

E-2-8



XV1000 '86
2AE-ME1

SERVICE MANUAL

XV1000

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 motorrepair 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.

TECHNICAL PUBLICATIONS
SERVICE DIVISION
MOTORCYCLE OPERATIONS
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

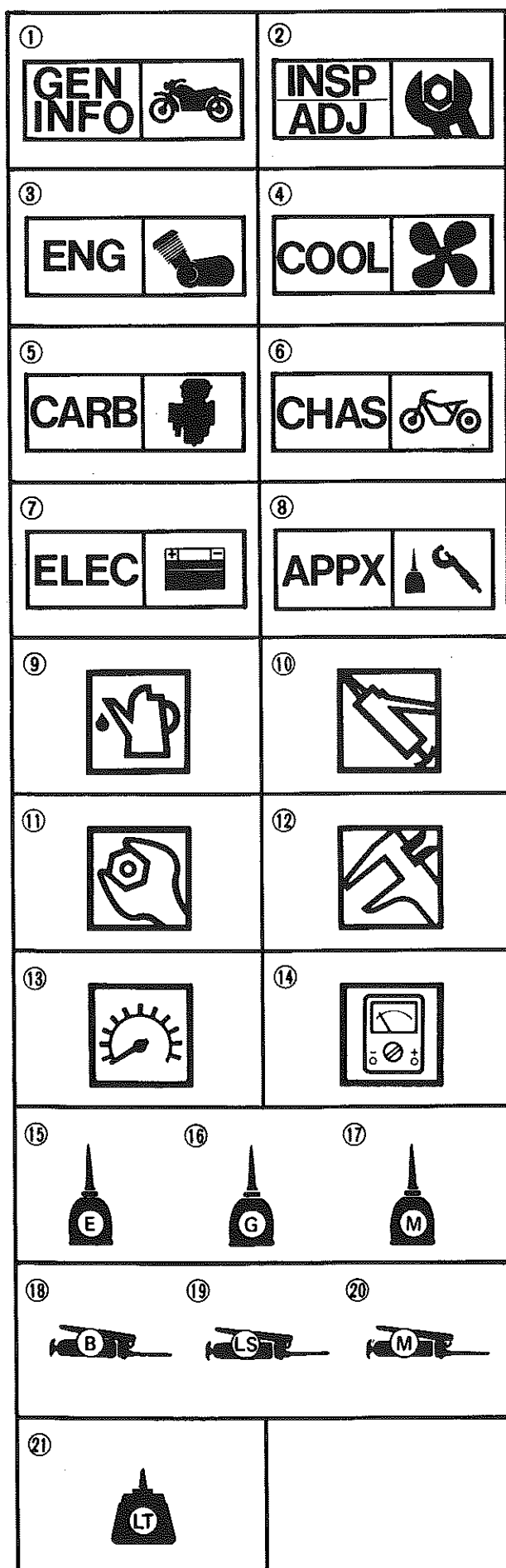
All of the procedures in this manual are organized in a sequential, step-by-step format. The information has been compiled to provide the mechanic with an easy to read, handy reference that contains comprehensive explanations of all disassembly, repair, assembly, and inspection operations. In this revised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

- 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.

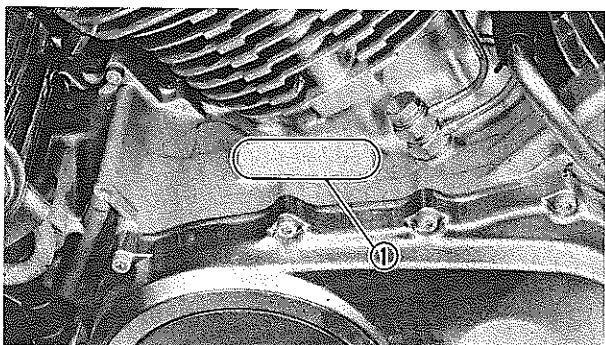
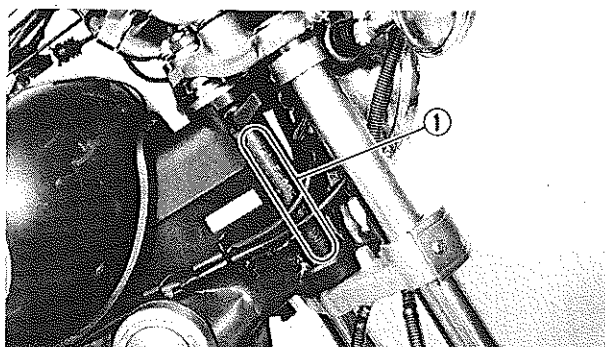
- ⑮ Apply engine oil
- ⑯ Apply gear oil
- ⑰ Apply molybdenum disulfide oil
- ⑱ Apply wheel bearing grease
- ⑲ Apply lightweight lithium-soap base grease
- ⑳ Apply molybdenum disulfide grease
- ㉑ Apply locking agent (LOCTITE®)

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CHAPTER 1. GENERAL INFORMATION

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GENERAL INFORMATION

MOTORCYCLE IDENTIFICATION

FRAME SERIAL NUMBER

The frame serial number ① is stamped into the right side of the steering head.

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:
2AM-000101 (For Switzerland)
2AE-000101 (Except for Switzerland)

NOTE:

Designs and specifications are subject to change without notice.



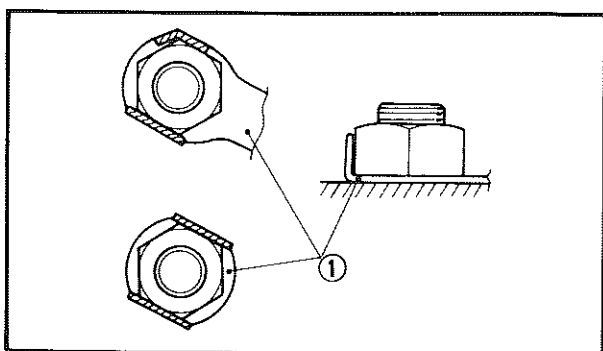
IMPORTANT INFORMATION

ALL REPLACEMENT PARTS

1. Use only genuine Yamaha parts for all replacements. Use oil and/or grease recommended by Yamaha for assembly and adjustment. Other brands may be similar in function and appearance, but inferior in quality.

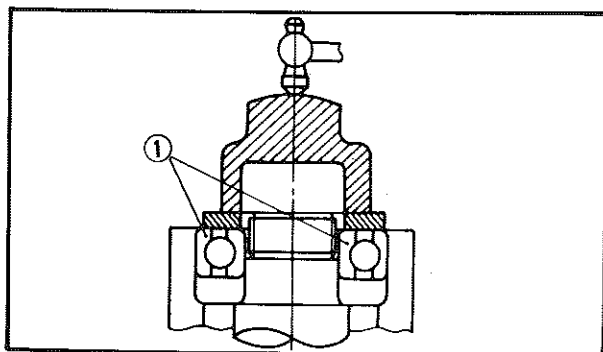
GASKETS, OIL SEALS, AND O-RINGS

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.

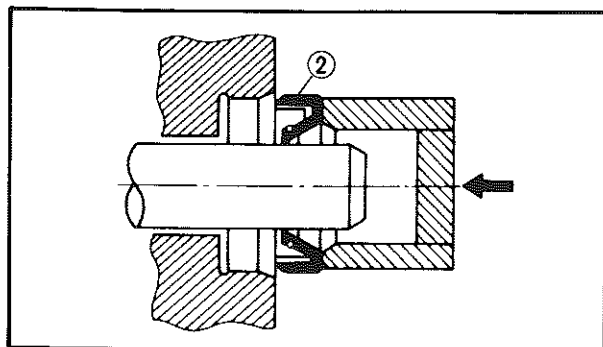


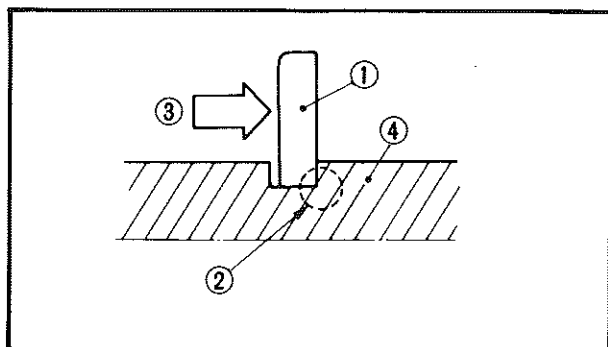
BEARINGS AND OIL SEALS

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.





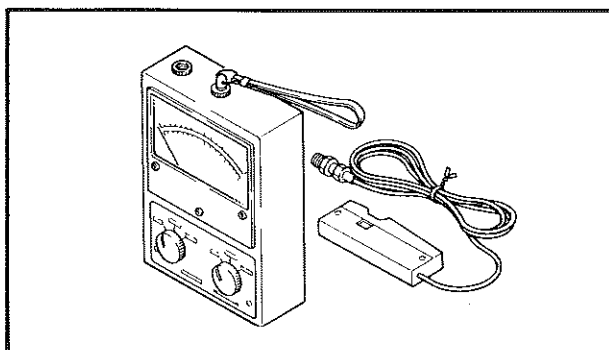
CIRCLIPS

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

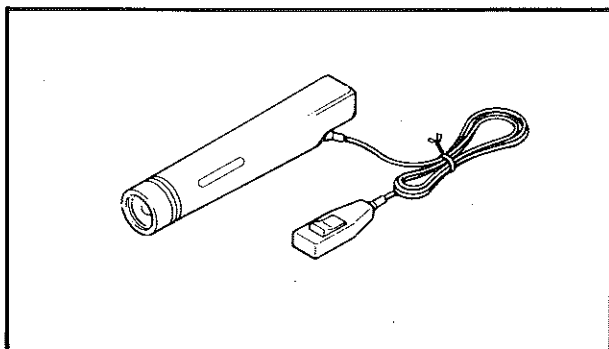
The proper special tools are necessary for complete and accurate tune-up and assembly. Using the correct special tool will help prevent damage caused by the use of improper tools or improvised techniques.



FOR TUNE UP

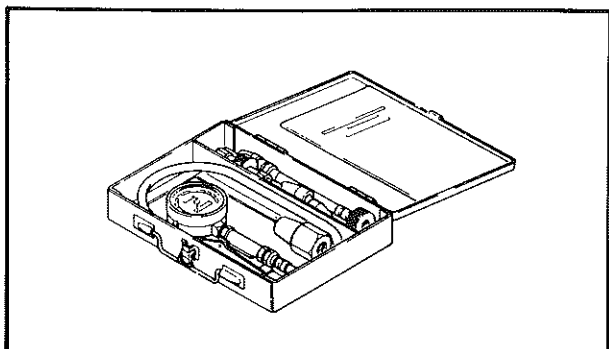
1. Tachometer
P/N 90890-03113

This tool is needed for detecting engine rpm.



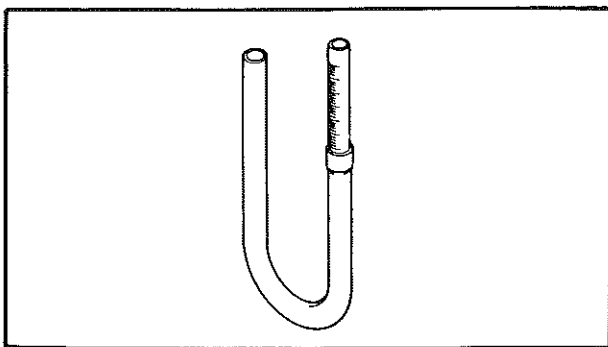
2. Timing Light
P/N 90890-03109

This tool is necessary for adjusting timing.



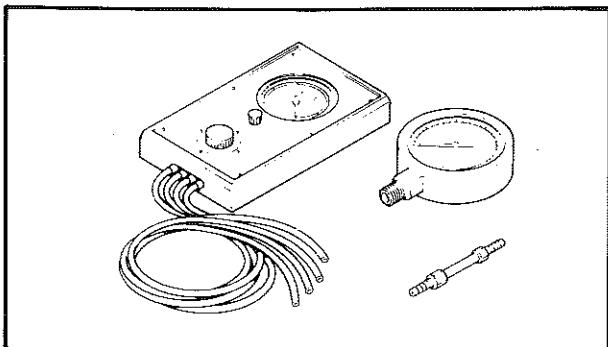
3. Compression Gauge
P/N 90890-03081

This gauge is used to measure engine compression.



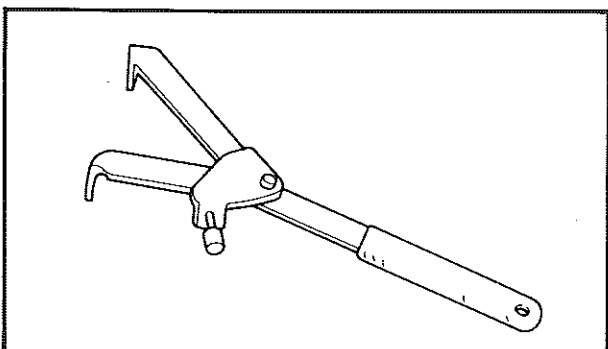
4. Fuel Level Gauge
P/N 90890-01312

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



5. Vacuum Gauge
P/N 90890-03094

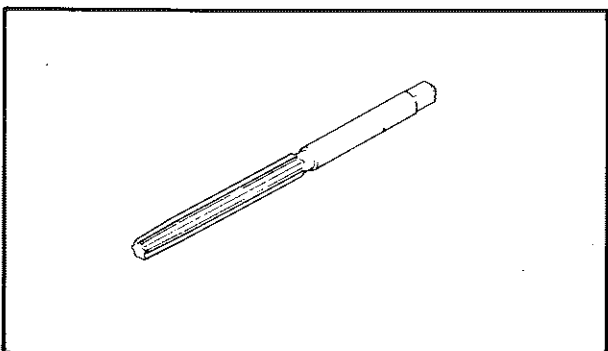
This gauge is needed for carburetor synchronization.



FOR ENGINE SERVICE

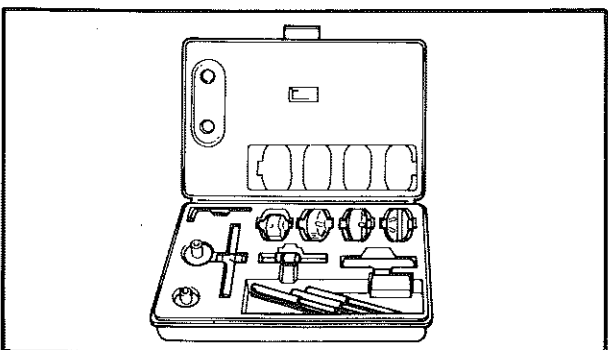
1. Clutch Hub Holder
P/N 90890-04086

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



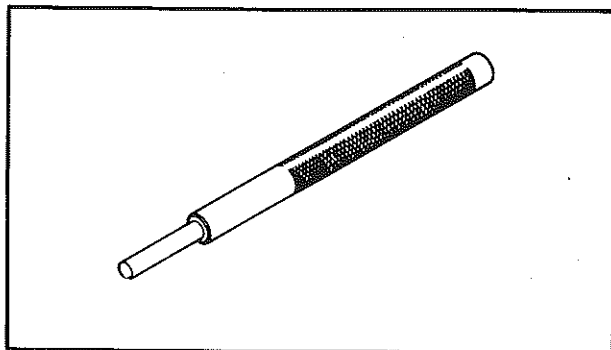
2. Valve Guide Reamer
P/N 90890-01211

This tool is used to rebores the new valve guide.



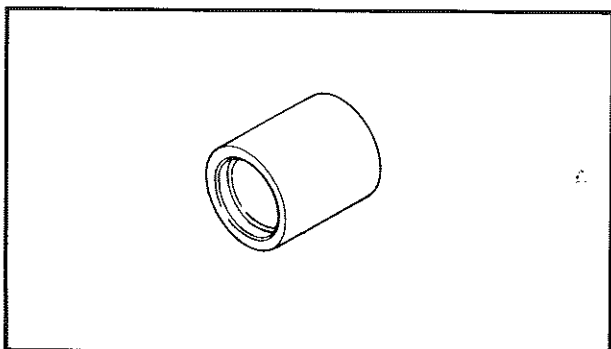
3. Valve Seat Cutter
P/N YM-91043

This tool is needed to resurface the valve seat.



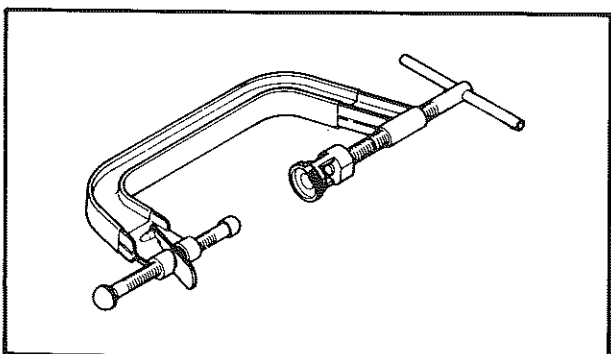
4. Valve Guide Remover
P/N 90890-01200

This tool is used to remove the valve guides.



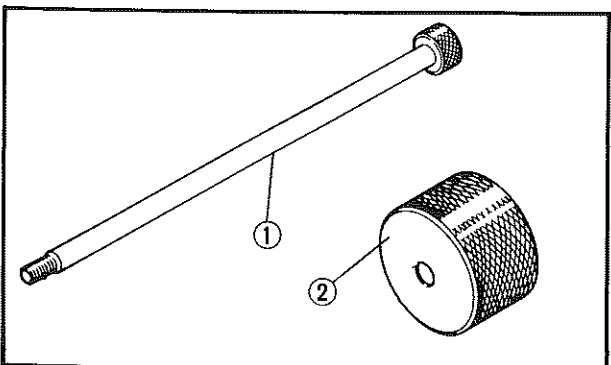
5. Valve Guide Installer
P/N 90890-04013

This tool is needed to install the valve guides properly.



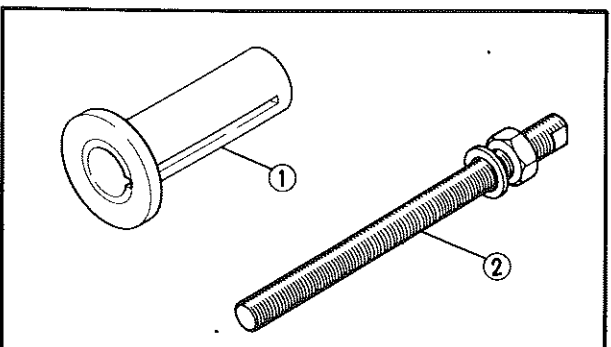
6. Valve Spring Compressor
P/N 90890-04019

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



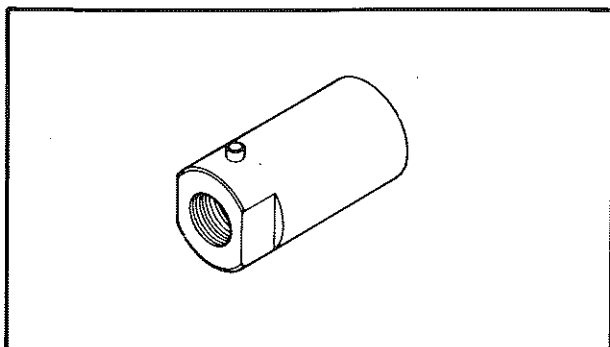
7. Slide Hammer
P/N 90890-01085 — ①
P/N 90890-01084 — ②

These tools are used when removing the rocker arm shaft.



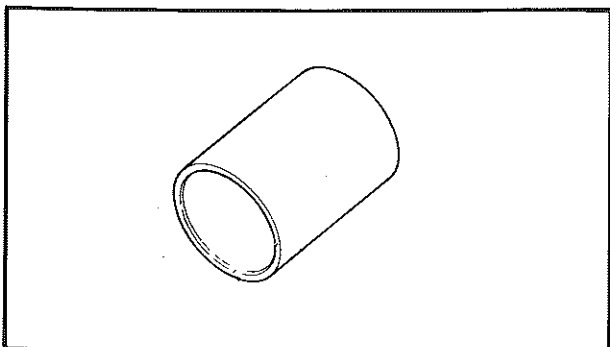
8. Crankshaft Installing Set
P/N 90890-01274 — ①
P/N 90890-01275 — ②

Thses tool are used when installing the crankshaft and the oil pump drive sprocket, and for removing the final-gear drive pinion.



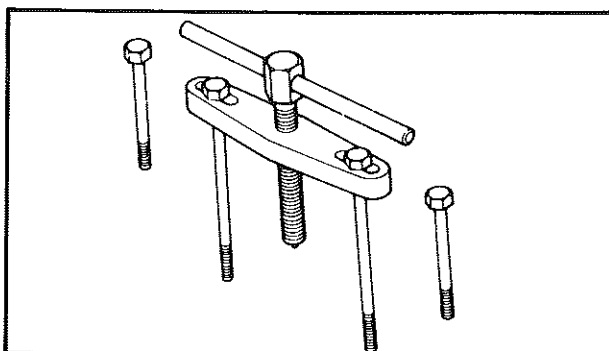
9. Crankshaft Installer Adapter (16 mm)
P/N 90890-04059

This tool is needed for installing the crankshaft, and removing the final gear drive pinion.



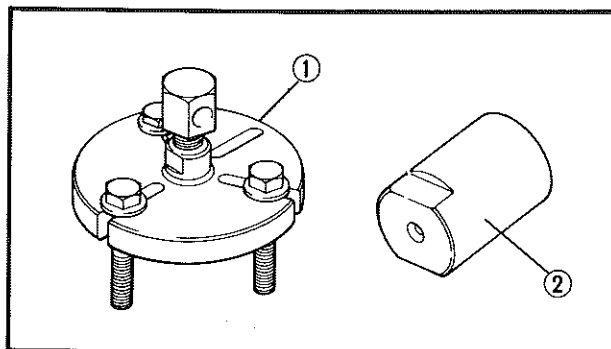
10. Crank Pot Spacer
P/N 90890-04060
P/N 90890-04061

This tool is used when installing the crankshaft.



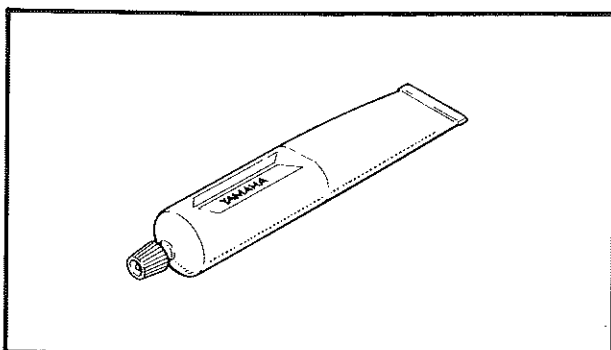
11. Crankcase Separating Tool
P/N 90890-01135

This tool is used for separating the crankcase and removing the crankshaft.



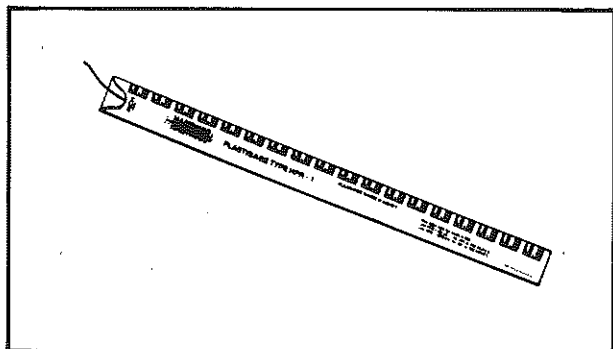
12. Flywheel Magneto Puller
P/N 90890-01362 – ①
Adapter
P/N 90890-04063 – ②

These tools are used to remove the flywheel.



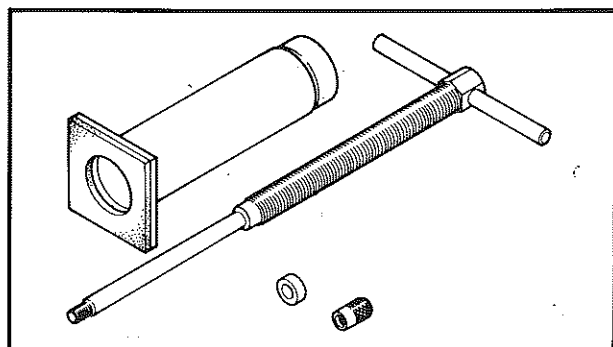
13. Yamaha Bond No. 1215
P/N 90890-85505

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



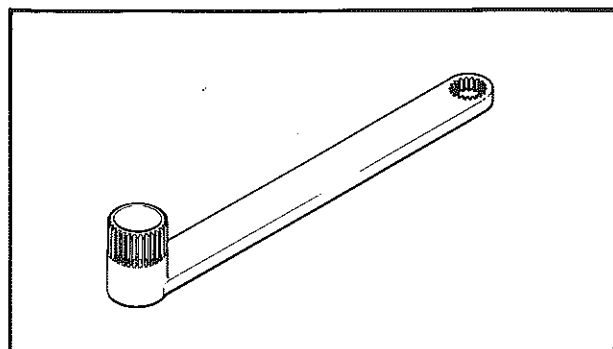
**14. Plastigage® Set
P/N YU-33210**

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



**15. Piston Pin Puller
P/N 90890-01304**

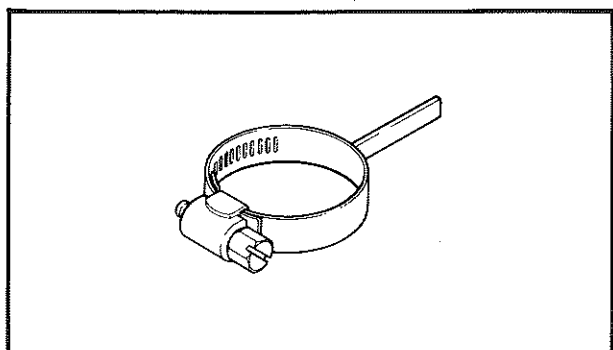
This tool is used to remove the piston pin.



FOR SHAFT DRIVE SERVICE

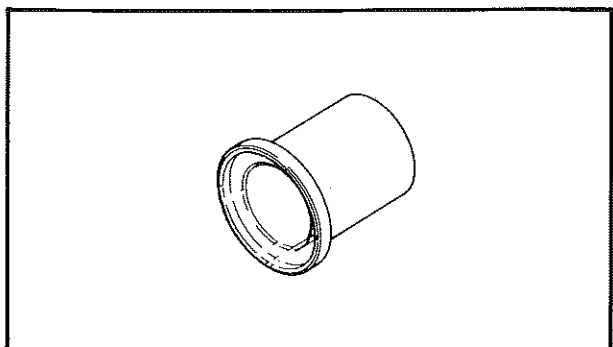
**1. Middle and Final Gear Holding Tool
P/N 90890-01229**

This tool is used when measuring gear lash.



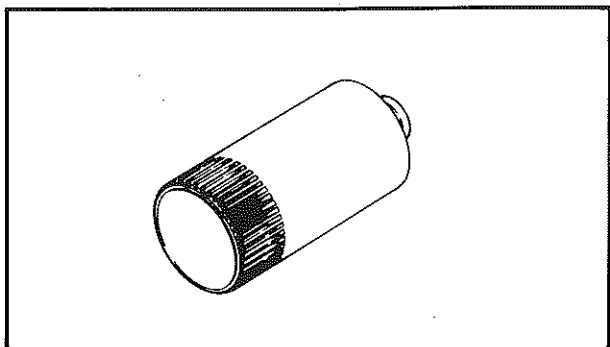
**2. Final-Drive Gear Lash Measurement Tool
P/N 90890-01230**

This tool is used to measure gear lash.



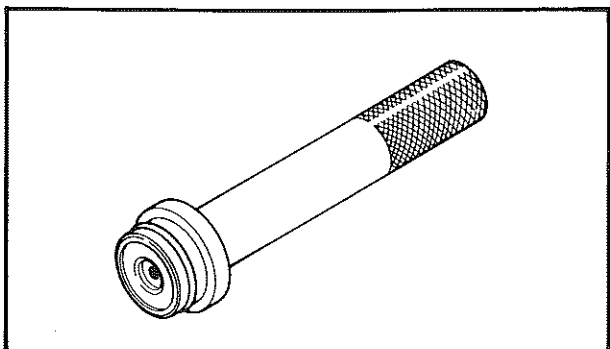
**3. Middle Drive Shaft Retainer
P/N 90890-04056**

This tool is used to hold the middle gear when measuring gear lash.



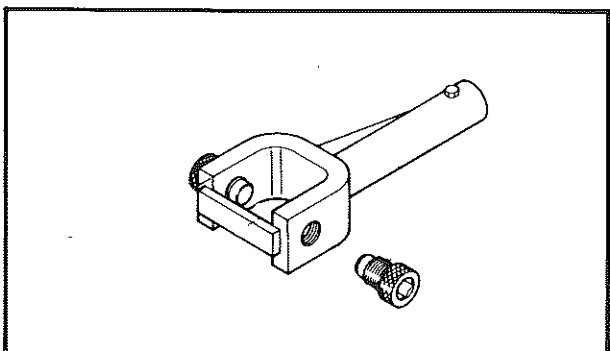
4. Middle Drive Shaft Bearing Retainer Wrench
P/N 90890-04057

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



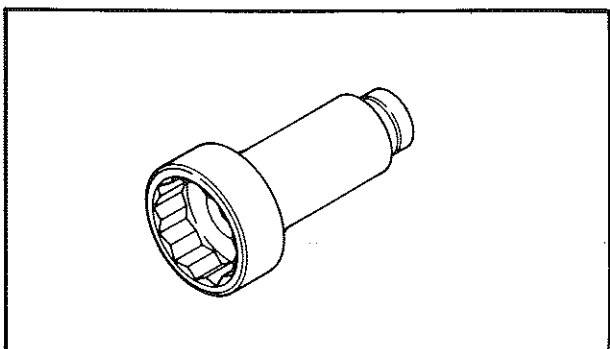
5. Middle-Driven-Shaft Bearing Driver
P/N 90890-04058

This tool is used to remove and install the middle-driven-shaft bearing.



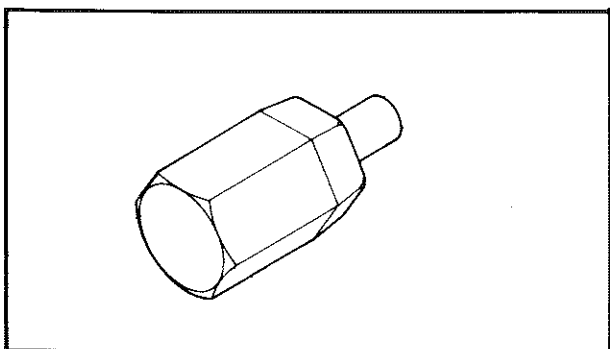
6. Universal Joint Holder
P/N 90890-04062

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



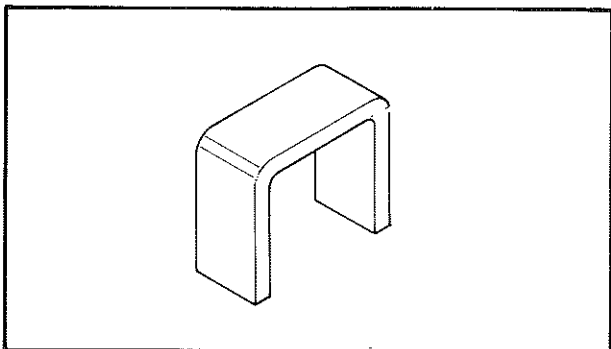
7. Middle Drive Shaft Nut Wrench
P/N 90890-04054

This tool is used to loosen and tighten the drive shaft nut.



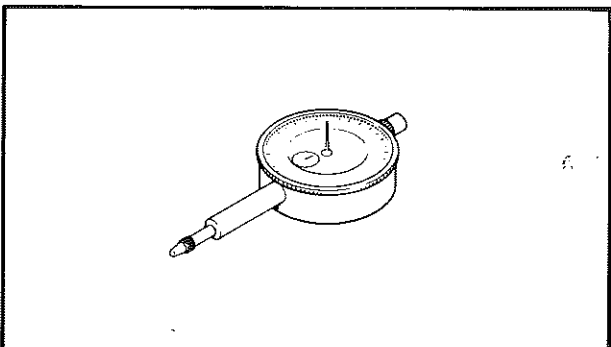
8. Middle-Drive-Shaft Holder
P/N 90890-04055

This tool is needed when loosening and tightening the drive shaft nut.



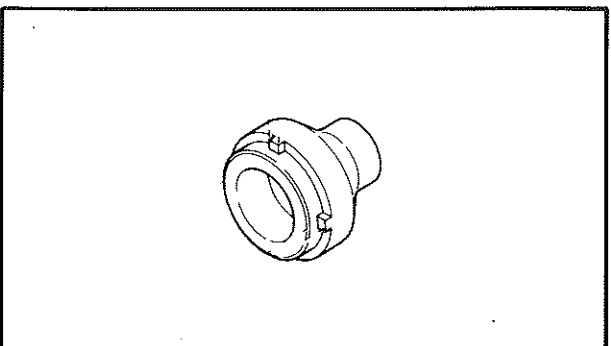
9. Damper Spring Compressor
P/N 90890-04011

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



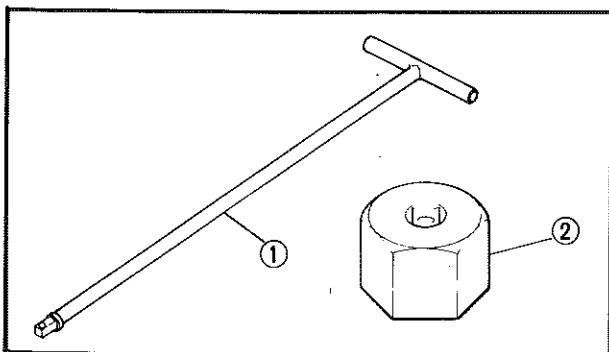
10. Dial Gauge
P/N 90890-03097

This gauge is used to measure gear lash.



11. Final Drive Shaft Bearing Retainer Wrench
P/N 90890-40450

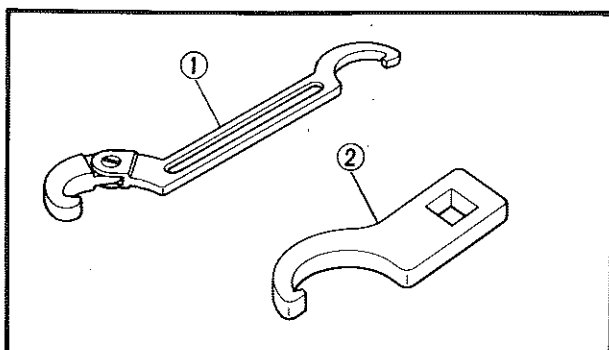
This tool is used to remove and install the bearing retainer.



FOR CHASSIS SERVICE

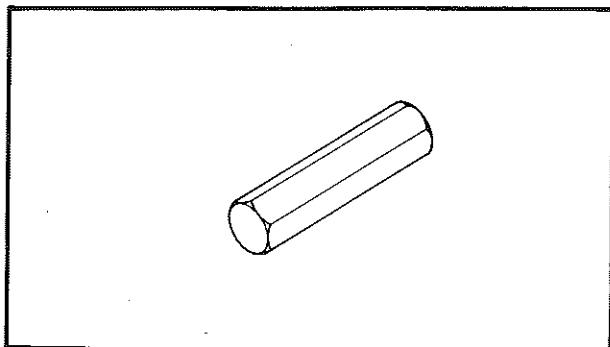
1. T-Handle
P/N 90890-01326 — ①
For Damper Rod Holder (22 mm)
P/N 90890-01365 — ②

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



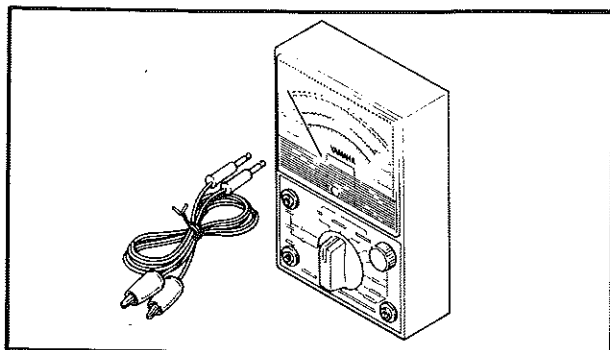
2. Ring Nut Wrench
P/N 90890-01268 — ①
P/N 90890-01403 — ②

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



3. Front Fork Cap Socket (17 mm)
P/N 90890-01104

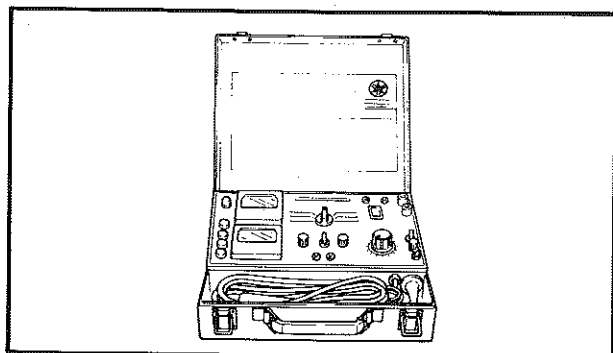
This tool is used to loosen and tighten the front fork cap bolt.



FOR ELECTRICAL COMPONENTS

1. Pocket Tester
P/N 90890-03112

This instrument is invaluable for electrical system inspection and adjustment.



2. Electro Tester
P/N 90890-03021

This instrument is necessary for ignition system inspection.

CHAPTER 2.

PERIODIC INSPECTIONS 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.

PERIODIC MAINTENANCE/LUBRICATION INTERVALS

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.		○	○
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	○	○
Front brake*	Check operation/fluid leakage/See NOTE. Correct if necessary.		○	○
Rear brake*	Check operation. Adjust if necessary.		○	○
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.***			○
Wheels*	Check balance/damage/runout. 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.		○	○
Fittings/Fasteners*	Check all chassis fittings and fasteners. Correct if necessary.	○	○	○
Center and sidestand*	Check operation. Repair if necessary.	○	○	○
Sidestand switch* (If so equipped)	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.

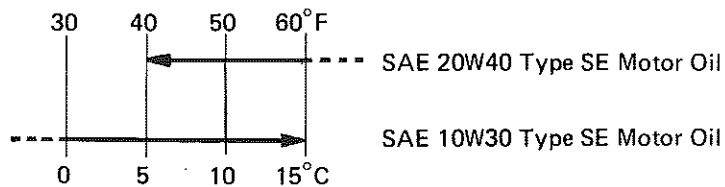
***: Lithium soap base grease.

NOTE:

• **Brake fluid replacement:**

- 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) On the inner parts of the master cylinder and caliper cylinder, replace the oil seals every two years.
- 3) Replace the brake hoses every four years, or it cracked or damaged.

• **Engine oil:**



ENGINE

VALVE CLEARANCE ADJUSTMENT

Removal

1. Remove:

- Seat
- Fuel tank

Refer to "CHAPTER 3. SEAT and FUEL TANK" section.

- Air filter case
- MCV case

Refer to "CHAPTER 3. AIR FILTER CASE and MIXTURE CONTROL VALVE CASE" section.

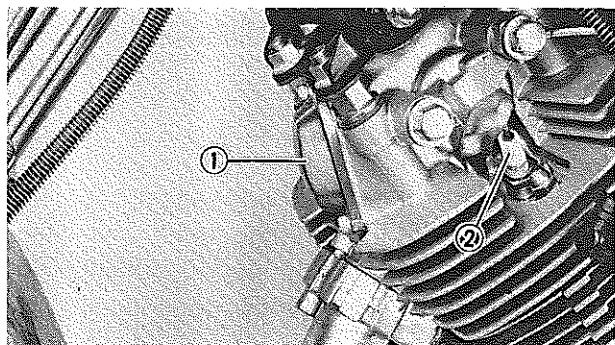
2. Disconnect:

- Crankcase breather hose

Refer to "CHAPTER 3. CRANKCASE BREATHER HOSE" section.

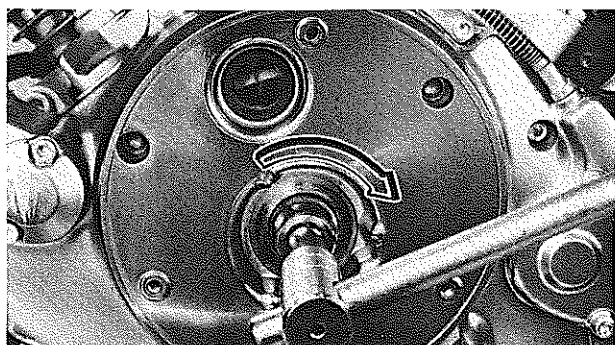
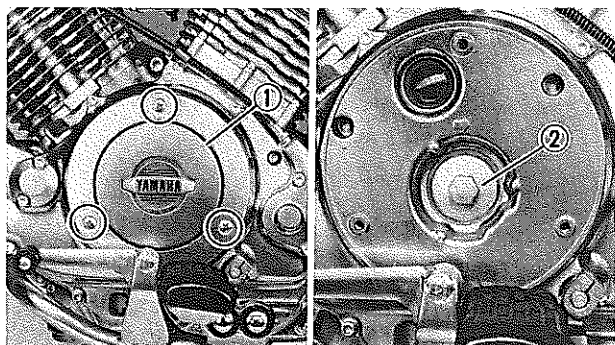
3. Remove:

- Intake valve covers ①
- Exhaust valve covers
- Spark plugs ②



4. Remove:

- Generator cover ①
- Crankshaft end cover ②



Measurement and Adjustment

1. Measure:

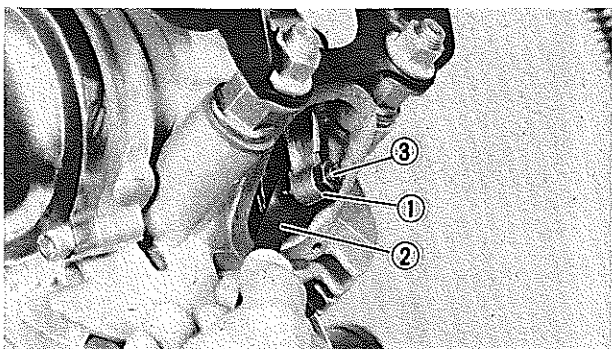
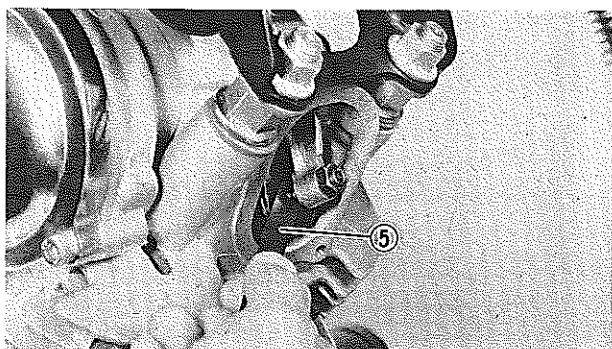
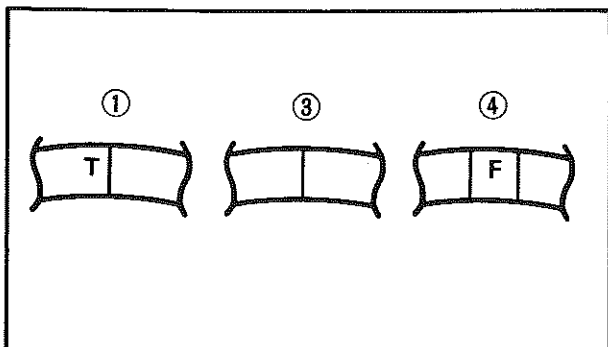
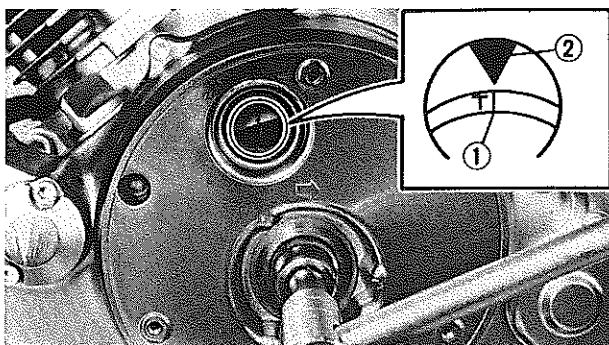
- Valve clearance

Valve clearance measurement steps:

- Turn the crankshaft clockwise with wrench.

NOTE:

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

**For rear (#1) cylinder:**

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

For front (#2) cylinder:

- Align the "I" mark ③ on the rotor with the stationary pointer ② on the crankcase. When the "I" mark is aligned with the stationary pointer, the piston is at Top Dead Center (TDC).

④ Firing range for rear cylinder**NOTE:**

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

- Measure the valve clearance using a Feeler Gauge ⑤.

Out of specification → Adjust clearance.

**Intake Valve (Cold):**

0.07 ~ 0.12 mm
(0.0028 ~ 0.0047 in)

Exhaust Valve (Cold):

0.12 ~ 0.17 mm
(0.0047 ~ 0.0067 in)

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 until proper clearance is attained.

**Intake Valve (Cold):**

0.07 ~ 0.12 mm
(0.0028 ~ 0.0047 in)

Exhaust Valve (Cold):

0.12 ~ 0.17 mm
(0.0047 ~ 0.0067 in)

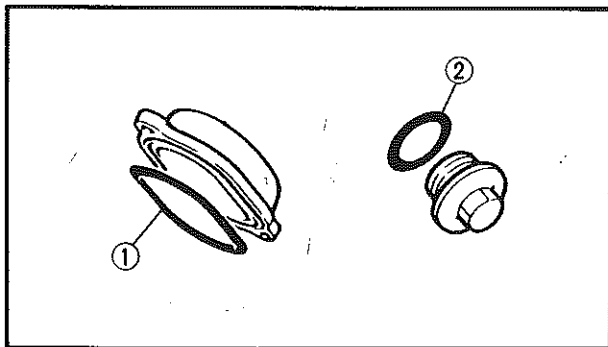


- Hold the adjuster to prevent it from moving and thoroughly tighten the locknut.



Valve Clearance Adjusting Locknut:
27 Nm (2.7 m·kg, 19 ft·lb)

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



Assembly

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

1. Inspect:

- O-rings (Intake and exhaust valve cover) ①
- O-ring (Crankshaft end cover) ②

2. Tighten:

- All bolts and nut
(Components in the above steps 4 ~ 1.)



Crankshaft End Cover:
12 Nm (1.2 m·kg, 8.7 ft·lb)

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

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

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

Air Filter Case:
10 Nm (1.0 m·kg, 7.2 ft·lb)

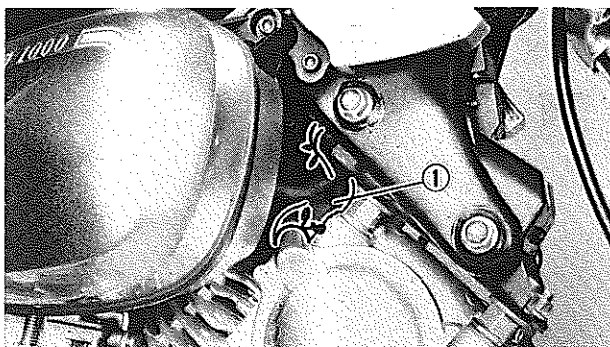
3. Connect:

- Breather hose (Crankcase and fuel tank)

NOTE:

When installing the fuel tank, be sure the breather hose is routed correctly.

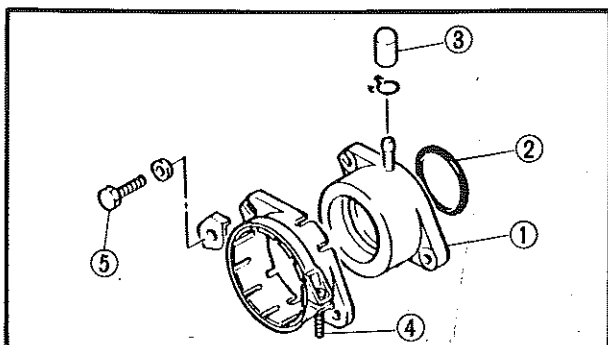
Refer to "FUEL LINE INSPECTION" section.



CRANKCASE BREATHER SYSTEM INSPECTION

1. Inspect:

- Crankcase breather hose (1)
- Cracks/Damage → Replace.



INTAKE MANIFOLD INSPECTION

1. Inspect:

- Carburetor joints (1)
 - O-rings (Carburetor joint) (2)
 - Blind plugs (Carburetor joint) (3)
- Cracks/Damage → Replace.

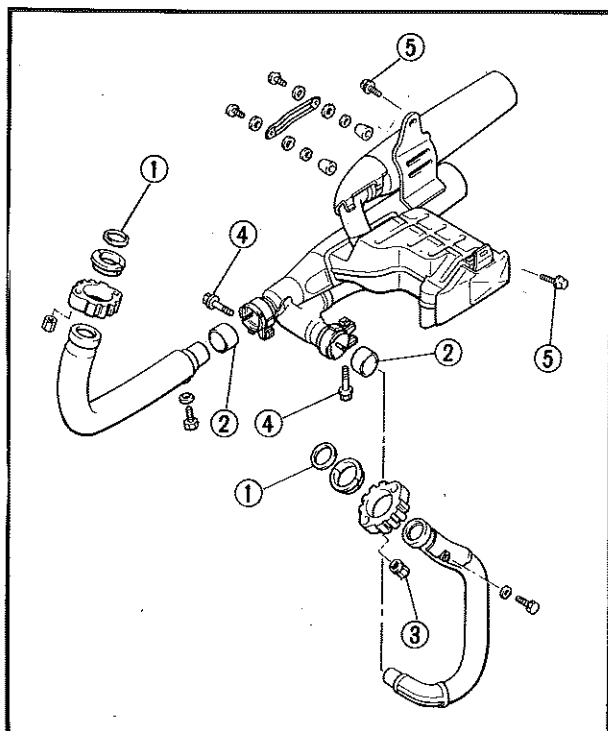
2. Tighten:

- Carburetor joint clamp (4)
- Carburetor joint (5)



Carburetor Joint Clamp (4) :
6 Nm (0.6 m·kg, 4.4 ft·lb)

Carburetor Joint (5) :
10 Nm (1.0 m·kg, 7.2 ft·lb)



EXHAUST SYSTEM INSPECTION

1. Inspect:

- Gaskets (Exhaust pipes) (1)
 - Gaskets (Muffler clamp) (2)
- Damage → Replace.

Exhaust gas leakage → Repair.

2. Tighten:

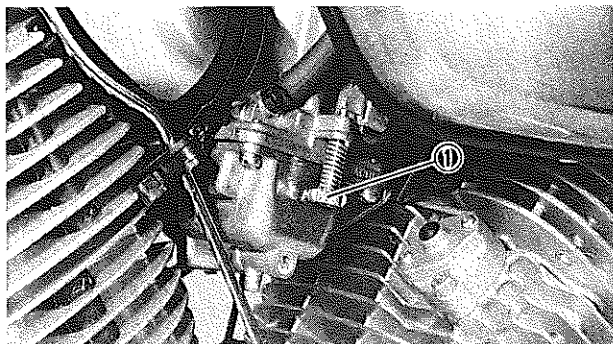
- Bolts and nuts



Exhaust Pipe Nut (3) :
20 Nm (2.0 m·kg, 14 ft·lb)

Exhaust Pipe Clamp Bolt (4) :
20 Nm (2.0 m·kg, 14 ft·lb)

Muffler Securing Bolt (5) :
20 Nm (2.0 m·kg, 14 ft·lb)



IDLING SPEED ADJUSTMENT

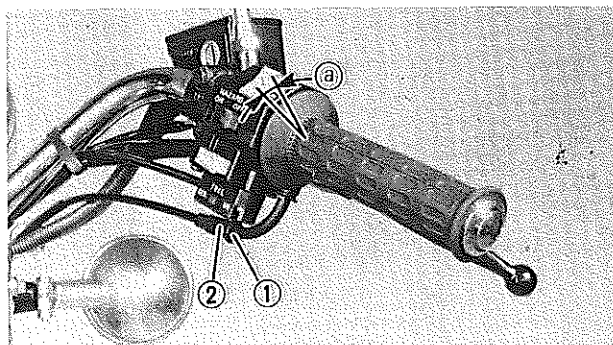
1. Adjust:

- Idle speed

Warm up the engine and turn the throttle stop screw ① to adjust.



Idle Speed:
950 ~ 1.050 r/min



THROTTLE CABLE 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.



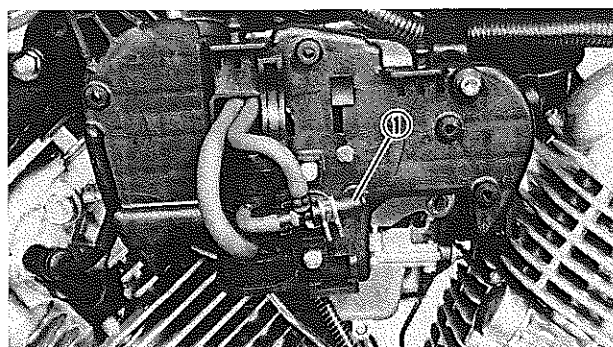
Throttle Cable Free Play (a) :
2 ~ 3 mm (0.08 ~ 0.12 in)

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.



CARBURETOR SYNCHRONIZATION

NOTE:

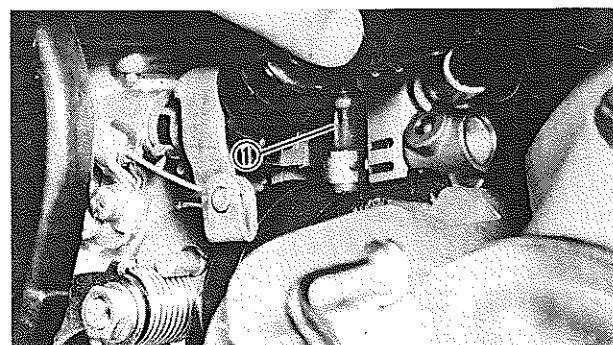
Valve clearance must be set properly before synchronizing the carburetors.

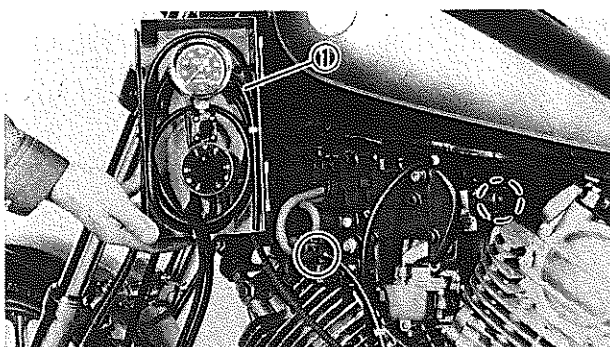
1. Remove:

- MCV case cover
- Blind plug ①

2. Remove:

- Blind plug ①
- From the rear carburetor joint.

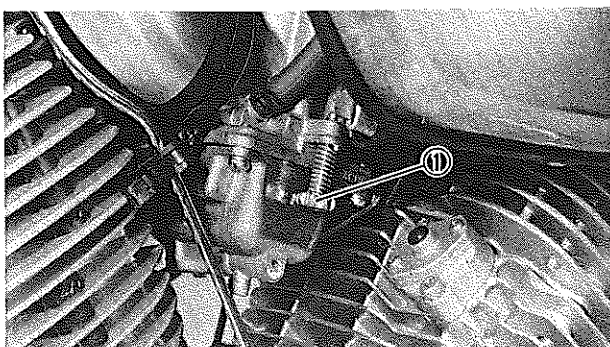




3. Attach:


- Vacuum Gauge ① (90890-03044)
To the vacuum plugs on the carburetor joints.

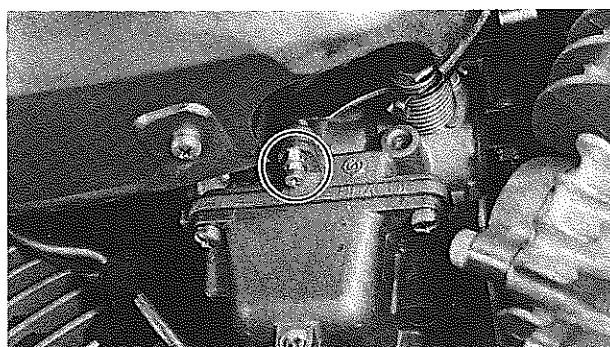
4. Starter the engine and let it warm up.



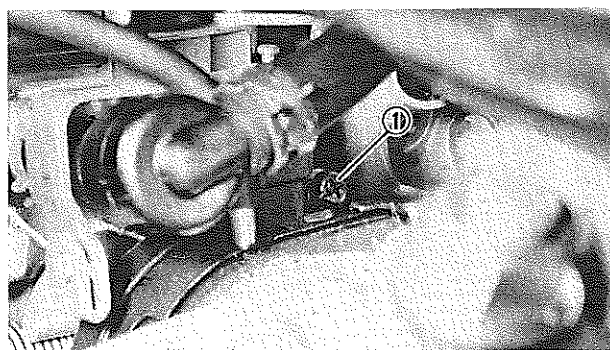
5. Adjust:

- Idle speed
Out of specification →
Turn the throttle stop screw ① to adjust.

	Idle Speed: 950 ~ 1,050 r/min
---	---

**CAUTION:**

Never adjust throttle stop screw on rear cylinder carburetor.



6. Adjust:

- Carburetor synchronization

Carburetor synchronization adjustment steps:

- Synchronize carburetor No. 1 to carburetor No. 2 by turning synchronizing screw ① until both gauges read the same.
- Rev the engine for a fraction of a second, two or three times, and check the synchronization again.

Vacuum Pressure at Idle Speed:

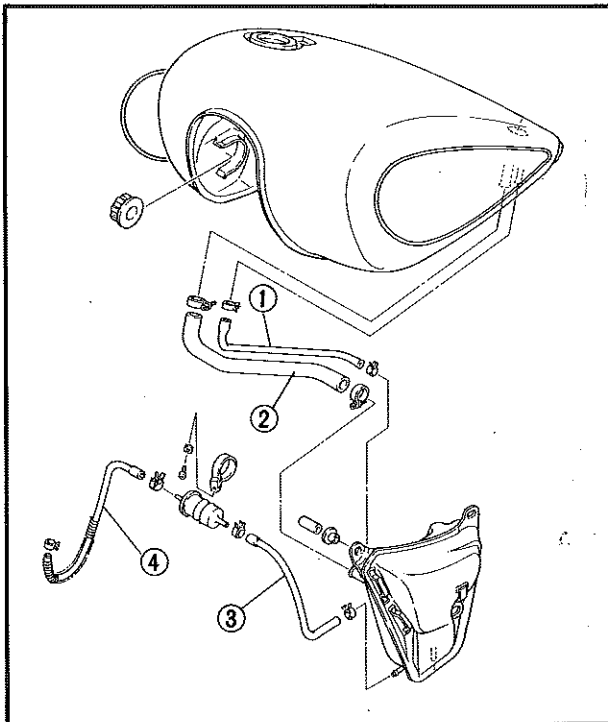
22.7 ~ 5.3 kPa
(170 ~ 190 mmHg, 6.7 ~ 7.5 inHg)

Vacuum Synchronous Difference:

(Below) 1.33 kPa (10 mmHg, 0.40 inHg)

7. Install:

- Components in above list (Step "3 ~ 1")

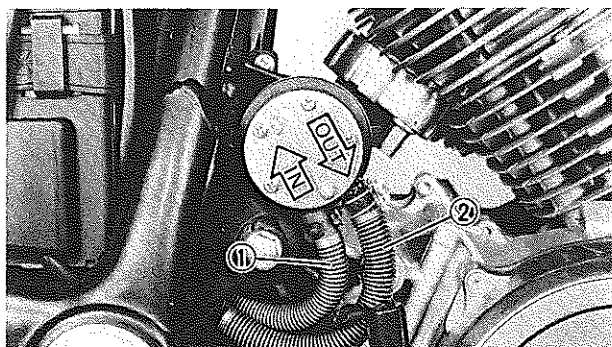


FUEL LINE INSPECTION

1. Inspect:

- Fuel breather hose ①
- Fuel feed hose 1 ②
- Fuel feed hose 2 ③
- Fuel feed hose 3 ④

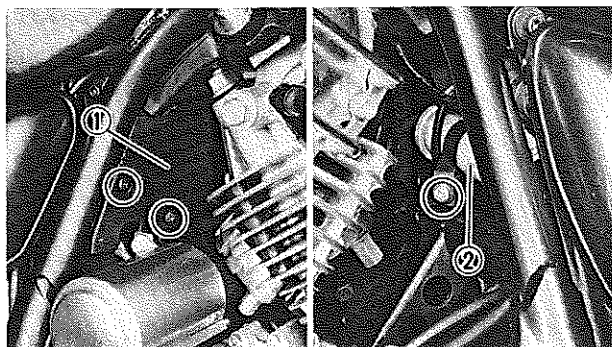
Cracks/Damage → Replace.



2. Inspect:

- Fuel pump "IN" hose ①
- Fuel pump "OUT" hose ②

Cracks/Damage → Replace.



FUEL FILTER REPLACEMENT

1. Remove:

- Frame cover ①
- Fuel filter ②

2. Inspect:

- Fuel filter

Dirty/Damage → Replace.

3. Install:

- Components in above list (Step "1")

ENGINE OIL LEVEL INSPECTION

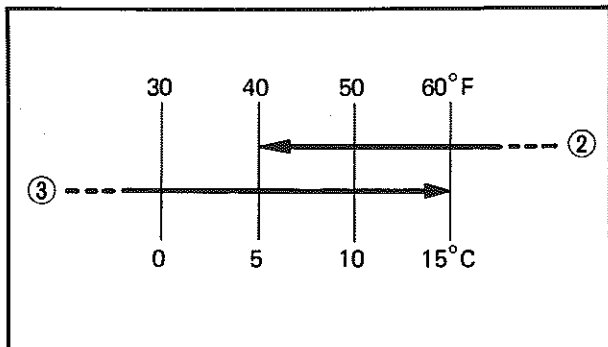
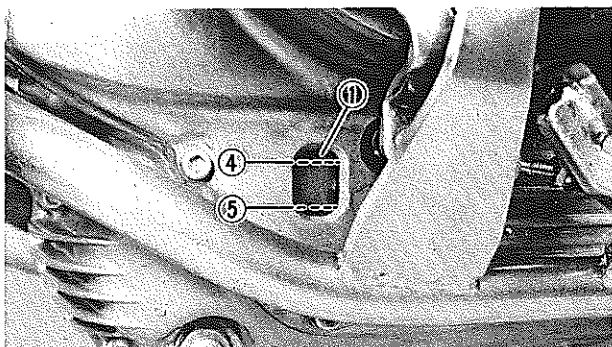
1. Inspect:

- Oil level

Oil level low → Add sufficient oil.

Engine oil level visual inspection steps:

- Place the motorcycle on its centerstand and warm up the engine for several minutes.



- Stop the engine and visually check the oil level through the level window ①.
- If the level is lower, add sufficient oil to the proper level.

**Recommended Oil:**

At 5°C (40°F) or Higher ② :

SAE 20W40 Type SE Motor Oil

At 15°C (60°F) or Lower ③ :

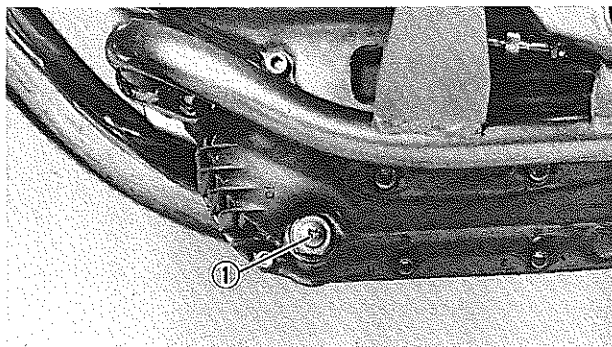
SAE 10W30 Type SE Motor Oil

NOTE:

- Position motorcycle straight up when checking oil level; a slight tilt to the side can produce false readings.
- Wait a few minutes until the oil level settles before checking.
- Oil level should be between maximum ④ and minimum ⑤ marks.

CAUTION:

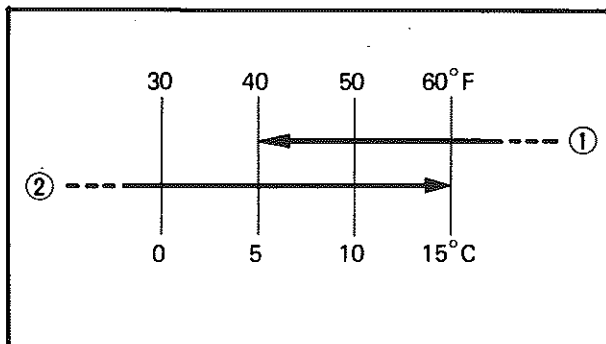
Do not allow foreign material to enter the crankcase.

**ENGINE OIL REPLACEMENT****Oil Change. (Without filter change)**

1. Warm up engine for several minutes.
2. Place a receptacle under the engine.
3. Remove:
 - Oil filler cap
4. Remove:
 - Drain plug ①
 - Drain the engine oil.
5. Inspect:
 - Drain plug gasket
 - Damage → Replace.
6. Tighten:
 - Drain plug

**Drain Plug:**

43 Nm (4.3 m·kg, 31 ft·lb)



7. Fill:

- Crankcase



Recommended Oil:

At 5°C (40°F) or Higher ① :

SAE 20W40 Type SE Motor Oil

At 15°C (60°F) or Lower ② :

SAE 10W30 Type SE Motor Oil

Periodic Oil Change:

3.0 L (2.6 Imp qt, 3.2 US qt)

CAUTION:

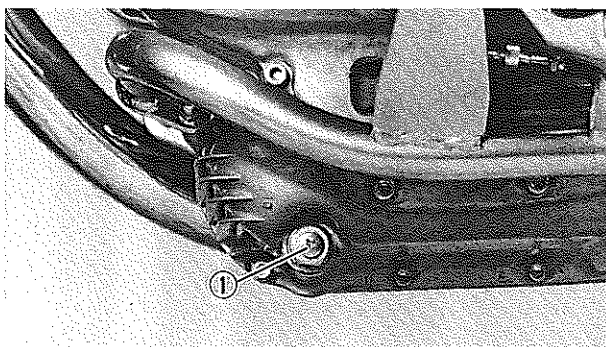
Do not allow foreign material to enter the crankcase.

8. Install:

- Oil filler cap

9. Inspect:

- Oil leaks
- Oil level



Oil Change (With filter change)

1. Warm up engine for several minutes.
2. Place a receptacle under the engine.

3. Remove:

- Oil filler cap

4. Remove:

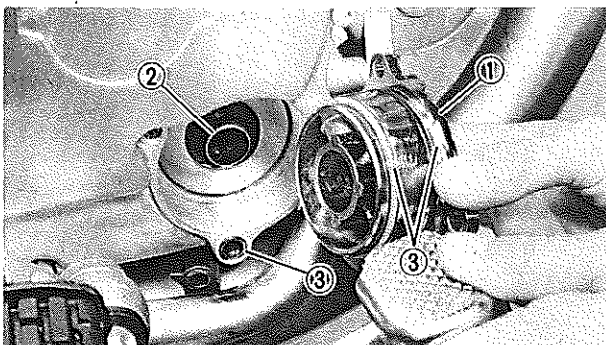
- Drain plug ①
- Drain the engine oil

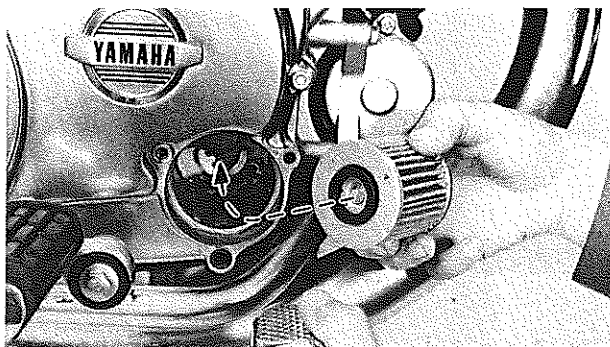
5. Remove:

- Oil filter cover ①
- Clamp
- Oil filter ②

6. Inspect:

- Drain plug gasket
 - O-rings ③
- Damage → Replace.





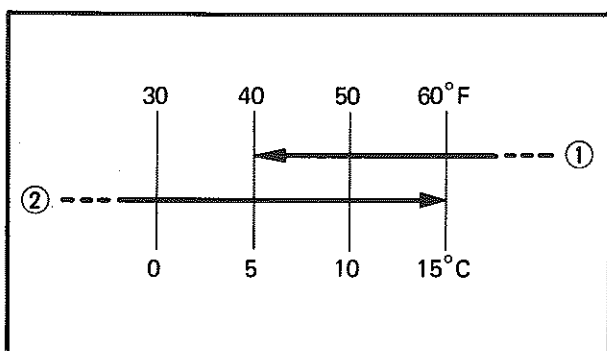
7. Install:
- Oil filter (New)
 - Oil filter cover

NOTE: _____
Install the oil filter ① with open end facing out.

8. Tighten:
- Components in above list (Step "5 and 4")



Drain Plug:
43 Nm (4.3 m·kg, 31 ft·lb)
Oil Filter Cover:
10 Nm (1.0 m·kg, 7.2 ft·lb)



9. Fill:
- Crankcase

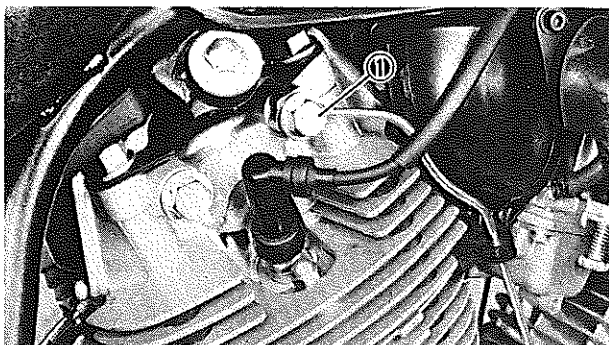


Recommended Oil:
At 5°C (40°F) or Higher ① :
SAE 20W40 Type SE Motor Oil
AT 15°C (60°F) or Lower ② :
SAE 10W30 Type SE Motor Oil
With Oil Filter Replacement:
3.6 L (3.2 Imp qt, 3.8 US qt)

CAUTION:

Do not allow foreign material to enter the crankcase.

10. Install:
- Oil filler cap
11. Inspect:
- Oil leaks
 - Oil level
 - Oil pressure
- Refer to "OIL PRESSURE INSPECTION" section.



OIL PRESSURE INSPECTION

1. Loosen:
 - Union bolt ① (Front or rear cylinder)
2. Start the engine and keep it idling for several minutes.
3. Inspect:
 - Oil flow condition (At loosened union bolt).

Oil flows out → Oil pressure is good.
No flows out → Oil pressure is bad.

CAUTION:

Turn off engine immediately if no oil seeps from union bolt after one minute to prevent engine seizure.

Locate and resolve problem, then recheck oil pressure.

4. Tighten:
 - Union bolt



Union Bolt:
20 Nm (2.0 m·kg, 14 ft·lb)

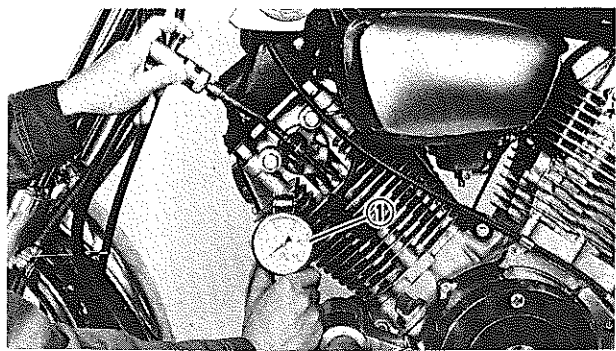
COMPRESSION PRESSURE MEASUREMENT

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:	
1,079 kPa (11 kg/cm ² , 156 psi)	
Minimum:	
981 kPa (10 kg/cm ² , 142 psi)	
Maximum:	
1,177 kPa (12 kg/cm ² , 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 bellow 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 ring(s).
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.

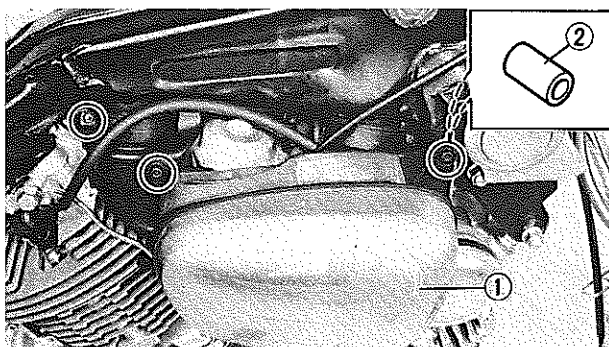
NOTE:

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

Difference Between Each Cylinder:
 Less than 98 kPa (1 kg/cm², 14 psi)

5. Install:

- Spark plugs

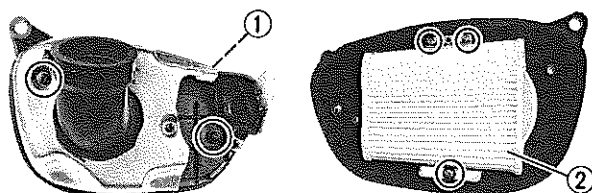


CHASSIS

AIR FILTER CLEANING

1. Remove:

- Air filter case assembly ① with collar ②.

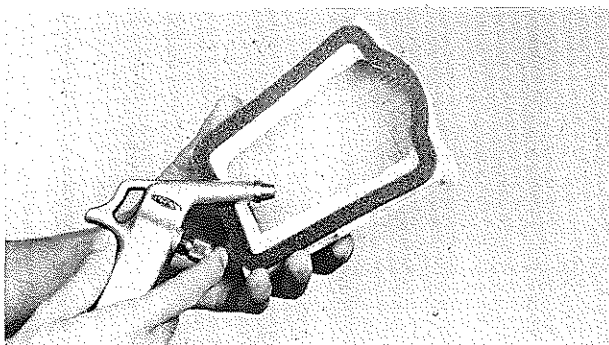


2. Remove:

- Air filter case cover ①
- Air filter element ②

CAUTION:

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



3. Inspect:

- Element
- Damage → Replace.

4. Eliminate:

- Dust
- Use the compressed air.
- Blow out dust in the element from the outer surface.



5. Install:

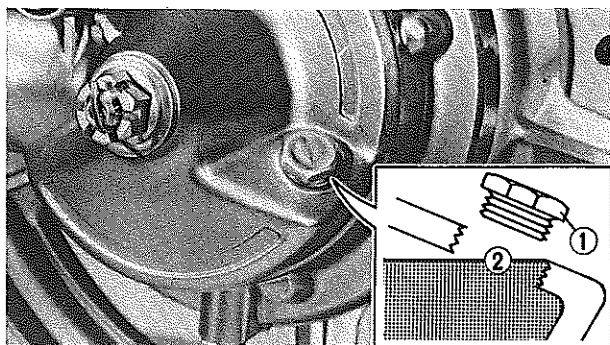
- Components in above list (Steps "2 and 1")

NOTE:

Be sure that the air filter element is properly seated against the filter case.



Air Filter Case Assembly:
10 Nm (1.0 m·kg, 7.2 ft·lb)



FINAL GEAR OIL LEVEL INSPECTION

1. Inspect:

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

Final gear oil level visual inspection steps:

- Position the motorcycle on a level area and place on its centerstand.
- Remove the oil filler cap ①.
- Visually check the oil level. Correct oil level ② should be at the brim of the hole.
- If the oil level is low, add sufficient oil to the proper level.



Recommended Oil:
SAE 80 API GL-4 Hypoid gear oil
If desired, an SAE 80W90 Hypoid gear oil may be used for all conditions.

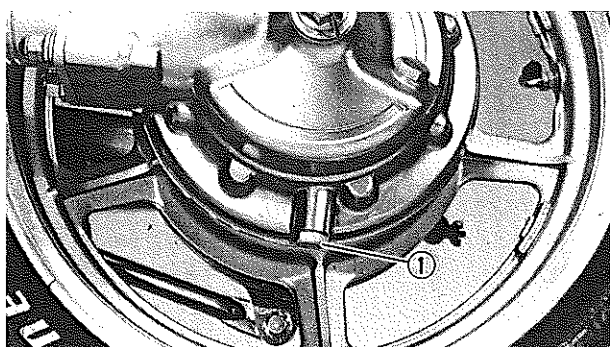
CAUTION:

Be sure that no foreign material enters the final gear case.

- 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 a receptacle under the final gear case.
2. Remove:
 - Oil filler cap
 - Drain plug ①
Drain the oil.
3. Inspect:
 - Gasket (Oil filler cap and drain plug)
Damage → Replace.

4. Install:

- Drain plug



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

5. Fill:

- Final gear case

WARNING:

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



Oil Capacity:
0.2 L (0.18 Imp qt, 0.21 US qt)

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

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

CAUTION:

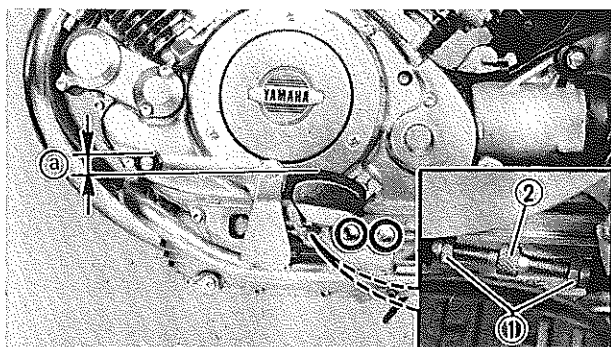
Be sure that no foreign material enters the final gear case.

6. Install:

- Oil filler cap



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



CHANGE PEDAL ADJUSTMENT

1. Loosen:

- Locknuts ①

2. Adjust:

- Change pedal height ②

Turn the adjuster ② until the change pedal position is at the specified height.



Change Pedal Height ② :
Zero mm (Zero in)
Flush with the Top of the Footrest

3. Tighten:

- Locknuts



BRAKE FLUID LEVEL INSPECTION

1. Inspect:

- Brake fluid level (brake master cylinder)
Level low → Replenish fluid.

	Brake Fluid: DOT #3
---	-------------------------------

① Lower level

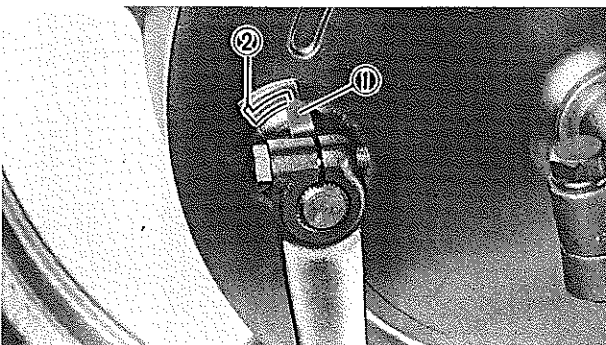
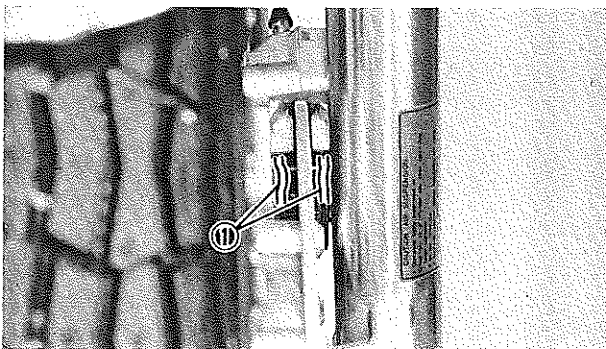
NOTE: _____

Be sure that:

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 AND REAR BRAKE PAD INSPECTION

Front Brake Pad

1. Remove:

- Cover

2. Activate the brake lever.

3. Inspect:

- Wear indicator ①

Indicator almost contact disc → Replace pads as a set.

Refer to "CHAPTER 5. FRONT BRAKE" section.

Rear Brake Lining

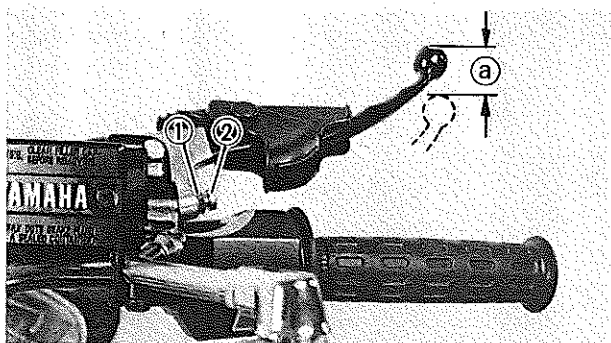
1. Activate the brake pedal.

2. Inspect:

- Wear indicator ①

Indicator at wear limit line ② → Replace brake shoes as a set.

Refer to "CHAPTER 5. REAR WHEEL AND BRAKE" section.



FRONT BRAKE ADJUSTMENT

- Loosen:
 - Locknut ①
- Adjust:
 - Free play ②

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



Free play ② :
2 ~ 5 mm (0.08 ~ 0.20 in)

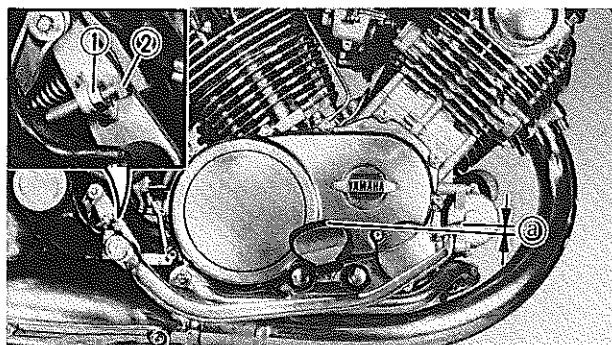
CAUTION:

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.

- Tighten:
 - Locknut



REAR BRAKE ADJUSTMENT

Brake Pedal Height

- Loosen:
 - Locknut ①
- Adjust:
 - Brake pedal height ②

Turn the adjuster ② until the brake pedal position is at the specified height.

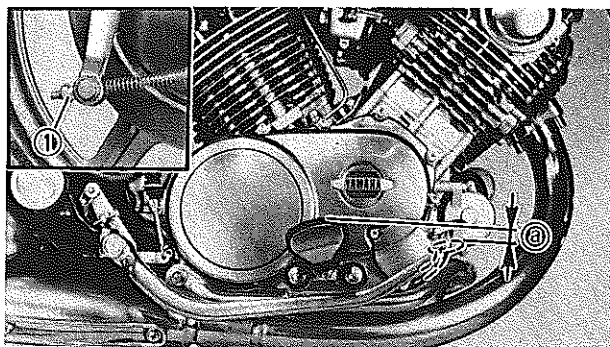


Brake Pedal Height ② :
20 mm (0.8 in)
Above the Top of the Footrest

- Tighten:
 - Locknut

WARNING:

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



Rear Brake Pedal Free Play

1. Adjust:

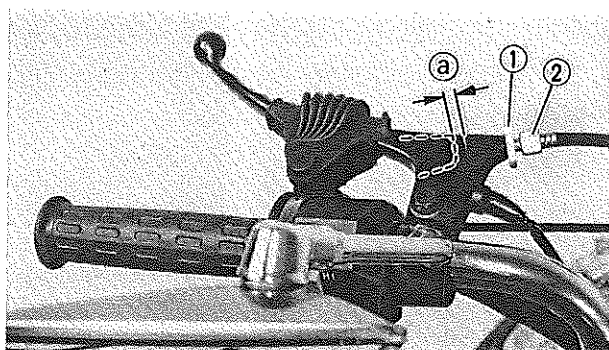
- Free play **a**
Turn the adjuster **1** until the free play **a** is within the specified limits.



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

WARNING:

- Adjust pedal height, then adjust brake pedal free play.
- Check to verify correct brake light operation after adjustment.



CLUTCH ADJUSTMENT

Free Play Adjustment

1. Loosen:

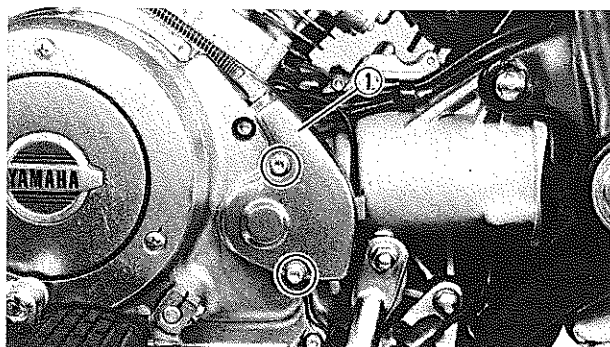
- Locknuts **1**

2. Adjust:

- Free play **a**
Turn the adjusters **2** until the free play is within the specified limits.



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



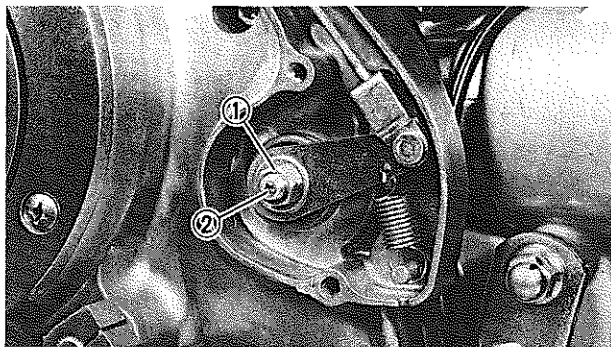
Mechanism Adjustment

1. Loosen:

- Clutch cable
Use the clutch cable adjuster on the clutch lever holder.

2. Remove:

- Clutch push lever cover.



3. Adjust:
- Free play

Clutch mechanism free play adjustment steps:

- Loosen the locknut ①.
- Turn the adjuster ② clockwise until it lightly seats against the clutch push rod.

NOTE:

There is an O-ring on the screw shaft which will cause some resistance. Be sure the screw contacts push rod firmly but lightly.

- Turn the adjuster 1/4 turn counterclockwise and tighten the locknut.



Locknut:
12 Nm (1.2 m·kg, 8.7 ft·lb)

4. Adjust:
- Clutch cable free play
- Refer to "Free Play Adjustment" section.

CABLE INSPECTION AND LUBRICATION

Cable inspection and lubrication steps:

- Remove the two 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**

CENTERSTAND AND SIDESTAND LUBRICATION

Lubricate centerstand and sidestand at their pivot points.



**Yamaha Chain and Cable Lube or
SAE 10W30 Motor Oil**

SWINGARM LUBRICATION

Lubricate the swingarm at pivot point.



**Lithium Base Waterproof Wheel
Bearing Grease**

WHEEL BEARINGS CHECK

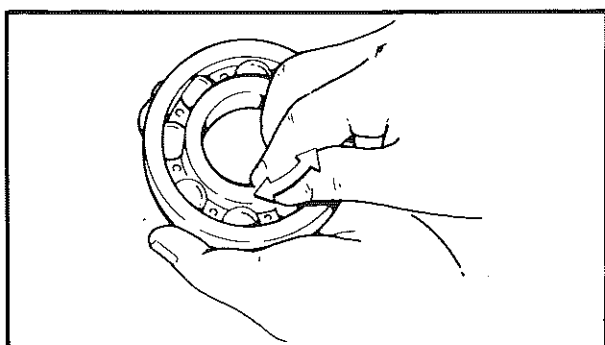
Front Wheel

1. Check:

- Front wheel bearings

Raise the front end of the motorcycle, and spin the wheel by hand. Touch the axle or front fender while spinning the wheel.

Excessive vibration → Replace bearings.



Rear Wheel

1. Remove:

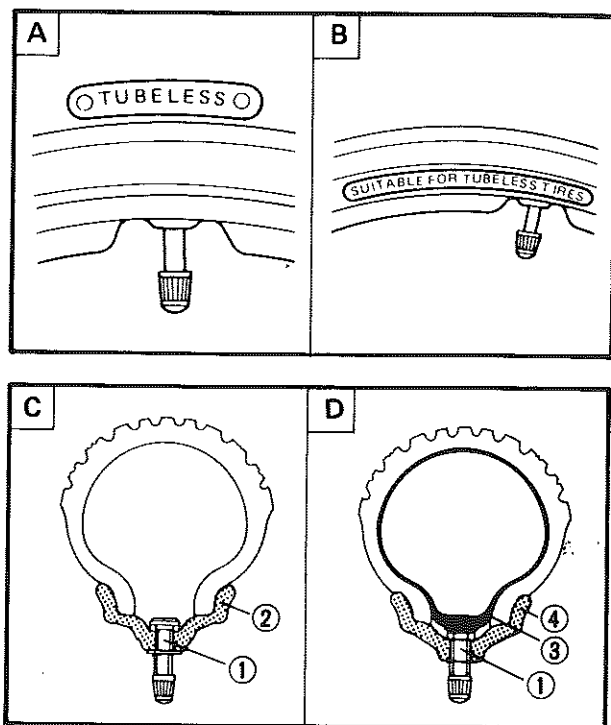
- Rear wheel

2. Check:

- Bearing movement

With the fingers.

Roughness/Wear → Replace.



TIRES CHECK

WARNING:

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

Wheel	Tire
Tube type	Tube type only
Tubeless type	Tube type or tubeless type

Be sure to install the correct tube when using tube type tires.

- A

Tire

C

Tubeless tire
- B

Wheel
- D

Tube type tire
- 1

Air valve
- 2

Aluminum wheel (tubeless type)
- 3

Tube
- 4

Aluminum wheel (tube type)

Basic weight: With oil and full fuel tank	235 kg (518 lb)	
Maximum load*	245 kg (540 lb)	
Cold tire pressure	Front	Rear
Up to 90 kg (198 lb) load*	177 kPa (1.8 kg/cm ² , 26 psi)	196 kPa (2.0 kg/cm ² , 28 psi)
90 kg (198 lb) ~ 160 kg (353 lb) load*	196 kPa (2.0 kg/cm ² , 28 psi)	226 kPa (2.3 kg/cm ² , 33 psi)
160 kg (353 lb) ~ Maximum load*	196 kPa (2.0 kg/cm ² , 28 psi)	275 kPa (2.8 kg/cm ² , 40 psi)
High speed riding	226 kPa (2.3 kg/cm ² , 33 psi)	245 kPa (2.5 kg/cm ² , 36 psi)

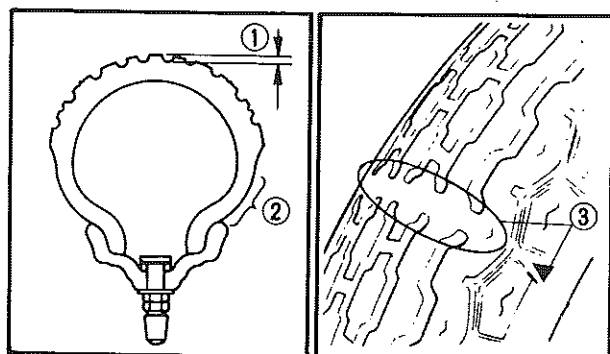
* Load is the total weight of cargo, rider, passenger, and accessories.

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.



1. 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.

WHEELS CHECK

1. Inspect:

- Aluminum 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.

2. Tighten:

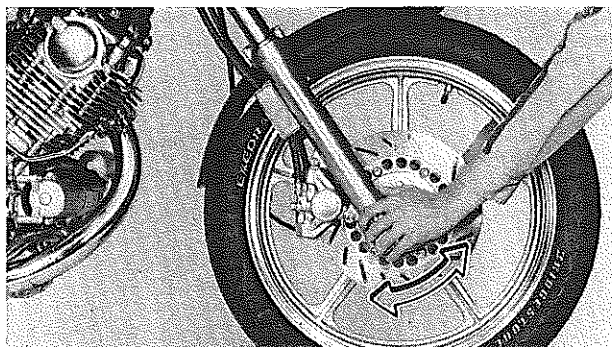
- Valve stem locknut



Valve Stem Locknut:
1.5 Nm (0.15 m·kg, 1.1 ft·lb)

WARNING:

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



STEERING HEAD INSPECTION

WARNING:

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

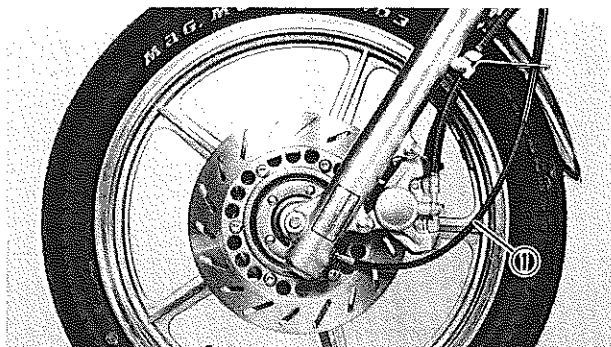
1. Place the motorcycle on its centerstand, then elevate the front wheel.
2. Check:
 - Steering assembly bearings
Grasp the bottom of the forks and gently rock the fork assembly back and forth.
Looseness → Adjust steering head.

STEERING HEAD ADJUSTMENT

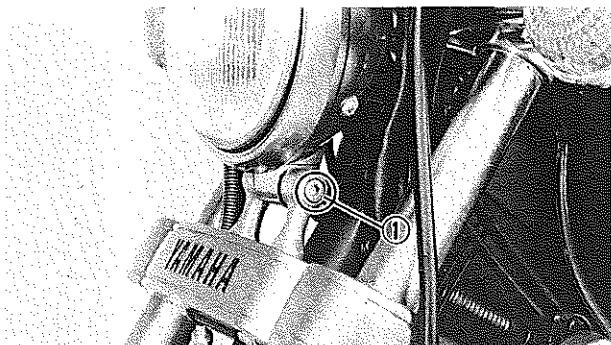
WARNING:

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

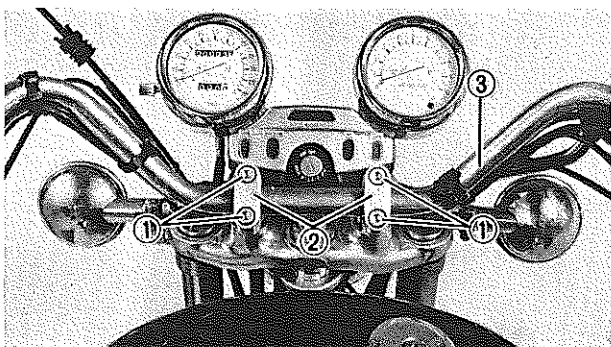
1. Elevate the front wheel by placing a suitable stand under the engine.



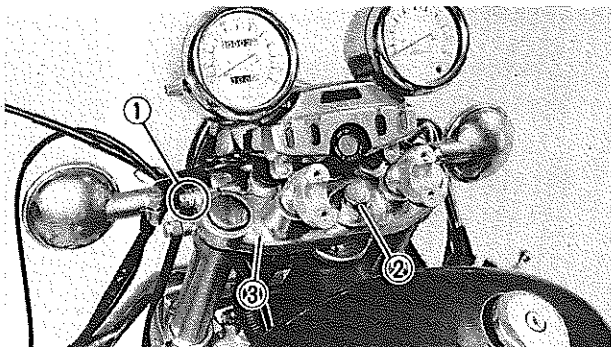
2. Disconnect:
 - Throttle cable
 - Choke cable
 - Clutch cable
 - Speedometer cable ①



3. Remove:
 - Headlight stay bolt ①

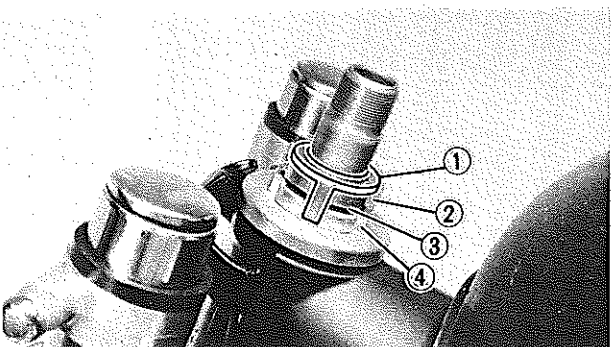


4. Remove:
 - Caps (Handlebar bolts)
 - Handlebar bolts ①
 - Handlebar upper brackets ②
 - Handlebar assembly ③



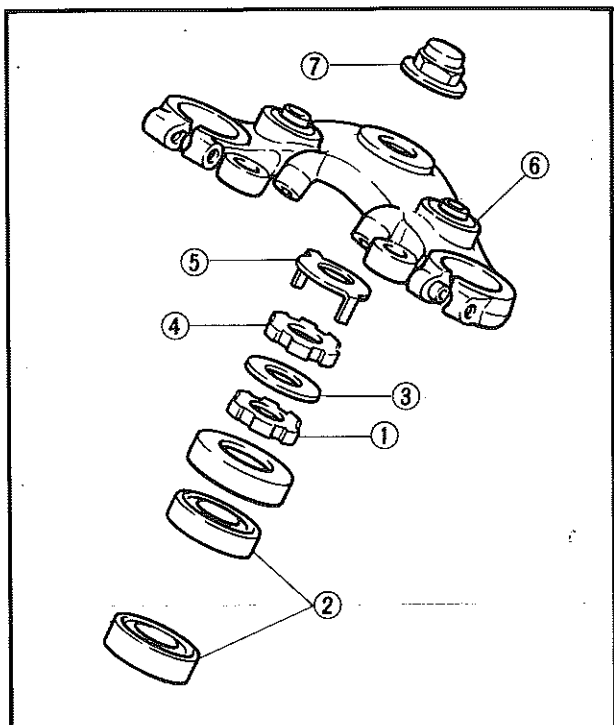
5. Loosen:
 - Upper front fork pinch bolts ①

6. Remove:
 - Steering stem nut ②
 - Steering crown ③ with meter panel assembly.



7. Remove:
 - Special washer ①
 - Upper ring nut ②
 - Rubber washer ③
8. Loosen:
 - Lower ring nut ④

Use Ring Nut Wrench (90890-01268).



9. Tighten:

- Ring nuts (Lower and upper)

Ring nuts tightening steps:

NOTE:

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

- Tighten the lower ring nut ① using the Ring Nut Wrench (90890-01403).



Ring Nut ① (Initial Tightening):
50 Nm (5.0 m·kg, 36 ft·lb)

- Loosen the lower ring nut ① completely and retighten it to specification.

WARNING:

Do not over-tightening.



Ring Nut ① (Final Tightening):
3 Nm (0.3 m·kg, 2.2 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 bearing ②.

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

- Install the rubber washer ③
- Install the upper ring nut ④

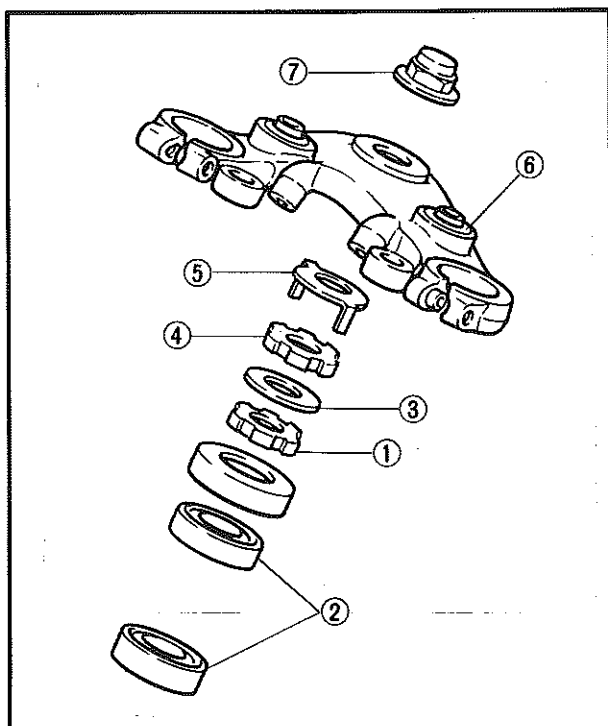
NOTE:

The tapered side of ring nut must face downward.

- Finger tighten the upper ring nut ④, then align the slots of both ring nuts. If not aligned, hold the lower ring nut ① and tighten the other until they are aligned.
- Install the special washer ⑤.

NOTE:

Make sure the special washer tab is placed in the slots.



- Install the steering crown ⑥ and tighten the steering stem nut ⑦ to specification.



Nut (Steering Stem):
110 Nm (11.0 m·kg, 80 ft·lb)

- Tighten the upper front fork pinch bolts.



Upper Front Fork Pinch Bolt:
20 Nm (2.0 m·kg, 14 ft·lb)

10. Install:

- Components in aforementioned list (Steps "REMOVAL 4 ~ 2").



Handlebar Upper Bracket:
20 Nm (2.0 m·kg, 14 ft·lb)

Brake Hose Joint Bolt:
9 Nm (0.9 m·kg, 6.5 ft·lb)

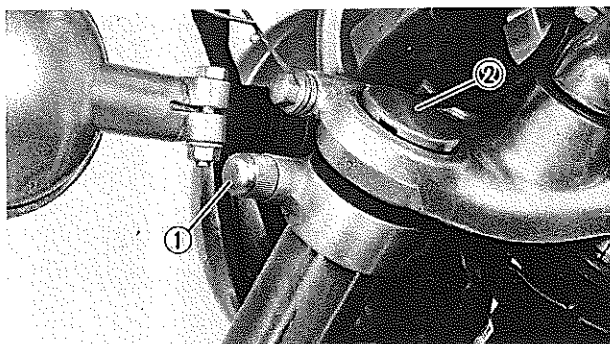
11. Adjust:

- Throttle cable free play
Refer to "CHAPTER 2. THROTTLE CABLE ADJUSTMENT" section.
- Clutch cable
Refer to "CHAPTER 2. CLUTCH ADJUSTMENT" section.

FRONT FORK OIL CHANGE

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.



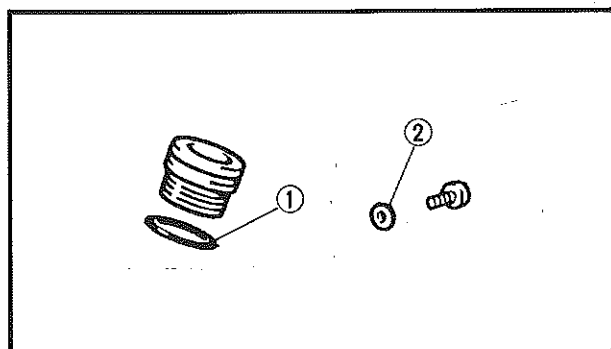
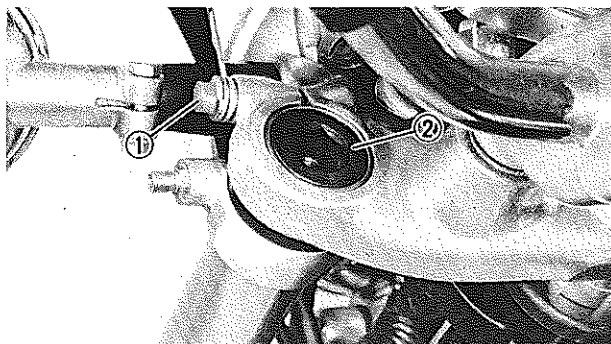
1. Elevate the front wheel by placing a suitable stand under the engine.

2. Remove:

- Air valve cap (left) ①
- Fork caps ②

NOTE:

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



3. Loosen:
 - Upper front fork pinch bolt ①
4. Remove:
 - Cap bolt ②
Use the Front Fork Cap Socket ③ (90890-01104).
 - Collars
5. Place a receptacles under the drain screws.
6. Remove:
 - Drain screws ①
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 (Cap bolt) ①
 - Gaskets (Drain screw) ②
Wear/Damage → Replace.
8. Install:
 - Drain screws
 - Collars
9. Fill:
 - Front forks



Each Fork:
396 cm³ (14.0 Imp oz, 13.4 US oz)
Yamaha Fork Oil 10WT or Equivalent

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

10. Tighten:
 - Cap bolts
Use the Front Fork Cap Socket (90890-01104).
 - Upper front fork pinch bolts



Cap Bolt:
23 Nm (2.3 m·kg, 17 ft·lb)

Upper Pinch Bolt:
20 Nm (2.0 m·kg, 14 ft·lb)



11. Install:

- Fork caps

12. Adjust:

- Front fork air pressure

Refer to "FRONT FORK ADJUSTMENT" section.

FRONT FORK ADJUSTMENT

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

NOTE: _____

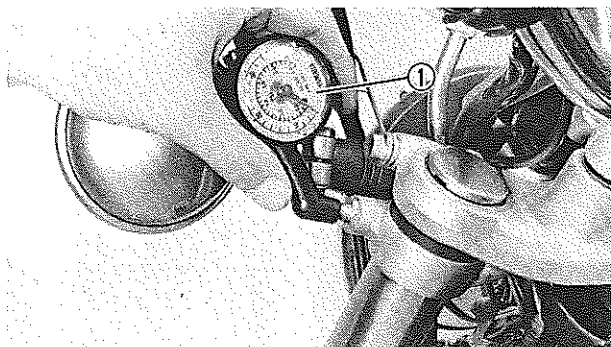
When checking and adjusting the air pressure, there should be no weight on the front end of the motorcycle.

2. Adjust:

- Air pressure

NOTE: _____

The air pressure of the front forks can be adjusted to suit rider's preference, weight, and the course condition.



Air pressure adjustment steps:

- Remove the valve cap.
- Using the air check gauge ①, check and adjust the air pressure.

Stiffer → Increase the air pressure.

(Use an air pump or pressurized air supply.)

Softer → Decrease the air pressure.

(Release the air by pushing the valve.)

Standard Air Pressure:

39.2 kPa (0.4 kg/cm², 5.7 psi)

Maximum Air Pressure:

118 kPa (1.2 kg/cm², 17.1 psi)

CAUTION: _____

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

- Install the valve cap securely.

REAR SHOCK ABSORBER ADJUSTMENT

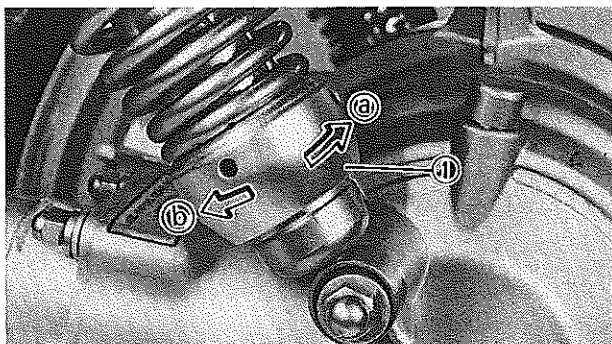
- Adjust:
 - Spring preload
 - Damping

NOTE:

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

WARNING:

Always adjust rear shock absorber preload and damping to the same setting. Uneven adjustment can cause poor handling and loss of stability.



Spring preload adjustment steps:

- Using the screwdriver, adjust the spring preload.

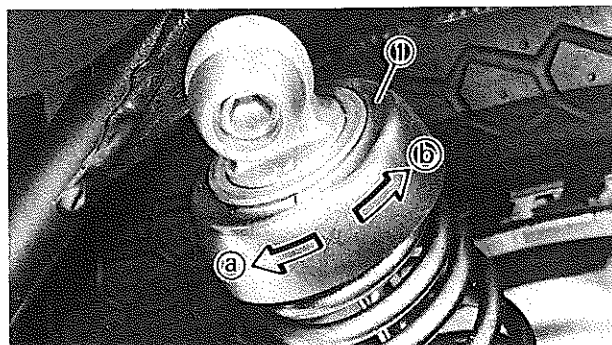
Stiffer (a) → Increase the spring preload.
(Turn the spring seat ① clock-wise.)

Softer (b) → Decrease the spring preload.
(Turn the spring seat ① counter-clockwise.)

Standard position	2
Minimum position	1
Maximum position	5

CAUTION:

Never attempt to turn the spring seat beyond the maximum or minimum setting.



Damping adjustment steps:

- Adjust the damping with the damping adjuster ① .

Stiffer (a) → Increase the damping.
(Turn the adjuster ① clockwise.)

Softer (b) → Decrease the damping
(Turn the adjuster ① counter-clockwise.)

REAR SHOCK ABSORBER ADJUSTMENT



Standard position	1
Minimum position	1
Maximum position	4

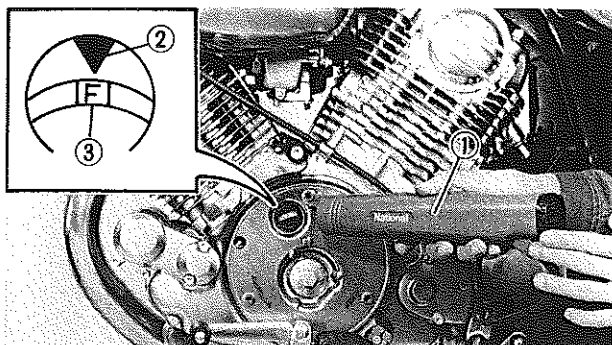
CAUTION:

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

Recommended combinations of the front fork and the rear shock absorber settings.

Use this table as a guide for specific riding and motorcycle load conditions.

	Front fork	Rear shock absorber		Loading condition			
	Air pressure	Spring seat	Damping adjuster	Solo rider	With passenger	With accessories and equipment	With accessories, equipment and passenger
1	39.2 ~ 78.5 kPa (0.4 ~ 0.8 kg/cm ² , 5.7 ~ 11.4 psi)	1 ~ 2	1	○			
2	39.2 ~ 78.5 kPa (0.4 ~ 0.8 kg/cm ² , 5.7 ~ 11.4 psi)	3 ~ 5	2		○		
3	39.2 ~ 78.5 kPa (0.4 ~ 0.8 kg/cm ² , 5.7 ~ 11.4 psi)	3 ~ 5	3			○	
4	78.5 ~ 117.7 kPa (0.8 ~ 1.2 kg/cm ² , 11.4 ~ 17.1 psi)	5	4				○



ELECTRICAL

IGNITION TIMING CHECK

1. Check:
 - Ignition timing

Ignition timing check steps:

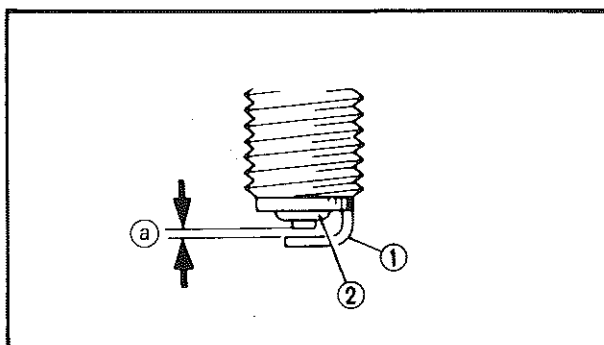
- Remove the generator cover.
- Connect the Timing Light (90890-03109)
 - ① to Rear (#1) cylinder spark plug lead.
- Warm up the engine and let it idle at the specified idle speed of 950 ~ 1.050 r/min.
- Visually check the stationary pointer ② in the timing window to verify it is within the required firing range mark ③ indicated on the flywheel.

Incorrect firing range → Check flywheel and/or pickup assembly (tightness damage)
 Refer to CHAPTER 6, "ELECTRICAL" for further information.

SPARK PLUG INSPECTION

1. Inspect:
 - Spark plug type
 - Incorrect → Replace

Standard Spark Plug:
 BPR7ES (NGK)
 W22EPR-U (NIPPONDENSO)



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.

① Spark plug gap

3. Clean:

• Spark plug

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

4. 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)

5. Tighten:

• Spark Plug

NOTE:

Before installing a spark plug, clean the gasket surface and plug surface.

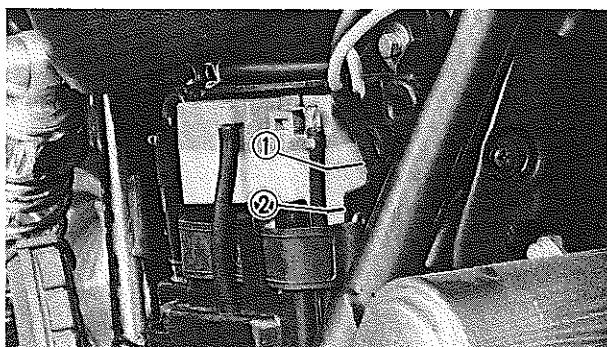


Spark Plug:

20 Nm (2.0 m·kg, 14.0 ft·lb)

NOTE:

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.



BATTERY INSPECTION

1. Check:

• Battery fluid level

Incorrect → Refill.

Fluid level should be between upper and lower level marks.

① Upper level

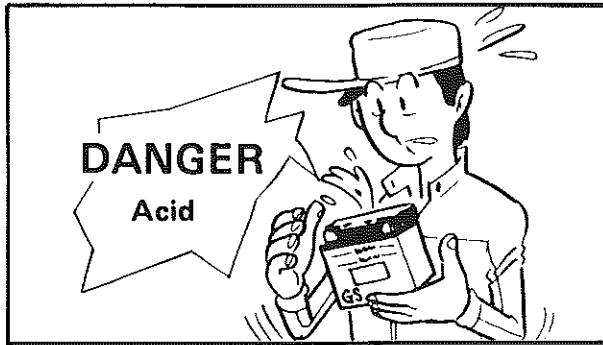
② Lower level

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 follow 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.

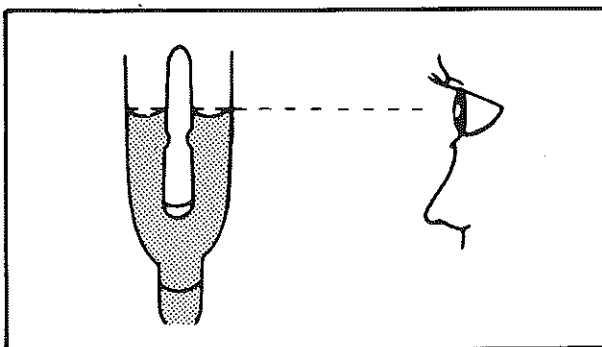
KEEP BATTERIES AND ELECTROLYTE OUT OF REACH OF CHILDREN.

2. Remove:

- Battery

3. Inspect:

- Battery fluid specific gravity
Out of specification → Charge.



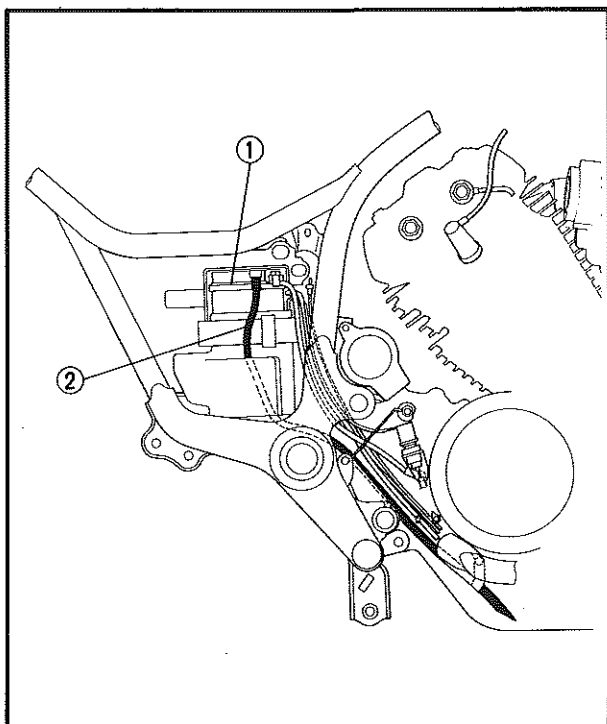
CAUTION:

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

Charging Current:
0.5 amps/10 hrs
Specific Gravity:
1.280 at 20°C (68°F)

4. Inspect:

- Breather hose
Obstruction → Remove.
Damage → Replace.



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.

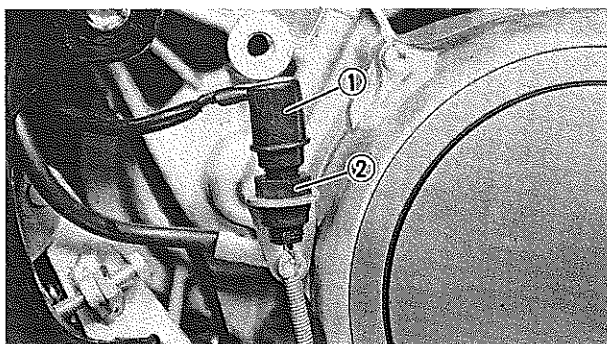
5. Install:

- Battery ①

6. Connect:

- Breather hose ②

Be sure the hose is properly attached and routed.

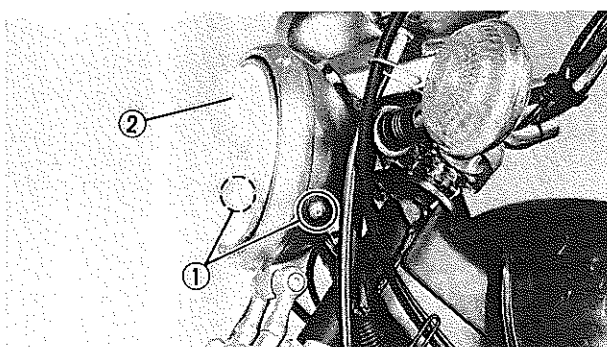


BRAKE LIGHT SWITCH ADJUSTMENT

1. Adjust:

- Brake light operating timing

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



HEADLIGHT

Headlight Bulb Replacement

1. Remove:

- Securing screws ①
- Headlight lens unit ②

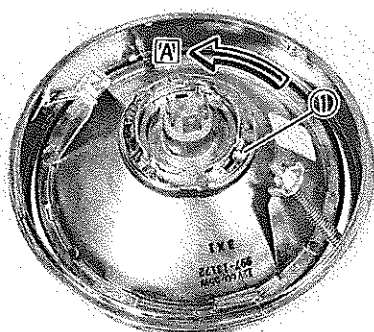
2. Disconnect:

- Headlight lens unit leads

3. Remove:

- Rubber cover
- Bulb holder ①

While pushing the bulb holder ①, turn it counterclockwise [A].

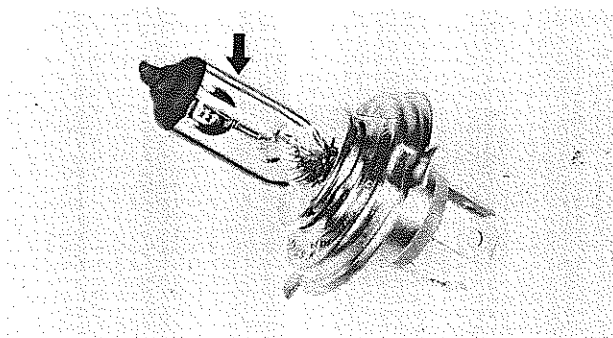


4. Remove:

- Bulb

WARNING:

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



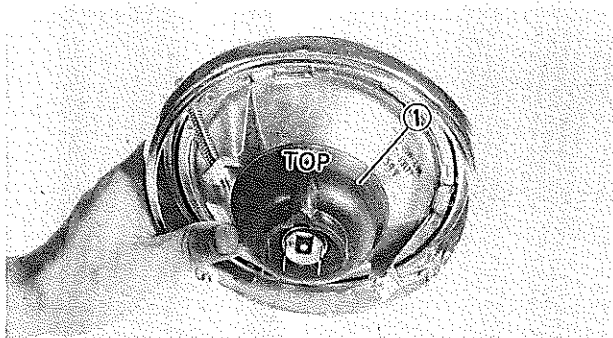
5. Install:

- Bulb (New)

Secure the new bulb with the bulb holder.

CAUTION:

Avoid touching glass part of bulb. Also keep it free from oil otherwise, transparency of glass, bulb life and illuminous flux will be adversely affected. If oil gets on bulb, clean it with a cloth moistened thoroughly with alcohol or lacquer thinner.



6. Install:

- Rubber cover

NOTE:

The "TOP" mark on the rubber cover must face upward.

7. Connect:

- Headlight lens unit leads

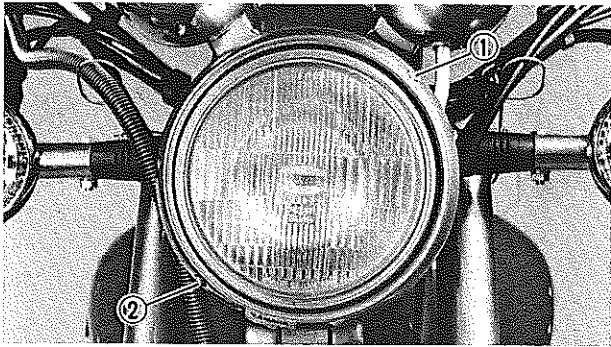
8. Install:

- Headlight lens unit

9. Adjust:

- Headlight beam

Refer to "HEADLIGHT BEAM ADJUSTMENT" section.



Headlight Beam Adjustment

1. Adjust:

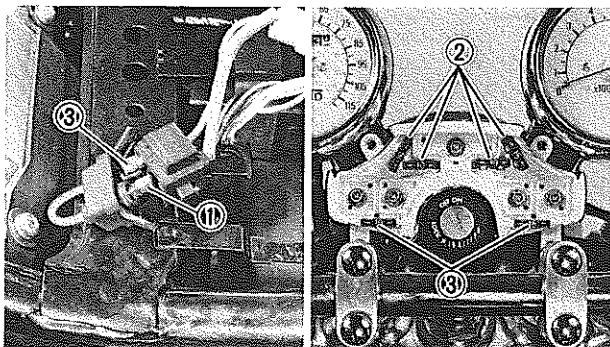
- Headlight beam (Horizontally)

Horizontal Adjustment	
Right	Turn the adjusting screw ① clockwise.
Left	Turn the adjusting screw ① counterclockwise.

2. Adjust:

- Headlight beam (Vertically)

Vertical Adjustment	
Higher	Turn the adjusting screw ② clockwise.
Lower	Turn the adjusting screw ② counterclockwise.



FUSE INSPECTION

The fuse box is under the indicator light panel.
The main fuse is under the seat.

1. Inspect:

- Main fuse ①
 - Fuse ②
- Defective → Replace.
Blown fuse (New) → Inspect circuit.

③ Spare fuses

Blown fuse replacement steps:

- Turn off ignition and the circuit.
 - Install a new fuse of proper amperage.
 - Turn on the switches and see if the electrical device operates.
 - Fuse interrupts the circuit again → Check electrical system.
- Refer to "CHAPTER 6. ELECTRICAL" for further information.

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.



