

**YAMAHA**

**XJ600S '92**

**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 motorcycle have a basic understanding of the mechanical concepts and procedures inherent in motorcycle repair technology. Without such knowledge, attempted repairs or service to this model may render it unfit to use and/or unsafe.

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

### PARTICULARLY IMPORTANT INFORMATION

This material is distinguished by the following notation.



The Safety Alert Symbol means ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!



#### WARNING

Failure to follow WARNING instructions could result in severe injury or death to the motorcycle operator, a bystander, or a person inspecting or repairing the motorcycle.

#### CAUTION:

A CAUTION indicates special precautions that must be taken to avoid damage to the motorcycle.

#### NOTE:

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

# HOW TO USE THIS MANUAL

## CONSTRUCTION OF THIS MANUAL

This manual consists of chapters for the main categories of subjects. (See "Illustrated symbols")

- 1st title ① : This is a chapter with its symbol on the upper right of each page.
- 2nd title ② : This title appears on the upper of each page on the left of the chapter symbol. (For the chapter "Periodic inspection and adjustment" the 3rd title appears.)
- 3rd title ③ : This is a final title.

## 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 inspections.

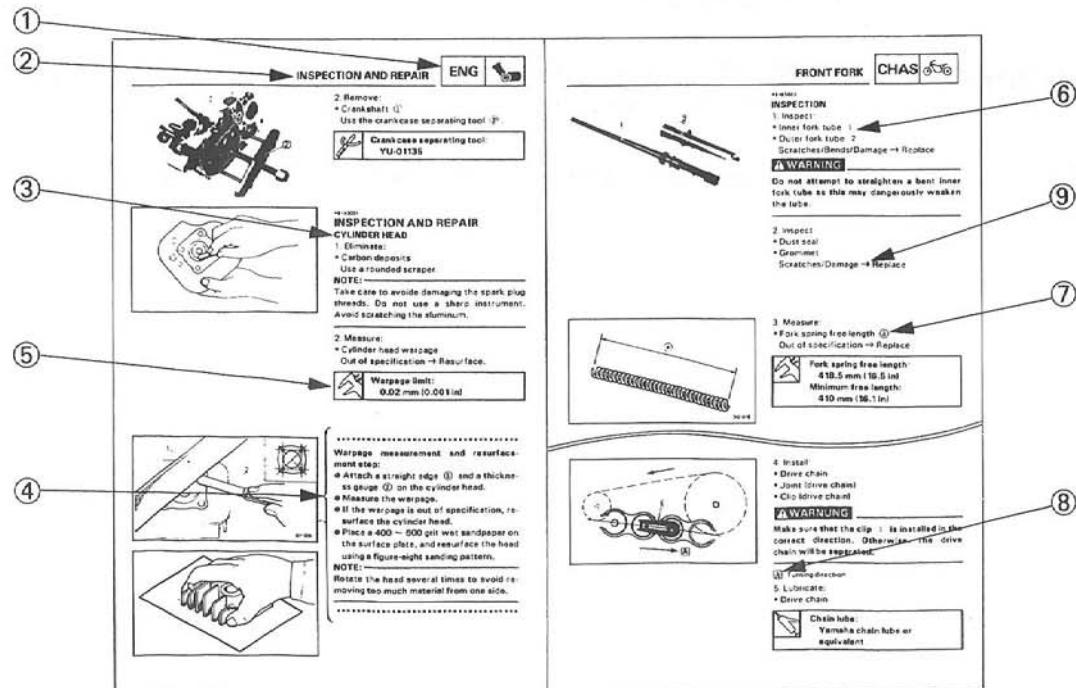
A set of particularly important procedure ④ is placed between a line of asterisks "\*" with each procedure preceded by "●".

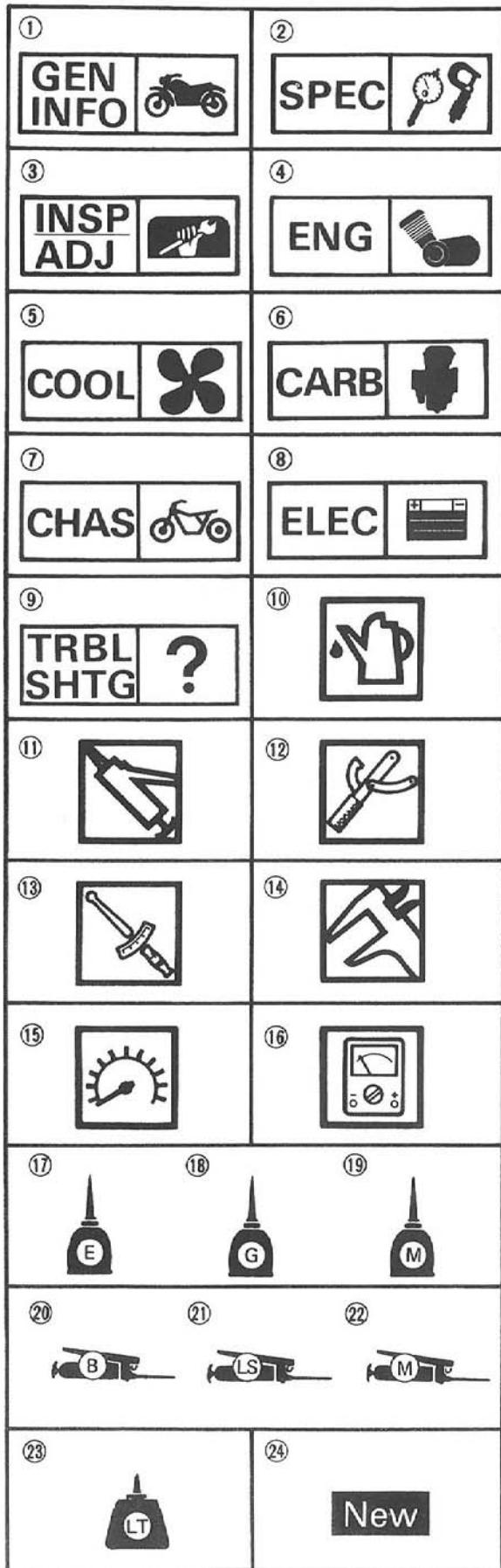
## IMPORTANT FEATURES

- Data and a special tool are framed in a box preceded by a relevant symbol ⑤ .
- An encircled numeral ⑥ indicates a part name, and an encircled alphabetical letter data or an alignment mark ⑦ , the others being indicated by an alphabetical letter in a box ⑧ .
- A condition of a faulty component will precede an arrow symbol and the course of action required the symbol ⑨ .

## 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 ⑨ are designed as thumb tabs to indicate the chapter's number and content.

- ① General information
- ② Specifications
- ③ Periodic inspection and adjustment
- ④ Engine
- ⑤ Cooling system
- ⑥ Carburetion
- ⑦ Chassis
- ⑧ Electrical
- ⑨ Troubleshooting

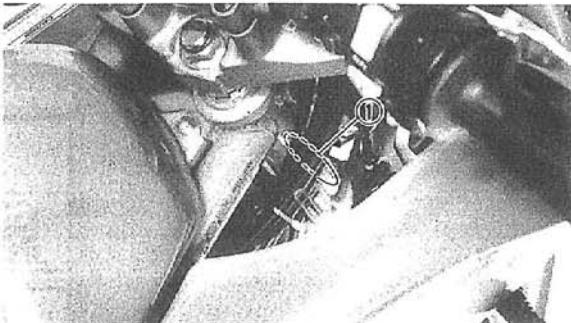
Illustrated symbols ⑩ to ⑯ are used to identify the specifications appearing in the text.

- ⑩ Filling fluid
- ⑪ Lubricant
- ⑫ Special tool
- ⑬ Tightening
- ⑭ Wear limit, clearance
- ⑮ Engine speed
- ⑯ Ω, V, A

Illustrated symbols ⑰ to ㉔ in the exploded diagram indicate grade of lubricant and location of lubrication point.

- ⑰ Apply engine oil
- ⑱ Apply gear oil
- ⑲ Apply molybdenum disulfide oil
- ⑳ Apply wheel bearing grease
- ㉑ Apply lightweight lithium-soap base grease
- ㉒ Apply molybdenum disulfide grease
- ㉓ Apply locking agent (LOCTITE®)
- ㉔ Use new one

YB211001

**1**

## GENERAL

## INFORMATION

### MOTORCYCLE IDENTIFICATION

#### VEHICLE IDENTIFICATION NUMBER

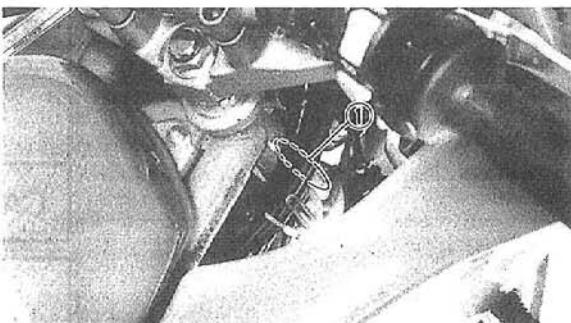
##### (For E)

The vehicle identification number ① is stamped into the right side of steering head.

**Starting serial number:**  
**JYA4BRSO\*NA026101 (E)**

#### NOTE: \_\_\_\_\_

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



### FRAME SERIAL NUMBER

#### (Except for E)

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

**Starting serial number:**  
**4BR-000101**  
**4BR-020101 (D) (S)**  
**4BR-032101 (D)**

#### NOTE: \_\_\_\_\_

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



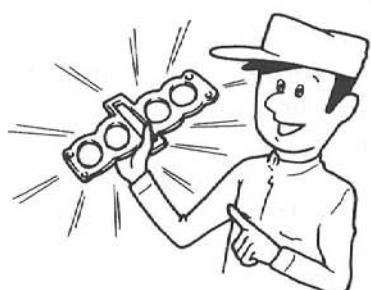
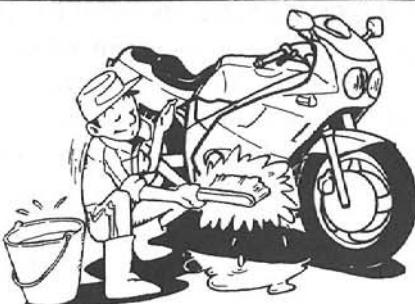
### ENGINE SERIAL NUMBER

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

**Starting serial number:**  
**4BR-000101**  
**4BR-026101 (E)**  
**4BR-020101 (D) (S)**  
**4BR-032101 (D)**

#### NOTE: \_\_\_\_\_

- The first three digits of these numbers are for model identifications; the remaining digits are the unit production number.
- Designs and specifications are subject to change without notice.



## IMPORTANT INFORMATION

### PREPARATION FOR REMOVAL

1. Remove all dirt, mud dust, and foreign material before removal and disassembly.

**1**

2. Use proper tools and cleaning equipment.  
Refer to "SPECIAL TOOL".

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

4. During the machine 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.

### ALL REPLACEMENT PARTS

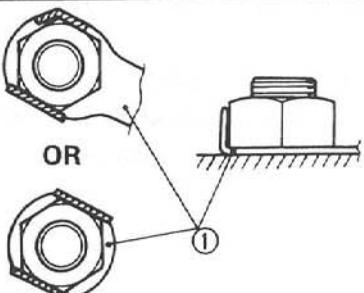
1. Use only genuine Yamaha parts for all replacements. Use oil and/or grease recommended by Yamaha for assembly and adjustment. Other brands may be similar in function and appearance, but inferior in quality.

### GASKETS, OIL SEALS, AND O-RINGS

1. All gaskets, seals and O-rings should be replaced when an engine is overhauled. All gaskets surfaces, oil seal lips and O-rings must be cleaned.

2. Properly oil all mating parts and bearing during reassembly. Apply grease to the oil seal lips.

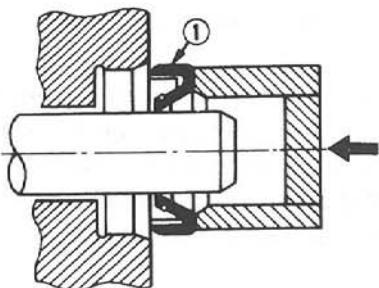
## IMPORTANT INFORMATION



300-000

### 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.



300-003

### BEARINGS AND OIL SEALS

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

① Oil seal

#### CAUTION:

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

① Bearing

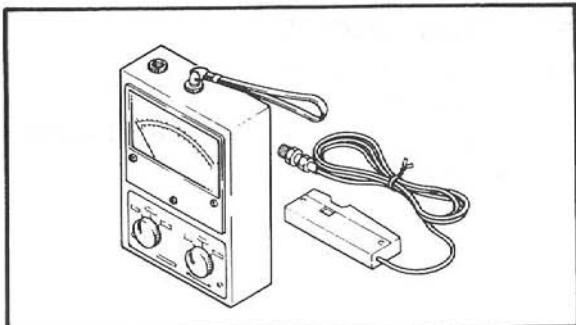
### CIRCLIPS

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

④ Shaft

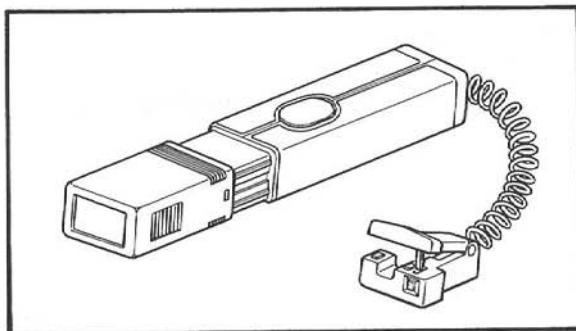
**SPECIAL TOOLS**

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. Inductive tachometer**

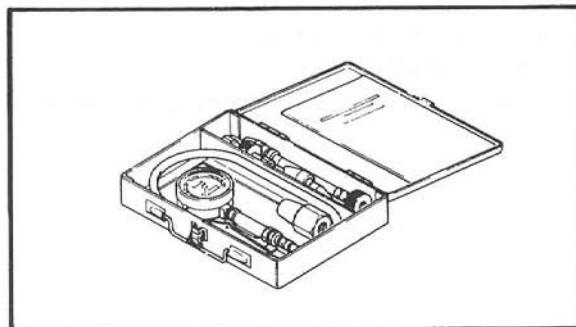
P/N 90890-03113

This tool is needed for detecting engine rpm.

**2. Inductive timing light**

P/N 90890-03141

This tool is necessary for checking ignition timing.

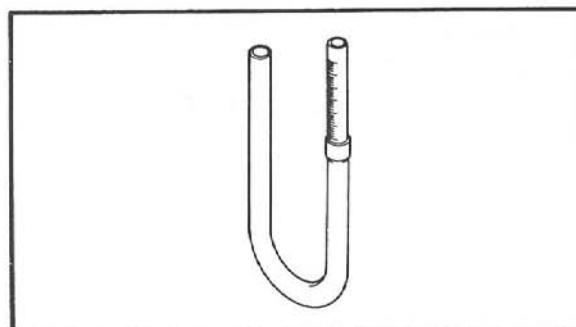
**3. Compression gauge**

P/N 90890-03081

This gauge is used to measure the engine compression.

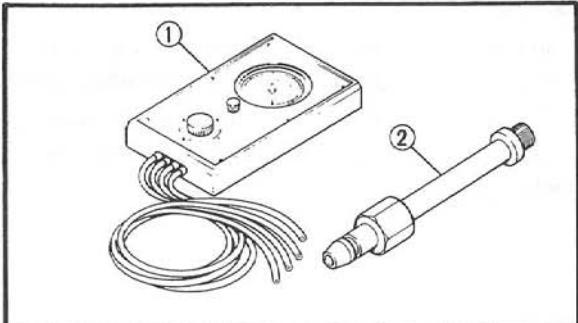
**Adapter**

P/N 90890-04082

**4. Fuel level gauge**

P/N 90890-01312

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



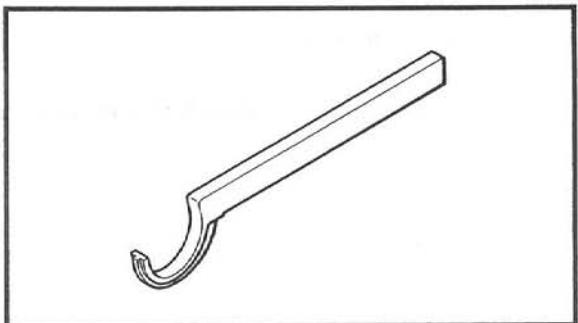
## 5. Vacuum gauge ①

P/N 90890-03094

## Attachment ②

P/N 90890-03060

These tools are needed for carburetor synchronization.

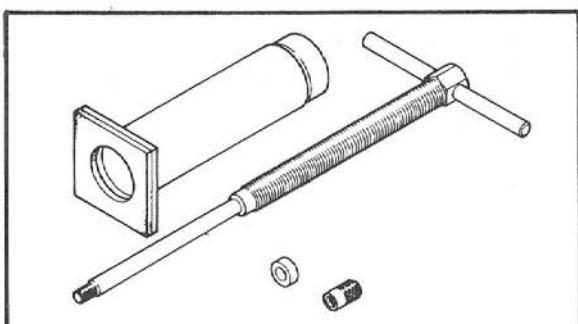


## FOR ENGINE SERVICE

## 1. Tappet adjusting tool

P/N 90890-04125

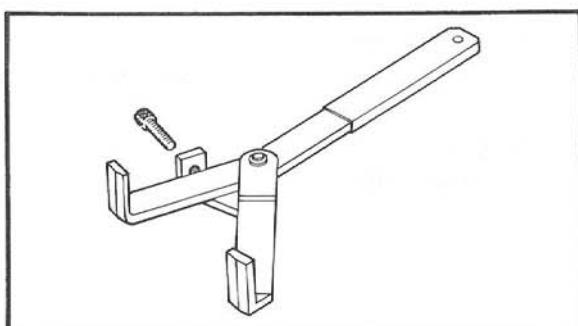
This tool is necessary to replace valve adjusting pads.



## 2. Piston pin puller

P/N 90890-01304

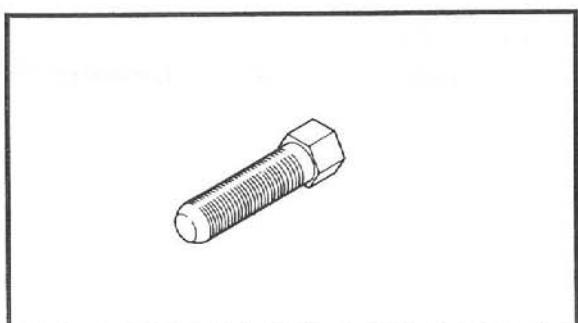
This tool is used to remove the piston pin.



## 3. Universal clutch holder

P/N 90890-04086

This tool is used to loosen and tighten the clutch boss locknut.



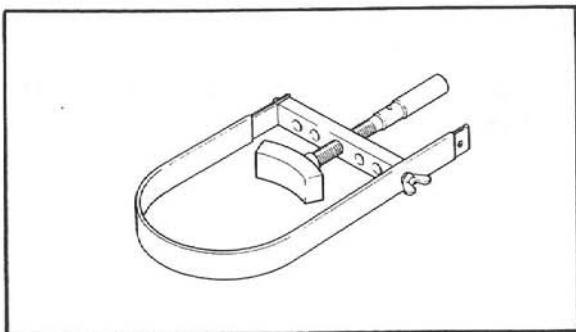
## 4. Rotor puller

P/N 90890-01080

This tool is used to remove the rotor.

## SPECIAL TOOLS

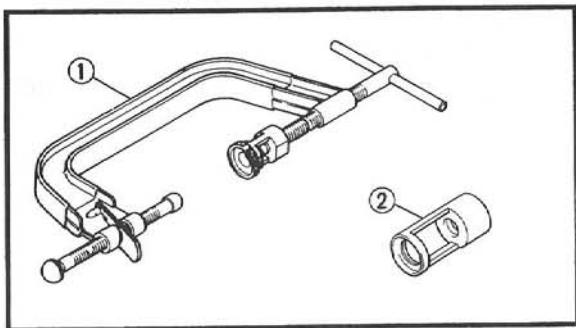
**GEN  
INFO**



### 5. Primary sheave holder

P/N 90890-01701

This tool is used to loosen and tighten the A.C. magneto.



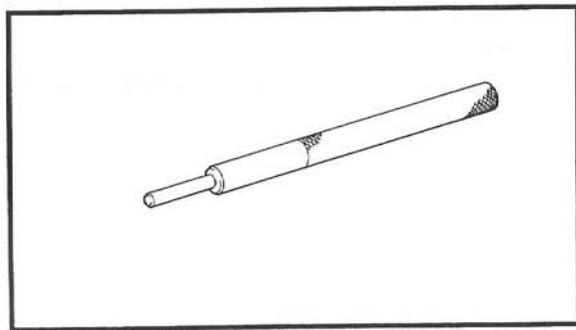
### 6. Valve spring compressor ①

P/N 90890-04019

Attachment ②

P/N 90890-04108

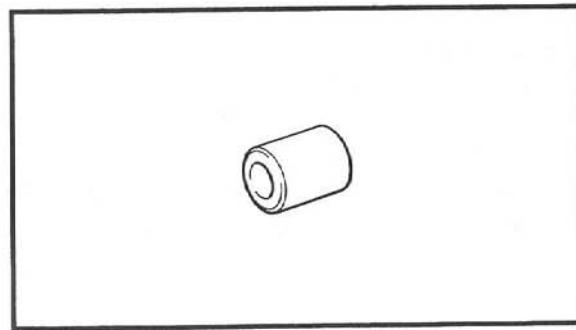
These tools are needed to remove and install the valve assemblies.



### 7. Valve guide remover (5.0 mm)

P/N 90890-04097

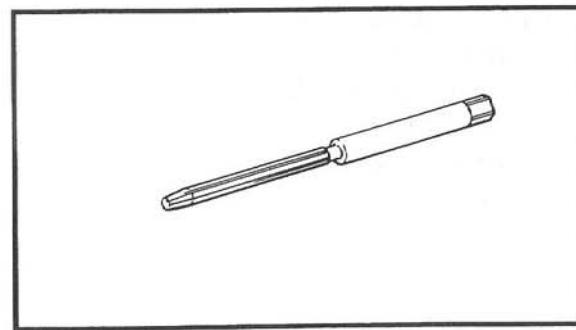
This tool is used to remove the valve guides.



### 8. Valve guide installer (5.0 mm)

P/N 90890-04098

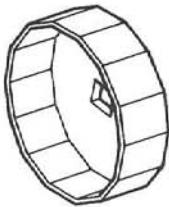
This tool is needed to install the valve guides properly.



### 9. Valve guide reamer (5.0 mm)

P/N 90890-04099

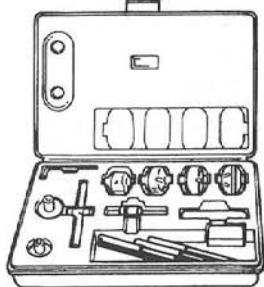
This tool is used to rebore the new valve guide.



## 10. Oil filter wrench

P/N 90890-01426

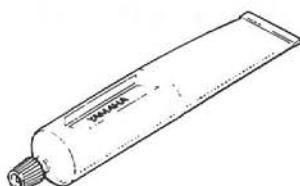
This tool is used to remove and install the oil filter.



## 11. Valve seat cutter

P/N YM-91043

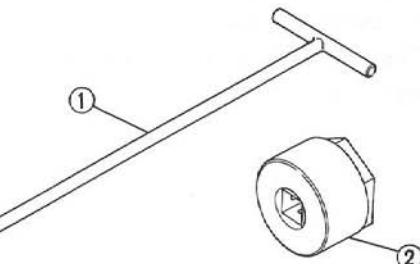
This tool is used to resurface the valve seat.



## 12. Yamaha bond No. 1215

P/N 90890-85505

This sealant (bond) is used for crankcase mating surface.



## FOR CHASSIS SERVICE

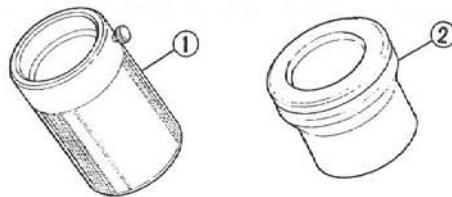
## 1. T-Handle ①

P/N 90890-01326

## For damper rod holder ②

P/N 90890-01328

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



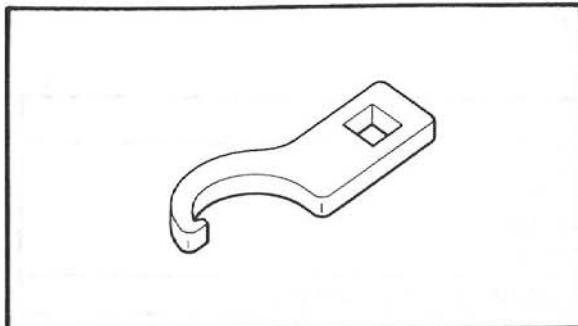
## 2. Front fork seal driver (weight) ①

P/N 90890-01367

## Adapter (38 mm) ②

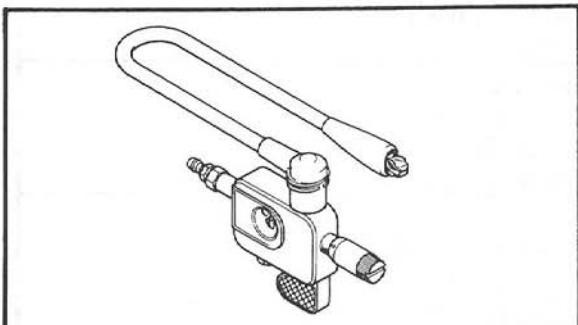
P/N 90890-01372

These tools are used when installing the fork seat.

**SPECIAL TOOLS****3. Ring nut wrench**

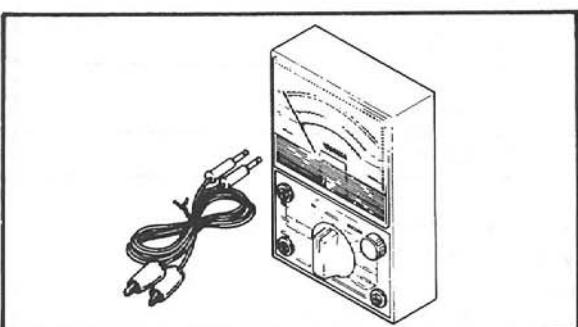
P/N 90890-01403

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

**FOR ELECTRICAL COMPONENTS****1. Ignition checker**

P/N 90890-06754

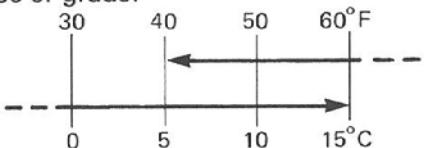
This instrument is necessary for checking the ignition system components.

**2. Pocket tester**

P/N 90890-03112

This instrument is invaluable for checking the electrical system.

**SPECIFICATIONS****GENERAL SPECIFICATIONS**

Model	XJ600S
Model code number:	4BR1 4BR2 (E) 4EB1 (D) (S) 4DS1 (D)
Vehicle identification number:	JYA4BRSO * NA026101 (E)
Frame starting number:	4BR-000101 4BR-020101 (D) (S) 4BR-032101 (D)
Engine starting number:	4BR-000101 4BR-026101 (E) 4BR-020101 (D) (S) 4BR-032101 (D)
Dimensions:	
Overall length	2,170 mm (85.4 in)
Overall width	750 mm (29.5 in)
Overall height	1,170 mm (46.1 in)
Seat height	770 mm (30.3 in)
Wheelbase	1,445 mm (56.9 in)
Minimum ground clearance	150 mm (5.91 in)
Basic weight:	
With oil and full fuel tank	197 kg (434 lb)
Minimum turning radius:	2,600 mm (102 in)
Engine:	
Engine type	Air cooled 4-stroke, gasoline, DOHC
Cylinder arrangement	4-cylinder parallel
Displacement	598.8 cm <sup>3</sup>
Bore x stroke	58.5 x 55.7 mm (2.30 x 2.19 in)
Compression ratio	10.0 : 1
Compression pressure	1,100 kPa (11.0 kg/cm <sup>2</sup> , 156 psi)
Starting system	Electric starter
Lubrication system:	Wet sump
Engine oil type or grade:	 SAE 20W40 type SE motor oil SAE 10W30 type SE motor oil
Engine oil capacity:	
Periodic oil change	2.2 L (1.9 Imp qt, 2.3 US qt)
With oil filter replacement	2.5 L (2.2 Imp qt, 2.6 US qt)
Total amount	2.9 L (2.6 Imp qt, 3.1 US qt)
Air filter:	Dry type element

# GENERAL SPECIFICATIONS

**SPEC**

**2**

Model	XJ600S	
Fuel: Type Tank capacity Reserve amount	Europe : Regular unleaded gasoline 17.0 L (3.74 Imp gal, 4.49 US gal) 3.5 L (0.77 Imp gal, 0.92 US gal)	
Carburetor: Type x quantity Manufacturer	BDST 28 x 4 MIKUNI	
Spark plug: Type/Manufacture  Gap	CR7E (NGK), CR8E (NGK), CR9E (NGK), U22ESR-N (N.D.), U24ESR-N (N.D.), U27ESR-N (N.D.) 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 23/24 x 65/28 (2.225) Chain drive 48/16 (3,000) Constant mesh 6-speed Left foot operation 1st 2nd 3rd 4th 5th 6th	
Chassis: Frame type Caster angle Trail	Double cradle 25° 97 mm (3.82 in)	
Tire: Type Size Manufacture (Type)	Front Tubeless 110/80-17 57H YOKOHAMA (F209) DUNLOP (K275F)	Rear Tubeless 130/70-18 63H YOKOHAMA (R209) DUNLOP (K275)
Tire pressure (Cold tire): Basic Weight: With oil and full fuel tank Maximum load*	197 kg (434 lb) 200 kg (441 lb)	
Cold tire pressure: Up to 90 kg (198 lb) load*	Front 200 kPa (2.0 kg/cm <sup>2</sup> , 28 psi)	Rear 225 kPa (2.25 kg/cm <sup>2</sup> , 32 psi)
90 kg (198 lb) ~ Maximum load*	Front 200 kPa (2.0 kg/cm <sup>2</sup> , 28 psi)	Rear 250 kPa (2.5 kg/cm <sup>2</sup> , 36 psi)
High speed riding	Front 200 kPa (2.0 kg/cm <sup>2</sup> , 28 psi)	Rear 250 kPa (2.5 kg/cm <sup>2</sup> , 36 psi)
* Load is the total weight of cargo, rider, passenger, and accessories.		

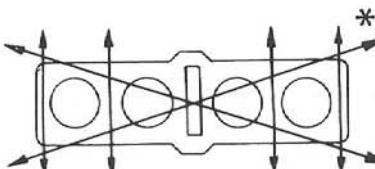
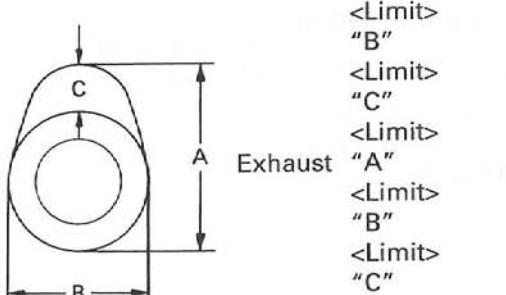
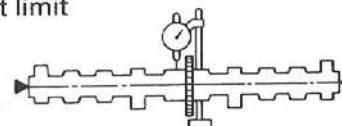
## GENERAL SPECIFICATIONS

SPEC	
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Model	XJ600S
Brake:	
Front	Single disc brake
Operation	Right hand operation
Rear	Single disc brake
Operation	Right foot operation
Suspension:	
Front suspension	Telescopic fork
Rear suspension	Swingarm (Monocross)
Shock absorber:	
Front shock absorber	Coil-spring/ Oil damper
Rear shock absorber	Coil-gas spring/Oil damper
Wheel travel:	
Front wheel travel	140 mm (5.51 in)
Rear wheel travel	110 mm (4.33 in)
Electrical:	
Ignition system	T.C.I. (Digital ignition)
Generator system	A.C. magneto generator
Battery type or model	YTX9-BS, GTX9-BS
Battery capacity	12V 8AH
Headlight type:	Quartz bulb (Halogen)
Bulb wattage x Quantity:	
Headlight	12V 60W/55W
Tail/brake light	12V 5W/21W
Flasher light	12V 21W x 4
Auxiliary light	12V 4W x 1      3.4W x 1 (GB)
Licence light	12V 5W x 2
Meter light	12V 1.7W x 3
Indicator light:	
Wattage x quantity	"NEUTRAL"
	12V 3.4W x 1
	"HIGH BEAM"
	12V 3.4W x 1
	"TURN"
	12V 3.4W x 1
	"OIL LEVEL"
	12V 3.4W x 1

## MAINTENANCE SPECIFICATIONS

### ENGINE

Model	XJ600S
Cylinder head: Warp limit*	0.03 mm (0.0012 in) *Lines indicate straightedge measurement.
	
Cylinder: Bore size Taper Limit Out of Round Limit	58.505 ~ 58.545 mm (2.3033 ~ 2.3049 in) 0.05 mm (0.002 in) 0.01 mm (0.0004 in)
Camshaft: Drive method Cam cap inside dia. Camshaft Outside Dia. Shaft-to-cap clearance <Limit> Cam dimensions:      Intake "A" <Limit> "B" <Limit> "C" <Limit> "A" <Limit> "B" <Limit> "C" <Limit> Camshaft runout limit    	Chain drive (Center) 25.000 ~ 25.021 mm (0.9843 ~ 0.9859 in) 24.967 ~ 24.980 mm (0.9830 ~ 0.9835 in) 0.020 ~ 0.054 mm (0.0008 ~ 0.0021 in) <0.16 mm (0.0063 in)> 35.75 ~ 35.85 mm (1.404 ~ 1.411 in) <35.7 mm (1.4 in)> 27.95 ~ 28.05 mm (1.100 ~ 1.104 in) <27.9 mm (1.1 in)> 7.8 mm (0.31 in) <7.6 mm (0.30 in)> 35.45 ~ 35.55 mm (1.396 ~ 1.400 in) <35.4 mm (1.4 in)> 27.95 ~ 28.05 mm (1.100 ~ 1.104 in) <27.9 mm (1.1 in)> 7.5 mm (0.30 in) <7.3 mm (0.29 in)> 0.05 mm (0.002 in)
Cam chain: Cam chain type/No. of links Cam chain adjustment method	82-RH 2010/144 Auto

# MAINTENANCE SPECIFICATIONS

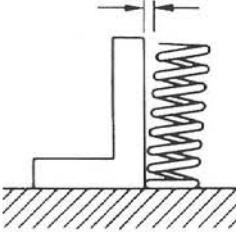
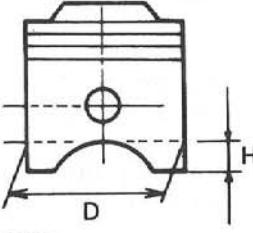
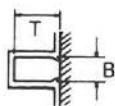
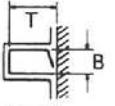
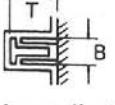
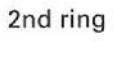
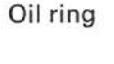
**SPEC**



Model	XJ600S		
Valve, valve seat, valve guide:			
Valve clearance (Cold):			
IN.	0.11 ~ 0.15 mm (0.004 ~ 0.006 in)		
EX.	0.21 ~ 0.25 mm (0.008 ~ 0.010 in)		
Valve dimensions:			
Head Dia.	Face Width	Seat Width	Margin Thickness
"A" Head dia.	IN.	29.9 ~ 30.1 mm (1.177 ~ 1.185 in)	
	EX.	25.9 ~ 26.1 mm (1.020 ~ 1.028 in)	
"B" Face width	IN.	2.26 mm (0.089 in)	
	EX.	2.26 mm (0.089 in)	
"C" Seat limit width	IN.	0.9 ~ 1.1 mm (0.035 ~ 0.043 in)	
	EX.	0.9 ~ 1.1 mm (0.035 ~ 0.043 in)	
<Limit>	IN.	<2.0 mm (0.08 in)>	
	EX.	<2.0 mm (0.08 in)>	
"D" Margin thickness limit	IN.	1.0 mm (0.039 in)	
	EX.	1.0 mm (0.039 in)	
Stem outside diameter	IN.	4.975 ~ 4.990 mm (0.1959 ~ 0.1965 in)	
	EX.	4.960 ~ 4.975 mm (0.1953 ~ 0.1959 in)	
<Limit>	IN.	<4.945 mm (0.195 in)>	
	EX.	<4.920 mm (0.194 in)>	
Guide inside diameter	IN.	5.000 ~ 5.012 mm (0.1969 ~ 0.1973 in)	
	EX.	5.000 ~ 5.012 mm (0.1969 ~ 0.1973 in)	
<Limit>	IN.	<5.045 mm (0.199 in)>	
	EX.	<5.020 mm (0.198 in)>	
Stem-to-guide clearance	IN.	0.010 ~ 0.037 mm (0.0004 ~ 0.0015 in)	
	EX.	0.025 ~ 0.052 mm (0.001 ~ 0.002 in)	
<Limit>	IN.	<0.1 mm (0.004 in)>	
	EX.	<0.1 mm (0.004 in)>	
Stem runout limit			
Valve seat width	IN.	0.9 ~ 1.1 mm (0.0354 ~ 0.0433 in)	
	EX.	0.9 ~ 1.1 mm (0.0354 ~ 0.0433 in)	
<Limit>	IN.	<2.0 mm (0.08 in)>	
	EX.	<2.0 mm (0.08 in)>	
Valve spring:			
Free length			
Inner spring	IN.	38.33 mm (1.51 in)	
	EX.	38.33 mm (1.51 in)	
Outer spring	IN.	38.52 mm (1.52 in)	
	EX.	38.52 mm (1.52 in)	
Installed length (valve closed):			
Inner spring	IN.	32.5 mm (1.28 in)	
	EX.	32.5 mm (1.28 in)	
Outer spring	IN.	33.4 mm (1.31 in)	
	EX.	33.4 mm (1.31 in)	

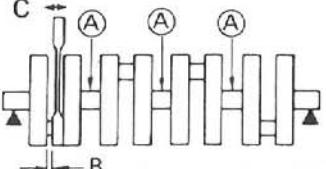
# MAINTENANCE SPECIFICATIONS

**SPEC** 

Model	XJ600S							
Tilt limit:								
Inner spring	IN. and EX.	2.5°/1.7 mm (0.067 in)						
Outer spring	IN. and EX.	2.5°/1.7 mm (0.067 in)						
								
Direction of winding (Top view):								
	<table border="1" style="width: 100px; margin-left: auto; margin-right: auto;"> <tr> <td style="text-align: center;">Inner spring</td> <td style="text-align: center;">Outer spring</td> </tr> <tr> <td style="text-align: center;">IN. and EX.</td> <td style="text-align: center;">IN. and EX.</td> </tr> <tr> <td style="text-align: center;">Counter Clockwise</td> <td style="text-align: center;">Clockwise</td> </tr> </table>	Inner spring	Outer spring	IN. and EX.	IN. and EX.	Counter Clockwise	Clockwise	 
Inner spring	Outer spring							
IN. and EX.	IN. and EX.							
Counter Clockwise	Clockwise							
Piston:								
Piston size "D"		58.47 ~ 58.51 mm (2.302 ~ 2.304 in)						
Measuring point "H"		4.0 mm (0.16 in)						
								
Piston-to-cylinder clearance:		0.025 ~ 0.045 mm (0.0010 ~ 0.0018 in)						
<Limit>		<0.15 mm (0.006 in)>						
Piston ring:								
Sectional sketch	  	Top ring Barrel $B = 1.0 \text{ mm (0.04 in)}$ $T = 2.3 \text{ mm (0.09 in)}$						
		2nd ring Taper $B = 1.2 \text{ mm (0.05 in)}$ $T = 2.5 \text{ mm (0.10 in)}$						
		Oil ring Expander $B = 2.5 \text{ mm (0.10 in)}$ $T = 2.8 \text{ mm (0.11 in)}$						
End gap (Installed):	Top ring <Limit> 2nd ring <Limit> Oil ring	0.15 ~ 0.30 mm (0.006 ~ 0.012 in) <0.7 mm (0.028 in)> 0.15 ~ 0.35 mm (0.006 ~ 0.014 in) <0.7 mm (0.028 in)> 0.2 ~ 0.7 mm (0.008 ~ 0.028 in)						
Side clearance	Top ring <Limit> 2nd ring <Limit> Oil ring	0.035 ~ 0.07 mm (0.0014 ~ 0.0028 in) <0.15 mm (0.006 in)> 0.02 ~ 0.06 mm (0.0008 ~ 0.0024 in) <0.15 mm (0.006 in)> —						

## MAINTENANCE SPECIFICATIONS

**SPEC** 

Model	XJ600S
Connecting rod: Oil clearance <Limit>	0.026 ~ 0.060 mm (0.0010 ~ 0.0024 in) <0.08 mm (0.003 in)>
Crankshaft:	
 <p>Runout limit "A"          Big end side clearance "B"          &lt;Limit&gt;          Big end radial clearance "C"          &lt;Limit&gt;          Main journal oil clearance          Bearing size No. color code</p>	<p>0.03 mm (0.0012 in)          0.160 ~ 0.262 mm (0.0063 ~ 0.0103 in)          &lt;0.5 mm (0.02 in)&gt;          0.026 ~ 0.060 mm (0.0010 ~ 0.0024 in)          &lt;0.08 mm (0.003 in)&gt;          0.014 ~ 0.053 mm (0.0006 ~ 0.0021 in)          1. Blue    2. Black    3. Brown    4. Green          5. Yellow</p>
Clutch: Friction plate: Thickness x Quantity <Wear limit> Clutch plate: Thickness x Quantity <Warp limit> Clutch spring: Free length x Quantity Minimum length Clutch housing: Thrust clearance Radial clearance Clutch release method	<p>2.9 ~ 3.1 mm (0.114 ~ 0.122 in) x 8          &lt;2.7 mm (0.106 in)&gt;</p> <p>1.5 ~ 1.7 mm (0.060 ~ 0.067 in) x 7          &lt;0.15 mm (0.006 in)&gt;</p> <p>42.8 mm (1.69 in) x 5          41.8 mm (1.65 in)</p> <p>0.12 ~ 0.39 mm (0.005 ~ 0.0115 in)          0.015 ~ 0.043 mm (0.0006 ~ 0.0017 in)          Outer pull, rack &amp; Pinion pull</p>
Transmission: Main axle deflection limit Drive axle deflection limit	0.08 mm (0.0031 in) 0.08 mm (0.0031 in)
Shifter: Shifter type	Guide bar

## MAINTENANCE SPECIFICATIONS

SPEC



Model	XJ600S
Carburetor:	
Type/Manufacture x quantity	BDST28/MIKUNI x 4
I.D. mark	4BR00, 4DS00(D), 4EB00(D,S)
Main jet	(M.J.) #1, #4 : #105 #2, #3 : #102.5
Main air jet	(M.A.J.) #70
Jet needle-clip position	(J.N.) 5CT-3.5, 5CT-2.5(D,S)
Needle jet	(N.J.) 0-4
Pilot jet	(P.J.) #15
Pilot outlet size	(P.O.) 0.8
Pilot air jet	(P.A.J.) #145
Pilot screw (turns out)	(P.S.) 2
Valve seat size	(V.S.) 1.5
Starter jet	(G.S. <sub>1</sub> ) 47.5
	(G.S. <sub>2</sub> ) 0.6
Bypass 1	(B.P.1) 0.8
Bypass 2	(B.P.2) 0.8 (B.P. 3 : 0.8)
Throttle valve size	(Th. V.) #130
Float height	(F.H.) 11 ~ 13 mm (0.43 ~ 0.51 in)
Fuel level	(F.L.) 3 ~ 5 mm (0.12 ~ 0.20 in) Above from the float chamber line
Engine idle speed	1,150 ~ 1,250 r/min
Intake vacuum	34,58 ~ 35,91 kPa (260 ~ 270 mmHg, 10,24 ~ 10,64 inHg)
Lubrication system:	
Oil filter type	Paper
Oil pump type	Trochoid pump
Tip clearance	0.09 ~ 0.15 mm (0.0035 ~ 0.0060 in)
<Limit>	<0.2 mm (0.008 in)>
Side clearance	0.03 ~ 0.08 mm (0.0012 ~ 0.0031 in)
<Limit>	<0.15 mm (0.006 in)>
Bypass valve setting pressure	80 ~ 120 kPa (0.8 ~ 1.2 kg/cm <sup>2</sup> , 11.4 ~ 17.1 psi)
Relief valve operating pressure	450 ~ 550 kPa (4.5 ~ 5.5 kg/cm <sup>2</sup> , 64.0 ~ 78.2 psi)
Oil pressure (Hot)	80 kPa (0.8 kg/cm <sup>2</sup> , 11.4 psi)/1,200 r/min
Pressure check location	Main gallery

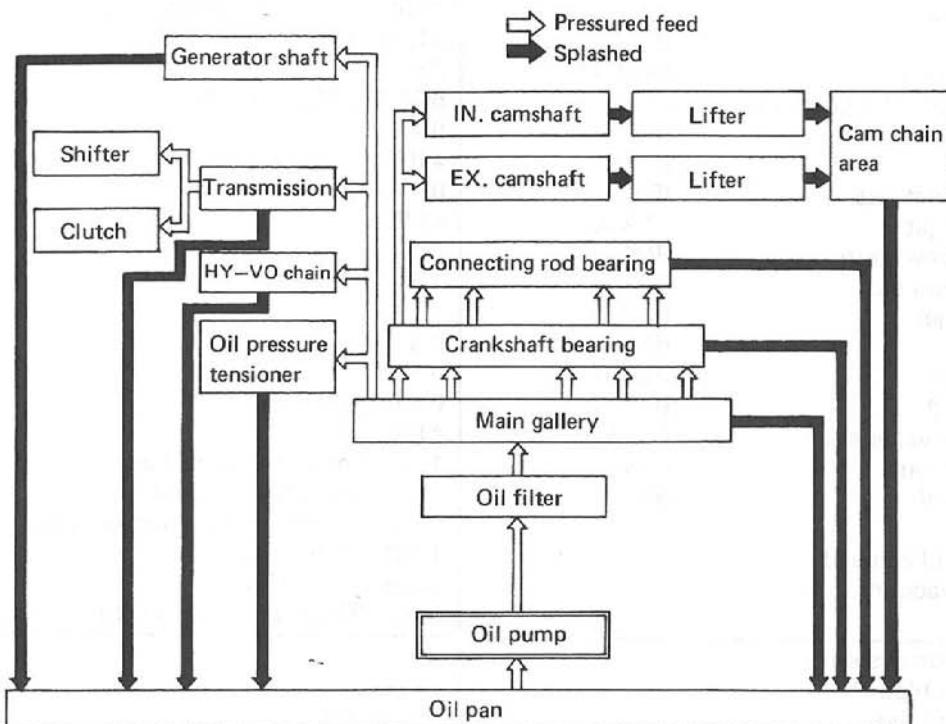
# MAINTENANCE SPECIFICATIONS

SPEC 

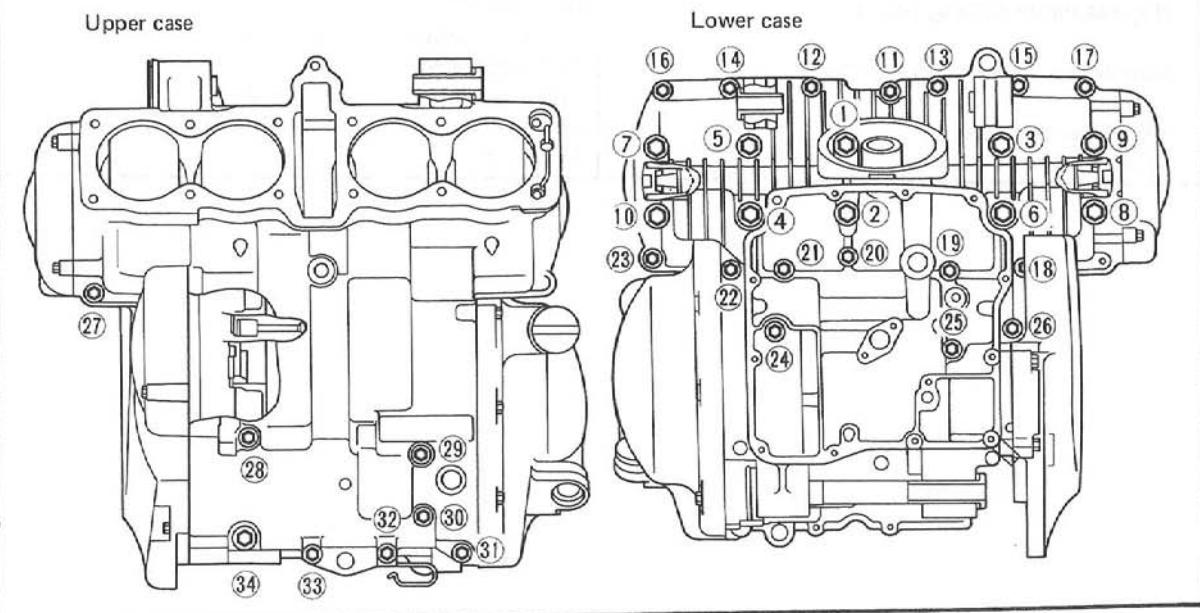
Model

XJ600S

Lubrication Chart:



Crankcase Thghtening Sequence:



# MAINTENANCE SPECIFICATIONS

**SPEC**



## TIGHTENING TORQUE:

Part to be tightened	Part name	Thread size	Q' ty	Tightening torque			Remarks
				Nm	m·kg	ft·lb	
Camshaft	Bolt	M 6	24	10	1.0	7.2	
Cylinder head (cam chain)	Stud bolt	M 6	4	5	0.5	3.6	
Cylinder head (exhaust pipe)	Stud bolt	M 6	8	15	1.5	11	
Cylinder head	Cap nut	M 8	12	22	2.2	16	
Spark plug	—	M 10	4	12.5	1.25	9.0	
Cylinder head cover	Bolt	M 6	8	10	1.0	7.2	
Cylinder and crankcase	Nut	M 8	1	20	2.0	14	
Cylinder head	Nut	M 6	4	10	1.0	7.2	
Connecting rod	Nut	M 7	8	25	2.5	18	
Cam sprocket	Bolt	M 7	4	24	2.4	17	
Cam chain tensioner	Bolt	M 6	2	10	1.0	7.2	
Cam chain guide	Cap bolt	—	1	20	2.0	14	
Oil pump rotor housing	Bolt	M 6	1	7	0.7	5.1	
Oil pump	Screw	M 6	1	7	0.7	5.1	
Oil pump strainer	Screw	M 6	3	7	0.7	5.1	
Oil pan	Bolt	M 6	2	10	1.0	7.2	
Oil filter	Bolt	M 6	12	10	1.0	7.2	
Drain bolt	Union bolt	M 20	1	17	1.7	12	
Oil filter housing	Plug	M 14	1	43	4.3	31	
Intake manihold	Union bolt	M 20	1	50	5.0	36	
Air filter cover	Bolt	M 6	8	10	1.0	7.2	
Air filter	Screw	M 5	4	5	0.5	3.6	
Exhaust pipe	Bolt	M 6	1	10	1.0	7.2	
Muffler	Nut	M 8	8	20	2.0	14	
Exhaust pipe joint	Bolt	M 10	2	25	2.5	18	
Crankcase	Bolt	M 8	2	20	2.0	14	
Crankcase (upper and lower)	Stud bolt	M 8	12	13	1.3	9.4	
Timing plate cover	Bolt	M 8	11	24	2.4	17	
Magneto cover	Bolt	M 6	22	12	1.2	8.8	
Crankcase (main gallary blind plug)	Bolt	M 6	4	8	0.8	5.8	
Sleeve tensioner	Bolt	M 6	3	10	1.0	7.2	
HI-VO chain guide (upper)	Plug	M 20	2	12	1.2	8.8	
Clutch pressure plate	Bolt	M 6	4	10	1.0	7.2	
Clutch boss	Bolt	M 6	2	8	0.8	5.8	
Primary drive gear	Bolt	M 6	5	8	0.8	5.8	
Drive sprocket	Nut	M 20	1	70	7.0	50	
Camshaft segment	Nut	M 16	1	50	5.0	36	
Shift shaft stopper lever	Nut	M 18	1	110	11.0	80	
Shift arm	Screw	M 6	1	12	1.2	8.8	
Stopper plate	Screw	M 8	1	22	2.2	16	
Shift pedal adjuster	Bolt	M 6	1	10	1.0	7.2	
Rotor	Nut	M 6	1	7	0.7	5.1	
Pickup coil base	Nut	M 6	1	10	1.0	7.2	
Timing plate	Bolt	M 10	1	80	8.0	58	
Neutral switch	Screw	M 6	2	8	0.8	5.8	
	Bolt	M 10	1	45	4.5	32	
	Screw	M 5	3	4	0.4	2.9	

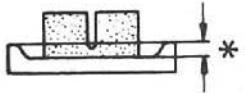
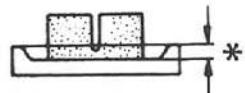
Left hand  
thread

**CHASSIS**

Model	XJ600S								
Steering system: Steering bearing type No./Size of steel balls:	Ball bearing 14 pcs/0.28 in 14 pcs/0.31 in								
Front suspension: Front fork travel Front spring free length <Limit> Spring rate: Stroke: Optional spring Oil capacity Oil level (Fully compression)	Upper Lower	K1 K2 K1 K2	140 mm (5.51 in) 476.5 mm (18.8 in) <471.5 mm (18.6 in)> 45 N/mm (0.45 kg/mm, 25.2 lb/in) 80 N/mm (0.8 kg/mm, 44.8 lb/in) 0 ~ 80 mm (0 ~ 3.15 in) 80 ~ 140 mm (3.15 ~ 5.51 in) No. 379 cm <sup>3</sup> (13.3 Imp oz, 12.8 US oz) 111 mm (4.37 in) Below the top of inner fork tube without fork spring Fork oil 10W or equivalent						
Rear suspension: Shock absorber travel Spring free length <Limit> Spring rate: Stroke: Optional spring Adjusting position		K1 K1	37 mm (1.46 in) 170.5 mm (6.71 in) <165 mm (6.51 in)> 1,800 N/mm (18 kg/mm, 1,008 lb/in) 0 ~ 37 mm (0 ~ 1.46 in) No.						
			Hard			STD	Soft		
			7	6	5	4	3	2	1
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 17 x MT2.50 Aluminum 2.0 mm (0.08 in) 2.0 mm (0.08 in)						
Rear wheel: Type Rim size Rim material Rim runout limit:	Radial Lateral		Cast wheel 18 x MT3.50 Aluminum 2.0 mm (0.08 in) 2.0 mm (0.08 in)						
Drive chain: Type/Manufacturer No. of links Chain free play			520VL2/DAIDO 110 30 ~ 40 mm (1.2 ~ 1.6 in)						

## MAINTENANCE SPECIFICATIONS

SPEC	
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Model	XJ600S
Front disc brake:	
Type	Single
Disc outside diameter × thickness	320 × 6 mm (12.6 × 0.24 in)
Pad thickness	Inner <Limit> *
	6.2 mm (0.24 in) <0.8 mm (0.03 in)>
Pad thickness	Outer <Limit> *
	6.2 mm (0.24 in) <0.8 mm (0.03 in)>
	
Master cylinder inside diameter	14 mm (0.55 in)
Caliper cylinder inside diameter	30.2 + 33.3 mm (1.19 + 1.31 in)
Brake fluid type	DOT #3 or #4
Rear disc brake:	
Type	Single
Disc outside diameter × thickness	245 × 4 mm (9.6 × 0.16 in)
Pad thickness	Inner <Limit> *
	5.5 mm (0.22 in) <0.5 mm (0.02 in)>
Pad thickness	Outer <Limit> *
	5.5 mm (0.22 in) <0.5 mm (0.02 in)>
	
Master cylinder inside diameter	12.7 mm (0.5 in)
Caliper cylinder inside diameter	38.18 mm (1.5 in)
Brake fluid type	DOT #3 or #4
Clutch lever:	
Clutch lever free play	2 ~3 mm (0.08 ~ 0.12 in)
Brake lever and brake pedal:	
Brake pedal position	40 mm (1.6 in) Below the top of the footrest

## MAINTENANCE SPECIFICATIONS

SPEC



## TIGHTENING TORQUE:

Part to be tightened	Thread size	Tightening torque			Remarks
		Nm	m-kg	ft-lb	
Handle crown and inner tube	M 8 x 1.25	23	2.3	17	
Handle crown and steering stem	M 22 x 1.0	110	11.0	80	
Steering stem and ring nut	M 25 x 1.0	18	1.8	13	
Inner tube and under bracket	M 8 x 1.25	38	3.8	2.7	
Under bracket and brake hose holder	M 6 x 1.0	10	1.0	7.2	
Brake hose and union bolt	M 10 x 1.25	30	3.0	22	
Upper cowl and stay	M 5 x 0.8	0.5	0.05	0.4	
Upper cowl and screen	M 5 x 0.8	0.5	0.05	0.4	
Cowl stay and frame	M 8 x 1.25	16	1.6	11	
Meter and stay	M 6 x 1.0	7	0.7	5.1	
Handlebar and grip end	M 16 x 1.5	26	2.6	19	
Front master cylinder and bracket	M 6 x 1.0	9	0.9	6.5	
Front master cylinder and cap	M 4 x 0.7	1.5	0.15	1.1	
Handle crown and holder upper	M 8 x 1.25	23	2.3	17	
Handle crown and main switch	M 6 x 1.0	7	0.7	5.1	
Front flasher light and stay	M 12 x 1.25	4	0.4	2.9	
Head light and stay	M 8 x 1.25	7	0.7	5.1	
Upper cowl and frame	M 5 x 0.8	0.5	0.05	0.4	
Upper cowl (left and right)	—	1.5	0.15	1.1	
Engine mount (upper)	M 10 x 1.25	60	6.0	43	
(lower)	M 10 x 1.25	60	6.0	43	
(rear)	M 12 x 1.25	88	8.8	64	
Engine stay and frame	M 10 x 1.25	46	4.6	33	
Pivot shaft and nut	M 14 x 1.5	91	9.1	66	
Rear shock absorber and rear arm	M 12 x 1.25	64	6.4	46	
Rear shock absorber and frame	M 12 x 1.25	64	6.4	46	
Chain case and rear arm	M 6 x 1.0	7	0.7	5.1	
Seal guard	M 6 x 1.0	7	0.7	5.1	
Fuel cock and fuel tank	M 6 x 1.0	7	0.7	5.1	
Fuel tank bracket and fuel tank	M 6 x 1.0	7	0.7	5.1	
Fuel tank bracket and frame	M 6 x 1.0	10	1.0	7.2	
Fuel tank and frame	M 8 x 1.25	15	1.5	11	
Rotor assembly and frame	M 6 x 1.0	7	0.7	5.1	
Rear fender and frame	M 6 x 1.0	7	0.7	5.1	
Tail light	M 6 x 1.0	7	0.7	5.1	
Rear fender cover and side cover	M 6 x 0.8	4	0.4	2.9	
Rectifier/Regulator	M 6 x 1.0	7	0.7	5.1	
Side cover	M 5 x 0.8	4	0.4	2.9	
Rear fender stay and frame	M 6 x 1.0	10	1.0	7.2	
Ignitor unit	—	1.5	0.15	1.1	
Fuse box	—	1.5	0.15	1.1	
Rear flasher light	M 12 x 1.25	5	0.5	3.6	
Front wheel axle	M 16 x 1.5	59	5.9	43	
Rear wheel axle and nut	M 16 x 1.5	105	10.5	75	
Front caliper and front fork	M 10 x 1.25	35	3.5	25	
Rear caliper and caliper bracket	M 10 x 1.25	35	3.5	25	
Caliper bracket and compression bar	M 8 x 1.25	30	3.0	22	
Rear arm and compression bar	M 8 x 1.25	30	3.0	22	
Brake disc and wheel (front and rear)	M 8 x 1.25	20	2.0	14	
Rear wheel sprocket and clutch hub	M 10 x 1.25	60	6.0	43	
Bleed screw and caliper	M 7 x 1.0	6	0.6	4.3	
Front wheel axle pinch bolt	M 8 x 1.25	20	2.0	14	
Front fender and front fork	M 6 x 1.0	9	0.9	6.5	



## MAINTENANCE SPECIFICATIONS

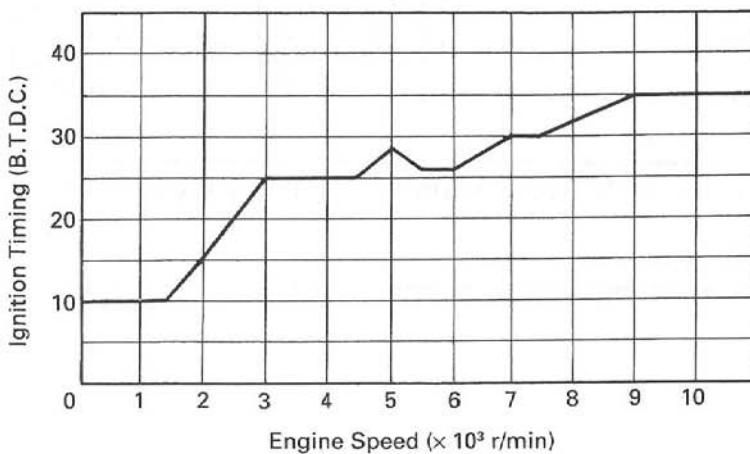
**SPEC** 
**TIGHTENING TORQUE:**

Part to be tightened	Thread size	Tightening torque			Remarks
		Nm	m • kg	ft • lb	
Brake hose holder and front fork	M 6 x 1.0	7	0.7	5.1	
Sidestand	M 10 x 1.25	40	4.0	29	
Sidestand and lock nut	M 10 x 1.25	40	4.0	29	
Rear master cylinder	M 8 x 1.25	23	2.3	17	
Rear brake reservoir tank	M 6 x 1.0	4	0.4	2.9	
Footrest bracket and footrest	M 10 x 1.25	30	3.0	22	
Shift pedal	M 8 x 1.25	30	3.0	22	

**NOTE:**

1. First, tighten the ring nut approximately 52 Nm (5.2 m • kg, 37 ft • lb) by using the torque wrench, then loosen the ring nut one turn.
2. Retighten the ring nut to specification.

**ELECTRICAL**

Model	XJ600S
Voltage:	12V
Ignition system:	
Ignition timing (B.T.D.C.)	10° at 1,200 r/min
Advanced timing (B.T.D.C.)	35° at 9,000 r/min
Advancer type	Electrical
	
T.C.I.:	
Pickup coil resistance (Color)	304 ~ 456Ω at 20°C (68°F) (White/Red – White/Black)
T.C.I. Unit/Manufacturer	4BR/YAMAHA
Ignition coil:	
Model/Manufacturer	4BR/YAMAHA
Minimum spark gap	6 mm (0.24 in)
Primary winding resistance	1.92 ~ 2.88Ω at 20°C (68°F)
Secondary winding resistance	9.52 ~ 14.28 kΩ at 20°C (68°F)
Spark plug cap:	
Type	Resin type
Resistance	10 kΩ
Charging system:	
Type	A.C. magneto generator
A.C. Generator:	
Model/Manufacturer	F4BR/YAMAHA
Nominal output	14V, 21A at 5,000 r/min
Stator coil resistance	0.32 ~ 0.48 Ω at 20°C (68°F) (White – White)
Voltage regulator:	
Type	Semi conductor – short circuit
Model/Manufacturer	SH629/SHINDENGEN
No load regulated voltage	14.3 ~ 15.3V
Rectifier:	
Model/Manufacturer	SH629/SHINDENGEN
Capacity	25A
Withstand voltage	200V
Battery:	
Capacity	12V, 8AH
Specific gravity	1.320

## MAINTENANCE SPECIFICATIONS

**SPEC**

Model	XJ600S
Electrical starter system:	
Type	Constant mesh type
Starter motor:	
Model/Manufacturer	SM-13/MITSUBA
Output	0.8 kW
Armature coil resistance	0.011 ~ 0.013Ω at 20°C (68°F)
Brush — Overall length	12.5 mm (0.49 in)
<Limit>	<4 mm (0.16 in)>
— Spring force	340 ~ 460g (12.0 ~ 16.2 oz)
Commutator dia.	28. mm (1.10 in)
<Wear limit>	<27 mm (1.06 in)>
Mica undercut	0.8 mm (0.03 in)
Starter switch:	
Model/Manufacturer	4BP/HITACHI
Amperage rating	100A
Coil winding resistance	3.9 ~ 4.7Ω at 20°C (68°F)
Horn:	
Type/Quantity	Plane type/1 pc.
Model/Manufacturer	YF-12/NIKKO
Maximum amperage	2.5A
Flasher relay (Relay assembly):	
Type	Semi transistor type
Model/Manufacturer	FB249M/NIPPON DENSO
Self cancelling device	No
Flasher frequency	75 ~ 95 cycle/min
Wattage	21W x 2 pcs + 3.4W
Oil level switch:	
Model/Manufacturer	4BR/NIPPON DENSO
Starting circuit cut-off relay:	
Model/Manufacturer	G8R-30Y/OMRON
Coil winding resistance	180 ~ 270Ω at 20°C (68°F)
Diode	Yes
Circuit breaker:	
Type	Fuse
Amperage for individual circuit x quantity:	
MAIN	30A x 1
HEAD	15A x 1
SIGNAL	15A x 1
IGNITION	10A x 1
RESERVE	30A x 1, 15A x 1, 10A x 1

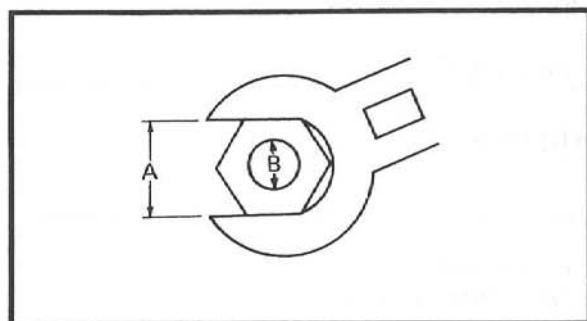
# GENERAL TORQUE SPECIFICATIONS/ DEFINITION OF UNITS



## 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	$1\text{kg} \times \text{m/sec}^2$	Force
Nm	Newton meter	$\text{N} \times \text{m}$	Torque
m-kg	Meter kilogram	$\text{m} \times \text{kg}$	Torque
Pa	Pascal	$\text{N/m}^2$	Pressure
N/mm	Newton per millimeter	$\text{N/mm}$	Spring rate
L	Liter	—	Volume or capacity
cm <sup>3</sup>	Cubic centimeter	—	Volume or capacity
r/min	Revolution per minute	—	Engine speed

## LUBRICATION POINT AND GRADE OF LUBRICANT

**SPEC** 

### LUBRICATION POINT AND GRADE OF LUBRICANT ENGINE

Lubrication Point	Symbol
Oil seal lips	
O-ring	
Bearing	
Piston surface	
Piston pin	
Crankshaft pin	
Crankshaft journal	
Connecting rod bolt/nut	
Camshaft cam lobe/journal	
Valve stem (IN, EX)	
Valve stem end (IN, EX)	
Valve lifter	
Oil pump rotor (Inner/outer), housing	
Oil strainer assembly	
Idle gear surface	
Starter idle gear	
Starter idle gear shaft	
Starter clutch (outer/roller)	
Crakcase cover (pull rod hole)	
Primary driver gear/damper	
Transmission gear (Wheel/pinion)	
Axle (Main/drive)	
Pull rod (bearing/washer)	
Shift cam	
Shift fork/guide bar	
Shift shaft assembly	

## CHASSIS

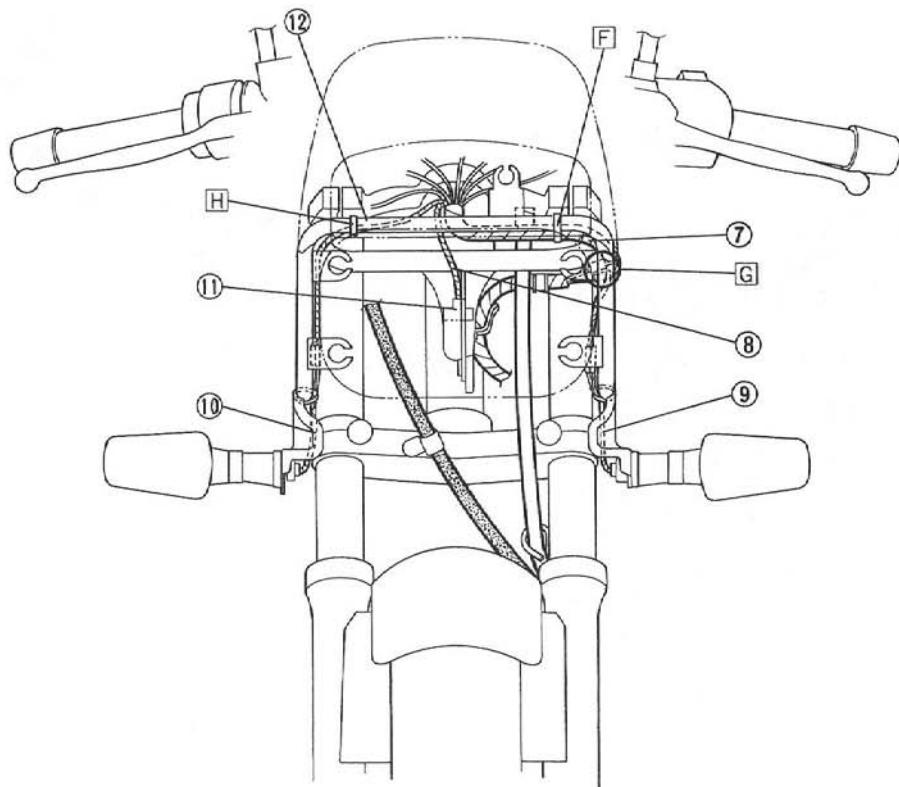
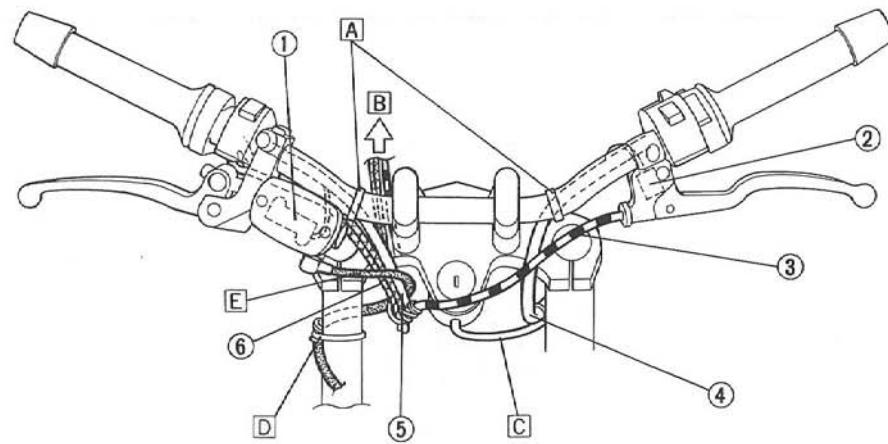
Lubrication Point	Symbol
Steering bearing (upper/lower)	 LS
Front wheel oil seal (right/left)	 LS
Rear wheel oil seal	 LS
Clutch hub oil seal	 LS
Clutch hub fitting area	 LS
Rear brake pedal shaft	 LS
Shift pedal	 LS
Center stand sliding surface	 LS
Side stand sliding surface	 LS
Tube guide (throttle grip) inner surface	 LS
Clutch cable end (lever side)	 LS
Brake lever bolt, sliding surface	 LS
Clutch lever bolt, sliding surface	 LS
Rear shock absorber (lower-collar/oil seal)	 LM
Swingarm pivot bearing	 LM
Pivot shaft	 LM
Swing arm (thrust cover)	 LM



## CABLE ROUTING

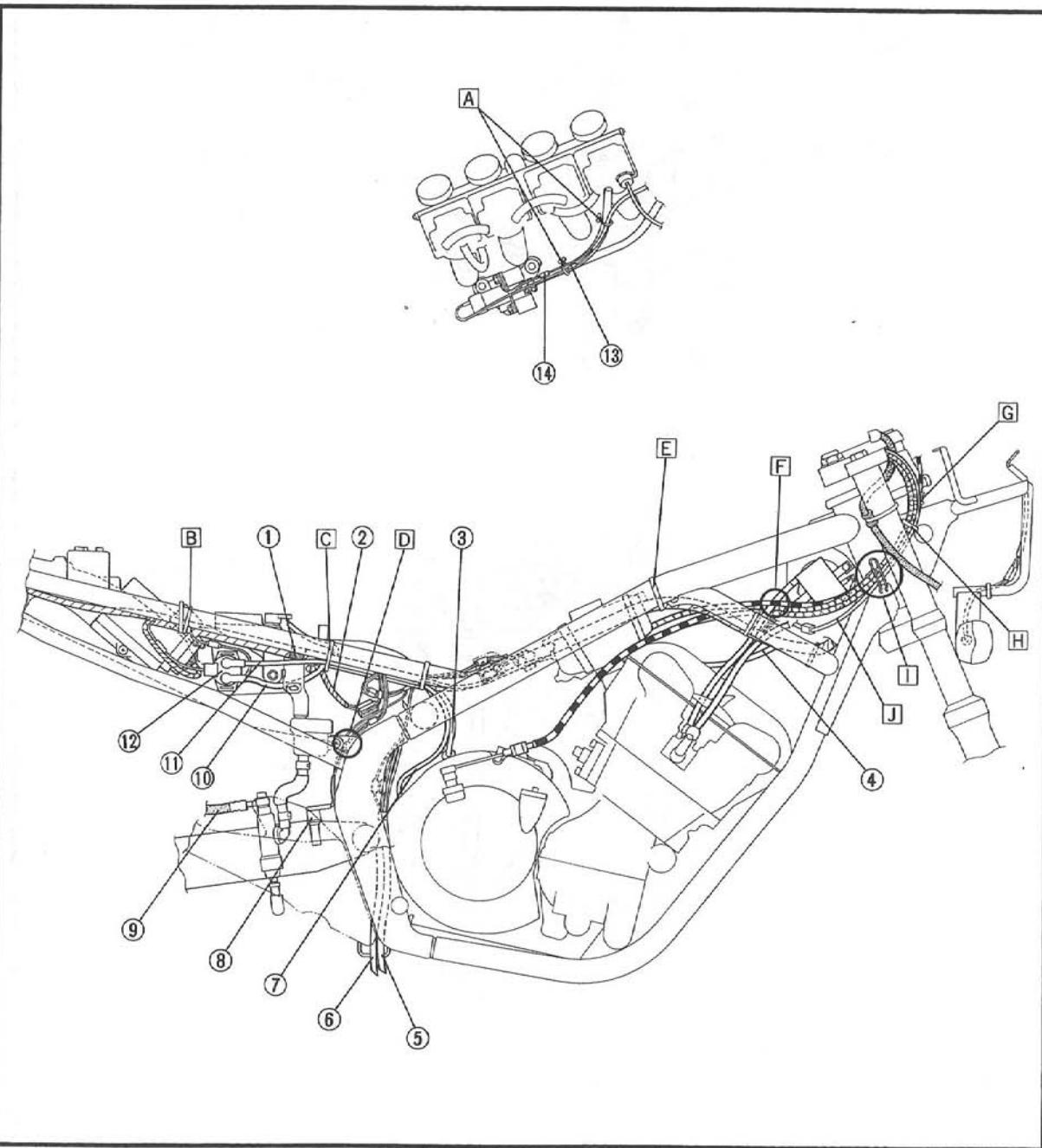
- ① Front brake switch
- ② Clutch switch
- ③ Clutch cable
- ④ Handlebar switch lead (left)
- ⑤ Handle bar switch lead (right)
- ⑥ Throttle cable
- ⑦ Meter light lead
- ⑧ Headlight lead
- ⑨ Flasher light lead (left)
- ⑩ Flasher light lead (right)

- ⑪ Headlight coupler
- ⑫ Cowling stay
- A Clamp the handlebar switch lead (left and right)
- B Under the fuel tank
- C Clamp the main switch lead to the handlebar switch (left).
- D Clamp the brake hose.
- E Pass the brake hose between the cables and handle crown.
- F Clamp the meter light lead to the cowling stay.
- G Keep the couplers on the inside of the cowling stay.
- H Clamp the flasher light lead (right) to the cowling stay.



- ① White tape
- ② Relay lead
- ③ Starter motor lead
- ④ High tension cord
- ⑤ Fuel tank breather hose
- ⑥ Air filter drain hose
- ⑦ Ground lead
- ⑧ Rear brake switch
- ⑨ Brake hose
- ⑩ Positive lead
- ⑪ Negative lead
- ⑫ Starter relay
- ⑬ Solenoid coupler
- ⑭ Ground coupler

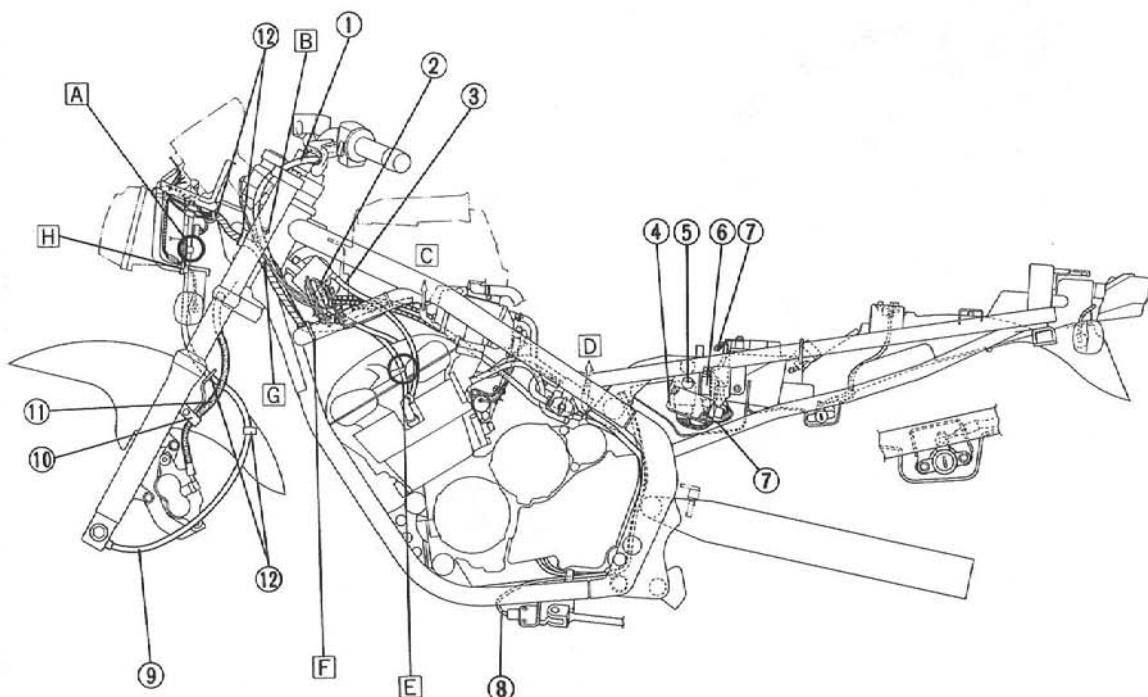
- [A] Clamp the hose and solenoid ground lead.
- [B] Clamp the wireharness.
- [C] Clamp the wireharness and starter motor lead.
- [D] Pass the rear brake switch lead on the inside of the reservoir tank bracket.
- [E] Clamp the wireharness.
- [F] Pass the high tension cord (#3) on the outside of the throttle cables.
- [G] Clamp the clutch cable (grommet) and throttle cable 2 (no adjuster).
- [H] Clamp the clutch cable, throttle cables and handlebar switch lead (right).
- [I] Clamp the handlebar switch lead (right), clutch cable and throttle cables.
- [J] Pass the handlebar switch lead (right) on the left side of frame.





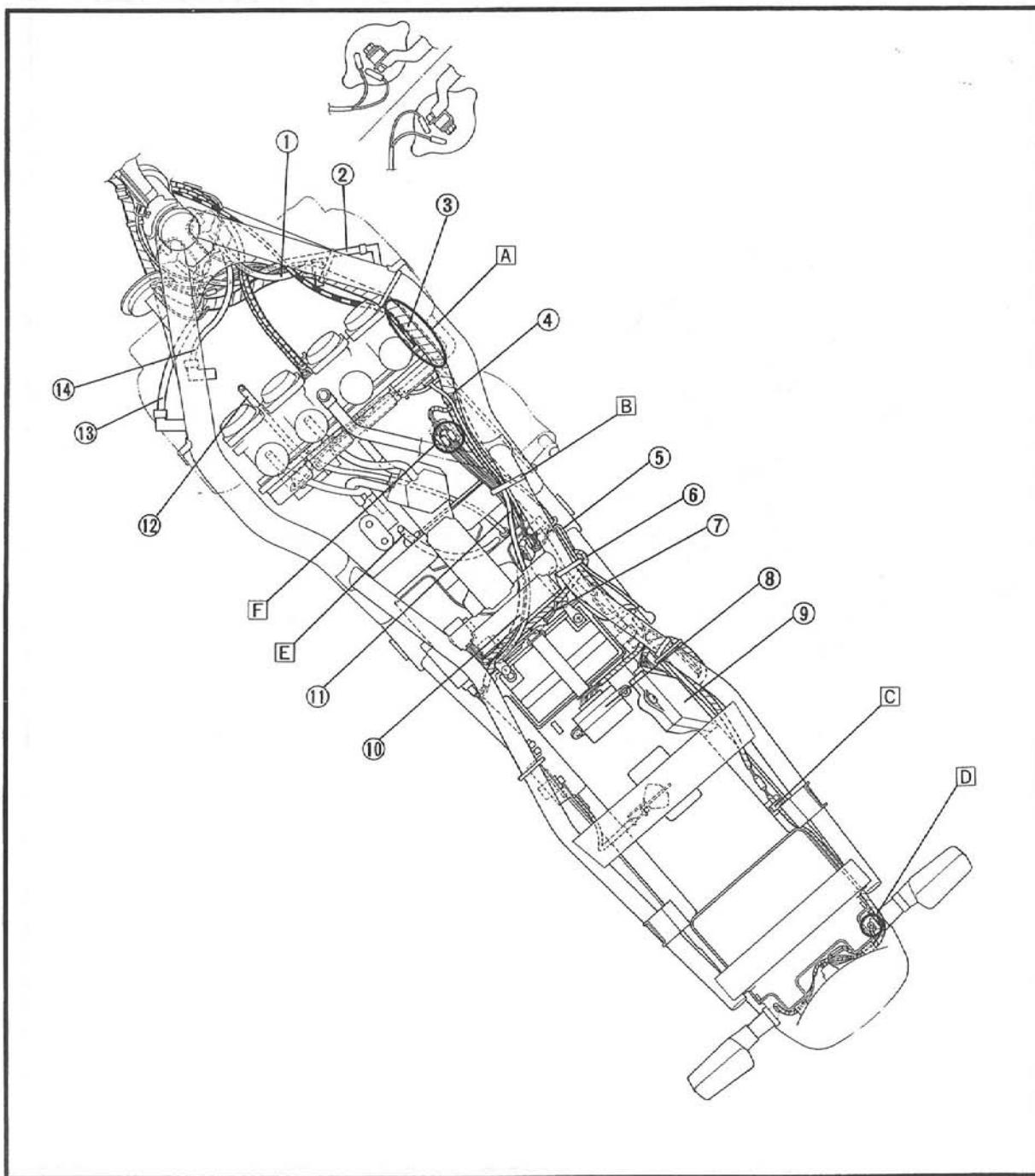
- ① Handlebar switch lead (left)
- ② Horn lead
- ③ High tension cord
- ④ Rectifier/regulator
- ⑤ Relay assembly
- ⑥ Flasher relay assembly
- ⑦ Ground lead
- ⑧ Sidestand switch lead
- ⑨ Speedometer cable
- ⑩ Brake hose holder
- ⑪ Brake hose
- ⑫ Clamp

- A Pass the speedometer cable on the inside of the headlight adjuster.
- B Clamp the main switch lead and handlebar switch lead (left).
- C To air cleaner
- D To fuel tank
- E Pass the high tension cord (#2, #3) through the hole in the rubber plate.
- F Clamp the handlebar switch lead (left) and wireharness (white tape).
- G Clamp the wireharness and handlebar switch lead (left).
- H Clamp the flasher light leads (left and right) to the cowling stay.



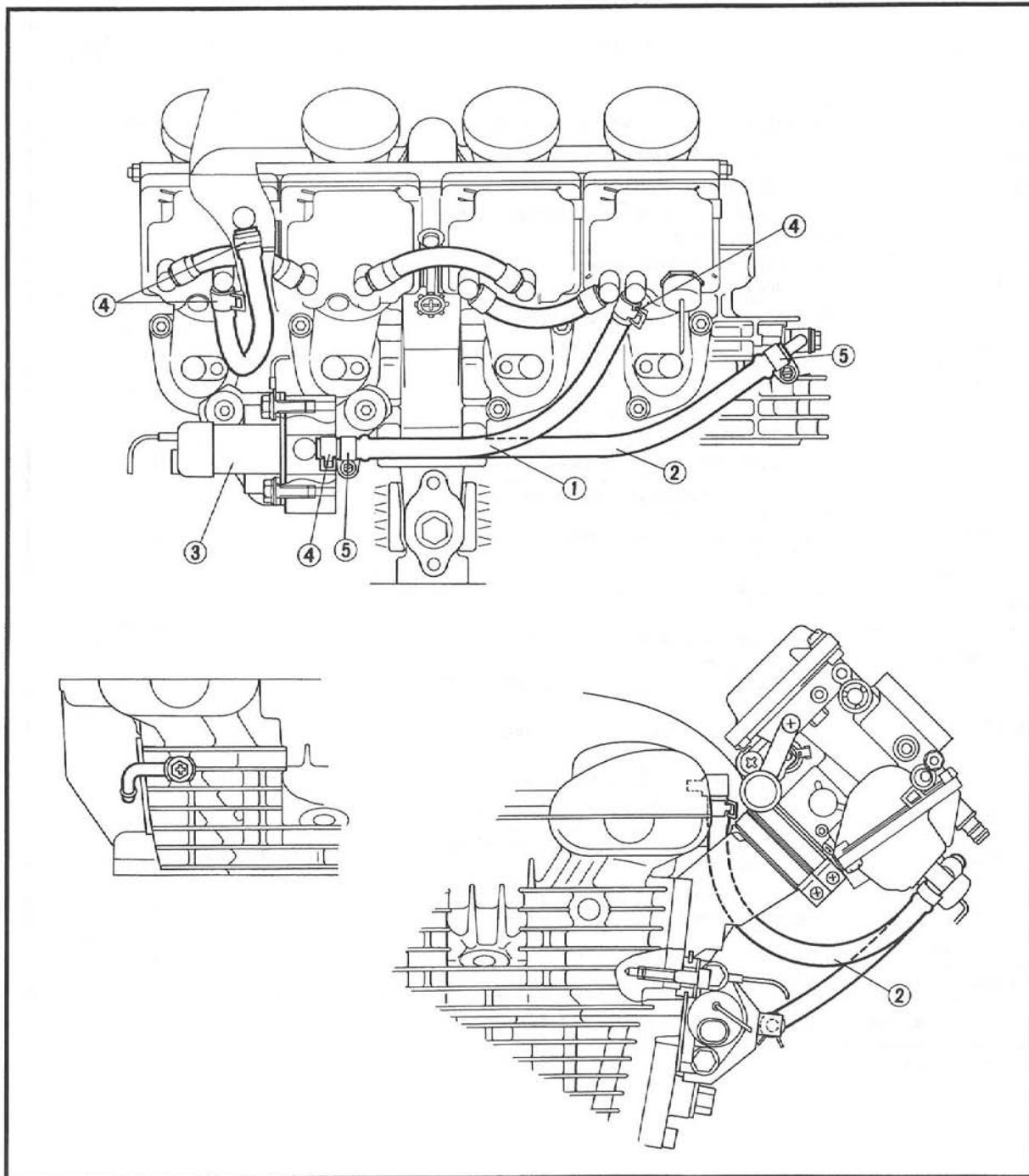


- |                          |   |
|--------------------------|---|
| ① High tension cord (#3) | ⑬ High tension cord (#1)  |
| ② High tension cord (#4) | ⑭ High tension cord (#2)  |
| ③ Wireharness            | A Pass the wireharness above the carburetor.  |
| ④ Clamp                  | B Clamp the wireharness, starter motor lead, ground lead, AC magneto leads, thermo switch lead, pick up lead, sidestand switch lead, and neutral/oil level switch lead. |
| ⑤ Rear brake switch lead | C Clamp the tail light lead.  |
| ⑥ Regulator lead         | D Pass the flasher light lead (left and right) through the hole in the rear fender.   |
| ⑦ Ground lead            | E Pass the fuel tank breather hose over the starter motor lead.   |
| ⑧ Fuse box               | F Keep the AC magneto lead, pick up lead, sidestand switch lead and neutral/oil level switch lead connector in the guide.   |
| ⑨ Ignitor unit           |   |
| ⑩ Relay lead             |   |
| ⑪ Starter motor lead     |   |
| ⑫ Air filter drain hose  |   |





- ① Hose (solenoid valve-carburetor)
- ② Hose (cylinder head-solenoid valve)
- ③ Solenoid valve
- ④ Clip
- ⑤ Clamp





## PERIODIC INSPECTION AND ADJUSTMENT

### INTRODUCTION

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

### PERIODIC MAINTENANCE/LUBRICATION

Unit: km (miles)

Item	Remarks	Break-in 1,000 (600)	EVERY	
			6,000 (4,000) or 6 months	12,000 (8,000) or 12 months
Valve(s)*	Check valve clearance. Adjust if necessary.		EVERY 24,000 (16,000) or 24 months	
Spark plug(s)	Check condition. Clean or replace if necessary.	○	○	○
Air filter	Clean. Replace if necessary.		○	○
Carburetor*	Check idle speed/synchronization/starter operation. Adjust if necessary.	○	○	○
Fuel line*	Check fuel hose and vacuum pipe for cracks or damage. Replace if necessary.		○	○
Fuel filter*	Check condition. Replace if necessary.			○
Engine oil	Replace (Warm engine before draining).	○	○	○
Engine oil filter*	Replace.	○		○
Brake*	Check operation/fluid leakage/See NOTE. Correct 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.***			○
Wheel*	Check balance/damage/runout. Repair if necessary.		○	○
Wheel bearings*	Check bearings assembly for looseness/damage. Replace if damaged.		○	○
Steering bearings*	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.		○	○
Drive chain	Check chain slack/alignment. Adjust if necessary. Clean and lube.		EVERY 500 (300)	
Fittings/Fasteners*	Check all chassis fittings and fasteners. Correct if necessary.	○	○	○
Center and sidestand*	Check operation. Repair if necessary.	○	○	○
Sidestand switch*	Check operation. Replace if necessary.	○	○	○

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

\*\* : Medium weight wheel bearing grease.

\*\*\* : Molybdenum disulfide grease.

