test readings.

Internal Connection



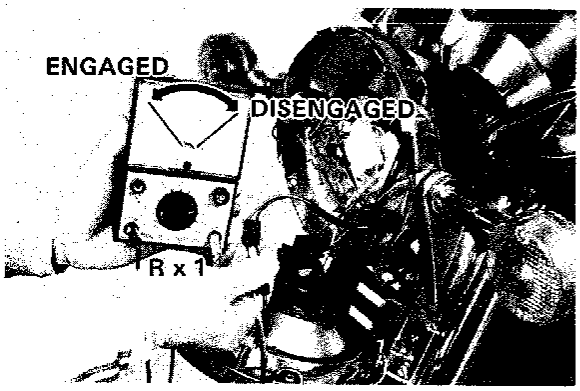
Neutral Switch Inspection

1. Remove the seat and fuel tank.
2. Disconnect the 4-pin connector from the main wire harness.
3. Connect the pocket tester leads as shown, and set the tester selector to ohm x 1.
   When the transmission is in neutral, the tester should read zero ohms.
   When the transmission is in gear, the tester should read infinity.



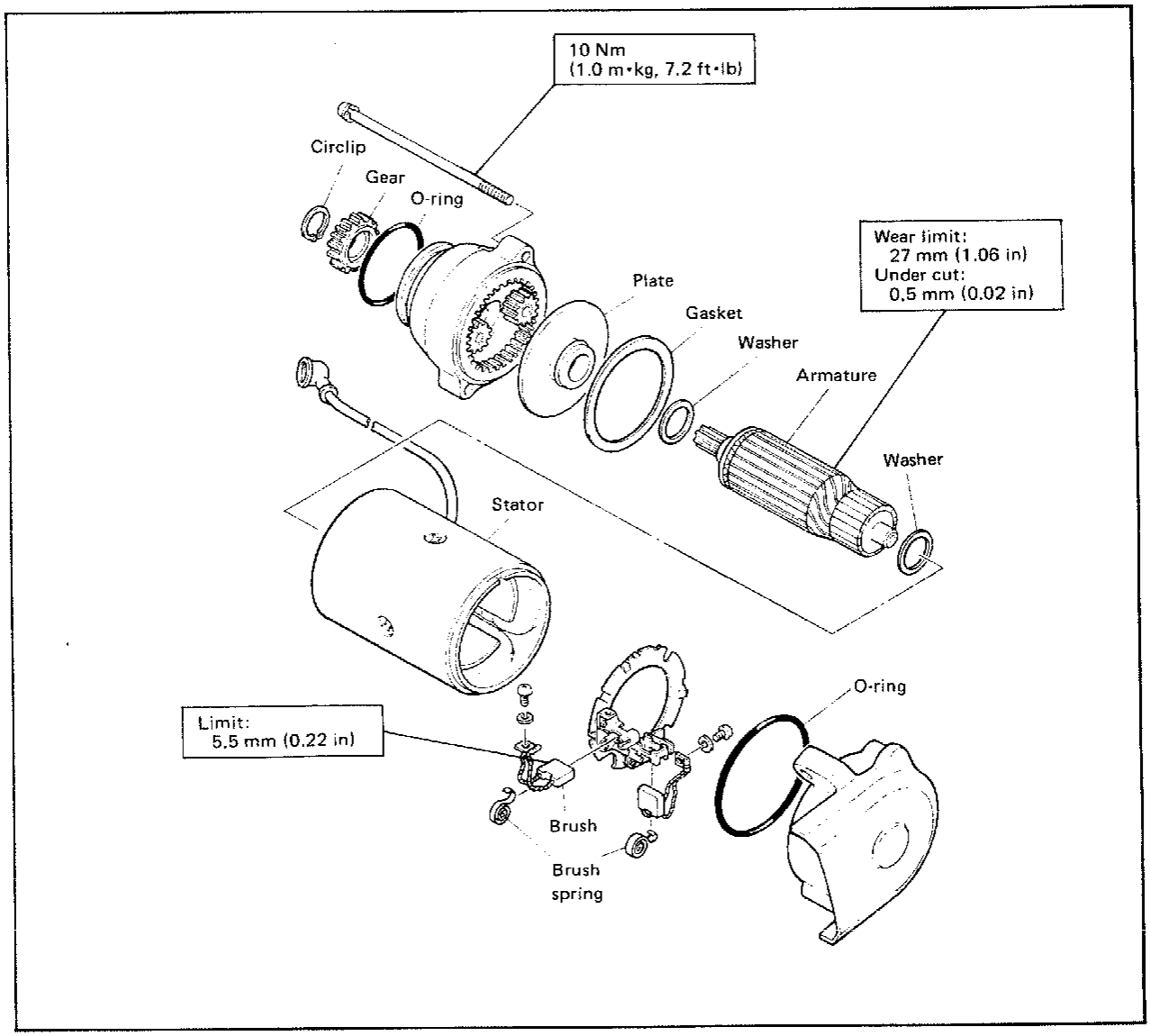
Clutch Switch Operation

1. Remove the two screws holding the headlight rim and remove the rim assembly.
2. Disconnect the 3-pin connector from the main wire harness.
3. Connect the pocket tester leads as shown, and set the tester selector to ohm x 1.
   When the clutch is disengaged, the tester should read zero ohms.
   When the clutch is engaged, the tester should read infinity.



B. Starter Motor

1. Removal (see Chapter 3, Engine Disassembly)



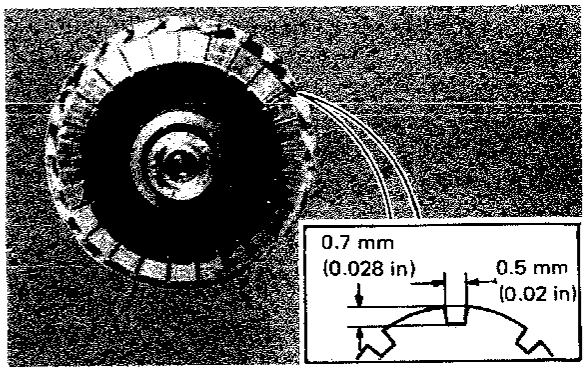
2. Inspection and repair

a. Check the outer surface of the commutator. If its surface is dirty, clean with No. 600 grit sand paper.

b. The mica insulation between commutator segments should be 0.5 ~ 0.8 mm (0.02 ~ 0.03 in) below the segment level. If not, scrape to proper limits with appropriately shaped tool. (A hack saw blade can be ground to fit.)

NOTE:

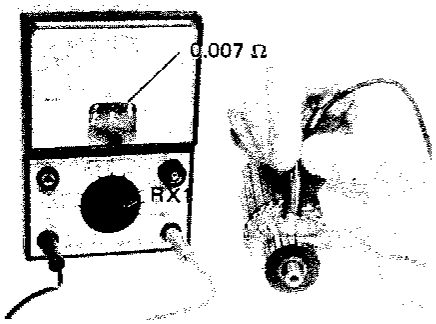
Mica insulation of commutator must be undercut to ensure proper operation of commutator.



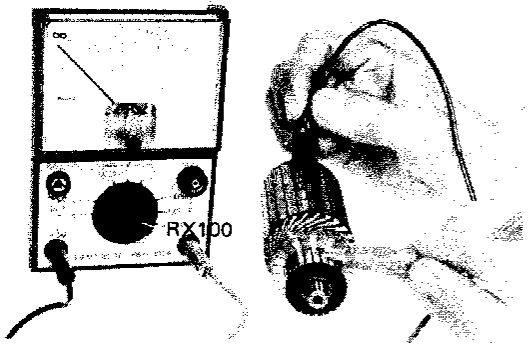
c. The starter's armature and field coil should be checked with an ohm meter for insulation breakdown (shorting to each other or to ground) and for continuity. Reference figures are given below.

Coil resistance:	
Armature coil:	0.007Ω (20°C)
Field coil:	0.01Ω (20°C)

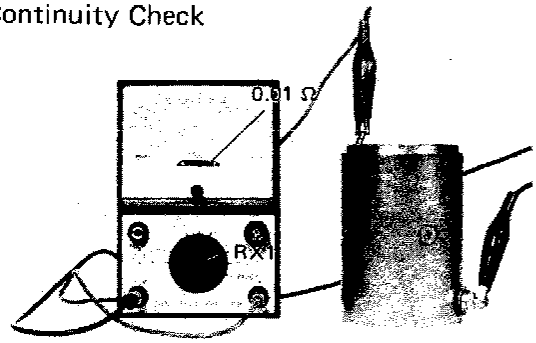
Continuity Check



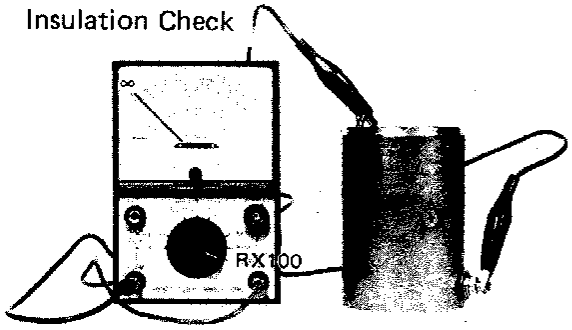
Insulation Check



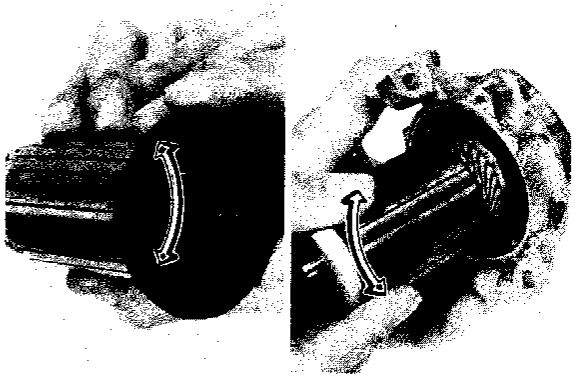
Continuity Check



Insulation Check

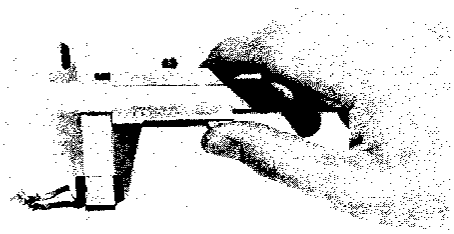


d. Check the front and rear cover bearings for damage. If damaged, the starter assembly must be replaced.



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

Minimum brush length:
5.5 mm (0.22 in)



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

C. Starter Relay and Switch

1. Removal

a. Remove the seat and side cover right. right.

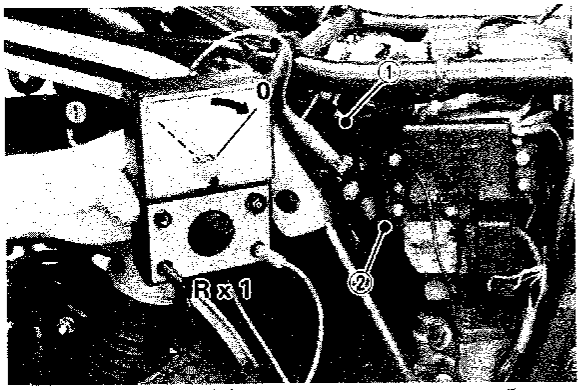
2. Inspection

a. Disconnect starter relay leads at the relay.

b. Connect pocket tester leads to the relay terminals (ohms x 1 scale).

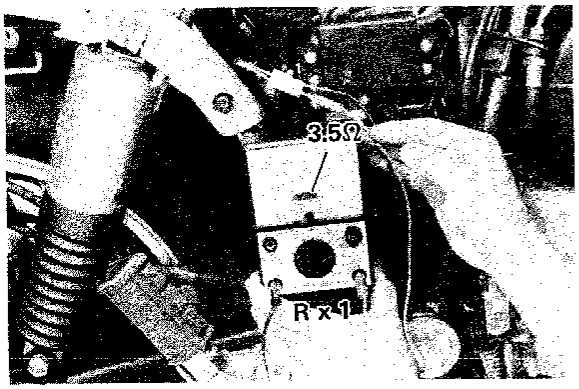
c. Turn ignition to "ON" position and engine stop switch to "RUN".

d. Push the starter button. The relay should click once and the scale should read zero does not read zero, the relay must be replaced.



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

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



D. Battery

This model has been equipped with a long life type battery; however, the battery fluid should be checked at least once a month or every 1,600 km (1,000 mi).

1. Checking

If the battery shows the following defects, it should be replaced.

a. The battery voltage will not rise to a specific value or no gassing occurs in any cell even after many hours of charging.
b. Sulfation of one or more cells is indicated by the plates turning white or an accumulation of material in the bottom of the cell.
c. Specific gravity readings after a long slow charge indicate a cell to be lower than any others.
d. Warpage or buckling of plates or insulators is evident.

WARNING:

Battery fluid is poisonous and dangerous, causing severe burns, etc. Contains sulfuric acid. Avoid contact with skin, eyes or clothing.

Antidote: EXTERNAL — Flush with water. INTERNAL — Drink large quantities of water or milk. Follow with milk of magnesia, beaten egg or vegetable oil. Call physician immediately.

Eyes: Flush with water for 15 minutes and get prompt medical attention. Batteries produce explosive gases. Keep sparks, flame, cigarettes, etc., away. Ventilate when charging or using in enclosed space. Always shield eyes when working near batteries.

KEEP OUT OF REACH OF CHILDREN.

2. The service life of a battery is usually 2 to 3 years, but lack of care as described below will shorten the life of the battery.

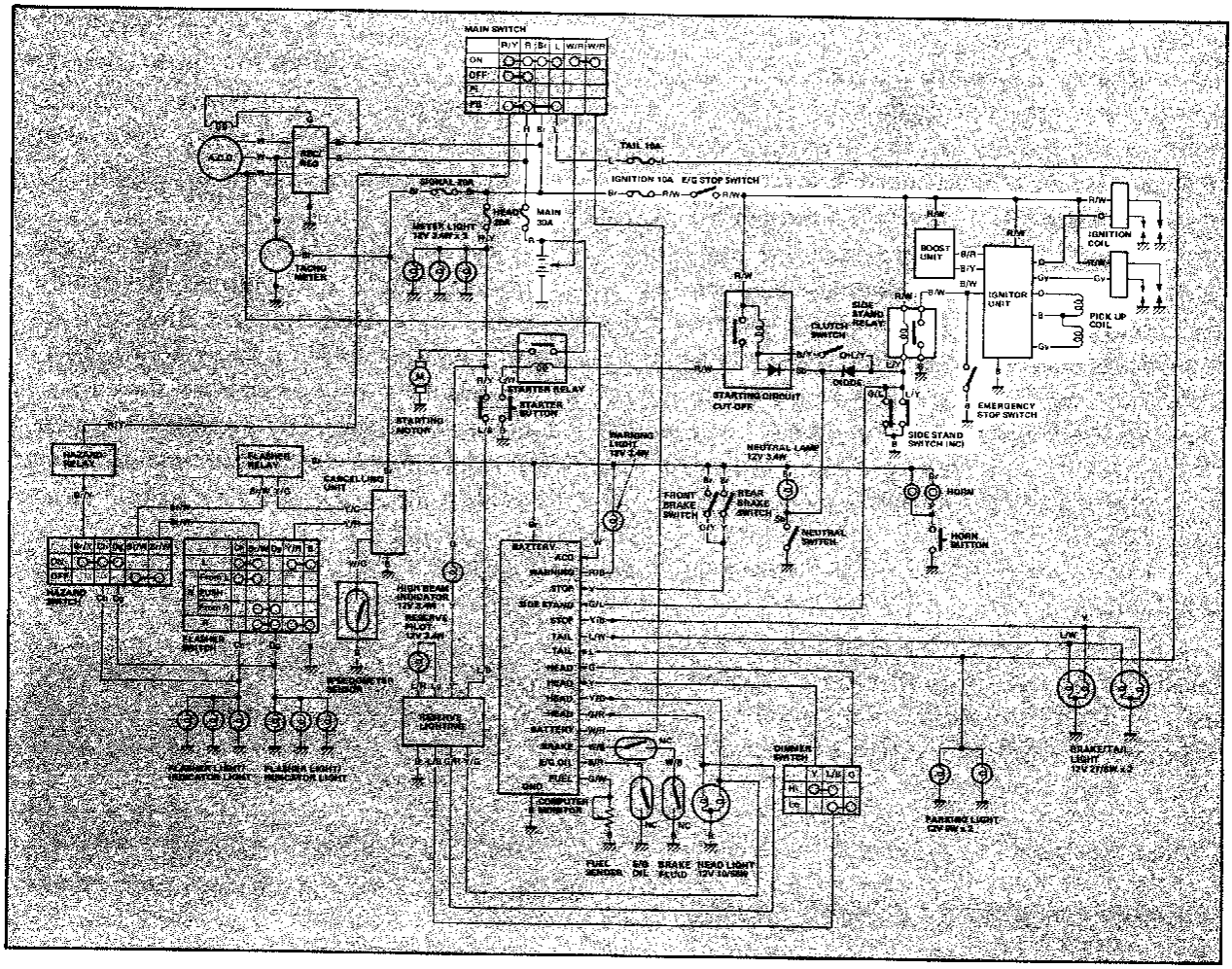
a. Negligence in keeping battery topped off with distilled water.
b. Battery being left discharged.
c. Over-charging with heavy charge.
d. Freezing.
e. Filling with water or sulfuric acid containing impurities.
f. Improper charging voltage or current on new battery.

Battery	12V 20 AH
Electrolyte	Specific gravity: 1.28
Initial charging current	2.0 amp for 10 hours (new battery)
Recharging current	10 hours (or until specific gravity reaches 1.28)
Refill fluid	Distilled water (to maximum level line)
Refill period	Check once per month (or more often, required)

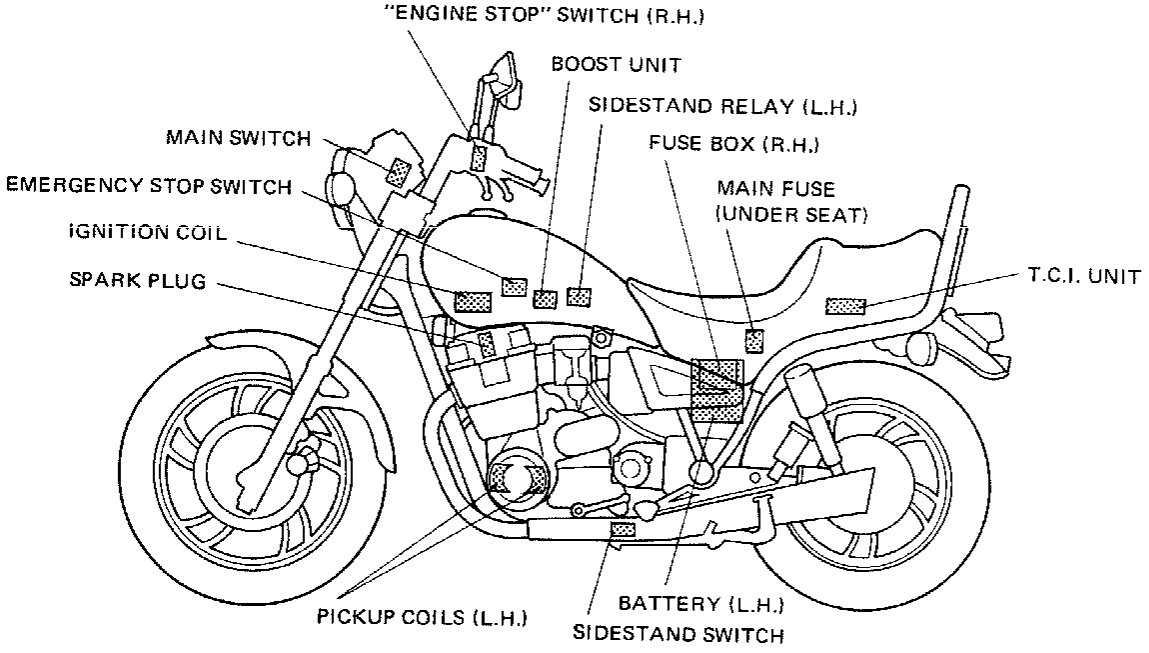
3. If the motorcycle is not to be used for a long time, remove the battery and have it stored. The following instructions should be observed:

a. Recharge the battery periodically.
b. Store the battery in a cool, dry place.
c. Recharge the battery before reinstallation.

IGNITION SYSTEM



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



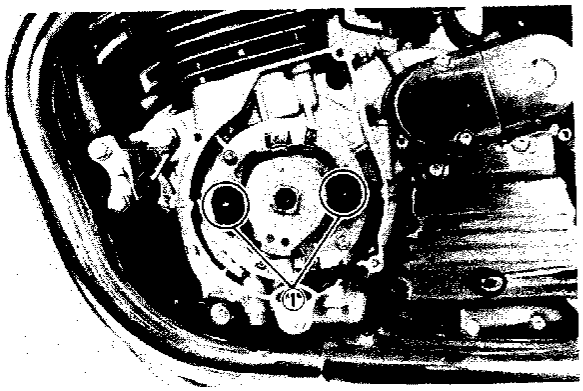
A. Description

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

B. Operation

The T.C.I. functions on the same principle as a conventional D.C. ignition system with the exception of using magnetic pick-up coils and a transistor control box (T.C.I.) in place of contact breaker points.

1. Pick-up unit



1. Pick-up coils

This unit consists of two pick-up coils and a magneto mounted on the crankcase (L.H.). When the reluctor (timing plate) projection passes the pick-up coil, the two signals are generated at the pick-up coil and transmitted to the ignitor unit as a signal. The ignition advance is determined by the width of the reluctor (timing plate) projection.

2. Ignitor unit

This unit has such functions of wave form, duty control, switching, electrical ignition advance, and etc. The ignition timing is advanced electrically using two signals from the pick-up coils and pressure sensor unit. The duty control circuit is provided to control the on-time period of the primary ignition current to reduce the electrical consumption. This unit also incorporates a protective circuit for the ignition coil.

If the ignition switch is turned on and the crankshaft is not turned, the protective circuit stops current flow to the primary coil within a few seconds. When the crankshaft is turned over, the current is turned on again by the signals generated by the pick-up coils and pressure sensor unit.

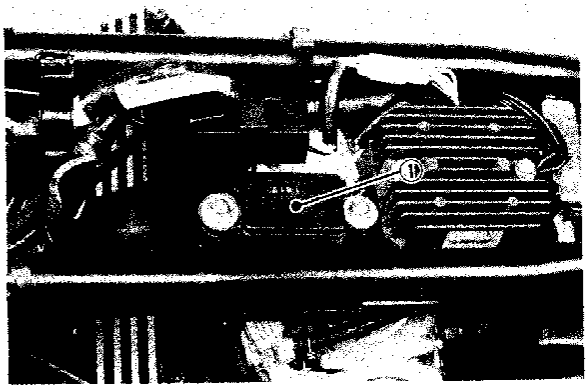
1. Ignitor unit

3. Pressure sensor unit

This unit has the function of sensing the intake manifold vacuum, producing respective voltage signals.

CAUTION:

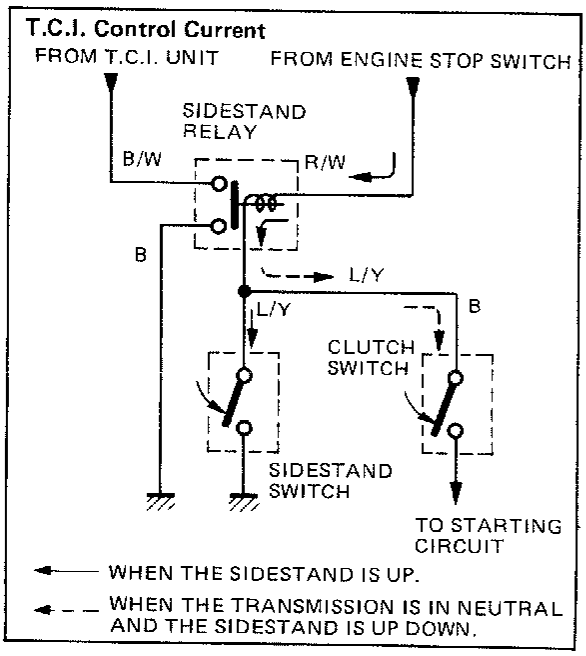
Do not run the engine without all spark plug caps in place. Due to the high secondary voltage, it is possible to damage the internal insulation of the secondary coil.



1. Pressure sensor unit

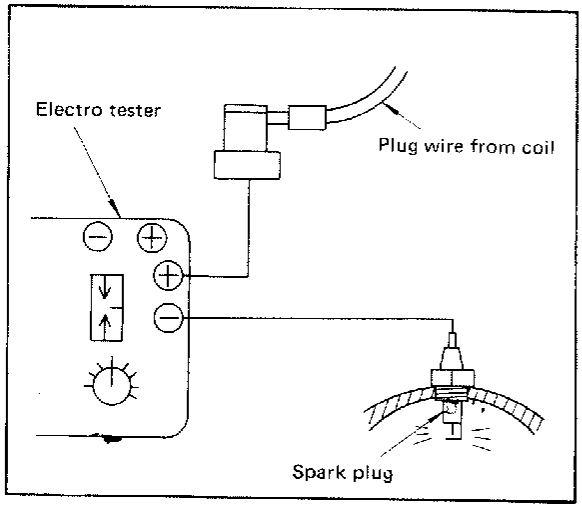
C. Sidestand Relay Operation

The sidestand relay operates by shorting the T.C.I. control current. When the sidestand is down, the sidestand relay is closed, and the T.C.I. control current is grounded through the sidestand relay. Thus, the engine will not run with the sidestand down unless the transmission is in neutral.



D. Troubleshooting/Inspection

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



a. Warm up engine thoroughly so that all electrical components are at operating temperature.
b. Stop the engine and connect the tester as shown.
c. Start the engine and increase the spark gap until misfire occurs. (Test at various rpm between idle and red line.)

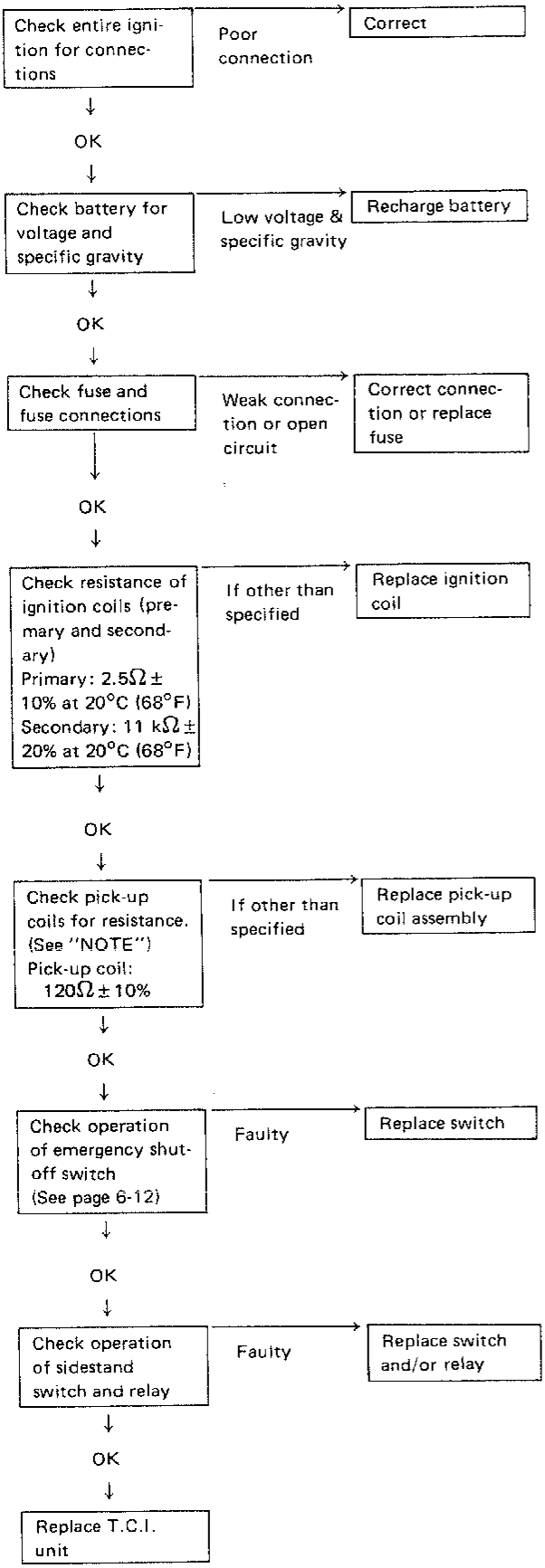
Minimum spark gap: 6 mm (0.24 in)

CAUTION:

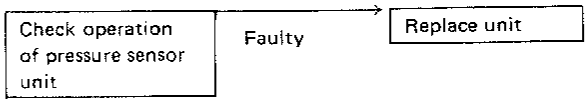
Do not run engine in neutral above 6,000 r/min for more than 1 or 2 seconds.

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

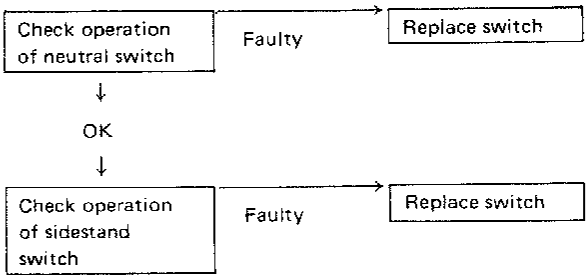
a. The engine will not start.



b. The engine starts but spark makes no advance.



c. The engine starts but the motorcycle does not start off.

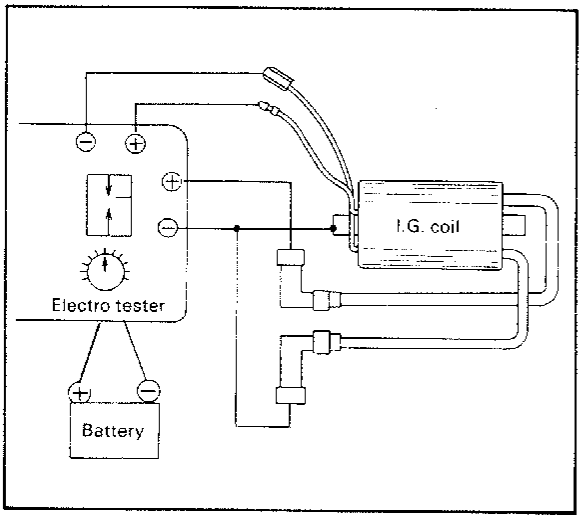


3. Ignition coil

a. Coil spark gap test

1) Remove the fuel tank and disconnect the ignition coil from wire harness and spark plugs.

2) Connect the Electro Tester as shown.



CAUTION:

When testing twin secondary lead coils, one lead must always be grounded and the other lead may not exceed the maximum spark gap because the insulation on the secondary windings may be destroyed by the overly high voltages that can be generated.

3) Connect fully charged battery to tester.

