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## CHAPTER 6. CARBURETORS

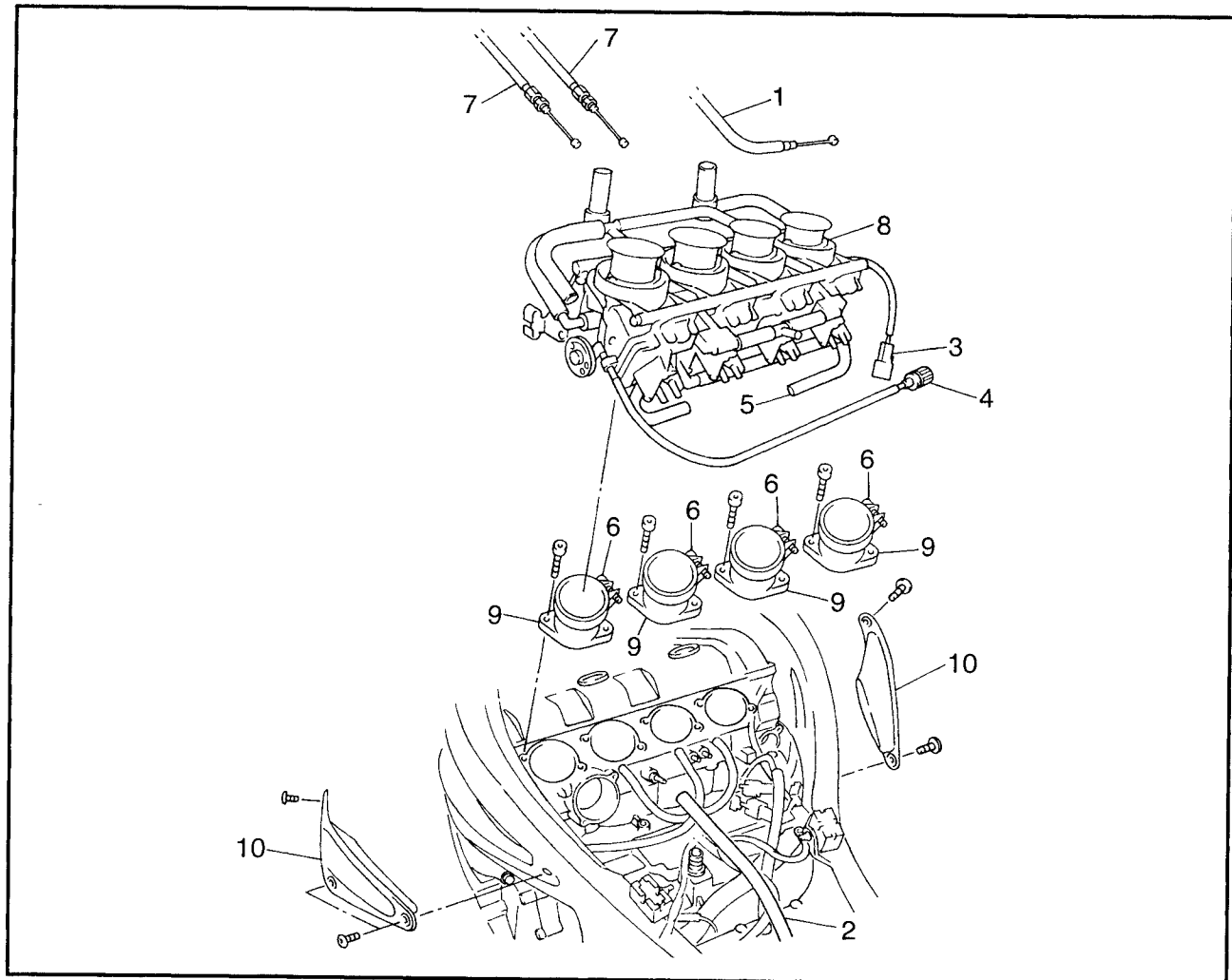
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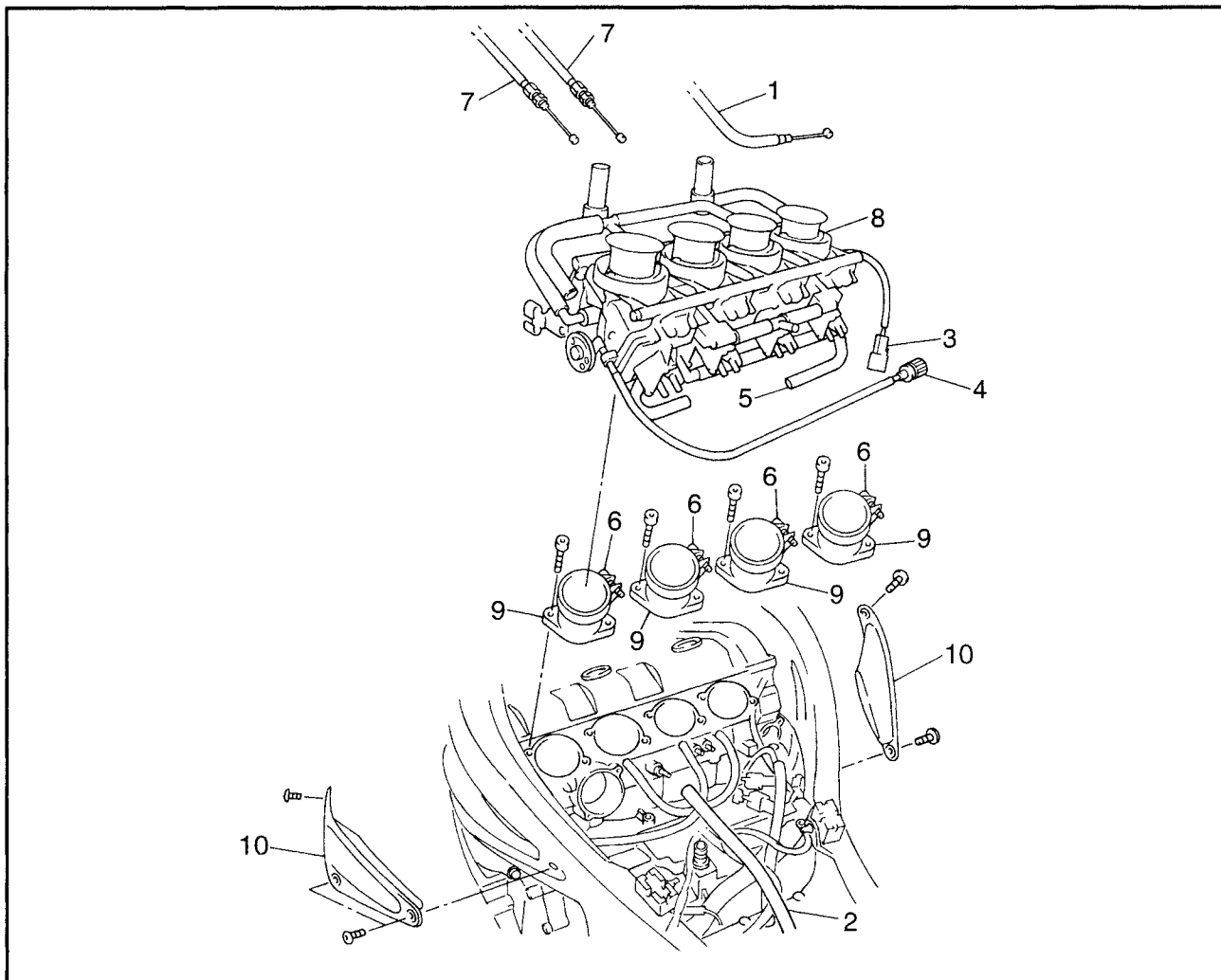
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# CARBURETORS

