YAMAHA XV500K

GENUINE YAMAHA

Service Manual



LIT-11616-03-51

YAMAHA

XV500K

Service Manual

LIT-11616-03-51

WAARSCHUWING

Dit handboek voor onderhoud en reparaties is samengesteld door Yamaha Motor Company voor gebruik door erkende Yamaha dealers en de daar werkzame deskundige monteurs, die als zodanig zijn opgeleid en over de door ons geadviseerde gereedschappen en meetapparatuur beschikken. Het handboek kan op verzoek aan de particuliere eigenaar/gebruiker ter beschikking worden gesteld, doch wij wijzen er nadrukkelijk op dat het uitvoeren van reparaties en onderhoudswerkzaamheden door anderen dan erkende Yamaha dealers risico's kan opleveren voor de veiligheid en/of de levensduur van onze produkten en daarom door ons wordt ontraden. Wij wijzen er voorts op, dat een eventuele garantie vervalt indien reparaties of onderhoudswerkzaamheden door anderen dan erkende Yamaha dealers zijn verricht.

De instrukties volgens dit handboek kunnen worden gewijzigd of aangevuld door mededelingen aan erkende Yamaha dealers, die niet aan andere gebruikers bekend worden gemaakt.

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XV500K
SERVICE MANUAL
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CYPRESS, CALIFORNIA 90630
LIT-11616-03-51

NOTICE

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

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

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

NOTE:

This Service Manaual contains information regarding periodic maintenance to the emission control system for the XV500K. Please read this material carefully.

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

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

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

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

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

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CHAPTER 1.
GENERAL INFORMATION

MOTORCYCLE IDENTIFICATION

Engine Serial Number

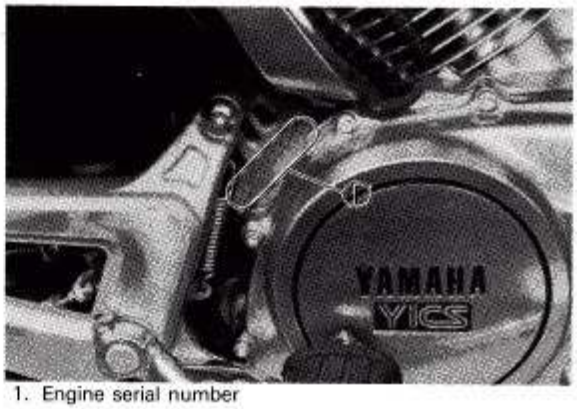
The engine serial number is stamped into the elevated part of the right rear section of the engine.

Starting serial number:

XV500K	22U-000101

NOTE:

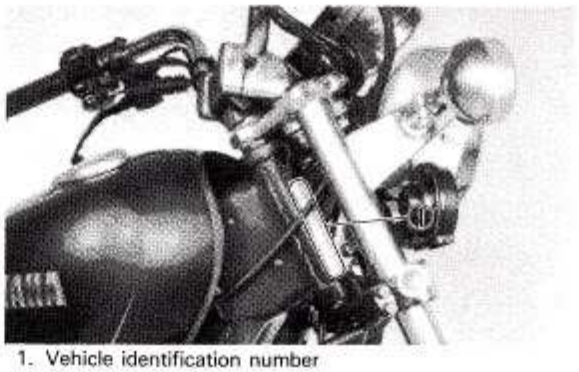
The first three digits of these numbers are for model identification; the remaining digits are the unit production number.



1. Engine serial number

Vehicle Identification Number

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



1. Vehicle identification number

Starting serial number:

JYA22U00*DA000101



SPECIAL TOOLS

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

For Tune-Up

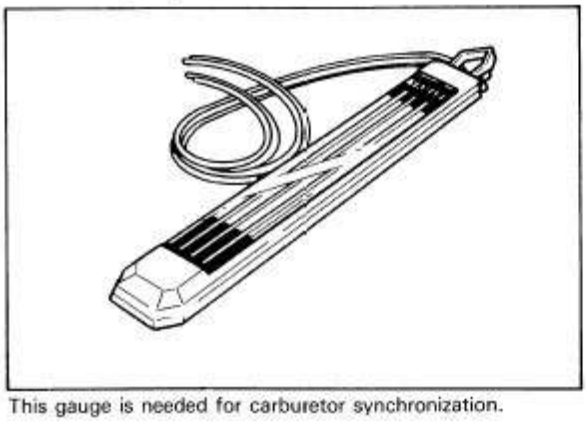
Inductive tachometer (P/N. YU-08036)

Inductive timing light (P/N. YU-08037)

Fuel level gauge (P/N. YM-01312)

Compression gauge (P/N. YU-33223)

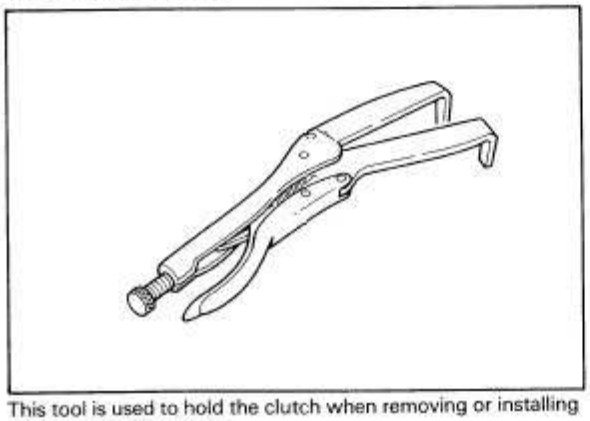
Vacuum gauge (P/N. YU-08030)



This gauge is needed for carburetor synchronization.

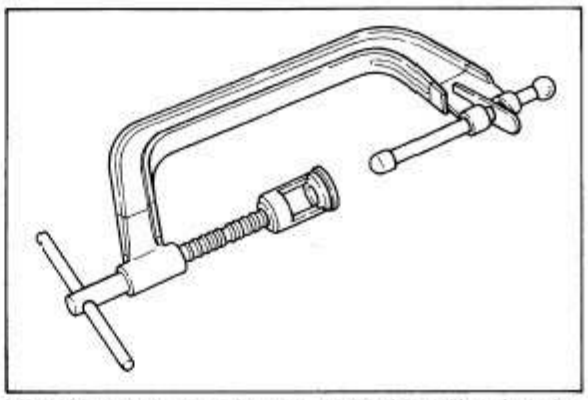
For Engine Service

Universal clutch holder
(P/N. YM-91042)



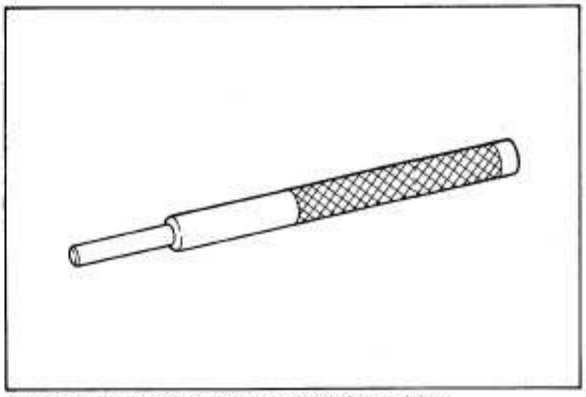
This tool is used to hold the clutch when removing or installing the clutch boss locknut.

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



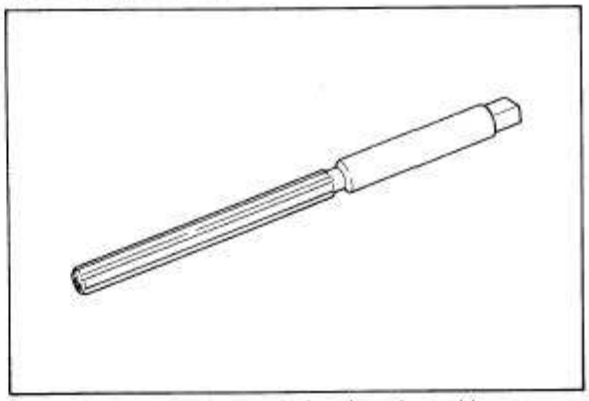
This tool must be used for removing and installing the valve assemblies.

Valve guide remover
(P/N. YM-01225)



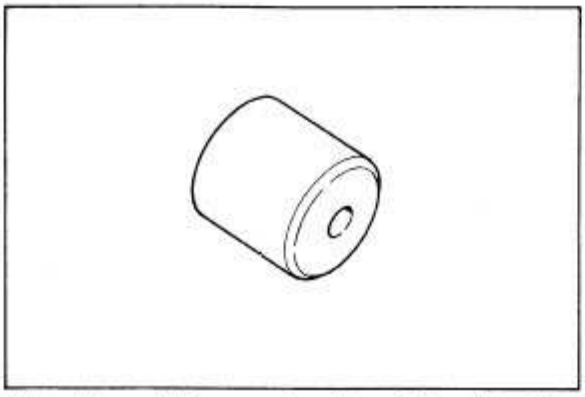
This must be used to remove the valve guides.

Valve guide reamer
(P/N. YM-01227)



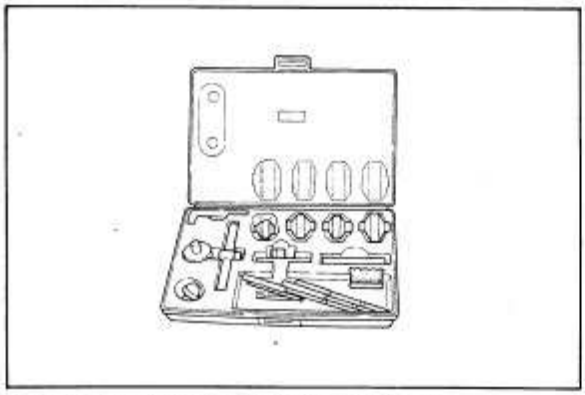
This must be used when replacing the valve guide.

Valve guide installer
(P/N. YM-04017)



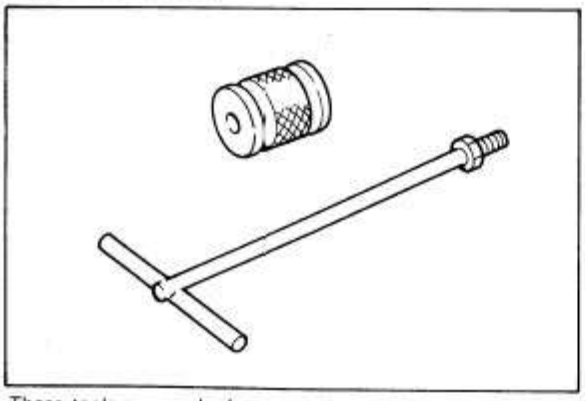
This tool is needed for proper installation of the valve guides.

Valve seat cutter set
(P/N. YM-91043)



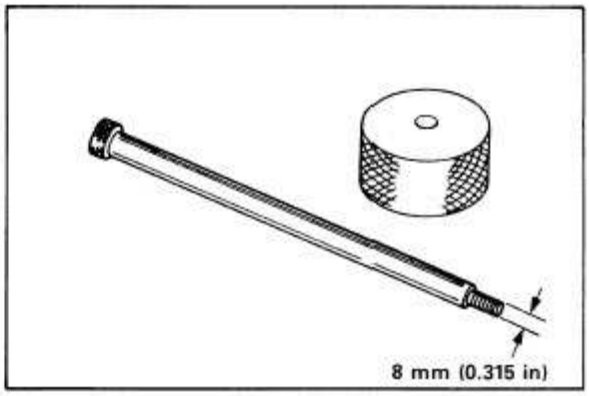
This tool is needed to resurface the valve seat.

Slide hammer
(P/N. YU-01047)



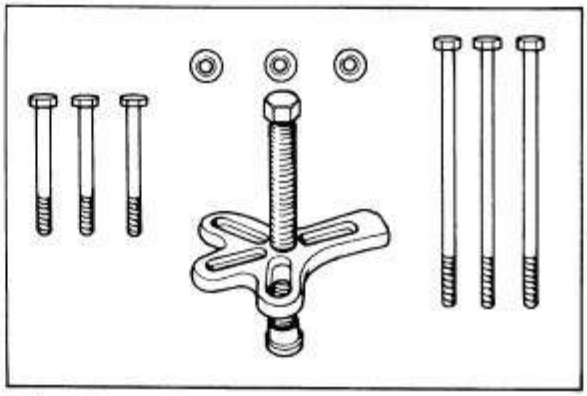
These tools are used when removing the camshaft.

Slide hammer
(P/N. YU-01083)



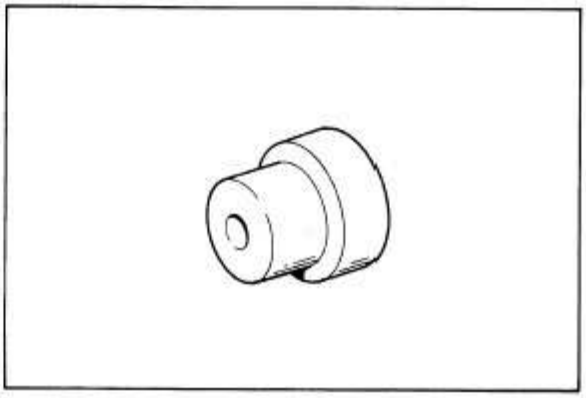
These tools are used when removing the rocker arm shaft.

3-way universal puller
(P/N. YU-33270)



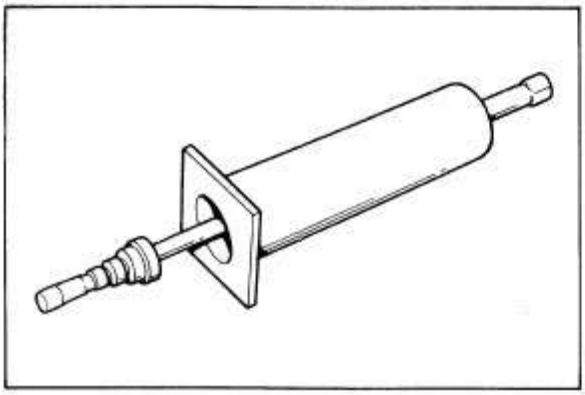
This tool is used for removing the flywheel.

Flywheel magneto puller attachment
(P/N. YM-33282)



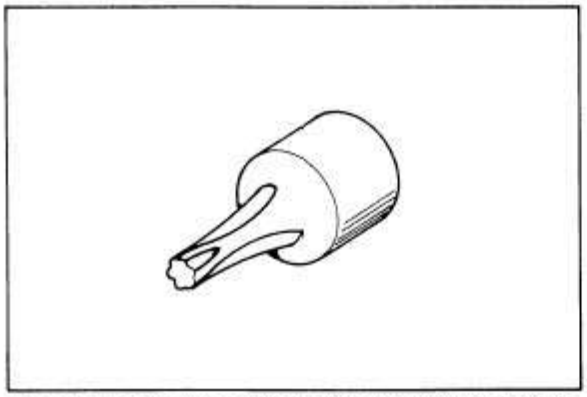
This tool is used to protect the crankshaft end when removing the flywheel.

Piston pin puller
(P/N. YU-01304)



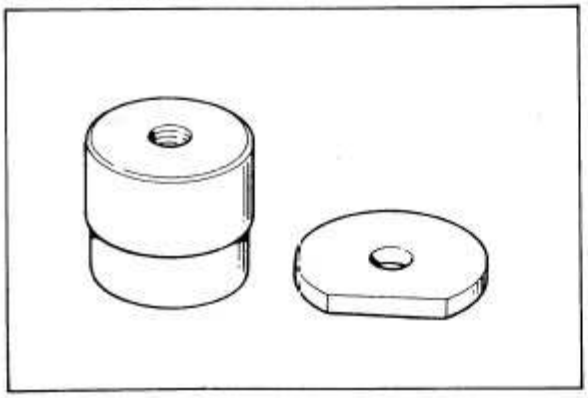
This tool is used to remove the piston pin.

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

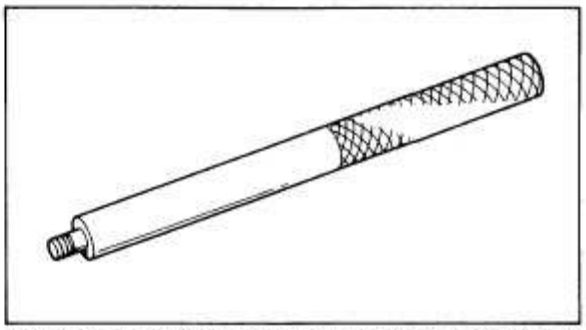


This tool is used to loosen or tighten the drive axle bearing stopper bolt.

Plain bearing driver/installer
(P/N. YM-28898)

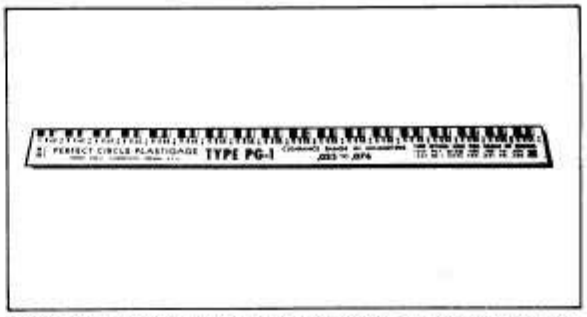


Handle (P/N. YM-04058-1)



These tools are used for removing and installing the crankshaft plain bearing.

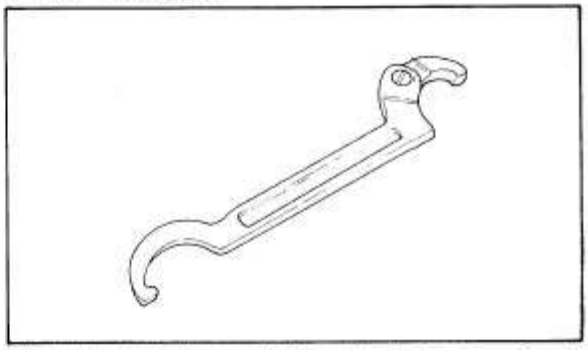
Plastigauge set "Green"
(P/N. YU-33210)



This gauge is needed when measuring clearance for connecting rod bearing.

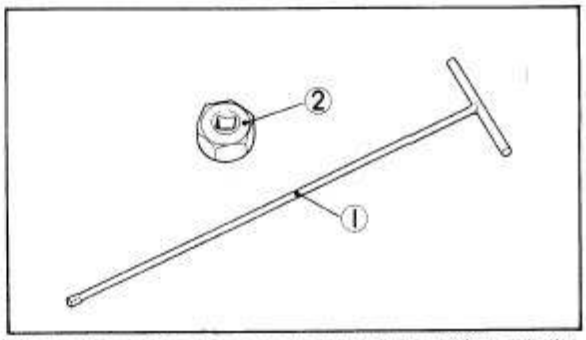
For Chassis Service

Ring nut wrench
(P/N. YU-01268)



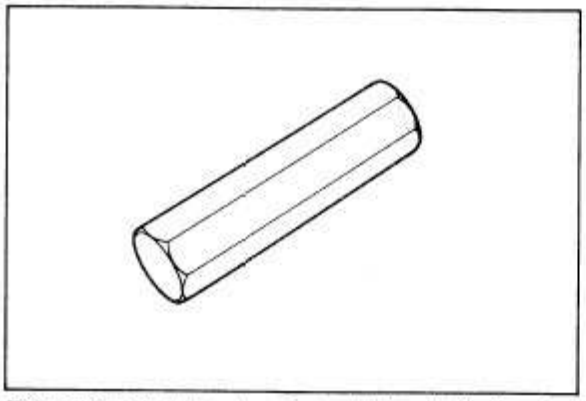
This tool is used to loosen and tighten the steering stem ring nut.

T-handle (P/N. YM-01326) ..... ①
Damper rod holder (P/N. YM-33256) .... ②



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

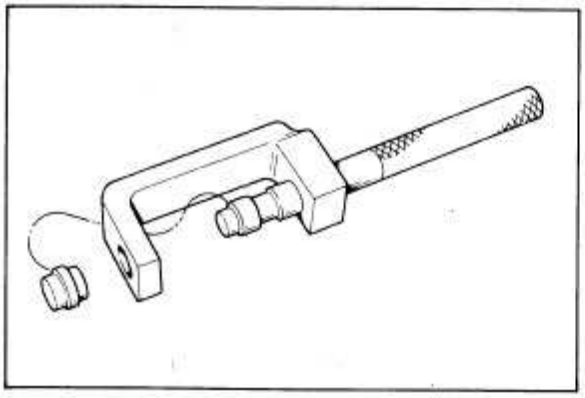
Front fork cap socket (17 mm (0.67 in))
(P/N. YM-01104)



This tool is needed when loosening and tightening the front fork cap bolt.

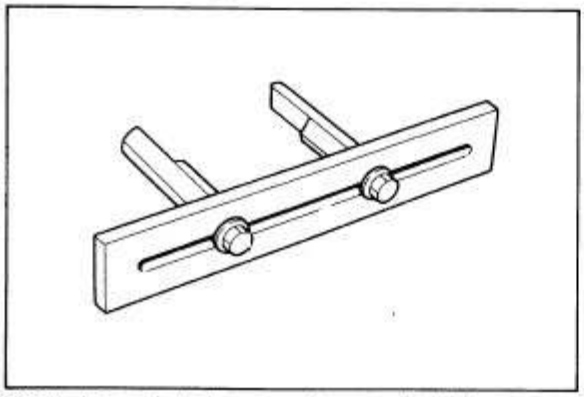
For Middle Gear Service

Universal joint holder and adapter
(P/N. YM-04062)



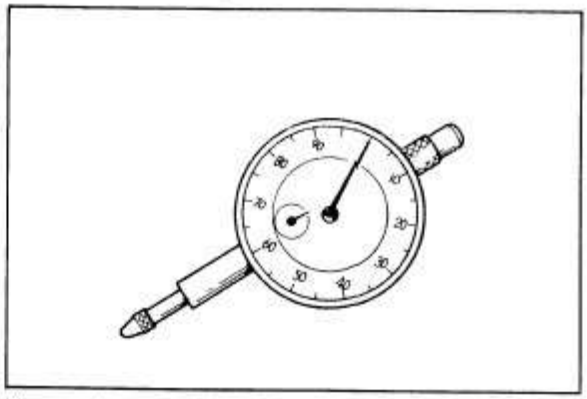
This tool is used when disassembling/assembling the U-joint and to adjust gear lash.

Middle drive gear holder
(P/N. YM-33222)



This tool is needed when measuring gear back lash.

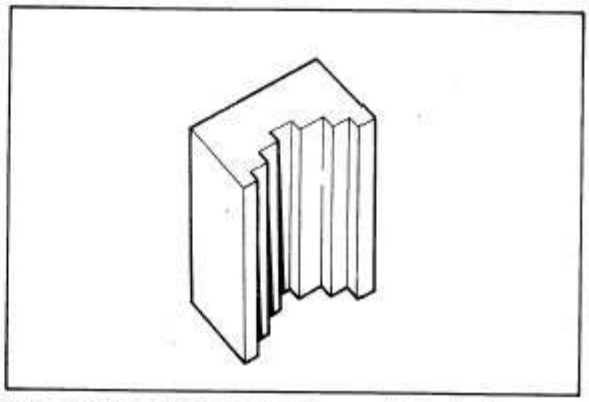
Dial indicator
(P/N. YU-03097)



These tools are used when measuring gear lash for middle gear.

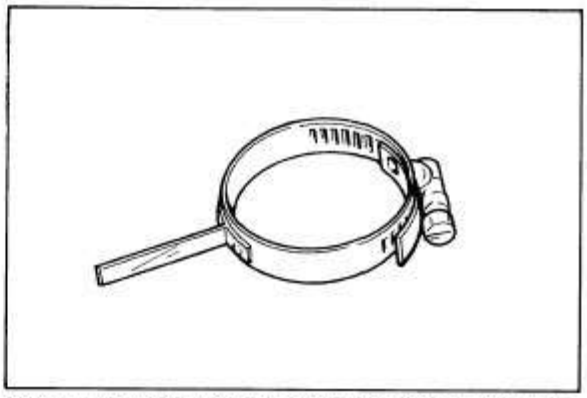
For Shaft Drive Service

Damper spring compressor
(P/N. YM-33286)



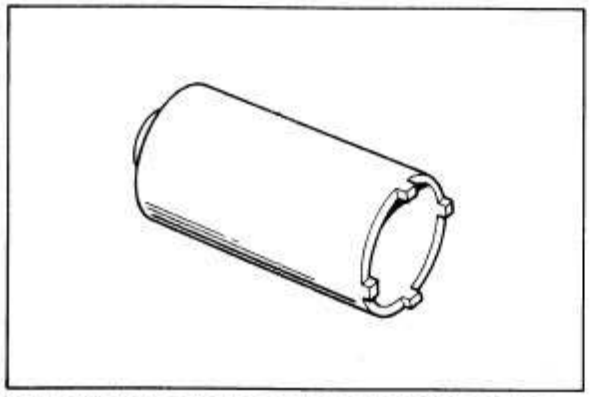
This tool is used with middle drive gear holder to disassemble and reassemble the middle gear damper.

Final drive gear lash tool
(P/N. YM-01230)



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

Bearing retainer wrench
(P/N. YM-33214)

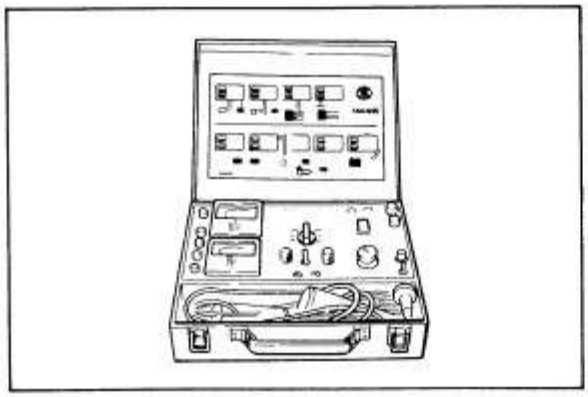


This tool is used to loosen or tighten the bearing retainer.

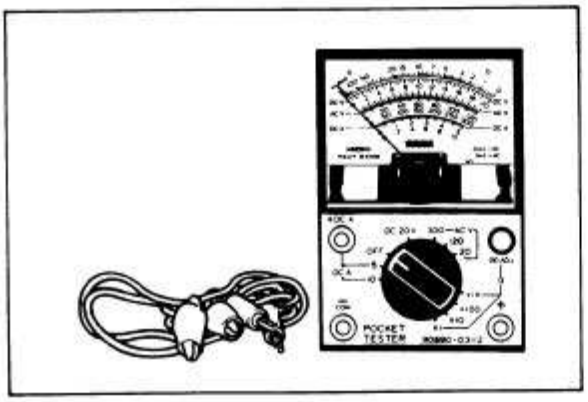
For Electrical Components

The uses of these tools are described in Chapter 6.

Electro tester
(P/N. YU-03021)



Pocket tester
(P/N. YU-03112)



CHAPTER 2.
PERIODIC INSPECTIONS AND ADJUSTMENTS

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CHAPTER 2.
PERIODIC INSPECTIONS AND ADJUSTMENTS

INTRODUCTION

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

MAINTENANCE INTERVALS CHARTS

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

PERIODIC MAINTENANCE EMISSION CONTROL SYSTEM

No.	Item	Remarks	Initial break-in		Thereafter every	
			1,000 km (600 mi) or 1 month	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*	Valve clearance	Check and adjust valve clearance when engine is cold.	○	○	○	
2	Spark plugs	Check condition. Adjust gap. Clean. Replace at 13,000 km (8,000 mi) (or 18 months) or thereafter every 12,000 km (7,400 mi) (or 18 months.)		○	○	Replace every 12,000 km (7,500 mi) or 18 months
3*	Crankcase ventilation system	Check ventilation hose for cracks or damage. Replace if necessary.		○		○
4*	Fuel line	Check fuel hose and vacuum pipe for cracks or damage. Replace if necessary.		○		○
5*	Exhaust system	Check for leakage. Retighten if necessary. Replace gasket(s) if necessary.		○	○	
6*	Carburetor synchronization	Adjust synchronization of carburetors.		○	○	
7*	Idle speed	Check and adjust engine idle speed. Adjust cable free play.		○	○	

*It is recommended that these items 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 page 2-6	○	○	○		
2	Oil filter	Clean replace as required	–	○	○		○	
3	Final gear oil	Replace	Refer to page 2-10	○			○	
4*	Air filter	Clean with compressed air	–		○		○	
5*	Brake system	Adjust the play Replace pads if necessary (front) Replace shoes if necessary (rear)	–	○	○	○		
6*	Clutch	Adjust free play	–	○	○	○		
7*	Control and meter cable	Apply chain lube thoroughly	Yamaha chain and cable lube or SAE 10W30 motor oil	○	○	○		
8	Brake pedal and change pedal shaft	Apply chain lube lightly	Yamaha chain and cable lube or SAE 10W30 motor oil		○	○		
9	Center and sidestand pivots	Apply chain lube lightly	Yamaha chain and cable lube or SAE 10W30 motor oil		○	○		
10*	Front fork oil	Drain completely Refill to specification	Yamaha fork oil 10wt or equivalent					○
11*	Steering bearing and races	Check bearings assembly for looseness Moderately repack every 16,000 km (10,000 mi)	Medium weight wheel bearing grease		○	○		Repack
12*	Wheel bearings	Check bearings for smooth rotation Replace if necessary	–		○	○		
13	Battery	Check specific gravity Check breather pipe for proper operation	–		○	○		
14	Brake/clutch lever pivot shaft	Apply chain lube lightly	Yamaha chain and cable lube or SAE 10W30 motor oil		○	○		
15*	Rear arm pivot bearings	Check bearings assembly for looseness Moderately repack every 16,000 km (10,000 mi)	Medium weight wheel bearings grease					Repack

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

ENGINE

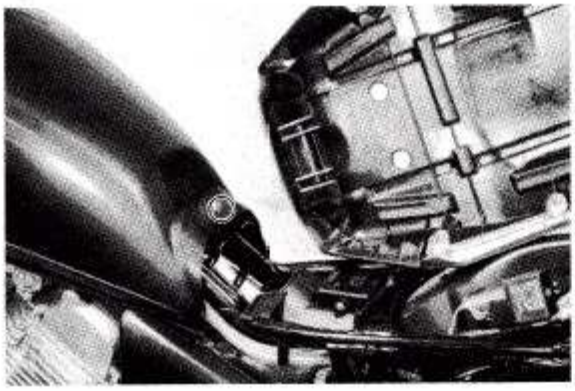
Valve Clearance Adjustment

Adjust the valve clearance as follows:

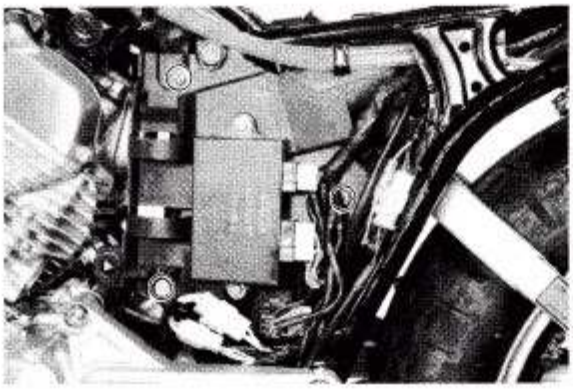
NOTE:

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

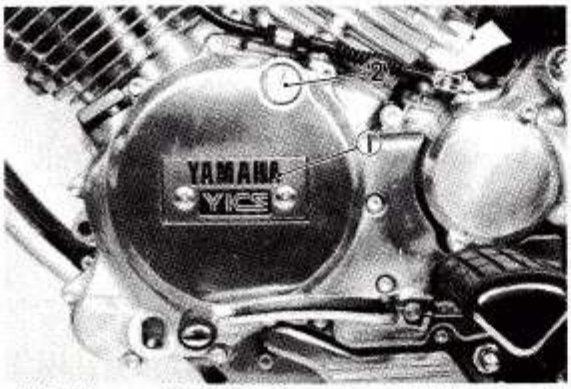
1. Remove the seat, side covers, and fuel tank.



2. Remove the T.C.I/regulator holding bracket.



3. Remove the intake and exhaust valve covers.
4. Remove the emblem and timing plug from the left-side crankcase cover.

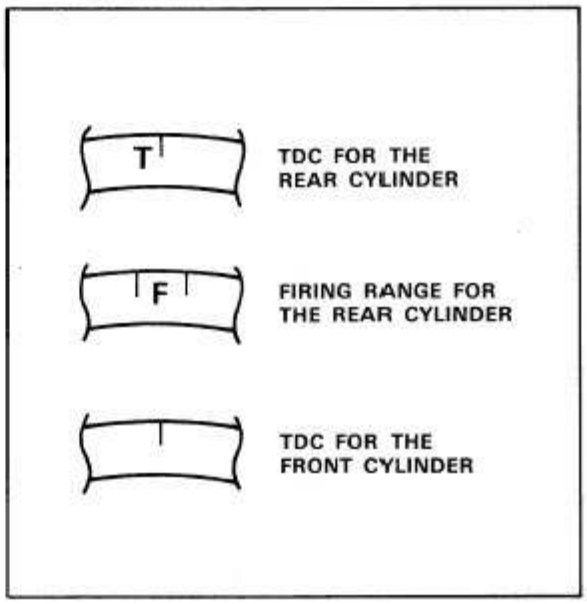


1. Emblem 2. Timing plug

5. Align the "T" mark (for the rear cylinder) on the flywheel with the stationary pointer on the crankcase cover. The pointer can be viewed through the timing window in the crankcase cover. When the "T" mark is aligned with the stationary pointer, the piston is at Top Dead Center (TDC). Valve clearance should be checked and adjusted when the piston is at TDC on the compression stroke. The piston is at TDC on compression when there is free play in both valve adjusters.

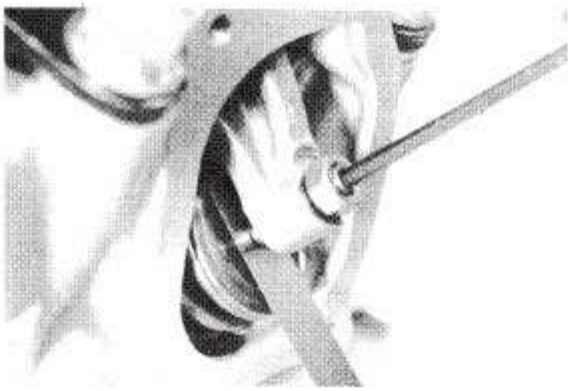


The flywheel is marked as follows:



6. Use a feeler gauge to determine the clearance.

Intake valve (cold):	
	0.10 mm (0.004 in)
Exhaust valve (cold):	
	0.15 mm (0.006 in)



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

TIGHTENING TORQUE:
14 Nm (1.4 m · kg, 10 ft · lb)

8. Rotate the crankshaft approximately 290 degrees clockwise to TDC for the front cylinder. Repeat the steps above, and check/adjust the valve clearance.
9. Install the intake and exhaust valve covers, the emblem and timing plug.
10. Install the T.C.I./regulator bracket on the frame.
11. Install the fuel tank, side covers, and seat.
12. Connect the fuel and vacuum lines.

Spark Plug

1. Check electrode condition and wear, insulator color, and electrode gap.
2. Clean the spark plug with spark plug cleaner if necessary. Use a wire gauge to adjust the plug gap to the specification.
3. If the electrode becomes 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:
BP7ES (NGK), W22EP-U (NIPPONDENSO)
Spark plug gap:
0.7 ~ 0.8 mm (0.028 ~ 0.031 in)
Spark plug tightening torque:
20Nm (2.0 m · kg, 14 ft · lb)

Crankcase Ventilation System

Check the ventilation pipe from the cam-sprocket cover on the rear cylinder to the frame assembly for cracks or damage; replace if necessary.

Fuel Line

Check the fuel hoses and vacuum lines for cracks or damage; replace if necessary.

Exhaust System

1. Retighten the exhaust pipe flange nuts and muffler clamp bolts.

TIGHTENING TORQUE:
Exhaust pipe flange nut:
20 Nm (2.0 m · kg, 14 ft · lb)
Muffler clamp bolt:
20 Nm (2.0 m · kg, 14 ft · lb)

2. Replace the exhaust pipe gasket(s) and/or muffler gasket(s) if necessary.

Carburetor Synchronization

Carburetors must be adjusted to open and close simultaneously. Adjust as follows:

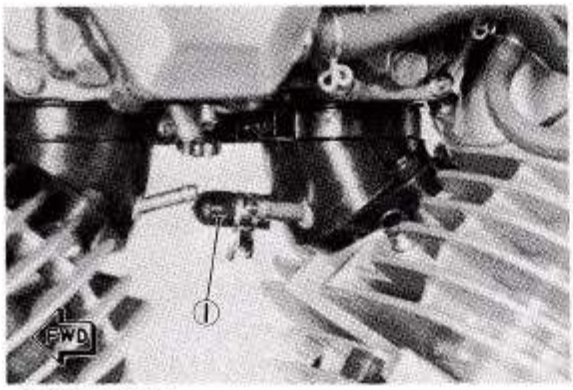
NOTE:

Valve clearance must be set properly before synchronizing the carburetors.

1. Disconnect the vacuum pipe from the front carburetor joint and remove the vacuum plug from the rear carburetor joint. Connect the vacuum gauge lines to the carburetor joints.

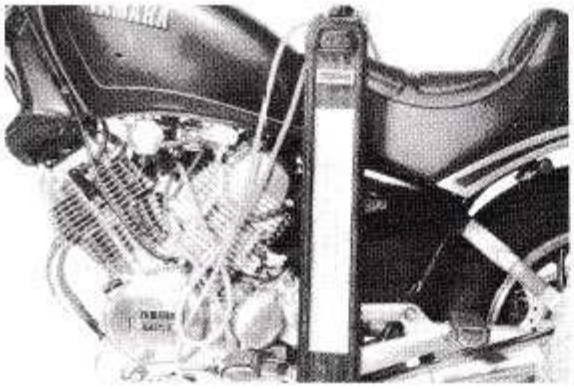
NOTE:

The rear-cylinder carburetor joint has two vacuum lines coming out of it. Disconnect the smaller diameter line, and leave the larger line in place on the joint.

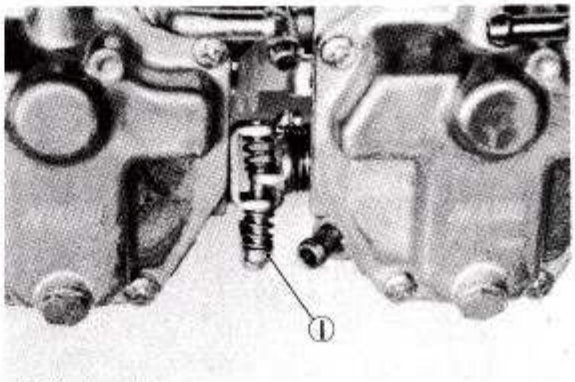


1. Vacuum plug

2. Turn the fuel cocks to the "PRI" position.
3. Start the engine, and let it warm up.
4. Read the vacuum gauge. The readings for each carburetor should be the same. If not, adjust the synchronizing screw until the readings are the same.



Vacuum pressure at idle speed:
Above 30.59 kPa
(230 mm Hg, 9.06 in Hg)
Vacuum synchronous difference:
Below 1.33 kPa
(10 mm Hg, 0.39 in Hg)



1. Synchroniging screw

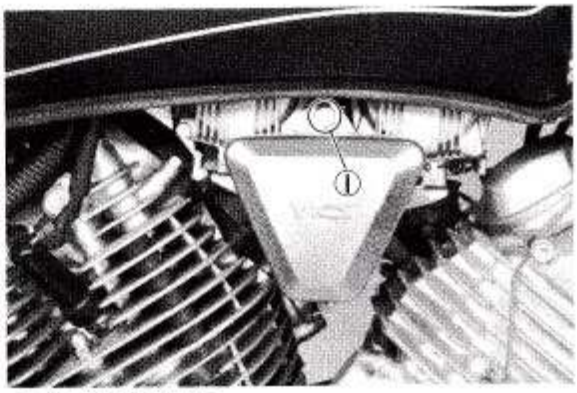
5. Reassemble the motorcycle.

Idle Speed

1. Remove the Y.I.C.S. chamber securing bolt from the carburetor.

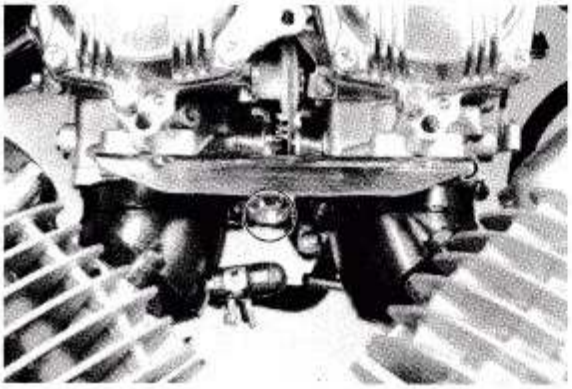
NOTE:

Do not disconnect the Y.I.C.S. vacuum pipes.



1. Y.I.C.S. chamber

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

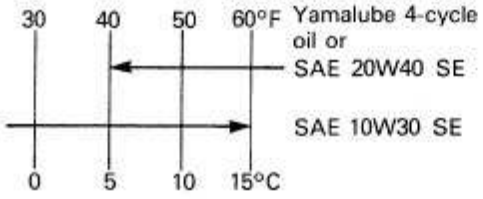


Engine Idle speed: 1,200 r/min

Engine Oil

Recommended oil

Use Yamalube 4-cycle oil or SAE 20W40 SE motor oil if the temperature does not go below 5°C (40°F). Use SAE 10W30 SE motor oil if the temperature does not go above 15°C (60°F).



Oil level measurement

1. Place the motorcycle on the centerstand. Warm up the engine for several minutes.

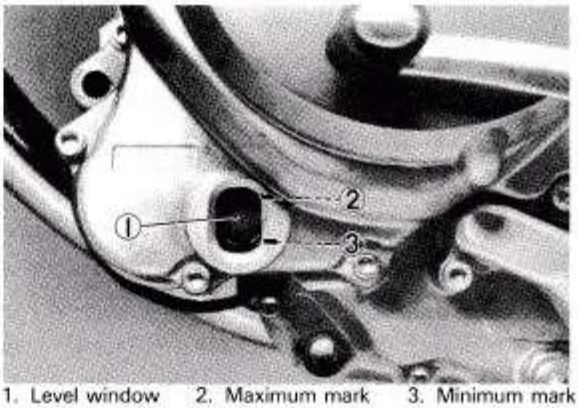
NOTE:

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

2. With the engine stopped, check the oil level through the level window located at the lower part of the left-side crankcase cover.

NOTE:

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

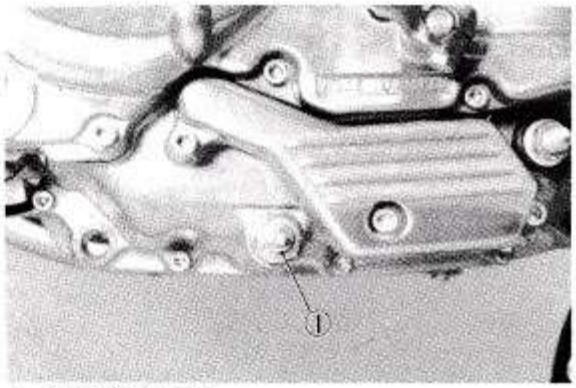


1. Level window 2. Maximum mark 3. Minimum mark

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

Oil change (without changing the filter)

1. Start the engine and stop after a few minutes of warm-up.
2. Place an oil pan under the engine and remove the oil filler cap.
3. Remove the drain plug and drain the oil.

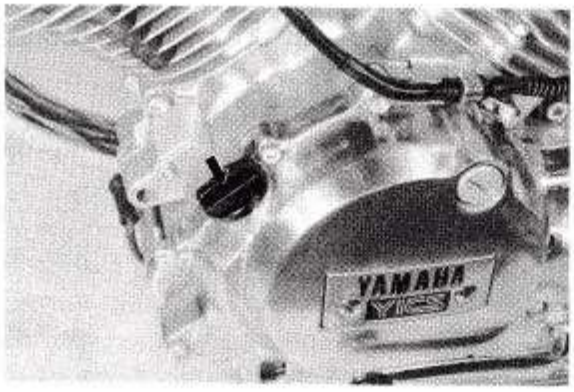


1. Engine drain plug

4. Reinstall the drain plug (make sure it is tight).

Drain plug torque: 43 Nm (4.3 m·kg, 31.0 ft·lb)

5. Add 2.4 L (2.1 Imp pt, 2.5 US qt) of engine oil through the oil filler hole. Reinstall the oil filler cap.



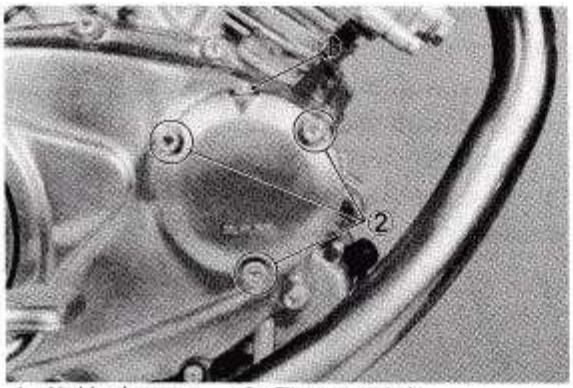
CAUTION:

Take care not to allow foreign material to enter the crankcase.

6. Start the engine, and let it warm up. The oil level indicator light should go off after the oil is filled. During warm-up, check for oil leakage. If oil leaks, stop the engine immediately, and check for the cause.
7. Stop the engine and check the oil level.

Oil and filter change

1. Remove the drain plug and drain the oil.
2. Remove the air bleed screw, oil filter cover bolts, and filter element.



1. Air bleed screw 2. Filter cover bolt

3. Reinstall the drain plug (make sure it is tight).

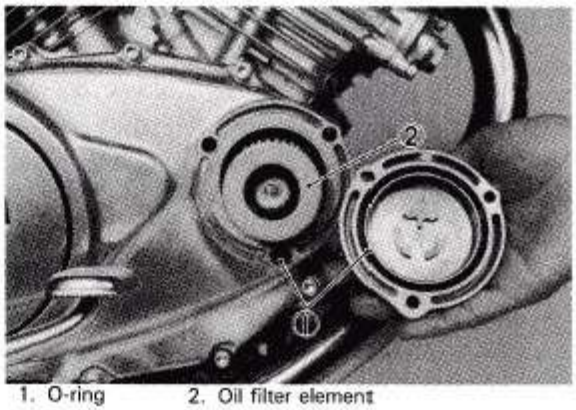
Drain plug torque:
43 Nm (4.3 m·kg, 31.0 ft·lb)

4. Install the new oil filter element, new O-ring, and filter cover; tighten the oil filter bolt.

TIGHTENING TORQUE:
Oil filter cover bolt:
10 Nm (1.0 m·kg, 7.2 ft·lb)
Air bleed screw:
5 Nm (0.5 m·kg, 3.6 ft·lb)

NOTE:

Make sure the O-rings are positioned properly.

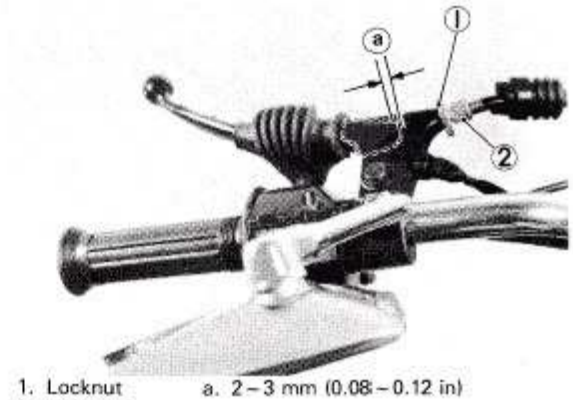


1. O-ring 2. Oil filter element

5. Add 2.5 L (2.2 Imp qt, 2.6 US qt) of engine oil through the oil filler. Reinstall the oil filler cap.
6. After the replacement of engine oil and/or oil filter, be sure to check for the oil level and any oil leakage. The oil level indicator light should go off after the oil is filled.

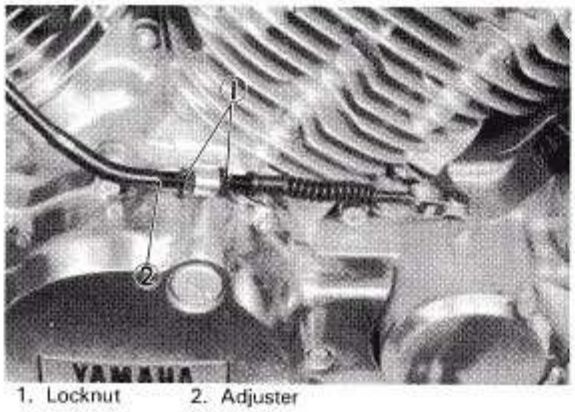
Clutch Adjustment

This model has two clutch cable length adjusters. The cable length adjusters are used to take up slack from cable stretch and to provide sufficient free play for proper clutch operation under various operating conditions.



1. Locknut
2. Adjuster

a. 2 – 3 mm (0.08 – 0.12 in)



1. Locknut 2. Adjuster

1. Free play adjustment
   The clutch should be adjusted to suit rider preference within a 2 ~ 3 mm (0.08 ~ 0.12 in) free play at the lever pivot side.
   Loosen either the handlebar lever adjuster locknut or the cable length adjuster locknut. Next, turn the cable length adjuster either in or out until proper lever free play is achieved.

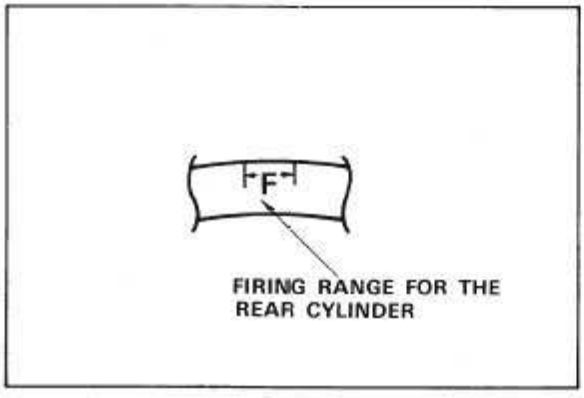
Clutch lever free play: 2 ~ 3 mm (0.08 ~ 0.12 in)

NOTE:

The above procedure provides for maximum cable free play to allow for proper clutch actuating mechanism adjustment. Refer to "Clutch" on page 3-38.

Checking Ignition Timing

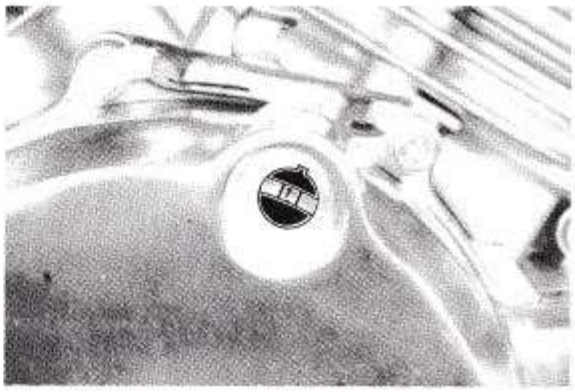
Check the ignition timing with a timing light by observing the stationary pointer and the marks stamped on the flywheel.



1. Remove the emblem and timing plug from the left-side crankcase cover.
2. Connect the timing light to the rear (#1) cylinder spark plug wire.
3. Start the engine, and keep the engine running at the specified speed. Use a tachometer to check the engine speed.

Engine Speed: 1,200 r/min

4. The stationary pointer (in the timing window) should be within the firing range shown on the flywheel. If the pointer is not within the range or if it is not steady, check the flywheel and/or pickup assembly for tightness and/or damage. (See Chapter 6, "ELECTRICAL" for further information.)

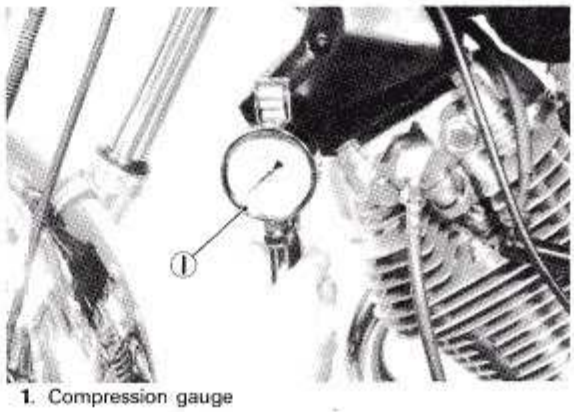


5. Reinstall the timing plug.

Compression Pressure Measurement

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

1. Make sure the valve clearance is correct.
2. Warm up the engine for 2 ~ 3 minutes; stop the engine.
3. Remove both spark plugs.
4. Install a compression gauge.



1. Compression 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 indicated on the gauge does not increase further. The compression should be within the specified levels.

Compression pressure (at sea level):
Standard:
1,079 kPa (11 kg/cm^2, 156 psi)
Minimum:
980 kPa (10 kg/cm^2, 142 psi)
Maximum:
1,177 kPa (12 kg/cm^2, 171 psi)

WARNING:

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

6. If the pressure is too low, squirt a few drops of oil into the cylinder being measured. Measure compression again. If there is a higher reading than before (without oil), the piston rings may be worn or damaged. If the pressure remains the same after measuring with the oil, one or both rings and valves may be the source of the problem.
7. Check both cylinders. Compression pressure should not vary more than the specified value from one cylinder to the other.

Difference between each cylinder:
Less than 98 kPa (1.0 kg/cm^2, 14 psi)

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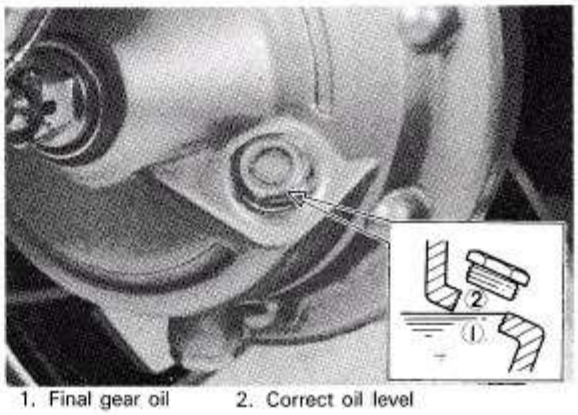
Final Gear Oil

Oil level measurement

1. Place the motorcycle on a level place, and place it on its centerstand. The engine should be cool (at atmospheric temperature).
2. Remove the oil filler cap and check the oil level. If it is not up to the brim of the filler hole, add oil.

CAUTION:

Take care not to allow foreign material to enter the final gear case.



1. Final gear oil 2. Correct oil level

Gear oil replacement

1. Place an oil pan under the final gear case.
2. Remove the final gear oil filler cap and the drain plug; drain the oil.



1. Final gear drain plug

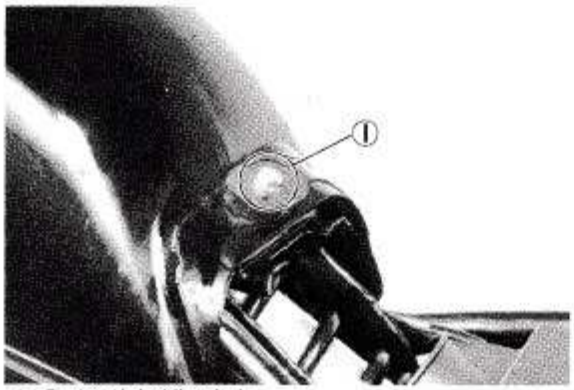
3. Reinstall and tighten the final gear drain plug.
4. Fill the gear case to the specified level.

Oil capacity:
0.19 L (0.17 Imp qt, 0.20 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.

5. Reinstall the filler cap securely.

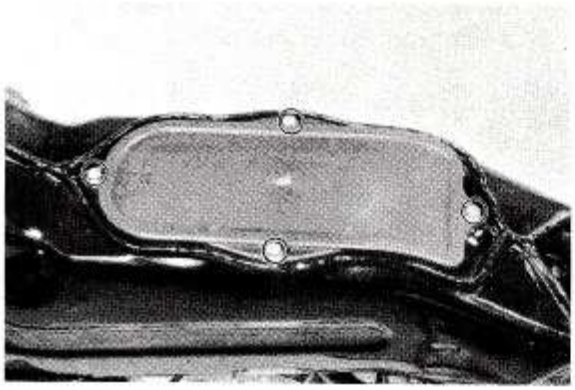
Air Filter

1. Turn the fuel cock lever to "RES". Remove the fuel and vacuum pipes from the fuel cock.
2. Remove the sidecovers.
3. Remove the seat and fuel tank holding bolt.

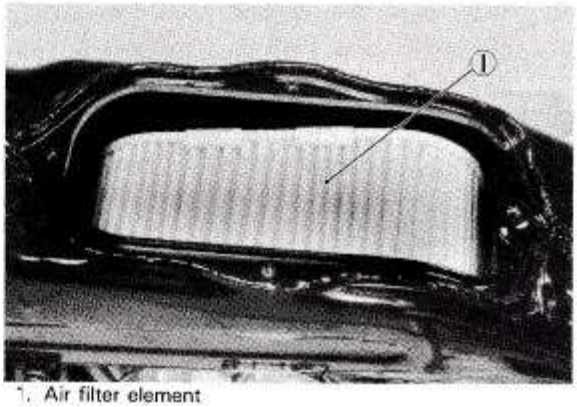


1. Fuel tank holding bolt

4. Remove the air filter case cover by removing the four screws.

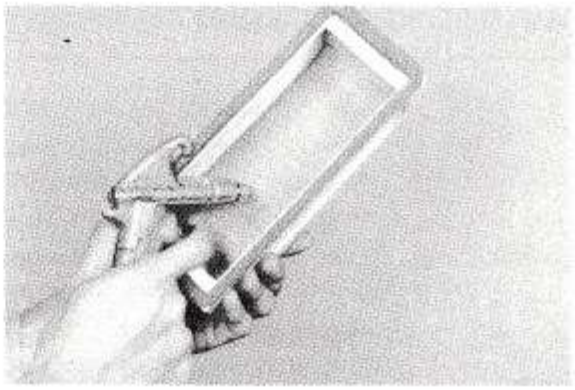


5. Pull out the element.



1. Air filter element

6. 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.



7. Reassemble by reversing the removal procedure. Check whether the element is seated completely against the case.
8. 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.

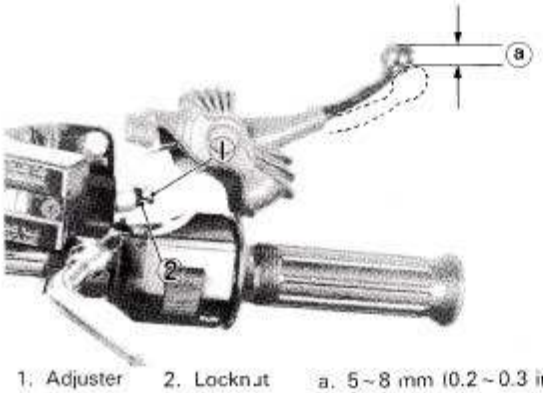
Front and Rear Brake

Front brake lever free play adjustment

The brake can be adjusted by simply adjusting the free play of the brake lever. The piston in the caliper moves forward as a brake pad wears out, automatically adjusting the clearance between the brake pads and brake disc.

CAUTION:

Proper lever free play is essential to avoid excessive brake drag.

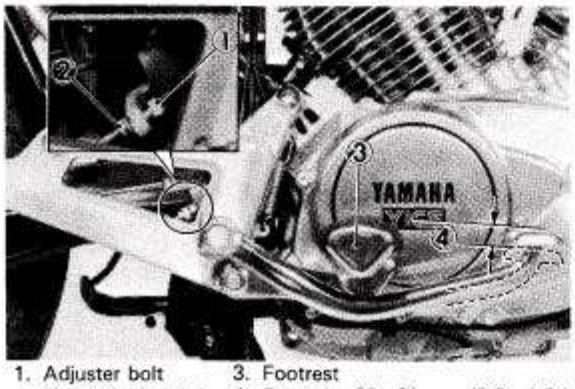


1. Adjuster 2. Locknut a. 5 ~ 8 mm (0.2 ~ 0.3 in)

1. Loosen the adjuster locknut 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 locknut.

Rear brake pedal height adjustment

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



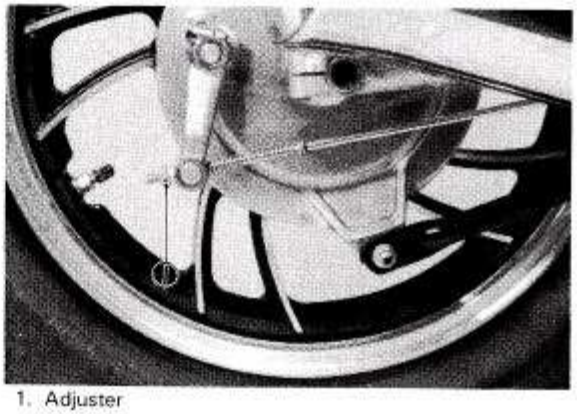
1. Adjuster bolt (for pedal height)
2. Locknut
3. Footrest
4. Free play 20 ~ 30 mm (0.8 ~ 1.2 in)

WARNING:

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

Free play

1. The rear brake should be adjusted to suit the rider's preference, but free play at the end of the brake pedal should be 20 ~ 30 mm (0.8 ~ 1.2 in).
   To adjust, turn the adjuster on the brake rod clockwise to reduce play; turn the adjuster couterclockwise to increase play.



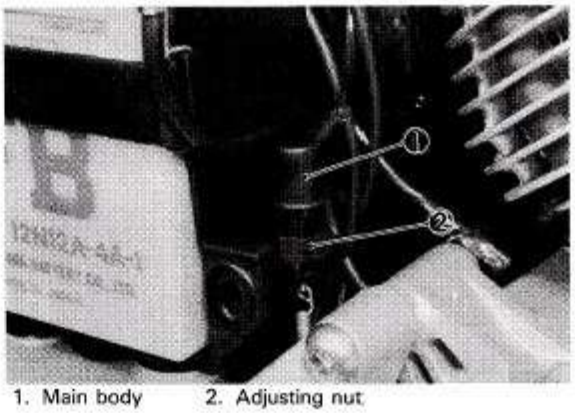
1. Adjuster

WARNING:

Check the operation of the brake light after adjusting the rear brake.

Brake Light Switch Adjustment

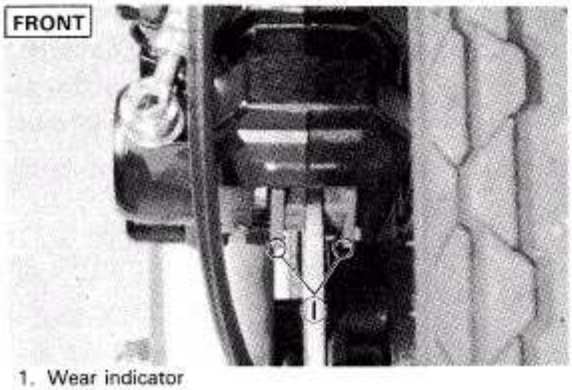
The brake light switch is operated by the movement of the brake pedal.
To adjust, hold the switch body with your hand so it does not rotate and turn the adjusting nut. Proper adjustment is achieved when the brake light comes on slightly before the brake begins to take effect.



1. Main body 2. Adjusting nut

Front Brake Pad

To check, examine the pads in the front brake. If any pad is worn to the wear limit, replace both pads in the caliper.

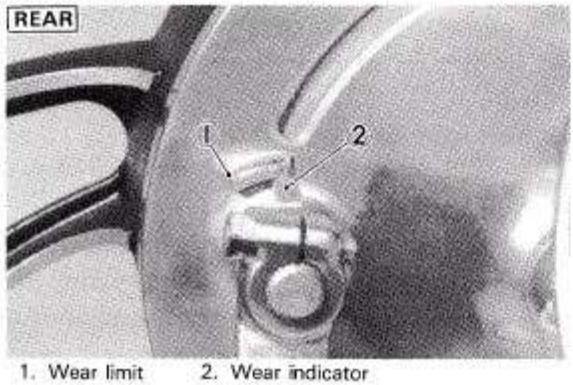


1. Wear indicator

Wear limit: 0.8 mm (0.03 in)

Rear Brake Shoe

To check, examine the wear indicator position while depressing the brake pedal. If the indicator reaches to the wear limit line, replace the shoes.



1. Wear limit 2. Wear indicator

Brake Fluid

Insufficient brake fluid may allow air to enter the brake system, possibly causing the brake to become ineffective. Check the brake fluid level and replenish when necessary, observing these precautions:



1. Lower level

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

Recommended brake fluid: DOT #3

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

Cable Inspection and Lubrication

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

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

Recommended lubricant:
Yamaha chain and cable lube or
10W30 motor oil.

Brake and Change Pedals/Brake and Clutch Levers

Lubricate the pivoting parts of each lever and pedal.

Recommended lubricant:
Yamaha chain and cable lube or 10W30 motor oil

Centerstand and Sidestand

Lubricate the centerstand and sidestand at their pivot points.

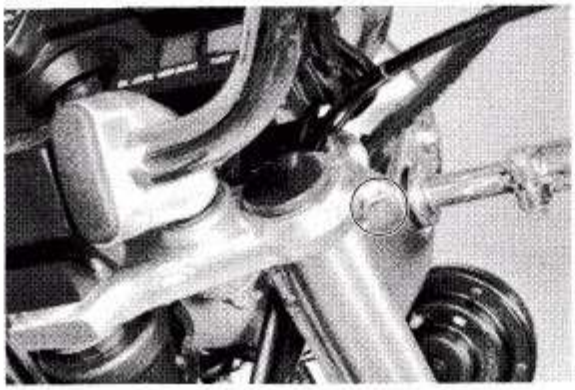
Recommended lubricant:
Yamaha chain and cable lube or 10W30 motor oil

Front Fork Oil Change

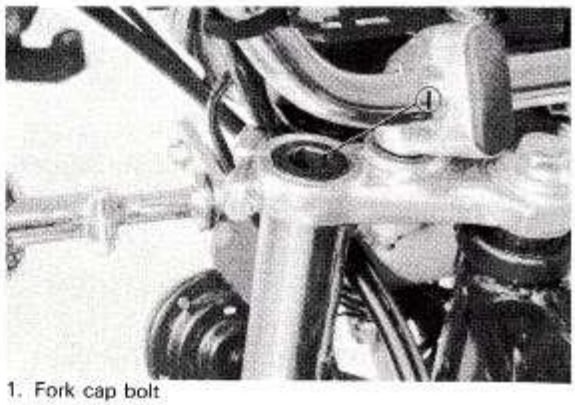
WARNING:

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

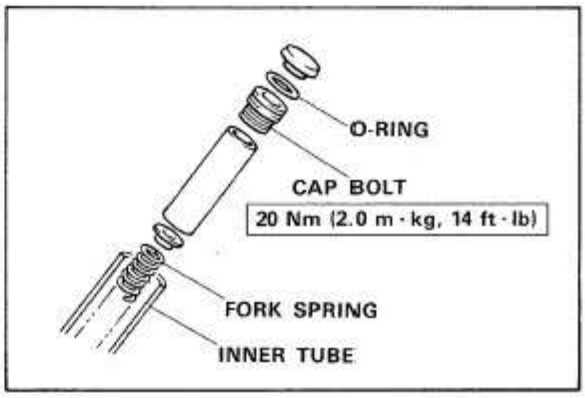
1. Raise the motorcycle so that there is no weight on the front end of the motorcycle.
2. Loosen the front fork pinch bolts at the steering crown.



3. Remove the caps and fork cap bolts from the inner fork tubes. Use with the special tool.



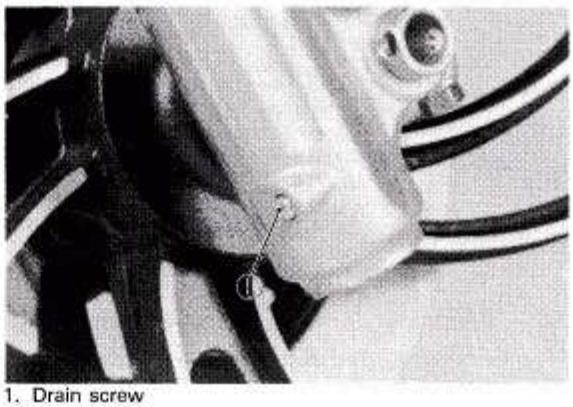
1. Fork cap bolt



4. Place an open container under each drain hole. Remove the drain screw from each outer tube.

WARNING:

Do not let oil contact the disc brake components. If any oil should contact the brake components, it must be removed before the motorcycle is operated. Oil will cause diminished braking capacity and will damage the rubber components of the brake assembly.



1. Drain screw

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

Front fork oil (each fork):
296 cm^3 (10.4 Imp oz, 10.0 US oz)
Yamaha fork oil 10 wt or equivalent

8. After filling, slowly pump the forks up and down to distribute the oil.
9. Inspect the O-ring on the fork cap bolt. Replace O-ring if damaged.
10. Reinstall the fork cap bolts, and tighten the front fork pinch bolts.

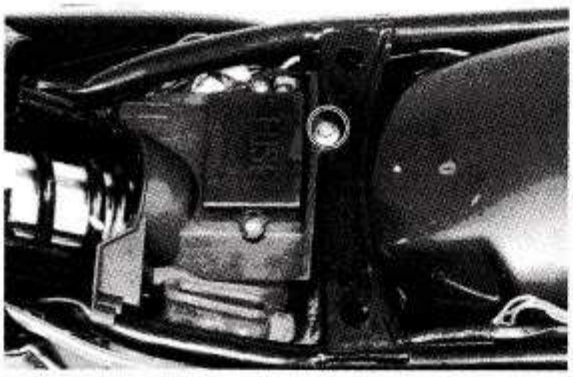
TIGHTENING TORQUE:
Fork cap bolt:
23 Nm (2.3 m·kg, 17 ft·lb)
Front fork pinch bolt:
20 Nm (2.0 m·kg, 14 ft·lb)

11. Reinstall the caps.

Rear Shock Absorber Adjustment

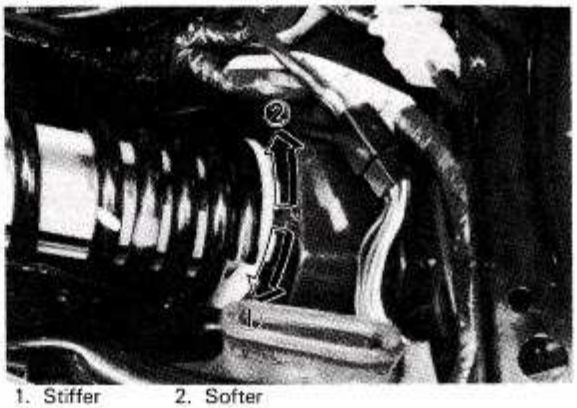
The spring preload of the rear shock absorber can be adjusted to suit rider's preference, weight, and road conditions.