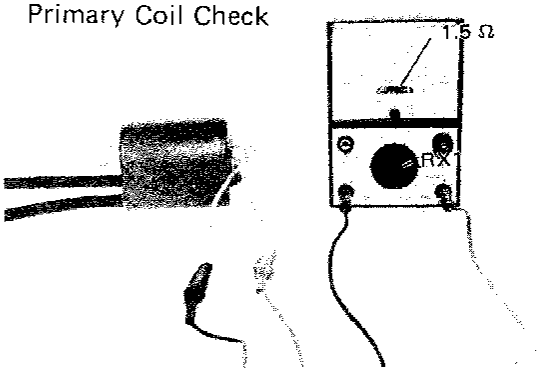
4) Turn on spark gap switch and the increase gap to maximum unless misfire occurs first.

Minimum spark gap: 6 mm (0.24 in)

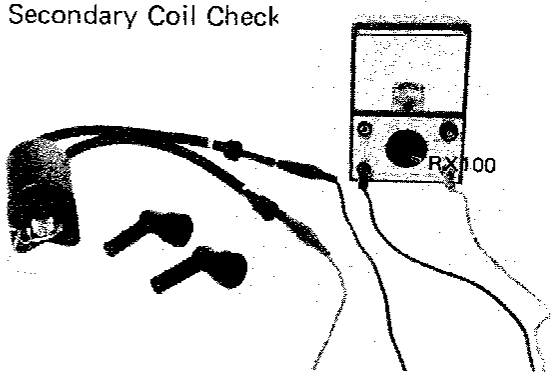
b. Direct current resistance test. Use a pocket tester or equivalent ohmmeter to determine resistance and continuity of primary and secondary coil windings.

Standard values:
Primary coil resistance:
2.5Ω ± 10% at 20°C (68°F)
Secondary coil resistance:
11 kΩ ± 20% at 20°C (68°F)

Primary Coil Check



Secondary Coil Check

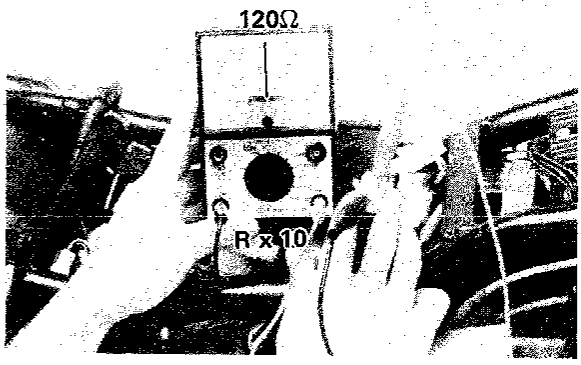


4. Pick-up coil

a. Remove the seat and the fuel tank.

b. Disconnect the pick-up coil wires from the T.C.I. unit wires.

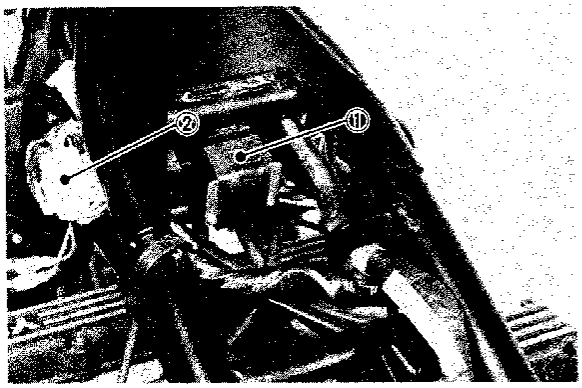
c. Check the resistance of the pick-up coil windings with the pocket tester. If the resistance is not within specification, replace the pick-up coil assembly.



Pick-up coil resistance:
120Ω ± 10% at 20°C (68°F)

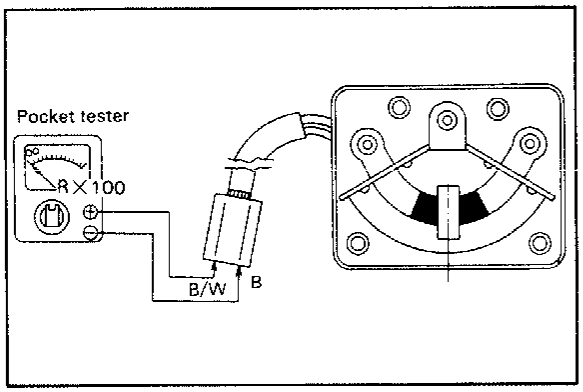
5. Emergency shutoff switch
The emergency shutoff switch is a mechanical switch and mounted under the fuel tank. This switch will shut off the ignition system if for any reason the motorcycle reaches a lean angle of 60 degrees or more from vertical.

a. Removal
1) Remove the seat and the fuel tank.
2) Disconnect the lead wires from the wire harness and pull out the switch assembly from the frame.

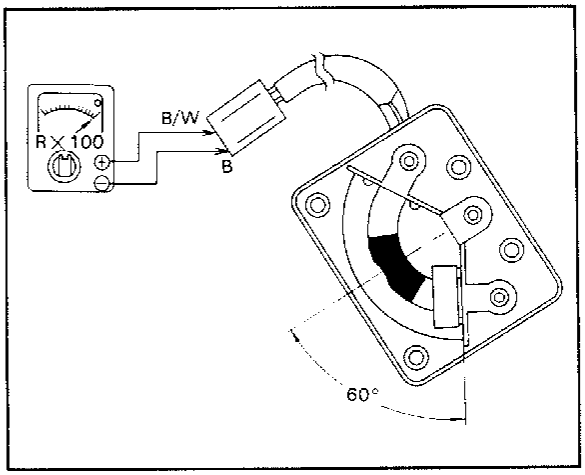


1. Emergency shutoff switch 2. Switch lead wires

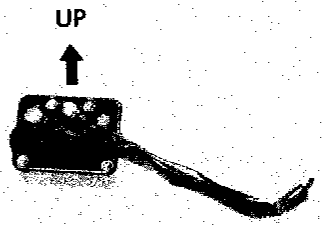
b. Inspection
1) Connect the pocket tester leads as shown.
2) The tester (with ohms x 100 scale) needle should shown infinity (∞) when the switch is positioned vertically as shown. Replace the switch if it shows 0Ω.



3) The tester (with ohms x 100 scale) needle should swing to 0Ω when the switch is leaned about 60 degrees or more to either left or right from the vertical position.
Replace the switch if it shows infinite resistance (∞).



c. Installation
Install the emergency shutoff switch with the UP mark turning upward. Otherwise, hard starting will result.



6. 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.

a. Inspection
1) Inspect and clean the spark plug every 4,000 km (2,500 mi), and replace at initial 13,000 km (9,000 mi) and thereafter every 12,000 km (8,000 mi).
2) Clean the electrodes of carbon and adjust the electrode gap to the specification.

b. Installation

Be sure to use the proper reach, type and electrode gap plug(s) as a replacement to avoid overheating, fouling or piston damage.

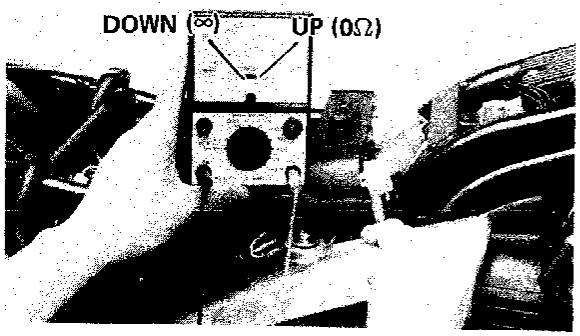
Type: BP6ES (NGK) or W20EP-U (NIPPONDENSO) Electrode gap: 0.7 ~ 0.8 mm (0.028 ~ 0.031 in) Tightening torque: 20 Nm (2.0 m·kg, 14 ft·lb)

7. Sidestand switch

a. Remove the seat and fuel tank. Disconnect the 3-pin connector from the main wire harness.

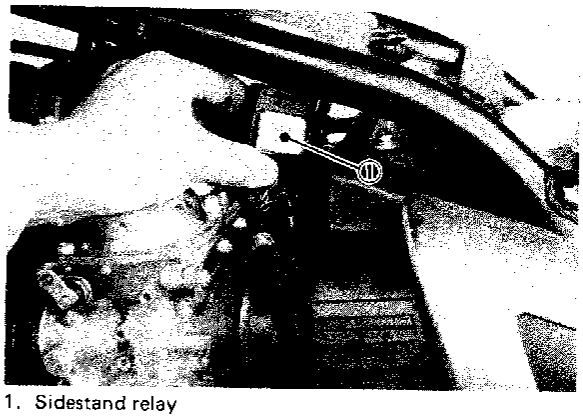
b. Connect the pocket tester leads as shown, and set the tester selector to ohm x 1. When the sidestand is up, the tester should read zero ohms. When the sidestand is down, the tester should read infinity.

	L/Y	B	G/L
UP	○	○	○
DOWN	–	–	–



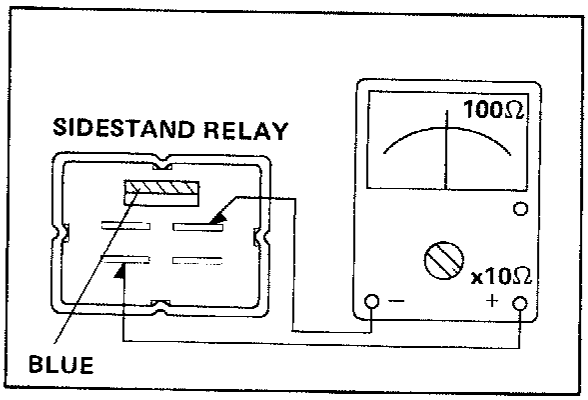
8. Sidestand relay

a. Remove the seat and fuel tank. Remove the sidestand relay from the frame brakcet, and disconnect the connector.

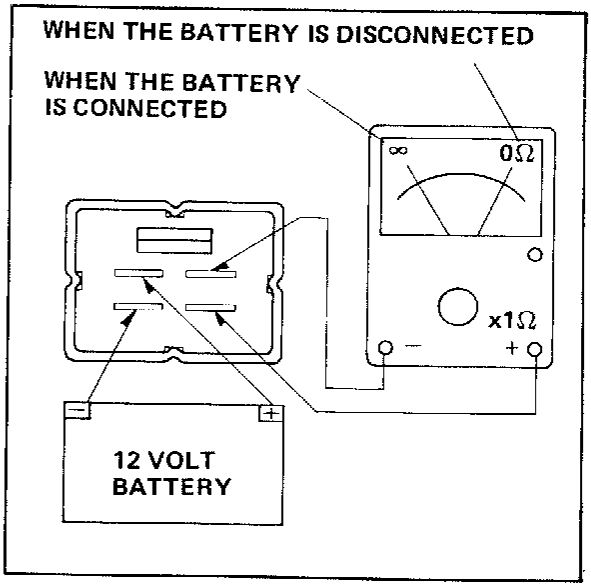


1. Sidestand relay

b. Check the resistance of the relay coil windings with the pocket tester. If the resistance is not within specification, replace the relay.



c. Check the relay contact breaker points with the pocket tester and a 12 volt battery. Connect the leads as shown in the illustration. If the resistance readings do not equal those shown in the illustration, replace the relay.

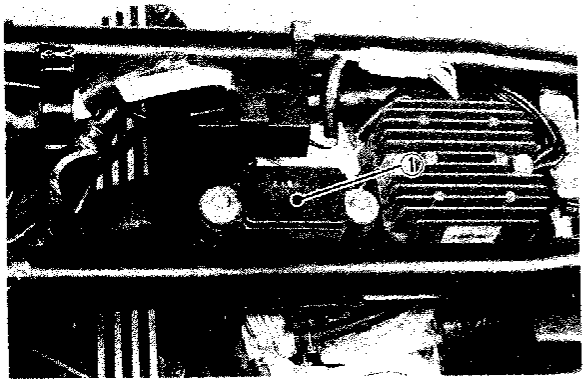


9. Pressure sensor unit

The pressure sensor transmits electrical signals to the igniter unit responding to the pressure in the intake pipe, by which ignition timing is advanced.

a. Removal

1) Remove the seat and fuel tank.
2) Remove the two panhead screws and disconnect the vacuum pipe.
3) Disconnect the connector from the wire harness and pull out the unit from the frame.

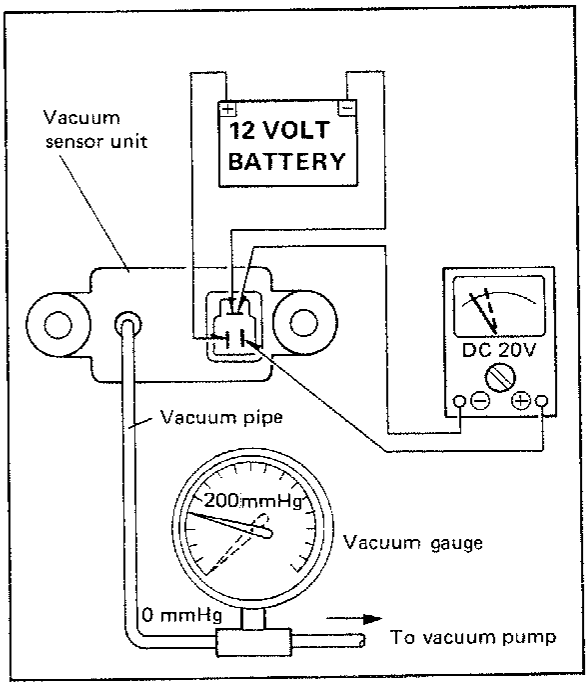


1. Pressure sensor unit

b. Inspection

1) Check the unit function with a 12 volt fully charged battery and the pocket tester.

Connect the battery, tester leads and hand operated vacuum pump (with vacuum gauge) to the vacuum advancer as shown in the illustration. Apply atmospheric pressure (0 mmHg) and 200 mmHg to the pressure sensor unit, and measure the output voltage.

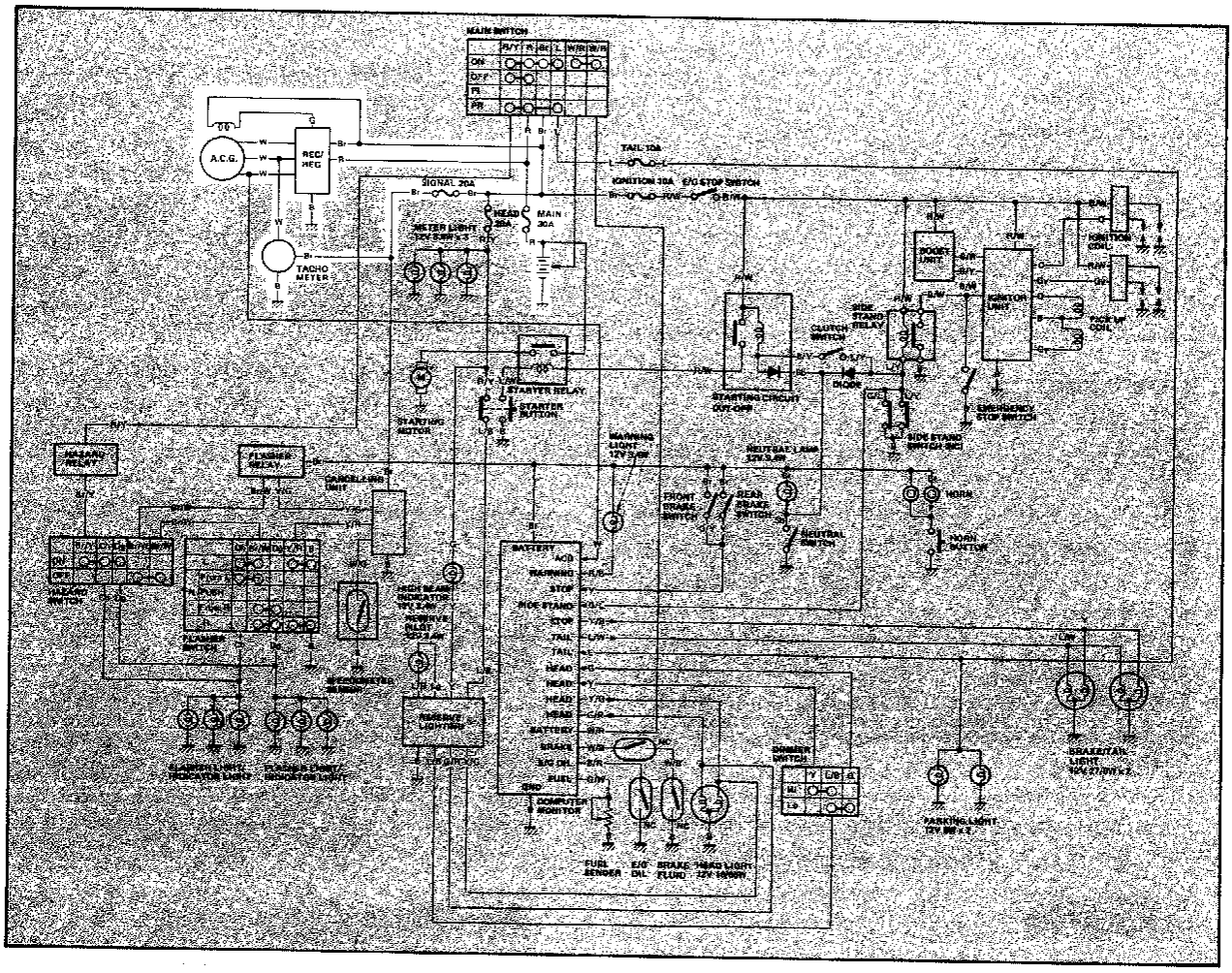


Vacuum gauge	Output voltage
0 mm Hg	2.0 ~ 2.4 V
200 mm Hg	1.6 ~ 2.0 V

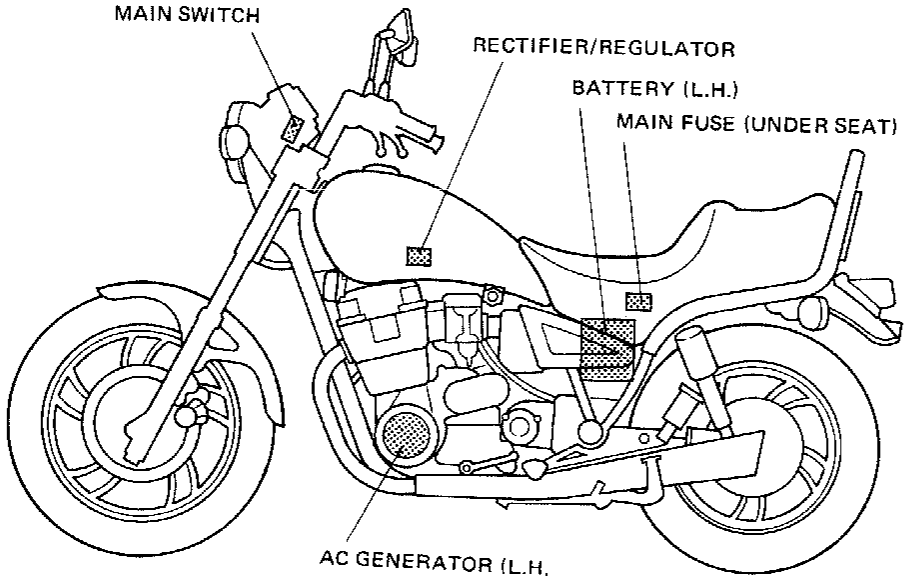
Replace the unit assembly if damaged.

2) Check the vacuum hose for cracks or any other damage, and replace it, if necessary.

CHARGING SYSTEM



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



A. A.C. Generator

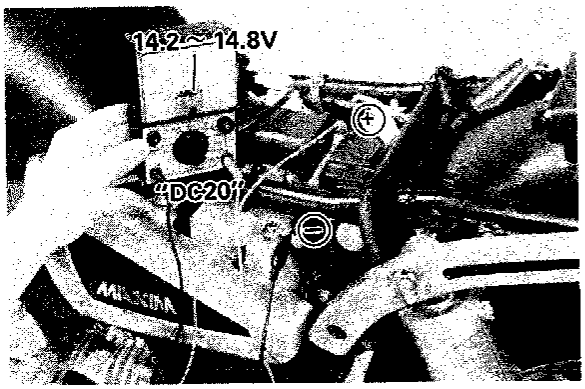
1. Checking method

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

b. Start engine.

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

Generated voltage: 14.5 ± 0.3V



1. Battery

d. If the indicated voltage cannot be reached, then perform the tests in step 2.

CAUTION:

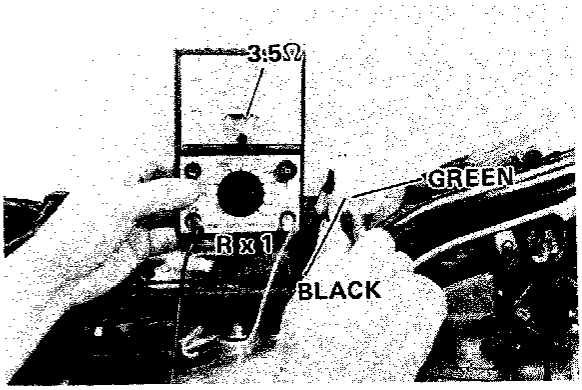
Never disconnect wires from the battery while the generator is in operation. If the battery is disconnected, the voltage across the generator terminals will increase, damaging the semiconductors.

2. Resistance test of field coil and stator coil.

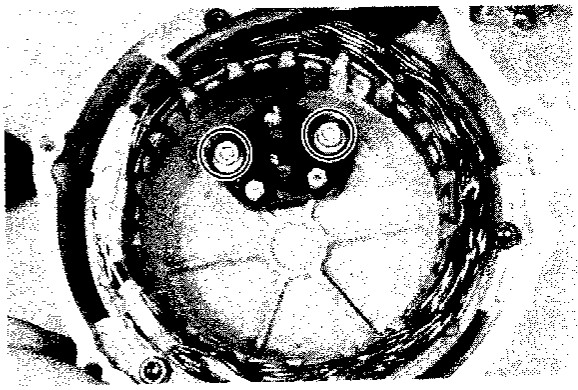
a. Remove the seat and fuel tank.
Disconnect the 2P connector from the main wire harness.

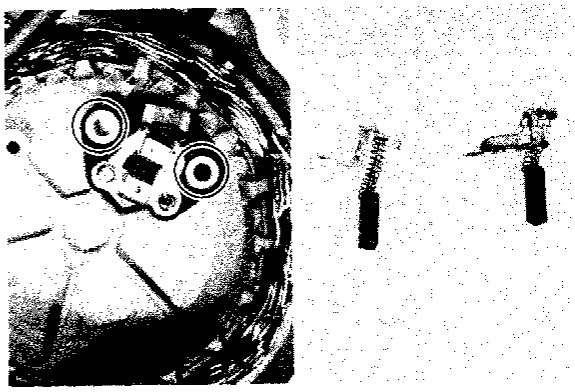
b. Check the resistance between terminals. If resistance is out of specification, coil is broken. Check the coil connections. If the coil connections are good, then the coil is broken inside and it should be replaced.

Field coil resistance (Green-Black): 4.0Ω ± 10% at 20°C (68°F) Stator coil resistance (White-White): 0.37Ω ± 10% at 20°C (68°F)



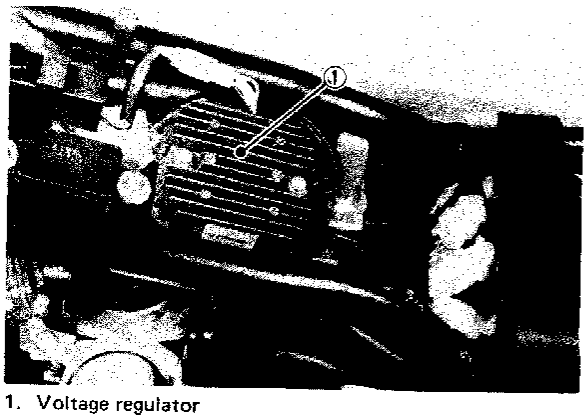
c. Replace the generator carbon brushes every 6,000 km (10,000 mi) of operation.





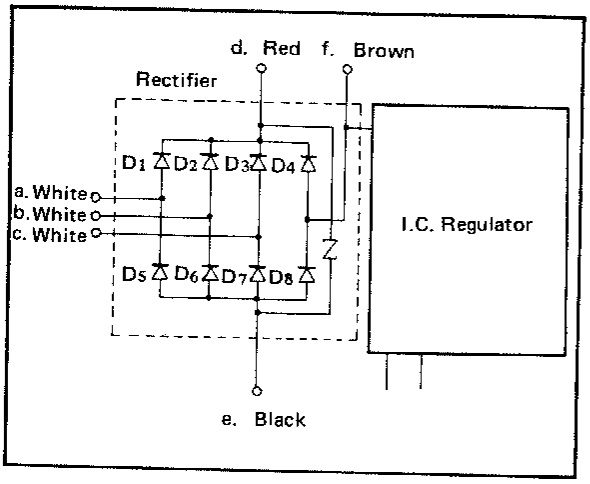
B. Voltage Regulator

The I.C. Voltage Regulator is a small and, normally, very reliable component. Due to its construction, it is lightweight and free from the wear and misadjustment associated with mechanical voltage regulators. If the following inspection reveals that the regulator is faulty, it cannot be adjusted and must be replaced.



1. Voltage regulator

1. Check the silicon rectifier as specified using the Yamaha Pocket Tester.



Checking element	Pocket tester connecting point		Good	Replace (element shorted)	Replace (element opened)
	(+) (red)	(+) (black)			
D_1	d	a	○	○	x
	a	d	x	○	x
D_2	d	b	○	○	x
	b	d	x	○	x
D_3	d	c	○	○	x
	c	d	x	○	x
D_4	a	e	○	○	x
	e	a	x	○	x
D_5	b	e	○	○	x
	e	b	x	○	x
D_6	c	e	○	○	x
	e	c	x	○	x

○ : Continuity
x : Discontinuity (∞)

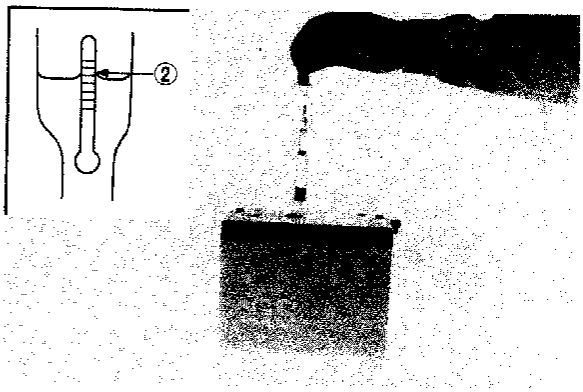
2. If any element is broken, replace the entire unit.

CAUTION:

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

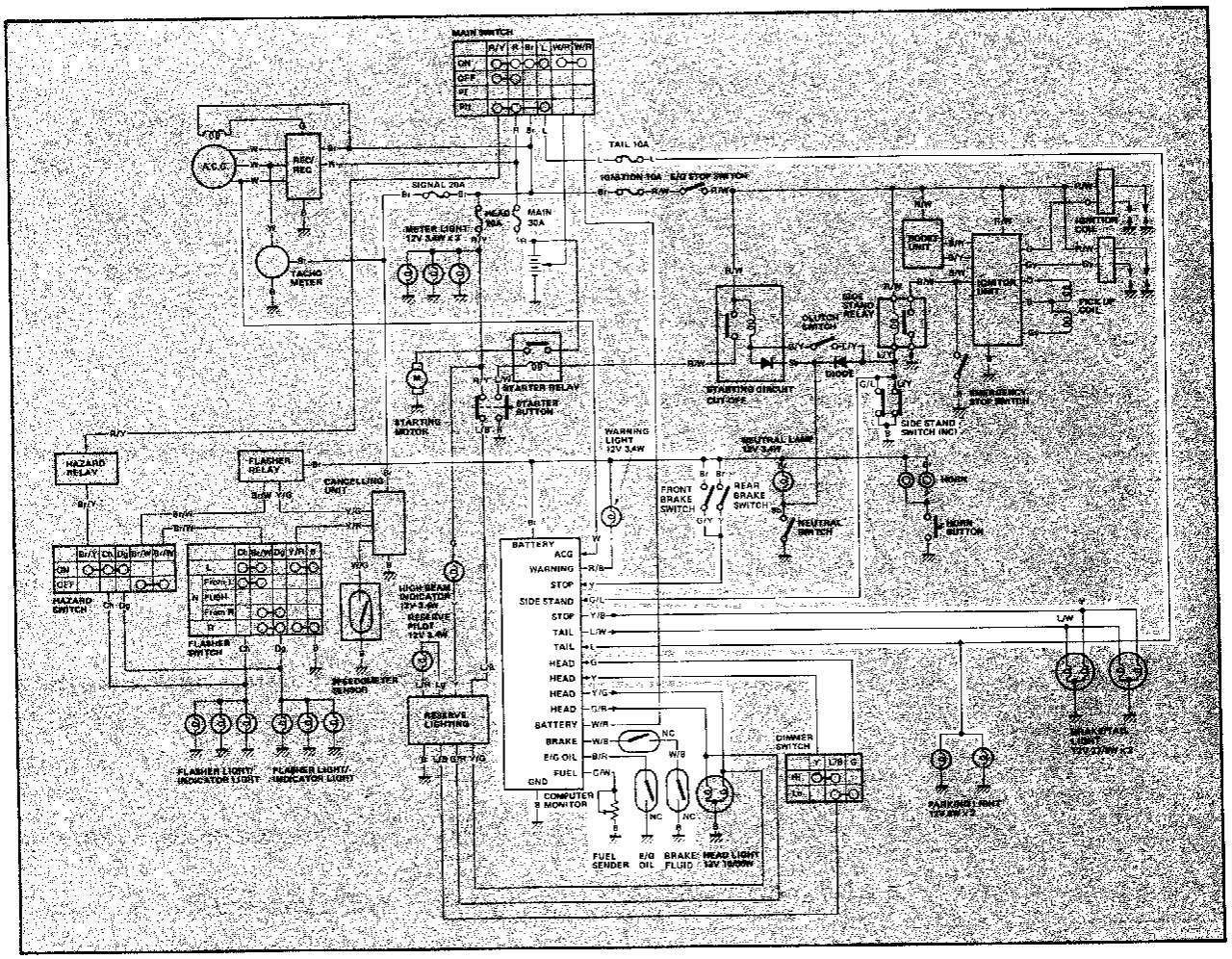
C. Battery Inspection

1. Check the battery terminals and couplers. They should be tight.
2. Measure the specific gravity of the battery. If it is less than 1.260, remove and charge the battery until the specific gravity is greater than 1.260.