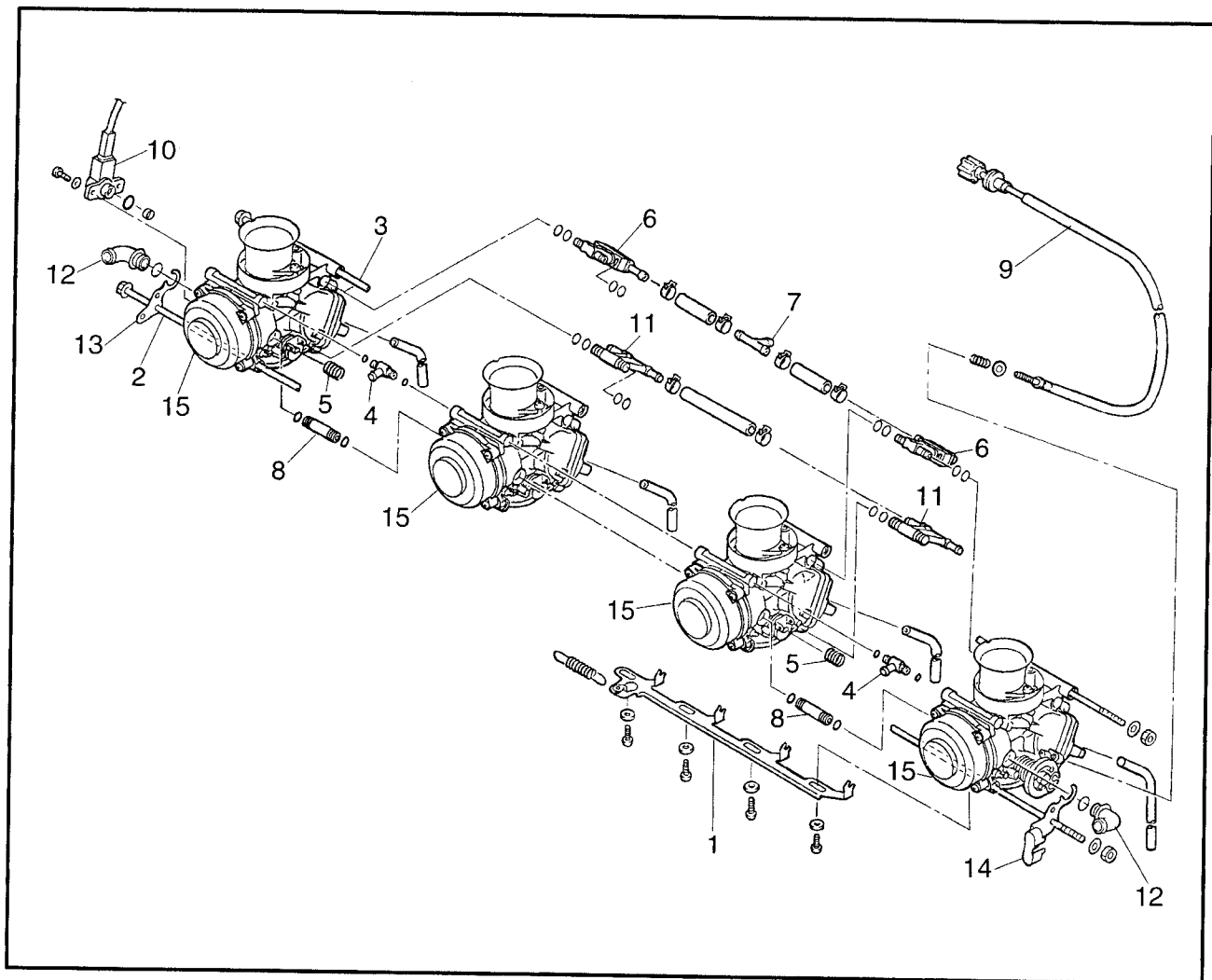
## CARBURETORS



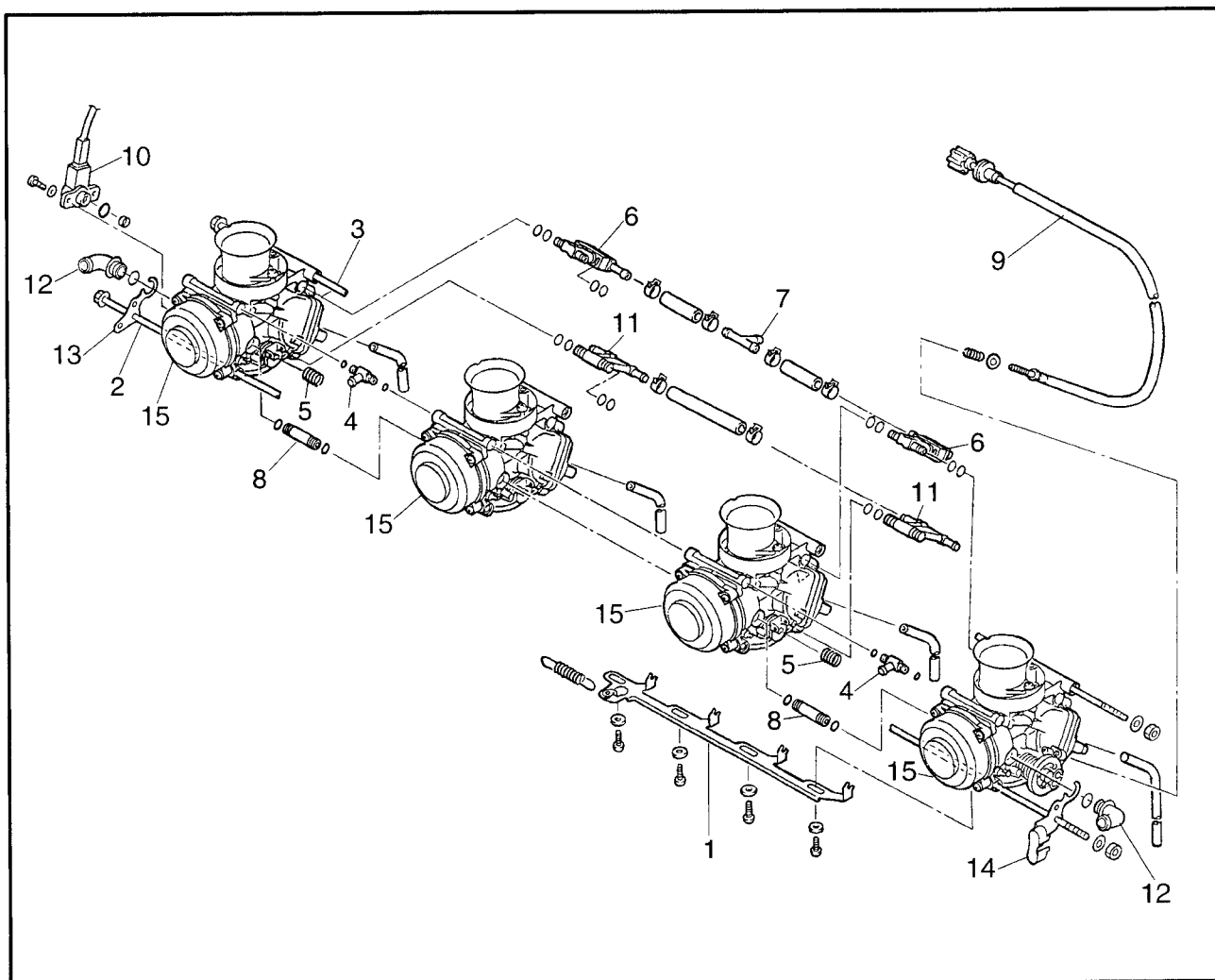
Order	Job/Part	Q'ty	Remarks
	<b>Removing the carburetors</b>		
	Rider seat and fuel tank		Remove the parts in the order listed. Refer to "Seats" and "FUEL TANK" in chapter 3.
	Air filter case and heat protector plate		Refer to "AIR FILTER CASE AND IGNITION COILS" in chapter 3.
1	Starter cable	1	
2	Fuel hose	1	
3	Throttle position sensor coupler	1	Disconnect
4	Throttle stop screw	1	