FUSE INSPECTION

Description	Amperage	Quantity
MAIN	30A	1
HEADLIGHT	15A	1
TAILLIGHT	10A	1
SIGNAL	15A	1
IGNITION	10A	1
RESERVE	30A	1
	15A	1
	10A	1



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:

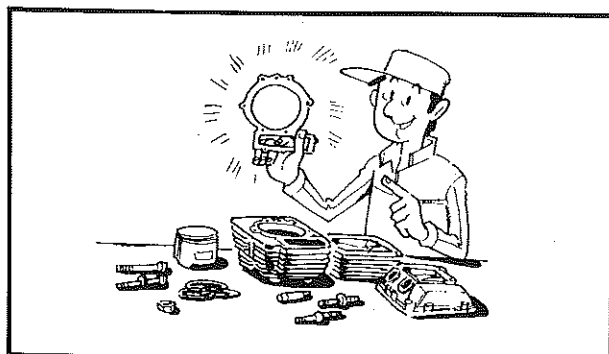
- Carburetor
- Flywheel magneto
- Clutch
- Starter motor
- Oil filter

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. GENERAL INFORMATION-SPECIAL TOOLS" section.

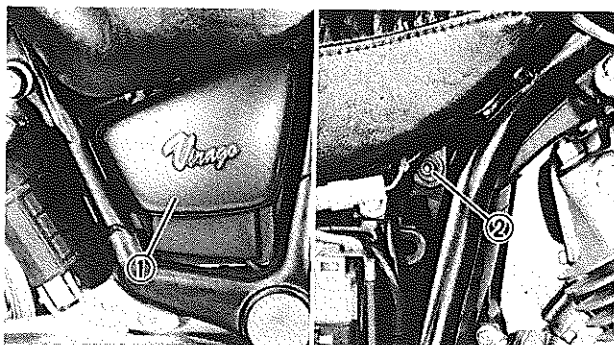
NOTE:

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.



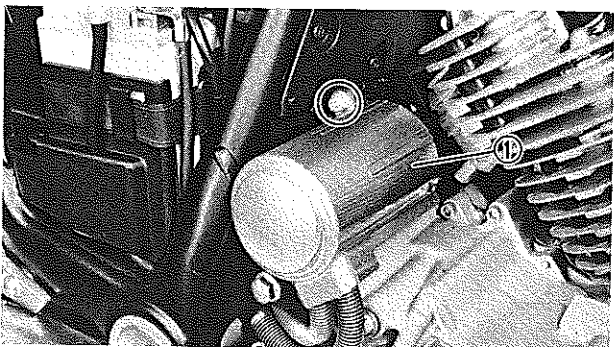
3. During engine disassembly, clean all parts and place them in trays in the order of disassembly. This will speed up assembly time and help assure that all parts are correctly reinstalled in the engine.

4. Start the engine and allow it to warm up.
5. Drain the engine oil completely. Refer to "CHAPTER 2. PERIODIC INSPECTIONS AND ADJUSTMENTS — ENGINE OIL REPLACEMENT" section.

**SEAT**

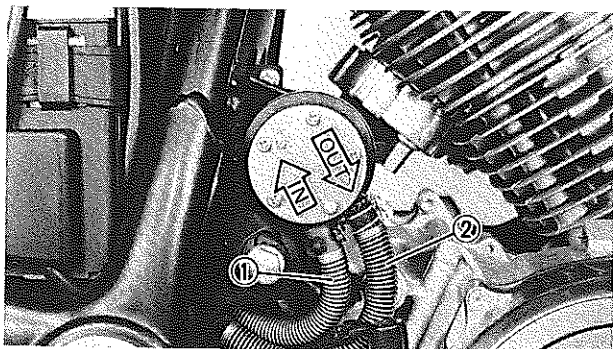
1. Remove:

- Side covers (Left and right) ①
- Seat screws (Left and right) ②

**FUEL TANK**

1. Remove:

- Pump cover ①



2. Disconnect:

- Fuel pump "IN" hose ①

3. Drain:

- Fuel (Completely)

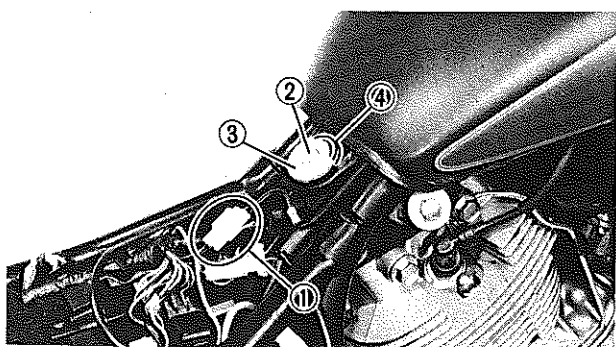
From within the fuel tank by the fuel pump "IN" hose.

NOTE:

When draining the fuel, remove the fuel tank cap.

4. Disconnect:

- Fuel pump "OUT" hose ②



5. Disconnect:

- Fuel sender lead ①

6. Remove:

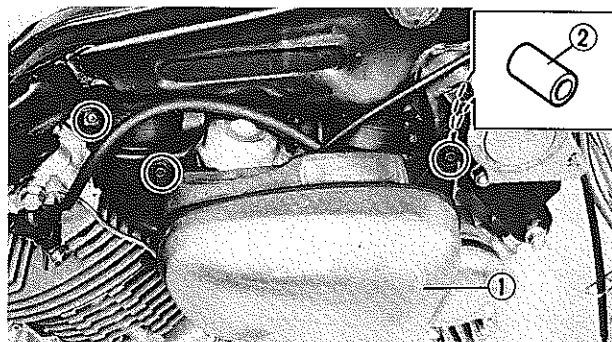
- Fuel tank bolt ②
- Plate washer ③
- Damper ring ④



7. Lift up the fuel tank ① end.

8. Disconnect:

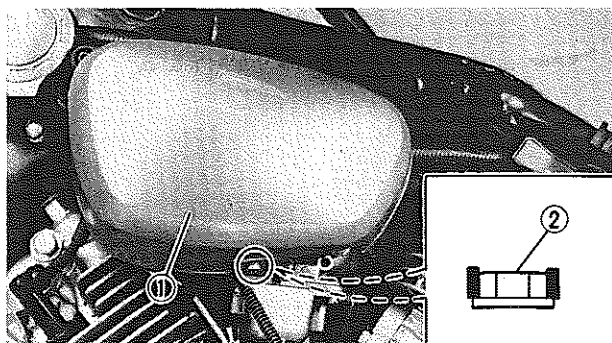
- Fuel vent hose ②
- Fuel feed hose ③



AIR FILTER CASE

1. Remove:

- Air filter case assembly ① with collar ②



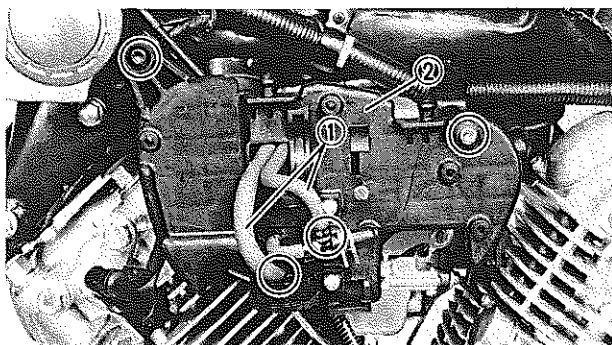
MIXTURE CONTROL VALVE CASE

1. Remove:

- MCV case cover ①

NOTE:

When removing the MCV case cover, do not lose the special nut ② on the MCV case cover.

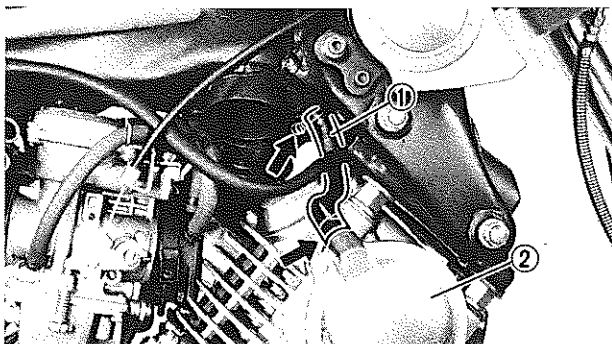


2. Disconnect:

- MCV hoses ①

3. Remove:

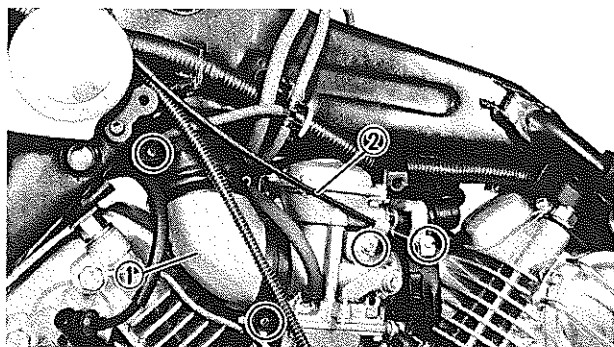
- MCV case assembly ②



CRANKCASE BREATHER HOSE

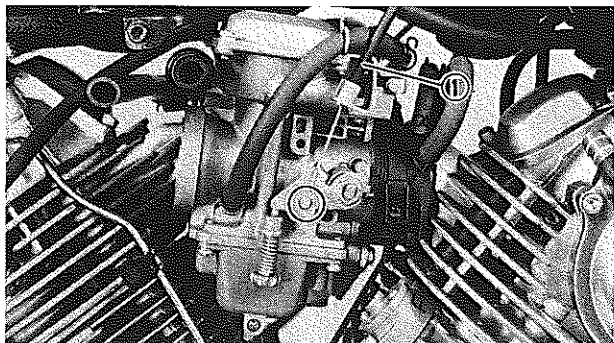
1. Remove:

- Crankcase breather hose ①
From cam chain sprocket cover ② on the front (#2) cylinder head.

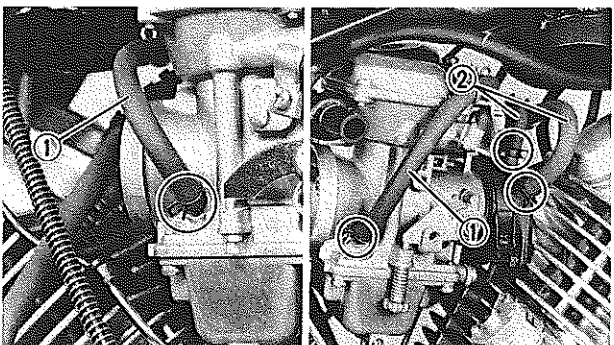


CARBURETOR CABLE AND HOSE

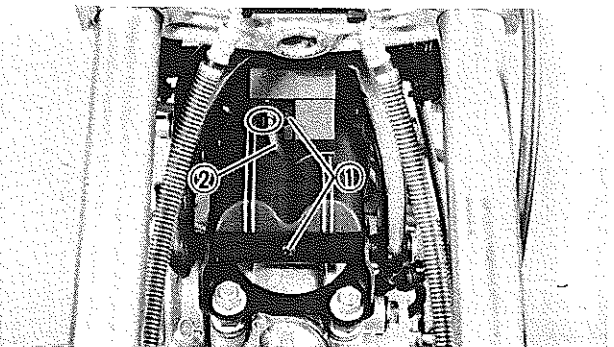
1. Remove:
 - Air filter joint hoses ①
From front (#2) and rear (#1) carburetor
 - Choke cable ②
From rear (#1) carburetor.



2. Remove:
 - Throttle cable ①
From front (#2) carburetor.

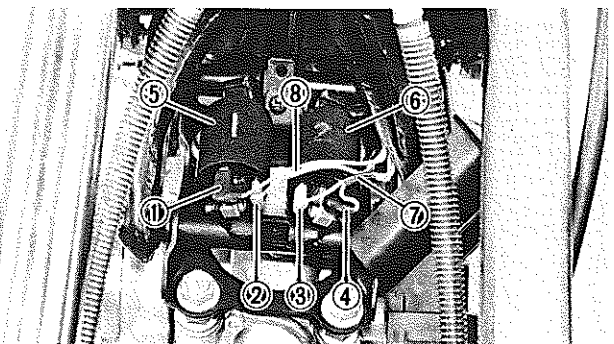


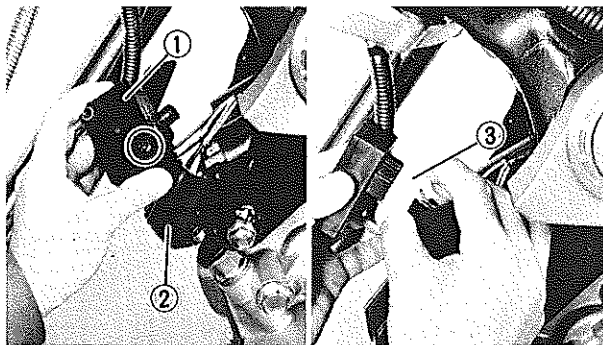
3. Disconnect:
 - Fuel feed hoses ①
From front (#2) and rear (#1) carburetors.
4. Remove:
 - Vacuum sensor hoses ②
From front (#2) carburetor joint.



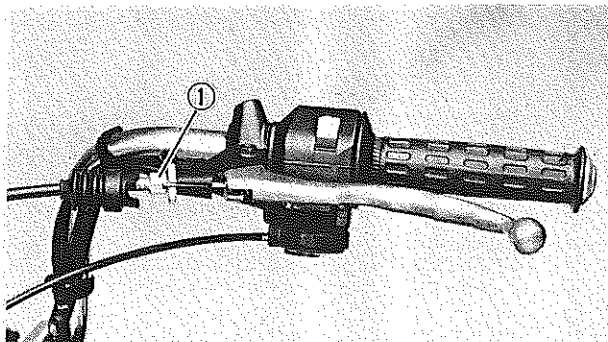
IGNITION COIL LEAD

1. Remove:
 - Ignition coil cover screw ①
2. Disconnect:
 - Vacuum sensor hose assembly ②



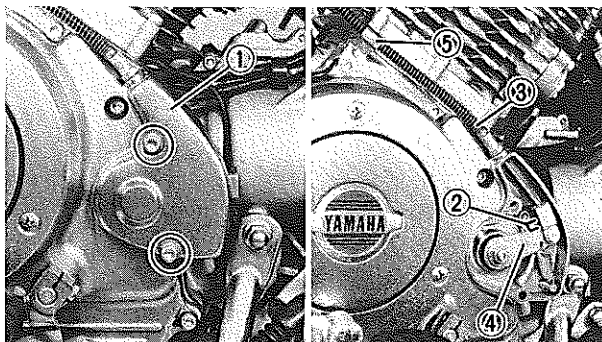


4. Remove:
 - Vacuum sensor ①
 - From ignition coil cover ②
5. Disconnect:
 - Vacuum sensor connector ③

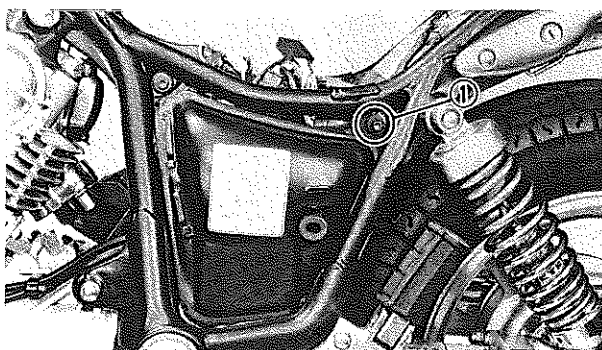


CLUTCH CABLE

1. Fully loosen the clutch cable adjuster ① on the clutch lever holder, then remove the clutch cable.

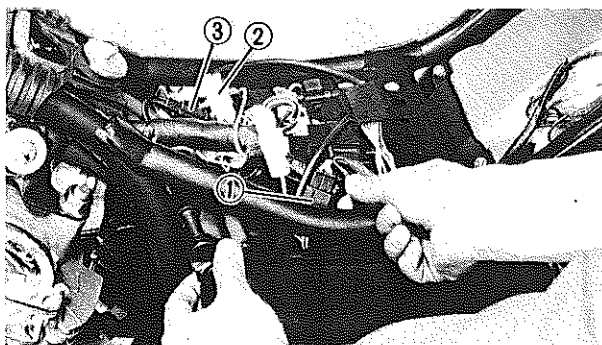


2. Remove:
 - Clutch push lever cover ①
3. Straighten:
 - Lock tab ②
4. Remove:
 - Clutch cable ③
 - From the clutch push lever ④ and cable holder ⑤.



AC GENERATOR LEAD, SIDESTAND SWITCH LEAD AND PICKUP COIL LEAD

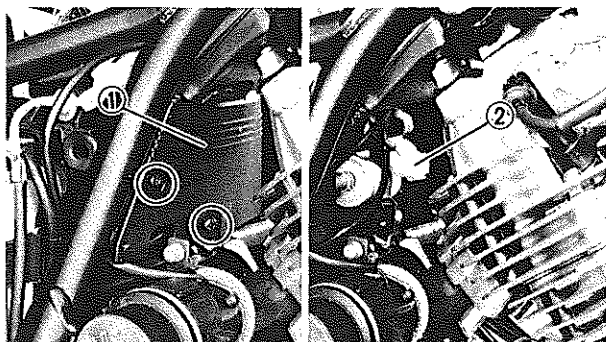
1. Remove:
 - Sub fuel tank screws ①



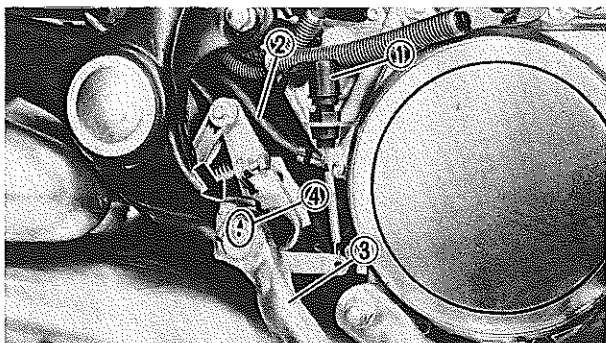
2. Disconnect:
 - AC Generator lead ①
 - Sidestand switch lead ②
 - Fuel pump lead ③

NOTE:

Pull the sub fuel tank to the frame side and pull out the above mentioned leads to the engine side (through the gap of the battery case, marked "sub fuel tank").



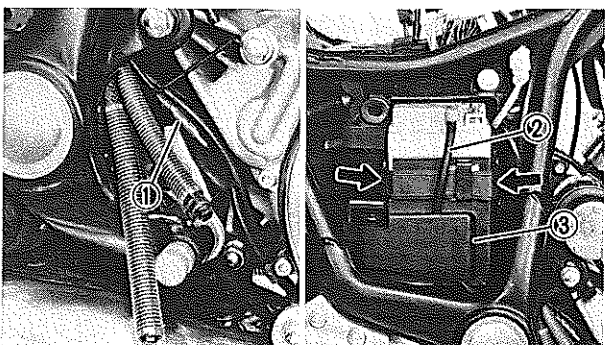
3. Remove:
 - Frame cover ①
4. Disconnect:
 - Pickup coil lead ②



BRAKE SWITCH, GROUND LEAD AND BRAKE PEDAL

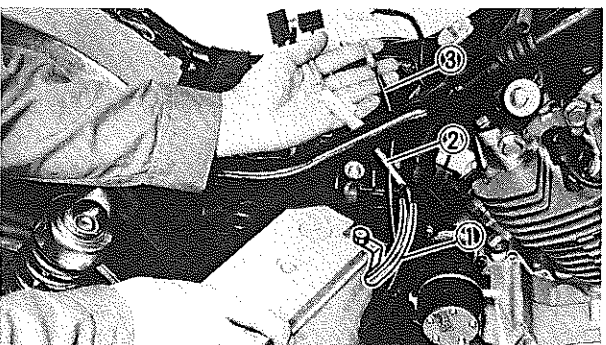
1. Remove:
 - Brake switch ①
 - Ground lead ②
 - Brake pedal ③

④ Matching mark



OIL LEVEL SWITCH LEAD, STARTER MOTOR LEAD, AND SOLENOID LEAD

1. Disconnect:
 - Oil level switch lead ①
 - Battery breather hose ②
2. Remove:
 - Battery side cover ③

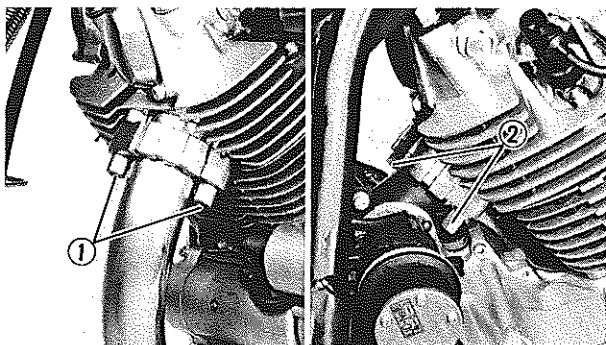


3. Pull out the battery from the battery case.
4. Disconnect:
 - Battery positive lead ①
 - Fuse positive lead ②
 - Solenoid switch lead ③

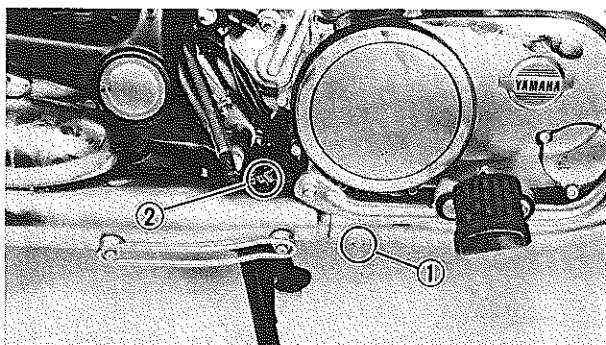
NOTE: _____

Pull out the battery positive lead and solenoid switch lead to the engine side.

5. Remove:
 - Battery

**EXHAUST PIPE AND MUFFLER**

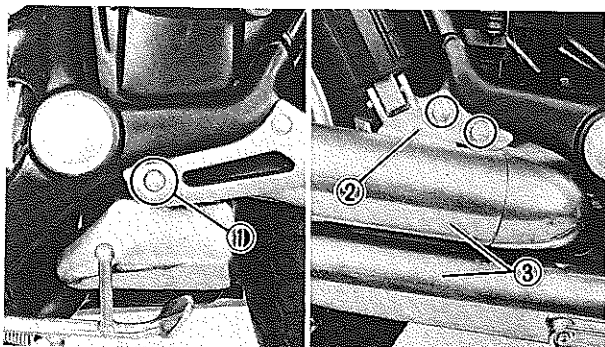
1. Remove:
 - Front exhaust pipe nuts ①
 - Rear exhaust pipe nuts ②



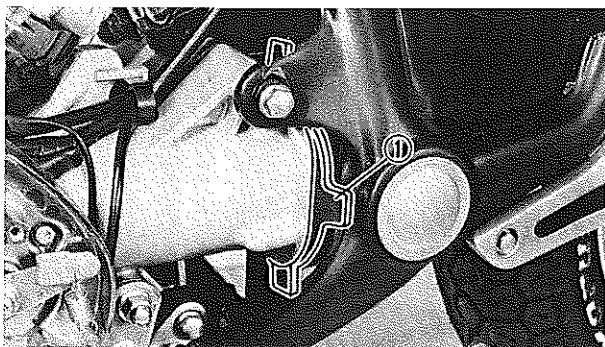
2. Loosen:
 - Front exhaust pipe clamp screw ①
 - Rear exhaust pipe clamp screw ②
3. Remove:
 - Front exhaust pipe

NOTE:

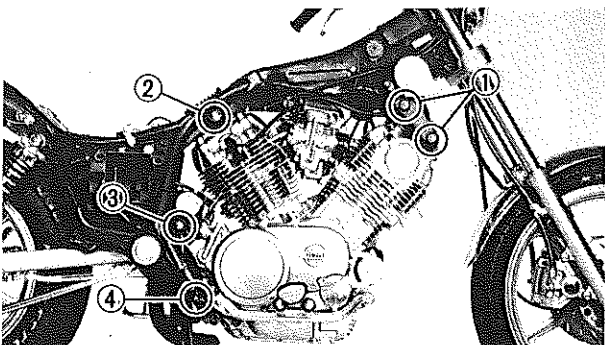
Remove the rear exhaust pipe at the time of engine removal off the frame because it cannot be done through the gap between the engine and the frame.



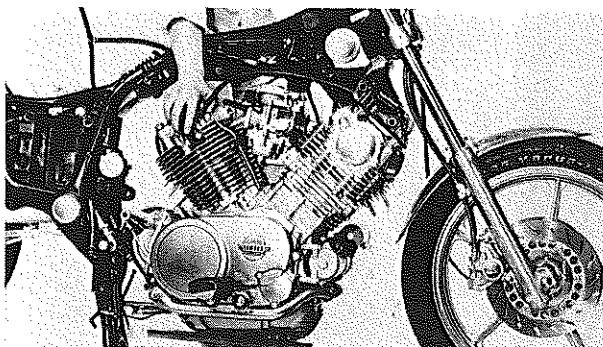
4. Remove:
 - Rear muffler securing bolt ①
 - Right passenger footrest bracket ②
 - Muffler assembly ③

**DRIVE SHAFT RUBBER BOOT**

1. Disconnect:
 - Rubber boot ①
 From crankcase side.

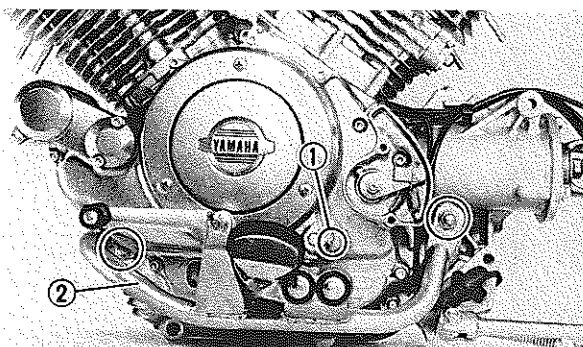
**ENGINE REMOVAL**

1. Place a suitable stand under the engine.
2. Remove:
 - Front cylinder head mounting bolts ①
 - Rear cylinder head mounting bolts ②
 - Rear upper mounting bolts ③
 - Rear lower mounting bolt ④



3. Remove:
 - Engine assembly
 To the right side.

NOTE: _____
 Remove it without dropping the rear exhaust pipe.

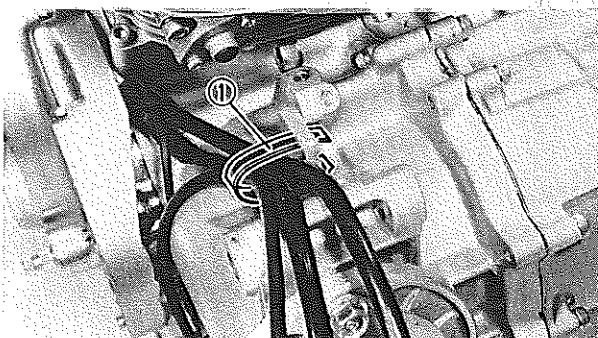


ENGINE DISASSEMBLY

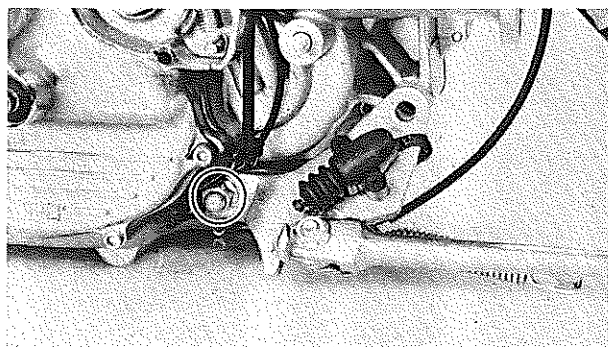
ENGINE GUARDS, CHANGE PEDAL AND SIDESTAND

1. Remove:
 - Change pedal bolt ①
 - Engine guards (Left and right) ②

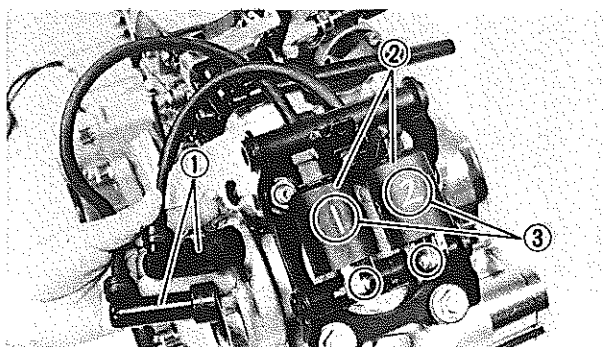
NOTE: _____
 Remove the left engine guard together with the change pedal assembly.



2. Remove:
 - Wire harness clamp ①



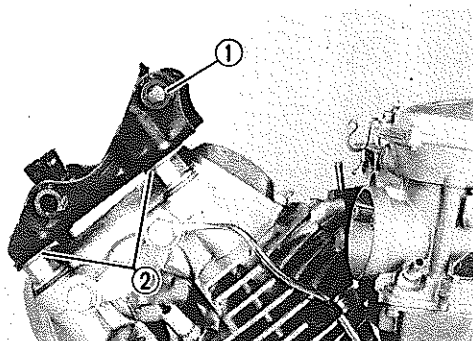
3. Remove:
 - Sidestand assembly



IGNITION COIL AND ENGINE MOUNTING BRACKET

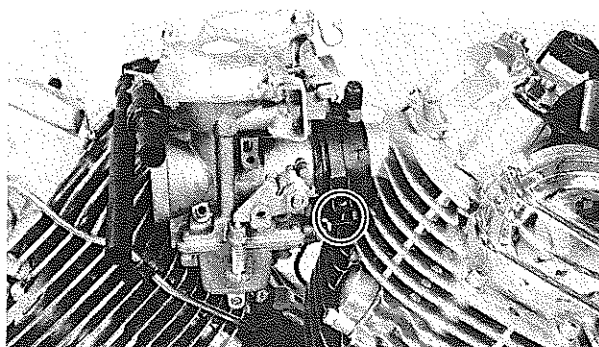
1. Remove:
 - Spark plug caps ①
 - From ignition coil leads.
 - Ignition coils ②

NOTE: _____
 Put marks ③ on the ignition coils before removing, so that they can be reinstalled in the original position.



2. Remove:

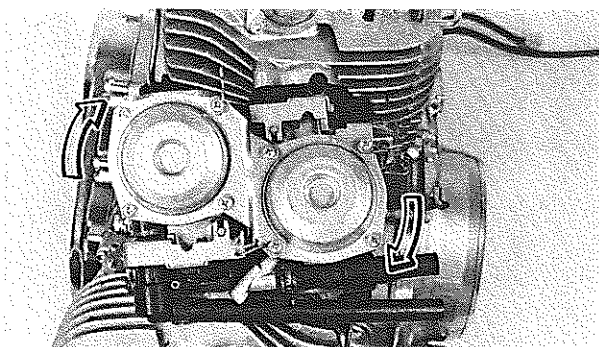
- Front engine mounting bracket ①
- Plain washer ②



CARBURETOR

1. Loosen:

- Carburetor joint clamp screws (Left and right)



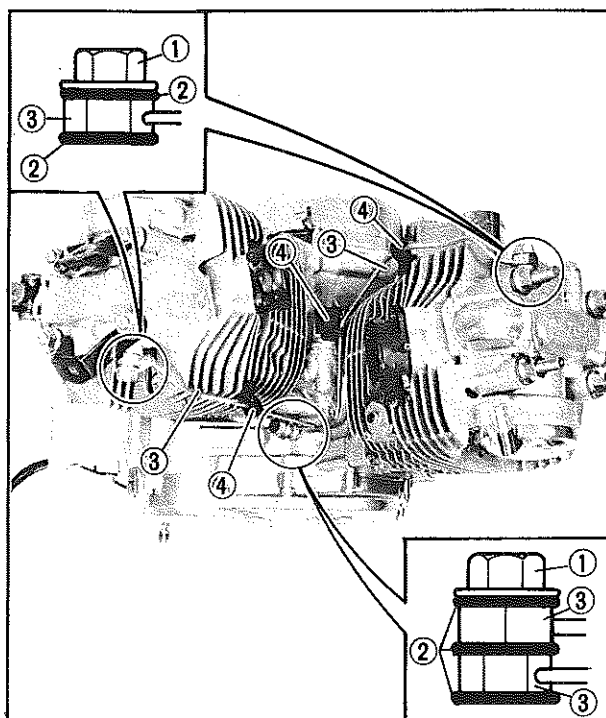
2. Rotate:

- Carburetors (Front and rear)

Turn them clockwise until they are free of the carburetor joint.

3. Remove:

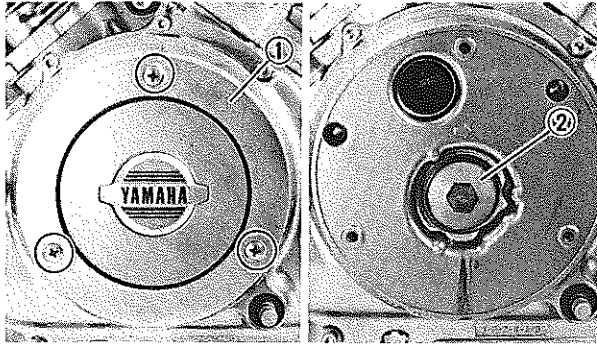
- Carburetors (Front and rear)



OIL DELIVERY PIPE

1. Remove:

- Union bolts ①
- Copper washers ②
- Oil delivery pipes ③ with rubber guides ④

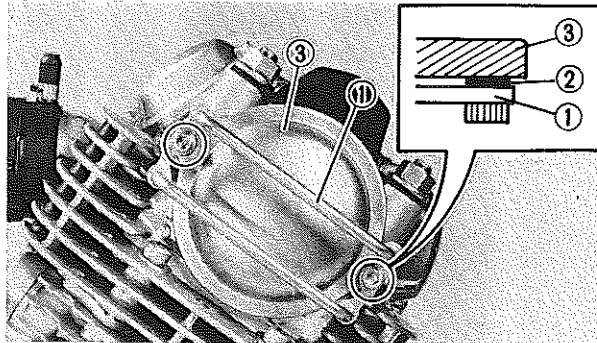


CYLINDER HEAD AND CYLINDER

1. Remove:

- Generator cover ①
- Crankshaft end cover ②
- Spark plugs

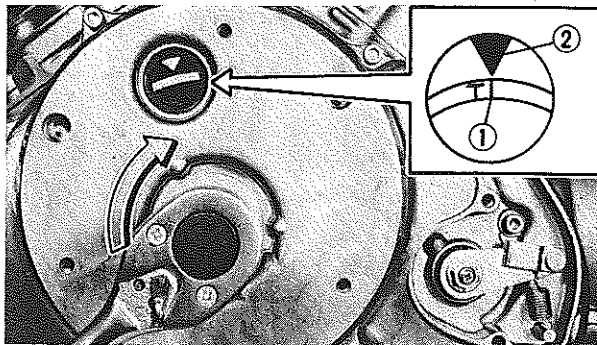
From front (#2) and rear (#1) cylinders.



Rear Cylinder

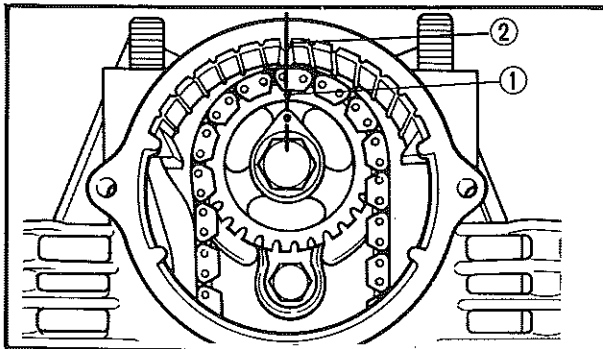
1. Remove:

- Cam chain sprocket cover guard ①
- Protector washers ②
- Cam chain sprocket cover ③



2. Align:

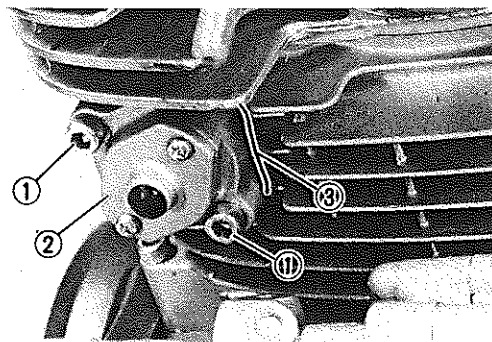
- Flywheel "T" mark ①
(with stationary pointer ②, when piston is at TDC on compression stroke.)



3. Align:

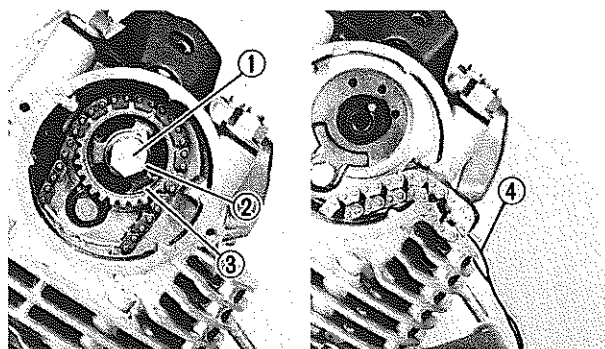
- Cam chain sprocket hole ①
(with the timing mark ② on the cylinder head.)

This places the rear (#1) piston at TDC on compression stroke.



4. Remove:

- Screws ①
- Cam chain tensioner assembly ②
- Gasket ③

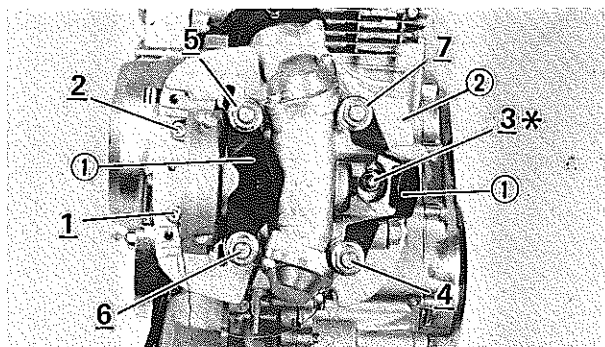


5. Remove:

- Bolt ①
- Washer ②
- Cam chain sprocket ③

NOTE:

Fasten safety wire ④ to the cam chain to prevent it from falling into the crankcase.



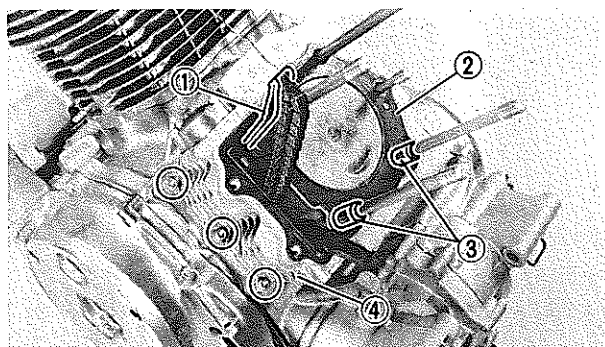
6. Remove:

- Nuts and bolts (Cylinder head)
- Cylinder head mounting brackets ①
- Cylinder head assembly ②

NOTE:

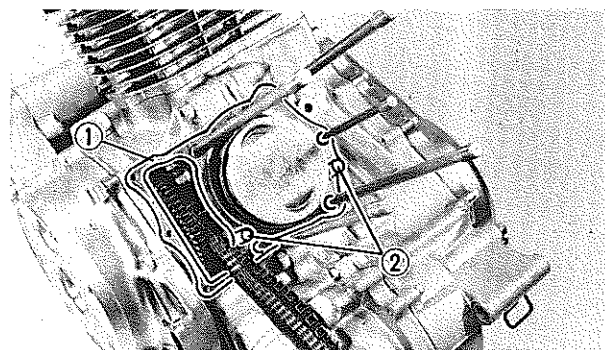
Remove the nuts and bolts starting with the lowest numbered one.

*: with washer



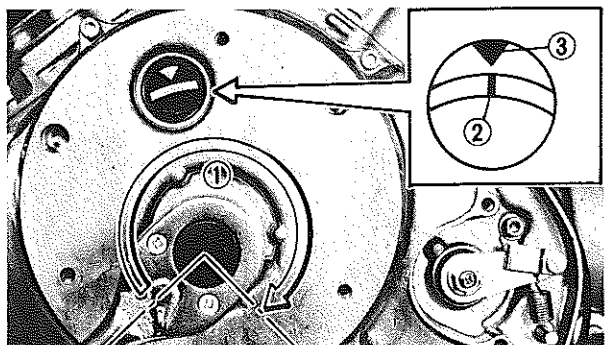
7. Remove:

- Front cam chain guide ①
- Cylinder head gasket ②
- Dowel pins ③
- Cylinder ④



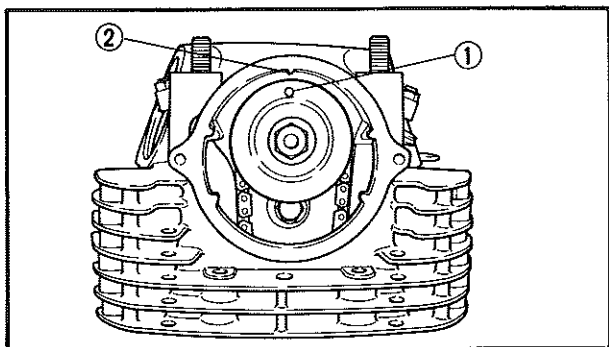
8. Remove:

- Cylinder gasket ①
- Dowel pins ②



Front Cylinder

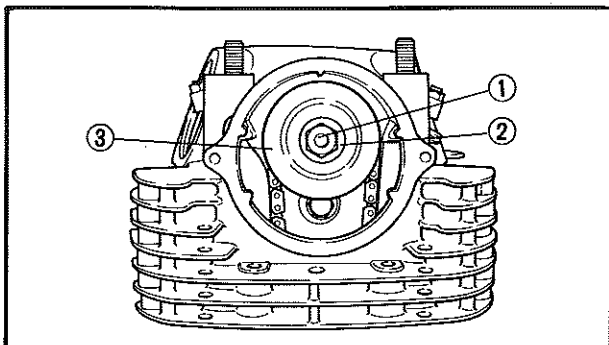
1. Repeat "Rear Cylinder" steps, but omit steps 2 and 3, 5 and 6. Then see note 2 (below) for step 6.
2. Rotate:
 - Crankshaft
 - Turn it clockwise 285° ① to align the "I" mark ② with the stationary pointer ③ when the piston is at TDC on the compression stroke.



3. Align:

- Oil baffle hole ①
(with the timing mark ② on the cylinder head)

This places the front (#2) piston at TDC on the compression stroke.

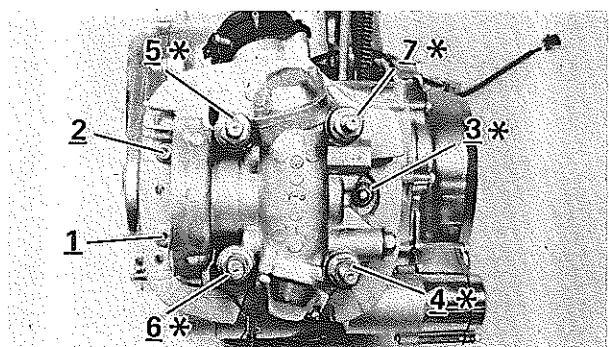


4. Remove:

- Bolt ①
- Washer ②
- Oil baffle ③
- Cam chain sprocket

NOTE:

Fasten safety wire to the cam chain to prevent it from falling into the crankcase.



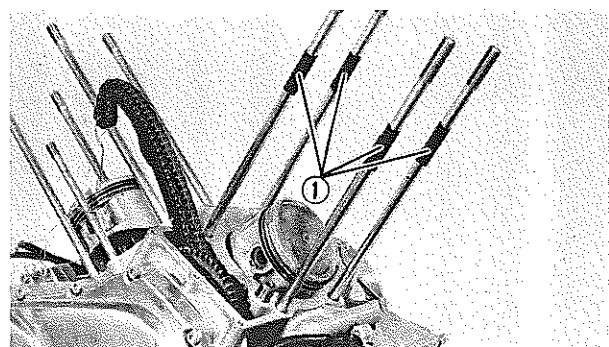
5. Remove:

- Nuts and bolts (Cylinder head)
- Cylinder head assembly

NOTE:

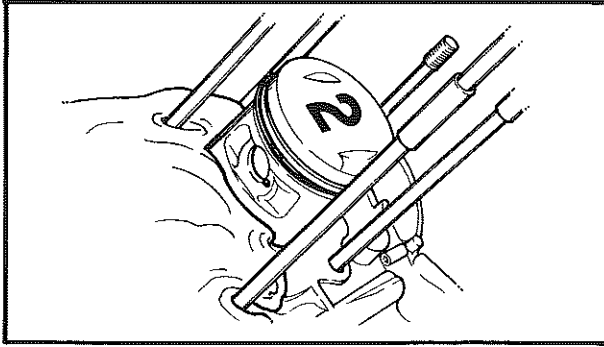
Remove the nuts and bolts starting with the highest numbered one.

* : with washers

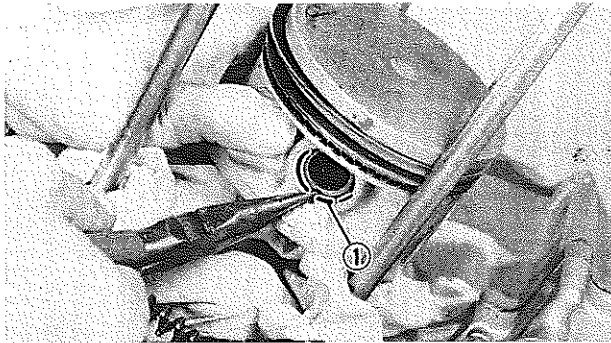


NOTE:

Do not remove rubber sleeves ① from the four cylinder studs on front cylinder.

**PISTON PIN AND PISTON**

1. Mark each piston to facilitate proper reinstallation.

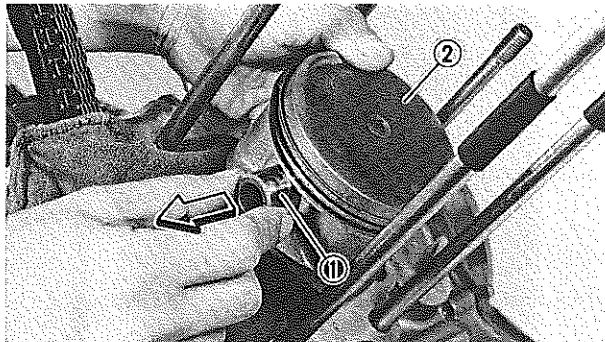


2. Remove:

- Piston pin clip ①

NOTE:

Before removing piston pin clip, cover crankcase with a clean rag to prevent clip from falling into crankcase cavity.



3. Remove:

- Piston pin ①
- Piston ②

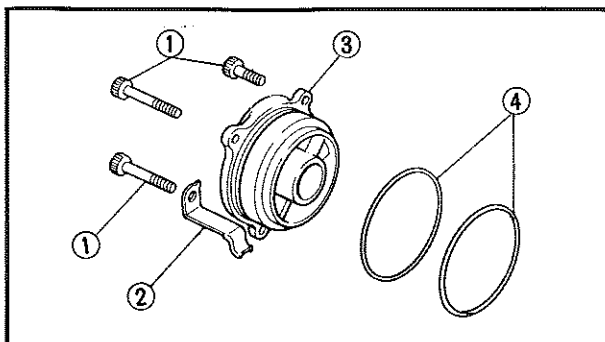
Push piston pin from the opposite side, then pull it out.

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).

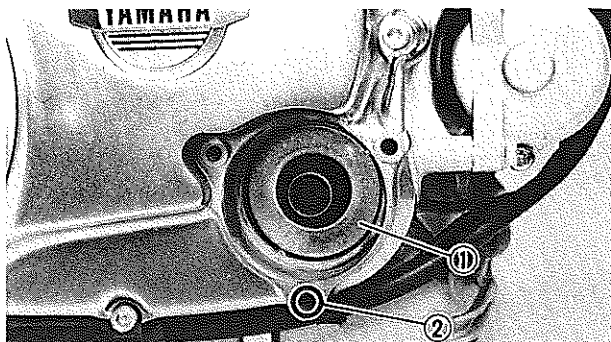
CAUTION:

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

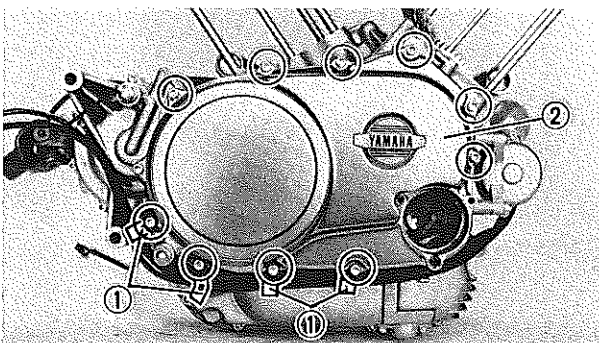
**OIL FILTER AND CRANKCASE COVERS**

1. Remove:

- Oil filter cover bolt ①
- Clamp ②
- Oil filter cover ③
- O-rings ④

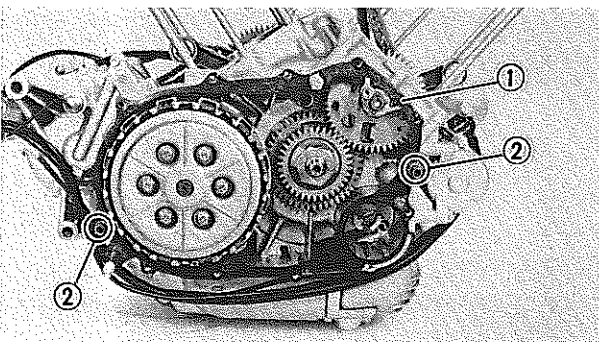


2. Remove:
 - Oil filter ①
 - O-ring ②

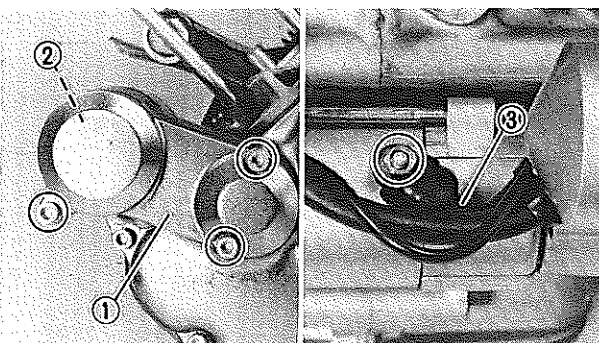


3. Remove:
 - Bolts (Right crankcase cover)
 - Clamps (Starter motor cable) ①
 - Right side crankcase cover ②

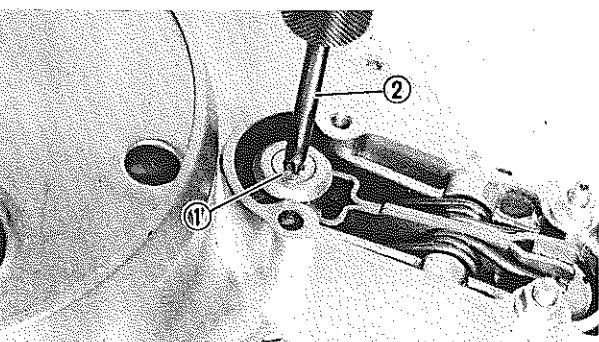
NOTE: Working in a crisscross pattern, loosen the bolts 1/4 turn each. Remove them after all are loosened.



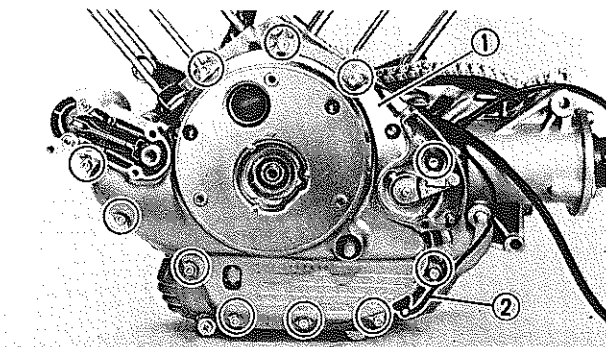
4. Remove:
 - Gasket ①
 - Dowel pins ②



5. Remove:
 - Drive lever cover ①
 - Gasket ②
 - Starter motor lead ③



6. Remove:
 - Drive lever collar screw ①
 - Use the #30 Torx Driver ②

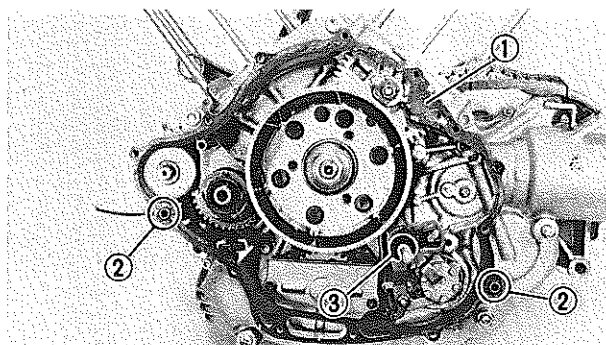


7. Remove:

- Left side crankcase cover ①
- Neutral switch lead ②

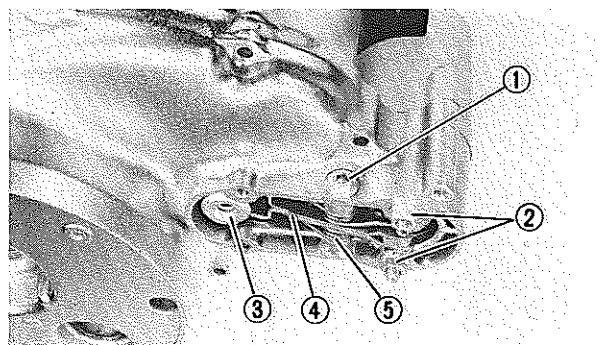
NOTE:

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



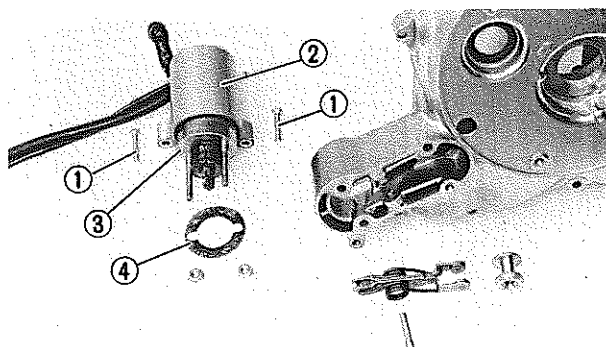
8. Remove:

- Gasket ①
 - Dowel pins ②
 - Thrust washer ③
- From change shaft



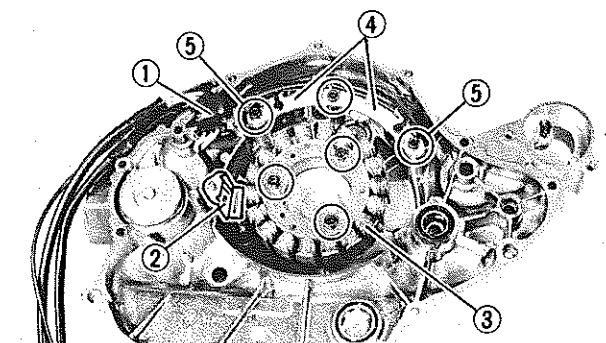
9. Remove:

- Drive lever screw ①
- Solenoid securing nuts ②
- Drive lever collar ③
- Drive lever ④ with spring ⑤



10. Remove:

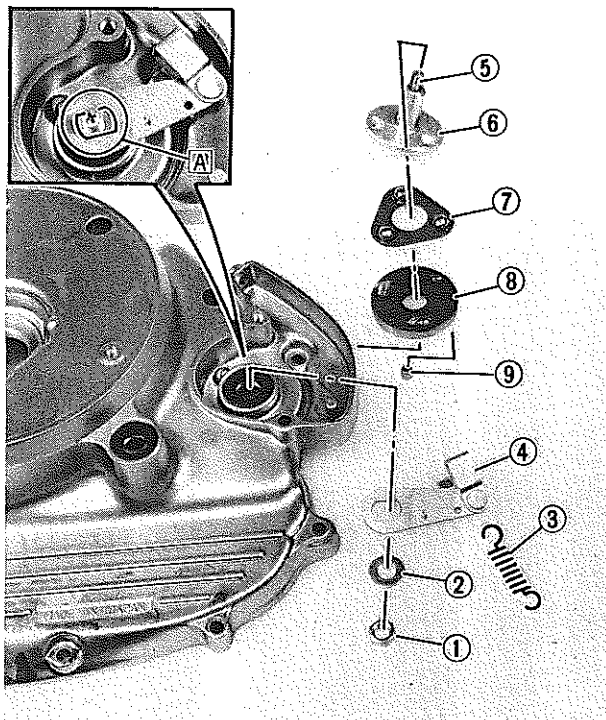
- Solenoid cover securing screws ①
- Solenoid cover ② with solenoid ③
- Gasket ④

**STATOR COIL AND PICKUP COIL**

1. Remove:

- Grommets ①
- Stator coil lead holding plate ②
- Stator coil assembly ③
- Pickup coil assembly ④

⑤ With washer



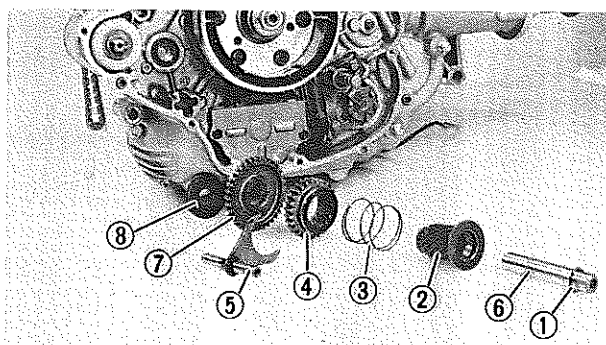
CLUTCH PUSH LEVER ASSEMBLY

1. Remove:

- Adjuster lock nut ①
- Washer ②
- Return spring ③
- Push lever ④
- Adjuster rod ⑤ with adjuster housing ⑥
- Ball retainer ⑦
- Ball retainer housing ⑧
- Dowel pin ⑨

NOTE:

When removing the push lever, confirm the cut position **A** of the adjuster housing for reassembling.



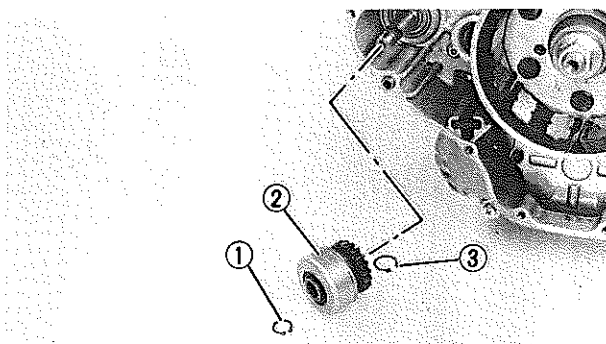
STARTER DRIVE GEAR, STARTER CLUTCH AND STARTER MOTOR

1. Remove:

- O-ring ①
- Starter wheel ②
- Spring ③
- Idler gear #2 ④ with idler gear fork ⑤
- Shaft ⑥
- Idle gear #1 ⑦
- Thrust collar ⑧

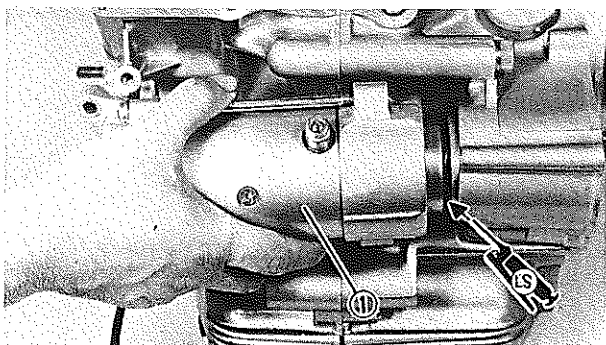
2. Remove:

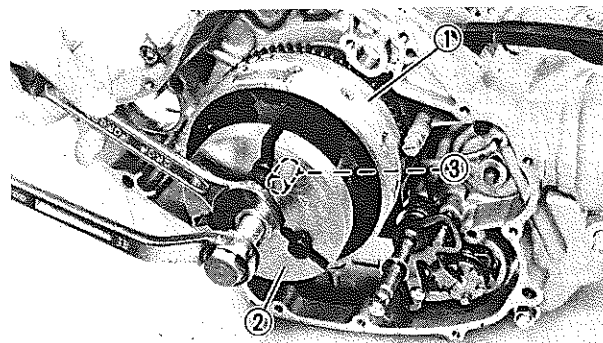
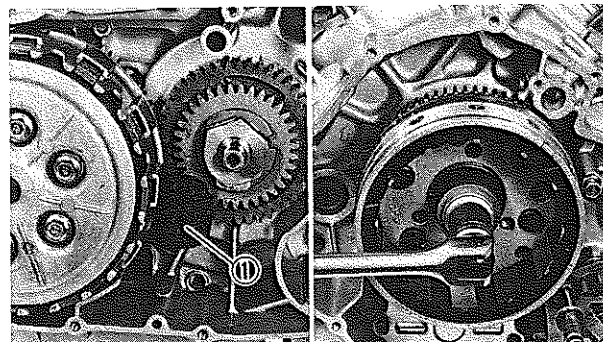
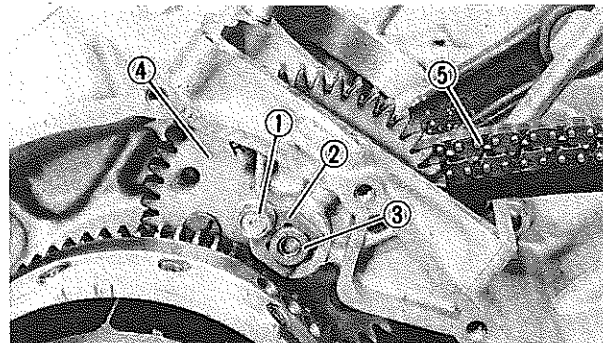
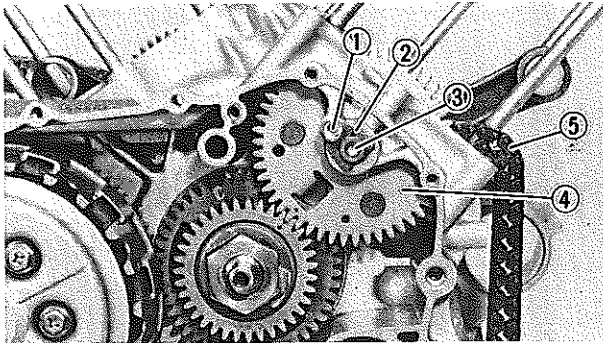
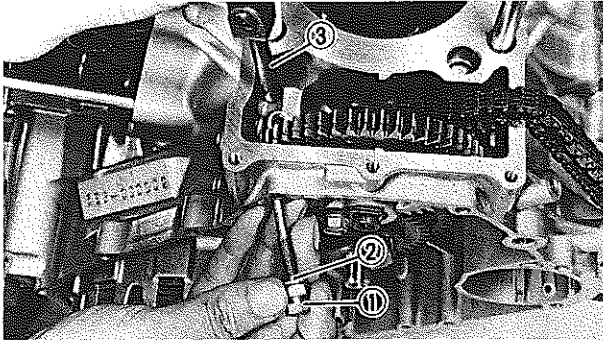
- Circlip ①
- Starter clutch ②
- Circlip ③



3. Remove:

- Starter motor securing bolts
- Starter motor





TIMING GEAR

Front Cylinder

1. Remove:
 - Securing bolt ①
 - Washer ②
 - Rear cam chain guide ③
2. Remove:
 - Bolt ①
 - Stopper plate ②
 - Timing gear shaft ③
 - Timing gear ④ with cam chain ⑤

Rear Cylinder

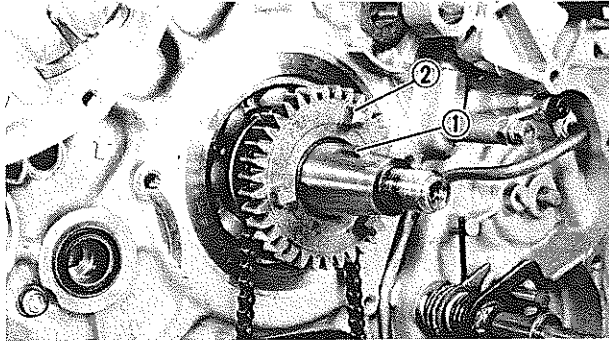
1. Remove:
 - Bolt ①
 - Stopper plate ②
 - Timing gear shaft ③
 - Timing gear ④ with cam chain ⑤

FLYWHEEL

1. Remove:
 - Flywheel securing nut
Place a folded rag ① between the teeth of the primary drive gear and driven gear to lock flywheel.
 - Plain washer
2. Remove:
 - Flywheel ①
Use the Flywheel Magneto Puller ② (90890-04063) and Adapter (90890-04063) ③.

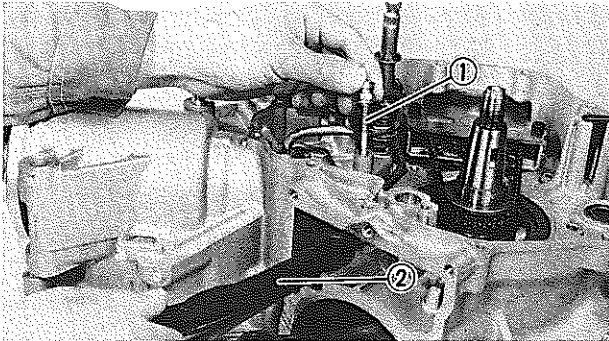
NOTE:

When removing flywheel, be careful not to lose the six springs and six pins that may fall from cam chain drive gear.



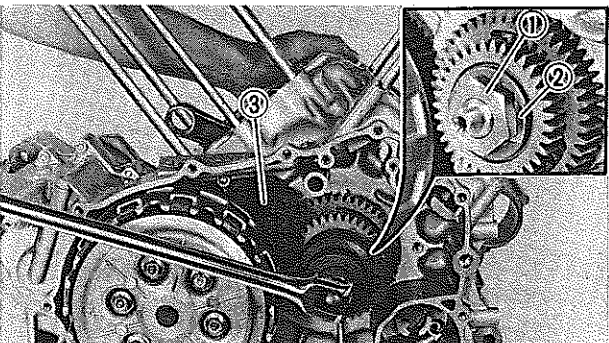
3. Remove:

- Woodruff key ①
- Cam chain drive gear ②



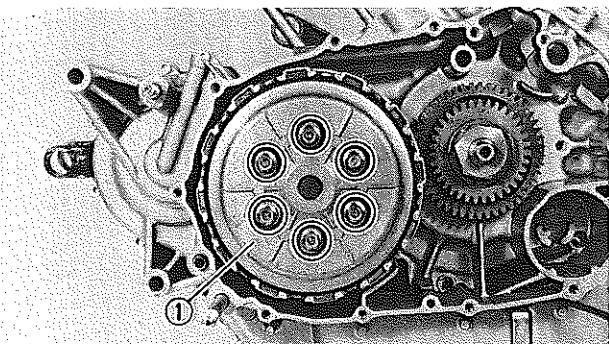
4. Remove:

- Securing bolt ① (Rear cylinder)
- Washer ②
- Rear cam chain guide ③



CLUTCH AND PRIMARY GEAR

1. Flatten lock washer tab ① on primary drive gear securing nut.
2. Loosen:
 - Primary drive securing nut ②
 Place a folded rag ③ between the teeth of the primary drive gear and driven gear to lock them.

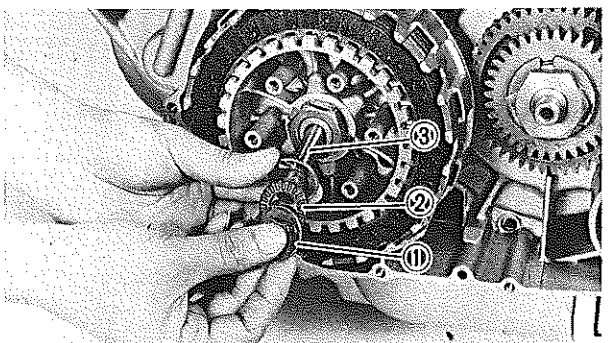


3. Remove:

- Pressure plate screws
- Clutch springs
- Pressure plate ①

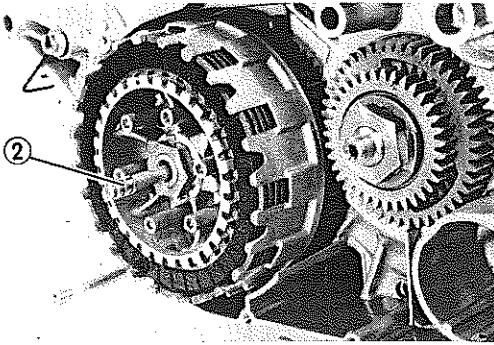
NOTE:

Loosen the screws in this stage, using a criss-cross pattern.



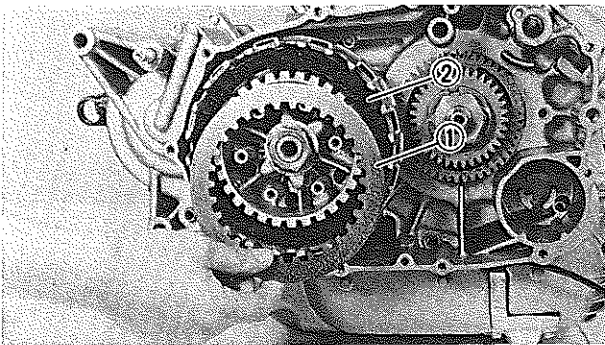
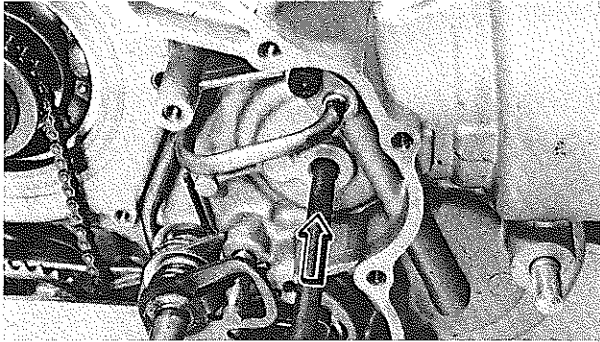
4. Remove:

- Thrust washer ①
- Thrust bearing ②
- Push rod #1 ③

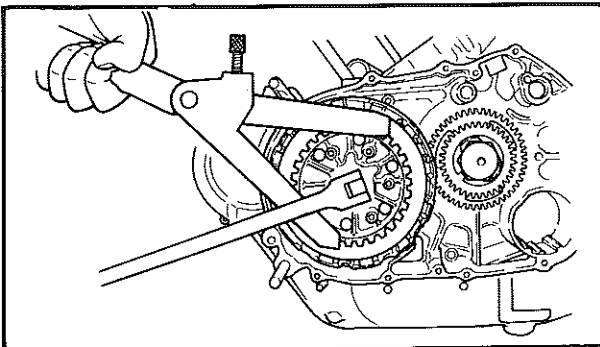


5. Remove:
 - Push rod #2 (2)

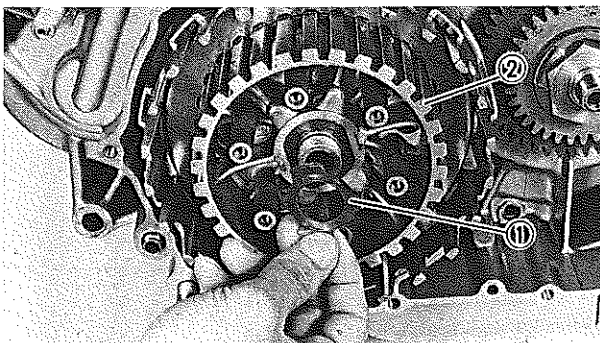
NOTE: _____
 Push out the push rod #2 to the right from the left side of the engine.



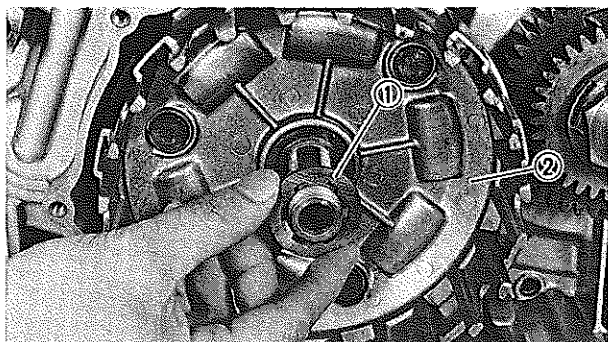
6. Remove:
 - Clutch plates #2 (1)
 - Friction plates (2)



7. Flatten lock washer tab.
8. Remove:
 - Clutch boss securing nut
 - Use Clutch Hub Holder (90890-04086).

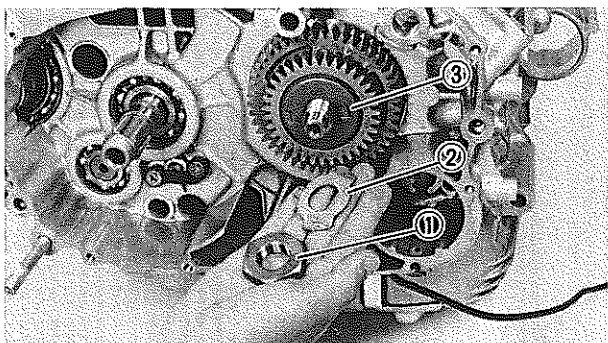


9. Remove:
 - Lock washer (1)
 - Clutch boss (2)



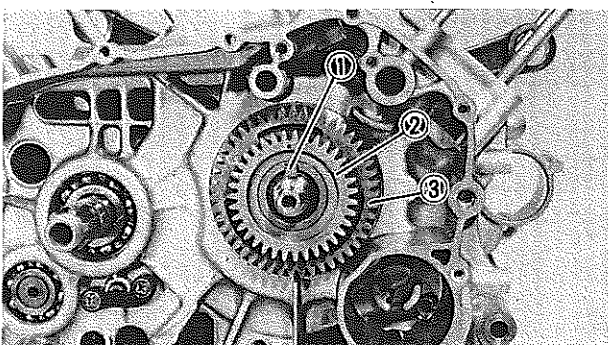
10. Remove:

- Thrust washer ①
- Clutch housing ②



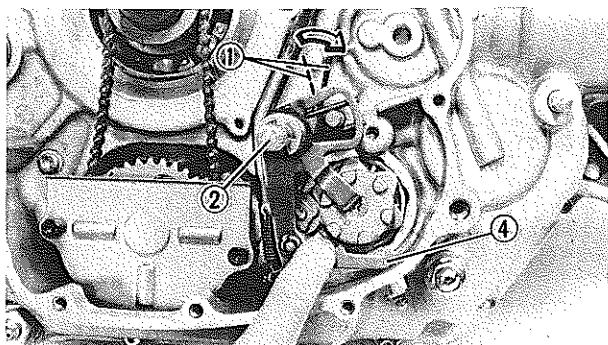
11. Remove:

- Primary drive securing nut ①
- Lock washer ②
- Special washer ③



12. Remove:

- Straight key ①
- Cam chain drive gear ② with primary drive gear ③



SHIFTER

1. Unhook:

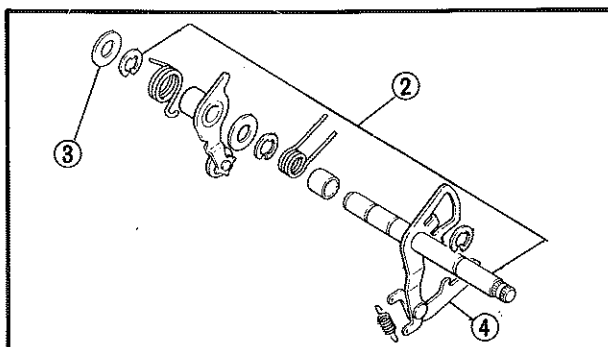
- Stopper lever return spring ①

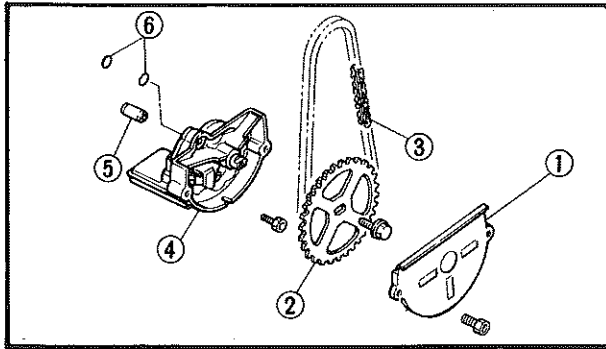
2. Remove:

- Shift shaft assembly ②
- Thrust washer ③

NOTE:

Disengage shift lever ④ from shift drum pins before removing the shift shaft assembly ②.

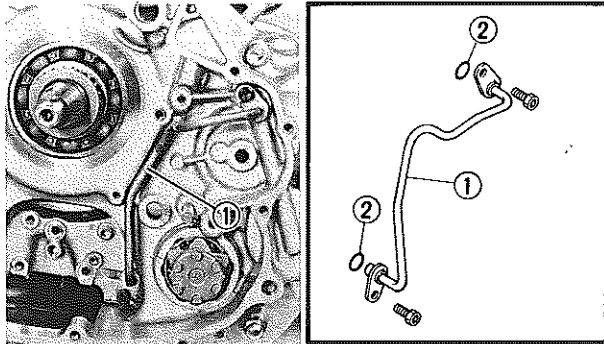




OIL PUMP AND OIL PUMP DRIVE SPROCKET

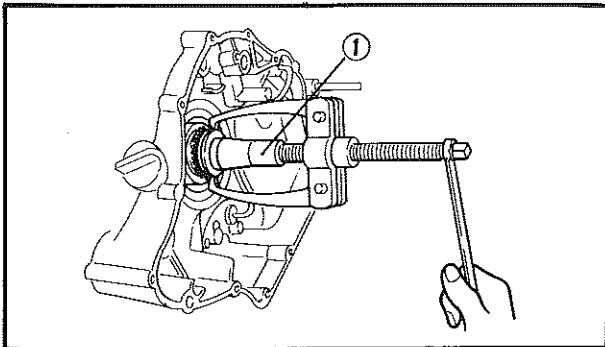
1. Remove:

- Oil pump cover ①
- Oil pump driven sprocket ②
- Drive chain ③
- Oil pump assembly ④
- Dowel pin ⑤
- O-rings ⑥



2. Remove:

- Oil delivery pipe ①
- O-rings ②

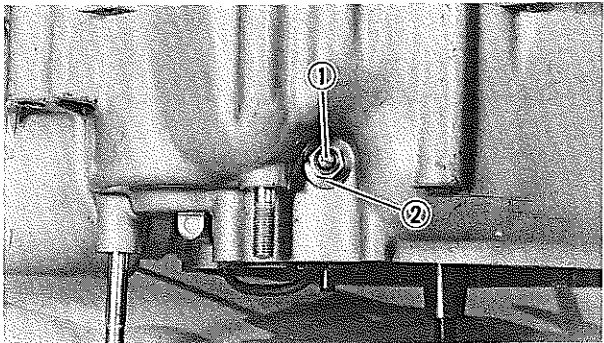


3. Remove:

- Oil pump drive sprocket
Use a general bearing Puller and the Attachment (90890-04063) ①.

NOTE:

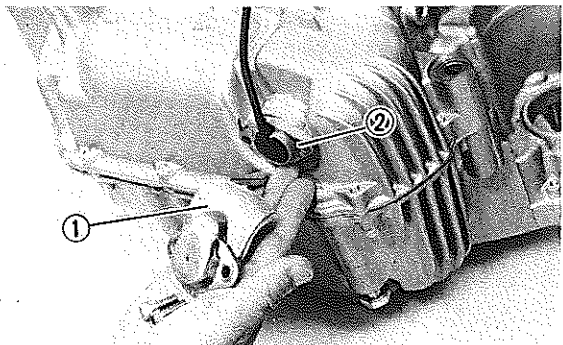
Discard removed oil pump drive sprocket.



CRANKCASE

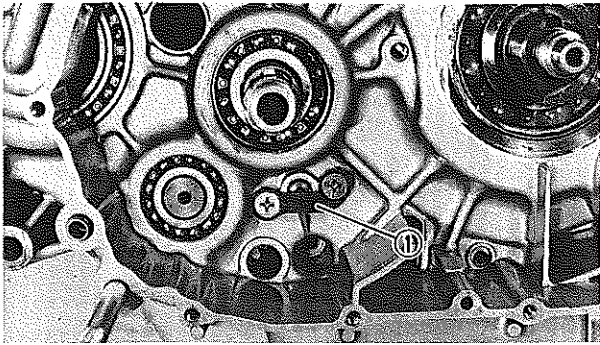
1. Remove:

- Neutral switch ①
- Copper washer ②
From left side crankcase.



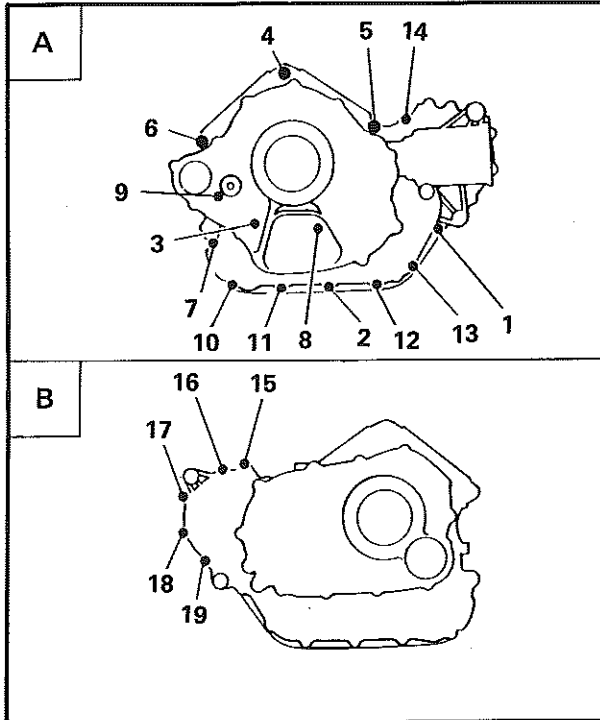
2. Remove:

- Oil level switch guard ①
- Oil level switch ②



3. Remove:

- Shift fork guide bar stopper plate ①



4. Remove:

- Crankcase bolts ① ~ ⑱

NOTE:

Remove the bolts starting with the highest numbered one.

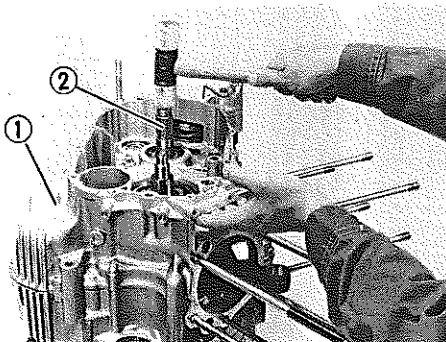
A Left

B Right

5. Place crankcase on its left side.

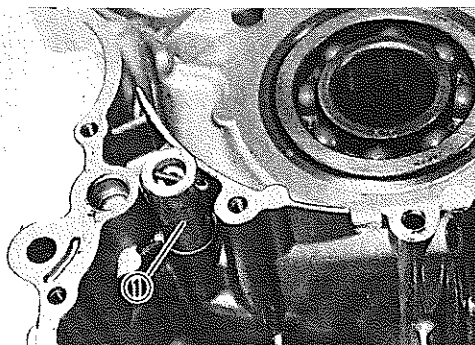
6. Remove:

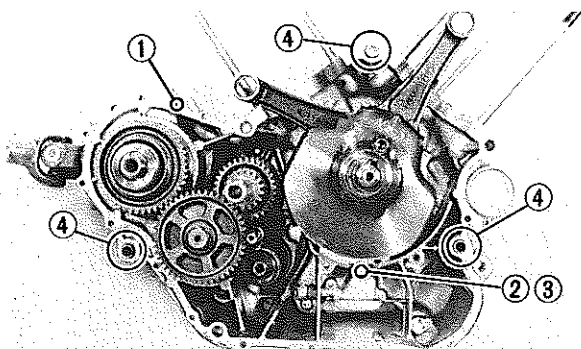
- Right side crankcase ①
While tapping the main shaft ② with a soft-head hammer.



7. Remove:

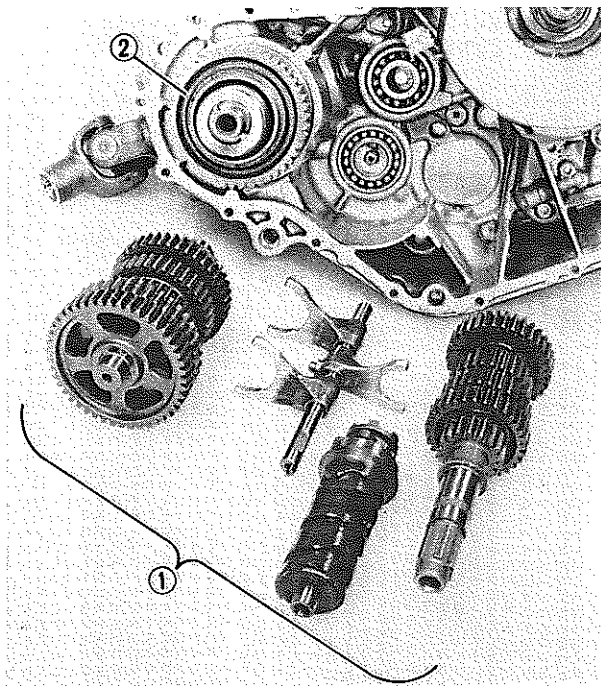
- Oil pressure relief valve ①
From the right side crankcase.





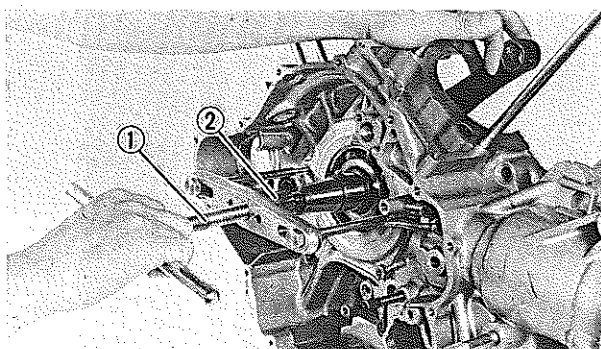
8. Remove:

- O-ring (Red) ①
- O-ring (Black) ②
- Nozzle ③
- Dowel pins ④



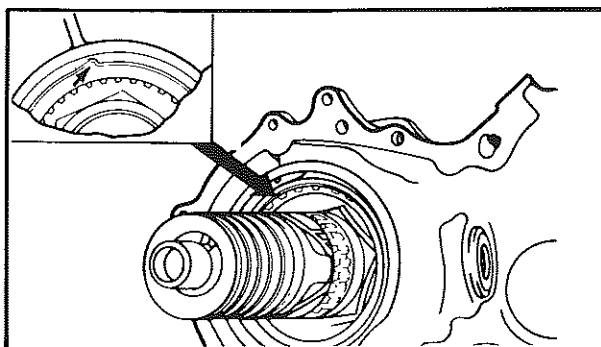
9. Remove:

- Transmission assembly ①
- Middle driven gear ②

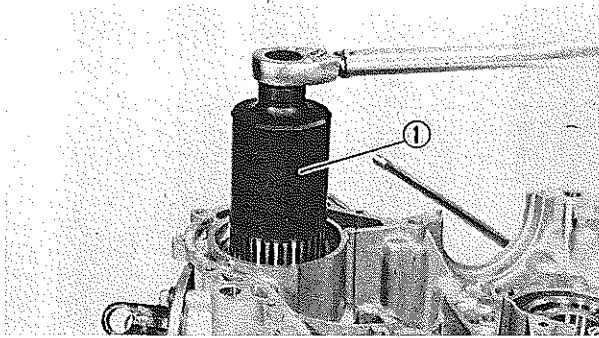


10. Remove:

- Crankshaft
Use Crankcase Separating Tool (90890-01135) ① and Puller Adapter (90890-04063) ② .

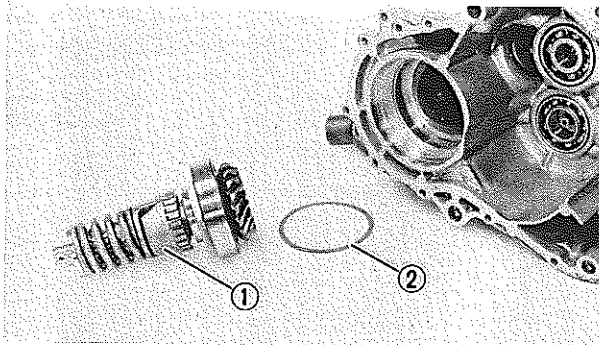
**MIDDLE GEAR**

1. Flatten punched portion of middle drive shaft bearing retainer.



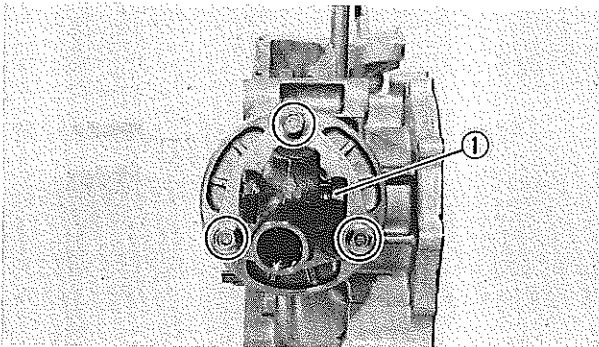
2. Remove:

- Middle drive shaft bearing retainer.
Use Middle Drive Shaft Bearing Retainer Wrench (90890-04057) ①.



3. Remove:

- Middle drive shaft assembly ①
- Shims ②



4. Remove:

- Middle driven shaft assembly ①

BEARINGS AND OIL SEALS

NOTE:

- It is not necessary to remove bearings and oil seals unless damaged. See Bearings and oil seals (INSPECTION AND REPAIR).
- To facilitate bearing removal and installation, first heat the cases to approximately 95° ~ 125°C (205° ~ 257°F) using an oven. Bring the case up to proper temperature slowly.

1. Remove:

- Oil seals

CAUTION:

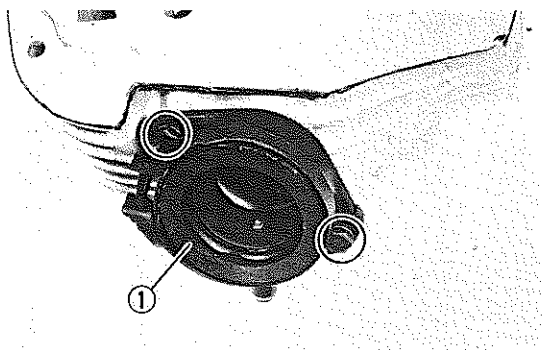
- Use a screwdriver to pry out the seal.
- Place a piece of wood under the screwdriver to prevent damage to the case.

2. Remove:

- Bearings

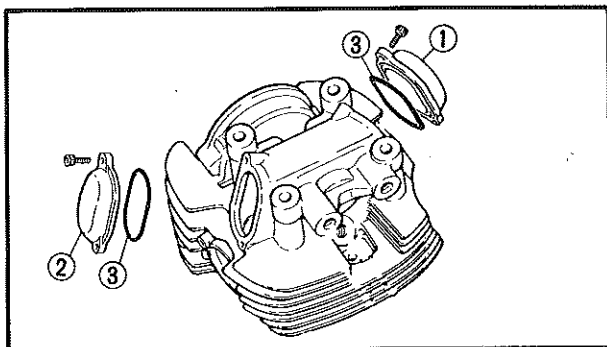


INSPECTION AND REPAIR

CYLINDER HEAD COMPONENT PARTS
REMOVAL

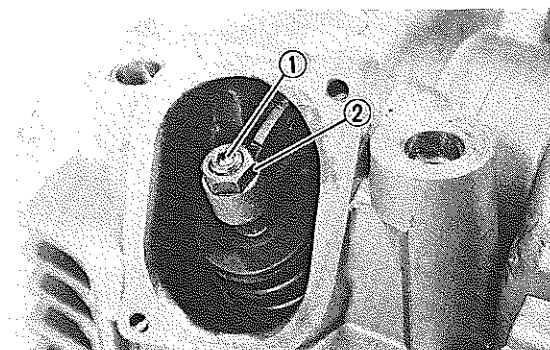
1. Remove:

- Carburetor joint (1)



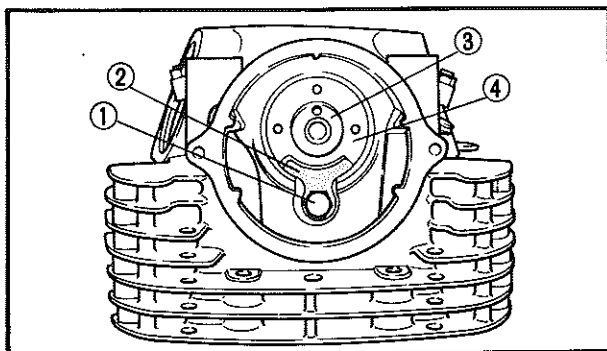
2. Remove:

- Intake valve cover (1)
- Exhaust valve cover (2)
- Gasket ring (3)



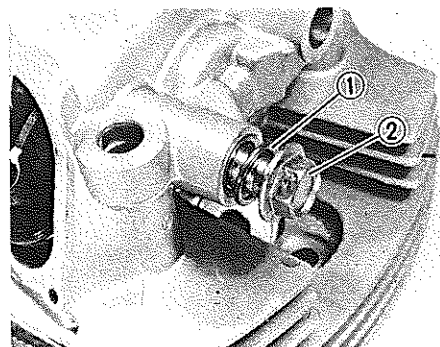
3. Loosen:

- Valve adjuster locknuts (Intake and exhaust) (1)
- Valve adjusters (Intake and exhaust) (2)



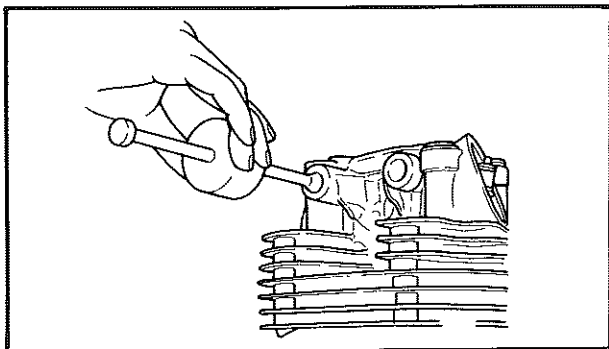
4. Remove:

- Bolt (1)
 - Stopper plate (2)
 - Camshaft (3)
 - Camshaft bushing (4)
- Use the 10 mm bolt.



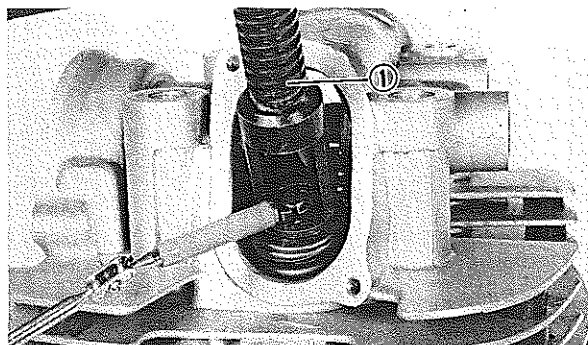
5. Remove:

- Union bolt (Intake side) (1)
- Copper washer (Intake side) (2)



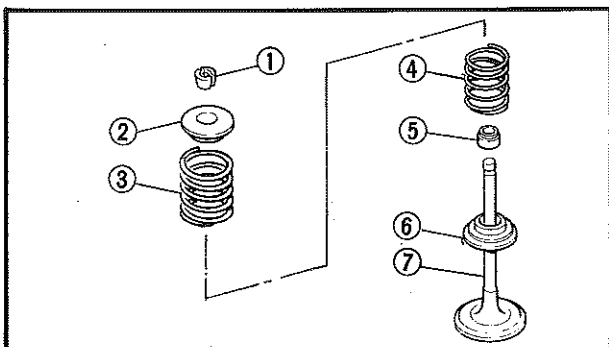
6. Remove:

- Rocker arm shafts (Intake and exhaust)
- Rocker arms (Intake and exhaust)
- Use the Slide Hammer (90890-01084/01085).



7. Attach:

- Valve Spring Compressor (90890-04019)
- ① Depress the valve springs.

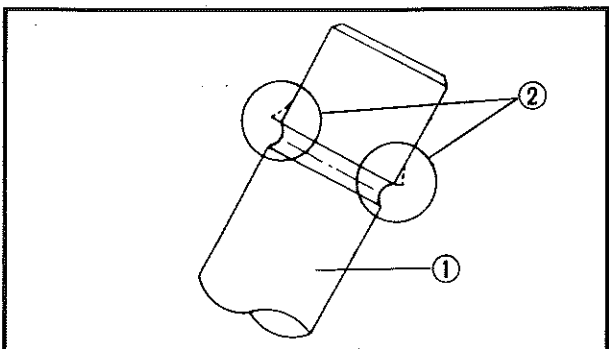


8. Remove:

- Valve retainers ①
- Valve spring seat (Upper) ②
- Valve spring (Outer) ③
- Valve spring (Inner) ④
- Valve stem seal ⑤
- Valve spring seat (Lower) ⑥
- Valve ⑦

NOTE:

- If any deformation has occurred on the valve stem ① end, deburr ② before pulling out the valve from the valve guide on the cylinder head. Use an oil stone to smooth the stem end.
- Number each valve so that it can be reinstalled into the same cylinder head.



CYLINDER HEAD

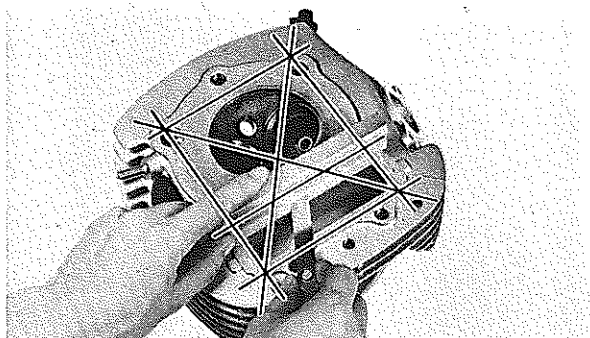
1. Eliminate:

- Carbon deposit
- Use the rounded scraper.

NOTE:

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

- Spark plug threads
- Valve seat
- Combustion chamber



2. Measure:

- Cylinder head warpage
Out of specification → Resurface/Replace.



Cylinder Head Warpage:
Less than 0.03 mm (0.0012 in)

VALVE, VALVE GUIDE, VALVE SEATS, AND VALVE SPRING

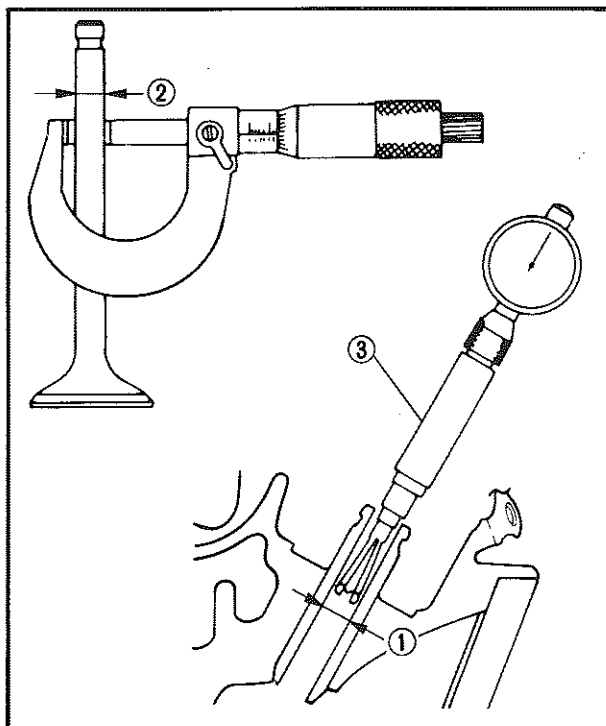
1. Measure:

- Valve stem clearance

Valve stem clearance =

Valve guide inside diameter ① –
Valve stem diameter ②

Out of specification → Replace valve and guide as a set.



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

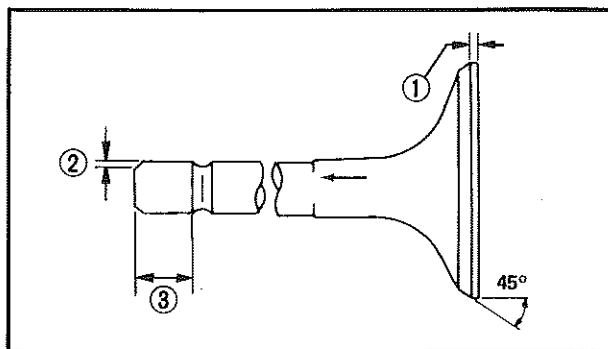
③ Bore gauge

2. Measure:

- Valve face:
Pitting/Wear → Regrind.
Out of specification → Replace.

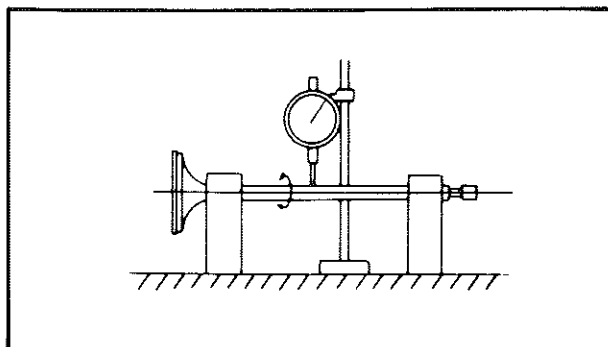


Minimum Thickness (Service limit) ① :
0.7 mm (0.0276 in)
Beveled ② : 0.5 mm (0.020 in)
Minimum Length (Service limit) ③ :
4.0 mm (0.157 in)

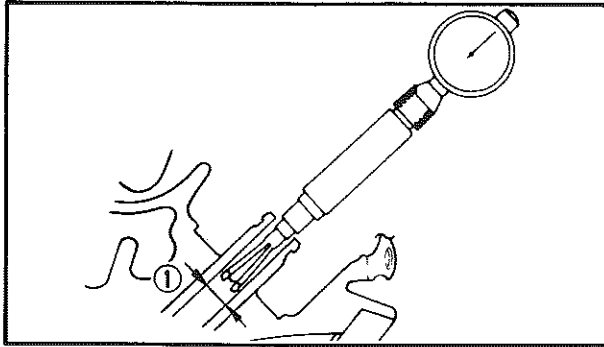


3. Check

- Valve stem end
Mushroom shape or diameter larger than rest of stem → Replace.
- Runout
Out of specification → Replace.



Maximum Valve Stem Runout:
0.03 mm (0.0012 in)



4. Measure:

- Valve guide (Inside diameter) ①
Out of specification → Replace.



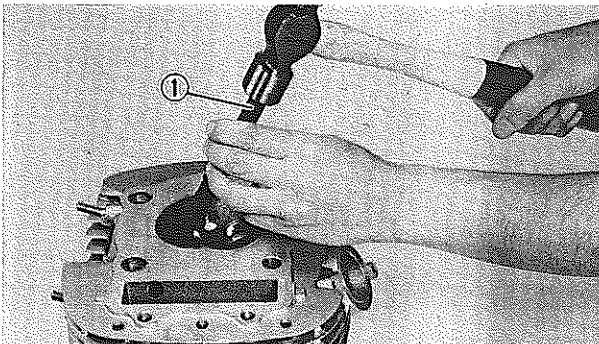
Guide Inside Diameter:
Limit: 8.10 mm (0.319 in)

5. Inspect:

- Valve guide
Wear/Oil leakage → Replace.

NOTE:

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



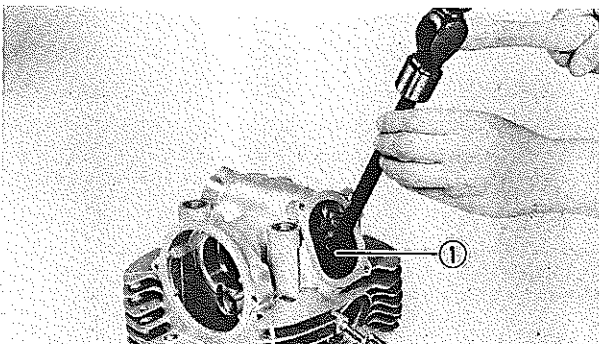
Valve Guide Replacement

1. Remove:

- Valve guide
Use Valve Guide remover (90890-01200) ①.

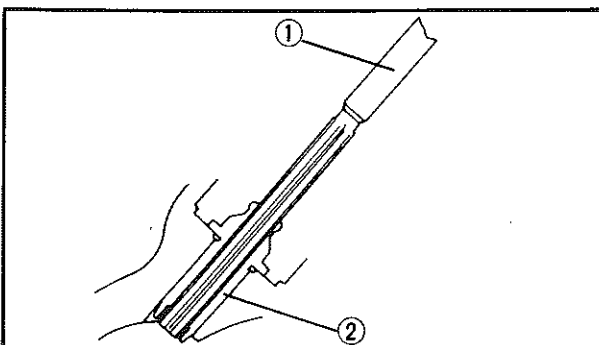
NOTE:

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

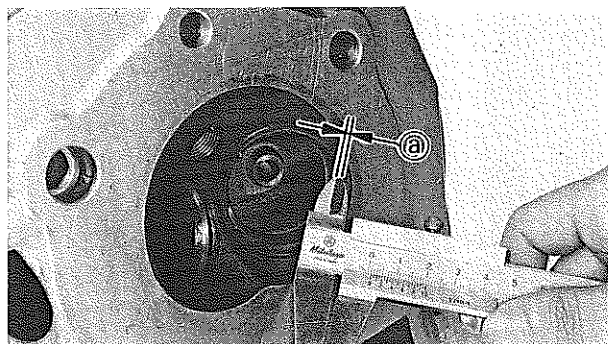
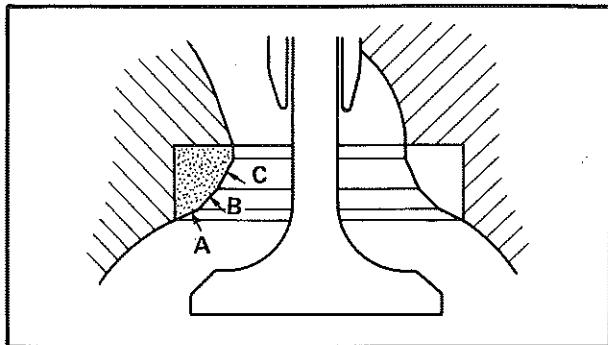
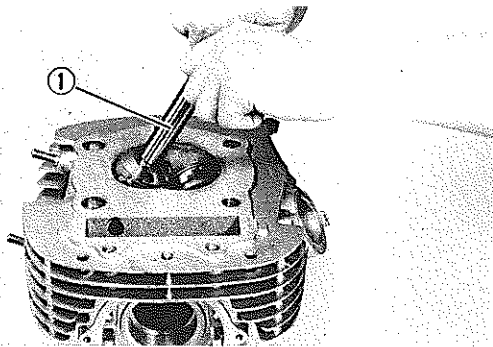


2. Install:

- Valve guide (New)
Use Valve Guide Installer (90890-04013) ①.



3. Bore valve guide ② to obtain proper valve stem clearance.
Use 8 mm Reamer (90890-01211) ①.



Valve Seat

1. Inspect:

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

CAUTION:

Clean valve seat if pitted or worn using a 45° Valve Seat Cutter (YM-91043) ①. When twisting cutter, keep an even downward pressure to prevent chatter marks.

Cut sections as follows	
Section	Cutter
A	30°
B	45°
C	60°

2. Measure:

- Valve seat width ②
Out of specification → Follow next steps.

	Standard Width	Wear Limit
Valve Seat Width	1.2 ~ 1.4 mm (0.047 ~ 0.055 in)	2.0 mm (0.080 in)

3. Apply:

- Mechanic's bluing dye (Dykem)
To valve and seat.
- Fine grinding compound (Small amount)
To valve face surface.

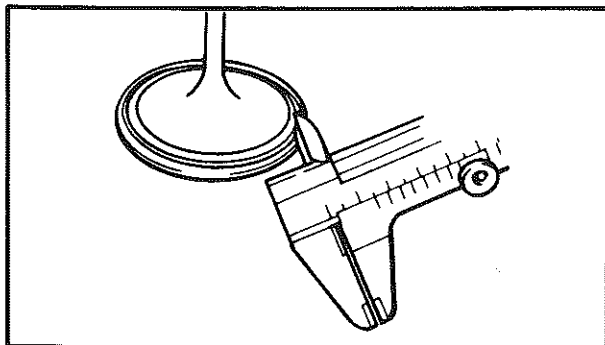
4. Position:

- Valve
Into cylinder head.

5. Spin it rapidly back and forth, then lift valve and clean off all grinding compound.

6. Inspect:

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



7. Measure:

- Valve seat width
Valve seat width must be uniform in contact area.
Out of specification → Cut.

CAUTION:

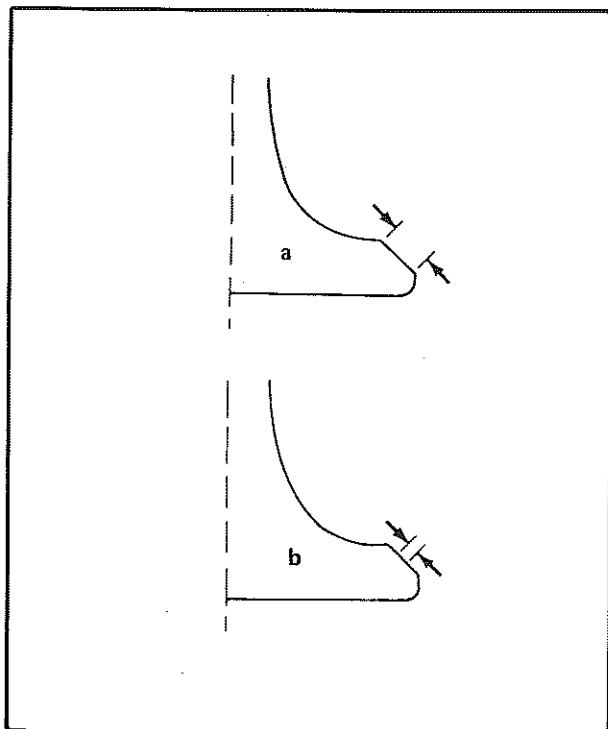
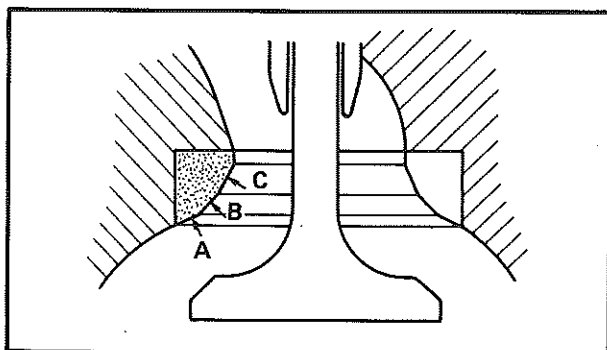
Remove just enough material to achieve satisfactory seat.



Seat Width:

Standard: 1.0 ~ 1.2 mm
(0.039 ~ 0.047 in)

Wear Limit: 2.0 mm (0.080 in)



Valve seat recutting steps are necessary if:

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

Cut Valve Seat As Follows:

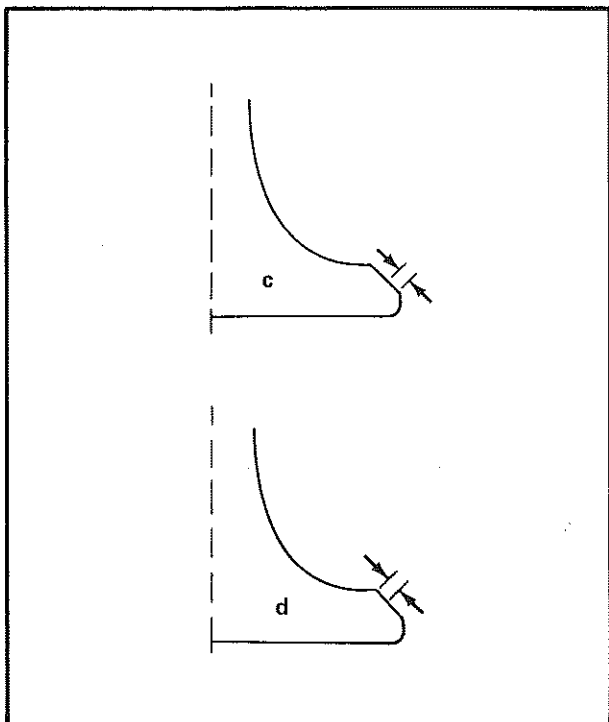
Section A	20° Cutter
Section B	45° Cutter
Section C	60° Cutter

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

Valve Seat Cutter Set		Desired Result
Use	20° Cutter	to reduce valve seat width.
	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 (Standard specification).



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

Valve Seat Cutter Set		Desired Result
Use	20° Cutter, first	to obtain correct seat width.
	45° Cutter	

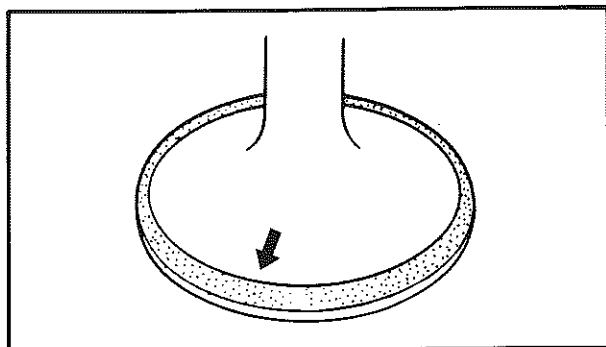
- Valve seat is too narrow and is located down near the bottom edge of the valve face (See "d" diagram).

Valve Seat Cutter Set		Desired Result
Use	60° Cutter, first	to obtain correct seat width.
	45° Cutter	

NOTE:

Lap valve/valve seat assembly if:

- Valve face/valve seat are used or severely worn.
- Valve and valve guide has been replaced.
- Valve seat has been cut.

**Valve/Valve Seat Assembly Lapping****1. Apply:**

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

2. Position

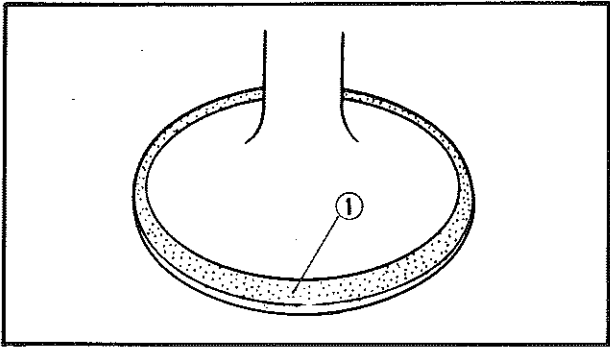
- Valve
In cylinder head.

3. Rotate:

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

4. Repeat above steps with fine compound and continue lapping until valve face shows a completely smooth surface uniformly.**5. Eliminate:**

- Compound
From valve face.

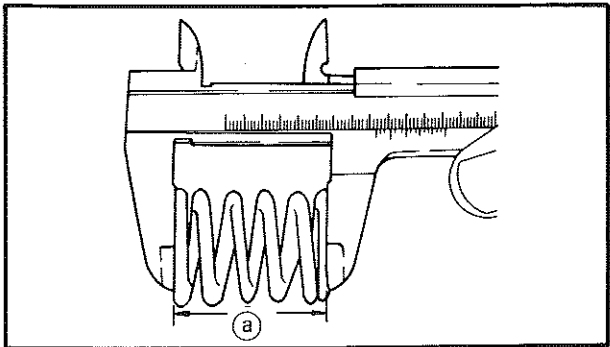


6. Apply:
 - Mechanic's bluing dye (Dykem) ①
To valve face and seat.
7. Rotate:
 - Valve
Valve must make full seat contact indicated by grey surface all around valve face where bluing was removed.
8. Apply:
 - Solvent
Into each intake and exhaust port.
Leakage past valve seat → Relap valve until seal is complete.

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


Relapping steps:

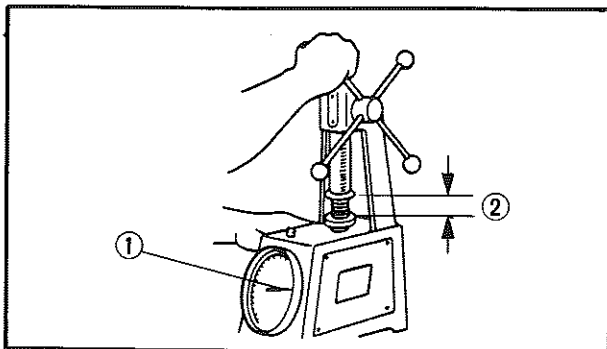
- Reassemble head parts.
- Repeat lapping steps using fine lapping compound.
- Clean all parts thoroughly.
- Reassemble and check for leakage again using solvent.
- Repeat steps as often as necessary to effect a satisfactory seal.



Valve Spring Measurement

1. Measure:
 - Valve spring free length ①
Out of specification → Replace.

 Valve Spring Free Length			
Inner Spring		Outer Spring	
Standard	Wear limit	Standard	Wear limit
45.3 mm (1.78 in)	43.3 mm (1.71 in)	44.6 mm (1.76 in)	42.4 mm (1.67 in)

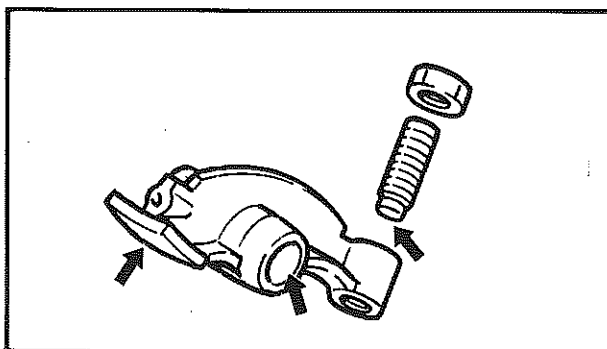


2. Measure:

- Valve spring installed force ①
Out of specification → Replace.

Valve Spring Installed Force			
Inner Spring		Outer Spring	
②	①	②	①
38.0 mm (1.50 in)	12.2 kg (26.7 lb)	40.0 mm (1.58 in)	16.4 kg (36.2 lb)

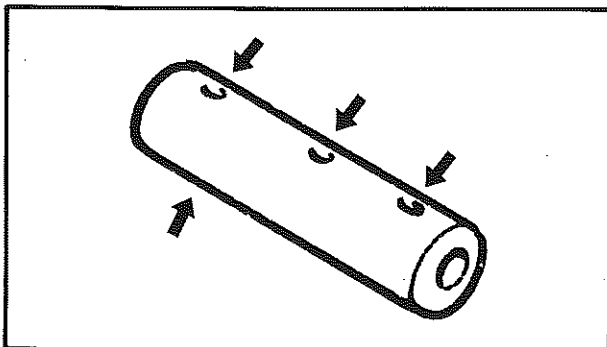
② Installed length



ROCKER ARM AND ROCKER ARM SHAFT

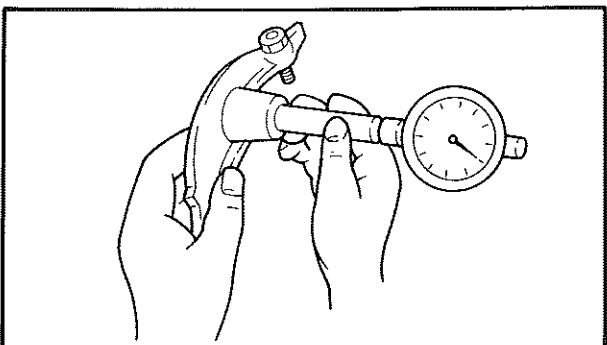
1. Inspect:

- Cam lobe contact surface
- Adjuster surface
- Rocker arm shaft hole
Unusual wear → Replace.



2. Inspect:

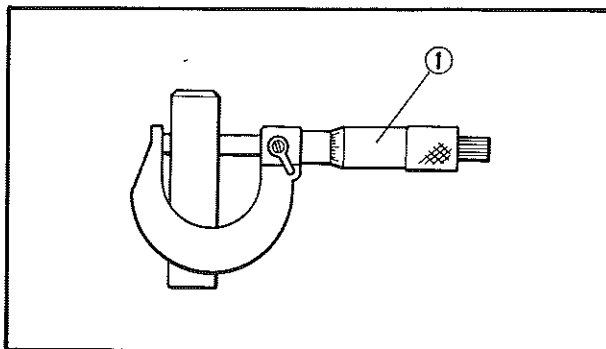
- Rocker arm shaft outer surface
Pitting/Scratches/Blue discoloration → Replace or check lubrication system.
- Oil passages
Clogged/Damage → Clean or replace.



3. Measure:

- Rocker arm inside diameter ("D₁")
Out of specification → Replace.

	Maximum Inside Diameter: 14.050 mm (0.553 in)
--	--



4. Measure:

- Rocker arm shaft outside diameter ("D₂")
- Out of specification → Replace.



Minimum Outside Diameter:
13.950 mm (0.549 in)

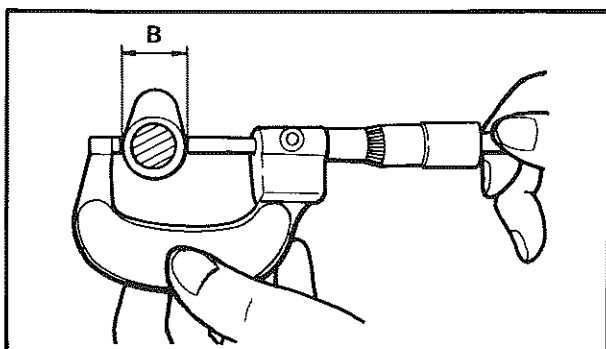
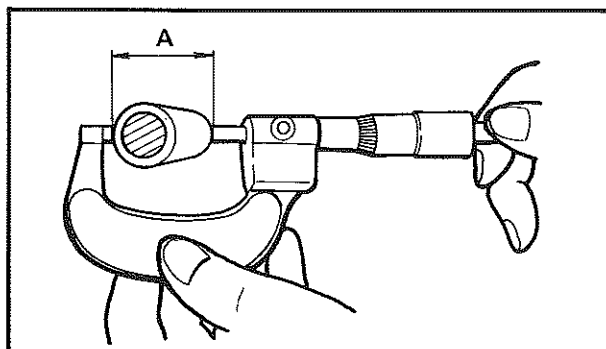
5. Calculate:

- Rocker arm to rocker arm shaft clearance.
- Out of specification → Replace.