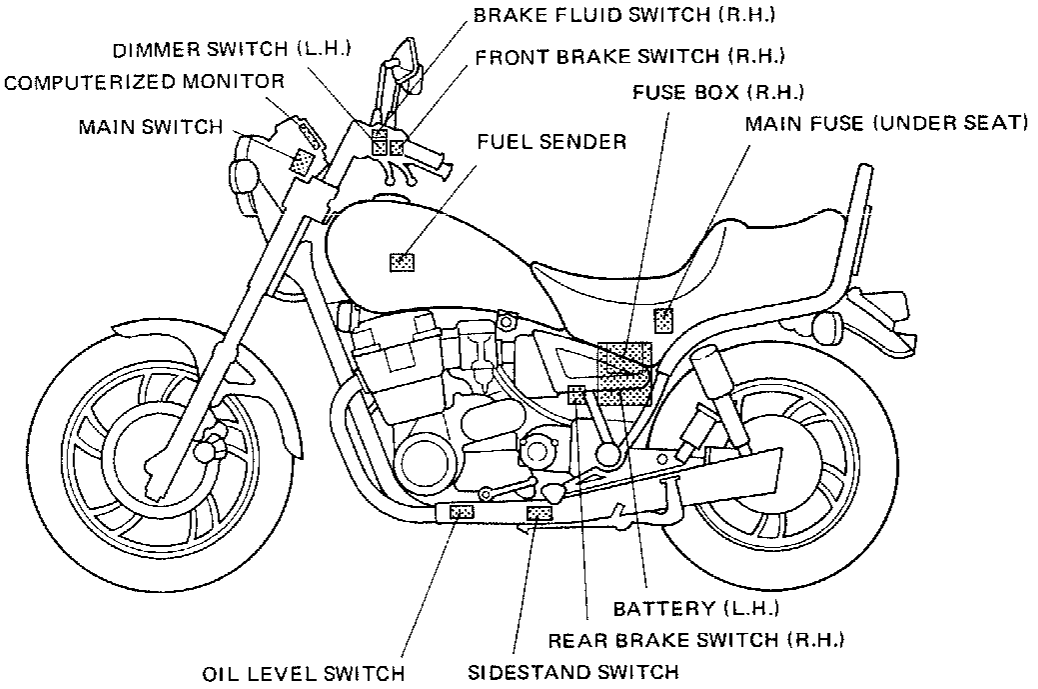


1. Hydrometer 2. Reading

COMPUTERIZED MONITOR SYSTEM

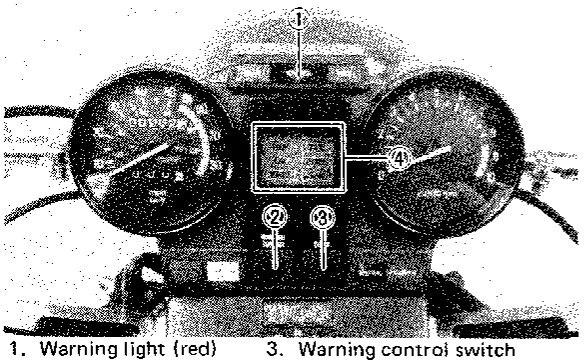


This circuit diagram shows the monitoring circuit in the wiring diagram.



A. Operation

This system monitors seven separate functions and will warn you of any malfunction if encountered until it is fixed. In addition, the fuel gauge in this system indicates the amount of fuel in the tank.



1. Warning light (red)
2. Display panel
3. Warning control switch
4. Check switch

1. When the main switch is turned on, all seven liquid crystal displays (LCDs) come on, with the bottom fuel display (■■■■) indicating the amount of fuel in the tank.
2. When the engine is started, the system begins its scan of the motorcycle conditions. From top to bottom all the LCDs flash on and then off in sequence. If any one condition is found improper or inadequate, the red warning light will begin flashing and the LCD for the area in question will remain displayed.

WARNING:

If any LCD remains displayed or the warning light flashes on, correct the problem immediately.

3. Warning light operation can be controlled by the warning control switch. If the control switch is pushed once, the warming light glow will change from a flashing to a steady one. If pushed again, the glow will go out completely. Still another push on the switch brings back the warning light operation all over again.

NOTE:

1. This switch operates only when a malfunction is displayed on an LCD.
2. Even if the warning light is made to glow steady or to go out, it will begin flashing on with another malfunction.

4. The entire monitoring system condition can be checked by pushing the check switch. The system will scan through the seven areas in sequence, just as when the engine was first started, to assure the rider that the system is functioning properly.

B. Display Panel

STND

This indicator is displayed when the sidestand is extended. Be sure to retract it before starting out on the road.

BRK

This indicator is displayed when the brake fluid level is below specification in the front and rear brake master cylinders.

WARNING:

Do not run the motorcycle with a low brake fluid level for a long time or at high speeds.

OIL

This indicator is displayed when the engine oil level is low. If it remains displayed or keeps flickering while riding, add engine oil at the first opportunity.

WARNING:

Do not run the motorcycle with a low engine oil level for a long time or at high speeds.

BATT

This indicator is displayed when the battery fluid level is low. If it remains displayed, add distilled water at the first opportunity.

CAUTION:

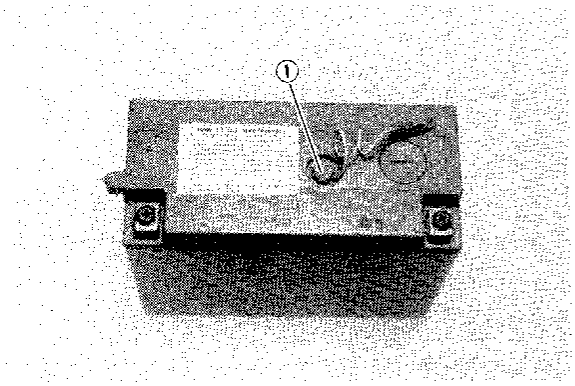
Continuous riding with a low battery fluid level will damage the battery.

NOTE:

The battery sensor terminal must be cleaned approximately every 5,000 km (3,000 mi). The terminal is constructed of lead, and its surface may become corroded, allowing a system malfunction.

CAUTION:

Make sure that the connection to the battery is correct; otherwise, damage to the microcomputer may occur.



1. Battery sensor

HEAD

This indicator is displayed when the headlight bulb is burned out. If it remains displayed, have it replaced and correctly adjusted at the first opportunity.

TAIL

This indicator is displayed when the taillight and/or brake light bulb is burned out. If it remains displayed, have it replaced at the first opportunity.

FUEL

This indicator is displayed when the fuel amount is little. If it remains displayed or keeps flickering while riding, add fuel at the first opportunity.

GENERAL CAUTION:

Failure to observe any of the following "mustn'ts" may result in malfunction of the microcomputer or damage to the electrical circuit.

1. **Taillight, brake light and other bulbs of wattage other than specified mustn't be used.**
2. **Extra electric accessories mustn't be connected to the computerized monitor system circuit (ex: taillight, headlight, etc.)**
3. **The instrument panel mustn't be subjected to any water splashes or steam from underneath.**
4. **The display panel mustn't be pressed hard or given any shock.**
5. **A magnet or other magnetized objects mustn't be put near the display panel.**

C. Troubleshooting

1. After the main switch is turned on:

PROBLEM	CAUSE	SOLUTION
a. Warning light doesn't come on.	Bulb is burned out.	Replace bulb.
	Low battery charge.	Recharge battery.
	Faulty coupler connection.	Clean coupler contacts.
	Broken wire.	Replace wiring.
	CMS control unit failed.	Replace CMS control unit.
b. Liquid crystal display (LCD) flashes on and off.	CMS control unit failed.	Replace CMS control unit.
c. LCD does not function.	LCD connectors incorrectly installed.	Reinstall connectors.
	Broken wire.	Replace wiring.
	Faulty contact between LCD panel and control unit.	Clean contacts.
	LCD panel failed.	Replace LCD panel.
	CMS control unit failed.	Replace CMS control unit.
d. LCD only partially displays.	LCD panel failed.	Replace LCD panel.

2. After the engine is started

PROBLEM	CAUSE	SOLUTION
a. LCD does not cycle.	Faulty coupler connection. Broken wire. CMS control unit failed.	Clean coupler contacts. Replace wiring. Replace CMS control unit.

3. After the check switch is pushed:

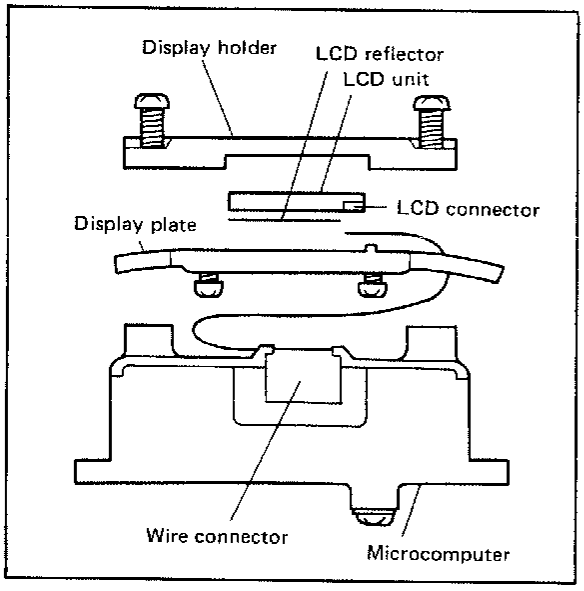
PROBLEM	CAUSE	SOLUTION
a. LCD does not cycle.	Check switch failed. Faulty coupler connection. Broken wire. CMS control unit failed.	Replace check switch. Clean coupler contacts. Replace wiring. Replace CMS control unit.

4. After the warning control switch is pushed:

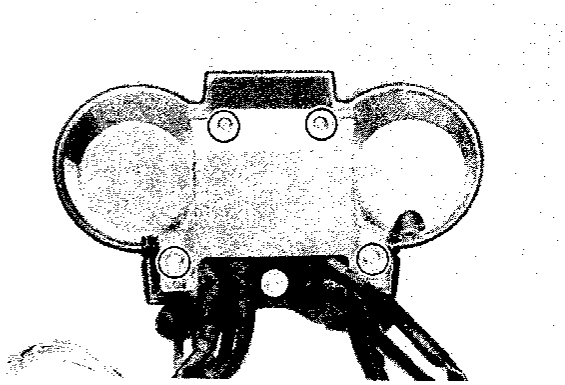
PROBLEM	CAUSE	SOLUTION
a. Warning light continues to flash.	Warning control switch failed. Faulty coupler connection. Broken wire. CMS control unit failed.	Replace warning control switch. Clean coupler contacts. Replace wiring. Replace CMS control unit.

D. Cleaning and Replacement

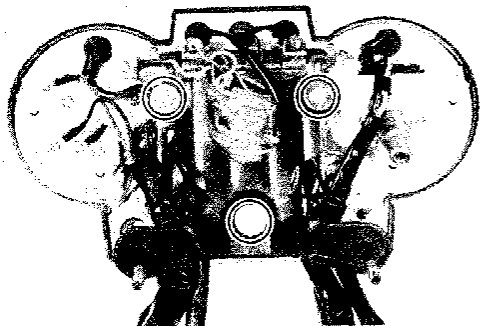
Use the following procedure to replace the LCD unit or the microcomputer unit.



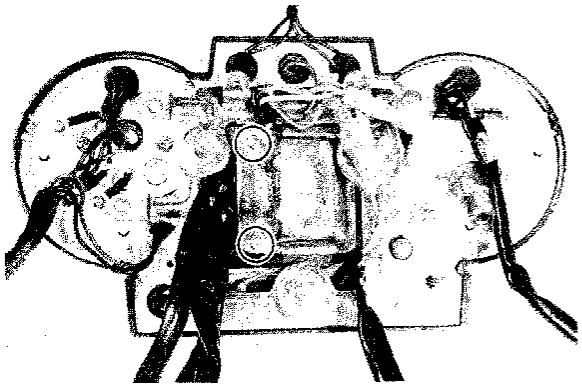
1. Remove the headlight lens and the two headlight-body holding bolts. This will give you easy access to the instrument-panel holding nuts.
2. Disconnect the wire connectors in the headlight assembly that lead to the instrument panel.
3. Disconnect the speedometer cable.
4. Disconnect the instrument-panel holding nuts, and remove the meter assembly.
5. Place the instrument panel assembly on a clean work surface, and remove the back panel cover.



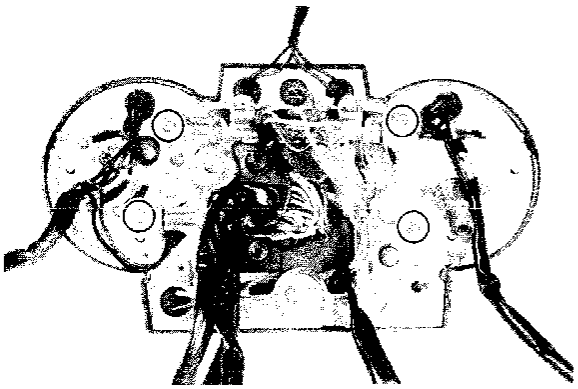
6. Remove the three nuts which secure the instrument-panel mounting bracket, and remove the bracket.



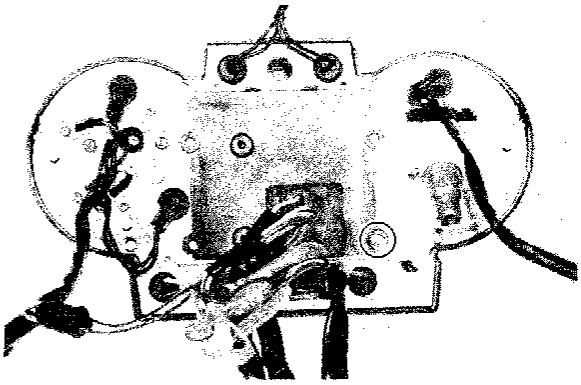
7. Remove the two panhead screws and wire harness cover.



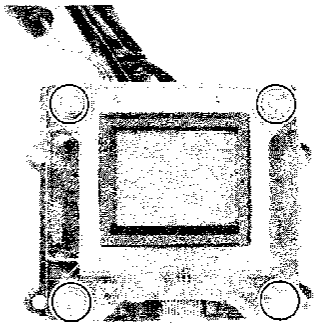
8. Remove the four panhead screws which secure the LCD/microcomputer holder, and remove the bracket.



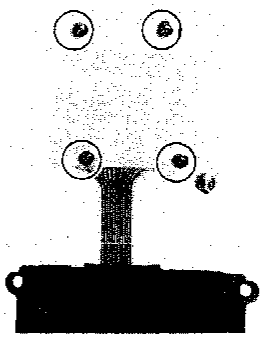
9. Remove the panhead screw and the unit.



10. Remove the four screws which hold the LCD display holder.



11. Very carefully turn the display holder over, and completely remove the four display plate holding screws. Remove the LCD reflector and the display plate.



12. Detach the wire connector from its indexing points.

CAUTION:

Disconnect the wire connector carefully. Do not pull on the wire connector. It is indexed and could be damaged if you pull on it. Do not touch the connector contacts. They are gold plated.

13. Remove the display plate and the LCD unit.
14. Clean the display plate and the LCD unit.

CAUTION:

1. **Use compressed-air lens cleaner (as used on cameras) to clean the display and the LCD unit. Do not use shop air for this purpose.**
2. **Use a soft cloth. Do not use cotton. It will leave lint deposits which will interfere with the delicate contacts.**
3. **Very carefully clean the LCD unit because it is possible to generate enough static electricity to damage it.**

15. Reinstall the LCD unit into the display holder.

CAUTION:

Do not touch the LCD connector with bare hands.

IMPORTANT NOTE:

The LCD unit must line up as shown in the illustration to seal the LCD unit properly.

16. Reinstall the LCD reflector so that the shiny surface faces toward the LCD unit.
17. Carefully place the wire connector on the LCD connector and seat it on its two indexing points. Install the display plate and carefully screw in the wire connector indexing screw first. Then screw in the remaining four holding screws. Do not overtighten the screws.

Tightening torque:
3 mm: 1 Nm (0.1 m·kg, 0.7 ft·lb)
(Use Loctite®)
4 mm: 2.4 Nm (0.24 m·kg, 1.7 ft·lb)

18. Reinstall the display holder on the microcomputer.

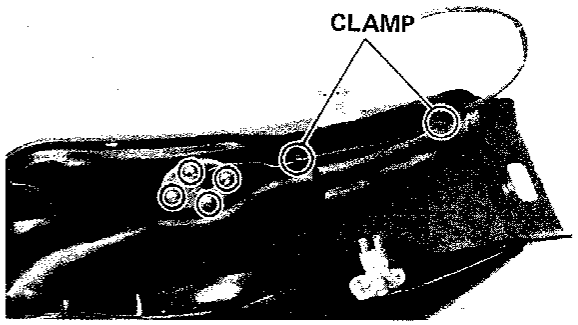
IMPORTANT NOTE:

Before reinstalling the components, connect the LCD assembly to the motorcycle and check that it is function properly.

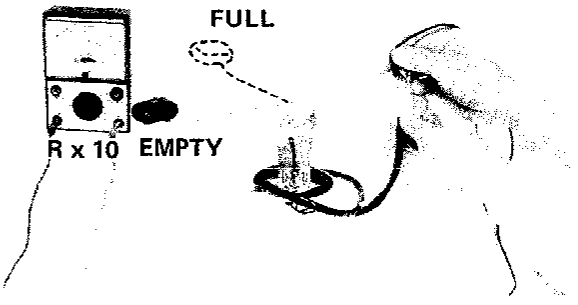
19. Reinstall the entire unit in the instrument panel.
20. Reinstall the instrument panel back to the motorcycle.
21. Check that the COM system is functioning properly.

E. Computerized Monitor Sending Units Check

1. Fuel tank sending unit
   Use a pocket tester (with ohm x 10 scale) for this check.
   a. Remove the sending unit from the fuel tank.



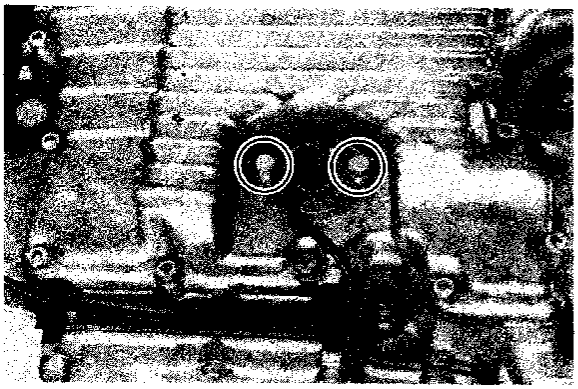
   b. Connect the pocket tester leads across the green wire and the black wire of the sending unit. The meter should show the following resistances at the specified fuel level. If not, replace.



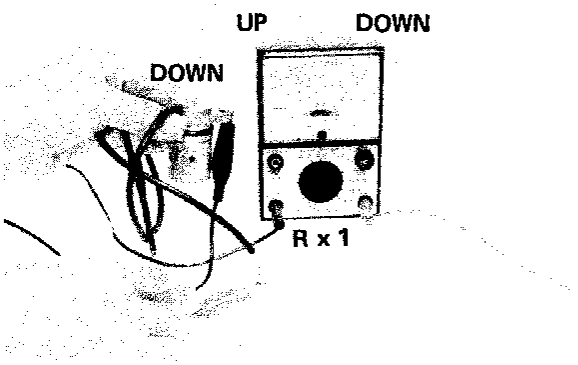
Fuel sender resistance	
Full	20 ~ 30Ω
1/2	160 ~ 180Ω
Empty	300 ~ 330Ω

2. Oil level sensor
   Use a pocket tester (with ohm x 1 scale) for this check.

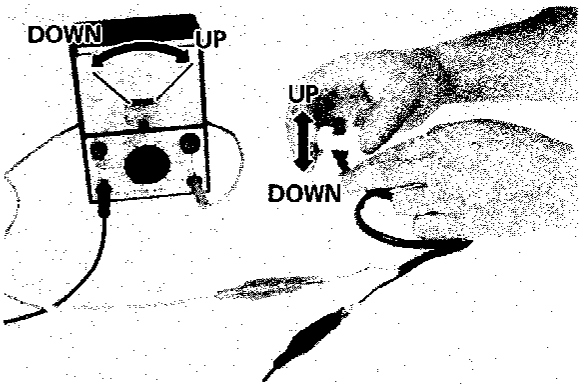
a. Remove the sending unit from the engine.



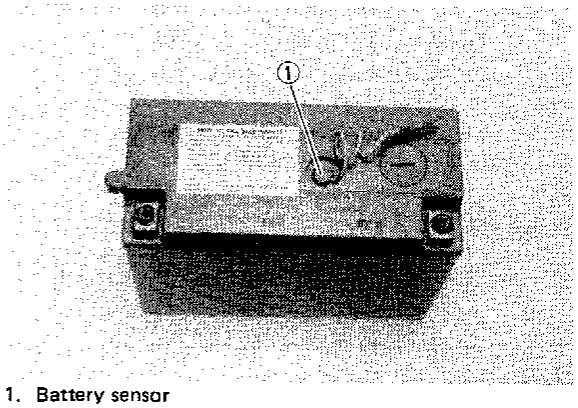
b. Connect the pocket tester leads as shown.
When the oil level sensor stands up right, the tester should read infinity. When the sensor stands up side down, the tester should read 0 ohms.



3. Brake fluid sensor (Front and Rear)
Use a pocket tester (with ohm x 1 scale) for this check.
a. Remove the master cylinder from the motorcycle. And remove the brake fluid sensor from the master cylinder.
b. Connect the pocket tester leads as shown. When the brake fluid sensor stands up right, the tester should read 0 ohms. When the sensor stands up side down, the tester should read infinity.

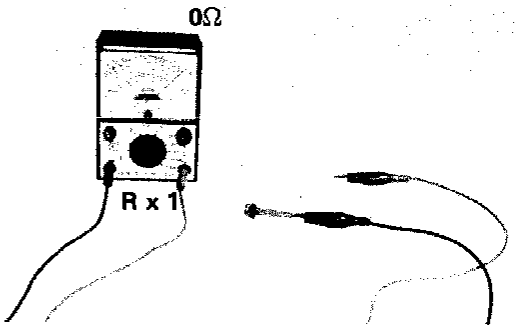


4. Battery fluid sensor
a. Remove the seat and remove the battery sensor from the battery.



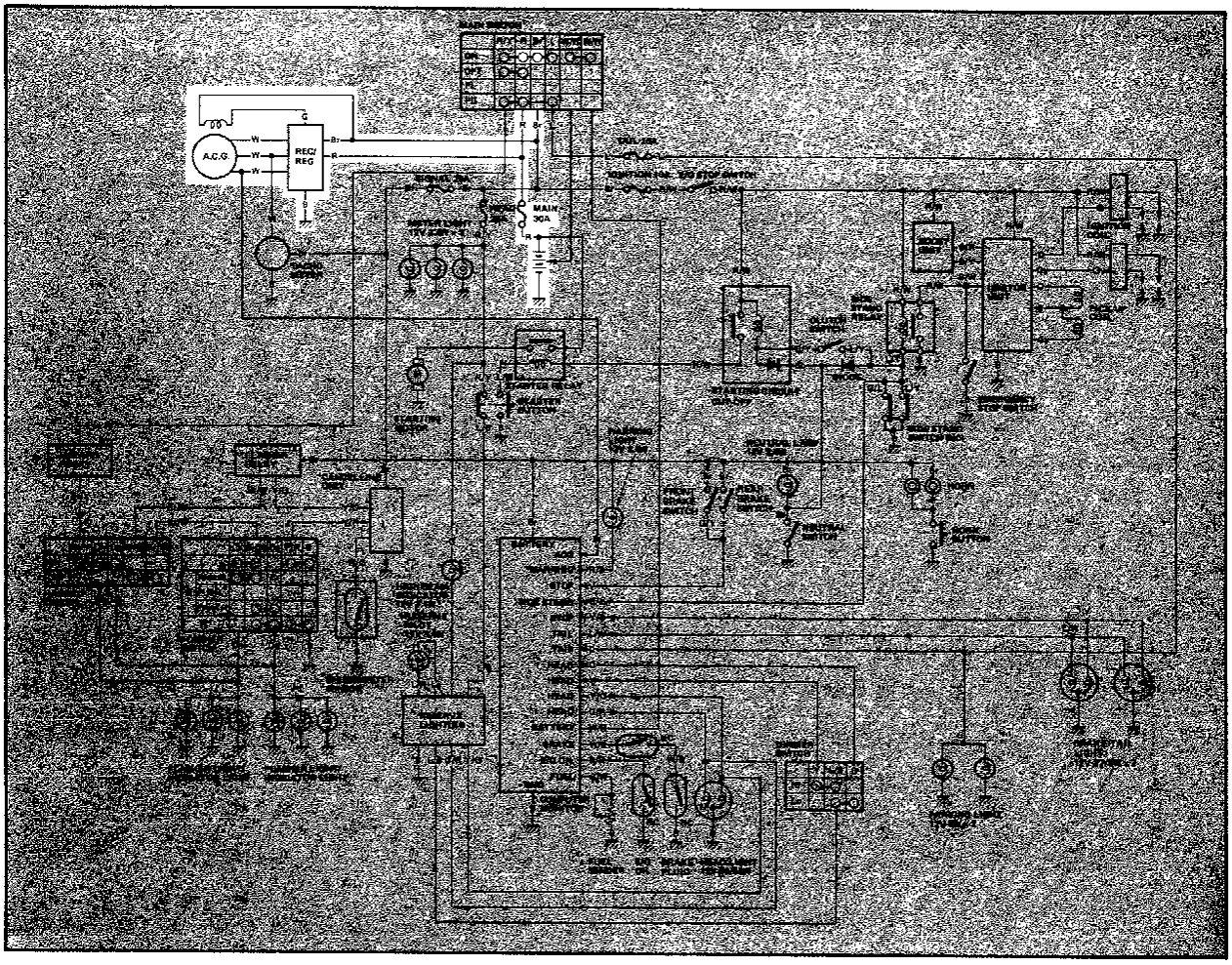
1. Battery sensor

Use a pocket tester (with ohm x 1 scale) for this check.
b. Connect the pocket tester leads as shown.
The tester needle should swing to 0 Ω. Replace the switch if it shows infinite vesistance (∞) .

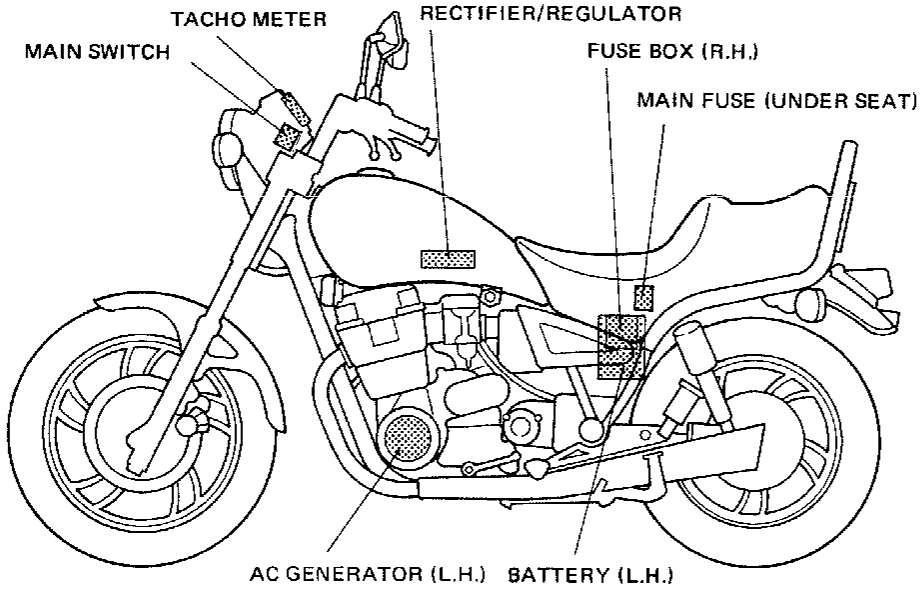


5. Check each sensor and replace it, if necessary. Next, check the main wire harness between the sensor connector and the computer monitor for breakage. If both wire harness and sensors are in good condition, replace the computer monitor.

TACHOMETER



This circuit diagram shows the electric tachometer circuit in the wiring diagram.

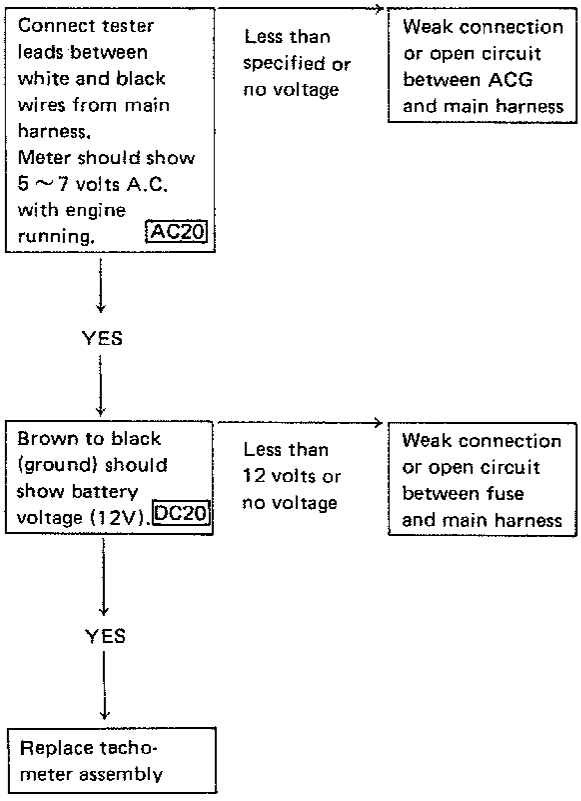


A. Description

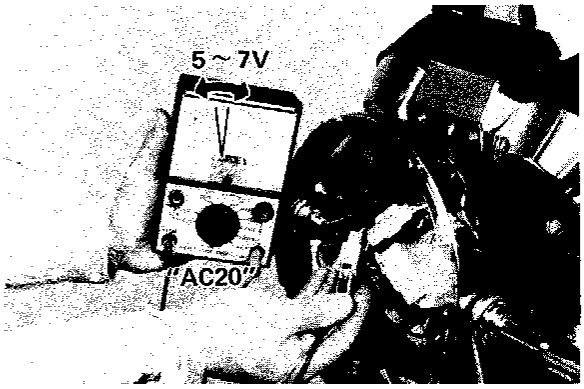
This model has been equipped with an electric tachometer. This tachometer receives its impulses from one of the stator leads of the alternator.

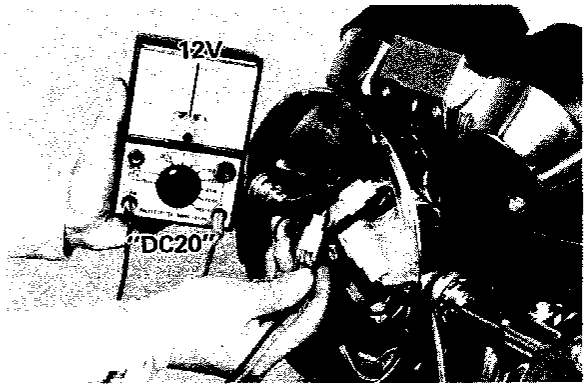
B. Troubleshooting/Inspection

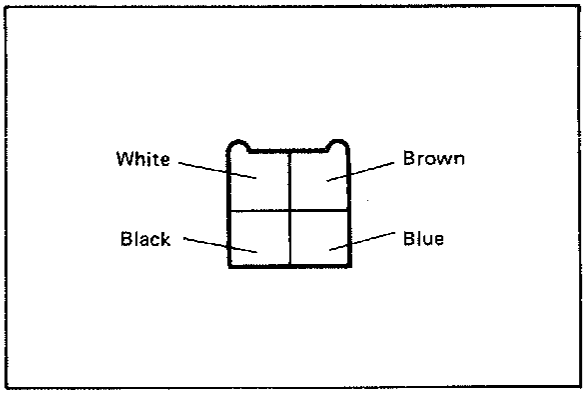
1. If the tachometer should become inoperative, the following troubleshooting steps will be useful.