1. Remove the seat and fuse box bracket.



2. To increase preload, raise the spring seat. To decrease preload, lower the spring seat.

	Hard			S.T.D.	Soft	
Adjusting position	6	5	4	3	2	1



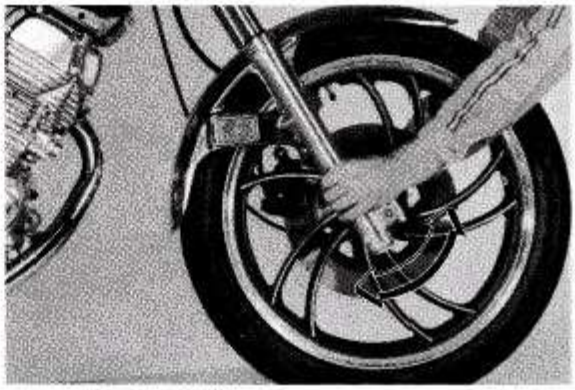
1. Stiffer 2. Softer

3. Install the fuse box bracket and seat in the original position.

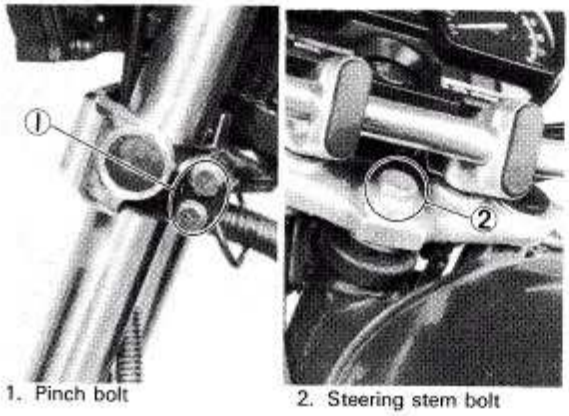
Steering Head Adjustment

The steering assembly should be checked periodically for looseness.

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

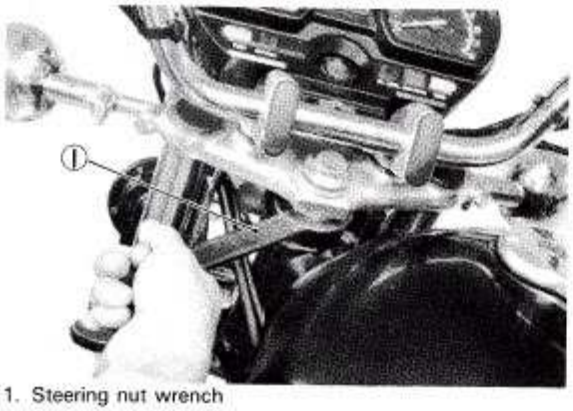


3. If the steering head is loosened, adjust it. Remove the handlebar cover, and loosen the front fork pinch bolts and steering stem bolt.



1. Pinch bolt 2. Steering stem bolt

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



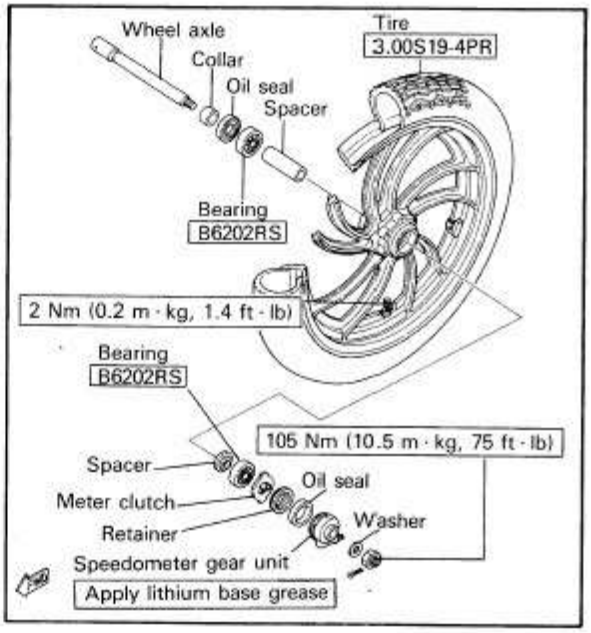
1. Steering nut wrench

6. Retighten the steering stem bolt, and the front fork 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 the adjustment procedure.

Wheel Bearings

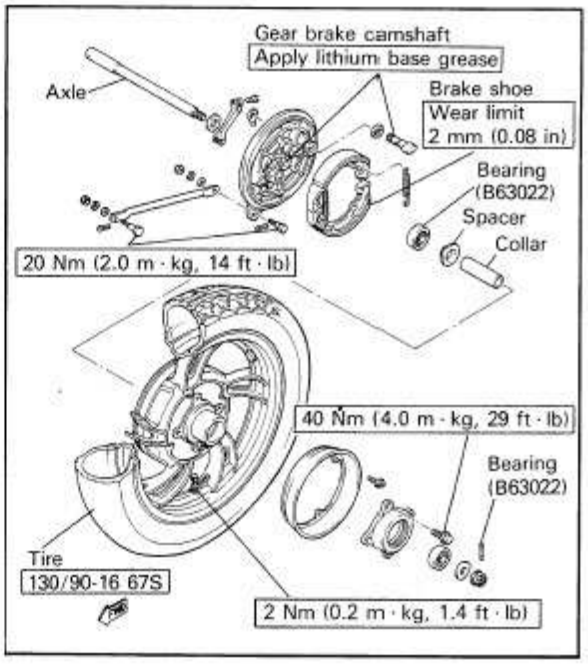
If a rolling rumble is noticed and increases with increasing wheel speed (not engine or transmission speed), the wheel bearings may be worn. Check the wheel bearings for both the front and rear wheels.

Front Wheel



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

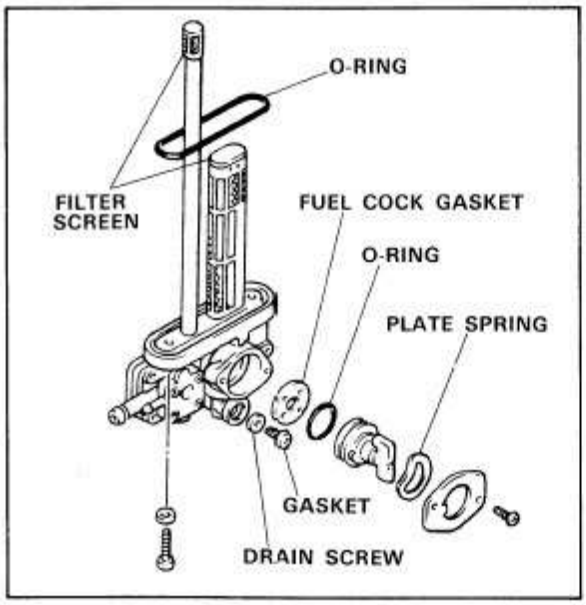
Rear Wheel



1. Remove the rear wheel, and check the bearing movement with your finger. Replace the bearings if they are rough or worn.

Fuel Cock

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



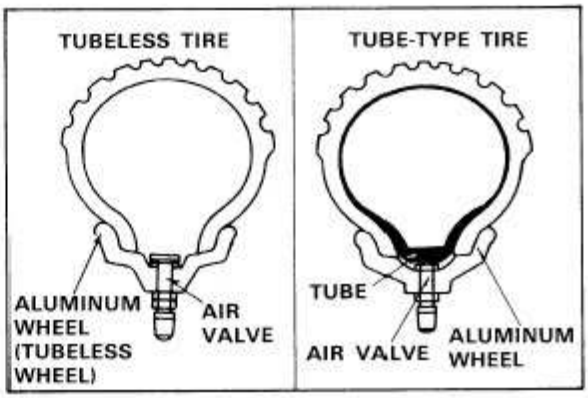
1. Remove the fuel tank and position it so that fuel will not spill when the fuel cock is removed.
2. Remove the fuel cock assembly and inspect the filter screen. Replace the fuel cock assembly if it is seriously contaminated.
3. Inspect all components, and replace any that are damaged. If the diaphragm is damaged in any way or if the fuel cock gasket surfaces are scratched or corroded, the fuel cock assembly must be replaced. If there is abrasive damage to any components, the fuel tank must be drained and flushed.
4. Reassemble the fuel cock, and install it on the fuel tank.

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 tires only
Tubeless-type wheel—Tube-type or tubeless tires
When using tube-type tires, be sure to install the proper tube.



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

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

Tire pressure (cold)

Basic weight: With oil and full fuel tank	185 kg (408 lb)	
Maximum load*	225 kg (496 lb)	
Cold tire pressure	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) 225 kg (496 lb) load*	196 kPa (2.0 kg/cm², 28 psi)	225 kPa (2.3 kg/cm², 32 psi)
High speed riding	196 kPa (2.0 kg/cm², 28 psi)	225 kPa (2.3 kg/cm², 32 psi)

*Load is the total weight of cargo, rider, passenger, and accessories.

2. Before operation, always check the tire surfaces for wear and/or damage; look for cracks, glass, nails, metal fragments, stones, etc. Correct any such hazard before riding.

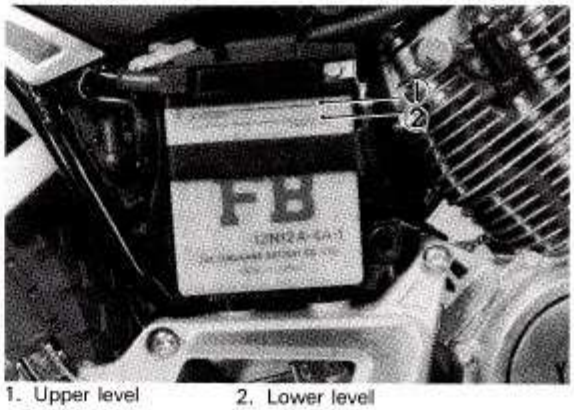
3. Always inspect the aluminum wheels before a ride. Place the motorcycle on its centerstand and check for cracks, bends or warpage of the wheels. Do not attempt even small repairs to the wheel. If a wheel is deformed or cracked, it must be replaced.
4. Tires and wheels should be balanced whenever either one is changed or replaced. Failure to have a wheel assembly balanced can result in poor performance, adverse handling characteristics, and shortened tire life.
5. After installing a tire, ride conservatively to allow the tire to seat itself on the rim properly. Failure to allow proper seating may cause tire failure resulting in damage to the motorcycle and injury to the rider.
6. After repairing or replacing a tire, check to be sure the valve stem locknut is securely fastened. If not, torque it as specified.

TIGHTENING TORQUE:
2 Nm (0.2 m · kg, 1.4 ft · lb)

ELECTRICAL

Battery

1. The fluid level should be between the upper and lower level marks. Use only distilled water if refilling is necessary.

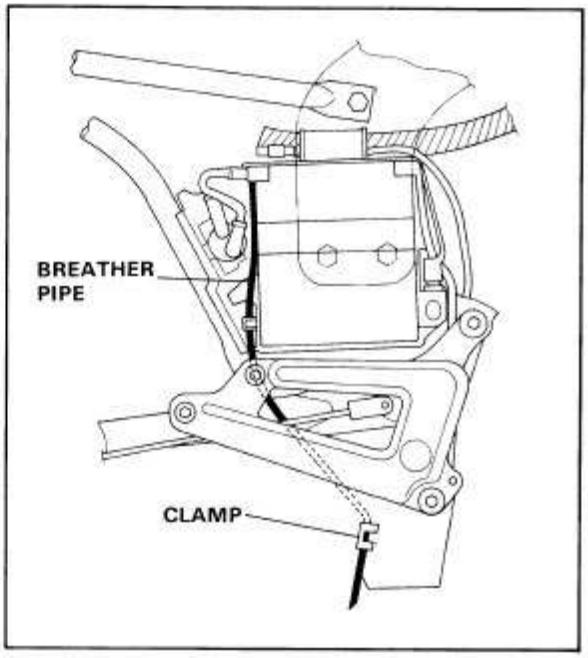


1. Upper level 2. Lower level

CAUTION:

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

2. 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.



CAUTION:

The battery must be charged before using to ensure maximum performance. Failure to charge the battery properly before first use or a low electrolyte level will cause premature failure of the battery. Charging current: 1.2 amps/10 hrs. or until the specific gravity reaches 1.280 at 20°C (68°F)

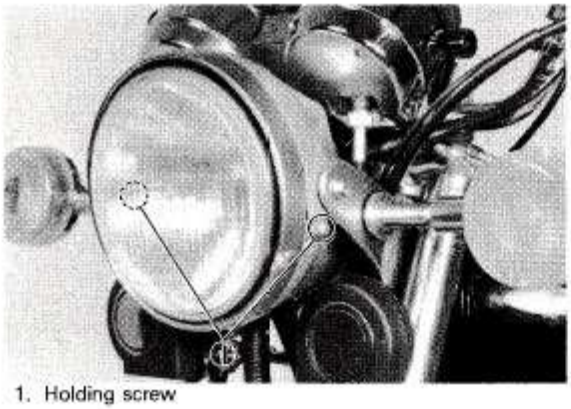
WARNING:

Battery electrolyte is poisonous and dangerous, causing severe burns, etc. It 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 closed space. Always shield eyes when working near batteries.
KEEP OUT OF REACH OF CHILDREN

Headlight

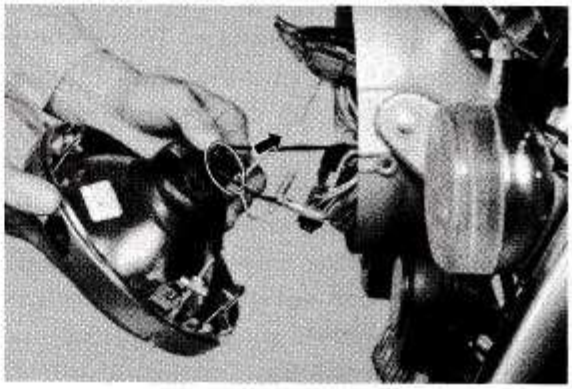
Headlight bulb replacement

1. Remove the two screws holding the light unit assembly to the headlight body.



1. Holding screw

2. Disconnect the connector and remove the light unit assembly.



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



4. 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; otherwise, the transparency of the glass, life of the bulb, and illuminous flux will be adversely affected. If oil gets on the lamp, clean it with a cloth moistened thoroughly with alcohol or lacquer thinner.

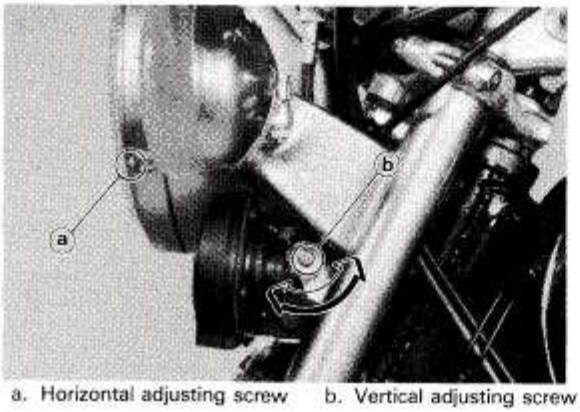
WARNING:

Keep flammable products or your hand away from the bulb while it is on; it gets hot. Do not touch the bulb until it cools down.

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

Headlight beam adjustment

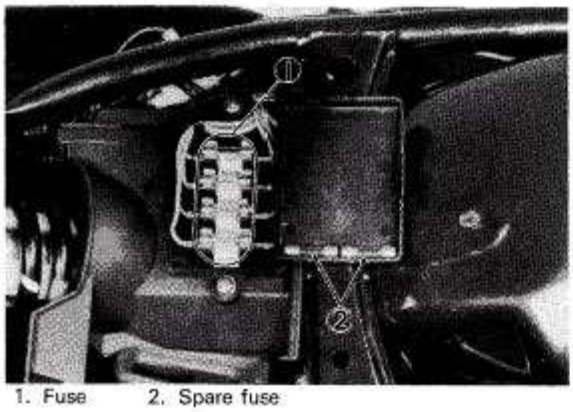
1. Horizontal adjustment:
   To adjust the beam to the right (as you're sitting on the bike), turn the adjusting screw clockwise.
   To adjust the beam to the left, turn the screw counterclockwise.
2. Vertical adjustment:
   Loosen the adjusting screw under the headlight body. Adjust vertically by moving the headlight body. When proper adjustment is attained, retighten the adjusting screw.



a. Horizontal adjusting screw b. Vertical adjusting screw

Fuse

1. The fuse block is located under the seat.



1. Fuse 2. Spare fuse

2. If any fuse is blown, turn off the ignition switch and the switch in the circuit in question; install a new fuse of proper amperage. Turn on the switches, and see if the electrical device operates. If the fuse immediately blows again, check the circuit in question (refer to Chapter 6, "ELECTRICAL").

WARNING:

Do not use fuses of a higher amperage rating than those recommended. Substitution of a fuse of improper rating can cause extensive electrical system damage and a possible fire.

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ENGINE OVERHAUL

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CHAPTER 3
ENGINE OVERHAUL

ENGINE REMOVAL

NOTE:

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

Preparation for Removal

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

NOTE:

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

3. During engine disassembly, clean all parts and place them in trays in their order of disassembly. This will speed up assembly and help assure that all parts are correctly reinstalled in the engine.
4. Place the motorcycle on its centerstand. Start the engine and let it warm-up. Stop the engine and drain the engine oil.
5. Remove the left and right sidecovers.

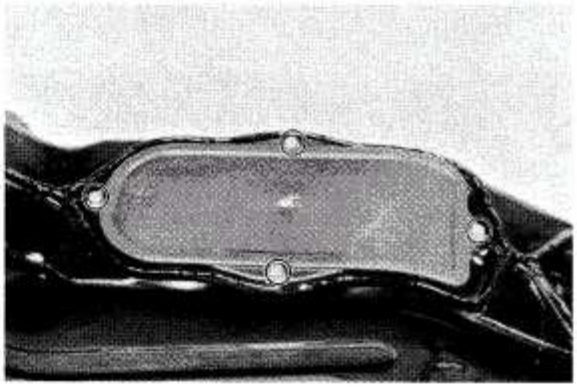
Fuel Tank

1. Turn the fuel cock to "ON".
2. Disconnect the fuel and vacuum lines from the fuel cock.
3. Remove the seat and fuel tank bolt.

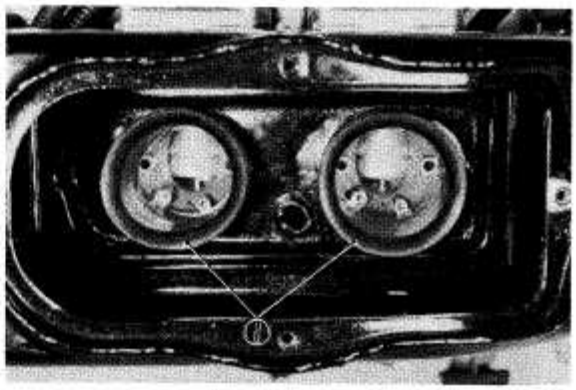


Air Filter

1. Remove the air filter cover and filter from the frame.



2. Loosen the carburetor inlet joint screws, and pull out the inlet joints from the frame.



1. Inlet joint

NOTE:

After removing the air filter assembly, cover the carburetor with a clean cloth to keep dust and dirt out of it.

Battery

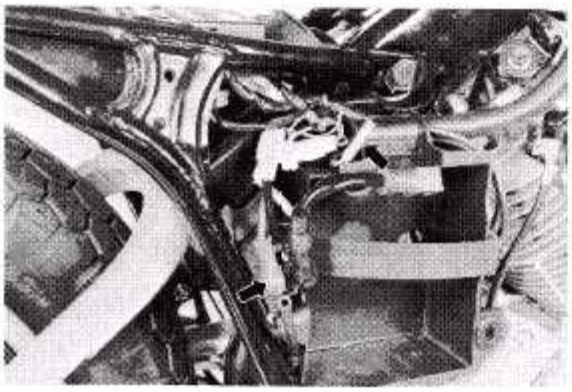
1. Disconnect the battery leads.

NOTE:

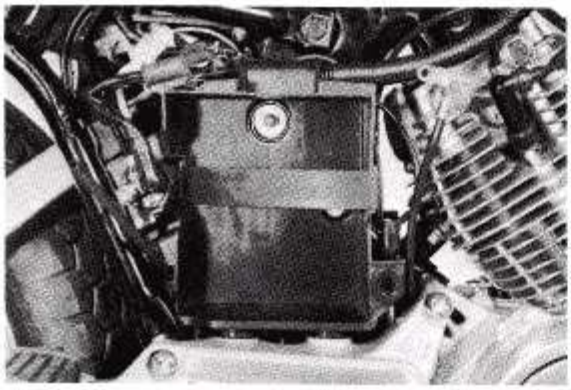
Disconnect the negative lead first.



2. Disconnect the starter motor lead from the starter motor relay, and oil level switch lead.

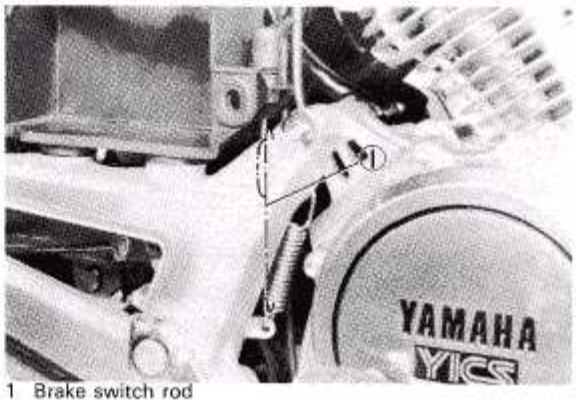


3. Remove the battery-box-holding screw and remove the battery box from the frame.



NOTE:

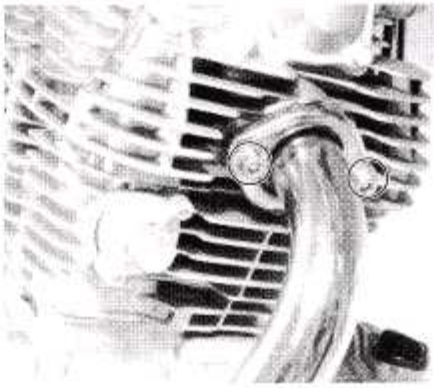
Be sure to disconnect the brake switch rod from the brake pedal return spring before completely removing the battery box.



1 Brake switch rod

Exhaust Pipes and Mufflers

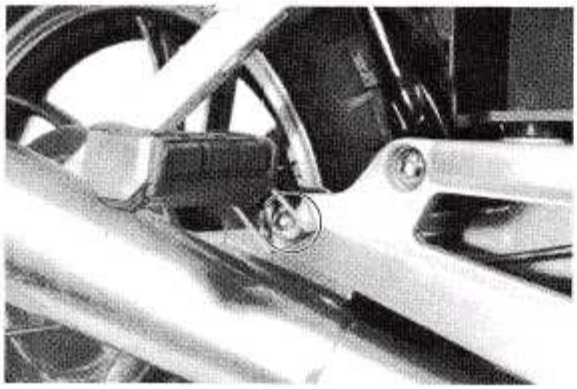
1. Remove the exhaust pipe flange nuts from the front cylinder head.



2. Loosen the muffler clamp bolt and remove the exhaust pipe.
3. Loosen the muffler clamp bolt at the rear cylinder.



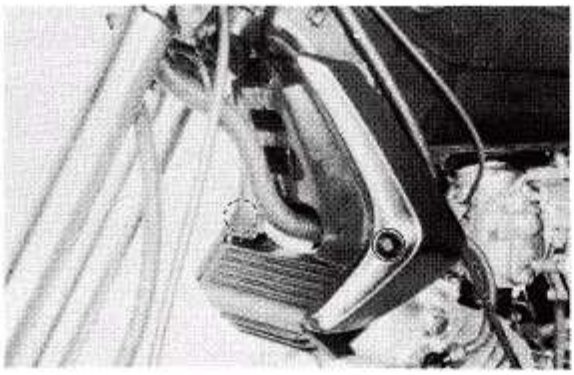
4. Remove the muffler and passenger footrest securing bolt from each muffler bracket.
   Remove the muffler assembly and the passenger footrests.



5. Remove the exhaust pipe flange nuts from the rear cylinder head.

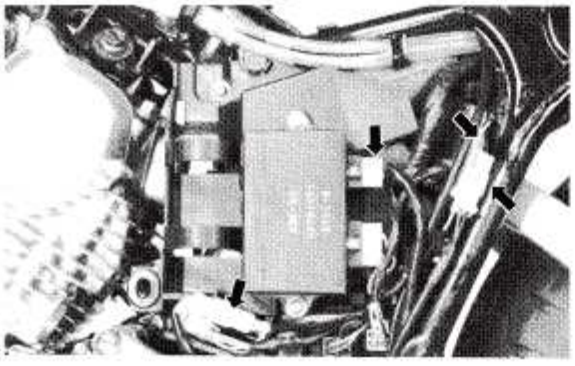
Leads and Couplers

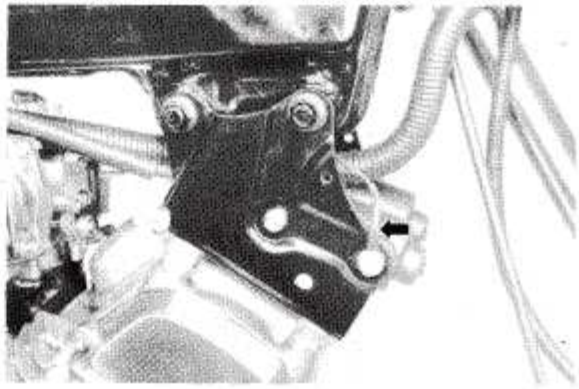
1. Remove the engine-mounting-bracket cover from the front cylinder. The cover is in three pieces: a centerpiece and two sidepieces. The upper part of each sidepiece hooks to the frame. Remove the securing screw, unhook each sidepiece, then remove the centerpiece.



2. Disconnect the following couplers and leads.

- A.C. magneto lead
- Sidestand switch lead
- Pickup coil lead
- Neutral switch lead
- Ignition coil leads
- Wire harness negative lead





Cables and Pipes

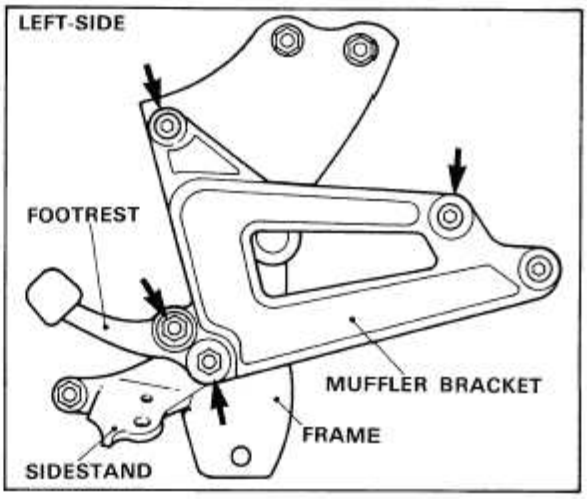
1. Disconnect the following cables.

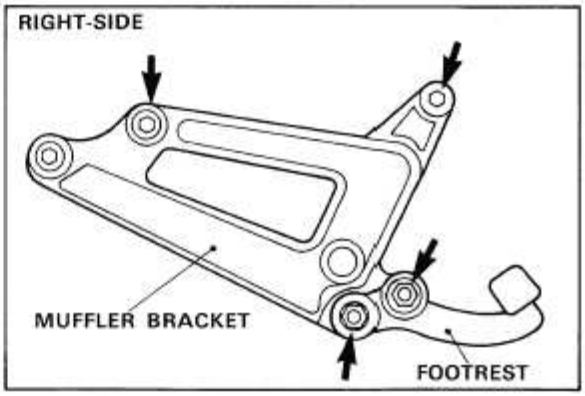
- Clutch cable
- Choke cable
- Crankcase ventilation pipe

2. Remove the Y.I.C.S. chamber securing bolt and disconnect the throttle cable.

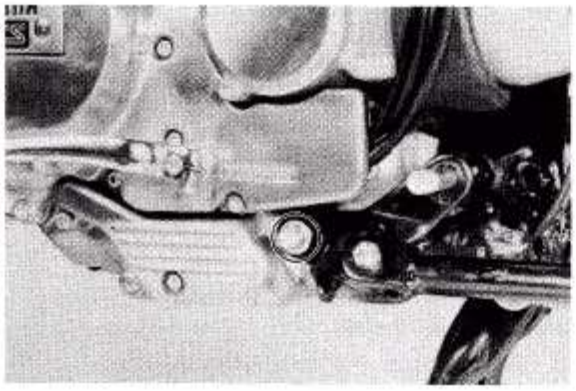
Footrests, Sidestand and Muffler Brackets

1. Remove the brake rod from the rear brake arm.
2. Remove the nuts and bolts shown in the illustration, and remove the front footrests and the muffler brackets.



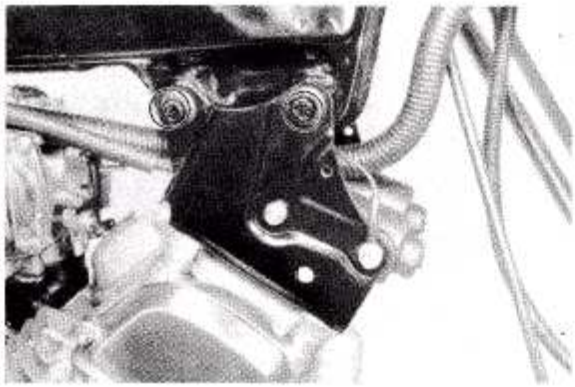


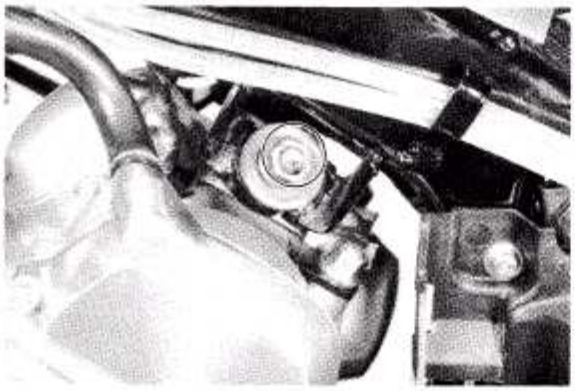
3. Remove the sidestand securing nut and remove the sidestand.



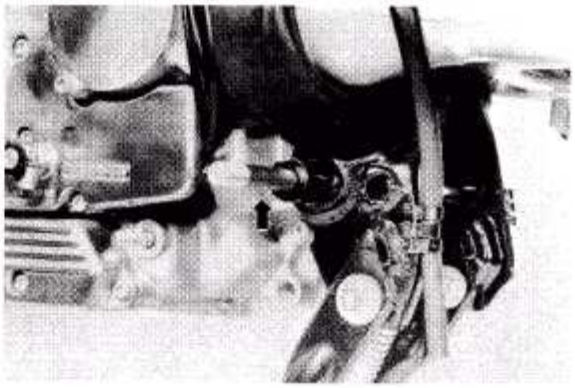
Engine Removal

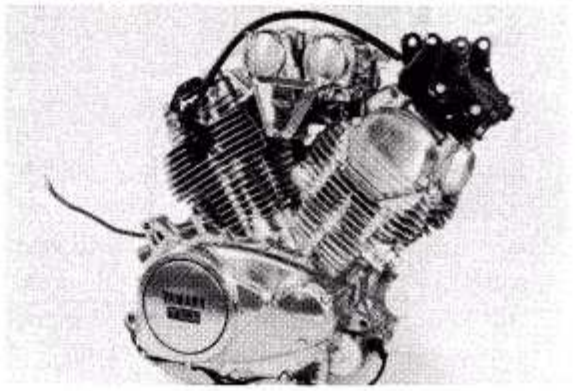
1. Remove the engine mounts and remove the engine. There are two engine-mounting bolts on the front cylinder, two bolts on the rear cylinder, and an engine-mounting stud in the rear of the engine.



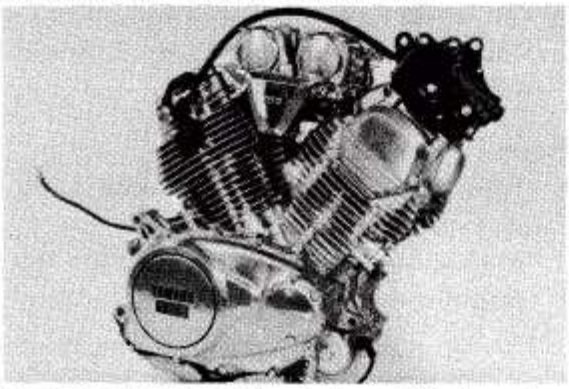


2. Finally, push the threaded stud through the frame and pull the engine forward. This will disengage the engine from the drive shaft, and the engine can be removed from the right-side of the frame.



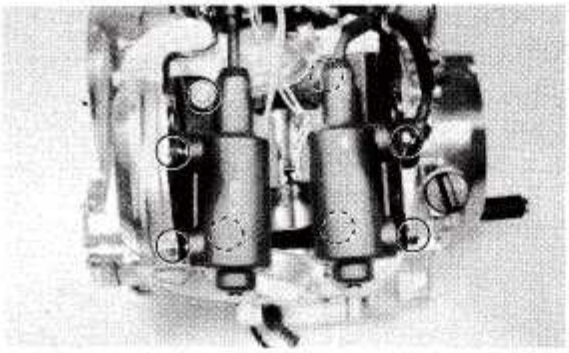


ENGINE DISASSEMBLY



Engine-Mounting Bracket and Carburetors

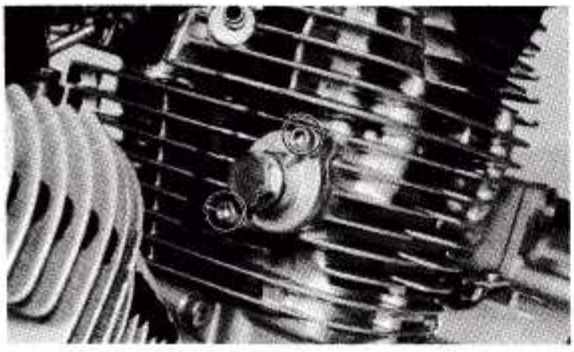
1. Remove the ignition coils from the engine-mounting bracket, and remove the engine-mounting bracket and washers from the front cylinder.



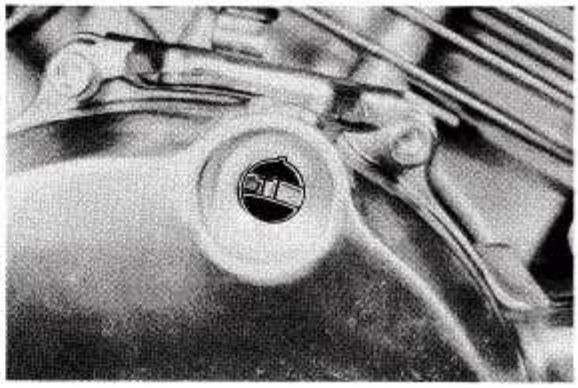
2. Disconnect Y.I.C.S. pipe from each cylinder and disconnect the fuel pump pipe from the carburetor joint.
3. Loosen the carburetor outlet joint clamp on each carburetor, and remove the carburetors.
4. Remove the change pedal and spark plugs.

Cylinder Heads and Cylinders

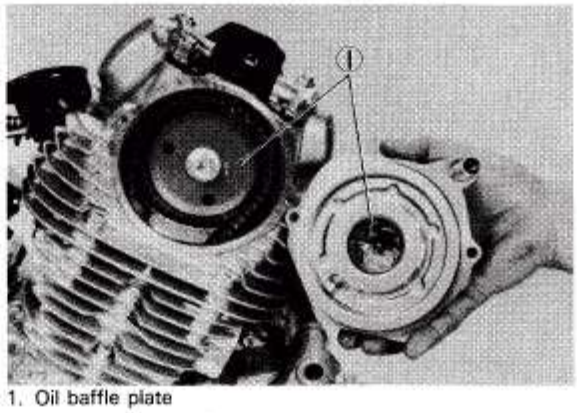
1. Remove the timing plug and emblem from the left-side crankcase cover.
2. Remove the cam chain tensioner from each cylinder.



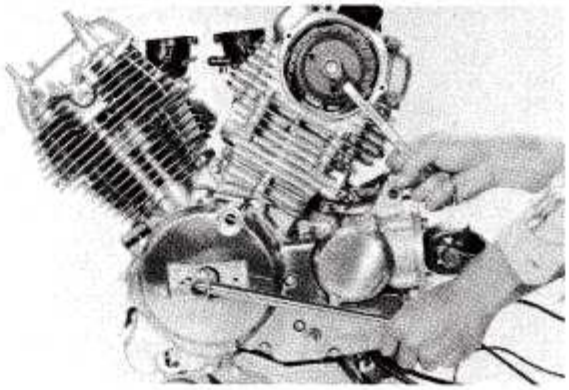
3. Turn the crankshaft clockwise, and align the "T" mark on the flywheel with the stationary pointer. This places the rear (# 1) piston at top dead center.



4. Remove the cam sprocket cover, oil baffle plate (rear cylinder only), and cam chain sprocket from the rear cylinder head; Hold the crankshaft end with the box wrench.



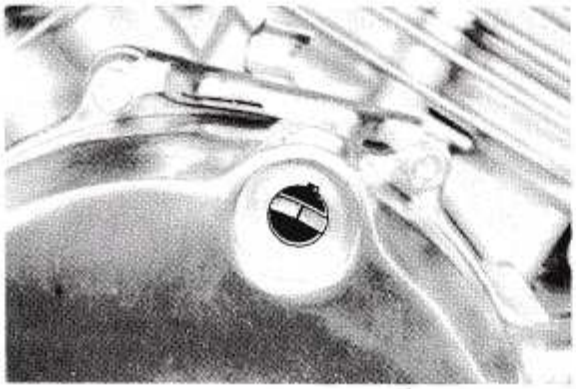
1. Oil baffle plate



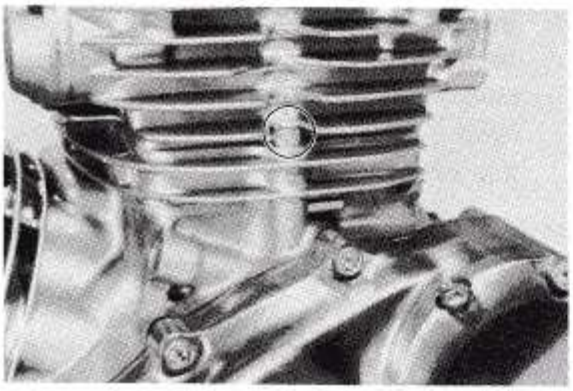
5. Rotate the crankshaft 290 degrees clockwise until the TDC mark for the front cylinder is opposite the stationary pointer.

NOTE:

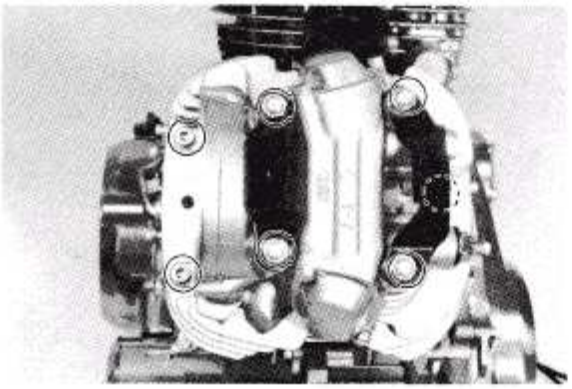
Be sure to keep the rear cylinder cam chain taut while turning the crankshaft.



6. Remove the cam sprocket cover and cam sprocket from the front cylinder head.
7. Remove the cylinder securing bolt from each cylinder.



8. Remove each cylinder head and engine-mounting brackets. Loosen all the cylinder head nuts and bolts first. Each nut and bolt must be loose before any one is removed.



9. Remove the three dowels and O-ring from each cylinder.
10. Remove the rear cam chain guide from each cylinder.
11. Remove each cylinder.

NOTE:

Put a marking on the cylinder for reinstallation.

Piston Pin and Piston

1. Mark each piston so it can be reinstalled in the appropriate cylinder.
2. Remove the piston pin clip from the piston.

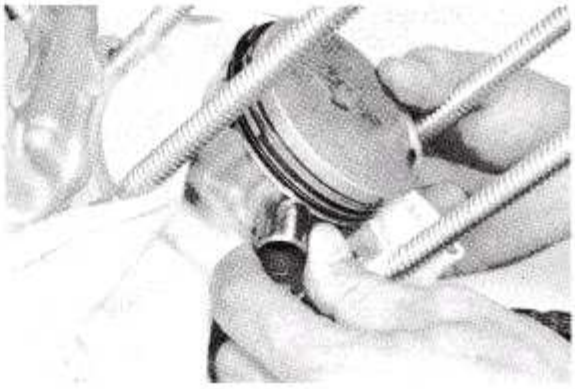
NOTE:

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

3. Remove the piston pin clip from the opposite side, then pull it out; use the special tool.

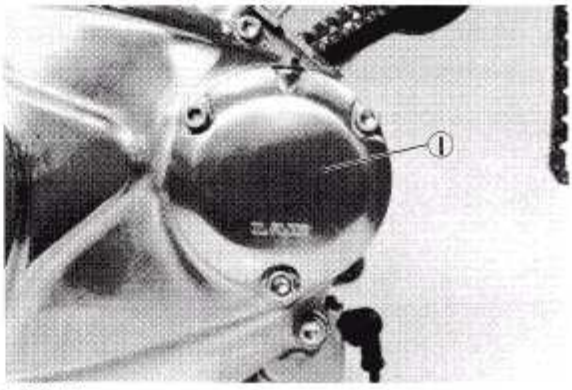
NOTE:

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



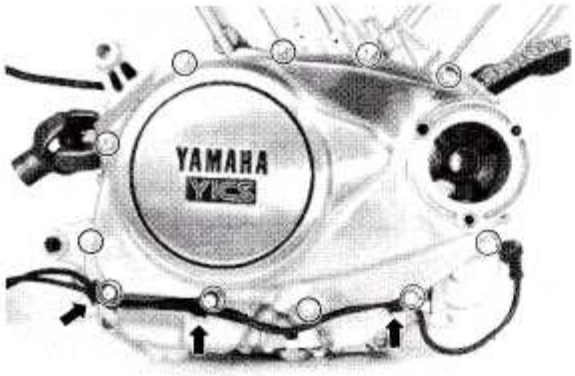
Crankcase Covers, Starter Motor, and Oil Pump

1. Remove the oil filter cover bolts and remove the cover and oil filter element.

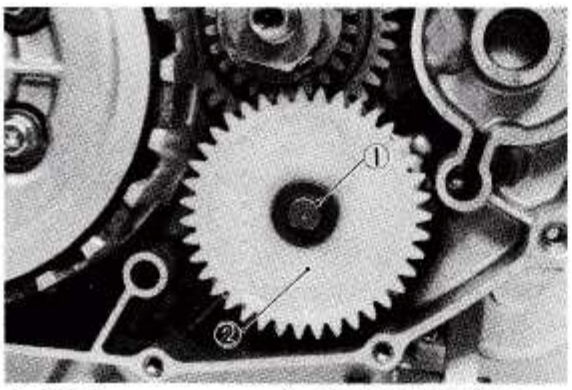


1. Oil filter cover

2. Remove the right-side crankcase cover bolts, and remove the crankcase cover and clamps.

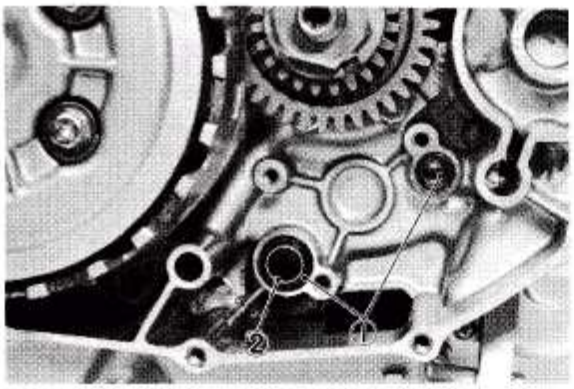


3. Remove the two dowels from the right side crankcase.
4. Remove the circlip and oil pump driven gear.



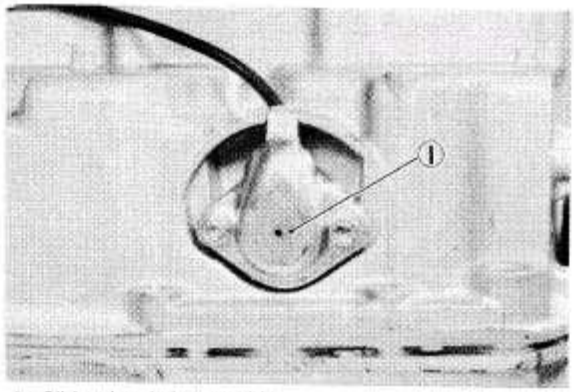
1. Circlip 2. Oil pump driven gear

5. Remove the oil pump assembly.
6. Remove the dowel and two O-rings from the crankcase.



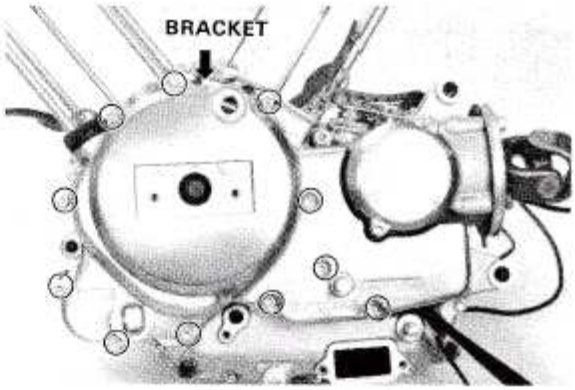
1. O-ring 2. Dowel

7. Remove the oil level switch assembly from the bottom of the crankcase.

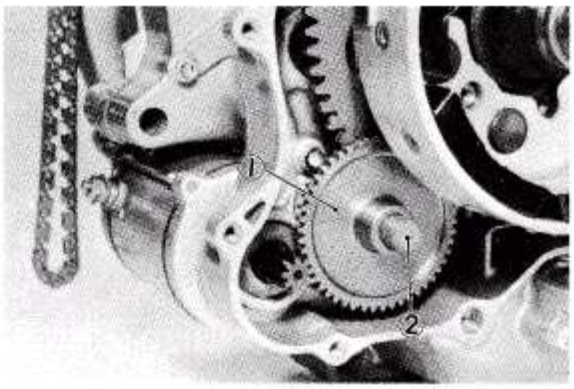


1. Oil level switch assembly

8. Remove the left-side crankcase cover bolts and remove the cover and clutch cable bracket.

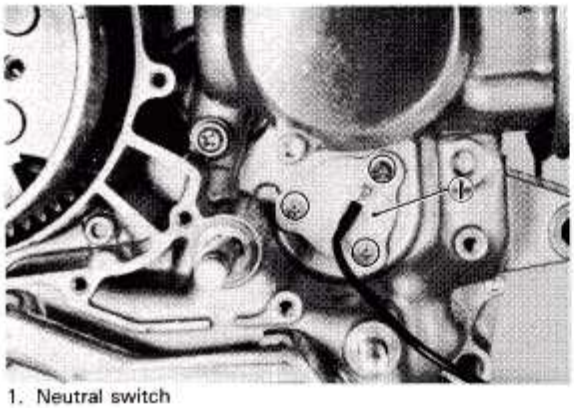


9. Remove the two dowels from the crankcase.
10. Remove the starter motor.
11. Remove the starter idle gear #1 and idle gear shaft.



1. Starter idle gear #1 2. Idle gear shaft

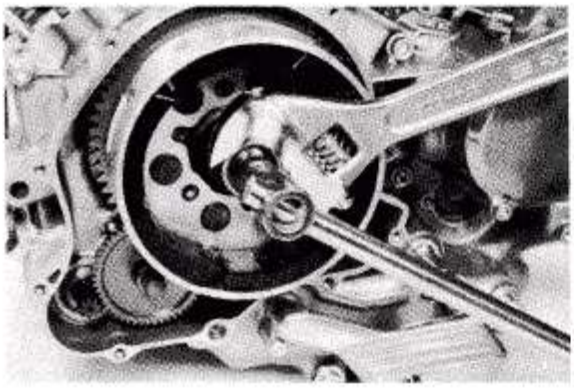
12. Remove the neutral switch assembly from the left-side crankcase.



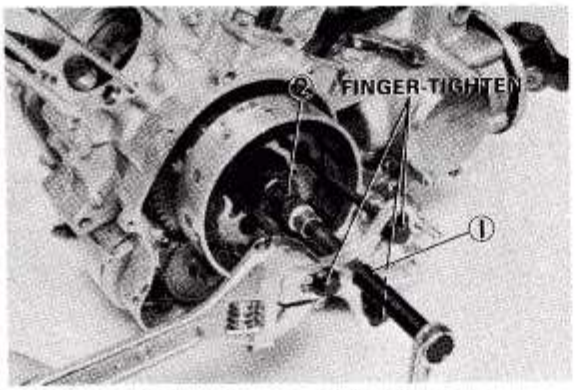
1. Neutral switch

Flywheel

1. Remove the flywheel securing bolt; Hold the flywheel end with a 32 mm (1.26 in) wrench.



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



1. 3-way universal puller 2. Puller attachment

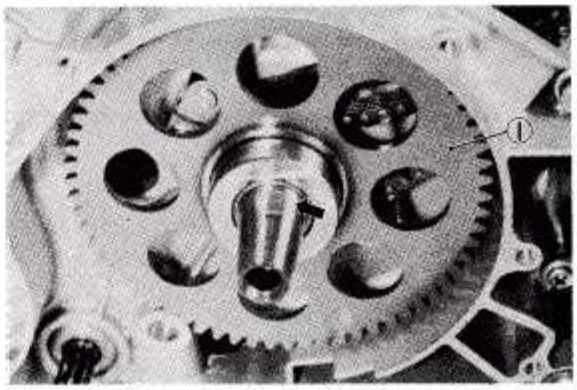
CAUTION:

The starter clutch assembly can become severely distorted if the flywheel-magneto-puller bolts are inserted too far.

NOTE:

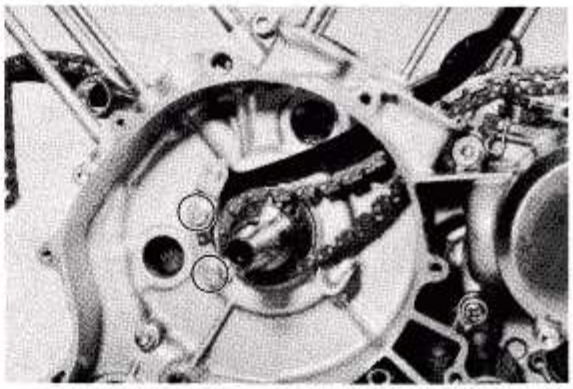
The starter clutch has three rollers, three springs, and three spring caps. Use care so that they don't fall out when removing the flywheel.

3. Remove the woodruf key and idle gear #2 from the crankshaft.

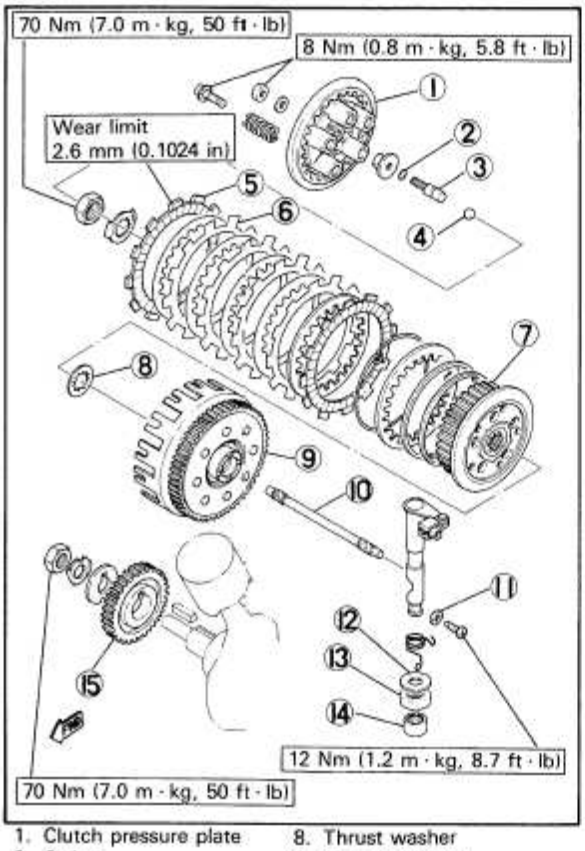


1. Idle gear #2

4. Remove the cam chain guide securing bolts, and remove the cam chain guide and cam chain.

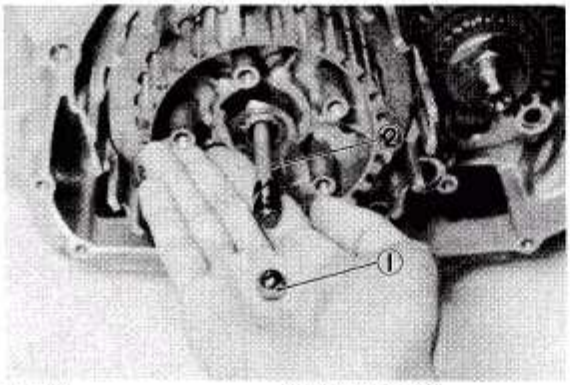


Clutch and Primary Gears



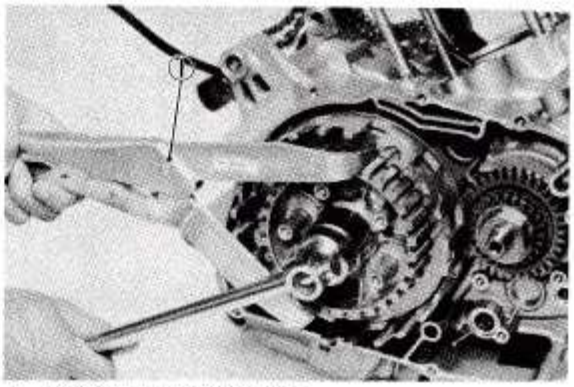
1. Clutch pressure plate
2. O-ring
3. Push rod #1
4. Ball
5. Clutch friction plate
6. Clutch plate
7. Clutch boss
8. Thrust washer
9. Clutch housing
10. Push rod #2
11. Gasket
12. Washer
13. Oil seal
14. Bearing

1. Remove the five clutch springs, then remove the clutch pressure plate, friction plates, and clutch plates.
2. Remove the ball and push rod #2 from the transmission main shaft.



1. Ball
2. Push rod #2

3. Flatten the lock tab on the primary drive gear securing nut.
4. Place a small piece of rolled rag or a small piece of lead between the gears, and remove the primary drive gear securing nut, lock washer, washer, and key.
5. Flatten the lock tab, and remove the clutch boss securing nut; use the universal clutch hub holder.

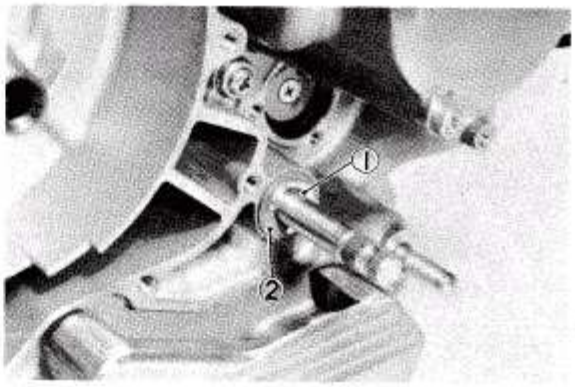


1. Universal clutch hub holder

6. Remove the lock washer, clutch boss, thrust washer, and the clutch housing from the transmission main axle.
7. Remove the key, oil pump drive gear, and primary drive gear from the crankshaft.
8. Remove the front cam chain guide securing bolts and remove the cam chain guide and cam chain.

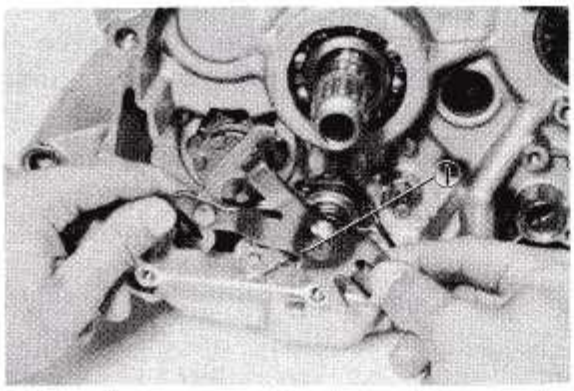
Shifter and Oil Strainer

1. Remove the shifter shaft circlip and washer from the left-side crankcase.



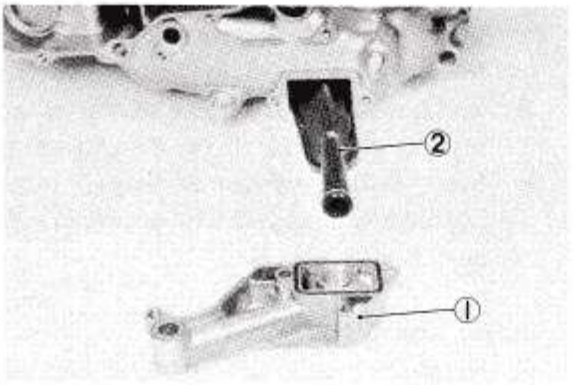
1. Circlip
2. Washer

2. Disengage the shift lever from the shift drum pins, and remove the shift shaft assembly.



1. Shift shaft assembly.

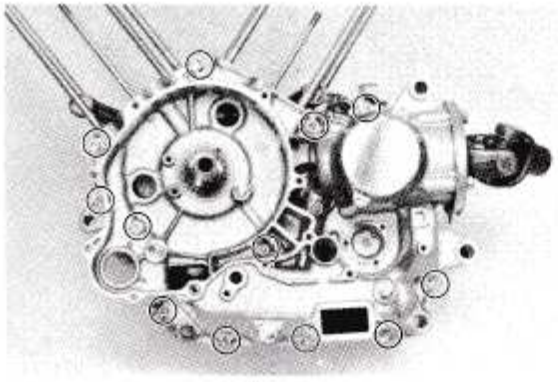
3. Remove the oil passage housing securing bolts, and remove the housing, O-rings, and oil strainer from the left-side crankcase.

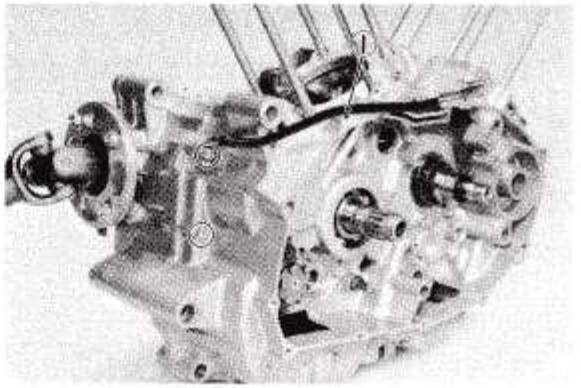


1. Oil passage housing 2. Oil strainer

Crankcase

1. Remove all the crankcase bolts and battery negative (–) lead from the crankcase.



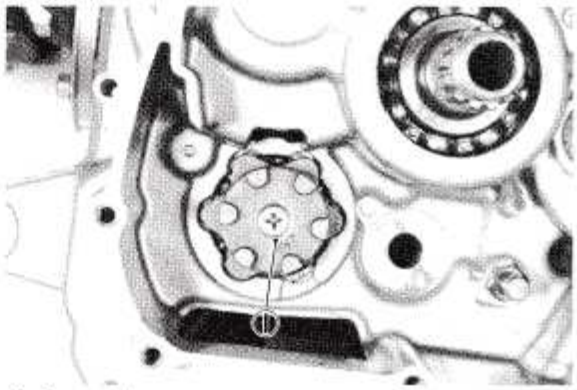


1. Battery negative (–) lead

2. Remove the right-side crankcase from the left-side, and remove the three dowels and O-rings.

CAUTION:

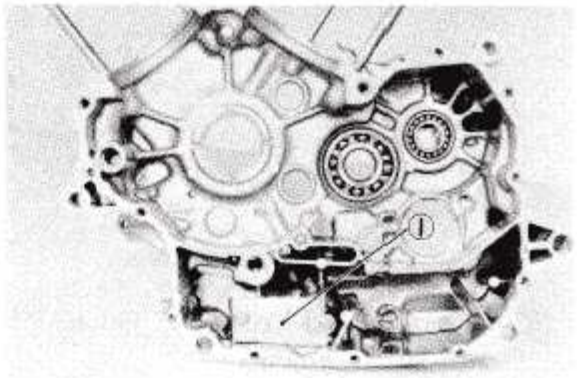
When separating the crankcase, be sure the shiftdrum star aligns with its corresponding contours in the crankcase.



1. Segment

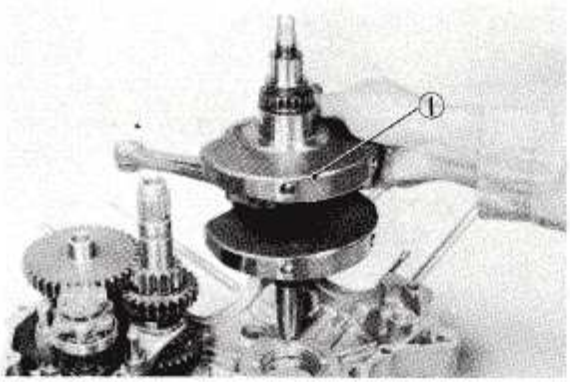
NOTE:

If the right crankcase has to be replaced, remove the oil baffle plate; otherwise, the removal of the oil baffle plate is unnecessary.



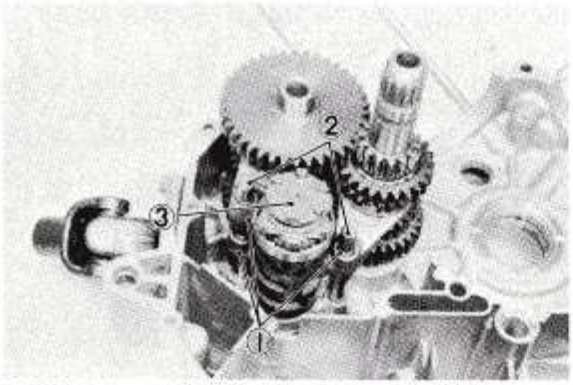
1. Oil baffle plate

3. Remove the crankshaft from the left-side crankcase.



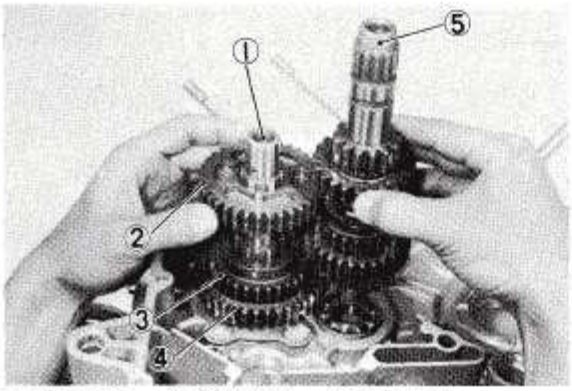
1. Crankshaft

4. Remove the shift fork guide bars first, then remove the shift levers and shift cam.



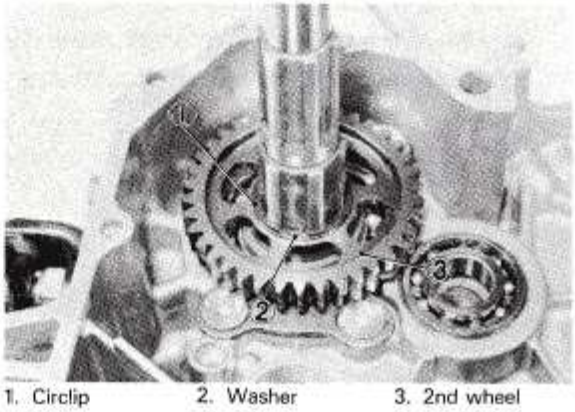
1. Shift fork 2. Shift fork guide 3. Shift cam

5. Remove the 1st wheel, 4th wheel, circlip, washer, and 5th wheel from the drive axle. Remove the main axle subassembly from the crankcase.



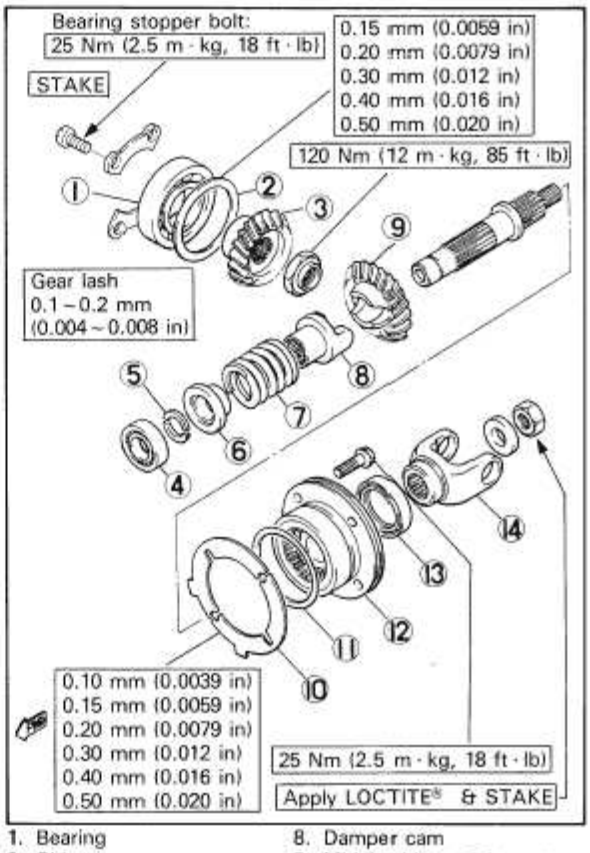
1. Drive axle 2. 3rd wheel 3. 5th wheel
4. 2nd wheel 5. Main axle subassembly

6. Remove the circlip, washer, and 2nd wheel from the drive axle.



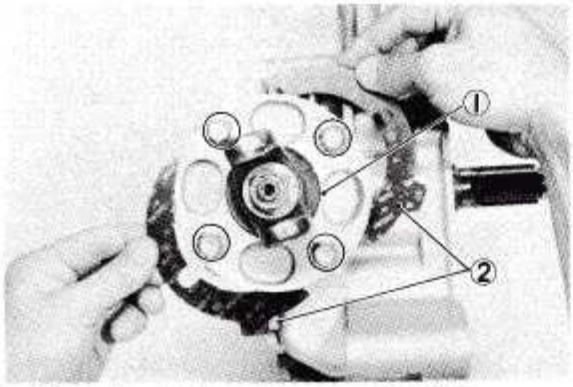
1. Circlip 2. Washer 3. 2nd wheel

The following steps are necessary only if you must service the middle gears or replace the crankcase.



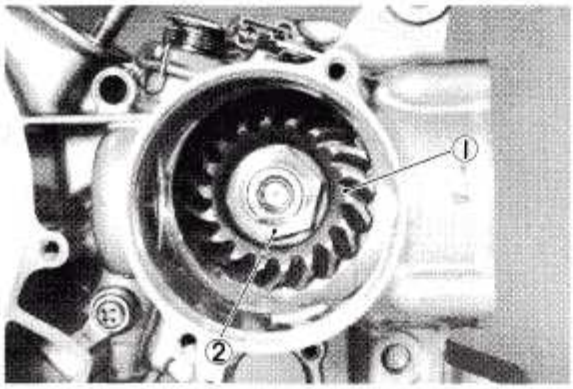
1. Bearing
2. Shim
3. Middle drive pinion gear
4. Bearing
5. Damper spring retainer
6. Spring seat
7. Damper spring
8. Damper cam
9. Middle driven pinion gear
10. Shim
11. O-ring
12. Bearing housing
13. Oil seal
14. Universal joint

7. Remove the middle-gear-case cover securing bolts and middle-drive-shaft bearing-housing securing bolts.
   Remove the middle-drive-shaft assembly and shims from the left-side crankcase.



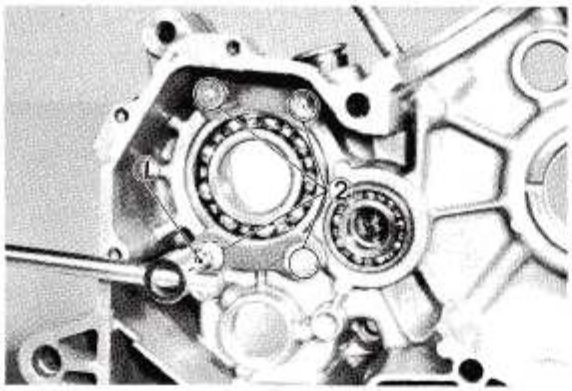
1. Middle-drive-shaft assembly 2. Shim

8. Secure the drive axle in a vice or other support.
9. Remove the middle drive gear and crankcase from the drive axle; With the drift punch, flatten the punched portion of the drive gear securing nut. Remove the drive gear securing nut.



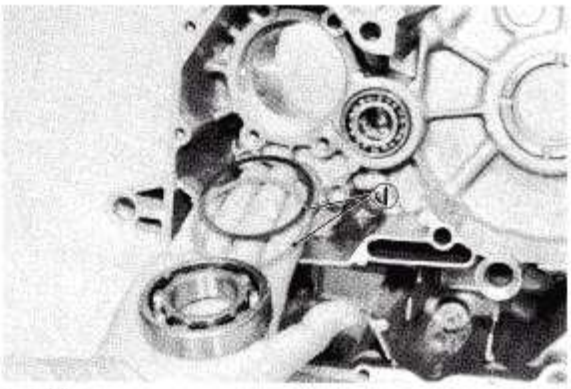
1. Middle drive gear 2. Nut

10. Remove the drive-axle-bearing-stopper bolts; use the torx driver.



1. Torx driver 2. Stopper bolt

11. Remove the bearing stopper plates, bearing and shims.

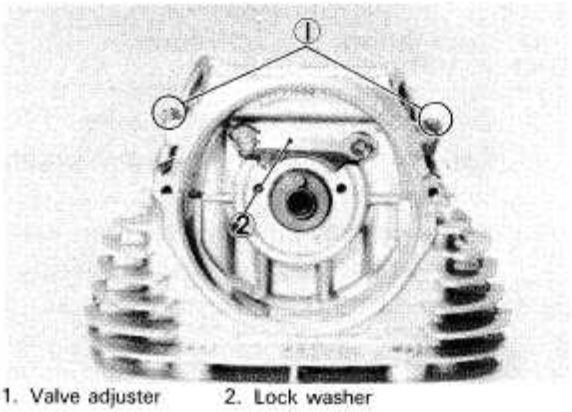


1. Shim

INSPECTION AND REPAIR

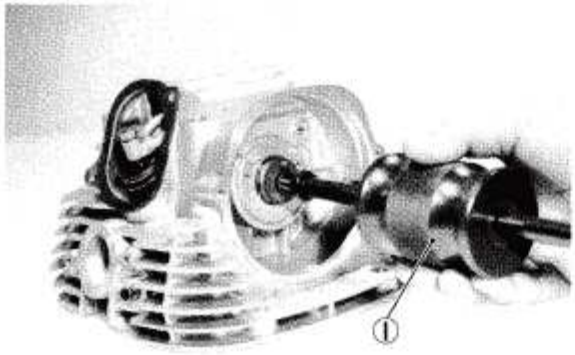
Cylinder Head Disassembly

1. Remove the intake and exhaust valve covers from each cylinder head.
2. Loosen the valve adjuster on both valves, and flatten the lock washer.



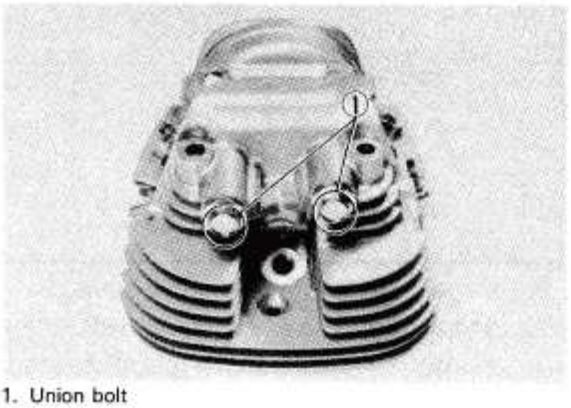
1. Valve adjuster 2. Lock washer

3. Remove the camshaft bearing securing bolts, washer, and plate.
4. Remove each camshaft and camshaft bearing with a slide hammer.