## PERIODIC MAINTENANCE/LUBRICATION

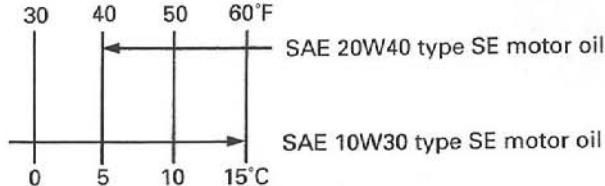


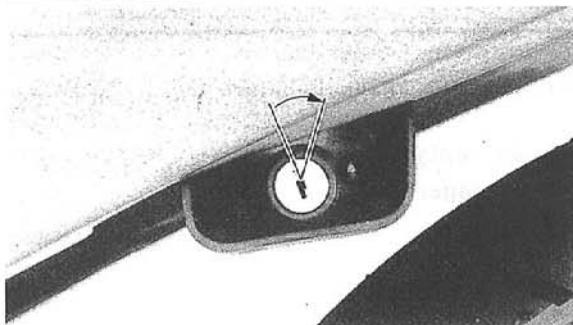
### NOTE:

Brake fluid replacement:

1. When dissembling 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 if cracked or damaged.

Engine oil:



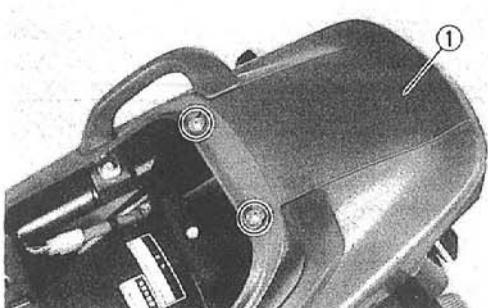


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**SIDE COVER, FUEL TANK AND COWLING****REMOVAL**

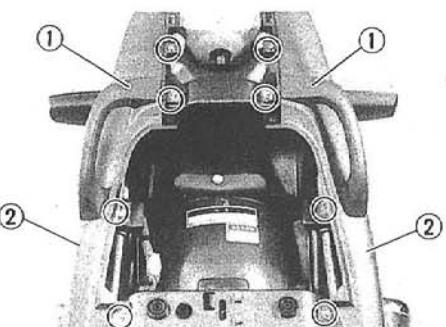
## 1. Remove:

- Seat



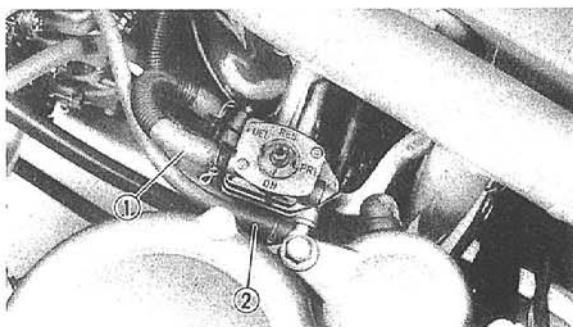
## 2. Remove:

- Tail cover ①



## 3. Remove:

- Grab bars ① (left and right)
- Side covers ① (left and right)



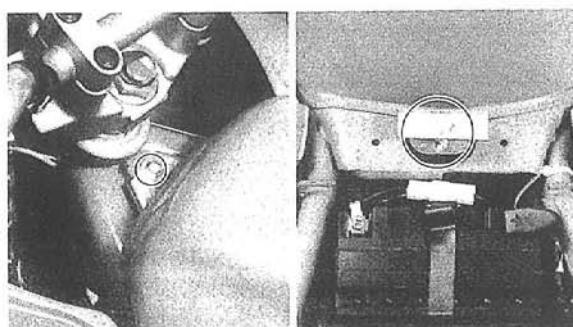
## 4. Turn the fuel cock to "RES" position.

## 5. Remove:

- Fuel cock knob

## 6. Disconnect:

- Fuel hose ①
- Vacuum hose ②

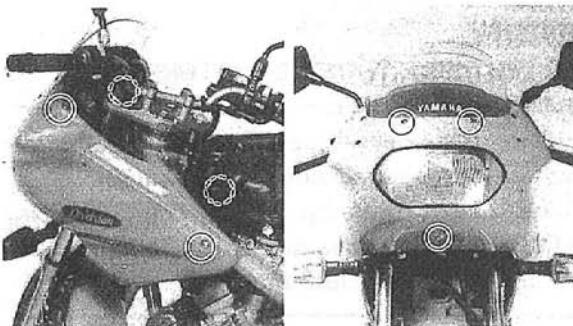


## 7. Remove:

- Fuel tank

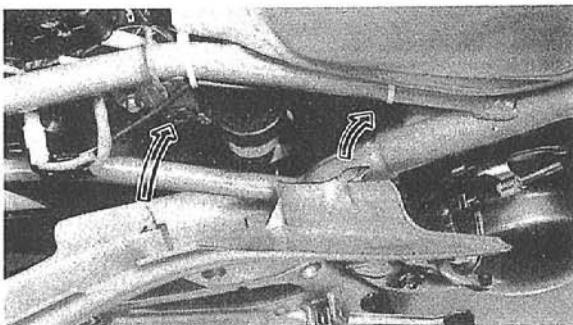
## SIDE COVER, FUEL TANK AND COWLING

INSP  
ADJ



### 8. Remove:

- Cowling



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## INSTALLATION

Reverse the "REMOVAL" procedure. Note the following points.

### 1. Install:

- Cowling
- Fuel tank
- Side covers (left and right)



#### Bolt (cowling):

0.5 Nm (0.05 m · kg, 0.4 ft · lb)

#### Screw (cowling):

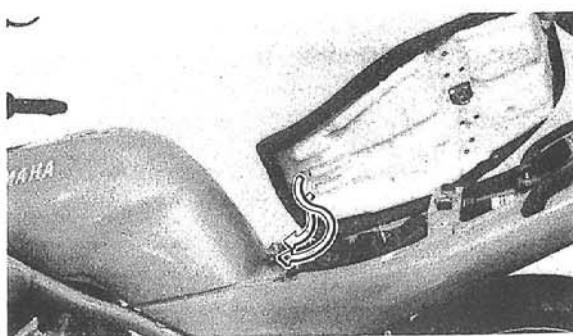
1.5 Nm (0.15 m · kg, 1.1 ft · lb)

#### Bolt (fuel tank—front):

10 Nm (1.0 m · kg, 7.2 ft · lb)

#### Bolt (fuel tank—rear):

15 Nm (1.5 m · kg, 11 ft · lb)



### 2. Install:

- Seat

#### NOTE:

When installing the seat, insert the lobes on the seat front into the respective on the frame, then push down the seat.

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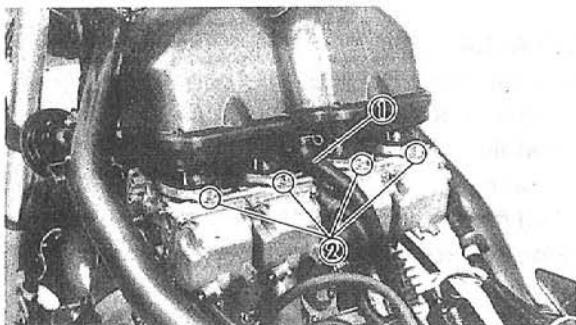
**ENGINE****VALVE CLEARANCE ADJUSTMENT****NOTE:**

- The valve clearance should be adjusted when the engine is cool to the touch.
- The piston must be at Top Dead Center (TDC) on compression stroke to check or adjust the valve clearance.

**1. Remove:**

- Seat
- Fuel tank
- Cowling

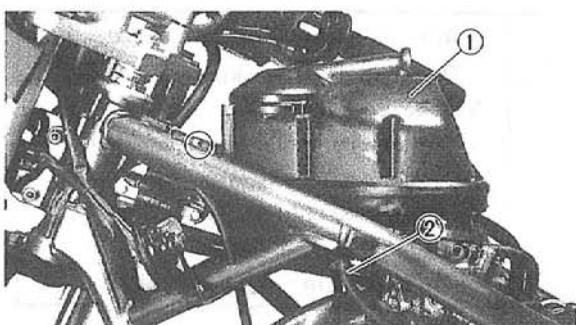
Refer to "SIDE COVER, FUEL TANK AND COWLING" section.

**2. Disconnect:**

- Breather hose (1)

**3. Loosen:**

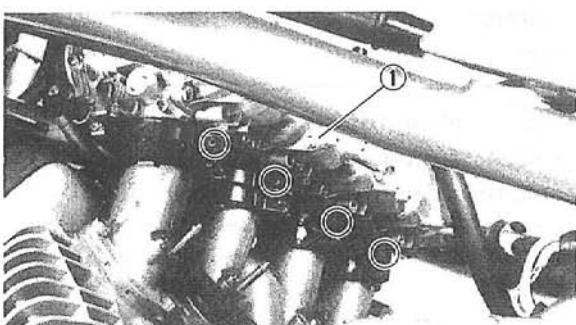
- Screws (2)

**4. Remove:**

- Air filter case (1)

**5. Disconnect:**

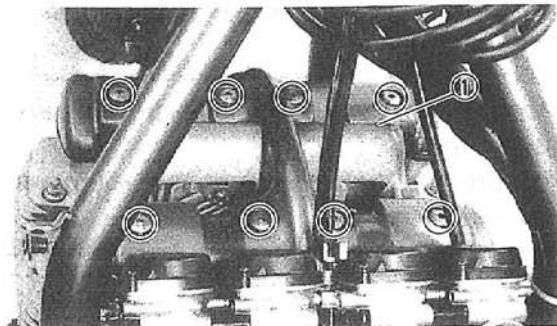
- Drain hose (2)

**6. Remove:**

- Carburetor assembly (1)

## VALVE CLEARANCE ADJUSTMENT

**INSP  
ADJ**

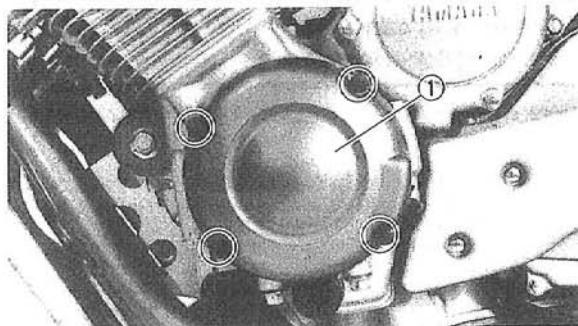


### 7. Disconnect:

- Spark plug caps

### 8. Remove:

- Cylinder head cover ①



### 9. Remove:

- Timing plate cover ①

### 10. Check:

- Valve clearance  
Out of Specification → Adjust



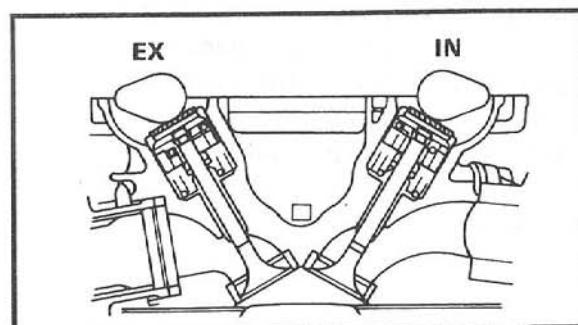
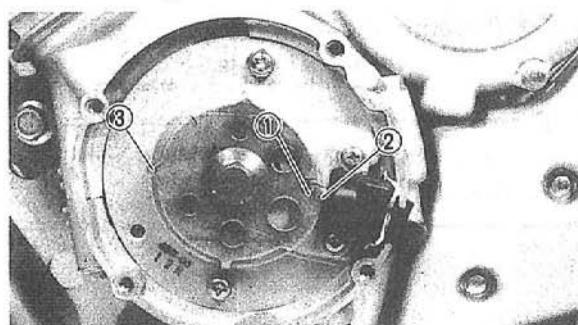
#### Valve clearance (cold):

##### Intake valve

0.11~0.15 mm (0.004~0.006 in)

##### Exhaust valve

0.21~0.25 mm (0.008~0.010 in)



#### \*\*\*\*\* Checking steps:

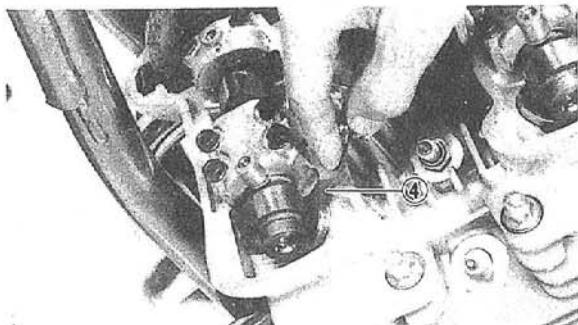
- Turn the crankshaft counterclockwise with a wrench.  
For #1 and #4 cylinders.
- Align the TDC mark ① with the pickup coil ②.  
For #2 and #3 cylinders.
- Align the TDC mark ③ with the pickup coil ②.

#### NOTE:

TDC on compression stroke can be found when the cam lobes are opposite each other as shown.

## VALVE CLEARANCE ADJUSTMENT

INSP  
ADJ



- Measure the valve clearance by using a feeler gauge ④ .

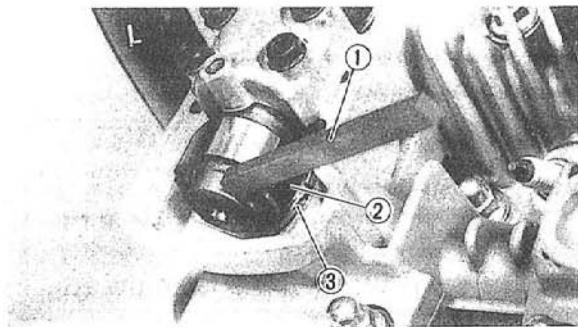
**NOTE:**

- Record the measured reading if the clearance is incorrect.
- Measure valve clearance in the following sequence.

**Measuring sequence:**

#1 → #2 → #4 → #3

\*\*\*\*\*



**11. Adjust:**

- Valve clearance

\*\*\*\*\*

**Adjustment steps:**

- Position the valve lifter slots (intake and exhaust) opposite each other.
- Attach the Tappet adjusting tool ① .

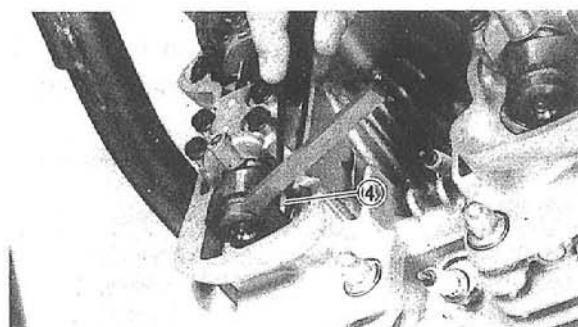


**Tappet adjusting tool:**  
**P/N. 90890-04125**

**NOTE:**

Make sure the tool only contacts the lifter ③ , not the pad ② .

- \*\*\*\*\*
- Slowly turn the tappet adjusting tool so that the pads can be removed.
  - Remove the pads ④ from the lifters. Use a small screwdriver and a pair of tweezers for removal. Note pad numbers.
  - Select the proper valve adjusting pad from the following chart.



# VALVE CLEARANCE ADJUSTMENT

**INSP  
ADJ**



## INTAKE

MEASURED CLEARANCE	INSTALLED PAD NUMBER																										
	200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320		
0.00~0.05		200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320	
0.06~0.10		200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320	
0.11~0.15																											
0.16~0.20		205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320		
0.21~0.25		210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320			
0.26~0.30		215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320				
0.31~0.35		220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320					
0.36~0.40		225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320						
0.41~0.45		230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320							
0.46~0.50		235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320								
0.51~0.55		240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320									
0.56~0.60		245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320										
0.61~0.65		250	255	260	265	270	275	280	285	290	295	300	305	310	315	320											
0.66~0.70		255	260	265	270	275	280	285	290	295	300	305	310	315	320												
0.71~0.75		260	265	270	275	280	285	290	295	300	305	310	315	320													
0.76~0.80		265	270	275	280	285	290	295	300	305	310	315	320														
0.81~0.85		270	275	280	285	290	295	300	305	310	315	320															
0.86~0.90		275	280	285	290	295	300	305	310	315	320																
0.91~0.95		280	285	290	295	300	305	310	315	320																	
0.96~1.00		285	290	295	300	305	310	315	320																		
1.01~1.05		290	295	300	305	310	315	320																			
1.06~1.10		295	300	305	310	315	320																				
1.11~1.15		300	305	310	315	320																					
1.16~1.20		305	310	315	320																						
1.21~1.25		310	315	320																							
1.26~1.30		315	320																								
1.31~1.35		320																									

VALVE CLEARANCE (cold):

0.11~0.15 mm (0.004~0.006 in)

Example: Installed is 250

Measured clearance is 0.23 mm

(0.009 in)

Replace 250 pad with 260 pad

Pad number: (example)

Pad No. 250 = 2.50 mm (0.098 in)

Pad No. 255 = 2.55 mm (0.100 in)

Always install pad with number down.

## EXHAUST

MEASURED CLEARANCE	INSTALLED PAD NUMBER																									
	200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320	
0.00~0.05			200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305		
0.06~0.10			200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	
0.10~0.15			200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	
0.16~0.20			200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	
0.21~0.25																										
0.26~0.30		210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320		
0.31~0.35		215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320			
0.36~0.40		220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320				
0.41~0.45		225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320					
0.46~0.50		230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320						
0.51~0.55		235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320							
0.56~0.60		240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320								
0.61~0.65		245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320									
0.66~0.70		250	255	260	265	270	275	280	285	290	295	300	305	310	315	320										
0.71~0.75		255	260	265	270	275	280	285	290	295	300	305	310	315	320											
0.76~0.80		260	265	270	275	280	285	290	295	300	305	310	315	320												
0.81~0.85		265	270	275	280	285	290	295	300	305	310	315	320													
0.86~0.90		270	275	280	285	290	295	300	305	310	315	320														
0.91~0.95		275	280	285	290	295	300	305	310	315	320															
0.96~1.00		280	285	290	295	300	305	310	315	320																
1.01~1.05		285	290	295	300	305	310	315	320																	
1.06~1.10		290	295	300	305	310	315	320																		
1.11~1.15		295	300	305	310	315	320																			
1.16~1.20		300	305	310	315	320																				
1.21~1.25		305	310	315	320																					
1.26~1.30		310	315	320																						
1.31~1.35		315	320																							
1.36~1.40		320																								

VALVE CLEARANCE (cold):

0.21~0.25 mm (0.008~0.010 in)

Example: Installed is 250

Measured clearance is 0.32 mm

(0.013 in)

Replace 250 pad with 265 pad

Pad number: (example)

Pad No. 250 = 2.50 mm (0.098 in)

Pad No. 255 = 2.55 mm (0.100 in)

Always install pad with number down.

## VALVE CLEARANCE ADJUSTMENT



Pad range		Pad availability: 25 increments
No. 200	2.00 mm (0.079 in)	Pads are stepped in 0.05 mm (0.002 in) incre- ments
~ No. 320	~ 3.20 mm (0.130 in)	

### NOTE:

Thickness of each pad is marked on the pad face that contacts the valve lifter (not the cam).

- Round off the hundredths digit of the original pad number to the nearest 0.05 mm increment.

Hundredths digit → Rounded valve
0 or 2 → 0
5 → (NOT ROUNDED OFF)
8 → 10

### EXAMPLE:

Original pad number = 248 (2.48 mm)

Rounded off digit = 250

### NOTE:

Pads can only be selected in 0.05 mm (0.002 in) increments.

- Locate the previously installed pad number on the chart. Locate the measured valve clearance on the chart. The point where these coordinates intersect is the new pad number.

### NOTE:

Use the new pad number as a guide only if the number must be verified.

- Install the new pad with the numbered side down.
- Remove the adjusting tool.
- Recheck the valve clearance.

## VALVE CLEARANCE ADJUSTMENT/ CARBURETOR SYNCHRONIZATION

**INSP  
ADJ**

- If the clearance is incorrect, repeat all of the clearance adjustment steps until the specified clearance is obtained.
- \*\*\*\*\*

### 12. Install:

- Carburetor assembly
- Air filter case



Bolt (air filter case):

10 Nm (1.0 m · kg, 7.2 ft · lb)

- Cowling
- Fuel tank
- Seat

YB703112

## CARBURETOR SYNCHRONIZATION

### NOTE:

Valve clearance should be adjusted properly before synchronizing the carburetors.

### 1. Place the motorcycle on a level surface.

### NOTE:

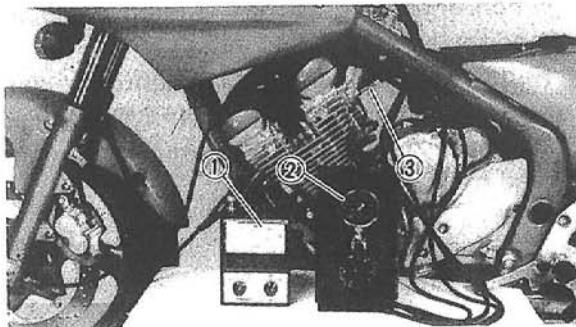
Place the motorcycle on its centerstand if a centerstand is equipped. If not, place a suitable stand under the motorcycle.

### 2. Remove:

- Seat
  - Fuel tank
- Refer to the "SIDE COVER, FUEL TANK AND COWLING" section.

### 3. Attach:

- Inductive tachometer ① (to #1 spark plug lead)
- Vacuum gauge ②
- Adapter ③



## CARBURETOR SYNCHRONIZATION

INSP  
ADJ



Inductive tachometer:

P/N 90890-03113

Vacuum gauge:

P/N 90890-03094

Adapter

P/N 90890-03060

4. Start the engine and let it warm up for several minutes.

5. Check:

- Engine idling speed

Out of specification → Adjust.

Refer to "ENGINE IDLING SPEED ADJUSTMENT" section.



Engine idling speed:

1,150~1,250 r/min

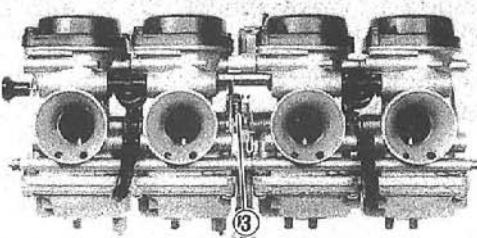
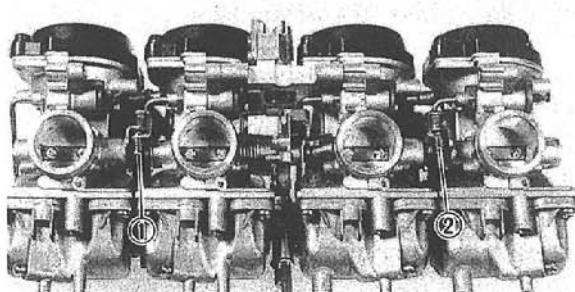
6. Adjust:

- Carburetor synchronization.

\*\*\*\*\*

### Adjustment steps:

- Synchronize carburetor No.1 to carburetor No.2 by turning synchronizing screw ① until both gauges read the same.
- Race the engine for less than a second, two or three times and check the synchronization again.
- Repeat the above steps to synchronize carburetor No.4 to carburetor No.3 by turning synchronizing screw ② until both gauges read the same.
- Repeat the same steps to synchronize carburetor No.2 to carburetor No.3 by turning synchronizing screw ③ until both gauges read the same.



## CARBURETOR SYNCHRONIZATION/ TIMING CHAIN ADJUSTMENT

**INSP  
ADJ**



Vacuum pressure at idle speed:

34.58~35.91 kPa

(260~270 mm Hg, 10.24~10.64 in Hg)

### NOTE:

The difference between both carburetors should be 1.33 kPa (10mm Hg, 0.4 in Hg) or less.

\*\*\*\*\*

### 7. Check:

- Engine idling speed  
Out of specification → Adjust.

### 8. Stop the engine and detach the measuring equipment.

### 9. Adjust:

- Throttle cable free play.  
Refer to "THROTTLE CABLE FREE PLAY ADJUSTMENT" section.



Free play:

3~7 mm (0.12~0.28 in)

### 10. Install:

- Fuel tank
- Seat  
Refer to the "SIDE COVER, FUEL TANK AND COWLING" section.

YB703102

### TIMING CHAIN ADJUSTMENT

Adjustment free.

## IDLING SPEED ADJUSTMENT

**INSP  
ADJ**

YB703113

### IDLING SPEED ADJUSTMENT

#### NOTE:

The carburetor synchronization should be adjusted properly before adjusting the idling speed.

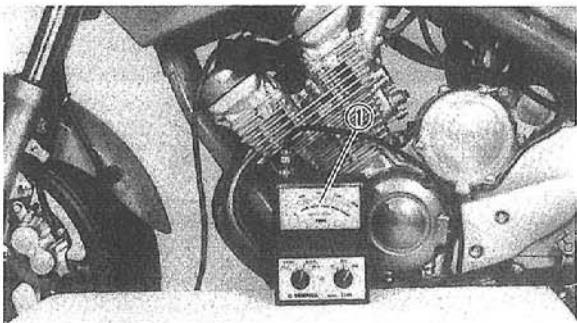
1. Start the engine and let it warm up for several minutes.

#### 2. Attach:

- Inductive tachometer ① (to the spark plug lead).



**Inductive tachometer:  
P/No. 90890-03113**

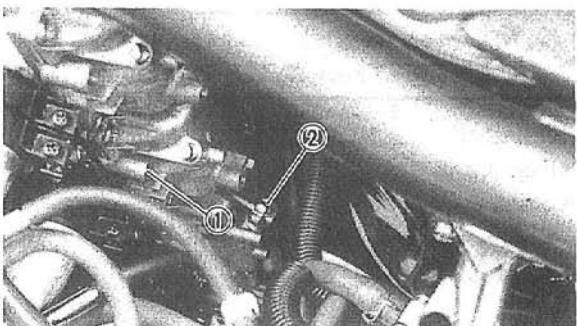


#### 3. Check:

- Engine idling speed  
Out of specification → Adjust.



**Engine idling speed:  
1,150~1,250 r/min**



#### 4. Adjust:

- Engine idling speed

\*\*\*\*\*

#### Adjustment steps:

- Turn the pilot air screw ① until it is lightly seated.
- Turn out the pilot air screw for the specified number of turns.

**Pilot air screw: 2 turns out**

- Turn the throttle stop screw ② in or out until specified idling speed is obtained.

**Turning in → Idling speed increased.**

**Turning out → Idling speed decreased.**

\*\*\*\*\*

## IDLING SPEED ADJUSTMENT/ THROTTLE CABLE ADJUSTMENT



### 5. Adjust:

- Throttle cable free play  
Refer to "THROTTLE CABLE FREE PLAY ADJUSTMENT" section.



Free play:

3~7 mm (0.12~0.28 in)

YB703114

## THROTTLE CABLE ADJUSTMENT

### NOTE:

Engine idling speed and carburetor synchronization should be adjusted properly before adjusting the throttle cable free play.



### 1. Check:

- Throttle cable free play ②  
Out of specification → Adjust.



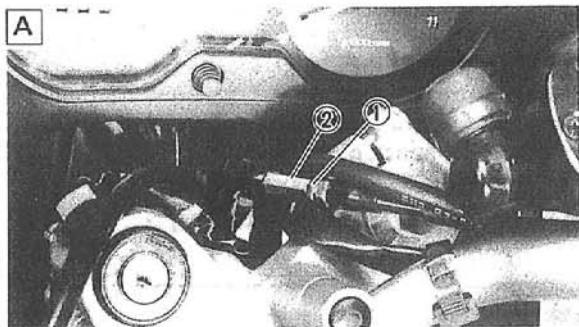
Free play:

3~7 mm (0.12~0.28 in)

At throttle grip end

### 2. Remove

- Seat
- Fuel tank  
Refer to the "SIDE COVER, FUEL TANK AND COWLING" section.
- Air filter case  
Refer to the "VALVE CLEARANCE ADJUSTMENT" section.



### 3. Adjust:

- Throttle cable free play

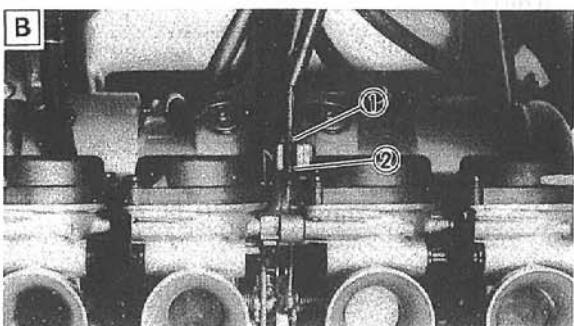
\*\*\*\*\*

#### Adjustment steps:

- Loosen the locknut ① .
- Turn the adjuster ② in or out until the specified free play is obtained.

## THROTTLE CABLE ADJUSTMENT/ SPARK PLUG INSPECTION

**INSP  
ADJ**



Turning in → Free play is increased.

Turning out → Free play is decreased.

- Tighten the locknut.

A Handlebar side

B Carburetor side

### ⚠ WARNING

After adjusting, turn the handlebar to the right and left, making sure that the engine idling speed does not change.

\*\*\*\*\*

#### 4. Install:

- Air filter case  
Refer to the "VALVE CLEARANCE ADJUSTMENT" section.
- Fuel tank
- Seat  
Refer to the "SIDE COVER, FUEL TANK AND COWLING" section.

YB703103

## SPARK PLUG INSPECTION

#### 1. Remove:

- Spark plug  
Use the spark plug wrench in the owner's tool kit.

#### 2. Inspect:

- Spark plug type  
Incorrect → Replace.

#### Standard spark plug:

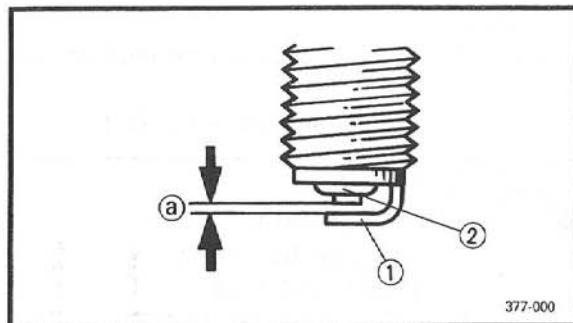
CR7E(NGK), CR8E(NGK), CR9E(NGK)

U22ESR-N(N.D.), U24ESR-N(N.D.)

U27ESR-N(N.D.)

## SPARK PLUG INSPECTION/ IGNITION TIMING CHECK

INSP  
ADJ



377-000

### 3. Inspect:

- Electrode ①  
Wear/Damage→Replace.
- Insulator ②  
Abnormal color→Replace  
Normal color is a medium-to-light tan color.

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

### 5. Measure:

- Plug gap ③  
Use a Wire Gauge or Feeler Gauge.  
Out of specification→Re-gap.



Spark plug gap:  
0.7~0.8 mm (0.028~0.031 in)

### 6. Tighten:

- Spark plug



Spark plug:  
12.5 Nm (1.25 m.kg, 9.0 ft.lb)

#### NOTE: \_\_\_\_\_

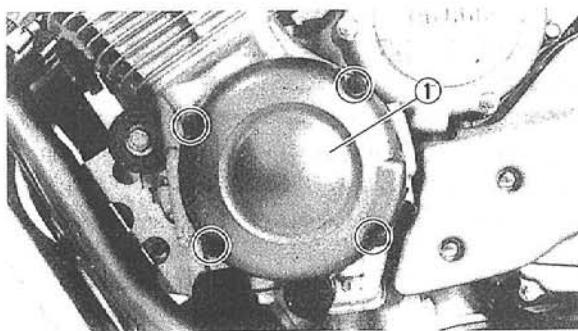
- Before installing a spark plug, clean the gasket surface and plug surface.

YB703104

## IGNITION TIMING CHECK

#### NOTE: \_\_\_\_\_

Carburetor synchronization, engine idling speed and throttle cable free play should be adjusted properly before checking the ignition timing.

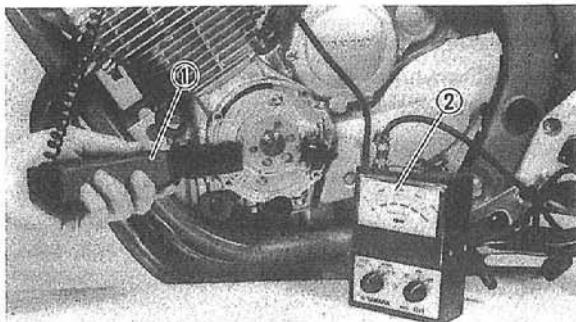


### 1. Remove:

- Timing plate cover ①

## IGNITION TIMING CHECK/ COMPRESSION PRESSURE MEASUREMENT

INSP  
ADJ



### 2. Attach:

- Timing light ① and inductive tachometer ②  
(To the spark plug lead for #1 cylinder)



#### Timing light:

P/N 90890-03141

#### Inductive tachometer:

P/N 90890-03113

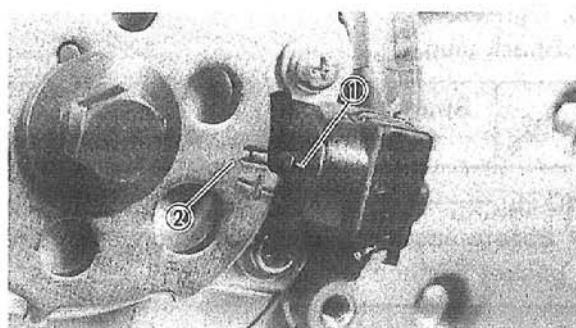
### 3. Check:

- Ignition timing

\*\*\*\*\*

#### Checking steps:

- Warm up the engine and keep it at the specified speed.



#### Engine speed:

1,150~1,250 r/min.

- Visually check the pickup coil ① to verify it is within the required firing range ② indicated on the timing plate.

Incorrect firing range → Check flywheel and/or pickup assembly.

\*\*\*\*\*

### 4. Install:

- Timing plate cover

YB703105

## COMPRESSION PRESSURE MEASUREMENT

#### NOTE:

Insufficient compression pressure will result in performance loss.

## COMPRESSION PRESSURE MEASUREMENT

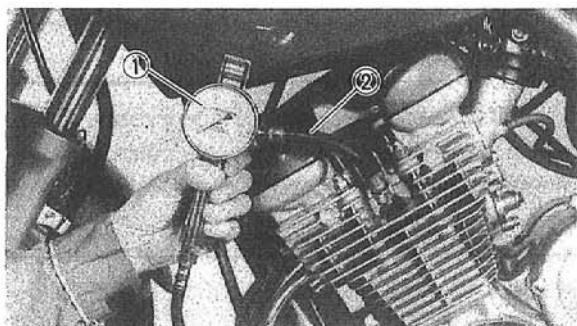


1. Check:  
• Valve clearance  
Out of specification → Adjust.  
Refer to the "VALVE CLEARANCE ADJUSTMENT" section.

2. Start the engine and let it warm up for several minutes.

3. Stop the engine.

4. Remove:  
• Spark plug



5. Attach:  
• Compression gauge ①  
• Adapter ②



Compression gauge:  
P/N. 90890-03081  
Adapter:  
P/N 90890-04082

6. Measure  
• Compression pressure  
Above the maximum pressure:  
Inspect cylinder head, valve surfaces, and piston crown for carbon deposits.  
Below the minimum pressure:  
Squirt a few drops of oil into affected cylinder and measure again.

• Follow the table below.

Compression pressure (With oil applied into cylinder)	
Reading	Diagnosis
Higher than without oil	Worn or damaged pistons
Same as without oil	Defective ring(s), valves, cylinder head gasket or piston is possible.

## COMPRESSION PRESSURE MEASUREMENT/ ENGINE OIL LEVEL INSPECTION

INSP  
ADJ



Compression pressure (at sea level):

Standard:

1,100 kPa (11.0 kg/cm<sup>2</sup>, 156 psi)

Minimum:

1,000 kPa (10.0 kg/cm<sup>2</sup>, 142 psi)

Maximum:

1,150 kPa (11.5 kg/cm<sup>2</sup>, 164 psi)

\*\*\*\*\*

**Measurement steps:**

- Crank over the engine with the throttle wide-open until the compression reading on the gauge stabilizes.

### **WARNING**

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

\*\*\*\*\*

7. Repeat the previous steps for the other cylinders.

### **NOTE:**

The difference of compression pressure between the highest and lowest cylinder compression readings should be 100 kpa (1 kg/cm<sup>2</sup>, 14 psi) or less.

YB703110

## ENGINE OIL LEVEL INSPECTION

### **NOTE:**

Position the motorcycle straight up when inspecting the oil level.

1. Place the motorcycle on a level surface.

### **NOTE:**

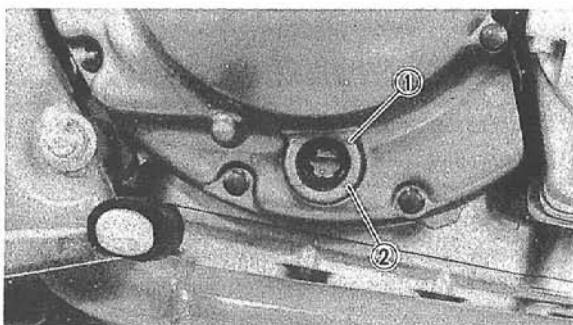
Place the motorcycle on its centerstand if a centerstand is equipped. If not, place a suitable stand under the motorcycle.

2. Inspect

- Oil level

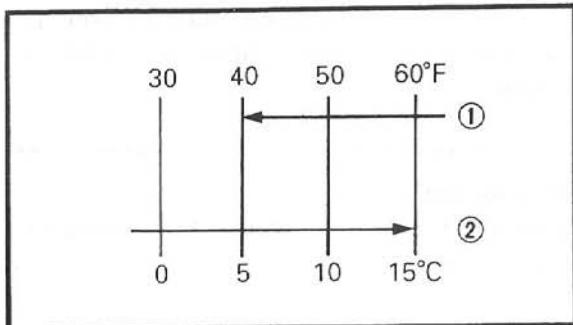
Oil level should be between maximum ① and minimum ② marks.

Oil level low → Add oil to proper level.



## ENGINE OIL LEVEL INSPECTION/ ENGINE OIL REPLACEMENT

**INSP  
ADJ**



### 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

### **CAUTION:**

- Do not add any chemical additives. Engine oil also lubricates the clutch and additives could cause clutch slippage.
- Do not allow foreign material to enter the crankcase.

3. Start the engine and let it warm up for several minutes.

4. Stop the engine and inspect the oil level once again.

### **NOTE:**

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

YB703111

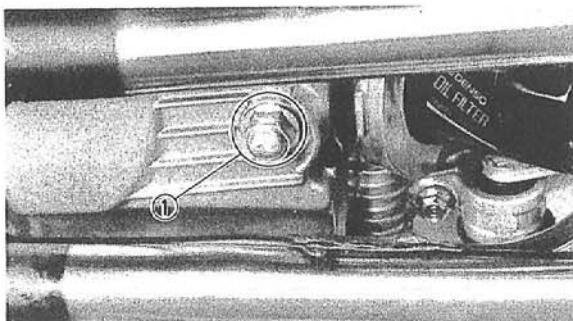
## ENGINE OIL REPLACEMENT

1. Start the engine and let it warm up for several minutes.

2. Stop the engine and place an oil pan under the engine.

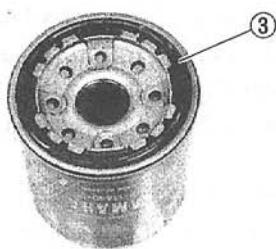
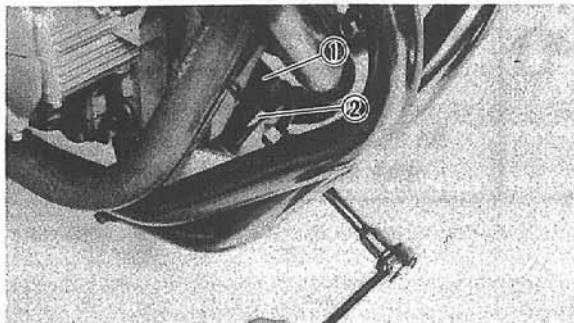
### 3. Remove:

- Oil filler plug
  - Drain plug ①
- Drain the crankcase of its oil.



## ENGINE OIL REPLACEMENT

**INSP  
ADJ**



4. If the oil filter is replaced with oil change, remove the following parts and reinstall them.

\*\*\*\*\*

### Replacement steps:

- Remove the oil filter element ① using the oil filter wrench ② .



**Oil filter wrench:  
P/N 90890-01426**

- Apply the engine oil lightly to O-ring ③ of new oil filter.

#### NOTE:

Make sure the O-ring is positioned properly.

- Install the new oil filter using the oil filter wrench.



**Oil filter wrench:  
P/N 90890-01426**



**Oil filter:  
17 Nm (1.7 m · kg, 12 ft · lb)**

\*\*\*\*\*

### 5. Install:

- Drain plug



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

#### NOTE:

Check the gasket (drain plug). If damaged, replace it with a new one.

### 6. Fill:

- Engine oil

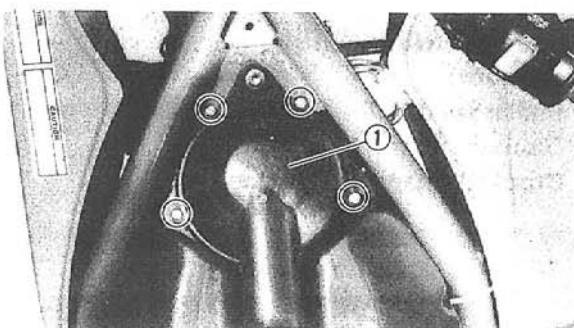
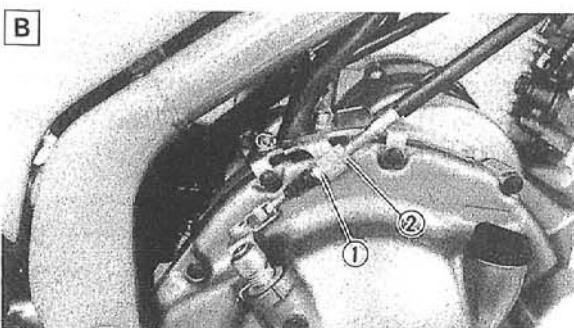
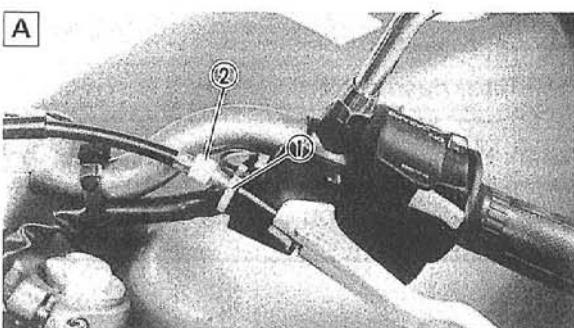
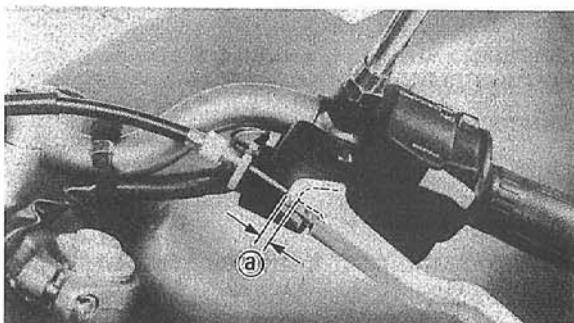


**Oil quantity:  
without oil filter change  
2.2 L (1.9 Imp.qt, 2.3 US.qt)  
with oil filter change  
2.5 L (2.2 Imp.qt, 2.6 US.qt)**

Refer to the "ENGINE OIL LEVEL INSPEC-



TION" section.



YB703116

### CLUTCH ADJUSTMENT

#### 1. Check:

- Clutch cable free play ②  
Out of specification → Adjust.



**Free play:**

2~3 mm (0.08~0.12 in)

At clutch lever pivot

#### 2. Adjust:

- Clutch cable free play

\*\*\*\*\*

#### Adjustment steps:

- Loosen the locknut(s) ① .
- Turn the adjuster(s) ② in or out until the specified free play is obtained.

**Turning in → Free play is increased.**

**Turning out → Free play is decreased.**

- Tighten the locknut(s).

\*\*\*\*\*

Ⓐ Handlebar side

Ⓑ Engine side

YB703106

### AIR FILTER CLEANING

#### 1. Remove:

- Seat
  - Fuel tank
- Refer to the "SIDE COVER, FUEL TANK AND COWLING" section.

#### 2. Remove:

- Air filter case cover ①

## AIR FILTER CLEANING/ FUEL LINE INSPECTION

INSP  
ADJ

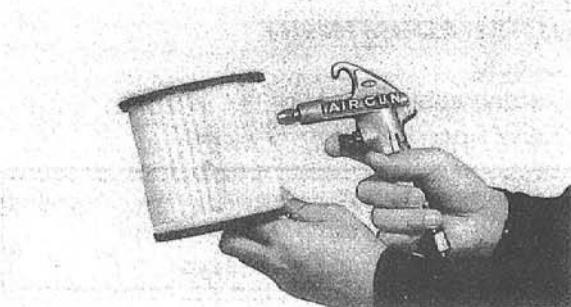


### 3. Remove:

- Air filter element

**CAUTION:**

Never operate the engine with the air filter element removed. Unfiltered air will cause rapid wear of engine parts and possible engine damage. Additionally, operation without the filter element will affect carburetor tuning with subsequent poor performance and possible engine overheating.



### 4. Inspect:

- Air filter element

Damaged → Replace.

### 5. Clean:

- Air filter element

Blow out the dust in the element from the outer surface using compressed air.

### 6. Install:

- Air filter element
- Air filter case cover

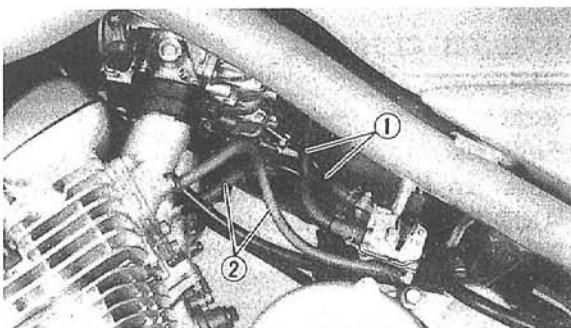
**NOTE:**

When installing the element in its case, be sure its sealing surface matches the sealing surface of the case so there is no air leak.

### 7. Install:

- Fuel tank
- Seat

Refer to the "SIDE COVER, FUEL TANK AND COWLING" section.



YB703115

## FUEL LINE INSPECTION

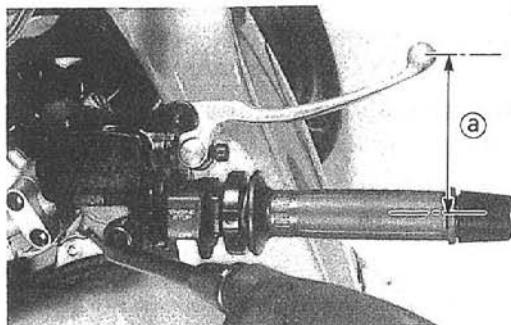
### 1. Inspect:

- Fuel hose ①
- Vacuum hose ②

Crack/Damage → Replace.

## FRONT BRAKE LEVER POSITION ADJUSTMENT/ REAR BRAKE ADJUSTMENT

INSP  
ADJ



YB703204

### CHASSIS

#### FRONT BRAKE LEVER POSITION ADJUSTMENT

##### 1. Adjust:

- Brake lever position  
(distance **a** from handle grip to front brake lever)

\*\*\*\*\*

##### Adjusting steps:

- Push the brake lever forward.
- Turn the adjuster **①** in or put.

Turning in → Distance is smaller.

Turning out → Distance is larger.

- Align the mark **a** on the adjuster with the mark **b** on the lever.

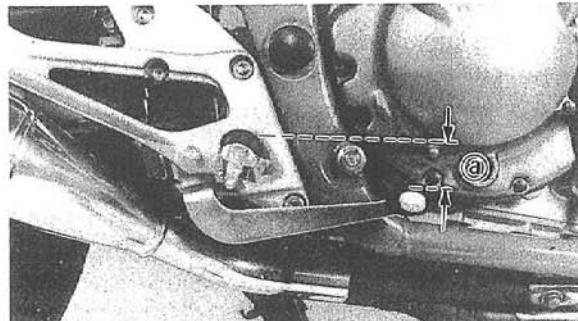
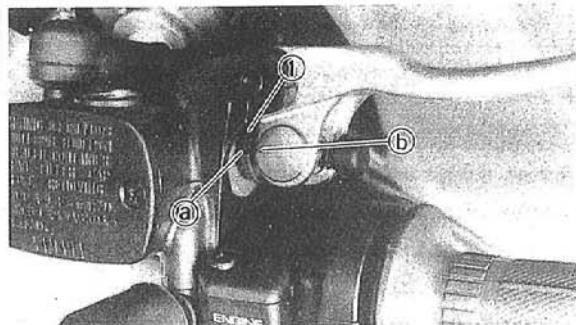
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##### CAUTION:

Make sure that the brake does not drag after adjusting it.

##### ⚠ 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.



YB703205

### REAR BRAKE ADJUSTMENT

##### 1. Check:

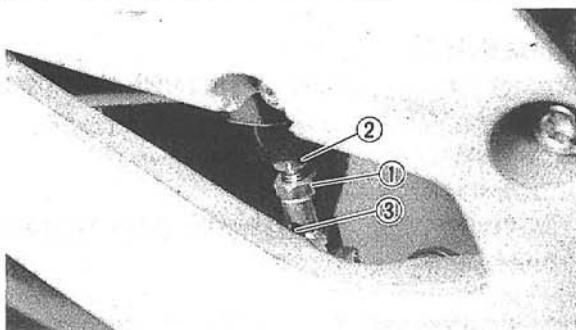
- Brake pedal height **a**  
Out of specification → Adjust.



Brake pedal height:  
40 mm (1.6 in)  
Below top of footrest

## REAR BRAKE ADJUSTMENT

**INSP  
ADJ**



### 2. Adjust:

- Brake pedal height

\*\*\*\*\*

#### Adjustment steps:

- Loosen the locknut(s) ①
- Turn the adjuster(s) ② in or out until the specified pedal height is obtained.

Turning in → Pedal height is down.

Turning out → Pedal height is up.

#### CAUTION:

After adjusting the brake pedal height, visually check the adjuster end through the hole ③ of the joint holder. The adjuster end must appear within this hole.

#### CAUTION:

Make sure that the brake does not drag after adjusting it.

#### ⚠ WARNING

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

\*\*\*\*\*

### 3. Adjust:

- Brake light switch

Refer to the "BRAKE LIGHT SWITCH ADJUSTMENT" section.

## BRAKE FLUID LEVEL INSPECTION

INSP  
ADJ



YB703206

### BRAKE FLUID LEVEL INSPECTION

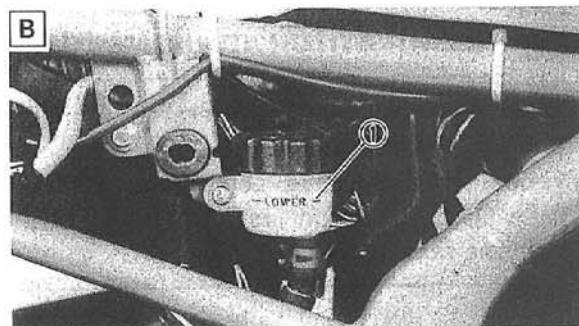
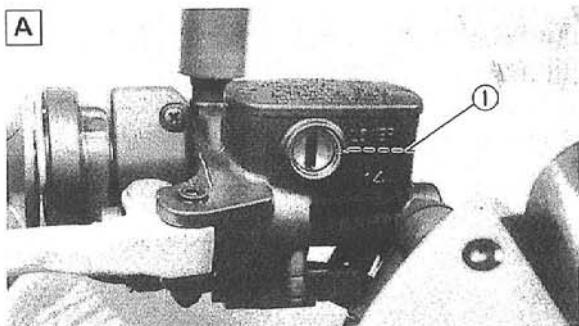
#### NOTE:

Position the motorcycle straight up when inspecting the fluid level.

#### 1. Place the motorcycle on a level surface.

#### NOTE:

Place the motorcycle on its centerstand if equipped. If not, place a suitable stand under the motorcycle.



#### 2. Inspect:

- Fluid level

Fluid level is under "LOWER" level line ①  
→ Fill to proper level.



Recommended fluid:  
DOT #3 or #4

[A] Front

[B] Rear

#### NOTE:

When inspecting the fluid level of the reservoir at the handlebars, make sure the master cylinder top is horizontally level.

#### CAUTION:

The fluid may corrode painted surfaces or plastic parts. Always clean up spilled fluid immediately.

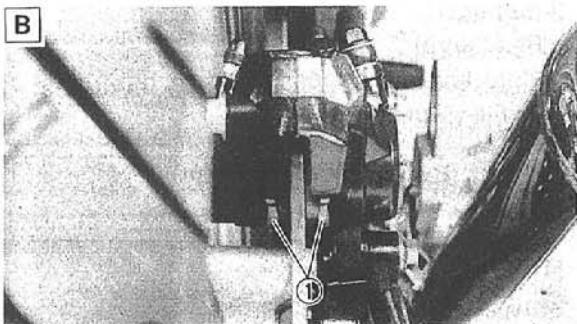
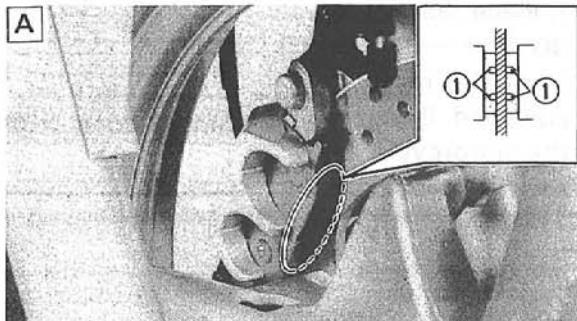
#### WARNING

- Use only the designated quality fluid. Otherwise, the rubber seals may deteriorate causing leakage and poor brake performance.
- Refill with the same type of fluid. Mixing fluids may result in a harmful chemical reaction leading to poor brake performance.
- Be careful that water does not enter the master cylinder when refilling. Water will

## BRAKE PAD INSPECTION/ BRAKE LIGHT SWITCH ADJUSTMENT

**INSP  
ADJ**

significantly lower the boiling point of the fluid and may result in vapor lock.



YB703207

### BRAKE PAD INSPECTION

1. Activate the brake lever or brake pedal.

#### 2. Inspect:

- Brake pad

Wear indicator ① nearly contacting brake disc → Replace brake pads as a set.

Refer to the "BRAKE PAD REPLACEMENT" section in the CHAPTER 6.

**A** Front

**B** Rear

YB703208

### BRAKE LIGHT SWITCH ADJUSTMENT

#### NOTE:

The brake light switch is operated by movement of the brake pedal.

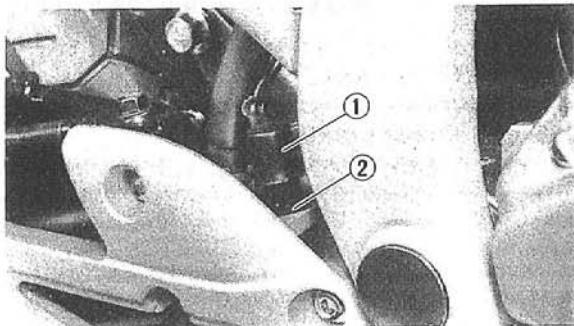
Proper adjustment is achieved when the brake light comes on just before the brake begins to take effect.

#### 1. Check:

- Brake light operating timing  
Incorrect→Adjust.

## BRAKE LIGHT SWITCH ADJUSTMENT/ AIR BLEEDING (HYDRAULIC BRAKE SYSTEM)

INSP  
ADJ



### 2. Adjust:

- Brake light operating timing

\*\*\*\*\*

#### Adjustment steps:

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

\*\*\*\*\*

YB703209

## AIR BLEEDING (HYDRAULIC BRAKE SYSTEM)

### 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 loss of braking performance may occur if the brake system is not properly bled.

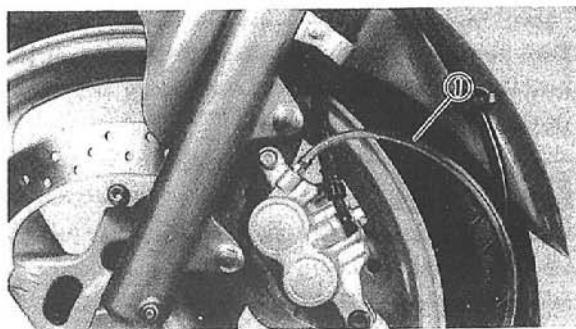
### 1. Bleed:

- 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 ① tightly to the caliper bleed screw.
- d. Place the other end of the tube into a container.
- e. Slowly apply the brake lever or pedal several times.
- f. Pull the lever in or push down on the pedal. Hold the lever or pedal in position.
- g. Loosen the bleed screw and allow the lever or pedal to travel towards its limit.



## AIR BLEEDING (HYDRAULIC BRAKE SYSTEM)/ DRIVE CHAIN SLACK ADJUSTMENT

**INSP  
ADJ**

h. Tighten the bleed screw when the lever or pedal limit has been reached, then release the lever or pedal.



**Bleed screw:**

6 Nm (0.6 m · kg, 4.3 ft · lb)

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 proper level.



**Check the operation of the brake after bleeding the brake system.**

\*\*\*\*\*

YB703214

## DRIVE CHAIN SLACK ADJUSTMENT

**NOTE:**

Before checking and/or adjusting, rotate the rear wheel several revolutions and check slack at several points to find the tightest point. Check and/or adjust the chain slack with the rear wheel in this "tightest" position.



**Too little of chain slack will overload the engine and other vital parts. Keep the slack within the specified limits.**



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

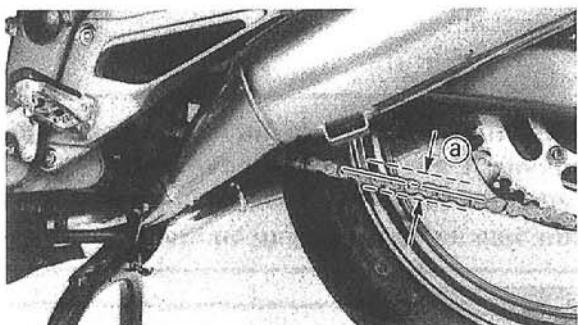
## DRIVE CHAIN SLACK ADJUSTMENT

**INSP  
ADJ**

1. Place the motorcycle on a level place, and hold it in an upright position.

**NOTE:**

The both wheels on the ground without rider on it.

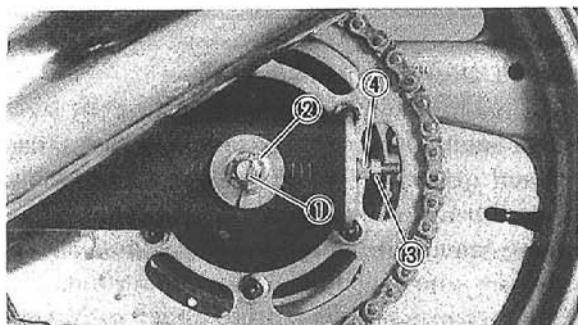


**2. Check:**

- Drive chain slack ①  
Out of specification → Adjust.



**Drive chain slack:**  
**30~40 mm (1.2~1.6 in)**  
**with elevated rear wheel.**



**3. Remove:**

- Cotter pin ①

**4. Loosen:**

- Axle nut ②

**5. Adjust:**

- Drive chain slack

\*\*\*\*\*

**Adjustment steps:**

- Loosen the locknut(s) ③ .
- Turn the adjuster(s) ④ in or out until the specified slack is obtained.

**Turning in → Slack is decreased.**

**Turning out → Slack is increased.**

**NOTE:**

Turn each adjuster exactly the same amount to maintain correct axle alignment. (There are marks on each side of swingarm and on each chain puller. Use them to check for proper alignment.)

## DRIVE CHAIN SLACK ADJUSTMENT/ DRIVE CHAIN LUBRICATION

INSP  
ADJ



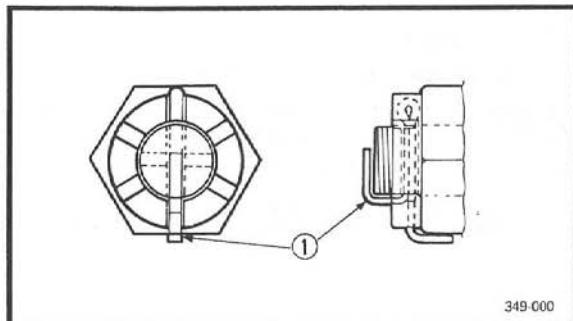
- Tighten the axle nut to specification while pushing up or down on the chain to zero slack.



Axle nut:

105 Nm (10.5 m · kg, 75 ft · lb)

\*\*\*\*\*



349-000

### 6. Install:

- Cotter pin ①

**CAUTION:** \_\_\_\_\_

Do not loosen the axle nut after torque tightening. If the axle nut groove is not aligned with the cotter pin hole, align groove with the hole by tightening up on the axle nut.

**WARNING** \_\_\_\_\_

Always use a new cotter pin.

YB703215

## DRIVE CHAIN LUBRICATION

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

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



Recommended lubricant:

SAE 30 ~ 50 W Motor Oil or  
chain lubricants suitable  
for "O-ring" chains.

## STEERING HEAD ADJUSTMENT

INSP  
ADJ



YB703201

### STEERING HEAD ADJUSTMENT

#### **WARNING**

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

1. Place the motorcycle on a level place.

2. Elevate the front wheel by placing a suitable stand under the exhaust pipe.

3. Check:

- Steering assembly bearings  
Grasp the bottom of the forks and gently rock the fork assembly back and forth.  
Looseness → Adjust steering head.

4. Remove:

- Front wheel  
Refer to the "FRONT WHEEL" section in CHAPTER 6.

5. Adjust:

- Steering head

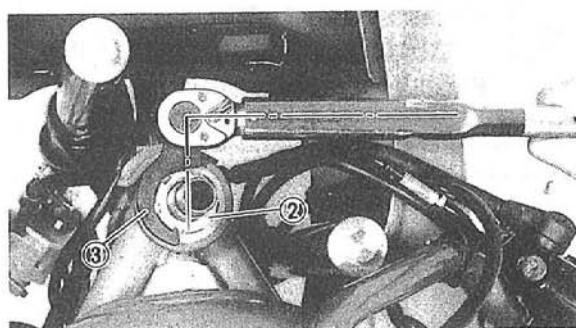
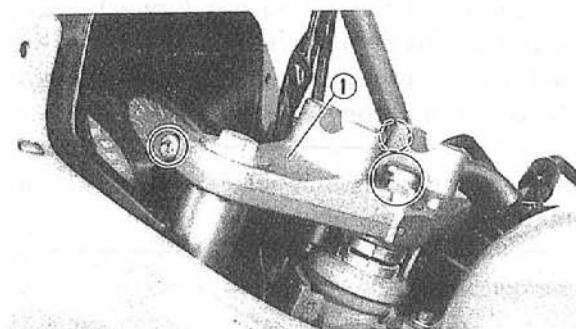
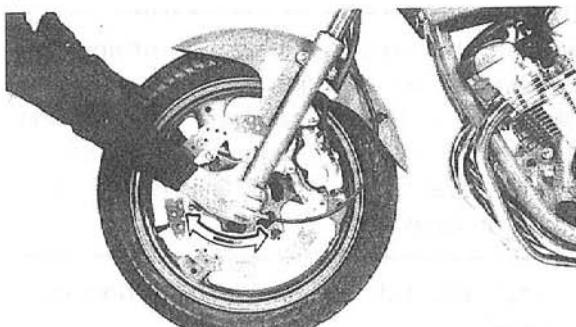
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#### Adjustment steps:

- Remove the handlebar.
- Remove the handle crown ① and special washer.
- Remove the ring nut (upper) and rubber washer.
- Tighten the ring nut (lower) ② using the ring nut wrench ③ .

#### NOTE:

Set the torque wrench to the Ring nut wrench so that they form a right angle.



Ring nut wrench:  
P/N 90890-01403



Ring nut (initial tightening):  
52 Nm (5.2 m · kg, 37 ft · lb)

- Loosen the ring nut one turn.
- Retighten the ring nut using the Ring nut wrench.

## STEERING HEAD ADJUSTMENT

INSP  
ADJ



### WARNING

Avoid over-tightening.



Ring nut (final tightening):  
18 Nm (1.8 m · kg, 13 ft · lb)

### NOTE:

Recheck the steering head by turning the steering from left to right.

If steering is bound, remove the steering stem assembly and inspect the steering bearing. Refer to the "STEERING HEAD" section in the CHAPTER 6.

- Install the rubber washer and ring nut (upper).
- Finger tighten the ring nut (upper), then align the slot of both ring nuts. If not aligned, hold the ring nut (lower) and tighten the other until they are aligned.

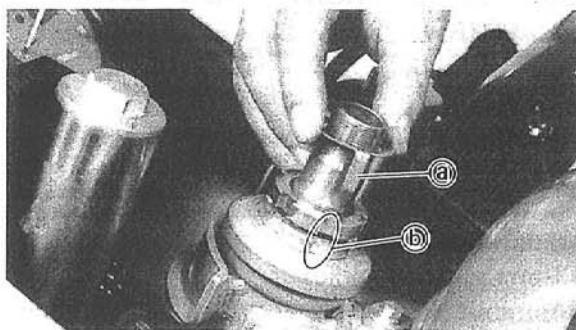
### NOTE:

Make sure the special washer tab **(a)** is placed in the slots **(b)**.

- Install the handle crown.



Nut (steering shaft):  
110 Nm (11.0 m · kg, 80 ft · lb)  
Pinch bolt (handle crown):  
23 Nm (2.3 m · kg, 17 ft · lb)



### 6. Install:

- Front wheel  
Refer to the "FRONT WHEEL" section in CHAPTER 6.

## FRONT FORK INSPECTION/ REAR SHOCK ABSORBER ADJUSTMENT



YB703202

### FRONT FORK INSPECTION



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

1. Place the motorcycle on a level place.

2. Check:

- Inner tube  
Scratch/Damage→Replace.
- Oil seal  
Excessive oil leakage→Replace.

3. Hold the motorcycle in upright position and apply the front brake.



4. Check:

- Operation  
Pump the front fork up and down several times.  
Unsmooth operation→Repair  
Refer to the "FRONT FORK" section in CHAPTER 6.

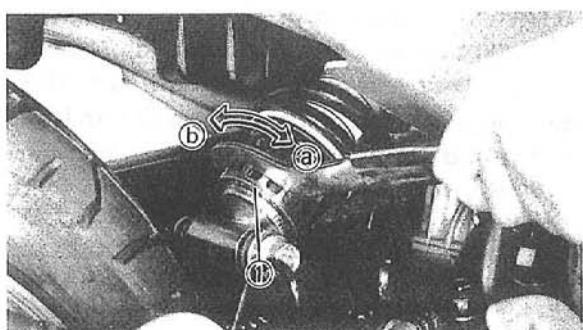
YB703203

### REAR SHOCK ABSORBER ADJUSTMENT



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

1. Place the motorcycle on a level place.



2. Adjust:

- Spring preload

Turn the adjuster ① to direction ② or ③.

Turning toward ② →  
Spring preload is harder.

Turning toward ③ →  
Spring preload is softer.

## REAR SHOCK ABSORBER ADJUSTMENT/ TIRE INSPECTION

INSP  
ADJ



### Adjuster position:

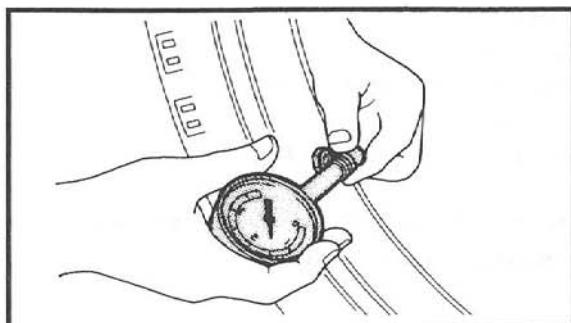
Standard 3

Minimum 1

Maximum 7

### CAUTION:

Never turn the adjuster beyond the maximum or minimum setting.



YB703210

### TIRE INSPECTION

#### 1. Measure:

- Tire pressure  
Out of specification→Adjust.

### ⚠ 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, 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, 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.

## TIRE INSPECTION

**INSP  
ADJ**



<b>Basic weight:</b>		
With oil and full fuel tank	197 kg (434 lb)	
<b>Maximum load*</b>	200 kg(441 lb)	
<b>Cold tire pressure</b>	Front	Rear
Up to 90 kg (198 lb)*	200kPa (2.0kg/cm <sup>2</sup> , 28 psi)	225kPa (2.25kg/cm <sup>2</sup> , 32 psi)

<b>Cold tire pressure</b>	<b>Front</b>	<b>Rear</b>
90 kg (198 lb)*~Ma-ximum load*	200kPa (2.0kg/cm <sup>2</sup> , 28 psi)	250kPa (2.5kg/cm <sup>2</sup> , 36 psi)
High speed riding	200kPa (2.0kg/cm <sup>2</sup> , 28 psi)	250kPa (2.5kg/cm <sup>2</sup> , 36 psi)

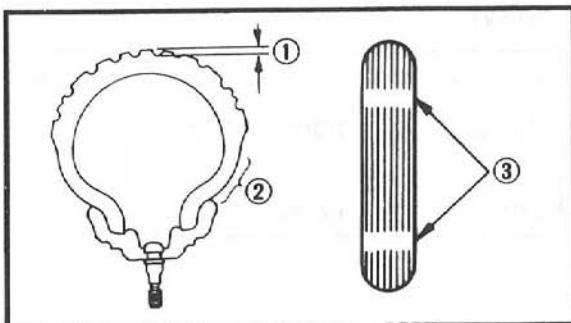
\*Load is the total weight of cargo, rider, and accessories.

### 2. Inspect:

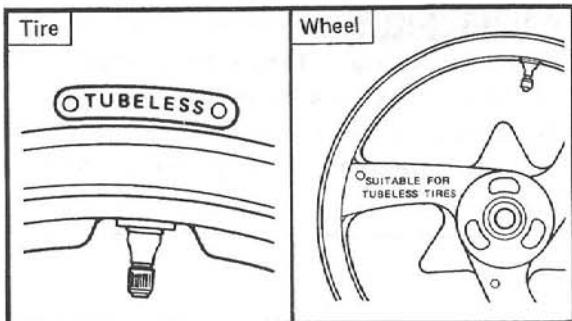
- Tire surfaces  
Wear/Damage→Replace.



**Minimum tire tread depth:  
(front and rear):  
1.0 mm (0.04 in)**



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



### ⚠ WARNING

- It is dangerous to ride with a worn-out tire. When a tire tread begins to show lines, replace the tire immediately.
- Do not use tubeless tires on a wheel designed for tube type tires only. Tire failure and personal injury may result from sudden deflation.

**TIRE INSPECTION****INSP  
ADJ****Tube type wheel → Tube type tire only****Tubeless type wheel → Tube type or tubeless tire**

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

**⚠ WARNING**

After extensive tests, the tires mentioned below have been approved by Yamaha motor Co., Ltd. for this model. No guarantee for handling characteristics can be given if tire combinations other than what is approved are used on this motorcycle. The front and rear tires should be of the same manufacture and design.

**FRONT:**

Manufacture	Size	Type
YOKOHA-MA	110/80-17 57H	F209
DUNLOP	110/80-17 57H	K275F

**REAR:**

Manufacture	Size	Type
YOKOHA-MA	130/70-18 63H	R209
DUNLOP	130/70-18 63H	K275

**⚠ 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.

**WHEEL INSPECTION/  
SIDESTAND LUBRICATION/  
CENTER STAND LUBRICATION**

**INSP  
ADJ**

YB703211

**WHEEL INSPECTION**

**1. Inspect:**

- Wheels

Damage/Bends→Replace.

**NOTE:**

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



**WARNING**

Never attempt to make any repairs to the wheel.

YB703216

**SIDESTAND LUBRICATION**

Lubricate the sidestand at pivoting points.



**Recommended lubricant:  
Lithium soap base grease**

YB703217

**CENTERSTAND LUBRICATION**

(If equipped centerstand)

Lubricate the centerstand at pivoting points.



**Recommended lubricant:  
Lithium soap base grease**

YB703301

**ELECTRICAL****BATTERY INSPECTION****NOTE:**

Since the MF battery is of a sealed-type construction, it is impossible to measure the specific gravity of the electrolyte in order to check the state of charge in the battery. Therefore, to check the state of charge in the battery, voltage must be measured at the battery terminals.

**CAUTION:****CHARGING METHOD**

- This battery is sealed type. Never remove sealing caps even when charging. With the sealing cap removed, this balancing will not be maintained, and battery performance will lower gradually.
- Never add water. If distilled water is added, chemical reaction in the battery will not proceed in the normal way, thus making it impossible for the battery to operate regularly.
- The charging time, charging current and charging voltage for the MF battery is different than general type batteries.  
The MF battery should be charged as instructed in the "Charging method". Should the battery be overcharged, the electrolyte level will over extremely. Therefore, use special care when charging the battery.
- Avoid using any electrolyte other than specified. The specific gravity of the MF battery electrolyte is 1.32 at 20°C (68°F). (The specific gravity of the general type battery electrolyte is 1.28.) If the electrolyte whose specific gravity is less than 1.32, the sulfuric acid will decrease and thus low battery performance will result. Should any electrolyte, whose specific gravity is 1.32 or more, be used, the battery plates will corrode and battery life will shorten.

## BATTERY INSPECTION

INSP  
ADJ



### 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 and 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 generate explosive hydrogen gas.

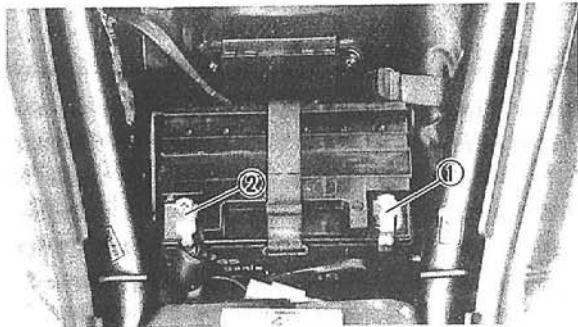
Always follow these preventive measures:

- 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.**

#### 1. Remove:

- Seat



#### 2. Disconnect:

- Battery leads

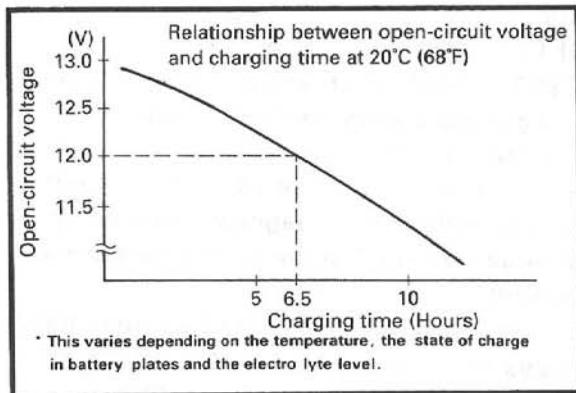
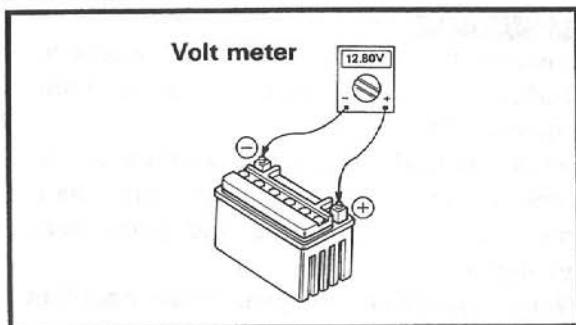
### CAUTION:

Disconnect the negative lead ① first and then disconnect the positive lead ②.

#### 3. Remove:

- Battery

## BATTERY INSPECTION



### 4. Check:

- Battery condition

\*\*\*\*\*

#### Battery condition checking steps:

- Connect a digital volt meter to the battery terminals.

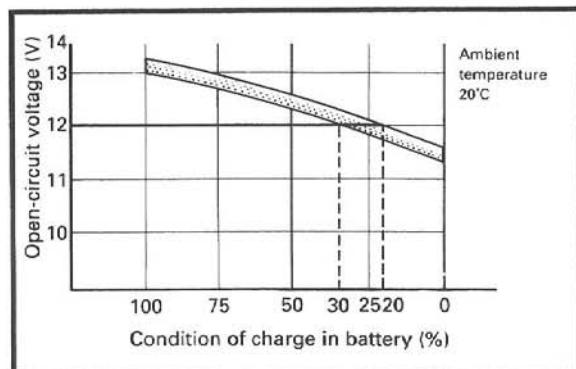
**Tester (+) lead → Battery (+) terminal.**

**Tester (-) lead → Battery (-) terminal.**

#### NOTE:

The state of a discharged MF battery can be checked by measuring open circuit voltage (the voltage measured with the positive terminals being disconnected).

Open circuit voltage	Charging time
12.8 v or more	No charging is necessary.



- Check the battery condition using figures.

#### EXAMPLE:

Open circuit voltage = 12.0 v

Charging time = 6.5 hours

Condition of charge in battery = 20~30 %

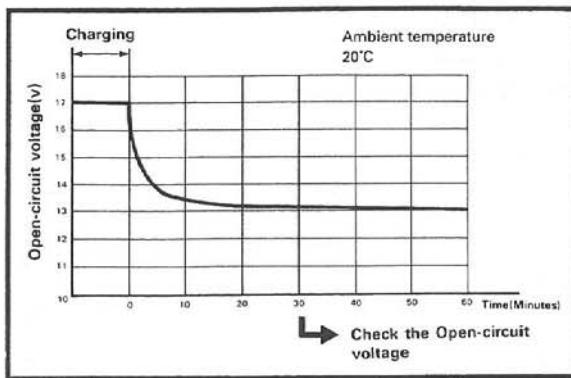
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## 5. Charging method of MF battery

#### CAUTION:

- If it is impossible to set the standard charging current, be careful not to overcharge.
- When charging the battery, be sure to remove it from the motorcycle. (If charging has to be done with the battery mounted on the motorcycle for some reason, be sure to disconnect the wire at the negati-

## BATTERY INSPECTION



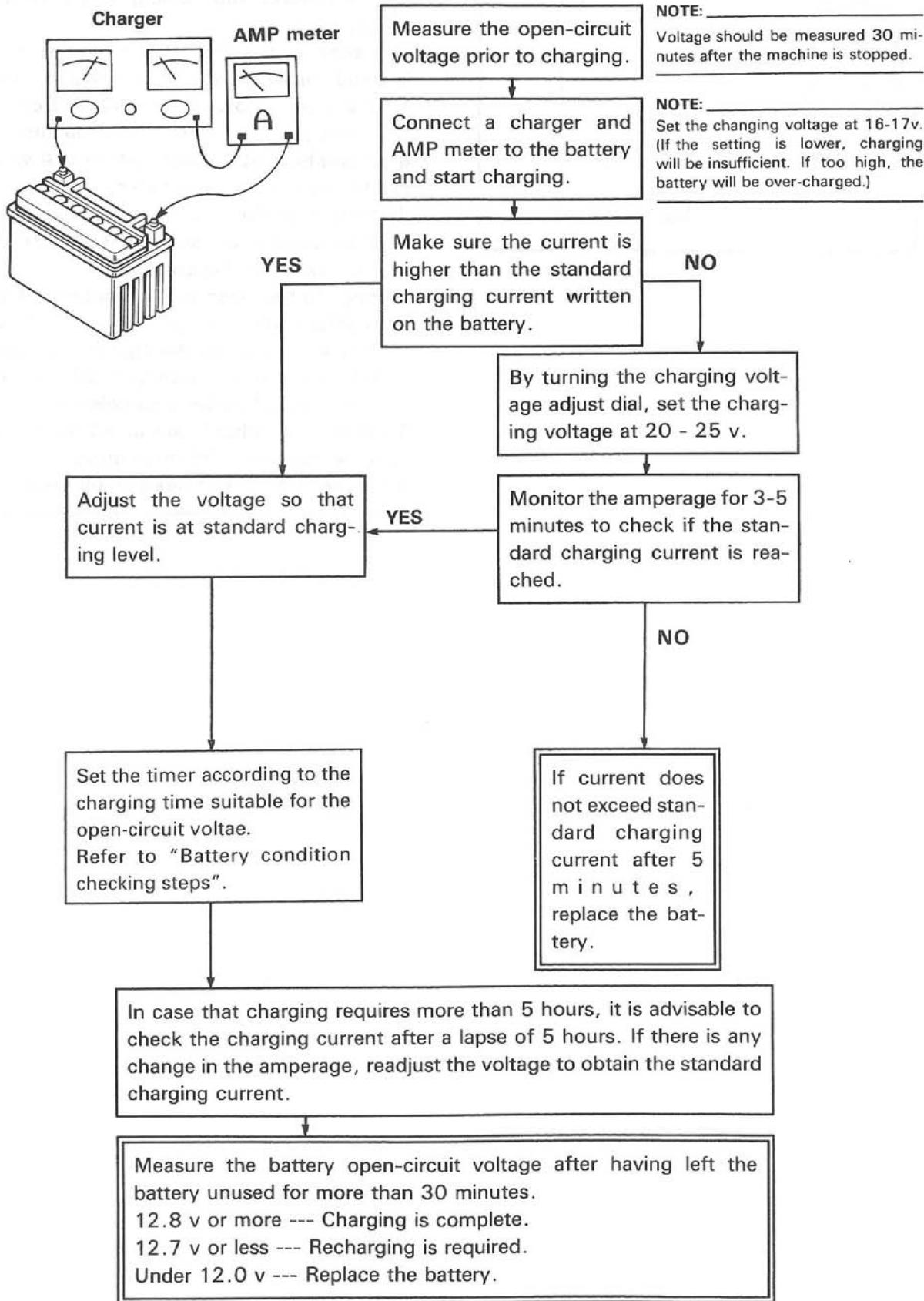
ve terminal.)

- Never remove the sealing plug from the MF battery.
- Use special care so that charging clips are in a full contact with the terminal and that they are not shorted. (A corroded clip of the charger may cause the battery to generate heat at the contact area. A weak clip spring may cause sparks.)
- Before removing the clips from the battery terminals, be sure to turn off the power switch of the charger.
- Change in the open-circuit voltage of the MF battery after being charged is shown below. As shown in the figure, the open-circuit voltage is stabilized 30 minutes after charging has been completed. Therefore, to check the condition of the battery, measure the open-circuit voltage 30 minutes after has been completed.

## BATTERY INSPECTION



### Charging method using a variable-current (voltage) type charger

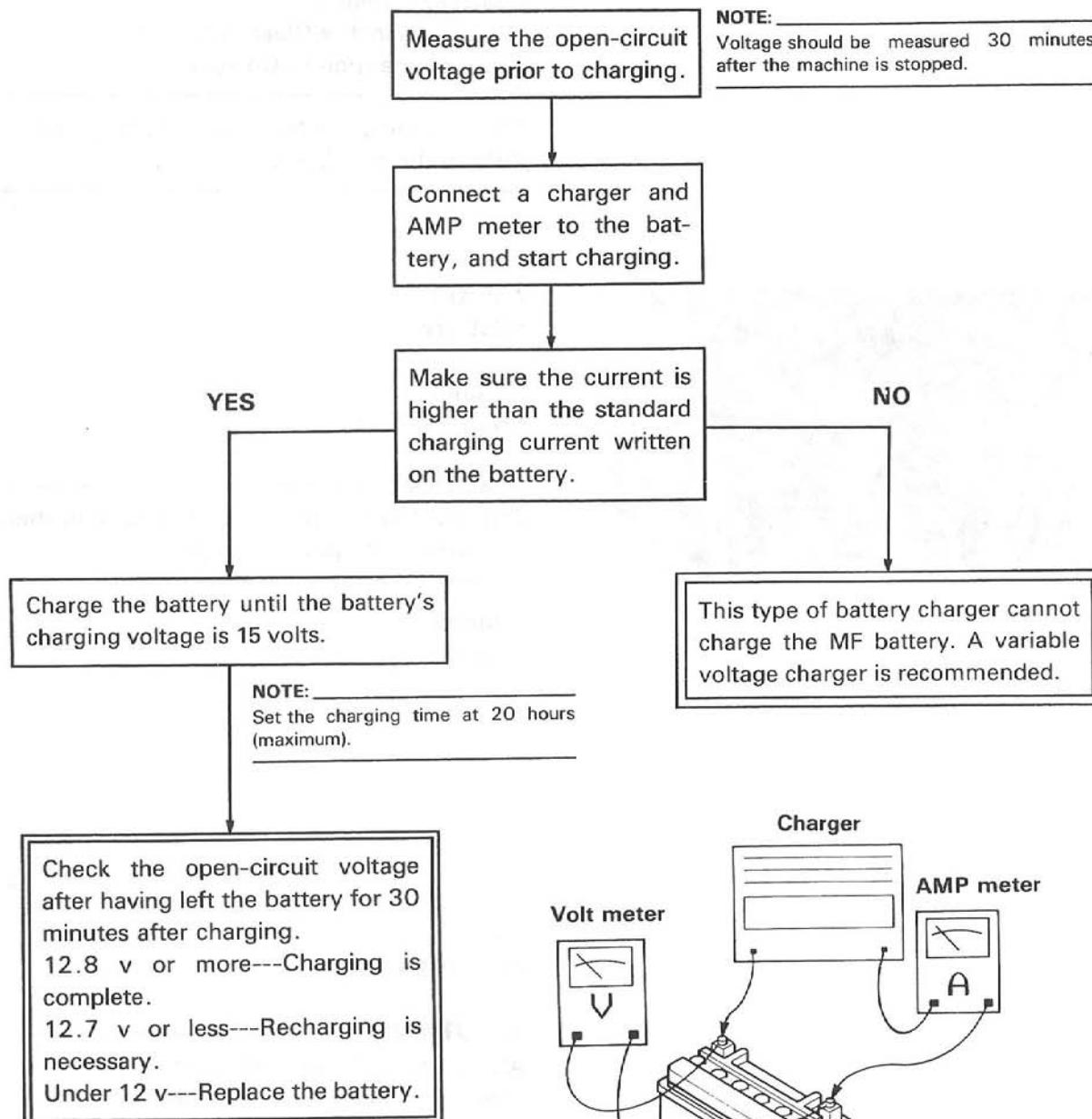


## BATTERY INSPECTION

INSP  
ADJ



### Charging method using a constant-voltage type charger



### Charging method using a constant current type charger

This type of battery charger cannot charge the MF battery.

## BATTERY INSPECTION/ FUSE INSPECTION

**INSP  
ADJ**

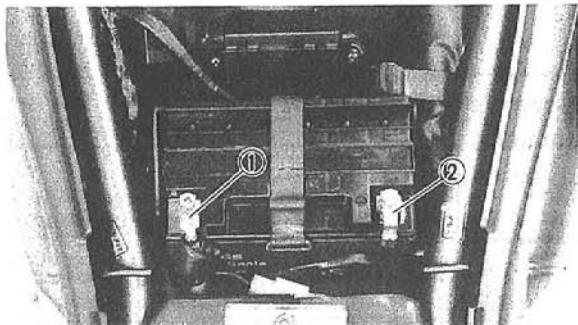


### 6. Inspect:

- Battery terminal
- Dirty terminal → Clean with wire brush.
- Poor connection → Correct.

#### NOTE:

After cleaning the terminals, apply grease lightly to the terminals.



### 7. Install

- Battery

### 8. Connect:

- Battery leads

#### CAUTION:

Connect the positive lead ① first and then connect the negative lead ②.

### 9. Install:

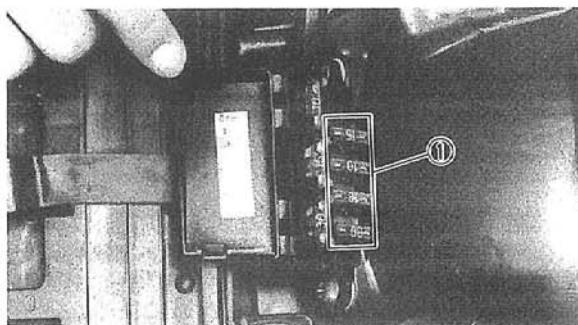
- Seat

YB703302

## FUSE INSPECTION

#### CAUTION:

Always turn off the main switch when checking or replacing a fuse. Otherwise, short-circuiting may occur.



### 1. Remove:

- Seat

### 2. Inspect:

- Fuse ①

\*\*\*\*\*

#### Inspection steps:

- Connect the Pocket tester to the fuse and check it for continuity.

## FUSE INSPECTION/ HEADLIGHT BEAM ADJUSTMENT

**INSP  
ADJ**

### NOTE:

Set the tester selector to " $\Omega \times 1$ " position.



**Pocket tester:  
P/N 90890-03112**

- If the tester indicates at  $\infty$ . Replace the fuse.

\*\*\*\*\*

### 3. Replace:

- Blown fuse

\*\*\*\*\*

### Replacement steps:

- Turn off the ignition.
- Install a new fuse of proper amperage.
- Turn on the switches to verify operation of the effected electrical device.
- If the fuse immediately blows again, check the electrical circuit.

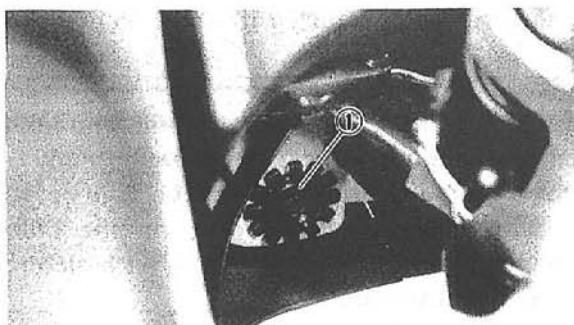
#### **WARNING**

Never use a fuse with a rating other than specified. Never use other material in place of a fuse. An improper fuse may cause damage to the electrical system, to possibly cause a fire, the lighting and/or ignition.

\*\*\*\*\*

### 4. Install:

- Seat



YB703303

## HEADLIGHT BEAM ADJUSTMENT

### 1. Adjust:

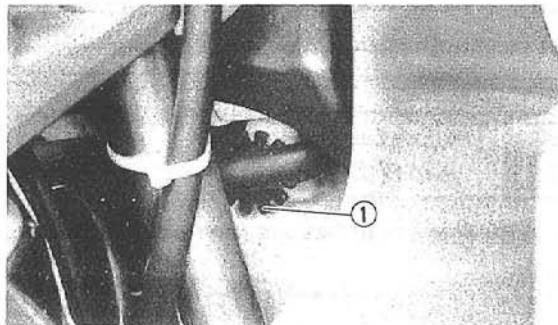
- Headlight beam (vertical)  
Turn the adjuster ① in or out.

Turning in → Headlight beam moves down.

Turning out → Headlight beam moves up.

## HEADLIGHT BULB REPLACEMENT

INSP  
ADJ

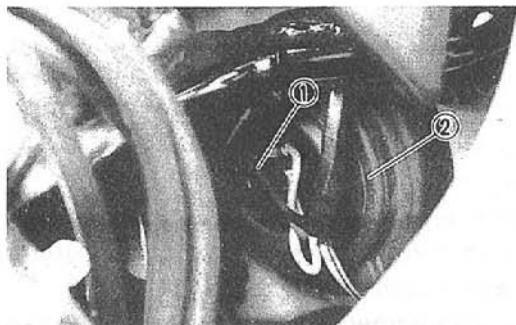


### 2. Adjust

- Headlight beam (horizontal)  
Turn the adjuster ① in or out.

Turning in → Headlight beam moves right.

Turning out → Headlight beam moves left.



YB703304

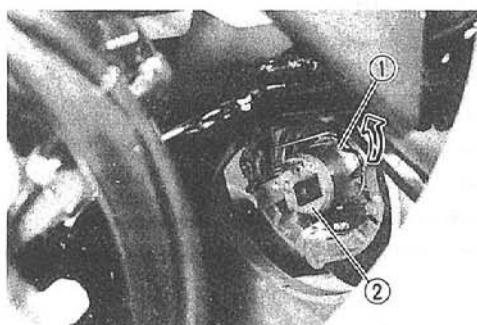
## HEADLIGHT BULB REPLACEMENT

### 1. Disconnect:

- Headlight lead ①

### 2. Remove:

- Cover ②



### 3. Unhook:

- Bulb holder ①

### 4. Remove:

- Bulb ②

### WARNING

Keep flammable products and your hands away from the bulb while it is on, it will be hot. Do not touch the bulb until it cools down.

### 5. Install:

- Bulb (new)

Secure the new bulb with the bulb holder.

### CAUTION

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

## HEADLIGHT BULB REPLACEMENT



6. Hook:

- Bulb holder

7. Install:

- Cover

8. Connect:

- Headlight lead



YB704101

## ENGINE OVERHAUL ENGINE REMOVAL

### **NOTE:**

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

- Cylinder head
- Cylinder
- Piston
- Clutch
- AC magneto

# 4

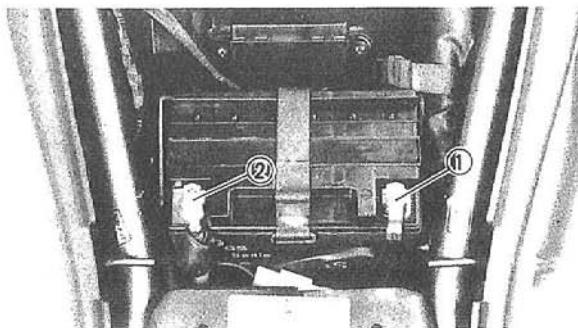
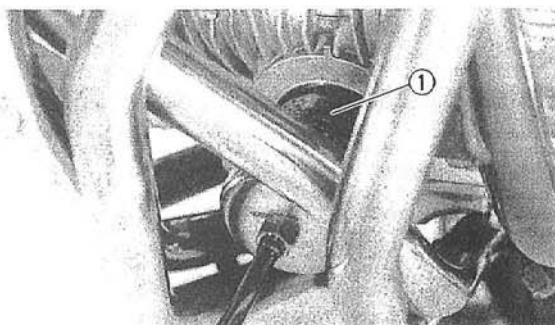
YB704107

## FUEL TANK AND COWLING

### 1. Remove:

- Seat
- Fuel tank
- Cowling

Refer to the "SIDE COVER, FUEL TANK AND COWLING" section in the CHAPTER 3.