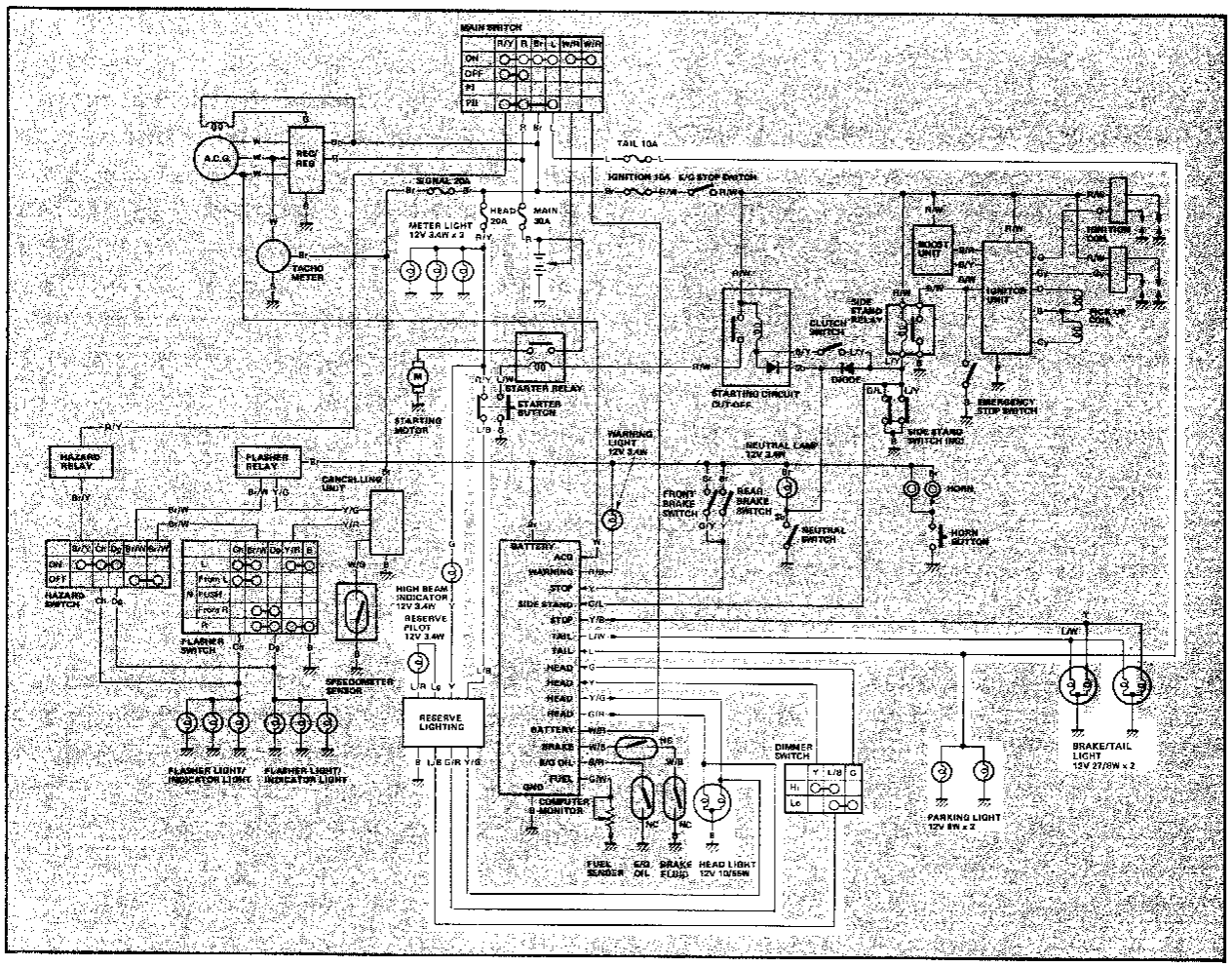
a. Remove the headlight rim.
b. Turn the ignition switch to the "ON" position.
c. Inside the headlight shell disconnect the tachometer leads from the main harness. Use a pocket tester to check and set the meter selector to the "AC 20" and "DC 20" position.



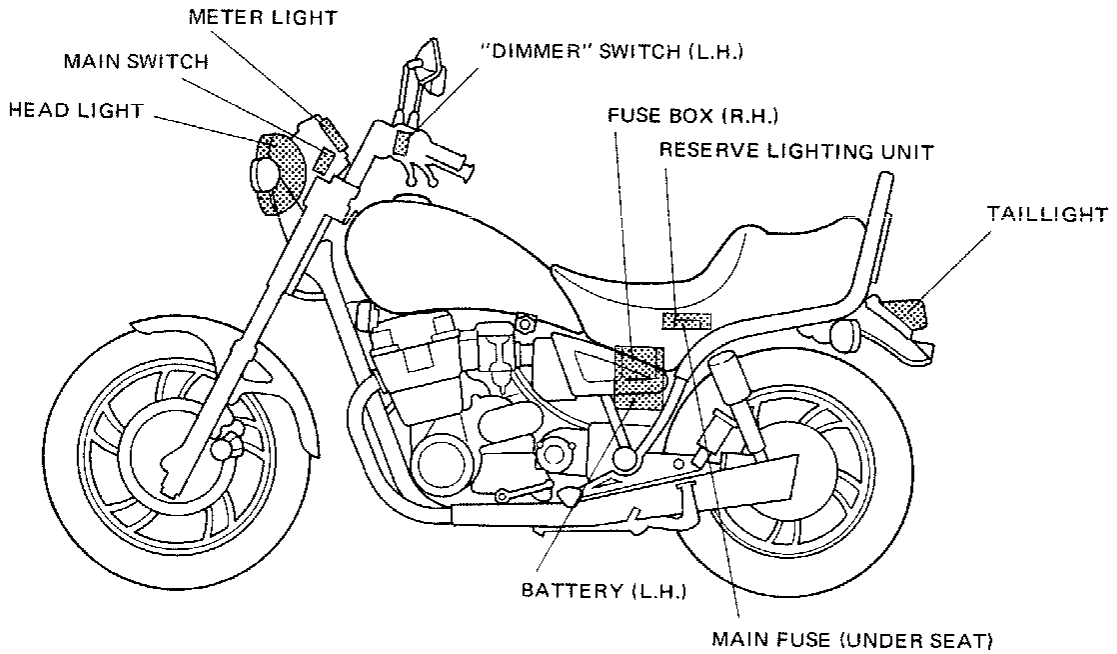




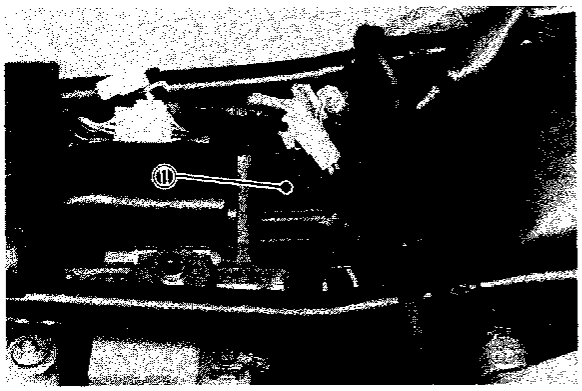
LIGHTING SYSTEMS



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



A. Reserve Lighting System



1. Reserve lighting unit

The reserve lighting system has two functions: (1) it notifies the rider that one of the head lamp filaments is inoperative, and (2) it switches current from the inoperative filament to the remaining functional filament.
The system is connected to the headlight circuit only. The reserve lighting system unit is located under the seat.

Headlight condition	Headlight failure indicator light	Reserve lighting function
Normal	Comes on (very dim)	–
High beam faulty	Comes on	Low beam comes on
Low beam faulty	Comes on	High beam comes on at low brilliance

B. Lighting Tests and Checks

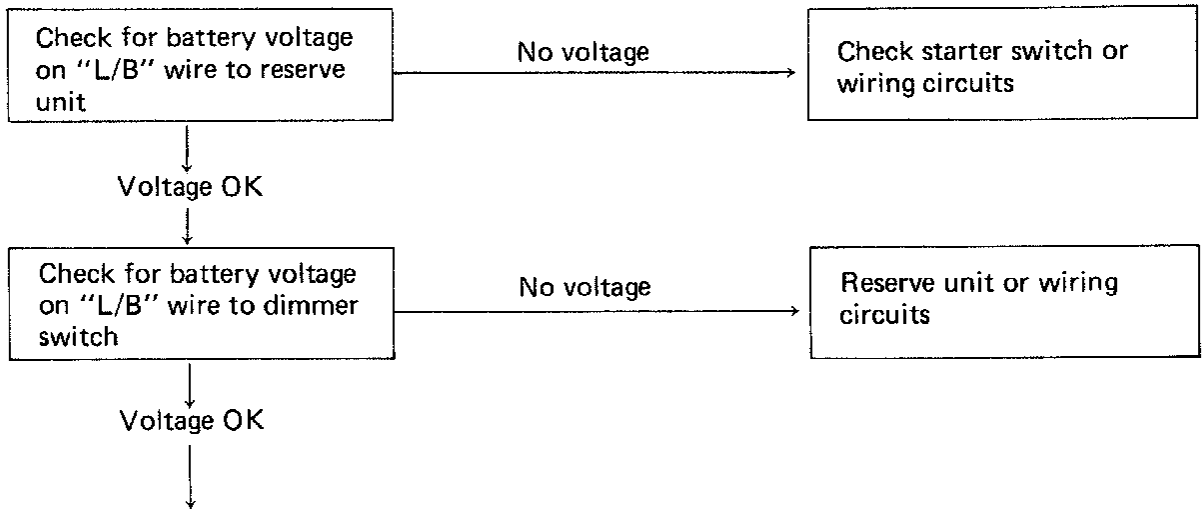
The battery provides power for operation of the headlight, taillight, and meter lights. If none of the above operates, always check battery voltage before proceeding further. Low battery voltage indicates either a faulty battery, low battery electrolyte, or a defective charging system. See page 6-19 "CHARGING SYSTEM" for checks of the battery and charging system. Also check fuse condition. Replace any "open" fuses. There are individual fuses for various circuits (see the complete circuit diagram).

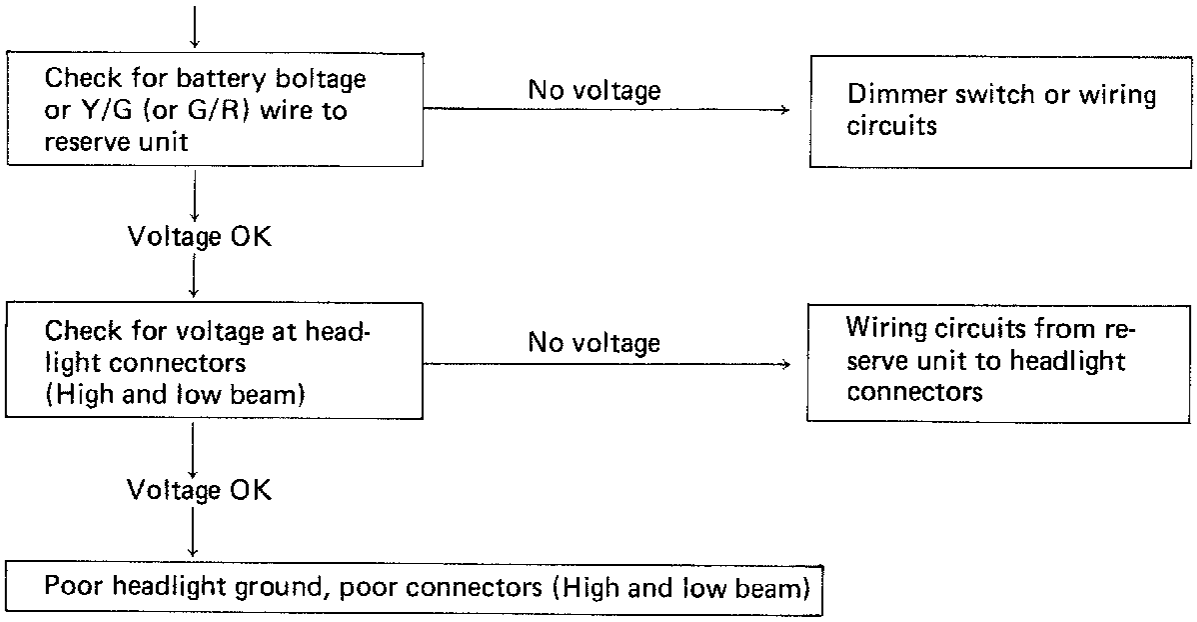
NOTE:
Check the headlight bulb first before performing the following check.

1. Headlight check.

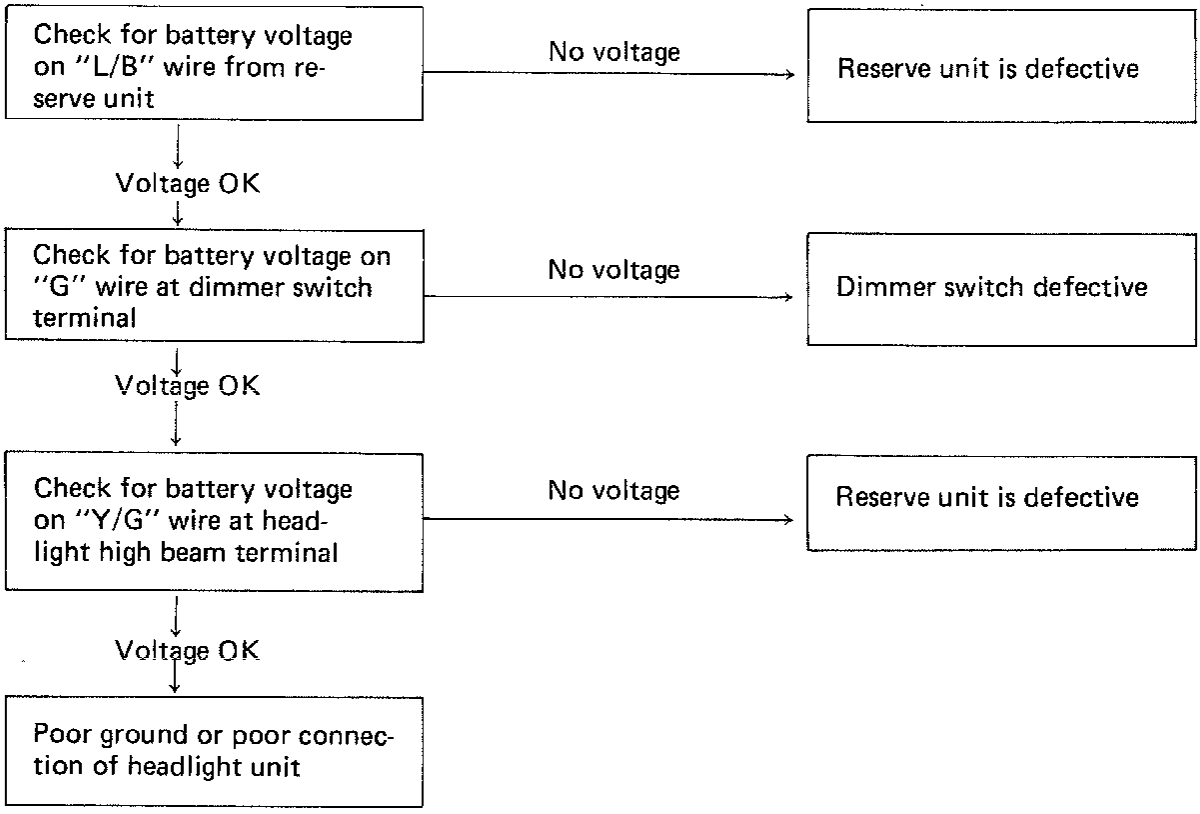
NOTE:
When the engine is started, the headlight and meter lights come on automatically and the lights stay on until the main switch is turned to "OFF" even if the engine stalls.

a. HEADLIGHT DOES NOT FUNCTION:

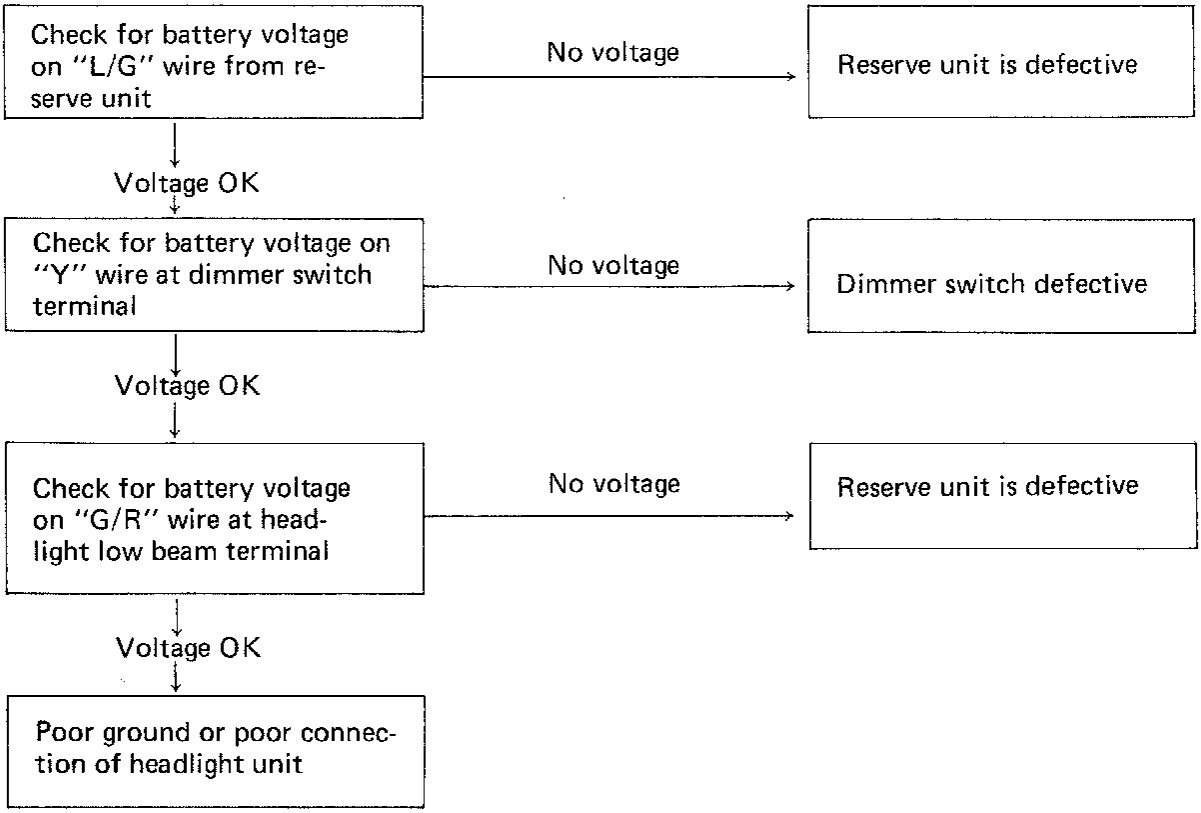




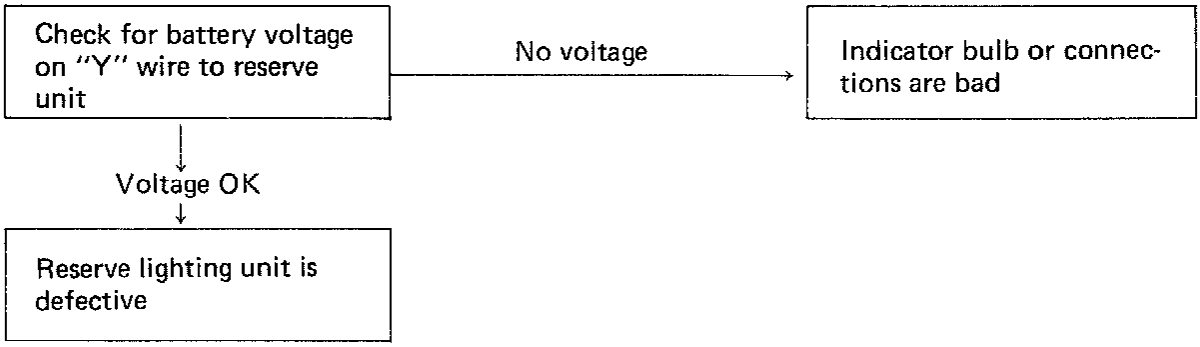
5. HIGH BEAM DOES NOT LIGHT WHEN LOW BEAM IS DEFECTIVE:



c. LOW BEAM DOES NOT LIGHT WHEN HIGH BEAM IS DEFECTIVE:

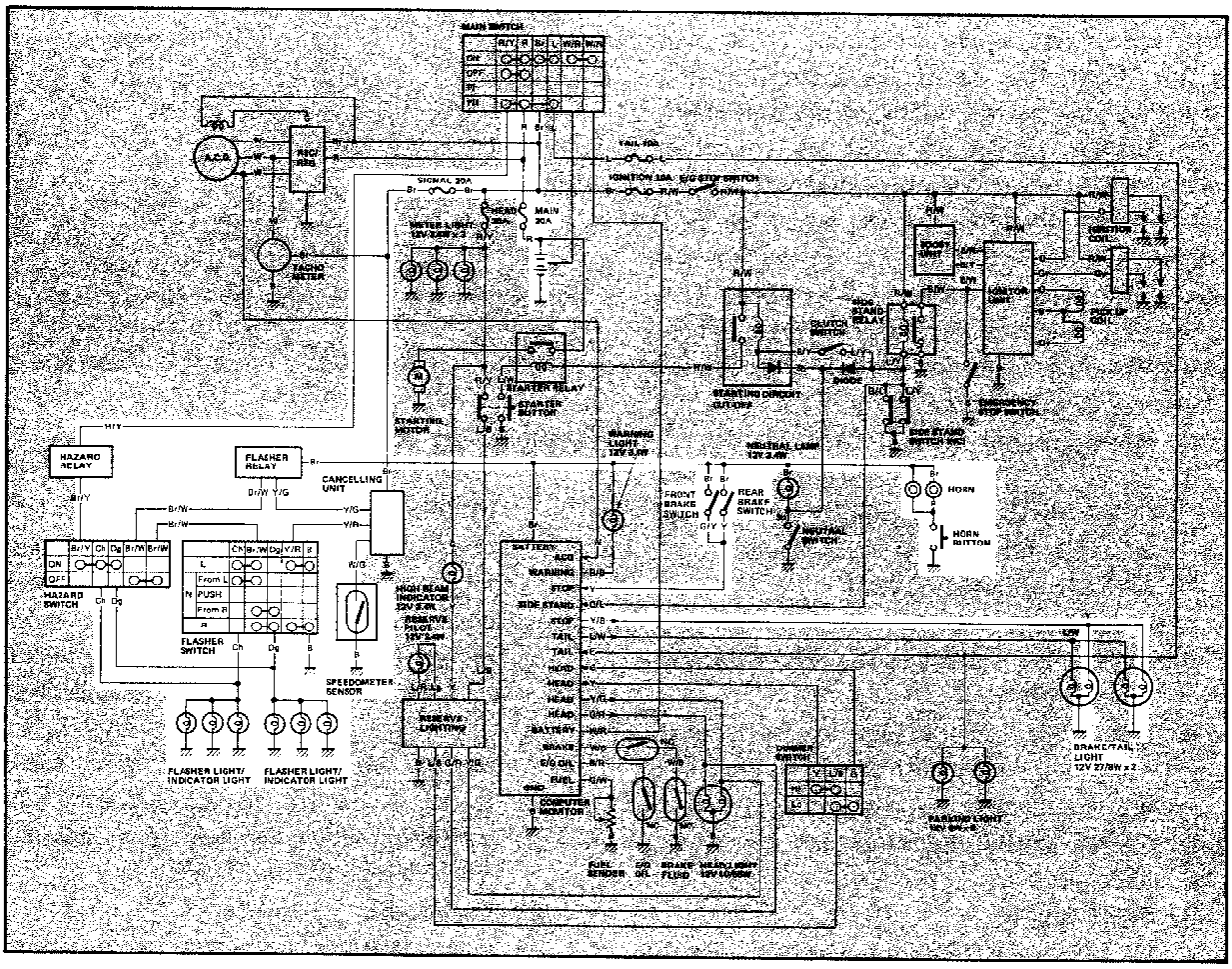


d. HIGH BEAM INDICATOR BULB DOES NOT GLOW:

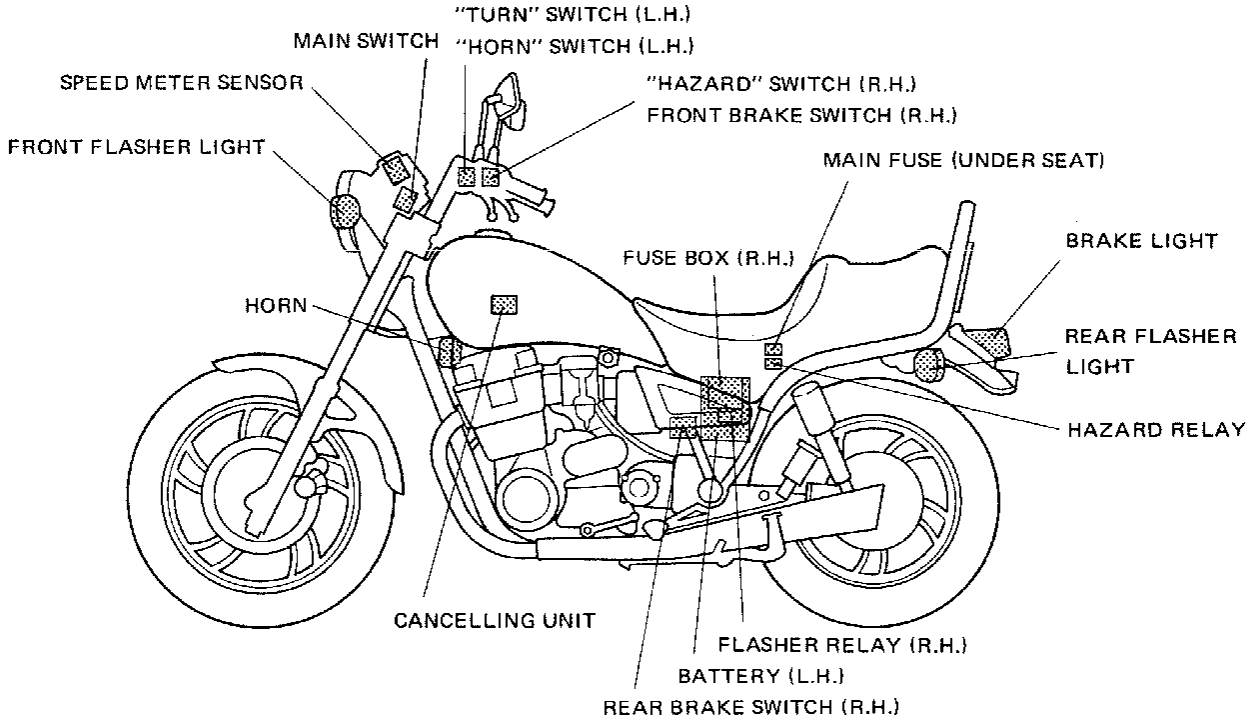


2. Taillight does not work.
   - Check the bulb.
   - Check for 12V on the blue wire.
   - Check for ground on black wire to tail/brake light assembly.

SIGNAL SYSTEM



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

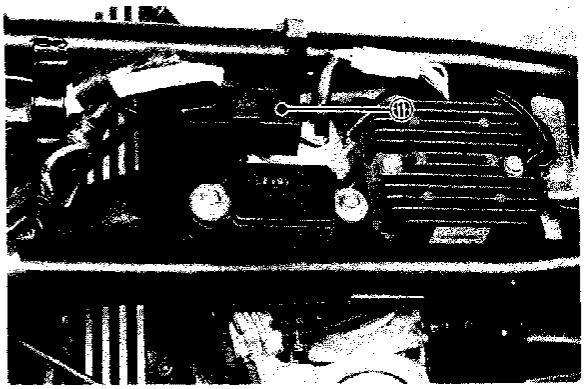


A. Signal System Tests and Checks

The battery provides power for operation of the horn, brake light, indicator lights, and flasher light. If none of the above operates, always check battery voltage before proceeding further. Low battery voltage indicates either a faulty battery, low battery water, or a defective charging system. See page 6-19 "CHARGING SYSTEM" for checks of battery and charging system. Also check fuse condition. Replace any "open" fuses. There are individual fuses for various circuits (see complete Circuit Diagram).

1. Horn does not work:
   a. Check for 12V on brown wire to horn.
   b. Check for good grounding of horn (pink wire) when horn button is pressed.
2. Brake light does not work:
   a. Check bulb.
   b. Check for 12V on yellow/white wire to brake light.
   c. Check for 12V on brown wire to each brake light switch (front brake and rear brake switches).
4. Flasher light(s) do not work:
   a. Check bulb.
   b. Right circuit:
      1) Check for 12V on dark green wire to light.
      2) Check for ground on black wire to light assembly.
   c. Left circuit:
      1) Check for 12V on dark brown wire to light.
      2) Check for ground on black wire to light assembly.
   d. Right and left circuits do not work:
      1) Check for 12V on brown/white wire to flasher switch on left handlebar.
      2) Check for 12V on brown wire to flasher relay.
      3) Replace flasher relay.
      4) Replace flasher switch.
   e. Check flasher self-cancelling system. (Refer to flasher self-cancelling system.)
5. Neutral light does not work:
   a. Check bulb.
   b. Check for 12V on sky blue wire to neutral switch.
   c. Replace neutral switch.

B. Self-Cancelling Flasher System

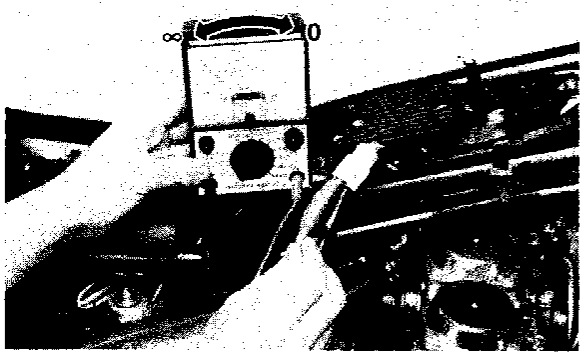


1. Self-cancelling flasher unit

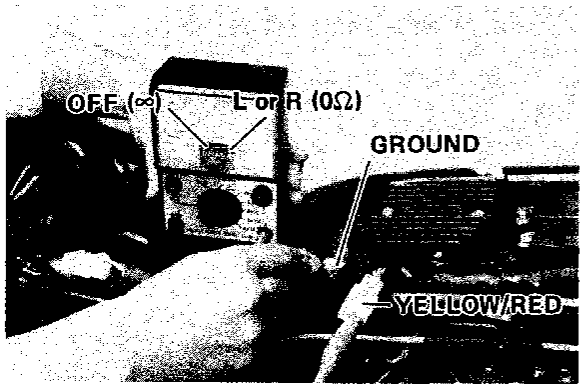
1. Description:
   The self-cancelling flasher system turns off the turn signal after a period of time or distance involved in turning or changing lanes. Generally, the signal will cancel after either 10 seconds, or 150 meters (164 yards), whichever is greater. At very low speed, the function is determined by distance; at high speed, it is determined by time. At low speed, especially when changing speeds, the cancelling determination is a combination of both time and distance.
2. Operation:
   The handle switch has three positions: L (left), OFF, and R (right). The switch lever will return to the "OFF" position after being pushed to L or R, but the signal will function. By pushing the lever in, the signal may be cancelled manually.
3. Inspection:
   If the flasher self-cancelling system should become inoperative, proceed as follows:
   a. Pull off the 6-pin connector from the flasher cancelling unit, ground the yellow/green lead to the frame, and operate the handle switch. If the signal operates normally in L, R, and OFF, the following are in good condition.
      2) Bulb
      3) Lighting circuit
      4) Handle switch light circuit

      If (1) through (4) are in good condition, the following may be faulty:
      1) Flasher cancelling unit.
      2) Handle switch reset circuit.
      3) Speedometer sensor circuit.

b. Pull off the 6-pin connector from the flasher cancelling unit, and connect a tester (ohms x 100 range) across the white/green and the black lead wires on the wire harness side. Turn the speedometer shaft. If the tester needle swing back and forth between 0 and ∞, the speedometer sensor circuit is in good condition. If not, the sender or wire harness may be inoperative.



c. Pull off the 6-pin connector from the flasher cancelling unit. Check if there is continuity between the yellow/red lead wire on the wire harness side and the chassis.