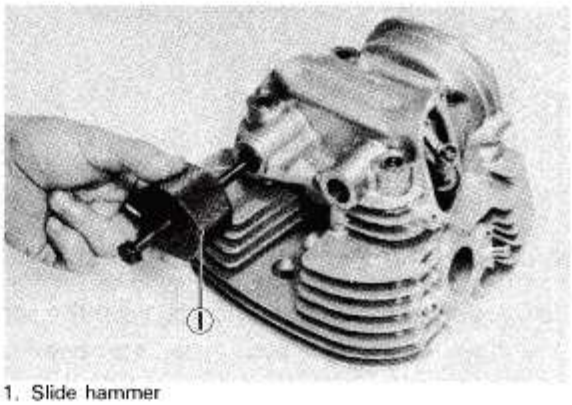
1. Slide hammer

5. Remove the rocker-arm-shaft-union bolts.



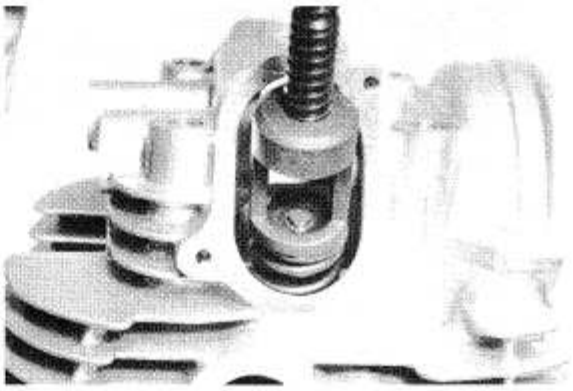
1. Union bolt

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



1. Slide hammer

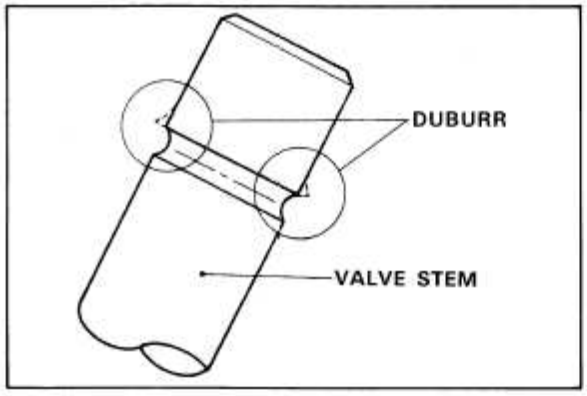
7. Mount the valve spring compressor on the head and depress each valve spring. Remove the valve retainers with a magnet or tweezers, remove the valve springs.



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

NOTE:

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

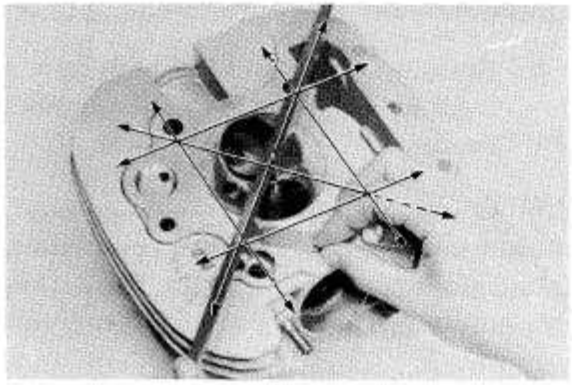


9. Using a rounded scraper, remove the carbon deposits from the combustion chamber. Take care to avoid damaging the spark plug threads and valve seats. Do not use a sharp instrument. Avoid scratching the aluminum.

Cylinder Head

1. Check the cylinder head warpage with a straightedge as shown.
   The warpage should not exceed the specified limit; if necessary, resurface the cylinder head. If the warpage exceeds allowable limit, the cylinder head should be replaced with a new one.

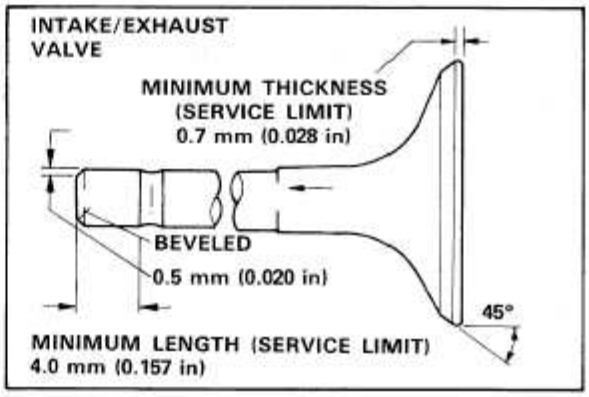
Cylinder head warpage: less than 0.03 mm (0.0012 in)



Valves, Valve Guides, Valve Seats, and Valve Springs

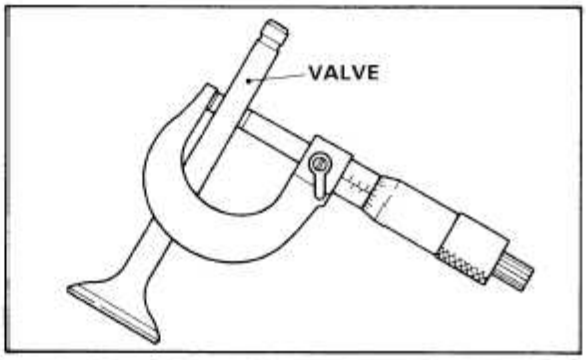
Valves

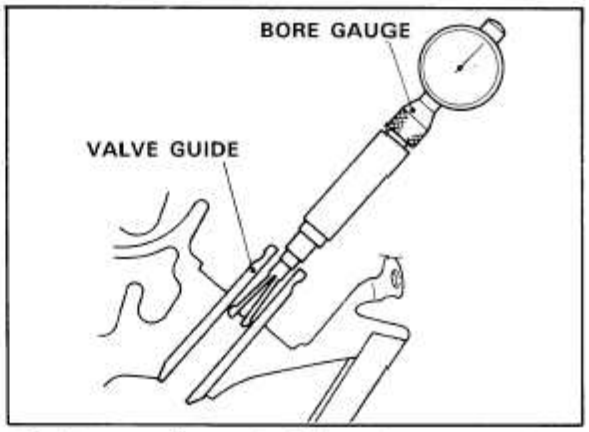
1. Check the valve face and the stem end for wear. If the valve face and/or the stem end are pitted or worn, regrind the valve with a valve refacer. Replace the valve if any dimension exceeds the specifications in the illustration.



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

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

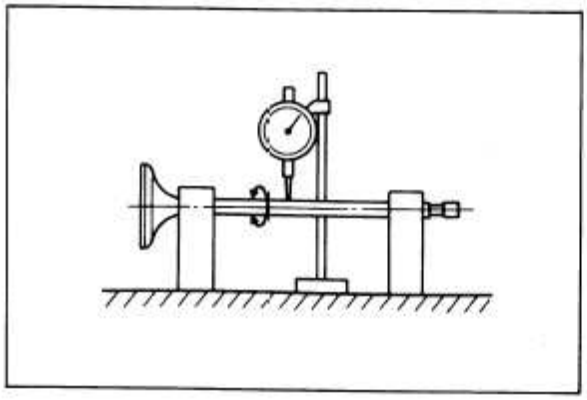




3. Inspect the end of the valve stem. If the end appears to be "mushroomed" or has a larger diameter than the rest of the stem, the valve, valve guide, and oil seal should be replaced.

4. Place the valve on "V" blocks, and measure the amount of stem runout with a dial gauge. If it exceeds the maximum limit, replace the valve.

Maximum valve stem runout: 0.01 mm (0.0004 in)



Valve guides

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

NOTE:

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

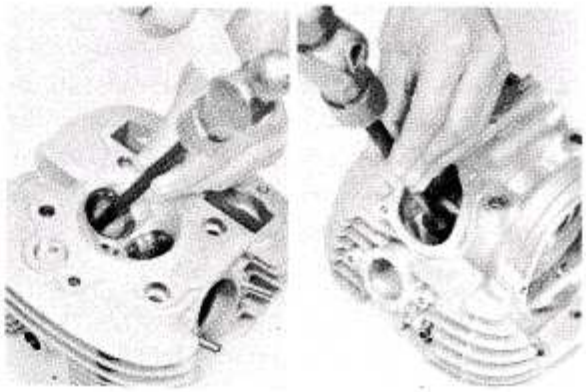
1. Measure the valve guide inside diameter with a small bore gauge. If it exceeds the limit, replace it with an oversize valve guide.

Guide diameter (I.D.): Limit: 7.10 mm (0.276 in)

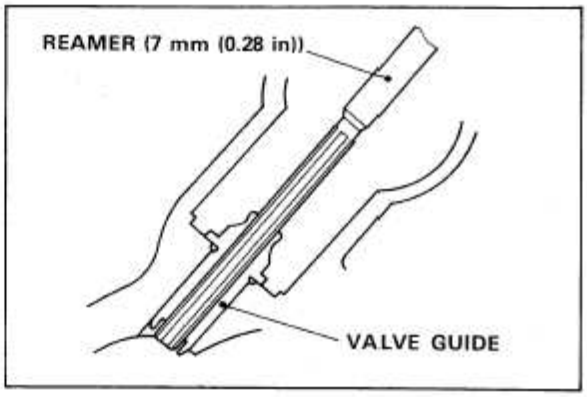
2. To ease guide removal and reinstallation and to maintain the correct interference fit, heat the head to 100°C (212°F). Use an oven to avoid any possibility of head warpage due to uneven heating.
3. Use the valve guide remover and valve guide installer to drive the old guide out and drive the new guide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

NOTE:

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



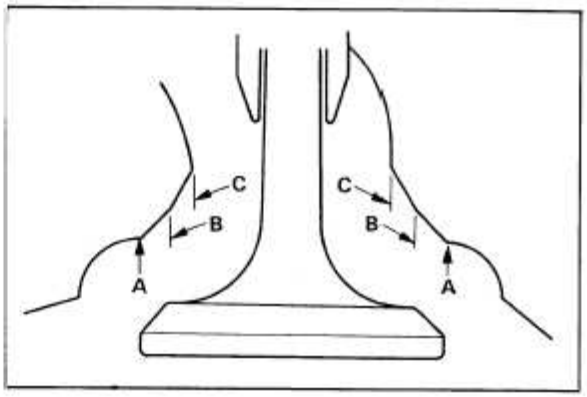
4. After installing the valve guide, use the 7 mm (0.28 in) reamer (special tool) to obtain the proper valve-guide-to-valve-stem clearance.



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

Valve seat

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



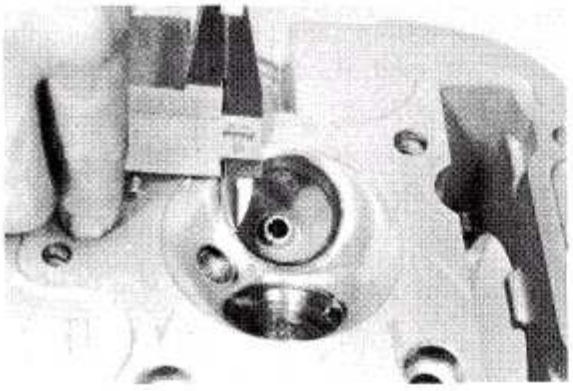
CAUTION:

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

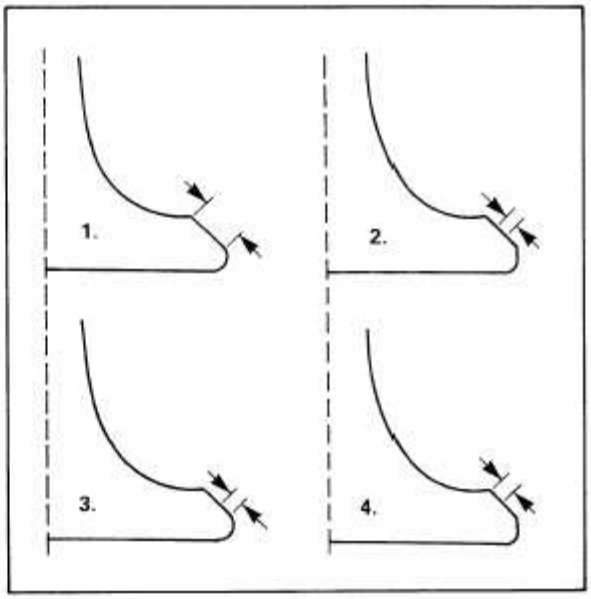
If cutting section A of the valve seat, use a 30° cutter. If cutting section B, use the 45° cutter. If cutting section C, use the 60° cutter.

2. Measure the valve seat width. Apply mechanic's bluing dye (such as Dykem) to the valve face and valve seat, apply a very small amount of fine grinding compound around the surface of the valve face, insert the valve into position, and spin the valve quickly back and forth. Lift the valve, clean off all grinding compound, and check valve seat width. The valve seat and valve face will have removed the bluing wherever they contacted each other. Measure the seat width with vernier calipers. It should measure approximately 1.1 mm (0.043 in). The valve-seat contact area should be one uniform width. If valve seat width varies or if pits still exist, further cutting will be necessary. Remove just enough material to achieve a satisfactory seat.

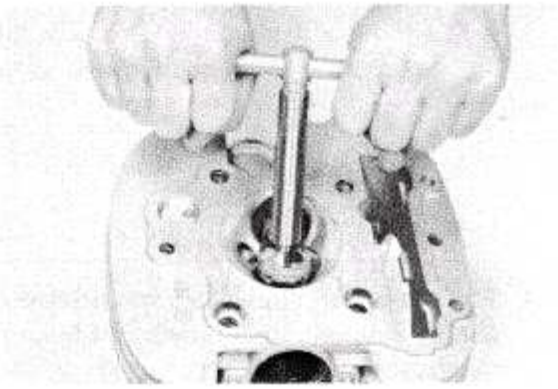
	Standard with (IN.EX.)	Wear limit
Seat width	1.0 – 1.2 mm (0.0394 – 0.0472 in)	2.0 mm (0.080 in)



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



- If the valve face shows that the valve seat is centered on the valve face but is too wide, then lightly use both the 30° and the 60° cutters to reduce the seat width to 1.1 ± 0.1 mm (0.043 ± 0.004 in)

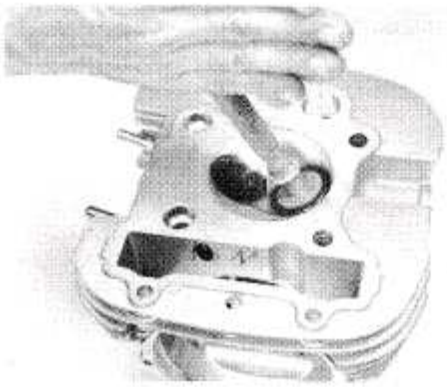


- If the seat shows to be in the middle of the valve face but too narrow, use the 45° cutter until the width equals 1.1 mm (0.043 in).
- If the seat is too narrow and right up near the valve margin, then first use the 30° cutter and then the 45° cutter to get the correct seat width.
- If the seat is too narrow and down near the bottom edge of the valve face, then first use the 60° cutter and then the 45° cutter.

Lapping

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

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

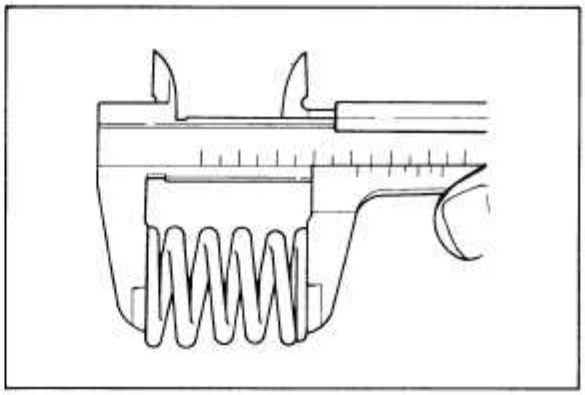


2. After all work has been performed on the valve and valve seat and all head parts have been assembled, check for proper valve/valve seat sealing by pouring solvent into each of the intake ports, then the exhaust ports. There should be no leakage past the seat. If fluid leaks, disassemble and continue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

Valve springs

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

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

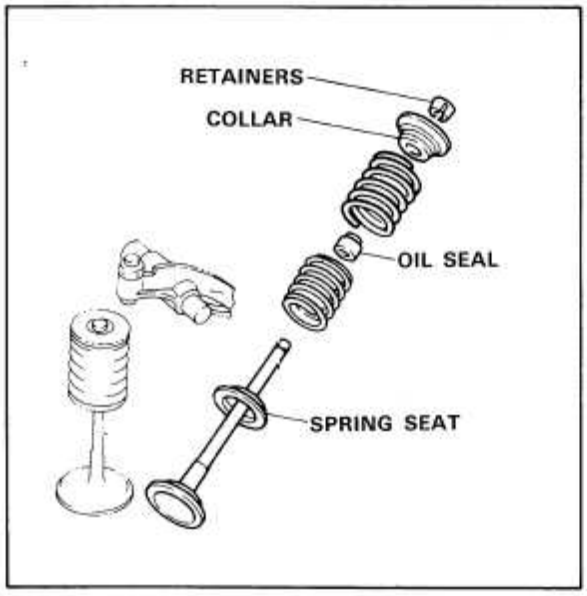


2. Another symptom of spring fatigue is insufficient spring pressure. This can be checked with a valve-spring-compression-rate gauge. Test each spring individually. Place a spring in the gauge and note the spring pressure when the spring is compressed to the installed length (valve closed). If the pressure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

Valve spring specifications

	Outer spring	Inner spring
Free length	43.6 mm (1.72 in)	39.9 mm (1.57 in)
Installed length (valve closed)	37.1 mm (1.46 in)	34.1 mm (1.37 in)
Installed pressure (valve closed)	18.7 – 21.9 kg (41.23 – 48.28 lb)	9.5 – 11.1 kg (20.94 – 24.47 lb)
Allowable tilt from vertical	2.5° or 1.9 mm (0.075 in)	2.5° or 1.7 mm (0.067 in)

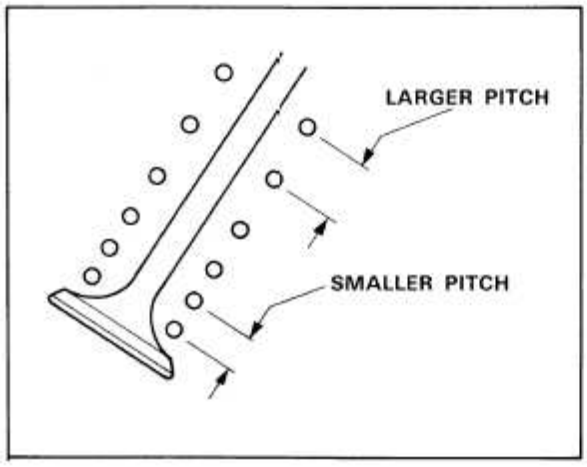
Valve installation



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

NOTE:

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



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

WARNING:

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

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

Rocker Arms and Rocker Arm Shafts

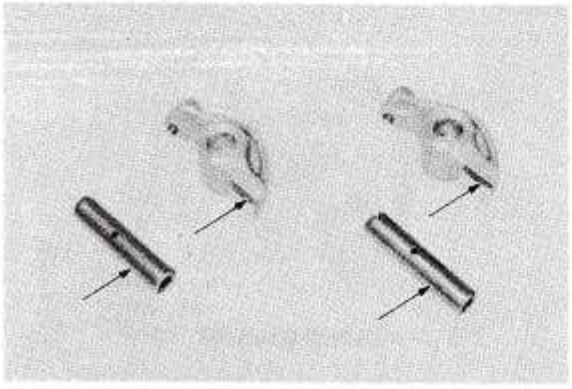
1. The rocker arm usually wears at two locations: at the rocker shaft hole and at the cam-lobe-contact surface. Check these areas for signs of unusual wear.
2. Measure the rocker arm inside diameter. If it exceeds specification, replace the rocker arm.

Maximum inside diameter: 14.05 mm (0.553 in)

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

Minimum outside diameter: 13.95 mm (0.549 in)

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



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

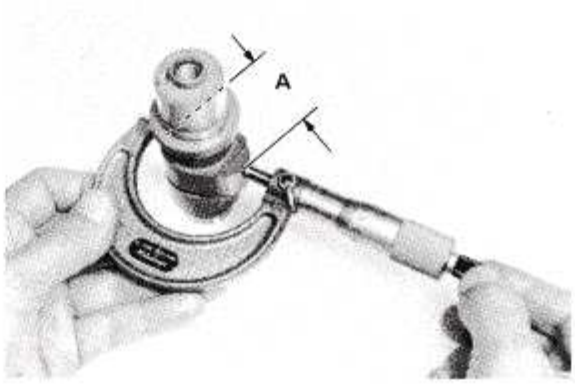
Camshafts, Cylinder Head Assembly and Cam Sprockets

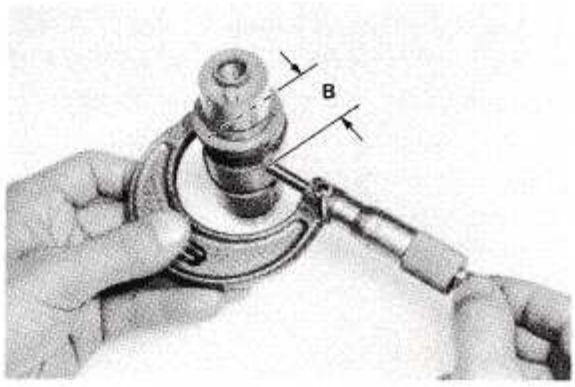
Camshaft

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

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

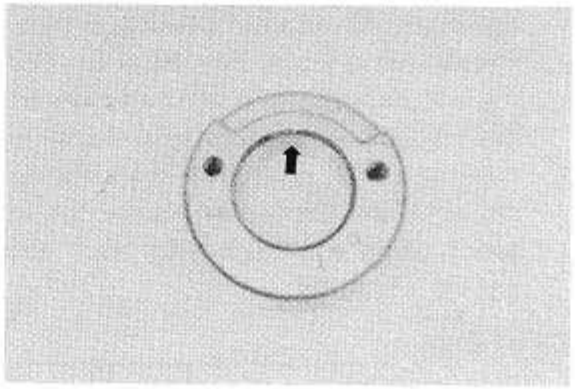
Wear limit	A	B
Intake	39.58 mm (1.558 in)	32.03 mm (1.261 in)
Exhaust	39.62 mm (1.560 in)	32.15 mm (1.266 in)





Camshaft bushings

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



Cylinder Head Assembly

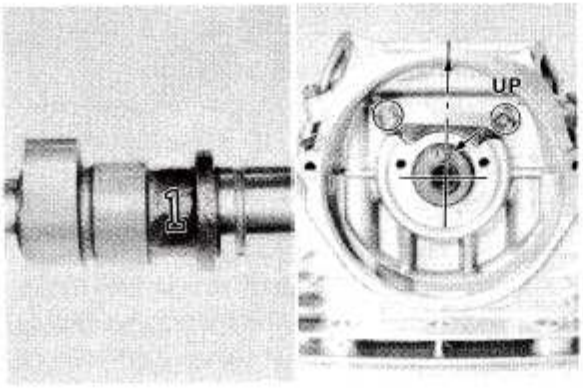
1. Install the rocker arms through the inlet valve cover hole and/or cam chain side of the cylinder head. Install the rocker arm shafts for that rocker arms. Do not install the union bolts at this point.

NOTE:

One end of the rocker arm shaft has an inside thread. This end **must** face out of the head. You will not be able to remove the rocker arm shaft if these threads face in.



2. Loosen the valve adjuster on both valves, and install the #1 camshaft into the rear (#1) cylinder head. The pin on the end of the camshaft must align with the timing mark on the cylinder head.

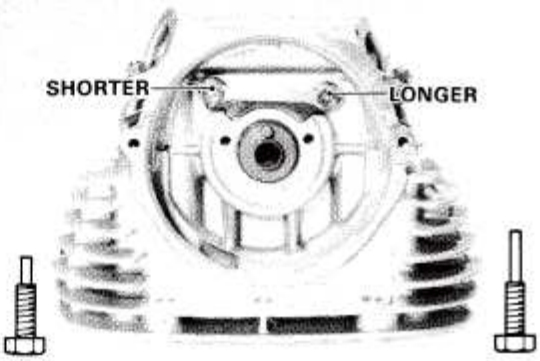


3. Install the camshaft bushing onto the camshaft. Be sure the bushing is completely seated in the cylinder head. The cut-out portion of the bushing must be flush with the cylinder head. Secure the bushing in the head with the securing plate. Torque the securing-plate bolt to specification, and bend the lock tab against a nut flat.

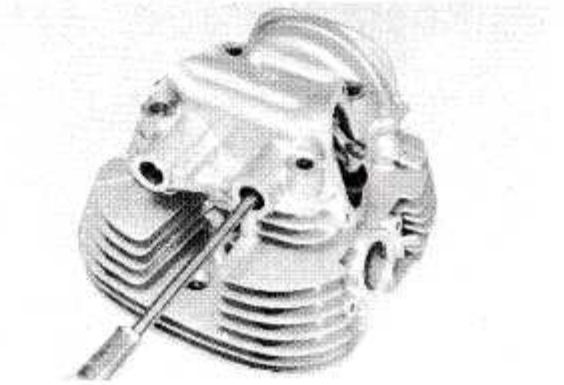
CAUTION:

- **Do not cock the bushing during installation. The bushing must be perpendicular to the camshaft during installation.**
- **The securing-plate bolts must be installed at the proper position as shown in the photograph.**

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



4. Install the screw driver on to the rocker arm shaft, and slightly turn and push the rocker arm shaft until the securing-plate-bolt-end fits into the slot in the rocker arm shaft end.

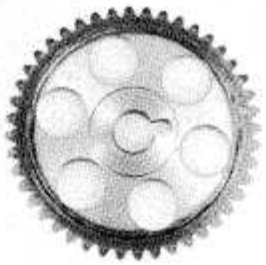


5. Install the union bolt with a copper washer onto each rocker arm shaft. Torque the bolts to specification.

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

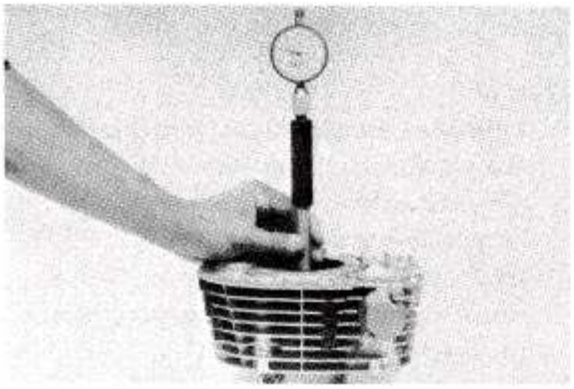
Cam Sprocket

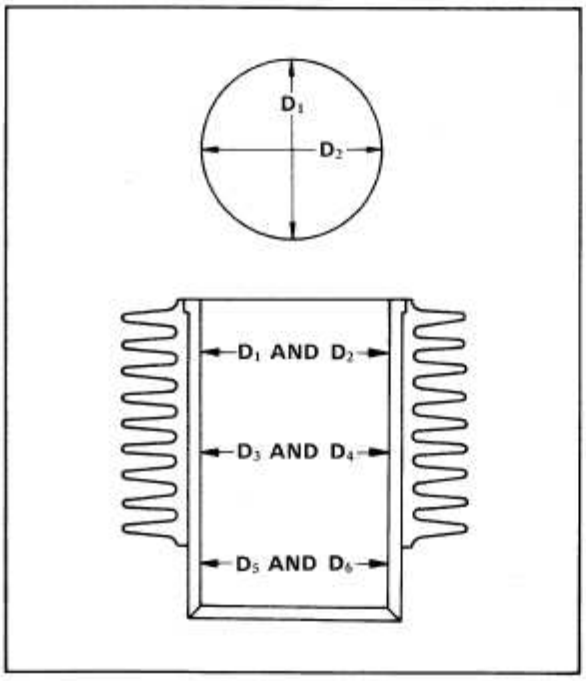
1. Check the cam sprocket for wear. If any profile has excessive wear and/or damage, replace the cam sprocket.



Cylinder

1. Visually check 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 in the manner as shown. If wear is excessive, compression pressure will decrease, and engine trouble will occur. Rebore the cylinder wall, and replace the piston and piston rings.
   Cylinder wear should be measured at three depths by placing the measuring instrument parallel to and at right angles to the crankshaft. (See the illustration.)
   If the cylinder wall is worn beyond the wear limit, it should be rebored.





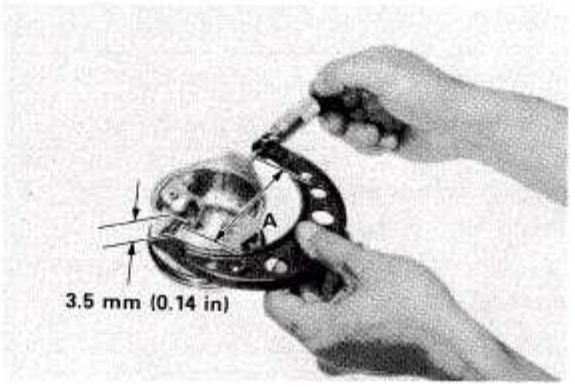
	Standard	Wear limit
Cylinder bore	73 mm (2.874 in)	73.1 mm (2.878 in)
Cylinder taper	—	0.05 mm (0.002 in)

Piston, Piston Rings, and Piston Pin

Piston

1. Using the micrometer, measure the outside diameter of the piston at the piston skirt. Measurement should be made at a point 3.5 mm (0.14 in) above the bottom edge of the piston by placing the micrometer parallel to and at right angles to the piston pin.

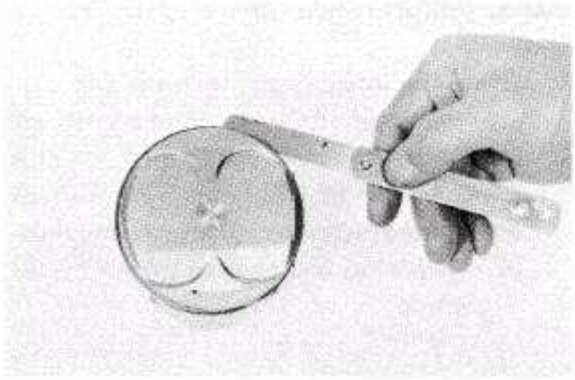
Piston clearance:
0.035 – 0.055 mm (0.0014 – 0.0022 in)



	Size A
Standard	73.00 mm (2.874 in)
Oversize 2	73.50 mm (2.894 in)
Oversize 4	74.00 mm (2.913 in)

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

Side clearance	Top	0.050 ~ 0.080 mm (0.0020 ~ 0.0033 in)
	2nd	0.030 ~ 0.070 mm (0.0012 ~ 0.0028 in)
	OIL	0.020 ~ 0.025 mm (0.0008 ~ 0.0010 in)



Piston ring

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

Oversize 2	0.50 mm (0.0197 in)
Oversize 4	1.00 mm (0.0394 in)

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.

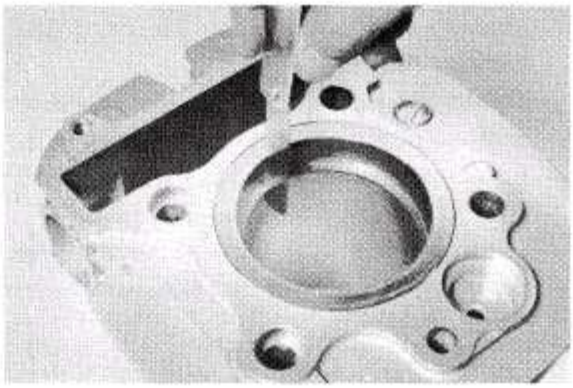
Size	Color
Oversize 2	Blue
Oversize 4	Yellow

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

NOTE:

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

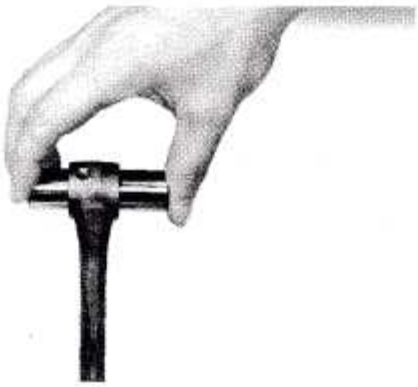
	Standard	Limit
Top ring	0.2 ~ 0.4 mm (0.0079 ~ 0.0157 in)	0.80 mm (0.0315 in)
2nd ring	0.2 ~ 0.4 mm (0.0079 ~ 0.0157 in)	0.80 mm (0.0315 in)
Oil control (Rails)	0.3 ~ 0.9 mm (0.0118 ~ 0.0354 in)	—



Piston pin

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

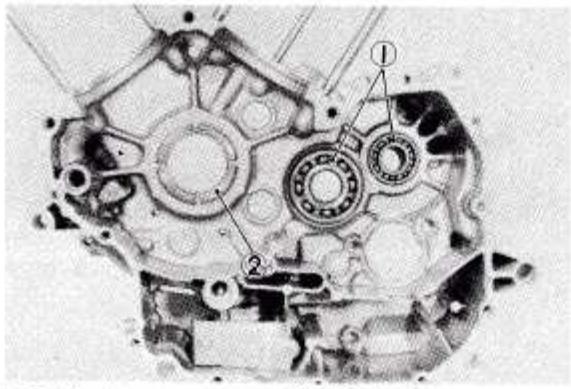




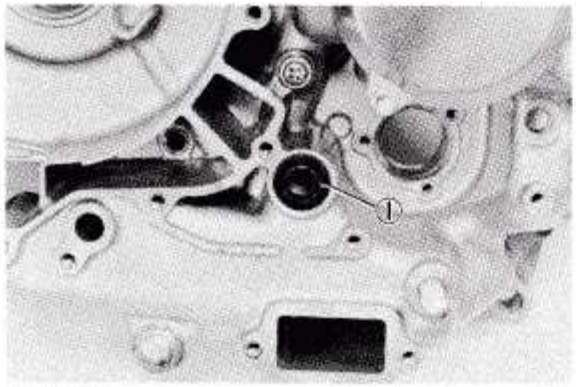
Crankcase

1. Thoroughly wash the case halves in a mild solvent.
2. Clean all gasket mating surfaces and crankcase mating surfaces thoroughly.
3. Visually inspect the case halves for any cracks, road damage, etc. Replace the crankcase as requied.
4. Check the oil-celivery passage for signs of blockage.

Bearings and Oil Seals



1. Ball bearing 2. Main bearing



1. Oil seal

1. After cleaning and lubricating the ball bearings, rotate the inner race with a finger. If rough spots are noticed, replace the ball bearing(s).
2. Check the needle bearing for damage. If damaged, replace it.
3. Check the oil seal lips for damage or wear. Replace as required.
4. If bearings have been removed, check their seats for signs of damage (such as the bearing spinning in the seat, etc.)

Removal

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

NOTE:

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

2. Drive out the bearing(s) with the appropriate special tool.

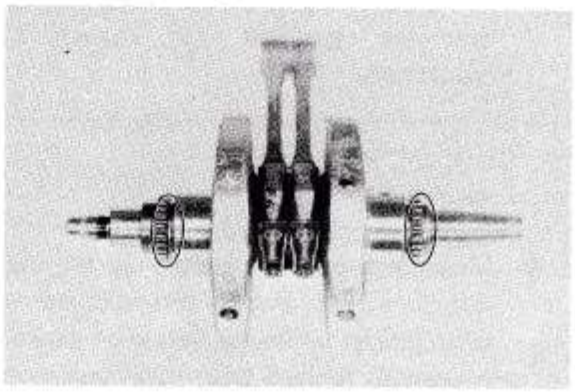
NOTE:

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

Crankshaft and Connecting Rod

Cam drive sprockets

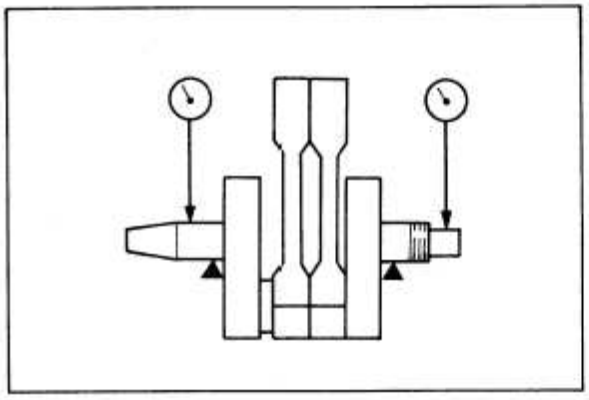
1. Check the cam drive sprockets for wear. If any profile has excessive wear and/or damage, replace the crankshaft.



Crankshaft runout

1. Support the crankshaft at both ends on V-blocks. Rotate the crankshaft in the V-blocks, and measure the runout at the main bearing journals. Use a dial gauge.
2. If runout exceeds the specification, replace the crankshaft.

Maximum crankshaft runout:
0.02 mm (0.0008 in)



Crankshaft main bearings (Main bearing)
Visually check the main bearings. If the bearing surface is burned, flaked, rough, scratched, or worn, the bearings should be replaced.

NOTE:

If either of the right- or left-side main bearings is worn or scratched, both bearings should be replaced as a set.

Crankshaft bearing clearance

1. Thoroughly clean all parts.
2. Measure the wear of each main bearing journal at two places, and if wear is more than the specified limit, replace the crankshaft.

Crankshaft wear limit:
44.958 mm (1.767 in)

3. Measure the inner diameter of the main bearing at two places, and calculate the oil clearance. If the oil clearance exceeds tolerance, replace both main bearings.

Oil clearance:
0.020 ~ 0.052 mm (0.0008 ~ 0.0020 in)

Oil clearance = crankshaft journal outside diameter − main bearings inside diameter.

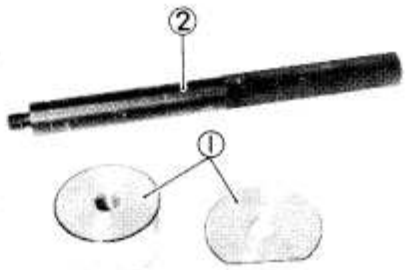
CAUTION:

On the journal, the larger measurement is used as a basis for calculation of the oil clearance, and on the main bearing, the smaller value is used.

Main bearing removal and installation

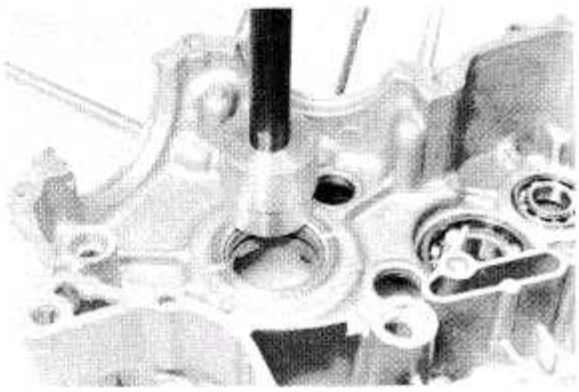
NOTE:

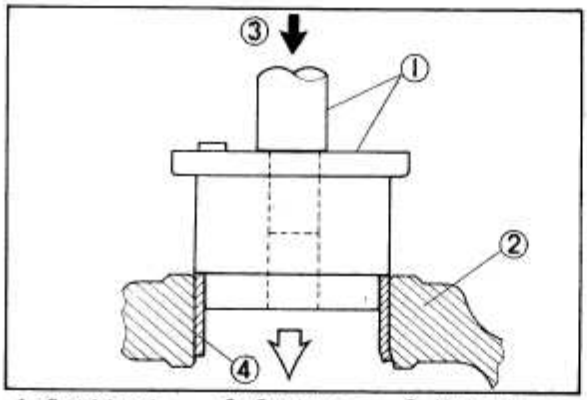
To remove or force-fit the main bearings, be sure to use the special tool set and a hydraulic press.



1. Plain bearing driver/installer 2. Handle

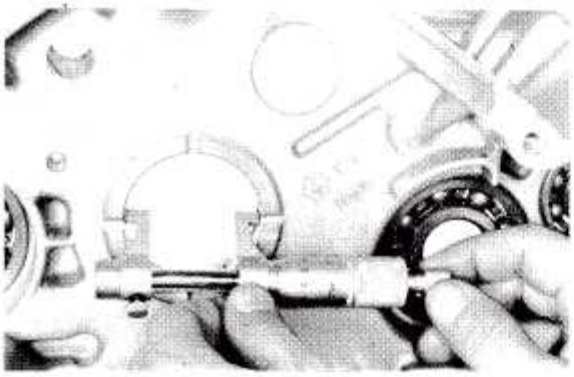
1. As shown in the photo, set the special tool set, and using a hydraulic press, pull the main bearing out to the outside of the crankcase.





1. Special tool 2. Crankcase 3. Hydraulic press
4. Main bearing

2. Clean the counterbore in the crankcase where the main bearing is fitted, and measure the diameter of the counterbore. By referring to the table below, choose the proper over-size main bearing.



CAUTION:

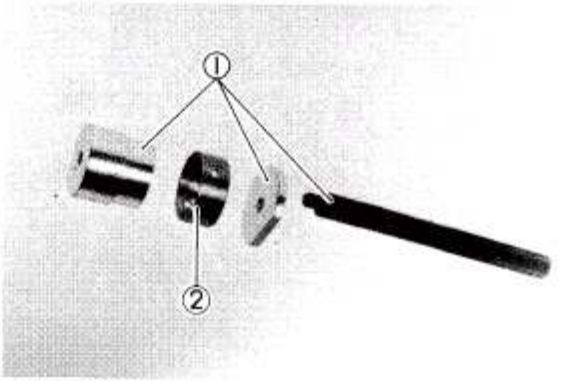
The diameter of counterbore should be measured at two places, and the average of the two measurements should be used to choose the bearing.

Diameter of counterbore in crankcase	Color code
49.000 ~ 49.010 mm (1.9291 ~ 1.9295 in)	BLUE
49.011 ~ 49.020 mm (1.9296 ~ 1.9299 in)	GREEN

NOTE:

If the diameter of the counterbore in the crankcase exceeds 49.020 mm (1.9299 in), the crankcase should be replaced with a new one. The new crankcase is already fitted with main bearings, and their inside diameters are normally 45.000 ~ 45.012 mm (1.77147 ~ 1.7721 in).

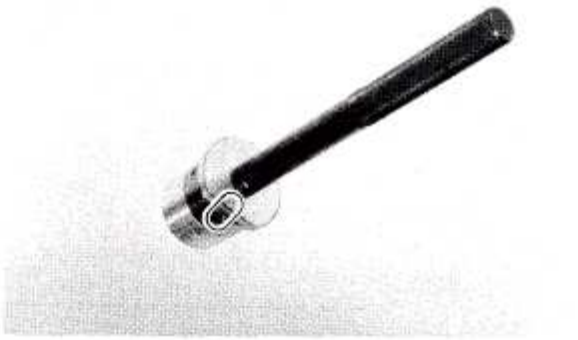
3. As shown in the photo, fit an over-size bearing over the special tool.



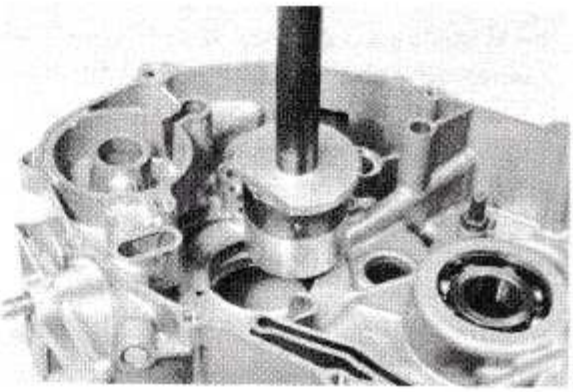
1. Special tool 2. Main bearing

NOTE:

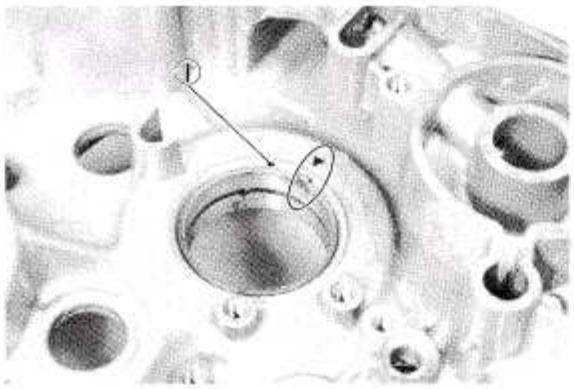
As shown in the photo, fit the key vertically to the bearing, and align the straight cutaway of the plate (special tool) with the key, then grip the bearing with the tool set.



4. Align the key with the keyway in the crankcase, and using a hydraulic press, force-fit the bearing.



5. Remove the special tool set and make sure the bearing is in place.



1. Main bearing

Connecting rod bearings

Check the bearings. If the inner or outer surface is burned, flaked, rough, scratched, or worn, the bearings should be replaced.

Connecting-rod-bearing clearance

1. Thoroughly clean all parts.
2. Install the connecting rod bearing upper half into the connecting rod.
3. Place Plastigage® on the crankpin.
4. Install the rod bearing lower half in the connecting rod cap, and install the rod cap onto the crankshaft.
5. Apply molybdenum disulfide grease to the bolt threads, and torque both ends of the rod cap evenly. Do not move the connecting rod until the clearance check is completed.

CAUTION:

When tightening the rod cap, apply continuous torque between 32 Nm (3.2 m · kg, 23 ft · lb) and 36 Nm (3.6 m · kg, 25 ft · lb). Once you reach 32 Nm (3.2 m · kg, 23 ft · lb) of torque, DO NOT STOP tightening until final torque is reached. If tightening is interrupted between 32 Nm (3.2 m · kg, 23 ft · lb) and 36 Nm (3.6 m · kg, 25 ft · lb), loosen the nut to less than 32 Nm (3.2 m · kg, 23 ft · lb) and start again. Tighten to full-torque specification without pausing.

TIGHTENING TORQUE:
36 Nm (3.6 m · kg, 25 ft · lb)

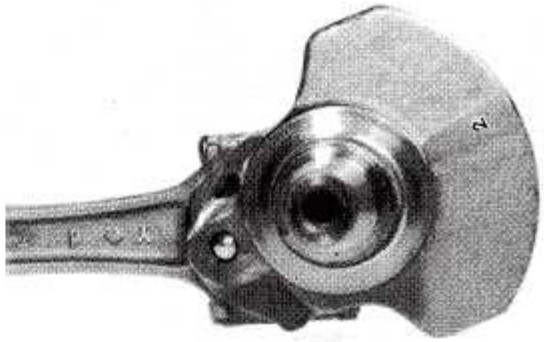
6. Carefully remove the connecting rod cap, and measure the width of the Plastigage®

Connecting-rod-bearing clearance:
0.026 – 0.050 mm (0.001 – 0.002 in)



Connecting rod bearing selection

The numbers used to indicate the crankpin size are stamped on the L.H. crank web.



The connecting rod numbers are stamped in ink on the rod.



Proper bearing selection is made by subtracting the crankpin number from the rod size number. Use the color code to choose the proper bearing.

Example:

Rod No. - Crankpin No.
= Bearing No.
4 − 1 = 3

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

Bearing color code	
No. 1	Blue
No. 2	Black
No. 3	Brown
No. 4	Green

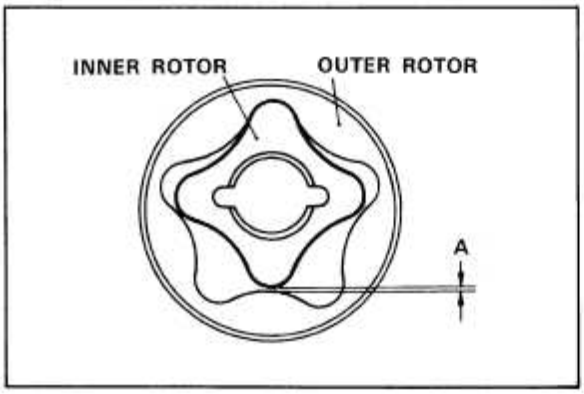
Oil Pump

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

Rotor width:
Crankshaft pump: 6 mm (0.236 in)
Transmission pump: 4 mm (0.157 in)

2. Measure the clearance between the rotor and housing. Replace the pump assembly if the clearance exceeds specifications.

Inner—Outer clearance:
0.12 mm (0.0047 in) or less



Primary Drive

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

Primary reduction ratio		
No. of teeth		Ratio
Drive	Driven	
36	70	1.944

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

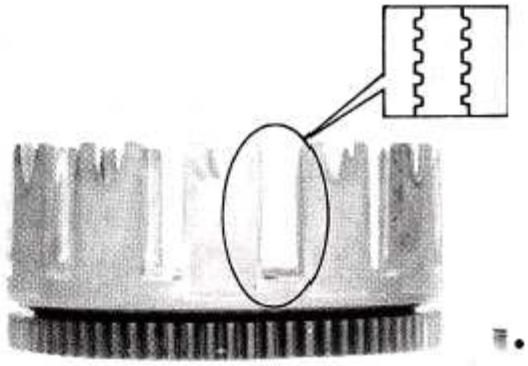
Clutch

Clutch housing

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

NOTE:

Galling on the clutch plate splines will cause erratic operation.



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

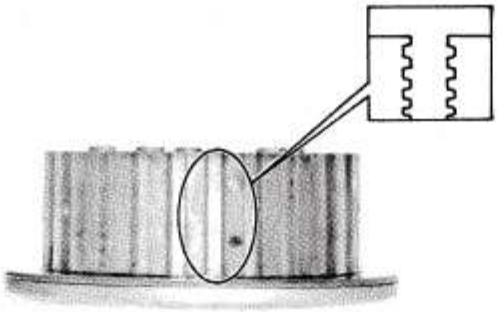
Clutch boss

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

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

NOTE:

Galling on clutch plate splines will cause erratic operation.

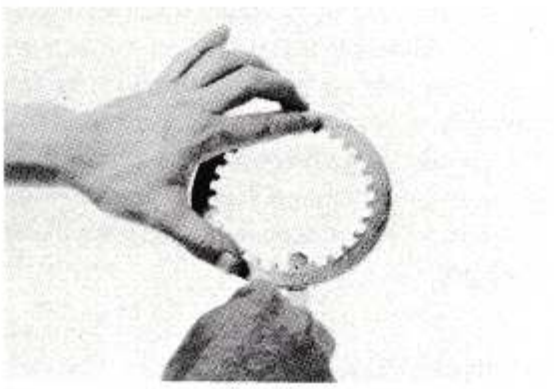


Friction and clutch plates

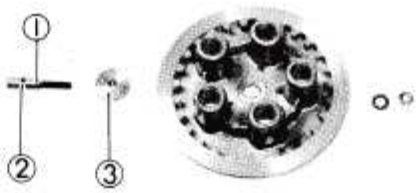
1. Check the clutch plates and friction plates for heat damage. Measure the friction plate thickness at 3 or 4 points. Measure the clutch plates for warpage with a feeler gauge and surface plate. Replace clutch plates or beyond the wear limit.

	Standard	Wear limit
Friction plate thickness	2.9 ~ 3.1 mm (0.114 ~ 0.122 in)	1.5 ~ 1.7 mm (0.059 ~ 0.067 in)
Clutch plate warp limit	—	0.2 mm (0.008 in)





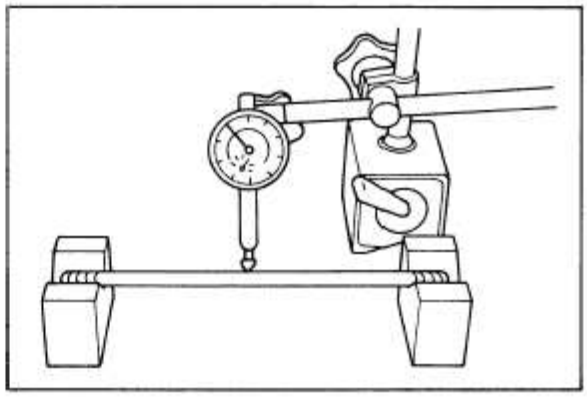
Clutch actuating mechanism



1. Push rod #1 2. O-ring 3. Washer

1. Check the short push rod #1 for wear or damage. Replace if damaged.
2. Check the O-ring in the short push rod #1 for damage. Replace if damaged.
3. Roll the long push rod on the V-blocks, and check for bends. If any bend is found, replace the push rod.

Bend limit: 0.5 mm (0.02 in)



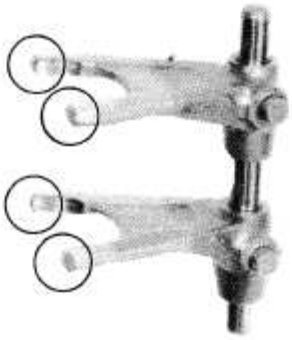
Clutch springs

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

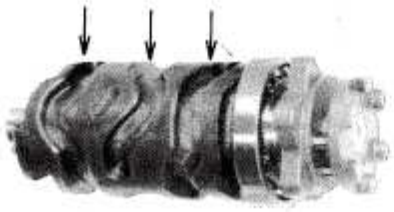
Clutch spring minimum length:
38.5 mm (1.516 in)

Transmission

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



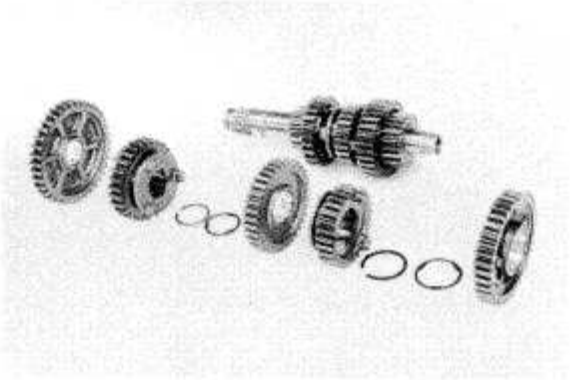
2. Roll the guide bar across a surface place. If the bar is bent, replace it.
3. Check the shift cam grooves for signs of wear or damage. If any profile has excessive wear and/or damage, replace the cam.



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

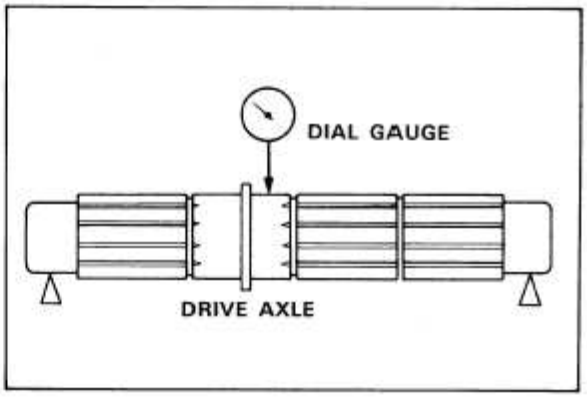


5. Check the shift cam dowel and side plate for looseness, damage, or wear. Replace as required.
6. Check the shift-cam stopper plate, circlip, and stopper for wear. Replace as required.
7. Carefully inspect each gear. Look for signs of obvious heat damage (blue discoloration). Check the gear teeth for signs of pitting, galling, or other extreme wear. Replace as required.
8. Check to see that each gear moves freely on its shaft.
9. Check to see that all washers and clips are properly installed and undamaged. Replace bent or loose clips and bent washers.
10. Check to see that each gear properly engages its counterpart on the shaft. Check the mating dogs for rounded edges, cracks, or missing portions. Replace as required.

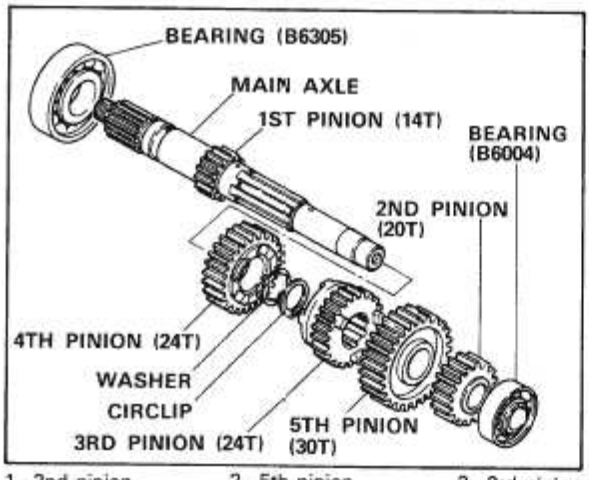


11. Check the transmission shafts using a centering device and dial gauge. If any shaft is bent beyond specified limit, replace the shaft.

Maximum runout: 0.06 mm (0.0024 in)

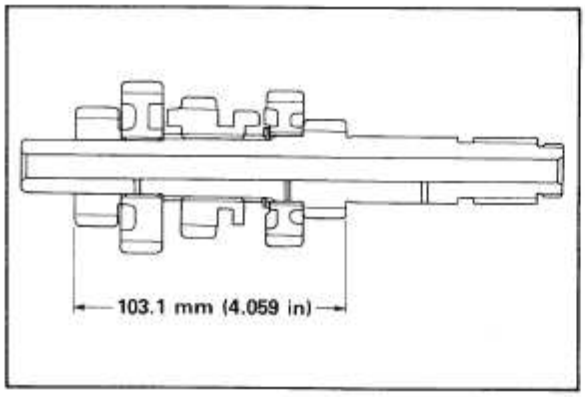


12. When replacing the main axle or pinions, take the following steps:



1. 2nd pinion 2. 5th pinion 3. 3rd pinion
4. 4th pinion

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

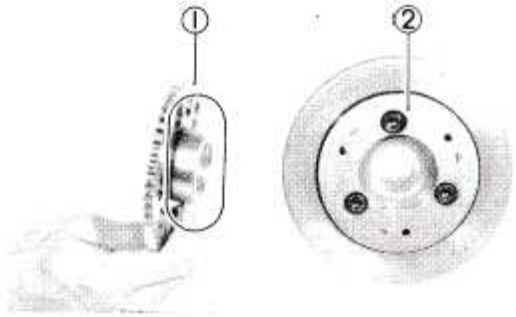


c. After installing the pinions onto the main axle, make sure the 4th and 5th pinions turn freely around the main axle.

Starter Drives

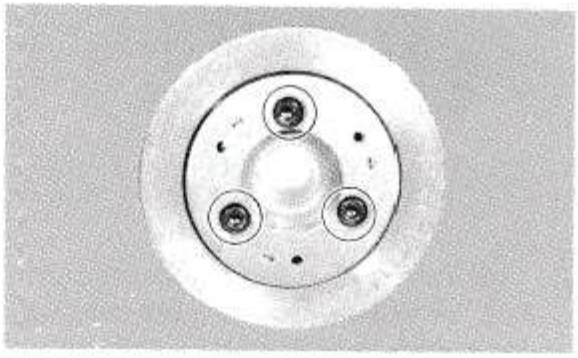
Electric starter clutch and gears

1. Check the surface of the idle gear #2 for pitting or other damage. If severe, replace the gear.



1. Idle gear #2 2. Electric starter clutch

2. Check the spring caps and the springs for deformation or damage. If severe, replace as necessary.
3. Check the starter clutch bolt (Allen screw) for looseness. If loose, remove the bolt and replace with a new bolt. Apply Loctite® to threads and tighten to specified torque. Clinch the end of the bolts.



Starter clutch bolt tightening torque:
20 Nm (2.0 m · kg, 14 ft · lb)

ENGINE ASSEMBLY AND ADJUSTMENT

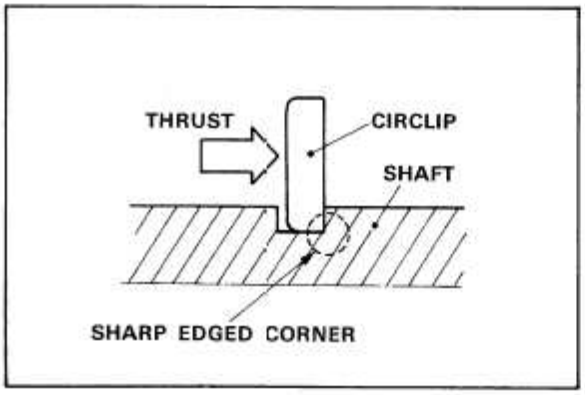
Important Information

Gaskets and seals

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

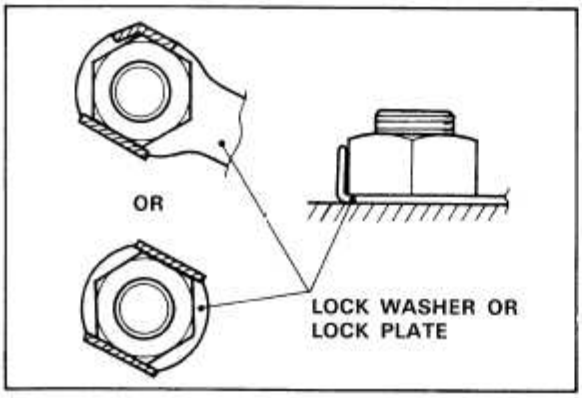
Circlips

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



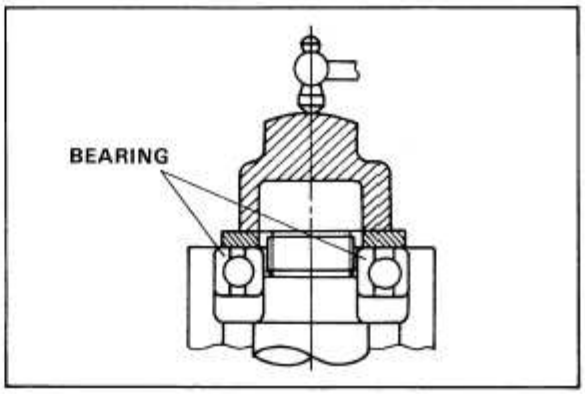
Lock washers/plates and cotter pins

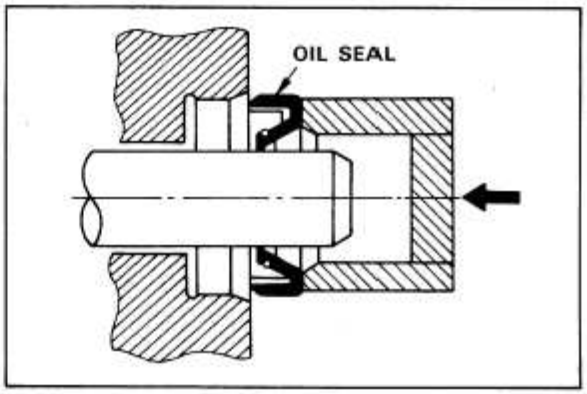
1. All lock washers/plates and cotter pins must be replaced when they are removed. Lock tab(s) should be bent along the bolt or nut flat(s) after the bolt or nut has been properly tightened.



Bearings and oil seal

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





CHAPTER 4. CARBURETION

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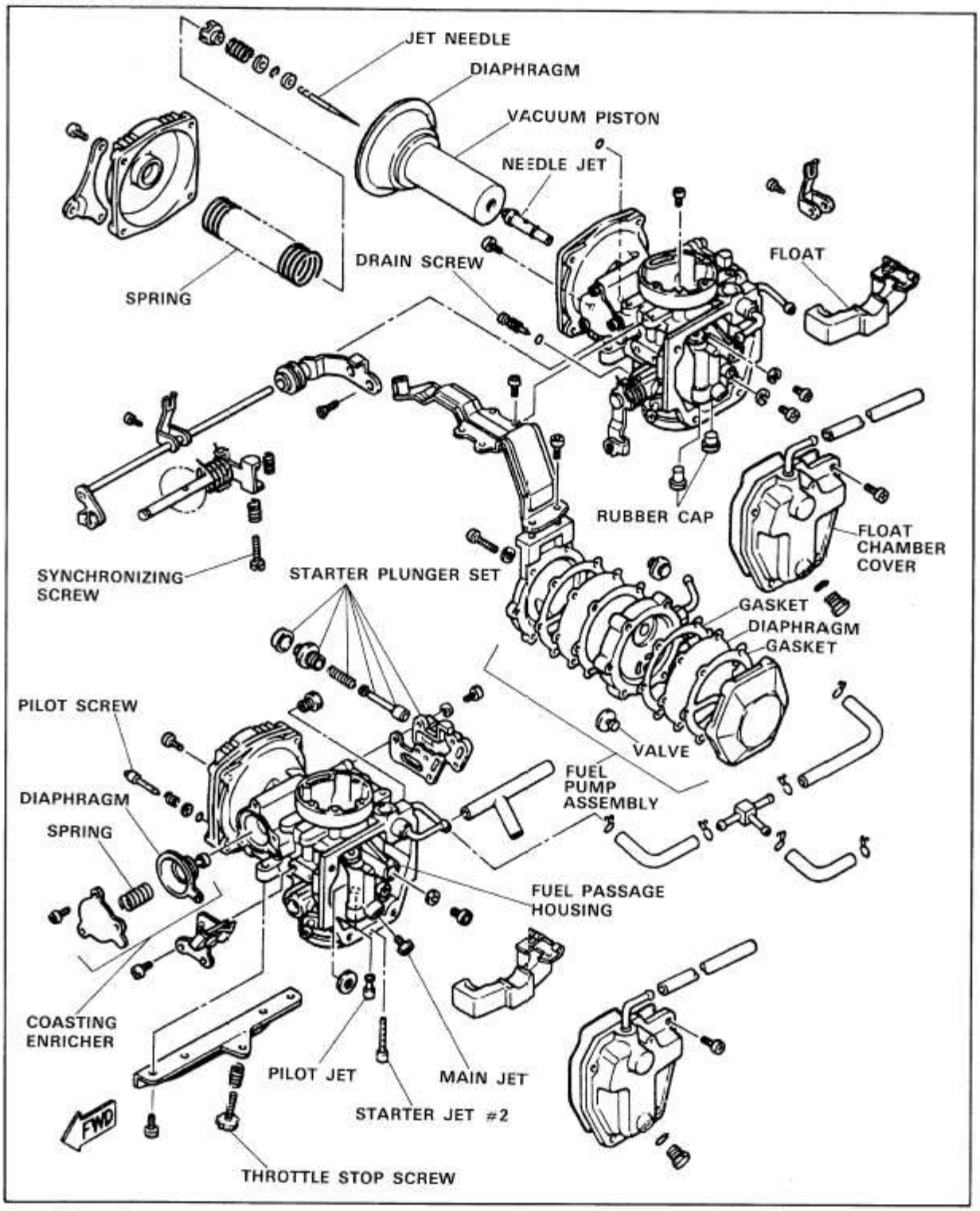
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CHAPTER 4.
CARBURETION

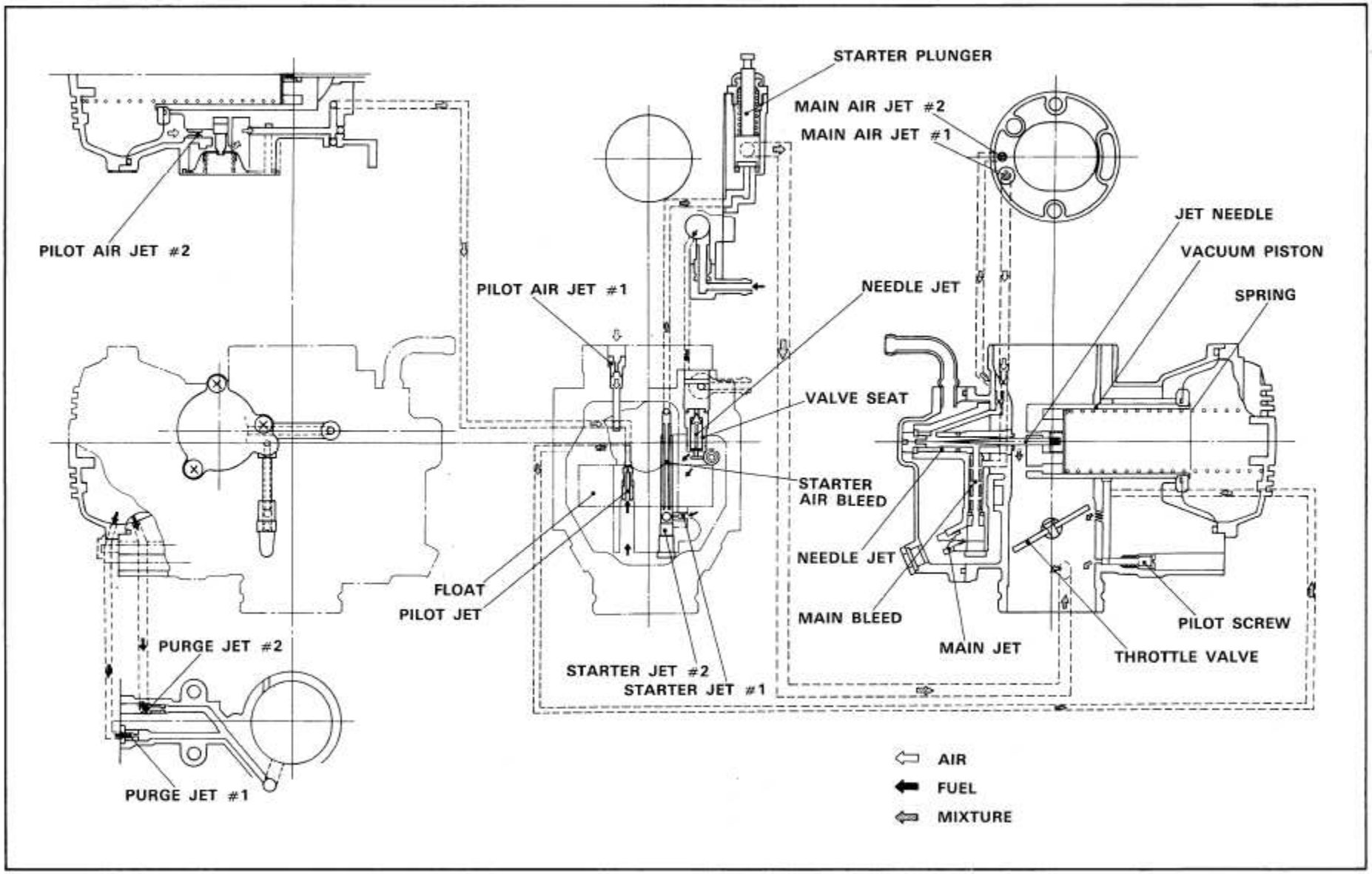
CARBURETOR



Specification

	Main jet	Jet needle	Starter jet	Pilot screw	Float valve seat	Engine idle speed
Front	#140	#5D4	(GS1) #40 (GS2) #0.8	Preset	φ2.0	1,200 r/min
Rear	#135	#5D2	↑	↑	↑	

Section View



Specifications

	Front	Rear
Main jet	#140	#135
Jet needle	#5D4	#5D2
Starter jet	(GS1) #40	←
	(GS2) #0.8	←
Pilot screw	Preset	←
Float valve seat	ø2.0	ø2.0
Engine idle speed	1,200 r/min	

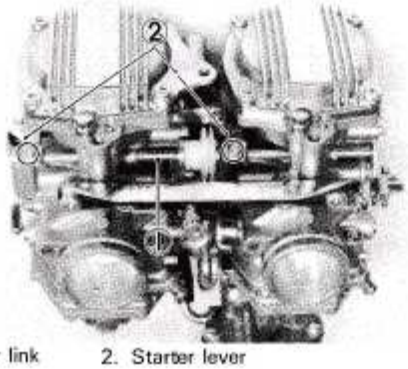
WARNING:

The pilot screw settings are adjusted for maximum performance at the factory with special 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.