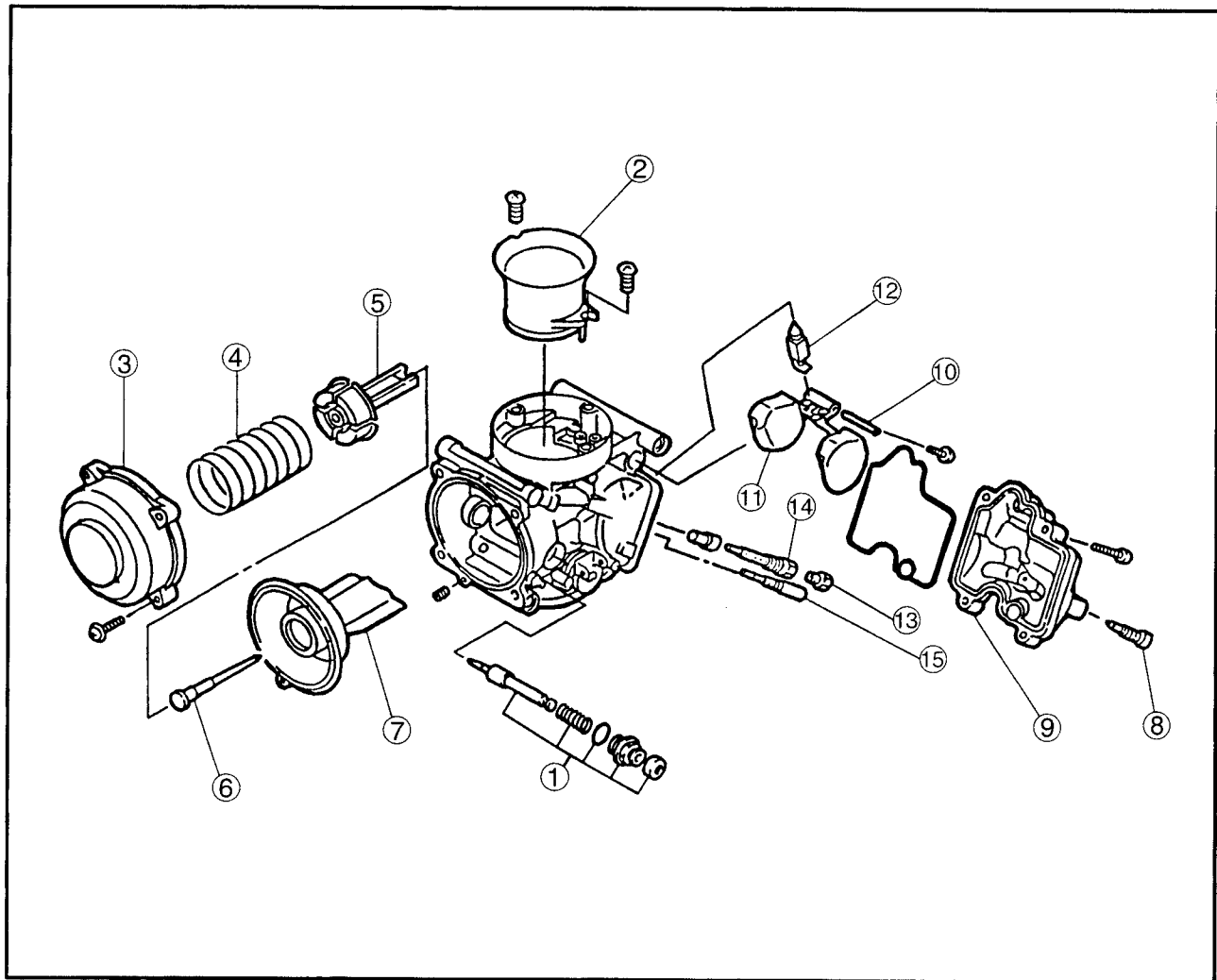
Order	Job/Part	Q'ty	Remarks
5	Therm bypass hose	2	For installation, reverse the removal procedure.
6	Carburetor joint clamp screw	4	
7	Throttle cable	2	
8	Carburetor assembly	1	
9	Carburetor joint	4	
10	Side cover	2	



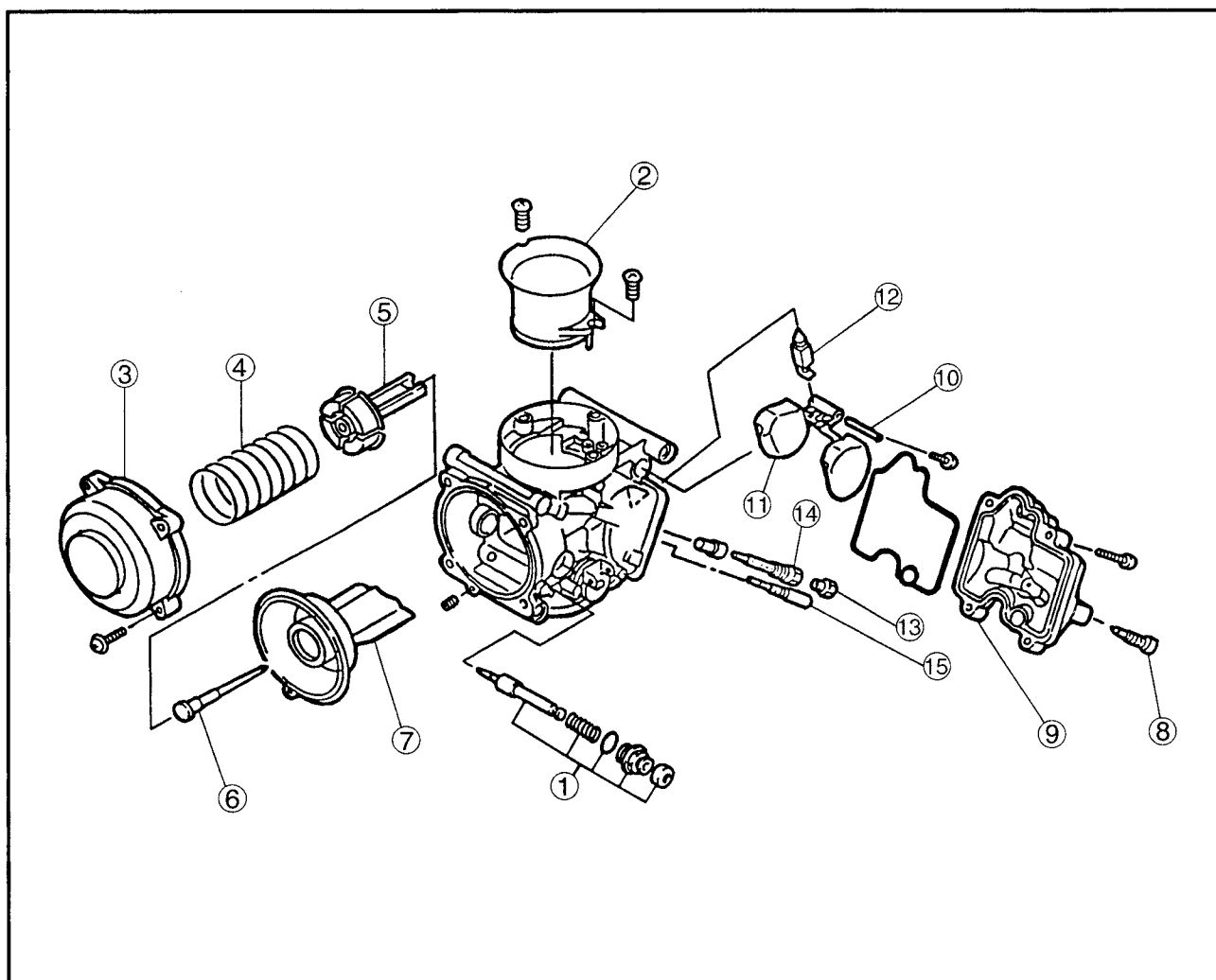
Order	Job/Part	Q'ty	Remarks
	<b>Separating the carburetors</b>		
1	Starter plunger link	1	Remove the parts in the order listed.
2	Connecting bolt	1	
3	Connecting bolt	1	
4	Hose joint	2	Refer to "ASSEMBLING THE CARBURETORS"
5	Spring	2	
6	Fuel feed pipe	2	Refer to "ASSEMBLING THE CARBURETORS"
7	Fuel feed pipe	1	
8	Pipe	2	
9	Throttle stop screw	1	
10	Throttle position sensor	1	
11	Water pipe	2	



