

F-2-12



YAMAHA

XV535 '88
2YL-ME1

SERVICE MANUAL

XV535

SERVICE MANUAL

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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 in motorcycle repair technology. Without such knowledge, attempted repairs or service to this model may render it unfit to use and/or unsafe.

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

NOTE:

This Service Manual contains information regarding periodic maintenance to the emission control system for the XV535 for Switzerland. Please read this material carefully.

TECHNICAL PUBLICATIONS
SERVICE DIVISION
MOTORCYCLES GROUP
YAMAHA MOTOR CO., LTD.

HOW TO USE THIS MANUAL

PARTICULARLY IMPORTANT INFORMATION

This material is distinguished by the following notation.

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.

MANUAL FORMAT

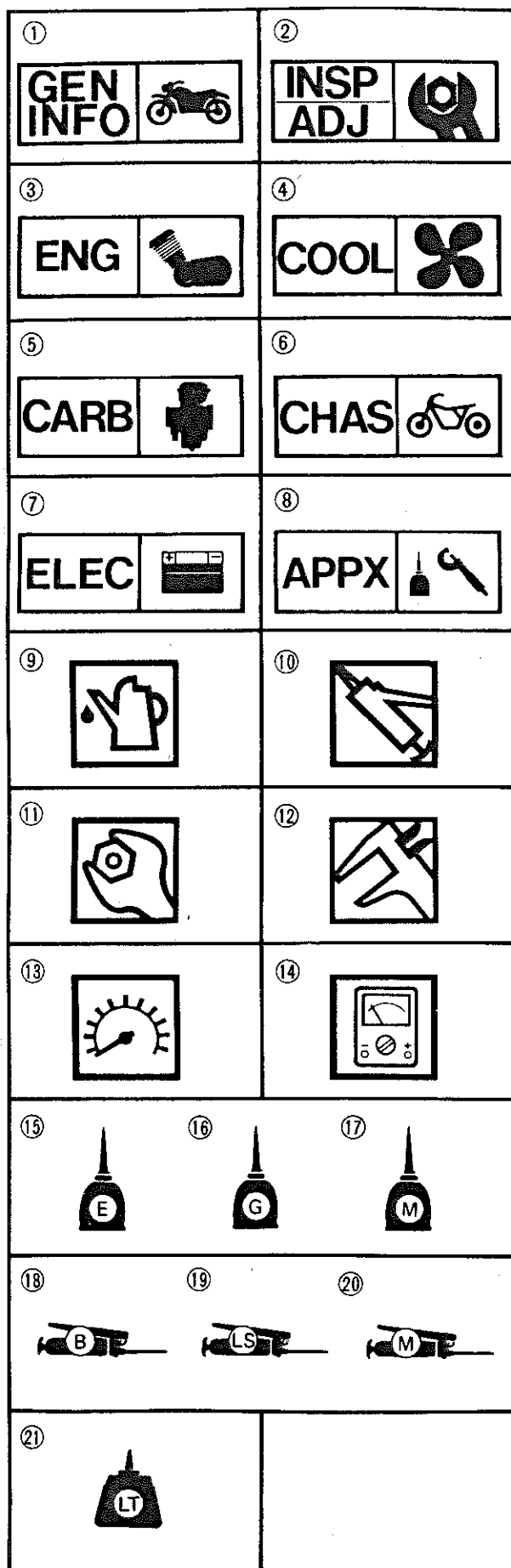
All of the procedures in this manual are organized in a sequential, step-by-step format. The information has been compiled to provide the mechanic with an easy to read, handy reference that contains comprehensive explanations of all disassembly, repair, assembly, and inspection operations.

In this revised format, the condition of a faulty component will precede an arrow symbol and the course of action required will follow the symbol, e.g.,

- Bearings
Pitting/Damage → Replace.

EXPLODED DIAGRAM

Each chapter provides exploded diagrams before each disassembly section for ease in identifying correct disassembly and assembly procedures.



ILLUSTRATED SYMBOLS (Refer to the illustration)

Illustrated symbols ① to ⑧ are designed as thumb tabs to indicate the chapter's number and content.

- ① General information
- ② Periodic inspection and adjustment
- ③ Engine
- ④ Cooling system
- ⑤ Carburetion
- ⑥ Chassis
- ⑦ Electrical
- ⑧ Appendices

Illustrated symbols ⑨ to ⑭ are used to identify the specifications appearing in the text.








- ⑨ Filling fluid
- ⑩ Lubricant
- ⑪ Tightening
- ⑫ Wear limit, clearance
- ⑬ Engine speed
- ⑭ Ω, V, A

Illustrated symbols ⑮ to ㉑ in the exploded diagram indicate grade of lubricant and location of lubrication point.

- ⑮ Apply engine oil
- ⑯ Apply gear oil
- ⑰ Apply molybdenum disulfide oil
- ⑱ Apply wheel bearing grease
- ⑲ Apply lightweight lithium-soap base grease
- ⑳ Apply molybdenum disulfide grease
- ㉑ Apply locking agent (LOCTITE®)

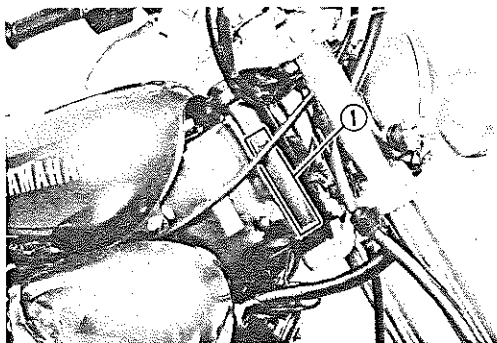


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GENERAL INFORMATION

MOTORCYCLE IDENTIFICATION

FRAME SERIAL NUMBER

The vehicle identification number ① is stamped into the steering head pipe.

NOTE:

The frame serial number is used to identify your motorcycle and may be used to register your motorcycle with the licensing authority in your state.

Starting Serial Number:

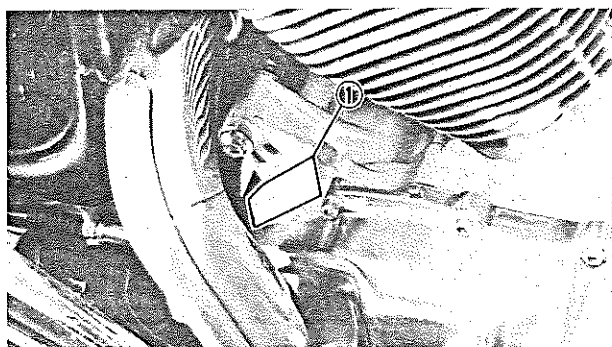
XV535:

2YL-000101 (F, I, A, B, DK, SF, NL, N)

2YL-003101 (GB, S, D)

3BR-000101 (D)

3BM-000101 (CH)



ENGINE SERIAL NUMBER

The engine serial number ① is stamped into the right side of the engine.

NOTE:

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

Starting Serial Number:

XV535:

2YL-000101 (F, I, A, B, DK, SF, NL, N)

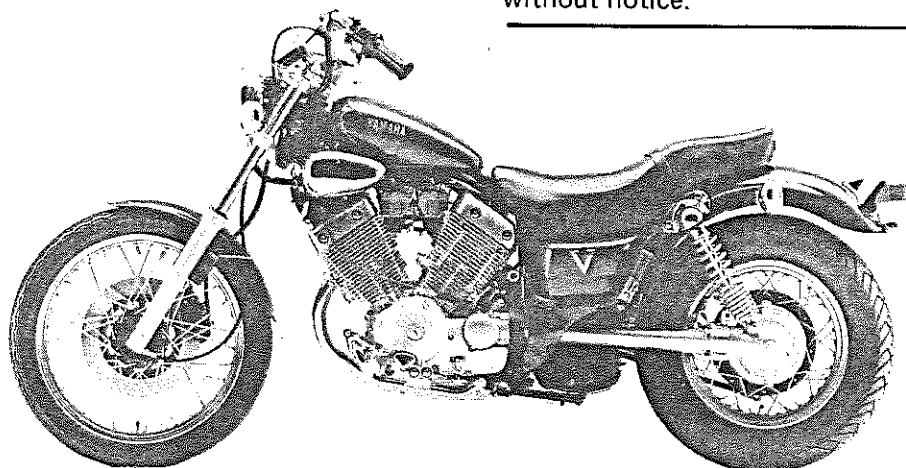
2YL-003101 (GB, S, D)

3BR-000101 (D)

3BM-000101 (CH)

NOTE:

Designs and specifications are subject to change without notice.



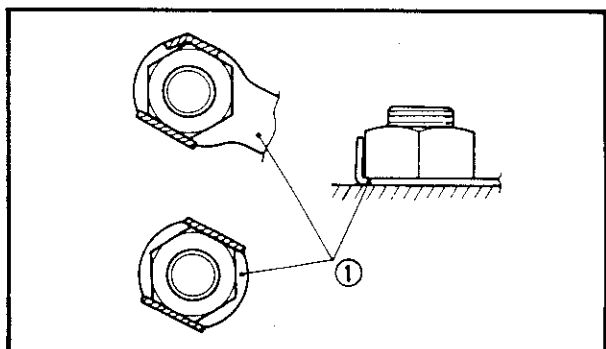
IMPORTANT INFORMATION

ALL REPLACEMENT PARTS

1. We recommend to use Yamaha genuine parts for all replacements. Use oil and/or grease recommended by Yamaha for assembly and adjustment.

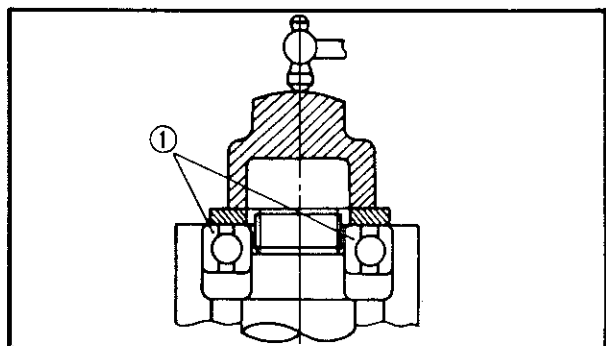
GASKETS, OIL SEALS, AND O-RINGS

1. All gaskets, seals, and O-rings should be replaced when an engine is overhauled. All gasket surfaces, oil seal lips, and O-rings must be cleaned.
2. Properly oil all mating parts and bearings during reassembly. Apply grease to the oil seal lips.



LOCK WASHERS/PLATES AND COTTER PINS

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

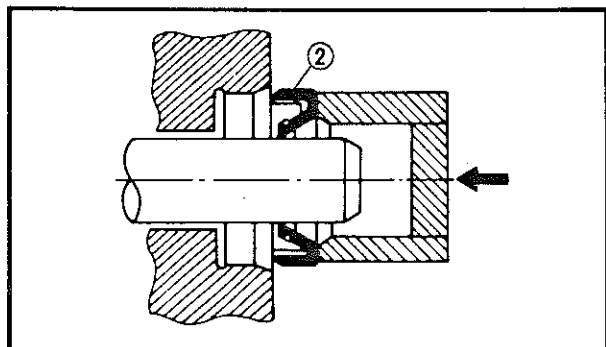


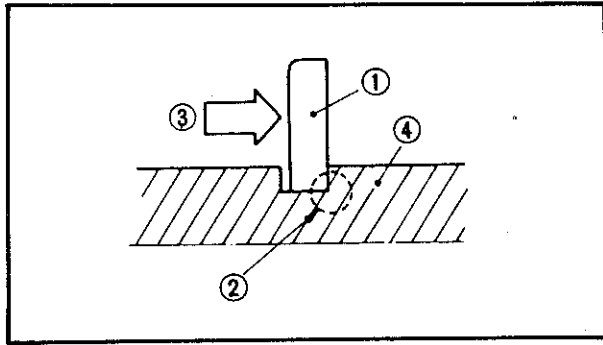
BEARINGS AND OIL SEALS

1. Install the bearing(s) ① and oil seal(s) ② 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 light-weight lithium base grease to the seal lip(s). Oil the bearings liberally when installing.

CAUTION:

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



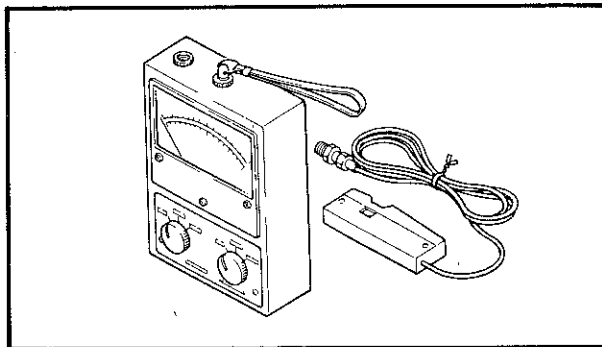
**CIRCLIPS**

1. All circlips should be inspected carefully before reassembly. Always replace piston pin clips after one use. Replace distorted circlips. When installing a circlip ①, make sure that the sharp-edged corner ② is positioned opposite to the thrust ③ it receives. See the sectional view.

④ Shaft

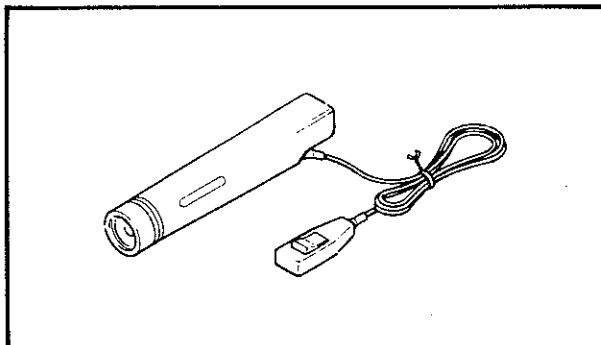
SPECIAL TOOLS

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

**FOR TUNE UP**

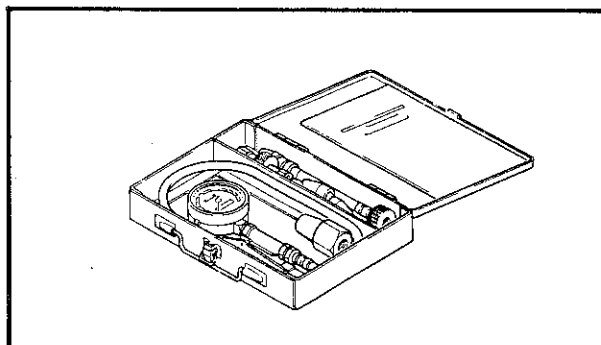
1. Engine Tachometer
P/N 90890-03113

This tool is needed for detecting engine rpm.



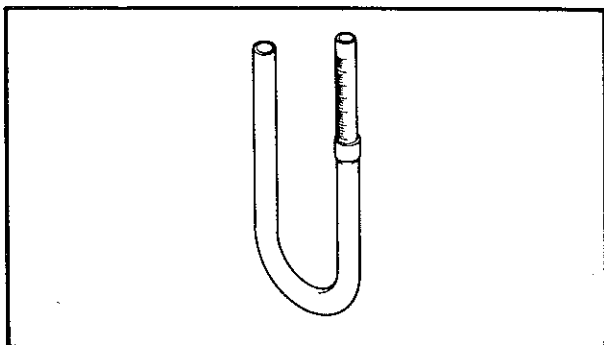
2. Timing Light
P/N 90890-03109

This tool is necessary for checking ignition timing.



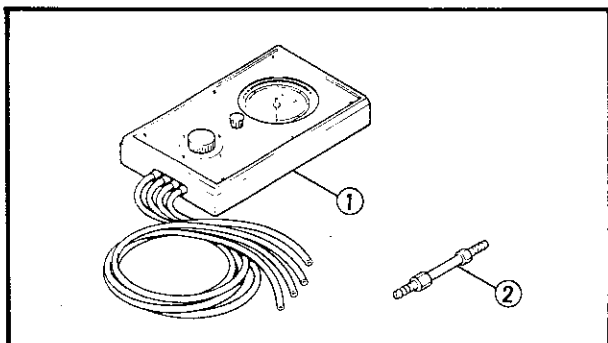
3. Compression Gauge
P/N 90890-03081

This gauge is used to measure the engine compression.



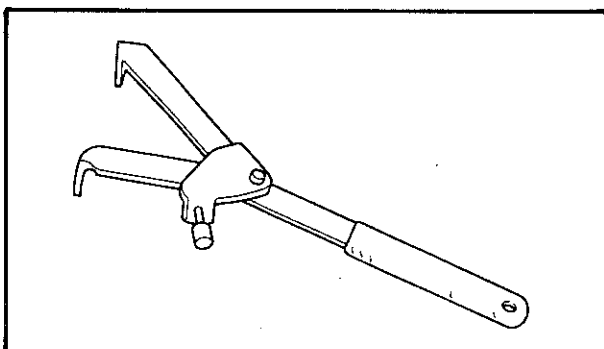
4. Fuel Level Gauge
P/N 90890-01312

This gauge is used to measure the fuel level in the float chamber.



5. Vacuum Gauge
P/N 90890-03094 – ①
Adapter
P/N 90890-03060 – ②

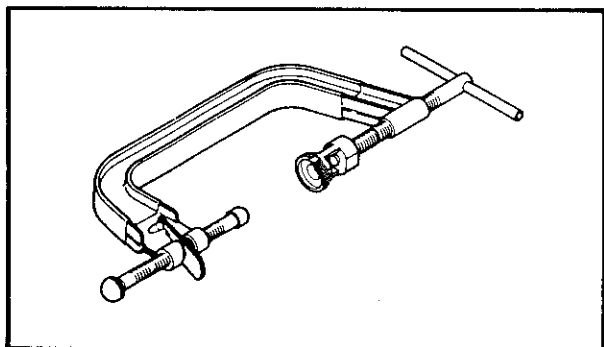
This gauge is needed for carburetor synchronization.



FOR ENGINE SERVICE

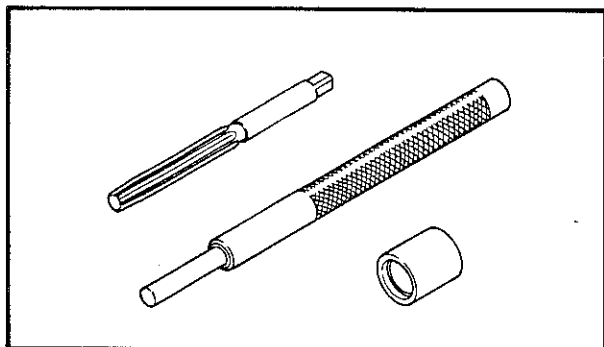
1. Clutch Holder
P/N 90890-04086

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



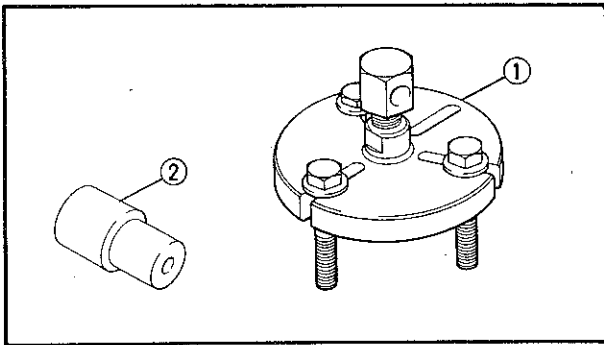
2. Valve Spring Compressor
P/N 90890-04019

This tool is needed to remove and install the valve assemblies.



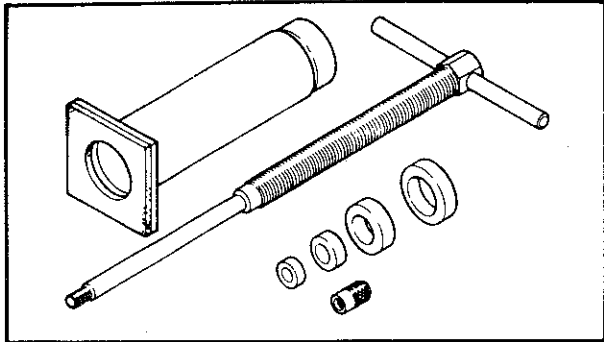
3. Valve Guide Remover (7.0 mm) & Installer Set
P/N 90890-04018

This tool is used to exchange the valve guides.



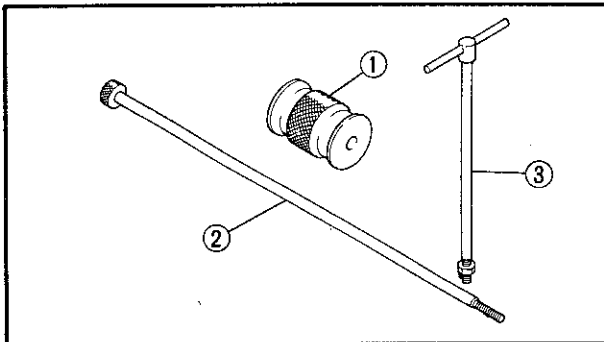
4. Flywheel Puller
P/N 90890-01362 — ①
Adapter
P/N 90890-04089 — ②

These tools are used to remove the flywheel.



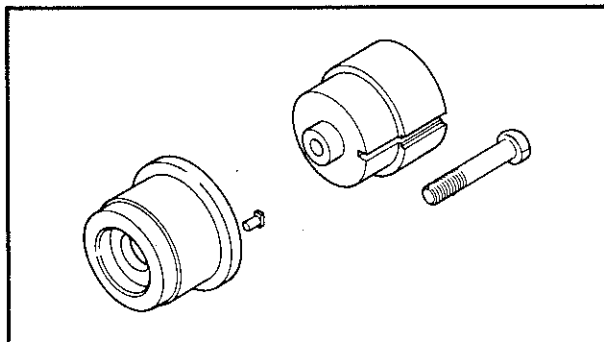
5. Piston Pin Puller
P/N 90890-01304

This tool is used to remove the piston pin.



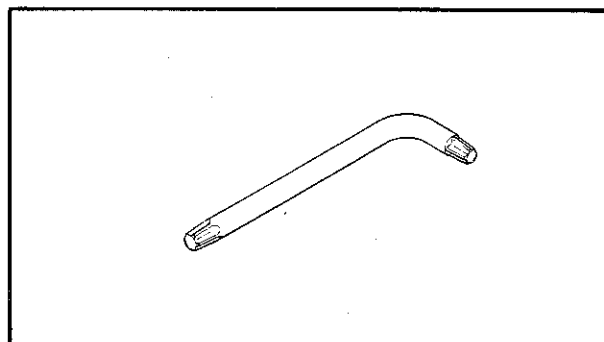
6. Slide Hammer
Weight
P/N 90890-01084 — ①
Bolt
P/N 90890-01083 — ②
✓ P/N 90890-01290 — ③

These tools are used when removing the rocker arm shaft and cam shaft.



7. Plain Bearing Installer and Remover Set
P/N 90890-04074

These tools are used to removal and assemble the plain bearing.

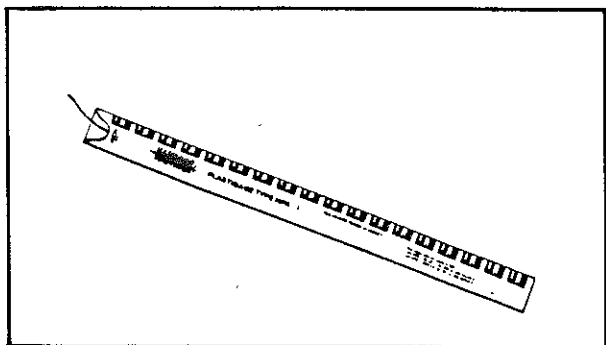


8. #30 Torx Driver
P/N 90890-05245

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

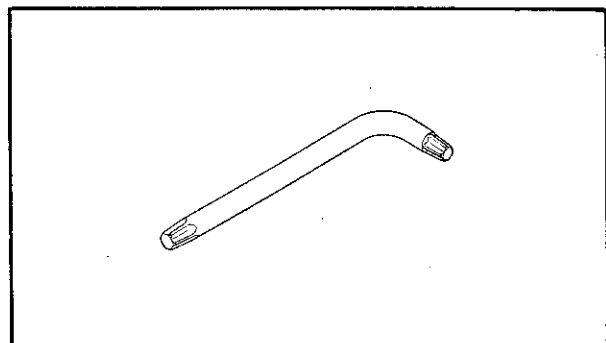


SPECIAL TOOLS



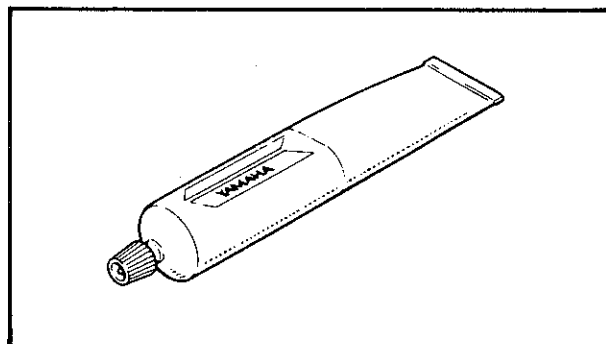
9. Plastigage® Set "Green"

This gauge is needed to measure the clearance for the connecting rod bearing and the crank shaft bearing.



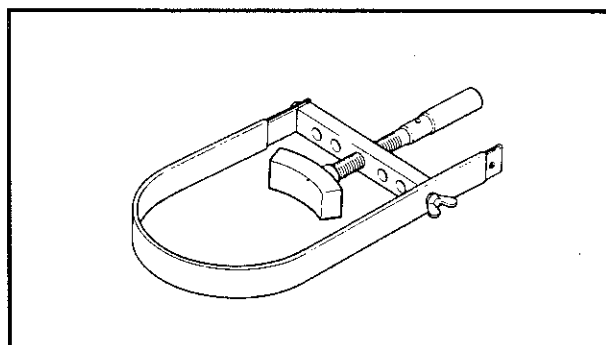
10. #25 Torx Driver P/N 90890-05349

This tool is used when overhauling the carburetors.



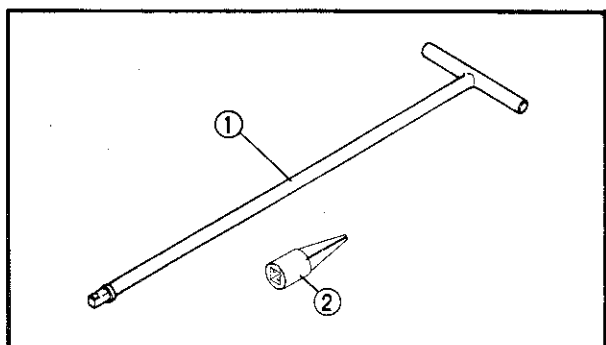
11. Yamaha Bond No. 1215 P/N 90890-85505

This sealant (bond) is used for crankcase mating surfaces, etc.



12. Sheave Holder P/N 90890-01701

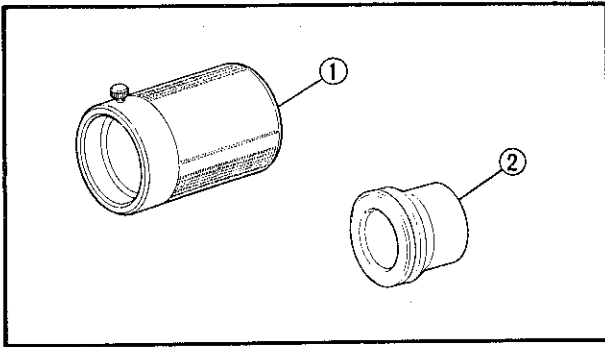
This tool is used to hold the rotor when removing or installing the rotor securing bolt.



FOR CHASSIS SERVICE

1. T-Handle
P/N 90890-01326 – ①
Damper Rod Holder
P/N 90890-01294 – ②

These tools are used to loosen and tighten the front fork cylinder holding bolt.



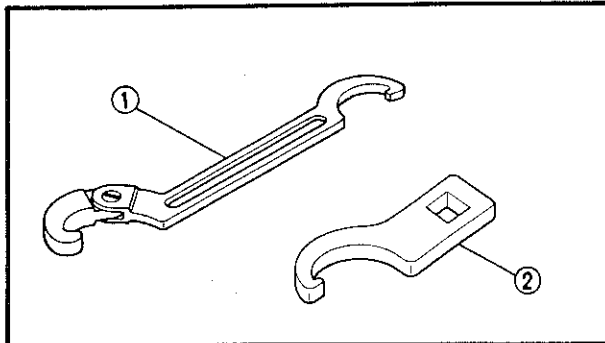
2. Front Fork Seal Driver Weight

P/N 90890-01367 – ①

Adapter (36 mm)

P/N 90890-01370 – ②

These tools are used when installing the fork seal.

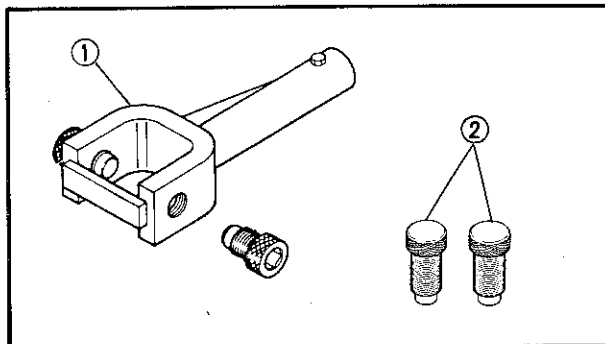


3. Ring Nut Wrench

P/N 90890-01268 – ①

P/N 90890-01403 – ②

These tools are used to loosen and tighten the steering ring nut.



FOR MIDDLE AND FINAL GEAR SERVICE

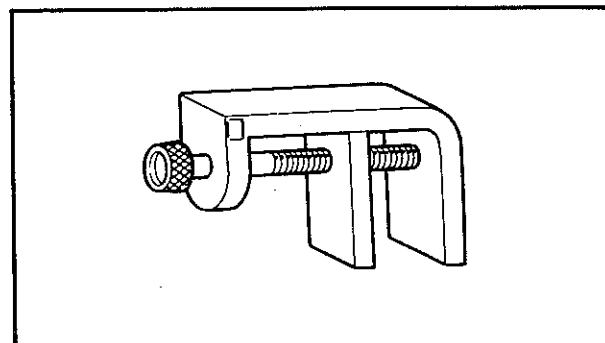
1. Universal Joint Holder

P/N 90890-04062 – ①

Attachment

P/N 90890-33291 – ②

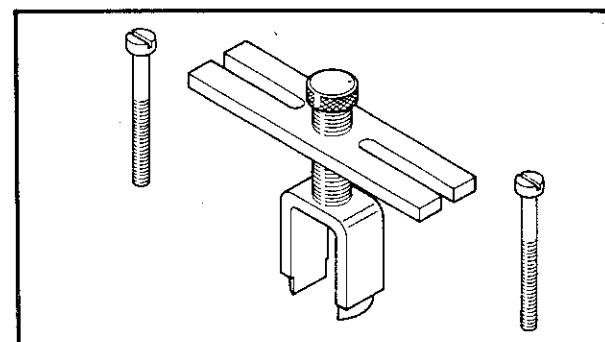
These tools are used to loosen and tighten the middle driven shaft nut.



2. Damper Spring Compressor

P/N 90890-04090

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



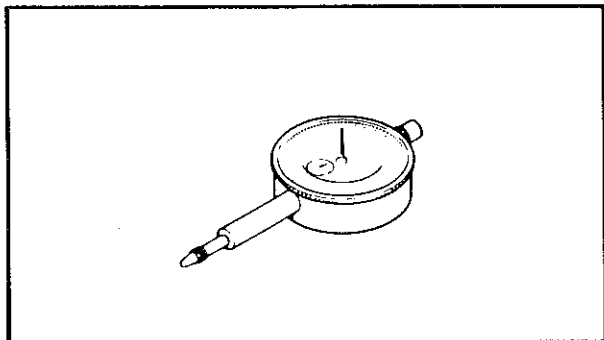
3. Middle Drive Gear Holder

P/N 90890-04086

Attachment

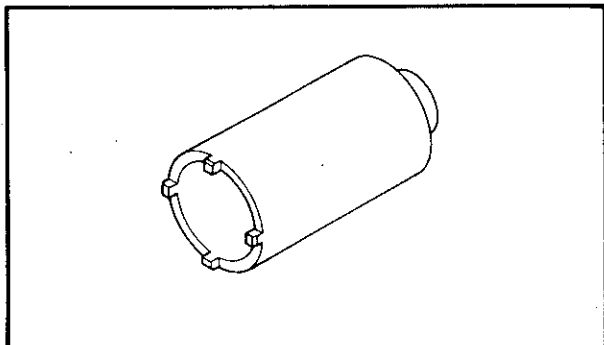
P/N 90890-04091

These tools are used to disassemble and reassemble the middle gear damper.



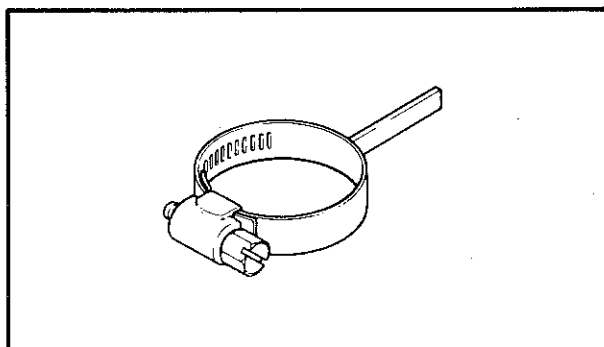
4. Dial Gauge
P/N 90890-03097

This tool is used to measure the gear lash for the middle gear and final gear.



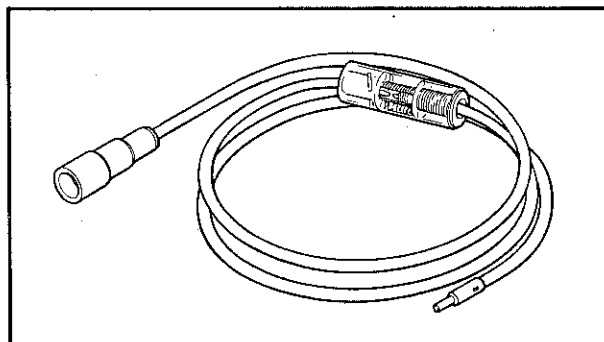
5. Final Drive Shaft Bearing Retainer Wrench
P/N 90890-04077

This tool is used to remove and install the bearing retainer.



6. Gear Lash Measurement Tool
P/N 90890-01230

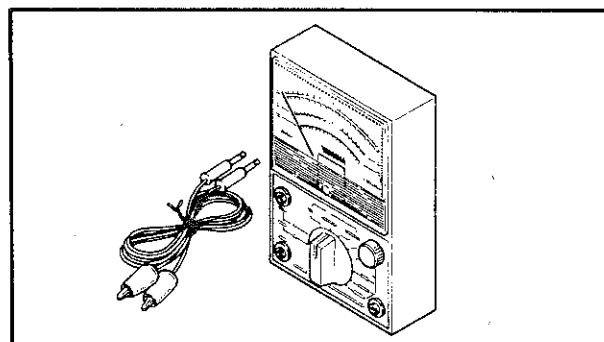
This tool is used to measure gear lash.



FOR ELECTRICAL COMPONENTS

1. Dynamic Spark Tester
P/N 90890-03144

This tester is necessary for checking the ignition system components.



2. Pocket Tester
P/N 90890-03112

This tester is invaluable for checking the electrical system.

CHAPTER 2.

PERIODIC INSPECTINS AND ADJUSTMENTS

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PERIODIC INSPECTIONS AND ADJUSTMENTS

INTRODUCTION

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

MAINTENANCE INTERVALS CHARTS

PERIODIC MAINTENANCE/LUBRICATION

Unit: km (miles)

Item	Remarks	Break-in 1,000 (600)	EVERY	
			6,000 (4,000) or 6 months	12,000 (8,000) or 12 months
Valve(s)*	Check valve clearance. Adjust if necessary.	○		○
Spark plug(s)	Check condition. Clean or replace if necessary.	○	○	○
Air filter	Clean. Replace if necessary.		○	○
Carburetor*	Check idle speed/synchronization/starter operation. Adjust if necessary.	○	○	○
Fuel line*	Check fuel hose (and vacuum pipe) for cracks or damage. Replace if necessary.		○	○
Fuel filter*	Check condition. Replace if necessary.			○
Engine oil	Replace (Warm engine before draining). See NOTE.	○	○	○
Engine oil filter*	Replace.	○		○
Final gear oil	Check oil level/oil leakage. Replace every 24,000 (16,000) or 24 months.	Replace	○	○
Brake system*	Adjust free play. Replace pads if necessary (Front). Replace shoes if necessary (Rear).		○	○
Clutch	Check operation. Adjust if necessary.		○	○
Rear arm pivot*	Check rear arm assembly for looseness. Correct if necessary. Moderately repack every 24,000 (16,000) or 24 months.**			○
Wheel (Spoke wheels)*	Check balance/damage/runout/spoke tightness. Repair if necessary.		○	○
Wheel bearings*	Check bearings assembly for looseness/damage. Replace if damaged.		○	○
Steering bearing*	Check bearings assembly for looseness. Correct if necessary. Moderately repack every 24,000 (16,000) or 24 months.**	○		○
Front forks*	Check operation/oil leakage. Repair if necessary.		○	○
Rear shock absorber*	Check operation/oil leakage. Repair if necessary.		○	○

PERIODIC MAINTENANCE/LUBRICATION INTERVALS

INSP
ADJ

Item	Remarks	Break-in 1,000 (600)	EVERY	
			6,000 (4,000) or 6 months	12,000 (8,000) or 12 months
Fittings/Fasteners*	Check all chassis fittings and fasteners. Correct if necessary.	○	○	○
Sidestand*	Check operation. Repair if necessary.	○	○	○
Sidestand switch*	Check operation. Clean or replace if necessary.	○	○	○
Battery*	Check specific gravity. Check breather pipe for proper operation. Correct if necessary.		○	○

*: It is recommended that these items be serviced by a Yamaha dealer.

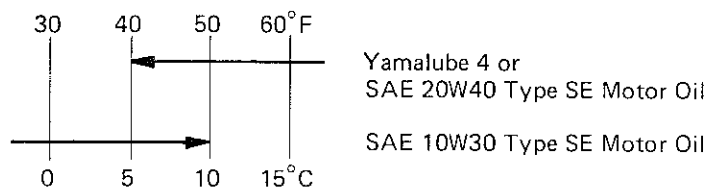
** : Medium weight wheel bearing grease.

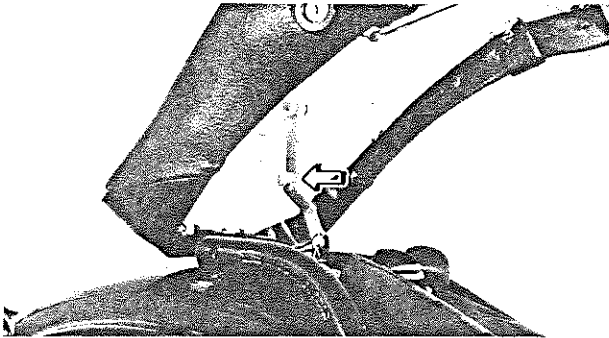
NOTE:

• Brake system:

- 1) When disassembling the master cylinder or caliper cylinder, replace the brake fluid. Normally check the brake fluid level and add the fluid as required.
- 2) We recommended that, on the inner parts of the master cylinder and caliper cylinder, replace the oil seals every two years.
- 3) We recommended that, replace the brake hoses every four years, or it cracked or damaged.

• Engine oil:





ENGINE

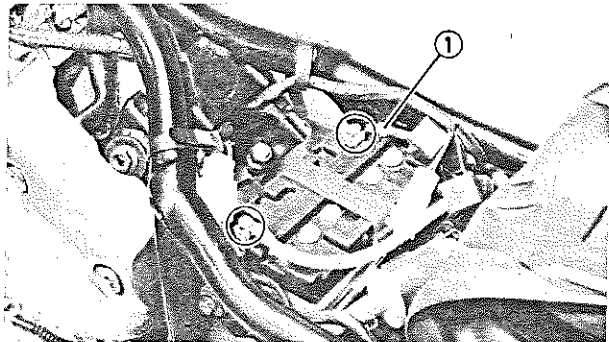
VALVE CLEARANCE ADJUSTMENT

Removal

1. Open:
 - Seat

NOTE:

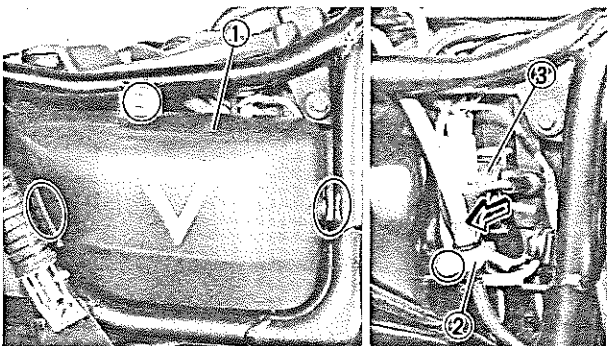
Make sure that the seat lever is locked correctly.



2. Disconnect:
 - Battery leads

NOTE:

Disconnect the negative lead ① first.

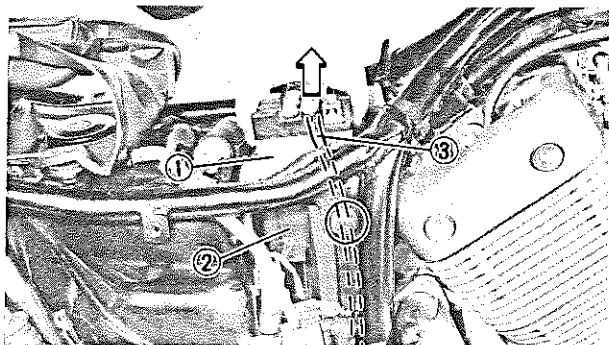


3. Remove:
 - Rear side cover (Right) ①
 - Clamp (Fuel hose) ②
 - Starter relay ③

Pull out the starter relay.

NOTE:

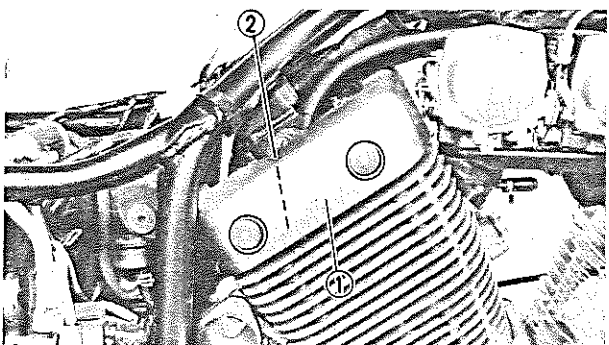
Do not disconnect the leads of the starter relay at this point.



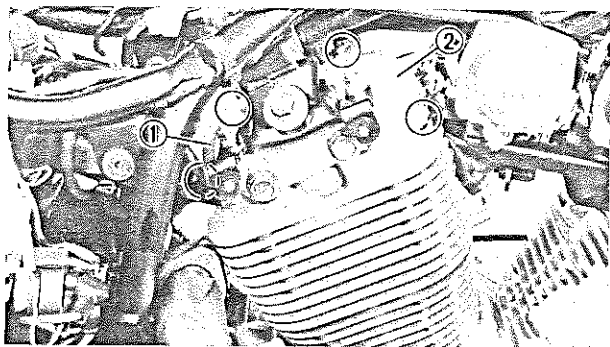
4. Remove:
 - Battery band
 - Battery ①
 - Battery box ②

NOTE:

Before removing the battery, disconnect the battery breather hose ③.

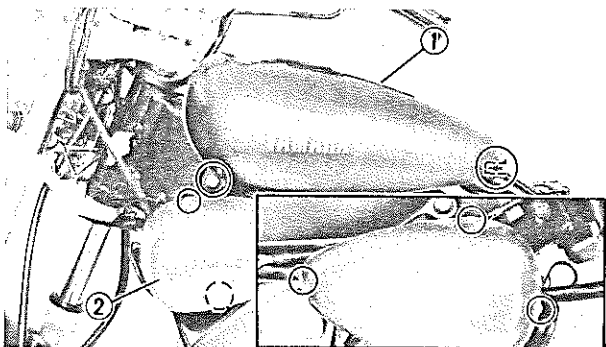


5. Remove:
 - Side covers (Rear cylinder – Left and right) ①
 - Spark plug (Rear cylinder) ②



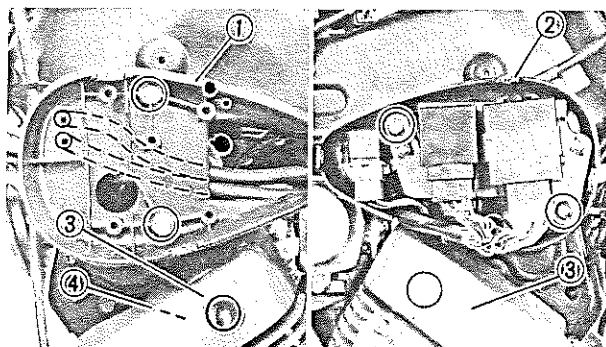
6. Remove:

- Tappet cover (Rear cylinder — Exhaust) ①
- Tappet cover (Rear cylinder — Intake) ②



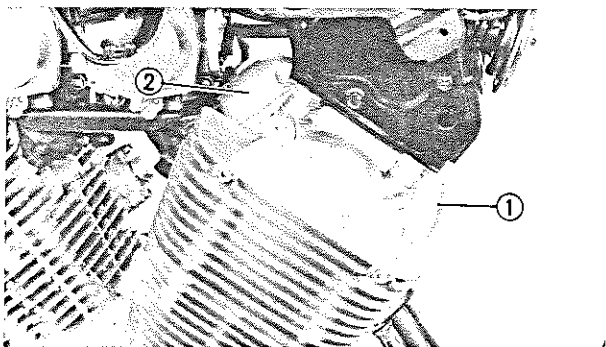
7. Remove:

- Top cover ①
- Front side cover (Left) ②
- Front side cover (Right) ③



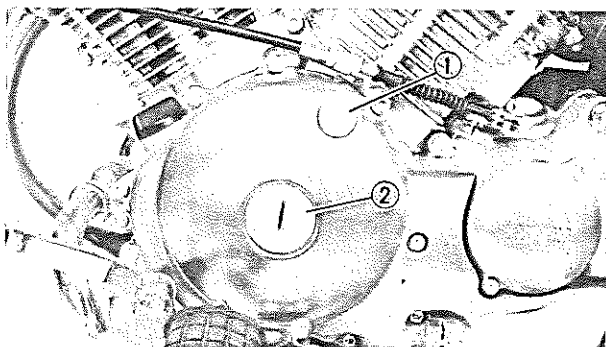
8. Remove:

- Front side cover bracket (Left) ①
Disconnect the carburetor hoses.
- Electrical component board (Front side cover — Right) ②
- Side covers (Front cylinder — Left and right) ③
- Spark plug (Front cylinder) ④



9. Remove:

- Tappet cover (Front cylinder — Exhaust) ①
- Tappet cover (Front cylinder — Intake) ②



10. Remove:

- Timing plug ①
- Crankcase cover plate ②

Measurement and Adjustment

1. Measure:

- Valve clearance

Valve clearance measurement steps:

- Turn the crankshaft clockwise with wrench.

NOTE:

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

- Align the "T" mark (For rear cylinder) ① on the flywheel with the stationary pointer ② on the crankcase cover. When the "T" mark is aligned with the stationary pointer, the piston is at Top Dead Center (TDC).

NOTE:

Be sure piston is at Top Dead Center (TDC) on compression stroke when measuring clearance.

- Note marks on flywheel to obtain correct valve clearance measurements.

- ③ TDC for rear cylinder
- ④ Firing range for rear cylinder
- ⑤ TDC for front cylinder

- Measure the valve clearance using a Feeler Gauge ⑥.

Out of specification → Adjust clearance.



Intake Valve (Cold):

0.07 ~ 0.12 mm (0.003 ~ 0.005 in)

Exhaust Valve (Cold):

0.12 ~ 0.17 mm (0.005 ~ 0.007 in)

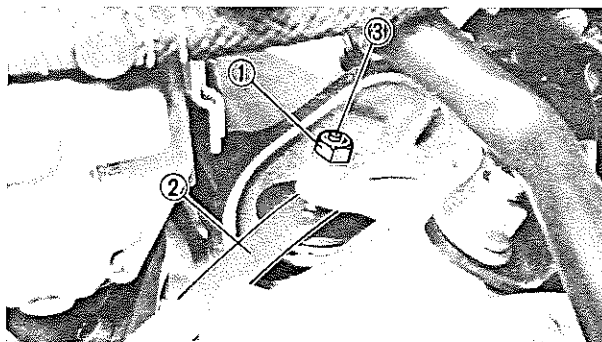
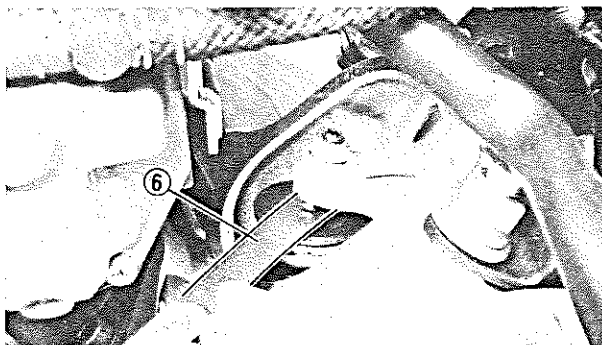
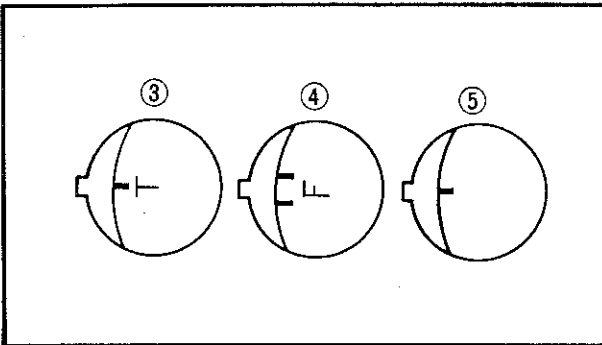
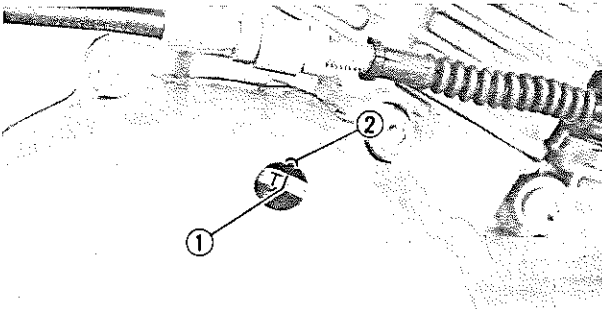
- Repeat the above steps for front cylinder.

2. Adjust:

- Valve clearance

Valve clearance adjustment steps:

- Loosen the locknut ①.
- Insert a Feeler Gauge ② between the adjuster end and the valve end.
- Turn the adjuster ③ clockwise or counter-clockwise with a wrench until proper clearance is attained.





VALVE CLEARANCE ADJUSTMENT



Intake Valve (Cold):
0.07 ~ 0.12 mm (0.003 ~ 0.005 in)
Exhaust Valve (Cold):
0.12 ~ 0.17 mm (0.005 ~ 0.007 in)

- Hold the adjuster to prevent it from moving and thoroughly tighten the locknut.



Valve Clearance Adjusting Locknut:
14 Nm (1.4 m·kg, 10 ft·lb)

- Measure the valve clearance.
- If the clearance is incorrect, repeat above steps until the proper clearance is obtained.
- Repeat above steps for front cylinder.

Assembly

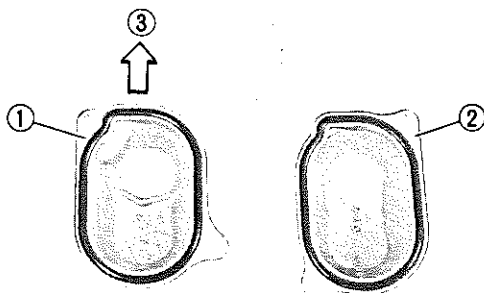
When installing the seat, reverse the removal procedure. Note the following points.

1. Inspect:

- O-rings (Tappet covers)
 - O-ring (Timing plug)
 - O-ring (Crankcase cover plate)
- Damage → Replace.

2. Install:

- Tappet covers (Intake — Front and rear) ①
- Tappet covers (Exhaust — Front and rear) ②



NOTE:

Install the intake tappet covers with its ridge facing upward ③.



Tappet Covers:
10 Nm (1.0 m·kg, 7.2 ft·lb)

3. Install:

- Spark plugs (Front and rear)
 - Side covers (Front and rear cylinder)
 - Electrical component board (Front side cover — Right)
 - Front side cover bracket (Left)
- Connect the carburetor hoses.

**Spark Plugs:**

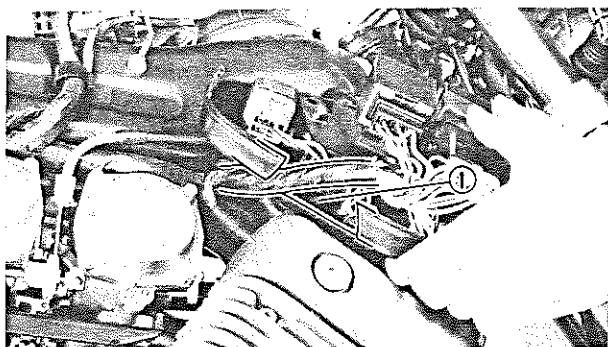
20 Nm (2.0 m·kg, 14 ft·lb)

Side Covers (Cylinder Head):

10 Nm (1.0 m·kg, 7.2 ft·lb)

Bolts (Front Side Covers – Left and Right):

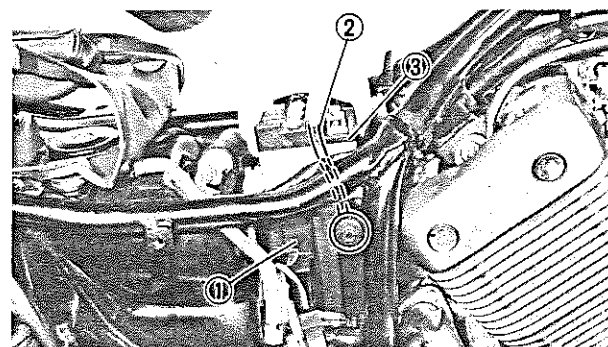
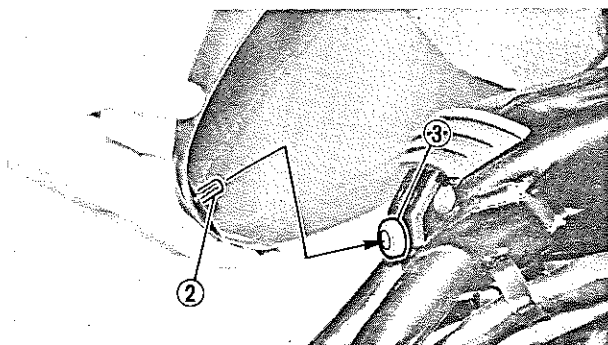
10 Nm (1.0 m·kg, 7.2 ft·lb)

**4. Install:**

- Front side cover (Right)
- Front side cover (Left)
- Top cover

NOTE:

- Pass the wireharness into the cut ① on the front side cover (Right).
- Insert the lobe ② on the top cover into the receptacle ③ on the frame.

**5. Install:**

- Battery box ①
- Battery breather hose ②
- Battery ③

NOTE:

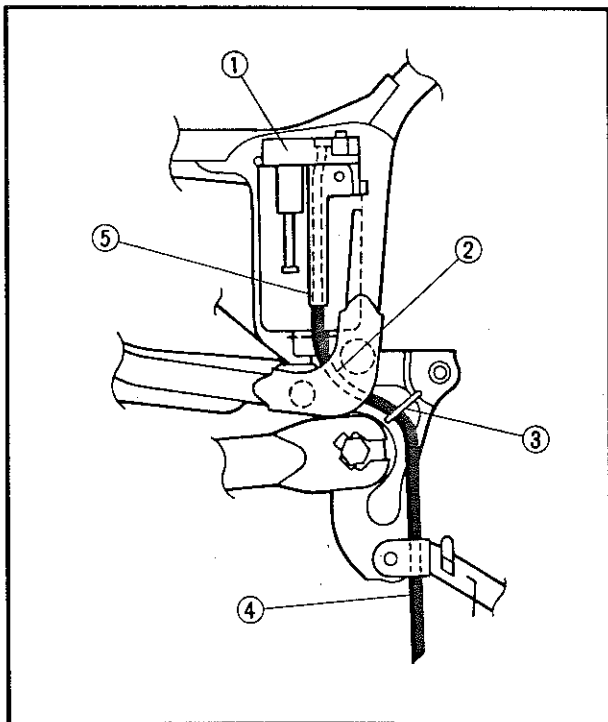
Be sure the breather hose is properly attached and routed.

CAUTION:

When inspecting the battery, be sure the breather hose is routed correctly. If the breather hose touches the frame or exits in such a way as to cause battery electrolyte or gas to exit onto the frame, structural and cosmetic damage to the motorcycle can occur.

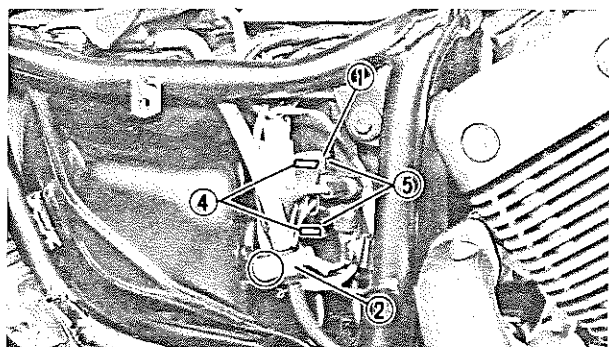
VALVE CLEARANCE ADJUSTMENT

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Battery Box:
7 Nm (0.7 m·kg, 5.1 ft·lb)

- ① Battery
- ② Route inside the frame
- ③ Pass through the clamp
- ④ Route inside the bracket
- ⑤ Route inside the battery box



6. Install:

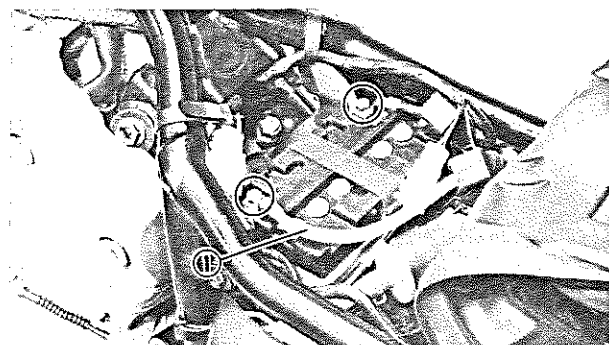
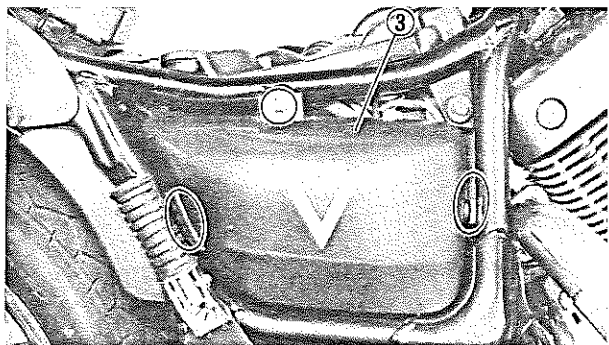
- Starter relay ①
- Clamp (Fuel hose) ②
- Rear side cover (Right) ③

NOTE:

Insert the lobes ④ on the battery box into the receptacles ⑤ on the relay band.



Rear Side Cover:
7 Nm (0.7 m·kg, 5.1 ft·lb)



7. Conncet:

- Battery leads

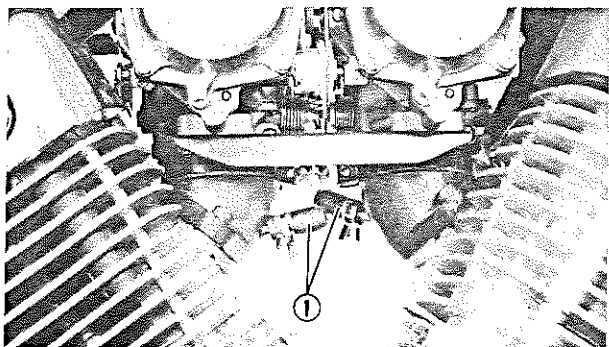
NOTE:

Connect the positive lead ① first.



CAM CHAIN ADJUSTMENT

This model has been equipped the automatic cam chain tensioner. No adjustment is necessary.

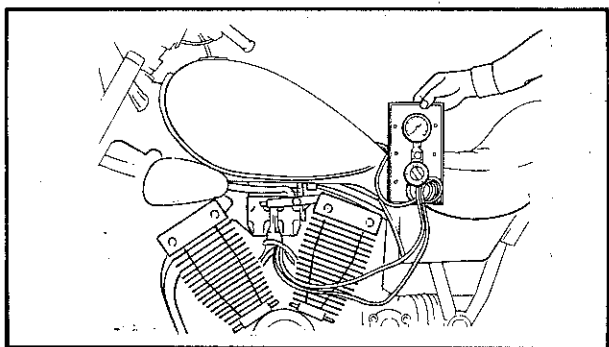


CARBURETOR SYNCHRONIZATION

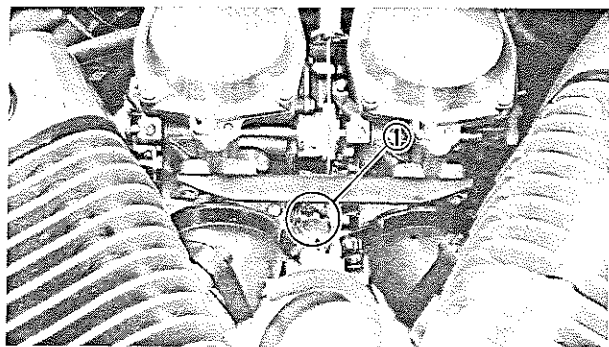
NOTE:

Valve clearance must be set properly before synchronizing the carburetors.

1. Remove:
 - Vacuum plug caps (Front and rear) ①



2. Attach:
 - Vacuum Gauge ① (90890-03094)
 - Adapter (90890-03060)To the vacuum plugs.
3. Start the engine and let it warm up.



4. Adjust:
 - Idle speedOut of specification →
Turn the throttle stop screw ① to adjust.



Idle Speed:
1,150 ~ 1,250 r/min

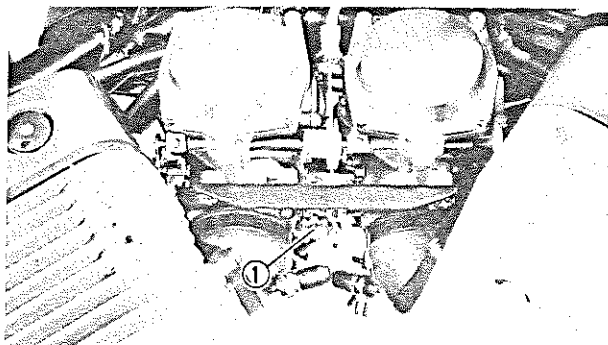
5. Adjust:
 - Carburetor synchronization

Carburetor synchronization adjustment steps:

- Synchronize carburetor (Rear) to carburetor (Front) by turning synchronizing screw ① until both gauges read the same.
- Reverse the engine for a fraction of a second, two or three times, and check the synchronization again.



Vacuum Pressure at Idle Speed:
30.6 kPa (230 mm Hg, 9.06 in Hg)
Vacuum Synchronous Difference:
1.3 kPa (10 mm Hg, 0.39 in Hg)

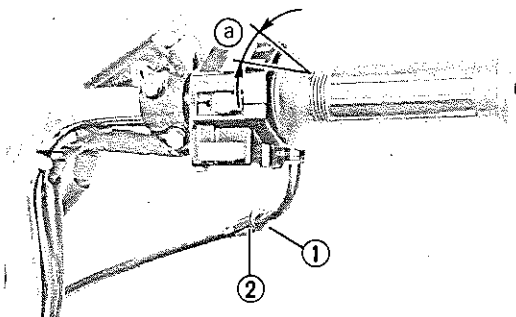


IDLE SPEED ADJUSTMENT

1. Adjust:
 - Idle speed
 Warm up the engine and turn the throttle stop screw ① to adjust.



Idle Speed:
1,150 ~ 1,250 r/min



THROTTLE CABLE FREE PLAY ADJUSTMENT

NOTE:

Before adjusting the throttle cable free play, the engine idling speed should be adjusted.

1. Check:
 - Throttle cable free play (a)
 Out of specification → Adjust.



Throttle Cable Free Play (a) :
3 ~ 5 mm (0.12 ~ 0.20 in)

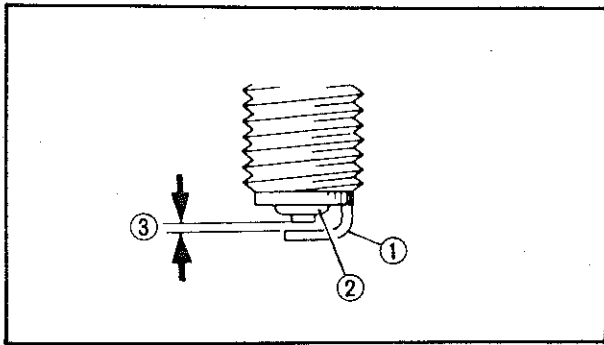
2. Adjust:
 - Throttle cable free play

Throttle cable adjustment steps:

- Loosen the locknut ①.
- Turn the adjuster ② clockwise or counter-clockwise until proper free play is attained.
- Tighten the locknut.

SPARK PLUG INSPECTION

1. Remove:
 - Side cover (Front cylinder — Left)
 - Side cover (Rear cylinder — Right)
 - Spark plugs



2. Inspect:

- Electrode ①
Wear/Damage → Replace.
- Insulator color ②
Normal condition is a medium to light tan color.
Distinctly different color → Check the engine condition.

③ Spark plug gap

3. Clean:

- Spark plug
Clean the spark plug with a spark plug cleaner or wire brush.

4. Inspect:

- Spark plug type
Incorrect → Replace

Standard Spark Plug:
BPR7ES (N.G.K.) or
W22EPR-U (N.D.)

5. Measure:

- Spark plug gap
Out of specification → Regap.
Use a wire gauge.



Spark Plug Gap:
0.7 ~ 0.8 mm (0.028 ~ 0.031 in)

6. Tighten:

- Spark plugs
- Side cover (Front cylinder — Left)
- Side cover (Rear cylinder — Right)

NOTE:

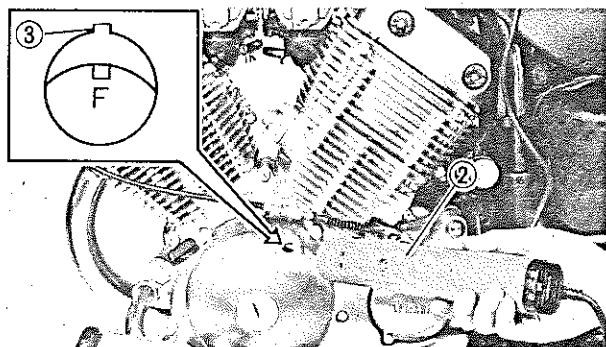
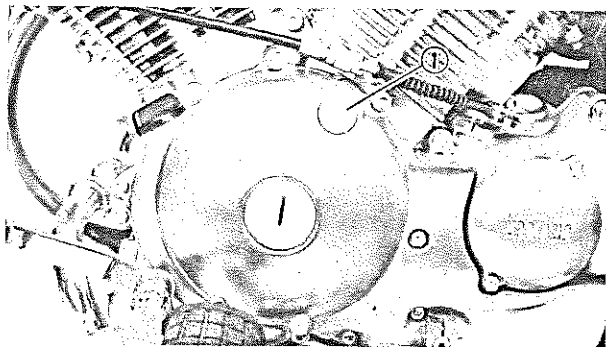
- Before installing a spark plug, clean the gasket surface and plug surface.
- If a torque wrench is not available when you are installing a spark plug, a good estimate of the correct torque is 1/4 to 1/2 turns part finger tight. Have the spark plug torqued to the correct value as soon as possible with a torque wrench.



Spark Plugs:
20 Nm (2.0 m·kg, 14 ft·lb)
Side Covers (Front and Rear Cylinders):
10 Nm (1.0 m·kg, 7.2 ft·lb)

IGNITION TIMING CHECK/COMPRESSION PRESSURE MEASUREMENT

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IGNITION TIMING CHECK

1. Check:

- Ignition timing

Ignition timing check steps:

- Remove the timing plug ①.
- Connect the Timing Light ② (90890-03109) to rear (# 1) cylinder spark plug lead.
- Warm up the engine and let it idle at the specified idle speed of 1,200 r/min.
- Visually check the stationary pointer ③ in the timing window to verify it is within the required firing range indicated on the flywheel.

Incorrect firing range → Check flywheel and/or pickup assembly (Tightness damage).

Refer to "CHAPTER 6, ELECTRICAL" for further information.

COMPRESSION PRESSURE MEASUREMENT

NOTE:

Insufficient compression pressure will result in performance loss.

1. Measure:

- Valve clearance

Out of specification → Adjust.

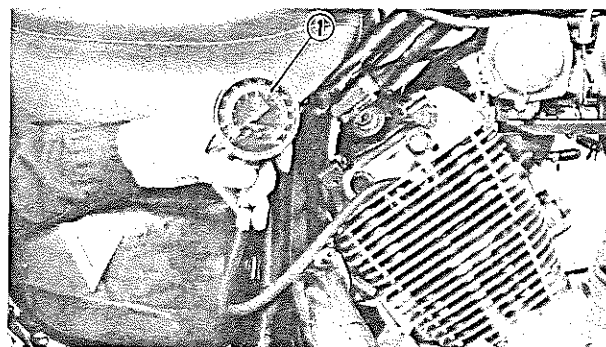
2. Warm up the engine.

3. Remove:

- Spark plugs

4. Measure:

- Compression pressure



Compression pressure measurement steps:

- Install the Compression Gauge ① (90890-03081) using an adapter.
- Crank over the engine with the electric starter (Be sure the battery is fully charged) with the throttle wide open until the compression reading on the gauge stabilizes.
- Check readings with specified levels (See chart)

Compression Pressure (At sea level):

Standard:

1,100 kPa (11 kg/cm², 156 psi)

Minimum:
1,000 kPa (10 kg/cm², 142 psi)

Maximum:
1,200 kPa (12 kg/cm², 171 psi)

WARNING:

When cranking the engine, ground all of the spark plug leads to prevent sparking.

- Repeat the previous steps for the other cylinders.
- If pressure falls below the minimum level:
 - 1) Squirt a few drops of oil into the affected cylinder.
 - 2) Measure the compression again.

Compression Pressure
(with oil introduced into cylinder)

Reading	Diagnosis
Higher than without oil	Worn or damaged pistons
Same as without oil	Defective ring(s), valves, cylinder head gasket or piston is possible.
Above maximum level	Inspect cylinder head, valve surfaces, or piston crown for carbon deposits.

NOTE:

The difference between the highest and lowest cylinder compression readings must not vary more than the specified value.

Difference Between Each Cylinder:
Less than 100 kPa
(1 kg/cm², 14 psi)

ENGINE OIL LEVEL INSPECTION

1. Inspect:

- Oil level

Oil level low → Add sufficient oil.



ENGINE OIL REPLACEMENT

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Engine oil level visual inspection steps:

- Place the motorcycle on a level place and support the motorcycle with a suitable stand.

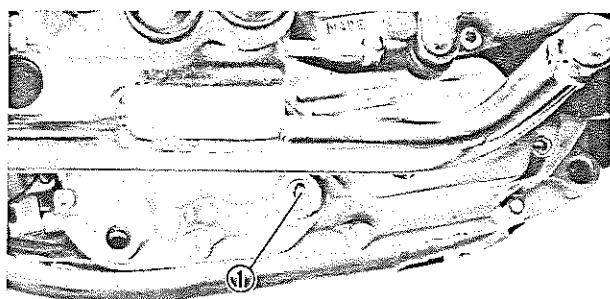
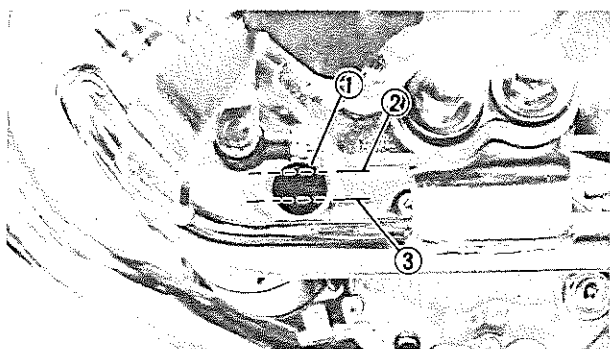
NOTE:

Position motorcycle straight up when checking oil level, a slight tilt to the side can produce false readings.

- Warm up the engine for several minutes.
- Stop the engine and visually check the oil level through the level window ①.

② Maximum

③ Minimum



ENGINE OIL REPLACEMENT

1. Warm up the engine for several minutes, then place an oil pan under the engine.
2. Remove:
 - Oil filler cap
 - Drain plug ①Drain the engine oil.
3. Tighten:
 - Drain plug ①



Drain Plug:

43 Nm (4.3 m·kg, 31 ft·lb)

4. Fill:

- Crankcase



Recommended Oil:

At 5°C (40°F) or Higher ① :

Yamalube 4 or

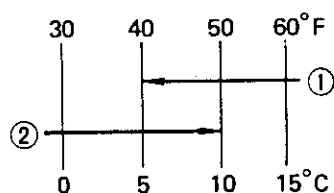
SAE 20W40 Type SE Motor Oil

At 15°C (60°F) or Lower ② :

SAE 10W30 Type SE Motor Oil

Periodic Oil Change:

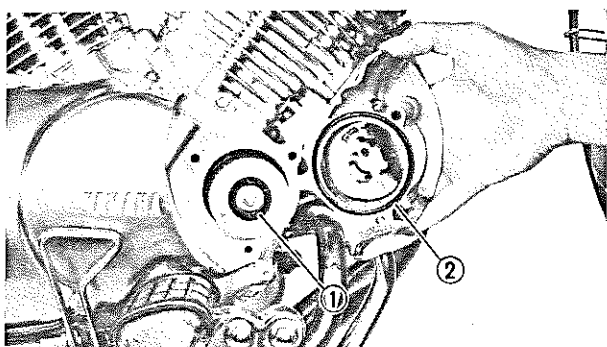
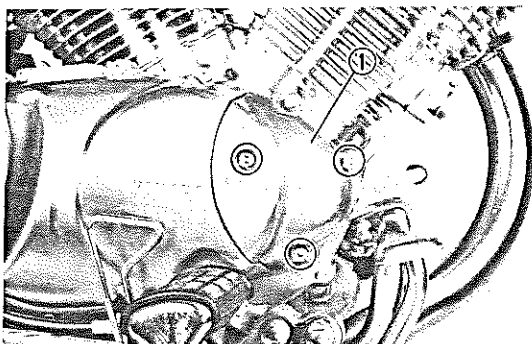
2.6 L (2.3 Imp qt, 2.7 US qt)



CAUTION:

Do not allow foreign material to enter the crankcase.

5. Install:
 - Filler cap
6. Inspect:
 - Oil leaks
 - Oil level



ENGINE OIL FILTER REPLACEMENT

1. Warm up the engine and place an oil pan under the engine.
2. Remove:
 - Oil filler cap
 - Drain plug
 Drain the engine oil.
3. Remove:
 - Oil filter cover ①
4. Install:
 - Drain plug



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

- Oil filter (New) ①
- O-ring (New) ②
- Oil filter cover

NOTE:

Be sure the O-ring is positioned properly.

5. Tighten:
 - Bolt (Oil filter)



Bolt (Oil Filter):
10 Nm (1.0 m·kg, 7.2 ft·lb)

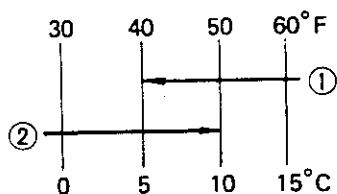
6. Fill:
 - Crankcase



Recommended Oil:
 At 5°C (40°F) or Higher ①:
 Yamalube 4 or
 SAE 20W40 Type SE Motor Oil
 At 15°C (60°F) or Lower ②:
 SAE 10W30 Type SE Motor Oil
With Oil Filter Replacement:
 2.8 L (2.5 Imp qt, 3.0 US qt)

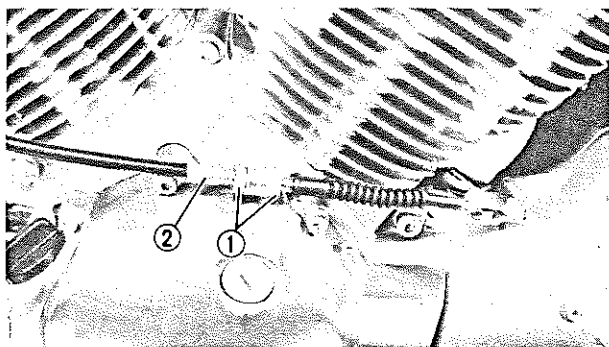
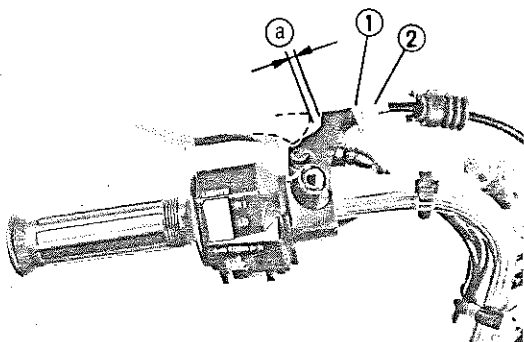
CAUTION:

Do not allow foreign material to enter the crankcase.





7. Install:
 - Oil filter cap
8. Inspect:
 - Oil leaks
 - Oil level



CLUTCH ADJUSTMENT

Free Play Adjustment

1. Loosen:
 - Locknuts ①
2. Adjust:
 - Free play ②

Turn the adjusters ② until the free play is within the specified limits.

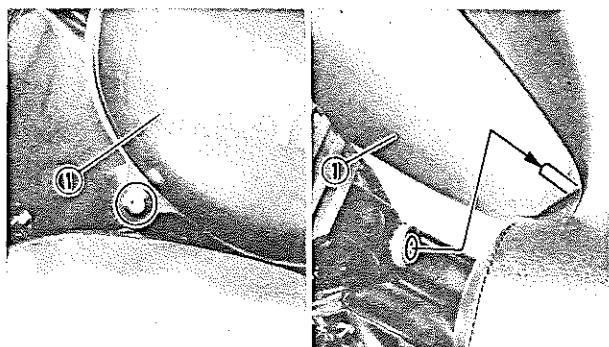


Free Play ② :
2 ~ 3 mm (0.08 ~ 0.12 in)

3. Tighten:
 - Locknuts

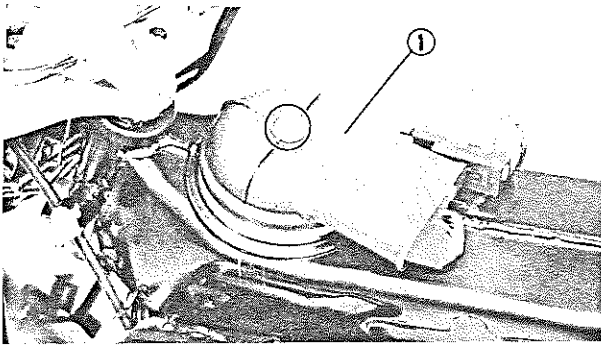
NOTE:

The above procedure provides for maximum cable free play to allow for proper clutch actuating mechanism adjustment. Refer to "CHAPTER 3, ENGINE OVERHAUL — ENGINE ASSEMBLY AND ADJUSTMENT" section.



AIR FILTER CLEANING

1. Remove:
 - Top cover ①

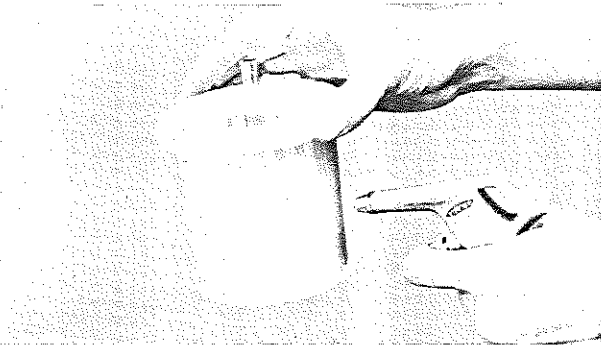


2. Remove:

- Air filter case cover ①
- Air filter element

CAUTION:

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



3. Eliminate:

- Dust

Use the compressed air.

Blow out dust in the element from the outer surface.

4. Inspect:

- Element

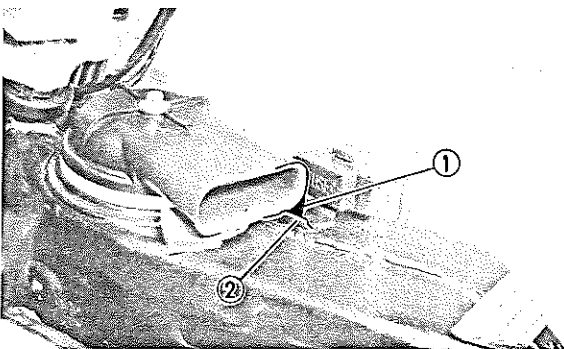
Damage → Replace.

5. Install:

- Element
- Air filter case cover
- Top cover

NOTE:

When installing the filter case cover, lightly touch the projection on the case cover ① with the projection on the frame ②.



Air Filter Case Cover:

7 Nm (0.7 m·kg, 5.1 ft·lb)

Top Cover:

7 Nm (0.7 m·kg, 5.1 ft·lb)

CARBURETOR JOINT INSPECTION

1. Tighten:

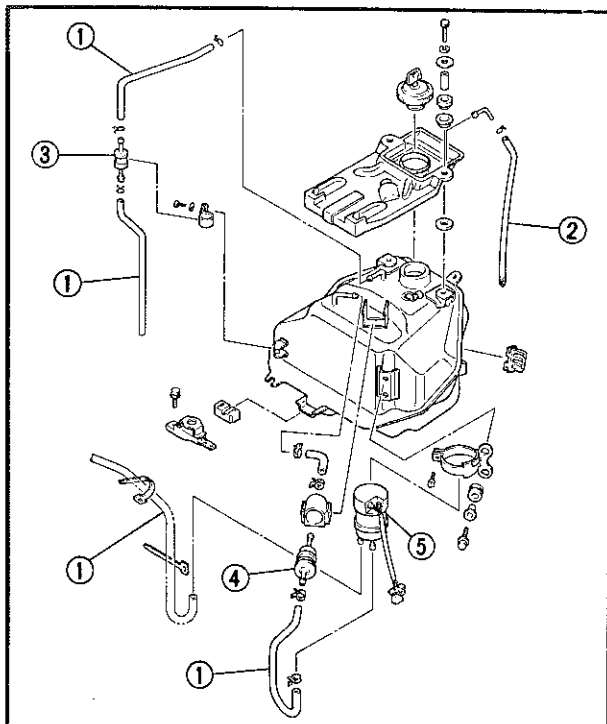
- Clamps (Carburetors)
- Bolts (Carburetor joints)

2. Inspect:

- Carburetor joints
 - O-rings (Carburetor joints)
 - Intake manifolds
- Cracks/Damage → Replace.

1 FUEL LINE INSPECTION/CRANKCASE VENTILATION HOSE INSPECTION/EXHAUST SYSTEM INSPECTION

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FUEL LINE INSPECTION

1. Inspect:

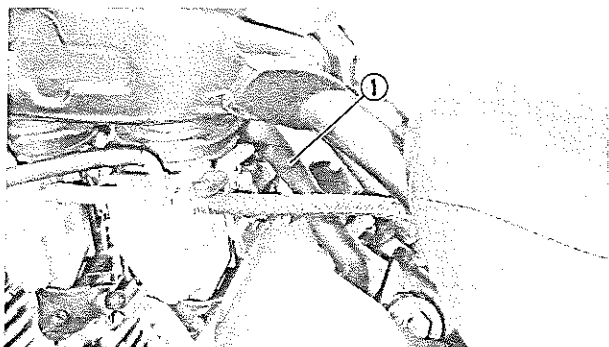
- Fuel hoses ①
- Breather hose ②
- Roll over valve ③
- Cracks/Damage → Replace.
- Clogs → Clean.

2. Inspect:

- Fuel filter ④
- Dirty/Damage → Replace.

NOTE:

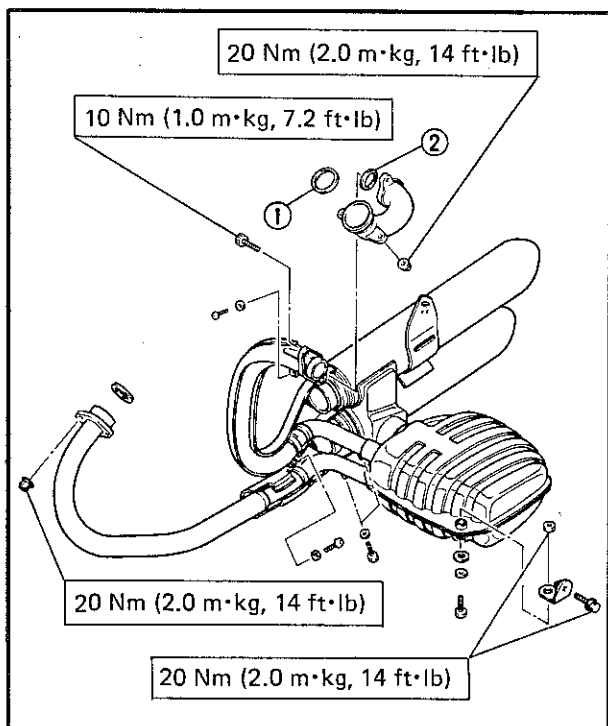
- Drain and flush fuel tank if abrasive damage to any components is evident.
- Arrow mark on the fuel filter should face toward the fuel pump ⑤ side.



CRANKCASE VENTILATION HOSE INSPECTION

1. Inspect:

- Crankcase ventilation hose ①
- Cracks/Damage → Replace.



EXHAUST SYSTEM INSPECTION

1. Inspect:

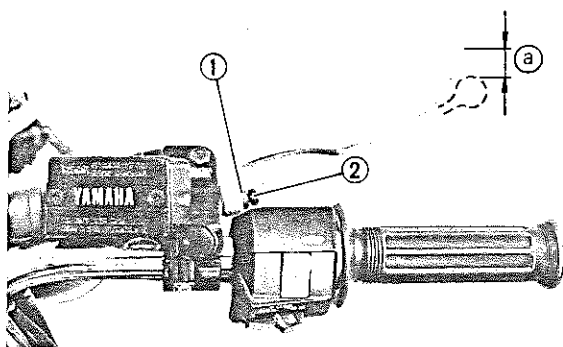
- Gaskets (Exhaust pipes) ①
- Gasket (Exhaust pipe – Rear joint) ②
- Damage → Replace.
- Exhaust gas leakage → Repair.

2. Tighten:

- Nuts (Exhaust pipes)
- Bolts (Exhaust pipe – Rear joint)
- Nut (Muffler chamber)
- Bolt (Muffler chamber)



Exhaust Pipes:
20 Nm (2.0 m·kg, 14 ft·lb)
Rear Joint (Exhaust Pipe):
10 Nm (1.0 m·kg, 7.2 ft·lb)
Muffler Chamber:
20 Nm (2.0 m·kg, 14 ft·lb)



CHASSIS

FRONT BRAKE ADJUSTMENT

1. Loosen:

- Locknut ①

2. Adjust:

- Free play ②

Turn the adjuster ② until the free play ② is within the specified limits.



Free play ② :
5 ~ 8 mm (0.20 ~ 0.32 in)

CAUTION:

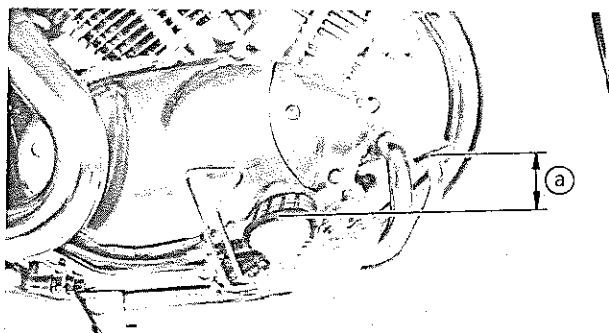
Proper lever free play is essential to avoid excessive brake drag.

WARNING:

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

3. Tighten:

- Locknut



REAR BRAKE ADJUSTMENT

Brake Pedal Height Adjustment

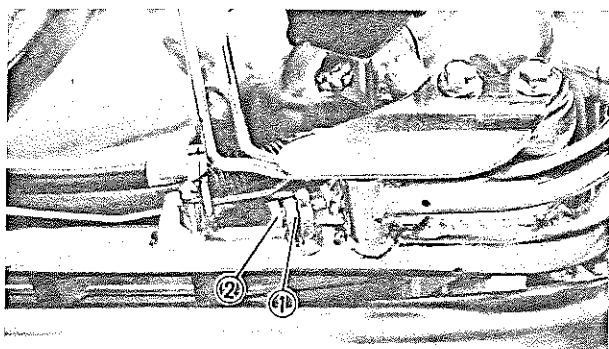
1. Loosen:
 - Locknut ①
2. Adjust:
 - Brake pedal height ②
 Turn the adjuster ② until the brake pedal position is at the specified height.



Brake Pedal Height ② :
38 mm (1.5 in)
Above the Top of the Footrest

WARNING:

Check the operation of the brake light after adjusting the brake pedal height.



Brake Pedal Free Play Adjustment

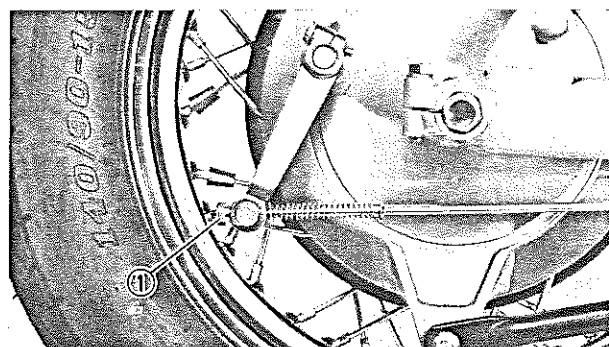
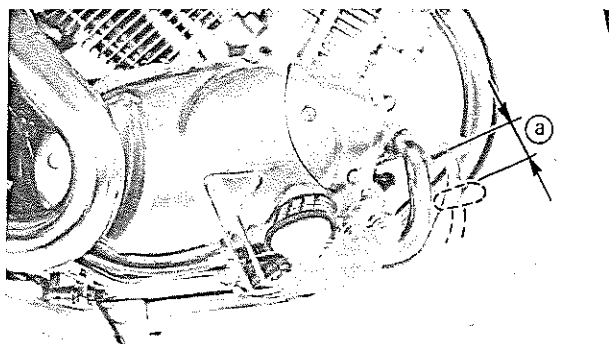
1. Adjust:
 - Brake pedal free play ②
 Turn the adjuster ① until the free play is within the specified limits.



Free Play ② :
20 ~ 30 mm (0.8 ~ 1.2 in)

WARNING:

After adjusting the pedal height, adjust the brake pedal free play.

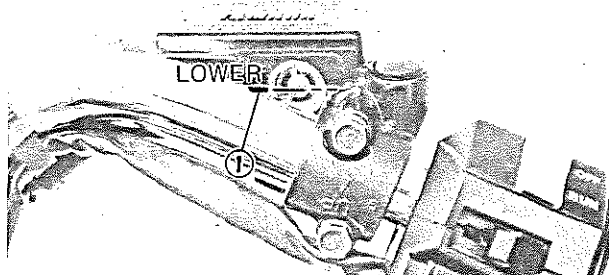


BRAKE FLUID LEVEL INSPECTION

1. Inspect:
 - Brake fluid level
 Level low → Replenish fluid.



Brake Fluid:
DOT # 4
If DOT #4 is not available, #3 can
be used.



① Lower level



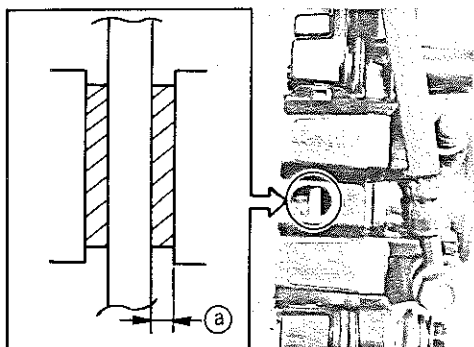
NOTE:

Be sure that:

- 1) The master cylinder top is horizontal by turning the handlebars.
- 2) Spilled fluid is cleaned up immediately to prevent painted surfaces or plastic parts from eroding.

WARNING:

- Use only the designated quality brake fluid, otherwise poor brake performance will result.
- Water does not enter the master cylinder when refilling, otherwise poor brake performance.



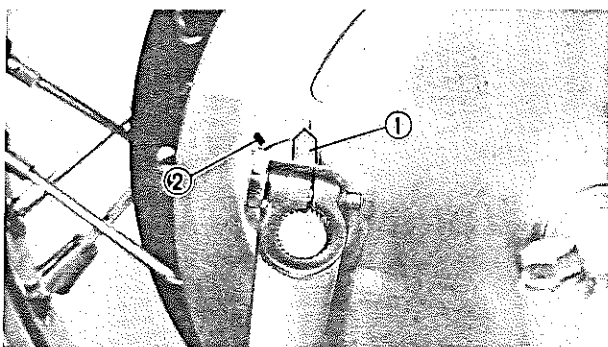
FRONT BRAKE PAD INSPECTION

1. Remove:
 - Blind plug
2. Inspect:
 - Wear limit ①
 Out of specification → Replace pads.



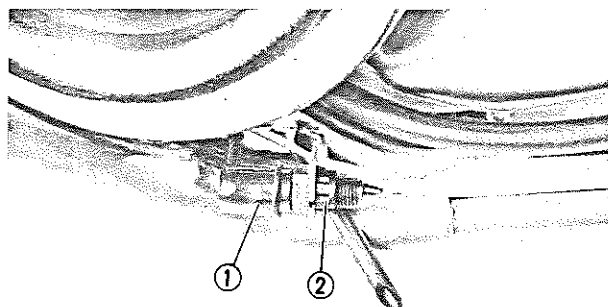
Wear Limit:
0.8 mm (0.03 in)

Refer to "CHAPTER 5. CHASSIS" section.



REAR BRAKE SHOE INSPECTION

1. Activate the brake pedal.
2. Inspect:
 - Wear indicator ①
 Indicator reaches wear limit line ② → Replace shoes.
Refer to "CHAPTER 5. CHASSIS" section.



BRAKE LIGHT SWITCH ADJUSTMENT

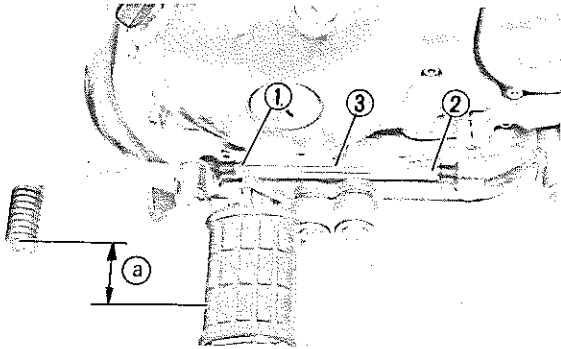
1. Adjust:
 - Brake light operating timing
 Hold the main body ① of the switch with your hand so it does not rotate, and turn the adjuster ② until the operating timing is correct.



BRAKE HOSE INSPECTION

1. Inspect:

- Brake hose
- Cracks/Wear/Damage → Replace.



CHANGE PEDAL ADJUSTMENT

1. Loosen:

- Locknut (Front) ①
- Locknut (Rear) ②

NOTE:

The locknut (Front) has left-hand threads.

2. Adjust:

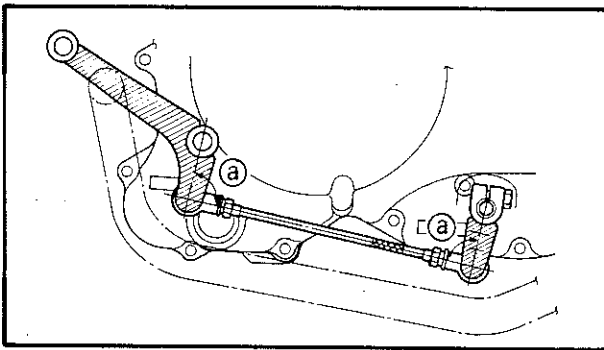
- Change pedal height ④
- Turn the adjuster rod ③ until the change pedal position is at the specified height.



Change Pedal Height:
50 ~ 60 mm (2.0 ~ 2.4 in)
Above the Top of the Footrest

WARNING:

After adjusting the change pedal height, visually check the angle of change pedal arms. The angle of arms must be at right angles ⑤ with the adjuster rod.



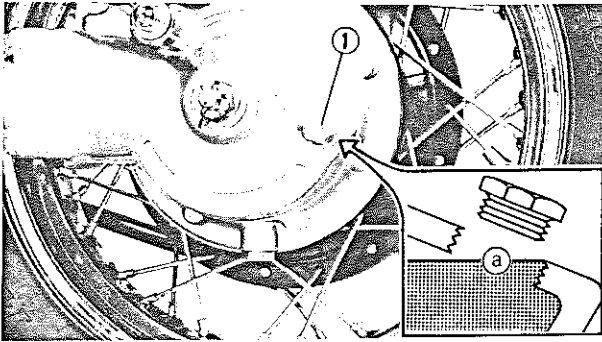
FINAL GEAR OIL LEVEL INSPECTION

1. Inspect:

- Final gear oil level
- Oil level low → Add sufficient oil.

FINAL GEAR OIL REPLACEMENT

INSP
ADJ

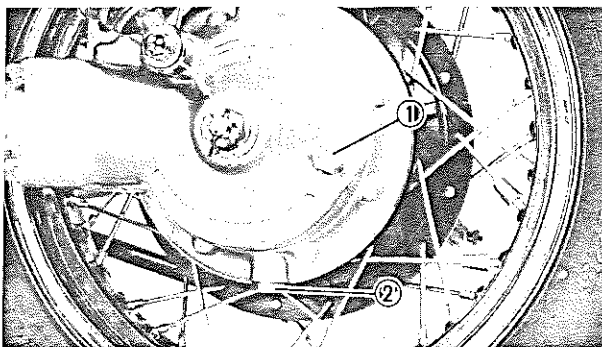


Final gear oil level visual inspection steps:

- Place the motorcycle on a level area and support the motorcycle with a suitable stand.
- Remove the oil filler cap ①.
- Visually check the oil level. Correct oil level (a) should be at the brim of the hole.
- If the oil level is low, add sufficient oil.
- Tighten the oil filler cap to specification.



Oil Filler Cap (Final Gear):
23 Nm (2.3 m·kg, 17 ft·lb)



FINAL GEAR OIL REPLACEMENT

1. Place an oil pan under the final gear case.
2. Remove:
 - Oil filler cap ①
 - Drain plug ②
 Drain the oil.
3. Install:
 - Drain plug



Drain Plug (Final Gear):
23 Nm (2.3 m·kg, 17 ft·lb)

4. Fill:
 - Final gear case



Oil Capacity:
0.19 L (0.17 Imp qt, 0.20 US qt)

Final Gear Oil:
SAE 80 API "GL-4" Hypoid
Gear Oil

If desired, an SAE 80W90 Hypoid gear oil may be used for all conditions.

WARNING:

Do not allow the gear oil to contact the tire or wheel.

5. Install:
 - Oil filler cap



Oil Filler Cap (Final Gear):
23 Nm (2.3 m·kg, 17 ft·lb)

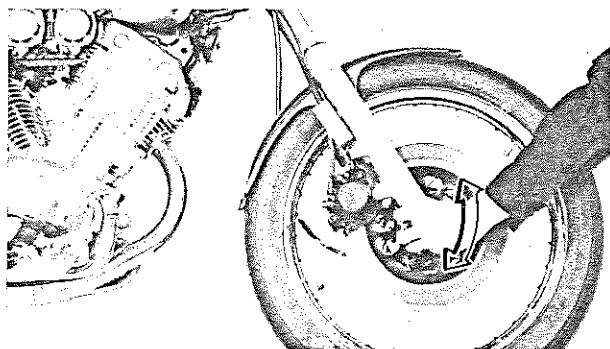


STEERING HEAD ADJUSTMENT

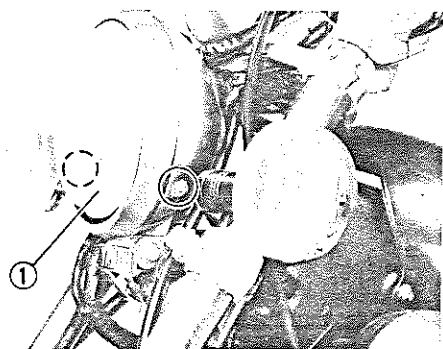
Inspection

WARNING:

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

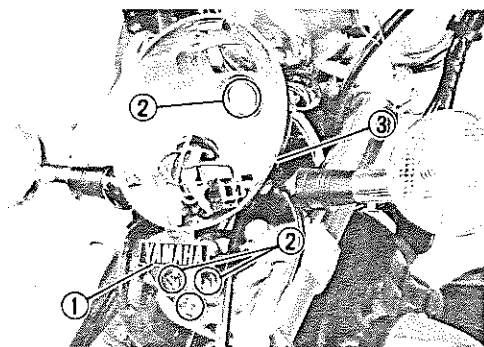


1. Place the motorcycle on a level place.
2. Elevate the front wheel by placing a suitable stand under the engine.
3. Check:
 - Steering assembly bearings
 Grasp the bottom of the forks and gently rock the fork assembly back and forth.
 Looseness → Adjust steering head.