Rocker Arm/Rocker Arm Shaft Clearance:

How to calculate	Maximum limit
$D_1 - D_2$	0.1 mm (0.004 in)



CAMSHAFT.

1. Inspect:

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

2. Measure:

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



	Cam Lobe Limit "A"	Cam Lobe Limit "B"
Intake	39.02 mm (1.536 in)	32.02 mm (1.261 in)
Exhaust	39.05 mm (1.537 in)	32.12 mm (1.270 in)



CAMSHAFT BUSHING

1. Clean and dry bushing

2. Inspect:

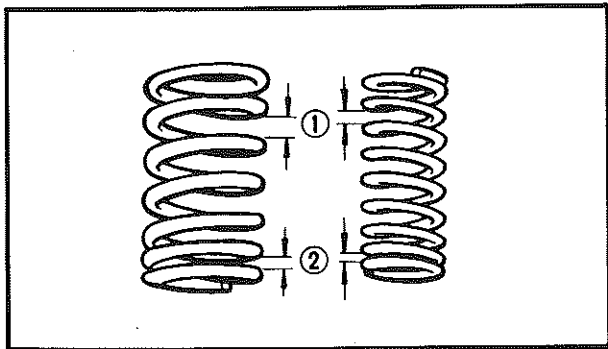
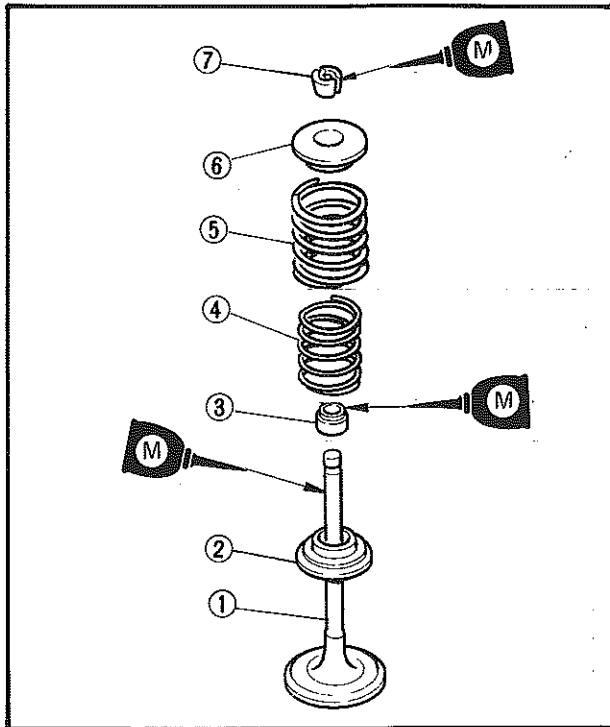
- Bushing (Inner surface)
- Rust spots/Pitting/Scoring → Replace.



CYLINDER HEAD COMPONENT PARTS REASSEMBLY

When reassembling the cylinder head, reverse the removal procedure.

Note the following points.



Valve Installation

1. Lubricate:

- Valve stem
- Valve stem seal
- Valve retainers



High-Quality Molybdenum Disulfide
Motor Oil or Molybdenum Disulfide
Grease

2. Install:

- Valve ①
- Valve spring seat (Lower) ②
- Valve stem seal (New) ③
- Valve spring (Inner) ④
- Valve spring (Outer) ⑤
- Valve spring seat (Upper) ⑥
- Valve retainers ⑦

Use the Valve Spring Compressor (90890-04019).

NOTE:

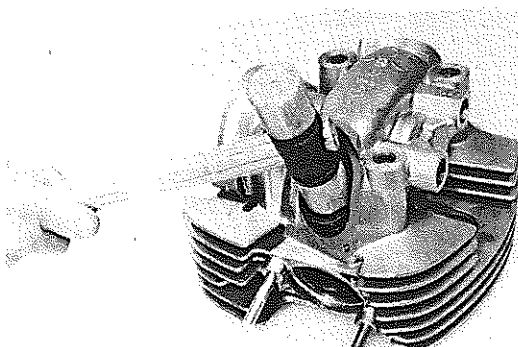
All valve springs must be installed with larger pitch upward as shown.

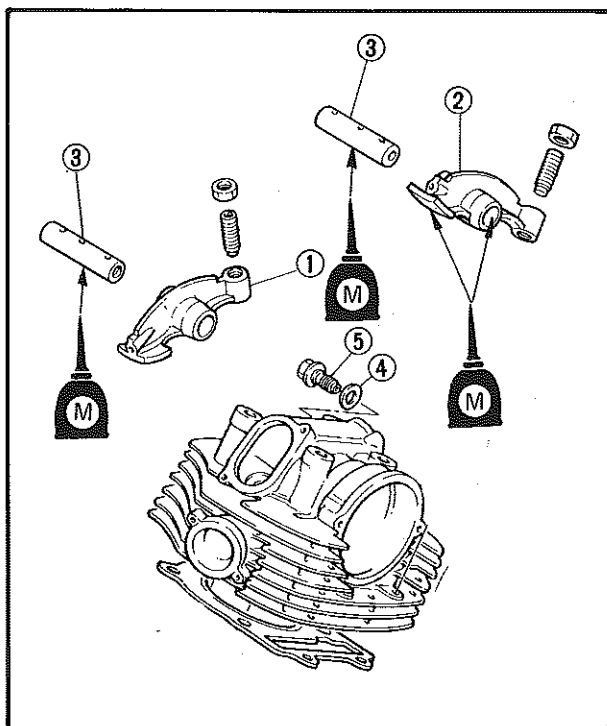
① Larger pitch

② Smaller pitch

NOTE:

After installing the valve assembly, tap on the stem end with a soft-head hammer so that the valve and valve retainer are seated snugly.





Rocker Arm, Rocker Arm Shaft and Camshaft Installation

1. Lubricate:

- Rocker arm shaft outer surface
- Camshaft journal and lobes outer surfaces



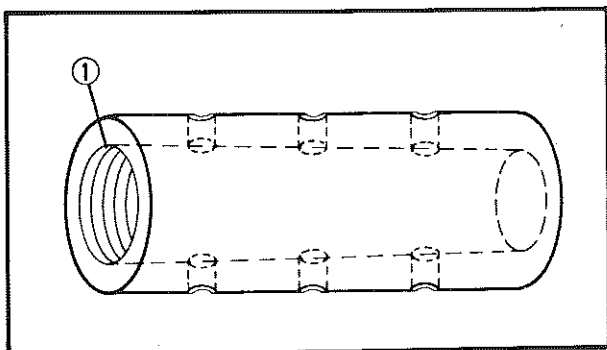
High-Quality Molybdenum Disulfide Motor Oil or Molybdenum Disulfide Grease

2. Install:

- Rocker arms (Intake ① and exhaust ②)
- Rocker arm shafts ③
- Copper washer (Intake side) ④
- Union bolt (Intake side) ⑤

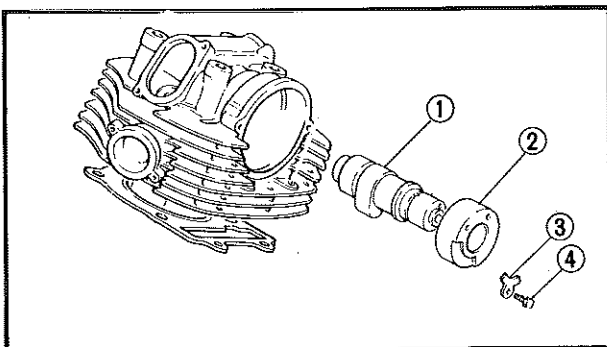


Union Bolt ⑤ :
38 Nm (3.8 m·kg, 27 ft·lb)



NOTE:

- Insert rocker arm through cam chain cavity.
- The rocker arm shaft should be installed so that the threaded ① portion faces outward.

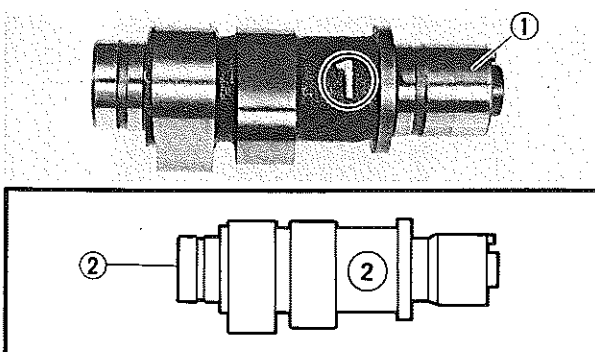


3. Install:

- Camshaft ①
- Camshaft bushing ②
- Stopper plate ③
- Bolt ④

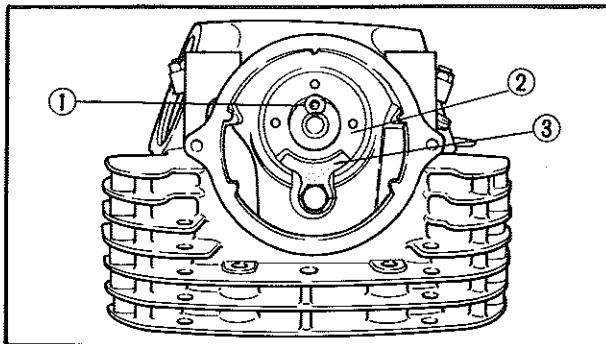


Stopper Plate Securing Bolt ④ :
20 Nm (2.0 m·kg, 14 ft·lb)

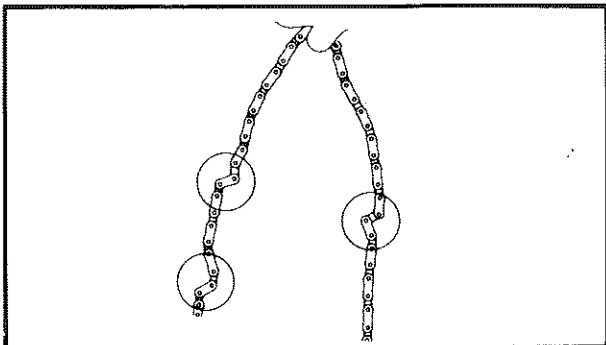


NOTE:

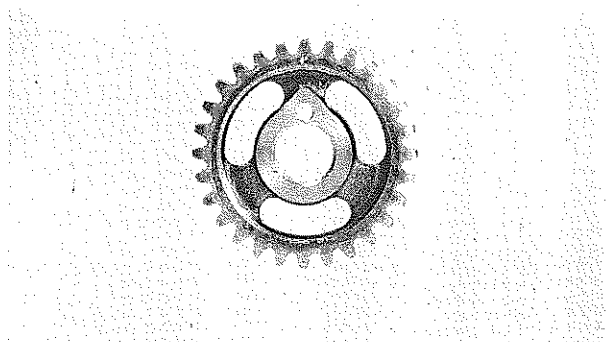
Be sure that the No. 1 camshaft ① is installed in the rear cylinder head and the No. 2 camshaft ② in the front cylinder head.

**NOTE:**

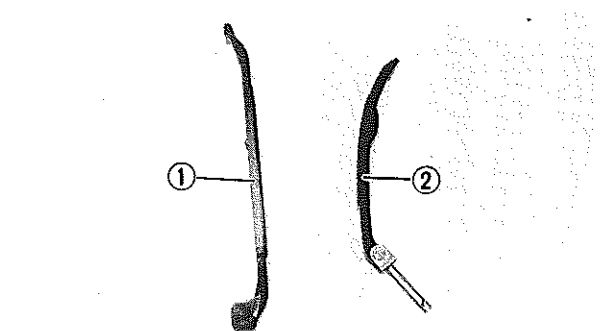
- Be sure camshaft pin ① faces upward.
- Be sure that the slot on the camshaft bushing ② aligns with the tab on the stopper plate ③.

**CAM CHAIN**

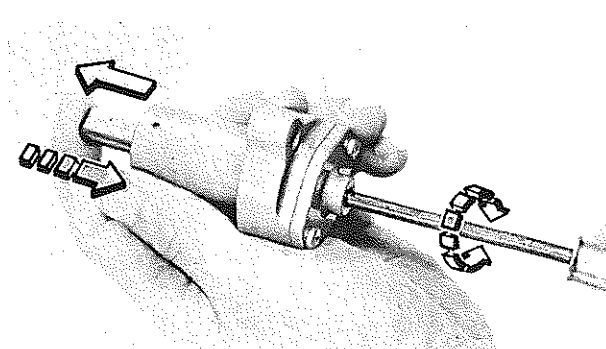
- Inspect:
 - Cam chain
Chain Stretch/Cracks Damaged → Replace.

**CAM CHAIN SPROCKET**

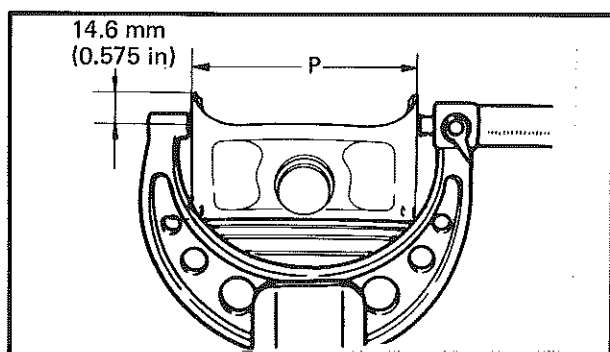
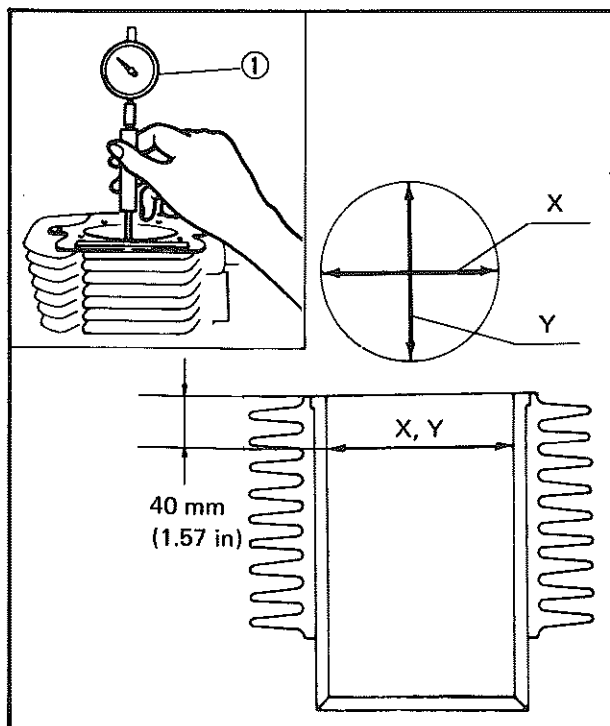
- Inspect:
 - Cam chain sprockets
Wear/Damage → Replace.

**CAM CHAIN GUIDES**

- Inspect:
 - Front cam chain guides ①
 - Rear cam chain guides ②
Wear/Damage → Replace.

**CAM CHAIN TENSIONER**

- Check:
 - One-way cam operation
Unsmooth operation → Replace as a set.



CYLINDER

1. Inspect:

- Cylinder wall
Wear/Scratches → Rebore or replace.

2. Measure:

- Cylinder bore "C"
Use the Cylinder Bore Gauge ①.
Measure the cylinder bore "C" horizontally and laterally at 40 mm (1.57 in) from cylinder top. Then find the coverage of the measurements.
Out of specification → Rebore.

	Standard	Wear Limit
Cylinder Bore "C"	95.0 mm (3.740 in)	95.1 mm (3.744 in)
$C = \frac{X + Y}{2}$		

PISTON, PISTON RING, AND PISTON PIN

Piston

1. Inspect:

- Piston wall
Wear/Scratches/Damage → Replace.

2. Measure:

- Piston outside diameter "P"
Use a Micrometer.
Out of specification → Replace.

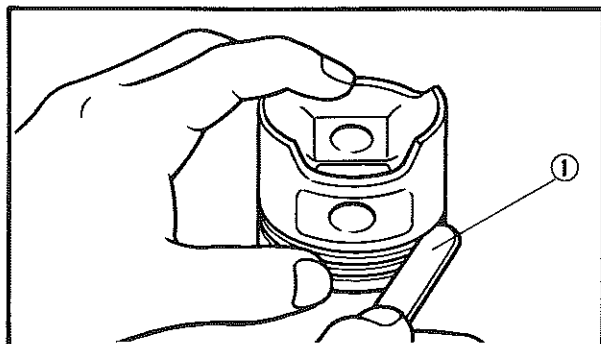
NOTE: Measurement should be made at a point 14.6 mm (0.575 in) above the bottom edge of the piston.

	Size "P"
Standard	94.945 ~ 94.965 mm (3.738 ~ 3.739 in)
Oversize 2	95.50 mm (3.76 in)
Oversize 4	96.00 mm (3.78 in)

3. Calculate:

- Piston clearance
Out of specification → Rebore cylinder or replace piston.

	Piston Clearance = C - P: 0.045 ~ 0.060 mm (0.0018 ~ 0.0024 in)
C: Cylinder bore P: Piston outside diameter	

**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	0.04 ~ 0.08 mm (0.0016 ~ 0.0031 in)	0.12 mm (0.0047 in)
2nd Ring	0.03 ~ 0.07 mm (0.0012 ~ 0.0028 in)	0.12 mm (0.0047 in)

NOTE:

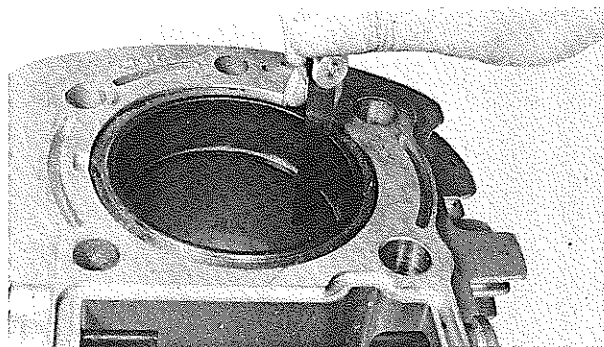
Clean carbon from piston ring grooves and rings before measuring side clearance.

2. Position:

- Piston ring

NOTE:

Insert a ring into cylinder, and push it approximately 20 mm (0.8 in) into cylinder. Push ring with piston crown so that ring will be at a right angle to cylinder bore.

**3. Measure:**

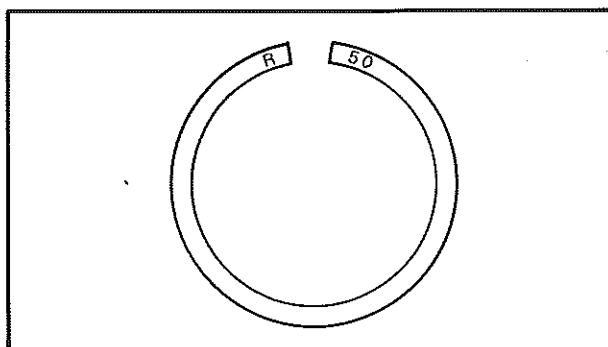
- Ring end gap

Out of specification → Replace rings as a set.

NOTE:

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

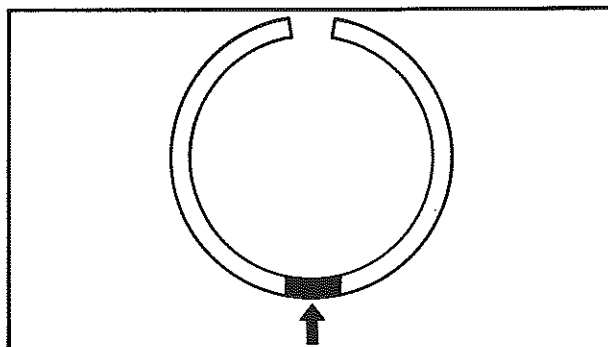
	End Gap	
	Standard	Limit
Top Ring	0.3 ~ 0.5 mm (0.012 ~ 0.020 in)	0.8 mm (0.032 in)
2nd Ring	0.2 ~ 0.4 mm (0.008 ~ 0.016 in)	0.8 mm (0.032 in)
Oil Ring	0.3 ~ 0.9 mm (0.012 ~ 0.035 in)	—



Piston Ring Oversize

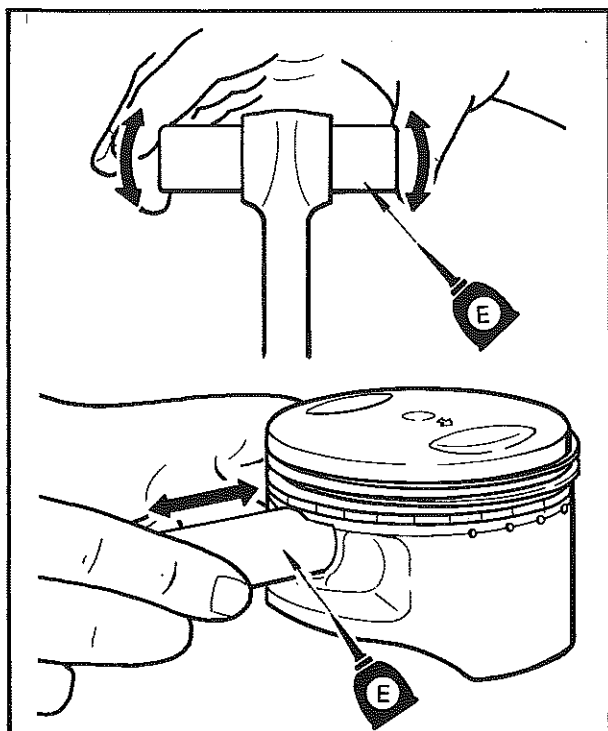
- Top and 2nd piston ring
- Oversize top and middle ring sizes are stamped on top of ring.

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

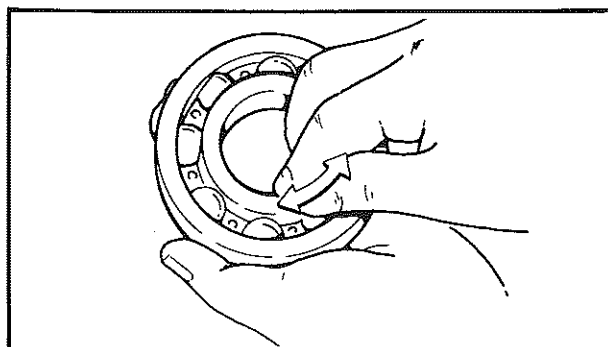
1. Lubricate:
 - Piston pin (Lightly)
2. Install:
 - Piston pin

Into small end of connecting rod.
3. Check:
 - Free play

Free play → Inspect connecting rod for wear.
Wear → Replace connecting rod and piston pin.
4. Position:
 - Piston pin

Into piston.
5. Check:
 - Free play

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



CRANKSHAFT AND CONNECTING ROD

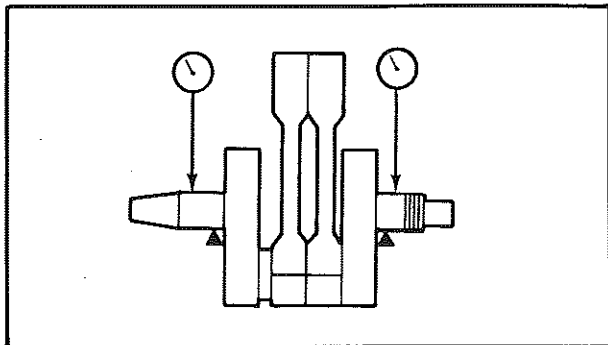
Crankshaft Bearings

1. Inspect
 - Bearing races

Pitting/Rust/Scoring → Replace.

NOTE:

- Clean and dry bearing before checking.
- Lubricate bearings immediately after examining them to prevent rust.

**Crankshaft Runout**

1. Place both ends of crankshaft on V-blocks.
2. Rotate:
 - Crankshaft
3. Measure:
 - Crankshaft runout
 At main journal bearings.
 Use a Dial Gauge (90890-03097).



Maximum Crankshaft Runout:
0.02 mm (0.0008 in)

Connecting Rod Bearings

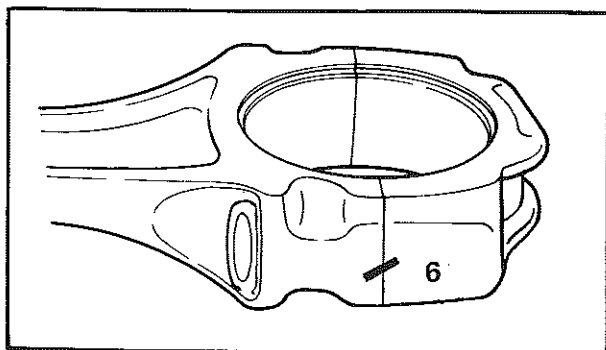
1. Inspect:
 - Bearings
 Burns/Flaking/Roughness/Scratches →
 Replace.

Connecting Rod Bearing Clearance Measurement

1. Clean all parts thoroughly.
2. Install:
 - Connecting rod bearings
 Into connecting rod and cap.
3. Attach:
 - Plastigage® (90890-33210)
 Onto crankpin.
4. Position:
 - Connecting rod
 - Connecting rod cap
 Onto crankshaft.

NOTE:

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

**5. Apply:**

- Molybdenum disulfide grease
- To bolt threads and nut surface.

6. Torque both ends of rod cap evenly.**NOTE:**

Do not move connecting rod until a clearance measurement has been completed.



CAUTION:

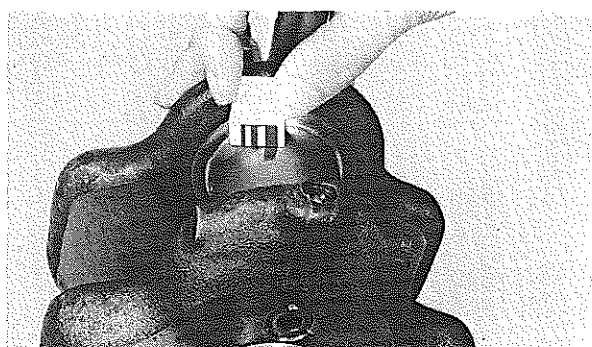
Tighten to full torque specification without pausing. Apply continuous torque between 4.3 and 4.8 m·kg. Once you reach 4.3 m·kg DO NOT STOP TIGHTENING until final torque is reached. If tightening is interrupted between 4.3 and 4.8 m·kg, loosen nut to less than 4.3 m·kg and start again.



Connecting Rod Cap:
48 Nm (4.8 m·kg, 35 ft·lb)

7. Remove:

- Connecting rod cap
Remove carefully.

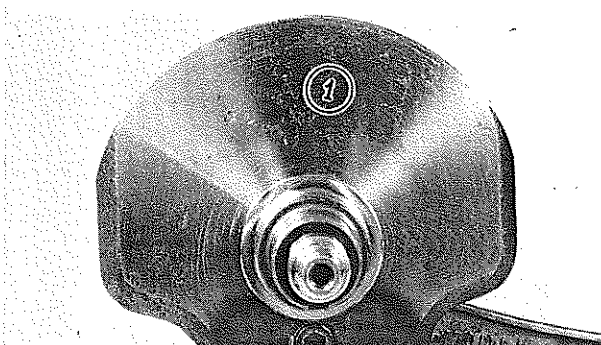


8. Measure:

- Plastigage® width
Out of specification → Replace connecting rod bearings and/or replace crankshaft if necessary.

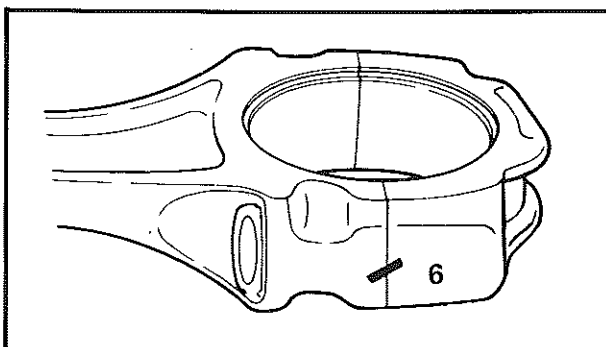


Connecting Rod Bearing Clearance:
0.030 ~ 0.054 mm
(0.0012 ~ 0.0021 in)

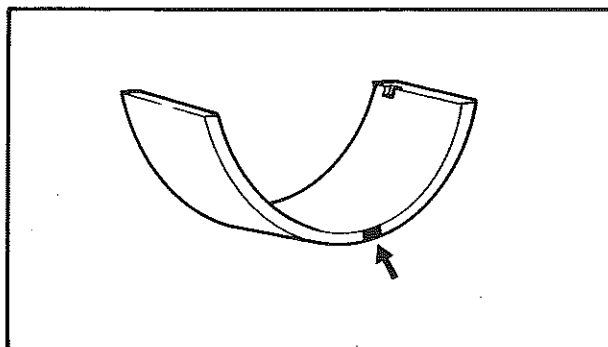


Connecting Rod Bearing Selection

Numbers used to indicate crankpin size are stamped on LH crank web.



Connecting rods are numbered "4" or "6"; numbers are stamped in ink, on the rod.



1. Subtract crankpin number from rod size number to select proper bearing number.
2. Use color code as shown in diagram to choose proper bearing.

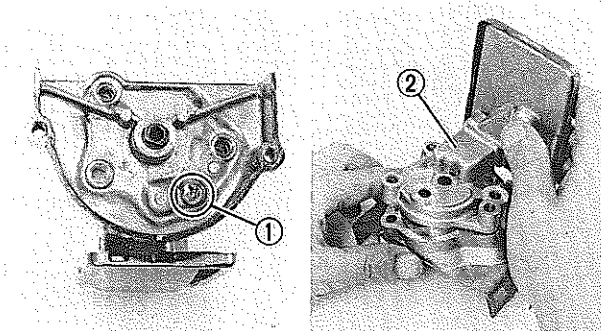
Example:

$$\text{Rod No.} - \text{Crankpin No.} = \text{Bearing No.}$$

$$6 - 1 = 5$$

No. 5 bearing is Yellow. Use Yellow bearing inserts.

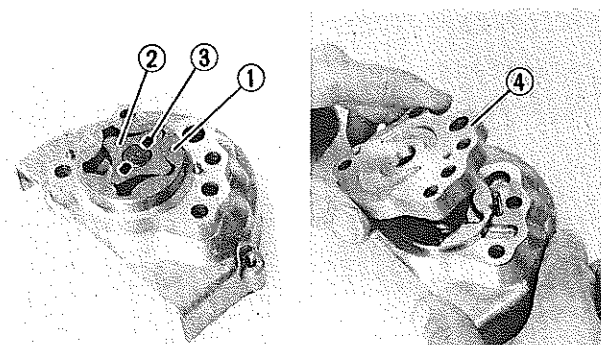
Bearing color code	
No. 1	Blue
No. 2	Black
No. 3	Brown
No. 4	Green
No. 5	Yellow



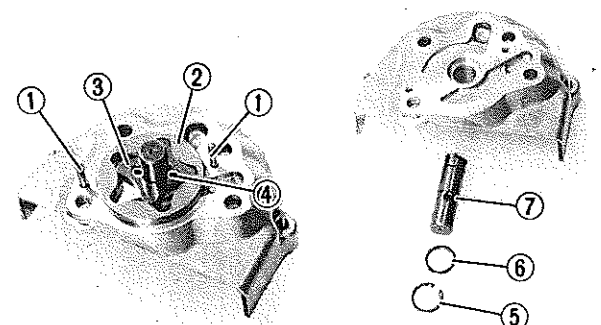
OIL PUMP

Disassembly

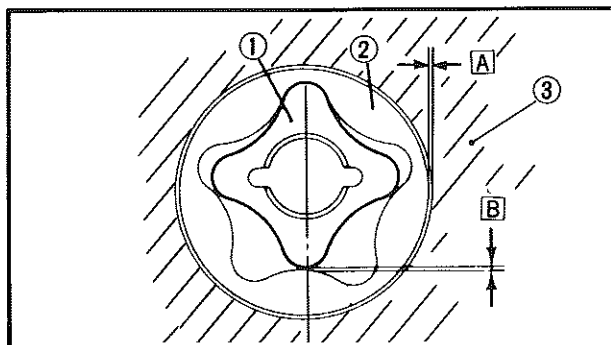
1. Remove:
 - Oil pump housing screw (1)
 - Oil pump housing #1 (2)



2. Remove:
 - Outer rotor #1 (1)
 - Inner rotor #1 (2)
 - Dowel pin (3)
 - Oil pump housing #2 (4)



3. Remove:
 - Dowel pins (1)
 - Outer rotor #2 (2)
 - Inner rotor #2 (3)
 - Dowel pin (4)
 - Circlip (5)
 - Thrust washer (6)
 - Pump drive shaft (7)



Rotor Clearance Measurement

1. Measure:

- Side clearance [A]
Between inner rotor ① and outer rotor ②
- Tip clearance [B]
Between outer rotor ② and pump housing ③
Use a Feeler Gauge.

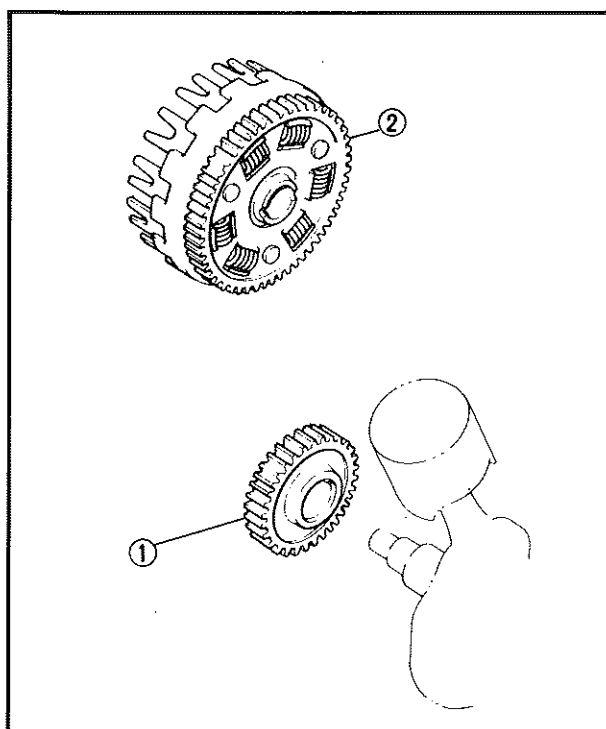


Side Clearance [A] :
0.03 ~ 0.08 mm (0.001 ~ 0.003 in)

Tip Clearance [B] :
0.03 ~ 0.09 mm (0.001 ~ 0.004 in)

ASSEMBLY

When reassembling the oil pump, reverse the removal procedure.

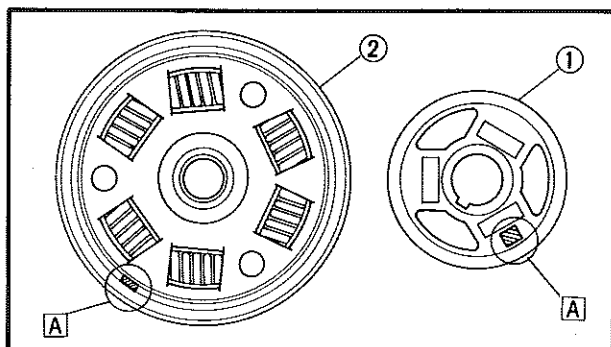


PRIMARY DRIVE

1. Inspect:

- Primary drive gear ①
- Primary driven gear ②
Wear/Damage → Replace both gears.
Excessive noises during operation → Replace both gears.

Primary reduction ratio:		
No. of teeth		Ratio
Drive	Driven	
47	78	1.659

**NOTE:**

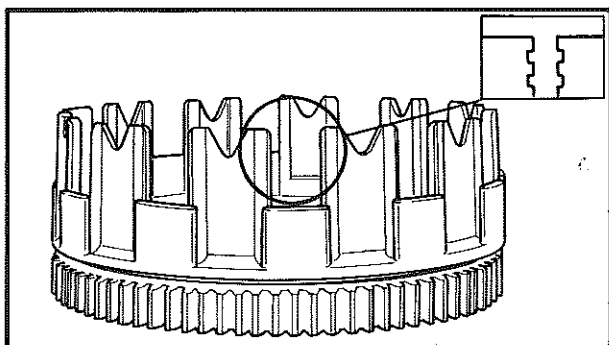
When the primary drive ① and driven ② gear need to be changed as a set, make sure that the new set of gears have the same marking, ranging from A to F.

[A] Punched mark

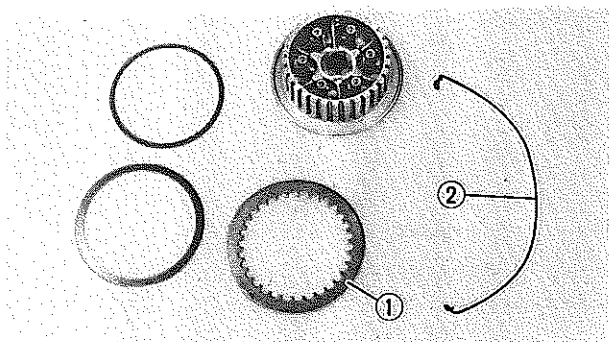
CLUTCH**Clutch Housing**

1. Inspect:

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

**Clutch Boss**

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

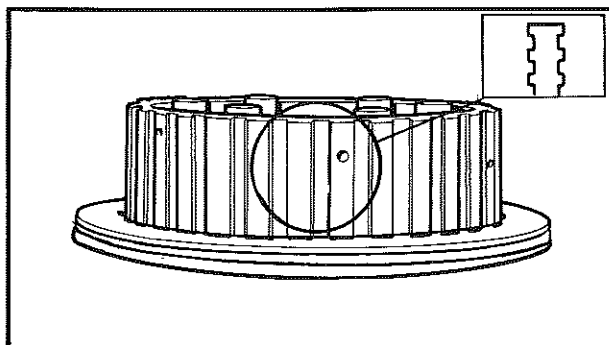


1. Inspect:

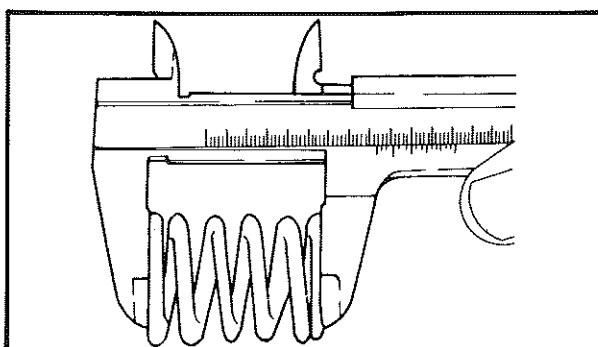
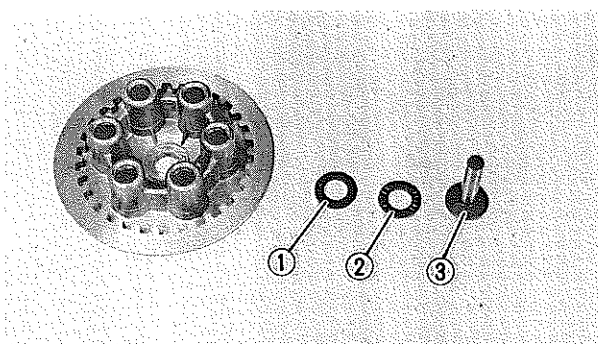
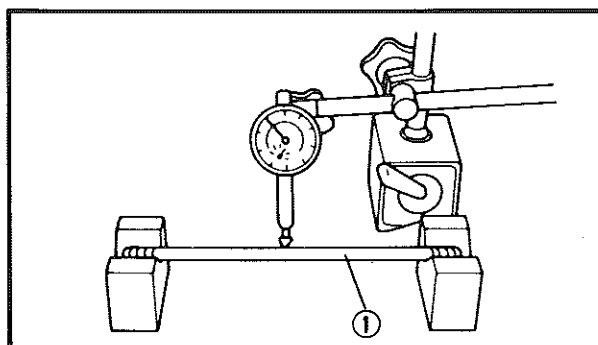
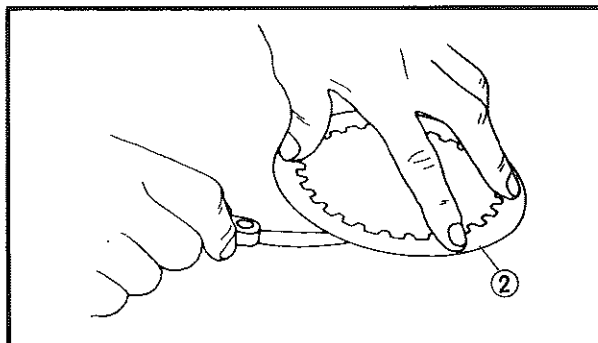
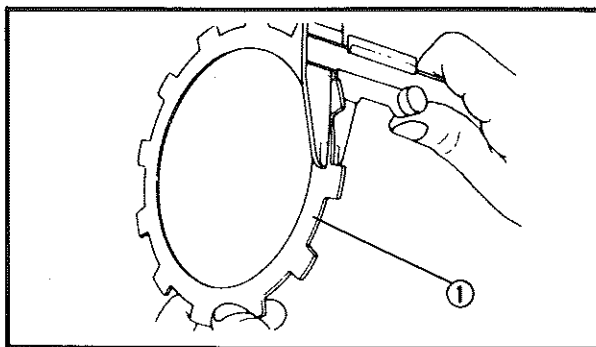
- Clutch housing inner bushing
Damage → Replace.

2. Inspect:

- Clutch boss spline
Pitting:
Moderate → Deburr,
Severe → Replace.

**NOTE:**

Pitting on clutch plate splines of clutch boss will cause erratic operation.



Friction and Clutch Plates

1. Measure:


- Friction plate thickness ①
 - Clutch plate warpage ②
- Out of specification → Replace.
Clutch or friction plate as a set.

	Standard	Wear Limit
Friction Plate Thickness ①	2.9 ~ 3.1 mm (0.114 ~ 0.122 in)	2.8 mm (0.11 in)
Clutch Plate Warp Limit ②	—	0.1 mm (0.004 in)

Push Rod

1. Measure:

- Push rod #2 runout ①
- Use V-Blocks and the Dial Gauge (90890-03097).
Out of specification → Replace.

	Bending Limit: 0.5 mm (0.02 in)
---	---


2. Inspect:

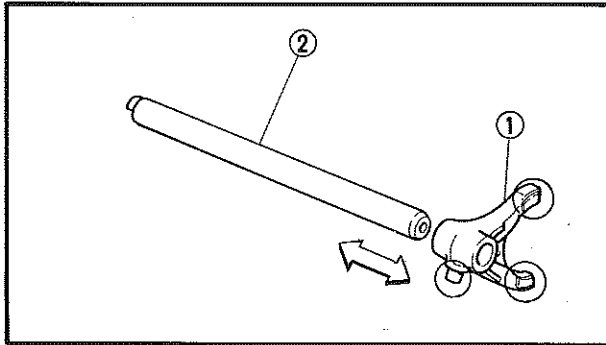
- Thrust washer ①
 - Thrust bearing ②
 - Push rod #1 ③
- Wear/Damage → Replace.

Clutch Spring

1. Measure:

- Clutch spring free play
- Out of specification → Replace spring as a set.

	Clutch Spring Minimum Free Length: 40.2 mm (1.583 in)
---	---



TRANSMISSION

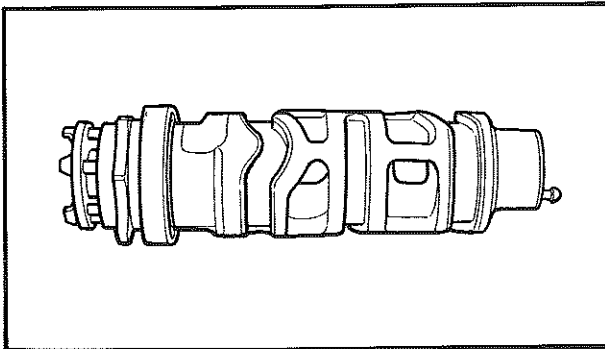
Shift Fork

1. Inspect:

- Shift forks ①
On the gear and shift cam contact surfaces.
Wear/Chafing/Bends/Damage → Replace.

2. Check:

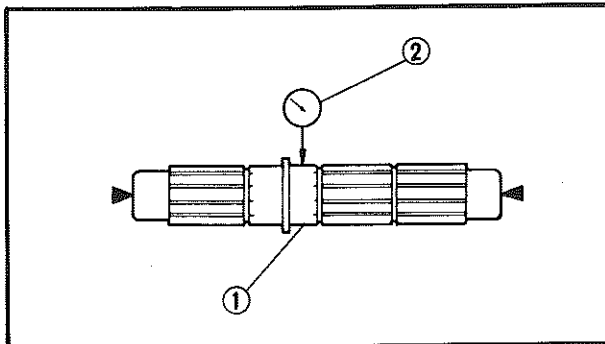
- Shift fork movement
On its guide bar ②.
Unsmooth operation → Replace fork and/or guide bar.



Shift Cam

1. Inspect:

- Shift cam grooves
Wear/Damage/Scratches → Replace.
- Shift cam segment
Damage/Wear → Replace.
- Shift cam bearing
Pitting/Damage → Replace.



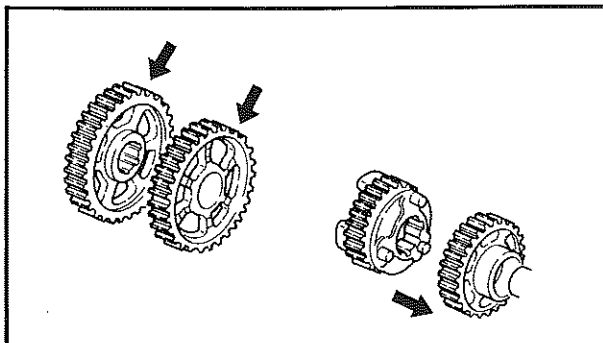
Main and Drive Axles

1. Measure:

- Axle runout ①
Use the centering device and Dial Gauge (90890-03097) ②.
Out of specification → Replace.



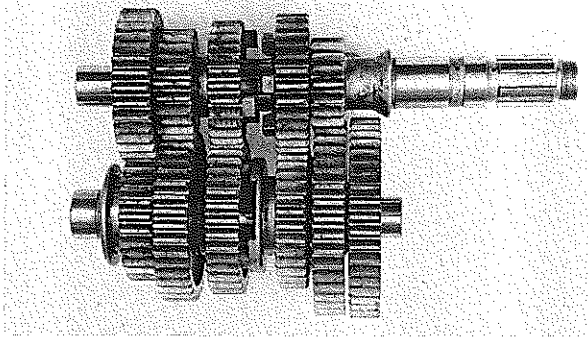
Runout Limit:
0.08 mm (0.0031 in)



Gears

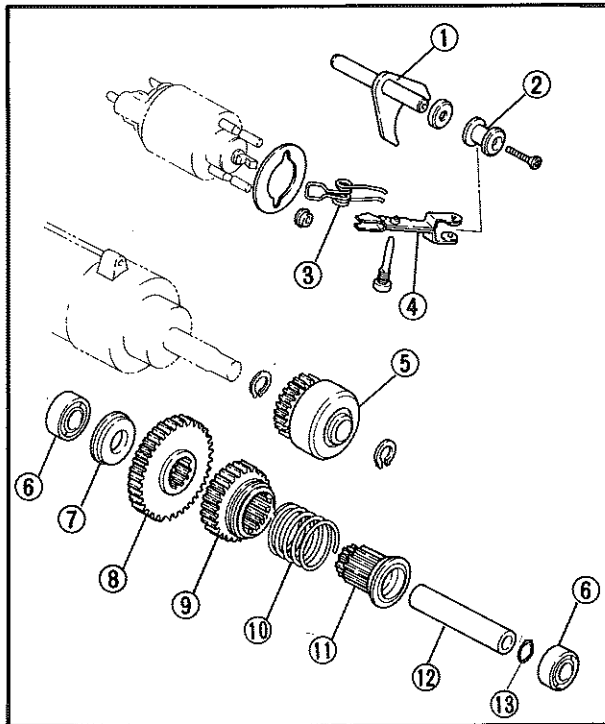
1. Inspect:

- Gear teeth
Blue discoloration/Pitting/Wear
→ Replace.
- Mated dogs
Rounded edges/Cracks/Missing portions
→ Replace.



2. Check:

- Proper gear engagement (Each gear)
To its counter part.
Incorrect → Reassemble
- Gear movement
Roughness → Replace.



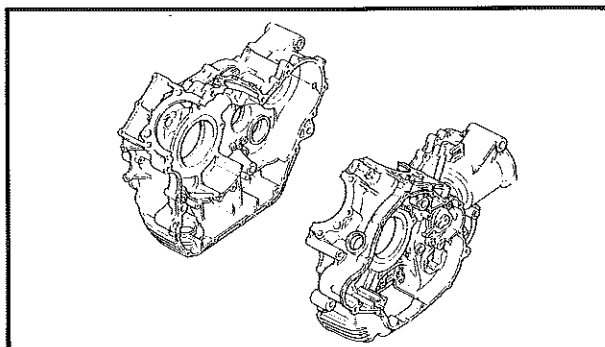
STARTER DRIVE COMPONENT PARTS

1. Inspect:

- Starter clutch ⑤
- Idler gear #1 ⑧
- Idle gear #2 ⑨
- Starter wheel ⑪
- Pitting/Damage → Replace.

2. Inspect:

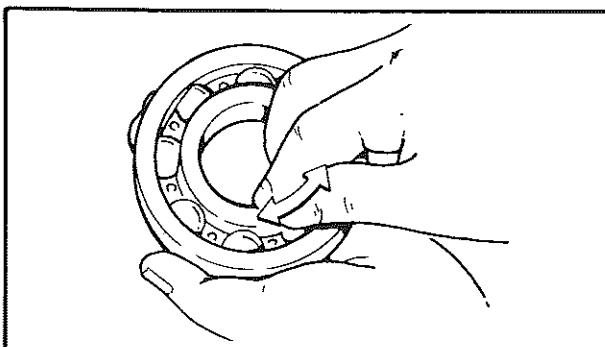
- Idler gear fork ①
- Drive lever collar ②
- Spring ③
- Drive lever ④
- Rubber bushing ⑥
- Thrust collar ⑦
- Compression spring ⑩
- Idler shaft ⑫
- O-ring ⑬
- Damage/Wear/Fatigue → Replace.



CRANKCASE

1. Inspect:

- Case halves
- Bearing seat
- Fitting
- Damage → Replace.



BEARINGS AND OIL SEALS

1. Inspect:

- Bearing
Clean and lubricate, then rotate inner
race with finger.
Roughness → Replace bearing (see
Removal).

2. Inspect:

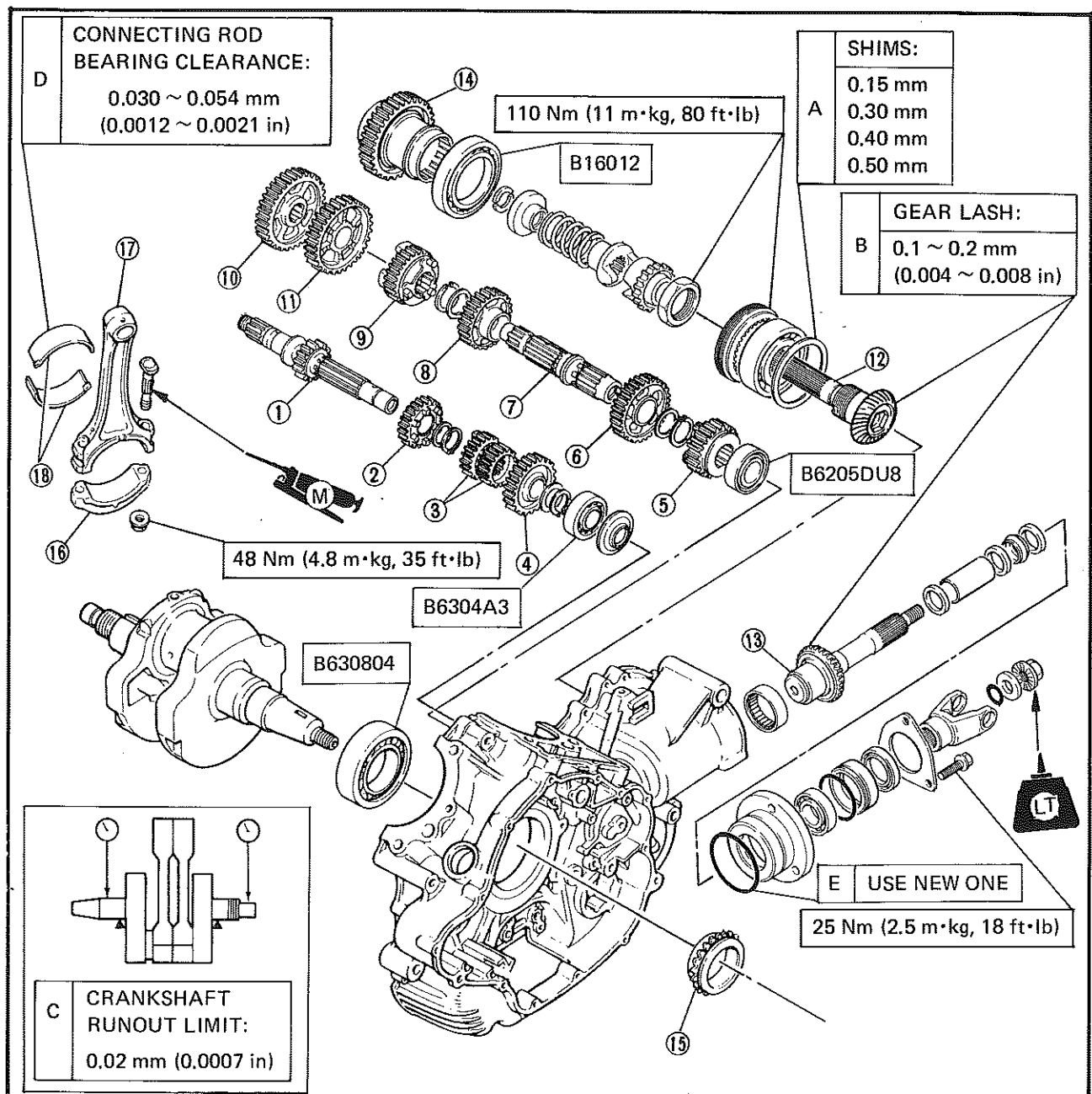
- Oil seals
Damage/Wear → Replace (see Removal).

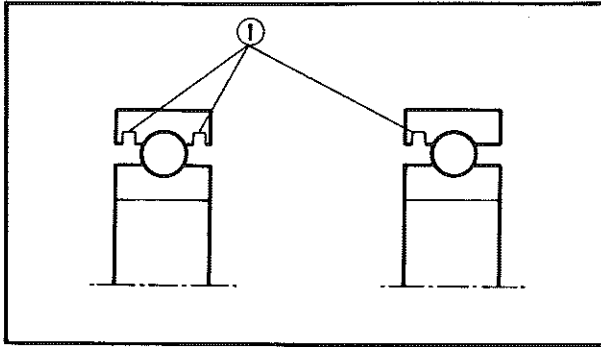


ENGINE ASSEMBLY AND ADJUSTMENT

LEFT SIDE CRANKCASE

- | | |
|-----------------------|---------------------------------------|
| ① Main shaft | ⑪ 1st wheel gear |
| ② 4th pinion gear | ⑫ Middle drive shaft |
| ③ 2nd/3rd pinion gear | ⑬ Middle driven shaft |
| ④ 5th pinion gear | ⑭ Middle driven gear |
| ⑤ 5th wheel gear | ⑮ Oil-pump drive sprocket (Press fit) |
| ⑥ 2nd wheel gear | ⑯ Connecting rod cap |
| ⑦ Drive axle | ⑰ Connecting rod |
| ⑧ 3rd wheel gear | ⑱ Connecting rod bearing |
| ⑨ 4th wheel gear | |
| ⑩ Middle drive gear | |

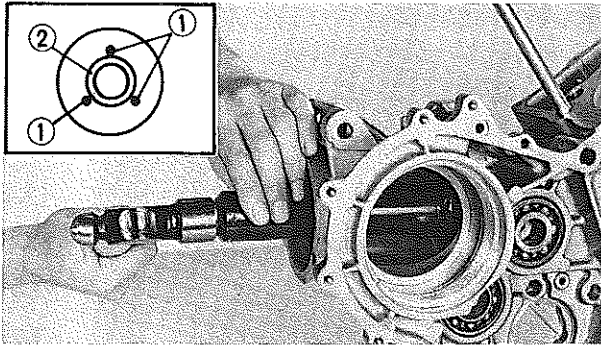




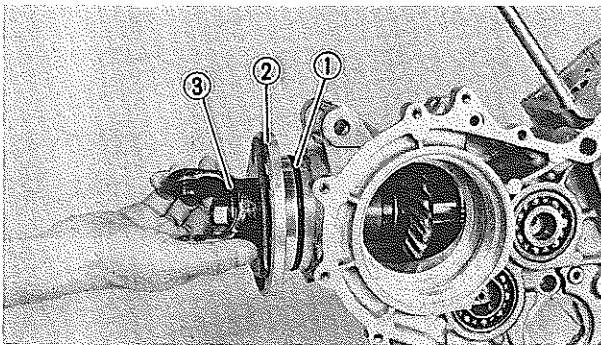
1. Lubricate:
 - Crankshaft bearing
 - Transmission bearing

NOTE:

- Be sure the bearing ID mark faces towards the inside of the crankcase.
- The left side crankcase bearing has a groove(s) ① in the outer race, the right side bearing does not.



2. Install:
 - Middle driven shaft bearing
Use Middle Drive Shaft Bearing Driver (90890-04058) with the alignment ring.
3. Lock bearing ② into place by lightly punching crankcase at three points ① around bearing.



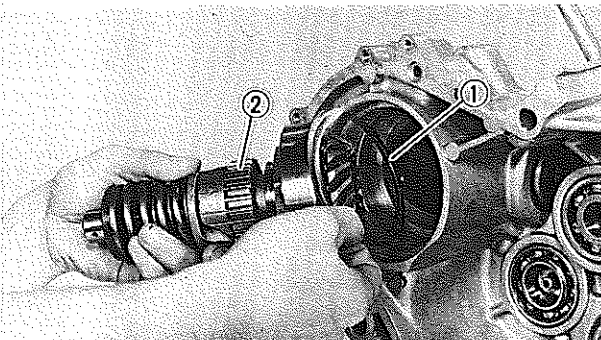
4. Install:
 - O-ring (New) ①
To the bearing housing ②
 - Middle driven shaft assembly ③
5. Tighten:
 - Bearing housing bolt



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

NOTE:

- Oil the O-ring ①
- Be careful not to damage the O-ring ① during installation.



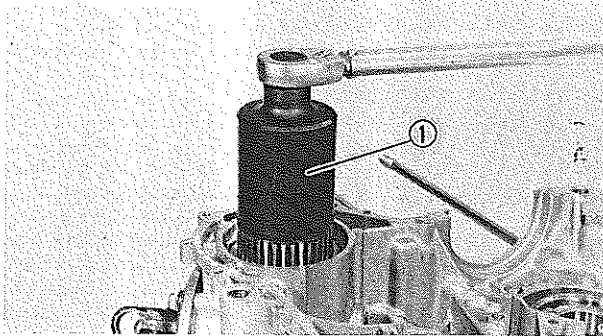
6. Install:
 - Proper shim ①
 - Middle drive shaft assembly ②

NOTE:

Be sure that bearing lower race is properly seated against crankcase.

**CAUTION:**

The middle drive shaft bearing is a slip fit. If bearing cocks during installation, remove the middle drive shaft assembly and start again. Bearing must go in smoothly.

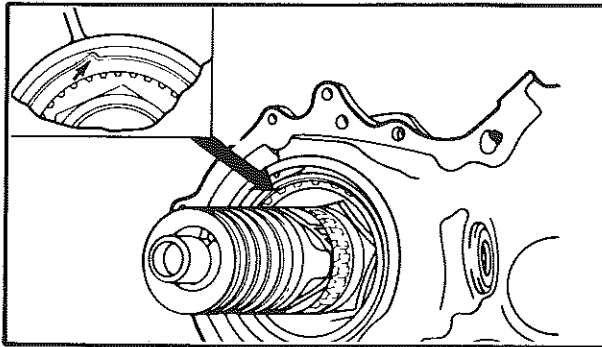


7. Install:

- Middle drive shaft bearing retainer
Use Middle Drive Shaft Bearing Retainer Wrench (90890-04057) ①.



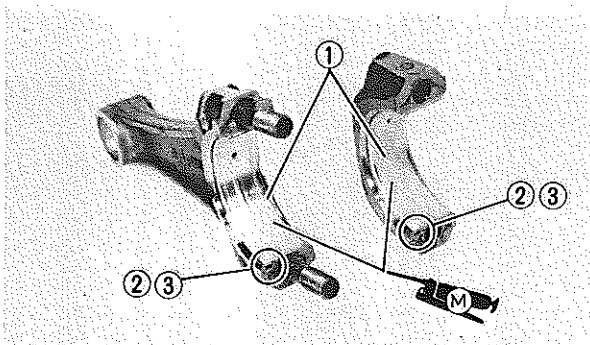
Bearing Retainer:
110 Nm (11 m·kg, 80 ft·lb)



8. Bend the retainer lock collar into the slot in the crankcase using a center punch.

CAUTION:

Be sure gear lash is properly adjusted before locking middle drive shaft bearing retainer.



9. Install:

- Connecting rod bearings ①
To the connecting rod and rod cap.

NOTE:

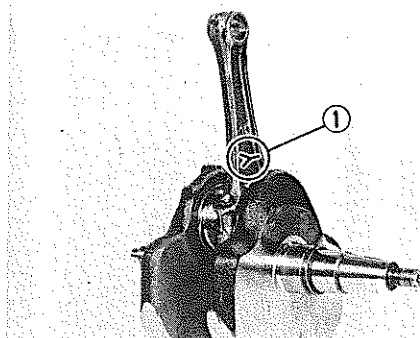
Align the tab ② with the slot ③.

10. Lubricate:

- Bearing contact surfaces



Molybdenum Disulfide Grease
(Lightly Coat)

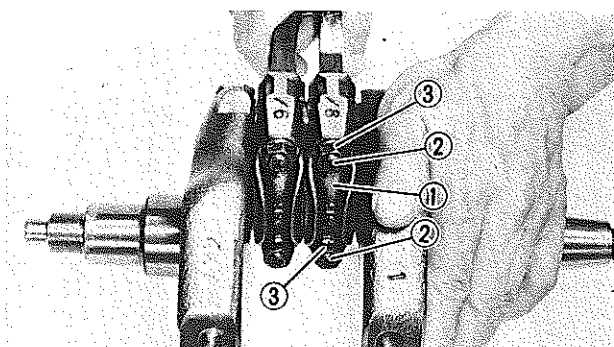


11. Install:

- Connecting rod
To the crank pin.

NOTE:

The stamped "Y" mark ① on the connecting rod should face towards the tapered end of the crankshaft.



12. Install:

- Connecting rod cap ①
- Connecting rod cap bolt ②
- Connecting rod cap nut ③

NOTE:

- Be sure the letters on both components align to form a perfect character.
- Apply Molybdenum disulfide grease to the rod cap bolt threads and nut surfaces.

13. Tighten:

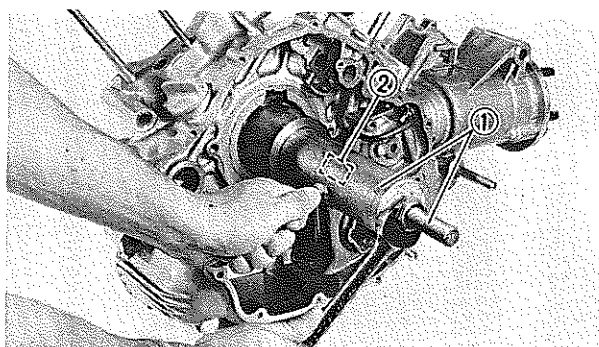
- Connecting rod cap nut



Connecting Rod Cap Nut:
48 Nm (4.8 m·kg, 35 ft·lb)

CAUTION:

Apply even tightening torque to both nuts in two or three steps.



14. Attach:

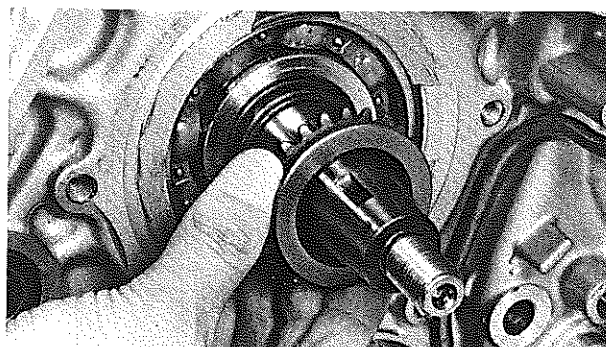
- Crankshaft Installing Set ① (90890-01274/01275)
- Adapter (16 mm) ② (90890-01280)

15. Install:

- Crankshaft

NOTE:

Rod must be in rear cylinder sleeve hole when the crankshaft is installed.

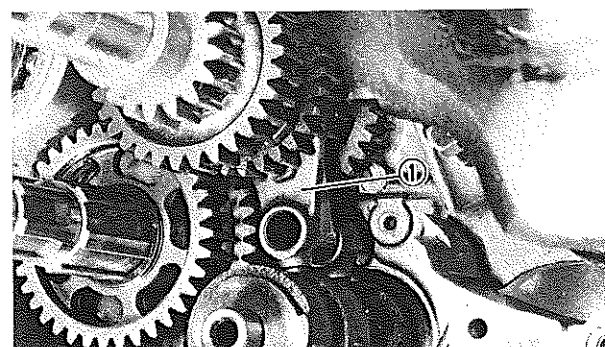
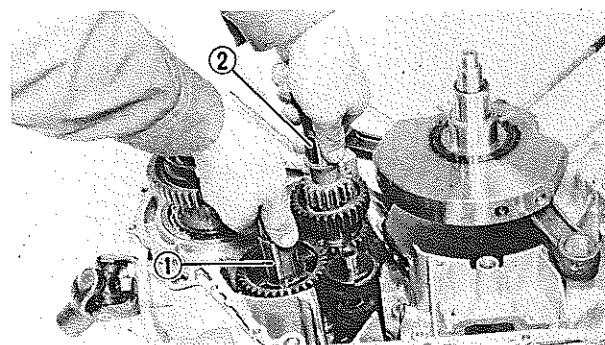
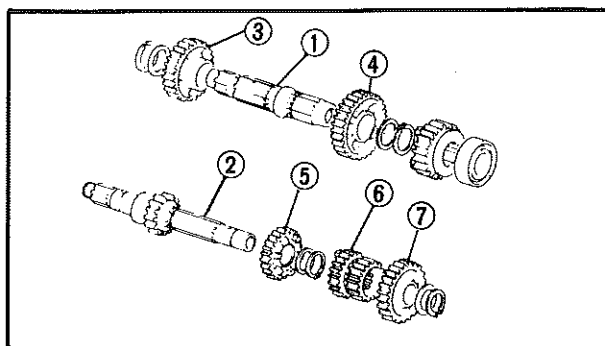
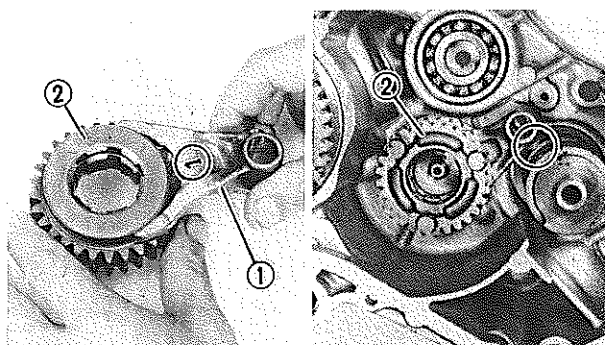
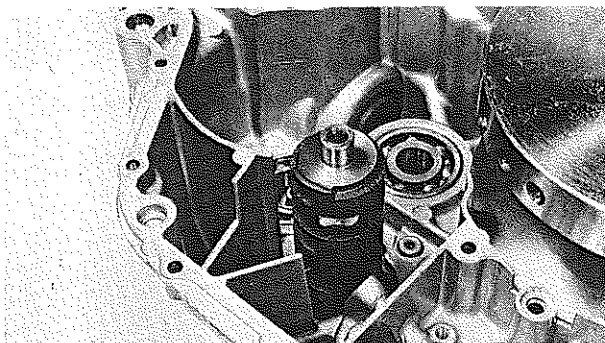


16. Install:

- Oil pump drive sprocket (New)
Use the Crankshaft Installing Set (90890-01274/01275)

NOTE:

The flange on the sprocket should face toward the flywheel rotor.



17. Install:
- Shift drum

18. Install:
- Shift fork #1 ①
Onto fifth wheel gear ②

19. Position:
- Fifth wheel gear ②
So it is centered over drive axle bearing.

NOTE:

- The number "1" forged on shift fork must always face towards the left side crankcase.
- Be sure that shift fork guide pin is properly seated in shift drum groove.

20. Assemble:
- Drive axle ①
 - Main axle ②

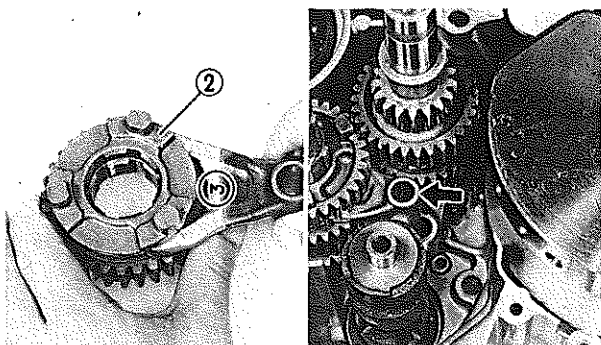
- ③ 3rd wheel gear
- ④ 2nd wheel gear
- ⑤ 4th pinion gear
- ⑥ 2nd/3rd pinion gear
- ⑦ 5th pinion gear

21. Install:
- Drive axle ① with main axle ②
22. Check:
- Transmission operation
Unsmooth operation → Reset.

NOTE:

When installing the drive axle and main axle, make sure that the 2nd and 3rd wheel gears of the drive axle are pinion geared in with those of the main axle, as they go into the crankcase.

23. Install:
- Shift fork #2 ①
Onto 2nd/3rd pinion gear.

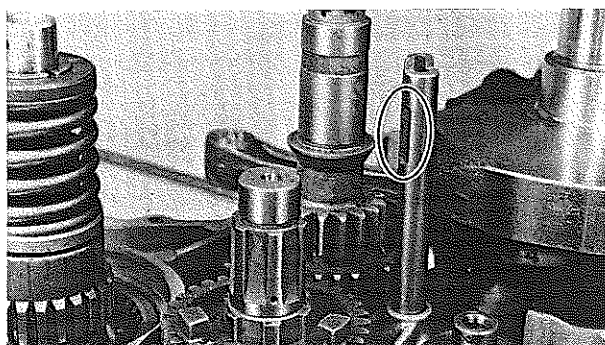


24. Install:

- Shift fork #3 ①
- Onto 4th wheel gear ②.
- 4th wheel gear ②
- Onto drive axle.

NOTE:

Be sure that shift fork guide pin is properly seated in shift drum groove.

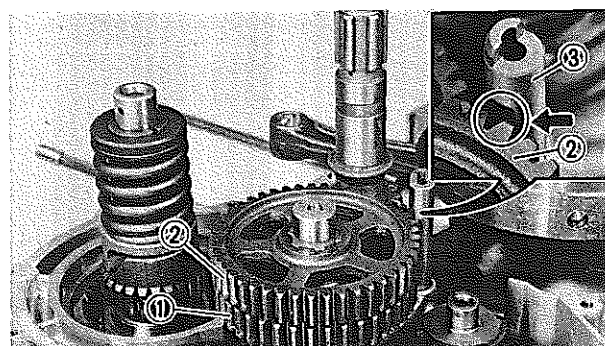


25. Install:

- Shift fork guide bar

NOTE:

- Be sure guide bar passes through all shift forks and engages guide bar boss in crankcase.
- Be sure that the flat cutting surface of the shift fork guide bar is facing the drive axle.

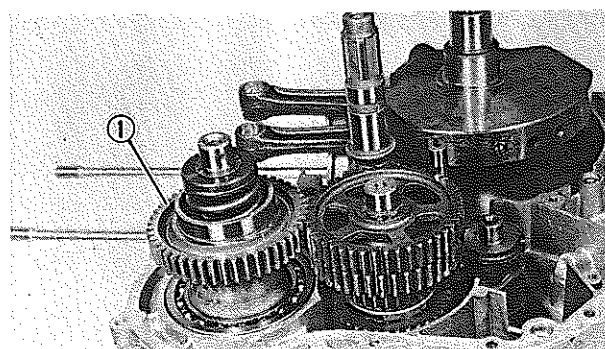


26. Install:

- 1st wheel gear ①
- Middle drive gear ②

NOTE:

Ensure there is a gap between the middle drive gear ② and the flat cutting surface of the shift fork guide bar ③, so that the middle drive gear can turn without touching.



27. Install:

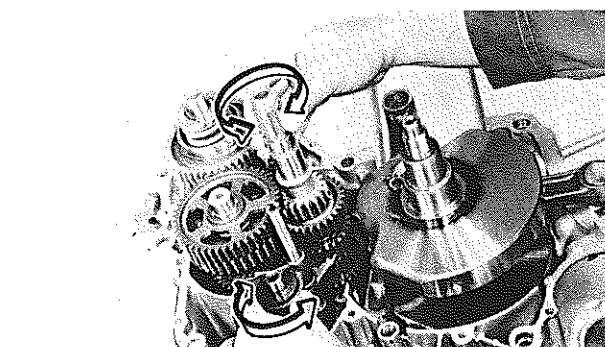
- Middle driven gear ①
- Onto middle drive shaft.

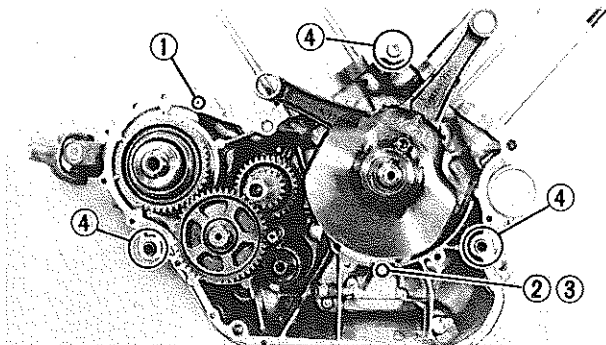
28. Check:

- Shifter operation
- Unsmooth operation → Reset or repair.

NOTE:

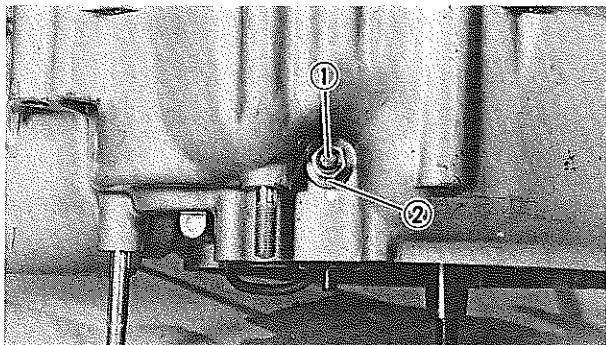
Oil each gear and bearing thoroughly.





29. Install:

- O-ring (Red) ①
- O-ring (Black) ②
- Nozzle ③
- Dowel pins ④



30. Install:

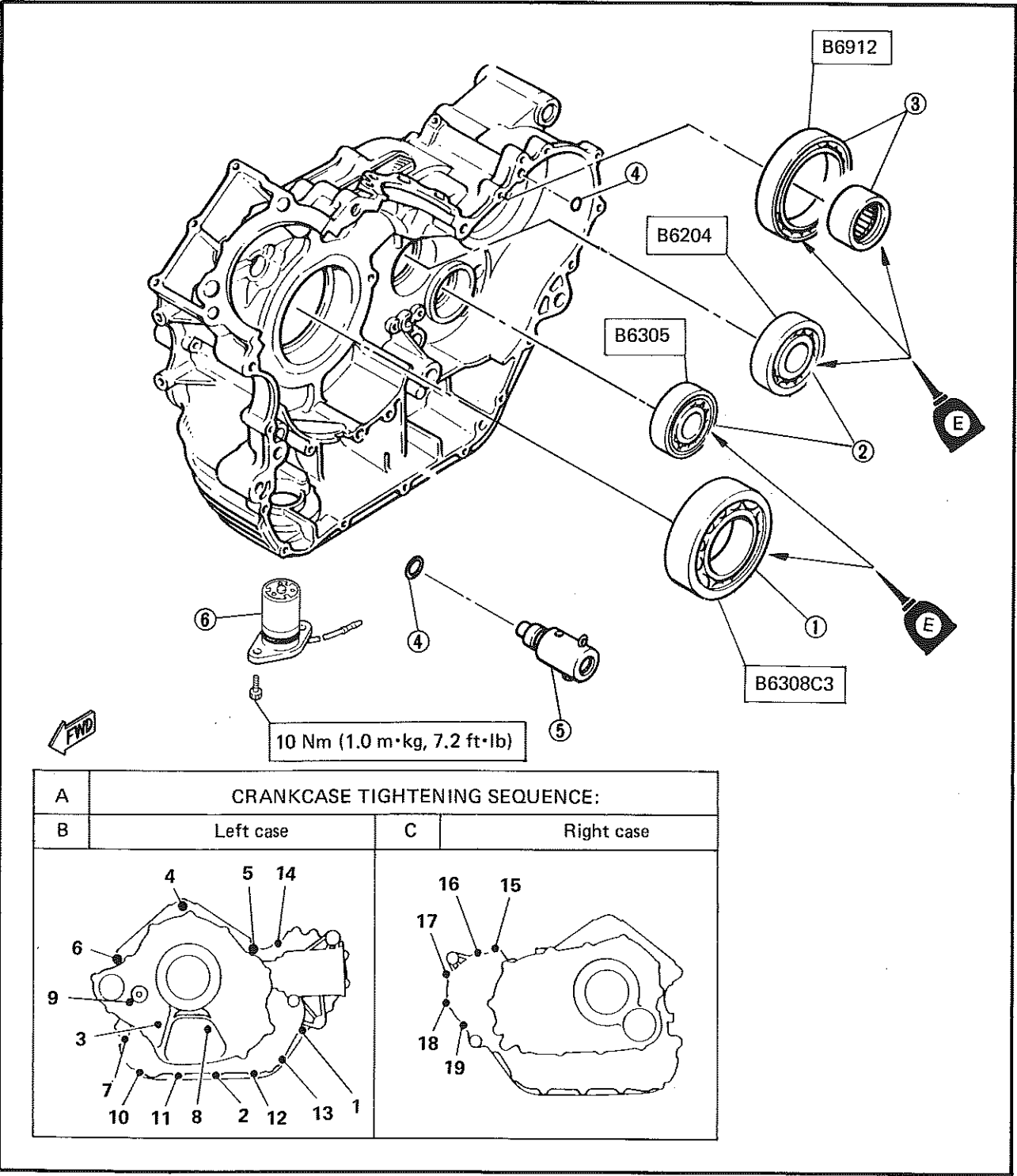
- Neutral switch ①
- Copper washer (New) ②

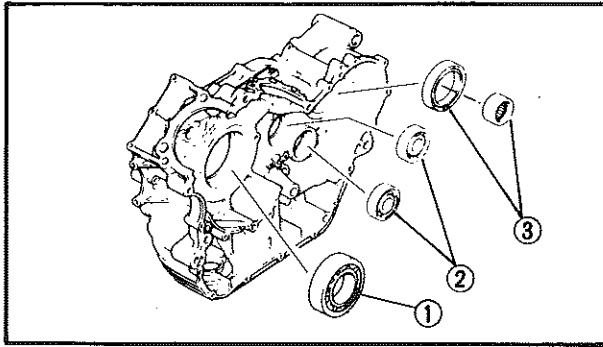


Neutral Switch Body:
20 Nm (2.0 m·kg, 14 ft·lb)

RIGHT SIDE CRANKCASE

- ① Crankshaft bearing
- ② Transmission bearings
- ③ Middle gear bearings
- ④ O-ring
- ⑤ Oil pressure relief valve
- ⑥ Oil level switch



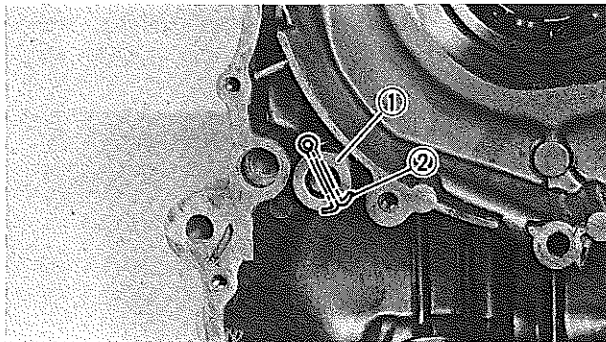


1. Install:

- Crankshaft bearing ①
- Transmission bearing ②
- Middle gear bearing ③

NOTE:

- Oil liberally before installation.
- Push out bearing race, not inner race.
- Crankshaft bearings are not interchangeable.
Left side crankcase bearing has groove in outer race, right side does not.

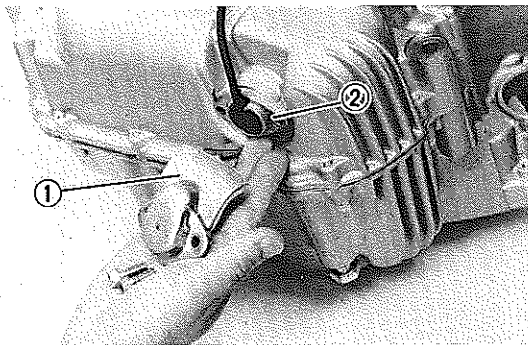


2. Install:

- O-ring (New)
To the oil pressure relief valve.
- Oil pressure relief valve ①

NOTE:

Rotate the valve so that the cotter pin ② does not contact the crankcase mating surface.

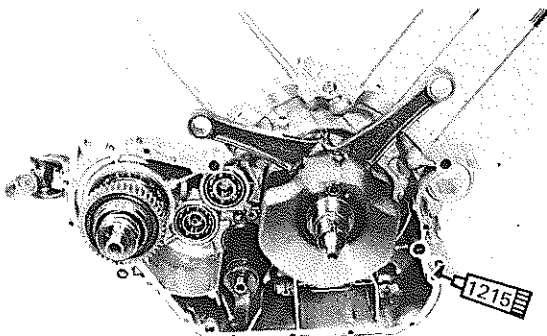


3. Install:

- Oil level switch ②
- Oil level switch cover ①



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



4. Apply:

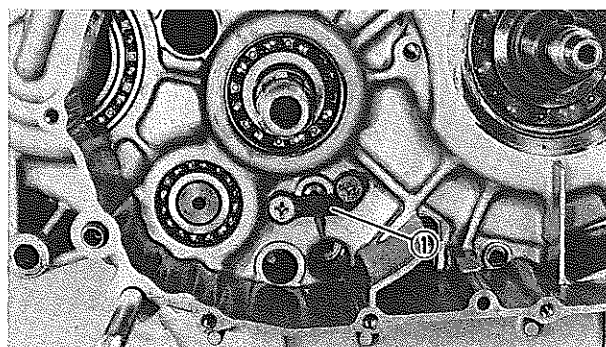
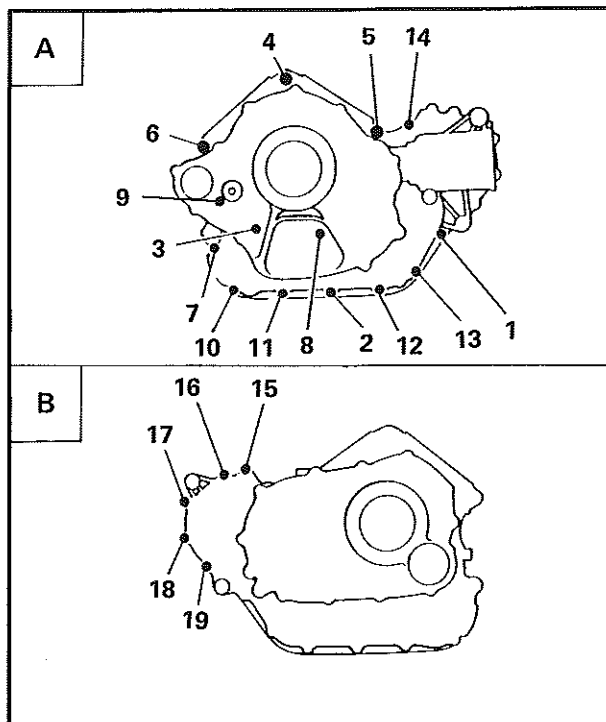
- Yamabond No. 1215 (90890-85505)
To the mating surfaces of both case halves.

5. Install:

- Right side crankcase
Onto left side crankcase.

NOTE:

Be sure front cylinder connecting rod is in front of cylinder sleeve hole.



6. Install:

- Crankcase bolts

NOTE:

Tighten the bolts starting with the lowest numbered one.



Nos. 4, 5, and 6:
39 Nm (3.9 m·kg, 28 ft·lb)

Others:
10 Nm (1.0 m·kg, 7.2 ft·lb)

- A** Left
- B** Right

7. Install:

- Shift fork guide bar stopper plate screw ①



7 Nm (0.7 m·kg, 5.1 ft·lb)
LOCTITE® Stud N'Bearing Mount
(red)

8. Apply:

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

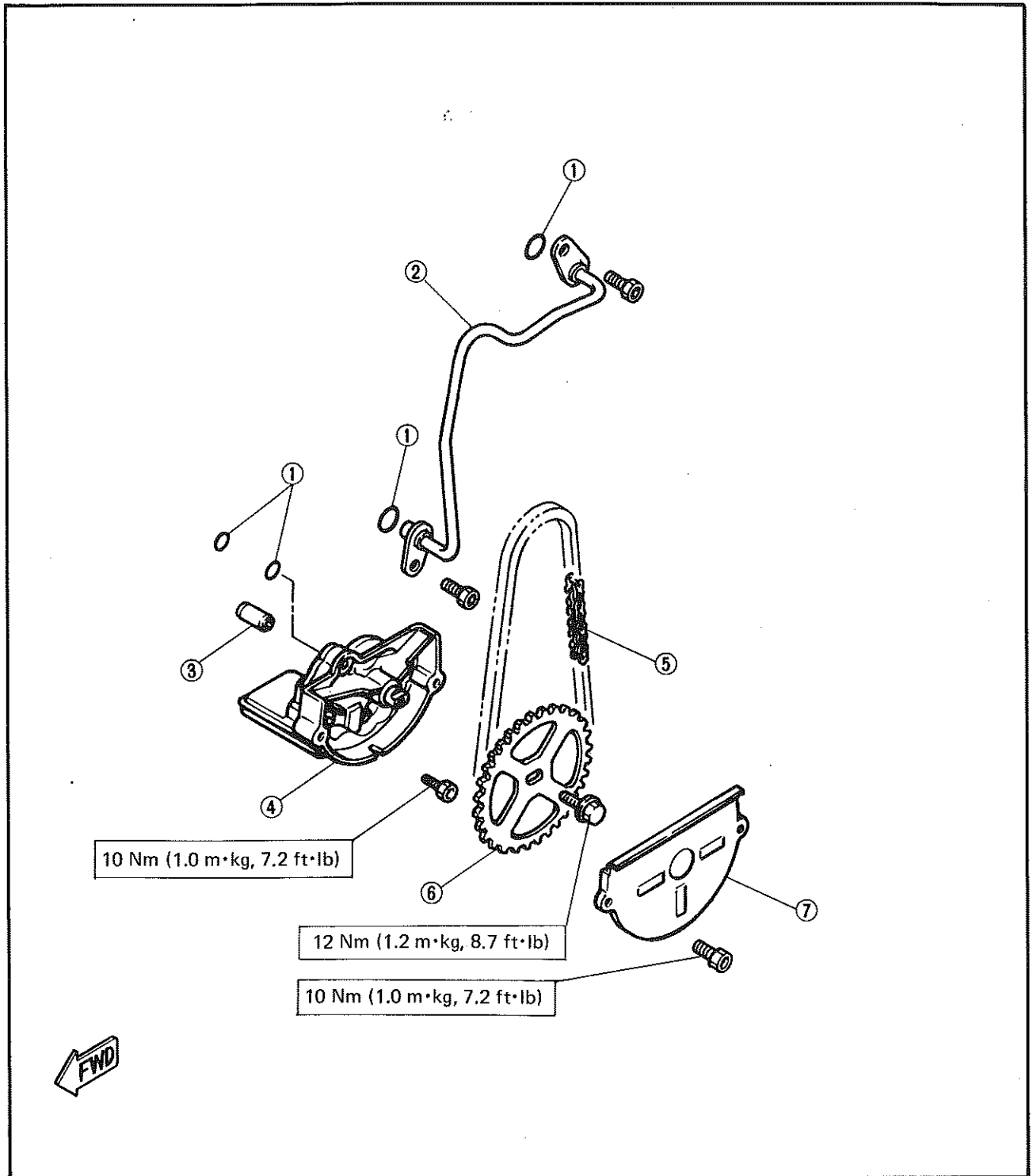
9. Check:

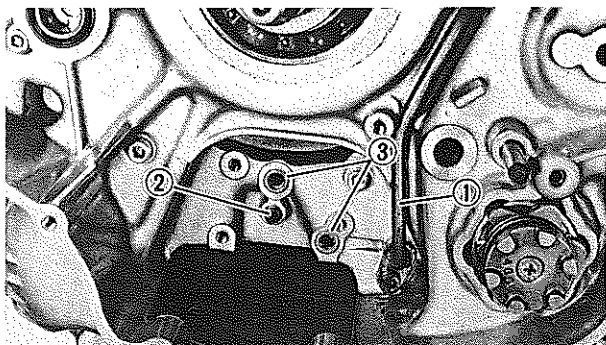
- Crankshaft and transmission operation
Unsmooth operation → Reset.



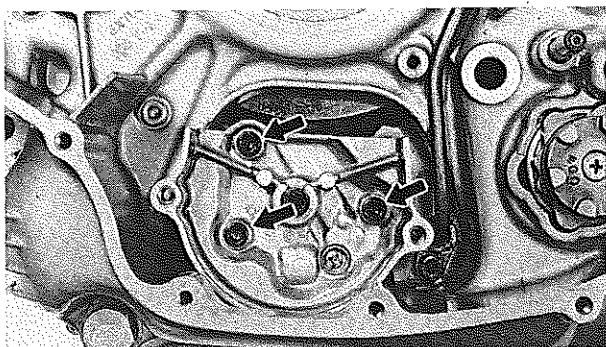
OIL PUMP

- ① O-ring
- ② Delivery pipe
- ③ Dowel pin
- ④ Oil pump assembly
- ⑤ Chain
- ⑥ Driven sprocket
- ⑦ Pump gear cover





1. Install:
 - O-rings (New)
 - Oil delivery pipe ①
 - Dowel pin ②
 - O-rings (New) ③



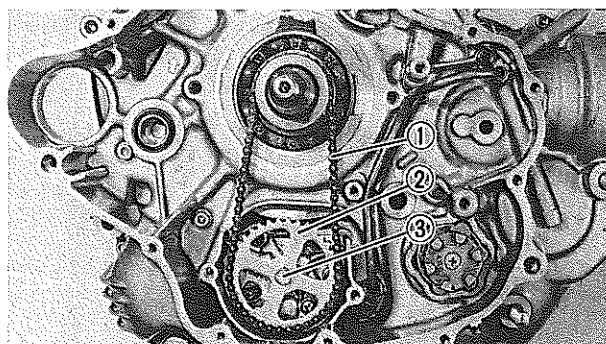
2. Install:
 - Oil pump assembly



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

CAUTION:

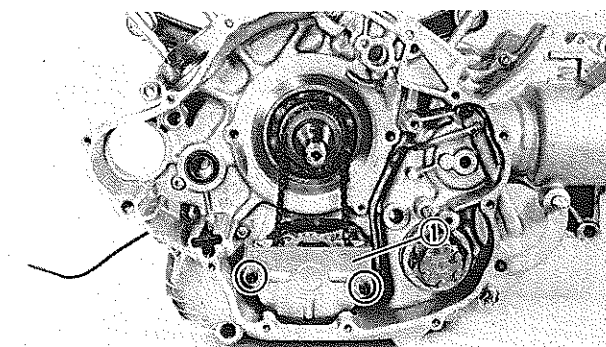
Apply a liberal amount of 4-stroke engine oil to the oil pump passages.



3. Install:
 - Oil pump drive chain ① with oil pump driven sprocket ②



Oil Pump Driven Sprocket Bolt ③ :
12 Nm (1.2 m·kg, 8.7 ft·lb)



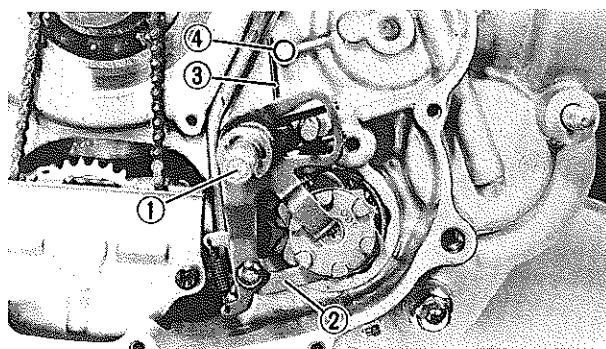
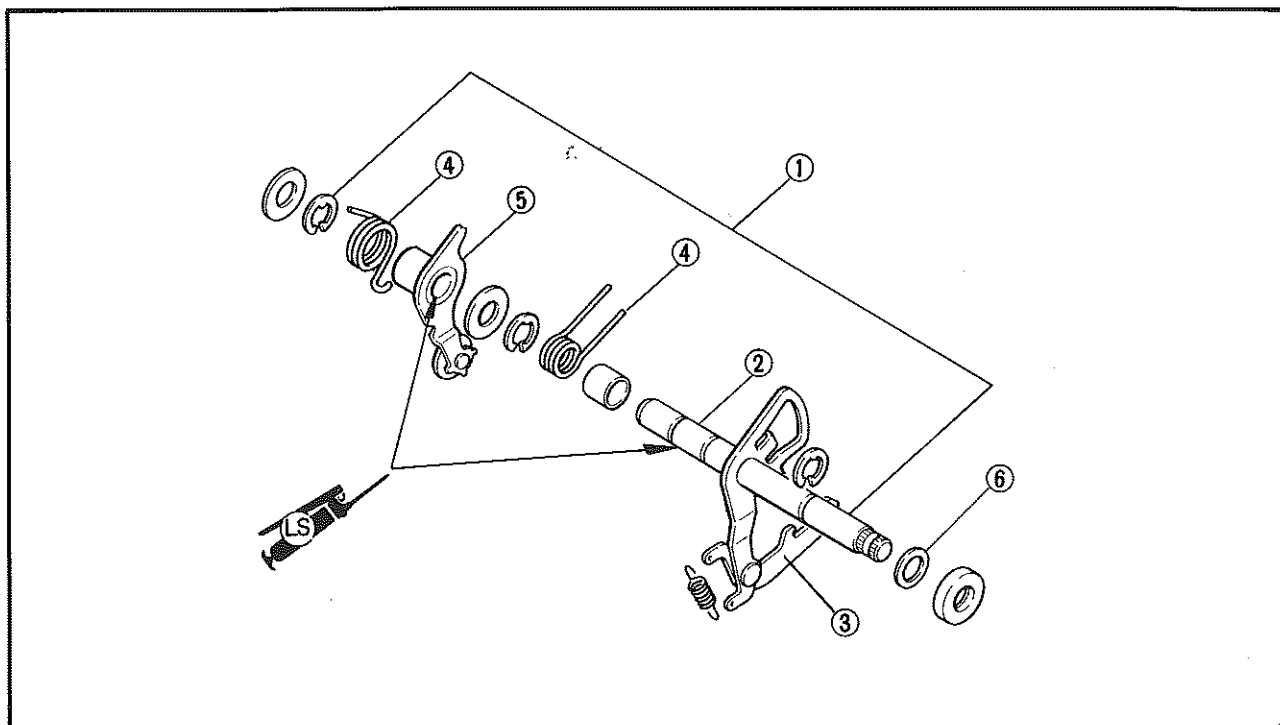
4. Install:
 - Oil pump cover ①



Oil Pump Securing Bolt ② :
10 Nm (1.0 m·kg, 7.2 ft·lb)

**SHIFTER**

- ① Shift shaft assembly
- ② Shift shaft
- ③ Shift lever
- ④ Spring
- ⑤ Lever assy stopper
- ⑥ Thrust washer



1. Install:
 - Thrust washer
 - Shift shaft assembly ①
Into left side crankcase.
2. Position:
 - Shift lever ②
To engage shift drum pins properly.
3. Hook:
 - Cam stopper spring ③
Crankcase projection ④.

NOTE: _____
Open shift lever and shift drum stopper so they
can clear shift drum during installation.



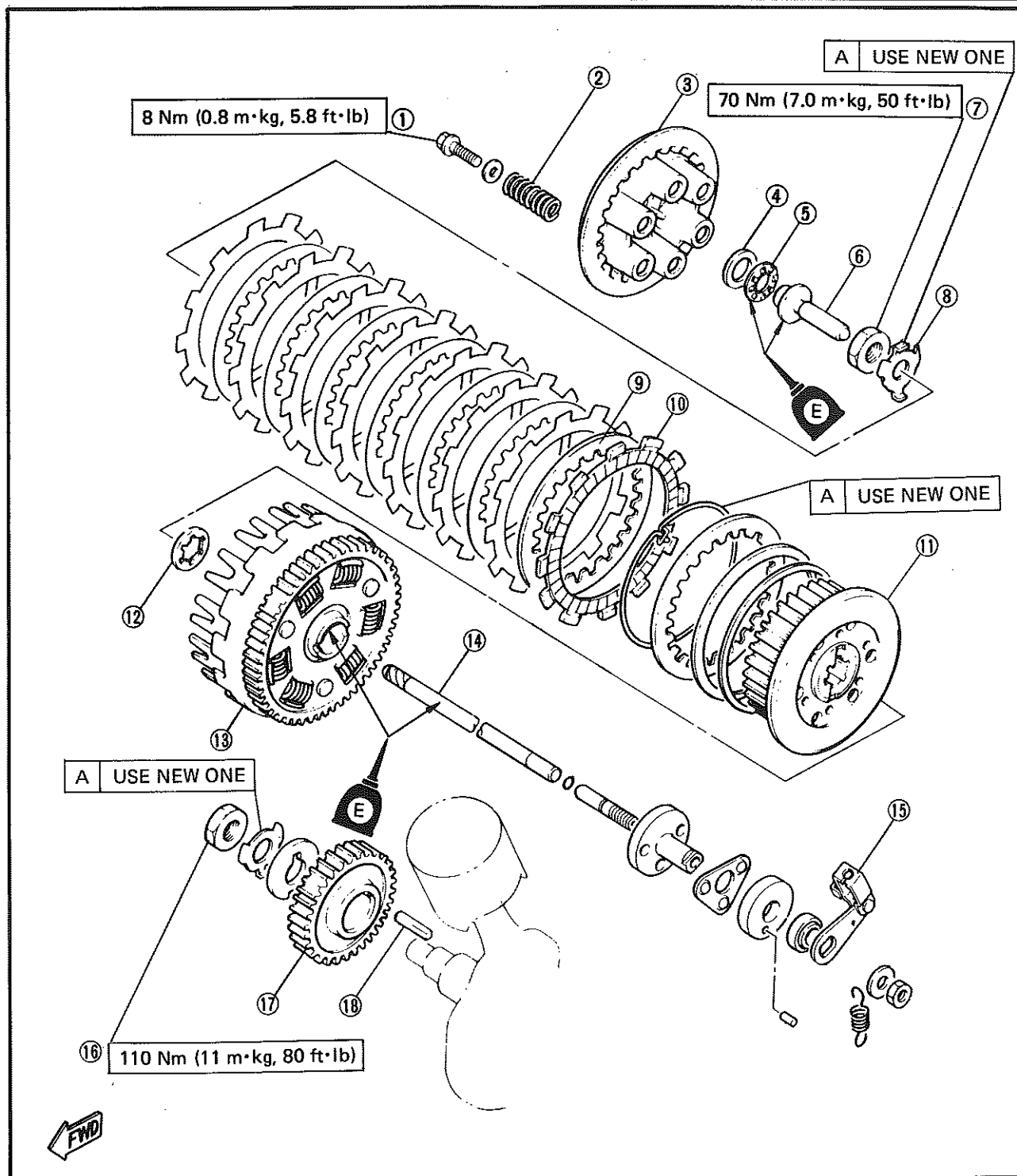
PRIMARY GEAR AND CLUTCH

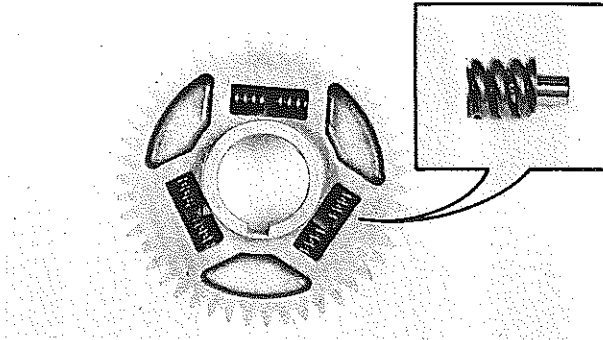
- | | |
|----------------------------|-----------------------------------|
| ① Flange bolt | ⑪ Clutch boss |
| ② Clutch spring | ⑫ Thrust washer |
| ③ Clutch pressure plate | ⑬ Clutch housing |
| ④ Thrust washer | ⑭ Push rod No. 2 |
| ⑤ Thrust bearing | ⑮ Push rod lever assembly |
| ⑥ Push rod No. 1 | ⑯ Primary drive gear securing nut |
| ⑦ Clutch boss securing nut | ⑰ Primary drive gear |
| ⑧ Lock washer | ⑱ Straight key |
| ⑨ Clutch plate | |
| ⑩ Friction plate | |

CLUTCH SPRING MINIMUM LENGTH:
40.2 mm (1.58 in)

CLUTCH PLATE WARP LIMIT:
0.1 mm (0.04 in)

FRICTION PLATE:
THICKNESS:
2.9 ~ 3.1 mm (0.114 ~ 0.122 in)
WEAR LIMIT:
2.8 mm (0.11 in)





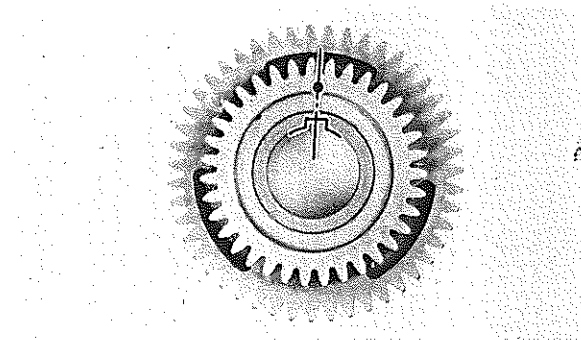
1. Install:

- Springs
- Pins

Into the primary drive gear slots.

NOTE:

Separate springs from each other as far as possible to allow clearance for dogs when installing cam chain drive gear.



2. Align:

- Cam chain drive gear punch mark
With primary drive gear key way.

NOTE:

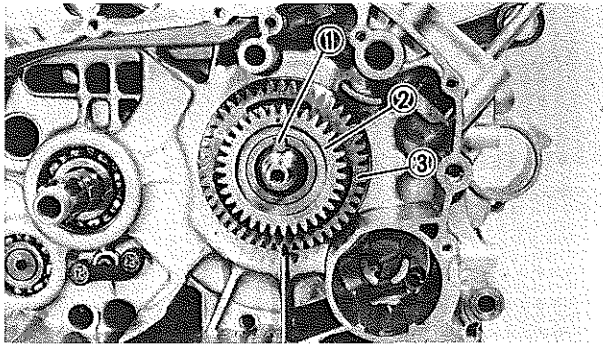
Right and left cam chain drive gears are not interchangeable. Only one will fit into primary drive gear.

3. Position:

- Cam chain drive gear dogs
To fall between springs in each primary gear slot.

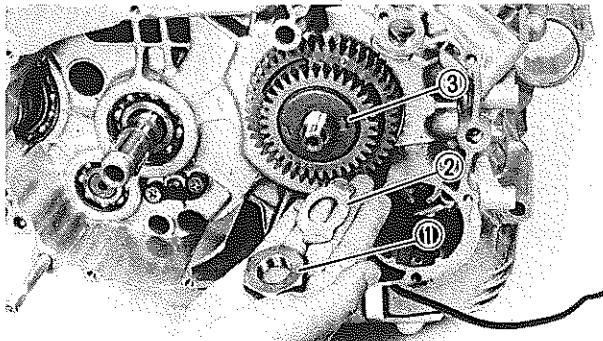
4. Install:

- Right side cam chain drive gear
Onto primary drive gear.



5. Install:

- Primary drive gear (3) /Cam chain drive gear (2) assembly
- Key (1)
Into key way.

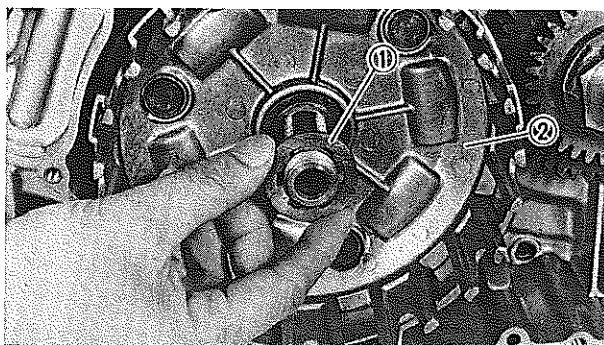


6. Install:

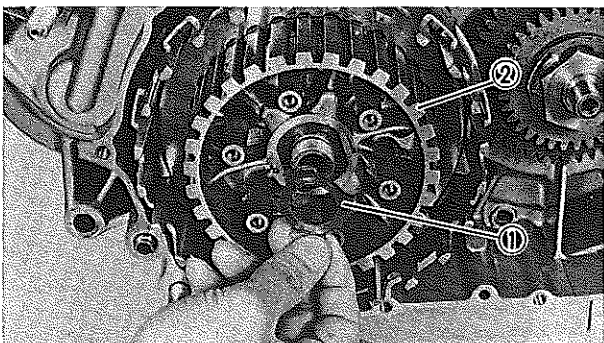
- Special washer (3)
- Lock washer (2)
- Securing nut (1)
Finger-tighten securing nut.

NOTE:

Be sure inside slot of special washer engages primary drive gear key; lock washer tab must engage outer slot of special washer.

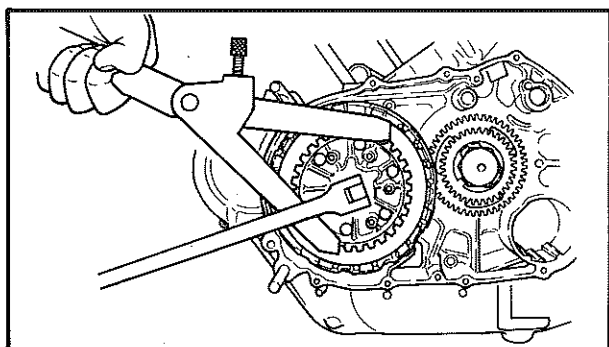


7. Install:
- Clutch housing (2)
 - Thrust washer (1)



8. Install:
- Clutch boss (2)
 - Lock washer (1)

NOTE: _____
Be sure washer tabs engage slots in clutch boss.

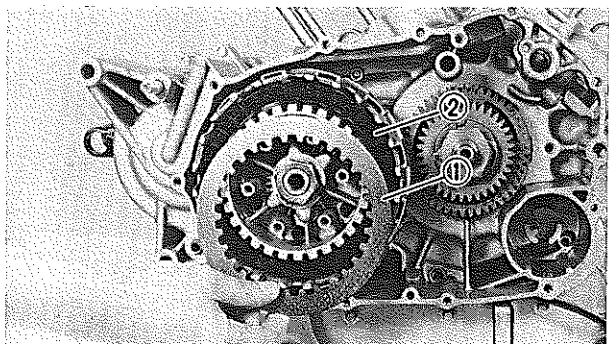


9. Install:
- Clutch boss securing nut
- Use Clutch Hub Holder (90890-04086).



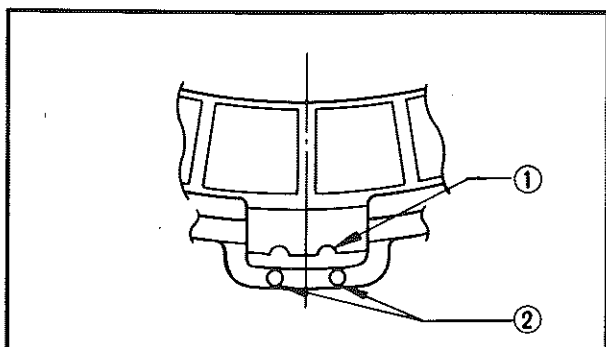
Clutch Boss Securing Nut:
70 Nm (7.0 m·kg, 50 ft·lb)

10. Bend lock tab against nut flat.



11. Install:
- Friction plates (2)
 - Clutch plates (1)

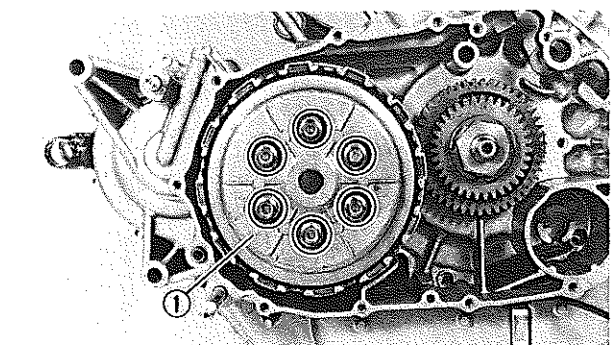
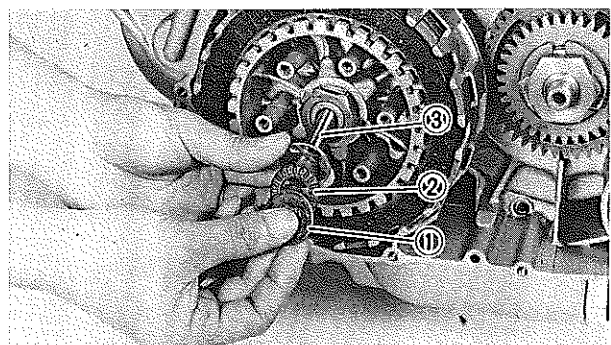
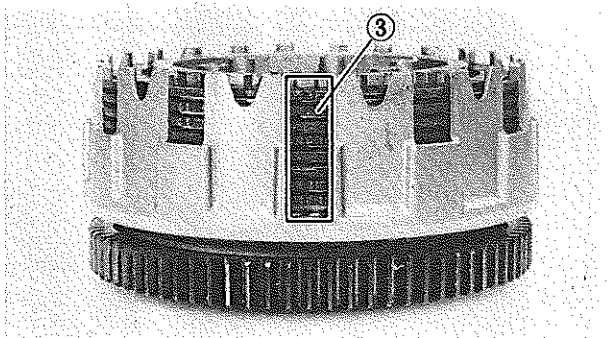
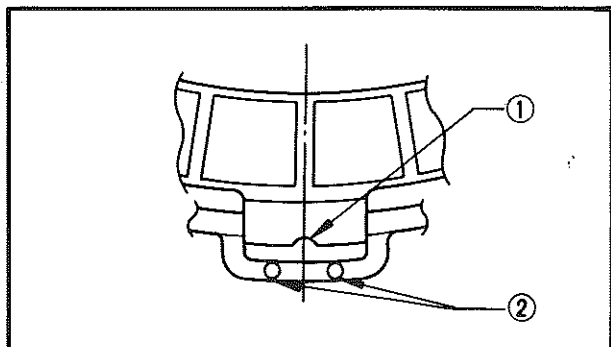
NOTE: _____
Start with friction plate. Alternate clutch and friction plates until all are in clutch boss.



Friction plates and clutch plates installation steps:

1. Install the eight friction plates (with the double semi-circular slots) and the seven 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.

2. Any tight-fitting friction plates must be removed and installation re-attempted.

NOTE:

- Be sure the single-slot (1) blade is placed in the blade groove of the embossed match marks (2).

3. If the fitting was still too tight after implementation of the above instructions steps 1 and 2, try aligning with the non-slot blade.

4. Recommendation:

Paint-mark (3) on the blades after the final installation. (Color: White)

12. Install:

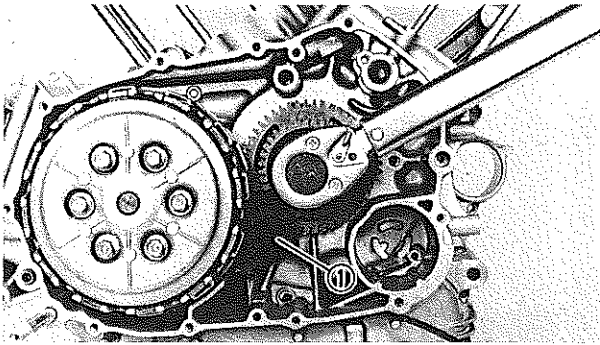
- Push rod #2
- Push rod #1 (3)
- Thrust bearing (2)
- Thrust washer (1)

13. Install:

- Clutch pressure plate (1)
- Clutch springs
- Pressure plate screw



Pressure Plate Screw:
8 Nm (0.8 m·kg, 5.8 ft·lb)



14. Tighten:

- Primary drive securing nut

NOTE:

Place a folded rag ① between the teeth of the primary drive gear and driven gear to lock them.



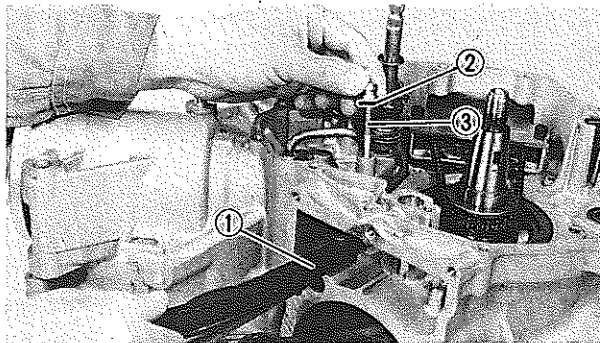
Primary Drive Securing Nut:
110 Nm (11.0 m·kg, 80 ft·lb)

15. Bend lock tab against nut flat.

FLYWHEEL

1. Install:

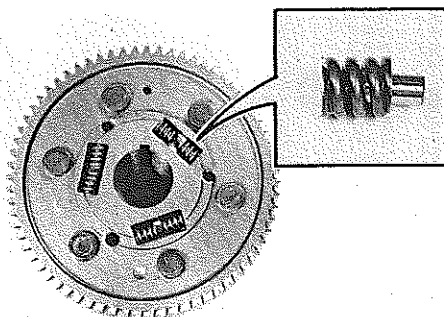
- Rear cam chain guide ①
- Washer ②
- Securing bolt ③



Securing Bolt:
8 Nm (0.8 m·kg, 5.8 ft·lb)
Locknut:
12 Nm (1.2 m·kg, 8.7 ft·lb)

NOTE:

Drilled portion of the holding pin must face outside of the engine.

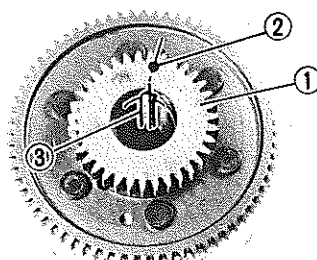


2. Install:

- Springs
 - Pins
- Into the flywheel.

NOTE:

Separate each spring as far as possible from the other to allow clearance for the dogs when installing the cam chain drive gear.



3. Install:

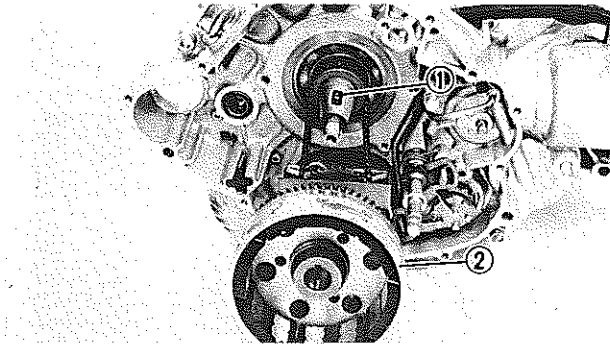
- Left side cam chain drive gear ①
- Onto primary drive gear.

4. Position:

- Cam chain drive gear dogs
- Dogs must be inserted between springs in flywheel slots to engage flywheel.

5. Align:

- Drive gear punch mark ②
- (with keyway ③ flywheel)

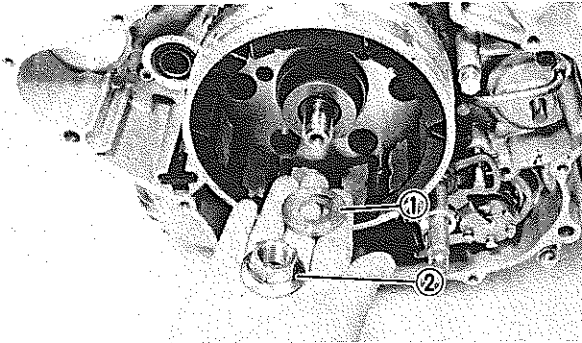


6. Install:

- Woodruff key ①
 - Flywheel assembly ②
- Onto crankshaft.

NOTE:

Be sure crankshaft key engages flywheel keyway.



7. Install:

- Plain washer ①
- Flywheel securing nut ②



Flywheel Securing Nut:
175 Nm (17.5 m·kg, 125 ft·lb)

NOTE:

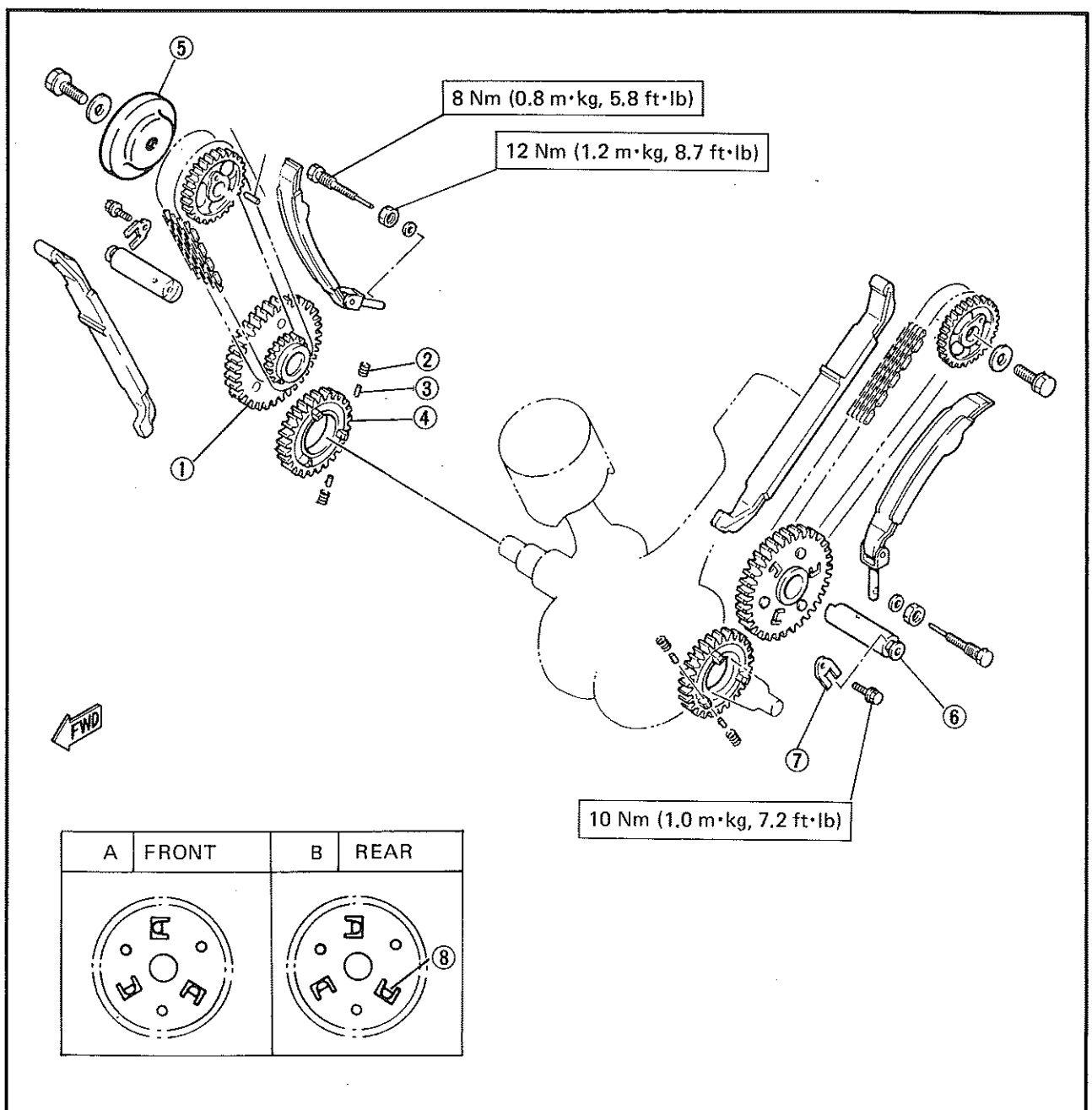
Place a folded rag between the teeth of the primary drive gear and driven gear to lock flywheel.