Order	Job/Part	Q'ty	Remarks
12	Balance pipe	2	For installation, reverse the removal procedure
13	Balance pipe bracket	1	
14	Throttle cable bracket	1	
15	Carburetor	4	

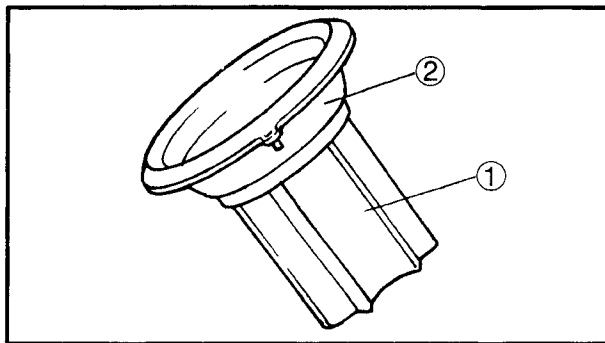


Order	Job/Part	Q'ty	Remarks
	<b>Disassembling the carburetor</b>		Disassemble the parts in the order listed. <b>NOTE:</b> _____ The following procedure applies to all of the carburetors.
①	Starter plunger	1	Refer to "ASSEMBLING THE CARBURETORS."
②	Air funnel	1	
③	Vacuum chamber cover	1	
④	Piston valve spring	1	
⑤	Jet needle holder	1	
⑥	Jet needle kit	1	
⑦	Piston valve	1	
⑧	Fuel drain bolt	1	
⑨	Float chamber	1	
⑩	Float pivot pin	1	

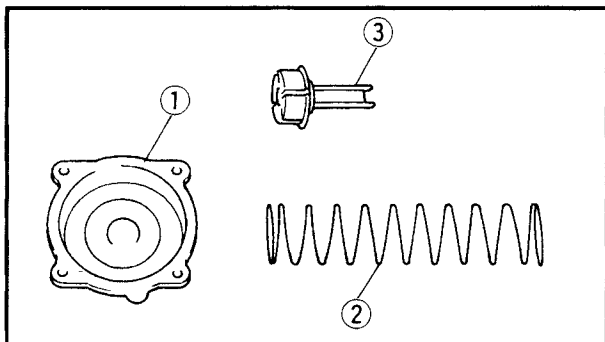


Order	Job/Part	Q'ty	Remarks
⑪	Float	1	For assembly, reverse the disassembly procedure.
⑫	Needle valve	1	
⑬	Main jet	1	
⑭	Main jet holder	1	
⑮	Pilot jet	1	

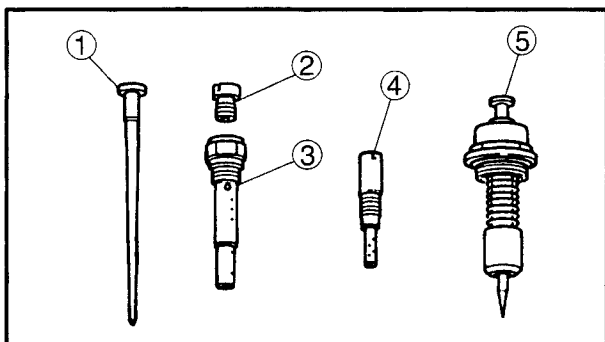




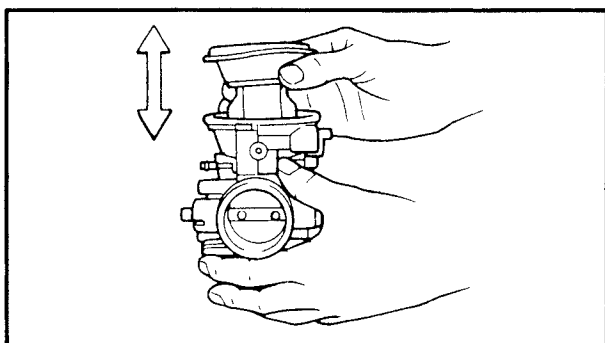
7. Check:
- piston valve ①  
Damage/scratches/wear → Replace.
  - piston valve diaphragm ②  
Cracks/tears → Replace.



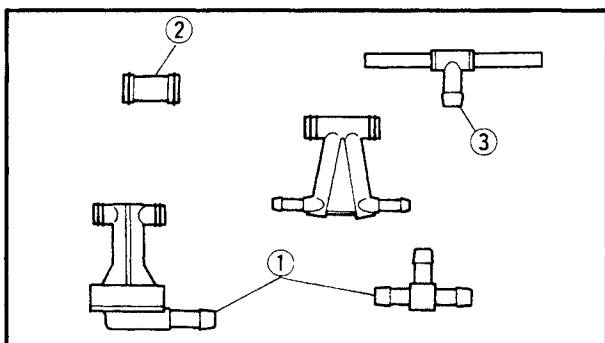
8. Check:
- vacuum chamber cover ①
  - piston valve spring ②
  - jet needle holder ③  
Cracks/damage → Replace.



9. Check:
- jet needle kit ①
  - main jet ②
  - main jet holder ③
  - pilot jet ④
  - starter plunger ⑤  
Bends/damage/wear → Replace.  
Obstruction → Clean.  
Blow out the jets with compressed air.



10. Check:
- piston valve movement  
Insert the piston valve into the carburetor body and move it up and down.  
Tightness → Replace the piston valve.



11. Check:
- fuel feed pipes ①
  - pipes ②
  - hose joint ③  
Cracks/damage → Replace.  
Obstruction → Clean.  
Blow out the pipes with compressed air.



### 12. Check:

- fuel hoses  
Cracks/damage/wear → Replace.  
Obstruction → Clean.  
Blow out the hoses with compressed air.

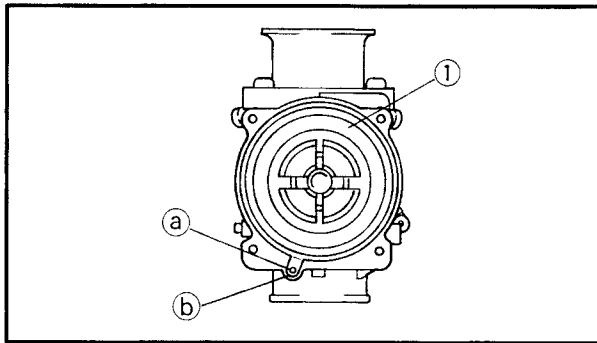
EAS00490

### ASSEMBLING THE CARBURETORS

The following procedure applies to all of the carburetors.

#### CAUTION:

- Before assembling the carburetors, wash all of the parts in a petroleumbased solvent.
- Always use a new gasket.



### 1. Install:

- piston valve ①
- jet needle
- jet needle holder
- piston valve spring
- vacuum chamber cover

#### NOTE:

- Install the end of the piston valve spring onto the spring guide on the vacuum chamber cover.
- Align the tab ① on the piston valve diaphragm with the recess ② in the carburetor body.