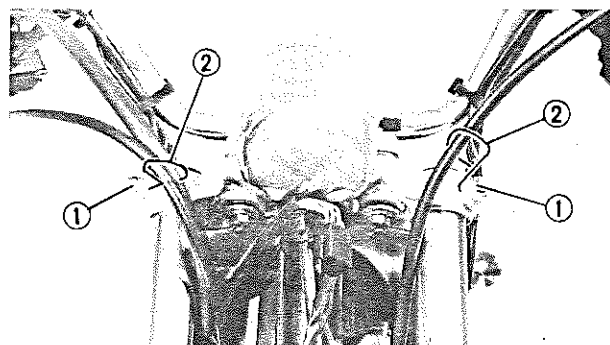


Adjustment

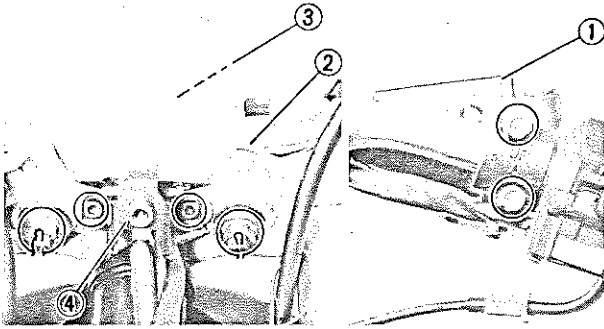
1. Remove:
 - Headlight lens unit ①
2. Disconnect:
 - All leads (In the headlight body)



3. Remove:
 - Emblem ①
 - Bolts (Headlight body bracket) ②
 - Headlight and flasher light bracket assembly ③
 Pull down the bracket assembly.



4. Remove:
 - Bolts (Front fork — Top) ①
 - Cable holders (Left and right) ②

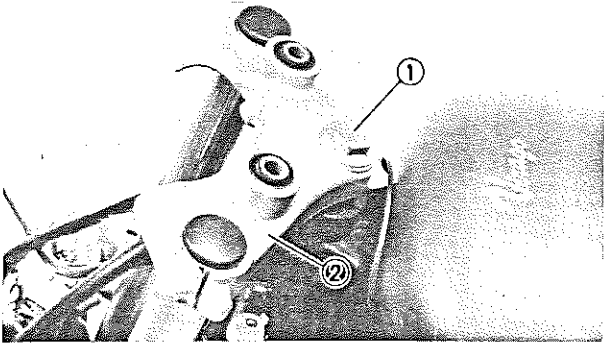


5. Remove:

- Master cylinder assembly ①
- Handlebar holder assembly ②
- Indicator box ③
- Speedometer with bracket ④

NOTE:

Take care not to lose the clevis pins.

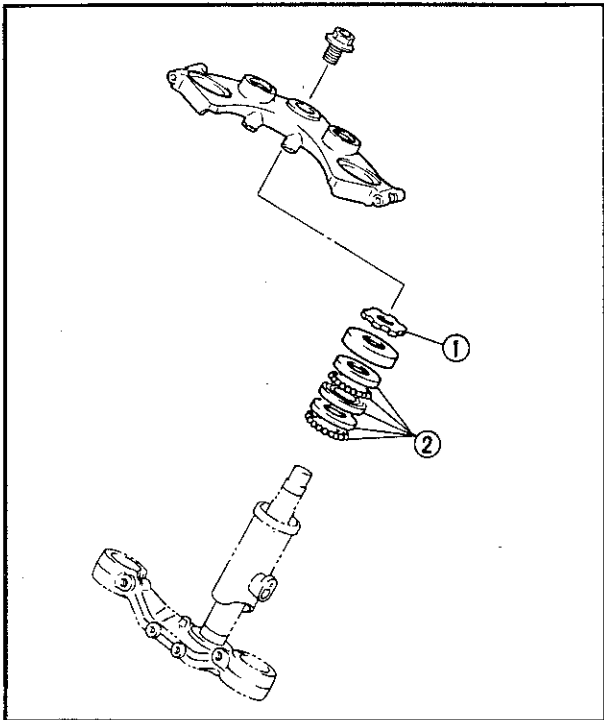


6. Remove:

- Bolt (Steering stem) ①
- Steering crown ②

7. Adjust:

- Steering head tightening condition

**Steering head adjustment steps:**

- Loosen the ring nut ① completely.
- Tighten the ring nut using the Ring Nut Wrench (90890-01403) ②.

NOTE:

Set the Torque Wrench to the Ring Nut Wrench so that they form a right angle.



Ring Nut (Initial Tightening):
38 Nm (3.8 m·kg, 27 ft·lb)

- Loosen the ring nut completely and retighten it to specification.

WARNING:

Do not over-tightening.



Ring Nut (Final Tightening):
10 Nm (1.0 m·kg, 7.2 ft·lb)

- Check the steering stem by turning it lock to lock. If there is any binding, remove the steering stem assembly and inspect the steering bearings ②.

Refer to "CHAPTER 5. STEERING HEAD" for more details.



8. Install:

Reverse the removal steps "8 ~ 1".

NOTE:

- Do not forget to fit:
 - 1) The clevis pins to the handlebar holders.
 - 2) The cable holders to the front fork top.
- After installing the headlight lens unit, adjust the headlight beam.



Bolt (Steering Stem):

54 Nm (5.4 m·kg, 39 ft·lb)

Bracket (Speedometer):

7 Nm (0.7 m·kg, 5.1 ft·lb)

Handlebar Holder (Lower):

20 Nm (2.0 m·kg, 14 ft·lb)

Master Cylinder Bracket:

9 Nm (0.9 m·kg, 6.5 ft·lb)

Flasher Light Bracket:

7 Nm (0.7 m·kg, 5.1 ft·lb)

Bolts (Front Fork Top):

20 Nm (2.0 m·kg, 14 ft·lb)

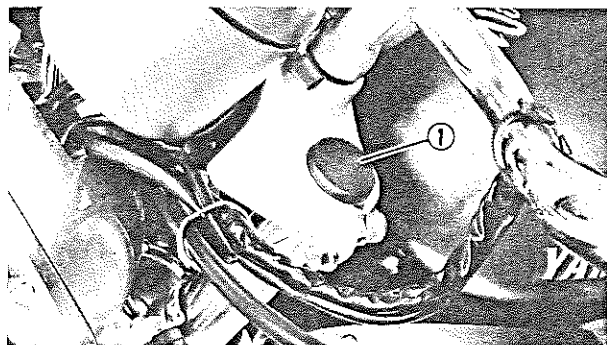
Headlight Body Bracket:

7 Nm (0.7 m·kg, 5.1 ft·lb)

FRONT FORK OIL REPLACEMENT

WARNING:

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



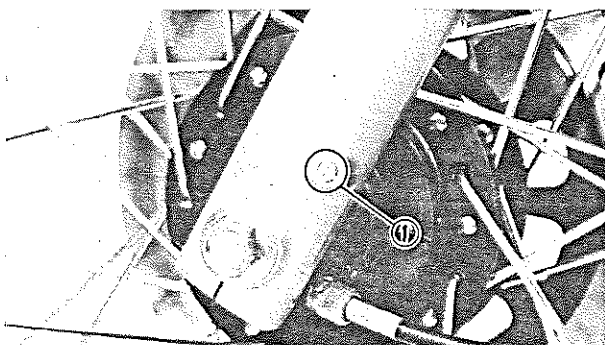
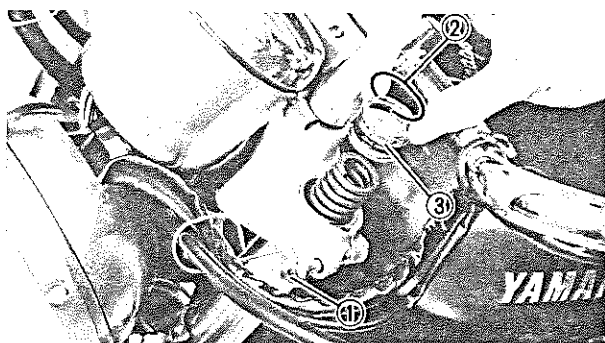
1. Elevate the front wheel by placing a suitable stand under the engine.
2. Remove:
 - Fork caps ①

FRONT FORK OIL REPLACEMENT

INSP
ADJ



C-



3. Loosen:
 - Pinch bolts (Steering crown) ①
4. Remove:
 - Stopper rings ②
 - Spring seats ③

Depress the spring seat with a suitable bar to remove the stopper ring.

5. Place an oil pan under the drain screws.

6. Remove:
 - Drain screws ④

Drain the fork oil.

WARNING:

Do not allow any oil to contact the disc brake components. If oil is discovered, be sure to remove it, otherwise diminished braking capacity and damage to the rubber components of the brake assembly will occur.

7. Inspect:
 - O-rings (Spring seat)
 - Gaskets (Drain screw)

Wear/Damage → Replace.
8. Install:
 - Drain screws
9. Fill:
 - Front forks



Each Fork:
228 cm³ (8.03 Imp oz, 7.71 US oz)
Yamaha Fork Oil 10wt or Equivalent

After filling, pump the forks slowly up and down to distribute the oil.

10. Install:

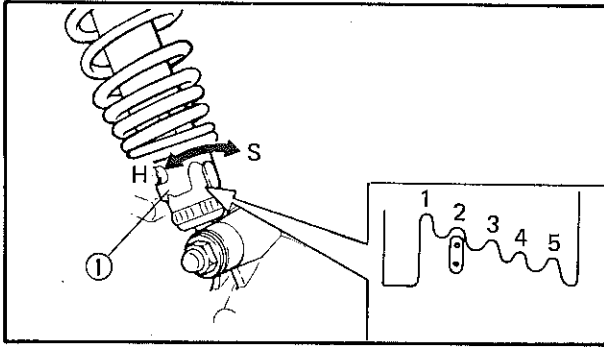
Reverse the removal steps "4 ~ 1".

WARNING:

Always use a new stopper ring.



Pinch Bolts (Steering Crown):
20 Nm (2.0 m·kg, 14 ft·lb)



REAR SHOCK ABSORBER ADJUSTMENT

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

1. Adjust:

Spring preload

Adjustment steps:

- To increase preload, adjuster ① is turned toward the "H". To decrease preload, adjuster is turned toward the "S".

	Hard			STD	Soft
Adjusting position	5	4	3	2	1

TIRE INSPECTION

1. Measure:

- Tire pressure

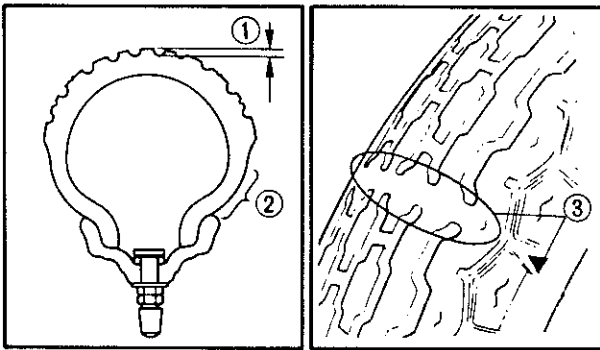
Out of specification → Adjust.

Basic weight: With oil and full fuel tank	188 kg (415 lb)	
Maximum load*	227 kg (501 lb)	
Cold tire pressure	Front	Rear
Up to 90 kg (198 lb) load*	200 kPa (2.0 kg/cm ² , 28 psi)	230 kPa (2.3 kg/cm ² , 32 psi)
90 kg (198 lb) ~ Maximum load*	200 kPa (2.0 kg/cm ² , 28 psi)	250 kPa (2.5 kg/cm ² , 36 psi)
High speed riding	200 kPa (2.0 kg/cm ² , 28 psi)	250 kPa (2.5 kg/cm ² , 36 psi)

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

**WARNING:**

- Tire inflation pressure should be checked and adjusted when the temperature of the tire equals the ambient air temperature. Tire inflation pressure must be adjusted according to total weight of cargo, rider, passenger, and accessories (fairing, saddlebags, etc. if approved for this model), and vehicle speed.
- Proper loading of your motorcycle is important for the handling, braking, and other performance and safety characteristics of your motorcycle. Do not carry loosely packed items that can shift. Securely pack your heaviest items close to the center of the motorcycle, and distribute the weight evenly from side to side. Properly adjust the suspension for your load, and check the condition and pressure of your tires. **NEVER OVERLOAD YOUR MOTORCYCLE.** Make sure the total weight of the cargo, rider, passenger, and accessories (fairing, saddlebags, etc. if approved for this model) does not exceed the maximum load of the motorcycle. Operation of an overloaded motorcycle could cause tire damage, an accident, or even injury.



2. Inspect:

- Tire surfaces
Wear/Damage → Replace.



Minimum Tire Tread Depth:
(Front and Rear)
1.0 mm (0.04 in)

- ① Tread depth
- ② Side wall
- ③ Wear indicator

WARNING:

- It is dangerous to ride with a wornout tire. When a tire tread begins to show lines, replace the tire immediately.
- Patching a punctured tube is not recommended. If it is absolutely necessary to do so, use great care and replace the tube as soon as possible with a good quality replacement.



WHEEL INSPECTION

1. Inspect:

- Wheels

Damage/Bends → Replace.

NOTE:

Always balance the wheel when a tire or wheel has been changed or replaced.

WARNING:

- Never attempt even small repairs to the wheel.
- Ride conservatively after installing a tire to allow it to seat itself properly on the rim.

SPOKE INSPECTION AND TIGHTENING

1. Inspect:

- Spokes

Bend/Damage → Replace.

Loose spoke → Retighten.

2. Tighten:

- Spokes



Nipple:
6 Nm (0.6 m·kg, 4.3 ft·lb)

CABLE INSPECTION AND LUBRICATION

Cable inspection and lubrication steps:

- Remove the screws that secure throttle housing to handlebar.
- Hold cable end high and apply several drops of lubricant to cable.
- Coat metal surface of disassembled throttle twist grip with suitable all-purpose grease to minimize friction.
- Check for damage to cable insulation. Replace any corroded or obstructed cables.
- Lubricate any cables that do not operate smoothly.



Yamaha Chain and Cable Lube or
SAE 10W30 Motor Oil

**BRAKE AND CHANGE PEDALS/BRAKE
AND CLUTCH LEVERS LUBRICATION**

Lubricate pivoting parts of each lever and pedal.



Yamaha Chain and Cable Lube or
SAE 10W30 Motor Oil

SIDESTAND LUBRICATION

Lubricate the centerstand and sidestand at their
pivot points.



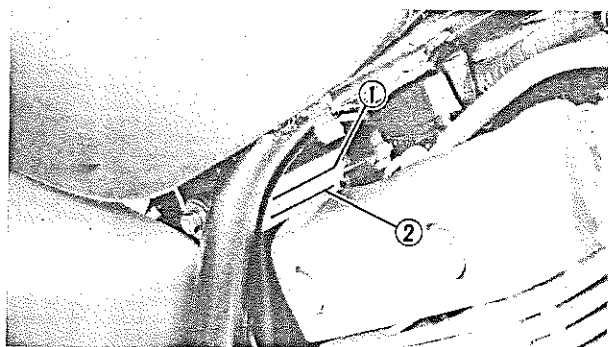
Yamaha Chain and Cable Lube or
SAE 10W30 Motor Oil

SWINGARM LUBRICATION

Lubricate the swingarm bearing.



Medium Weight Wheel
Bearing Grease



ELECTRICAL

BATTERY INSPECTION

1. Inspect:

- Battery fluid level

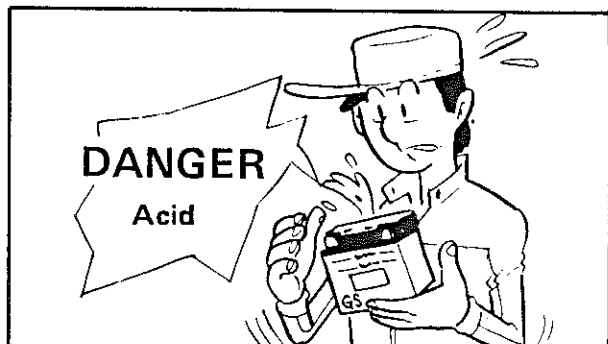
Battery fluid level low → Fill.

Fluid level should be between upper and
lower level marks.

- ① Upper level
- ② Lower level

CAUTION:

Refill with distilled water only; tap water
contains minerals harmful to a battery.



**WARNING:**

Battery electrolyte is dangerous; it contains sulfuric acid and therefore is poisonous and highly caustic.

Always follow these preventive measures:

- Avoid bodily contact with electrolyte as it can cause severe burns or permanent eye injury.
- Wear protective eye gear when handling or working near batteries.

Antidote (EXTERNAL):

- SKIN – Flush with water.
- EYES – Flush with water for 15 minutes and get immediate medical attention.

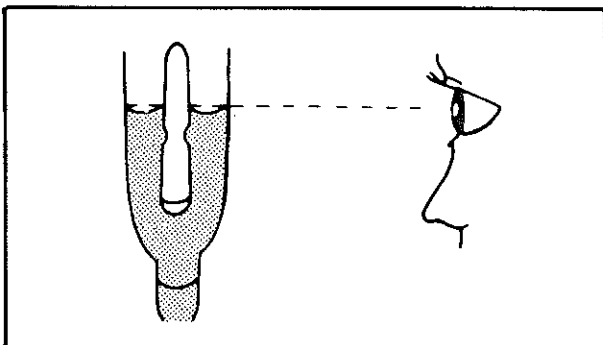
Antidote (INTERNAL):

- Drink large quantities of water or milk followed with milk of magnesia beaten egg, or vegetable oil. Get immediate medical attention.

Batteries also generate explosive hydrogen gas, therefore you should always follow these preventive measures:

- Charge batteries in a well-ventilated area.
- Keep batteries away from fire, sparks, or open flames (e.g., welding equipment, lighted cigarettes, etc.)
- DO NOT SMOKE when charging or handling batteries.

KEEP BATTERIES AND ELECTROLYTE OUT OF REACH OF CHILDREN.



2. Remove:

- Battery

3. Inspect:

- Battery fluid specific gravity
Out of specification → Charge.

CAUTION:

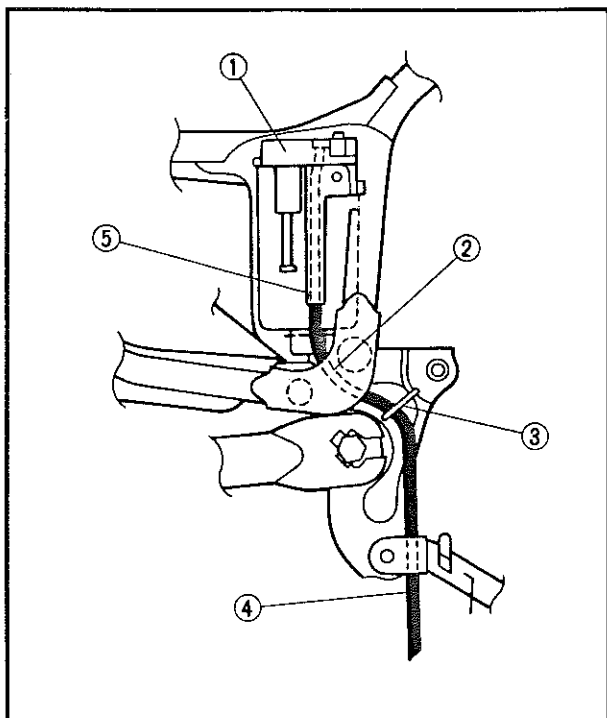
Always charge a new battery before using it to ensure maximum performance.

Charging Current:

1.2 amps/10 hrs

Specific Gravity:

1.280 at 20°C (68°F)



4. Install:

- Battery

5. Connect:

- Breather hose

Be sure the hose is properly attached and routed.

CAUTION:

When inspecting the battery, be sure the breather hose is routed correctly. If the breather hose touches the frame or exits in such a way as to cause battery electrolyte or gas to exit onto the frame, structural and cosmetic damage to the motorcycle can occur.

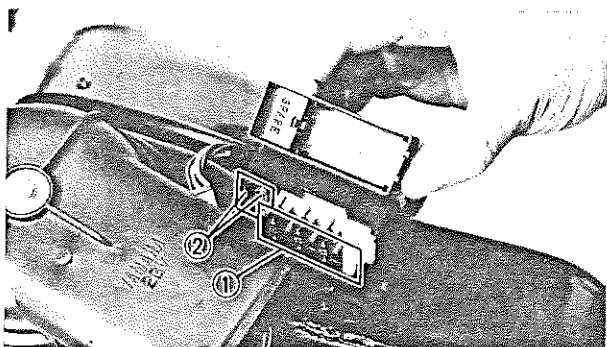
- ① Battery
- ② Route inside the frame
- ③ Pass through the clamp
- ④ Route inside the bracket
- ⑤ Route inside the battery box

6. Inspect:

- Breather hose

Obstruction → Remove.

Damage → Replace.



FUSE INSPECTION

The fuse panel is located under the top cover.

1. Inspect:

- Fuses ①

Defective → Replace.

Blown fuse (new) → Inspect circuit.

- ② Spare fuses

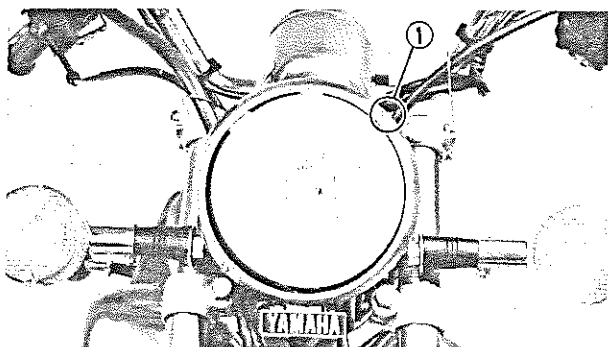
CAUTION:

Do not use fuses of higher amperage rating than those recommended.

Substitution of a fuse of improper rating can cause extensive electrical system damage and possibly a fire.



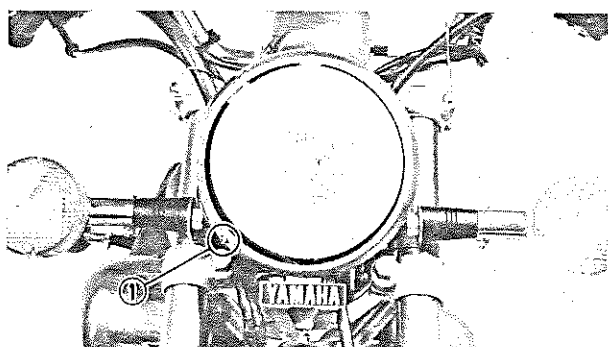
Description	Amperage	Quantity
Main	20A	1
Headlight	10A	1
Signal	10A	1
Ignition	10A	1
Reserve	20A	1
	10A	1

**HEADLIGHT BEAM ADJUSTMENT**

1. Adjust:

- Headlight beam (Horizontally)

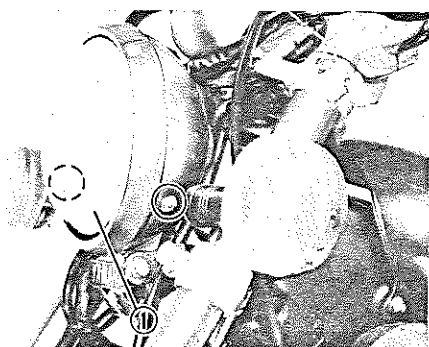
Horizontal Adjustment	
Right	Turn adjusting screw ① clockwise
Left	Turn adjusting screw ① counter-clockwise



2. Adjust:

- Headlight beam (Vertically)

Vertical Adjustment	
Higher	Turn the adjusting screw ① clockwise.
Lower	Turn the adjusting screw ① counter-clockwise.

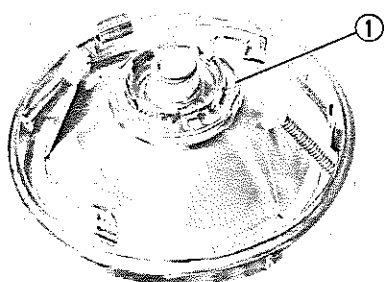
**HEADLIGHT BULB REPLACEMENT**

1. Remove:

- Headlight lens unit ①

2. Disconnect:

- Headlight lens unit leads



3. Remove:

- Bulb

Turn the bulb holder ① counterclockwise to release bulb.

WARNING:

Do not touch headlight bulb when it is on as the bulb generates enormous heat; keep flammable objects away.



4. Install:
 - Bulb (new)
Secure the new bulb with the bulb holder.
5. Install:
 - Headlight lens unit
6. Adjust:
 - Headlight beam
Refer to "HEADLIGHT BEAM ADJUSTMENT" section.



CHAPTER 3.

ENGINE OVERHAUL

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ENGINE OVERHAUL

ENGINE REMOVAL

NOTE:

It is not necessary to remove the engine in order to remove the following components:

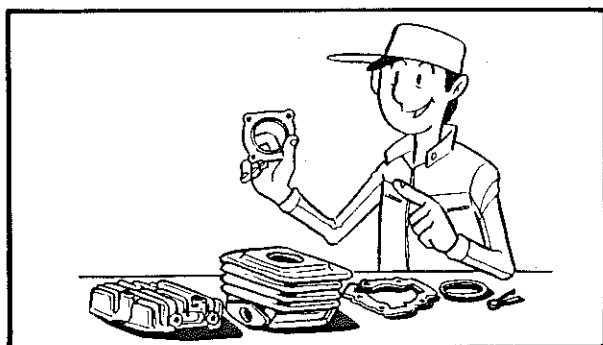
- Clutch
- Carburetor
- AC magneto

PREPARATION FOR REMOVAL

1. Remove all dirt, mud, dust, and foreign material before removal and disassembly.
2. Use proper tools and cleaning equipment. Refer to "CHAPTER 1. SPECIAL TOOL" section.

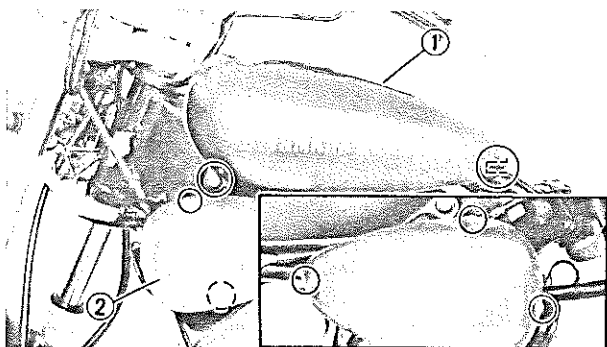
NOTE:

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

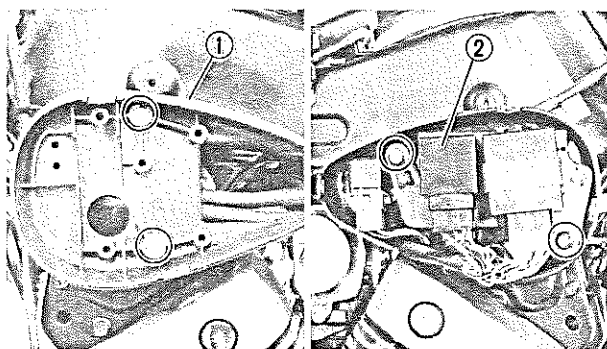


3. During engine disassembly, clean all parts and place them in trays in the order of disassembly. This will speed up assembly time and help assure that all parts are correctly reinstalled in the engine.

4. Drain engine oil completely. Refer to "CHAPTER 2. ENGINE OIL REPLACEMENT" section.

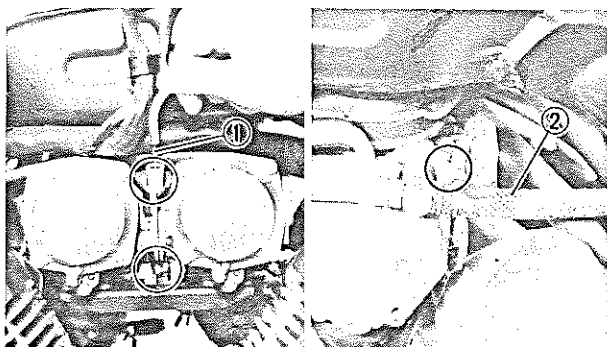
**CARBURETOR****1. Remove:**

- Top cover ①
- Front side cover (Left) ②
- Front side cover (Right) ③

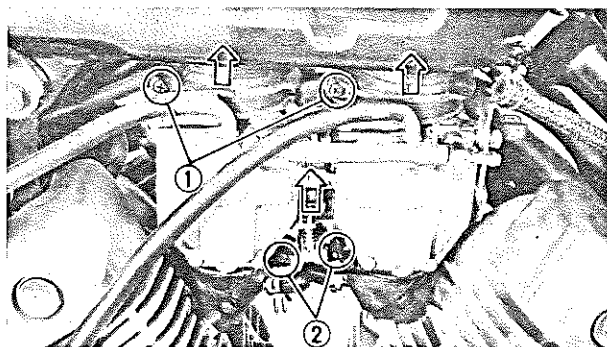
**2. Remove:**

- Front side cover bracket (Left) ①
- Electrical component board (Front side cover – Right) ②

Disconnect the carburetor hoses and relay couplers.

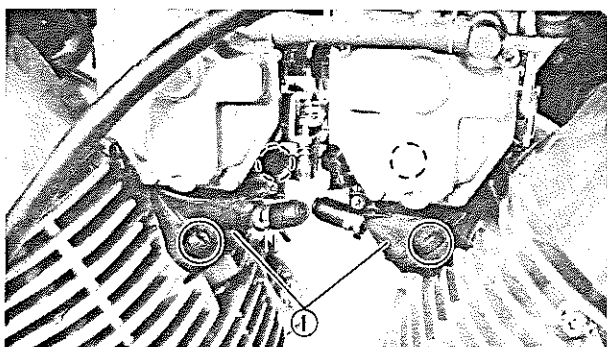
**3. Disconnect:**

- Throttle cable ①
- Fuel hose ②

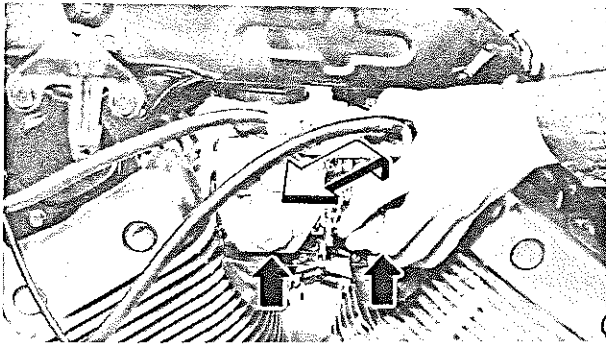
**4. Loosen:**

- Screws (Air cleaner joints) ①
- Screws (Carburetor joints) ②

Push in the air cleaner joints into the air cleaner case, and move up the carburetor.

**5. Remove:**

- Carburetor joints (Front and rear) ①



6. Remove:

- Carburetor assembly

Pull out the carburetor to the left side.

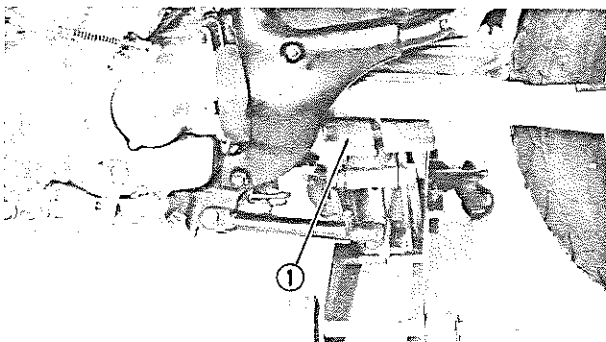
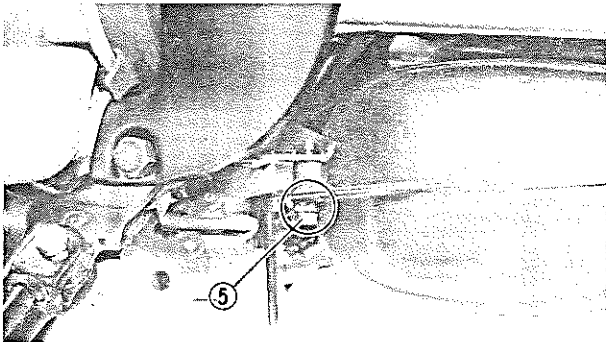
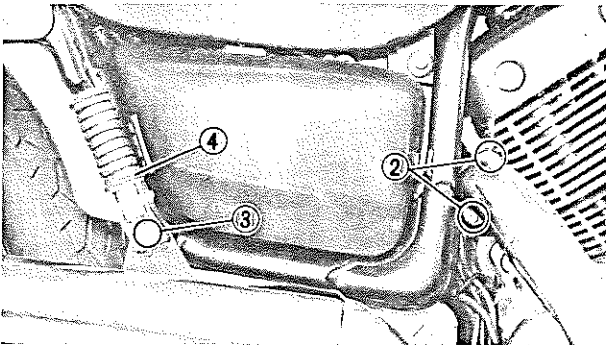
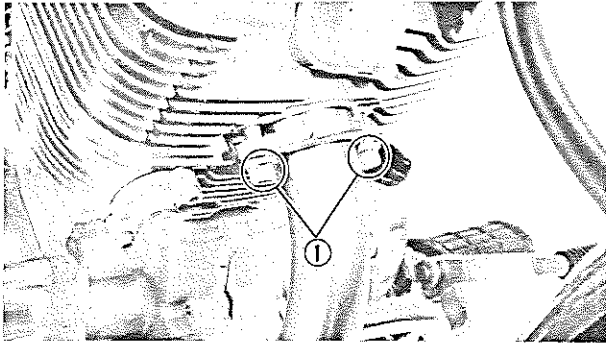
NOTE:

Cover the carburetor with a clean rag to prevent dirt or foreign matter into the carburetor.

MUFFLER ASSEMBLY

1. Remove:

- Nuts (Front cylinder – Exhaust pipe) ①
- Bolts (Rear cylinder – Rear joint) ②
- Bolt (Muffler bracket) ③
- Rear footrest (Right) ④
- Bolt (Muffler chamber) ⑤
- Muffler assembly



- Support the motorcycle with a suitable stand ① at the swingarm pivot.

WARNING:

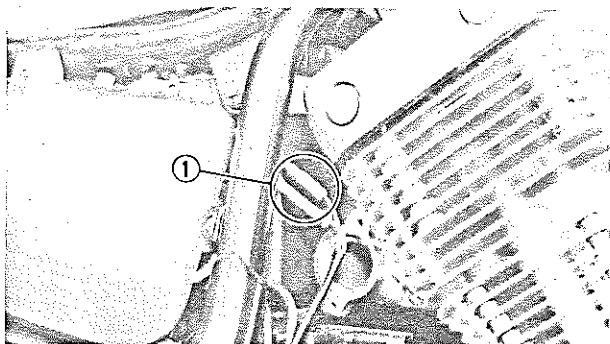
Securely support the motorcycle so there is no danger of it falling over.



BRAKE PEDAL/FOOTREST (RIGHT) AND CHANGE PEDAL/FOOTREST (LEFT)

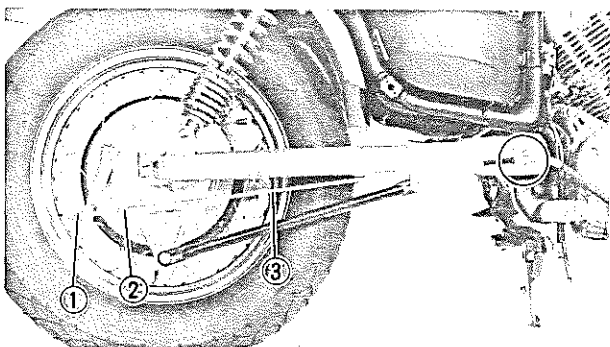
1. Disconnect:

- Brake light switch leads (Brown and Yellow) ①



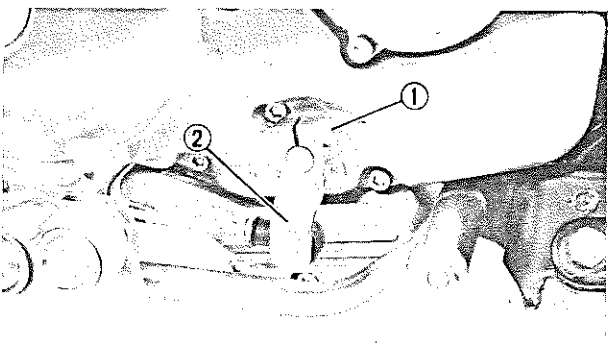
2. Remove:

- Adjuster (Rear brake) ①
- Spring ②
- Brake rod ③



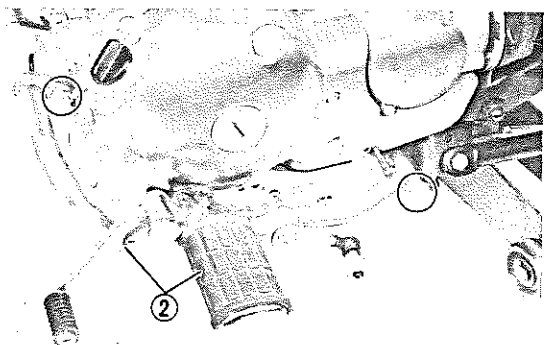
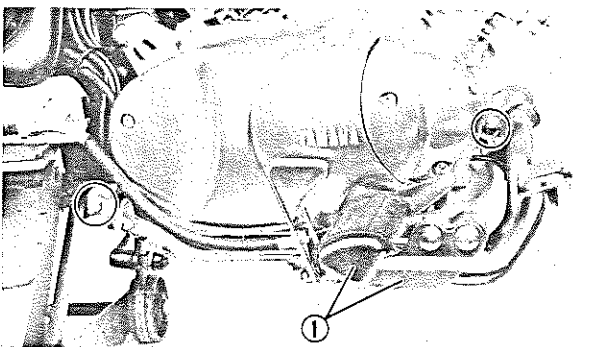
3. Remove:

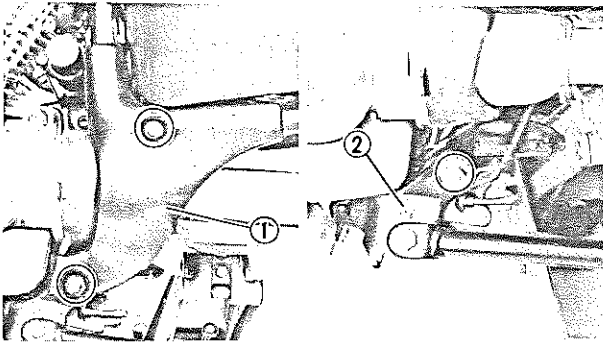
- Bolt (Change pedal) ①
- Change pedal ②



4. Remove:

- Brake pedal and footrest (Right) assembly ①
- Change pedal and footrest (Left) assembly ②





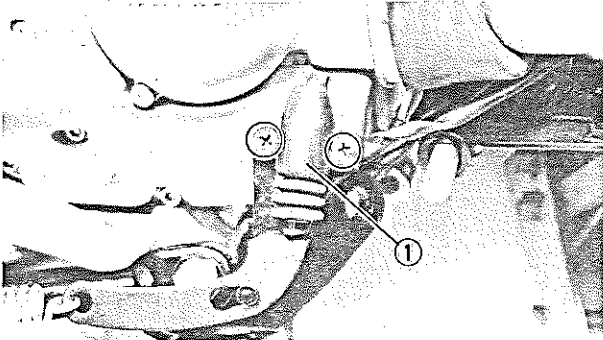
SIDE STAND AND SIDE STAND SWITCH

1. Remove:

- Rear-under-side cover ①
- Sidestand ②

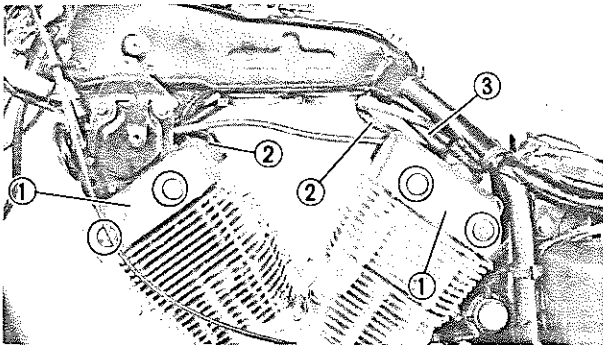
WARNING:

Before removing the sidestand, securely support the motorcycle so there is no danger of it falling over.



2. Remove:

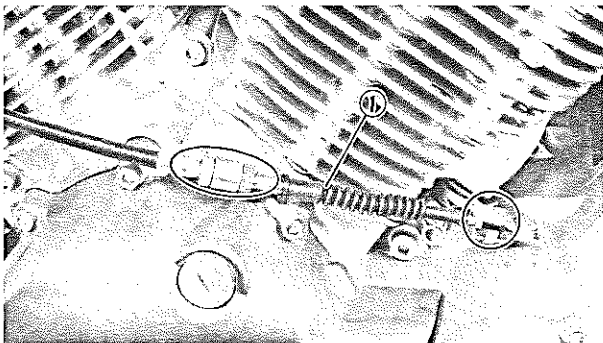
- Sidestand switch ①



WIRING AND CABLES

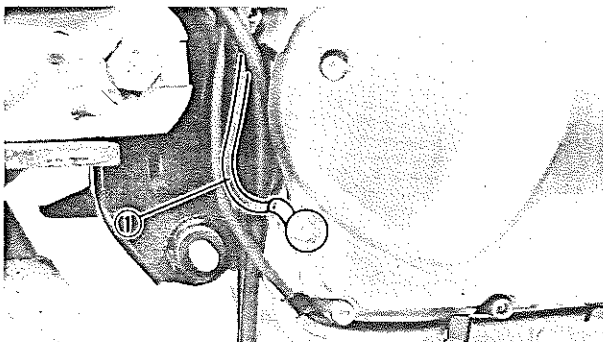
1. Remove:

- Side covers (Front and rear cylinders) ①
- Spark plug leads (Front and rear cylinders) ②
- Crankcase ventilation hose ③



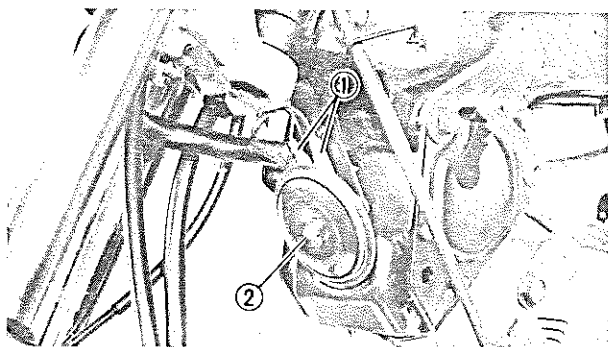
2. Disconnect:

- Clutch cable ①
- Loosen the locknuts and disconnect the clutch cable.

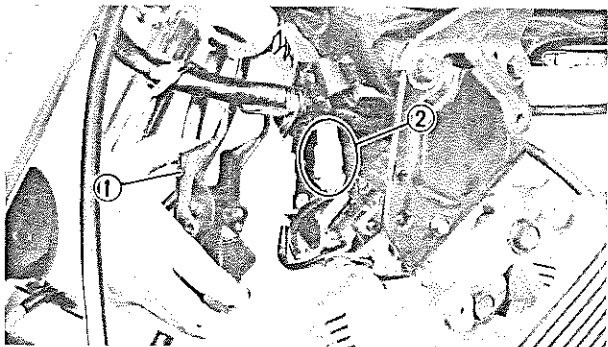


3. Disconnect:

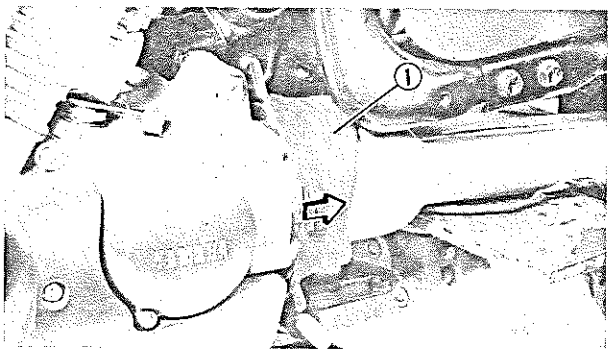
- Ground lead ①



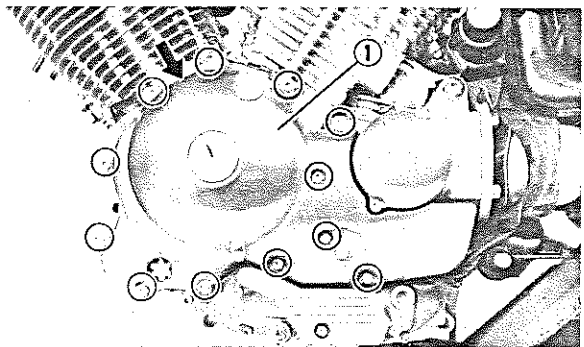
4. Disconnect:
 - Horn leads ①
5. Remove:
 - Horn ②



6. Remove:
 - Cover (Ignition coil) ①
7. Disconnect:
 - Ignition coil couplers ②



8. Pull out the rubber boot ①

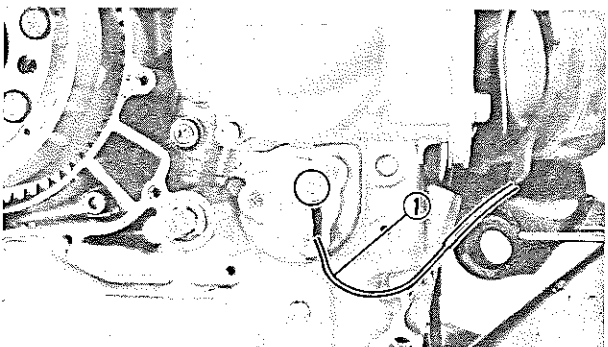


CRANKCASE COVER (LEFT)

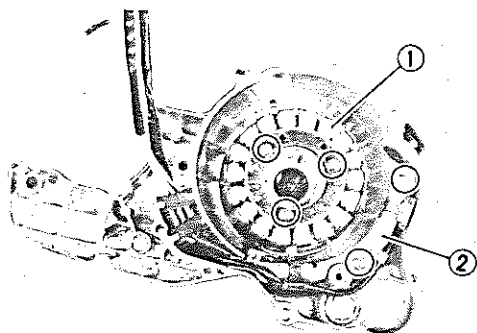
1. Remove:
 - Crankcase cover (Left) ①
 - Dowel pins
 - Gasket

NOTE:

- Working in a crisscross pattern, loosen the bolts 1/4 turn each. Remove them after all are loosened.
- For this removal, slit in the crankcase cover can be use.
- Be sure not to give damages to the mating surface.

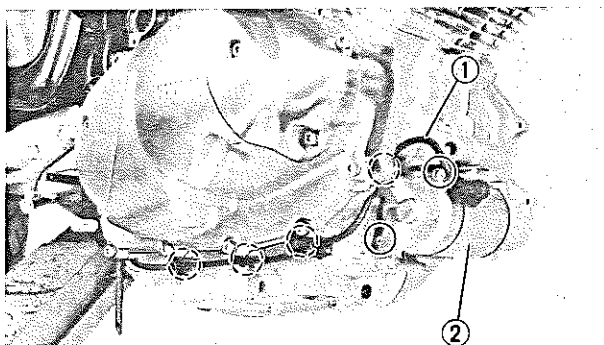


2. Disconnect:
 - Neutral switch lead ①



3. Remove:

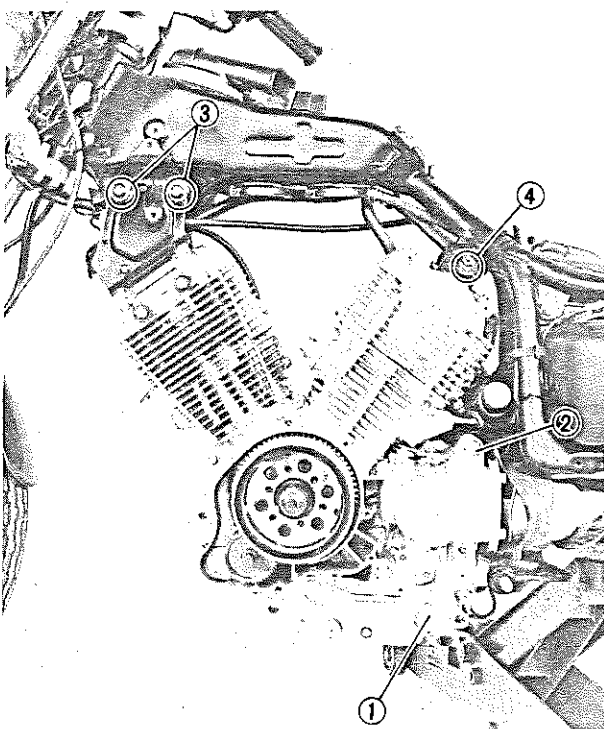
- Stator assembly ①
- Pickup coil assembly ②



STARTER MOTOR

1. Disconnect:

- Starter motor lead ①
Loosen the clamp holding bolts.
- Starter motor ②

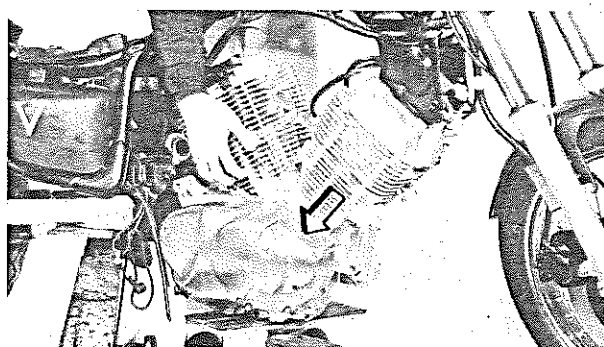


ENGINE REMOVAL

1. Place a suitable stand under the engine.

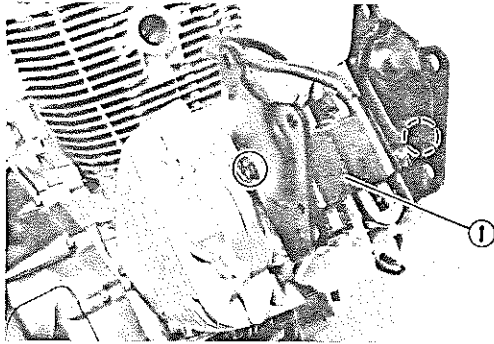
2. Remove:

- Shaft (Crankcase - Rear Bottom) ①
- Bolts (Crankcase - Rear Top) ②
- Bolts (Front cylinder) ③
- Bolts (Rear cylinder) ④



3. Remove:

- Engine assembly
From the right side.

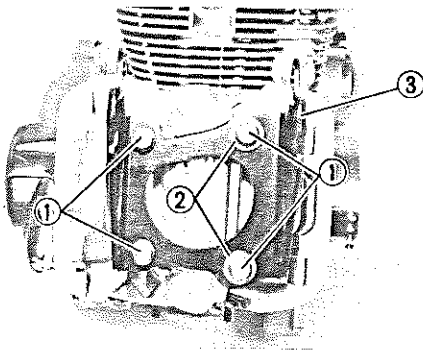


DISASSEMBLY

ENGINE MOUNTING BRACKET AND IGNITION COILS

1. Remove:

- Bracket (Ignition coils) ①
- Spark plugs (Front and rear cylinder)



2. Remove:

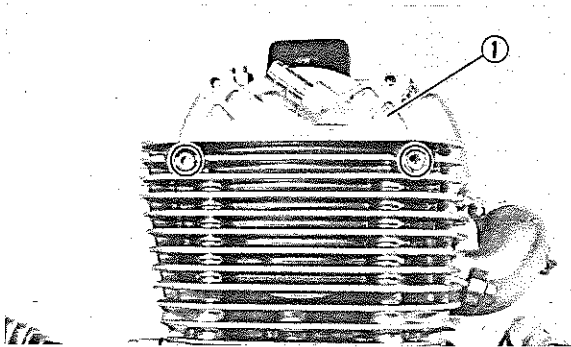
- Nuts (Front cylinder) ①
- Washers (Front cylinder – Bracket Outside) ②
- Bracket (Engine mounting) ③
- Washers (Front cylinder – Bracket Inside)

CYLINDER HEAD/CYLINDER AND PISTON

NOTE:

Identify following parts position carefully so that they can be reinstalled in their original place.

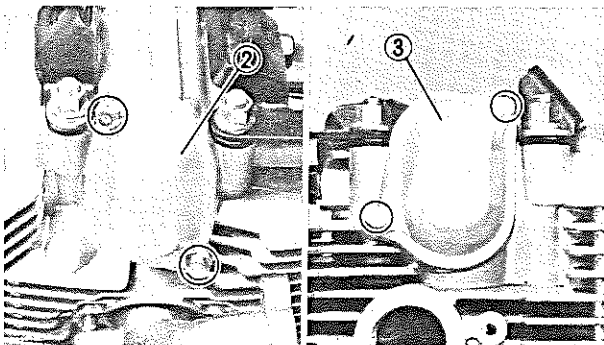
- Cam sprocket
- Cylinder head
- Cylinder
- Piston

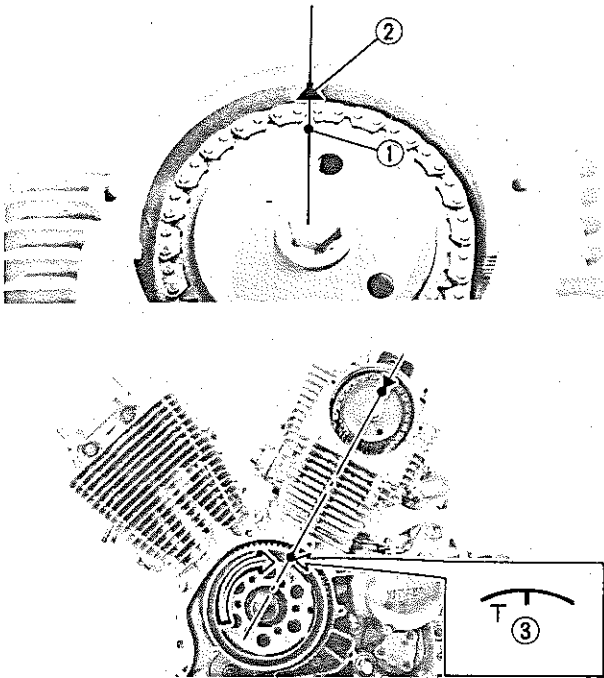


Rear Side

1. Remove:

- Cam sprocket cover ①
- O-ring (Cam sprocket cover)
- Tappet cover (Exhaust) ②
- O-ring (Exhaust cover)
- Tappet cover (Intake) ③
- O-ring (Intake cover)





2. Align:

- Cam sprocket punch mark

With the stationary pointer on the rear cylinder head.

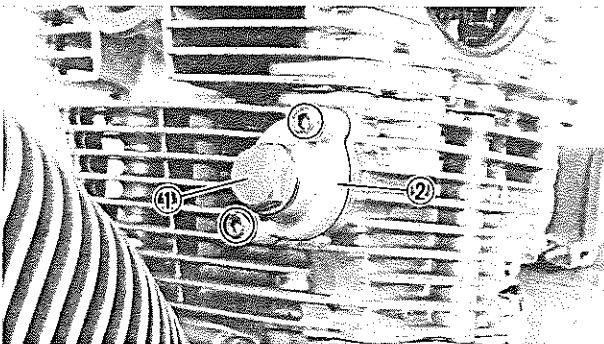
TDC alignment steps (Rear cylinder):

- Turn the crankshaft clockwise with wrench.
- Align the cam sprocket punch mark ① with the stationary pointer ② on the rear cylinder head. When the punch mark is aligned with the stationary pointer, the piston is at Top Dead Center (TDC).

NOTE:

TDC on compression stroke check:

- Both rocker arms must have a valve clearance when the "T" mark ③ on the rotor is aligned with the center line of the rear cylinder.
- If not, give the crankshaft one clockwise turn to meet above condition.

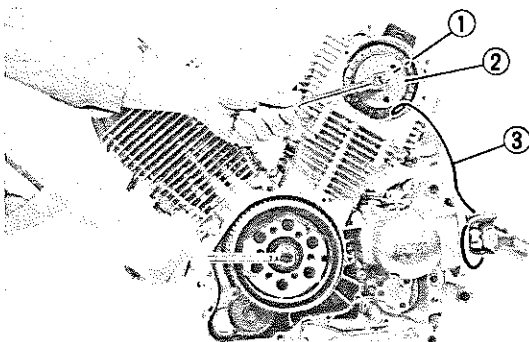


3. Loosen:

- End plug (Cam chain tensioner) ①

4. Remove:

- Cam chain tensioner ②
- Gasket

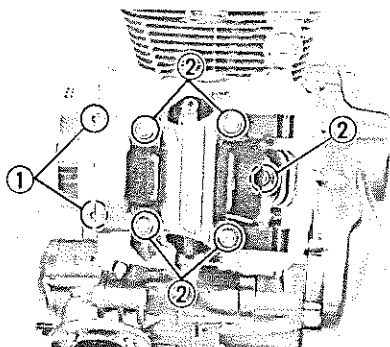


5. Remove:

- Cam sprocket ①
- Oil baffle plate (Rear cylinder only) ②
- Dowel pin (Cam sprocket positioning)

NOTE:

- Hold the crankshaft end with a wrench.
- Fasten a safety wire ③ to the cam chain.
- When removing the cam sprocket, it is not necessary to separate the cam chain.

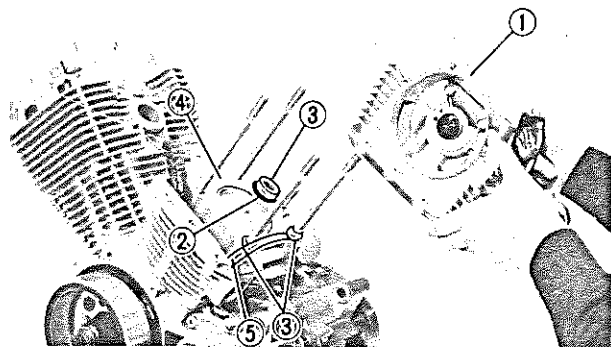


6. Remove:

- Bolts (Cylinder head) ①
- Nuts (Cylinder head) ②
- Washers
- Bracket (Engine mounting)

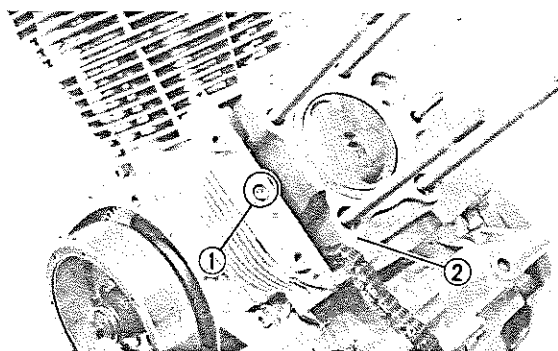
NOTE:

Loosen the bolts and nuts in this stage, using a crisscross pattern.



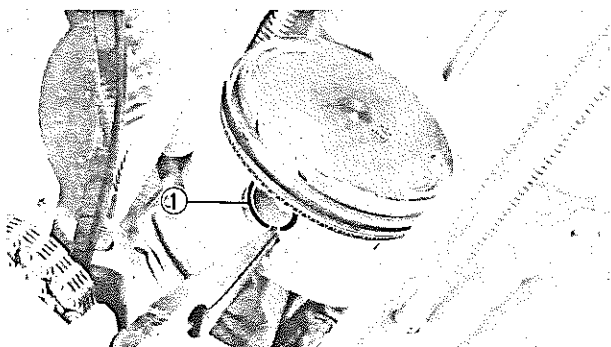
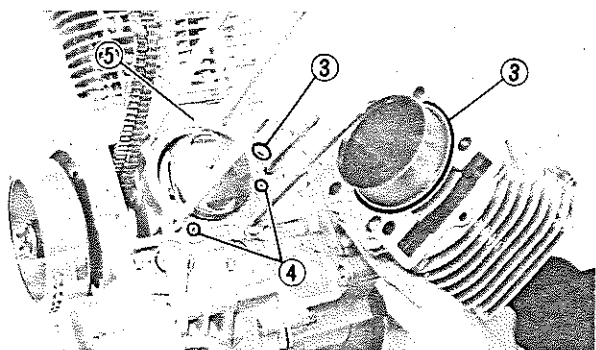
7. Remove:

- Cylinder head ①
- O-ring ②
- Dowel pins ③
- Gasket ④
- Cam chain damper (Exhaust) ⑤



8. Remove:

- Bolt (Cylinder) ①
- Cylinder ②
- O-rings ③
- Dowel pins ④
- Gasket ⑤

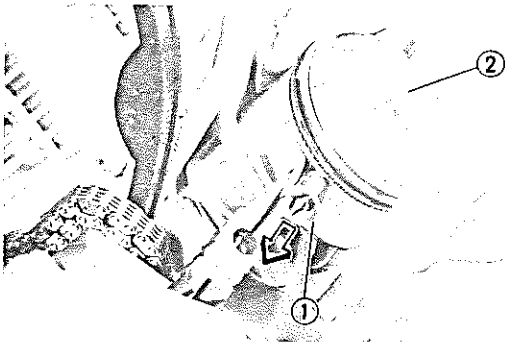


9. Remove:

- Piston pin clip ①

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.



10. Remove:

- Piston pin ①
- Piston ②

NOTE:

Before removing the piston pin, deburr the clip groove and pin hole area. If the piston pin groove is deburred and piston pin is still difficult to remove, use Piston Pin Puller (90890-01304).

CAUTION:

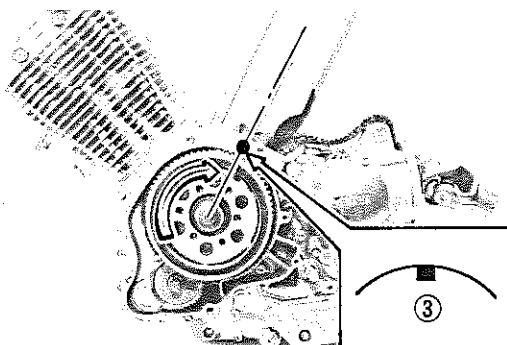
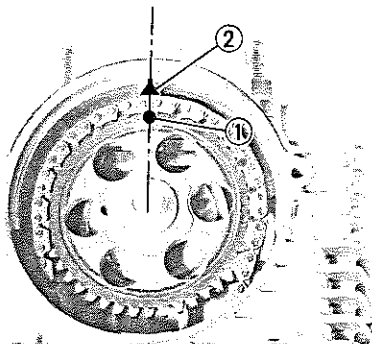
Do not use a hammer to drive the piston pin out.

Front Side

When removing the front side components, repeat the rear side removal procedure. However, note the following points.

1. Align:

- Cam sprocket punch mark
With the stationary pointer on the front cylinder head.



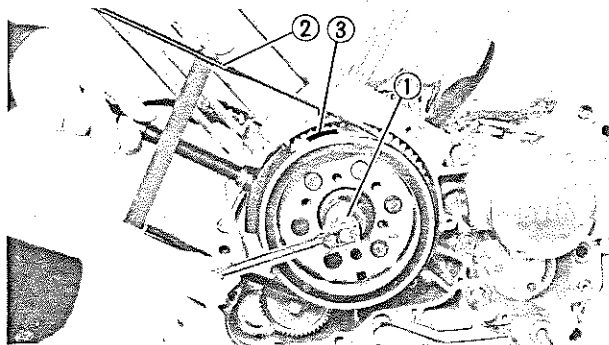
TDC alignment steps (Front cylinder):

- Turn the crankshaft clockwise with wrench.
- Align the cam sprocket punch mark ① with the stationary pointer ② on the front cylinder head. When the slit ③ is aligned with the stationary pointer, the piston is at Top Dead Center (TDC).

NOTE:

TDC on compression stroke check:

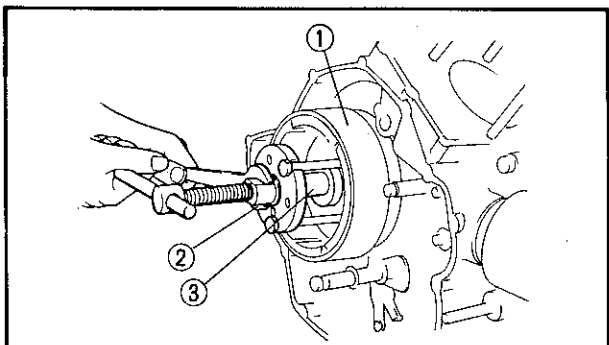
- Both rocker arms must have a valve clearance when the slit on the rotor is aligned with the center line of the rear cylinder.
- If not, give the crankshaft one clockwise turn to meet above condition.

**CDI MAGNETO****1. Remove:**

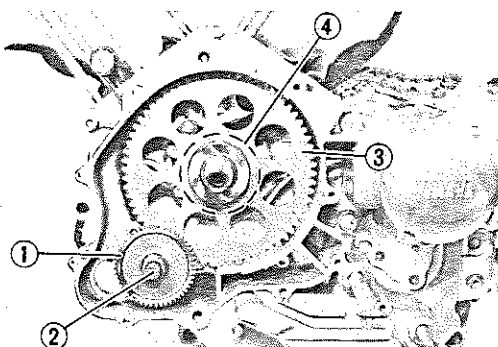
- Bolt (Rotor) ①
- Using the Sheave Holder ② (90890-01701) to lock the rotor.

NOTE:

Do not allow the special tool to touch the projection ③ on the rotor.

**2. Remove:**

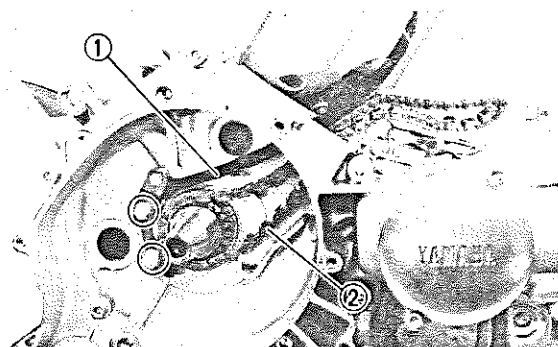
- Rotor ①
- Use the Flywheel Puller Set ② (90890-01362) and Adapter (90890-04089) ③.
- Woodruff key

**3. Remove:**

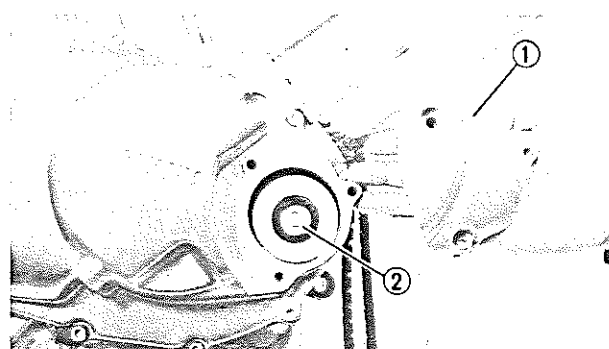
- Idler gear # 1 ①
- Shaft (Idler gear # 1) ②
- Idler gear # 2 ③
- Washer ④

NOTE:

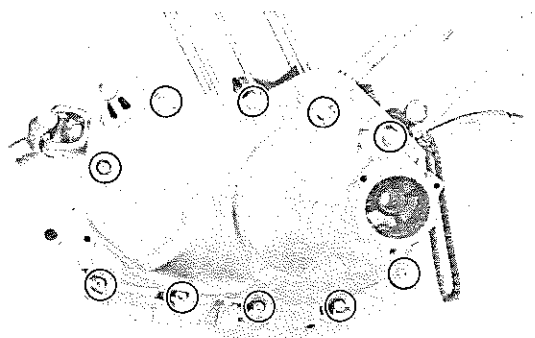
When removing the idler gear # 2, the washer ④ fall out. Take care not to lose it.

**4. Remove:**

- Cam chain damper (Rear cylinder - Intake) ①
- Cam chain ②

**CRANKCASE COVER (RIGHT)****1. Remove:**

- Oil filter cover ①
- Oil filter ②
- O-ring (Filter cover)

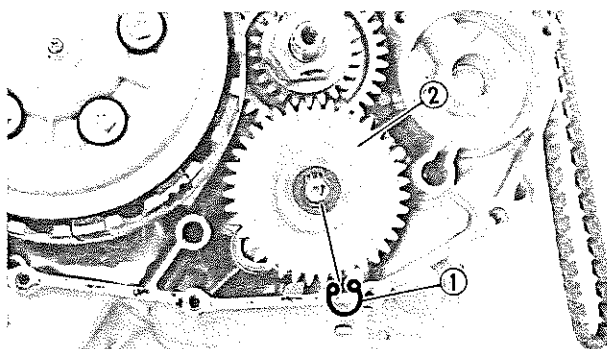
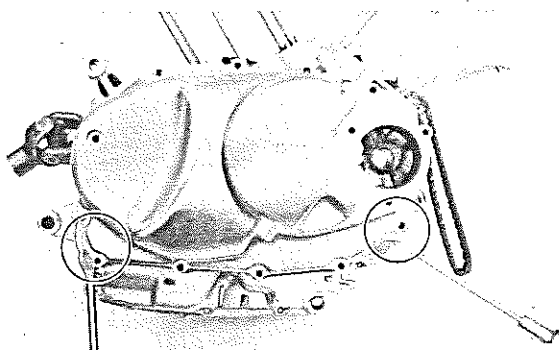


2. Remove:

- Crankcase cover (Right)
- Gasket
- Dowel pins

NOTE:

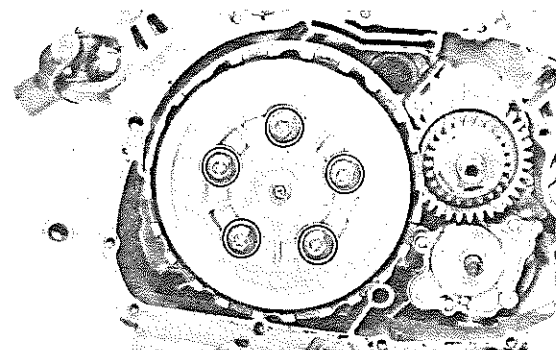
- Working in a crisscross pattern, loosen bolt 1/4 turn each. Remove them after all are loosened.
- For this removal, slits in the crankcase can be use as shown.
- Be sure not to give damages to the mating surface.



CLUTCH

1. Remove:

- Clip ①
- Oil pump gear ②

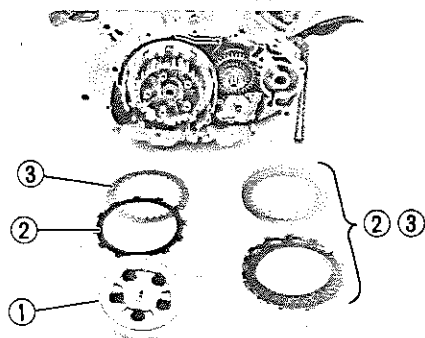


2. Remove:

- Screws (Clutch spring)
- Clutch springs

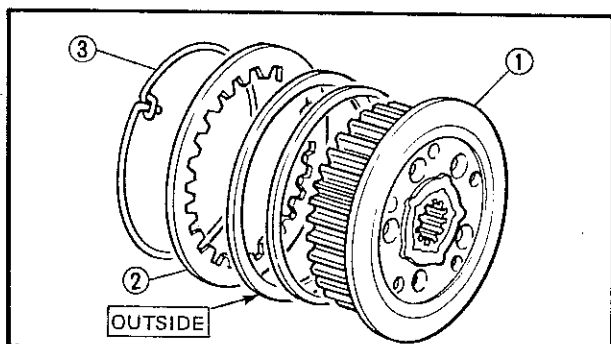
NOTE:

Loosen the screws in this stage, using a crisscross pattern.

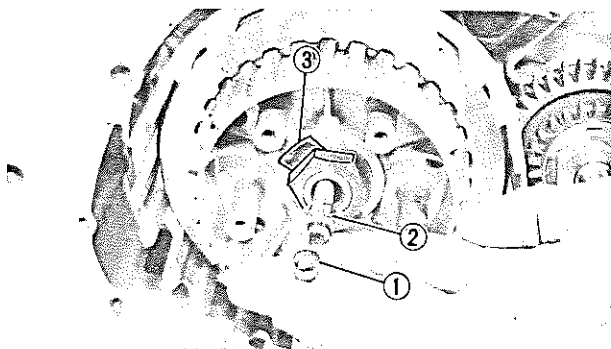


3. Remove:

- Pressure plate ①
- Friction plates (6 pcs.) ②
- Clutch plates (5 pcs.) ③

**NOTE:**

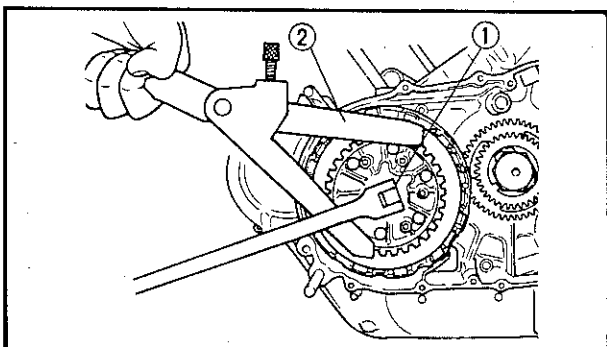
The clutch boss ① contains a built-in damper beneath the clutch plate ②. It is not necessary to remove the wire circlip ③ and disassemble the built-in damper unless there is serious clutch chattering.

**4. Remove:**

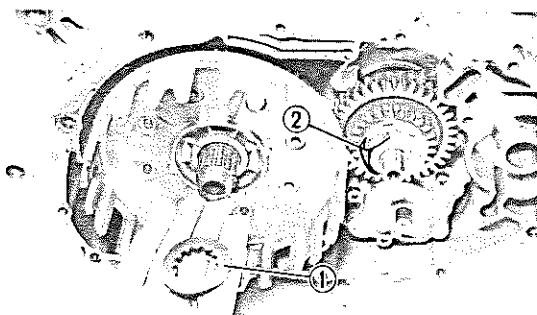
- Ball ①
- Push rod # 2 ②

5. Straighten:

- Lock washer tab ③

**6. Remove:**

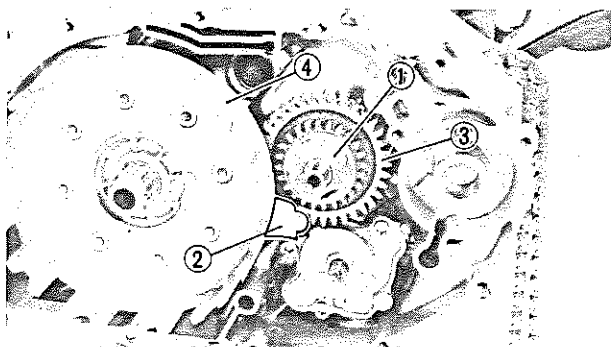
- Locknut (Clutch boss) ①
Use the Universal Clutch Holder ② (90890-04086) to hold the clutch boss.
- Lock washer
- Clutch boss

**7. Remove:**

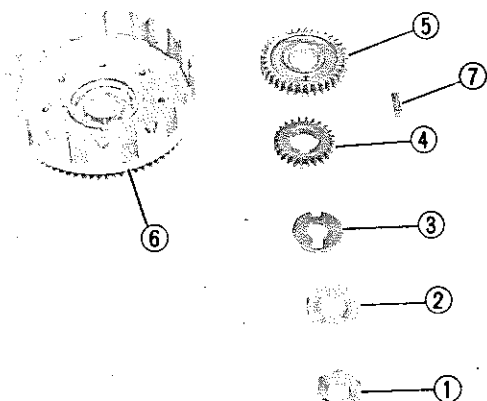
- Holding plate ①

8. Straighten:

- Lock washer tabs (Primary drive gear) ②.

**9. Loosen:**

- Nut (Primary drive gear) ①
Place a folded rag ② between the teeth of the drive gear ③ and driven gear ④ to lock them.

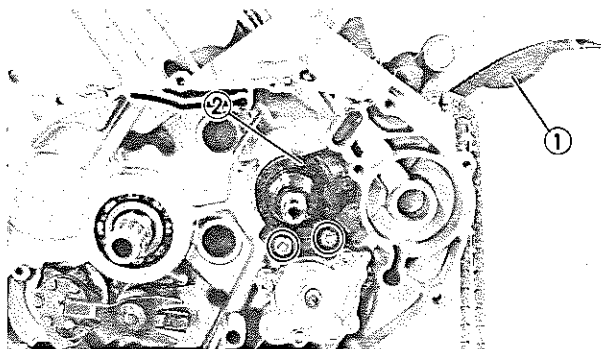
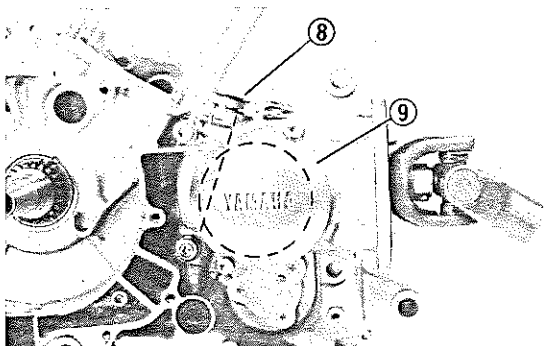


10. Remove:

- Nut (Primary drive gear) ①
- Lock washer ②
- Holding plate ③
- Oil pump drive gear ④
- Primary driven gear ⑤
- Primary drive gear ⑥
- Key ⑦

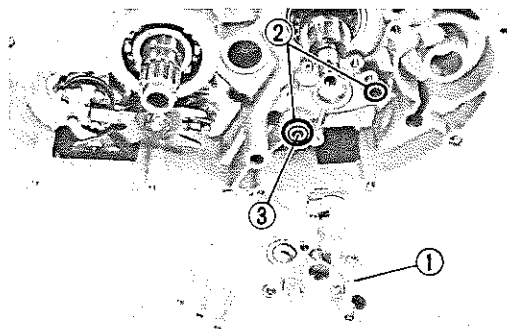
NOTE:

It is necessary to remove the middle drive gear ⑨ in order to remove the clutch push lever axle ⑧.

**OIL PUMP**

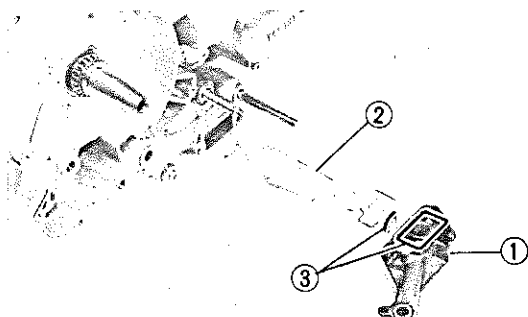
1. Remove:

- Cam chain damper (Front cylinder — Exhaust) ①
- Cam chain ②



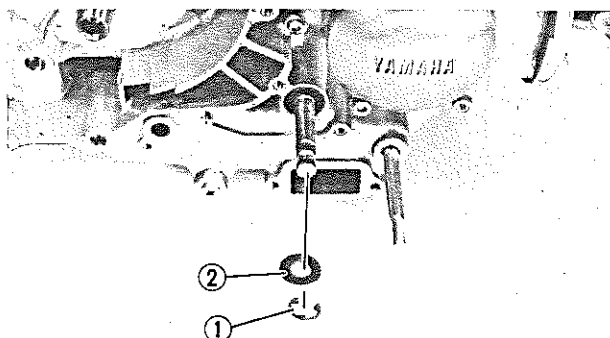
2. Remove:

- Oil pump assembly ①
- O-rings ②
- Power pin ③



3. Remove:

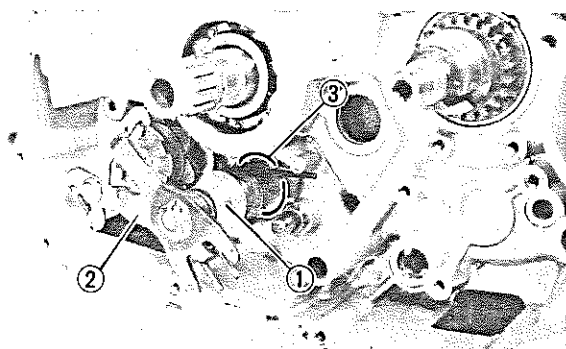
- Oil passage housing ①
- Oil strainer ②
- O-rings ③



SHIFT SHAFT

1. Remove:

- Circlip ①
- Plain washer ②



2. Unhook the torsion spring from its position.

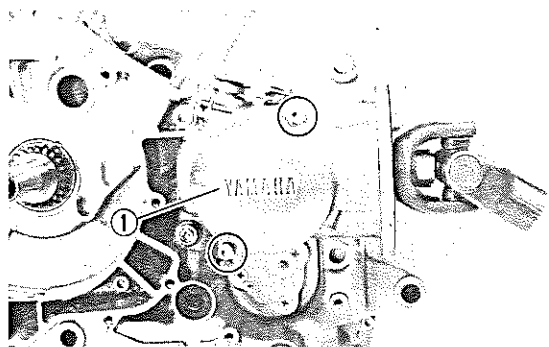
3. Remove:

- Shift shaft ①
- Stopper lever ②

Pull out the shift shaft with stopper lever.

NOTE:

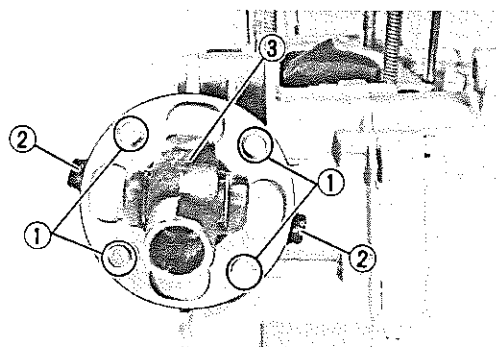
When removing the shift shaft, the plain washer ③ will fall out. Take care not to lose it.



MIDDLE DRIVEN GEAR

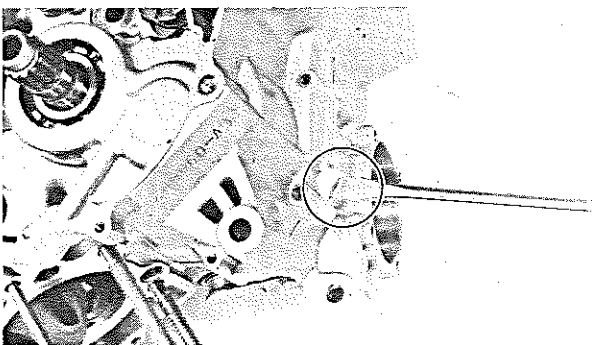
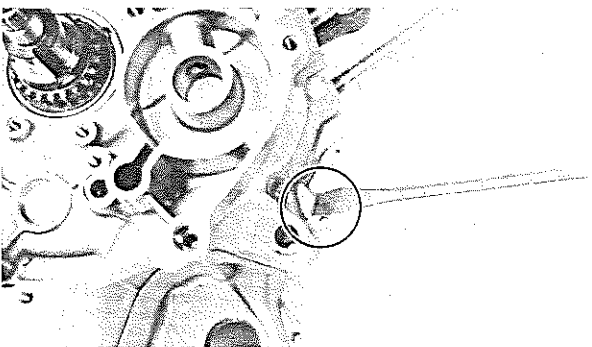
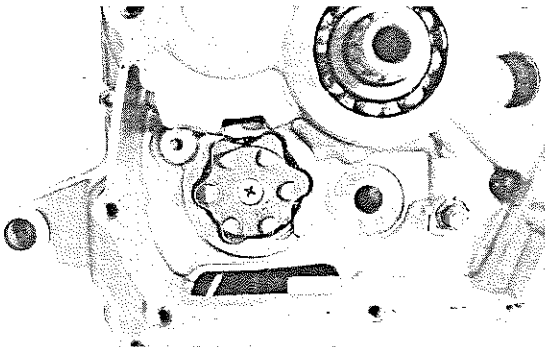
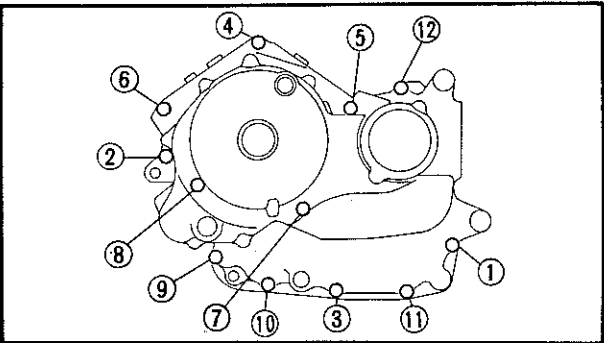
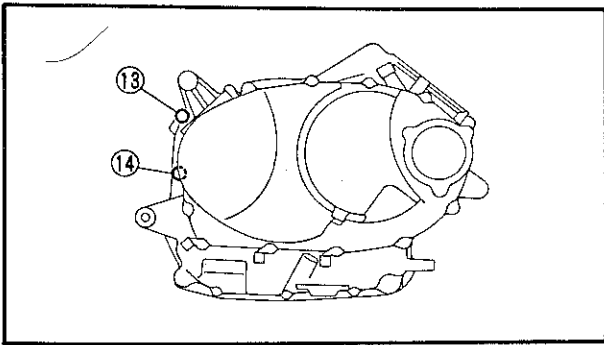
1. Remove:

- Middle gear case ①
- O-ring



2. Remove:

- Bolts (Bearing housing) ①
- Shims ②
- Middle driven gear assembly ③

**CRANKCASE****1. Remove:**

- Bolts (Crankcase) ① ~ ⑭

NOTE:

- Remove the bolts starting with the highest numbered one.
- Turn the shift cam to the position shown in the figure so that it does not contact the crankcase when separating the crankcase.

2. Remove:

- Crankcase (Right)

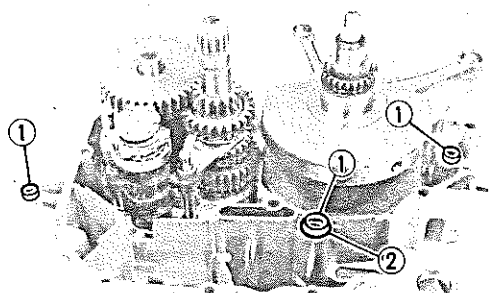
As pressure is applied, alternately tap on the front engine mounting boss, transmission shafts, and shift cam.

NOTE:

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

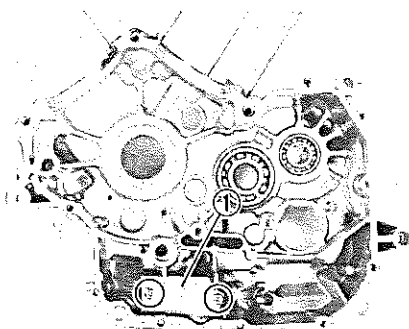
CAUTION:

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



3. Remove:

- Dowel pins ①
- O-ring ②



4. Remove:

- Oil baffle plate ①

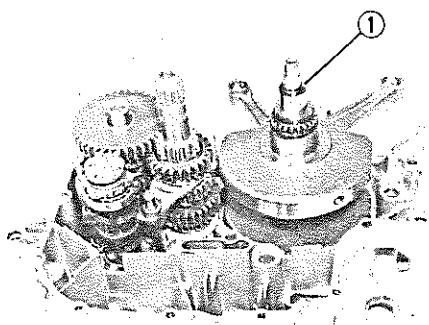
NOTE:

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

CRANKSHAFT AND TRANSMISSION

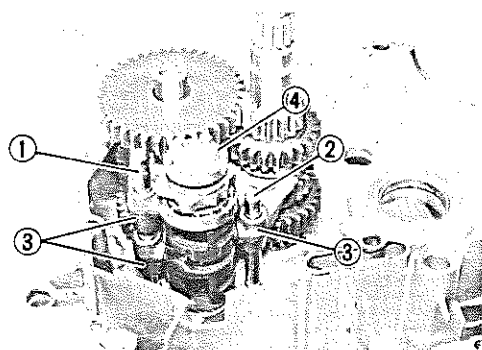
1. Remove:

- Crankshaft ①

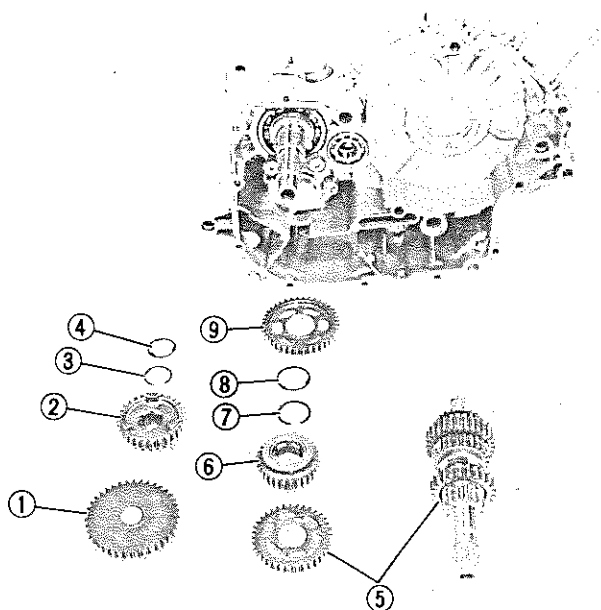


2. Remove:

- Guide bar (Rear – Longer) ①
- Guide bar (Front – Shorter) ②
- Shift forks ③
- Shift cam ④

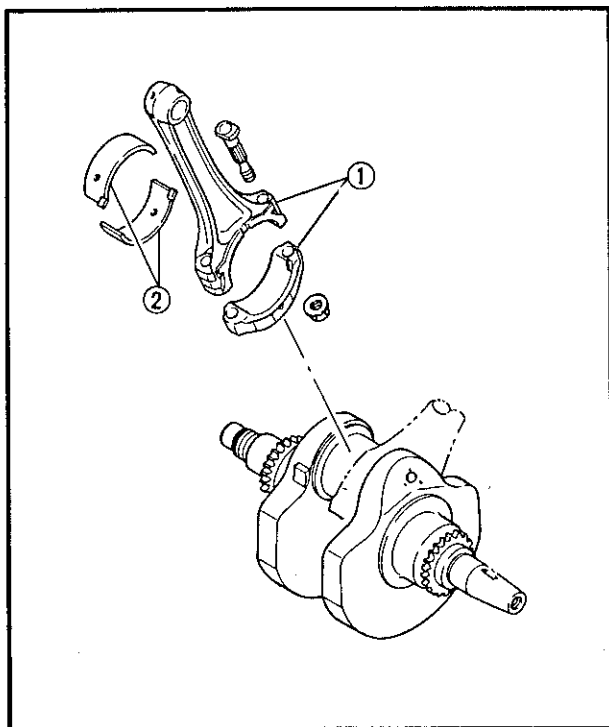
**NOTE:**

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



3. Remove:

- 1st wheel gear (38T) ①
- 4th wheel gear (28T) ②
- Circlip ③
- Washer ④
- 3rd wheel gear (35T) and main axle assembly ⑤
- 5th wheel gear (29T) ⑥
- Circlip ⑦
- Washer ⑧
- 2nd wheel gear (38T) ⑨



4. Remove:

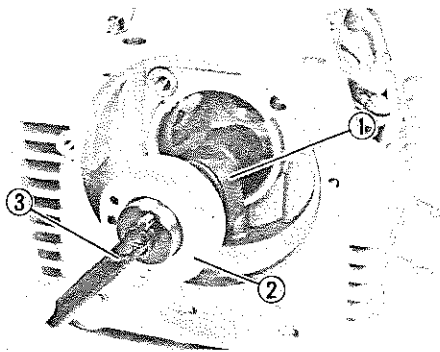
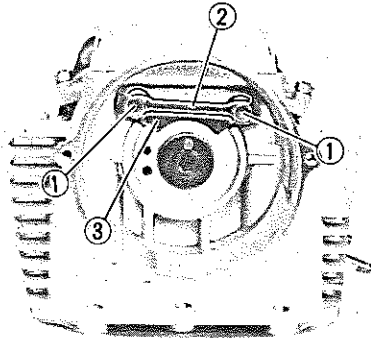
- Connecting rod ①
 - Connecting rod bearings ②
- From the crankshaft.



INSPECTION AND REPAIR

ROCKER ARMS AND ROCKER ARM SHAFTS

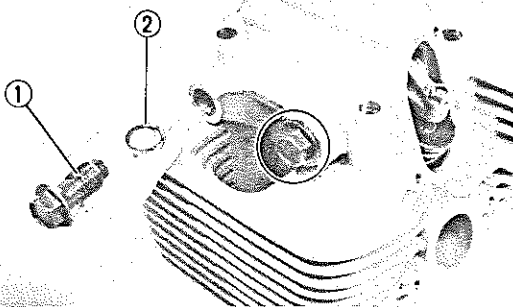
1. Remove:
 - Tappet covers (Intake and exhaust)
2. Loosen:
 - Locknuts
 - Adjusters
3. Straighten:
 - Lock washer tabs
4. Remove:
 - Bolts (Camshaft) ①
 - Lock washer ②
 - Retainer ③



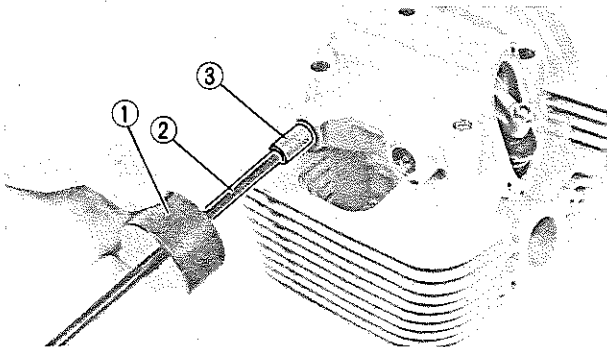
5. Remove:
 - Camshaft ①
 - Camshaft bushing ②

NOTE:

Screw in a suitable length of 10 mm bolt (90890-01290) ③ into the thread hole on the camshaft, and pull out the camshaft.



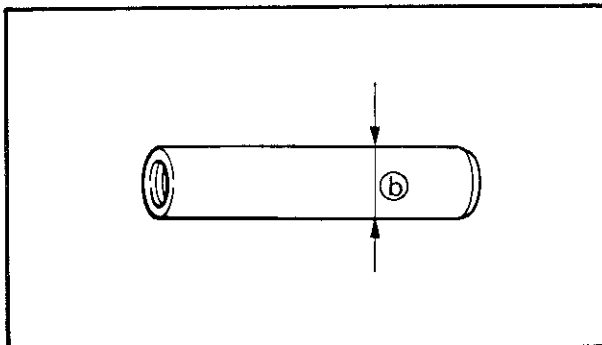
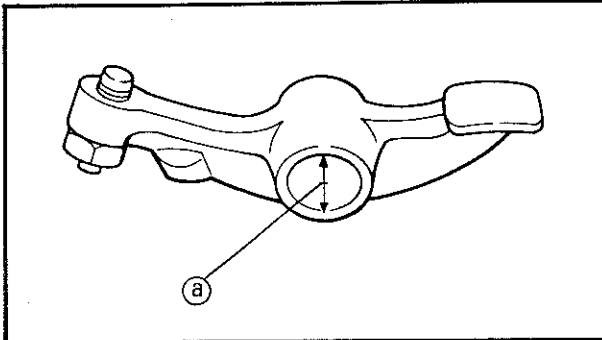
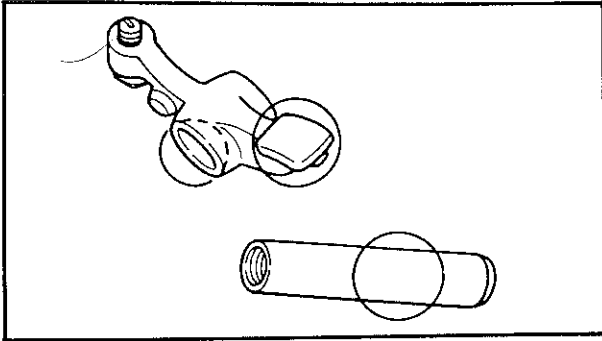
6. Remove:
 - Holding bolts (Rocker arm shafts) ①
 - Copper washers ②



7. Attach:
 - Slide Hammer
 - Weight (90890-01084) ①
 - Bolt (90890-01083) ②
8. Remove:
 - Rocker arm shafts ③
 - Rocker arms (Intake and Exhaust)

NOTE:

Remove the rocker arm (Exhaust) through the rocker arm hole (Intake).



9. Inspect:

- Rocker arm shafts
- Rocker arms

Wear/Damage → Replace.

Rocker arm shaft and arm inspection steps:

- Inspect the two areas on the rocker arm for signs of unusual wear.

1) Rocker arm shaft hole.

2) Cam-lobe-contact surface.

Excessive wear → Replace.

- Inspect the surface condition of the rocker arm shaft.

Pitting/Scratches/Blue discoloration → Replace/Check lubrication.

- Measure the inside diameter (a) of the rocker arm hole.

Out of specification → Replace.



Rocker Arm Inside Diameter Limit:
14.078 mm (0.5543 in)

- Measure the outside diameter (b) of the rocker arm shaft.

Out of specification → Replace.



Rocker Arm Shaft Outside Diameter Limit:
13.950 mm (0.5492 in)

- Calculate the clearance by subtracting the rocker-arm-shaft outside diameter from the rocker-arm inside diameter.

Clearance is greater than 0.08 mm (0.0032 in) → Replace either or both parts.



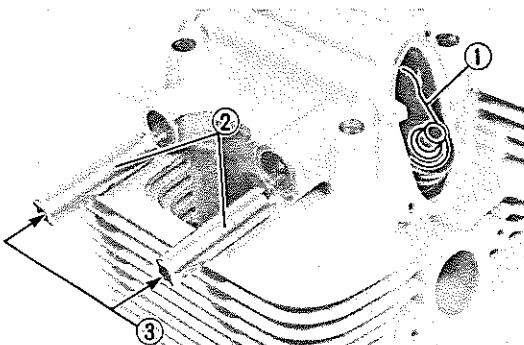
Arm-to-shaft Clearance (Standard):
0.009 ~ 0.038 mm
(0.0004 ~ 0.0015 in)

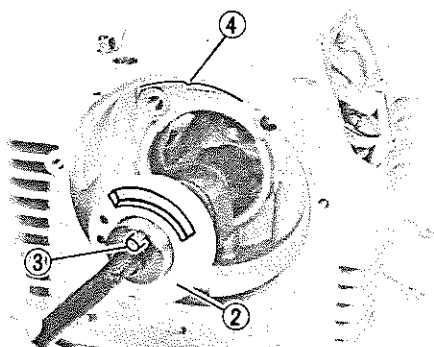
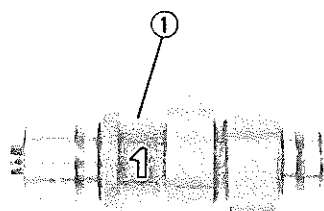
10. Install:

- Rocker arms ①
- Rocker arm shafts ②

NOTE:

- Install the rocker arm (Exhaust) through the rocker arm hole (Intake).
- Thread hole ③ of the rocker arm shaft should be placed outside.
- Do not install the holding bolts at this point.





11. Install:

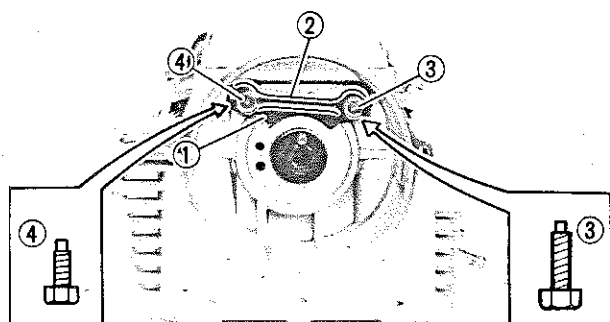
- Camshaft ①
 - Camshaft bushing ②
- To the cylinder head.

NOTE:

- Install the # 1 camshaft into the rear cylinder head.
- The pin ③ on the end of the camshaft must align with the timing mark ④ on the cylinder head.
- The cut-out portion of the bushing must be flush with the cylinder head.

CAUTION:

Do not cock the bushing during installation. The bushing must be perpendicular to the camshaft during installation.



12. Install:

- Retainer ①
- Lock washer (New) ②
- Bolt (Camshaft — Exhaust) ③
- Bolt (Camshaft — Intake) ④

CAUTION:

The bolt (Exhaust side) has longer length, and the bolt (Intake side) has shorter length.



Bolts (Camshaft):
20 Nm (2.0 m·kg, 14 ft·lb)

13. Bend the lock washer tabs.

14. Install:

- Copper washers ①
- Holding bolts (Rocker arm shafts) ②

NOTE:

Before tightening the holding bolts, slightly turn and push the rocker arm shaft using the screwdriver ③ until the bolt end fits into the slot in the rocker arm shaft end.