Disassembly

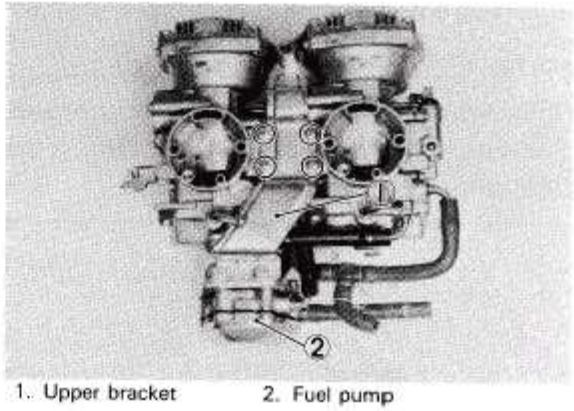


1. Remove the two starter link securing screws, and remove the starter link and starter levers from the carburetors.



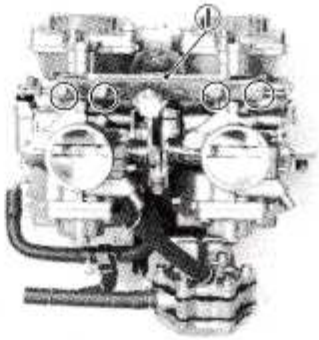
1. Starter link 2. Starter lever

2. Remove the upper bracket securing screws and remove the upper bracket with fuel pump.



1. Upper bracket 2. Fuel pump

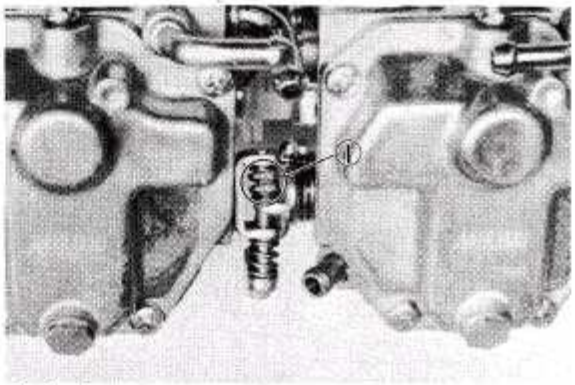
3. Remove the lower brackets from the carburetors and separate the carburetors.



1. Lower bracket

NOTE:

When you separate the carburetors, the small spring may fall out. This spring is connecting the both throttle levers. Do not lose this spring.

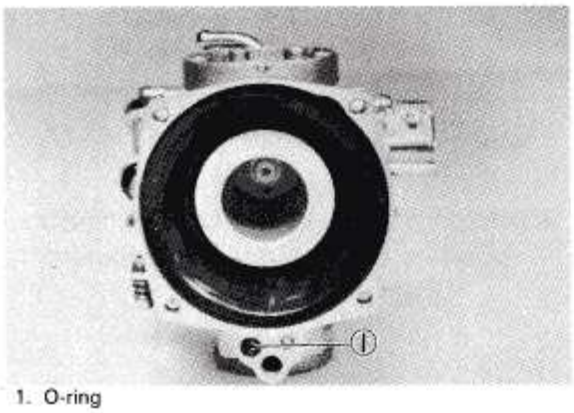


1. Spring

4. Remove the vacuum chamber cover, and remove the spring, O-ring, and diaphragm. The vacuum piston will come out with the diaphragm.

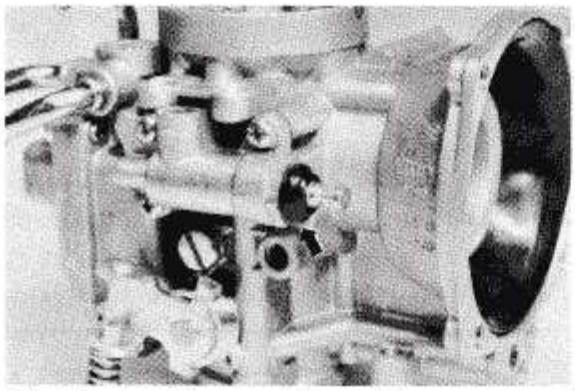
NOTE:

Note the position of the tab on the diaphragm. This tab must be placed in the recess in the carburetor body during reassembly.

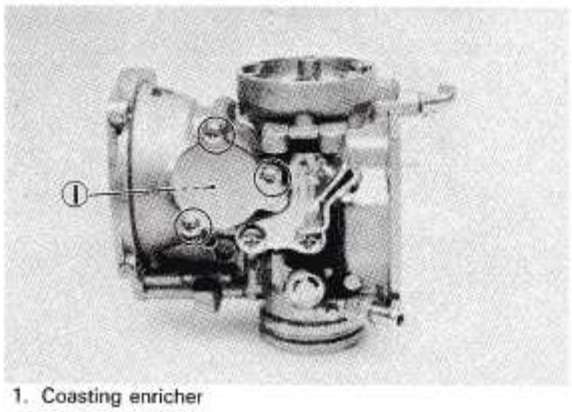


1. O-ring

5. Remove the starter plunger from the carburetor body.

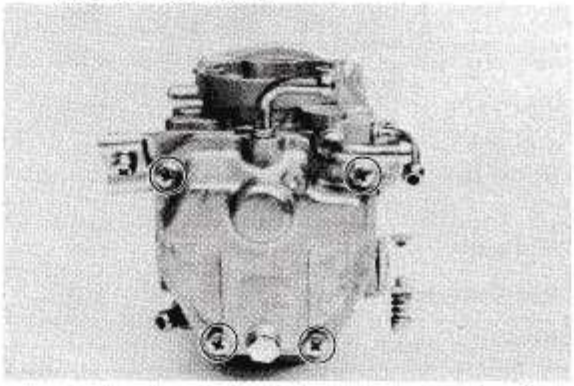


6. Remove the coasting enricher cover, and remove the spring and diaphragm.

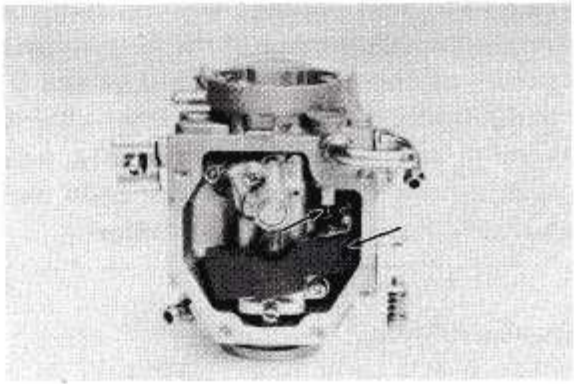


1. Coasting enricher

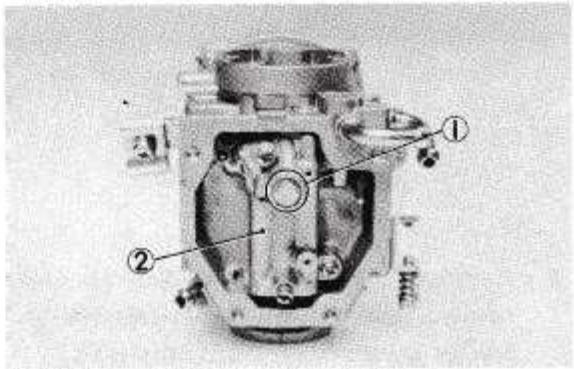
7. Remove the float chamber cover from the carburetor body.



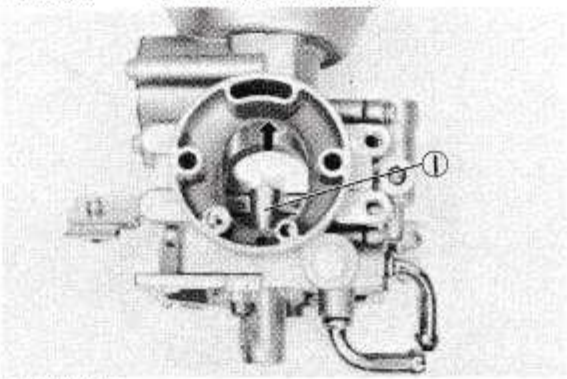
8. Remove the float, and remove the float needle valve. Be careful not to close the float valve which is under the float arm.



9. Remove the needle jet securing screw from the fuel passage housing. Remove the needle jet toward the vacuum piston.

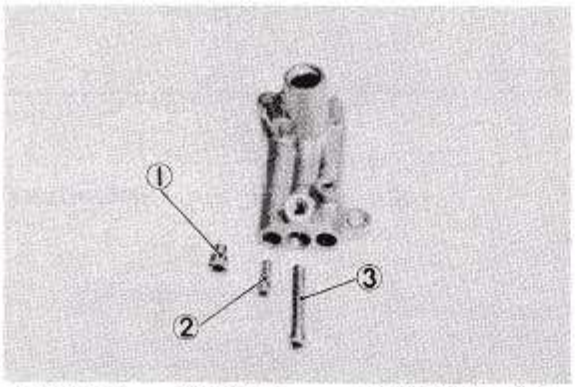


1. Screw 2. Fuel passage housing



1. Needle jet

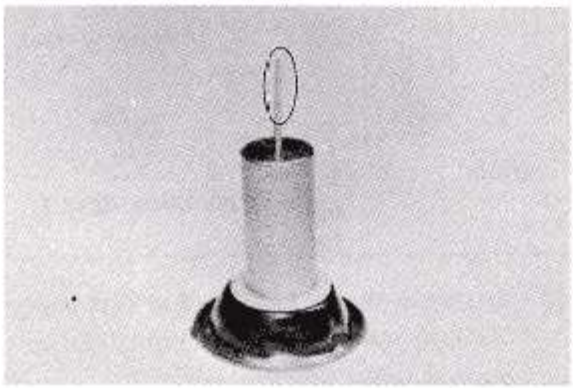
10. Remove the fuel passage housing from the carburetor body.
11. Remove the rubber caps, jets, and main bleed pipe as necessary.



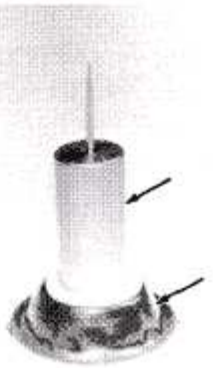
1. Main jet 2. Pilot jet 3. Main bleed pipe

Inspection

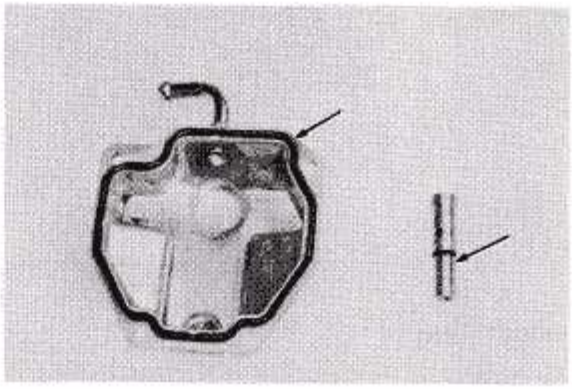
1. Examine the carburetor body and fuel passages. If they are contaminated, wash the carburetor in a petroleumbased solvent. Do not use any caustic carburetor cleaning solutions. Blow out all passages and jets with compressed air.
2. Examine the condition of the floats. If the floats are damaged, they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



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 jet needle for bends or wear. If the needle is bent or severely worn, replace it.
6. Inspect the coasting enricher diaphragm. If it is torn, replace it.
7. Check the O-rings for damage. Replace them if damaged.

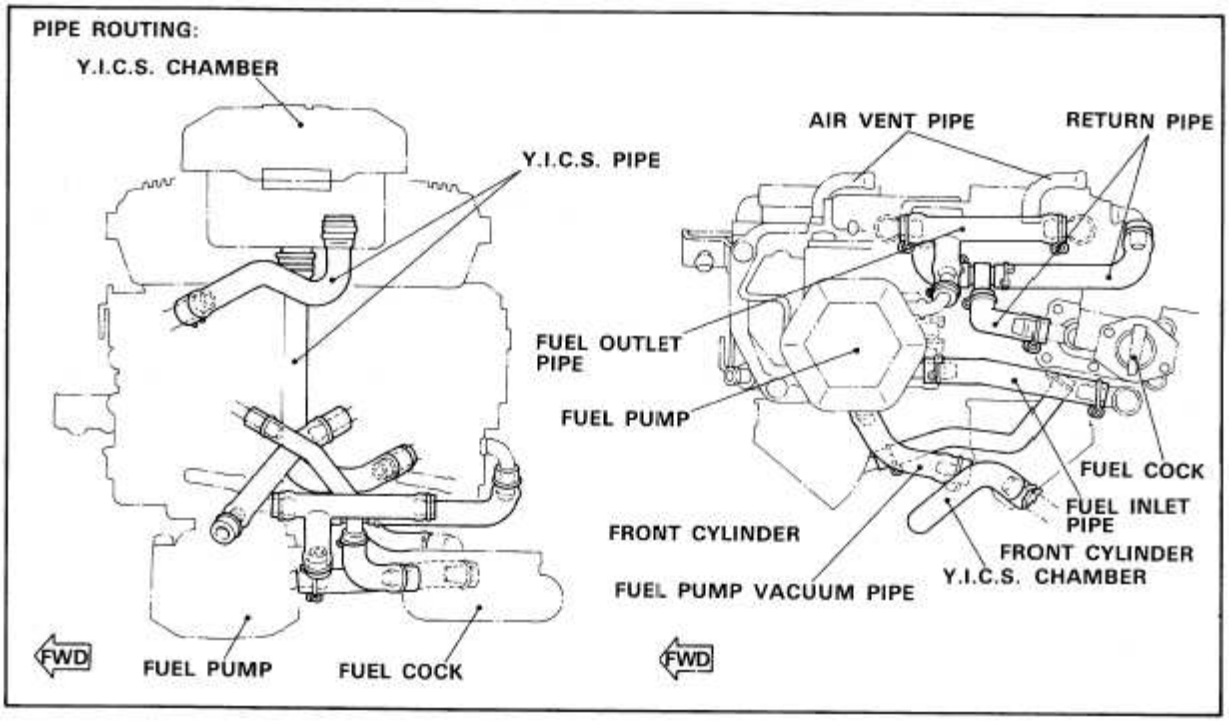


8. Check the fuel passage housing and starter plunger housing gaskets for damage. Replace the gasket(s) if damaged.
9. Inspect the starter plunger. If it is worn or damaged, replace it.



Assembly

1. To assemble the carburetors, reverse the disassembly procedures. Pay close attention to the installation of the vacuum piston diaphragm and the location of each jet.



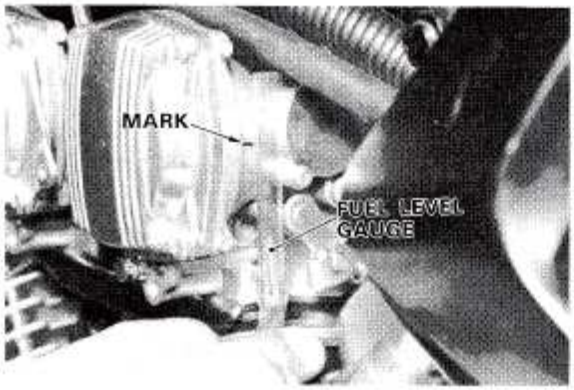
Adjustment

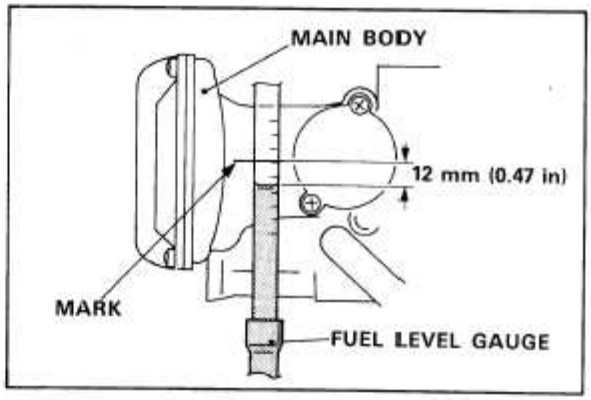
Fuel level

NOTE:

Before checking the fuel level, place the motorcycle on a level surface.

1. Place the motorcycle on the centerstand. Connect the fuel level gauge or a vinyl tube, 6 mm (0.24 in) inside diameter, to the float bowl nozzle on the carburetor.





2. As shown above, hold the fuel level gauge vertically, and loosen the front or rear carburetor drain screw.
3. Set the fuel cock to "ON" and start the engine. Stop it after a few minutes.
4. Check the fuel level. It should be within the specified range.

Fuel level:
12 ± 1 mm (0.47 ± 0.04 in)

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



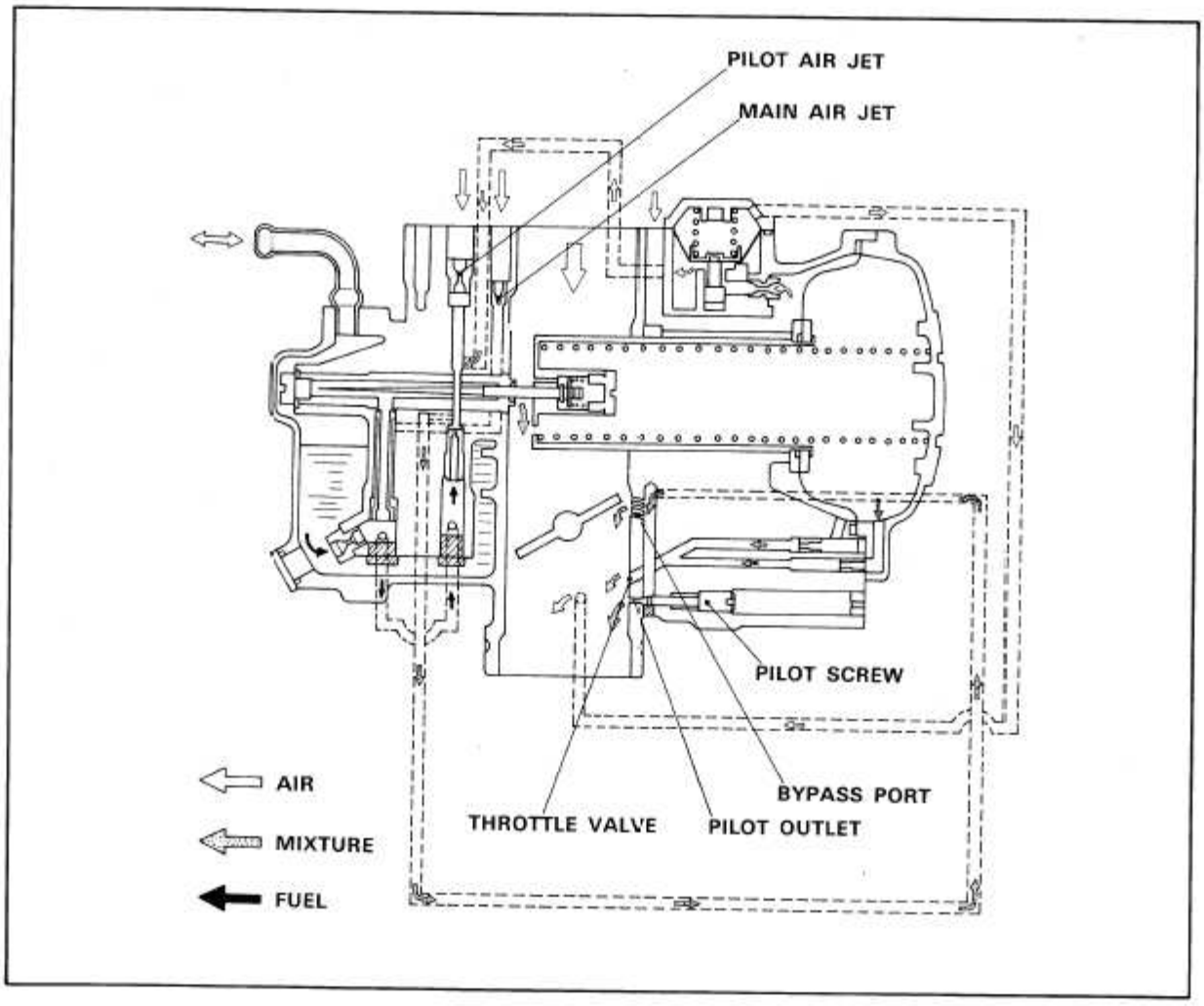
1. Tang

7. Repeat the procedure for the other carburetor.

COASTING ENRICHER

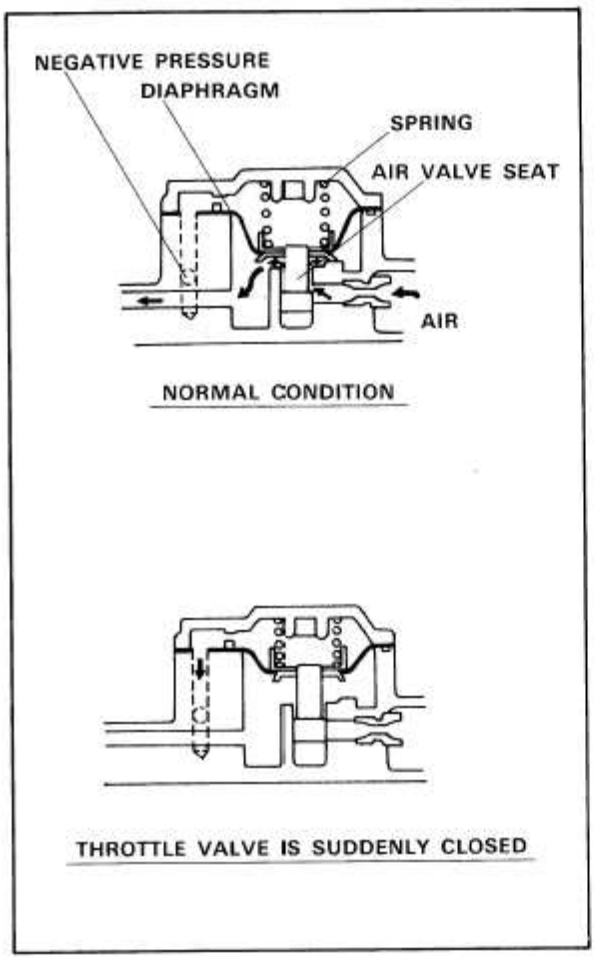
This model is eqipped with an afterburning protection device (coasting enricher).

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



Operation

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



Maintenance

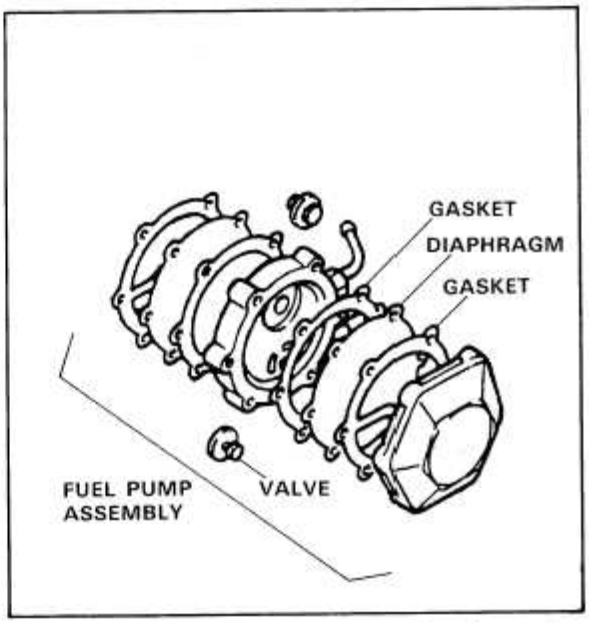
Each individual spring is rigorously tested for its preload and therefore must not be broken down or adjusted in any way. If an afterburning sound is heard during normal riding, clean the pilot air jet, pilot jet, and bypass port by blowing air into them.

FUEL PUMP

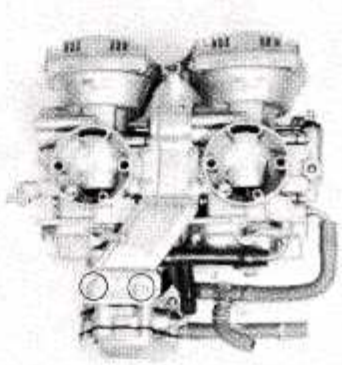
Operation

The fuel pump diaphragm is operated by variations in the pressure in the carburetor joint and thus produces a pumping action that pumps fuel from the fuel tank to the carburetor.

Disassembly



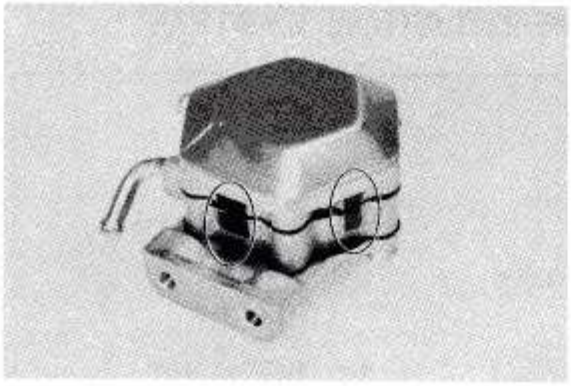
1. Remove the Y.I.C.S. chamber from the fuel pump.
2. Remove the fuel pump from the carburetor upper bracket.



3. Remove the six screws, and remove the fuel pump covers, gaskets, diaphragms, and valves from the fuel pump body.

NOTE:

Note the position of the tab on the gaskets. This tab must be placed in the recess in the fuel pump body during reassembly.

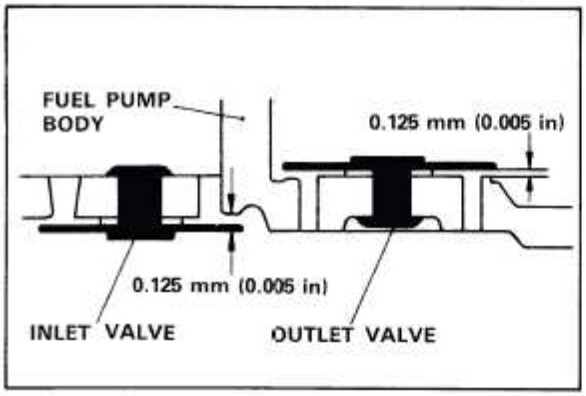


Inspection

1. Examine the fuel pump body and fuel passage. If they are contaminated, wash the fuel pump body in a petroleum-based solvent. Blow out all passages with compressed air.
2. Inspect the fuel pump diaghragm, valve, and gasket for damage. If damaged, replace these ccmponents as a set.

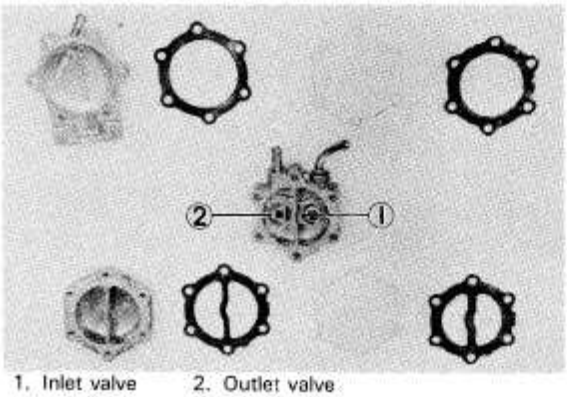
NOTE:

As shown below, a gap of 0.125 mm (0.005 in) is provided between the valve seat and the fuel pump body on both inlet and outlet valves.



Assembly

1. Install the valves into the fuel pump body as shown.



1. Inlet valve 2. Outlet valve

2. Install the diaphragm, gaskets and covers onto the fuel pump body. Tighten the screws to specification.

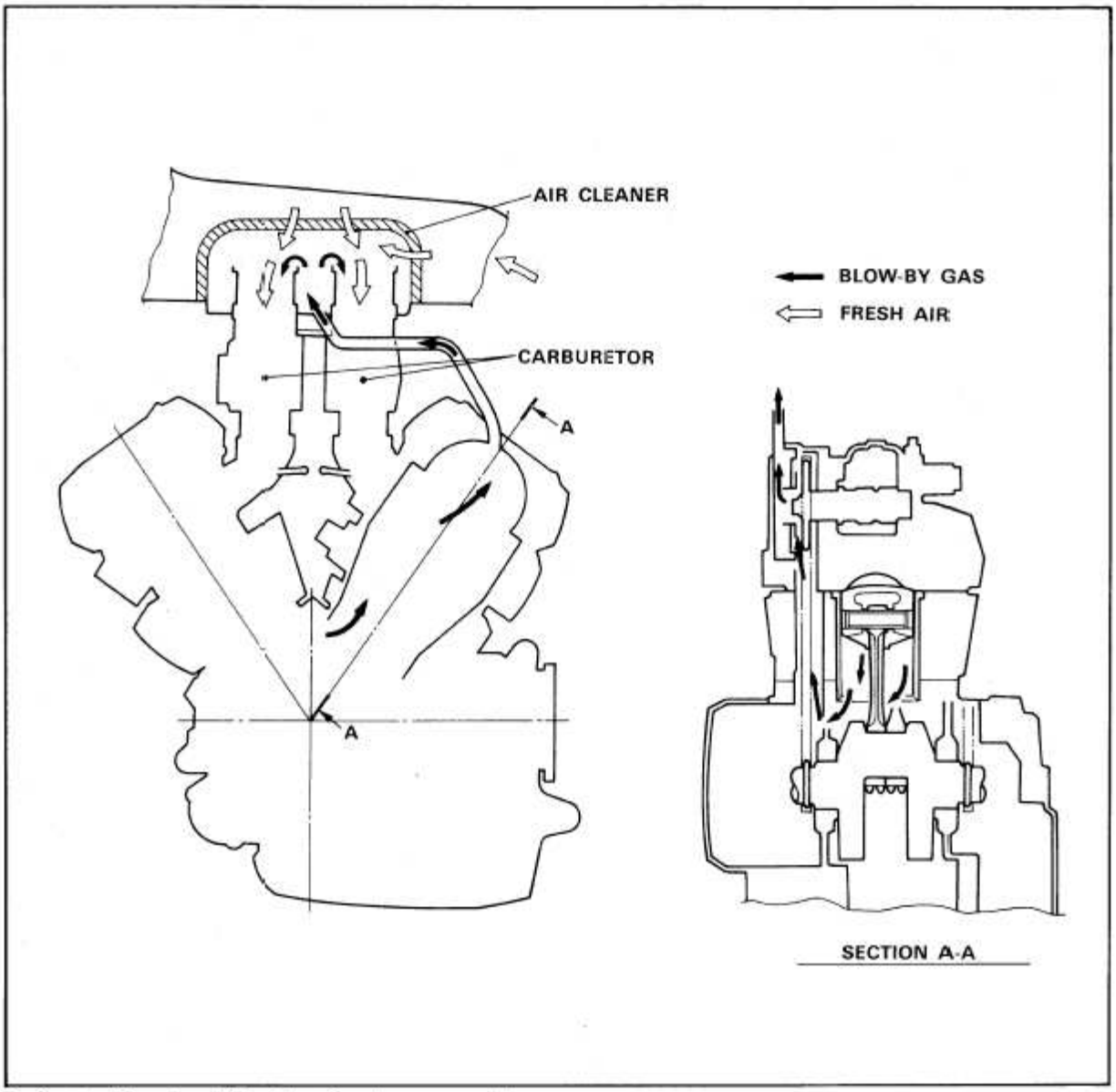
TIGHTENING TORQUE:
3 Nm (0.3 m · kg, 2.2 ft · lb)

CAUTION:

Avoid tightening the screws too hard, or the gasket could be deformed or broken.

3. Install the fuel pump assembly to the carburetor upper bracket, and connect the fuel and vacuum lines.

AIR CLEANER AND CRANKCASE VENTILATION SYSTEM



Refer to Chapter 2 for the air cleaner maintenance.

CHAPTER 5.
CHASSIS

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CHAPTER 5.
CHASSIS

FRONT WHEEL

Removal

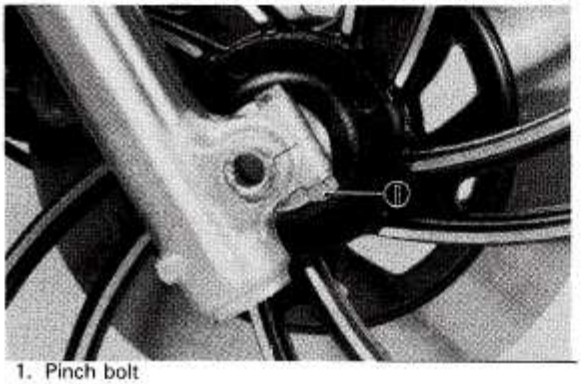
1. Place the motorcycle on its centerstand.
2. Remove the cotter pin and wheel axle nut.



3. Remove the speedometer cable holder securing bolts.



4. Loosen the pinch bolt securing the axle.

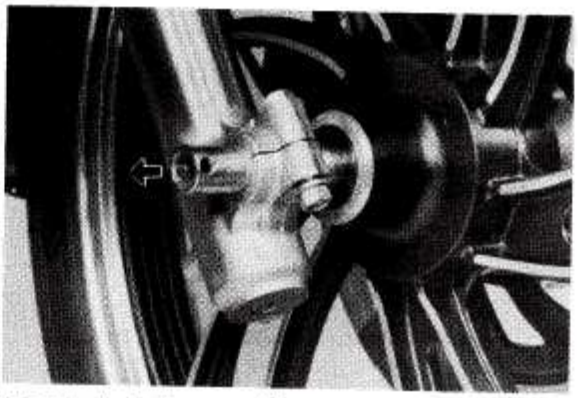


1. Pinch bolt

5. Remove the axle shaft and the front wheel. In this case, make sure the motorcycle is properly supported.

NOTE:

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



Front Axle Inspection

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

Front Wheel Inspection

This motorcycle is equipped with aluminum wheels designed to be compatible with either tube or tubeless tires.

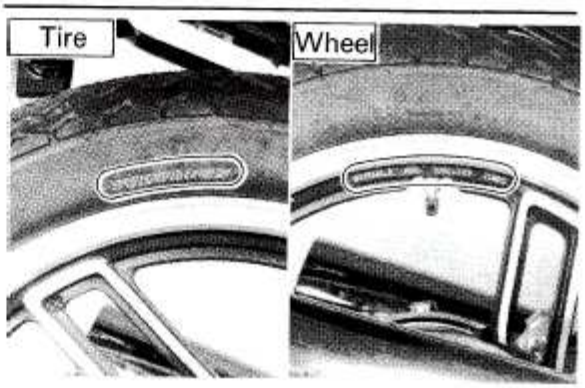
WARNING:

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 Tires 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 the Tubeless Tire and Aluminum Wheel Manual for proper tubeless and aluminum wheel service.

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

Rim run-out limits:
Vertical: 2 mm (0.079 in)
Lateral: 2 mm (0.079 in)

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

NOTE:

The wheel should be balanced with the brake disc installed.

4. After installing a tire, ride conservatively to allow the tire to seat itself properly on the rim. Failure to allow proper seating may cause tire failure, resulting damage to the motorcycle and injury to the rider.
5. After repairing or replacing a tire, check to be sure the valve-stem locknut is securely fastened. If not, torque it as specified.

TIGHTENING TORQUE:
2 Nm (0.2 m · kg, 1.4 ft · lb)

Replacing the Wheel Bearings

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

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

WARNING:

Eye protection is recommended when using striking tools.

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

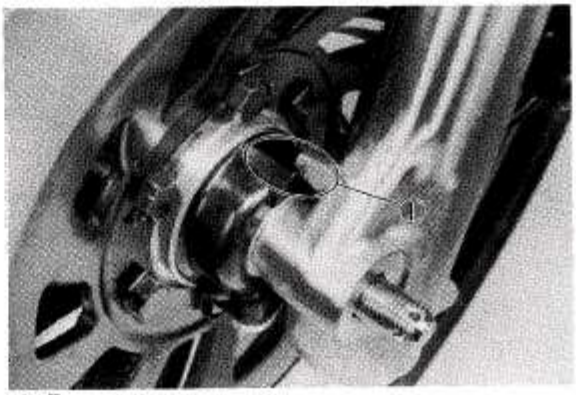
CAUTION:

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

Installing the Front Wheel

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

1. Lightly grease the lips of the front wheel oil seals and the gear teeth of the speedometer drive and driven gears. Use lightweight lithium base grease.
2. Install the speedometer-cable-holder securing bolt.
3. Make sure the projecting portion (torque stopper) of the speedometer housing is positioned correctly.



1. Torque stopper

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

TIGHTENING TORQUE:
105 Nm (10.5 m · kg, 75 ft · lb)

5. Install the front fender.
6. Before tightening the pinch bolt, compress the front forks several times to check for proper fork operation.
7. Tighten the axle pinch bolt and a new cotter pin.

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

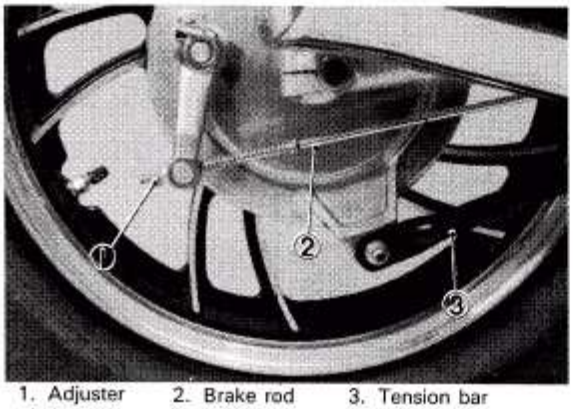
WARNING:

Always use a new cotter pin on the axle nut.

REAR WHEEL

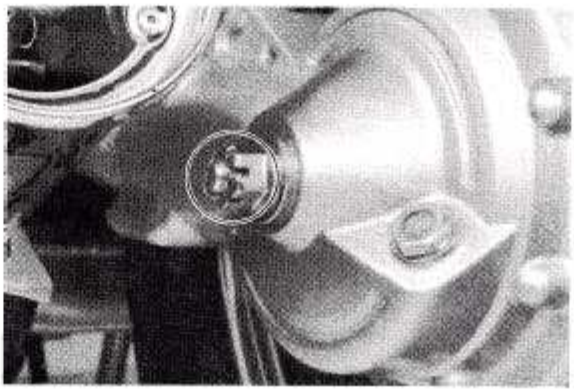
Removal

1. Place the motorcycle on its centerstand.
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.

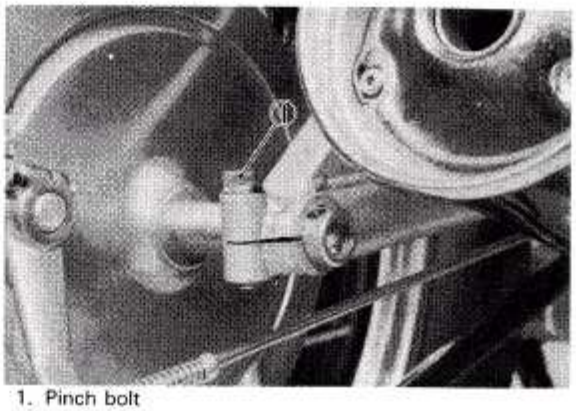


1. Adjuster 2. Brake rod 3. Tension bar

3. Remove the axle nut cotter pin and axle nut. Discard the old pin.

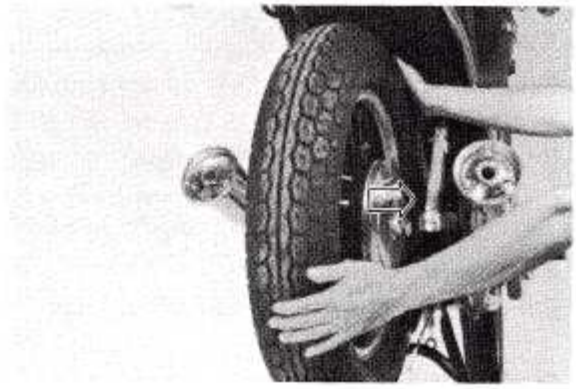


4. Loosen the rear axle pinch bolt and pull out the rear axle.



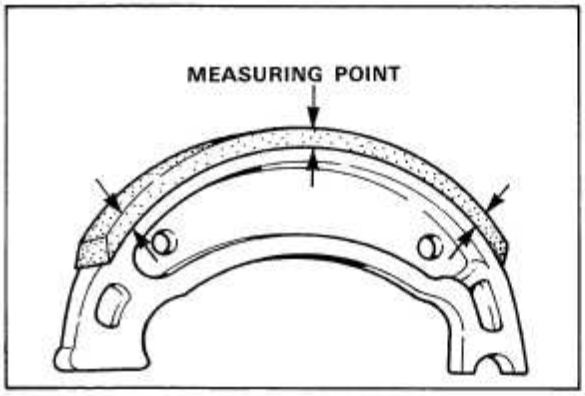
1. Pinch bolt

5. Move the wheel to the right side to separate it from the final gear case and remove the rear wheel.



Checking Brake Shoe Wear

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



Wear limit: 2 mm (0.08 in)

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

Brake Drum

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

Brake Shoe Plate

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

NOTE:

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

Rear Axle Inspection

Refer to "Front Axle Inspection" on page 5-1.

Replaceing the Wheel Bearings

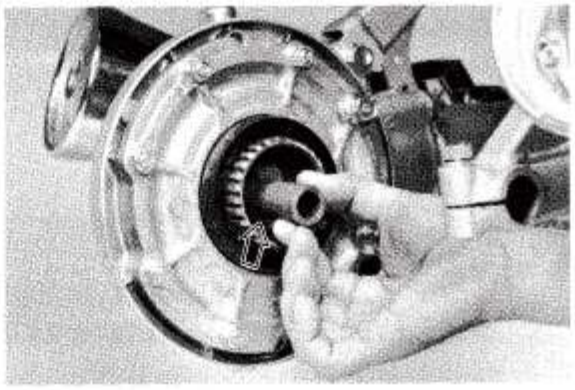
Rear wheel bearing replacement is similar to the procedure for the front wheel bearings.

Rear Wheel Inspection

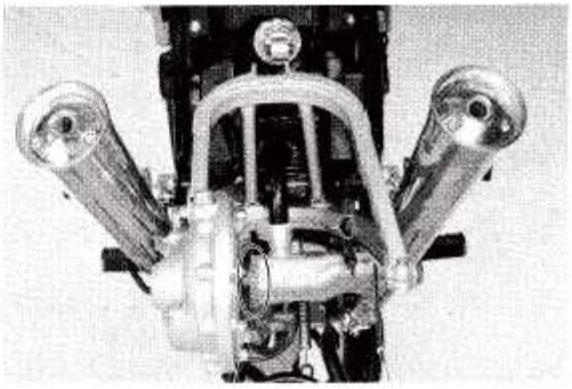
See "Front Wheel Inspection" on page 5-1.

Installing the Rear Wheel

1. Install the spacer in the final drive coupling as shown in the photograph.



2. Lightly grease the lips of the rear wheel oil seals.



3. Install the wheel assembly and axle.

NOTE:

When installing the rear wheel, be sure the splines on the wheel hub fit into the final gear case. Lightly apply grease to the gear teeth.

WARNING:

Always use a new cotter pin on the axle nut.

TIGHTENING TORQUE:
- Axle nut:
  - 105 Nm (10.5 m·kg, 75 ft·lb)
- Axle pinch bolt:
  - 6 Nm (0.6 m·kg, 4.3 ft·lb)

FRONT BRAKE

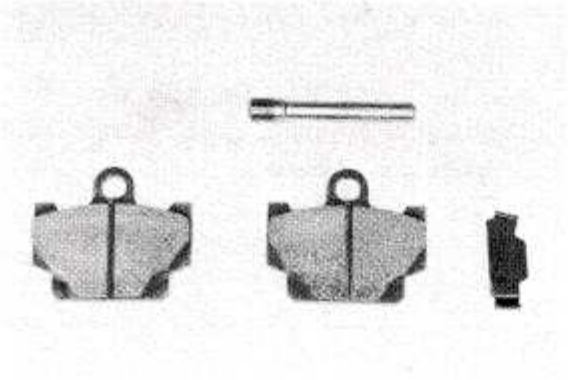
CAUTION:

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 can injure your eyes, and it will damage painted surfaces and plastic parts.

Brake Pad Replacement

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

1. Remove the retaining bolt from the caliper cylinder. Then remove the pads and pad shim.



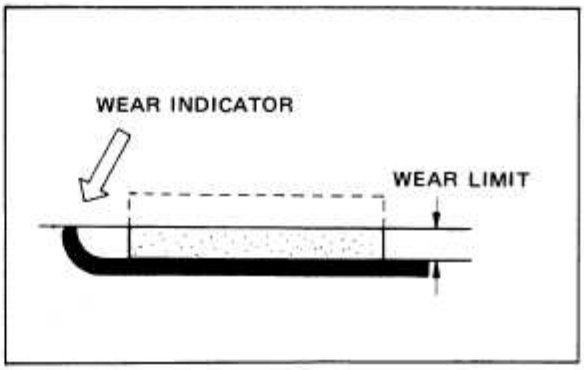
2. Install the new brake pads. Replace the following parts if pad replacement is required.

- Pads
- Pad shim
- Pad retaining pin

NOTE:

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

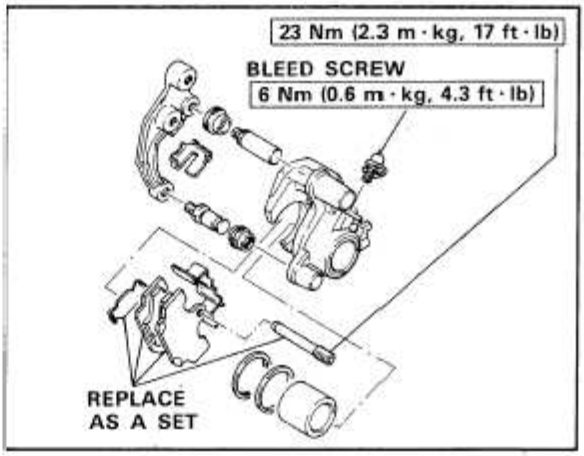
Pad wear limit:
0.8 mm (0.032 in)



3. Tighten the pad retaining bolt to specification.

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

Caliper Disassembly



1. Remove the brake hose from the caliper. Allow the caliper assembly to drain into a container.
2. Place the open hose end into the container and pump the old fluid out of the master cylinder.
3. Remove the retaining spring, retaining bolt, shim and the pads.
4. Remove the caliper cylinder securing bolts from the front fork.
5. Carefully force the piston out of the caliper cylinder with compressed air. Never try to pry out the piston.

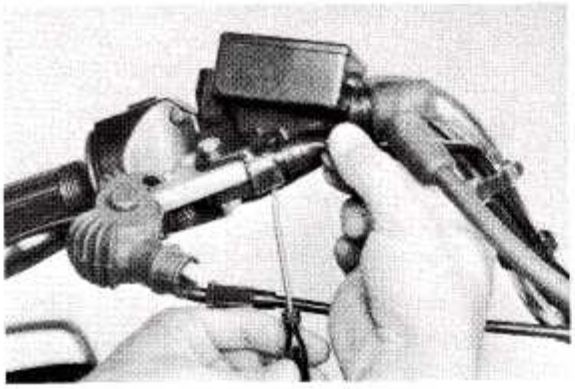
WARNING:

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

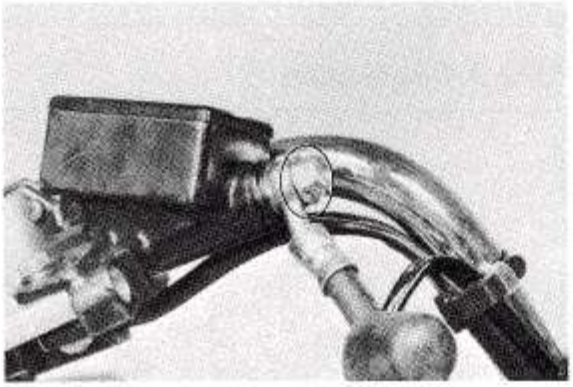
6. Remove the piston seals.

Master Cylinder Disassembly

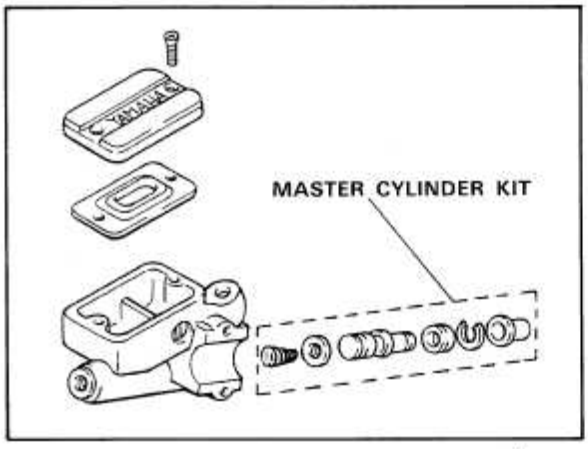
1. Remove the brake light switch.



2. Remove the brake hose.



3. Remove the brake lever and spring.
4. Remove the master cylinder from the handlebar. Remove the cap, and drain the remaining fluid.
5. Remove the master cylinder dust boot.
6. Remove the snap ring.



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

Brake Inspection and Repair

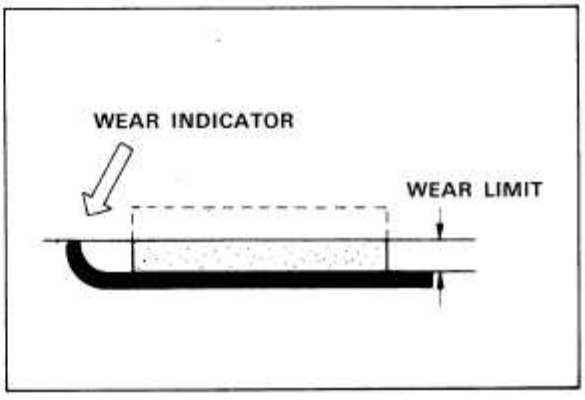
Recommended brake component Replacement schedule:
- Brake pads: As required
- Piston seal, dust seal: Every two years
- Brake hoses: Every four years
- Brake fluid: Replace only when brakes are disassembled

1. Replace the caliper piston if it is scratched.



2. Replace any brake pad that is worn beyond limits. Always replace the brake pads as a set.
   See "Brake Pad Replacement" for a listing of the parts to be replaced when pads are replaced.

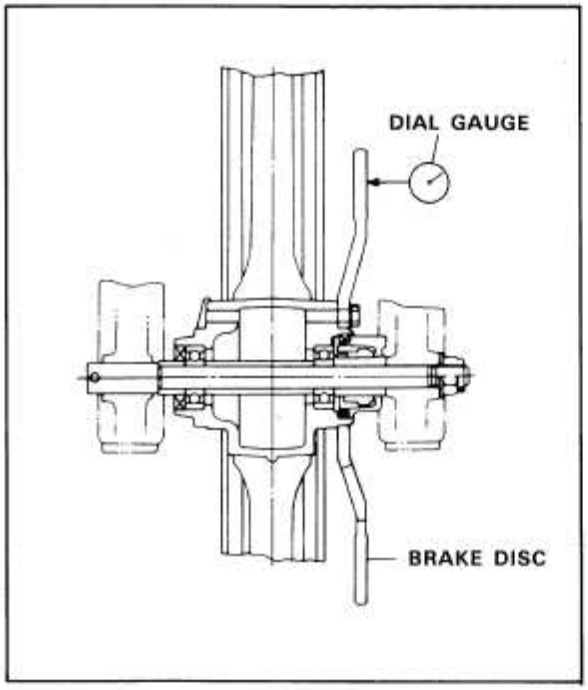
Wear limit: 0.8 mm (0.032 in)



3. Replace the piston seals if damaged. Replace the seals every two years.
4. Inspect the master cylinder body; replace if scratched. Clean all the passages with new brake fluid.

5. Inspect the brake hoses. Replace the hoses every four years or immediately if cracked, frayed, or damaged.
6. Check for wear and deflection of the disc. If the disc is worn beyond minimum thickness or if deflection exceeds the specified amount, replace the disc.

Maximum deflection:
0.15 mm (0.006 in)
Minimum disc thickness:
4.5 mm (0.18 in)

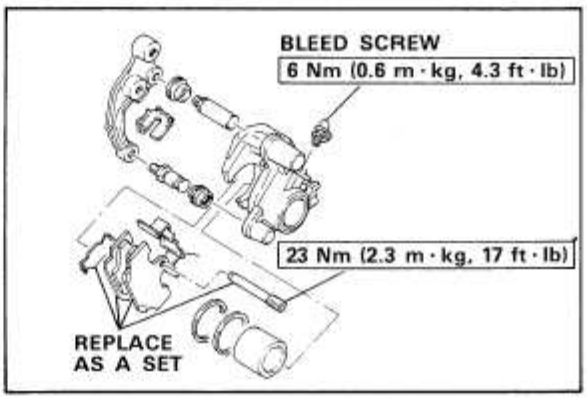


Brake Assembly

Caliper

All internal parts should be cleaned in new brake fluid only. Internal parts should be lubricated with brake fluid when installed. Replace the following parts whenever a caliper is disassembled:

- Piston seals
- Retaining ring
- Rubber boot
- Bleed screw and rubber cap

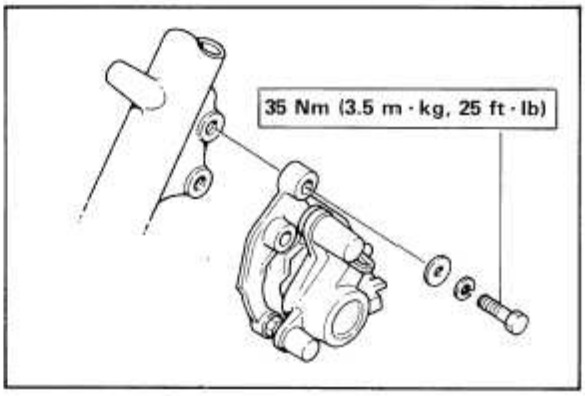


1. Install the piston seals and the piston.
2. Install the retaining spring, pads, and retaining bolt into the caliper cylinder. Torque the retaining bolt to specification.

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

3. Apply rubber grease to the piston seals, caliper cylinder, and piston.
4. Install the caliper assembly on the front fork. Torque the bolts to specification.

TIGHTENING TORQUE:
35 Nm (3.5 m · kg, 25 ft · lb)



5. Attach the brake hoses.

TIGHTENING TORQUE:
26 Nm (2.6 m · kg, 19 ft · lb)

6. If the brake disc has been removed from the hub or is loose, tighten the bolts. Use new lock plates, and bend the lock tabs against a bolt flat after the bolts are torqued to specification.

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

7. Reassemble the master cylinder as shown in the illustration.

TIGHTENING TORQUE:
(all brake union bolts)
26 Nm (2.6 m · kg, 19 ft · lb)

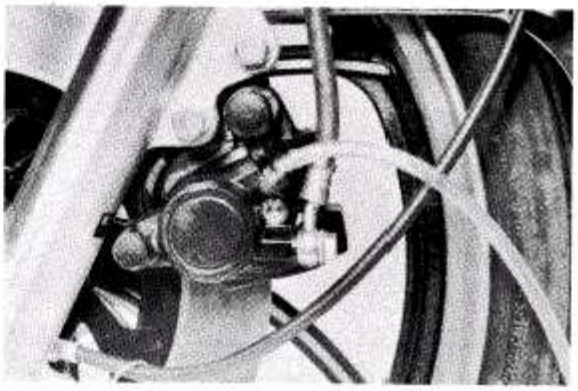


Bleeding the brakes

WARNING:

If the brake system is disassembled or if 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.

1. Add proper brake fluid to the reservoir. Install the diaphragm, being careful not to spill or overflow the reservoir.
2. Connect a clear plastic tube, 4.5 mm (3/16 in) inside diameter, tightly to the caliper bleed screw. Put the other end of the tube into a container.



3. Slowly apply the brake lever several times. Pull in the lever. Hold the lever in this "on" position. Loosen the bleed screw. Allow the lever to travel slowly toward its limit. When the limit is reached, tighten the bleed screw. Then release the lever.

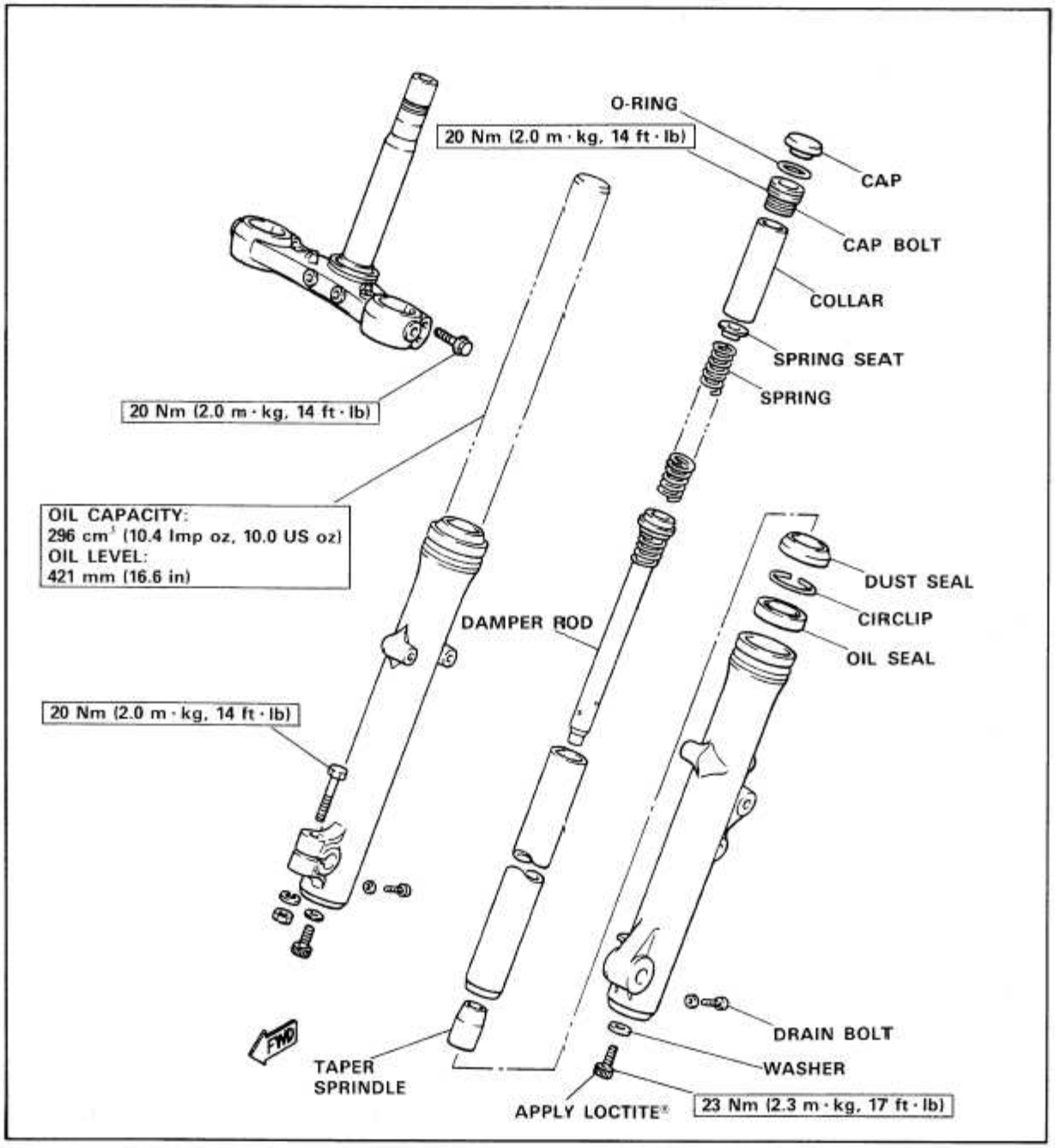
Bleed screw tightening torque:
6 Nm (0.6 m · kg, 4.3 ft · lb)

4. Repeat the above procedure until all air bubbles are removed from the 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 have settled out.

FRONT FORK

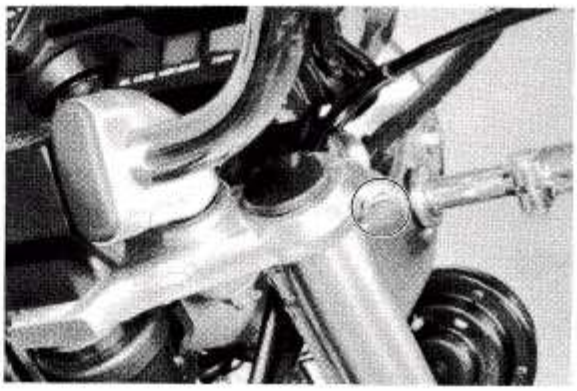


Removal and Disassembly

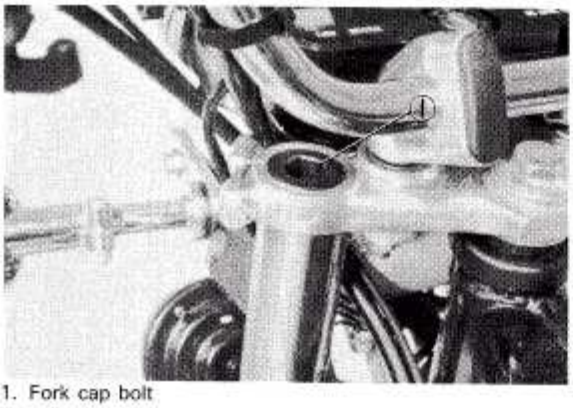
WARNING:

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

1. Disconnect the speedometer cable. Remove the brake caliper and the front wheel. Remove the front fender.
2. Loosen the front fork pinch bolts at the steering crown.

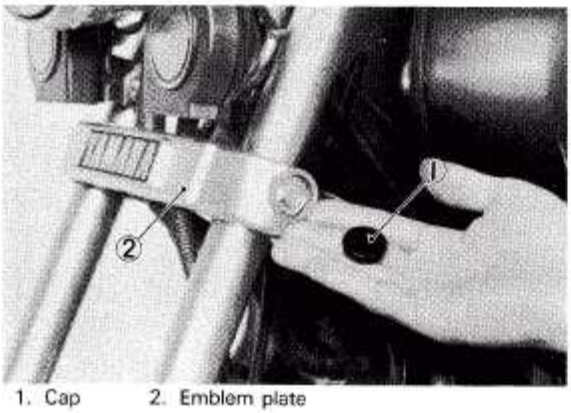


3. Remove the cap and fork cap bolt from each inner fork tube.



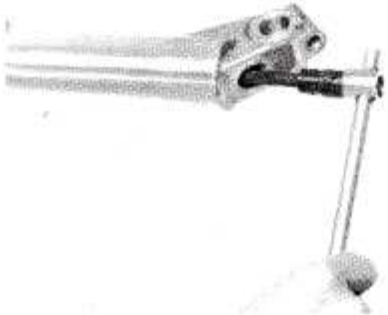
1. Fork cap bolt

4. Place an open container under each drain hole. Remove the drain screw from each outer tube.
5. Remove the emblem plate from the under bracket.



1. Cap 2. Emblem plate

6. Loosen the pinch bolts on the under bracket, and remove the fork(s).
7. Remove the collar, spring seat, and fork spring. Remove the cylinder securing bolt from the bottom of the fork assembly. Hold the damper rod with the front-fork-cylinder holder. Remove the damper rod assembly and inner fork tube.

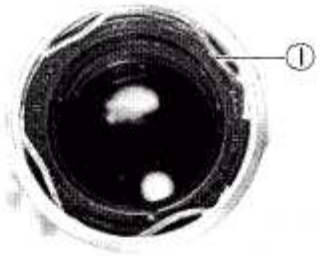


8. Remove the dust seal from the outer fork tube with a screwdriver. Be careful not to scratch the inner fork tube surface.



1. Dust seal

9. Remove the retaining clip from the outer fork tube, and pry out the fork seal. Be careful not to damage the fork tube surface.



1. Retaining clip



1. Oil seal

Inspection

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

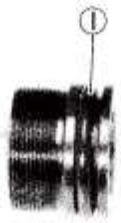
WARNING:

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

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

Fork spring free length limit:
470.5 mm (18.52 in)

5. Check the O-ring on the cap bolt. If it's damaged, replace it.



1. O-ring

Assembly

1. Make sure all components are clean before assembly. Always install a new fork seal. Do not reuse a seal.
2. Apply oil to the fork seal, and install the fork seal by pressing it in with a large socket. Install the retaining clip.
3. Install the dust seal into the outer fork tube.
4. Install the damper rod assembly into the inner fork tube. Hold the damper rod with the fornt fork cylinder holder.
5. Put the taper spindle on the damper rod.
6. Hold the inner fork tube, and carefully install the outer fork tube over the taper spindle.
7. Apply Loctite® (red) to the cylinder securing bolt, and install the bolt and a copper washer into the outer fork tube. Torque the bolt to specification.

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

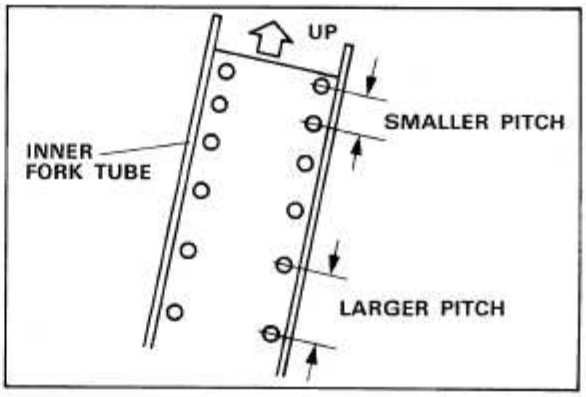
8. Pour the specified amount of fork oil into the inner fork tube.

Fork oil capacity:
296 cm^3 (10.4 Imp oz, 10.0 US oz)
Fork oil level: 421 mm (16.6 in)
(From top of inner tube fully compressed without spring.)
Recommended oil:
Yamaha fork oil 10 wt or equivalent

9. Install the fork spring, spring seat, collar and cap bolt with a new O-ring into the inner fork tube. Finger tighten the cap bolt.

NOTE:

The fork spring must be installed with the smaller pitch side facing upward as shown.



10. Install the fork into the brackets. Make the top of the inner fork tube level with the top of the steering crown.



11. Tighten the pinch bolts at the under bracket. Torque the bolt to specification.

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

12. Tighten the cap bolt to specification, use the special tool.

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



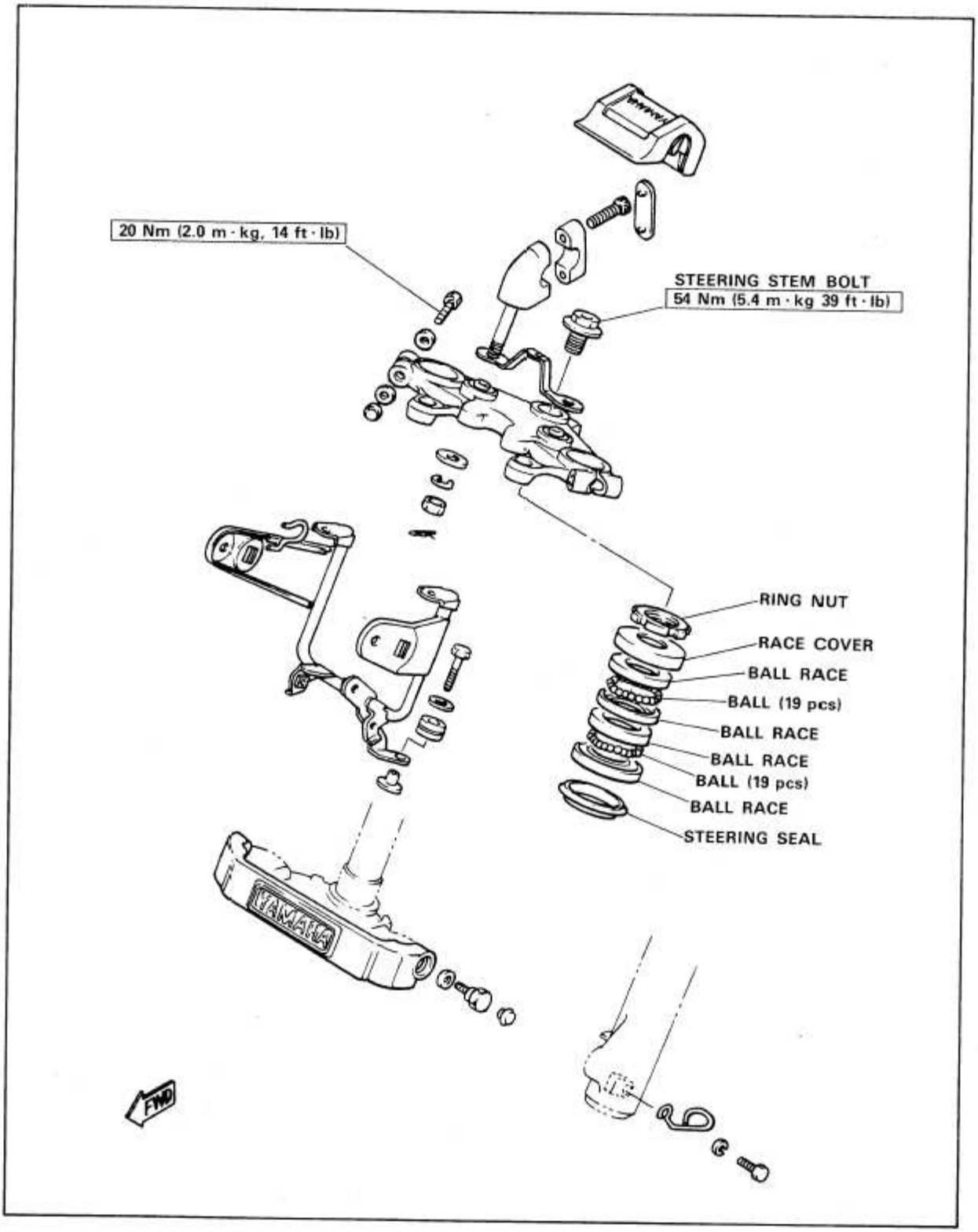
1. Fork cap bolt

13. Tighten the pinch bolt at the steering crown. Torque the bolt to specification.

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

14. Install the emblem plate onto the under bracket.
15. To install the front wheel, reverse the removal procedure.
    Refer to "FRONT WHEEL" on page 5-1.

STEERING HEAD

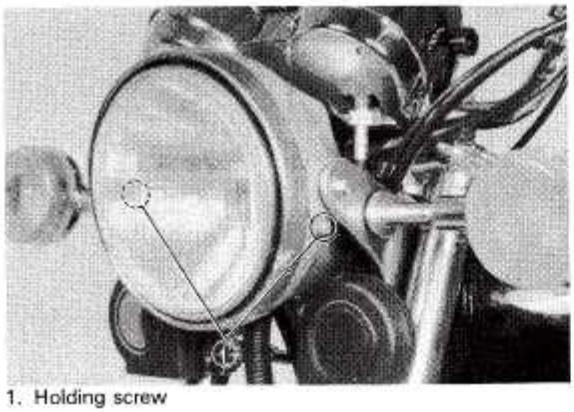


Adjustment

Refer to "Assembly" for steering head adjustment procedures.