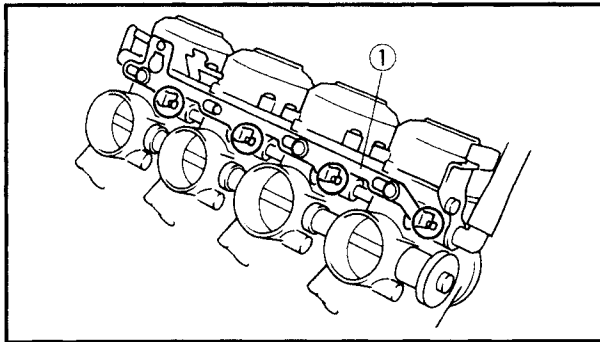
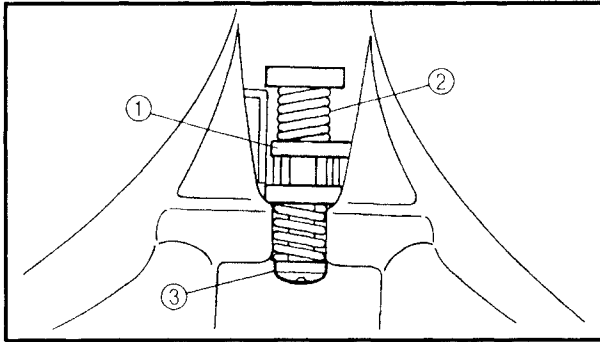


## 2. Install:

- pipes
- fuel feed pipes
- vacuum chamber pipe
- vacuum chamber air vent hose
- springs
- float chamber air vent hoses
- hose joint
- spacers
- copper washer
- connecting bolts

**NOTE:**

- Do not tighten the connecting bolts yet.
- Install the throttle valve lever ① onto carburetors #2, #3, and #4 between the spring ② and synchronizing screw ③.



## 3. Install:

- starter plunger link ①

**NOTE:**

Install the starter plunger link ① onto each starter plunger.

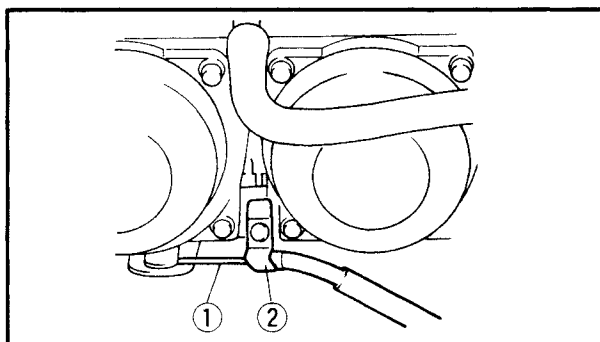
## 4. Tighten:

- connecting bolts

7 Nm (0.7 m•kg, 5.1 ft•lb)

**NOTE:**

- Place the carburetor assembly on a surface plate with the intake manifold side down. Then, tighten the connecting bolts while pushing down the carburetor assembly with an even force.
- After tightening the connecting bolts, check that the throttle valve lever and starter plunger link operate smoothly.



## 5. Install:

- starter cable ①

**NOTE:**

Install the starter cable holder ② onto the starter cable.



EAS00493

**INSTALLING THE CARBURETORS**

## 1. Adjust:

- carburetor synchronization

Refer to "SYNCHRONIZING THE CARBURETORS" in chapter 3.

## 2. Adjust:

- engine idling speed



**Engine idling speed**  
**1250 ~ 1350 r/min**

Refer to "ADJUSTING THE ENGINE IDLING SPEED" in chapter 3.

## 3. Adjust:

- throttle cable free play



**Throttle cable free play (at the flange of the throttle grip)**  
**6 ~ 8 mm (0.24 ~ 0.31 in)**

Refer to "ADJUSTING THE THROTTLE CABLE FREE PLAY" in chapter 3.



EAS00497

## MEASURING AND ADJUSTING THE FUEL LEVEL

### 1. Measure:

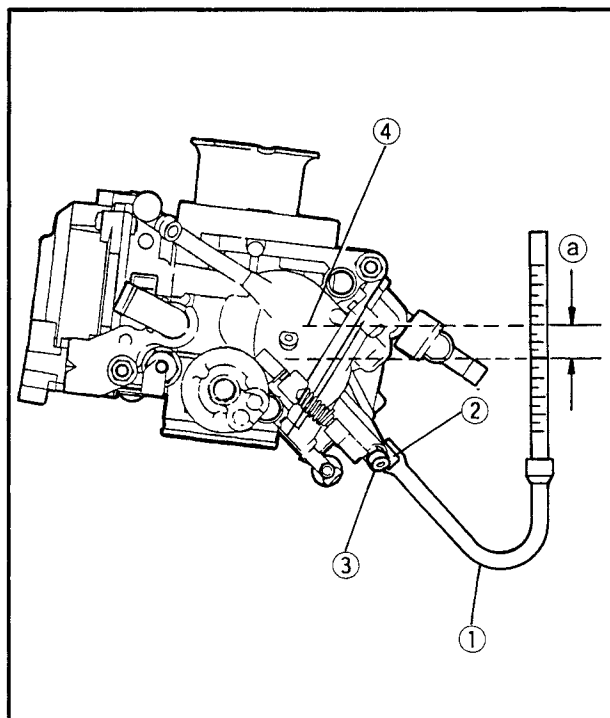
- fuel level ①

Out of specification → Adjust.



**Fuel level (below the mark on the body)**

**17.5 ~ 18.5 mm (0.69 ~ 0.73 in)**



- Stand the motorcycle on a level surface.
- Place the motorcycle on a suitable stand to ensure that the motorcycle is standing straight up.
- Install the fuel level gauge ① onto the fuel drain pipe ②.



**Fuel level gauge**

**90890-01312, YM-01312-A**

- Loosen the fuel drain bolt ③.
- Hold the fuel level gauge vertically next to the line ④ on the float chamber.
- Measure the fuel level ①.

### NOTE:

Fuel level readings should be equal on both sides of the carburetor assembly.

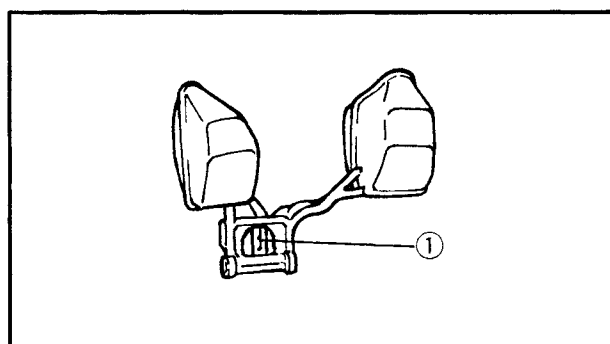
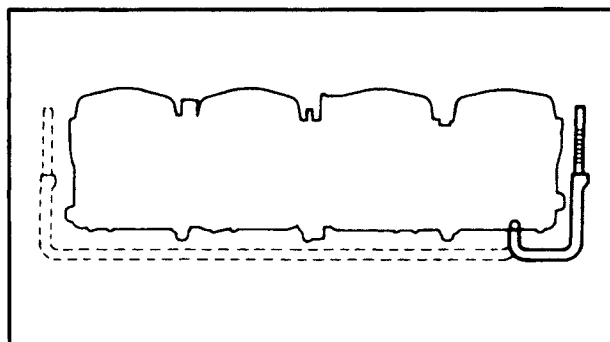


### 2. Adjust:

- fuel level



- Remove the carburetor assembly.
- Check the needle valve seat and needle valve.
- If either is worn, replace them as a set.
- If both are fine, adjust the float level by slightly bending the float tang ①.
- Install the carburetor assembly.
- Measure the fuel level again.
- Repeat steps (a) to (f) until the fuel level is within specification.



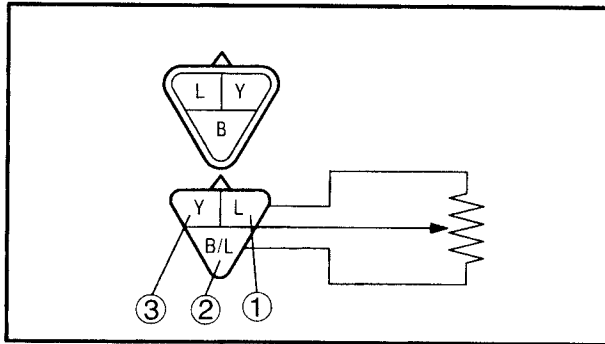


EAS00502

## CHECKING AND ADJUSTING THE THROTTLE POSITION SENSOR

### NOTE:

Before adjusting the throttle position sensor, the engine idling speed should be properly adjusted.