Flasher switch OFF:	∞
Flasher switch L or R:	0 ohms

If the tester needle does not swing as indicated above, check the handle switch circuit and wire harness.

d. If no defect is found with the above three check-ups and the flasher cancelling system is still inoperative, replace the flasher cancelling unit.

e. If the signal flashes only when the handle switch lever is turned to L or R and it turns off immediately when the handle switch lever returns to center, replace the flasher cancelling unit.

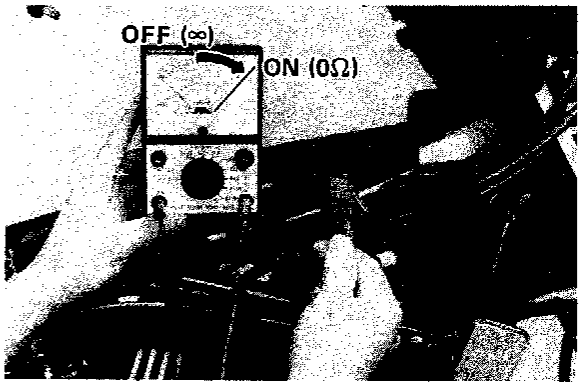
C. "HAZARD" Flasher (Emergency Flasher)

1. Operation:
   Both sides of the front and rear flasher lights will flash simultaneously when the "HAZARD" switch is turned on. The "HAZARD" switch is located on bottom of the right handlebar switch assembly. The "HAZARD" flasher will operate when the main switch is in the "ON", "OFF", or "P" position.
2. Inspection:
   If the "HAZARD" flasher should become inoperative, proceed as follows:

a. Push the "TURN" switch to the left and right in the main switch "ON" position. If the signal operates normally in L, and R the following are in good condition.
   1) Bulbs
   2) Lighting circuit from the handlebar switch to the bulbs.

   If 1), and 2) above are in good condition, the following may be faulty:
   1) "HAZARD" switch
   2) "HAZARD" flasher relay unit
   3) Lighting circuit from the relay unit to the switch and/or to the main fuse.

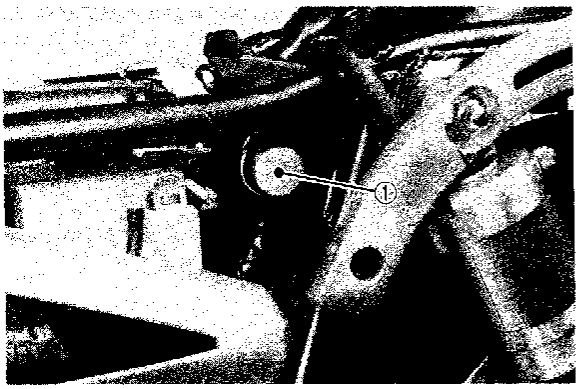
b. Disconnect the lead wire from the right handlebar switch at the 6-pin connector under the fuel tank. Check if there is continuity between the chocolate, dark green and brown/yellow lead wires.



"HAZARD" switch "OFF":	∞
"HAZARD" switch "ON":	0 ohm

If the tester needle does not swing as indicated above, check the handlebar switch circuit and wire harness.

c. If no defect is found with the above two check-ups and the "HAZARD" flasher is still inoperative, replace the hazard flasher unit.



1. Hazard relay

SWITCHES

Switches may be checked for continuity with a pocket tester on the "ohm x 1" position.

1. Main switch

Switch Position	Wire Color					
	R/Y	R	Br	L	W/R	W/R
OFF	○—○					
ON	○—○		○—○		○—○	
P_I						
P_{II}	○—○					

2. Engine stop switch (right handlebar)

Switch Position	Wire Color	
	R/W	R/W
RUN	○——	——○
OFF		

3. "HAZARD" switch (right handlebar)

Switch Position	Wire Color				
	Br/W	Br/W	Dg	Ch	Br/Y
OFF	○—○				
ON			○—	—○—	—○

4. Starter switch (right handlebar)

Switch Position	Wire Color			
	R/Y	L/B	L/W	B
OFF	○——○			
ON			○—	—○

5. Dimmer switch (left handlebar)

Switch Position	Wire Color		
	Y	L/W	G
HI	○——○		
LO		○—	—○

6. Horn switch (left handlebar)

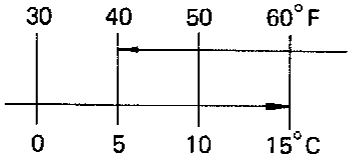
Switch Position	Wire Color	
	P	B
FREE		
PUSH	○—	—○

7. Turn switch (left handlebar)

Switch Position		Wie Color				
		Dg	Br/W	Ch	Y/R	B
R		○—○			○—	—○
N	R → N	○—○				
	PUSH					
	L → H		○—	—○		
L			○—	—○	○—	—○

SPECIFICATIONS

GENERAL SPECIFICATIONS

Item \ Model	XJ1100J
Model:	
IBM Number	10M
Frame Starting Number	10M-000101
Engine Starting Number	10M-000101
Dimensions:	
Overall Length	2,250 mm (88.6 in)
Overall Width	870 mm (34.3 in)
Overall Height	1,195 mm (47.0 in)
Seat Height	765 mm (30.1 in)
Wheelbase	1,545 mm (60.8 in)
Minimum Ground Clearance	155 mm (6.1 in)
Basic Weight:	
With Oil and Full Fuel Tank	277 kg (610 lb)
Minimum Turning Radius:	2,700 mm (106.3 in)
Engine:	
Engine Type	Air cooled 4-stroke, gasoline, DOHC
Cylinder Arrangement	Forward inclined, 4-cyclinder
Displacement	1,101 cm^3 (67.18 cu.in)
Bore x Storke	71.5 x 68.6 mm (2.815 x 2.701 in)
Compression Ratio	9.0 : 1
Compression Pressure	981 kPa (10 kg/cm^2, 142 psi)
Starting System	Electric starter
Lubrication System:	Wet sump
Oil Tupe or Grade (4-Cycle):	
Engine oil	
	Yamalube 4-cycle oil or SAE 20W40 type SE motor oil (If temperature does not go below 5°C (40°F).)
	SAE 10W30 type SE motor oil (If temperature does not go above 15°C (60°F).)
Middle/Final Gear Oil	SAE 80 API "GL-4" Hypoid gear oil
Oil Capacity (4-Cycle):	
Engine Oil:	
Periodic Oil Change	3.0 L (2.64 Imp qt, 3.17 US qt)
With Oil Filter Replacement	3.5 L (3.08 Imp qt, 3.70 US qt)
Total Amount	4.0 L (3.52 Imp qt, 4.23 US qt)
Middle Gear Case Oil Amount	0.375 L (0.33 Imp qt, 0.40 US qt)
Final Gear Case Oil Amount	0.30 L (0.26 Imp qt, 0.32 US qt)
Air Filter:	Dray type element
Fuel:	
Type	Regular gasoline
Tank Capacity	19 L (4.18 Imp gal, 5.02 US gal)
Reserve Amount	4.1 L (0.9 Imp gal, 1.09 US gal)
Carburetor:	
Type/Manufacturer	BS34 x 4

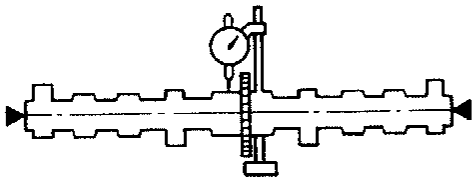
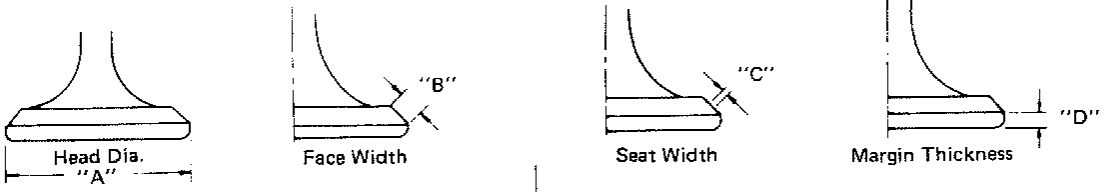
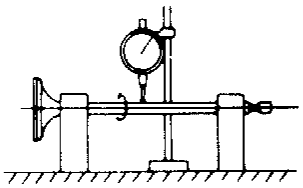
Item \ Model	XJ1100J	
Spark Plug:		
Type/Manufacturer	BP6ES (NGK), W20EP-U (NIPPONDENSO)	
Gap	0.7 ~ 0.8 mm (0.028 ~ 0.031 in)	
Clutch Type:	Wet, multiple-disc	
Transmission:		
Primary Reduction System	Gear	
Primary Reduction Ratio	58/35 (1.657)	
Secondary Reduction System	Shaft drive	
Secondary Reduction Ratio	44/47 x 19/18 x 33/10 (3.260)	
Transmission Type	Constant mesh, 5-speed	
Operation	Left foot operation	
Gear Ratio: 1st	38/17 (2.235)	
2nd	39/24 (1.625)	
3rd	36/28 (1.285)	
4th	32/31 (1.032)	
5th	30/34 (0.882)	
Chassis:		
Frame Type	Double cradle, Steel tube	
Caster Angle	29°30:	
Trail	130 mm (5.12 in)	
Tire:		
Type	Tubeless	
Size (F)	3.50H19-4PR	
Size (R)	130/90-16 67H	
Tire Pressure (Cold tire):	FRONT	REAR
Up to 90 kg (198 lb) load*	177 kPa (1.8 kg/cm², 26 psi)	196 kPa (2.0 kg/cm², 28 psi)
90 kg (198 lb) load ~ 213 kg (407 lb) load* (Maximum load)	196 kPa (2.0 kg/cm², 28 psi)	275 kPa (2.8 kg/cm², 40 psi)
High speed riding	225 kPa (2.3 kg/cm², 32 psi)	245 kPa (2.5 kg/cm², 36 psi)
	* Total weight of accessory, etc. excepting motorcycle.	
Brake:		
Front Brake Type	Disc brake (Double)	
Operation	Right hand operation	
Rear Brake Type	Disc brake	
Operation	Right foot operation	
Suspension:		
Front Suspension	Telescopic fork	
Rear Suspension	Swingarm	
Shock Absorber:		
Front Shock Absorber	Air, Coil spring, Oil damper	
Rear Shock Absorber	Air, Coil spring, Oil damper	
Wheel Travel:		
Front Wheel Travel	175 mm (6.89 in)	
Rear Wheel Travel	108 mm (4.25 in)	

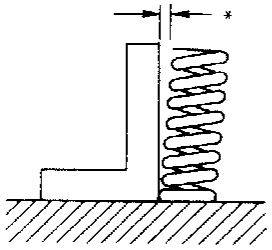
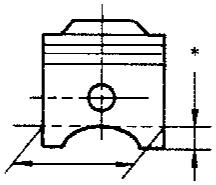
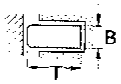
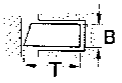
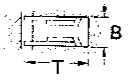
Item \ Model	XJ1100J
Electrical:	
Ignition System	T.C.I.
Generator System	A.C. generator
Battery Type or Model	GM18Z-3A
Battery Capacity	12V 20 AH
Headlight Type:	Semi-sealed beam (Quartz bulb)
Bulb Wattage/Quantity:	
Headlight	60W/55W (Quartz bulb)
Tail/Brake Light	8W (3 cp)/27W (32 cp) x 2
Flasher Light	27W (32 cp) x 4
Licence Light	8 W (3 cp) x 2
Meter Light	3.4W x 3
Indicator Light Wattage/Quantity:	
"NEUTRAL"	3.4W x 1
"HIGH BEAM"	3.4W x 1
"TURN"	3.4W x 2
"HEAD LAMP"	3.4W x 1
"WARNING"	3.4W x 1

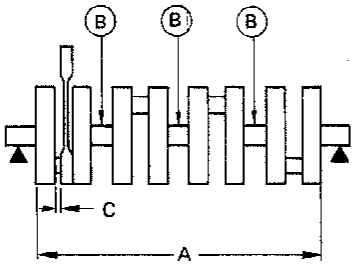
MAINTENANCE SPECIFICATIONS

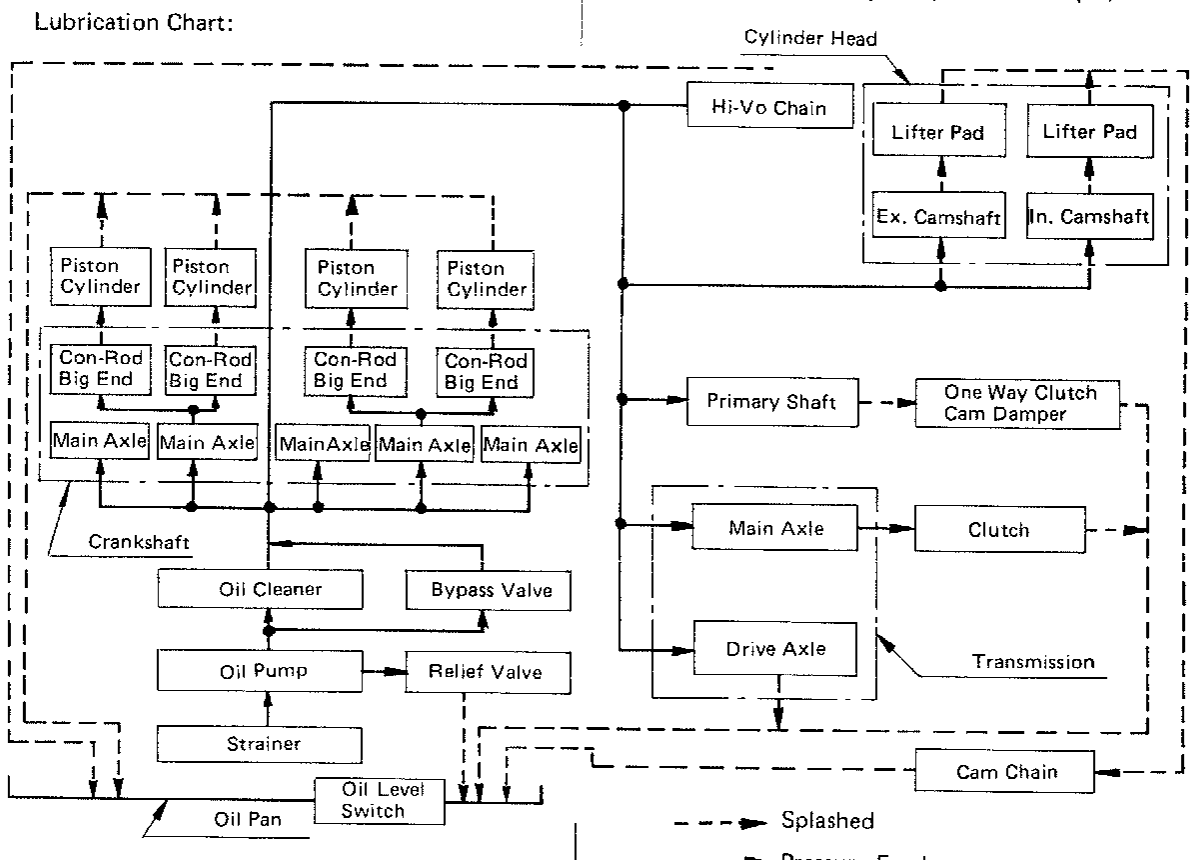
A. Engine

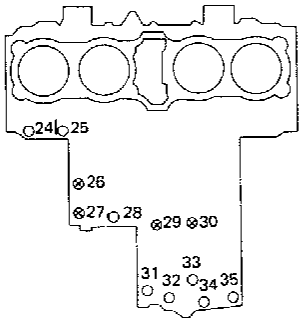
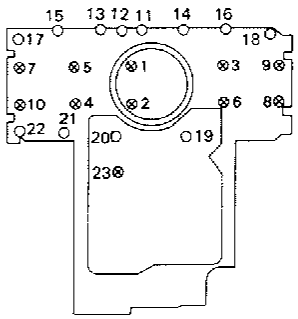
Item \ Model	XJ1100J
Cylinder Head:	
Warp Limit	0.25 mm (0.010 in) * Lines indicates straightedge measurement.
Cylinder:	
Bore Size (Limit)	71.6 mm (2.82 in)
Taper Limit	0.05 mm (0.002 in)
Out-of-round Limit	0.01 mm (0.0004 in)
Camshaft:	
Drive Method	Chain
Camshaft Outside Diameter:	24.967 ~ 29.980 mm (0.9830 ~ 0.9835 in)
Shaft-to-cap Clearance	0.020 ~ 0.054 mm (0.0008 ~ 0.0021 in)
< Cap Clearance Limit >	0.160 mm (0.006 in)
Cam Dimensions:	
Intake/Exhaust "A"	36.80 ± 0.05 mm (1.449 ± 0.002 in)
< Limit >	36.65 mm (1.443 in)
"B"	28.31 ± 0.05 mm (1.115 ± 0.002 in)
< Limit >	28.19 mm (1.11 in)
"C"	8.80 mm (0.347 in)

Item		Model XJ1100J
Camshaft Runout Limit		0.1 mm (0.004 in)
		
Cam Chain Type/Number of Links		Bushing chain/128 links
Cam Chain Adjustment Method		Manual
Valve, Valve Seat, Valve Guide:		
Valve Clearance (Cold)	IN.	0.11 ~ 0.15 mm (0.0043 ~ 0.0059 in)
	EX.	0.21 ~ 0.25 mm (0.0083 ~ 0.0098 in)
Valve Dimensions		
		
"A" Head Dia.	IN.	38 mm (1.496 in)
	EX.	32 mm (1.260 in)
"B" Face Width	IN./EX.	2.26 ± 0.57 mm (0.0890 ± 0.0224 in)
"C" Seat Limit Width	IN./EX.	1.1 ± 0.1 mm (0.0433 ± 0.0039 in)
"D" Margin Thickness Limit	IN./EX.	0.7 mm (0.0276 in)
Stem Outside Diameter	IN./EX.	$7\ ^{-0.010}_{-0.025}$ mm ($0.2756\ ^{-0.0004}_{-0.0010}$ in)
Guide Inside Diameter	IN./EX.	$7\ ^{+0.015}_{0}$ mm ($0.2756\ ^{+0.0006}_{0}$ in)
Stem-to-guide Clearance	IN.	0.010 ~ 0.040 mm (0.0004 ~ 0.0016 in)
	EX.	0.025 ~ 0.055 mm (0.0010 ~ 0.0022 in)
Stem Runout Limit		0.03 mm (0.0012 in)
		
Valve Seat Width Standard		1.2 mm (0.047 in)
< Limit >		2.0 mm (0.080 in)
Valve Spring:		
Free Length		
Inner Spring	IN./EX.	35.6 mm (1.402 in)
Outer Spring	IN./EX.	39.9 mm (1.571 in)
Compressed Length (Valve Closed)		
Inner Spring	IN./EX.	23.0 mm (0.906 in)
Outer Spring	IN./EX.	26.0 mm (1.024 in)

Item		Model: XJ1100J
Tilt Limit*	IN.	1.6 mm (0.063 in)
	EX.	1.75 mm (0.069 in)
		
Direction of Winding (Top view)		INTAKE: Outer / Inner / Intake; EXHAUST: Outer / Inner / Exhaust
Piston:		
Measuring Point* 		10 mm (0.4 in) (From bottom line of piston skirt)
Piston Clearance		0.050 ~ 0.055 mm (0.0020 ~ 0.0022 in)
< Limit >		0.1 mm (0.0039 in)
Oversize:	1st	71.75 mm (2.82 in)
	2nd	72.00 mm (2.83 in)
	3rd	72.25 mm (2.84 in)
	4th	72.50 mm (2.85 in)
Piston Ring:		
Sectional Sketch		
	Top Ring	Plain B = 1.2 mm (0.047 in) T = 3 mm (0.12 in)
	2nd Ring	Plain B = 1.5 mm (0.06 in) T = 3 mm (0.12 in)
	Oil Ring	B = 0.45 mm (0.018 in) T = 2.25 mm (0.089 in)
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	0.2 ~ 0.9 mm (0.008 ~ 0.035 in)
< Limit >	Top Ring	1.0 mm (0.039 in)
	2nd Ring	1.0 mm (0.039 in)
	Oil Ring	1.5 mm (0.059 in)
Side Clearance	Top Ring	0.04 ~ 0.08 mm (0.0016 ~ 0.0031 in)
	2nd Ring	0.03 ~ 0.07 mm (0.0012 ~ 0.0028 in)
	Oil Ring	0 mm (0 in)
< Limit >	Top Ring	0.15 mm (0.0059 in)
	2nd Ring	0.15 mm (0.0059 in)

Item \ Model	XJ1100J
Connecting Rod:	
Oil Clearance	0.042 ~ 0.064 mm (0.0017 ~ 0.0025 in)
Color Code (Corresponding Size)	1. Blue: $1.5\ ^{+0.001}_{-0.003}$ mm ($0.059\ ^{+0.00004}_{-0.00012}$ in) 2. Black: $1.5\ ^{-0.003}_{-0.007}$ mm ($0.059\ ^{-0.00012}_{-0.00028}$ in) 3. Brown: $1.5\ ^{-0.007}_{-0.011}$ mm ($0.059\ ^{-0.00028}_{-0.00043}$ in) 4. Green: $1.5\ ^{-0.001}_{-0.015}$ mm ($0.059\ ^{-0.00004}_{-0.00059}$ in) 5. Yellow: $1.5\ ^{-0.015}_{-0.019}$ mm ($0.059\ ^{-0.00059}_{-0.00075}$ in)
Crankshaft: 	
Assembly Width "A"	385.4 mm (15.17 in) ± 0.6 mm (0.024 in)
Runout Limit "B"	0.04 mm (0.0016 in)
Con-rod side clearance "C"	0.16 ~ 0.26 mm (0.006 ~ 0.01 in)
Oil Clearance	0.035 ~ 0.059 mm (0.0014 ~ 0.0023 in)
Color Code (Corresponding Size)	1. Blue: $1.5\ ^{+0.006}_{-0.002}$ mm ($0.059\ ^{+0.00024}_{-0.00008}$ in) 2. Black: $1.5\ ^{+0.002}_{-0.002}$ mm ($0.059\ ^{+0.00008}_{-0.00008}$ in) 3. Brown: $1.5\ ^{-0.002}_{-0.006}$ mm ($0.059\ ^{-0.00008}_{-0.00024}$ in) 4. Green: $1.5\ ^{-0.006}_{-0.010}$ mm ($0.059\ ^{-0.00024}_{-0.00039}$ in) 5. Yellow: $1.5\ ^{-0.010}_{-0.014}$ mm ($0.059\ ^{-0.00039}_{-0.00055}$ in)
Position of Thrust Bearing (From Left)	No. 4 Journal (upper)
Clutch:	
Friction Plate Thickness/Quantity	3 mm (0.12 in)/8
Wear Limit	2.8 mm (0.11 in)
Clutch Plate Thcikness/Quantity	2.6 mm (0.102 in)/1, 2.0 mm (0.079 in)/7
Warp Limit	0.1 mm (0.004 in)
Clutch Spring Free Length/Quantity	42.8 mm (1.685 in)/6
Clutch Spring Minimum Length	41.8 mm (1.646 in)
Primary Reduction Gear	
Backlash Tolerance	0.02 ~ 0.03 mm (0.0008 ~ 0.0012 in)
Clutch Release Method	Outer push (Cam, ball)
Transmission:	
Main Axle Deflection Limit	0.08 mm (0.0031 in)
Drive Axle Deflection Limit	0.08 mm (0.0031 in)
Shifter:	
Shifter Type	Guide bar

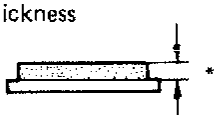
Item \ Model	XJ1100J
Carburetor:	
Type/Manufacturer/Quantity	BS34/HITACHI/4
I.D.Mark	10M-00
Main Jet (M.J.)	#112.5
Main Air Jet (M.A.J.)	#140
Jet Needle-clip Position (J.N.)	5GLZ-34
Needle Jet (N.J.)	X-2
Pilot Jet (P.J.)	#47.5
Pilot Air Jet (P.A.J.)	#170
Pilot Screw (P.S.)	Preset
Valve Seat (V.S.)	ϕ2.0
Starter Jet (G.S.)	#25
Fuel Level (F.L.)	3 ± 1 mm (0.12 ± 0.04 in)
Engine Idling Speed	1,100 r/min
Vacuum Synchronous Difference	Below 10 kPa (10 mmHg, 0.4 inHg)
Lubrication System:	
Oil Filter Type	Paper and Wire mesh
Oil Pump Type	Trochoid pump
Tip Clearance	0.12 mm (0.0047 in) or less
Side Clearance	0.03 ~ 0.08 mm (0.0012 ~ 0.0031 in)
Bypass Valve Setting Pressure	$196\ ^{+39.2}_{-29.4}$ kPa ($2\ ^{+0.4}_{-0.3}$ kg/cm^2, $28.4\ ^{+5.69}_{-4.27}$ psi)
Relef Valve Operating Pressure	490 ± 49 kPa (5 ± 0.5 kg/cm^2, 71.1 ± 7.11 psi)
Lubrication Chart:	
Middle Gear Backlash: < Limit >	0.10 ~ 0.20 mm (0.0039 ~ 0.0079 in) 0.20 mm (0.0079 in)
Final Gear Backlash: < Limit >	0.25 ~ 0.50 mm (0.010 ~ 0.020 in) 0.50 mm (0.020 in)

Item \ Model	XJ1100J
Crankcase Tightening Sequence: Left crankcase  ○ ..... 6 mm ⊗ ..... 8 mm	Right crankcase 

Torque Specifications

Item	Thread Size	Tightening torque		
		Nm	m·kg	ft·lb
Engine:				
Crankcase:				
Tightening bolt	M8	24	2.4	17
	M6	12	1.2	8.7
Straight screw plug	M18	12	1.2	8.7
Crankcase cover	M6	10	1.0	7.2
Cylinder head:				
Carburetor joint	M6	10	1.0	7.2
Stud bolt fitting nut	M8	20	2.0	14
Camshaft cap	M6	10	1.0	7.2
Filling nut	M10	35	3.5	25
Connecting rod	M8	40	4.0	29
Clutch	M6	10	1.0	7.2
	M8	12	1.2	8.7
Primary drive gear	M18	70	7.0	50
Generator cover	M6	10	1.0	7.2
A.C.G. Rotor	M10	65	6.5	47
Breather cover	M6	10	1.0	7.2
Cylinder head cover	M6	10	1.0	7.2
Camshaft	M7	20	2.0	14
Oil pump	M6	10	1.0	7.2
Transmission	M10	43	4.3	31
	M14	43	4.3	31
Strainer cover	M6	10	1.0	7.2
	M8	20	2.0	14
Pick-up coil	M6	8	0.8	5.8
Bearing housing	M6	10	1.0	7.2
Oil nozzle	M6	10	1.0	7.2
Oil filter		32	3.2	23
Crankcase – Cylinder holding	M10	20	2.0	14
	M5	8	0.8	5.8
Shifter	M6	10	1.0	7.2
Chain damper – Tensioner	M6	10	1.0	7.2
	M6	6	0.6	4.3
Chain tensioner – Rod	M8	9	0.9	6.5

B. Chassis

Item \ Model		XJ1100J
Steering System:		
Steering Bearing Type		Taper roller bearing
Front Suspension:		
Front Fork Travel		175 mm (6.89 in)
Fork Spring Free Length		599.2 mm (23.59 in)
Collor Length		
Spring Rate/Stroke		K_1 = 4.7 N/mm (0.477 kg/mm, 26.7 lb/in) 0 ~ 110 mm (0 ~ 4.33 in) K_2 = 5.3 N/mm (0.54 kg/mm, 30.2 lb/in) 110 ~ 175 mm (4.33 ~ 6.89 in)
Oil Capacity or Oil Level		250 cm^3 (8.82 Imp oz, 8.45 US oz) 210 mm (8.27 in) (From top of inner tube fully compressed without spring.)
Oil Grade		Yamaha fork oil 10 wt
Enclosed Air Pressure Max. ~ Min.		39.2 kPa (0.4 kg/cm^2, 5.7 psi) 118 ~ 39 kPa (1.2 ~ 0.4 kg/cm^2, 17 ~ 5.7 psi)
Rear Suspension:		
Shock Absorber Travel		80 mm (3.15 in)
Spring Free Length		269.5 mm (10.6 in)
Spring Rate		K_1 = 13.9 N/mm (1.42 kg/mm, 79.5 lb/in)
Enclosed Air Pressure Max. ~ Min.		98 kPa (1.0 kg/cm^2, 14 psi) 392 ~ 98 kPa (4.0 ~ 1.0 kg/cm^2, 57 ~ 14 psi)
Rear Arm:		
Swingarm Free Play Limit:	End Side	1.0 mm (0.04 in) 1.0 mm (0.04 in)
Wheel:		
Front Wheel Type		Cast Wheel
Rear Wheel Type		Cast Wheel
Front Rim Size/Material		MT1.85 x 19/Aluminum
Rear Rim Size/Material		MT3.00 x 16/Aluminum
Rim Runout Limit:	Vertical Lateral	2.0 mm (0.08 in) 2.0 mm (0.08 in)
Disc Brake:		
Type	Front Rear	Dual disc Single disc
Pad Thickness 	< Limit > *	0.8 mm (0.03 in)
Master Cylinder Inside Dia.	Front Rear	14 mm (0.55 in) 17.46 mm (0.69 in)
Caliper Cylinder Inside Dia.	Front Rear	38.18 mm (1.50 in) 38.18 mm (1.50 in)
Brake Fluid Type		DOT #3
Brake Lever & Brake Pedal:		
Brake Lever Free Play/Position		5 ~ 8 mm (0.2 ~ 0.3 in)/at lever end
Brake Pedal Position		0 mm (0 in)
Brake Pedal Free Play		13 ~ 15 mm (0.51 ~ 0.59 in) (Vertical height below footrest top.)
Clutch Lever Free Play/Position:		2 ~ 3 mm (0.08 ~ 0.12 in) at lever pivot

Recommended combinations of the front fork and the rear shock absorber.
Use this table as guidance to meet specific riding conditions and motorcycle load.