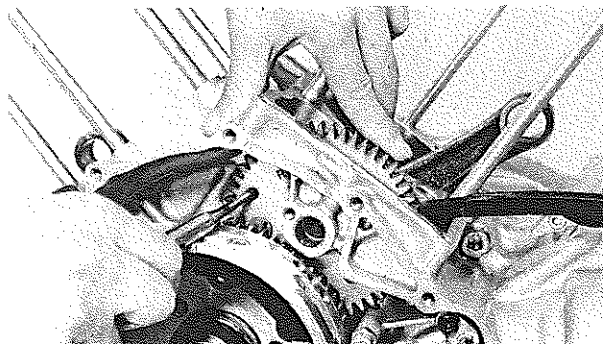
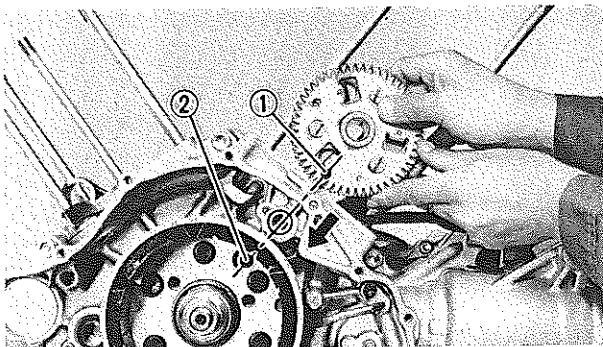
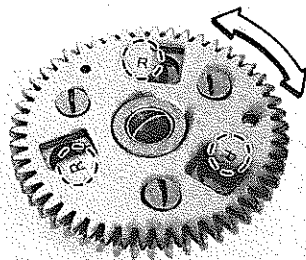
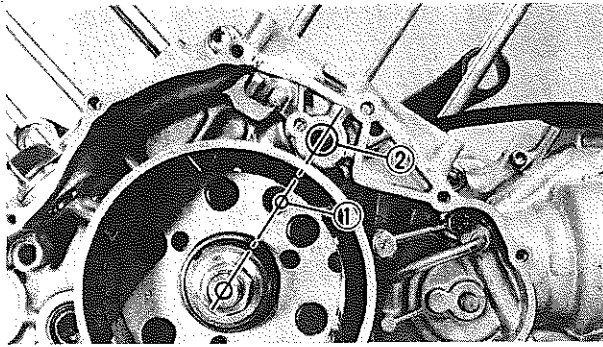
TIMING GEAR

- ① Timing gear (Zero-lash gear)
- ② Spring
- ③ Pin
- ④ Cam chain drive gear
- ⑤ Oil baffle (Front cylinder head only)
- ⑥ Timing gear shaft
- ⑦ Stopper plate
- ⑧ Spring stopper
- ⑨ Front cam chain guide
- ⑩ Rear cam chain guide
- ⑪ Cam chain sprocket

NOTE:

- Front and rear cylinder timing gears are not identical.
- Gears can be identified by direction in which spring stopper faces on side of gears.





Rear Cylinder Timing Gear

1. Align:
 - Flywheel timing hole (1)
(with timing gear shaft hole (2))

2. Inspect:
 - Zero-lash gear spring damper
Looseness/Damage → Replace.
3. Install:
 - Cam chain
Onto timing gear sprocket.

NOTE: _____

Attach a length of wire to cam chain.

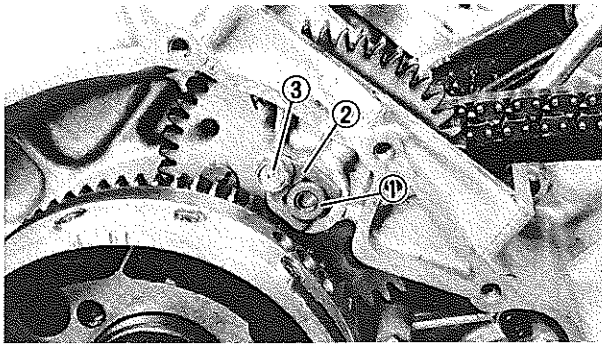
4. Align:
 - Timing gear timing mark (1)
(with flywheel timing hole (2))

5. Align:
 - Both sets of teeth
(on timing gear)

NOTE: _____

Insert appropriately sized punch into gear alignment hole on timing gear. Apply prying motion to punch and rotate gears until both sets of teeth on timing gear align with each other.

6. Install:
 - Timing gear
Onto cam chain drive gear.

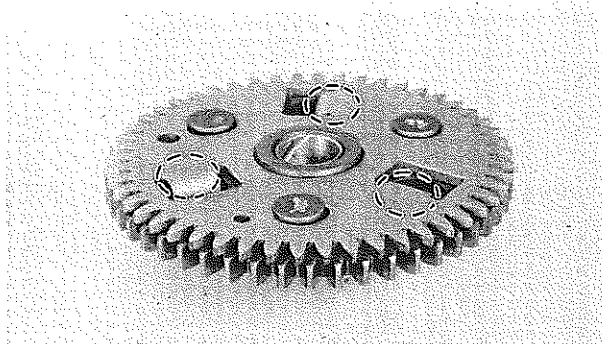


7. Install:

- Timing gear shaft ①
- Stopper plate ②
- Bolt ③



Stopper Plate Securing Bolt:
10 Nm (1.0 m·kg, 7.2 ft·lb)



Front Cylinder Timing Gear

1. Align:

- Drive gear timing mark
(with timing gear shaft hole)

2. Inspect:

- Zero-lash gear spring damper
Looseness/Damage → Replace.

3. Install:

- Cam chain
Onto timing gear sprocket.

NOTE:

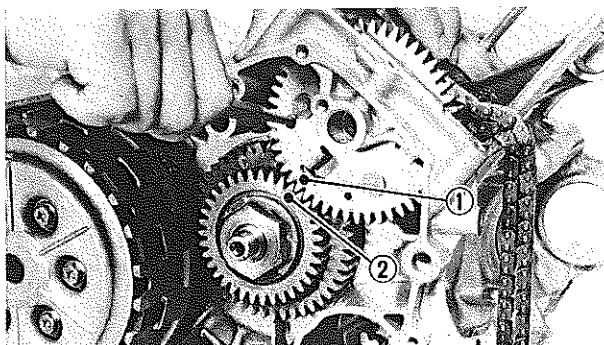
Attach a length of wire to cam chain.

4. Align:

- Both sets of teeth
(on timing gear)

NOTE:

Insert appropriately sized punch into gear alignment hole on timing gear. Apply prying motion to punch and rotate gears until both sets of teeth on timing gear align with each other.

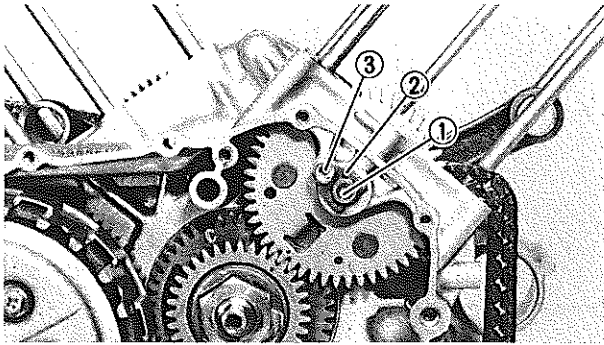


5. Align:

- Timing gear timing mark ①
(with drive gear timing mark ②)

6. Install:

- Timing gear
Onto cam chain drive gear.

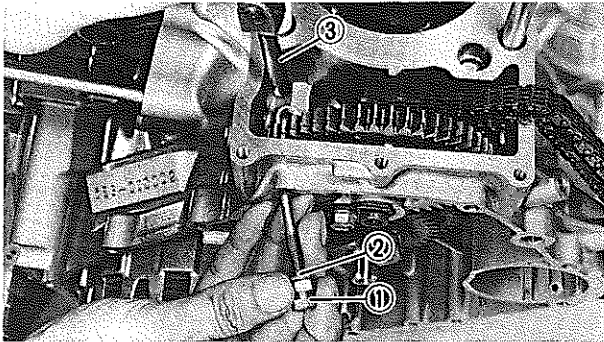


7. Install:

- Timing gear shaft ①
- Stopper plate ②
- Bolt ③



Stopper Plate Securing Bolt:
10 Nm (1.0 m·kg, 7.2 ft·lb)



8. Install:

- Rear cam chain guide ①
- Washer ②
- Securing bolt ③



Securing Bolt:
8 Nm (0.8 m·kg, 5.8 ft·lb)
Locknut:
12 Nm (1.2 m·kg, 8.7 ft·lb)

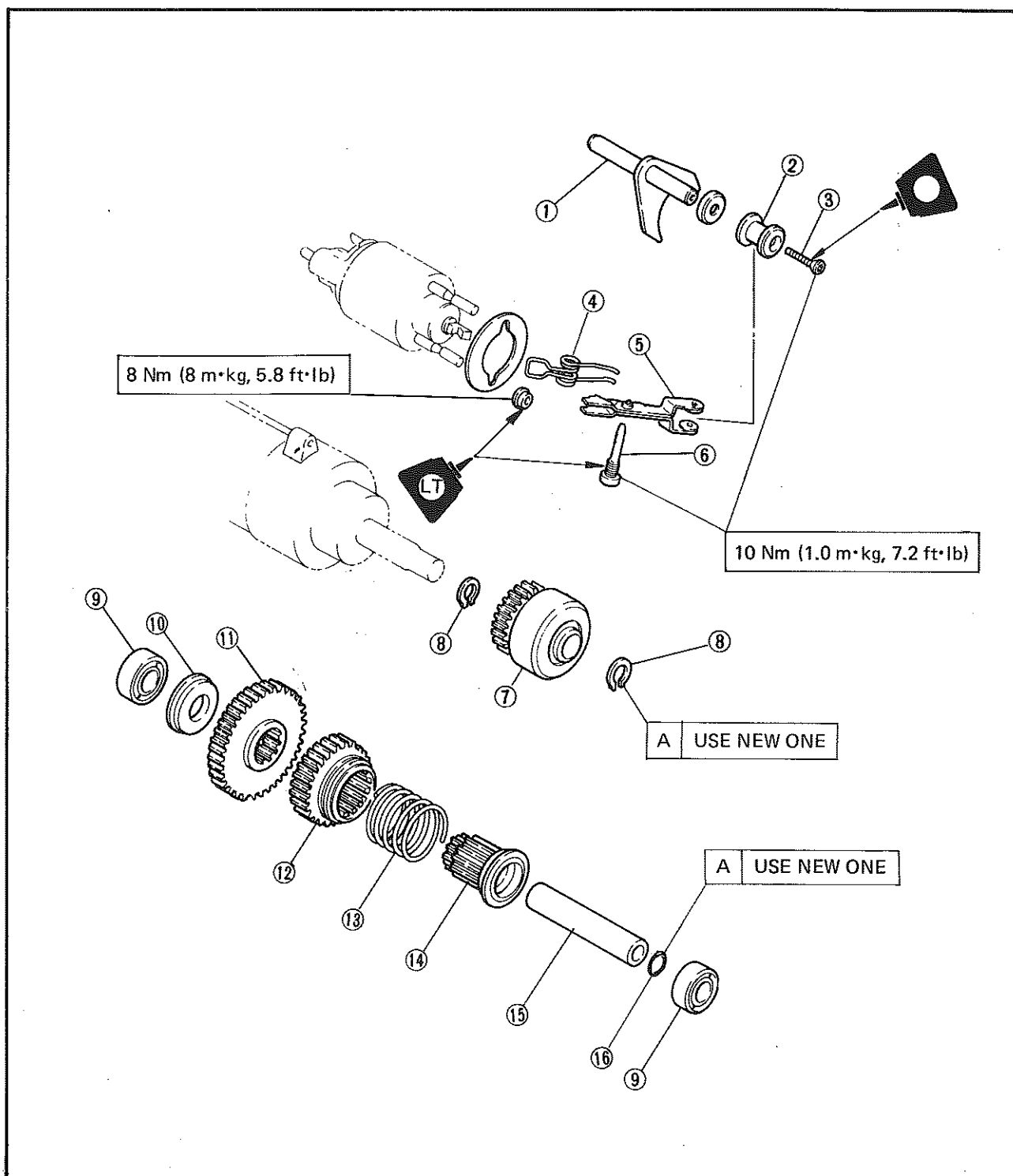
NOTE:

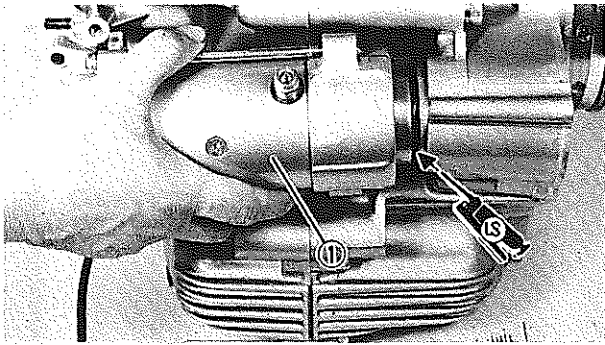
Drilled portion of the holding pin must face outside of the engine.



STARTER MOTOR, STARTER DRIVE, AND CRANKCASE COVER

- | | |
|----------------------------|----------------------|
| ① Drive lever shaft | ⑨ Rubber bushing |
| ② Drive lever collar | ⑩ Thrust collar |
| ③ Drive lever collar screw | ⑪ Idle gear # 1 |
| ④ Spring | ⑫ Drive gear |
| ⑤ Drive lever | ⑬ Compression spring |
| ⑥ Drive lever screw | ⑭ Idler wheel |
| ⑦ Starter clutch | ⑮ Idler shaft |
| ⑧ Circlip | ⑯ O-ring |



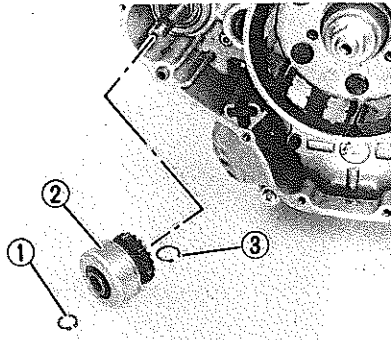


1. Apply:
 - Grease
To the O-ring.
2. Install:
 - Starter motor ①
3. Install:
 - Securing bolts

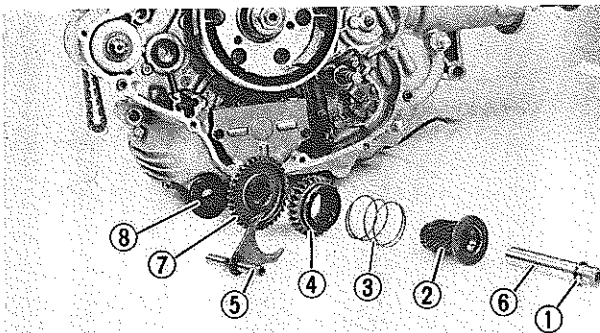


Starter Motor Securing Bolt:
10 Nm (1.0 m·kg, 7.2 ft·lb)

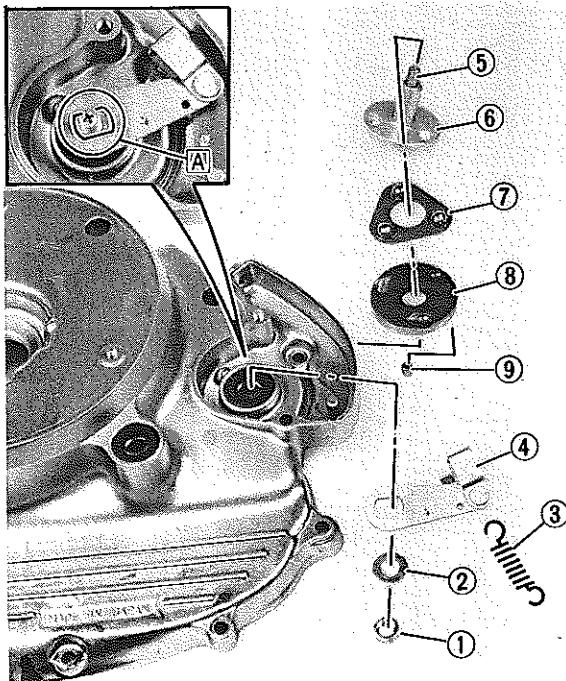
4. Install:
 - Circlip (New) ③
 - Starter clutch ②
 - Circlip (New) ①



5. Install:
 - Thrust collar ⑧
 - Idler gear #1 ⑦
 - Shaft ⑥
 - Idler gear fork ⑤ with idler gear #2 ④
 - Spring ③
 - Starter wheel ②
 - O-ring (New) ①

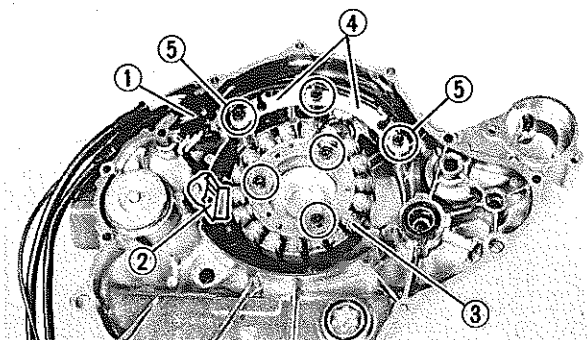


6. Install:
 - Dowel pin ⑨
 - Ball retainer housing ⑧
 - Ball retainer ⑦
 - Adjuster rod ⑤ with adjuster housing ⑥
 - Push lever ④
 - Return spring ③
 - Washer ②
 - Adjuster lock nut ①



NOTE: _____

Reset the cut position **A** of the adjuster housing as shown on the photo.



7. Install:

- Pickup coil assembly ④
- Starter coil assembly ③
- Starter coil lead holding plate ②
- Grommets ①



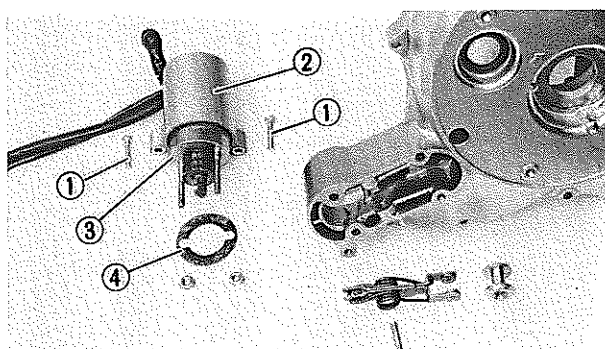
Securing Bolt:

6 Nm (0.6 m·kg, 4.3 ft·lb)
LOCTITE®

NOTE:

Fix the grommets to the crankcase cover use a bond.

⑤ With washer

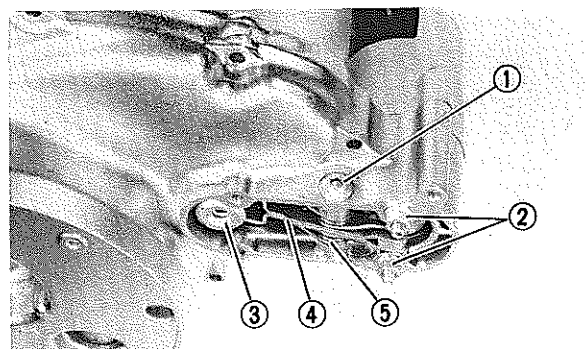


8. Install:

- Gasket (New) ④
- Solenoid cover ② with solenoid ③
- Solenoid cover securing screw ①



Solenoid Cover Securing Screw ① :
10 Nm (1.0 m·kg, 7.2 ft·lb)



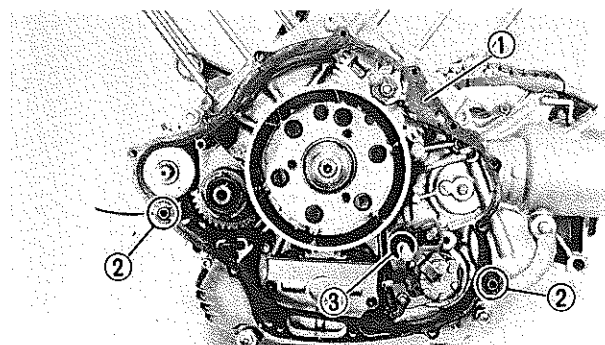
9. Install:

- Drive lever ④ with spring ⑤
- Drive lever collar ③
- Solenoid securing nuts ②
- Drive lever screw ①



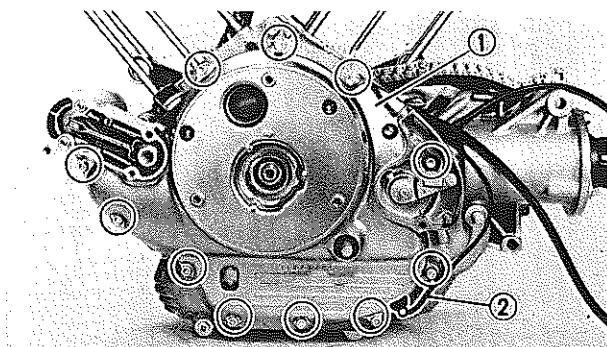
Solenoid Securing Nut ② :
8 Nm (0.8 m·kg, 5.8 ft·lb)
LOCTITE®

Drive Lever Screw ① :
10 Nm (1.0 m·kg, 7.2 ft·lb)
LOCTITE®



10. Install:

- Thrust washer ③
Onto the change shaft.
- Dowel pins ②
- Gasket (New) ①

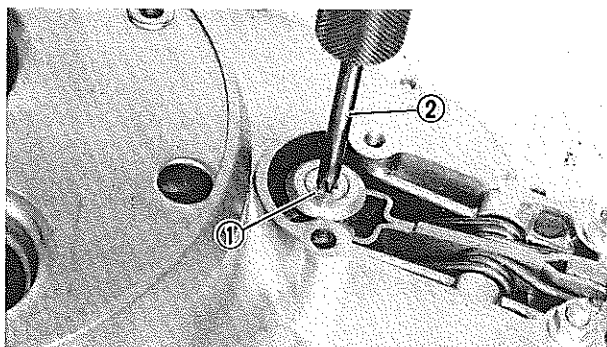


11. Install:

- Neutral switch lead ②
- Left side crankcase cover ①

NOTE:

Tighten the bolts in stage, using the crisscross pattern.

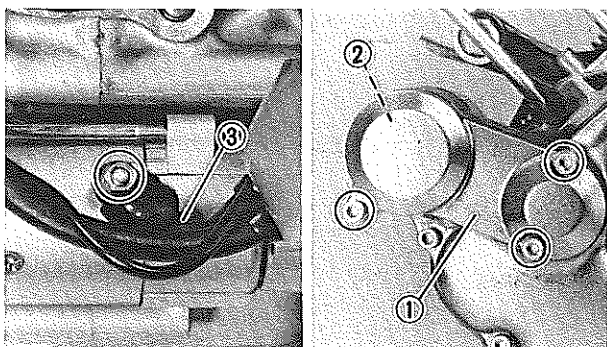


12. Tighten:

- Drive lever collar screw ①
- Use the #30 Torx Driver ②



Solenoid Lever Collar Screw ① :
 10 Nm (1.0 m·kg, 7.2 ft·lb)
 LOCTITE®

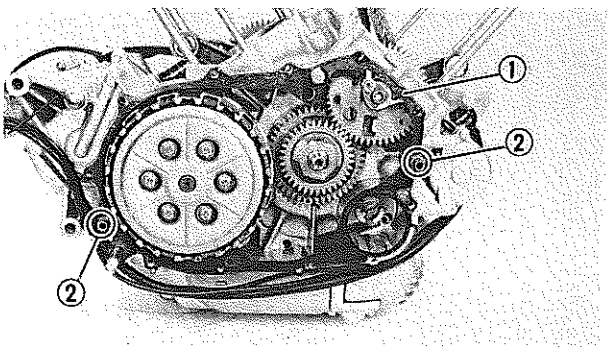


13. Install:

- Starter motor lead ③
- Gasket (New) ②
- Drive lever cover ①

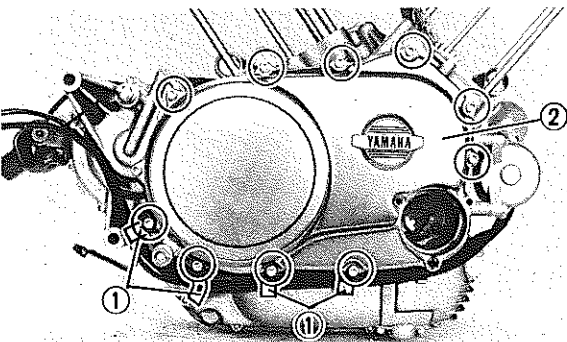


Drive Lever Cover Bolt:
 10 Nm (1.0 m·kg, 7.2 ft·lb)



14. Install:

- Dowel pins ②
- Gasket (New) ①

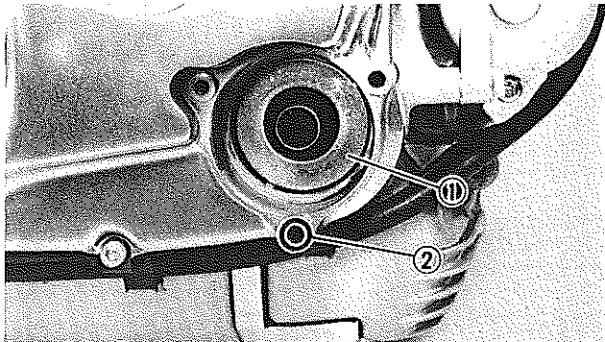


15. Install:

- Right side crankcase cover ②
- Clamps (Starter motor cable) ①
- Bolts (Right side crankcase cover)

NOTE:

- Before tightening the crankcase cover bolt, clamp the starter motor lead, solenoid lead and oil level switch lead.
- Tighten the bolts in stage, using the crisscross pattern.



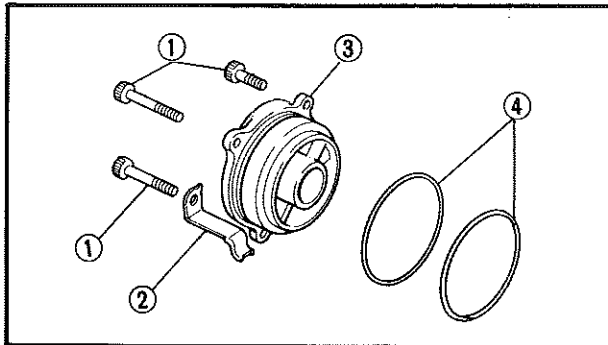
OIL FILTER

1. Install:

- O-ring (New) ②
- Oil filter ①

NOTE:

Install oil filter with open end facing out.



2. Install:

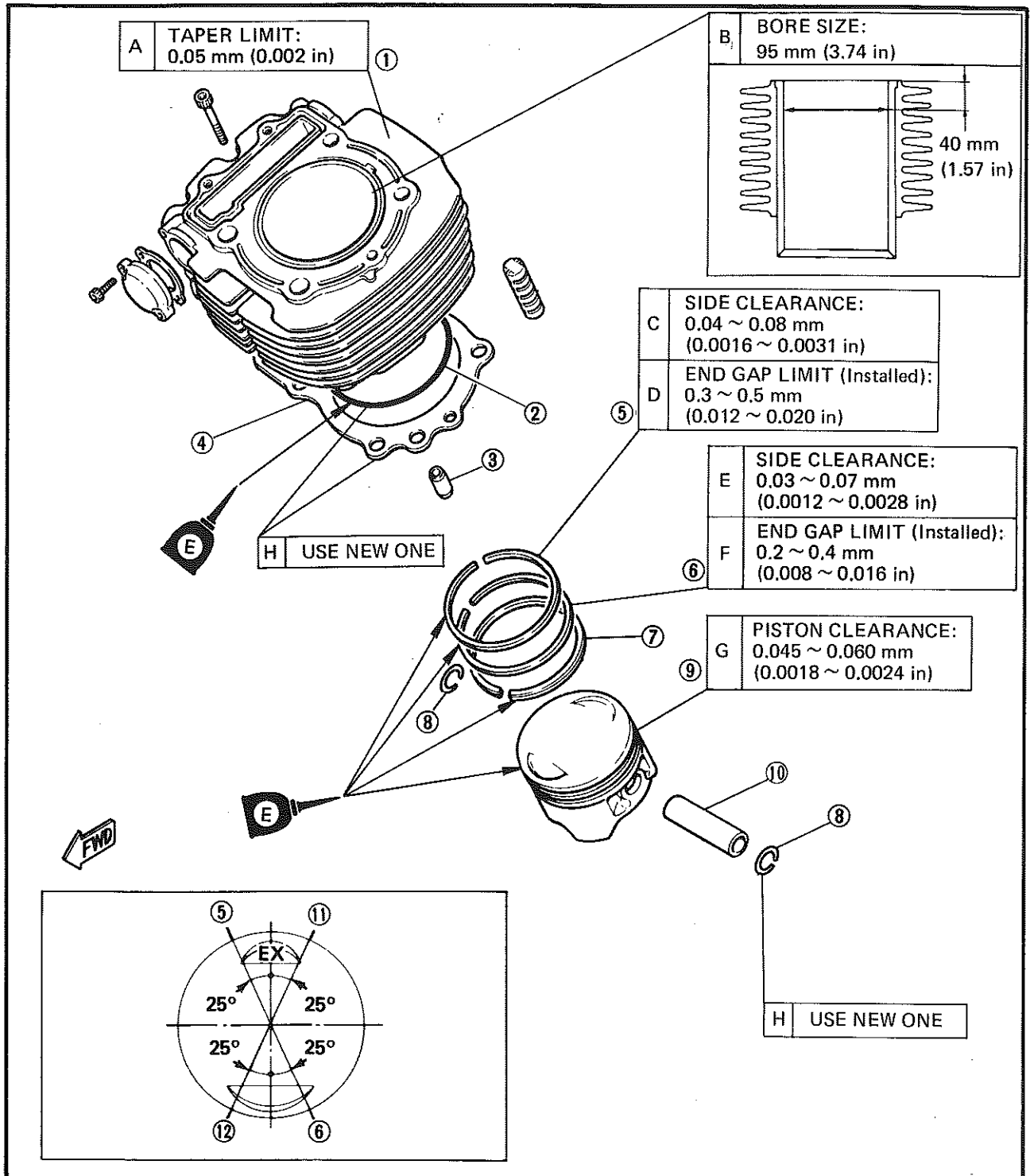
- O-rings (New) ④
- Oil filter cover ③
- Clamp ②
- Oil filter cover bolt ①

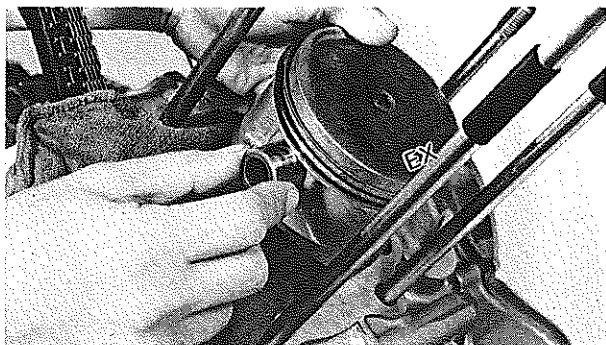


Oil Filter Cover Bolt ① :
10 Nm (1.0 m·kg, 7.2 ft·lb)


PISTON, CAM CHAIN GUIDES, AND CYLINDER

- | | |
|-------------------|-------------------------|
| ① Cylinder | ⑩ Piston pin |
| ② O-ring | ⑪ Oil ring (Lower rail) |
| ③ Dowel pin | ⑫ Oil ring (Upper rail) |
| ④ Base gasket | |
| ⑤ Top ring | |
| ⑥ 2nd ring | |
| ⑦ Oil ring | |
| ⑧ Piston pin clip | |
| ⑨ Piston | |

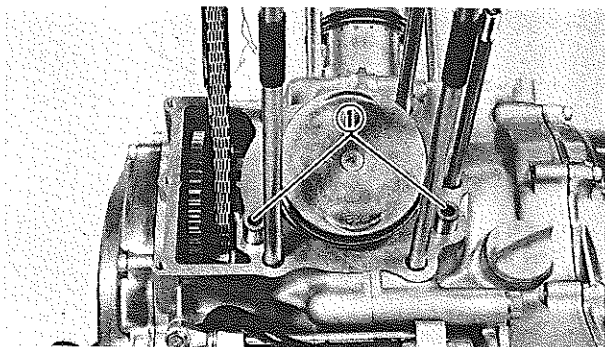




1. Install:
 - Pistons
 - Piston pins
 - Piston pin clips (New)
2. Position:
 - Pistons

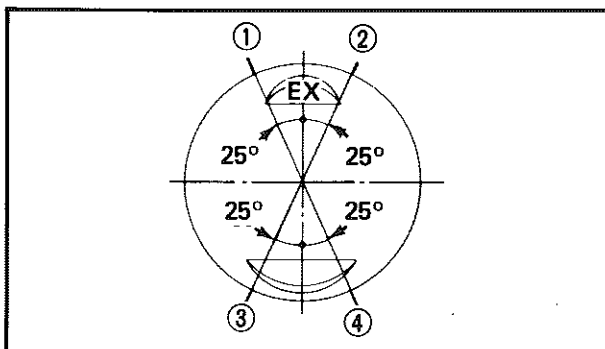
The "EX" marks on the front piston must face toward the front of engine:
The "EX" marks on rear piston must face towards rear.

NOTE: _____
Cover crankcase with clean rag before installing piston pin clips to prevent clips from falling into crankcase cavity.



3. Install:
 - Dowels ①
 - Cylinder base gasket (New)
4. Lubricate:
 - Piston
 - Piston rings

Use engine oil.

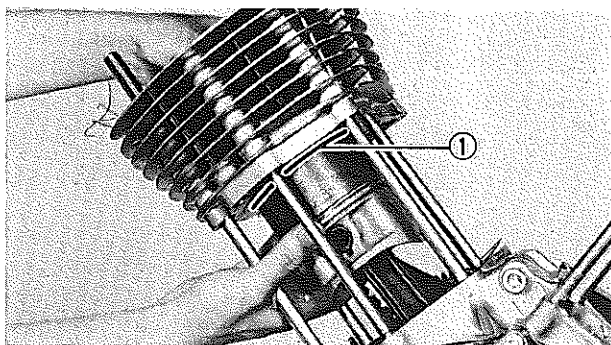


5. Align:
 - Top ring ①
 - Oil ring (Lower rail) ②
 - Oil ring (Upper rail) ③
 - 2nd ring ④

Align the above components as shown.

CAUTION: _____
Be sure ends of oil ring expanders do not overlap.

NOTE: _____
Manufacturer's marks or numbers stamped on rings should face upwards.

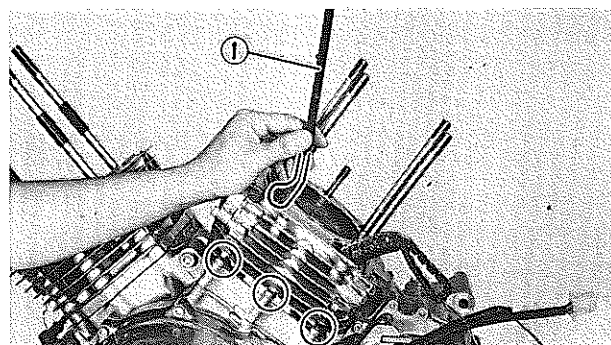


6. Install:

- Cylinder
Compress piston rings with fingers while installing.
- O-ring (New) ①

NOTE:

- Route cam chain and rear cam chain guide through cam chain cavity in each cylinder.
- If used pistons are reinstalled, assemble only mated parts together, e.g., No. 1 piston with No. 1 (rear) cylinder.



7. Install:

- Cylinder base bolts



Cylinder Base Bolt:
10 Nm (1.0 m·kg, 7.2 ft·lb)

8. Install:

- Front cam chain guide ①

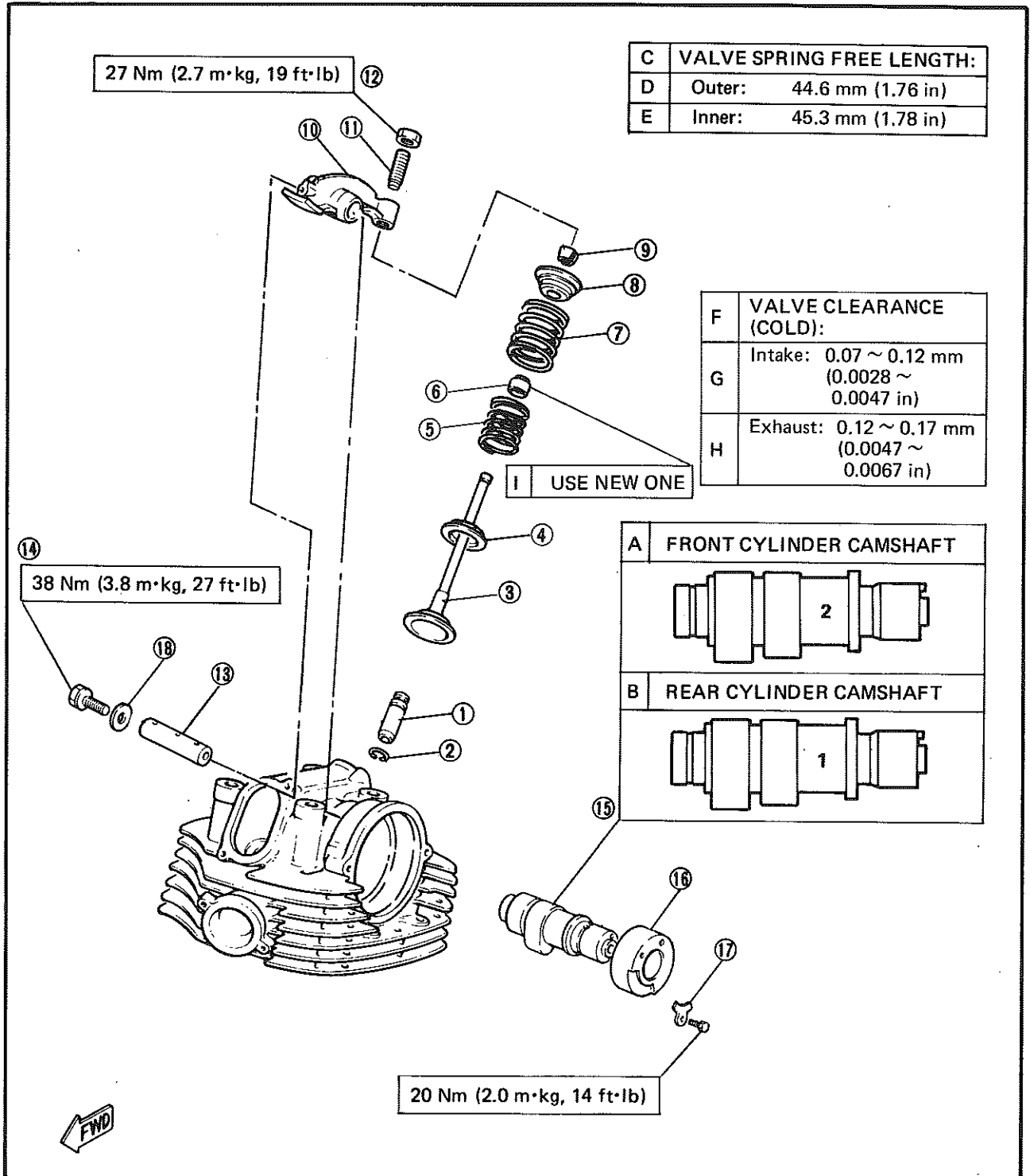
9. Position:

- Guides
Lower end of each guide must rest in the crankcase slots.



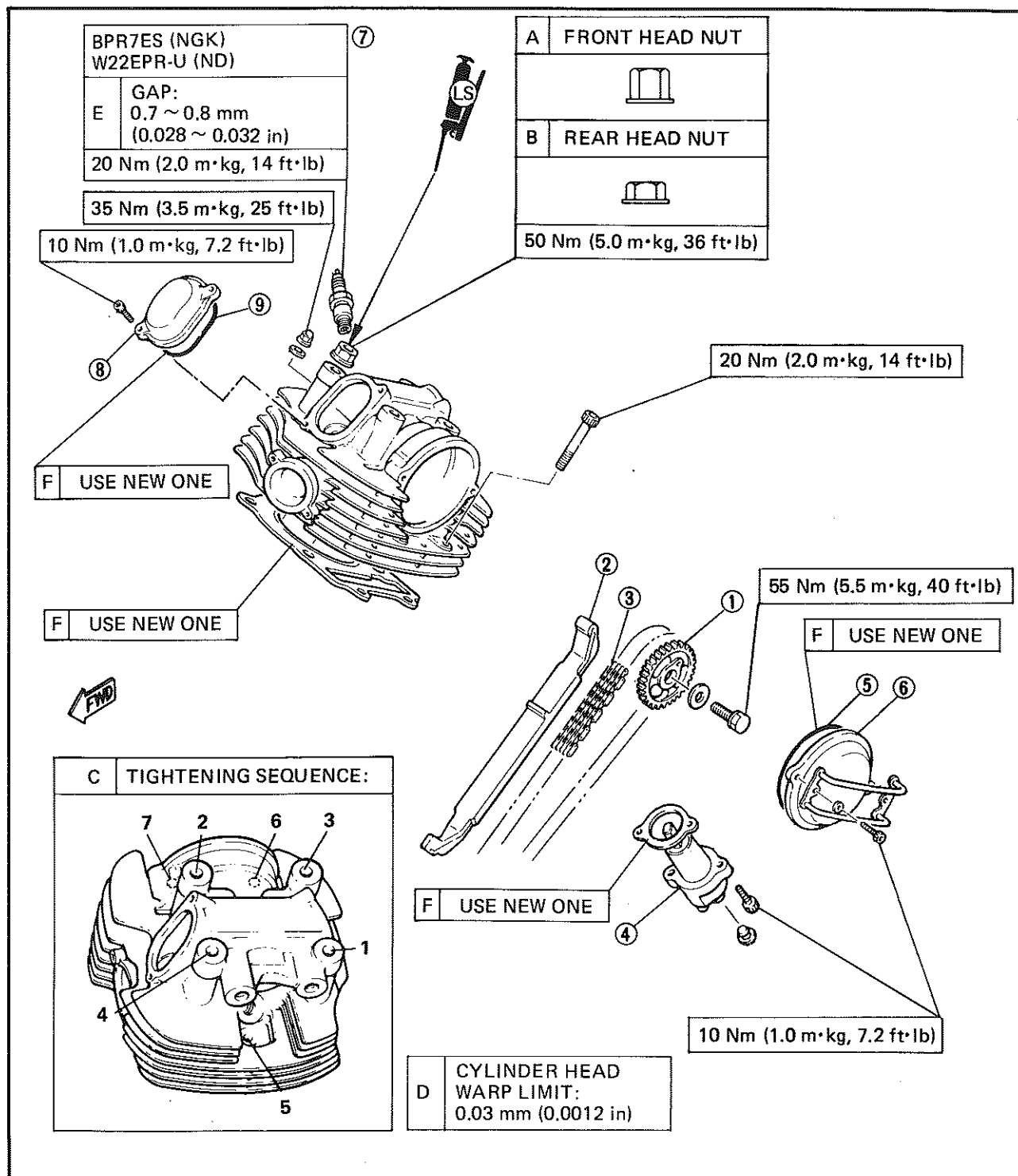
CYLINDER HEAD

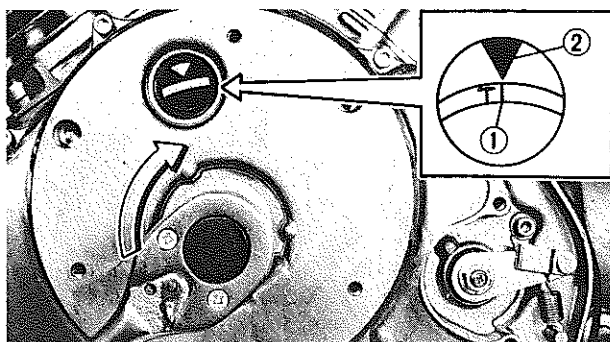
- | | |
|-----------------------|--------------------|
| ① Valve guide | ⑩ Rocker arm |
| ② Circlip | ⑪ Adjuster |
| ③ Valve | ⑫ Locknut |
| ④ Spring seat (Lower) | ⑬ Rocker arm shaft |
| ⑤ Inner spring | ⑭ Union bolt |
| ⑥ Valve stem seal | ⑮ Camshaft |
| ⑦ Outer spring | ⑯ Camshaft bushing |
| ⑧ Spring seat (Upper) | ⑰ Stopper plate |
| ⑨ Valve retainer | ⑱ Copper washer |



CYLINDER HEAD AND CAMSHAFT SPROCKET

- ① Cam chain sprocket
- ② Front cam chain guide
- ③ Cam chain
- ④ Cam chain tensioner
- ⑤ O-ring
- ⑥ Cam sprocket cover
- ⑦ Spark plug
- ⑧ Valve cover
- ⑨ O-ring





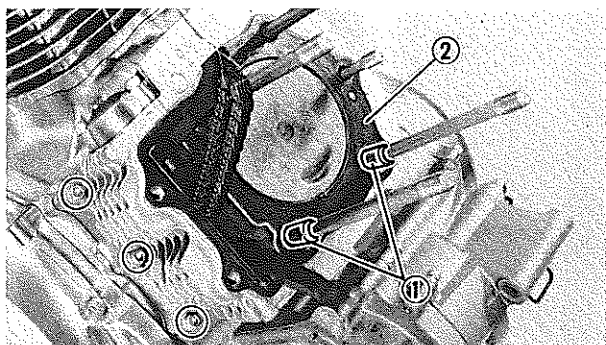
Rear Cylinder Head

1. Align:

- Flywheel "T" mark ①
(with stationary pointer ②)

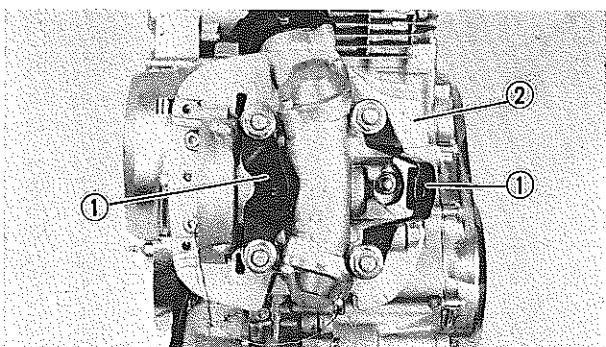
NOTE:

Be sure to keep cam chain taut while turning crankshaft.



2. Install:

- Dowel pins ①
- Cylinder head gasket (New) ②

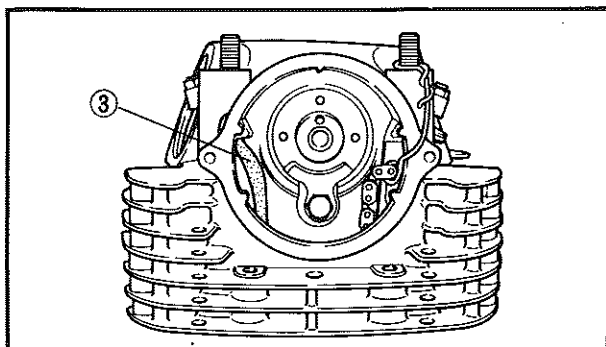


3. Install:

- Cylinder head assembly ②
- Cylinder head mounting brackets ①
- Nuts and bolts (Cylinder head)

NOTE:

- Route cam chain through cam chain cavity in cylinder head.
- Secure front cam chain guide ③ into cam chain guide slot in head.



4. Tighten:

- Nuts and bolts (Cylinder head)



Cylinder Nuts: (No. 1 ~ No. 4)

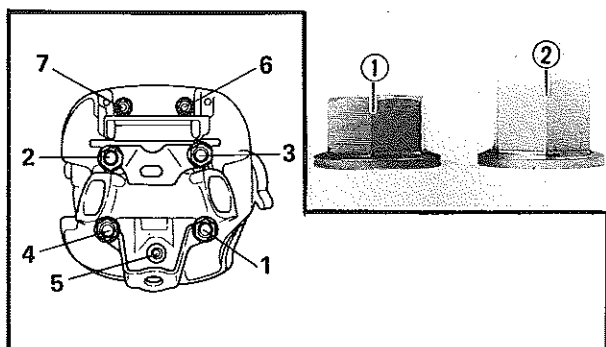
50 Nm (5.0 m·kg, 36 ft·lb)

Cylinder Head Bolts: (No. 6, No. 7)

20 Nm (2.0 m·kg, 14 ft·lb)

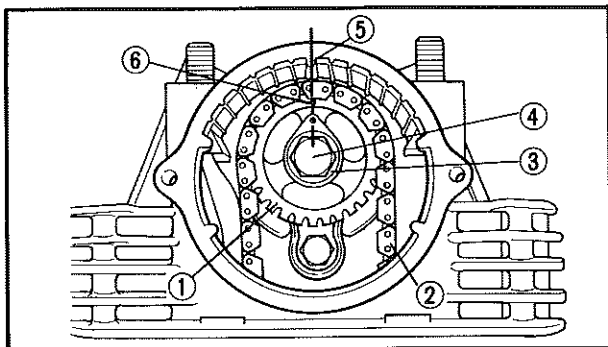
Cylinder Head Nut: (No. 5)

35 Nm (3.5 m·kg, 25 ft·lb)



NOTE:

- Tighten the nuts and bolts starting with the lowest numbered one.
- There are two different cylinder nuts (No. 1 ~ No. 4). Install shorter nuts ① on rear cylinder and taller ones ② on front cylinder.



5. Install:

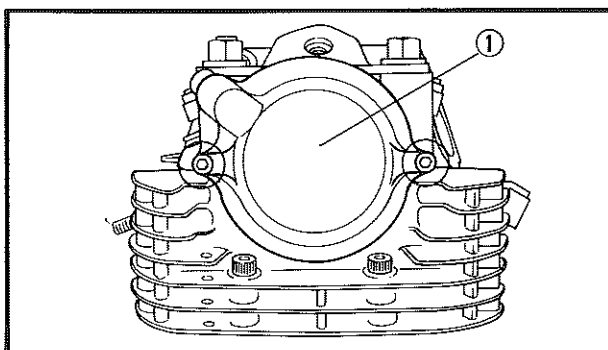
- Cam chain sprocket ①
- Cam chain ②
- Washer ③
- Bolt ④



Cam Chain Sprocket Bolt ④ :
55 Nm (5.5 m·kg, 40 ft·lb)

6. Align:

- Sprocket timing mark ⑥
(with cylinder head timing mark ⑤)
- Remove any slack from front side of cam chain.

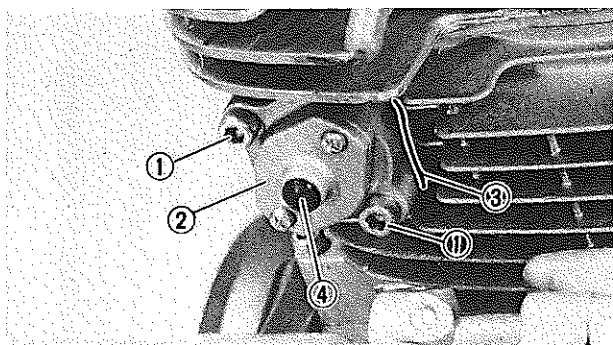


7. Install:

- O-ring (New)
- Cam sprocket cover ①
- Bolt



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

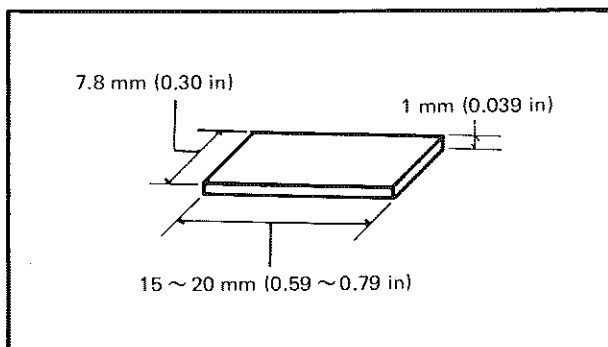


8. Install:

- Gasket (New) ③
- Cam chain tensioner assembly ②
- Screws ①
- Plug ④

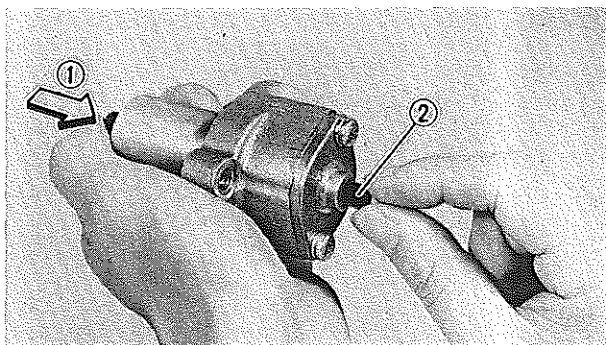
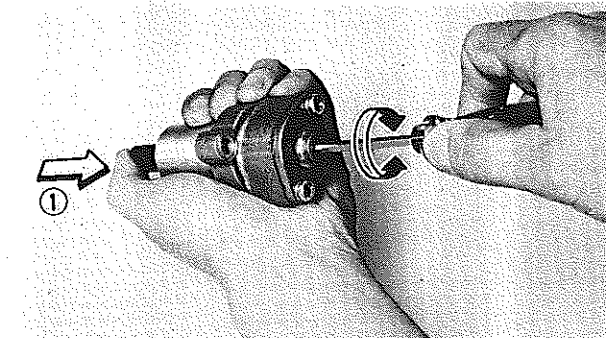


Chain Tensioner Assembly Screw ① :
10 Nm (1.0 m·kg, 7.2 ft·lb)



Cam chain tensioner preparation and installation steps:

- Cut a tensioner plate from a sheet of steel 1 mm (0.039 in) thick as shown.



- Remove the rubber plug from the cam chain tensioner, and insert a small screwdriver.
- Tighten spring by turning screwdriver and pushing ① tension rod into cam chain tensioner.
- Keep tightening spring until completely tight.
- Remove screwdriver while maintaining pressure ① on tension rod.
- Insert tensioner plate ② into cam chain tensioner.
- Attach cam chain tensioner to the rear cylinder.
- Remove tension plate from cam chain tensioner, and reinstall rubber plug.

9. Adjust:

- Valve clearance

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

10. Install:

- Spark plug
- Valve covers (Intake and exhaust)

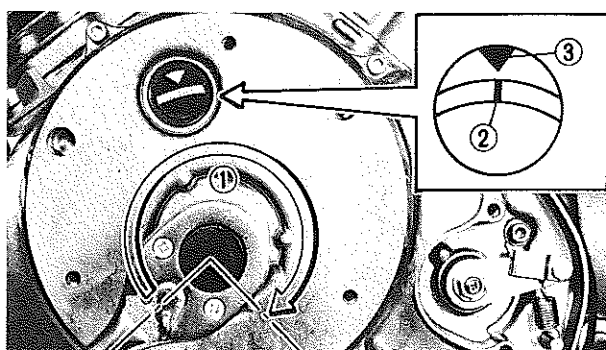


Spark Plug:

20 Nm (2.0 m·kg, 14 ft·lb)

Valve Covers (Intake and Exhaust):

10 Nm (1.0 m·kg, 7.2 ft·lb)



Front Cylinder Head

1. Rotate:

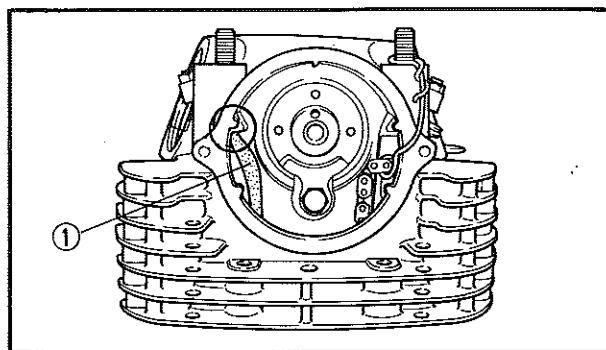
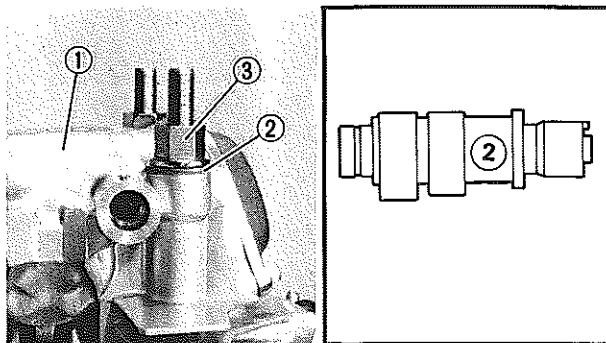
- Crankshaft 285 degrees clockwise ①

2. Align:

- Flywheel "I" mark ②
(with stationary pointer ③)

NOTE:

Be sure to keep cam chain taut while turning crankshaft.



3. Repeat step 2 (Rear Cylinder Head)
4. Install:
 - Front cylinder head assembly ①
 - Washer ②
 - Nuts ③
 - Screws

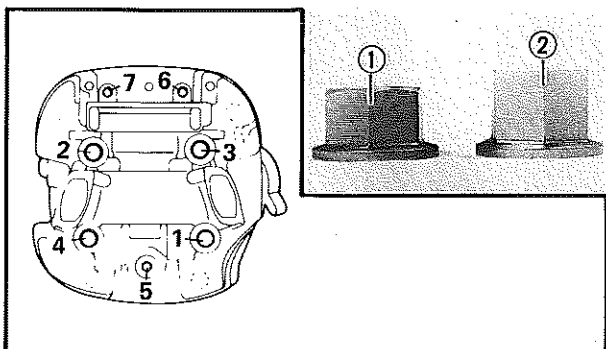
NOTE:

- Route cam chain through cam chain cavity in cylinder head.
- Secure front cam chain guide ① into cam chain guide slot in cylinder head.

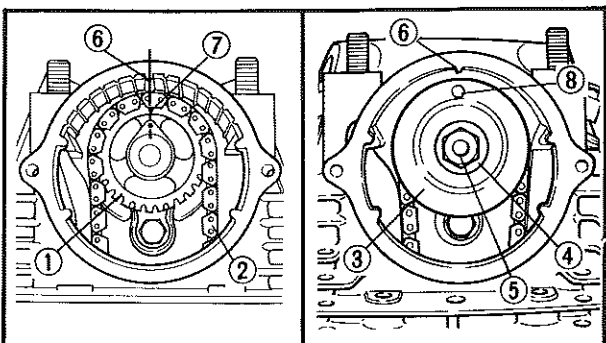
5. Tighten:
 - Nuts and bolts (Cylinder head)



Cylinder Nuts: (No. 1 ~ No. 4)
 50 Nm (5.0 m·kg, 36 ft·lb)
 Cylinder Head Bolts: (No. 6, No. 7)
 20 Nm (2.0 m·kg, 14 ft·lb)
 Cylinder Head Nut: (No. 5)
 35 Nm (3.5 m·kg, 25 ft·lb)

**NOTE:**

- Tighten the nuts and bolts starting with the lowest numbered one.
- There are two different cylinder nuts (No. 1 ~ No. 4). Install taller nuts ② on front cylinder and shorter ones ① on rear cylinder.



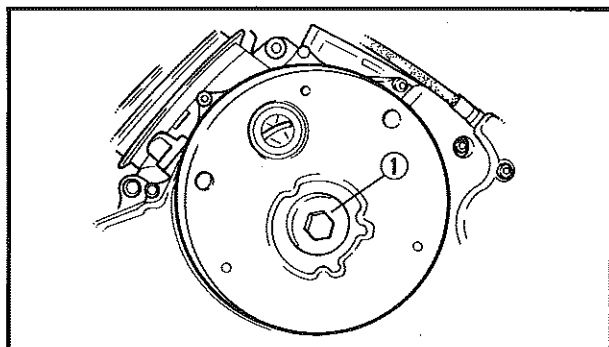
6. Install:
 - Cam chain sprocket ①
 - Cam chain ②
 - Oil baffle ③
 - Washer ④
 - Bolt ⑤



Cam Chain Sprocket Bolt ⑤ :
 55 Nm (5.5 m·kg, 40 ft·lb)

7. Align:

- Sprocket timing mark ⑦
(with cylinder head timing mark ⑥)
Remove any slack from front side of cam chain.
- Oil baffle hole ⑧
(with cylinder head timing mark ⑥)



8. Repeat steps 7 to 10 (Rear Cylinder Head).

9. Install:

- Crankshaft end cover ①



Crankshaft End Cover ① :
10 Nm (1.0 m·kg, 7.2 ft·lb)

10. Install:

- Generator cover

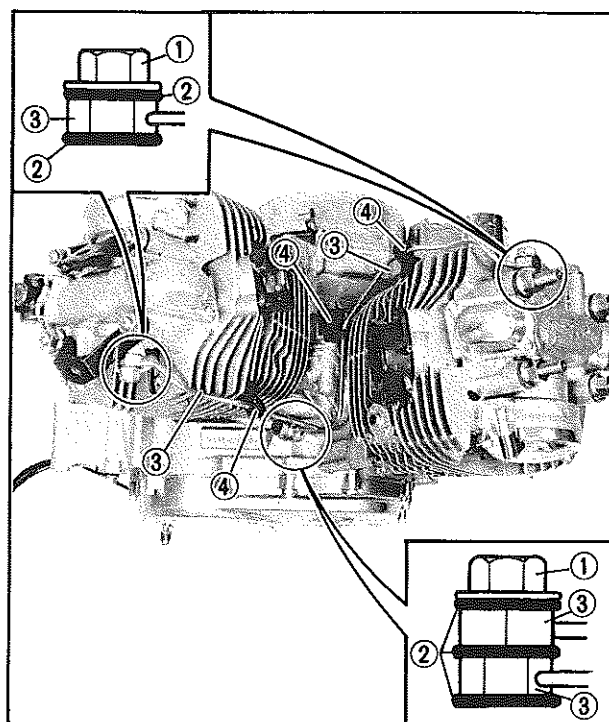
OIL DELIVERY PIPE

1. Install:

- Oil delivery pipes ③ with rubber guides ④
- Copper washers ②
- Union bolts ①



Union Bolt ① :
20 Nm (2.0 m·kg, 14 ft·lb)



Reverse the applicable removal steps for following items.

CARBURETOR.

IGNITION COIL AND ENGINE MOUNTING BRACKET.

ENGINE GUARD, CHANGE PEDAL, AND SIDE STAND.



REMounting ENGINE

1. Install:

- Carburetor joint screw



10 Nm (1.0 m·kg, 7.2 ft·lb)

- Front engine mounting bracket



64 Nm (6.4 m·kg, 46 ft·lb)

- Sidestand



55 Nm (5.5 m·kg, 40 ft·lb)

- Engine guards (Left and right)



55 Nm (5.5 m·kg, 40 ft·lb)

- Change pedal bolt



10 Nm (1.0 m·kg, 7.2 ft·lb)

- Engine mounting bolts



Front Cylinder Head:

Rear Cylinder Head:

Rear Upper:

Rear Lower:

55 Nm (5.5 m·kg, 40 ft·lb)

- Exhaust pipe and Muffler



Front Exhaust Pipe Clamp Bolt:

20 Nm (2.0 m·kg, 14 ft·lb)

Rear Exhaust Pipe Clamp Bolt:

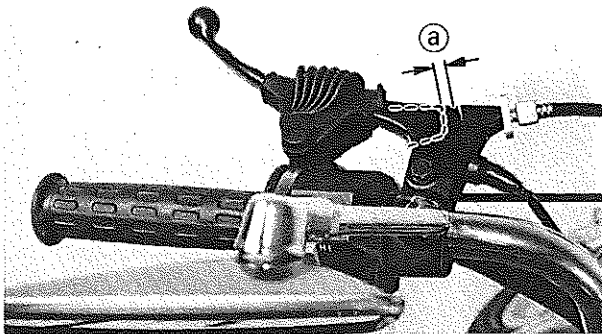
20 Nm (2.0 m·kg, 14 ft·lb)

Exhaust Pipe Nut:

20 Nm (2.0 m·kg, 14 ft·lb)

Muffler Securing Bolt:

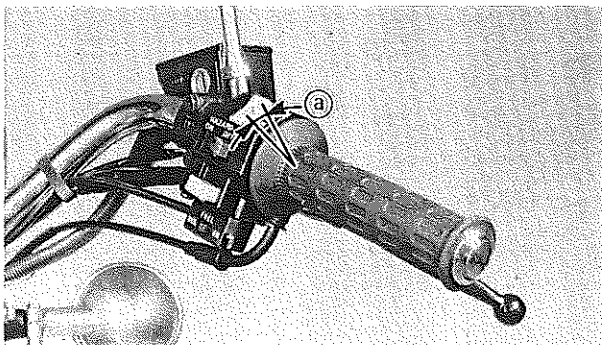
20 Nm (2.0 m·kg, 14 ft·lb)



2. Adjust:
- Clutch cable free play
Refer to "CHAPTER 2. CLUTCH ADJUSTMENT" section.



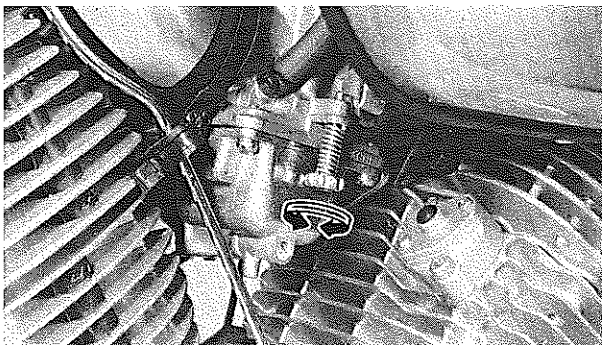
Free Play (a) :
2 ~ 3 mm (0.08 ~ 0.12 in)



3. Adjust:
- Throttle cable free play
Refer to "CHAPTER 2. THROTTLE CABLE ADJUSTMENT" section.



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



4. Adjust:
- Carburetor synchronization
Refer to "CHAPTER 2. CARBURETOR SYNCHRONIZATION" section.

5. Adjust:
- Idle speed
Refer to "CHAPTER 2. IDLE SPEED ADJUSTMENT" section.

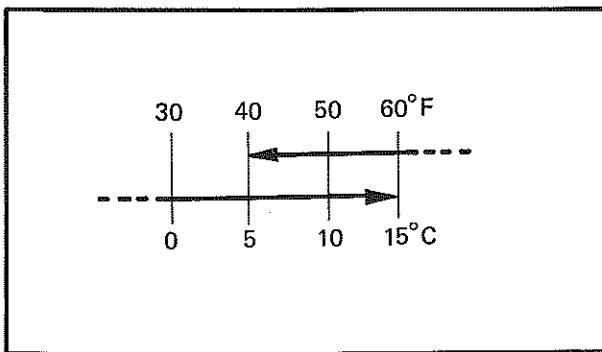


Idle Speed:
950 ~ 1,050 r/min

6. Apply:
- Engine oil

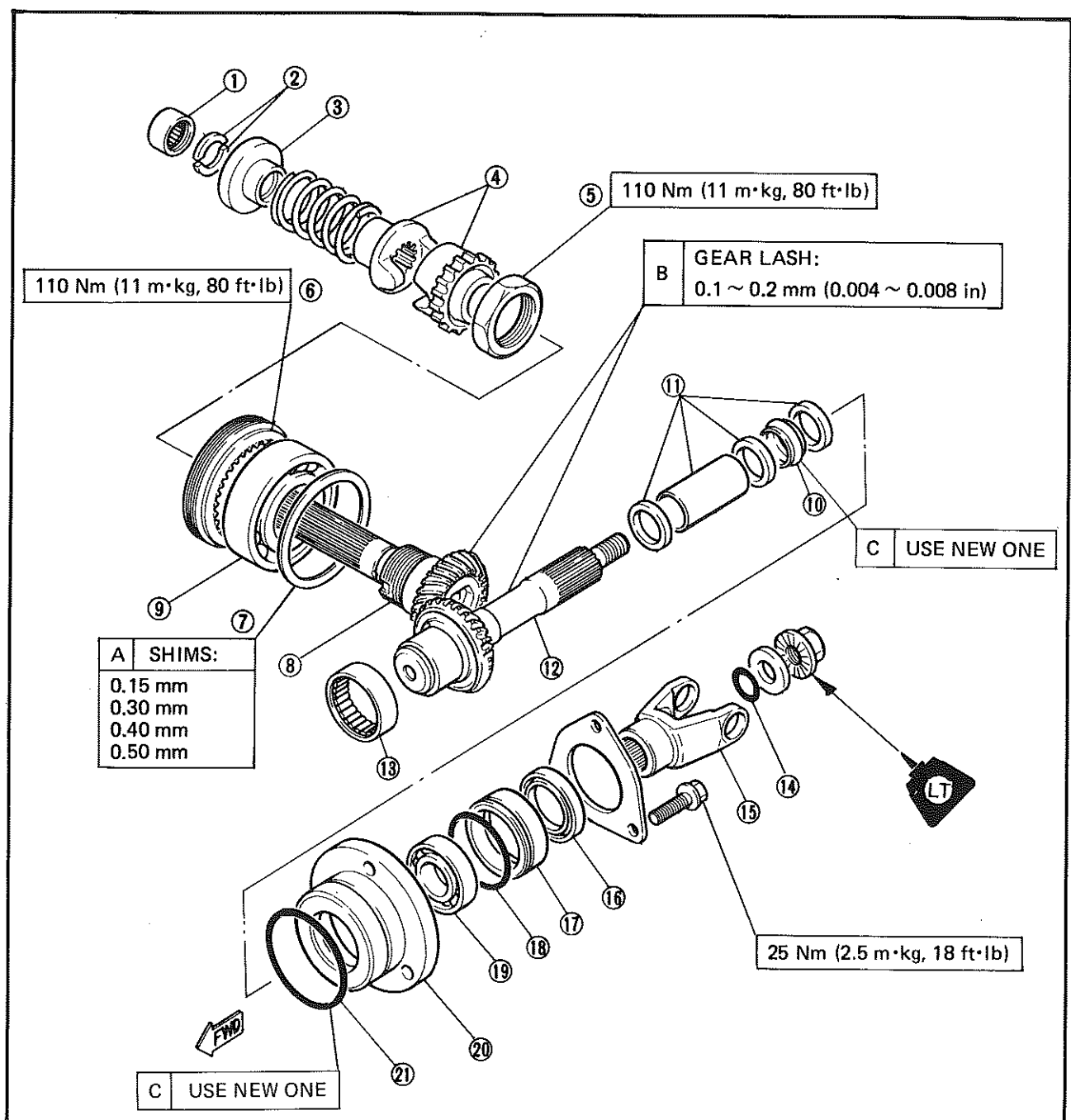


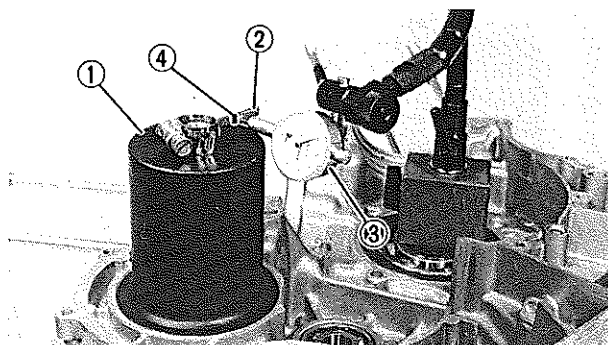
Recommended Oil:
SAE 20W40 type SE motor oil
SAE 10W30 type SE motor oil
Total Amount:
3.6 L (3.2 Imp qt, 3.8 US qt)




MIDDLE GEAR SERVICE

- | | |
|---------------------------------------|--------------------------|
| ① Bearing (Needle 20 x 26 x 12) | ⑭ O-ring |
| ② Spring retainers | ⑮ Universal joint |
| ③ Spring seat | ⑯ Oil seal (35 x 50 x 6) |
| ④ Damper cams | ⑰ Bearing retainer |
| ⑤ Middle drive shaft nut | ⑱ O-ring (52 x 56 x 1.9) |
| ⑥ Middle drive shaft bearing retainer | ⑲ Bearing (B6205 RC2) |
| ⑦ Middle drive gear shim | ⑳ Bearing housing |
| ⑧ Middle drive shaft | ㉑ O-ring (71 x 77 x 3) |
| ⑨ Bearing (B6209RSH2C2) | |
| ⑩ Collapsible collar | |
| ⑪ Spacers | |
| ⑫ Middle driven shaft | |
| ⑬ Bearing (Needle 40 x 50 x 15) | |





GEAR LASH MEASUREMENT

1. Install:
 - Middle Drive Shaft Retainer (90890-04056) ①.
 - Gear Lash Measurement Tool (90890 01230) ②.
(onto the middle drive shaft)
2. Attach:
 - Dial Gauge (90890-03097) ③
At the scribed mark ④ on the measurement tool.
3. Measure:
 - Middle gear lash
Out of specification (at any rotation point) → Remove the yoke and readjust the gear lash.



Middle Gear Lash:
0.1 ~ 0.2 mm (0.004 ~ 0.008 in)

Middle gear lash measurement steps:

- Rotate the yoke gently back and forth and measure the lash.
- Rotate the yoke three times by 90° and each time repeat steps.

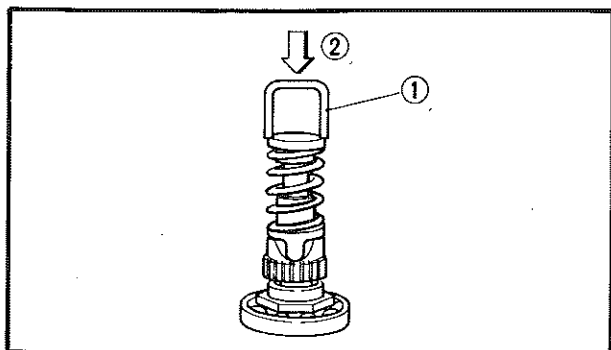
REMOVAL

1. Remove:
 - Middle drive shaft assembly
 - Middle driven shaft assembly
Refer to "ENGINE DISASSEMBLY – MIDDLE GEAR" section.

DISASSEMBLY

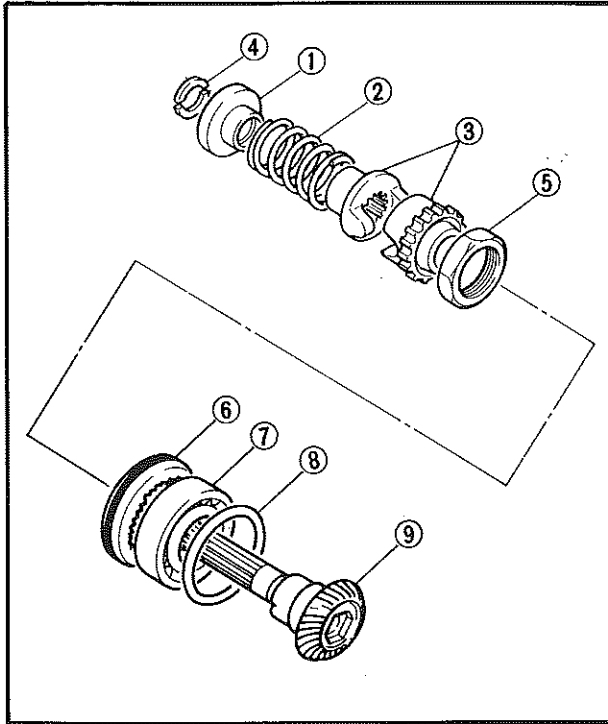
Middle Drive Shaft

1. Remove:
 - Spring retainer
Use Damper Compressor ① (90890-04011) with hydraulic press ②.



**WARNING:**

Measure the inside distance between the legs of the damper compressor. This distance must not exceed 37 mm (1.4 in).



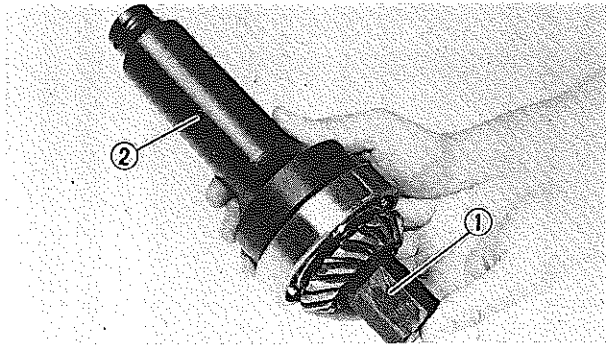
2. Remove:

- Spring seat ①
- Spring ②
- Damper cam ③

- ④ Spring retainer
- ⑤ Middle drive shaft nut
- ⑥ Middle-drive-shaft-bearing retainer
- ⑦ Middle-drive-shaft bearing
- ⑧ Shim(s)
- ⑨ Middle drive shaft

NOTE:

Perform following steps only if middle-drive-shaft bearing or middle-drive-shaft gear must be replaced.



3. Flatten the lock collar of the middle drive shaft nut with a suitable center punch.

4. Attach:

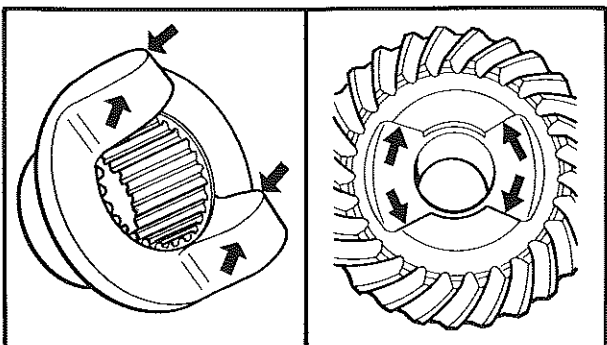
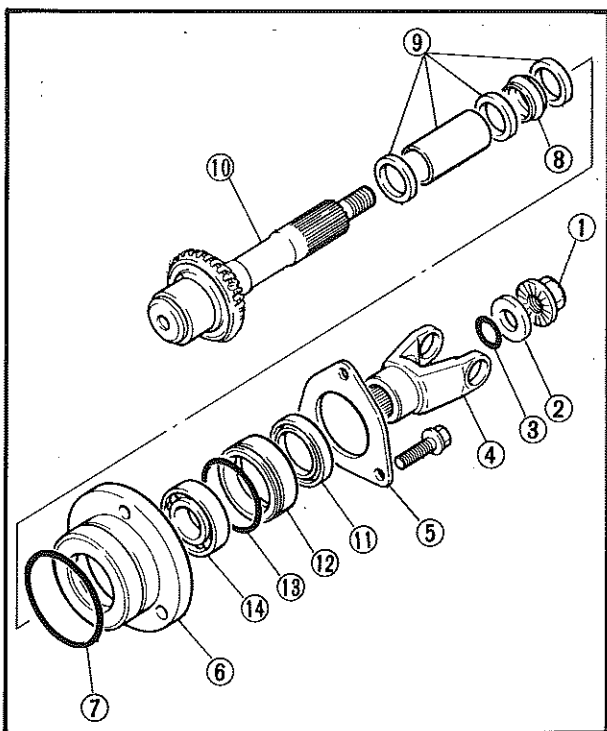
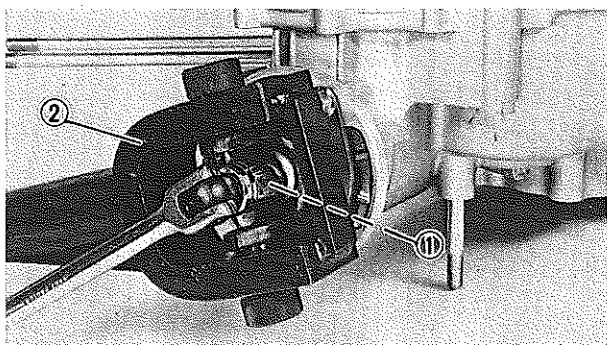
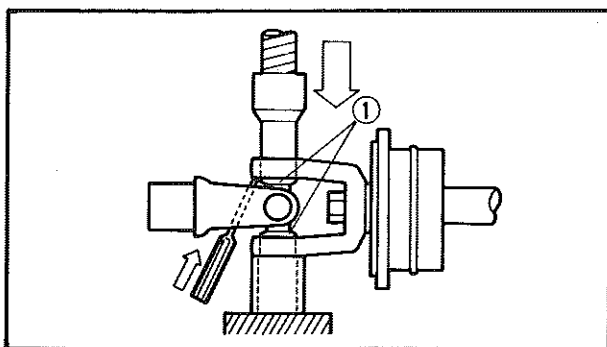
- Middle Drive Shaft Holder (90890-04055) ①
- Middle Drive Shaft Nut Wrench (90890-04054) ②

Onto middle drive shaft.

5. Secure Middle Drive Shaft Holder in a Vise.

6. Remove:

- Middle drive shaft nut
- Bearing
- Middle drive shaft



Middle Driven Shaft

1. Remove:
 - Clips ①
 - Bearings
 - Yoke

NOTE:

- Place U-joint in a press. With a suitable diameter pipe beneath yoke, press bearing into pipe.
- It may be necessary to lightly tap yoke with a punch.

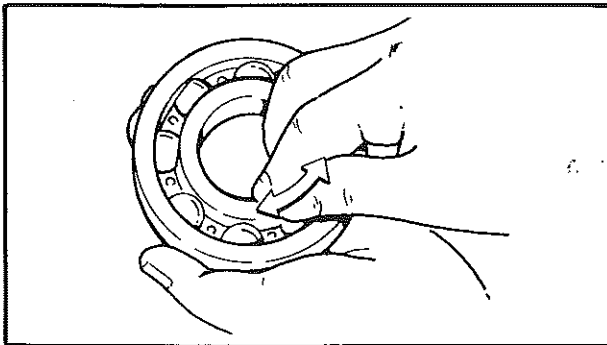
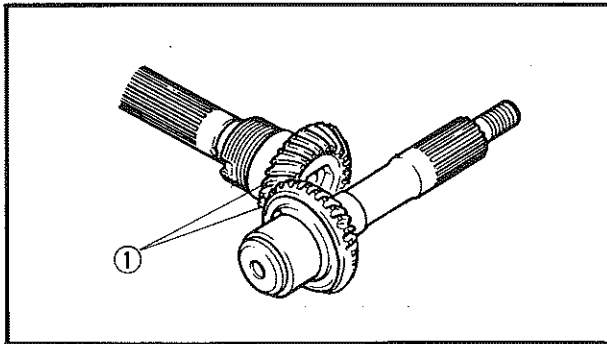
2. Remove:
 - Driven shaft nut ①
 Use Universal Joint Holder (90890-04062) ② .

3. Remove:
 - Securing nut ①
 - Plain washer ②
 - O-ring ③
 - Universal joint ④
 - Bearing housing retainer ⑤
 - Bearing housing assembly ⑥
 - O-ring ⑦
 - Spacers ⑧
 - Collapsible collar ⑨
 - Middle driven shaft ⑩

- ⑪ Oil seal (35 x 50 x 6)
- ⑫ Bearing retainer
- ⑬ O-ring (52 x 56 x 1.9)
- ⑭ Bearing (B6205RC2)

INSPECTION

1. Inspect:
 - Damper cam surfaces
Wear/Scratches → Replace damper and drive pinion gear as a set.
2. Inspect:
 - Damper spring
Damage/Cracks → Replace.



3. Check:

- Teeth of middle gears ①
Discoloration/Pitting/Wear → Replace all middle gears as set.

4. Check:

- Bearing movement
Rotate the race by hand.
Roughness → Replace.

5. Install:

- Bearings
Onto yoke.

6. Check:

- Yoke bearing free play
Free play → Replace U-joint assembly.

ASSEMBLY AND ADJUSTMENT

- Select proper middle drive gear shim.

NOTE:

Select proper middle drive gear shim whenever crankcase and/or middle gears are replaced.

Shim thickness calculation:

- Calculate shim thickness using formula below:

$$\text{Shim thickness (A)} = a - b$$

a = 43 plus or minus the number printed on end of middle drive shaft.

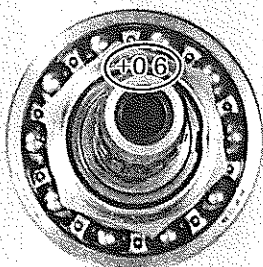
b = 42 plus the number found on-left side crankcase.

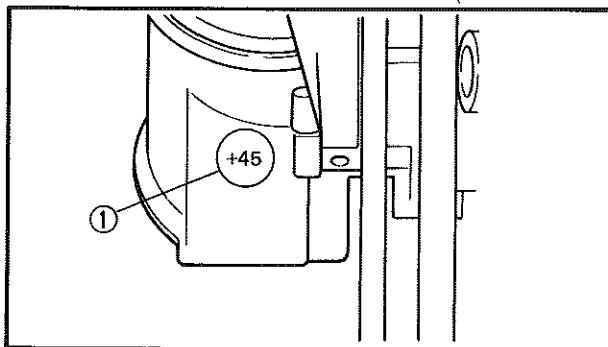
- For example:

If middle drive shaft is marked "+ 06" ①.

$$a = 43 + 0.06$$

$$a = 43.06$$





If left side crankcase is stamped "45" ① .

$$b = 42 + 0.45$$

$$b = 42.45$$

$$A = a - b$$

$$A = 43.06 - 42.45$$

$$A = 0.61$$

Calculated shim thickness is 0.61 mm.

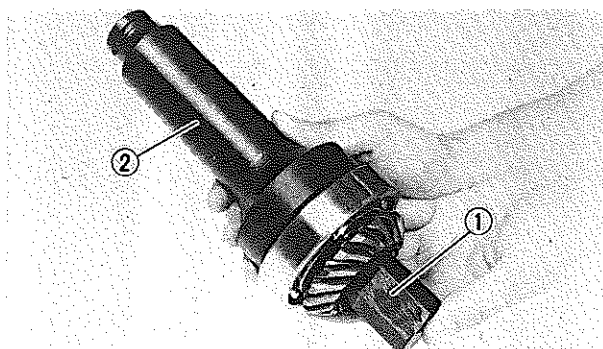
Shim thicknesses:

0.15 mm, 0.30 mm, 0.40 mm, 0.50 mm

Because shims can only be selected in 0.05 mm increments, use following chart to round off the hundredths digit of calculated thickness, and select appropriate shim.

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

In above example, calculated shim thickness is 0.61 mm. The chart instructs you, however, to round off the 1 to 0. Thus you should use two 0.30 mm shims.



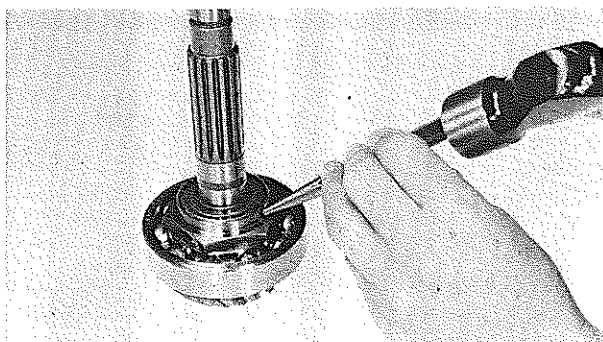
2. Install:

- Middle drive shaft bearing
- Nut

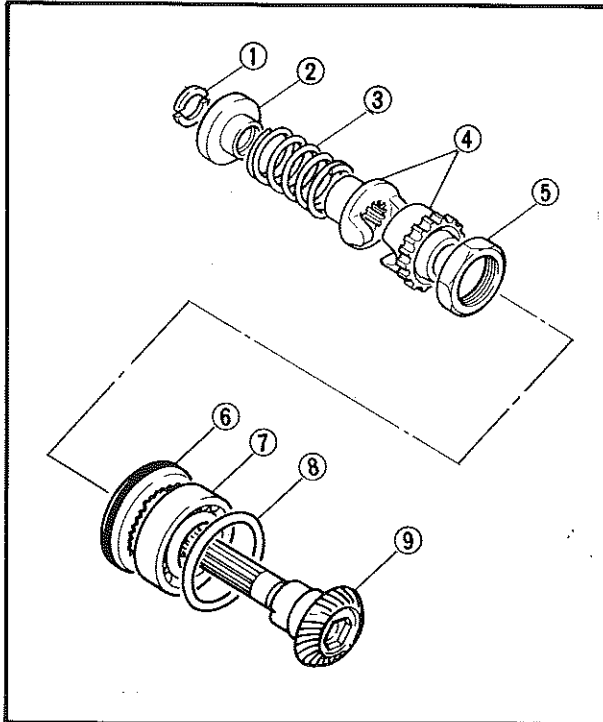


Middle Drive Shaft Nut:
110 Nm (11 m·kg, 80 ft·lb)

Use Middle Drive Shaft Holder (90890-04055) ① and Middle Drive Shaft Nut Wrench (90890-04054) ② .



3. Bend lock collar of nut into middle drive shaft slot using a center punch.

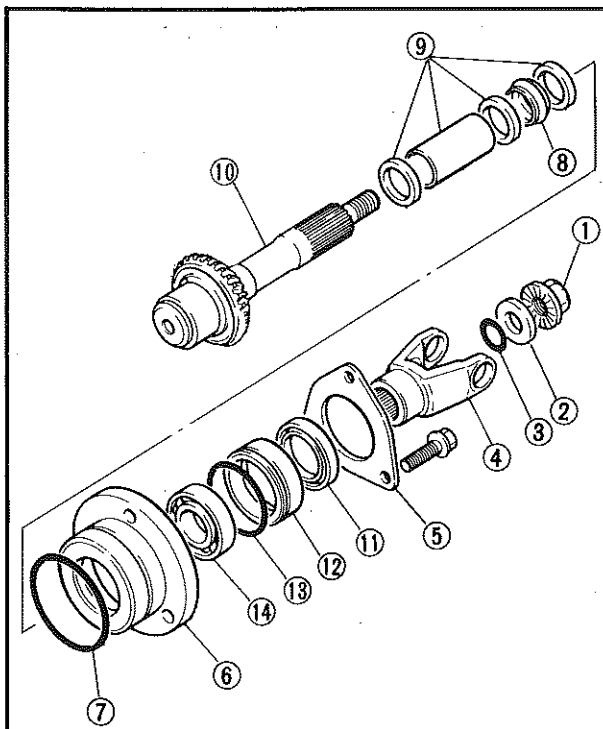


4. Install:

- Damper cams ④
- Spring ③
- Spring seat ②
- Retainers ①

Use Damper Compressor (90890-04011) with hydraulic press.

- ⑤ Nut
- ⑥ Middle drive shaft bearing retainer
- ⑦ Bearing
- ⑧ Shim(s)
- ⑨ Middle drive shaft



5. Install:

- Collapsible collar ⑨
 - Spacers ⑧
 - O-ring (New) ⑦
 - Bearing housing assembly ⑥
 - Bearing housing retainer ⑤
 - Universal joint ④
 - O-ring (New) ③
 - Plain washer ②
 - Securing nut ①
- Onto middle driven shaft ⑩

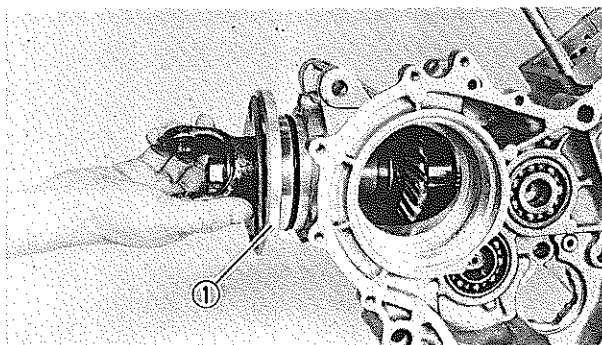
NOTE:

Finger-tighten securing nut ①.

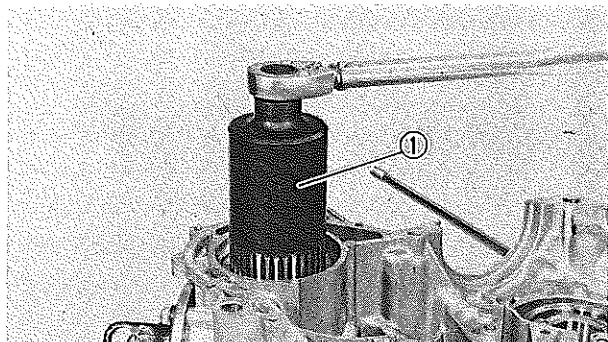
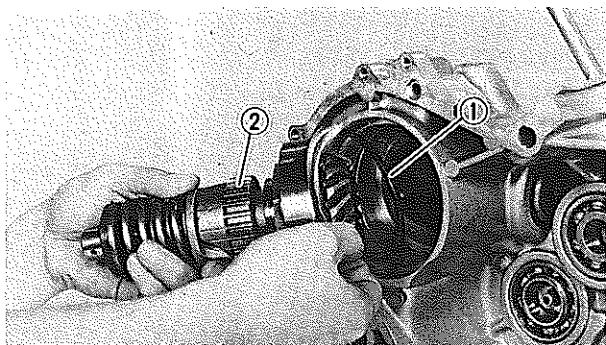
- ⑪ Oil seal (35 x 50 x 6)
- ⑫ Bearing retainer
- ⑬ O-ring (52 x 56 x 1.9)
- ⑭ Bearing (B6205RC2)

6. Install:

- Middle driven shaft assembly ⑩
 - Bearing housing bolt
- Into left side crankcase.



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



7. Install:

- Middle drive shaft assembly (2)
- Proper shim (1)

8. Install:

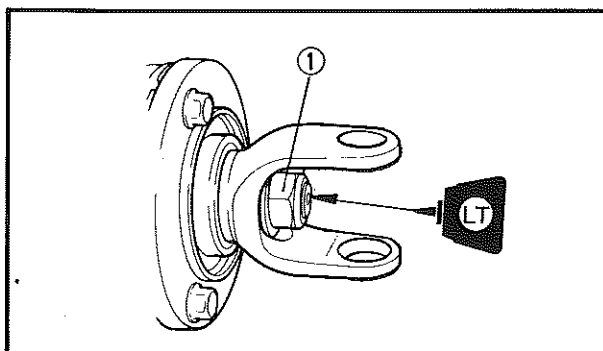
- Middle drive shaft bearing retainer
Use Middle Drive Shaft Bearing Retainer Wrench (90890-04057) (1).



Bearing Retainer:
110 Nm (11 m·kg, 80 ft·lb)

NOTE:

- Be sure middle drive shaft bearing is properly seated in crankcase before installing bearing retainer.

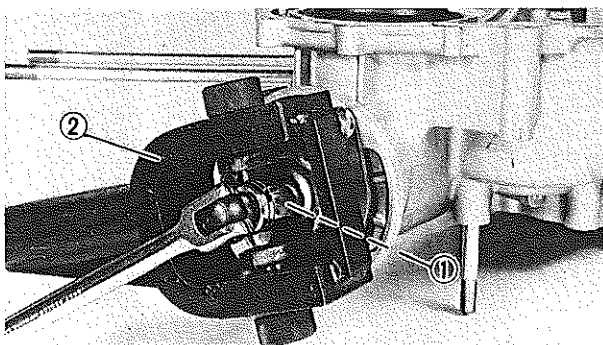


9. Remove:

- Securing nut (1)

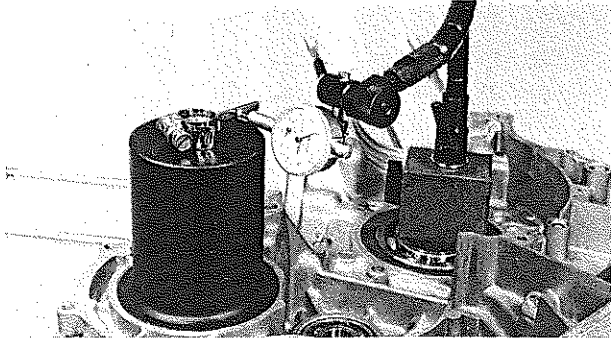
10. Apply:

- LOCTITE®
To the securing nut threads.



11. Tighten:

- Securing nut (1) (a little)
Use Universal Joint Tool (90890-04062) (2).



12. Measure:

- Middle gear lash

13. Repeat steps 11 and 12 until gear lash measurement is within specification.



Middle Gear Lash:

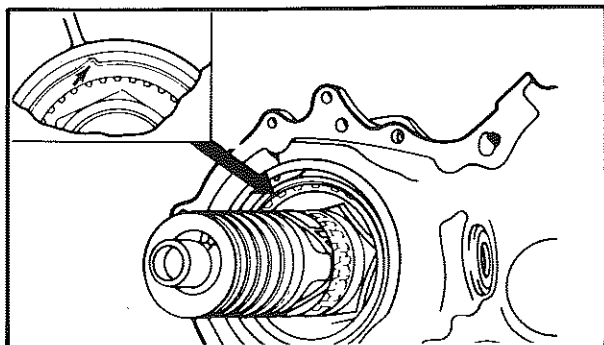
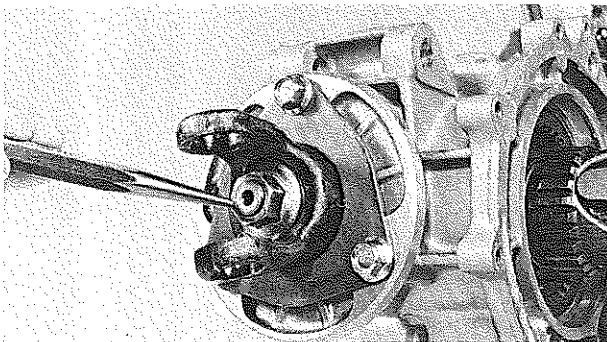
0.1 ~ 0.2 mm (0.004 ~ 0.008 in)

NOTE:

Disassemble middle driven shaft and replace collapsible collar if gear lash is less than 0.1 mm.

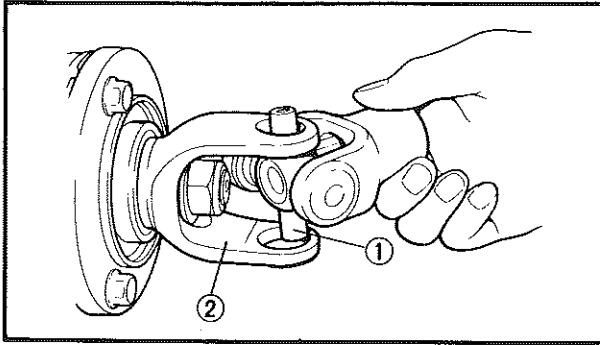
CAUTION:

- Proceed slowly with gear lash steps to avoid damage to collapsible collar.
- Never loosen securing nut when adjusting gear lash or there will be insufficient pressure on collapsible collar.
- Complete gear lash adjustment within five minutes or LOCTITE® will harden and inhibit gear lash adjustment.

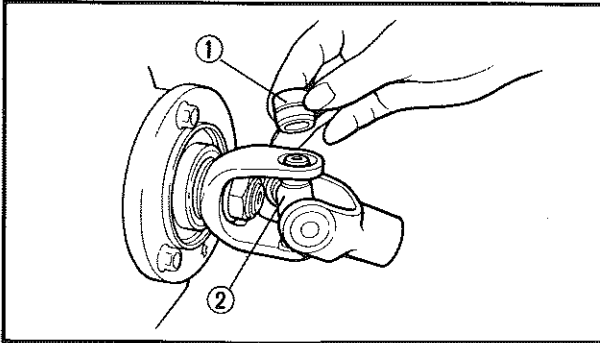


14. Lock the threads on the securing nut with a center punch.

15. Bend the lock collar on middle drive shaft bearing retainer into crankcase slot.



16. Position:
- Yoke ①
Into the U-joint ② .



17. Lubricate:
- Bearings ①

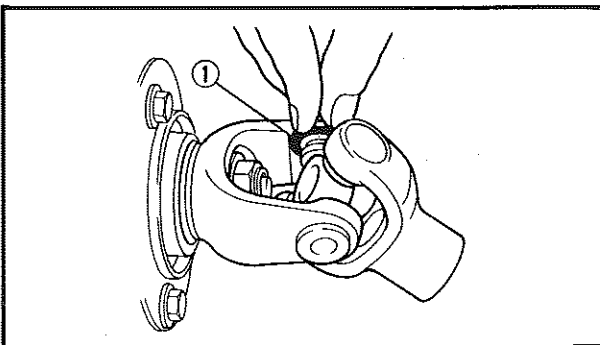


Wheel Bearing Grease

18. Install:
- Bearings ①
Onto the yoke ② .

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.



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

NOTE:

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

20. Install:
- Circlip (New) ①
Into groove of each bearing.

CHAPTER 4. CARBURETION

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CABURETOR



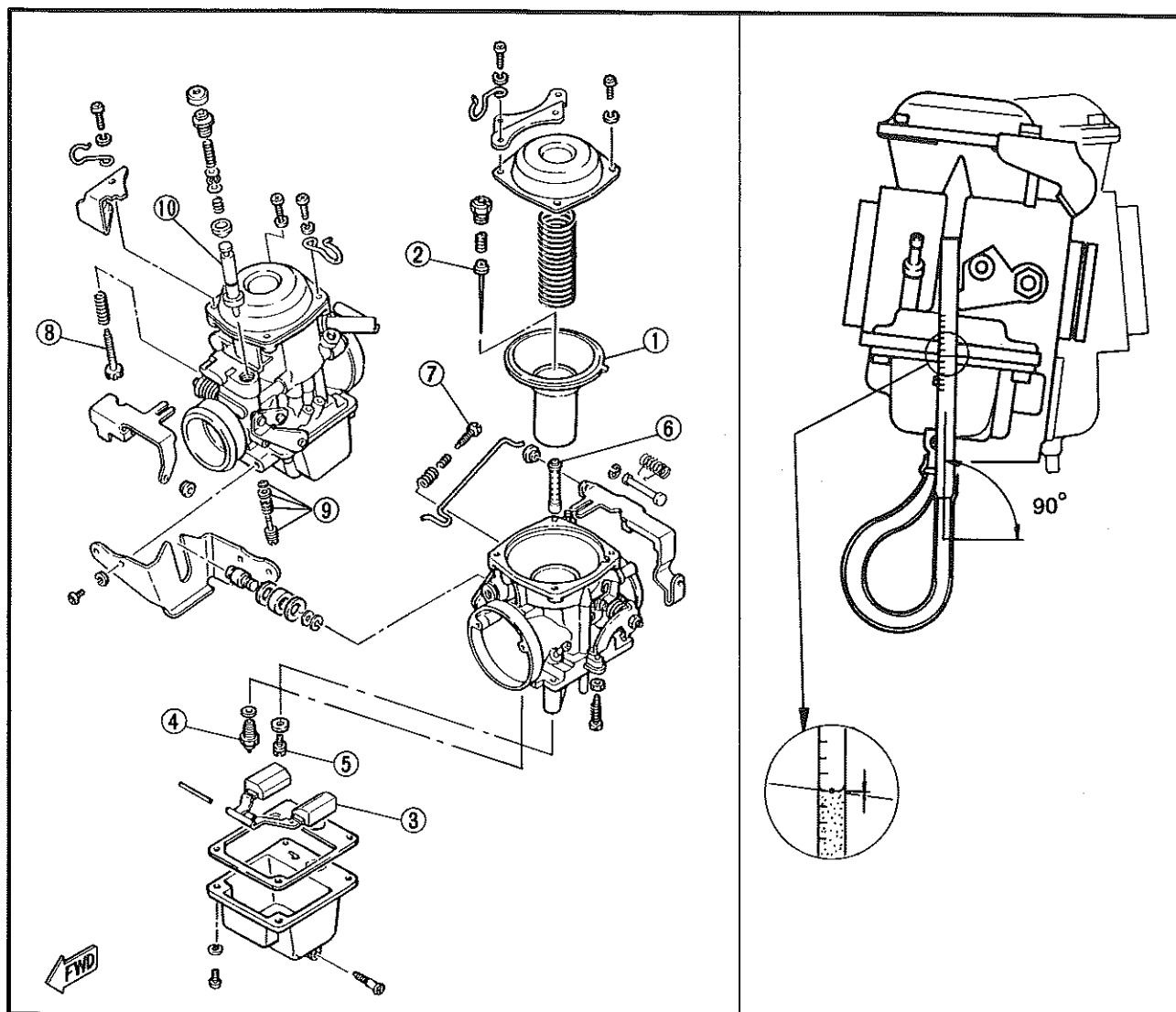
CARBURETION

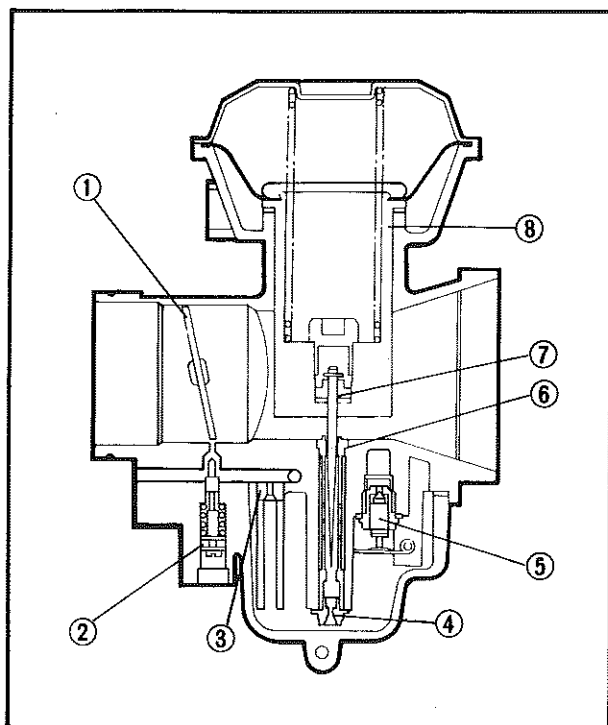
CARBURETOR

- ① Vacuum piston
- ② Jet needle
- ③ Float
- ④ Float valve
- ⑤ Main jet
- ⑥ Main nozzle
- ⑦ Synchronizing screw
- ⑧ Throttle stop screw
- ⑨ Pilot screw
- ⑩ Starter plunger

SPECIFICATIONS

Main jet:	
# 1 Carburetor	# 124
# 2 Carburetor	# 132
Jet needle:	
# 1 Carburetor	Y-34
# 2 Carburetor	Y-33
Pilot jet:	# 40
Starter jet	# 40
Float heith	15 ~ 16 mm (0.59 ~ 0.63 in)
Fuel level	-1.0 ~ 1.0 mm (-0.04 ~ 0.04 in)
Pilot screw	1-1/2 ± 1/2 turns out
Float valve seat	φ 1.4
Engine idle speed	950 ~ 1,050 r/min





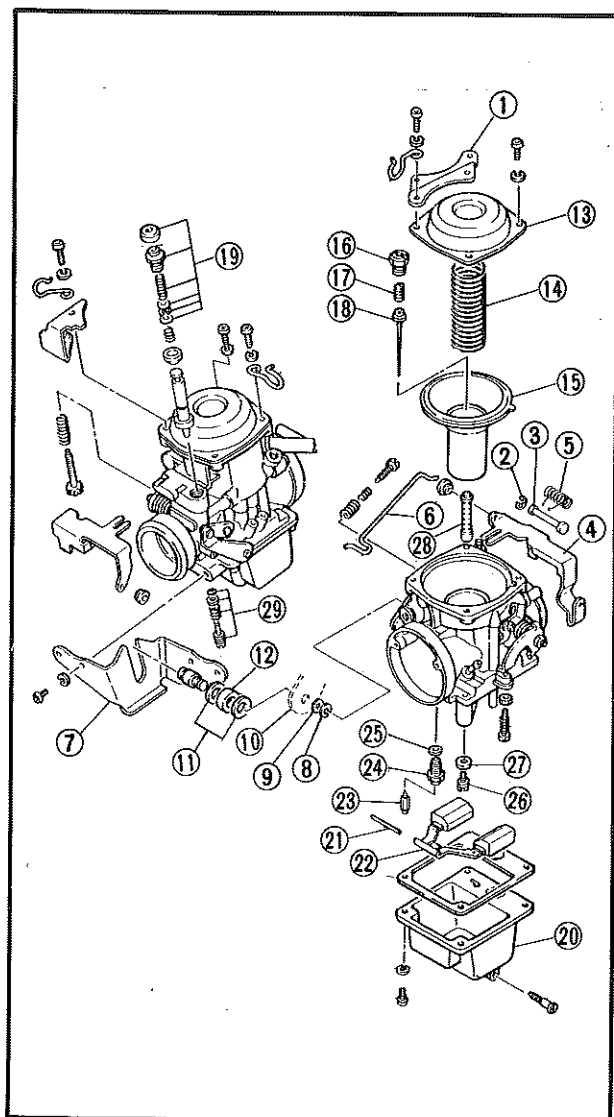
SECTION VIEW

- ① Throttle valve
- ② Pilot screw
- ③ Pilot jet
- ④ Main jet
- ⑤ Float valve
- ⑥ Main nozzle
- ⑦ Jet needle
- ⑧ Vacuum piston

REMOVAL

1. Remove:

- Carburetor assembly
- Refer to "CHAPTER 3. CARBURETOR CABLE AND HOSE AND CARBURETOR" sections.



DISASSEMBLY

1. Remove:

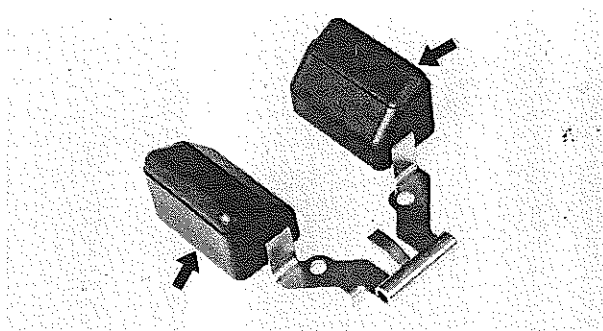
- Suction hose
- Upper bracket ①
- E-clip ②
- Pin ③
- Starter lever ④
- Spring ⑤
- Starter link ⑥
- Lower bracket ⑦
- E-clip ⑧
- Washer ⑨
- Connecting link ⑩
- Washer ⑪
- Collar ⑫
- Vacuum chamber cover ⑬
- Spring ⑭
- Vacuum piston ⑮
- Jet needle holder ⑯
- Spring ⑰
- Jet needle ⑱
- Starter plunger assembly ⑲
- Float chamber cover ⑳
- Float pin ㉑
- Float ㉒
- Float needle valve ㉓
- Needle valve seat ㉔
- Washer ㉕
- Main jet ㉖
- Washer ㉗
- Main nozzle ㉘
- Pilot screw assembly ㉙

INSPECTION

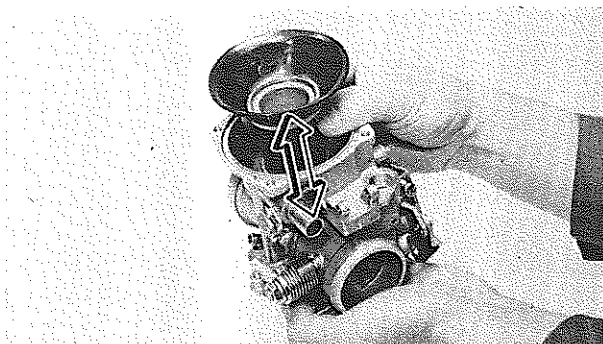
1. Inspect:
 - Carburetor body
 - Fuel passage
 Contamination → Clean.

Carburetor cleaning steps:

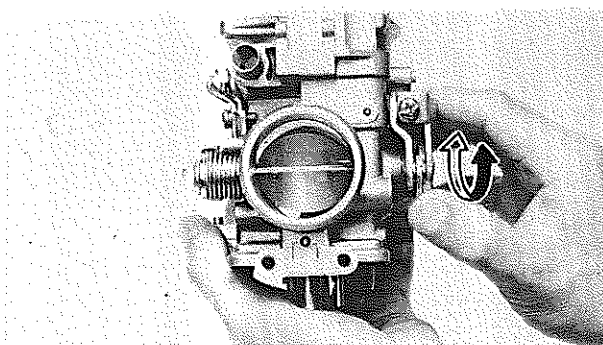
- Wash carburetor in petroleum based solvent (Do not use any caustic carburetor cleaning solution).
- Blow out all passages and jets with compressed air.



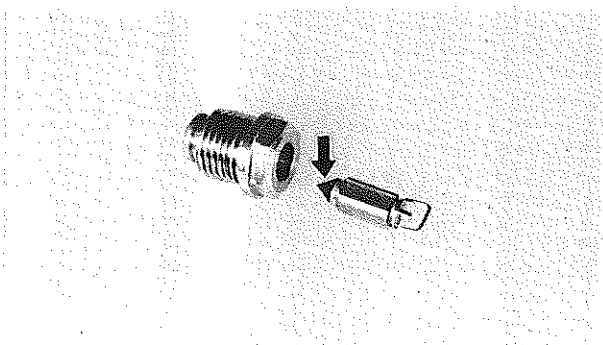
2. Inspect:
 - Floats
 Damage → Replace.



3. Check:
 - Vacuum piston free movement
Insert the vacuum piston into the carburetor body, and check for free movement.
Stick → Replace.

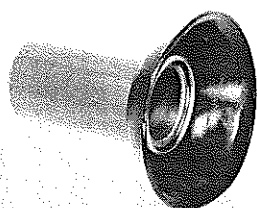


4. Inspect:
 - Throttle valve
Wear/Damage → Replace.
5. Check:
 - Valve free movement
Stick → Replace carburetor assembly.

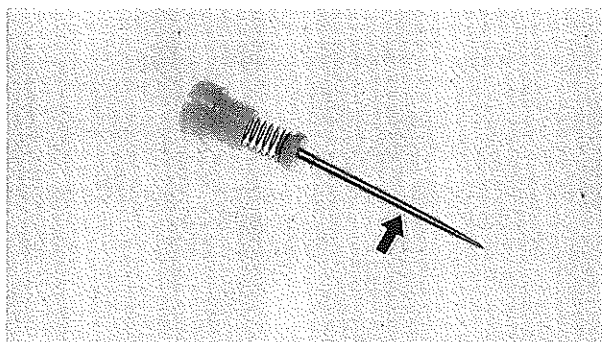


6. Inspect:
 - Float needle valve
 - Valve seat
 Wear/Contamination → Replace as a set.

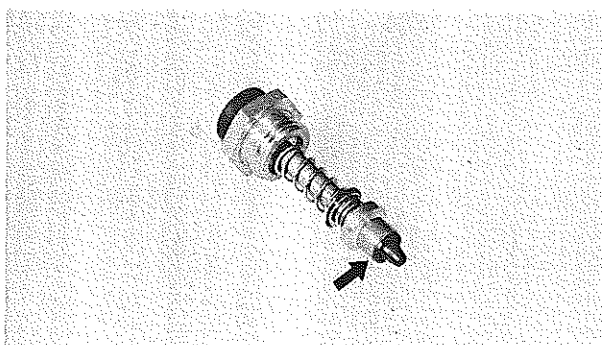
NOTE: _____
 Always replace the needle valve and valve seat as a set.



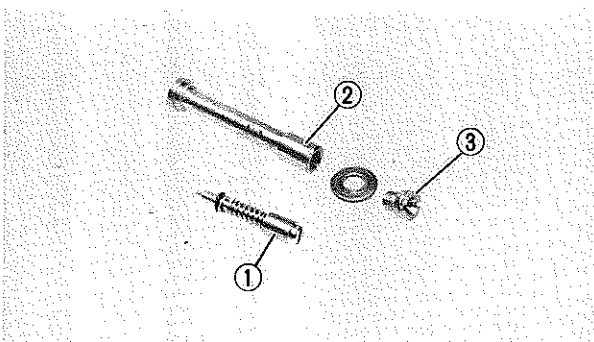
7. Inspect:
 - Vacuum piston
Scratches/Cracks/Damage → Replace.
 - Rubber diaphragm
Damage/Torn → Replace.



8. Inspect:
 - Jet needle
Bends/Wear → Replace.



9. Inspect:
 - Starter plunger
Wear/Damage → Replace.



10. Inspect:
 - Pilot screw ①
Wear/Damage → Replace.
 - Main nozzle ②
 - Main jet ③
Damage/Contamination → Replace.

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. Measure:

- Float height
Out of specification → Adjust.

Float height measurement and adjustment steps:

- Hold the carburetor in an upside down position.
- Measure the float height (a) between the mating surface of the float chamber (gasket removed) and top of the float using a gauge.

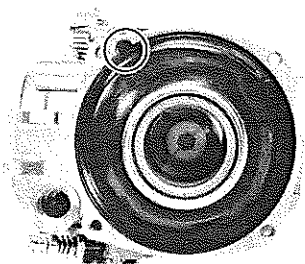
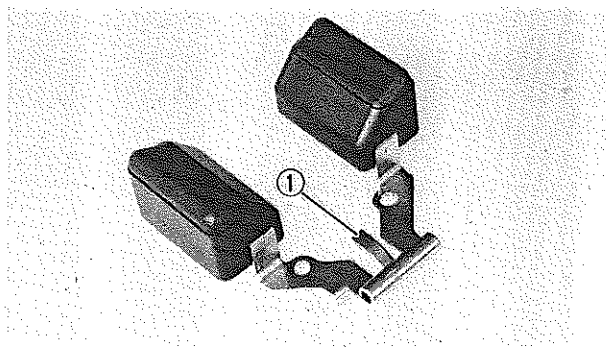
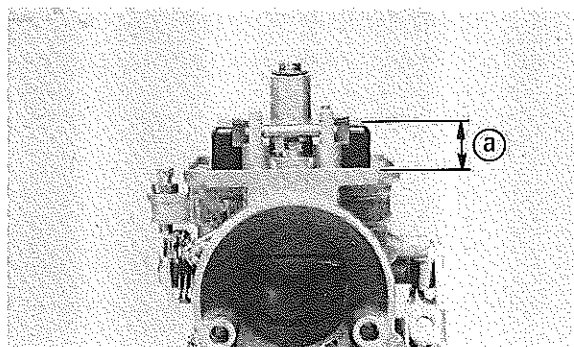
NOTE:

The float arm should be resting on the needle valve, but not compressing the needle valve.



Float Height (a) :
15 ~ 16 mm (0.59 ~ 0.63 in)

- If the float height is not within specification, inspect the valve seat and needle valve.
- If either is worn, replace them both.
- If both are fine, adjust the float height by bending the float tang (1) on the float.
- Recheck the float height.



2. Install:

- Vacuum piston

NOTE:

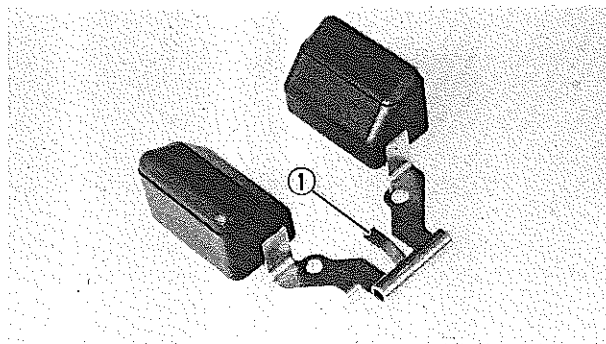
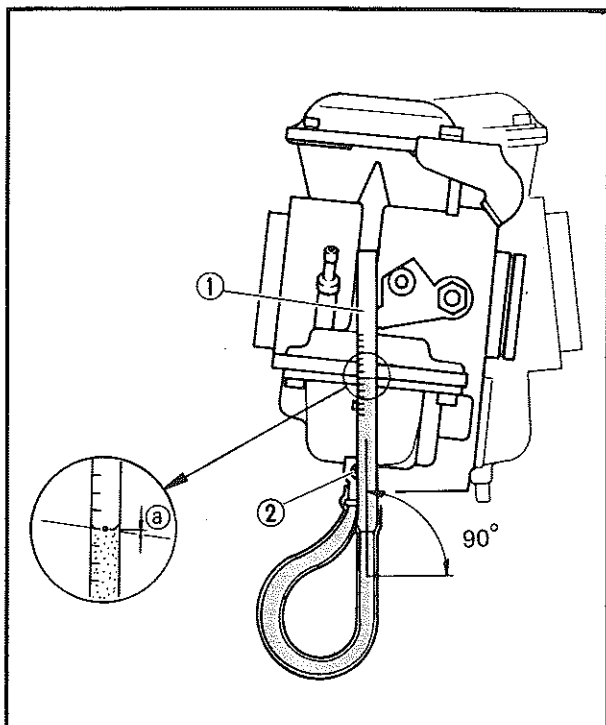
Note position of tab on diaphragm. This tab must be placed in the cavity of the carburetor body during reassembly.



INSTALLATION

1. Install:

- Carburetor assembly
- Reverse the "REMOVAL" steps.



ADJUSTMENT

Fuel Level Adjustment

NOTE:

Before adjusting the fuel level, the float height should be adjusted.

1. Measure:

- Fuel level (a)
- Out of specification → Adjust.

Fuel level measurement and adjustment steps:

- Place the motorcycle on a level place.
- Attach the Fuel Level Gauge (1) (90890-01312) to the float chamber nozzle.
- Loosen the drain screw (2), and warm up the engine for several minutes.
- Measure the fuel level (a) with the gauge.

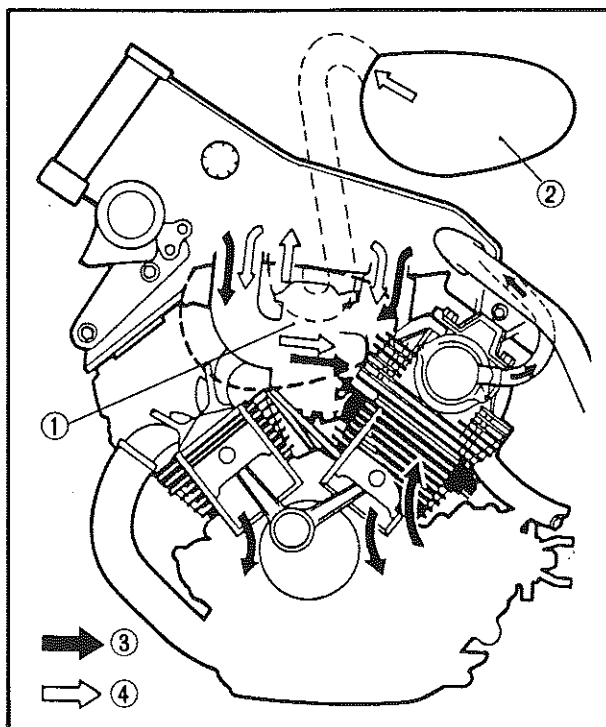


Fuel Level (a) :
-1.0 ~ 1.0 mm (-0.04 ~ 0.04 in)

- If the fuel level is incorrect, adjust the fuel level.
- Remove the carburetor assembly.
- Inspect the valve seat and needle valve.
- If either is worn, replace them both.
- If both are fine, adjust the float height by bending the float tang (1) on the float.
- Recheck the fuel level.