### 1. Check:

- throttle position sensor (installed on the carburetor)

- Disconnect the throttle position sensor coupler.
- Connect the pocket tester ( $\Omega \times 1k$ ) to the throttle position sensor.

**Tester positive probe → blue ①**

**Tester negative probe → black/blue ②**

- Measure the throttle position sensor maximum resistance.  
Out of specification → Replace the throttle position sensor.



### Throttle position sensor maximum resistance

**4.0 ~ 6.0 k $\Omega$  at 20°C (68°F)  
(blue – black/blue)**

- Connect the pocket tester ( $\Omega \times 1k$ ) to the throttle position sensor.

**Tester positive probe → yellow ③**

**Tester negative probe → black/blue ②**

- While slowly opening the throttle, check that the throttle position sensor resistance is within the specified range.

### NOTE:

Check mainly that the resistance changes gradually when turning the throttle, since the readings (from closed to wide-open throttle) may differ slightly from those specified.

Out of specification or the resistance changes abruptly → Go to step (2).



### Throttle position sensor resistance

**0 ~ 5 ± 1.0 k $\Omega$  at 20°C (68°F)  
(yellow – black/blue)**

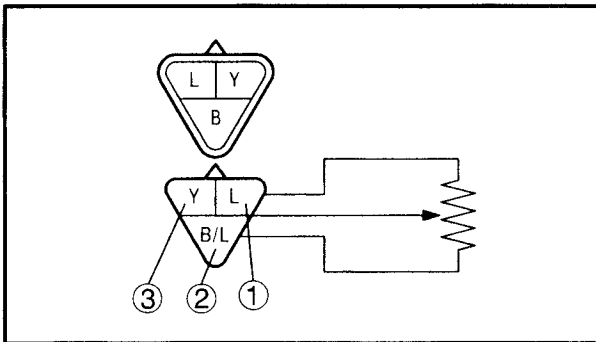


### 2. Check:

- throttle position sensor  
(removed from the carburetor)



- Disconnect the throttle position sensor coupler.
- Remove the throttle position sensor from the carburetor.
- Connect the pocket tester ( $\Omega \times 1k$ ) to the throttle position sensor.



**Tester positive probe** → blue ①  
**Tester negative probe** → black/blue ②

- Measure the throttle position sensor maximum resistance.  
 Out of specification → Replace the throttle position sensor.



**Throttle position sensor maximum resistance**  
 4.0 ~ 6.0 k $\Omega$  at 20°C (68°F)  
 (blue – black/blue)

- Connect the pocket tester ( $\Omega \times 1k$ ) to the throttle position sensor coupler.

**Tester positive probe** → yellow ③  
**Tester negative probe** → black/blue ②

- While slowly opening the throttle, check that the throttle position sensor resistance is within the specified range.

The resistance does not change or it changes abruptly → Replace the throttle position sensor.  
 The slot is worn or broken → Replace the throttle position sensor.

### NOTE:

Check mainly that the resistance changes gradually when turning the throttle, since the readings (from closed to wide-open throttle) may differ slightly from those specified.

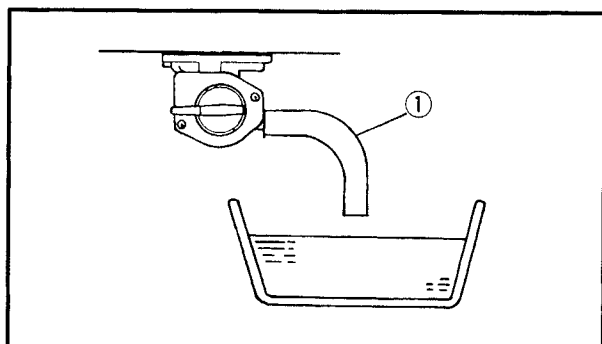
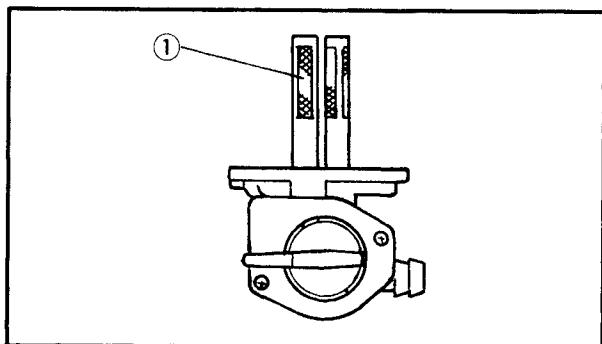
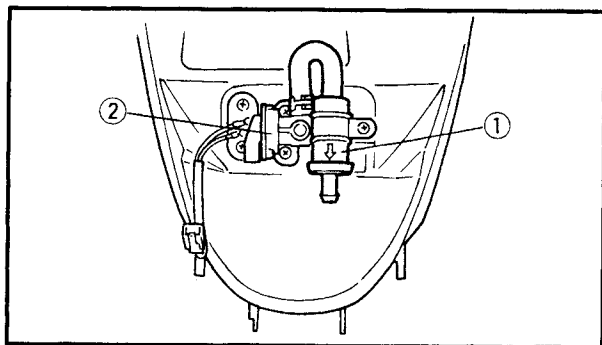


**Throttle position sensor resistance**  
 0 ~ 5 ± 1.0 k $\Omega$  at 20°C (68°F)  
 (yellow – black/blue)









EAS00505

**CHECKING THE FUEL COCK**

1. Remove
  - fuel tank
  - fuel filter (1)
  - fuel cock (2)
2. Check:
  - fuel cock
  - Cracks/damage/wear → Replace.
3. Check:
  - fuel cock strainer (1)
  - (with compressed air)
  - Dirt/obstruction → Clean.
  - Damage → Replace.
4. Install
  - fuel cock
  - fuel filter
  - fuel tank

EAS00506

**CHECKING THE FUEL COCK OPERATION****NOTE:**

After installing the fuel cock, check its operation.

1. Check that the fuel cock lever is turned to "ON" or "OFF".
  2. Place a container under the end of the fuel hose.
  3. Check:
    - fuel cock operation
  - a. Suck on the end of the vacuum hose.
- Fuel flows.  
Fuel cock is OK.  
Fuel does not flow.  
Replace the fuel cock.



EAS00507

## AIR INDUCTION SYSTEM

### AIR INJECTION

The air induction system burns unburned exhaust gases by injecting fresh air (secondary air) into the exhaust port, reducing the emission of hydrocarbons.

When there is negative pressure at the exhaust port, the reed valve opens, allowing secondary air to flow into the exhaust port. The required temperature for burning the unburned exhaust gases is approximately 600 to 700°C (1112 to 1292°F).

EAS00508

### AIR CUTOFF VALVE

The air cutoff valve is operated by the intake gas pressure through the piston valve diaphragm. Normally, the air cutoff valve is open to allow fresh air to flow into the exhaust port. During sudden deceleration (the throttle valve suddenly closes), negative pressure is generated and the air cutoff valve is closed in order to prevent after-burning.

Additionally, at high engine speeds and when the pressure decreases, the air cutoff valve automatically closes to guard against a loss of performance due to self-EGR.

(This "low-boost close" function is the same as on the FZR600 (3HW).)

#### VIEW 1. (NO FLOW)

When decelerating (the throttle closes), the valve will close.