YB704108

## ENGINE OIL

### 1. Drain:

- Engine oil
- Refer to the "ENGINE OIL REPLACEMENT" section in the CHAPTER 3.

### 2. Remove:

- Oil filter ①

YB704102

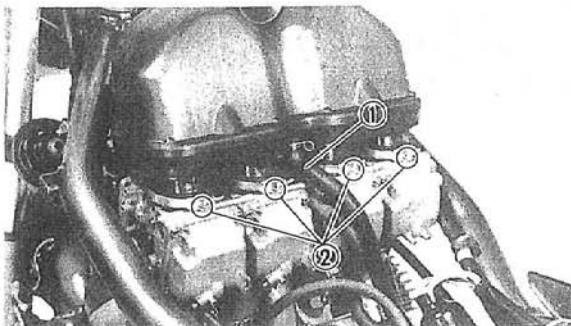
## BATTERY LEADS

### 1. Disconnect:

- Battery leads

### **CAUTION:**

Disconnect the negative lead ① first and then disconnect the positive lead ②.

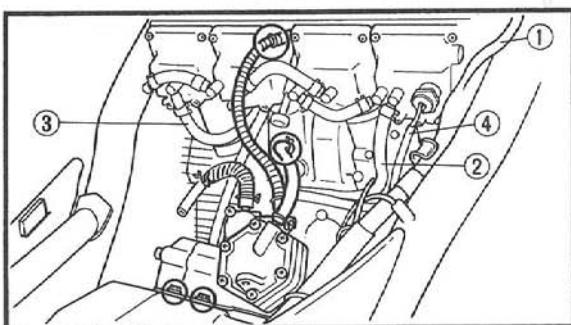
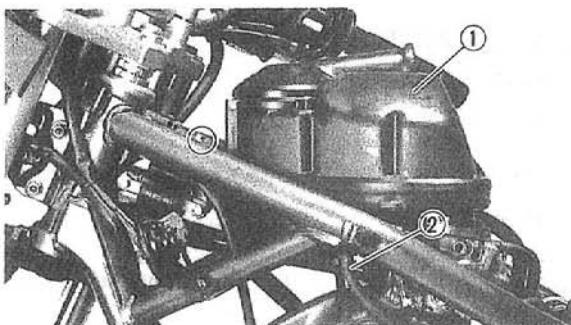


YB704109

**AIR FILTER CASE**

1. Disconnect:  
• Breather hose ①

2. Loosen:  
• Screws ②



YB704103

**CARBURETOR**

1. Remove:  
• Hose ① (cylinder head-solenoid valve)  
• Hose ② (solenoid valve-carburetor)  
• Hose ③ (carburetor-cylinder head)

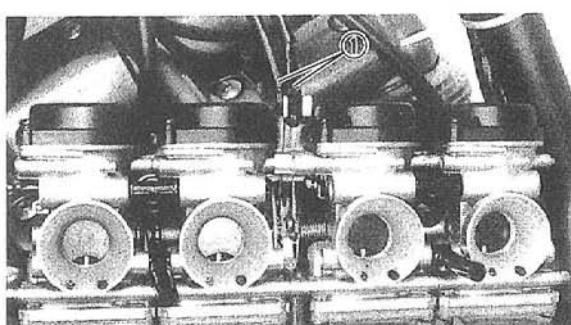
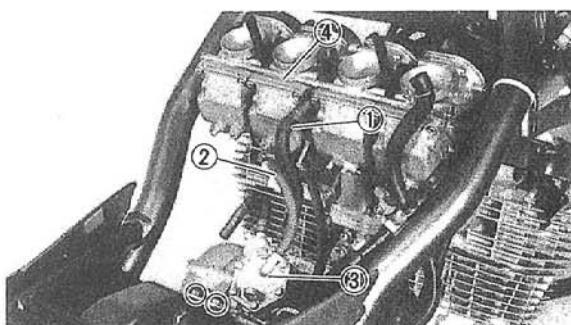
2. Disconnect:  
• Thermo switch lead ④

3. Disconnect:

- Fuel hose ①
- Vacuum hose ②

4. Remove:

- Fuel pump ③
- Carburetors ④



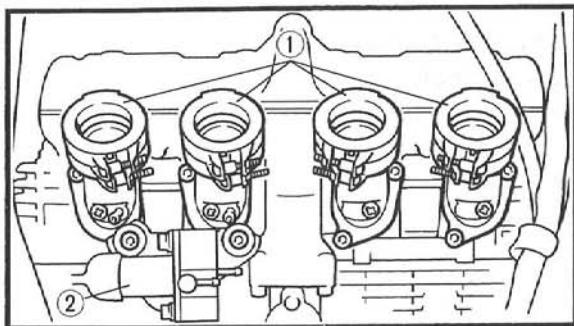
5. Disconnect:

- Throttle cables ①

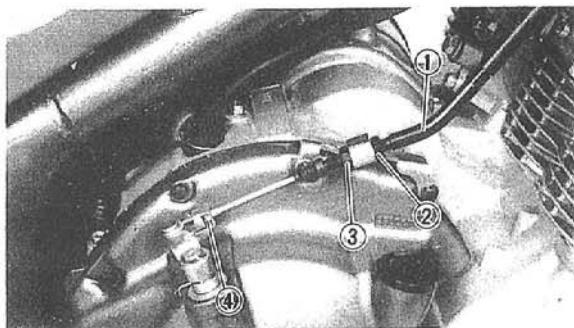
**NOTE:**

Cover the carburetor with a clean rag to prevent dirt or foreign material from entering the carburetor.

4

**6. Remove:**

- Intake manifolds ①
- Solenoid valve ②



YB704104

**CLUTCH CABLE****1. Remove:**

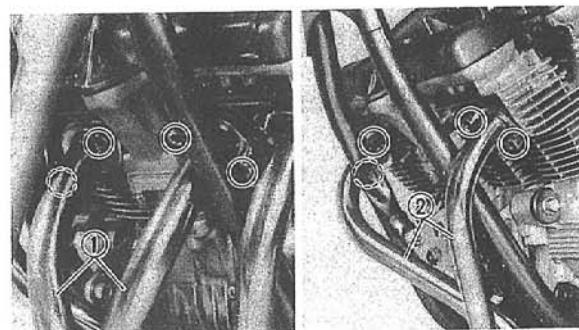
- Clutch cable ①

\*\*\*\*\*

**Removal steps:**

- Loosen the locknuts ② .
- Turn the adjuster ③ enough to free the clutch cable.
- Unhook the cable end ④ .

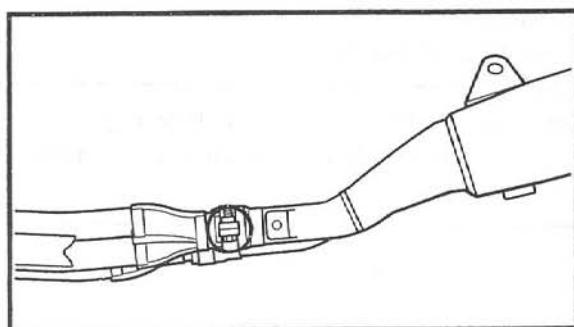
\*\*\*\*\*

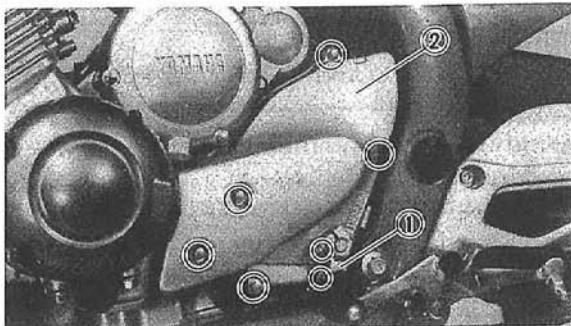


YB704110

**EXHAUST PIPE****1. Remove:**

- Exhaust pipe (#2, #3) ①
- Exhaust pipe (#1, #4) ②



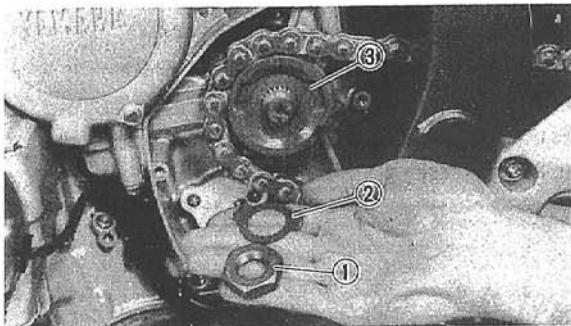


YB704105

**DRIVE SPROCKET**

## 1. Remove:

- Shift arm ①
- Cover (drive sprocket) ②
- Collars



## 2. Straighten:

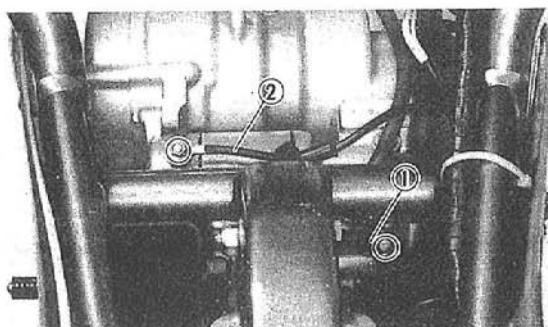
- Lock washer tab

## 3. Remove:

- Nut ①
- Lock washer ②
- Drive sprocket ③

**NOTE:**

Loosen the nut while applying the rear brake.

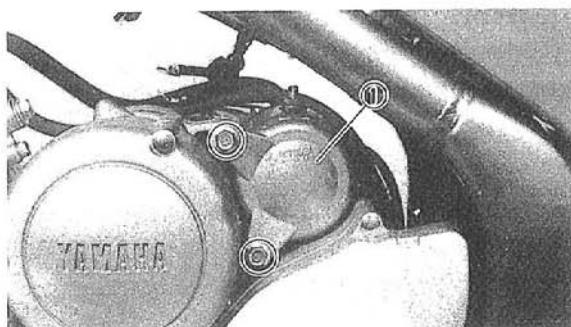


YB704111

**CABLE AND LEADS**

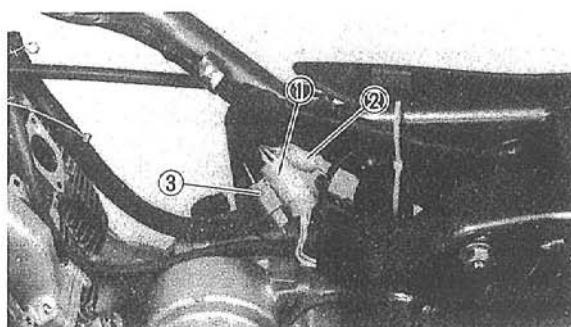
## 1. Disconnect:

- Spark plug leads
- Ground lead ①
- Starter motor lead ②



## 2. Remove:

- Starter motor ①



## 3. Disconnect:

- AC magneto leads ①
- Neutral switch/oil level switch lead ②

## 4. Remove:

- Sidestand switch lead ③  
from engine clamp



YB704106

**ENGINE REMOVAL**

1. Place suitable stand under the engine.

**WARNING**

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

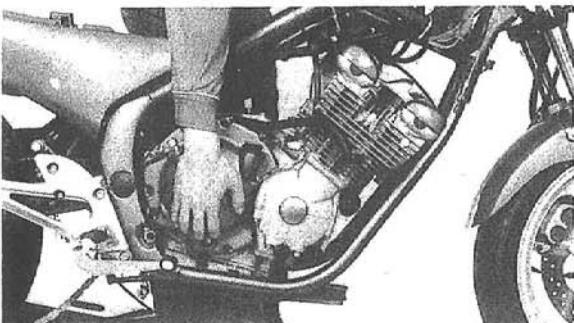
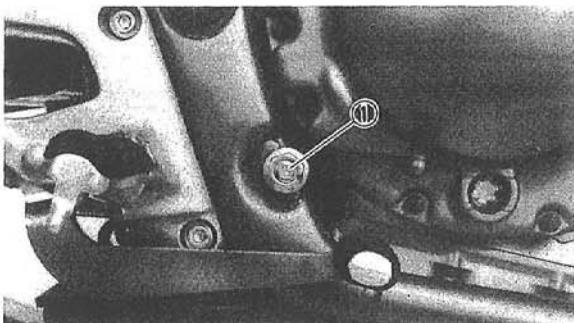
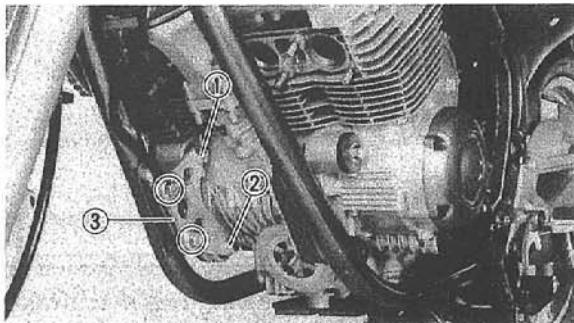
2. Cover the frame (right side)

**3. Remove:**

- Mounting bolt ① (front—upper)
- Mounting bolt ② (front—lower)
- Engine brackets ③ (left and right)

**NOTE:**

Put identification mark on the each engine bracket for reference during reinstallation.



4. Remove:

- Mounting bolt ④ (rear)

5. Remove:

- Engine assembly from right side

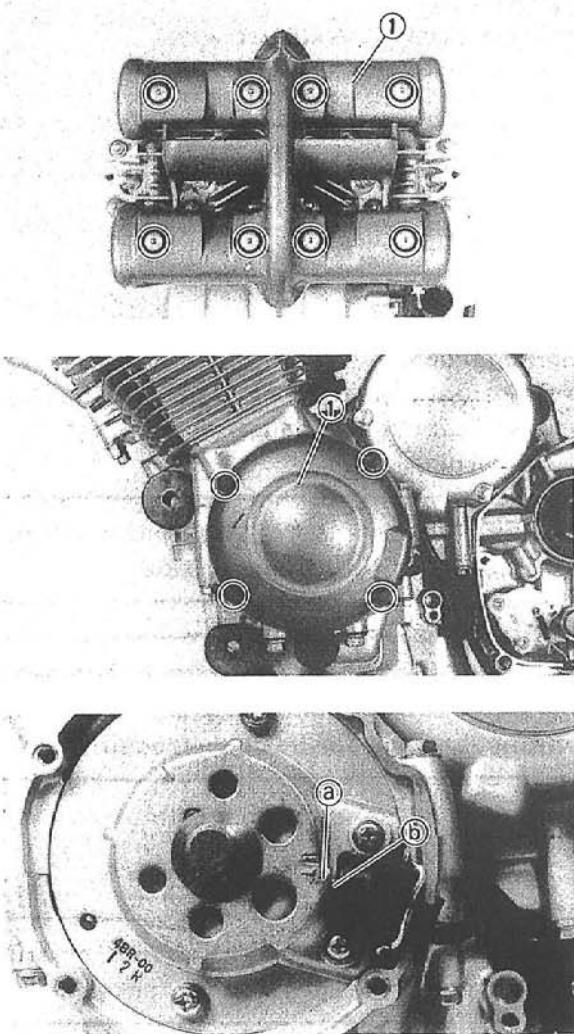


YB704201

**ENGINE DISASSEMBLY****CYLINDER HEAD COVER, CAMSHAFT AND CYLINDER HEAD****NOTE:**

With the engine mounted, the cylinder head cover, camshaft and cylinder head can be maintained by removing the following parts.

- Fuel tank
- Cowling
- Air filter case
- Carburetor

**1. Remove:**

- Cylinder head cover ①

**NOTE:**

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

**2. Remove:**

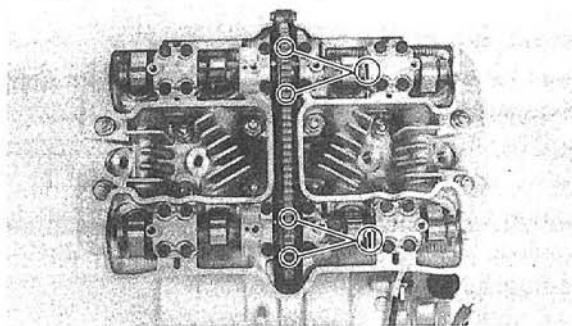
- Timing plate cover ①

**3. Align:**

- "T" mark  
(with pickup coil)

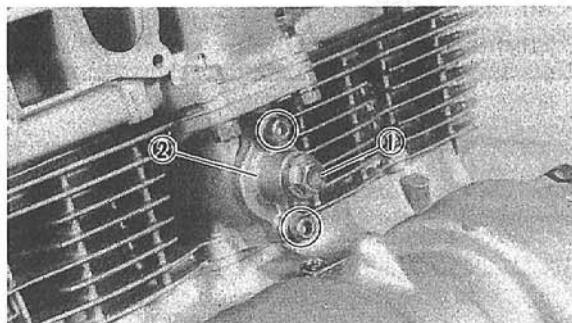
**NOTE:**

Turn the crankshaft counterclockwise and align the "T" mark ④ on the timing plate with the pickup coil ⑤ when #1 piston is at TDC on compression stroke.



## 4. Loosen:

- Bolts (cam sprockets) ①

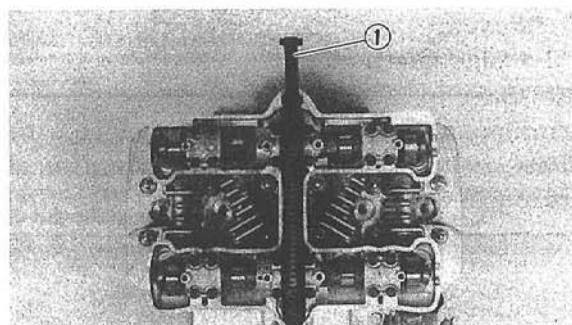


## 5. Loosen:

- Tensioner bolt ①

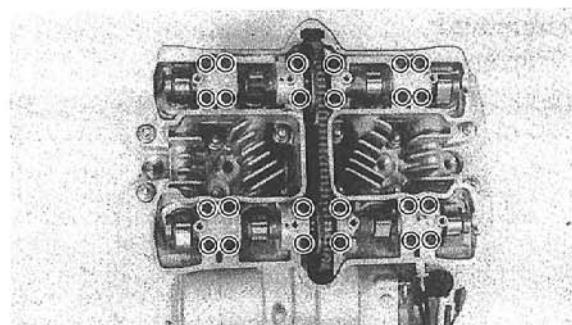
## 6. Remove:

- Timing chain tensioner ②



## 7. Remove:

- Chain guide ① (exhaust side)



## 8. Remove:

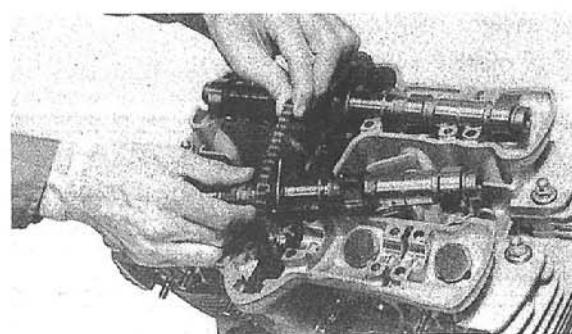
- Camshaft caps (intake)
- Camshaft caps (exhaust)
- Dowel pins

**NOTE:**

Remove the camshaft cap bolts in a crisscross pattern from out side to in side.

**CAUTION:**

The bolts (camshaft caps) must be removed evenly or damage to the cylinder head, camshaft caps and camshafts will result.



## 9. Remove:

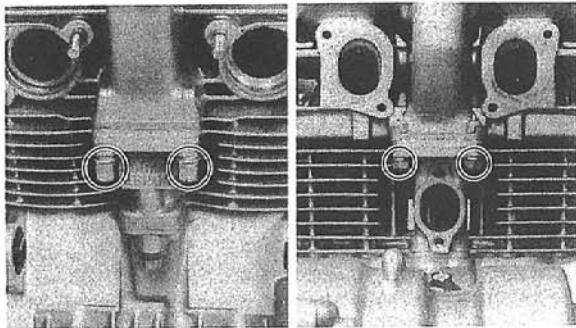
- Camshafts

**NOTE:**

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

## ENGINE DISASSEMBLY

ENG

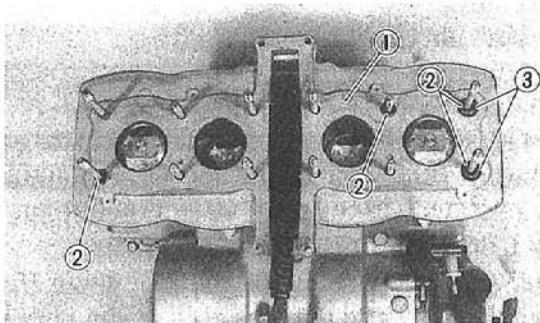
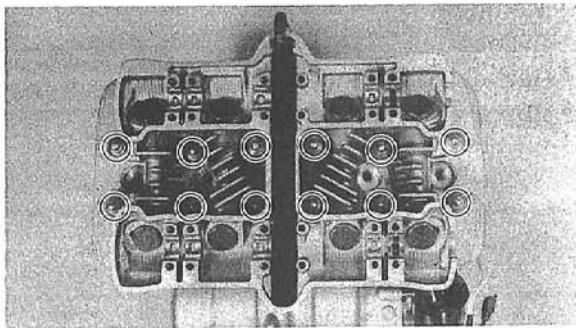


### 10. Remove:

- Nuts (cylinder head)

#### NOTE:

- Loosen the bolts in their proper loosening sequence.
- Follow numerical order shown in photo.  
Start by loosening each nut 1/2 turn until all are loose.



### 11. Remove:

- Cylinder head
- Gasket ① (cylinder head)
- Dowel pins ②
- O-rings ③

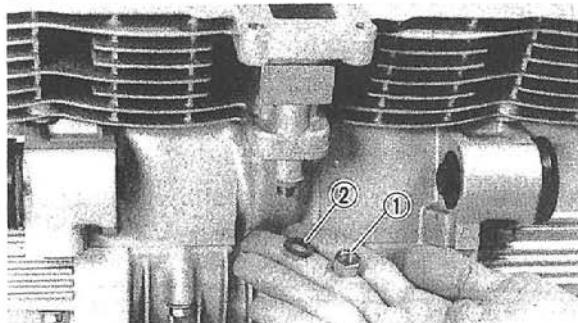
YB704202

## CYLINDER AND PISTON

#### NOTE:

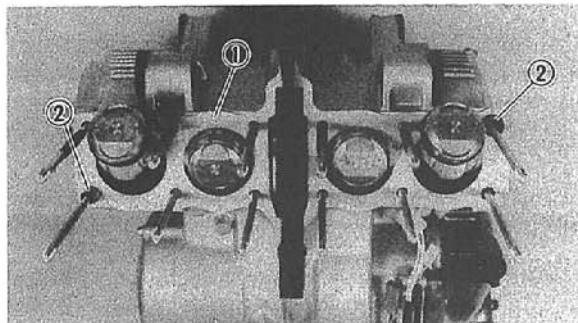
With the engine mounted, the cylinder and piston can be maintained by removing the following parts.

- Fuel tank
- Cowling
- Air filter case
- Carburetor
- Cylinder head



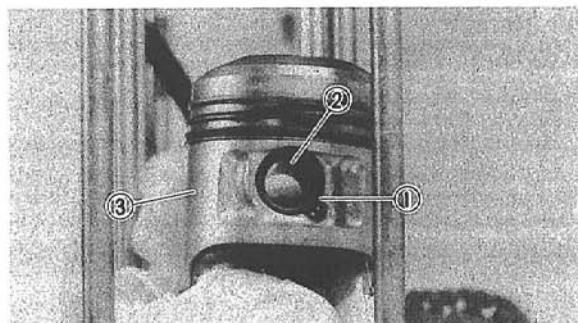
## 1. Remove:

- Nut ①
- Washer ②



## 2. Remove:

- Cylinder
- Gasket ① (cylinder)
- Dowel pins ②

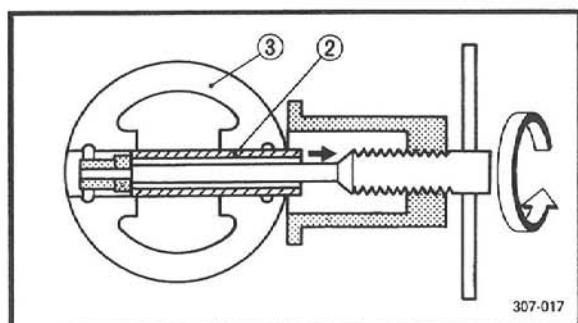


## 3. Remove:

- Piston pin circlips ①
- Piston pins ②
- Pistons ③

**NOTE:**

- Before removing piston pin circlip, cover crankcase with a clean rag to prevent circlip from falling into crankcase cavity.
- Before removing the piston pin, debur the clip grooved and pin hole area. If the piston pin groove is deburred and piston pin is still difficult to remove, use piston pin puller.
- Put identification mark on the each piston head for reference during reinstallation.



**Piston pin puller:**  
P/N 90890-01304

**CAUTION:**

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

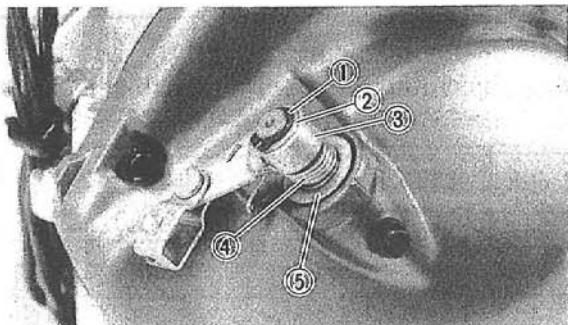


YB704203

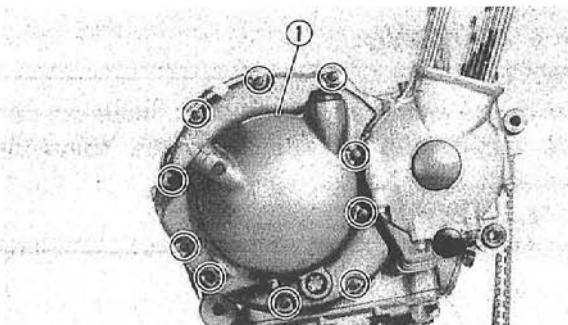
**CLUTCH****NOTE:**

With the engine mounted, the clutch assembly can be maintained by removing the following parts.

- Clutch cover

**1. Remove:**

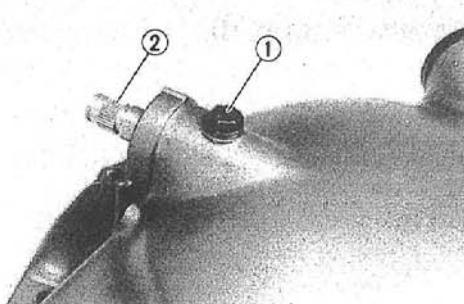
- Circlip ①
- Washer ②
- Pull lever ③
- Return spring ④
- Plate washer ⑤

**2. Remove:**

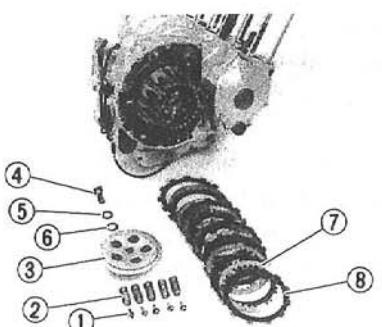
- Clutch cable bracket
- Clutch cover ①
- Gasket
- Dowel pins

**NOTE:**

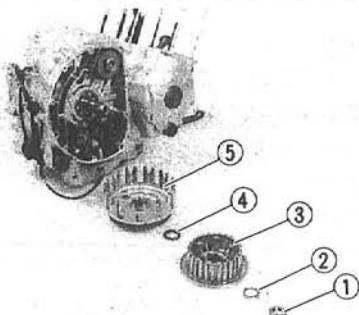
Working in a crisscross pattern, loosen the bolts 1/4 turn each. Remove them after all are loosened.

**3. Remove:**

- Bolt ①
- Clutch pull lever shaft ②

**4. Remove:**

- Clutch bolts ①
- Clutch springs ②
- Pressure plate ③
- Pull rod ④
- Bearing ⑤
- Washer ⑥
- Clutch plates ⑦
- Friction plates ⑧



## 5. Straighten:

- Lock washer tab

## 6. Remove:

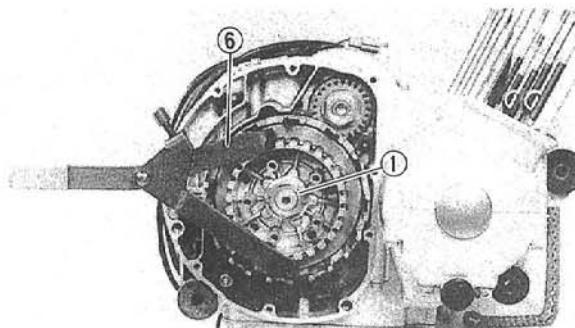
- Nut ① (clutch boss)
- Lock washer ②
- Clutch boss ③
- Holding plate ④
- Clutch housing ⑤

**NOTE:**

Loosen the nut (clutch boss) ① while holding the clutch boss by the clutch holder ⑥.



**Clutch holder:**  
P/N 90890-04086

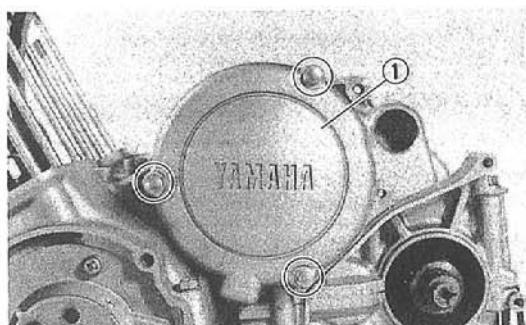


YB704208

**A.C. MAGNETO****NOTE:**

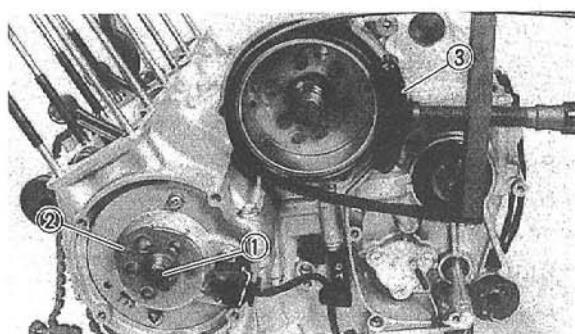
With the engine mounted, A.C. magneto can be maintained by removing the following parts.

- Magneto cover



## 1. Remove:

- Magneto cover ①

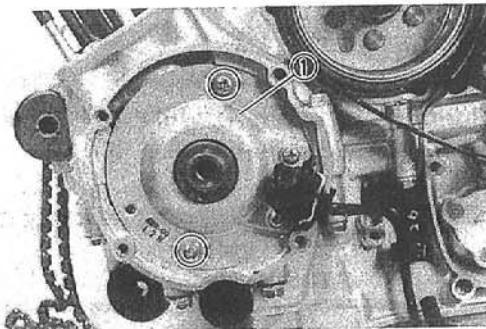


## 2. Remove:

- Bolt (timing plate) ①
- Timing plate ②
- Pin ③

**NOTE:**

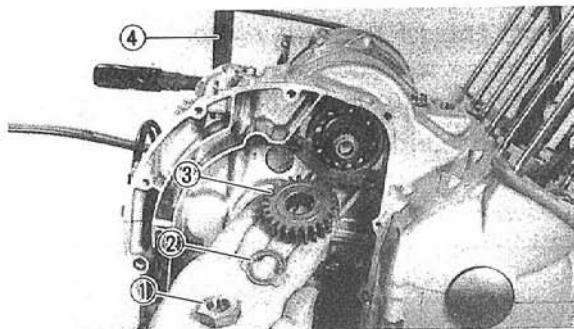
Loosing the bolt (timing plate) ① while holding the rotor by the sheave holder ③.



 Sheave holder:  
P/N 90890-01701

3. Remove:

- Pickup coil base ①



4. Straighten:

- Lock washer tab

5. Remove:

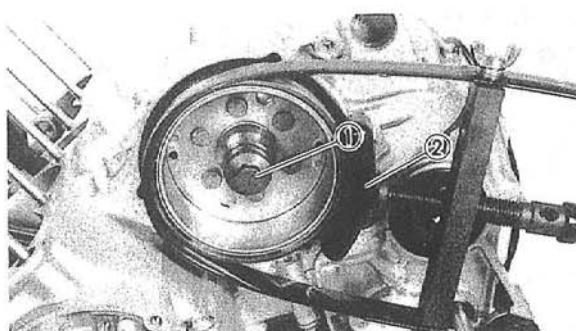
- Nut ① (primary drive gear)
- Lock washer ②
- Primary drive gear ③
- Collar

**NOTE:**

Loosen the nut (primary drive gear) ① while holding the rotor by the sheave holder ④.



Sheave holder:  
P/N 90890-01701



6. Remove:

- Bolt (rotor) ①
- Washer

**NOTE:**

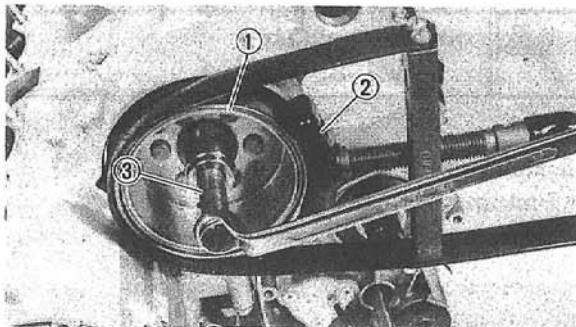
Loosen the Bolt (rotor) ① while holding the rotor by the sheave holder ②.



Sheave holder:  
P/N 90890-01701

## ENGINE DISASSEMBLY

ENG



### 7. Remove:

- Rotor ①

#### NOTE:

Remove the rotor ① while pushing back the rotor by the flywheel puller ②.



#### Flywheel puller:

P/N 90890-01080

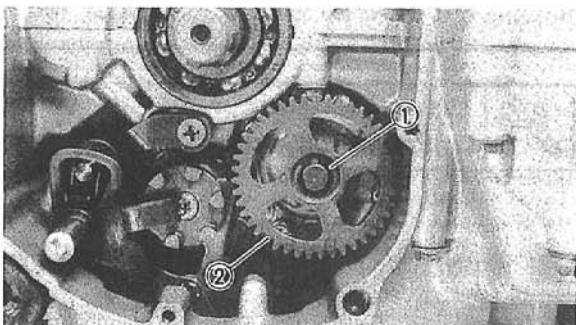
YB704206

## SHIFT SHAFT AND OIL PUMP

#### NOTE:

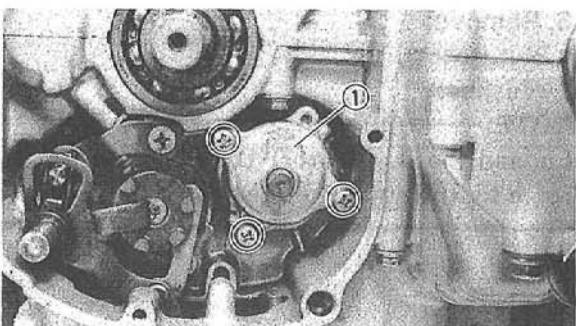
With the engine mounted, the shift shaft and oil pump can be maintained by the following parts.

- Clutch assembly



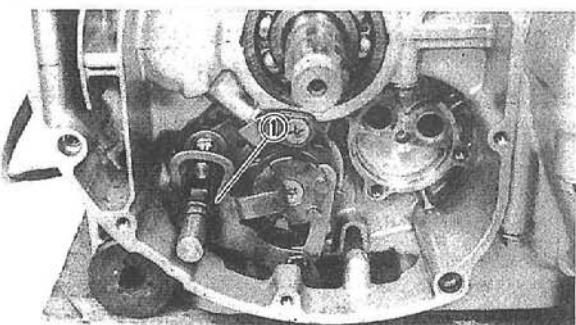
### 1. Remove:

- Circlip ①
- Driven gear ②



### 2. Remove:

- Oil pump assembly ①
- O-ring ②



### 3. Remove:

- Shift shaft ①

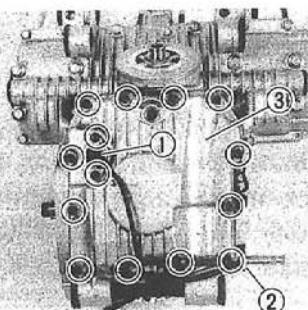


YB704205

**OIL PAN AND OIL STRAINER****NOTE:**

With the engine mounted, the oil pan, oil filter and oil strainer can be maintained by removing the following parts.

- Exhaust pipes

**1. Remove:**

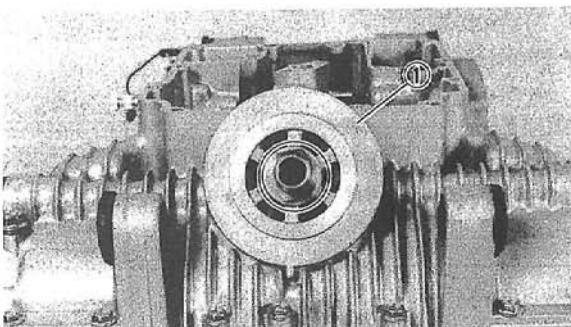
- Oil level gauge ①
- Neutral switch lead ②
- Oil pan ③
- Gasket
- Dowel pins

**NOTE:**

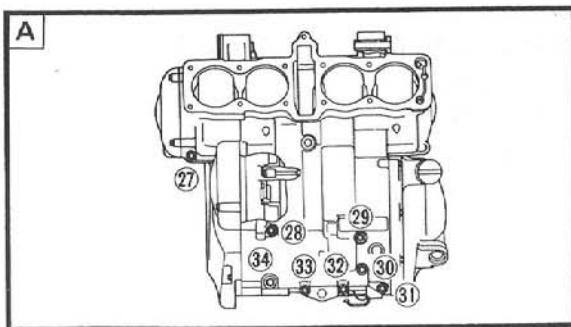
Working in a crisscross pattern, loosen the bolts 1/4 turn each. Remove them after all are loosened.

**2. Remove:**

- Relief valve ①
- Oil strainer ②
- Oil strainer housing

**3. Remove:**

- Oil filter housing ①
- O-ring



YB704209

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

- Bolts (crankcase)

- A crankcase (upper)
- B crankcase (lower)

**NOTE:**

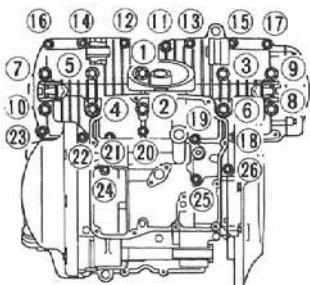
- Loosen the bolts 1/4 turn each and remove

## ENGINE DISASSEMBLY

ENG



B



them after all are loosened.

- Loosen the bolts starting with the highest numbered one.
- The embossed numbers in the crankcase (lower) designate the tightening sequence.

### 2. Remove:

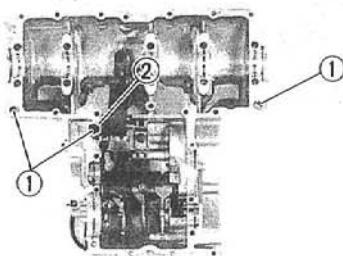
- Lower crankcase

**CAUTION:**

Use a soft hammer to tap on the case half. Tap only on reinforced portions of the case. Do not tap on the gasket mating surface. Work slowly and carefully. Make sure that the case halves separate evenly.

### 3. Remove:

- Dowel pins ①
- O-ring ②

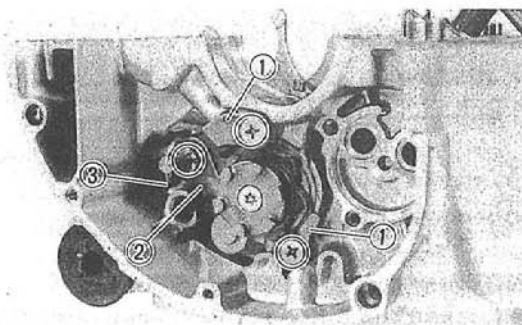


### 4. Remove:

- Main journal bearing  
(from lower crankcase)

**NOTE:**

Identify each plane bearing position very carefully so that it can be reinstalled in its original place.

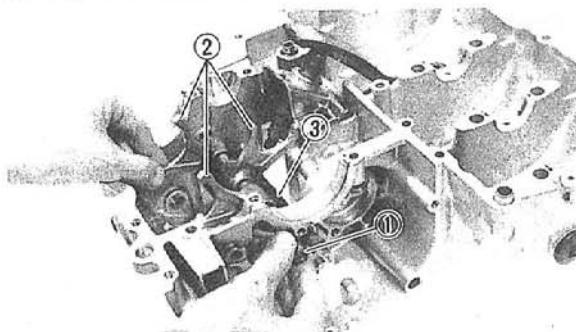


YB704204

## SHIFT SHAFT AND SHIFT CAM

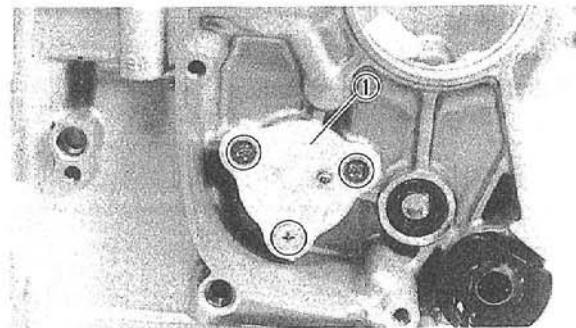
### 1. Remove:

- Stopper plats ①
- Stopper lever ②
- Return spring ③



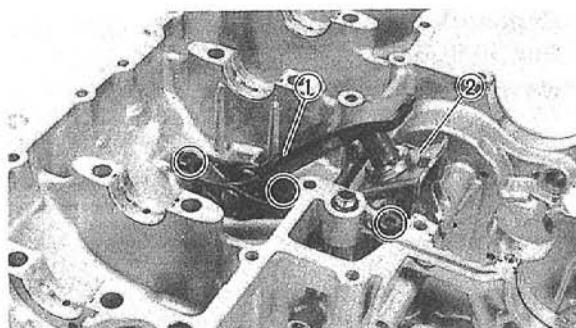
## 2. Remove:

- Guide bar ①
- Shift forks ②
- Shift cam ③



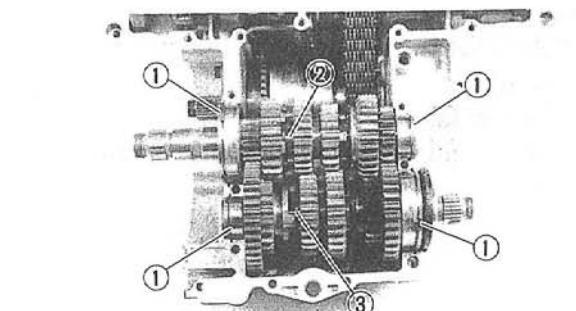
## 3. Remove:

- Neutral switch ①



## 4. Remove:

- Chain guide ① (HY-VO chain—lower)
- Chain tensioner ② (HY-VO chain)

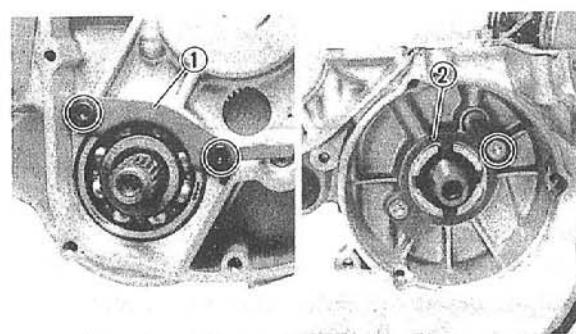


YB704214

**TRANSMISSION**

## 1. Remove:

- Circlips ①
- Main axle assembly ②
- Drive axle assembly ③

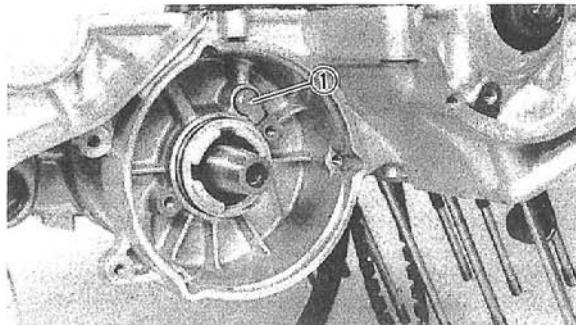


YB704212

**STARTER CLUTCH**

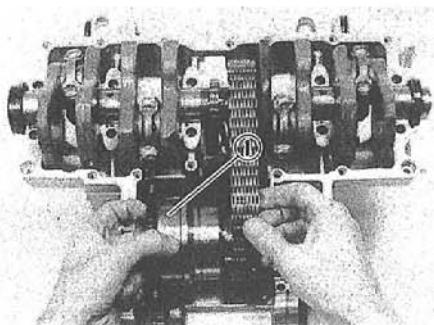
## 1. Remove:

- Bearing retainer ①
- Oil seal retainer ②



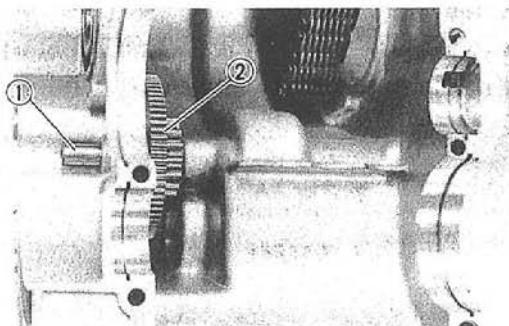
## 2. Remove:

- Oil nozzle ①



## 3. Remove:

- Starter clutch shaft
- Starter clutch assembly ①



## 4. Remove:

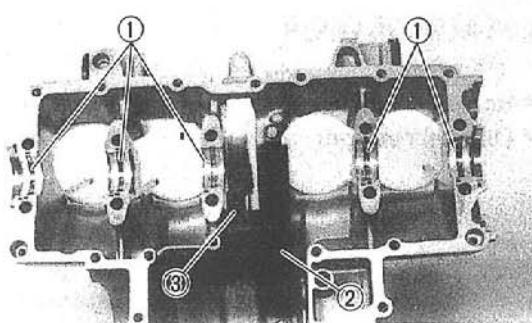
- Shaft (idle gear) ①
- Idle gear ②

YB704213

**CRANKSHAFT**

## 1. Remove:

- Crankshaft  
(with timing chain and HY-VO chain)



## 2. Remove:

- Main journal bearing ①  
(from upper crankcase)

**NOTE:**

Identify each plane bearing position very carefully so that it can be reinstalled in its original place.

- 
- Chain guide ② (HY-VO chain—upper)
  - Chain guide ③ (timing chain—intake)



YB704210

**VALVE****NOTE:**

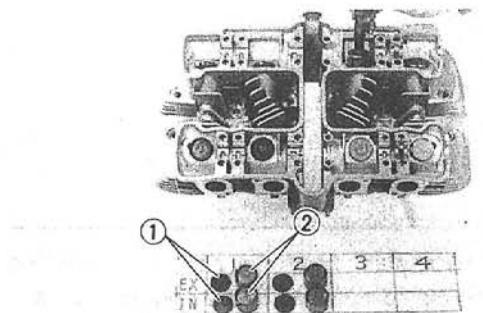
With the engine mounted, the valve and cam-shaft can be maintained by removing the following parts.

- Fuel tank
- Cowling
- Air filter case
- Carburetor
- Cylinder head

**NOTE:**

Before removing the internal parts (valve, valve spring, valve seat etc.) of the cylinder head.

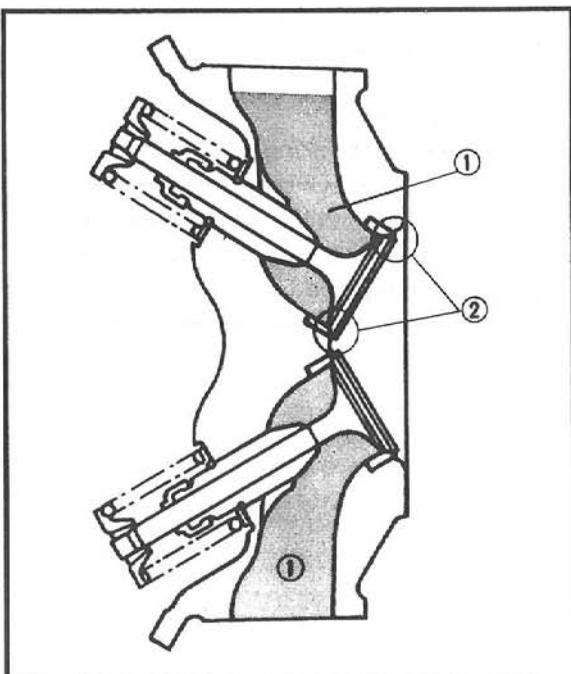
The valve sealing should be checked.

**1. Remove:**

- Pads ①
- Lifters ②

**NOTE:**

Identify each lifter and pad position very carefully so that it can be reinstalled in its original place.

**2. Check:**

- Valve sealing

Leakage at valve seat → Inspect the valve face, valve seat and valve seat width.

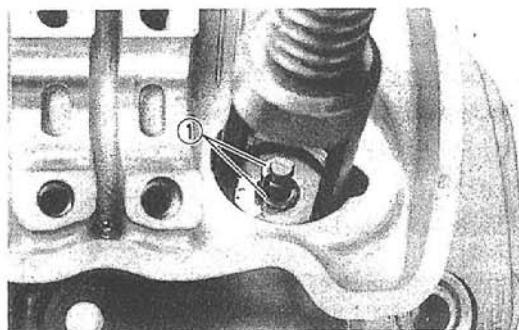
Refer to the "INSPECTION AND REPAIR—VALVE SEAT".

\*\*\*\*\*

**Checking steps:**

- Pour a clean solvent ① into the intake and exhaust ports.
- Check the valve sealing.  
There should be no leakage at the valve seat ②.

\*\*\*\*\*



## 3. Remove:

- Valve cotters ①

## NOTE: \_\_\_\_\_

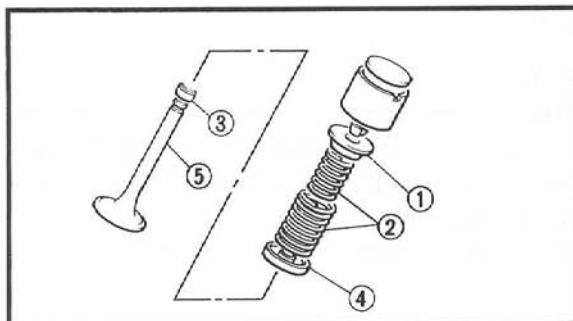
Remove the valve cotters while compressing the valve spring with the valve spring compressor.



Valve spring compressor:  
P/N 90890-04019

Attachment:

P/N 90890-04108

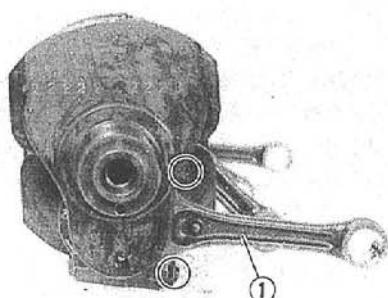


## 4. Remove:

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

## NOTE: \_\_\_\_\_

Identify each part position very carefully so that it can be reinstalled in its original place.



YB704211

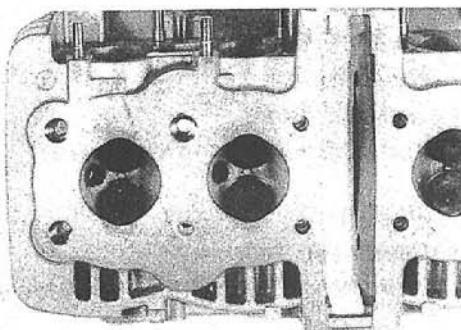
## CONNECTING ROD

## 1. Remove:

- Connecting rod ①
- Connecting rod bearing

## NOTE: \_\_\_\_\_

Identify each connecting rod bearing position very carefully so that it can be reinstalled in its original place.



YB704301

**INSPECTION AND REPAIR****CYLINDER HEAD****1. Eliminate:**

- Carbon deposits  
(from combustion chamber)  
Use a rounded scraper.

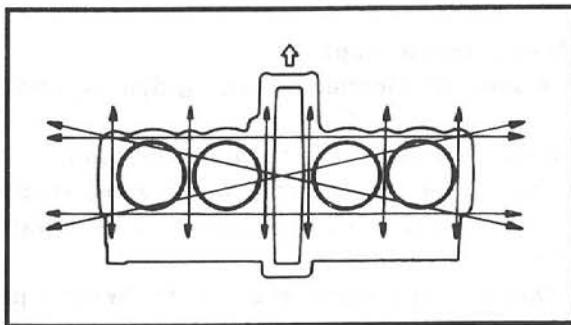
**NOTE:** ——————

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

- Spark plug threads
- Valve seat

**2. Inspect:**

- Cylinder head  
Scratches/Damage → Replace.

**3. Measure:**

- Cylinder head warpage  
Out of specification → Resurface.



**Warpage limit:**  
0.03 mm (0.0012 in)

\*\*\*\*\*

**Warpage measurement and resurfacement step:**

- Attach a straight edge and a thickness gauge on the cylinder head.
- Measure the warpage.
- If the warpage is out of specification, resurface the cylinder head.
- Place a 400 ~ 600 grit wet sandpaper on the surface plate, and resurface the head using a figure-eight sanding pattern.

**NOTE:** ——————

Rotate the head several times to avoid removing too much material from one side.

\*\*\*\*\*



YB704302

**VALVE SEAT**

## 1. Eliminate:

- Carbon deposit  
(from valve face and valve seat)

## 2. Inspect:

- Valve seat  
Pitting/Wear → Refuse the valve seat.

## 3. Measure:

- Valve seat width ②

Out of specification → Reface valve seat.

**Valve seat width:**

## Intake

2.0 mm (0.08 in)

## Exhaust

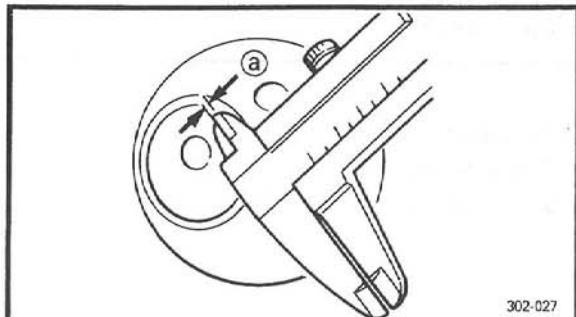
2.0 mm (0.08 in)

\*\*\*\*\*

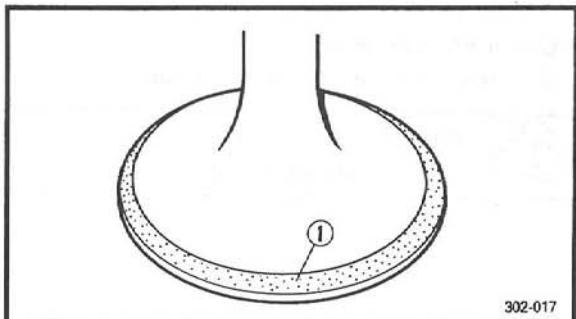
**Measurement steps:**

- Apply the Mechanic's bluing dye (Dykel) ① to the valve face.
- Install the valve into the cylinder head.
- Press the valve through the valve guide and onto the valve seat to make a clear pattern.
- Measure the valve seat width. Wherever the valve seat and valve face made contact, bluing will have been removed.
- If the valve seat width is too wide, too narrow, or seat has not centered, the valve seat must be refaced.

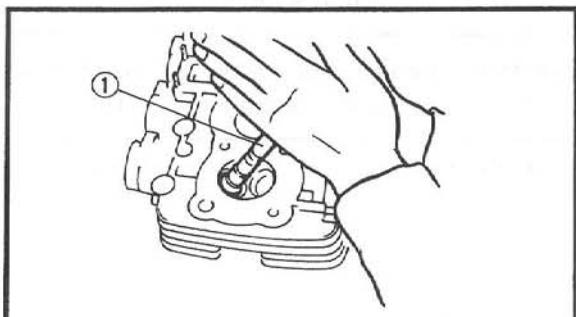
\*\*\*\*\*



302-027



302-017



## 4. Reface:

- Valve seat

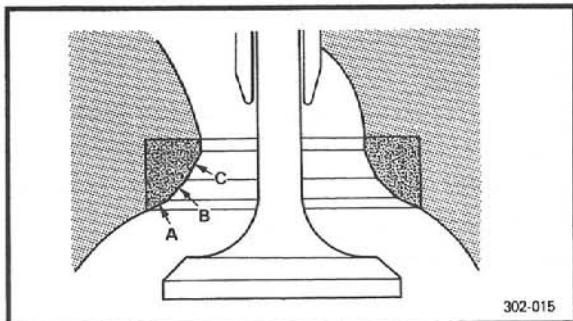
Use a 45°, 60° and 75° valve seat cutter ① .

**Valve seat cutter:**

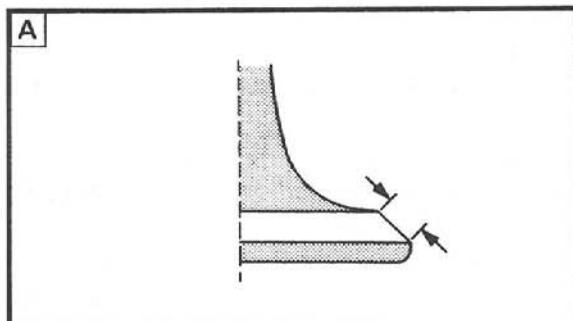
YM-91043

**CAUTION:**

When twisting cutter, keep an even downward pressure (4~5 kg) to prevent chatter marks.



Cut section as follows	
Section	Cutter
A	45°
B	60°
C	75°

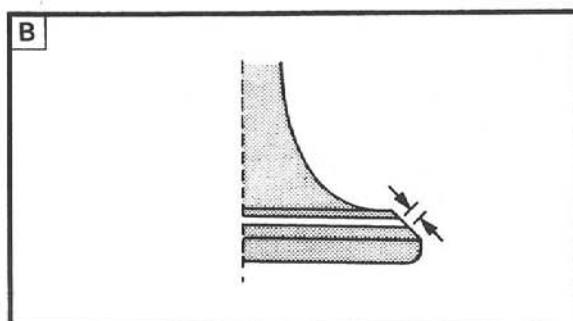


\*\*\*\*\*

**Refacing steps:**

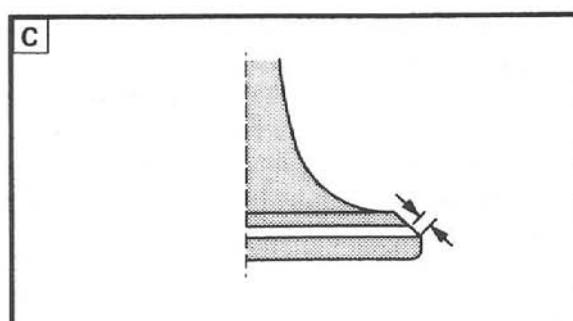
- A** Valve seat is centered on valve face but it is too wide.

Valve seat cutter set		Desire result
Use	45° cutter 75° cutter	To reduce valve seat width to 1.0 mm (0.039 in).
lightly		



- B** Valve seat is in the middle of the face but it is too narrow.

Valve seat cutter set		Desired result
Use	60° cutter	To achieve a uniform valve seat width of 1.0 mm (0.039 in).

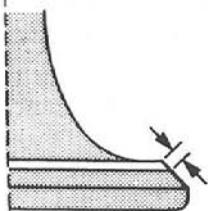


- C** Valve seat is too narrow and it is near valve margin.

Valve seat cutter set		Desired result
Use	First: 45° cutter Second: 60° cutter	To center the seat and to achieve its width of 1.0 mm (0.039 in).



D



- D Valve seat is too narrow and it is located near the bottom edge of the valve face.

Valve seat cutter set		Desired result
Use	First: 75° cutter Second: 60° cutter	To center the seat and increase its width.

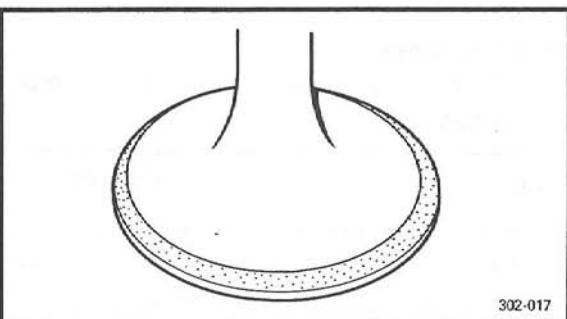
\*\*\*\*\*

#### 5. Lap:

- Valve face
- Valve seat

#### NOTE:

After refacing the valve seat or replacing the valve and valve guide, the valve seat and valve face should be lapped.



302-017

\*\*\*\*\*

#### Lapping steps:

- Apply a coarse lapping compound to the valve face.

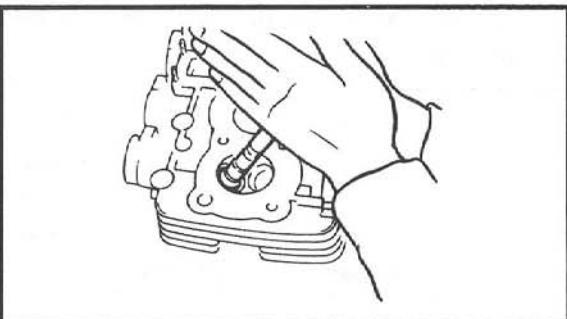
#### CAUTION:

Be sure no compound enters the gap between the valve stem and guide.



302-024

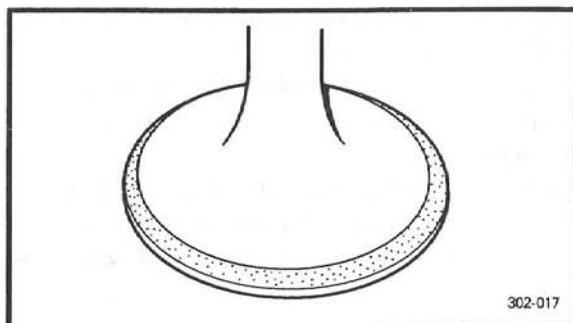
- Apply a molybdenum disulfide oil to the valve stem.
- Install the valve into the cylinder head.
- Turn the valve until the valve face and valve seat are evenly polished, then clean off all compound.



#### NOTE:

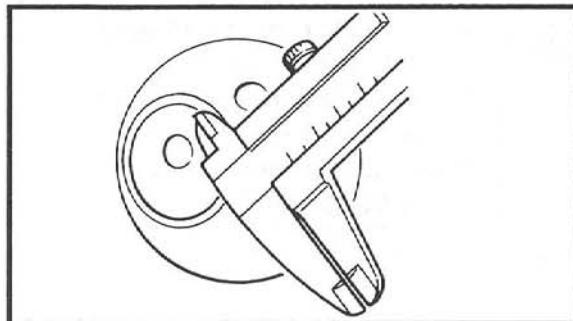
To obtain the best lapping results, lightly tap the valve seat while rotating the valve back and forth between your hands.

- Apply fine lapping compound to the valve face and repeat the above steps.

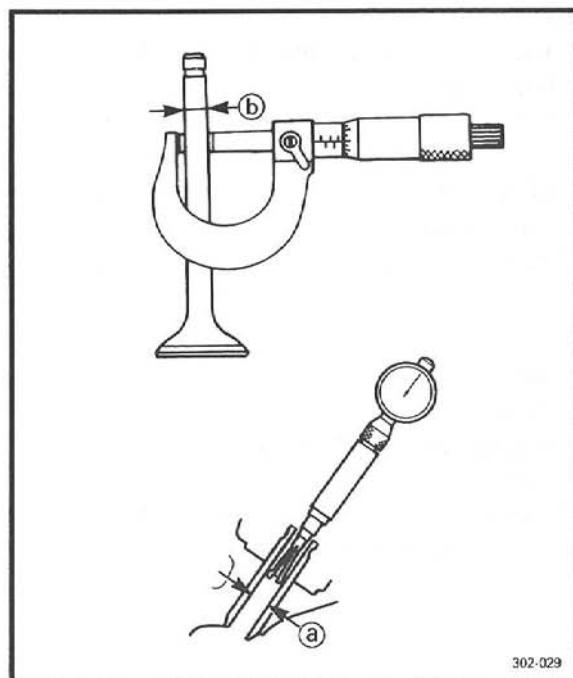
**NOTE:**

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

- Apply a Mechanic's bluing dye (Dyke) to the valve face.
- Install the valve into the cylinder head.



- Press the valve through the valve guide and onto the valve seat to make a clear pattern.
  - Measure the valve seat width again. If the valve seat width is out of specification, reface and lap the valve seat.
- \*\*\*\*\*



YB704303

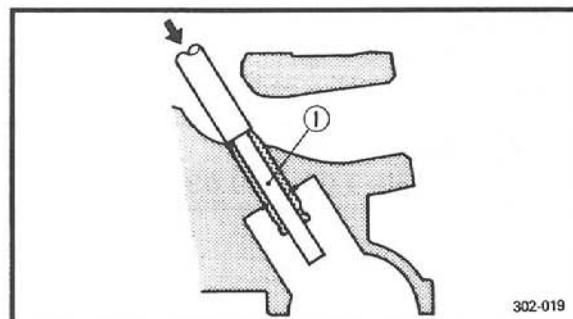
**VALVE AND VALVE GUIDE****1. Measure:**

- Stem-to-guide clearance

$$\text{Stem-to-guide clearance} = \text{Valve guide inside diameter } \textcircled{a} - \text{Valve stem diameter } \textcircled{b}$$

Out of specification → Replace valve guide.

	<b>Stem-to-guide clearance:</b> <b>Intake:</b> $0.010 \sim 0.037 \text{ mm}$ $(0.0004 \sim 0.0015 \text{ in})$ <b>&lt;Limit&gt;:</b> $0.1 \text{ mm (0.004 in)}$ <b>Exhaust:</b> $0.025 \sim 0.052 \text{ mm}$ $(0.001 \sim 0.002 \text{ in})$ <b>&lt;Limit&gt;:</b> $0.1 \text{ mm (0.004 in)}$
--	--

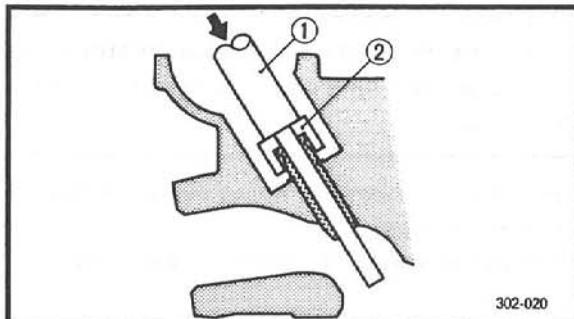
**2. Replace:**

- Valve guide

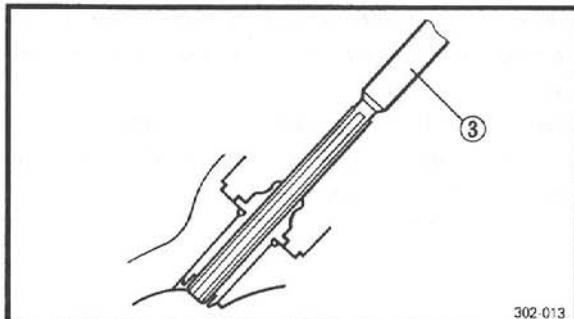
\*\*\*\*\*

**Replacement steps:****NOTE:**

Heat the cylinder head in an oven to  $100^\circ\text{C}$  ( $212^\circ\text{F}$ ) to ease guide removal and installation and to maintain correct interference fit.



- Remove the valve guide using the valve guide remover ① .
- Install the valve guide (new) using the valve guide installer ② and valve guide remover ① .
- After installing the valve guide, bore the valve guide using the valve guide reamer ③ to obtain proper stem-to-guide clearance.



	<b>Valve guide remover (5 mm):</b> P/N 90890-04097
	<b>Valve guide installer (5 mm):</b> P/N 90890-04098
	<b>Valve guide reamer (5 mm):</b> P/N 90890-04099

\*\*\*\*\*

#### NOTE:

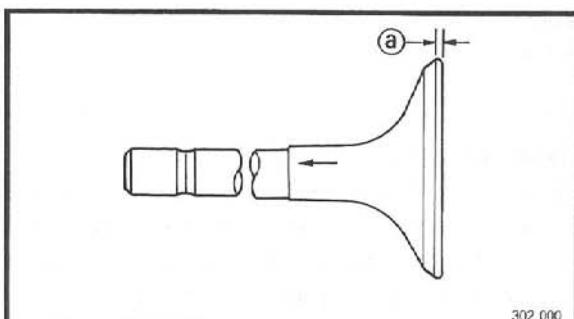
Reface the valve seat after replacing the valve guide.

#### 3. Eliminate:

- Carbon deposit  
(from valve face)

#### 4. Inspect:

- Valve face  
Pitting/Wear → Grind the face.
- Valve stem end  
Mushroom sharp or diameter larger than rest of stem → Replace.



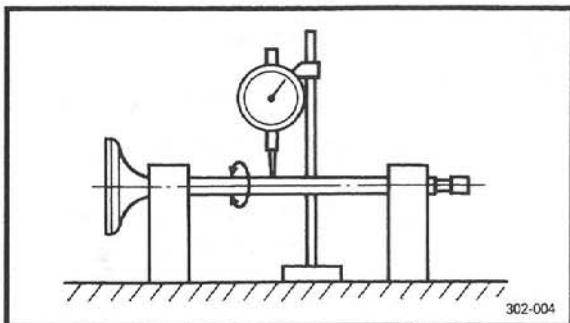
#### 5. Measure:

- Margin thickness ④  
Out of specification → Replace.



#### Margin thickness:

Limit: 1.0 mm (0.039 in)



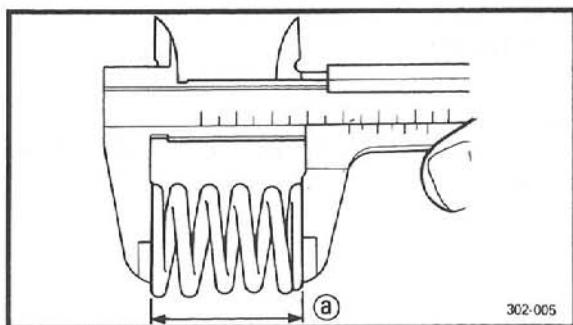
## 6. Measure:

- Runout (valve stem)  
Out of specification → Replace.



## Runout:

**Less than 0.03 mm (0.0012 in)**



YB704304

**VALVE SPRING**

## 1. Measure:

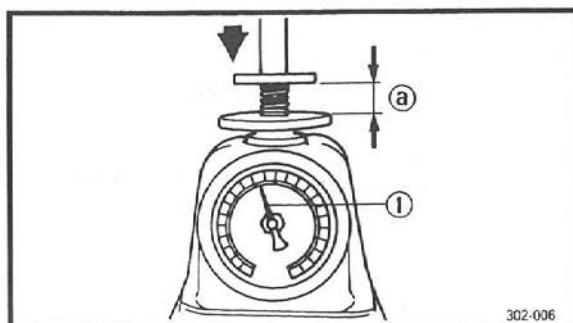
- Free length ② (valve spring)  
Out of specification → Replace.



## Free length (valve spring):

**Inner (intake/exhaust):  
38.33 mm (1.51 in)**

**Outer (intake/exhaust):  
38.52 mm (1.52 in)**



## 2. Measure:

- Compressed force (valve spring) ①  
Out of specification → Replace.

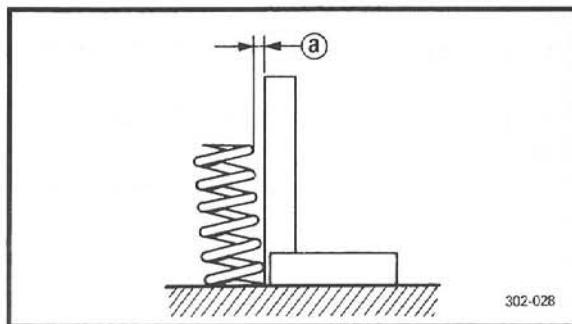
① Installed length

**Compressed force:****Intake**

6.25~7.25 kg (13.8~16.0 lb)  
at 32.5 mm (1.28 in)

**Exhaust**

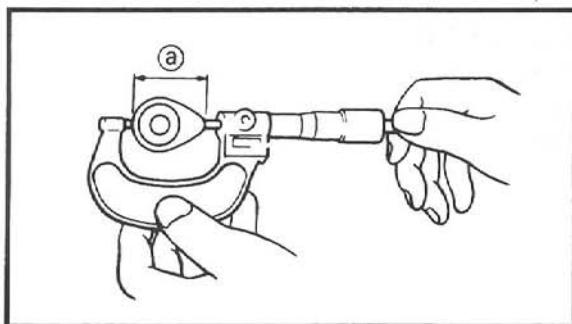
6.25~7.25 kg (13.8~16.0 lb)  
at 32.5 mm (1.28 in)

**3. Measure:**

- Spring tilt ②  
Out of specification → Replace.

**Spring tilt:**

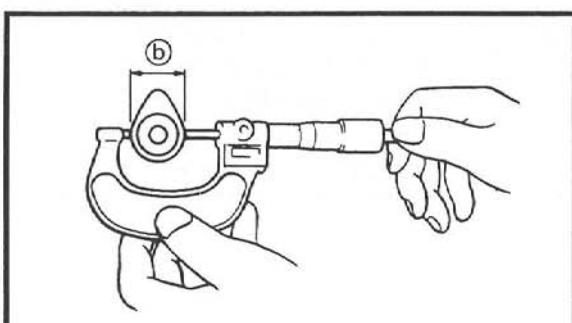
Less than 1.7 mm (0.067 in)



YB704305

**CAMSHAFT****1. Inspect:**

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

**2. Measure:**

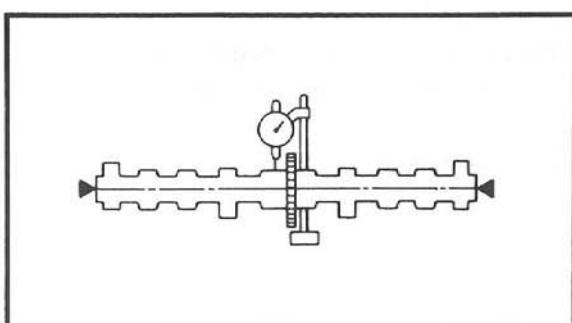
- Cam lobes length ② and ③  
Out of specification → Replace.

**Cam lobes length:****Intake**

② 35.7 mm (1.4 in)  
③ 27.9 mm (1.1 in)

**Exhaust**

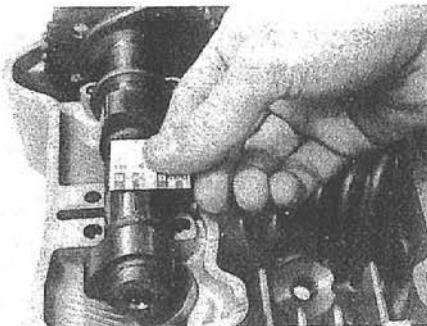
② 35.4 mm (1.4 in)  
③ 27.9 mm (1.1 in)

**3. Measure:**

- Runout (camshaft)  
Out of specification → Replace.

**Runout (camshaft):**

Less than 0.05 mm (0.002 in)



## 4. Measure:

- Camshaft-to-cap clearance  
Out of specification → Measure bearing diameter (camshaft).



Camshaft-to-cap clearance:

0.16 mm (0.0063 in)

\*\*\*\*\*

**Measurement steps:**

- Install the camshaft onto the cylinder head.
- Position a strip of Plastigauge® onto the camshaft.
- Install the dowel pins and camshaft caps.



Bolt (camshaft cap):

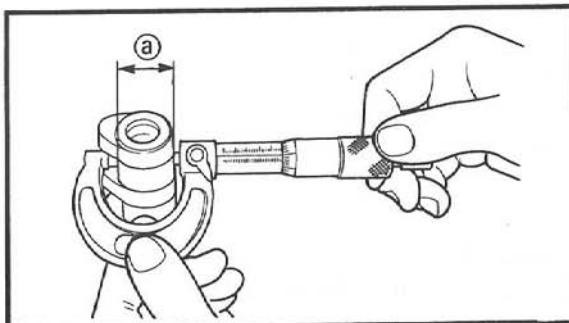
10 Nm (1.0 m · kg, 7.2 ft · lb)

**NOTE:**

- Tighten the camshaft caps in a crisscross pattern from innermost to outer.
- Do not turn the camshaft when measuring clearance with the Plastigauge®.

- Remove the camshaft caps and measure width of the Plastigauge®.

\*\*\*\*\*

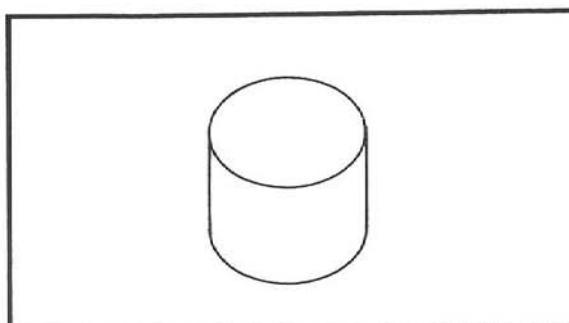


## 5. Measure:

- Bearing diameter ① (camshaft)  
Out of specification → Replace camshaft.  
Within specification → Replace cylinder head.



Bearing diameter (camshaft):

25.000~25.021 mm  
(0.9843~0.9859 in)

YB704306

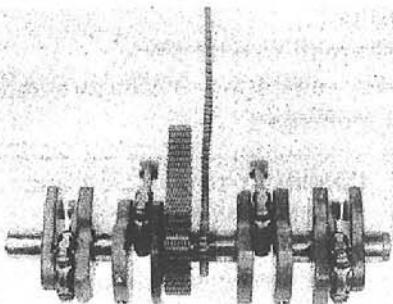
**VALVE LIFTER**

## 1. Inspect:

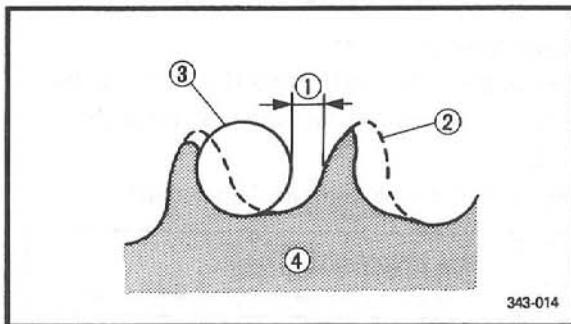
- Valve lifters  
Scratches/Damage → Replace both lifters and cylinder head.



YB704307

**TIMING CHAIN, HY-VO CHAIN, SPROCKET  
AND CHAIN GUIDE****1. Inspect:**

- Timing chain
  - HY-VO chain
- Stiff/Cracks → Replace.

**2. Inspect:**

- Cam sprocket
- Wear/Damage → Replace cam sprocket and timing chain as a set.

- (1) 1/4 tooth
- (2) Correct
- (3) Roller
- (4) Sprocket

**3. Inspect:**

- Chain guide (exhaust side)
  - Chain guide (intake side)
  - Chain guide (upper)
  - Chain guide (HY-VO chain—lower)
  - Chain guide (HY-VO chain—upper)
- Wear/Damage → Replace.

YB704308

**TIMING CHAIN TENSIONER****1. Check:**

- One-way cam operation
- Unsmooth operation → Replace.

**2. Inspect:**

- All parts
- Damage/Wear → Replace.

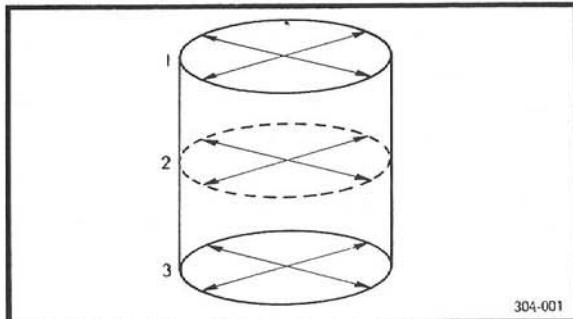


YB704309

**CYLINDER AND PISTON****1. Inspect:**

- Cylinder and piston walls

Vertical scratches → Rebore or replace cylinder and piston.

**2. Measure:**

- Piston-to-cylinder clearance

\*\*\*\*\*

**Measurement steps:****First step:**

- Measure the cylinder bore "C" with a cylinder bore gauge.

**NOTE:**

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

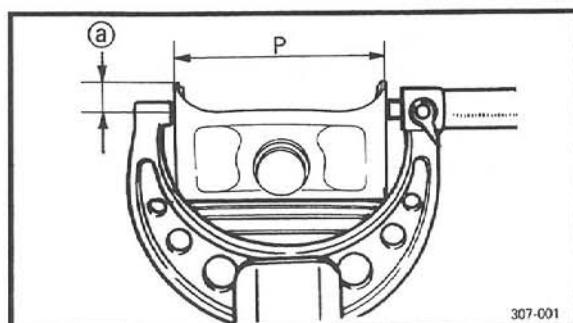
<b>Cylinder bore "C"</b>	<b>58.505~58.545 mm (2.3033~2.3049 in)</b>
<b>Taper limit "T"</b>	<b>0.05 mm(0.002 in)</b>
<b>Out of round "R"</b>	<b>0.01 mm (0.0004 in)</b>

"C"=Maximum D

"T"=(Maximum D<sub>1</sub>, or D<sub>2</sub>)-(Maximum D<sub>5</sub> or D<sub>6</sub>)

"R"=(Maximum D<sub>1</sub>, D<sub>3</sub> or D<sub>5</sub>)  
-(Minimum D<sub>2</sub>, D<sub>4</sub> or D<sub>6</sub>)

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

**Second step:**

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

② 4.0 mm (0.16 in) from the piston bottom edge.



	Piston size P
Standard	58.47~58.51 mm (2.302~2.304 in)
Oversize 2	59.0 mm (2.32 in)
Oversize 4	59.5 mm (2.34 in)

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

#### Third step:

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

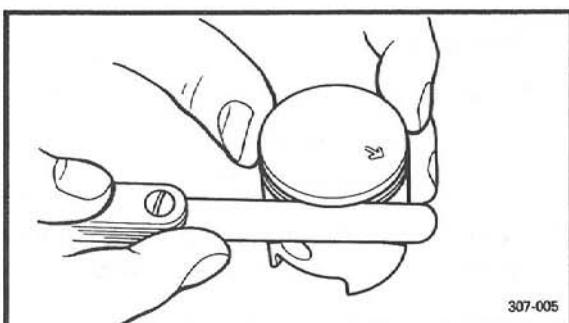
**Piston-to-cylinder clearance =**  
**Cylinder bore "C" —**  
**Piston skirt diameter "P"**

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



**Piston-to-cylinder clearance:**  
**0.025~0.045 mm**  
**(0.0010~0.0018 in)**  
**Limit: 0.15 mm (0.006 in)**

\*\*\*\*\*



YB704310

#### PISTON RING

##### 1. Measure:

- Side clearance

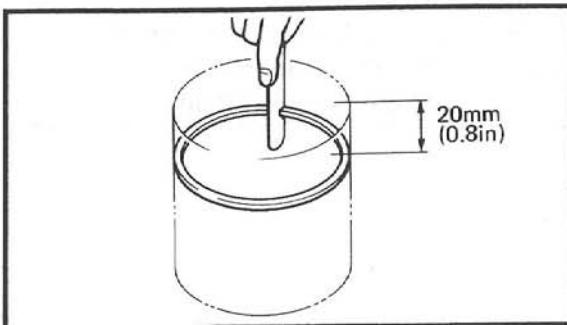
Out of specification → Replace piston and piston ring as a set.

##### NOTE:

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



**Side clearance:**  
**Top ring**  
**0.15 mm (0.006 in)**  
**2nd ring**  
**0.15 mm (0.006 in)**



## 2. Position:

- Piston ring  
(into the cylinder)

**NOTE:**

Push the ring with the piston crown so that the ring will be at a right angle to cylinder bore.

(a) 20 mm (0.8 in)

## 3. Measure:

- End gap  
Out of specification → Replace.

**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:

Top ring

0.7 mm (0.028 in)

2nd ring

0.7 mm (0.028 in)

Oil ring

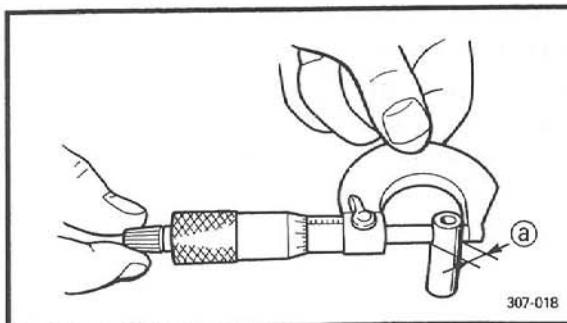
0.2~0.7 mm(0.008~0.028 in)

YB704311

**PISTON PIN**

## 1. Inspect:

- Piston pin  
Blue discoloration/groove → Replace, then inspect lubrication system.



## 2. Measure:

- piston pin-to-piston clearance

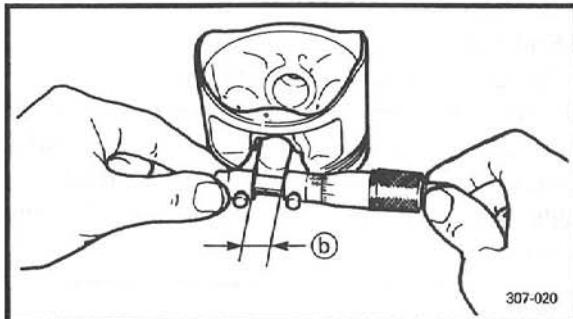
\*\*\*\*\*

**Measurement steps:**

- Measure the piston pin outside diameter (a).  
If out of specification, replace the piston pin.



Outside diameter (piston pin):  
14.995~15.000 mm  
(0.5904~0.5906 in)



- Measure the piston inside diameter (b).
- Calculate the piston pin-to-piston clearance with following formula:

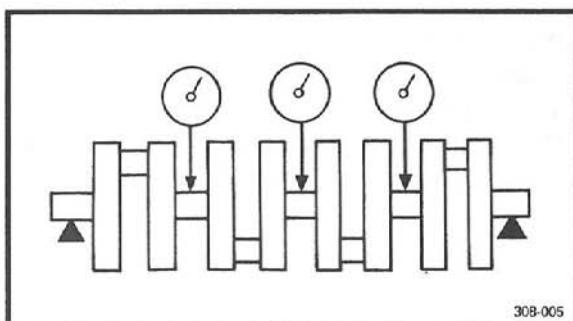
Piston pin-to-piston clearance =  
Bore size (piston pin) (b) -  
Outside diameter (piston pin) (a)

- If out of specification, replace the piston.



Piston pin-to-piston clearance:  
0.002~0.018 mm  
(0.00008~0.00071 in)  
Limit: 0.07 mm (0.003 in)

\*\*\*\*\*



YB704312

#### CRANKSHAFT AND CONNECTING ROD

##### 1. Measure:

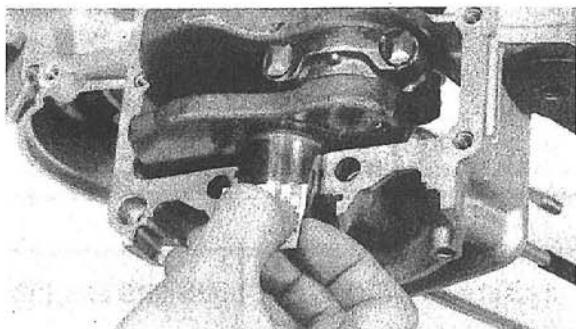
- Runout (crankshaft)  
Out of specification → Replace.



Runout:  
Less than 0.03 mm (0.0012 in)

##### 2. Inspect:

- Main journal surfaces
- Crank pin surfaces
- Bearing surfaces
- Wear/Scratches → Replace.



## 3. Measure:

- Oil clearance (main journal)  
Out of specification → Replace bearing.



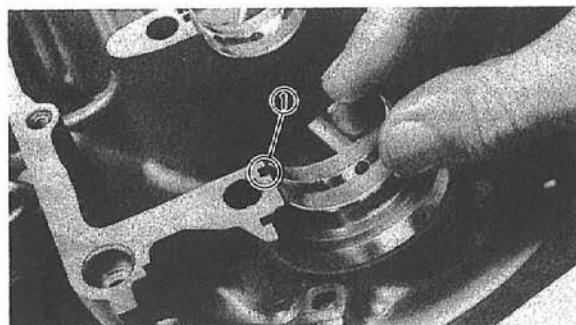
## Oil clearance:

0.014~0.053 mm  
(0.0006~0.0021 in)

\*\*\*\*\*

**Measurement steps:****CAUTION:**

**Do not interchange the bearings. They must be installed in their original positions, or the correct oil clearance may not be obtained causing engine damage.**



- Clean the bearings, main journals and bearing portions of the crankcase.
- Place the crankcase (upper) on a bench in an upside down position.
- Install the upper half of the bearings and crankshaft into the crankcase(upper).

**NOTE:**

Align the projection ① of the bearing with the notch in the crankcase.

- Put a piece of Plastigauge® on the each main journal.

**NOTE:**

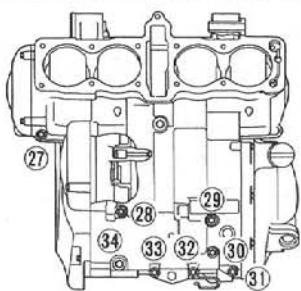
Do not put the Plastigauge® over the oil hole in the main journal of the crankshaft.

- Install lower half of the bearings into the crankcase (lower) and assembly the crankcase halves.

**NOTE:**

- Align the projection of the bearing with the notch in the crankcase.
- Do not move the crankshaft until the oil clearance measurement has been completed.

- Tighten the bolt to specification in tightening sequence cast on the crankcase.

**Bolts (crankcase):****M8 (① ~ ⑩ and ⑯):**

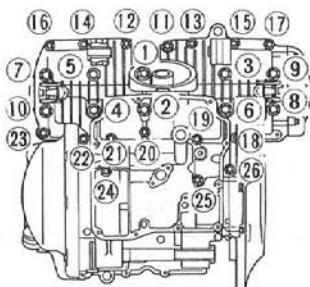
24 Nm (2.4 m · kg, 17 ft · lb)

**M6 (⑪ ~ ⑯):**

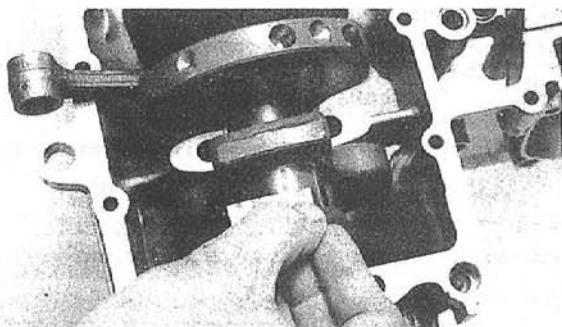
12 Nm (1.2 m · kg, 8.7 ft · lb)

**NOTE:** \_\_\_\_\_

Lubricate the threads of bolts (M8 and M6) with engine oil.



- Remove the crankcase (lower) and lower half of the bearings.
  - Measure the compressed Plastigauge® width on each main journal. If oil clearance is out of specification, select a replacement bearing.
- \*\*\*\*\*

**4. Measure:**

- Oil clearance (crank pin)

Out of specification → Replace bearing.