Front fork		Rear shock absorber		Loading condition			
Air pressure	Damping adjuster	Air pressure	Damping adjuster	Solo rider	With passenger	With accessory equipments	With accessory equipments and passenger
39.2 kPa (0.4 kg/cm^2, 5.7 psi)	1	98.1 kPa (1.0 kg/cm^2, 14 psi)	1	○			
58.8 kPa (0.6 kg/cm^2, 8.5 psi)	2	196 kPa (2.0 kg/cm^2, 28 psi)	2	○	○		
78.5 kPa (0.8 kg/cm^2, 11 psi)	3	294 kPa (3.0 kg/cm^2, 43 psi)	3		○	○	
118 kPa (1.2 kg/cm^2, 17 psi)	4	392 kPa (4.0 kg/cm^2, 57 psi)	4			○	○

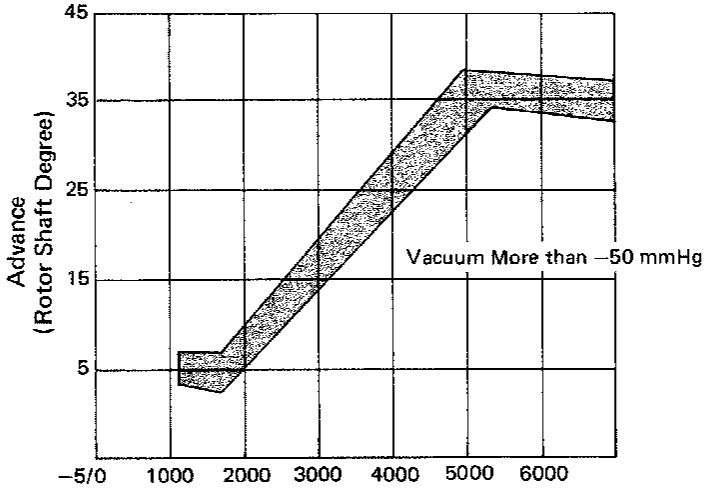
Tightening Torque

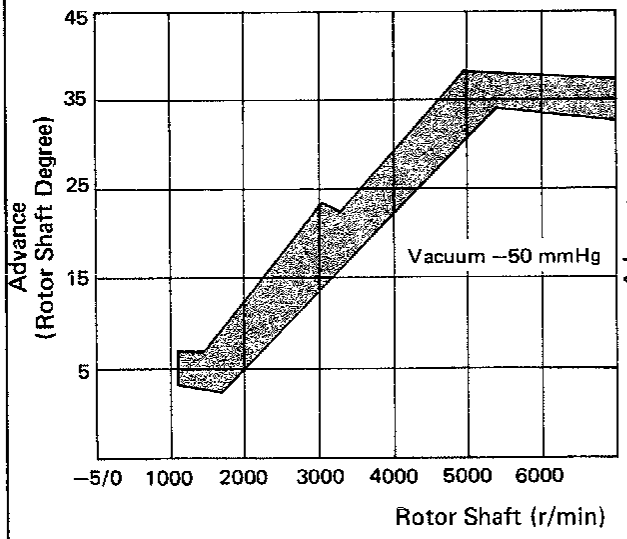
Item	Thread Size	Tightening torque		
		Nm	m•kg	ft•lb
Chassis:				
Front wheel	M14	110	11.0	80
Front fender	M8	15	1.5	11
Inner tube:				
Under bracket	M8	20	2.0	14
Handle crown	M8	30	3.0	22
Front fork:				
Caliper	M10	37	3.7	27
Axle holder	M8	20	2.0	14
Handle crown:				
Steering shaft	M14	85	8.5	61
Pinch	M8	30	3.0	22
Handle holder (front)	M8	20	2.0	14
Handle holder (rear)	M10	50	5.0	36
Handle holder:				
Handle left/right	M8	30	3.0	22
Special washer	M8	20	2.0	14
Bar handle:				
Handle L/R (upper)	M6	13	1.3	9.4
Handle L/R (side)	M6	13	1.3	9.4
Cast wheel – Disc	M8	20	2.0	14
Master cylinder:				
Bracket	M6	8	0.8	5.8
Brake hose	M10	25	2.5	18
Brake hose:				
Caliper	M10	25	2.5	18
Joint	M10	25	2.5	18
Brake pipe	M10	20	2.0	14
Proportioning valve	M10	25	2.5	18
Brake pipe:				
Proportioning valve	M10	20	2.0	14
Master cylinder	M10	20	2.0	14

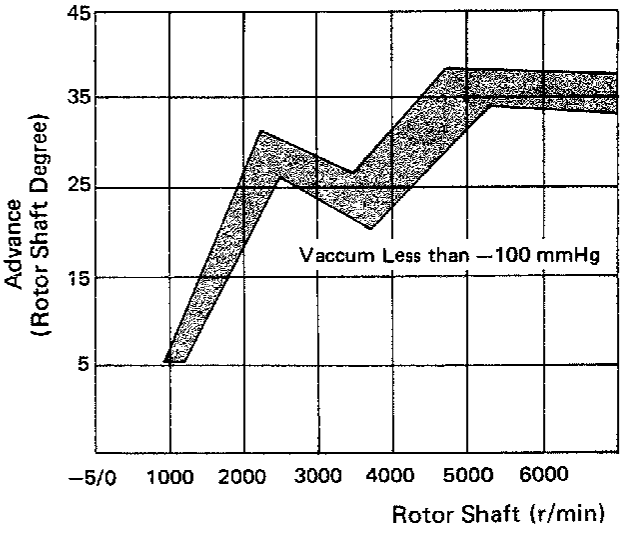
Item	Thread Size	Tightening torque		
		Nm	m·kg	ft·lb
Master cylinder:				
Cylinder cap (front)	M4	2	0.2	1.4
Cylinder cap (rear)	M5	2	0.2	1.4
Engine mounting:				
Front upper	M10	55	5.5	40
Front lower	M10	67	6.7	48
Rear	M12	100	10.0	72
Frame – Engine stay	M8	35	3.5	25
Pivot shaft:				
Rear arm	M22	5	0.5	3.6
Lock nut	M22	100	10.0	72
Frame – Master cylinder (rear)	M8	25	2.5	18
Caliper – Torque stopper	M8	20	2.0	14
Rear shock:				
Frame	M10	50	5.0	36
Rear arm	M10	40	4.0	29
Gear housing	M10	40	4.0	29
Rear arm – Gear housing	M10	40	4.0	29
Rear wheel axle	M18	150	15.0	110
Cast wheel – Disc	M8	20	2.0	14
Ball joint – Middle gear	M8	43	4.3	31
Cast wheel – Clutch hub	M10	67	6.7	48
Muffler bracket:				
Frame	M10	67	6.7	48
Rear foot rest	M10	67	6.7	48
Rear fender:				
Frame (front)	M6	7	0.7	5.1
Frame (rear)	M10	30	3.0	22
Muffler – Bracket	M10	30	3.0	22
Exhaust pipe – Head cylinder	M8	20	2.0	14
Fuel sendor	M6	5	0.5	3.6
Frame:				
Fender stay (front)	M8	30	3.0	22
Fender stay (rear)	M8	23	2.3	17

C. Electrical

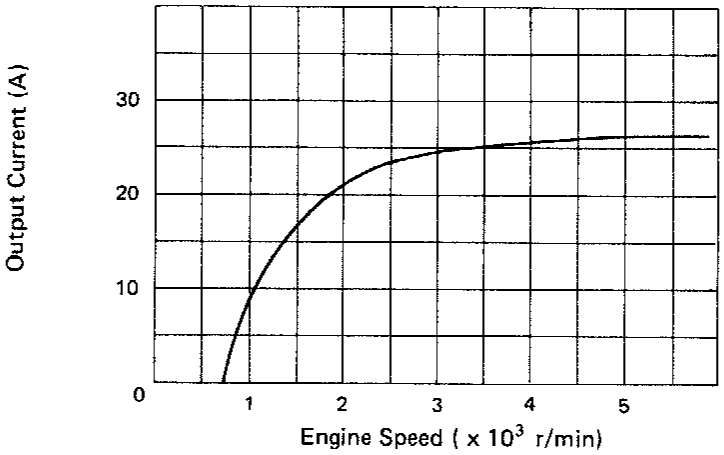
Item \ Model	XJ1100J
Voltage:	12V
Ignition System:	
Ignition Timing (B.T.D.C.)	5° at 1,100 r/min
Advanced Timing (B.T.D.C)	36° at 5,500 r/min
Advancer Type	Electrical, Vacuum
T.C.I.:	
Pickup Coil Resistance (Color)	120Ω ± 10% at 20°C (68°F) (Black – Gray) (Black – Orange)
T.C.I.-Unit–Model/Manufacturer	TID14-10/HITACHI
Ignition Coil:	
Model/Manufacturer	CM12-09/HITACHI
Minimum Spark Gap	6 mm (0.24 in) at idle
Primary Winding Resistance	2.5Ω ± 10% at 20°C (68°F)
Secondary Winding Resistance	11 kΩ ± 20% at 20°C (68°F)
Charging System:	
Type	A.C. Generator







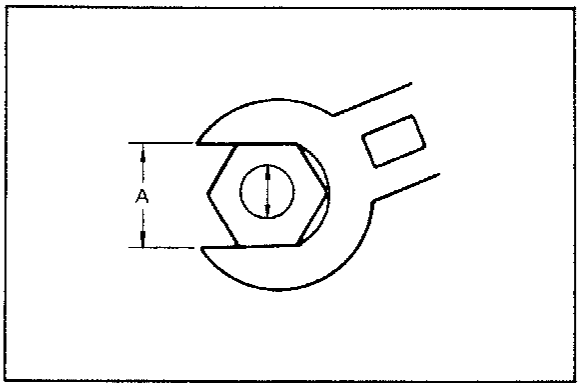
Item \ Model	XJ1100J
A.C. Generator:	
Model/Manufacturer	LD125-03/HITACHI
Nominal Output	14V, 26A at 5,000 r/min
Field Coil Resistance (Rotor Coil) (Color)	4.0Ω ± 10% at 20°C (68°F) (Green — Black)
Armature Coil Resistance (Stator Coil) (Color)	0.37Ω ± 10% at 20°C (68°F) (White — White)
Brush:	
Overall Length	17 mm (0.67 in)
Wear Limit	10 mm (0.39 in)
Spring Pressure	360 g
Voltage Regulator/Rectifier:	
Type	Semi Conductor Field Control
Model/Manufacturer	SH252-12/SHINDENMOTO KOGYO
No Load Regulated Voltage	14.5V
Capacity	35A
Withstand Voltage	240V
Battery:	
Capacity	12V 20 AH
Specific Gravity	1.280
Electric Starter System:	
Type	Constant mesh type
Starter Motor:	
Model/Manufacturer	SM-224F/MITSUBA
Output	0.5 kW
Armature Coil Resistance	0.007Ω ± 10% at 20°C (68°F)
Field Coil Resistance	0.01Ω ± 10% at 20°C (68°F)
Brush:	
Overall Length	12.5 mm (0.49 in)
< Limit >	5.5 mm (0.22 in)
Spring Pressure	620 g
Commutator Dia.	28 mm (1.1 in)
Wear Limit	27 mm (1.06 in)
Mica Undercut	0.5 mm (0.02 in)
Starter Switch:	
Model	HONDALOCK
Amperage Rating	150A
Coil Winding Resistance	3.46Ω ± 10% at 20°C (68°F)



Item \ Model	XJ1100J
Horn:	
Type/Quantity	Eddy type x 2
Model/Manufacturer	YPH-12/NIKKO
Maximum Amperage	2A
Flasher Relay:	
Type	Condenser type
Model/Manufacturer	FU249CD/NIPPONDENSO
Self Cancelling Device	Yes
Flasher Frequency	85 cycle/min
Wattage	27W x 2 + 3.4W
Hazard Flasher Relay:	
Type	Heat ribbon type
Model/Manufacturer	FR-9H22/MITSUBA
Flasher Frequency	90 cycle/min
Wattage	27W x 4 + 3.4W x 2
Self Cancelling Unit:	
Model/Manufacturer	–/MATSUSHITA
Reserve Lighting Unit:	Yes
Model/Manufacturer	–/KOITO
Oil Level Switch:	
Model/Manufacturer	204/NIPPONDENSO
Fuel gauge:	
Model/Manufacturer	–/NIPPON SEIKI
Sender Unit Resistance: Full	24Ω ± 10Ω at 20°C (68°F)
Empty	315Ω ± 15Ω at 20°C (68°F)
Starting Circuit Cut-off Relay:	Yes
Model/Manufacturer	G2MW-1121T-100-Y2/TATEISHI
Coil Winding Resistance	100Ω ± 10% at 20°C (68°F)
Sidestand Relay:	Yes
Model/Manufacturer	G2MW-1121T-100-Y4/TATEISHI
Coil Winding Resistance	100Ω ± 10% at 20°C (68°F)
Color Code	Blue
Circuit Breaker:	
Type	Fuse
Amperage for Individual Circuit:	
Main	30A
Headlight	10A
Signal	20A
Ignition	10A
Tail	10A

GENERAL TORQUE SPECIFICATIONS

This chart specifies torque for standard fasteners with standard I.S.O. pitch threads. Torque specifications for special components or assemblies are included in the applicable sections of this book. To avoid warpage, tighten multi-fastener assemblies in a criss-cross fashion, in progressive stages, until full torque is reached. Unless otherwise specified, torque 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	51
22 mm	16 mm	130	13.0	94

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 x m/sec^2	Force
Nm	Newton meter	N x m	Torque
m·kg	Meter kilogram	m x kg	Torque
Pa	Paskal	N/m^2	Pressure
N/mm	Newton per millimeter	N/mm	Spring rate
L	Liter	–	Volume or Capacity
cm^3	Cubic centimeter		
r/min	Rotation per minute	–	Engine speed

CONVERSION TABLES

METRIC TO INCH SYSTEM		
Known	Multiplier	Result
m·kg	9.807	Nm
	7.233	ft·lb
kg	9.807	N
	2.205	lb
mm	0.03937	in
cm^3	0.03527	Imp oz
	0.03381	US oz
L (liter)	0.2200	Imp gal
	0.2642	US gal
L (liter)	0.8802	Imp qt
	1.057	US qt
kg/mm	9.807	N/mm
	56.00	lb/in
kg/cm^2	98.07	kPa
	14.22	psi
mmHg	133.3	pa
	0.03937	inHg
Centigrade (°C)	9/5 (°C) + 32	Fahrenheit (°F)

INCH TO METRIC SYSTEM		
Known	Multiplier	Result
Nm	0.10197	m·kg
ft·lb	0.13826	
N	0.10197	kg
lb	0.4535	
in	25.4	mm
Imp oz	28.35	cm^3
US oz	29.57	
Imp gal	4.545	L (liter)
US gal	3.785	
Imp qt	1.136	L (liter)
US qt	3.785	
N/mm	0.10197	kg/mm
lb/in	0.0178	
kPa	0.0102	kg/cm^2
psi	0.0703	
pa	0.0075	mmHg
inHg	25.4	
Fahrenheit (°F)	5/9 (°F) – 32	Centigrade (°C)

CONSUMER INFORMATION

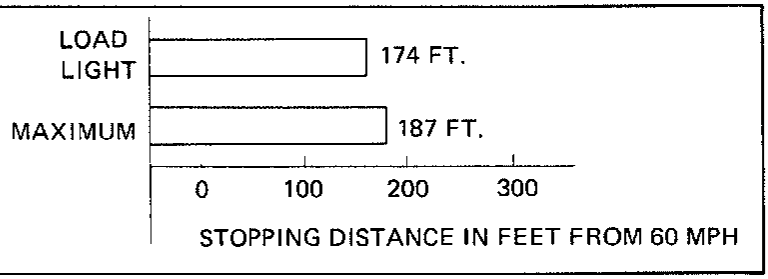
Notice

The information presented represents results obtainable by skilled drivers under controlled road and vehicle conditions, and the information may not be correct under other conditions.

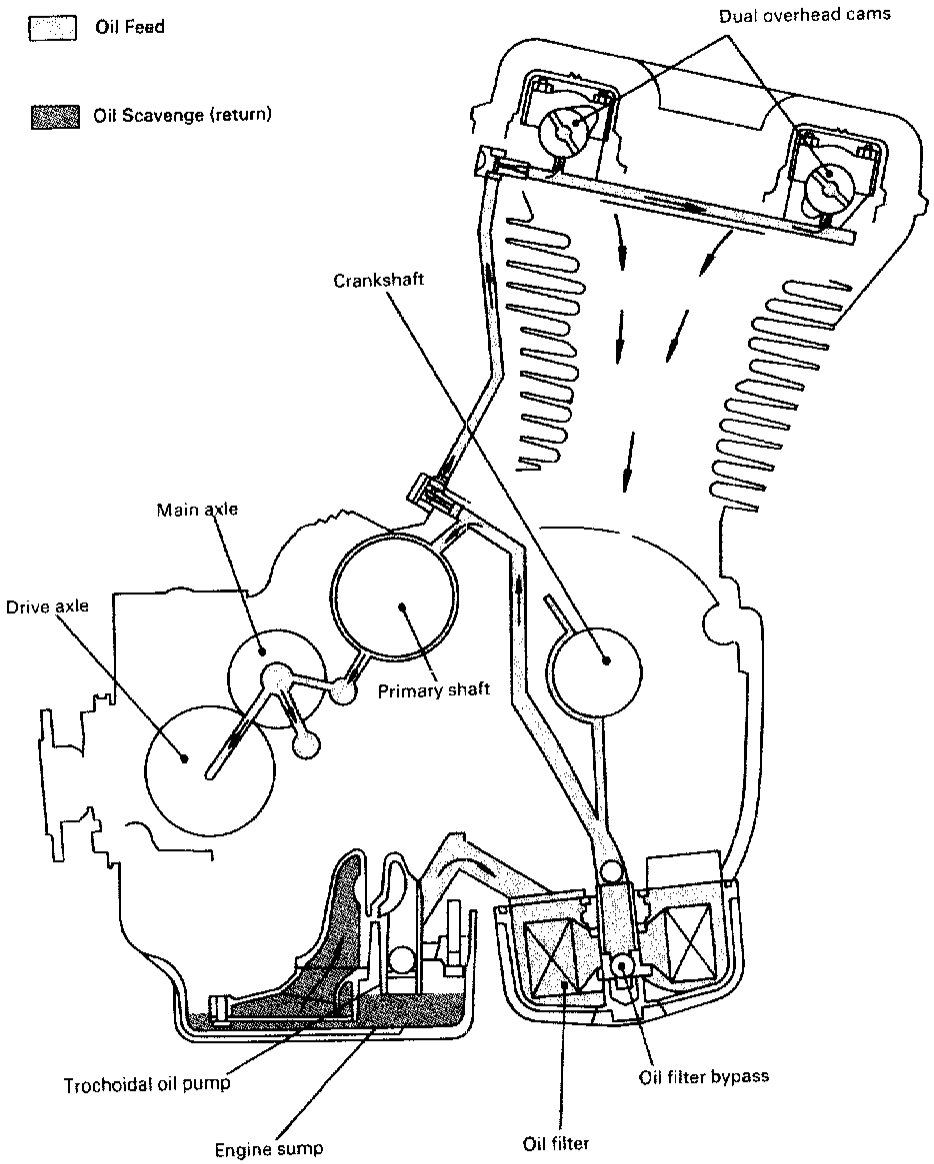
STOPPING DISTANCE

This figure indicates braking performance that can be met or exceeded by the vehicles to which it applies, without bocking the wheels, under different conditions of loading and with partial failures of the braking system.

FULL OPERATIONAL SERVICE BRAKE
("Partial failure" information is not applicable and is not included)



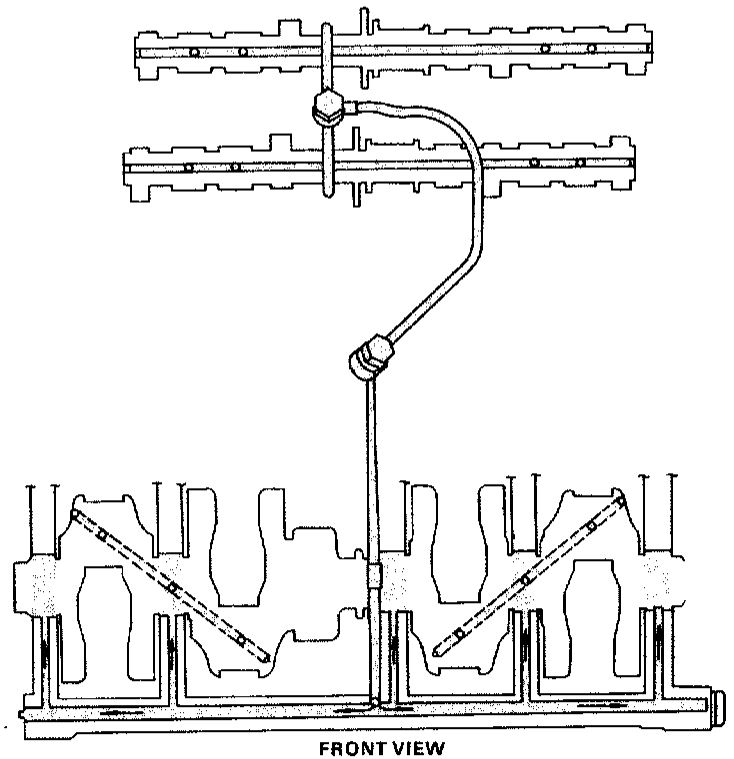
LUBRICATION CHART



OIL PRESSURE INFORMATION

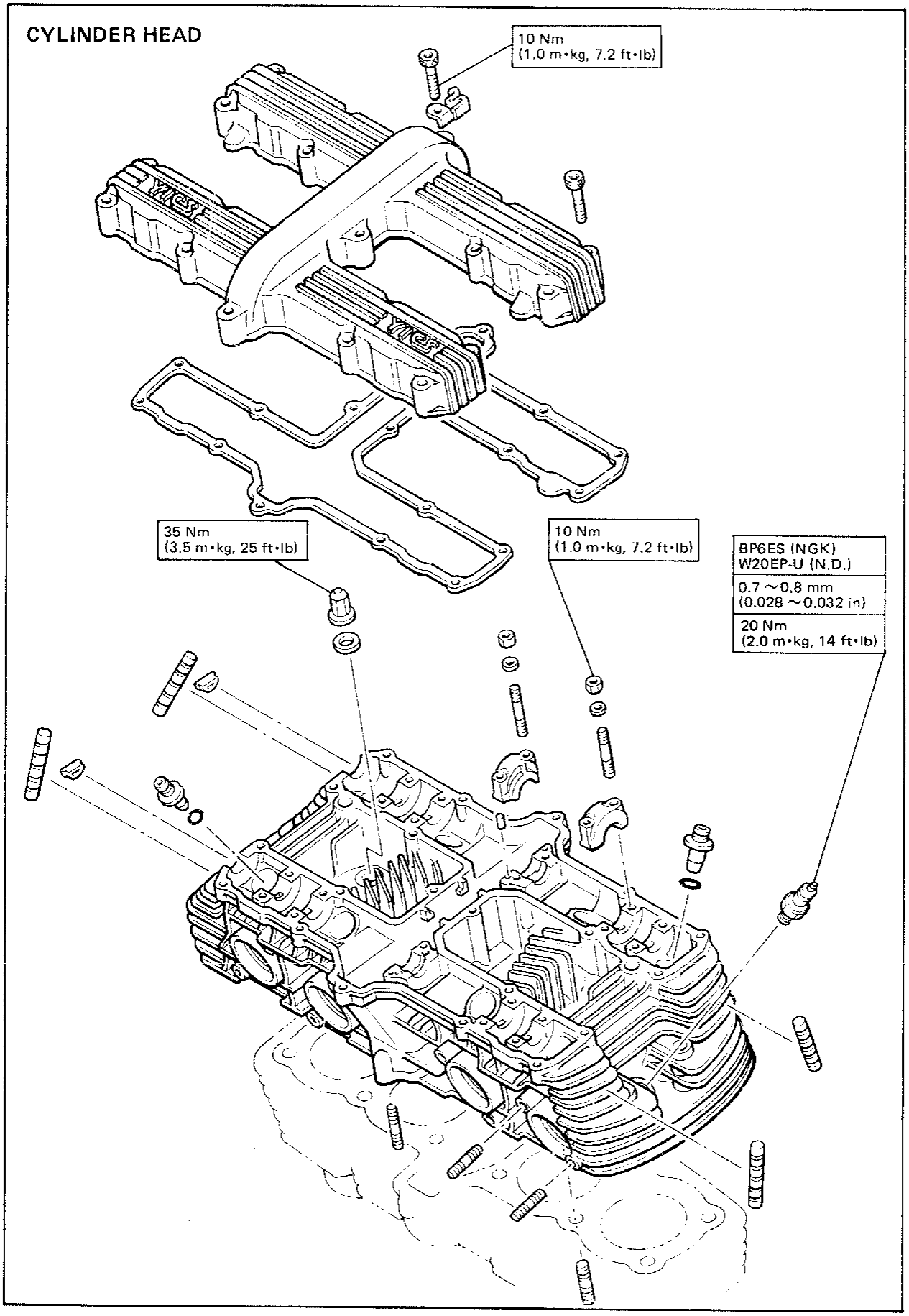
Relief valve opening 471 kPa (4.8 kg/cm^2, 70 psi)

Cruising speed oil pressure
(at operating temperaturel) over 196 kPa (2 kg/cm^2, 28 psi)