Holding Bolts (Rocker Arm Shaft):
38 Nm (3.8 m·kg, 27 ft·lb)



CAMSHAFT

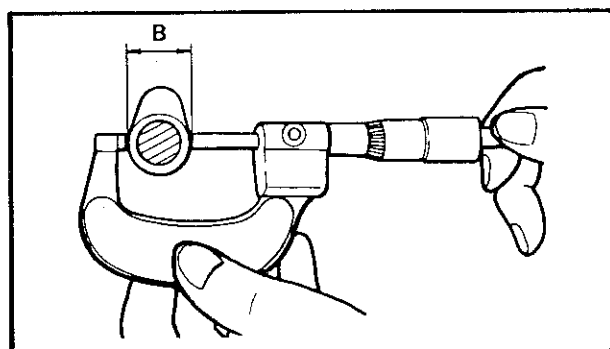
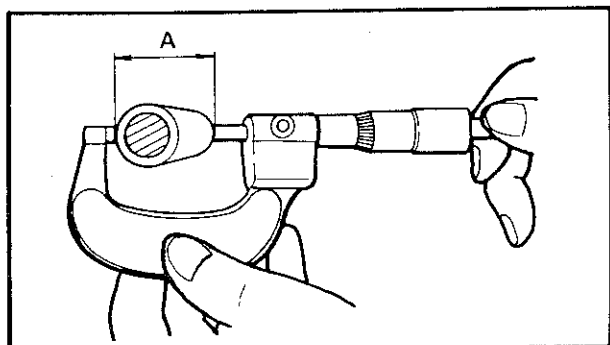
1. Remove:

- Camshaft

Refer to "ROCKER ARMS AND ROCKER ARM SHAFTS" section.

2. Inspect:

- Camshaft bushing
Wear/Damage → Replace.



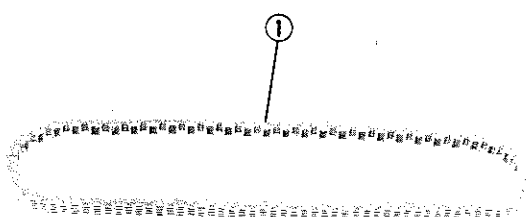
3. Inspect:

- Cam lobes
Pitting/Scratches/Blue discoloration → Replace.

4. Measure:

- Cam lobes
Use a Micrometer.
Out of specification → Replace.

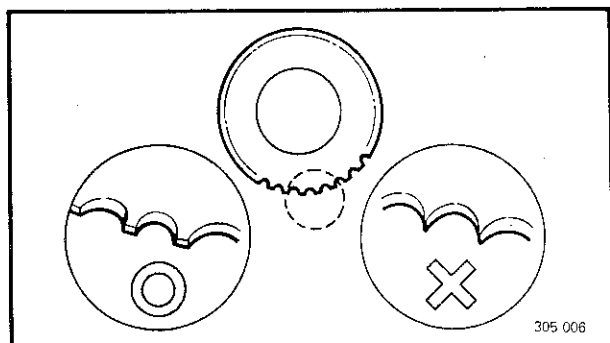
	Cam Lobe Limit "A"	Cam Lobe Limit "B"
Intake	39.63 mm (1.560 in)	31.22 mm (1.229 in)
Exhaust	39.67 mm (1.562 in)	31.30 mm (1.232 in)



CAM CHAIN

1. Inspect:

- Cam chain ①
Chain stretch/Cracks → Replace.



CAM SPROCKET

1. Inspect:

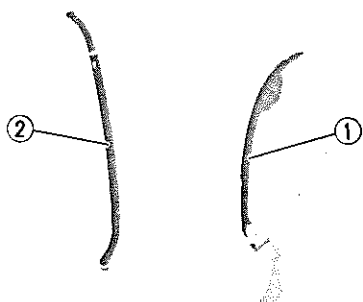
- Cam sprocket
Wear/Damage → Replace.



CHAIN DAMPERS

1. Inspect:

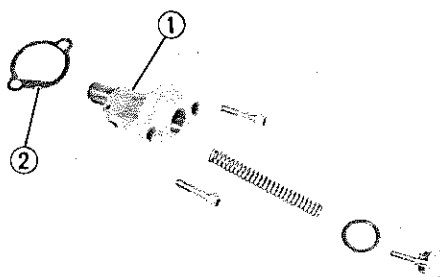
- Cam chain damper (Intake) ①
 - Cam chain damper (Exhaust) ②
- Wear → Replace.



CAM CHAIN TENSIONER

1. Inspect:

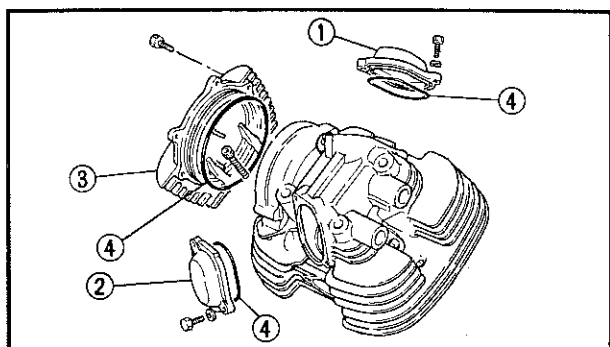
- Chain tensioner rod ①
 - Gasket ②
- Damage/Wear → Replace.



TAPPET COVER AND CAM SPROCKET COVER

1. Inspect:

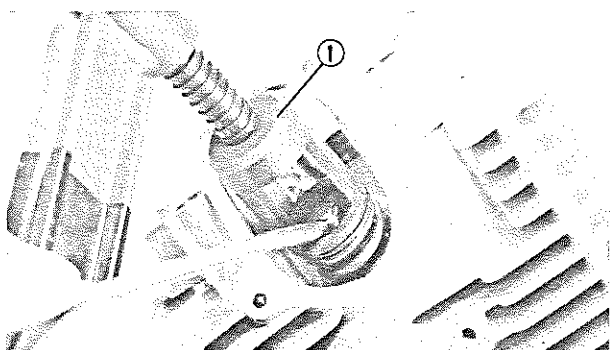
- Tappet covers (Intake and exhaust) ① , ②
 - Cam sprocket cover ③
 - O-rings ④
- Damage → Replace.



CYLINDER HEAD

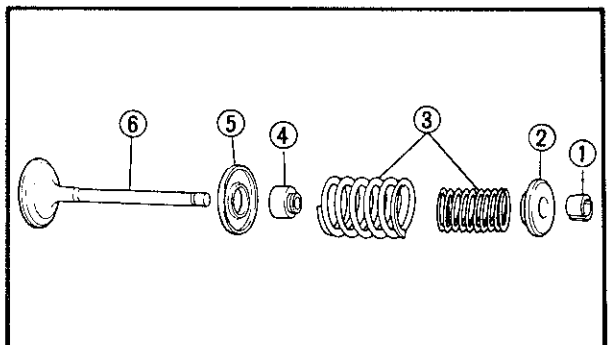
1. Attach:

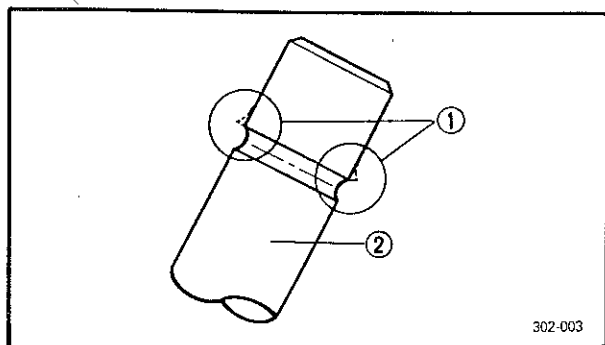
- Valve Spring Compressor ① (90890-04019)



2. Remove:

- Valve retainers ①
- Valve spring seat ②
- Valve spring ③
- Oil seal ④
- Valve spring seat ⑤
- Valve ⑥



**NOTE:**

Deburr any deformed valve stem end. Use an oil stone to smooth the stem end.

- ① Deburr
- ② Valve stem

3. Eliminate:

- Carbon deposit

Use the rounded scraper.

NOTE:

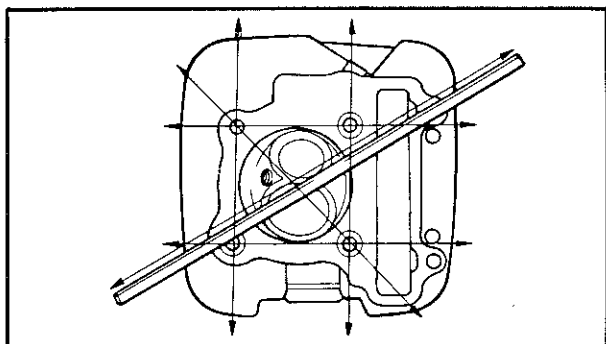
Do not use a sharp instrument and avoid damaging or scratching:

- Spark plug thread
- Valve seat
- Cylinder head

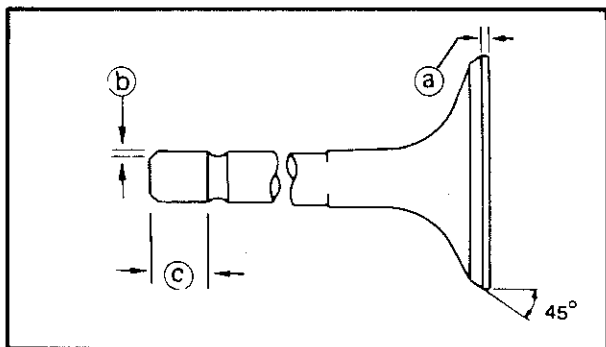
4. Measure:

- Cylinder head warpage

Out of specification → Resurface/Replace.



Cylinder Head Warp Limit:
Less than 0.03 mm (0.0012 in)



VALVE, VALVE GUIDE, AND VALVE SEAT

Intake and Exhaust Valve

1. Check:

- Valve face
- Stem end

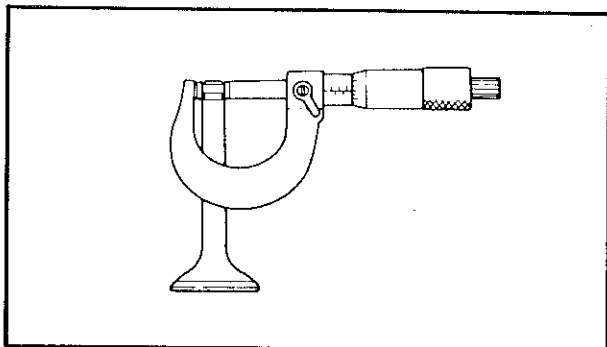
Wear/Pitting/Out of specification → Replace.



Minimum Thickness (Service Limit) (a):
0.7 mm (0.028 in)

Beveled (b): 0.5 mm (0.020 in)

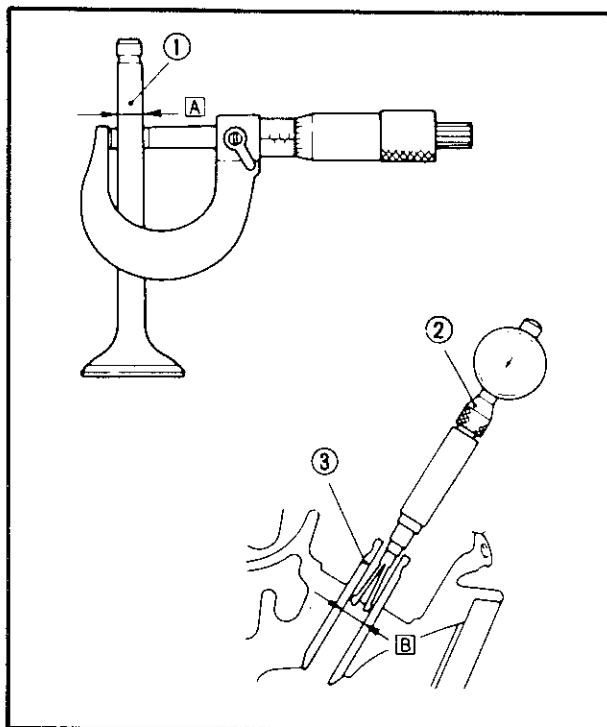
Minimum Length (Service Limit) (c):
4.0 mm (0.157 in)



2. Inspect:

- Valve stem end

Mushroom shape/Larger diameter than rest of stem → Replace valve, valve guide, and oil seal.



3. Measure:

- Valve stem clearance

Use the Micrometer and Bore Gauge ②.

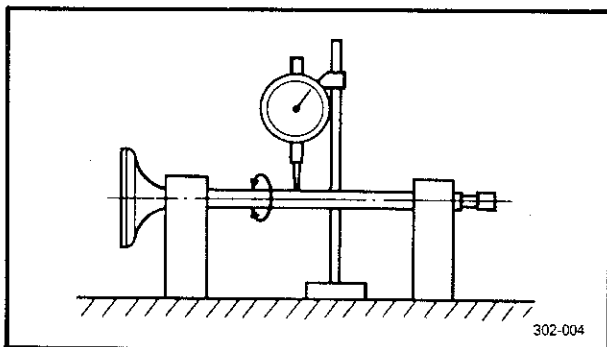
Out of specification → Replace either valve ① and/or guide ③.

$$\text{Valve Stem Clearance} = B - A$$

	Valve Stem Clearance	Maximum
Intake	0.010 ~ 0.037 mm (0.0004 ~ 0.0015 in)	0.08 mm (0.0031 in)
Exhaust	0.025 ~ 0.052 mm (0.0010 ~ 0.0020 in)	0.10 mm (0.0039 in)

A VALVE STEM OUTSIDE DIAMETER

B VALVE GUIDE INSIDE DIAMETER



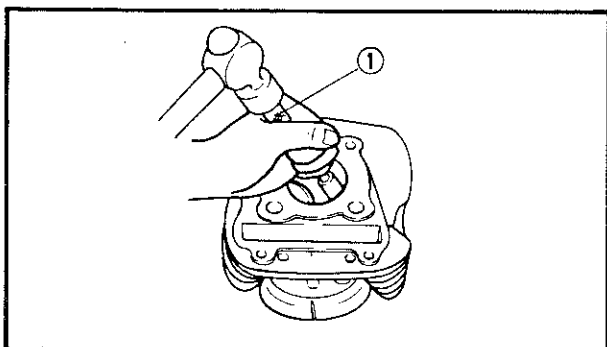
4. Measure:

- Valve stem runout

Out of specification → Replace.



Maximum Runout:
0.03 mm (0.0012 in)



Valve Guide

NOTE:

- Always replace valve guide if valve is replaced.
- Always replace oil seal if valve is removed.

1. Remove:

- Valve guide

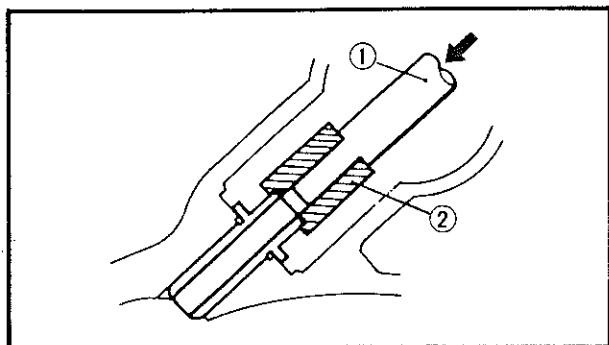
Use a Valve Guide Remover & Installer Set ① (90890-04018).

**NOTE:**

Heat the head in an oven to 100°C (212°F) to ease guide removal and installation and to maintain correct interference fit.

2. Inspect:

- Valve guides
- Wear/Oil leakage into cylinder → Replace.

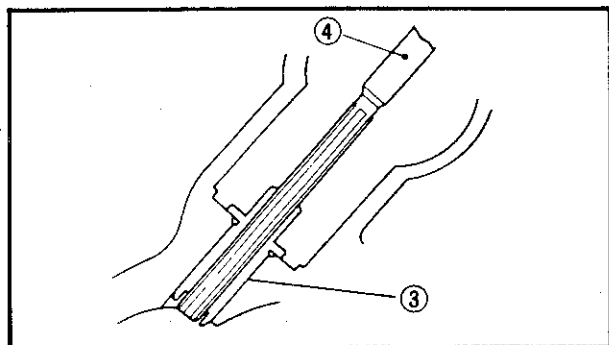
**3. Install:**

- Circlip (New)
 - Valve guide (Oversize)
- Use a Valve Guide Remover ① with Valve Guide Remove & Installer Set ② (90890-04018).

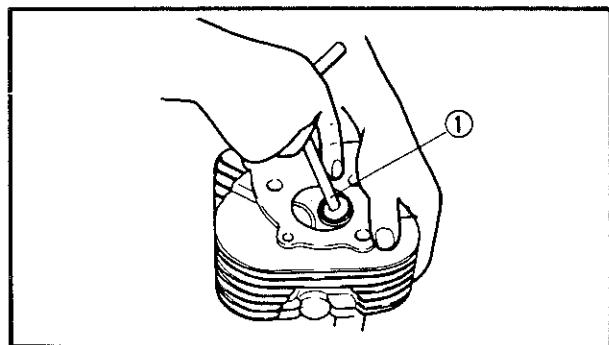
NOTE:

After installing valve guide ③ :

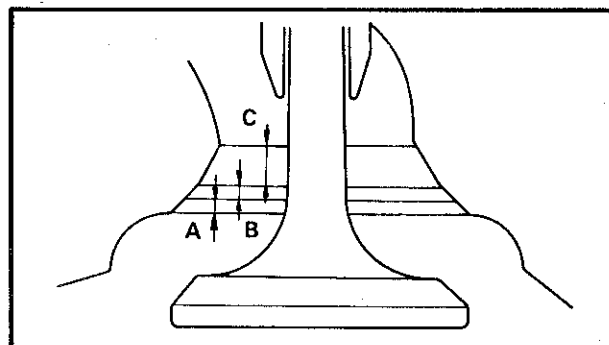
- Use the 7.0 mm Valve Guide Reamer & Installer Set ④ (90890-04018) to obtain proper valve guide/valve stem clearance.
- Recut the valve seat.

**Valve Seat****1. Inspect:**

- Valve seats
- Wear/Pitting/Valve replacement → Resurface seat at 45° angle.

**CAUTION:**

Clean valve seat if pitted or worn using the 45° Valve Seat Cutter ① . When twisting cutter, keep an even downward pressure to prevent chatter marks.



Cut section as follows

Section	Cutter
A	30°
B	45°
C	60°



2. Measure:

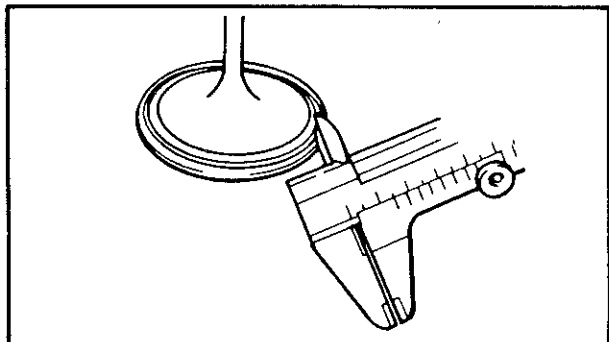
- Valve seat width

3. Apply:

- Mechanics bluing dye (Dykem)
To valve and seat.

4. Position:

- Valves
Into cylinder head.
Press the valve through the valve guide and onto the valve seat to make a clear pattern.



5. Inspect:

- Valve seat surface
Wherever valve seat and valve face made contact, bluing will have been removed.

6. Measure:

- Valve seat width "a"
Out of specification/Pitting/Variation of valve seat width → Cut valve seat further.

CAUTION:

Remove just enough material to achieve satisfactory seat.



Seat Width:

Standard:

1.0 ~ 1.2 mm (0.04 ~ 0.005 in)

Wear Limit:

1.4 mm (0.055 in)

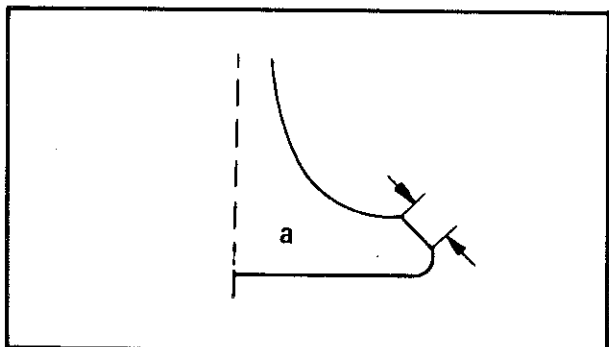
Valve seat recutting steps are necessary if:

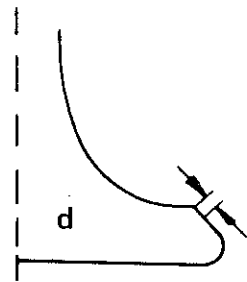
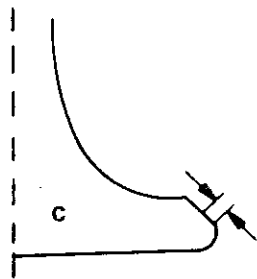
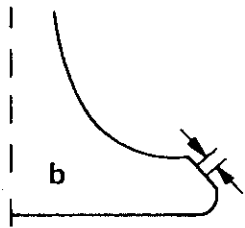
- Valve seat is uniform around perimeter of valve face but too wide or not centered on valve face.

Valve Seat Cutter Set		Desired result
Use either	30° cutter	To center the seat or to reduce its width
	45° cutter	
	60° cutter	

- Valve face indicates that valve seat is centered on valve face but is too wide (see "a" diagram).

Valve Seat Cutter Set		Desired result
Use lightly	30° cutter	To reduce valve seat width to 1.0 mm (0.039 in)
	60° cutter	





- Valve seat is in the middle of the valve face but too narrow (see "b" diagram).

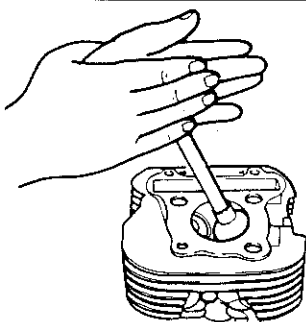
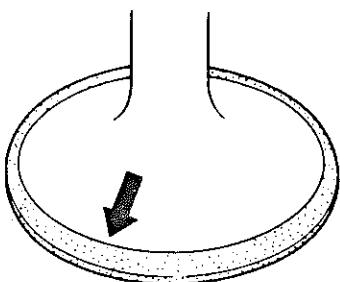
Valve Seat Cutter Set		Desired Result
Use	45° cutter	To achieve a uniform valve seat width of 1.0 mm (0.039 in)

- Valve seat is too narrow and right up near valve margin (see "c" diagram).

Valve Seat Cutter Set		Desired Result
Use	30° cutter, first	To center the seat and to increase its width
	45° cutter	

- Valve seat is too narrow and is located down near the bottom edge of the valve face (see diagram "d").

Valve Seat Cutter Set		Desired Result
Use	60° cutter, first	To center the seat and to increase its width
	45° cutter	



Valve/Valve Seat Assembly Lapping

1. Apply:

- Coarse lapping compound (Small amount)
To valve face.
- Molybdenum disulfide oil
To valve stem.

2. Position:

- Valves
In cylinder head.

3. Rotate:

- Valve
Turn until valve and valve seat are evenly polished, then clean off all compound.

4. Apply:

- Fine lapping compound (Small amount)
To valve face.



5. Repeat steps 2 and 3.

NOTE:

Be sure to clean off all compound from valve face after every lapping operation.

6. Inspect:

- Valve face

Not yet uniformly smooth → Repeat procedure from step 1.

7. Apply:

- Mechanics bluing dye (Dykem)

To valve face and seat.

8. Install:

- Valves

Into cylinder head.

Press the valve through the valve guide and onto the valve seat to make a clear pattern.

9. Inspect:

- Valve face

Valve must make full seat contact indicated by grey surface all around. The valve face where bluing was removed.

Faulty contact → Replace.

See procedure below.

10. Apply:

- Solvent

Into each intake and exhaust port.

NOTE:

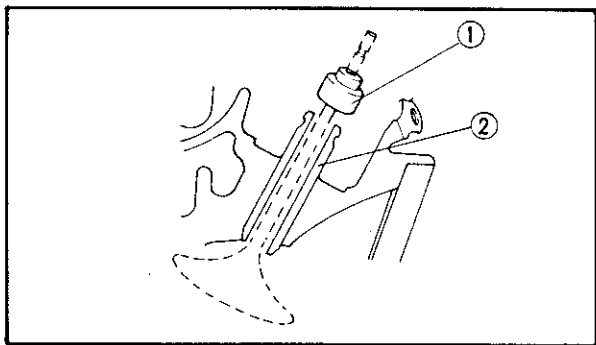
Pour solvent into intake and exhaust ports only after completion of all valve work and assembly of all head parts.

11. Check:

- Valve seals ①

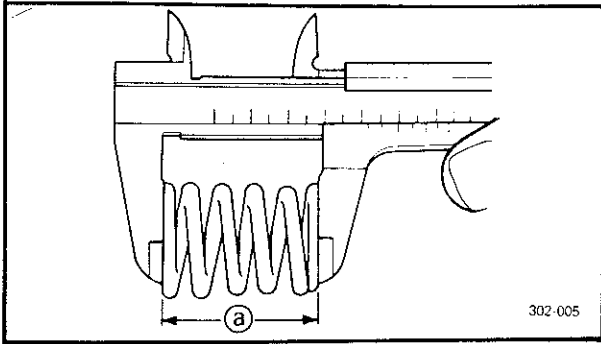
Leakage past valve seat → Replace valve.
(See procedure below)

② Valve guide

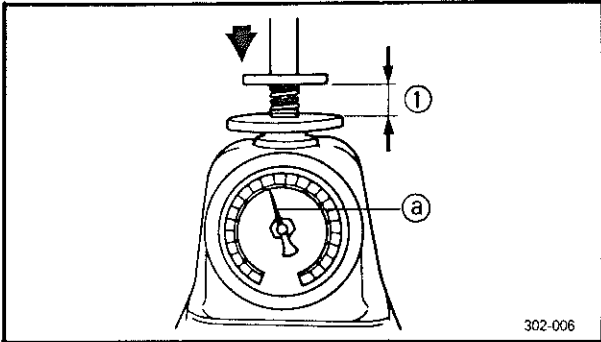


Relapping steps:

- Disassemble head parts.
- Repeat lapping steps using fine lapping compound.
- Clean all parts thoroughly.
- Reassemble and check for leakage again using solvent.
- Repeat steps as often as necessary to effect a satisfactory seal.



302-005



302-006

Valve Spring**1. Measure:**

- Spring free length (a)
- Out of specification → Replace.

**Minimum Free Length:**

Inner Spring:
37.7 mm (1.484 in)

Outer Spring:
41.4 mm (1.630 in)

2. Measure:

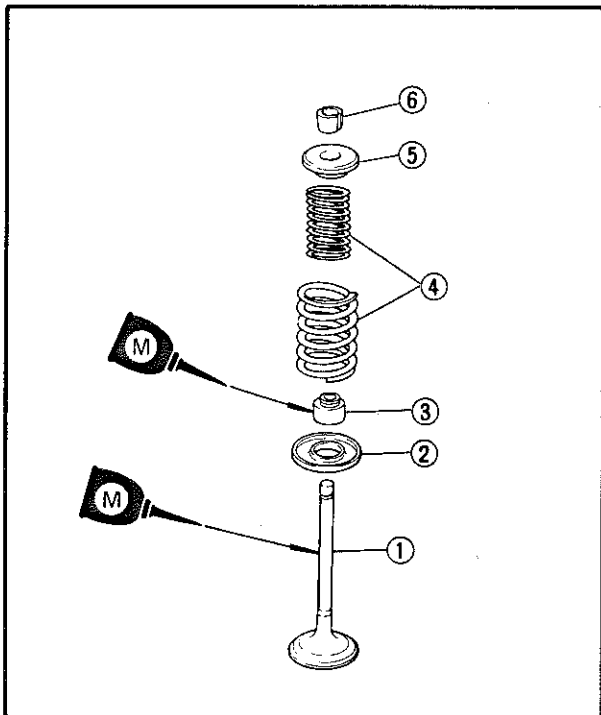
- Spring force (Installed length) (a)
- Out of specification → Replace.

**Valve Compressed Force:**

Inner Spring:
9.5 ~ 11.1 kg (21.0 ~ 24.5 lb)
at 34.1 mm (1.343 in)

Outer Spring:
18.7 ~ 21.9 kg (41.2 ~ 48.3 lb)
at 37.1 mm (1.461 in)

① Installed length

**Valve Installation****1. Lubricate:**

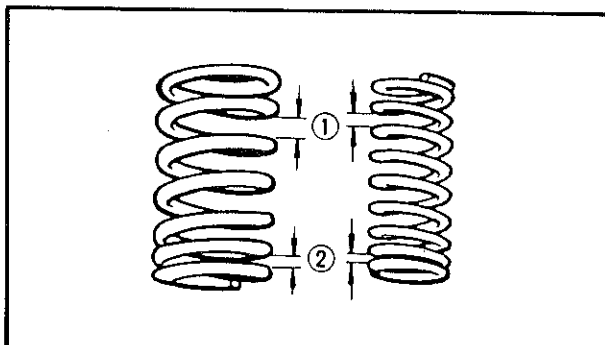
- Valve stem
- Oil seal



**High-Quality Molybdenum Disulfide
Motor Oil or Molybdenum Disulfide
Grease**

2. Install:

- Valve ①
- Valve spring seat ②
- Oil seal ③
- Valve springs ④
- Valve spring seat ⑤
- Valve retainers ⑥

**NOTE:**

Install spring with wider-gapped coil facing upwards, as shown.

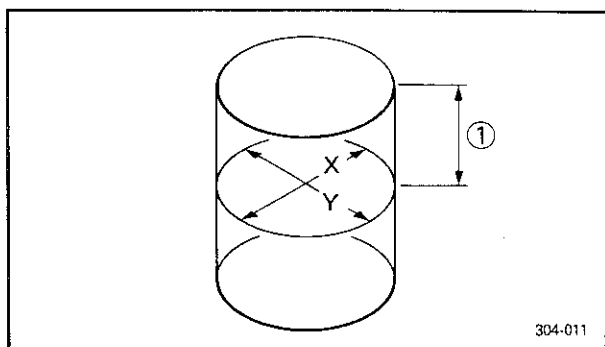
- ① Larger pitch
- ② Smaller pitch

CYLINDER AND PISTON**1. Inspect:**

- Cylinder and piston walls
Vertical scratches → Rebore or replace cylinder and piston.

2. Measure:

- Piston-to-cylinder clearance

**Piston-to-cylinder clearance measurement steps:****First pipe:**

- Measure the cylinder bore "C" with the Cylinder Bore Gauge.

- ① 40 mm (1.57 in) from the cylinder top

NOTE:

Measure the cylinder bore "C" in parallel to and at right angles to the crankshaft. Then, find the average of the measurements.



	Standard	Wear Limit
Cylinder Bore "C":	75.98 ~ 76.02 mm (2.991 ~ 2.993 in)	76.10 mm (2.996 in)

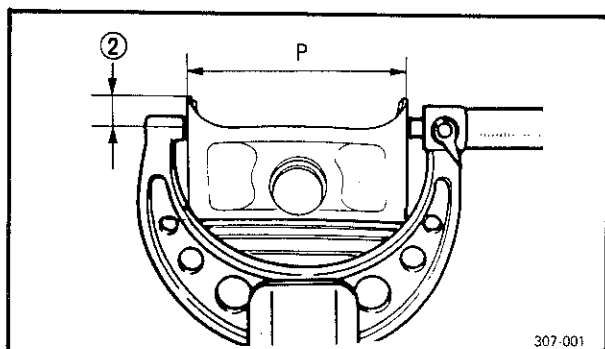
$$C = \frac{X + Y}{2}$$

- If out of specification, rebore or replace the cylinder, and replace the piston and piston ring as a set.

Second step:

- Measure the piston skirt diameter "P" with a micrometer.

- ② 3.5 mm (0.14 in) from the piston bottom edge





Piston Outside Diameter "P"

Standard	75.92 ~ 75.97 mm (2.989 ~ 2.991 in)
Oversize 2	76.50 mm (3.012 in)
Oversize 4	77.00 mm (3.031 in)

- If out of specification, replace the piston and piston rings as a set.

Third step:

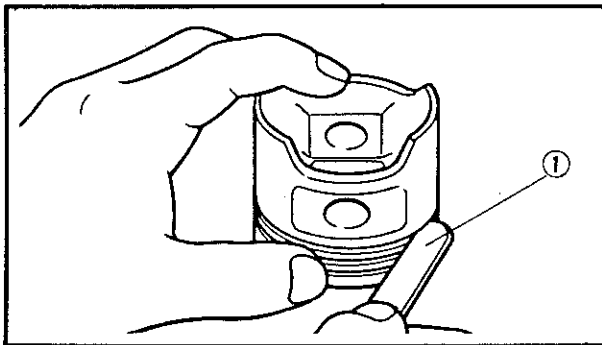
- Find the piston-to-cylinder clearance with following formula:

$$\text{Piston-to-cylinder Clearance} = \text{Cylinder Bore "C"} - \text{Piston Skirt Diameter "P"}$$

- If out of specification, rebore or replace the cylinder, and replace the piston and piston rings as a set.



Piston-to-cylinder Clearance:
0.035 ~ 0.055 mm
(0.0014 ~ 0.0022 in)



PISTON RING AND PISTON PIN

Piston Ring

1. Measure:

- Side clearance

Use the Feeler Gauge ①.

Out of specification → Replace piston and/or rings.



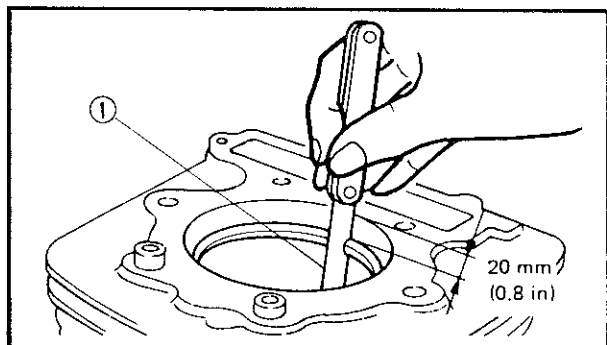
Side Clearance

	Standard	Limit
Top Ring	0.03 ~ 0.07 mm (0.001 ~ 0.003 in)	0.12 mm (0.005 in)
2nd Ring	0.02 ~ 0.06 mm (0.0008 ~ 0.0024 in)	0.005 mm (0.005 in)

2. Position:

- Piston ring

Push the ring with the piston crown.



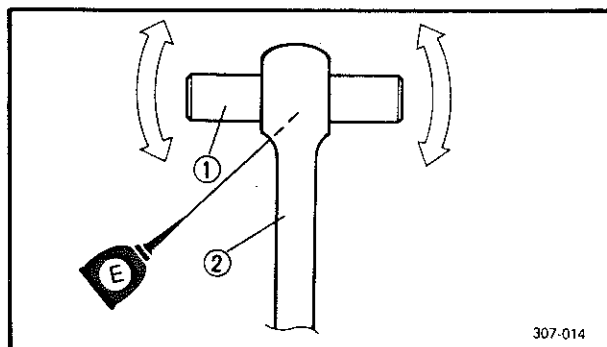
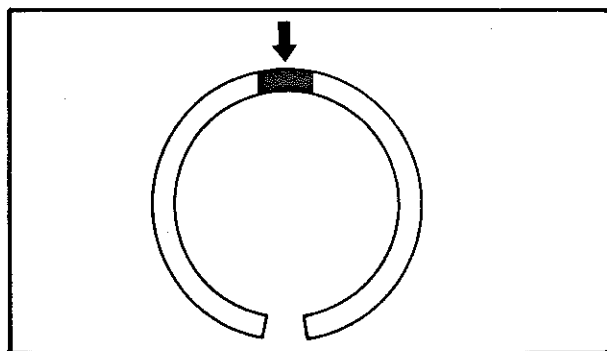
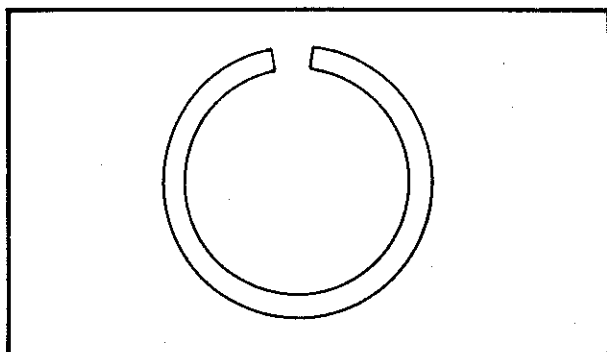
3. Measure:

- End gap

Use a Feeler Gauge ①

Out of specification → Replace rings as set.

	End Gap	
	Standard	Limit
Top Ring	0.30 ~ 0.45 mm (0.012 ~ 0.018 in)	0.7 mm (0.028 in)
2nd Ring	0.30 ~ 0.45 mm (0.012 ~ 0.018 in)	0.8 mm (0.031 in)
Oil Ring	0.2 ~ 0.8 mm (0.008 ~ 0.031 in)	—



Piston Ring Oversize

- Top and 2nd piston ring

Oversize top and middle ring sizes are stamped on top of ring.

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

- Oil control ring

Expander spacer of bottom ring (oil control ring) is color-coded to identify sizes.

Size	Color
Oversize 2	Blue
Oversize 4	Yellow

Piston Pin

1. Lubricate:

- Piston pin (Lightly)

2. Install:

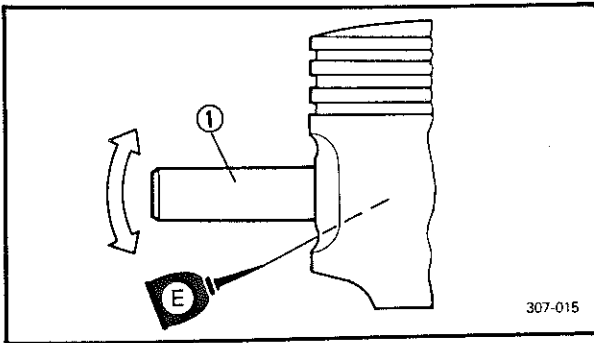
- Piston pin ①

Into small end of connecting rod ② .

3. Check:

- Free play

Free play → Inspect connecting rod and piston pin for wear.

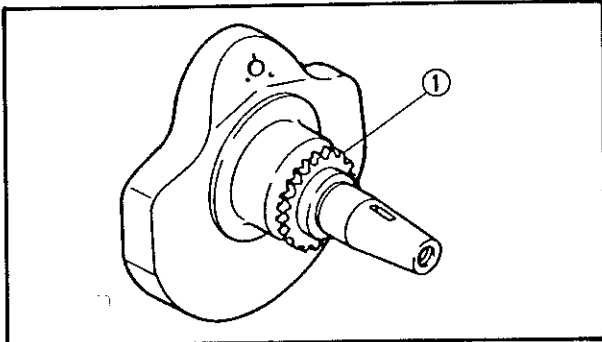


4. Position:

- Piston pin ①
Into piston.

5. Check:

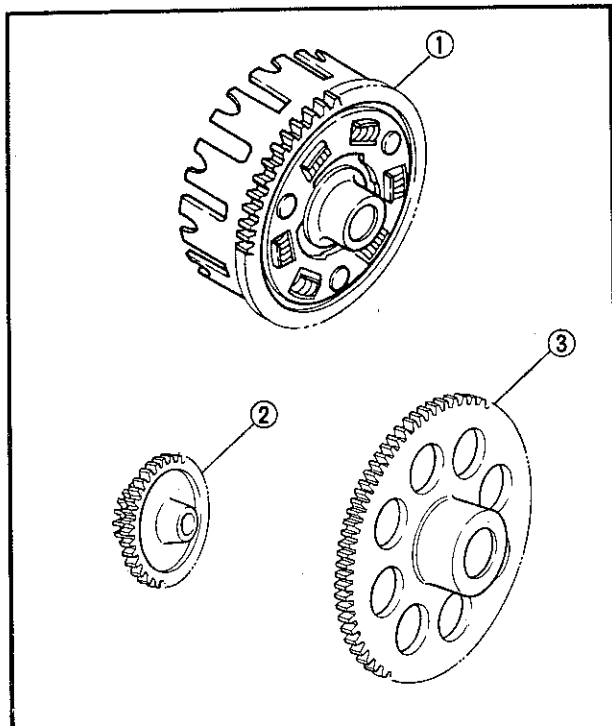
- Free play
When pin is in place in piston.
Free play → Replace piston pin and/or piston.



PRIMARY GEARS AND STARTER

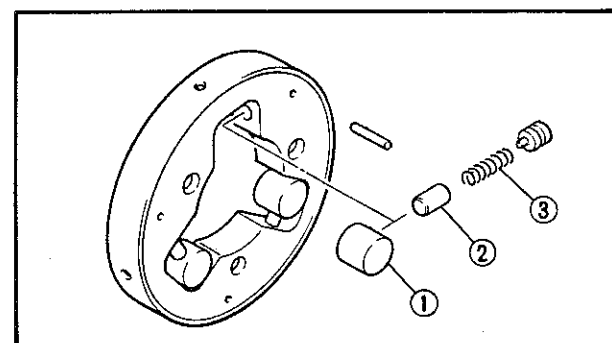
1. Inspect:

- Drive gear ①
Scratches/Wear/Damage → Replace crankshaft.



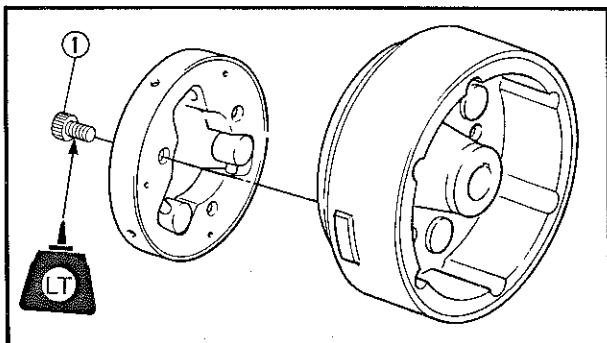
2. Inspect:

- Driven gear ①
Scratches/Wear/Damage → Replace clutch housing assembly.
- Idler gears (# 1 and # 2) ② ③
Scratches/Wear/Damage → Replace.



3. Check:

- Roller ① operation
- Spring cap ② operation
- Spring ③ operation
Unsmooth operation → Replace one-way clutch.



4. Inspect:

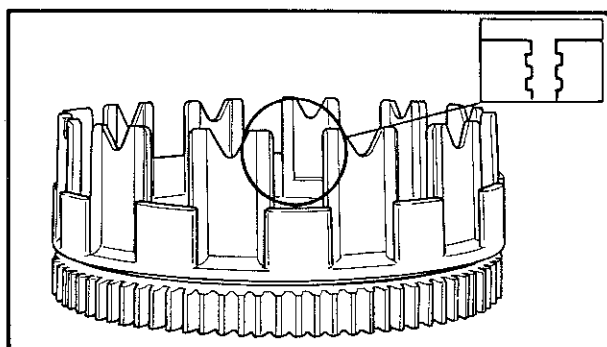
- Bolts (Starter clutch) ①
Loose → Replace with a new one, and clinch the end of the bolt.

NOTE:

The arrow mark on the starter clutch must face inward, away from the CDI rotor.



Bolts (Starter Clutch):
20 Nm (2.0 m·kg, 14 ft·lb)
LOCTITE®
Stake Over the End of the Bolt

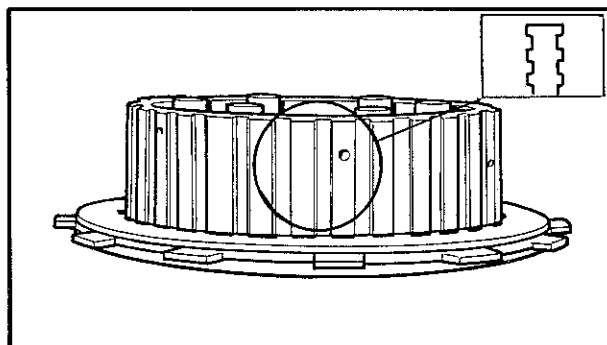


CLUTCH

Clutch Housing

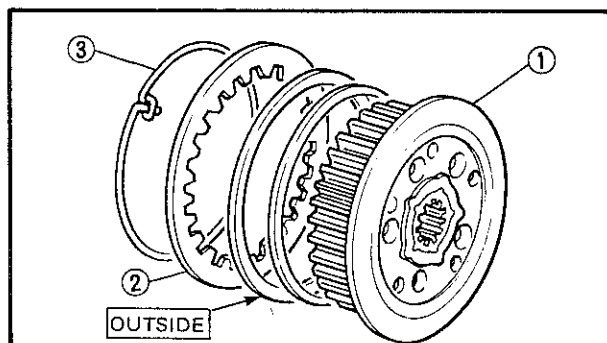
1. Inspect:

- Dogs on the housing
Cracks/Wear/Damage → Deburr or replace.
- Clutch housing bearing
Chafing/Wear/Damage → Replace.



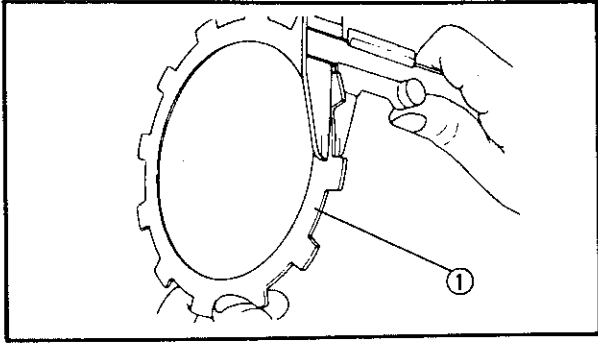
1. Inspect:

- Clutch boss splines
Scoring/Wear/Damage → Replace clutch boss assembly.



NOTE:

- Scoring on the clutch plate splines will cause erratic operation.
- The clutch boss ① contains a built-in damper beneath the clutch plate ②. It is not necessary to remove the wire circlip ③ and disassemble the built-in damper unless there is serious clutch chattering.

**Friction Plates**

1. Inspect:

- Friction plate ①

Damage/Wear → Replace friction plate as a set.

2. Measure:

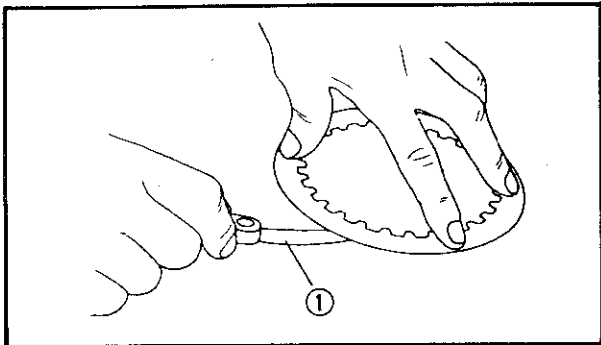
- Friction plate thickness

Measure at all four points.

Out of specification → Replace friction plate as a set.



Wear Limit:
2.6 mm (0.102 in)

**Clutch Plates**

1. Measure:

- Clutch plate warpage

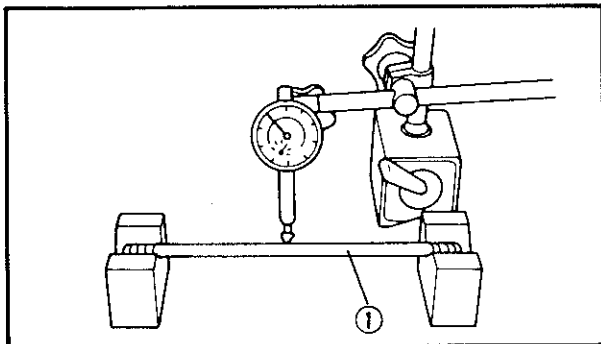
Use the surface plate and the Feeler Gauge

①.

Out of specification → Replace.



Warp Limit:
0.2 mm (0.008 in)

**Push Rod**

1. Measure:

- Push rod runout ①

Use V-Blocks and the Dial Gauge.

Out of specification → Replace.



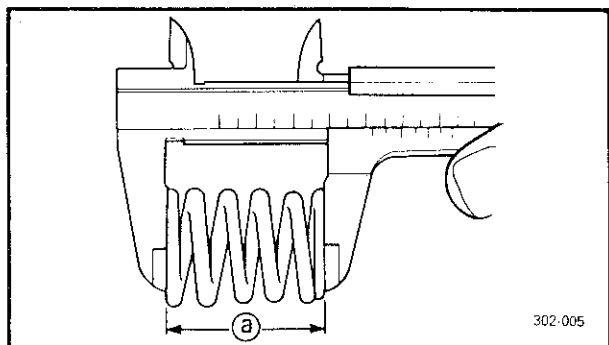
Bending Limit:
0.5 mm (0.02 in)

Clutch Bearing

1. Inspect:

- Bearing

Pitting/Damage → Replace.

**Clutch Spring**

1. Inspect:

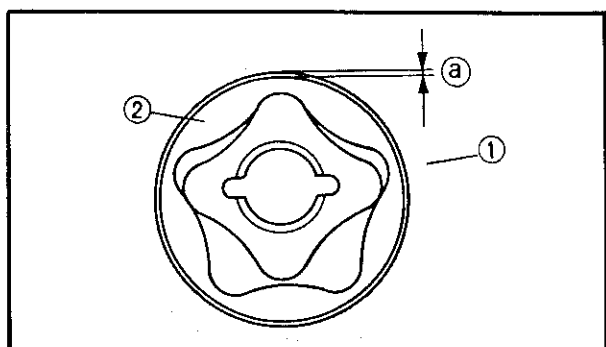
- Clutch spring
Wear/Damage → Replace.

2. Measure:

- Clutch spring free length (a)
Out of specification → Replace springs as a set.



Clutch Spring Minimum Length:
38.5 mm (1.52 in)

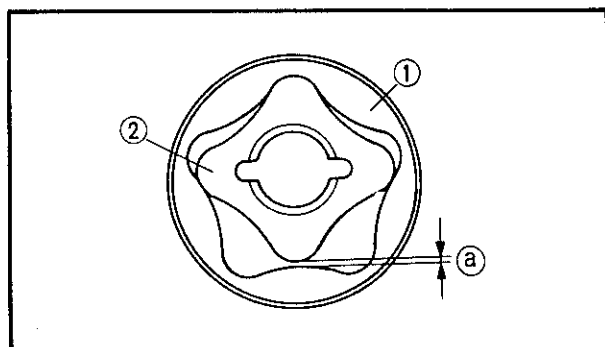
**OIL PUMP**

1. Measure:

- Housing ① /Outer rotor ② clearance (a)
Use a Feeler Gauge.
Out of specification → Replace oil pump assembly.



Side Clearance Limit:
0.08 mm (0.003 in)



2. Measure:

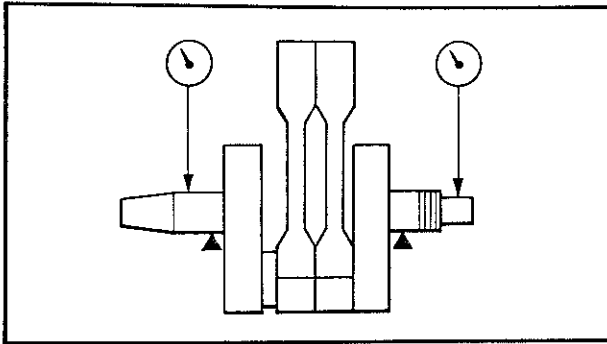
- Outer rotor ① /Inner rotor ② clearance (a)
Use a Feeler Gauge.
Out of specification → Replace oil pump assembly.



Tip Clearance Limit:
0.17 mm (0.007 in)

3. Inspect:

- Oil pump drive gear
- Oil pump driven gear
Wear/Damage → Replace.

**CRANKSHAFT****Crankshaft**

1. Measure:

- Runout

Use the V-Blocks and Dial Gauge.

Out of specification → Replace.



Runout Limit:
0.03 mm (0.0012 in)

Journal Oil Clearance Measurement

1. Measure:

- Journal oil clearance

Journal oil clearance measurement steps:**CAUTION:**

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

- Clean the surface of crankshaft journal and journal bearings.
- Check the bearing surface. If the bearing surface is worn or scratched, the bearings should be replaced.

NOTE:

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

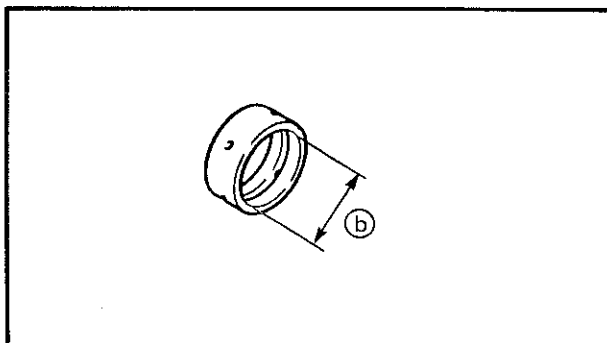
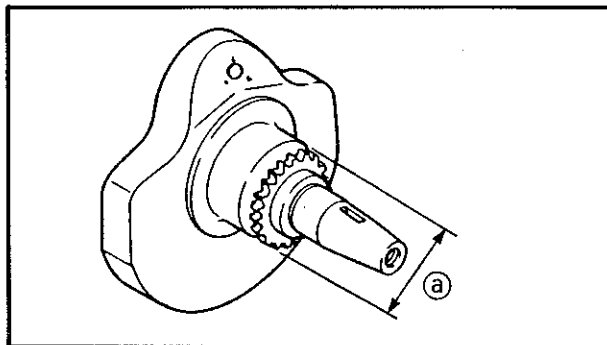
- Measure the outside diameter (a) of each crankshaft journal at two places. If it is out of specification, replace the crankshaft.



Outside Diameter Limit
(Crankshaft Journal):
44.958 mm (1.767 in)

- Measure the inside diameter (b) of each journal bearing at two places.
- To find oil clearance use following formula:

Journal Oil Clearance =
Crankshaft Journal Diameter –
Journal Bearing Inside Diameter

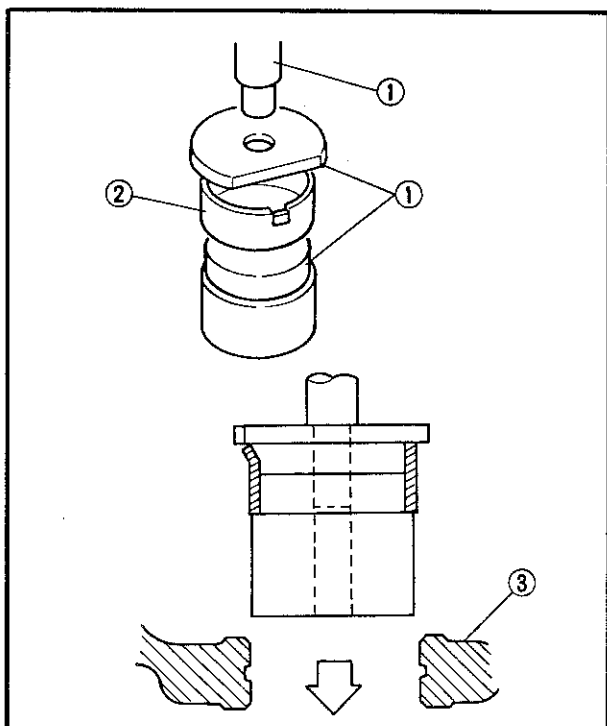
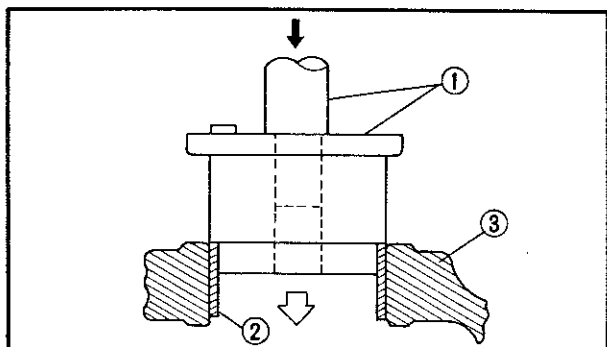
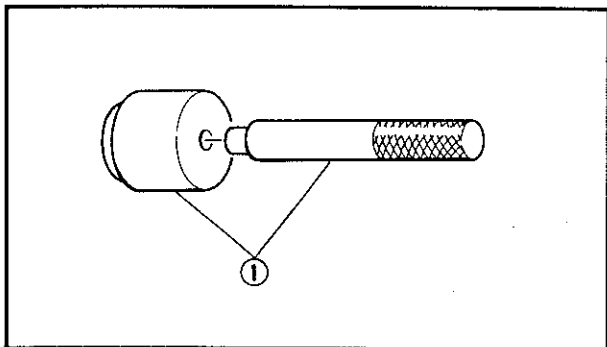




- If the oil clearance is out of specification, replace both journal bearings.



Journal Oil Clearance:
0.020 ~ 0.052 mm
(0.0008 ~ 0.0020 in)



Journal Bearing Removal and Installation

NOTE:

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

1. Attach:
 - Plain Bearing Remover and Installer set ①
 - To the crankcase.

2. Remove:
 - Journal bearing ②
 - Press the tool end using a hydraulic press.

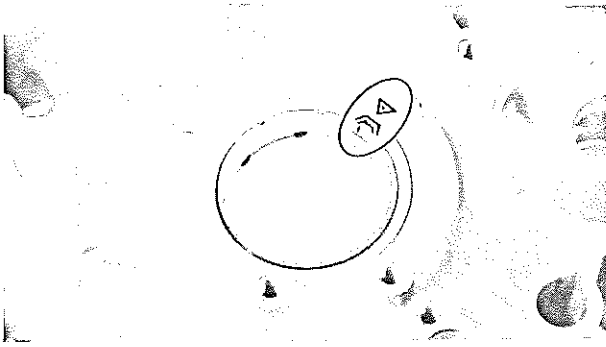
③ Crankcase

3. Clean:
 - Crankcase surface (Outside of journal bearing)

4. Select:
 - Journal bearings
 - Refer to "Journal Bearing Selection" section.

5. Attach:
 - Plain Bearing Remover and Installer Set ① (90890-04074)
 - Journal bearing (New) ②
 - To the crankcase.

③ Crankcase



6. Install:

- Journal bearing

Press the tool end using a hydraulic press.

NOTE:

Make sure that the key aligns with the keyway in the crankcase.

Journal Bearing Selection

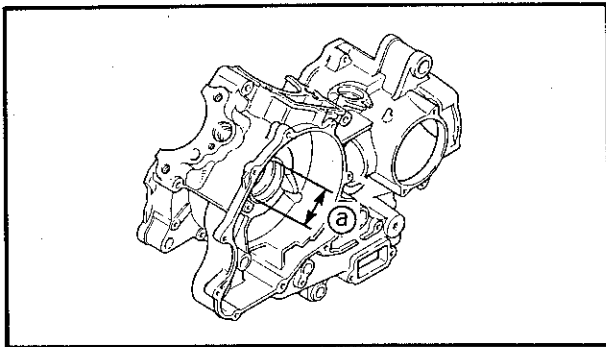
1. Remove:

- Journal bearing

Refer to "Journal Bearing Removal and Installation" section.

2. Select:

- Journal bearing

**Journal bearing selection steps:**

- Clean the counterbore in the crankcase where the journal bearing is fitted.
- Measure the diameter (a) of counterbore at two places.


NOTE:

If the diameter of counterbore in the crankcase exceeds 49.02 mm (0.930 in), the crankcase should be replaced with a new one. The new crankcase is already fitted with journal bearings, and their inside diameters are normally 45.000 ~ 45.012 mm (1.7715 ~ 1.7721 in).

CAUTION:

The average of the two values is used to choose the bearing.

- Select the proper oversize journal bearing with the following table.

 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



3. Install:

- Journal bearing

Refer to "Journal Bearing Removal and Installation" section.

Connecting Rod Bearing Clearance Measurement

1. Clean all parts.

2. Install:

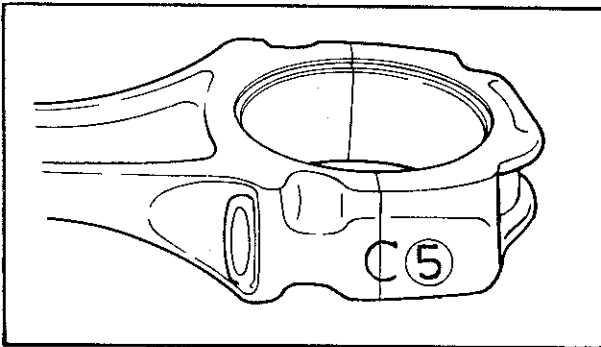
- Connecting rod bearings
Into connecting rod and cap.

3. Attach:

- Plastigage®
Onto the crank pin.

4. Install:

- Connecting rod
- Connecting rod cap

**NOTE:**

Be sure the letter on both components align to form perfect character.

5. Lubricate:

- Bolt threads (Connecting rod)



Molybdenum Disulfide Grease

6. Tighten:

- Nuts (Connecting rod cap)

NOTE:

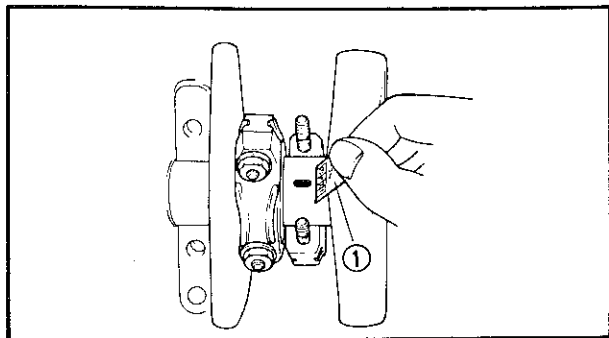
Do not turn connecting rod until clearance measurement has been completed.

CAUTION:

Tighten to full torque specification without pausing. Apply continuous torque between 3.2 and 3.6 m·kg. Once you reach 3.2 m·kg, **DO NOT STOP TIGHTENING** until final torque is reached. If tightening is interrupted between 3.2 and 3.6 m·kg, loosen nut to less than 3.2 m·kg and start again.



Connecting Rod Cap:
36 Nm (3.6 m·kg, 25 ft·lb)



7. Remove:

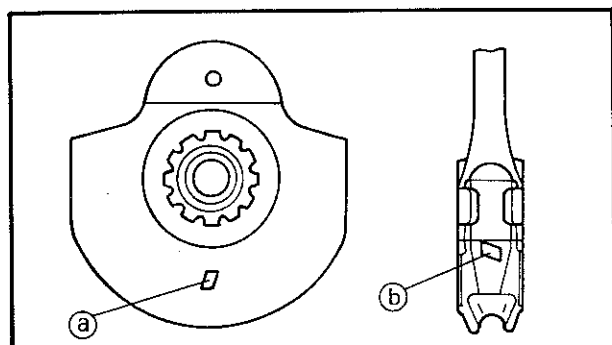
- Connecting rod cap
Use care in removing.

8. Measure:

- Width of Plastigage® ①
Out of specification → Replace bearings and/or replace crankshaft if necessary.

**Connecting Rod Bearing Clearance:**

0.026 ~ 0.050 mm
(0.001 ~ 0.002 in)

**Connecting Rod Bearing Selection**

1. Select:

- Connecting rod

Connecting rod bearing selection steps:

- The numbers used to indicate crankpin sizes ① is stamped on the crankweb (Left).
- The numbers used to indicate connecting rod sizes ② is stamped in link on the rod.
- To find connecting rod bearing size use following formula:

$$\text{Connecting Rod Bearing Size} = \text{Connecting Rod No. } \textcircled{2} - \text{Crankpin No. } \textcircled{1}$$

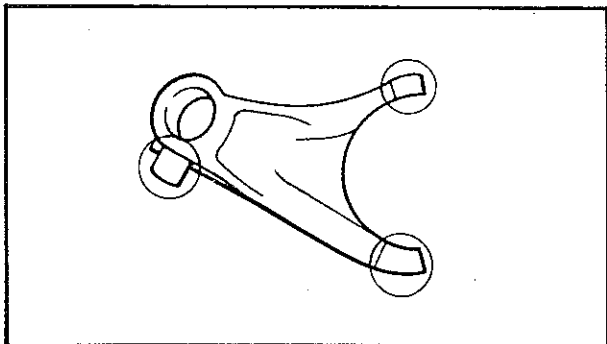
- Select the proper size bearing with the following table.

Bearing Color	Code
No. 1	Blue
No. 2	Black
No. 3	Brown
No. 4	Green

Example:

Rod No. — Crankpin No.
= 4 — 1 = 3

Therefore, use brown (No. 3) bearing inserts.

**TRANSMISSION****Shift Fork**

1. Inspect:

• Shift forks

On the gear and shift cam contact surfaces.

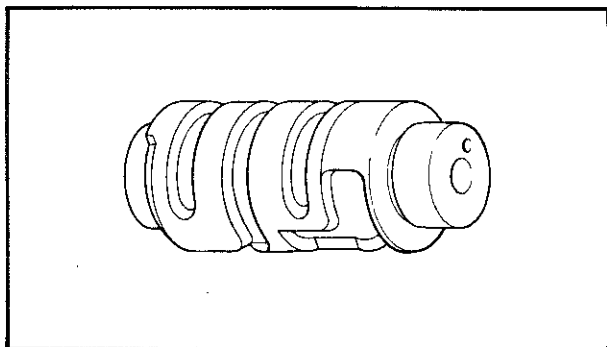
Wear/Chafing/Bends/Damage → Replace.

2. Check:

• Shift fork movement

On its guide bar.

Unsmooth operation → Replace fork and/or guide bar.

**Shift Cam**

1. Inspect:

• Shift cam grooves

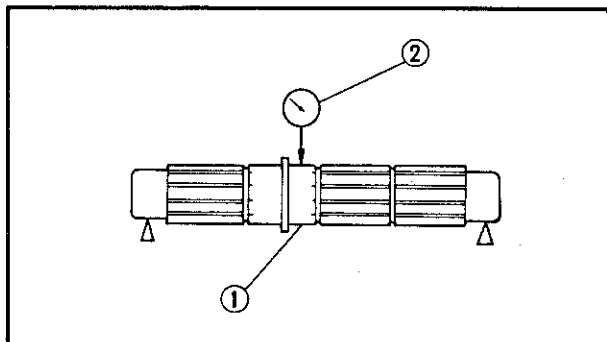
Wear/Damage/Scratches → Replace.

• Shift cam segment

Damage/Wear → Replace.

• Shift cam bearing

Pitting/Damage → Replace.

**Main/Drive Axles and Gears**

1. Measure:

• Axle runout ①

Use the centering device and Dial Gauge

②.

Out of specification → Replace.



Runout Limit:

0.06 mm (0.0024 in)

2. Inspect:

• Gears

Damage/Wear → Replace.

3. Check:

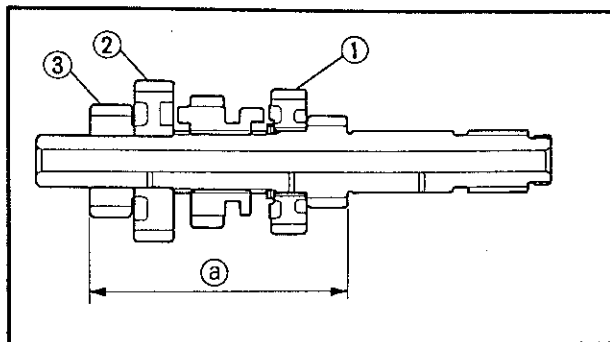
• Gear movement

Unsmooth operation → Replace.

4. Inspect:

• Mating dogs

Cracks/Wear/Damage → Replace.

**NOTE:**

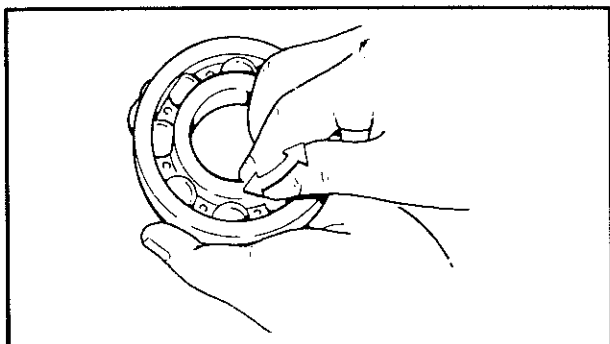
When replacing the main axle or pinions, take the following steps:

- Apply molybdenum oil to the 4th ① and 5th ② pinion gear bosses.
- Using a hydraulic press; force-fit the 2nd pinion gear ③ to the position specified ②.



2nd Pinion Gear Position ② :
103.1 mm (4.06 in)

- After installing the pinions onto the main axle, make sure the 4th and 5th pinion gears turn freely.

**BEARINGS****1. Inspect:**

- Axle bearings
 - Shift cam bearing
- Pitting/Damage → Replace.

CIRCLIPS AND WASHERS**1. Inspect:**

- Circlips
 - Washers
- Damage/Looseness/Bends → Replace.

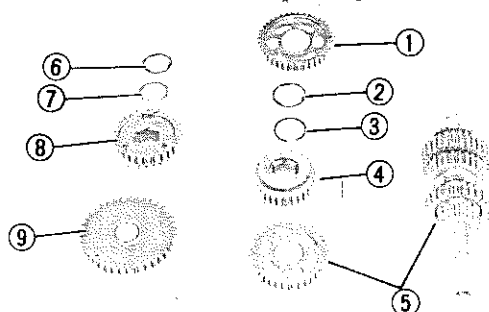


ENGINE ASSEMBLY AND ADJUSTMENT

TRANSMISSION AND CRANKSHAFT

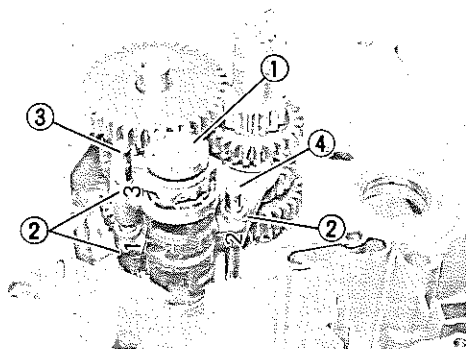
1. Install:

- 2nd wheel gear (38T) ①
- Washer ②
- Circlip ③
- 5th wheel gear (29T) ④
- 3rd wheel gear (35T) and main axle assembly ⑤
- Washer ⑥
- Circlip ⑦
- 4th wheel gear (28T) ⑧
- 1st wheel gear (38T) ⑨



2. Install:

- Shift cam ①
- Shift forks ②
- Guide bar (Rear – Longer) ③
- Guide bar (Front – Shorter) ④



NOTE:

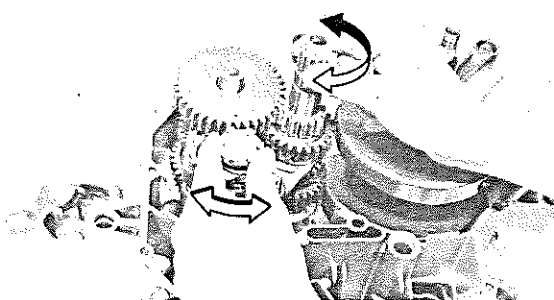
Each shift forks is identified by a number cast on its side. All the numbers should face the left side.

3. Check:

- Shifter operation
- Unsmooth operation → Repair.

NOTE:

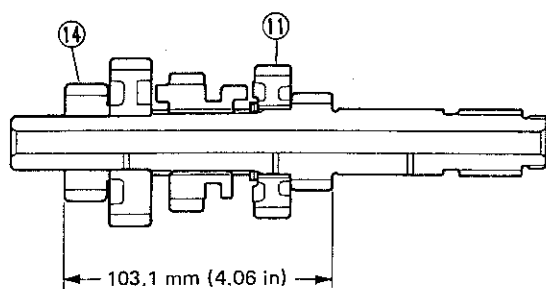
- Oil each gear and bearing thoroughly.
- Before assembling the crankcase, be sure that the transmission is in neutral and that the gears turn freely.



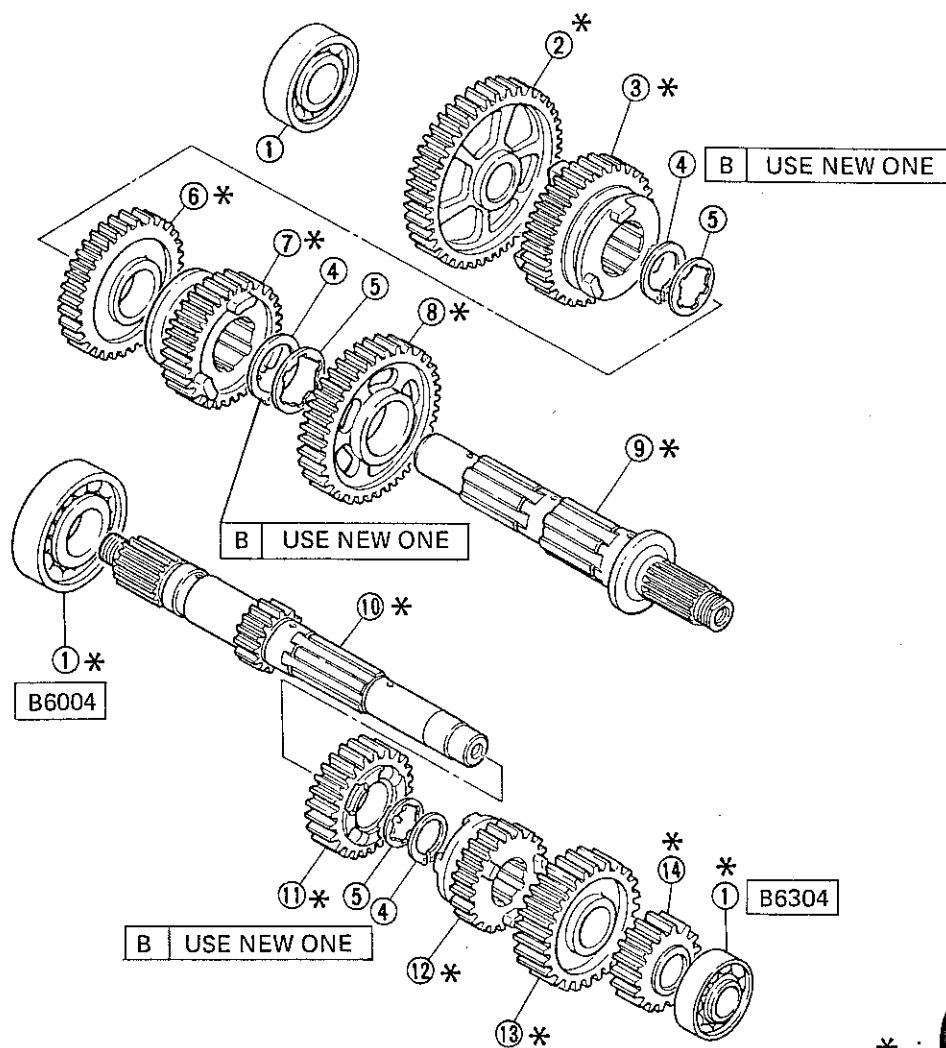


TRANSMISSION

- | | |
|------------------------|-------------------------|
| ① Bearing | ⑨ Drive axle |
| ② 1st wheel gear (38T) | ⑩ Main axle |
| ③ 4th wheel gear (28T) | ⑪ 4th pinion gear (24T) |
| ④ Circlip | ⑫ 3rd pinion gear (24T) |
| ⑤ Washer | ⑬ 5th pinion gear |
| ⑥ 3rd wheel gear (35T) | ⑭ 2nd pinion gear (20T) |
| ⑦ 5th wheel gear (29T) | |
| ⑧ 2nd wheel gear (38T) | |



A RUNOUT LIMIT:
0.06 mm (0.0024 in)





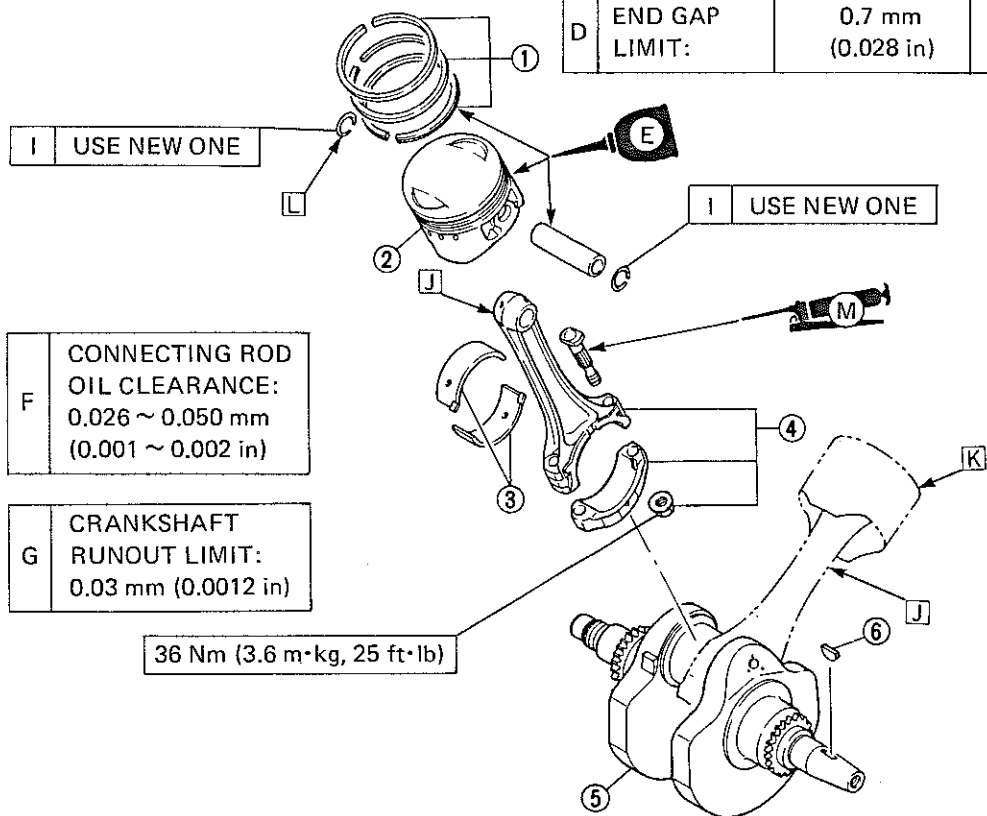
CRANKSHAFT

- ① Piston ring set
- ② Piston
- ③ Connecting rod bearing
- ④ Connecting rod assembly
- ⑤ Crankshaft
- ⑥ Woodruff key

- J "Y" mark towards the outside.
- K For rear cylinder
- L For front cylinder

E	PISTON CLEARANCE: 0.035 ~ 0.055 mm (0.0014 ~ 0.0022 in)
---	---------------------------------------------------------------

	A TOP RING	B 2ND RING
C SIDE CLEARANCE LIMIT:	0.12 mm (0.005 in)	0.12 mm (0.005 in)
D END GAP LIMIT:	0.7 mm (0.028 in)	0.8 mm (0.031 in)

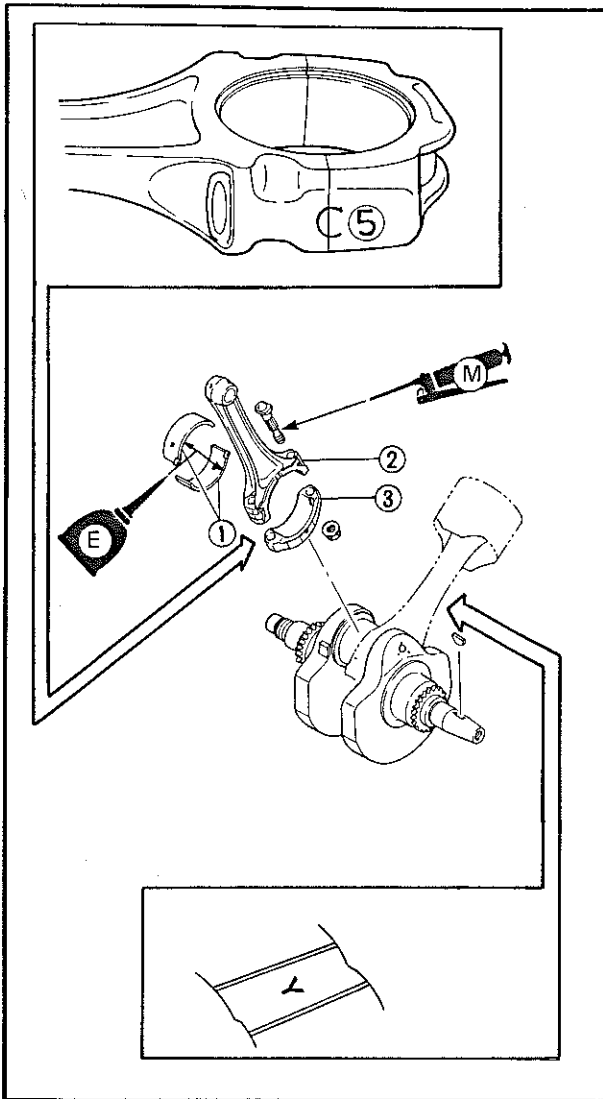


F	CONNECTING ROD OIL CLEARANCE: 0.026 ~ 0.050 mm (0.001 ~ 0.002 in)
---	----------------------------------------------------------------------------

G	CRANKSHAFT RUNOUT LIMIT: 0.03 mm (0.0012 in)
---	----------------------------------------------------

H	CRANKSHAFT JOURNAL OIL CLEARANCE: 0.020 ~ 0.052 mm (0.0008 ~ 0.0020 in)
---	----------------------------------------------------------------------------------





4. Install:

- Connecting rod assembly

Connecting rod assembly installation steps:

- Clean the all components.
- Install the connecting rod bearings ① onto the connecting rods ② and rod caps ③.

NOTE:

Align the projection on the bearing with the groove in the rod or cap.

- Apply 4-stroke engine oil to the connecting rod bearings.
- Install the rod caps to the connecting rods.

NOTE:

Be sure the letters on both components align to form a perfect character.

- Separate the caps and rods, and then install the caps and rods onto the crankshaft.

NOTE:

- The "Y" mark on each rod must face the outside.
- Apply the molybdenum disulfide grease to the rod cap bolt threads and nut surfaces.

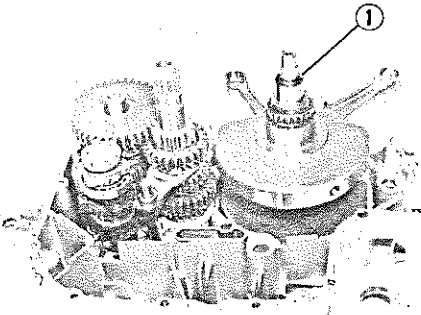
- Tighten the connecting rod cap nuts to specification.

CAUTION:

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



Connecting Rod Cap:
36 Nm (3.6 m·kg, 25 ft·lb)

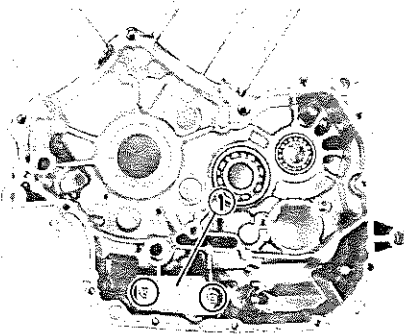


5. Install:

- Crankshaft ①
Into the crankcase (Left).

NOTE:

- Install the tapered end of the crankshaft (Left side) into the crankcase.
- Align the left connecting rod with the rear cylinder sleeve hole.
- The rod must be in this hole when the crankshaft is properly installed.



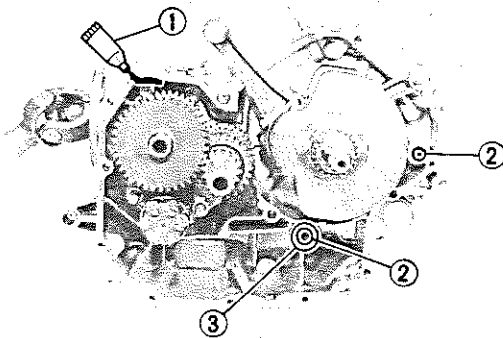
CRANKCASE

1. Install:

- Oil baffle plate ①



Oil Baffle Plate:
10 Nm (1.0 m·kg, 7.2 ft·lb)



2. Apply:

- Yamaha Bond No. 1215 (90890-85505) ①
To the mating surfaces of both case halves.

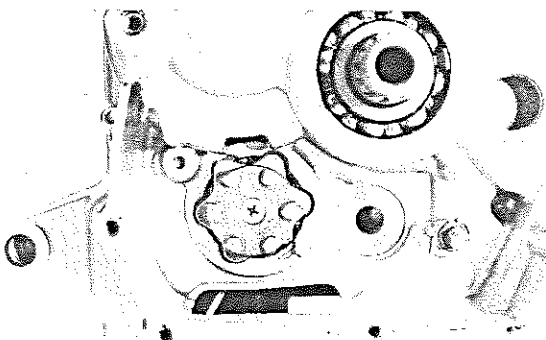
3. Install:

- Dowel pins ②
- O-ring ③

4. Fit the right crankcase onto the left case.
Tap lightly on the case with a soft hammer.

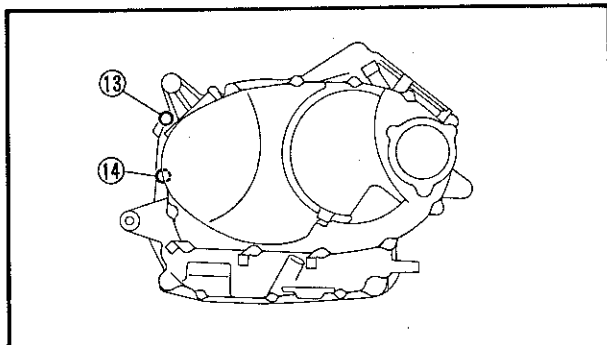
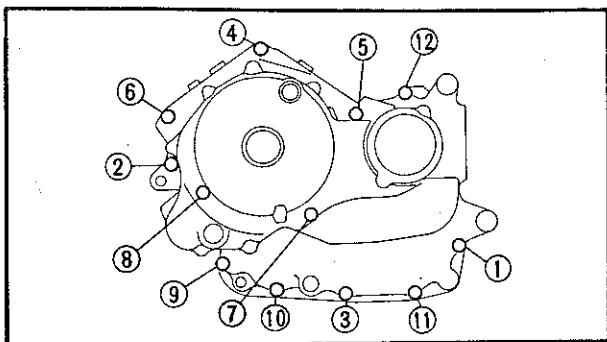
NOTE:

Turn the shift cam to the position shown in the figure so that it does not contact the crankcase when installing the crankcase.



CAUTION:

Before installing and torquing the crankcase holding bolts, be sure to check whether the transmission is functioning properly by manually rotating the shift cam either way.



5. Tighten:

- Bolts (Crankcase) ① ~ ⑭

NOTE:

Tighten the bolts starting with the lowest numbered one.



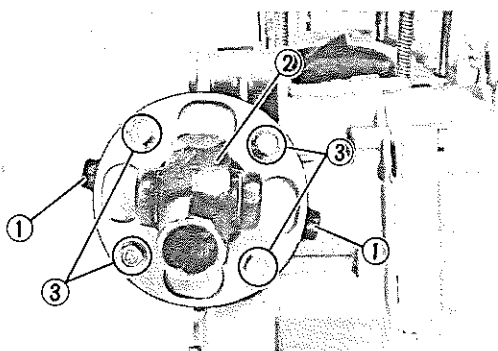
6 mm Bolts (Crankcase):
10 Nm (1.0 m·kg, 7.2 ft·lb)
8 mm Bolts (Crankcase):
24 Nm (2.4 m·kg, 17 ft·lb)

6. Apply:

- 4-stroke engine oil
To the crank pin, bearing and oil delivery hole.

7. Check:

- Crankshaft and transmission operation
Unsmooth operation → Repair.



MIDDLE DRIVEN GEAR

1. Install:

- Shims ①
- Middle driven gear assembly ②
- Bolts (Bearing housing) ③

NOTE:

Finger tighten the mounting bolts, do not torque them at this point.

2. Check:

- Middle gear operation
Unsmooth operation → Reinstallation.

3. Tighten:

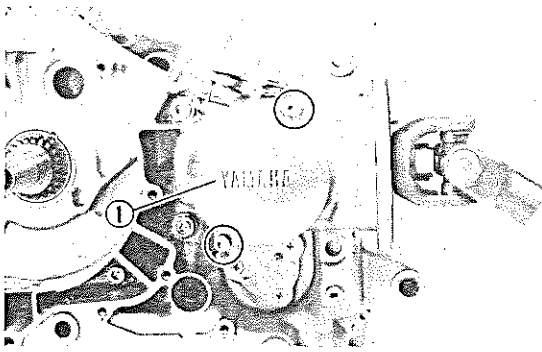
- Bolts (Bearing housing)

NOTE:

Before tightening the bolts, adjust the gear lash of the middle gear. Refer to "MIDDLE GEAR SERVICE – ADJUSTMENT" section.



Bolts (Bearing Housing):
25 Nm (2.5 m·kg, 18 ft·lb)



4. Install:
 - O-ring
 - Middle gear case ①

NOTE:

Inspect the o-ring. If damaged, replace it.



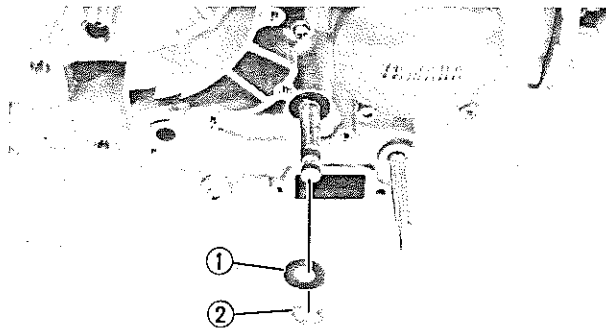
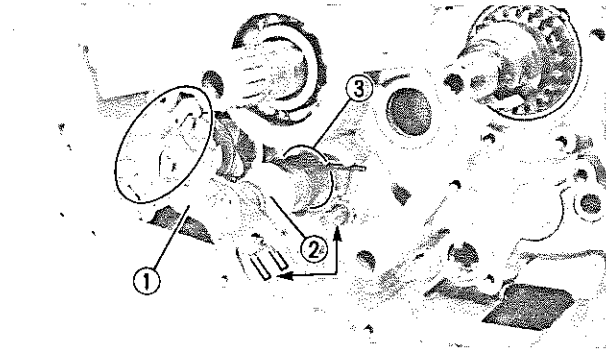
Middle Gear Case:
10 Nm (1.0 m·kg, 7.2 ft·lb)

SHIFT SHAFT

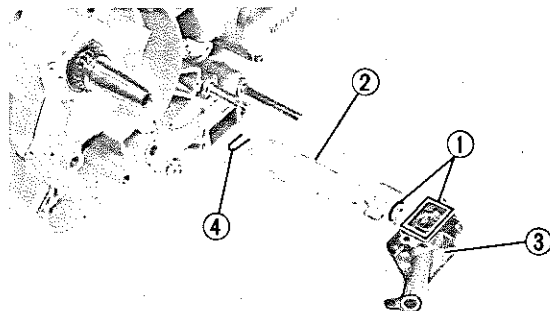
1. Install:
 - Stopper lever ①
 - Shift shaft ②

NOTE:

Before installing the shift shaft, do not forget to fit the plain washer ③.



2. Set the stopper lever and torsion spring as properly position.
3. Install:
 - Plain washer ①
 - Circlip ②
4. Check:
 - Change operation
 - Unsmooth operation → Repair.

**OIL PUMP**

1. Install:
 - O-rings ①
 - Oil strainer ②
 - Oil passage housing ③

NOTE:

- Inspect the O-ring. If damaged, replace it.
- The tab ④ on the end of the oil strainer should be engaged in the crankcase groove.



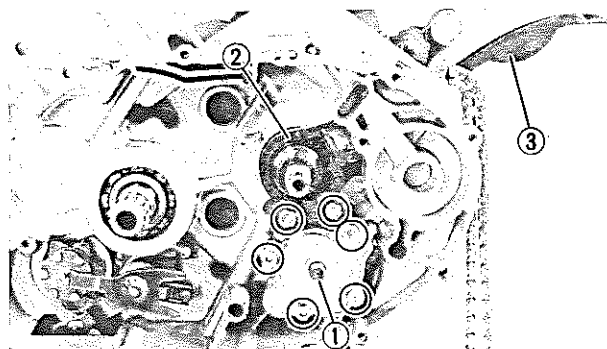
Oil Passage Housing:
10 Nm (1.0 m·kg, 7.2 ft·lb)



2. Install:
 - Dowel pin ①
 - O-rings ②
3. Apply 4-stroke engine oil to the oil pump passages.

CAUTION:

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



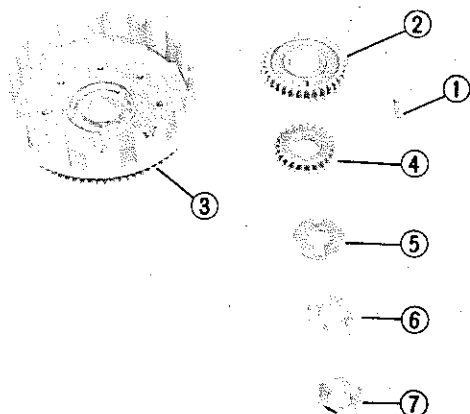
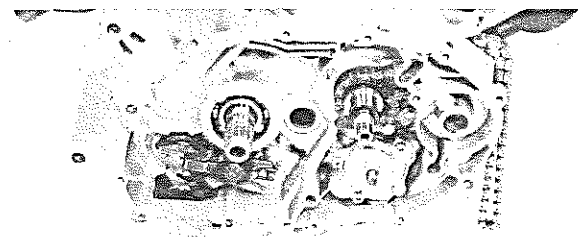
4. Install:
 - Oil pump assembly ①
 - Cam chain ②
 - Cam chain damper (Front cylinder — Exhaust) ③

**Oil Pump:**

7 Nm (0.7 m·kg, 5.1 ft·lb)

Cam Chain Damper:

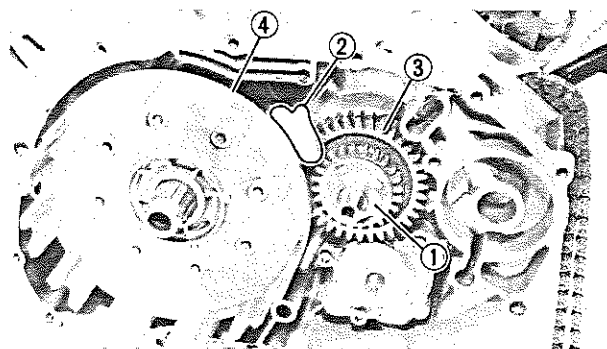
10 Nm (1.0 m·kg, 7.2 ft·lb)

**CLUTCH**

1. Install:
 - Key ①
 - Primary drive gear ②
 - Primary driven gear ③
 - Oil pump drive gear ④
 - Holding plate ⑤
 - Lock washer (New) ⑥
 - Nut (Primary drive gear) ⑦

NOTE:

- Make sure that the tab of the lock washer engages the slots in the holding plate.
- Finger tighten the nut, do not torque it at this point.



2. Tighten:
 - Nut (Primary drive gear) ①

Place a folded rag ② between the teeth of the drive gear ③ and driven gear ④ to lock them.

**Nut (Primary Drive Gear):**

70 Nm (7.0 m·kg, 50 ft·lb)

3. Bend the lock washer tab along the nut flats.



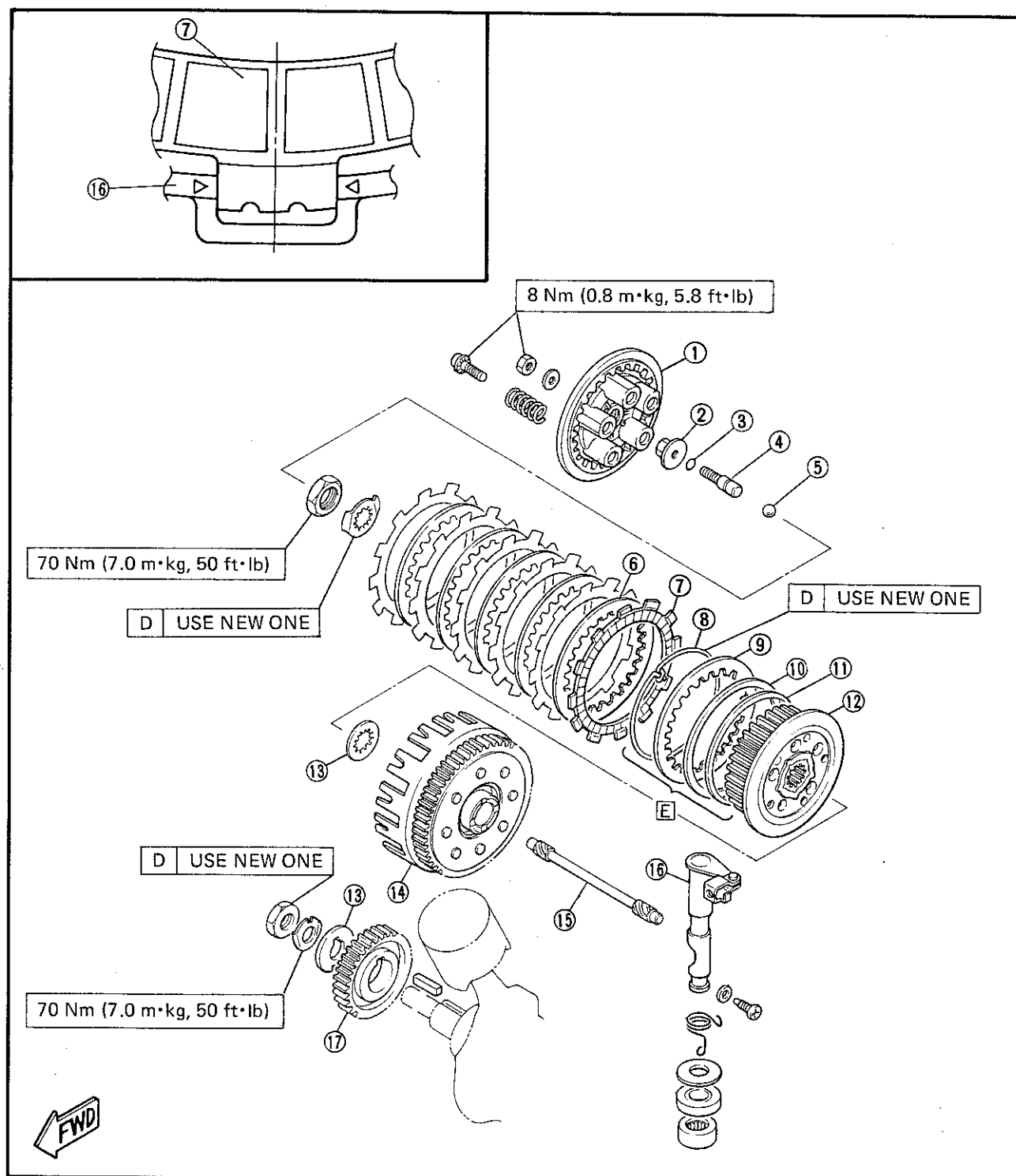
CLUTCH

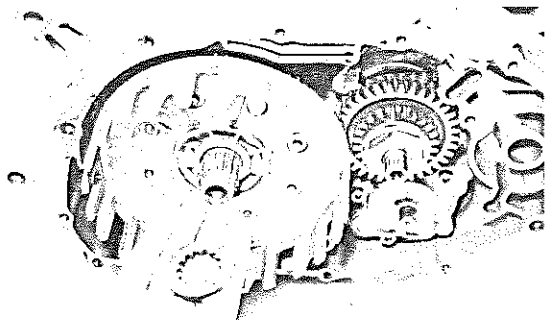
- ① Pressure plate
- ② Push plate
- ③ O-ring
- ④ Push rod # 1
- ⑤ Ball
- ⑥ Clutch plates (5 pcs.)
- ⑦ Friction plates (6 pcs.)
- ⑧ Wire circlip

- ⑨ Clutch plate (1 pc.)
- ⑩ Seat spring
- ⑪ Seat plate
- ⑫ Clutch boss
- ⑬ Holding plate
- ⑭ Clutch housing
- ⑮ Push rod # 2
- ⑯ Push lever assembly

- ⑰ Primary drive gear

E It is not necessary to remove the wire circlip and disassemble the built-in damper unless there is serious clutch chattering.





4. Install:

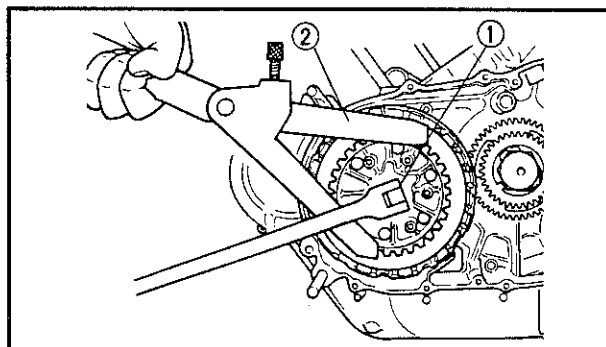
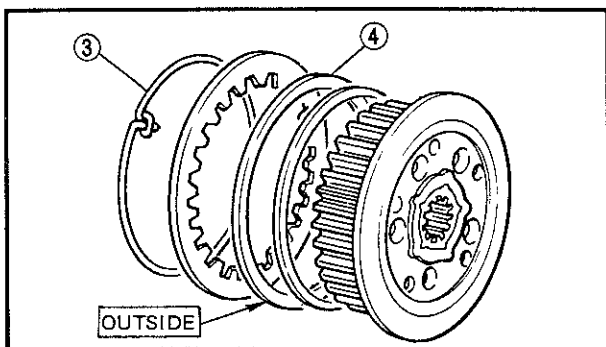
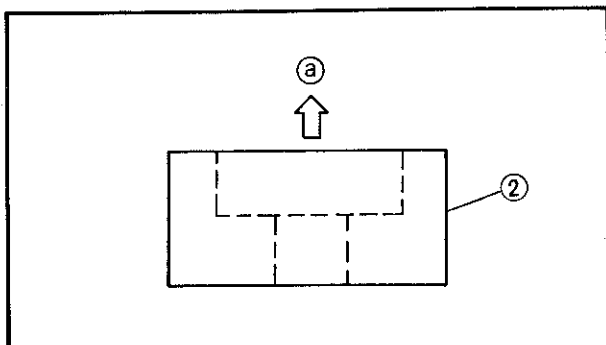
- Holding plate ①
- Clutch boss
- Lock washer (New)
- Locknut (Clutch boss)

NOTE:

- Make sure that the tab of the lock washer engages the slots in the clutch boss.
- Install the nut ② with its recessed side (a) facing the clutch boss.
- If the wire circlip ③ is removed, take care reinstall them as shown.
- Install the seat spring ④ with its "OUTSIDE" mark on the outside.