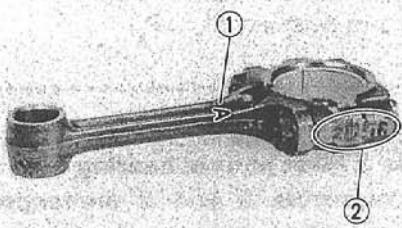
**Oil clearance:**0.026~0.060 mm (0.0010~  
0.0024 in)**Measurement steps:****CAUTION:** \_\_\_\_\_

Do not interchange the bearings and connecting rod. They must be installed in their original positions, or the correct oil clearance may not be obtained causing engine damage.

- Clean the bearings, crank pins and bearing portions of the connecting rods.
- Install the upper half of the bearing into the connecting rod and lower half of the bearing into the connecting rod cap.

**NOTE:** \_\_\_\_\_

Align the projection of the bearing with the groove of the cap and connecting rod.



- Put a piece of Plastigauge® on the crank pin.

- Assemble the connecting rod halves.

**NOTE:**

- Do not move the connecting rod or crank-shaft until the oil clearance measurement has been completed.
- Lubricate molybdenum disulfide grease to the bolt, threads and nut seats.
- Make sure the "A" marks ① on the connecting rods face toward right side crankshaft.
- Make sure that the letters ② on both components align to form a perfect character.

- Tighten the nuts in 2~3 steps.



**Nut:**

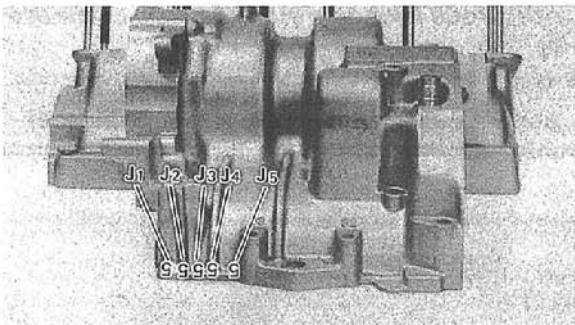
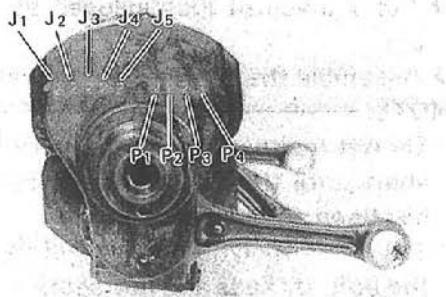
25 Nm (2.5 m · kg, 18 ft · lb)

**CAUTION:**

Tighten to full torque specification without pausing. Apply continuous torque between 2.0 and 2.5 m · kg. Once you reach 2.0 m · kg DO NOT STOP TIGHTENING until final torque is reached. If the tightening is interrupted between 2.0 and 2.5 m · kg, loosen the nut to less than 2.0 m · kg and start again.

- Remove the connecting rods and bearings.
- Measure the compressed plastigauge® width on each crank pin.  
If oil clearance is out of specification, select a replacement bearing.

\*\*\*\*\*

**5. Select:**

- Main journal bearing ( $J_1 \sim J_5$ )
- Crank pin bearing ( $P_1 \sim P_4$ )

\*\*\*\*\*

**Selection of bearings:****Example 1: Main journal bearing**

- If the numerals "5" and "2" are respectively shown on the crankcase  $J_1$  and crankwed  $J_1$ , the bearing size of  $J_1$  is:

**Bearing size of  $J_1$ :**

**Crankcase  $J_1$ -Crankwed  $J_1$ =  
5-2=3 (Brown)**

**BEARING COLOR CODE**

1	Blue
2	Black
3	Brown
4	Green
5	Yellow

**Example 2: Crank pin bearing**

- If the numerals "5" and "2" are respectively shown on the connecting rod  $P_1$  and crankwed  $P_1$ , the bearing size of  $P_1$  is:

**Bearing size of  $P_1$ :**

**Connecting rod  $P_1$ -Crankwed  $P_1$ =  
5-2=3 (Brown)**

**BEARING COLOR CODE**

1	Blue
2	Black
3	Brown
4	Green

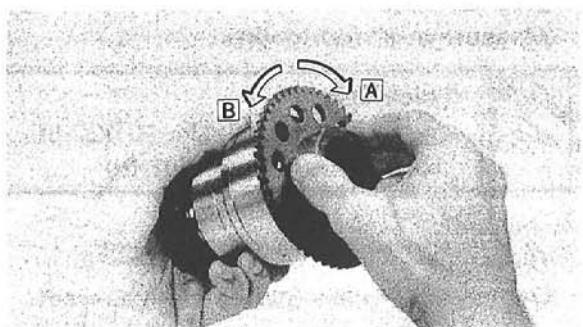
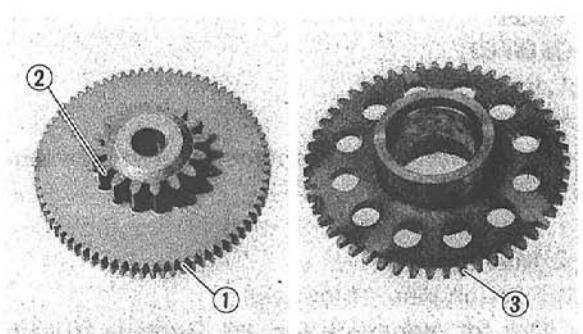
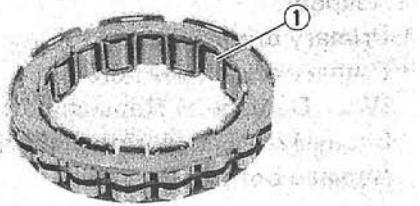
\*\*\*\*\*



YB704313

**ELECTRIC STARTER DRIVE****1. Inspect:**

- Starter clutch roller ①  
Wear/Damage → Replace.

**2. Inspect:**

- Starter idle gear teeth ①
- Starter drive gear teeth ②
- Starter wheel gear teeth ③  
Burrs/Chips/Roughness/Wear → Replace.

**3. Inspect:**

- Starter wheel gear  
(contacting surfaces)  
Pitting/Wear/Damage → Replace.

**4. Check:**

- Starter clutch operation

\*\*\*\*\*

**Checking steps:**

- Install the starter clutch gear to the starter clutch, and hold the starter clutch.
- When turning the starter clutch gear clockwise **A**, the starter clutch and the wheel gear should be engaged.  
If not, the starter clutch is faulty. Replace it.
- When turning the starter clutch gear counterclockwise **B**, the starter clutch gear should turn freely.  
If not, the starter clutch is faulty. Replace it.

\*\*\*\*\*

**5. Inspect:**

- Starter clutch shaft  
Bend/Wear/Damage → Replace.

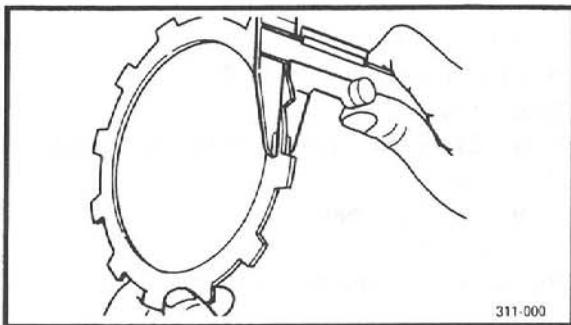


YB704314

**PRIMARY DRIVE**

## 1. Inspect:

- Primary drive gear teeth
  - Primary driven gear teeth
- Wear/Damage → Replace both gears.  
Excessive noise during operation → Replace both gears.



YB704315

**CLUTCH**

## 1. Inspect:

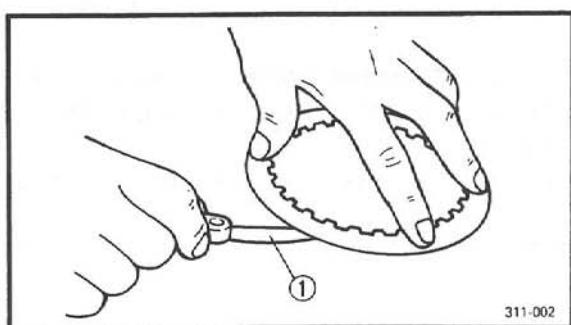
- Friction plate
- Damage/Wear → Replace friction plate as a set.

## 2. Measure:

- Friction plate thickness
- Out of specification → Replace friction plate as a set.  
Measure at all four points.

**Thickness:**

**2.9~3.1 mm (0.114~0.122 in)**  
**⟨Limit: 2.7 mm (0.106 in)⟩**



## 3. Inspect:

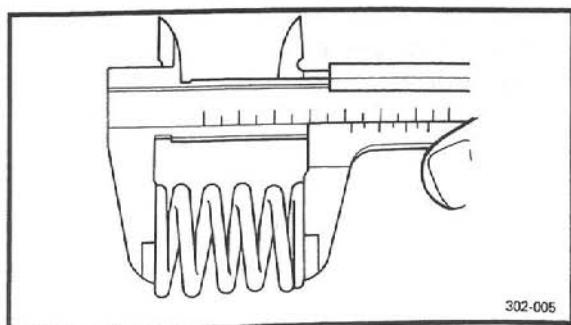
- Clutch plate
- Damage → Replace clutch plate as a set.

## 4. Measure:

- Clutch plate warpage
- Out of specification → Replace clutch plate as a set.  
Use a surface plate and feeler gauge ①.

**Warp limit:**

**Less than 0.15 mm (0.006 in)**



## 5. Inspect:

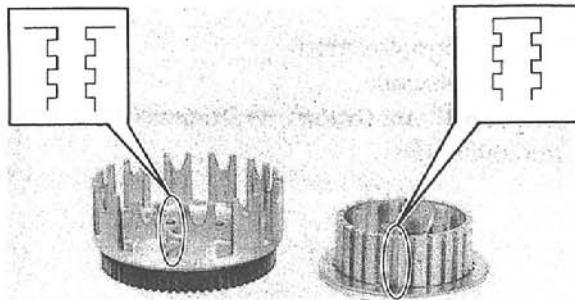
- Clutch spring
- Damage → Replace as a set.

## 6. Measure:

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



Free length(clutch spring):  
 42.8 mm (1.69 in)  
(Limit: 41.8 mm (1.65 in))



#### 7. Inspect:

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

#### NOTE:

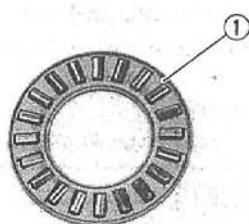
Pitting on the clutch housing dogs will cause erratic operation.

#### 8. Inspect:

- Clutch boss splines  
Pitting/Wear/Damage → Replace clutch boss.

#### NOTE:

Pitting on the clutch boss splines will cause erratic operation.

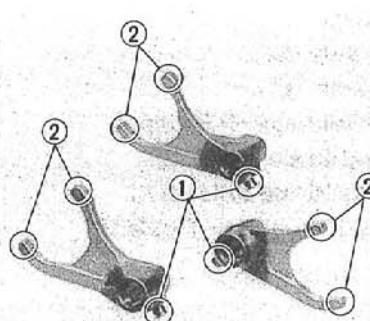


#### 9. Inspect:

- Gear teeth (pull lever pinion gear)
- Gear teeth (pull rod)  
Wear/Damage → Replace as a set.

#### 10. Inspect:

- Bearing ① (pull rod)  
Wear/Damage → Replace.

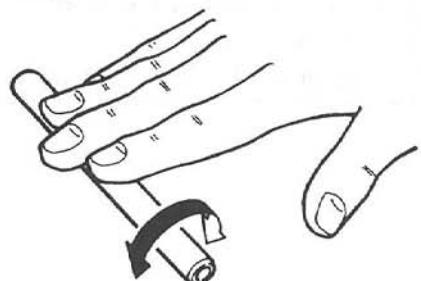


YB704316

## TRANSMISSION

#### 1. Inspect:

- Shift fork cam follower ①
- Shift fork pawl ②  
Wear/Coring/Bends/Damage → Replace.



## 2. Inspect:

- Guide bar  
Roll the guide bar on the flat surface.  
Bends → Replace.

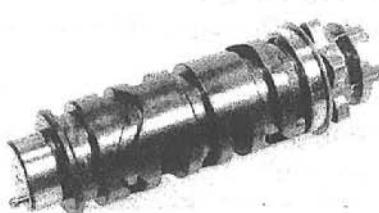
**WARNING**

**Do not attempt to straighten a bent guide bar.**



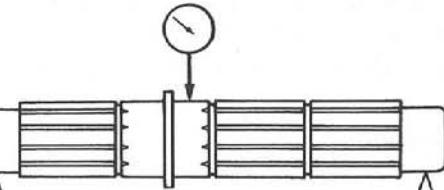
## 3. Check:

- Shift fork movement  
on its guide bar  
Unsmooth operation → Replace the fork and guide bar.



## 4. Inspect:

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



319-001

## 5. Measure:

- Runout (drive axle and main axle)  
Out of specification → Replace.

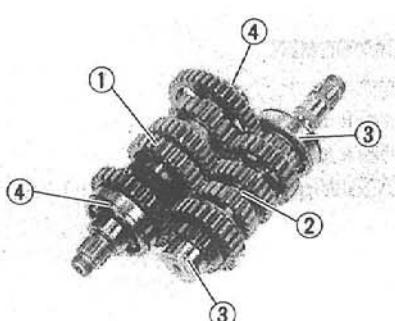


**Runout:**

**Less than 0.08 mm (0.0031 in)**

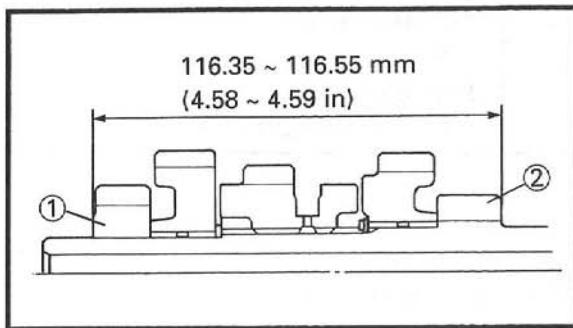
**WARNING**

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

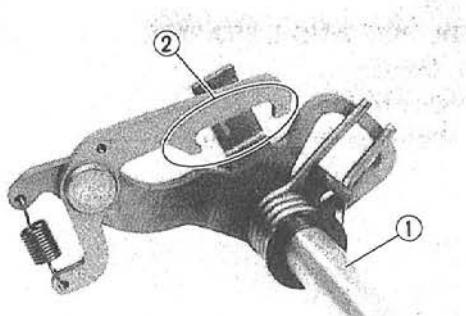


## 6. Inspect:

- Drive axle ①
- Main axle ②  
Wear/Damage → Replace.
- Bearing (main axle) ③
- Bearing (drive axle) ④  
Pitting/Damage → Replace.

**Reassembling points:**

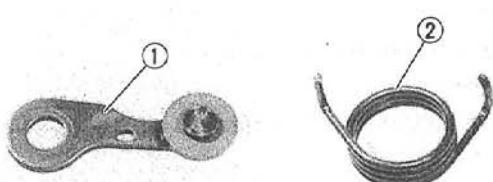
- Press the 2nd pinion gear ① in the main axle ② as shown.



YB704317

**SHIFT SHAFT AND STOPPER LEVER****1. Inspect:**

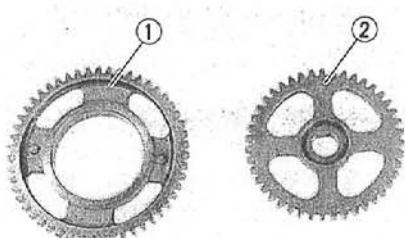
- Shift shaft ①
  - Shift pawls ②
- Bends/Wear/Damage → Replace.

**2. Inspect:**

- Stopper lever ①
- Roller turns roughly → Replace.  
Bends/Damage → Replace.

**3. Inspect:**

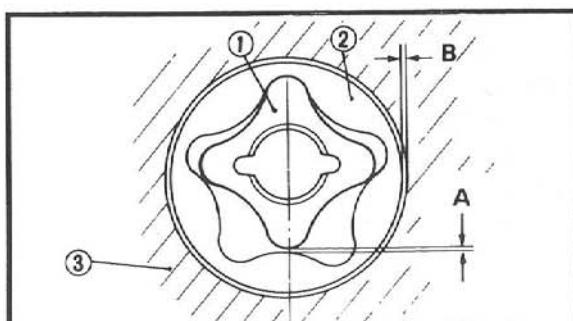
- Return spring (stopper lever) ②
- Wear/Damage → Replace.



YB704318

**OIL PUMP****1. Inspect:**

- Oil pump drive gear ①
  - Oil pump driven gear ②
- Wear/Crack/Damage → Replace.

**2. Measure:**

- Tip clearance ③  
(between inner rotor ① and outer rotor ②)
  - Side clearance ④  
(between outer rotor ② and pump housing ③)
- Out of specifications → Replace oil pump.



**Tip clearance:**  
0.2 mm (0.008 in)  
**Side clearance:**  
0.15 mm (0.006 in)

### 3. Check:

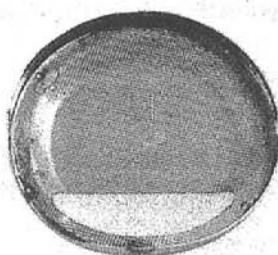
- Oil pump operation  
Unsmooth operation → Replace.

YB704319

## OIL PIPE AND STRAINER

### 1. Inspect:

- Oil strainer  
Damage → Replace.



YB704323

## RELIEF VALVE AND PIPE

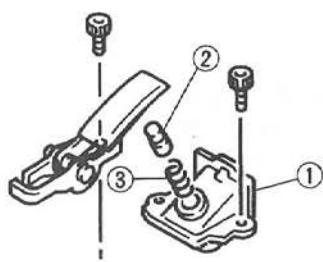
### 1. Inspect:

- Relief valve assembly ①
- O-ring ②  
Wear/Damage → Replace.



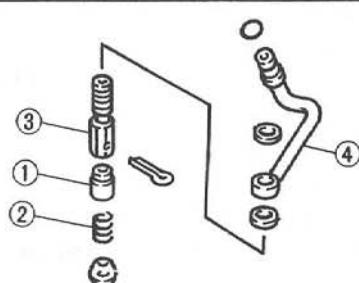
### 2. Inspect:

- Relief valve body ① (tensioner)
- Plunger ②
- Spring ③  
Wear/Damage → Replace.



### 3. Inspect:

- Tensioner plunger ①
- Spring ②
- Tensioner body ③
- Oil delivery pipe ④
- O-ring  
Wear/Damage → Replace.





YB704320

**CRANKCASE**

1. Thoroughly wash the case halves in mild solvent.

2. Clean all the gasket mating surface and crankcase mating surface thoroughly.

3. Inspect:

- Crankcase  
Cracks/Damage → Replace.

- Oil delivery passages  
Clog → Blow out with compressed air.

YB704321

**BEARING AND OIL SEAL**

1. Inspect:

- Bearings  
Clean and lubricate, then rotate inner race with finger.  
Roughness → Replace.

2. Inspect:

- Oil seals  
Damage/Wear → Replace.

YB704322

**CIRCLIP AND WASHER**

1. Inspect:

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



YB704401

## ENGINE ASSEMBLY AND ADJUSTMENT

### **WARNING**

For engine reassembly, replace the following parts with new ones.

- O-ring
- Gasket
- Oil seal
- Copper washer
- Lock washer
- Circlip

YB704402

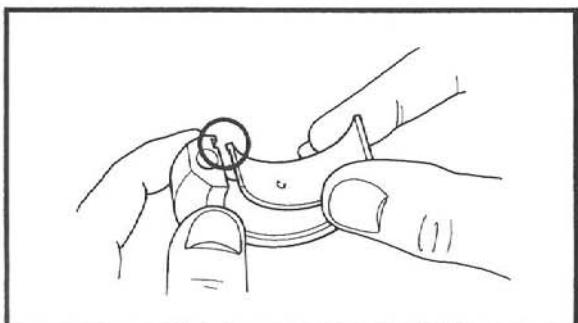
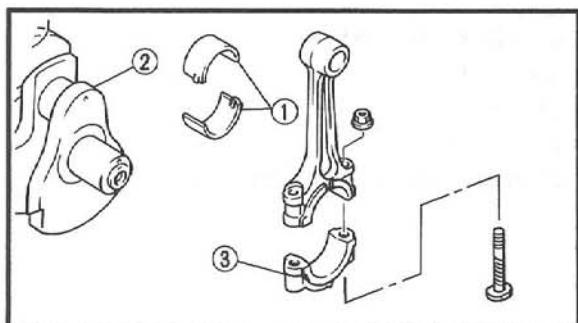
## CONNECTING ROD

### 1. Apply:

- Molybdenum disulfide grease  
(onto threads of bolts and bottom surfaces of nuts)
- Engine oil  
(onto crank pins, crank pin bearings and inner surfaces of connecting rods)

### 2. Install:

- Crank pin bearings ①
- Connecting rods ②
- Connecting rod caps ③  
(onto crank pins)

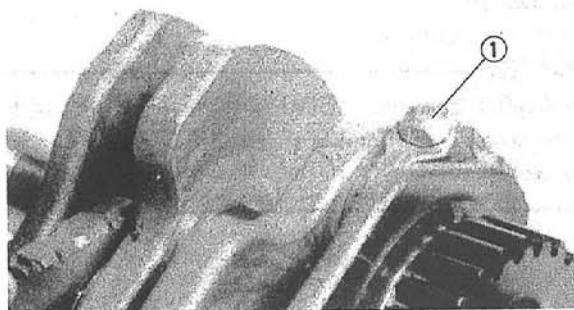
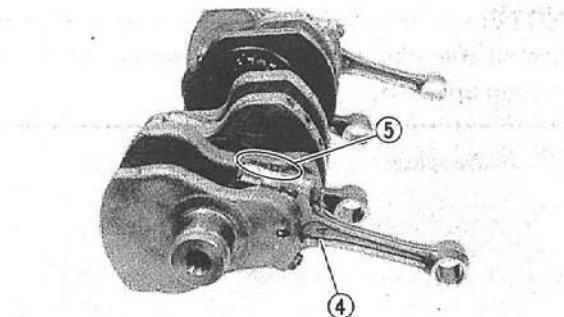


### NOTE:

- Align the projection of bearing with the groove of the caps and connecting rod.
- Identify each bearing position very carefully so that it can be reinstalled in its original place.
- The stamped "A" mark on the connecting rods ④ should face towards the right side of the crankcase.
- Be sure that the letter ⑤ on both com-



ponents align to from a perfect character.



### 3. Align:

- Bolt head ①  
(with connecting rod cap)

### 4. Tighten:

- Nuts (connecting rods)

#### **CAUTION:**

Tighten to full torque specification without pausing. Apply continuous torque between 2.0 and 2.5 m · kg. Once you reach 2.0 m · kg DO NOT STOP TIGHTENING until final torque is reached. If the tightening is interrupted between 2.0 and 2.5 m · kg, loosen the nut to less than 2.0 m · kg and start again.



#### Nut (connecting rod):

25 Nm (2.5 m · kg, 18 ft · lb)

YB704403

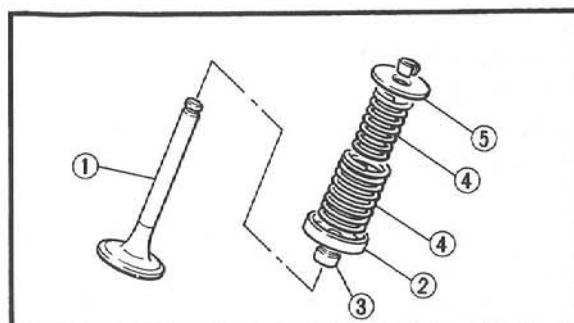
## VALVES

### 1. Deburr:

- Valve stem end  
Use an oil stone to smooth the stem end.

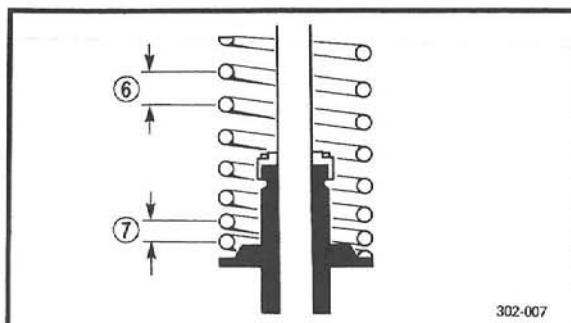
### 2. Apply:

- Molybdenum disulfide oil  
(onto valve stem and oil seal)



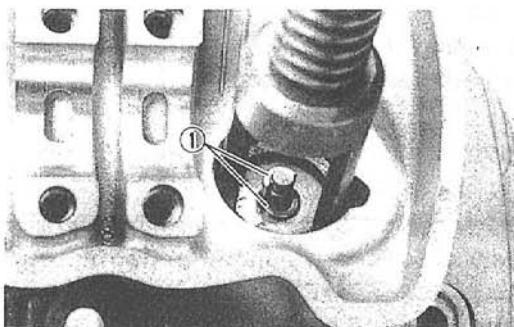
### 3. Install:

- Valve ①
- Spring seat ②
- Oil seal ③
- Valve spring ④
- Valve retainer ⑤  
(into cylinder head)

**NOTE:**

Install the valve spring with larger pitch ⑥ facing upward.

⑦ Smaller pitch

**4. Install:**

- Valve cotters ①

**NOTE:**

Install the valve cotters while compressing the valve spring with the valve spring compressor.



**Valve spring compressor:**

P/N 90890-04019

**Attachment:**

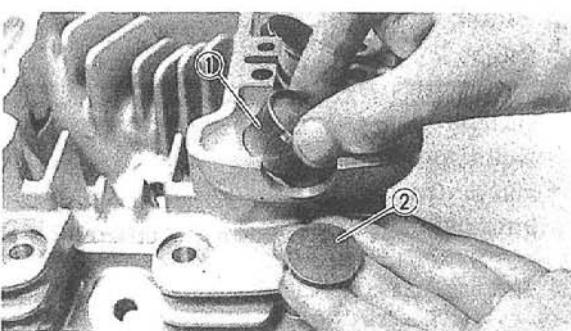
P/N 90890-04108

**5. Secure the valve coker on to the valve stem by tapping it lightly with a piece of wood.****NOTE:**

Do not hit so much as to damage the valve.

**6. Apply:**

- Molybdenum disulfide oil (onto outer surface of valve lifters and pads.)

**7. Install:**

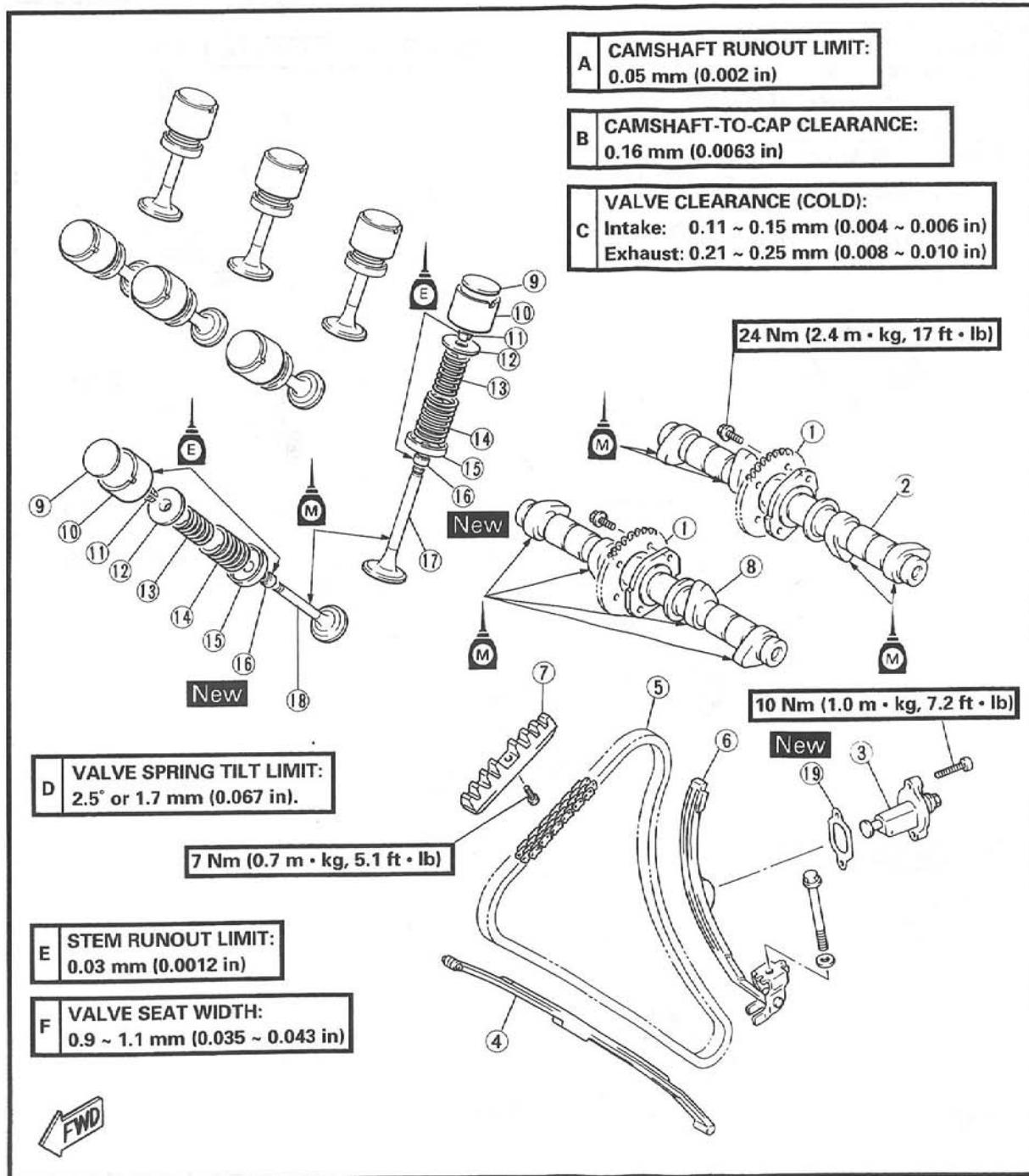
- Valve lifters ①
- Pads ②

**NOTE:**

- Valve lifter must be rotated smoothly by a finger.
- Each valve lifter and pad position very carefully so that its original place.

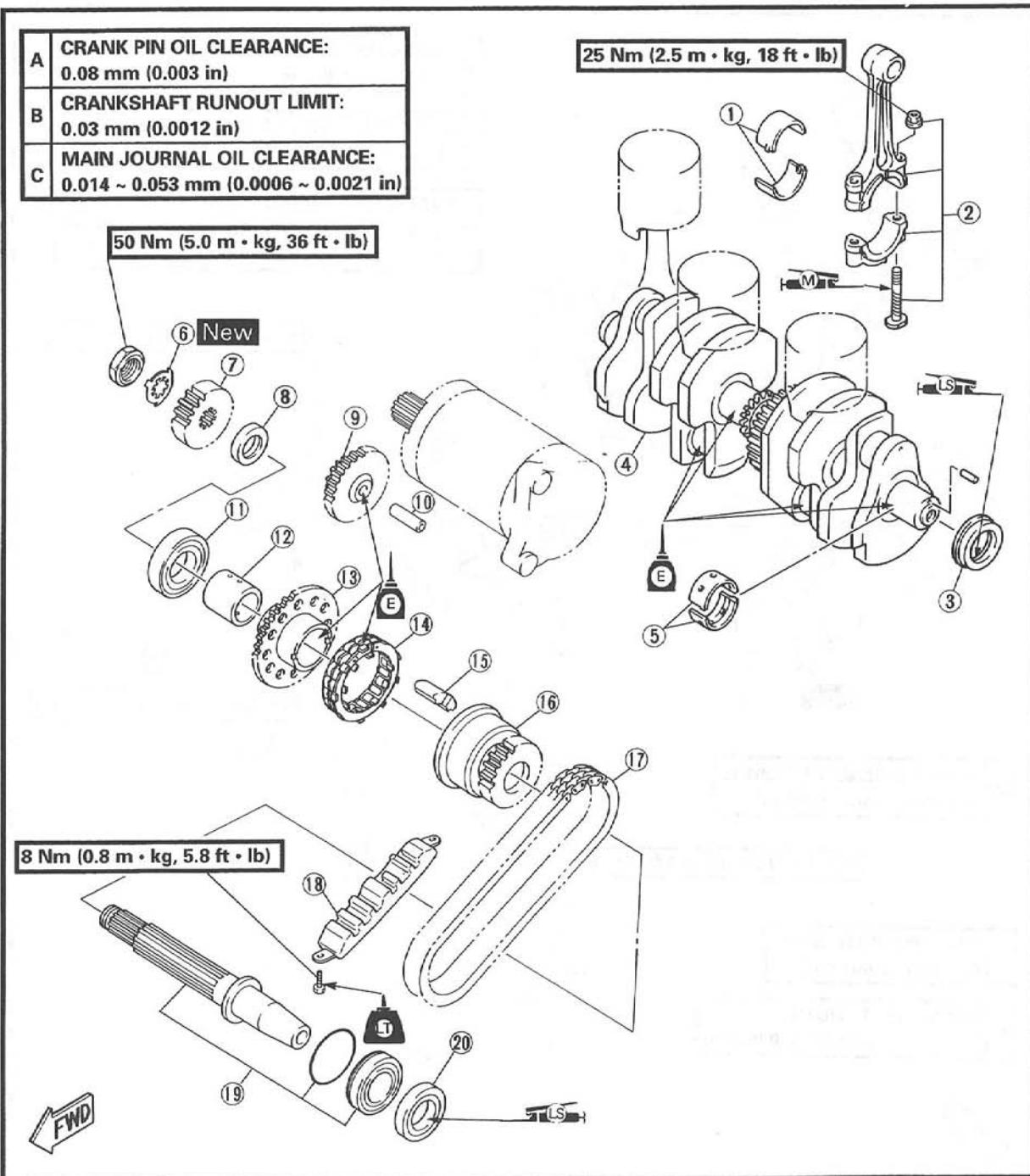
**CAMSHAFT, VALVE AND TIMING CHAIN**

- |                         |                        |                   |
|-------------------------|------------------------|-------------------|
| ① Cam sprocket          | ⑧ Camshaft (exhaust)   | ⑯ Spring seat     |
| ② Camshaft (intake)     | ⑨ Valve pad            | ⑰ Valve stem seal |
| ③ Chain tensioner       | ⑩ Valve lifter         | ⑱ Intake valve    |
| ④ Chain guide (exhaust) | ⑪ Valve cotter         | ⑲ Exhaust valve   |
| ⑤ Timing chain          | ⑫ Valve retainer       | ⑳ Gasket          |
| ⑥ Chain guide (intake)  | ⑬ Valve spring (inner) |                   |
| ⑦ Chain guide (upper)   | ⑭ Valve spring (outer) |                   |



**CRANKSHAFT AND STARTER CLUTCH**

- |                          |                              |                                      |
|--------------------------|------------------------------|--------------------------------------|
| (1) Crank pin bearing    | (8) Collar                   | (15) Absorber                        |
| (2) Connecting rod       | (9) Idle gear                | (16) Driven gear                     |
| (3) Oil seal             | (10) Shaft                   | (17) HY-VO chain                     |
| (4) Crankshaft           | (11) Bearing                 | (18) Chain guide (HY/VO chain-upper) |
| (5) Main journal bearing | (12) Collar                  | (19) Starter shaft                   |
| (6) Lock washer          | (13) Starter wheel gear      | (20) Oil seal                        |
| (7) Primary drive gear   | (14) Starter clutch assembly |                                      |





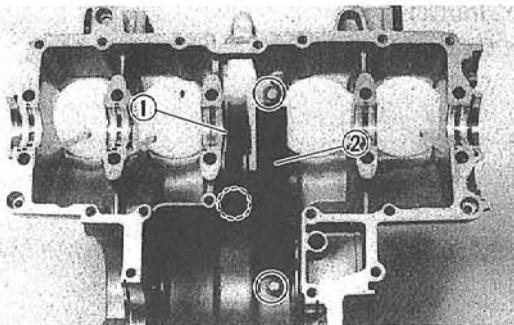
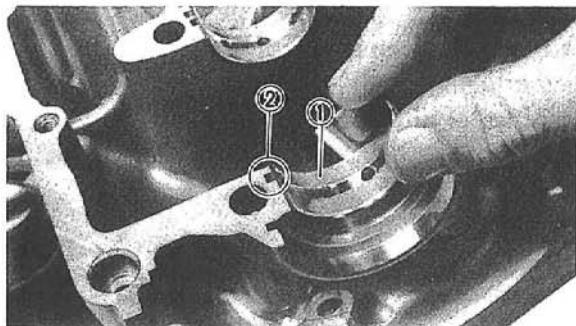
YB704406

**CRANKSHAFT****1. Install:**

- Main journal bearings ① (onto upper crankcase)

**NOTE:** \_\_\_\_\_

- Align the projection ② of the bearing with the notch in the case.
- Identify each bearing position so that the bearing should be installed in position.

**2. Install:**

- Chain guide ① (timing chain—intake)
- Chain guide ② (HY-VO chain—upper)

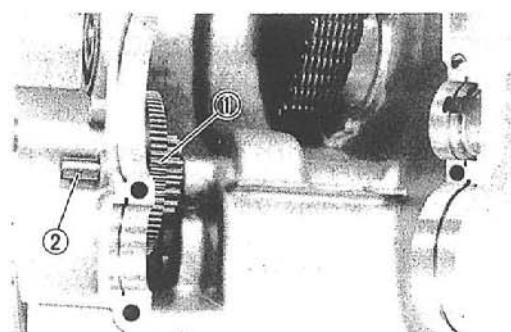
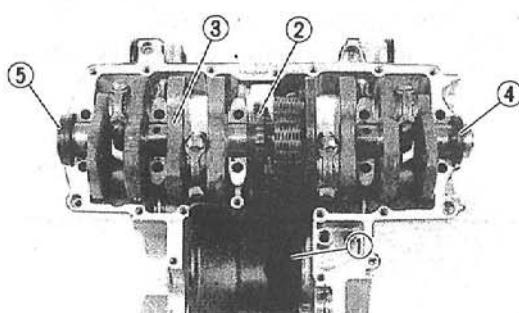
**Bolt (timing chain guide):**

7 Nm (0.7 m · kg, 5.1 ft · lb)

**Bolt (HY-VO chain):**

8 Nm (0.8 m · kg, 5.8 ft · lb)

use Loctite®

**3. Install:**

- HY-VO chain ①
- Timing chain ② (onto crankshaft)
- Crankshaft assembly ③
- Oil seal ④
- Plug ⑤

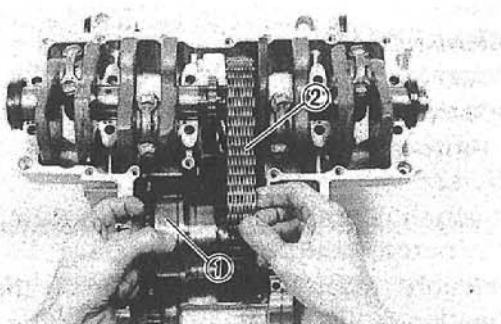
**NOTE:** \_\_\_\_\_

Pass the timing chain through the timing chain cavity. Be sure to attach a retaining wire to the timing chain.

YB704414

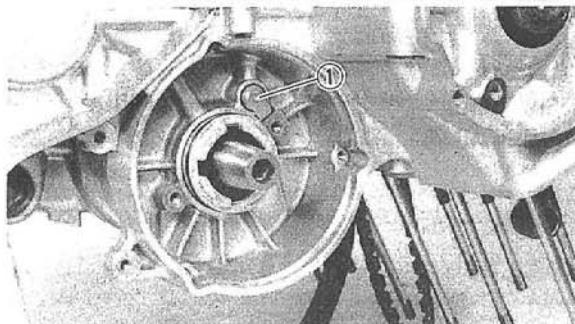
**STARTER CLUTCH****1. Install:**

- Idle gear ①
- Shaft ② (idle gear)



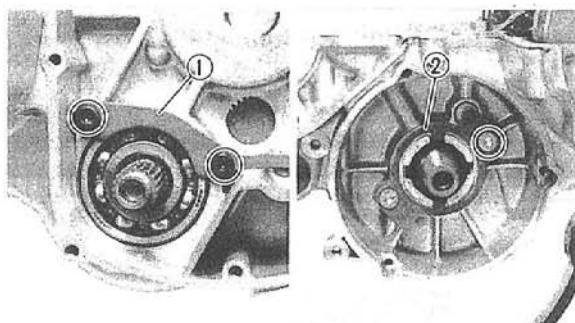
## 2. Install:

- Starter clutch assembly ①  
(connect the HY-VO chain ②)
- Starter clutch shaft



## 3. Install:

- Oil nozzle ①



## 4. Tighten:

- Bearing retainer ①
- Oil seal retainer ②

**NOTE:**

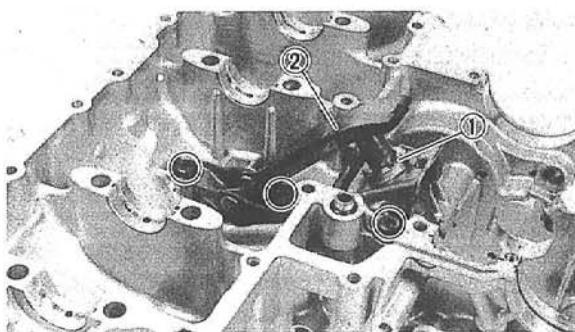
Align the oil seal retainer with crankcase as photo.

**Bolt (bearing retainer):**

**10 Nm (1.0 m · kg, 7.2 ft · lb)  
use Loctite®**

**Screw (oil seal retainer):**

**10 Nm (1.0 m · kg, 7.2 ft · lb)  
use Loctite®**



YB704404

**SHIFT FORK AND SHIFT CAM**

## 1. Install:

- Tensiner ① (HY-VO chain)
- Chain guide ② (HY-VO chain—lower)



Bolt (HY-VO chain tensioner):

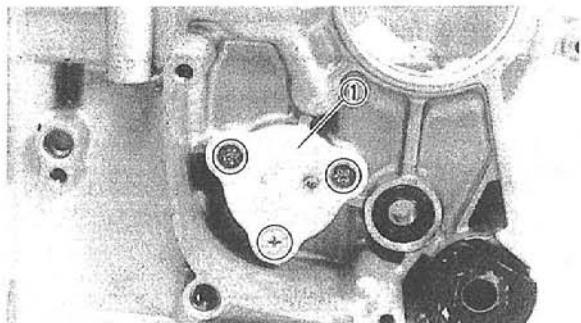
10 Nm (1.0 m · kg, 7.2 ft · lb)

use Loctite®

Bolt (chain guide):

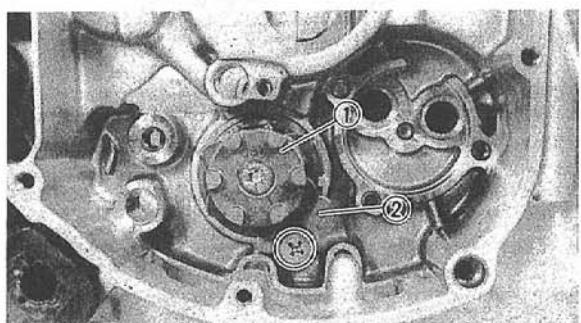
10 Nm (1.0 m · kg, 7.2 ft · lb)

use Loctite®



## 2. Install:

- Neutral switch (1)



## 3. Install:

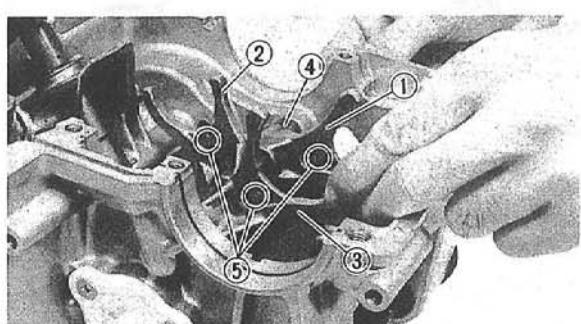
- Shift cam (1)
- Stopper plate (2)



Screw (stopper plate):

7 Nm (0.7 m · kg, 5.1 ft · lb)

use Loctite®

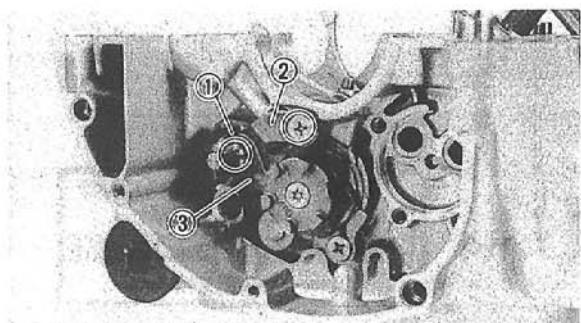


## 4. Install:

- Shift fork "3" (1)
- Shift fork "2" (2)
- Shift fork "1" (3)
- Guide bar (4)

### NOTE:

- Install the shift forks with the embossed mark (5) on each shift fork facing left side of the engine.
- Install the guide bar with the groove side facing the right side of the engine.



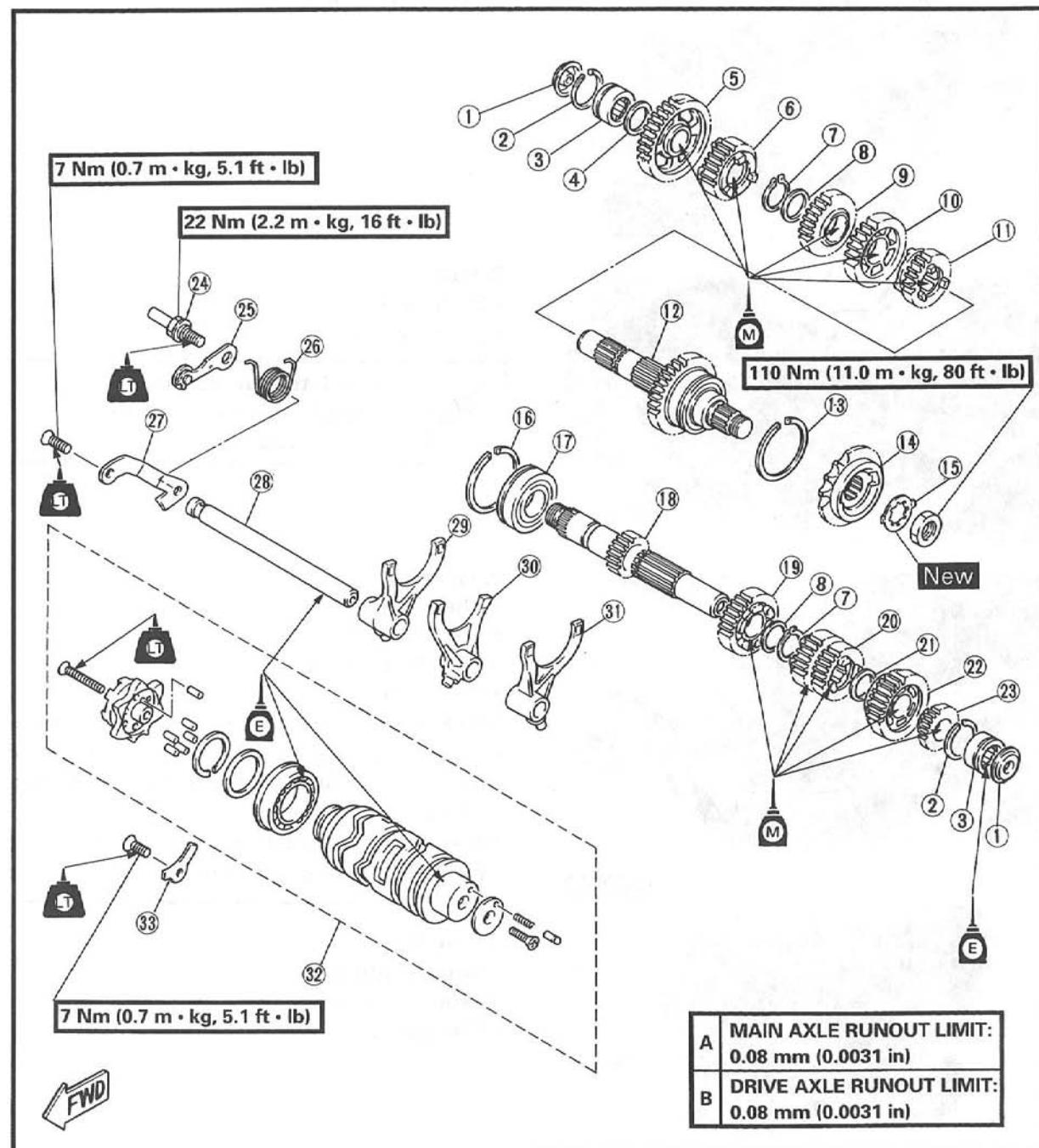
## 5. Install:

- Return spring (1)
- Stopper plate (2)
- Stopper lever (3)



## TRANSMISSION AND SHIFT CAM/SHIFT FORK

- |                  |                   |                         |
|------------------|-------------------|-------------------------|
| ① Plug           | ⑫ Drive axle      | ㉓ 2nd pinion gear       |
| ② Circlip        | ⑬ Circlip         | ㉔ Stopper screw         |
| ③ Bearing        | ⑭ Drive sprocket  | ㉕ Stopper lever         |
| ④ Plate washer   | ⑮ Lock washer     | ㉖ Spring                |
| ⑤ 1st wheel gear | ⑯ Circlip         | ㉗ Guide bar stopper     |
| ⑥ 5th wheel gear | ⑰ Bearing         | ㉘ Guide bar             |
| ⑦ Circlip        | ⑱ Main axle       | ㉙ Shift fork 3          |
| ⑧ Washer         | ⑲ 5th pinion gear | ㉚ Shift fork 2          |
| ⑨ 4th wheel gear | ㉐ 3rd pinion gear | ㉛ Shift fork 1          |
| ⑩ 3rd wheel gear | ㉑ Plate washer    | ㉜ Shift cam             |
| ⑪ 6th wheel gear | ㉒ 6th pinion gear | ㉝ Bearing stopper plate |





**Screw (stopper plate):**

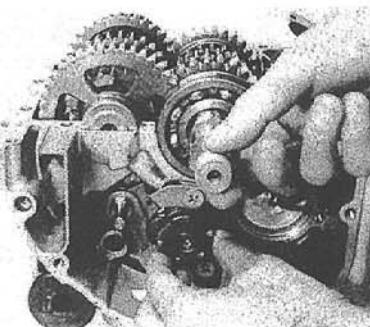
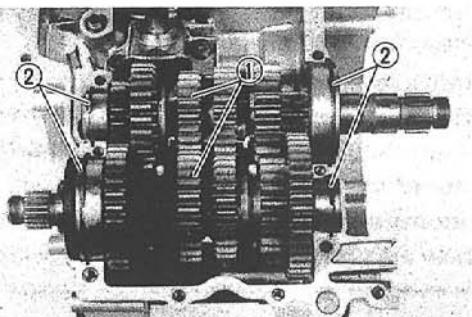
7 Nm (0.7 m · kg, 5.1ft · lb)

use Loctite®

**Bolt (stopper lever):**

22 Nm (2.2 m · kg, 16 ft · lb)

use Loctite®



YB704407

## TRANSMISSION

### 1. Install:

- Transmission assembly ①

### NOTE:

Be sure that the main axle/drive axle bearing circlips ② are inserted into the upper crankcase positioning grooves.

### 2. Check:

- Transmission and shifter operation  
Unsmooth operation → Repair.

### NOTE:

Oil each gear and bearing thoroughly.

YB704408

## CRANKCASE

### 1. Apply:

- Engine oil  
(onto main journal bearings)

### 2. Apply:

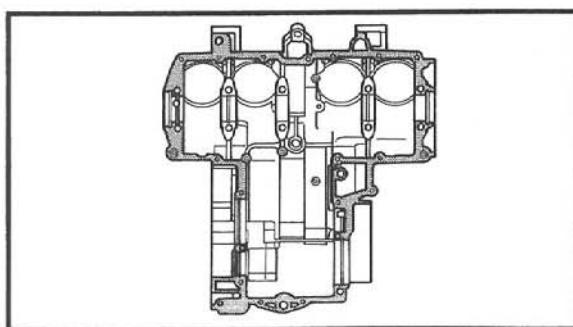
- Sealant  
(onto crankcase matching surfaces)



**Yamaha bond No. 1215:  
P/N 90890-85505**

### NOTE:

DO NOT ALLOW any sealant to come in contact with the oil gallery or crankshaft bearing.

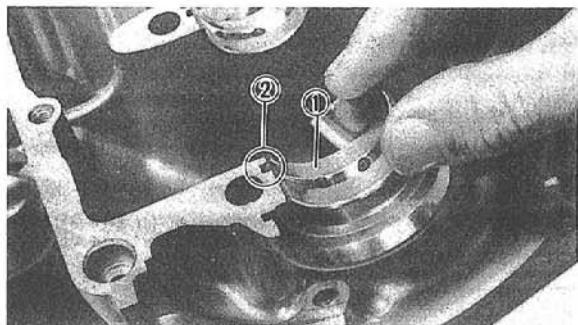


## ENGINE ASSEMBLY AND ADJUSTMENT

ENG



Do not apply sealant to within 2~3 mm (0.08~0.12 in) of the bearings.



### 3. Install:

- Main journal bearings ①  
(onto lower crankcase)

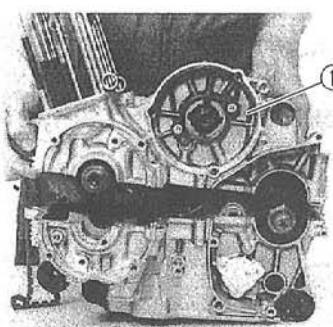
#### NOTE:

- Align the projection ② of the bearing with the notch in the case.
- Identify each bearing position so that the bearing should be installed in position.

### 4. Install:

- Dowel pins
- O-ring

### 5. Set shift cam and transmission gears in NEUTRAL position.



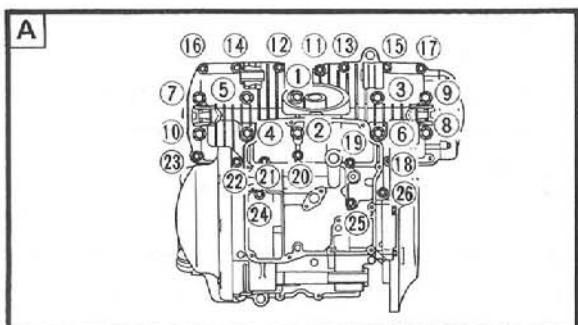
### 6. Install:

- Upper crankcase ①

#### CAUTION:

Before tightening the crankcase bolts, check the following points:

- Be sure the gear shifts correctly while hand turning the shift cam.



### 7. Install:

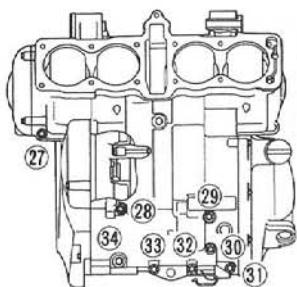
- Bolts (crankcase)

A Lower crankcase

B Upper crankcase



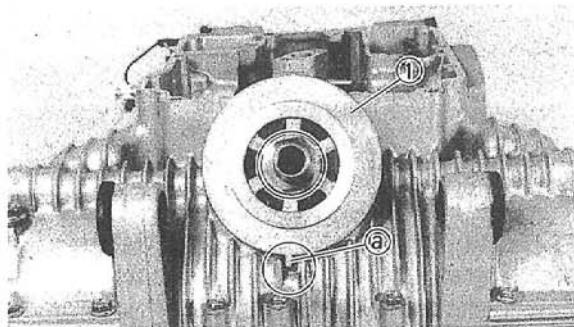
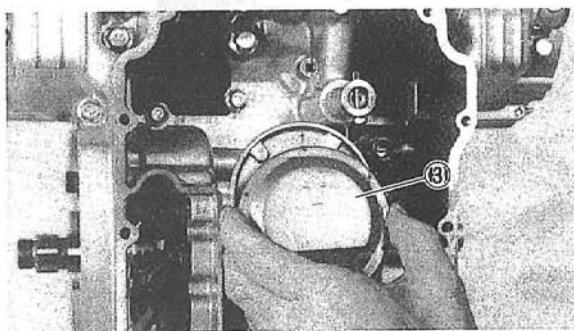
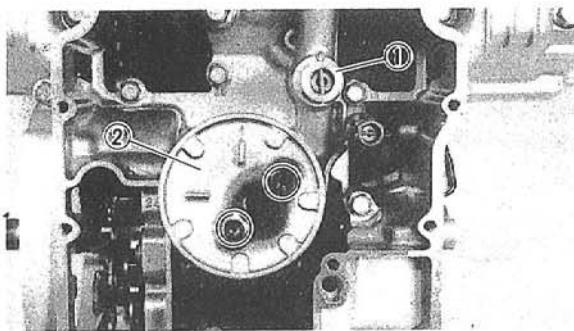
B



- M8 (① ~ ⑩ and ㉙):  
24 Nm (2.4 m · kg, 17 ft · lb)  
 M6 (⑪ ~ ㉓):  
12 Nm (1.2 m · kg, 8.7 ft · lb)

**NOTE:**

- Lubricate the threads of bolts (M8 and M6) with engine oil.
- Tighten the bolts starting with the lowest numbered one.
- Install the washer on the bolts No.1~No. 10.
- Install the cable holder on the bolt No.32.



YB704413

**OIL STRAINER AND OIL PAN****1. Install:**

- Relief valve ①
- Oil strainer housing ②
- Oil strainer ③

**NOTE:**

The arrow mark on the oil strainer point to the front of the engine.

**⚠ WARNING**

Always use a new O-ring.

**Bolt (oil strainer):**

10 Nm (1.0 m · kg, 7.2 ft · lb)

**2. Install:**

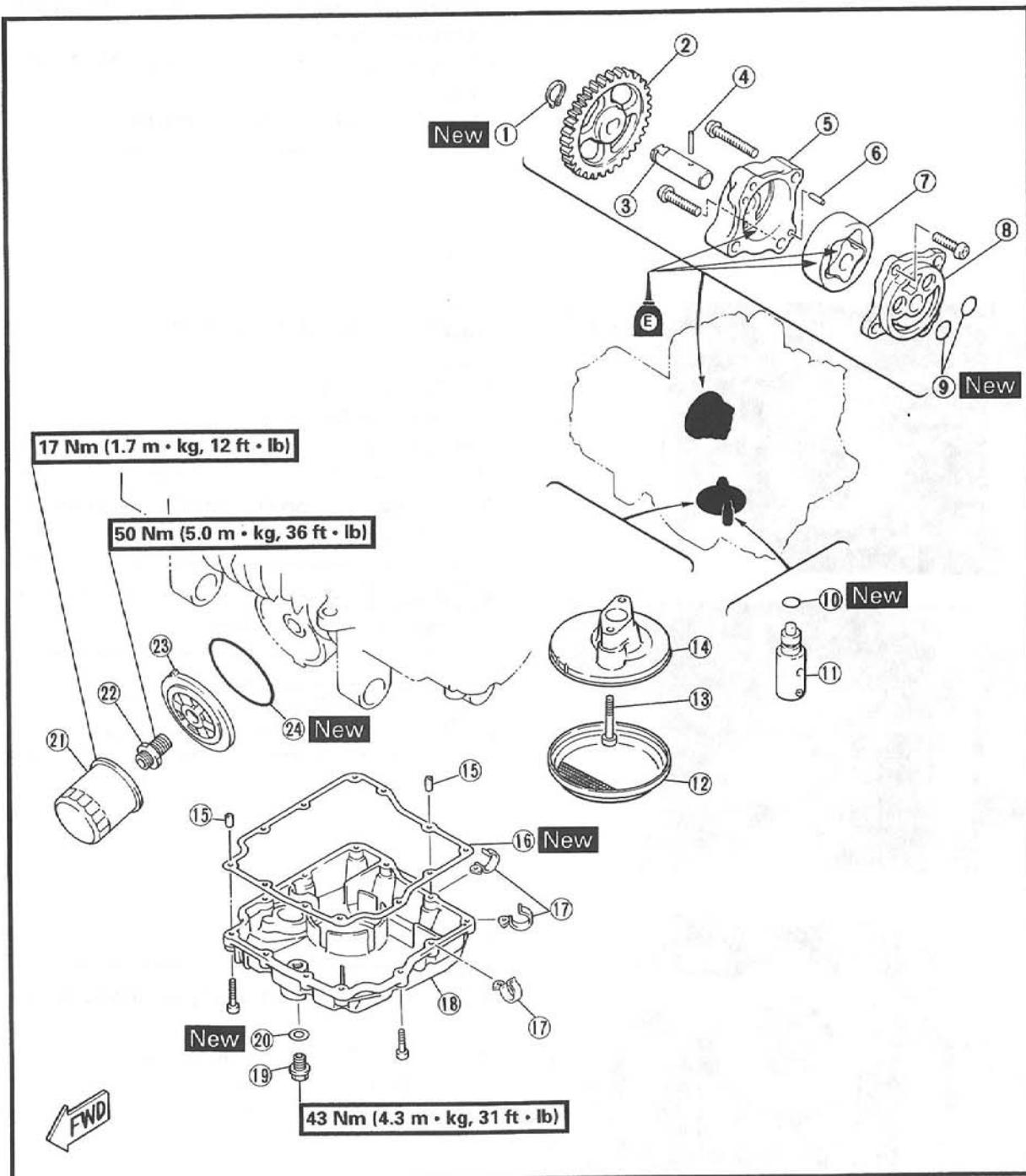
- Oil filter housing ①

**NOTE:**

- Be sure that the O-ring is positioned properly.
- Mesh the oil filter housing projection ㉚ with the crankcase slot.

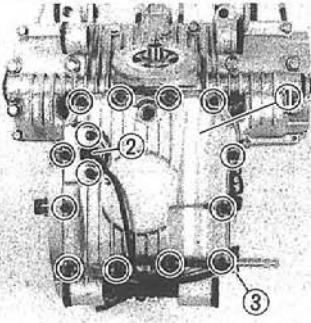
## OIL PUMP AND OIL STRAINER

- |                    |                    |          |                      |
|--------------------|--------------------|----------|----------------------|
| ① Circlip          | ⑨ O-ring           | ⑯ Gasket | ⑰ Clamp              |
| ② Pump driven gear | ⑩ O-ring           | ⑯ Gasket | ⑱ Oil pan            |
| ③ Pump shaft       | ⑪ Relief valve     | ⑯ Gasket | ⑲ Drain bolt         |
| ④ Dowel pin        | ⑫ Oil strainer     | ⑯ Gasket | ⑳ Gasket             |
| ⑤ Rotor housing    | ⑬ Bolt             | ⑯ Gasket | ㉑ Oil filter         |
| ⑥ Dowel pin        | ⑭ Strainer housing | ⑯ Gasket | ㉒ Union bolt         |
| ⑦ Rotor assembly   | ⑮ Dowel pin        | ⑯ Gasket | ㉓ Oil filter housing |
| ⑧ Pump cover       | ⑯ Gasket           | ⑯ Gasket | ㉔ O-ring             |



## ENGINE ASSEMBLY AND ADJUSTMENT

ENG



Union bolt (oil filter housing):  
50 Nm (5.0 m · kg, 36 ft · lb)

### 3. Install:

- Dowel pins
- Gasket
- Oil pan ①
- Oil level switch ②

#### NOTE:

Tighten the bolts (oil pan) in a crisscross pattern.



**WARNING**

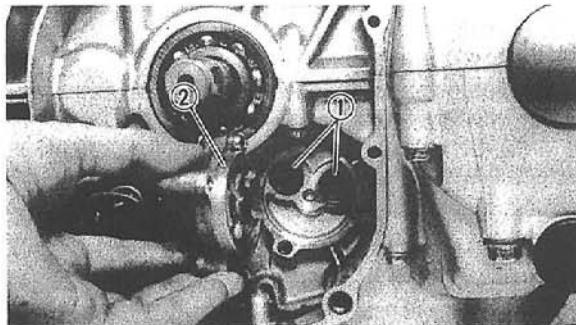
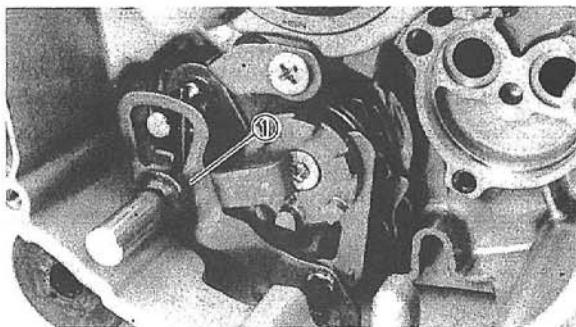
Always use new gasket.



Bolt (oil pan):  
10 Nm (1.0 m · kg, 7.2 ft · lb)  
Bolt (oil level switch):  
10 Nm (1.0 m · kg, 7.2 ft · lb)

### 4. Connect:

- Neutral switch lead ③



YB704412

## OIL PUMP AND SHIFT SHAFT

### 1. Install:

- Shift shaft ①

### 2. Install:

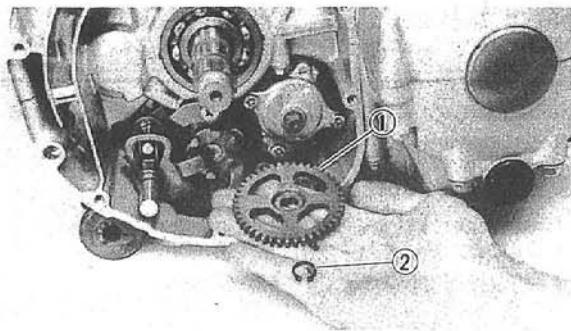
- O-rings ①
- Oil pump assembly ②



Bolt (oil pump):  
7 Nm (0.7 m · kg, 5.1 ft · lb)

## ENGINE ASSEMBLY AND ADJUSTMENT

ENG



### 3. Install:

- Oil pump driven gear ①
- Circlip ②

YB704409

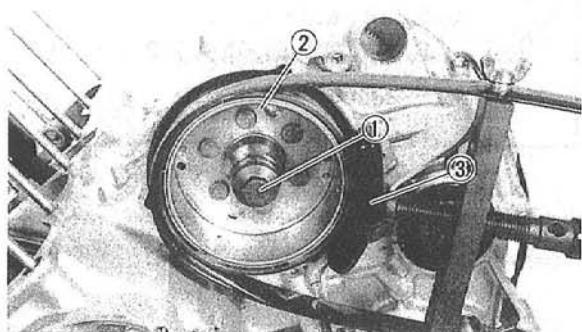
## AC MAGNETO

### 1. Install:

- Magneto rotor
- Washer
- Bolt (magneto rotor)

### NOTE:

Clean the tapered portion of the crankshaft and magneto rotor.



### 2. Tighten:

- Bolt (magneto rotor) ①

### NOTE:

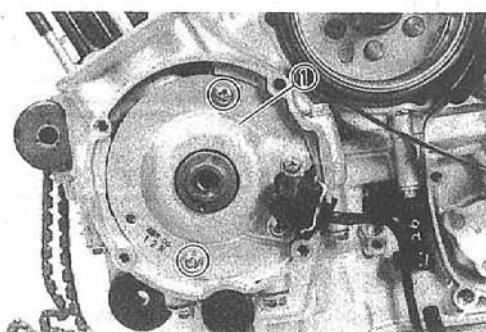
Tighten the bolt (magneto rotor) ① while holding the magneto rotor ② with the primary sheave holder ③.



Primary sheave holder:  
P/N 90890-01701



Bolt (magneto rotor):  
80 Nm (8.0 m · kg, 58 ft · lb)

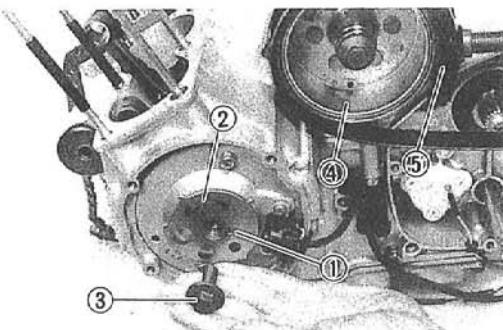


### 3. Install:

- Pickup coil base ①



Screw (pickup coil base):  
8 Nm (0.8 m · kg, 5.8 ft · lb)



## 4. Install:

- Pin ① (timing plate)
- Timing plate ②

## NOTE:

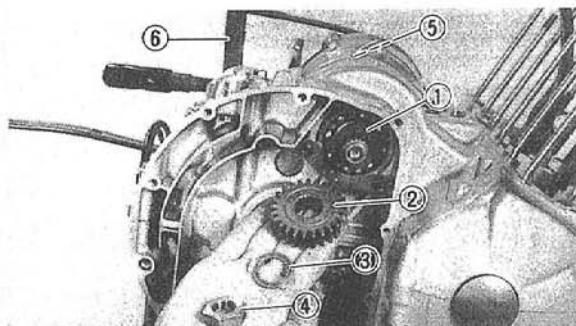
Tighten the bolt (timing plate) ③ while holding the magneto rotor ④ with the primary sheave holder ⑤.



**Primary sheave holder:**  
90890-01701



**Bolt (timing plate):**  
45 Nm (4.5 m · kg, 32 ft · lb)



## 5. Install:

- Collar ①
- Primary drive gear ②
- Lock washer ③
- Nut ④

## NOTE:

Tighten the nut (primary drive gear) ④ while holding the magneto rotor ⑤ with the primary sheave holder ⑥.



**Primary sheave holder:**  
P/N 90890-01701



**Nut (primary drive gear):**  
50 Nm (5.0 m · kg, 36 ft · lb)

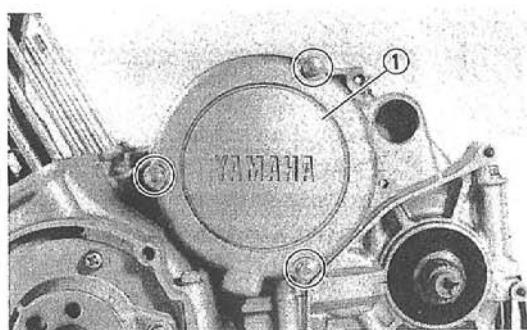
## 6. Bend the lock washer tab along the nut flat.

## 7. Install:

- Magneto cover ①

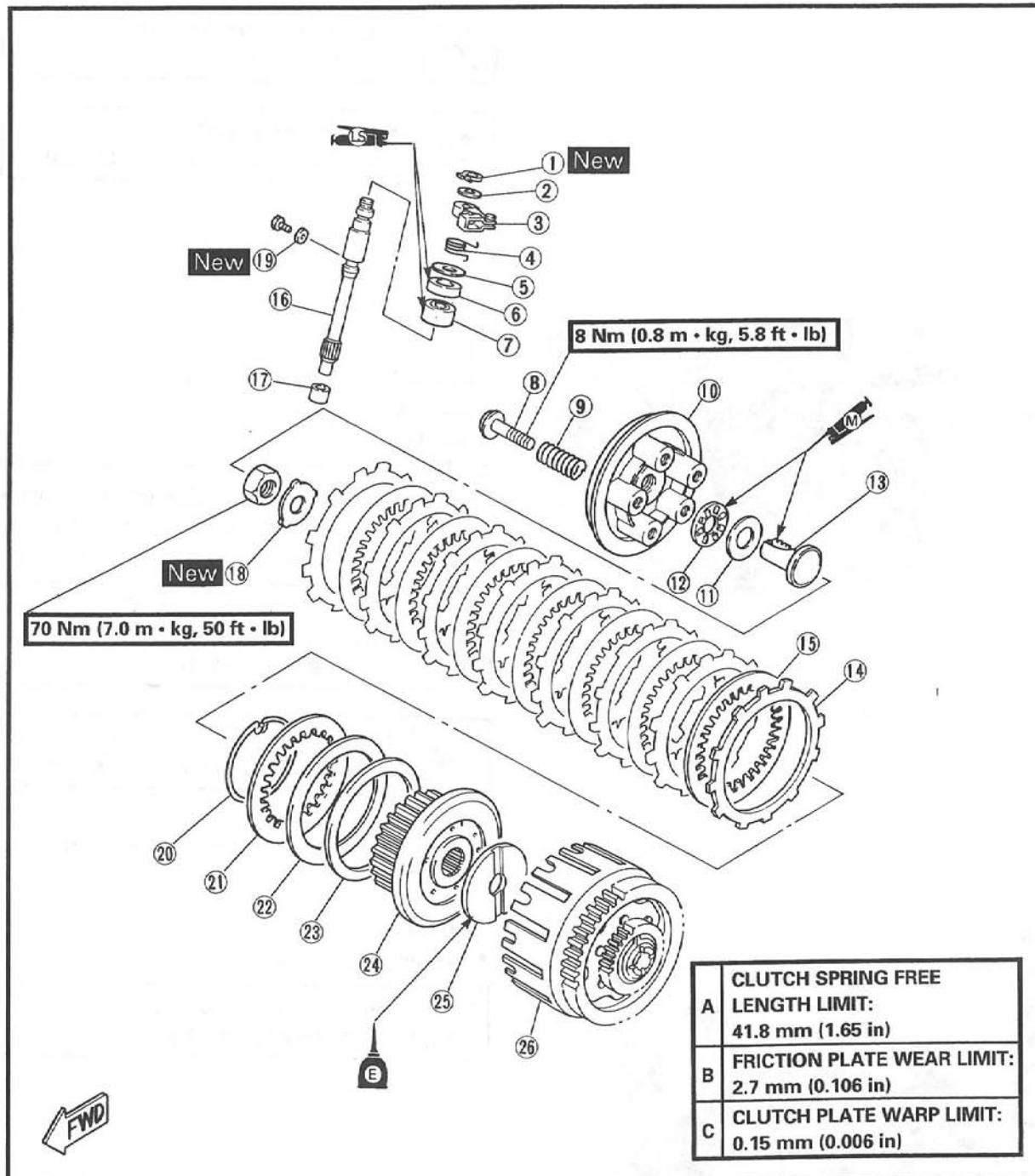


**Bolt (magneto cover):**  
10 Nm (1.0 m · kg, 7.2 ft · lb)



**CLUTCH**

- |                 |                   |                      |
|-----------------|-------------------|----------------------|
| ① Circlip       | ⑩ Pressure plate  | ⑯ Gasket             |
| ② Plate washer  | ⑪ Plate washer    | ⑰ Wire circlip       |
| ③ Pull lever    | ⑫ Thrust bearing  | ㉑ Clutch plate 1     |
| ④ Spring        | ⑬ Pull rod        | ㉒ Clutch boss spring |
| ⑤ Plate wahser  | ⑭ Friction plate  | ㉓ Seat plate         |
| ⑥ Oil seal      | ⑮ Clutch plate    | ㉔ Clutch boss        |
| ⑦ Bearing       | ⑯ Pull lever axle | ㉕ Thrust plate       |
| ⑧ Bolt          | ⑰ Bearing         | ㉖ Clutch housing     |
| ⑨ Clutch spring | ⑱ Lock washer     |                      |



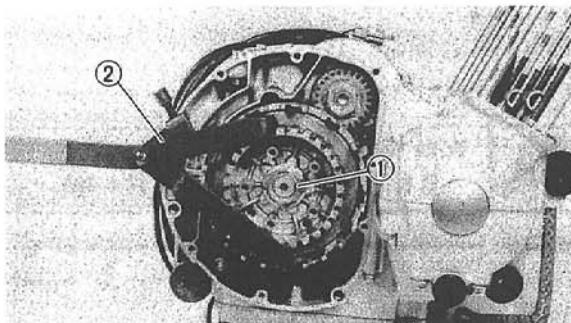
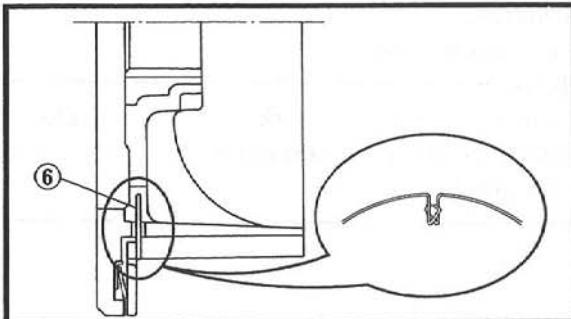
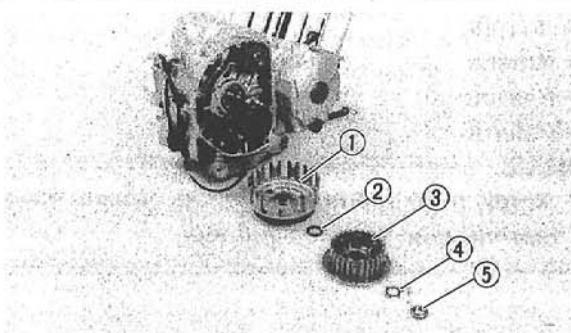


YB704416

**CLUTCH**

## 1. Install:

- Clutch housing ①
- Holding plate ②
- Clutch boss ③
- Lock washer ④ (new)
- Nut (clutch boss) ⑤

**NOTE:**

- If the wire circlip ⑥ is removed, take care reinstall them as shown.
- Make sure that the tab of the lock washer engages the slot in the clutch boss.

## 2. Tighten:

- Nut (clutch boss) ①

**Nut (clutch boss):**

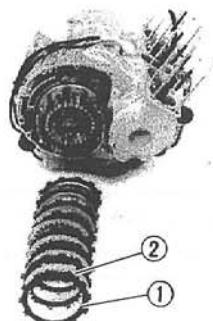
70 Nm (7.0 m · kg, 50 ft · lb)

**NOTE:**

- Tighten the nut (clutch boss) ① while holding the clutch housing by the clutch holder ②.
- Bend the lock washer tab along the nut flat.

**Clutch holding tool:**

P/N 90890-04086

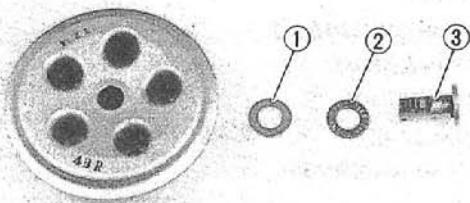


## 3. Install:

- Friction plates ①
- Clutch plates ②

**NOTE:**

Mount friction and clutch plate alternately.

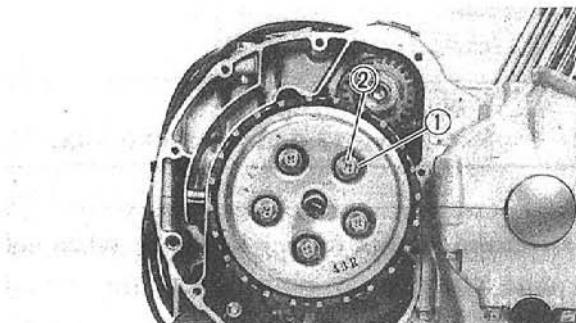
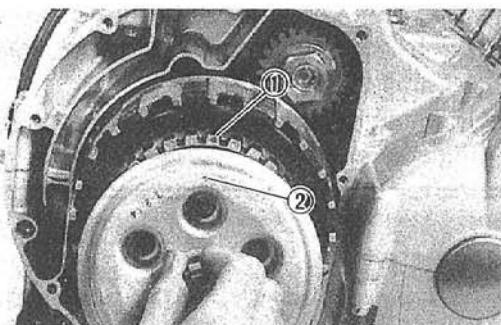


## 4. Install:

- Washer ①
- Bearing ②
- Pull rod ③

## NOTE:

- Apply molybdenum disulfide grease onto bearing/gear teeth of pull rod.



## 5. Install:

- Pressure plate

## NOTE:

Align the punched mark ① on the clutch boss with the punched mark ② on the pressure plate.

## 6. Install:

- Clutch springs ①
- Bolts (clutch spring) ②



## Bolt (clutch spring):

8 Nm (0.8 m · kg, 5.8 ft · lb)

## NOTE:

Tighten the bolts (clutch spring) in stage, using a crisscross pattern.

## 7. Install:

- Clutch pull lever shaft

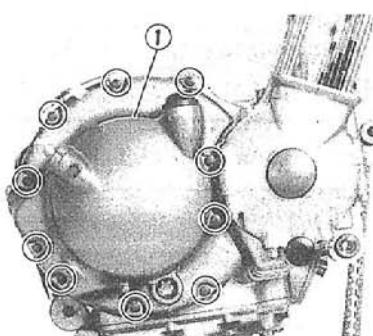
## NOTE:

Apply molybdenum disulfide grease on the gear (pull shaft).



## Bolt (clutch pull shaft):

10 Nm (1.0 m · kg, 7.2 ft · lb)



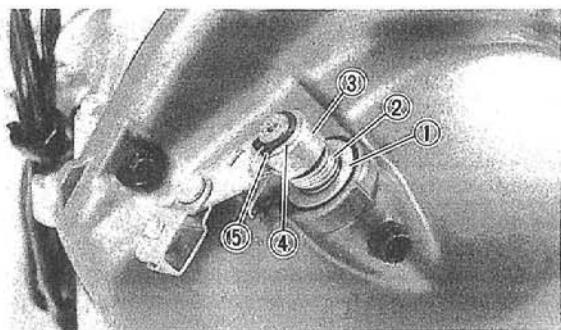
## 8. Install:

- Dowel pins
- Gasket
- Clutch cover ①
- Clutch cable bracket

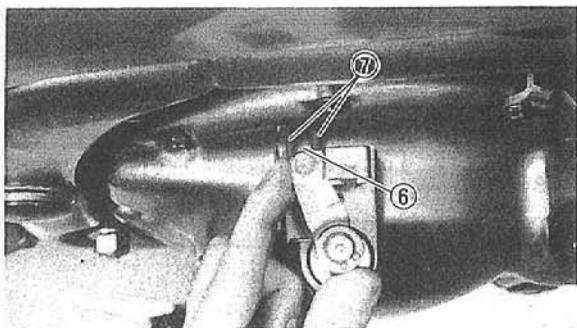


## Bolt (clutch cover):

10 Nm (1.0 m · kg, 7.2 ft · lb)

**NOTE:**

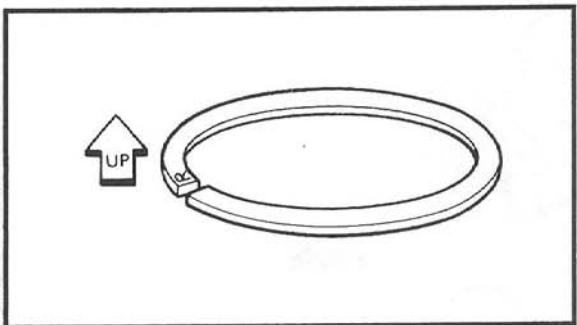
Tighten the bolts (clutch cover) in a criss-cross pattern.

**9. Install:**

- Washer ①
- Return spring ②
- Pull lever ③
- Washer ④
- Circlip ⑤

**NOTE:**

Make sure that the indicator ⑥ on the pull lever is aligned within between the embossed marks ⑦ on the crankcase while pushing the pull lever. If not, change the pull lever position.



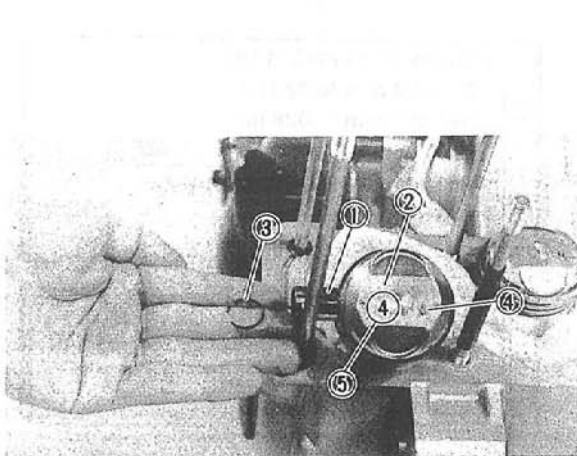
YB704417

**CYLINDER AND PISTON****1. Install:**

- Piston rings

**NOTE:**

- Be sure to install rings so that manufacturer's marks or numbers are located on the top side of the rings. Oil the pistons and rings liberally.
- Piston ring with "R" mark should be installed into second ring position.

**2. Install:**

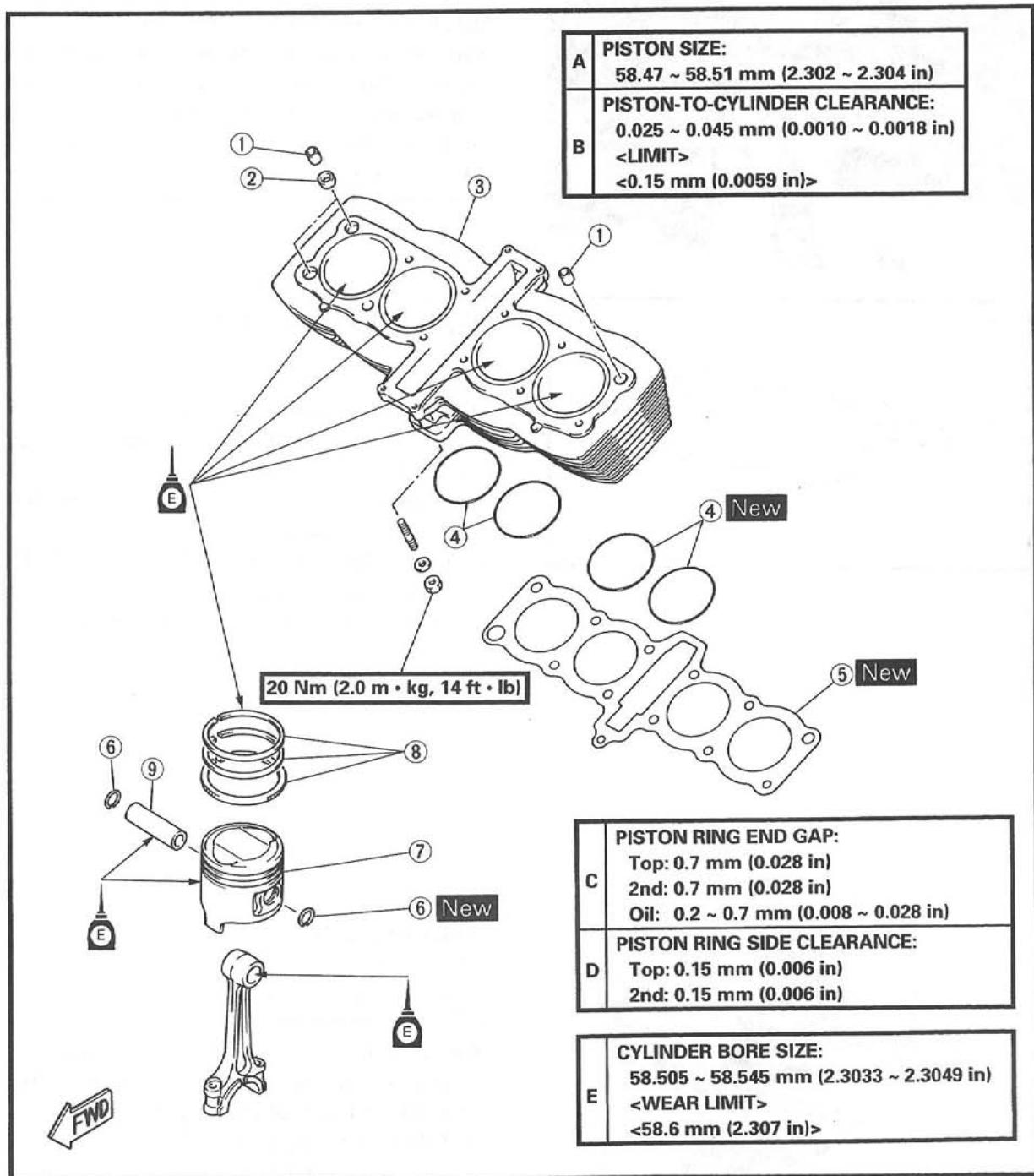
- Piston pins ①
- Pistons ②
- Circlips (piston pin) ③

**NOTE:**

- Apply the engine oil to the piston pins.
- Be sure that the piston allow mark ④ face to exhaust side of the engine.
- Before installing the piston pin circlips, cover the crankcase with a clean rag to pre-

**CYLINDER, PISTON AND PISTON RING**

- |             |                      |
|-------------|----------------------|
| ① Dowel pin | ⑥ Piston pin circlip |
| ② Gasket    | ⑦ Piston             |
| ③ Cylinder  | ⑧ Piston ring set    |
| ④ O-ring    | ⑨ Piston pin         |
| ⑤ Gasket    |                      |



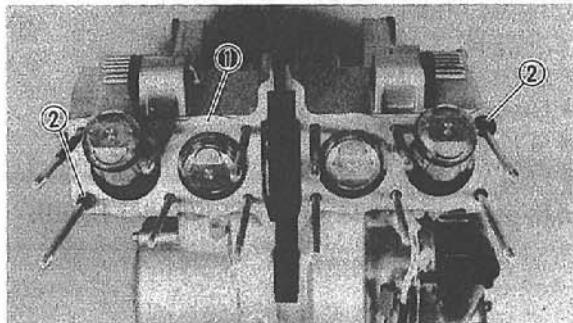


vent the circlip from falling into the crank-case cavity.

- Be sure that the marked piston numbers ⑤ should be in sequence (1,2,3,4) beginning from the left.

**⚠ WARNING**

**Always use new circlips (piston pin).**



3. Install:

- Gasket (cylinder) ①
- Dowel pins ②

**NOTE:**

The gasket "UP" mark should face upward.

**⚠ WARNING**

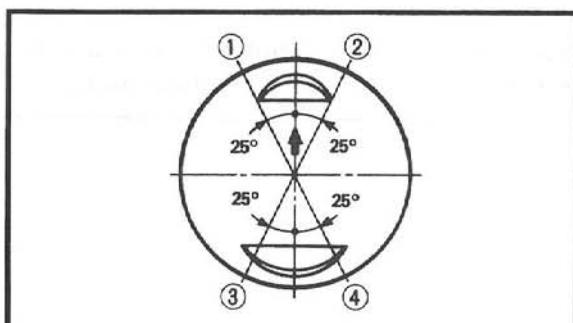
**Always use a new gasket (cylinder).**

4. Apply:

- Pistons
- Piston rings
- Cylinder

**NOTE:**

Apply a liberal coating of engine oil.



5. Piston:

- Top ring
- 2nd ring
- Oil ring

Offset the piston ring end gaps as shown.

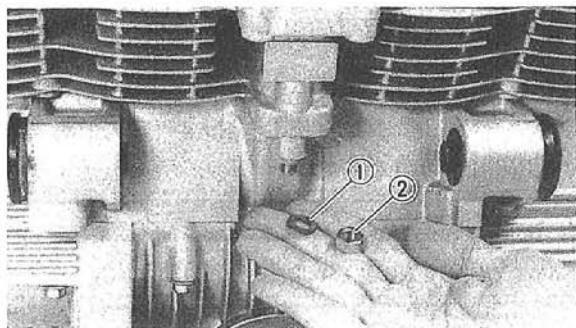
- ① Top ring end
- ② Oil ring end (lower)
- ③ Oil ring end (upper)
- ④ 2nd ring end

6. Install:

- Cylinder

**NOTE:**

- Install the #2 and #3 pistons first.
- Pass the cam chain and cam chain guide (exhaust side) through the cam chain cavity.