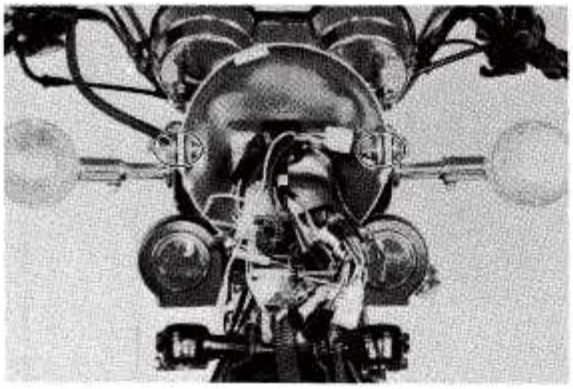
Removal

1. Place the motorcycle on its centerstand.
2. Remove the side covers, seat, and fuel tank.
3. Remove the front wheel and front forks.
4. Remove the headlight lens unit, and disconnect all wiring connectors in the headlight shell.

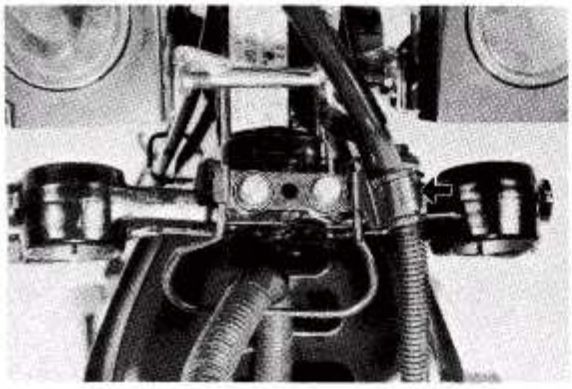


1. Holding screw

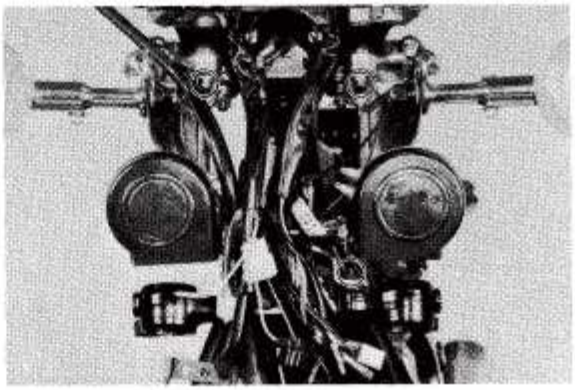
5. Remove the headlight body.



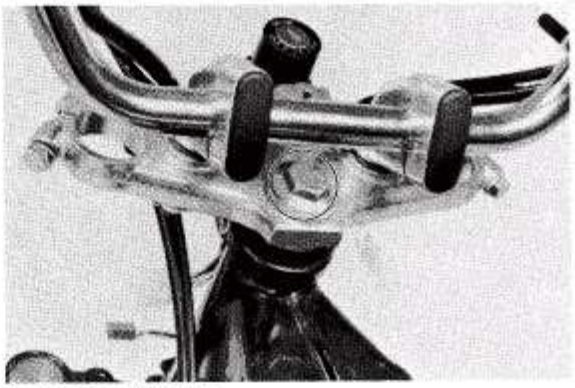
6. Disconnect the brake hose from the hose clamp. Then remove the wireharness guide securing bolts from the lower bracket.



7. Remove the headlight body bracket securing bolt and nuts. Remove the meter assembly and the headlight body bracket.



8. Remove the steering stem bolt, and remove the steering crown with the handlebar together.



1. Steering stem bolt

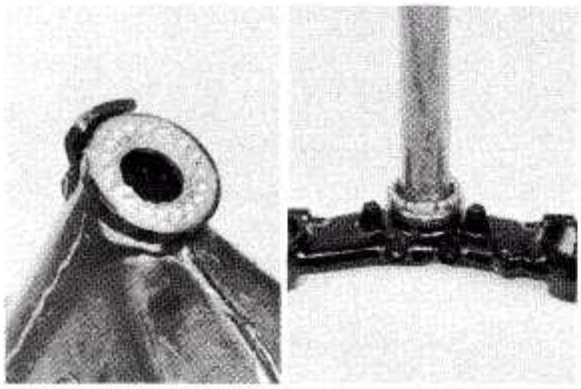
9. Support the steering stem, and remove the ring nut.



1. Ring nut wrench

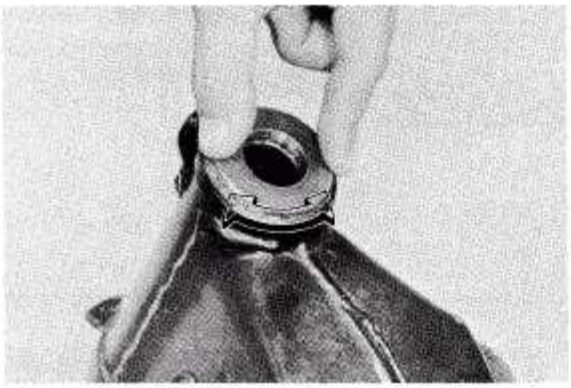
10. Remove the bearing cover, top bearing race, and all of the balls from the bearing. Remove the steering stem and lower balls.

Ball quantity (upper and lower): 19 pcs.



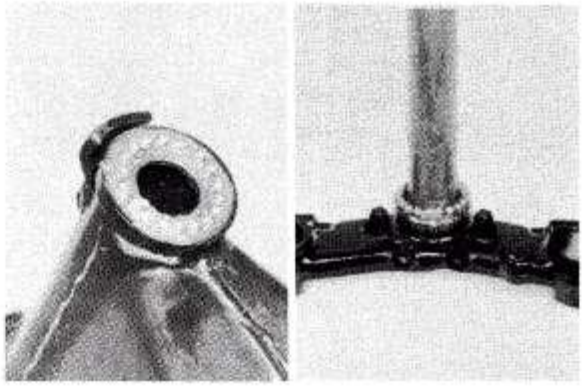
Inspection

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 the balls are replaced.
3. Clean and inspect the bearing races. Spin the bearings by hand. If the bearings are not smooth in their operation, replace balls and races.



Assembly

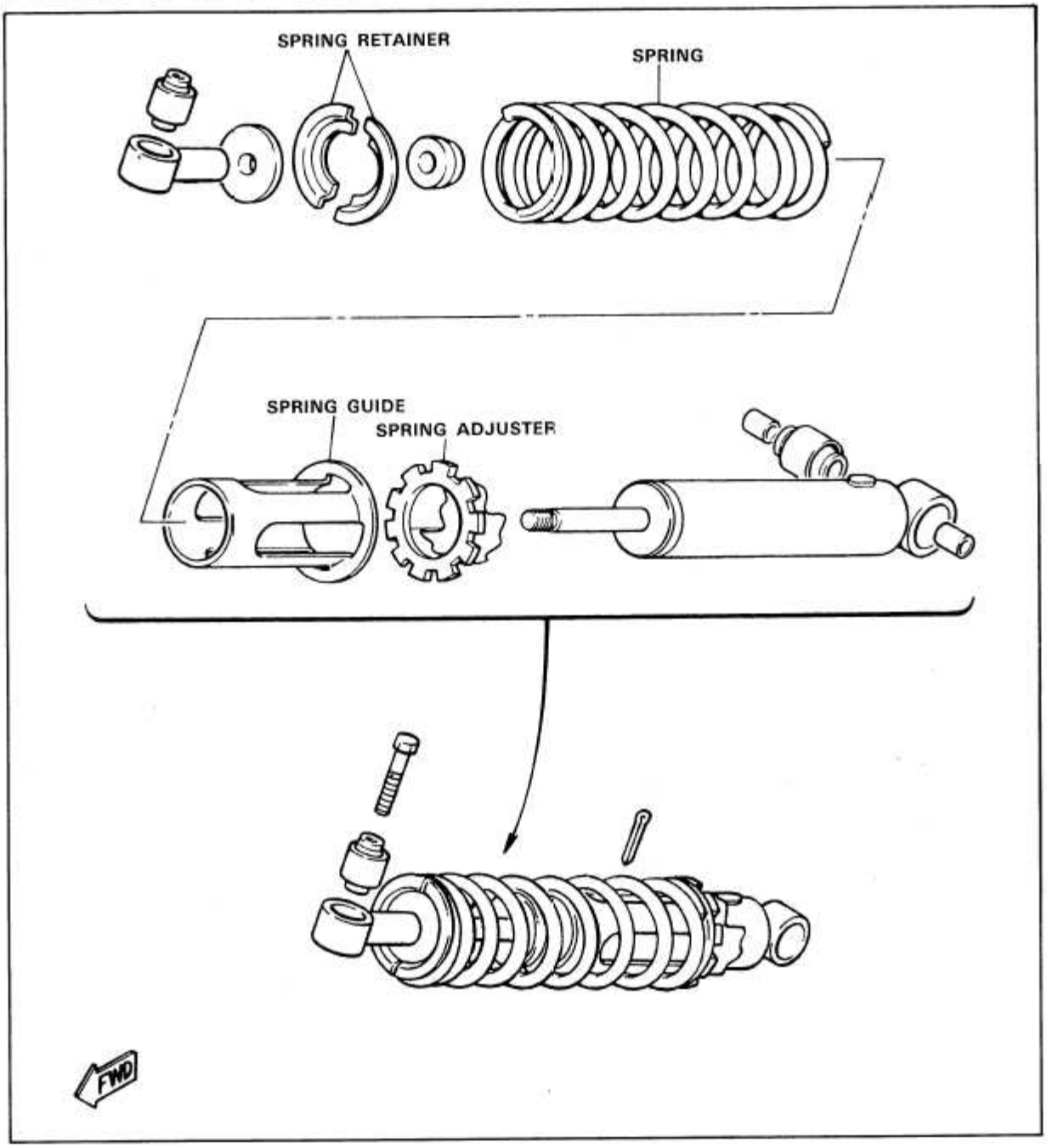
1. Grease the bearings and races with wheel bearing grease.



2. Install the steering stem, balls, and races.
3. Install the ring nut. Tighten it to approximately 20 Nm (2.0 m · kg, 14 ft · lb) and loosen it approximately 1/4 turn.
4. Continue assembly; reverse the disassembly procedure.
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 tightness of the steering stem.

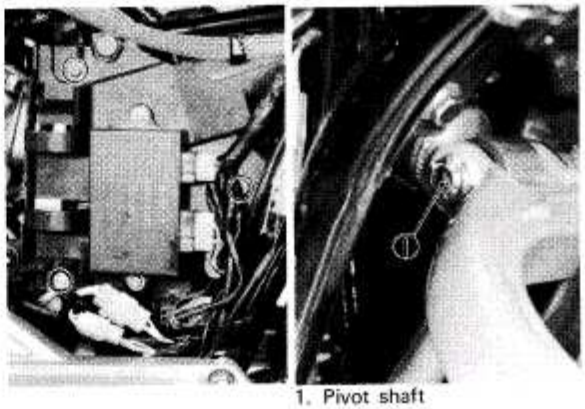
TIGHTENING TORQUE:
Steering crown pinch bolt:
20 Nm (2.0 m · kg, 14 ft · lb)
Under bracket pinch bolt:
20 Nm (2.0 m · kg, 14 ft · lb)
Steering stem bolt:
54 Nm (5.4 m · kg, 39 ft · lb)

REAR SHOCK ABSORBER



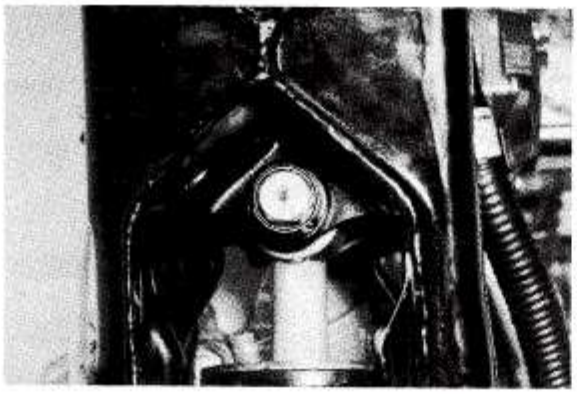
Removal

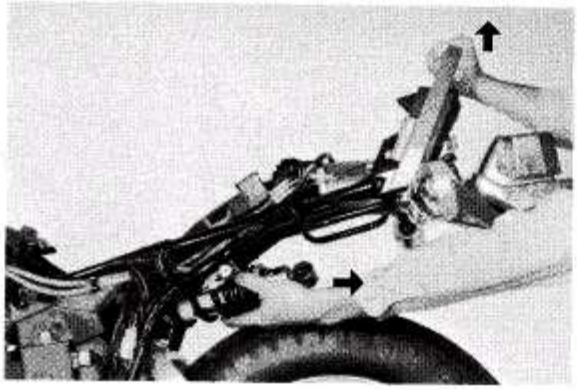
1. Remove the side covers, seat, and fuel tank.
2. Remove the T.C.I. unit bracket and rear frame securing bolt and nut from each muffler bracket.
3. Remove the cotter pin from the pivot shaft, drive out the shock absorber pivot shaft, and disconnect the shock absorber from the swingarm.



1. Pivot shaft

4. Remove the shock absorber mounting bolt, lift up the rear of the motorcycle, and remove the shock absorber from the frame by carefully pulling it towards the rear of the motorcycle.





5. Compress the spring and remove the spring seats.

NOTE:

The spring should be compressed as little as possible and handled with special care.

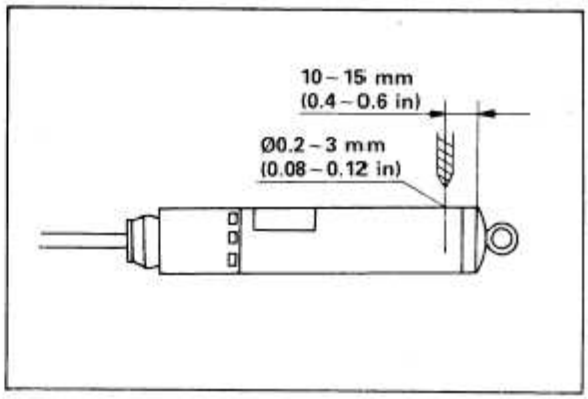
6. Remove the spring, spring guide, spring adjuster, and damper sub-assemblies from the shock absorber.

Inspection

Visually inspect the shock absorber for oil leaks. If you notice any signs of an oil leak, replace the entire shock absorber.

Notes on Disposal

Gas pressure must be released before disposing of the shock absorber. To do so, drill a 2 ~ 3 mm (0.08 ~ 0.12 in) hole through the cylinder wall at a point 10 ~ 15 mm (0.4 ~ 0.6 in) above the bottom of the cylinder.



CAUTION:

Always wear a proper eye protection to prevent eye damage from escaping gas and/or metal chips.

Installation and Adjustment

1. To install the shock absorber in the motorcycle, reverse the removal procedures.

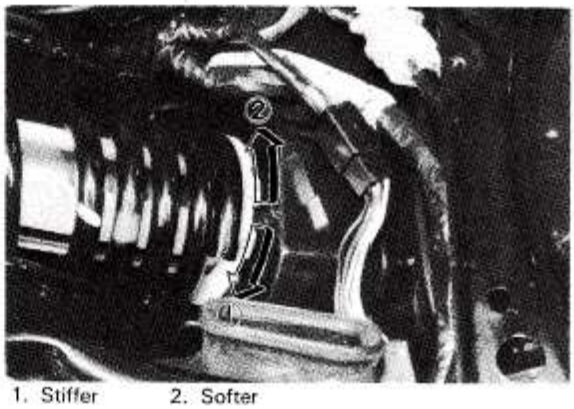
TIGHTENIG TORQUE:
Shock absorber mount bolt:
45 Nm (4.5 m · kg, 32 ft · lb)

WARNING:

Always use a new cotter pin on the pivot shaft.

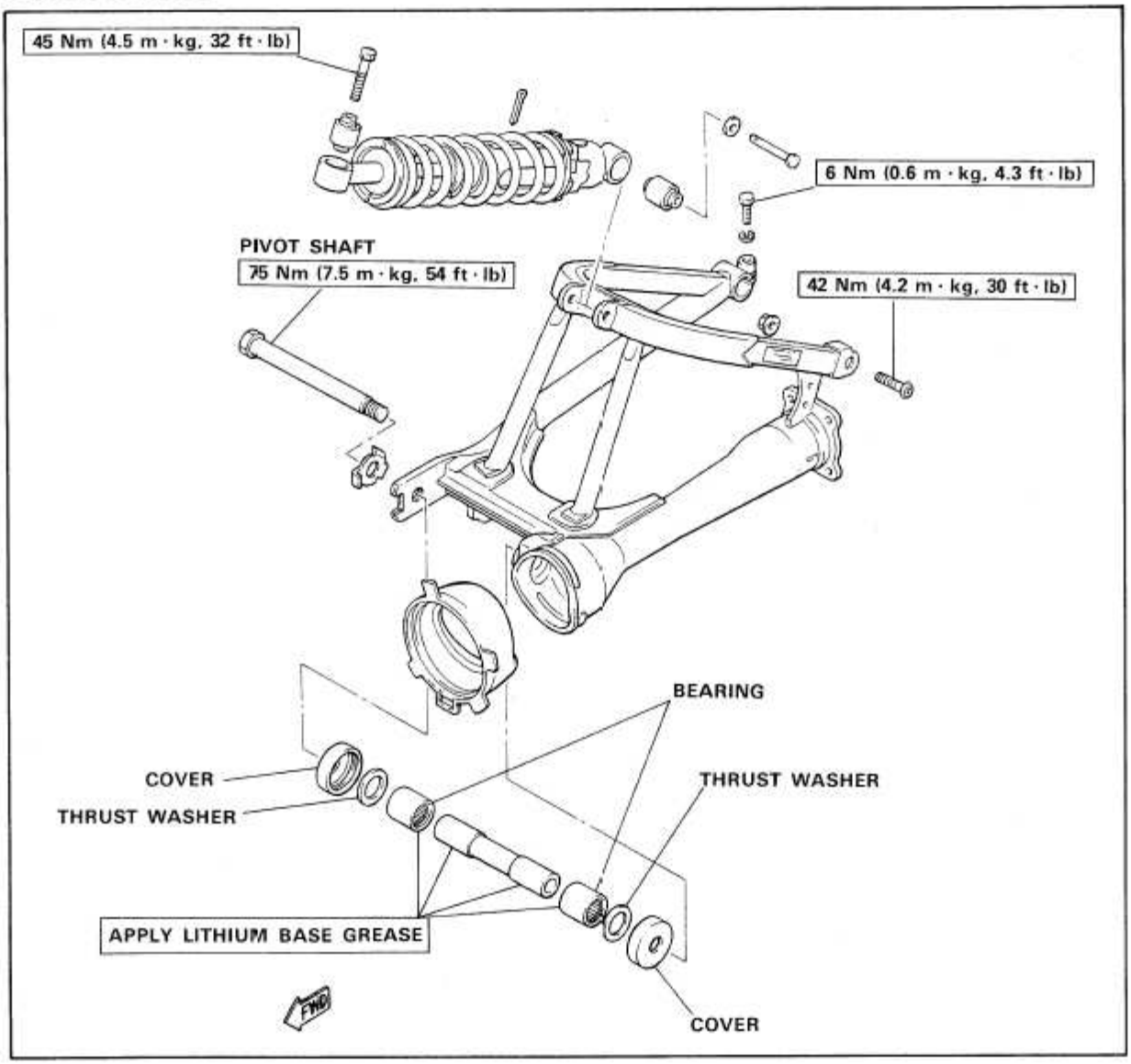
2. Turn the adjuster to the standard setting (the setting with the slot).

	Hard			STD	Soft	
Adjusting position	6	5	4	3	2	1



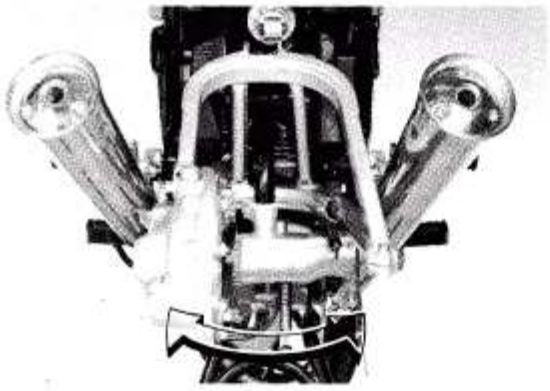
1. Stiffer 2. Softer

SWINGARM

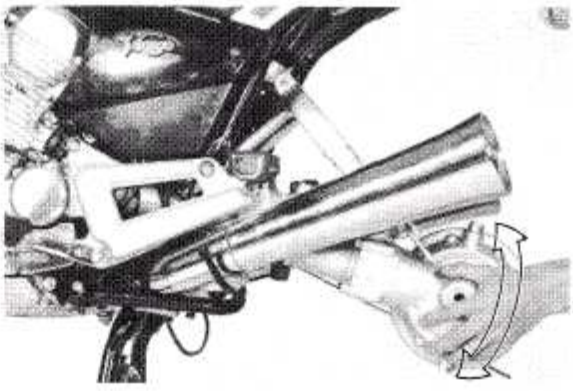


Free Play Inspection

1. Remove the rear wheel and the shock absorber pivot shaft. Grasp the swingarm and try to move it from side to side as shown. There should be no noticeable side play.

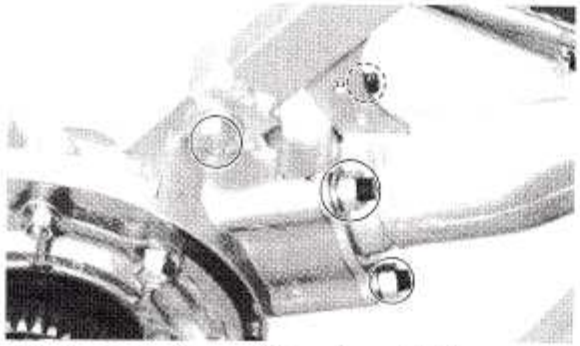


2. The swingarm is mounted on needle bearings. Move the swingarm up and down as shown. The swingarm should move smoothly, without tightness, binding, or rough spots that could indicate damaged bearings.

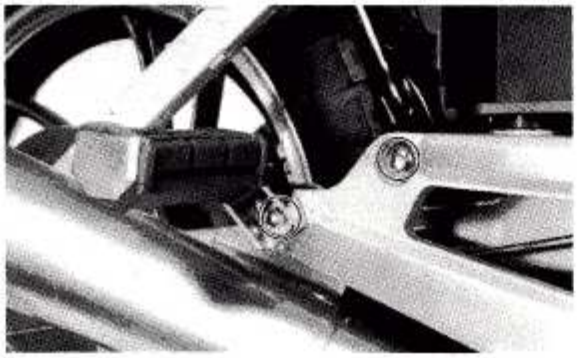


Removal

1. Remove the rear wheel, seat, side covers, and fuel tank.
2. Remove the final gear assembly and the dirve shaft from the swingarm.

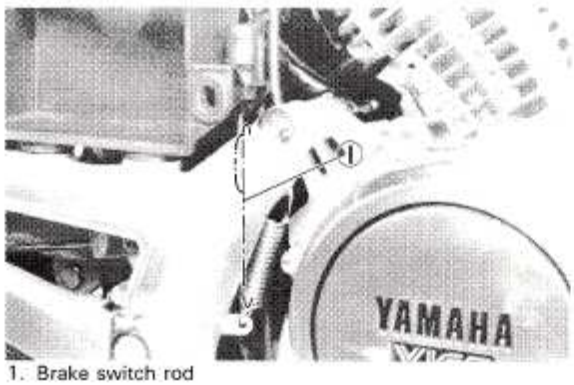


3. Loosen the muffler clamp bolts.
4. Remove the passenger footrests and the muffler.
5. Remove the brake rod from the brake arm.
6. Remove the nuts and bolts shown in the photograph, and remove the front right-side footrest and the right-side muffler bracket.



NOTE:

Be sure to disconnect the brake switch rod from the brake pedal return spring before completly removing the right-side muffler bracket from the frame.



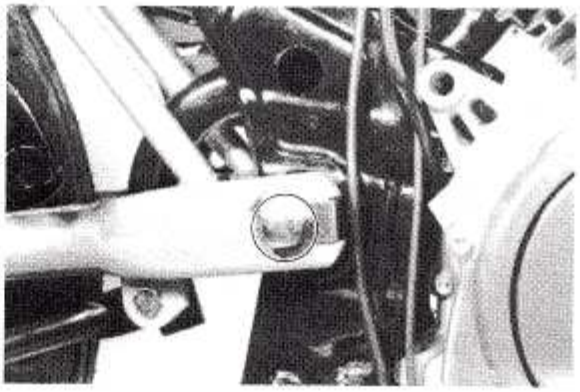
1. Brake switch rod

7. Remove the cotter pin from the swingarm, drive out the shock absorber pivot shaft, and disconnect the shock absorber from the swingarm.



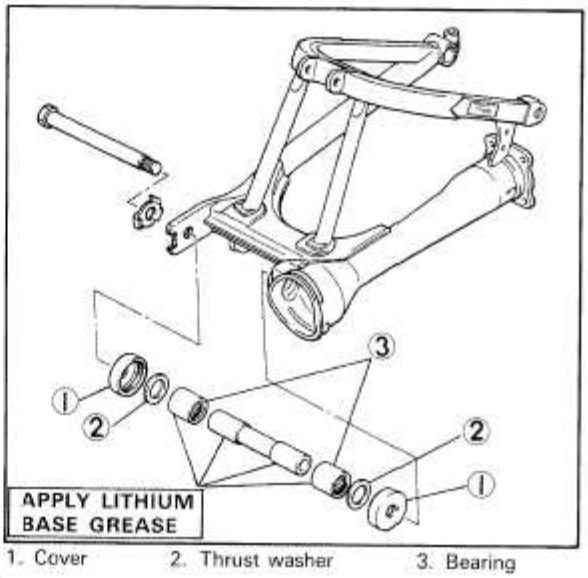
1. Pivot shaft

8. Remove the swingarm pivot bolt, and remove the swingarm.



Inspection and Lubrication

1. Remove the bearing caps. Inspect the bearings for pitting or other damage. Make sure that the bearings roll freely. If a bearing is damaged, it should be replaced.



1. Cover 2. Thrust washer 3. Bearing

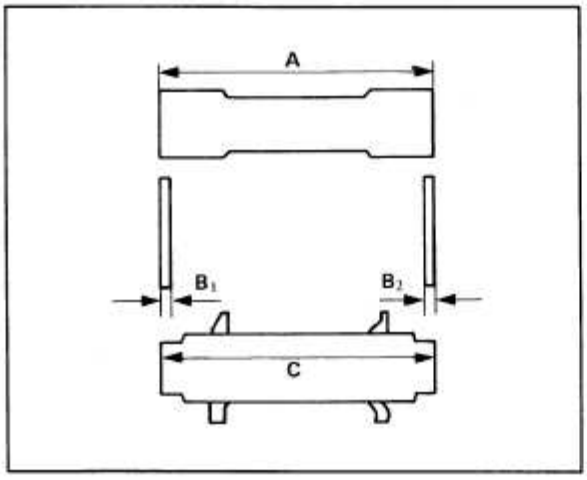
NOTE:

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

2. If the inner seals of the bearing caps are damaged, replace the bearing caps.
3. Examine the rubber boot for damage. Replace it if it's damaged.



4. Measure the length of the bushing (A), the thickness of each thrust washer (B_1 and B_2), and the length of the swingarm mounting bracket (C) in the lower frame member.



5. Calculate the swingarm side clearance by using the formula given below:
   Side clearance = $A-(B_1+B_2+C)$
6. If the side clearance is not within specification, adjust the clearance by installing a new thrust washer(s) of appropriate thickness. Recheck the side clearance.

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

Assembly

1. Assemble the swingarm by reversing the removal procedures. Use a new lock washer, and torque the swingarm pivot bolt to specification.

TIGHTENING TORQUE:
75 Nm(7.5 m · kg, 54 ft · lb)

WARNING:

Always use with a new cotter pin in the pivot shaft.

CABLES AND FITTINGS

Cable Maintenance

NOTE:

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

WARNING:

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

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

NOTE:

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

Throttle Maintenance

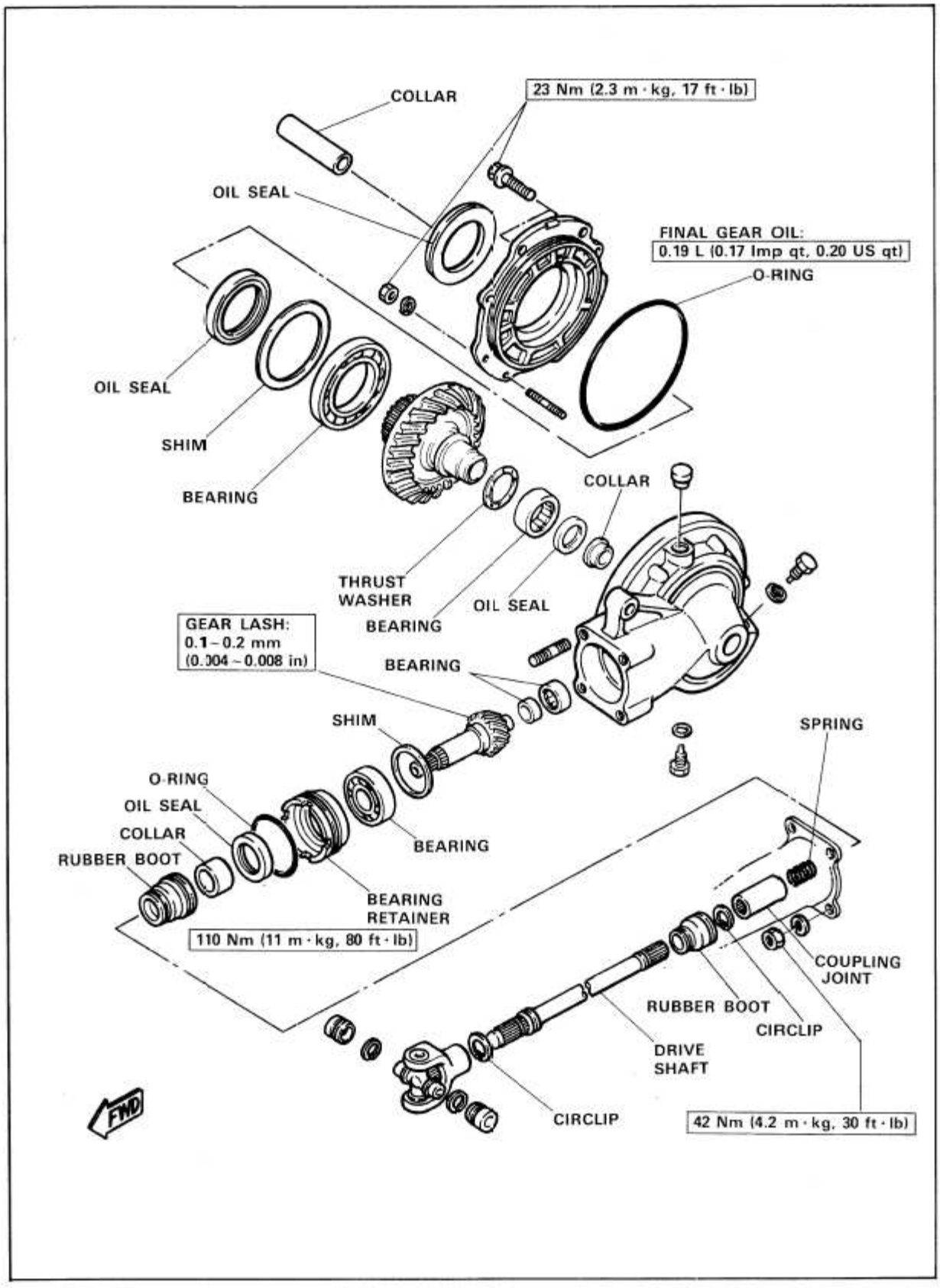
1. Remove the phillips head screws from the throttle housing assembly and separate the two halves of housing.
2. Disconnect the cable end from the throttle grip assembly, and remove the grip assembly.
3. Wash all parts in a mild solvent, and check all contact surfaces for burrs or other damage. (Also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

NOTE:

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

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

SHAFT DRIVE


COLLAR
23 Nm (2.3 m · kg, 17 ft · lb)
OIL SEAL
FINAL GEAR OIL:
0.19 L (0.17 Imp qt, 0.20 US qt)
O-RING
OIL SEAL
SHIM
BEARING
COLLAR
THRUST WASHER
OIL SEAL
BEARING
GEAR LASH:
0.1 – 0.2 mm
(0.004 – 0.008 in)
BEARING
SHIM
SPRING
O-RING
OIL SEAL
COLLAR
RUBBER BOOT
BEARING
BEARING RETAINER
110 Nm (11 m · kg, 80 ft · lb)
COUPLING JOINT
RUBBER BOOT
CIRCLIP
DRIVE SHAFT
CIRCLIP
42 Nm (4.2 m · kg, 30 ft · lb)
FWD

Troubleshooting

The following conditions may indicate damaged shaft drive components:

Symptoms	Possible Damaged Areas
1. A pronounced hesitation or "jerky" movement during acceleration, deceleration, or sustained speed. (This must not be confused with engine surging or transmission characteristics.) 2. A "rolling rumble" noticeable at low speed; a high-pitched whine; a "clunk" from a shaft drive component or area.	A. Damage to bearings. B. Improper gear lash. C. Gear tooth damage.
3. A locked-up condition of the shaft drive mechanism; no power transmitted from engine to rear wheel.	D. Broken drive-shaft. E. Broken gear teeth. F. Seizure due to lack of lubrication. G. Small foreign object lodged between moving parts.

NOTE:

Damage areas A, B, and C above may be extremely difficult to diagnose. The symptoms are quite subtle and difficult to distinguish from normal motorcycle operating noise. If there is reason to believe these components are damaged, remove the components for specific inspection.

Inspection notes:

1. During coasting, accelerating, or decelerating, the "rolling rumble" will increase with rear wheel speed, not engine or transmission gear speeds. However, such noise may also be due to damaged wheel bearings.
2. Noise that varies with acceleration and deceleration: following incorrect reassembly, a condition of too-little gear lash may produce a whine during deceleration.

CAUTION:

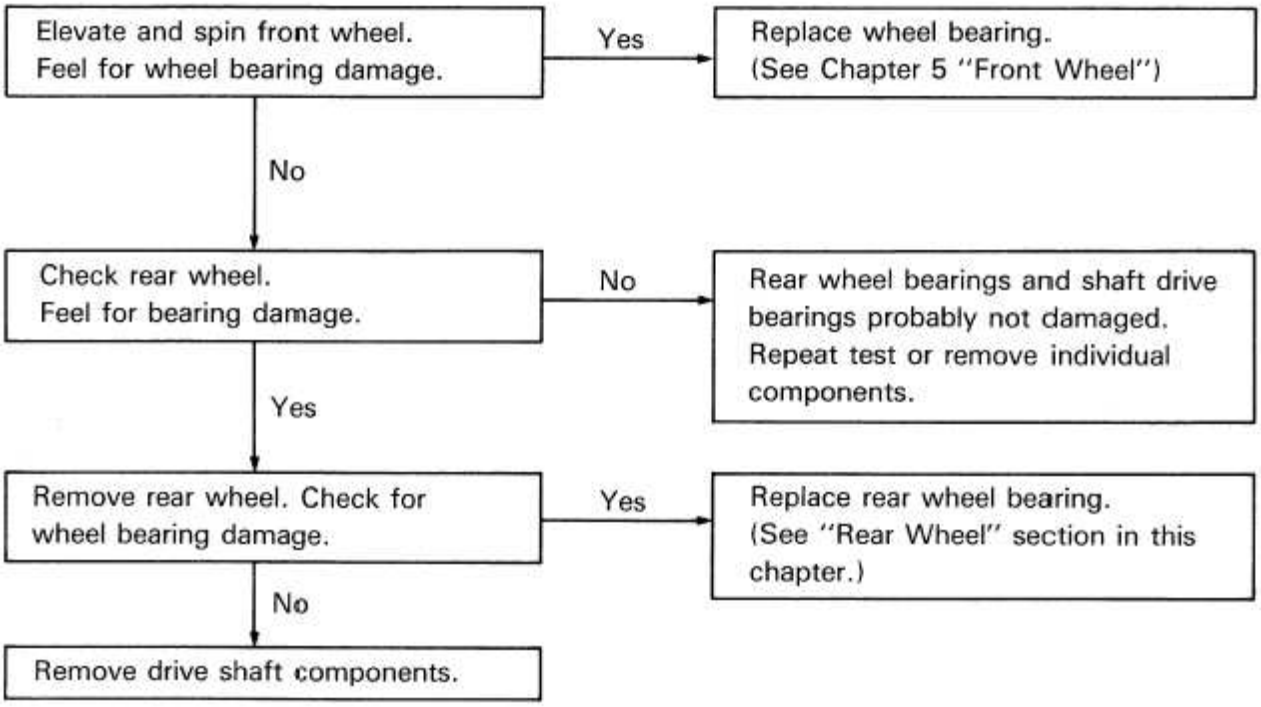
Too-little gear lash is extremely destructive to the gear teeth. If a test ride following reassembly indicates this condition, stop riding immediately to minimize damage to the gears.

3. A slight "thunk" must be distinguished from normal motorcycle operation. It will be most noticeable at low speed and could indicate broken gear teeth.

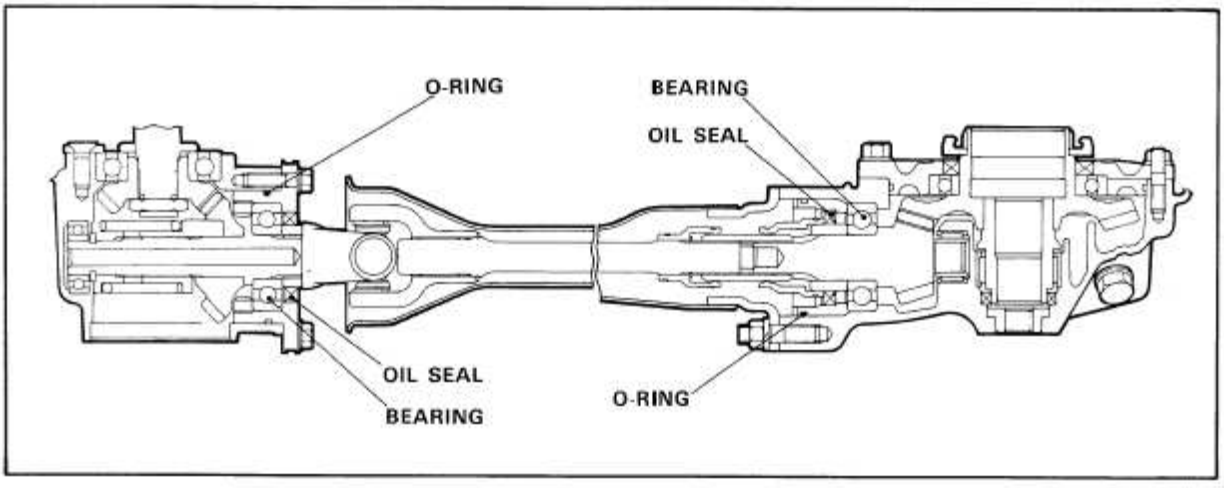
WARNING:

If broken gear teeth are suspected, stop riding immediately. This condition could lead to locking-up of the shaft drive assembly and result in harm to a rider.

4. Troubleshooting chart
Where basic conditions "1" and "2" above exist, consider the following chart:



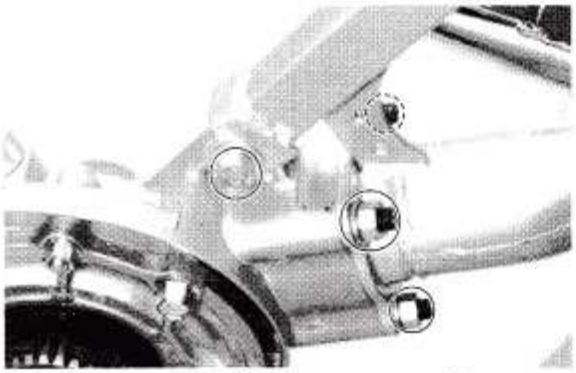
5. Oil leak inspection
if a shaft drive component is suspected of leaking oil, first thoroughly clean the entire motorcycle. The apparent location of an oil leak on a dusty motorcycle may be misleading. Dry the motorcycle and apply a leak-localizing compound or a dry-powder spray that will limit the flow of any leaking oil. Operate the motorcycle prepared in this way for the distance necessary to locate precisely the leak. There are the possibilities that a component housing may have been damaged by road debris or an accident, or a gasket or a seal may be cracked or broken. However, on a new or nearly new motorcycle, an apparent oil leak may be the result of a rust-preventive coating or excessive assembly lubrication of the seals. Always clean the motorcycle and recheck the suspected location of any apparent leakage.



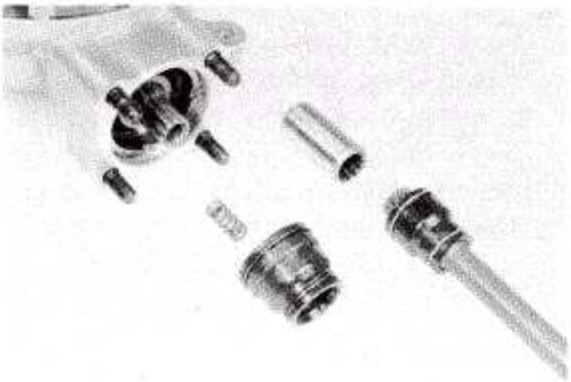
6. Checking drained oil
   Whenever a problem is suspected in either the middle or final gear assemblies, drain and inspect the oil. Metal particles on the drain plug or in the oil could indicate a bearing seizure or other problem. However, a small amount of metal particles in the oil is normal.

Final Gear Removal

1. Remove the rear axle and the rear wheel (see "REAR WHEEL" section in this Chapter).
2. Remove the four nuts and one bolt holding the final drive unit to the swingarm.



3. Remove the final gear assembly.
4. Remove the drive shaft, coupling joint, spring, and rubber boots from the final-drive-shaft.

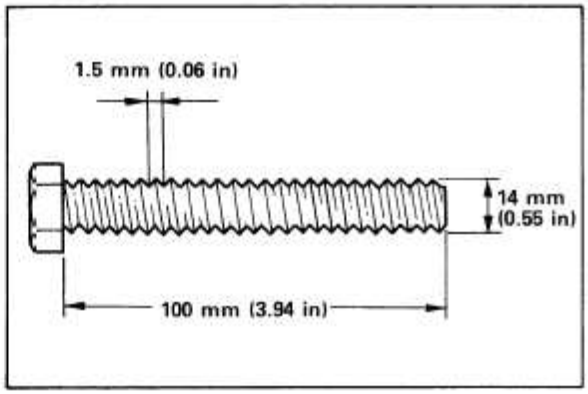


Gear Lash Check and Adjustment

1. Remove the drain plug from the final gear cose and drain the oil.
2. Secure the gear case in a vise or other support.
3. Install a specified size of bolt (as shown) into the drain plug hole. Finger-tighten the bolt until it holds the ring gear.

NOTE:

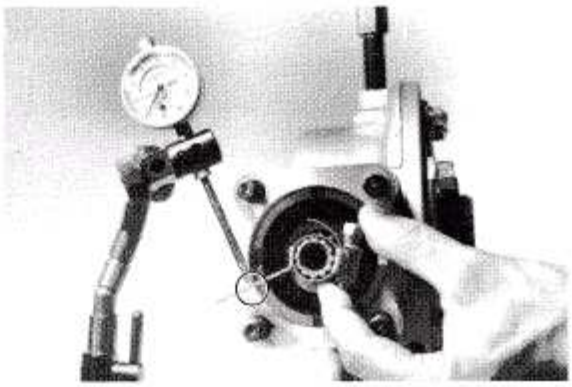
The bolt should not be over tightened, finger tight is sufficient.



4. Install the final gear lash measurement tool on the drive shaft.

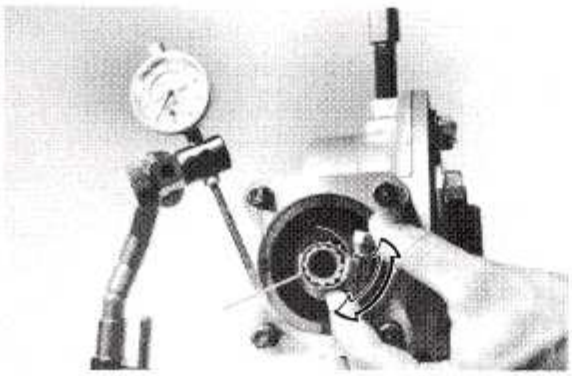


5. Mount a dial gauge against the lash measurement tool at the scribed mark.

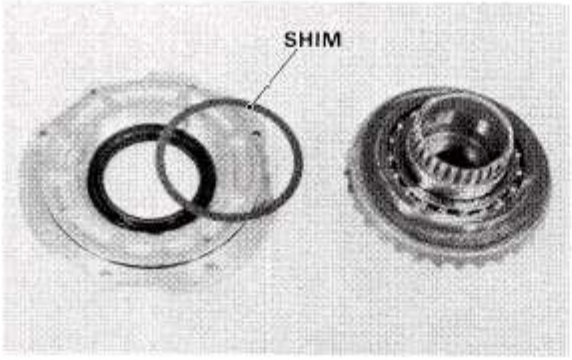


6. Gently rotate the measurement tool back and forth. Note the lash measurement on the dial gauge.

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



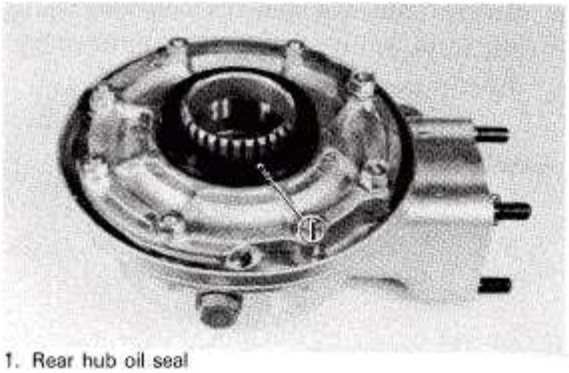
7. If the gear lash exceeds the specified limits, adjust as follows:
- To reduce gear lash, increase the ring gear shim.
- To increase gear lash, reduce the ring gear shim.



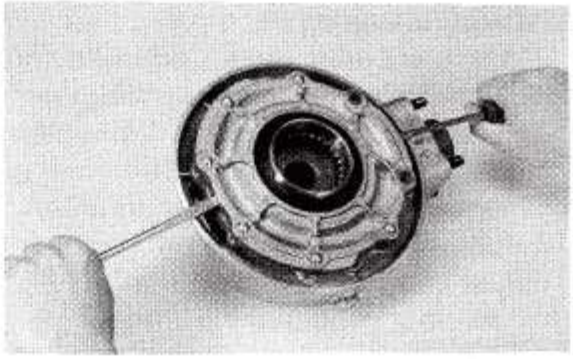
- If it is necessary to increase the ring gear shim by more than 0.1 mm (0.004 in), reduce the thrust washer thickness by 0.1 mm (0.004 in) for each 0.1 mm (0.004 in) of ring-gear-shim increase. If it is necessary to reduce the shim by more than 0.1 mm (0.004 in), reverse the above procedure.

Final Gear Disassembly

1. Remove the rear hub oil seal.
2. Remove the nuts and bolts holding the bearing housing.
3. Remove the ring gear assembly and thrust washer from the final gear case.



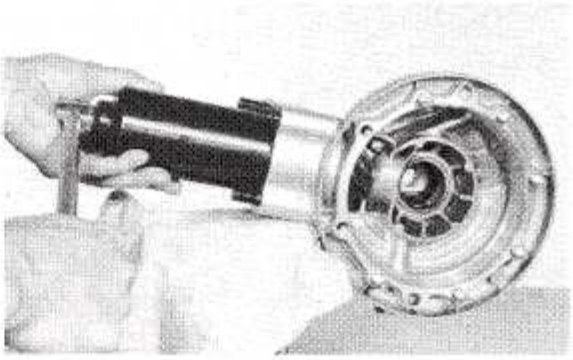
1. Rear hub oil seal



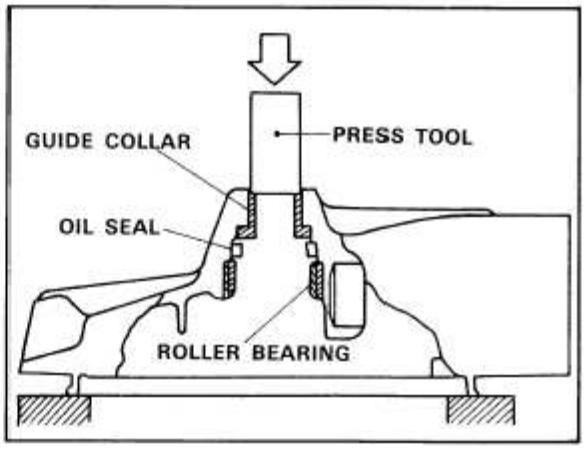
4. Remove the final-drive-shaft-bearing retainer with the final-drive-shaft-bearing-retainer wrench. Remove the final drive shaft from the final gear case.

CAUTION:

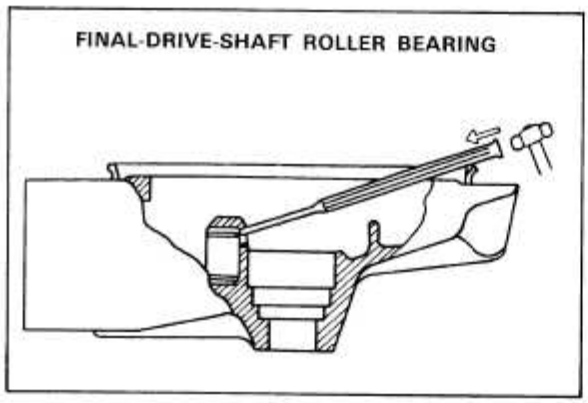
The final-drive-shaft-bearing-retainer nut has left-hand threads. Turn the retainer nut clockwise to loosen it.



5. Remove the guide collar, oil seal, and roller bearing from the main housing by using an appropriate press tool and a press. Use the appropriate supports for the main housing during this operation. The roller bearing may be reused if undamaged. Do not reuse the oil seal.



6. Final-drive-shaft roller bearing; removal of this bearing is difficult and seldom necessary. Heat the bare housing to 150°C (302°F). Use an appropriately shaped punch to remove the roller bearing outer race. Remove the inner race from the final drive shaft.

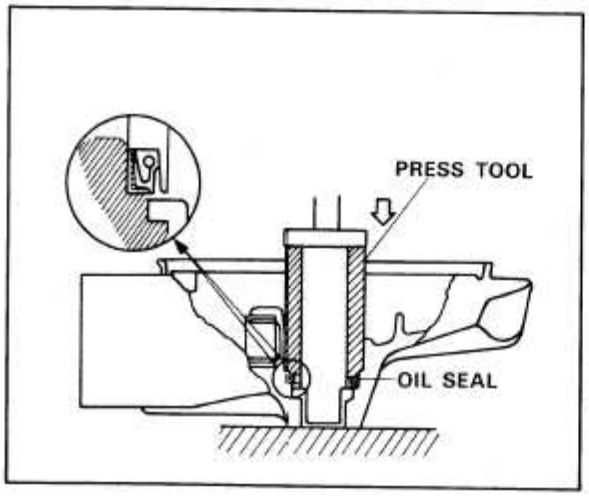


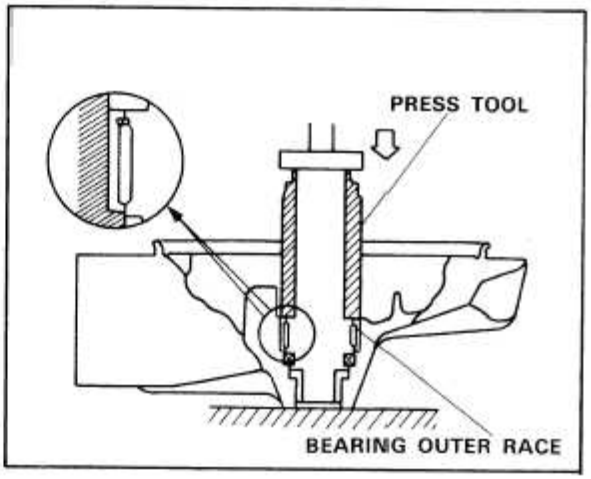
Final Gear Assembly

1. Install the new rear final-drive-shaft roller bearing. Heat the bare bearing to 150°C (302°F), and use an appropriate adapter to install the roller bearing outer race. Install the inner race onto the final drive shaft.
2. Using an appropriate press tool and a press, install the guide collar, new oil seal, and roller bearing into the main housing in that order.

NOTE:

The removed roller bearing can be used if undamaged; however, we recommend replacement with a new one.



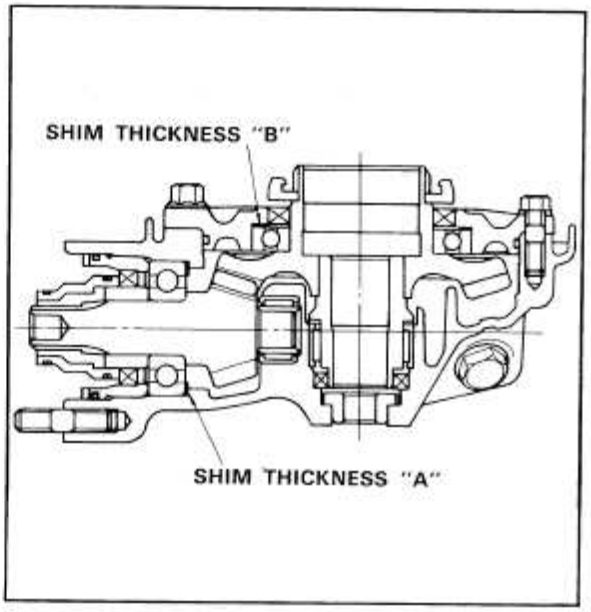


3. Final drive/ring gear positioning.

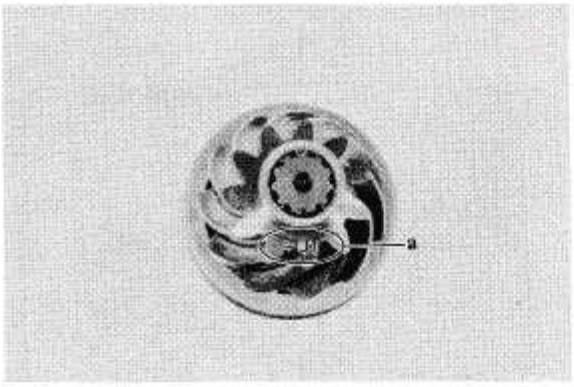
NOTE:

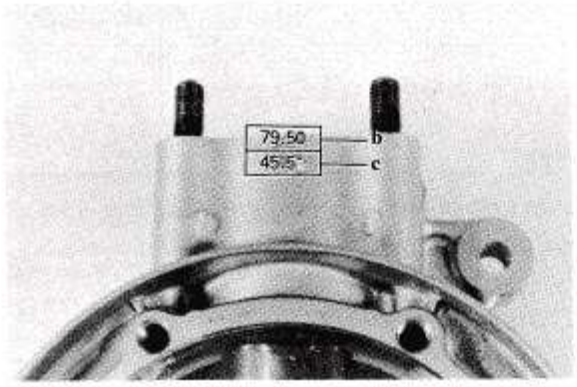
When any of the following parts are replaced, gear positioning is necessary:

- Final gear case
- Ring gear bearing housing
- Bearing(s)



a. The shim thickness "A" necessary for the final-drive-shaft gear positioning can be calculated from the information found on the final gear case and on the drive gear end.





To find shim thickness "A" use the following formula:

A = a − b

Where:

a = a numeral (usually a decimal number) on the gear is either added to or subtracted from 80.

b = a numeral on the gear case (i.e. 79.50).

Example:
If the final-drive-shaft gear is marked "+01"...."a" is 80.01.
If the gear case is marked "79.50" "b" is 79.50

A = 80.01 − 79.50
A = 0.51

Then the necessary shim thickness is 0.51 mm (0.020 in)
Shim sizes are supplied in the following thicknesses:
0.15 mm (0.006 in), 0.30 mm (0.012 in), 0.40 mm (0.016 in), 0.50 mm (0.020 in), 0.60 mm (0.024 in)

Because the shims can only be selected in 0.05 mm (0.0020 in) increments, round off the hundredths digit and select the appropriate shim(s).

Hundredths	Round value
0, 1, 2	0
3, 4, 5, 6, 7	5
8, 9	10

In the example above, the calculated shim thickness is 0.51 mm (0.0200 in). The chart instructs you, however, to round off the 1 to 0. Thus you should use a 0.50 mm (0.020 in) shim.

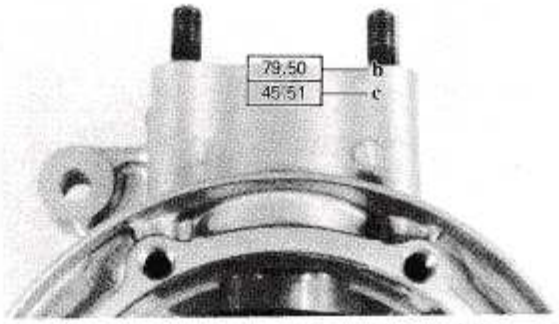
b. The shim thickness "B" necessary for the ring gear positioning can be calculated from the information found on the final gear case, ring gear, and bearing.

To find shim thickness "B" use the following formula:

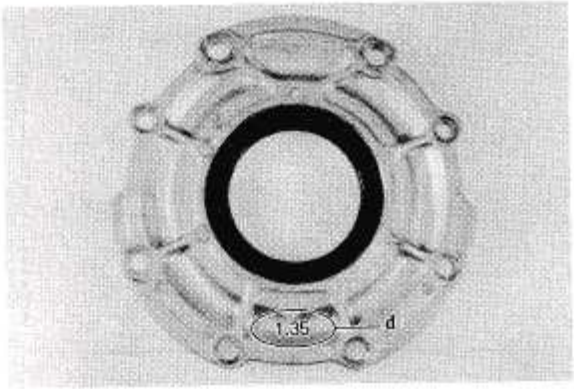
B = c + d − (e + f)

Where:

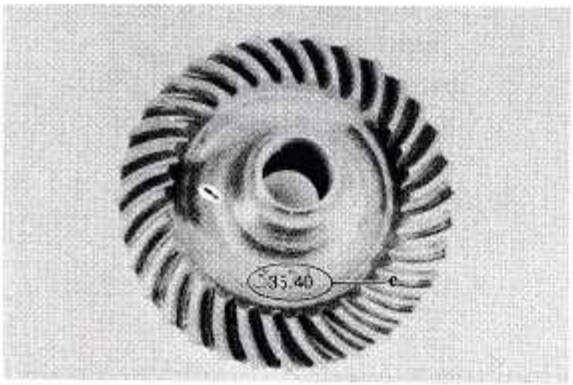
c = the numeral on the gear case (i.e. 45.51)



d = a numeral on the outside of the ring gear bearing housing (i.e. 1.35)



e = a numeral (usually a decimal number) on the inside of the ring gear either added to or subtracted from 35.40.



f = a bearing thickness (considered constant).

Bearing thickness "f" =
11.00 mm (0.43 in)

Example:

- If the gear case is marked "45.51" .... "c" is 45.51
- If the ring gear bearing housing is marked "1.35" .... "d" is 1.35
- If the ring gear is marked "−05" or "−0.05" "e" is 35.40 − 0.05 = 35.35
- "f" is 11.00

B = c + d − (e + f)
B = 45.51 + 1.35 − (35.35 + 11.00)
B = 46.86 − 46.35
B = 0.51

Then the necessary shim thickness is 0.50 mm (0.020 in)

Shim size are supplied in the following thickness:

0.25 mm (0.010 in), 0.30 mm (0.012 in), 0.35 mm (0.014 in), 0.40 mm (0.016 in), 0.45 mm (0.018 in), 0.50 mm (0.020 in)

NOTE:

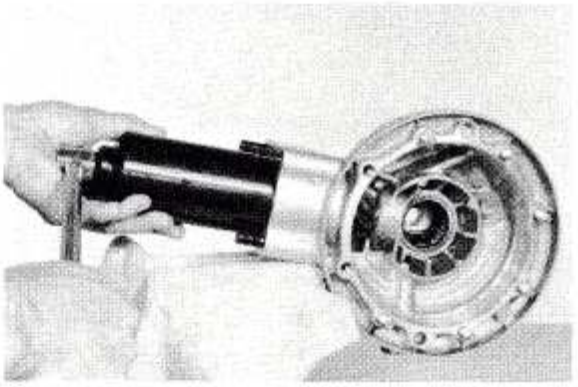
Use the chart for the final-drive-shaft shim to select the ring gear shim size.

4. Install the fial-drive-shaft gear with the proper size shim(s), and secure it with the bearing retainer nut. Use the final-drive-shaft-bearing-retainer wrench.

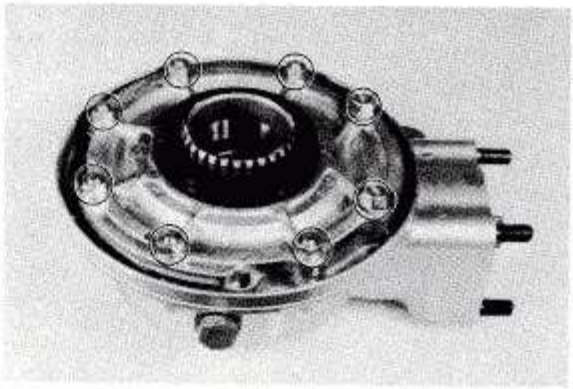
NOTE:

The bearing retainer nut has left-hand threads; turn the nut counterclockwise to tighten it.

TIGHTENING TORQUE:
110 Nm (11 m · kg, 80 ft · lb)



5. Install the ring gear assembly without the thrust washer. Adjust the gear lash (refer to "Gear Lash Check And Adjustment").
6. Place four pieces of Plastigage® between the originally fitted thrust washer and the ring gear.
7. Install the gear case onto the ring gear assembly, and tighten the nuts and bolts with the specified torque.



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

NOTE:

Do not turn the drive pinion/ring gear when measuring clearance with Plastigage® .

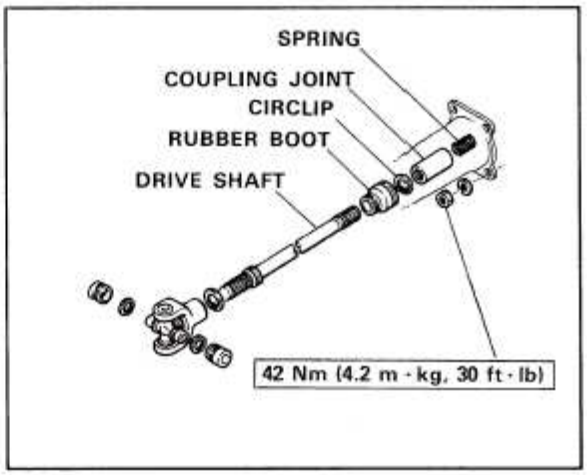
8. Remove the ring gear assembly and determine the clearance by measuring the width of the flattened Plastigage®



Ring gear thrust clearance:
0.1 ~ 0.2 mm (0.004 ~ 0.008 in)

9. If the clearance exceeds the specified value, replace the thrust washer to obtain the proper clearance.

DRIVE SHAFT



Removal

1. Remove the rear wheel. See "REAR WHEEL" in this chapter.
2. Remove the final gear case assembly.
3. Remove the drive shaft. See "SWINGARM" in this chapter.

Inspection

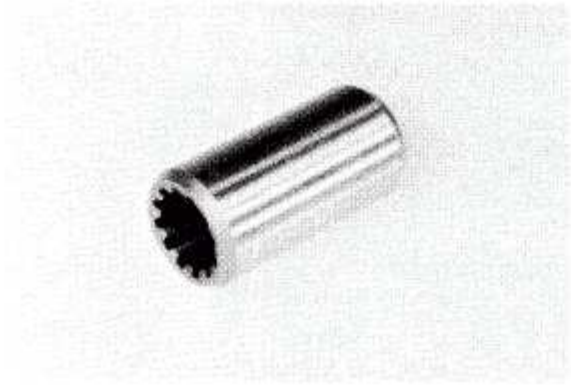
1. Drive shaft
   Inspect the shaft splines for wear and/or damage. If wear is excessive, replace the drive shaft.

NOTE:

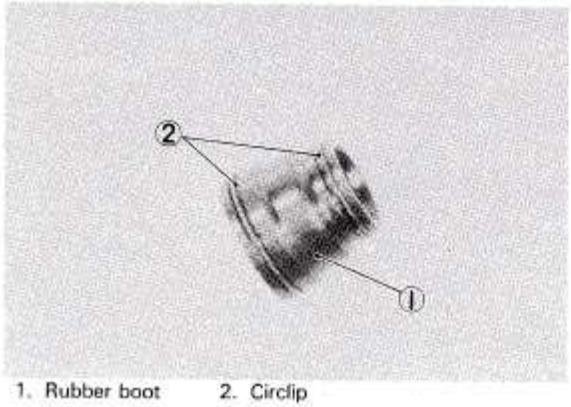
When installing the drive shaft, lubricate the splines with molybdenum disulfide grease.



2. Coupling joint
   Inspect the joint splines for wear and/or damage. If wear is excessive, replace the coupling joint.



3. Rubber boots
   Examine the rubber boot for damage. Replace it if it's damaged.



1. Rubber boot 2. Circlip

Installation

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

- Lubricate the shaft splines with molybdenum disulfide grease.
- Torque the final gear case nuts and bolts to specification.