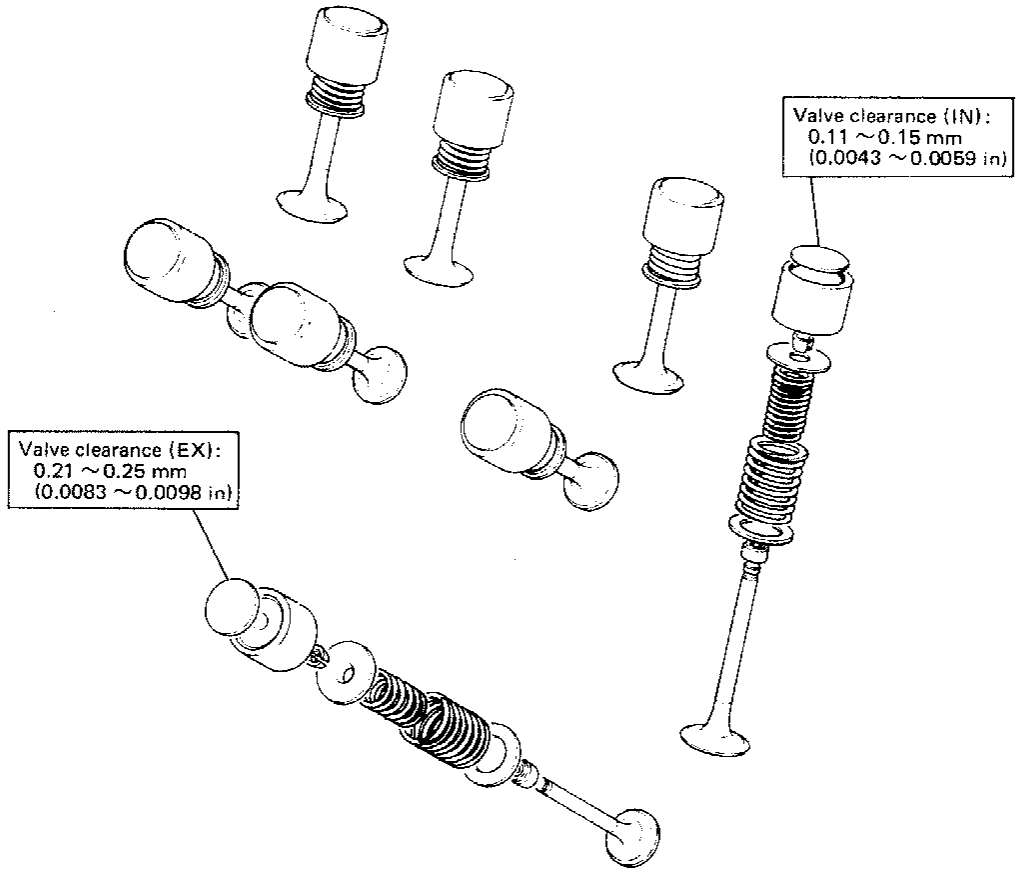


FRONT VIEW

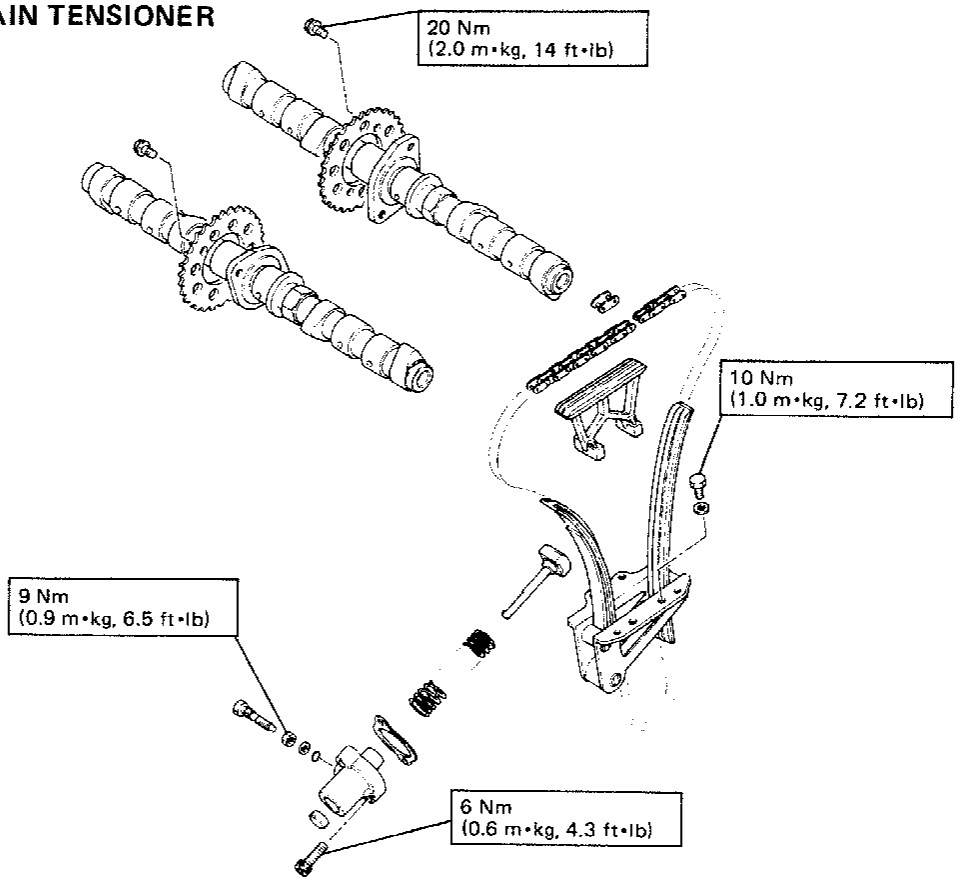
CYLINDER HEAD



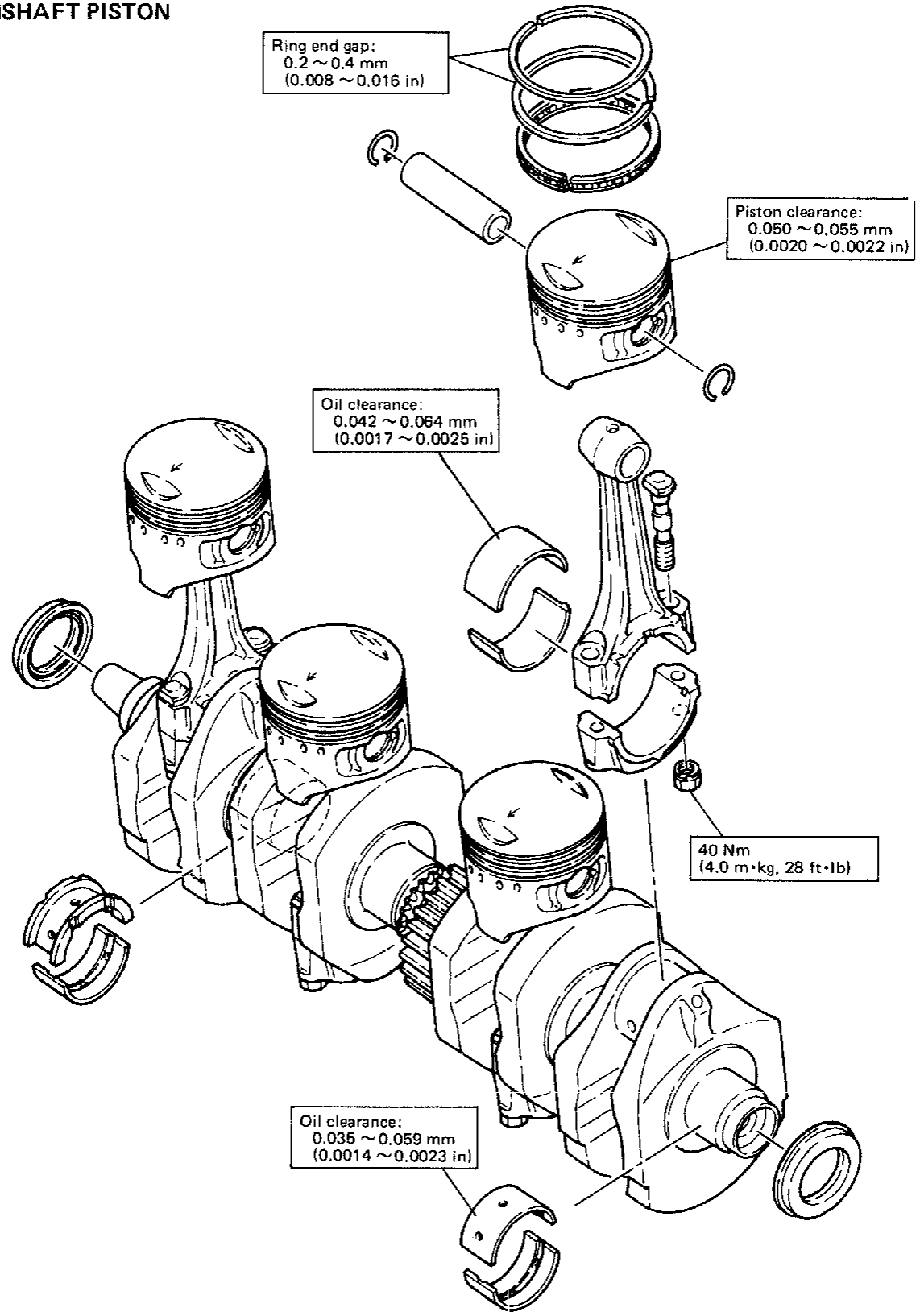
VALVE



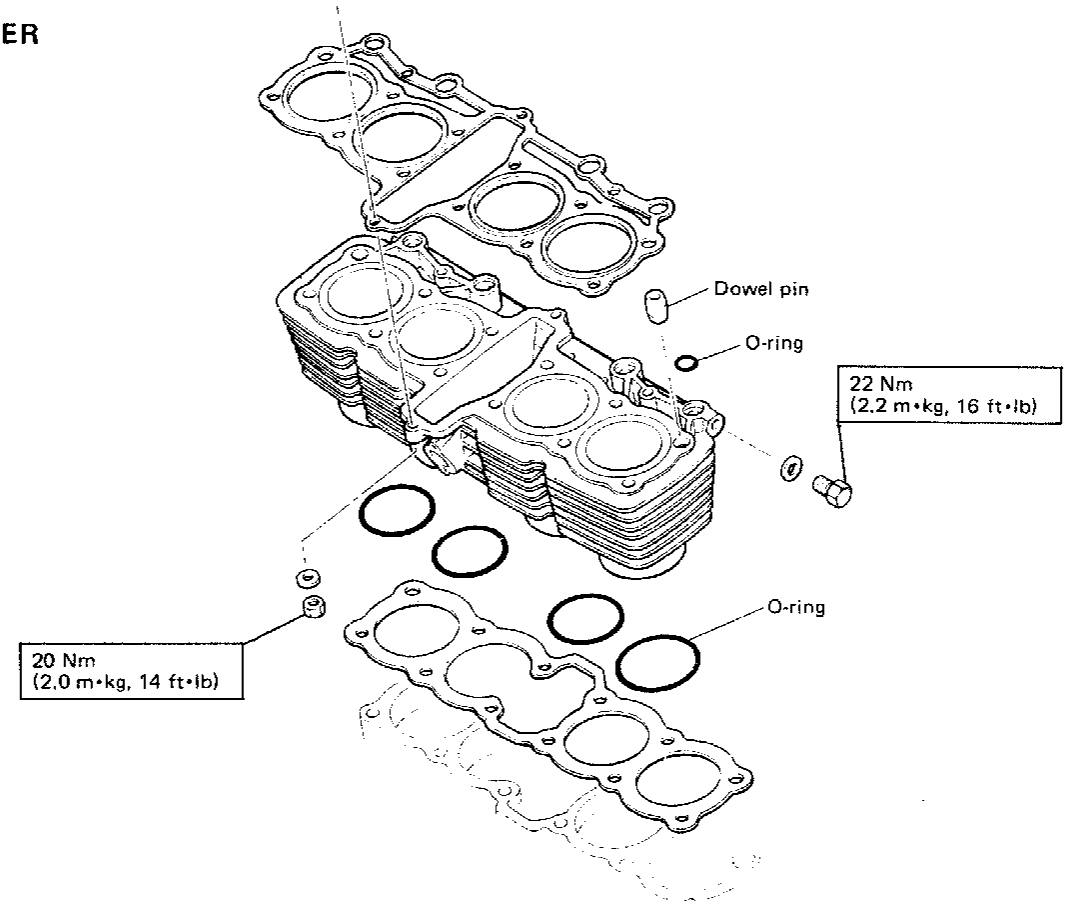
CAMSHAFT, CHAIN TENSIONER



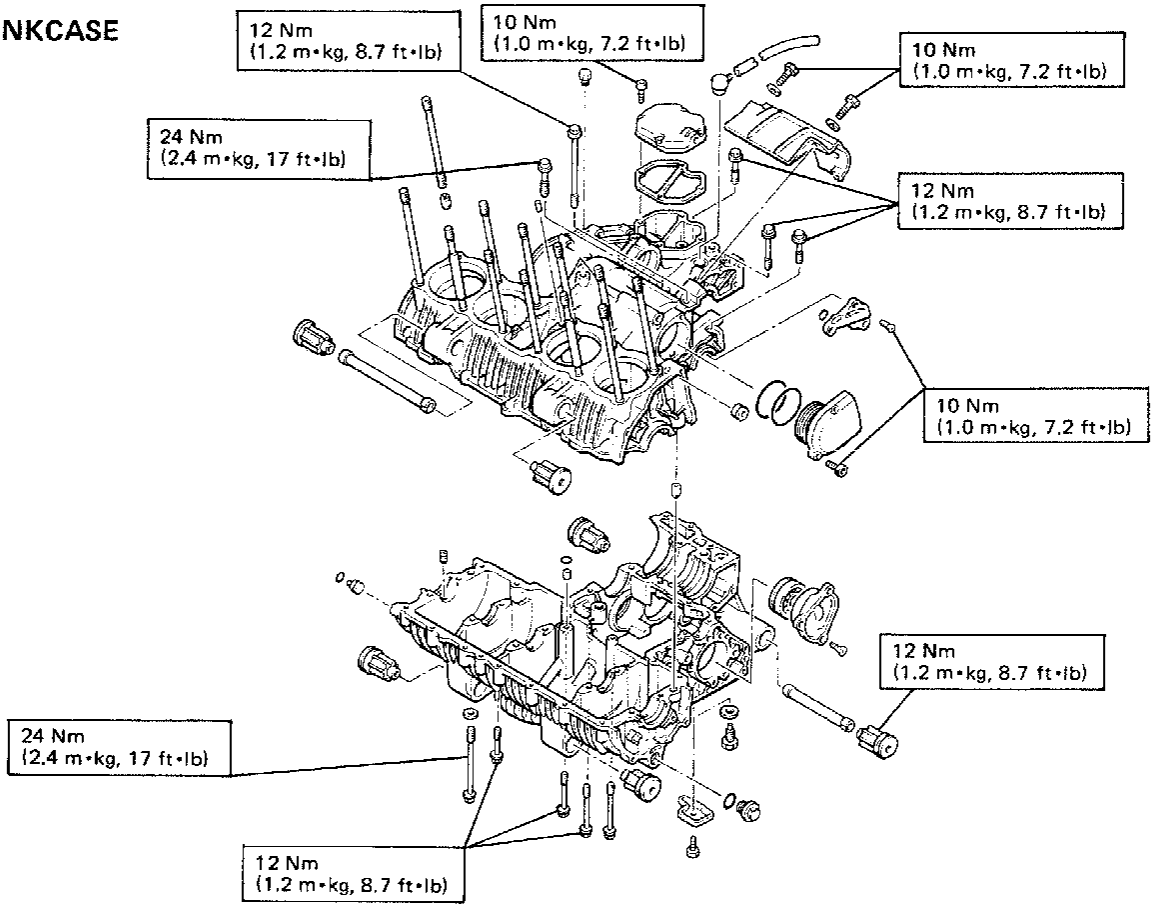
CAMSHAFT PISTON



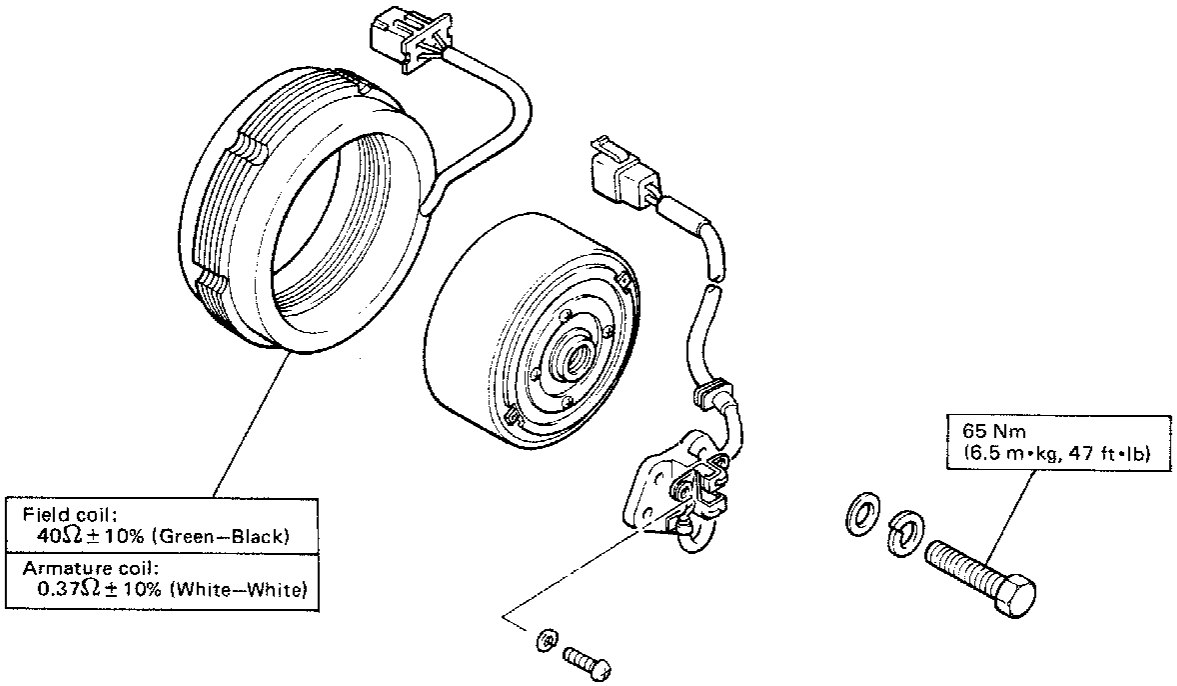
CYLINDER



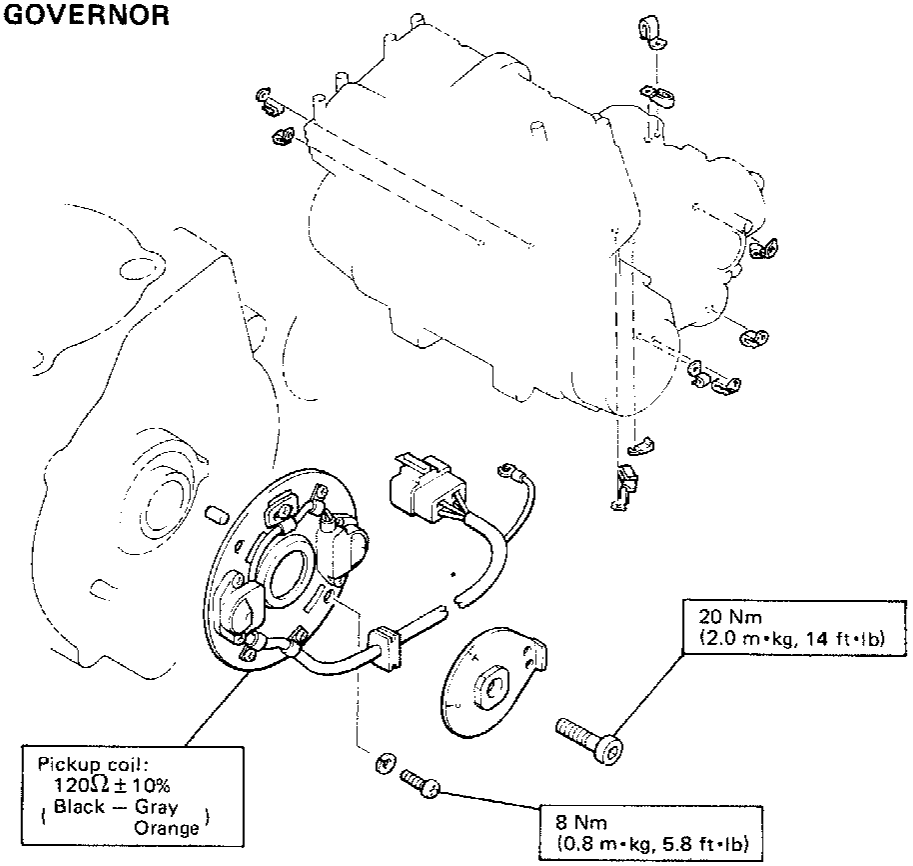
CRANKCASE



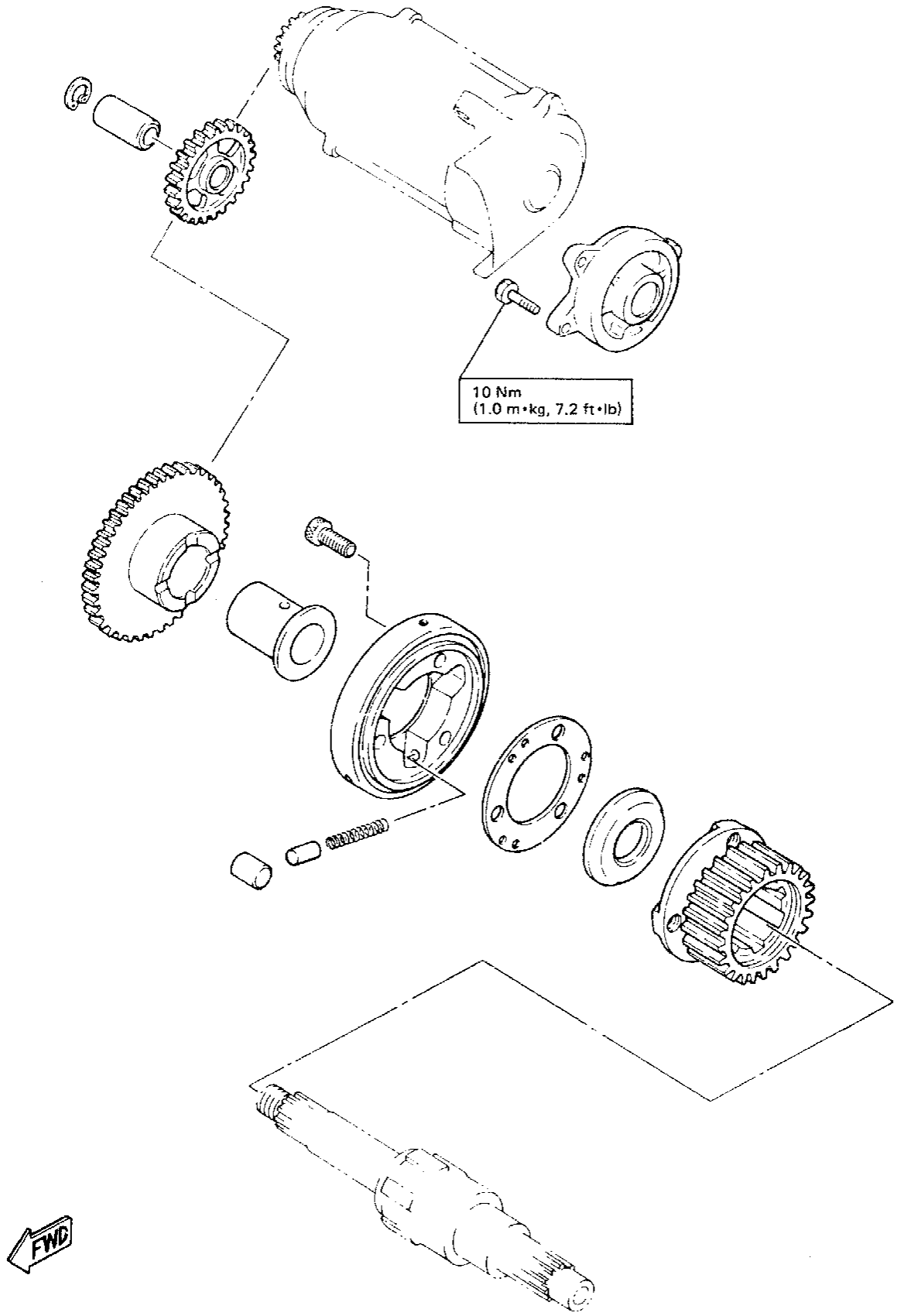
A.C. GENERATOR



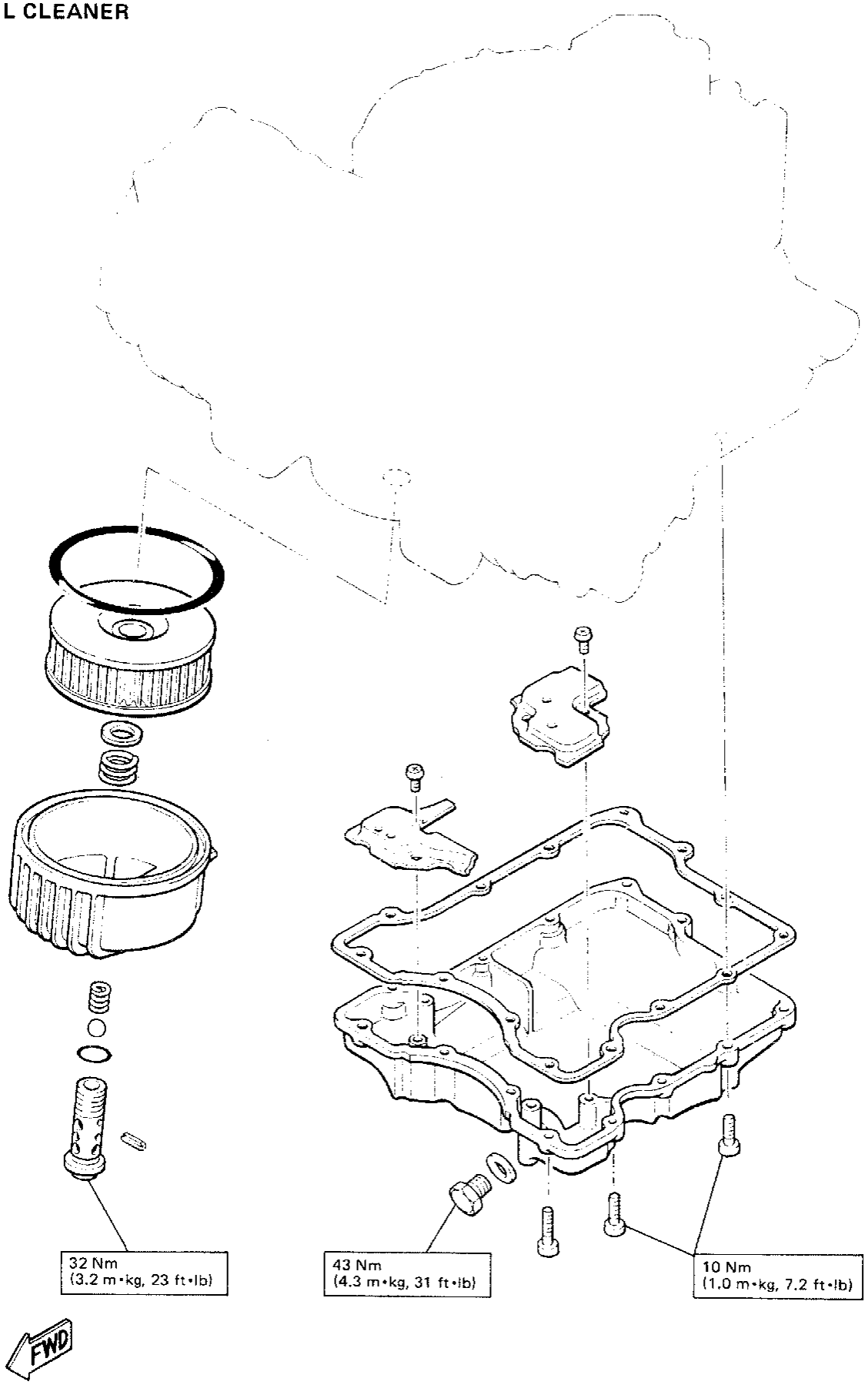
PICKUP COIL GOVERNOR



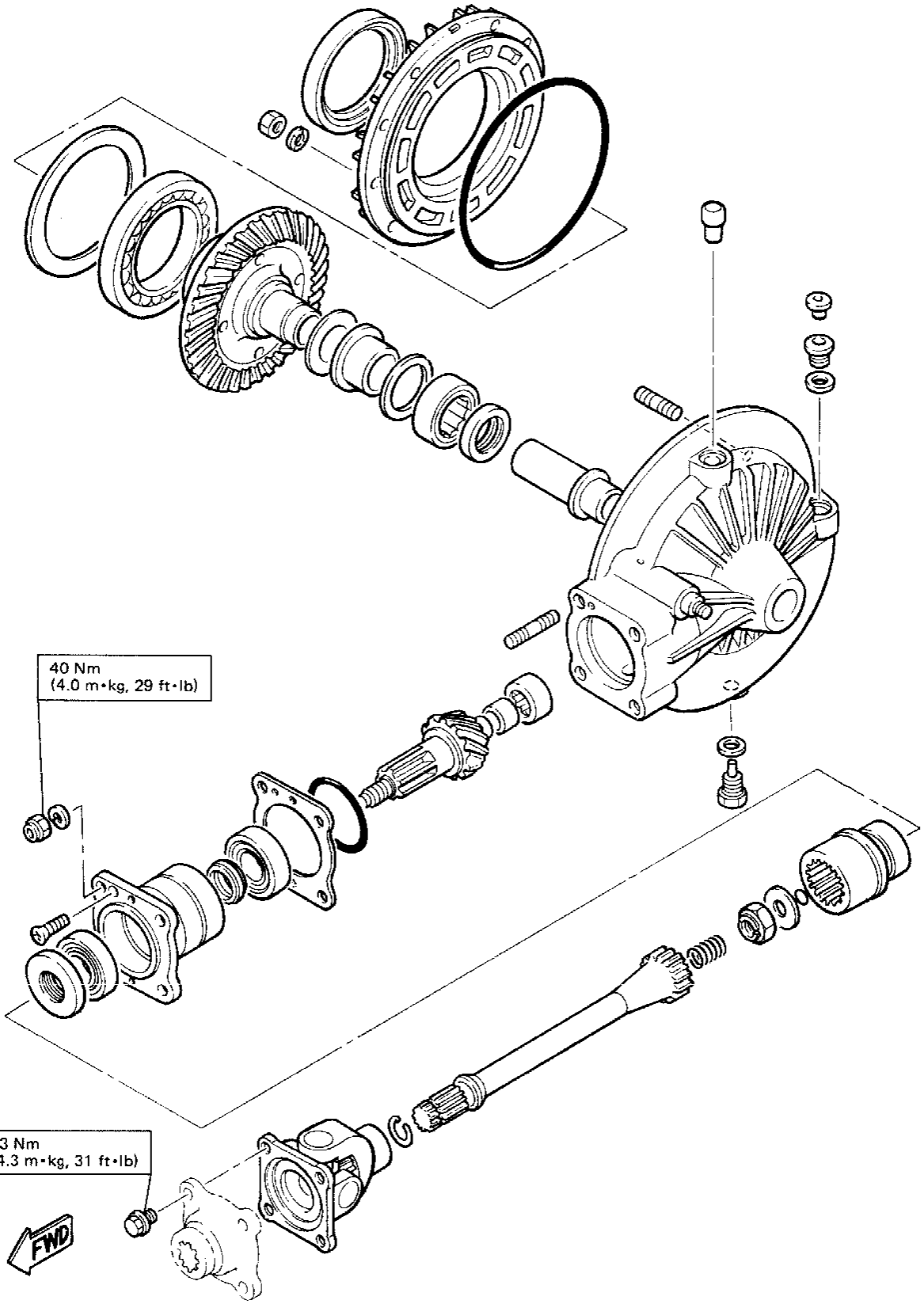
STARTER CLUTCH



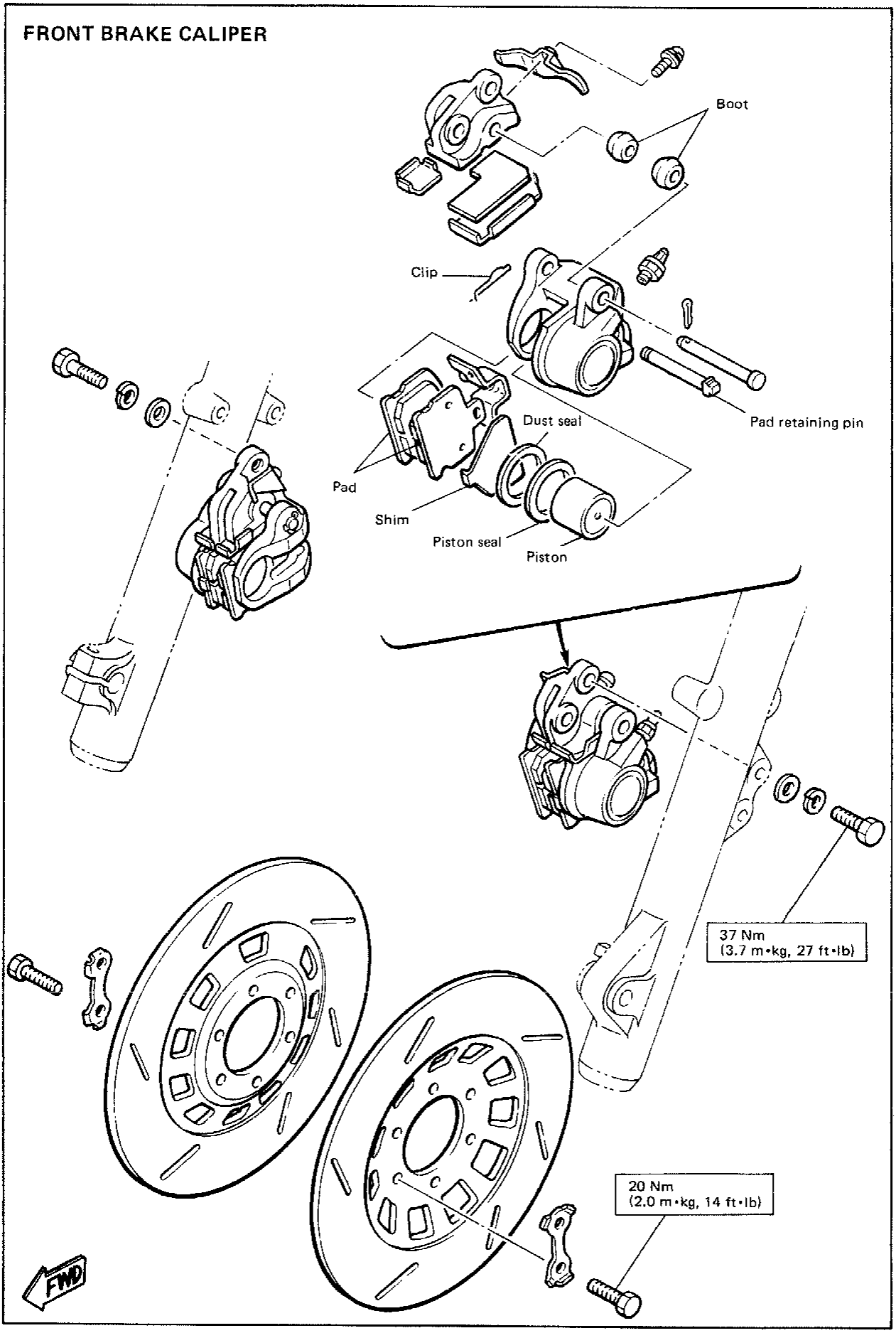
OIL CLEANER



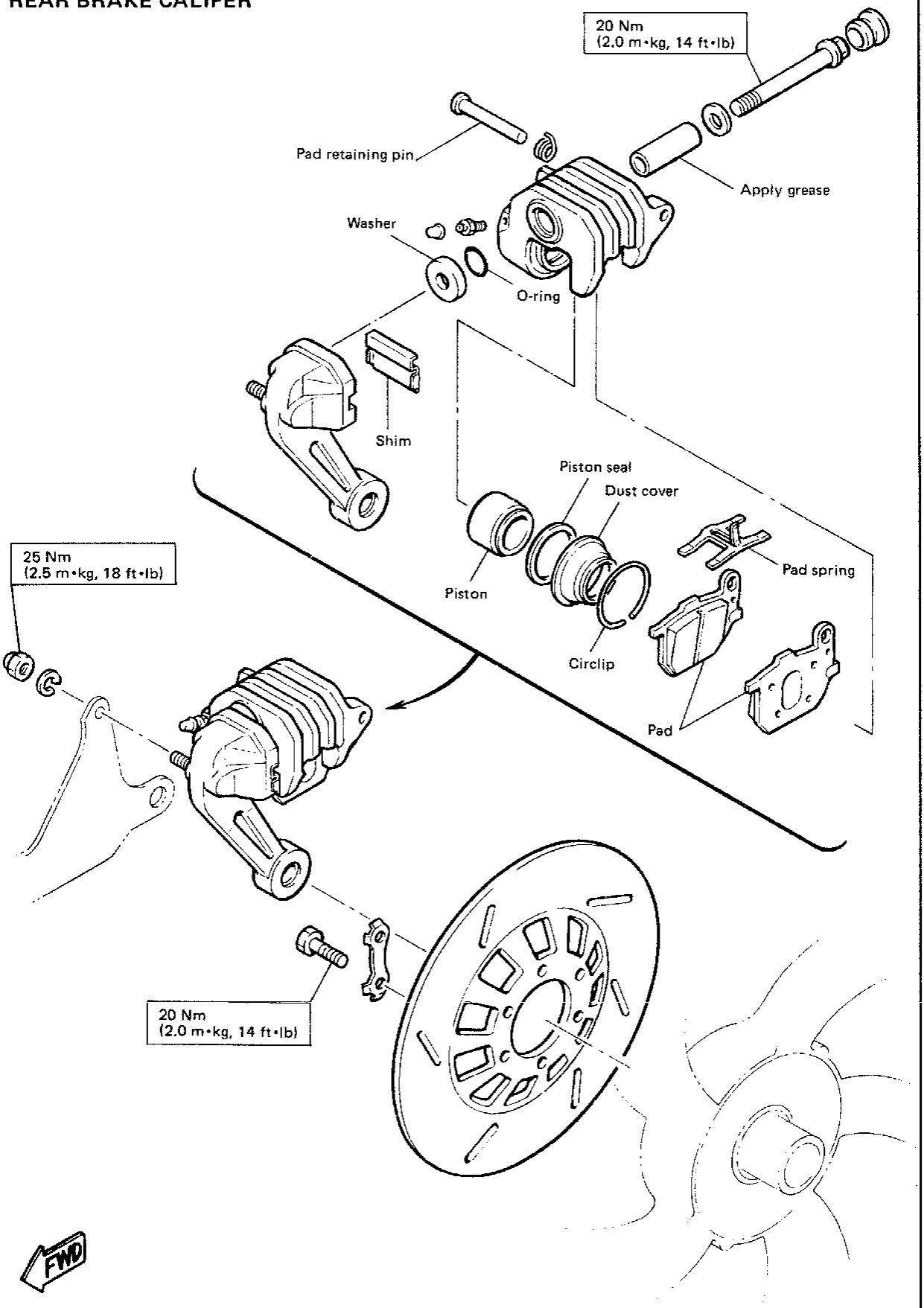
DRIVE SHAFT



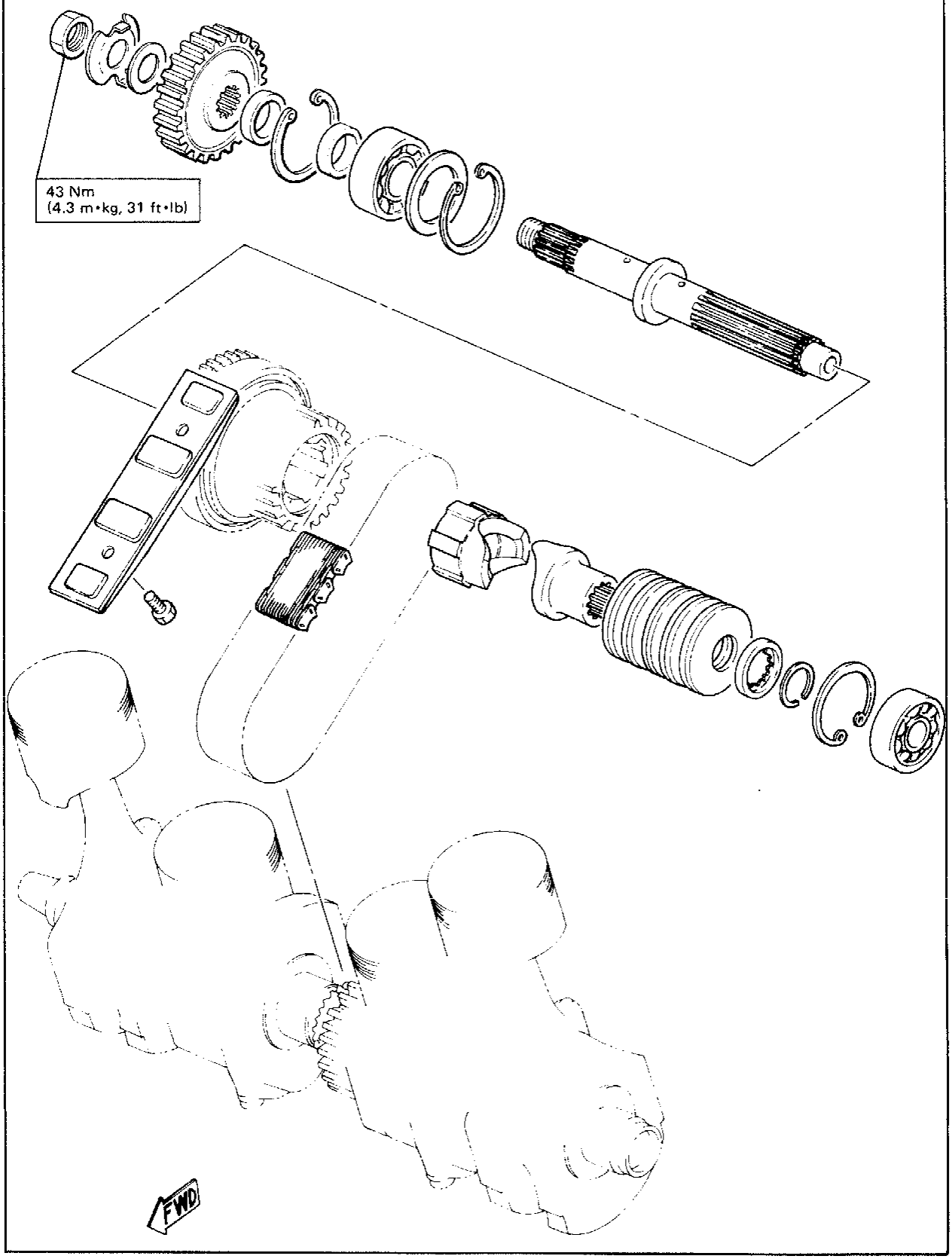
FRONT BRAKE CALIPER



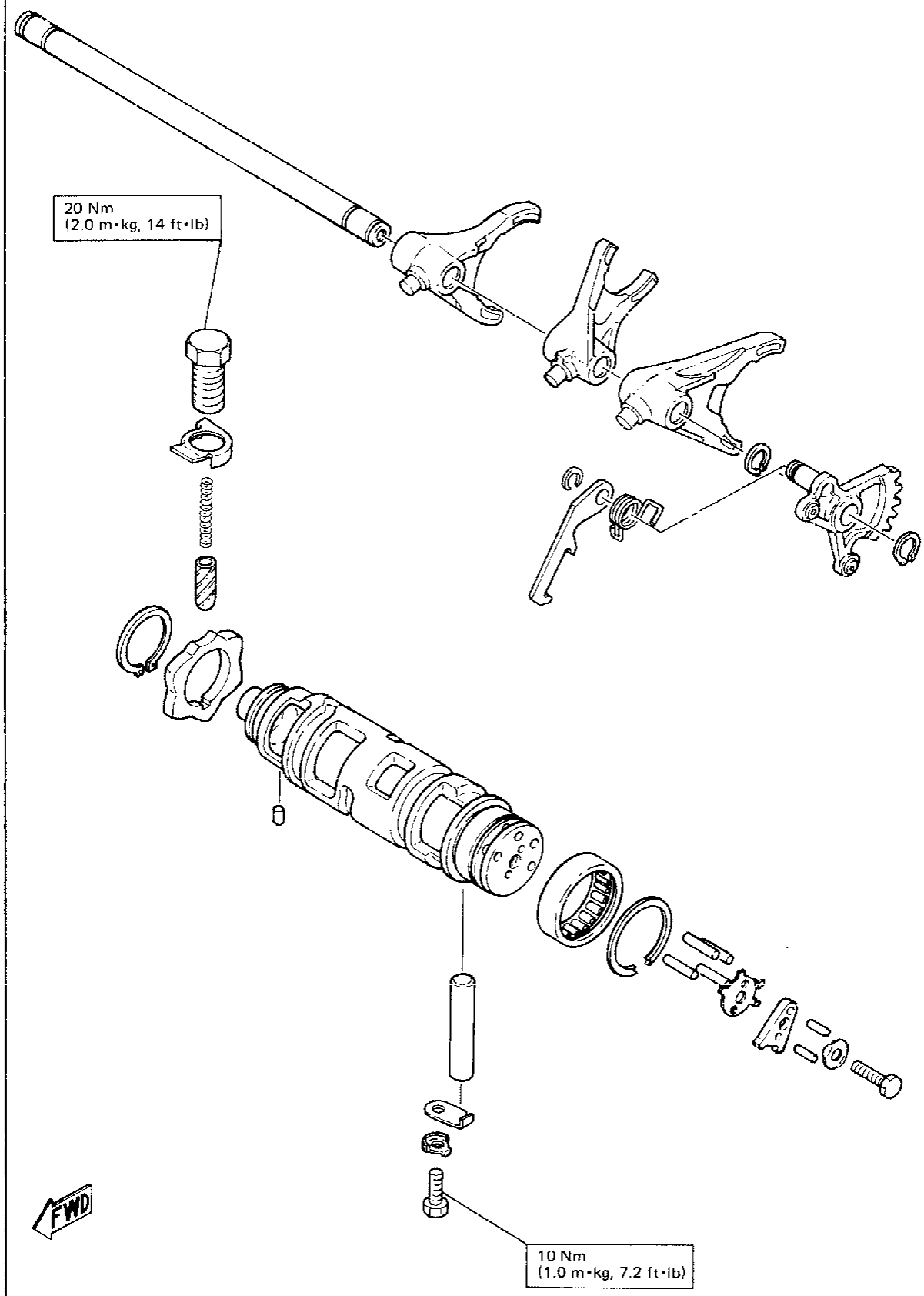
REAR BRAKE CALIPER



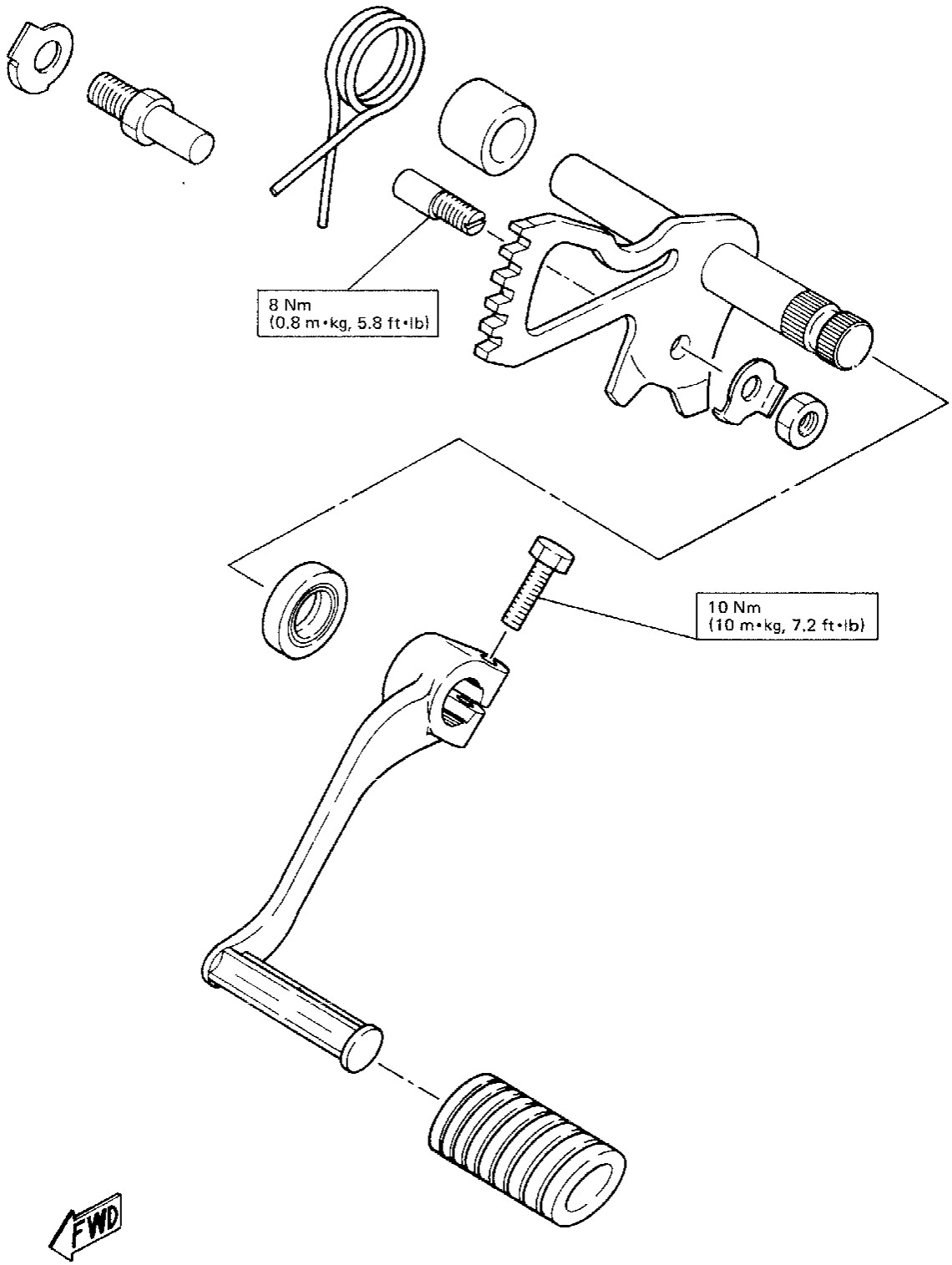