## 7. Install:

- Washer ①
- Nut ② (cylinder)



Nut (cylinder):

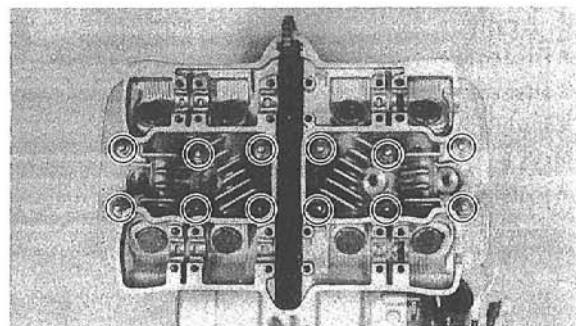
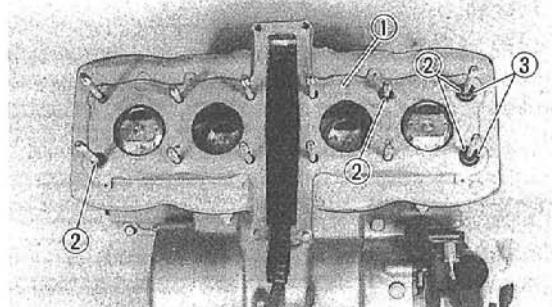
20 Nm (2.0 m · kg, 14 ft · lb)

YB704418

**CYLINDER HEAD AND CAMSHAFT**

## 1. Install:

- Gasket ① (cylinder head)
- Dowel pins ②
- O-rings ③

**Always use a new gasket (cylinder head).**

## 2. Install:

- Cylinder head
- Washers
- Copper washers
- Nuts

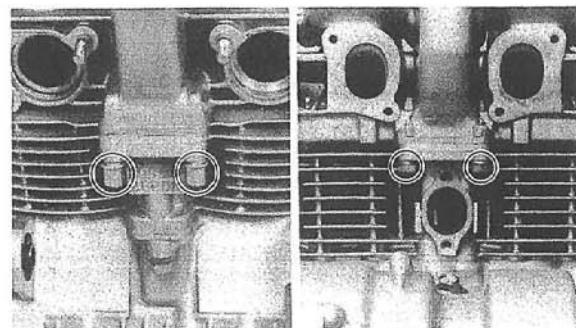


Nut (cylinder head):

22 Nm (2.2 m · kg, 16 ft · lb)

**NOTE:**

- Apply the engine oil onto the nut threads.
- Tighten the nuts in a crisscross pattern.



## 3. Install:

- Washers
- Nuts



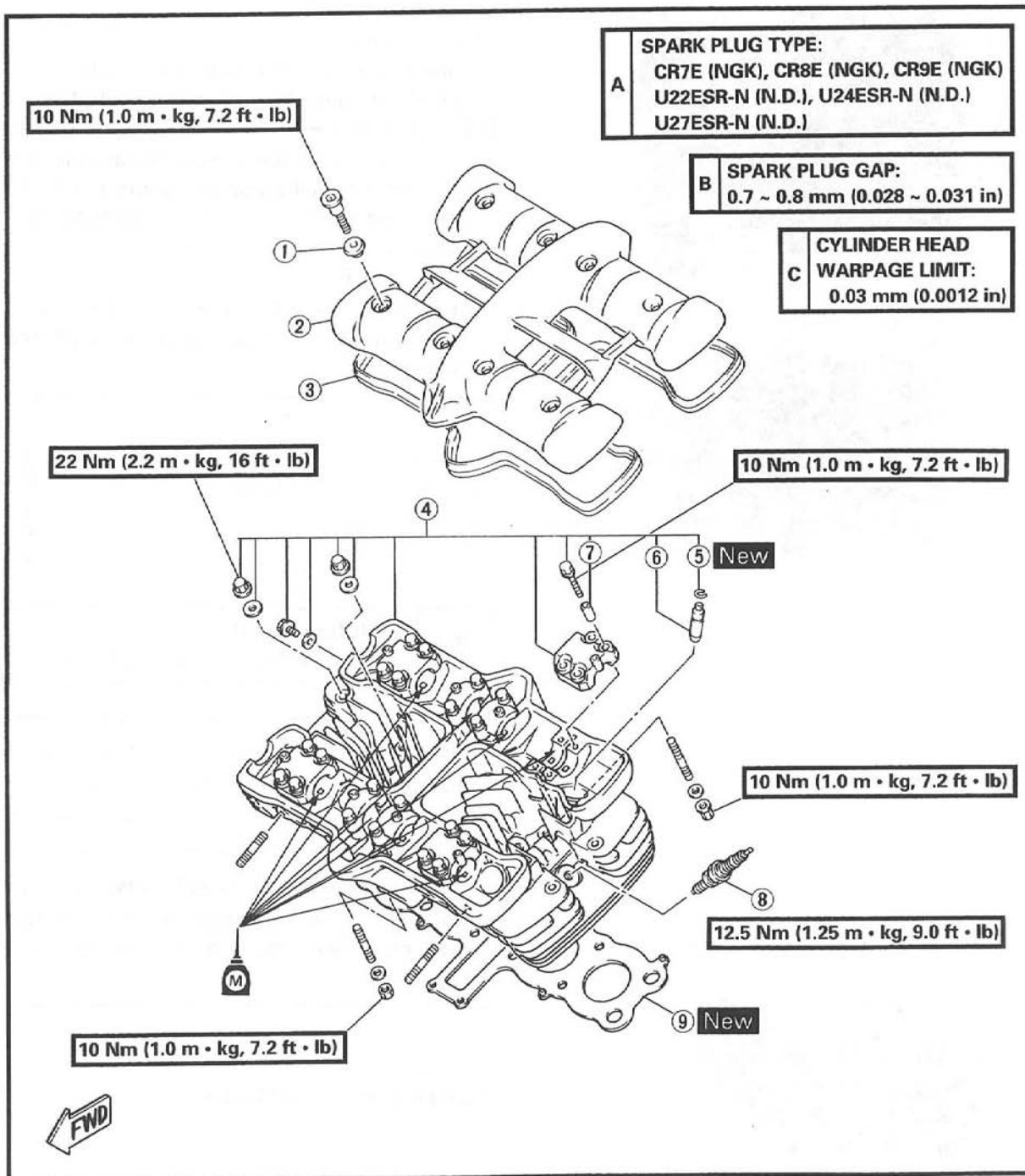
Nut (cylinder head—front/rear side):

10 Nm (1.0 m · kg, 7.2 ft · lb)



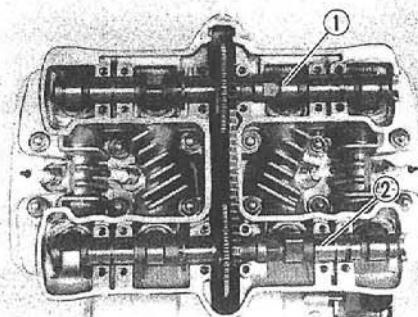
## CYLINDER HEAD AND CYLINDER HEAD COVER

- |                          |               |
|--------------------------|---------------|
| ① Rubber                 | ⑥ Valve guide |
| ② Cylinder head cover    | ⑦ Dowel pin   |
| ③ Cylinder head gasket   | ⑧ Spark plug  |
| ④ Cylinder head assembly | ⑨ Gasket      |
| ⑤ Circlip                |               |



## ENGINE ASSEMBLY AND ADJUSTMENT

ENG

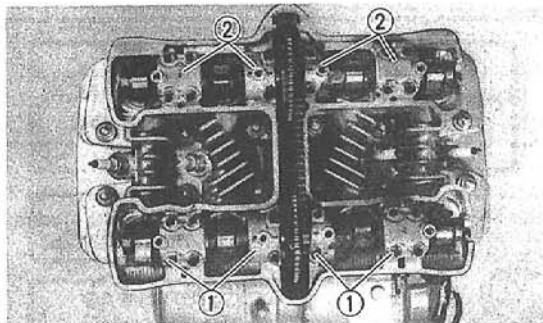


### 4. Install:

- Exhaust camshaft ①
- Intake camshaft ②  
(with cam sprocket at temporaly tighten)

#### NOTE:

Install the camshaft with the punch mark facing upward.



### 5. Install:

- Dowel pins
- Camshaft caps ① (intake camshaft)
- Camshaft caps ② (exhaust camshaft)

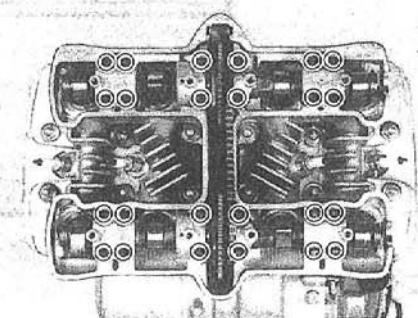
#### NOTE:

• Make sure that each camshaft cap is installed in its original place by reference to its embossed identification mark, as follows:

Intake :I

Exhaust :E

- Install the camshaft cap with the arrow mark embossed facing right side of the engine.



### 6. Install:

- Bolts (camshaft caps)



#### Bolt (camshaft cap):

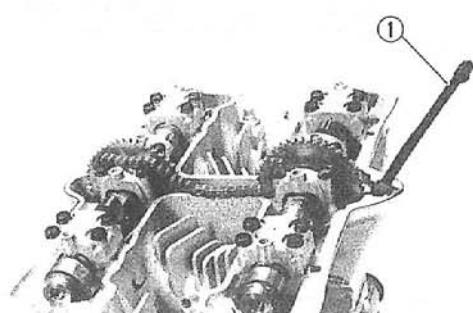
10 Nm (1.0 m · kg, 7.2 ft · lb)

#### NOTE:

Tighten the bolts (camshaft cap) in a criss-cross pattern from in side to out side.

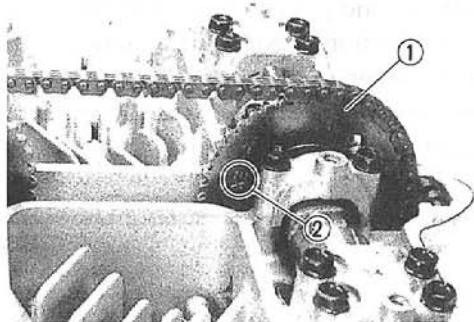
#### CAUTION:

The bolts (camshaft caps) must be tightened evenly or damage to the cylinder head, camshaft caps and camshaft will result.



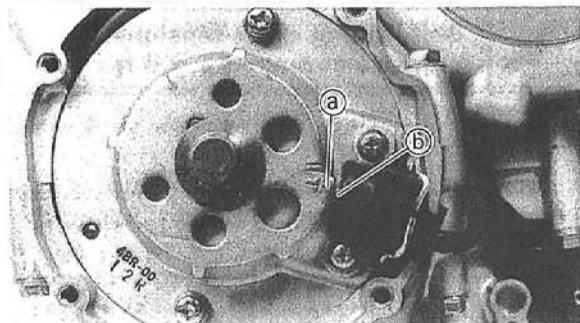
### 7. Install:

- Chain guide ① (exhaust)



## 8. Install:

- Cam sprockets ①



\*\*\*\*\*

**Installing steps:**

- Turn the crankshaft counterclockwise until the TDC mark ② is aligned with the pickup coil ③.
- Fit the timing chain onto both cam sprockets and install the cam sprockets on the camshafts.

**NOTE:**

When installing the cam sprockets, start with the exhaust camshaft to keep the timing chain as tense as possible on the exhaust side, and set the hole of "EX" mark side ② on the cam sprocket to the camshaft.

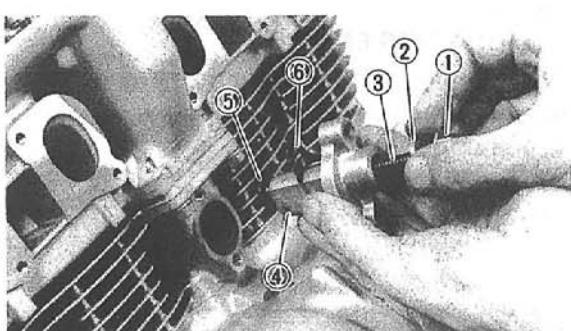
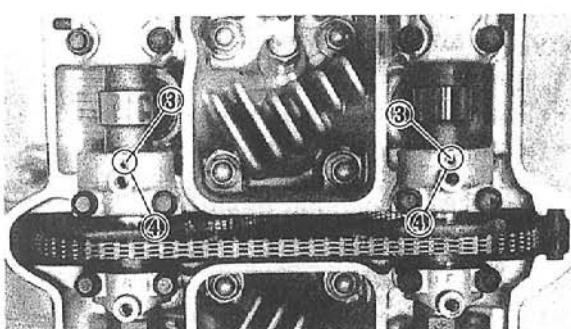
"IN":Intake side "EX":Exhaust side.

**CAUTION:**

**Do not turn the crankshaft during the camshafts installation. Damage or improper valve timing will result.**

- Turn both camshafts opposite to each other until the punch mark ③ on the camshaft is aligned with the hole ④ on the camshaft cap.
- While holding the camshafts, temporary tighten the bolts.

\*\*\*\*\*



YB704419

**TIMING CHAIN TENSIONER**

## 1. Install:

- Timing chain tensioner

\*\*\*\*\*

**Installation steps:**

- Remove the tensioner cap bolt ①, washer ② and springs ③.
- Release the timing chain tensioner one-



way cam ④ and push the tension rod ⑤.

- Install the tensioner with a new gasket ⑥ into the cylinder.

**NOTE:**

The ratchet face on the tensioner should face downward.



**Bolt (timing chain tensioner):**  
10 Nm (1.0 m · kg, 7.2 ft · lb)

- Install the springs ③, washer ② and cap bolt ①.



**Cap bolt (timing chain tensioner):**  
20 Nm (2.0 m · kg, 14 ft · lb)

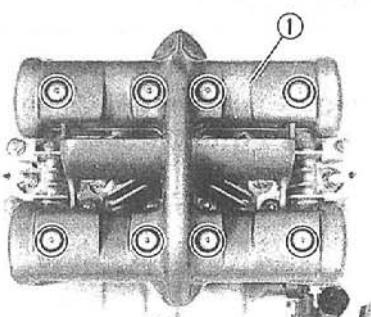
\*\*\*\*\*

**2. Tighten:**

- Bolts (cam sprockets)



**Bolt (cam sprocket):**  
24 Nm (2.4 m · kg, 17 ft · lb)  
use Loctite®



YB704420

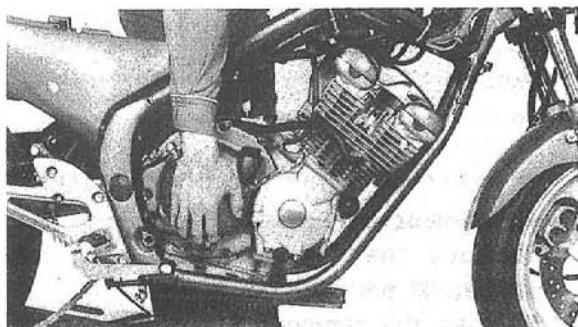
**CYLINDER HEAD COVER**

**1. Install:**

- Gasket (cylinder head cover)
- Cylinder head cover ①



**Bolt (cylinder head):**  
10 Nm (1.0 m · kg, 7.2 ft · lb)



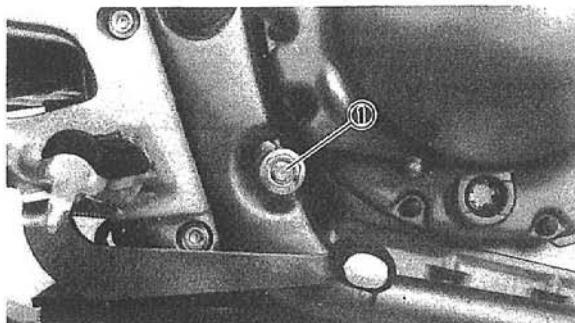
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**REMOUNTING ENGINE**

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

**1. Install:**

- Engine assembly  
(from right side)

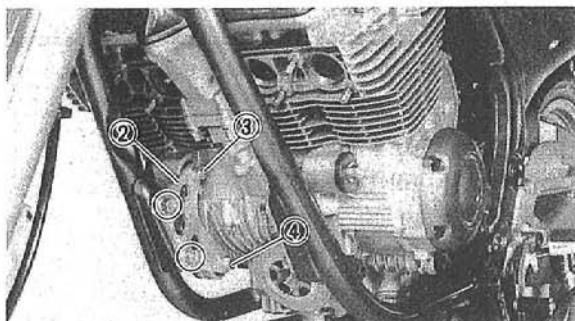


## 2. Install:

- Mounting bolt (rear) ①
- Engine brackets ② (left and right)  
(to the frame)
- Mounting bolts (front—upper) ③
- Mounting bolts (front—lower) ④

**NOTE:**

Install the all bolts and nuts first, and then tighten the bolts and nuts to specification.

**Engine mounting:****Nut (rear)**

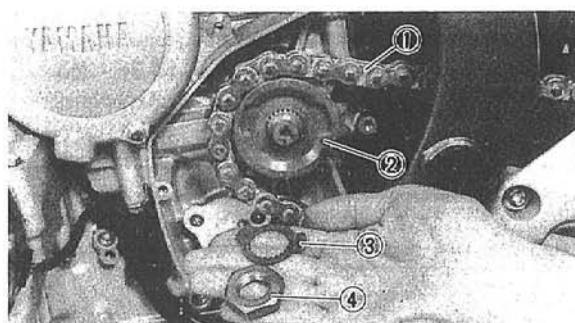
88 Nm (8.8 m · kg, 64 ft · lb)

**Nut (engine bracket—frame)**

60 Nm (6.0 m · kg, 43 ft · lb)

**Bolt (engine bracket—engine)**

46 Nm (4.6 m · kg, 33 ft · lb)



## 3. Install:

- Drive chain ①
- Drive sprocket ②
- Lock washer ③
- Nut (drive sprocket) ④

**Nut (drive sprocket):**

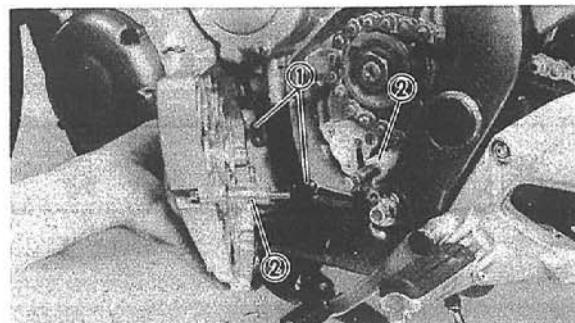
110 Nm (11.0 m · kg, 80 ft · lb)

**NOTE:**

- Tighten the nut (drive sprocket) while applying the rear brake.
- Bend the lock washer tab along the nut flat.

 **WARNING**

Always use a new lock washer.

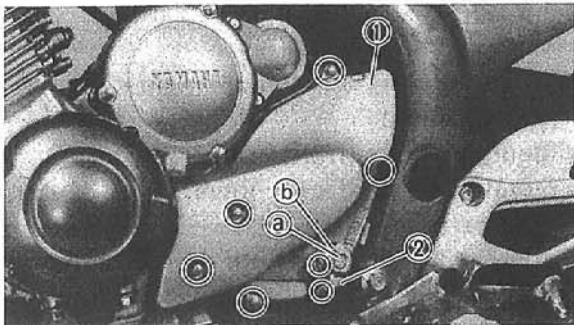


## 4. Install:

- Dowel pins ①
- Collars ②

## ENGINE ASSEMBLY AND ADJUSTMENT

**ENG**



### 5. Install:

- Cover (drive sprocket)
- Shift arm ①

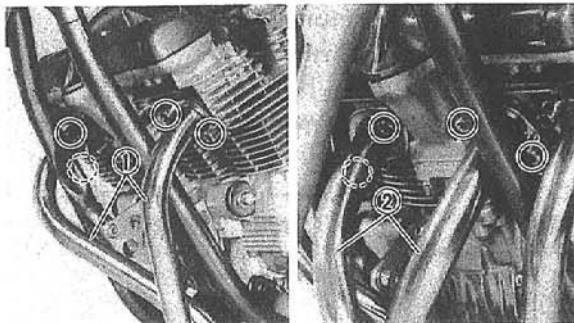


**Bolt (drive sprocket cover/shift arm):**

**10 Nm (1.0 m · kg, 7.2 ft · lb)**

### NOTE:

Align the punch mark ④ with the slot ⑤ on shift pedal joint.



### 6. Install:

- Exhaust pipe #1,#4 ①
- Exhaust pipe #2,#3 ②

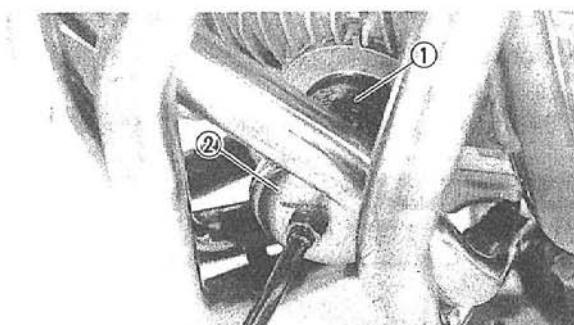
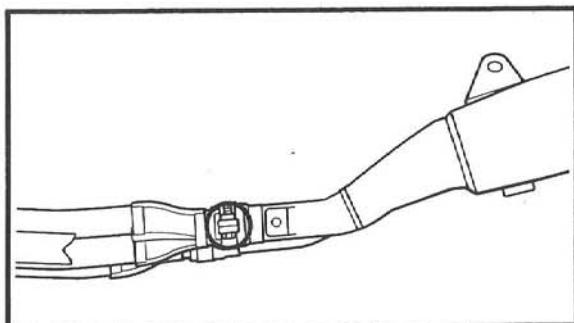


**Nut (exhaust pipe):**

**20 Nm (2.0 m · kg, 14 ft · lb)**

**Bolt (exhaust pipe—muffler):**

**20 Nm (2.0 m · kg, 14ft · lb)**



### 7. Install:

- Oil filter ①

### NOTE:

- Be sure the O-ring is positioned properly.
- Install the oil filter ① using the oil filter wrench ②.



**Oil filter wrench:**

**P/N 90890-01426**

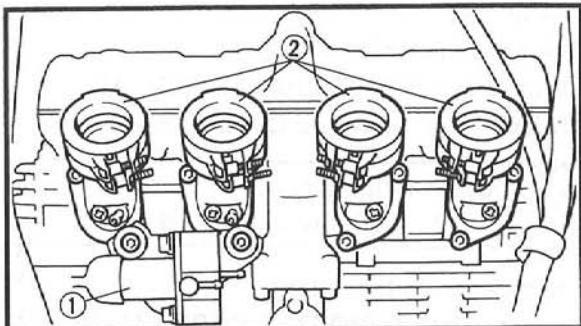


**Oil filter:**

**17 Nm (1.7 m · kg, 12 ft · lb)**

## ENGINE ASSEMBLY AND ADJUSTMENT

ENG

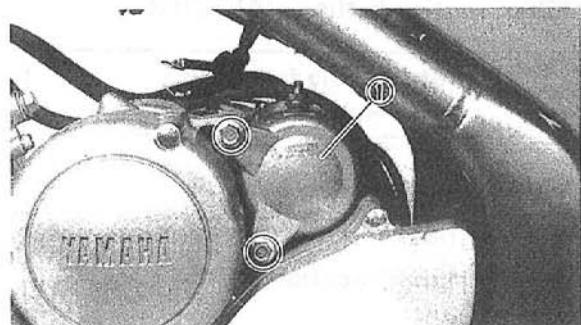


### 8. Install:

- Solenoid valve ①
- Intake manifold ②

#### NOTE:

Make sure the O-ring is positioned properly.



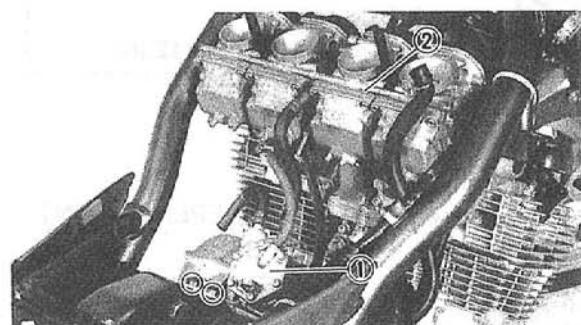
### 9. Install:

- Starter motor ①

#### NOTE:

Apply the lithium soap base grease onto O-ring on starter motor.

	<b>Bolt (starter motor):</b> 10 Nm (1.0 m · kg, 7.2 ft · lb)
--	---



### 10. Install:

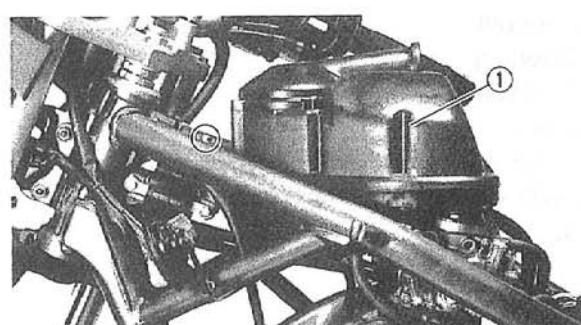
- Fuel pump ①

	<b>Bolt (fuel pump bracket):</b> 10 Nm (1.0 m · kg, 7.2 ft · lb)
--	---

- Carburetor assembly ②

#### NOTE:

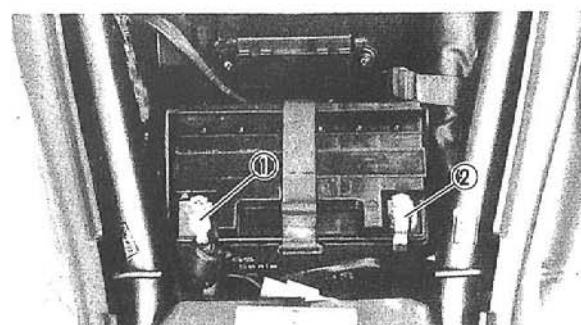
Make the the carburetors is properly in place.



### 11. Install:

- Air filter case ①

	<b>Bolt (air filter case):</b> 10 Nm (1.0 m · kg, 7.2 ft · lb)
--	---



### 12. Connect:

- Battery leads

#### CAUTION:

Connect the positive lead ① first and then connect the negative lead ② .



## 13. Adjust:

- Drive chain slack

Refer to the "DRIVE CHAIN SLACK ADJUSTMENT" section in the CHAPTER 3.



## Drive chain slack:

30 ~ 40 mm (1.2 ~ 1.6 in)

- Throttle cable free play

Refer to the "THROTTLE CABLE ADJUSTMENT" section in the CHAPTER 3.



## Throttle cable free play:

3 ~ 7 mm (0.08 ~ 0.28 in)

- Clutch cable free play

Refer to the "CLUTCH CABLE FREE PLAY ADJUSTMENT" section in the CHAPTER 3.



## Clutch free play:

2 ~ 3 mm (0.08 ~ 0.12 in)

## 14. Fill:

- Engine oil

Refer to the "ENGINE OIL REPLACEMENT" section in the CHAPTER 3.

## 15. Install:

- Cowling
- Fuel tank
- Seat

Refer to the "SIDE COVER, FUEL TANK AND COWLING" section in the CHAPTER 3.

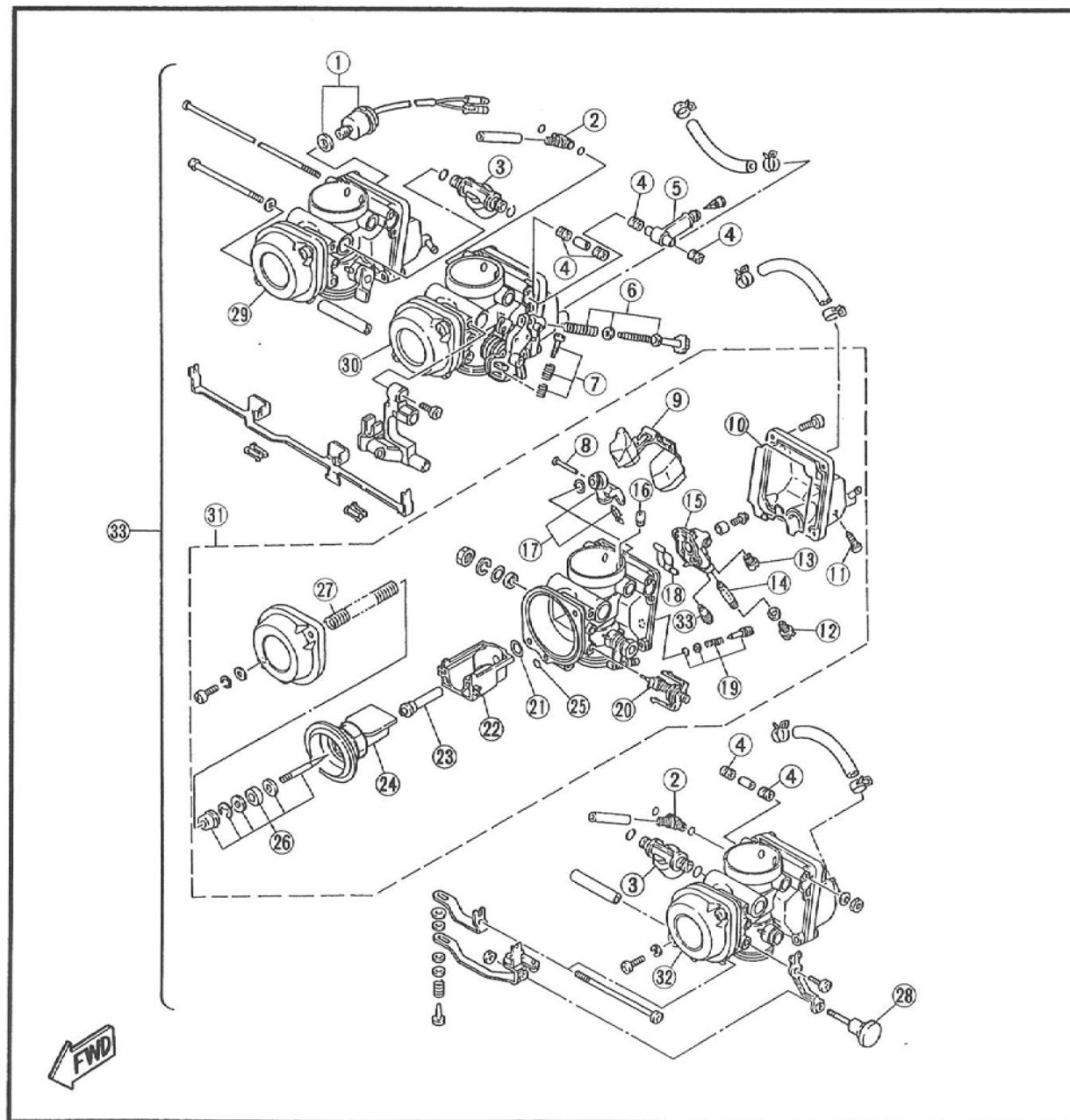


## CARBURETION

### CARBURETOR

- |                          |                           |                       |
|--------------------------|---------------------------|-----------------------|
| ① Thermo switch assembly | ⑬ Starter jet             | ㉓ O-ring              |
| ② Joint (overflow)       | ⑭ Holder                  | ㉔ Jet needle set      |
| ③ Joint (ventilation)    | ⑮ Jet housing             | ㉕ Spring              |
| ④ Gasket                 | ⑯ Pilot air jet           | ㉖ Starter lever knob  |
| ⑤ Joint (fuel hose)      | ⑰ Needle valve set        | ㉗ Carburetor #4       |
| ⑥ Throttle stop screw    | ⑱ O-ring                  | ㉘ Carburetor #3       |
| ⑦ Stop screw             | ⑲ Pilot screw             | ㉙ Carburetor #2       |
| ⑧ Float pin              | ㉚ Starter plunger         | ㉚ Carburetor #1       |
| ⑨ Float                  | ㉛ O-ring                  | ㉛ Carburetor assembly |
| ⑩ Gasket                 | ㉜ Throttle valve support  |                       |
| ⑪ Drain screw            | ㉝ Needle jet              |                       |
| ⑫ Main jet               | ㉞ Throttle valve assembly |                       |

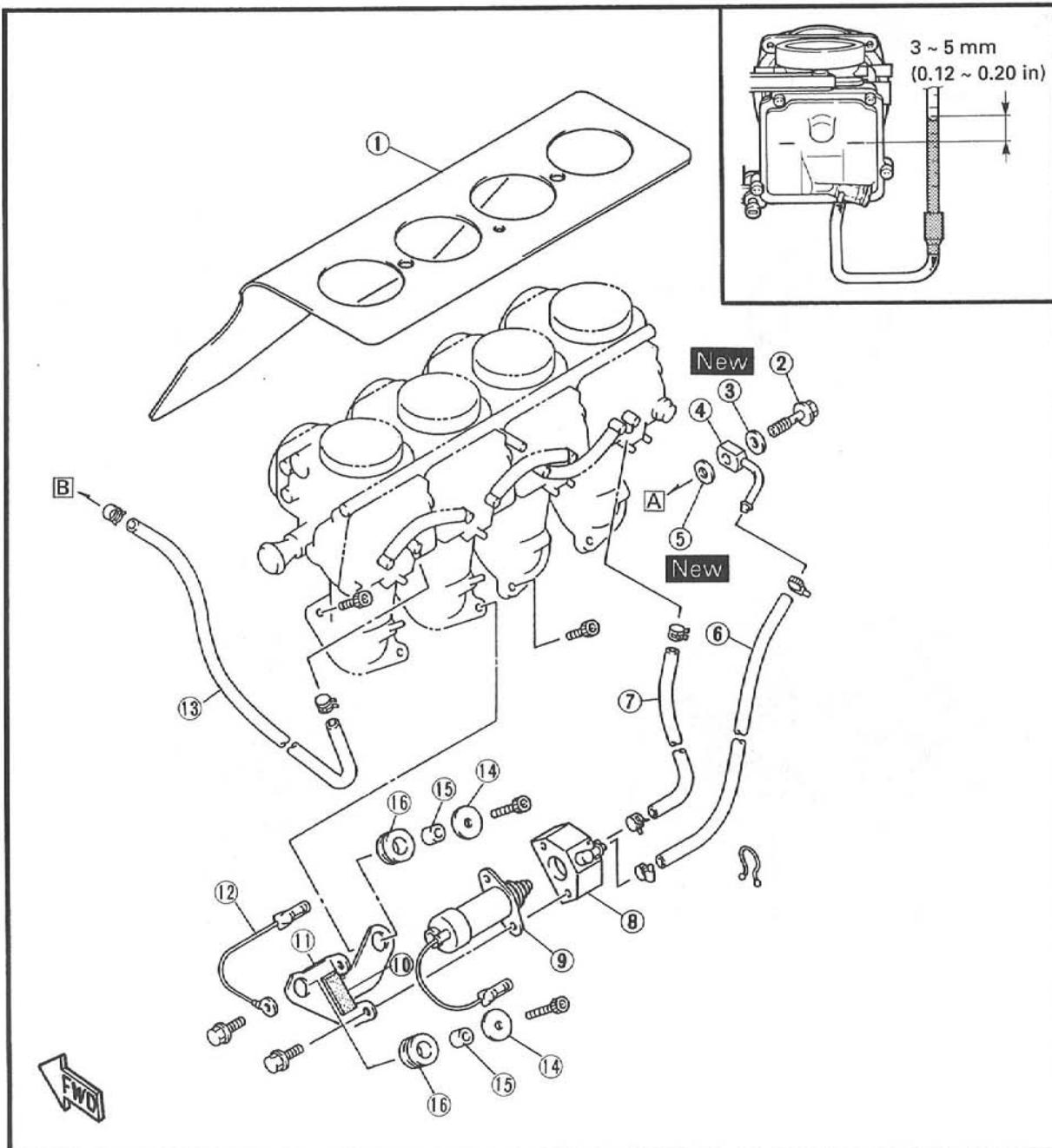
**5**





- |                  |                            |
|------------------|----------------------------|
| ① Heat protector | ⑪ Holder                   |
| ② Union bolt     | ⑫ Lead                     |
| ③ Copper washer  | ⑬ Hose                     |
| ④ Pipe           | ⑭ Plate washer             |
| ⑤ Copper washer  | ⑮ Collar                   |
| ⑥ Hose           | ⑯ Grommet                  |
| ⑦ Hose           |                            |
| ⑧ Body           | [A] to cylinder head       |
| ⑨ Solenoid valve | [B] to cylinder head cover |
| ⑩ Damper         |                            |

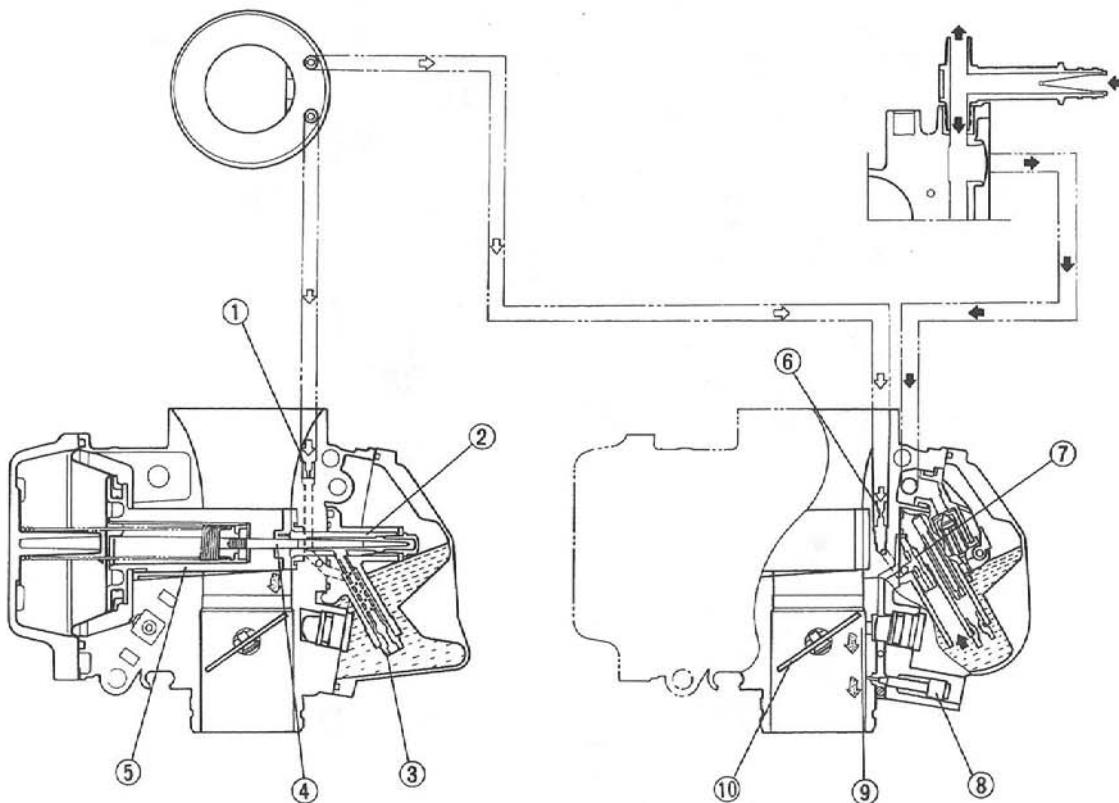
SPECIFICATIONS		
ID MARK	4BR00/4DS00(D)	4EB00(D,S)
MAIN JET	#1, #4:#105/#2, #3:#102.5	←
MAIN AIR JET	#70	←
PILOT JET	#15	←
PILOT AIR JET 1	#145	←
JET NEEDLE	5CT-3.5	5CT-2.5
PILOT SCREW	2 turns out	←
THROTTLE VALVE	#130	←
ENGINE IDLE SPEED	1,150 ~ 1,250 r/min	←
FUEL LEVEL A	3 ~ 5 mm (0.12 ~ 0.20 in)	←



**SECTION VIEW**

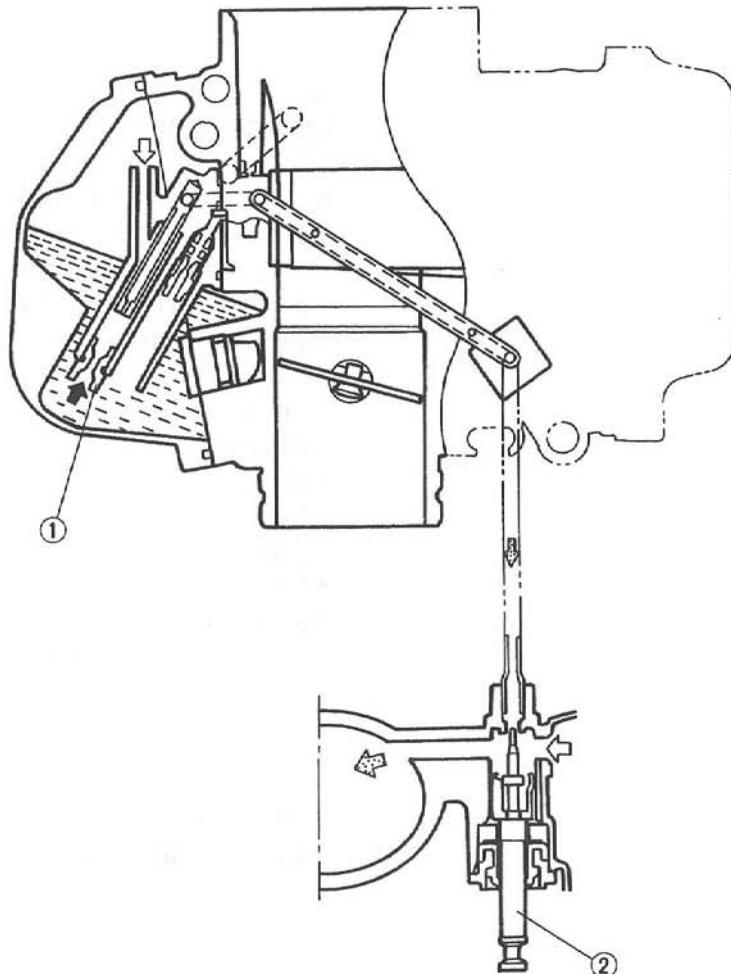
- ① Main air jet
- ② Needle jet
- ③ Main jet
- ④ Jet needle
- ⑤ Piston valve
- ⑥ Pilot air jet
- ⑦ Pilot jet
- ⑧ Pilot screw
- ⑨ By-pass hole
- ⑩ Throttle valve

A		AIR
B		MIXTURE
C		FUEL



- ① Starter jet  
② Starter plunger

A	←	AIR
B	↙	MIXTURE
C	→	FUEL





YB705101

**REMOVAL**

## 1. Remove:

- Seat
- Fuel tank

Refer to the "SIDE COVER, FUEL TANK AND COWLING" section in the CHAPTER 3.

## • Air filter case

Refer to the "ENGINE REMOVAL-AIR FILTER CASE" section in the CHAPTER 4.

## • Carburetor assembly

Refer to the "ENGINE REMOVAL-CARBURETOR" section in the CHAPTER 4.

YB705102

**DISASSEMBLY****NOTE:** —

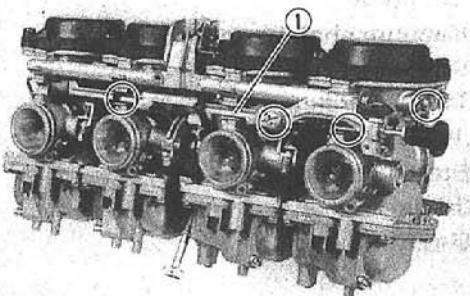
The following parts can be cleaned and inspected without carburetor separation.

(All inner parts except starter plunger can be cleaned and inspected without carburetor separation.)

- Throttle valve
- All jets
- Float
- Needle valve
- Valve seat
- Needle jet
- Jet needle

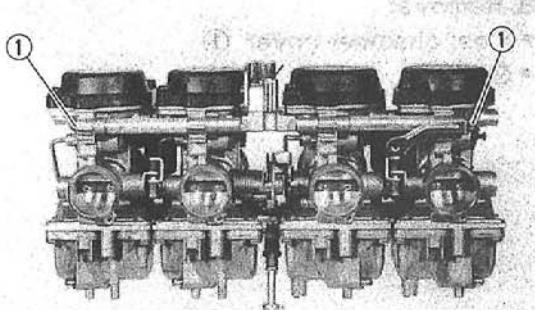
## 1. Remove:

- Connecting hoses



## 2. Remove:

- Starter lever ①

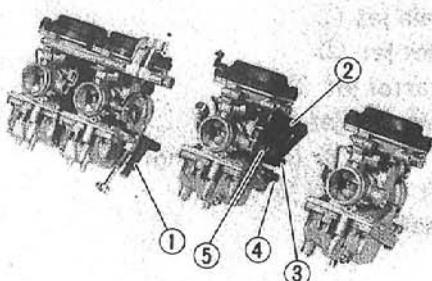
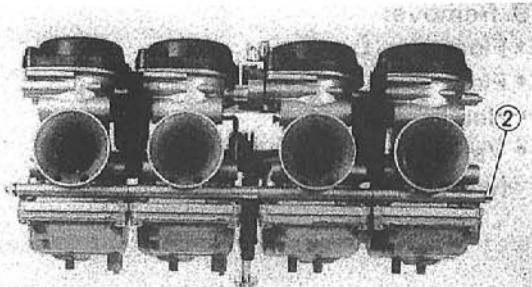


## 3. Remove:

- Connecting bolts ① (upper)
- Connecting bolt ② (lower)

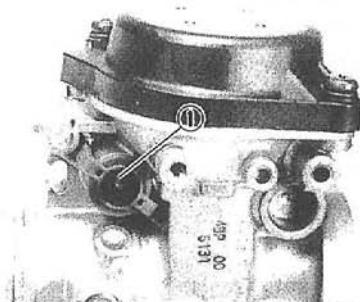
## 4. Separate:

- Carburetors



## 5. Remove:

- Joint ① (fuel hose)
- Joint ② (ventilation hose)
- Joint ③ (overflow hose)
- Joint ④ (fuel feed)
- Spring ⑤

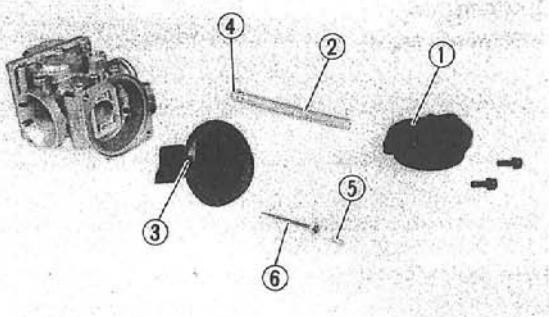


## 6. Remove:

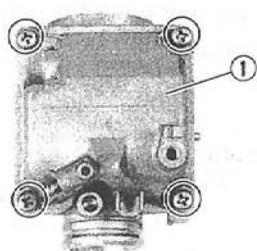
- Starter plunger ①

## NOTE:

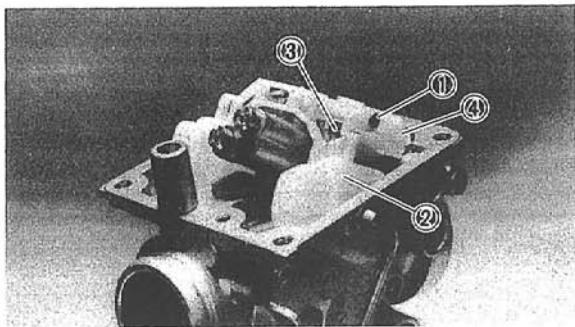
Unhook the hooks from the carburetor body and then pull out the starter plunger.

**7. Remove:**

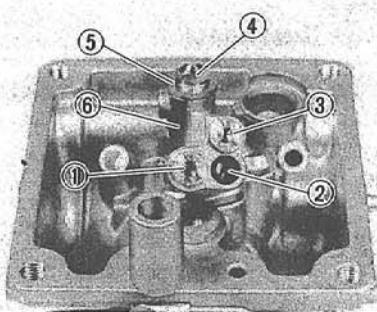
- Vacuum chamber cover ①
- Spring (throttle valve) ②
- Throttle valve ③
- Jet needle holder ④
- Spring (jet needle holder) ⑤
- Jet needle ⑥
- O-ring

**8. Remove:**

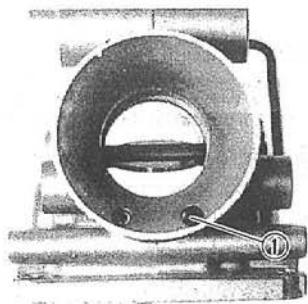
- Float chamber cover ①
- Gasket

**9. Remove:**

- Float pin ①
- Float ②
- Needle valve ③
- Valve seat ④
- (with O-ring)

**10. Remove:**

- Main jet ①
- Pilot jet ②
- Starter jet ③
- Bolt ④ (jet housing)
- Washer ⑤ (jet housing)
- Jet housing ⑥
- Gasket

**11. Remove:**

- Needle jet
- Throttle valve support  
(with O-ring)

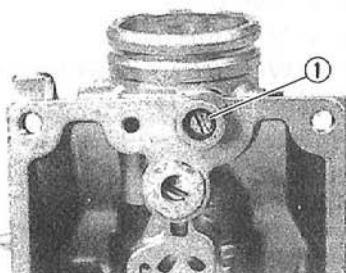
**12. Remove:**

- Pilot air jet ①



## 13. Remove:

- Pilot screw ①

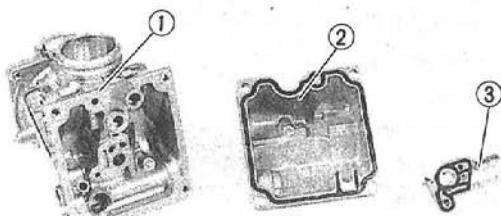


YB705103

**INSPECTION**

## 1. Inspect:

- Carburetor body ①
- Float chamber ②
- Jet housing ③  
Cracks/Damage → Replace.
- Fuel passage  
Contamination → Clean as indicated.
- Carburetor float chamber body  
Contamination → Clean.



\*\*\*\*\*

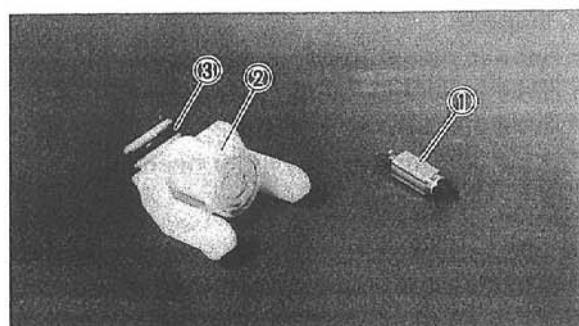
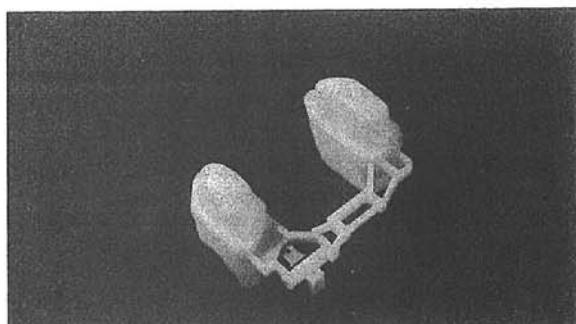
**Cleaning steps:**

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

\*\*\*\*\*

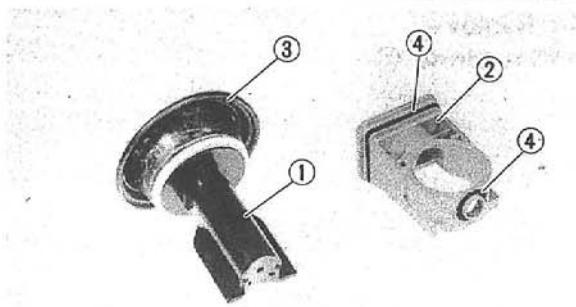
## 2. Inspect:

- Floats  
Damage → Replace.

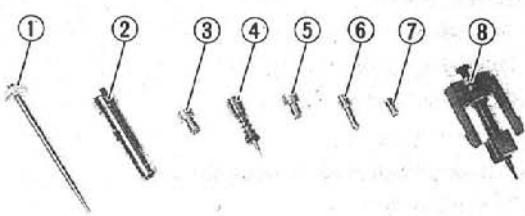


## 3. Inspect:

- Needle valve ①
- Valve seat ②
- O-ring ③  
Damage/Wear/Contamination → Replace as a set.

**4. Inspect:**

- Throttle valve ①
- Throttle valve support ②  
Scratches/Wear/Damage → Replace.
- Rubber diaphragm ③  
Tears → Replace.
- O-rings ④  
Wear/Damage → Replace.

**5. Inspect:**

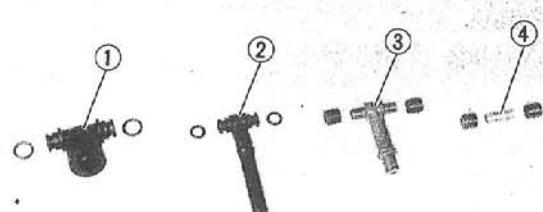
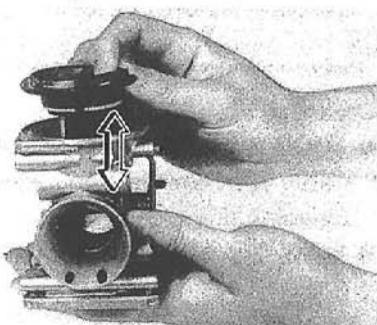
- Jet needle ①
- Needle jet ②
- Main jet ③
- Pilot screw ④
- Starter jet ⑤
- Pilot jet ⑥
- Pilot air jet ⑦
- Starter plunger ⑧  
Bends/Wear/Damage → Replace.  
Contamination → Blow out jets with compressed air.

**6. Check:**

- Free movement

Insert the throttle valve and throttle valve support into the carburetor body, and check for free movement.

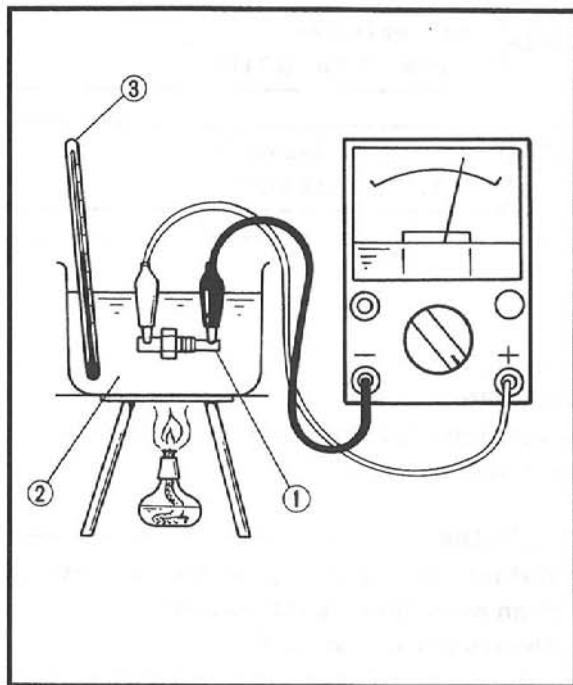
Stick → Replace.

**7. Inspect:**

- Joint (ventilation hose) ①
- Joint (overflow hose) ②
- Joint (fuel hose) ③
- Joint (fuel feed) ④  
Cracks/Damage → Replace.

**8. Inspect:**

- Hose (cylinder head—solenoid valve)
- Hose (solenoid valve—carburetor)
- Hose (carburetor—carburetor)
- Hose (carburetor—cylinder head)  
Damage/Cracks → Replace.



Test step	Water temperature	Good condition
1	Less than 30°C (86 ± 35 °F)	○
2	More than 35°C (95 + 23°F)	✗
3*	35 to 23°C (95 to 73.4°F)	✗
4*	Less than 23°C (73.4°F)	○

Test 1 & 2; Heat-up tests  
Test 3\* & 4\*; Cool-down tests

○ : Continuity ✗ : No Continuity

## 9. Inspect:

- Thermo switch  
Bad condition → Replace.

\*\*\*\*\*

## Inspecting steps:

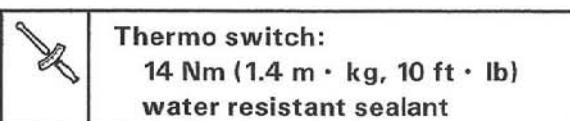
- Connect the pocket tester ( $\Omega \times 1$ ) to the thermo switch ①.



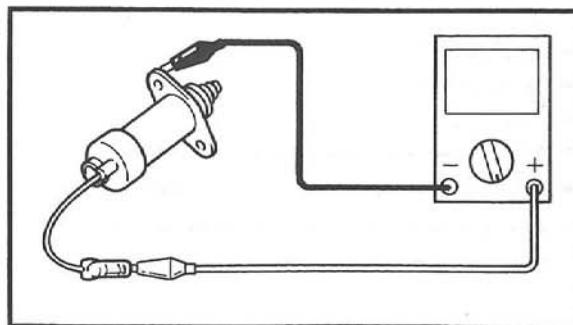
- Immerse the thermo switch in the water ②.
- Check the thermo switch for continuity.  
Note temperatures while heating(or cooling) the water with the temperature gauge ③.

**WARNING**

Handle the thermo switch with special care.  
Never subject it to strong shock or arrow it to be dropped. Should it be dropped, it must be replaced.



\*\*\*\*\*



## 10. Inspect:

- Solenoid valve  
Out of specification → Replace.

\*\*\*\*\*

## Inspecting steps:

- Connect the pocket tester to the solenoid valve.



Pocket tester:  
P/N 90890-03112



Solenoid valve resistance:  
11~15 Ω at 20°C

\*\*\*\*\*

YB705104

## ASSEMBLY

Reverse the "DISASSEMBLY" procedures.  
Note the following points.

### CAUTION:

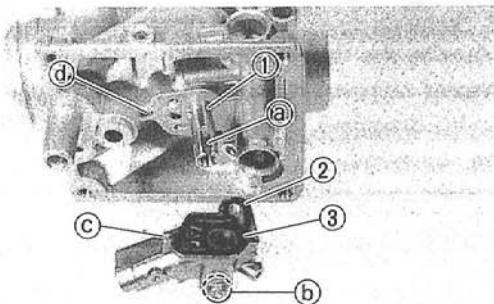
- Before reassembling, wash all parts in clean petroleum based solvent.
- Always use a new gasket.

#### 1. Install:

- Needle jet ①
- Gasket ②
- Jet housing ③
- Holder (jet housing)
- Bolt (jet housing)

#### NOTE:

Align the groove ④ on the needle jet ① with the projection ⑤ on the jet housing ③ and then align the projection ⑥ on the jet housing ③ with the hole ⑦ on the carburetor body.

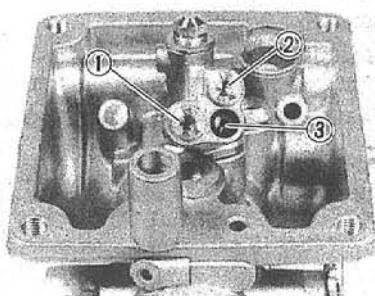


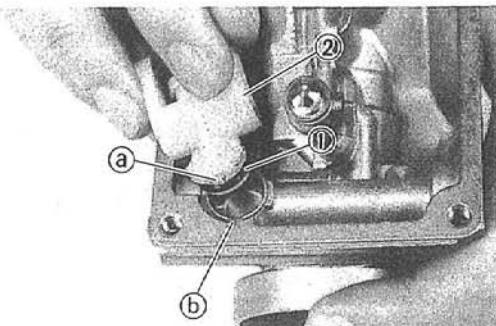
#### 2. Install:

- Main jet ①
- Starter jet ②
- Pilot jet ③

#### NOTE:

- The jet with a bigger eye is main jet ① .
- The jet with a smaller eye is starter jet ② .

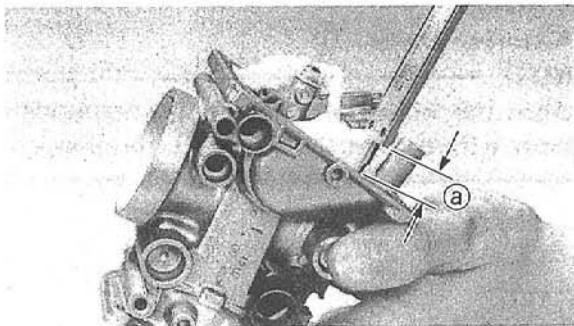


**3. Install:**

- O-ring ①
- Valve seat ②
- Needle valve
- Float
- Float pin

**NOTE:**

Align the projection ⑥ on the valve seat with the slot ⑦ on the carburetor body.

**4. Measure:**

- Float height ⑧
- Out of specification → Adjust.

**Float height (F.H.):**

11~13 mm (0.43~0.51 in)

\*\*\*\*\*

**Measurement and adjustment steps:**

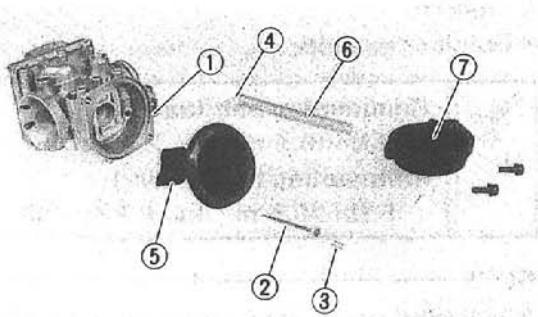
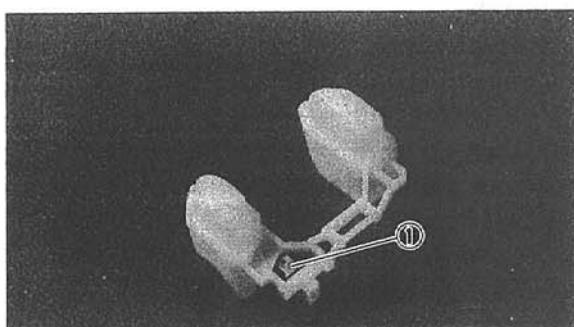
- Hold the carburetor in an upside down position.
- Measure the distance from the mating surface of the float chamber (gasket removed) to the top of the float.

**NOTE:**

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

- 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 ⑨ on the float.
- Recheck the float height.

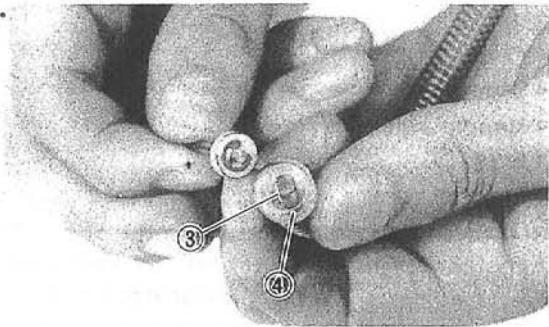
\*\*\*\*\*

**5. Install:**

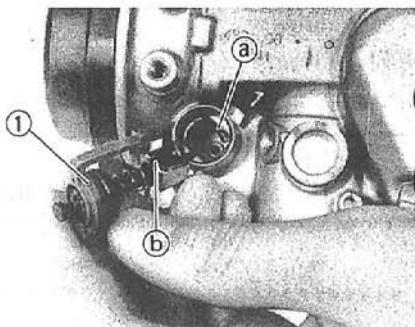
- O-ring ①
- Jet needle ②
- Spring (jet needle holder) ③
- Jet needle holder ④
- Throttle valve ⑤
- Spring ⑥
- Vacuum chamber cover ⑦

**NOTE:**

Insert the spring ③ onto the spring guide on



the jet needle holder ④ .

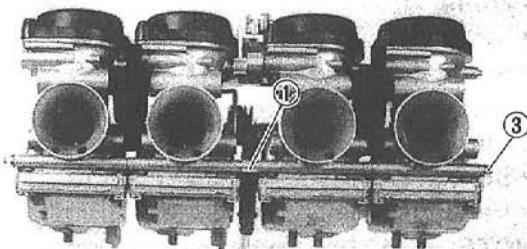
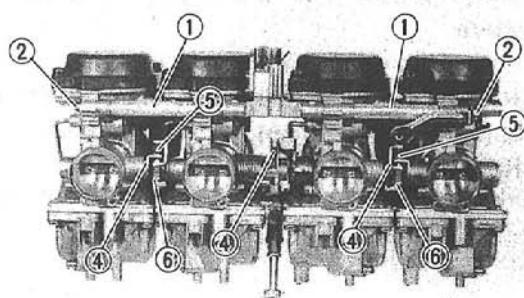
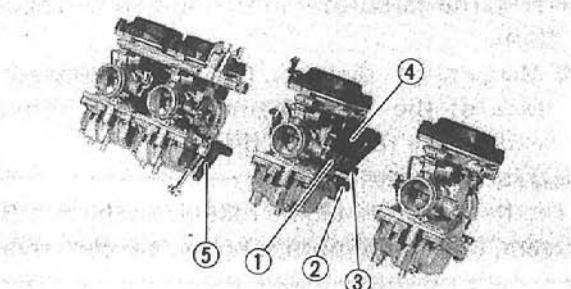


#### 6. Install:

- Starter plunger ①

#### NOTE:

Align the projection ③ of the carburetor body with the slot ⑤ of the starter plunger.



#### 7. Install:

- Carburetors

- ① Spring
- ② Joint (fuel feed—with gasket rings)
- ③ Joint (overflow hose—with O-ring)
- ④ Joint (ventilation hose—with O-ring)
- ⑤ Joint (fuel hose—with gasket ring)

#### 8. Install:

- Spacer collars ①
- Connecting bolts ② (upper)
- Connecting bolt ③ (lower)

#### NOTE:

- Do not tighten the connecting bolts yet.
- Insert the throttle arm ④ (on the #1, #2, #4 carburetors) between the spring ⑤ and synchronizing screw ⑥ .

#### 9. Tighten:

- Connecting bolts



#### Connecting bolt (upper):

3 Nm(0.3 m · kg, 2.2 ft · lb)

#### Connecting bolt (lower):

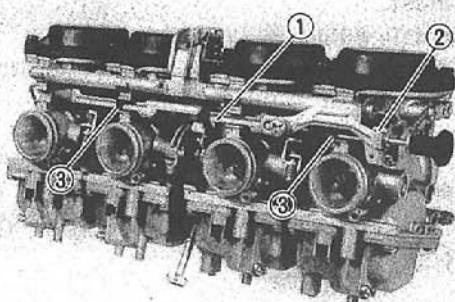
5 Nm (0.5 m · kg, 3.6 ft · lb)

#### NOTE:

- Place the carburetor assembly on a surface

plate with the intake manifold side down and then tighten the connecting bolts while pushing down the respective carburetor with an even force.

- After tightening, check the throttle lever and starter joint for smooth action.



#### 10. Tighten:

- Starter joint ①

#### NOTE:

- Hook the starter joint arm ② onto each starter plunger.
- Insert the stoppers ③ into the slots on the carburetor body.

#### 11. Install:

- Connecting hoses

YB705105

### INSTALLATION

Reverse the "REMOVAL" procedure.

Note the following points.

#### 1. Install:

- Carburetor joint

#### NOTE:

- Install the carburetor joint with the "R" mark onto the #1 and #2 carburetors and the carburetor joint with the "L" mark onto the #3 and #4 carburetors.
- The carburetor joints with the "R" and "L" marks should face the carburetor side.

#### 2. Adjust:

- Carburetor synchronization

Refer to the "CARBURETOR SYNCHRONIZATION" section in the CHAPTER 3.

## 3. Adjust:

- Idle speed



**Engine idle speed:**  
1,150~1,250 r/min

Refer to the "IDLE SPEED ADJUSTMENT" section in the CHAPTER 3.

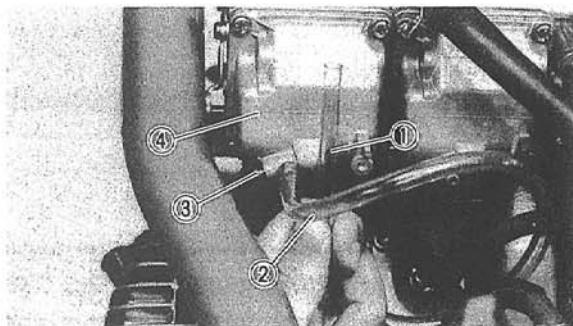
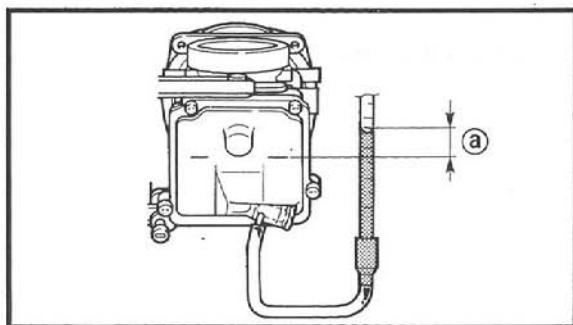
## 4. Adjust:

- Throttle cable free play



**Throttle cable free play:**  
3~7 mm (0.12 ~ 0.28 in)

Refer to the "THROTTLE CABLE FREE PLAY ADJUSTMENT" section in the CHAPTER 3.



YB705106

**FUEL LEVEL ADJUSTMENT**

## 1. Measure:

- Fuel level ②  
Out of specification → Adjust.



**Fuel level ② :**  
3~5 mm (0.12~0.20 in)  
above float chamber line

\*\*\*\*\*

**Fuel level measurement and adjustment steps:**

- Place the motorcycle on a level surface.
- Use a garage jack under the engine to ensure that the carburetor is positioned vertically.
- Connect the fuel level gauge ① to the drain pipe ② .



**Fuel level gauge:**  
P/N 90890-01312

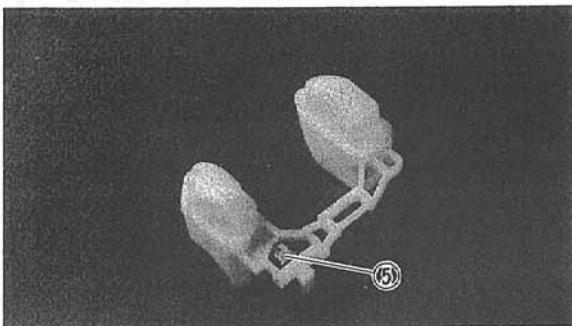
- Loosen the drain screw ③ and warm up the engine for several minutes.
- Hold the gauge vertically next to the float chamber line ④ .
- Measure the fuel level ② with the gauge.

**NOTE:**

Fuel level readings of both side of carburetor line should be equal.

- If the fuel level is incorrect, adjust the fuel level.
- Remove the carburetor.
- Inspect the valve seat and needle valve.
- If either is worn, replace them both.
  
- If both are fine, adjust float level by bending the float tang ⑤ slightly.
- Install the carburetor.
- Recheck the fuel level.

\*\*\*\*\*





## CHASSIS

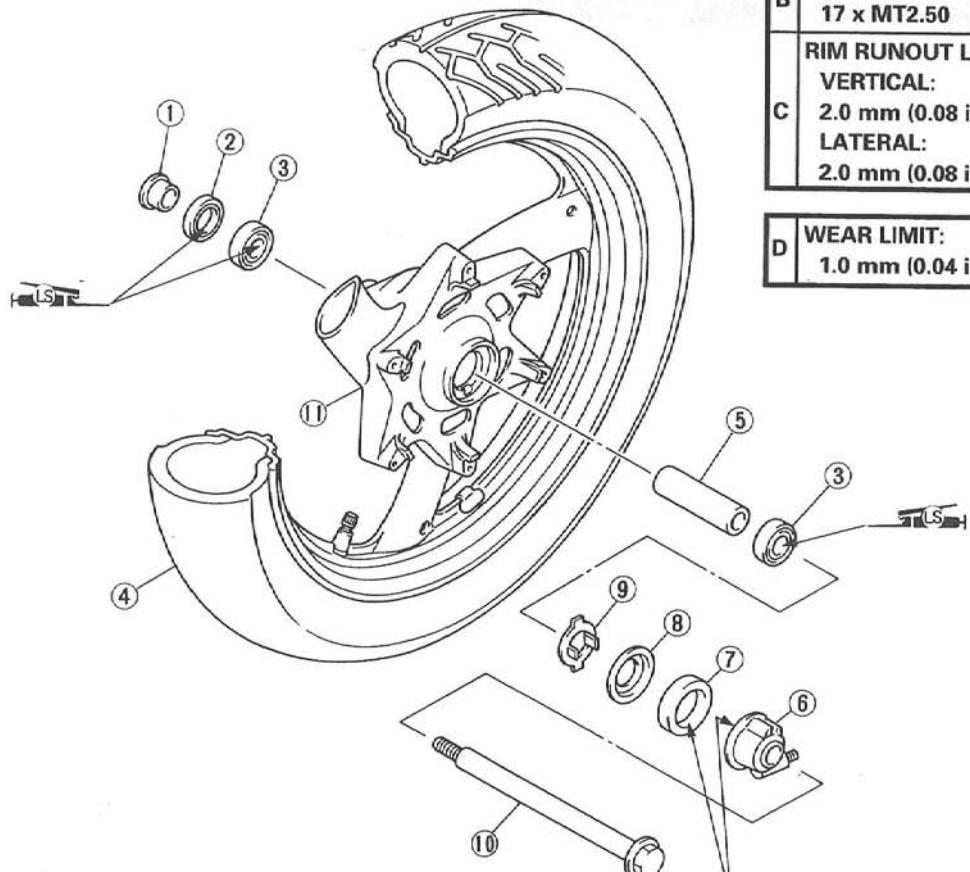
## FRONT WHEEL

- ① Collar
- ② Oil seal
- ③ Bearing
- ④ Tire
- ⑤ Spacer
- ⑥ Gear unit assembly

- ⑦ Oil seal
- ⑧ Clutch retainer
- ⑨ Speedometer clutch
- ⑩ Wheel axle
- ⑪ Front wheel

TIRE AIR PRESSURE (COLD):		
Cold tire pressure	Front	Rear
Up to 90 kg (198 lb) load*	200 kPa (2.00 kg/cm <sup>2</sup> , 28 psi)	225 kPa (2.25 kg/cm <sup>2</sup> , 33 psi)
90 kg (198 lb) ~ 200 kg (441 lb)*	200 kPa (2.00 kg/cm <sup>2</sup> , 28 psi)	250 kPa (2.50 kg/cm <sup>2</sup> , 36 psi)
High speed riding	200 kPa (2.00 kg/cm <sup>2</sup> , 28 psi)	250 kPa (2.50 kg/cm <sup>2</sup> , 36 psi)

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

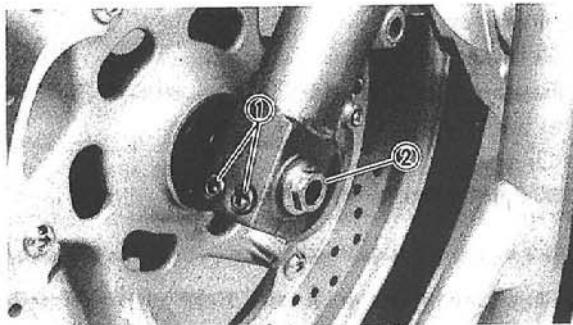
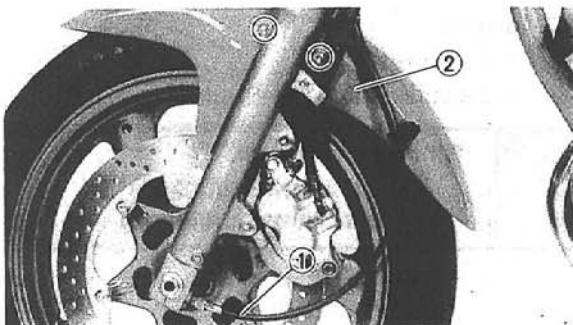


A	TIRE SIZE: 110/80-17 57H
B	RIM SIZE: 17 x MT2.50
C	RIM RUNOUT LIMIT: VERTICAL: 2.0 mm (0.08 in) LATERAL: 2.0 mm (0.08 in)
D	WEAR LIMIT: 1.0 mm (0.04 in)

YB706101

**REMOVAL**** WARNING**

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



1. Place the motorcycle on a level place.

2. Disconnect:

- Speedometer cable (1)

3. Remove:

- Front fender (2)

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

5. Loosen:

- Pinch bolts (wheel axle) (1)

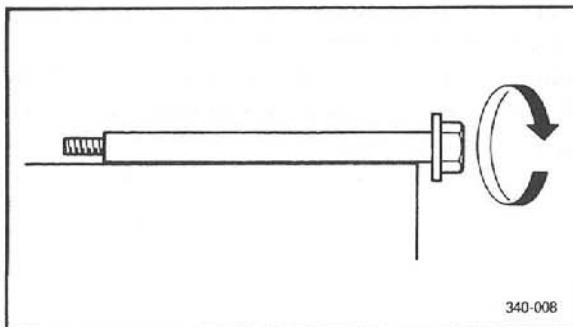
6. Remove:

- Wheel axle (2)
- Front wheel assembly

**NOTE:**

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

6



YB706102

**INSPECTION**

1. Inspect:

- Front axle

Roll the axle on a flat surface.

Bends → Replace.

** WARNING**

Do not attempt to straighten a bent axle.

## 2. Inspect:

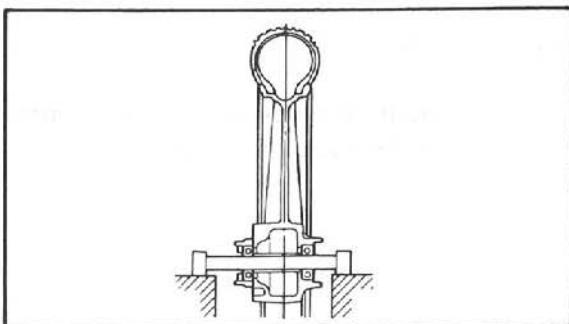
## • Tire

Wear/Damage → Replace.

Refer to the "TIRE INSPECTION" section in the CHAPTER 3.

## • Wheel

Refer to the "WHEEL INSPECTION" section in the CHAPTER 3.



## 3. Measure:

## • Wheel runout

Over specified limit → Replace.

**Rim runout limits:**

Radial: 2.0 mm (0.08 in)

Lateral: 2.0 mm (0.08 in)

## 4. Inspect:

## • Wheel bearings

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

## • Oil seals

Wear/Damage → Replace.

\*\*\*\*\*

**Wheel bearing and oil seal replacement steps:**

- Clean the outside of the wheel hub.
- Remove the oil seals ① use a flat-head screw driver.

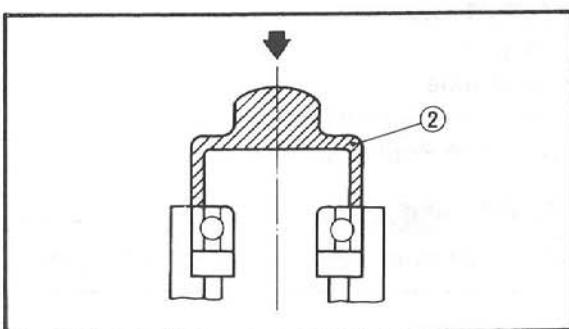
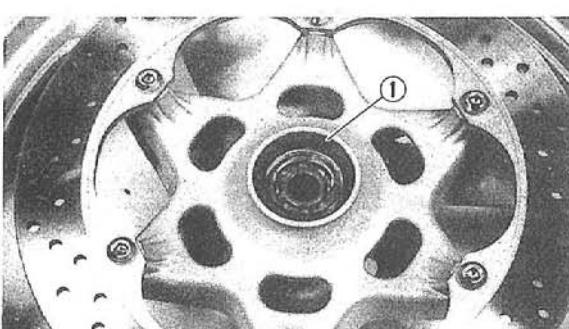
**NOTE:**

Place a rag on the outer edge to prevent damage.

- 
- Remove the bearing using a general bearing puller.
  - Install the new bearing and oil seal by reversing the previous steps.

**NOTE:**

Use a socket ② that matches the outside diameter of the race of the bearing and oil seal.



**CAUTION:**

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

\*\*\*\*\*

YB706103

**INSTALLATION**

Reverse the "Removal" procedure.

Note the following points.

**1. Lubricate:**

- Front wheel axle
- Bearings
- Oil seal (lips)
- Drive/Driven gear (speedometer)



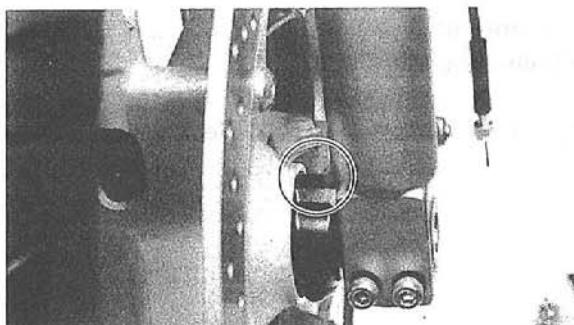
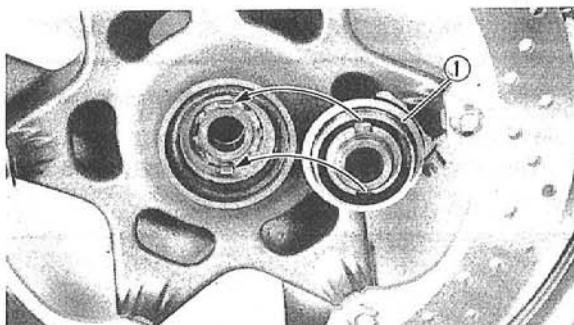
**Recommended lubricant:**  
Lithium soap base grease

**2. Install:**

- Speedometer gear unit ①

**NOTE:**

Be sure the projections on the meter clutch are meshed with the flats in the wheel hub.

**3. Install:**

- Front wheel

**NOTE:**

Be sure the boss on the outer fork tube is pressed against the projection on the gear unit housing.

**4. Tighten:**

- Front wheel axle
- Pinch bolts (wheel axle)



**Front wheel axle:**  
59 Nm (5.9 m · kg, 43 ft · lb)

**Pinch bolt (wheel axle):**

20 Nm (2.0 m · kg, 14 ft · lb)

**CAUTION:**

Before tightening the nuts (wheel axle), compress the front forks several times to allow proper fork setting.

## 5. Install:

- Front fender
- Speedometer cable

**Bolt (front fender):**

**9 Nm (0.9 m · kg, 6.5 ft · lb)**

**WARNING:**

Make sure that the brake hoses are routed properly.

YB706104

**STATIC WHEEL BALANCE ADJUSTMENT****NOTE:**

- After replacing the tire and/or rim, wheel balancer should be adjusted.
- Adjust the wheel balance with brake disk installed.

## 1. Remove:

- Balancing weight

2. Set the wheel on a suitable stand.

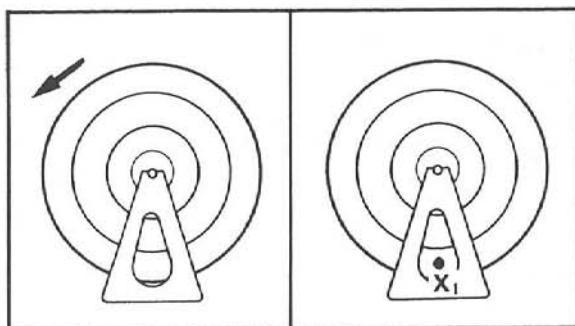
## 3. Find:

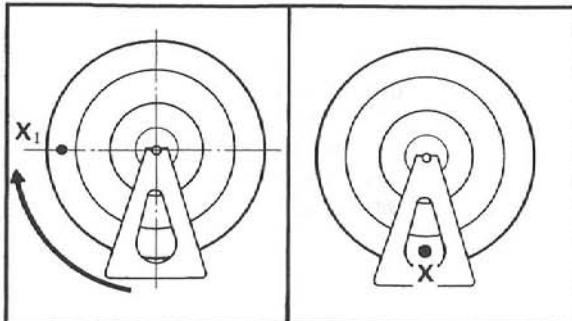
- Heavy spot

\*\*\*\*\*

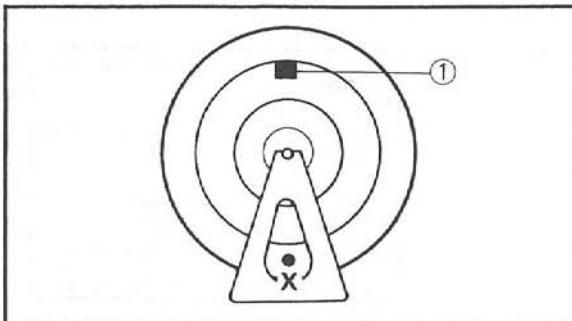
**Procedure:**

- a. Spin the wheel and wait for it to rest.
- b. Put an "X<sub>1</sub>" mark on the wheel bottom spot.
- c. Turn the wheel so that the "X<sub>1</sub>" mark is 90° up.





- d. Let the wheel fall and wait for it to rest. Put an "X<sub>2</sub>" mark on the wheel bottom spot.
  - e. Repeat the above b., c., and d. several times until these marks come to the same spot.
  - f. This spot is the heavy spot "X".
- \*\*\*\*\*



#### 4. Adjust:

- Wheel balance

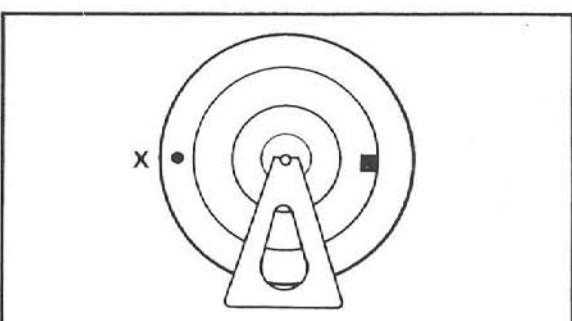
\*\*\*\*\*

##### Adjusting steps:

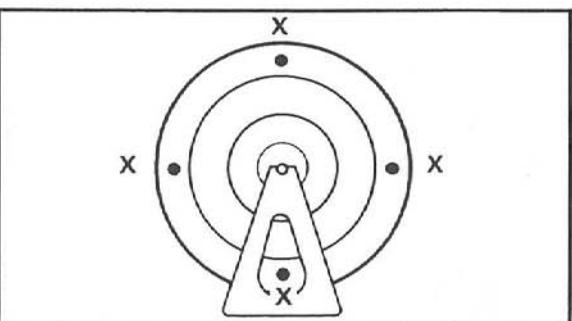
- Install a balancing weight ① on the rim exactly opposite to the heavy spot "X".

##### NOTE:

Start with the smallest weight.



- Turn the wheel so that the heavy spot is 90° up.
  - Check that the heavy spot is at rest there. If not, try another weight until the wheel is balanced.
- \*\*\*\*\*



#### 5. Check:

- Wheel balance

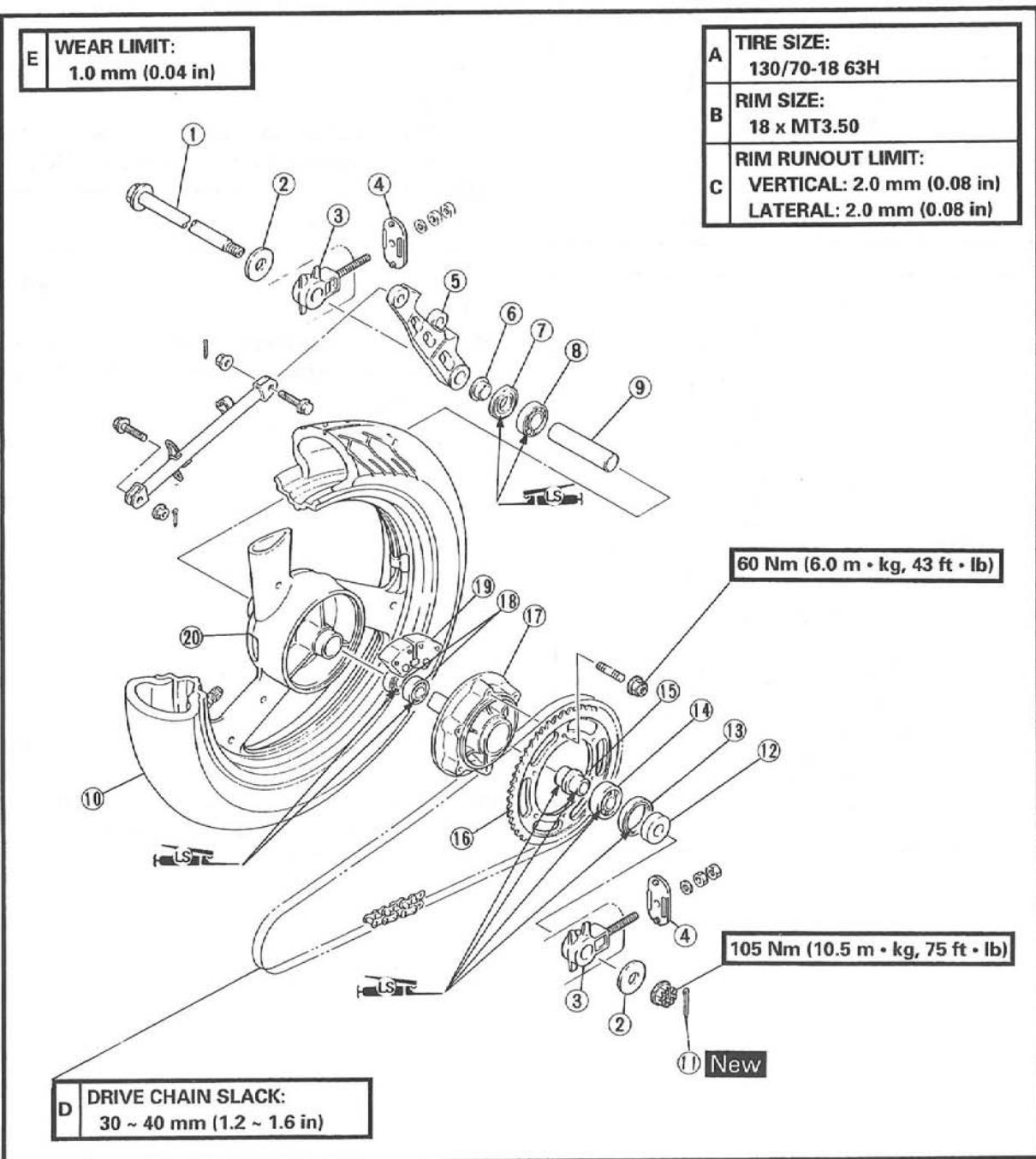
\*\*\*\*\*

##### Checking steps:

- Turn the wheel so that it comes to each point as shown.
  - Check that the wheel is at rest at each point. If not, readjust the wheel balance.
- \*\*\*\*\*

**REAR WHEEL**

- |                     |                 |                          |
|---------------------|-----------------|--------------------------|
| (1) Wheel axle      | (8) Bearing     | (15) Collar              |
| (2) Plate washer    | (9) Spacer      | (16) Rear sprocket wheel |
| (3) Chain puller    | (10) Tire       | (17) Clutch hub          |
| (4) End plate       | (11) Cotter pin | (18) Bearing             |
| (5) Caliper bracket | (12) Collar     | (19) Clutch damper       |
| (6) Collar          | (13) Oil seal   | (20) Rear wheel          |
| (7) Oil seal        | (14) Bearing    |                          |

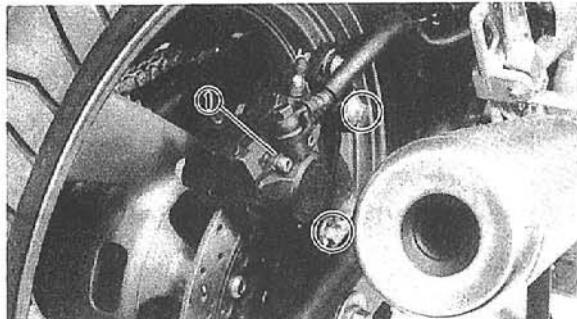


YB706201

**REMOVAL****WARNING**

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

1. Place the motorcycle on a level place.

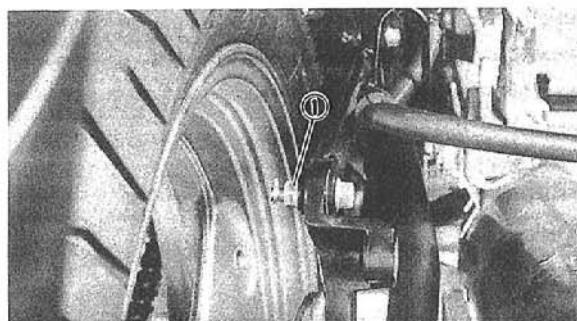


2. Remove:

- Brake caliper ①

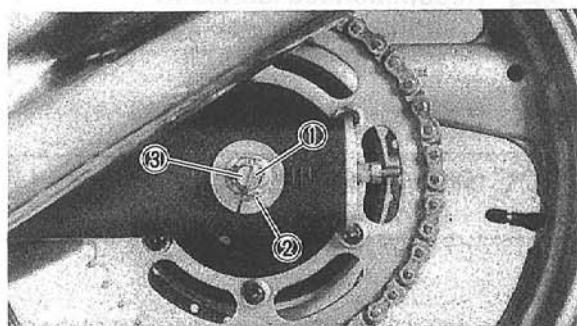
**NOTE:**

Do not depress the brake pedal while the caliper is removed.