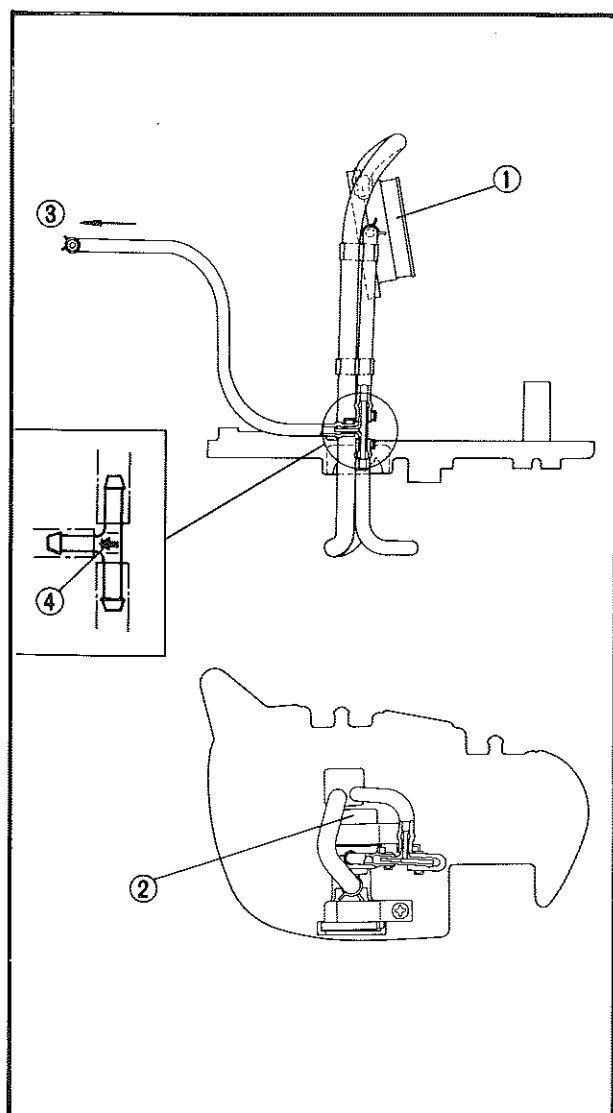
AIR CLEANER AND CRANKCASE VENTILATION SYSTEM/ MIXTURE CONTROL VALVE



AIR CLEANER AND CRANKCASE VENTILATION SYSTEM

Refer to "CHAPTER 2, Air Cleaner Maintenance."

- ① Carburetor
- ② Air cleaner
- ③ Blow-by gas
- ④ Fresh air

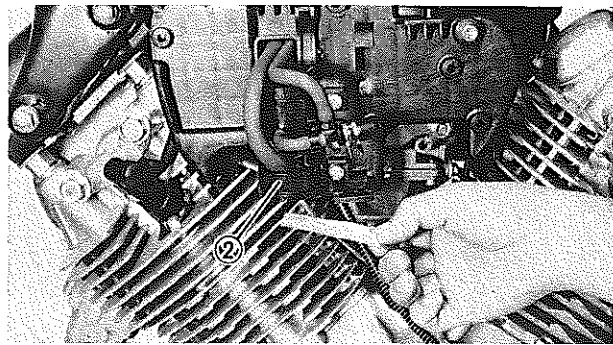
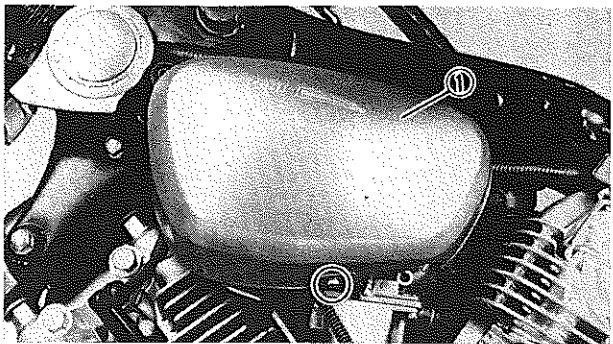


MIXTURE CONTROL VALVE

VACUUM LINE ROUTING

MCV Vacuum Line Routing

- ① Front carburetor joint
- ② Mixture control valve
- ③ To vacuum sensor
- ④ Face arrow mark to vacuum sensor

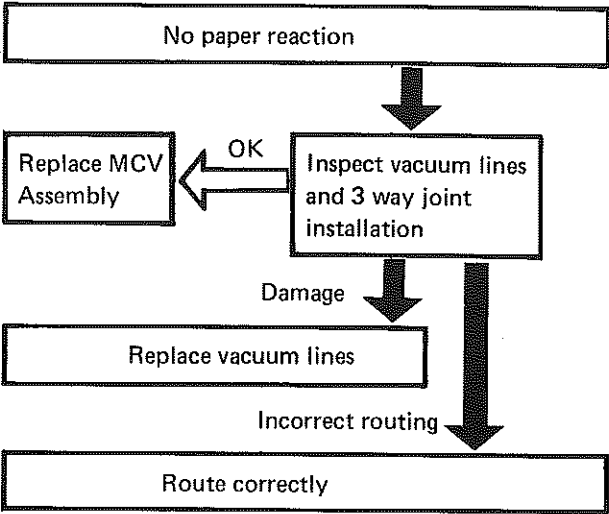


INSPECTION

MCV Vacuum Inspection

- MCV Vacuum inspection steps:
- Remove MCV case cover ①
 - Start the engine.
 - Place a piece of paper on intake side of the mixture control valve.
 - Rev the engine to 5,000 rpm, The paper should be drawn towards mixture control valve ②

MCV Troubleshooting



NOTE: _____
The narrow nozzle in the joint must be connected to the small vacuum line coming from mixture control valve.

CHAPTER 5.

CHASSIS

FRONT WHEEL	G-1
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INSPECTION	G-4
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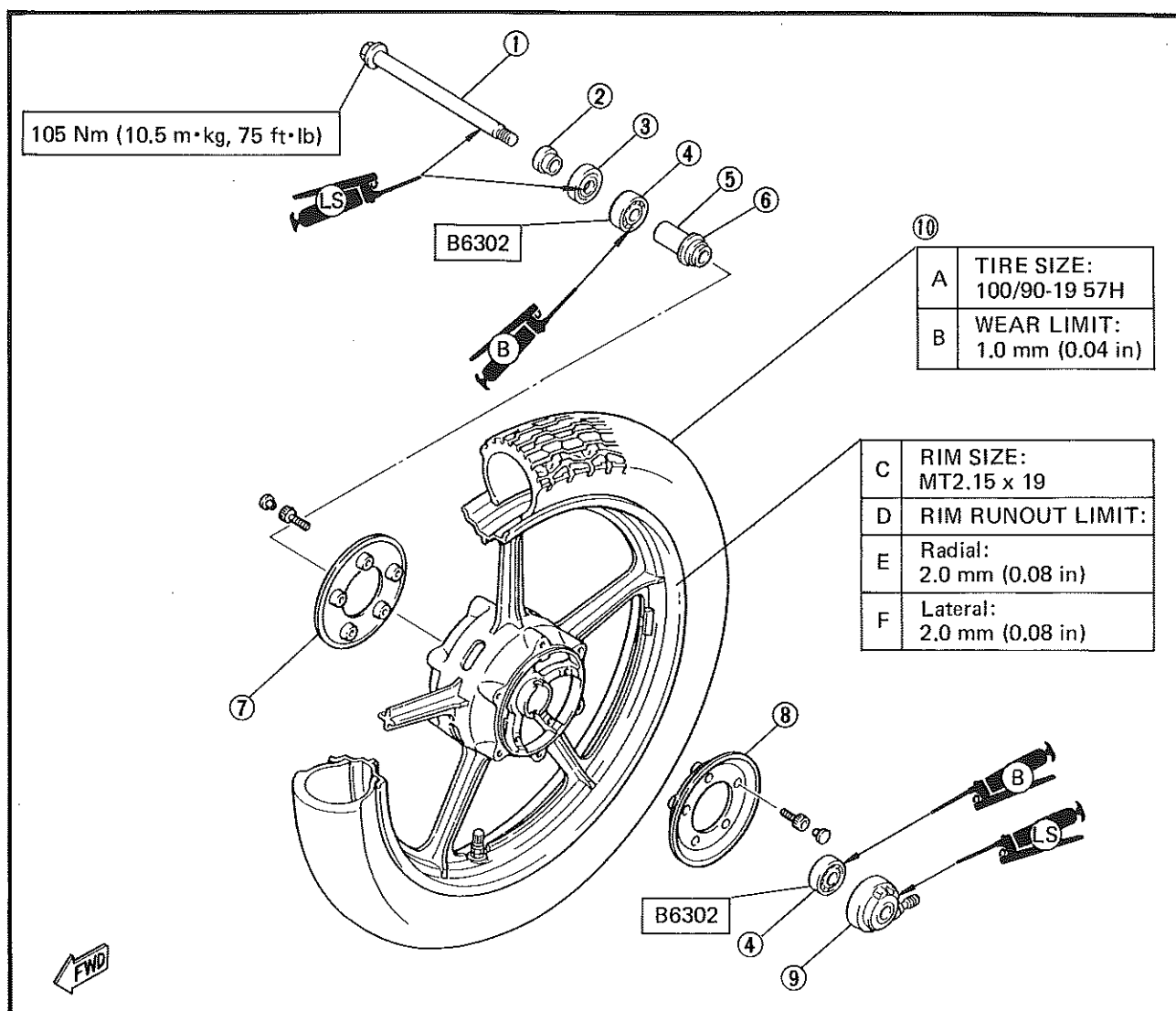
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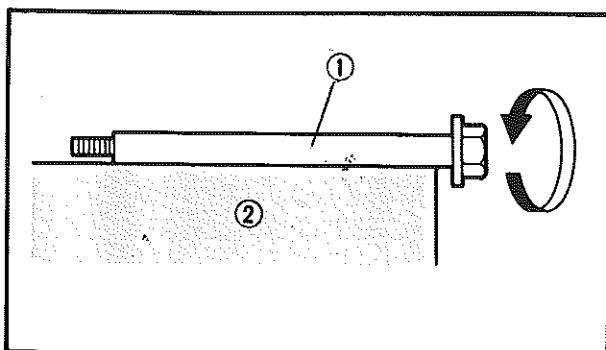
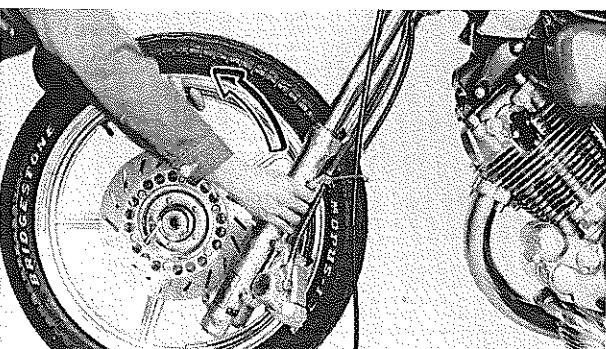
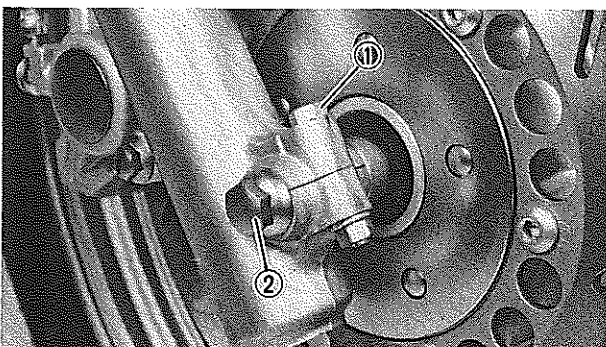
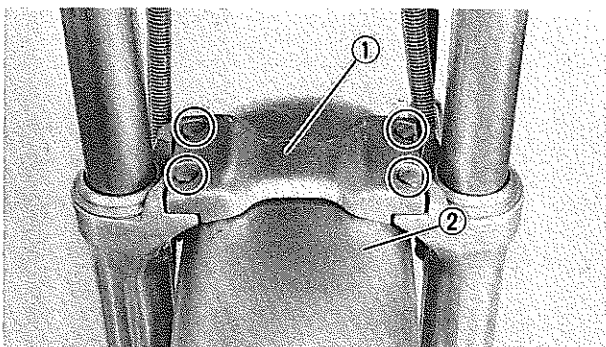
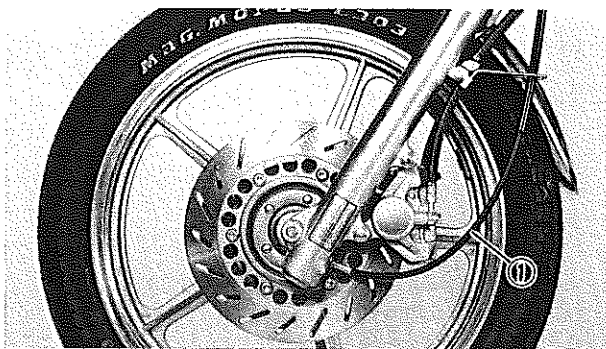
FRONT WHEEL

- ① Wheel axle
- ② Collar
- ③ Oil seal
- ④ Bearing
- ⑤ Spacer
- ⑥ Spacer flange
- ⑦ Wheel cap (Right)
- ⑧ Wheel cap (Left)
- ⑨ Speedometer gear unit
- ⑩ Tire

Basic weight: With oil and full fuel tank	235 kg (518 lb)	
Maximum load*	245 kg (540 lb)	
Cold tire pressure	Front	Rear
Up to 90 kg (198 lb) load*	177 kPa (1.8 kg/cm ² , 26 psi)	196 kPa (2.0 kg/cm ² , 28 psi)
90 kg (198 lb) ~ 160 kg (353 lb) load*	196 kPa (2.0 kg/cm ² , 28 psi)	226 kPa (2.3 kg/cm ² , 33 psi)
160 kg (353 lb) ~ Maximum load*	196 kPa (2.0 kg/cm ² , 28 psi)	275 kPa (2.8 kg/cm ² , 40 psi)
High speed riding	226 kPa (2.3 kg/cm ² , 33 psi)	245 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 it won't fall over when the front wheel.

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

6. Remove:
 - Front axle
 - Front wheel

Lift the wheel until the brake discs come off the calipers. Turn the brake calipers outward so they do not obstruct the wheel.

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

INSPECTION

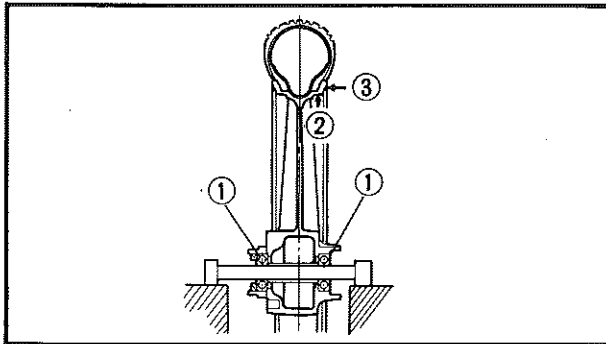
1. Eliminate any corrosion from parts.
2. Inspect:
 - Front axle ①

Bends → Replace.

Roll the axle on a flat surface ② .

WARNING:

Do not attempt to straighten a bent axle.



3. Inspect:

- Front wheel
Cracks/Bends/Warpage → Replace.

4. Measure:

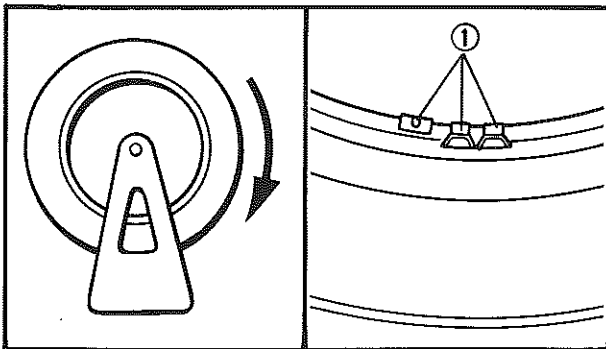
- Wheel runout
Out of specification → Replace wheel or check bearings ①.



Rim Runout Limits:

Radial ② : 2 mm (0.079 in)

Lateral ③ : 2 mm (0.079 in)



5. Check:

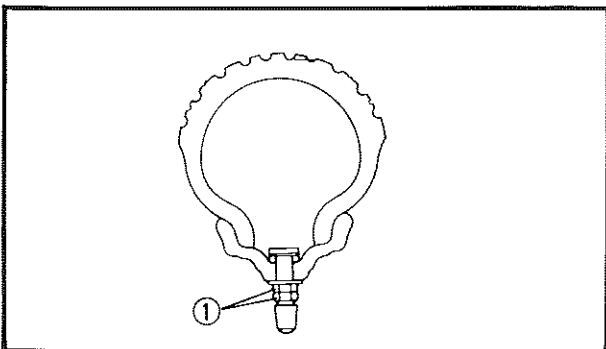
- Wheel balance
Wheel is not statically balanced if it comes to rest at the same point after several light rotations.
Out of balance → Install appropriate balance weight ① at lightest point (on top).

NOTE:

- Balance wheel with brake disc installed.

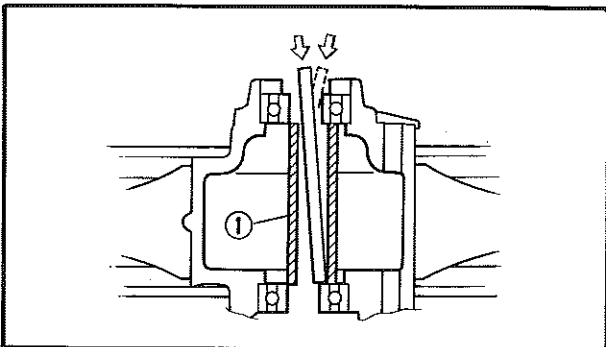
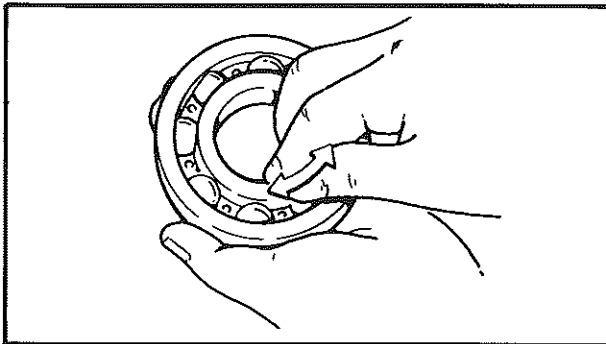
WARNING:

- After mounting a tire, ride conservatively to allow proper tire to rim seating. Failure to do so may cause an accident resulting in motorcycle damage and possible operator injury.
- After a tire repair or replacement, be sure to torque tighten the valve stem locknut ① to specification.



Valve Stem Locknut:

1.5 Nm (0.15 m·kg, 1.1 ft·lb)



6. Inspect:

- Wheel bearings
Bearings allow play in the wheel hub or wheel turns roughly → Replace.
- Oil seals
Damage → Replace.

Wheel bearing and oil seal replacement steps:

- Clean wheel hub exterior.
- Remove the oil seal using a flat-head screw driver.
- Drive bearing out by pushing spacer ① aside and tapping around perimeter of bearing inner race. Use soft metal drift punch and hammer. The spacer ① "floats" between bearings. Remove both bearings as described.

WARNING:

Eye protection is recommended when using striking tools.

- To install the wheel bearing and oil seal, reverse the above sequence. Use a socket that matches outside diameter of bearing outer race to drive in bearing.

CAUTION:

Do not strike the center race or balls of 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. Lubricate:

- Oil seal lips
- Speedometer gear unit (Gear teeth)

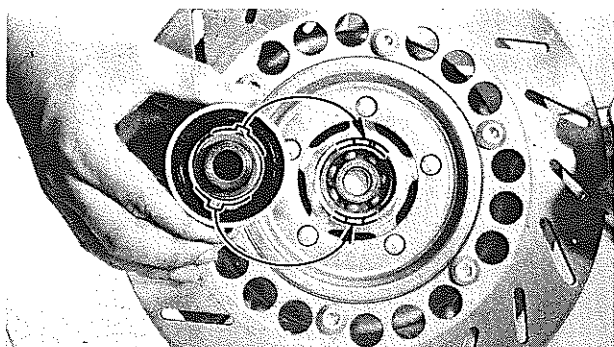


**Lithium Base Grease
(Lightly)**

- Wheel bearings



**Bearing Grease
(Lightly)**



2. Install:
- Gear unit assembly

NOTE:

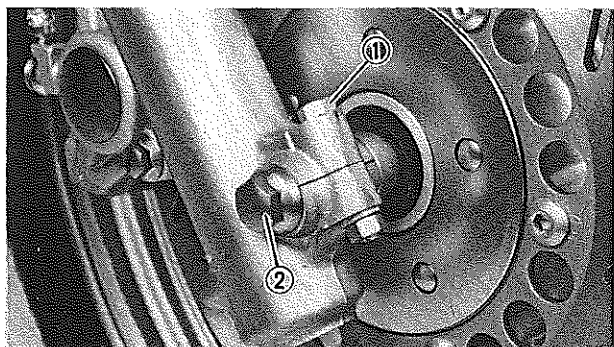
Be sure that the two slots inside the wheel hub mesh with the two projections on the speedometer clutch.



3. Install:
- Front wheel

NOTE:

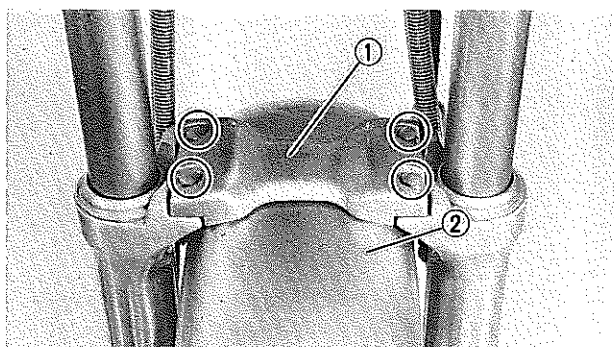
Be sure that the projecting portion (Torque stopper) ① of the gear unit housing is positioned correctly.



4. Tighten:
- Front axle ②
 - Pinch bolt ①



Front Axle ② :
105 Nm (10.5 m·kg, 75 ft·lb)
Pinch Bolt ① :
20 Nm (20 m·kg, 14 ft·lb)



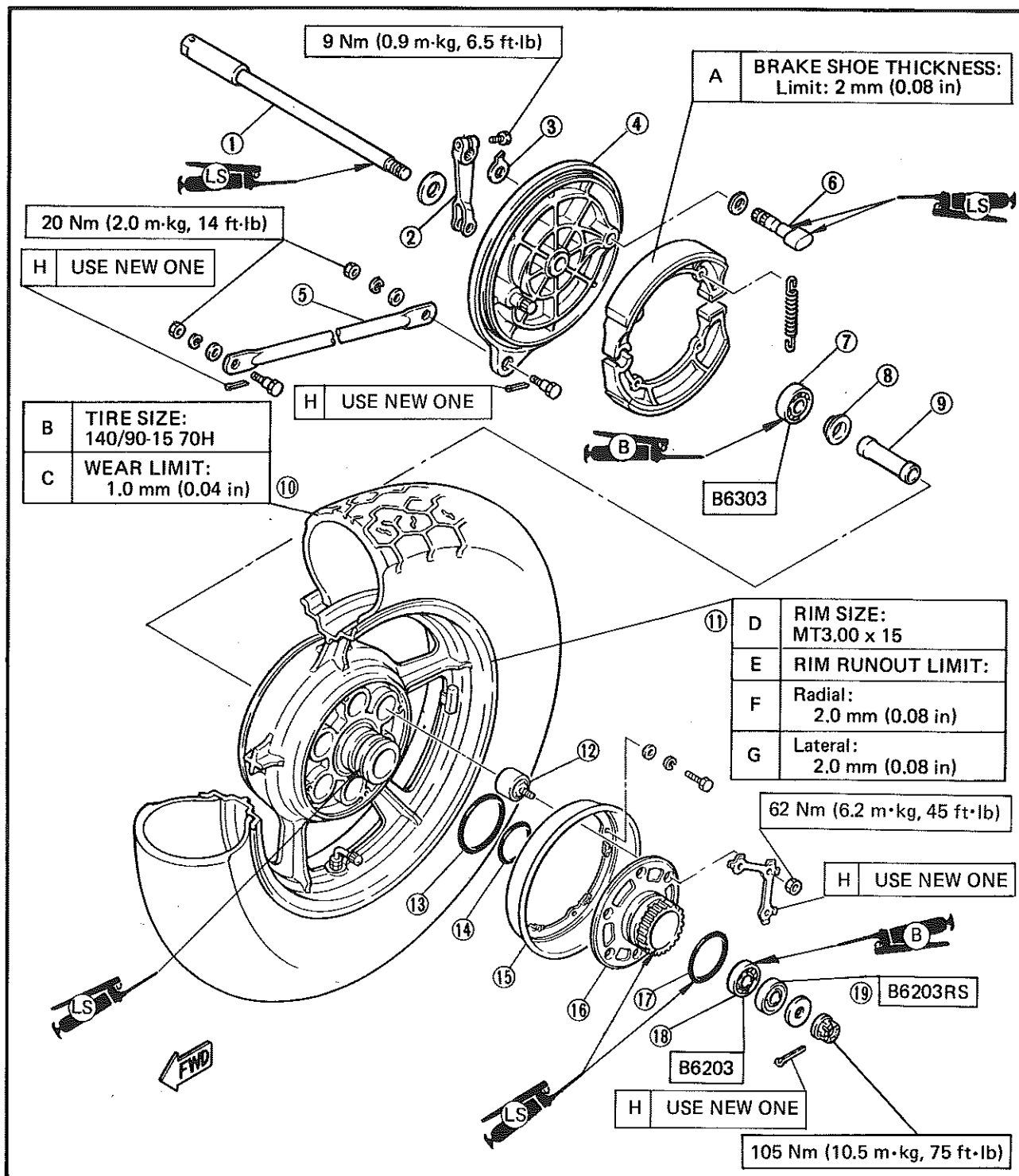
5. Tighten:
- Front fender ②
 - Front fork brace ①

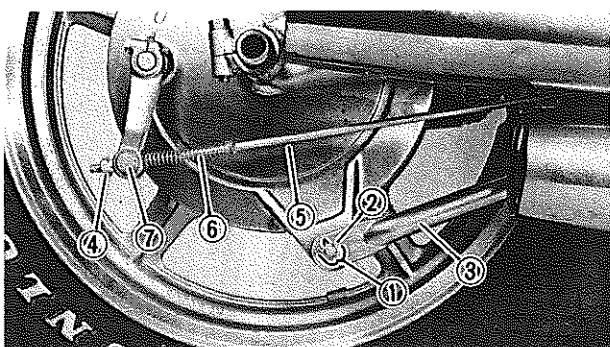


Bolts (Fender – Fork Brace):
9 Nm (0.9 m·kg, 6.5 ft·lb)
Bolts (Fork brace – Front fork):
9 Nm (0.9 m·kg, 6.5 ft·lb)

REAR WHEEL AND BRAKE

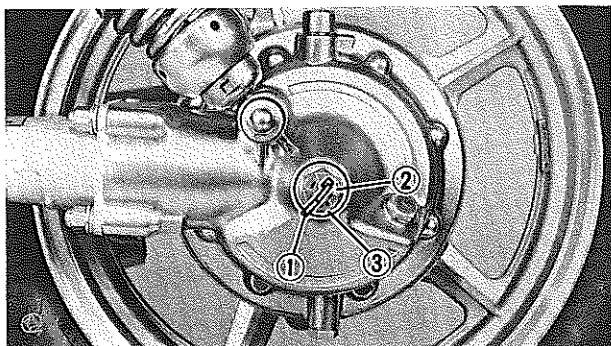
- | | |
|-----------------------------|---------------|
| ① Axle | ⑪ Wheel |
| ② Rear brake camshaft lever | ⑫ Damper |
| ③ Wear indicator | ⑬ O-ring |
| ④ Brake shoe plate | ⑭ O-ring |
| ⑤ Tension bar | ⑮ Plate cover |
| ⑥ Rear brake camshaft | ⑯ Clutch hub |
| ⑦ Bearing | ⑰ O-ring |
| ⑧ Spacer flange | ⑱ Bearing |
| ⑨ Spacer | |
| ⑩ Tire | |



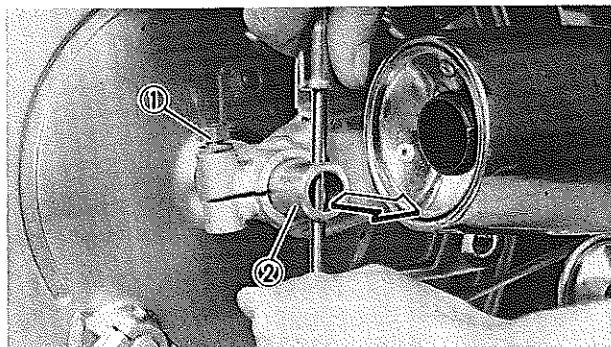


REMOVAL

1. Place the motorcycle on its centerstand.
2. Remove:
 - Cotter pin ①
 - Nut ②
 - Spring washer
 - Washer
 - Bolt
 - Tension bar ③
 - Brake rod adjuster ④
 - Brake rod ⑤
 - Spring ⑥
 - Pin ⑦

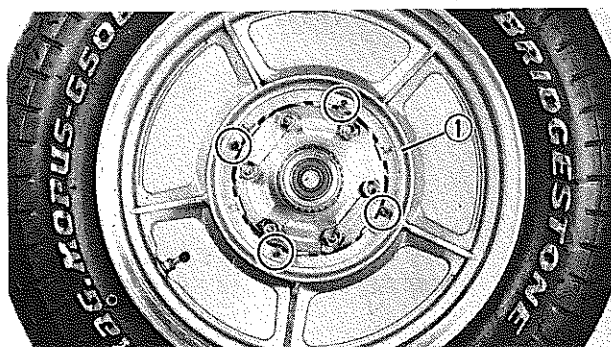


3. Remove:
 - Cotter pin ①
 - Axle nut ②
 - Plate washer ③



4. Loosen:
 - Rear axle pinch bolt ①
5. Remove:
 - Rear axle ②
 - Plate washer
 - Rear wheel with brake shoe plate

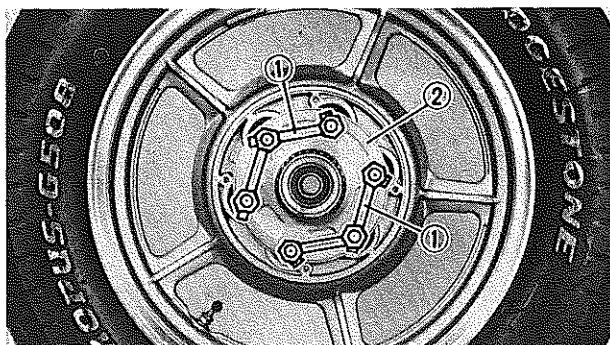
Move the wheel towards the right side to separate it from final gear case.



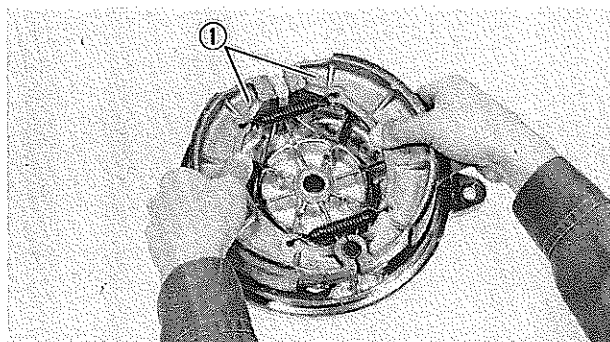
DISASSEMBLY

Rear Wheel

1. Remove:
 - Plate cover ①

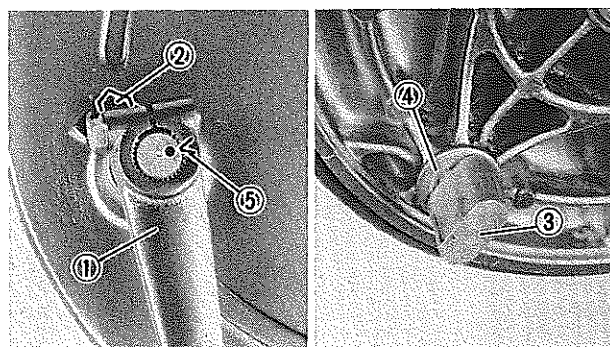


2. Straighten:
 - Lock washer tabs
3. Remove:
 - Nuts
 - Lock washers ①
 - Clutch hub ②



Brake Shoe Plate

1. Remove:
 - Brake shoes ①



2. Remove:
 - Brake camshaft lever ①
 - Wear indicator ②
 - Brake camshaft ③
 - Washer ④

NOTE: Put mark ⑤ on the cam shaft lever before removing out so that it can be reinstalled in the original position.

INSPECTION

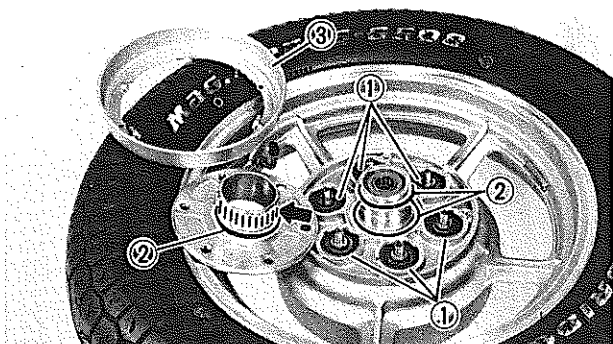
Rear Wheel

1. Inspect:
 - Tire
 - Rear axle
 - Wheel
 - Wheel bearings

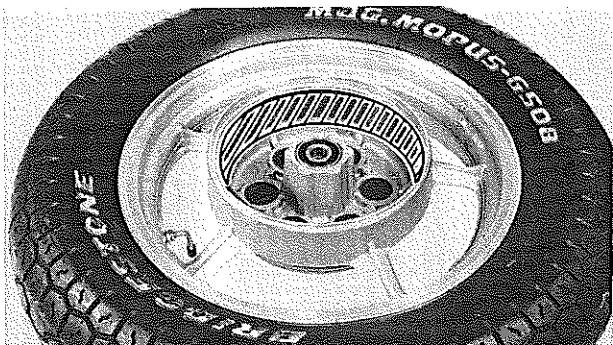
Refer to "FRONT WHEEL — INSPECTION" section.
2. Measure:
 - Wheel runout

Refer to "FRONT WHEEL — INSPECTION" section.
3. Check:
 - Wheel balance

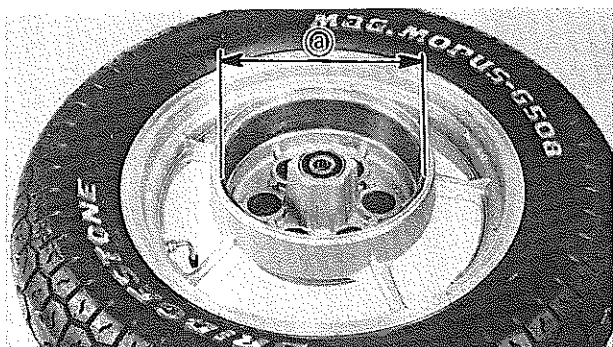
Refer to "FRONT WHEEL — INSPECTION" section.



4. Inspect:
 - Clutch hub splines
Wear/Cracks/Damage → Replace.
 - Dampers ①
 - O-rings ②
Wear/Damage → Replace.
 - Plate cover ③
Cracks/Damage → Replace.



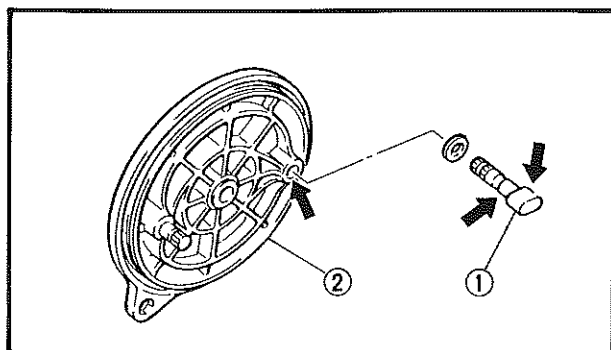
5. Inspect:
 - Brake drum (Inner surface)
Oil → Wipe off brake drum with rag soaked in lacquer thinner or solvent.
Scratches → Polish brake drum lightly and evenly with emery cloth.



6. Measure:
 - Brake drum inside diameter ①
Out of specification → Replace.

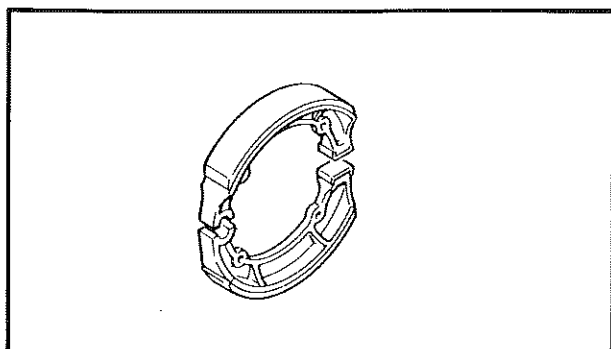


Brake Drum Inside Diameter ① :
 STD: 200 mm (7.87 in)
 Limit: 201 mm (7.91 in)

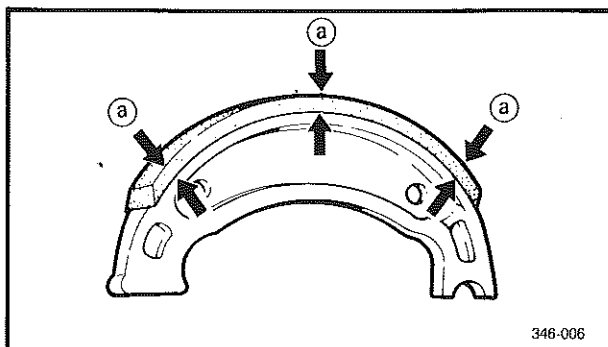


Brake Shoe Plate

1. Inspect:
 - Brake camshaft ①
 - Brake camshaft hole
Scratches/Excessive wear → Replace.
 - Brake shoe plate ②
Cracks/Damage → Replace.



2. Inspect:
 - Brake shoes
Glazed parts → Sand with coarse sand-paper.

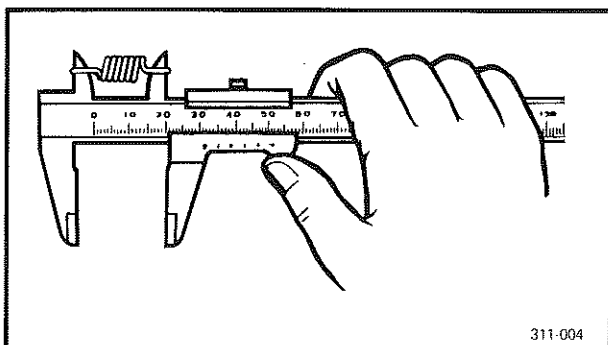


3. Measure:

- Brake shoes (Thickness) (a)
- Out of specification → Replace as a set.



Brake Shoe Thickness (a) :
 STD: 4.0 mm (0.16 in)
 Limit: 2.0 mm (0.08 in)



4. Inspect:

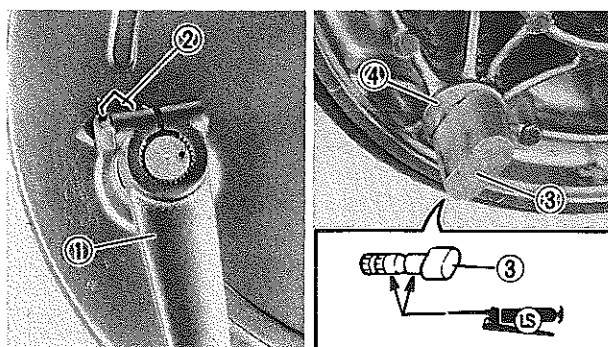
- Shoe springs
- Damage → Replace.

5. Measure:

- Shoe spring free length
- Out of specification → Replace.



Shoe Spring Free Length:
 68 mm (2.68 in)



ASSEMBLY

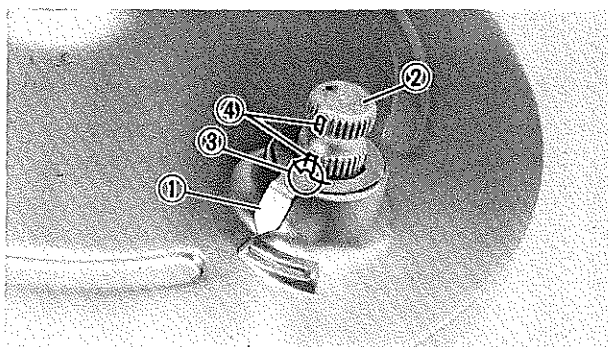
Brake Shoe Plate

1. Install:

- Washer (4)
- Brake camshaft (3)
- Wear indicator (2)
- Brake camshaft lever (1)



Brake camshaft Lever:
 9 Nm (0.9 m·kg, 6.5 ft·lb)



NOTE:

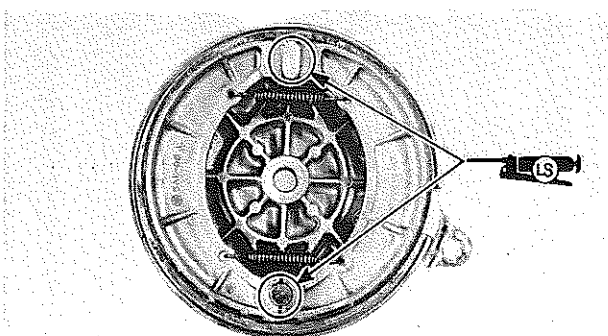
- Before installing the brake camshaft, lightly coat the lithium base grease to the brake camshaft.
- When installing the wear indicator (1) to the brake camshaft (2), align the projection (3) on the wear indicator with the slot (4) on the camshaft.

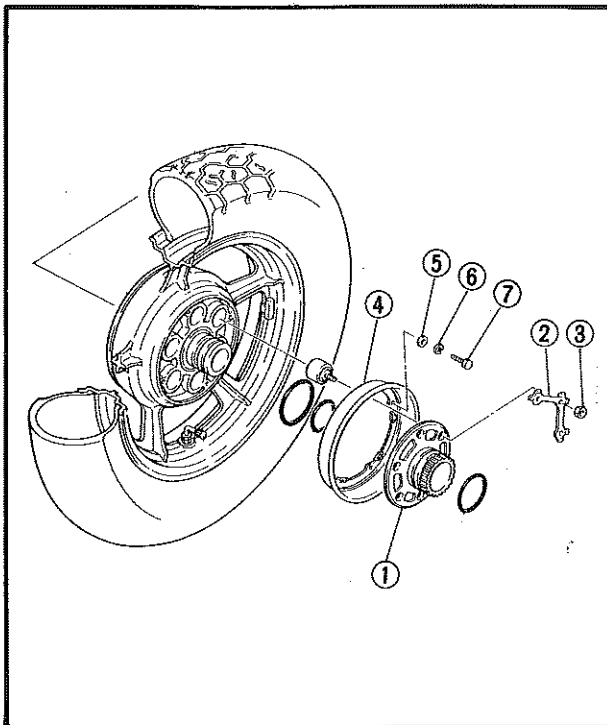
2. Install:

- Brake shoes
- On the brake shoe plate.

NOTE:

Before installing the brake shoes, grease the brake shoe pivot and cam contact surface.





Rear Wheel

1. Lubricate:

- Wheel boss (Contact with clutch hub).
- Clutch hub splines.



Lithium Base Grease

2. Install:

- Clutch hub ①
- On the wheel boss
- Lock washer (New) ②
- Nuts (Clutch hub) ③



Nut (Clutch Hub) ③ :
62 Nm (6.2 m·kg, 45 ft·lb)

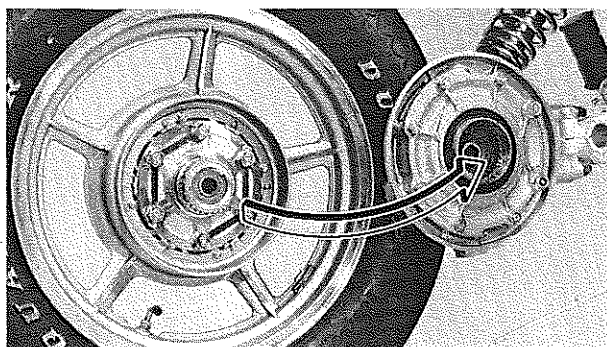
3. Bend the lock washer tabs.

4. Install:

- Plate cover ④
- Washers ⑤
- Spring washers ⑥
- Bolts (Plate cover) ⑦



Bolt (Plate cover) ⑦ :
9 Nm (0.9 m·kg, 6.5 ft·lb)



INSTALLATION

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

1. Apply:

- Lithium base grease
- Lightly grease to the final gear case splines, oil seal lip and rear axle.

2. Install:

- Rear wheel assembly

NOTE: _____

Be sure the splines on the wheel hub fit into final gear case.

3. Tighten:

- Bolt and nut



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

Axle Pinch Bolt:
6 Nm (0.6 m·kg, 4.3 ft·lb)

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

NOTE:

Always use a new cotter pin.

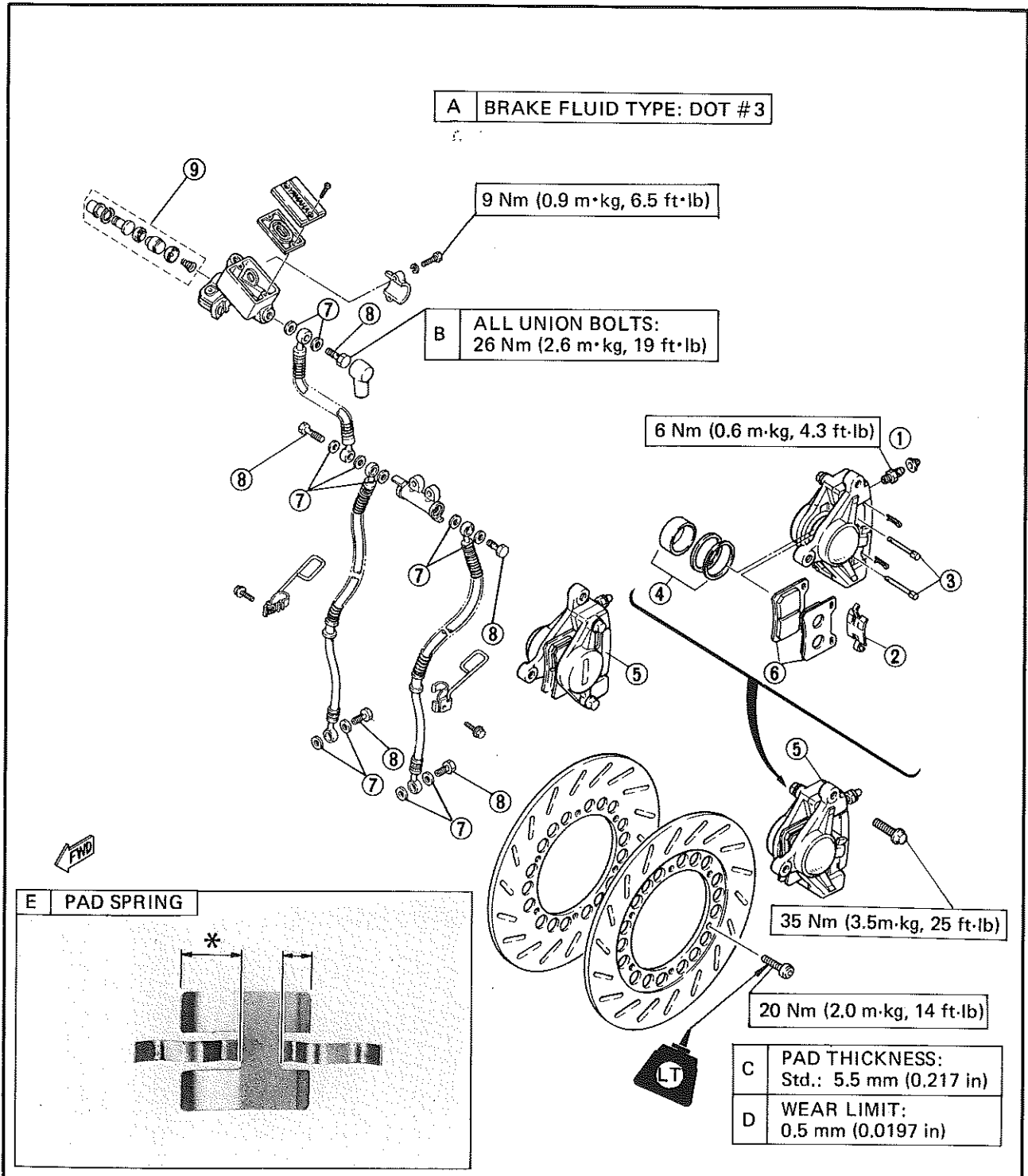
4. Adjust:

- Rear brake free ply/pedal height.
Refer to "CHAPTER 2 – REAR BRAKE INSPECTION" section.

FRONT BRAKE

- ① Bleed screw
- ② Pad spring
- ③ Pad retaining pin
- ④ Caliper piston assembly
(Replace as a set)
- ⑤ Caliper
- ⑥ Brake pads (Replace as a set)
- ⑦ Copper washer
- ⑧ Union bolt
- ⑨ Master cylinder kit
(Replace as a set)

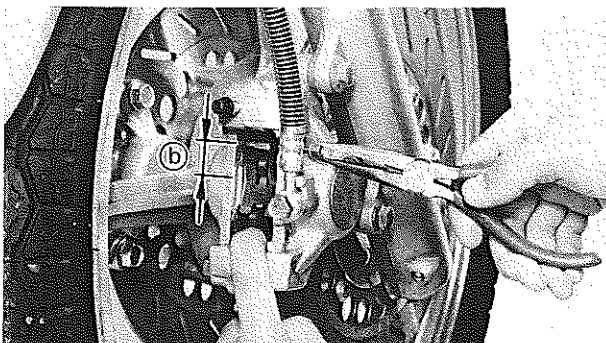
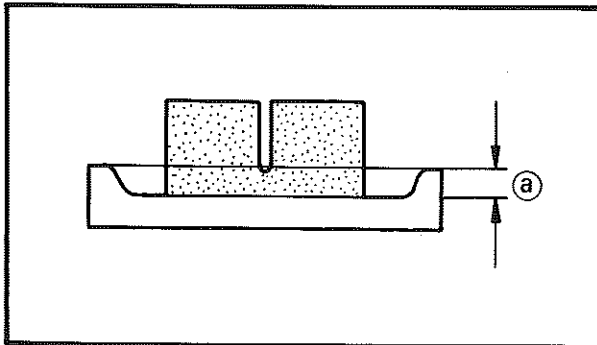
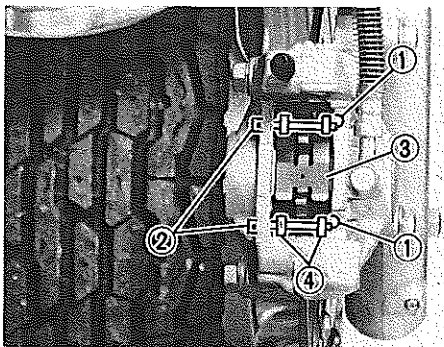
* Install the pad spring with its longer tangs facing upwards.



CAUTION:

Disc brake components rarely require disassembly. Do not:

- Disassemble components unless absolutely necessary.
- Use solvents on internal brake component.
- Use contaminated brake fluid for cleaning. Use only clean brake fluid.
- Allow brake fluid to come in contact with the eyes otherwise eye injury may occur.
- Allow brake fluid to contact painted surfaces or plastic parts otherwise damage may occur.
- Disconnect any hydraulic connection otherwise the entire system must be disassembled, drained, cleaned, and then properly filled and bled after reassembly.

**BRAKE PAD REPLACEMENT**

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

1. Remove:

- Cover
- Circlips ①
- Pad retaining pin ②
- Pad spring ③
- Pads ④

2. Install:

- Components in above list (step 1)

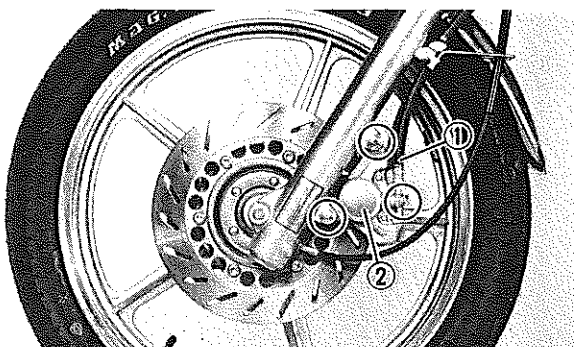
NOTE:

- 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 (a) :
0.5 mm (0.02 in)

- Install the pad spring with its longer tangs (b) facing upwards.



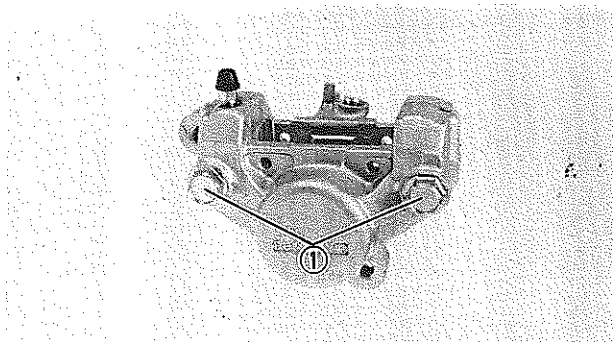
CALIPER DISASSEMBLY

1. Remove:

- Brake hose ①
Place the open hose end into a container and pump the old fluid out carefully.
- Pads
Refer to "BRAKE PAD REPLACEMENT" section.
- Caliper assembly ②

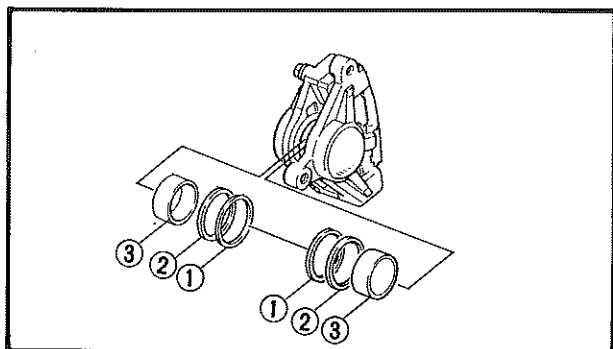
CAUTION:

Never loosen the bridge bolts ① on either side of the caliper.



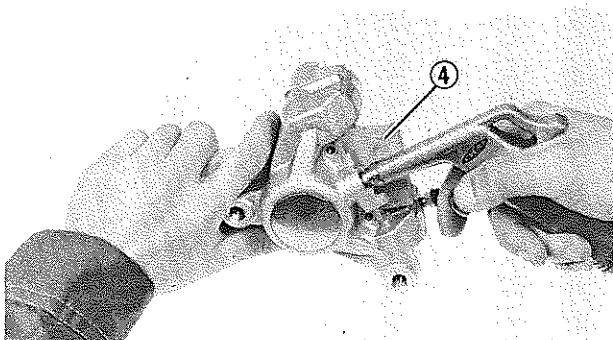
2. Remove:

- Dust seals ①
- Piston seals ②
- Pistons ③



Caliper piston removal steps:

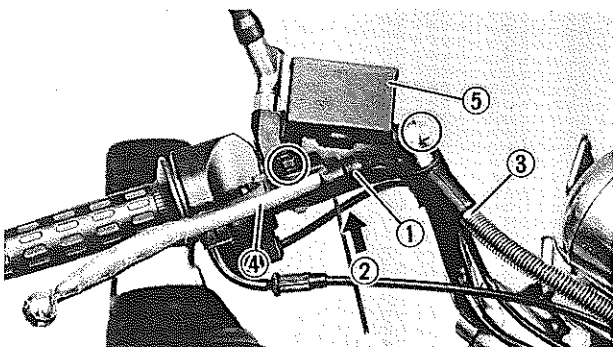
- Insert a piece of wooden board ④ into the caliper to lock the right side piston.
- Blow compressed air into the tube joint opening to force out the left side piston from the caliper body.
- Repeat previous step to force out the right side piston from the caliper body.

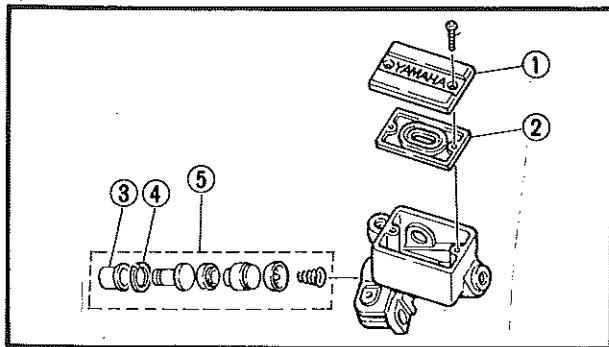


MASTER CYLINDER DISASSEMBLY

1. Remove:

- Brake light switch ①
Push ② the brake light switch stopper.
- Brake hose ③
Drain the fluid.
- Brake lever ④ and spring
- Master cylinder assembly ⑤





2. Remove:
 - Cap ①
 - Diaphragm ②
 - Drain remaining fluid.
 - Master cylinder dust boot ③
 - Circlip ④
 - Master cylinder cup assembly.

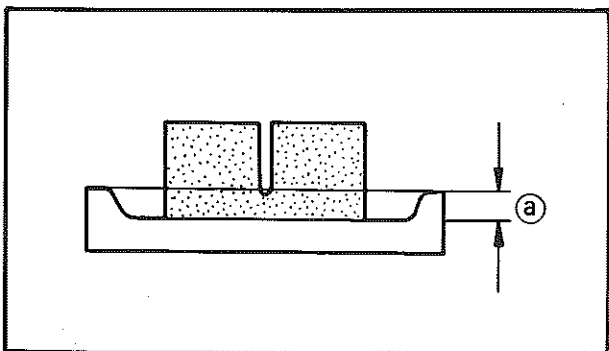
⑤ Master cylinder kit

INSPECTION AND REPAIR

Recommended Brake Component Replacement Schedule	
Brake pads	As required
Piston seal, dust seal	Every 2 years
Brake hoses	Every 4 years
Brake fluid	Replace only when brakes disassembled

WARNING:

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

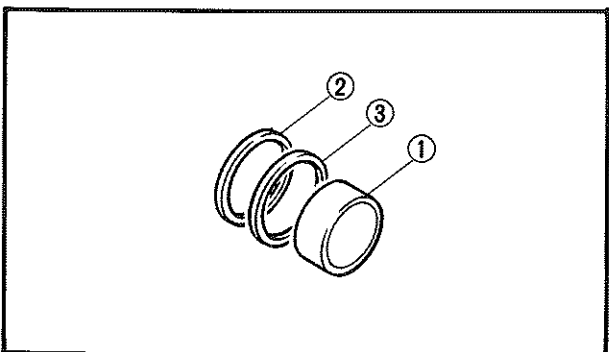


1. Inspect:

- Brake pad
- Over wear limit ① → Replace as a set.



Brake Pad Wear Limit ①
0.5 mm (0.0197 in)



2. Inspect:

- Caliper piston ①
- Damage/Scratches → Replace.
- Dust seal ②
- Piston seal ③
- Damage → Replace.

WARNING:

Replace the piston and dust seals whenever a caliper is disassembled.

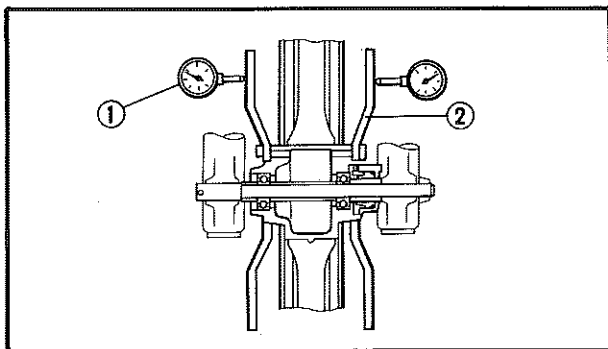
3. Inspect:

- Master cylinder kit
- Master cylinder body
- Scratches → Replace.

NOTE:

Clean all passages with new brake fluid.

- Brake hoses
- Cracks/Frayed/Damage/Over four years old → Replace.



4. Inspect:

- Brake disc ②
- Wear deflection out of specification → Replace.



Maximum Deflection:
0.15 mm (0.006 in)
Minimum Disc Thickness:
4.5 mm (0.2 in)

① Dial gauge

ASSEMBLY

Caliper

When assembling the caliper, reverse the disassembly procedure. Note the following points.

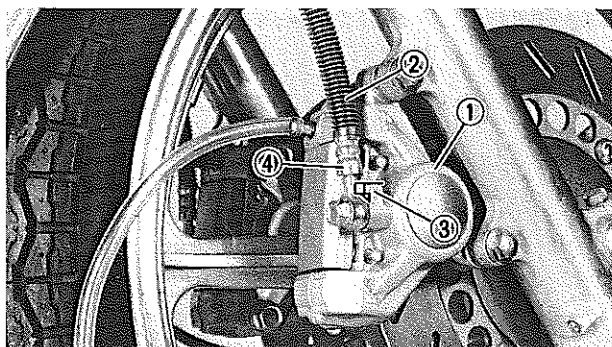
WARNING:

- All internal parts should be cleaned in new brake fluid only.
- Internal parts should be lubricated with brake fluid when installed.



Brake Fluid:
DOT #3

- Replace the piston and dust seals whenever the caliper is disassembled.



1. Install:

- Brake calipers ①
- Brake hoses ②



Brake Caliper:
35 Nm (3.5 m·kg, 25 ft·lb)
Brake Hose:
26 Nm (2.6 m·kg, 19 ft·lb)

CAUTION:

When installing the brake hose, lightly touch the brake pipe ④ with the projection ③ on the brake caliper.

2. Bleed the air completely from the brake system.

Refer to "AIR BLEEDING" section.

Master Cylinder

When assembling the master cylinder, reverse the disassembly procedure. Note the following points.

1. Install:
 - Master cylinder kit

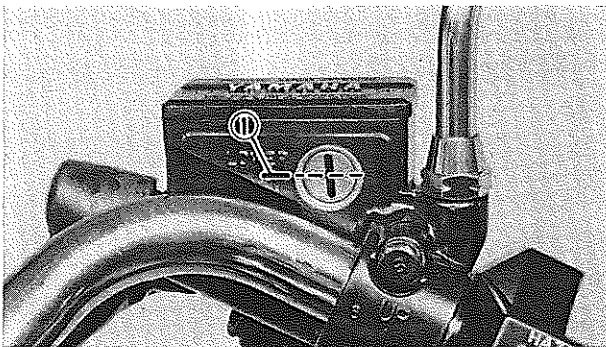
WARNING:

Internal parts should be lubricated with brake fluid when installed.

2. Install:
 - Master cylinders
 - Brake hoses



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 cylinders



Brake Fluid:
DOT #3

- ① Lower level
4. Bleed the air completely from the brake system.
Refer to "AIR BLEEDING" section.

AIR BLEEDING

WARNING:

Bleed the brake system if:

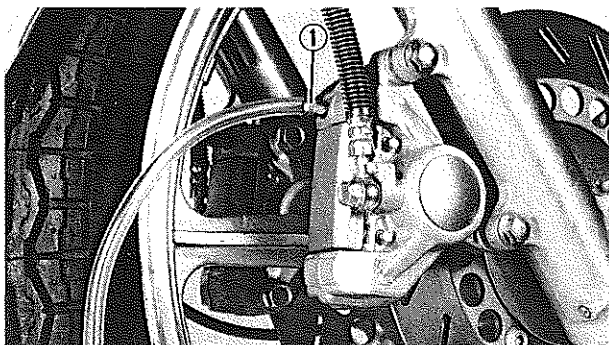
- The system has been disassembled.
- A brake hose has been loosened or removed.
- The brake fluid is very low.
- The brake operation is faulty.

A dangerous loss of braking performance may occur if the brake system is not properly bled.

1. Bleed:
 - Brake fluid

Air bleeding steps:

- a. Add proper brake fluid to the reservoir.
- b. Install the diaphragm. Be careful not to spill any fluid or allow the reservoir to overflow.

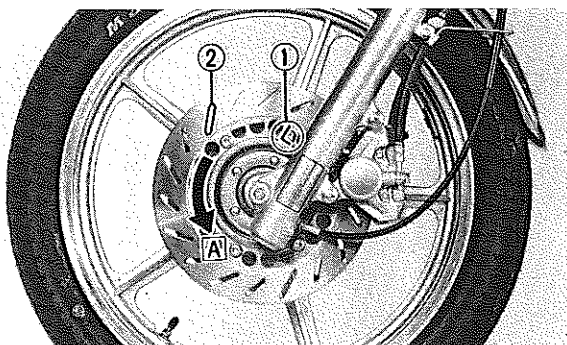


- c. Connect the clear plastic tube tightly to the caliper bleed screw ①.
- d. Place the other end of the tube into a container.
- e. Slowly apply the brake lever several times.
- f. Pull the lever and hold the lever in position.
- g. Loosen the bleed screw and allow the lever to travel towards its limit.
- h. Tighten the bleed screw when the lever limit has been reached; then release the lever.
- i. 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.

- j. Add brake fluid to the level line on the reservoir.

**BRAKE DISC INSTALLATION**

1. Install:

- Brake disc(s)

NOTE:

- The brake disc should be installed with the identified mark (L or R) ① face outward.
- The slots ② in the disc must point in the rotating direction A of the wheel.

2. Tighten:

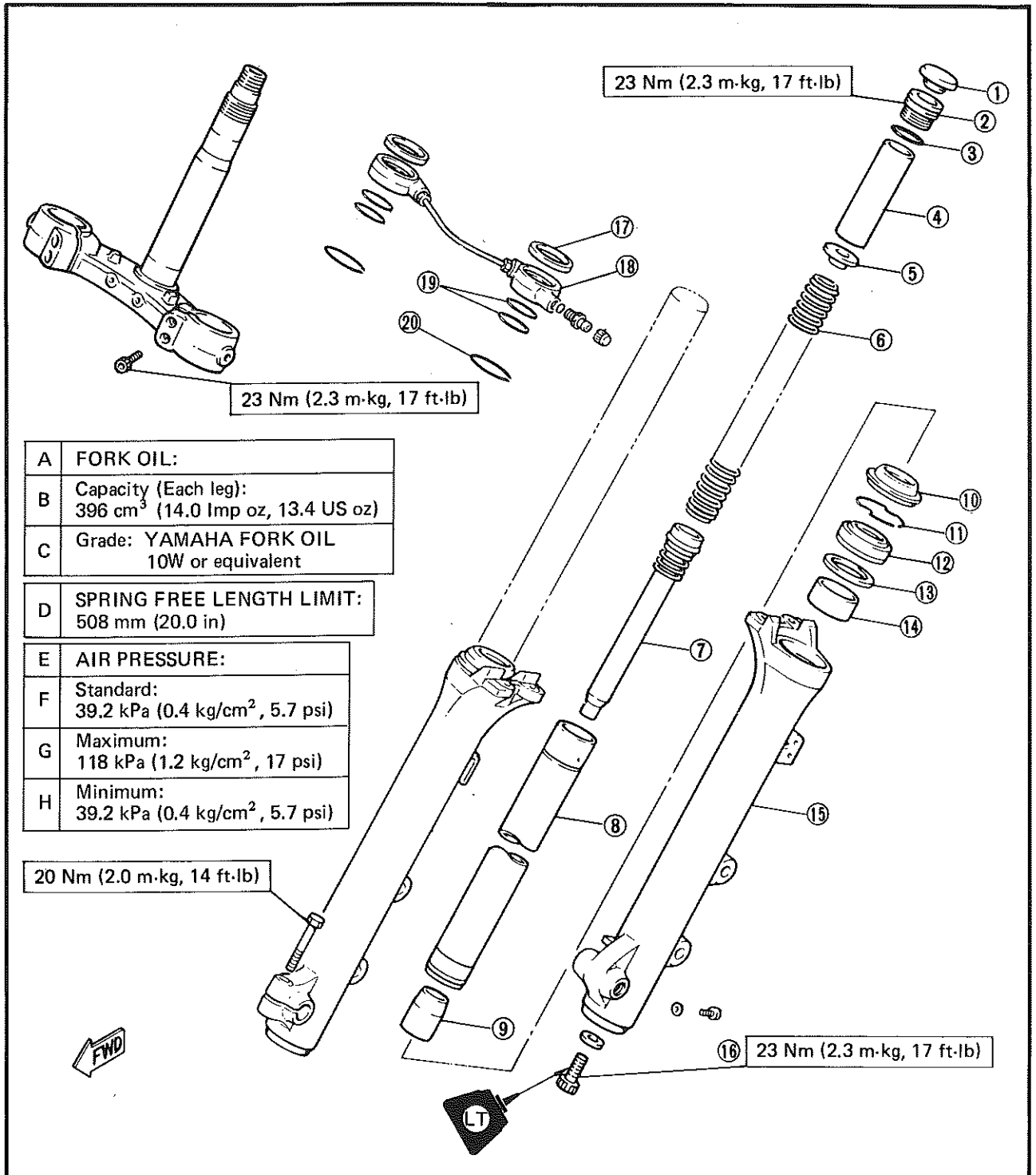
- Bolts (Disc)

**Bolts:**

20 Nm (2.0 m·kg, 14 ft·lb)
LOCTITE®

FRONT FORK

- | | |
|-------------------|----------------------------|
| ① Cap | ⑪ Circlip |
| ② Cap bolt | ⑫ Oil seal |
| ③ O-ring | ⑬ Washer |
| ④ Spacer | ⑭ Guide bushing |
| ⑤ Spring seat | ⑮ Outer fork tube |
| ⑥ Fork spring | ⑯ Damper rod securing bolt |
| ⑦ Damper rod | ⑰ Rubber spacer |
| ⑧ Inner fork tube | ⑱ Air joint bracket |
| ⑨ Oil lock piece | ⑲ O-ring |
| ⑩ Dust seal | ⑳ Stopper ring |



REMOVAL

WARNING:

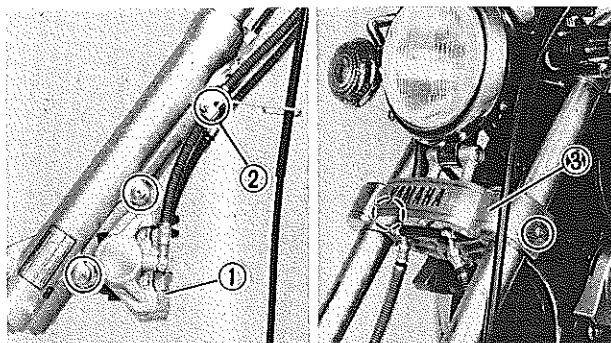
Securely support the motorcycle so it won't fall over when the front wheel and front forks are removed.

1. Remove:

- Front wheel
Refer to "FRONT WHEEL" section.

2. Remove:

- Brake calipers ①
- Brake hose holder ②
- Brake hose joint cover ③

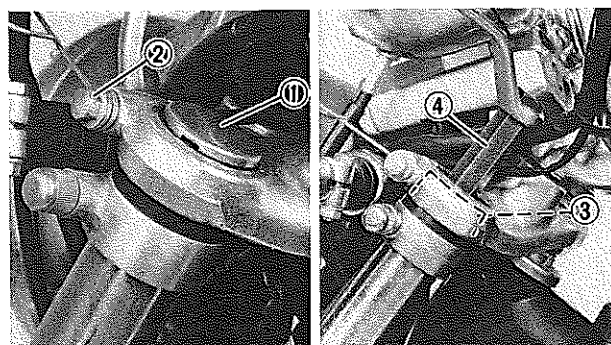


3. Remove:

- Cap ①

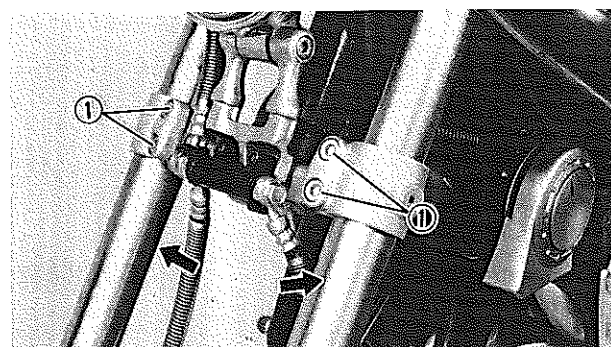
4. Loosen:

- Upper front fork pinch bolt ②
- Cap bolt ③
Use the Front Fork Cap Socket ④ (90890-01104).



5. Loosen:

- Lower front fork pinch bolts ①



CAUTION:

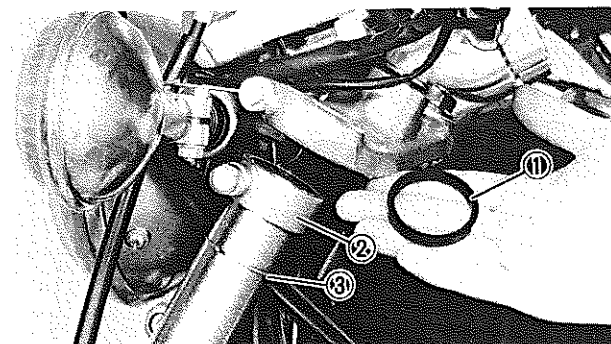
Support the fork before loosening the pinch bolts.

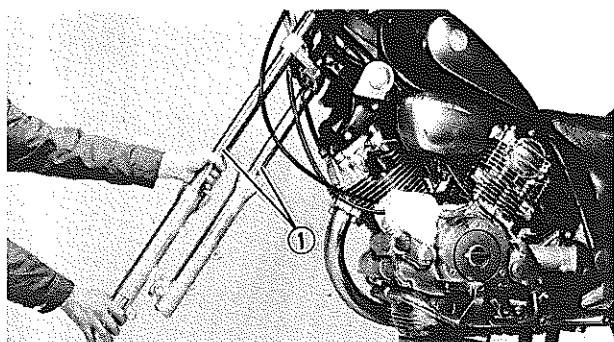
6. Remove:

- Front fork(s)
From the steering crown.

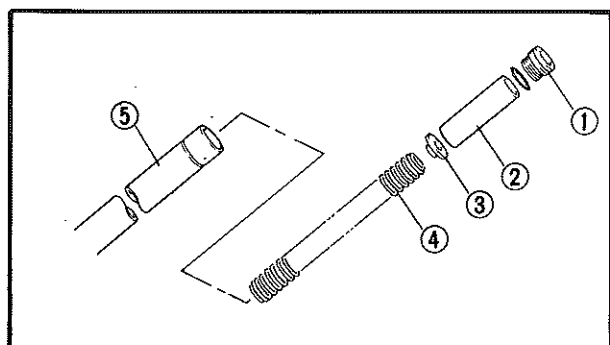
7. Remove:

- Rubber damper ①
- Air joint bracket ②
- Circlip ③





8. Remove:
- Front fork(s) ①
- From the under bracket.

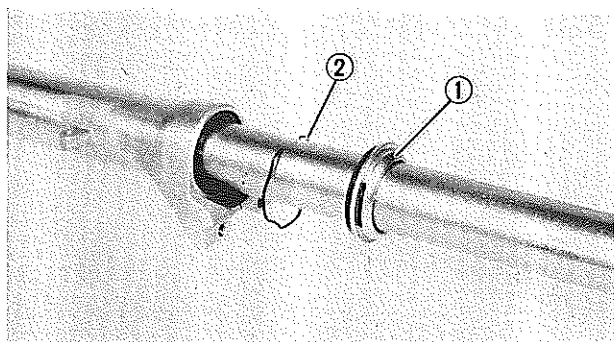


DISASSEMBLY

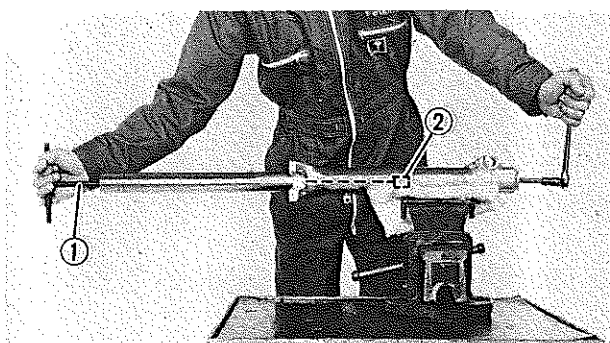
1. Remove:
- Cap bolt ①
- Use the Front Fork Cap Socket (90890-01104).
- Collar ②
 - Spring seat ③
 - Fork spring ④
- Drain the fork oil.

⑤ Inner fork tube

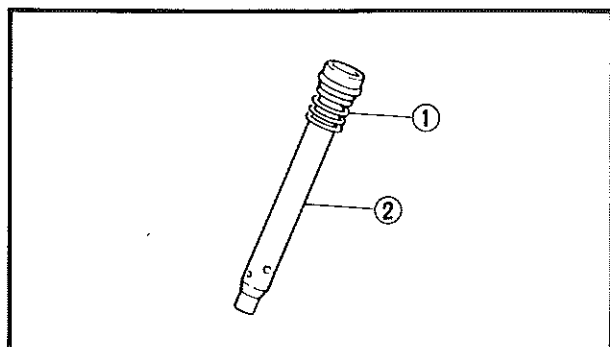
2. Remove:
- Dust cover ①
 - Retaining clip ②
- Use a thin screwdriver, and be careful not to scratch the inner fork tube.

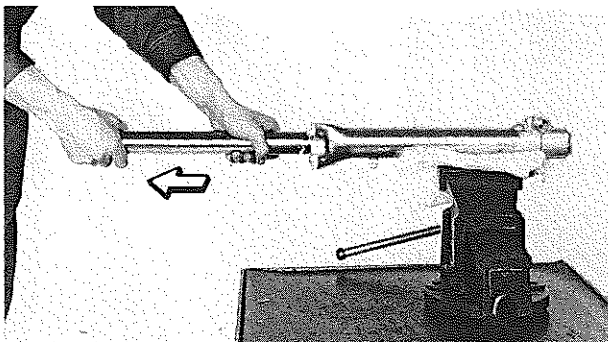


3. Remove:
- Damper rod securing bolt
- Use T-Handle ① (90890-01326) and Damper Rod Holder ② (90890-01365) to lock the damper rod.



4. Remove:
- Damper rod ①
 - Rebound spring ②





5. Remove:

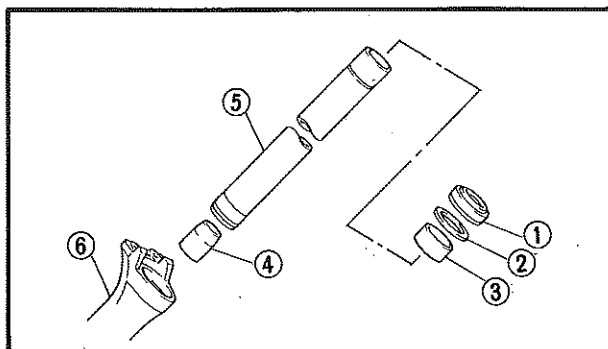
- Inner fork tube

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
- Washer ②
- Guide bushing ③
- Oil lock piece ④

⑤ Inner fork tube

⑥ Outer fork tube

INSPECTION

1. Inspect:

- Inner fork tube ①
Severe scratches/Bends → Replace.
Damaged oil lock valve → Replace.

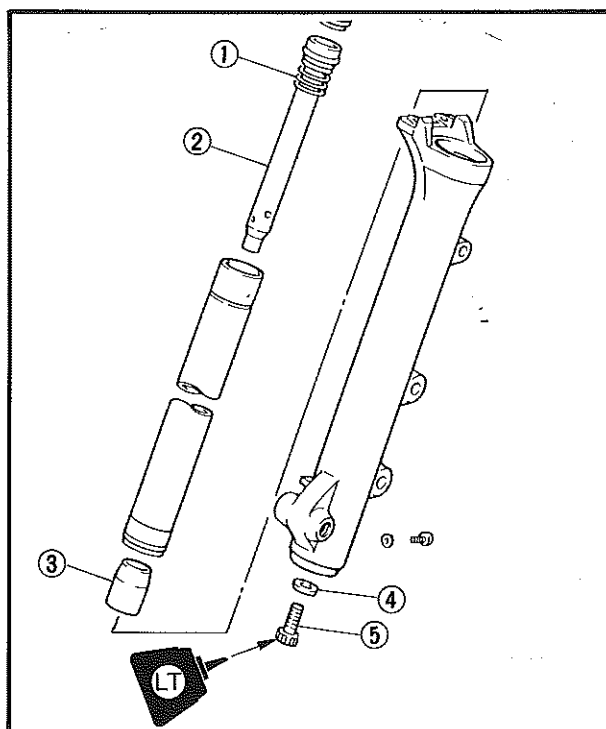
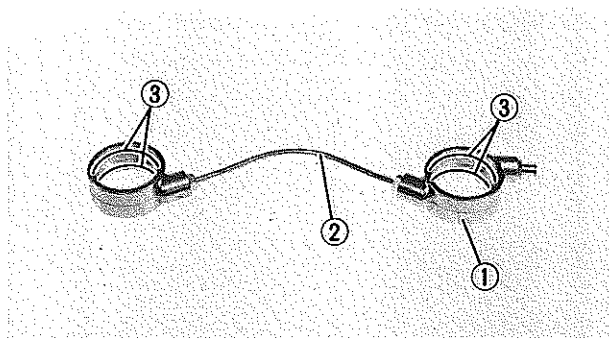
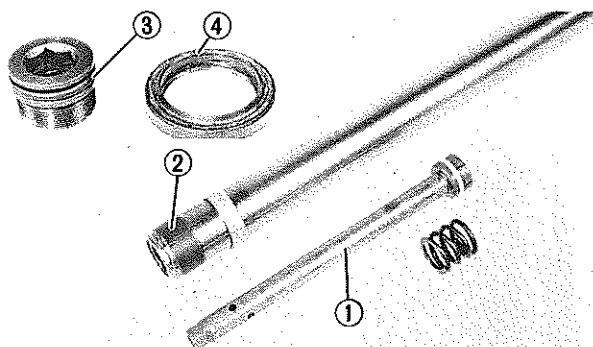
WARNING:

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

- Outer fork tube ②
Scratches/Bends/Damage → Replace.
- Fork spring ③
Over specified limit → Replace.



Fork Spring Free Length (Limit):
508 mm (20.0 in)



2. Inspect:

- Damper rod ①
Wear/Damage → Replace.
Contamination → Wash and blow out all passages with compressed air.
- Slide bushing ② (Inner fork tube)
Wear/Damage → Replace.
- Cap bolt O-ring ③
Damage → Replace.
- Seals ④
Wear/Damage → Replace.

3. Inspect:

- Air joint bracket ①
- Air pipe ②
Cracks/Damage → Replace.
- O-ring ③
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
- Guide bush
- Oil seal
- Dust seal

1. Install:

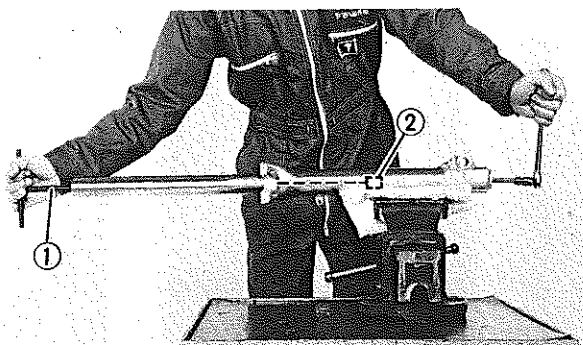
- Rebound spring ①
- Damper rod ②
Allow the rod to slide slowly down the tube until it protrudes from the bottom.
- Oil lock piece ③
Fit oil lock piece over damper rod sticking out of the inner fork tube.

2. Install:

- Inner fork tube
Into outer tube.
- Gasket ④ (New)
- Damper rod securing bolt ⑤

NOTE:

Apply the LOCTITE® to the damper rod securing bolt thread.

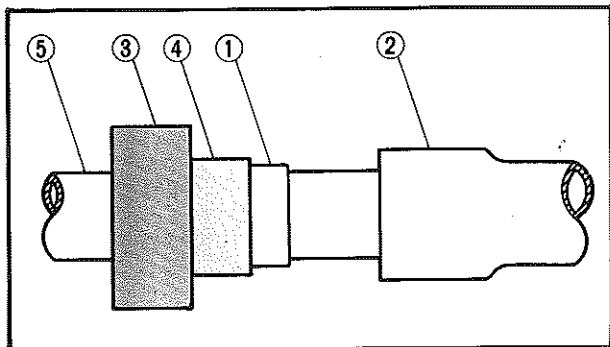


3. Tighten:

- Damper rod securing bolt
Use T-Handle ① (90890-01326) and Damper Rod Holder ② (90890-01365) to lock the damper rod.



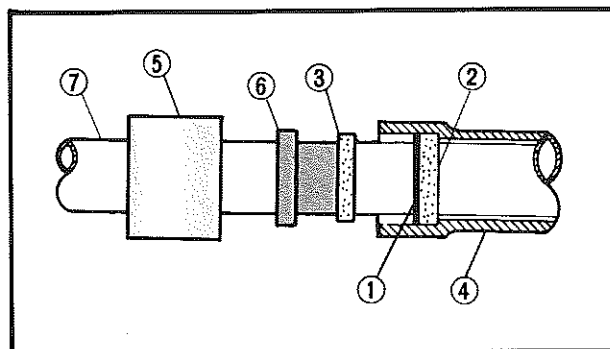
Damper Rod Securing Bolt:
23 Nm (2.3 m·kg, 17 ft·lb)
LOCTITE®



4. Install:

- Guide bushing ①
Press guide bushing into the outer fork tube ② with Fork Seal Driver ③ (90890-01367) and Adapter ④ (90890-01398).

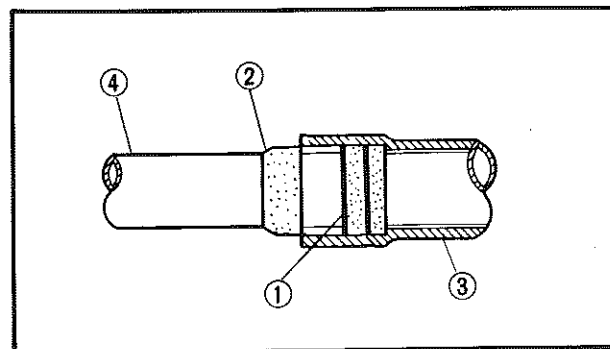
⑤ Inner fork tube



5. Install:

- Washer ①
Onto the guide bushing ②.
- Fork oil seal ③
Press fork oil seal into the outer fork tube ④ with Fork Seal Drive ⑤ (90890-01367) and Adapter ⑥ (90890-01398).

⑦ Inner fork tube



6. Install:

- Circlip ①
- Dust seal ②

③ Outer fork tube

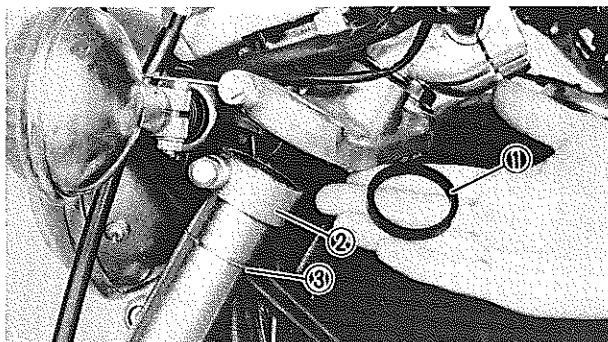
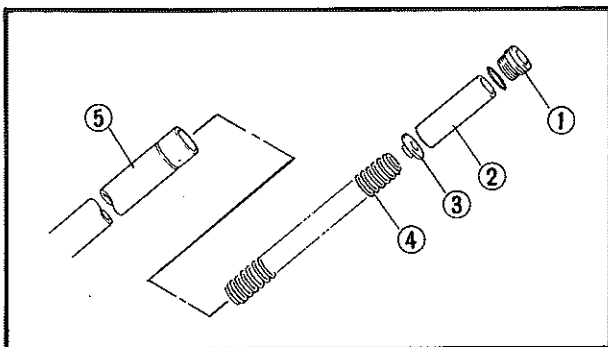
④ Inner fork tube

7. Fill:

- Front fork



Each Fork:
396 cm³ (14.0 Imp oz, 13.4 US oz)
Yamaha fork oil 10w or equivalent
After filling, slowly pump the fork up and down to distribute oil.



8. Install:

- Fork spring (4)
 - Spring seat (3)
 - Collar (2)
 - Cap bolt (1)
- Finger tighten the cap bolt.

(5) Inner fork tube

INSTALLATION

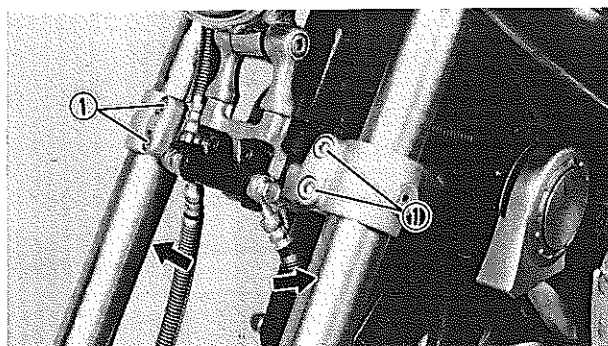
1. Install:

- Front fork(s)
- Into under bracket.
- Circlip (New) (3)
- Onto inner tube.

NOTE:

Apply a light coat of lithium base grease to the O-rings in the air joint bracket.

- Air joint bracket (2)
- Rubber damper (1)
- Over inner fork tube.
- Front fork(s)
- Into steering crown.

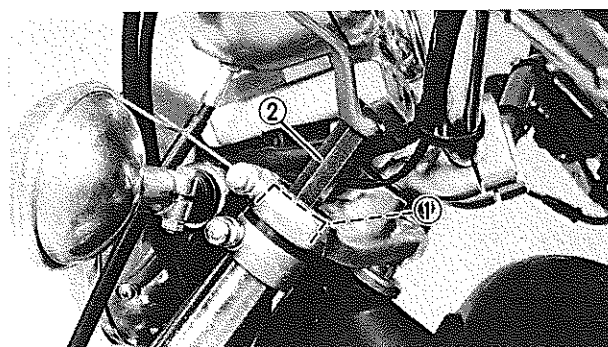


2. Tighten:

- Lower front fork pinch bolts (1)
- Temporarily tighten the pinch bolts.

NOTE:

Position the inner tube end so that it is flush with the top of the steering crown.



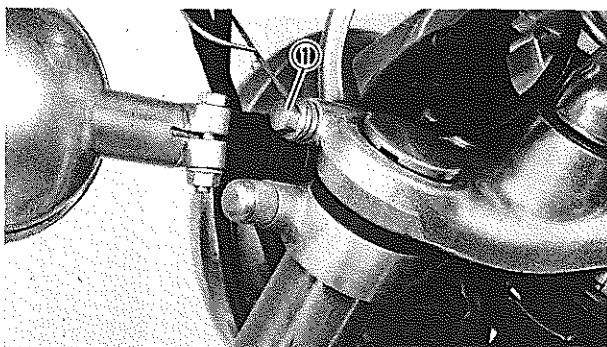
3. Tighten:

- Lower front fork pinch bolts
- Cap bolt (1)
- Use the Front Fork Cap Socket (2) (90890-01104).



Lower Pinch Bolt:
23 Nm (2.3 m·kg, 17 ft·lb)

Cap Bolt:
23 Nm (2.3 m·kg, 17 ft·lb)



4. Tighten:

- Upper front fork pinch bolt ①



Upper Pinch Bolt ① :
20 Nm (2.0 m·kg, 14 ft·lb)

5. Install:

- Cap
- Fork cover
- Brake hose holder
- Brake calipers

Refer to "REMOVAL" section.



Brake Caliper:
35 Nm (3.5 m·kg, 25 ft·lb)

6. Install:

- Front wheel

Refer to "FRONT WHEEL" section.

7. Adjust:

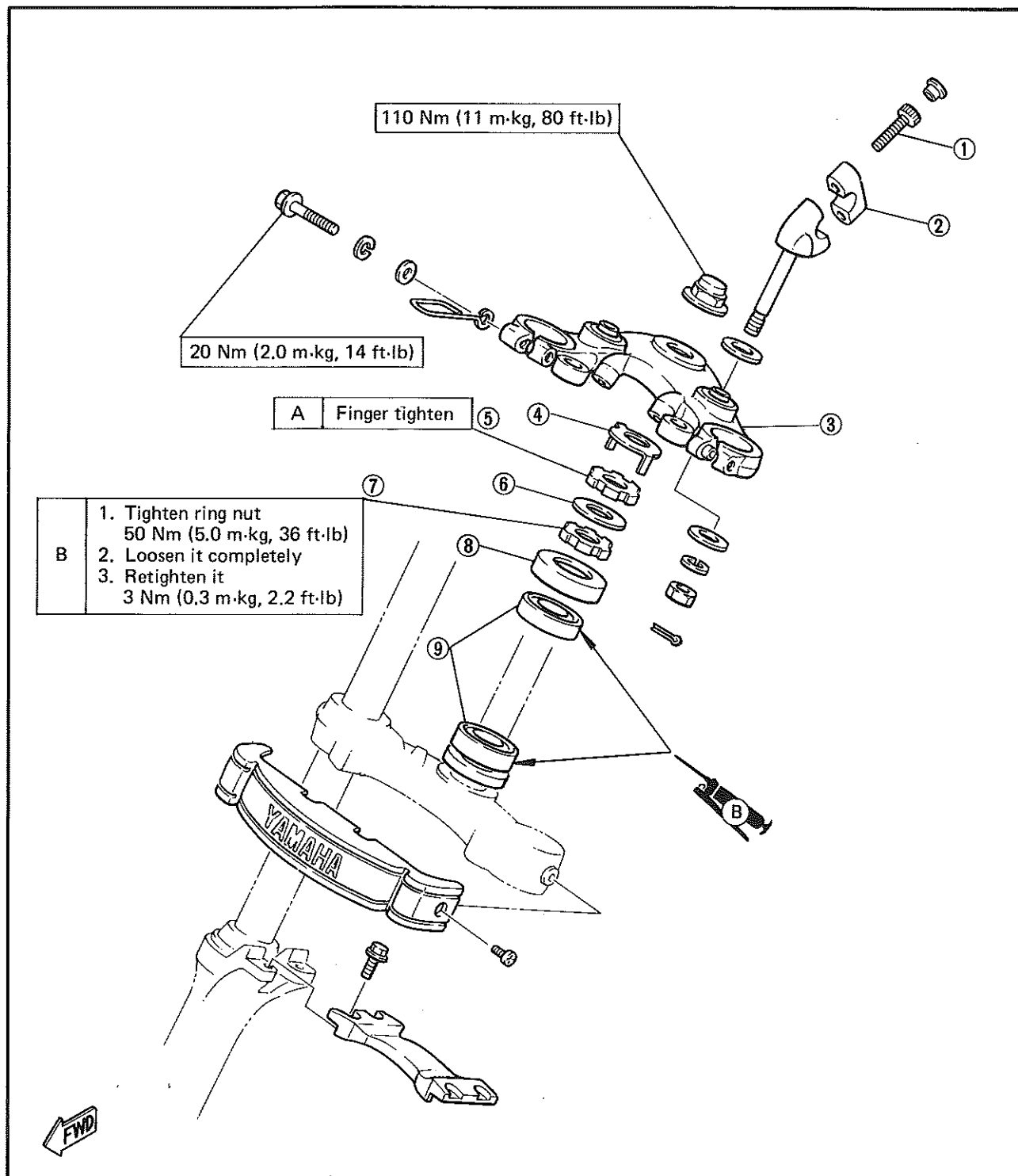
- Front fork air pressure

Refer to "CHAPTER 2 – FRONT FORK
AND REAR SHOCK ABSORBER AD-
JUSTMENT" section.



STEERING HEAD

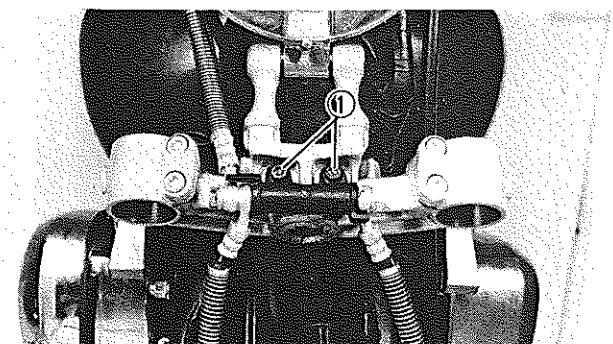
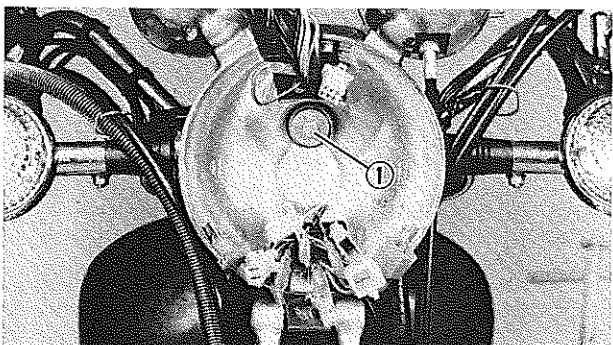
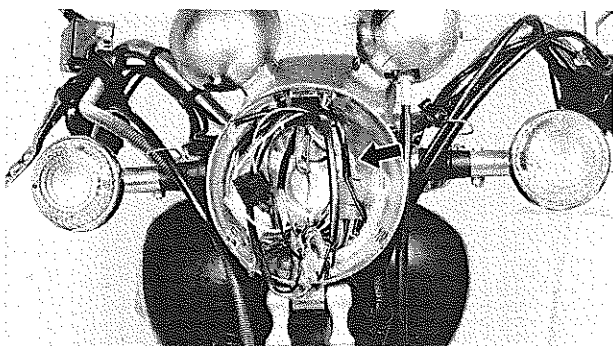
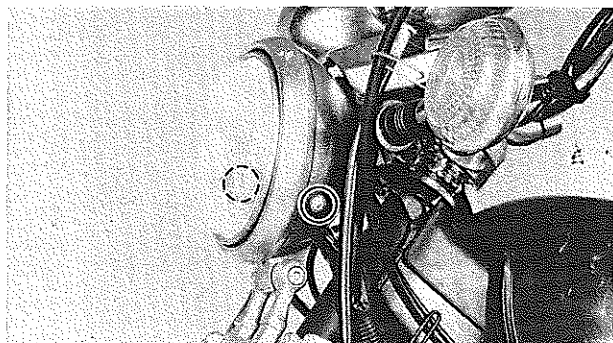
- ① Handlebar bolt
- ② Handlebar upper bracket
- ③ Steering crown
- ④ Special washer
- ⑤ Upper ring nut
- ⑥ Rubber washer
- ⑦ Lower ring nut
- ⑧ Bearing cover
- ⑨ Bearing
- ⑩ Oil seal



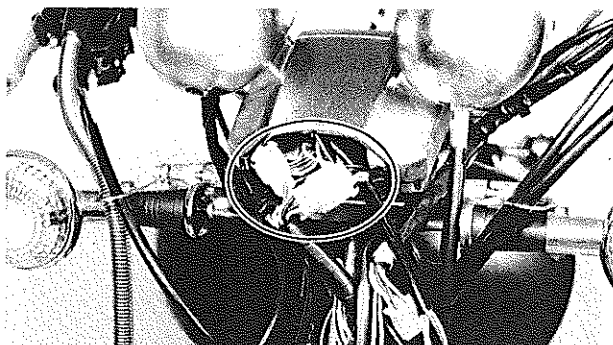
REMOVAL

WARNING:

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



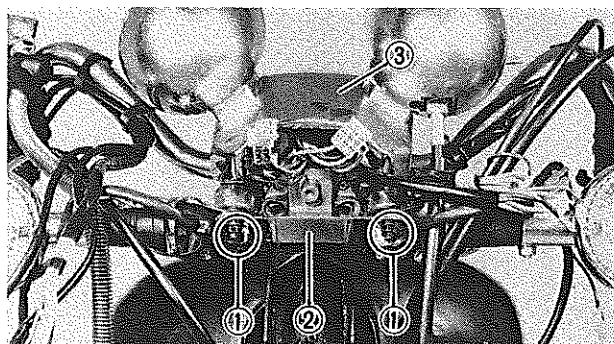
1. Remove:
 - Front wheel
 - Front forksRefer to "FRONT WHEEL" and "FRONT FORK" sections.
2. Remove:
 - Headlight lens unit
3. Disconnect:
 - Wire connectorsIn the headlight shell
4. Remove:
 - Headlight shell securing bolt ①
5. Remove:
 - Brake hose joint cover
 - Brake hose joint securing bolts ①
 - Headlight shell



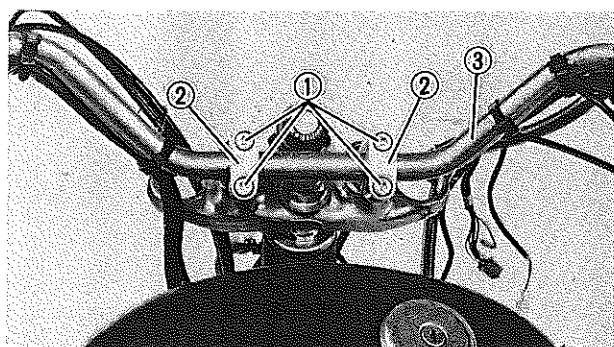
6. Remove:
- Rubber cover
 - Meter panel wiring connectors

7. Remove:
- Air cleaner case assembly
 - MCV case assembly

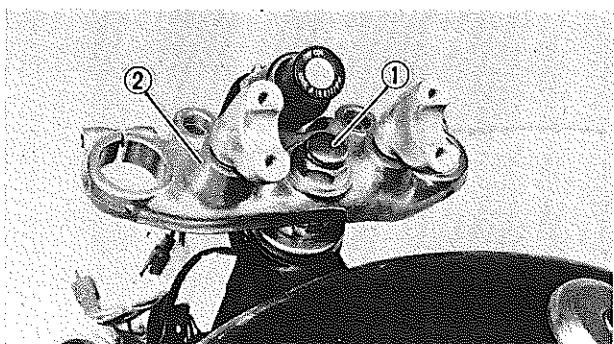
8. Disconnect:
- Throttle cable
 - Choke cable
 - Clutch cable
 - Speedometer cable



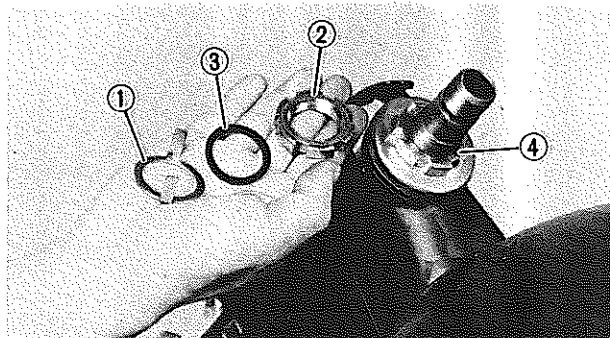
9. Remove:
- Meter stay securing nut ①
 - Front flasher light assembly ②
 - Meter assembly ③



10. Remove:
- Caps (Handlebar bolt)
 - Handlebar bolts ①
 - Handlebar upper brackets ②
 - Handlebar assembly ③



11. Remove:
- Steering stem nut ①
 - Steering crown ②



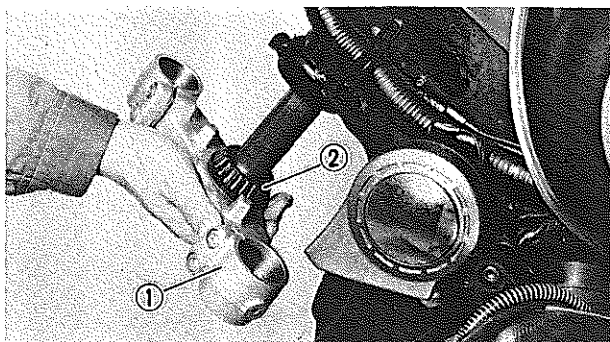
12. Remove:

- Special washer ①
- Upper ring nut ②
- Rubber washer ③
- Lower ring nut ④

Use Ring Nut Wrench (90890-01268).

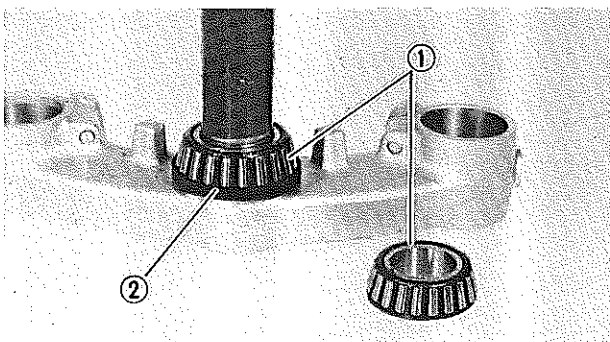
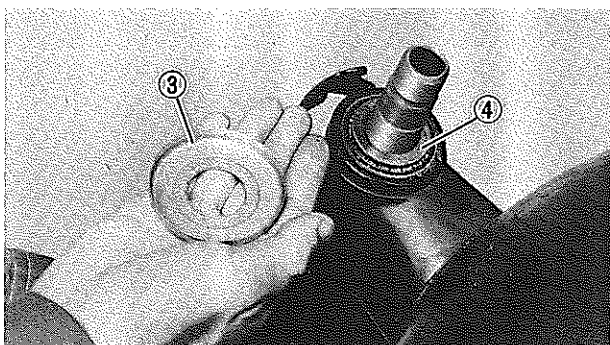
WARNING:

Support the under bracket so that it may not fall down.



13. Remove:

- Under bracket ① with lower bearing ②
- Bearing cover ③
- Upper bearing ④



INSPECTION

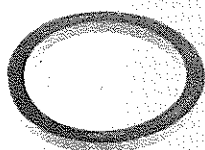
1. Wash the bearing in a solvent.
2. Inspect:
 - Bearings ①
 - Bearing race
 - Pitting/Damage → Replace.
 - Oil seal ②
 - Damage → Replace.

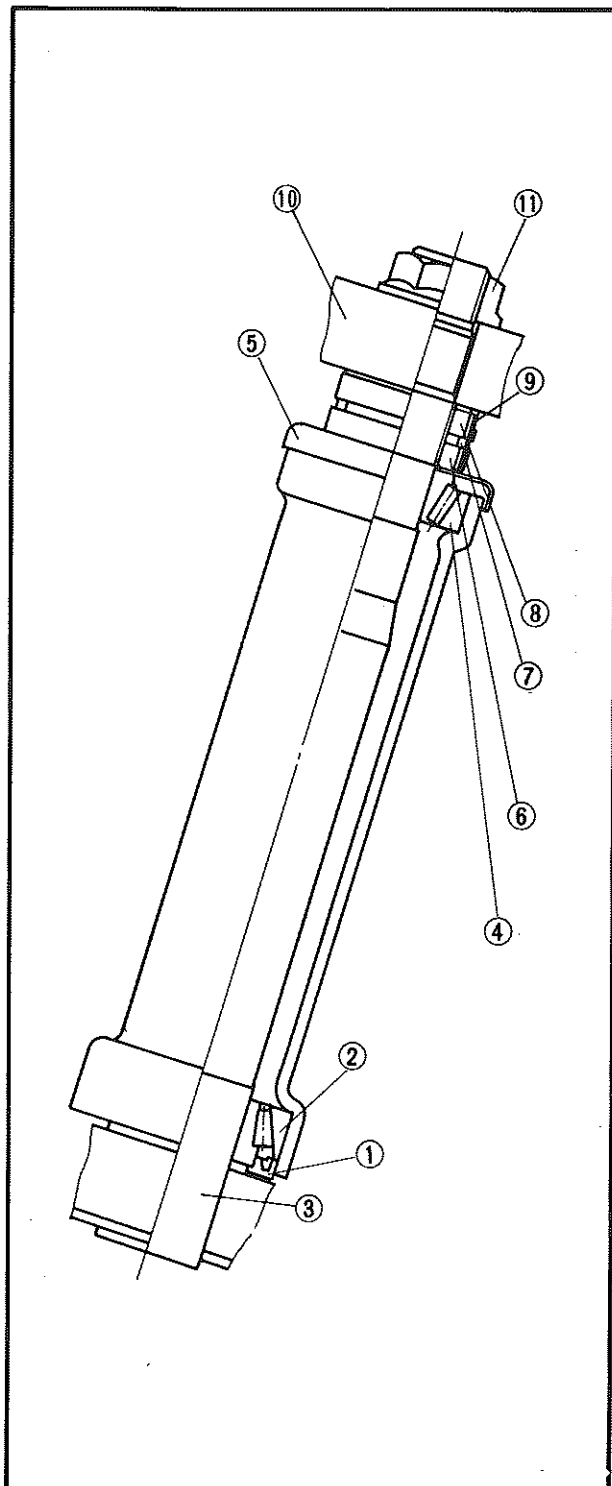
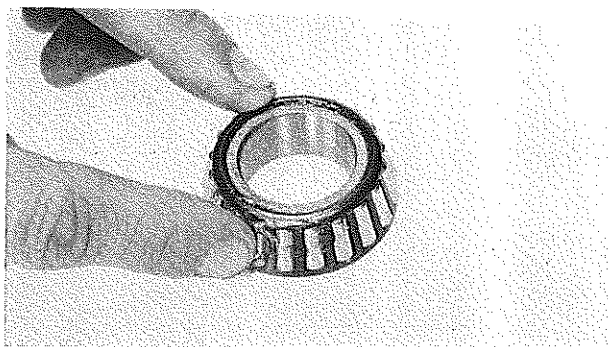
NOTE:

Always replace bearing and race as a set.

3. Inspect:

- Rubber washer
- Damage → Replace.





ASSEMBLY

1. Lubricate:

- Bearings and races



Wheel bearing grease

2. Install:

- Oil seal ①
- Bearing (Lower) ②
Onto steering stem.
- Under bracket (Steering stem) ③

CAUTION:

Hold the steering stem until it is secured.

- Upper bearing ④
 - Ball race cover ⑤
 - Lower ring nut ⑥
- #### 3. Tighten:
- Ring nuts (Lower and upper)

Ring nuts tightening steps:

NOTE:

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

- Install the lower ring nut ⑥.

NOTE:

The tapered side of ring nut must face downward.

- Tighten the lower ring nut ⑥ using the Ring Nut Wrench (90890-01403).



Ring Nut ⑥ (Initial Tightening):
50 Nm (5.0 m·kg, 36 ft·lb)

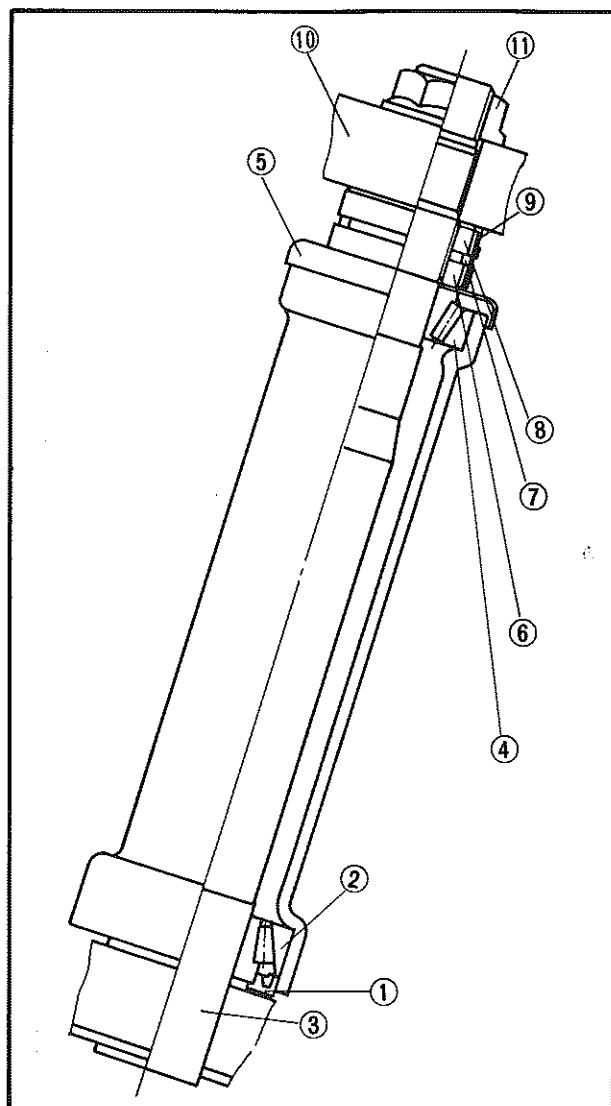
- Loosen the lower ring nut ⑥ completely and retighten it to specification.

WARNING:

Do not over-tightening.



Ring Nut ⑥ (Final Tightening):
3 Nm (0.3 m·kg, 2.2 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 bearing ②, ④.

- Install the rubber washer ⑦.
- Install the upper ring nut ⑧.

NOTE:

The tapered side of ring nut must face downward.

- Finger tighten the upper ring nut ⑧, then align the slots of both ring nuts. If not aligned, hold the lower ring nut ⑥ and tighten the other until they are aligned.
- Install the special washer ⑨.

NOTE:

Make sure the special washer tab is placed in the slots.

- Install the steering crown ⑩ and tighten the steering stem nut ⑪ to specification.



Nut (Steering Stem):
110 Nm (11.0 m·kg, 80 ft·lb)

4. Install:

- Components in aforementioned list (Steps "REMOVAL 10 ~ 2")



Handlebar Upper Bracket:
20 Nm (2.0 m·kg, 14 ft·lb)

Brake Hose Joint Bolt:
9 Nm (0.9 m·kg, 6.5 ft·lb)

- Front forks
- Front wheel
Refer to "FRONT FORK" and "FRONT WHEEL" sections.

5. Adjust:

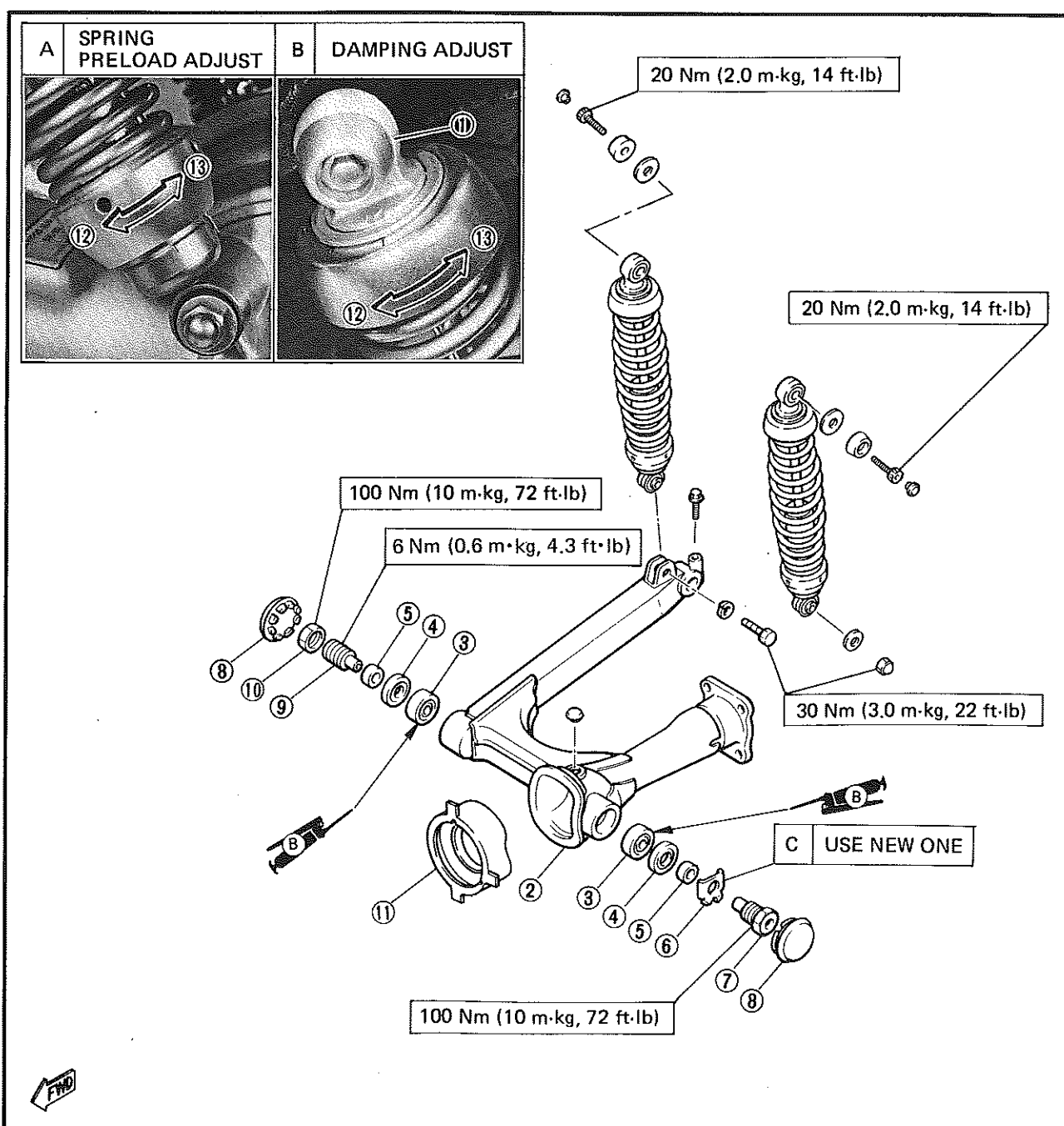
- Throttle cable free play
Refer to "CHAPTER 2. THROTTLE CABLE ADJUSTMENT" section.
- Clutch cable
Refer to "CHAPTER 2. CLUTCH ADJUSTMENT" section.

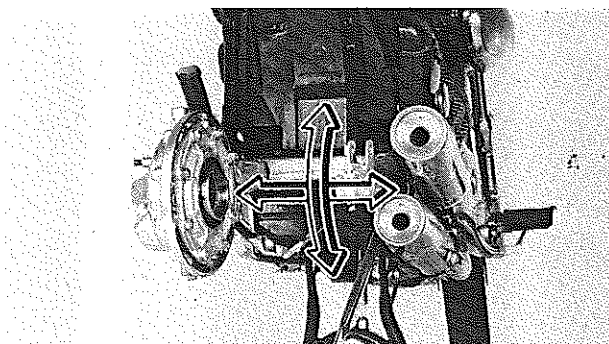
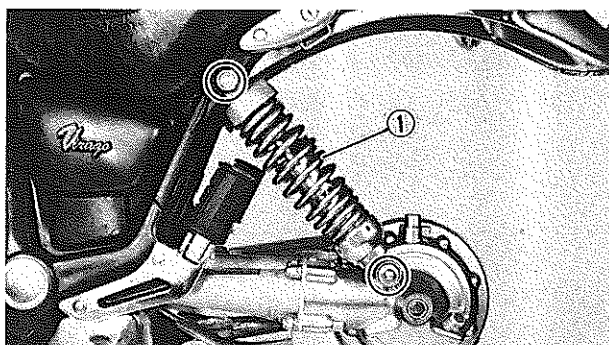
SWINGARM AND REAR SHOCK ABSORBER

- ① Rear shock absorber
- ② Swingarm
- ③ Bearing
- ④ Oil seal
- ⑤ Collar
- ⑥ Lock washer
- ⑦ Left pivot shaft
- ⑧ Pivot cover
- ⑨ Right pivot shaft
- ⑩ Nut
- ⑪ Rubber boot
- ⑫ Softer
- ⑬ Stiffer

A SPRING PRELOAD ADJUST	
Standard position	2
Softest	1
Stiffest	5

B DAMPING ADJUST	
Standard position	No.1
Minimum	No.1
Maximum	No.4



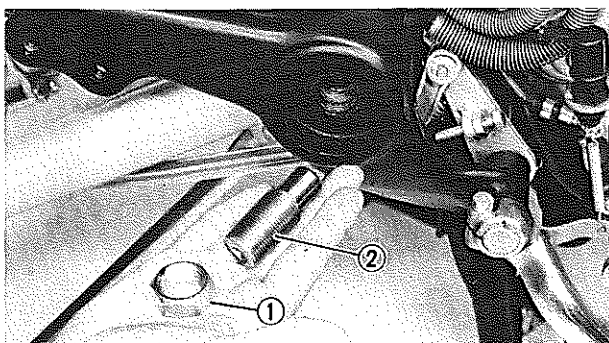
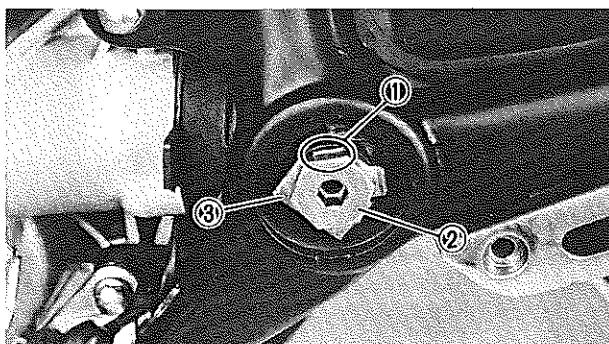


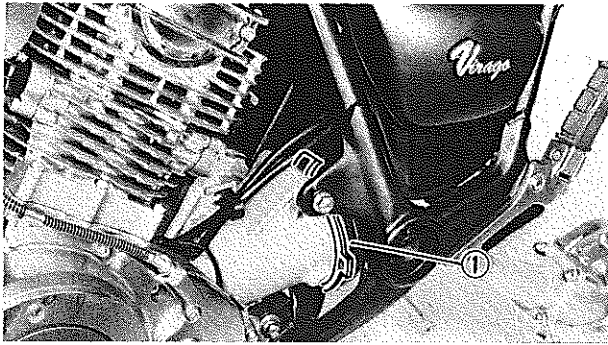
SWINGARM FREE PLAY INSPECTION

1. Place the motorcycle on its centerstand.
2. Remove:
 - Rear wheel
 - Rear shock absorbers ①
3. Check:
 - Swingarm (Side play)
Side play → Replace taper roller bearings and collars.
Move the swingarm from side to side.
There should be no noticeable side play.
 - Swingarm (Vertical movement)
Tightness/Binding/Rough spots → Replace bearings.
Move the swingarm up and down.