CAUTION:

Always use a new wire circlip.



5. Tighten:

- Locknut (Clutch boss) ①
- Use the Universal Clutch Holder ② (90890-04086) to hold the clutch boss.

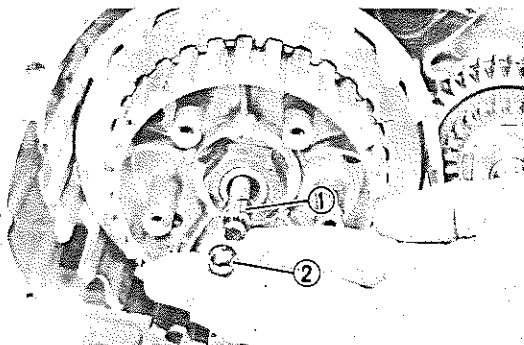


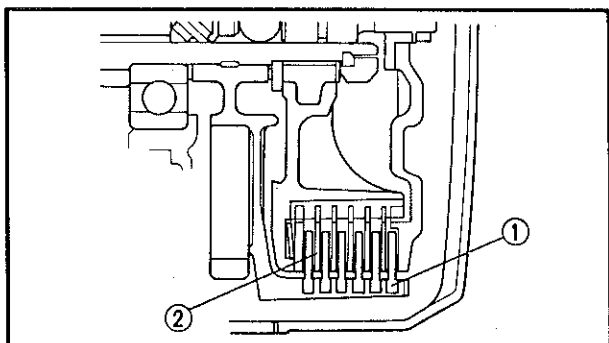
Locknut (Clutch Boss):
70 Nm (7.0 m·kg, 50 ft·lb)

6. Bend the lock washer tab along the nut flats.

7. Install:

- Push rod # 2 ①
- Ball ②

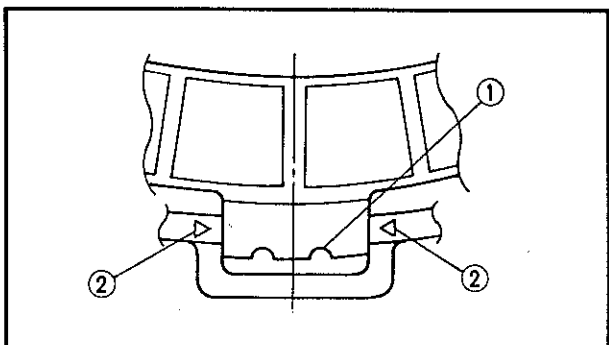




8. Install:
- Friction plates ①
 - Clutch plates ②

NOTE:

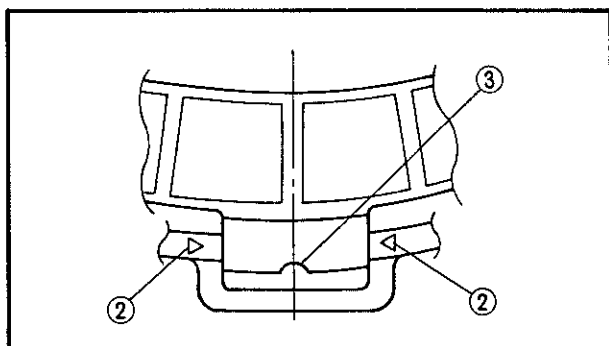
Install the clutch plates and friction plate alternately on the clutch boss, starting with a friction plate and ending with a friction plate.


Friction plates and clutch plates installation steps:

- Install the friction plates (with the double semi-circular slots) and the five clutch plates.

NOTE:

Be sure the double semi-circular slots ① on the friction plate is aligned with the clutch housing embossed match marks ②.

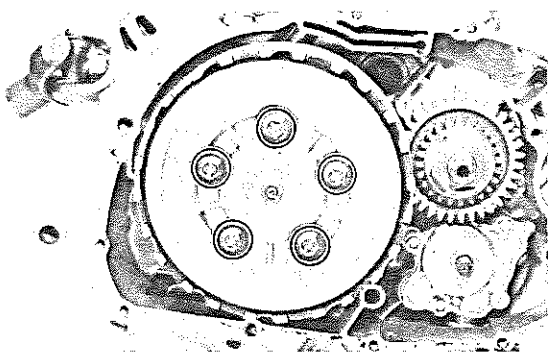


- If the clutch does not release due to hard meshing between the friction plates and the clutch housing, check to see if any of the friction plates fit too snugly into the clutch housing. Any tight-fitting friction plates must be repositioned as follows.

- 1) Remove the friction plates and the clutch plates.
- 2) Install the six friction plate (with the double semi-circular slots) and the five clutch plates.

NOTE:

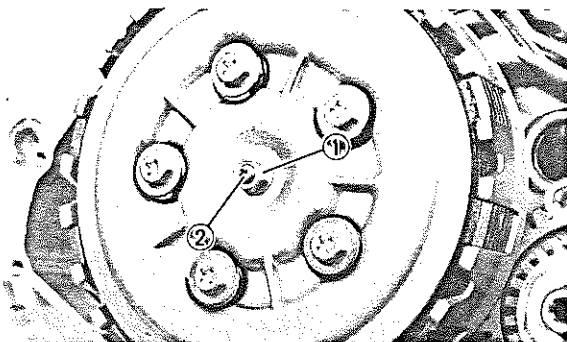
- Invert the friction plates.
- Be sure the single semi-circular slot ③ on the friction plate is aligned with the clutch housing embossed match marks ②.



9. Install:
- Pressure plate
 - Clutch springs
 - Screws (Clutch spring)



Screws (Clutch Spring):
8 Nm (0.8 m·kg, 5.8 ft·lb)



10. Adjust:

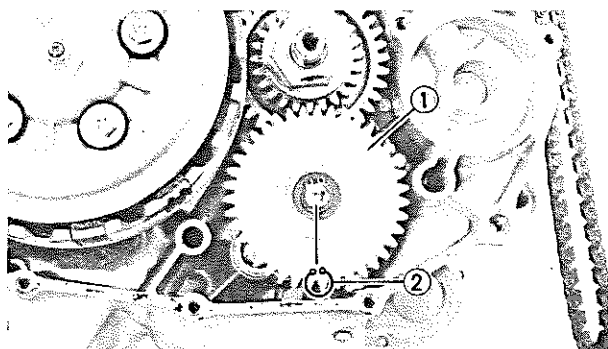
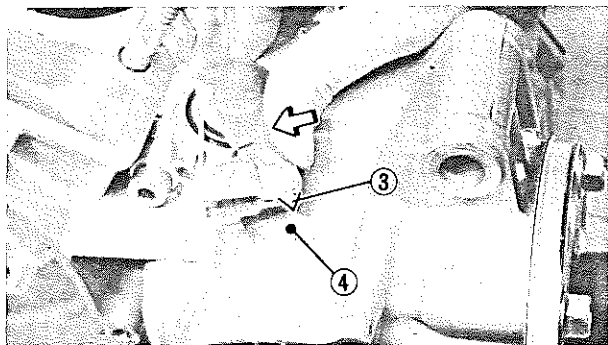
- Clutch mechanism free play

Clutch mechanism free play adjustment steps:

- Loosen the locknut ①.
- Push the push lever toward the front of the engine with your finger until it stops.
- With the push lever in this position, turn the adjuster ② either in or out until the push lever mark ③ and crankcase match mark ④ are aligned.
- Tighten the locknut.

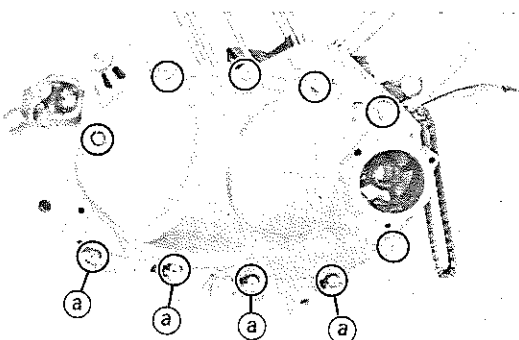
**Locknut:**

8 Nm (0.8 m·kg, 5.8 ft·lb)



11. Install:

- Oil pump gear ①
- Clip ②

**CRANKCASE COVER (RIGHT)**

1. Install:

- Dowel pins
- Gasket (New)
- Crankcase cover (Right)

2. Tighten:

- Bolts (Crankcase cover)

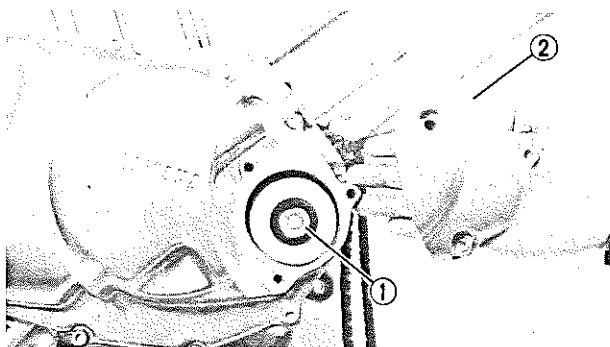
(a) With clamp

NOTE:

- Finger tighten the four bolts with clamps at this point.
- Tighten the bolts in stage, using a crisscross pattern.

**Bolts (Crankcase Cover):**

10 Nm (1.0 m·kg, 7.2 ft·lb)



3. Install:

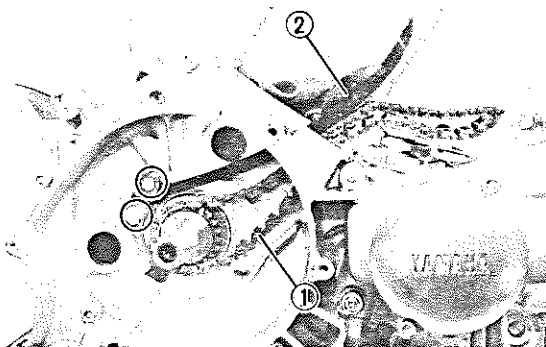
- O-ring (Filter cover)
- Oil filter ①
- Oil filter cover ②

NOTE:

Inspect the O-ring and oil filter. If damaged, replace them.



Oil Filter Cover:
10 Nm (1.0 m·kg, 7.2 ft·lb)



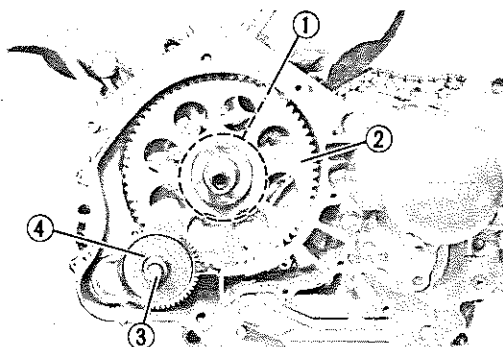
CDI MAGNETO

1. Install:

- Cam chain ①
- Cam chain damper (Rear cylinder — Intake) ②



Cam Chain Damper:
10 Nm (1.0 m·kg, 7.2 ft·lb)



2. Install:

- Washer ①
- Idler gear # 2 ②
- Shaft (Idler gear # 1) ③
- Idler gear # 1 ④

NOTE:

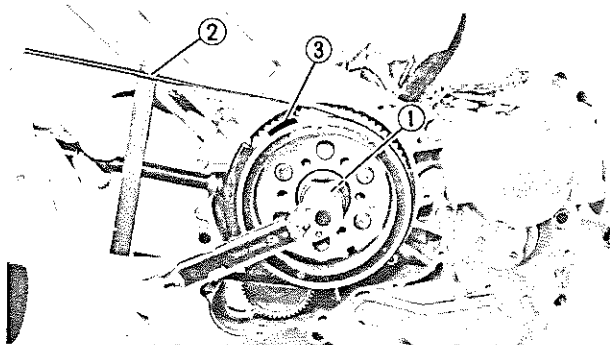
Before installing the idler gear # 2, do not forget to fit the washer ①.

3. Install:

- Woodruff key
- Rotor
- Plain washer
- Nut (Rotor)

NOTE:

- Before installing the rotor, clean the outside of the crankshaft and inside of the rotor.



- When installing the CDI rotor, make sure the woodruff key is properly seated in the key way of the crankshaft.

2. Tighten:

- Nut (Rotor) ①
Use the Sheave Holder ② (90890-01701) to lock the rotor.

NOTE:

Do not allow the special tool to touch the projection ③ on the rotor.

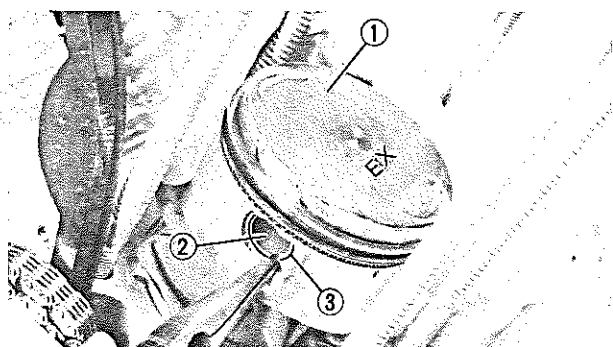


Nut (CDI Rotor):
80 Nm (8.0 m·kg, 58 ft·lb)

PISTON/CYLINDER AND CYLINDER HEAD**NOTE:**

Identify following parts position carefully so that they can be installed in its original place.

- Piston
- Cylinder
- Cylinder head
- Cam sprocket

**Rear Side****1. Install:**

- Piston ①
- Piston pin ②
- Piston pin clip ③

NOTE:

- The "EX" mark on the piston must point to the exhaust side of the engine.
- Before installing the piston pin clip, cover the crankcase with a clean towel or rag so you will not accidentally drop the pin clip and material into the crankcase.

WARNING:

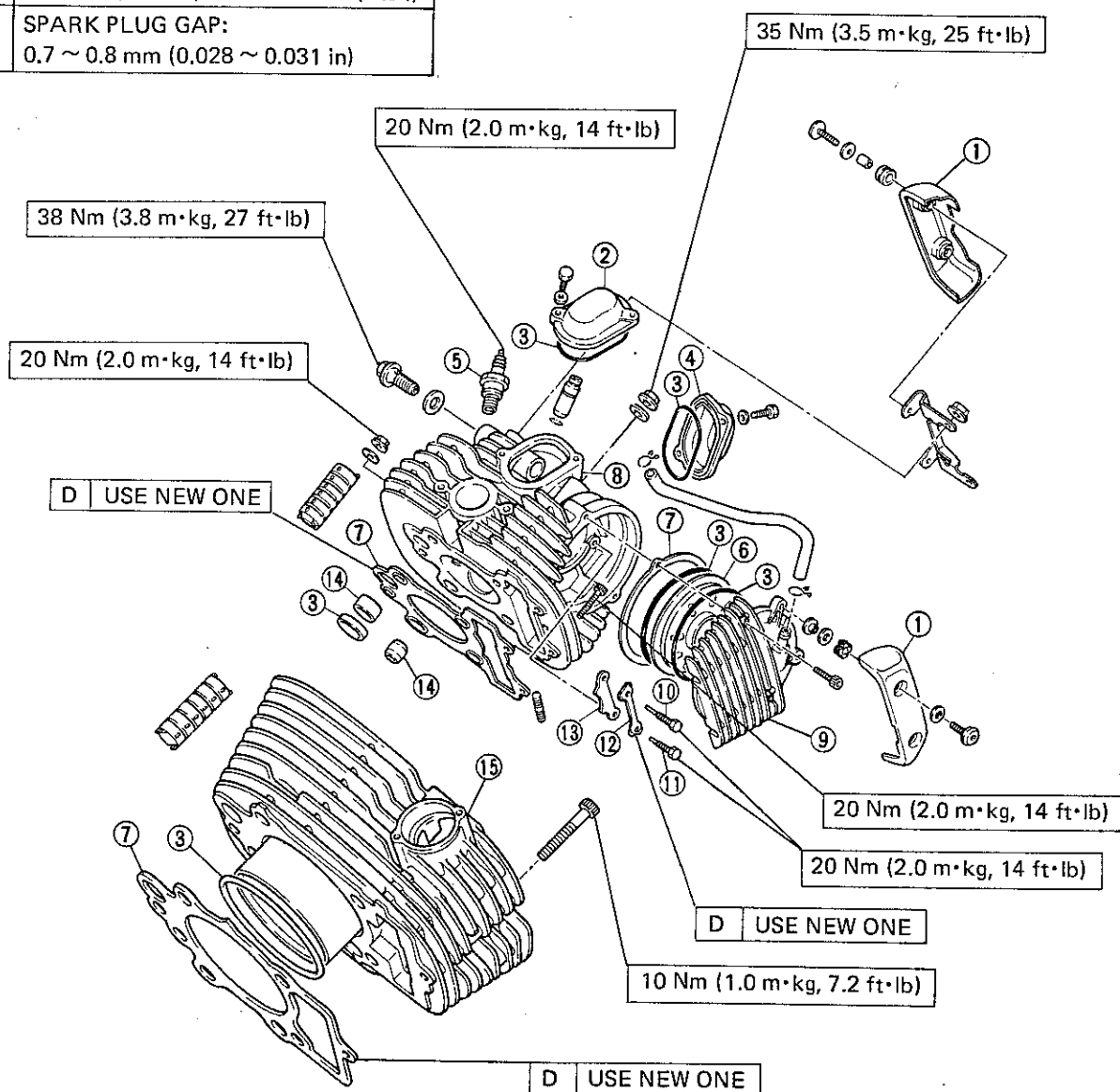
Always use a new piston pin clip.



CYLINDER AND CYLINDER HEAD

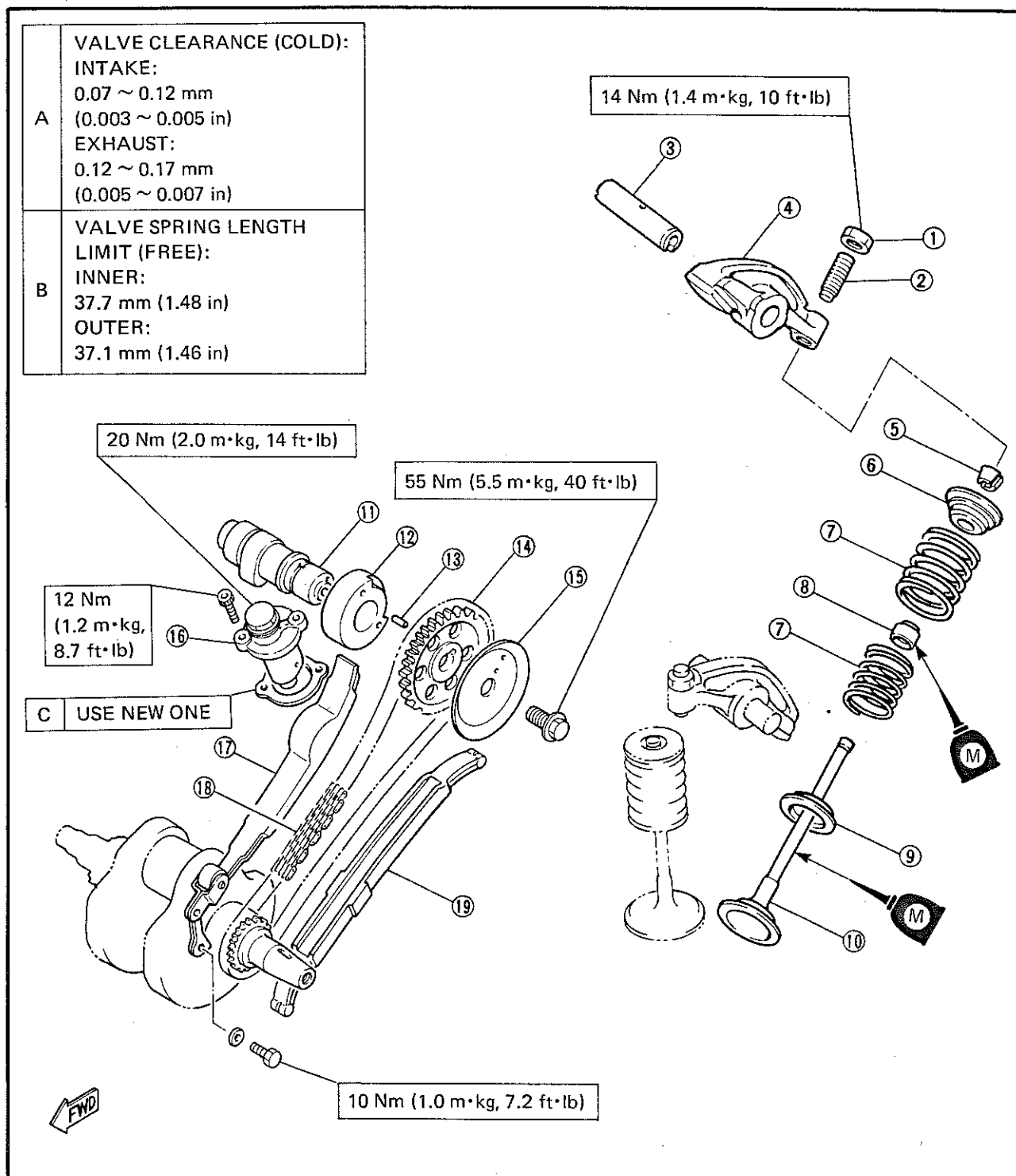
- | | |
|--------------------------------|----------------------|
| ① Side cover (Cylinder head) | ⑨ Cam sprocket cover |
| ② Tappet cover (Intake) | ⑩ Longer bolt |
| ③ O-ring | ⑪ Shorter bolt |
| ④ Tappet cover (Exhaust) | ⑫ Lock washer |
| ⑤ Spark plug | ⑬ Retainer |
| ⑥ Oil baffle plate (Rear only) | ⑭ Dowel pin |
| ⑦ Gasket | ⑮ Cylinder (Rear) |
| ⑧ Cylinder head (Rear) | |

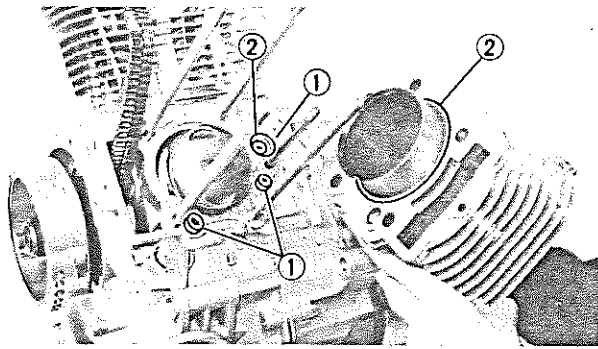
A	CYLINDER HEAD WARP LIMIT: 0.03 mm (0.0012 in)
B	TYPE/MANUFACTURER: BPR7ES (N.G.K.) or W22EPR-U (N.D.)
C	SPARK PLUG GAP: 0.7 ~ 0.8 mm (0.028 ~ 0.031 in)





- | | | |
|------------------------------|-----------------------------|------------------------------|
| ① Locknut (Valve adjusting) | ⑩ Valve | ⑱ Cam chain |
| ② Adjuster (Valve adjusting) | ⑪ Camshaft | ⑲ Cam chain damper (Exhaust) |
| ③ Rocker arm shaft | ⑫ Camshaft bushing | |
| ④ Rocker arm | ⑬ Positioning pin | |
| ⑤ Valve retainers | ⑭ Cam sprocket | |
| ⑥ Valve spring seat | ⑮ Oil baffle plate | |
| ⑦ Valve springs | (Rear only) | |
| ⑧ Oil seal | ⑯ Cam chain tensioner | |
| ⑨ Valve spring seat | ⑰ Cam chain damper (Intake) | |





2. Apply:

- 4-stroke engine oil

To the piston pin, bearing, piston ring grooves and piston skirt areas.

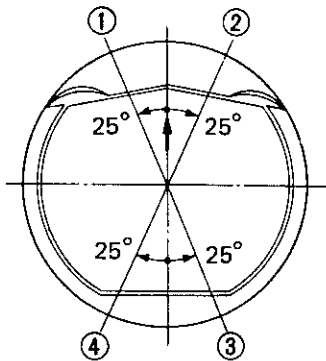
3. Install:

- Gasket (New)
- Dowel pins ①
- O-rings ②

4. Offset the piston ring end gaps as shown.

NOTE:

- Be sure to check the manufacturer's marks or numbers stamped on the rings are on the top side of the rings.
- Before installing the cylinder, apply a liberal coating of 4-stroke engine oil to the piston rings.



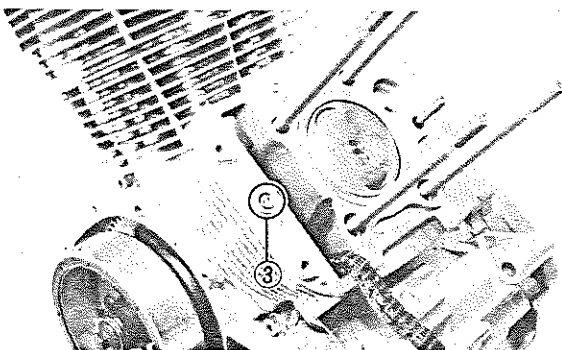
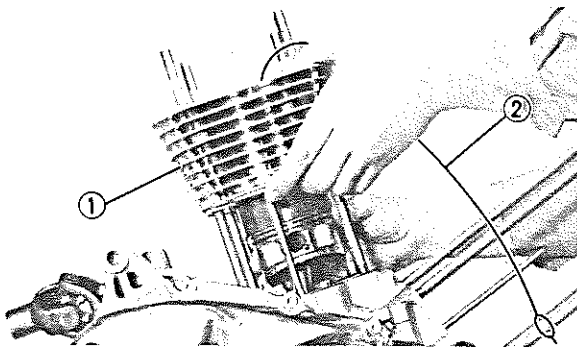
- ① Top ring
- ② Oil ring (Lower rail)
- ③ 2nd ring
- ④ Oil ring (Upper rail)

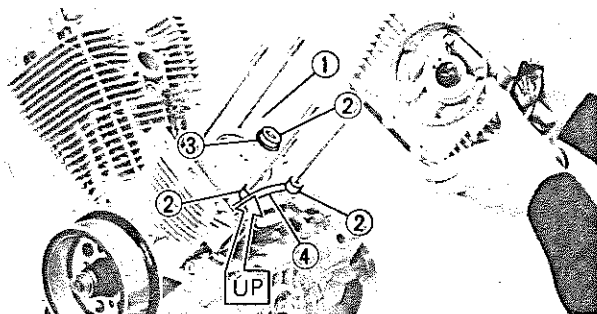
5. Install:

- Cylinder ①

NOTE:

- Install the cylinder with one hand while compressing the piston rings with the other hand.
- Tie the cam chain with a piece of mechanics wire ②, and feed it through the chain opening.
- Finger tighten the bolt ③ in this point.





6. Install:

- Gasket (New) ①
- Dowel pins ②
- O-ring ③
- Cam chain damper (Exhaust) ④

NOTE:

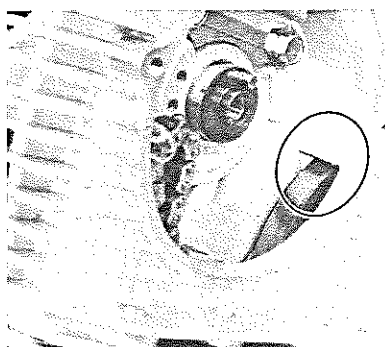
The cam chain damper should be installed with the "UP" mark upward.

7. Install:

- Cylinder head
- Washers
- Bracket (Engine mounting)

NOTE:

- Tie the cam chain so that it does not fall into the crankcase.
- The bracket with its has projected nut facing the inside.

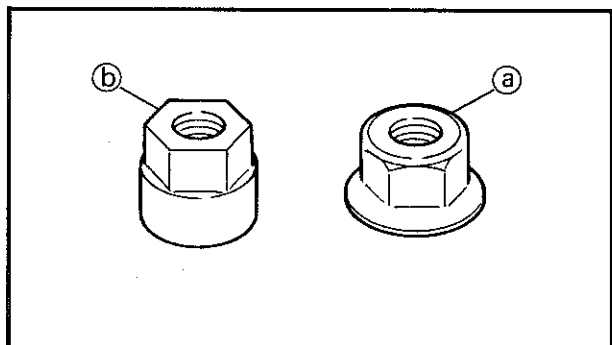
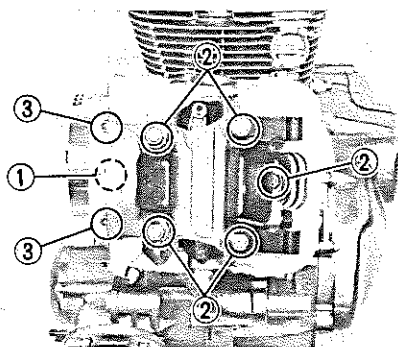


8. Tighten:

- Bolt (Cylinder) ①
- Nuts (Cylinder head) ②
- Bolts (Cylinder head) ③

NOTE:

- Before tightening the bolts and nuts, make sure that the top end of cam chain damper engages with slot in the cylinder head.
- Tighten the bolts and nuts in this stage, using a crisscross pattern.
- Do not forget to tighten the bolt (Cylinder).
- There are two different nuts (Cylinder head) used on this model. The shorter nuts ① go on the rear cylinder, the taller nuts ② on the front cylinder.



Bolt (Cylinder):

10 Nm (1.0 m·kg, 7.2 ft·lb)

10 mm Nuts (Cylinder Head):

35 Nm (3.5 m·kg, 25 ft·lb)

8 mm Nut (Cylinder Head):

20 Nm (2.0 m·kg, 14 ft·lb)

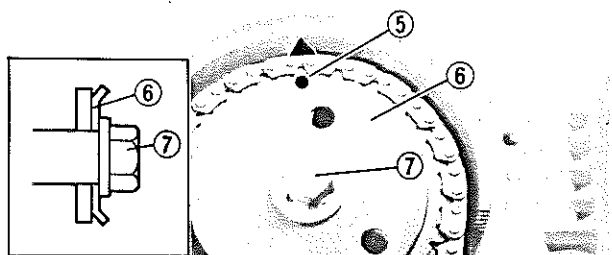
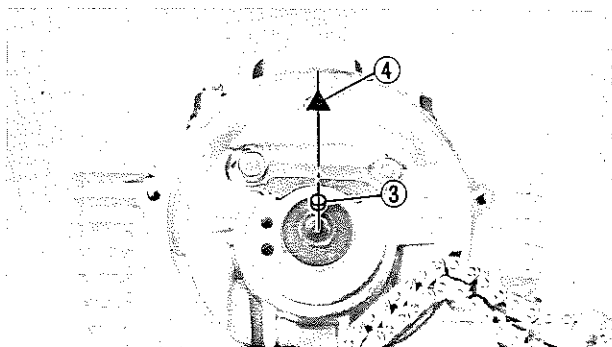
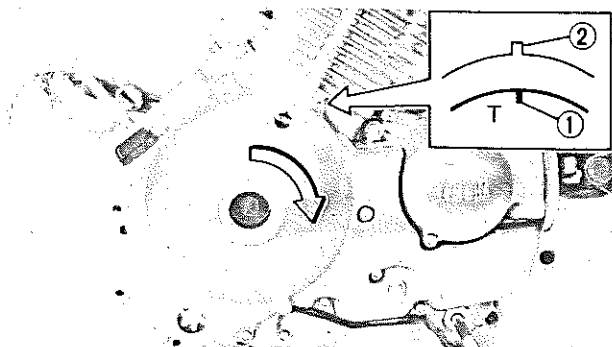
Bolts (Cylinder Head):

20 Nm (2.0 m·kg, 14 ft·lb)



9. Install:

- Dowel pin (Cam sprocket positioning)
- Oil baffle plate (Rear cylinder only)
- Cam sprocket

**Cam sprocket installing steps:**

- Temporarily install the crankcase cover (Left) in this stage.
- Remove the timing plug and crankcase cover plate.
- Turn the crankshaft clockwise with wrench.
- Align the "T" mark (1) on the rotor with the stationary pointer (2) on the crankcase cover.
- Install the dowel pin (Cam sprocket positioning) securely.

CAUTION:

Do not fall the pin during the sprocket installation.

- Align the positioning pin (3) on the camshaft with the stationary pointer (4) on the rear cylinder head.
- Install the cam sprocket with the punched mark (5) facing outward.
- Install the oil baffle plate (Rear cylinder only) (6) and sprocket bolt (7), and finger tighten the bolt.

NOTE:

The bented side of oil baffle plate must face inward.

- Force the camshaft clockwise to remove the cam chain slack.
- Insert your finger into the cam chain tensioner hole, and push the cam chain damper inward.
- While pushing the cam chain damper, be sure the cam sprocket punch mark aligns with the stationary pointer on the cylinder head at TDC.
- If marks are aligned, tighten the cam sprocket bolt.

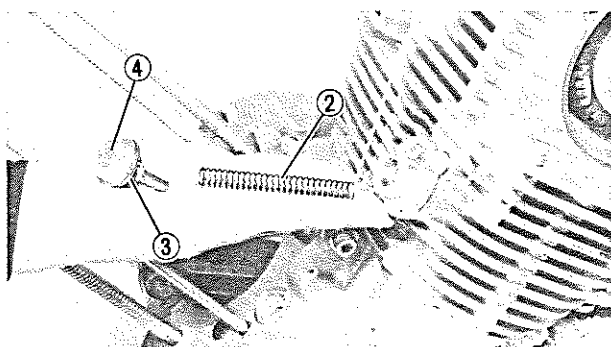
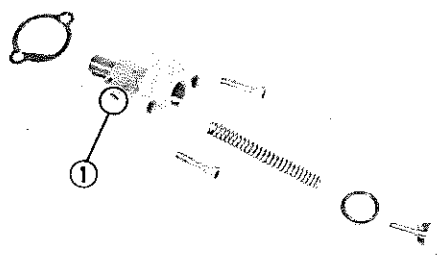


Cam Sprocket:
55 Nm (5.5 m·kg, 40 ft·lb)

- If marks do not align, change the meshing position of sprocket and chain.

10. Install:

- Gasket (New)
- Cam chain tensioner



Cam chain tensioner installation steps:

- Remove the tensioner end cap bolt and spring.
- Release the cam chain tensioner one-way cam ①.
- Install the tensioner with a new gasket into the cylinder.



Cam Chain Tensioner Body:
12 Nm (1.2 m·kg, 8.7 ft·lb)

- Install the tensioner spring ②, copper washer ③ and end cap bolt ④.



End Bolt (Cam Chain Tensioner):
20 Nm (2.0 m·kg, 14 ft·lb)

11. Adjust:

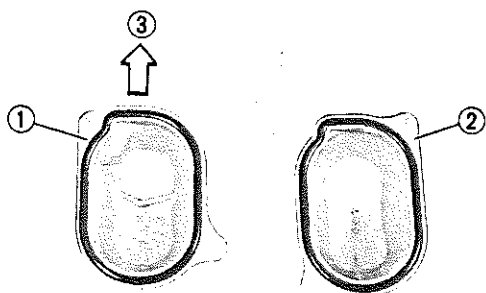
- Valve clearance

Refer to "CHAPTER 2. VALVE CLEARANCE ADJUSTMENT" section.



Intake Valve (Cold):
0.07 ~ 0.12 mm
(0.003 ~ 0.005 in)

Exhaust Valve (Cold):
0.12 ~ 0.17 mm
(0.005 ~ 0.007 in)



12. Install:

- O-rings
- Tappet cover (Intake) ①
- Tappet cover (Exhaust) ②
- Cam sprocket cover

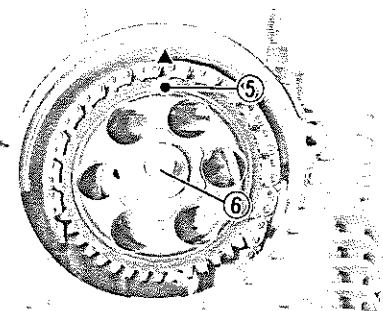
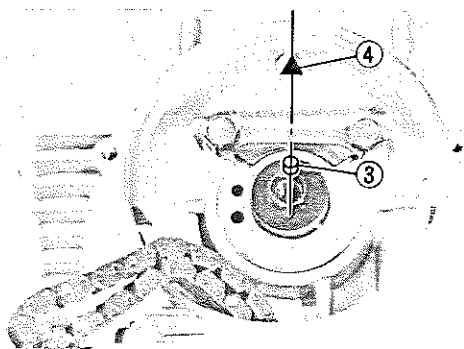
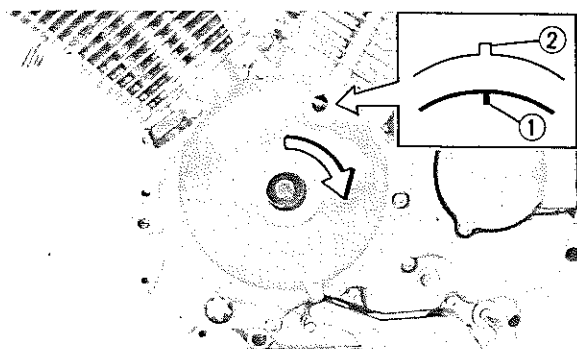
NOTE:

- Inspect the O-rings. If damaged, replace them.
- Install the intake tappet cover with its ridge facing upward ③.



Tappet Covers:
10 Nm (1.0 m·kg, 7.2 ft·lb)

Cam Sprocket Cover:
10 Nm (1.0 m·kg, 7.2 ft·lb)



Front Side

When installing the front side components, repeat the rear side installation procedure. However, note the following points.

1. Install:

- Dowel pin (Cam sprocket positioning)
- Cam sprocket

Cam sprocket installing steps:

- Turn the crankshaft clockwise with wrench.
- Align the slit ① on the rotor with the stationary pointer ② on the crankcase cover.
- Install the dowel pin (Cam sprocket positioning) securely.

CAUTION:

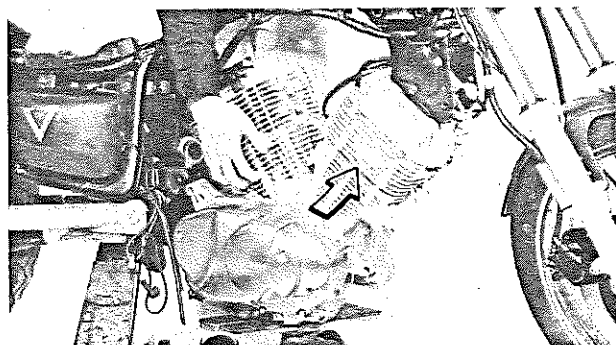
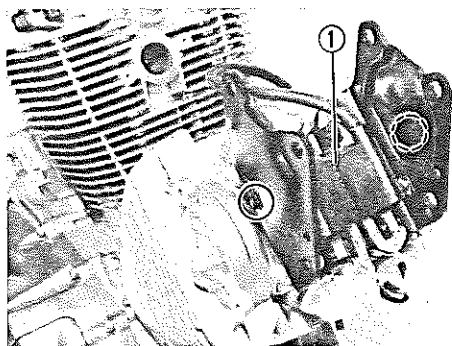
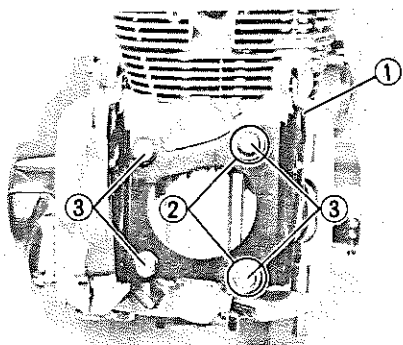
Do not fall the pin during the sprocket installation.

- Align the positioning pin ③ on the camshaft with the stationary pointer ④ on the front cylinder head.
- Install the cam sprocket with the punched mark ⑤ facing outward, and finger tighten the sprocket bolt ⑥.
- Force the camshaft clockwise to remove the cam chain slack.
- Insert your finger into the cam chain tensioner hole, and push the cam chain damper inward.
- While pushing the cam chain damper, be sure the cam sprocket punch mark aligns with the stationary pointer on the cylinder head at TDC.
- If marks are aligned, tighten the cam sprocket bolt. Install the timing plug and crankcase cover plate, and remove the crankcase cover (Left).



Cam Sprocket:
55 Nm (5.5 m·kg, 40 ft·lb)

- If marks do not align, change the meshing position of sprocket and chain.



ENGINE MOUNTING BRACKET AND IGNITION COILS

1. Install:

- Washers (Front cylinder — Bracket Inside)
- Bracket (Engine mounting) ①
- Washers (Front cylinder — Bracket Outside) ②
- Nuts (Front cylinder) ③



Engine Mounting Bracket:
55 Nm (5.5 m·kg, 40 ft·lb)

2. Install:

- Spark plugs (Front and rear cylinder)
- Bracket (Ignition coils) ①



Bracket (Ignition Coils):
7 Nm (0.7 m·kg, 5.1 ft·lb)

Spark Plugs:
20 Nm (2.0 m·kg, 14 ft·lb)

REMounting ENGINE

When remounting the engine, reverse the removal procedure. Note the following points.

1. Place the suitable stands under the engine and frame.

WARNING:

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

2. Install:

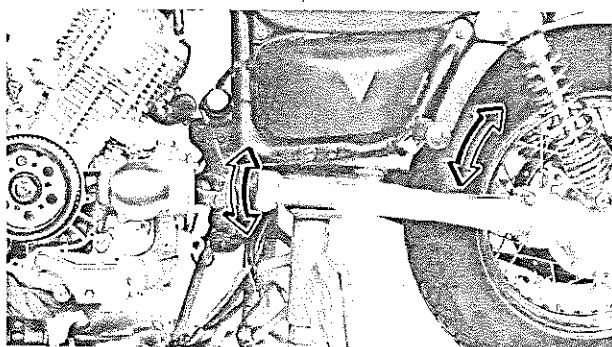
- Engine assembly
To the right side.

3. Apply:

- Molybdenum disulfide grease
To the drive shaft spline.

4. Connect:

- Universal joint
To the drive shaft spline.



5. Check:

- Shaft drive operation

Drive shaft operation checking steps:

- Temporarily install the engine mounting bolts.
- Make sure that the motorcycle is off the ground at the rear.

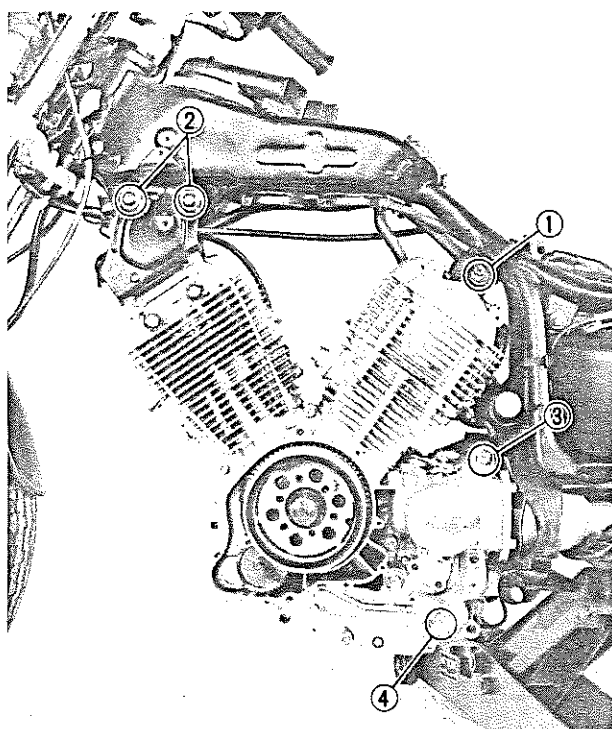
WARNING:

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

- Turn the rear wheels back and forth.
- Check the drive shaft operation. If the operation is unsmooth, reinstall the engine properly.

6. Install:

- Bolts (Rear cylinder) ①
- Bolts (Front cylinder) ②
- Bolts (Crankcase – Rear Top) ③
- Shaft (Crankcase – Rear Bottom) ④



Engine Stay (Front) and Frame:
55 Nm (5.5 m·kg, 40 ft·lb)

Engine Stay (Rear) and Frame:
55 Nm (5.5 m·kg, 40 ft·lb)

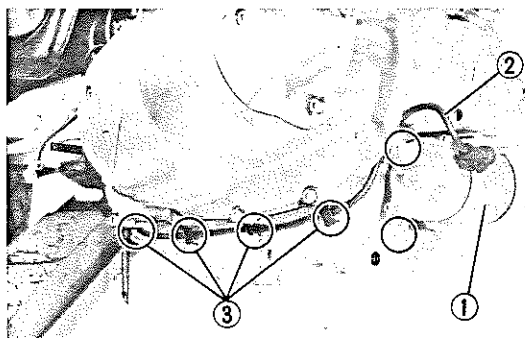
Engine Mounting (Rear – Top) and
Frame:
55 Nm (5.5 m·kg, 40 ft·lb)

7. Install:

- Starter motor ①
- Starter motor lead ②

NOTE:

- Inspect the O-ring. If damaged, replace it.
- After connecting the lead, secure the lead with clamps ③ and then tighten the bolts (Crankcase cover).

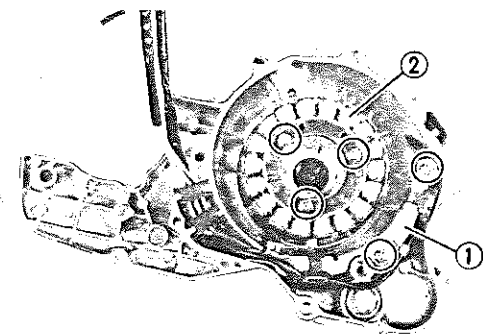


Starter Motor:

7 Nm (0.7 m·kg, 5.1 ft·lb)

Bolts (Crankcase Cover):

10 Nm (1.0 m·kg, 7.2 ft·lb)



8. Install:

- Pickup coil assembly ①
- Stator assembly ②

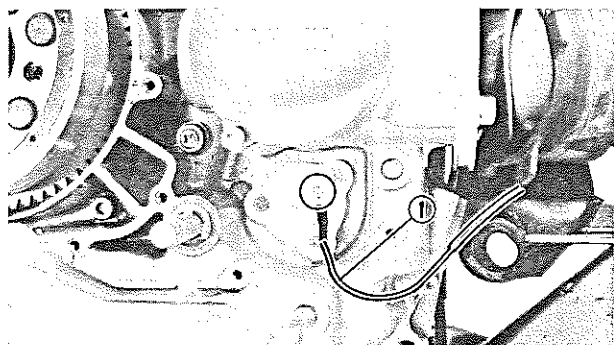


Pickup Coil Assembly:

7 Nm (0.7 m·kg, 5.1 ft·lb)

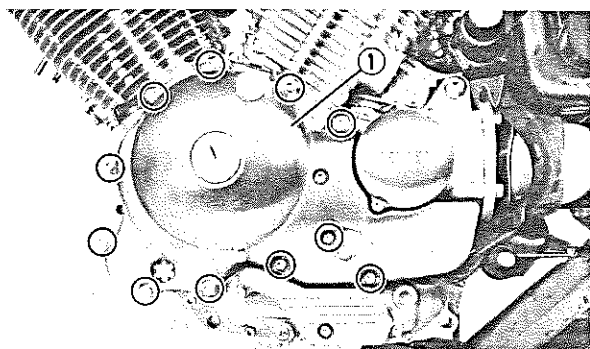
Stator Assembly:

7 Nm (0.7 m·kg, 5.1 ft·lb)



9. Connect:

- Neutral switch lead ①



10. Install:

- Gasket (New)
- Dowel pins
- Crankcase cover (Left) ①

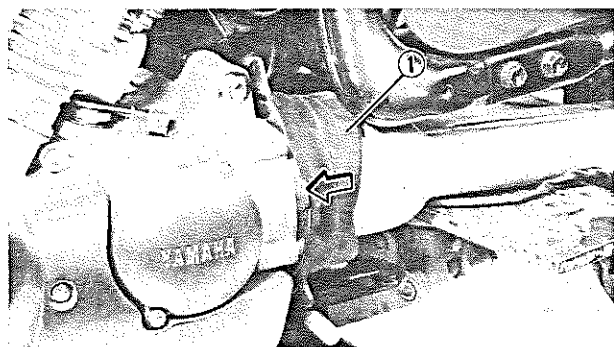
NOTE:

Tighten the bolts in this stage, using a crisscross pattern.

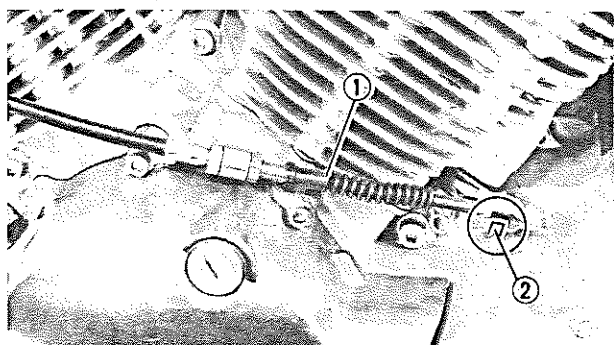


Crankcase Cover:

10 Nm (1.0 m·kg, 7.2 ft·lb)

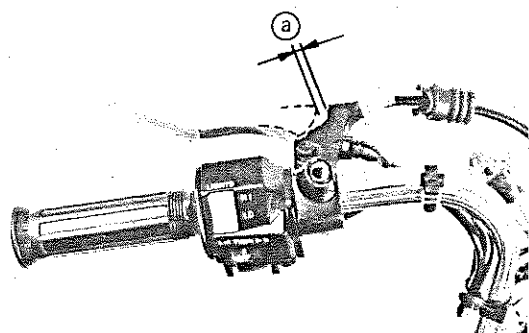


11. Pull in the rubber boot ① completely.



12. Connect:

- Clutch cable ①
- Bend the lock tab ② securely.



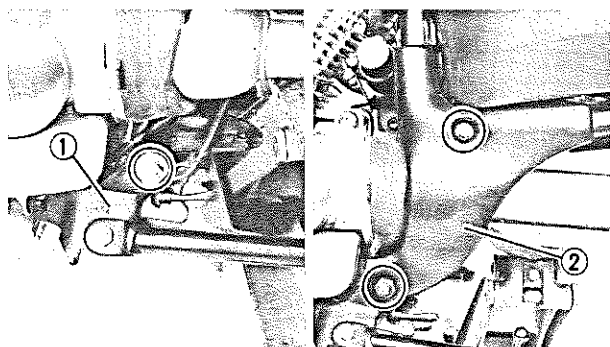
13. Adjust:

- Clutch cable free play ①

Refer to "CHAPTER 2. CLUTCH ADJUSTMENT" section.



Clutch Cable Free Play:
2 ~ 3 mm (0.08 ~ 0.12 in)



14. Install:

- Sidestand switch
- Sidestand ①
- Rear-under-side cover ②

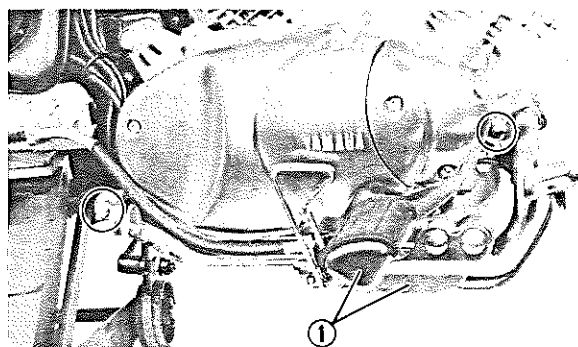
**Sidestand:**

26 Nm (2.6 m·kg, 19 ft·lb)

Rear-under-side Cover:

Top: 7 Nm (0.7 m·kg, 5.1 ft·lb)

Bottom: 20 Nm (2.0 m·kg, 14 ft·lb)



15. Install:

- Brake pedal and footrest (Right) assembly ①
- Change pedal and footrest (Left) assembly ②

**Engine Mounting (Rear – Bottom) and Frame:**

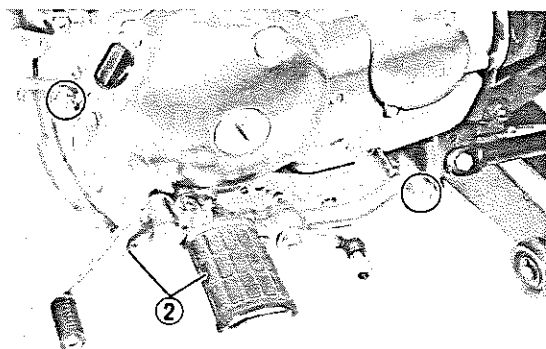
70 Nm (7.0 m·kg, 50 ft·lb)

Engine and Footrest Bar (Front):

55 Nm (5.5 m·kg, 40 ft·lb)

Engine and Footrest Bar (Rear):

55 Nm (5.5 m·kg, 40 ft·lb)

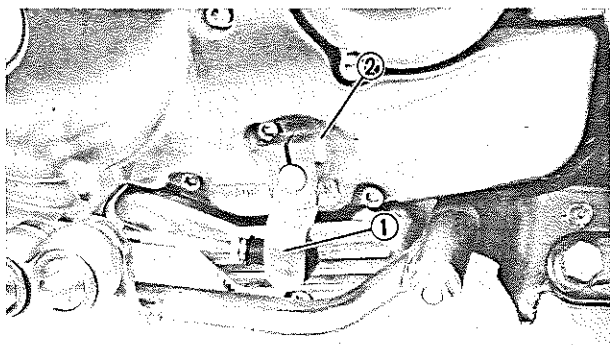


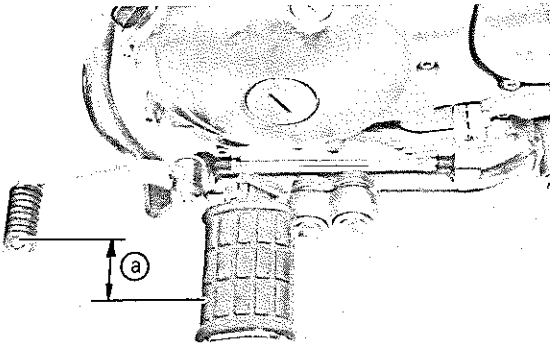
16. Install:

- Change pedal ①
- Bolt (Change pedal) ②

**Bolt (Change Pedal):**

10 Nm (1.0 m·kg, 7.2 ft·lb)





17. Adjust:

- Change pedal height ①

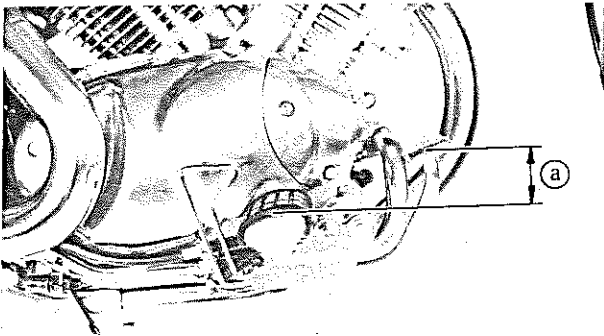
Refer to "CHAPTER 2. CHANGE PEDAL ADJUSTMENT" section.



Change Pedal Height:

50 ~ 60 mm (2.0 ~ 2.4 in)

Above the Top of the Footrest.



18. Adjust:

- Brake pedal height ①
- Brake pedal free play ②

Refer to "CHAPTER 2. REAR BRAKE ADJUSTMENT" section.

WARNING:

- Check the operation of the brake light after adjusting the brake pedal height.
- After adjusting the pedal height, adjust the brake pedal free play.



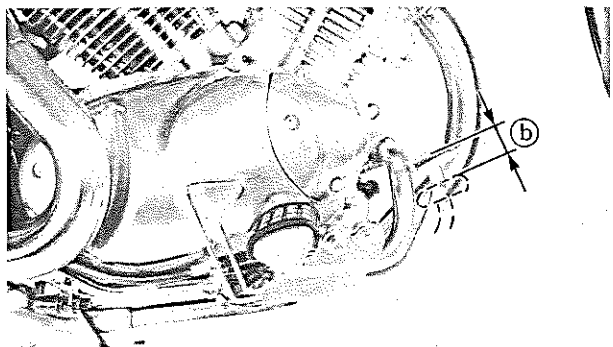
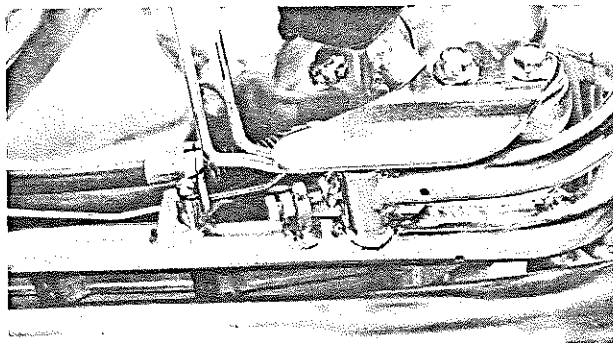
Brake Pedal Height:

38 mm (1.5 in)

Above the Top of the Footrest.

Brake Pedal Free Play:

20 ~ 30 mm (0.8 ~ 1.2 in)

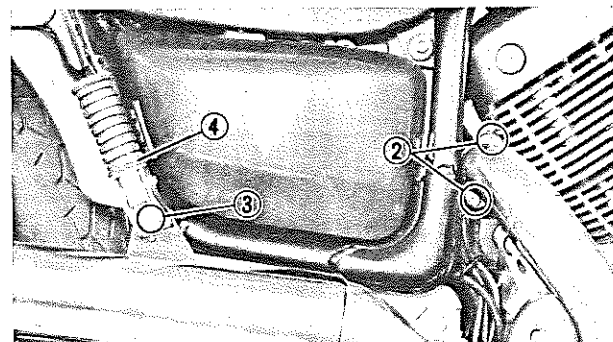


19. Tighten:

- Nuts (Front cylinder — Exhaust pipe) ①
- Bolts (Rear cylinder — Rear joint) ②
- Bolt (Muffler bracket) ③
- Rear footrest (Right) ④
- Bolt (Muffler chamber) ⑤

NOTE:

Inspect the gaskets. If damaged, replace them.



Exhaust Pipes:

20 Nm (2.0 m·kg, 14 ft·lb)

Rear Joint (Exhaust Pipe):

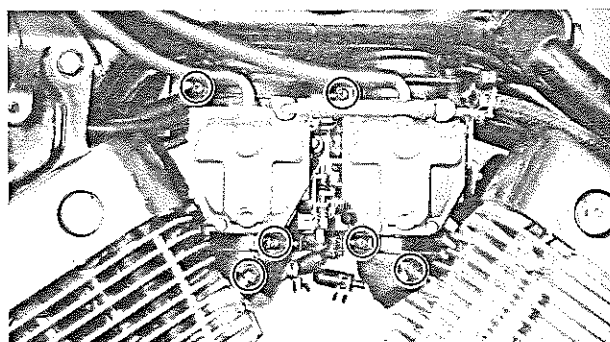
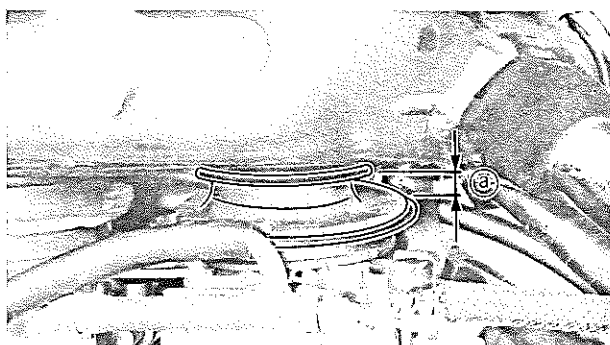
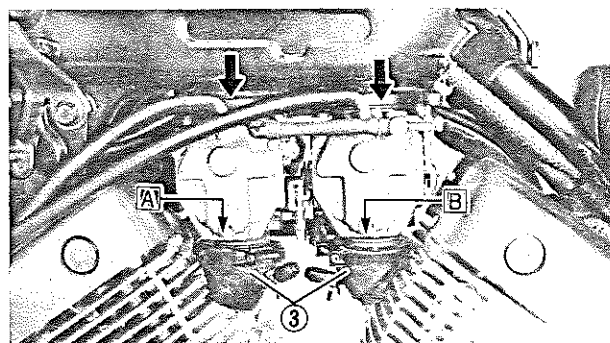
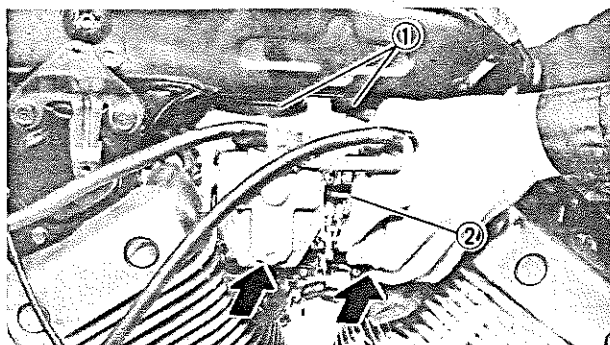
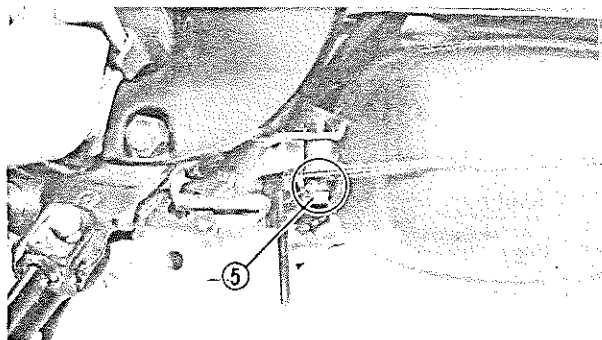
10 Nm (1.0 m·kg, 7.2 ft·lb)

Rear Footrest:

45 Nm (4.5 m·kg, 32 ft·lb)

Muffler Chamber:

20 Nm (2.0 m·kg, 14 ft·lb)



20. Install:

- Carburetor assembly

Carburetor installation steps:

- Make sure that the air cleaner joints ① have already been pushed into the air cleaner case.
- Push the carburetor assembly ② to the left side and connect the air cleaner joints.
- Install the carburetor joints (Front and rear) ③ to the carburetors.

NOTE:

- Inspect the O-rings. If damaged, replace them.
- The carburetor joints should be installed with the "A" (Front) and "B" (Rear) marks upward.
- Do not torque the carburetor joints at this point.

CAUTION:

Do not damage the O-rings during the carburetor reinstallation.

- Using a suitable tool, pull the air cleaner joints back in their original place (a).

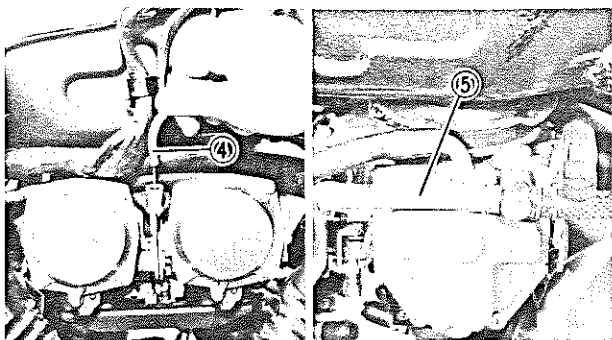
CAUTION:

Be sure not to give damages to the air cleaner joints and carburetor joints.

- Tighten the joint screws securely, and tighten the joint bolts to specification.



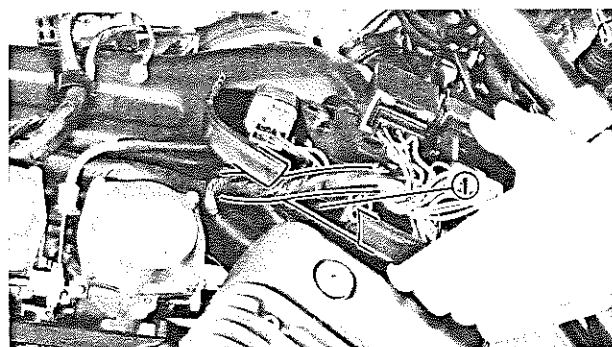
Carburetor Joints:
12 Nm (1.2 m·kg, 8.7 ft·lb)



- Connect the throttle cable (4) and fuel hose (5).

- Adjust the following items of the carburetors. Refer to "CHAPTER 2. PERIODIC INSPECTIONS AND ADJUSTMENTS" section.

- 1) Carburetor synchronization
- 2) Idle speed
- 3) Throttle cable free play

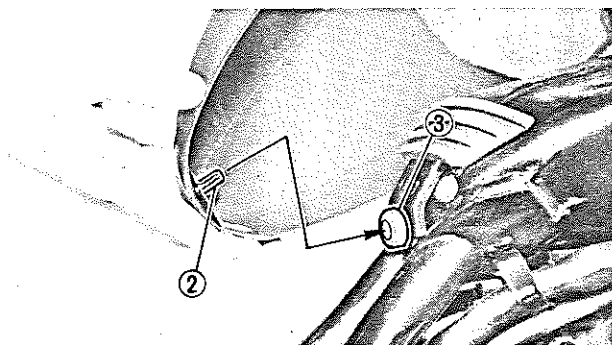


21. Install:

- Front side cover (Right)
- Front side cover (Left)
- Top cover

NOTE:

- Pass the wireharness into the cut (1) on the front side cover (Right).
- Insert the lobe (2) on the top cover into the receptacle (3) on the frame.



22. Fill:

- Crankcase

Refer to "CHAPTER 2. ENGINE OIL REPLACEMENT" section.

CAUTION:

Do not allow foreign material to enter the crankcase.



Total Amount:
3.2 L (2.8 Imp qt, 3.4 US qt)

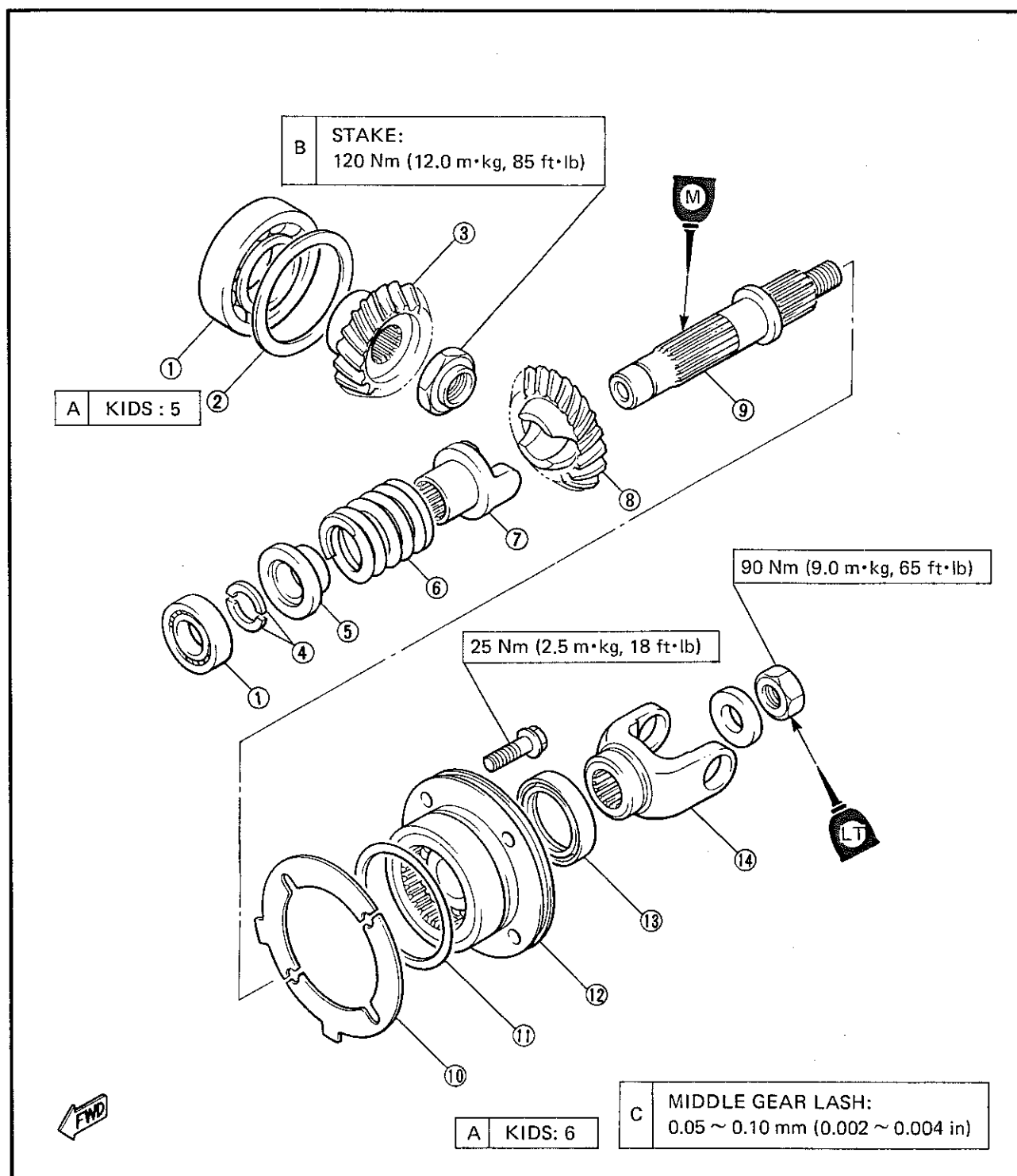
23. Inspect:

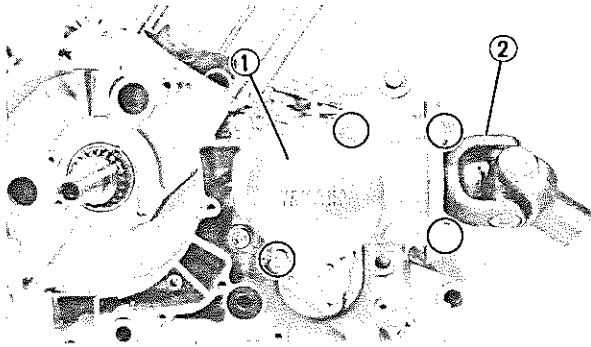
- Oil leaks
- Oil level



MIDDLE GEAR SERVICE

- | | |
|----------------------|----------------------------|
| ① Bearing | ⑨ Middle driven shaft |
| ② Thrust shims | ⑩ Shims |
| ③ Middle drive gear | ⑪ O-ring |
| ④ Retainers | ⑫ Bearing housing assembly |
| ⑤ Holder | ⑬ Oil seal |
| ⑥ Damper spring | ⑭ Universal joint |
| ⑦ Damper cam | |
| ⑧ Middle driven gear | |



**REMOVAL****Middle Driven Gear****1. Remove:**

- Middle gear case ①
- Middle driven gear assembly ②

Refer to "ENGINE REMOVAL – MIDDLE DRIVEN GEAR" section.

DISASSEMBLY**Middle Driven Shaft****1. Attach:**

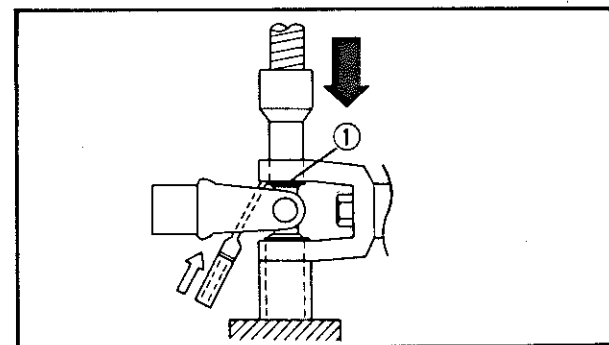
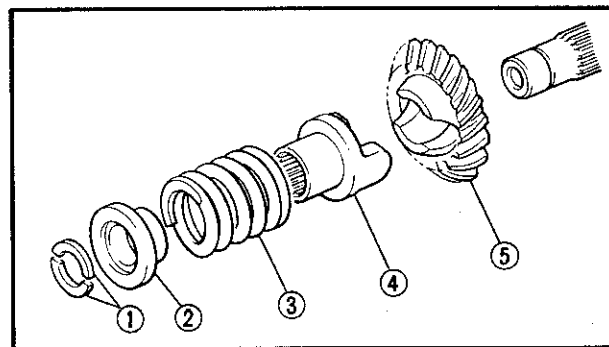
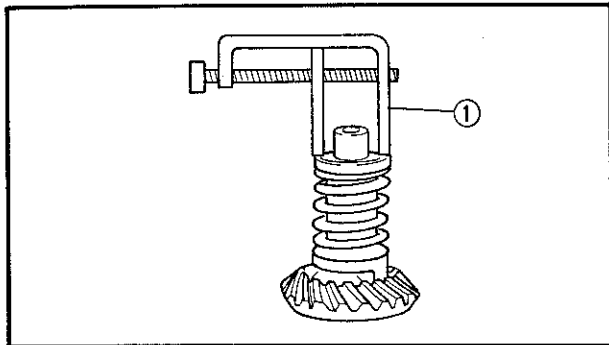
- Damper Spring Compressor ① (90890-04090)

2. Position:

- Middle driven shaft assembly
Onto a Hydraulic Press.

3. Compress the damper spring on the middle driven gear assembly.**4. Remove:**

- Retainers ①
- Holder ②
- Damper spring ③
- Damper cam ④
- Middle driven gear ⑤

**5. Remove:**

- Universal joint

Universal joint removal steps:

- Remove the circlips ①.
- Place the U-joint in a press.
- With a suitable diameter pipe beneath the yoke, press the bearing into the pipe as shown.

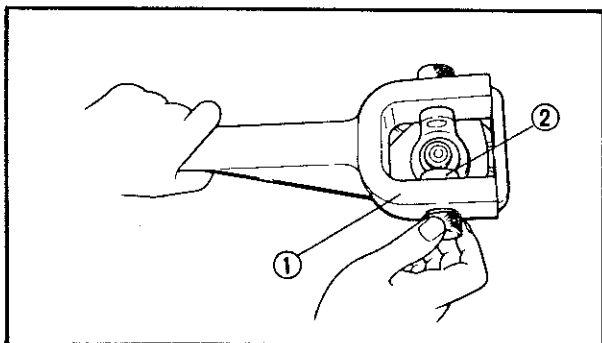
NOTE: _____

It may be necessary to lightly tap the yoke with a punch.

- Repeat the steps for the opposite bearing.
- Remove the yoke.

NOTE: _____

It may be necessary to lightly tap the yoke with a punch.



6. Attach:

- Universal Joint Holder ① (90890-04062)
 - Attachment ② (90890-33291)
- Onto the universal joint yoke.

7. Remove:

- Nut (Middle driven shaft)
- Washer
- O-ring
- Yoke
- Middle drive shaft

From the bearing housing assembly.

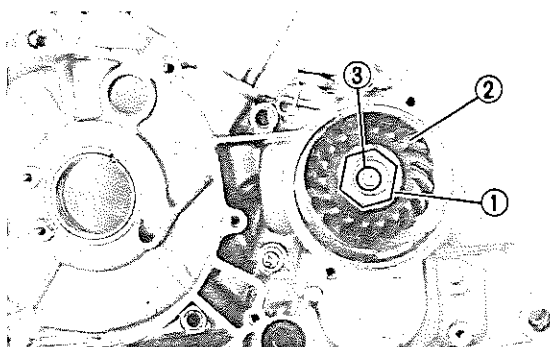
Lightly tap the end of the axle with soft hammer.

Middle Drive Shaft

NOTE:

Before removing the middle drive shaft, separate the crankcase.

1. Secure the middle drive shaft in a vice or other support.



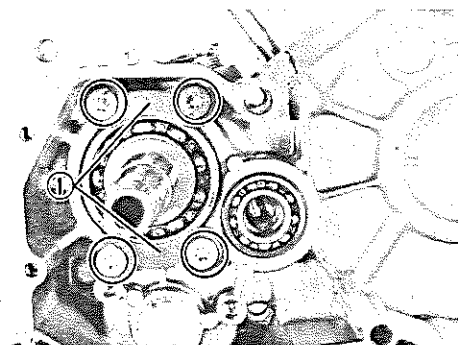
2. Flatten the punched portion of the middle drive gear nut using the drift punch.

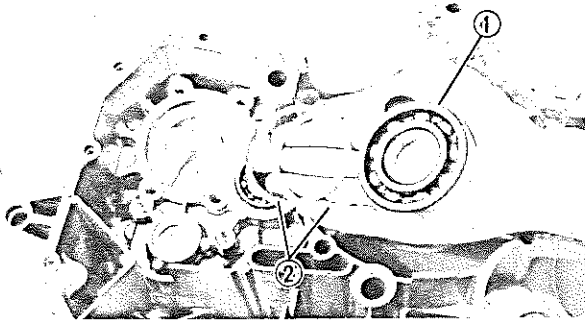
3. Remove:

- Nut (Middle drive gear) ①
- Middle drive gear ②
- Middle drive axle ③

4. Remove:

- Bearing retainers ①
- Use #30 Torx Driver (90890-05245).





5. Remove:

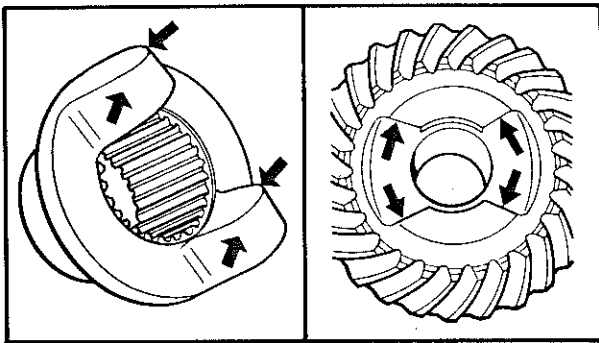
- Bearing ①
- Shim ②

INSPECTION

Middle Drive Shaft

1. Inspect:

- Gear teeth
Pitting/Galling/Wear → Replace middle gear as a set.
- Bearing
Pitting/Damage → Replace.



Middle Driven Shafts

1. Inspect:

- Damper cam surfaces
Wear/Scratches → Replace damper and middle driven gear as a set.

2. Inspect:

- Damper spring
Damage/Cracks → Replace.

3. Inspect:

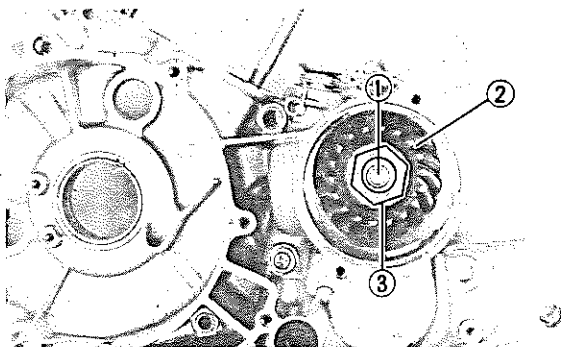
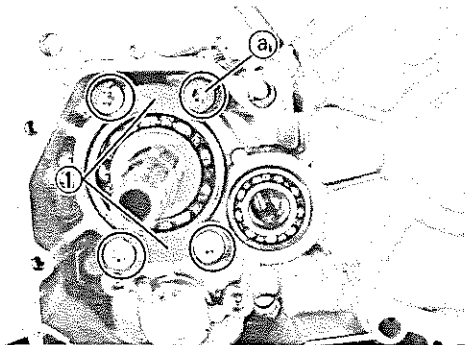
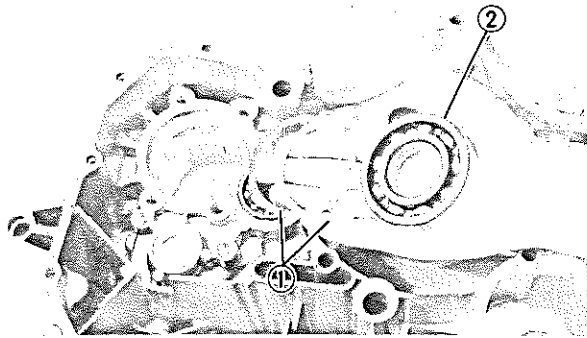
- Gear teeth
Pitting/Galling/Wear → Replace middle gear as a set.

4. Inspect:

- O-ring
• Oil seal
Damage → Replace.
- Bearings
Pitting/Damage → Replace.

5. Check:

- U-joint movement
Roughness → Replace U-joint.



REASSEMBLY

Middle Drive Shaft

1. Install:

- Shim ①
- Bearing ②

2. Install:

- Bearing retainers ①
- Use #30 Torx Driver (90890-05245).

CAUTION:

The shorter bolt ① (1 pc.) should be installed as shown. If the longer bolt is installed, the clutch push axle is hold down.



Bearing Retainer:
25 Nm (2.5 m·kg, 18 ft·lb)
LOCTITE®

3. Lock the screw head ② with drift punch.

4. Install:

- Middle drive axle ①
- Middle drive gear ②
- Nut (Middle drive gear) ③

Secure the middle drive axle in a vice or other support.



Nut (Middle Drive Gear):
120 Nm (12.0 m·kg, 85 ft·lb)

5. Lock the threads with drift punch.

Middle Driven Shaft

1. Apply:

- Lithium base grease
- To the O-ring and oil seals.

2. Install:

- Bearing housing assembly
 - Yoke
 - O-ring
 - Washer
 - Nut (Middle driven shaft)
- To the middle driven shaft.

3. Attach:

- Universal Joint Holder (90890-04062)
 - Attachment (90890-33291)
- Onto the universal joint yoke.



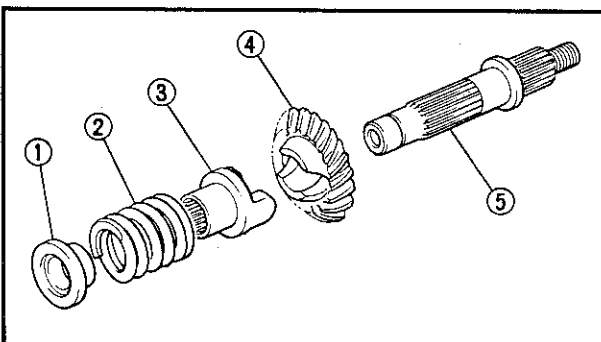
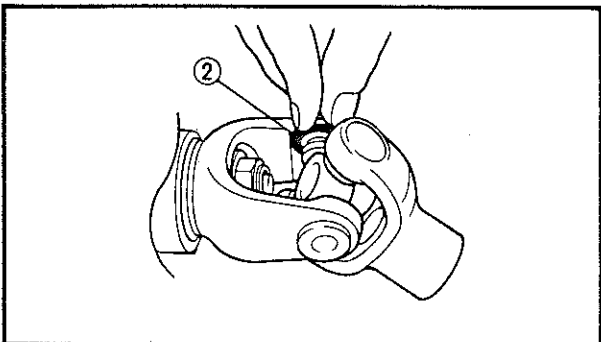
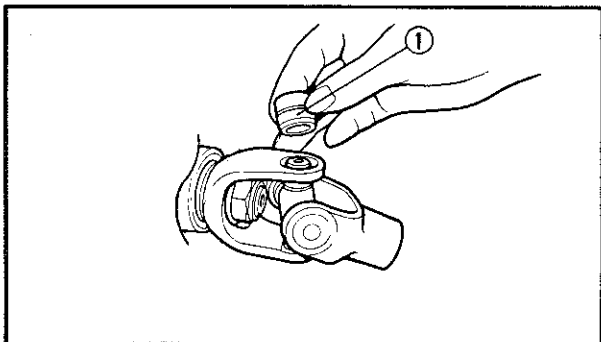
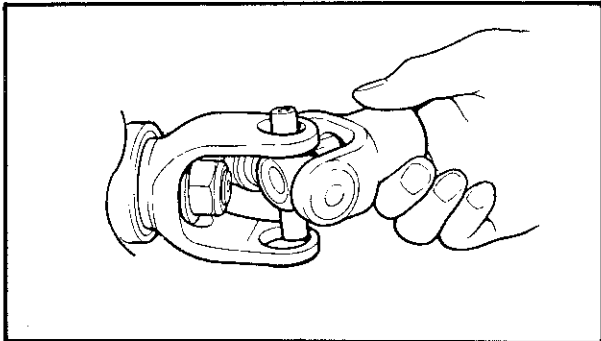
4. Tighten:

- Nut (Middle driven shaft)

Torque the nut carefully, little by little.



Nut (Middle Driven Shaft):
90 Nm (9.0 m·kg, 65 ft·lb)
LOCTITE®



5. Install:

- Universal joint

Universal joint installation steps:

- Install the opposite yoke into the U-joint.
- Apply the wheel bearing grease to the bearings.
- Install the bearing ① onto the yoke.

CAUTION:

Check each bearing. The needles can easily fall out of their races. Slide the yoke back and forth on the bearings; the yoke will not go all the way onto a bearing if a needle is out of place.

- Press each bearing into the U-joint using a suitable socket.

NOTE:

Bearing must be inserted far enough into U-joint so that circlip can be installed.

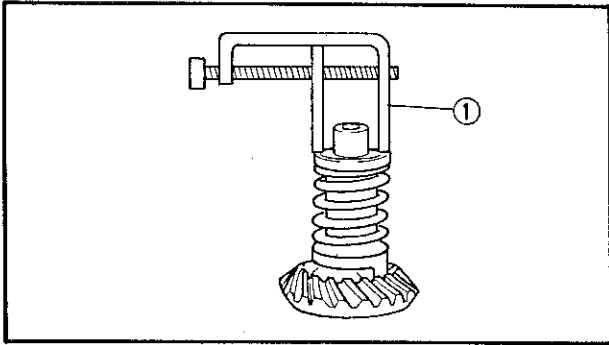
- Install the circlips ② into the groove of each bearing.

6. Apply:

- Molybdenum disulfide grease
To the middle driven shaft.

7. Install:

- Middle driven gear ①
- Damper cam ②
- Damper spring ③
- Holder ④
To the middle driven shaft ⑤.



8. Attach:
 - Damper Spring Compressor ① (90890-04090)
9. Position:
 - Middle driven shaft assembly
Onto a Hydraulic Press.
10. Compress the damper spring on the holder.
11. Install:
 - Retainers
Into the middle driven shaft groove.

INSTALLATION

Middle Driven Gear

1. Install:
 - Middle driven gear assembly
 - Middle gear case

NOTE: _____

Before tightening the bolts;

- 1) Adjust the gear lash of the middle gear.
Refer to "ADJUSTMENT" section.
- 2) Check the middle driven gear operation.



Bolts (Middle Driven Gear Assembly):
25 Nm (2.5 m·kg, 18 ft·lb)

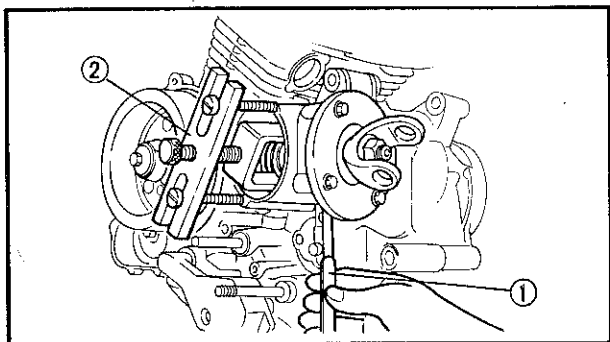
ADJUSTMENT

Middle Gear Gear Lash Adjustment

1. Remove:
 - Middle gear case
 - Bolts (Bearing housing)

NOTE: _____

After removing the bolts, pull out the middle driven shaft assembly slightly.



2. Install:

- Bolts (Four — Bearing housing)
On the bearing housing.
Finger-tighten the bolts.

NOTE:

Clearance between the crankcase and bearing housing should be about 2 mm. Measure gap with Feeler Gauge ①.

3. Attach:

- Middle Drive Gear Holder ② (90890-04086) and Attachment (90890-04091)
Onto the crankcase.

CAUTION:

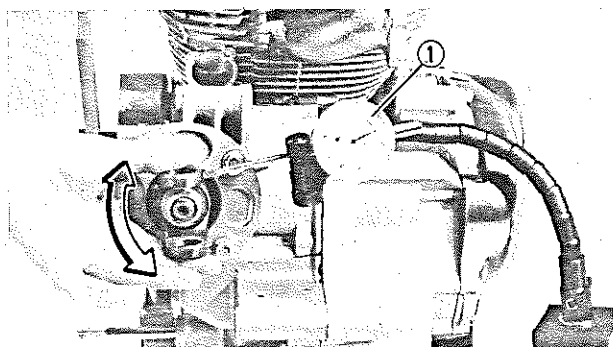
Finger tighten the bolt until it holds the middle drive gear. Otherwise, the drive gear will be damaged.

4. Position:

- Dial Gauge (90890-03097) ①
On the outside edge of U-joint.

NOTE:

Be sure the gauge is positioned over the center-line of the yoke bearing hole.



5. Rotate:

- U-joint
Move it gently back and forth.

6. Measure:

- Gear lash
Over specification → Follow next steps.
Under or same specification → Incorrect; check for faulty parts and/or reassemble bearing housing.



Middle Gear Gear Lash:
0.05 ~ 0.10 mm (0.002 ~ 0.004 in)

NOTE:

Check the gear lash at four positions. Rotate the U-joint 90 degrees each time and repeat the gear lash check.

7. Tighten:

- Bolt (Four)
Tighten carefully one-thread turn only.
Push in bearing housing and hold in position while tightening bearing housing bolts.

**CAUTION:**

Do not overtighten bearing housing bolts or you may obtain too little gear lash and cause damage to gears. If over tightened, loosen the 4 bolts so that crankcase/bearing housing clearance is about 2 mm (0.08 in) and repeat all previous steps.

8. Repeat steps 5 and 6 until correct gear lash is achieved.

**Middle Gear Lash:**

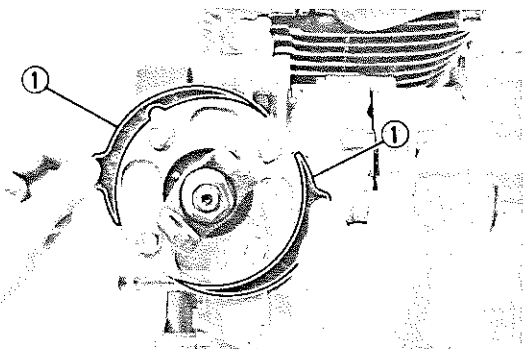
0.05 ~ 0.10 mm (0.002 ~ 0.004 in)

9. Measure:

- Crankcase/bearing housing clearance
Use a Feeler Gauge.

10. Select:

- Shim(s) ①

**Example: Selection of the drive pinion gear shim;**

- If the clearance is 0.46 mm.
- The shim can only be selected in 0.05 mm increments, round off hundredths digit and select appropriate shim(s).

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

- In the example above, the measured shim thickness is 0.46 mm. The chart instructs you, however, to round off the 6 to 5. Thus you should use 0.15 mm and 0.30 mm shims.
- Shim sizes are supplied in the following thickness.

**Middle Driven Gear Shim**

Thickness (mm)	0.10	0.15	0.20
	0.30	0.40	0.50



11. Tighten:

- Bolts (Bearing housing)



Bolts (Bearing Housing):
25 Nm (2.5 m·kg, 18 ft·lb)

12. Measure:

- Gear lash

MIDDLE DRIVE GEAR AND DRIVEN GEAR POSITIONING**NOTE:**

Gear positioning is necessary when any of the following parts are replaced.

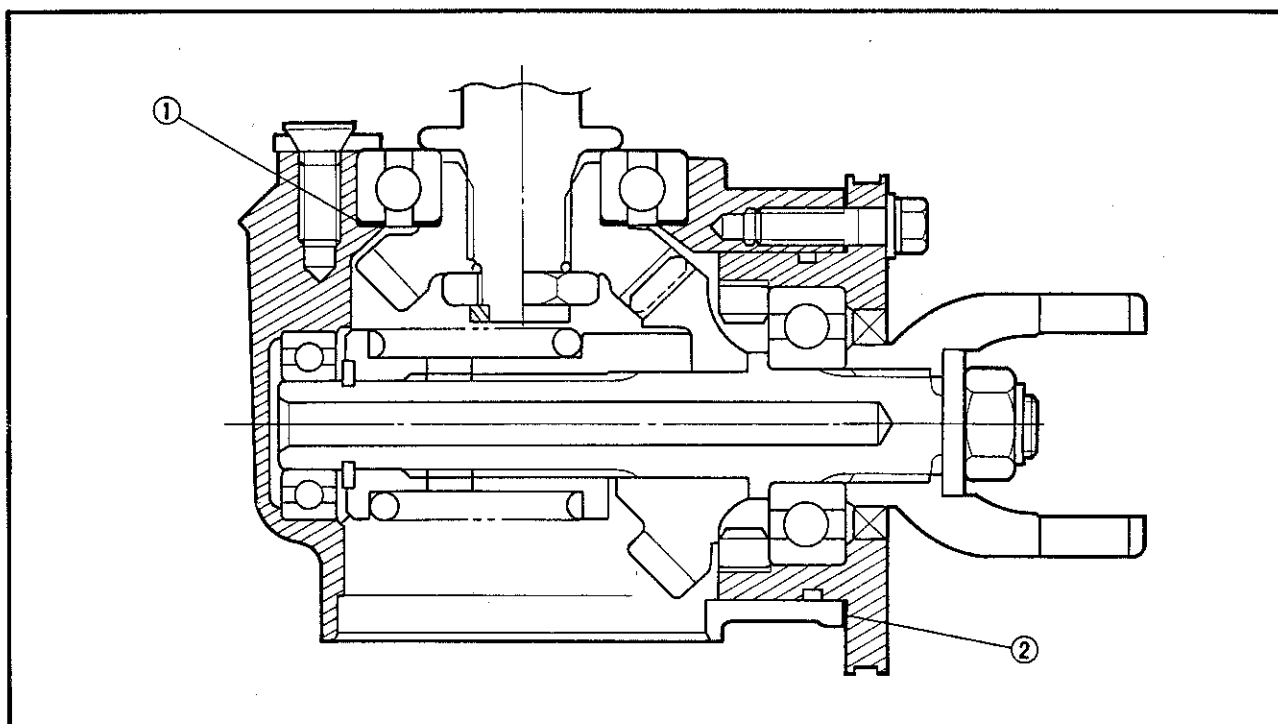
- Crankcase assembly
- Middle drive shaft
- Bearing

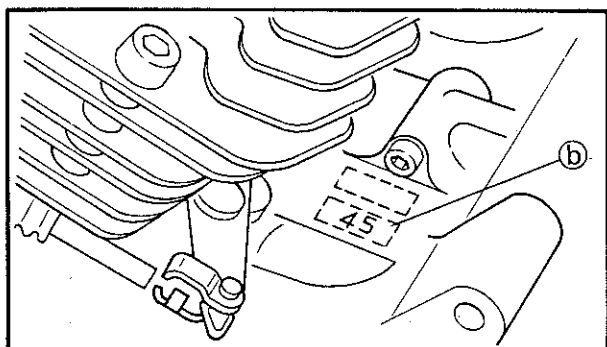
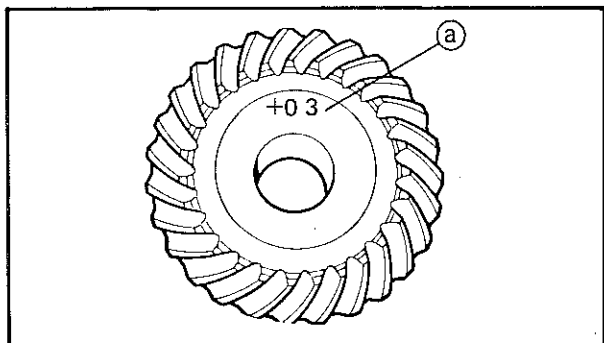
1. Select:

- Middle drive gear shim ①

NOTE:

Select the middle driven gear shim ② by calculating out the middle drive gear shim ① and then actually measuring the gear lash.





Middle drive gear shim selection steps:

- Position middle drive gear by using shims ① with their respective thickness calculated from information marked on crankcase and drive gear end.

① Shim thickness "A" (Middle drive gear)

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

Middle Drive Gear Shim Thickness:

$$A = \textcircled{a} - \textcircled{b}$$

Where:

- ① = a numeral (usually a decimal number) on the drive gear is either added to or subtracted from "44".
- ② = a numeral (usually a decimal number) on the crankcase is either added to or subtracted from "43.5".

Example:

- 1) If the drive gear is marked "+03"

..... ① is 44.03

- 2) If the crankcase is marked "45"

..... ② is 43.45

$$A = 44.03 - 43.45$$

$$= 0.58$$

- 3) Therefore, shim thickness is 0.58 mm.

Shim sizes are supplied in following thickness:



Middle Drive Gear Shim

Thickness (mm)	0.15	0.20
	0.30	0.40
	0.50	

Because shims can only be selected in 0.05 mm increments, round off hundred the digit and select 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 0.58 mm. The chart instructs you, however, to round off the 8 to 10.

Thus you may choose either 2 pcs. – 0.30 mm shims, or 1 pc. – 0.30 mm and 2 pcs. – 0.15 mm shims.

CHAPTER 4.

CARBURETION

CARBURETOR	H-3
REMOVAL	H-3
DISASSEMBLY	H-3
INSPECTION	H-5
ASSEMBLY	H-6
INSTALLATION	H-7
ADJUSTMENT	H-7
 AIR INJECTION (For Switzerland)	H-8
AIR INJECTION (AIR INDUCTION SYSTEM)	H-8
AIR CUT VALVE	H-8
AIR INDUCTION SYSTEM INSPECTION	H-8



CARBURETION

CARBURETOR

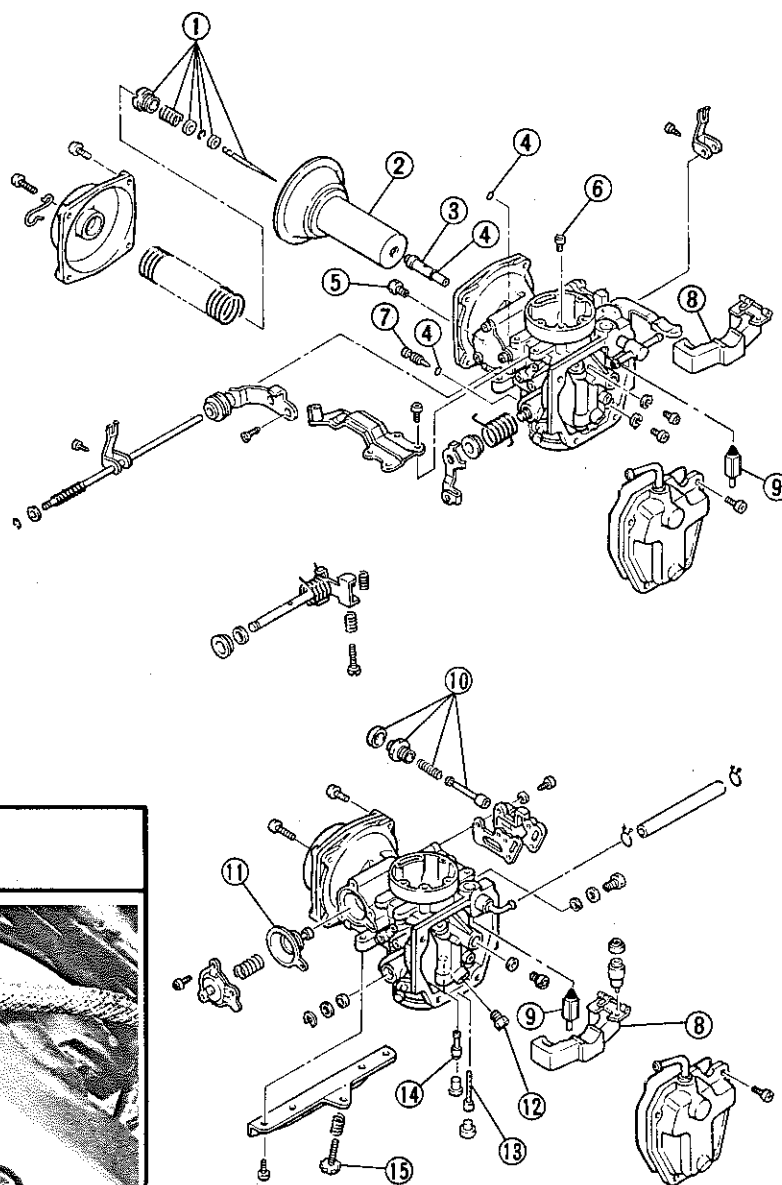
- | | |
|--------------------|----------------------------|
| ① Jet needle set | ⑨ Needle valve |
| ② Vacuum piston | ⑩ Starter plunger assembly |
| ③ Main nozzle | ⑪ Diaphragm |
| ④ O-ring | (Coasting enricher) |
| ⑤ Pilot air jet #2 | ⑫ Main jet |
| ⑥ Pilot air jet #1 | ⑬ Main bleed pipe |
| ⑦ Drain screw | ⑭ Pilot jet |
| ⑧ Float | ⑮ Throttle stop screw |

SPECIFICATIONS

MAIN JET	# 135
MAIN AIR JET	# 140
JET NEEDLE	*: 5DZ10-3
	** : 5DZ9-3
NEEDLE JET	Y-0
PILOT JET	# 35
PILOT SCREW	2 turns
STARTER JET	# 40
FUEL LEVEL	13.5 ~ 14.5 mm (0.53 ~ 0.57 in)
ENGINE IDLING SPEED	1,150 ~ 1,250 r/min

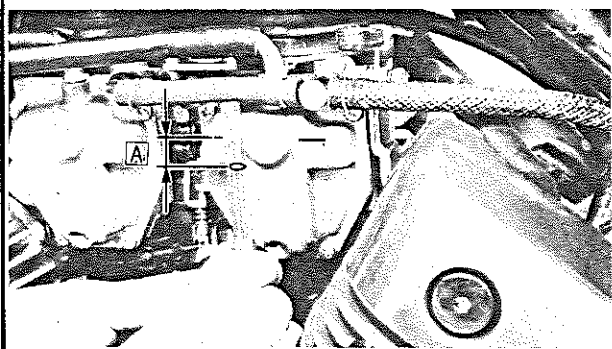
*: FRONT

*: REAR



A

FUEL LEVEL:
13.5 ~ 14.5 mm (0.53 ~ 0.57 in)



**REMOVAL**

1. Remove:

- Carburetor assembly

Refer to engine removal section.