3. Loosen:

- Nut ① (compression bar)

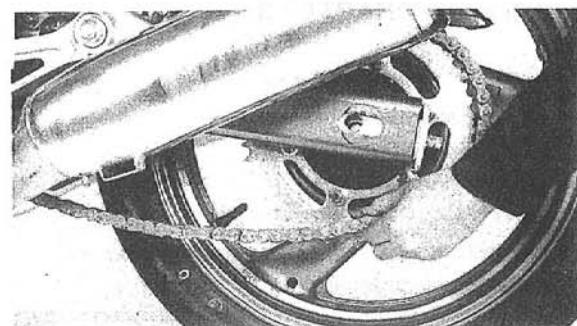


4. Remove:

- Cotter pin ①
- Nut (wheel axle) ②
- Rear wheel axle ③
- Rear wheel assembly

**NOTE:**

Push the rear wheel forward and disconnect the drive chain from the rear sprocket wheel.



YB706202

**INSPECTION**

1. Inspect:
- Rear wheel axle
  - Wheel
  - Wheel bearing
  - Oil seals

Refer to the "FRONT WHEEL INSPECTION" section.

2. Measure:

- Wheel runout

Refer to the "FRONT WHEEL INSPECTION" section.

YB706203

**INSTALLATION**

Reverse the "Removal" procedure.

Note the following points.

1. Lubricate:

- Rear wheel axle
- Bearings
- Oil seals



**Recommended lubricant:**  
Lithium soap base grease

2. Adjust:

- Drive chain slack



**Drive chain slack:**  
30~40 mm (1.2~1.6 in)

Refer to the "DRIVE CHAIN ADJUSTMENT" section in the CHAPTER 3.

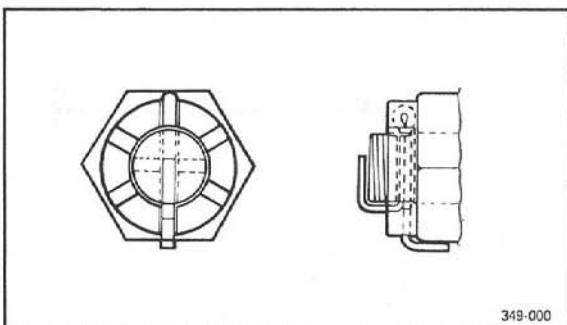
3. Tighten:

- Nut (rear wheel axle)
- Nut (compression bar)
- Bolts (brake caliper)

**Nut (rear wheel axle):****105 Nm (10.5 m · kg, 75 ft · lb)****Nut (compression bar):****30 Nm (3.0 m · kg, 22 ft · lb)****Bolt (brake caliper):****35 Nm (3.5 m · kg, 25 ft · lb)****NOTE:**

Do not loosen the axle nut after torque tightening.

If the axle nut groove is not aligned with the wheel shaft cotter pin hole, align groove to hole by tightening up on the axle nut.

**4. Install:**

- Cotter pin

**WARNING**

- Always use a new cotter pin on the axle nut.
- Make sure that the brake hose is routed properly.

YB706204

**STATIC WHEEL BALANCE ADJUSTMENT****NOTE:**

- After replacing the tire and/or rim, wheel balance should be adjusted.
- Adjust the wheel balance with brake disc and hub installed.

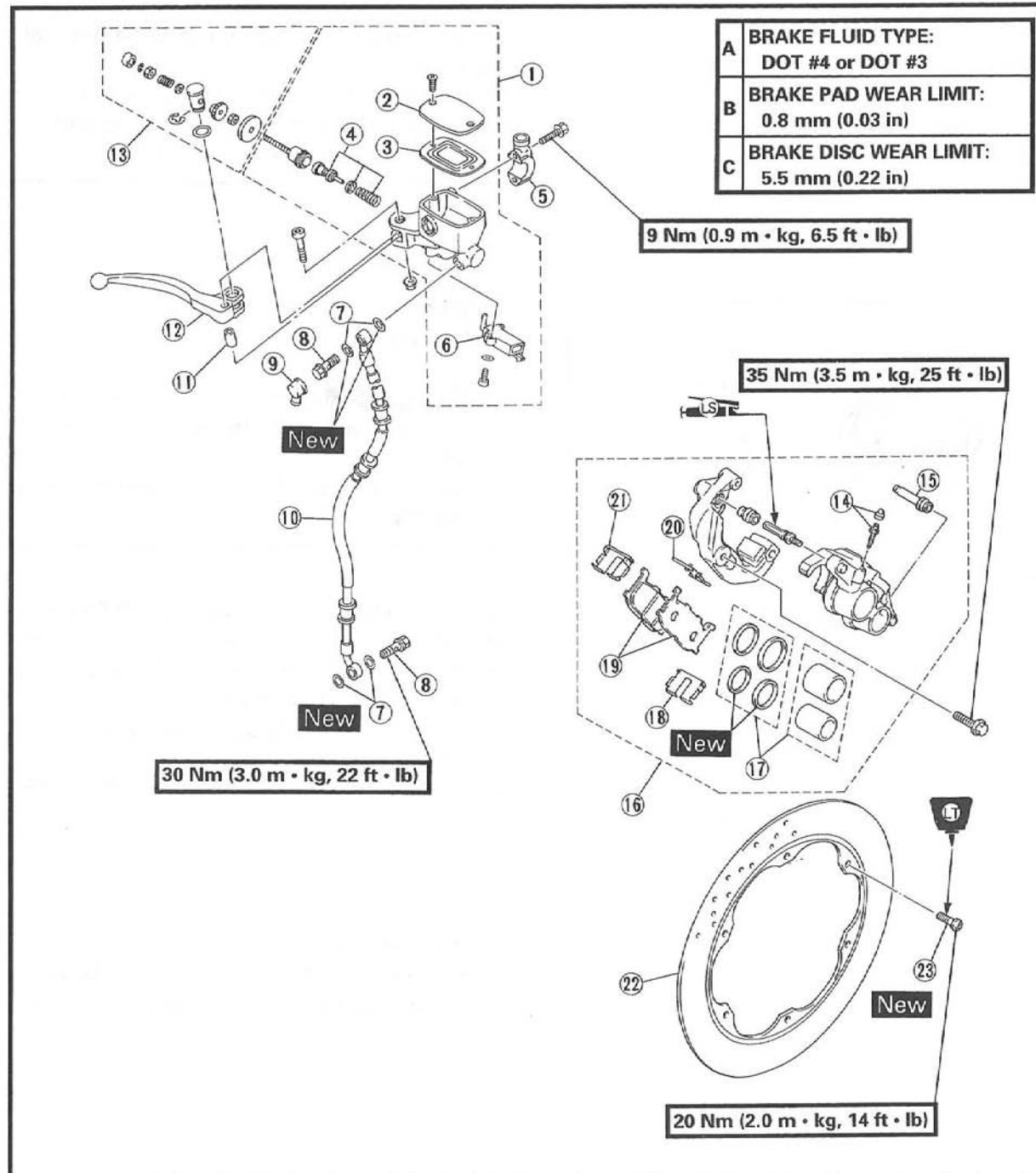
**1. Adjust:**

- Wheel balance

Refer to the "STATIC WHEEL BALANCE ADJUSTMENT—FRONT WHEEL" section.

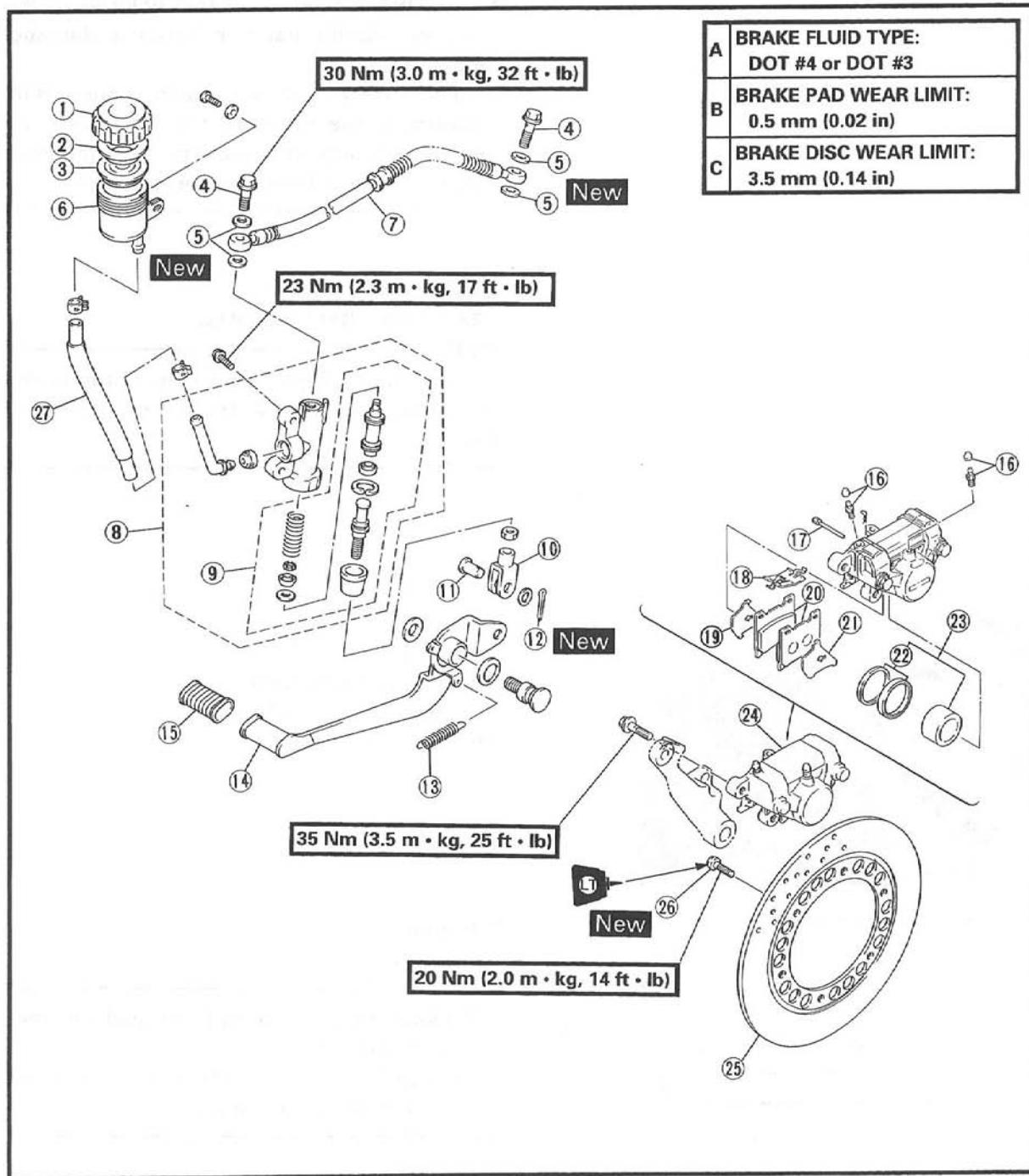
**FRONT AND REAR BRAKE****FRONT BRAKE**

- |                              |                                |                              |
|------------------------------|--------------------------------|------------------------------|
| (1) Master cylinder assembly | (9) Dust cover                 | (17) Caliper piston assembly |
| (2) Master cylinder cap      | (10) Brake hose                | (18) Pad spring              |
| (3) Diaphragm                | (11) Collar                    | (19) Brake pad               |
| (4) Master cylinder kit      | (12) Brake lever               | (20) Pad spring              |
| (5) Master cylinder bracket  | (13) Master cylinder screw kit | (21) Pad spring              |
| (6) Front brake switch       | (14) Bleed screw               | (22) Brake disc              |
| (7) Copper washer            | (15) Rataining bolt            | (23) Bolt                    |
| (8) Union bolt               | (16) Caliper assembly          |                              |



**REAR BRAKE**

- |                              |                     |                              |
|------------------------------|---------------------|------------------------------|
| (1) Reservoir cap            | (10) Joint          | (19) Shim                    |
| (2) Bush                     | (11) Crevis pin     | (20) Brake pad               |
| (3) Diaphragm                | (12) Cotter pin     | (21) Shim                    |
| (4) Union bolt               | (13) Spring         | (22) Piston seal             |
| (5) Copper washer            | (14) Brake pedal    | (23) Caliper piston assembly |
| (6) Reservoir tank           | (15) Cover          | (24) Caliper assembly        |
| (7) Brake hose               | (16) Bleed screw    | (25) Brake disc              |
| (8) Master cylinder assembly | (17) Retaining bolt | (26) Bolt                    |
| (9) Master cylinder kit      | (18) Pad spring     | (27) Reservoir hose          |



YB706301

**CAUTION:**

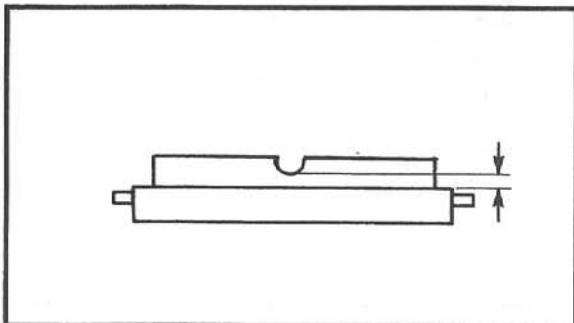
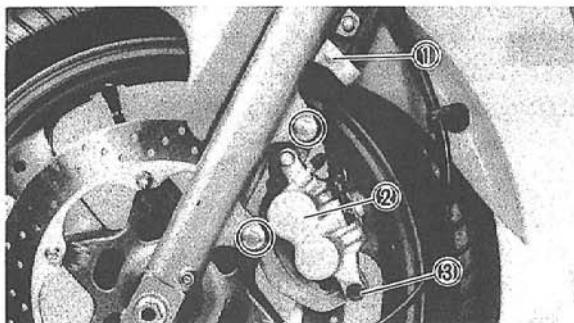
Disc brake components rarely require disassembly. DO NOT:

- Disassembly components unless absolutely necessary.
- Use solvents on internal brake component.
- Use contaminated brake fluid for cleaning.
- 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.

YB706302

**BRAKE PAD REPLACEMENT****NOTE:**

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

**Front brake****1. Remove:**

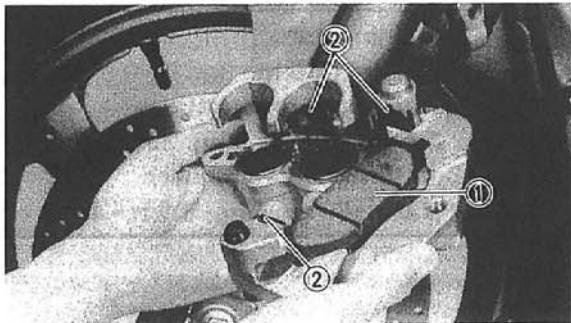
- Bolt (brake hose holder) ①
- Caliper assembly ②
- Retaining bolt ③

**2. Remove:**

- Brake pads

**NOTE:**

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

**Wear limit:**

0.8 mm (0.03 in)

**4. Install:**

- Brake pads ①
- Pad springs ②

\*\*\*\*\*

**Installation steps:**

- Connect a suitable hose ③ tightly to the caliper bleed screw. Then, place the other end of this hose into an open container.
- Loosen the caliper bleed screw and push the piston into the caliper by your finger.
- Tighten the caliper bleed screw.

**Caliper bleed screw:**

6 Nm (0.6 m · kg, 4.3 ft · lb)

- Be careful to install the pad springs in proper position as shown.
- Install the brake pads.

**NOTE:**

Be sure to position the pad so that its round side **A** is backward.

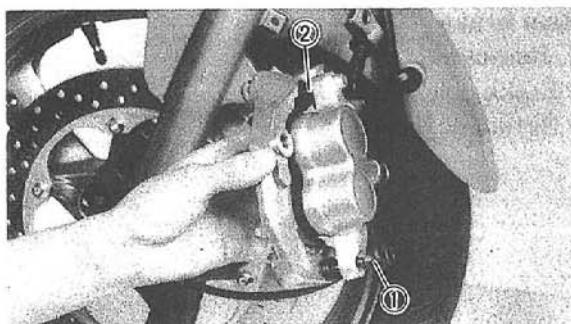
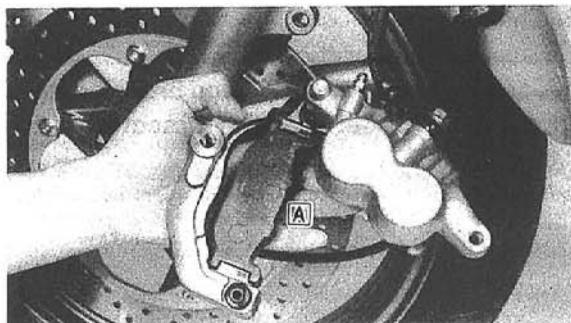
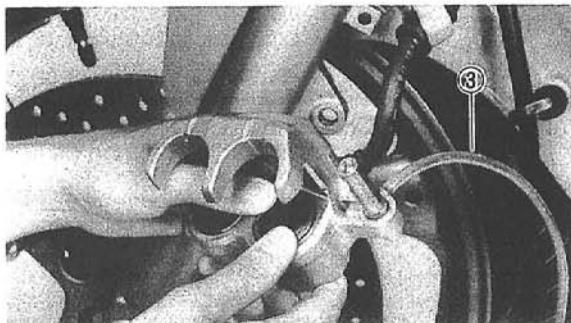
\*\*\*\*\*

**5. Lubricate:**

- Retaining bolt ① (caliper body)
- Caliper guide shaft ②

**Recommended lubricant:**

Lithium soap base grease

**CAUTION:**

- Take care not to allow the brake pads to be smeared by grease.
- Wipe off any unnecessary grease that comes out of place.

**6. Install:**

- Retaining bolt
- Caliper assembly
- Brake hose holder

**Retaining bolt:**

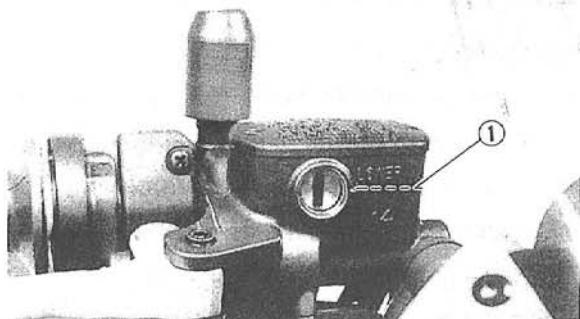
23 Nm (2.3 m · kg, 17 ft · lb)

**Bolt (caliper bracket):**

35 Nm (3.5 m · kg, 25 ft · lb)

**Bolt (brake hose holder):**

7 Nm (0.7 m · kg, 5.1 ft · lb)

**7. Inspect:**

- Brake fluid level

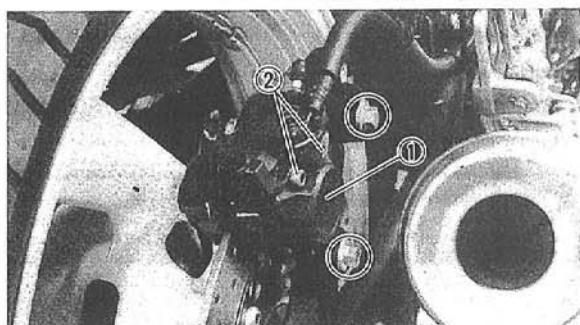
Refer to the "BRAKE FLUID INSPECTION" section in the CHAPTER 3.

① "LOWER" level line

**8. Check:**

- Brake lever operation

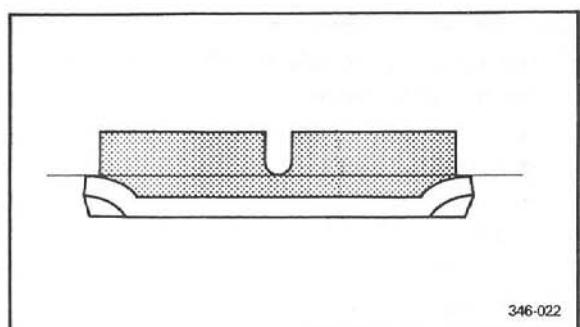
A soft spongy filling → Bleed brake system.  
Refer to the "AIR BLEEDING" section in the CHAPTER 3.



YB706303

**Rear brake****1. Remove:**

- Brake caliper ①
- Retaining bolt ②

**2. Remove:**

- Brake pads  
(with shims)

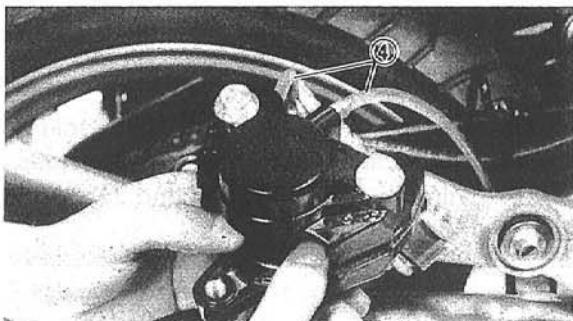
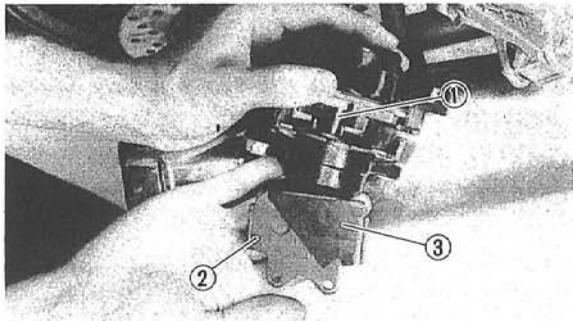
**NOTE:** —

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

**Wear limit:**

0.5 mm (0.02 in)

- Replace the pad shim if the pad replacement is required.

**3. Install:**

- Pad spring ①
- Brake pads ②
- Shims ③

\*\*\*\*\*

**Installation steps:**

- Connect a suitable hose ④ tightly to the caliper bleed screw. Then, place the other end of this hose into an open container.
- Loosen the caliper bleed screw and push the piston into the caliper by your finger.
- Tighten the caliper bleed screw.

**Caliper bleed screw:**

6 Nm (0.6 m · kg, 4.3 ft · lb)

- Install the pad shim (new) to the brake pad (new).

- Install the pad spring (new) and brake pads (new).

\*\*\*\*\*

**4. Install:**

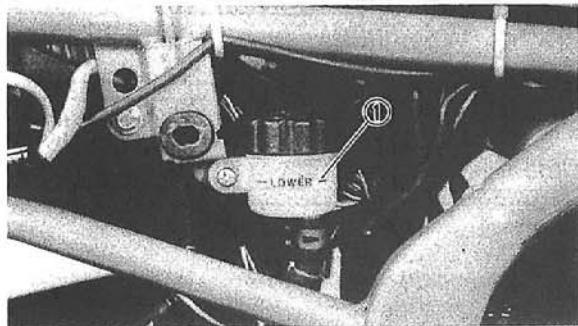
- Retaining bolts
- Brake caliper

**Retaining bolt:**

10 Nm (1.0 m · kg, 7.2 ft · lb)

**Bolt (brake caliper):**

35 Nm (3.5 m · kg, 25 ft · lb)

**5. Inspect:**

- Brake fluid level

Refer to the "BRAKE FLUID INSPECTION" section in the CHAPTER 3.

① "LOWER" level line

**6. Check:**

- Brake pedal operation

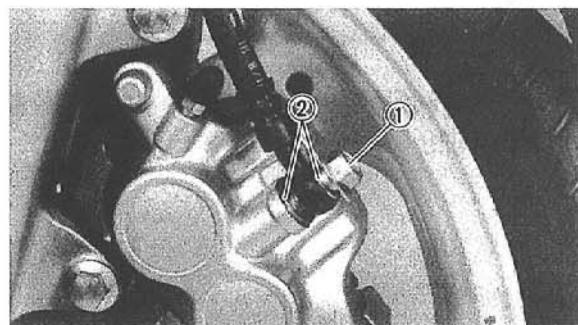
A softy or spongy filling → Bleed brake system.

Refer to the "AIR BLEEDING" section in the CHAPTER 3.

YB706304

**CALIPER DISASSEMBLY****NOTE:** \_\_\_\_\_

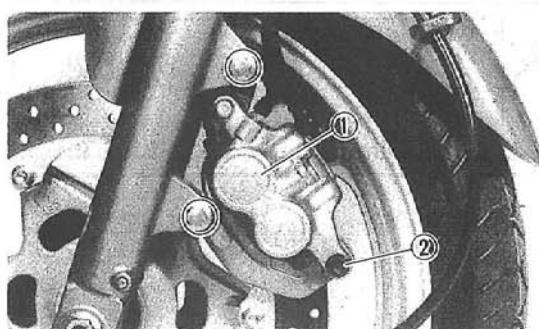
Before disassembling the front brake caliper or rear brake caliper, drain the brake hose, master cylinder, brake caliper and reservoir tank of their brake fluid.

**Front brake****1. Remove:**

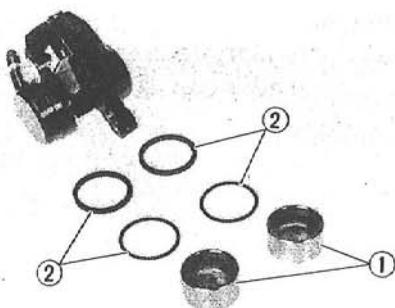
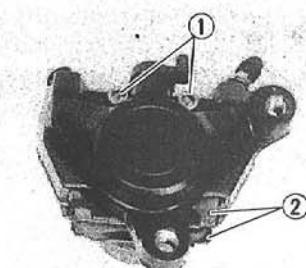
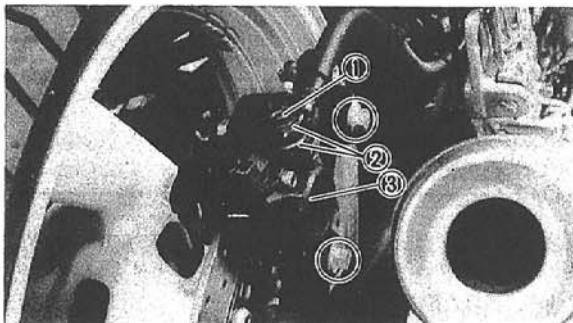
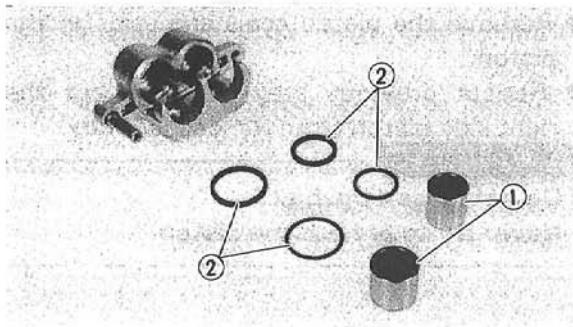
- Union bolt ①
- Copper washers ②

**NOTE:** \_\_\_\_\_

Place the open hose end into a container and pump the oil fluid out carefully.

**2. Remove:**

- Caliper assembly ①
- Retaining bolt ②
- Brake pads
- Pad springs

**3. Remove:**

- Pistons (1)
  - Piston seals (2)
- \*\*\*\*\*

**Removal steps:**

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

** WARNING**

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

- Remove the piston seals.
- \*\*\*\*\*

YB706305

**Rear brake****1. Remove:**

- Union bolt (1)
- Copper washers (2)
- Brake caliper (3)

**NOTE:**

Place the open hose end into a container and pump the oil fluid out carefully.

\*\*\*\*\*

**2. Remove:**

- Retaining bolts (1)
- Brake pads (2)

**3. Remove:**

- Pistons (1)
  - Piston seals (2)
- \*\*\*\*\*

**Caliper piston removal steps:**

- Using a wood piece, lock the piston.
- Blow compressed air into the hose joint opening to force out the left side piston from the caliper body.



- Remove the piston seals and reinstall the piston.

- Repeat previous step to force out the right side piston from the caliper body.

**WARNING**

- Do not loosen the bolt.
- Never try to pry out the piston.

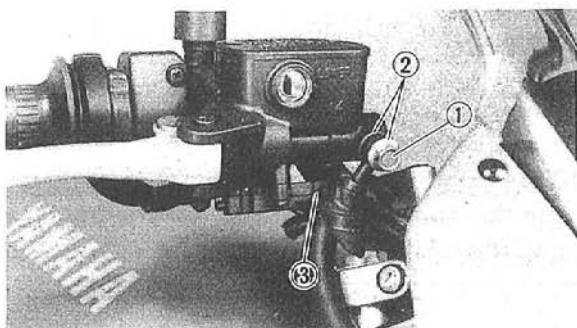
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YB706306

## MASTER CYLINDER DISASSEMBLY

**NOTE:**

Before disassembling the front or rear brake master cylinders, drain the brake hose, master cylinder, brake caliper and reservoir tank of their brake fluid.



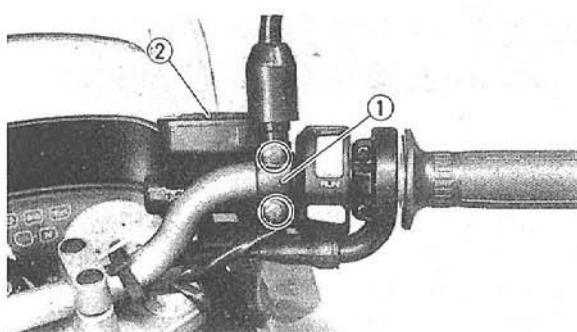
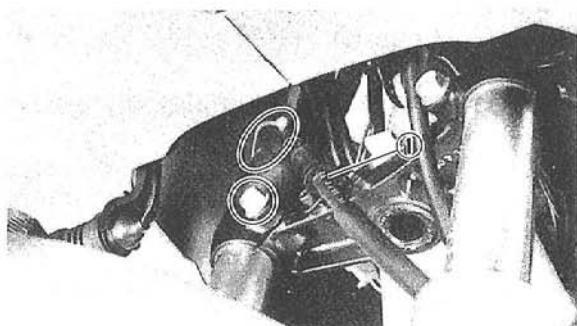
### Front brake

**1. Remove:**

- Union bolt ①
- Copper washers ②
- Brake switch lead ③

**NOTE:**

Disconnect the brake switch from the brake lever while the hook of the brake switch is pushed by suitable rod.

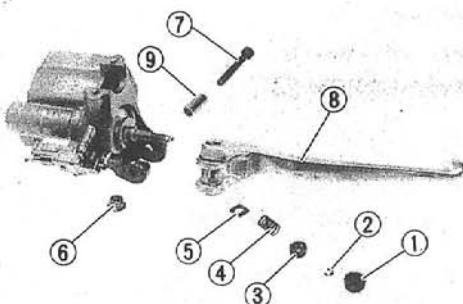


**2. Remove:**

- Brake hose ①

**3. Remove:**

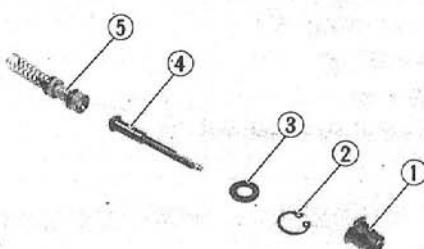
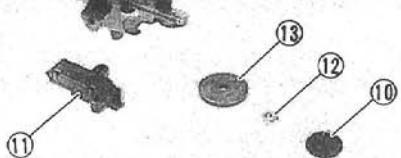
- Master cylinder bracket ①
- Master cylinder cap ②
- Diaphragm
- Plate



4. Remove:
- Cap ① (rubber)
- Circlip ②
- Nut ③
- Spring ④
- Washer ⑤
- Nut ⑥
- Bolt ⑦ (brake lever)
- Brake lever ⑧
- Collar ⑨
- Adjuster ⑩
- Brake switch ⑪
- Nut ⑫
- Plate ⑬

**CAUTION:**

**Do not damage the rod threads.**



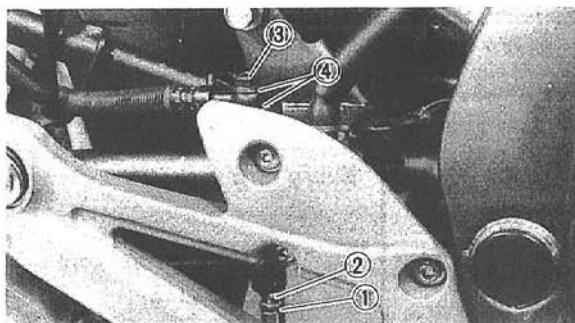
5. Remove:
- Dust cover ①
- Circlip ②
- Plate washer ③
- Rod ④
- Master cylinder kit ⑤

YB706307

**Rear brake**

1. Remove:
- Seat
- Side cover (right)

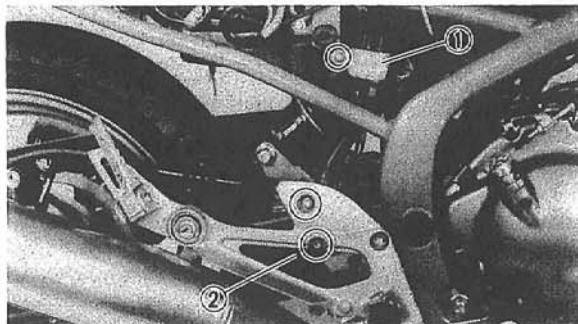
Refer to the "SIDE COVER, FUEL TANK AND COWLING" section in the CHAPTER 3.



2. Loosen:
- Locknut ①
3. Disconnect:
- Brake adjuster ②
4. Remove:
- Union bolt ③
- Copper washers ④

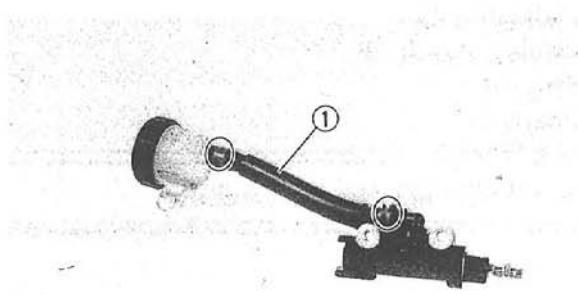
## FRONT AND REAR BRAKE

**CHAS** 



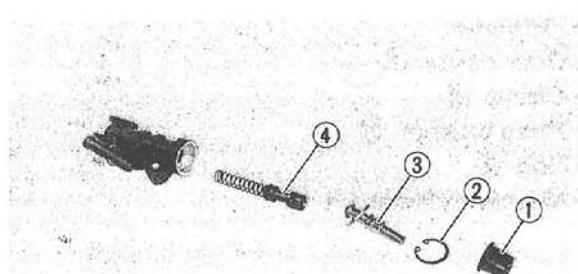
### 5. Remove:

- Reservoir tank ①
- Master cylinder ②



### 6. Remove:

- Hose (reservoir tank) ①



### 7. Remove:

- Dust cover ①
- Circlip ②
- Rod ③
- Master cylinder kit ④

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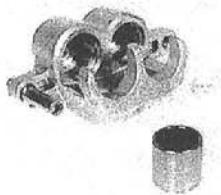
## INSPECTION AND REPAIR

Recommended brake component replacement schedule:

<b>Brake pads</b>	<b>As required</b>
<b>Piston seal, Dust seal</b>	<b>Every two years</b>
<b>Brake hoses</b>	<b>Every four years</b>
<b>Brake fluid</b>	<b>Replace only when brakes are disassembled.</b>

**WARNING**

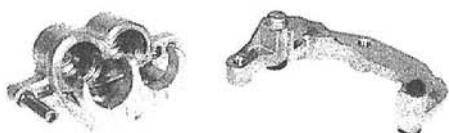
All internal parts should be cleaned in new brake fluid only. Do not use solvents will cause seals to swell and distort.

**A****B****1. Inspect:**

- Caliper piston  
Scratches/Rust/Wear → Replace caliper assembly.
- Caliper cylinder  
Wear/Scratches → Replace caliper assembly.

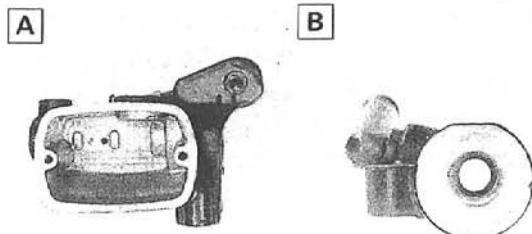
**A** Front**B** Rear**WARNING**

Replace the piston seals whenever a caliper is disassembled.

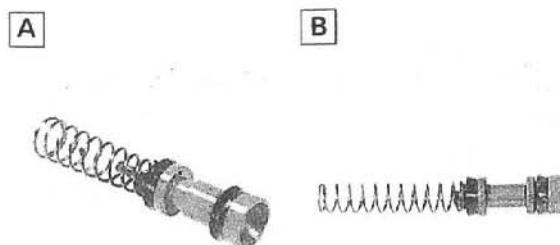
**A****2. Inspect:**

- Caliper body
- Caliper bracket  
Cracks/Damage → Replace.
- Oil delivery passage (caliper body)  
Blow out with compressed air.

**A** Front**B** Rear**B**

**3. Inspect:**

- Master cylinder  
Wear/Scratches → Replace the master cylinder assembly.
- Master cylinder body  
Cracks/Damage → Replace.
- Oil delivery passage (master cylinder body)  
Blow out with compressed air.

**A** Front**B** Rear**4. Inspect:**

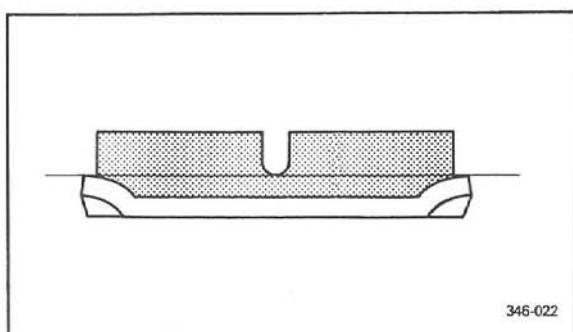
- Master cylinder kit  
Scratches/Wear/Damage → Replace as a set.

**A** Front**B** Rear**5. Inspect:**

- Reservoir tank  
Cracks/Damage → Replace.
- Diaphragm (front)
- Diaphragm (rear)  
Wear/Damage → Replace.

**6. Inspect:**

- Brake hose  
Cracks/Wear/Damage → Replace.



346-022

**7. Measure:**

- Brake pads (thickness)  
Out of specification → Replace.

**Wear limit:**

Front 0.8 mm (0.03 in)  
Rear 0.5 mm (0.02 in)

**NOTE:**

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

**8. Inspect:**

- Brake discs (front and rear)  
Galling/Damage → Replace.

**9. Measure:**

- Brake disc deflection  
Out of specification → Inspect wheel runout.  
If wheel runout is in good condition, replace the brake disc(s).



**Maximum deflection:**  
0.15 mm (0.006 in)

- Brake disc thickness  
Out of specification → Replace.



**Minimum thickness:**  
Front 5.5 mm (0.22 in)  
Rear 3.5 mm (0.14 in)

① Dial gauge

**NOTE:**

Tighten the bolts (brake disc) in stage using a crisscross pattern.



**Bolt (brake disc):**  
20 Nm (2.0 m · kg, 14 ft · lb)  
Loctite®

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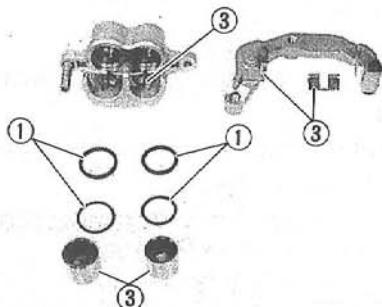
**CALIPER ASSEMBLY****⚠ WARNING**

- All internal parts should be cleaned in new brake fluid only.
- Internal parts should be lubricated with brake fluid when installed.



Recommended brake fluid:  
DOT #3 or #4

- Replace the piston seals whenever a caliper is disassembled.



#### Front brake

##### 1. Install:

- Piston seals ①
- Caliper pistons ②
- Pad spring ③



**Always use new piston seals.**

##### 2. Install:

- Brake pads
- Caliper body
- Caliper bracket

Refer to the "BRAKE PAD REPLACEMENT" section.

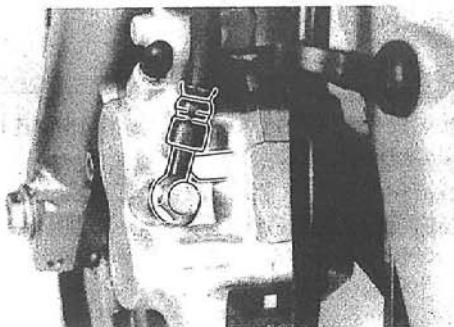


**Retaining bolt (caliper body):**

23 Nm (2.3 m · kg, 17 ft · lb)

**Bolt (caliper bracket):**

35 Nm (3.5 m · kg, 25 ft · lb)



##### 3. Install:

- Brake hose
- Copper washers
- Union bolts



**Union bolt:**

30 Nm (3.0 m · kg, 22 ft · lb)

**CAUTION:**

When installing the brake hose to the caliper, lightly touch the brake pipe with the projection on the caliper.

**WARNING**

- Proper hose routing is essential to insure safe motorcycle operation. Refer to "CABLE ROUTING".
- Always use new copper washers.

## 4. Fill:

- Brake fluid



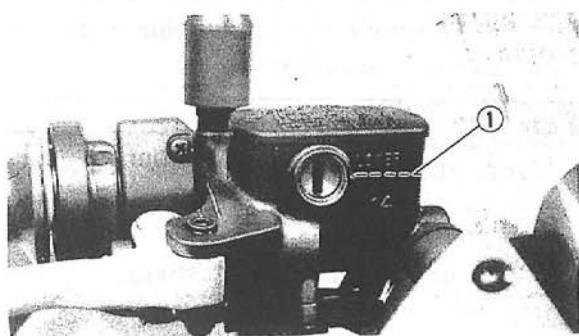
**Recommended brake fluid:**  
DOT #3 or #4

**CAUTION:**

Brake fluid may erode painted surface or plastic parts. Always clean up spilled fluid immediately.

**WARNING**

- Use only designated quality brake fluid: otherwise, the rubber seals may deteriorate, causing leakage and poor brake performance.
- Refill with the same type of brake fluid: mixing fluids may result in a harmful chemical reaction and lead to poor performance.
- Be careful that water does not enter the master cylinder when refilling. Water will significantly lower the boiling point of the fluid may result in vapor lock.

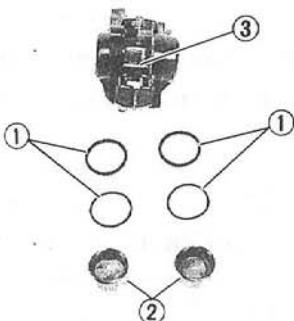


## 5. Air bleed:

- Brake system  
Refer to "AIR BLEEDING" section.

## 6. Inspect:

- Brake fluid level  
Fluid level is under "LOWER" level line ① → Replenish.  
Refer to "BRAKE FLUID INSPECTION" section in the CHAPTER 3.



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**Rear brake****1. Install:**

- Piston seals ①
- Caliper piston ②
- Pad spring ③

**WARNING** \_\_\_\_\_**Always use new piston seals.****2. Install:**

- Brake pads
- Retaining bolts
- Brake caliper

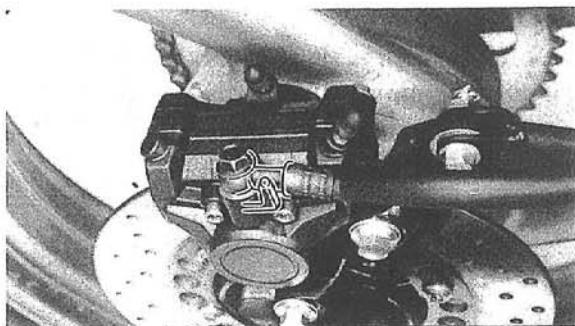
Refer to the "BRAKE PAD REPLACEMENT" section.

**Retaining bolt:**

10 Nm (1.0 m · kg, 7.2 ft · lb)

**Bolt (brake caliper):**

35 Nm (3.5 m · kg, 25 ft · lb)

**3. Install:**

- Brake hose
- Copper washers
- Union bolts

**Union bolt:**

30 Nm (3.0 m · kg, 22 ft · lb)

**CAUTION:** \_\_\_\_\_  
When installing the brake hose to the caliper, lightly touch the brake pipe with the projection on the caliper.

- WARNING** \_\_\_\_\_
- Proper hose routing is essential to insure safe motorcycle operation. Refer to "CABLE ROUTING".
  - Always use new copper washers.

## 4. Fill:

- Brake fluid



**Recommended brake fluid:  
DOT #3 or #4**

**CAUTION:**

Brake fluid may erode painted surface or plastic parts. Always clean up spilled fluid immediately.

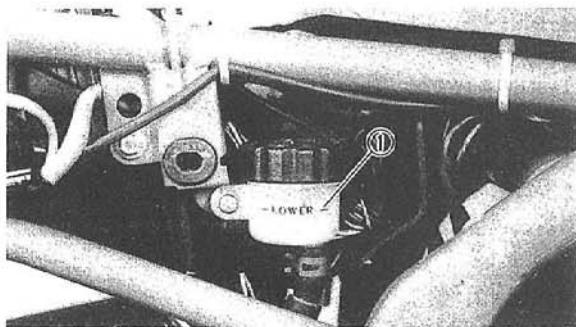
**⚠ WARNING**

- Use only designated quality brake fluid: otherwise, the rubber seals may deteriorate, causing leakage and poor brake performance.
- Refill with the same type of brake fluid: mixing fluids may result in a harmful chemical reaction and lead to poor performance.
- Be careful that water does not enter the master cylinder when refilling. Water will significantly lower the boiling point of the fluid may result in vapor lock.

## 5. Air bleed:

- Brake system

Refer to "AIR BLEEDING" section.



## 6. Inspect:

- Brake fluid level

Fluid level is under "LOWER" level line ①  
→ Replenish.

Refer to "BRAKE FLUID INSPECTION" section in the CHAPTER 3.

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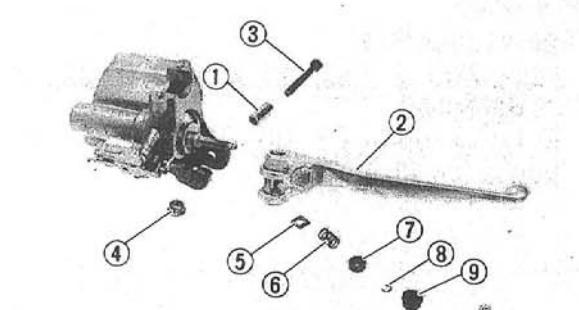
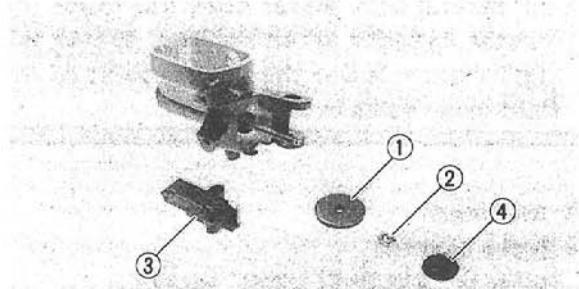
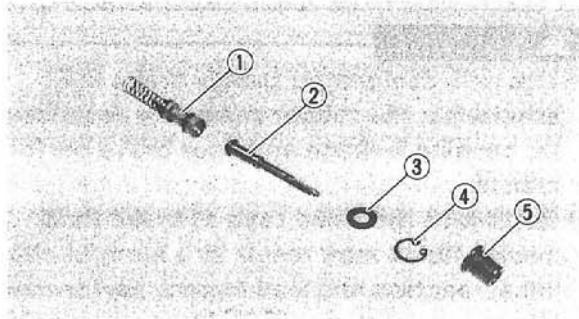
**MASTER CYLINDER ASSEMBLY****⚠ WARNING**

- All internal parts should be cleaned in new brake fluid only.
- Internal parts should be lubricated with brake fluid when installed.



Recommended brake fluid:  
DOT #3 or #4

- Replace the piston seals whenever a caliper is disassembled.



### Front brake

#### 1. Install:

- Master cylinder kit ①
- Rod ②
- Plate washer ③
- Circlip ④
- Dust cover ⑤

#### 2. Install:

- Plate ①
- Nut ②
- Brake switch ③
- Adjuster ④

**CAUTION:** \_\_\_\_\_

**Do not damage the rod threads.**

#### 3. Install:

- Collar ①
- Brake lever ②
- Bolt ③
- Nut ④
- Washer ⑤
- Spring ⑥
- Nut ⑦
- Circlip ⑧
- Cap (rubber) ⑨

**NOTE:** \_\_\_\_\_

Apply the lithium soap base grease to the brake lever pivot.

#### 4. Install:

- Master cylinder bracket ①



Bolt (master cylinder bracket):  
9 Nm (0.9 m · kg, 6.5 ft · lb)

## FRONT AND REAR BRAKE



### 5. Install:

- Brake hose
- Copper washers
- Union bolt



**Union bolt:**

**30 Nm (3.0 m · kg, 22 ft · lb)**

### NOTE:

- Install each brake hose as shown.
- Tighten the union bolt while each brake hose is inclined backward.



- WARNING**
- Proper hose routing is essential to insure safe motorcycle operation. Refer to the "CABLE ROUTING".
  - Always use new copper washers.

- ### 6. Make sure that brake hose does not touch with another parts (throttle cable, wire harness, leads ect.) by turning the handlebar to right and left. If touch, repair.

### 7. Fill:

- Brake fluid



**Recommended brake fluid:**

**DOT #3 or #4**



**CAUTION:**  
Brake fluid may erode painted surface or plastic parts. Always clean up spilled fluid immediately.

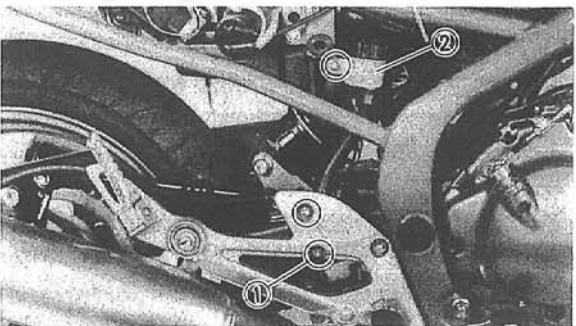
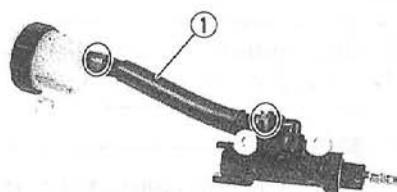
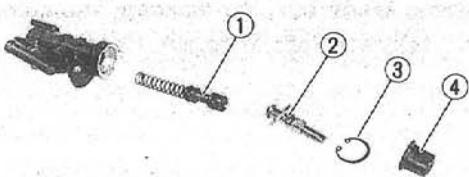
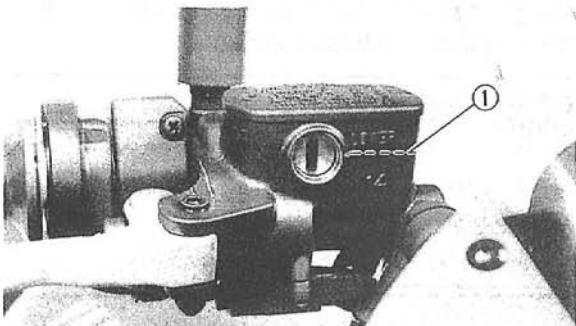


- WARNING**
- Use only designated quality brake fluid: otherwise, the rubber seals may deteriorate, causing leakage and poor brake performance.
  - Refill with the same type of brake fluid: mixing fluids may result in a harmful chemical reaction and lead to poor performance.

- Be careful that water does not enter the master cylinder when refilling. Water will significantly lower the boiling point of the fluid may result in vapor lock.

#### 8. Air bleed:

- Brake system  
Refer to "AIR BLEEDING" section.



#### 9. Inspect:

- Brake fluid level  
Fluid level is under "LOWER" level line ①  
→ Replenish.  
Refer to "BRAKE FLUID INSPECTION" section in the CHAPTER 3.

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#### Rear brake

##### 1. Install:

- Master cylinder kit ①
- Rod ②
- Circlip ③
- Dust cover ④

##### 2. Install:

- Hose (reservoir tank) ①

##### 3. Install:

- Master cylinder ①
- Reservoir tank ②



**Bolt (master cylinder):**

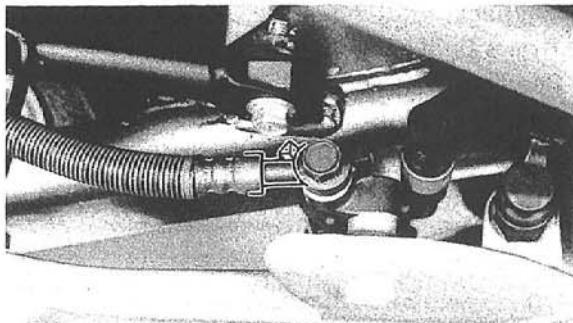
23 Nm (2.3 m · kg, 17 ft · lb)

**Screw (reservoir tank):**

4 Nm (0.4 m · kg, 2.9 ft · lb)

## FRONT AND REAR BRAKE

CHAS 



### 4. Install:

- Brake hose
- Copper washers
- Union bolts



#### Union bolt:

30 Nm (3.0 m · kg, 22 ft · lb)

#### CAUTION:

When installing the brake hose to the master cylinder, lightly touch the brake pipe with the projection on the master cylinder.

#### ⚠ WARNING

- Proper hose routing is essential to insure safe motorcycle operation. Refer to the "CABLE ROUTING".
- Always use new copper washers.

### 5. Fill:

- Brake fluid



#### Recommended brake fluid:

DOT #3 or #4

#### CAUTION:

Brake fluid may erode painted surface or plastic parts. Always clean up spilled fluid immediately.

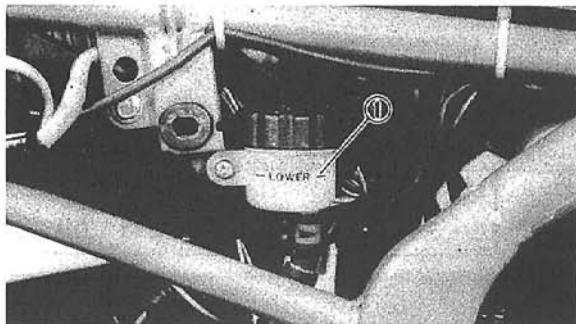
#### ⚠ WARNING

- Use only designated quality brake fluid: otherwise, the rubber seals may deteriorate, causing leakage and poor brake performance.
- Refill with the same type of brake fluid: mixing fluids may result in a harmful chemical reaction and lead to poor performance.
- Be careful that water does not enter the master cylinder when refilling. Water will significantly lower the boiling point of the fluid may result in vapor lock.

### 6. Air bleed:

- Brake system

Refer to "AIR BLEEDING" section.

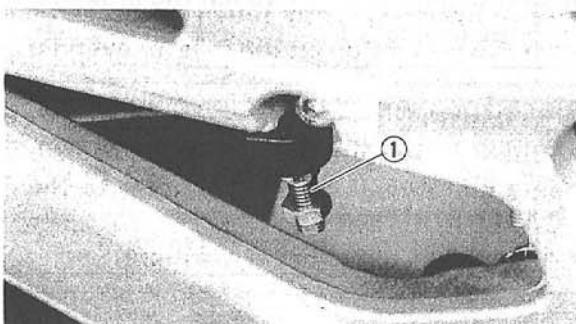


## 7. Inspect:

- Brake fluid level

Fluid level is under "LOWER" level line ①  
→ Replenish.

Refer to "BRAKE FLUID INSPECTION" section in the CHAPTER 3.



## 8. Connect:

- Brake adjuster ①

## 9. Adjust:

- Rear brake pedal height



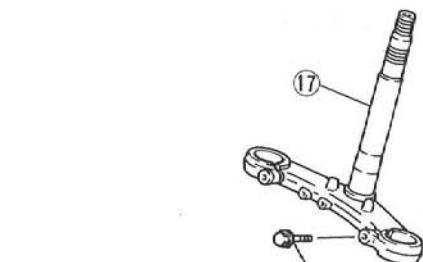
Pedal height:  
40 mm (1.6 in)  
below top of footrest

Refer to "REAR BRAKE ADJUSTMENT" section in the CHAPTER 3.

**FRONT FORK**

- |                                |                      |                                  |
|--------------------------------|----------------------|----------------------------------|
| (1) Front fork assembly (left) | (8) Outer tube       | (15) O-ring                      |
| (2) Inner tube                 | (9) Copper washer    | (16) Cap bolt                    |
| (3) Dust seal                  | (10) Oil lock piece  | (17) Under bracket               |
| (4) Retaining clip             | (11) Damper assembly | (18) Front fork assembly (right) |
| (5) Oil seal                   | (12) Fork spring     | (19) Outer tube                  |
| (6) Washer                     | (13) Spring seat     |                                  |
| (7) Slide metal                | (14) Spacer          |                                  |

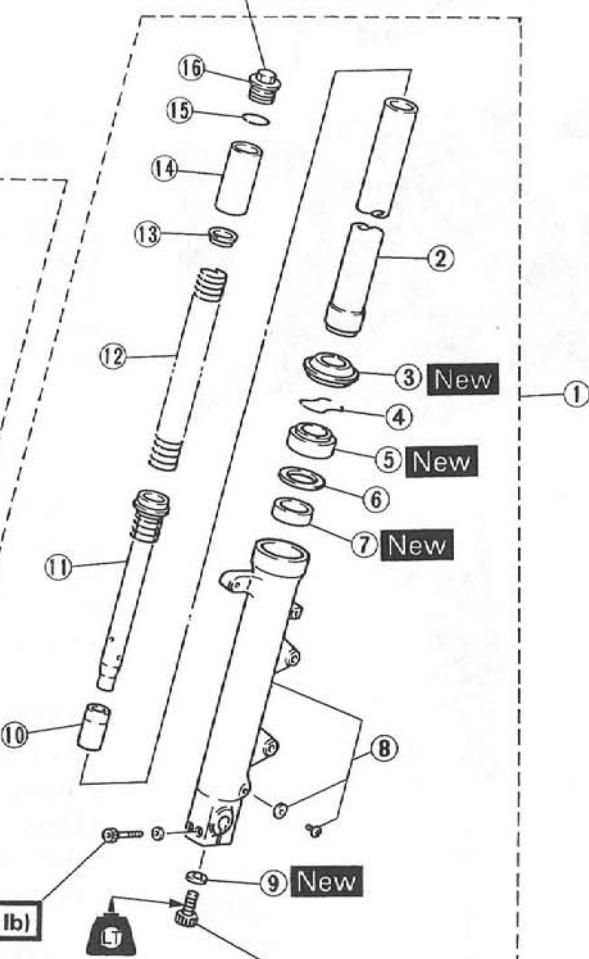
**FORK SPRING:**  
B MINIMUM FREE LENGTH:  
471.5 mm (18.6 in)



38 Nm (3.8 m · kg, 27 ft · lb)

**FORK OIL (EACH):**  
A CAPACITY:  
379 cm<sup>3</sup> (13.3 Imp oz, 12.8 US oz)  
GRADE:  
FORK OIL 10W or equivalent

23 Nm (2.3 m · kg, 17 ft · lb)



20 Nm (2.0 m · kg, 14 ft · lb)

30 Nm (3.0 m · kg, 22 ft · lb)

**C OIL LEVEL:**  
111 mm (4.37 in)  
From top of inner fork tube fully  
compression without spring

YB706401

**REMOVAL****⚠ WARNING**

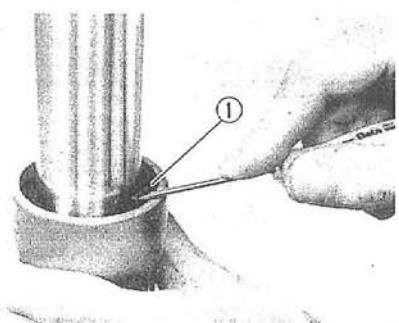
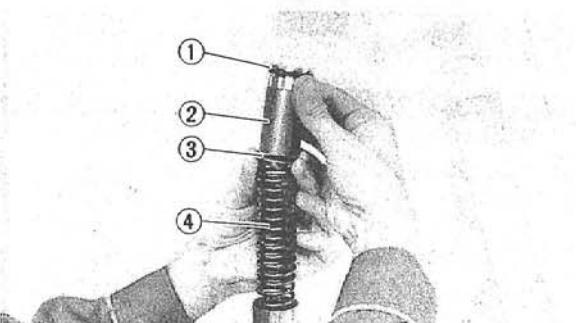
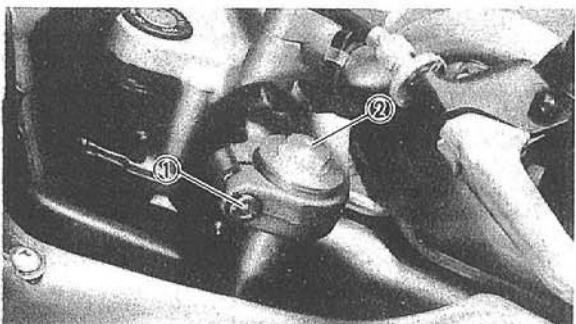
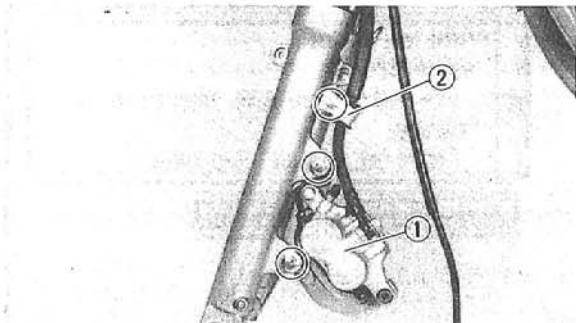
Securely support the motorcycle so there is no danger of it falling over.

1. Place the motorcycle on a level place.

2. Elevate the front wheel by placing suitable stand under the engine.

3. Remove:

- Front wheel  
Refer to the "FRONT WHEEL — REMOVAL" section.
- Caliper assembly ①
- Brake hose holder ②



4. Loosen:

- Pinch bolts (handle crown) ①
- Cap bolt ②
- Pinch bolts (under bracket)

**⚠ WARNING**

Support the fork before loosening the pinch bolts.

YB706402

**DISASSEMBLY**

1. Remove:

- Cap bolt ①
- Spacer ②
- Spring seat ③
- Spring ④

2. Drain:

- Fork oil

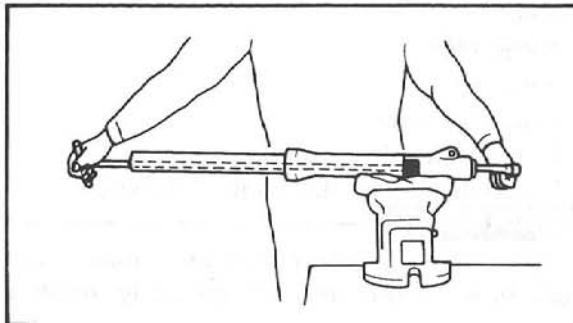
3. Remove:

- Dust seal
- Retaining clip ①

Use a thin slotted head screw driver.

**CAUTION:**

Take care not to scratch the inner tube.



## 4. Remove:

- Bolt (damper rod)
- Copper washer

**NOTE:**

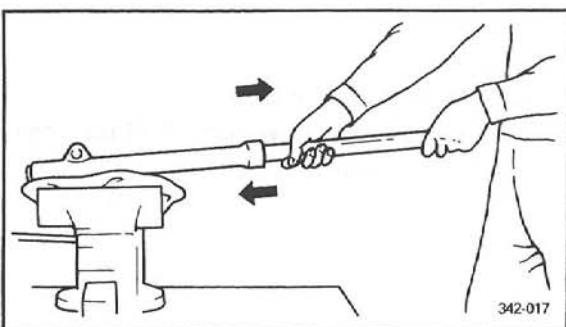
Loosen the bolt (damper rod) while holding the damper rod with the T-handle and holder.

**T-handle:**

90890-01326

**Holder (24 mm):**

90890-01328



## 5. Remove:

- Inner fork tube

\*\*\*\*\*

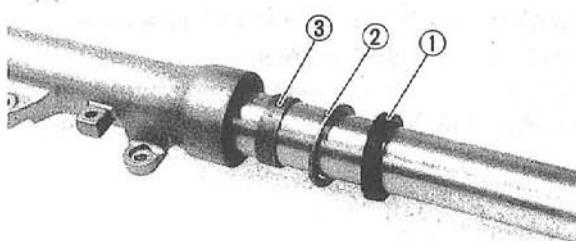
**Removal steps:**

- Hold the 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.

**CAUTION:**

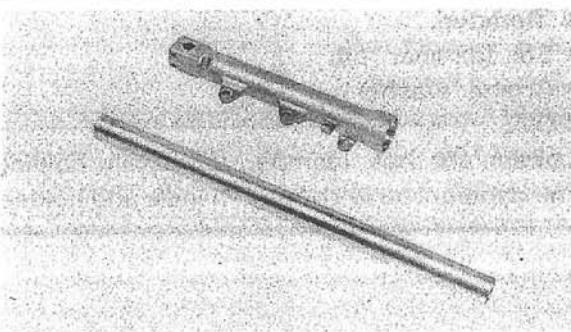
- Excessive force will damage the oil seal and/or the bushes. Damage oil seal and bushing must be replaced.
- Avoid bottoming the inner tube in the outer tube during the above procedure, as the oil lock piece will be damaged.

\*\*\*\*\*



## 6. Remove:

- Oil seal ①
- Seal spacer ②
- Slide metal ③
- Piston metal
- Damper rod
- Oil lock piece



YB706403

**INSPECTION**

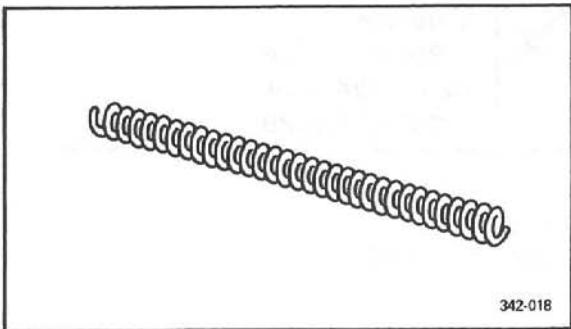
## 1. Inspect:

- Inner fork tube
- Outer fork tube

Scratches/Bends/Damage → Replace.

**WARNING**

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



342-018

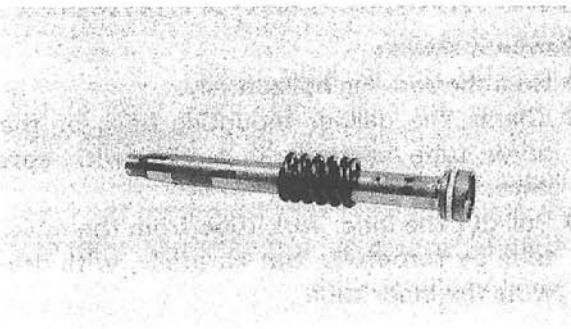
## 2. Measure:

## • Fork spring

Over specified limit → Replace.



**Fork spring free length (limit):**  
**471.5 mm (18.6 in)**

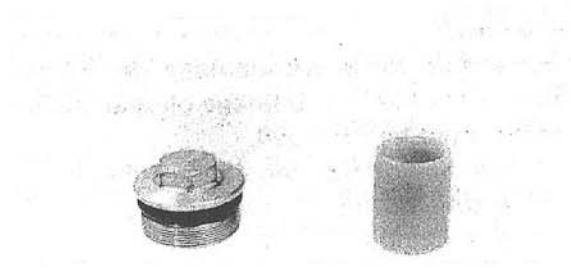


## 3. Inspect:

## • Damper rod

Wear/Damage → Replace.

Contamination → Blow out all oil passages with compressed air.



## 4. Inspect:

## • Oil lock piece

## • O-ring (cap bolt)

Wear/Damage → Replace.

YB706404

**ASSEMBLY**

Reverse the "DISASSEMBLY" procedure.

Note the following points.

**NOTE:**

- In front fork reassembly, be sure to use following new parts.

\*Piston metal

\*Slide metal

\*Oil seal

\*Dust seal

- Make sure that all components are clean before reassembly.

#### 1. Install:

- Damper rod

#### CAUTION: —

Allow the damper rod to slide slowly down the inner fork tube until it protrudes from the bottom, being careful not to damage the inner fork tube.

#### 2. Lubricate:

- Inner fork tube (outer surface)



#### Recommended lubricant:

Fork oil 10w or equivalent

#### 3. Install:

- Piston metal ①
- Oil lock piece ②

#### 4. Tighten:

- Bolt (damper rod)



#### Bolt (damper rod):

30 Nm (3.0 m · kg, 22 ft · lb)

Loctite®

#### NOTE: —

Tighten the bolt (damper rod) while holding the damper rod with the T-handle and holder.

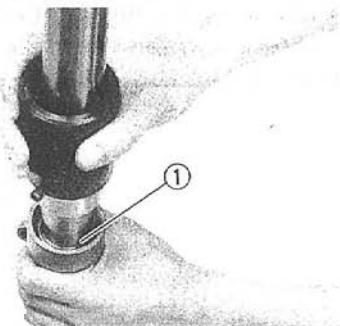


#### T-handle:

90890-01326

#### Holder (24 mm):

90890-01328



## 5. Install:

- Slide metal ①

Use the fork seal driver weight and adapter.

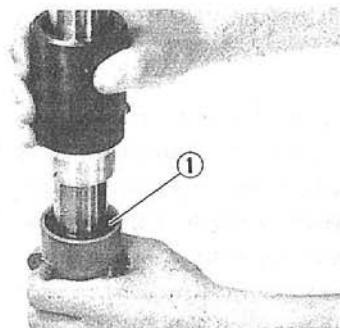


**Fork seal driver weight:**

90890-01367

**Adapter:**

90890-01372



## 6. Install:

- Seal spacer
- Oil seal ①

Use the fork seal driver weight and adapter.



**Fork seal driver weight:**

90890-01367

**Adapter:**

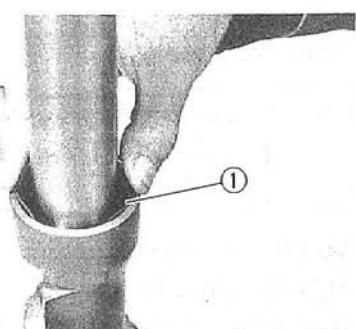
90890-01372

**NOTE:**

Before installing the oil seal, apply the lithium soap base grease onto the oil seal lips.

**CAUTION:**

Be sure that the oil seal numbered side face upward.

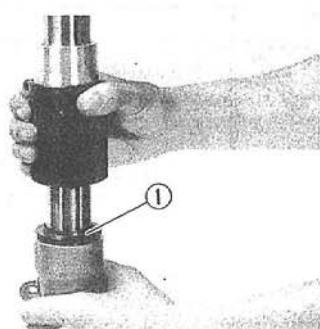


## 7. Install:

- Retaining clip ①

**NOTE:**

Fit the retaining clip correctly in the groove in the outer tube.



## 8. Install:

- Dust seal ①

Use the fork seal driver weight.

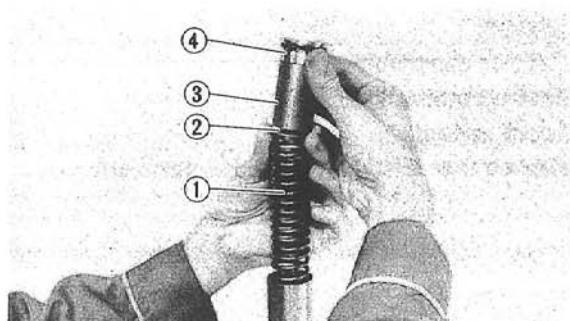


**Fork seal driver weight:**

90890-01367

## 9. Fill:

- Fork oil

**Each fork:****379 cm<sup>3</sup>****(13.3 Imp oz, 12.8 US oz)****Fork oil 10w or equivalent after filling, slowly pump the fork up and down to distribute oil.****Oil level:****111 mm (4.37 in)****from the top of inner fork tube fully compressed without spring.****NOTE:****Place the front fork on upright position.**

## 10. Install:

- Fork spring ①
- Spring seat ②
- Spacer collar ③
- Cap bolt ④

**NOTE:**

- Fork spring must be installed with the smaller pitch upward.
- Before installing the cap bolt, apply the grease to the O-ring.
- Temporarily tighten the cap bolt.

YB706405

**INSTALLATION**

Reverse the "REMOVAL" procedure.

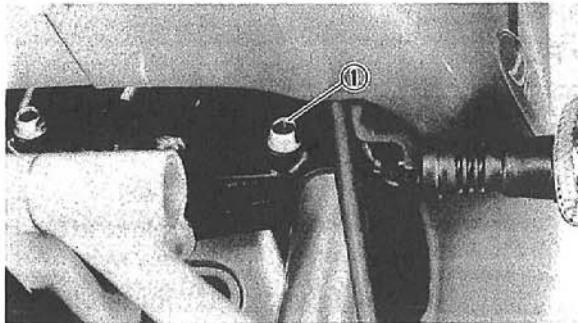
Note the following points.

## 1. Install:

- Front fork(s)  
Temporary tighten the pinch bolts.

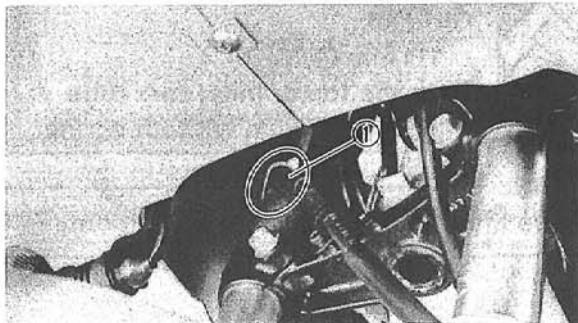
**NOTE:**

Be sure the inner fork tube end is flush with the top of the handle crown.



## 2. Tighten:

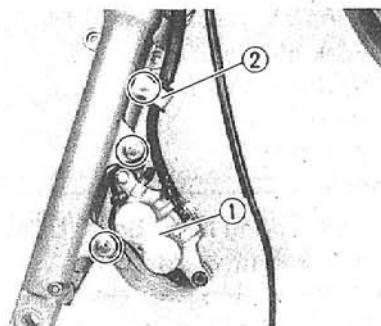
- Pinch bolt ① (under bracket)
- Cap bolt (front forl)
- Pinch bolt (handle crown)



	<b>Pinch bolt (lower bracket):</b> 38 Nm (3.8 m · kg, 27 ft · lb) <b>Cap bolt (front fork):</b> 23 Nm (2.3 m · kg, 17 ft · lb) <b>Pinch bolt (handle crown):</b> 23 Nm (2.3 m · kg, 17 ft · lb)
---	--

## 3. Clamp:

- Brake hose (right side) ①



## 4. Install:

- Caliper assembly ①
- Brake hose holder ②
- Front wheel

Refer to the "FRONT WHEEL" section.

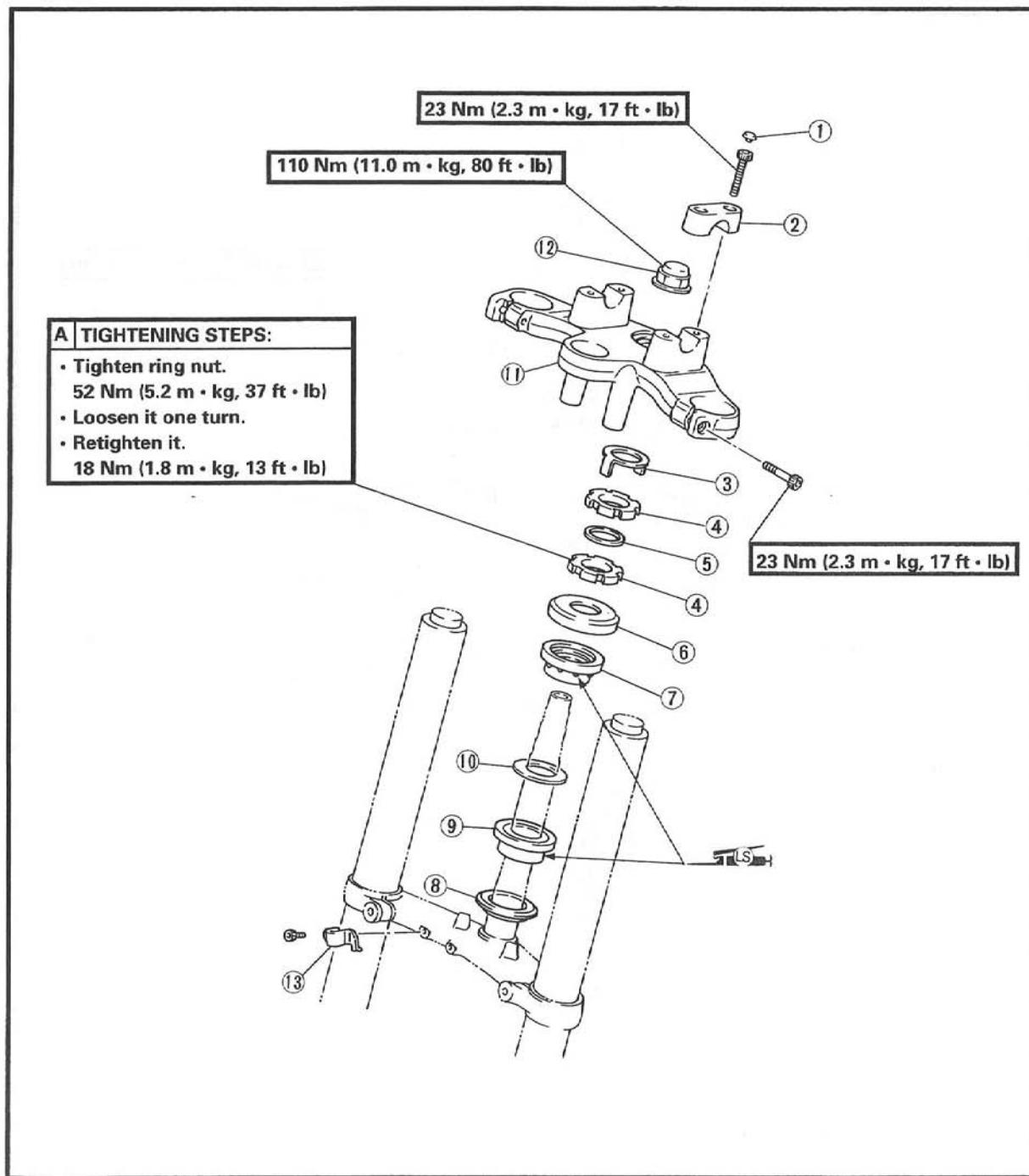
	<b>Bolt (caliper bracket):</b> 35 Nm (3.5 m · kg, 25 ft · lb) <b>Wheel axle:</b> 59 Nm (5.9 m · kg, 43 ft · lb) <b>Pinch bolt (wheel axle):</b> 20 Nm (2.0 m · kg, 14 ft · lb)
---	---

**WARNING**

Make sure that the brake hose are routed properly.

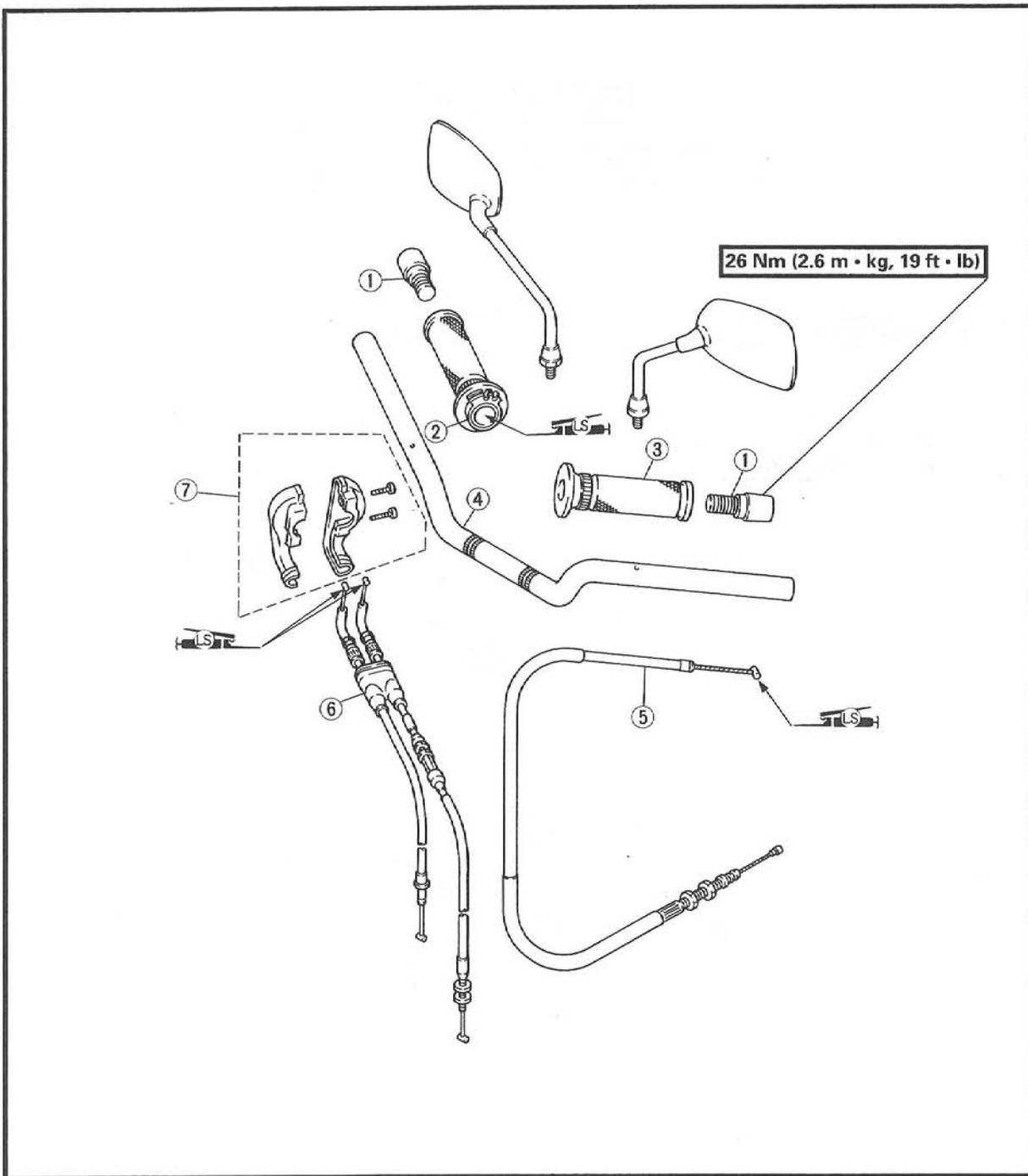
**STEERING HEAD AND HANDLEBAR****STEERING HEAD**

- |                    |                     |
|--------------------|---------------------|
| ① Cap              | ⑧ Ball race         |
| ② Handlebar holder | ⑨ Bearing           |
| ③ Special washer   | ⑩ Rubber seal       |
| ④ Ring nut         | ⑪ Handle crown      |
| ⑤ Rubber washer    | ⑫ Nut               |
| ⑥ Ball race cover  | ⑬ Brake hose holder |
| ⑦ Bearing          |                     |



**HANDLEBAR**

- ① Grip end
- ② Handlebar grip (right)
- ③ Handlebar grip (left)
- ④ Handlebar
- ⑤ Clutch cable
- ⑥ Throttle cable
- ⑦ Cable connector

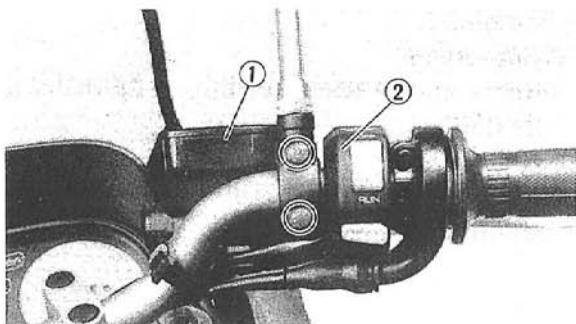


YB706501

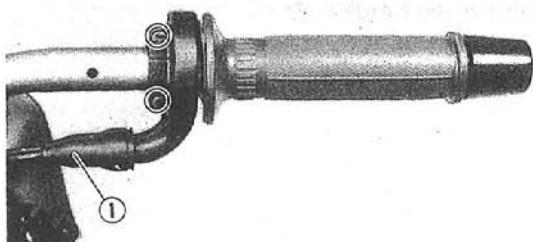
**REMOVAL****WARNING**

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

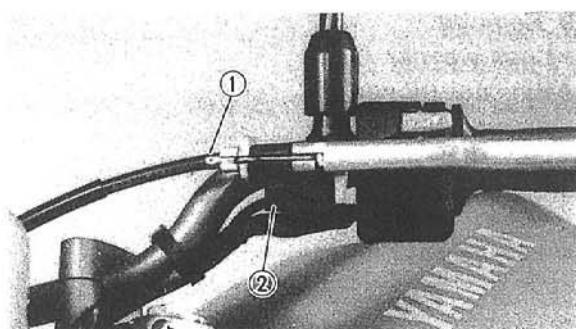
1. Place the motorcycle on a level place.

**2. Remove:**

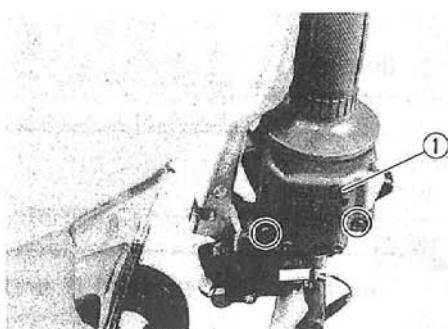
- Master cylinder ①
- Handlebar switch (right) ②

**3. Disconnect:**

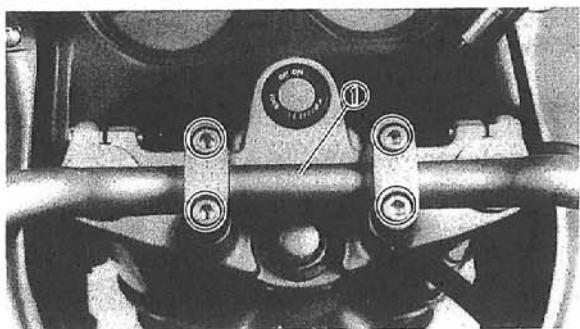
- Throttle cables ①

**4. Disconnect:**

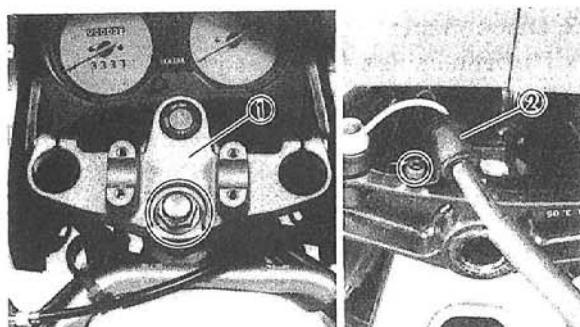
- Clutch cable ①
- Clutch switch lead ②

**5. Remove:**

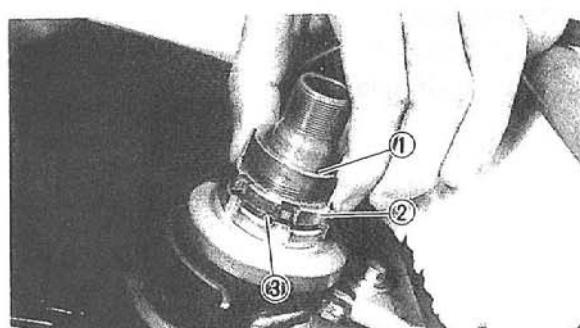
- Handlebar switch (left) ①



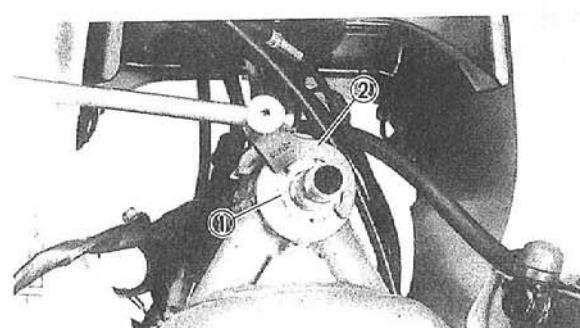
6. Remove:
- Handlebar ①



7. Remove:
- Front wheel  
Refer to the "FRONT WHEEL — REMOVAL" section.
  - Front forks  
Refer to the "FRONT FORK — REMOVAL" section.



8. Remove:
- Handle crown ①
  - Brake hose holder ②



9. Remove:
- Lock washer ①
  - Ring nut (upper) ②
  - Rubber washer ③

10. Remove:
- Ring nut ① (lower)  
Use the ring nut wrench ② .

	<b>Ring nut wrench:</b> 90890-01403
---	--

**WARNING** \_\_\_\_\_  
Support the steering shaft so that it may not fall down.

YB706502

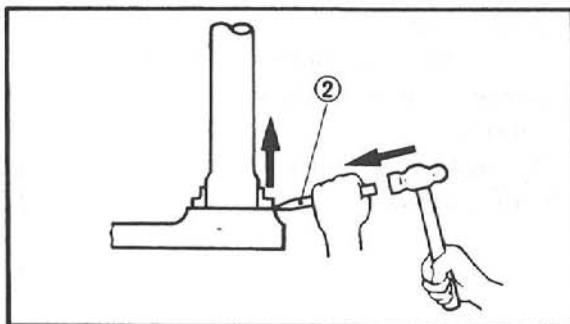
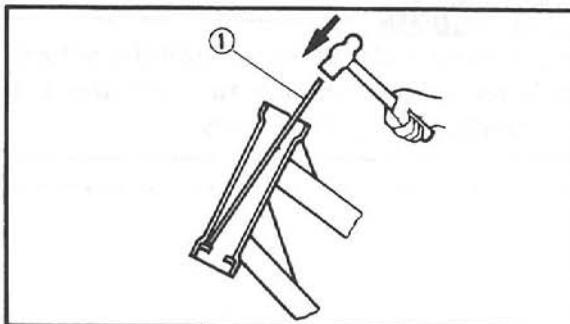
**INSPECTION**

1. Wash the bearing and bearing races with a solvent.



## 2. Inspect:

- Bearings
  - Bearing races
- Pitting/Damage → Replace.



\*\*\*\*\*

**Bearing race replacement steps:**

- Remove the bearing races on the head pipe using long rod ① and the hammer as shown.
- Remove the bearing race on the under bracket using the floor chisel ② and the hammer as shown.
- Install the new dust seal and races.

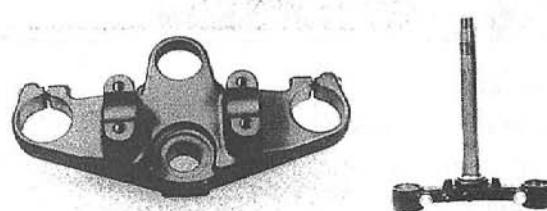
\*\*\*\*\*

**NOTE:**

- Always replace bearings and races as a set.
- Replace the dust seal whenever a steering head disassembled.

**CAUTION:**

If the bearing race is fitted not squarely, the head pipe could be damaged.



## 3. Inspect:

- Handle crown
  - Under bracket (with steering stem)
- Cracks/Bends/Damage → Replace.

## 4. Inspect:

- Handlebar
- Bends/Cracks/Damage → Replace.

**WARNING**

**Do not attempt to straighten a bent handlebar as this may dangerously weaken the handlebar.**

\*\*\*\*\*

**Handlebar replacement steps:**

- Remove the handlebar grip and lever holder.
- Install the lever holder to a new handlebar.
- Apply a light coat of an adhesive for rubber on the handlebar end.
- Install the handlebar grip.

**NOTE:**

Wipe off excess adhesive with a clean rag.

** WARNING**

Leave the handlebar intact until the adhesive becomes dry enough to make the grip and handlebar stuck securely.