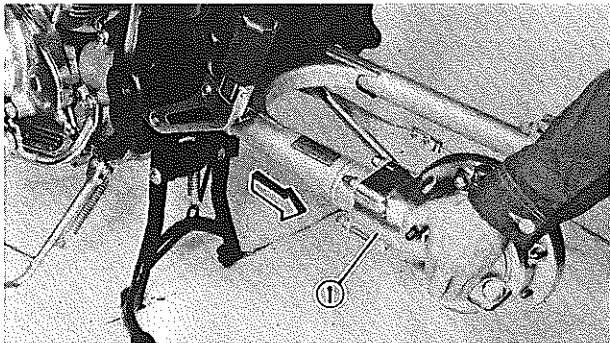
REMOVAL

1. Remove:
 - Rear wheel
 - Rear shock absorbers
2. Remove:
 - Front exhaust pipe
 - Muffler assembly
Refer to "CHAPTER 3. EXHAUST PIPE AND MUFFLER" section.
3. Remove:
 - Pivot shaft caps (Left and right)
4. Flatten:
 - Lock washer tab ①
5. Remove:
 - Left pivot shaft ②
 - Lock washer ③
6. Remove:
 - Nut ①
 - Right pivot shaft ②

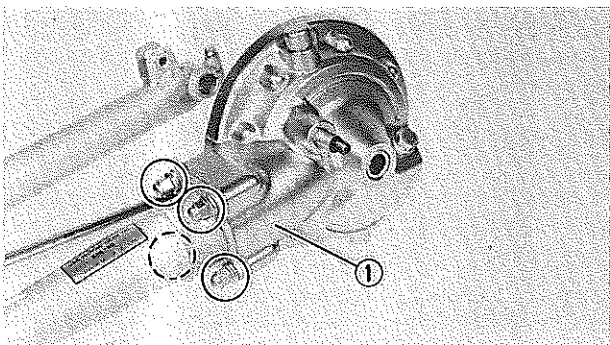




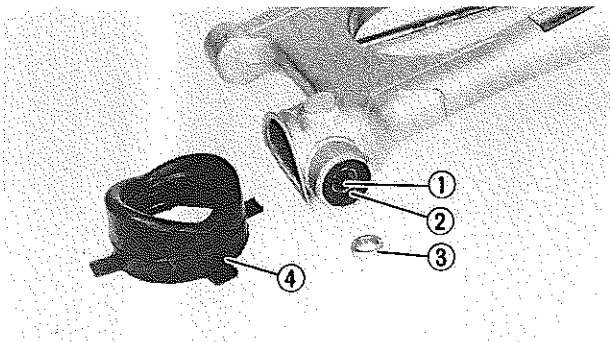
7. Remove:
- Rubber boot ①
From engine side.



8. Remove:
- Swingarm ①

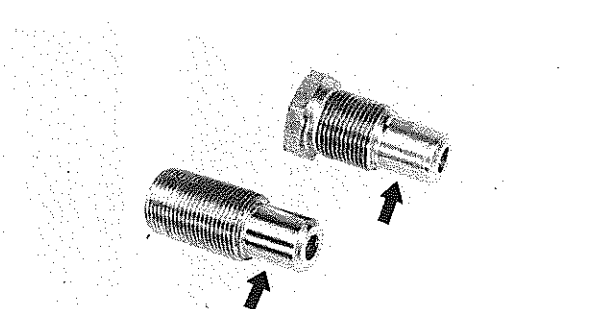


9. Remove:
- Final gear assembly ①

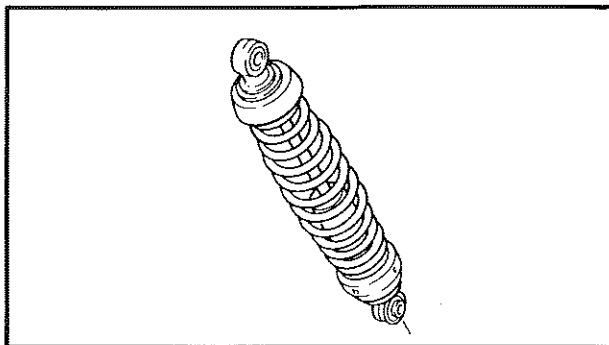


INSPECTION AND LUBRICATION

1. Wash the bearings in a solvent.
2. Inspect:
 - Bearings ①
 - Oil seals ②
 - Collars ③
 - Rubber boot ④
 Damage → Replace.



3. Inspect:
 - Pivot shafts
 Damage → Replace.



4. 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.
- Bump rubber
 - Damage → Replace.

INSTALLATION

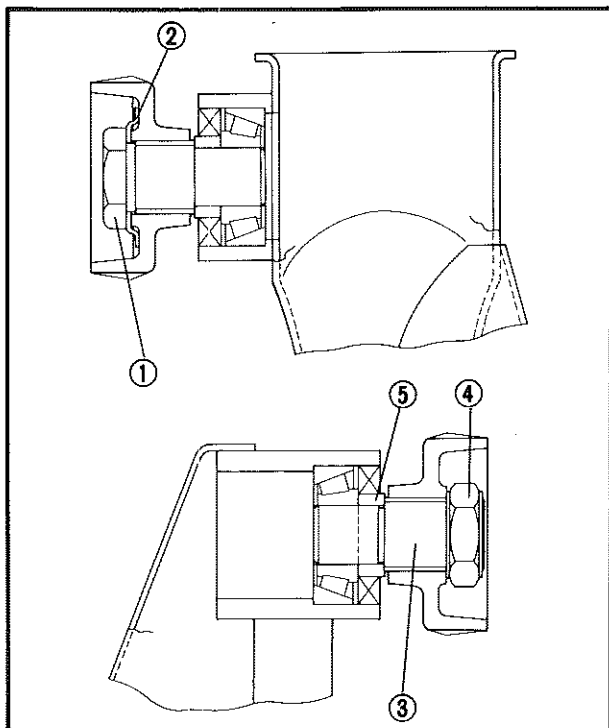
When installing the swingarm, reverse the removal steps. Note the following points.

1. Lubricate:

- Bearing
- Oil seals



Lithium Base Waterproof Wheel Bearing Grease



2. Install:

- Swingarm
- Lock washer (New)
- Pivot shafts

3. Tighten:

- Pivot shafts

Pivot shaft tightening steps:

- Tighten the pivot shaft (Left) ① to specification.

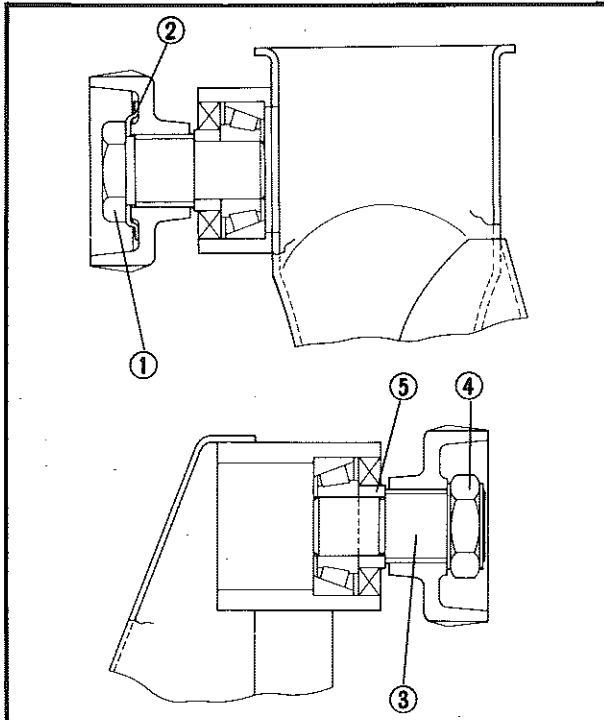


Pivot Shaft (Left):
100 Nm (10.0 m·kg, 72 ft·lb)

- Tighten the pivot shaft (Right) ③ until it contacts the collar ⑤.



Pivot Shaft (Right):
6 Nm (0.6 m·kg, 4.3 ft·lb)

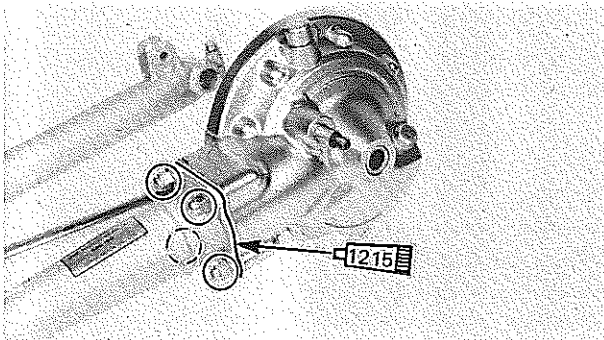


- Tighten nut (Right pivot shaft) (4) to specification.



Nut (Right Pivot Shaft):
100 Nm (10.0 m·kg, 72 ft·lb)

- Bend the lock washer tab (2) along the nut flat.



4. Apply:

- Yamaha Bond No. 1215
(90890-85505)

To the mating surfaces of both case halves.

5. Install:

- Final gear assembly

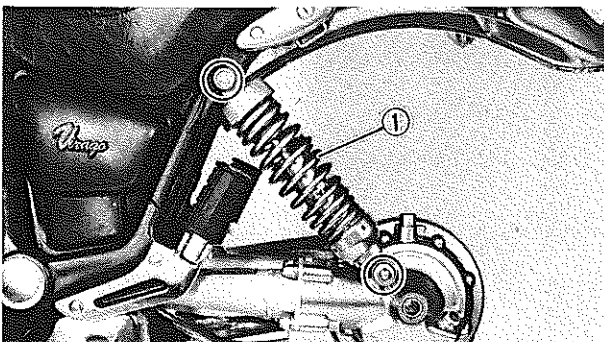


Nuts (Final Gear Case):
43 Nm (4.3 m·kg, 32 ft·lb)

6. Check:

- Swingarm (Side play)
- Swingarm (Vertical movement)

Refer to "FREE PLAY INSPECTION" section.



7. Install:

- Rear shock absorbers (1)



Rear Shock Absorber
Upper: 20 Nm (2.0 m·kg, 14 ft·lb)
Lower: 30 Nm (3.0 m·kg, 22 ft·lb)

NOTE:

When installing the rear shock absorber, make sure that the side with the dumping adjuster mark faces outside.



8. Adjust:

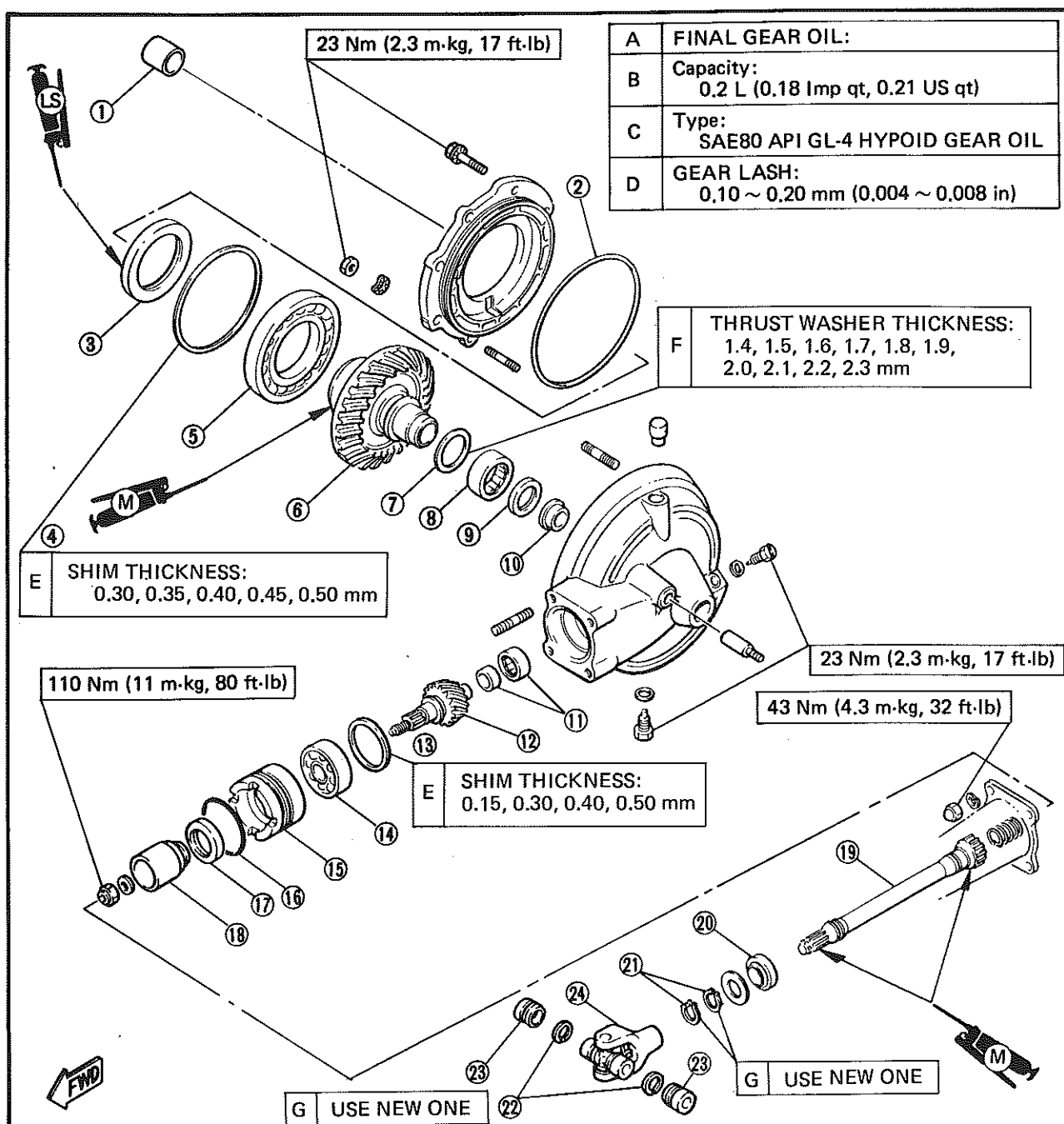
- Spring preload

Refer to "CHAPTER 2. REAR SHOCK ABSORBER ADJUSTMENT" section.



SHAFT DRIVE

- | | |
|----------------------|---------------------|
| ① Collar | ⑫ Final drive shaft |
| ② O-ring | ⑬ Shim(s) |
| ③ Oil seal | ⑭ Bearing |
| ④ Shim(s) | (B6305RBI special) |
| ⑤ Bearing (B16014C2) | ⑮ Bearing retainer |
| ⑥ Ring gear | ⑯ O-ring |
| ⑦ Thrust washer | ⑰ Oil seal |
| ⑧ Bearing | ⑱ Gear coupling |
| (Needle NQ37/20D) | ⑲ Drive shaft |
| ⑨ Oil seal | ⑳ Oil seal |
| ⑩ Guide collar | ㉑ Circlip |
| ⑪ Bearing | ㉒ Circlip |
| (Needle 22BTM3018) | ㉓ Bearing |
| | ㉔ Universal joint |





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. 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.

2. 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.

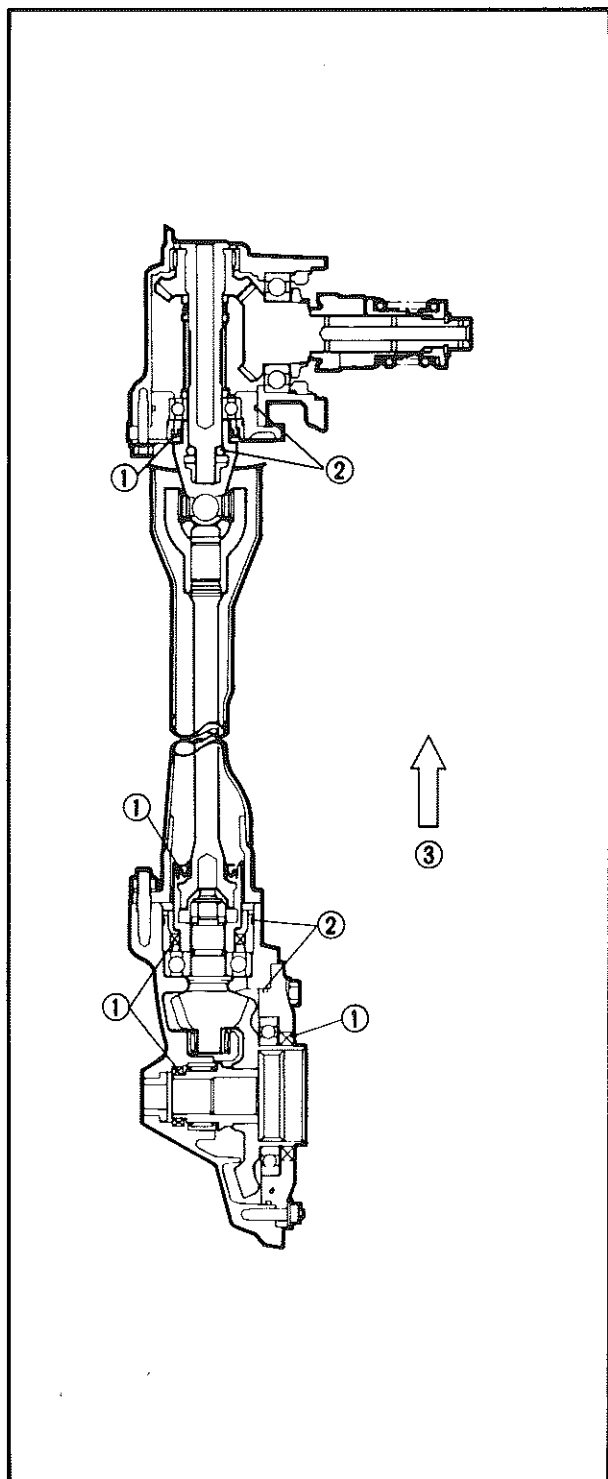
Leakage → Inspect component housing, gasket, and/or seal for damage.

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.



3. 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.

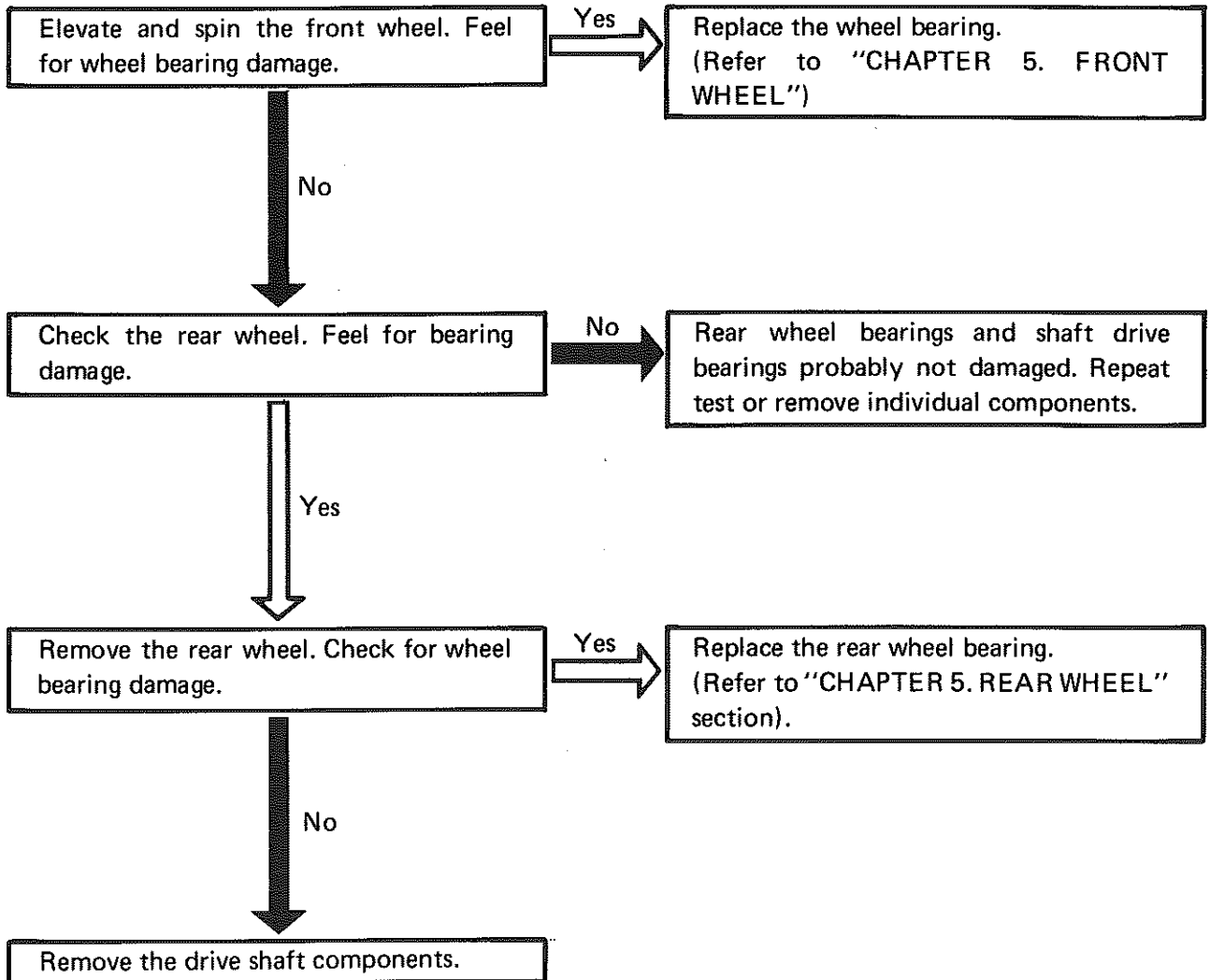
Diagnosis: Possible broken gear teeth.

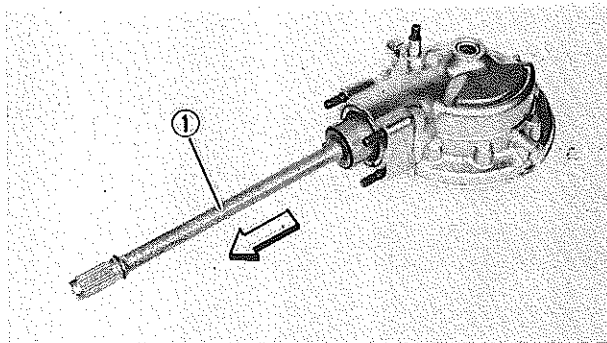
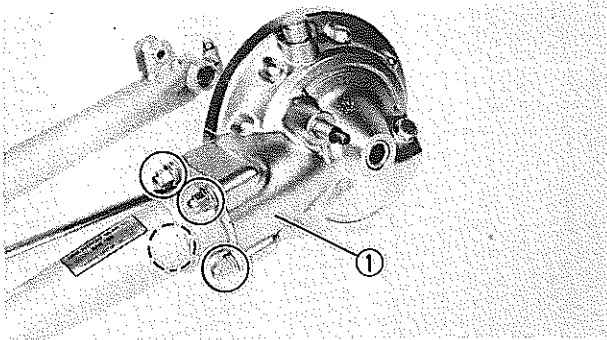
WARNING:

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.

Troubleshooting Chart

When basic conditions "a" and "b" above exist, check the following points:





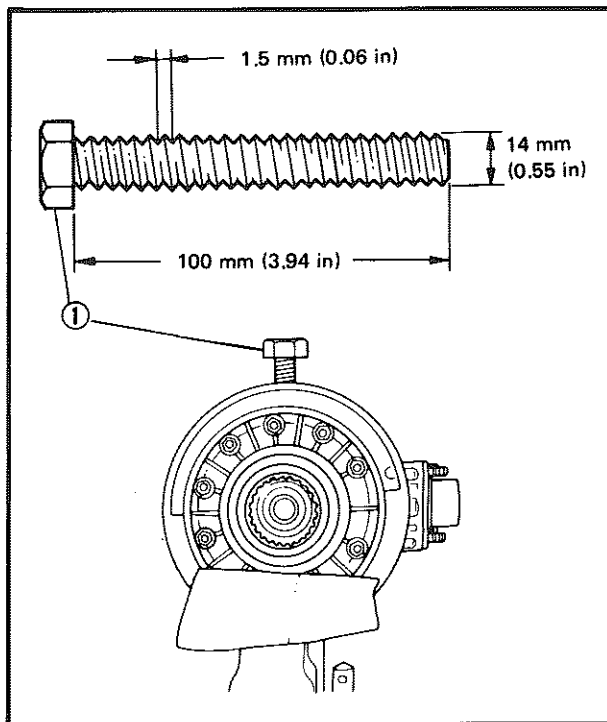
FINAL DRIVE GEAR

Removal

1. Remove:
 - Rear wheel
 - Rear shock absorber (Left)
 - Nuts
 - Final gear assembly ① with drive shaft.
2. Remove:
 - Drive shaft ①

Pull out the drive shaft with oil seal from the final gear case.

 - Compression spring on the final drive shaft.
 - Collar



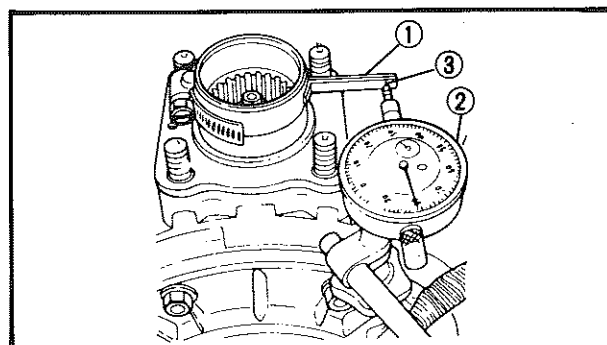
Gear Lash Measurement

1. Secure the gear case in a vise or other support.
2. Remove:
 - Drain plug

Drain the oil.
3. Install:
 - A specified bolt ①

Into the drain plug hole.
4. Finger tighten the bolt until it holds the ring gear.

NOTE: _____
Do not over tighten the bolt; finger-tight is sufficient.



5. Attach:
 - Gear Lash Measurement Tool ① (90890-01230)
 - Dial Gauge ② (90890-03097)

Set the dial gauge rod at position mark ③ .

6. Measure:

• Gear lash

Gently rotate the gear coupling from engagement to engagement.

Over specified limit → Adjust.

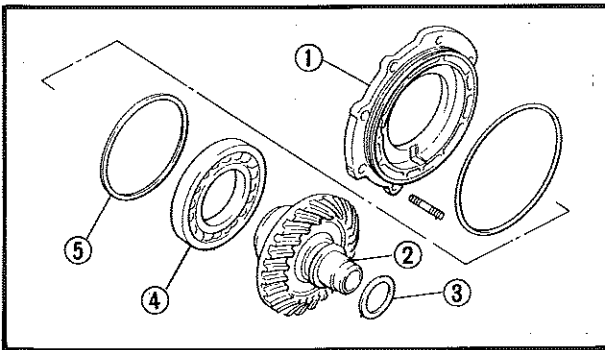
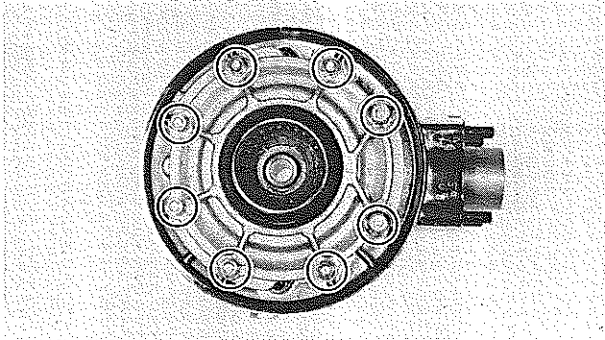


Final Gear Lash:

0.10 ~ 0.20 mm (0.004 ~ 0.008 in)

NOTE:

Measure the gear lash at 4 positions. Rotate the shaft 90° each time.



Gear Lash Adjustment

1. Remove:

- Nuts (Bearing housing)
- Bolts (Bearing housing)

NOTE:

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

2. Remove:

- Bearing housing ①
- Ring gear ②
- Thrust washer ③
- Bearing ④
- Shim(s) ⑤

NOTE:



When removing the bearing from the bearing housing, heat the bearing housing to 150°C (302°F).

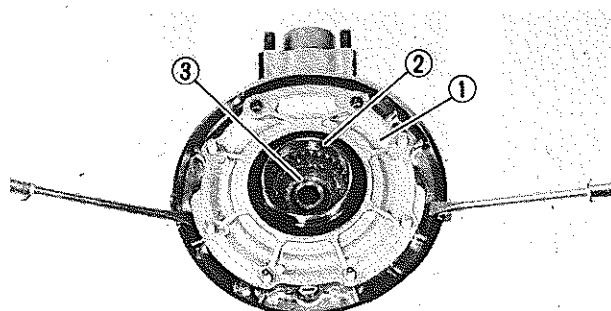
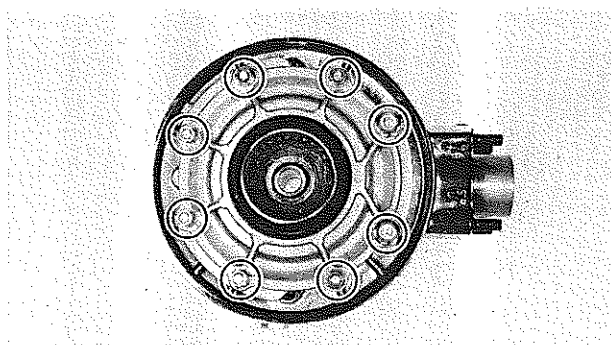
3. Adjust:

- Gear lash

Gear lash adjustment steps:

- Select the suitable shims and thrust washer by the following chart.

<p>Too-little gear lash → Reduce shim thickness.</p> <p>Too-large gear lash → Increase shim thickness.</p>			
<p>To Add or Reduce Ring Gear Shim Thickness</p>			
<p>Increase by more than 0.1 mm.</p>		<p>Reduce by more than 0.1 mm.</p>	
<p>Reduce thrust washer thickness by 0.1 mm for every 0.1 mm of ring gear shim increase.</p>		<p>Reverse procedure</p>	
 Ring Gear Shim			
Thickness (mm)	0.25 0.40	0.30 0.45	0.35 0.50
 Thrust Washer			
Thickness (mm)	1.4 1.7 2.0 2.3	1.5 1.8 2.1	1.6 1.9 2.2



Final Drive Gear Disassembly

1. Remove:

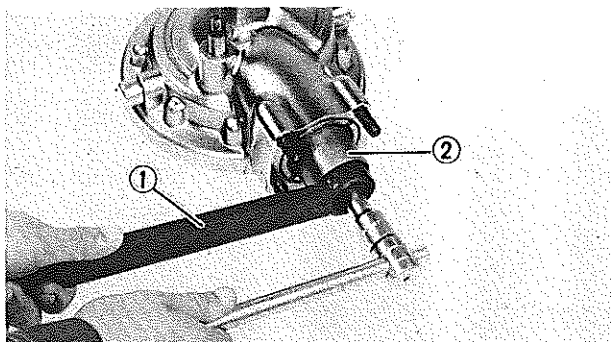
- Nuts (Bearing housing)
- Bolts (Bearing housing)

NOTE:

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

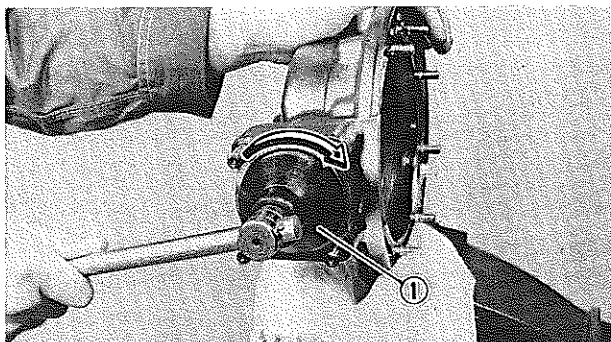
2. Remove:

- Bearing housing ① with ring gear ②
- Thrust washer ③



3. Remove:

- Self-locking nut
From final drive shaft.
Use Middle and Final Gear Holding Tool (90890-01229) ① .
- Coupling ②

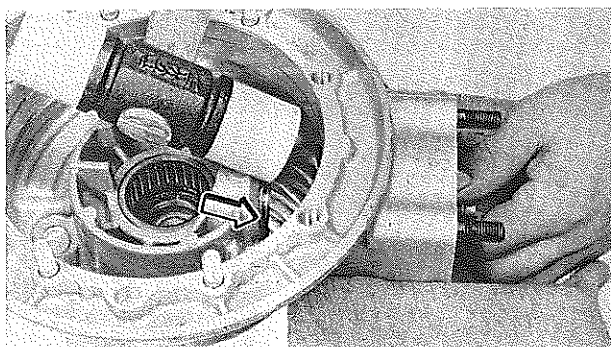


4. Remove:

- Final drive shaft bearing retainer
Use Final Drive Shaft Bearing Retainer Wrench (90890-04050) ① .

CAUTION:

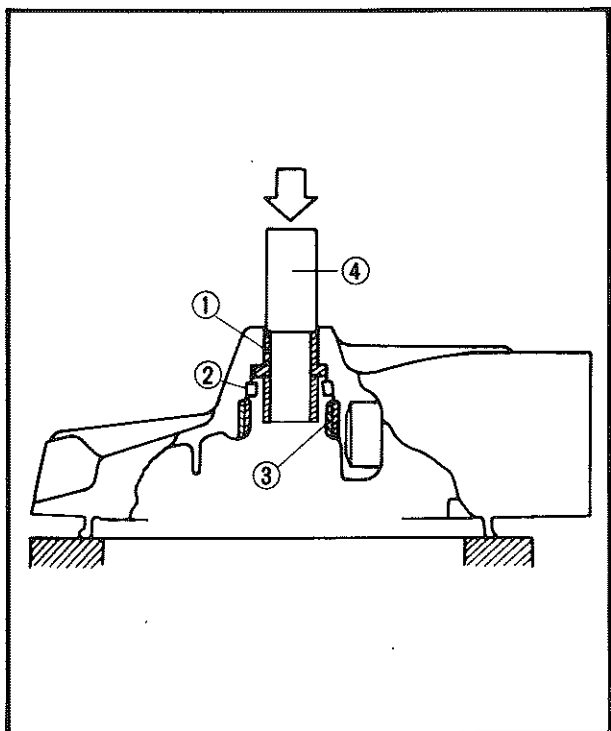
Final drive shaft bearing retainer has left-hand threads. Turn retainer nut clockwise to loosen it.



- Bearing
- Shim(s)
- Final drive shaft
Tap lightly on the final drive shaft end with a soft hammer.

CAUTION:

Final drive shaft removal should be performed only if gearing replacement is necessary. Do not reuse bearings or races after removal.

**Bearing Removal and Reassembly**

1. Remove:

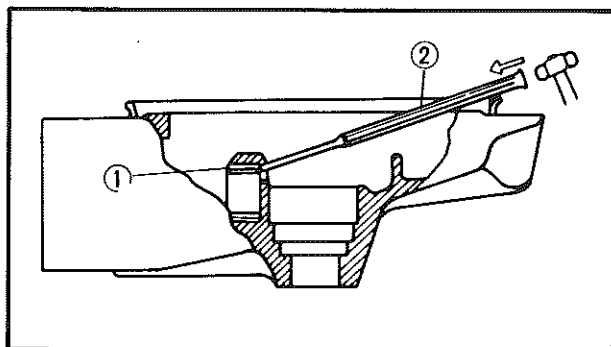
- Guide collar ①
- Oil seal ②
- Roller bearing ③
Use a suitable press tool ④ and an appropriate support for the main housing.

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. Remove:

- Final drive shaft roller bearing ①

Final drive shaft roller bearing 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:

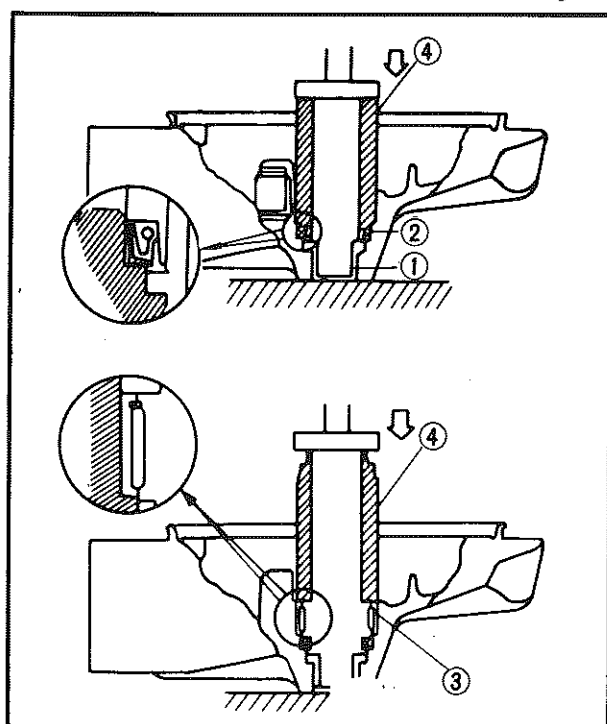
The removal of the final drive shaft roller bearing is difficult and seldom necessary.

4. Install:

- Rear final drive shaft roller bearing (New)

Final drive shaft roller bearing 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.



5. Install:

- Guide collar ①
- Oil seal (New) ②
- Roller bearing (Outer race) ③

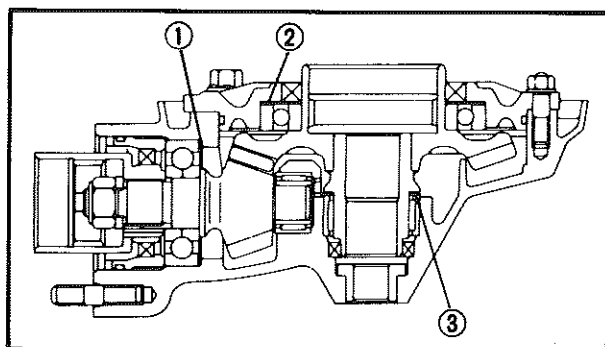
Use a suitable press tool ④ and a press to install the above components into the main housing.

Final Drive/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 ①
- Ring gear shim ②

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 and drive gear end.

- 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":

$$A = a - b$$

Where:

a = a numeral (usually a decimal number) on the gear is either added to or subtracted from "84".

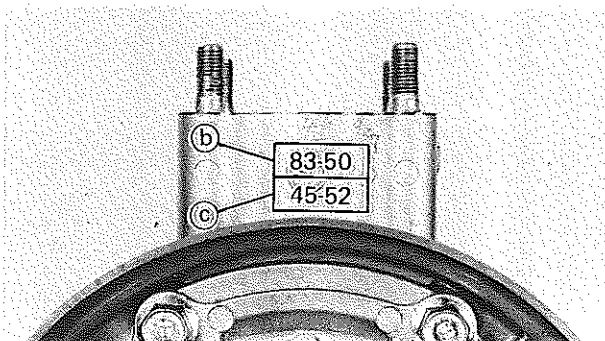
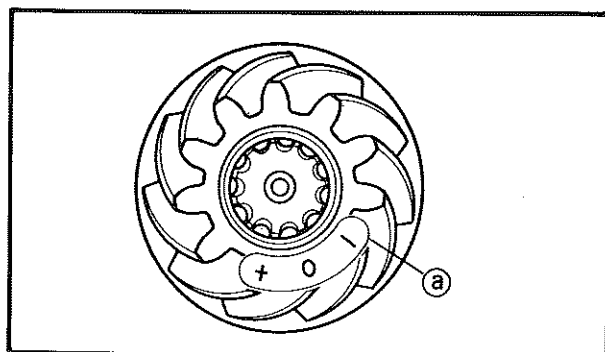
b = a numeral on the gear case (i.e. 83.50)

Example:

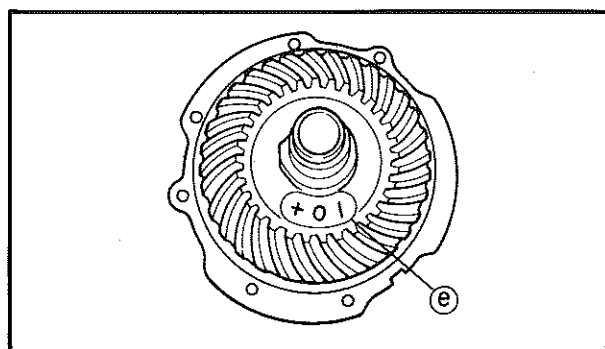
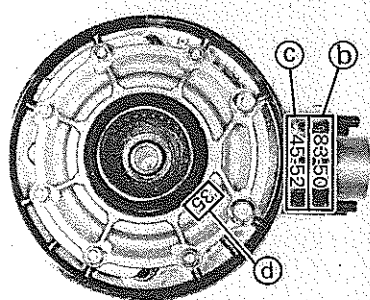
- 1) If final drive shaft gear is marked "+01" ... "a" is 84.01.
- 2) If the gear case is marked "83.50" ... "b" is 83.50.
 $A = 84.01 - 83.50$
 $= 0.51$

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 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 shim.

• To find shim thickness "B", use following formula:

Ring Gear Shim Thickness "B":

$$B = c + d - (e + f)$$

Where:

c = numeral on gear case (i.e. 45.52)

d = numeral (usually a decimal number) on outside of ring gear bearing housing and added to 3.

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

f = bearing thickness (considered constant).



Bearing Thickness "f" = 13.00 mm

Example:

1) If gear case is marked "45.52" ... "c" is 45.52.

2) If ring gear bearing housing is marked "35" ... "d" is $0.35 + 3 = 3.35$.

3) If ring gear is marked "+01" ... "e" is $35.40 + 0.01 = 35.41$.

4) "f" is 13.00.

$$\begin{aligned} B &= c + d - (e + f) \\ &= 45.52 + 3.35 - (35.41 + 13.00) \\ &= 48.87 - (48.41) \\ &= 0.46 \end{aligned}$$



5) Therefore, shim thickness is 0.46 mm. Shim sizes are supplied in following thickness:



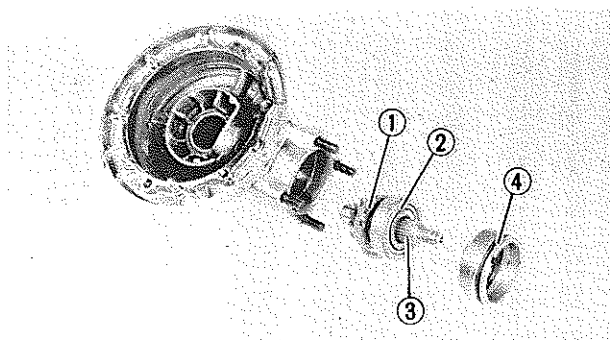
Ring Gear Shim

Thickness (mm)	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 0.46 mm. The chart instructs you, however, to round off the 6 to 5. Thus you should use a 0.45mm shims.



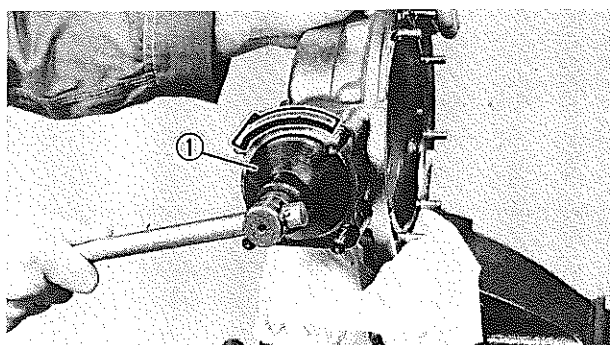
2. Install:

- Shims ① (Proper size as calculated)
- Bearing ②
- Final drive shaft ③
- Bearing retainer ④

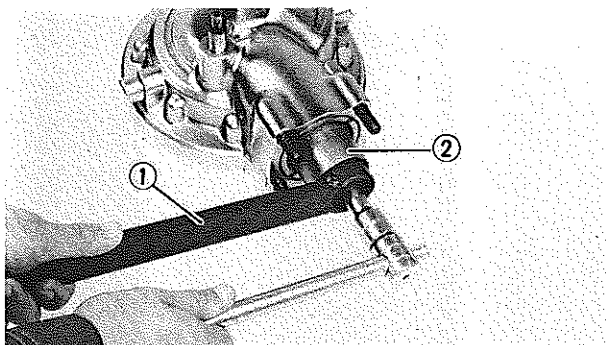
Use Final Drive Shaft Bearing Retainer Wrench (90890-04045).

NOTE:

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



Bearing Retainer ① :
110 Nm (11.0 m·kg, 80 ft·lb)


3. Install:

- Coupring ②
- Self-locking nut (New)

Use Middle and Final Gear Holding Tool (90890-01229) ①



Self-locking Nut:
110 Nm (11.0 m·kg, 80 ft·lb)

4. Install:

- Ring gear assembly (Without thrust washer)

5. Adjust:

- Gear lash

Refer to "Gear Lash Measurement and Adjustment" section.

6. 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 and nuts to specification.



Bolts (Bearing Housing):
40 Nm (4.0 m·kg, 29 ft·lb)

Nuts (Bearing Housing):
23 Nm (2.3 m·kg, 17 ft·lb)

NOTE:

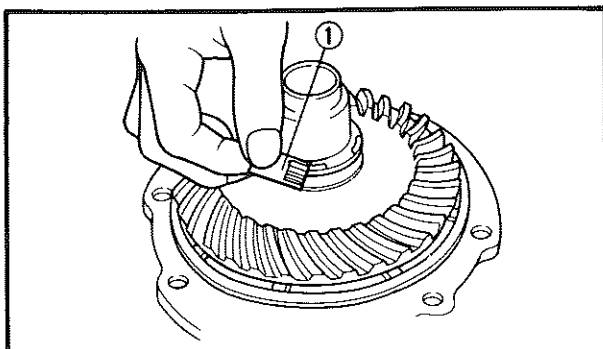
- Do not turn the shaft drive and ring gear when measuring clearance with Plastigage®.
- Tighten the bolts and nuts, using a criss-cross pattern.

- 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.

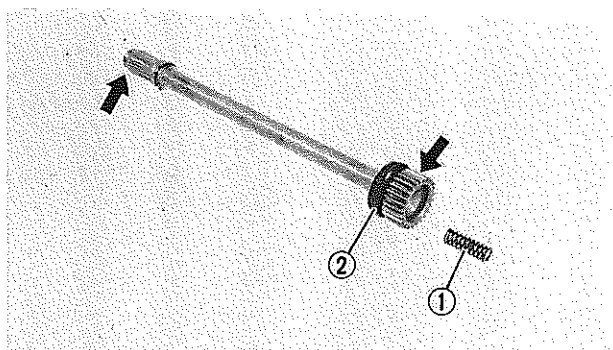
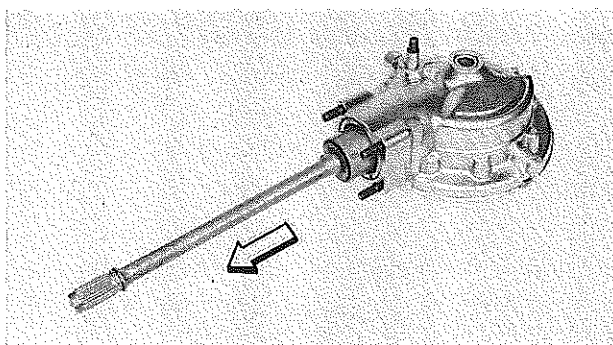
Thrust washer selection steps:

- Select the suitable thrust washer by the following chart.

Thrust Washer			
Thickness (mm)	1.4	1.5	1.6
	1.7	1.8	1.9
	2.0	2.1	2.2
	2.3		

- 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)



DRIVE SHAFT

Removal

- Remove:
 - Drive shaft
Refer to "FINAL DRIVE GEAR – Removal" section.

Inspection

- Inspection:
 - Drive shaft splines
 - Compression spring ①
 - Oil seal ②
Wear/Damage → Replace.

Installation

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

- Lubricate:
 - Shaft splines

Molybdenum Disulfide Grease

2. Install:

- Drive shaft

NOTE:

Before installing, first set the universal joint in place on the middle case side.

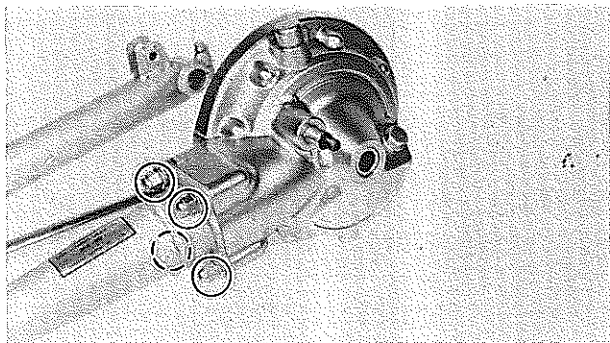
3. Apply:

- Yamaha bond No. 1215
(90890-85505)

To the mating surfaces of both case halves.

4. Tighten:

- Nuts (Final gear case)



Nuts (Final Gear Case):
43 Nm (4.3 m·kg, 32 ft·lb)

38

39

CHAPTER 6. ELECTRICAL

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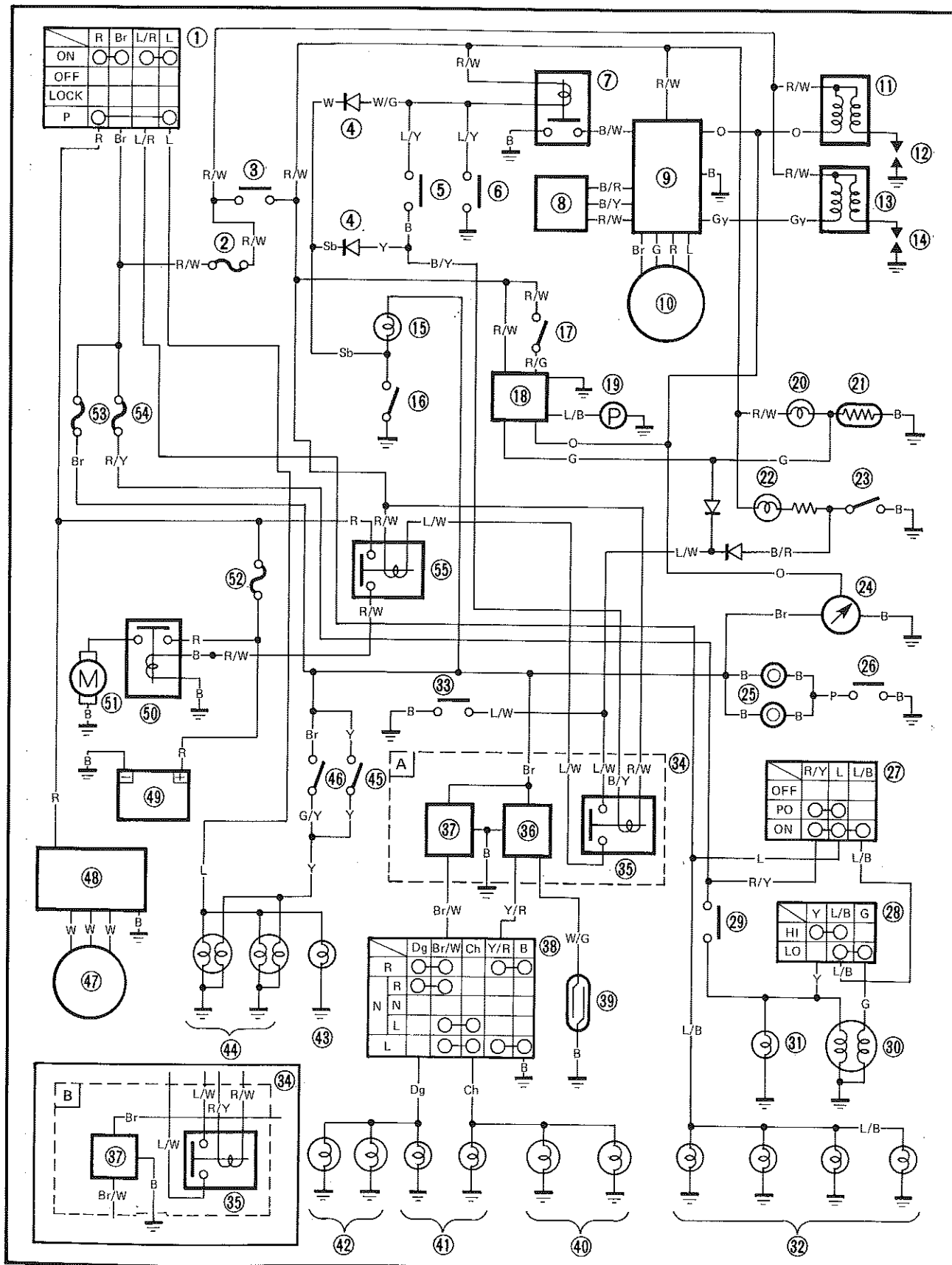


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ELECTRICAL

XV1000 CIRCUIT DIAGRAM

(With sidestand relay)





- | | |
|----------------------------------|-----------------------------------|
| ① Main switch | ③⑩ Headlight |
| ② Fuse (IGNITION) | ③① "HIGH BEAM" indicator light |
| ③ "ENGINE STOP" switch | ③② Meter illumination light |
| ④ Diode | ③③ "START" switch |
| ⑤ Clutch switch | ③④ Flasher unit |
| ⑥ Sidestand switch | ③⑤ Starting circuit cut-off relay |
| ⑦ Sidestand relay | ③⑥ Cancelling unit |
| ⑧ Pressure sensor | ③⑦ Flasher relay |
| ⑨ Ignitor unit | ③⑧ "TURN" switch |
| ⑩ Pick up coil | ③⑨ Reed switch |
| ⑪ Ignition coil (# 1) | ④① Flasher light (Left) |
| ⑫ Spark plug (# 1) | ④② "TURN" indicator light |
| ⑬ Ignition coil (# 2) | ④③ Flasher light (Right) |
| ⑭ Spark plug (# 2) | ④④ Auxiliary light |
| ⑮ "NEUTRAL" indicator light | ④⑤ Tail/Brake light |
| ⑯ Neutral switch | ④⑥ Rear brake switch |
| ⑰ "FUEL" (RESERVE) switch | ④⑦ Front brake switch |
| ⑱ Fuel pump control unit | ④⑧ A.C. Magneto |
| ⑲ Fuel pump | ④⑨ Rectifier/Regulator |
| ⑳ "FUEL" warning indicator light | ④⑩ Battery |
| ㉑ Fuel sender | ⑤① Solenoid switch |
| ㉒ "OIL" warning indicator light | ⑤② Starter motor |
| ㉓ Oil level switch | ⑤③ Fuse (MAIN) |
| ㉔ Tachometer | ⑤④ Fuse (SIGNAL) |
| ㉕ Horn | ⑤⑤ Fuse (HEAD) |
| ㉖ "HORN" switch | ⑤⑥ Starter relay |
| ㉗ "LIGHTS" switch | Ⓐ Except for Germany |
| ㉘ "LIGHTS" (Dimmer) switch | Ⓑ For Germany |
| ㉙ "PASS" switch | |

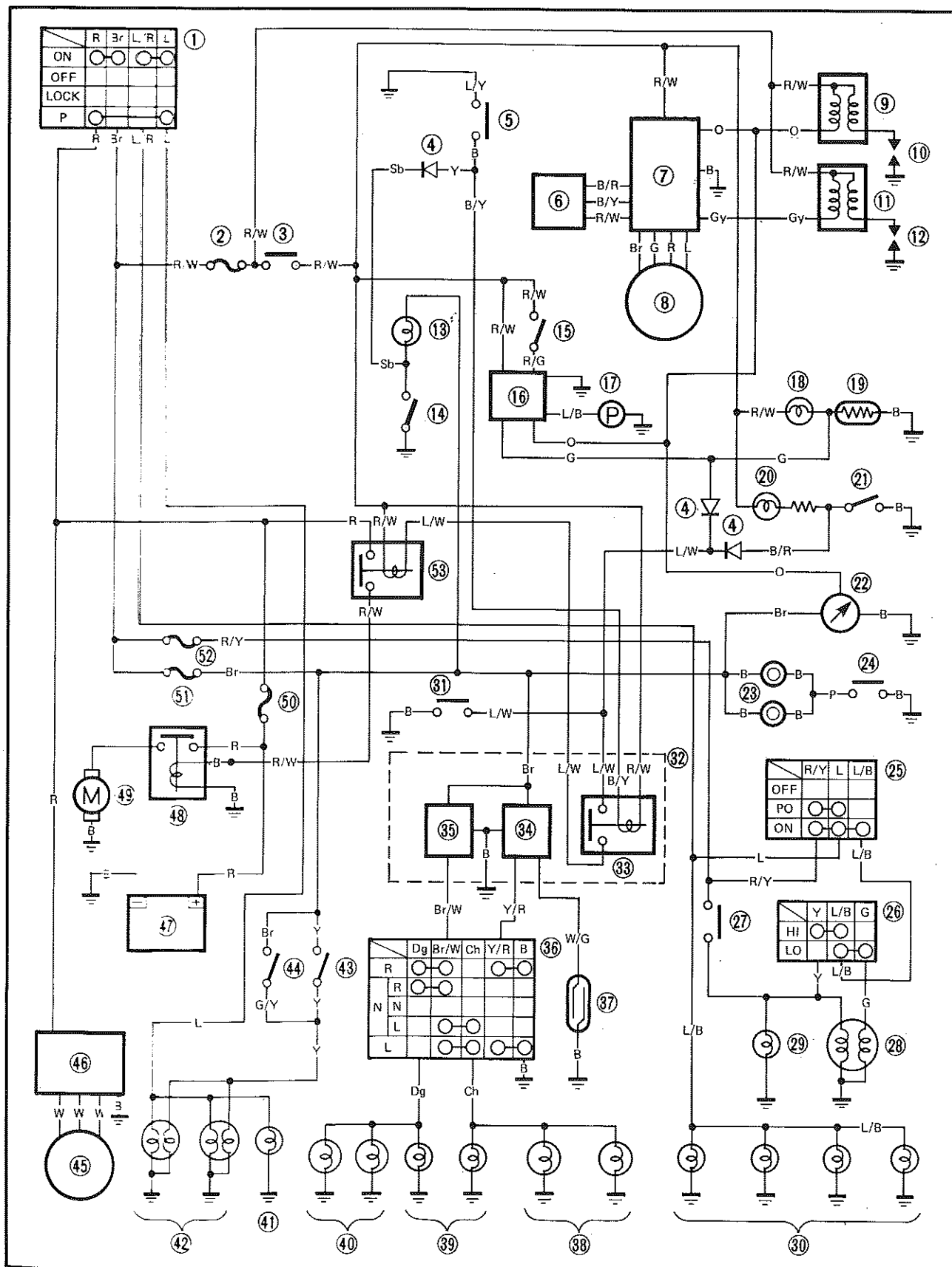
COLOR CODE

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/Y Green/Yellow
 B/R Black/Red
 B/W Black/White
 B/Y Black/Yellow
 L/R Blue/Red

L/Y Blue/Yellow
 L/B Blue/Black
 L/W Blue/White
 R/W Red/White
 R/G Red/Green
 R/Y Red/Yellow
 W/G White/Green
 Y/R Yellow/Red
 Br/W Brown/White

XV1000 CIRCUIT DIAGRAM
(Without sidestand relay)





- | | |
|----------------------------------|-----------------------------------|
| ① Main switch | ②⑧ Headlight |
| ② Fuse (IGNITION) | ②⑨ "HIGH BEAM" indicator light |
| ③ "ENGINE STOP" switch | ③⑩ Meter illumination light |
| ④ Diode | ③① "START" switch |
| ⑤ Clutch switch | ③② Flasher unit |
| ⑥ Pressure sensor | ③③ Starting circuit cut-off relay |
| ⑦ Ignitor unit | ③④ Cancelling unit |
| ⑧ Pick up coil | ③⑤ Flasher relay |
| ⑨ Ignition coil (# 1) | ③⑥ "TURN" switch |
| ⑩ Spark plug (# 1) | ③⑦ Reed switch |
| ⑪ Ignition coil (# 2) | ③⑧ Flasher light (Left) |
| ⑫ Spark plug (# 2) | ③⑨ "TURN" indicator light |
| ⑬ "NEUTRAL" indicator light | ④⑩ Flasher light (Right) |
| ⑭ Neutral switch | ④① Auxiliary light |
| ⑮ "FUEL" (RESERVE) switch | ④② Tail/Brake light |
| ⑯ Fuel pump control unit | ④③ Rear brake switch |
| ⑰ Fuel pump | ④④ Front brake switch |
| ⑱ "FUEL" warning indicator light | ④⑤ A.C. Magneto |
| ⑲ Fuel sender | ④⑥ Rectifier/Regulator |
| ⑳ "OIL" warning indicator light | ④⑦ Battery |
| ㉑ Oil level switch | ④⑧ Solenoid switch |
| ㉒ Tachometer | ④⑨ Starter motor |
| ㉓ Horn | ⑤⑩ Fuse (MAIN) |
| ㉔ "HORN" switch | ⑤① Fuse (SIGNAL) |
| ㉕ "LIGHTS" switch | ⑤② Fuse (HEAD) |
| ㉖ "LIGHTS" (Dimmer) switch | ⑤③ Starter relay |
| ㉗ "PASS" switch | |

COLOR CODE

BBlack
LBlue
OOrange
GGreen
RRed
PPink
YYellow
WWhite
BrBrown

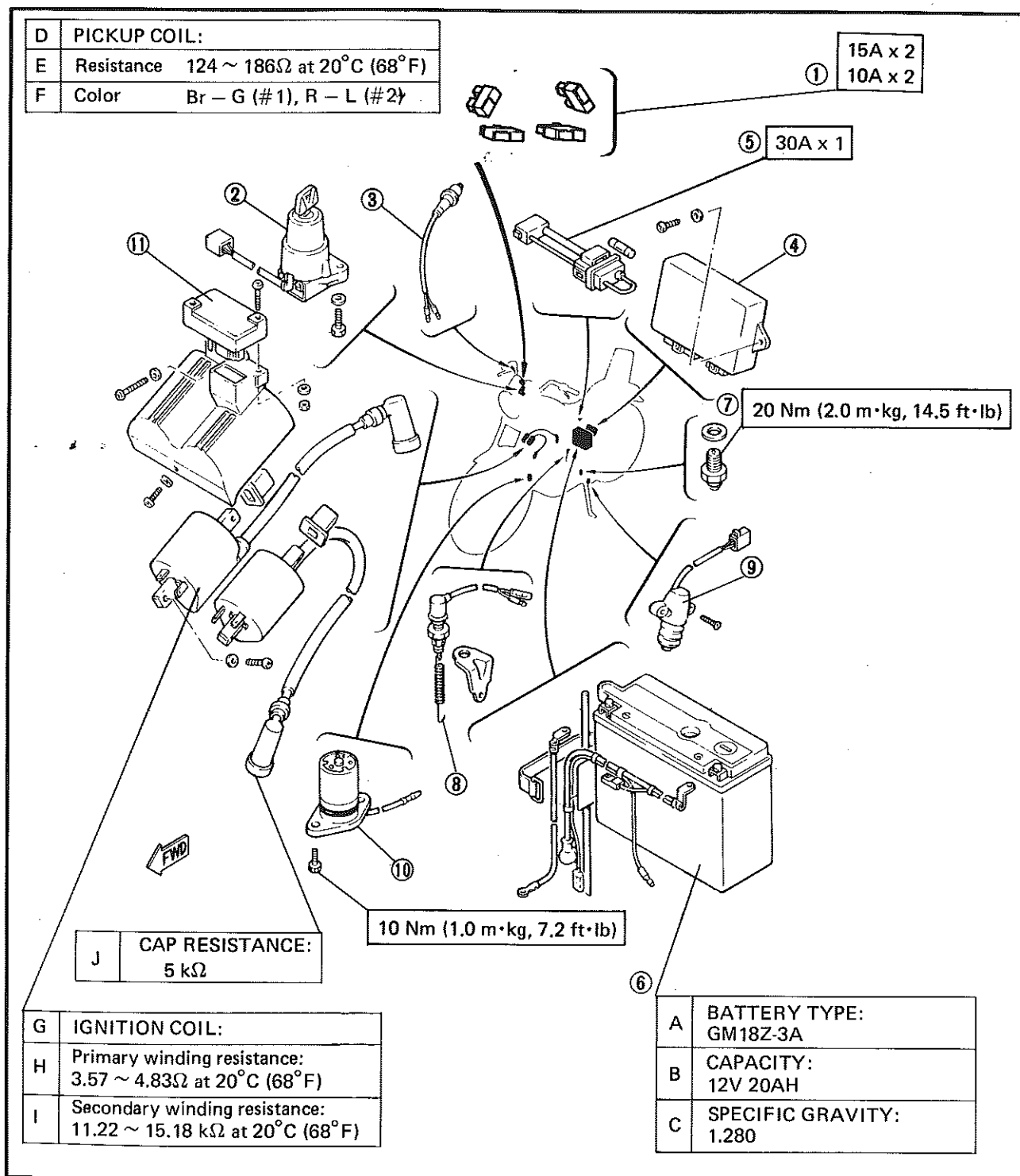
DgDark green
ChChocolate
SbSky blue
GyGray
G/YGreen/Yellow
B/RBlack/Red
B/WBlack/White
B/YBlack/Yellow
L/RBlue/Red

L/YBlue/Yellow
L/BBlue/Black
L/WBlue/White
R/WRed/White
R/GRed/Green
R/YRed/Yellow
W/GWhite/Green
Y/RYellow/Red
Br/WBrown/White



ELECTRICAL COMPONENTS (1)

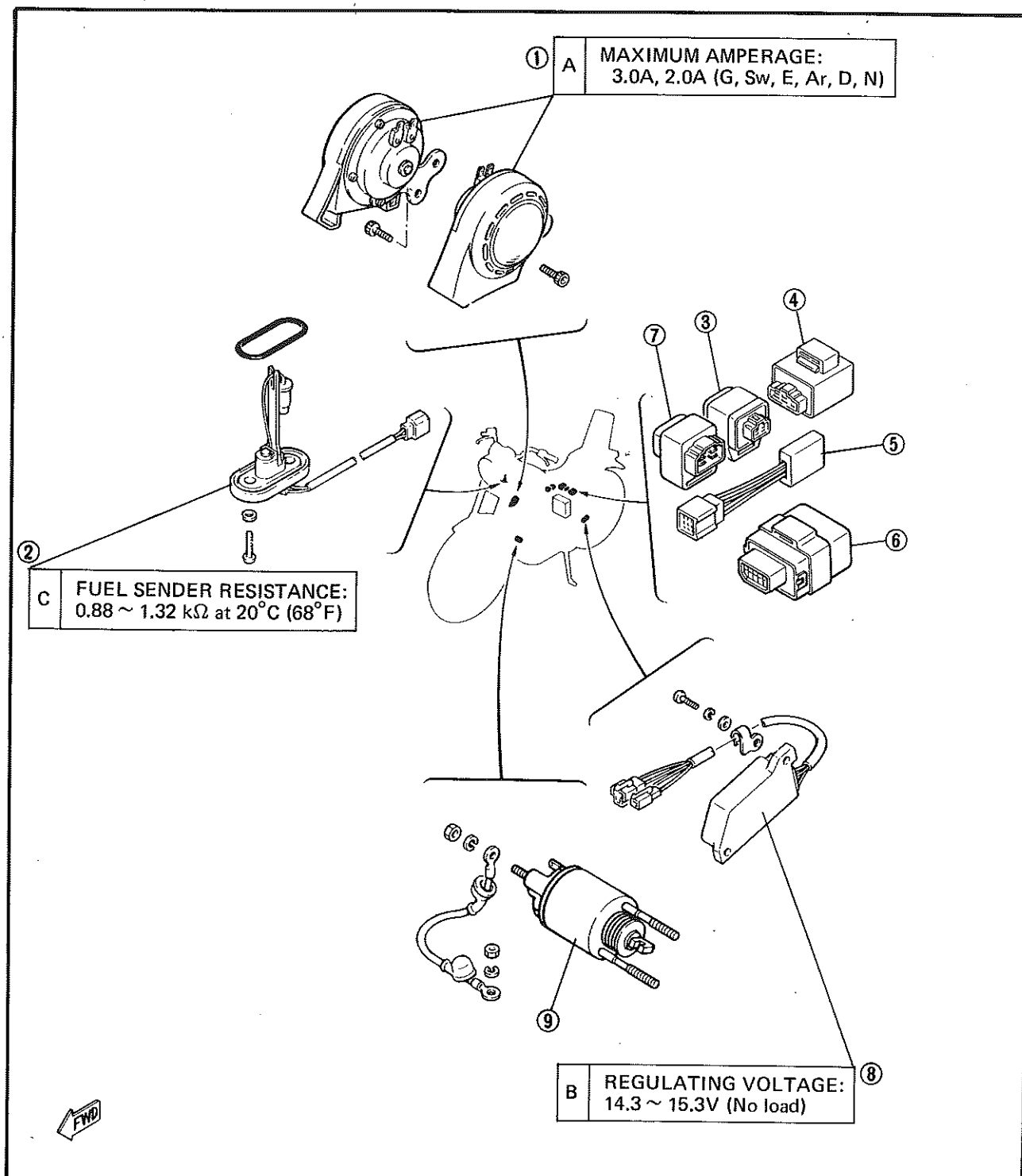
- ① Fuse
- ② Main switch
- ③ Front brake switch
- ④ TCI unit
- ⑤ Main fuse
- ⑥ Battery
- ⑦ Neutral switch
- ⑧ Rear brake switch
- ⑨ Sidestand switch
- ⑩ Oil level switch
- ⑪ Pressure sensor





ELECTRICAL COMPONENTS (2)

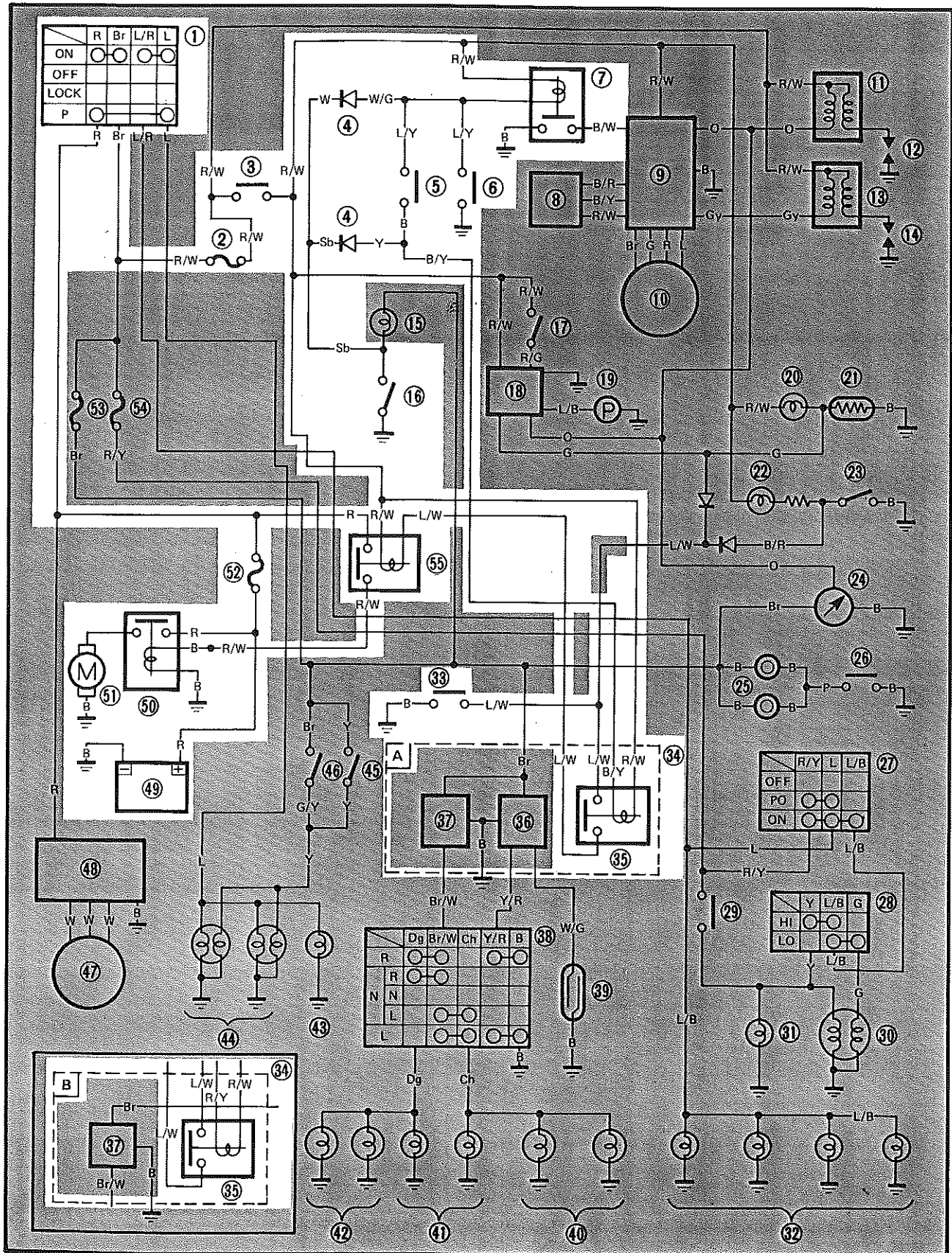
- ① Horn
- ② Fuel sender
- ③ Sidestand relay
- ④ Fuel pump control unit
- ⑤ Diode
- ⑥ Flasher unit
- ⑦ Starter relay
- ⑧ Rectifier/Regulator
- ⑨ Solenoid switch





ELECTRIC STARTING SYSTEM

CIRCUIT DIAGRAM (With sidestand relay)



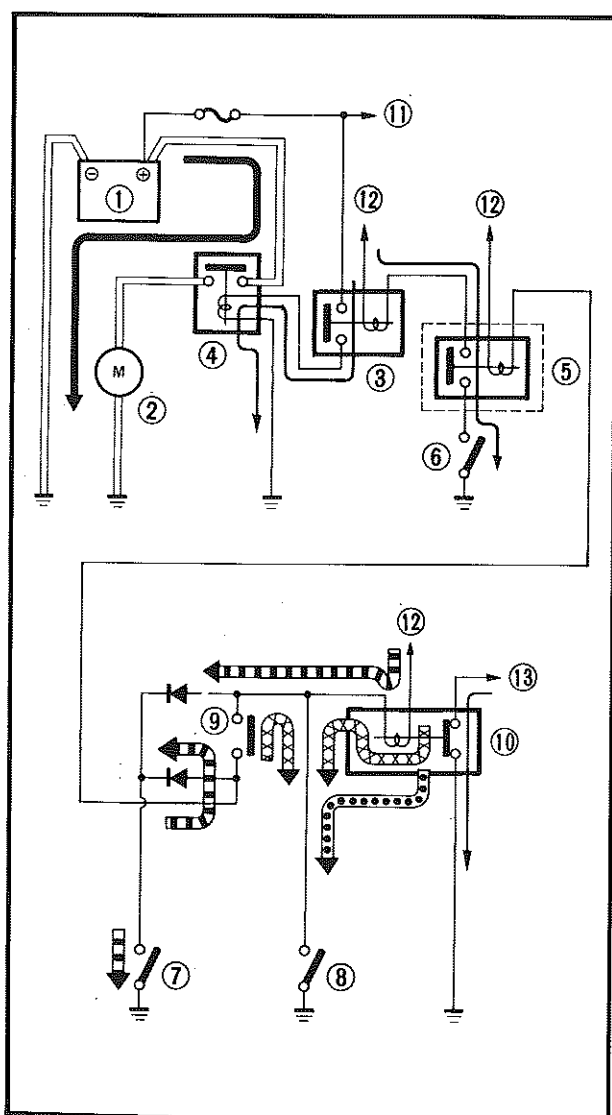
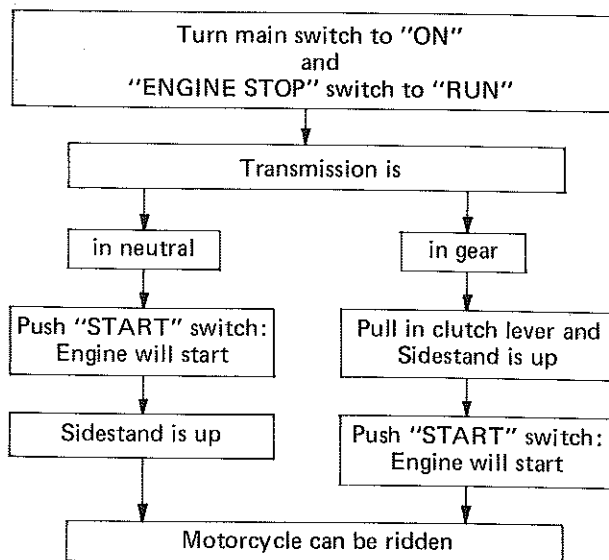




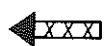
STARTING CIRCUIT OPERATION

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

- The transmission is in neutral (the neutral switch is on).
- The clutch lever is pulled in (clutch switch is on) and the sidestand is up (the sidestand switch is on).



When the transmission is in neutral.



When the sidestand is up and the clutch lever is pulled in.



When the engine is running.

- ① Battery
- ② Starter motor
- ③ Starter relay
- ④ Solenoid switch
- ⑤ Starting circuit cut-off relay (Flasher relay)
- ⑥ "START" switch
- ⑦ Neutral switch
- ⑧ Sidestand switch
- ⑨ Clutch switch
- ⑩ Sidestand relay
- ⑪ To main switch
- ⑫ To "ENGINE STOP" switch
- ⑬ To ignitor unit



TROUBLESHOOTING

Troubleshooting Chart (1)

THE STARTER MOTOR DOES NOT OPERATE.



Remove the seat.



Check the main and ignition fuses condition.

Faulty

Replace faulty fuse(s).



Measure the battery for voltage and specific gravity.
Battery voltage: More than 12V
Specific gravity: 1,280

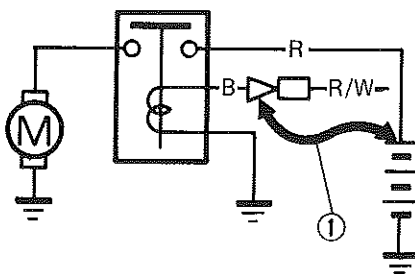
No

Recharge the battery.



Disconnect the "Black" lead coupler from the solenoid switch and connect the "Black" lead to the battery positive (+) terminal; use a jumper lead ①.

If the solenoid switch does not click, replace the solenoid switch.



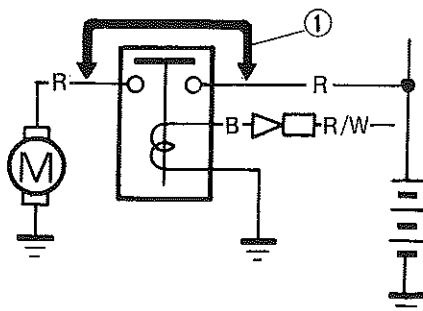
If the solenoid switch clicks and starter motor run go to CHART (2).



The solenoid switch clicks but starter motor does not run.



Connect the "Red" leads using the heavy duty jumper lead ① *.



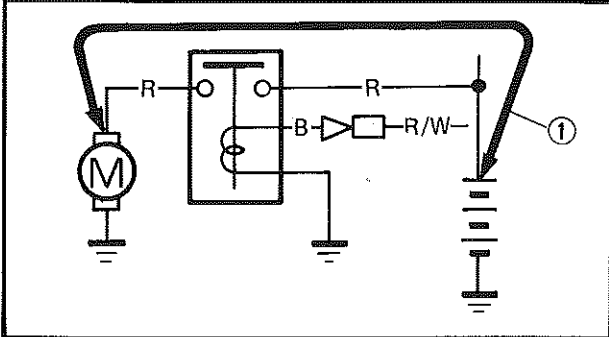
If starter motor run, replace the solenoid switch.



Starter motor does not run



Connect the battery positive (+) lead and starter motor lead; use the heavy duty jumper lead ① * .



If starter motor does not run, check the starter motor and replace if necessary. (Refer to "STARTER MOTOR TEST" section.)

*

WARNING:

This test should be performed within a few seconds to prevent further damage. Also, there should be no flammables close to the starter relay.



Troubleshooting Chart (2)

THE STARTER MOTOR DOES NOT OPERATE.



Check the solenoid switch and starter motor.
(Refer to CHART (2).)



Measure voltage on "Brown" lead from
main switch ("ON" position).

No voltage



Check main switch, replace if necessary.

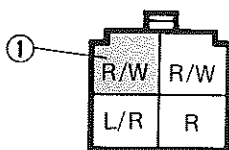


12V

Main and "ENGINE STOP" switches are
turned to "ON".



Disconnect the starter relay connector and
measure the voltage on "Red/White" lead
①.



No voltage



Check for an open or poor connection
between the main switch and starter
relay.

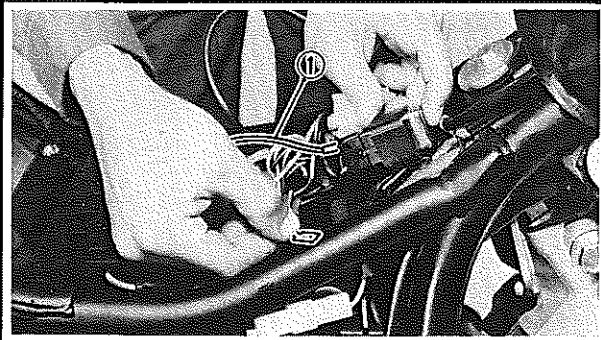


12V

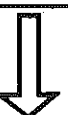
Connect the starter relay connector.



Connect the "Blue/White" lead to "Ground"
on the frame; use a jumper lead ①.



If the starter relay does not click,
replace the starter relay.



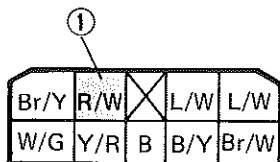
Starter relay clicks



Main and "ENGINE STOP" switches are turned to "ON".



Disconnect the flasher unit connector and measure the voltage on "Red/White" lead ①.



No voltage

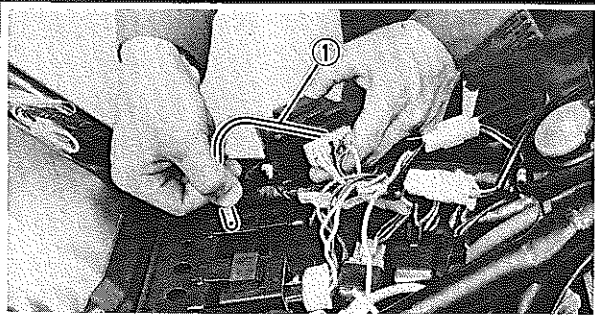
Check for an open or poor connection between the main switch and flasher unit.



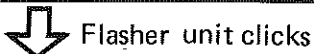
Connect the flasher unit connector.



Connect the "Black/Yellow" lead to "Ground" on the frame; use a jumper lead ①.



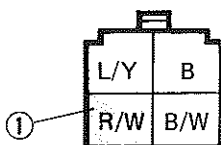
If the flasher unit does not click, replace the flasher unit.



Main and "ENGINE STOP" switches are turned to "ON".

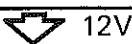


Disconnect the sidestand relay connector and measure the voltage on "Red/White" lead ①.



No voltage

Check for an open or poor connection between the main switch and side-stand relay.

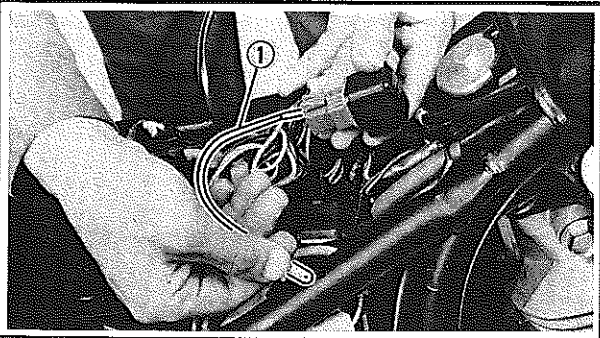




Connect the sidestand relay connector.



Connect the "Blue/Yellow" lead to "Ground" on the frame; use a jumper lead ①.



If the sidestand relay does not click, replace the sidestand relay.



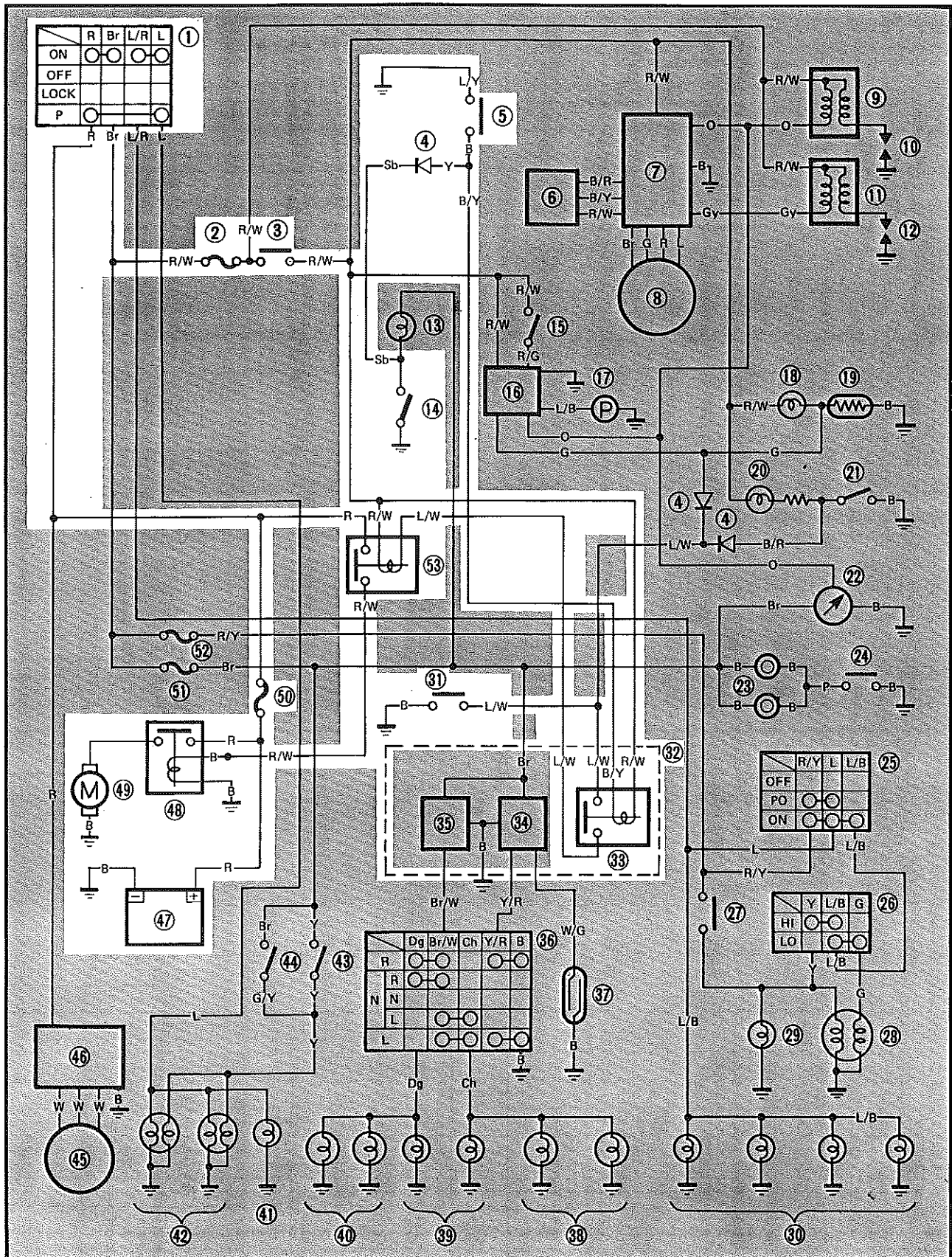
If the sidestand relay clicks, check the diodes, clutch, neutral and sidestand switch. Replace switch(es) if necessary.



ELECTRIC STARTING SYSTEM

CIRCUIT DIAGRAM

(Without sidestand relay)



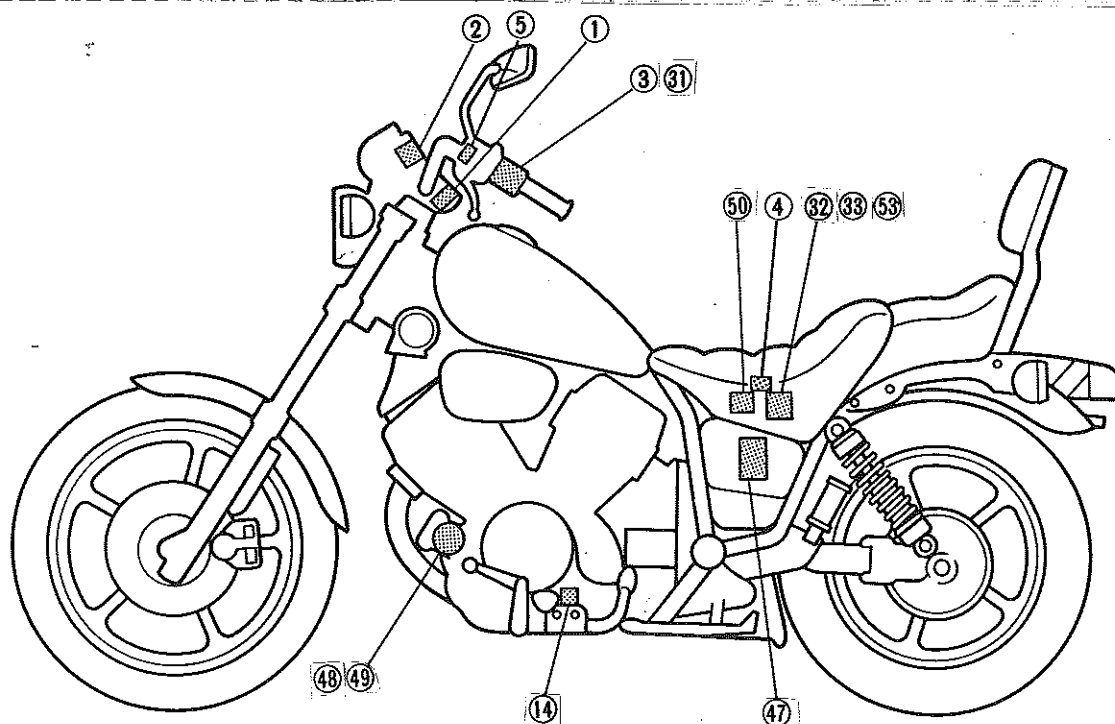


Afcrementioned circuit diagram shows charging circuit in wiring diagram.

NOTE:

For the encircled numbers and color codes, see page 6-4.

- ① Main switch
- ② Fuse (IGNITION)
- ③ "ENGINE STOP" switch
- ④ Diode
- ⑤ Clutch switch
- ⑭ Neutral switch
- ③① "START" switch
- ③② Flasher unit
- ③③ Starting circuit cut-off relay
- ④⑦ Battery
- ④⑧ Solenoid switch
- ④⑨ Starter motor
- ⑤⑩ Fuse (MAIN)
- ⑤③ Starter relay

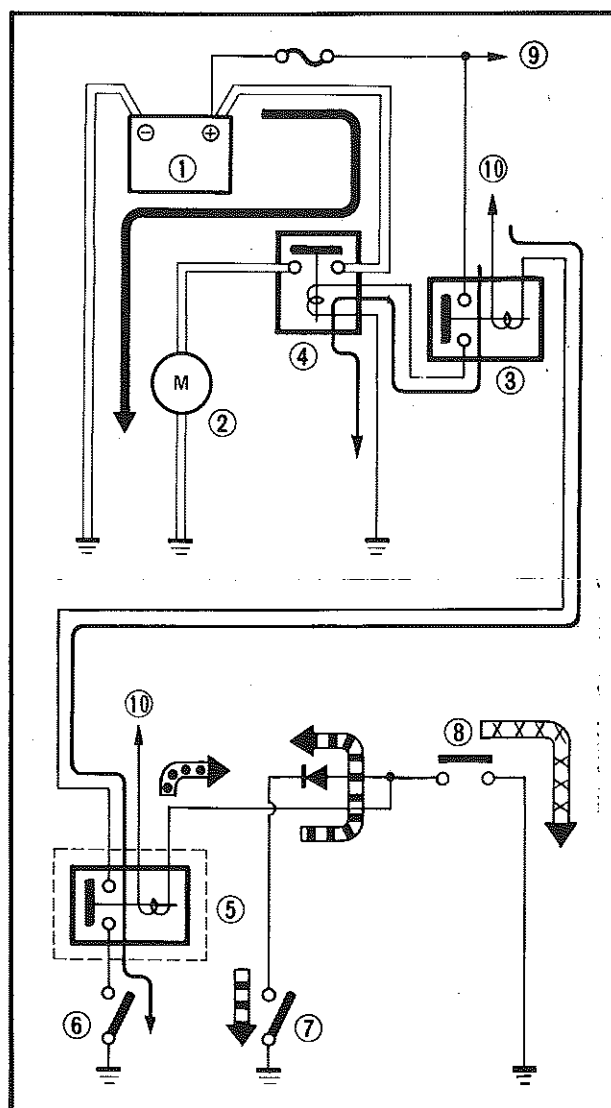
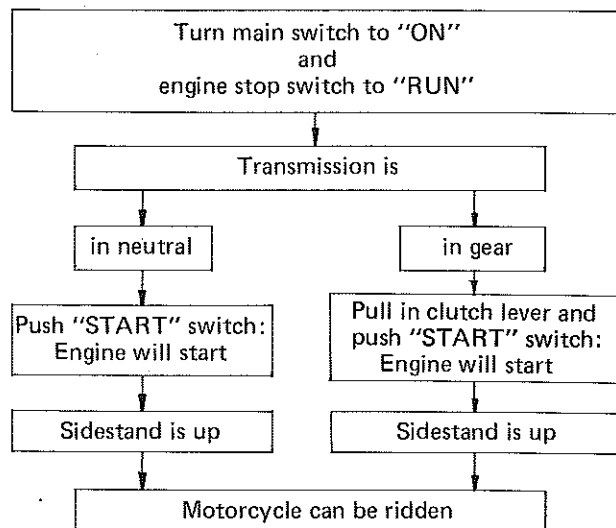




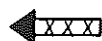
STARTING CIRCUIT OPERATION

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

- The transmission is in neutral (the neutral switch is on).
- The clutch lever is pulled in (clutch switch is on).



When the transmission is in neutral.



When the clutch lever is pulled in.



When the engine is running.

- ① Battery
- ② Starter motor
- ③ Starter relay
- ④ Solenoid switch
- ⑤ Starting circuit cut-off relay (Flasher relay)
- ⑥ "START" switch
- ⑦ Neutral switch
- ⑧ Clutch switch
- ⑨ To main switch
- ⑩ To "ENGINE STOP" switch



TROUBLESHOOTING

Troubleshooting Chart (1)

THE STARTER MOTOR DOES NOT OPERATE.



Remove the seat.



Check the main and ignition fuses condition.

Faulty

Replace faulty fuse(s).



Measure the battery for voltage and specific gravity.

Battery voltage: More than 12V

Specific gravity: 1,280

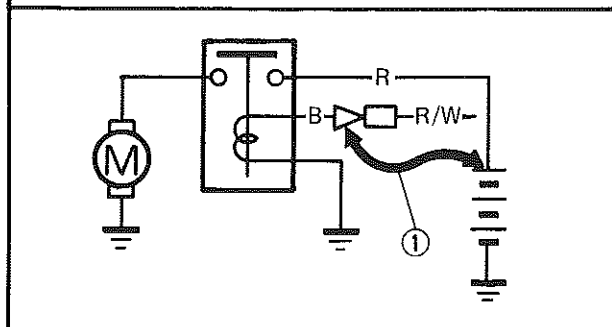
No

Recharge the battery.



Disconnect the "Black" lead coupler from the solenoid switch and connect the "Black" lead to the battery positive (+) terminal; use a jumper lead ①.

If the solenoid switch does not click, replace the solenoid switch.



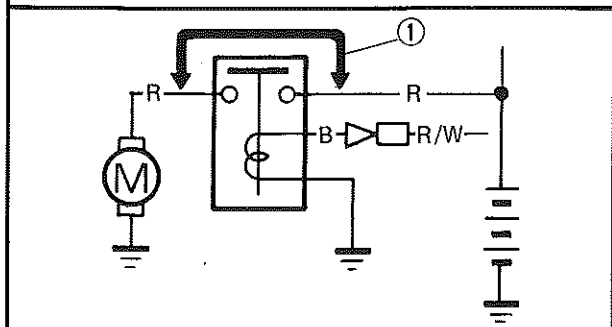
If the solenoid switch clicks and starter motor run; go to CHART (2).



If the solenoid switch clicks but starter motor does not run.



Connect the "Red" leads using the heavy duty jumper lead ①*.



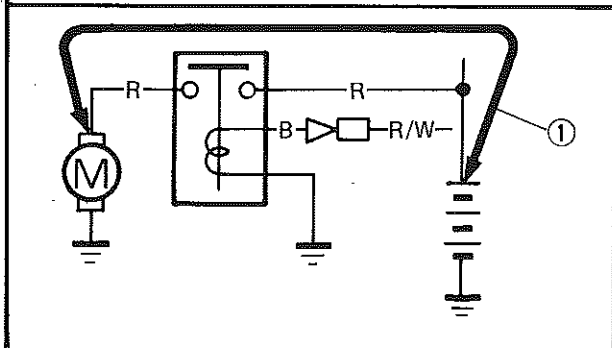
If starter motor run, replace the solenoid switch.



Starter motor does not run



Connect the battery positive (+) lead and starter motor lead; use the heavy duty jumper lead ①*.



If starter motor does not run, check the starter motor and replace if necessary. (Refer to "STARTER MOTOR TEST" section.)

* **WARNING:**

This test should be performed within a few seconds to prevent further damage. Also, there should be no flammables close to the starter relay.



Troubleshooting Chart (2)

THE STARTER MOTOR DOES NOT OPERATE.



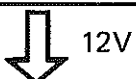
Check the solenoid switch and starter motor.
(Refer to CHART (2).)



Measure voltage on "Brown" lead from
main switch ("ON" position).

No voltage

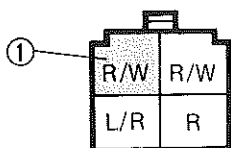
Check main switch, replace if necessary.



Main and "ENGINE STOP" switches are
turned to "ON".

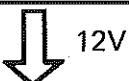


Disconnect the starter relay connector and
measure the voltage on "Red/White" lead
①.



No voltage

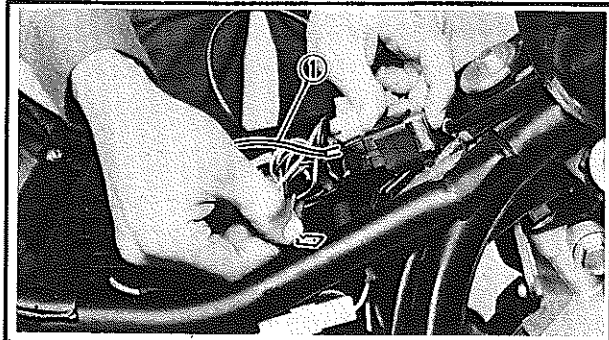
Check for an open or poor connection
between the main switch and starter
relay.



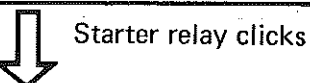
Connect the starter relay connector.



Connect the "Blue/White" lead to "Ground"
on the frame; use a jumper lead ①.



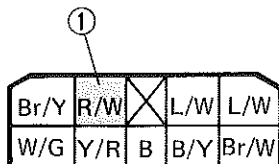
If the starter relay does not click,
replace the starter relay.





Main and "ENGINE STOP" switches are turned to "ON".

Disconnect the flasher unit connector and measure the voltage on "Red/White" lead ①.



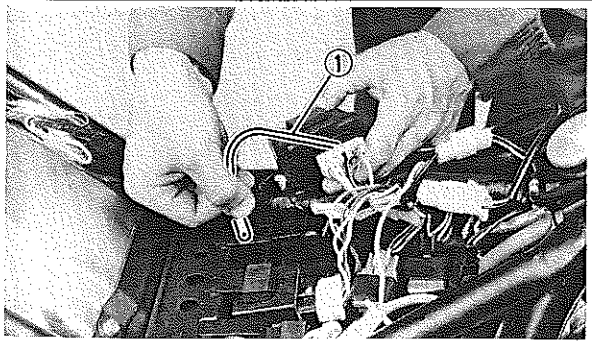
No voltage

Check for an open or poor connection between the main switch and flasher unit.

12V

Connect the flasher unit connector.

Connect the "Black/Yellow" lead to "Ground" on the frame; use a jumper lead ①.

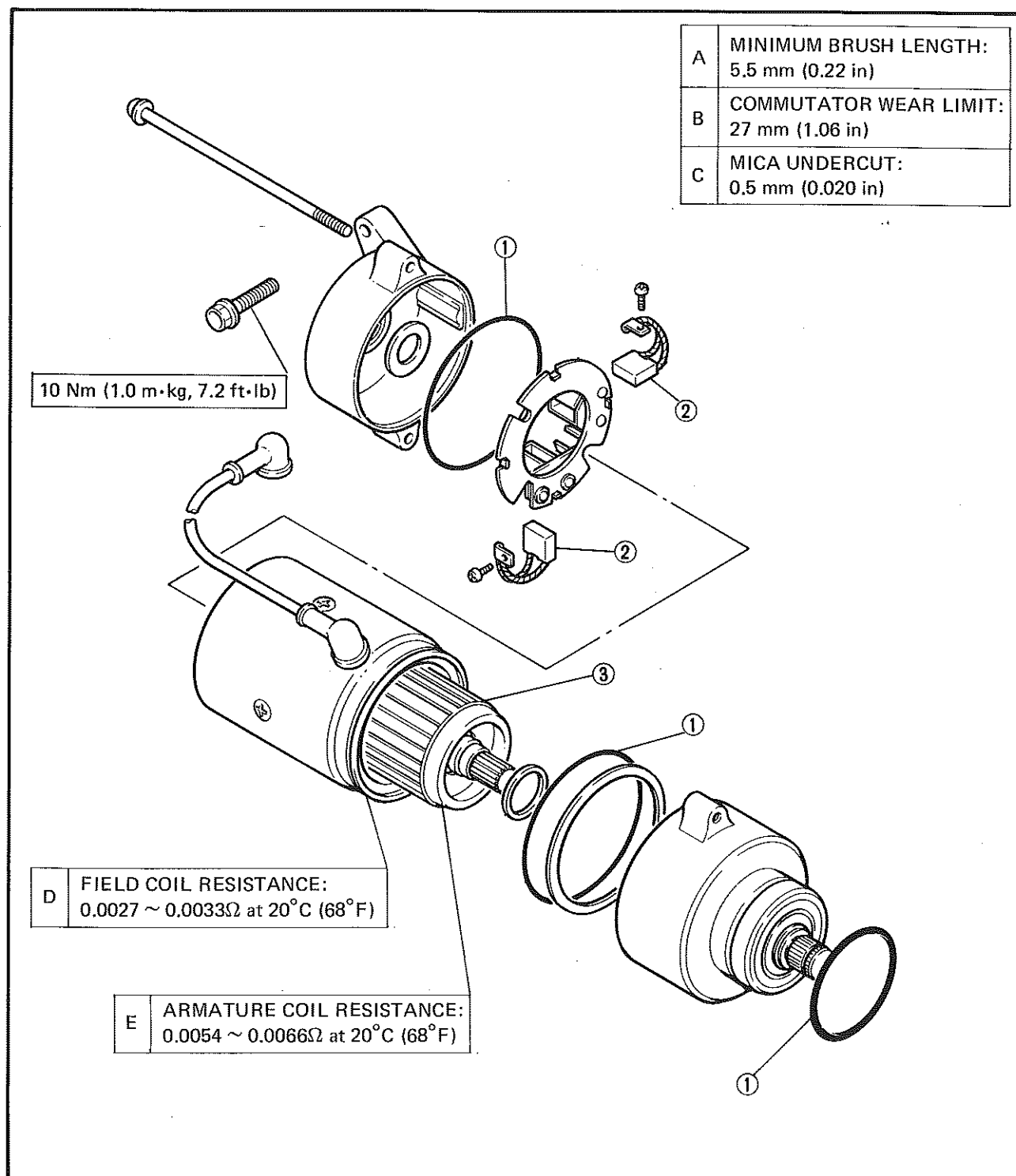


If the flasher unit does not click, replace the flasher unit.

If the flasher unit clicks, check the diode, clutch and neutral switch. Replace switch(es) if necessary.

STARTER MOTOR TEST

- ① O-ring
- ② Brush
- ③ Armature



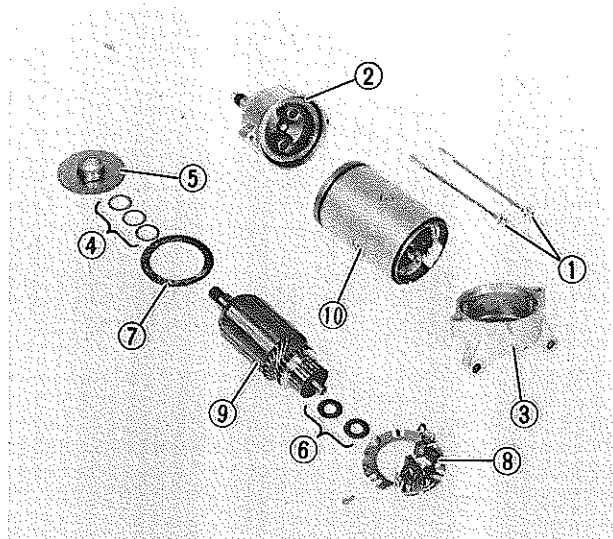


Removal

1. Remove:

- Starter motor

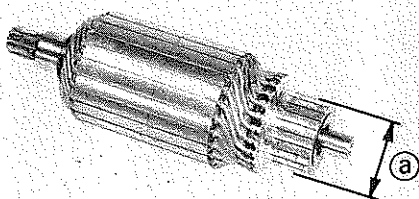
Refer to "CHAPTER 3. ENGINE DIS-ASSEMBLY" section.



Disassembly

1. Remove:

- Screws ①
- Front cover ②
- Rear cover ③
- Shim(s) ④
- Center cover ⑤
- Shim(s) ⑥
- Gasket ⑦
- Brush holding plate ⑧
- Armature coil ⑨
- From yoke assembly ⑩



Inspection and Repair

1. Inspect:

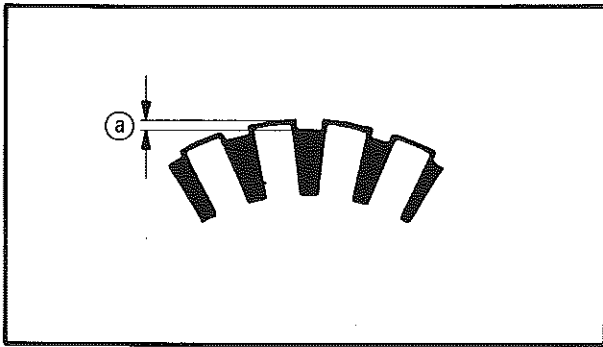
- Commutator
- Dirty → Clean with #600 grit sandpaper.

2. Measure:

- Commutator diameter (a)
- Out of specification → Replace starter motor.



Commutator Wear Limit:
27 mm (1.06 in)



3. Measure:

- Mica undercut (a)

(between commutator segments)

Out of specification → Scrape mica to proper value.

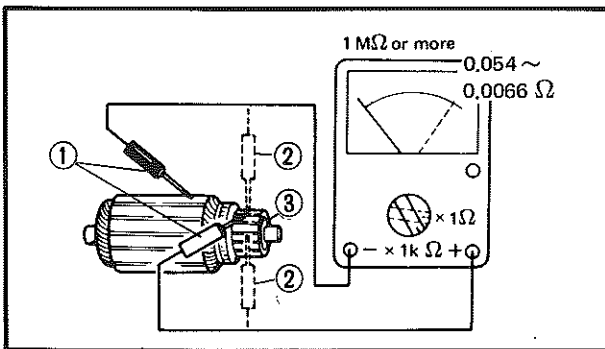
Use a hacksaw blade that is ground to fit.



Mica Undercut:
0.7 mm (0.028 in)

NOTE:

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



4. Measure:

- Armature coil insulation (1) / continuity (2)

Defect(s) → Replace starter motor.

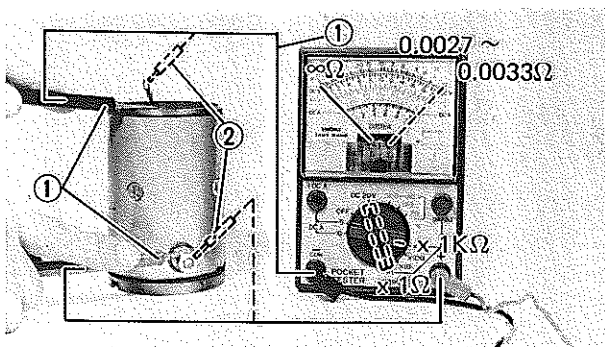


Insulation Resistance:

1 MΩ or more at 20°C (68°F)

Continuity Resistance:

0.0054 ~ 0.0066Ω at 20°C (68°F)



5. Measure:

- Field coil insulation (1) / continuity (2)

Defect(s) → Replace starter motor.

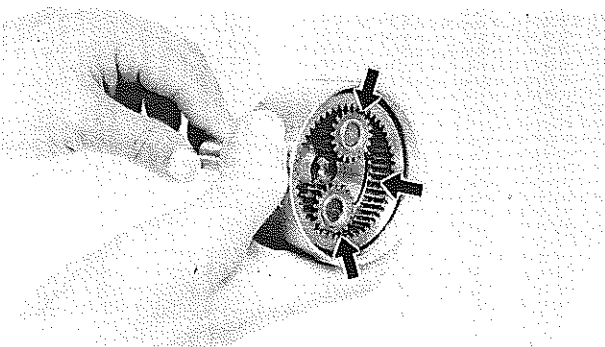


Insulation Resistance:

1MΩ or more at 20°C (68°F)

Continuity Resistance:

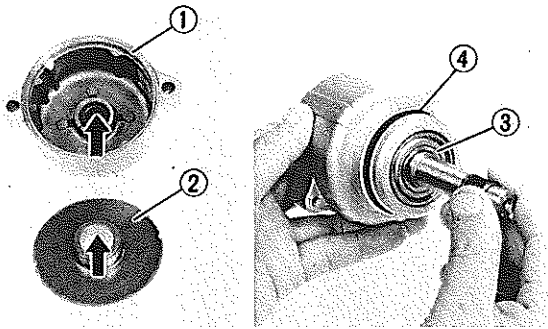
0.0027 ~ 0.0033Ω at 20°C (68°F)



6. Check:

- Gear tooth

Wear/Damage → Replace.



7. Inspect:

- Front cover bearing ①
- Center cover bearing ②
- Rear cover bearing ③
- O-ring ④

Damage → Replace.

8. Inspect:

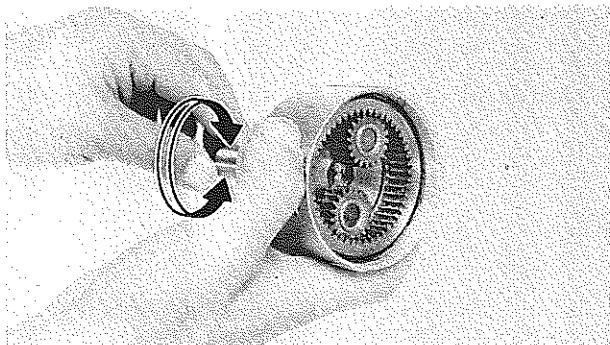
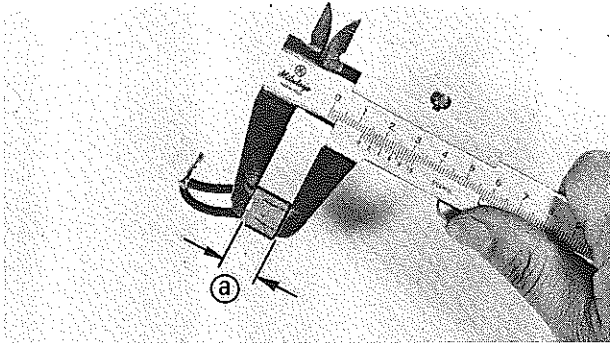
- Commutator brushes
- Damage → Replace.

9. Measure:

- Brush length (Each) ⑤
- Out of specification → Replace.



Minimum Brush Length:
5.5 mm (0.22 in)

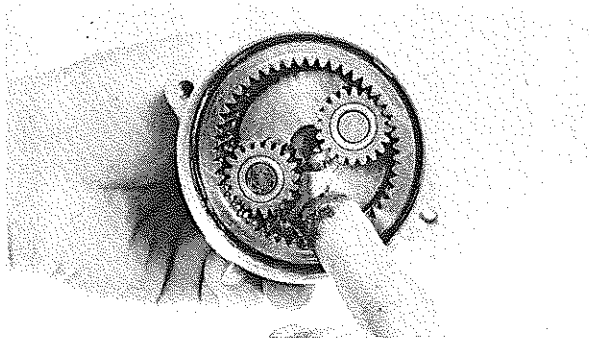


10. Check:

- Brush spring pressure
- Compare with new spring.
Wear/Damage → Replace.

11. Check:

- Gear assembly movement
- Unsmooth movement → Repair.



Assembly

When assembling the starter motor, reverse the disassembly steps. Note the following points.

1. Apply:

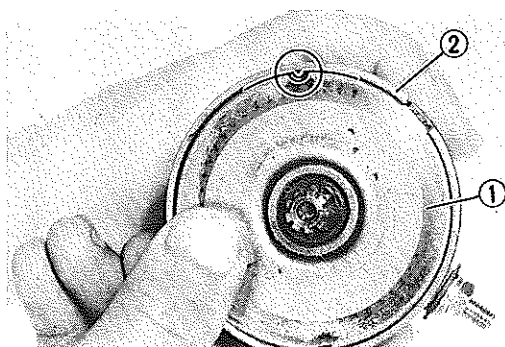
- Lithium soap base grease
- To the gear assembly.

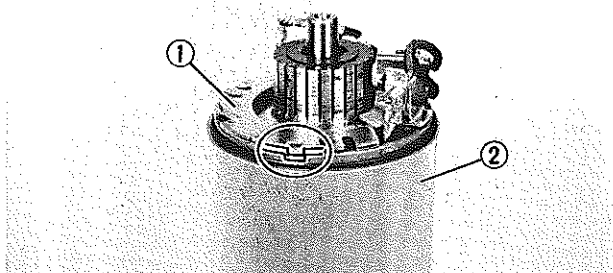
2. Install:

- Center cover ①

NOTE:

Mesh the slot on the center cover ① to the projection on the yoke ②.



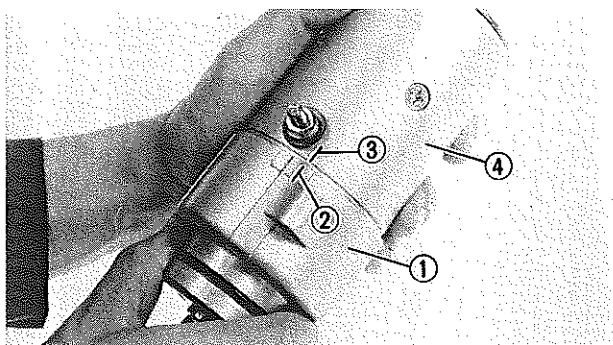


3. Install:

- Brush holding plate ①

NOTE:

Mesh the projection on the brush holding plate ① to the slot on the yoke ②.

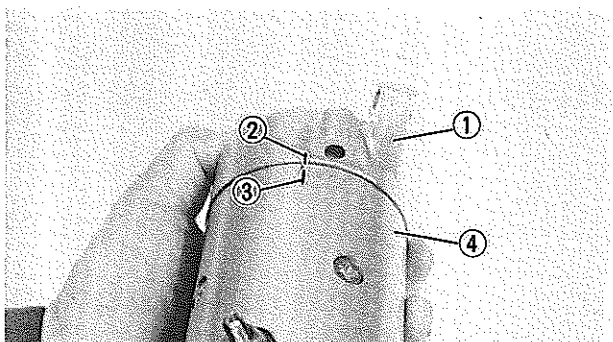


4. Install:

- Front cover ①

NOTE:

Align the match mark ② on the front cover ① with the match mark ③ on the yoke ④.



5. Install:

- Rear cover ①

NOTE:

Align the match mark ② on the rear cover ① with the match mark ③ on the yoke ④.

6. Tighten:

- Screw



Starter Motor Housing Screw:
10 Nm (1.0 m·kg, 7.2 ft·lb)

Installation

When installing the starter motor, reverse the removal step.

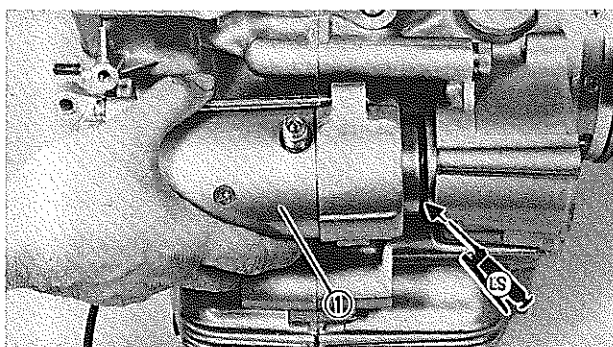
Note the following points.

1. Apply:

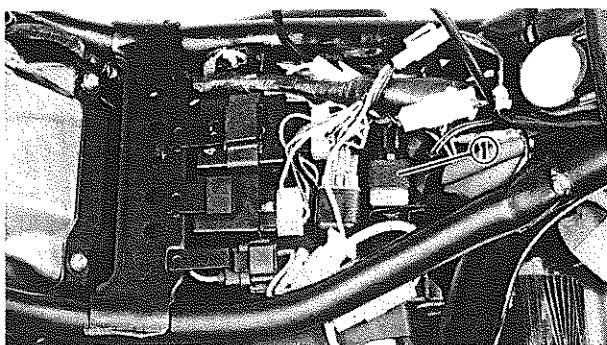
- Lithium soap base grease

2. Tighten:

- Starter motor ① securing bolts



Starter Motor Securing Bolt:
10 Nm (1.0 m·kg, 7.2 ft·lb)



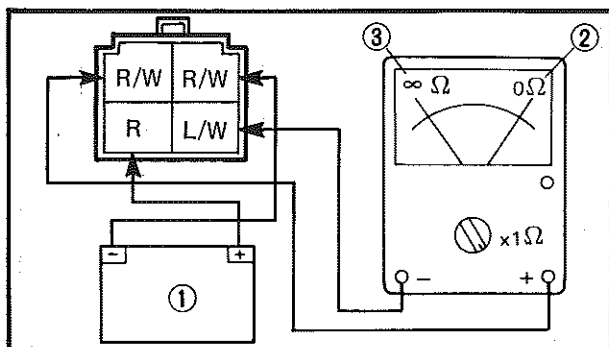
STARTER RELAY TEST


1. Remove:

- Seat
- Starter relay ①

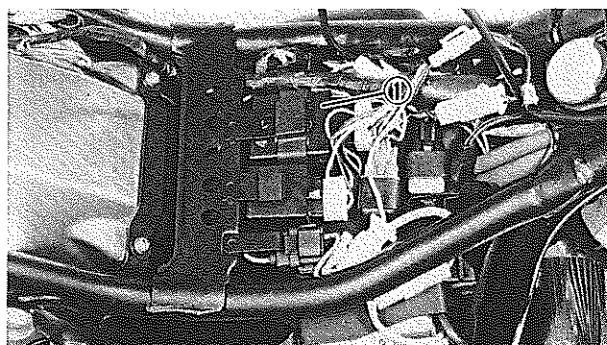
2. Check:

- Starter relay contacts
Use 12V battery ① and Pocket Tester (90890-03112).
Out of specification → Replace relay.





Battery Connected: 0Ω ②
Battery disconnected: ∞Ω ③



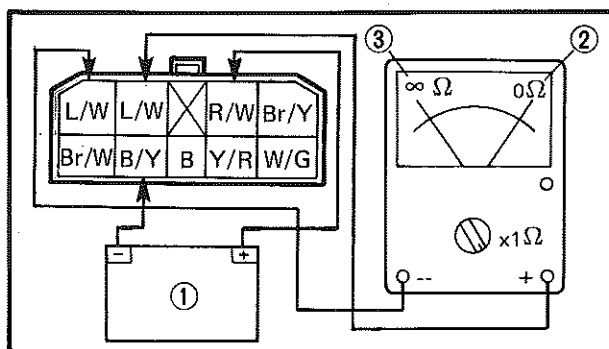
STARTING CIRCUIT CUT-OFF RELAY TEST (Flasher Unit)

1. Remove:

- Seat
- Starting circuit cut-off relay ①

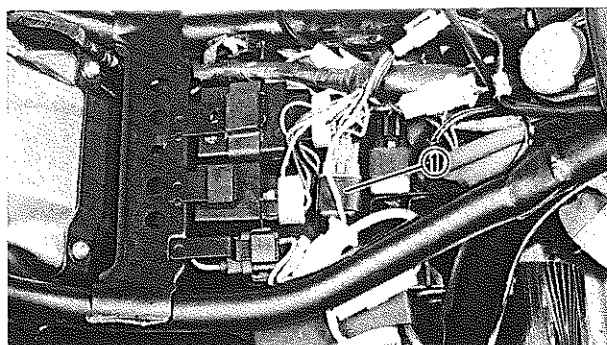
2. Check:

- Starting circuit cut-off relay contacts
Use 12V battery ① and Pocket Tester (90890-03112).
Out of specification → Replace relay.





Battery Connected: 0Ω ②
Battery disconnected: ∞Ω ③

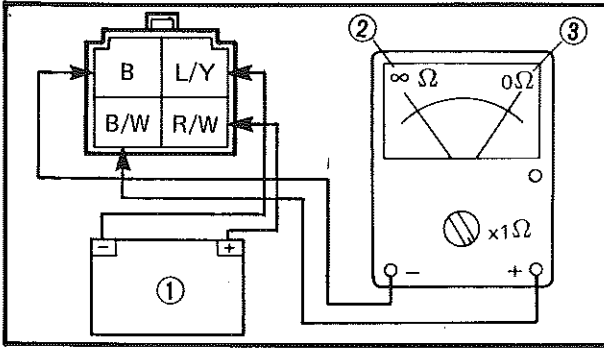


SIDESTAND RELAY TEST

(For models fitted with sidestand relay)

1. Remove:

- Seat
- Starter relay ①



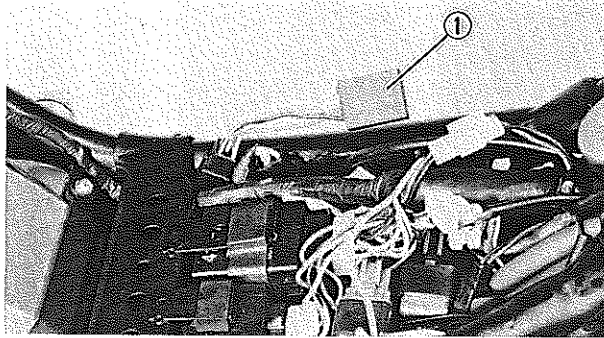
2. Check:

- Sidestand relay contacts
- Use 12V battery ① and Pocket Tester (90890-03112).
- Out of specification → Replace relay.