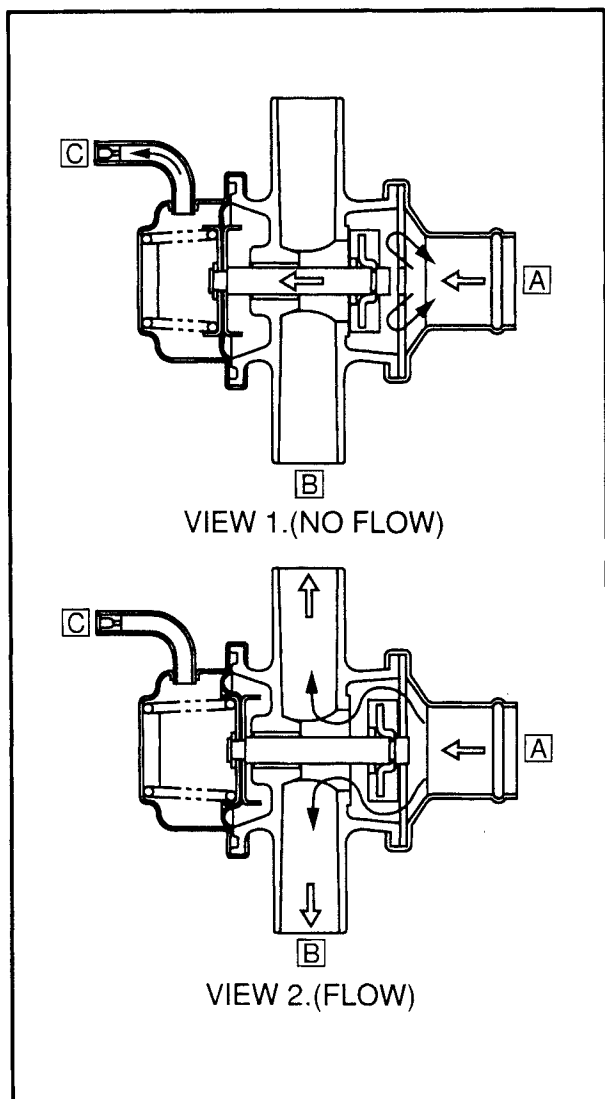
#### VIEW 2. (FLOW)

During normal operation the valve is open.

**A** From the air filter

**B** To the reed valve

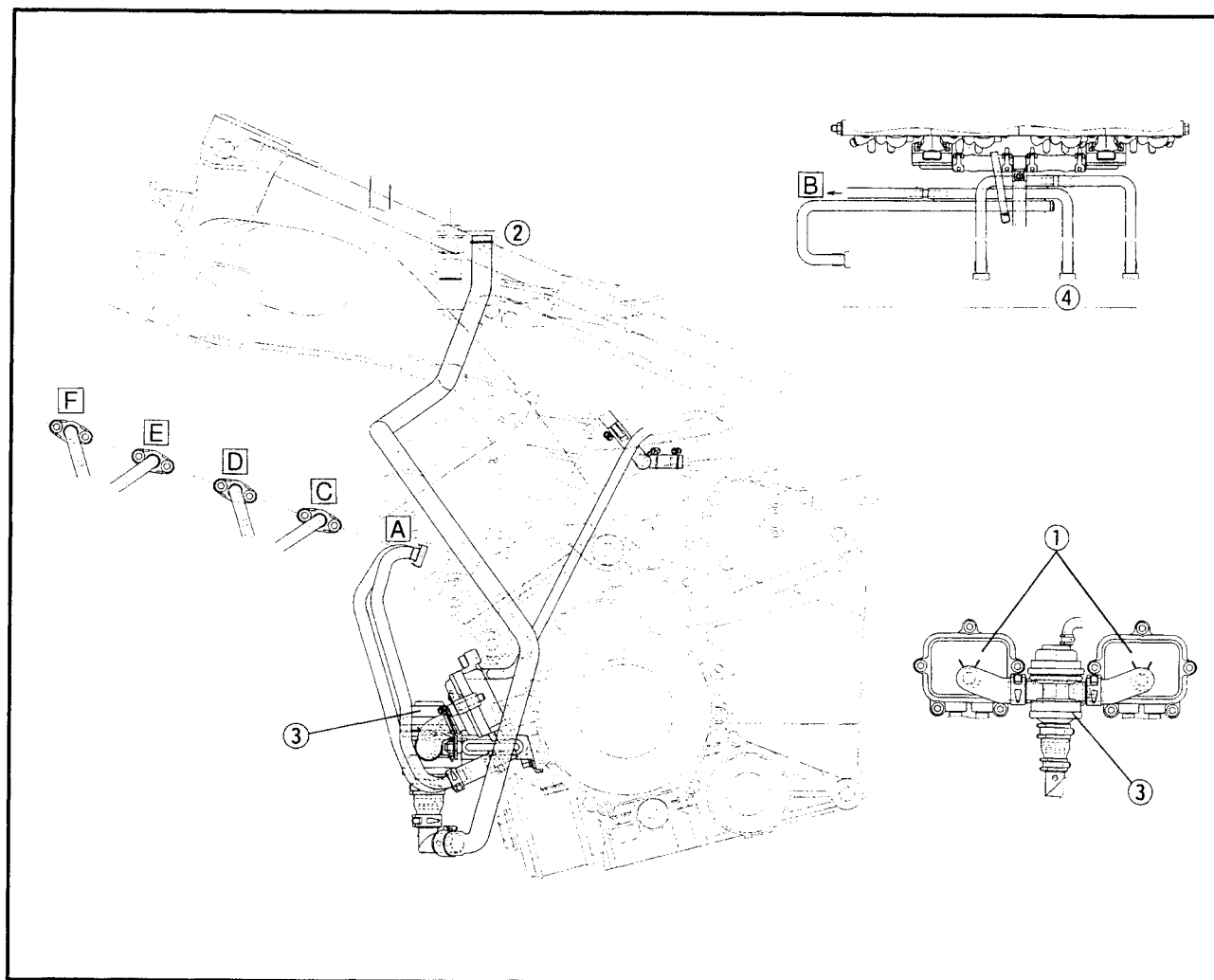
**C** To the carburetor joint





EAS00509

## AIR INDUCTION SYSTEM DIAGRAMS



- ① Reed valve
- ② Air cleaner
- ③ Air cutoff valve
- ④ Carburetor joint (cylinder #3)

- A** To the cylinders
- B** To the air cutoff valve
- C** To cylinder #1
- D** To cylinder #2
- E** To cylinder #3
- F** To cylinder #4



EAS00510

## CHECKING THE AIR INDUCTION SYSTEM

### 1. Check:

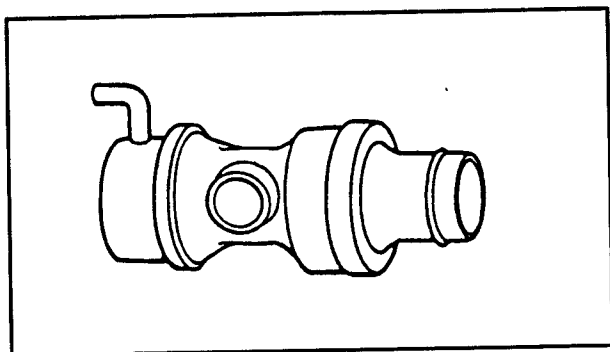
- hoses

Loose connection → Connect properly.

Cracks/damage → Replace.

- pipes

Cracks/damage → Replace.



### 2. Check:

- air cutoff valve

Cracks/damage → Replace.