\*\*\*\*\*

YB706503

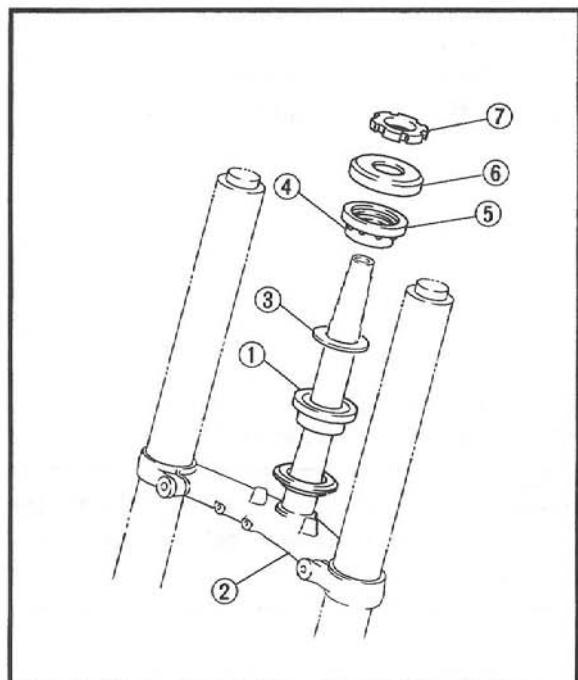
**INSTALLATION**

Reverse the "REMOVAL" procedure.

Note the following points.

**1. Lubricate:**

- Bearings (upper and lower)
- Bearing races



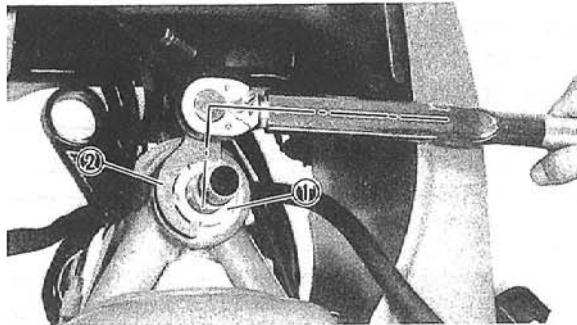
**Recommended lubricant:**  
Wheel bearing grease

**2. Install:**

- Bearing ① (lower) onto steering stem
- Under bracket ②
- Rubber washer ③
- Bearing ④ (upper)
- Bearing race ⑤
- Bearing cover ⑥
- Ring nut ⑦ (lower)

** CAUTION:**

Hold the steering stem until it is secured.



## 3. Tighten:

- Ring nuts (lower and upper)

\*\*\*\*\*

**Tightening steps:**

- Tighten the ring nut ① using the ring nut wrench ②.

**NOTE:**

- The tapered side of ring nut must face downward.
- Set the torque wrench to the ring nut wrench so that they form a right angle.



**Ring nut wrench:**  
90890-01403



**Ring nut (initial tightening):**  
52 Nm (5.2 m · kg, 37 ft · lb)

- Loosen the ring nut one turn.
- Retighten the ring nut using the ring nut wrench.



**WARNING** \_\_\_\_\_

**Do not over tighten.**



**Ring nut (final tightening):**  
18 Nm (1.8 m · kg, 13 ft · lb)

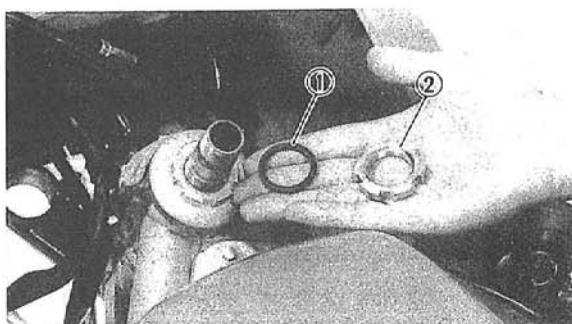
- Check the steering stem by turning lock to lock. If there is any binding, remove the steering stem assembly and inspect the steering bearings.

- Install the rubber washer ①.

- Install the ring nut (upper) ②.

**NOTE:**

The tapered side of ring nut must be face upward.



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

- Install the lock washer.

**NOTE:**

Make sure that the lock washer tab is placed in the slots.

\*\*\*\*\*

## 4. Install:

- Handle crown
- Nut (steering stem)

## NOTE: \_\_\_\_\_

Temporarily tighten the steering stem nut.

## 5. Install:

- Front fork

Refer to the "FRONT FORK INSTALLATION" section.



**Pinch bolt (under bracket):**  
38 Nm (3.8 m · kg, 27 ft · lb)

## NOTE: \_\_\_\_\_

In this stage, temporarily tighten the pinch bolts (handle crown).

## 6. Tighten:

- Nut (steering stem)
- Pinch bolt (handle crown)



**Nut (steering stem):**  
110 Nm (11.0 m · kg, 80 ft · lb)  
**Pinch bolt (handle crown):**  
23 Nm (2.3 m · kg, 17 ft · lb)

## 7. Install:

- Front wheel

Refer to the "FRONT WHEEL INSTALLATION" section.



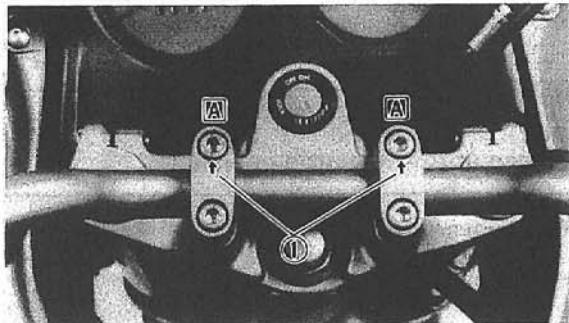
**Wheel axle:**  
59 Nm (5.9 m · kg, 43 ft · lb)  
**Pinch bolt (wheel axle):**  
20 Nm (2.0 m · kg, 14 ft · lb)

## 8. Install:

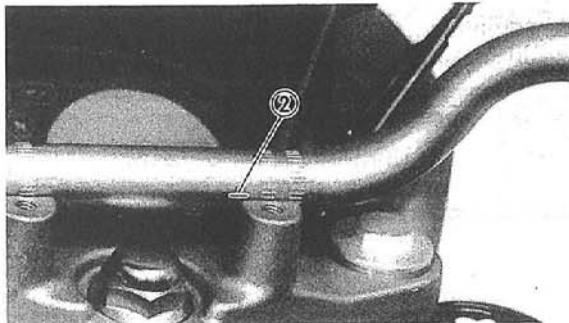
- Handlebar
- Handlebar holders



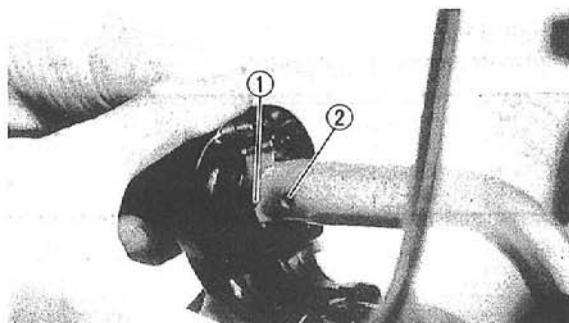
**Bolt (handlebar holder):**  
23 Nm (2.3 m · kg, 17 ft · lb)

**NOTE:**

- Before installing the handlebar onto the handle crown, apply a light coat of lithium soap base grease onto the handlebar end and install the throttle housing to the handlebar.
- The upper handlebar holder should be installed with the arrow mark ① forward A.
- Align the match mark ② on the handlebar with the top of handlebar holder (lower).

**CAUTION:**

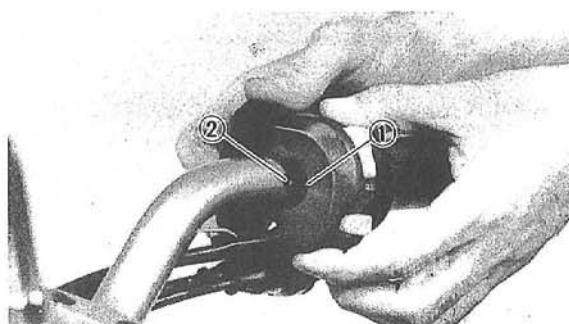
- First tighten the bolts on the front side of the handlebar holder, and then tighten the bolts on the rear side.
- Check the handlebar by turning lock to lock. If there is any contact to the fuel tank, adjust the handlebar position.

**9. Connect:**

- Throttle cable

** WARNING**

Make sure that the projection ① on the throttle housing with the hole ② on the handlebar.

**10. Install:**

- Handlebar switches (left and right)

**NOTE:**

Align the projection ① on the handlebar switch with the hole ② on the handlebar.

**11. Install:**

- Master cylinder (front brake)



**Bolt (master cylinder bracket):**  
9 Nm (0.9 m · kg, 6.5 ft · lb)

## 12. Install:

- Clutch cable

## NOTE:

Apply a light coat of lithium soap base grease onto the clutch cable end.

- Clutch switch lead

## 13. Adjust:

- Clutch cable free play



## Free play:

2~3 mm (0.08~0.12 in)  
at lever pivot

## 14. Adjust:

- Throttle cable free play

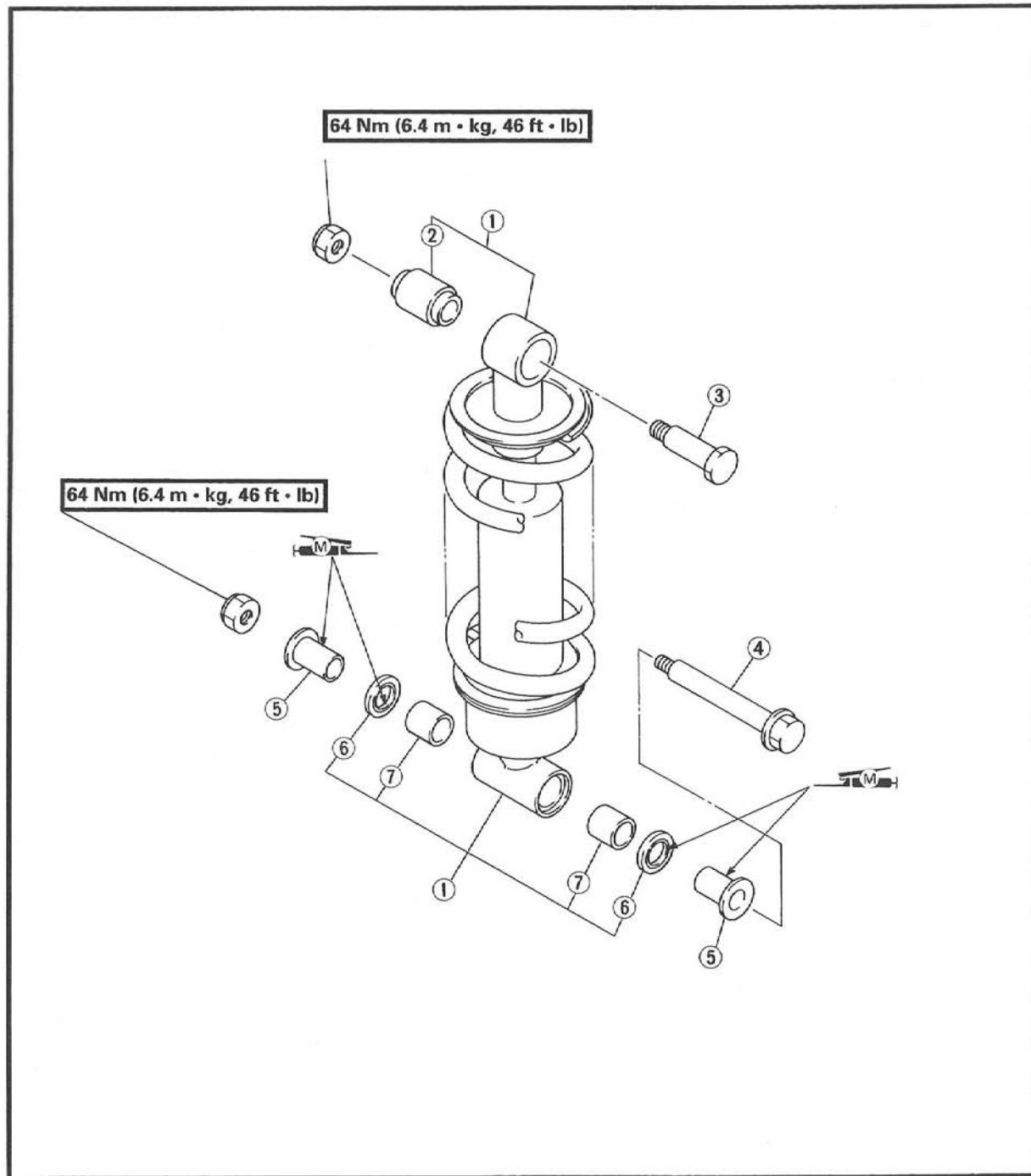


## Free play:

3~7 mm (0.12~0.28 in)  
at throttle grip flange

**REAR SHOCK ABSORBER AND SWINGARM****REAR SHOCK ABSORBER**

- ① Rear shock absorber assembly
- ② Bush
- ③ Bolt
- ④ Bolt
- ⑤ Collar
- ⑥ Oil seal
- ⑦ Bush

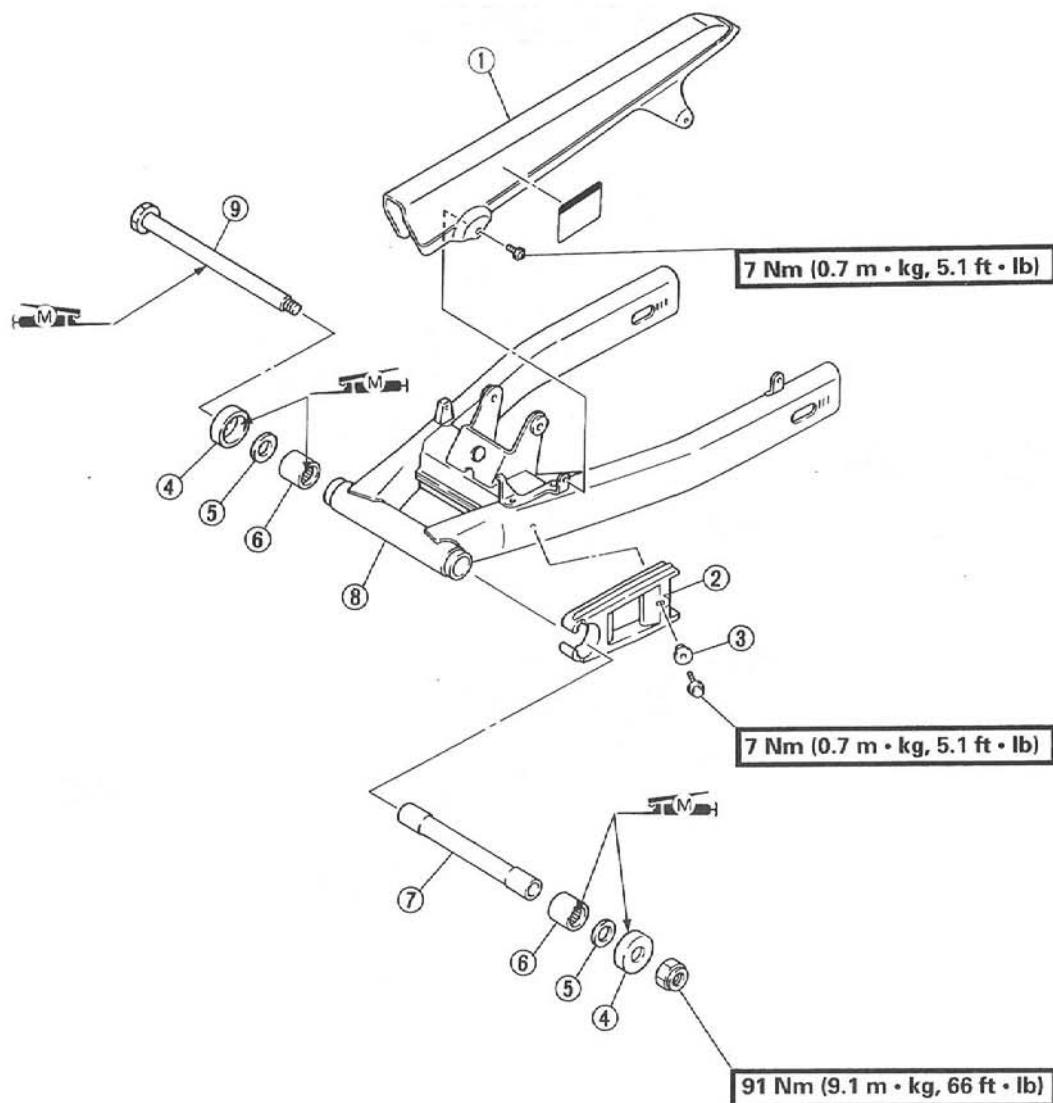


## REAR SHOCK ABSORBER AND SWINGARM



### SWINGARM

- |                   |               |
|-------------------|---------------|
| ① Chain case      | ⑥ Bearing     |
| ② Chain protector | ⑦ Bush        |
| ③ Collar          | ⑧ Swingarm    |
| ④ Cover           | ⑨ Pivot shaft |
| ⑤ Plate washer    |               |



YB706601

**HANDLING NOTES****⚠ WARNING**

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

1. Do not tamper or attempt to open the cylinder assembly.
2. Do not subject shock absorber to an open flame or other high heat. This may cause the unit to explode due to excessive gas pressure.
3. Do not deform or damage the cylinder in any way. Cylinder damage will result in poor damping performance.

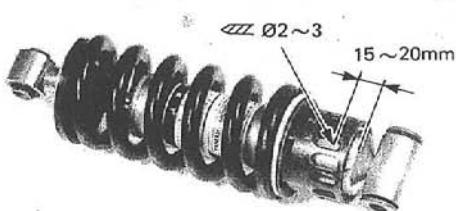
YB706602

**NOTES ON DISPOSAL**

\*\*\*\*\*

**Shock absorber disposal steps:**

- Gas pressure must be released before disposing of shock absorber. To do so, drill a 2~3 mm (0.08~0.12 in) hole through the cylinder wall at a point 15~20 mm (0.6~0.8 in) from the end of gas chamber.

**⚠ WARNING**

Wear eye protection to prevent eye damage from escaping gas and/or metal chips.

\*\*\*\*\*

YB706603

**REMOVAL****Rear shock absorber**

1. Place the motorcycle on a level place.

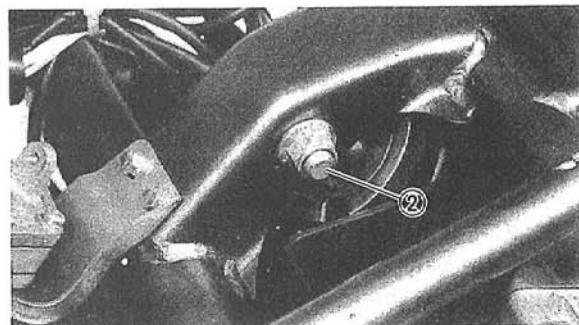
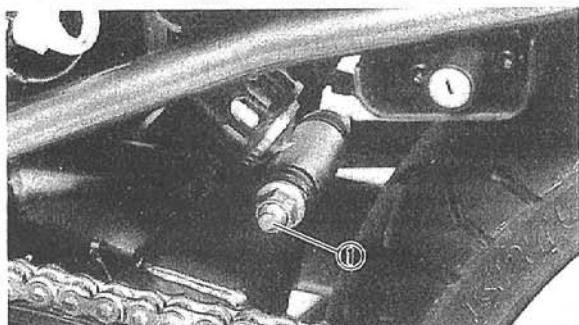
**WARNING**

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

2. Remove:

- Seat
- Fuel tank

Refer to the "SIDE COVER, FUEL TANK AND COWLING" section in the CHAPTER 3.



3. Remove:

- Bolt ① (shock absorber-lower)

**NOTE:**

When removing the lower bolt, hold the swingarm so that it does not drip downwards when the lower bolt removed.

4. Remove:

- Bolt ② (shock absorber-upper)
- Rear shock absorber

YB706604

**Swingarm**

1. Place the motorcycle on a level place.

**WARNING**

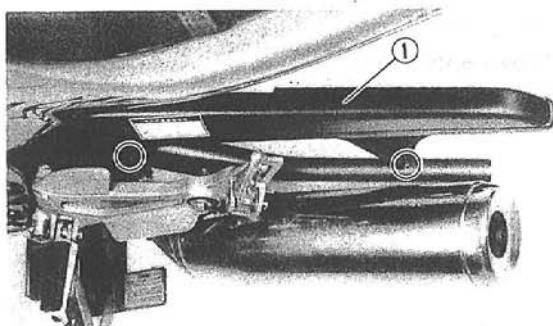
Securely support the motorcycle so there is no danger of it falling over.

## 2. Remove:

- Rear wheel assembly  
Refer to the "REAR WHEEL REMOVAL" section.
- Seat
- Fuel tank  
Refer to the "SIDE COVER, FUEL TANK AND COWLING" section in the CHAPTER 3.
- Rear shock absorber  
Refer to the "Rear shock absorber removal" section.

## 3. Remove:

- Compression bar



## 4. Remove:

- Chain case ①

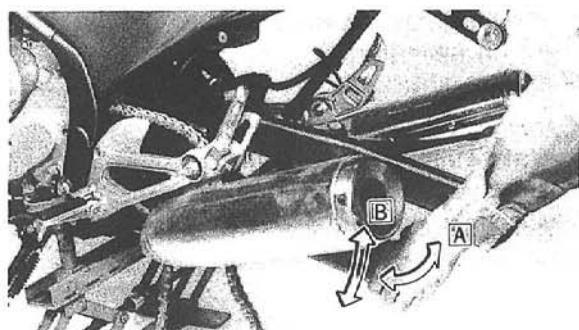
## 5. Check:

- Swingarm free play

\*\*\*\*\*

**Inspection steps:**

- Check the tightening torque of the pivot shaft (swingarm) securing nut.



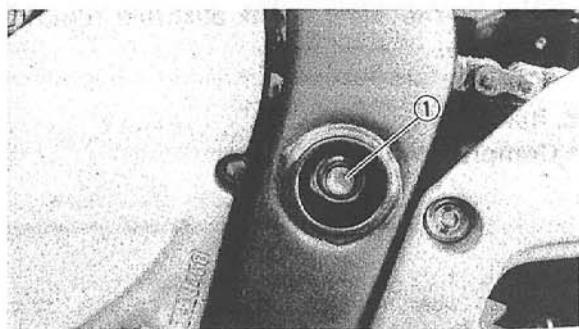
	Nut (swingarm pivot shaft): 91Nm (9.1 m · kg, 66 ft · lb)
---	--

- Check the swingarm side play **A** by moving it from side to side.  
If side play noticeable, check the inner collar, bearing, washer and thrust cover.



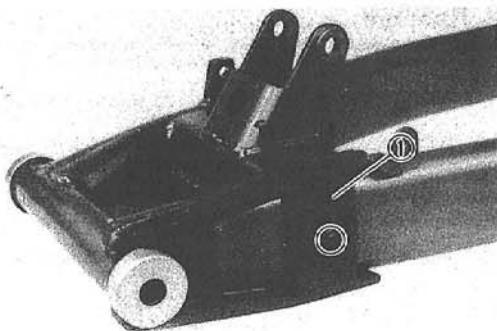
**Side play (at end of swingarm):  
1.0 mm (0.04 in)**

- Check the swingarm vertical movement **B** by moving it up and down.  
If vertical movement is tight, binding or rough, check the inner collar, bearing, washer and thrust cover.
- \*\*\*\*\*



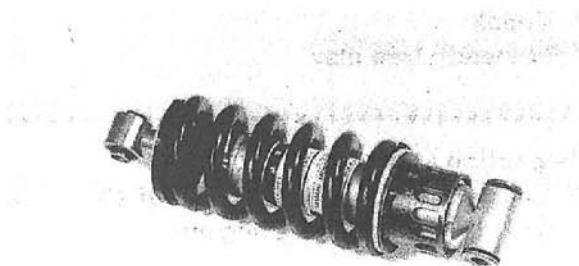
#### 6. Remove:

- Pivot shaft ①
- Swingarm



#### 7. Remove:

- Chain guide ②



YB706605

### INSPECTION

#### Rear shock absorber

##### 1. Inspect:

- Rear shock absorber rod  
Bends/Damage → Replace the rear shock absorber assembly.
- Rear shock absorber  
Oil leaks/Gas leaks → Replace the rear shock absorber assembly.
- Spring  
Wear/Damage → Replace the rear shock absorber assembly.
- Bushings
- Dust seals  
Wear/Damage → Replace.
- Bolts  
Wear/Bends/Damage → Replace.

## REAR SHOCK ABSORBER AND SWINGARM

CHAS 



YB706606

### Swingarm

#### 1. Inspect:

- Swingarm  
Crack/Bends/Damage → Replace.

#### 2. Inspect:

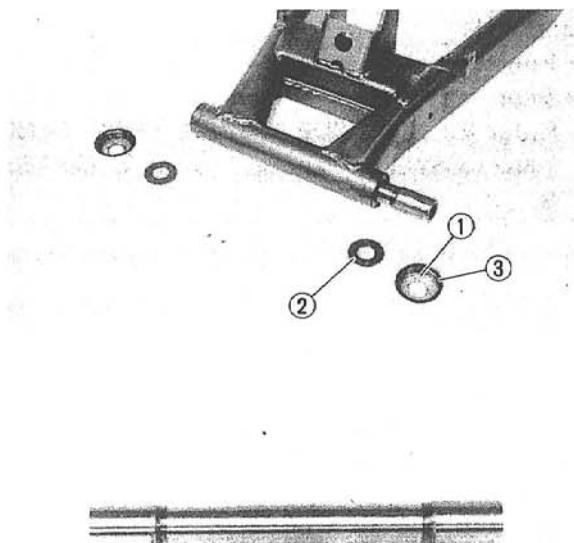
- Pivot shaft

Roll the axle on a flat surface.

Bends → Replace.

#### WARNING

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



#### 3. Wash the swingarm pivoting parts in a solvent.

#### 4. Inspect:

- Thrust cover ①
- Washer ②
- Oil seal ③

Wear/Damage → Replace.

#### 5. Inspect:

- Bearing  
Pitting/Damage → Replace.
- Bush  
Scratches/Damage → Replace.

YB706608

## INSTALLATION

### Rear shock absorber

Reverse the "REMOVAL" procedure.

Note the following points.

#### 1. Lubricate:

- Collars
- Bushes

## REAR SHOCK ABSORBER AND SWINGARM

CHAS 



Recommended lubricant:  
Molybdenum disulfide grease

### 2. Install:

- Collars
- Rear shock absorber



Nut (rear shock absorber-upper):  
**64 Nm (6.4 m · kg, 46 ft · lb)**  
Nut (rear shock absorber-lower):  
**64 Nm (6.4 m · kg, 46 ft · lb)**

### NOTE:

Lift up the swingarm to install the rear shock absorber.

### 3. Install:

- Fuel tank
- Seat

Refer to the "SIDE COVER, FUEL TANK AND COWLING" section in the CHAPTER 3.

YB706609

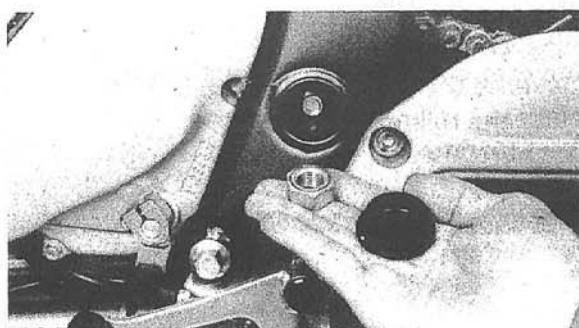
## Swingarm

Reverse the "REMOVAL" procedure.

Note the following points.

### 1. Lubricate:

- Bearing
- Bush
- Thrust washers
- Pivot shaft



Recommended lubricant:  
Molybdenum disulfide grease

### 2. Install:

- Swingarm



Nut (pivot shaft):  
**91 Nm (9.1 m · kg, 66 ft · lb)**

## 3. Install:

- Chain case
- Compression bar



**Screw (chain case):**

7 Nm (0.7 m · kg, 5.1 ft · lb)

**Nut (compression bar):**

30 Nm (3.0 m · kg, 22 ft · lb)

**WARNING**

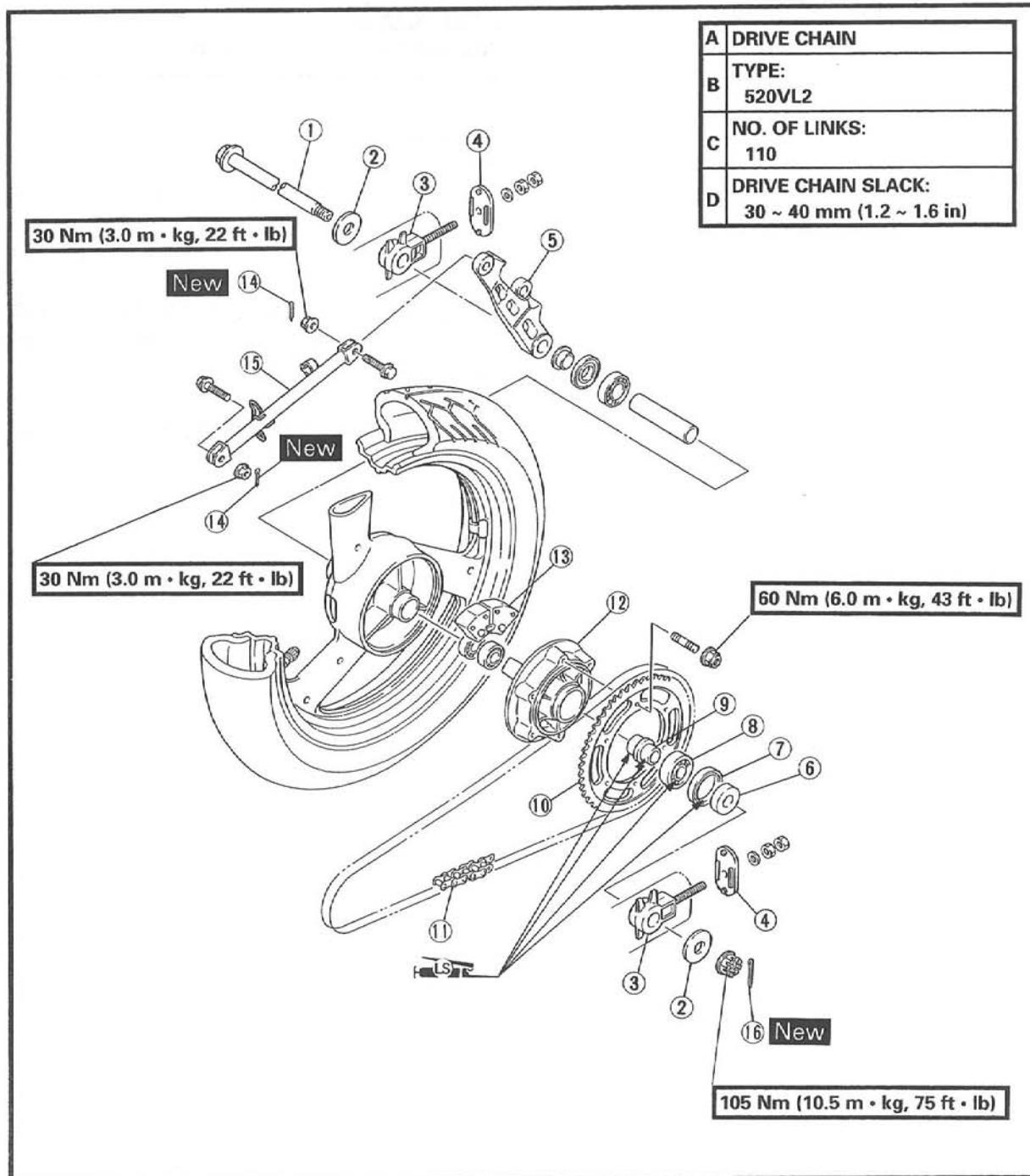
Always use a new cotter pin.

## 4. Install:

- Rear shock absorber  
Refer to the "Rear shock absorbar installation" section.
- Fuel tank
- Seat  
Refer to the "SIDE COVER, FUEL TANK AND COWLING" section in the CHAPTER 3.
- Rear wheel  
Refer to the "REAR WHEEL INSTALLATION" section.

**DRIVE CHAIN AND SPROCKETS**

- |                   |                       |
|-------------------|-----------------------|
| ① Wheel axle      | ⑨ Collar              |
| ② Plate washer    | ⑩ Rear sprocket wheel |
| ③ Chain puller    | ⑪ Drive chain         |
| ④ End plate       | ⑫ Clutch hub          |
| ⑤ Caliper bracket | ⑬ Clutch damper       |
| ⑥ Collar          | ⑭ Cotter pin          |
| ⑦ Oil seal        | ⑮ Compression bar     |
| ⑧ Bearing         | ⑯ Cotter pin          |



YB706701

**NOTE:**

Before removing the drive chain and sprockets, drive chain slack and 10 link length of drive chain should be measured.

YB706702

**REMOVAL**

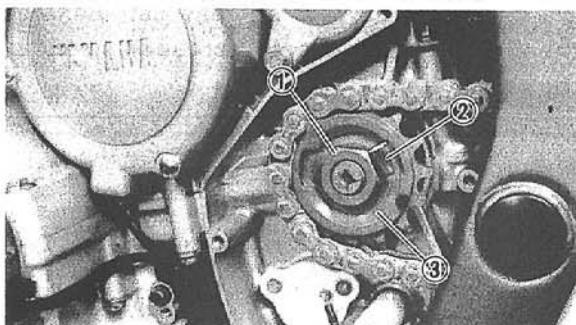
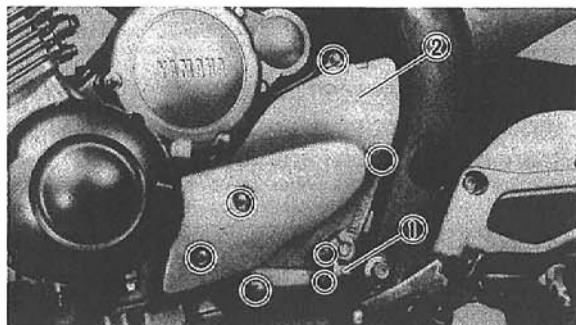
1. Place the motorcycle on a level place.

** WARNING**

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

**2. Remove:**

- Shift arm ①
- Drive sprocket cover ②

**3. Straighten:**

- Lock washer tab

**4. Remove:**

- Nut (drive sprocket) ①
- Lock washer ②
- Drive sprocket ③

**NOTE:**

Loosen the nut (drive sprocket) while applying the rear brake.

**5. Remove:**

- Rear wheel

Refer to the "REAR WHEEL REMOVAL" section.

- Swingarm

Refer to the "Swingarm removal" section.

**6. Remove:**

- Drive chain

YB706703

**INSPECTION****1. Measure:**

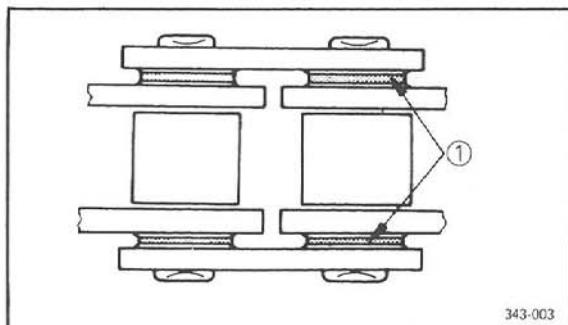
- 10 link length ② (drive chain)  
Out of specification → Replace drive chain.



**10 link length limit:**  
**150 mm (5.91 in)**

**NOTE:**

- For measurement make the chain tense by finger.
- 10 link length is a measurement between the insides of the ① and ⑪ rollers as shown.
- Two or three different 10 link length should be measured.



343-003

**2. Clean:****• Drive chain**

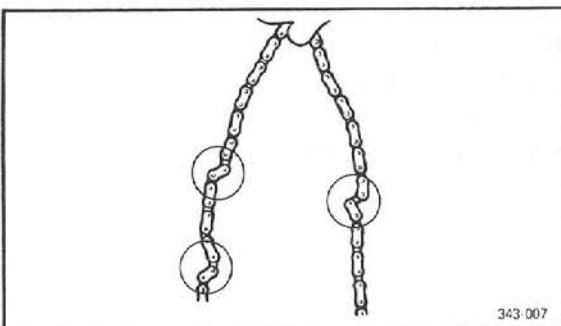
Place it in kerosene, and brush off as much dirt as possible. Then remove the chain from the kerosene and dry the chain.

**CAUTION:**

This motorcycle has a drive chain with small rubber O-ring ① between the chain plate. Steam cleaning, high pressure washes, and certain solvent can damage these O-rings. Use only kerosene to clean the drive chain.

**3. Inspect:**

- O-ring (drive chain)  
Damage → Replace drive chain.
- Rollers
- Side plates  
Damage/Wear → Replace drive chain.

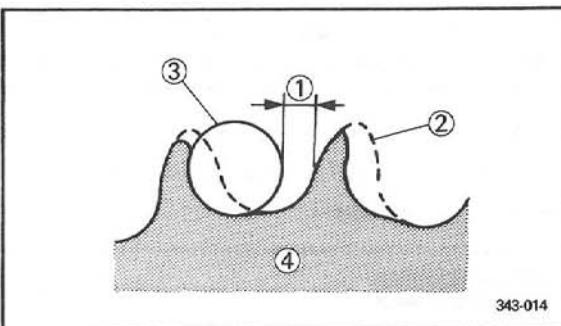


## 4. Lubricate:

- Drive chain



**Drive chain lubricant:**  
SAE 30 ~ 50W motor oil



## 5. Inspect:

- Drive chain stiffness  
Stiff → Clean and lubricate or replace.

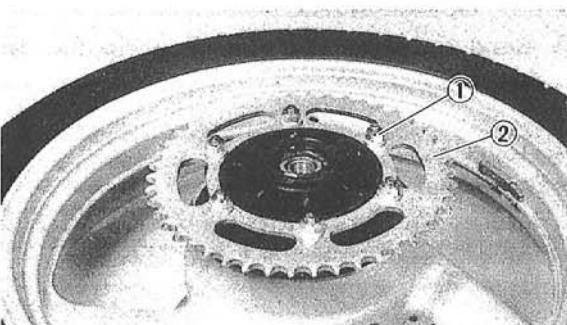
## 6. Inspect:

- Drive sprocket
- Driven sprocket  
More than 1/4 teeth ① wear → Replace sprocket.  
Bent teeth → Replace sprocket.

② Correct

③ Roller

④ Sprocket



## \*\*\*\*\*

**Driven sprocket replacement steps:**

- Remove the self locknuts ①, and driven sprocket ②.
- Clean the hub, especially on the surfaces in contact with the sprocket, using clean cloth.
- Install the new driven sprocket.

**NOTE:** \_\_\_\_\_

Tighten the self lock nut in stage, using a criss-cross pattern.



**Self locknut (driven sprocket):**  
60 Nm (6.0 m · kg, 43 ft · lb)

## \*\*\*\*\*

YB706704

**INSTALLATION**

Reverse the "REMOVAL" procedure.

Note the following points.

## 1. Install:

- Drive chain
- Swingarm  
Refer to the "Swingarm installation" section.
- Rear wheel  
Refer to the "REAR WHEEL INSTALLATION" section.

## 2. Install:

- Drive chain
- Driven sprocket
- Lock washer
- Nut (drive sprocket)

**Nut (drive sprocket):****110 Nm (11.0 m · kg, 80 ft · lb)****NOTE:**

Tighten the nut (drive sprocket) while applying the rear brake.

**WARNING**

**Always use a new lock washer.**

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

## 4. Adjust:

- Drive chain slack

Refer to the "DRIVE CHAIN SLACK ADJUSTMENT" section in the CHAPTER 3.

**Drive chain slack:****30~40 mm (1.2~1.6 in)****CAUTION:**

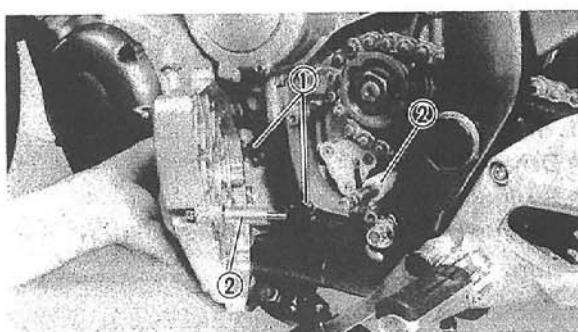
Too small chain slack will overload the engine and other vital parts; keep the slack within the specified limits.

**WARNING**

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

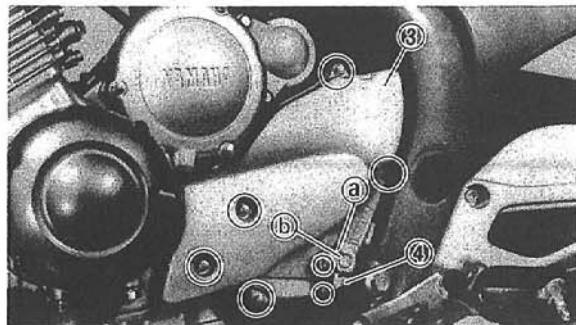
## 5. Install:

- Dowelpins ①
- Cover (drive sprocket) ③
- Shift arm ④



## DRIVE CHAIN AND SPROCKETS

CHAS 



### NOTE:

- Do not forget the collars ②.
- Align the opening ③ of the shift arm with the punch mark ⑤ on the shift shaft.



#### Bolt (cover):

10 Nm (1.0 m · kg, 7.2 ft · lb)

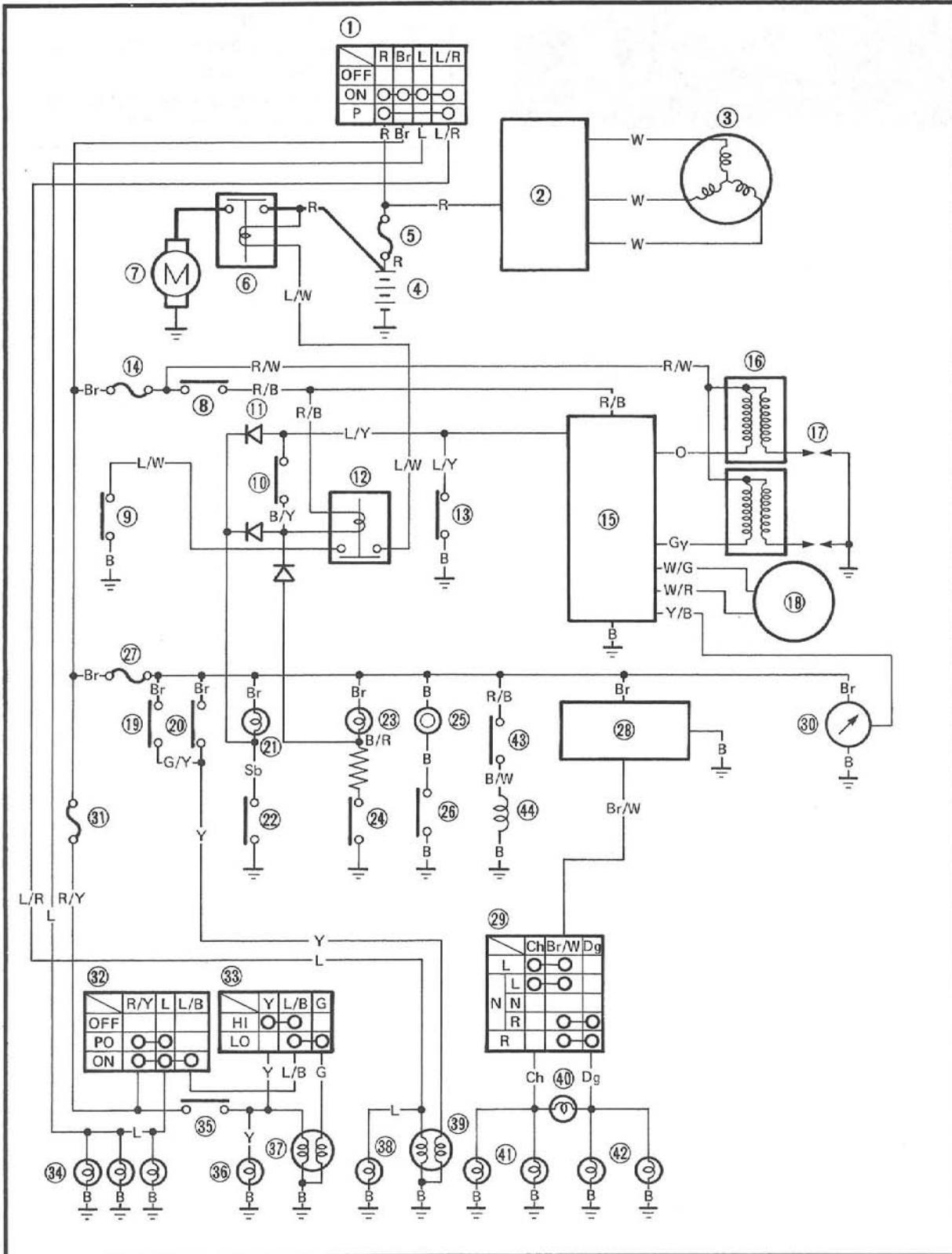
#### Bolt (shift arm):

10 Nm (1.0 m · kg, 7.2 ft · lb)



## ELECTRICAL

## XJ600S CIRCUIT DIAGRAM





- |                                  |                               |
|----------------------------------|-------------------------------|
| ① Main switch                    | ②3 Oil level indicator light  |
| ② Rectifier/ regulator           | ②4 Oil level switch           |
| ③ A.C. magneto                   | ②5 Horn                       |
| ④ Battery                        | ②6 "HORN" switch              |
| ⑤ Fuse (main)                    | ②7 Fuse (signal)              |
| ⑥ Starter relay                  | ②8 Flasher relay              |
| ⑦ Starter motor                  | ②9 "TURN" switch              |
| ⑧ "ENGINE STOP" switch           | ⑩ Tachometer                  |
| ⑨ "START" switch                 | ⑪ Fuse (head)                 |
| ⑩ Clutch switch                  | ⑫ "LIGHTS" switch             |
| ⑪ Diode                          | ⑬ "LIGHTS" (dimmer) switch    |
| ⑫ Starting circuit cut-off relay | ⑭ Meter light                 |
| ⑬ Sidestand switch               | ⑮ "PASS" switch               |
| ⑭ Fuse (ignition)                | ⑯ "HIGH BEAM" indicator light |
| ⑮ Ignitor unit                   | ⑰ Headlight                   |
| ⑯ Ignition coil                  | ⑱ Auxiliary light             |
| ⑰ Spark plug                     | ⑲ Tail/brake light            |
| ⑱ Pick up coil                   | ⑳ "TURN" indicator light      |
| ⑲ Front brake switch             | ㉑ Front flasher light         |
| ㉐ Rear brake switch              | ㉒ Rear flasher light          |
| ㉑ "NEUTRAL" indicator light      | ㉓ Thermo switch               |
| ㉒ Neutral switch                 | ㉔ Solenoid valve              |

**NOTE:**

- "START" switch is closed while the button (switch) is pushed.
- "HORN" switch is closed while the button (switch) is pushed.
- Clutch switch is closed while the clutch lever is pulled.
- Sidestand switch is closed while the sidestand is upped.
- Neutral switch is closed while the transmission is in neutral.
- Brake switch is closed while the brake is applied.

**COLOR CODE**

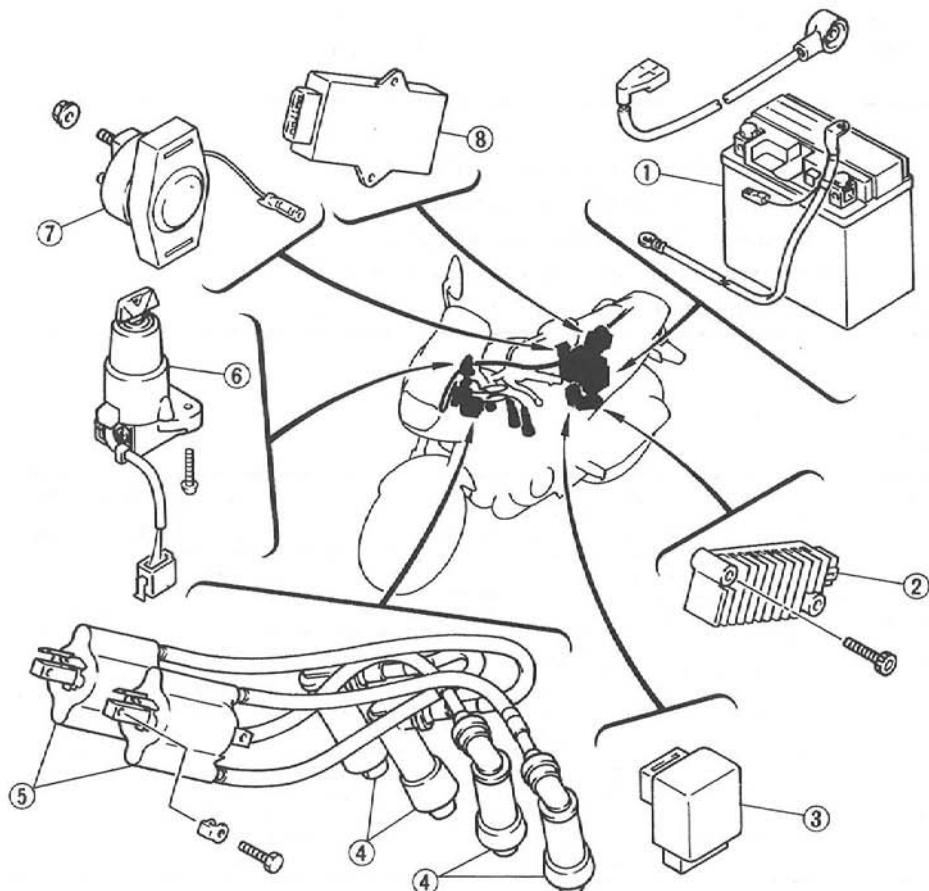
B	Black	Sb	Sky blue	R/Y	Red/Yellow
L	Blue	Dg	Dark green	L/Y	Blue/Yellow
G	Green	W	White	L/R	Blue/Red
Y	Yellow	B/Y	Black/Yellow	L/W	Blue/White
R	Red	B/W	Black/White	R/W	Red/White
P	Pink	B/R	Black/Red	Br/W	Brown/White
O	Orange	G/Y	Green/Yellow	W/G	White/Green
Br	Brown	L/B	Blue/Black	W/R	White/Red
Ch	Chocolate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

**ELECTRICAL COMPONENTS**

- ① Battery
- ② Rectifier/regulator
- ③ Relay assembly
- ④ Spark plug cap
- ⑤ Ignition coil
- ⑥ Main switch
- ⑦ Starter relay
- ⑧ Ignitor unit

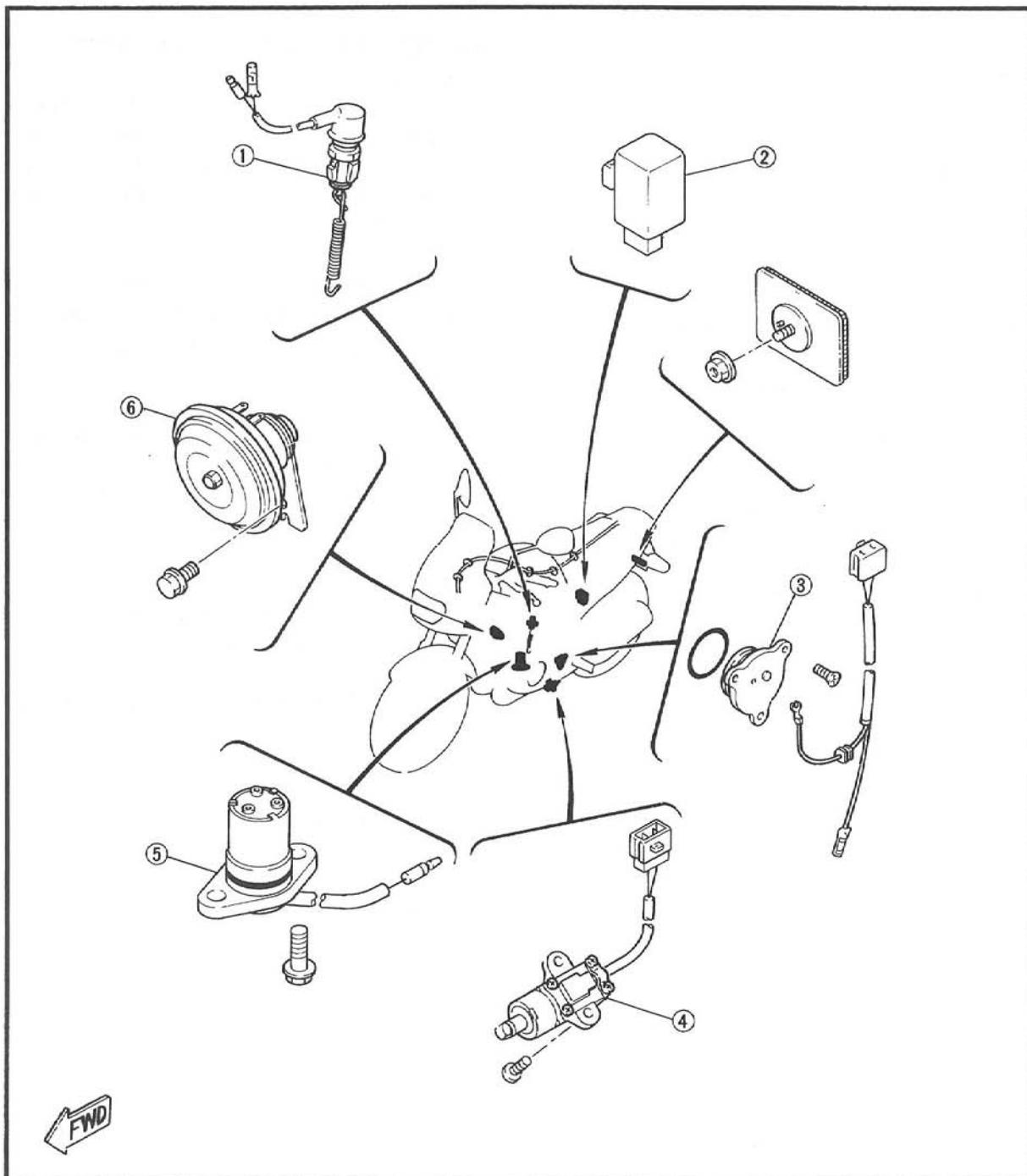
**BATTERY:**  
**SPECIFIC GRAVITY: 1.32**

**IGNITION COIL:**  
**PRIMARY COIL RESISTANCE:**  
1.92 ~ 2.88Ω at 20°C (68°F)  
**SECONDARY COIL RESISTANCE:**  
9.52 ~ 14.28kΩ at 20°C (68°F)





- ① Rear brake switch
- ② Flasher relay
- ③ Neutral switch
- ④ Sidestand switch
- ⑤ Oil level switch
- ⑥ Horn





YB707101

**CHECKING OF SWITCHES**

Check the switches for the continuity between the terminal to determine correct connection.

Read the following for switch inspection.

YB707102

**SWITCH CONNECTION AS SHOWN IN MANUAL**

The manual contains a connection chart as shown left showing the terminal connections of the switches (e.g., main switch, handlebar switch, bracket switch, lighting switch etc.)

The extreme left column indicates the switch positions and the top line indicates the colors of leads connected with the terminals in the switch component.

"○—○" indicates the terminals between which there is a continuity of electricity; i.e., a closed circuit at the respective switch positions.

In this chart:

"R and Br" and "L/W and L/R" are continuous with the "ON" switch position.

"B and B/W" is continuous with the "OFF" switch position.

"B and B/W" is continuous with the "LOCK" switch position.

"B and B/W" and "R and L/R" are continuous with the "P" switch position.

	B	B/W	R	Br	L/W	L/R
ON			○—○	○—○	○	○—○
OFF	○—○					
LOCK	○—○					
P	○—○	○—○	○			○

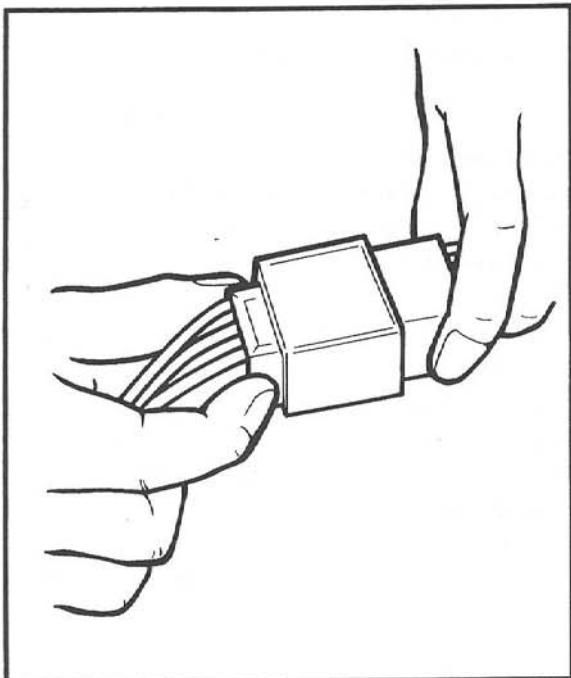


YB707103

**CHECKING SWITCH FOR TERMINAL CONNECTION**

Before checking the switch, refer to the connection chart as shown above and check for the correct terminal connection (closed circuit) by the color combination.

To explain how to check the switch, the main switch taken for example in the following.



1. Disconnect the main switch coupler from the wireharness.

**CAUTION:** —

Never disconnect the main switch coupler by pulling the leads. Otherwise, leads may be pulled off the terminals inside the coupler.

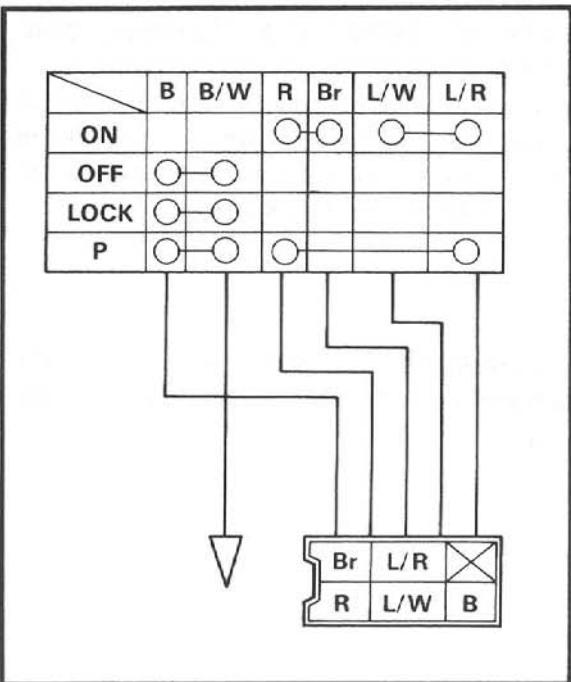
2. Inspect whether any lead is off the terminal inside the coupler. If it is, repair it.

**NOTE:** —

If the coupler is clogged with mud or dust, blow it off by compressed air.

## CHECKING OF SWITCHES

ELEC



3. Use the connection chart to check the color combination for continuity (a closed circuit). In this example, the continuity is as follows.

"R and Br" and "L/W and L/R" are continuous with the "ON" switch position.

"B and B/W" is continuous with the "OFF" switch position.

"B and B/W" is continuous with the "LOCK" switch position.

"B and B/W" and "R and L/R" are continuous with the "P" switch position.

Please note that there is no continuity (an open circuit) at all for the color combinations other than the above.

4. Check the switch component for the continuity between "R and Br".

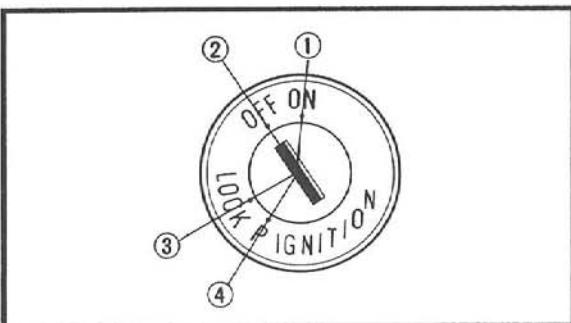
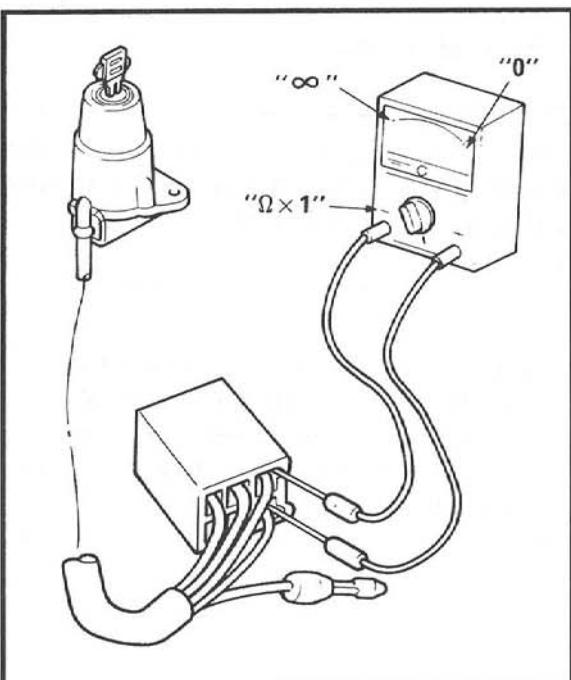
\*\*\*\*\*

### Checking steps:

- Turn the switch key to the "ON", "OFF", "LOCK" and "P" several times.
- Set the pocket tester selector to the "Qx1".
- Connect the tester (+) lead to the "R" lead terminal in the coupler and the (-) lead to the "Br" lead terminal.

### NOTE:

Use thin probes for checking the continuity. Otherwise, the probes may contact other terminals inside the coupler.



- Check the continuity between "R" and "Br" at the respective switch position of "ON" ① , "OFF" ② , "LOCK" ③ , and "P" ④ . There must be continuity (the tester indicating "0") at the "ON" switch position, and there must be no continuity (the tester indicating "∞") at "OFF", "LOCK", or "P". There is something wrong between "R" and "Br" if there is no continuity at the "ON" position or if there is some continuity either at the "OFF" or "LOCK" or "P".

## CHECKING OF SWITCHES



### NOTE:

Check the switch for continuity several times.

\*\*\*\*\*

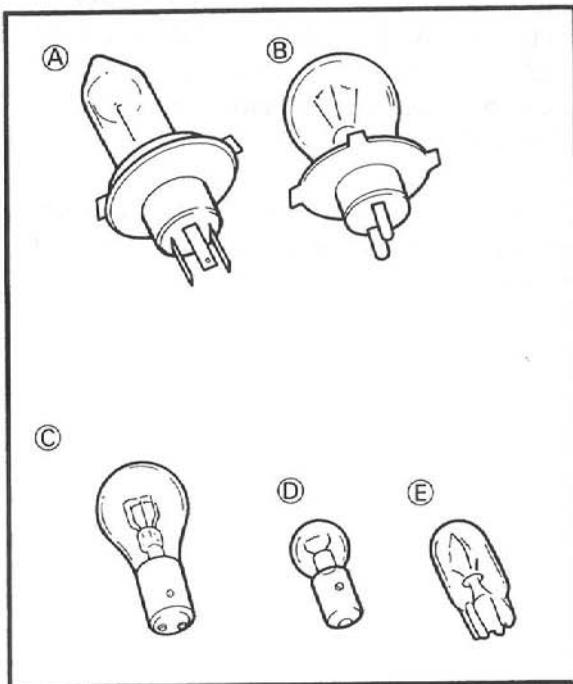
5. Next go on to checking of the continuity between "B" and "B/W", "L/W and L/R", and "R and L/R" at the respective switch positions, as in the same manner mentioned above.
6. If there is something wrong with any one of the combinations, replace the switch component.



YB707104

## CHECKING OF BULBS (FOR HEAD-LIGHT, TAIL/BRAKE LIGHT, FLASHER LIGHT, METER LIGHT, ETC.)

Check the bulb terminal continuity for the condition of the bulb.



EB608110

### KINDS OF BULBS

The bulbs used in the motorcycle are classified as shown left by the shape of the bulb socket.

Ⓐ and Ⓑ are many used for the headlight.

Ⓒ is mainly used for the flasher light and tail /brake light.

Ⓓ and Ⓗ are mainly used for the meter light and other indicator lights.

YB707106

### CHECKING BULB CONDITION

#### 1. Remove the bulb

##### NOTE:

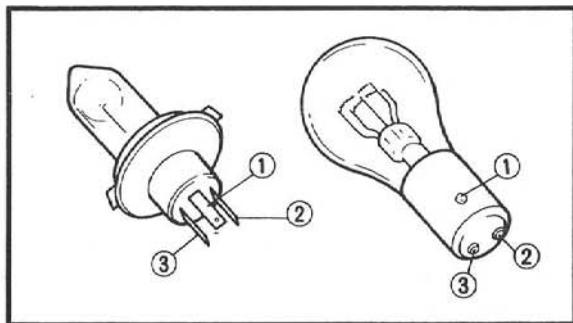
- Bulbs of the Ⓑ and Ⓒ type uses a bulb holder. Remove the bulb holder before removing the bulb itself. Most of the bulb holder for this type can be removed by turning them counterclockwise.
- Most of the bulbs of Ⓓ and Ⓔ type can be removed from the bulb sockets by pushing and turning them counterclockwise.
- Bulbs of the Ⓗ type can be removed from the bulb sockets by simply pulling them out.

**CAUTION:**

Be sure to hold the socket firmly when removing the bulb. Never pull the lead. Otherwise, the lead may be pulled off the terminal in the coupler.

**WARNING**

Keep flammable products or your hands away from the headlight bulb while it is on. It will be hot. Do not touch the bulb until it cools down.

**2. Check the bulb terminals for continuity.**

\*\*\*\*\*

**Checking steps:**

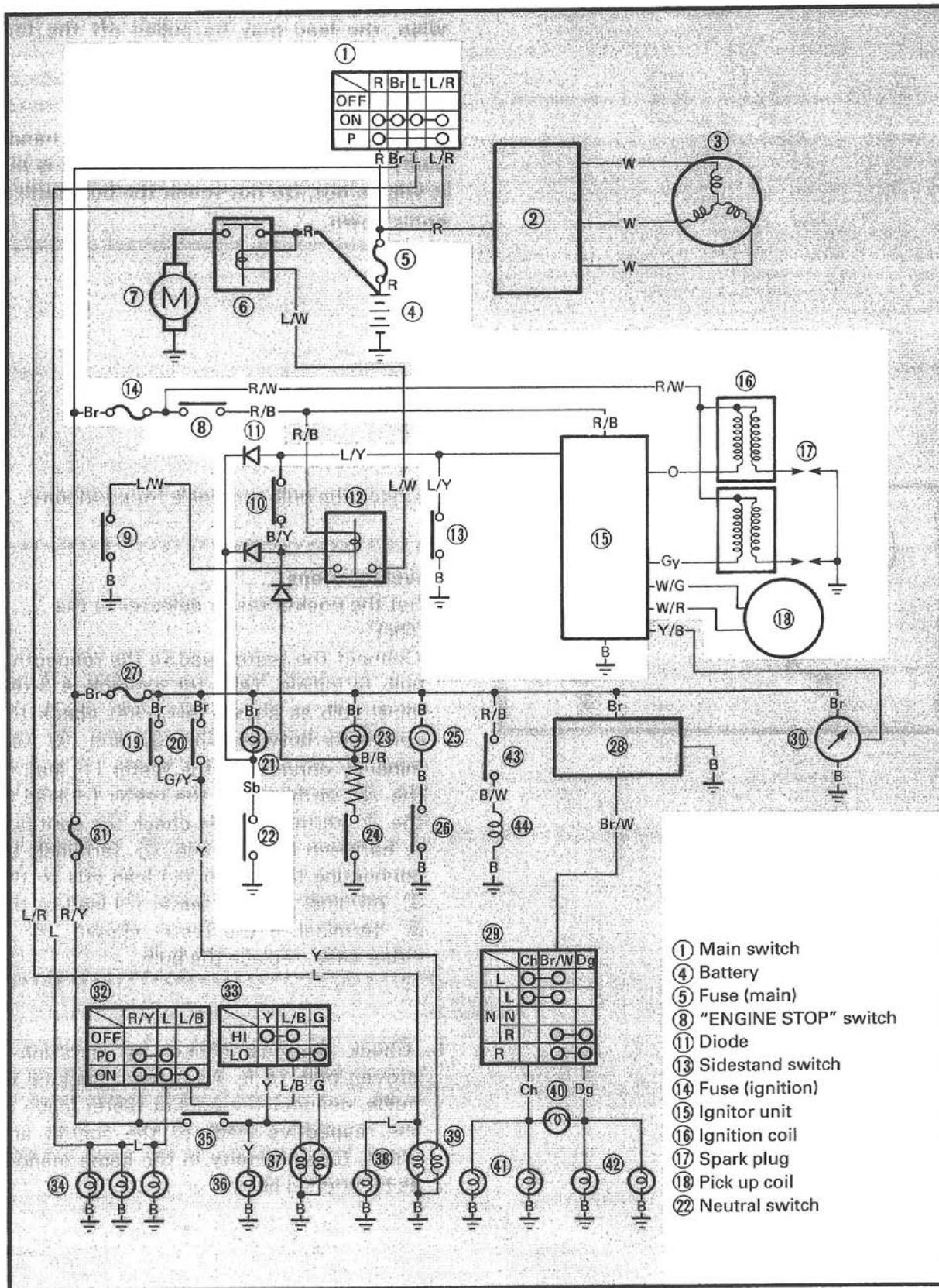
- Set the pocket tester selector to the "Ωx1".
- Connect the tester lead to the respective bulb terminals. Take for example a 3-terminal bulb as shown left. First check the continuity between the ① and ② terminal by connecting the tester (+) lead to the ① terminal and the tester (-) lead to the ② terminal. Then check the continuity between the ① and ③ terminals by connecting the tester (+) lead still to the ① terminal and the tester (-) lead to the ③ terminal. If the tester shows "∞" in either case, replace the bulb.

\*\*\*\*\*

**3. Check the bulb socket by installing a proven bulb to it. As in the checking of bulbs, connect the pocket tester leads to the respective leads of the socket and check for continuity in the same manner as mentioned above.**



## IGNITION SYSTEM CIRCUIT DIAGRAM



- ① Main switch
- ④ Battery
- ⑤ Fuse (main)
- ⑧ "ENGINE STOP" switch
- ⑪ Diode
- ⑬ Sidestand switch
- ⑭ Fuse (ignition)
- ⑮ Ignitor unit
- ⑯ Ignition coil
- ⑰ Spark plug
- ⑱ Pick up coil
- ⑳ Neutral switch



YB707201

**TROUBLESHOOTING**

**IF IGNITION SYSTEM SHOULD BECOME  
INOPERATIVE  
(NO SPARK OR INTERMITTENT  
SPARK)**

YB707202

**Procedure**

Check;

1. Fuse (main and ignition)
2. Battery
3. Spark plug
4. Ignition spark gap
5. Spark plug cap resistance
6. Ignition coil resistance
7. Main switch

YB707203

**NOTE:**

- Remove the following parts before troubleshooting.
- 1) Seat
  - 2) Cowling
  - 3) Side covers (left and right)
  - 4) Fuel tank

YB707204

**1. Fuse (main and ignition)**

- Remove the fuses.
- Connect the pocket tester ( $\Omega \times 1$ ) to the fuses.
- Check the fuses for continuity.



CONTINUITY

NO CONTINUITY

Replace fuse(s).

YB707205

**2. Battery**

- Check the battery condition.  
Refer to the "BATTERY INSPECTION" section in the CHAPTER 3.

**Open circuit voltage:**  
**12.8V or more at 20°C (68°F)**



\*

INCORRECT

- Clean the battery terminals.
- Recharge or replace the battery.



YB707206

**3. Spark plug**

- Check the spark plug condition.
- Check the spark plug type.
- Check the spark plug gap.  
Replace to the "SPARK PLUG INSPECTION" section in the CHAPTER 3.

**Standard spark plug:**

**CR7E(NGK), U22ESR-N(N.D.)**  
**CR8E(NGK), U24ESR-N(N.D.)**  
**CR9E(NGK), U27ESR-N(N.D.)**



**Spark plug gap:**  
**0.7~0.8 mm (0.028~0.031 in)**

**INCORRECT**

Repair or replace spark plug.

YB707207

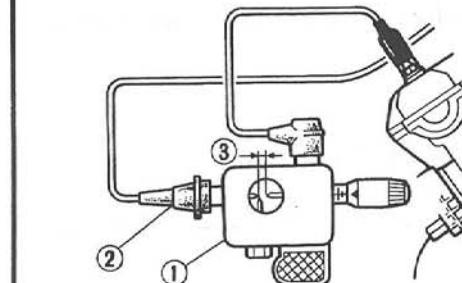
**4. Ignition spark gap**

- Disconnect the spark plug cap from spark plug.
- Connect the ignition checker ① as shown.
- ② Spark plug cap
- Turn the main switch to "ON".

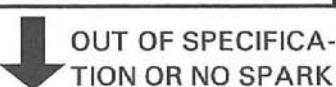
- Check the ignition spark gap ③.
- Start engine, and increase spark gap until misfire occurs.



**Minimum spark gap:**  
**6.0 mm (0.24 in)**

**MEETS SPECIFICATION**

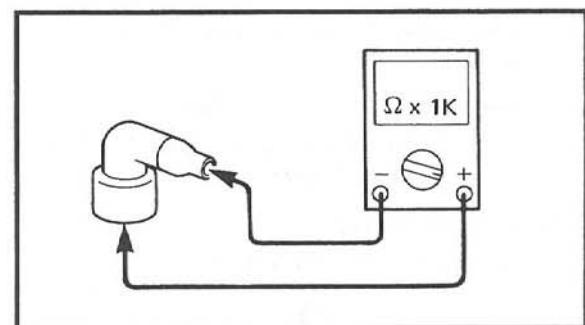
Ignition system is good.



YB707208

**5. Spark plug cap resistance**

- Remove the spark plug cap.
- Connect the pocket tester ( $\Omega \times 1k$ ) to the spark plug cap.





- Check the spark plug cap for specified resistance.



**Spark plug cap resistance:**  
9~11 kΩ at 20°C (68°F)

**MEETS SPECIFICATION**

YB707209

#### 6. Ignition coil resistance

- Disconnect the ignition coil coupler from the wireharness.
- Connect the pocket tester ( $\Omega \times 1$ ) to the ignition coil.



**Primary coil resistance:**  
1.92~2.88 Ω at 20°C (68°F)

- Connect the pocket tester ( $\Omega \times 1k$ ) to the ignition coil.



**Secondary coil resistance:**  
9.52~14.28 kΩ at 20°C (68°F)  
(Spark plug lead-Spark plug lead)

**BOTH MEET SPECIFICATION**

YB707210

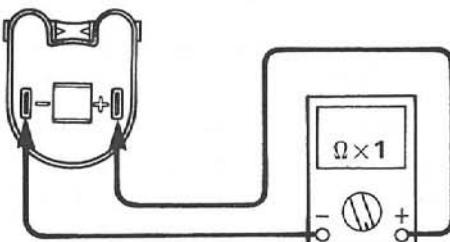
#### 7. Main switch

- Disconnect the main switch coupler ① from the wireharness.
- Check the switch component for the continuity between "Red ②" and Brown ③". Refer to the "CHECKING OF SWITCHES" section.

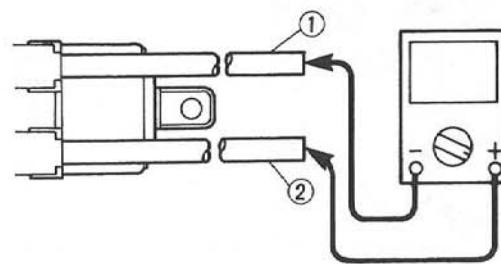
**OUT OF SPECIFICATION**

Replace spark plug cap.

**Tester (+) lead → Terminal  
Tester (-) lead → Terminal**

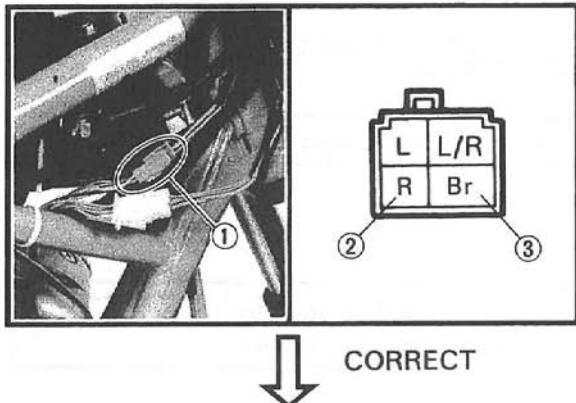


**Tester (+) lead → Spark plug lead ①  
Tester (-) lead → Spark plug lead ②**



**OUT OF SPECIFICATION**

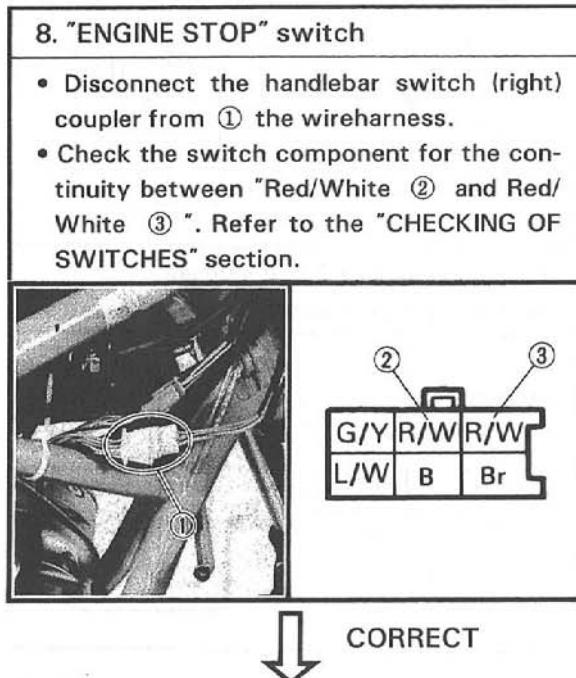
Replace ignition coil.



YB707211

INCORRECT

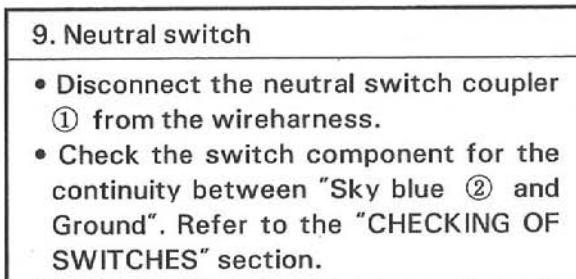
Replace main switch.

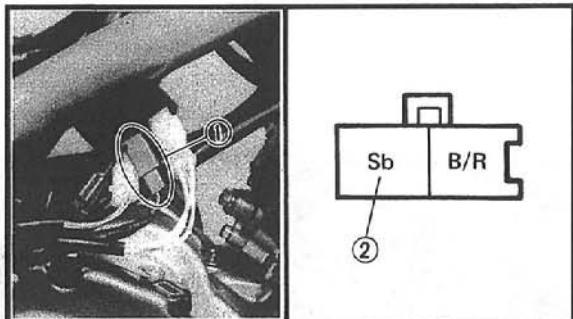


YB707212

INCORRECT

Replace handlebar switch (right).



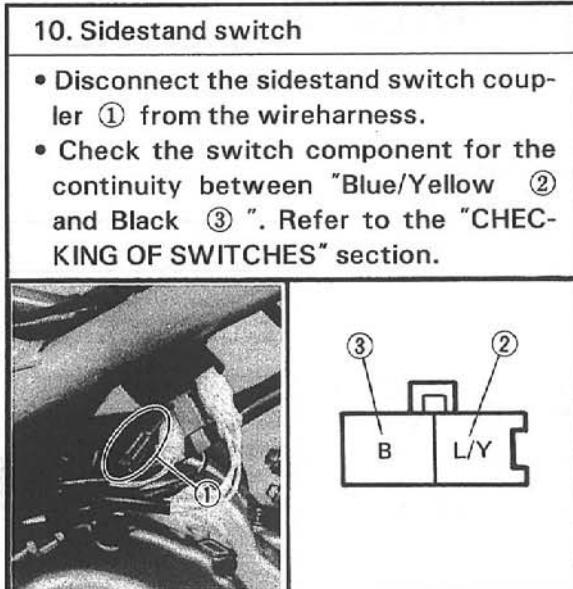


**CORRECT**

YB707213

**INCORRECT**

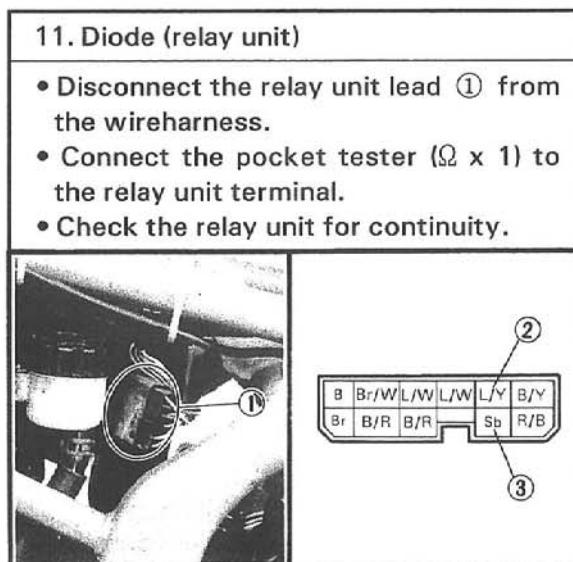
Replace neutral switch.

**CORRECT**

YB707214

**INCORRECT**

Replace sidestand switch.



**\***

**CORRECT****11. Diode (relay unit)**

- Disconnect the relay unit lead ① from the wireharness.
- Connect the pocket tester ( $\Omega \times 1$ ) to the relay unit terminal.
- Check the relay unit for continuity.

Tester (+) lead → Blue/Yellow terminal ②  
Tester (-) lead → Sky blue terminal ③

**NO CONTINUITY**

Replace relay unit.



\*  
↓ CONTINUITY

YB707215

**12. Pickup coil resistance**

- Disconnect the pickup coil coupler ① from the wireharness.
- Connect the pocket tester ( $\Omega \times 100$ ) to the pickup coil terminal.

Tester (+) lead → White/Red ② terminal  
 Tester (-) lead → White/Green ③ terminal

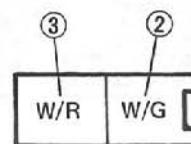
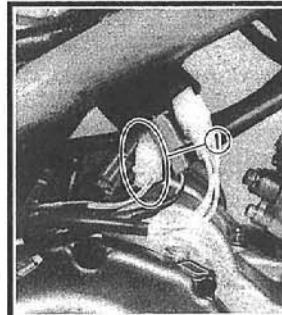
- Check the pickup coil for specified resistance.



**Pickup coil resistance:**  
 304~456  $\Omega$  at 20°C (68°F)  
 (White/Red-White/Green)

↓ MEET SPECIFICATION

YB707216



OUT OF SPECIFICATION

Replace pickup coil.

**13. Wiring connection**

- Check the entire ignition system for connections.  
 Refer to the "WIRING DIAGRAM" section.

↓ CORRECT

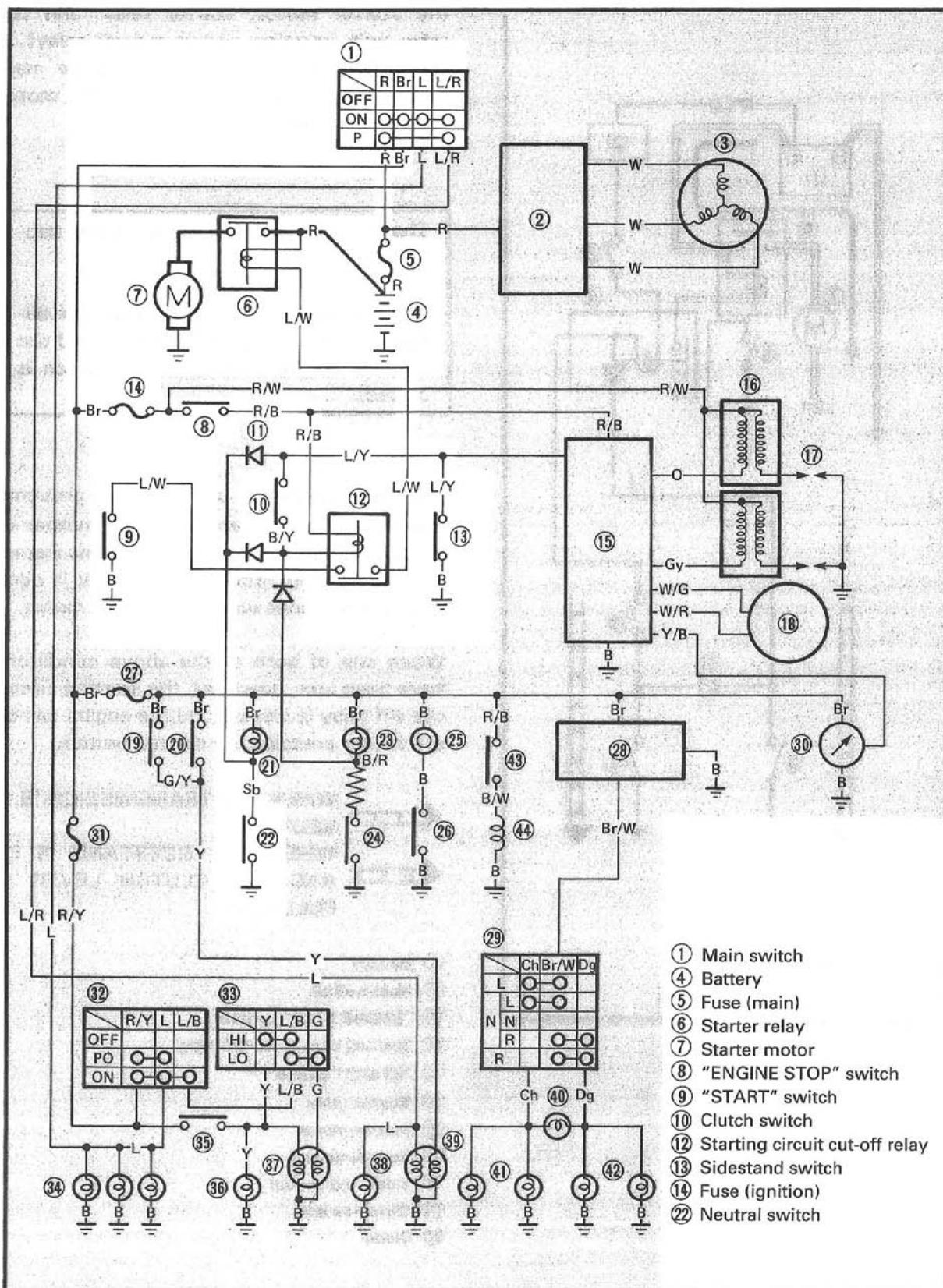
POOR CONNECTION

Correct.

Replace digital ignitor unit.



## ELECTRIC STARTING SYSTEM CIRCUIT DIAGRAM

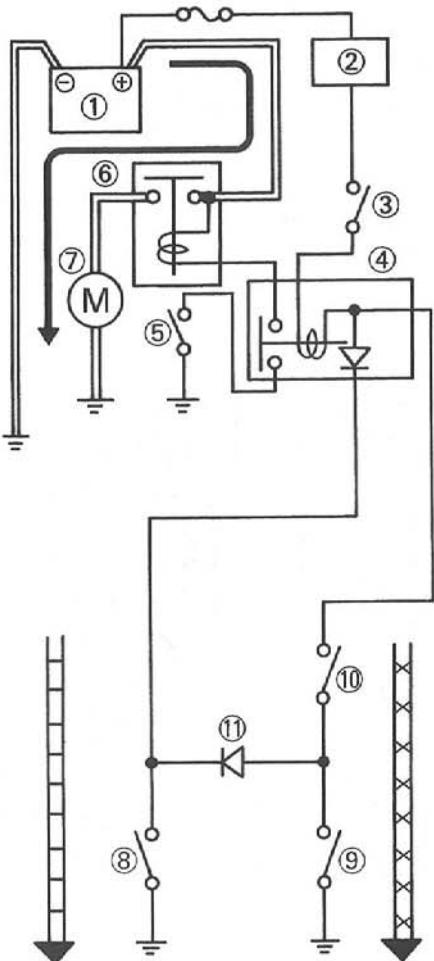




YB707301

**STARTING CIRCUIT OPERATION**

The starting circuit on this model consist of the starter motor, starter relay, and the relay unit (starting circuit cut-off relay). If the "ENGINE STOP" switch and the main switch are both closed, the starter motor can operate only if:



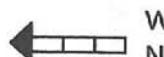
The transmission is in neutral (the neutral switch is closed).

**or if**

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

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

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



WHEN THE TRANSMISSION IS IN NEUTRAL



WHEN THE CLUTCH LEVER IS PULLED IN

- ① Battery
- ② Main switch
- ③ "ENGINE STOP" switch
- ④ Starting circuit cut-off relay
- ⑤ "START" switch
- ⑥ Starter relay
- ⑦ Starter motor
- ⑧ Neutral switch
- ⑨ Sidestand switch
- ⑩ Clutch switch
- ⑪ Diode



YB707302

**TROUBLESHOOTING**
**STARTER MOTOR DOES NOT OPERATE.**

YB707303

**Procedure****Check:**

1. Fuse (main and ignition)
2. Battery
3. Starter motor
4. Starter relay
5. Starting circuit cut off relay
6. Main switch
7. "ENGINE STOP" switch
8. Neutral switch
9. Sidestand switch
10. Clutch switch
11. "START" switch
12. Wiring connection  
(entire electric starting system)

YB707304

**NOTE:** \_\_\_\_\_

Remove the following parts before troubleshooting.

- 1) Seat
- 2) Side covers (left and right)
- 3) Fuel tank
- 4) Cowling


**Pocket tester:  
90890-03112**

YB707305

**1. Fuse (main and ignition)**

- Remove the fuses.
- Connect the pocket tester ( $\Omega \times 1$ ) to the fuses.
- Check the fuses for continuity.

NO CONTINUITY

Replace fuse(s).



CONTINUITY

YB707306

**2. Battery**

- Check the battery condition.  
Refer to the "BATTERY INSPECTION" section in the CHAPTER 3.

**Open circuit voltage:  
12.8V or more at 20°C (68°F)**

INCORRECT

- Clean the battery terminals.
- Recharge or replace the battery.



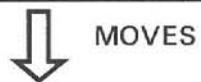
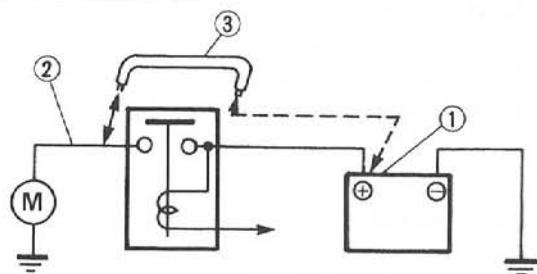
\*



YB707307

**3. Starter motor**

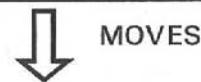
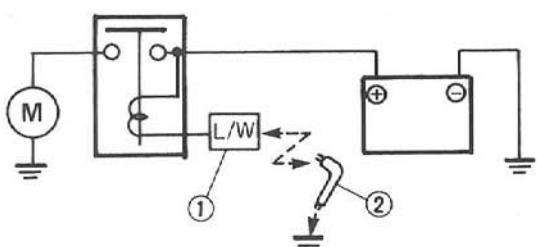
- Connect the battery positive terminal ① and starter motor cable ② using a jumper lead ③ \*.
- Check the starter motor for operation.



YB707308

**4. Starter relay**

- Disconnect the starter relay lead from the wireharness.
- Ground the starter relay lead "Blue/White" ① to the frame using the jumper lead ② .
- Check the starter motor for operation.



YB707309

**5. Starting circuit cut-off relay (relay unit)**

- Disconnect the relay unit lead from the wireharness.
- Connect the pocket tester ( $\Omega \times 1$ ) and battery (12 V) to the relay unit coupler terminals.



- A wire for jumper lead must have the equivalent capacity as that of the battery lead or more, otherwise it may cause the jumper lead to be burned.
- This check is likely to produce sparks, so be sure that no flammable gas or fluid is in the vicinity.

DOES NOT MOVE

Repair or replace starter motor.