Battery Connected: $\infty \Omega$ ②

Battery disconnected: 0Ω ③



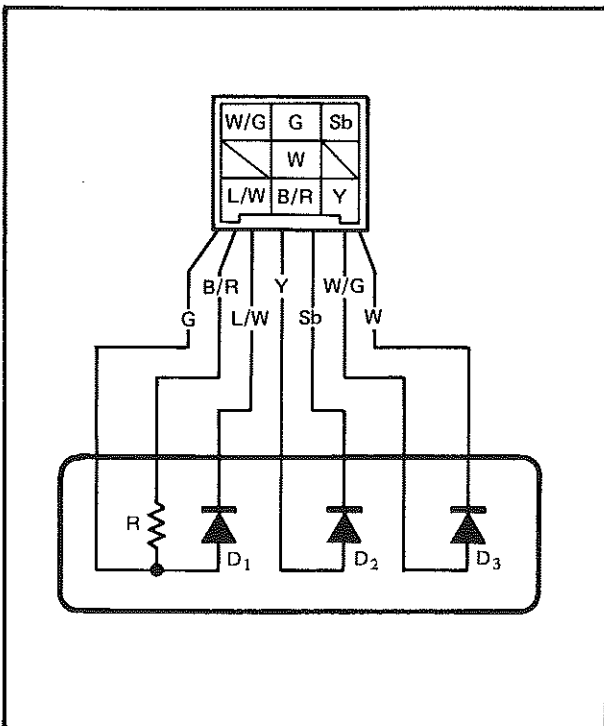
DIODE TEST

1. Remove:

- Seat
- Diode ①

2. Check:

- Diode continuity/discontinuity
- Defective element(s) → Replace the unit.



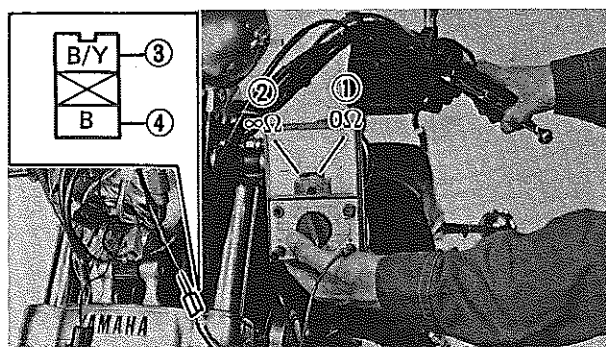
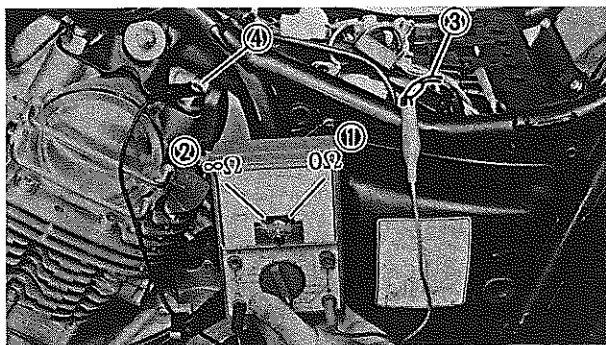
Checking element	Pocket tester connecting point		Good
	(+) (red)	(-) (black)	
D ₁	G	L/W	○
	L/W	G	X
D ₂	Y	Sb	○
	Sb	Y	X
D ₃	W/G	W	○
	W	W/G	X
R	G	B/R	8.2Ω

○: Continuity (0Ω) (Scale $\Omega \times 1K$)

X: Discontinuity (∞) (Scale $\Omega \times 1$)

NOTE:

The results "○" or "X" should be reversed according to the pocket tester polarity.



NEUTRAL SWITCH TEST

1. Remove:
 - Seat
 - Left side cover
 - Sub-fuel tank

NOTE:

It is not necessary to remove sub-fuel tank hoses.

2. Disconnect:
 - Neutral switch lead coupler (Blue)
3. Check:
 - Neutral switch contact

Out of specification → Replace switch.



In Neutral: 0Ω ①
In Gear: $\infty\Omega$ ②

- ③ "Blue" lead
 ④ Ground

CLUTCH SWITCH TEST

1. Remove:
 - Headlight unit
2. Disconnect:
 - Clutch switch lead connector (Black/Yellow and Black)
3. Check:
 - Clutch switch contact

Out of specification → Replace switch.



Clutch Lever Pulled in: 0Ω ①
Clutch Lever Free: $\infty\Omega$ ②

- ③ Black/Yellow
 ④ Black

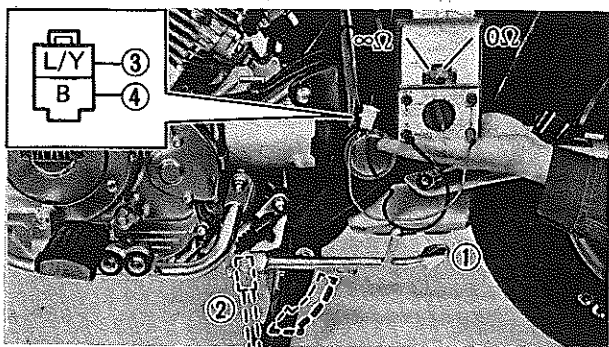
SIDESTAND SWITCH TEST

(For models fitted with sidestand relay)

1. Remove:
 - Seat
 - Left side cover
 - Sub-fuel tank

NOTE:

It is not necessary to remove sub-fuel tank hoses.



2. Disconnect:

- Sidestand switch connector (Blue/Yellow and Black)

3. Check:

- Sidestand switch contact
Out of specification → Replace switch.

Sidestand Up ① : 0Ω Sidestand Down ② : $\infty\Omega$

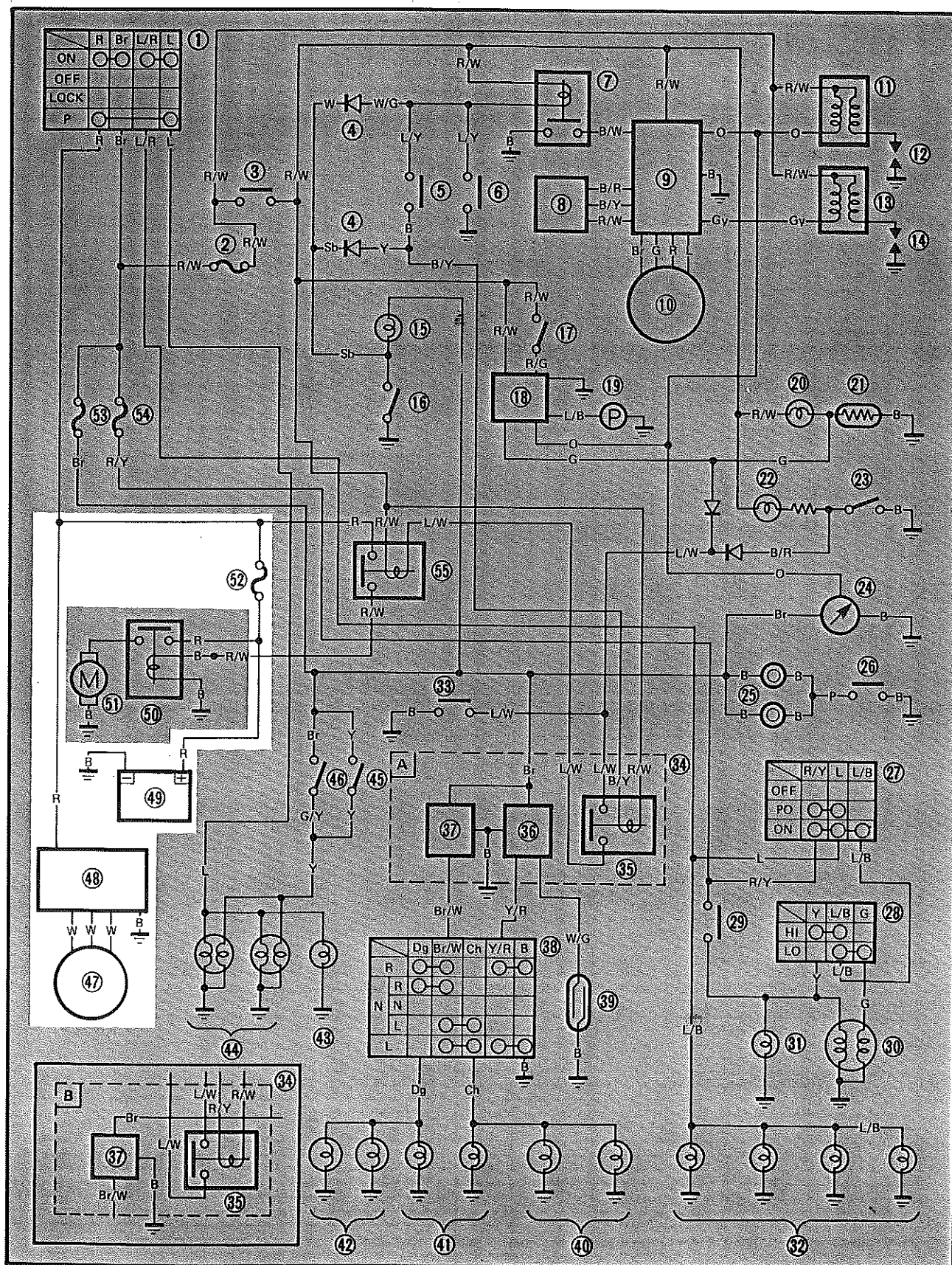
③ Blue/Yellow

④ Black

CHARGING SYSTEM

CIRCUIT DIAGRAM

(With sidestand relay)



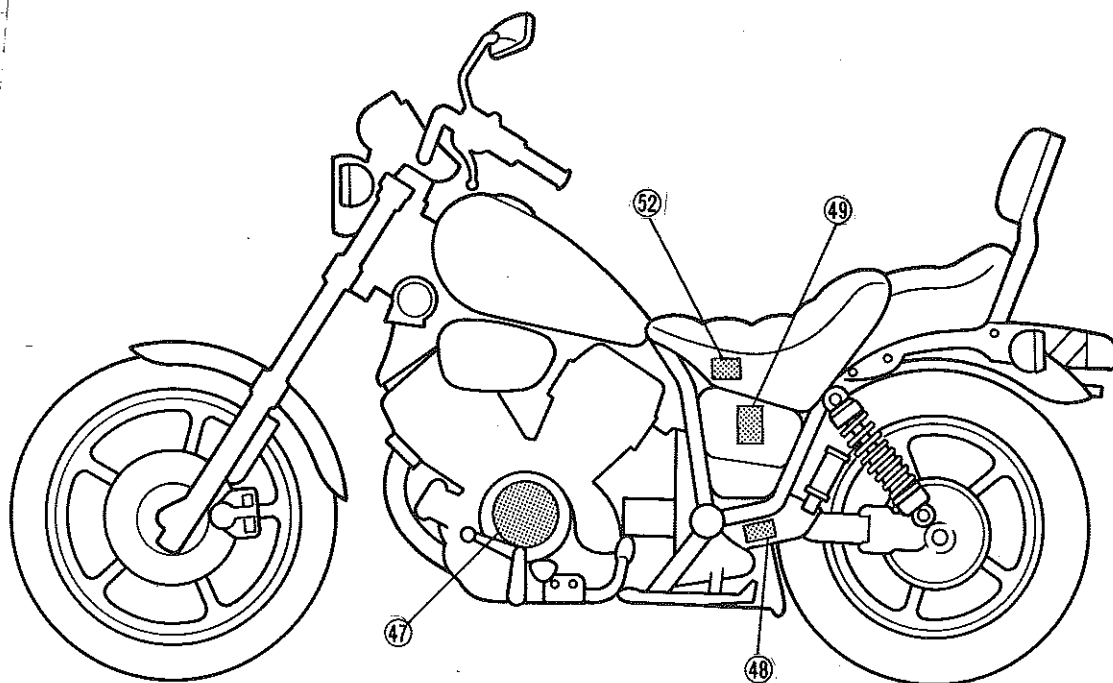


Afcrementioned circuit diagram shows charging circuit in wiring diagram.

NOTE:

For the encircled numbers and color codes, see page 6-2.

- ④7 AC Magneto
- ④8 Rectifier/Regulator
- ④9 Battery
- ⑤2 Fuse (MAIN)

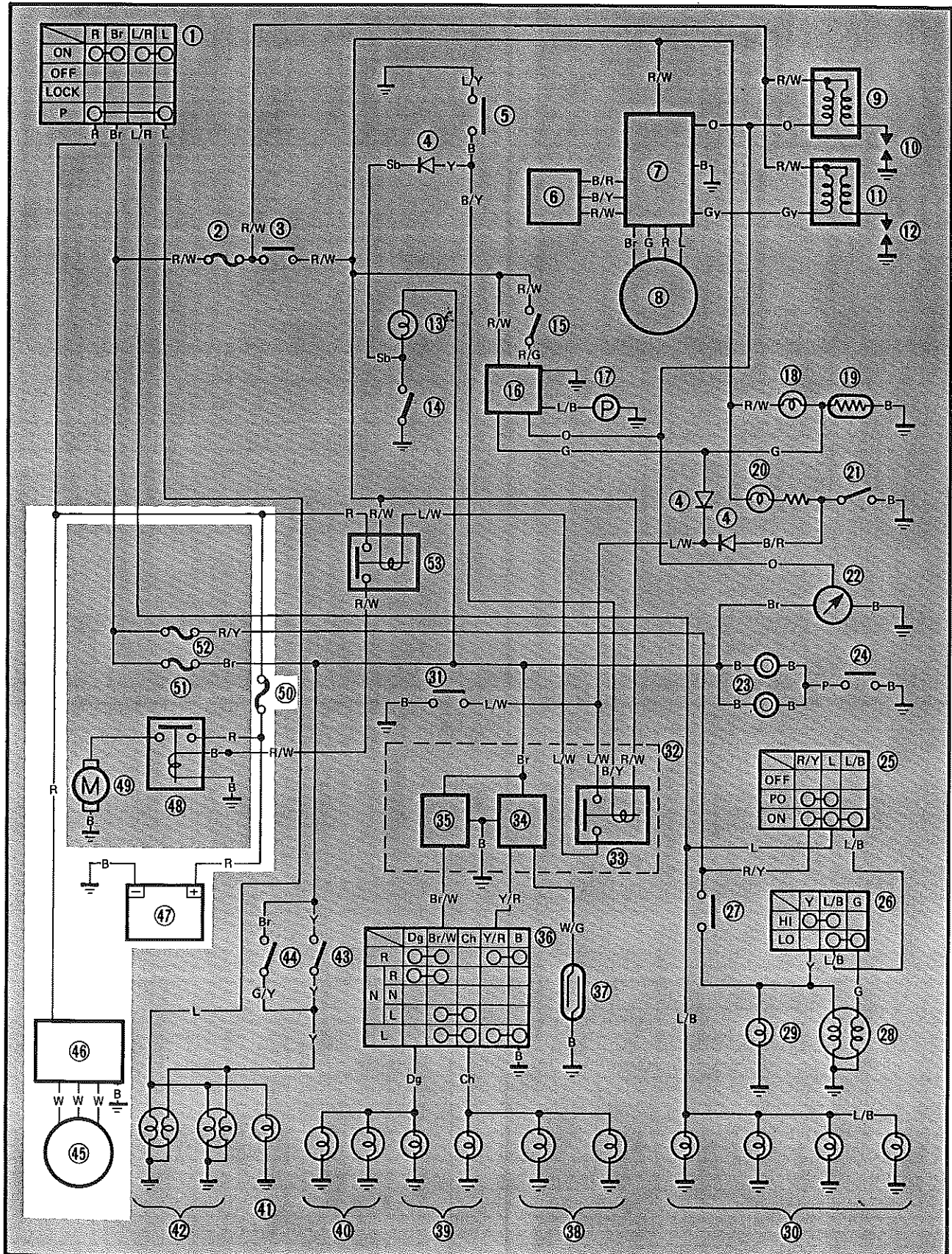




CHARGING SYSTEM

CIRCUIT DIAGRAM

(Without sidestand relay)



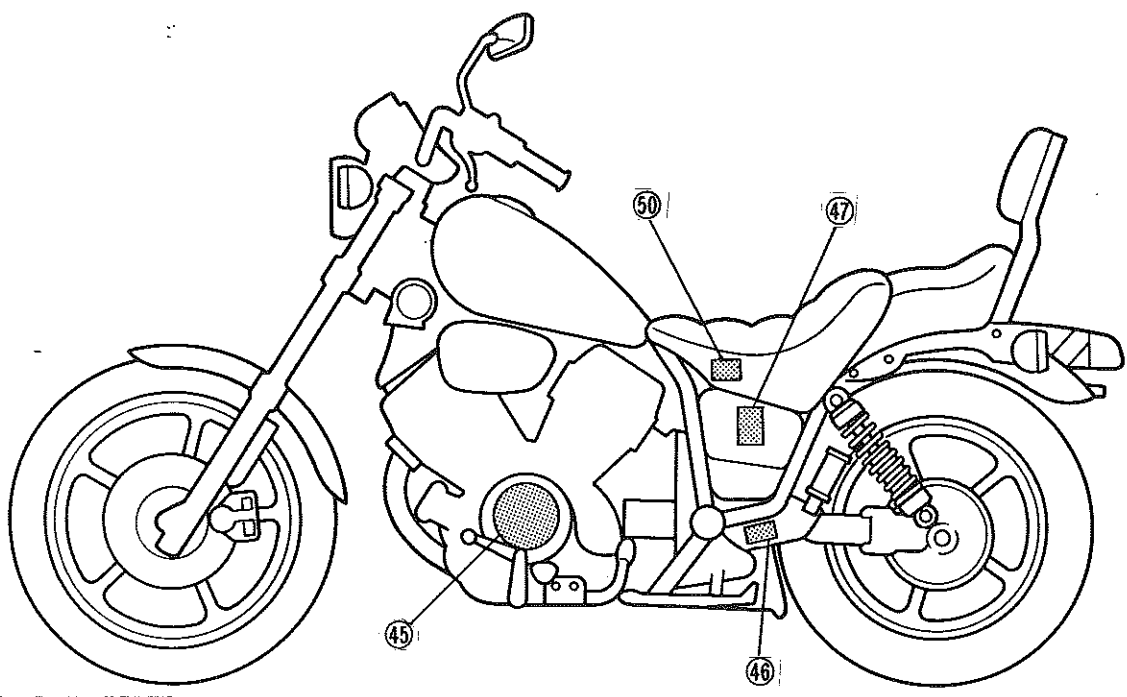


Aforementioned circuit diagram shows charging circuit in wiring diagram.

NOTE:

For the encircled numbers and color codes, see page 6-4.

- ④⑤ AC Magneto
- ④⑥ Rectifier/Regulator
- ④⑦ Battery
- ⑤⑩ Fuse (MAIN)





TROUBLESHOOTING

THE BATTERY IS NOT CHARGED.



Remove the seat.



Check the main fuse condition.

Faulty

Replace faulty fuse.



Measure the battery for voltage and specific gravity.
Battery voltage: More than 12V
Specific gravity: 1,280

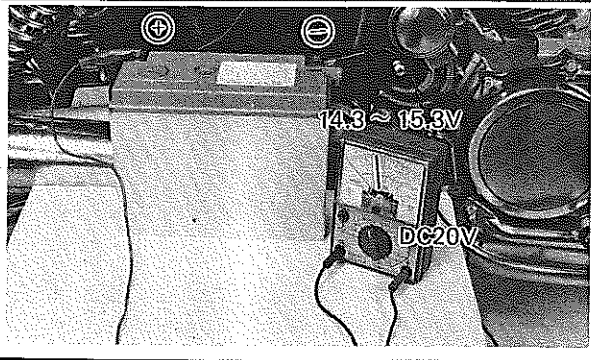
No.

Recharge the battery.



Yes

Connect the Pocket Tester to the battery to measure the generator voltage.



Start the engine and accelerate to about 2,000 r/min or more.



Generator Voltage:
More than 15.5V



Generator Voltage:
14.3 ~ 15.3V



Check the Stator coil resistance.
Stator coil resistance (White — White):
0.45 ~ 0.55Ω at 20°C (68°F)



Replace the stator coil.

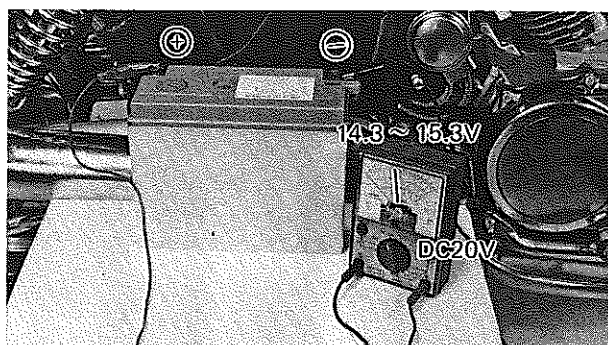


Replace rectifier/regulator.



CHARGING VOLTAGE TEST

1. Remove:
 - Seat
 - Right side cover
 - Battery case cover
2. Pull out the battery from the battery case.



3. Connect:
 - Pocket Tester (90890-03112)
 - To battery terminals.
4. Start the engine and accelerate to about 2,000 r/min or more.
5. Measure:
 - Generator voltage
 - Out of specification → Check battery, stator coil, and rectifier/regulator.



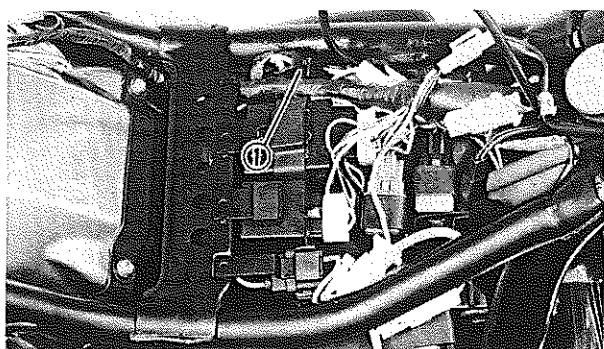
Generator Voltage: 14.3 ~ 15.3V

CAUTION:

Never disconnect the wires from the battery while the generator is operating, otherwise the voltage across the generator terminals will increase and damage the semiconductors.

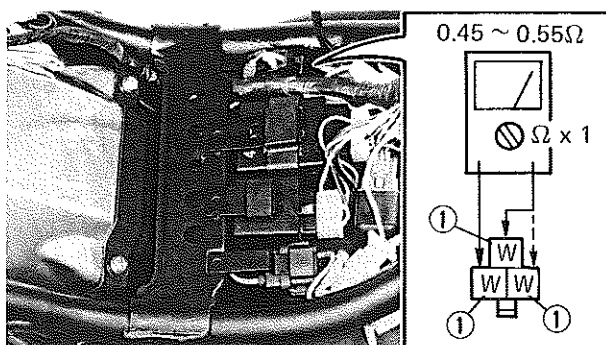
BATTERY INSPECTION

Refer to "CHAPTER 2 BATTERY INSPECTION" section.



STATOR COIL RESISTANCE TEST

1. Remove:
 - Seat
2. Disconnect:
 - Stator coil lead connector ①
 - (White, White and White)



3. Measure:

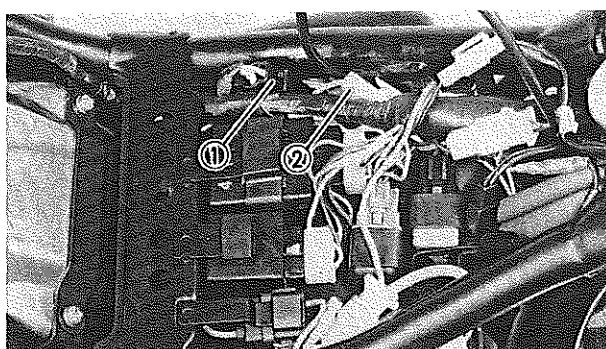
- Stator coil resistance

Out of specification → Replace stator coils.

**Stator Coil Resistance:**

0.45 ~ 0.55Ω at 20°C (68°F)
(White – White)

① White

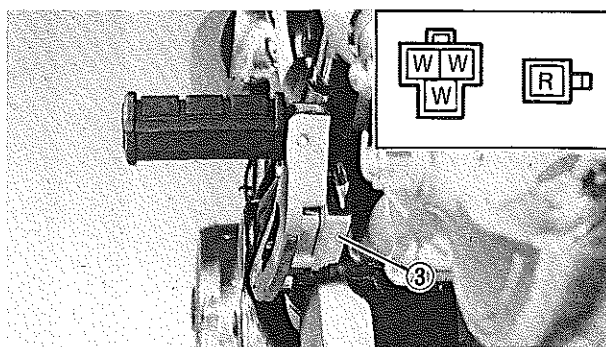
**RECTIFIER/REGULATOR TEST**

1. Remove:

- Seat

2. Disconnect:

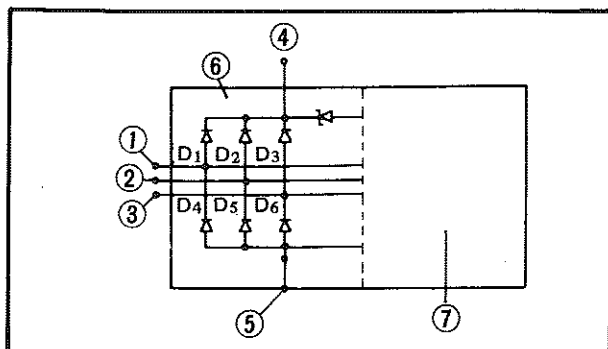
- Rectifier/Regulator lead connectors
(White, White and White) ①, (Red) ②



3. Check:

- Rectifier/Regulator ③

Defective element → Replace rectifier/regulator.



- ① White wire
- ② White wire
- ③ White wire
- ④ Red wire
- ⑤ Ground
- ⑥ Rectifier
- ⑦ Regulator



Checking element	Pocket tester connecting point		Good
	(+) (red)	(-) (black)	
D ₁	④	①	○
	①	④	X
D ₂	④	②	○
	②	④	X
D ₃	④	③	○
	③	④	X
D ₄	①	⑤	○
	⑤	①	X
D ₅	②	⑤	○
	⑤	②	X
D ₆	③	⑤	○
	⑤	③	X

○: Continuity (0Ω) X: Discontinuity ($\infty\Omega$)

NOTE:

The results "○" or "X" should be reversed according to the pocket tester polarity.

CAUTION:

Do not overcharge rectifier or damage may result.

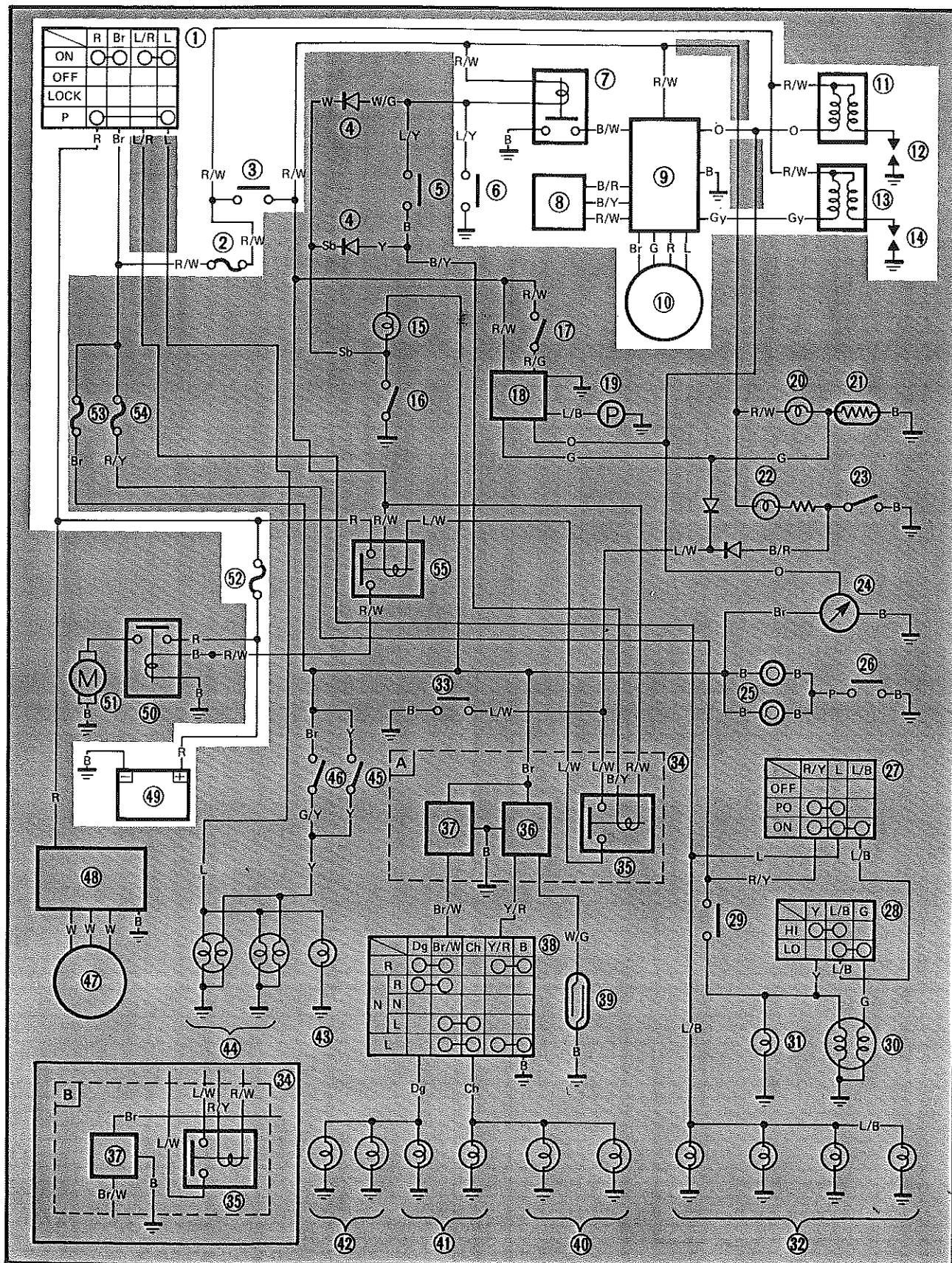
Avoid:

- A short circuit
- Inverting + and – battery leads
- Direct connection of rectifier to battery

IGNITION SYSTEM

CIRCUIT DIAGRAM

(With sidestand relay)



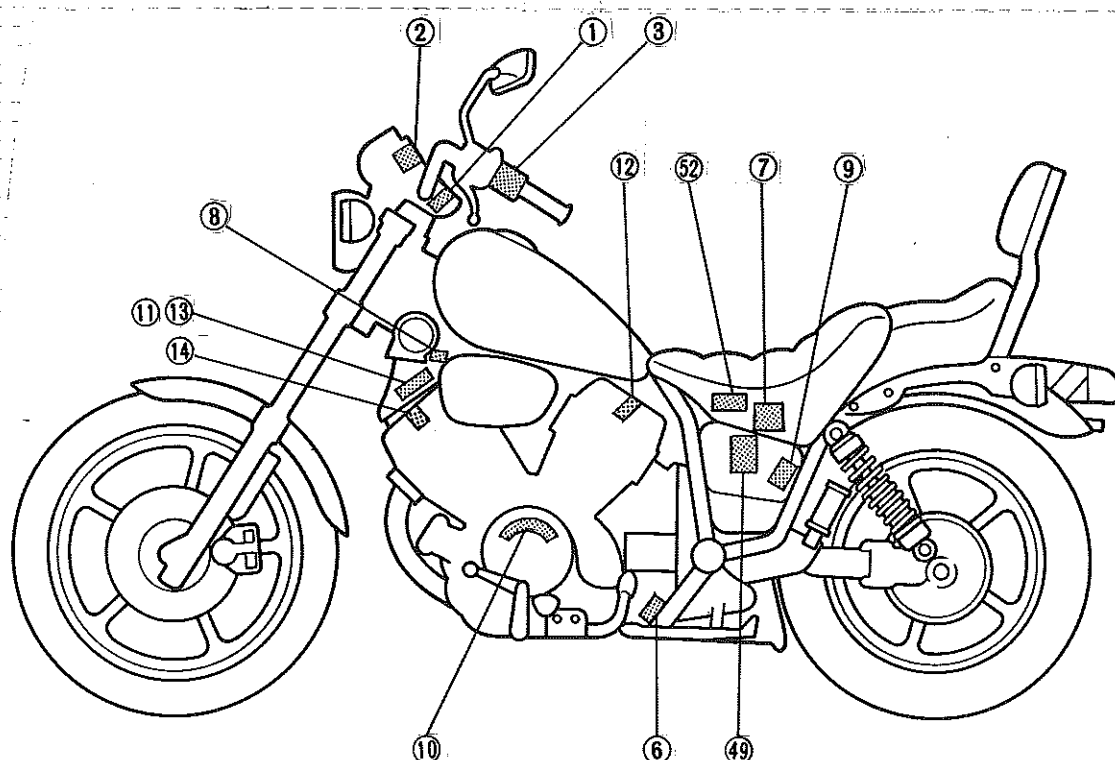


Aforementioned circuit diagram shows ignition circuit in wiring diagram.

NOTE:

For the encircled numbers and color codes, see page 6-2.

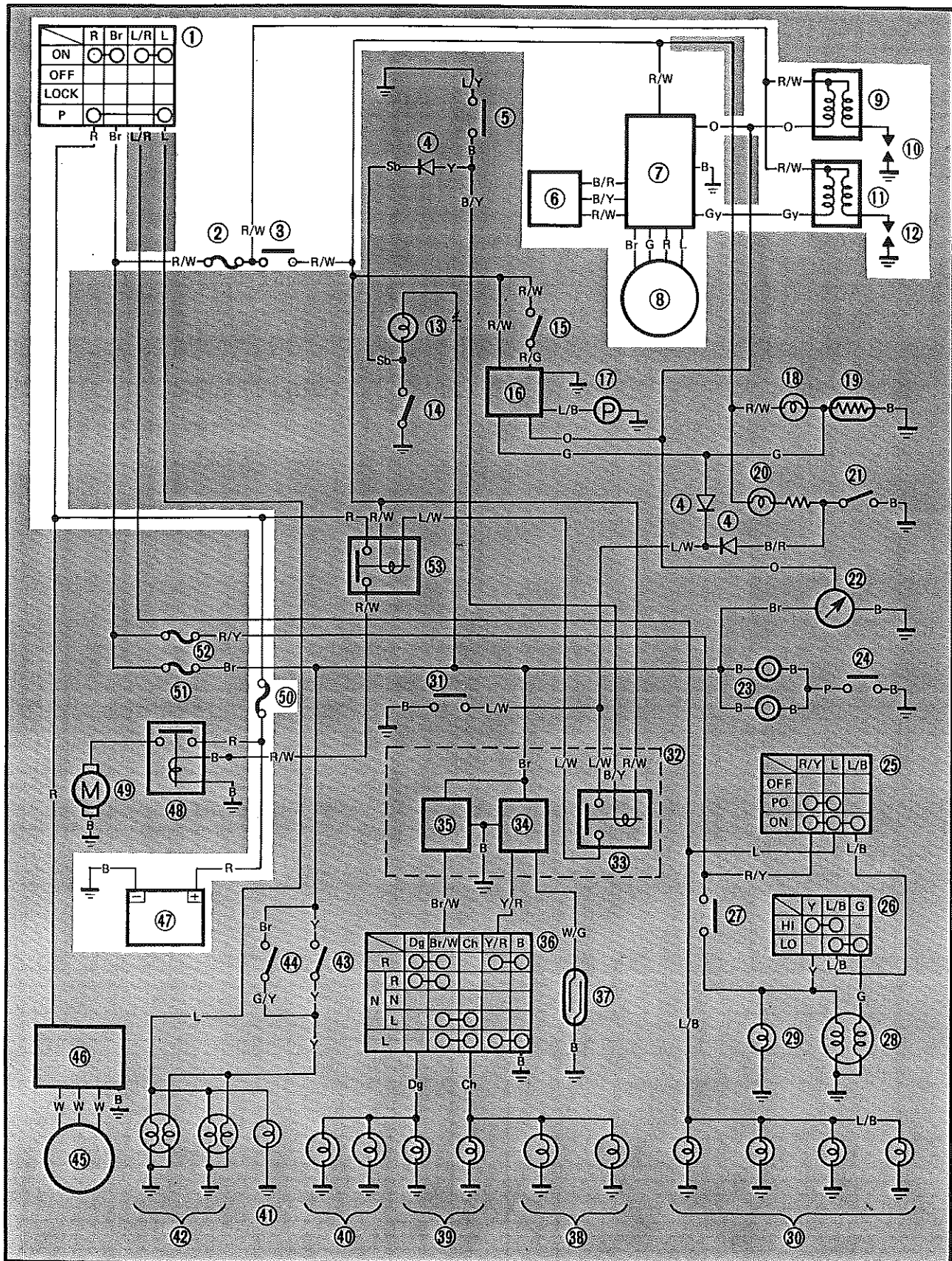
- ① Main switch
- ② Fuse (IGNITION)
- ③ "ENGINE STOP" switch
- ⑥ Sidestand switch
- ⑦ Sidestand relay
- ⑧ Pressure sensor
- ⑨ Ignitor unit
- ⑩ Pickup coil
- ⑪ Ignition coil (#1)
- ⑫ Spark plug (#1)
- ⑬ Ignition coil (#2)
- ⑭ Ignition coil (#2)
- ④ Battery
- ⑤ Fuse (MAIN)



IGNITION SYSTEM

CIRCUIT DIAGRAM

(Without sidestand relay)



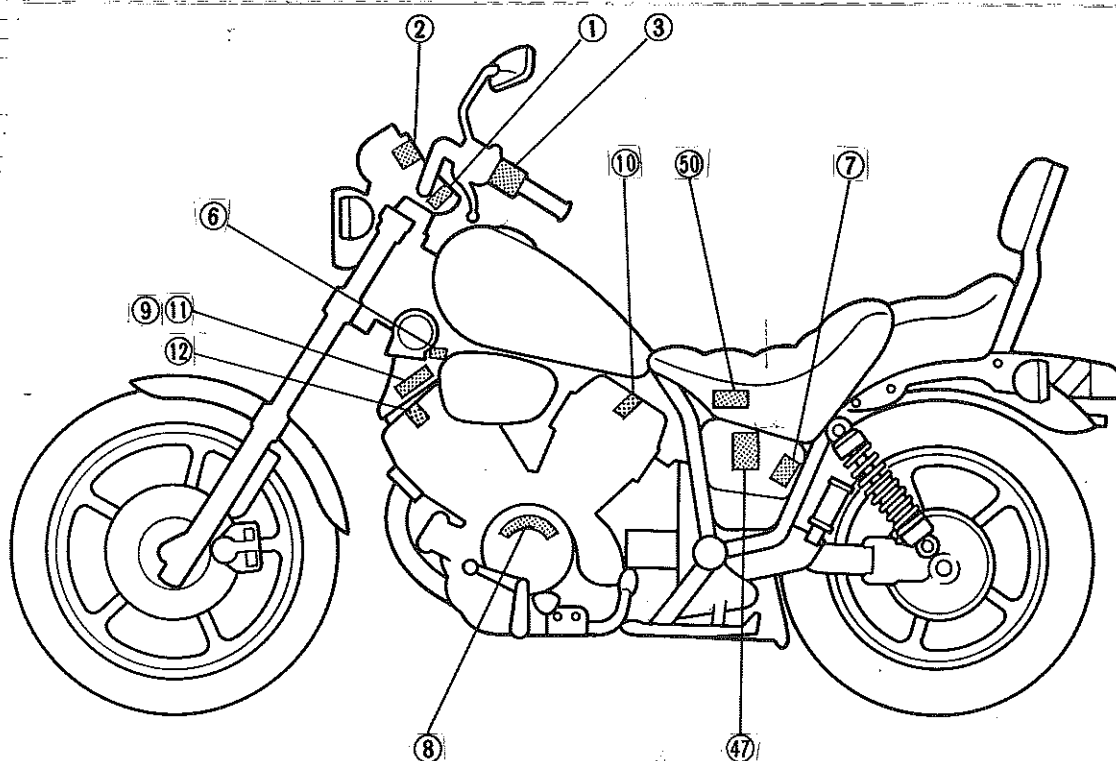


Aforementioned circuit diagram shows ignition circuit in wiring diagram.

NOTE:

For the encircled numbers and color codes, see page 6-4.

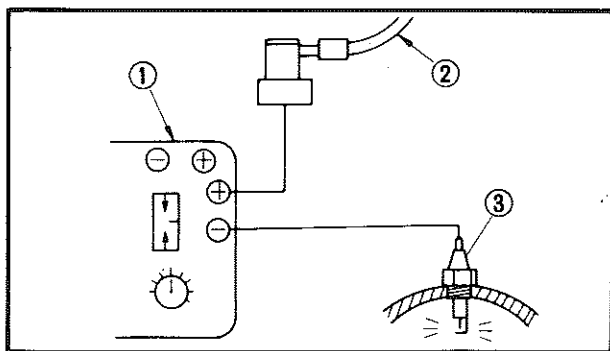
- ① Main switch
- ② Fuse (IGNITION)
- ③ "ENGINE STOP" switch
- ⑥ Pressure sensor
- ⑦ Ignitor unit
- ⑧ Pickup coil
- ⑨ Ignition coil (#1)
- ⑩ Spark plug (#1)
- ⑪ Ignition coil (#2)
- ⑫ Spark plug (#2)
- ④ Battery
- ⑤ Fuse (MAIN)



**TROUBLESHOOTING**

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

1. Warm up the engine so that all of the electrical components are at operating temperature.



2. Connect:

• Electro Tester (90890-03021) ①

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

- ② Spark plug lead
③ Spark plug

CAUTION:

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



Minimum Spark Gap:
6 mm (0.24 in)

Faulty ignition system operation (at the minimum spark gap or smaller) → Follow the troubleshooting chart until the source of the problem is located.



Troubleshooting Chart

Check the entire ignition for connections.

Correct.

Faulty

Measure the battery voltage and specific gravity.

Battery voltage: More than 12V
Specific gravity: 1,280

Recharge the battery.

No

Main and engine stop switches are turned to "ON". Check for voltage (12V) on the "Red/White" lead at the TCI unit and ignition coils.

Check the fuse "IGNITION" (10A) and wiring circuit.

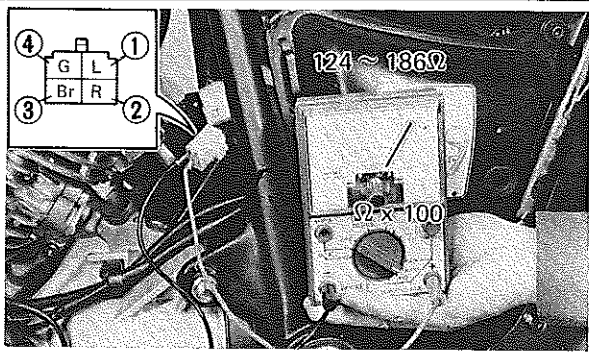
No

Measure the pickup coils resistance.

Pickup coil: $124 \sim 186\Omega$ at 20°C (68°F)
(Brown ③ — Green ④)
(Red ② — Blue ①)

Replace the pickup coil assembly.

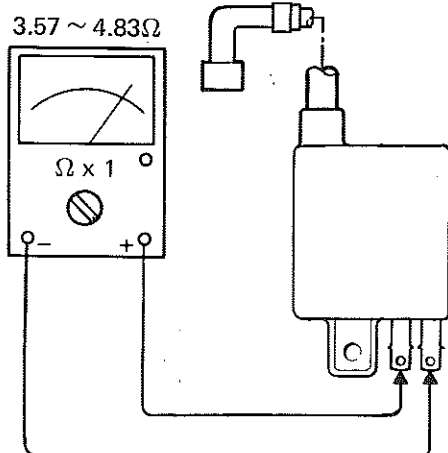
No



OK

Check the ignition coils for resistance (primary and secondary).

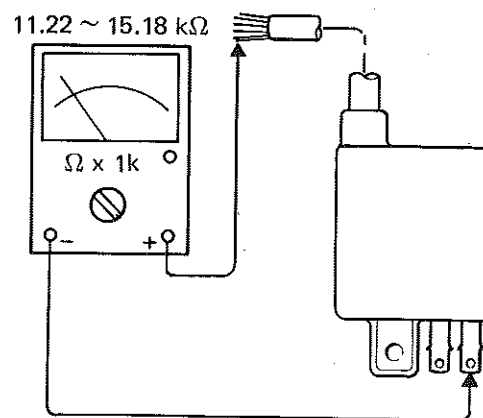
[A] Primary: $3.57 \sim 4.83\Omega$ at 20°C (68°F)



OK

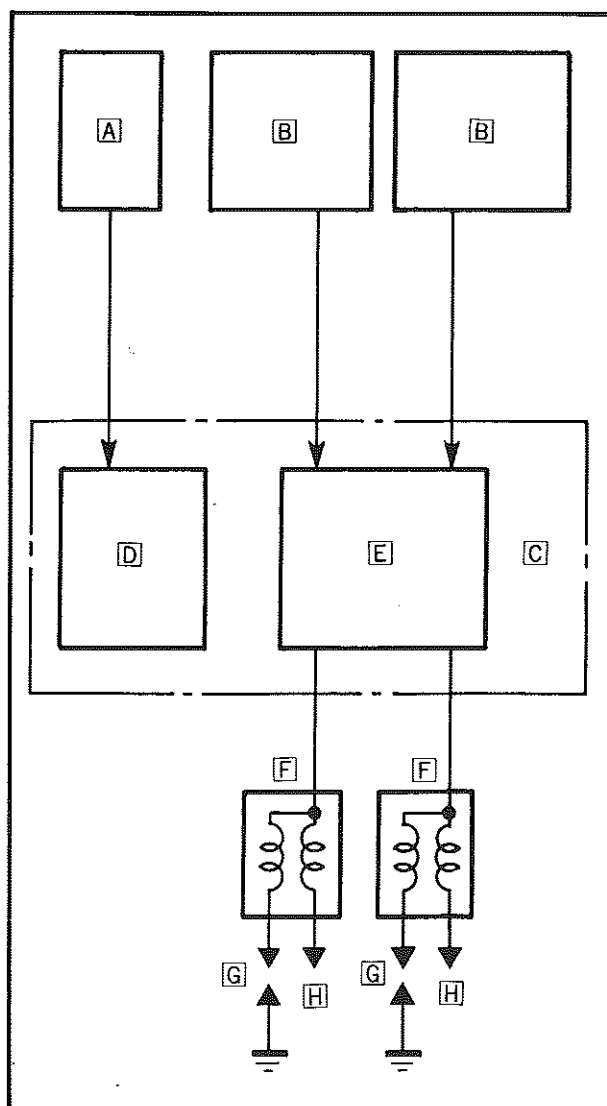
TCI unit is faulty, replace the unit.

[B] Secondary: $11.22 \sim 15.18\text{ k}\Omega$ at 20°C (68°F)



No

Replace the ignition coil(s).



DESCRIPTION

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

- [A] Pressure sensor
- [B] Pickup coil
- [C] Ignitor unit
- [D] Advance controller
- [E] Electronic advance circuit
- [F] Ignition coil
- [G] Spark plug
- [H] To the battery

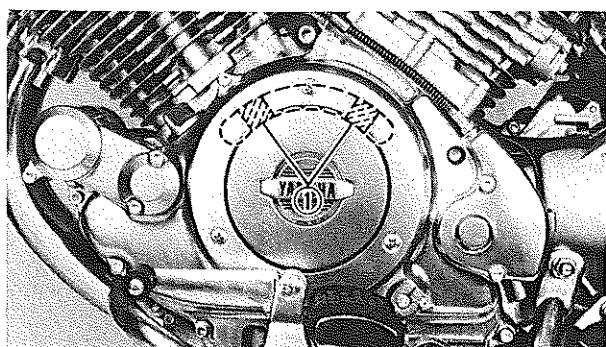
OPERATION

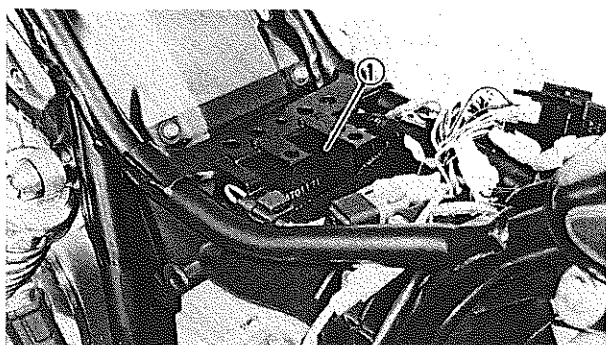
The TCI functions on the same principle as a conventional DC ignition system with the exception of using magnetic pickup coils and a transistor control box (TCI) in place of contact breaker points.

Pickup Unit

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

- ① Pickup coil

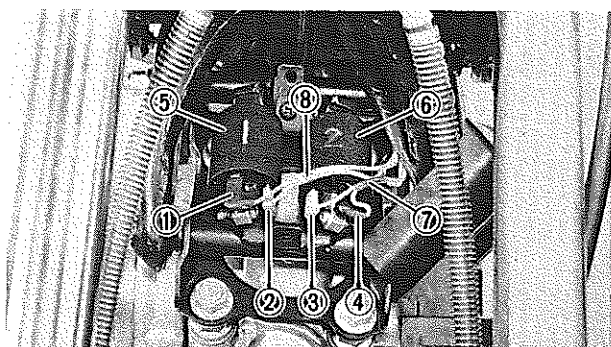




Ignitor Unit

This unit controls wave form, duty control, switching, electronic ignition advance, etc. The duty control circuit reduces electrical consumption by controlling the duration of the primary ignition current.

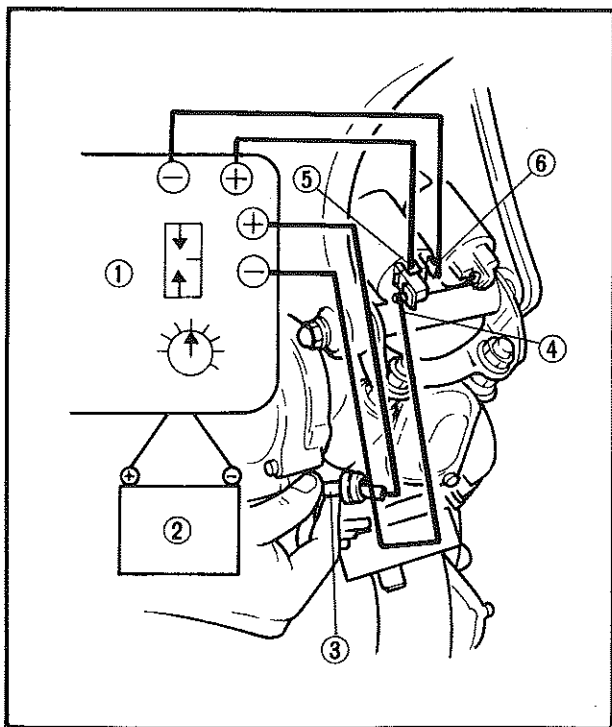
The ignitor unit ① also has a protective circuit for the ignition coil. If the ignition switch is on and the crankshaft is not turning, the protective circuit interrupts the current flow to the primary coil after a few seconds. When the crankshaft is turning, however, the ignitor unit sends current to the primary coil.



IGNITION SPARK GAP TEST

1. Remove:
 - Ignition coil cover
2. Disconnect:
 - Ignition coil leads ① ~ ④
 - Spark plug leads

- ① "Red/White" lead
- ② "Orange" lead
- ③ "Gray" lead
- ④ "Red/White" lead
- ⑤ Rear (# 1) cylinder ignition coil
- ⑥ Rear (# 1) cylinder ignition coil
- ⑦ "Black" tape
- ⑧ "Red" tape



3. Connect:

- Electro Tester (90890-03021) ①

NOTE:

Be sure to use a fully charge 12V battery ② .

- Turn the spark plug gap adjuster and increase the gap to the maximum limit unless misfire occurs first.



Minimum Spark Gap:
6 mm (0.24 in)

- ③ Rear (#1) cylinder spark plug lead
- ④ Ground
- ⑤ "Red/White" lead connector
- ⑥ "Orange" lead connector

IGNITION COIL RESISTANCE TEST

1. Connect:

- Pocket Tester (90890-03112)

2. Measure:

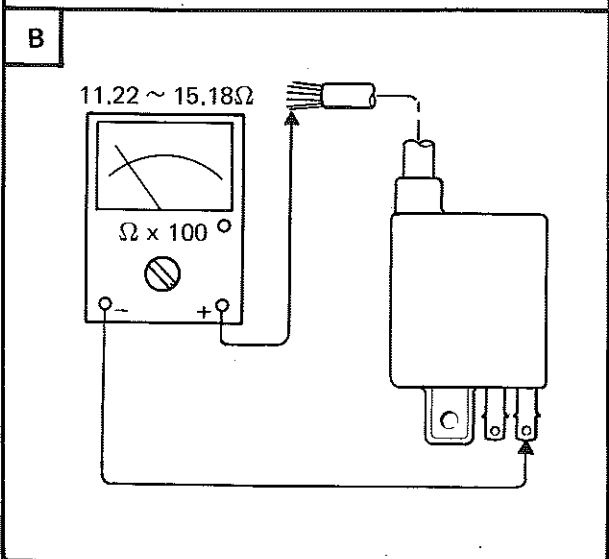
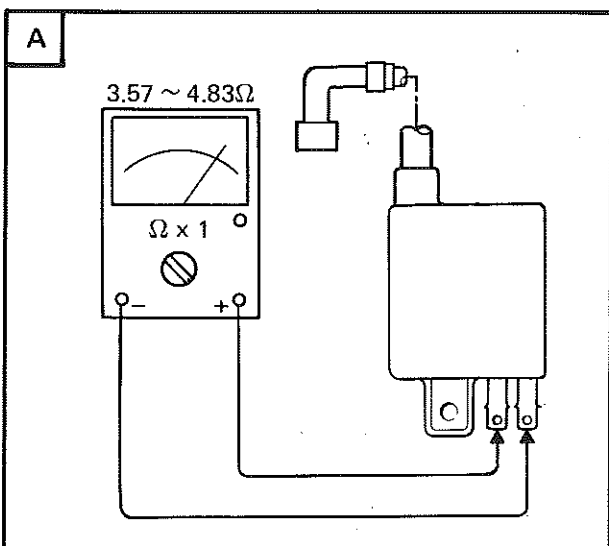
- Primary coil resistance [A]
 - Secondary coil resistance [B]
- Out of specification → Replace.

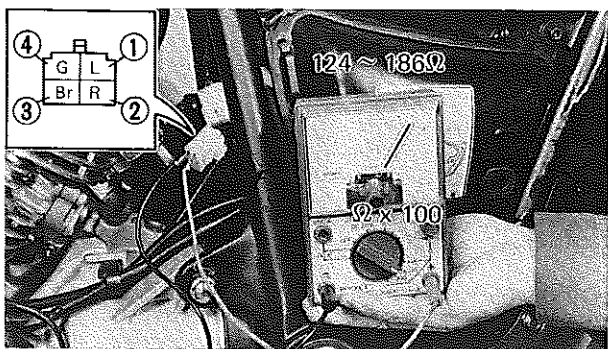
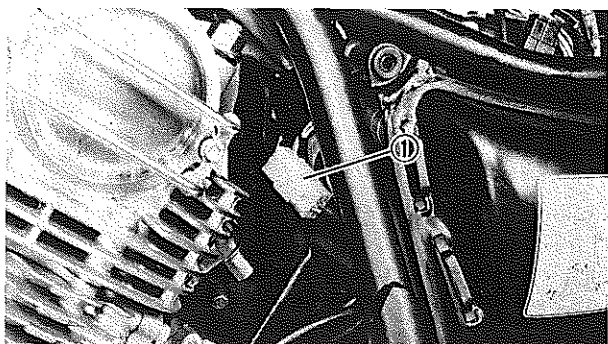


Primary Coil Resistance:
3.57 ~ 4.83Ω at 20°C (68°F)

Secondary Coil Resistance:
11.22 ~ 15.18 kΩ at 20°C (68°F)

Spark Plug Cap:
4.5 ~ 5.5 kΩ





PICKUP COIL RESISTANCE TEST

1. Remove:
 - Seat
 - Frame cover
2. Disconnect:
 - Pickup coil lead connector
(Blue, Red, Green and Brown)
3. Measure
 - Pickup coil resistance ①
Use a Pocket Tester (90890-03112).
Out of specification → Replace.



Pickup Coil Resistance:

Front Cylinder (#2):

124 ~ 186Ω at 20°C (68°F)
(Brown — Green)

Rear Cylinder (#1):

124 ~ 186Ω at 20°C (68°F)
(Red — Blue)

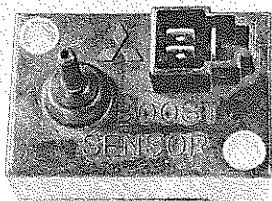
- ① Blue
- ② Red
- ③ Brown
- ④ Green

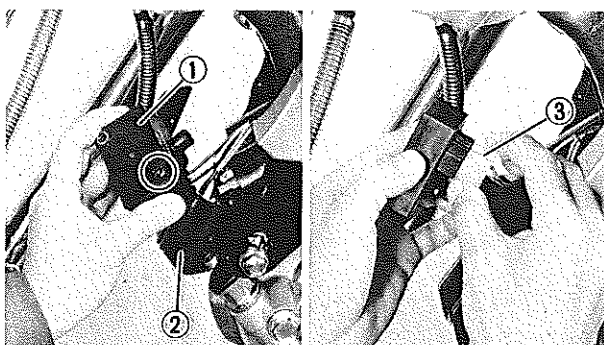
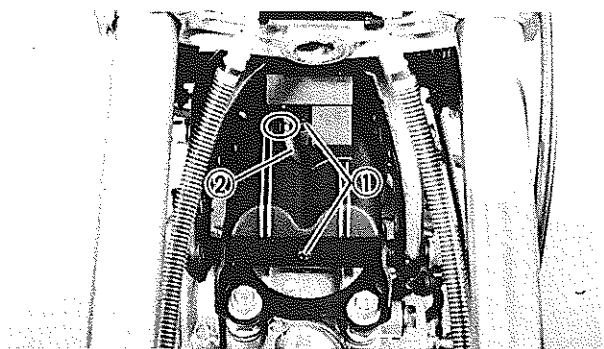
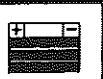
SPARK PLUG INSPECTION

Refer to "CHAPTER 2 SPARK PLUG INSPECTION" section.

PRESSURE SENSOR

This pressure sensor unit consists of a semiconductor strain gauge and an amplifying circuit. Pressure to the carb manifold (venturi portion) is sensed by the strain gauge and amplified in the circuit connected with this gauge. The amplified pressure signals are then transmitted to the ignition system for the control of ignition timing advance.





Removal

1. Remove:
 - Ignition coil cover ①
2. Disconnect:
 - Vacuum sensor hose ②
3. Remove:
 - Vacuum sensor ①
 - From ignition coil cover ②
4. Disconnect:
 - Vacuum sensor connector ③

Inspection

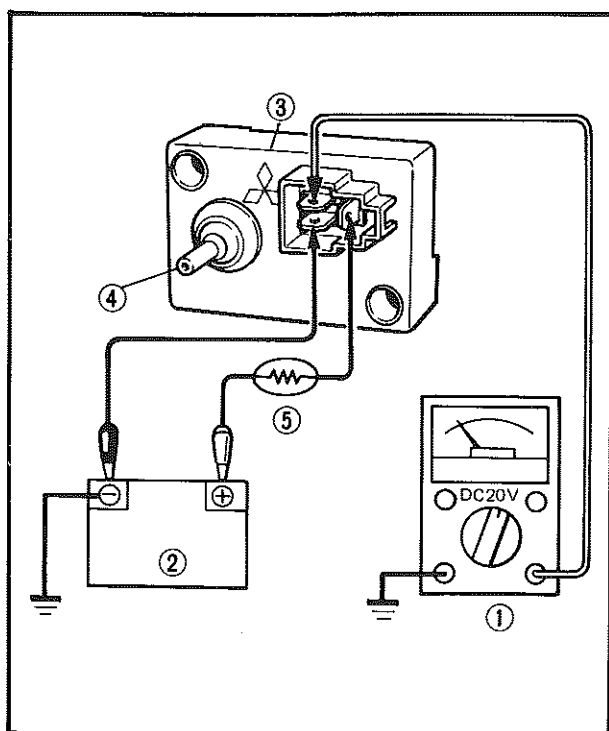
1. Connect:
 - Pocket Tester (90890-03112) ①
 - Battery (12V) ②
2. Measure:
 - Output voltage (Pressure sensor ③)
 - Out of specification → Replace.



Output Voltage:
 $3.00 \pm 0.05V$

NOTE:

Be sure that the pressure intake tube ④ is free of obstructions when measuring voltage output.



⑤ 180Ω

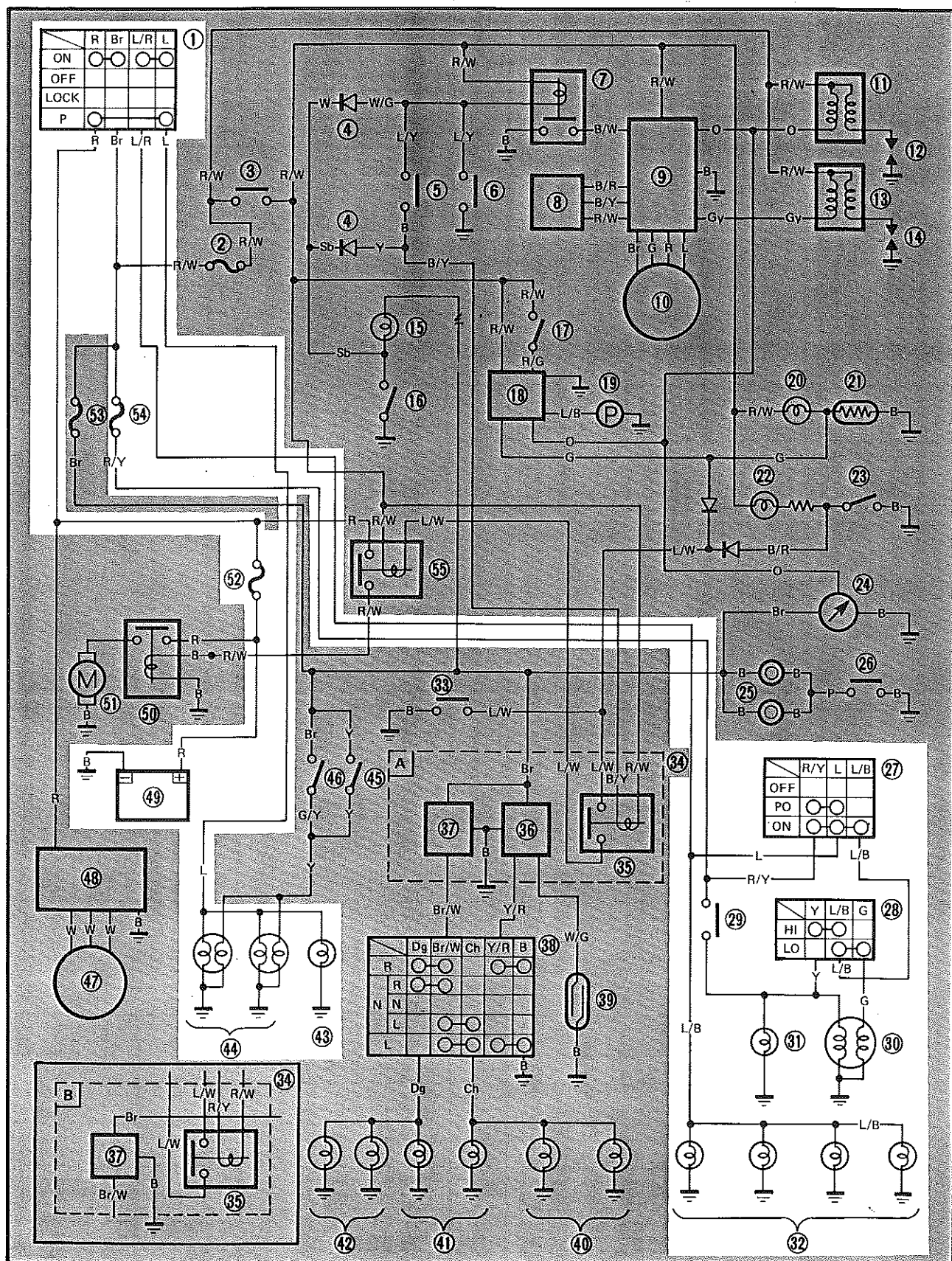
Installation

1. Install:
 - Pressure sensor
 - Reverse the removal procedure.

LIGHTING SYSTEM

CIRCUIT DIAGRAM

(With sidestand relay)



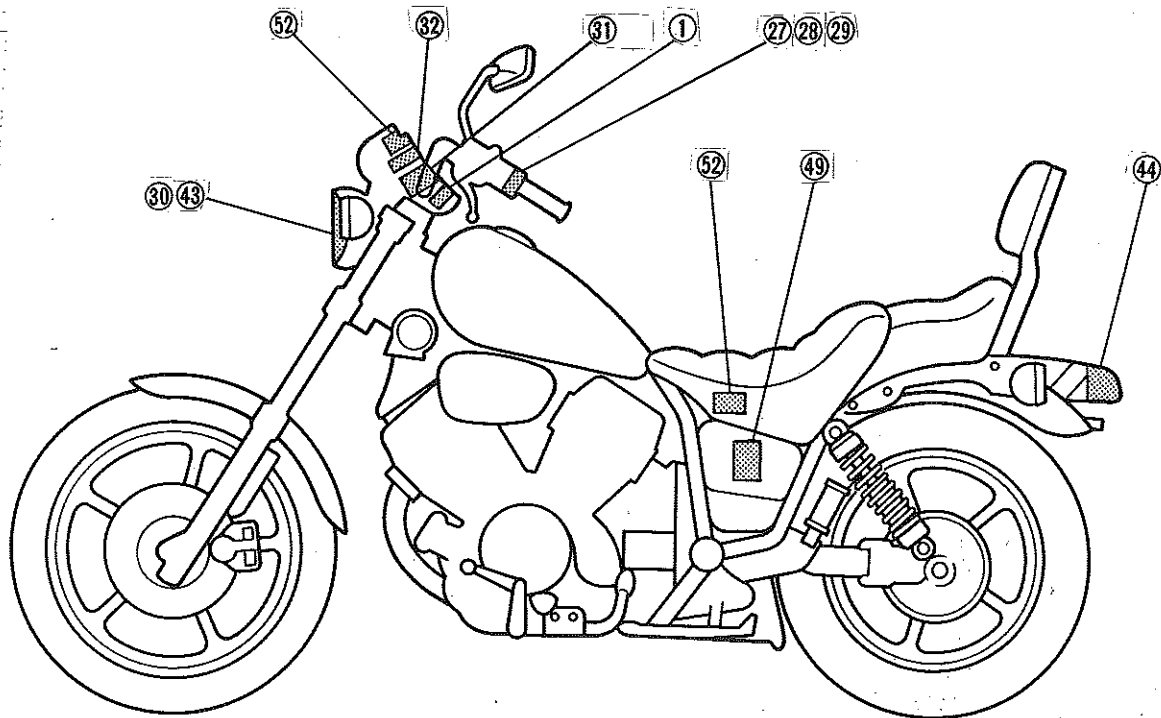


Aforementioned circuit diagram shows lighting circuit in wiring diagram.

NOTE:

For the encircled numbers and color codes, see page 6-2.

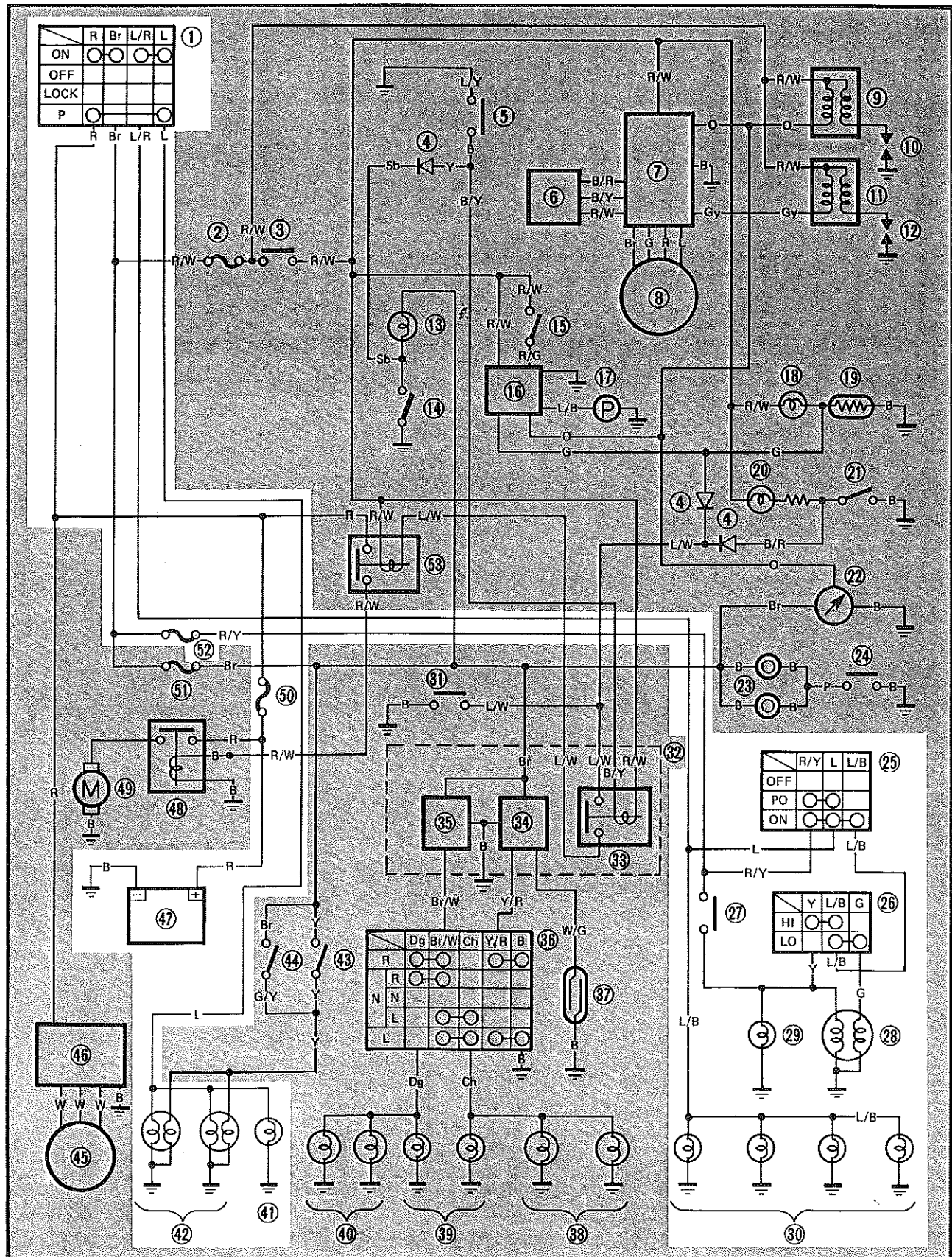
- ① Main switch
- ②⑦ "LIGHTS" switch
- ②⑧ "LIGHTS" (Dimmer) switch
- ②⑨ "PASS" switch
- ③⑩ Headlight
- ③① "HIGH BEAM" indicator light
- ③② Meter illumination light
- ④③ Auxiliary light
- ④④ Tail/Brake light
- ④⑨ Battery
- ⑤② Fuse (MAIN)
- ⑤④ Fuse (HEAD)



LIGHTING SYSTEM

CIRCUIT DIAGRAM

(Without sidestand relay)



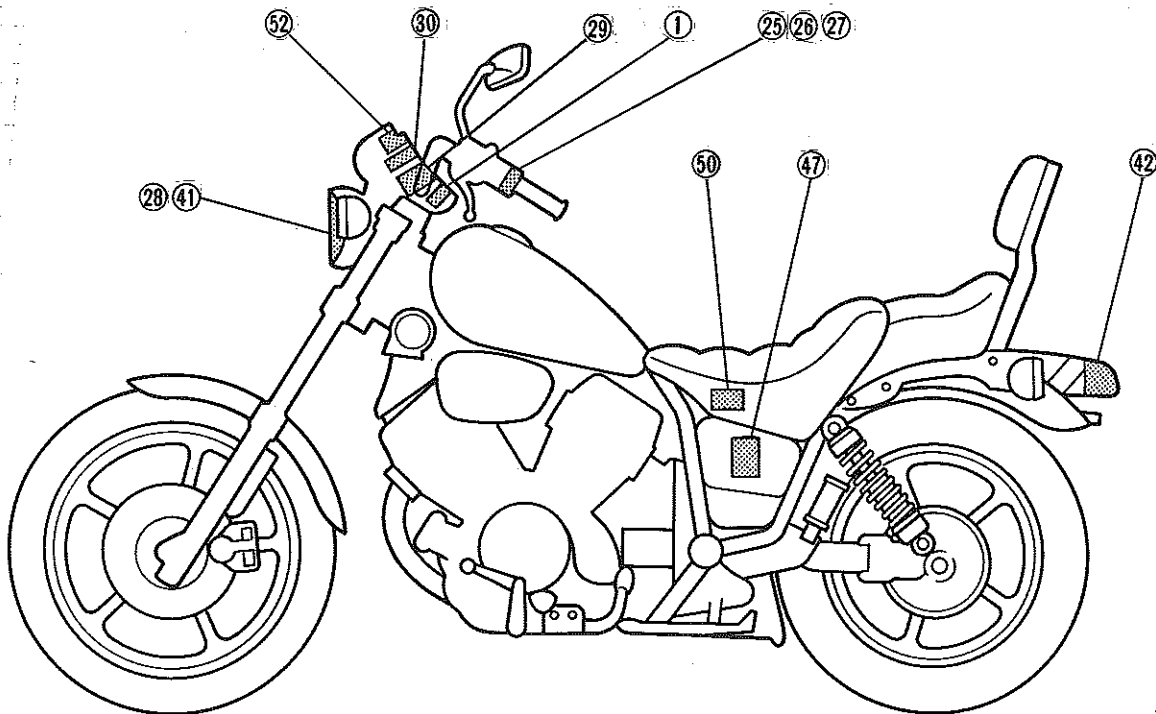


Aforementioned circuit diagram shows lighting circuit in wiring diagram.

NOTE:

For the encircled numbers and color codes, see page 6-4.

- ① Main switch
- ②⑤ "LIGHTS" switch
- ②⑥ "LIGHTS" (Dimmer) switch
- ②⑦ "PASS" switch
- ②⑧ Headlight
- ②⑨ "HIGH BEAM" indicator light
- ③⑩ Meter illumination light
- ④① Auxiliary light
- ④② Tail/Brake light
- ④⑦ Battery
- ⑤⑩ Fuse (MAIN)
- ⑤② Fuse (HEAD)



**LIGHTING TESTS AND CHECKS**

The battery provides power for operation of the headlight, taillight, and meter lights. If none of the above fail to operate proceed further. Low battery voltage indicates either a faulty battery, low battery fluid level, or a defective charging system.

Also check fuse condition. Replace any "open" fuses. There are individual fuses for various circuits (see complete Circuit Diagram).

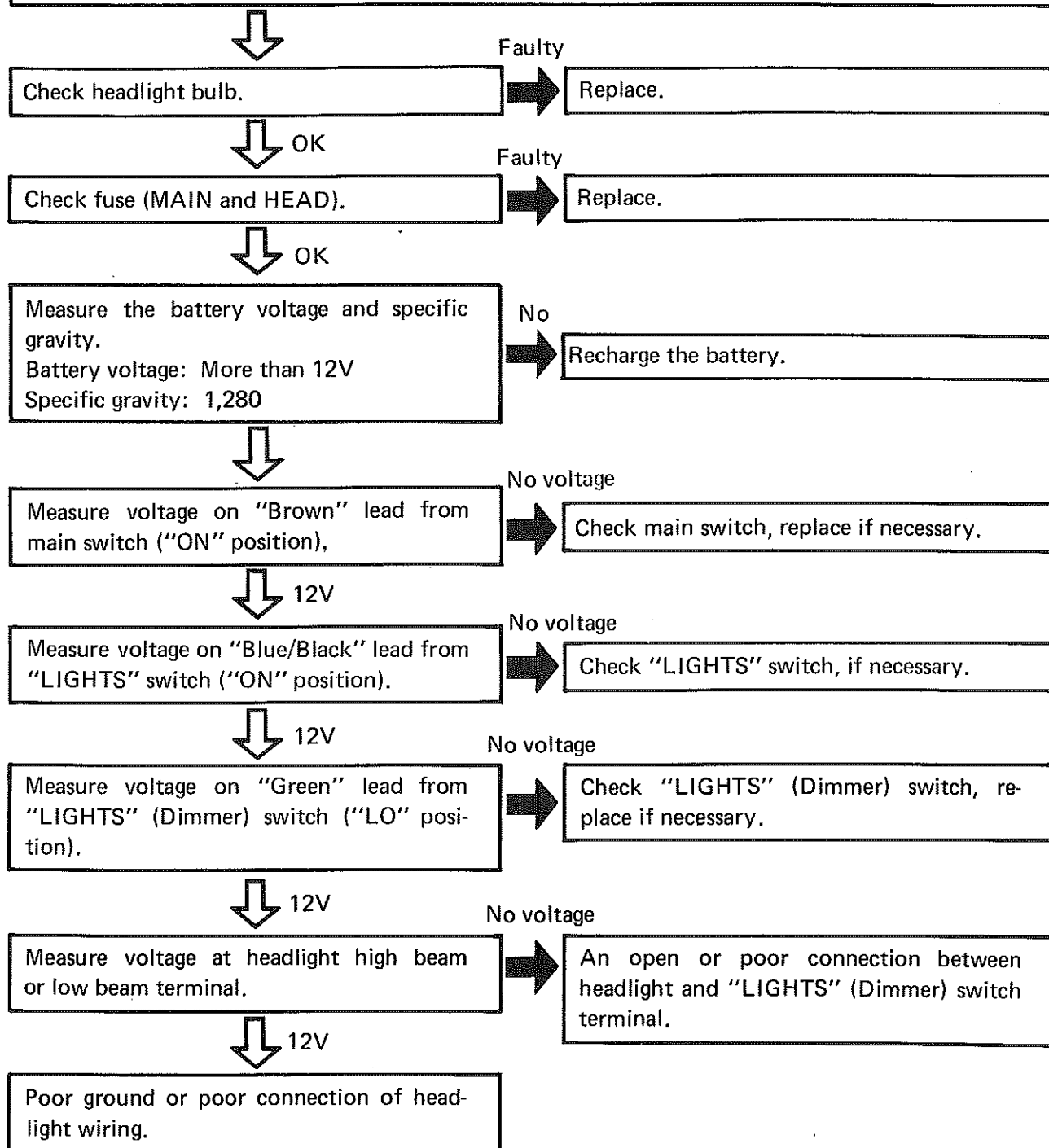
NOTE:

Check each bulb first before performing the following check.



Headlight Troubleshooting

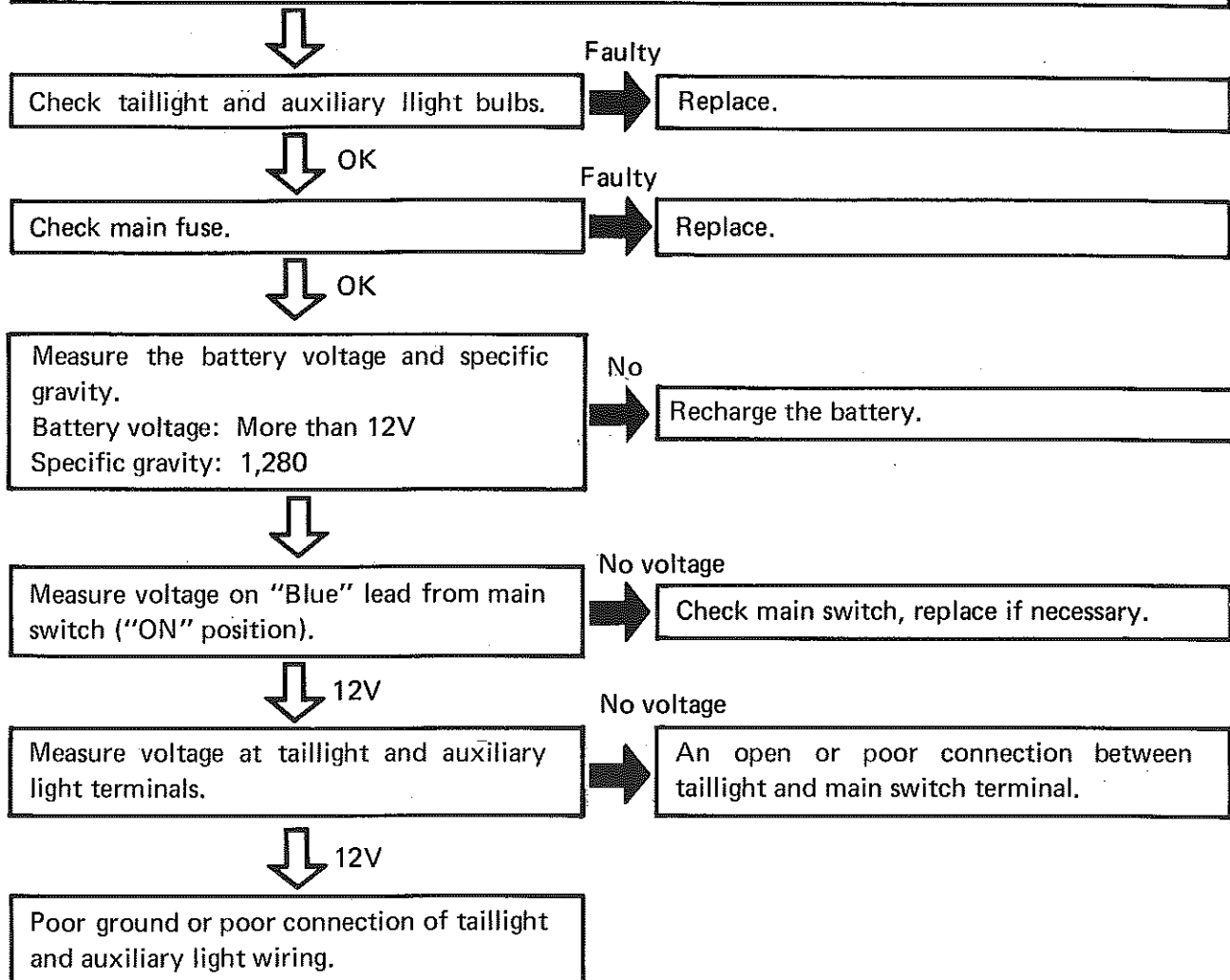
HEADLIGHT DOES NOT COME ON WHEN ENGINE IS RUNNING/HIGH BEAM DOES NOT OPERATION.





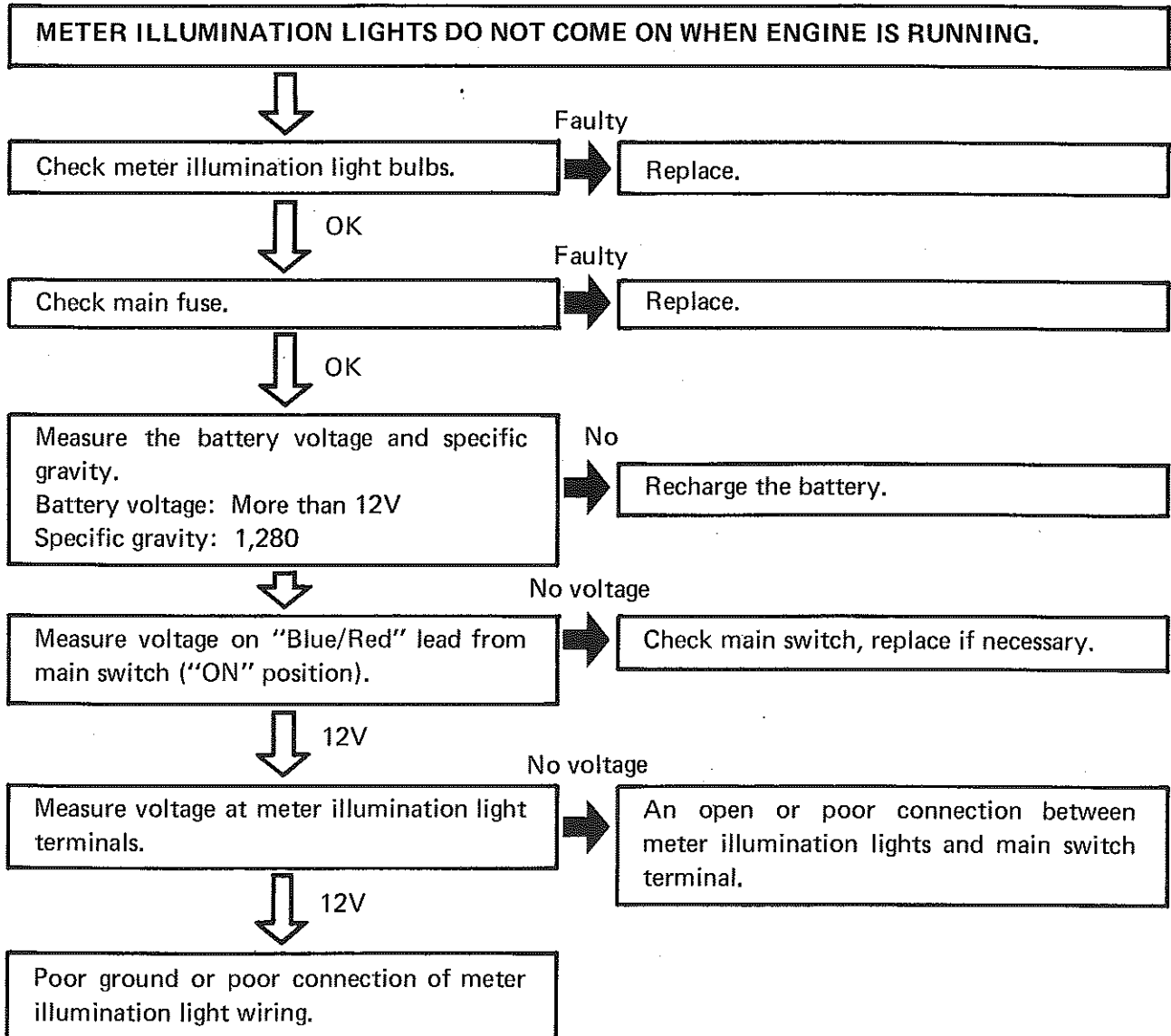
Taillight and Auxiliary Light Troubleshooting

TAILLIGHT AND AUXILIARY LIGHT DO NOT COME ON WHEN ENGINE IS RUNNING.





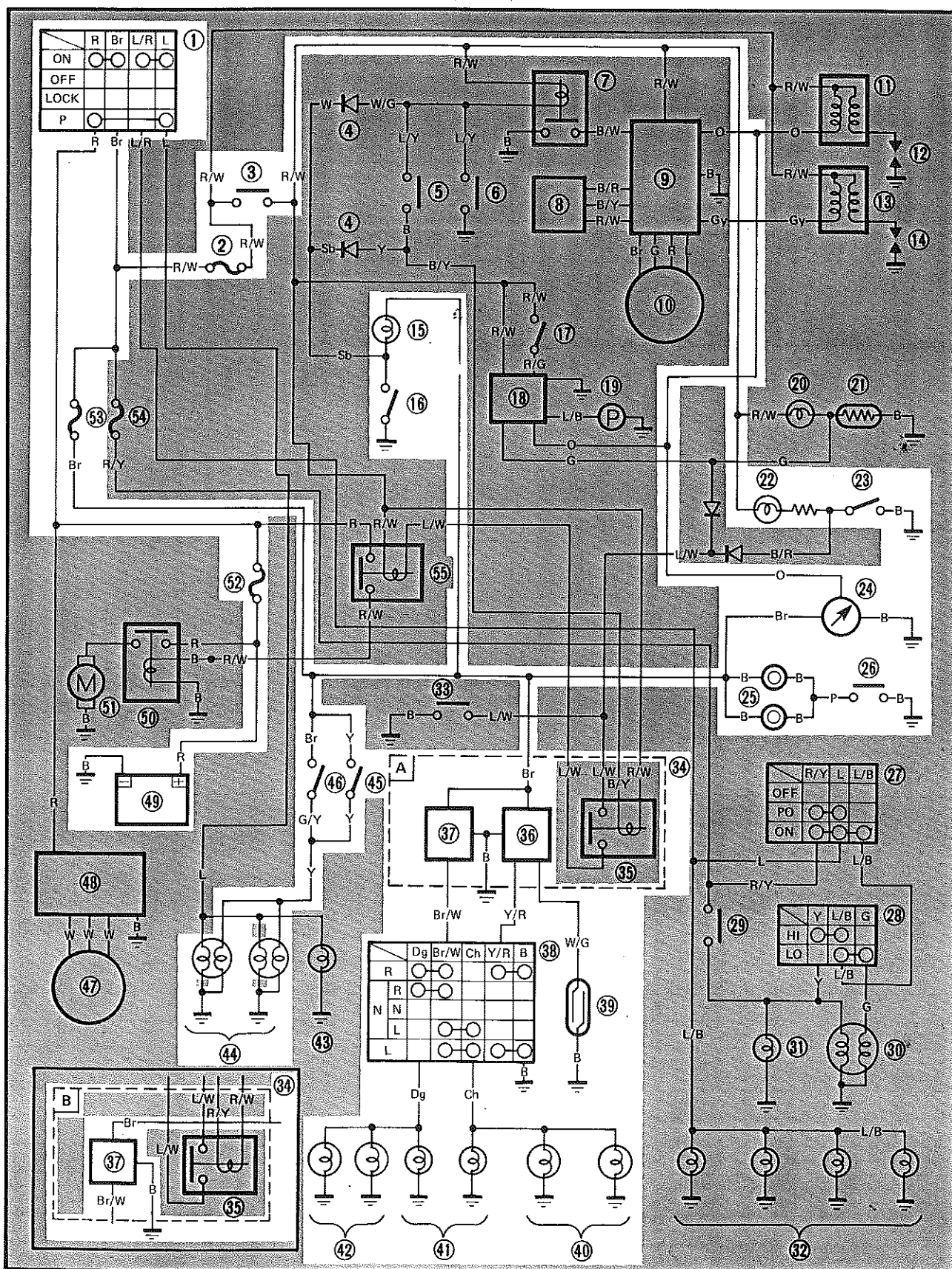
Meter Illumination Lights Troubleshooting



SIGNAL SYSTEM

CIRCUIT DIAGRAM

(With sidestand relay)



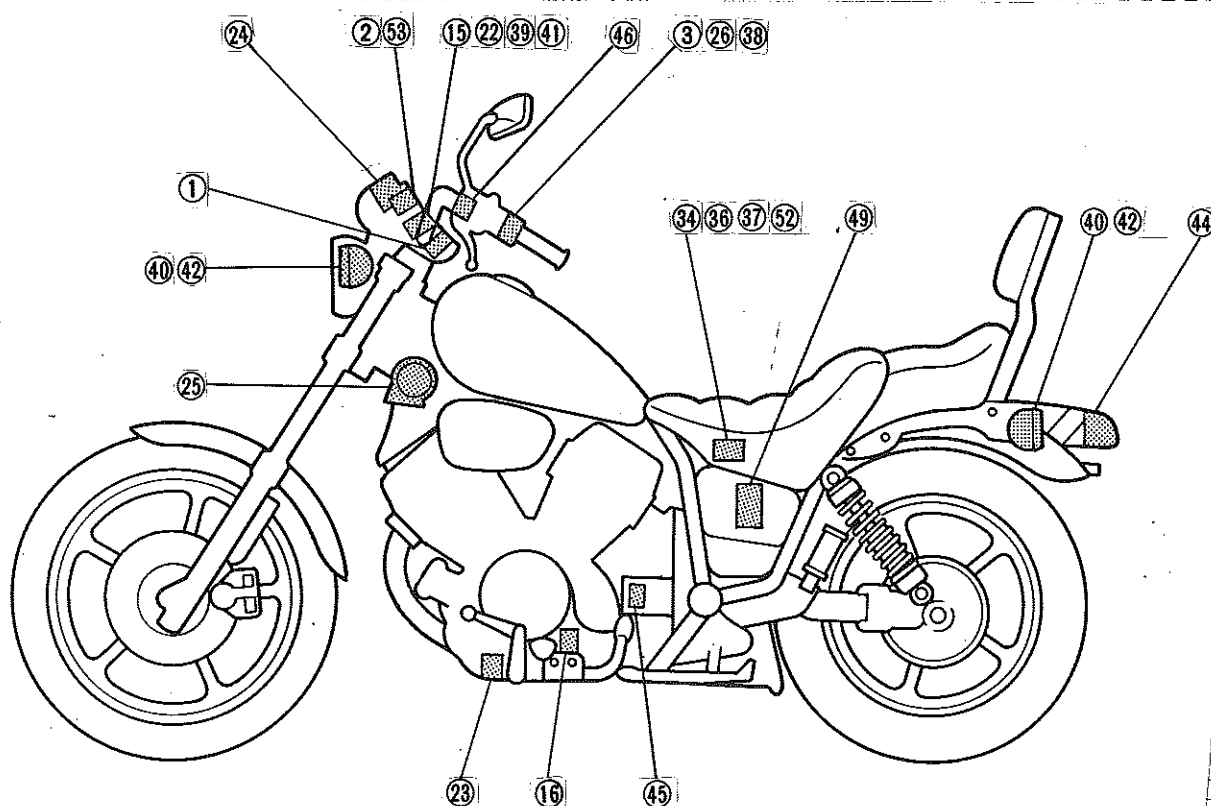


Aforementioned circuit diagram shows signal circuit in wiring diagram.

NOTE:

For the encircled numbers and color codes, see page 6-2.

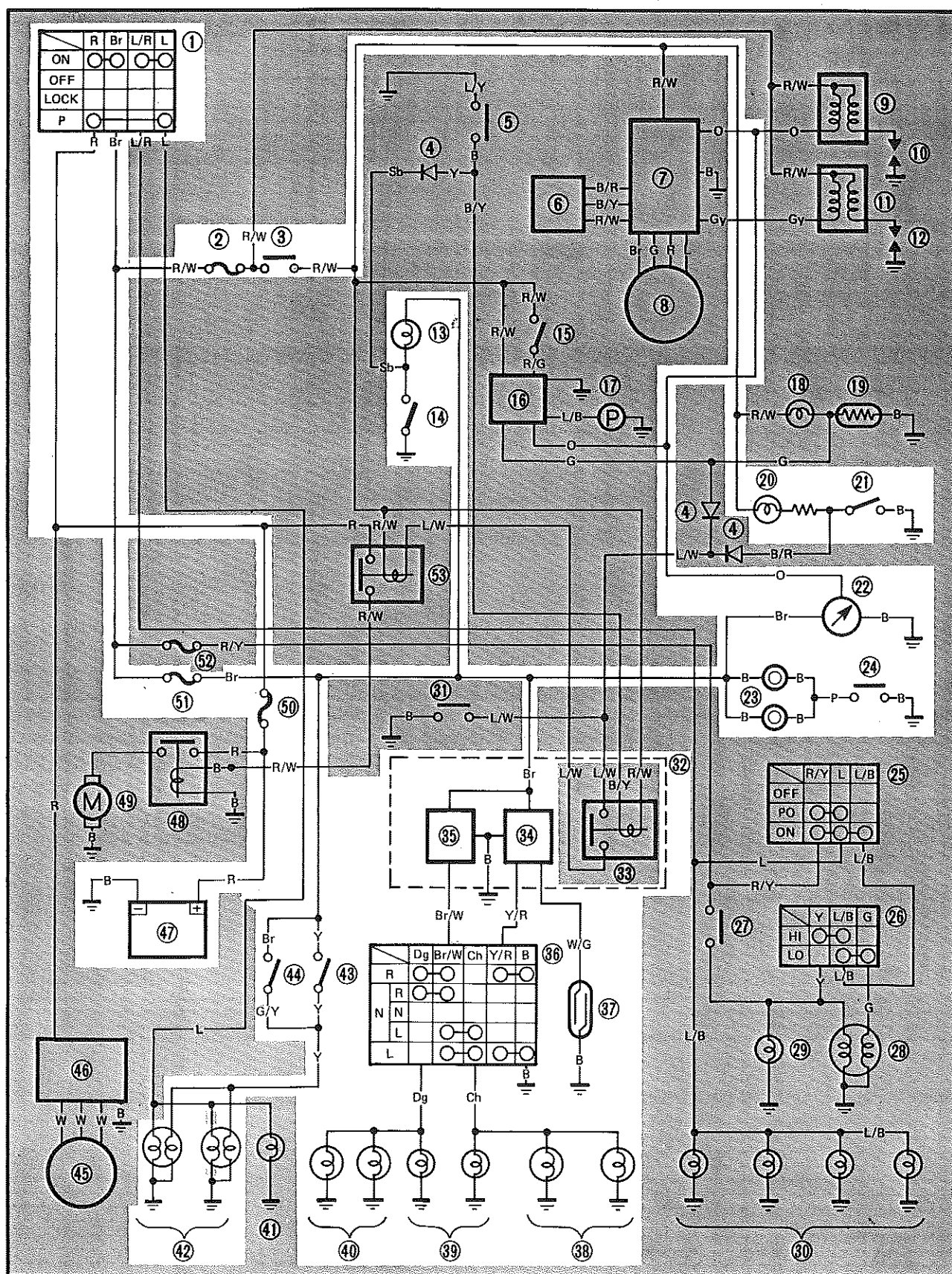
- | | |
|----------------------------------|---------------------------|
| ① Main switch | ③⑧ "TURN" switch |
| ② Fuse (IGNITION) | ③⑨ Reed switch |
| ③ "ENGINE STOP" switch | ④⑩ Flasher light (Left) |
| ⑮ "NEUTRAL" indicator light | ④⑪ "TURN" indicator light |
| ⑮ Neutral switch | ④⑫ Flasher light (Right) |
| ②② "OIL" warning indicator light | ④④ Tail/Brake light |
| ②③ Oil level switch | ④⑤ Rear brake switch |
| ②④ Tachometer | ④⑥ Front brake switch |
| ②⑤ Horn | ④⑨ Battery |
| ②⑥ Horn switch | ⑤② Fuse (MAIN) |
| ③④ Flasher unit | ⑤③ Fuse (SIGNAL) |
| ③⑥ Cancelling unit | Ⓐ Except for Germany |
| ③⑦ Flasher relay | Ⓑ For Germany |



SIGNAL SYSTEM

CIRCUIT DIAGRAM

(Without sidestand relay)



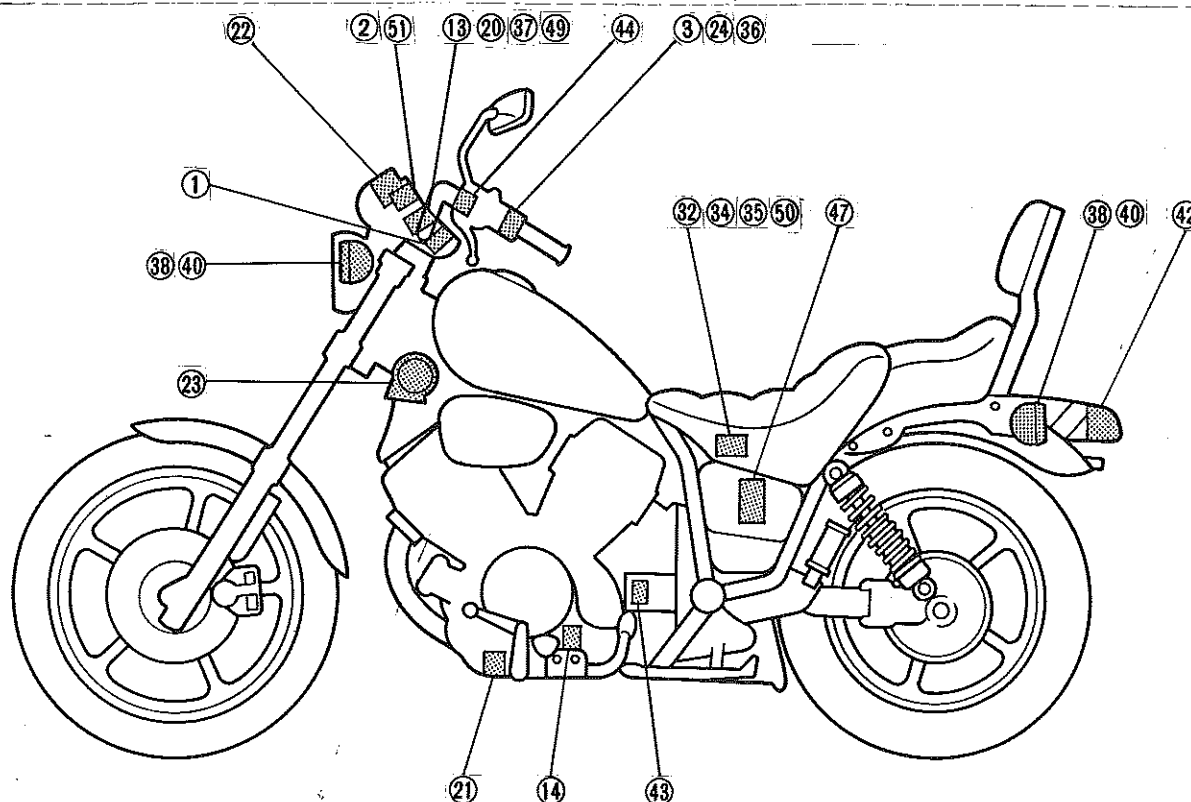


Aforementioned circuit diagram shows signal circuit in wiring diagram.

NOTE:

For the encircled numbers and color codes, see page 6-4.

- | | |
|---------------------------------|---------------------------|
| ① Main switch | ③⑥ "TURN" switch |
| ② Fuse (IGNITION) | ③⑦ Reed switch |
| ③ "ENGINE STOP" switch | ③⑧ Flasher light (Left) |
| ⑬ "NEUTRAL" indicator light | ③⑨ "TURN" indicator light |
| ⑭ Neutral switch | ④⑩ Flasher light (Right) |
| ⑳ "OIL" warning indicator light | ④② Tail/Brake light |
| ㉑ Oil level switch | ④③ Rear brake switch |
| ㉒ Tachometer | ④④ Front brake switch |
| ㉓ Horn | ④⑦ Battery |
| ㉔ Horn switch | ⑤⑩ Fuse (MAIN) |
| ③② Flasher unit | ⑤① Fuse (SIGNAL) |
| ③④ Cancelling unit | |
| ③⑤ Flasher relay | |





SIGNAL SYSTEM TESTS AND CHECKS

The battery provides power for operation of the horn, brakelight, indicator lights and flasher lights. If none of the above operates, always check battery voltage before proceeding further.

Battery

1. Check:

- Battery voltage

Defective components → Replace.

Check for:	Faulty battery
	Low battery fluid level
	Defective charging system
	Faulty fuse(s)

Horn

1. Check:

- Horn operation

Defective components → Replace.

Check for:	12V on "Black" lead to horn
	Good grounding of horn (Pink lead) when horn button is pressed
	Faulty fuse(s)

Brake Light

1. Check:

- Brake light operation

Defective components → Replace.

Check for:	Defective bulb
	12V on "Yellow" lead to brake light
	12V on "Brown" lead to each brake light switch (Front and rear brake switch)

"NEUTRAL" Indicator Light

1. Check:

- Indicator light operation

Defective components → Replace.

Check for:	Defective bulb
	12V on "Brown" lead to indicator light
	12V on "Sky Blue" lead to neutral switch



"OIL LEVEL" Warning Indicator Light

1. Check:

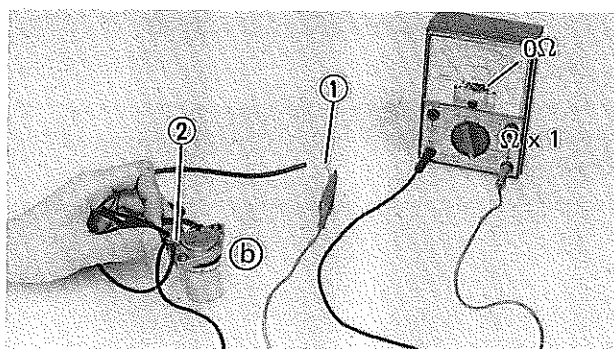
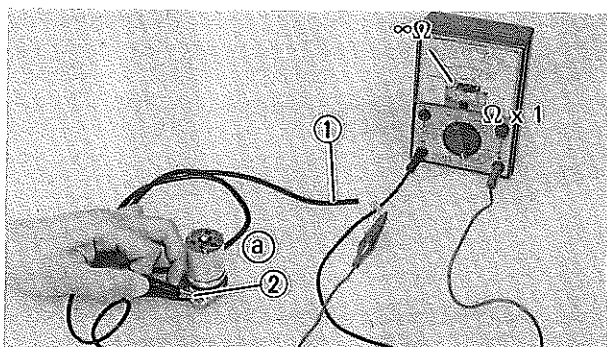
- Indicator light operation
- Defective components → Replace.

Check for:	Defective bulb
	Defective oil level switch
	12V on "Red/White" lead to indicator light

Flasher Light

1. Check:

- Flasher light operation
- Refer to "SELF-CANCELLING FLASHER SYSTEM" section.



OIL LEVEL GAUGE TEST

1. Drain:

- Engine oil

2. Remove:

- Oil level gauge

3. Measure:

- Oil level gauge resistance
- Use the Pocket Tester (90890-03112).
Out of specification → Replace.

	Oil Level Gauge Resistance:
	Float is down (a) → $\infty \Omega$
	Float is up (b) → 0Ω

- ① Black/Red
② Ground

4. Install:

- Oil level gauge

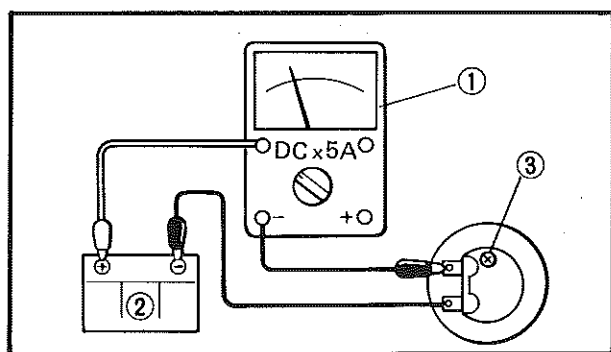
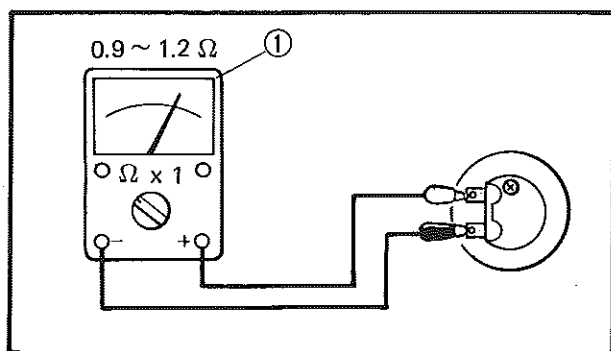
5. Connect:

- Leads

6. Fill:

- Crankcase

Refer to "CHAPTER 2 ENGINE OIL REPLACEMENT" section.

**HORN TEST**

1. Measure:

- Horn resistance
- Use the Pocket Tester (90890-03112) ①
Out of specification → Replace.

**Standard Resistance:**

0.9 ~ 1.2Ω at 20°C (68°F)

2. Connect:

- Pocket Tester (90890-03112) ①
- Battery (12V) ②

3. Adjust:

- Volume
- Turn the adjuster ③ in and out so that the volume is maximum at the maximum amperage.

**Maximum Amperage:**

3.0A, 2.0A (G, Sw, E, Ar, D, N)

SELF-CANCELLING FLASHER SYSTEM TEST (Except for Germany)**Description**

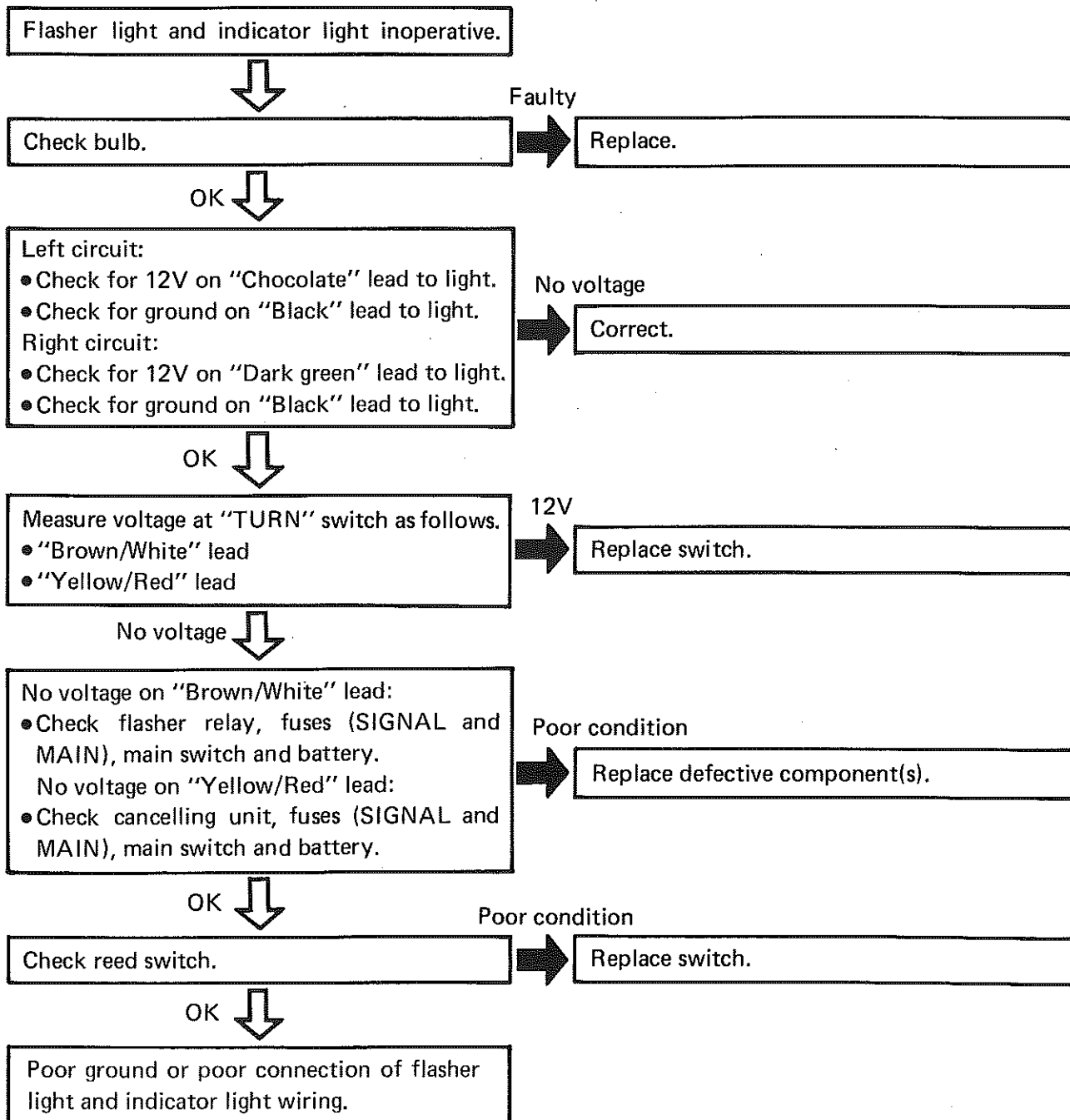
The self-cancelling flasher system turns off the turn signal after a period of time or distance involved in turning or changing lanes. Generally, the signal will cancel after either 10 seconds, or 150 meters (490 feet), whichever is greater. At very low speed, the function is determined by distance; at high speed, especially when changing speeds the cancelling determination is a combination of both times and distance. The self-cancelling determination is a mechanism only operates when the motorcycle is moving; thus the signal will not self-cancel while you are stopped at an intersection.

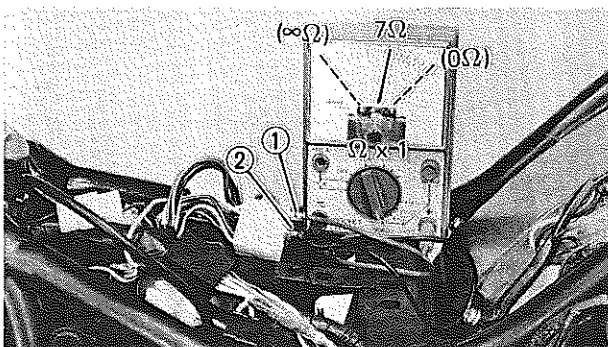
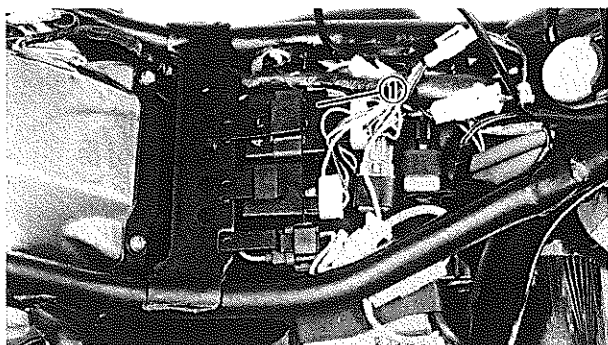


Operation

The flasher switch has three positions: L (left), OFF, and R (right). The switch lever will return to the "OFF" position after being pushed to L or R, but the signal will function. By pushing the lever in, the signal may be cancelled manually. If the flasher self-cancelling system should become inoperative, replace relay unit.

Troubleshooting





REED SWITCH TEST

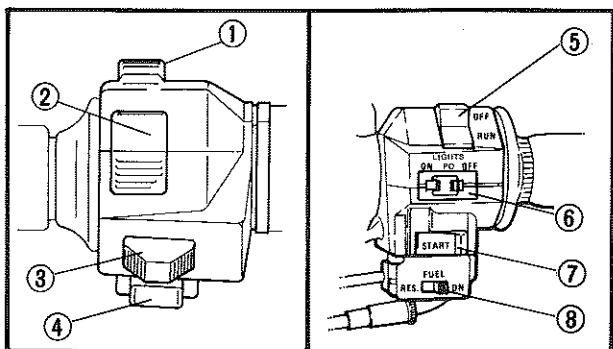
1. Remove:
 - Seat
2. Disconnect:
 - Relay unit coupler ①
3. Measure:
 - Reed switch resistance

Use the Pocket Tester (90890-03112).
Out of specification → Replace.
Lift the front wheel and rotate the wheel by hand.



Reed Switch Resistance:
About 7Ω
Then return back 0Ω or ∞Ω
when wheel is stopped

- ① White/Green
- ② Black



SWITCHES TEST

Switches may be checked for continuity with a Pocket Tester (90890-03112) on the "Ohm x 1" position.

- ① "PASS" switch
- ② "LIGHTS" (Dimmer) switch
- ③ "TURN" signal switch
- ④ "HORN" switch
- ⑤ "ENGINE STOP" switch
- ⑥ "LIGHTS" switch
- ⑦ "START" switch
- ⑧ "FUEL" (Reserve) switch

Main Switch

Switch position	Wire color			
	R	Br	L	L/R
ON	○	○	○	○
OFF	○	○		
P	○	○		○

"ENGINE STOP" Switch

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



"START" Switch

Switch position	Wire color	
	L/W	B
OFF		
ON	○	○

"LIGHTS" (Dimmer) Switch

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

"HORN" Switch

Switch position	Wire color	
	P	B
PUSH	○	○
OFF		



"TURN" Switch

Switch position	Wire color				
	Ch	Br/W	Dg	Y/R	B
L	○	○		○	○
N	○	○			
		○	○		
R		○	○	○	○



"LIGHTS" Switch

Switch position	Wire color		
	R/Y	L	L/B
OFF			
PO	○	○	
ON	○	○	○



"FUEL" (Reserve) Switch

Switch position	Wire color	
	R/W	R/G
RES		
ON		



"PASS" Switch

Switch position	Wire color	
	R/Y	Y
OFF		
PUSH		

Front Brake Switch

Switch position	Wire color	
	Br	G/Y
ON		
OFF		

Rear Brake Switch

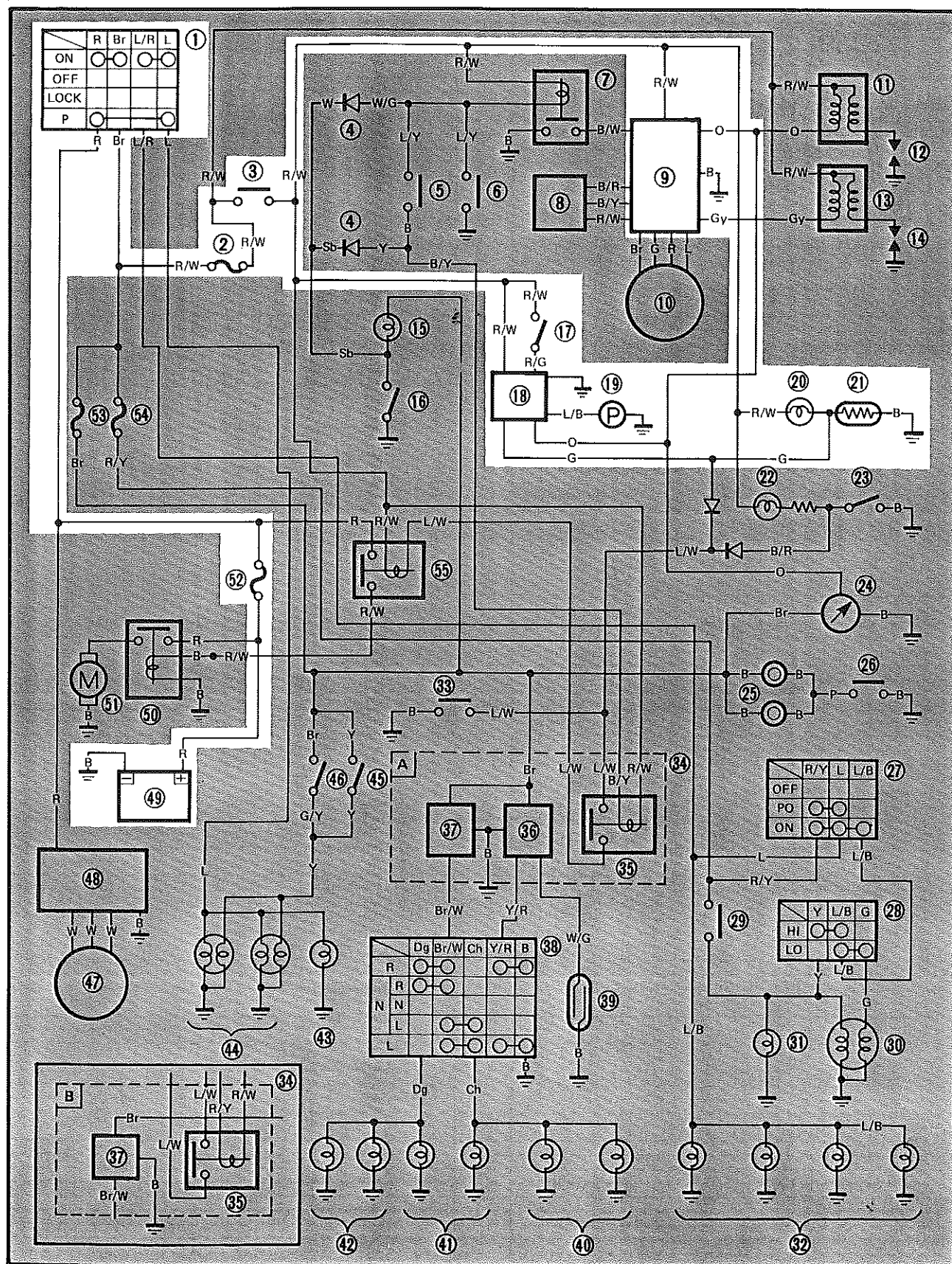
Switch position	Wire color	
	Y	Y
ON		
OFF		

[illegible]

FUEL PUMP SYSTEM

CIRCUIT DIAGRAM

(With sidestand relay)



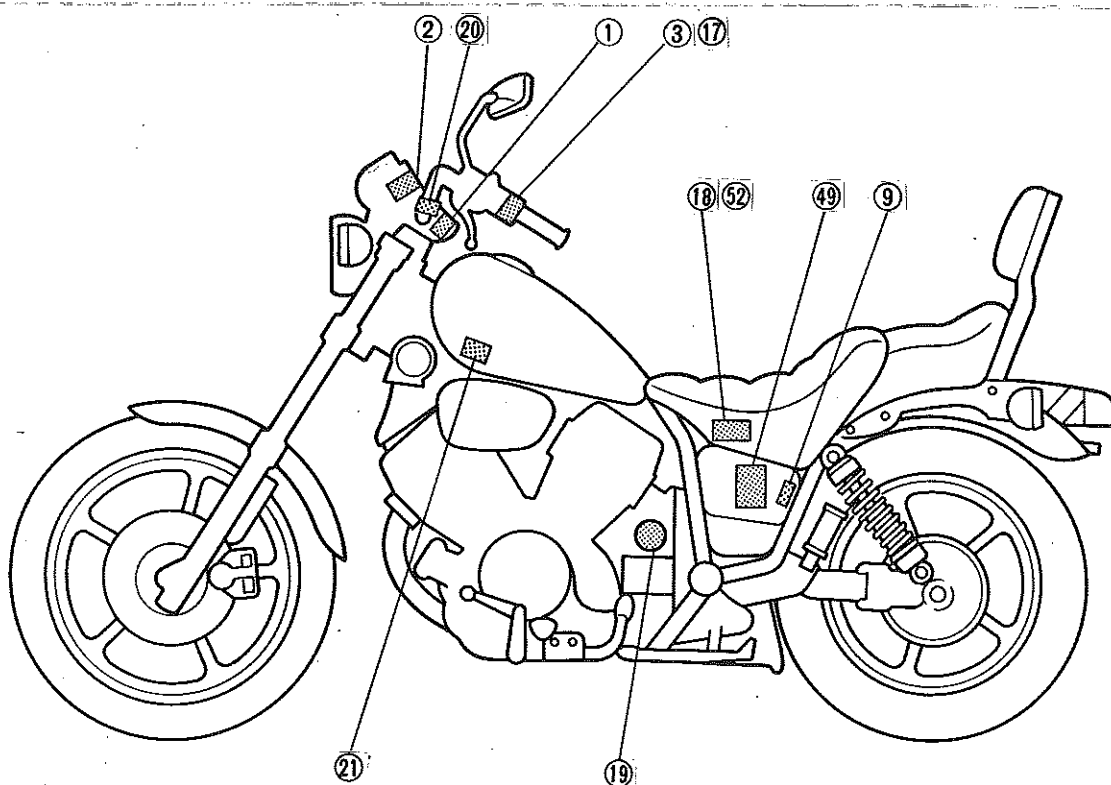


Aforementioned circuit diagram shows signal circuit in wiring diagram.