NOTE:

The following parts can be cleaned and inspected without disassembly.

- Vacuum piston
- Starter plunger
- Coasting enricher
- Throttle stop screw

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.

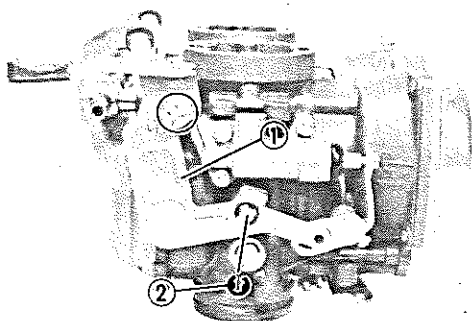
DISASSEMBLY

1. Remove:

- Starter lever ①

NOTE:

When removing the starter lever, be sure not to lose the clip ② and plastic washers that may fall out.

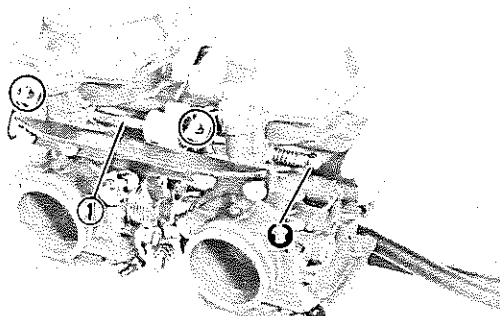


2. Remove:

- Starter link ①

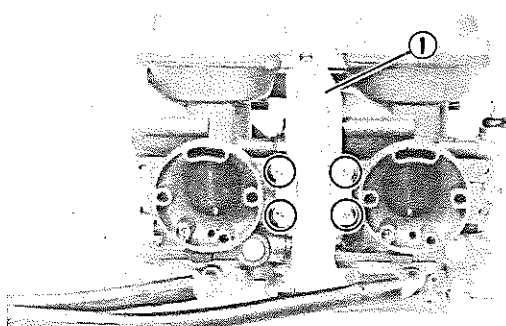
NOTE:

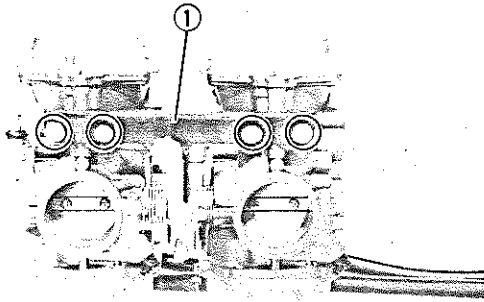
When removing the starter link, be sure not to lose the clip, spring and plastic holders that may fall out.



3. Remove:

- Stay plate (Upper) ①



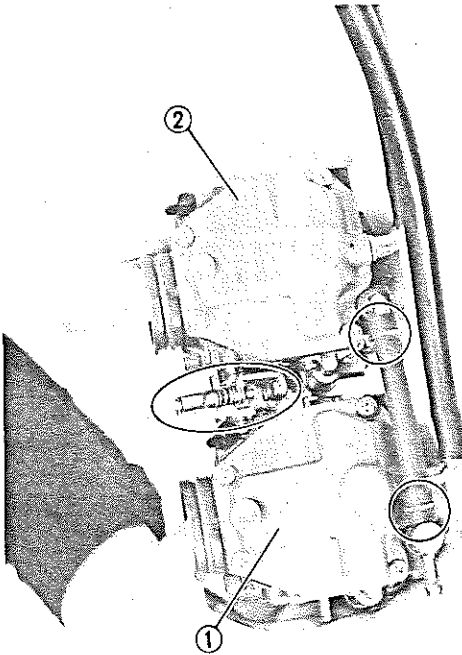


4. Remove:

- Stay plate (Lower) ①

NOTE:

Before separating the carburetors, number each carburetor for reinstallation.

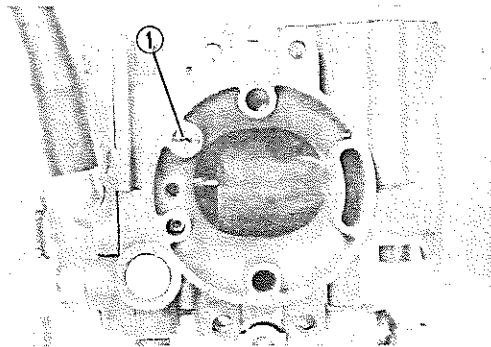


5. Separate:

- Carburetor (Rear) ①
- Carburetor (Front) ②

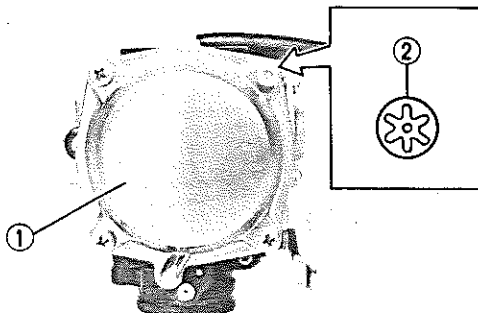
NOTE:

- When separating the carburetors, be sure not to lose the spring (Synchronization screw) that may fall out.
- The rear and front carburetors are connected by the fuel hose and synchronization screw. To separate the carburetors, pull them apart, applying an equal amount of force on each carburetor.



6. Remove:

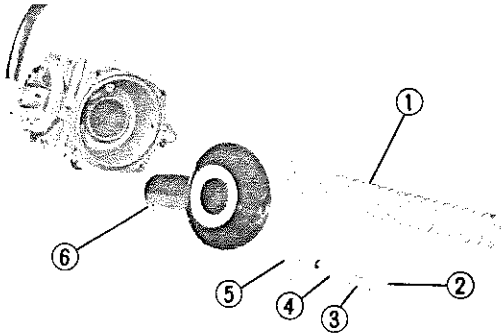
- Pilot air jet # 1 ①



7. Remove:

- Vacuum chamber cover ①
- Use the Special Torx Driver (90890-05349).

- ② Tamperproof screw

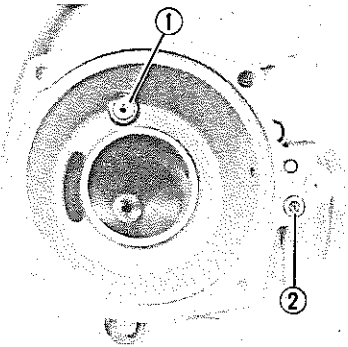


8. Remove:

- Spring (Larger) ①
- Holder (Jet needle) ②
- Spring (Smaller) ③
- Washer ④
- Jet needle assembly ⑤
- Vacuum piston ⑥

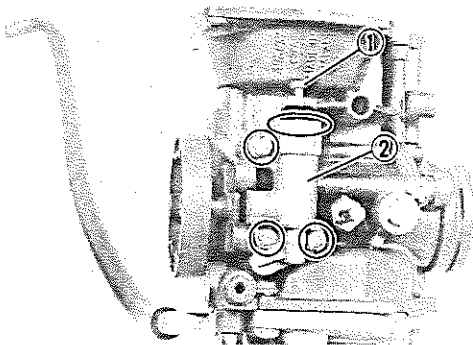
NOTE:

When removing the jet needle assembly, be sure not to lose holder, spring (Small) and washer that may fall out.



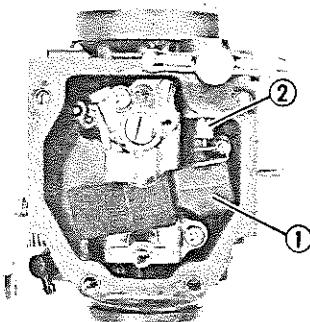
9. Remove:

- Pilot air jet # 2 ①
- O-ring ②



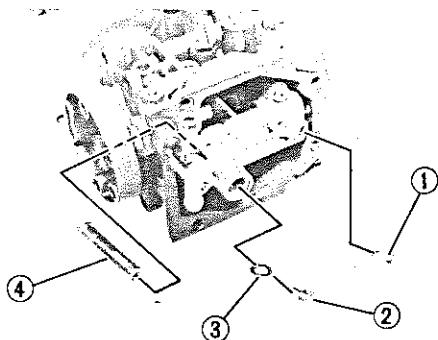
10. Remove:

- Starter plunger assembly ①
- Starter plunger body ②
- Gasket



11. Remove:

- Float chamber cover
- Float ①
- Needle valve ②

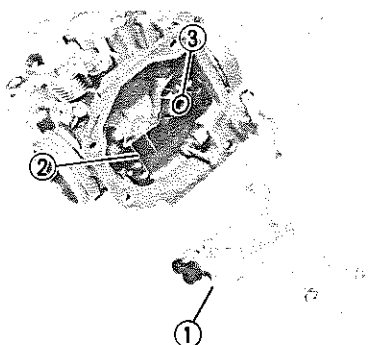


12. Remove:

- Main jet ①
- Holder (Main nozzle) ②
- Washer (Holder) ③
- Main nozzle ④

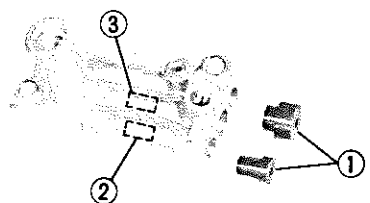
NOTE:

Move the main nozzle toward the vacuum piston.



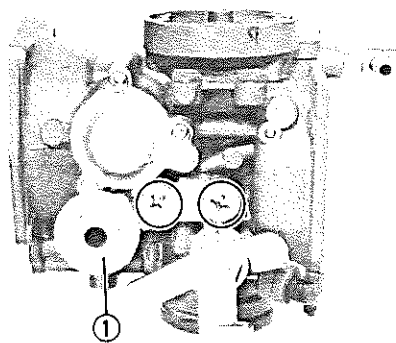
13. Remove:

- Jet block ①
- Gasket ②
- O-ring ③



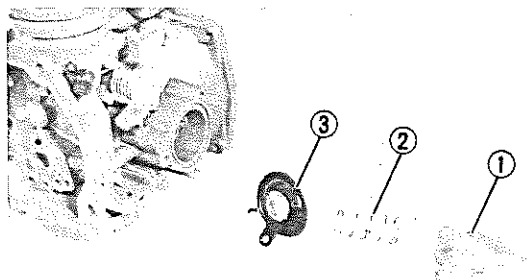
14. Remove:

- Rubber caps ①
- Pilot jet ②
- Main bleed pipe ③



15. Remove:

- Pulley bracket (Throttle cable) ①



16. Remove:

- Cover (Coasting enricher) ①
- Spring ②
- Diaphragm ③

NOTE:

When removing the cover, be sure to lose the spring that may fall out.



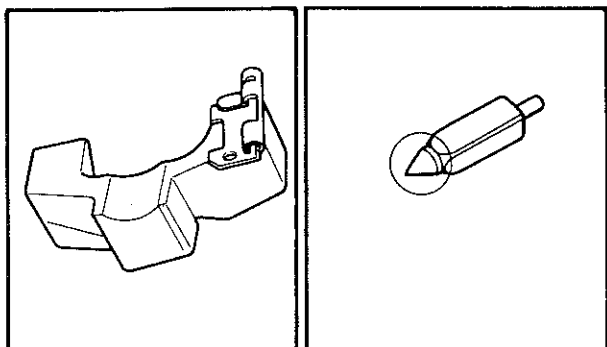
INSPECTION

1. Inspect:

- Carburetor body
Contamination → Clean.

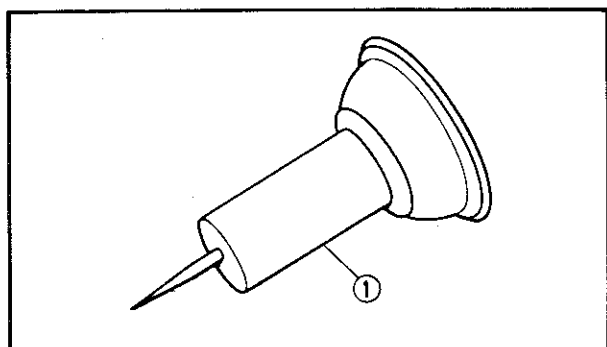
NOTE:

Use a petroleum based solvent for cleaning.
Blow out all passages and jets with compressed air.



2. Inspect:

- Float
Damage → Replace.
- Needle valve
Wear/Contamination → Replace.

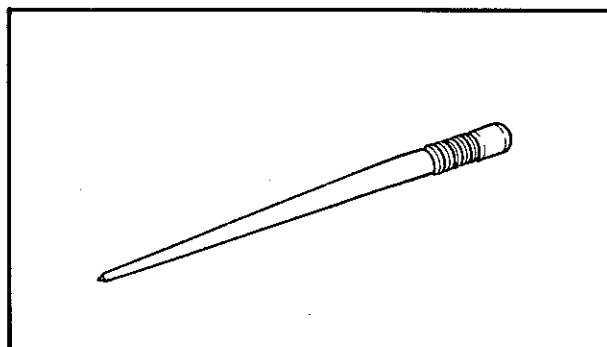


3. Inspect:

- Vacuum piston ①
Cracks → Replace.

NOTE:

If you suspect the piston valve has been damaged, check the component for cracks by pouring gasoline into the valve. If it leaks, replace with a new piston valve.

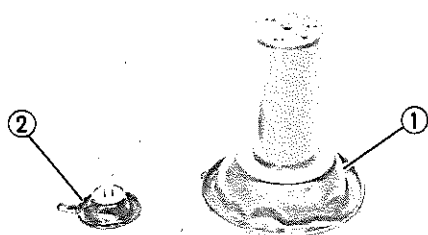


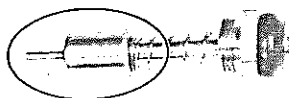
4. Inspect:

- Jet needle
Bends/Wear → Replace.

5. Inspect:

- Diaphragm (Vacuum piston) ①
- Diaphragm (Coasting enricher) ②
Tears → Replace.



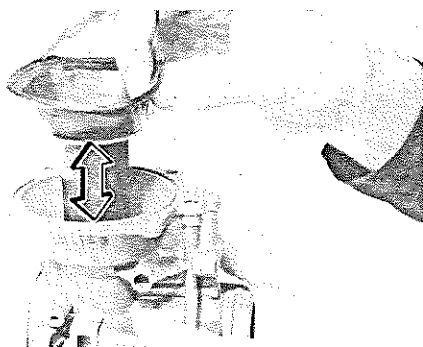


6. Inspect:

- Starter plunger
Damage/Wear → Replace.

7. Inspect:

- O-ring
- Gasket
Damage → Replace.



8. Check:

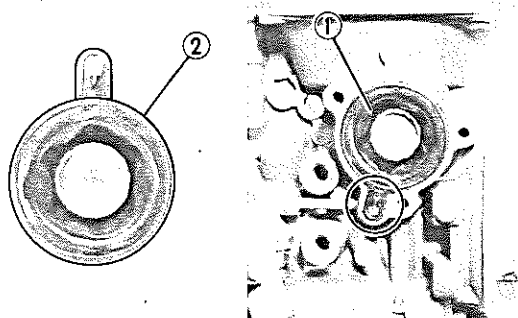
- Free movement
Stick → Replace.
Insert the vacuum piston into the carburetor body, and check for free movement.

ASSEMBLY

To assemble the carburetors, reverse the disassembly procedures. Note the following points.

CAUTION:

- Before reassembling, wash all parts in clean gasoline.
- Always use a new gasket.

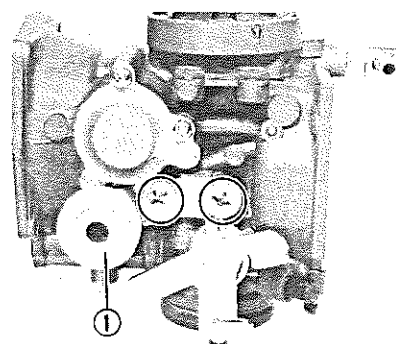


1. Install:

- Diaphragm (Coasting enricher) ①

NOTE:

- Match the tab on the diaphragm to the matching recess in the coasting enricher.
- The round lip ② side face to carburetor body.

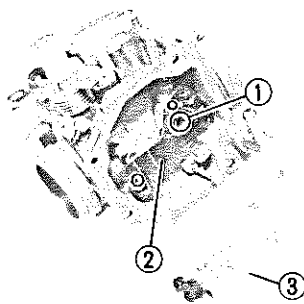


2. Install:

- Pulley bracket (Throttle cable) ①



Screws (Pulley Bracket):
5 Nm (0.5 m·kg, 3.6 ft·lb)
LOCTITE®

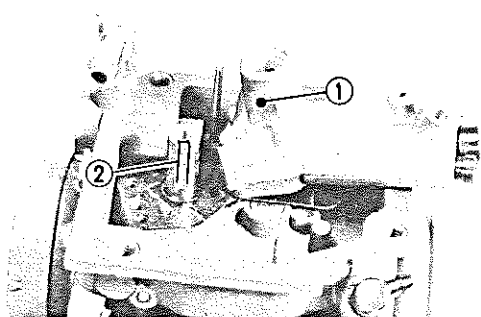


3. Install:

- O-ring ①
- Gasket (New) ②
- Jet block ③

NOTE:

Make sure the projections on the carburetor body are meshed with the holes on the gasket.

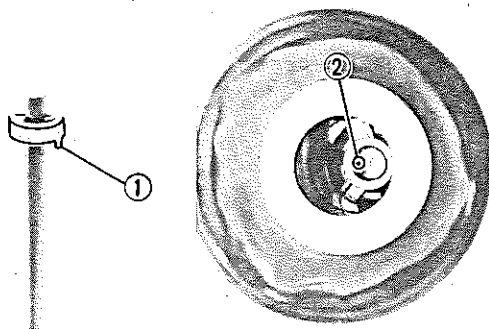


4. Install:

- Main nozzle

NOTE:

- Insert the main nozzle from the vacuum piston.
- Make sure the projection ① on the jet block is meshed with the groove ② on the needle jet.

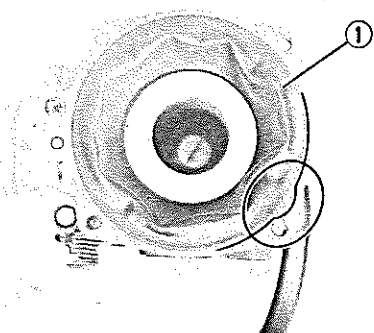


5. Install:

- Jet needle assembly
To the vacuum piston.

NOTE:

Be sure to install the jet needle plate so that the projection ① is located toward the hole ② in the vacuum piston.

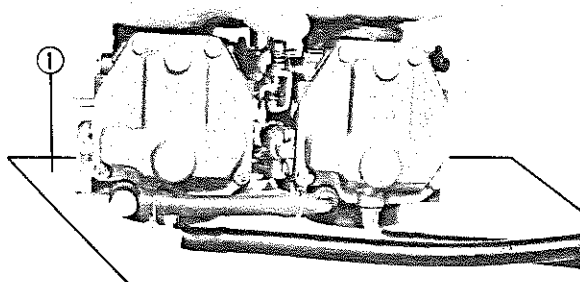


6. Install:

- Vacuum piston ①

NOTE:

Match the tab on the diaphragm to the matching recess in the vacuum piston.



7. Install:

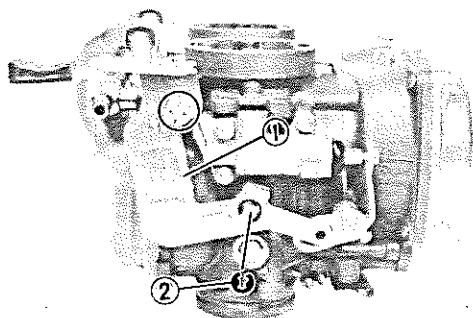
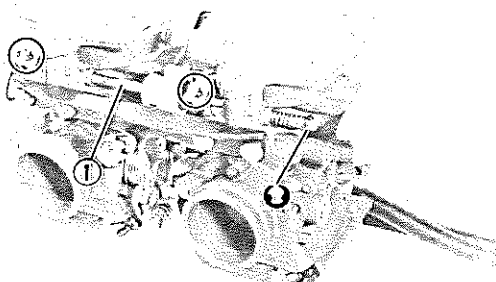
- Stay plate (Upper)
- Stay plate (Lower)

NOTE:

When reassembling, the surface plate ① should be used for proper carburetor alignment.



Stay Plate:
5 Nm (0.5 m·kg, 3.6 ft·lb)



6. Install:

- Starter link ①

NOTE:

- Apply LOCTITE® to the starter plunger lever securing screws.
- Do not forget to fit the plastic holders, spring and clip.

7. Install:

- Starter lever ①

NOTE:

Do not forget to fit the plastic washers and clip ②.

8. Check:

- Starter lever operation
Unsmooth operation → Reinstall.

INSTALLATION

1. Install:

- Carburetors
Reverse the removal steps.

ADJUSTMENT

Fuel Level Adjustment

1. Measure:

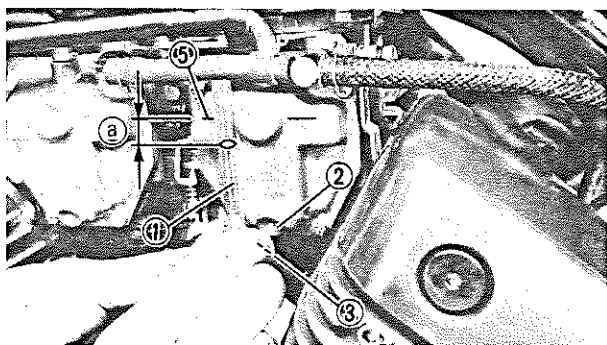
- Fuel level
Out of specification → Adjust.



Fuel Level:

13.5 ~ 14.5 mm (0.53 ~ 0.57 in)

Below the Carburetor Piston Valve
Center Mark.

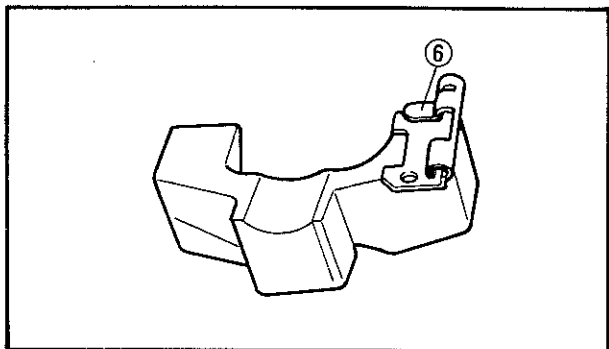
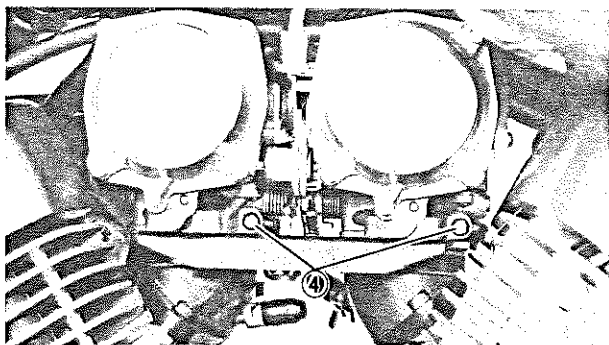


Fuel level measurement and adjustment steps:

- Place the motorcycle on a level surface.
- Use a garage jack under the engine to ensure that the carburetor is positioned vertically.
- Connect the Fuel Level Gauge ① (90890-01312) to the drain pipe ② using a level gauge adapter ③.
- Loosen the drain screw ④ and warm up the engine for several minutes.



CARBURETOR

CARB

- Measure the fuel level (a) with the gauge.

⑤ Piston valve center mark

- Repeat the above procedure for other carburetors.
- If the fuel level(s) is incorrect, adjust the fuel level(s).
- Remove the carburetors.
- Inspect the needle valve.
- If it is worn, replace it.
- If it is fine, adjust float level by bending the float tang ⑥ slightly.
- Repeat the procedure for the other carburetors.

CHAPTER 5.

CHASSIS

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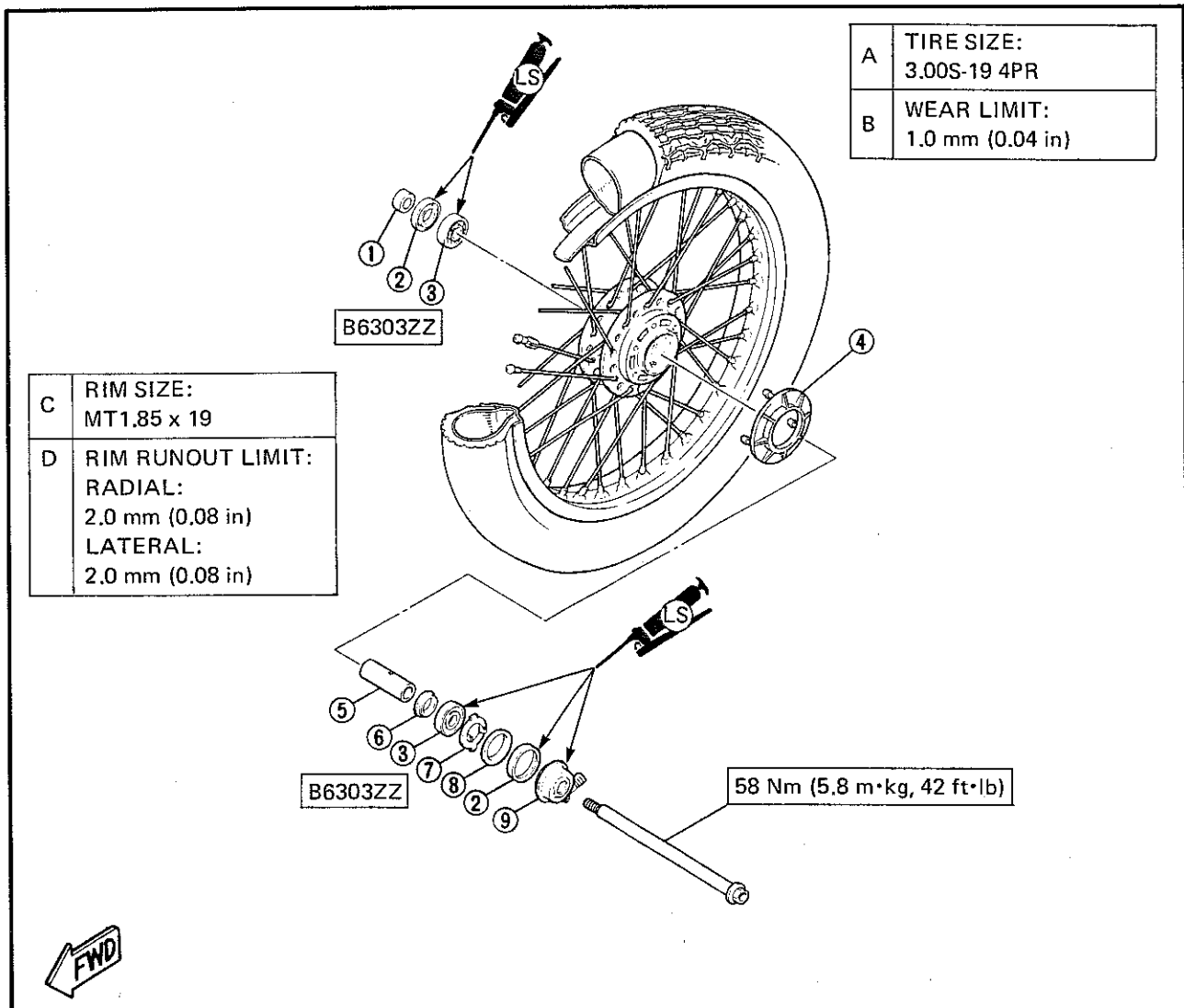
CHASSIS

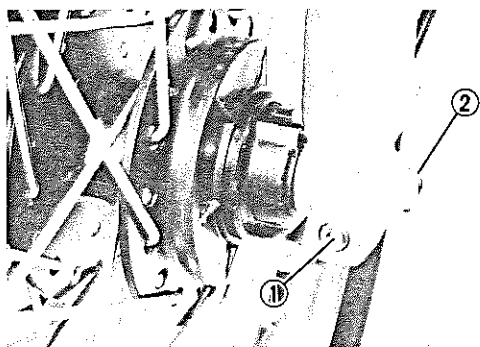
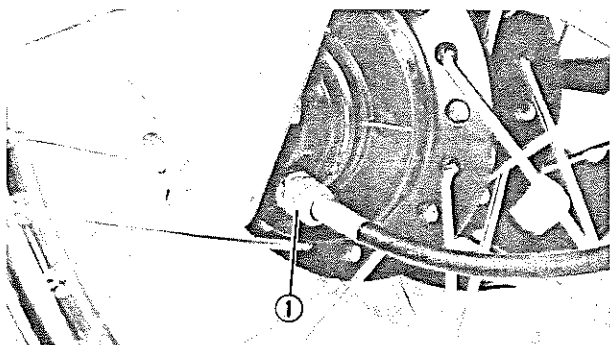
FRONT WHEEL

- ① Collar
- ② Oil seal
- ③ Bearing
- ④ Hub cover
- ⑤ Spacer
- ⑥ Spacer flange
- ⑦ Meter clutch
- ⑧ Clutch retainer
- ⑨ Gear unit

Basic weight: With oil and full fuel tank	188 kg (415 lb)	
Maximum load*	227 kg (501 lb)	
Cold tire pressure	Front	Rear
Up to 90 kg (198 lb) load*	200 kPa (2.0 kg/cm ² , 28 psi)	230 kPa (2.3 kg/cm ² , 32 psi)
90 kg (198 lb) ~ Maximum load*	200 kPa (2.0 kg/cm ² , 28 psi)	250 kPa (2.5 kg/cm ² , 36 psi)
High speed riding	200 kPa (2.0 kg/cm ² , 28 psi)	250 kPa (2.5 kg/cm ² , 36 psi)

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



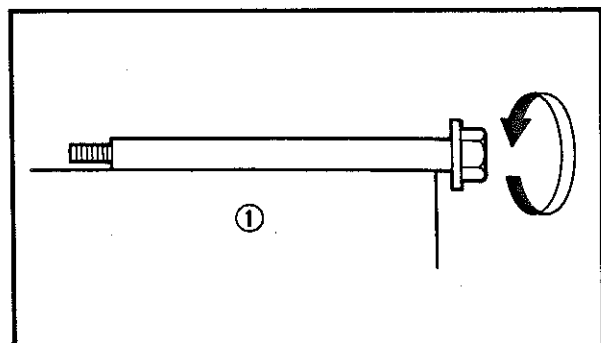
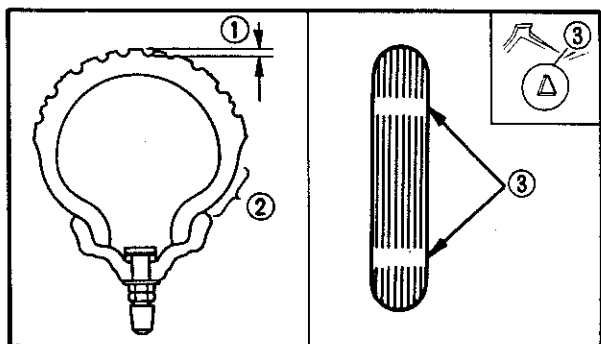
**REMOVAL****WARNING:**

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

1. Place the motorcycle on level place.
2. Remove:
 - Speedometer cable ①
3. Loosen:
 - Pinch bolt (Front axle) ①
 - Front axle ②
4. Elevate the front wheel by placing a suitable stand under the engine.
5. Remove:
 - Front axle
 - Front wheel

NOTE:

Do not squeeze the brake lever while the wheel is off the motorcycle.

**INSPECTION**

1. Inspect:
 - Tire

Tire tread shows crosswise lines (Minimum tread depth)/Cracks → Replace.



Minimum Tire Tread Depth:
1.0 mm (0.04 in)

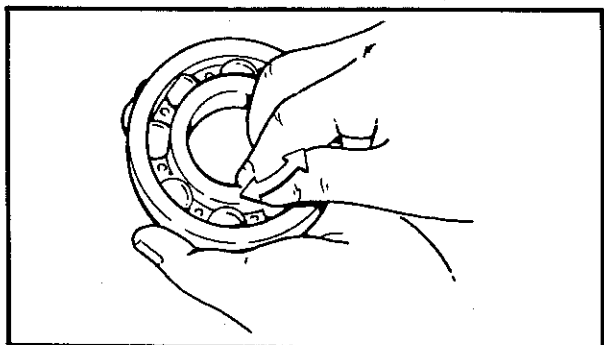
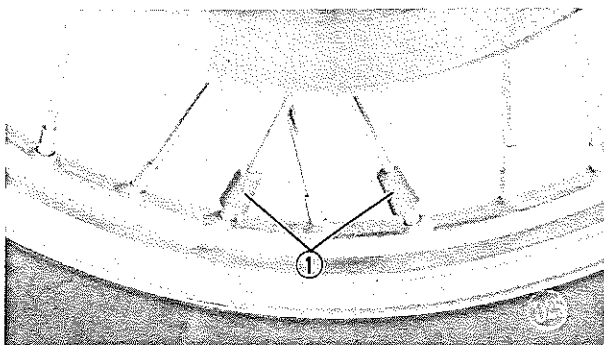
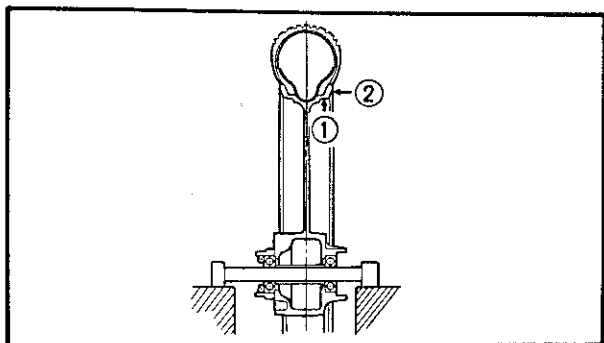
① Tread depth ② Sidewall ③ Wear indicator

2. Inspect:
 - Front axle

Bends → Replace.
Roll the axle on a flat surface ① .

WARNING:

Do not attempt to straighten a bent axle.



3. Inspect:

- Wheel

Cracks/Bends/Warpage → Replace.

4. Measure:

- Wheel runout

Out of specification → Replace.



Rim Runout Limits:

Raidal ① : 2.0 mm (0.08 in)

Lateral ② : 2.0 mm (0.08 in)

5. Check:

- Wheel balance

Out of balance → Adjust.

NOTE:

Balance wheels with the brake discs installed.

① Balancer weight

CAUTION:

Be sure the valve stem locknut is tightened securely after repairing or replacing a tire and/or wheel.

WARNING:

Ride conservatively after installing a tire to allow the tire to seat itself correctly on the rim.

6. Inspect:

- Wheel bearings

Bearings allow play in the wheel hub or wheel turns roughly → Replace.

Wheel bearing replacement steps:

- Clean the outside of the wheel hub.
- Drive out the bearing.

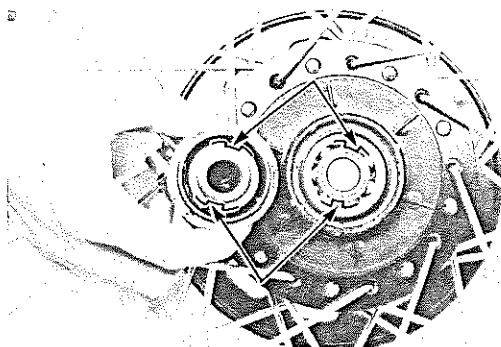
WARNING:

Eye protection is recommended when using striking tools.

- Install the new bearing by reversing the previous steps.

CAUTION:

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

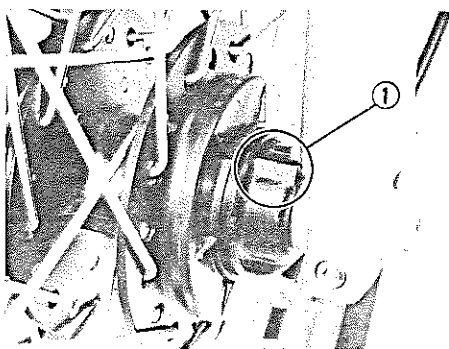
**INSTALLATION**

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

1. Apply:
 - Lithium base greaseLightly grease to the oil seal and gear unit.
2. Install:
 - Gear unit assembly

NOTE:

Be sure that the two projections inside the wheel hub mesh with the two slots in the gear unit assembly.



3. Install:
 - Front wheel

NOTE:

Be sure that the projecting portion (Torque stopper) ① of the gear unit housing is positioned correctly.

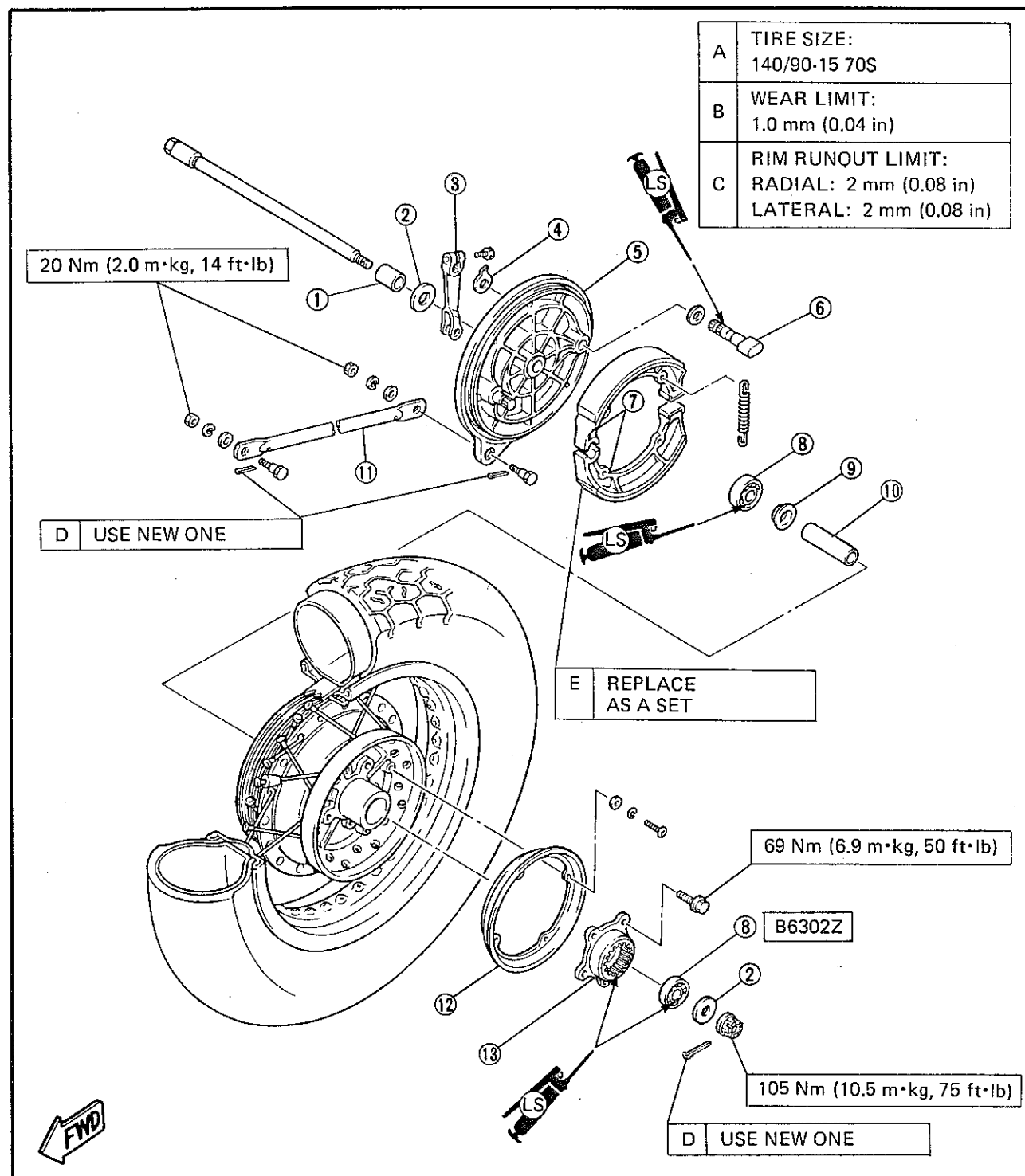
4. Tighten:
 - Front axle
 - Pinch bolt (Front axle)



Front Axle:
58 Nm (5.8 m·kg, 42 ft·lb)
Pinch Bolt (Front Axle):
20 Nm (2.0 m·kg, 14 ft·lb)

REAR WHEEL

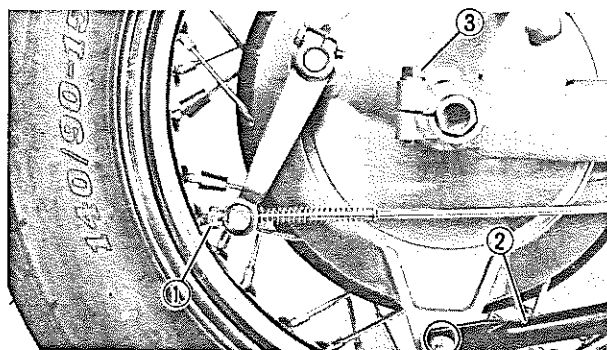
- | | |
|--------------------|-----------------|
| ① Collar | ⑧ Bearing |
| ② Washer | ⑨ Spacer flange |
| ③ Camshaft lever | ⑩ Spacer |
| ④ Indicator plate | ⑪ Tension bar |
| ⑤ Brake shoe plate | ⑫ Hub dust seal |
| ⑥ Brake camshaft | ⑬ Clutch hub |
| ⑦ Brake shoe set | |



REMOVAL

WARNING:

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



1. Place the motorcycle on level place.

2. Remove:

- Adjuster (Rear brake) ①
- Tension bar ②

3. Loosen:

- Pinch bolt (Rear axle) ③

4. Remove:

- Cotter pin
- Nut (Rear axle)
- Plain washer

5. Elevate the rear wheel by placing a suitable stand.

6. Remove:

- Rear axle
- Rear wheel
- Plain washer
- Collars (Shorter and longer)

NOTE:

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

INSPECTION

1. Inspect:

- Tire
- Rear axle
- Wheel
- Wheel bearings

Refer to "FRONT WHEEL — INSPECTION" section.

2. Measure:

- Wheel runout

Refer to "FRONT WHEEL — INSPECTION" section.

3. Check:

- Wheel balance

Refer to "FRONT WHEEL — INSPECTION" section.

4. Inspect:

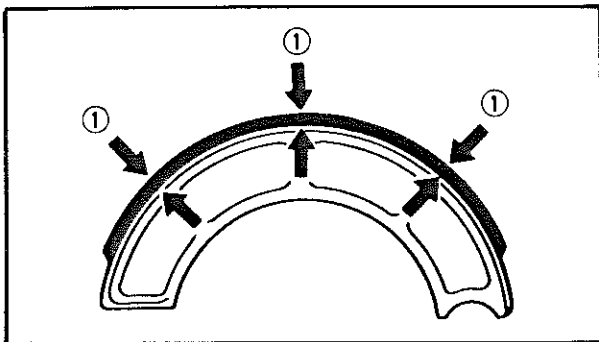
- Brake lining surface

Glazed areas → Remove.

Use a coarse sand paper.

NOTE:

After using the sand paper, clean of the polished particles with cloth.



5. Measure:

- Brake lining thickness

Out of specification → Replace.

① Measuring points

NOTE:

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



Brake Lining Thickness:

4 mm (0.16 in)

Wear Limit:

2 mm (0.08 in)

6. Inspect:

- Brake drum inner surface

Oil/Scratches → Replace.

Oil	Use a rag soaked in lacquer thinner or solvent.
Scratches	Use a emery cloth (lightly and evenly polishing)

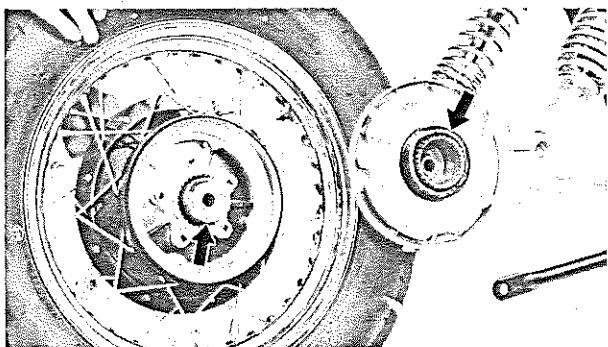
7. Inspect:

- Camshaft face

Wear → Replace.

**NOTE:**

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

**8. Inspect:**

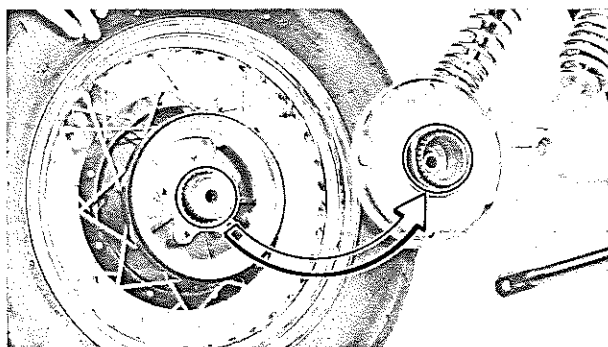
- Gear teeth (Clutch hub)
- Gear teeth (Ring gear)
- Pitting/Galling/Wear → Replace clutch hub and ring gear as a set.

INSTALLATION

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

1. Apply:

- Lithium base grease
- To the oil seals, bearing, final gear splines and rear wheel hub splines.

**2. Install:**

- Rear wheel

NOTE:

- Make sure that the splines on the wheel hub fit into the final gear case.
- Do not forget to fit the collars (Shorter and longer) and plain washer.

3. Install:

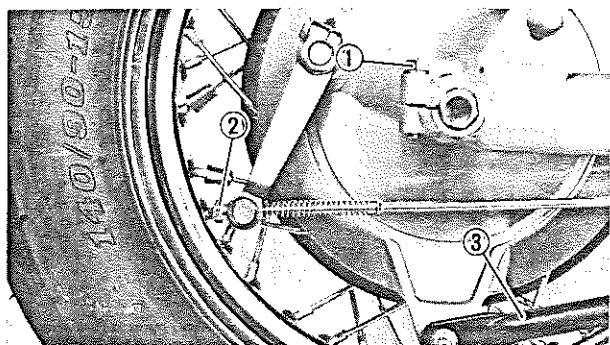
- Plain washer
- Nut (Rear axle)
- Cotter pin (New)

WARNING:

Always use a new cotter pin.



Nut (Rear Axle):
105 Nm (10.5 m·kg, 75 ft·lb)



4. Tighten:

- Pinch bolt (Rear axle) ①



Pinch Bolt (Rear Axle):
16 Nm (1.6 m·kg, 11 ft·lb)

5. Install:

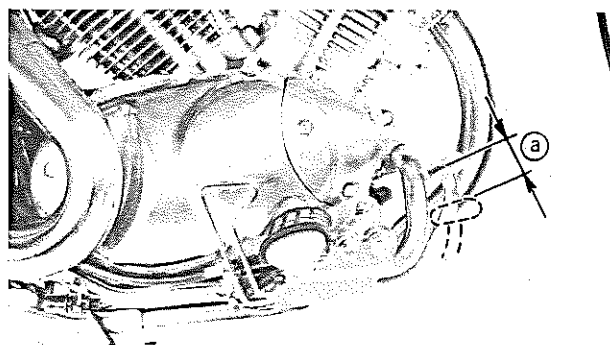
- Tension bar ②
- Adjuster (Rear brake) ③

WARNING:

Always use a new cotter pin.



Tension Bar:
20 Nm (2.0 m·kg, 14 ft·lb)



6. Adjust:

- Brake pedal free play (a)
Refer to "CHAPTER 2. REAR BRAKE ADJUSTMENT" section.

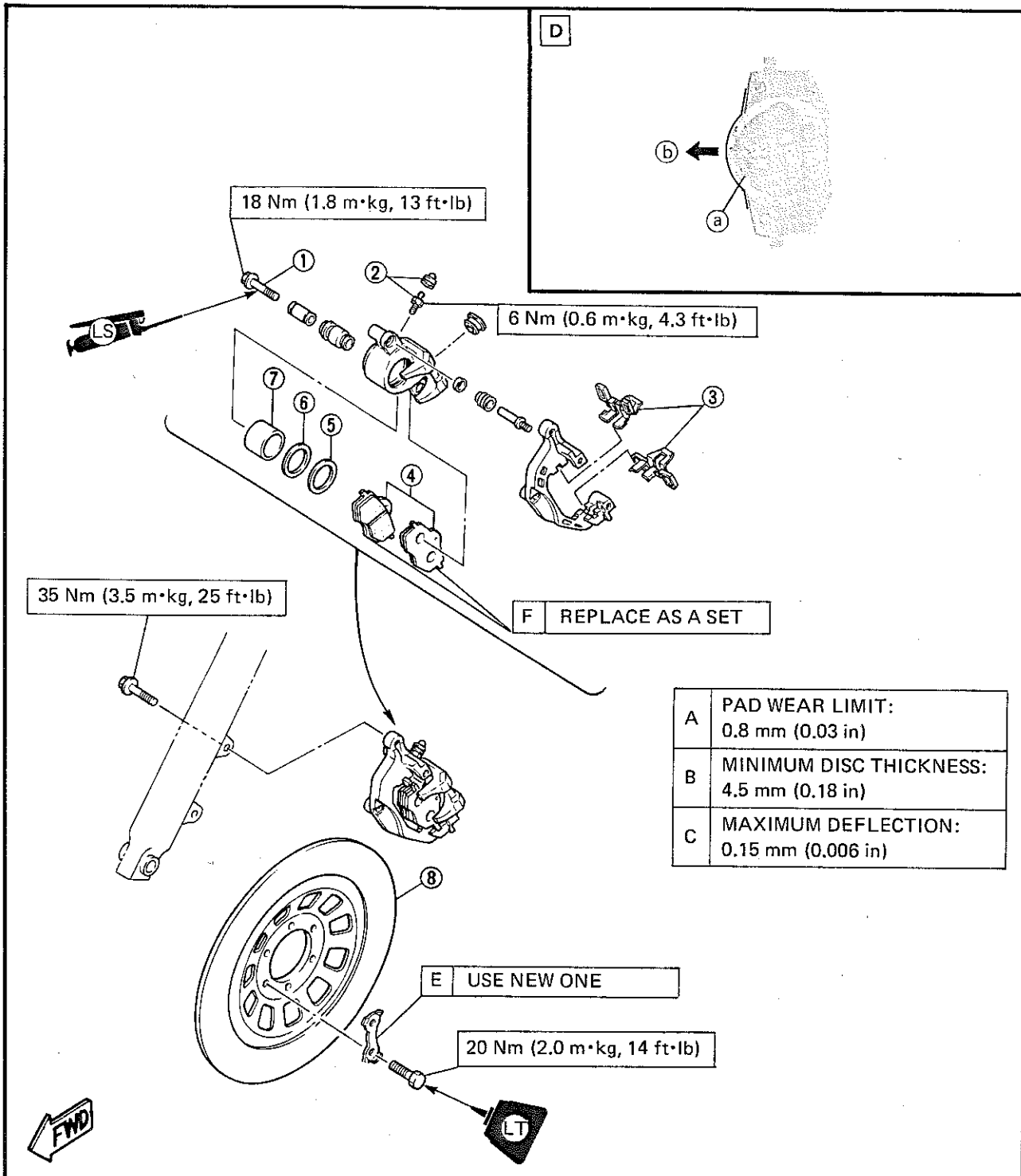


Brake Pedal Free Play:
20 ~ 30 mm (0.8 ~ 1.2 in)

FRONT BRAKE

- ① Retaining bolt
- ② Air bleed screw
- ③ Pad springs
- ④ Brake pads
- ⑤ Dust seal
- ⑥ Piston seal
- ⑦ Piston
- ⑧ Brake disc

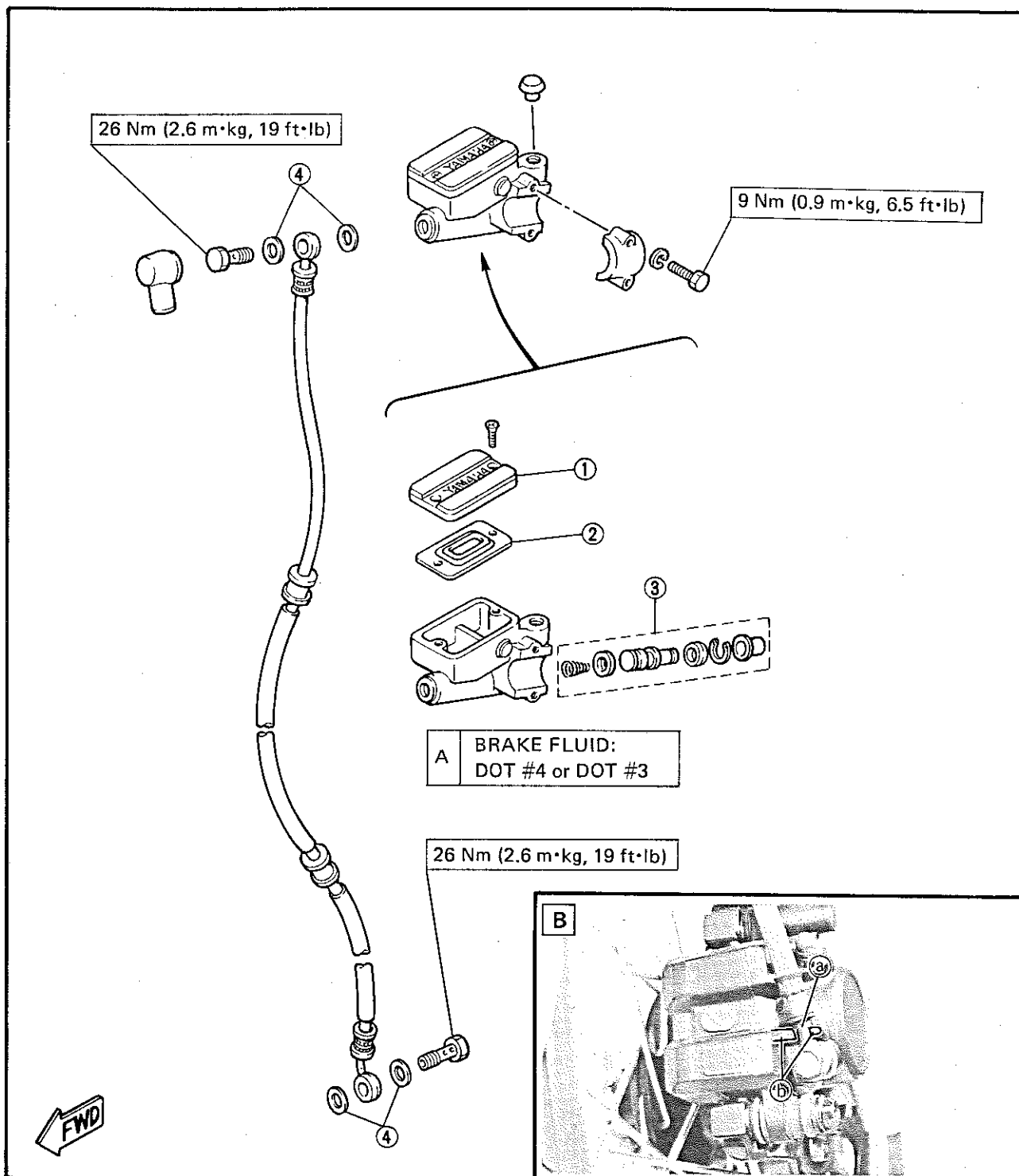
D Be sure to position the pad so that its round side **(a)** is backward **(b)**.

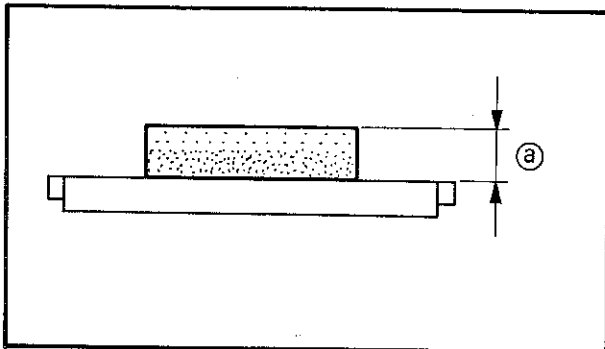
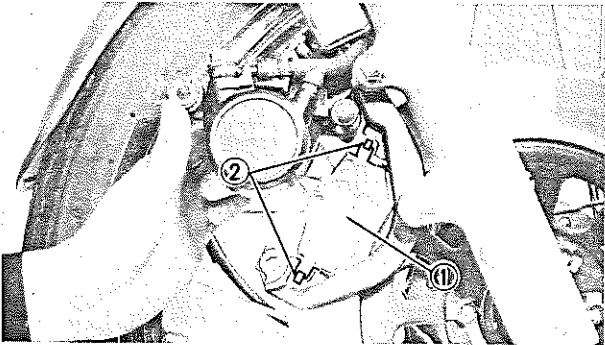
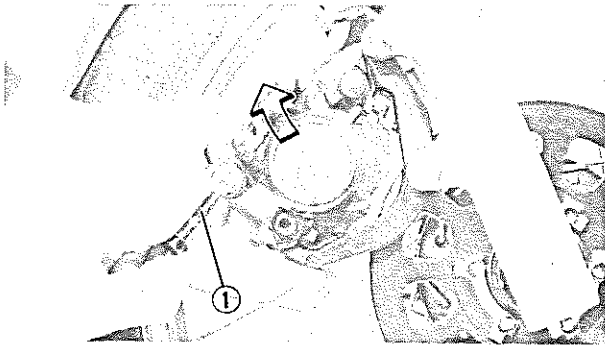




- ① Master cylinder cap
- ② Diaphragm
- ③ Master cylinder kit
- ④ Copper washer

- ⓑ When installing the brake hose, lightly touch the brake pipe ① with projections ② on the caliper.





CALIPER PAD REPLACEMENT

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

1. Remove:
 - Retaining bolt ①
2. Turn the caliper body clockwise.

3. Remove:
 - Pads ①
 - Pad springs ②

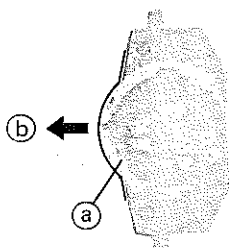
4. Measure:
 - Pad thickness ①
 Out of specification → Replace.

NOTE:

- Replace the pad spring if pad replacement is required.
- Replace the pads as a set if either if found to be worn to the wear limit.



Wear Limit:
0.8 mm (0.03 in)



5. Install:
 - Pad springs (New)
 - Pads (New)
 To the caliper.

NOTE:

Be sure to position the pad so that its round side ① is backward ②.

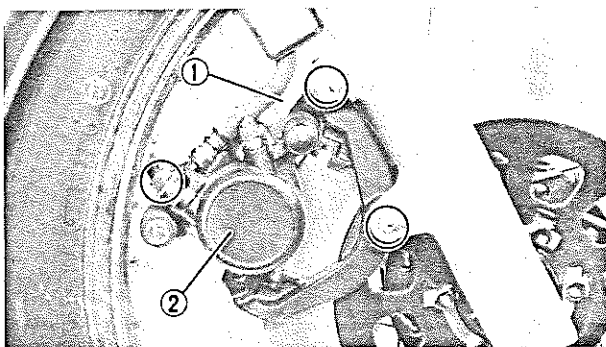
6. Apply:
 - Lithium base grease
To the retaining bolt.
7. Set caliper body at the original position.
8. Install:
 - Retaining bolt



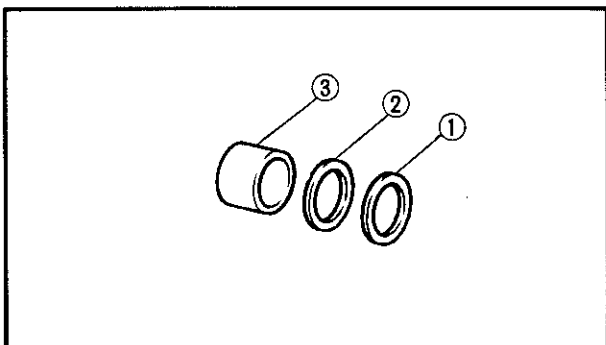
Retaining Bolt:
18 Nm (1.8 m·kg, 13 ft·lb)

CALIPER DISASSEMBLY

1. Remove:
 - Retaining bolt
 - Pads
 - Pad springs
 Refer to the "CALIPER PAD REPLACEMENT" section.



2. Remove:
 - Brake hose ①
Place the open hose end into a container and pump the old fluid out carefully.
 - Caliper ②



3. Remove:
 - Dust seal ①
 - Piston seal ②
 - Piston ③

Caliper piston removal steps:

- Blow compressed air into the tube joint opening to force out the caliper piston from the caliper body.

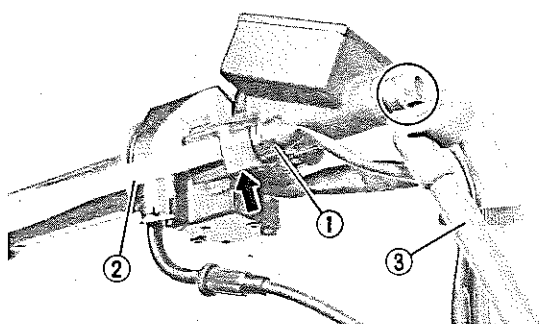
WARNING:

- Never try to pry out the caliper piston.
- Cover the piston with a rag. Use care so that piston does not cause injury as it is expelled from the cylinder.

MASTER CYLINDER DISASSEMBLY

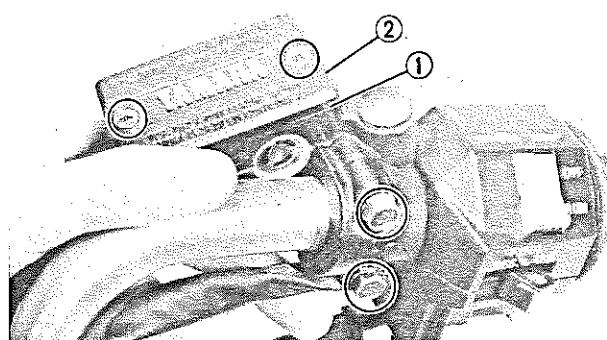
NOTE:

Drain the brake fluid before removing master cylinder.

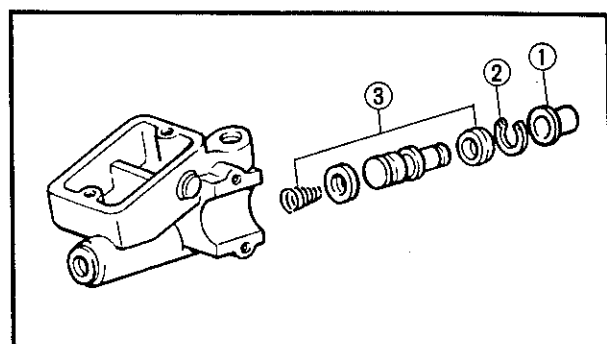


1. Remove:
 - Brake light switch lead ①
 - Brake lever ②
 - Lever spring
2. Disconnect:
 - Brake hose ③

Drain the fluid.



3. Remove:
 - Master cylinder ①
 - Master cylinder cap ②



4. Remove:
 - Dust boot ①
 - Circlip ②
 - Master cylinder kit ③

BRAKE INSPECTION AND REPAIR

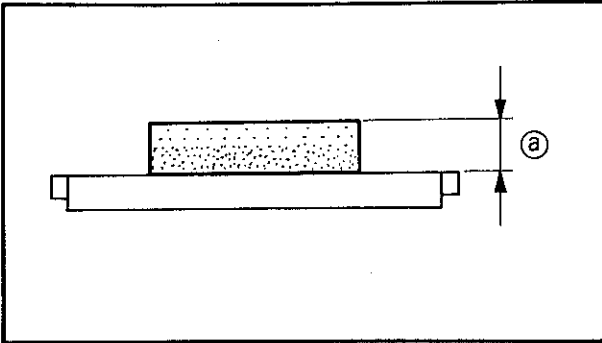
Recommended Brake Component Replacement Schedule:	
Brake pads	As required
Piston seal, dust seal	Every two years
Brake hoses	Every four years
Brake fluid	Replace only when brakes are disassembled

WARNING:

All internal parts should be cleaned in new brake fluid only. Do not use solvents will cause seals to swell and distort.

1. Inspect:

- Brake pads (Thickness) (a)
Out of specification → Replace.

**NOTE:**

- Replace the pad spring if pad replacement is required.
- Replace the pads as a set if either if found to be worn to the wear limit.



Wear Limit:
0.8 mm (0.03 in)

2. Inspect:

- Caliper piston
Rust/Wear/Damage → Replace.
- Dust seal/Piston seal
Damage → Replace.

WARNING:

Replace the piston and dust seals whenever a caliper is disassembled.

- Master cylinder kit
- Master cylinder body
Scratches/Wear → Replace.
- Brake hose
Cracks/Wear/Damage → Replace.

3. Inspect:

- Brake disc
Out of specification → Replace.



Maximum Deflection:
0.15 mm (0.006 in)
Minimum Disc Thickness:
4.5 mm (0.18 in)



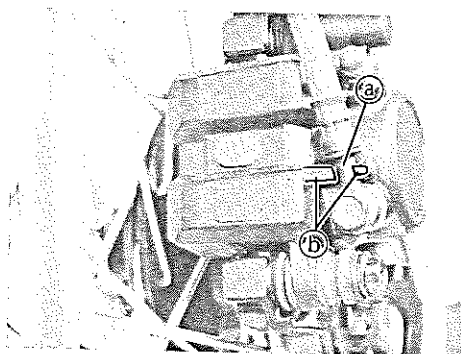
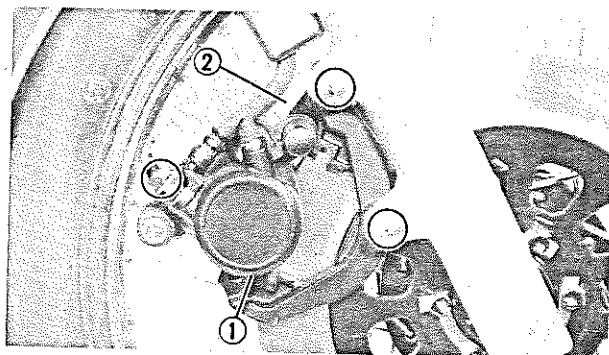
BRAKE REASSEMBLY

WARNING:

- All internal parts should be cleaned in new brake fluid only.
- Internal parts should be lubricated with brake fluid when installed.



Brake Fluid:
DOT #4
If DOT #4 is not available,
#3 can be used.



Caliper Reassembly

When assembling the caliper, reverse the disassembly procedure. Note the following points.

1. Install:

- Brake caliper ①
- Brake hose ②

CAUTION:

When installing the brake hose, lightly touch the brake pipe ① with projections ② on the caliper.



Brake Caliper:
35 Nm (3.5 m·kg, 25 ft·lb)
Brake Hose:
26 Nm (2.6 m·kg, 19 ft·lb)

2. Install:

- Pad springs
- Pads
- Retaining bolt

Refer to "CALIPER PAD REPLACEMENT" section.

3. Bleed:

- Air

Refer to "AIR BLEEDING" section.

Master Cylinder Reassembly

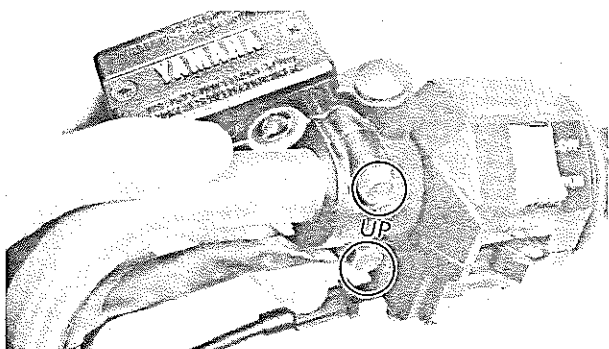
When assembling the master cylinder, reverse the disassembly procedure. Note the following points.

1. Install:

- Master cylinder kit

**WARNING:**

Internal parts should be lubricated with brake fluid when installed.



2. Install:

- Master cylinder
- Brake hose

NOTE:

Install the master cylinder bracket with its "UP" mark to top.



Bracket (Master Cylinder):
9 Nm (0.9 m·kg, 6.5 ft·lb)

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

3. Fill:

- Master cylinder



Brake Fluid:
DOT #4
If DOT #4 is not available,
#3 can be used.

4. Bleed:

- Air
- Refer to "AIR BLEEDING" section.

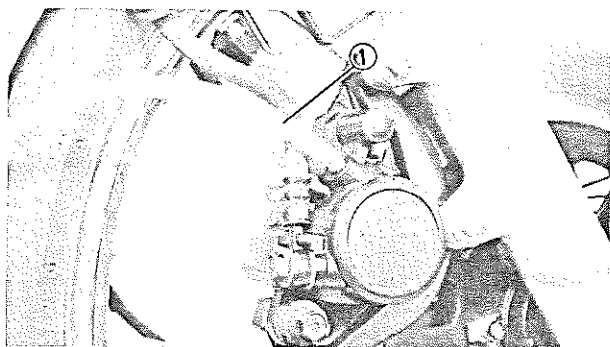
AIR BLEEDING

WARNING:

Bleed the brake system if:

- The system has been disassembled.
- A brake hose has been loosened or removed.
- The brake fluid is very low.
- The brake operation is faulty.

A dangerous loss of braking performance may occur if the brake system is not properly bled.



1. Bleed:

- Brake fluid

Air bleeding steps:

- Add proper brake fluid to the reservoir.
- Install the diaphragm. Be careful not to spill any fluid or allow the reservoir to overflow.
- Connect the clear plastic tube ① tightly to the caliper bleed screw.
- Place the other end of the tube into a container.
- Slowly apply the brake lever several times.
- Pull the lever in. Hold the lever in position.
- Loosen the bleed screw and allow the lever to travel towards its limit.
- Tighten the bleed screw when the lever limit has been reached; then release the lever.

**Bleed Screw:****6 Nm (0.6 m·kg, 4.3 ft·lb)**

- Repeat steps (e) to (h) until the air bubbles have been removed from the system.

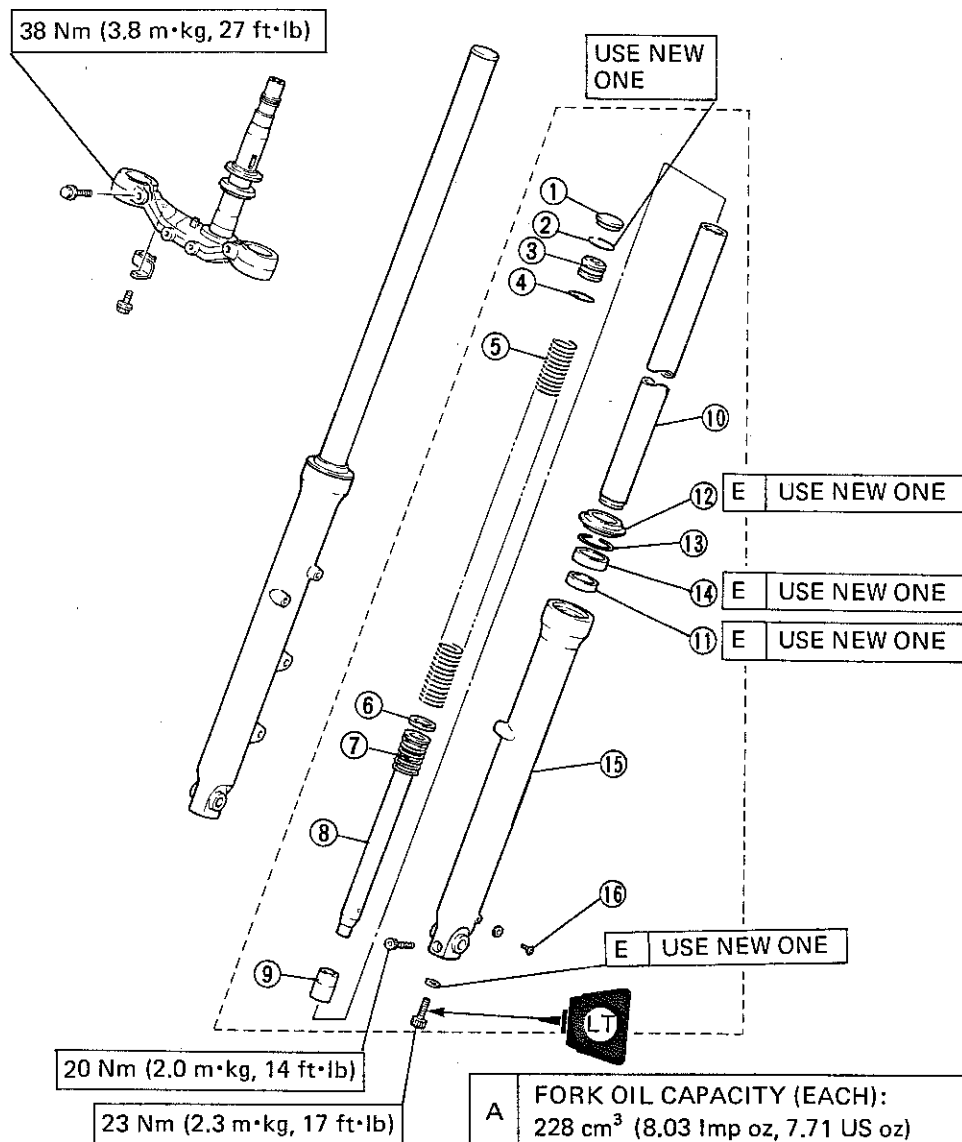
NOTE:

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 disappeared.

- Add brake fluid to the level line on the reservoir.

FRONT FORK

- ① Fork cap
- ② Stopper ring
- ③ Spring seat
- ④ O-ring
- ⑤ Fork spring
- ⑥ Piston ring
- ⑦ Rebound spring
- ⑧ Cylinder complete
- ⑨ Oil lock piece
- ⑩ Inner tube
- ⑪ Slide bush
- ⑫ Dust cover
- ⑬ Retaining clip
- ⑭ Oil seal
- ⑮ Outer tube
- ⑯ Drain screw

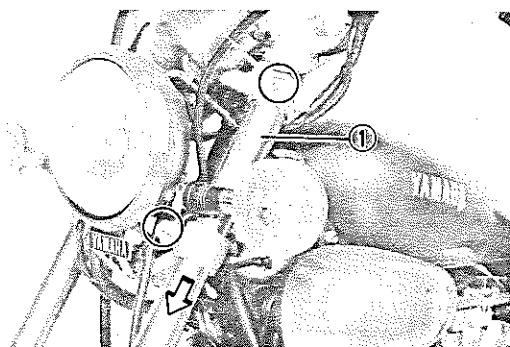
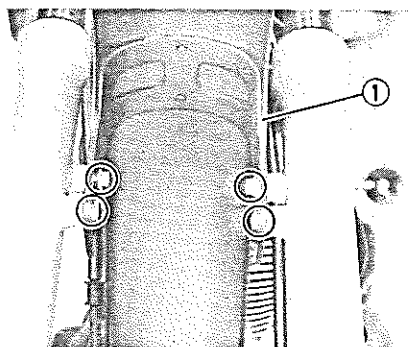


A	FORK OIL CAPACITY (EACH): 228 cm ³ (8.03 Imp oz, 7.71 US oz)
B	FORK OIL LEVEL (FROM TOP OF FULLY COMPRESSED INNER TUBE WITHOUT FORK SPRING): 176 mm (6.93 in)
C	GRADE: YAMAHA FORK OIL 10WT OR EQUIVALENT
D	FORK SPRING FREE LENGTH (LIMIT): 541.6 mm (21.3 in)

REMOVAL

WARNING:

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



1. Remove:
 - Front wheel
 - Brake caliper (Right)
Refer to "FRONT WHEEL and FRONT BRAKE" sections.
2. Remove:
 - Front fender ①
3. Remove:
 - Fork caps
4. Loosen:
 - Pinch bolts (Steering crown)
 - Pinch bolts (Under bracket)
5. Remove:
 - Front fork(s) ①

DISASSEMBLY

1. Remove:
 - Stopper ring
 - Spring seat
 - Fork spring

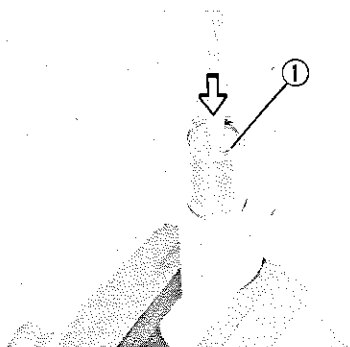
Removal steps:

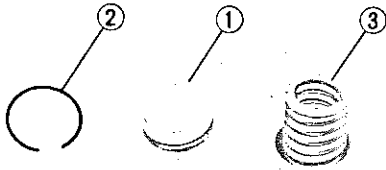
- Hold fork leg vertically.
- Clamp the inner tube securely in a vise with soft jaws.

CAUTION:

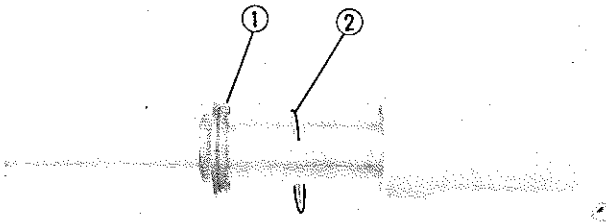
Do not to give damages to the inner tube surface.

- Depress the spring seat ① with a suitable bar.



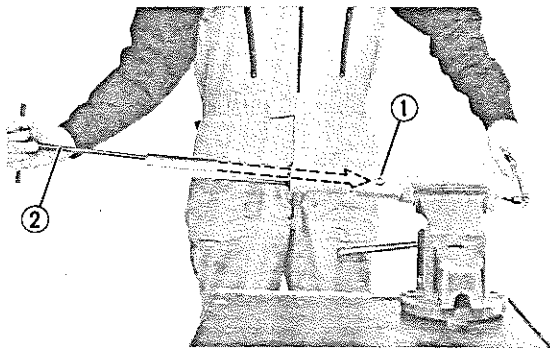


- Hold the spring seat, and remove the stopper ring ② with a thin screwdriver.
- Remove the spring seat ① and fork spring ③.
- Place an oil pan under the fork, and fork upside down and drain the oil.



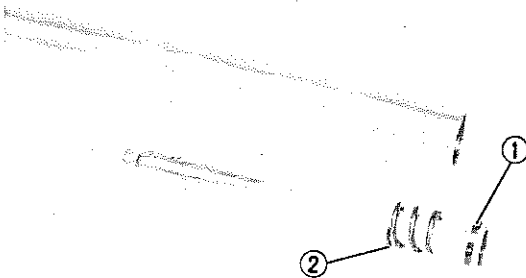
2. Remove:

- Dust cover ①
 - Retaining clip ②
- Use a thin screwdriver, and be careful not to scratch the inner fork tube.



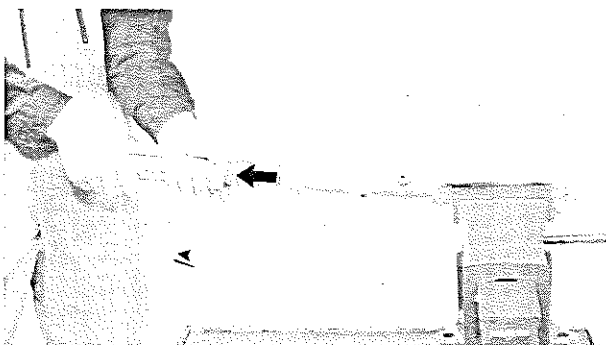
3. Remove:

- Bolt (Cylinder complete)
- Use the Damper Rod Holder ① (90890-01294) and the T-Handle ② (90890-01326) to lock the damper rod.



4. Remove:

- Damper rod (Cylinder complete) ①
- Rebound spring ②



5. Remove:

- Inner fork tube

Inner fork tube removal steps:

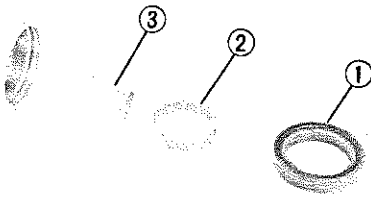
- Hold fork leg horizontally.
- Clamp the caliper mounting boss of the outer tube securely in a vise with soft jaws.
- Pull out the inner fork tube from the outer tube by forcefully, but carefully, with drawing the inner tube.

**NOTE:**

- Excessive force will damage the oil seal and/or the bushes. Damaged oil seal and bushing must be replaced.
- Avoid bottoming the inner tube in the outer tube during the above procedure, as the oil lock piece will be damaged.

6. Remove:

- Oil seal ①
- Slide bush ②
- Oil lock piece ③

**INSPECTION**

1. Inspect:

- Inner fork tube
Scratches/Bends → Replace.

WARNING:

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

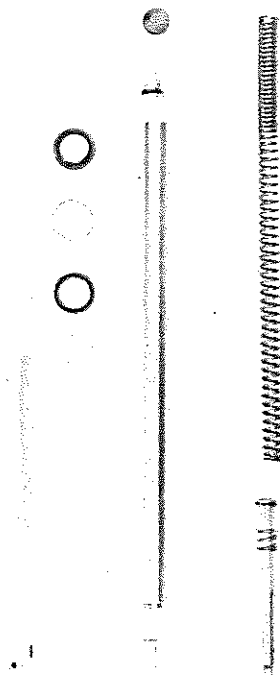
- Outer fork tube
Scratches/Bends/Damage → Replace.
- Fork spring
Over specified limit → Replace.



Fork Spring Free Length (Limit):
541.6 mm (21.3 in)

2. Inspect:

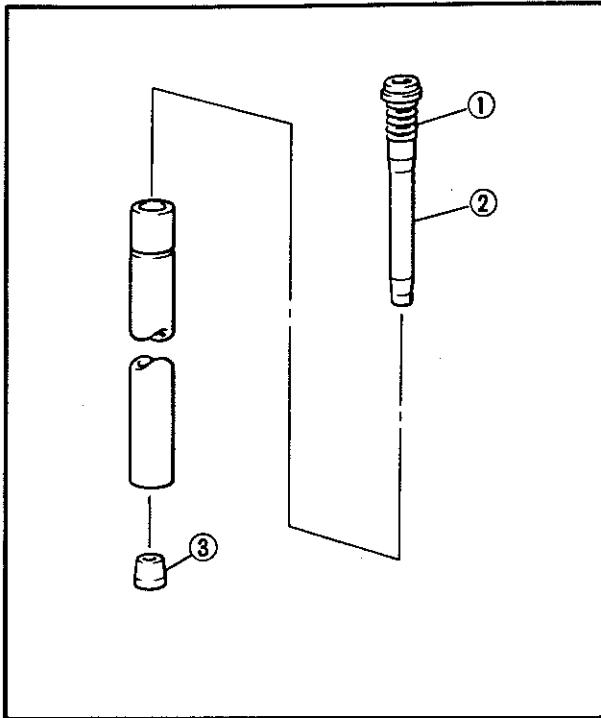
- Damper rod
Wear/Damage → Replace.
Contamination → Blow out all oil passages with compressed air.





3. Inspect:

- O-ring (Spring seat) ①
 - Oil lock piece ②
- Damage → Replace.



ASSEMBLY

Before assembling, clean and inspect all parts and replace when necessary.

NOTE:

In front fork assembly, be sure to use following new parts. Do not reuse them.

- Slide bush
- Oil seal
- Dust seal

1. Install:

- Rebound spring ①
- Damper rod ②

Allow the rod to slide slowly down the tube until the it protrudes from the bottom.

- Oil lock piece ③

Fit oil lock piece over damper rod sticking out of the inner fork tube.

2. Install:

- Inner fork tube
- Into outer tube.

3. Tighten:

- Bolt (Cylinder complete)

Use the Damper Rod Holder (90890-01294) and the T-Handle (90890-01326).



Bolt (Cylinder Complete):
23 Nm (2.3 m·kg, 17 ft·lb)
LOCTITE®

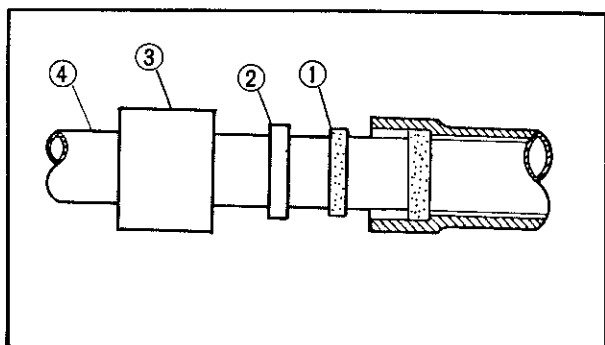
4. Install:

- Slide bush ①

Into outer tube.

Use the Fork Seal Driver Weight ③ (90890-01367) and the Adapter ② (90890-01370).

- ④ Inner tube
- ⑤ Outer tube



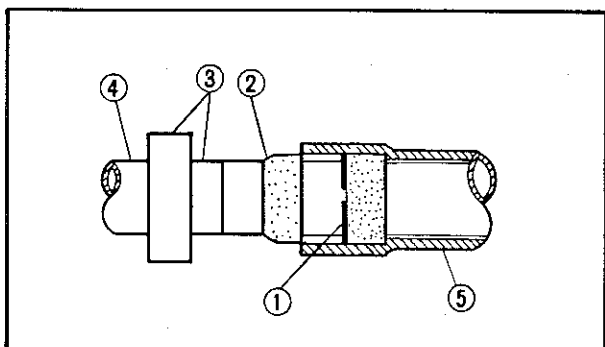
5. Install:

- Oil seal ①

Use the Fork Seal Driver Weight ③ (90890-01367) and the Adapter ② (90890-01370), and install with numbered side up.

④ Inner tube

⑤ Outer tube



6. Install:

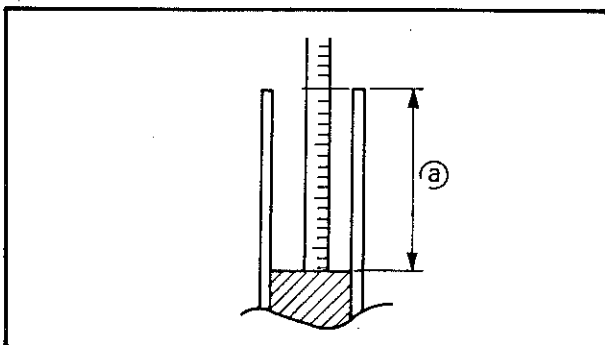
- Retaining clip ①

- Dust seal ②

Use the Special Tools ③.
(90890-01367, 90890-01370).

④ Inner tube

⑤ Outer tube



7. Fill:

- Front fork



Fork Oil Capacity (Each):

228 cm³ (8.03 Imp oz, 7.71 US oz)

Fork Oil Level ① (From Top of Fully Compressed Inner Tube Without Fork Spring):

176 mm (6.93 in)

Grade:

Yamaha fork oil 10wt or equivalent
After filling, slowly pump the fork
up and down to distribute oil.

8. Install:

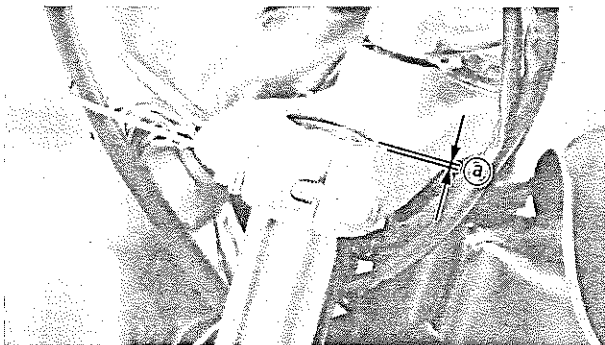
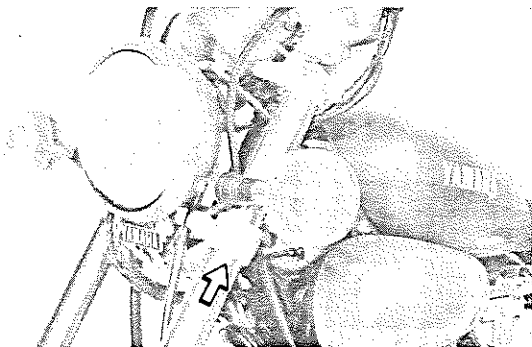
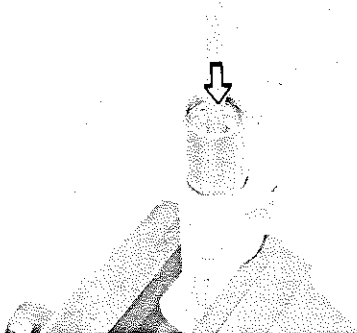
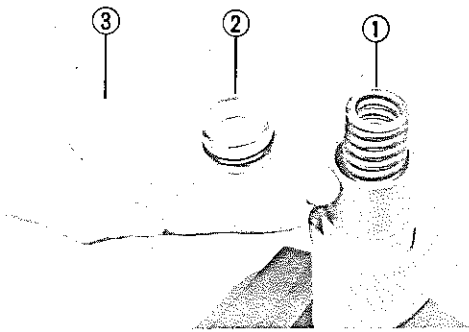
- Fork spring
- Spring seat
- Stopper ring

Installation steps:

- Hold the fork leg vertically.
- Clamp the inner tube in a vise with soft jaws.

CAUTION:

Do not to give damages to the inner tube surface.



- Install the fork spring ① into the inner tube.

NOTE:

Install the fork spring with its smaller pitch side up.

- Inspect the O-ring (Spring seat). If damaged, replace it.
- Fit the spring seat ② onto the fork spring, depress the spring seat with a suitable bar.
- Hold the spring seat, and install the stopper ring ③ into the inner tube.

INSTALLATION**1. Install:**

- Front fork(s)
Into the underbracket and steering crown.

2. Tighten:

- Pinch bolts (Under bracket)
Temporarily tighten the pinch bolts.

NOTE:

Position the inner tube end so that it is flush ④ with the top of the steering crown.

3. Tighten:

- Pinch bolts (Under bracket)
- Pinch bolts (Steering crown)

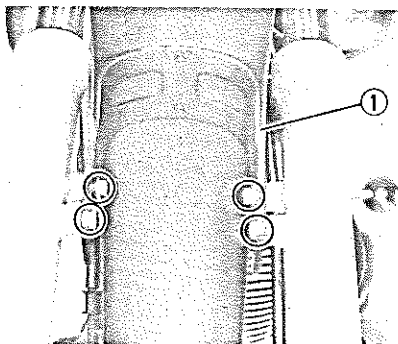
NOTE:

Do not forget to fit the cable holders to the front fork top.



Pinch Bolts (Under Bracket):
38 Nm (3.8 m·kg, 27 ft·lb)

Pinch Bolts (Steering Crown):
20 Nm (2.0 m·kg, 14 ft·lb)



4. Install:

- Fork caps
- Front fender ①



Front Fender:
10 Nm (1.0 m·kg, 7.2 ft·lb)

5. Install:

- Front wheel
- Brake caliper (Right)

Refer to "FRONT WHEEL and FRONT BRAKE" section.

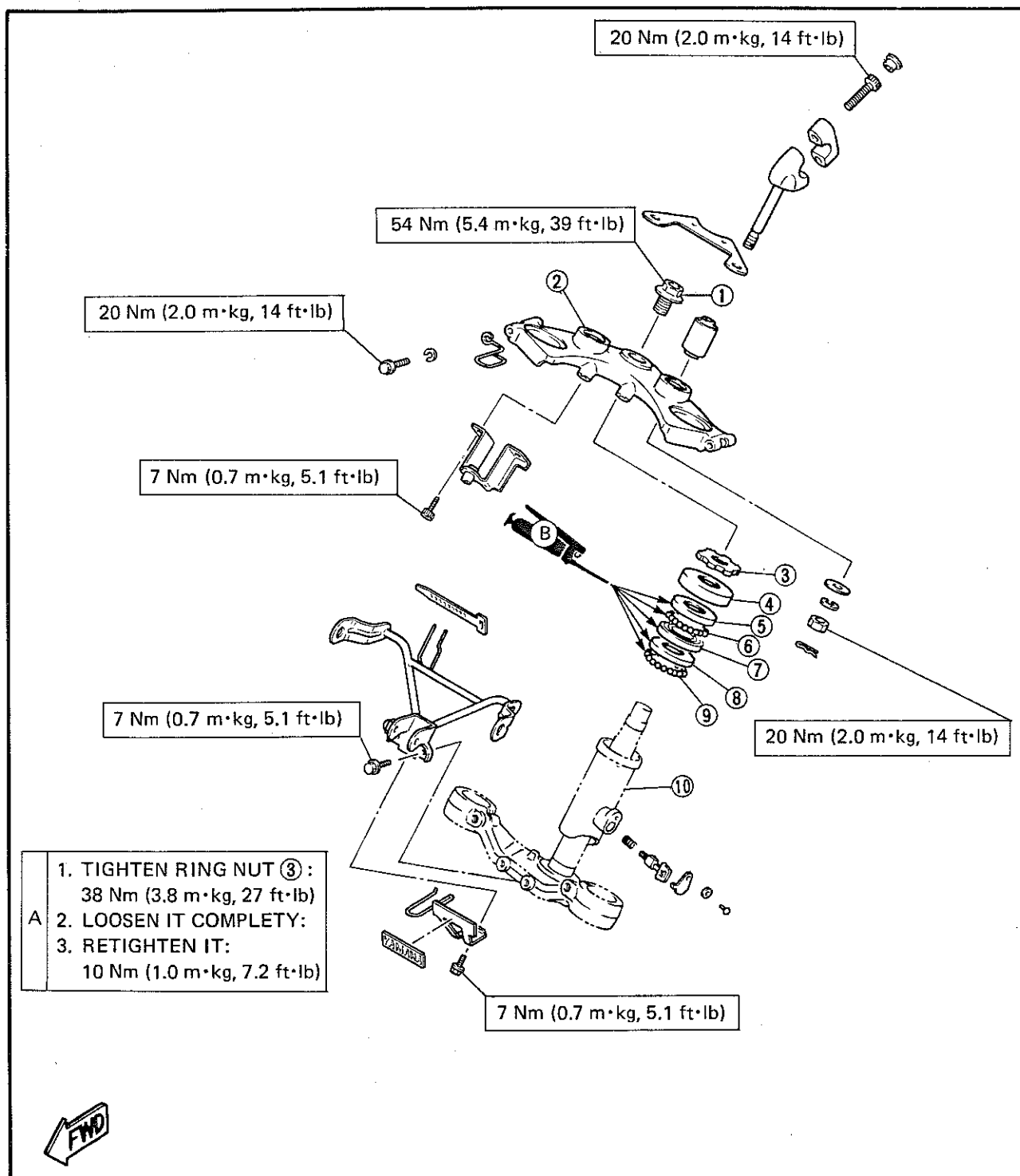
6. Inspect:

- Fork operation
Unsmooth operation → Repair.
- Oil leaks
Leakage → Repair.



STEERING HEAD

- | | |
|------------------------------|---------------------------|
| ① Steering stem bolt | ⑧ Ball race (Lower — Top) |
| ② Steering crown | ⑨ Ball (19 pcs.) |
| ③ Ring nut | ⑩ Steering stem |
| ④ Bearing cover | |
| ⑤ Ball race (Upper — Top) | |
| ⑥ Ball (19 pcs.) | |
| ⑦ Ball race (Upper — Bottom) | |





REMOVAL

WARNING:

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

1. Remove:

- Front wheel
- Front forks

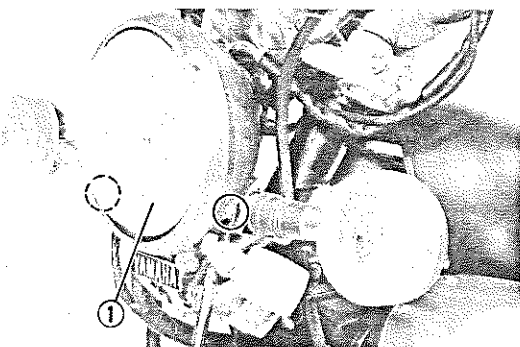
Refer to "FRONT WHEEL and FRONT FORK" section.

2. Remove:

- Headlight lens unit ①

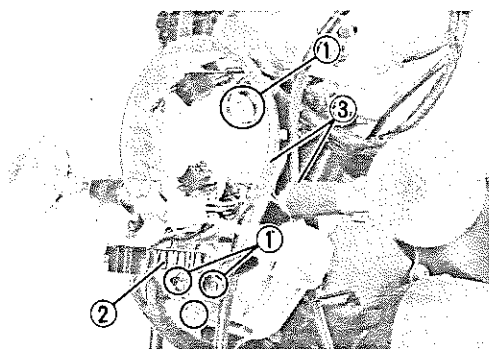
3. Disconnect:

- All leads (In the headlight body)



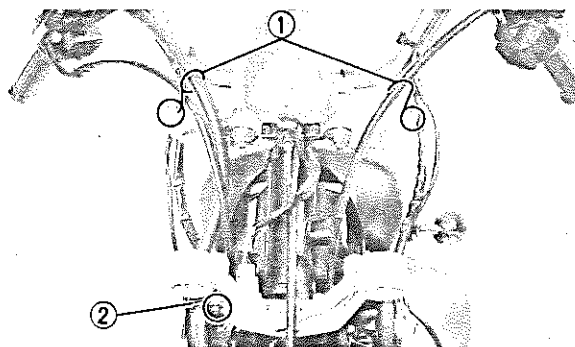
4. Remove:

- Emblem ②
 - Bolts (Headlight body bracket) ①
 - Headlight bracket and flasher light bracket assembly ③
- Pull down the bracket assembly.



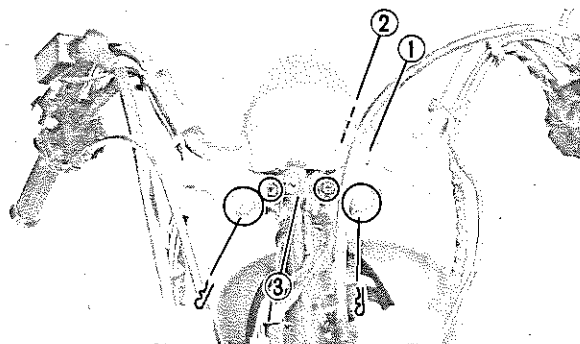
5. Remove:

- Cable holders (Left and right) ①
- Brake hose holder ②

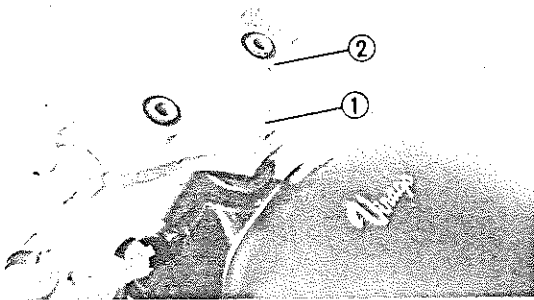


6. Remove:

- Handlebar holder assembly ①
- Indicator box ②
- Speedometer with bracket ③

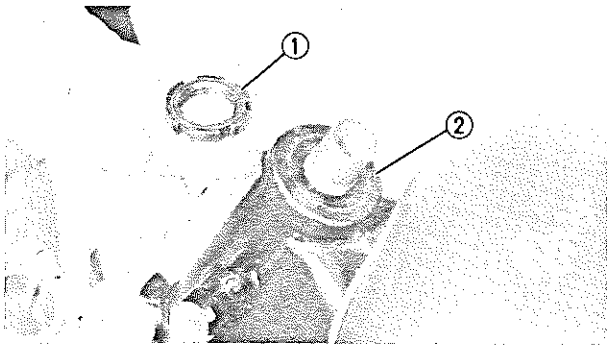
**NOTE:**

Take care not to lose the clevis pins.



7. Remove:

- Bolt (Steering crown) ①
- Steering crown ②

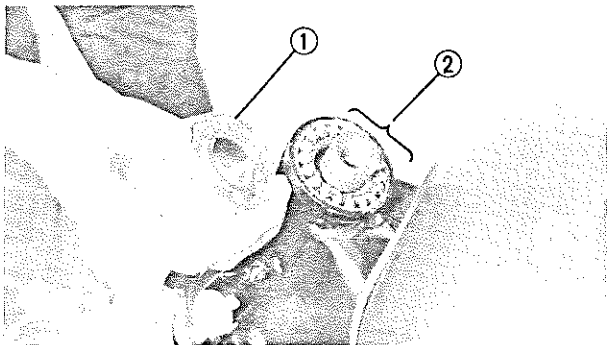


8. Remove:

- Ring nut ①
Use the Ring Nut Wrench (90890-01403).
- Bearing cover ②

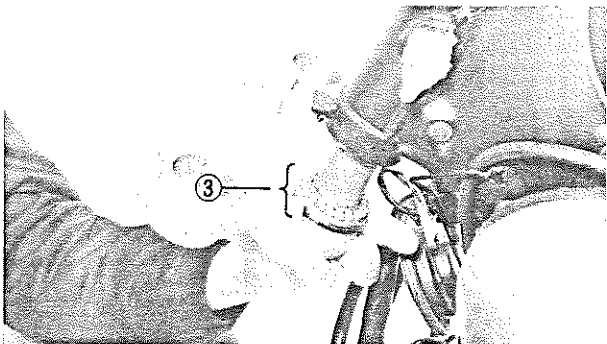
WARNING:

Support the under bracket so that it may not fall down.