DOES NOT MOVE

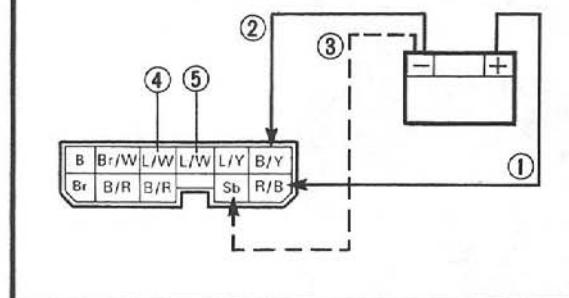
Replace starter relay.

**Step 1.**

- Battery (+) terminal → Red/Black ① terminal.
- Battery (-) terminal → Black/Yellow ② terminal.

**Step 2.**

- Battery (+) terminal → Red/Black ① terminal.
- Battery (-) terminal → Sky blue ③ terminal.



Tester (+) lead → Blue/White ④ terminal

Tester (-) lead → Blue/White ⑤ terminal

- Check the starting circuit cut-off relay for continuity.

NO CONTINUITY

Replace relay unit assembly.

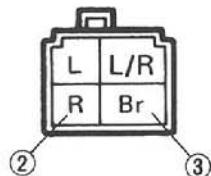
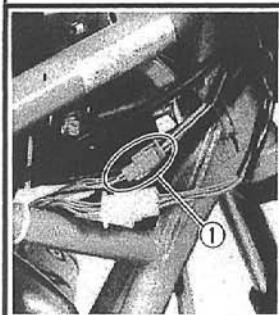


CONTINUITY

YB707310

**6. Main switch**

- Disconnect the main switch coupler ① from the wireharness.
- Check the switch component for the continuity between "Red ②" and Brown ③". Refer to the "CHECKING OF SWITCHES" section.



INCORRECT

Replace main switch.

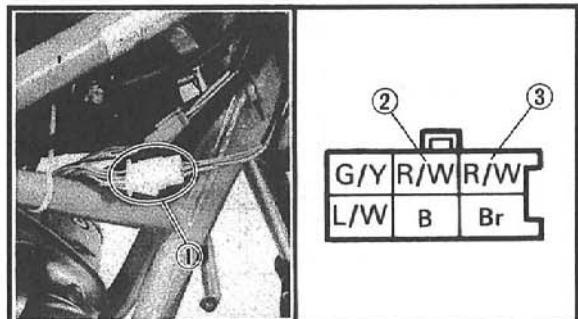


CORRECT

YB707311

**7. "ENGINE STOP" switch**

- Disconnect the handlebar switch (right) coupler from ① the wireharness.
- Check the switch component for the continuity between "Red/White ②" and Red/White ③". Refer to the "CHECKING OF SWITCHES" section.



INCORRECT

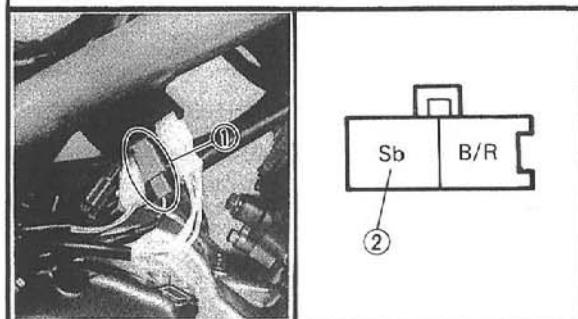
Replace handlebar switch (right).

CORRECT

YB707312

**8. Neutral switch**

- Disconnect the neutral switch coupler ① from the wireharness.
- Check the switch component for the continuity between "Sky blue ② and Ground". Refer to the "CHECKING OF SWITCHES" section.



INCORRECT

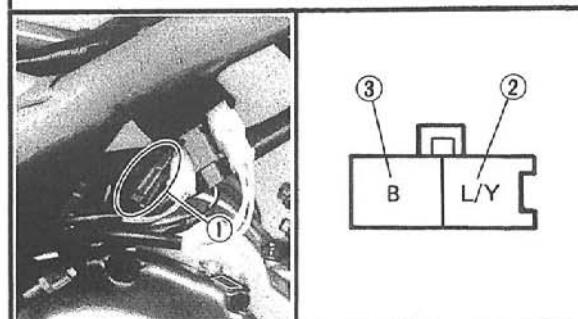
Replace neutral switch.

CORRECT

YB707313

**9. Sidestand switch**

- Disconnect the sidestand switch coupler ① from the wireharness.
- Check the switch component for the continuity between "Blue/Yellow ② and Black ③". Refer to the "CHECKING OF SWITCHES" section.



INCORRECT

Replace sidestand switch.

CORRECT

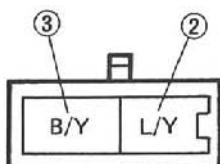
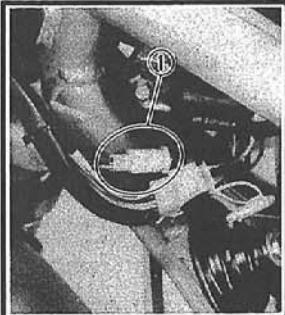
\*



YB707314

**10. Clutch switch**

- Disconnect the handlebar switch (left) coupler ① from wireharness.
- Check the clutch switch component for the continuity between "Blue/Yellow ② and Black/Yellow ③". Refer to the "CHECKING OF SWITCHES" section.

**INCORRECT**

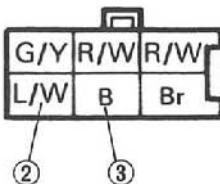
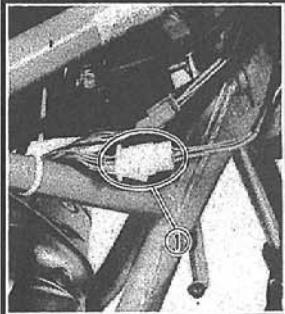
Replace the clutch switch.

**CORRECT**

YB707315

**11. "START" switch**

- Disconnect handlebar switch (right) coupler ① from wireharness.
- Check the "START" switch component for the continuity between "Blue/White ② and Black ③". Refer to the "CHECKING OF SWITCHES" section.

**INCORRECT**

Replace handlebar switch (right).

**CORRECT**

YB707316

**12. Wiring connection**

- Check the entire starting system for connections.  
Refer to the "WIRING DIAGRAM" section.

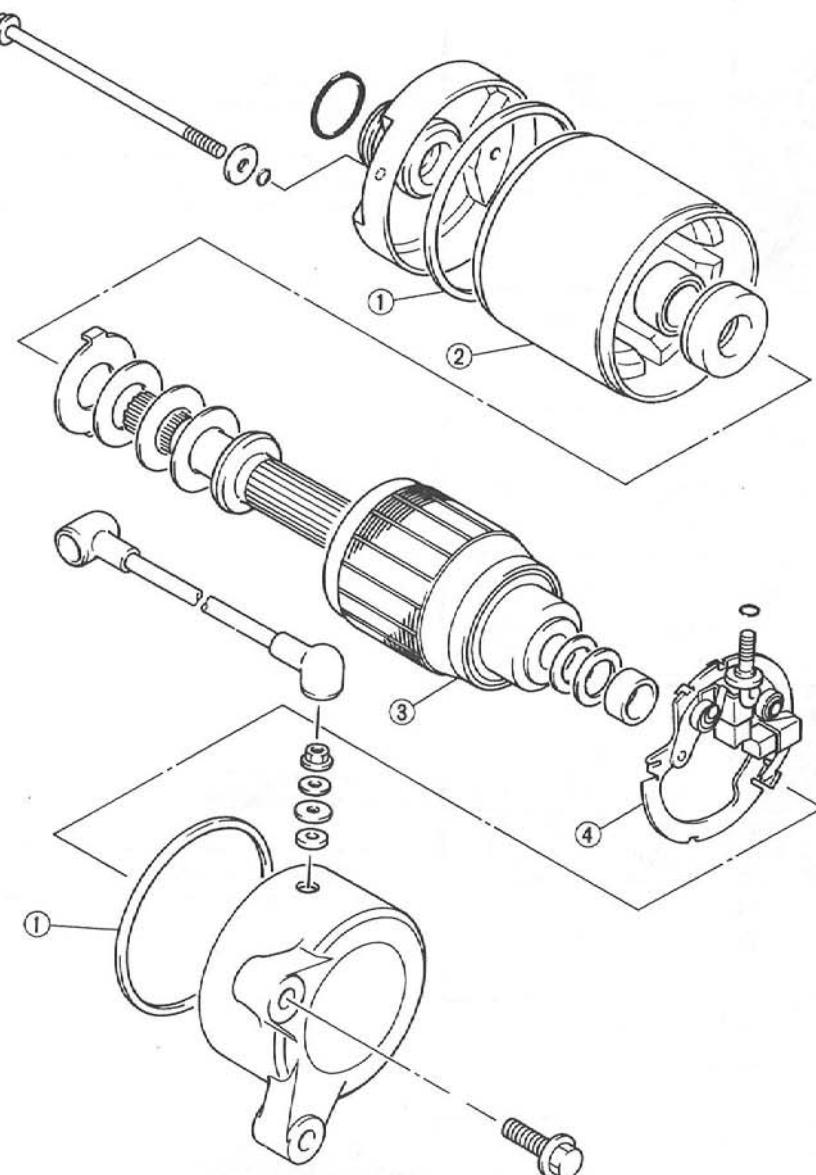
**POOR CONNECTION**

Correct.

**STARTER MOTOR**

- ① O-ring
- ② Yoke
- ③ Armature
- ④ Brush

A	ARMATURE COIL RESISTANCE: 3.9 ~ 4.7Ω at 20°C (68°F)
B	BRUSH WEAR LIMIT: 4 mm (0.16 in)
C	COMMUTATOR WEAR LIMIT: 27 mm (1.06 in)
D	MICA UNDERCUT: 0.8 mm (0.03 in)





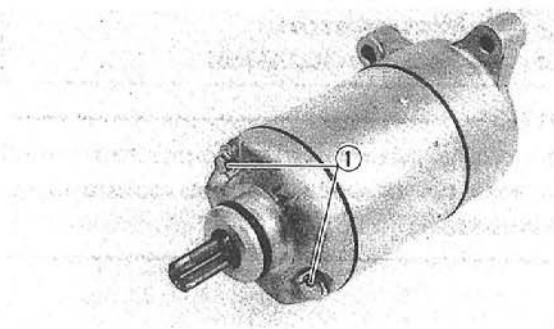
YB707317

**Removal**

## 1. Remove:

- Starter motor

Refer to the "ENGINE OVERHAUL—ENGINE DISASSEMBLY" section in the CHAPTER 4.

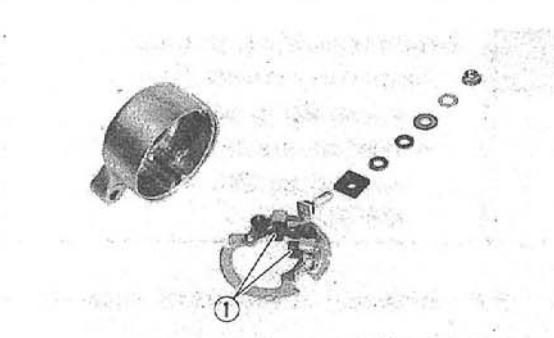
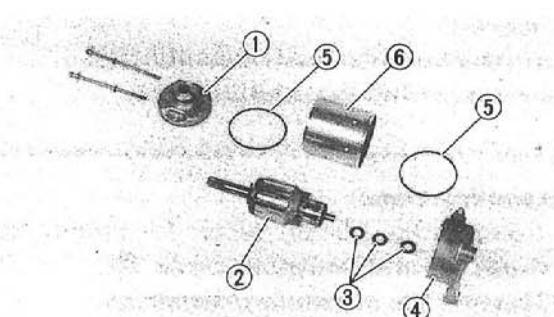


YB707318

**Disassembly**

## 1. Remove:

- Bolts ①

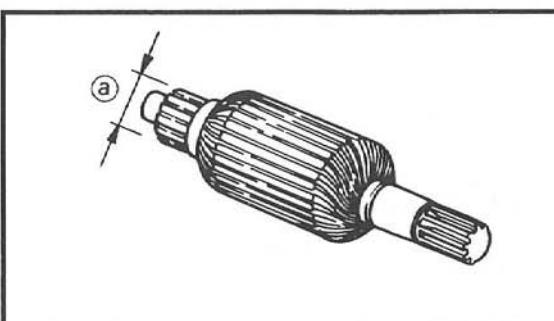


## 2. Remove:

- Bracket ①
- Washers
- Armature ②
- Shims ③
- Bracket ④
- O-rings ⑤
- Yoke ⑥

## 3. Remove:

- Brushes ①



YB707319

**Inspection and repair**

## 1. Inspect:

- Commutator

Dirty → Clean it with #600 grit sandpaper.

## 2. Measure:

- Commutator diameter ②

Out of specification → Replace starter motor.



**Commutator wear limit:**  
27 mm (1.06 in)

### 3. Measure:

- Mica undercut ②

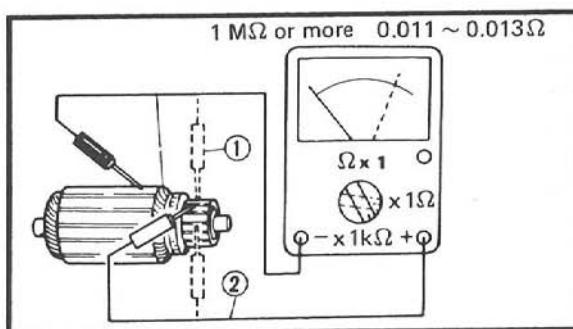
Out of specification → Scrape the mica to proper value use a hacksaw blade can be ground to fit.



**Mica undercut:**  
0.8 mm (0.031 in)

### NOTE:

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



### 4. Inspect:

- Armature coil (insulation/continuity)  
Defects → Replace starter motor.

\*\*\*\*\*

### Inspecting steps:

- Connect the pocket tester for continuity check ① and insulation check ② .
- Measure the armature resistances.



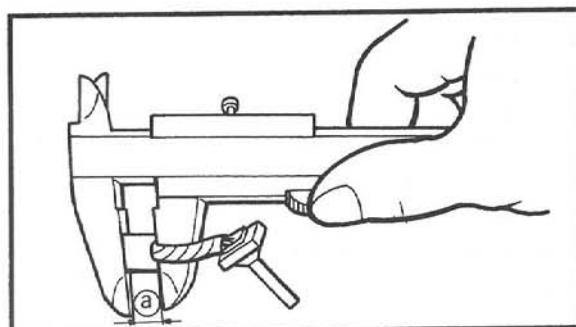
#### Armature coil resistance:

**Continuity check ① :**

0 Ω at 20 °C (68°F)

**Insulation check ② :**

More than 1MΩ at 20°C  
(68°F)



- If the resistance is incorrect, replace the starter motor.

\*\*\*\*\*

### 5. Measure:

- Brush length ②  
Out of specification → Replace.



**Brush length limit:**  
4 mm (0.16 in)



#### **6. Measure:**

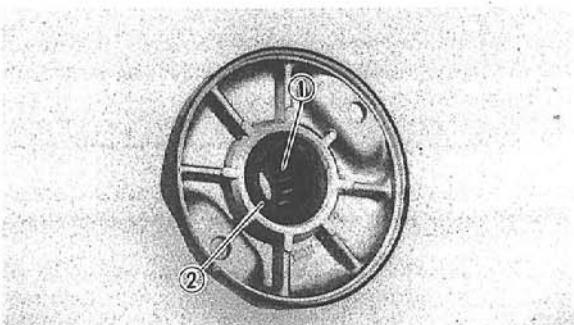
- Brush spring force

Fatigue/Out of specification → Replace as a set.



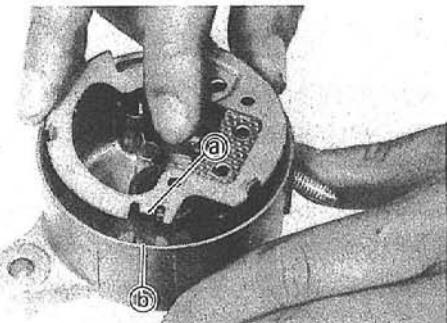
### **Brush spring force:**

**340~460 g (12.0~16.2 oz)**



### 7. Inspect:

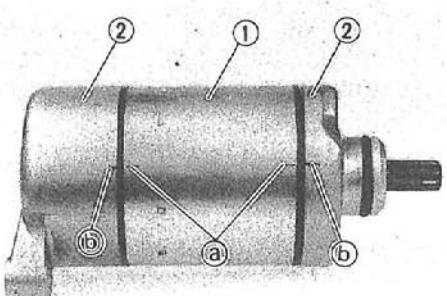
- Bearing ①
  - Oil seal ②



YB707320

## Assembly

Reserve the "Removal" procedure.  
Note the following points.

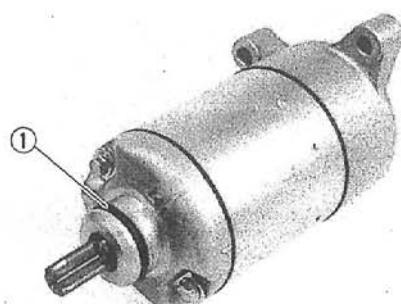


## 2 Install:

- Yoke ①
  - Brackets ②

**NOTE:**

Align the match marks ④ on the yoke with the match marks on the brackets ⑤.



YBZ07331

## Installation

## 1. Install:

- Starter motor

**NOTE:**

Apply a lightly grease to the O-ring ①.

## ELECTRIC STARTING SYSTEM

ELEC 



Bolt (starter motor):

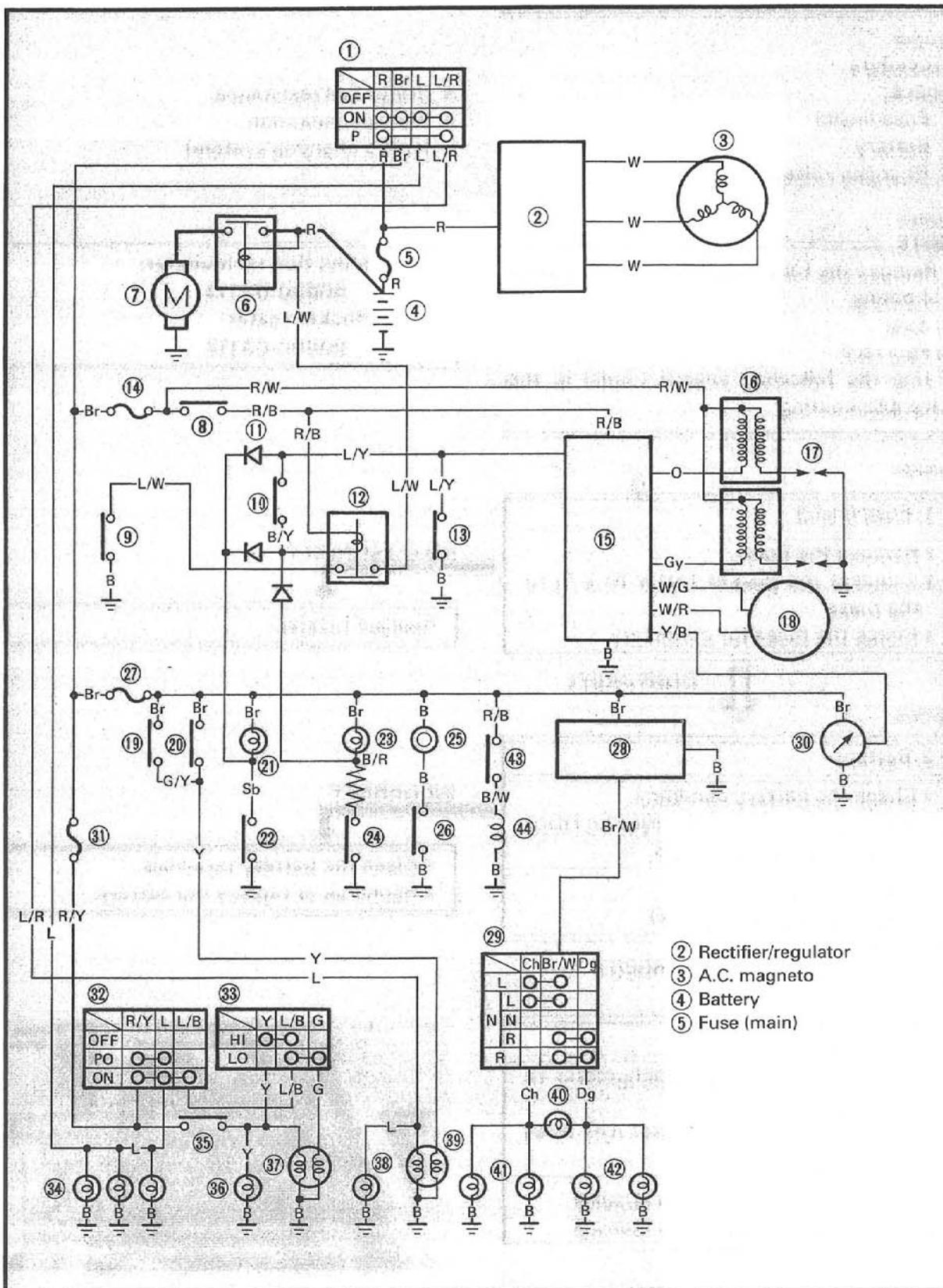
10 Nm (1.0 m · kg, 7.2 ft · lb)

Refer to the "ENGINE OVERHAUL—ENGINE ASSEMBLY" section in the CHAPTER 4.



## CHARGING SYSTEM

## CIRCUIT DIAGRAM





YB707401

**TROUBLESHOOTING****THE BATTERY IS NOT CHARGED.**

YB707402

**Procedure**

Check;

1. Fuse (main)
2. Battery
3. Charging voltage

YB707403

**NOTE:**

- Remove the following parts before troubleshooting.
  - 1) Seat
  - 2) Fuel tank
- Use the following special tool(s) in this troubleshooting.

4. Stator coil resistance
5. Wiring connection  
(entire charging system)

Inductive tachometer:  
90890-03113Pocket tester:  
90890-03112

YB707404

**1. Fuse (main)**

- Remove the fuses.
- Connect the pocket tester ( $\Omega \times 1$ ) to the fuses.
- Check the fuses for continuity.

NO CONTINUITY

Replace fuse(s).



YB707405

**2. Battery**

- Check the battery condition.  
Refer to the "BATTERY INSPECTION" section in the CHAPTER 3.

**Open circuit voltage:**

12.8V or more at 20°C (68°F)

INCORRECT

- Clean the battery terminals.
- Recharge or replace the battery.



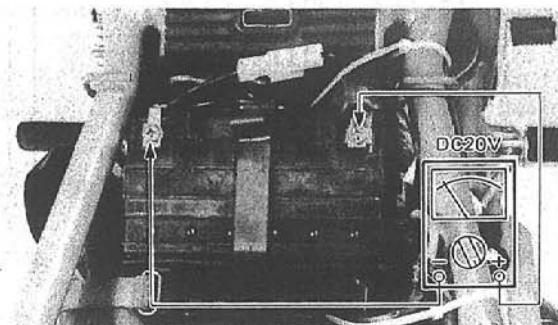
YB707406

**3. Charging voltage**

- Connect the inductive tachometer to spark plug lead.
- Connect the pocket tester (DC 20 V) to the battery.

Tester (+) lead → Battery (+) terminal

Tester (-) lead → Battery (-) terminal





- Start the engine and accelerate to about, 5,000 r/min.
- Check charging voltage.

**Charging voltage:**

14.3~15.3 V at 5,000 r/min

**NOTE:**

Use a full charged battery.

MEETS SPECIFICATION

Charging circuit is good.

↓ OUT OF SPECIFICATION

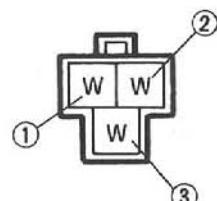
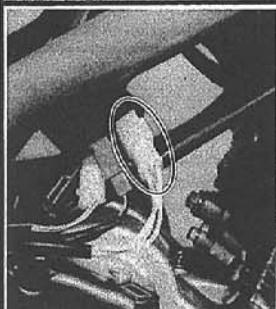
YB707407

**4. Stator coil resistance**

- Remove the generator cover.
- Connect the pocket tester "Ω x 1" to the stator coils.
- Measure the stator coil resistances.

**Stator coil resistance:**

0.32~0.48 Ω at 20°C (68°F)



Tester (+) lead → White lead ①

Tester (-) lead → White lead ②

Tester (+) lead → White lead ①

Tester (-) lead → White lead ③

OUT OF SPECIFICATION

Replace stator assembly.

↓ BOTH MEET SPECIFICATIONS

YB707408

**5. Wiring connection**

- Check the entire ignition system for connections.
- Refer to the "WIRING DIAGRAM" section.

↓ CORRECT

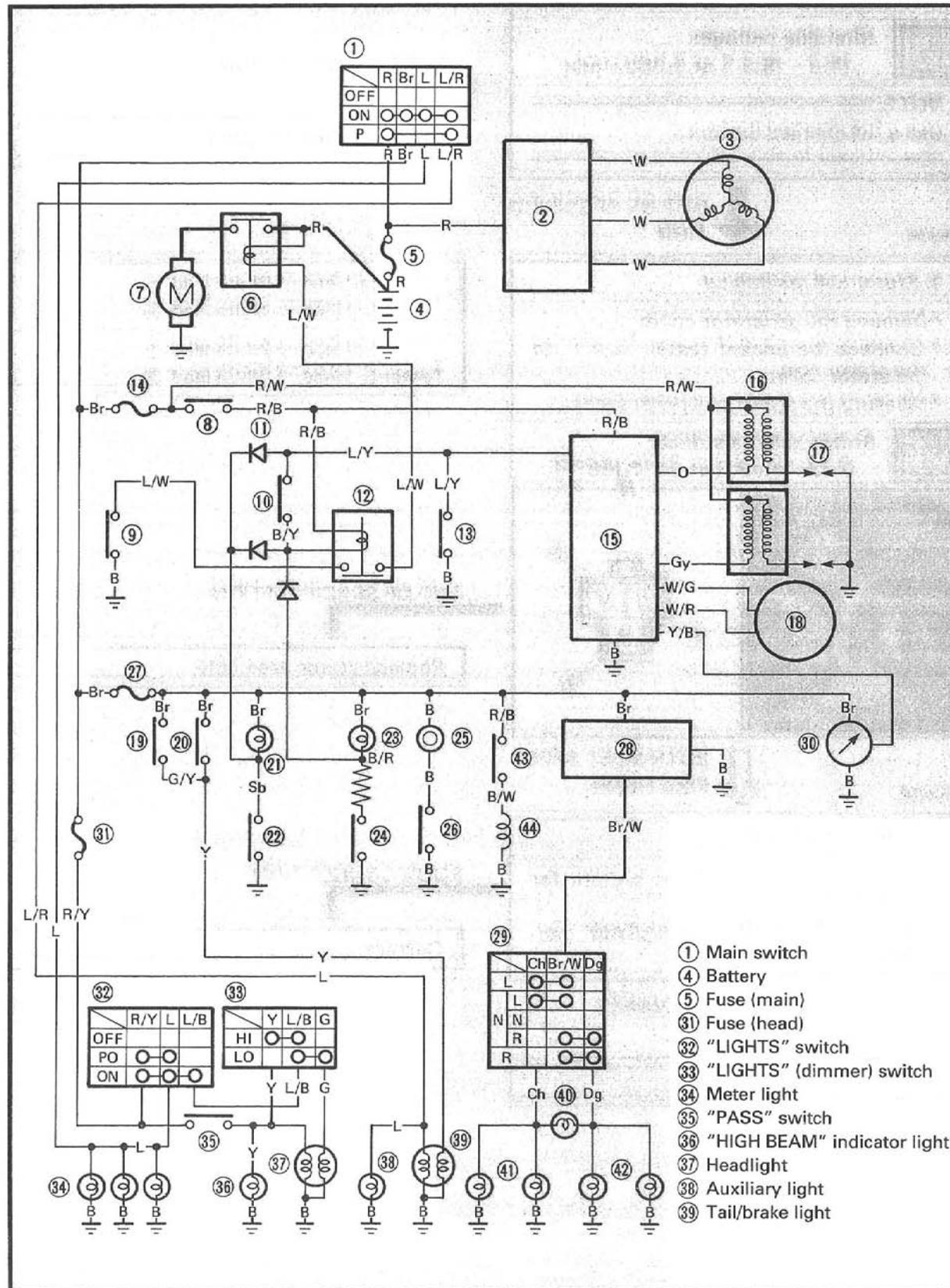
Replace rectifier/regulator.

POOR CONNECTION

Correct.

# LIGHTING SYSTEM

## CIRCUIT DIAGRAM





YB707501

**TROUBLESHOOTING**

**HEADLIGHT "HIGH BEAM" INDICATOR  
LIGHT, TAILIGHT, AND/OR METER  
LIGHT DO NOT COME ON.**

YB707502

**Procedure**

Check:

1. Fuse (main and head)
2. Battery
3. Main switch
4. "LIGHTS" switch
5. "LIGHTS" (Dimmer) switch
6. "PASS" switch
7. Wiring connection (entire lighting system)

YB707503

**NOTE:**

- Remove the following parts before troubleshooting.
- 1) Seat
- 2) Cowling
- Use the following special tool(s) in this troubleshooting.



**Pocket tester:  
P/N 90890-03112**

YB707504

**1. Fuse (main and head)**

- Remove the fuses.
- Connect the pocket tester ( $\Omega \times 1$ ) to the fuses.
- Check the fuses for continuity.



CONTINUITY

NO CONTINUITY

Replace fuse(s).

YB707505

**2. Battery**

- Check the battery condition.  
Refer to the "BATTERY INSPECTION" section in the CHAPTER 3.

**Open circuit voltage:**

12.8V or more at 20°C (68°F)



CORRECT

\*

INCORRECT

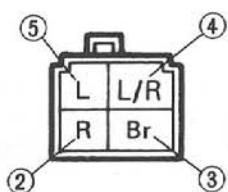
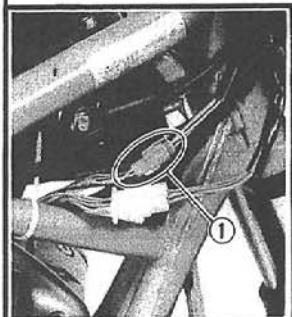
- Clean the battery terminals.
- Recharge or replace the battery.



YB707506

**3. Main switch**

- Disconnect the main switch coupler ① from the wireharness.
- Check the switch component for the continuity between "Red ② and Brown ③", "Blue/Red ④ and Blue ⑤" and "Red ② and Blue/Red ④".



INCORRECT

Replace main switch.

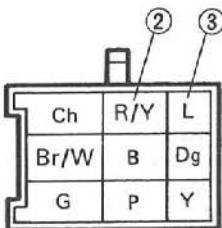
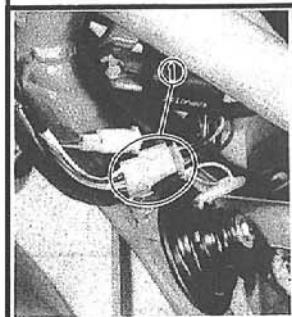


CORRECT

YB707507

**4. "LIGHTS" switch**

- Disconnect the handlebar switch (left) coupler ① from the wireharness.
- Check the switch component for the continuity between "Red/Yellow ② and Blue ③", "Red/Yellow ② and Blue/Black". Refer to the "CHECKING OF SWITCHES" section.



INCORRECT

"LIGHTS" switch is faulty, replace handlebar switch (right).

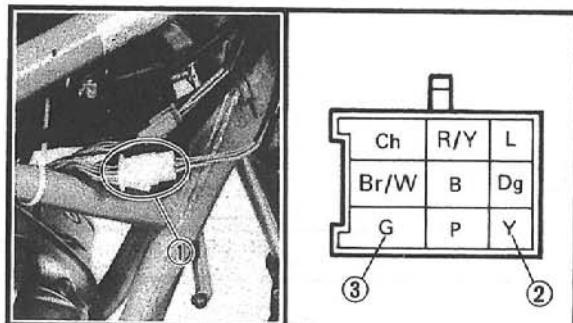


CORRECT

YB707508

**5. "LIGHTS" (Dimmer) switch**

- Disconnect the handlebar switch (left) coupler ① from the wireharness.
- Check the switch component for the continuity between "Blue/Black and Yellow ②" and "Blue/Black and Green ③". Refer to the "CHECKING OF SWITCHES" section.



INCORRECT

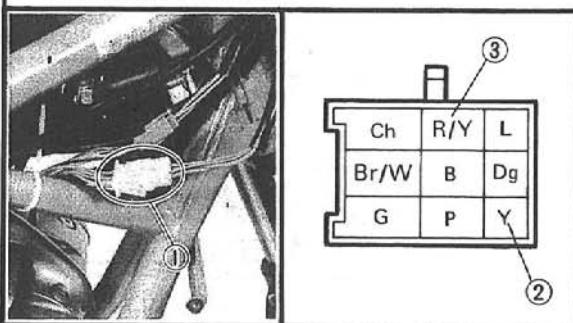
Replace handlebar switch (left).

CORRECT

YB707509

**6. "PASS" switch**

- Disconnect the handlebar switch (left) coupler ① from the wireharness.
- Check the switch component for the continuity between "Yellow ②" and Red/Yellow ③". Refer to the "CHECKING OF SWITCHES" section.



INCORRECT

"PASS" switch is faulty, replace handlebar switch (left).

CORRECT

YB707511

**7. Wiring connection**

- Check the entire lighting system for connections.
- Refer to the "WIRING DIAGRAM" section.

POOR CONNECTION

Correct.

CORRECT

Check condition of each circuit for lighting system.  
Refer to "LIGHTING SYSTEM CHECK" section.



YB707512

**LIGHTING SYSTEM CHECK**

1. Headlight and "HIGH BEAM" indicator light does not come on.

## 1. Bulb and bulb socket

- Check the bulb and bulb socket for continuity. Refer to the "CHECKING OF BULBS" section.

NO CONTINUITY

Replace bulb and/or bulb socket.



CONTINUITY

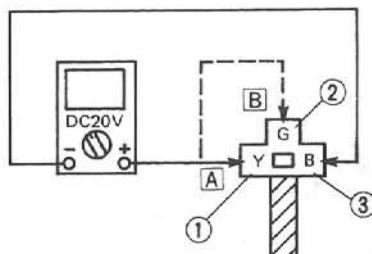
YB707513

## 2. Voltage

- Connect the pocket tester (DC 20 V) to the headlight and "HIGH BEAM" indicator light couplers.

- [A] When "LIGHTS" (dimmer) switch is "LO" position.
- [B] When "LIGHTS" (dimmer) switch is "HI" position.

A



## Head light:

Tester (+) lead → Yellow ① or Green ② lead.

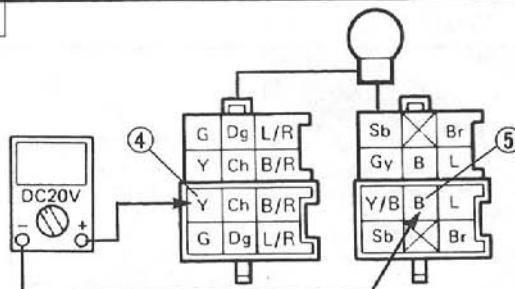
Tester (-) lead → Black ③ lead.

## "HIGH BEAM" indicator light:

Tester (+) lead → Yellow ④ lead

Tester (-) lead → Black ⑤ lead

B



- Turn the main switch to "ON".
- Turn the "LIGHTS" (dimmer) switch to "LO" or "HI" position.
- Check for voltage (12 V) on the "Green" and "Yellow" lead at bulb socket connectors.

OUT OF SPECIFICATION

Wiring circuit from main switch to bulb socket connector is faulty, repair.



MEETS SPECIFICATION

This circuit is good.



YB707514

## 2. Meter light does not come on.

## 1. Bulb and bulb socket

- Check the bulb and bulb socket for continuity. Refer to the "CHECKING OF BULBS" section.

NO CONTINUITY

Replace bulb and/or bulb socket.



CONTINUITY

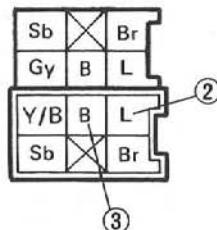
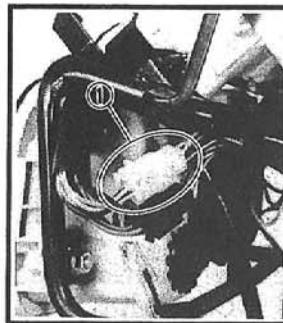
YB707515

## 2. Voltage

- Connect the pocket tester (DC 20 V) to the bulb socket coupler ①.

Tester (+) lead → Blue ② terminal

Tester (-) lead → Black ③ terminal



- Turn the main switch to "ON".
- Check for voltage (12 V) on the "Blue" lead at the bulb socket connector.



MEETS SPECIFICATION

OUT OF SPECIFICATION

Wiring circuit from main switch to bulb socket connector is faulty, repair.

This circuit is good.

YB707516

## 3. Taillight does not come on.

## 1. Bulb and bulb socket

- Check the bulb and bulb socket for continuity. Refer to the "CHECKING OF BULBS" section.

NO CONTINUITY

Replace bulb and/or bulb socket.



CONTINUITY

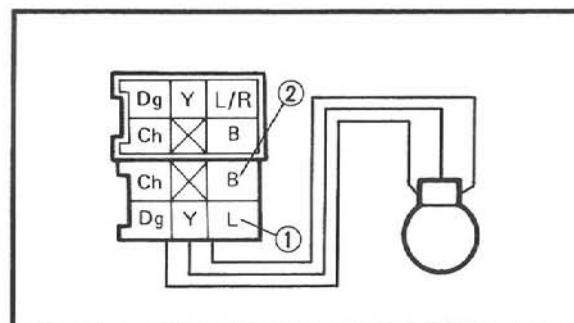
YB707517

## 2. Voltage

- Connect the pocket tester (DC 20 V) to the bulb socket connector.

Tester (+) lead → Blue ① terminal

Tester (-) lead → Black ② terminal



## LIGHTING SYSTEM

ELEC



- Turn the main switch to "ON".
- Check for voltage (12 V) on the "Blue" lead at the bulb socket connector.

MEETS SPECIFICATION

This circuit is good.

OUT OF SPECIFICATION

Wiring circuit from main switch to bulb socket connection is faulty, repair.

YB707518

### 4. Auxiliary light does not come on.

#### 1. Bulb and bulb socket

- Check the bulb and bulb socket for continuity. Refer to the "CHECKING OF BULBS" section.

CONTINUITY

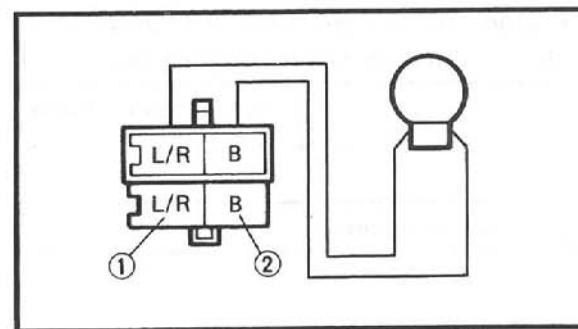
YB707519

#### 2. Voltage

- Connect the pocket tester (DC 20 V) to the bulb socket connector.
- Tester (+) lead → Blue/Red ① lead  
Tester (-) lead → Black ② lead

NO CONTINUITY

Bulb and/or bulb socket are faulty, replace.



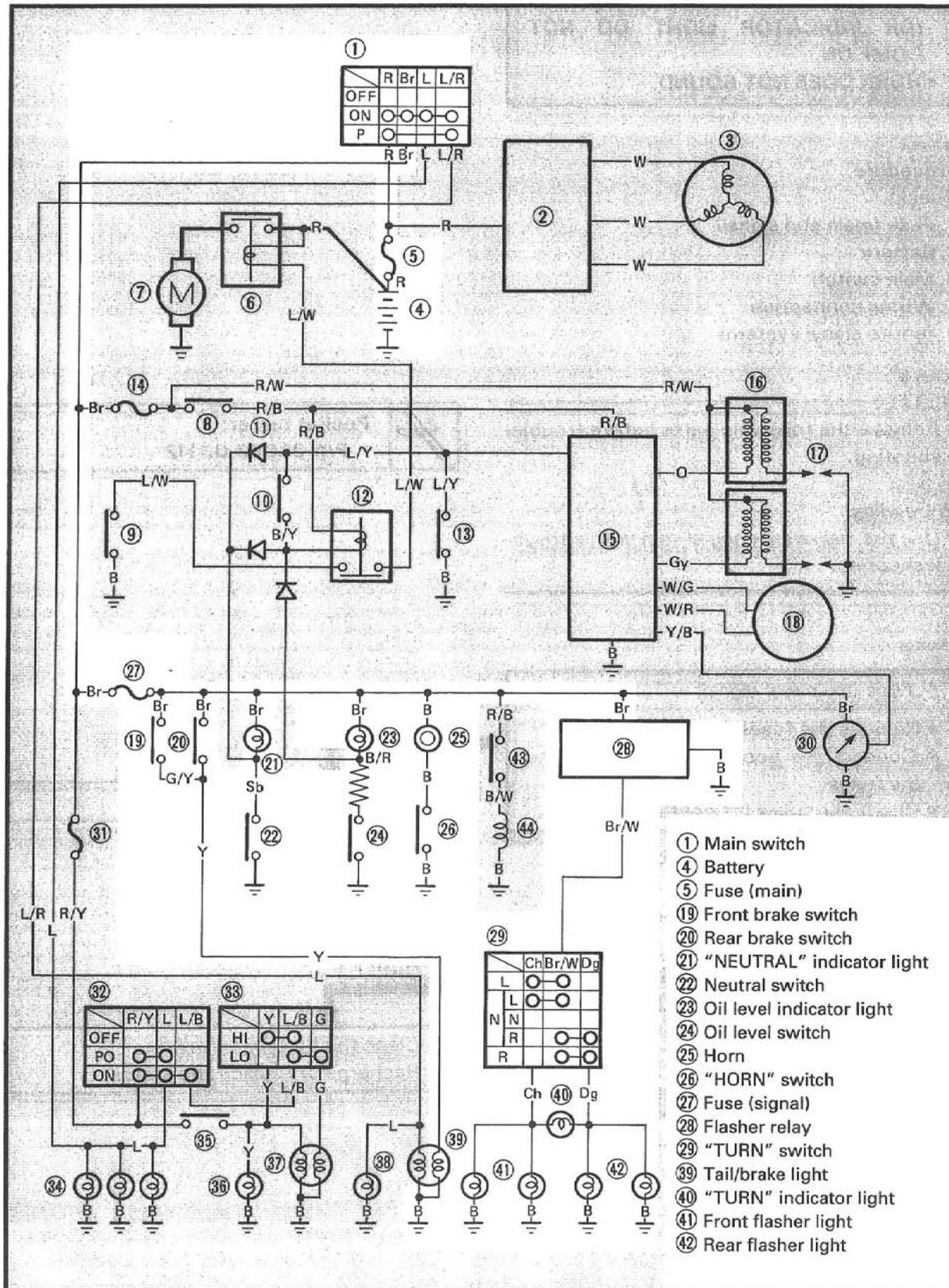
- Turn the main switch to "ON".
- Turn the "LIGHTS" switch to "PO".
- Check for voltage (12 V) on the "Blue/Red" lead at the bulb socket connector.

MEETS SPECIFICATION

This circuit is good.

OUT OF SPECIFICATION

Wiring circuit from main switch to bulb socket connector is faulty, repair.

**SIGNAL SYSTEM****CIRCUIT DIAGRAM**



YB707601

**TROUBLESHOOTING**

- FLASHER LIGHT, BRAKE LIGHT AND /OR INDICATOR LIGHT DO NOT COME ON.
- HORN DOES NOT SOUND.

YB707602

**Procedure**

Check;

1. Fuse (main and signal)
2. Battery
3. Main switch
4. Wiring connection  
(entire signal system)

YB707603

**NOTE:**

- Remove the following parts before troubleshooting.
  - 1) Seat
  - 2) Cowling
- Use the following special tool in this troubleshooting.



**Pocket tester:**  
**P/N 90890-03112**

YB707604

**1. Fuse (main and signal)**

- Remove the fuses.
- Connect the pocket tester ( $\Omega \times 1$ ) to the fuses.
- Check the fuses for continuity.

NO CONTINUITY

Replace fuse(s).



CONTINUITY

YB707605

**2. Battery**

- Check the battery condition.  
Refer to the "BATTERY INSPECTION" section in the CHAPTER 3.

**Open circuit voltage:**

12.8V or more at 20°C (68°F)

INCORRECT

- Clean the battery terminals.
- Recharge or replace the battery.



CORRECT

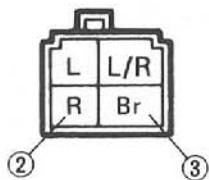
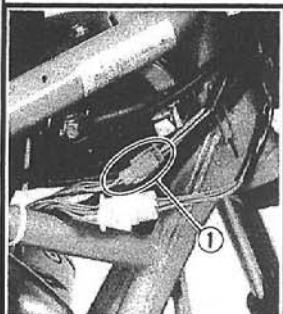
\*



YB707606

### 3. Main switch

- Disconnect the main switch coupler ① from the wireharness.
- Check the switch component for the continuity between "Red ② and Brown ③". Refer to the "CHECKING OF SWITCHES" section.



CORRECT

INCORRECT

Replace main switch.

YB707607

### 4. Wiring connection

- Check the entire signal system for connections.  
Refer to the "WIRING DIAGRAM" section.



CORRECT

POOR CONNECTION

Correct.

Check condition of each circuit for signal system. Refer to "SIGNAL SYSTEM CHECK" section.

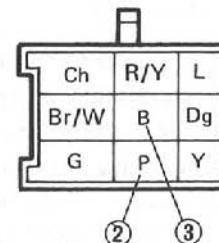
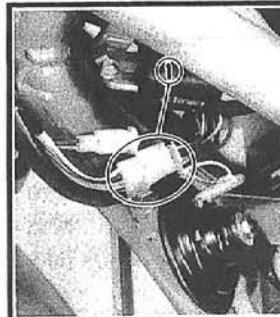


Y8707608

**SIGNAL SYSTEM CHECK**

1. Horn does not sound.

1. "HORN" switch.



- Disconnect the handlebar switch (left) coupler ① from wireharness.
- Check the switch component for the continuity between "Pink ②" and Black ③". Refer to the "CHECKING OF SWITCHES" section.

INCORRECT

Replace handlebar switch (left).

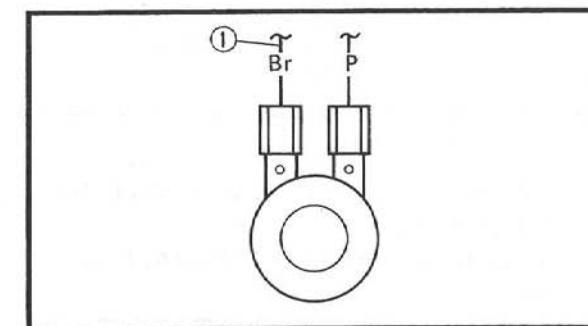


CORRECT

Y8707609

2. Voltage

- Connect the pocket tester (DC 20 V) to the horn lead.
- Tester (+) lead → Brown ① lead**  
**Tester (-) lead → Frame ground**



- Turn the main switch to "ON".
- Check for voltage (12 V) on the "Brown" lead at the horn terminal.



MEETS SPECIFICATION

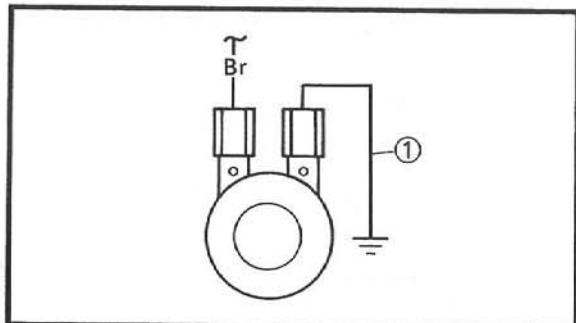
Y8707610

OUT OF SPECIFICATION

Wiring circuit from main switch to horn terminal is faulty, repair.

3. Horn

- Disconnect the "Pink" lead at the horn terminal.
- Connect a jumper lead ① to the horn terminal and ground the jumper lead.
- Turn the main switch to "ON".



HORN IS NOT SOUNDED

YB707611

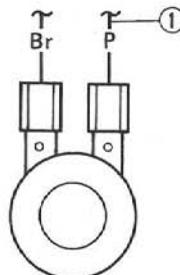
HORN IS SOUNDED

Horn is good.

#### 4. Voltage

- Connect the pocket tester (DC 20 V) to the horn at the "Pink" terminal.

Terminal (+) lead → Pink ① lead  
Terminal (-) lead → Frame ground



- Turn the main switch to "ON".
- Check for voltage (12 V) on the "Pink" lead at the horn terminal.

MEETS SPECIFICATION

Adjust or replace horn.

YB707612

#### 2. Brake light does not come on.

##### 1. Bulb and bulb socket

- Check the bulb and bulb socket for continuity. Refer to the "CHECKING OF BULBS" section.

CONTINUITY

YB707613

NO CONTINUITY

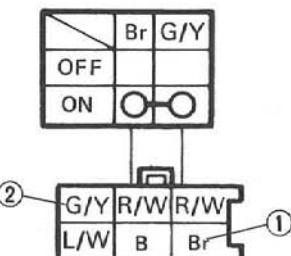
Replace bulb and/or bulb socket.

##### 2. Brake switch

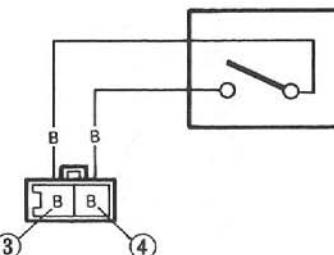
- Disconnect the brake switch coupler from the wireharness.
- Check the switch component for the continuity between "Brown ① and Green/Yellow ②", or "Black ③ and Black ④". Refer to the "CHECKING OF SWITCHES" section.



A



B



A Front brake switch

B Rear brake switch

CORRECT  
↓

IN CORRECT

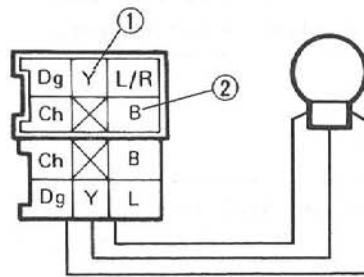
Replace brake switch.

Y8707614

**3. Voltage**

- Connect the pocket tester (DC 20 V) to the bulb socket connector.

**Tester (+) lead → Yellow ① lead**  
**Tester (-) lead → Black ② lead**



- Turn the switch to "ON".
- The brake level is pulled in or brake pedal is stepped down.
- Check for voltage (12 V) on the "Yellow" lead at the bulb socket connector.

↓ MEETS SPECIFICA-  
TION

OUT OF SPECIFICATION

Wiring circuit from main switch to bulb socket connector is faulty, repair.

This circuit is good.



YB707615

3. Flasher light and/or "TURN" indicator light does not blink.

**1. Bulb and bulb socket**

- Check the bulb and bulb socket for continuity. Refer to the "CHECKING OF BULBS" section.

NO CONTINUITY

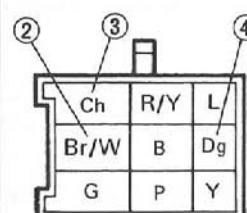
Replace bulb and/or bulb socket.



CONTINUITY

YB707616

**2. "TURN" switch**



- Disconnect the handlebar switch (left) coupler ① from the wireharness.
- Check the switch component for the continuity between "Brown/White ② and Chocolate ③" and "Brown/White ② and Dark green ④". Refer to the "CHECKING OF SWITCHES" section.

IN CORRECT

Replace handlebar switch (left).



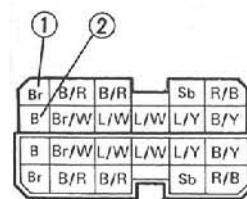
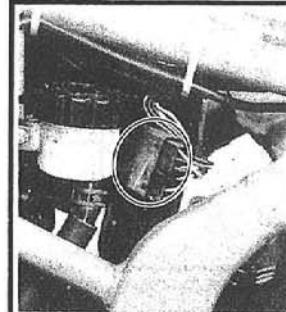
CORRECT

YB707617

**3. Voltage**

- Connect the pocket tester (DC 20 V) to the flasher relay lead.

Tester (+) lead → Brown ① terminal  
Tester (-) lead → Black ② terminal



- Turn the main switch to "ON".
- Check for voltage (12 V) on the "Brown" lead at the flasher relay terminal.

OUT OF SPECIFICATION

Wiring circuit from main switch to flasher relay connector is faulty, repair.



MEETS SPECIFICATION

\*



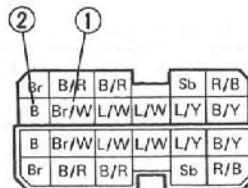
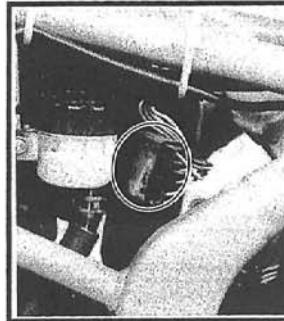
YB707618

**4. Voltage**

- Connect the pocket tester (DC 20 V) to the flasher relay lead.

**Tester (+) lead → Brown/White ① terminal**

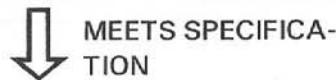
**Tester (-) lead → Black ② terminal**



- Turn the main switch to "ON".
- Check for voltage (12 V) on the "Brown/White" lead at the flasher relay terminal.

**OUT OF SPECIFICATION**

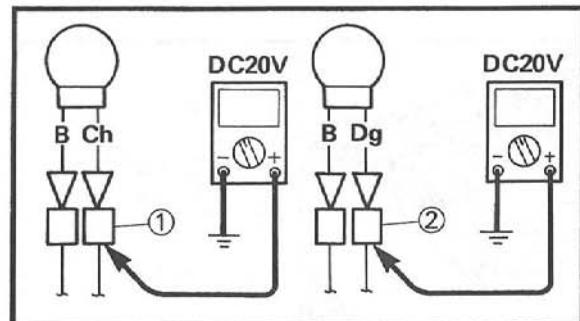
Replace flasher relay.



YB707619

**5. Voltage**

- Connect the pocket tester (DC 20 V) to the bulb socket connector.

**At flasher light (left):**

- Tester (+) lead → Chocolate ① lead  
Tester (-) lead → Frame ground**

**At flasher light (right):**

- Tester (+) lead → Dark green ② lead  
Tester (-) lead → Frame ground**

- Turn the main switch to "ON".
- Turn the "TURN" switch to "L" or "R".
- Check for voltage (12 V) on the "Chocolate" lead or "Dark green" lead at the bulb socket connector.

**OUT OF SPECIFICATION**

Wiring circuit from "TURN" switch to bulb socket connector is faulty, repair.





This circuit is good.

YB707620

4. "NEUTRAL" indicator light does not come on.

**1. Bulb and bulb socket**

- Check the bulb and bulb socket for continuity. Refer to the "CHECKING OF BULBS" section.

**NO CONTINUITY**

Replace bulb and/or bulb socket.

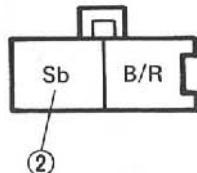
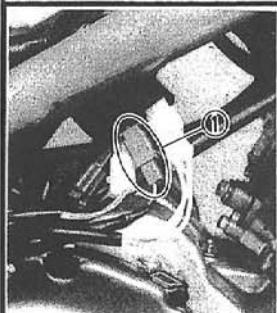


CONTINUITY

YB707621

**2. Neutral switch**

- Disconnect the neutral switch coupler ① from the wireharness.
- Check the switch component for the continuity between "Sky blue ②" and "Ground". Refer to the "CHECKING OF SWITCHES" section.



**IN CORRECT**

Replace neutral switch.

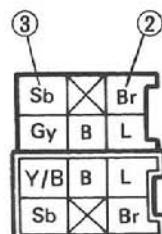
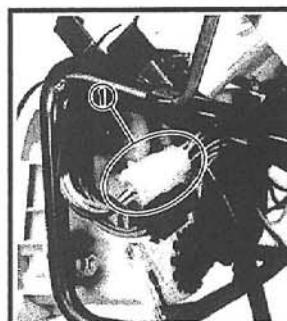


CORRECT

YB707622

**3. Voltage**

- Connect the pocket tester (DC 20 V) to the bulb socket coupler ①.
- Tester (+) lead → Brown ② terminal  
Tester (-) lead → Sky blue ③ terminal





- Turn the main switch to "ON".
- Check for voltage (12 V) on the "Brown" lead at bulb socket connector.

MEETS SPECIFICATION

This circuit is good.

### OUT OF SPECIFICATION

Wiring circuit from main switch to bulb socket connector is faulty, repair.

YB707623

5. "OIL LEVEL" indicator light does not come on, when engine oil level is low.

#### 1. Bulb and bulb socket

- Check the bulb and bulb socket for continuity. Refer to the "CHECKING OF BULBS" section.

### NO CONTINUITY

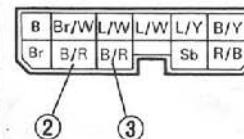
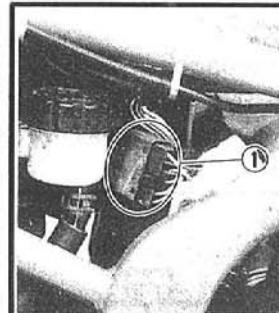
Replace bulb and/or bulb socket.

CONTINUITY

YB707624

#### 2. Resistor

- Remove the relay unit lead ① from the wireharness.
- Connect the pocket tester ( $\Omega \times 1$ ) to the relay unit terminal.



### NO CONTINUITY

Replace relay unit.

- Tester (+) lead → Black/Red ② terminal  
 Tester (-) lead → Black/Red ③ terminal
- Check resistor for continuity.

CONTINUITY  
 \*

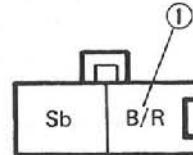
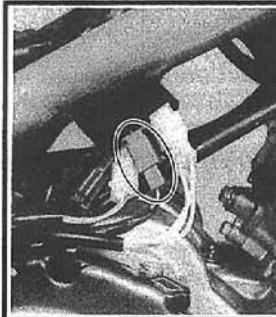


YB707626

**3. Oil level switch**

- Drain the engine oil and remove the oil level switch from the oil pan.
- Connect the pocket tester ( $\Omega \times 1$ ) to the oil level gauge.

Tester (+) lead → Black/Red ① terminal  
 Tester (-) lead → Frame ground



- Check the oil level switch for continuity.



GOOD CONDITION

YB707627

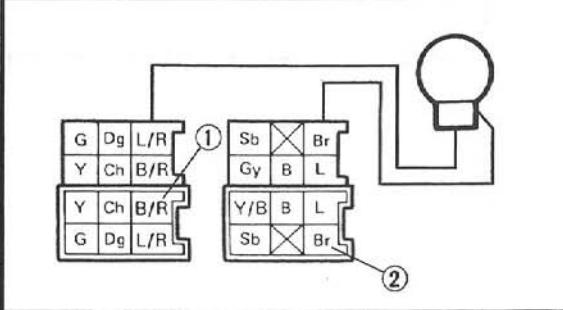
BAD CONDITION

Replace oil level switch.

**4. Voltage**

- Connect the pocket tester (DC 20 V) to the bulb socket connector.

Tester (+) lead → Black/Red ① lead  
 Tester (-) lead → Brown ② lead



- Turn the main switch to "ON".
- Check for voltage (12 V) on the "Brown" lead at bulb socket connector.



MEETS SPECIFICATION

OUT OF SPECIFICATION

Wiring circuit from main switch to bulb socket connector is faulty, repair.

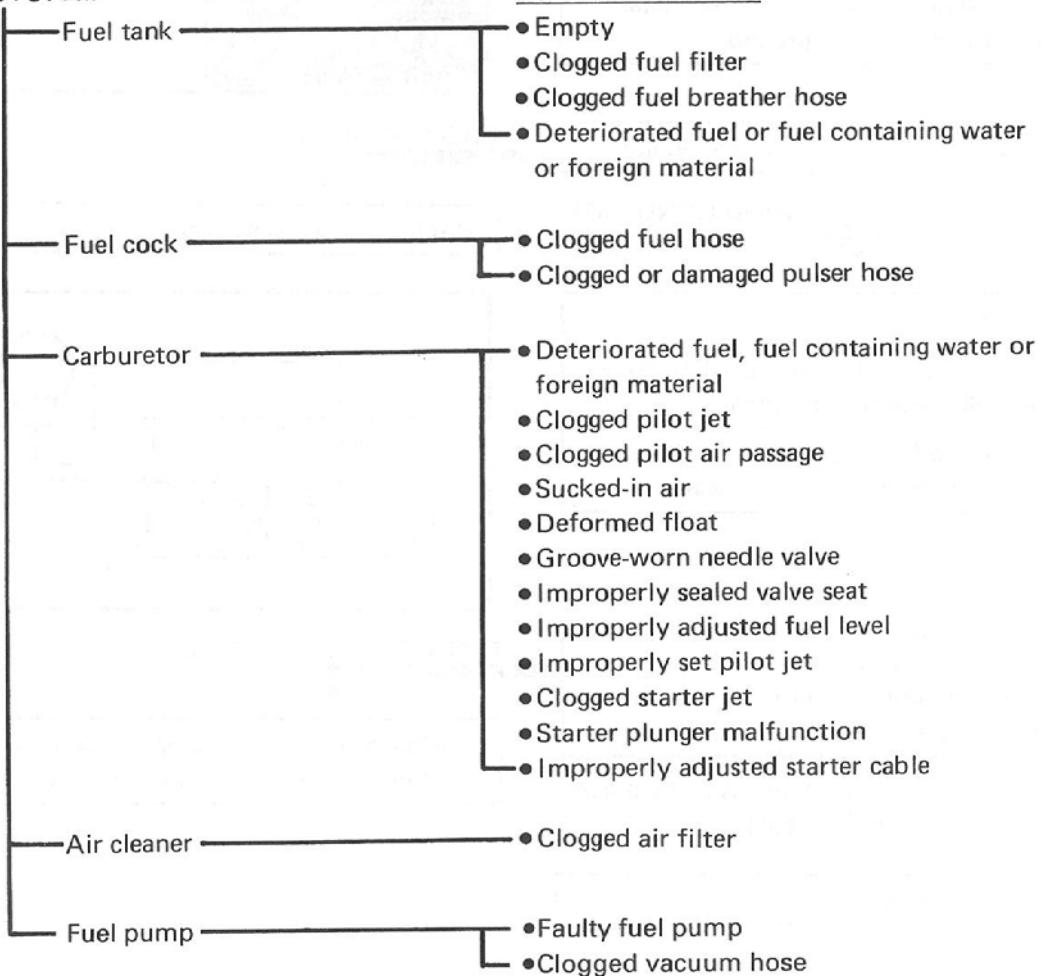
This circuit is good.

## TROUBLESHOOTING

**NOTE:**

The following troubleshooting does not cover all the possible causes of trouble. It should be helpful, however, as a guide to troubleshooting. Refer to the relative procedure in this manual for inspection, adjustment and replacement of parts.

### STARTING FAILURE/HARD STARTING

**FUEL SYSTEM****PROBABLE CAUSE**

## STARTING FAILURE/HARD STARTING

**TRBL  
SHTG**



### ELECTRICAL SYSTEM

#### PROBABLE CAUSE

- Spark plug —
  - Improper plug gap
  - Worn electrodes
  - Wire between terminals broken
  - Improper heat range
  - Faulty spark plug cap
- Ignition coil —
  - Broken or shorted primary/secondary
  - Faulty spark plug lead
  - Broken body
- Full-transistor system —
  - Faulty ignitor unit
  - Faulty pickup coil
- Switches and wiring —
  - Faulty main switch
  - Faulty engine stop switch
  - Broken or shorted wiring
  - Faulty neutral switch
  - Faulty start switch
  - Faulty starter motor switch
  - Faulty clutch switch
- Starter motor —
  - Faulty starter motor
  - Faulty starter relay
  - Faulty circuit cut-off relay
  - Faulty starter clutch

### COMPRESSION SYSTEM

#### PROBABLE CAUSE

- Cylinder and cylinder head —
  - Loose spark plug
  - Loose cylinder head or cylinder
  - Broken cylinder head gasket
  - Worn, damaged or seized cylinder
  - Improperly sealed valve
  - Improperly contacted valve and valve seat
  - Improper valve timing
  - Broken valve spring
- Piston and piston rings —
  - Improperly installed piston ring
  - Worn, fatigued or broken piston ring
  - Seized piston ring
  - Seized or damaged piston
- Crankcase and crankshaft —
  - Improperly seated crankcase
  - Seized crankshaft

**POOR IDLE SPEED PERFORMANCE/  
POOR MEDIUM AND HIGH SPEED PERFORMANCE**

**TRBL  
SHTG** ?

**POOR IDLE SPEED PERFORMANCE**

**POOR IDLE SPEED PERFORMANCE**

	<u>PROBABLE CAUSE</u>
Carburetor	<ul style="list-style-type: none"><li>• Improperly returned starter plunger</li><li>• Loose pilot jet</li><li>• Clogged pilot air jet</li><li>• Improperly synchronized carburetors</li><li>• Improperly adjusted idle speed (Throttle stop screw)</li><li>• Improper throttle cable play</li><li>• Flooded carburetor</li></ul>
Electrical system	<ul style="list-style-type: none"><li>• Faulty battery</li><li>• Faulty spark plug</li><li>• Faulty ignitor unit</li><li>• Faulty pickup coil</li><li>• Faulty ignition coil</li></ul>
Valve train	<ul style="list-style-type: none"><li>• Improperly adjusted valve clearance</li></ul>
Air cleaner	<ul style="list-style-type: none"><li>• Clogged air filter</li></ul>

**POOR MEDIUM AND HIGH SPEED PERFORMANCE**

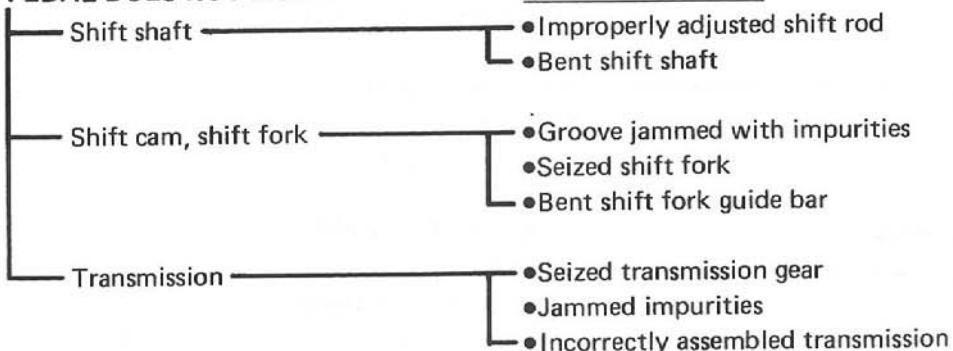
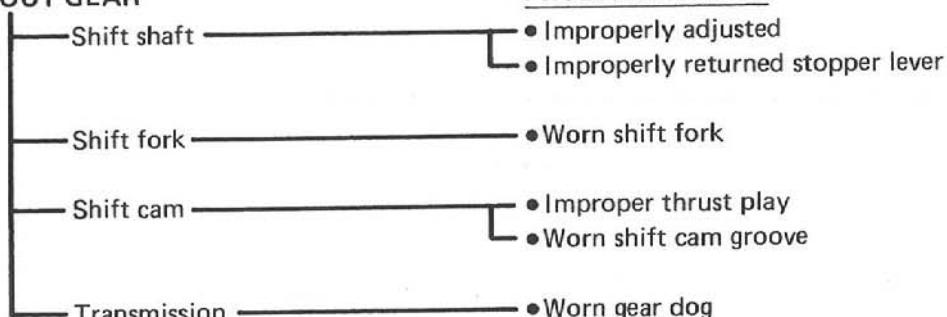
**POOR MEDIUM AND HIGH SPEED PERFORMANCE**

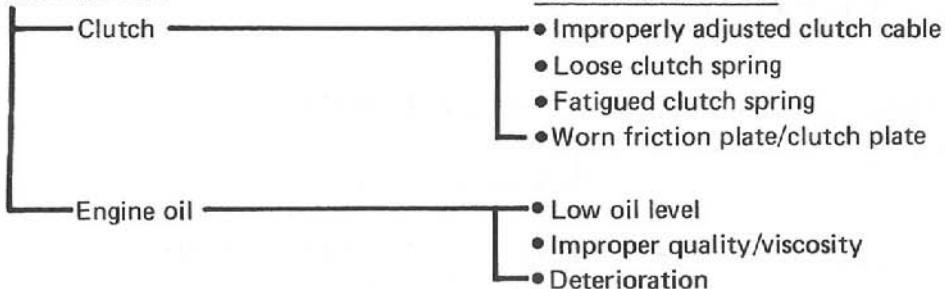
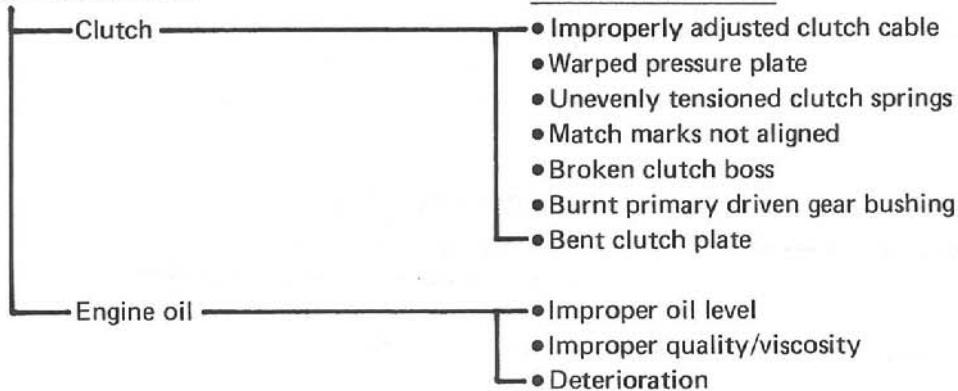
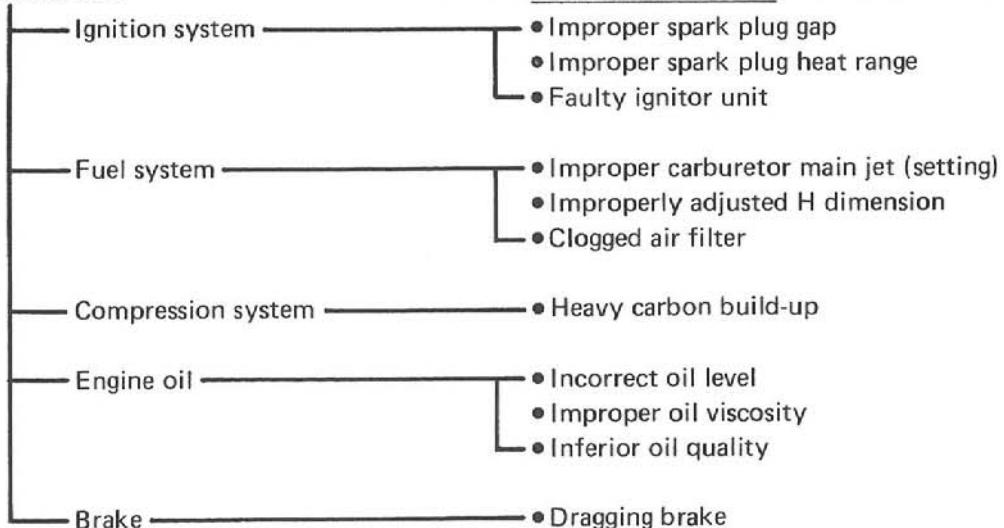
Refer to "Starting failure/Hard starting." (Fuel system, electrical system, compression system and valve train)

	<u>PROBABLE CAUSE</u>
Carburetor	<ul style="list-style-type: none"><li>• Improper jet needle clip position</li><li>• Diaphragm malfunction</li><li>• Improperly adjusted fuel level</li><li>• Clogged or loose main jet</li></ul>
Air cleaner	<ul style="list-style-type: none"><li>• Clogged air filter</li></ul>
Fuel pump	<ul style="list-style-type: none"><li>• Faulty fuel pump</li></ul>

**FAULTY GEAR SHIFTING****HARD SHIFTING**

Refer to "Clutch dragging."

**SHIFT PEDAL DOES NOT MOVE****PROBABLE CAUSE****JUMP-OUT GEAR****PROBABLE CAUSE**

**CLUTCH SLIPPING/DRAGGING****CLUTCH SLIPPING****CLUTCH DRAGGING****OVERHEATING****OVERHEATING**

**FAULTY BRAKE/FRONT FORK OIL LEAKAGE  
AND FRONT FORK MALFUNCTION**

**TRBL**

**SHTG**



**FAULTY BRAKE**

**POOR BRAKING EFFECT**

Disc brake

**PROBABLE CAUSE**

- Worn brake pads
- Worn disc
- Air in brake fluid
- Leaking brake fluid
- Faulty cylinder kit cup
- Faulty caliper kit seal
- Loose union bolt
- Broken brake hose
- Oily or greasy disc/brake pads
- Improper brake fluid level

**FRONT FORK OIL LEAKAGE AND FRONT FORK MALFUNCTION**

**OIL LEAKAGE**

**PROBABLE CAUSE**

- Bent, damaged or rusty inner tube
- Damaged or cracked outer tube
- Damaged oil seal lip
- Improperly installed oil seal
- Improper oil level (too much)
- Loose damper rod holding bolt
- Broken cap bolt O-ring

**MALFUNCTION**

**PROBABLE CAUSE**

- Bent, deformed or damaged inner tube
- Bent or deformed outer tube
- Damaged fork spring
- Worn or damaged slide metal
- Improper oil viscosity
- Improper oil level

**INSTABLE HANDLING****INSTABLE HANDLING****PROBABLE CAUSE**

Handlebar	•Improperly installed or bent
Steering	<ul style="list-style-type: none"> <li>•Improperly installed handlebar crown</li> <li>•Bent steering stem</li> <li>•Improperly installed steering shaft (Improperly tightened ringnut)</li> <li>•Damaged ball bearing or bearing race</li> </ul>
Front forks	<ul style="list-style-type: none"> <li>•Uneven oil levels on both sides</li> <li>•Broken spring</li> <li>•Twisted front forks</li> </ul>
Tires	<ul style="list-style-type: none"> <li>•Uneven tire pressures on both sides</li> <li>•Incorrect tire pressure</li> <li>•Unevenly worn tires</li> </ul>
Wheels	<ul style="list-style-type: none"> <li>•Incorrect wheel balance</li> <li>•Deformed cast wheel</li> <li>•Damaged bearing</li> <li>•Bent or loose wheel axle</li> <li>•Excessive wheel run-out</li> </ul>
Frame	<ul style="list-style-type: none"> <li>•Twisted</li> <li>•Damaged head pipe</li> <li>•Improperly installed bearing race</li> </ul>
Swingarm	<ul style="list-style-type: none"> <li>•Worn bearing or bush</li> <li>•Bent or damaged</li> </ul>
Rear shock absorber	<ul style="list-style-type: none"> <li>•Fatigued spring</li> <li>•Oil and gas leakage</li> </ul>
Drive chain	•Improperly adjusted chain slack
Cowling	<ul style="list-style-type: none"> <li>•Damaged or broken</li> <li>•Incorrectly installed</li> </ul>

## FAULTY SIGNAL AND LIGHTING SYSTEM

TRBL  
SHTG ?

### FAULTY SIGNAL AND LIGHTING SYSTEM

HEADLIGHT DARK

#### PROBABLE CAUSE

- Improper bulb
- Too many electric accessories
- Hard charging (broken stator coil wire, faulty rectifier/regulator)
- Incorrect connection
- Improperly grounded
- Poor contacts (main or light switch)
- Bulb life expires

BULB BURNT OUT

#### PROBABLE CAUSE

- Improper bulb
- Faulty battery
- Faulty rectifier/regulator
- Improperly grounded
- Faulty main and/or light switch
- Bulb life expires

FLASHER DOES NOT LIGHT

#### PROBABLE CAUSE

- Improperly grounded
- Discharged battery
- Faulty flasher switch
- Faulty flasher relay
- Broken wireharness
- Loosely connected coupler
- Bulb burnt out
- Faulty fuse

FLASHER KEEPS ON

#### PROBABLE CAUSE

- Faulty flasher relay
- Insufficient battery capacity (nearly discharged)
- Bulb burnt out

## FAULTY SIGNAL AND LIGHTING SYSTEM

TRBL  
SHTG ?

FLASHER WINKS SLOWER

### PROBABLE CAUSE

- Faulty flasher relay
- Insufficient battery capacity  
(nearly discharged)
- Improper bulb
- Faulty main and/or "TURN" switch

FLASHER WINKS QUICKER

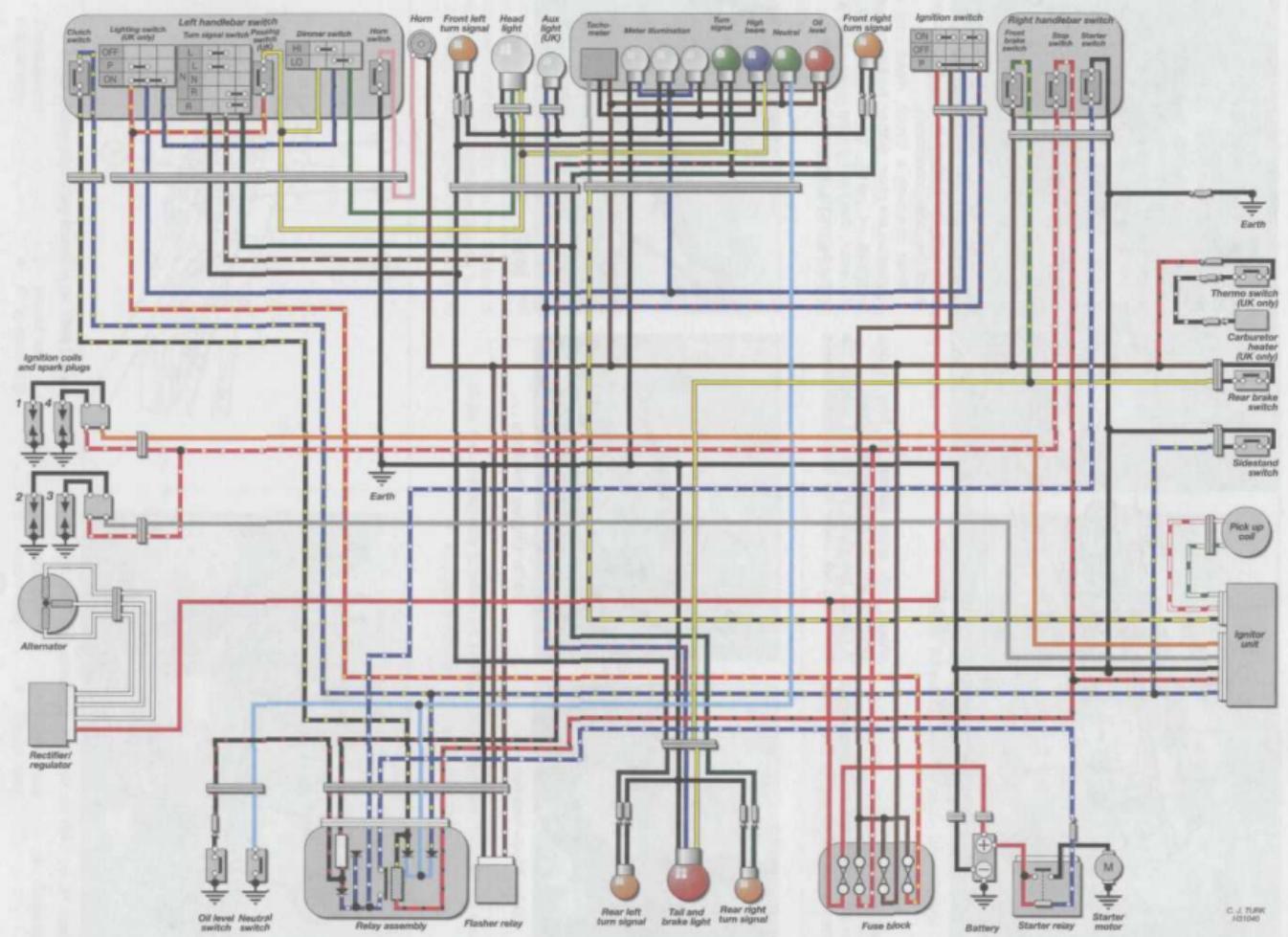
### PROBABLE CAUSE

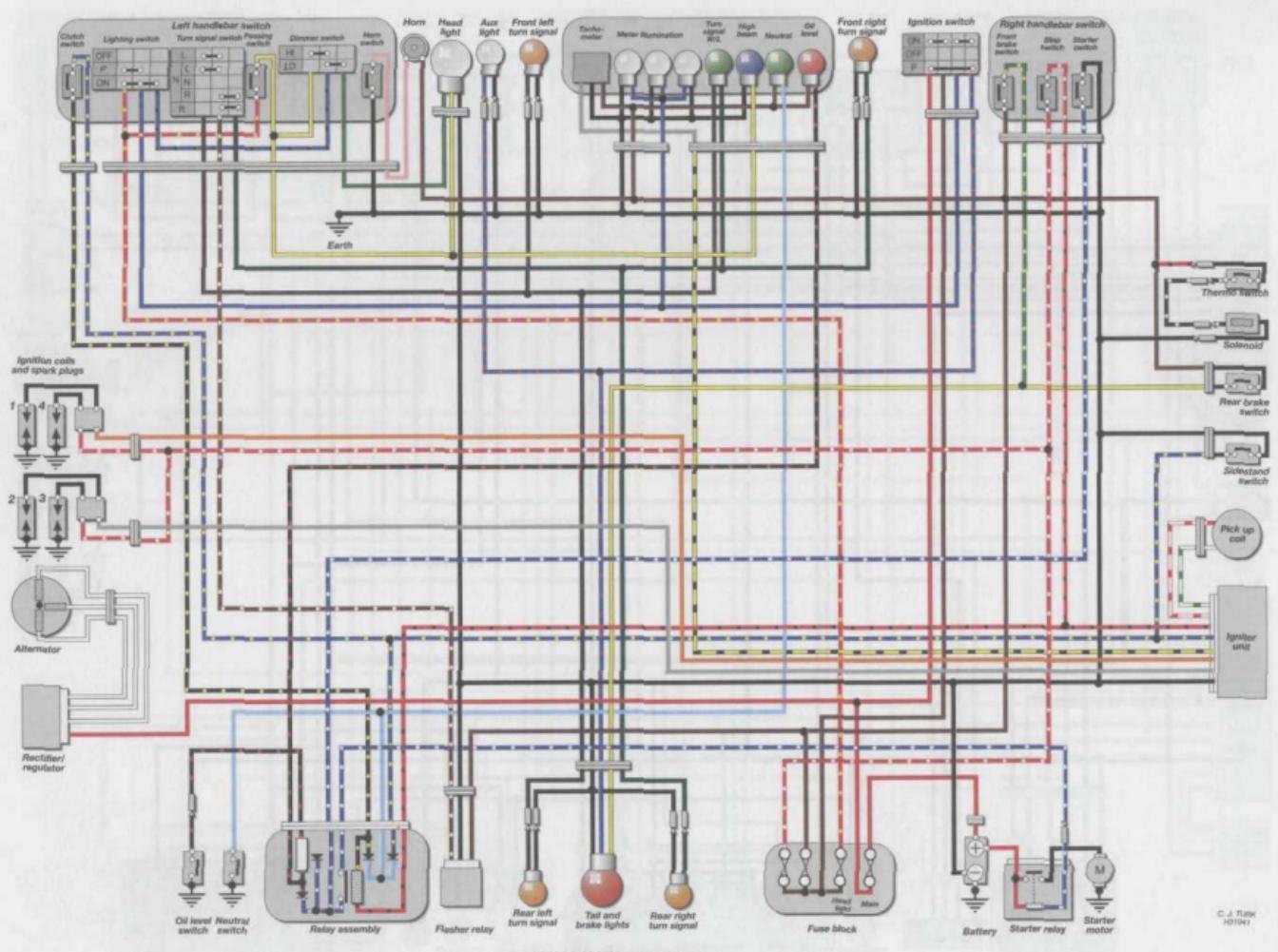
- Improper bulb
- Faulty flasher relay

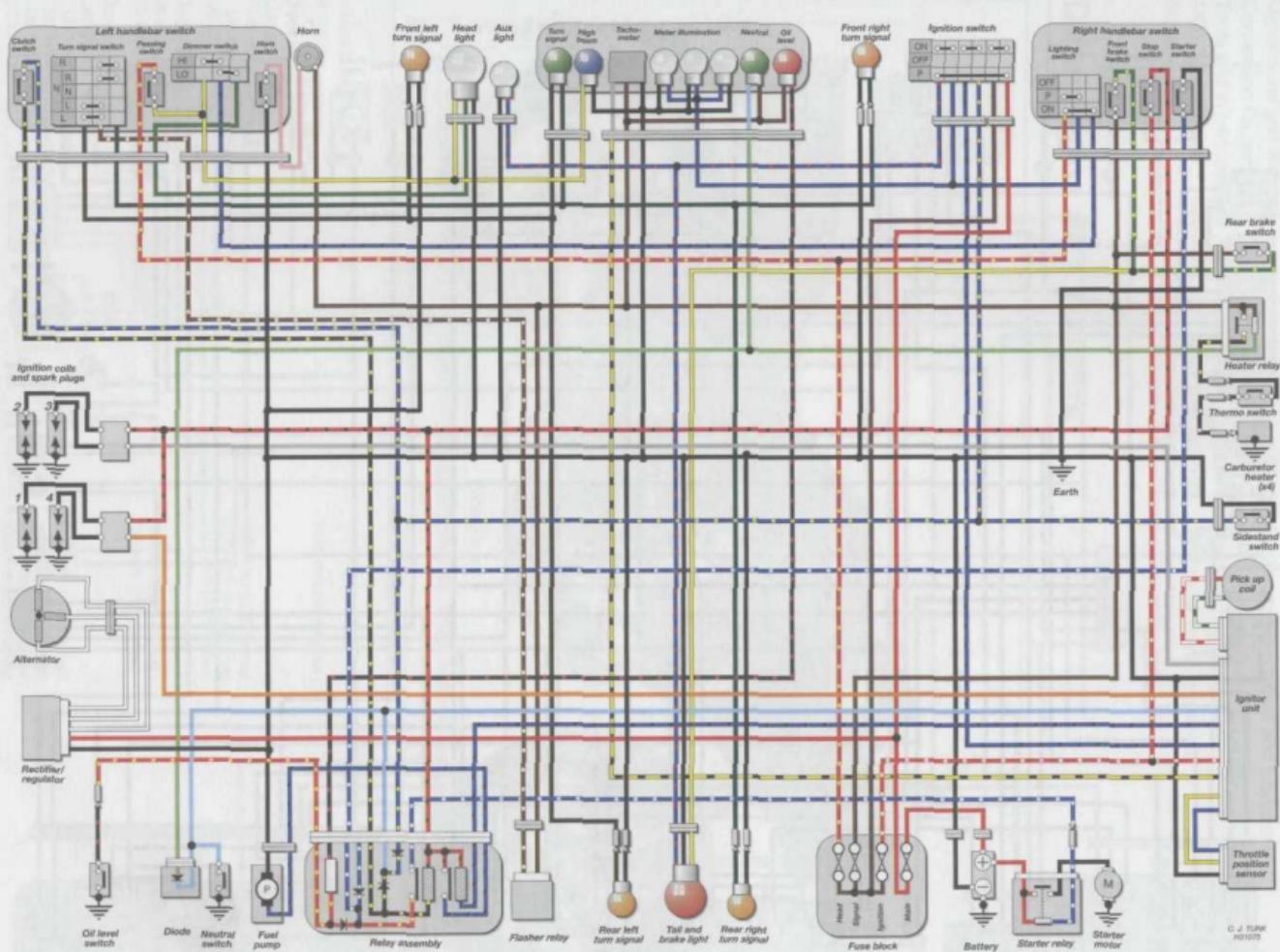
HORN IS INOPERATIVE

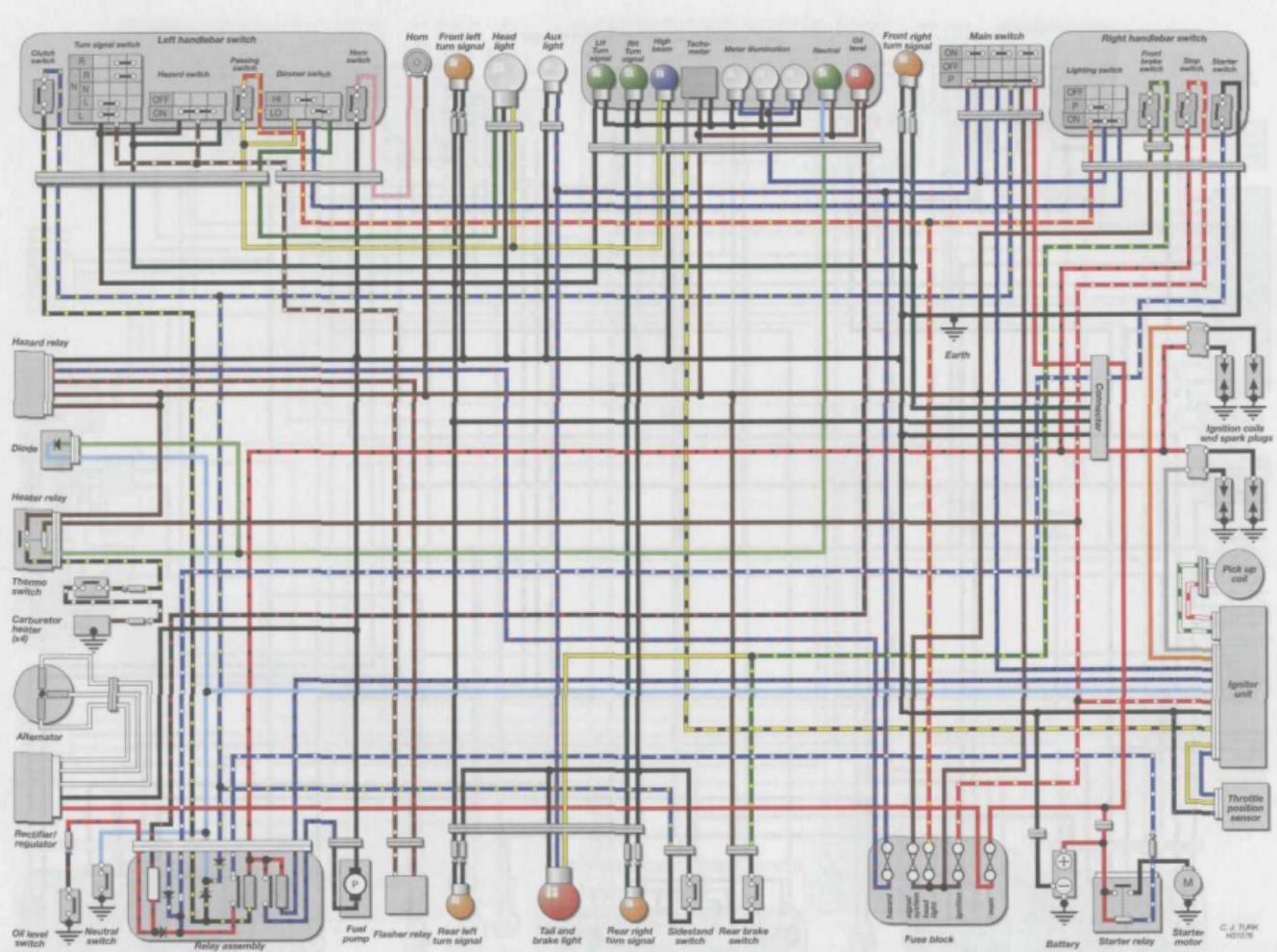
### PROBABLE CAUSE

- Faulty battery
- Faulty fuse
- Faulty main and/or horn switch
- Improperly adjusted horn
- Faulty horn
- Broken wireharness









XJ600 S and N UK models 1997 onwards