TIGHTENING TORQUE:
Bolts/Nuts: 43 Nm (4.3 m·kg, 31 ft·lb)

CHAPTER 6.
ELECTRICAL

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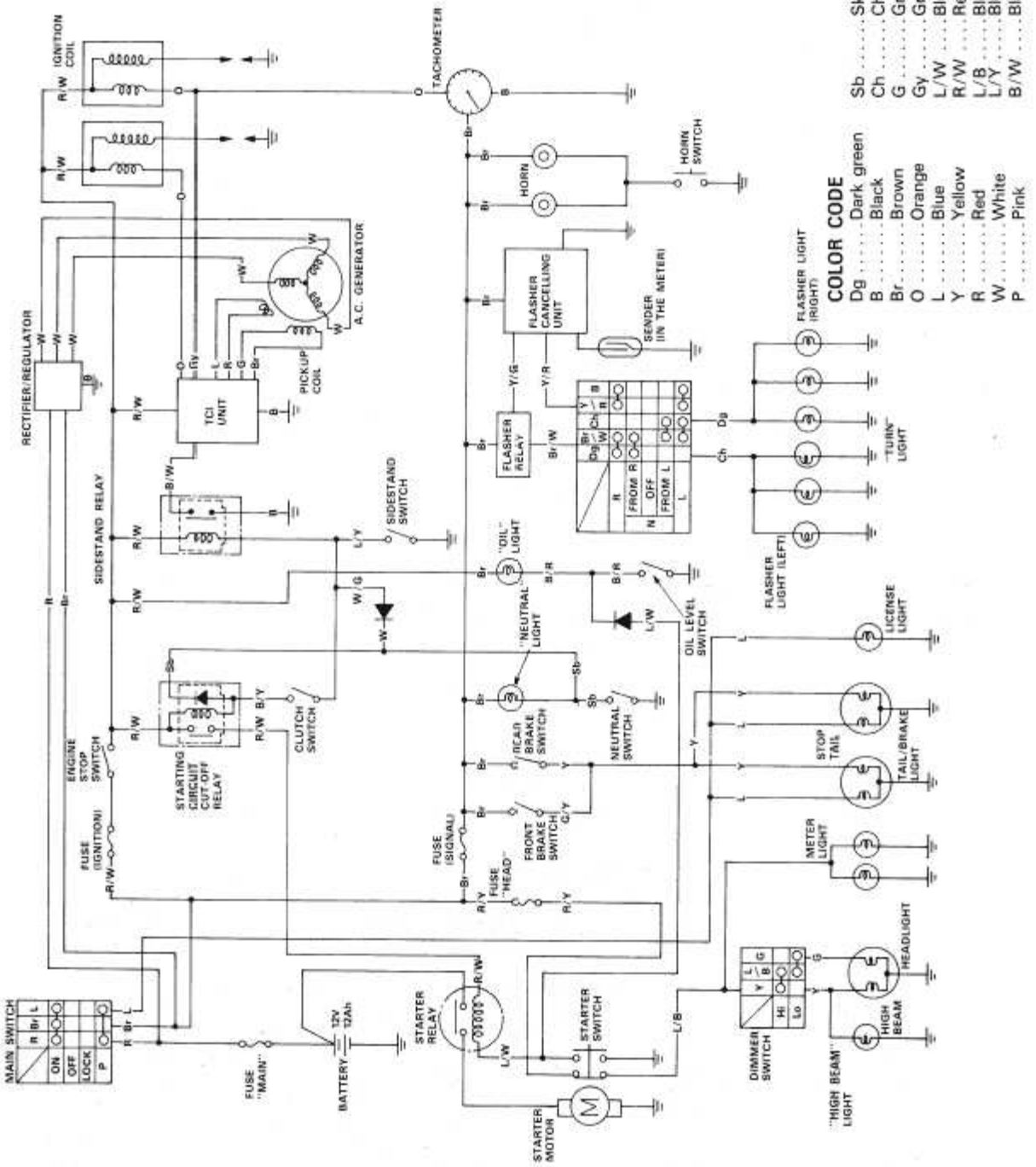
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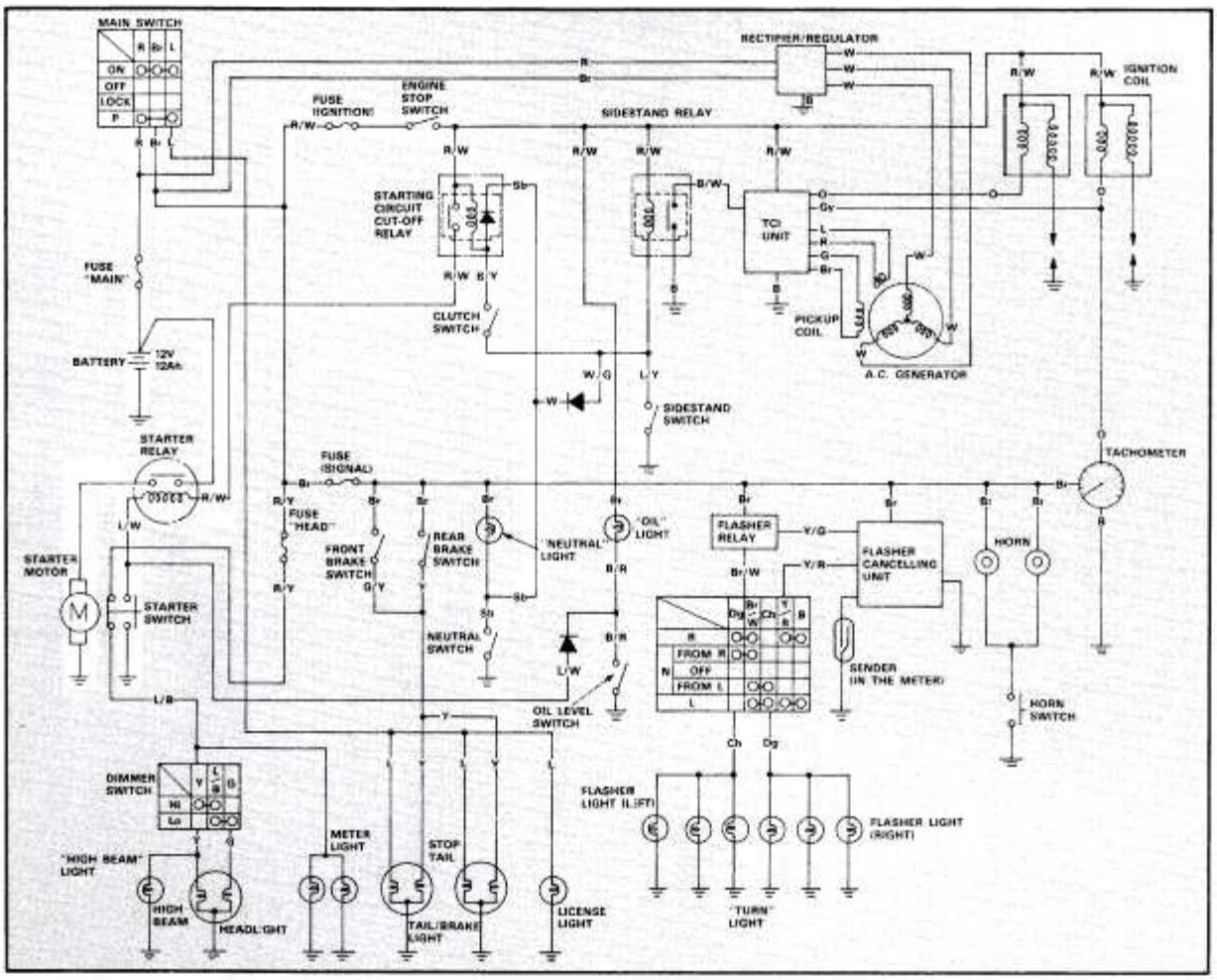
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CHAPTER 6.
ELECTRICAL

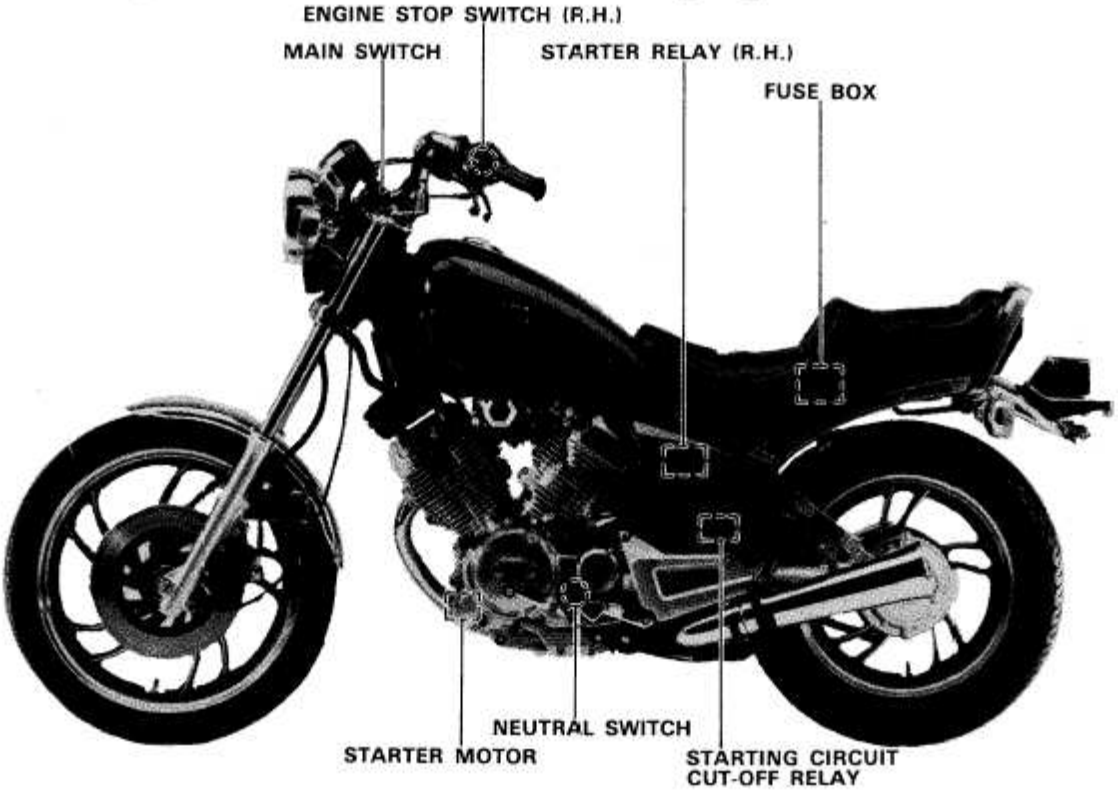
XV500K WIRING DIAGRAM



ELECTRIC STARTING SYSTEM



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



STARTING CIRCUIT CUT-OFF SYSTEM

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

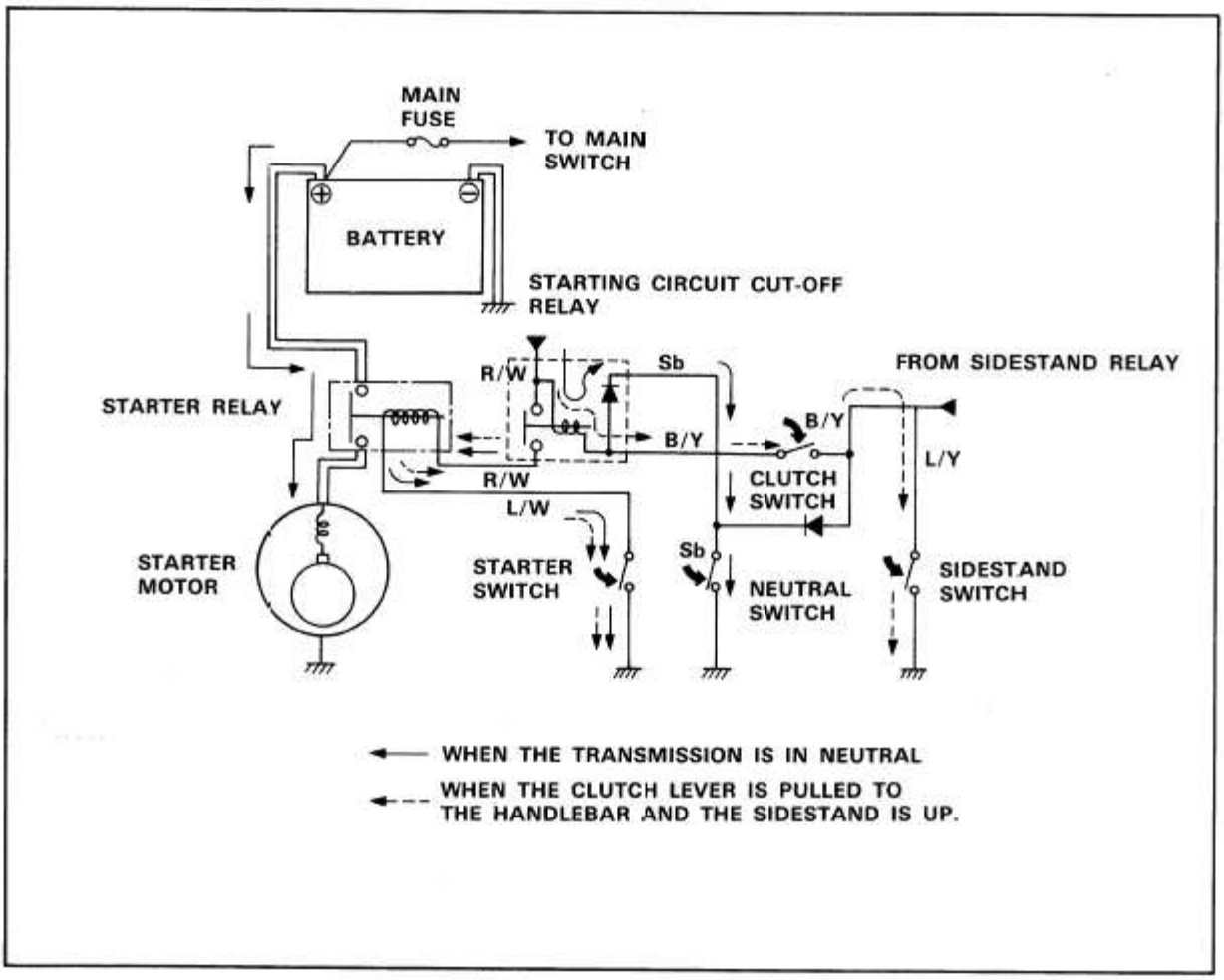
Starting Circuit Operation

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:

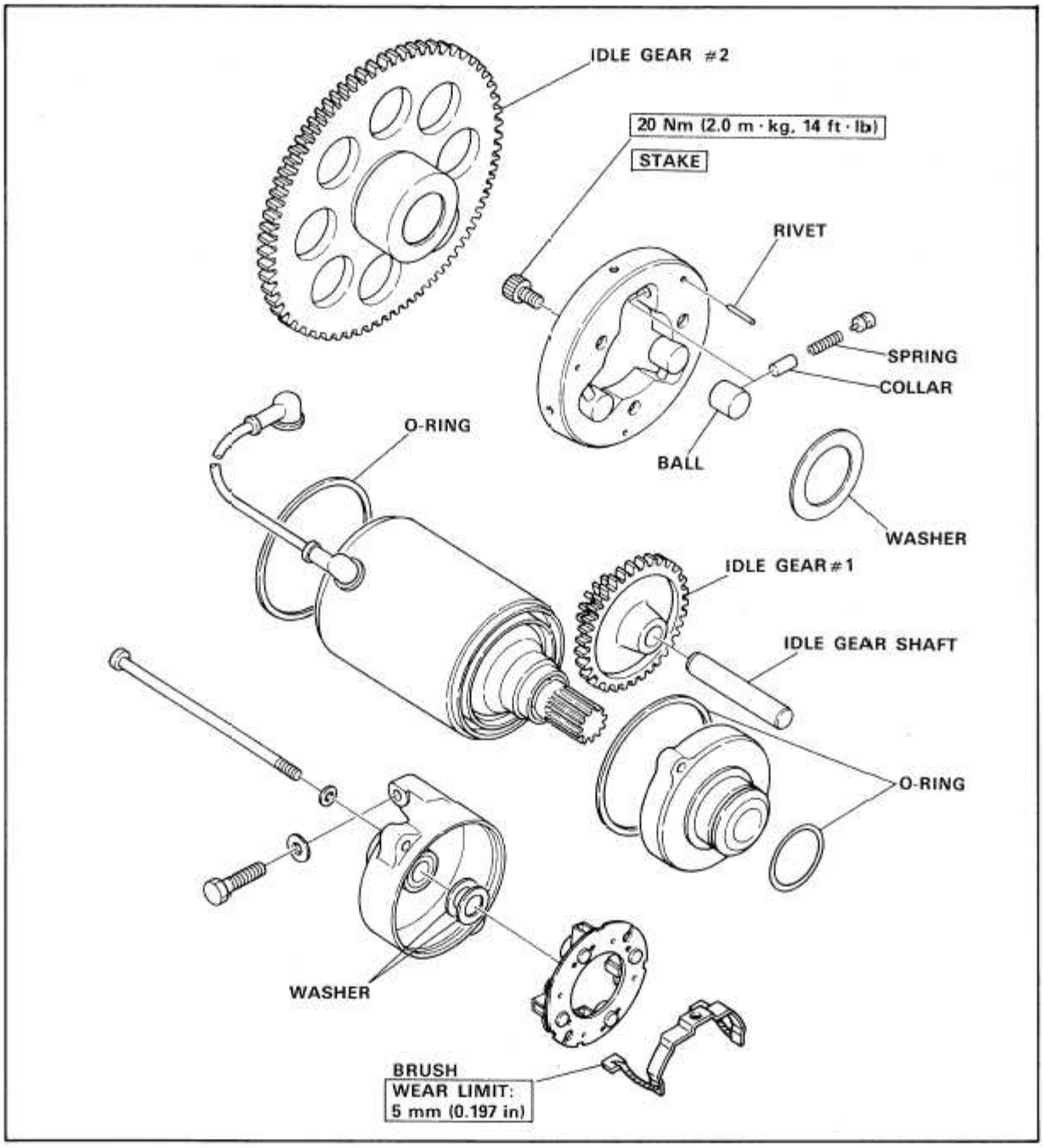
> The transmission is in neutral (the neutral switch is on).
>
> **or if**
>
> The clutch lever is pulled to the handlebar (the clutch switch is on) and the sidestand is up (the sidestand switch is on.)

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.



STARTER MOTOR



Removal

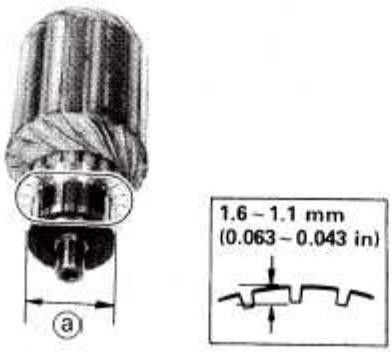
1. See Chapter 3. "ENGINE DISASSEMBLY."

Inspection and Repair

1. Check the outer surface of the commutator. If its surface is dirty, clean it with #600 grit sandpaper.
2. The mica insulation between the commutator segments should be 1.6 ~ 1.1 mm (0.06 ~ 0.04 in) below the segment level. If not, scrape the mica to proper limits with an appropriately shaped tool. (A hacksaw blade can be ground to fit.)

NOTE:

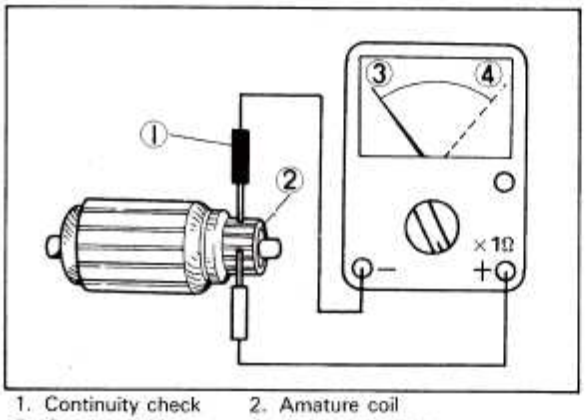
The mica insulation of the commutator must be undercut to ensure proper operation of commutator.



a. Commutator diameter

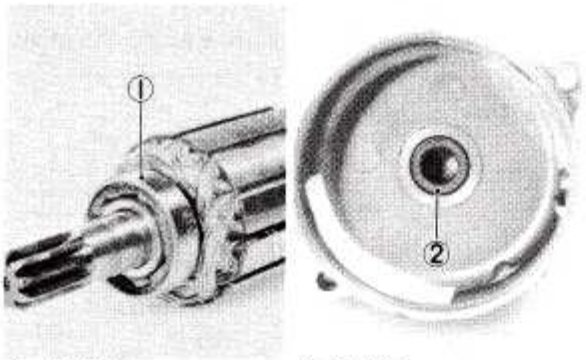
Commutator dia limit: 27 mm (1.06 in)

3. The armature ccil should be checked for continuity. Use a pocket tester.



1. Continuity check
2. Amature coil
3. Good condition
4. Replace armature

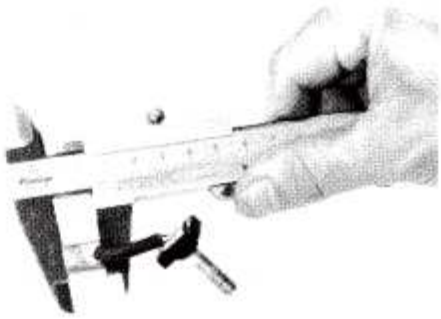
4. Check the bearing and bushing for damage. If either is damaged, the starter motor must be replaced.



1. Bearing
2. Bushing

5. Check the brush length. Replace the brush if it's at or near its limits.

Minimum brush length: 5.0 mm (0.197 in)



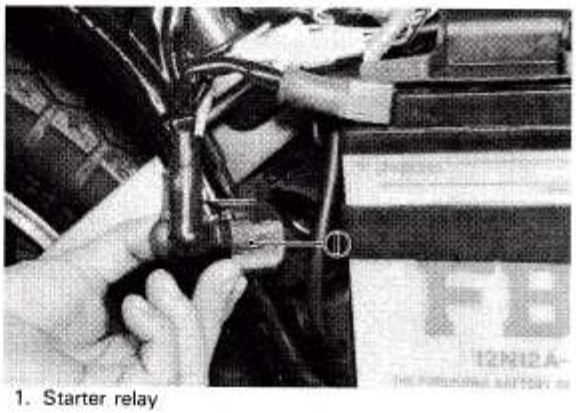
6. Check the brush spring pressure. Compare it with a new spring. Replace the old spring if it is weak.

Brush spring pressure: 800 – 520 g (28.216 – 18.340 oz)

STARTER RELAY

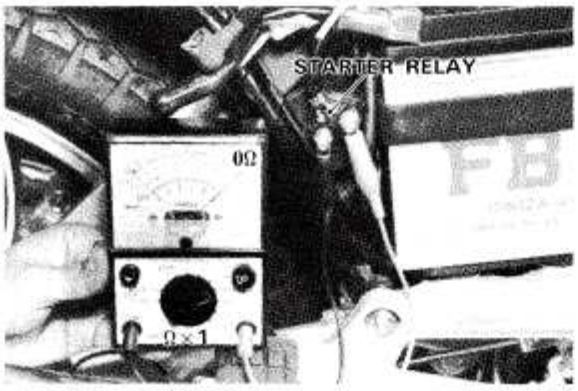
Inspection

1. Remove the right sidecover.



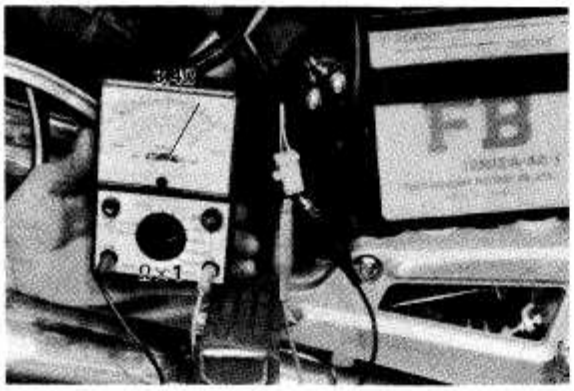
1. Starter relay

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



6. If the relay does not click, check the leads from the starter button and from the starting circuit cut-off relay (red/white, blue/white). Turn the ignition off. Use the scale (ohms × 1) on the tester. The resistance between these wires should be no more than 3.4 ohms. If there is more resistance, the relay should be replaced.

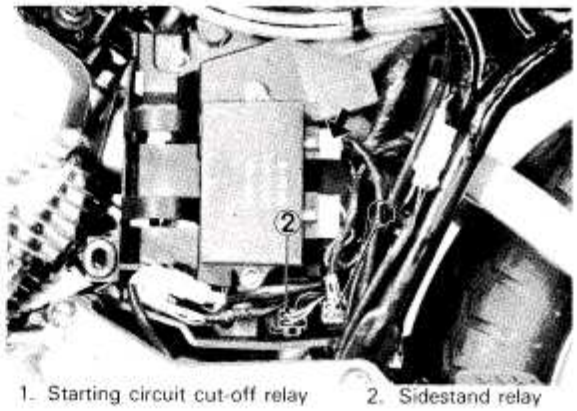
Sidestand relay resistance:
3.4Ω ± 10% at 20°C (68°F)
(Blue/white — Red/white)



STARTING CIRCUIT CUT-OFF RELAY

Inspection

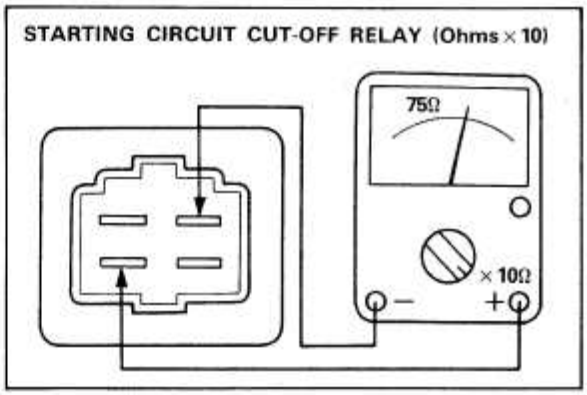
1. Remove the left side cover.
2. Remove the starting circuit cut-off relay from the rubber clamp, and disconnect the connector.



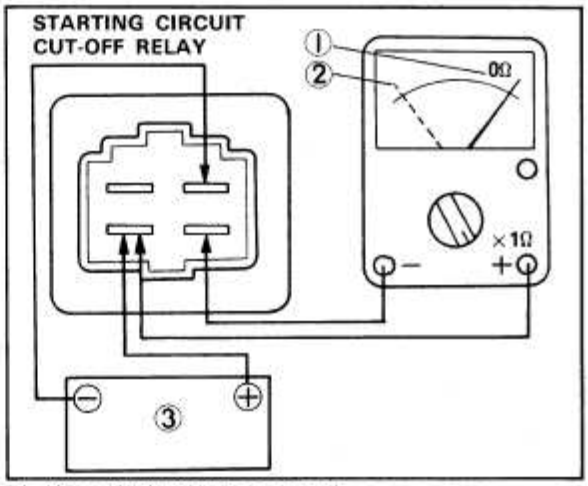
1. Starting circuit cut-off relay 2. Sidestand relay

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

Starting circuit cut-off relay resistance:
75Ω ± 10% at 20°C (68°F)

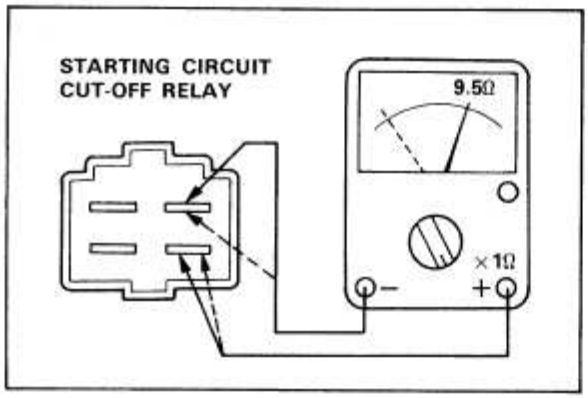


4. Check the relay function with a 12 volt battery and the pocket tester. Connect the leads as shown in the illustration. If the resistance readings do not equal those shown in the illustration, replace the relay.



1. When the battery is connected
2. When the battery is disconnected
3. 12 volt battery

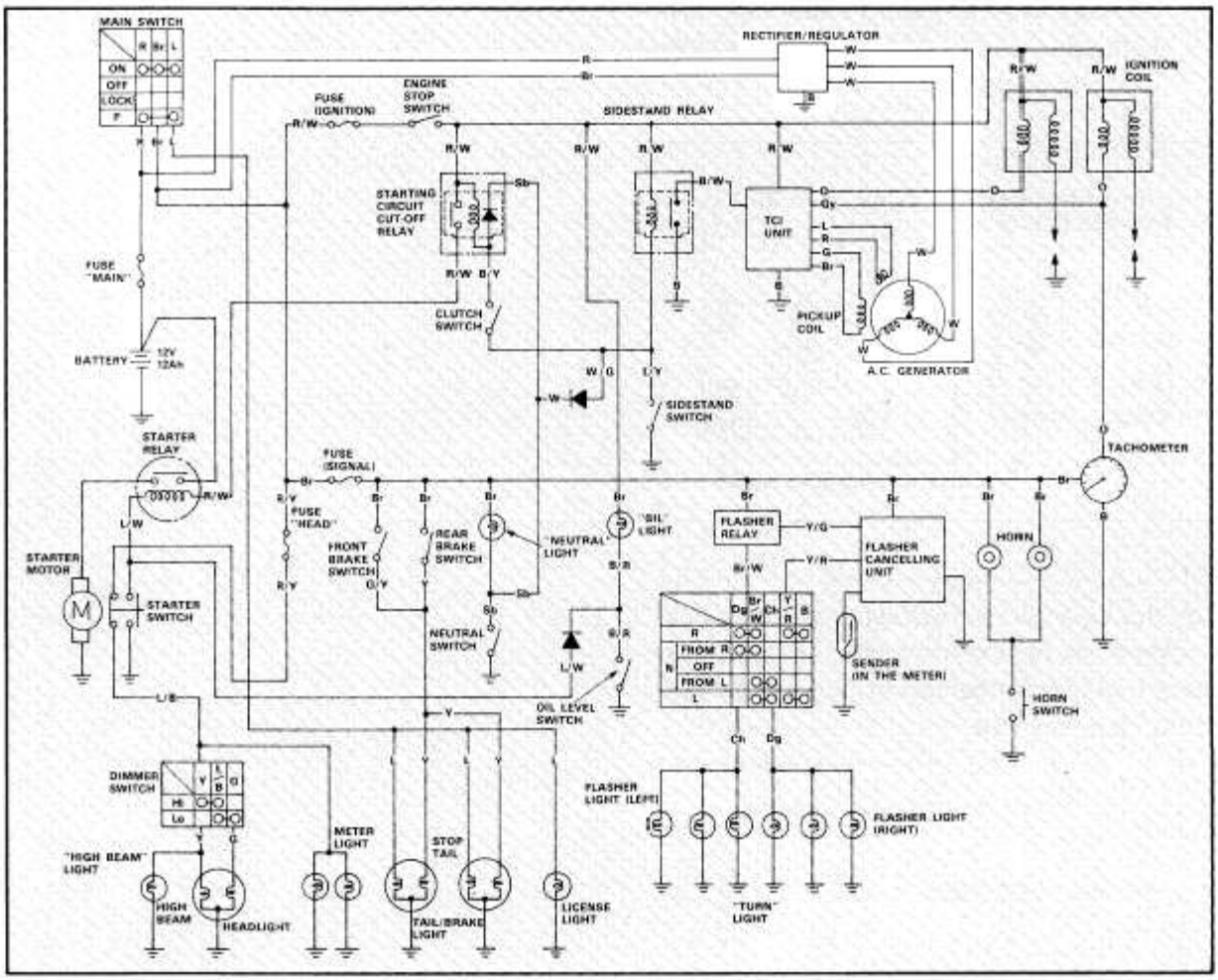
5. Check the diode in the starting circuit cut-off relay with the pocket tester as shown in the illustration. Replace the relay if the diode is damaged.



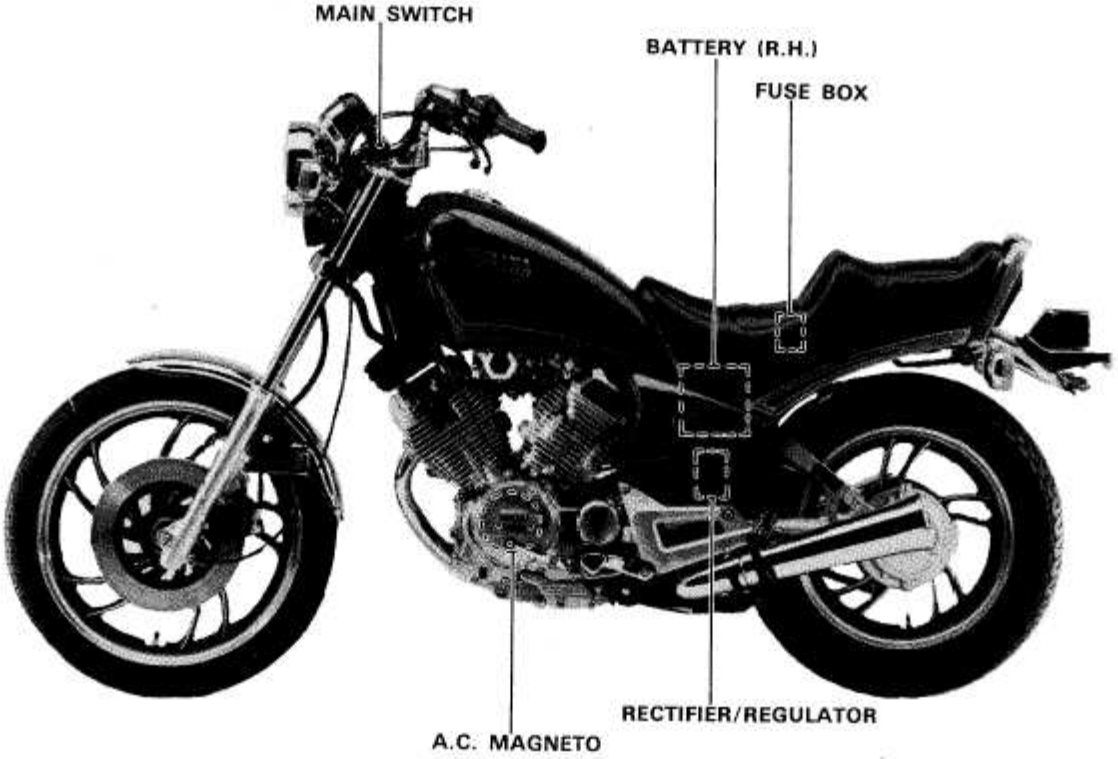
NOTE:

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.

CHARGING SYSTEM



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

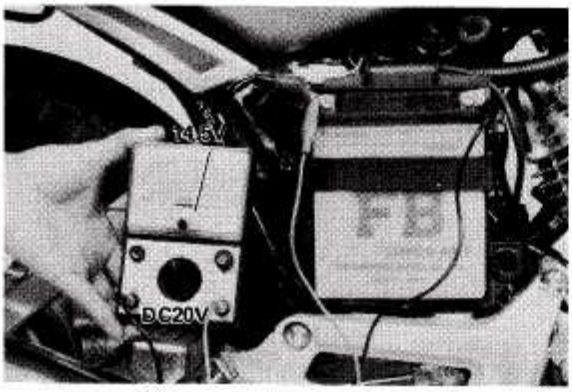


AC GENERATOR AND VOLTAGE REGULATOR

Inspection

1. Remove the right side cover and connect the pocket tester leads to the battery terminals.
2. Start the engine.
3. Accelerate the engine to approximately 5,000 r/min or more, and check the generator voltage.

Generator voltage:
14 ~ 15V at 5,000 r/min



4. If the indicated voltage cannot be reached, check all connections. If the connections are all good, check the battery, stator coil, and the regulator/rectifier. If both the battery and stator coil are in working order, the regulator is defective and should be replaced.

CAUTION:

Never disconnect the wires from the battery while the generator is operating. If the battery is disconnected, the voltage across the generator terminals will increase and damage the semi-conductors.

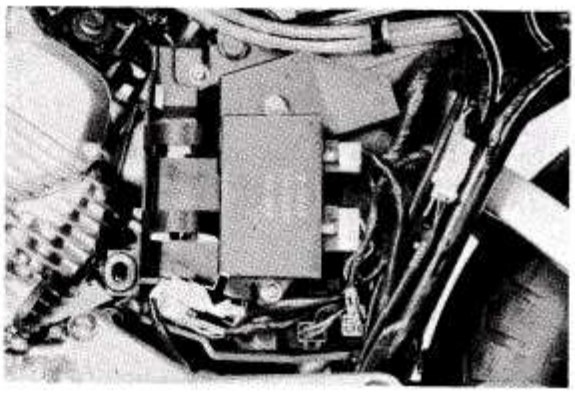
Battery Inspection

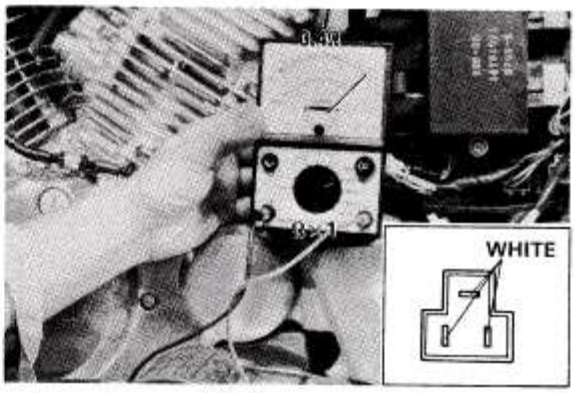
1. Check the battery terminals and couplers. They should be tight.
2. Measure the specific gravity of the battery. If it is less than 1.260, remove and charge the battery, until the specific gravity is greater than 1.260.

Stator Coil Inspection

1. Remove the left sidecover.
2. Disconnect the stator coil leads from the rectifier/regulator, and connect the pocket tester as shown. If the resistance does not equal the specified value, the stator coil is defective and should be replaced.

Stator coil resistance: (All)
0.4Ω ± 10% of 20°C (68°F)
(White-White)

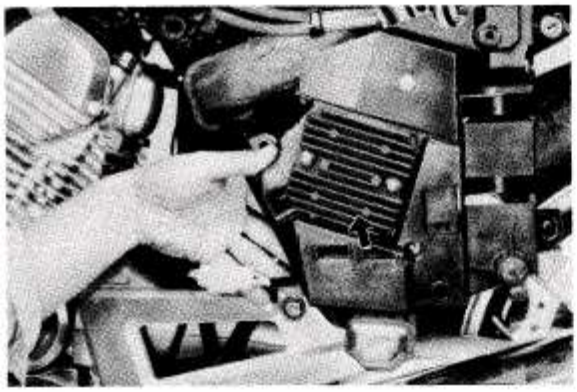


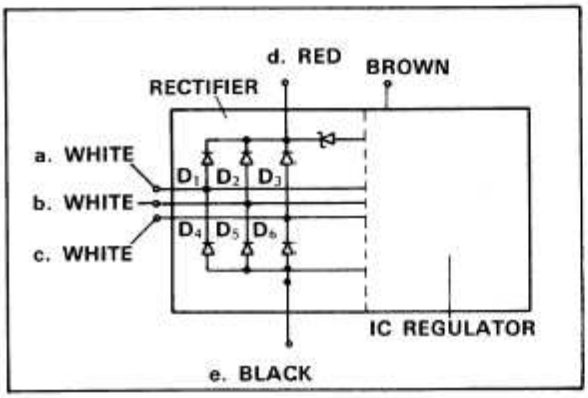


3. If the resistance in each coil is correct, check the stator for a short to ground. Connect one lead of the ohmmeter to a white lead, the other lead to ground. With the selector knob set at × 1Ω, the reading should be infinity (∞). If it is not, the stator is defective and should be replaced.

Checking the Silicon Rectifier

1. Check the silicon rectifier as specified using the pocket tester.





Checking element	Pocket tester connecting point (+) (red)	(−) (black)	Good	Replace (element shorted)	Replace (element opened)
D_1	d	a	○	○	×
	a	d	×	○	×
D_2	d	b	○	○	×
	b	d	×	○	×
D_3	d	c	○	○	×
	c	d	×	○	×
D_4	a	e	○	○	×
	e	a	×	○	×
D_5	b	e	○	○	×
	e	b	×	○	×
D_6	c	e	○	○	×
	e	c	×	○	×

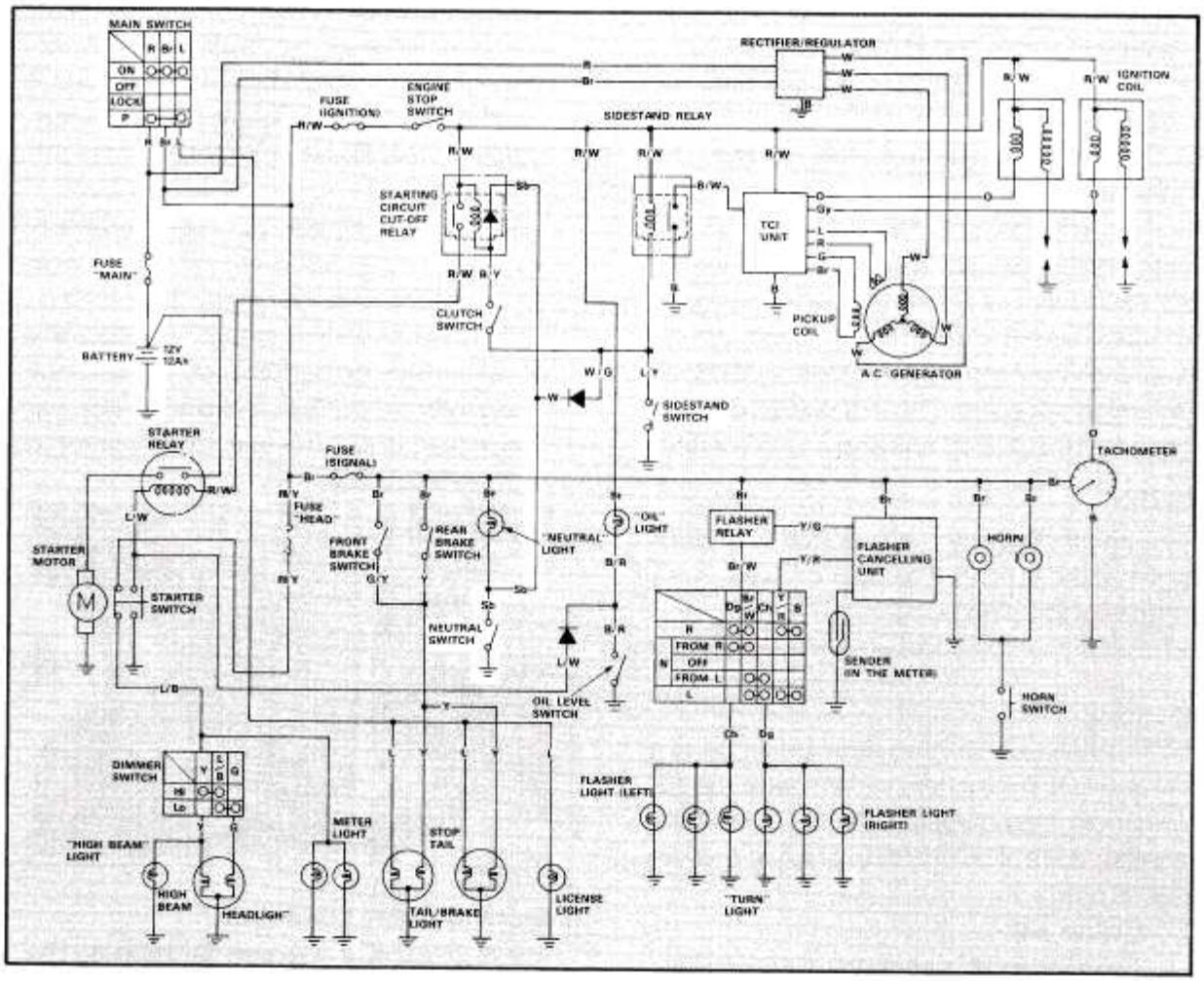
○: Continuity
×: Discontinuity (∞)

2. If any element is broken, replace the entire unit.

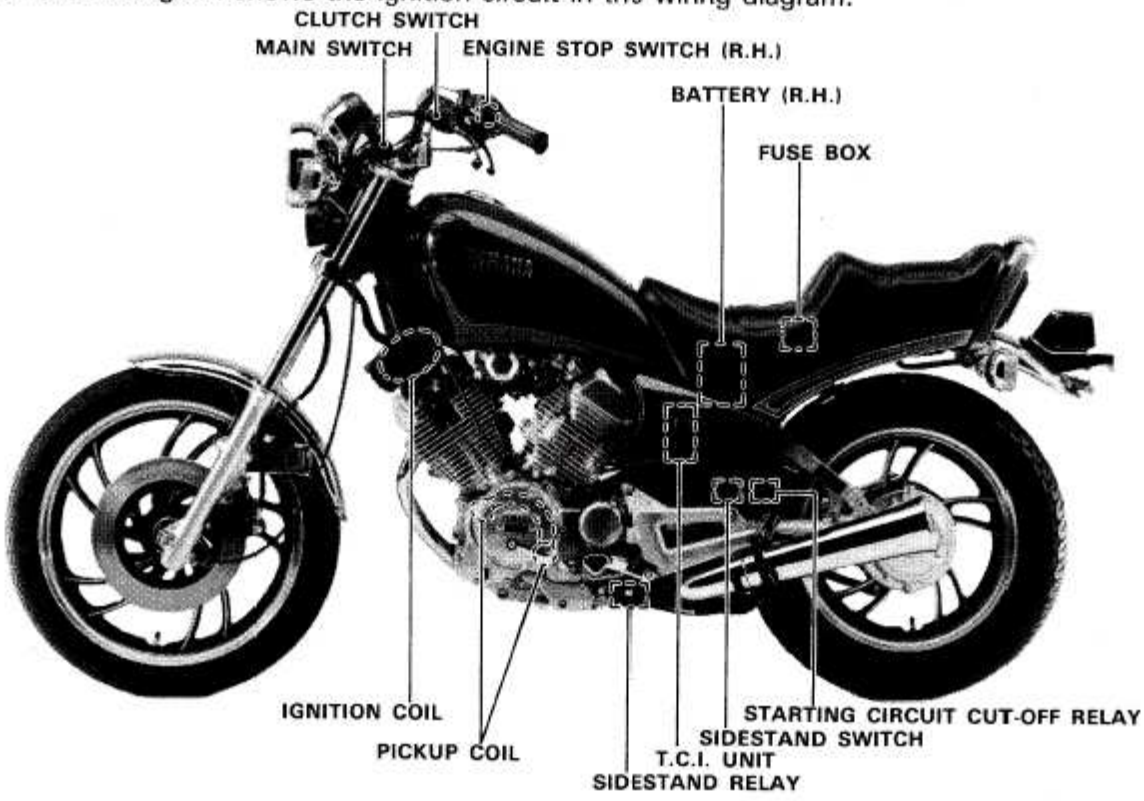
CAUTION:

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.

IGNITION SYSTEM



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



Description

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

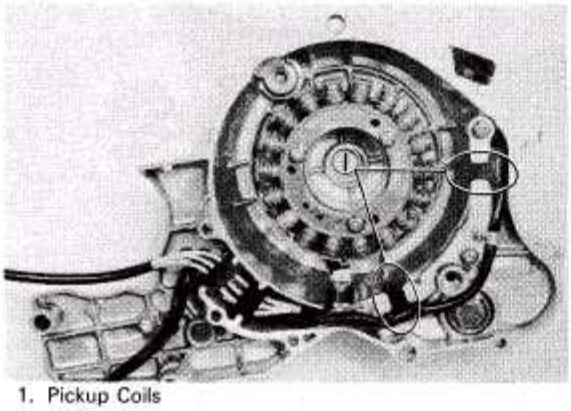
NOTE:

The ignition circuit can be operated only when the sidestand is up (the sidestand switch is on) or the transmission is in neutral.

Operation

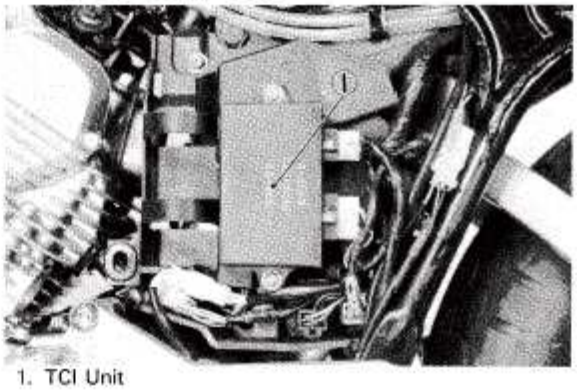
The TCI functions on the same principle as a conventional DC ignition system with the exception of using magnetic pickup coils and a transistor control box (TCI) in place of contact breaker points.

1. Pickup unit
   The pickup unit consists of two pickup coils and a flywheel mounted onto the crankshaft. When the projection on the flywheel passes a pickup coil, a signal is generated and transmitted to the ignitor unit. The width of the projection on the flywheel determines the ignition advance.



1. Pickup Coils

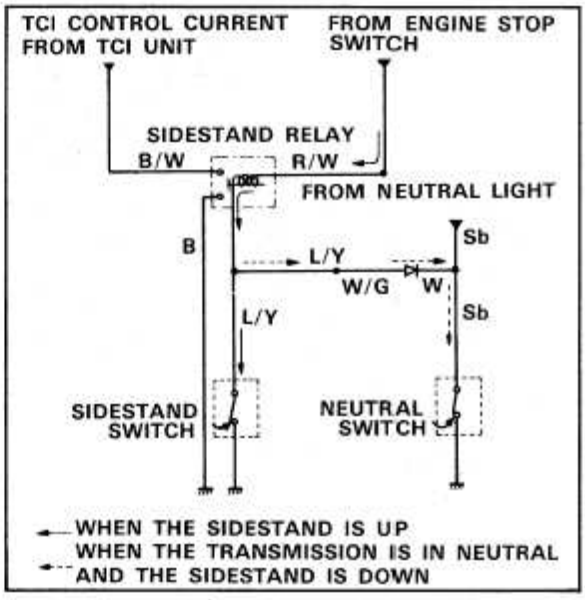
2. Ignitor unit
   This unit controls wave form, duty control, switching, electronic ignition advance, etc. The duty control circuit reduces electrical consumption by controlling the duration of the primary ignition current.
   The ignitor unit also has a protective circuit for the ignition coil. If the ignition switch is on and the crankshaft is not turning, the protective circuit interrupts the current flow to the primary coil after a few seconds. When the crankshaft is turning, however, the ignitor unit sends current to the primary coil.



1. TCI Unit

Sidestand Relay Operation

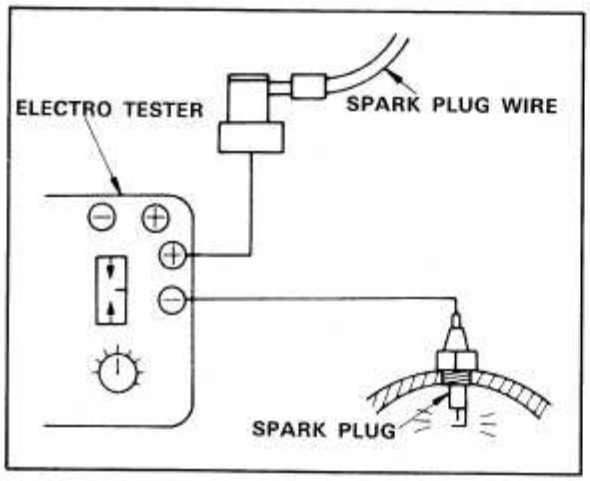
The sidestand relay operates by shorting the TCI control current. When the sidestand is down, the sidestand relay is closed, and the TCI control current is grounded through the sidestand relay. Thus, the engine will not run with the sidestand down unless the transmission is in neutral.



Troubleshooting

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

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



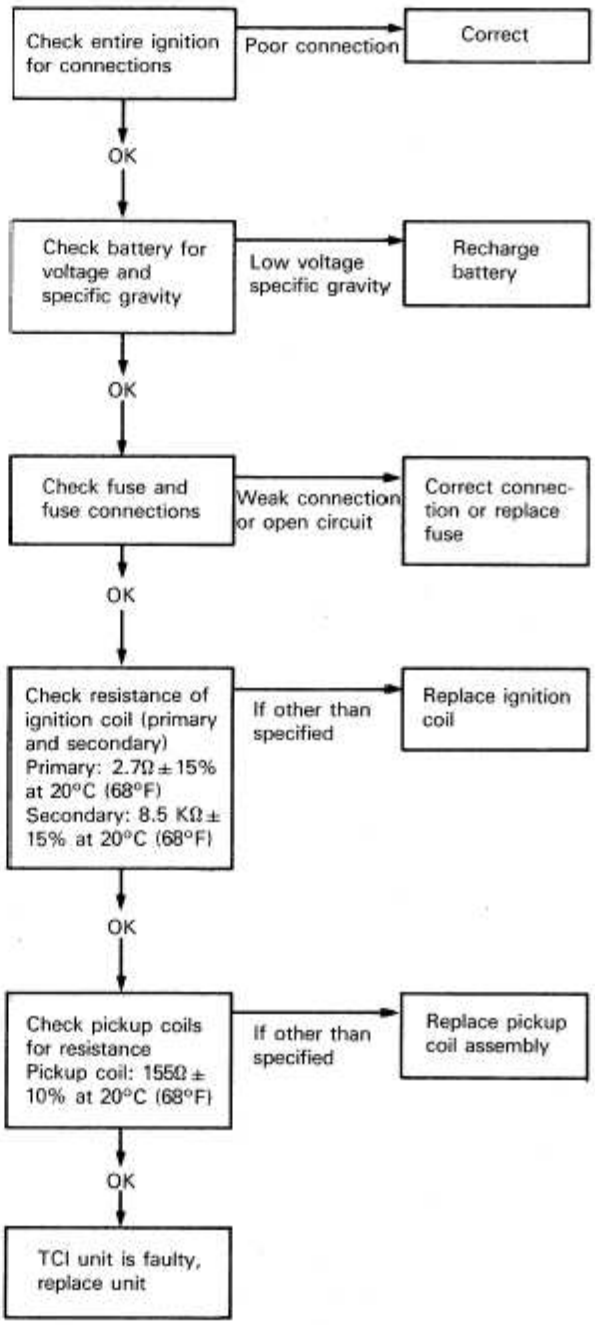
3. Start the engine, and increase the spark gap until misfire occurs. (Test at various r/min between idle and red line.)

Minimum spark gap: 6 mm (0.24 in)

CAUTION:

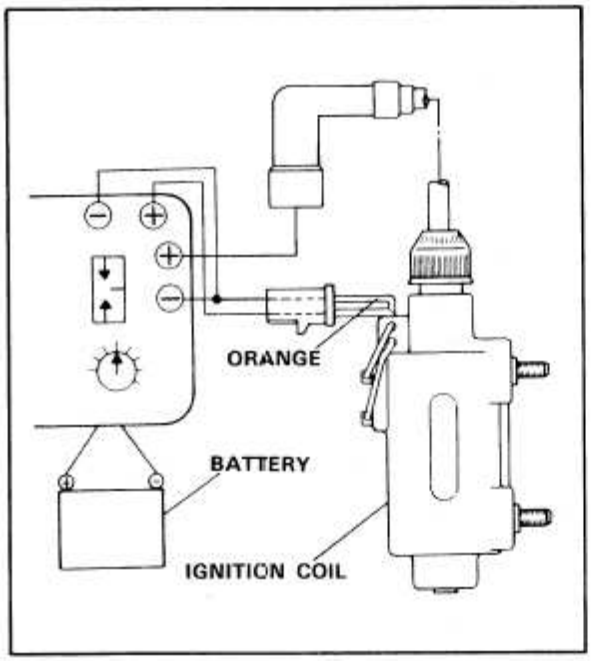
Do not run the engine in neutral above 6,000 r/min for more than 1 or 2 seconds.

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



Ignition spark gap test

1. Remove the engine-mounting-bracket-covers and disconnect the ignition coil leads from the wiring harness and from the spark plugs.
2. Connect the Electro Tester as shown.

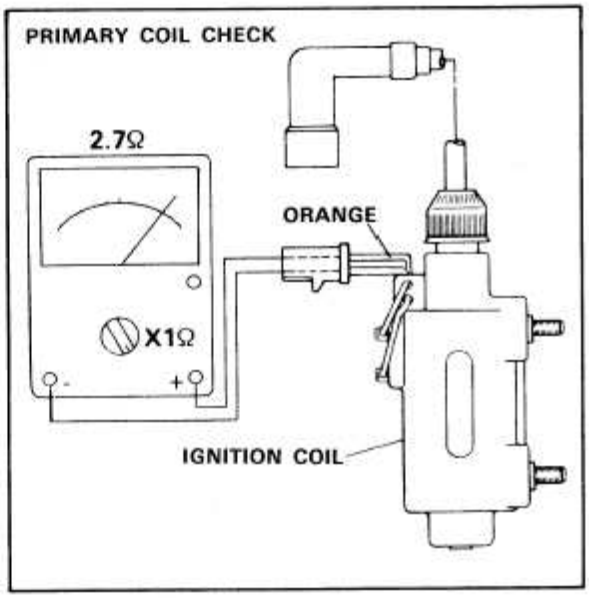


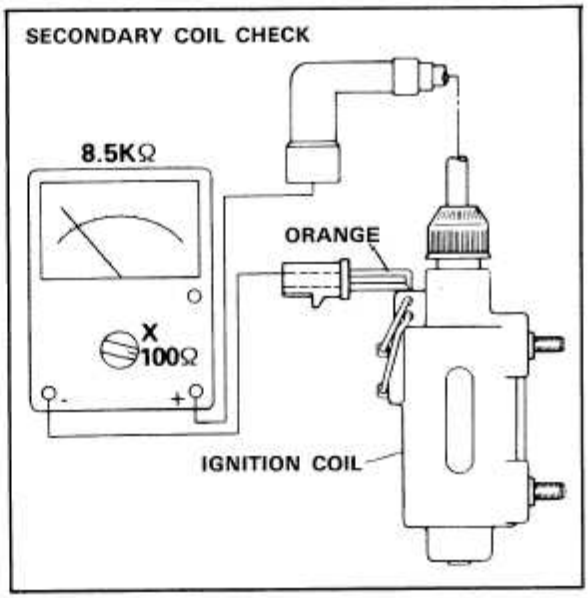
3. Connect a fully charged battery to the tester.
4. Turn on the spark gap switch, and increase the gap to maximum unless misfire occurs first.

Minimum spark gap: 6 mm (0.24 in)

Direct current resistance test.
Use the pocket tester to determine resistance and continuity of primary and secondary coil windings.

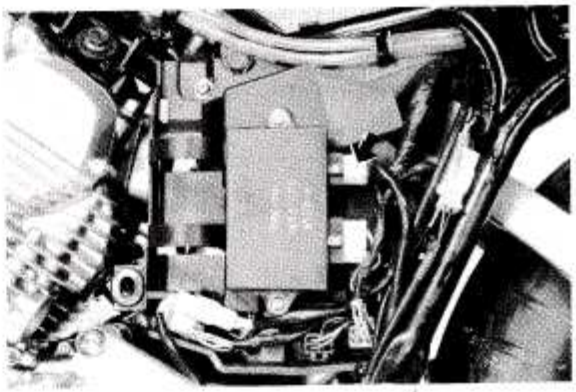
Standard value: Primary coil resistance: 2.7Ω ± 15% at 20°C (68°F) Secondary coil resistance: 8.5 KΩ ± 15% at 20°C (68°F)



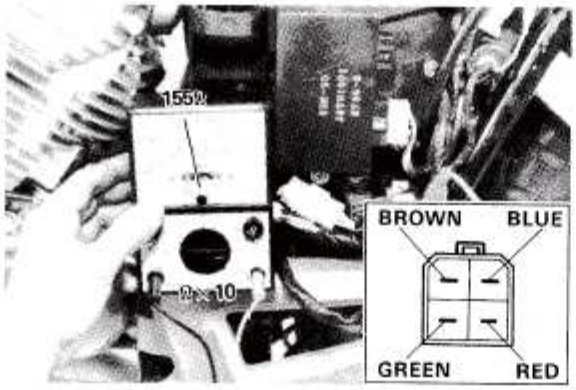


Pickup coil

1. Remove the left sidecover.
2. Disconnect the pickup coil connector from the TCI unit.



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



Pickup coil resistance:
155Ω ± 10% at 20°C (68°F)
(Red — Blue, Green — Brown)

Spark plug

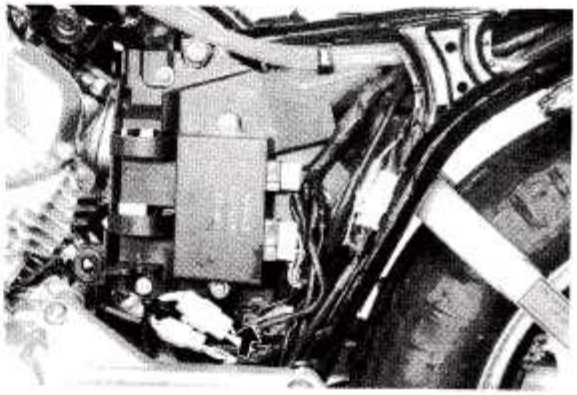
The life of a spark plug and its coloring vary according to the habits of the rider. At each periodic inspection, replace burned or fouled plugs with new ones of the specified type. It is actually economical to install new plugs often since it will tend to keep the engine in good condition and prevent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

1. Inspect and clean the spark plug every 4,000 km (2,500 mi), and replace after initial 13,000 km (8,000 mi).
2. Clean the electrodes of carbon, and adjust the electrode gap to the specification. Be sure to use the proper reach, type, and electrode gap plug(s) as a replacement to avoid overheating, fouling, or piston damage.

Type:
BP7ES (NGK) or W22EP-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)

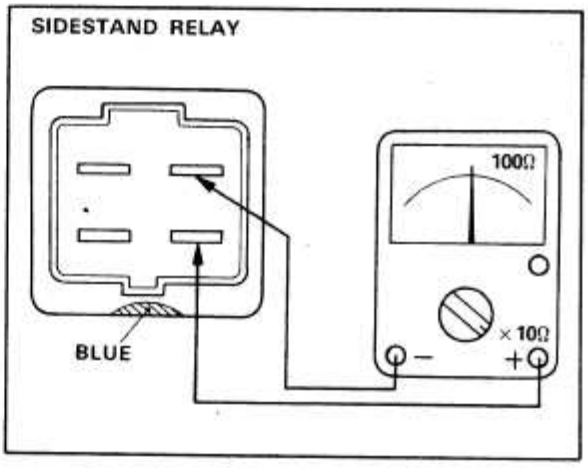
Sidestand relay

1. Remove the left sidecover.
2. Remove the sidestand relay from the rubber clamp and disconnect the connector.

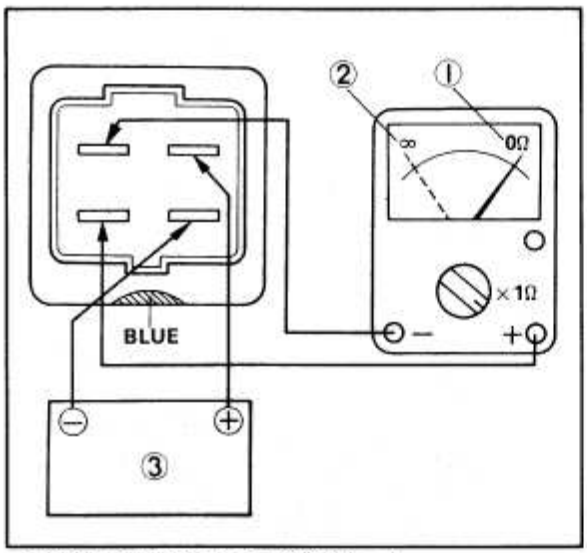


3. Check the resistance of the relay coil windings with the pocket tester. If the resistance is not within specification, replace the relay.

Sidestand relay resistance:
100Ω ± 10% at 20°C (68°F)



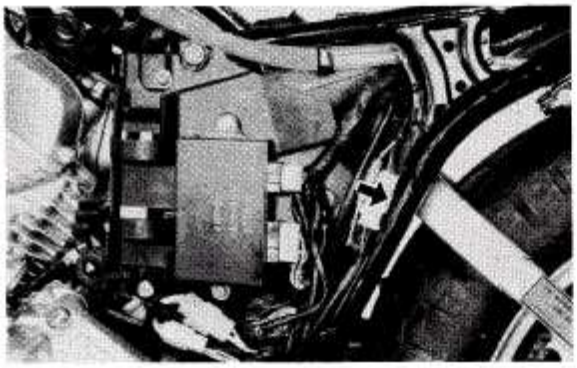
4. Check the relay contact breaker points with the pocket tester and a 12 volt battery. Connect the leads as shown in the illustration. If the resistance readings do not equal those shown in the illustration, replace the relay.



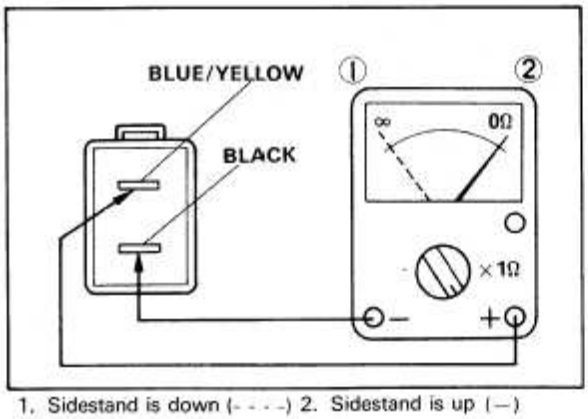
1. When the battery is connected (—)
2. When the battery is disconnected (---)
3. 12 volt battery

Sidestand switch

1. Remove the left sidecover.
2. Disconnect the connector from the wiring harness.

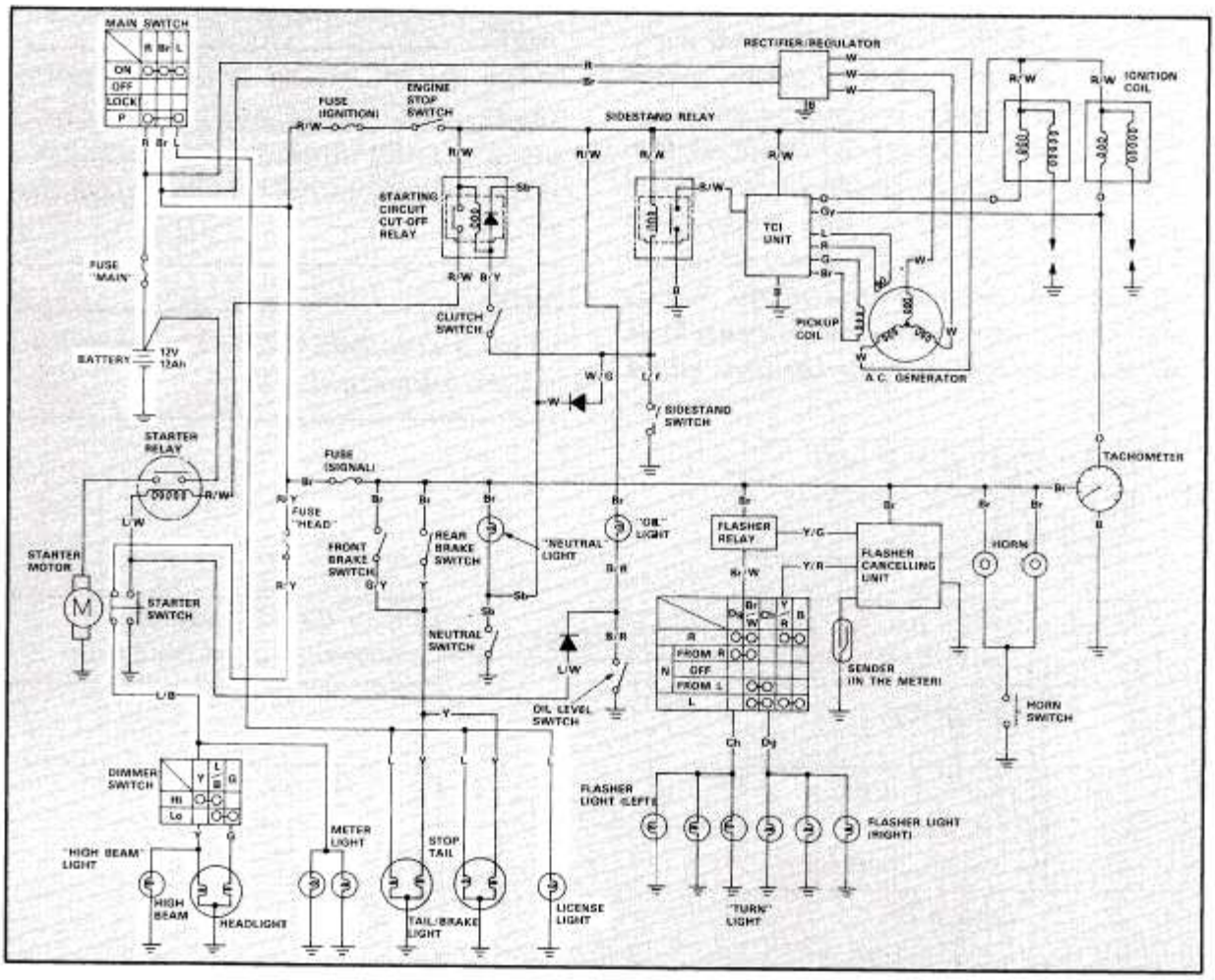


3. Connect the pocket tester leads as shown, and set the tester selector to ohm × 1. When the sidestand is up, the tester should read zero ohms. When the sidestand is down, the tester should read infinity.

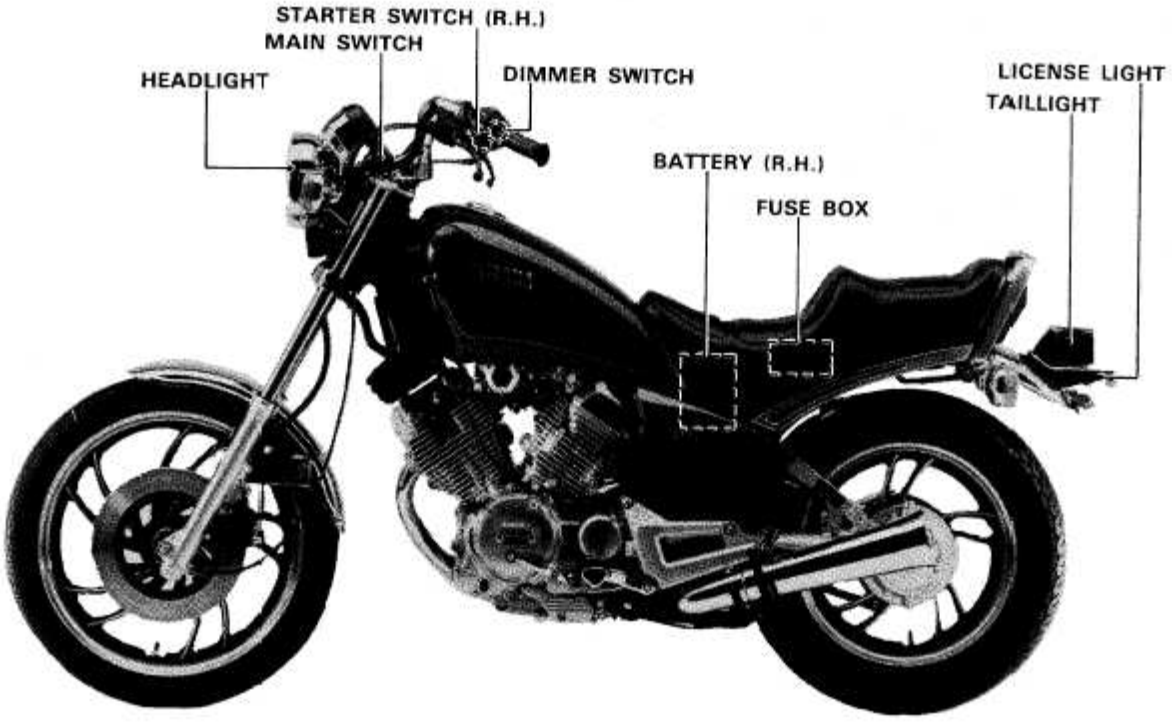


1. Sidestand is down (- - - -) 2. Sidestand is up (—)

LIGHTING SYSTEM



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



Lighting Tests and Checks

The battery provides power for operation of the headlight, taillight, license light, 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 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).

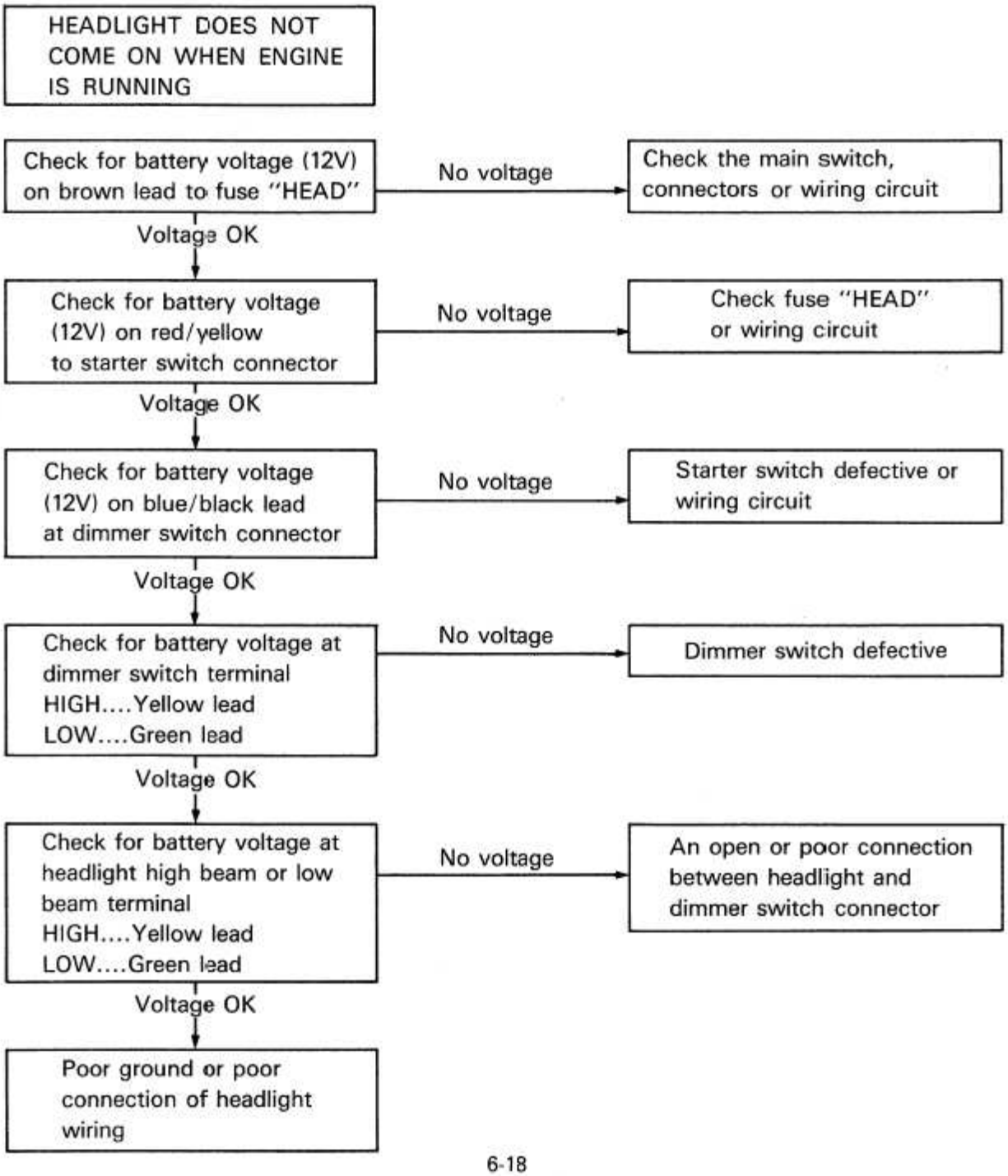
1. Headlight check.

NOTE:

When the main switch is turned "ON" the headlight, meter light, taillight, and license light come on. But when the starter switch is depressed, the headlight and meter light come off.