9. Remove:

- Steering stem ①
- Ball race (Upper – Top) ①
- Ball (19 pcs.) ②
- Ball (19 pcs.) ③



10. Remove:

- Ball race (Upper – Bottom)
- Ball race (Lower – Top)
Use a drift punch and a hammer.

NOTE:

Work the race out gradually by tapping lightly around its complete backside diameter.



INSPECTION

1. Wash the bearing in a solvent.
2. Inspect:
 - Balls
 - Ball races
 Pitting/Damage → Replace.

NOTE:

Always replace ball and race as a set.

INSTALLATION

1. Install:
 - Ball race (Upper – Bottom) ①
 - Ball race (Lower – Top) ②
 Tap in the new races in the head pipe.
2. Lubricate:
 - Ball race (Upper – Bottom)
 - Ball race (Lower – Top)



Wheel Bearing Grease

3. Install:
 - Balls (Upper and lower) ③ , ④
 Arrange the balls around race, and apply more grease.

Ball Quantity/Size:
19 pcs./1/4 in

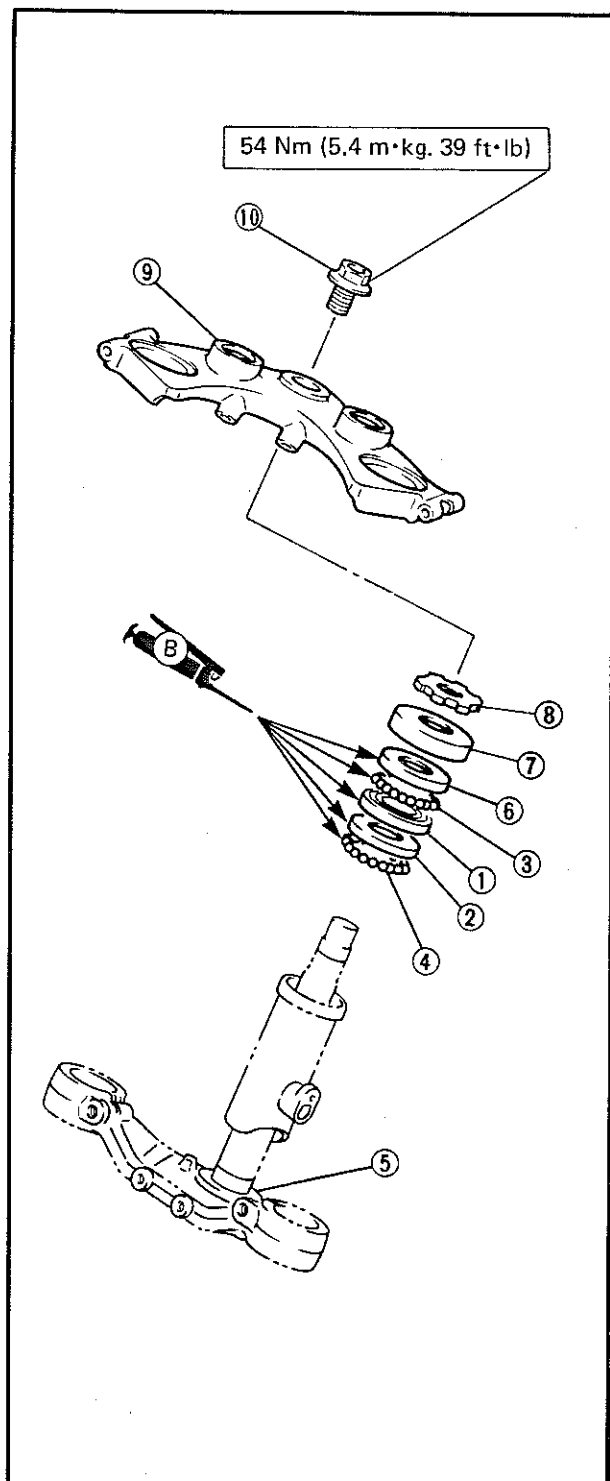
4. Install:
 - Steering stem ⑤
 - Ball race (Upper – Top) ⑥
 - Bearing cover ⑦
 - Ring nut ⑧

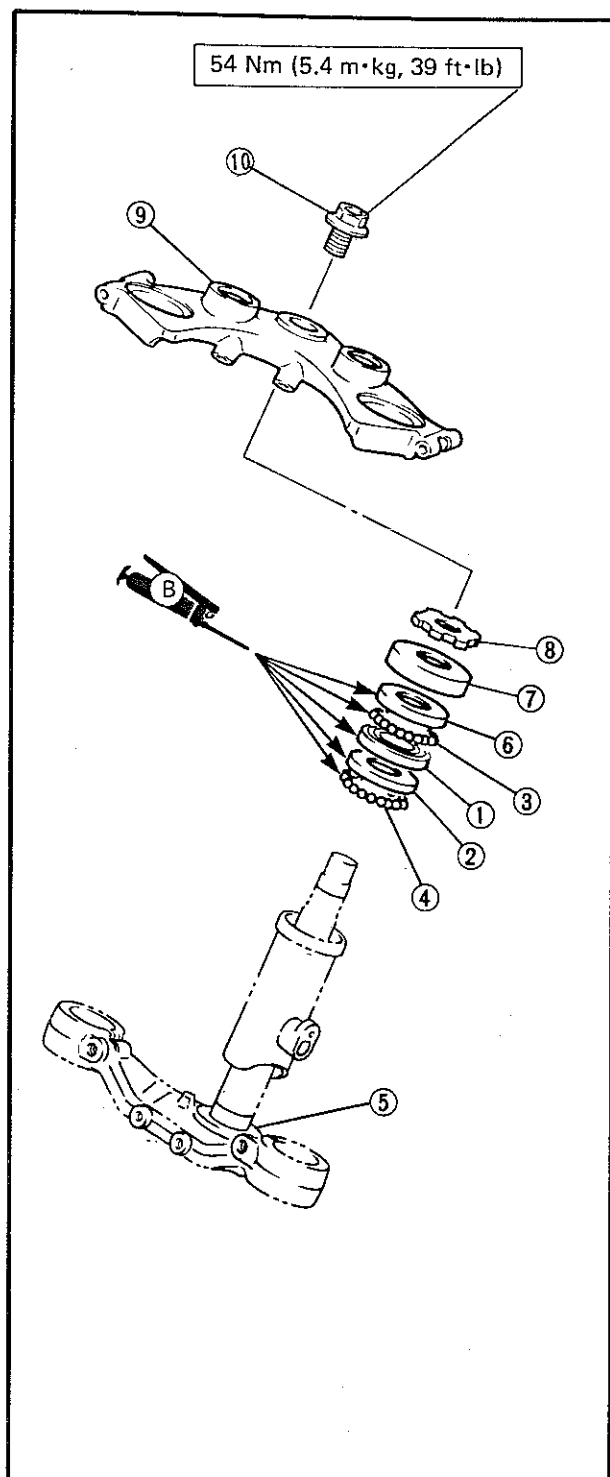
NOTE:

The tapered side of ring nut must face downward.

CAUTION:

Hold the steering stem until it is secured.





5. Tighten:

- Ring nut ⑧

Ring nut tightening steps:

NOTE:

Set the Torque Wrench to the Ring Nut Wrench so that they form a right angle.

- Tighten the ring nut ⑧ using the Ring Nut Wrench (90890-01403).



Ring Nut (Initial Tightening):
38 Nm (3.8 m·kg, 27 ft·lb)

- Loosen the ring nut ⑧ completely and re-tighten it to specification.

WARNING:

Do not over-tightening.



Ring Nut (Final Tightening):
10 Nm (1.0 m·kg, 7.2 ft·lb)

- Check the steering stem by turning it lock to lock. If there is any binding, remove the steering stem assembly and inspect the steering bearings ④, ⑥.
- Install the steering crown ⑨ and tighten the steering stem nut ⑩ to specification.



Nut (Steering Stem):
54 Nm (5.4 m·kg, 39 ft·lb)

6. Install:

- Components in aforementioned list (Removal steps "6 ~ 1")
Refer to "FRONT FORK and FRONT WHEEL" section.

NOTE:

Do not forget to fit:

- The clevis pins to the handlebar holders.
- The cable holders to the front fork top.



Headlight Stay:

7 Nm (0.7 m·kg, 5.1 ft·lb)

Pinch Bolts (Steering Crown):

20 Nm (2.0 m·kg, 14 ft·lb)

Handlebar Holder (Lower):

20 Nm (2.0 m·kg, 14 ft·lb)

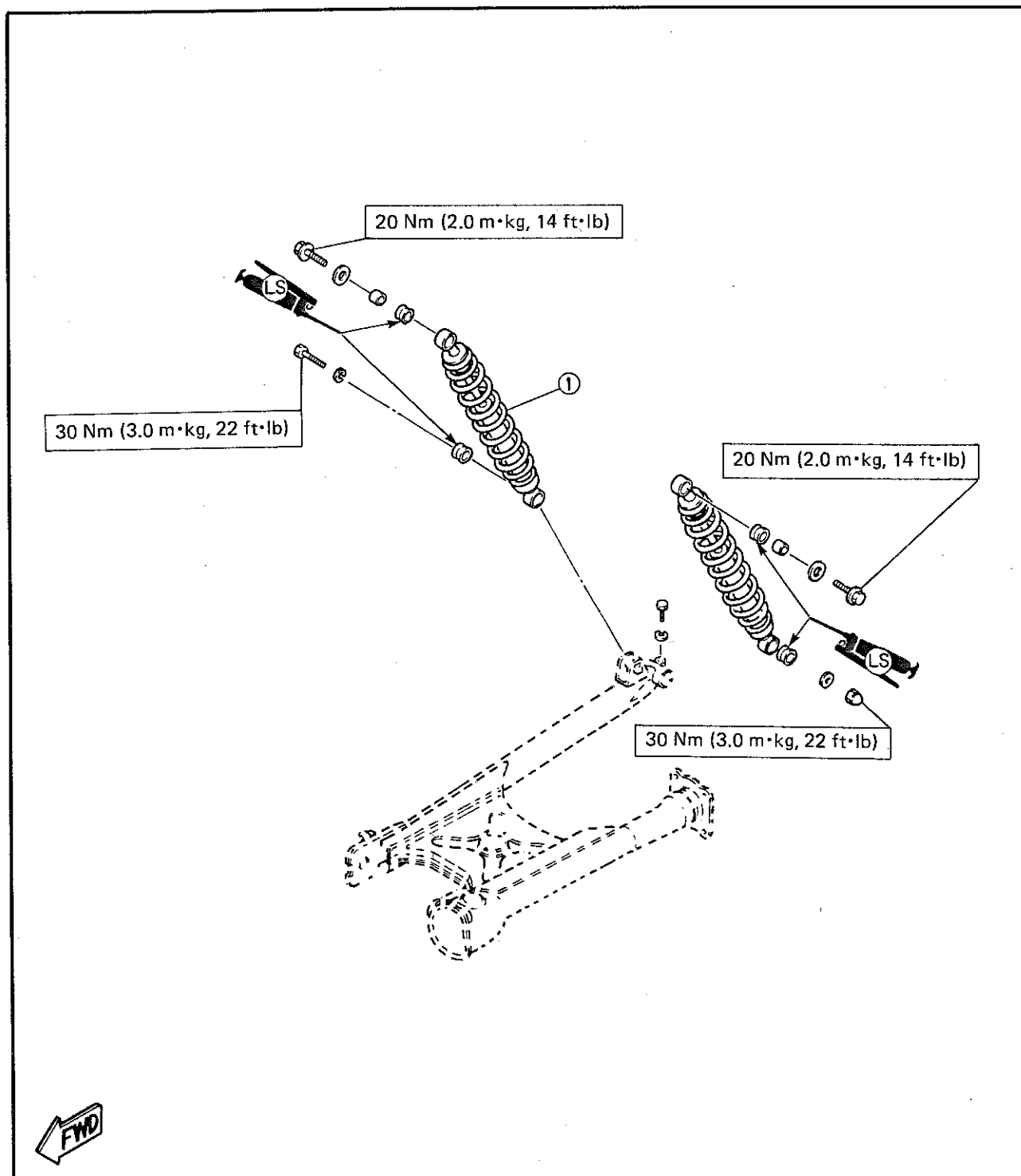
7. Adjust:

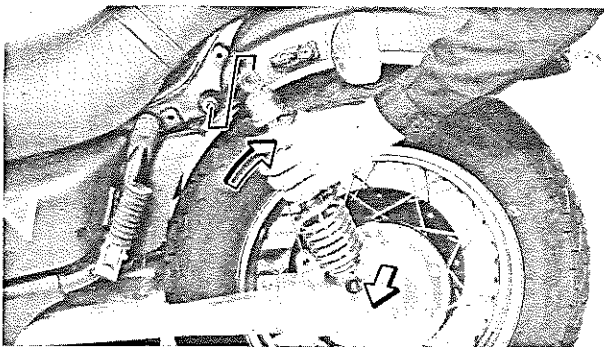
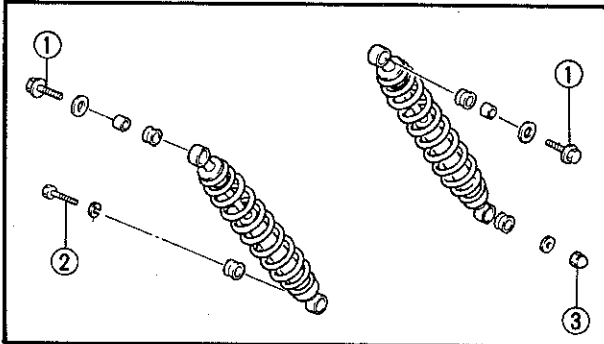
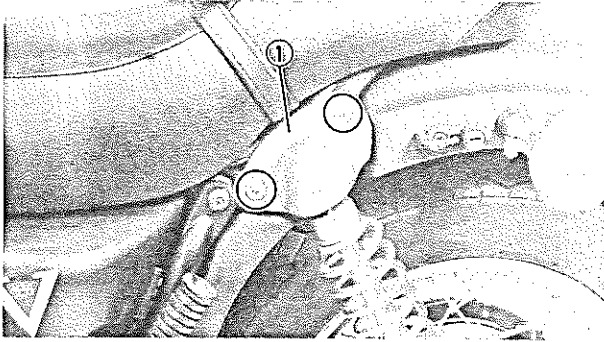
- Headlight beam

Refer to "CHAPTER 2. HEADLIGHT
BEAM ADJUSTMENT" section.

REAR SHOCK ABSORBER

① Rear shock absorber assembly





REMOVAL

WARNING:

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

1. Place the motorcycle on level place.
2. Remove:
 - Covers (Rear shock absorber) ①
3. Remove:
 - Bolts (Rear shock absorber – Top) ①
 - Bolt (Rear shock absorber – Right bottom) ②
 - Nut (Rear shock absorber – Left bottom) ③
4. Elevate the rear wheel by placing a suitable stand under the engine.
5. Pull out the shock absorber top, and turn the shock absorber clockwise.
6. Remove:
 - Rear shock absorbers

INSPECTION

1. Inspect:
 - Shock absorber rod
 - Bends/Damage → Replace the shock absorber assembly.
 - Shock absorber
 - Oil leaks → Replace the shock absorber assembly.
 - Spring
 - Fatigue → Replace the shock absorber assembly.
 - Move the spring up and down.

INSTALLATION

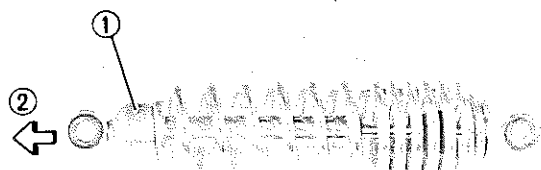
When installing the rear shock absorber, reverse the removal procedure. Note the following points.

1. Apply:
 - Lithium base grease
 - To the pivot points.

2. Install:
 - Rear shock absorbers

NOTE:

The rear shock absorber should be installed so that the gas chamber ① on the shock absorber faces toward ② .



3. Tighten:
 - Bolts (Shock absorber – Top)
 - Bolt (Shock absorber – Right bottom)
 - Nut (Shock absorber – Left bottom)
 - Covers (Shock absorber)



Bolts (Shock Absorber – Top):
20 Nm (2.0 m·kg, 14 ft·lb)

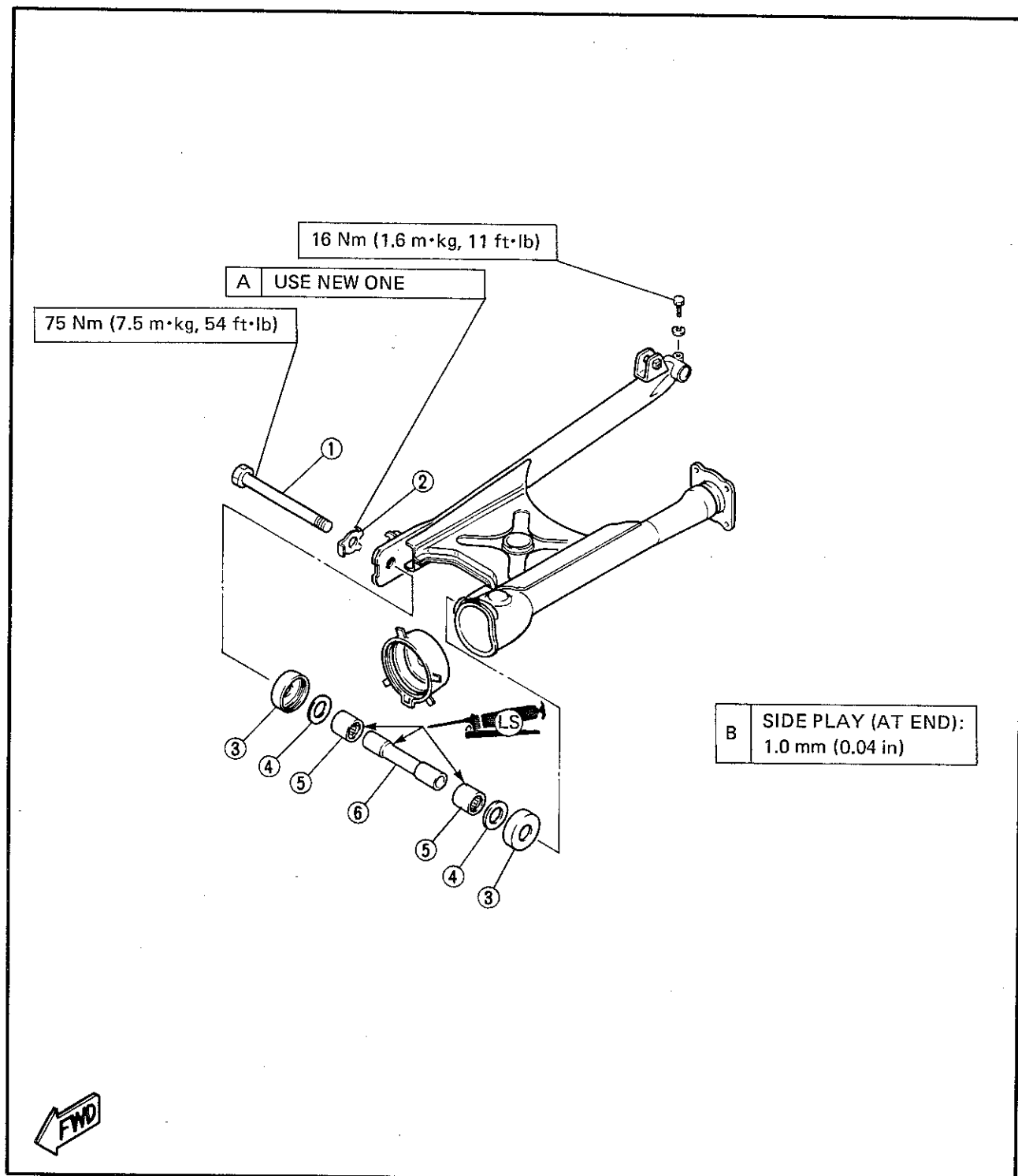
Bolt (Shock Absorber – Right Bottom):
30 Nm (3.0 m·kg, 22 ft·lb)

Nut (Shock Absorber – Left Bottom):
30 Nm (3.0 m·kg, 22 ft·lb)

Covers (Shock Absorber):
9 Nm (0.9 m·kg, 6.5 ft·lb)

SWINGARM

- ① Pivot shaft
- ② Lockwasher
- ③ Thrust cover
- ④ Plain washer
- ⑤ Taper roller bearing
- ⑥ Bushing



FREE PLAY INSPECTION

WARNING:

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

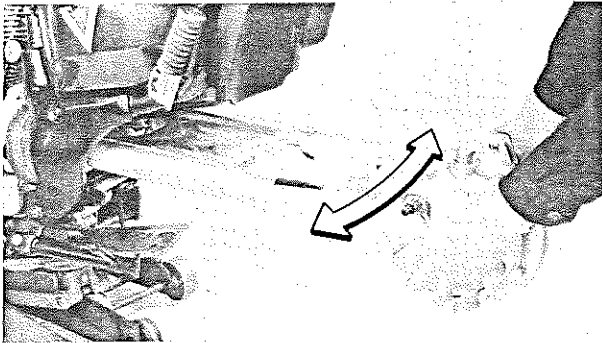
1. Remove:

- Rear wheel
- Rear shock absorbers

Refer to "REAR WHEEL and REAR SHOCK ABSORBER" sections.

2. Check:

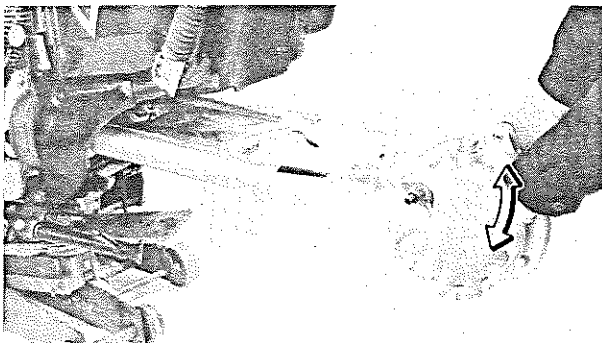
- Swingarm (Side play)
Side play → Replace taper roller bearings and bushing.
Move the swingarm from side to side.



Side Play (At End of Swingarm):
1.0 mm (0.04 in)

3. Check:

- Swingarm (Vertical movement)
Tightness/Binding/Rough spots → Replace bearings.
Move the swingarm up and down.



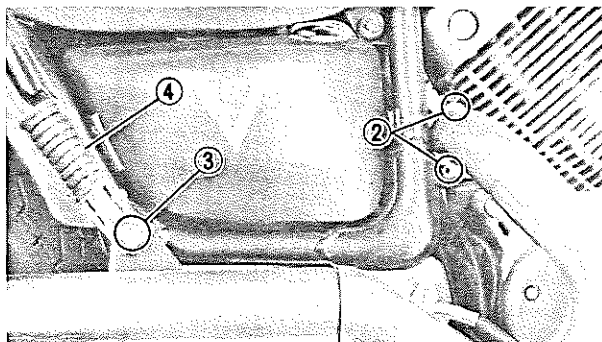
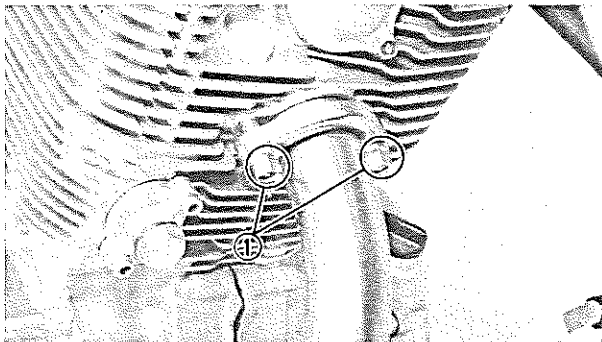
REMOVAL

WARNING:

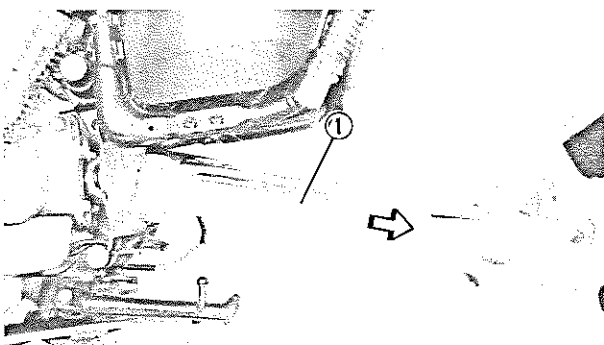
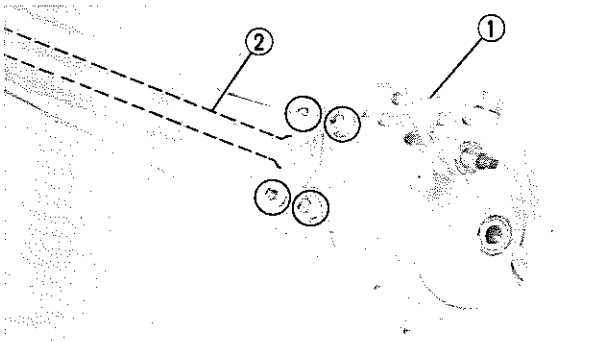
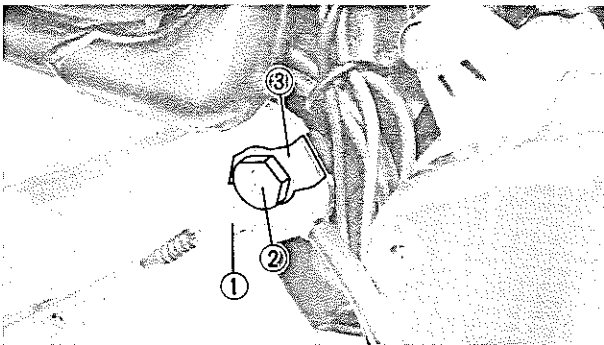
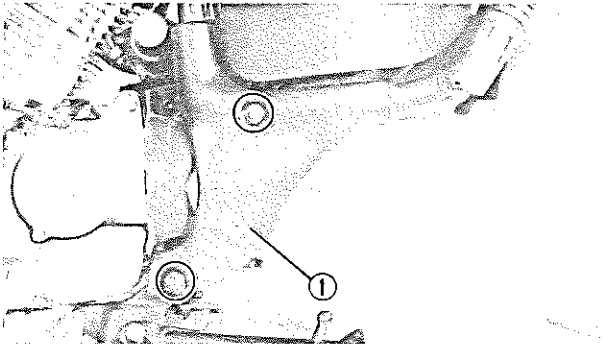
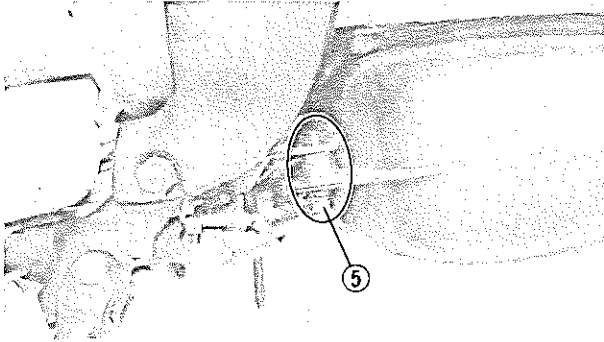
Securely support the motorcycle so there no danger of it falling over.

1. Remove:

- Nuts (Front cylinder — Exhaust pipe) ①
- Bolts (Rear cylinder — Rear joint) ②
- Bolt (Muffler bracket) ③
- Rear footrest (Right) ④
- Bolt (Muffler chamber) ⑤
- Muffler assembly

**NOTE:**

After removing the muffler assembly elevate the rear wheel by placing a suitable stand under the engine.

**2. Remove:**

- Rear wheel
- Rear shock absorbers

Refer to "REAR WHEEL and REAR SHOCK ABSORBER" sections.

3. Remove:

- Rear-under-side cover (1)

4. Unhook the rear brake cable (1) .**5. Flatten:**

- Lock washer tab
- Use a blunt chisel.

6. Remove:

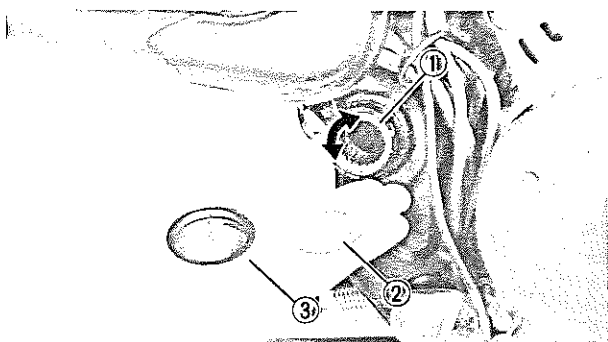
- Pivot shaft (2)
- Lock washer (3)

7. Remove:

- Final gear assembly (1)
- Drive shaft (2)

8. Remove:

- Swingarm (1)

**INSPECTION**

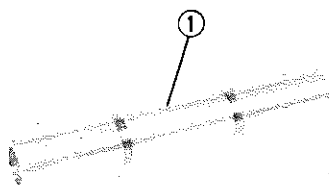
1. Wash the bearings in a solvent.

2. Inspect:

- Bearings (Race/Rollers) ①
Pitting/Damage → Replace.
- Plain washer ②
- Thrust cover ③
Damage → Replace.

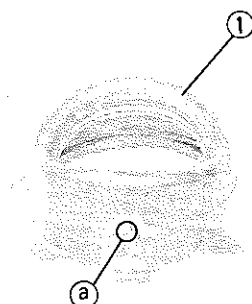
3. Inspect:

- Bushing ①
Scratches/Damage → Replace.



4. Inspect:

- Rubber boot ①
Damage → Replace.

**NOTE:**

The rubber boot should be installed so that the hole ① on the boot face downward.

INSTALLATION

When installing the swingarm, reverse the removal procedures. Note the following points.

1. Lubricate:

- Bearings
- Bushing



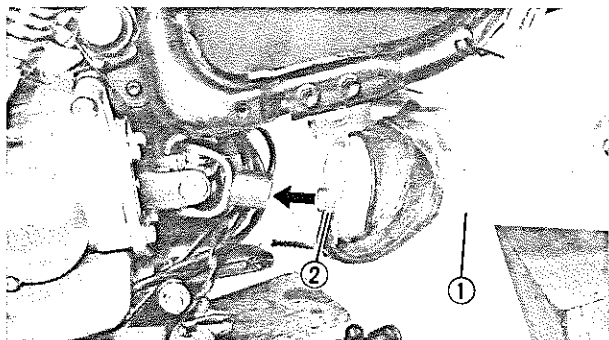
**Lithium Base Waterproof
Wheel Bearing Grease**

2. Lubricate:

- Drive shaft splines



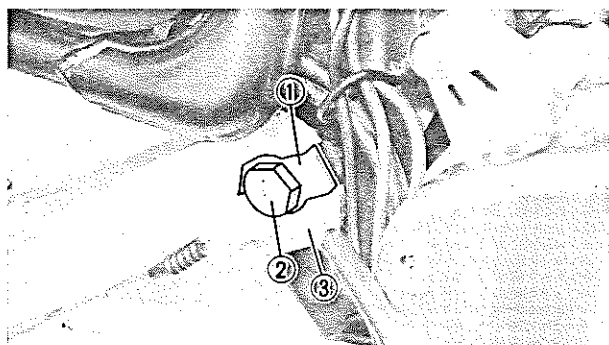
Molybdenum Disulfide Grease



3. Install:
- Swingarm (Without final gear assembly) ①
 - Drive shaft ②

NOTE:

Insert the drive shaft properly through the swingarm into the universal joint.



4. Install:
- Lock washer (New) ①
 - Pivot shaft ②

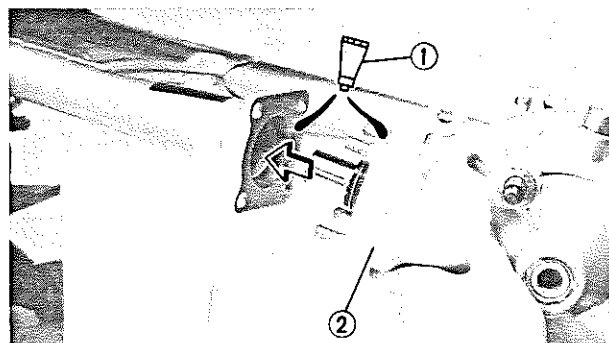
NOTE:

Make sure that the tab of the lock washer engages the slot in the swingarm.



Pivot Shaft:
70 Nm (7.0 m·kg, 54 ft·lb)

5. Bend the lock washer tab along the bolt head flats.
6. Hook the rear brake cable ③.



7. Apply:
- Yamaha Bond No. 1215 (90890-85505) ①
- To the mating surfaces of both case halves.
8. Install:
- Final gear assembly ②

NOTE:

Fit the coupling gear over the drive shaft properly.



Nuts (Final Gear Assembly):
42 Nm (4.2 m·kg, 30 ft·lb)

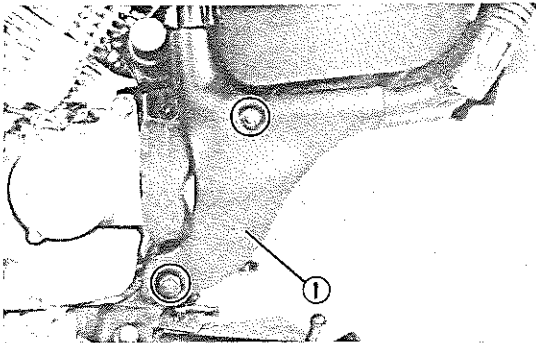


9. Check:

- Side play (Swingarm)
- Vertical movement (Swingarm)

Faulty → Repair.

Refer to "FREE PLAY INSPECTION" section.



10. Install:

- Rear-under-side cover ①

**Rear-under-side Cover:**

Top: 7 Nm (0.7 m·kg, 5.1 ft·lb)

Bottom: 20 Nm (2.0 m·kg, 14 ft·lb)

11. Install:

- Rear shock absorbers
- Rear wheel

Refer to "REAR SHOCK ABSORBER and REAR WHEEL" sections.

12. Install:

- Muffler assembly

NOTE:

Inspect the gaskets. If damaged, replace them.

**Exhaust Pipe:**

20 Nm (2.0 m·kg, 14 ft·lb)

Rear Joint (Exhaust Pipe):

10 Nm (1.0 m·kg, 7.2 ft·lb)

Rear Footrest:

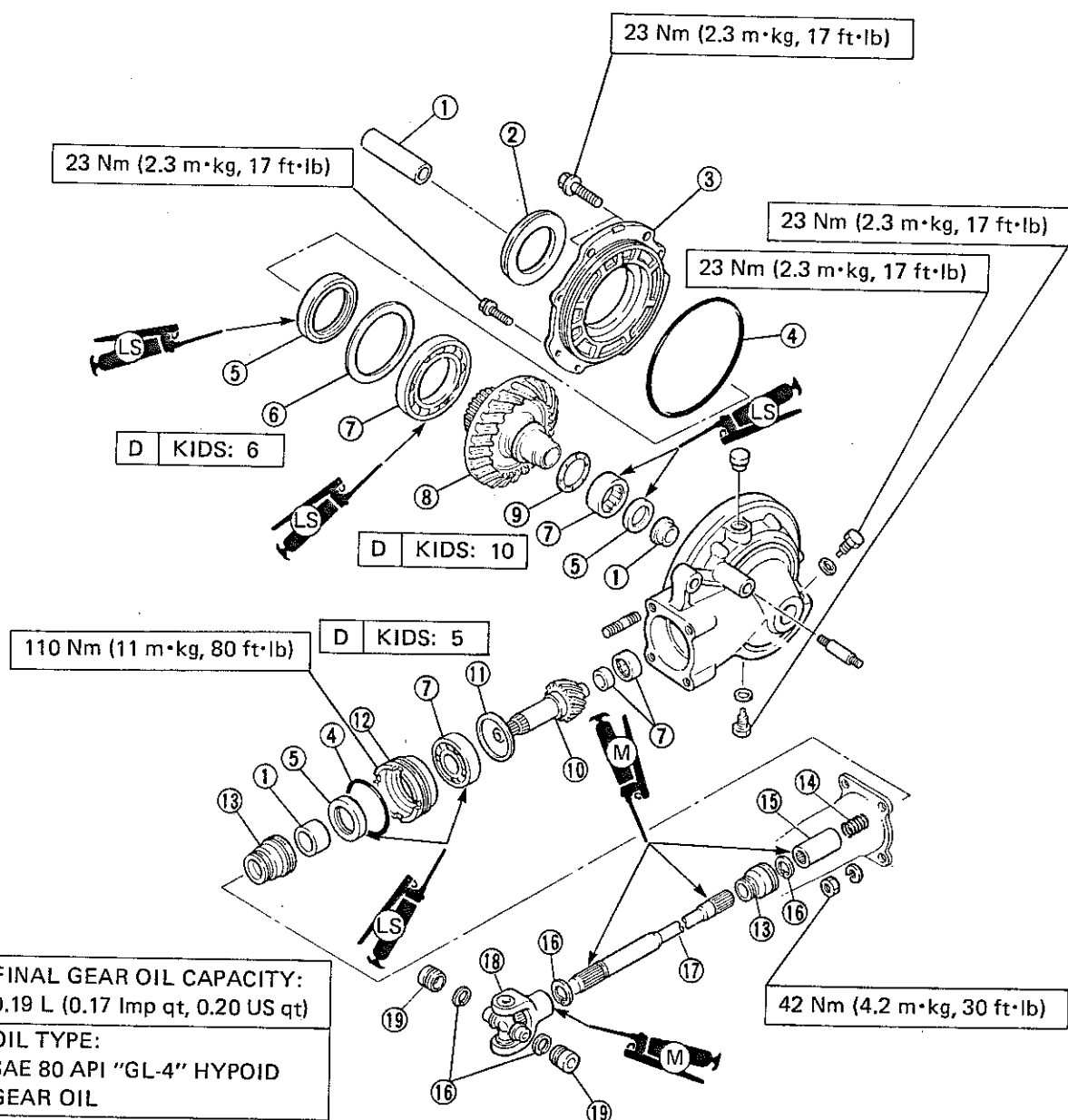
45 Nm (4.5 m·kg, 32 ft·lb)

Muffler Chamber:

20 Nm (2.0 m·kg, 14 ft·lb)

SHAFT DRIVE

- | | | |
|-------------------|-------------------------|-------------------|
| ① Collar | ⑨ Thrust washer | ⑰ Drive shaft |
| ② Dust seal | ⑩ Drive pinion gear | ⑱ Universal joint |
| ③ Bearing housing | ⑪ Final drive gear shim | ⑲ Bearing |
| ④ O-ring | ⑫ Bearing retainer | |
| ⑤ Oil seal | ⑬ Boot | |
| ⑥ Ring gear shim | ⑭ Spring | |
| ⑦ Bearing | ⑮ Coupling gear | |
| ⑧ Ring gear | ⑯ Circlip | |



A	FINAL GEAR OIL CAPACITY: 0.19 L (0.17 Imp qt, 0.20 US qt)
B	OIL TYPE: SAE 80 API "GL-4" HYPOID GEAR OIL
C	GEAR LASH: 0.1 ~ 0.2 mm (0.004 ~ 0.008 in)



**TROUBLESHOOTING**

The following conditions may indicate damaged shaft drive components:

A	Symptoms	B	Possible Causes
	<ol style="list-style-type: none">1. A pronounced hesitation or "jerky" movement during acceleration, deceleration, or sustained speed. (This must not be confuse with engine surging or tansmission characteristics.)2. A "rolling rumble" noticeable at low speed; a high-piched whine; a "clunk" from a shaft drive component or area.3. A locked-up condition of the shaft drive mechanism; no power transmitted from engine to rear wheel.		<ol style="list-style-type: none">A. Bearing damage.B. Improper gear lash.C. Gear tooth damage.D. Broken drive shaft.E. Broken gear teeth.F. Seizure due to lack of lubrication.G. Small foreign object lodged between moving parts.

NOTE:

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. Investigate any unusual noises

The following "Noises" may indicate a mechanical defect:

- a. A "rolling rumble" noise during coasting, acceleration, or deceleration. The noise increases with rear wheel speed, but it does not increase with higher engine or transmission speeds.

Diagnosis: Possible wheel bearing damage.

- b. A "whining" noise that varies with acceleration and deceleration.

Diagnosis: Possible incorrect reassembly, too-little gear lash.

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 gear damage.

- c. A slight "thunk" evident at low speed operation. This noise must be distinguished from normal motorcycle operation.

Diagnosis: Possible broken gear teeth.

WARNING:

Stop riding immediately if broken gear teeth are suspected. This condition could result in a locking-up of the shaft drive assembly, causing loss of control of the bike and possible injury to the rider.

2. Inspect:

- Drained oil

Drain plug shows large amount of metal.

Particles → Check bearing for seizure.

NOTE:

A small amount of metal particles in the oil is normal.

3. Inspect:

- Oil leakage

Oil leakage inspection steps:

- Clean the entire motorcycle thoroughly, then dry it.
- Apply a leak-localizing compound or dry powder spray to the shaft drive.
- Road test the motorcycle for the distance necessary to locate the leak.

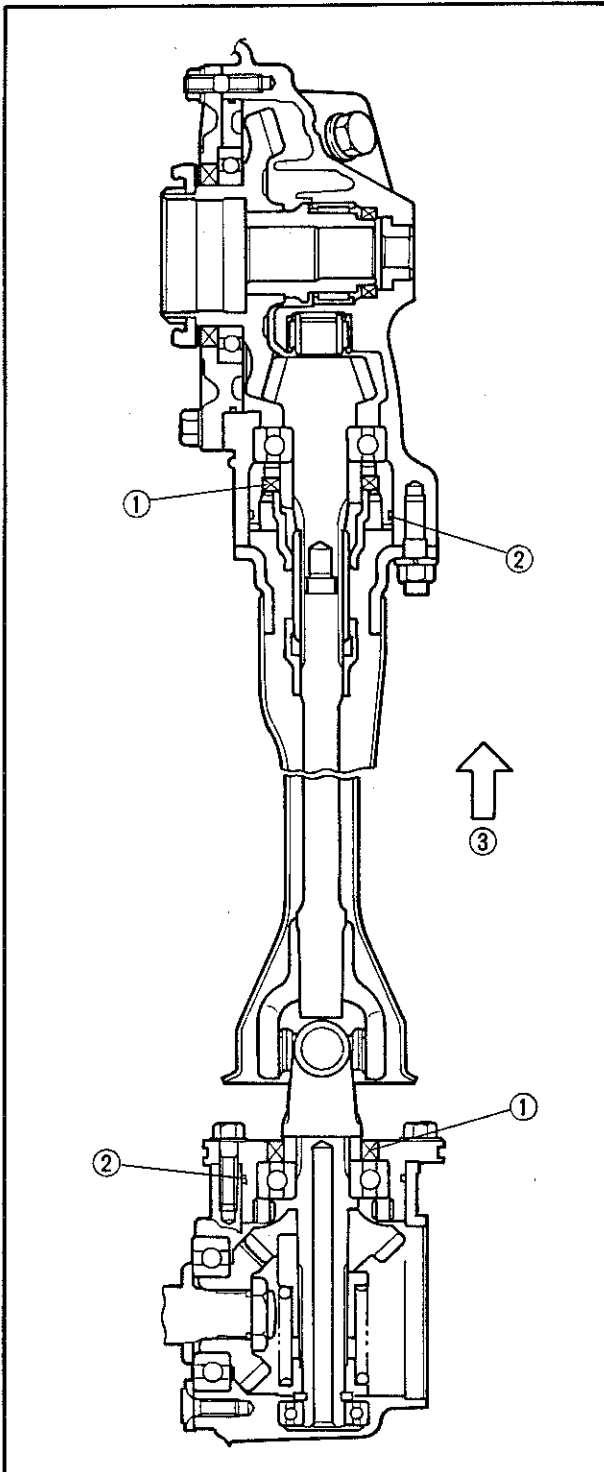
Leakage → Inspect component housing, gasket, and/or seal for damage.

Damage → Replace component.

- ① Oil seal
- ② O-ring
- ③ Forward

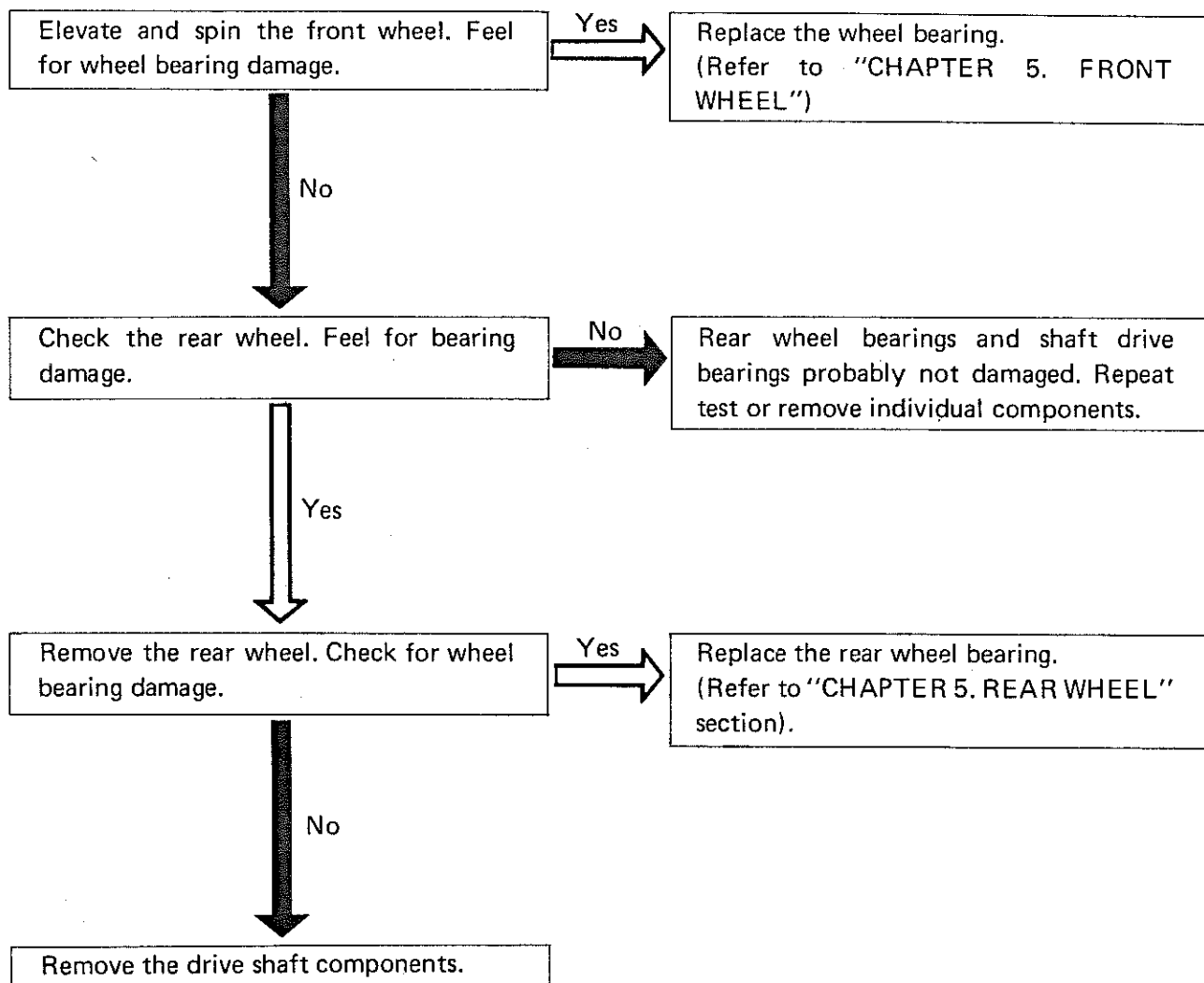
NOTE:

- An apparent oil leak on a new or nearly new motorcycle may be the result of a rest-preventative coating or excessive seal lubrication.
- Always clean the motorcycle and recheck the suspected location of an apparent leakage.



**Troubleshooting Chart**

When basic conditions "a" and "b" above exist, check the following points:



REMOVAL

WARNING:

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

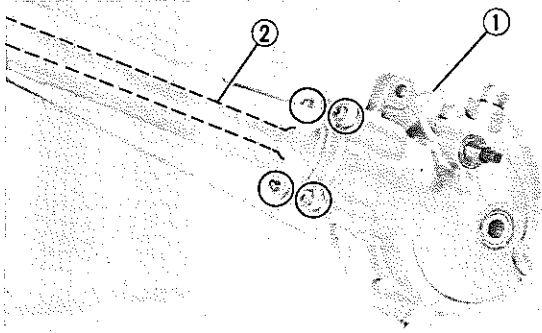
1. Remove:

- Rear wheel
- Rear shock absorbers

Refer to "REAR WHEEL and REAR SHOCK ABSORBER" sections.

2. Remove:

- Final gear assembly ①
- Drive shaft ②



DISASSEMBLY

NOTE:

Before disassembling the rear final gear, drain the oil completely.

1. Remove:

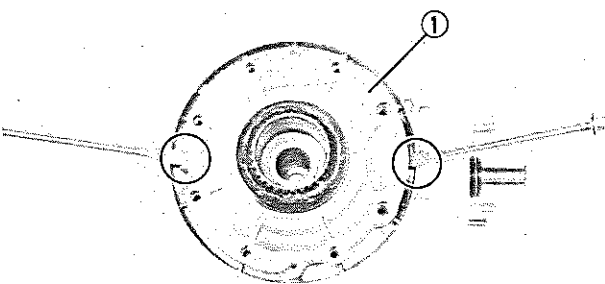
- 8 mm bolts (Bearing housing)
- 10 mm bolts (Bearing housing)

NOTE:

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

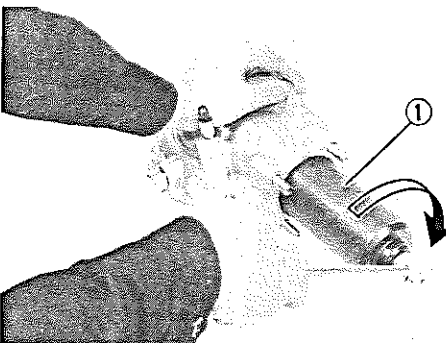
2. Remove:

- Bearing housing with ring gear ①
- Shim(s)
- Thrust washer



3. Remove:

- Coupling gear
- Bearing retainer (Final drive shaft)
Use a Final Drive Shaft Bearing Retainer ① (90890-04077).

**CAUTION:**

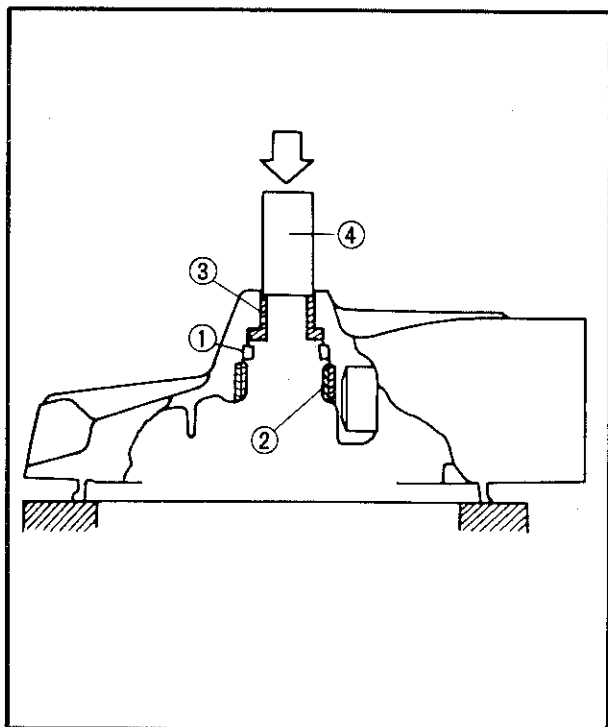
Final-drive-shaft-bearing-retainer has left-hand threads. Turn retainer clockwise to loosen it.

4. Remove:

- Final drive pinion gear assembly
Tap lightly on the final drive pinion gear end with a soft hammer.

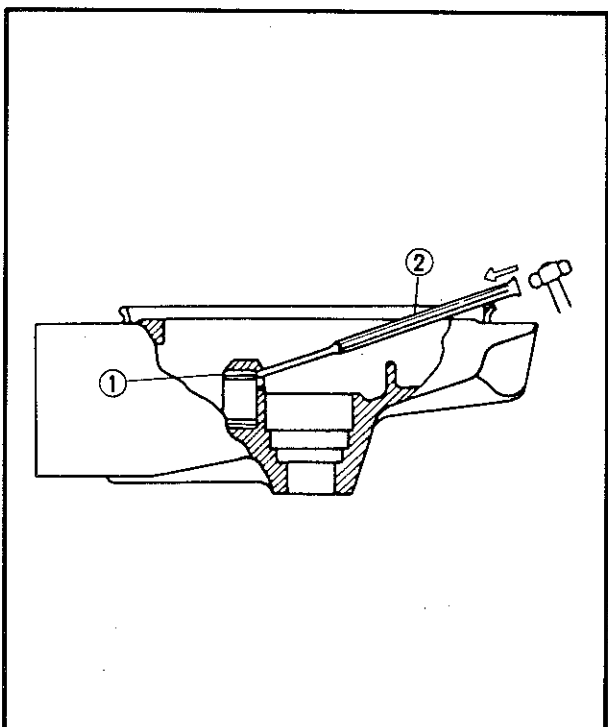
CAUTION:

Final drive pinion gear removal should be performed only if gearing replacement is necessary. Do not reuse bearings or races after removal.



5. Remove:

- Oil seal (1)
- Roller-bearing (Large) (2)
- Guide collar (3)
Use a suitable press tool (4) and an appropriate support for the main housing.



6. Remove:

- Final drive shaft roller bearing (Small) (1)

Roller bearing (Small) removal steps:

- Heat the bare housing to 150°C (302°F).
- Remove the roller bearing outer race with an appropriately shaped punch (2).
- Remove the inner race from the final drive shaft.

NOTE:

The removal of the final drive shaft roller bearing is difficult and seldom necessary.

INSPECTION

1. Inspect:

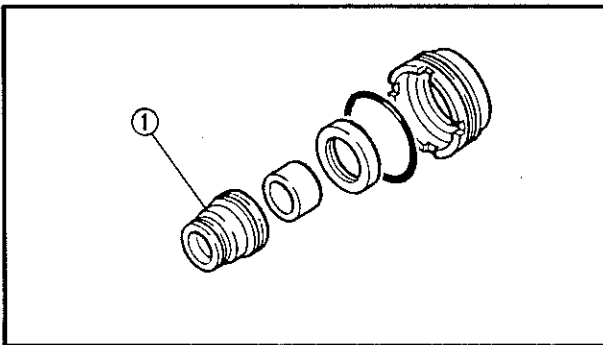
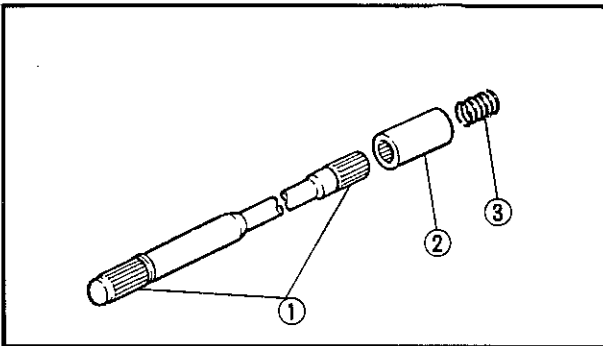
- Gear teeth
Pitting/Galling/Wear → Replace drive pinion gear and ring gear as a set.
- Oil seal
- O-ring
Damage → Replace.

2. Inspect:

- Roller bearing
Damage → Replace.

NOTE:

Reuse of roller bearing OK, but Yamaha recommends installation of new bearing. Do not reuse the oil seal.



3. Inspect:

- Drive shaft splines ①
- Coupling gear spline ②
Wear/Damage → Replace.
- Spring ③
Fatigue → Replace.
Move the spring up and down.

4. Inspect:

- Boot ①
Damage → Replace.

REASSEMBLY

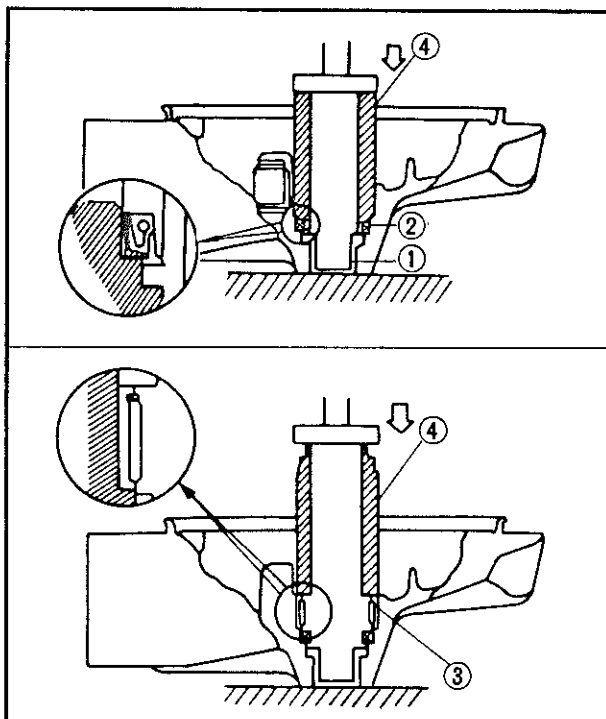
When reassembling the final gear, reverse the disassembly procedures. Note the following points.

1. Install:

- Roller bearing (Small-New)

Roller bearing (Small) installation steps:

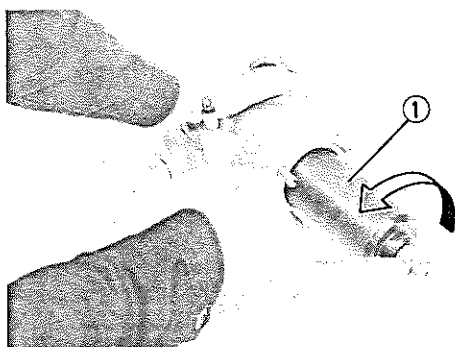
- Heat the bare bearing to 150°C (302°F).
- Install the roller bearing outer race using the proper adapted.
- Install the inner race onto the drive shaft.



2. Install:

- Guide collar ①
- Oil seal (New) ②
- Roller bearing (Large) ③

Use a suitable press tool ④ and a press to install the above components into the main housing.



3. Install:

- Shims
- Final drive pinion gear assembly
- Bearing retainer (Final drive shaft)

Use a Final Drive Shaft Bearing Retainer Wrench ① (90890-04077).

NOTE:

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



Bearing Retainer:
110 Nm (11 m·kg, 80 ft·lb)

4. Install:

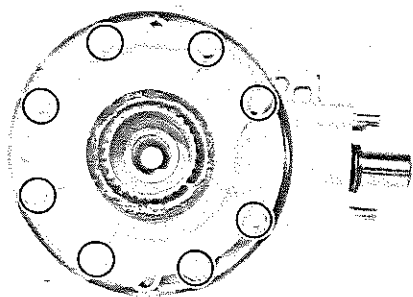
- Thrust washer
- Shim(s)
- Bearing housing with ring gear

5. Install:

- 10 mm bolts (Bearing housing)
- 8 mm bolts (Bearing housing)

NOTE:

Tighten the bolts in stage, using a crisscross pattern.





10 mm Bolts (Bearing Housing):

23 Nm (2.3 m·kg, 17 ft·lb)

8 mm Bolts (Bearing Housing):

23 Nm (2.3 m·kg, 17 ft·lb)

6. Check:

- Gear lash

Out of specification → Adjust.

Refer to "MEASUREMENT AND ADJUSTMENT" section.

7. Fill:

- Rear final gear case

WARNING:

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



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, and SAE 80W90 Hypoid
gear oil may be used for all condi-
tions.

INSTALLATION

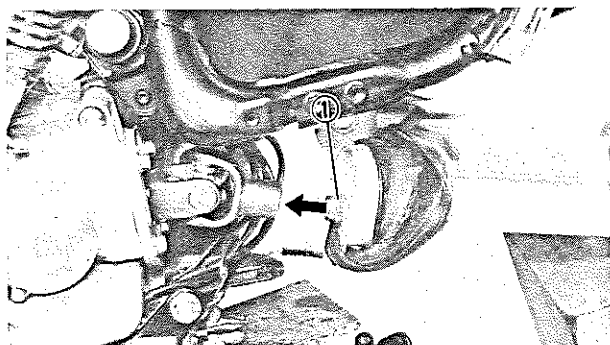
When installing the final gear, reverse the removal procedure. Note the following points.

1. Lubricate:

- Shaft splines



Molybdenum Disulfide Grease

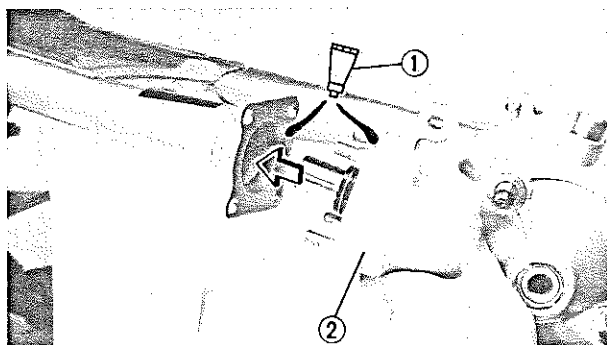


2. Install:

- Drive shaft ①

NOTE:

Insert the drive shaft properly through the swingarm into the universal joint.



3. Apply:

- Yamaha Bond No. 1215 (90890-85505) ①

To the mating surfaces of both case halves.

4. Install:

- Final gear assembly ②

NOTE:

Fit the coupling gear over the drive shaft properly.

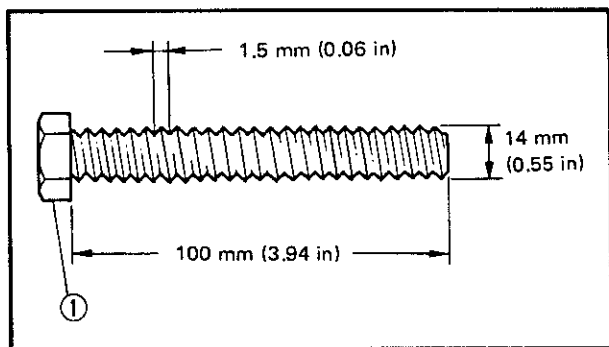


Nuts (Final Gear Assembly):
42 Nm (4.2 m·kg, 30 ft·lb)

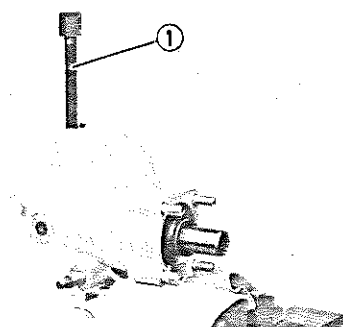
5. Install:

- Rear shock absorbers
- Rear wheel

Refer to "REAR SHOCK ABSORBER and REAR WHEEL" sections.

**MEASUREMENT AND ADJUSTMENT****NOTE:**

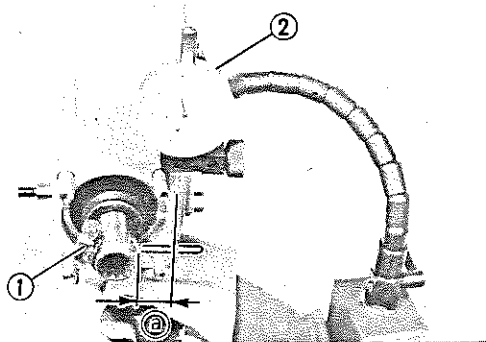
Before measuring and adjusting the gear back lash, drain the oil completely.

**Final Gear Gear Lash Measurement**

1. Secure the gear case in a vise or other support.
2. Remove:
 - Drain plug
 Drain the oil.
3. Install:
 - A bolt of the specified size ①
 Into the drain plug hole.

CAUTION:

Finger tighten the bolt until it holds the ring gear. Otherwise, the ring gear will be damaged.



4. Attach:

- Gear Lash Measurement Tool ① (90890-01230)
- Dial Gauge ② (90890-03097)

a) Measuring point

5. Measure:

- Gear lash

Gently rotate the gear coupling from engagement to engagement.

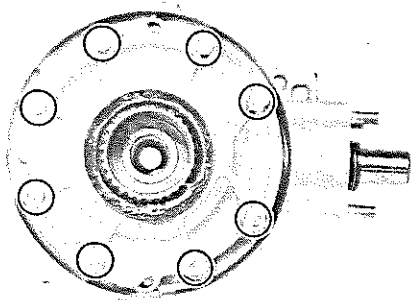
Over specified limit → Adjust.



Rear Final Gear Gear Lash:
0.1 ~ 0.2 mm (0.004 ~ 0.008 in)

NOTE:

Measure the gear lash at 4 positions. Rotate the shaft 90° each time.

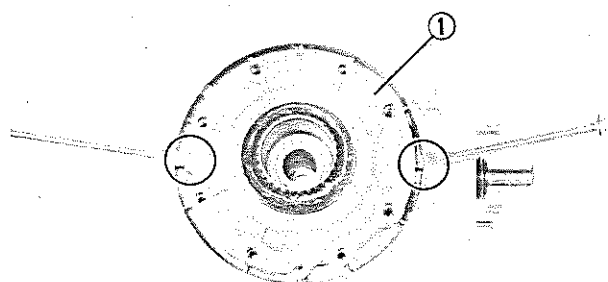
**Final Gear Gear Lash Adjustment**

1. Remove:

- 8 mm bolts (Bearing housing)
- 10 mm bolts (Bearing housing)

NOTE:

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

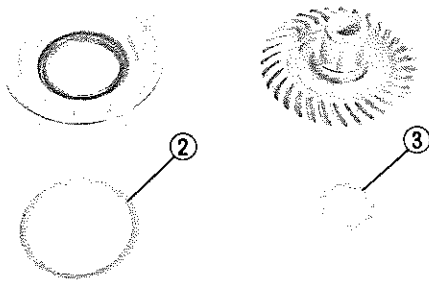


2. Remove:

- Bearing housing ①
- Shim(s) ②
- Thrust washer ③

3. Adjust:

- Gear lash

**Gear lash adjustment steps:**

- Select the suitable shims and thrust washer by the following chart.

Too-little gear lash →

Reduce shim thickness.

Too-large gear lash →

Increase shim thickness.

To Add or Reduce Ring Gear Shim Thickness

Increase by more than 0.1 mm (0.004 in)

Reduce by more than 0.1 mm (0.004 in)

Reduce thrust washer thickness by 0.1 mm (0.004 in) for every 0.1 mm of ring gear shim increase.

Reverse procedure



Ring Gear Shim

Thickness (mm)

0.25

0.30

0.35

0.40

0.45

0.50



Thrust Washer

Thickness (mm)

1.2

1.3

1.4

1.5

1.6

1.7

1.8

1.9

2.0

2.1

FINAL DRIVE GEAR AND RING GEAR POSITIONING

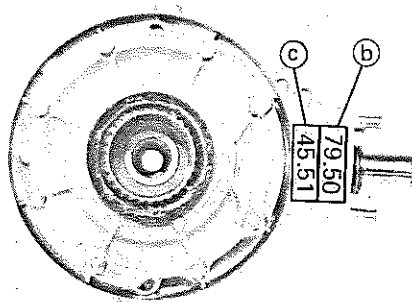
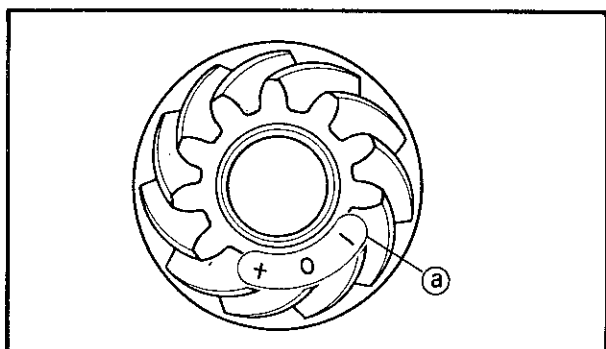
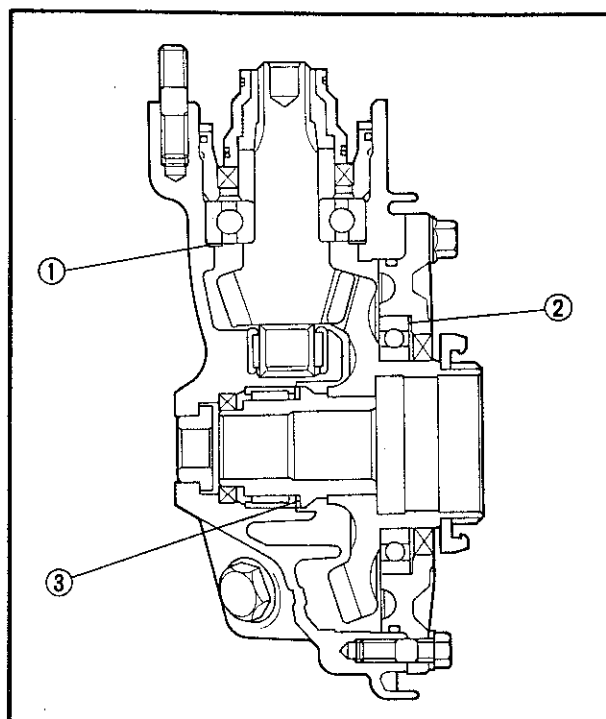
NOTE:

Gear positioning is necessary when any of the following parts are replaced:

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

1. Select:

- Final drive gear shim
- Ring gear shim



Final drive/Ring gear shim selection steps:

- Position final drive shaft gear and ring gear by using shims ① and ② with their respective thicknesses calculated from information marked on final gear case, drive gear end and ring gear.

- ① Shim thickness "A"
- ② Shim thickness "B"
- ③ Thrust washer

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

Final Drive Gear Shim Thickness:

$$A = \textcircled{a} - \textcircled{b}$$

Where:

① = ① numeral (usually a decimal number) on the gear is either added to or subtracted from "80".

② = ② numeral on the gear case (i.e. 79.50)

Example:

1) If final drive shaft gear is marked "+01" ... "①" is 80.01.

2) If the gear case is marked "79.50" ... "②" is 79.50.

$$A = 80.01 - 79.50 \\ = 0.51$$

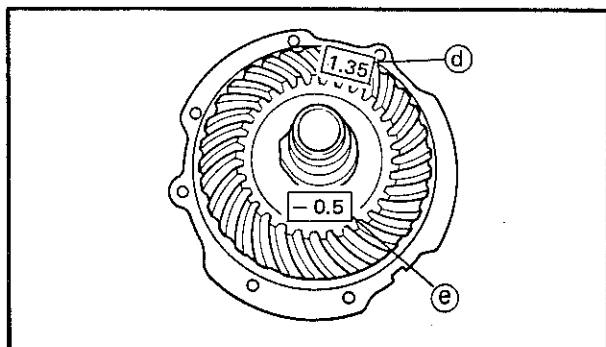
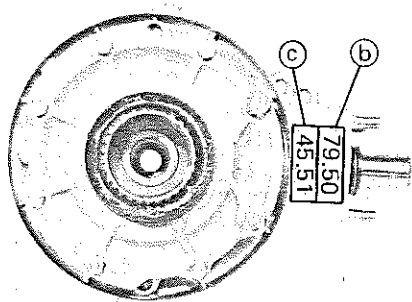
3) Therefore, shim thickness is 0.51 mm.

Shim sizes are supplied in following thicknesses:

	Final Drive Gear Shim	
Thickness (mm)	0.15	0.30
	0.40	0.50
	0.60	

Because shims can only be selected in 0.05 mm increments, round off hundred the digit and select 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. The chart instructs you, however, to round off the 1 to 0. Thus you should use a 0.50 mm shim.

- To find shim thickness "B", use following formula:

Ring Gear Shim Thickness:

$$B = \textcircled{c} + \textcircled{d} - (\textcircled{e} + \textcircled{f})$$

Where:

- ③ = numeral on gear case (i.e. 45.51)
- ④ = numeral on outside of ring gear bearing housing (i.e. 1.35)
- ⑤ = numeral (usually a decimal number) on inside of ring gear either added to or subtracted from 35.40.
- ⑥ = bearing thickness (considered constant).



Bearing Thickness "⑥" = 11.00 mm

Example:

- 1) If gear case is marked "45.51" ... "③" is 45.51.
- 2) If ring gear bearing housing is marked "1.35" ... "④" is 1.35.
- 3) If ring gear is marked "-05" ... "⑤" is $35.40 - 0.05 = 35.35$.
- 4) "⑥" is 11.00.

$$\begin{aligned} B &= \textcircled{c} + \textcircled{d} - (\textcircled{e} + \textcircled{f}) \\ &= 45.51 + 1.35 - (35.35 + 11.00) \\ &= 46.86 - 46.35 \\ &= 0.51 \end{aligned}$$

- 5) Therefore, shim thickness is 0.51 mm.

Shim sizes are supplied in following thickness:



Ring Gear Shim

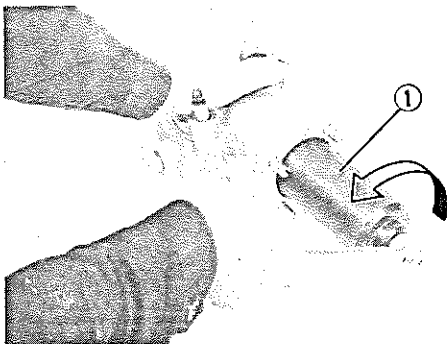
Thickness (mm)	0.25	0.30	0.35
	0.40	0.45	0.50



Because shims can only be selected in 0.05 mm increments, round off hundredths digit and select 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. The chart instructs you, however, to round off the 1 to 0. Thus you should use a 0.50 mm shims.



2. Install:

- Shims (Proper size as calculated)
- Final drive pinion gear assembly
- Bearing retainer (Final drive shaft)
Use a Final Drive Shaft Bearing Retainer Wrench ① (90890-04077).

NOTE:

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



Bearing Reatiner:
110 Nm (11 m·kg, 80 ft·lb)

3. Install:

- Coupling gear
- Ring gear assembly (Without thrust washer)

4. Adjust:

- Gear lash

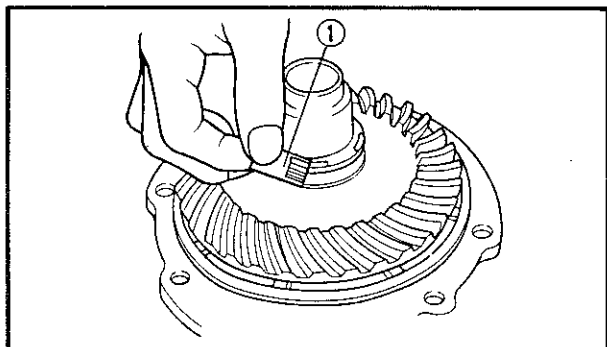
Refer to "Gear Lash Measurement and Adjustment" section.

5. Measure/Select:

- Ring gear thrust clearance

Thrust clearance measurement steps:

- Remove the ring gear assembly.
- Place four pieces of Plastigage® between originally fitted thrust washer and ring gear.



- Install the ring gear assembly and tighten the bolts to specification.



8 mm Bolts (Bearing Housing):
23 Nm (2.3 m·kg, 17 ft·lb)

10 mm Bolt (Bearing Housing):
23 Nm (2.3 m·kg, 17 ft·lb)

NOTE:

Do not turn the shaft drive and ring gear when measuring clearance with Plastigage®.

- Remove the ring gear assembly.
- Measure the thrust clearance. Calculate width of flattened Plastigage® ①.



Ring Gear Thrust Clearance:
0.1 ~ 0.2 mm (0.004 ~ 0.008 in)

- If the correct clearance, install the ring gear assembly.
- If the out of specification, select the correct washer.

Thrust washer selection steps:

- Select the suitable thrust washer by the following chart.



Thrust Washer

Thickness (mm)	1.2	1.3	1.4
	1.5	1.6	1.7
	1.8	1.9	2.0
	2.1		

- Repeat measurement steps until the ring gear thrust clearance is within the specified limits.



Ring Gear Thrust Clearance:
0.1 ~ 0.2 mm (0.004 ~ 0.008 in)

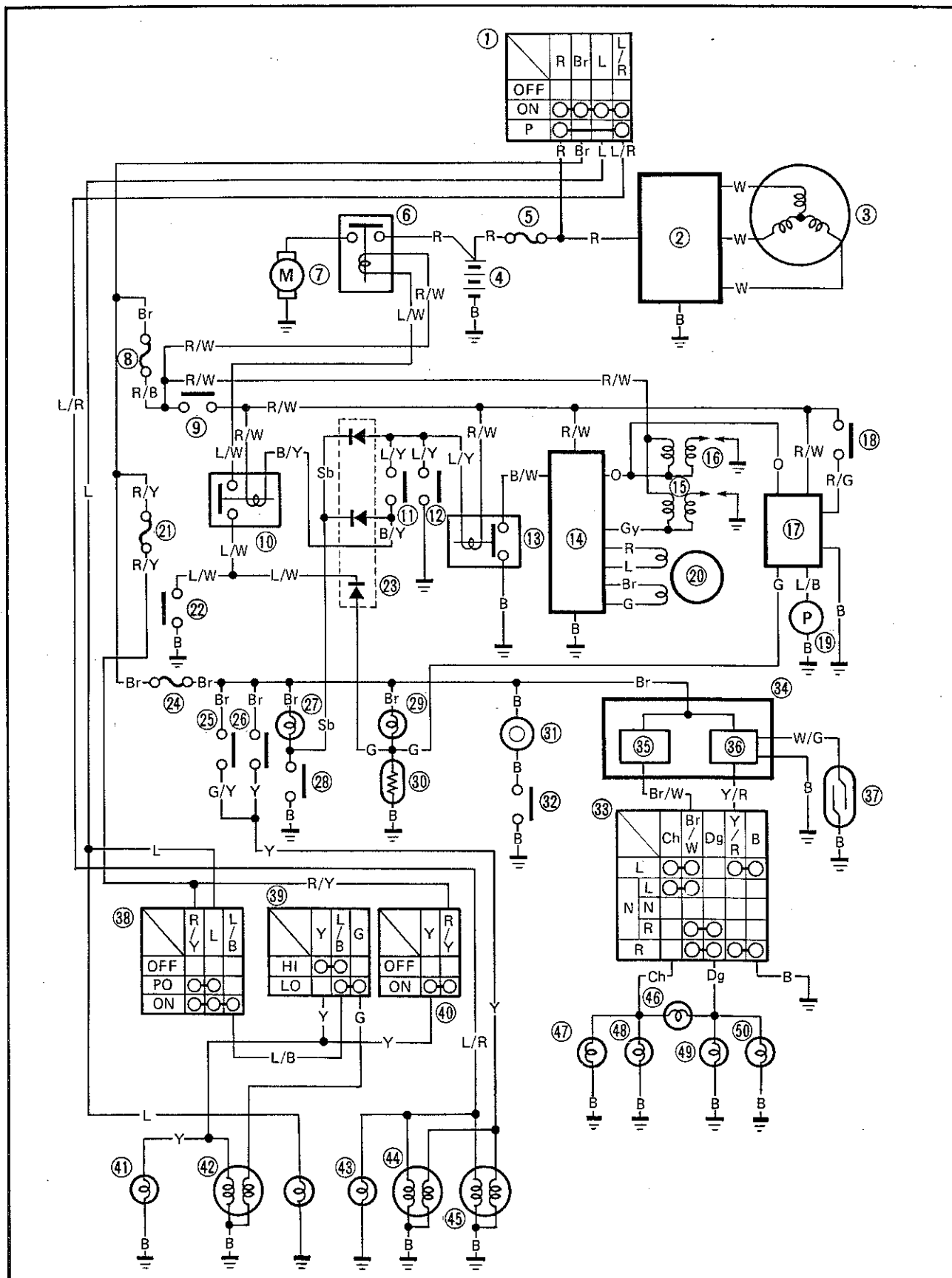
CHAPTER 6.

ELECTRICAL

XV535 CIRCUIT DIAGRAM	K-3
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ELECTRICAL

XV535 CIRCUIT DIAGRAM





- | | |
|----------------------------------|--------------------------------|
| ① Main switch | ②⑥ Rear brake switch |
| ② Rectifier/regulator | ②⑦ "NEUTRAL" indicator light |
| ③ A.C. magneto | ②⑧ Neutral switch |
| ④ Battery | ②⑨ "FUEL" warning light |
| ⑤ Fuse "MAIN" | ③⑩ Fuel sender |
| ⑥ Starter relay | ③⑪ Horn |
| ⑦ Starter motor | ③⑫ "HORN" switch |
| ⑧ Fuse "IGNITION" | ③⑬ "TURN" switch |
| ⑨ "ENGINE STOP" switch | ③⑭ Relay assembly |
| ⑩ Starting circuit cut-off relay | ③⑮ Flasher relay |
| ⑪ Clutch switch | ③⑯ Cancelling unit |
| ⑫ Sidestand switch | ③⑰ Reed switch |
| ⑬ Sidestand relay | ③⑱ "LIGHTS" switch |
| ⑭ Ignitor unit | ③⑲ "LIGHTS" (Dimmer) switch |
| ⑮ Ignition coil | ④⑰ Passing switch |
| ⑯ Spark plug | ④⑱ "HIGH BEAM" indicator light |
| ⑰ Fuel pump relay | ④⑲ Headlight |
| ⑱ "FUEL" (Reserve) switch | ④⑲ Meter light |
| ⑲ Fuel pump | ④⑲ Auxiliary light |
| ⑲ Pickup coil | ④⑲ Tail/Brake light |
| ⑲ Fuse "HEAD" | ④⑲ "TURN" indicator light |
| ⑲ "START" switch | ④⑲ Front flasher light (Left) |
| ⑲ Diode | ④⑲ Rear flasher light (Left) |
| ⑲ Fuse "SIGNAL" | ④⑲ Front flasher light (Right) |
| ⑲ Front brake switch | ④⑲ Rear flasher light (Right) |

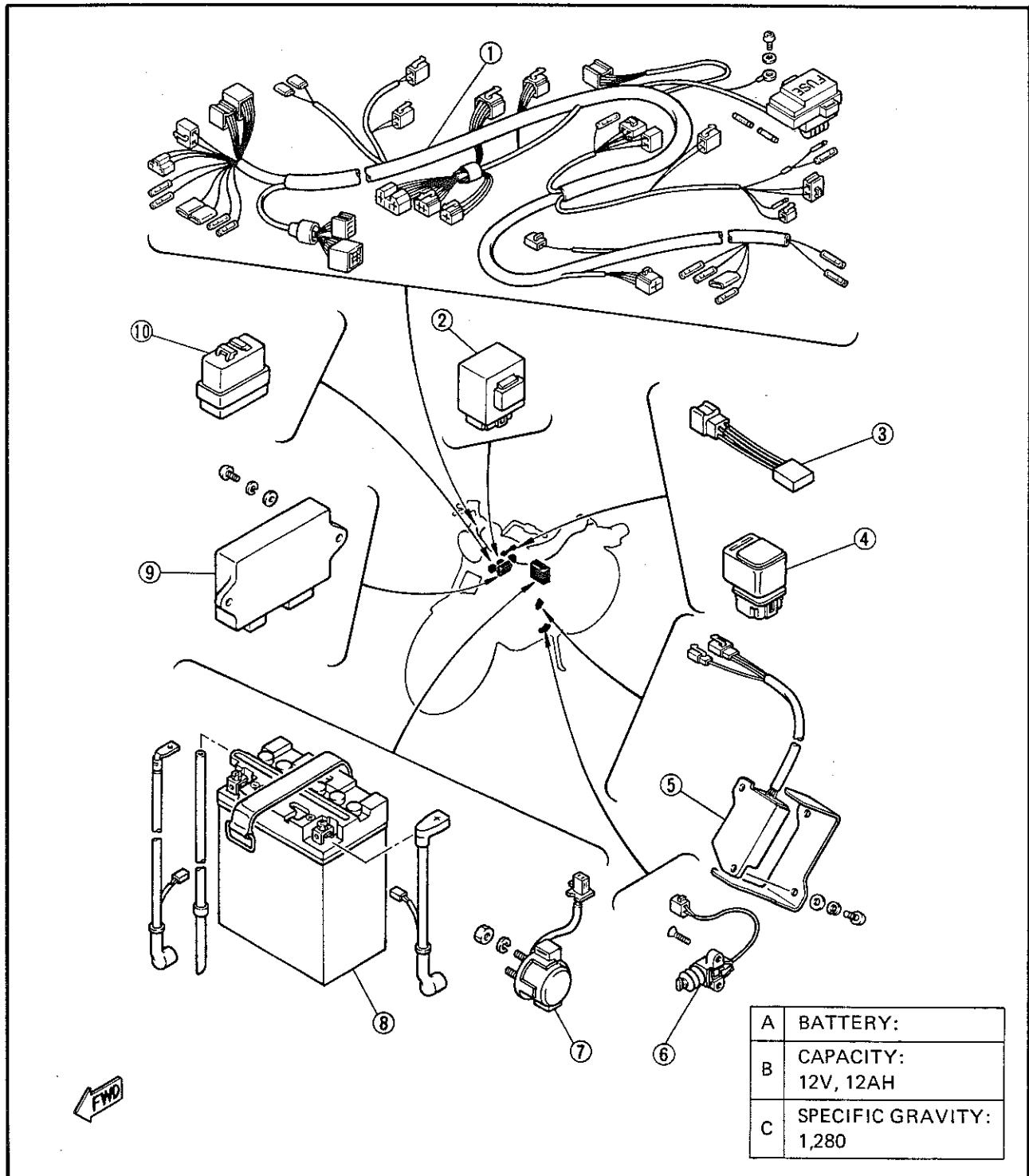
COLOR CODE

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



ELECTRICAL COMPONENTS (1)

- | | |
|-----------------------|--------------------|
| ① Wireharness | ⑥ Sidestand switch |
| ② Fuel pump relay | ⑦ Starter relay |
| ③ Diode | ⑧ Battery |
| ④ Sidestand relay | ⑨ Ignitor unit |
| ⑤ Rectifier/regulator | ⑩ Relay assembly |

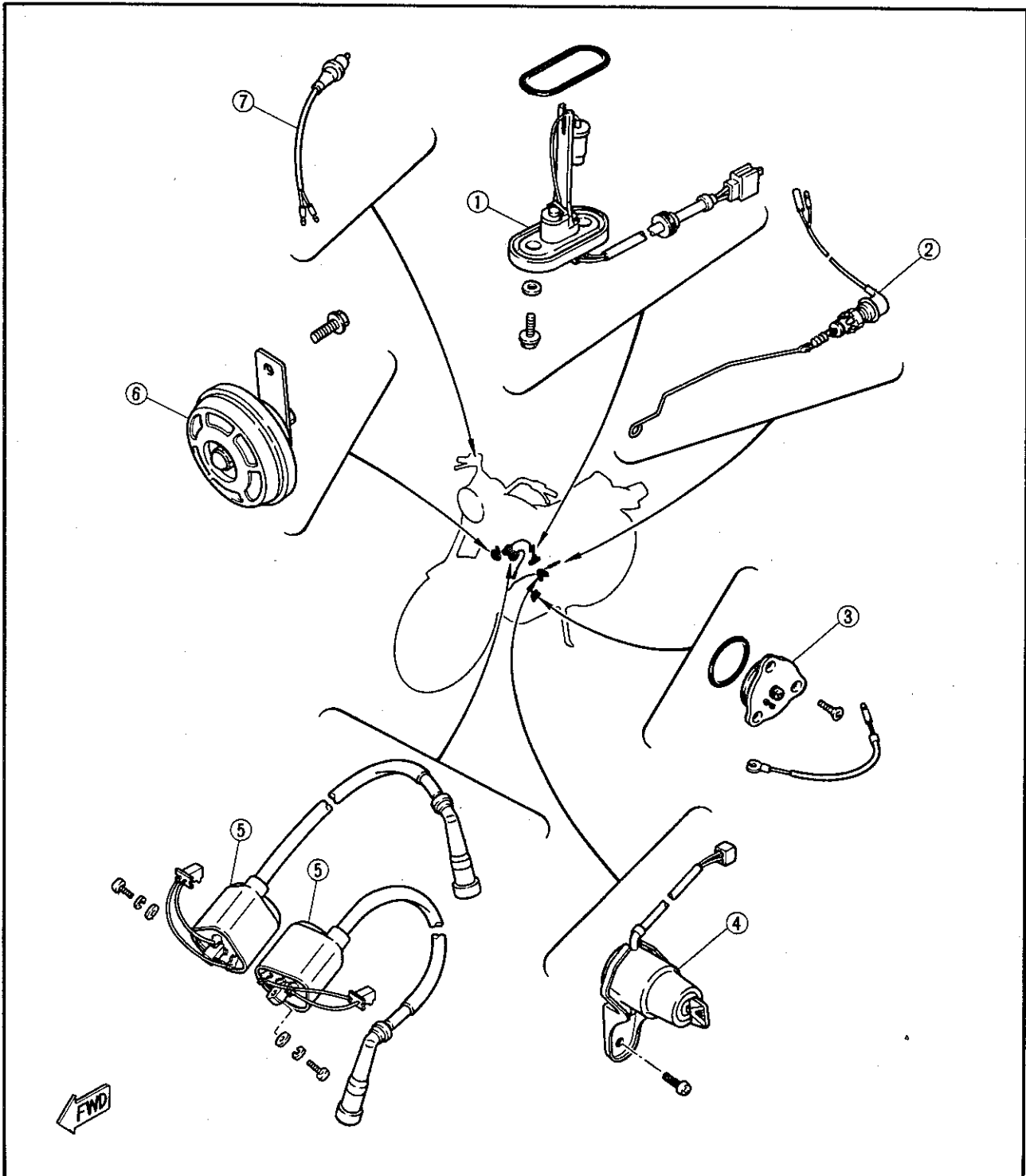




ELECTRICAL COMPONENTS (2)

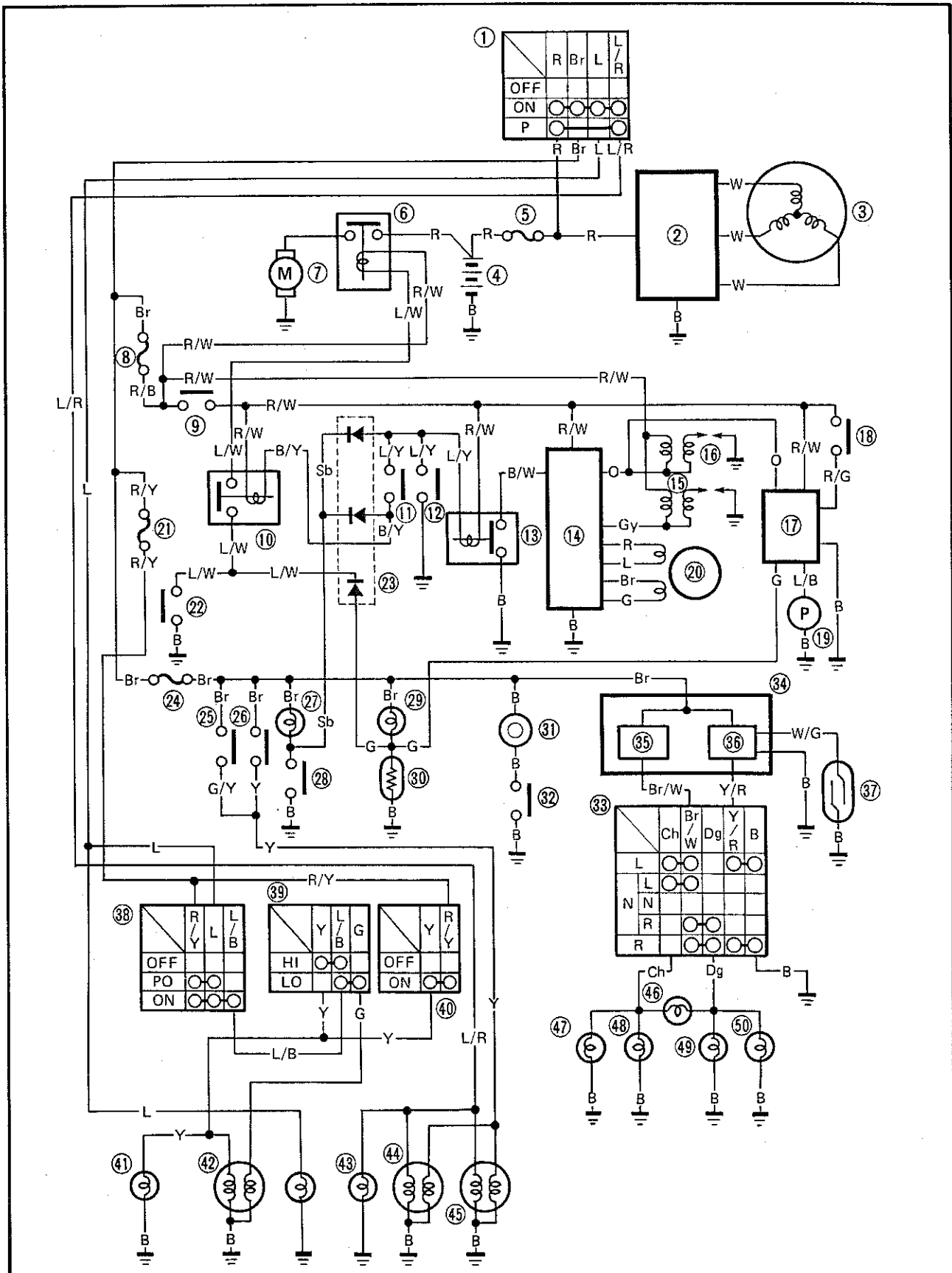
- ① Fuel sender
- ② Rear brake switch
- ③ Neutral switch
- ④ Main switch
- ⑤ Ignition coil
- ⑥ Horn
- ⑦ Front brake switch

SPECIFICATIONS	RESISTANCE
IGNITION COIL: PRIMARY	3.8 ~ 4.6Ω
SECONDARY	10.6 ~ 15.8kΩ
PICKUP COIL	140 ~ 170Ω
CHARGING COIL	0.34 ~ 0.42Ω





ELECTRIC STARTING SYSTEM CIRCUIT DIAGRAM



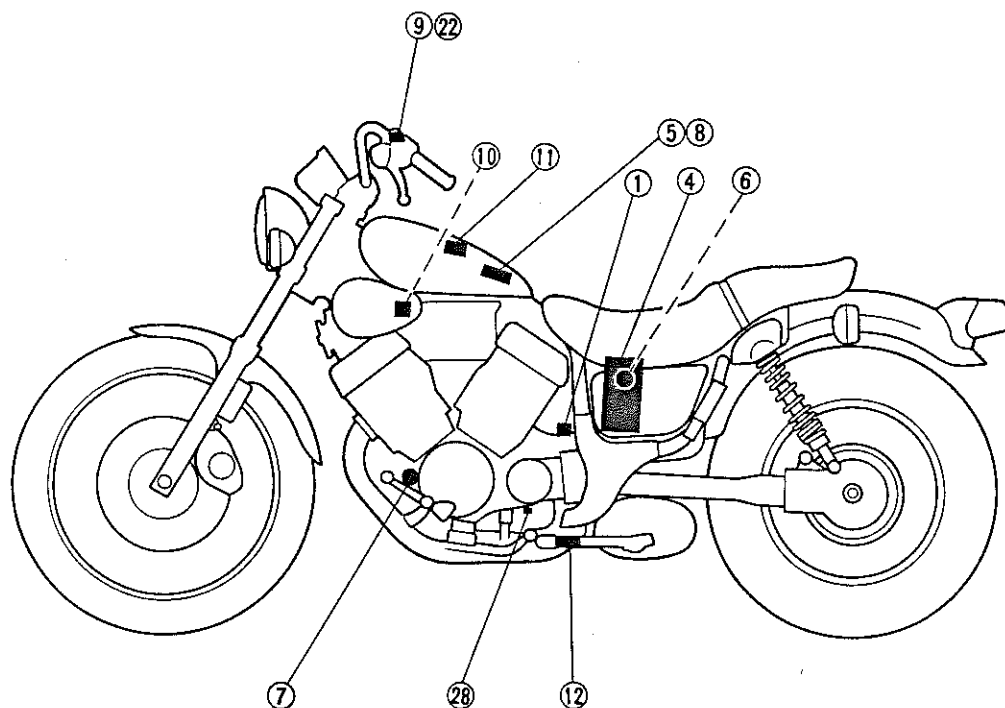


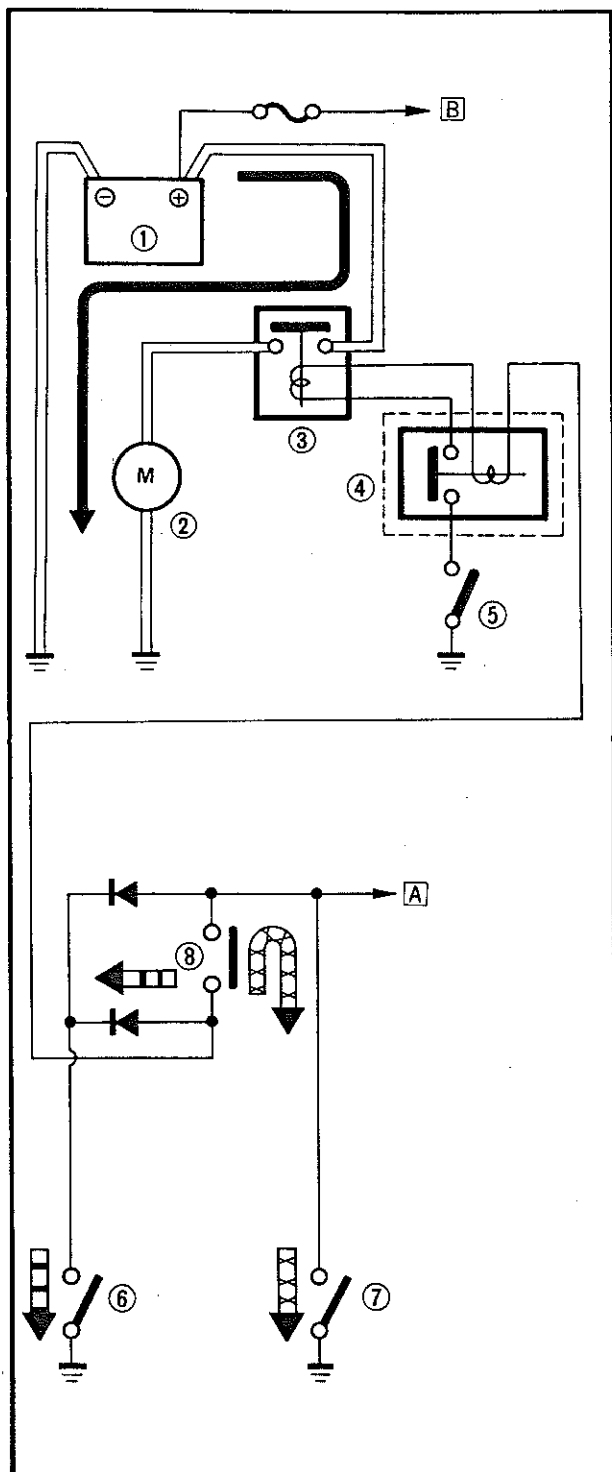
Aforementioned circuit diagram shows electrical starting circuit in wiring diagram.

NOTE:

For the color codes, see page 6-2.

- ① Main switch
- ④ Battery
- ⑤ Fuse "MAIN"
- ⑥ Starter relay
- ⑦ Starter motor
- ⑧ Fuse "IGNITION"
- ⑨ "ENGINE STOP" switch
- ⑩ Starting circuit cut-off relay
- ⑪ Diode
- ⑫ Sidestand switch
- ⑫ "START" switch
- ⑫ Neutral switch





STARTING CIRCUIT OPERATION

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

The transmission is in neutral (the neutral switch is closed).

or if

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

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 open so current cannot reach the starter motor.

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

← WHEN THE TRANSMISSION IS IN NEUTRAL
 ← WHEN THE SIDESTAND IS UP AND THE CLUTCH LEVER IS PULLED IN

- ① Battery
- ② Starter motor
- ③ Starter relay
- ④ Starting circuit cut-off relay
- ⑤ "START" switch
- ⑥ Neutral switch
- ⑦ Sidestand switch
- ⑧ Clutch switch

- A To sidestand relay
- B To main switch



TROUBLESHOOTING

NOTE:

Before this troubleshooting, remove the seat, top cover and side cover.

STARTER MOTOR DOES NOT OPERATE.

1. Battery inspection

- Check the battery condition. Refer to "CHAPTER 2. BATTERY INSPECTION" section.