PRIMARY SHAFT, CHAIN



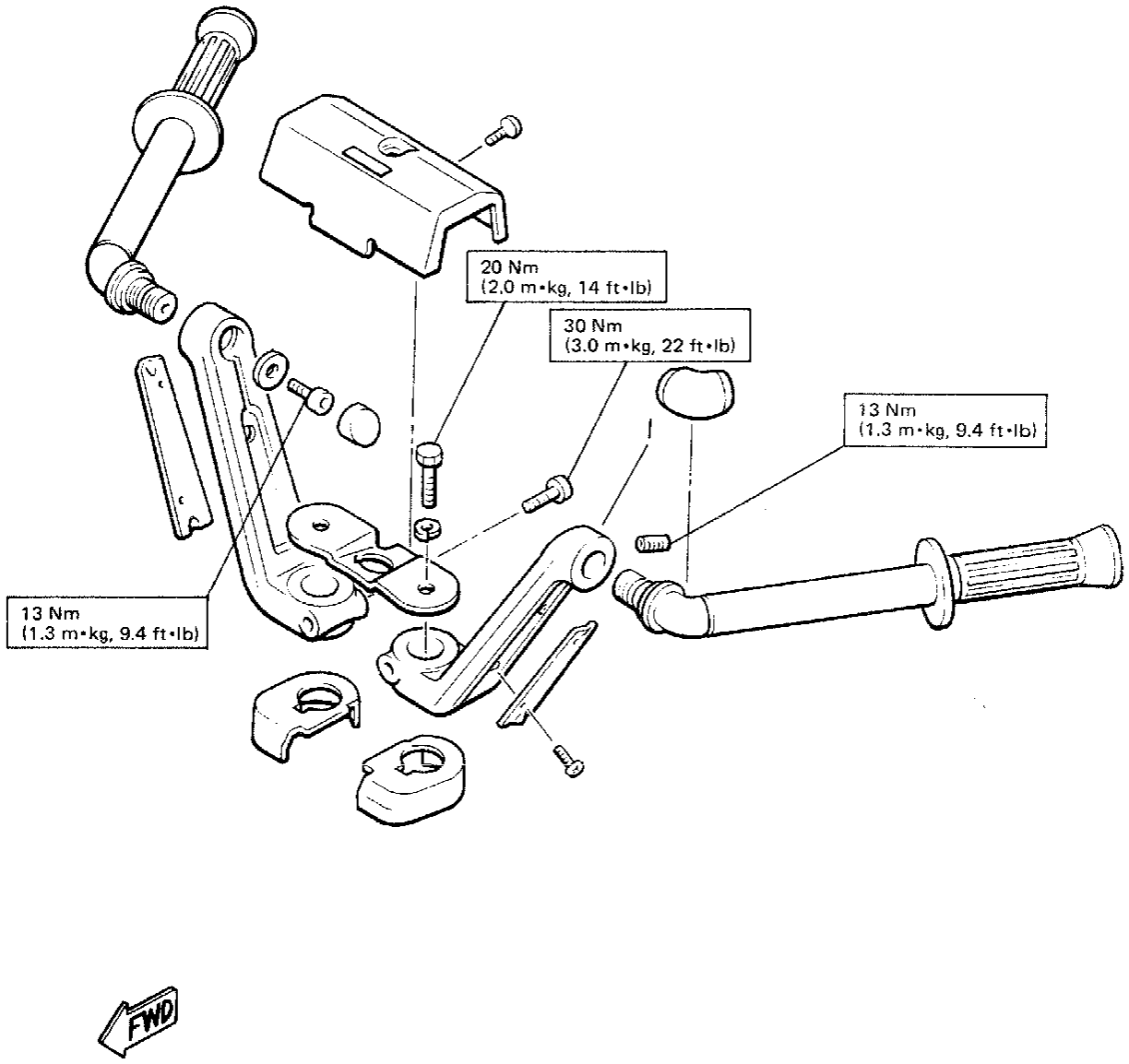
SHIFT CAM, FORK



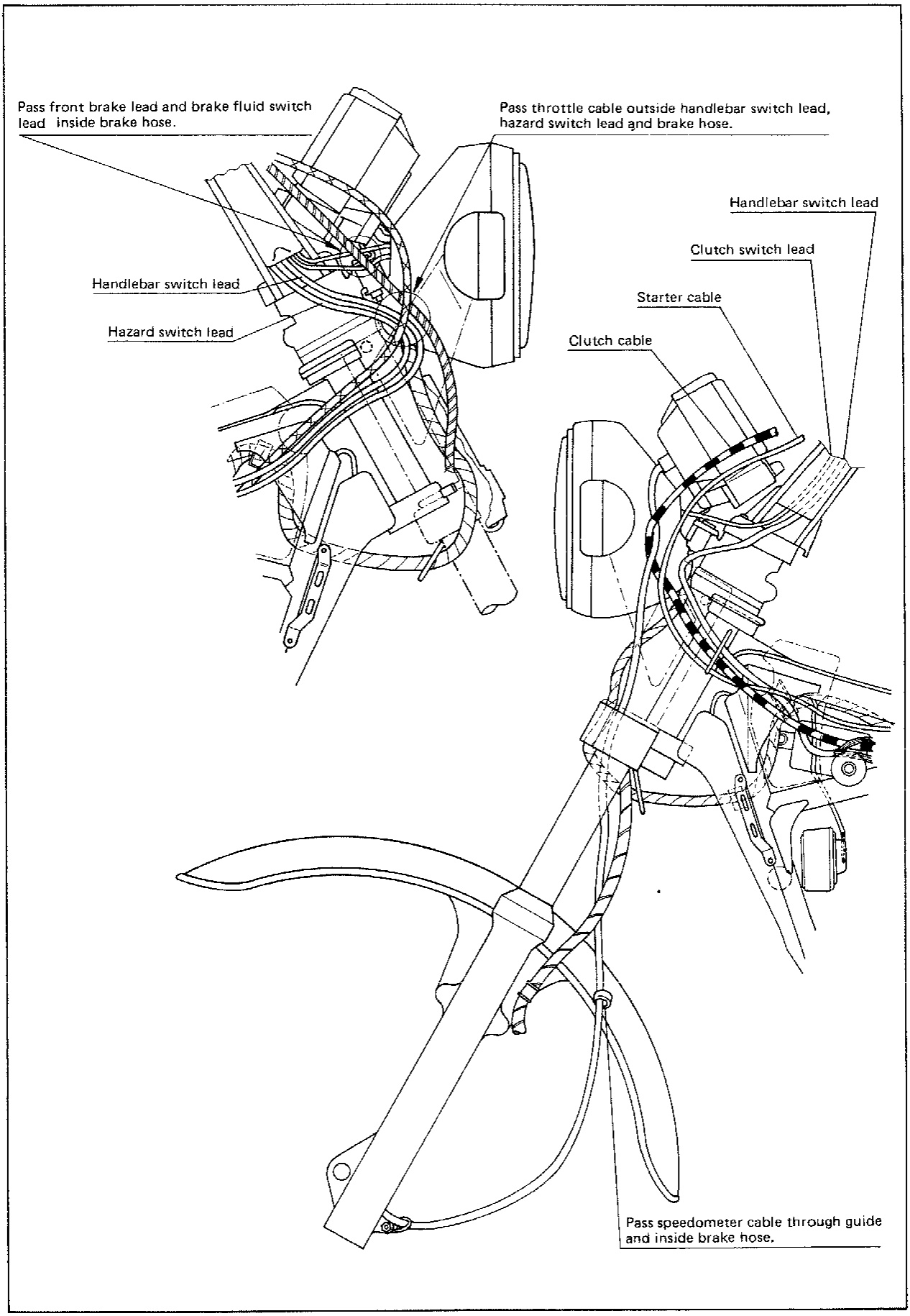
SHIFT SHAFT PEDAL

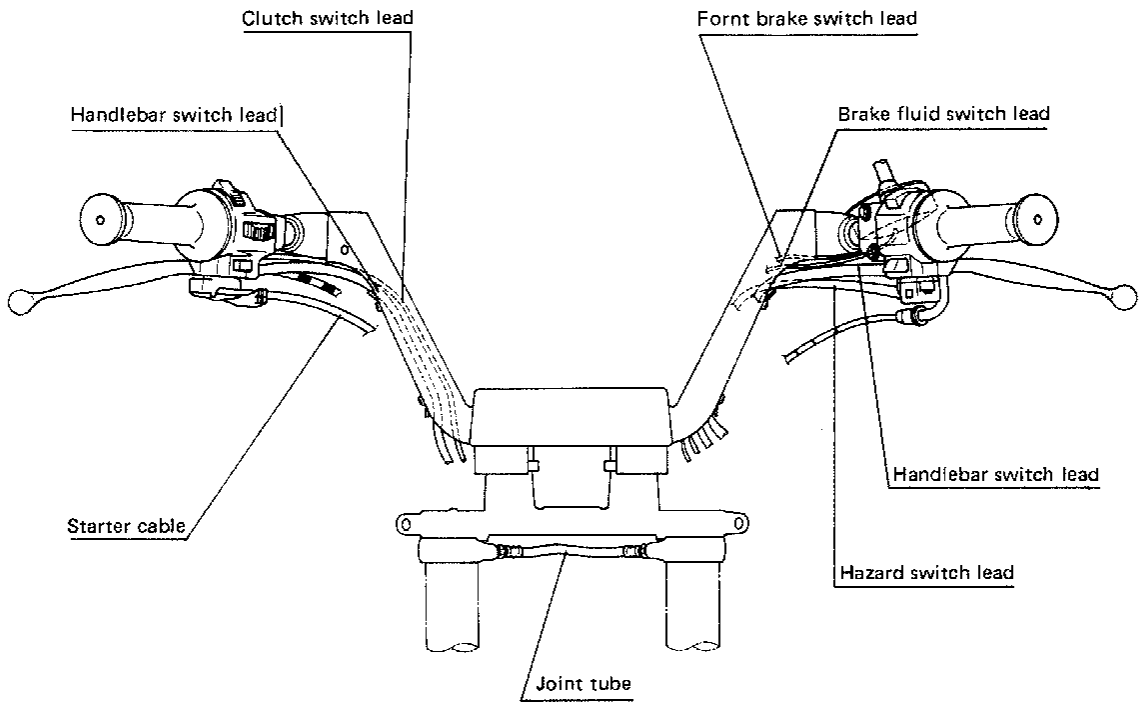


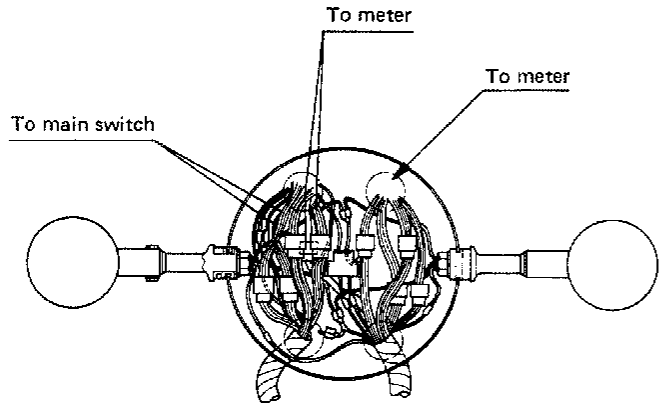
HANDLEBARS

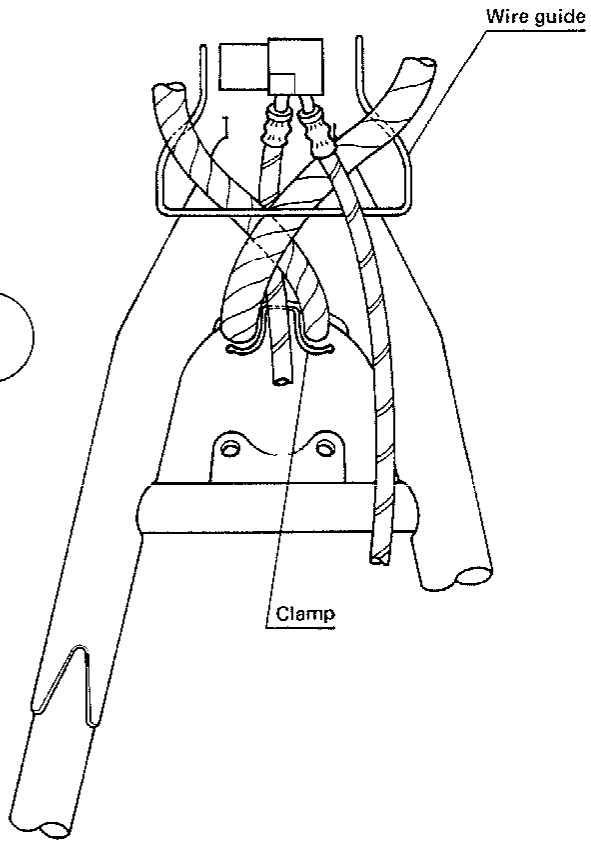

20 Nm
(2.0 m•kg, 14 ft•lb)
30 Nm
(3.0 m•kg, 22 ft•lb)
13 Nm
(1.3 m•kg, 9.4 ft•lb)
13 Nm
(1.3 m•kg, 9.4 ft•lb)
FWD

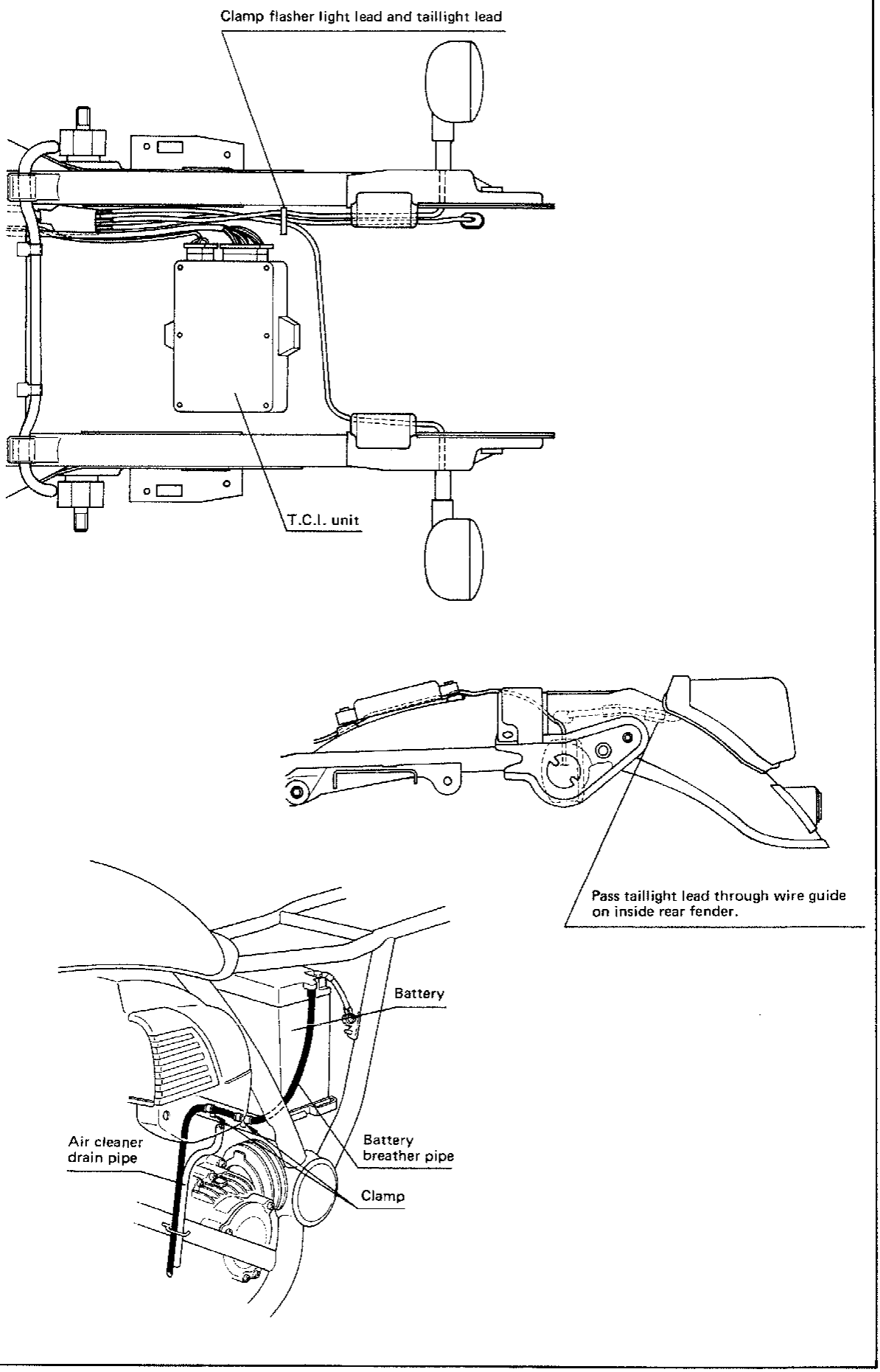
CABLE ROUTING




Clutch switch lead
Fornt brake switch lead
Handlebar switch lead
Brake fluid switch lead
Handlebar switch lead
Starter cable
Hazard switch lead
Joint tube


To meter
To meter
To main switch


Wire guide
Clamp


Clamp flasher light lead and taillight lead
T.C.I. unit
Pass taillight lead through wire guide on inside rear fender.
Battery
Air cleaner drain pipe
Battery breather pipe
Clamp