NOTE:

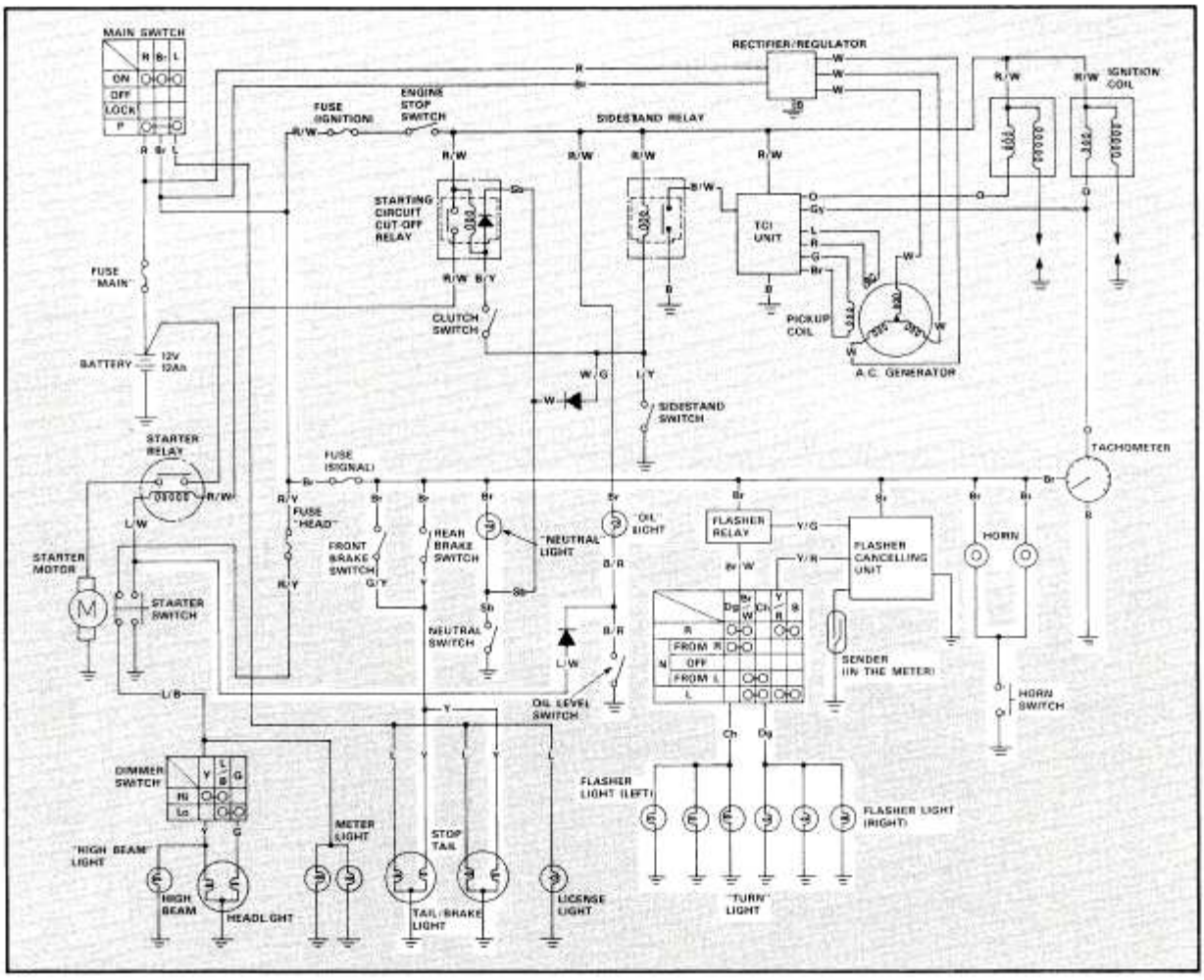
Check the headlight bulb first before performing the following check.



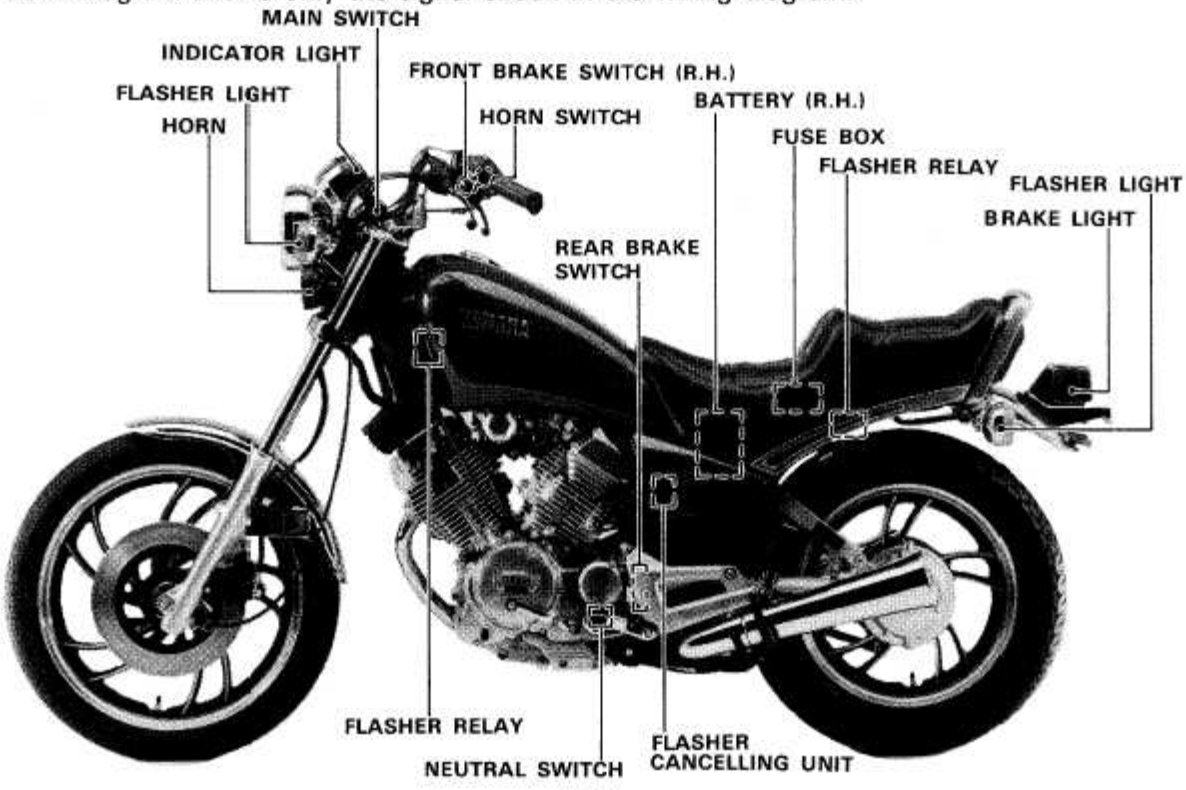
2. Taillight and license light does not work:

- Check the bulb.
- Check for 12V on the blue lead.
- Check for ground on black lead to tail/brake light and/or license light assembly.

SIGNAL SYSTEM



Circuit diagram shows only the signal circuit in the wiring diagram.



Signal System Tests and Check

The battery provides power for operation of the horn, brake light, indicator lights, and flasher light. If none of the above operates, always check the battery voltage before proceeding further. Low battery voltage indicates either a faulty battery, low battery electrolyte, or a defective charging system. See page 6-8 CHARGING SYSTEM for checks of the battery and charging system. Also check the fuse condition. Replace any "open" fuses. There are individual fuses for various circuits (see the complete circuit diagram).

Horn does not work:

1. Check for 12V on the brown wire to the horn.
2. Check for good grounding of the horn (pink wire) when the horn button is pressed.

Brake light does not work:

1. Check the bulb.
2. Check for 12V on the yellow wire to the brake light with brake pedal depressed.
3. Check for 12V on the brown wire to each brake light switch (front brake and rear brake switches).

Flasher light(s) do nct work:

1. Check the bulb.
2. Right circuit:
   a. Check for 12V on the dark green wire to the light.
   b. Check for ground on the black wire to the light assembly.
3. Left circuit:
   a. Check for 12V on the dark brown wire to the light.
   b. Check for ground on the black wire to the light assembly.
4. Right and left circuits do not work:
   a. Check for 12V on the brown/white wire to the flasher switch on the left handlebar.
   b. Check for 12V on the brown wire to the flasher relay.
   c. Replace the flasher relay.
   d. Replace the flasher switch.
5. Check the self-cancelling unit. (Refer to Flasher Self-Cancelling Unit.)

The neutral light does not work:

1. Check the bulb.
2. Check for 12V on the sky blue wire to the neutral switch.
3. Replace the neutral switch.

Oil level warning light does not work:

1. Connect the oil level switch (black/red wire) to ground. If the light comes on, check for proper oil level.
2. If the oil level is correct, replace the oil level switch.

Flasher Cancelling Unit

The cancelling unit turns off the flashers. Generally, the signal will cancel after either 10 seconds of operation or after the motorcycle has traveled 150 meters (490 feet), whichever is greater. At low speed, the cancelling is a function of distance; at high speeds, it's a function of both time and distance.

The handlebar 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.

Inspection

If the flasher cancelling unit should become inoperative, proceed as follows:

1. Pull off the 6-pin connector from the flasher cancelling unit, and connect the yellow/green lead to ground. Operate the handlebar switch. If the signal operates normally in L, R, and OFF, the following are in good condition:
   a. Flasher unit
   b. Bulb
   c. Lighting circuit
   d. Handlebar switch light circuit

If (a) and (b) are in good condition, the following may be faulty:

- Flasher cancelling unit.
- Handlebar switch reset circuit.
- Speedometer sensor circuit.

2. Pull off the 6-pin connector from the flasher cancelling unit, and connect a tester (ohms × 100 range) across the white/green and the black leads on the wiring harness side. Turn the

speedometer shaft. If the tester needle swings back and forth between 0 and ∞, the speedometer sensor circuit is in good condition. If not, the sensor-to-wiring harness may be inoperative.

3. Pull the 6-pin connector from the flasher self-cancelling unit. Check if there is continuity between the yellow/red lead wire on the wiring 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 handlebar switch circuit and wiring harness.

4. If no defect is found with the above three checks and the flasher cancelling system is still inoperative, replace the flasher cancelling unit.
5. If the signal flashes only when the handlebar switch lever is turned to L or R and it turns off immediately when the handlebar switch lever returns to center, replace the flasher cancelling unit.

Switches

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

1. Main switch

Switch position	Wire color		
	R	Br	L
ON	○	○	○
OFF			
LOCK			
P (parking)	○		○

2. Engine stop switch

Switch position	Wire color	
	R/W	R/W
RUN	○	○
OFF		

3. Start switch

Switch position	Wire color			
	R/Y	L/B	L/W	B
OFF	○	○		
PUSH (ON)			○	○

4. Lights (dimmer) switch

Switch position	Wire color		
	Y	L/B	G
HI	○	○	
LO		○	○

5. Turn switch

Switch position	Wire color				
	Ch	Br/w	Dg	Y/R	B
L	○	○		○	○
L → N	○	○			
N → Push					
R → N		○	○		
R		○	○	○	○

6. Horn switch.

Switch position	Wire color	
	P	B
RUN	○	○
OFF		

Battery

If the battery shows the following defects, it should be replaced:

1. The battery voltage will not rise to a specific value nor will bubbles rise in any cell, even after many hours of charging.
2. Sulfation of one or more cells is indicated by the plates turning white or an accumulation of material in the bottom of the cell.

3. Specific gravity readings after a long, slow charge indicate a cell to be lower than any others.
4. Warpage or buckling of plates or insulators is evident.

WARNING:

Battery fluid is poisonous and dangerous, causing severe burns, etc. It contains sulfuric acid. Avoid contact with the skin, eyes, or clothing.
Antidote: EXTERNAL — Flush with water. INTERNAL — Drink large quantities of water or milk. Follow with milk of magnesia, beaten eggs, 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 an enclosed space. Always shield your eyes when working near batteries.
KEEP OUT OF REACH OF CHILDREN.

The service life of a battery is usually two to three years. Lack of care, as described below, will shorten the life of the battery:

- Negligence in keeping battery topped off with distilled water;
- Battery left discharged;
- Over-charging with heavy charge;
- Freezing;
- Filling with tap water or sulfuric acid containing impurities;
- Improper charging voltage or current on new battery;

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:

1. Recharge the battery periodically.
2. Store the battery in a cool, dry place.
3. Recharge the battery before reinstallation.

Battery	12N12A-4A-1
Electrolyte	Specific gravity: 1.280
Initial charging current	1.2 amp for 10 hours (new battery)
Recharging current	10 hours (or until specific gravity reaches 1.280)
Refill fluid	Distilled water (to maximum level line)
Refill period	Check once per month (or more often, as required)

APPENDICES
CHAPTER 7.

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CONSUMER INFORMATION 7-17

GENERAL TORQUE SPECIFICATIONS 7-17

DEFINITION OF UNITS 7-18

CONVERSION TABLES 7-18

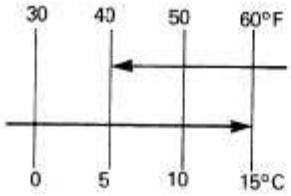
EXPLODED DIAGRAMS 7-19
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CHAPTER 7.
APPENDICES

SPECIFICATIONS
GENERAL SPECIFICATIONS

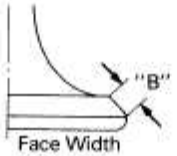
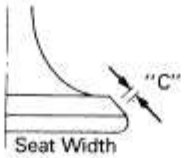
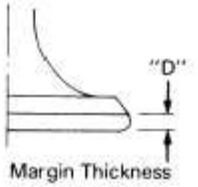
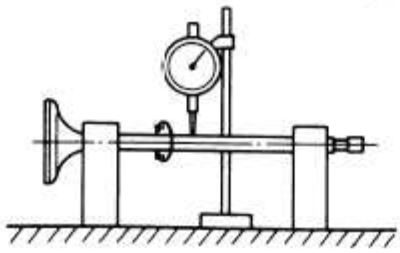
Model	XV500K
Model Code Number	22U
Federal V.I.N. Number	JYA22U00* DA000101
Engine Starting Number	22U-000101
Dimensions: Overall Length Overall Width Overall Height Seat Height Wheelbase Minimum Ground Clearance	 2,135 mm (84.1 in) 825 mm (32.5 in) 1,160 mm (45.7 in) 745 mm (29.3 in) 1,410 mm (55.5 in) 155 mm (6.1 in)
Basic Weight: With Oil and Full Fuel Tank	 185 kg (408 lb)
Minimum Turning Radius:	2,500 mm (98.4 in)
Engine: Engine Type Cylinder Arrangement Displacement Bore × Stroke Compression Ratio Compression Pressure Starting System	 4-stroke, gasoline, DOHC V-2 cylinder 494 cm^3 73 × 59 mm (2.874 × 2.323 in) 9.3 : 1 1,079 kPa (11 kg/cm^2, 156 psi) Electric starter
Lubrication System:	Wet sump
Oil Type or Grade Engine oil  Final Gear 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)) SAE 80 API "GL-4" Hypoid gear oil
Oil Capacity Engine Oil Periodic Oil Change With Oil Filter Replacement Total Amount Final Gear Case Oil Amount	 2.4 L (2.1 Imp qt, 2.5 US qt) 2.5 L (2.2 Imp qt, 2.6 US qt) 3.0 L (2.6 Imp qt, 3.2 US qt) 0.19 L (0.17 Imp qt, 0.20 US qt)

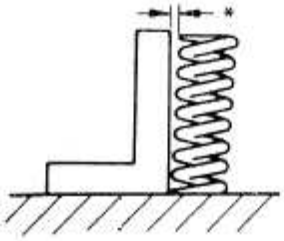
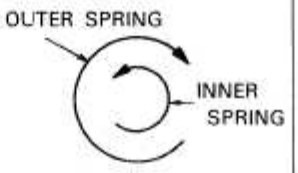
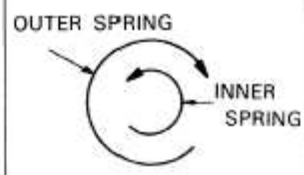
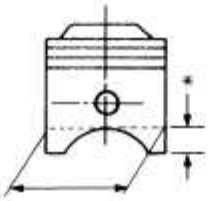
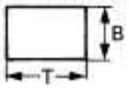
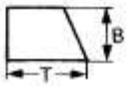
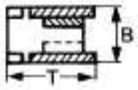
Model	XV500K	
Air Filter	Dry type element	
Fuel: Type Tank Capacity Reserve Amount	 Regular gasoline 11 L (2.42 Imp gal, 2.91 US gal) 2.6 L (0.57 Imp gal, 0.69 US gal)	
Carburetor: Type/Manufacturer	 BDS34/MIKUNI	
Spark Plug: Type/Manufacturer Gap	 BP7ES (NGK), W22EP-U (NIPPONDENSO) 0.7 ~ 0.8 mm (0.028 ~ 0.031 in)	
Clutch Type:	Wet, multiple-disc	
Transmission: Primary Reduction System Primary Reduction Ratio Secondary Reduction System Secondary Reduction Ratio Transmission Type Operation Gear Ratio 1st 2nd 3rd 4th 5th	 Gear 70/36 (1.944) Shaft drive 19/18 × 32/11 (3.071) Constant mesh, 5-speed Left foot operation 38/14 (2.714) 38/20 (1.900) 35/24 (1.458) 28/24 (1.166) 29/30 (0.966)	
Chassis: Frame Type Caster Angle Trail	 Pressed backbone 29°00' 125 mm (4.92 in)	
Tire: Type Size (F) Size (R)	 Tubeless 3.00 S19-4PR 130/90-16-67S	
Tire Pressure (Cold tire):		
Maximum load*	225 kg (496 lb)	
Cold tire pressure	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) - 225 kg (496 lb) load)	196 kPa (2.0 kg/cm², 28 psi)	225 kPa (2.3 kg/cm², 32 psi)
High speed riding	196 kPa (2.0 kg/cm², 28 psi)	225 kPa (2.3 kg/cm², 32 psi)
	* Load is the total weight of cargo, rider, passenger, and accessories.	

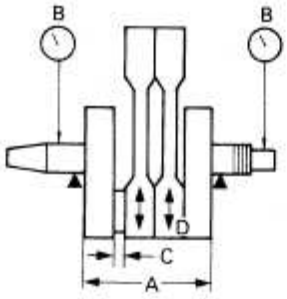
Model	XV500K
Brake:	
Front Brake Type	Single Disc brake
Operation	Right hand operation
Rear Brake Type	Drum brake
Operation	Right foot operation
Suspension:	
Front Suspension	Telescopic fork
Rear Suspension	Swingarm (Monocross suspension)
Shock Absorber:	
Front Shock Absorber	Coil spring, Oil damper
Rear Shock Absorber	Coil spring, Gas/Oil damper
Wheel Travel:	
Front Wheel Travel	150 mm (5.9 in)
Rear Wheel Travel	100 mm (3.9 in)
Electrical:	
Ignition System	T.C.I.
Generator System	A.C. generator
Battery Type or Model	12N12A-4A-1
Battery Capacity	12V 12AH
Headlight Type:	Bulb Type
Bulb Wattage/Quantity:	
Headlight	60W/55W × 1
Tail/Brake Light	8W/27W
Flasher Light	27W × 4
Licence light	8W × 2
Indicator light Wattage/Quantity:	
"METER LIGHT"	3.4W × 2
"NEUTRAL"	3.4W × 1
"HIGH BEAM"	3.4W × 1
"OIL"	3.4W × 1
"TURN"	3.4W × 2

MAINTENANCE SPECIFICATIONS
Engine

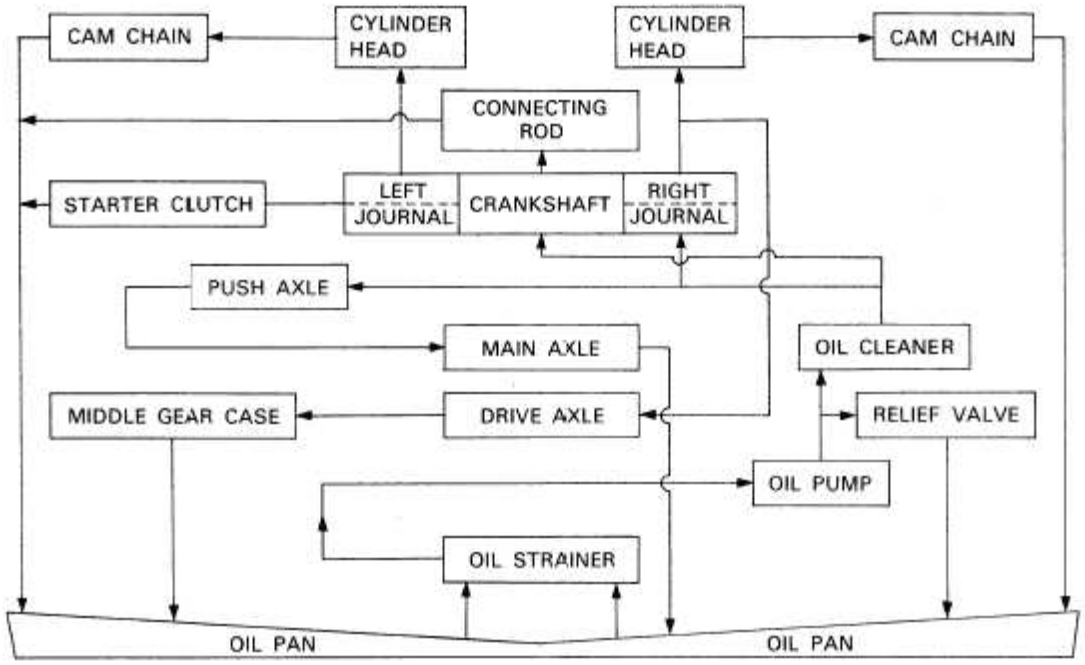
Model	XV500K
Cylinder Head:	
Warp Limit	<0.03 mm (0.0012 in)> *Lines indicate straightedge measurement.
Cylinder:	
Bore Size	73 mm (2.874 in)
Taper Limit	<0.05 mm (0.002 in)>
Out-of-round Limit	<0.01 mm (0.0004 in)>
Camshaft:	
Drive Method	Chain
	(Left, Right)
Cam Cap Inside Diameter	28.000 ~ 28.021 mm (1.1024 ~ 1.1032 in)
Camshaft Outside Diameter	27.96 ~ 27.98 mm (1.1008 ~ 1.1016 in)
Shaft-to-cap Clearance	0.020 ~ 0.061 mm (0.0008 ~ 0.0024 in)
Cam Dimensions	
Intake "A"	39.732 mm (1.5642 in)
Intake "B"	32.221 mm (1.2685 in)
Intake "C"	7.732 mm (0.3044 in)
Exhaust "A"	39.772 mm (1.5658 in)
Exhaust "B"	32.302 mm (1.2717 in)
Exhaust "C"	7.772 mm (0.3060 in)
Camshaft Runout Limit	<0.03 mm (0.0012 in)>
Cam Chain Type/Number of Links	SILENT CHAIN/118 Links
Cam Chain Adjustment Method	Automatic
Rocker Arm/Rocker Arm Shaft:	
Bearing Inside Diameter	14.000 ~ 14.018 mm (0.5512 ~ 0.5519 in)
Shaft Outside Diameter	13.980 ~ 13.991 mm (0.5504 ~ 0.5508 in)
Arm-to-shaft Clearance	0.009 ~ 0.038 mm (0.0004 ~ 0.0015 in)
Valve, Valve Seat, Valve Guide:	
Valve Clearance (Cold)	
IN.	0.10 mm (0.004 in)
EX.	0.15 mm (0.006 in)

Model		XV500K
Valve Dimensions		
   		
"A" Head Dia.	IN.	37.0 ~ 37.2 mm (1.457 ~ 1.465 in)
	EX.	32.0 ~ 32.2 mm (1.260 ~ 1.268 in)
"B" Face Width	IN.	2.3 mm (0.0906 in)
	EX.	2.3 mm (0.0906 in)
"C" Seat Limit Width	IN.	1.0 ~ 1.2 mm (0.039 ~ 0.047 in)
	EX.	1.0 ~ 1.2 mm (0.039 ~ 0.047 in)
"D" Margin Thickness Limit	IN.	1.0 ~ 1.4 mm (0.039 ~ 0.055 in)
	EX.	1.0 ~ 1.4 mm (0.039 ~ 0.055 in)
Stem Outside Diameter	IN.	6.975 ~ 6.990 mm (0.2746 ~ 0.2752 in)
	EX.	6.960 ~ 6.975 mm (0.274 ~ 0.275 in)
Guide Inside Diameter	IN.	7.000 ~ 7.012 mm (0.2756 ~ 0.2761 in)
	EX.	7.000 ~ 7.012 mm (0.2756 ~ 0.2761 in)
Stem-to-guide Clearance		
	IN.	0.010 ~ 0.037 mm (0.0004 ~ 0.0015 in)
	EX.	0.025 ~ 0.052 mm (0.0010 ~ 0.0020 in)
Stem Runout Limit		<0.01 mm (0.0004 in)>
		
Valve Seat Width Standard		
	IN.	1.0 ~ 1.2 mm (0.039 ~ 0.047 in)
	EX.	1.0 ~ 1.2 mm (0.039 ~ 0.047 in)
Valve Spring:		
Free Length		
Inner Spring	IN.	39.9 mm (1.57 in)
	EX.	39.9 mm (1.57 in)
Outer Spring	IN.	43.6 mm (1.72 in)
	EX.	43.6 mm (1.72 in)
Compressed Length (Valve Closed)		
Inner Spring	IN.	34.1 mm (1.37 in)
	EX.	34.1 mm (1.37 in)
Outer Spring	IN.	37.1 mm (1.46 in)
	EX.	37.1 mm (1.46 in)

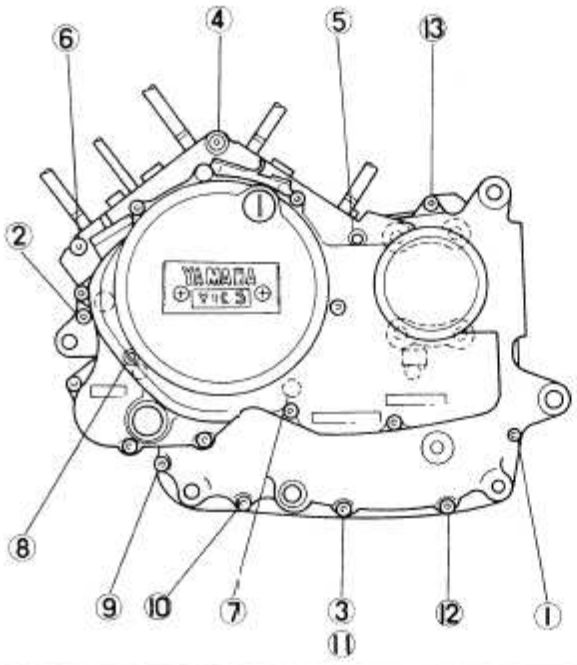
Model		XV500K	
Tilt Limit*:			
Inner Spring	IN. & EX.	2.5° or 1.7 mm (0.067 in)	
Outer Spring	IN. & EX.	2.5° or 1.9 mm (0.075 in)	
			
Direction of Winding (Top view):		IN.	EX.
			
Piston:			
Piston Size/ Measuring Point*		72.92 ~ 72.97 mm (2.871 ~ 2.873 in)/ 3.5 mm (0.138 in) (From bottom line of piston skirt)	
Piston Clearance		0.035 ~ 0.055 mm (0.0014 ~ 0.0022 in)	
Oversize	2nd	73.50 mm (2.894 in)	
	4th	74.00 mm (2.913 in)	
Piston Ring:			
Sectional Sketch	Top Ring	Plain B = 1.2 mm (0.047 in) T = 3.1 mm (0.122 in)	
	2nd Ring	Taper B = 1.5 mm (0.059 in) T = 3.3 mm (0.130 in)	
	Oil Ring	B = 2.5 mm (0.098 in) T = 3.1 mm (0.122 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	0.3 ~ 0.9 mm (0.012 ~ 0.035 in)	
Side Clearance	Top Ring	0.050 ~ 0.080 mm (0.0020 ~ 0.0033 in)	
	2nd Ring	0.030 ~ 0.070 mm (0.0012 ~ 0.0028 in)	
	Oil Ring	0.020 ~ 0.025 mm (0.0008 ~ 0.0010 in)	
Connecting Rod Oil Clearance		0.026 ~ 0.050 mm (0.001 ~ 0.002 in)	
Color Code		1. Blue 2. Black 3. Brown 4. Green	

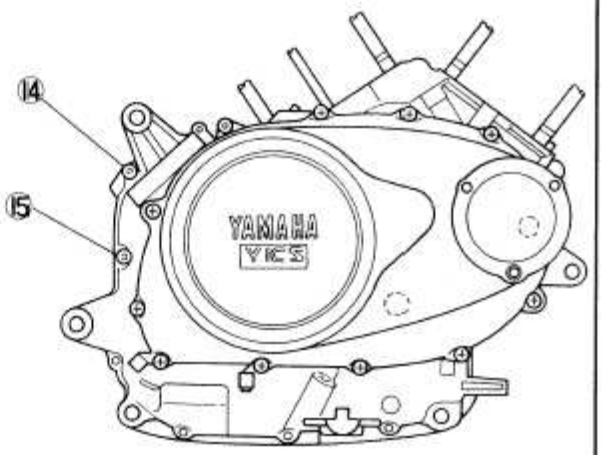
Model	XV500K	
Crankshaft		
		
Crank Width "A"	93.95 ~ 94.00 mm (3.6988 ~ 3.7008 in)	
Runout Limit "B"	<0.02 mm (0.008 in)>	
Big End Side Clearance "C"	0.270 ~ 0.424 mm (0.0106 ~ 0.0167 in)	
Big End Radial Clearance "D"	0.026 ~ 0.050 mm (0.001 ~ 0.002 in)	
Journal Oil Clearance	0.020 ~ 0.052 mm (0.0008 ~ 0.0020 in)	
Clutch:		
Friction Plate Thickness/Quantity	2.9 ~ 3.1 mm (0.1142 ~ 0.1220 in)/6	
Wear Limit	<2.6 mm (0.1024 in)>	
Clutch Plate Thickness/Quantity	1.5 ~ 1.7 mm (0.059 ~ 0.067 in)/5	
Warp Limit	<0.2 mm (0.008 in)>	
Clutch Spring Free Length/Quantity	39.5 mm (1.555 in)/5	
Clutch Spring Minimum Length	38.5 mm (1.516 in)	
Clutch Release Method	Inner push (Cam push)	
Push Rod Bending Limit	<0.5 mm (0.020 in)>	
Transmission:		
Main Axle Deflection Limit	<0.06 mm (0.0024 in)>	
Drive Axle Deflection Limit	<0.06 mm (0.0024 in)>	
Shifter:		
Shifter Type	Guide bar	
Carburetor:		
Type/Manufacturer/Quantity	BDS34/MIKUNI/2	
I.D. Mark	22U01	
	FRONT	REAR
Main Jet (M.J.)	#140	#135
Main Air Jet (M.A.J.)	ø140	←
Jet Needle-clip Position (J.N.)	5D4	5D2
Needle Jet (N.J.)	Y-0	←
Throttle Valve (Th.V.)	140	←
Pilot Jet (P.J.)	#37.5	←
Pilot Air jet #1 (P.A.J.1)	#80	←
Pilot Air Jet #2 (P.A.J.2)	#145	←
Pilot Screw (P.S.)	Preset	←
Valve Seat (V.S.)	ø2.0	←
Starter Jet #1 (G.S.1)	#40	←
Starter Jet #2 (G.S.2)	#0.8	←
Fuel Level (F.L.)	12±1 mm (0.47±0.04 in)	←

Model	XV500K
Engine Idling Speed	1,200 r/min
Vacuum Pressure at Idling Speed	Above 30.59 kPa (230 mm Hg 9.06 in Hg)
Vacuum Synchronous Difference	Below 1.33 kPa (10 mm Hg 0.39 in Hg)
Lubrication System:	
Oil Filter Type	Paper
Oil Pump Type	Trochoid pump
Tip Clearance	0.12 mm (0.0047 in)
Side Clearance	0.03 ~ 0.08 mm (0.0012 ~ 0.0031 in)
Relief Valve Operating Pressure	441.32 ~ 539.39 kPa (4.5 ~ 5.5 kg/cm², 63.99 ~ 78.21 psi)
Lubrication Chart	
Middle Gear Backlash	0.1 ~ 0.2 mm (0.0039 ~ 0.0079 in)
Final Gear Backlash	0.1 ~ 0.2 mm (0.0039 ~ 0.0079 in)



Model	XV500K
Crankcase Tightening Sequence LEFT-CASE	RIGHT-CASE





Tightening Torque:

		Thread Size	Q'ty	Nm	m·kg	ft·lb	Remarks
Cylinder head	Nut	M10×1.25	4	35	3.5	25.0	Front cyl.
Cylinder head	Nut	M10×1.25	4	35	3.5	25.0	Rear cyl.
Cylinder head	Cap nut	M8 ×1.25	2	20	2.0	14.0	
Cylinder head	Bolt	M8 ×1.25	4	20	2.0	14.0	
Cylinder head (exhaust pipe flange)	Stud bolt	M8 ×1.25	4	13	13.0	9.4	
Cam sprocket cover	Bolt	M6 ×1.0	4	10	1.0	7.2	
Rocker arm shaft stopper	Union bolt	M16×1.5	4	38	3.8	27.0	
Spark plug	—	M14×1.25	2	20	2.0	14.0	
Camshaft bearing stopper	Bolt	M6 ×1.0	4	10	1.0	7.2	Use lock washer
Cylinder body	Bolt	M6 ×1.0	2	10	1.0	7.2	
YICS chamber	Flange bolt	M6 ×1.0	1	10	1.0	7.2	
Connecting rod	Nut	M8 ×0.75	4	36	3.6	25.0	Apply molybdenum disufide grease
Flywheel	Bolt	M10×1.25	1	80	8.0	58.0	
Valve adjuster locknut	Nut	M6 ×1.0	4	14	1.4	10.0	
Valve cover	Bolt	M6 ×1.0	8	10	1.0	7.2	
Cam sprocket	Bolt	M10×1.25	2	55	5.5	40.0	
Cam chain tensioner assembly	Bolt	M6 ×1.0	4	12	1.2	8.7	
Cam chain guide stopper	Bolt	M6 ×1.0	4	10	1.0	7.2	
Oil pump assembly	Bolt	M6 ×1.0	3	7	0.7	5.1	
Oil passage housing	Bolt	M6 ×1.0	3	10	1.0	7.2	
Oil filter cover	Bolt	M6 ×1.0	3	10	1.0	7.2	
Oil filter cover air bleed	Screw	M5 × —	1	5	0.5	3.6	
Carburetor joint	Bolt	M6 ×1.0	4	10	1.0	7.2	
Exhaust pipe flange	Nut	M8 ×1.25	4	20	2.0	14.0	
Crankcase (left and right)	Bolt	M8 ×1.25	4	24	2.4	17.0	
Crankcase (left and right)	Bolt	M6 ×1.0	10	10	1.0	7.2	
Drive axle bearing stopper	Screw	M8 ×1.25	4	25	2.5	18.0	Stake
Crankcase cover (left)	Bolt	M6 ×1.0	10	10	1.0	7.2	
Crankcase cover (right)	Bolt	M6 ×1.0	11	10	1.0	7.2	
Starter clutch assembly	Bolt	M8 ×1.25	3	20	2.0	14.0	Stake
Primary drive gear	Nut	M16×1.0	1	70	7.0	50.0	
Clutch pressure plate	Screw	M6 ×1.0	5	8	0.8	5.8	
Clutch adjuster locknut	Nut	M6 ×1.0	1	8	0.8	5.8	
Clutch boss	Nut	M20×1.0	1	70	7.0	50.0	Use lock washer
Clutch push lever	Screw	M8 ×1.0	1	12	1.2	8.7	
Middle drive gear	Nut	M20×1.0	1	120	12.0	85.0	Bend locknut tab
Universal joint yoke	Nut	M14×1.5	1	90	9.0	65.0	Apply LOCTITE®
Middle driver shaft bearing housing	Bolt	M8 ×1.25	4	25	2.5	18.0	
Cam shift segment	Screw	M5 ×0.8	1	4	0.4	2.9	Apply LOCTITE®

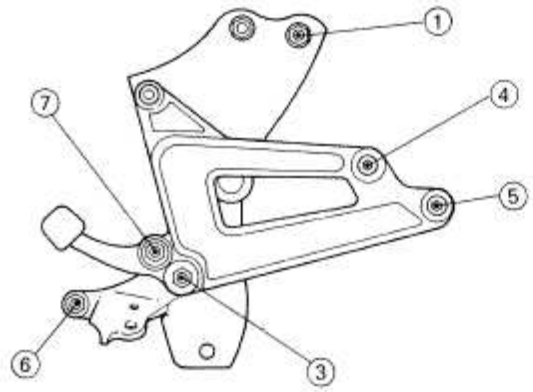
Chassis

Model	XV500K
Steering System:	
Steering Bearing Type	Ball Bearing
No./ Size of Steel Balls Upper	19 pcs/ 1/4 in
Lower	19 pcs/ 1/4 in
Front Suspension:	
Front Fork Travel	150 mm (5.91 in)
Fork Spring Free Length	475.5 mm (18.72 in)
<Limit>	<470.5 mm (18.52 in)>
Collar length	190 mm (7.48 in)
Spring Rate/ Stroke	K_1 = 6.86 N/mm (0.70 kg/mm, 39.2 lb/in)
	0 ~ 80 mm (0 ~ 3.1496 in)
	K_2 = 10.40 N/mm (1.06 kg/mm, 59.3 lb/in)
	80 ~ 150 mm (3.1496 ~ 5.9055 in)
Optional Spring	No.
Oil Capacity or	296 cm^3 (10.4 Imp oz, 10.0 US oz)
Oil Level	421 mm (16.6 in)
	(From top of inner tube fully compressed without spring.)
Oil Grade	Yamaha fork oil 10 wt
Rear Suspension:	
Shock Absorber Travel	55 mm (2.17 in)
Spring Free Length	234 mm (9.21 in)
<Limit>	<229 mm (9.02 in)>
Fitting length	226 mm (8.90 in)
Spring Rate/ Stroke	K_1 = 73.6 N/mm (7.5 kg/mm, 420 lb/in)
	0 ~ 32 mm (0 ~ 1.26 in)
	K_2 = 108 N/mm (11.0 kg/mm, 616 lb/in)
	32 ~ 55 mm (1.26 ~ 2.16 in)
Optional Spring	No.
Spring Position (S.T.D.)	"3"
Rear Arm:	
Swing Arm Free Play Limit	
End	<1 mm (0.0394 in)>
Side	<1 mm (0.0394 in)>
Wheel:	
Front Wheel Type	Cast Wheel
Rear Wheel Type	Cast Wheel
Front Rim Size/ Material	MT1.85 × 19/ Aluminum
Rear Rim Size/ Material	MT2.50 × 16/ Aluminum
Rim Runout Limit	
Vertical	<2 mm (0.079 in)>
Lateral	<2 mm (0.079 in)>

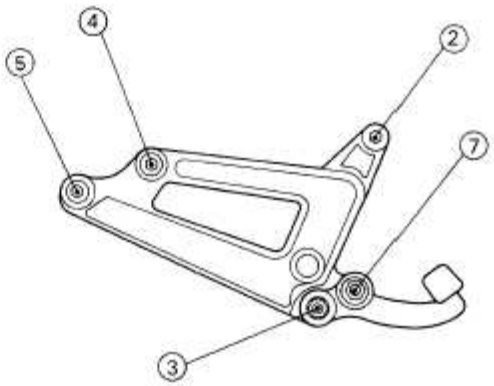
Model		XV500K
Disc Brake:		
Type	Front	Single disc
Outside Dia × Thickness	Front	298 × 5 mm (11.73 × 0.20 in)
Pad Thickness		
<Limit>	Inner	6.8 mm (0.268 in) <0.8 mm (0.032 in)>
	Outer	6.8 mm (0.268 in) <0.8 mm (0.032 in)>
Master Cylinder Inside Dia.		
<Limit>		12.7 mm (0.50 in)
Caliper Cylinder Inside Dia.		
<Limit>		38.18 mm (1.50 in)
Brake Fluid Type		DOT #3
Drum Brake:		
Type	Rear	Leading and trailing
Drum Inside Dia		
<Limit>	Rear	180 mm (7.09 in) <181 mm (7.13 in)>
Lining Thickness		
<Limit>		4 mm (0.16 in) <2 mm (0.08 in)>
Shoe Spring Free Length		68 mm (2.68 in)
Brake Lever & Brake Pedal:		
Brake Lever Free Play/position		5 ~ 8 mm (0.2 ~ 0.3 in)/at lever end
Brake Pedal Position		Same level with footrest top
Brake Pedal Free Play		20 ~ 30 mm (0.8 ~ 1.2 in) (Vertical height below footrest top)
Clutch Lever Free Play/position		2 ~ 3 mm (0.08 ~ 0.12 in)/at lever pivot

Tightening Torque:

	Thread Size	Nm	M·kg	ft·lb	Remarks
Front axle	M14×1.5	105	10.5	75.0	
Front fender-Front forks	M8 ×1.25	10	1.0	7.2	
Under bracket-Inner tube	M8 ×1.25	20	2.0	14.0	
Steering crown-Inner tube	M8 ×1.25	20	2.0	14.0	
Steering stem	M14×1.25	54	5.4	39.0	
Brake caliper-Front fork	M10×1.25	35	3.5	25.0	
Front axle shaft holder	M8 ×1.25	20	2.0	14.0	
Steering crown pinch bolt	M8 ×1.25	20	2.0	14.0	
Brake disc-Front wheel hub	M8 ×1.25	20	2.0	14.0	
Front brake hose (All)	M10×1.25	26	2.6	19.0	
Air bleed (Caliper)	M8 ×1.25	6	0.6	4.3	
Master cylinder cap	M5 ×0.8	2	0.2	1.4	
Master cylinder bracket	M6 ×1.0	9	0.9	6.5	
Engine mounting bracket (Front upper) -Cylinder head	M10×1.25	55	5.5	40.0	
Engine mounting bracket (Front upper) -Frame	M10×1.25	55	5.5	40.0	
Engine mounting bracket (Rear upper) -Frame	M10×1.25	55	5.5	40.0	
Lower frame-Main frame	M10×1.25	55	5.5	40.0	Refer to No. 1
Muffler bracket-Engine upper	M10×1.25	55	5.5	40.0	Refer to No. 2
Muffler bracket-Engine lower	M12×1.25	70	7.0	50.0	Refer to No. 3
Brake pedal pinch bolt	M6 ×1.0	9	0.9	6.5	
Muffler bracket-Rear frame	M10×1.25	55	5.5	40.0	Refer to No. 4
Muffler bracket-Muffler	M10×1.25	35	3.5	25.0	Refer to No. 5
Frame-Rear frame	M10×1.25	55	5.5	40.0	
Pivot shaft	M16×1.5	75	7.5	54.0	
Final gear case (Side)-Rear frame	M10×1.25	42	4.2	30.0	
Final gear case (Stud bolt)-Rear arm end	M10×1.25	42	4.2	30.0	
Rear axle	M14×1.5	105	10.5	75.0	
Rear axle pinch bolt	M8 ×1.25	6	0.6	4.3	
Clutch hub-Al. wheel	M10×1.25	64	6.4	46.0	
Rear shock absorber (Front)	M12×1.25	45	4.5	32.0	
Sidestand bracket	M10×1.25	55	5.5	40.0	Refer to No. 6
Rear fender-Rear frame	M8 ×1.25	20	2.0	14.0	
Tension bar-Rear arm	M8 ×1.25	20	2.0	14.0	
Tension bar-Rear brake plate	M8 ×1.25	20	2.0	14.0	
Rear stay-Frame	M8 ×1.25	20	2.0	14.0	
Muffler bracket-Footrest	M10×1.25	55	5.5	40.0	Refer to No. 7

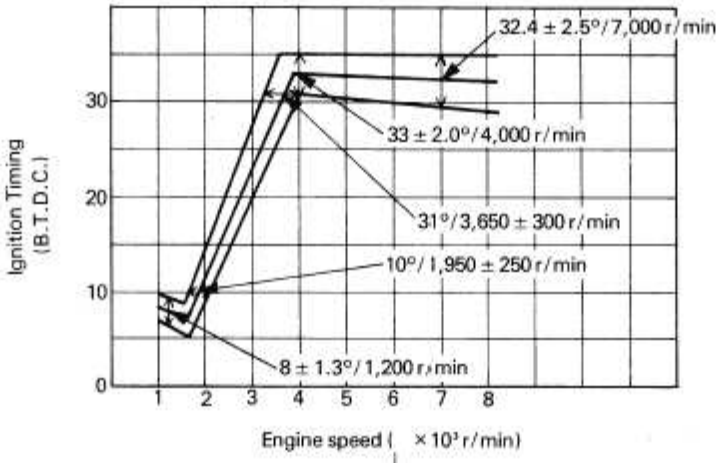


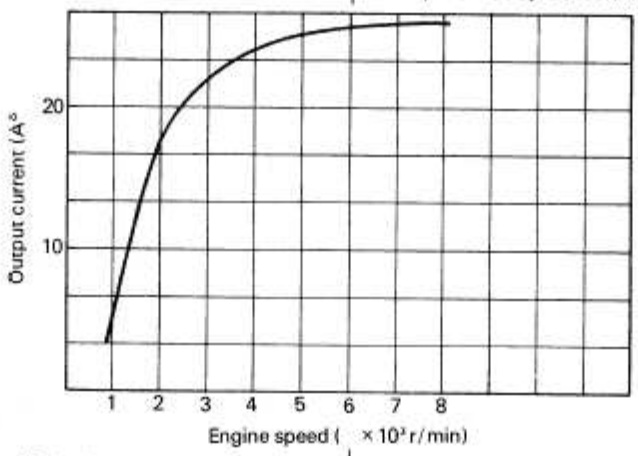
Muffler Bracket (L/H)



Muffler Bracket (R/H)

Electrical

Model	XV500K
Voltage	12V
Ignition System: Ignition Timing (B.T.D.C.) Advanced Timing (B.T.D.C.) Advancer Type	 8° at 1,200 r/min 33° at 4,000 r/min 
T.C.I.: Pickup Coil Resistance (Color) T.C.I. Unit-Model/ Manufacturer	 155 Ω ± 10% at 20°C (68°F) (Green — Brown), (Red — Blue) J4T01071/ MITSUBISHI
Ignition Coil: Model/ Manufacturer Minimum Spark Gap Primary Winding Resistance Secondary Winding Resistance	 F6T423/ MITSUBISHI 6 mm (0.24 in) 2.7 Ω ± 15 % at 20°C (68°F) 3.5 KΩ ± 15 % at 20°C (68°F)
Spark Plug Cap Type Resistance	 Resin Type 5 KΩ
Charging System/ Type	A.C. Magneto

Model	XV500K
A.C. Generator	
Model/ Manufacturer	F3T420/ MITSUBISHI
Nominal Output	14V, 1.5A at 5,000 r/min
	
Stator Coil Resistance (Color)	0.4Ω ± 10% at 20°C (68°F) (White — White)
Voltage Regulator	
-Type	Short Circuit Type
-Model/ Manufacture	SH238-12B/ SHINDENGEN
-No Load Regulated Voltage	14 ~ 15V
Rectifier	
-Model/ Manufacturer	SH238-12B/ SHINDENGEN
-Capacity	20A
-Withstand Voltage	200V
Battery:	
Capacity	12V 12AH
Specific Gravity	1.280
Electric Starter System:	
Type	Constant mesh type
Starter Motor-Model/ Manufacturer	SM-8219/ MITSUBA
-Out put	0.6 kw
Brush-Overall Length	12 mm (0.472 in)
<Limit>	<5 mm (0.197 in)>
-Spring Pressure	800 ~ 520 g (28.216 ~ 18.340 oz)
Commutator Dia.	28 mm (1.10 in)
<Wear Limit>	<27 mm (1.06 in)>
-Mica Undercut	1.6 mm (0.06 in)
Starter switch	
Model/ Manufacturer	22U/ HONDALOCK
Amperage Rating	150A
Horn:	
Type/ Quantity	Plain type × 2
Model/ Manufacturer	YPL-12, YPH-12/ NIKKO
Maximum Amperage	2A

Model	XV500K
Flasher Relay:	
Type	Condenser type
Model/ Manufacturer	FU257CD/ NIPPONDENSO
Self Cancelling Device	Yes
Flasher Frequency	75 – 95 cycle/ min
Wattage	27W × 2 + 3.4W
Self Cancelling Unit:	
Model/ Manufacturer	YH-001/ MATSUSHITA
Reserve Lighting Unit:	No.
Oil Level Switch:	
Model/ Manufacturer	22U/ NIPPONDENSO
Headlight Relay:	No.
Sidestand Relay:	Yes.
Model/ Manufacturer	G2MW-D-3626/ TATEISHI
Coil Winding Resistance	100 Ω ± 10 % at 20°C (68°F)
Color Code	Blue
Diode	No.
Starting Circuit Cut-off Relay	Yes.
Model/ Manufacture	G4MW-D-380/ TATEISHI
Coil Winding Resistance	75 Ω ± 10 % at 20°C (68°F)
Diode	Yes.
Circuit Breaker:	
Type	Fuse
Amperage for Individual Circuit/ Quantity	
Main	20A × 1
Headlight	10A × 1
Signal	10A × 1
Ignition	10A × 1
Reserve	20A × 1, 10A × 1

CONSUMER INFORMATION

NOTICE

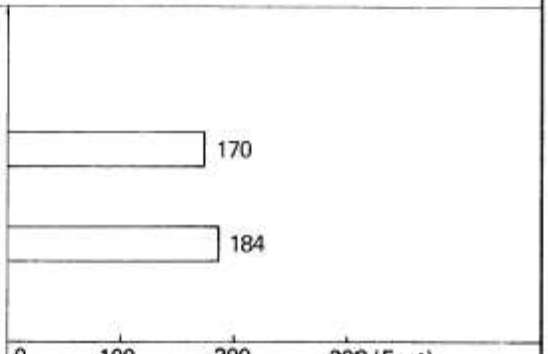
The information presented represents results obtainable by skilled drivers under controlled road and vehicle conditions, and the information may not be correct under other conditions.

Stopping distance

These figures indicate braking performance that can be met or exceeded by the vehicles to which they apply, without locking the wheels, under different conditions of loading and with partial failures of the braking system. 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.

Description of vehicles to which this table applies.: Yamaha motorcycle XV500K

A. Fully Operational Service Brake

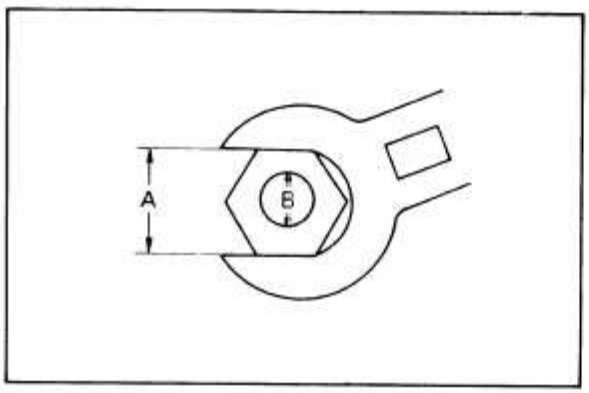


NOTE:
The statement above is required by U.S. Federal law. "Partial failures" of the braking system do not apply to this chart.

GENERAL TORQUE SPECIFICATIONS

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

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



DEFINITION OF UNITS

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

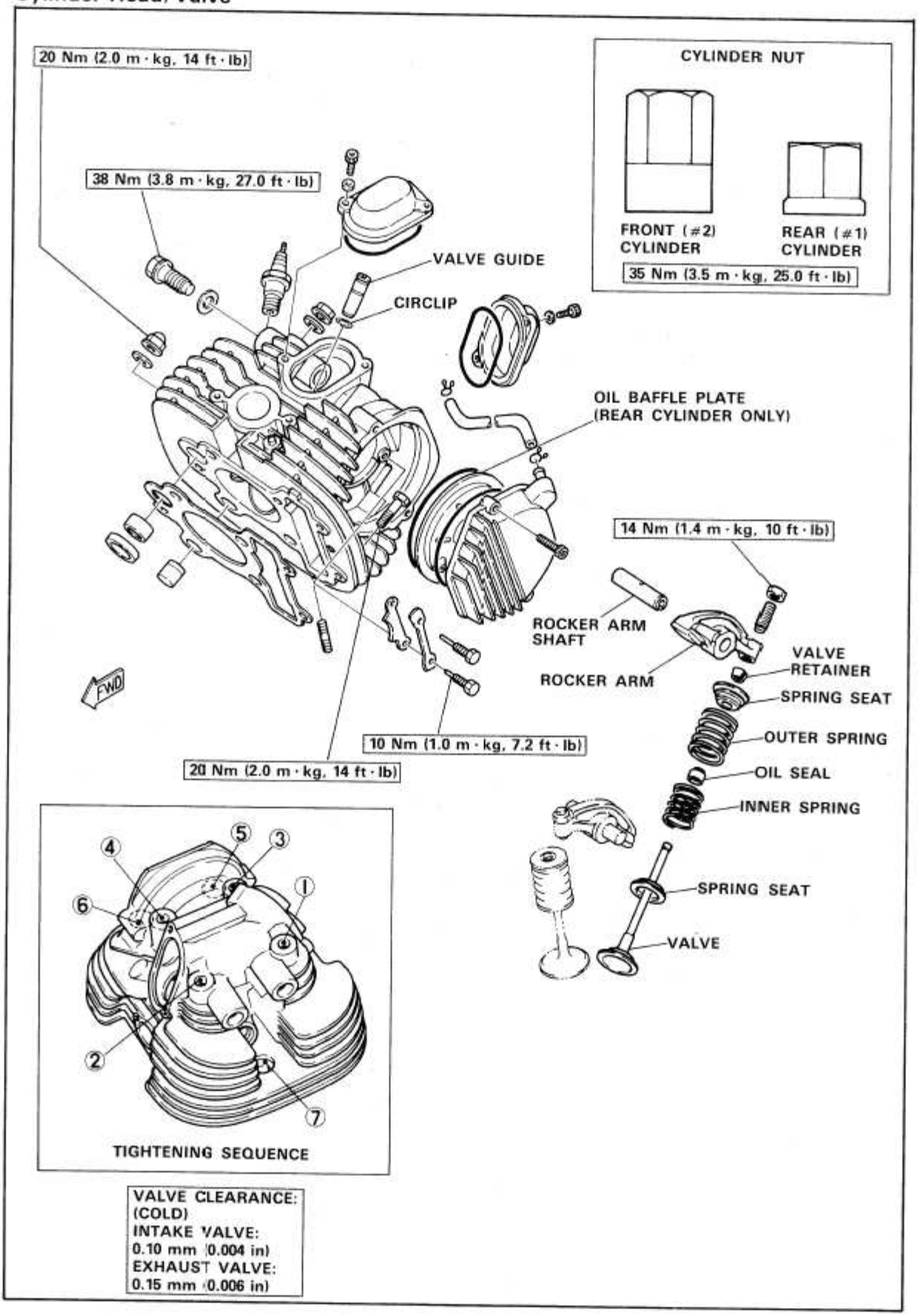
CONVERSION TABLES

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

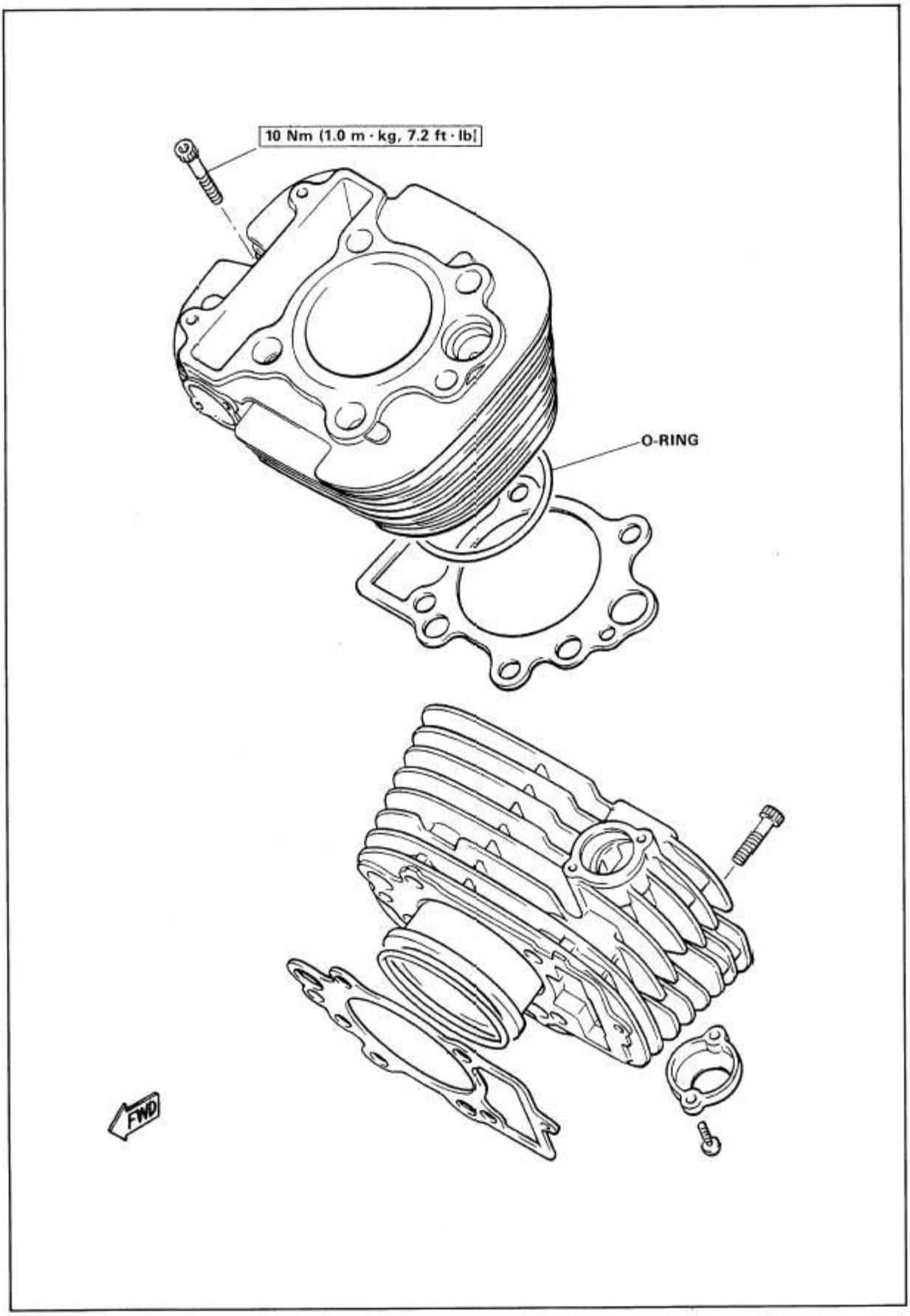
Inch to metric system		
Known	Multiplier	Result
ft·lb	0.13826	m·kg
in·lb	0.01152	m·kg
ft·lb	13.831	cm·kg
in·lb	1.1521	cm·kg
lb	0.4535	kg
oz	28.352	g
mpg	0.4252	km/lit
mph	1.609	km/hr
mi	1.609	km
ft	0.3048	m
yd	0.9141	m
in	2.54	cm
in	25.4	mm
oz (US liq)	29.57	cc (cm^{3})
cu in	16.387	cc (cm^{3})
pt (US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

EXPLODED DIAGRAMS

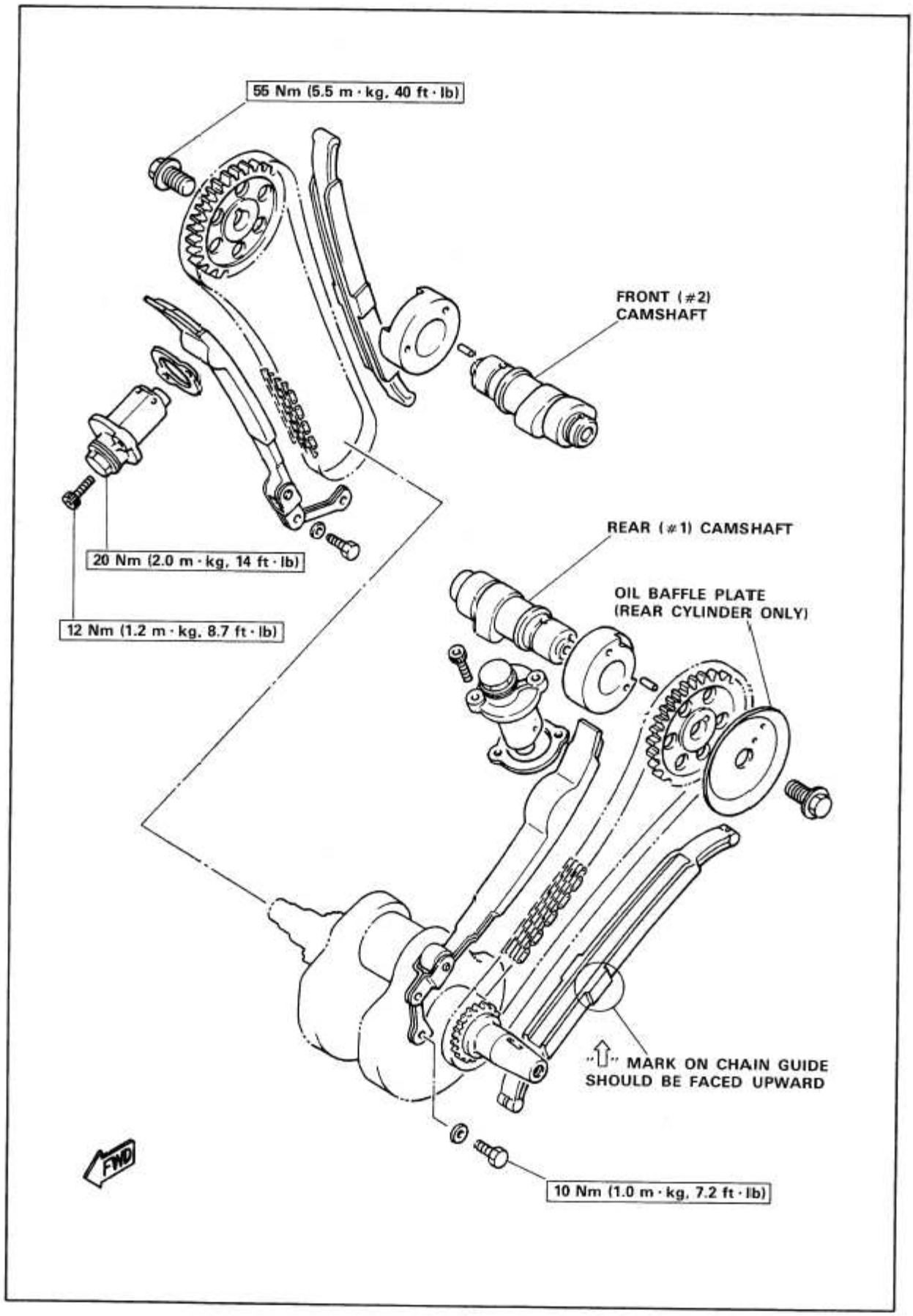
Cylinder Head/Valve



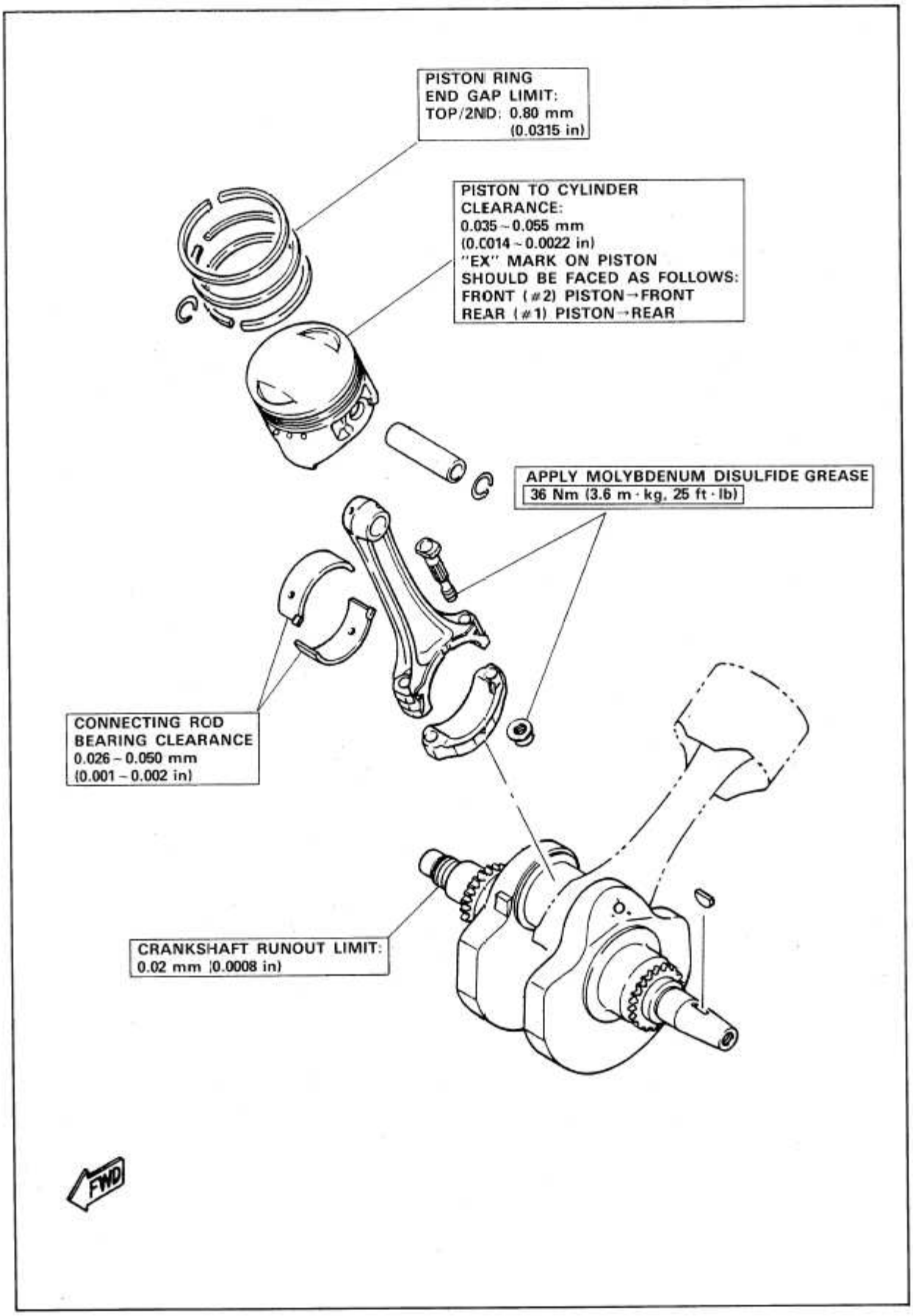
Cylinder

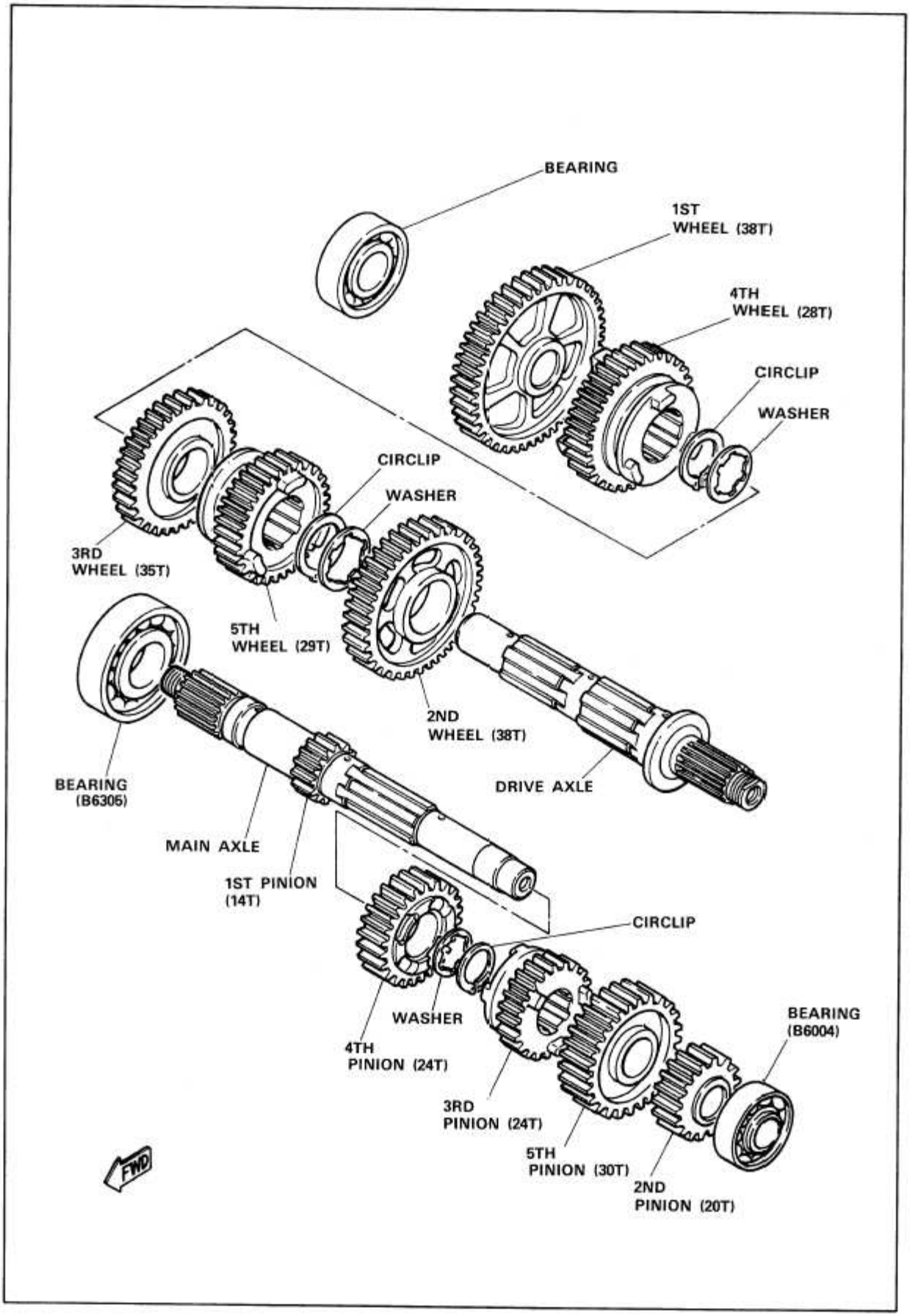


Cam Chain

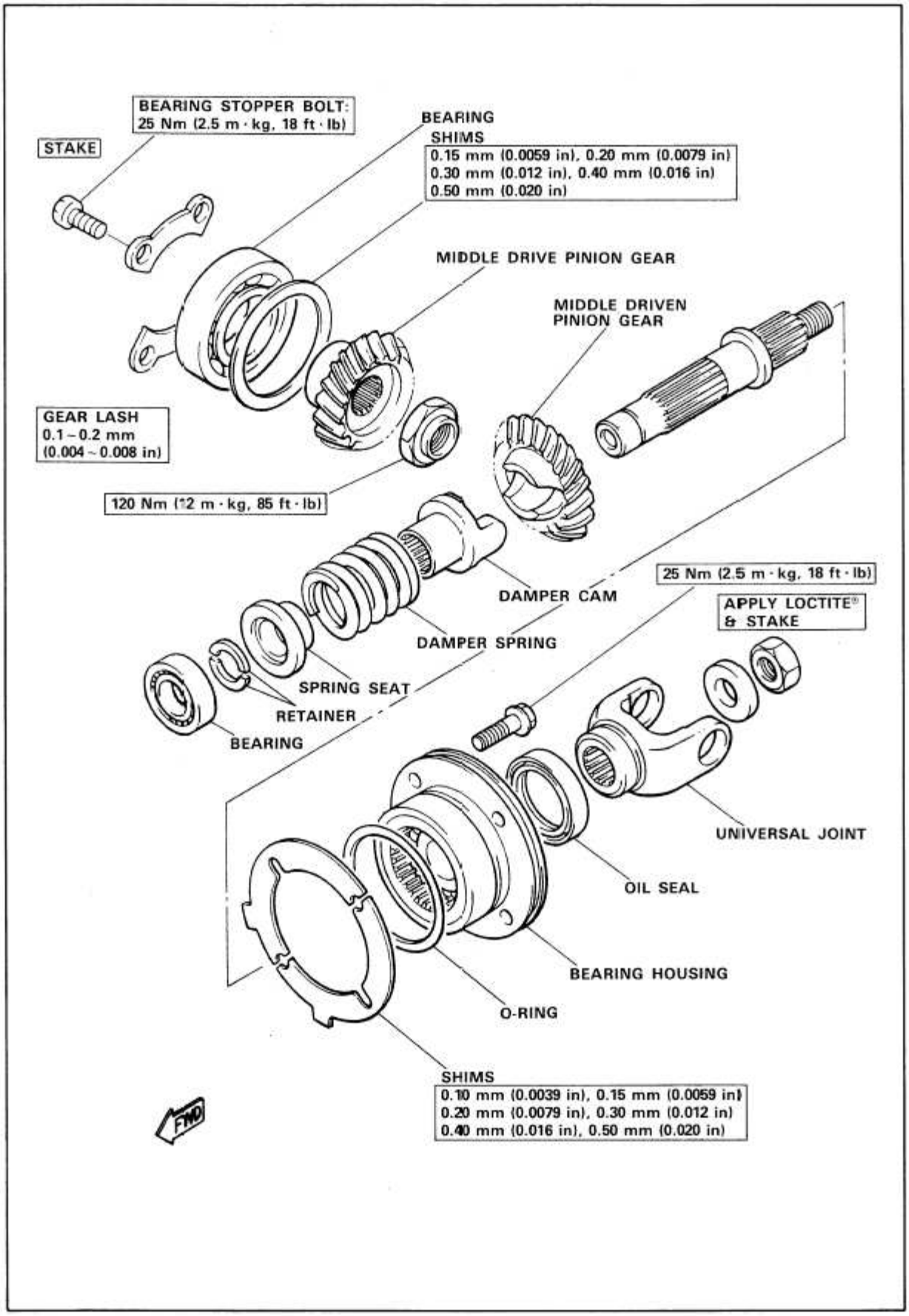

55 Nm (5.5 m · kg, 40 ft · lb)
FRONT (#2) CAMSHAFT
20 Nm (2.0 m · kg, 14 ft · lb)
12 Nm (1.2 m · kg, 8.7 ft · lb)
REAR (#1) CAMSHAFT
OIL BAFFLE PLATE (REAR CYLINDER ONLY)
"⇧" MARK ON CHAIN GUIDE SHOULD BE FACED UPWARD
FWD
10 Nm (1.0 m · kg, 7.2 ft · lb)