NOTE:

For the encircled numbers and color codes, see page 6-2.

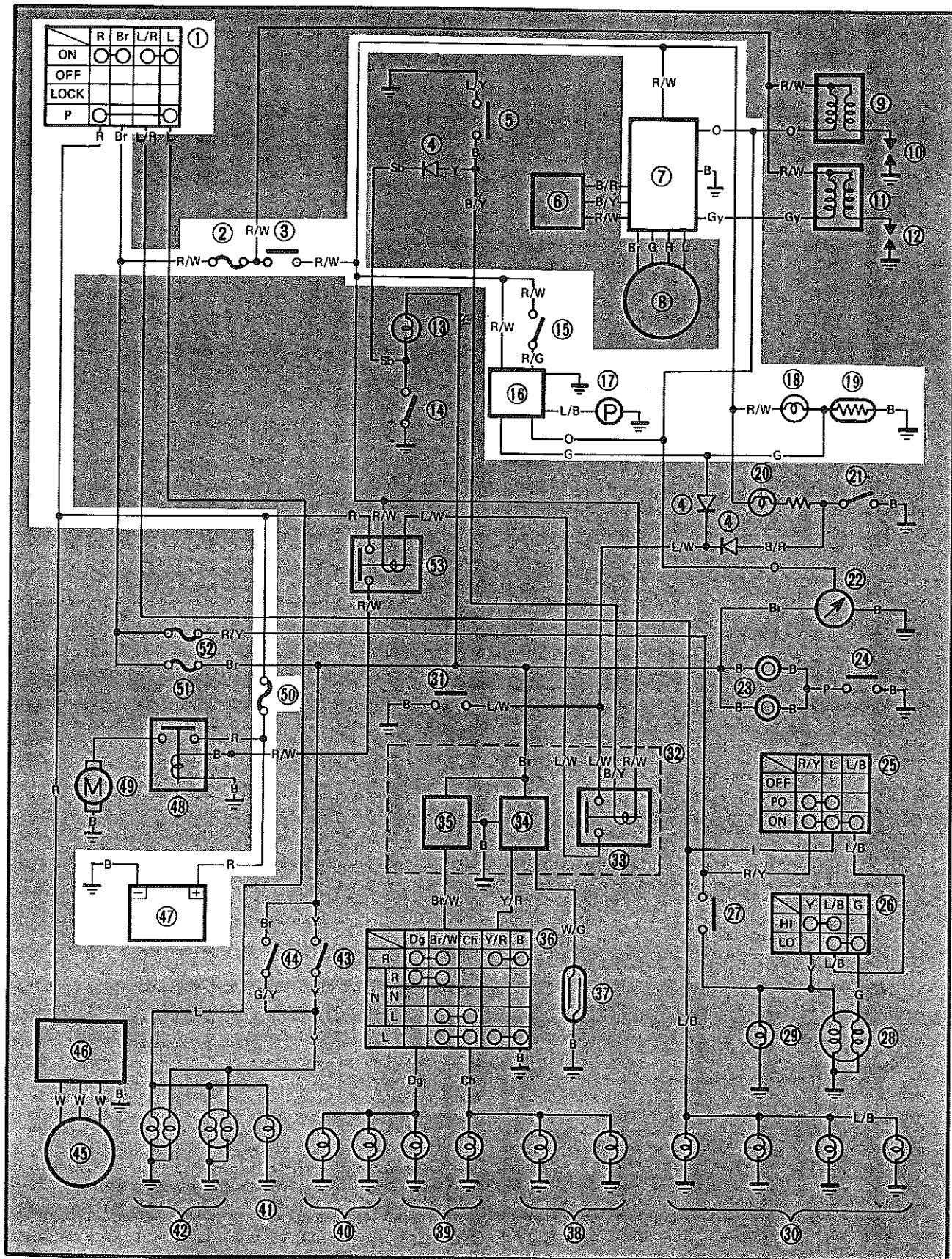
- ① Main switch
- ② Fuse (IGNITION)
- ③ "ENGINE STOP" switch
- ⑨ Ignitor unit
- ⑰ "FUEL" (RESERVE) switch
- ⑱ Fuel pump control unit
- ⑲ Fuel pump
- ⑳ "FUEL" warning indicator light
- ㉑ Fuel sender
- ㉔ Battery
- ㉖ Fuse (MAIN)



FUEL PUMP SYSTEM

CIRCUIT DIAGRAM

(Without sidestand relay)



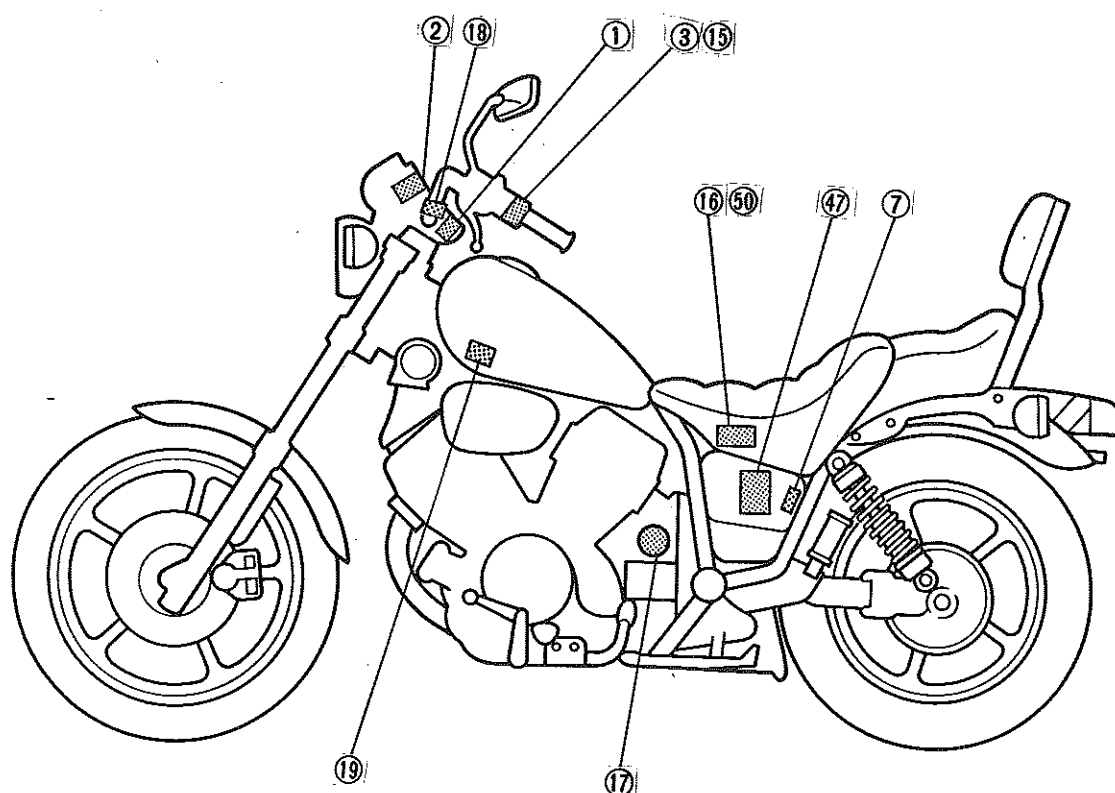


Aforementioned circuit diagram shows signal circuit in wiring diagram.

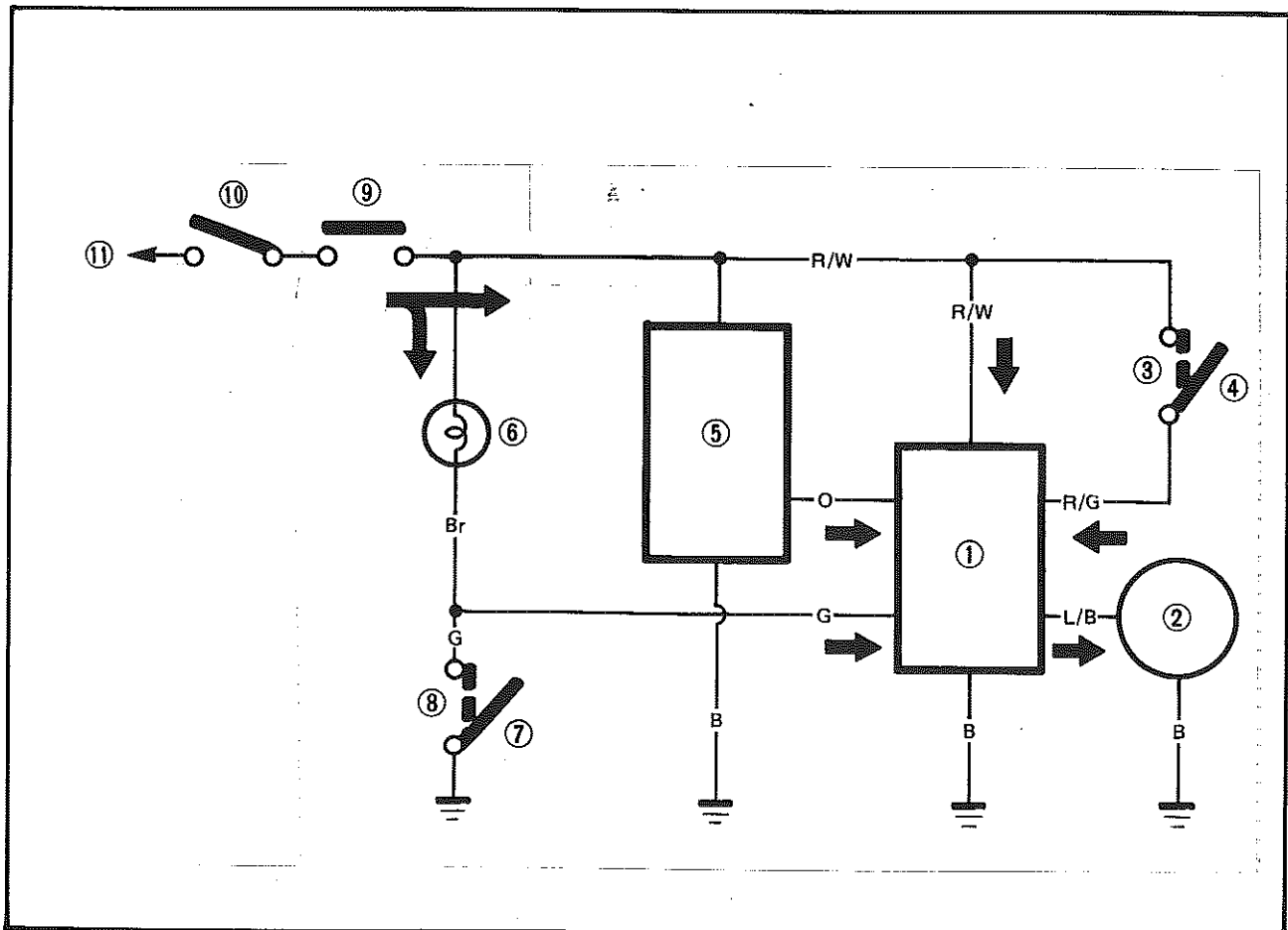
NOTE:

For the encircled numbers and color codes, see page 6-4.

- ① Main switch
- ② Fuse (IGNITION)
- ③ "ENGINE STOP" switch
- ⑦ Ignitor unit
- ⑮ "FUEL" (RESERVE) switch
- ⑯ Fuel pump control unit
- ⑰ Fuel pump
- ⑱ "FUEL" warning indicator light
- ⑲ Fuel sender
- ④⑦ Battery
- ⑤⑩ Fuse (MAIN)



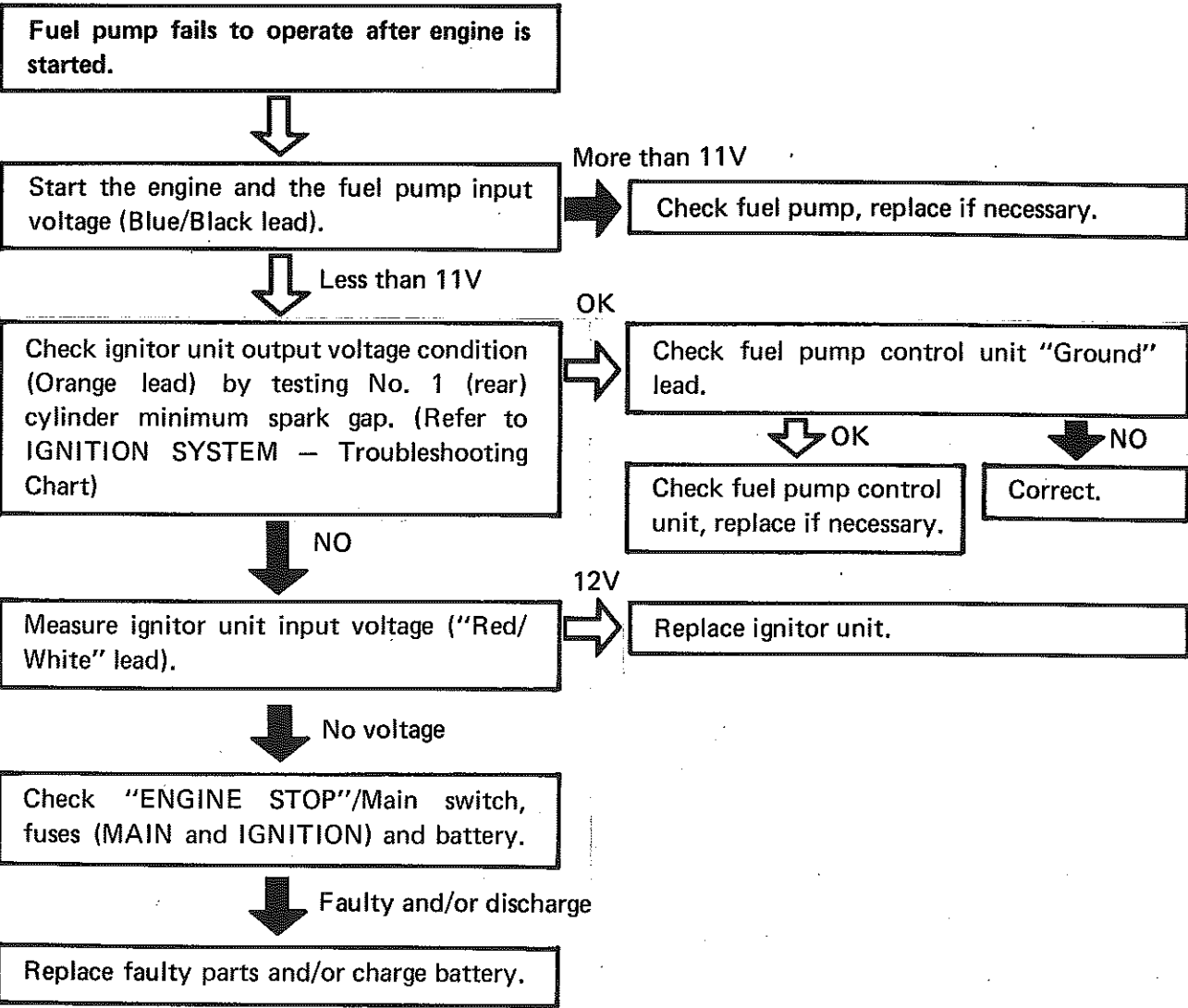
- ① Fuel pump control unit
- ② Fuel pump
- ③ "FUEL" (RESERVE) switch in "RES" position
- ④ "FUEL" (RESERVE) switch in "ON" position
- ⑤ Ignitor unit
- ⑥ Fuel warning indicator light
- ⑦ Fuel sender in "FULL" position
- ⑧ Fuel sender in "EMPTY" position
- ⑨ Engine stop switch
- ⑩ Main switch
- ⑪ To main fuse and battery



FUEL PUMP			
START		STOP	
<ul style="list-style-type: none"> • Main/Engine stop switch turned to "ON" • Fuel reserve switch turned to "RES" 	<ul style="list-style-type: none"> • Engine turned on 	<ul style="list-style-type: none"> • Fuel warning indicator light comes on 	<ul style="list-style-type: none"> • Engine turned off
For about 5 seconds when carburetor fuel level is low	After about 0.1 second	After about 30 seconds	After about 5 seconds

TROUBLESHOOTING

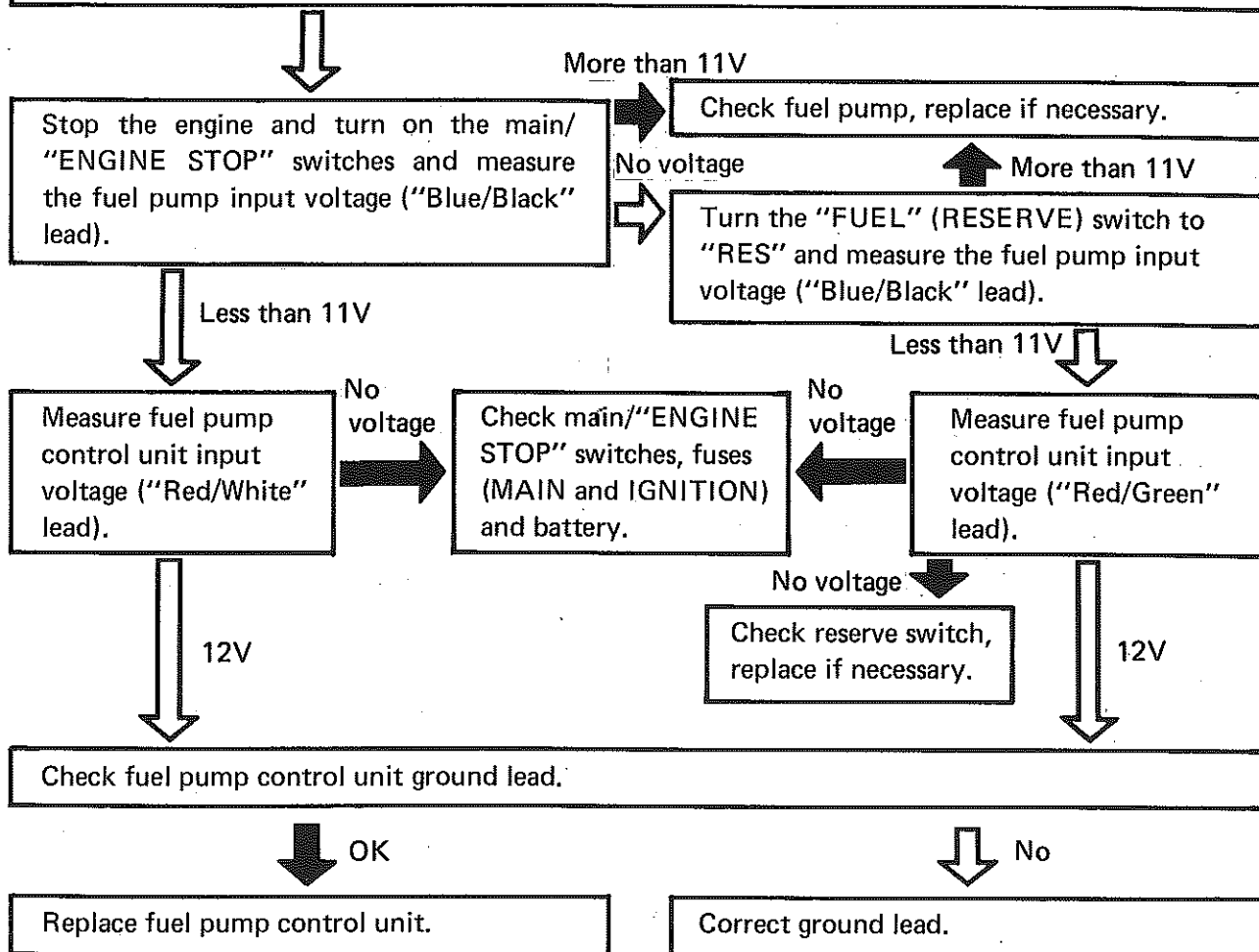
Troubleshooting Chart (1)



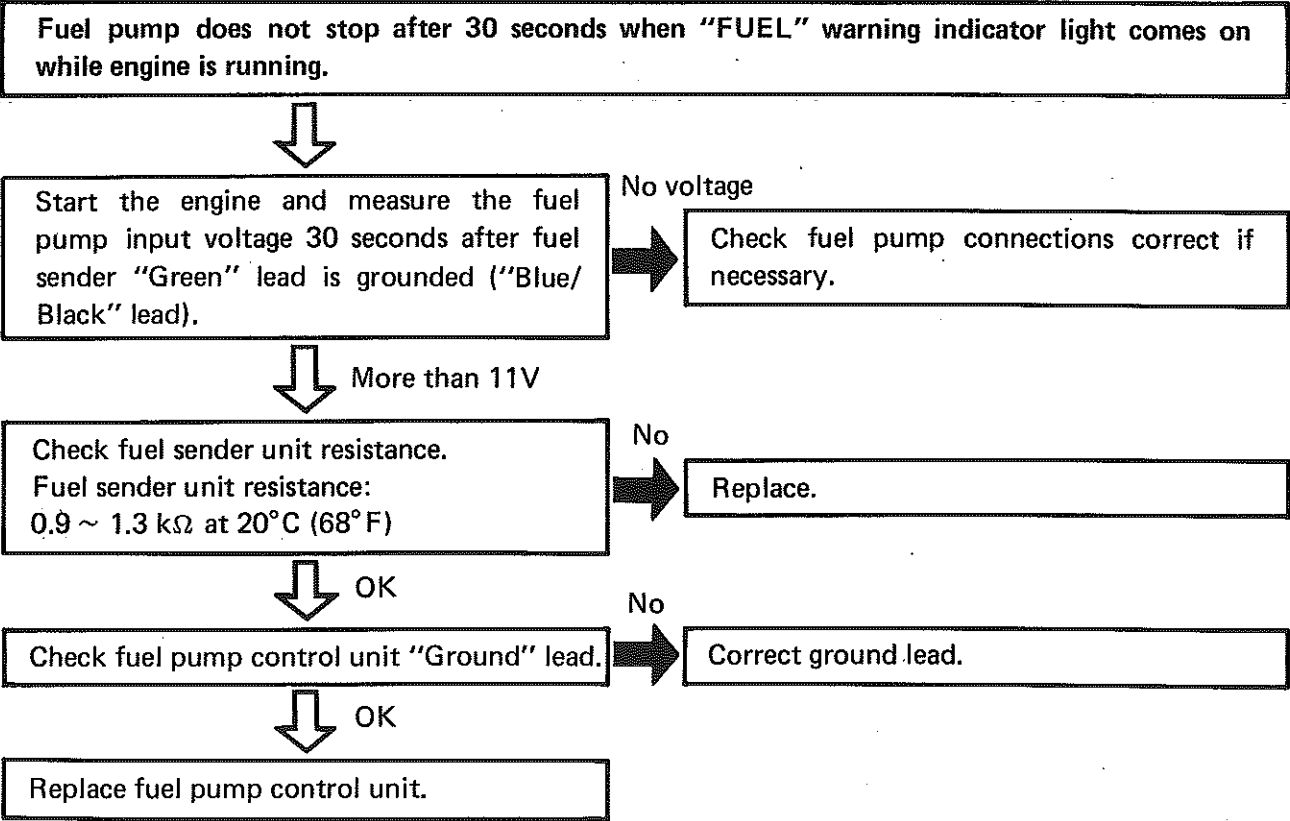


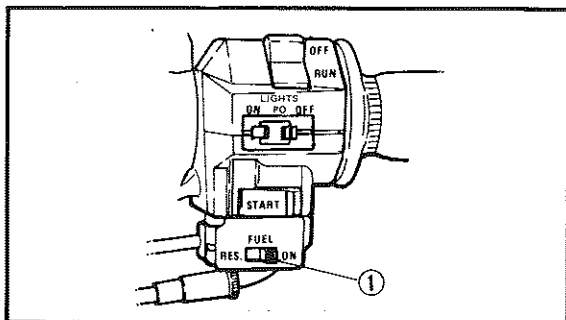
Troubleshooting chart (2)

Fuel pump fails to operate for a 5 second interval when carburetor fuel level is low with the main/ "ENGINE STOP" switches turned to "ON" and "FUEL" (RESERVE) switch turned to "RES".



Troubleshooting Chart (3)





"FUEL" (RESERVE) SWITCH TEST

Switch may be checked for continuity with a Pocket Tester (90890-03112) on the "Ohm x 1" position

Switch Position	Lead Color	
	R/W	R/G
OFF		
ON	○	○

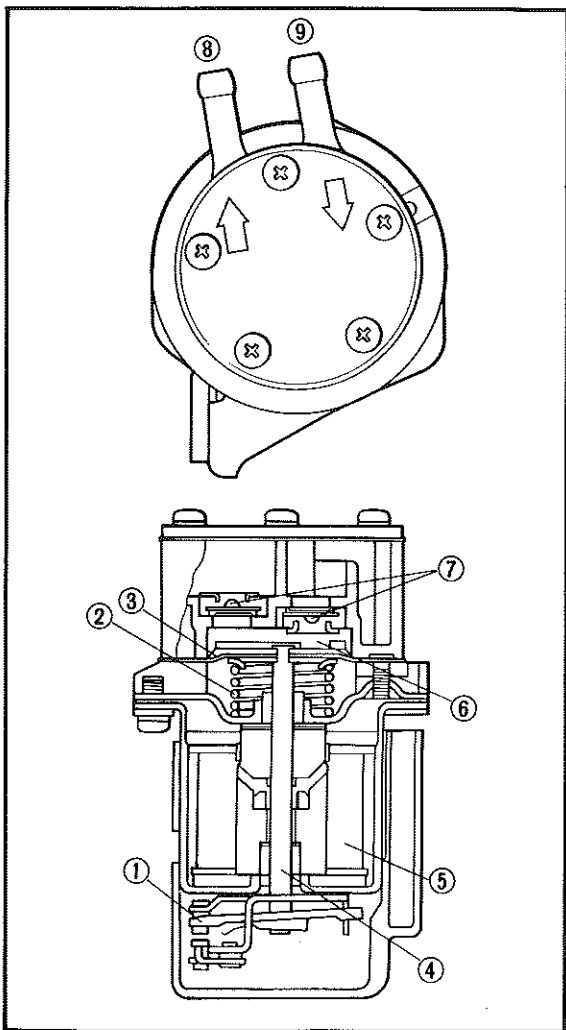
① "FUEL" (RESERVE) switch

FUEL PUMP TEST

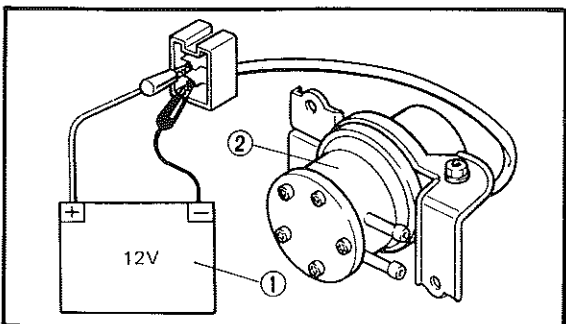
Operation

The diaphragm is pulled down 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.



- ① Cut-out switch
- ② Spring
- ③ Diaphragm
- ④ Plunger
- ⑤ Solenoid coil
- ⑥ Fuel chamber
- ⑦ Valve
- ⑧ Outlet
- ⑨ Inlet



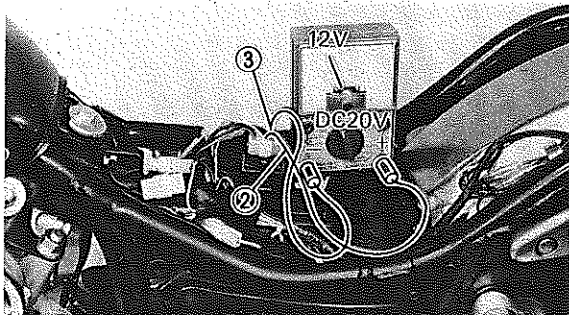
Inspection

1. Connect:
 - Battery (12V) ①
2. Check:
 - Fuel pump ② operation
 - Faulty operation → Replace.
3. Inspect:
 - Fuel pump
 - Cracks/Damage → Replace.



FUEL PUMP CONTROL UNIT TEST

1. Check:
 - Fuel pump operation
Refer to "FUEL PUMP TEST" section.
2. Remove:
 - Seat



3. Measure:
 - Out put voltage (Fuel pump control unit)
Use the Pocket Tester (90890-03112) ①
Out of specification → Replace control unit.

NOTE:

When measuring the output voltage be sure the main and "ENGINE STOP" switches are turned to "ON".

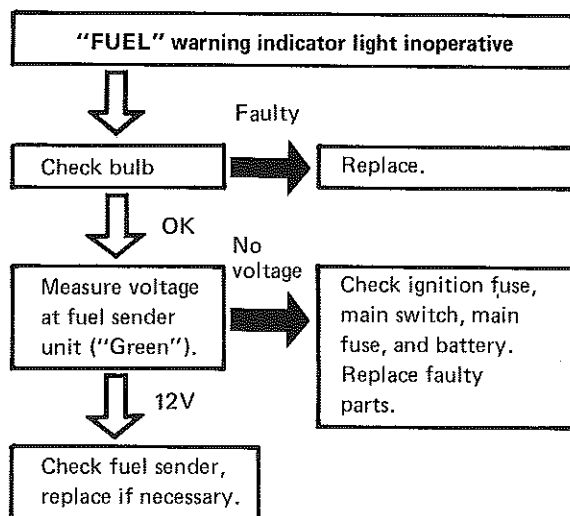


Fuel Pump Control Unit Out Put
Voltage:
12V

- ② Red/White
- ③ Black

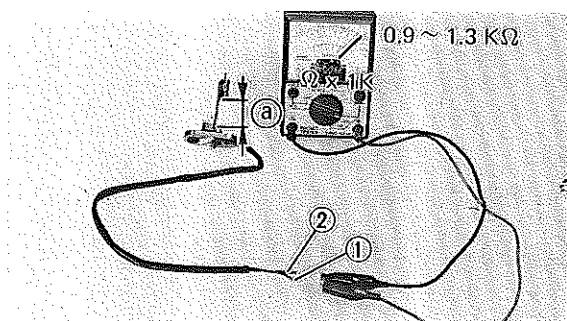
"FUEL" WARNING INDICATOR LIGHT

1. Troubleshooting



**FUEL SENDER UNIT TEST**

1. Remove:
 - Seat
 - Fuel tank
Drain the fuel.
 - Fuel sender
2. Measure:
 - Fuel sender unit resistance.
Use the Pocket Tester (90890-03112).
Out of specification → Replace.



Fuel Sender Resistance:
0.9 ~ 1.3 kΩ at 20°C (68°F)
When the Measuring Height (a) :
22 mm (0.86 in)

- ① Green
② Black

3. Install:
 - Components in above list (Step 1).

**CHAPTER 7.
APPENDICES**

SPECIFICATIONS K-12
 GENERAL SPECIFICATIONS K-12
 MAINTENANCE SPECIFICATIONS K-13

GENERAL TORQUE SPECIFICATIONS L-5

DEFINITION OF UNITS L-5

LUBRICATION DIAGRAMS L-5

CABLE ROUTING L-7

FUEL PIPE ROUTING L-9

XV1000 WIRING DIAGRAM
 (For model with sidestand switch) L-11

XV1000 WIRING DIAGRAM
 (For model without sidestand switch) L-12



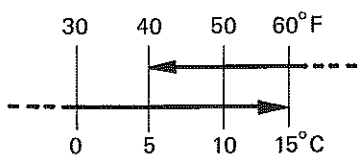


APPENDICES

SPECIFICATIONS

(F): For France (D): For Denmark (N): For Norway
(E): For England (G): For Germany (I): For Italy
(Ar): For Austria (H): For Holland (Sw): For Sweden
(B): For Belgium (S): For Switzerland

GENERAL SPECIFICATIONS

Model	XV1000	
Model Code Number	2AE (Except for Switzerland)	2AM (For Switzerland)
Engine Starting Number	2AE-000101	2AM-000101
Vehicle Identification Number	2AE-000101	2AM-000101
Dimensions:		
Overall Length	2,235 mm (88.0 in)	
Overall Width	2,250 mm (88.6 in) (G, Sw, S, Ar, D, N)	
Overall Height	840 mm (33.1 in)	
Seat Height	1,170 mm (46.1 in)	
Wheelbase	715 mm (28.1 in)	
Minimum Ground Clearance	1,525 mm (60.0 in)	
	145 mm (5.7 in)	
Basic Weight:		
Weight Oil and Full Fuel Tank	235 kg (518 lb)	
Minimum Turning Radius:	2,740 mm (107.9 in)	
Engine:		
Engine Type	Air cooled 4-stroke gasoline, SOHC	
Cylinder Arrangement	V-2 cylinder	
Displacement	981 cm ³	
Bore x Stroke	95.0 x 69.2 mm (3.740 x 2.724 in)	
Compression Ratio	8.3 : 1	
Compression Pressure	981 kPa (10 kg/cm ² , 142 psi)	
Starting System	Electric starter	
Lubrication System:	Wet sump	
Oil Type or Grade:		
Engine Oil		
Final Gear Oil	SAE 20W40 type SE motor oil (If temperature does not go below 5°C (40°F)) SAE 10W30 type SE motor oil (If temperature does not above 15°C (60°F)) SAE 80 API "GL-4" Hypoid gear oil	
Oil Capacity:		
Engine Oil:		
Periodic Oil Change	3.0 L (2.6 Imp qt, 3.2 US qt)	
With Oil Filter Replacement	3.1 L (2.7 Imp qt, 3.3 US qt)	
Total Amount	3.6 L (3.2 Imp qt, 3.8 US qt)	
Final Gear Case:		
Total Amount	0.2 L (0.18 Imp qt, 0.21 US qt)	
Air Filter:	Dry type element	
Fuel:		
Type	Regular gasoline	
Tank Capacity:		
Total	14.5 L (3.2 Imp gal, 3.8 US gal)	
Reserve	3.0 L (0.66 Imp gal, 0.79 US gal)	



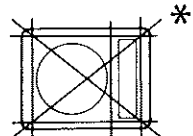

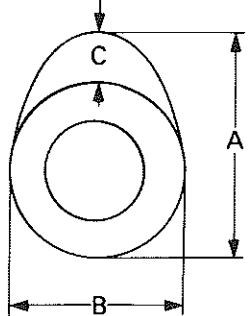
Model	XV1000	
Carburetor: Type/Manufacturer	HSC40 x 2/HITACHI	
Spark Plug: Type/Manufacturer Gap	BPR7ES/NGK, W22EPR-U/NIPPONDENSO 0.7 ~ 0.8 mm (0.028 ~ 0.031 in)	
Clutch Type:	Wet, multiple-disc	
Transmission: Primary Reduction System Primary Reduction Ratio Secondary Reduction System Secondary Reduction Ratio Transmission Type Operation Gear Ratio:	Spur gear 78/47 (1.659) Shaft drive 45/46 x 19/18 x 32/11 (3.003) Constant mesh, 5-speed Left foot operation 1st 40/17 (2.352) 2nd 40/24 (1.666) 3rd 36/28 (1.285) 4th 32/31 (1.032) 5th 29/34 (0.852)	
Chassis: Frame Type Caster Angle Trail	Pressed backbone 32° 129 mm (5.1 in)	
Tire: Type Size (F) Size (R) Wear Limit	Tubeless 100/90-19 57H 140/90-15 70H 1.0 mm (0.04 in)	
Tire Pressure (Cold Tire): Basic Weight: With Oil and Full Fuel Tank Maximum Load * Cold Tire Pressure: Up to 90 kg (198 lb) Load* 90 kg (198 lb) ~ 160 kg (353 lb) Load* 160 kg (353 lb) ~ Maximum Load* High Speed Riding	235 kg (518 lb) 245 kg (540 lb)	
	FRONT	REAR
	177 kPa (1.8 kg/cm ² , 26 psi)	196 kPa (2.0 kg/cm ² , 28 psi)
	196 kPa (2.0 kg/cm ² , 28 psi)	226 kPa (2.3 kg/cm ² , 33 psi)
	196 kPa (2.0 kg/cm ² , 28 psi)	275 kPa (2.8 kg/cm ² , 40 psi)
	226 kPa (2.3 kg/cm ² , 33 psi)	245 kPa (2.5 kg/cm ² , 36 psi)
	* Load is the total weight of cargo, rider, passenger, and accessories.	
Brake: Front Brake Type Operation Rear Brake Type Operation	Dual disc brake Right hand operation Drum brake Right foot operation	

Model	XV1000
Suspension: Front Suspension Rear Suspension	Telescopic fork Swingarm (Conventional)
Shock Absorber: Front Shock Absorber Rear Shock Absorber	Air/Coil spring, Oil damper Coil spring, Oil damper
Wheel Travel: Front Wheel Travel Rear Wheel Travel	150 mm (5.9 in) 97 mm (3.8 in)
Electrical: Ignition System Generator System Battery Type or Model Battery Capacity	T.C.I. A.C. magneto generator GM18Z-3A 12V, 20AH
Headlight Type:	Quartz bulb (Halogen)
Bulb Wattage x Quantity: Headlight Tail/Brake Light Flasher Light Auxiliary Light Indicator Light: "NEUTRAL" "HIGH BEAM" "TURN" "FUEL" "OIL" Meter Light	12V, 60W/55W x 1 12V, 5W/21W x 2 12V, 21W x 4 12V, 4W x 1 12V, 3.4W x 1 (E) 12V, 3W x 1 12V, 3W x 1 12V, 3W x 2 12V, 3W x 1 12V, 3W x 1 12V, 3W x 4



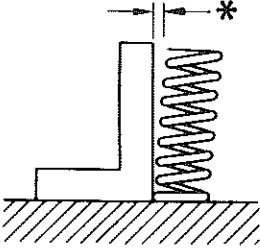
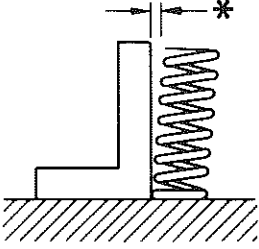
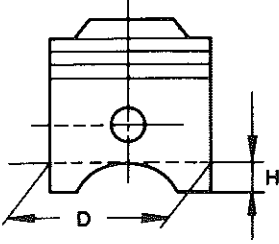
MAINTENANCE SPECIFICATIONS


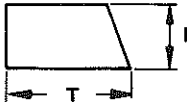
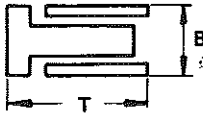
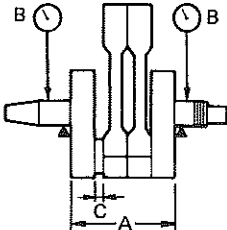
Engine

Model	XV1000	
Cylinder Head: Warp Limit * 	0.03 mm (0.0012 in) *Lines indicate straightedge measurement	
Cylinder: Bore Size/Measuring Point * 	95 mm (3.74 in)/40 mm (1.57 in) Taper Limit 0.05 mm (0.002 in) Out of Round Limit 0.05 mm (0.002 in)	
Camshaft: Drive Method Cam Cap Inside Diameter Camshaft Outside Diameter Shaft-to-cap Clearance Cam Dimensions: Intake: "A" < Limit > "B" < Limit > "C" Exhaust: "A" < Limit > "B" < Limit > "C" Camshaft Runout Limit Cam Chain Type/Number of Links Cam Chain Adjustment Method 	Chain drive (Left, Right) 25.000 ~ 25.021 mm (0.9843 ~ 0.9851 in) 24.967 ~ 24.980 mm (0.9830 ~ 0.9835 in) 0.020 ~ 0.061 mm (0.0008 ~ 0.0024 in) 39.17 mm (1.542 in) 39.02 mm (1.536 in) 32.17 mm (1.267 in) 32.02 mm (1.261 in) 7.17 mm (0.282 in) 39.20 mm (1.543 in) 39.05 mm (1.537 in) 32.27 mm (1.271 in) 32.12 mm (1.270 in) 7.20 mm (0.284 in) 0.03 mm (0.001 in) SILENT CHAIN/98L Automatic	
Rocker Arm/Rocker Arm Shaft: Bearing Inside Diameter < Limit > Shaft Outside Diameter < Limit > Arm-to-shaft Clearance < Limit >	14.000 ~ 14.018 mm (0.5512 ~ 0.5519 in) 14.050 mm (0.553 in) 13.985 ~ 13.991 mm (0.5506 ~ 0.5508 in) 13.950 mm (0.549 in) 0.009 ~ 0.033 mm (0.0004 ~ 0.0013 in) 0.1 mm (0.004 in)	
Valve, Valve Seat, Valve Guide: Valve Clearance (Cold): <div style="display: inline-block; vertical-align: middle; margin-left: 20px;"> IN. EX. </div>	0.07 ~ 0.12 mm (0.0028 ~ 0.0047 in) 0.12 ~ 0.17 mm (0.0047 ~ 0.0067 in)	



Model		XV1000
Valve Dimensions:		
"A" Head Diameter	IN.	47.0 ~ 47.2 mm (1.850 ~ 1.858 in)
	EX.	39.0 ~ 39.2 mm (1.535 ~ 1.543 in)
"B" Face Width	IN.	2.1 mm (0.083 in)
	EX.	2.1 mm (0.083 in)
"C" Seat Width	IN.	1.2 ~ 1.4 mm (0.047 ~ 0.055 in)
	EX.	1.2 ~ 1.4 mm (0.047 ~ 0.055 in)
< Limit >	IN.	2.0 mm (0.079 in)
	EX.	2.0 mm (0.079 in)
"D" Margin Thickness	IN.	1.1 ~ 1.5 mm (0.043 ~ 0.059 in)
	EX.	1.1 ~ 1.5 mm (0.043 ~ 0.059 in)
< Limit >	IN.	0.7 mm (0.028 in)
	EX.	0.7 mm (0.028 in)
Stem Outside Diameter	IN.	7.975 ~ 7.990 mm (0.314 ~ 0.315 in)
	EX.	7.960 ~ 7.975 mm (0.313 ~ 0.314 in)
< Limit >	IN.	7.94 mm (0.313 in)
	EX.	7.92 mm (0.312 in)
Guide Inside Diameter	IN.	8.000 ~ 8.012 mm (0.315 ~ 0.316 in)
	EX.	8.000 ~ 8.012 mm (0.315 ~ 0.316 in)
< Limit >	IN.	8.10 mm (0.319 in)
	EX.	8.10 mm (0.319 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.	0.10 mm (0.004 in)
	EX.	0.12 mm (0.005 in)
Stem Runout Limit		0.03 mm (0.0012 in)
Valve Seat Width	IN.	1.2 ~ 1.4 mm (0.047 ~ 0.055 in)
	EX.	1.2 ~ 1.4 mm (0.047 ~ 0.055 in)
< Limit >	IN.	2.0 mm (0.080 in)
	EX.	2.0 mm (0.080 in)
Valve Spring:		
Inner Spring:		
Free Length	IN.	45.3 mm (1.78 in)
	EX.	45.3 mm (1.78 in)
< Limit >	IN.	43.3 mm (1.71 in)
	EX.	43.3 mm (1.71 in)
Set Length (Valve Closed)	IN.	38.0 mm (1.50 in)
	EX.	38.0 mm (1.50 in)
Compressed Pressure (Installed)	IN.	12.2 kg (26.7 lb)
	EX.	12.2 kg (26.7 lb)

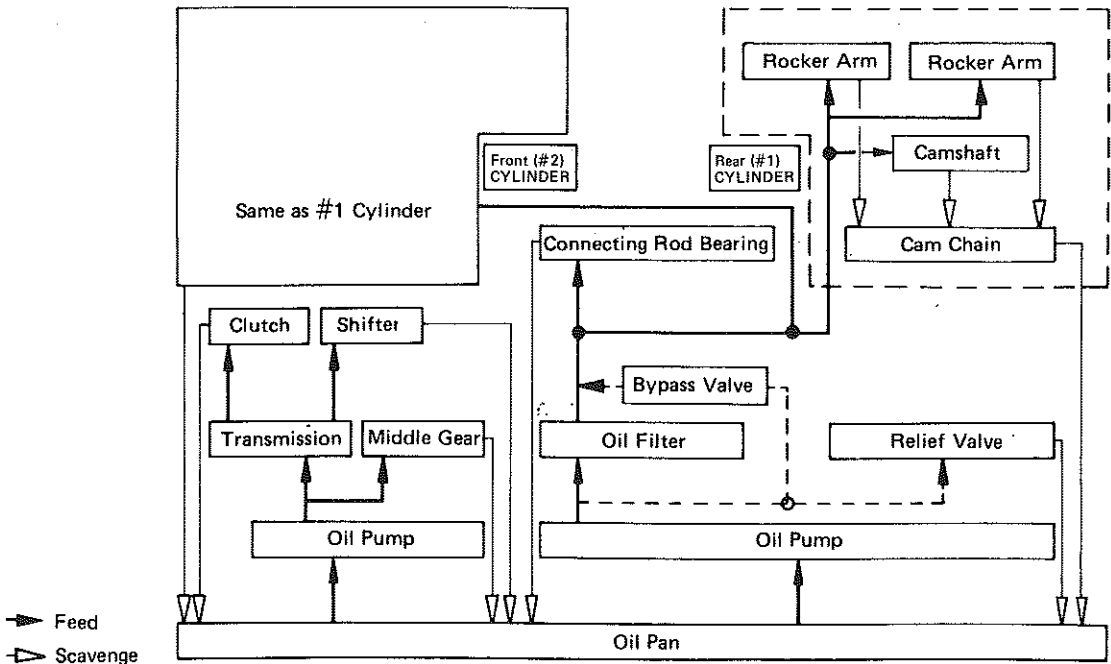
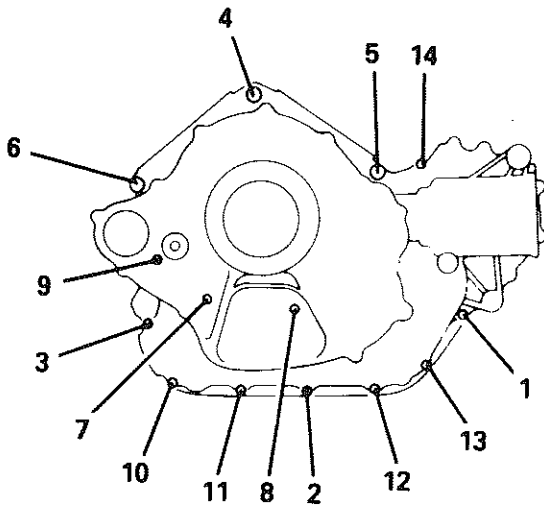
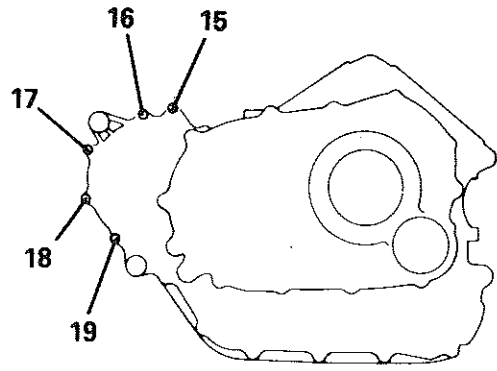
Model			XV1000
Tilt Limit * IN. EX.			2.5°/2.0 mm (0.079 in) 2.5°/2.0 mm (0.079 in)
			
Direction of Winding IN. EX.			Counterclockwise Counterclockwise
Outer Spring: Free Length IN. EX.			44.6 mm (1.76 in) 44.6 mm (1.76 in)
< Limit > IN. EX.			42.4 mm (1.70 in) 42.4 mm (1.70 in)
Set Length (Valve Closed) IN. EX.			40.0 mm (1.58 in) 40.0 mm (1.58 in)
Compressed Pressure (Installed) IN. EX.			16.4 kg (36.2 lb) 16.4 kg (36.2 lb)
Tilt Limit * IN. EX.			2.5°/2.0 mm (0.079 in) 2.5°/2.0 mm (0.079 in)
			
Direction of Winding IN. EX.			Clockwise Clockwise
Piston: Piston Clearance < Limit > Piston Size "D" Measuring Point "H"			0.045 ~ 0.060 mm (0.0018 ~ 0.0024 in) 0.12 mm (0.0048 in) 94.945 ~ 94.965 mm (3.738 ~ 3.739 in) 14.6 mm (0.575 in)
			
Piston Off-set Oversize: 2nd 4th			0 mm 95.50 mm (3.76 in) 96.00 mm (3.78 in)

Model	XV1000
Piston Ring: Top Ring: Type Dimensions (B x T) End Gap (Installed) < Limit > Side Clearance (Installed) < Limit > 2nd Ring: Type Dimensions (B x T) End Gap (Installed) < Limit > Side Clearance < Limit > Oil Ring: Dimensions (B x T) End Gap (Installed)	 Plain 1.5 x 3.8 mm (0.06 x 0.15 in) 0.3 ~ 0.5 mm (0.012 ~ 0.020 in) 0.8 mm (0.032 in) 0.04 ~ 0.08 mm (0.0016 ~ 0.0031 in) 0.12 mm (0.0047 in)  Taper 2.0 x 4.0 mm (0.08 x 0.16 in) 0.2 ~ 0.4 mm (0.008 ~ 0.016 in) 0.8 mm (0.032 in) 0.03 ~ 0.07 mm (0.0012 ~ 0.0028 in) 0.12 mm (0.0047 in)  4.0 x 3.9 mm (0.16 x 0.15 in) 0.3 ~ 0.9 mm (0.012 ~ 0.035 in)
Connecting Rod: Oil Clearance Bearing Color Code	0.030 ~ 0.054 mm (0.0012 ~ 0.0021 in) 1. Blue 2. Black 3. Brown 4. Green 5. Yellow
Crankshaft:  Crank Width "A" Runout Limit "B" Big End Side Clearance "C" Bearing Color Code Position of Thrust Bearing	101.95 ~ 102.00 mm (4.013 ~ 4.016 in) 0.02 mm (0.0008 in) 0.370 ~ 0.474 mm (0.0146 ~ 0.0187 in) 1. Blue 2. Black 3. Brown 4. Green 5. Yellow Left & Right
Clutch: Friction Plate: Thickness Quantity Wear Limit Clutch Plate: Thickness Quantity Warp Limit Clutch Spring: Free Height Quantity Minimum Height Clutch Housing Thrust Clearance Clutch Housing Radial Clearance Clutch Release Method Push Rod Bending Limit	2.9 ~ 3.1 mm (0.114 ~ 0.122 in) 8 pcs 2.8 mm (0.11 in) 1.5 ~ 1.7 mm (0.059 ~ 0.067 in) 7 pcs 0.1 mm (0.004 in) 41.2 mm (1.62 in) 6 pcs 40.2 mm (1.58 in) 0.05 ~ 0.40 mm (0.002 ~ 0.016 in) 0.010 ~ 0.044 mm (0.0004 ~ 0.0017 in) Inner Push, Screw Push 0.5 mm (0.02 in)



Model	XV1000
Transmission: Main Axle Deflection Limit Drive Axle Deflection Limit	0.08 mm (0.003 in) 0.08 mm (0.003 in)
Shifter: Shifter Type	Guide Bar
Carburetor: I.D. Mark Main Jet (M.J.) Main Air Jet (M.A.J.) Jet Needle (J.N.) Needle Jet (N.J.) Pilot Jet (P.J.) Pilot Air Jet (P.A.J.) Pilot Screw (P.S.) Throttle valve (Th.V.) Valve Seat Size (V.S.) Starter Jet (G.S.) Float Height (F.H.) Fuel Level (F.L.) Engine Idling Speed Vacuum Pressure at Idling Speed Vacuum Synchronous Difference	42J-00 #1 : #124 #2 : #132 #50 #1 : Y-34 #2 : Y-33 #92 (φ3.2) #40 #190 1-1/2 ± 1/2 turns out 12.5° φ1.4 #40 15 ~ 16 mm (0.59 ~ 0.63 in) -1.0 ~ 1.0 mm (-0.04 ~ 0.04 in) 950 ~ 1,050 r/min 22.7 ~ 25.3 kPa (170 ~ 190 mmHg, 6.7 ~ 7.5 inHg) Below 1.33 kPa (10 mmHg, 0.4 inHg)
Lubrication System: Oil Filter Type Oil Pump Type Tip Clearance < Limit > Side Clearance < Limit > Bypass Valve Setting Pressure Relief Valve Operating Pressure	Paper type Trochoid type 0.03 ~ 0.09 mm (0.001 ~ 0.004 in) 0.13 mm (0.005 in) 0.03 ~ 0.08 mm (0.001 ~ 0.003 in) 0.08 mm (0.003 in) 78 ~ 118 kPa (0.8 ~ 1.2 kg/cm ² , 11.4 ~ 17.1 psi) 441 ~ 539 kPa (4.5 ~ 5.5 kg/cm ² , 64.0 ~ 78.2 psi)



Model	XV1000
<p>Lubrication Chart:</p>  <p>➔ Feed - - - Scavenge</p>	
<p>Shaft Drive:</p> <p>Middle Gear Backlash < Limit ></p> <p>Final Gear Backlash < Limit ></p>	<p>0.1 ~ 0.2 mm (0.004 ~ 0.008 in) 0.3 mm (0.012 in) 0.1 ~ 0.2 mm (0.004 ~ 0.008 in) 0.3 mm (0.012 in)</p>
<p>Crankcase Tightening Sequence:</p> <p>Left crankcase</p> 	<p>Right crankcase</p> 



Tightening Torque

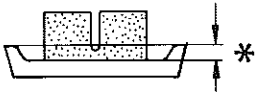
Part to be tightened	Part name	Thread size	Q'ty	Tightening torque			Remarks
				Nm	m·kg	ft·lb	
ENGINE:							
Cylinder Nut	Nut	M12 x P1.25	8	50	5.0	36	Apply oil
Cylinder Head Nut	Nut	M10 x P1.25	2	35	3.5	25	
Cylinder Head Bolt	Bolt	M8 x P1.25	4	20	2.0	14	
Spark Plug	—	—	2	20	2.0	14	
Cam Sprocket Cover	Bolt	M6 x P1.0	4	10	1.0	7.2	
Cam Sprocket	Bolt	M10 x P1.25	2	55	5.5	40	
Camshaft Bushing	Bolt	M8 x P1.25	2	20	2.0	14	
Rocker Arm Cover	Bolt	M6 x P1.0	8	10	1.0	7.2	
Rocker Arm Shaft	Union bolt	M16 x P1.5	2	38	3.8	27	
Rocker Armshaft/ Oil Delivery Pipe	Union bolt	M16 x P1.5	2	20	2.0	14	
Oil Delivery Pipe	Union bolt	M10 x P1.25	1	20	2.0	14	
Valve Adjuster Lock Nut	Nut	M8 x P1.25	4	27	2.7	19	
Cam Chain Tensioner	Bolt	M6 x P1.0	4	10	1.0	7.2	
Cylinder	Bolt	M6 x P1.0	6	10	1.0	7.2	
Cam Chain Guide (Rear)	Bolt	M8 x P1.25	2	8	0.8	5.8	
Cam Chain Guide (Rear)	Nut	M8 x P1.25	2	12	1.2	8.7	
Starter Motor	Flange bolt	M6 x P1.0	2	10	1.0	7.2	
Timing Gear Shaft	Bolt	M6 x P1.0	2	10	1.0	7.2	
Stopper Plate	Nut	M16 x P1.5	1	175	17.5	125	
A.C. Generator Rotor	Nut	M20 x P1.5	1	110	11.0	80	Use lock washer
Primary Drive Gear	Nut	M20 x P1.5	1	70	7.0	50	
Clutch Boss	Bolt	M32 x P1.5	1	12	1.2	8.7	Use lock washer
Crankshaft End Cover	Bolt	M6 x P1.5	3	10	1.0	7.2	
Oil Pump Cover	Bolt	M6 x P1.0	1	12	1.2	8.7	
Oil Pump Sprocket	Bolt	M6 x P1.0	3	10	1.0	7.2	
Oil Pump	—	M10 x P1.25	1	20	2.0	14	
Neutral switch	Flat head screw	M6 x P1.0	2	7	0.7	5.1	
Shift Fork Guide Bar Stopper	Bolt	M10 x P1.25	2	39	3.9	28	Use LOCTITE®
Crankcase	Bolt	M6 x P1.0	16	10	1.0	7.2	
Crankcase	Nut	M88 x P1.5	1	110	11.0	80	Apply oil
Middle Drive Bearing Reatiner	Nut	M44 x P1.5	1	110	11.0	80	
Middle Drive Shaft Nut	Nut	M9 x P1.25	4	48	4.8	35	Stake
Connecting Rod	Bolt	M14 x P1.5	1	43	4.3	31	
Drain Plug	Flange bolt	M8 x P1.25	3	25	2.5	18	Stake
Middle Driven Gear	Nut	M8 x P1.25	1	12	1.2	8.7	
Bearing Housing	Nut	M8 x P1.25	4	20	2.0	14	Apply molybde- num disulfide grease
Clutch Push Screw Lock Nut	Bolt	M8 x P1.25	2	20	2.0	14	
Exhaust Pipe	Bolt	M6 x P1.0	4	10	1.0	7.2	
Exhaust Pipe Joint (Band)	Bolt	M6 x P1.0	1	10	1.0	7.2	
Carburetor Joint	Bolt	M6 x P1.0	2	10	1.0	7.2	
Change Pedal	Bolt	M6 x P1.0	2	10	1.0	7.2	
Oil Level Switch	Bolt	M6 x P1.0	2	10	1.0	7.2	



Part to be tightened	Part name	Thread size	Q'ty	Tightening torque			Remarks
				Nm	m·kg	ft·lb	
Generator Cover	Screw	M6 x P1.0	3	7	0.7	5.1	Left-thread screw
Clutch Pressure Plate	Flange bolt	M6 x P1.0	6	8	0.8	5.8	
Change Pedal	Bolt	M6 x P1.0	1	10	1.0	7.2	
Exhaust Pipe	Bolt	M8 x P1.0	2	12	1.2	8.7	
Change Pedal Adjuster	Nut	M6 x P1.0	1	10	1.0	7.2	
Change Pedal Adjuster	Nut	M6 x P1.0	1	10	1.0	7.2	
Cylinder	Stud bolt	M10 x P1.25	2	20	2.0	14	
Cylinder	Stud bolt	M12 x P1.25	4	24	2.4	17	
Left Cover	Screw	M5 x P0.8	1	2	0.2	1.4	
Air Cleaner Case	Bolt	M6 x P1.0	2	10	1.0	7.2	
Left Cover	Screw	M6 x P1.0	2	7	0.7	5.1	
Muffler Bracket	Stud bolt	M10 x P1.25	2	20	2.0	14	
Sidestand	Stud bolt	M10 x P1.25	1	20	2.0	14	
Footrest	Stud bolt	M10 x P1.25	1	20	2.0	14	
Solenoid	Nut	M6 x P1.0	2	8	0.8	5.8	Use LOCTITE®
Solenoid Lever Cover	Bolt	M6 x P1.0	3	10	1.0	7.2	Use LOCTITE®
Collar	Screw	M6 x P1.0	1	10	1.0	7.2	
Drive Lever	Screw	M8 x P1.0	1	10	1.0	7.2	
Solenoid Cover	Screw	M6 x P1.0	2	7	0.7	5.1	



Chassis

Model	XV1000
Steering System: Steering Bearing Type	Taper Roller Bearing
Front Suspension: Front Fork Travel Fork Spring Free Length Spring Rate: K1 Stroke: K1 Optional Spring Oil Capacity Oil Level Oil Grade Enclosed Gas/Air Pressure (Standard) < Min. ~ Max. >	150 mm (5.91 in) 513 mm (20.2 in) 6.28 N/mm (0.64 kg/mm, 35.8 lb/in) 0 ~ 150 mm (0 ~ 5.91 in) No. 396 cm ³ (14.0 Imp oz, 13.4 US oz) 179 mm (7.05 in) Yamaha fork oil 10W or equivalent 39.2 kPa (0.4 kg/cm ² , 5.7 psi) 39.2 ~ 117.7 kPa (0.4 ~ 1.2 kg/cm ² , 5.7 ~ 17.1 psi)
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) 224.5 mm (8.84 in) 219.5 mm (8.64 in) 190 mm (7.48 in) 43.2 N/mm (4.4 kg/mm, 246 lb/in) 62.8 N/mm (6.4 kg/mm, 358 lb/in) 0 ~ 45 mm (0 ~ 1.77 in) 45 ~ 70 mm (1.77 ~ 2.76 in) No.
Rear Arm: Swingarm Free Play Limit: End Side	1.0 mm (0.04 in) 1.0 mm (0.04 in)
Front Wheel: Type Rim Size Rim Material Rim Runout Limit: Radial Lateral	Cast Wheel MT2.15 x 19 Aluminum 2 mm (0.08 in) 2 mm (0.08 in)
Rear Wheel: Type Rim Size Rim Material Rim Runout Limit: Radial Lateral	Cast wheel MT3.00 x 15 Aluminum 2 mm (0.08 in) 2 mm (0.08 in)
Front Disc Brake: Type Disc Outside Diameter x Thickness Pad Thickness Inner < Limit > * Pad Thickness Outer < Limit > *  Master Cylinder Inside Diameter Caliper Cylinder Inside Diameter Brake Fluid Type	Dual 267 x 5.0 mm (10.5 x 0.20 in) 5.5 mm (0.22 in) 0.5 mm (0.02 in) 5.5 mm (0.22 in) 0.5 mm (0.02 in) 15.87 mm (0.62 in) 38.18 mm (1.50 in) DOT #3



Model	XV1000
Rear Drum Brake:	
Type	Leading Trailing
Brake Drum Inside Diameter	200 mm (7.87 in)
< Limit >	201 mm (7.91 in)
Lining Thickness	4.0 mm (0.16 in)
< Limit >	2.0 mm (0.08 in)
Shoe Spring Free Length	68 mm (2.68 in)
Brake Lever and Brake Pedal:	
Brake Lever Free Play	5 ~ 8 mm (0.2 ~ 0.3 in)
Brake Pedal Position	20 mm (0.8 in) Upper from footrest top end
Brake Pedal Free Play	20 ~ 30 mm (0.8 ~ 1.2 in)
Clutch Lever Free Play	2 ~ 3 mm (0.08 ~ 0.12 in)



Tightening Torque

Part to be tightened	Part name	Thread size	Q'ty	Tightening torque			Remarks
				Nm	m·kg	ft·lb	
CHASSIS:							
Engine Cylinder & Engine Stay (Front)	Nut	M12 x P1.25	4	55	5.5	40	Use lock washer
Engine Stay (Front) & Frame	Bolt/Nut	M10 x P1.25	2/2	55	5.5	40	
Engine Stay (Rear) & Frame	Bolt	M10 x P1.25	2	55	5.5	40	
Engine Rear Mounting (Upper)	Bolt	M10 x P1.25	2	55	5.5	40	
Engine Rear Mounting (Under)	Bolt/Nut	M10 x P1.25	1/2	55	5.5	40	
Steering Crown & Steering Stem	Nut	M22 x P1.0	1	110	11.0	80	
Steering Crown & Inner Tube	Bolt/Nut	M8 x P1.25	2/2	20	2.0	14	
Steering Crown & Handlebar Lower Holder	Nut	M8 x P1.25	2	20	2.0	14	
Under Bracket & Front Forks	Bolt	M8 x P1.25	4	23	2.3	17	
Front Wheel Axle	Bolt	M14 x P1.5	1	105	10.5	75	
Front Wheel Axle & Front Forks	Bolt/Nut	M8 x P1.25	1/1	20	2.0	14	
Rear Arm Pivot Shaft (Left)	Bolt	M22 x P1.5	1	100	10.0	72	
Rear Arm Pivot Shaft (Right)	Bolt	M22 x P1.5	1	5.5	0.55	4.0	
Rear Arm Pivot Shaft (Right)	Nut	M22 x P1.5	1	100	10.0	72	
Rear Wheel Axle	Nut	M14 x P1.5	1	105	10.5	75	
Rear Shock Absorber (Frame)	Bolt	M8 x P1.25	2	20	2.0	14	
Rear Shock Absorber (Rear arm)	Bolt	M10 x P1.25	1	30	3.0	22	
Rear Shock Absorber & Housing Gear	Nut	M10 x P1.25	1	30	3.0	22	
Rear Arm & Housing Gear	Nut	M10 x P1.25	4	42	4.2	30	
Foot Peg (Front)	Bolt/Nut	M10 x P1.25	1/1	55	5.5	40	
Foot Peg (Rear)	Nut	M10 x P1.25	2	55	5.5	40	
Footrest & Footrest Bracket (L/R)	Bolt	M10 x P1.25	4	45	4.5	32	
Tension Bar & Brake Plate	Bolt/Nut	M8 x P1.25	1/1	20	2.0	14	
Tension Bar & Rear Arm	Bolt/Nut	M8 x P1.25	1/1	20	2.0	14	
Rear Brake Camshaft Lever & Brake Camshaft	Bolt	M6 x P1.0	1	9	0.9	6.5	
Brake Disc & Hub	Bolt	M8 x P1.25	6	20	2.0	14	
Caliper Cylinder & Brake Hose	Union bolt	M10 x P1.25	1	26	2.6	19	
Caliper Cylinder & Front Fork	Bolt	M10 x P1.25	4	35	3.5	25	
Caliper Cylinder Bleed Screw	—	M8 x P1.25	1	6	0.6	4.3	
Front Fender	Bolt	M6 x P1.00	4	9	0.9	6.5	
Rear Arm & Housing Gear	Nut	M10 x P1.25	4	43	4.3	31	
Sidestand Bracket & Engine Housing Gear & Gear Oil Drain Plug	Nut	M10 x P1.25	1	55	5.5	40	
Front Fender & Fork Brace	Bolt	M14 x P1.5	1	23	2.3	17	
Headlight Stay & Under Bracket		M6 x P1.00		9	0.9	6.5	
		M6 x P1.00		9	0.9	6.5	

Part to be tightened	Part name	Thread size	Q'ty	Tightening torque			Remarks
				Nm	m·kg	ft·lb	
Headlight Stay & Headlight		M8 x P1.25		20	2.0	14	
Master Cylinder Cap		M5 x P0.8		2	0.2	1.4	
Master Cylinder & Bracket		M6 x P1.00		9	0.9	6.5	
Muffler Bracket & Frame		M8 x P1.25		23	2.3	17	
Wheel Hub & Clutch Hub		M10 x P1.25		69	6.9	50	
Rear Fender (Front) & Frame		M8 x P1.25		30	3.0	22	
Rear Fender (Rear) & Frame		M10 x P1.25		23	2.3	17	
Handle & Handle Holder Upper		M8 x P1.25		20	2.0	14	
Clutch Hub & Damper		M10 x P1.25		62	6.2	45	
Steering Stem & Ring Nut	Nut	M25 x P1.0		6	0.6	4.4	
Rear Brake Camshaft Lever & Brake Camshaft	Bolt	M6 x P1.0	1	9	0.9	6.5	



Electrical

Model	XV1000
Voltage:	12V
Ignition System: Ignition Timing (B.T.D.C.) Advancer Timing (B.T.D.C.) Advaneer Type	10° at 1,000 r/min 41.9° at 4,500 r/min Vacuum and electrical
<p>Ignition Timing (B.T.D.C.)</p> <p>Engine speed (x 10³ r/min)</p> <p>41.2 ± 2.5° at 7,000 r/min</p> <p>37° at 3,000 ± 400 r/min</p> <p>31.5° at 2,400 ± 250 r/min</p> <p>37 ± 2.2° at 5,500 r/min</p> <p>31 ± 2.2° at 3,800 r/min</p> <p>26° at 3,250 ± 250 r/min</p> <p>P = 630 mmHgabs</p> <p>P = 730 mmHgabs</p> <p>13° at 1,600 ± 250 r/min</p> <p>13° at 2,400 ± 250 r/min</p> <p>10 ± 1.3° at 1,000 r/min</p>	
T.C.I.:	
Pickup Coil Resistance (Color)	124 ~ 186Ω at 20°C (68°F) (Brown – Green), (Red – Blue)
T.C.I. Unit-Model/Manufacturer	J4T071/MITSUBISHI
Ignition Coil:	
Model/Manufacturer	F6T507/MITSUBISHI
Primary Winding Resistance	3.57 ~ 4.83Ω at 20°C (68°F)
Secondary Winding Resistance	11.22 ~ 15.18 kΩ at 20°C (68°F)
Spark Plug Cap:	
Type	Resin
Resistance	5 kΩ
Charging System/Type:	A.C. magneto generator
A.C. Generator:	
Model/Manufacturer	F3T414-74/MITSUBISHI
Nominal Output	14V, 16A at 5,000 r/min
Stator Coil Resistance	0.45 ~ 0.55Ω at 20°C (68°F)
<p>Output current (A)</p> <p>Engine speed (x 10³ r/min)</p>	



Model	XV1000	
Voltage Regulator: Type Model/Manufacturer No Load Regulated Voltage	I.C. type, Short control SH569/SHINDENGEN 14.3 ~ 15.3V	
Rectifier: Model/Manufacturer Capacity Withstand Voltage	SH569/SHINDENGEN 25A 200V	
Battery: Capacity Specific Gravity	12V 20AH 1.280	
Electric Starter System: Type Starter Motor: Model/Manufacturer Output Armature Coil Resistance Field Coil Resistance Bush: Overall Length < Limit > Spring Pressure Commutator: Outside Diameter < Wear Limit > Mica Undercut Starter Switch: Model/Manufacturer Amperage Rating	Electromagnetic shift type SM224I-1/MITSUBA 0.6 kW 0.0054 ~ 0.0066Ω at 20°C (68°F) 0.0027 ~ 0.0033Ω at 20°C (68°F) 12.5 mm (0.492 in) 5.5 mm (0.217 in) 560 ~ 680 g (19.7 ~ 23.9 oz) 28 mm (1.10 in) 27 mm (1.06 in) 0.5 mm (0.02 in) 1NL/OMRON 15A	
Horn: Type/Quantity Model/Manufacturer Maximum Amperage	Plane type x 2 2AE-00, 2AE-10/ NIKKO 3A	Eddy type x 2 (G, Sw, E, Ar, D, N) 56F-20, 56F-30/ NIKKO 2A
Flasher Relay: Type Model/Manufacturer Self Cancelling Device Flasher Frequency Wattage	Semi transistor type FX257N/NIPPONDENSO Yes. No. (for Germany) 75 ~ 95 cycle/min 21W x 2 + 3.4W	
Self Cancelling Unit (Except for Germany): Model/Manufacturer	FX257N/NIPPONDENSO	
Oil Level Switch: Model/Manufacturer	4X7/NIPPONDENSO	
Starting Circuit Cut-off Relay: Model/Manufacturer Diode	FX257N/NIPPONDENSO No.	
Sidestand Relay (E, G, Sw, S, Ar, D, N): Model/Manufacturer Coil Winding Resistance Diode	4U8/OMRON 90 ~ 110Ω No.	

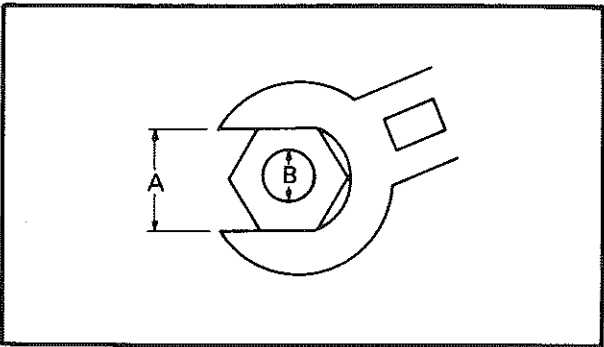


Model	XV1000
Circuit Breaker:	
Type	Fuse
Amperage for Individual Circuit x Quantity:	
MAIN	30A x 1
HEAD	15A x 1
TAIL	10A x 1
SIGNAL	15A x 1
IGNITION	10A x 1
RESERVE	30A x 1
	15A x 1
	10A x 1

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 multi-fastener assemblies in a crisscross fashion, in progressive stages, until full torque is reached. Unless otherwise specified, torque specifications call for clean, dry threads. Components should be at room temperature.

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



A: Distance across flats
B: Outside thread diameter

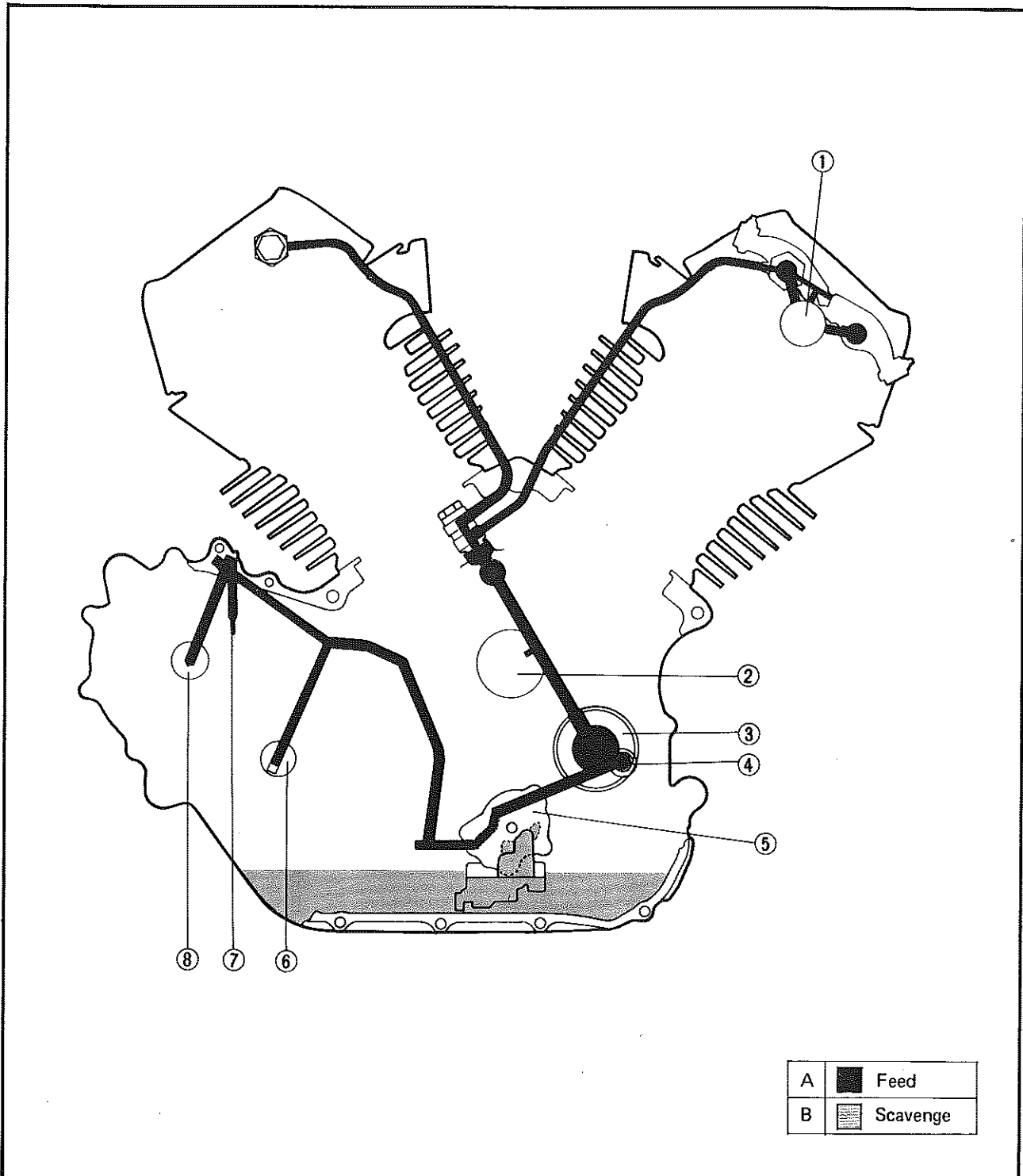
DEFINITION OF UNITS

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/mm	Newton per millimeter	N/mm	Spring rate
L	Liter	—	Volume or Capacity
cm ³	Cubic centimer	—	
r/min	Rotation per minute	—	Engine Speed



LUBRICATION DIAGRAMS (1)

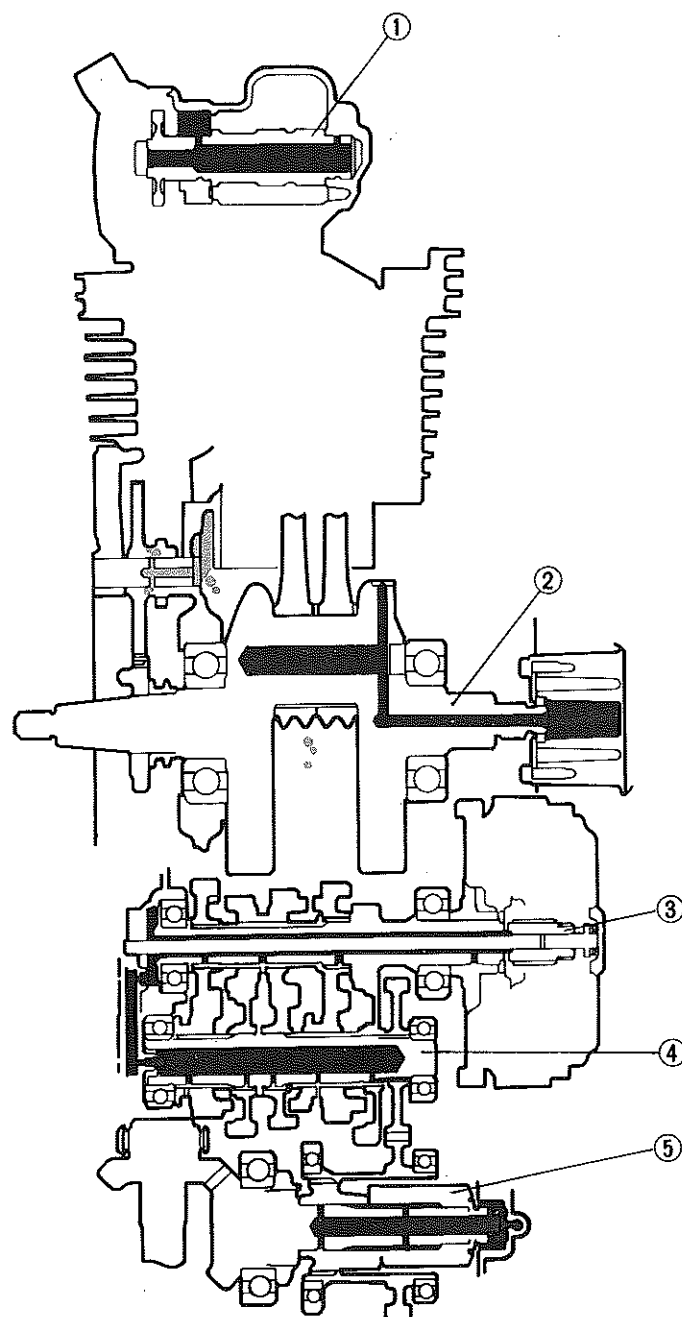
- ① Camshaft
- ② Crankshaft
- ③ Oil filter
- ④ Relief valve
- ⑤ Oil pump
- ⑥ Main axle
- ⑦ Drive axle
- ⑧ Middle drive shaft







LUBRICATION DIAGRAMS (2)

- ① Camshaft
- ② Crankshaft
- ③ Main axle
- ④ Drive axle
- ⑤ Middle drive shaft

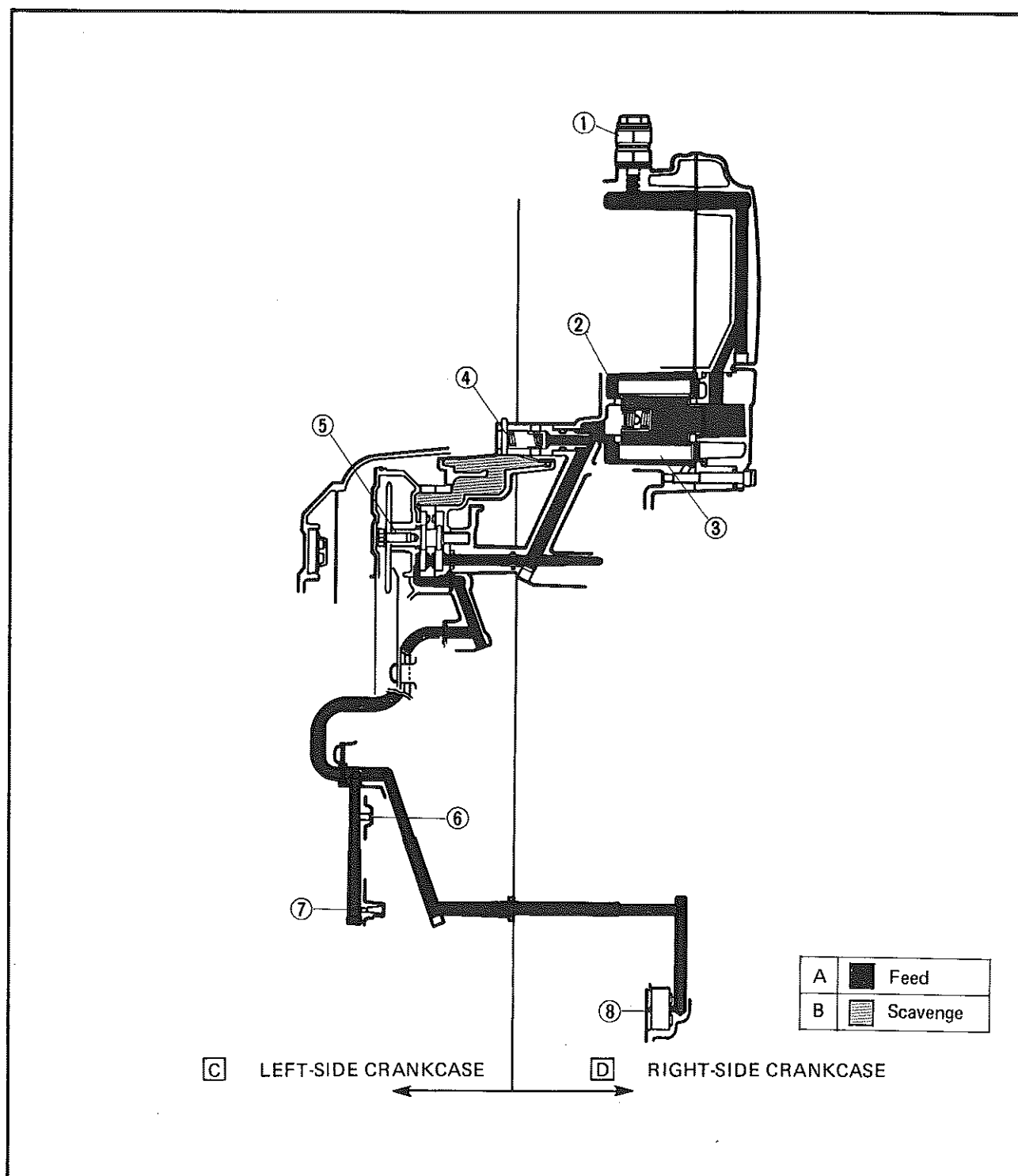


A		Feed
B		Scavenge



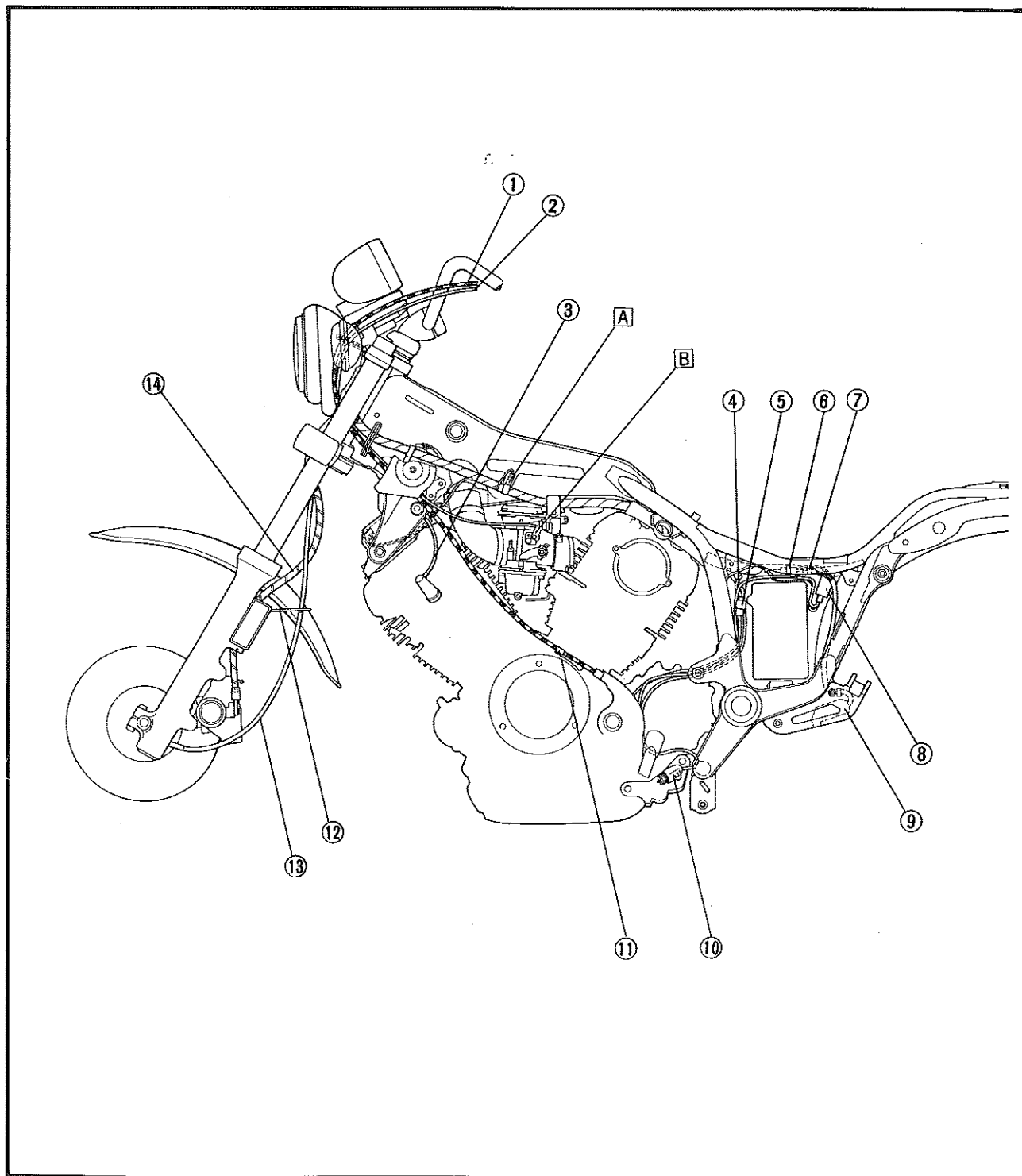
LUBRICATION DIAGRAMS (3)

- ① To cylinder heads
- ② Bypass valve
- ③ Oil filter
- ④ Relief valve
- ⑤ Oil pump
- ⑥ Main axle
- ⑦ Drive axle
- ⑧ Middle drive shaft



CABLE ROUTING (1)

- | | | |
|---------------------------------------|-----------------------|---|
| ① Clutch cable | ⑪ Clutch cable holder | A Clamp the wireharness at the white tape wound around it. |
| ② Starter wire | ⑫ Wire guide | B Connect the outer cable end with the cable stopper. |
| ③ Spark plug lead | ⑬ Speedometer cable | |
| ④ Sidestand switch lead | ⑭ Brake hose | |
| ⑤ Pickup coil lead coupler | | |
| ⑥ Rectifier/Regulator lead coupler | | |
| ⑦ A.C. magneto/Rectifier lead coupler | | |
| ⑧ Ignitor unit | | |
| ⑨ Rectifier/Regulator | | |
| ⑩ Sidestand switch | | |

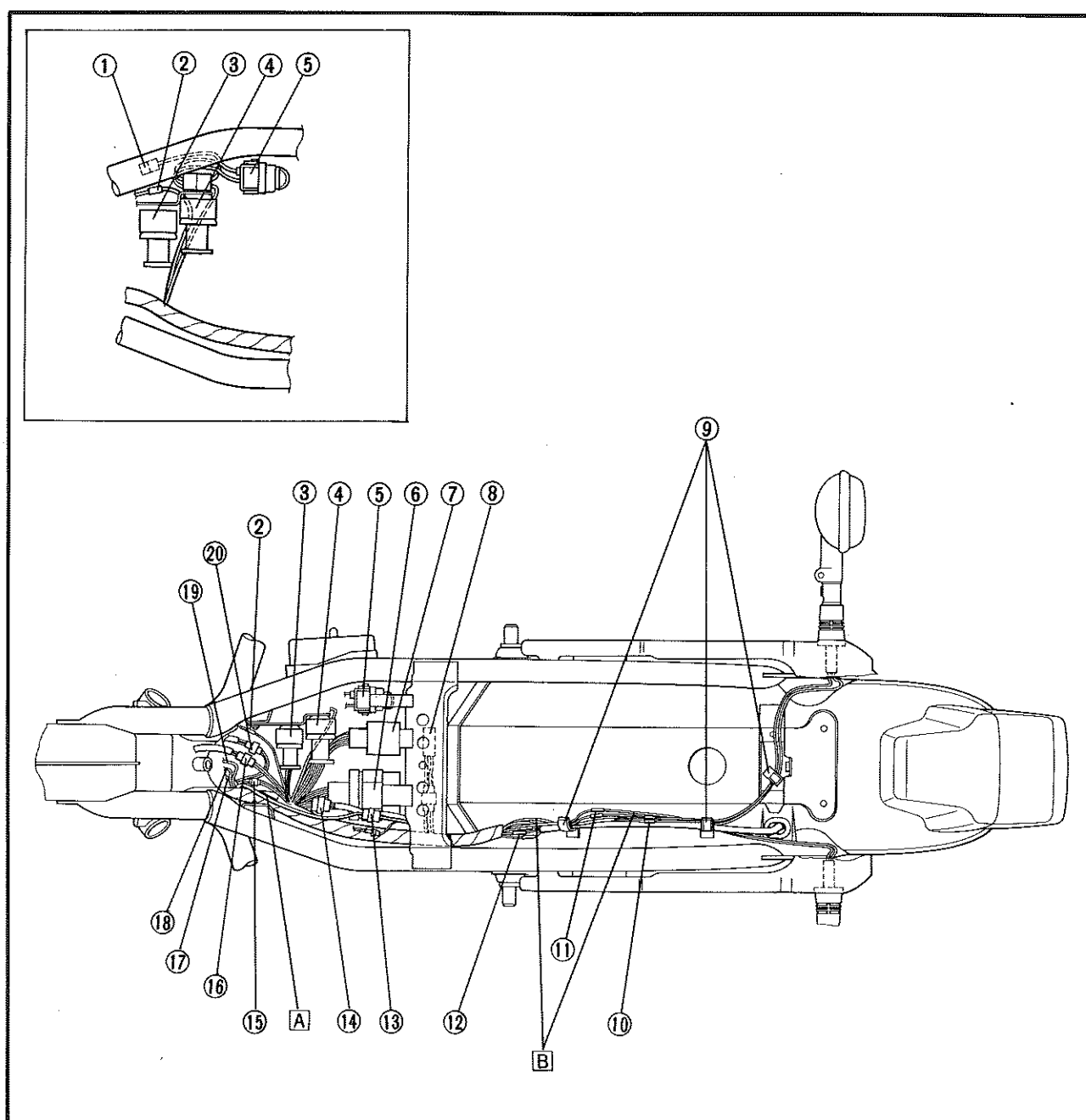




CABLE ROUTING (2)

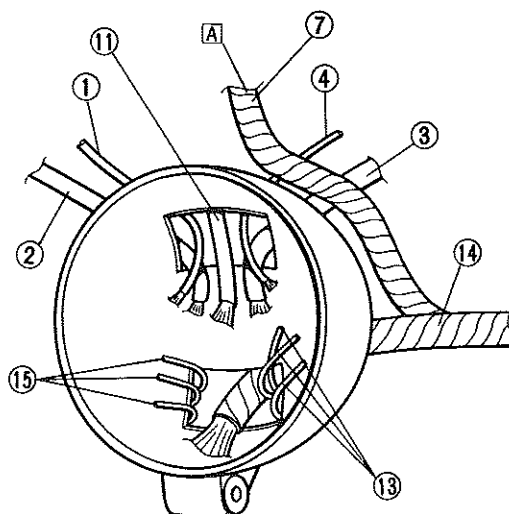
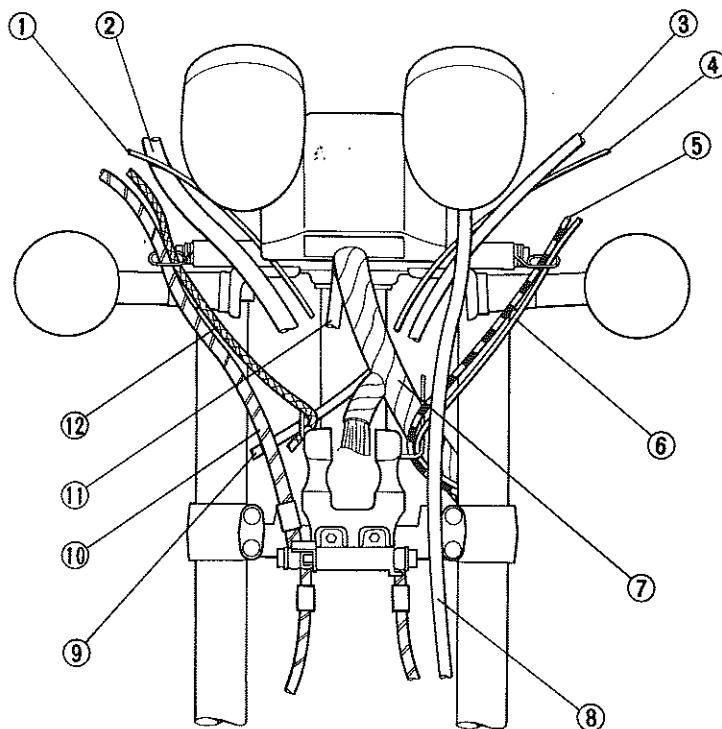
- | | |
|-----------------------------------|-------------------------------------|
| ① Battery positive lead | ⑪ Rear flasher light lead (Left) |
| ② Solenoid lead | ⑫ Taillight lead |
| ③ Starter relay | ⑬ AC magneto/Rectifier lead coupler |
| ④ Sidestand relay | ⑭ Rectifier/Regulator lead coupler |
| ⑤ Main fuse | ⑮ Sidestand switch lead |
| ⑥ Relay unit | ⑯ Fuel sender lead coupler |
| ⑦ Fuel pump control unit | ⑰ Pickup coil lead |
| ⑧ Diode | ⑱ Rear brake switch lead |
| ⑨ Clamp | ⑲ Oil level switch lead |
| ⑩ Rear flasher light lead (Right) | ⑳ Fuel pump lead |

- A** Route the cables inside the gusset seat rail.
- B** The connectors must be positioned in safe place so that the connectors do not obstruct the fitting of seat and fender.



CABLE ROUTING (3)

- | | |
|----------------------------------|-------------------------------------|
| ① Brake switch lead | ⑪ Main switch lead |
| ② Handlebar switch lead (Right) | ⑫ Throttle cable |
| ③ Handlebar switch lead (Left) | ⑬ Front flasher light leads (Left) |
| ④ Clutch switch lead | ⑭ Wireharness |
| ⑤ Clutch cable | ⑮ Front flasher light leads (Right) |
| ⑥ Starter cable | A To main switch lead. |
| ⑦ Meter and indicator light lead | |
| ⑧ Speedometer cable | |
| ⑨ Horn lead (Right) | |
| ⑩ Brake hose | |

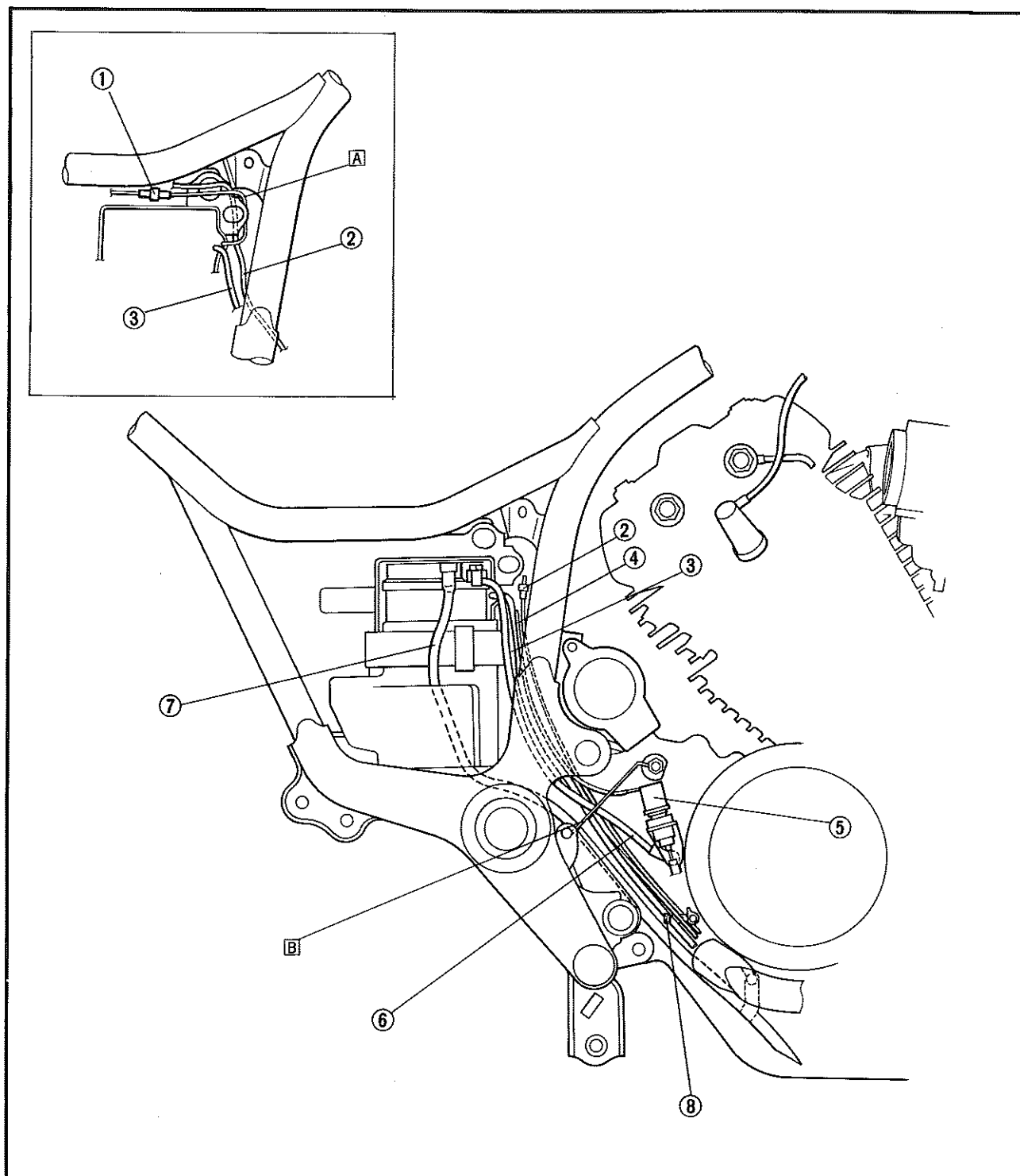




CABLE ROUTING (4)

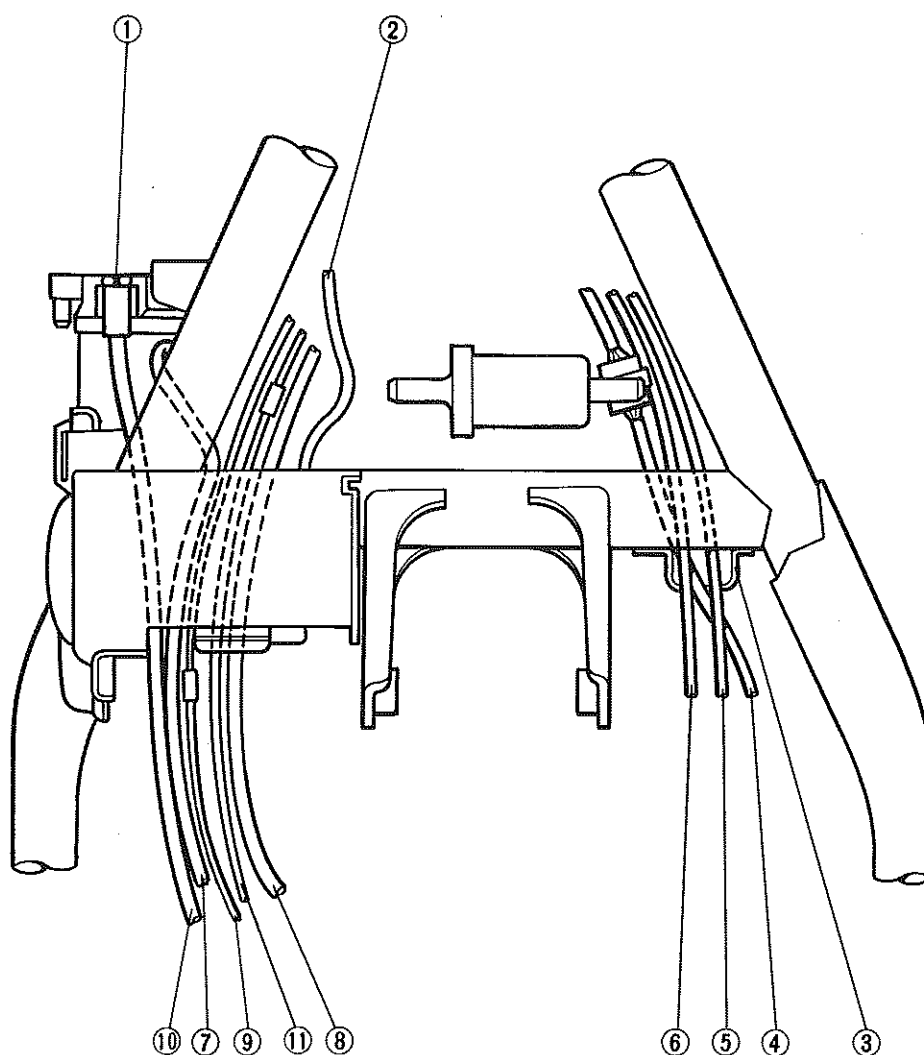
- ① Battery positive lead
- ② Solenoid lead
- ③ Starter lead
- ④ Oil level switch lead
- ⑤ Rear brake switch
- ⑥ Ground lead
- ⑦ Battery breather hose
- ⑧ Clamp

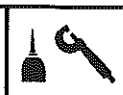
- A Route the leads behind of the side cover stay.
- B Pass the all leads through the wire holder.



CABLE ROUTING (5)

- | | |
|-----------------------------|-------------------------|
| ① Battery negative terminal | ⑩ Battery negative lead |
| ② Fuel pump lead | ⑪ Solenoid lead |
| ③ Clamp | |
| ④ Sidestand switch lead | |
| ⑤ AC magneto lead | |
| ⑥ Pickup coil lead | |
| ⑦ Starter motor lead | |
| ⑧ Rear brake switch lead | |
| ⑨ Oil level switch lead | |

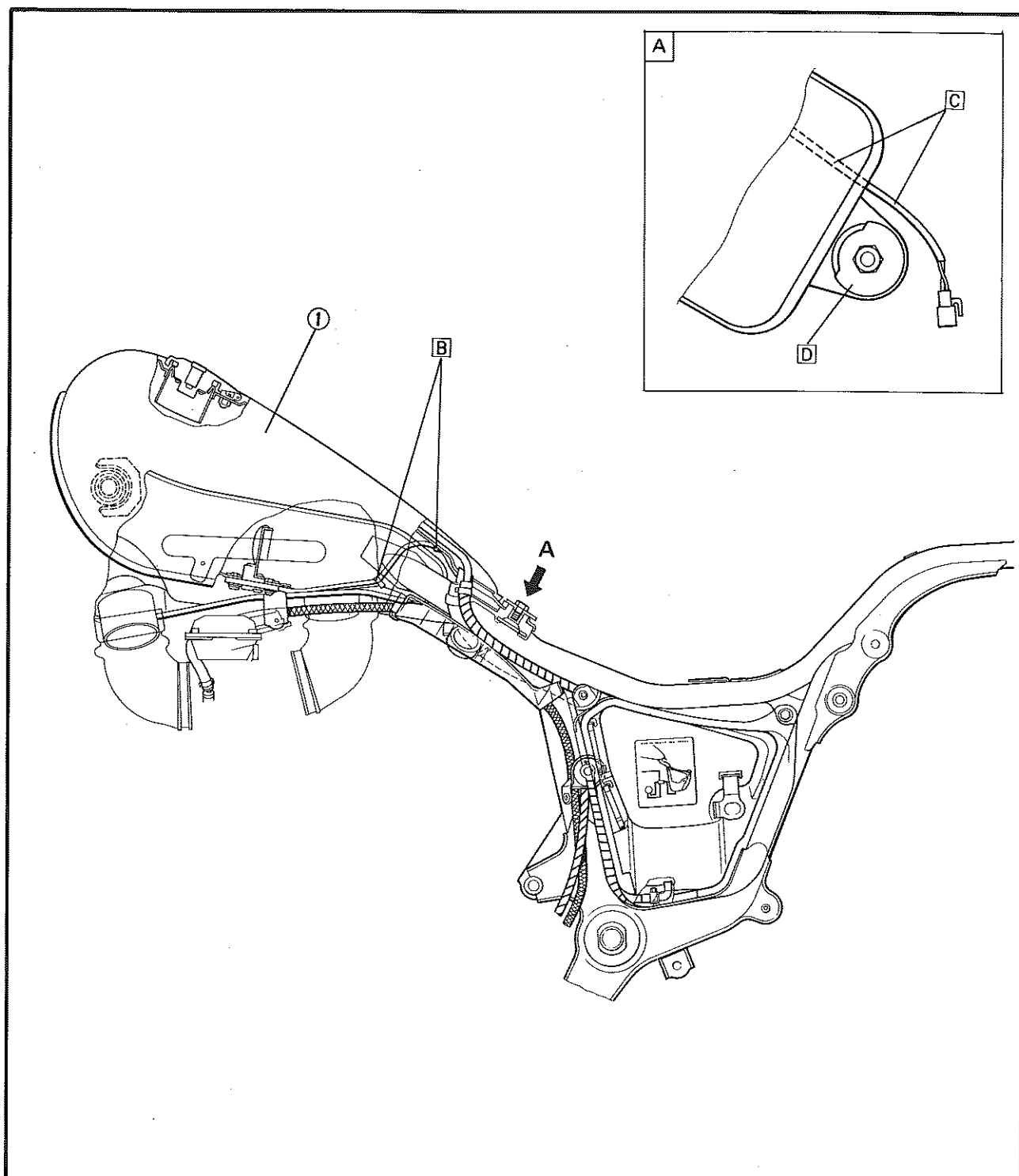




FUEL PIPE ROUTING (1)

① Fuel tank assembly

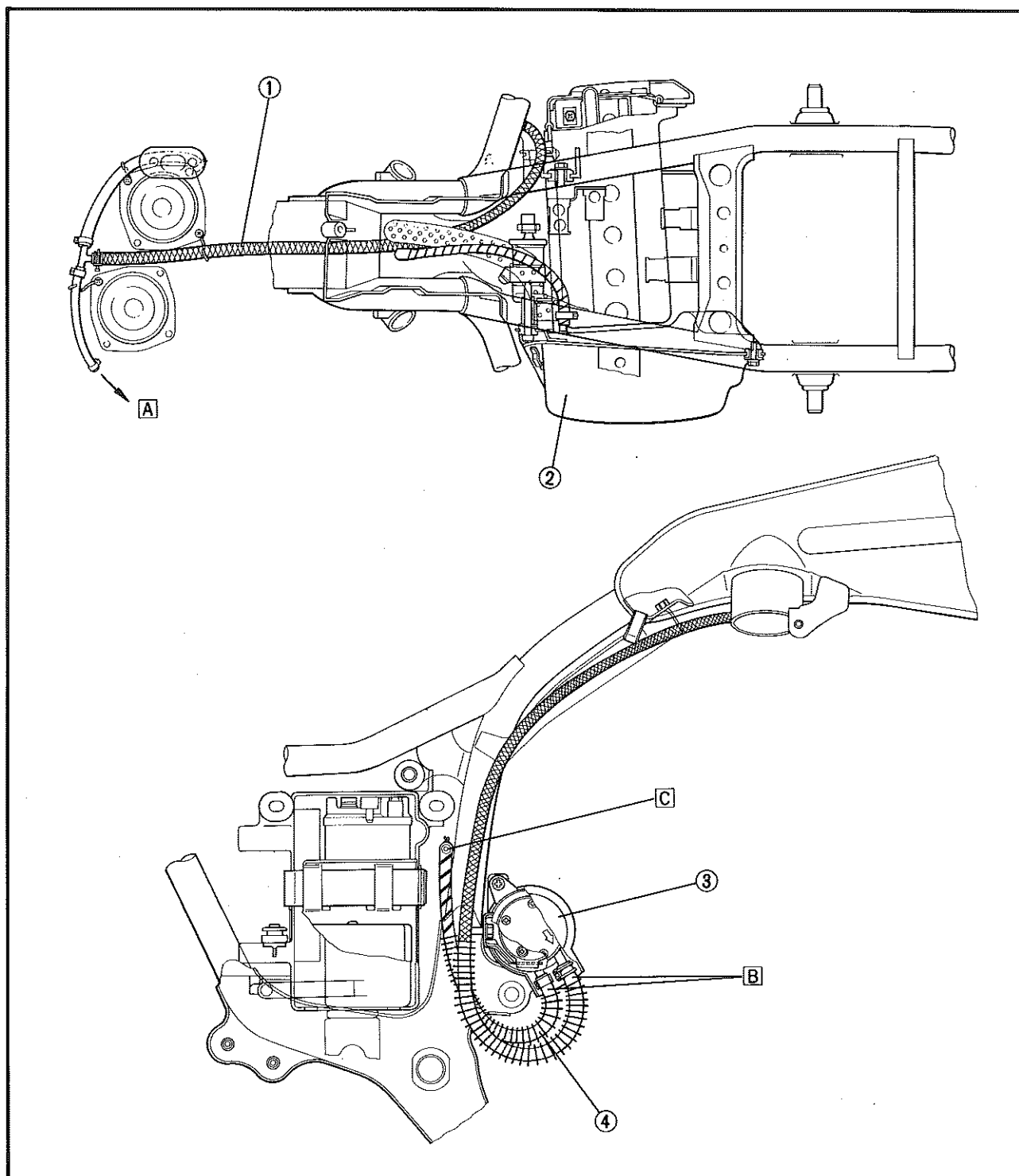
- [A] "A" VIEW
- [B] Clamp the fuel sender lead with the three inner clamps.
- [C] Pay attention to the fuel tank so that it may not clip the fuel sender lead.
- [D] Refer to the illustration for the installing direction of the special washer.



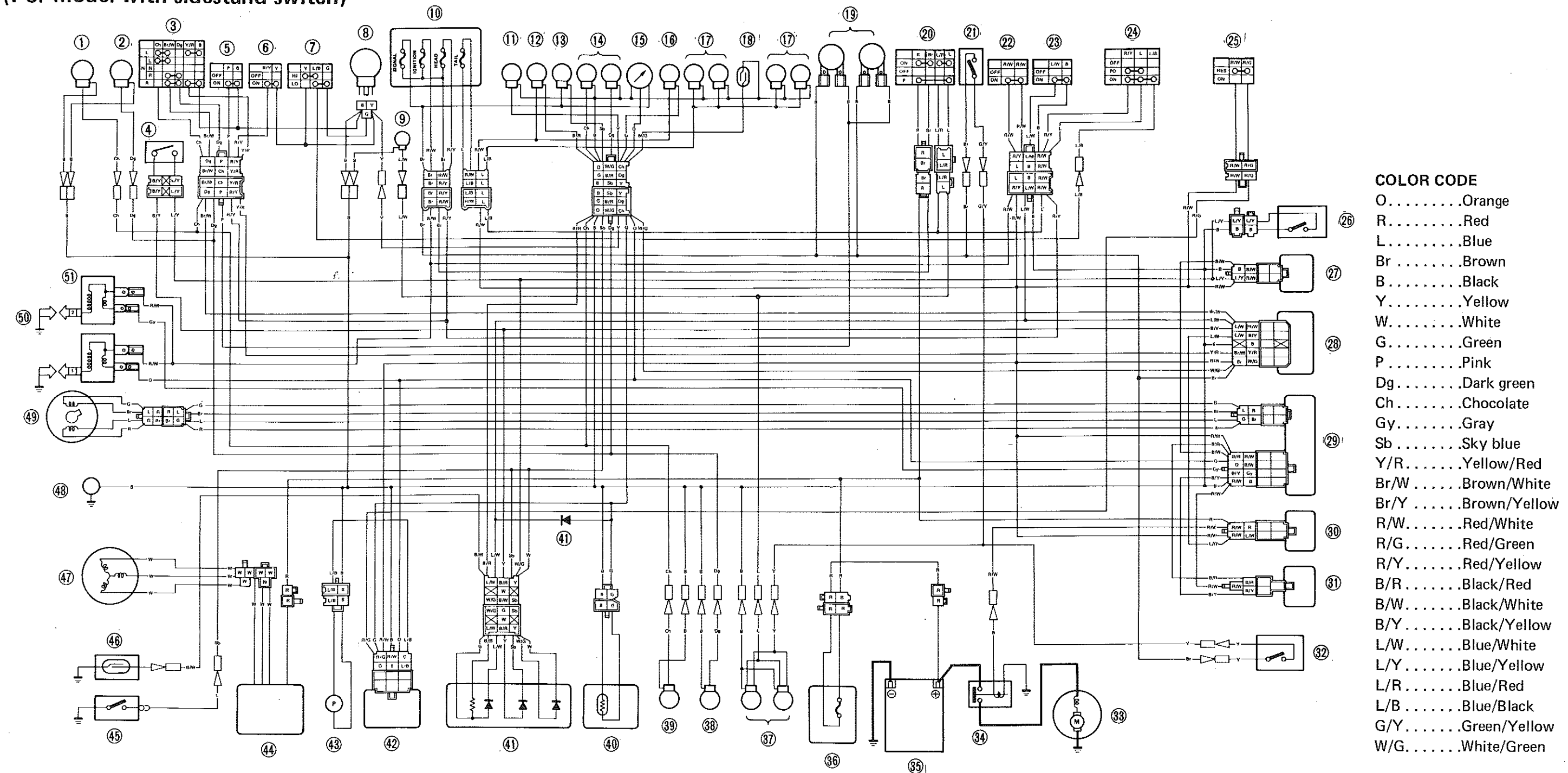
FUEL PIPE ROUTING (2)

- ① Fuel pump outlet hose
- ② Sub fuel tank assembly
- ③ Fuel pump
- ④ Fuel pump inlet hose

- A** To carburetor.
- B** Insert the spring end into the fuel pump cover.
- C** From fuel filter



XV1000 WIRING DIAGRAM (For model with sidestand switch)

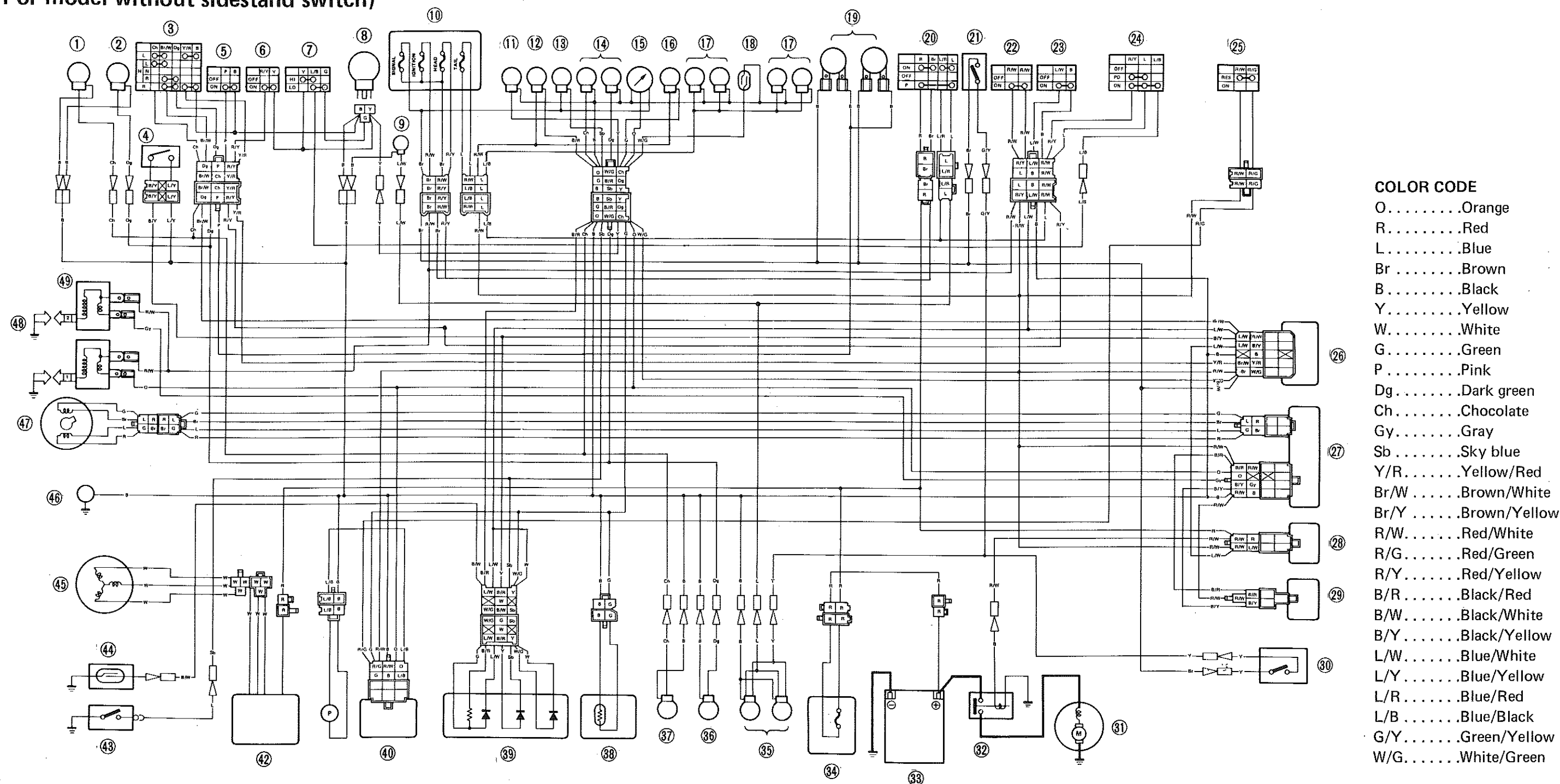


COLOR CODE

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

- | | | | | |
|----------------------------|----------------------------------|---------------------------|--------------------------|---------------------------|
| ① Front flasher light (L) | ⑪ "HIGH BEAM" indicator light | ⑳ Front brake switch | ⑳ Pressure sensor | ④① Diode |
| ② Front flasher light (R) | ⑫ "OIL" warning indicator light | ㉑ "ENGINE STOP" switch | ㉒ Rear brake switch | ④② Fuel pump control unit |
| ③ "TURN" switch | ⑬ "NEUTRAL" indicator light | ㉒ "START" switch | ㉓ Starter motor | ④③ Fuel pump |
| ④ Clutch switch | ⑭ "TURN" indicator light | ㉓ "LIGHTS" switch | ㉔ Solenoid switch | ④④ Rectifier/Regulator |
| ⑤ "HORN" switch | ⑮ Tachometer | ㉔ "FUEL" (RESERVE) switch | ㉕ Battery | ④⑤ Neutral switch |
| ⑥ "PASS" switch | ⑯ "FUEL" warning indicator light | ㉕ Sidestand switch | ㉖ Fuse (MAIN) | ④⑥ Oil level switch |
| ⑦ "LIGHTS" (Dimmer) switch | ⑰ Meter illumination light | ㉖ Sidestand relay | ㉗ Tail/Brake light | ④⑦ A.C. Magneto |
| ⑧ Headlight | ⑱ Reed switch | ㉗ Relay assembly | ㉘ Rear flasher light (R) | ④⑧ Body earth |
| ⑨ Auxiliary light | ㉒ Horn | ㉘ Ignitor unit | ㉙ Rear flasher light (L) | ④⑨ Pick-up coil |
| ⑩ Fuse box | ㉓ Main switch | ㉙ Starter relay | ㉚ Fuel sender | ④⑩ Spark plug |
| | | | | ④⑪ Ignition coil |

XV1000 WIRING DIAGRAM (For model without sidestand switch)



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

- | | | | | |
|----------------------------|----------------------------------|---------------------------|--------------------------|-----------------------|
| ① Front flasher light (L) | ⑪ "HIGH BEAM" indicator light | ⑳ Front brake switch | ㉑ Starter motor | ㉒ Fuel pump |
| ② Front flasher light (R) | ⑫ "OIL" warning indicator light | ㉒ "ENGINE STOP" switch | ㉒ Solenoid switch | ㉒ Rectifier/Regulator |
| ③ "TURN" switch | ⑬ "NEUTRAL" indicator light | ㉓ "START" switch | ㉓ Battery | ㉓ Neutral switch |
| ④ Clutch switch | ⑭ "TURN" indicator light | ㉔ "LIGHTS" switch | ㉔ Fuse (MAIN) | ㉔ Oil level switch |
| ⑤ "HORN" switch | ⑮ Tachometer | ㉕ "FUEL" (RESERVE) switch | ㉕ Tail/Brake light | ㉕ A.C. Magneto |
| ⑥ "PASS" switch | ⑯ "FUEL" warning indicator light | ㉖ Relay assembly | ㉖ Rear flasher light (R) | ㉖ Body earth |
| ⑦ "LIGHTS" (Dimmer) switch | ⑰ Meter illumination light | ㉗ Ignitor unit | ㉗ Rear flasher light (L) | ㉗ Pick-up coil |
| ⑧ Headlight | ⑱ Reed switch | ㉘ Starter relay | ㉘ Fuel sender | ㉘ Spark plug |
| ⑨ Auxiliary light | ㉑ Horn | ㉙ Pressure sensor | ㉙ Diode | ㉙ Ignition coil |
| ⑩ Fuse box | ㉒ Main switch | ㉚ Rear brake switch | ㉚ Fuel pump control unit | |