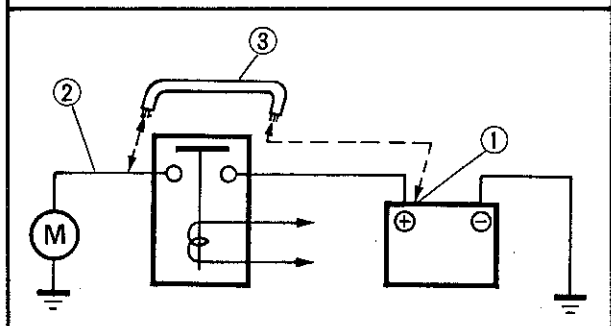
FAULTY

Battery is faulty. Recharge or replace it.



2. Starter motor test

- Connect the battery positive terminal ① and starter motor cable ② using the jumper lead ③ *.
- Check the starter motor operation.



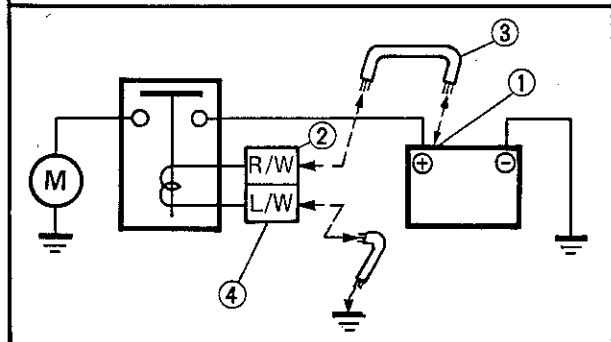
FAULTY

Starter motor is faulty. Repair and/or replace it.



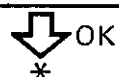
3. Starter relay test

- Disconnect the starter relay coupler (Red/White and Blue/White).
- Connect the battery positive terminal ① and starter relay coupler (Red/White) ② using the jumper lead ③.
- Ground the starter relay coupler (Blue/White) ④ to the frame using the jumper lead ③.
- Check the starter motor operation.



FAULTY

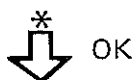
Starter relay is faulty. Replace it.



*

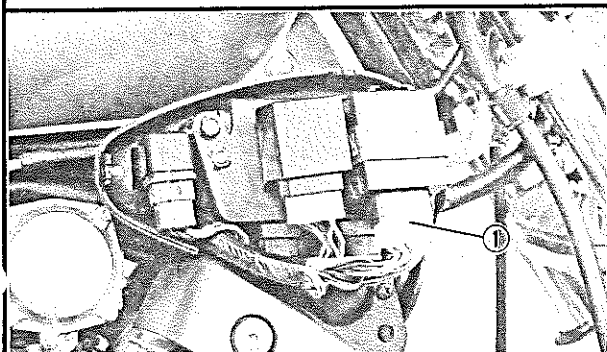
WARNING:

- A wire for the jumper lead must have the equivalent capacity as that of the battery lead or more, otherwise it may cause the jumper lead to be burned.
- This check is likely to produce sparks, so be sure that no flammable gas or fluid is in the vicinity.



4. Starting circuit cut-off relay test

- Disconnect the relay assembly ① coupler (Brown, White/Green, Brown/White, Yellow/Red, Black, Blue/White, Black/Yellow, Blue/White and Red/White) from the wire harness.



- Connect the Pocket Tester (90890-03112) and battery (12V) ⑥ to the relay (Blue/White ②, Blue/White ③, Red/White ④ and Blue/Yellow ⑤).
- Check the relay for continuity.



Good Condition

Bad Condition

Battery Connected

○

○

X

X

Battery Disconnected

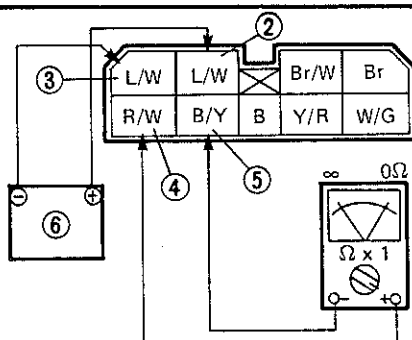
X

○

X

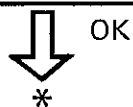
○

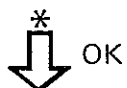
○: Continuity X: Nocontinuity



FAULTY

Starting circuit cut-off relay is faulty.
Replace relay assembly.





5. Clutch switch conduct check

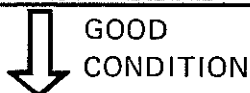
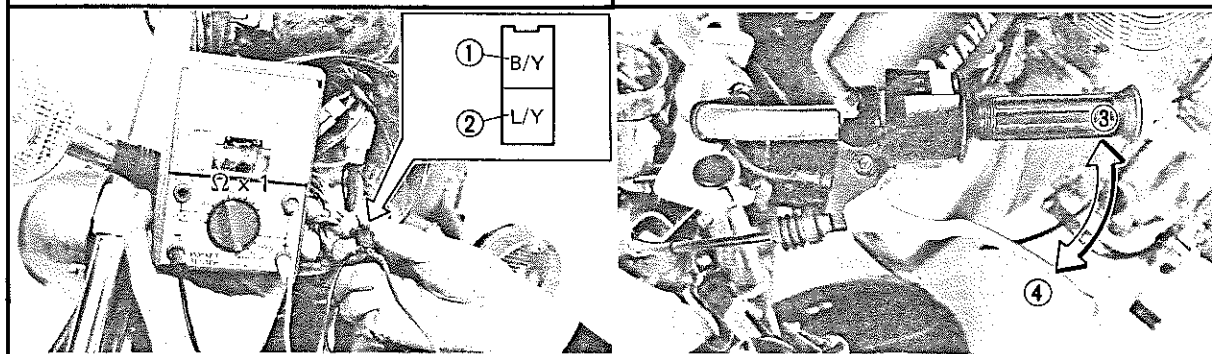
- Disconnect the clutch switch coupler (Blue/Yellow ② and Black/Yellow ①) from the wire harness.
- Connect the Pocket Tester (90890-03112) to the clutch switch coupler.
- Grab or release the clutch lever, and check the clutch switch for continuity.

Clutch Lever Position	Good Condition	Bad Condition		
Grab ③	○	○	X	X
Release ④	X	○	X	○

○: Continuity X: Nocontinuity

BAD
CONDITION

Clutch switch is faulty. Replace it.



6. Sidestand switch conduct check

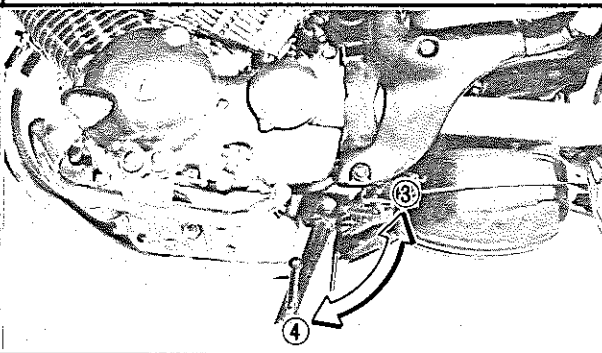
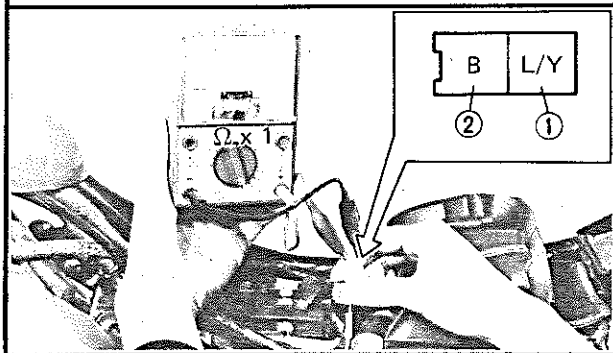
- Disconnect the sidestand switch coupler (Blue/Yellow ① and Black/Yellow ②) from the wire harness.
- Connect the Pocket Tester (90890-03112) to the sidestand switch coupler.
- Move the sidestand up or down, and check the sidestand switch for continuity.



Sidestand Position	Good Condition	Bad Condition		
Up ③	○	○	X	X
Down ④	X	○	X	○
○: Continuity X: Nocontinuity				

BAD
CONDITION

Sidestand switch is faulty. Replace it.



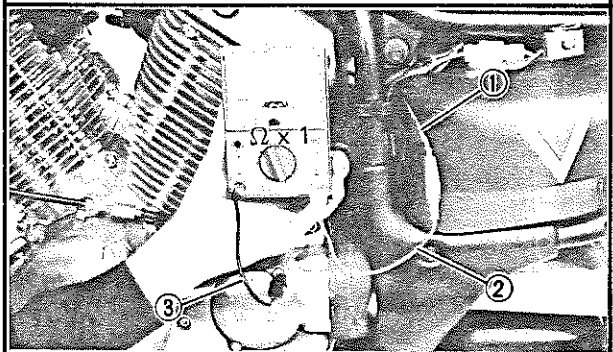
↓
GOOD
CONDITION

7. Neutral switch conduct test

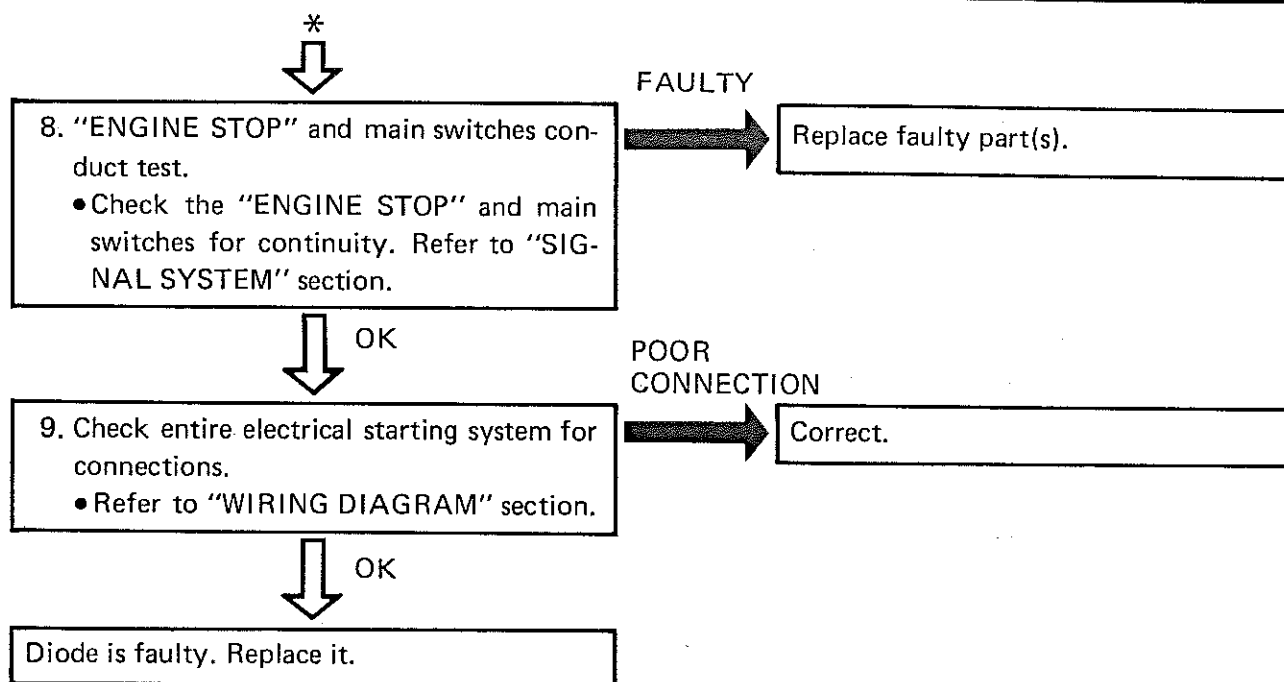
- Disconnect the neutral switch lead (Sky blue) ① from the wire harness.
- Connect the positive lead ② of the Pocket Tester (90890-03112) to the neutral switch lead.
- Ground the negative lead ③ of the Tester to the engine.
- Shift the gear, and check the switch for continuity.

BAD
CONDITIONNeutral switch is faulty.
Replace it.

Transmission Position	Good Condition	Bad Condition		
In neutral	○	○	X	X
In gear	X	○	X	○
○: Continuity X: Nocontinuity				

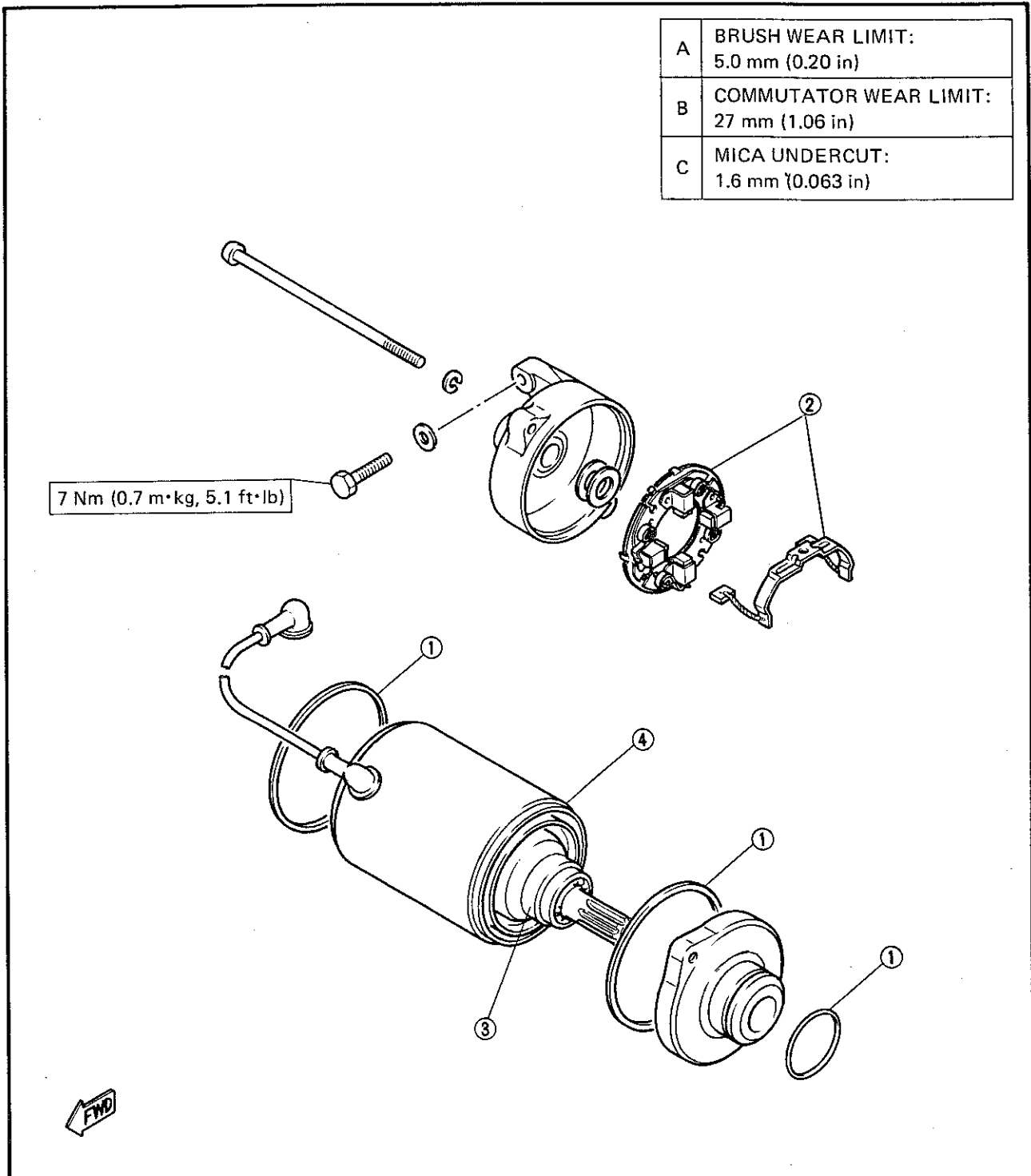


↓
GOOD
CONDITION
*



STARTER MOTOR TEST

- ① O-ring
- ② Brush set
- ③ Armature
- ④ Stator



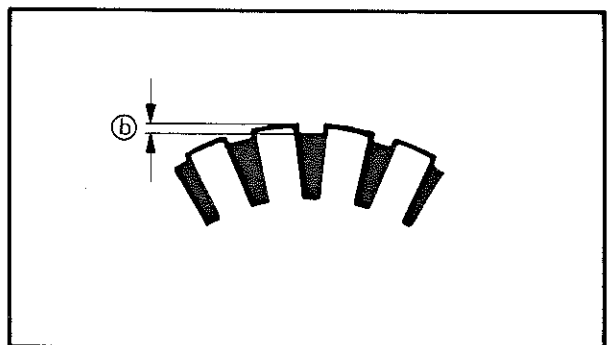
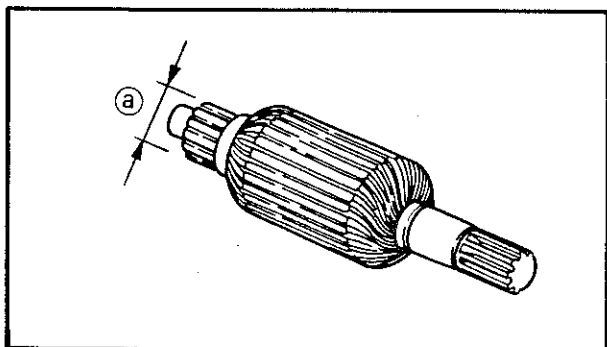


Removal

1. Remove:

- Starter motor

Refer to "CHAPTER 3. ENGINE OVERHAUL – ENGINE REMOVAL" section.



Inspection and Repair

1. Inspect:

- Commutator

Dirty → Clean it with #600 grit sandpaper.

2. Measure:

- Commutator diameter (a)

Out of specification → Replace starter motor.



Commutator Wear Limit:
27 mm (1.06 in)

3. Measure:

- Mica undercut (b)

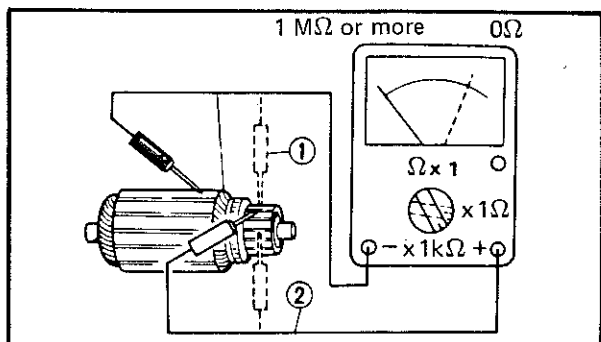
Out of specification → Scrape the mica to proper value use a hacksaw blade can be ground to fit.



Mica Undercut (b) :
1.6 mm (0.063 in)

NOTE:

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



4. Inspect:

- Armature coil (insulation/continuity)

Defects(s) → Replace starter motor.

Armature coil inspecting steps:

- Connect the Pocket Tester (90890-03112) for continuity check ① and insulation check ②.

- Measure the armature coil resistances.

**Armature Coil Resistance:****Continuity Check ① :**

0Ω at 20°C (68°F)

Insulation Check ② :

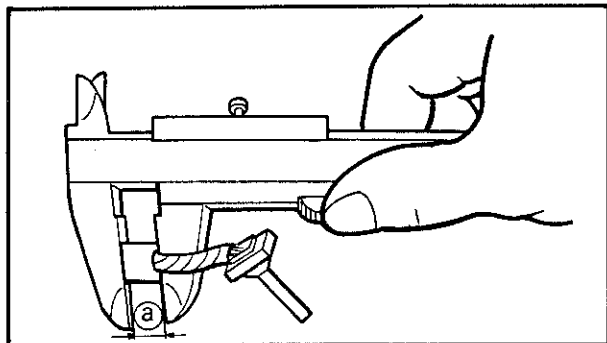
More than 1MΩ at 20°C (68°F)

- If the resistance is incorrect, replace the starter motor.

5. Measure:

- Brush length ①

Out of specification → Replace.

**Brush Length Limit:**

5.0 mm (0.20 in)

6. Measure:

- Brush spring pressure

Fatigue/Out of specification → Replace as a set.

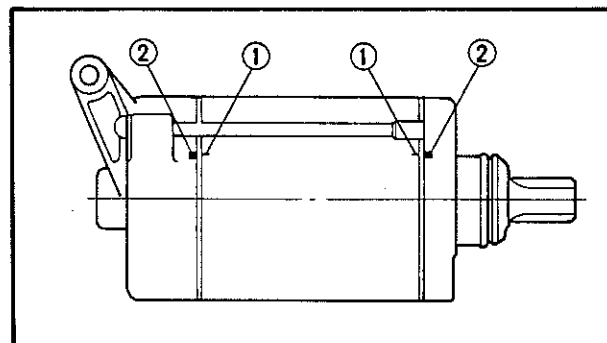
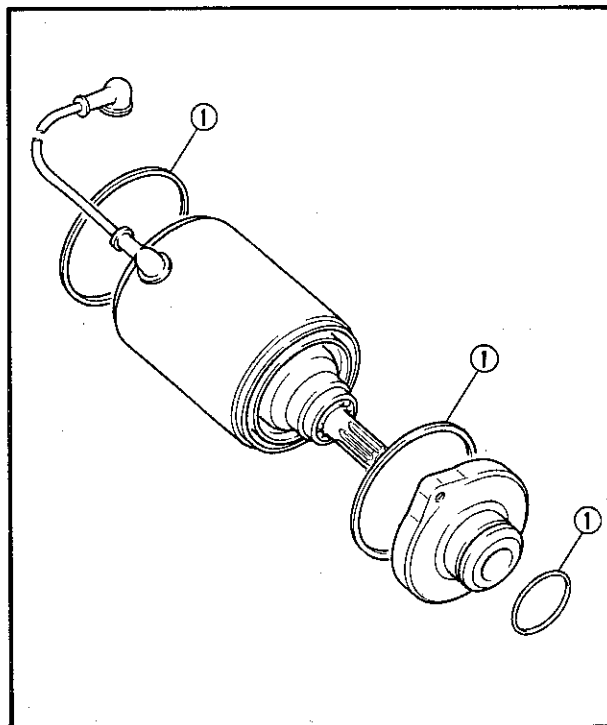
**Brush Spring Pressure:**

520 ~ 920 g (18.3 ~ 32.4 oz)

7. Inspect:

- Bearing
- Oil seal
- O-rings ①

Wear/Damage → Replace.

**Installation****1. Install:**

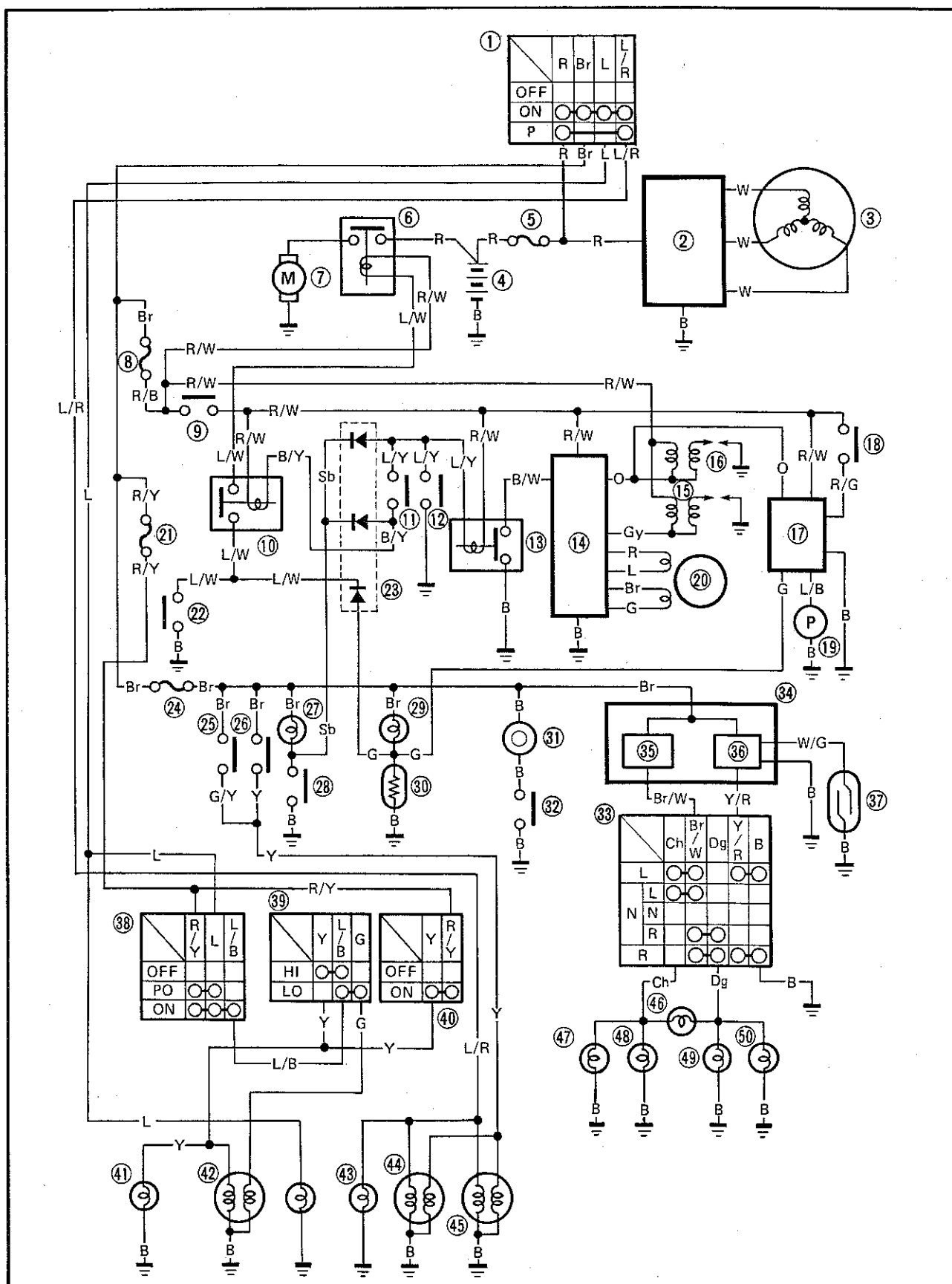
- Starter motor

NOTE:

Align the match marks ① on the bracket with the match marks ② on the housing.

CHARGING SYSTEM

CIRCUIT DIAGRAM



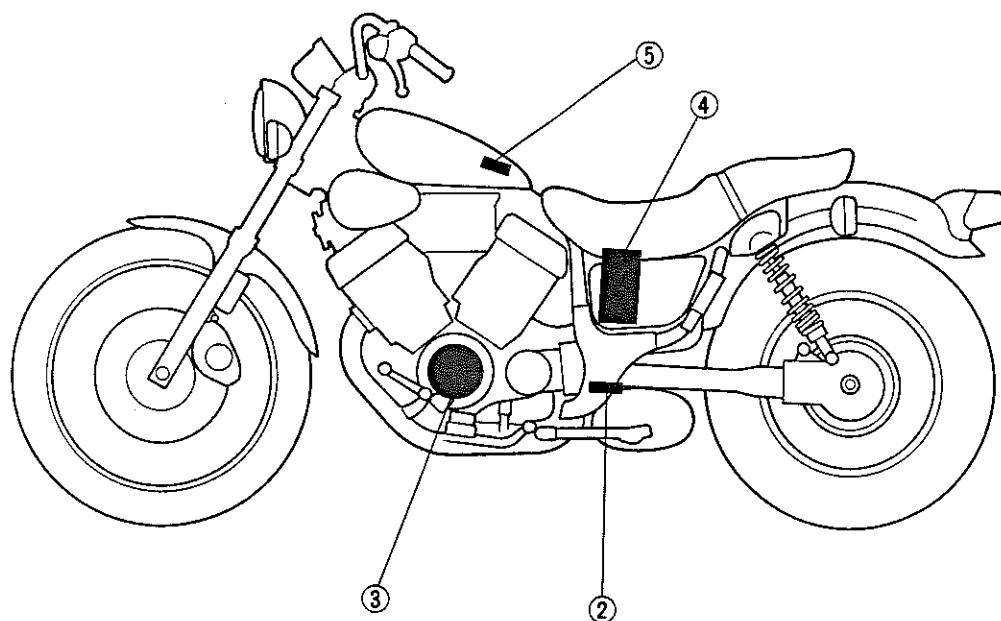


Aforementioned circuit diagram shows charging circuit in circuit diagram.

NOTE: _____

For the color codes, see page 6-2.

- ② Rectifier with regulator
- ③ A.C. magneto
- ④ Battery
- ⑤ Fuse "MAIN"





TROUBLESHOOTING

NOTE:

Before this troubleshooting, remove the seat and top cover.

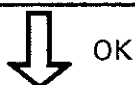
BATTERY IS NOT CHARGED.

1. Fuse inspection

- Check the fuse condition.
Refer to "CHAPTER 2. FUSE INSPECTION" section.

FAULTY

Fuse is faulty.
Replace it.



OK

2. Battery inspection

- Check the battery condition. Refer to "CHAPTER 2. BATTERY INSPECTION" section.

FAULTY

Battery is faulty.
Recharge or replace it.



OK

3. Charging voltage test

- Connect the Pocket Tester (90890-03112) to the battery.
- Start the engine and accelerate to about 5,000 r/min.
- Measure the charging voltage.

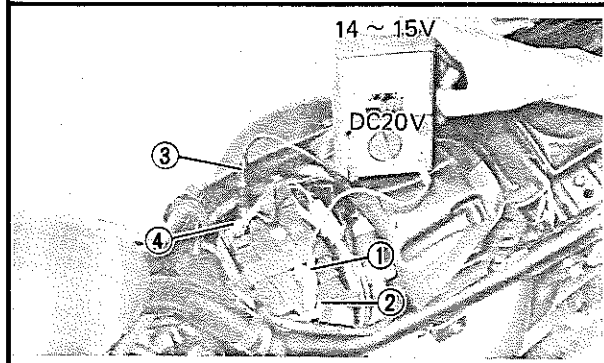


Charging Voltage:
14 ~ 15V at 5,000 r/min

- ① Positive lead (Pocket Tester)
- ② Positive terminal (Battery)
- ③ Negative lead (Pocket Tester)
- ④ Negative terminal (Battery)

CHARGING VOLTAGE
MEETS SPECIFICATION

Battery is faulty.
Replace it.

OUT OF
SPECIFICATION

*



4. Charging coil resistance test

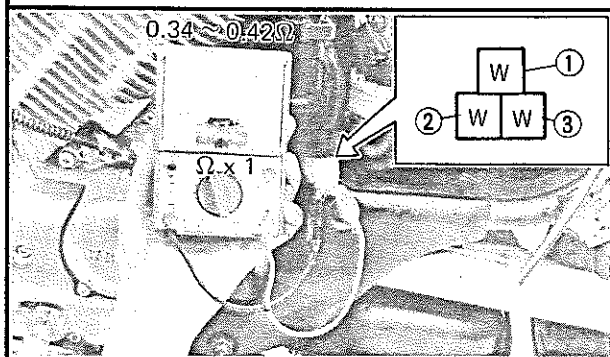
- Disconnect the A.C. magneto coupler (White ①, White ② and White ③) from the wire harness.
- Connect the Pocket Tester (90890-03112) to the A.C. magneto coupler.
- Measure the charging coil resistance.



Charging Coil Resistance

(White ① – White ②,
White ① – White ③):

$0.34 \sim 0.42 \Omega$ at 20°C (68°F)



OUT OF
SPECIFICATION

Charging coil is faulty.
Replace stator assembly.



RESISTANCE MEETS
SPECIFICATION

5. Check entire charging system for connections.

- Refer to "WIRING DIAGRAM" section.

POOR
CONNECTION

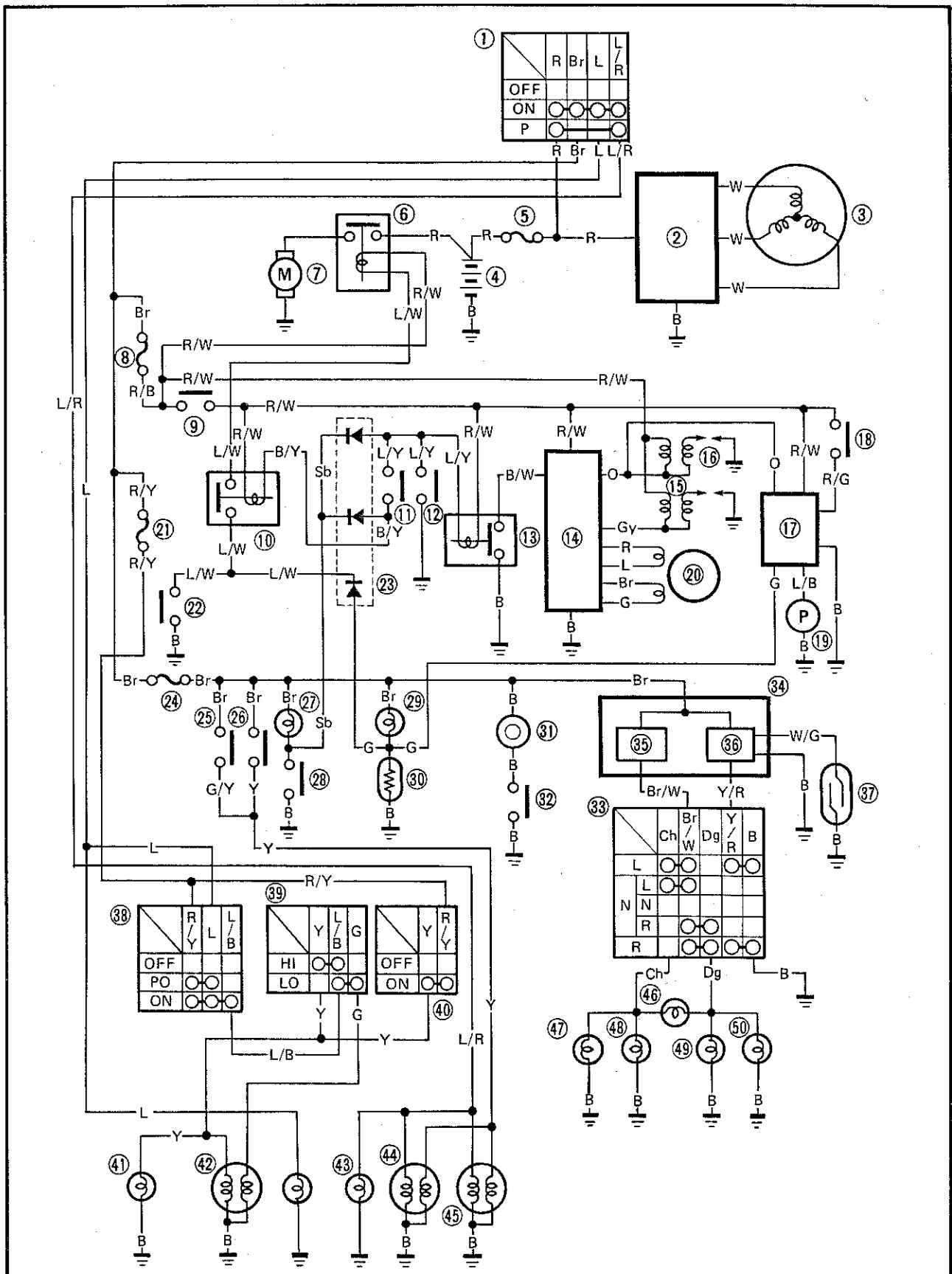
Correct.



OK

Rectifier/Regulator is faulty. Replace it.

IGNITION SYSTEM CIRCUIT DIAGRAM



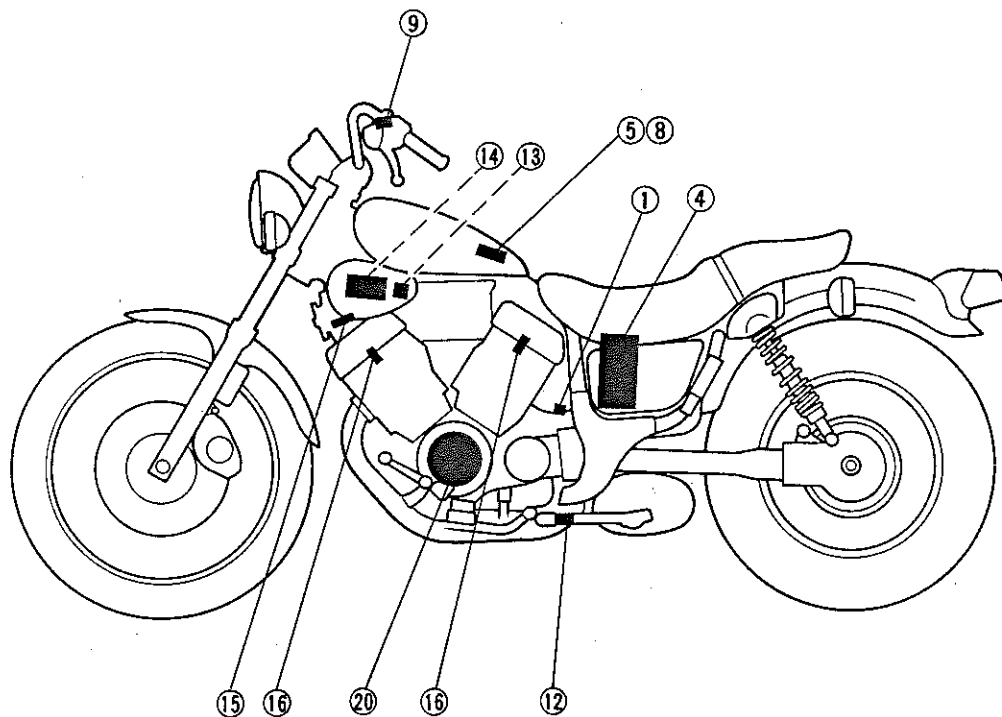


Aforementioned circuit diagram shows ignition circuit in circuit diagram.

NOTE:

For the color codes, see page 6-2.

- ① Main switch
- ④ Battery
- ⑤ Fuse "MAIN"
- ⑧ Fuse "IGNITION"
- ⑨ "ENGINE STOP" switch
- ⑫ Sidestand switch
- ⑬ Sidestand relay
- ⑭ Ignitor unit
- ⑮ Ignition coil
- ⑯ Spark plug
- ⑰ Pickup coil





TROUBLESHOOTING

NOTE:

Before this troubleshooting, remove the seat, top cover and front side cover.

IF IGNITION SYSTEM SHOULD BECOME INOPERATIVE (NO SPARK OR INTERMITTENT SPARK).

1. Spark plug inspection

- Check the spark plug condition. Refer to "CHAPTER 2. SPARK PLUG INSPECTION" section.

FAULTY

Replace or regap spark plug.



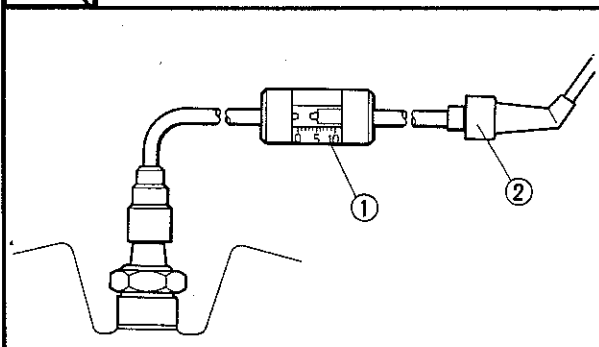
OK

2. Ignition spark test

- Disconnect the spark plug cap from the spark plug.
- Connect the Dynamic Spark Tester to the spark plug and spark plug cap, and set the specified spark gap.
- Turn the main switch to "ON" and "ENGINE STOP" switch to "RUN" then, shift the gear in neutral.
- Start the engine.
- Check the ignition spark condition.



Minimum Spark Gap:
6 mm (0.24 in)



- ① Dynamic spark tester
- ② Spark plug cap

SPARK

Ignition circuit is good.



*

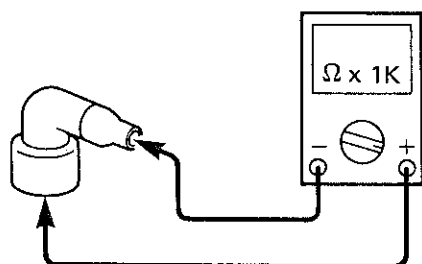


3. Spark plug cap resistance

- Connect the Pocket Tester ($k\Omega \times 1$) to the spark plug cap.
- Check the spark plug cap for specified resistance.



Spark Plug Cap Resistance:
10 $k\Omega$ at 20°C (68°F)



OUT OF
SPECIFICATION

Spark plug cap is faulty.
Replace it.



MEETS SPECIFICATION

4. Ignition coil resistance test

- Disconnect the ignition coil coupler and spark plug lead.
- Connect the Pocket Tester (90890-03112) as shown.
- Measure the primary and secondary coil resistances.

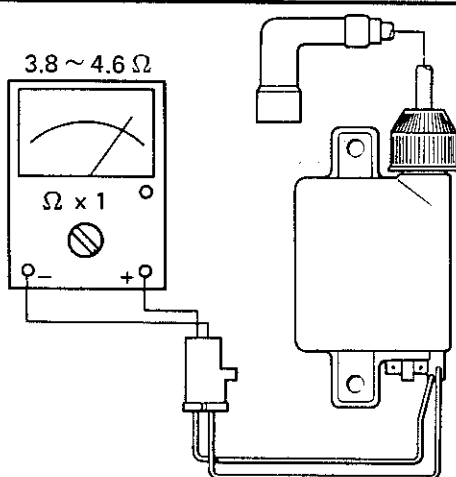


Primary Coil Resistance [A] :
3.8 ~ 4.6 Ω at 20°C (68°F)
Secondary Coil Resistance [B] :
10.6 ~ 15.8 $k\Omega$ at 20°C (68°F)

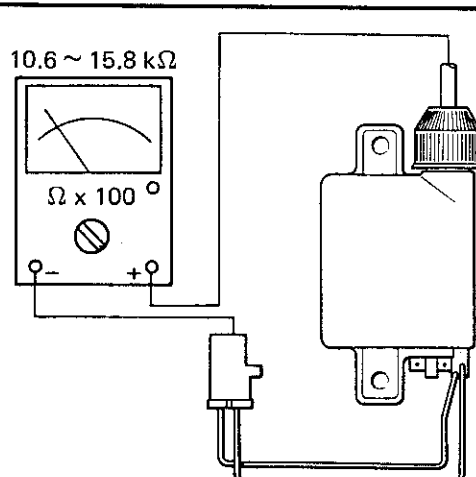
OUT OF
SPECIFICATION

Ignition coil is faulty. Replace it.

A



B



BOTH RESISTANCES
MEET SPECIFICATIONS



5. "START" and main switches conduct check.

- Check the "START" and main switches for continuity. Refer to "SIGNAL SYSTEM" section.

FAULTY

"START" and/or main switches are faulty. Replace faulty part(s).



OK

6. Sidestand switch conduct check

- Disconnect the sidestand switch coupler (Blue/Yellow ① and Black ②) from the wire harness.
- Connect the Pocket Tester (90890-03112) to the sidestand switch coupler.
- Move the sidestand up or down, and check the sidestand switch for continuity.

BAD
CONDITION

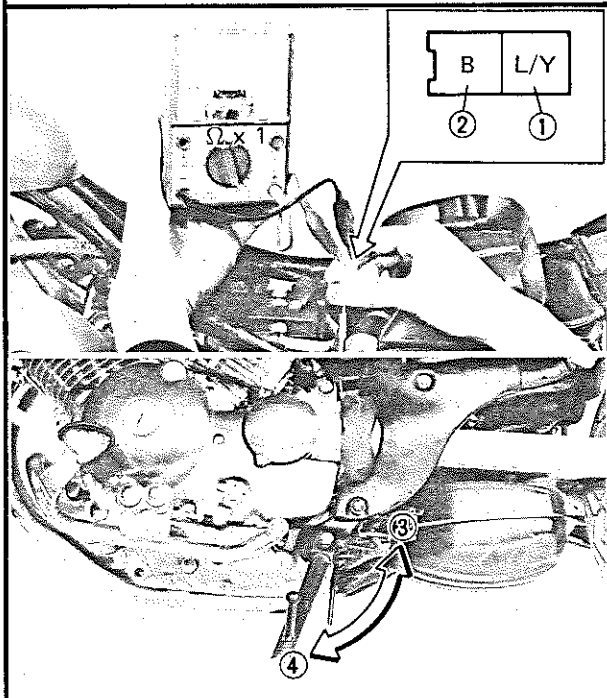
Neutral switch is faulty. Replace it.

BAD
CONDITION

Sidestand switch is faulty. Replace it.

Sidestand Position	Good Condition	Bad Condition		
Up ③	○	○	X	X
Down ④	X	○	X	○

○: Continuity X: Nocontinuity



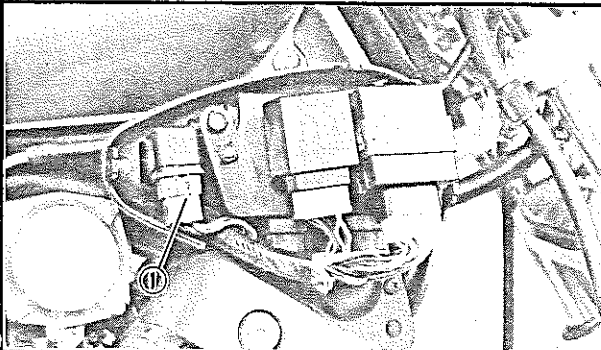
GOOD
CONDITION

*



7. Sidestand relay test

- Disconnect the sidestand relay ① coupler (Red/White, Blue/Yellow, Black and Black/White) from the wire harness.



- Connect the Pocket Tester (90890-03112) and battery (12V) ⑥ to the relay coupler (Blue/Yellow ②, Red/White ③, Black/White ④ and Black ⑤).
- Check the relay for continuity.



Good Condition

Bad Condition

Battery Connected

X

○

X

○

Battery Disconnected

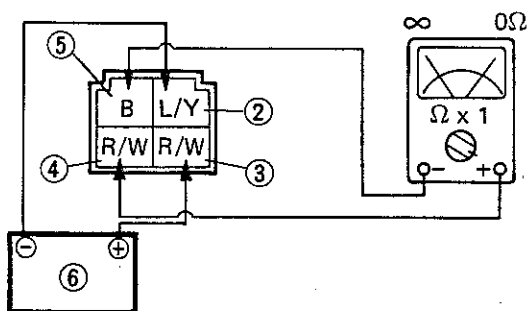
○

○

X

X

○: Continuity X: Nocontinuity



FAULTY

Sidestand relay is faulty. Replace it.



OK

*



8. Pickup coil resistance test

- Disconnect the pickup coil coupler (Red ①, Blue ②, Brown ③ and Green ④) from the ignitor unit.
- Connect the Pocket Tester (90890-03112) to the pickup coil coupler.
- Measure the pickup coil resistance.

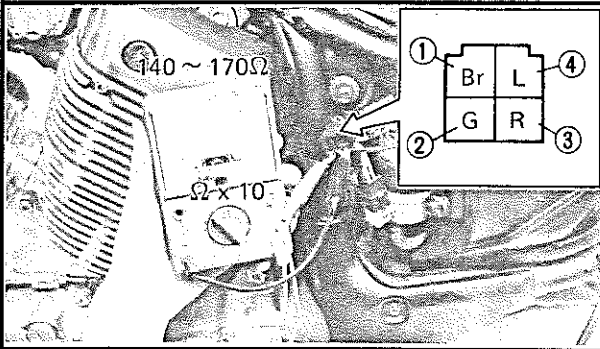


Pickup Coil Resistance
(Brown ① – Green ②,
Red ③ – Blue ④):

140 ~ 170 Ω at 20°C (68°F)

OUT OF
SPECIFICATION

Pickup coil is faulty. Replace it.



BOTH RESISTANCES
MEET SPECIFICATIONS

9. Check entire ignition system for connections.

- Refer to "WIRING DIAGRAM" section.

POOR
CONNECTION

Correct.

OK

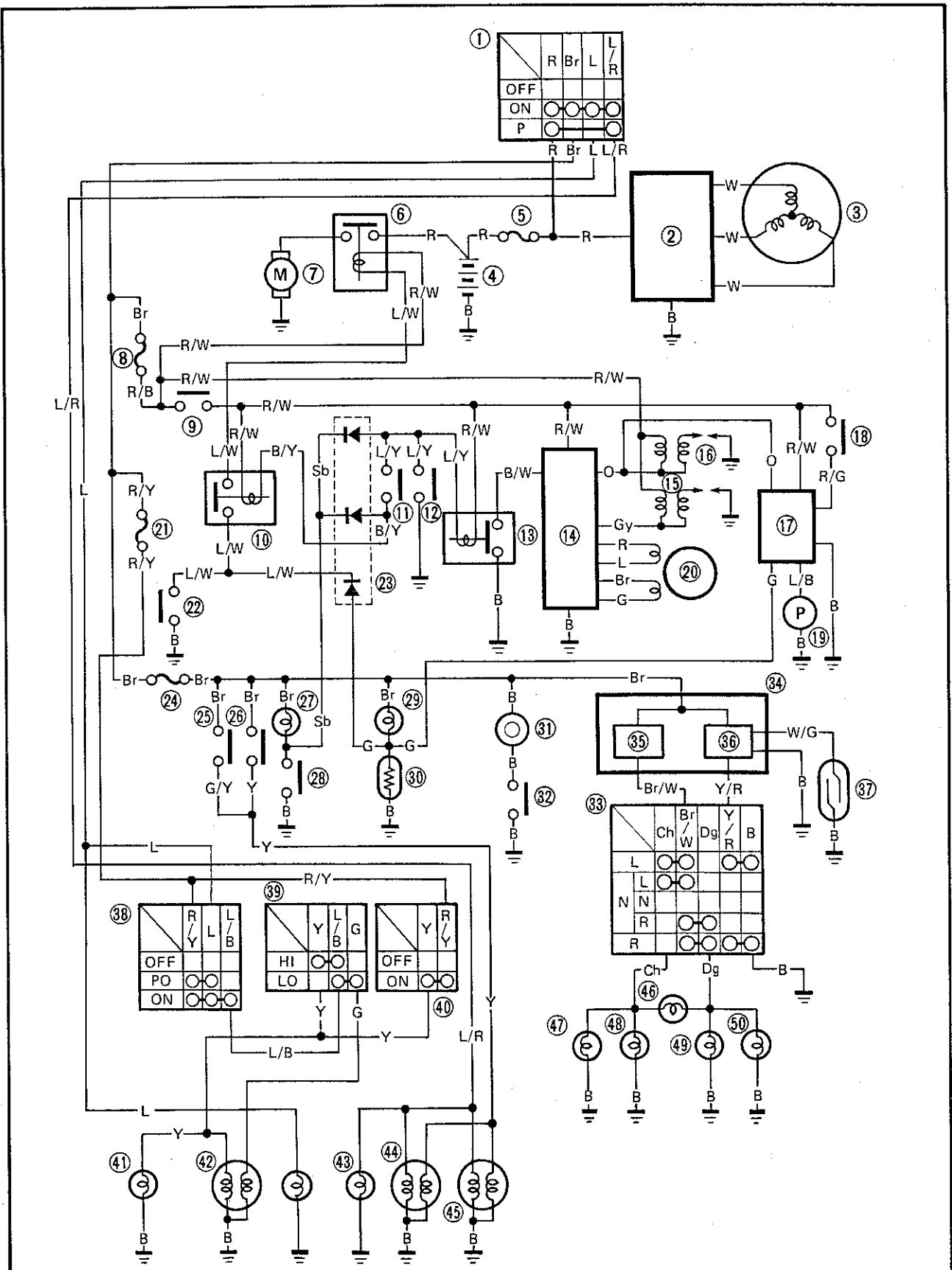
Ignitor unit is faulty. Replace it.





LIGHTING SYSTEM

CIRCUIT DIAGRAM



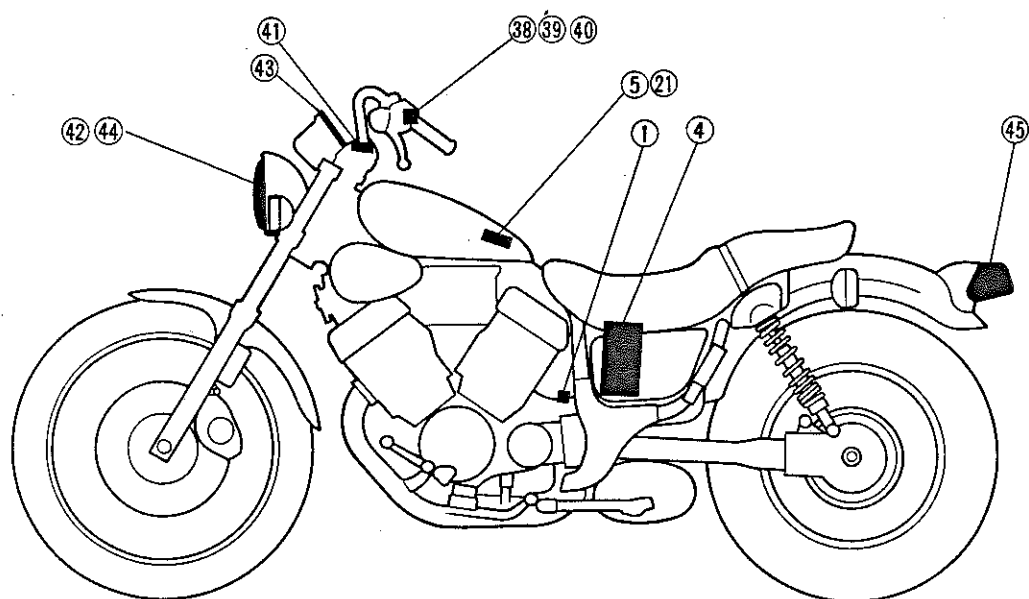


Aforementioned circuit diagram shows lighting circuit in circuit diagram.

NOTE:

For the color codes, see page 6-2.

- ① Main switch
- ④ Battery
- ⑤ Fuse "MAIN"
- ②① Fuse "HEAD"
- ②② "ENGINE STOP" switch
- ③⑧ "LIGHTS" switch
- ③⑨ "LIGHTS" (Dimmer) switch
- ④⑩ Passing switch
- ④① "HIGH BEAM" indicator light
- ④② Headlight
- ④③ Meter light
- ④④ Auxiliary light
- ④⑤ Tail light





TROUBLESHOOTING

NOTE:

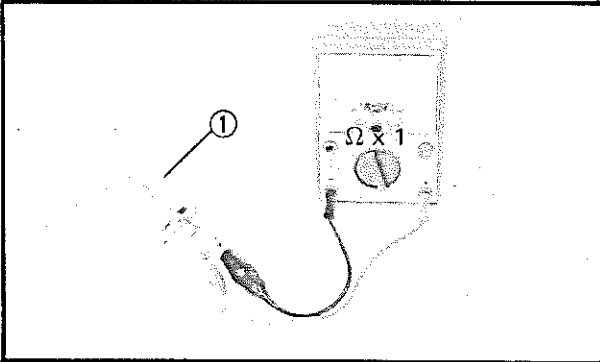
Before this troubleshooting, remove the headlight, top cover and seat.

HEADLIGHT DOES NOT COME ON.**1. Headlight bulb conduct check**

- Remove the headlight bulb ①. Refer to "CHAPTER 2. HEADLIGHT BULB REPLACEMENT" section.
- Connect the Pocket Tester (90890-03112) to the bulb terminals as shown, and check the bulb for continuity.

CONTINUITY DOES NOT
EXIST ON CIRCUIT

Bulb is faulty.
Replace it.



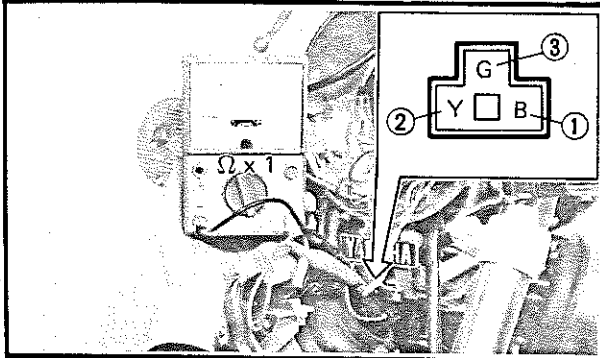
↓ CONTINUITY EXISTS ON
BOTH CIRCUIT

2. Headlight bulb socket conduct check

- Install the bulb to the headlight socket.
- Connect the Pocket Tester (90890-03112) to the headlight coupler (Black ①, Yellow ② and Green ③), and check it for continuity.

CONTINUITY DOES NOT
EXIST ON CIRCUIT

Bulb socket is faulty.
Replace it.



↓ CONTINUITY EXISTS ON
BOTH CIRCUIT

3. Fuse inspection

- Check the fuse condition.
Refer to "CHAPTER 2. FUSE INSPECTION" section.

FAULTY

Fuse is faulty.
Replace it.

↓ OK
*



4. Battery inspection

- Check the battery condition. Refer to "CHAPTER 2. BATTERY INSPECTION" section.

FAULTY

Battery is faulty.
Recharge or replace it.



5. Lighting voltage test

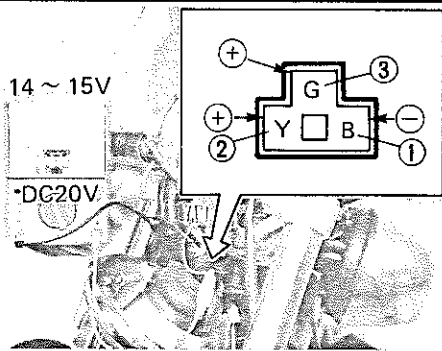
- Connect the Pocket Tester (90890-03112) to the headlight coupler (Black ①, Yellow ② and Green ③).
- Turn the "LIGHTS" (Dimmer) switch to "LO" and "HI" position.
- Start the engine and accelerate to about 5,000 r/min.
- Measure the lighting voltage.

LIGHTING VOLTAGE
MEETS SPECIFICATION

Lighting system (Headlight) is good.



Lighting Voltage:
14 ~ 15V at 5,000 r/min



6. "LIGHTS" switch conduct check

- Check the "LIGHTS" switch for continuity. Refer to "SIGNAL SYSTEM" switch.

FAULTY

"LIGHTS" switch is faulty.
Replace faulty part(s).

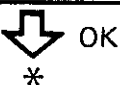


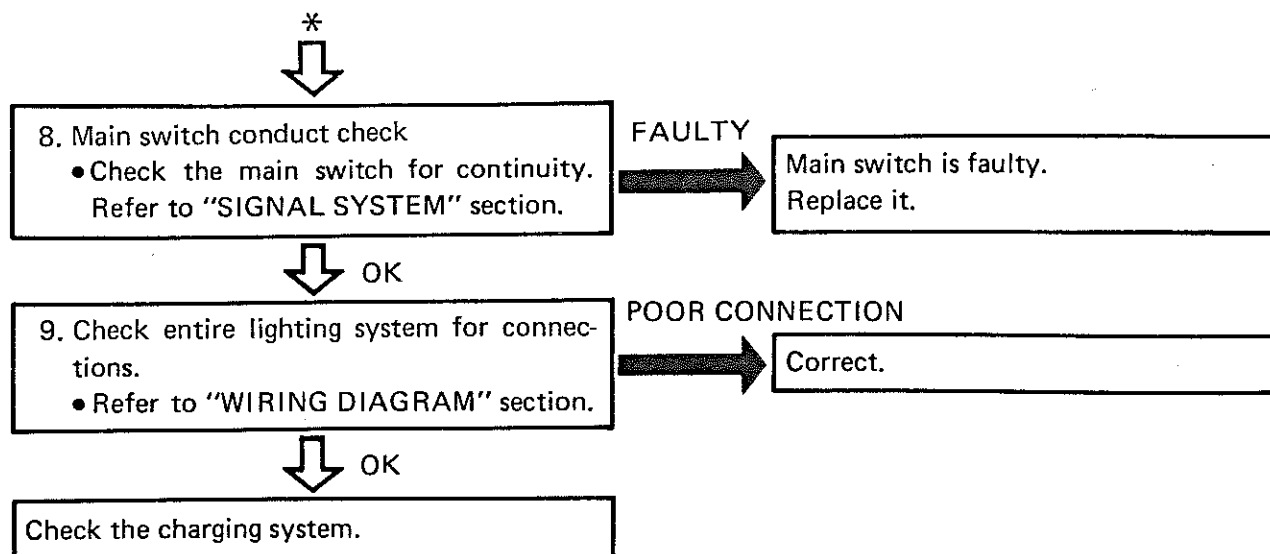
7. "LIGHTS" (Dimmer) switch conduct check.

- Check the "LIGHTS" (Dimmer) switch for continuity. Refer to "SIGNAL SYSTEM" section.

FAULTY

"LIGHTS" (Dimmer) switch is faulty.
Replace faulty part(s).



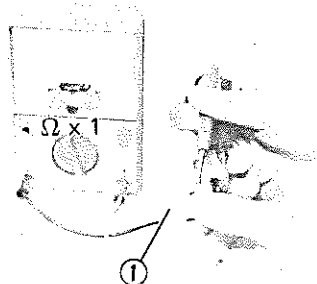




TAILLIGHT DOES NOT COME ON.

1. Taillight bulb conduct check

- Remove the taillight lens and bulb ①.
- Connect the Pocket Tester (90890-03112) to the bulb terminals as shown, and check the bulb for continuity.



NO CONTINUITY

Bulb is faulty.
Replace it.

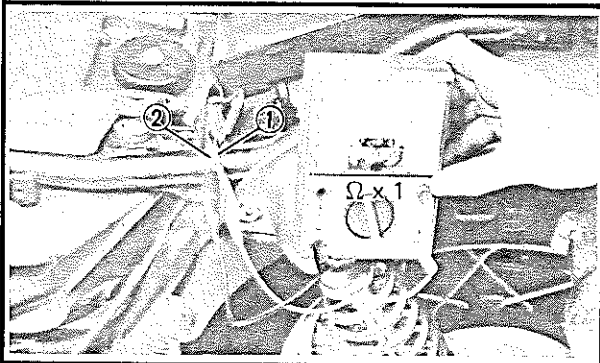
CONTINUITY

2. Taillight bulb socket conduct check

- Install the bulb to taillight socket.
- Disconnect the taillight coupler (Blue ① and Black ②).
- Connect the Pocket Tester (90890-03112) to the taillight coupler as shown, and check if for continuity.

CONTINUITY DOES NOT
EXIST ON CIRCUIT

Bulb socket is faulty.
Replace it.



CONTINUITY EXISTS ON
BOTH CIRCUIT

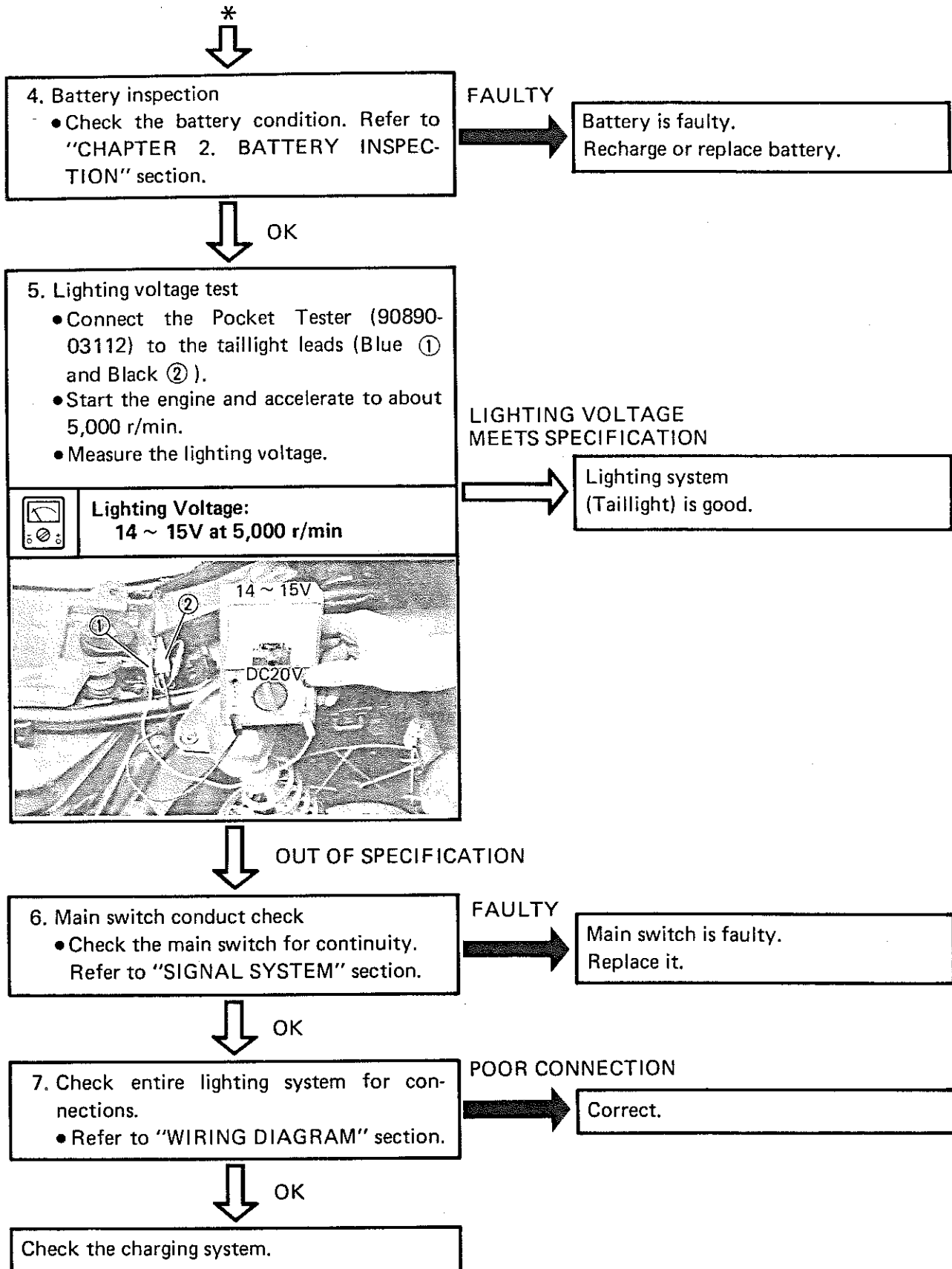
3. Fuse inspection

- Check the fuse condition.
Refer to "CHAPTER 2. FUSE INSPECTION" section.

FAULTY

Fuse is faulty.
Replace it.

OK
*





LIGHTING SYSTEM

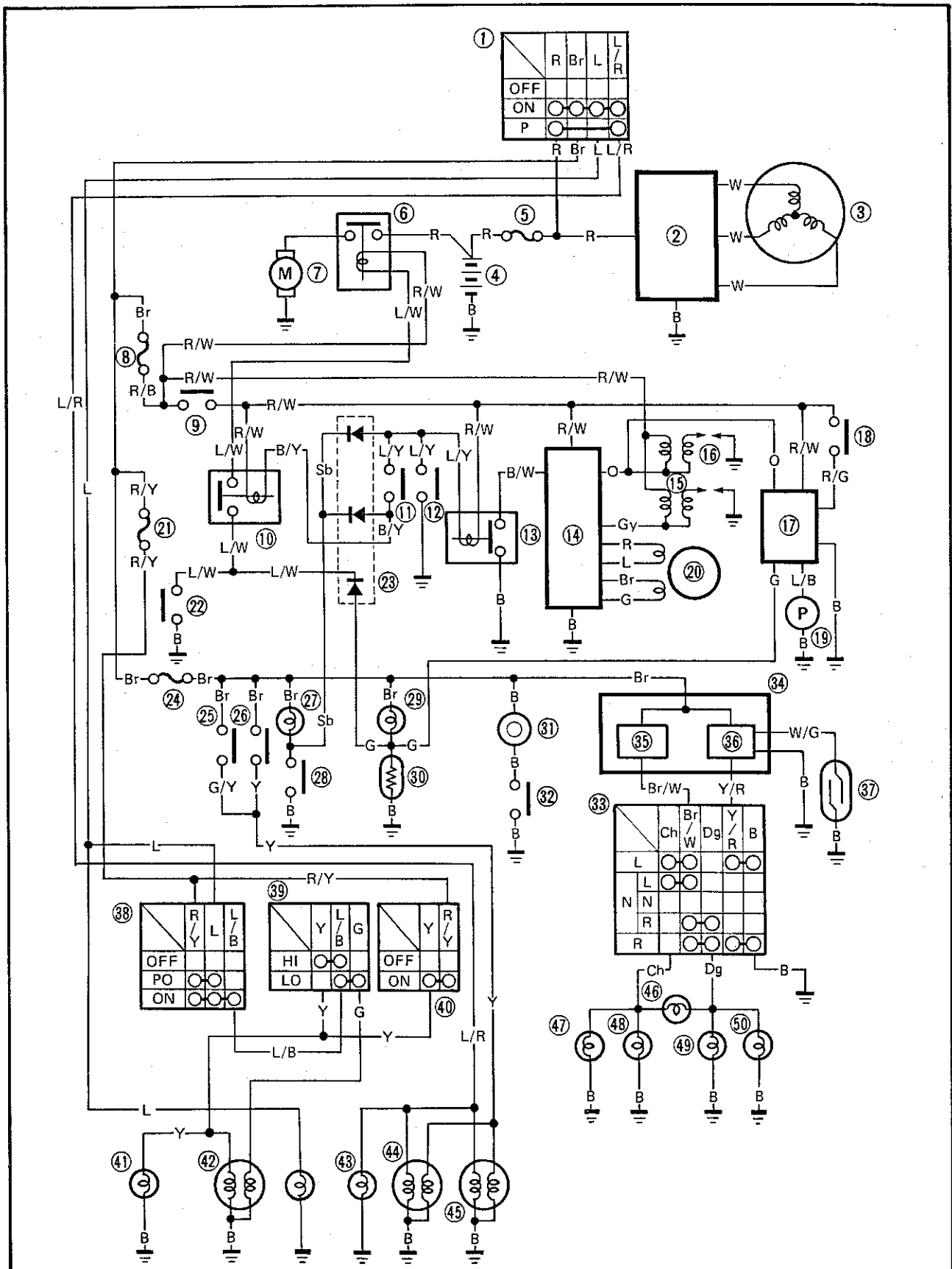
ELEC





SIGNAL SYSTEM

CIRCUIT DIAGRAM



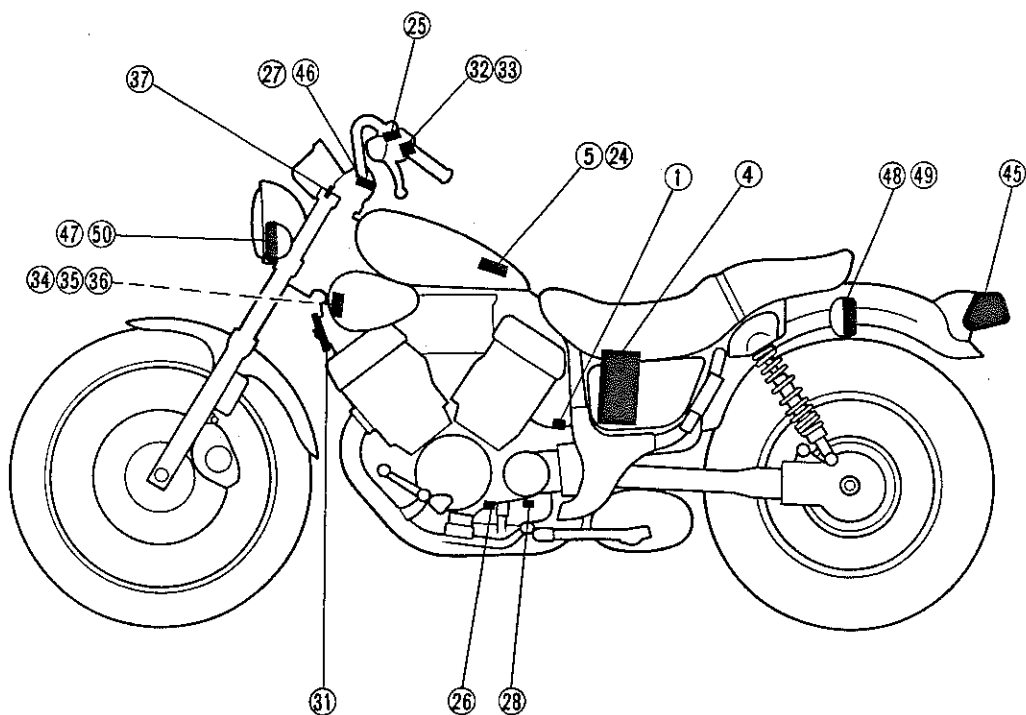


Aforementioned circuit diagram shows signal circuit in circuit diagram.

NOTE:

For the color codes, see page 6-2.

- | | |
|------------------------------|--------------------------------|
| ① Main switch | ③④ Relay assembly |
| ④ Battery | ③⑤ Flasher relay |
| ⑤ Fuse "MAIN" | ③⑥ Cancelling unit |
| ②④ Fuse "SIGNAL" | ③⑦ Reed switch |
| ②⑤ Front brake switch | ④⑤ Brake light |
| ②⑥ Rear brake switch | ④⑥ "TURN" indicator light |
| ②⑦ "NEUTRAL" indicator light | ④⑦ Front flasher light (Left) |
| ②⑧ Neutral switch | ④⑧ Rear flasher light (Left) |
| ③① Horn | ④⑨ Rear flasher light (Right) |
| ③② "HORN" switch | ⑤⑩ Front flasher light (Right) |
| ③③ "TURN" switch | |



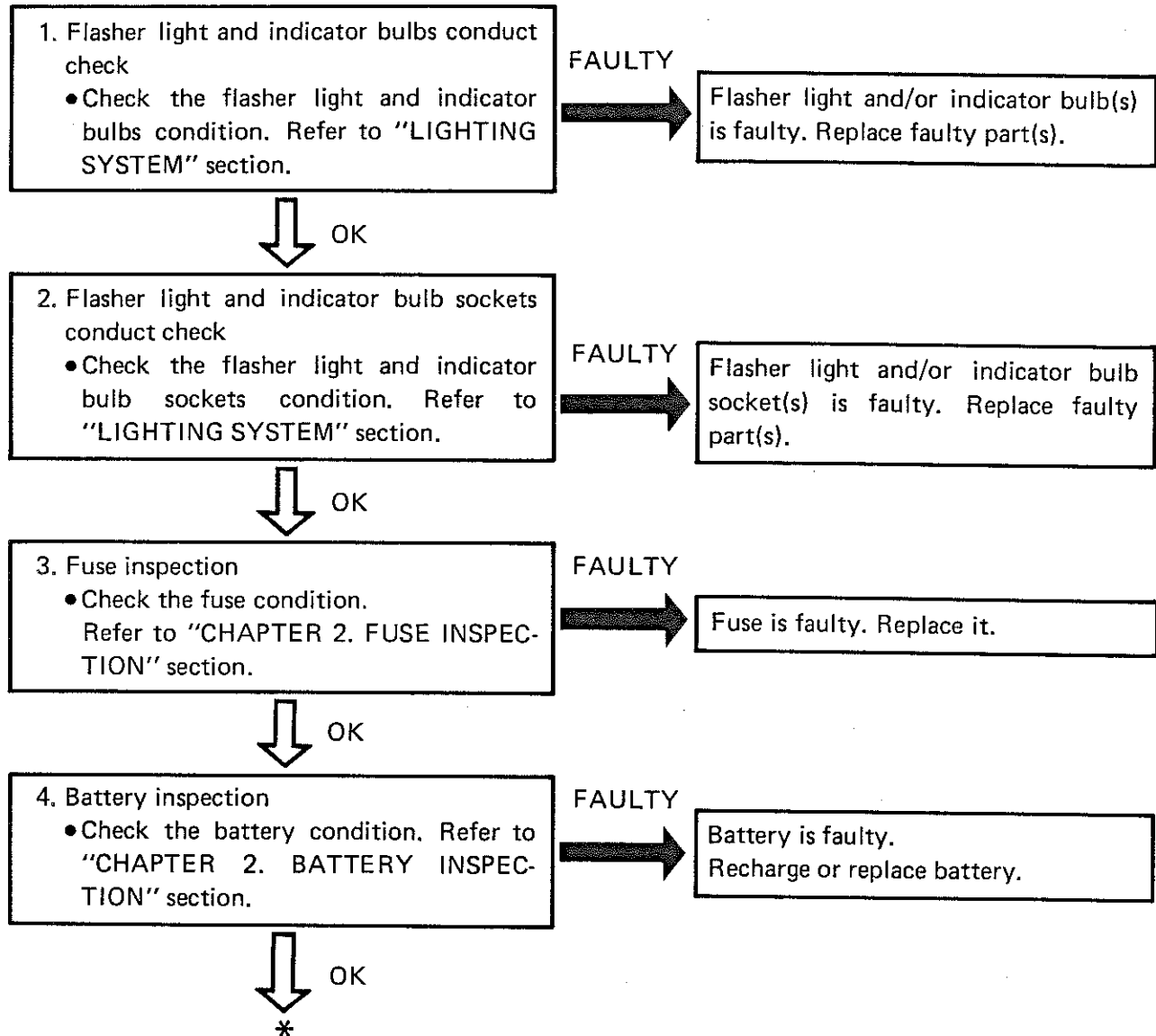


TROUBLESHOOTING

NOTE:

Before this troubleshooting, remove the front side cover and seat.

FLASHER LIGHT AND INDICATOR LIGHT DO NOT COME ON.



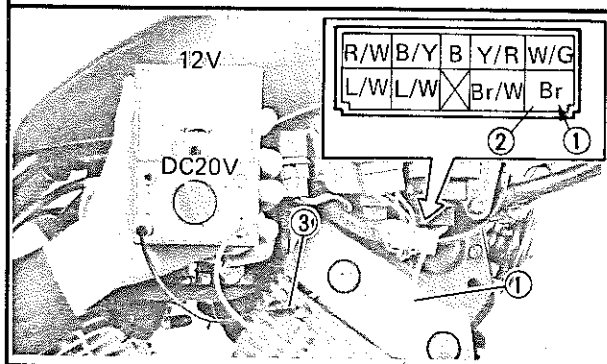


5. Battery voltage test

- Disconnect the relay assembly coupler.
- Connect the positive lead ① of the Pocket Tester (90890-03112) to the relay assembly coupler terminal (Brown ② – Wire harness side).
- Ground the negative lead ③ of the Pocket Tester to the engine.
- Turn the main switch to "ON", and measure the battery voltage.

LESS THAN 12V

Check main switch.



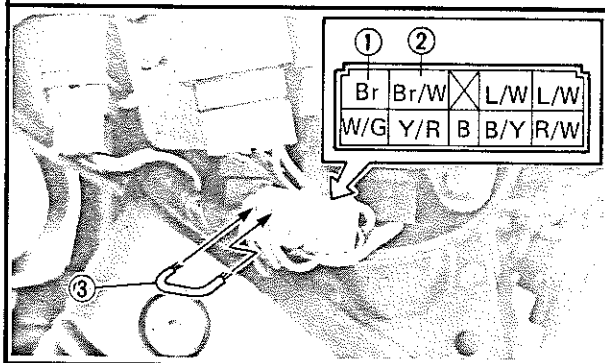
MORE THAN 12V

6. Flasher relay test

- Disconnect the relay assembly coupler.
- Connect the relay assembly coupler terminals (Brown ① and Brown/White ②) with the jumper lead ③.
- Turn the main switch to "ON", and turn the "TURN" switch to "L" or "R".
- Check the flasher light condition.

DOES NOT LIGHT

Check "TURN" switch,



OK

7. Check entire signal system for connections.

- Refer to "WIRING DIAGRAM" section.

FAULTY

Correct.



OK

Replace relay assembly.



FLASHER LIGHTS DO NOT CANCEL

1. "TURN" switch conduct check

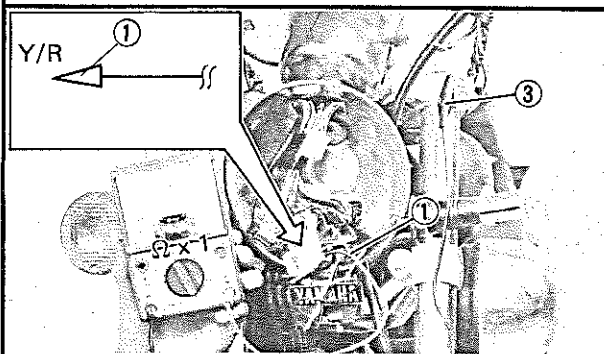
- Disconnect the handlebar switch (Left) coupler.
 - Connect the positive lead ① of the Pocket Tester (90890-03112) to the handlebar switch lead (Yellow/Red ②).
 - Ground the negative lead ③ of the Pocket Tester to the frame.
 - Check the following for continuity.
 - Push the "TURN" switch to left or right. Once the switch is released it will return to the center position.
- To cancel the signal, push the switch in after it has returned to the center position.

BAD
CONDITION

"TURN" switch is faulty.
Replace it.

"TURN" switch Position	Good Condition	Bad Condition		
"L" and "R"	○	○	X	X
"N" (Cancel)	X	○	X	○

○: Continuity X: Nocontinuity



GOOD
CONDITION

2. Reed switch test

- Remove the headlight lens unit, and disconnect the speedometer coupler.
- Connect the Pocket Tester (90890-03112) leads to the speedometer coupler terminals (White/Green ① and Black ②).
- Lift the front wheel and rotate the wheel by hand, and measure the reed switch resistance.

WARNING:

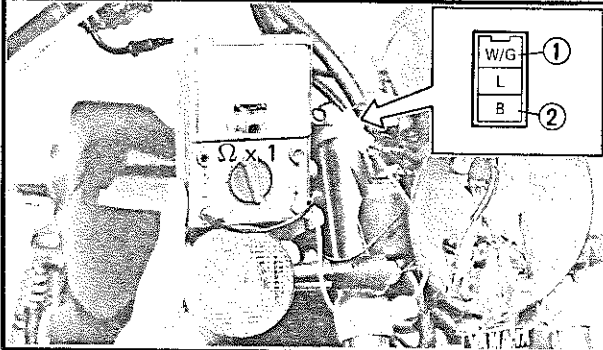
Securely support the motorcycle so there is no danger of it falling over.



Reed Switch Resistance:

About 7Ω

Then return back 0Ω or ∞
when wheel is stopped.



OUT OF
SPECIFICATION

Reed switch is faulty.
Replace it.



BOTH RESISTANCES
MEET SPECIFICATIONS

3. Check entire flasher cancelling system for
connections.

- Refer to "WIRING DIAGRAM" section.

FAULTY

Correct.



OK

Replace relay assembly.



BRAKE LIGHT DOES NOT COME ON.

1. Brake light bulb conduct check

- Remove the taillight lens and bulb.
- Check the brake light bulb condition. Refer to "LIGHTING SYSTEM" section.

FAULTY

Brake light bulb is faulty.
Replace it.



OK

2. Brake light bulb socket conduct check

- Check the brake light bulb socket condition. Refer to "LIGHTING SYSTEM" section.

FAULTY

Brake light bulb socket is faulty.
Replace it.



OK

3. Fuse inspection

- Check the fuse condition. Refer to "CHAPTER 2. FUSE INSPECTION" section.

FAULTY

Fuse is faulty.
Replace it.



OK

4. Battery inspection

- Check the battery condition. Refer to "CHAPTER 2. BATTERY INSPECTION" section.

FAULTY

Battery is faulty.
Recharge or replace battery.



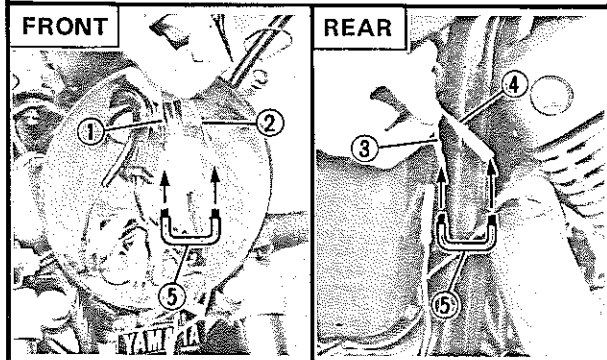
OK

5. Front and rear brake switches test

- Disconnect the front and rear brake switch couplers.
- Connect the front brake switch terminals (Brown ① and Green/Yellow ②) and rear brake switch terminals (Brown ③ and Yellow ④) with the jumper leads ⑤ .
- Turn the main switch to "ON", and check the brake light condition.

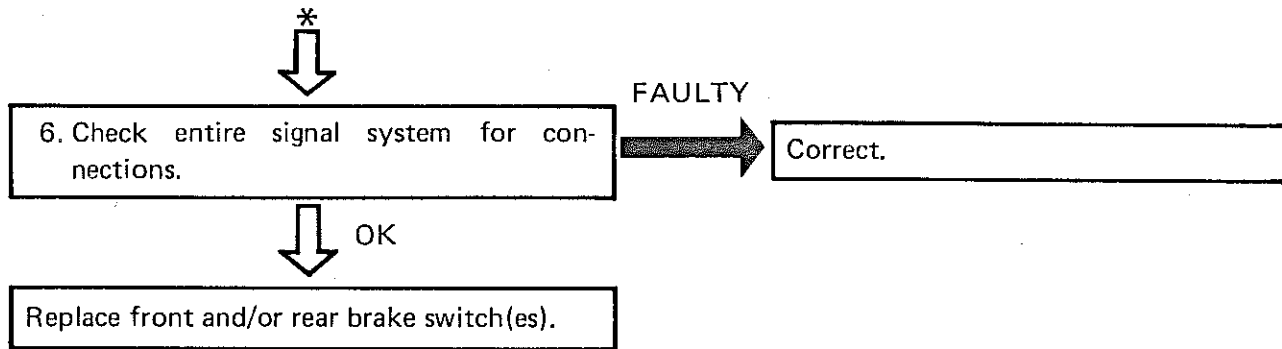
DOES NOT LIGHT

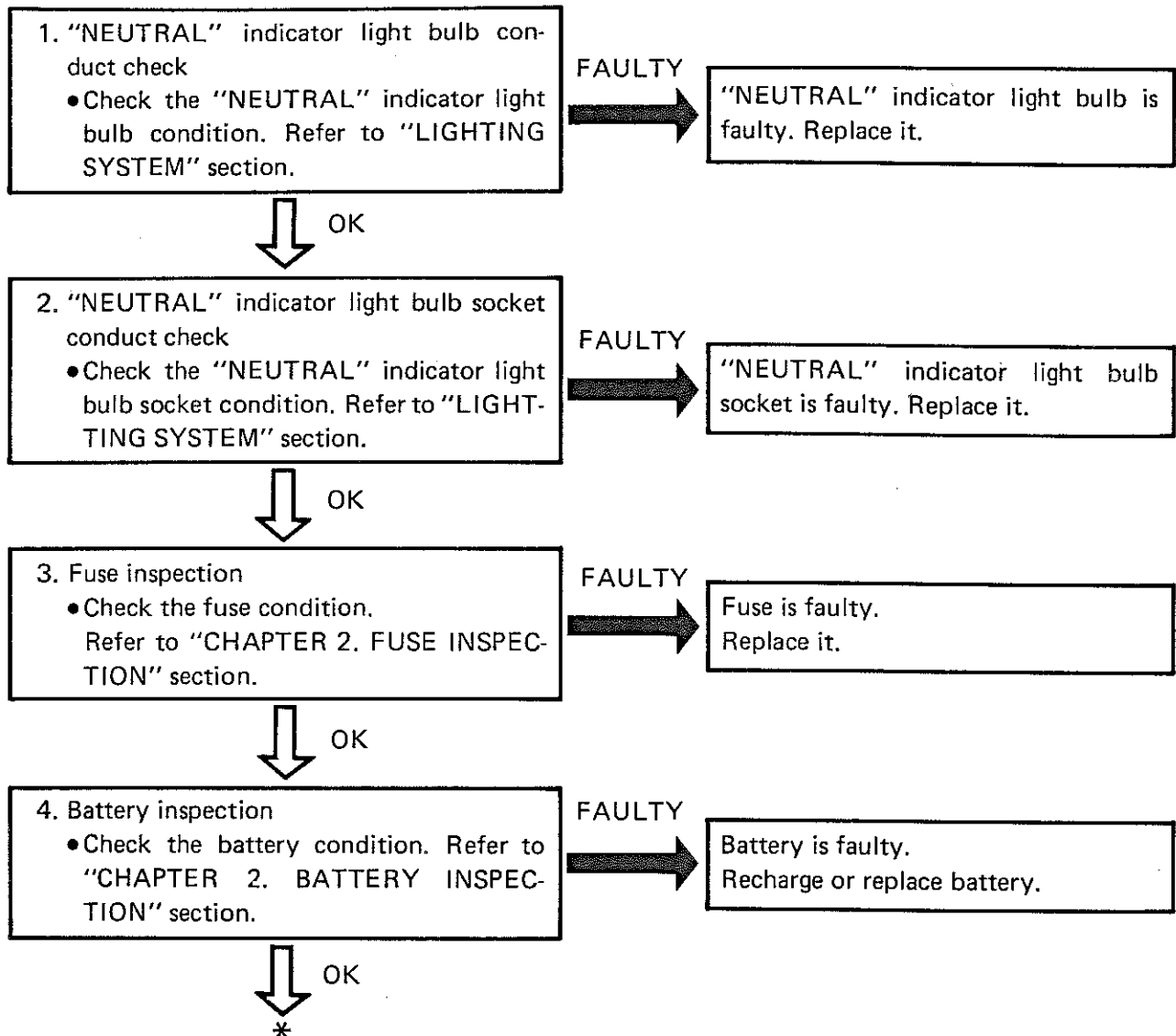
Check the main switch.



LIGHTS

*



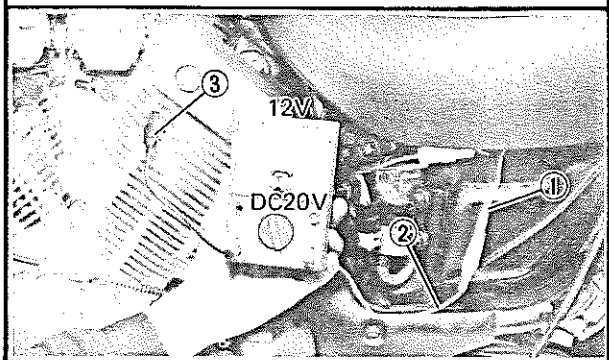
**"NEUTRAL" INDICATOR LIGHT DOES NOT COME ON.**

**5. Battery voltage test**

- Disconnect the neutral switch lead (Sky blue ① – Wire harness side).
- Connect the positive lead ② of the Pocket Tester (90890-03112) to the neutral switch lead.
- Ground the negative lead ③ of the Pocket Tester to the engine.
- Turn the main switch to "ON", and measure the battery voltage.

LESS THAN 12V

Check main switch.

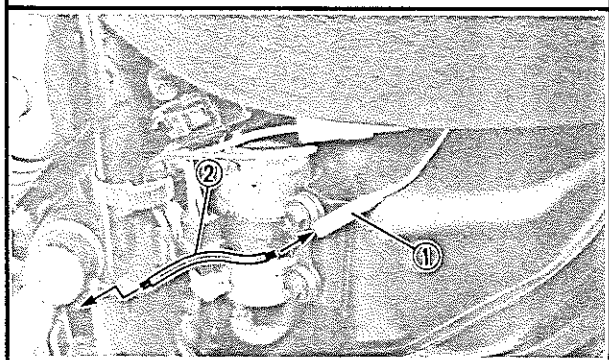


MORE THAN 12V

6. Neutral switch test

- Ground the neutral switch lead (Sky blue ① – Wire harness side) to the engine with the jumper lead ②.
- Shift the gear in neutral.
- Turn the main switch to "ON", and check the "NEUTRAL" indicator light condition.

LIGHTS

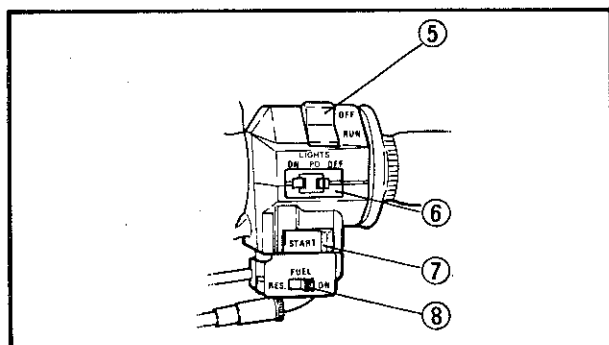
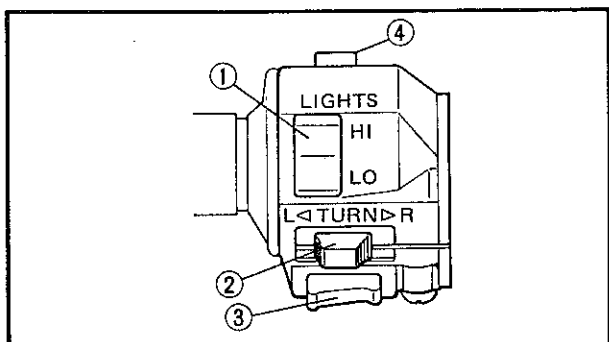
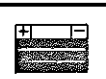
Neutral switch is faulty.
Replace it.

DOES NOT LIGHT

- 7. Check entire signal system for connection.**
- Refer to "WIRING DIAGRAM" section.

FAULTY

Correct.



SWITCHES TEST

Switches may be checked for continuity with the Pocket Tester (YU-03112) on the "Ohm x 1" position.

- ① "LIGHTS" (Dimmer) switch
- ② "TURN" switch
- ③ "HORN" switch
- ④ "PASSING" switch
- ⑤ "ENGINE STOP" switch
- ⑥ "LIGHTS" switch
- ⑦ "START" switch
- ⑧ "FUEL" (Reserve) switch

Main Switch

Switch Position	Lead Color			
	R	Br	L	L/R
ON	○—○		○—○	
OFF				
P	○			○

"LIGHTS" Switch

Switch Position	Lead Color		
	R/Y	L	L/B
OFF			
PO	○—○		
ON	○—○	○—○	○—○

"LIGHTS" (Dimmer) switch

Switch Position	Lead Color		
	Y	L/B	G
HI	○—○		
LO		○—○	

**"PASSING" Switch**

Switch Position	Lead Color	
	Y	R/Y
OFF		
ON		

"TURN" Switch

Switch Position		Lead Color				
		Ch	Br/W	Dg	Y/R	B
L						
N	L					
	OFF					
	R					
R						

"HORN" Switch

Switch Position	Lead Color	
	P	B
OFF		
ON		

"ENGINE STOP" Switch

Switch Position	Lead Color	
	R/W	R/B
OFF		
RUN		

"FUEL" (Reserve) Switch

Switch Position	Lead Color	
	R/W	R/G
ON		
RES		

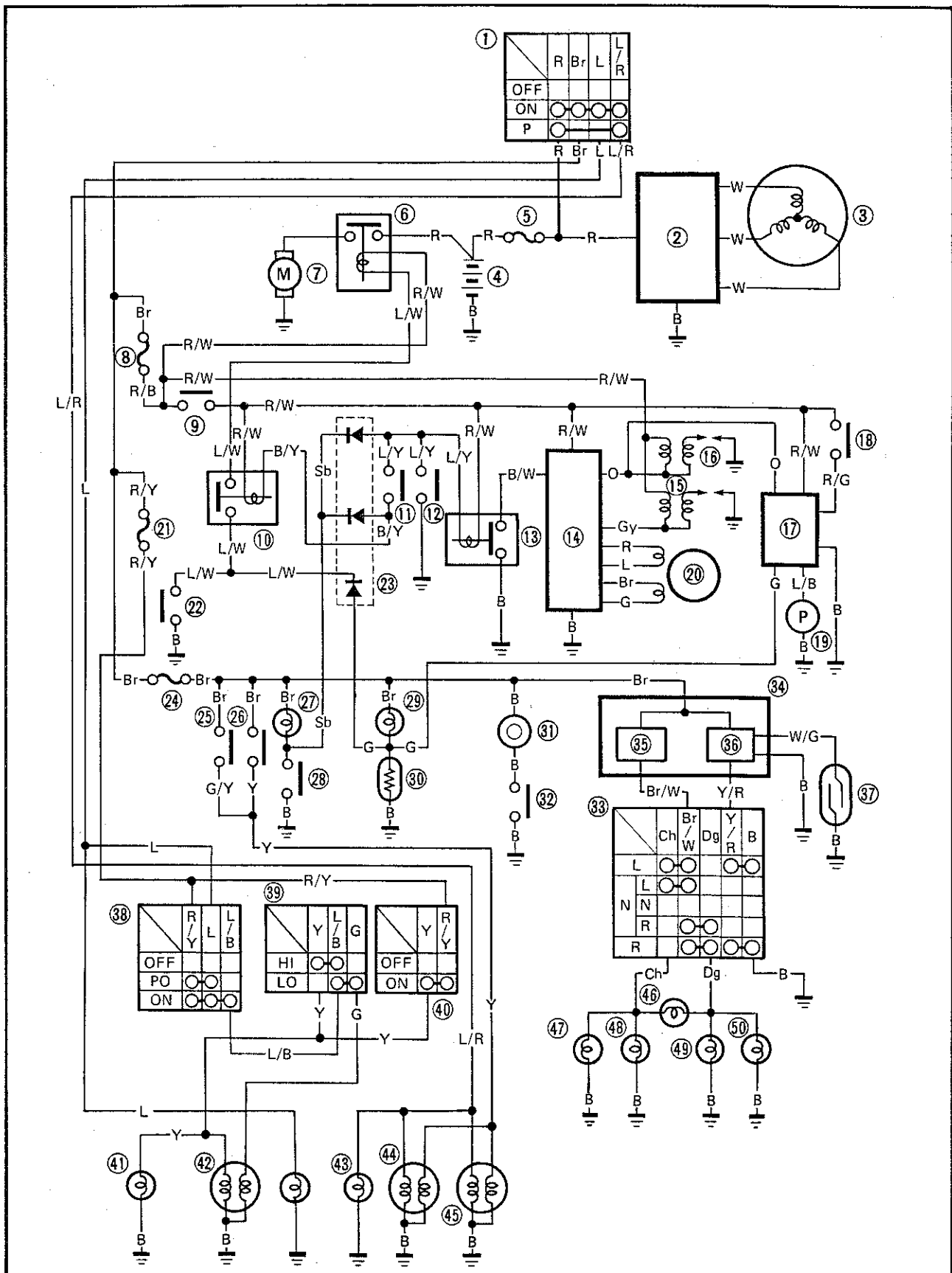
"START" Switch

Switch Position	Lead Color	
	L/W	B
OFF		
ON		



FUEL SYSTEM

CIRCUIT DIAGRAM



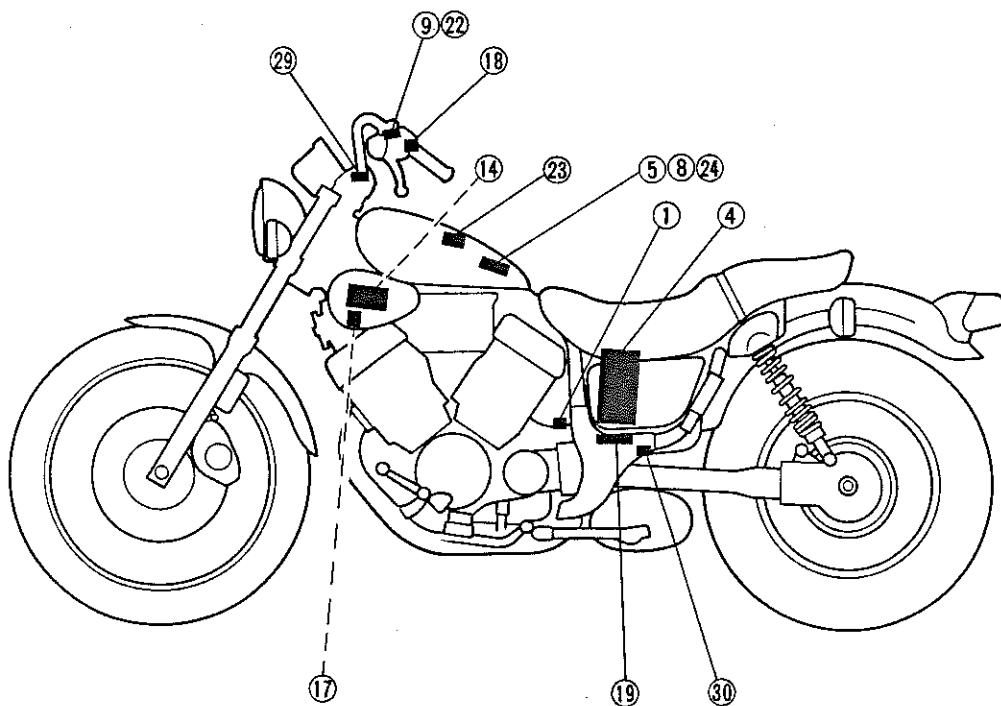


Aforementioned circuit diagram shows fuel circuit in circuit diagram.

NOTE:

For the color codes, see page 6-2.

- ① Main switch
- ④ Battery
- ⑤ Fuse "MAIN"
- ⑧ Fuse "IGNITION"
- ⑨ "ENGINE STOP" switch
- ⑭ Ignitor unit
- ⑰ Fuel pump relay
- ⑱ "FUEL" (Reserve) switch
- ⑲ Fuel pump
- ⑳ "START" switch
- ㉓ Diode
- ㉔ Fuse "SIGNAL"
- ㉙ "FUEL" indicator light
- ㉚ Fuel sender





TROUBLESHOOTING

NOTE:

Before this troubleshooting, remove the top cover, front side cover and seat.

FUEL PUMP FAILS TO OPERATE AFTER ENGINE IS STARTED.

1. Fuse inspection

- Check the fuse condition.
Refer to "CHAPTER 2. FUSE INSPECTION" section.