Crankshaft/Connecting Rod/Piston

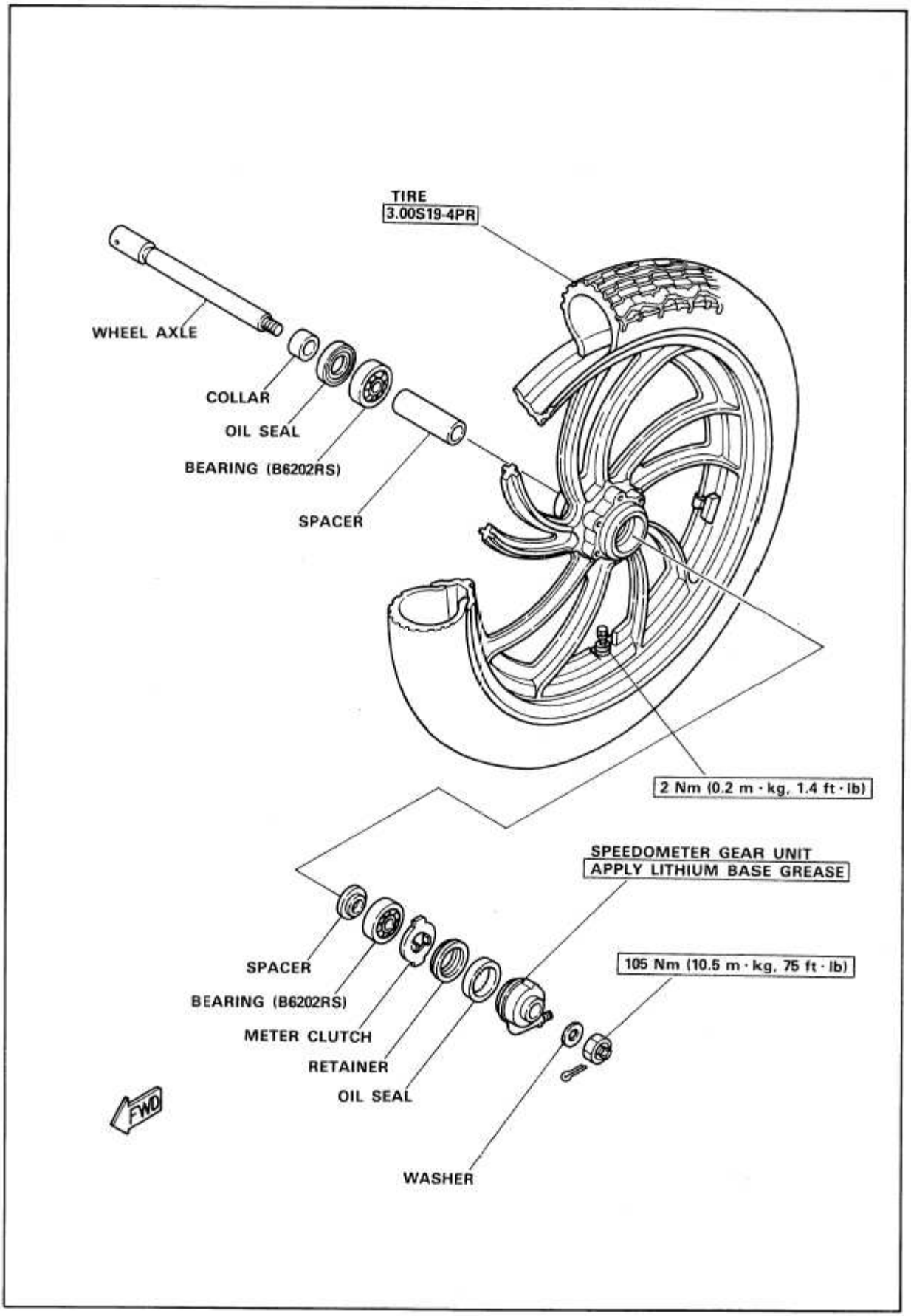



BEARING
1ST WHEEL (38T)
4TH WHEEL (28T)
CIRCLIP
WASHER
CIRCLIP
WASHER
3RD WHEEL (35T)
5TH WHEEL (29T)
2ND WHEEL (38T)
BEARING (B6305)
DRIVE AXLE
MAIN AXLE
1ST PINION (14T)
CIRCLIP
WASHER
BEARING (B6004)
4TH PINION (24T)
3RD PINION (24T)
5TH PINION (30T)
2ND PINION (20T)
FWD

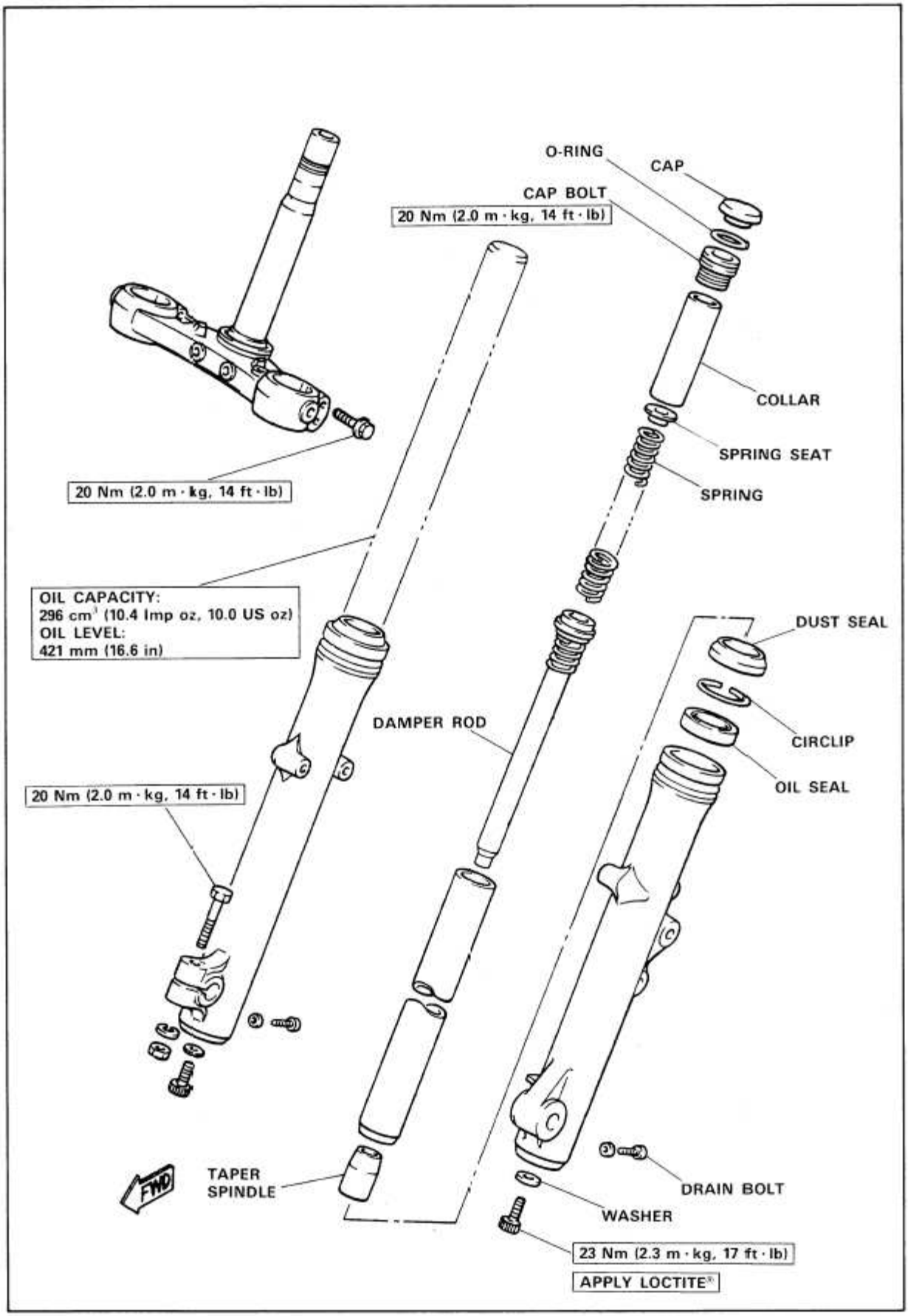
Middle Gear


BEARING STOPPER BOLT:
25 Nm (2.5 m · kg, 18 ft · lb)
STAKE
BEARING
SHIMS
0.15 mm (0.0059 in), 0.20 mm (0.0079 in)
0.30 mm (0.012 in), 0.40 mm (0.016 in)
0.50 mm (0.020 in)
MIDDLE DRIVE PINION GEAR
MIDDLE DRIVEN
PINION GEAR
GEAR LASH
0.1 – 0.2 mm
(0.004 – 0.008 in)
120 Nm (12 m · kg, 85 ft · lb)
DAMPER CAM
DAMPER SPRING
SPRING SEAT
RETAINER
BEARING
25 Nm (2.5 m · kg, 18 ft · lb)
APPLY LOCTITE®
& STAKE
UNIVERSAL JOINT
OIL SEAL
BEARING HOUSING
O-RING
SHIMS
0.10 mm (0.0039 in), 0.15 mm (0.0059 in)
0.20 mm (0.0079 in), 0.30 mm (0.012 in)
0.40 mm (0.016 in), 0.50 mm (0.020 in)
FWD

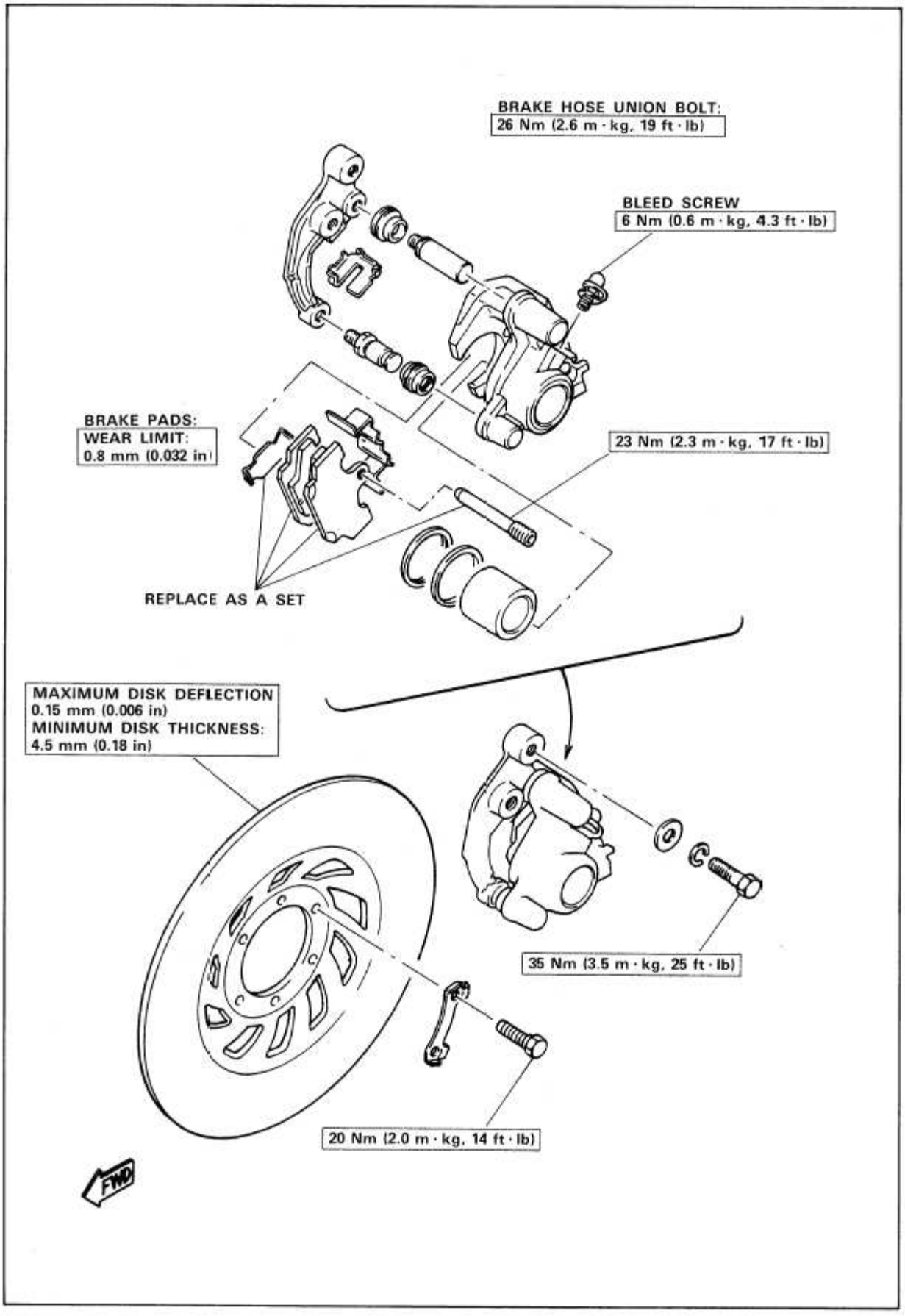
Front Wheel

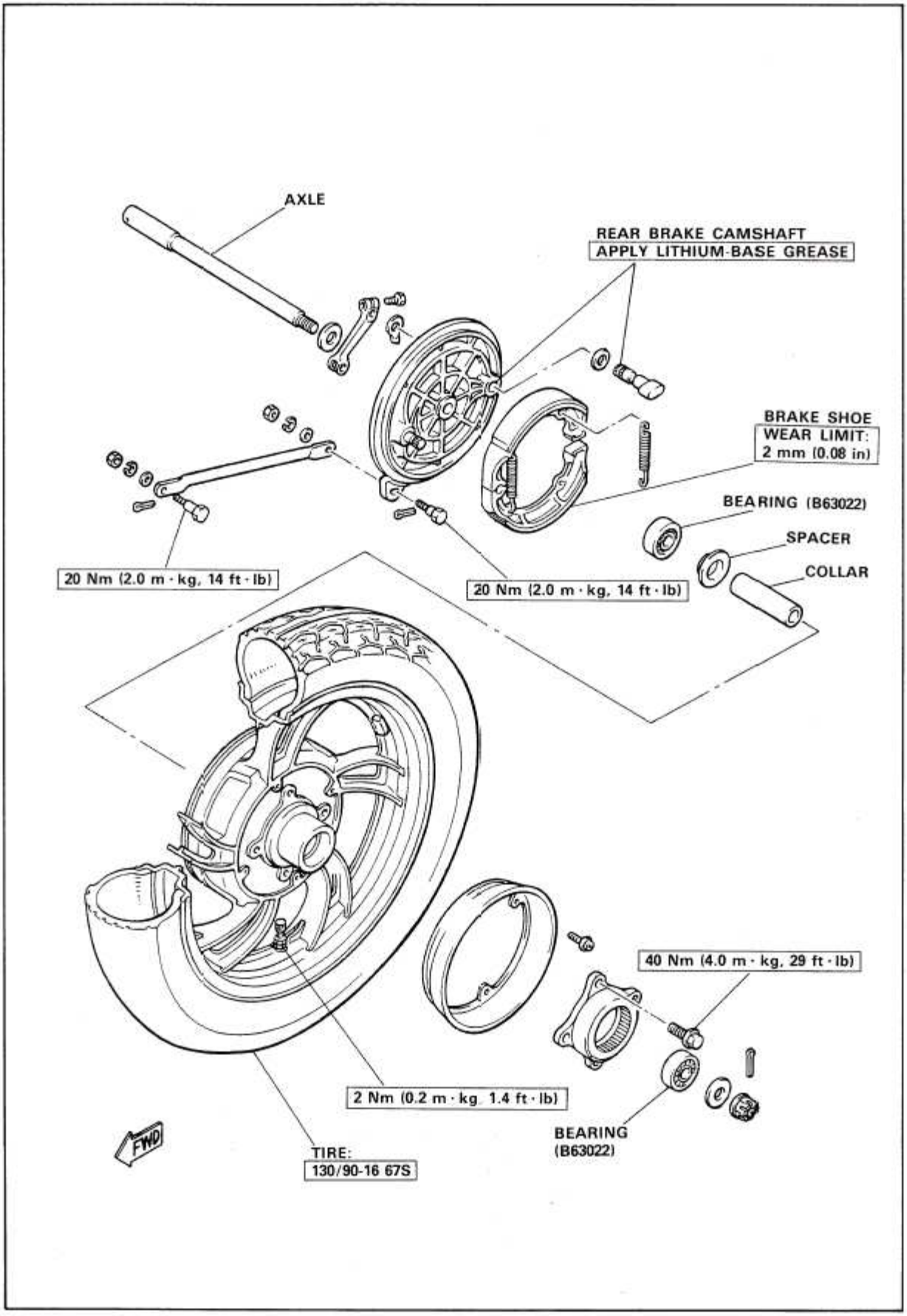

TIRE
3.00S19-4PR
WHEEL AXLE
COLLAR
OIL SEAL
BEARING (B6202RS)
SPACER
2 Nm (0.2 m · kg, 1.4 ft · lb)
SPEEDOMETER GEAR UNIT
APPLY LITHIUM BASE GREASE
105 Nm (10.5 m · kg, 75 ft · lb)
SPACER
BEARING (B6202RS)
METER CLUTCH
RETAINER
OIL SEAL
FWD
WASHER

Front Fork

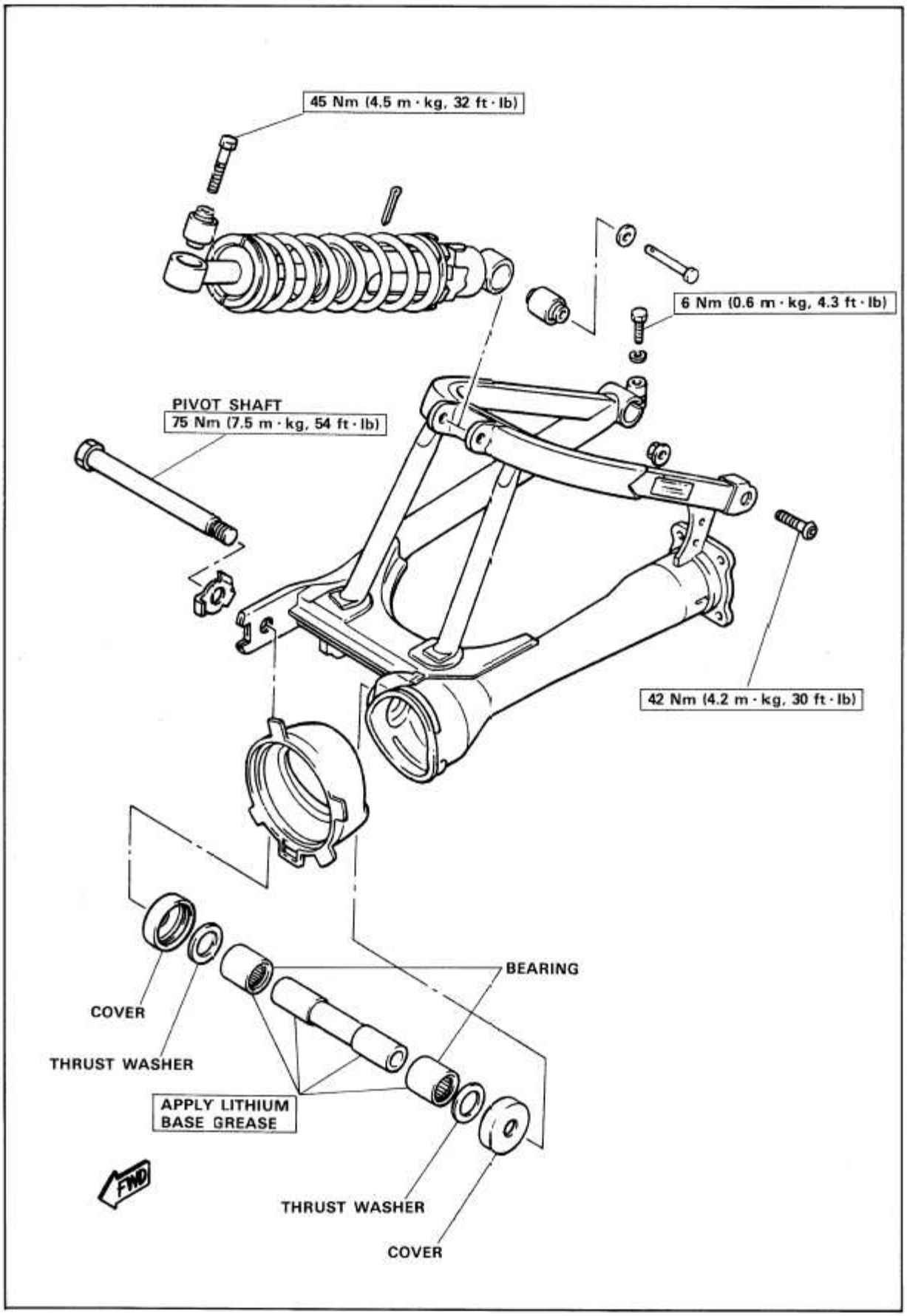

O-RING
CAP
CAP BOLT
20 Nm (2.0 m · kg, 14 ft · lb)
COLLAR
SPRING SEAT
SPRING
20 Nm (2.0 m · kg, 14 ft · lb)
OIL CAPACITY:
296 cm³ (10.4 Imp oz, 10.0 US oz)
OIL LEVEL:
421 mm (16.6 in)
DUST SEAL
DAMPER ROD
CIRCLIP
OIL SEAL
20 Nm (2.0 m · kg, 14 ft · lb)
FWD
TAPER
SPINDLE
DRAIN BOLT
WASHER
23 Nm (2.3 m · kg, 17 ft · lb)
APPLY LOCTITE®

Front Brake Caliper

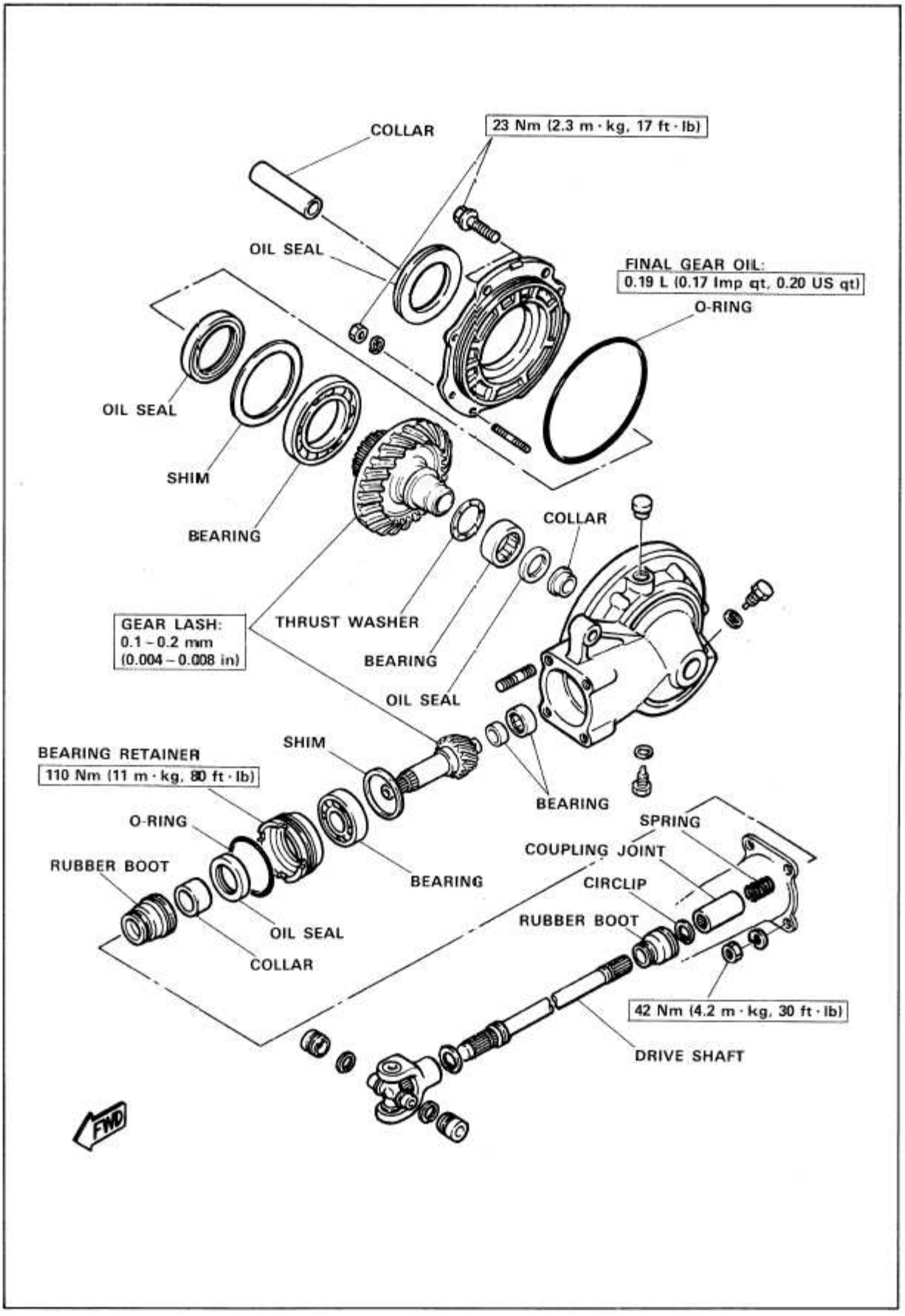


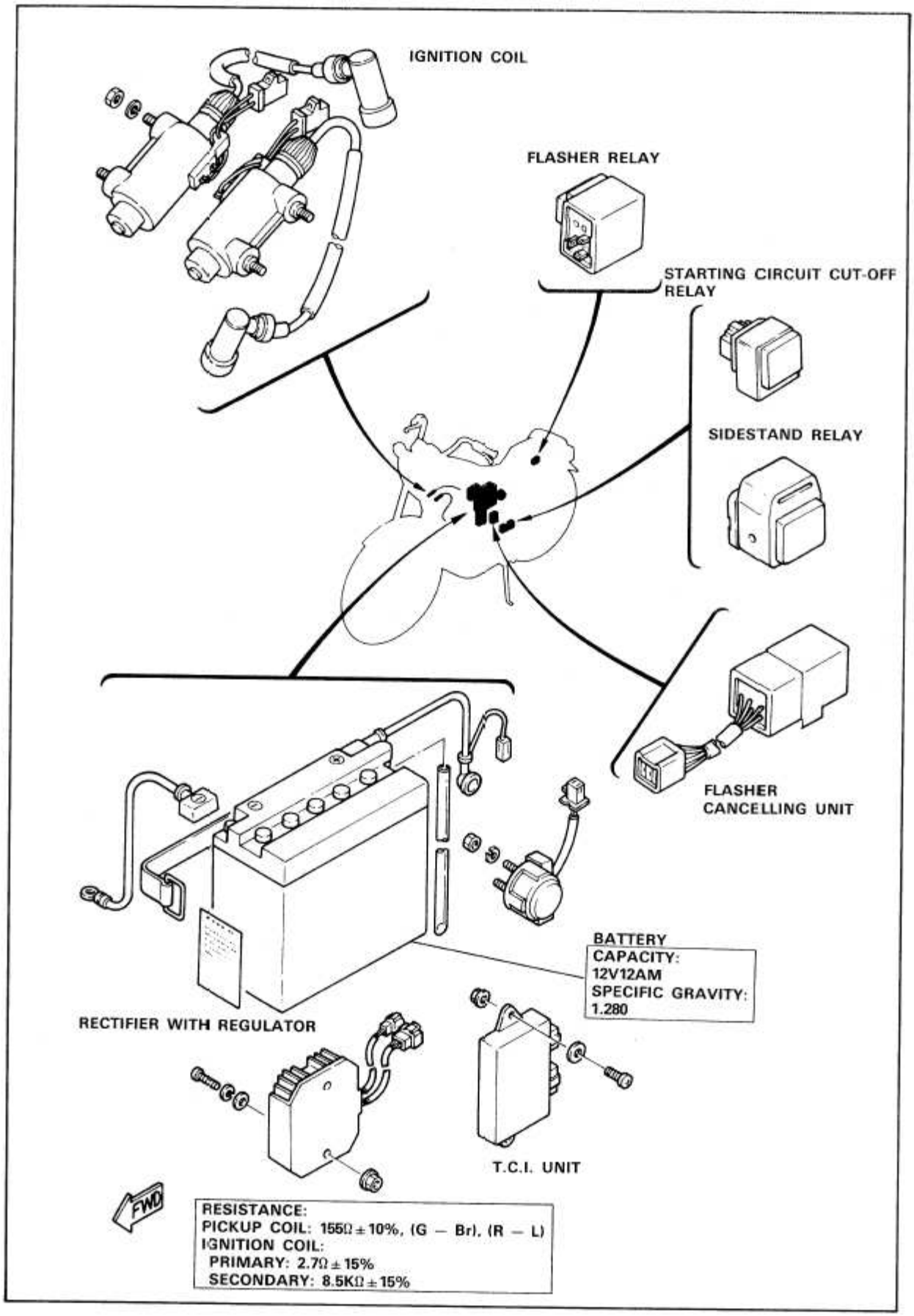

AXLE
REAR BRAKE CAMSHAFT
APPLY LITHIUM-BASE GREASE
BRAKE SHOE
WEAR LIMIT:
2 mm (0.08 in)
BEARING (B63022)
SPACER
COLLAR
20 Nm (2.0 m · kg, 14 ft · lb)
20 Nm (2.0 m · kg, 14 ft · lb)
40 Nm (4.0 m · kg, 29 ft · lb)
2 Nm (0.2 m · kg, 1.4 ft · lb)
BEARING
(B63022)
FWD
TIRE:
130/90-16 67S

Swingarm


45 Nm (4.5 m · kg, 32 ft · lb)
6 Nm (0.6 m · kg, 4.3 ft · lb)
PIVOT SHAFT
75 Nm (7.5 m · kg, 54 ft · lb)
42 Nm (4.2 m · kg, 30 ft · lb)
BEARING
COVER
THRUST WASHER
APPLY LITHIUM BASE GREASE
FWD
THRUST WASHER
COVER

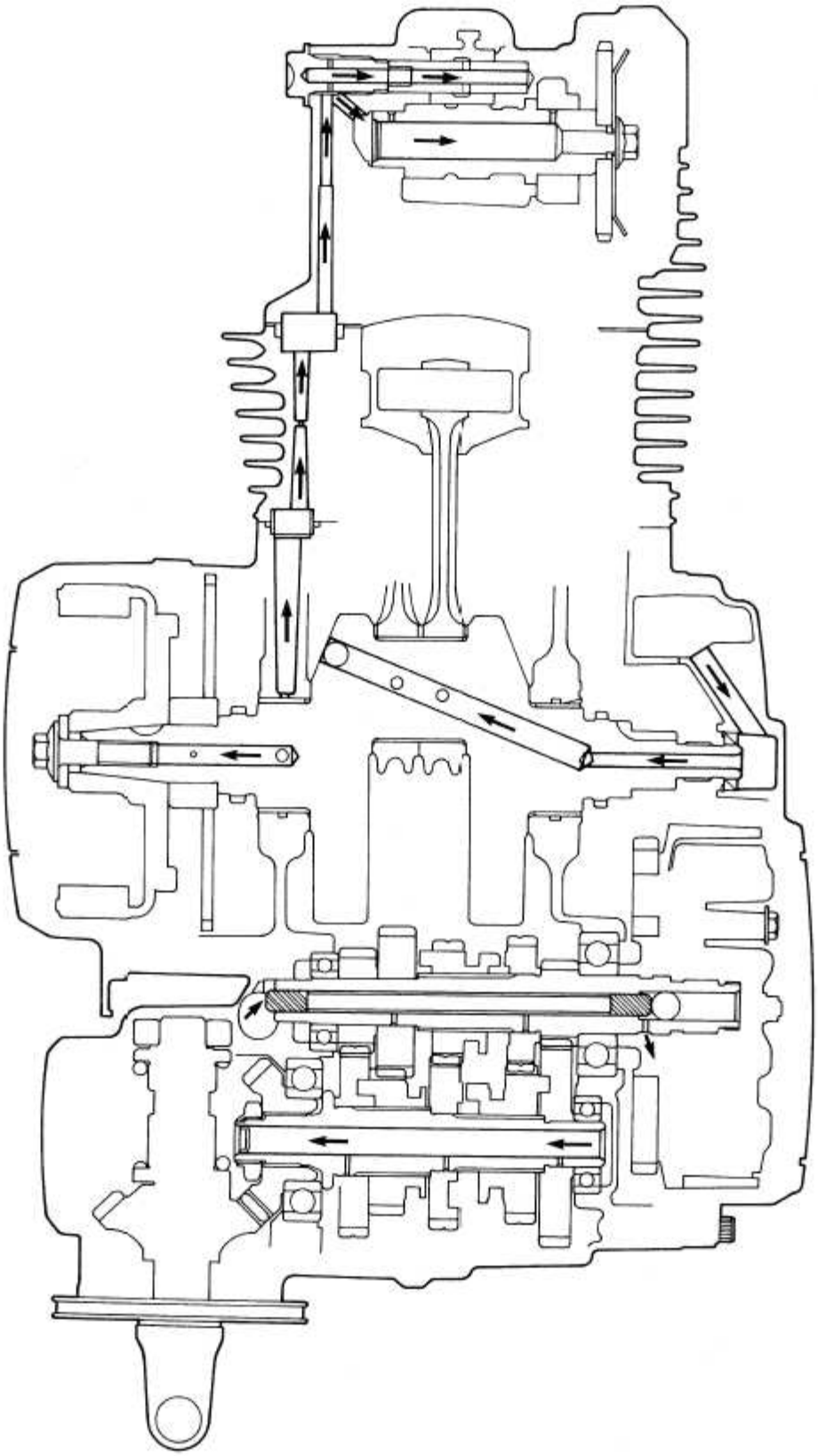
Final Gear/Drive Shaft



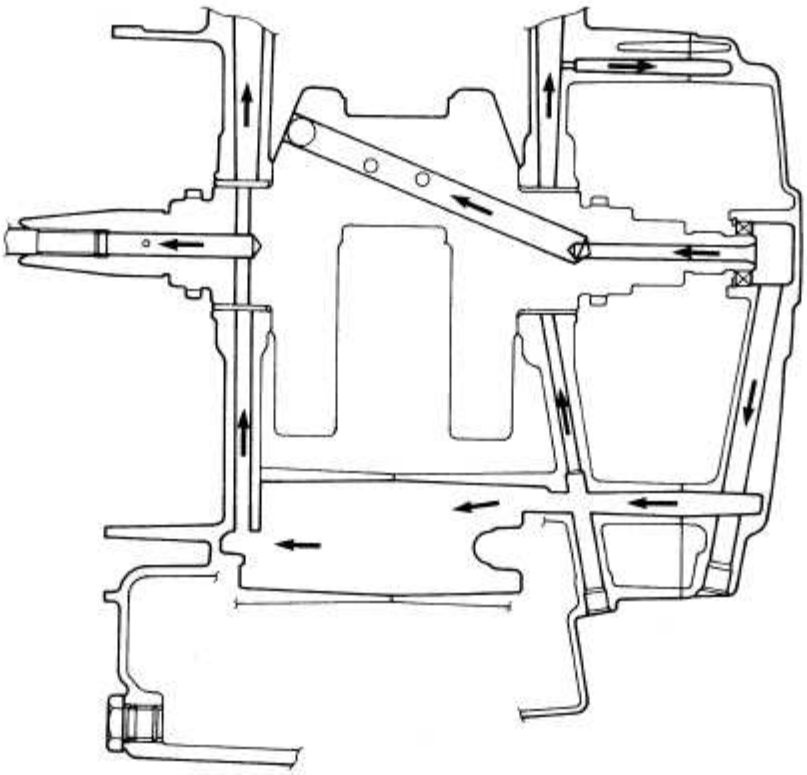

IGNITION COIL
FLASHER RELAY
STARTING CIRCUIT CUT-OFF RELAY
SIDESTAND RELAY
FLASHER CANCELLING UNIT
BATTERY
CAPACITY:
12V12AM
SPECIFIC GRAVITY:
1.280
RECTIFIER WITH REGULATOR
T.C.I. UNIT
FWD
RESISTANCE:
PICKUP COIL: 155Ω ± 10%, (G – Br), (R – L)
IGNITION COIL:
PRIMARY: 2.7Ω ± 15%
SECONDARY: 8.5KΩ ± 15%

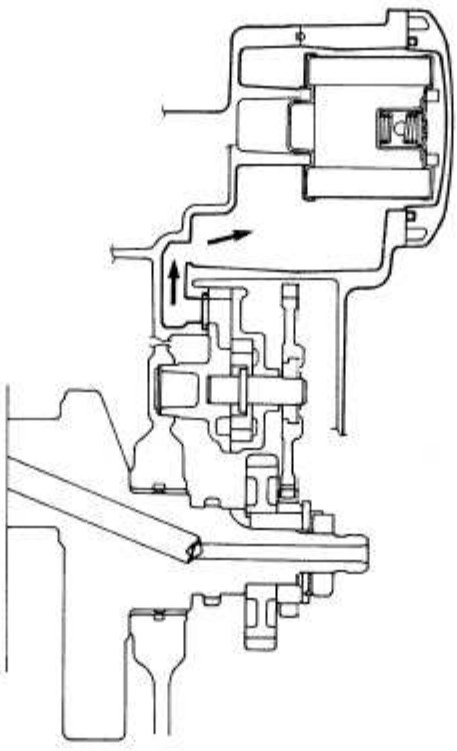
LUBRICATION DIAGRAMS

Lubrication Diagram (1)

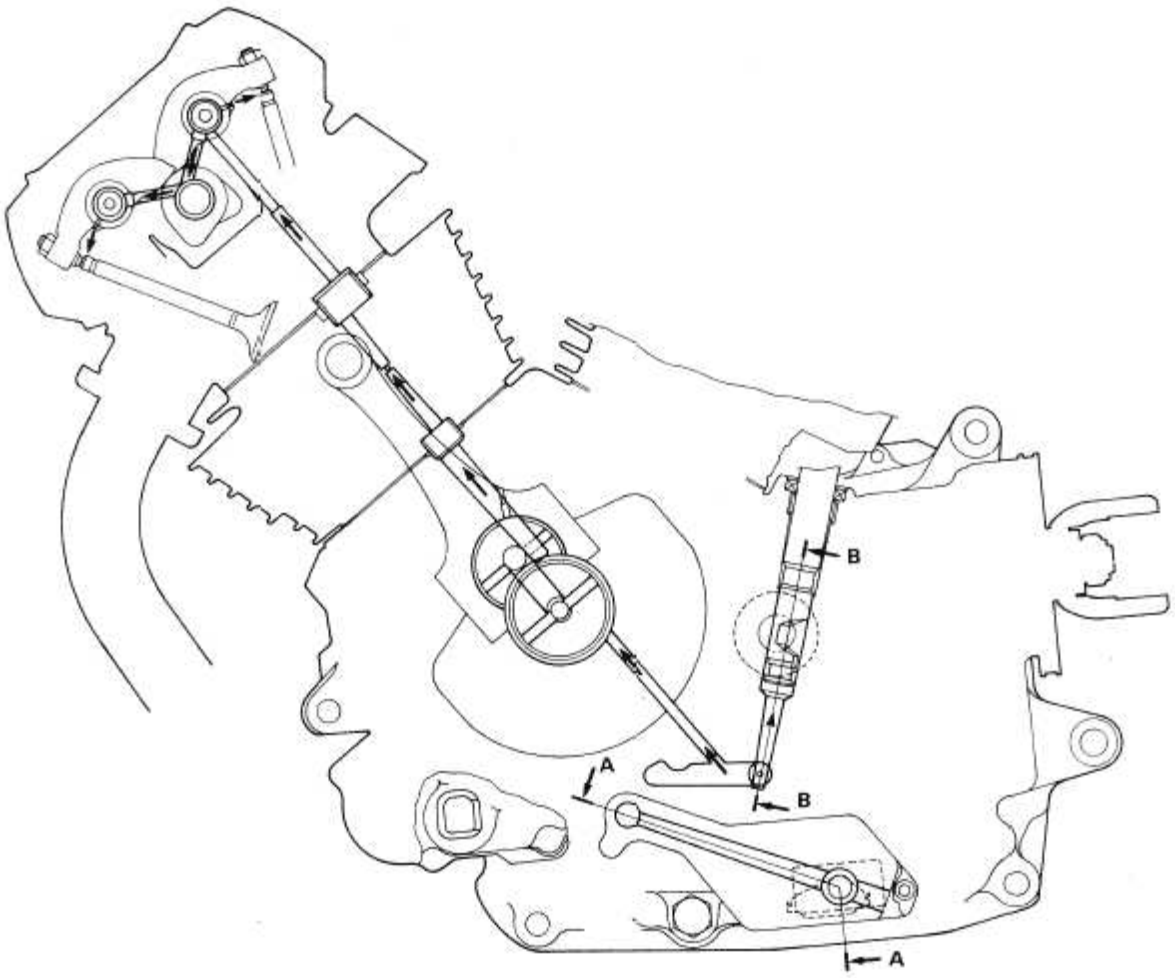


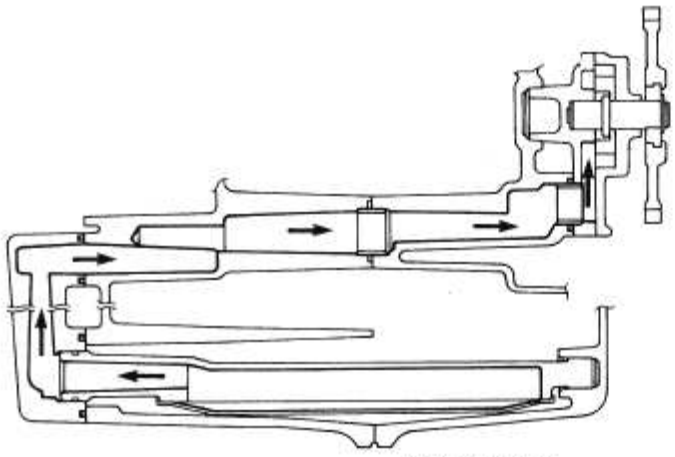
Lubrication Diagram (2)



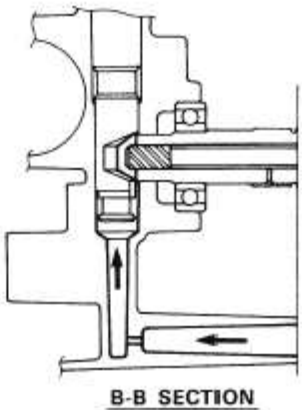


Lubrication Diagram (3)



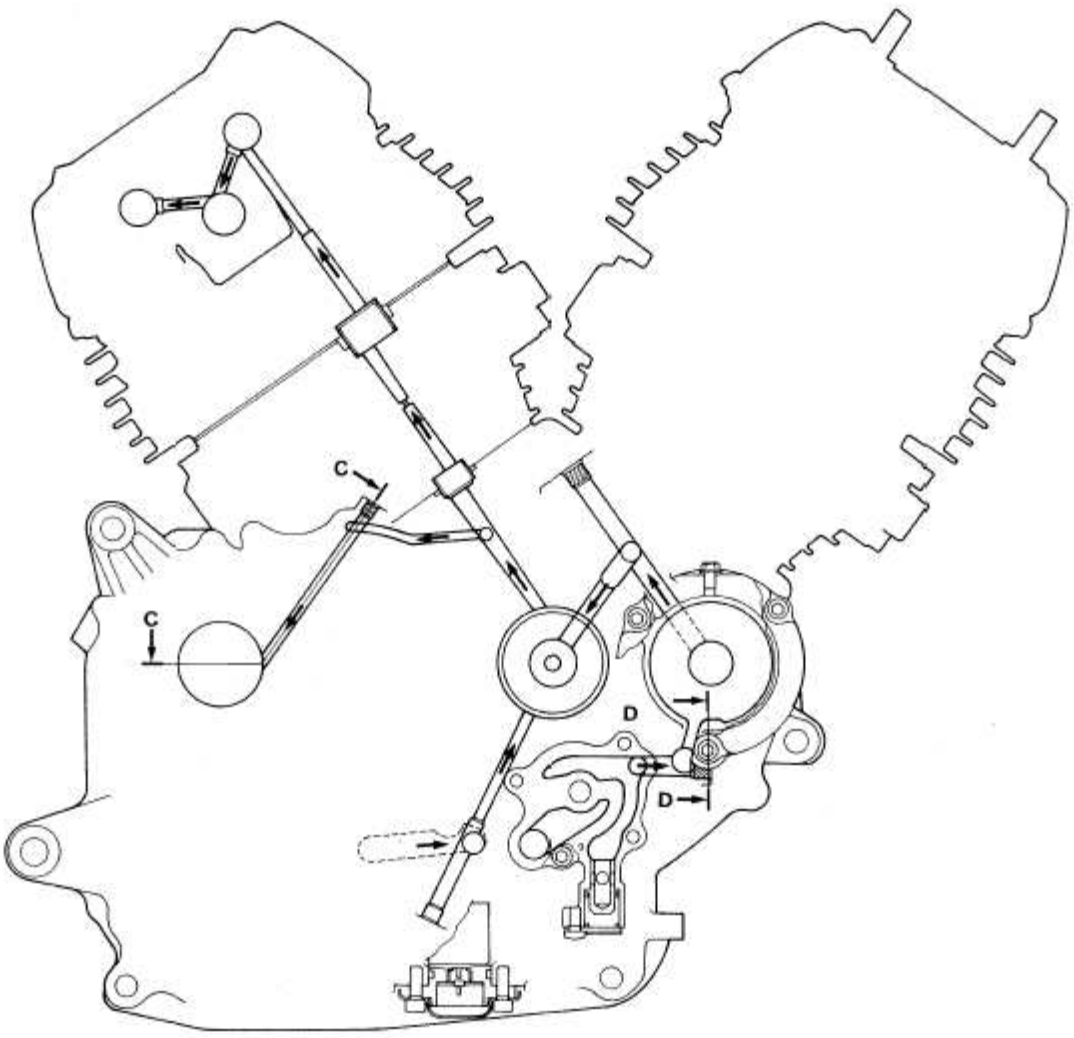


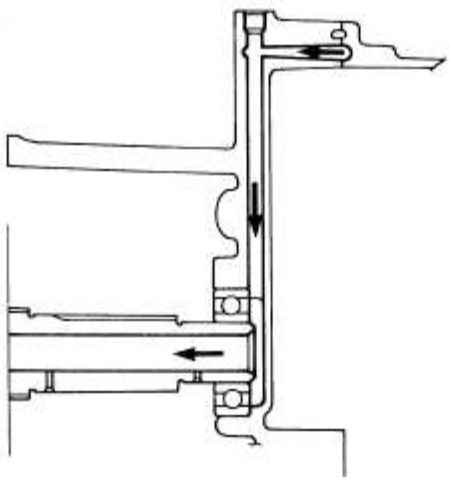
A-A SECTION



B-B SECTION

Lubrication Diagram (4)





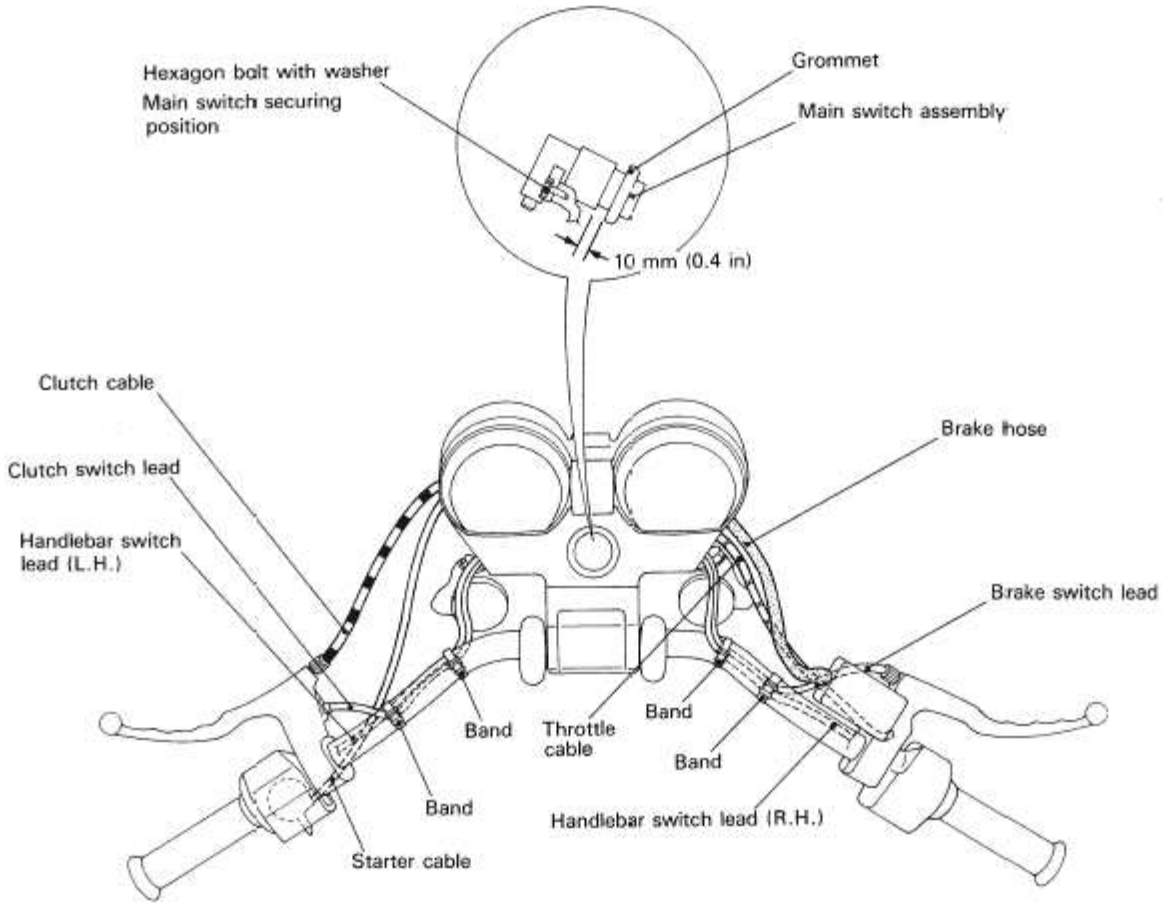
C-C SECTION

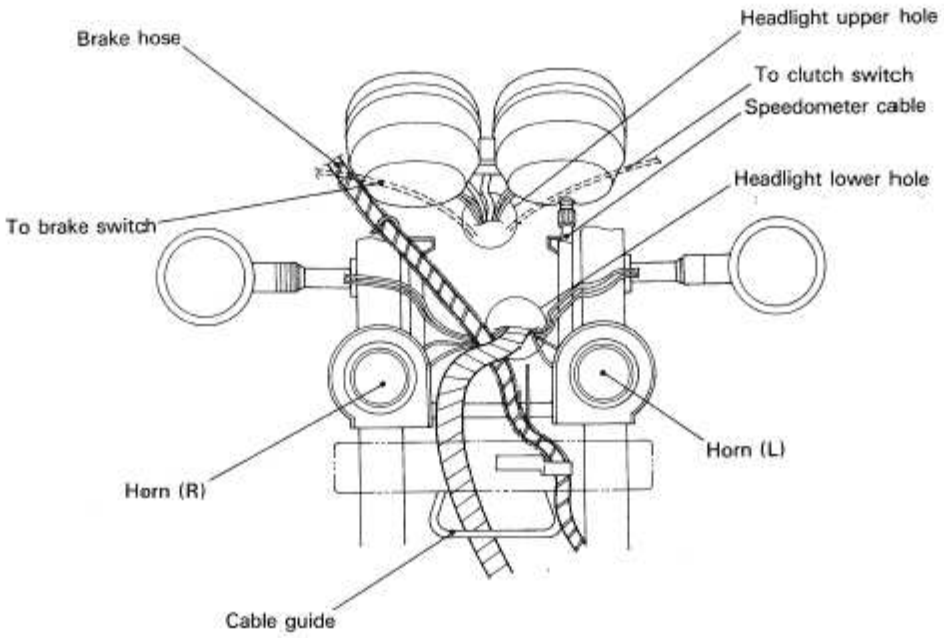


D-D SECTION

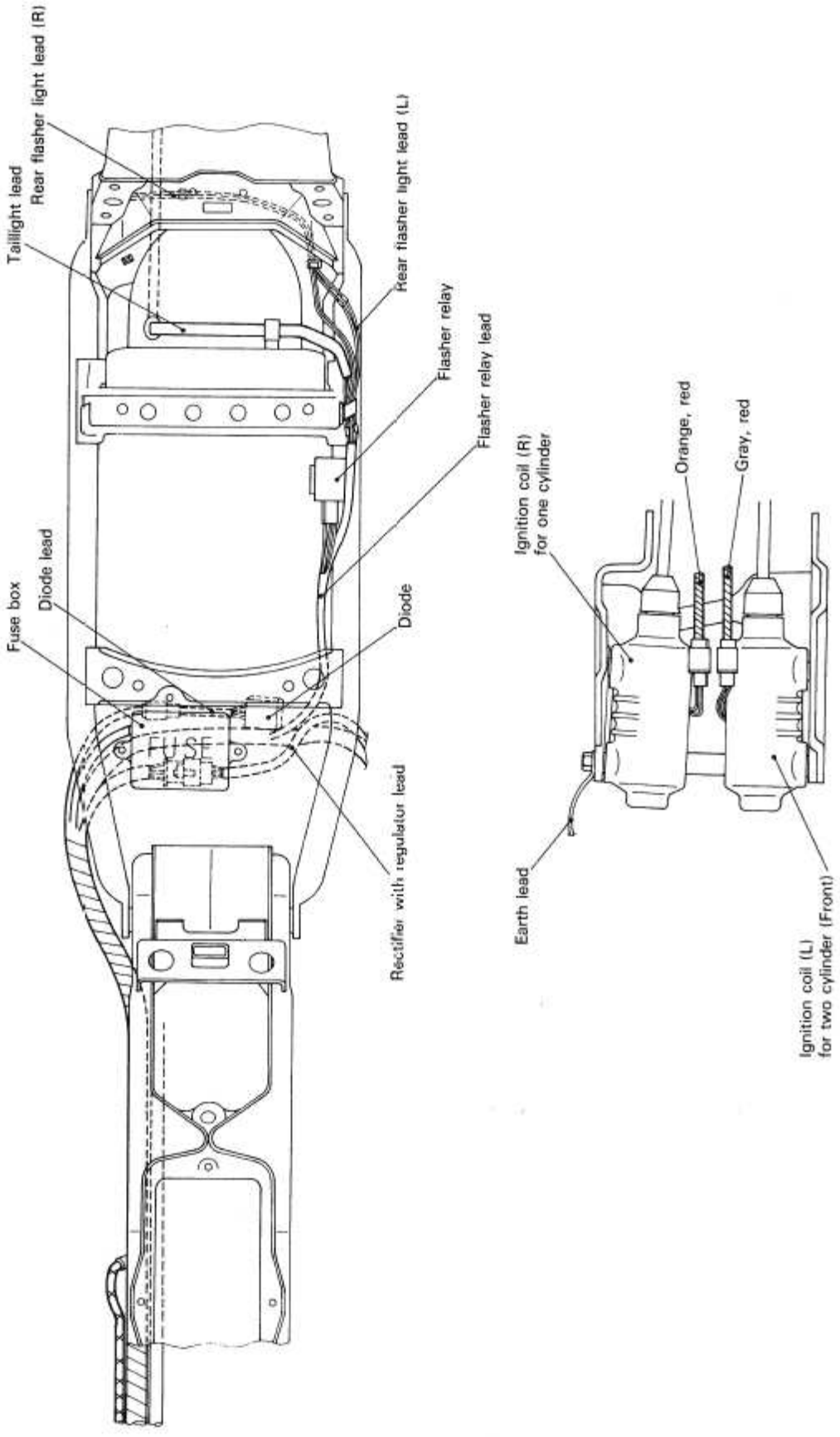
CABLE ROUTING

Cable Routing (1)

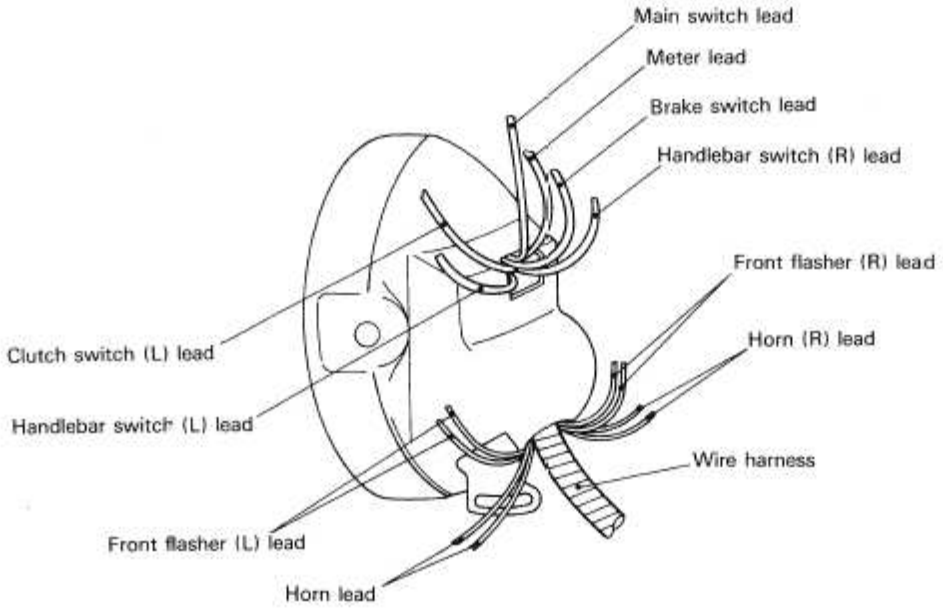


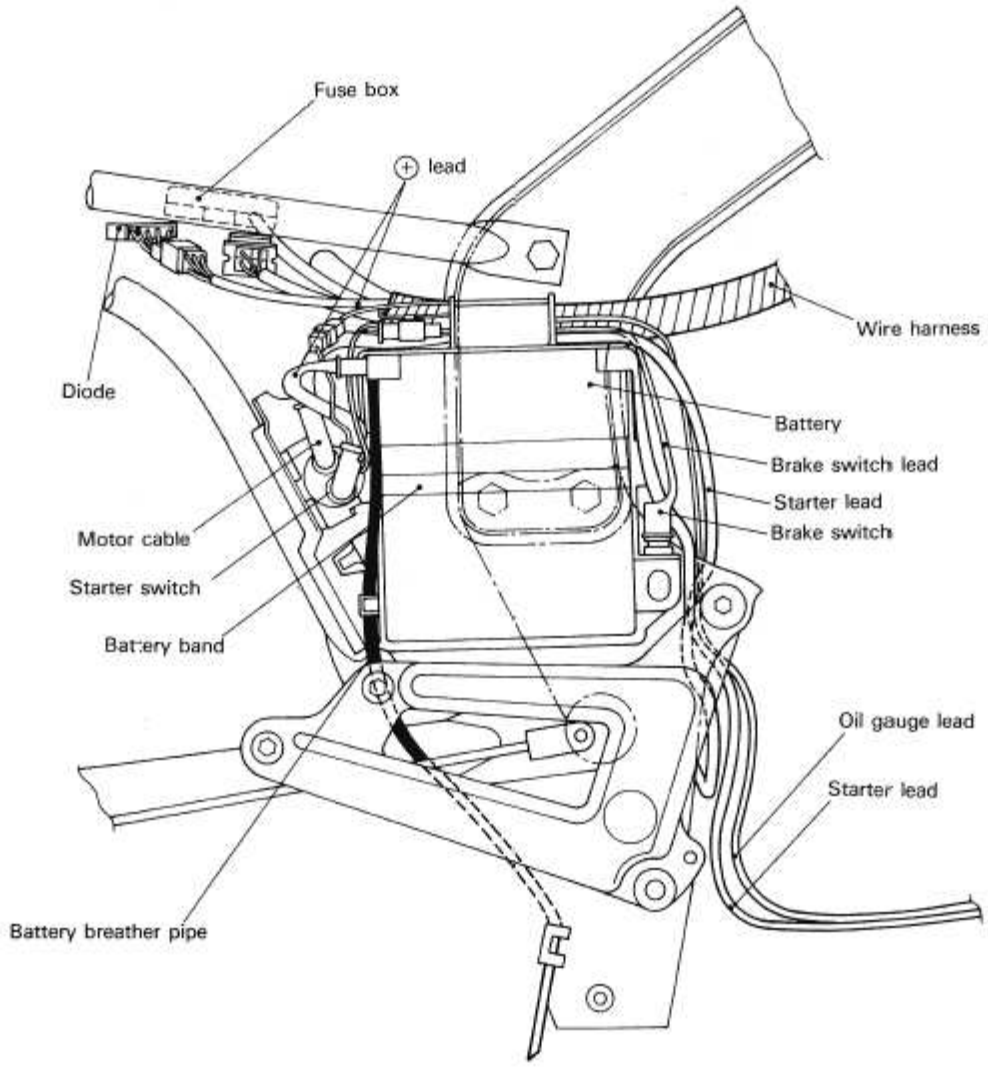


Cable Routing (2)

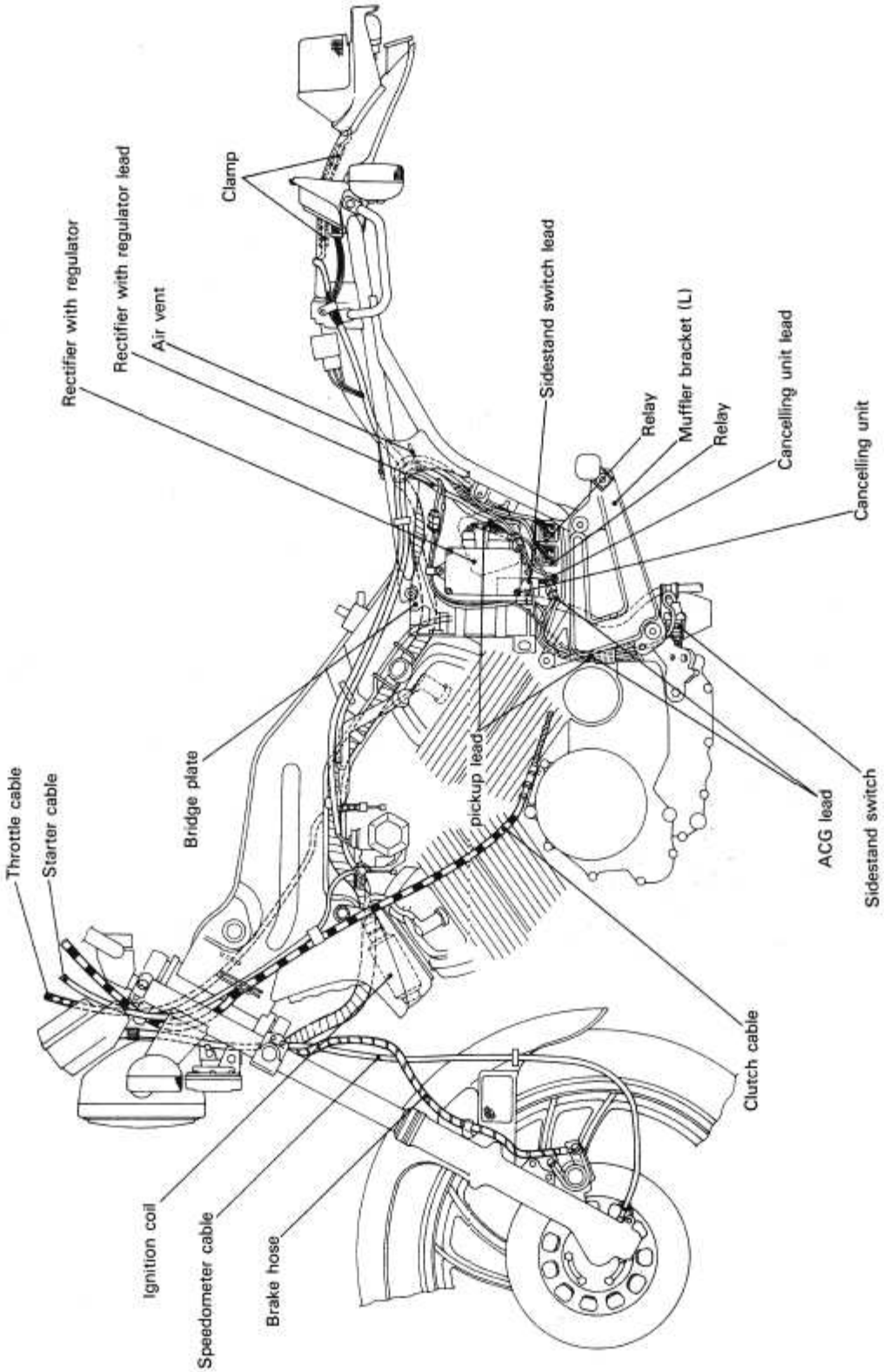


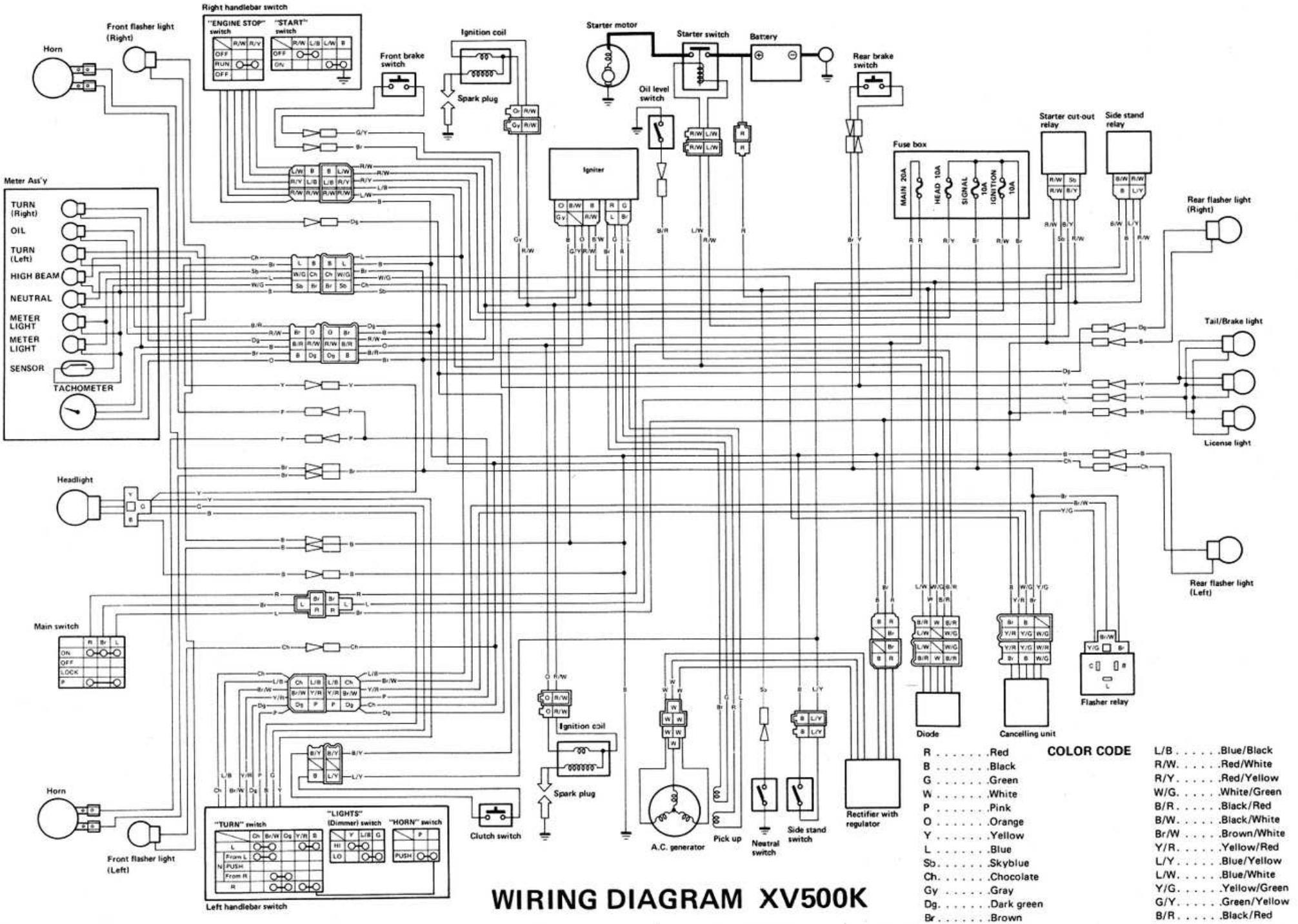
Cable Routing (3)





Cable Routing (4)





WIRING DIAGRAM XV500K

COLOR CODE

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