FAULTY

Fuse is faulty.
Replace it.



2. Battery inspection

- Check the battery condition. Refer to "CHAPTER 2. BATTERY INSPECTION" section.

FAULTY

Battery is faulty.
Recharge or replace battery.

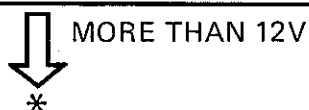
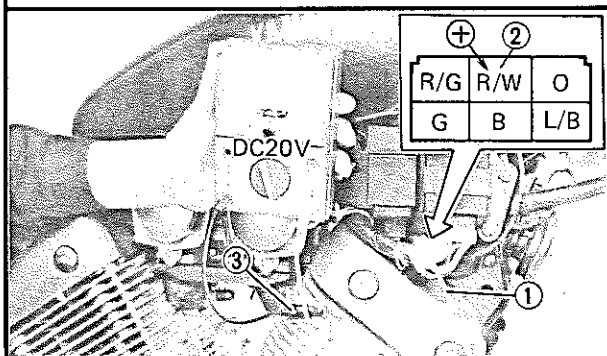


3. Battery voltage test

- Disconnect the fuel pump relay coupler.
- Connect the positive lead ① of the Pocket Tester (90890-03112) to the relay coupler terminal (Red/White ② – Wireharness side).
- Ground the negative lead ③ of the Pocket Tester to the engine.
- Turn the main switch to "ON" and engine stop switch to "RUN", then push the "START" switch.
- Measure the battery voltage.

LESS THAN 12V

Check main switch.





4. "FUEL" (Reserve) switch conduct check

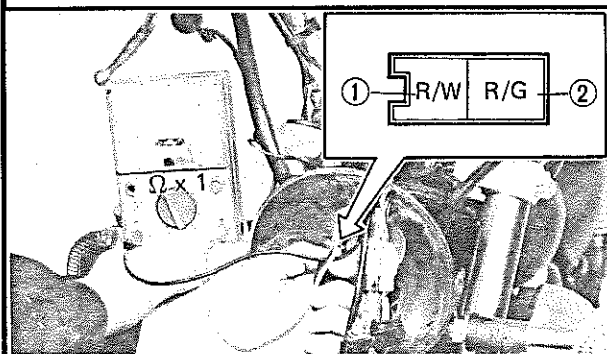
- Disconnect the handlebar switch (Right) coupler.
- Connect the Pocket Tester (90890-03112) leads to the switch coupler terminals (Red/White ① and Red/Green ②).
- Push or release the "FUEL" (Reserve) switch, and check the reserve switch for continuity.

"FUEL" (Reserve) Switch Position	Good Condition	Bad Condition		
PUSH	○	○	X	X
RELEASE	X	○	X	○

○: Continuity X: Nocontinuity

BAD
CONDITION

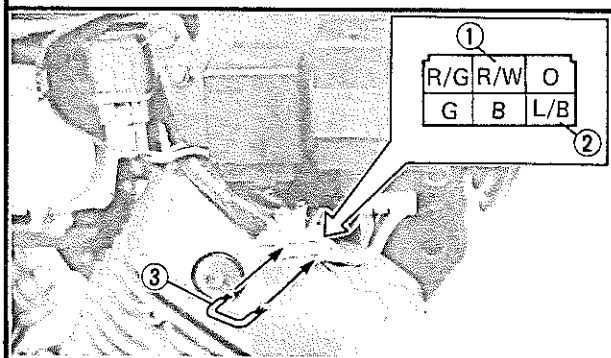
"FUEL" (Reserve) switch is faulty.
Replace it.

GOOD
CONDITION



5. Fuel pump relay test

- Disconnect the fuel pump relay coupler (Red/Green, Green, Red/White, Black, Orange and Blue/Black).
- Connect the relay coupler terminals (Red/White ① and Blue/Black ② — Wireharness side) with the jumper lead ③.
- Turn the main switch to "ON" and engine stop switch to "RUN", then push the "START" and "FUEL" (Reserve) switches.
- Check the fuel pump condition.



FAULTY

Fuel pump is faulty.
Replace it.



6. Check entire fuel system for connection.

- Refer to "WIRING DIAGRAM" section.

FAULTY

Correct.



Fuel pump relay is faulty. Replace it.



FUEL PUMP FAILS TO OPERATE FOR A 5 SECOND INTERVAL WHEN CARBURETOR FUEL LEVEL IS LOW AND FUEL INDICATOR DOES NOT COME ON.

1. Fuse inspection

- Check the fuse condition. Refer to "CHAPTER 2. FUSE INSPECTION" section.

FAULTY

Fuse is faulty.
Replace it.



2. Battery inspection

- Check the battery condition. Refer to "CHAPTER 2. BATTERY INSPECTION" section.

FAULTY

Battery is faulty.
Recharge or replace battery.

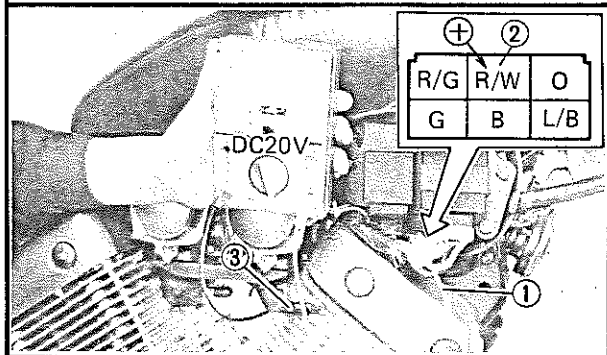


3. Battery voltage test

- Disconnect the fuel pump relay coupler.
- Connect the positive lead ① of the Pocket Tester (90890-03112) to the relay coupler terminal (Red/White ② – Wireharness side).
- Ground the negative lead ③ of the Pocket Tester to the engine.
- Turn the main switch to "ON" and engine stop switch to "RUN", then push the "START" switch.
- Measure the battery voltage.

LESS THAN 12V

Check main switch.



MORE THAN 12V

*



4. "FUEL" (Reserve) switch conduct check

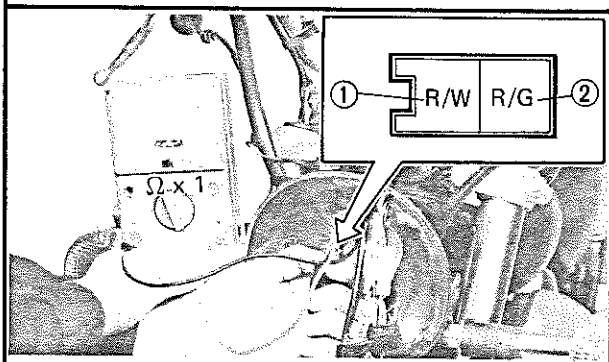
- Disconnect the handlebar switch (Right) coupler.
- Connect the Pocket Tester (90890-03112) leads to the switch coupler terminals (Red/White ① and Red/Green ②).
- Push or release the "FUEL" (Reserve) switch, and check the reserve switch for continuity.

"FUEL" (Reserve) Switch Position	Good Condition	Bad Condition		
PUSH	○	○	X	X
RELEASE	X	○	X	○

○: Continuity X: Nocontinuity

BAD
CONDITION

"FUEL" (Reserve) switch is faulty.
Replace it.

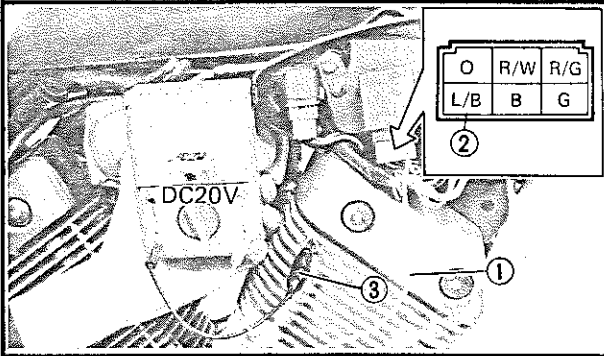


GOOD
CONDITION



5. Fuel pump input voltage test

- Connect the positive lead ① of the Pocket Tester (90890-03112) to the pump relay coupler terminal (Blue/Black ②).
- Ground the negative lead ③ of the Pocket Tester to the engine.
- Turn the main switch to "ON" and engine stop switch to "RUN", then push the "START" and "FUEL" (Reserve) switches.
- Measure the fuel pump input voltage.



LESS THAN 11V

Fuel pump relay is faulty.
Replace it.



MORE THAN 11V

6. Check entire fuel system for connection.

- Refer to "WIRING DIAGRAM" section.

FAULTY

Correct.



OK

Fuel pump is faulty. Replace it.



FUEL PUMP FAILS TO OPERATE FOR A 5 SECOND INTERVAL WHEN CARBURETOR FUEL LEVEL IS LOW AND FUEL INDICATOR COMES ON.

1. Fuse inspection

- Check the fuse condition. Refer to "CHAPTER 2. FUSE INSPECTION" section.

FAULTY

Fuse is faulty.
Replace it.

↓ OK

2. Battery inspection

- Check the battery condition. Refer to "CHAPTER 2. BATTERY INSPECTION" section.

FAULTY

Battery is faulty.
Recharge or replace battery.

↓ OK

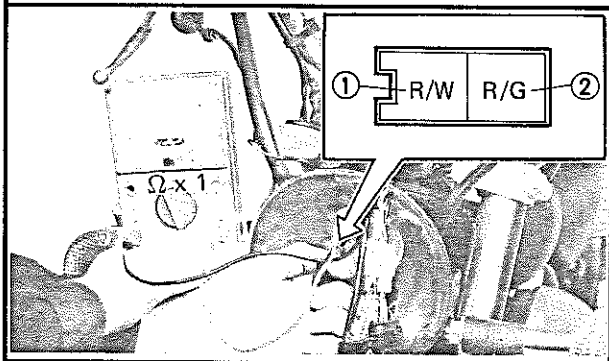
3. "FUEL" (Reserve) switch conduct check

- Disconnect the handlebar switch (Right) coupler.
- Connect the Pocket Tester (90890-03112) leads to the switch coupler terminals (Red/White ① and Red/Green ②).
- Push or release the "FUEL" (Reserve) switch, and check the reserve switch for continuity.

"FUEL" (Reserve) Switch Position	Good Condition	Bad Condition		
PUSH	○	○	X	X
RELEASE	X	○	X	○
○: Continuity X: Nocontinuity				

BAD
CONDITION

"FUEL" (Reserve) switch is faulty.
Replace it.

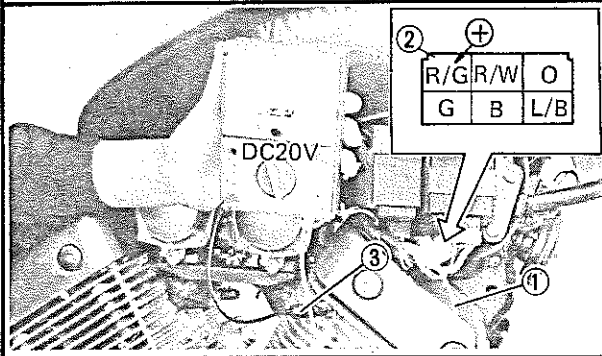


↓ GOOD
CONDITION
*



4. Battery voltage test

- Disconnect the fuel pump relay coupler.
- Connect the positive lead ① of the Pocket Tester (90890-03112) to the relay coupler terminal (Red/Green ② – Wireharness side).
- Ground the negative lead ③ of the Pocket Tester to the engine.
- Turn the main switch to "ON" and engine stop switch to "RUN", then push the "START" switch.
- Measure the battery voltage.



LESS THAN 12V

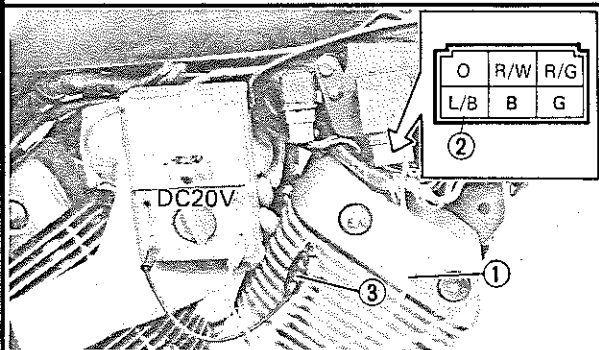
Check main switch.



MOTRE THAN 12V

5. Fuel pump input voltage test

- Connect the positive lead ① of the Pocket Tester (90890-03112) to the pump relay coupler terminal (Blue/Black ②).
- Ground the negative lead ③ of the Pocket Tester to the engine.
- Turn the main switch to "ON" and engine stop switch to "RUN", then push the "START" and "FUEL" (Reserve) switches.
- Measure the fuel pump input voltage.



LESS THAN 11V

Fuel pump relay is faulty.
Replace it.



MORE THAN 11V FOR
ABOUT 5 SECONDS



6. Check entire fuel system for connection.
• Refer to "WIRING DIAGRAM" section.

FAULTY



Correct.



OK

Fuel pump is faulty. Replace it.



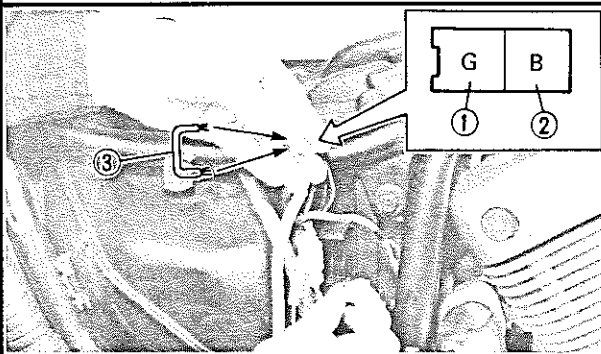
FUEL PUMP DOES NOT STOP AFTER 30 SECONDS WHEN FUEL INDICATOR COMES ON WHILE ENGINE TURNED ON.

1. Fuel pump input voltage and fuel sender test

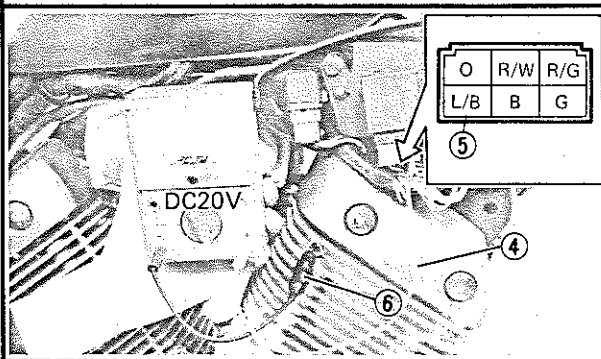
- Disconnect the fuel sender coupler from the wireharness.
- Connect the sender coupler terminals (Green ① and Black ② – Wireharness side) with the jumper lead ③ and hold it.

NOTE:

Go to the next step while holding the jumper lead.



- Connect the positive lead ④ of the Pocket Tester (90890-03112) to the pump relay coupler terminal (Blue/Black ⑤).
- Ground the negative lead ⑥ of the Pocket Tester to the engine.
- Turn the main switch to "ON" and engine stop switch to "RUN", then push the "START" switch.
- Measure the fuel pump input voltage.



0V AFTER ABOUT
30 SECONDS

Fuel fender is faulty.
Replace it.

MORE THAN 0V AFTER
ABOUT 30 SECONDS



2. Check entire fuel system for connection.
• Refer to "WIRING DIAGRAM" section.

FAULTY

Correct.



Fuel pump relay is faulty.
Replace it.



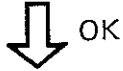
"FUEL" WARNING LIGHT DOES NOT COME ON.

1. "FUEL" warning light bulb conduct check

- Check the "FUEL" warning light bulb condition. Refer to "LIGHTING SYSTEM" section.

FAULTY

"FUEL" warning light bulb is faulty. Replace it.



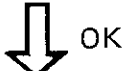
OK

2. "FUEL" warning light bulb socket conduct check

- Check the "FUEL" warning light bulb socket condition. Refer to "LIGHTING SYSTEM" section.

FAULTY

"FUEL" warning light bulb socket is faulty. Replace it.



OK

3. Fuse inspection

- Check the fuse condition. Refer to "CHAPTER 2. FUSE INSPECTION" section.

FAULTY

Fuse is faulty. Replace it.



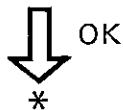
OK

4. Battery inspection

- Check the battery condition. Refer to "CHAPTER 2. BATTERY INSPECTION" section.

FAULTY

Battery is faulty. Replace it.



*

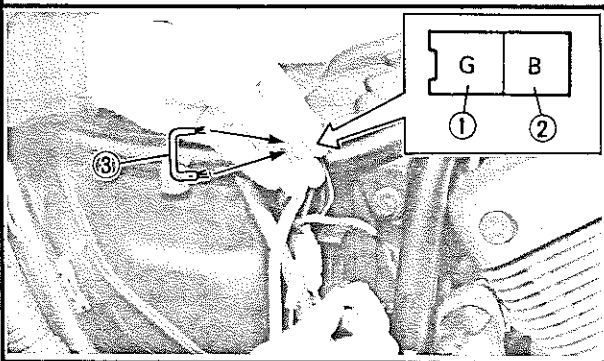


5. Fuel sender test

- Disconnect the fuel sender coupler from the wireharness.
- Connect the sender coupler terminals (Green ① and Black ② – Wireharness side) with the jumper lead ③.
- Turn the main switch to "ON" and engine stop switch to "RUN", then push the "START" switch.
- Check the "FUEL" warning light condition.

DOES NOT LIGHT

Check the main switch, engine stop switch and "START" switch. Refer to "SIGNAL SYSTEM" section.



LIGHTS

Fuel sender is faulty. Replace it.



FUEL PUMP TEST

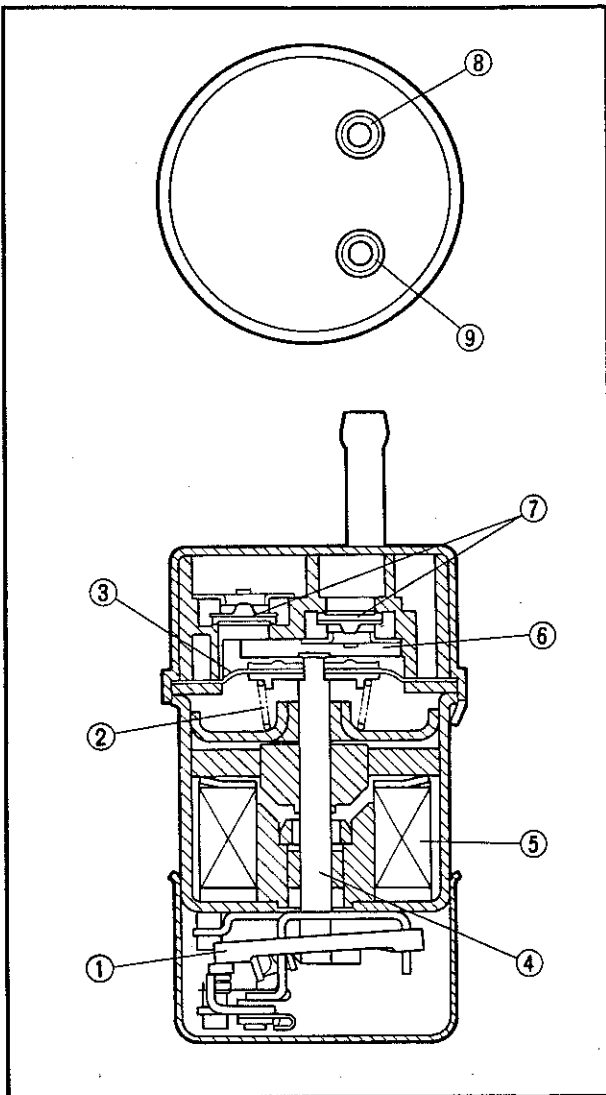
Operation

The diaphragm is pulled in by the plunger allowing fuel to be sucked into the fuel chamber. Fuel is pushed out from the pump until carb float chamber is filled with fuel, and then the cut-off switch cuts off the circuit.

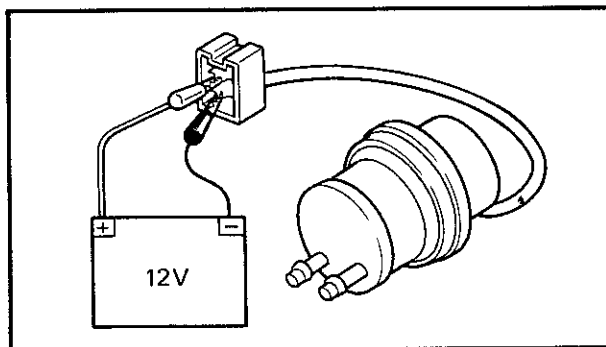
When the spring pushes the diaphragm further to the end, the cut-off switch turns on and the solenoid coil pulls the plunger with the diaphragm forcing fuel into the fuel chamber.

NOTE:

When the main and engine stop switches are ON, the fuel pump relay is activated for five (5) seconds at which time the fuel pump operates.



- ① Cut-out switch
- ② Spring
- ③ Diaphragm
- ④ Plunger
- ⑤ Solenoid coil
- ⑥ Fuel chamber
- ⑦ Valve
- ⑧ Outlet
- ⑨ Inlet



Inspection

1. Connect:
 - Battery (12V)
2. Inspect:
 - Fuel pump
 - Cracks/Damage → Replace.
3. Check:
 - Fuel pump operation
 - Faulty operation → Replace.



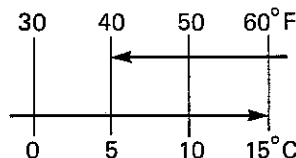
CHAPTER 7. APPENDICES

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GENERAL TORQUE SPECIFICATIONS.....	A-11
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WIRING DIAGRAM	

APPENDICES

SPECIFICATIONS

GENERAL SPECIFICATIONS

Model	XV535			
Model Code Number	2YL: (F)(I)(A) (B)(DK)(SF) (NL)(N)	2YL: (GB)(S)(D)	3BR: (D)	3BM: (CH)
Engine Starting Serial Number	2YL-000101	2YL-003101	3BR-000101	3BM-000101
Frame Starting Serial Number	2YL-000101	2YL-000101	3BR-000101	3BM-000101
Dimensions:				
Overall Length	2,225 mm (87.6 in)			
Overall Width	810 mm (31.9 in)			
Overall Height	1,100 mm (43.3 in)			
Seat Height	700 mm (27.6 in)			
Wheelbase	1,520 mm (59.8 in)			
Minimum Ground Clearance	160 mm (6.3 in)			
Basic Weight:				
Weight Oil and Full Fuel Tank	188 kg (415 lb)			
Minimum Turning Radius:	2,800 mm (110.2 in)			
Engine:				
Engine Type	Air cooled 4-stroke gasoline, SOHC			
Cylinder Arrangement	V-2 cylinder			
Displacement	535 cm ³			
Bore x Stroke	76 x 59 mm (2.992 x 2.323 in)			
Compression Ratio	9.0 : 1			
Compression Pressure	1,000 kPa (10 kg/cm ² , 142 psi)			
Starting System	Electric starter			
Lubrication System:	Wep sump			
Oil Type or Grade:				
Engine Oil				
				
Final Gear Oil				
Oil Capacity:				
Engine Oil:				
Periodic Oil Change	2.6 L (2.3 Imp qt, 2.7 US qt)			
With Oil Filter Replacement	2.8 L (2.5 Imp qt, 3.0 US qt)			
Total Amount	3.2 L (2.8 Imp qt, 3.4 US qt)			
Final Gear Case:				
Total Amount	0.19 L (0.17 Imp qt, 0.20 US qt)			
Air Filter:	Dry type element			
Fuel:				
Type	Regular gasoline			
Tank Capacity:				
Total	8.6 L (1.9 Imp gal, 2.3 US gal)			
Reserve	2.0 L (0.4 Imp gal, 0.5 US gal)			



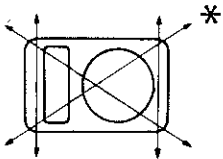
Model	XV535	
Carburetor: Type/Manufacturer	BDS34 x 2/MIKUNI	
Spark Plug: Type/Manufacturer Gap	BPR7ES/NGK, W22EPR-U/NIPPONDENSO 0.7 ~ 0.8 mm (0.028 ~ 0.031 in)	
Clutch Type:	Wet, multiple-disc	
Transmission: Primary Reduction System Primary Reduction Ratio Secondary Reduction System Secondary Reduction Ratio Transmission Type Operation Gear Ratio:	Spar gear 70/36 (1.944) Shaft drive 19/18 x 32/11 (3.071) Constant mesh, 5-speed Left foot operation	
1st 2nd 3rd 4th 5th	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 31.5° 125 mm (4.9 in)	
Tire: Type Size (F) Size (R) Wear Limit	With tube 3.00S-19 4PR BRIDGESTONE L303A/DUNLOP F14G 140/90-15 70S BRIDGESTONE G508/DUNLOP K425 1.0 mm (0.04 in)	
Tire Pressure (Cold Tire): Basic Weight: With Oil and Full Fuel Tank Maximum Load*	188 kg (415 lb) 227 kg (501 lb)	
Cold Tire Pressure:	FRONT	REAR
Up to 90 kg (198 lb) Load *	200 kPa (2.0 kg/cm ² , 28 psi)	230 kPa (2.3 kg/cm ² , 32 psi)
90 kg (198 lb)*~ Maximum Load *	200 kPa (2.0 kg/cm ² , 28 psi)	250 kPa (2.5 kg/cm ² , 36 psi)
High Speed Riding	200 kPa (2.0 kg/cm ² , 28 psi)	250 kPa (2.5 kg/cm ² , 36 psi)
	* Load is the total weight of cargo, rider, passenger, and accessories.	
Brake: Front Operation Rear Operation	Single disc brake Right hand operation Drum brake Right foot operation	



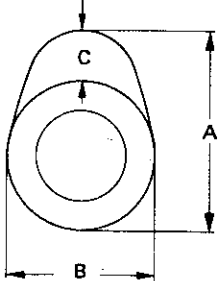

Model	XV535
Suspension: Front Suspension Rear Suspension	Telescopic fork Swing arm
Shock Absorber: Front Shock Absorber Rear Shock Absorber	Coil spring/Oil damper Coil spring/Oil damper
Wheel Travel: Front Wheel Travel Rear Wheel Travel	150 mm (5.9 in) 85 mm (3.3 in)
Electrical: Ignition System Generator System Battery Type or Model Battery Capacity	T.C.I. A.C. magneto generator GM12AZ-3A 12V 12AH
Headlight Type:	Bulb type
Bulb Wattage x Quantity: Headlight Tail/Brake Light Flasher Light Auxiliary Light Indicator Light: "NEUTRAL" "HIGH BEAM" "TURN" "FUEL" Meter Light	12V, 60W/55W x 1 12V, 5W/21W x 2 12V, 21W x 4 12V, 4W 12V, 3.4W (GB) 12V, 3W x 1 12V, 1.7W x 1 12V, 3W x 1 12V, 3W x 1 12V, 3W x 1

MAINTENANCE SPECIFICATIONS

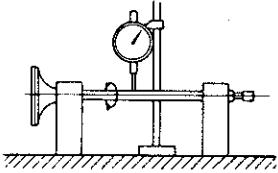
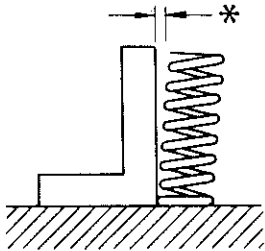
Engine

Model	XV535
Cylinder Head: Warp Limit*	< 0.03 mm (0.0012 in) > * Lines indicate straight edge measurement.
	
Cylinder: Bore Size Taper Limit Out of Round Limit	75.98 ~ 76.02 mm (2.991 ~ 2.993 in) < 0.05 mm (0.002 in) > < 0.05 mm (0.002 in) >

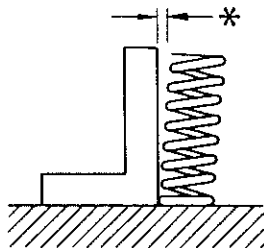
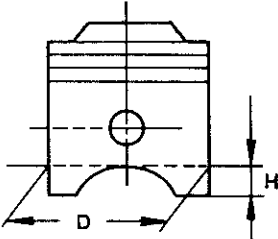

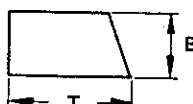



Model	XV535	
Camshaft: Drive Method Cam Cap Inside Dia. Camshaft Outside Dia. Shaft-to-Cap Clearance Cam Dimensions: Intake: "A" < Limit > "B" < Limit > "C" Exhaust: "A" < Limit > "B" < Limit > "C" Camshaft Runout Limit	Chain drive (Left and right) 28.00 ~ 28.02 mm (1.102 ~ 1.103 in) 27.96 ~ 27.98 mm (1.100 ~ 1.102 in) 0.020 ~ 0.061 mm (0.0008 ~ 0.0024 in)  39.73 mm (1.564 in) < 39.63 mm (1.560 in) > 32.22 mm (1.269 in) < 31.22 mm (1.229 in) > 7.73 mm (0.304 in) 39.77 mm (1.566 in) < 39.67 mm (1.562 in) > 32.30 mm (1.272 in) < 31.30 mm (1.232 in) > 7.77 mm (0.306 in) < 0.03 mm (0.0012 in) >	
Rocker Arm and Rocker Arm Shaft: Rocker Arm Inside Diameter < Limit > Shaft Outside Diameter < Limit > Arm-to-Shaft Clearance < Limit >	14.000 ~ 14.018 mm (0.5512 ~ 0.5519 in) < 14.078 mm (0.5543 in) > 13.980 ~ 13.991 mm (0.5504 ~ 0.5508 in) < 13.950 mm (0.5492 in) > 0.009 ~ 0.038 mm (0.0004 ~ 0.0015 in) < 0.08 mm (0.0032 in) >	
Cam Chain: Cam Chain Type/No. of Links Cam Chain Adjustment Method	SILENT CHAIN/118 Automatic	
Valve, Valve Seat, Valve Guide: Valve Clearance (Cold): IN. EX. Valve Dimensions:	0.07 ~ 0.12 mm (0.003 ~ 0.005 in) 0.12 ~ 0.17 mm (0.005 ~ 0.007 in)  "A" Head Dia. IN. EX. "B" Face Width IN. EX. "C" Seat Width IN. EX. < Limit > IN. EX.	
	36.9 ~ 37.1 mm (1.453 ~ 1.461 in) 31.9 ~ 32.1 mm (1.256 ~ 1.264 in) 2.3 mm (0.09 in) 2.3 mm (0.09 in) 1.0 ~ 1.2 mm (0.04 ~ 0.05 in) 1.0 ~ 1.2 mm (0.04 ~ 0.05 in) < 1.4 mm (0.055 in) > < 1.4 mm (0.055 in) >	

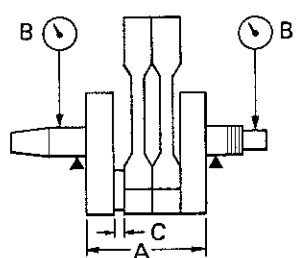


Model		XV535
"D" Margin Thickness	IN.	1.0 ~ 1.4 mm (0.04 ~ 0.06 in)
	EX.	1.0 ~ 1.4 mm (0.04 ~ 0.06 in)
< Limit >	IN.	< 0.7 mm (0.028 in) >
	EX.	< 0.7 mm (0.028 in) >
Stem Outside Dia.	IN.	6.975 ~ 6.990 mm (0.274 ~ 0.275 in)
	EX.	6.960 ~ 6.975 mm (0.273 ~ 0.274 in)
< Limit >	IN.	< 6.945 mm (0.273 in) >
	EX.	< 6.920 mm (0.272 in) >
Guide Inside Dia.	IN.	7.000 ~ 7.012 mm (0.275 ~ 0.276 in)
	EX.	7.000 ~ 7.012 mm (0.275 ~ 0.276 in)
< Limit >	IN.	< 7.05 mm (0.278 in) >
	EX.	< 7.05 mm (0.278 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)
< Limit >	IN.	< 0.08 mm (0.0031 in) >
	EX.	< 0.10 mm (0.0039 in) >
Stem Runout Limit		< 0.03 mm (0.0012 in) >
		
Valve Spring:		
Inner Spring:		
Free Length	IN.	39.9 mm (1.571 in)
	EX.	39.9 mm (1.571 in)
< Limit >	IN.	< 37.7 mm (1.48 in) >
	EX.	< 37.7 mm (1.48 in) >
Set Length (Valve Closed)	IN.	34.1 mm (1.343 in)
	EX.	34.1 mm (1.343 in)
Compressed Pressure (Installed)	IN.	9.5 ~ 11.1 kg (21.0 ~ 24.5 lb)
	EX.	9.5 ~ 11.1 kg (21.0 ~ 24.5 lb)
Tilt Limit *	IN.	< 2.5°/1.7 mm (0.067 in) >
	EX.	< 2.5°/1.7 mm (0.067 in) >
		
Direction of Winding	IN.	Clockwise
	EX.	Clockwise
Outer Spring:		
Free Length	IN.	43.6 mm (1.717 in)
	EX.	43.6 mm (1.717 in)
< Limit >	IN.	< 41.4 mm (1.630 in) >
	EX.	< 41.4 mm (1.630 in) >
Set Length (Valve Closed)	IN.	37.1 mm (1.46 in)
	EX.	37.1 mm (1.46 in)



Model		XV535
Compressed Pressure (Installed)	IN. EX.	18.7 ~ 21.9 kg (41.2 ~ 48.3 lb) 18.7 ~ 21.9 kg (41.2 ~ 48.3 lb)
Tilt Limit *	IN. EX.	< 2.5°/1.9 mm (0.075 in) > < 2.5°/1.9 mm (0.075 in) >
		
Direction of Winding	IN. EX.	Counter clockwise Counter clockwise
Piston:		
Piston Clearance < Limit > Piston Size "D" Measuring Point "H"		0.035 ~ 0.055 mm (0.0014 ~ 0.0022 in) < 0.1 mm (0.004 in) > 75.92 ~ 75.97 mm (2.989 ~ 2.991 in) 3.5 mm (0.14 in)
Oversize:	2nd 4th	76.50 mm (3.012 in) 77.00 mm (3.031 in)
Piston Ring:		
Top Ring:		Plain
Type		1.2 x 2.9 mm (0.05 ~ 0.11 in)
Dimensions (B x T)		0.30 ~ 0.45 mm (0.012 ~ 0.018 in)
End Gap (Installed)		< 0.7 mm (0.028 in) >
< Limit >		0.03 ~ 0.07 mm (0.001 ~ 0.003 in)
Side Clearance (Installed)		< 0.12 mm (0.005 in) >
< Limit >		
2nd Ring:		Taper
Type		1.5 x 3.2 mm (0.06 ~ 0.13 in)
Dimensions (B x T)		0.30 ~ 0.45 mm (0.012 ~ 0.018 in)
End Gap (Installed)		< 0.8 mm (0.031 in) >
< Limit >		0.02 ~ 0.06 mm (0.0008 ~ 0.0024 in)
Side Clearance		< 0.12 mm (0.005 in) >
< Limit >		
Oil Ring:		
Dimensions (B x T)		2.5 x 3.1 mm (0.10 ~ 0.12 in)
End Gap (Installed)		0.2 ~ 0.8 mm (0.008 ~ 0.031 in)
Connecting Rod:		
Oil Clearance		0.026 ~ 0.050 mm (0.001 ~ 0.002 in)
Bearing Color Code		1. Blue 2. Black 3. Brown 4. Green

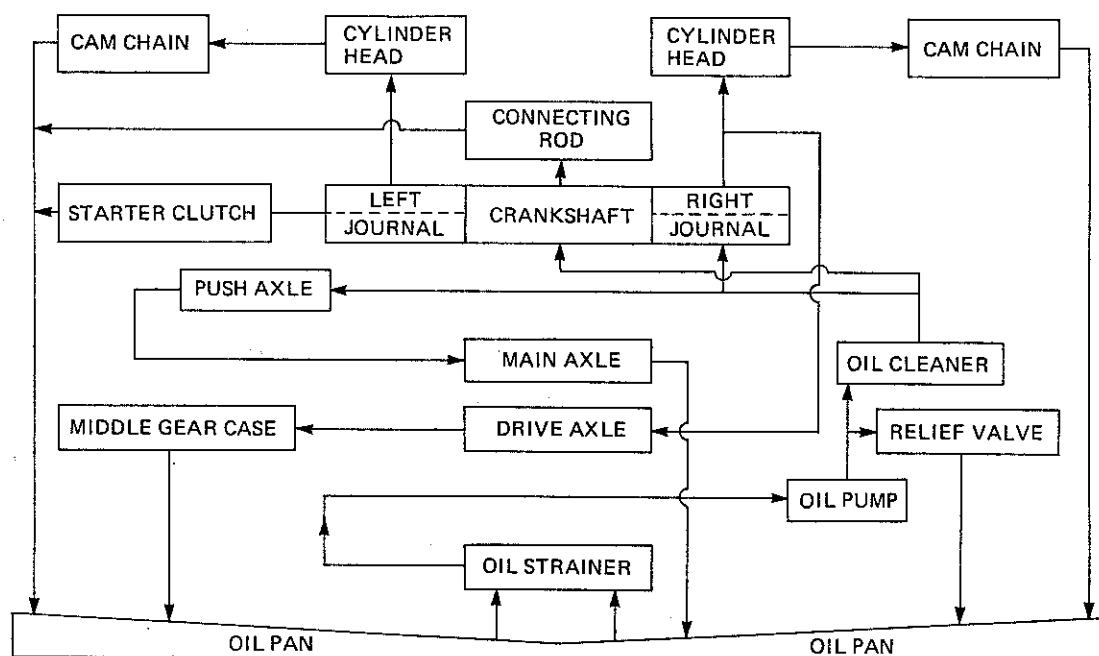


Model	XV535
Crankshaft:  <p> Crank Width "A" Runout Limit "B" Big End Side Clearance "C" Journal Oil Clearance Bearing Color Code </p>	<p>93.95 ~ 94.00 mm (3.699 ~ 3.701 in)</p> <p>< 0.03 mm (0.0012 in) ></p> <p>0.27 ~ 0.42 mm (0.011 ~ 0.017 in)</p> <p>0.020 ~ 0.052 mm (0.0008 ~ 0.0020 in)</p> <p>1. Blue 2. Green</p>
Clutch: <p>Friction Plate: Thickness Quantity Wear Limit</p> <p>Clutch Plate: Thickness Quantity Warp Limit</p> <p>Clutch Spring: Free Length Quantity Minimum Length</p> <p>Push Rod Bending Limit</p>	<p>2.9 ~ 3.1 mm (0.114 ~ 0.122 in)</p> <p>6 pcs.</p> <p>< 2.6 mm (0.102 in) ></p> <p>1.5 ~ 1.7 mm (0.060 ~ 0.067 in)</p> <p>5 pcs.</p> <p>< 0.2 mm (0.008 in) ></p> <p>39.5 mm (1.56 in)</p> <p>5 pc.</p> <p>< 38.5 mm (1.52 in) ></p> <p>< 0.5 mm (0.02 in) ></p>
Transmission: <p>Main Axle Deflection Limit Drive Axle Deflection Limit</p>	<p>< 0.06 mm (0.0024 in) ></p> <p>< 0.06 mm (0.0024 in) ></p>
Shifter: <p>Shifter Type Guide Bar Bending Limit</p>	<p>Guide Bar</p> <p>< 0.025 mm (0.001 in) ></p>
Carburetor: <p>I.D. Mark</p> <p>Main Jet (M.J.)</p> <p>Main Air Jet (M.A.J.)</p> <p>Jet Needle (J.N.)</p> <p>Needle Jet (N.J.)</p> <p>Pilot Jet (P.J.)</p> <p>Pilot Air Jet (P.A.J. 1) (P.A.J. 2)</p> <p>Pilot Screw (P.S.)</p> <p>Pilot Outlet (P.O.)</p> <p>Bypass (B.P. 1) (B.P. 2)</p> <p>Valve Seat Size (V.S.)</p> <p>Starter Jet (G.S.)</p> <p>Fuel Level</p> <p>Engine Idling Speed</p> <p>Vacuum Pressure at Idling Speed</p> <p>Vacuum Synchronous Difference</p>	<p>2JV00</p> <p># 135</p> <p># 140</p> <p>FRONT: 5DZ10-3 REAR: 5DZ9-3</p> <p>Y-O</p> <p>#35</p> <p>#70</p> <p>#170</p> <p>2 turns</p> <p>φ0.95</p> <p>φ0.8</p> <p>φ0.8</p> <p>φ1.5</p> <p>#40</p> <p>13.5 ~ 14.5 mm (0.53 ~ 0.57 in)</p> <p>1,150 ~ 1,250 r/min</p> <p>Above 30.6 kPa (230 mmHg, 9.06 inHg)</p> <p>Below 1.3 kPa (10 mmHg, 0.39 inHg)</p>



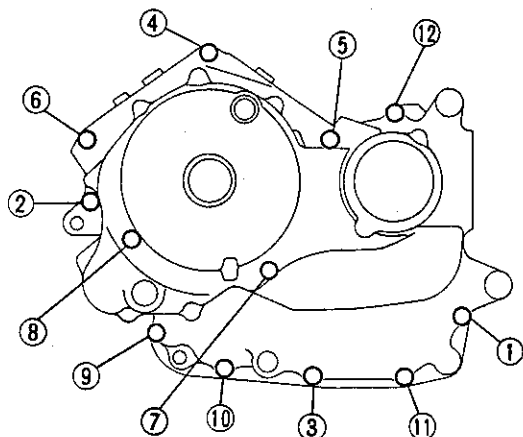
Model	XV535
Fuel Pump: Type Consumption Amperage (Max.) Out-put Pressure	Electrical type 0.8A 12.3 kPa (0.125 kg/cm ² , 1.78 psi)
Lubrication System: Oil Filter Type Oil Pump Type: Tip Clearance < Limit > Side Clearance < Limit > Relief Valve Operating Pressure	Paper type Trochoid type 0 ~ 0.12 mm (0 ~ 0.005 in) < 0.17 mm (0.007 in) > 0.03 ~ 0.08 mm (0.001 ~ 0.003 in) < 0.08 mm (0.003 in) > 441 ~ 539 kPa (4.5 ~ 5.5 kg/cm ² , 64 ~ 78 psi)
Shaft Drive: Middle Gear Backlash Final Gear Backlash	0.05 ~ 0.10 mm (0.002 ~ 0.004 in) 0.1 ~ 0.2 mm (0.004 ~ 0.008 in)

Lubrication Chart:

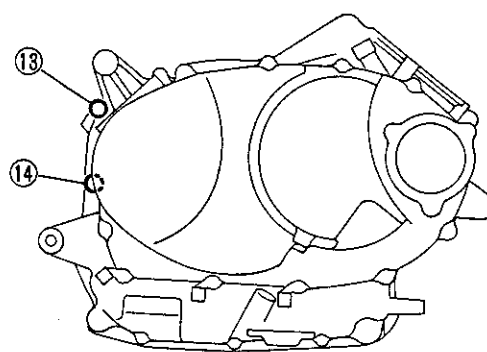


Crankcase Tightening Sequence:

LEFT-CASE



RIGHT-CASE





TIGHTENING TORQUE

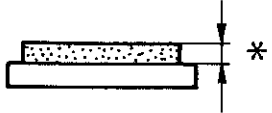
Parts to be tightened	Part name	Thread size	Q'ty	Tightening torque			Remarks
				Nm	m·kg	ft·lb	
Cylinder Head	Nut	M10 x 1.25	8	35	3.5	25	
	Flange nut	M8 x 1.25	2	20	2.0	14	
	Bolt	M8 x 1.25	4	20	2.0	14	
	Bolt	M16 x 1.25	4	38	3.8	27	
Cylinder Head (Exhaust pipe)	Stud bolt	M8 x 1.25	4	13	1.3	8.4	Use lock washer
Cylinder Head (Tappet Cover)	Bolt	M6 x 1.0	8	10	1.0	7.2	
Cylinder Head (Side Cover)	Bolt	M6 x 1.0	8	10	1.0	7.2	
Cam Sprocket Cover	Bolt	M6 x 1.0	4	10	1.0	7.2	
Rocker Arm Shaft Stopper	Bolt	M8 x 1.25	4	20	2.0	14	
Spark Plug	—	M14 x 1.25	2	20	2.0	14	
Cylinder	Bolt	M8 x 1.25	2	10	1.0	7.2	
Connecting Rod	Nut	M8 x 0.75	4	36	3.6	25	
Flywheel	Bolt	M10 x 1.25	1	80	8.0	58	
Valve Adjusting Locknut	Nut	M6 x 1.0	4	14	1.4	10	
Cam Sprocket	Bolt	M10 x 1.25	2	55	5.5	40	Stake
Cam Chain Tensioner	Bolt	M6 x 1.0	4	12	1.2	8.7	
Cam Chain Damper Stopper	Bolt	M6 x 1.0	4	10	1.0	7.2	
Oil Pump	Bolt	M6 x 1.0	3	7	0.7	5.1	
Oil Strainer Cover	Bolt	M6 x 1.0	3	10	1.0	7.2	
Oil Filter Cover	Bolt	M6 x 1.0	3	10	1.0	7.2	
Carburetor Joint	Bolt	M6 x 1.0	4	12	1.2	8.7	
Air Filter Element	Screw	M6 x 1.0	1	7	0.7	5.1	
Front Side Cover	Bolt	M6 x 1.0	2	10	1.0	7.2	
Sidestand	Stud bolt	M19 x 1.25	1	20	2.0	14	
Exhaust pipe	Nut	M8 x 1.25	4	20	2.0	14	Stake
Exhaust pipe (Rear joint)	Bolt	M6 x 1.0	2	10	1.0	7.2	
Crankcase	Stud bolt	M10 x 1.25	8	20	2.0	14	
	Stud bolt	M8 x 1.25	2	13	1.3	9.4	
	Bolt	M8 x 1.25	2	24	2.4	17	
	Bolt	M6 x 1.0	9	10	1.0	7.2	
Bearing Stopper (Drive Axle)	Screw	M8 x 1.25	4	25	2.5	18	
Crankcase Cover (Left)	Bolt	M6 x 1.0	10	10	1.0	7.2	
Crankcase Cover (Right)	Bolt	M5 x 1.0	11	10	1.0	7.2	
Starter Clutch	Bolt	M8 x 1.25	3	20	2.0	14	
Primary Drive Gear	Nut	M16 x 1.0	1	70	7.0	50	
Clutch Pressure Plate	Screw	M6 x 1.0	5	8	0.8	5.8	Use lock washer
Clutch Adjuster Locknut	Nut	M6 x 1.0	1	8	0.8	5.8	
Clutch Boss	Nut	M20 x 1.0	1	70	7.0	50	
Clutch Push Lever	Screw	M8 x 1.0	1	12	1.2	8.7	
Middle Drive Gear	Nut	M20 x 1.0	1	120	12.0	85	
Universal Joint	Nut	M14 x 1.5	1	90	9.0	65	
Bearing Housing (Middle Driven Shaft)	Bolt	M8 x 1.25	4	25	2.5	18	
Cam Shaft Segment	Screw	M5 x 0.8	1	4	0.4	2.9	
Change Pedal	Bolt	M6 x 1.0	1	10	1.0	7.2	
Bearing Housing (Ring Gear)	Bolt	M10 x 1.25	2	23	2.3	17	
	Bolt	M8 x 1.25	6	23	2.3	17	Use lock washer
Shift Lever	Screw	M8 x 1.25	1	22	2.2	16	
Muffler Chamber	Bolt	M8 x 1.25	1	20	2.0	14	
	Nut	M8 x 1.25	1	20	2.0	14	
Engine Stay	Nut	M10 x 1.25	8	55	5.5	40	
Stator	Screw	M6 x 1.0	3	7	0.7	5.1	
Pickup Coil	Screw	M6 x 1.0	3	7	0.7	5.1	



Chassis


Model	XV535
Steering System: Steering Bearing Type Number/Size of Steel Ball: Upper Lower	Ball bearing 19 pcs./1/4 in 19 pcs./1/4 in
Front Suspension: Front Fork Travel Fork Spring Free Length < Limit > Spring Rate: K1 K2 Stroke: K1 K2 Optional Spring Oil Capacity Oil Level Oil Grade	150 mm (5.91 in) 546.6 mm (21.5 in) < 541.6 mm (21.3 in) > 3.43 N/mm (0.35 kg/mm, 19.6 lb/in) 5.20 N/mm (0.53 kg/mm, 29.7 lb/in) 0 ~ 65 mm (0 ~ 2.56 in) 65 ~ 150 mm (2.56 ~ 5.91 in) No. 228 cm ³ (8.03 Imp oz, 7.71 US oz) 176 mm (6.93 in) From top of fully compressed inner tube without fork spring Yamaha fork oil 10wt or equivalent
Rear Suspension: Shock Absorber Travel Spring Free Length < Limit > Fitting Length Spring Rate: K1 K2 Stroke: K1 K2 Optional Spring	70 mm (2.76 in) 237.5 mm (9.35 in) < 232.5 mm (9.15 in) > 229 mm (9.01 in) 13.7 N/mm (1.4 kg/mm, 78.4 lb/in) 24.5 N/mm (2.5 kg/mm, 140 lb/in) 0 ~ (24 ~ 38) mm (0 ~ (9.45 ~ 14.96 in)) (24 ~ 38) ~ 70.0 mm ((9.45 ~ 14.96) ~ 27.56 in) No.
Swingarm: Swingarm Free Play Limit: End	< 1 mm (0.04 in) >
Front Wheel: Type Rim Size Rim Material Rim Runout Limit: Vertical Lateral	Spoke wheel MT1.85 x 19 Steel < 2 mm (0.08 in) > < 2 mm (0.08 in) >
Rear Wheel: Type Rim Size Rim Material Rim Runout Limit: Vertical Lateral	Spoke wheel MT3.00 x 15 Steel < 2 mm (0.08 in) > < 2 mm (0.08 in) >



Model	XV535
Front Disc Brake: Type Disc Outside Diameter x Thickness Pad Thickness < Limit > * 	Single 298 x 5 mm (11.7 x 0.2 in) 6.2 mm (0.26 in) < 0.8 mm (0.03 in) >
Master Cylinder Inside Diameter Caliper Cylinder Inside Diameter Brake Fluid Type	14 mm (0.55 in) 45.4 mm (1.79 in) DOT #4 or DOT #3
Rear Drum Brake: Type Drum Inside Diameter < Limit > Lining Thickness < Limit >	Leading and trailing 200 mm (7.87 in) < 201 mm (7.91 in) > 4 mm (0.16 in) < 2 mm (0.08 in) >
Brake Lever and Brake Pedal: Brake Lever Free Play Brake Pedal Position Brake Pedal Free Play	5 ~ 8 mm (0.20 ~ 0.32 in) 38 mm (1.50 in) 20 ~ 30 mm (0.8 ~ 1.2 in)



TIGHTENING TORQUE:

Part to be tightened	Thread size	Tightening torque			Remarks
		Nm	m·kg	ft·lb	
Front Wheel Axle	M14 x 1.5	58	5.8	42	See NOTE
Front Axle Pinch Bolt	M8 x 1.25	20	2.0	14	
Under Bracket and Inner Tube	M12 x 1.25	38	3.8	27	
Front Fender and Front Fork	M8 x 1.25	10	1.0	7.2	
Front Brake Caliper and Front Fork	M10 x 1.25	35	3.5	25	
Under Bracket and Clamp	M6 x 1.0	7	0.7	5.1	
Headlight Stay and Under Bracket	M6 x 1.0	7	0.7	5.1	
Headlight Stay and Headlight (Lower)	M8 x 1.25	16	1.6	11	
Handle Crown and Inner Tube	M8 x 1.25	20	2.0	14	
Handle Crown and Steering Shaft	M14 x 1.25	54	5.4	39	
Steering Shaft and Ring Nut	M25 x 1.0	38	3.8	27	
Handle Crown and Handlebar Holder (Lower)	M8 x 1.25	20	2.0	14	
Handlebar and Handlebar Holder (Upper)	M8 x 1.25	20	2.0	14	
Speedometer and Handle Crown	M6 x 1.0	7	0.7	5.1	
Headlight (Upper) and Meter Stay	M6 x 1.0	7	0.7	5.1	
Headlight Stay and Flasher Light Stay	M12 x 1.25	20	2.0	14	
Front Brake Disc and Hub	M8 x 1.25	20	2.0	14	Use lock washer 
Front Brake Hose and Caliper	M10 x 1.25	26	2.6	19	
Front Brake Bleed Screw	M8 x 1.25	6	0.6	4.3	
Master Cylinder and Brake Hose	M10 x 1.25	26	2.6	19	
Master Cylinder and Bracket	M6 x 1.0	9	0.9	6.5	
Horn and Frame	M6 x 1.0	7	0.7	5.1	
Cylinder Stud Bolt and Engine Stay (Front)	M10 x 1.25	55	5.5	40	
Engine Stay (Front) and Ignition Coil Stay	M6 x 1.0	7	0.7	5.1	
Ignition Coil and Coil Stay	M6 x 1.0	7	0.7	5.1	
Engine Stay (Front) and Frame	M10 x 1.25	55	5.5	40	
Top Cover and Frame	M6 x 1.0	7	0.7	5.1	
Engine Stay (Rear) and Frame	M10 x 1.25	55	5.5	40	
Engine Mounting (Rear-Top) and Frame	M10 x 1.25	55	5.5	40	
Engine Mounting (Rear-Bottom) and Frame	M12 x 1.25	70	7.0	50	
Main Switch and Frame	M8 x 1.25	20	2.0	14	
Regulator and Frame	M6 x 1.0	7	0.7	5.1	
Rear-Under-Side Cover (Top) and Frame	M6 x 1.0	7	0.7	5.1	
Rear-Under-Side Cover (Bottom) and Frame	M12 x 1.25	20	2.0	14	
Engine and Footrest Bar (Front)	M10 x 1.25	55	5.5	40	
Engine and Footrest Bar (Rear)	M10 x 1.25	55	5.5	40	
Footrest and Footrest Bar	M10 x 1.25	45	4.5	32	
Brake Pedal Adjuster Locknut	M6 x 1.0	7	0.7	5.1	
Sidestand	M10 x 1.25	26	2.6	19	
Rear Footrest and Frame	M10 x 1.25	45	4.5	32	
Pivot Shaft and Swingarm	M16 x 1.5	75	7.5	54	
Tank Bracket and Frame	M6 x 1.0	7	0.7	5.1	
Pump Bracket and Fuel Tank	M6 x 1.0	7	0.7	5.1	
Fuel Tank (Rear-Top) and Frame	M6 x 1.0	9	0.9	6.5	
Battery Box and Frame	M6 x 1.0	7	0.7	5.1	
Rear Stay and Frame	M8 x 1.25	20	2.0	14	
Rear Shock Absorber Cover and Frame	M8 x 1.25	9	0.9	6.5	
Seatlock and Seat	M6 x 1.0	7	0.7	5.1	
Seat and Frame	M6 x 1.0	7	0.7	5.1	



Part to be tightened	Thread size	Tightening torque			Remarks
		Nm	m·kg	ft·lb	
Rear Shock Absorber and Frame	M8 x 1.25	20	2.0	14	
Rear Shock Absorber and Swingarm	M10 x 1.25	30	3.0	22	
Rear Shock Absorber and Shaft Drive Housing	M10 x 1.25	30	3.0	22	
Swingarm and Shaft Drive Housing	M10 x 1.25	42	4.2	30	
Rear Wheel Axle	M14 x 1.5	105	10.5	75	
Rear Wheel Pinch Bolt	M8 x 1.25	16	1.6	11	
Rear Wheel Hub and Clutch Hub	M10 x 1.25	69	6.9	50	
Rear Fender (Front) and Frame	M6 x 1.0	7	0.7	5.1	
Rear Fender (Rear) and Frame	M8 x 1.25	16	1.6	11	
Rear Fender and Flasher Light Stay	M12 x 1.25	20	2.0	14	
Rear Fender and Taillight	M6 x 1.0	7	0.7	5.1	
Rear Fender and Licence Bracket	M6 x 1.0	7	0.7	5.1	
Tension Bar and Swingarm	M8 x 1.25	20	2.0	14	
Tension Bar and Brake Shoe Plate	M8 x 1.25	20	2.0	14	
Drain Plug (Final Gear)	M14 x 1.5	23	2.3	17	
Filler Plug (Final Gear)	M14 x 1.5	23	2.3	17	

NOTE:

1. First, tighten the ring nut approximately 38 Nm (3.8 m·kg, 27 ft·lb) by using the torque wrench, then loosen the ring nut one turn.
2. Retighten the ring nut 10 Nm (1.0 m·kg, 7.2 ft·lb).



Electrical

Model	XV535
Voltage:	12V
Ignition System: Ignition Timing (B.T.D.C.) Advanced Timing (B.T.D.C.) Advancer Type	8° at 1,200 r/min 29° at 4,200 r/min Electrical
<p>Ignition Timing (B.T.D.C.)</p> <p>Engine speed (x 10³ r/min)</p>	
T.C.I.: Pickup Coil Resistance (Color) T.C.I. Unit-Model/Manufacturer	140 ~ 170Ω at 20°C (68°F) (Brown – Green) (Red – Blue) J4T020/MITSUBISHI
Ignition Coil: Model/Manufacturer Minimum Spark Gap Primary Winding Resistance Secondary Winding Resistance	F6T507/MITSUBISHI 6 mm (0.24 in) 3.8 ~ 4.6Ω at 20°C (68°F) 10.6 ~ 15.8 kΩ at 20°C (68°F)
Spark Plug Cap: Type Resistance	Resin 10 kΩ
Charging System/Type:	A.C. magneto generator
A.C. Generator: Model/Manufacturer Nominal Output	F3T438/MITSUBISHI 14V, 20A at 5,000 r/min
<p>Output current (A)</p> <p>Engine speed (x 10³ r/min)</p>	
Stator Coil Resistance	0.34 ~ 0.42Ω at 20°C (68°F) (White – White)

SPECIFICATIONS

APPX



A-

Model	XV535
Voltage Regulator: Type Model/Manufacturer No Load Regulated Voltage	Short control SH569/SHINDENGEN 14 ~ 15V
Rectifier: Model/Manufacturer Capacity Withstand Voltage	SH569/SHINDENGEN 25A 200V
Battery: Capacity: Specific Gravity	12V, 12AH 1.280
Electric Starter System: Type Starter Motor: Model/Manufacturer Output Bush: Overall Length < Limit > Spring Pressure Commutator: Outside Diameter < Wear Limit > Mica Undercut Starter Relay: Model/Manufacturer Amperage Rating Coil Winding Resistance	Constant mesh type SM-8219/MITSUBA 0.6 kW 12 mm (0.47 in) < 5.0 mm (0.20 in) > 520 ~ 920 g (18.3 ~ 32.4 oz) 28 mm (1.1 in) < 27 mm (1.06 in) > 1.6 mm (0.063 in) A104-132/HITACHI 100A 3.0 ~ 3.7Ω at 20°C (68°F)
Horn: Type/Quantity Model/Manufacturer Maximum Amperage	Plain type x 1 YF-12/NIKKO 2.5A
Flasher Relay: Type Model/Manufacturer Self Cancelling Device Flasher Frequency Wattage	Semi transistor type FX257N/NIPPONDENSO Yes. 75 ~ 95 cycle/min 21W x 2 + 3.4W
Self Cancelling Unit: Model/Manufacturer	FX257N/NIPPONDENSO
Fuel Gauge: Model/Manufacturer Sender Unit Resistance (Full)	2GV/NIPPONSEIKI 600 ~ 1,700Ω at 20°C (68°F)
Sidestand Relay: Model/Manufacturer Coil Winding Resistance Diode	4U8-01/TATEISHI 68 ~ 83Ω at 20°C (68°F) No.



SPECIFICATIONS

APPX



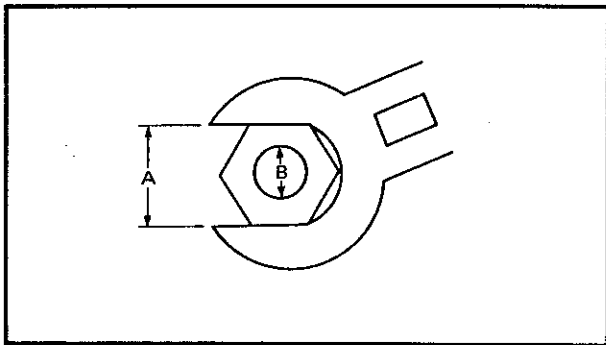
Model	XV535
Starting Circuit Cut-off Relay: Model/Manufacturer Coil Winding Resistance Diode	FX257N/NIPPONDENSO 202 ~ 248 Ω at 20°C (68°F) No
Fuel Pump Relay: Model/Manufacturer	G8D-04Y/TATEISHI
Circuit Breaker: Type Amperage for Individual Circuit x Quantity:	Fuse Main 20A x 1 Headlight 10A x 1 Signal 10A x 1 Ignition 10A x 1 Reserve 20A x 1 10A x 1



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 multifastener 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
10mm	6mm	6	0.6	4.3
12mm	8mm	15	1.5	11
14mm	10mm	30	3.0	22
17mm	12mm	55	5.5	40
19mm	14mm	85	8.5	61
22mm	16mm	130	13.0	94



A: Distance across flats

B: Outside thread diameter

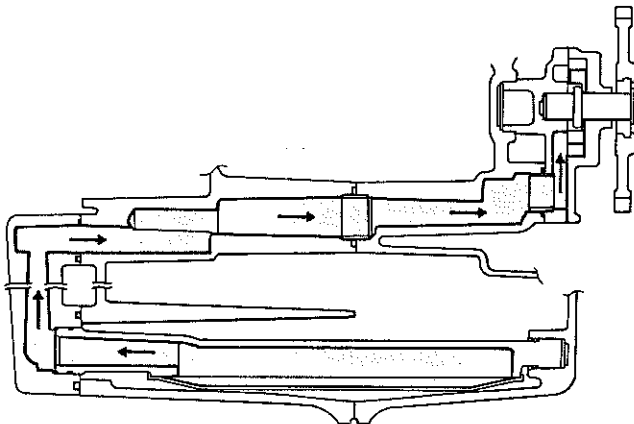
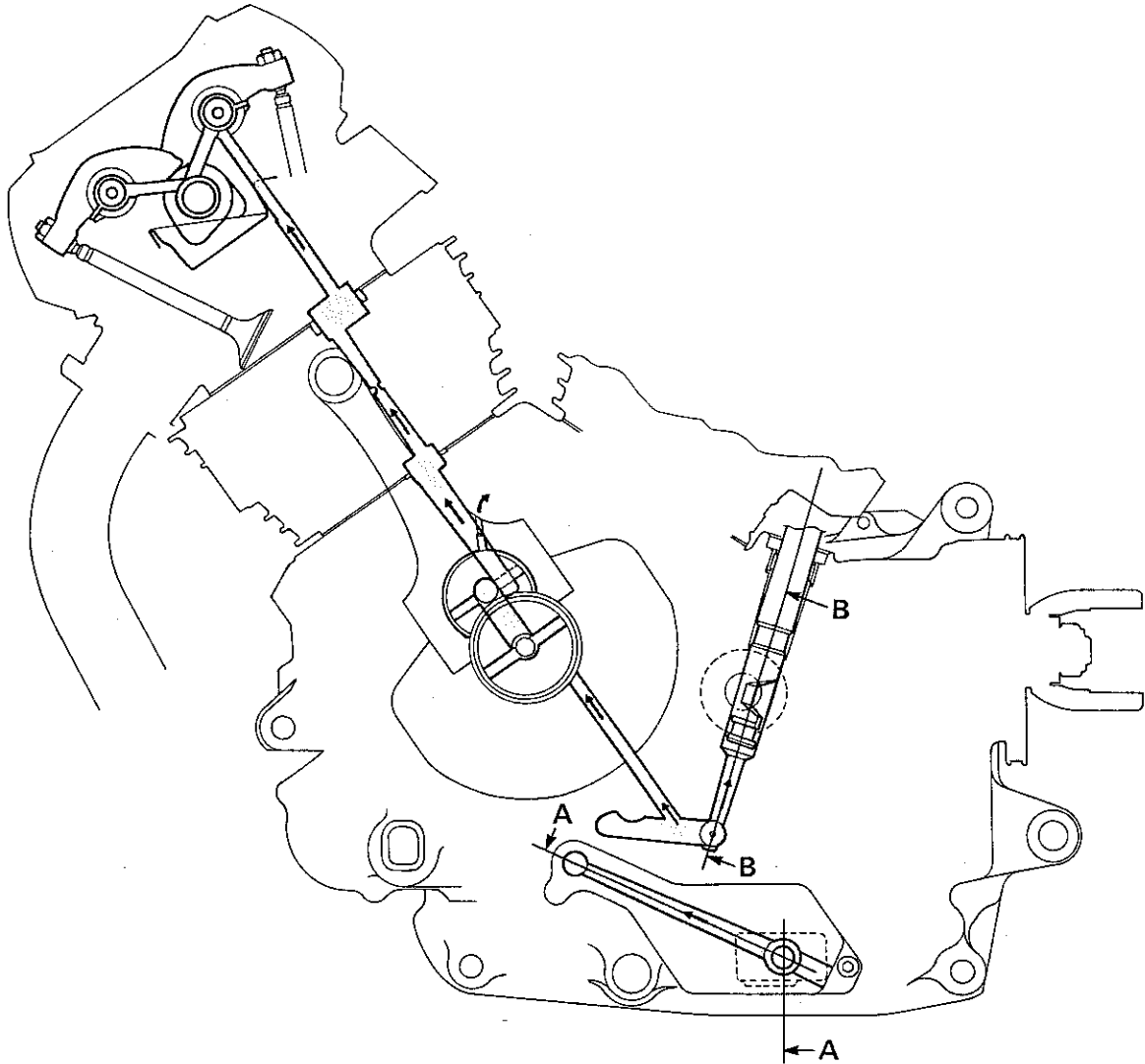
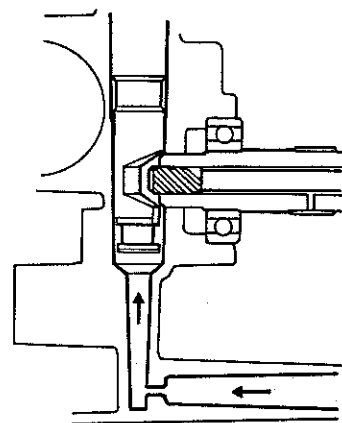
DEFINITION OF UNITS

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



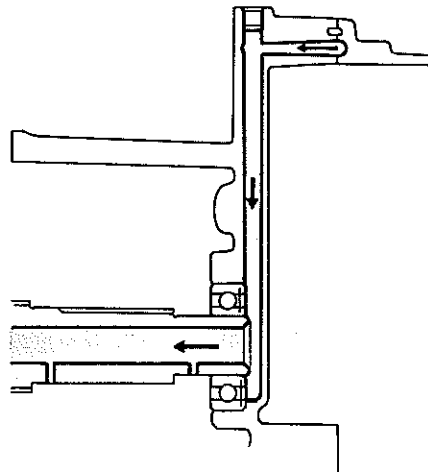
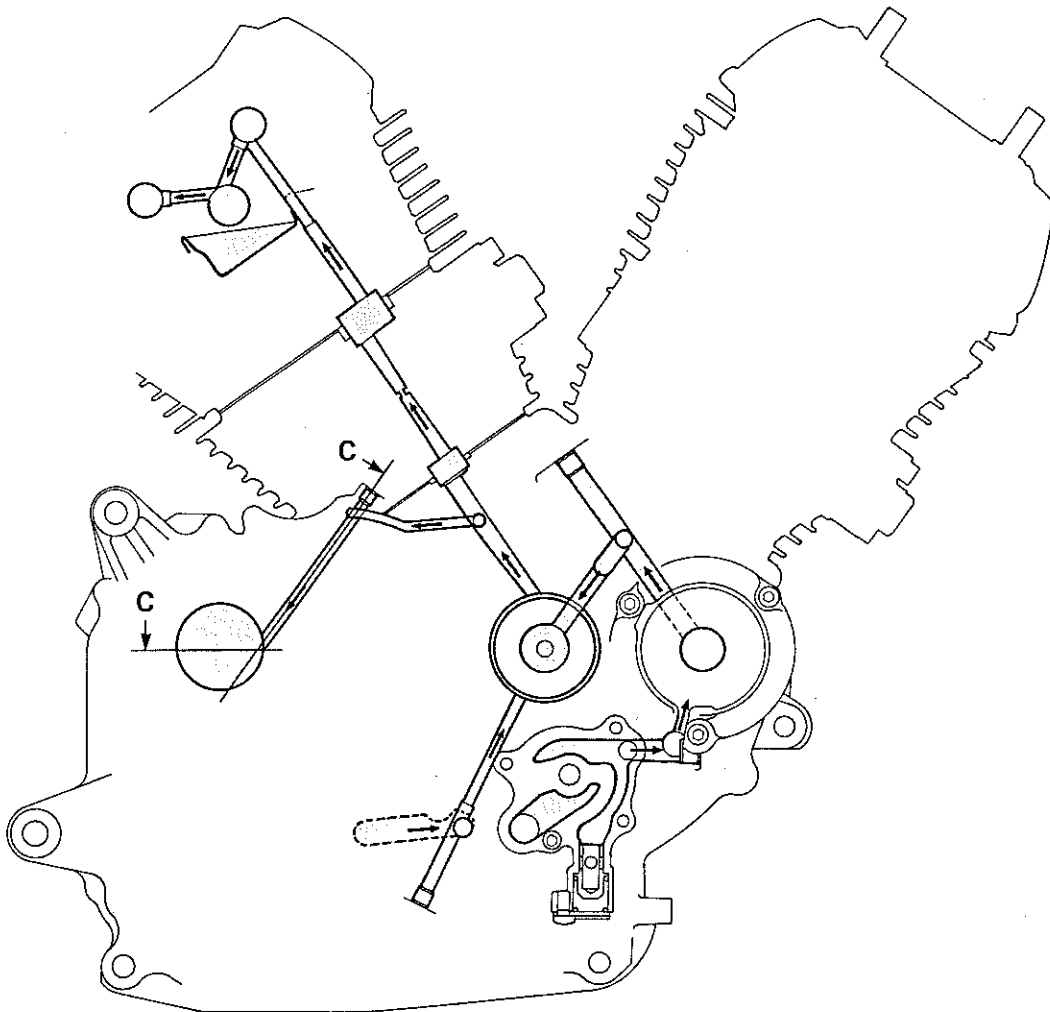
LUBRICATION DIAGRAMS

- A** Section A – A
B Section B – B

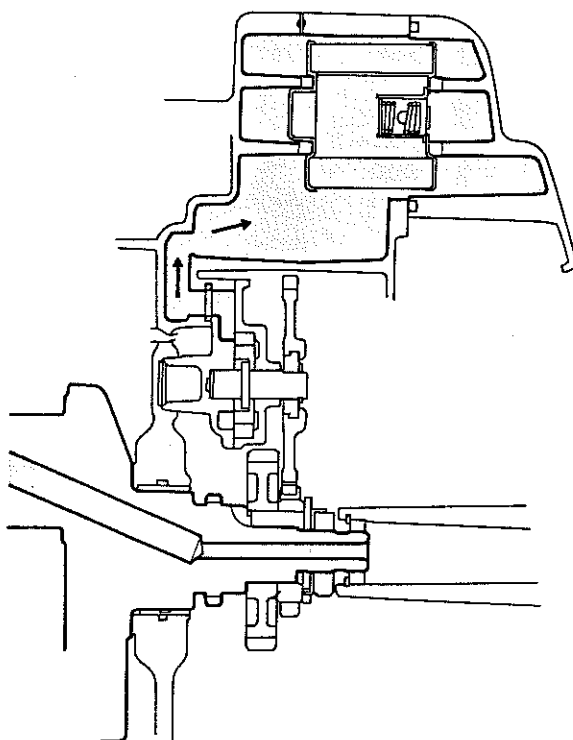
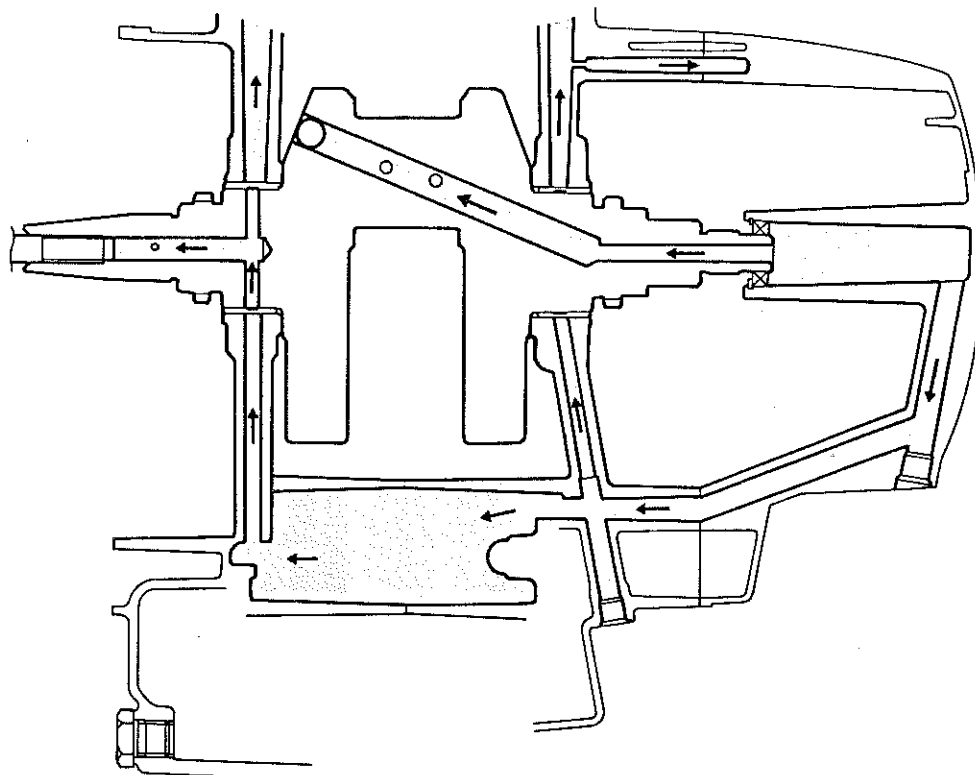
**A****B**

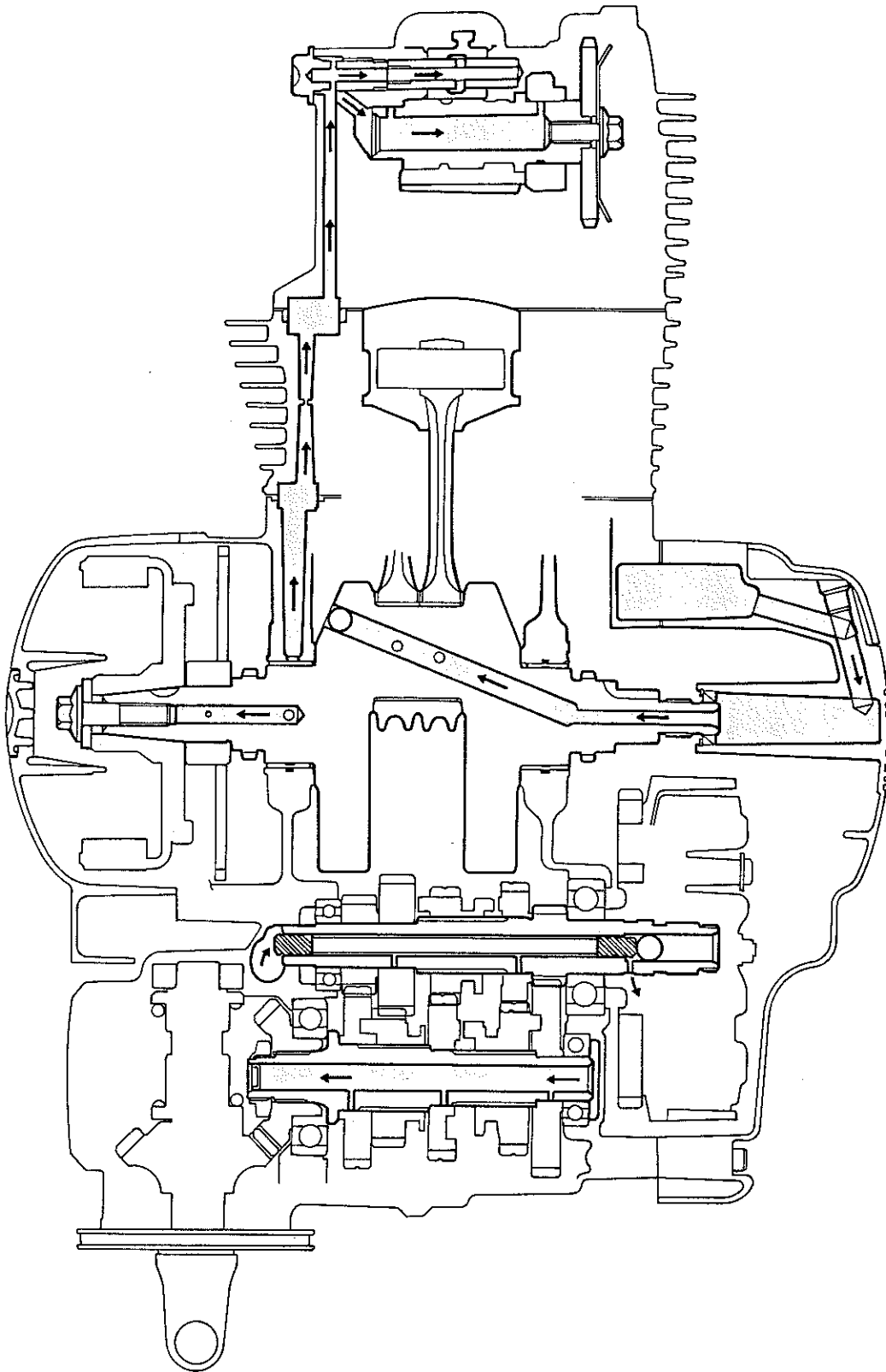


C Section C — C



C

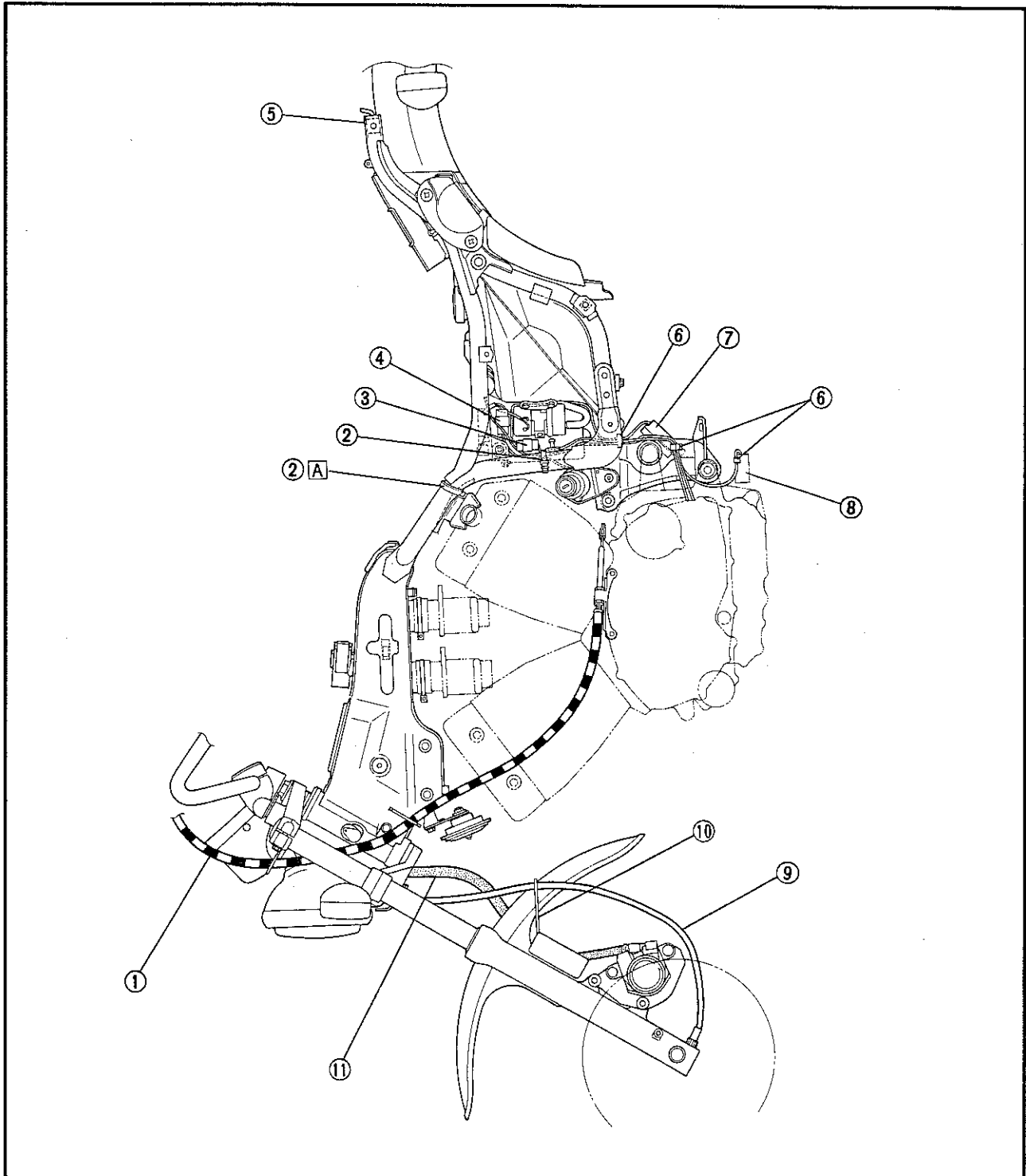






CABLE ROUTING

- | | | |
|----------------------------|---------------------|-----------------------|
| ① Clutch cable | ⑨ Speedometer cable | Ⓐ Clamp the fuel hose |
| ② Band | ⑩ Cable guide | |
| ③ A.C. magneto leads | ⑪ Brake hose | |
| ④ Pickup coil leads | | |
| ⑤ Cap | | |
| ⑥ Clamp | | |
| ⑦ Rectifier with regulator | | |
| ⑧ Sidestand switch | | |



CABLE ROUTING

APPX

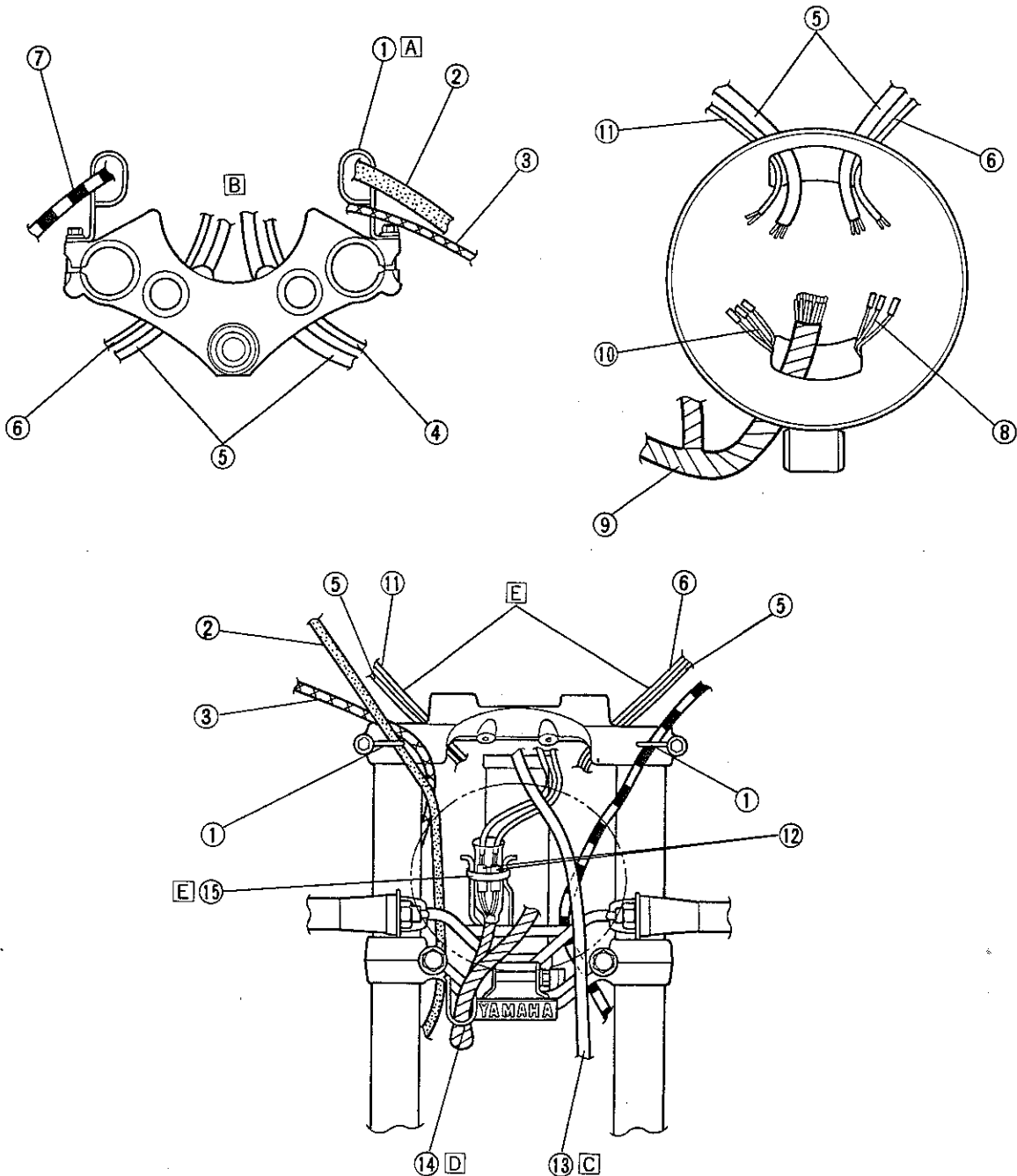


A

- ① Cable holder
- ② Brake hose
- ③ Throttle cable
- ④ Brake light switch lead
- ⑤ Handlebar switch lead
- ⑥ Clutch switch lead
- ⑦ Clutch cable
- ⑧ Front flasher light lead (Left)
- ⑨ Wireharness

- ⑩ Front flasher light lead (Right)
- ⑪ Brake switch lead
- ⑫ Pilot/Speedometer light lead
- ⑬ Speedometer cable
- ⑭ Clamp
- ⑮ Band

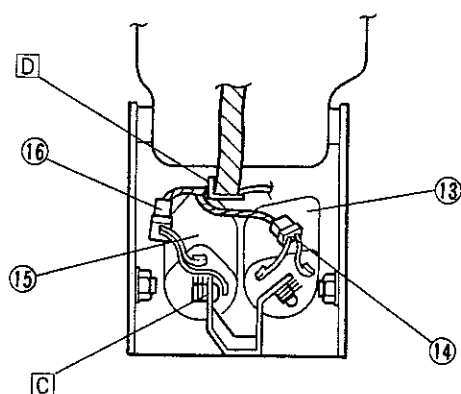
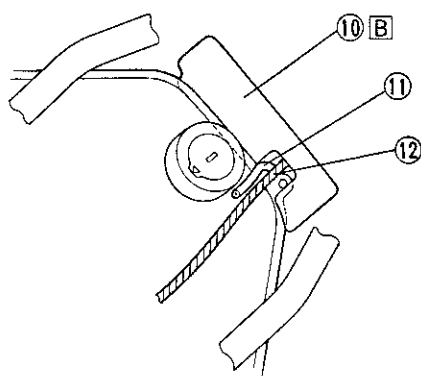
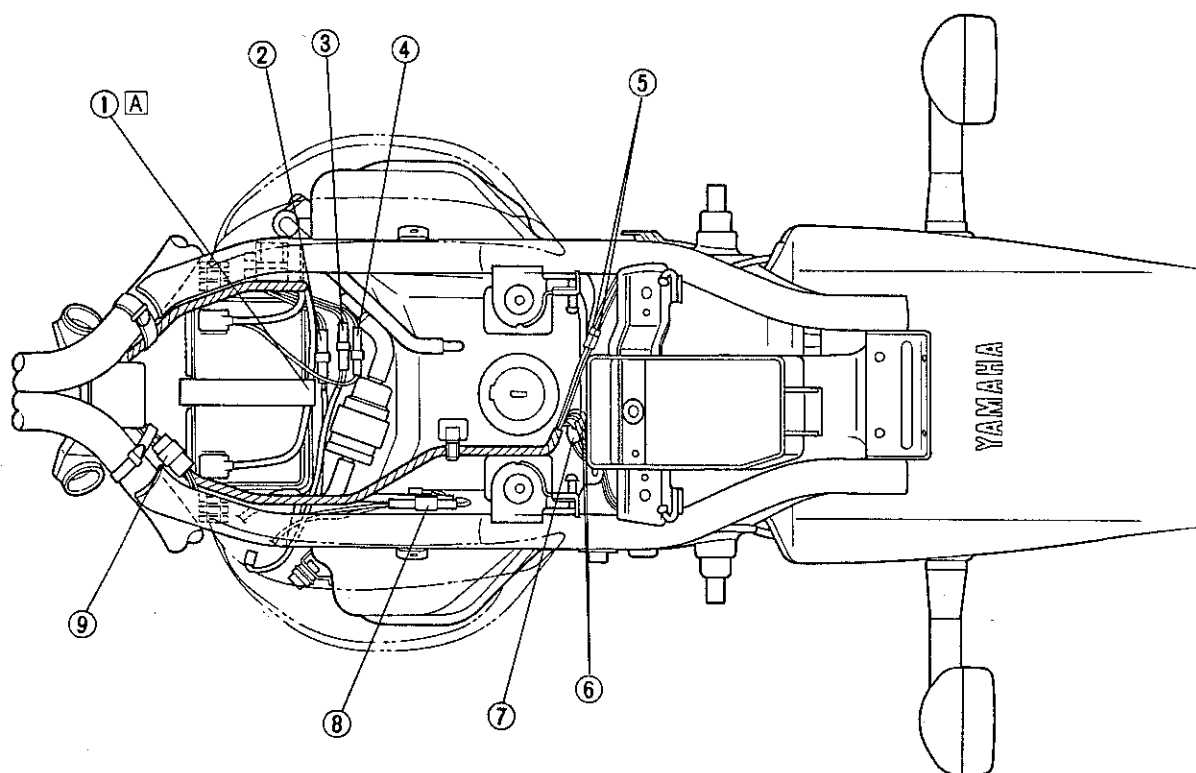
- A Pass the brake hose only.
- B To headlight
- C Pass the speedometer cable in front of under bracket.
- D Clamp the wireharness.
- E Clamp the leads.
- F Pass the leads behind the handlebar crown.





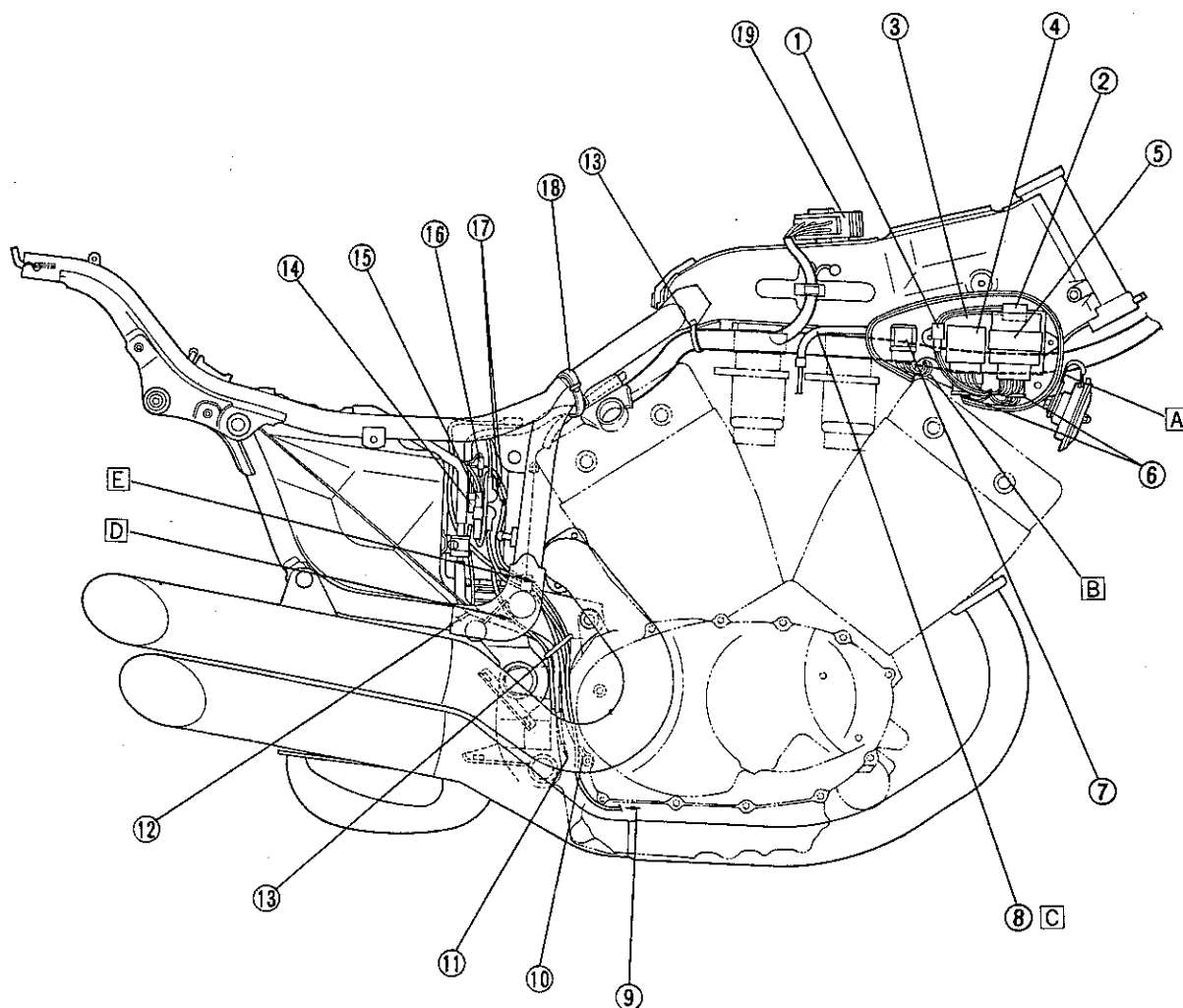
- | | |
|-----------------------------------|---------------------------------------|
| ① Band | ⑩ Cover 3 |
| ② Sidestand switch lead | ⑪ Drain hose |
| ③ Fuel pump lead | ⑫ Wireharness |
| ④ Battery negative lead | ⑬ Ignition coil (Rear cylinder) |
| ⑤ Rear flasher light lead (Right) | ⑭ Ignition coil lead (Yellow coupler) |
| ⑥ Taillight lead | ⑮ Ignition coil lead (White coupler) |
| ⑦ Rear flasher light lead (Left) | ⑯ Ignition coil (Front cylinder) |
| ⑧ Neutral switch lead | |
| ⑨ Main switch lead | |

- A** Clamp the battery positive lead.
- B** After connecting the rear flasher light leads and taillight leads, fit the cover on the connectors.
- C** Take care that the ignition coil position is correctly.
- D** Press the wireharness (For ignition coil) to backward and pass the wireharness (For horn) to forward.



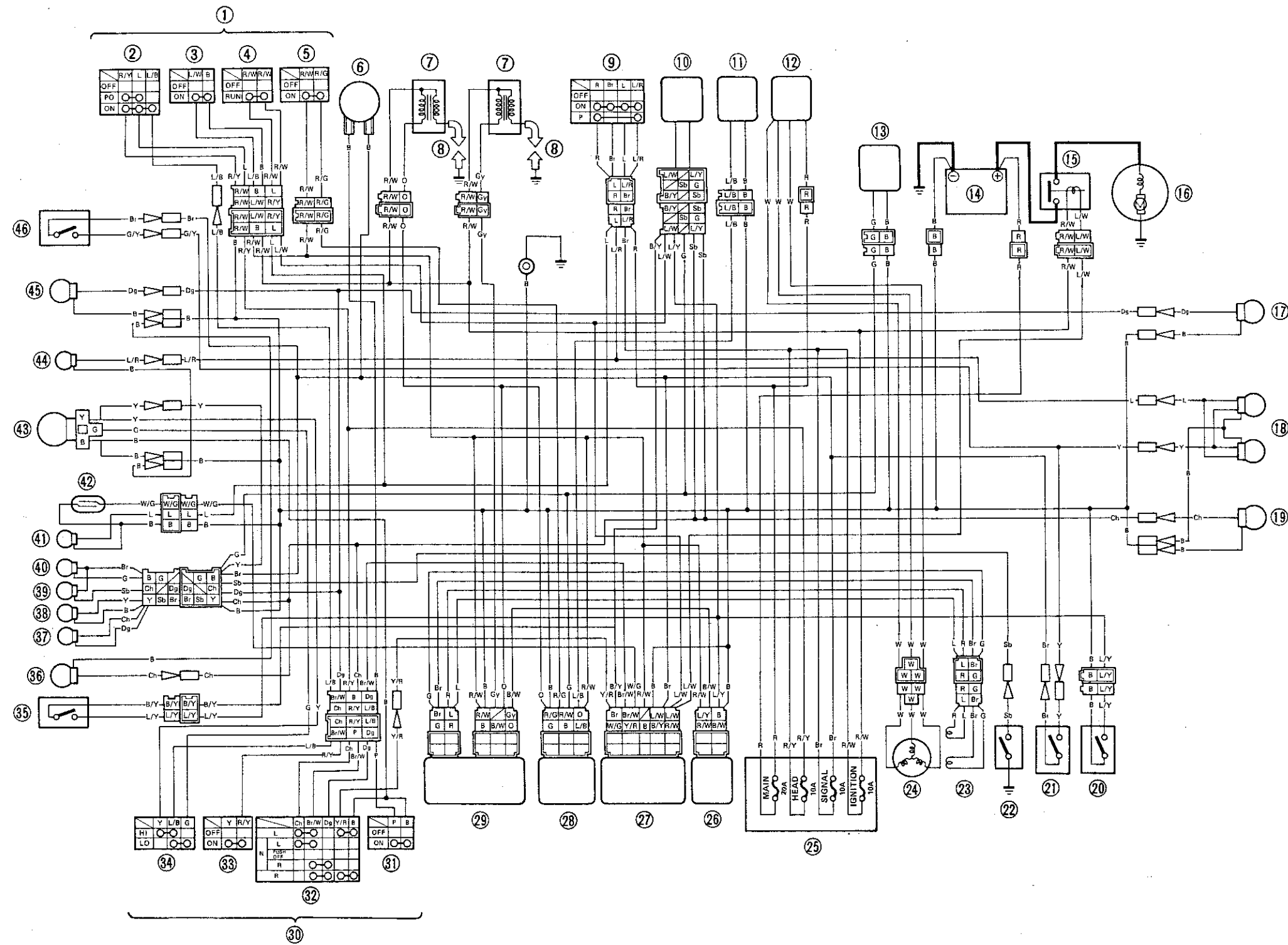


- | | | |
|--------------------------|------------------------------|--------------------------------------------------------------|
| ① Diode leads | ⑪ To rear brake light switch | A Clamp the wireharness. |
| ② Diode | ⑫ To fuel sender | B Pass the wireharness into the cut on the front side cover. |
| ③ Ignitor unit | ⑬ Clamp | C Pass the throttle cable outside of the wireharness. |
| ④ Fuel pump control unit | ⑭ Fuel sender lead | D Pass the hose between cross tubes. |
| ⑤ Relay assembly | ⑮ Positive lead | E Pass the leads upper the cross tube. |
| ⑥ Ignitor leads | ⑯ Starter relay lead | |
| ⑦ Sidestand relay | ⑰ Brake switch lead | |
| ⑧ Throttle cable | ⑱ Band | |
| ⑨ To starter motor | ⑲ Fuse | |
| ⑩ Ground lead | | |





XV535 WIRING DIAGRAM



- ① Handlebar switch (Right)
- ② "LIGHTS" switch
- ③ "START" switch
- ④ "ENGINE STOP" switch
- ⑤ "FUEL" switch
- ⑥ Horn
- ⑦ Ignition coil
- ⑧ Spark plug
- ⑨ Main switch
- ⑩ Diode
- ⑪ Fuel pump
- ⑫ Rectifier/Regulator
- ⑬ Fuel sender
- ⑭ Battery
- ⑮ Starter relay
- ⑯ Starter motor
- ⑰ Rear flasher light (Right)
- ⑱ Tail/Brake light
- ⑲ Rear flasher light (Left)
- ⑳ Sidestand relay
- ㉑ Rear brake switch
- ㉒ Neutral switch
- ㉓ Pick up coil
- ㉔ A.C. magneto
- ㉕ Fuse box
- ㉖ Sidestand relay
- ㉗ Relay assembly
- ㉘ Fuel pump relay
- ㉙ Ignitor unit
- ㉚ Handlebar switch (Left)
- ㉛ "HORN" switch
- ㉜ "TURN" switch
- ㉝ "PASS" switch
- ㉞ "LIGHTS" (Dimmer) switch
- ㉟ Clutch switch
- ㊱ Front flasher light (Left)
- ㊲ "TURN" indicator light
- ㊳ "HIGH BEAM" indicator light
- ㊴ "NEUTRAL" indicator light
- ㊵ "FUEL" warning light
- ㊶ Meter illumination
- ㊷ Reed switch
- ㊸ Headlight
- ㊹ Marker light
- ㊺ Front flasher light (Right)
- ㊻ Front brake switch

COLOR CODE

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