## CHAPTER 7. CHASSIS

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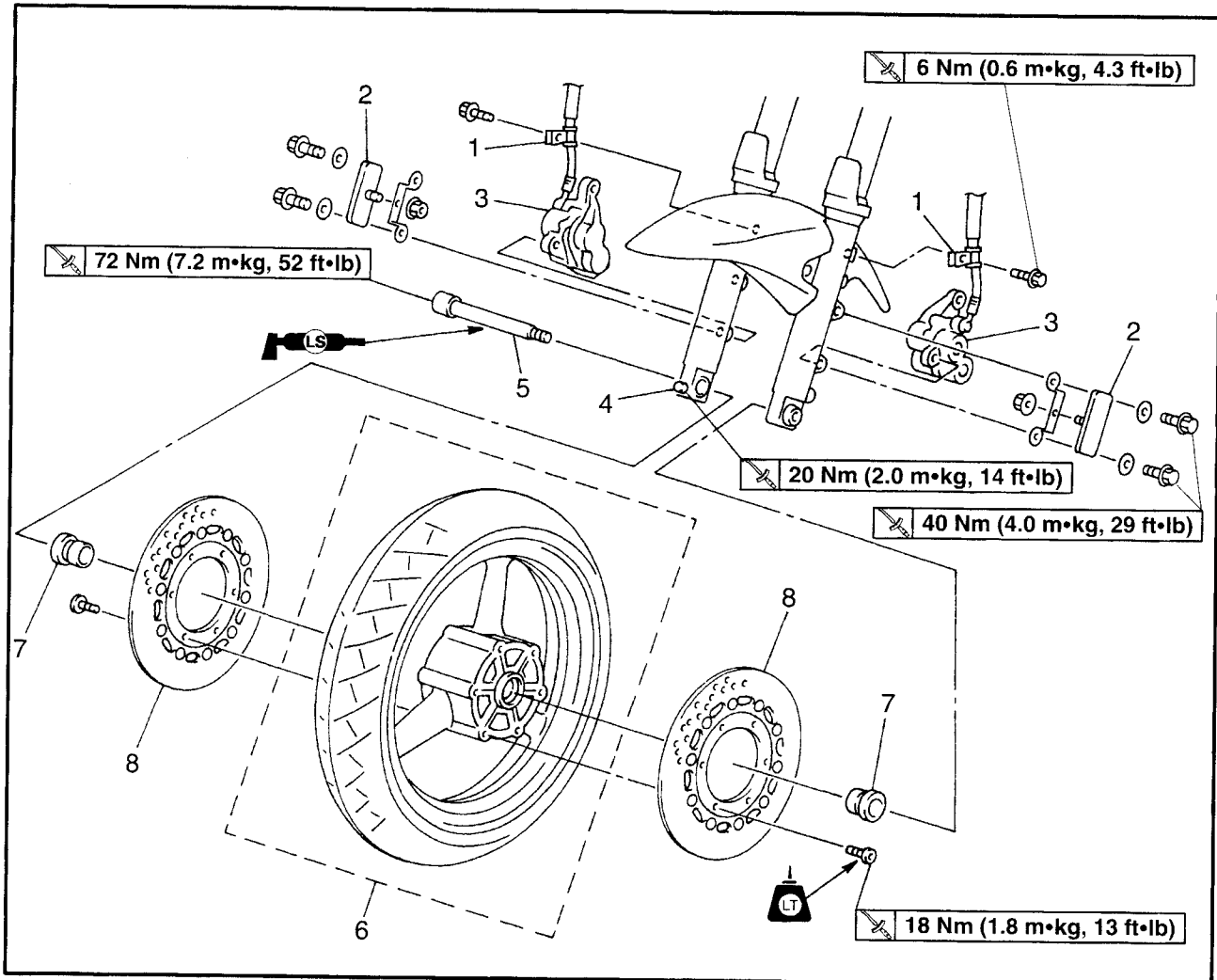


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EAS00514

## CHASSIS

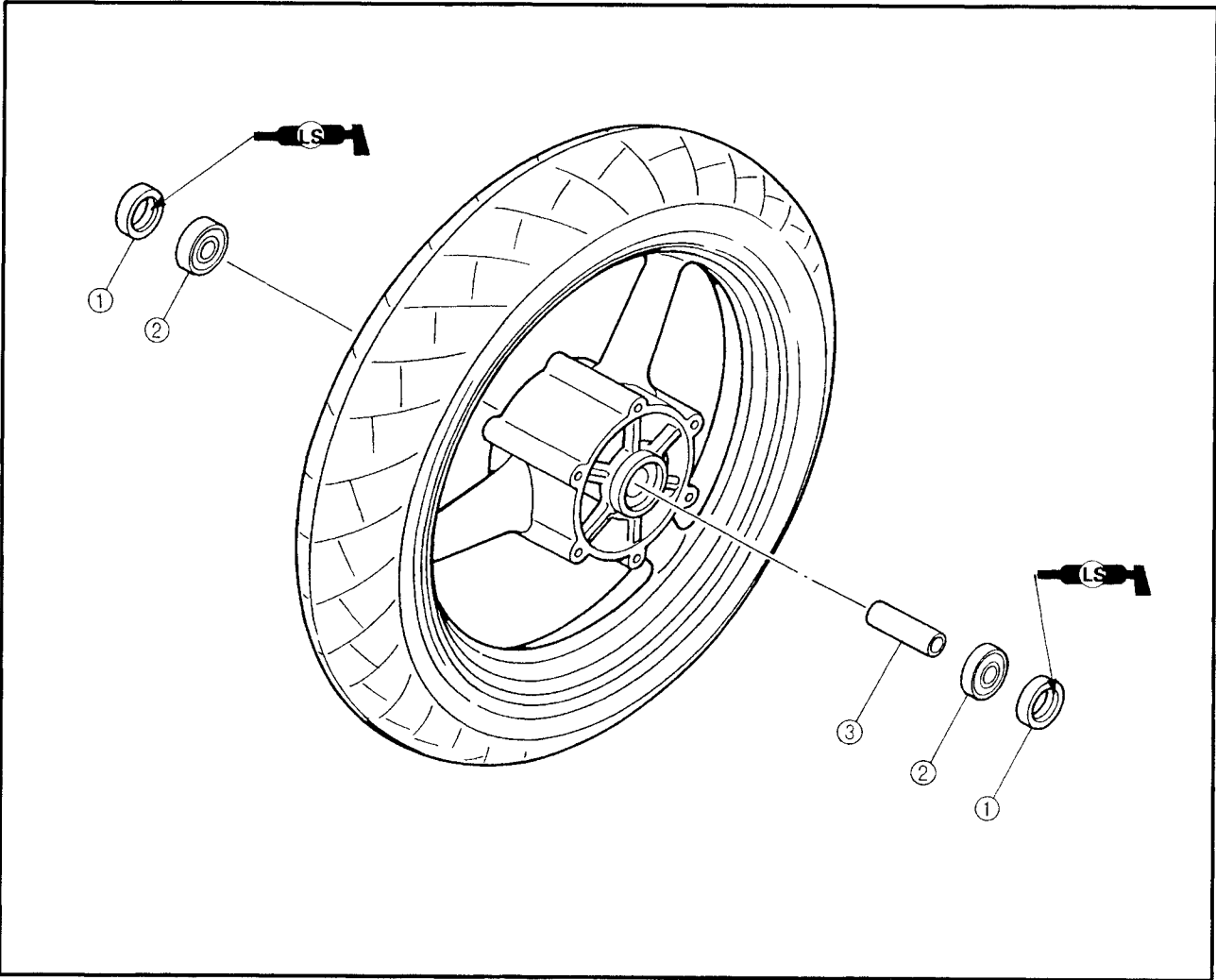
## FRONT WHEEL AND BRAKE DISCS



Order	Job/Part	Q'ty	Remarks
	<b>Removing the front wheel and brake discs</b>		Remove the parts in the order listed.
			<b>NOTE:</b> _____ Place the motorcycle on a suitable stand so that the front wheel is elevated.
1	Brake hose holders (left and right)	2	Refer to "REMOVING/INSTALLING THE FRONT WHEEL".
2	Front reflectors (left and right)	2	
3	Brake calipers (left and right)	2	
4	Wheel axle pinch bolt	1	Loosen
5	Front wheel axle	1	Refer to "REMOVING/INSTALLING THE FRONT WHEEL".
6	Front wheel	1	
7	Collars (left and right)	2	
8	Brake discs (left and right)	2	For installation, reverse the removal procedure.



EAS00518



Order	Job/Part	Q'ty	Remarks
①	<b>Disassembling the front wheel</b>		
②	Oil seals (left and right)	2	Remove the parts in the order listed.  For assembly, reverse the disassembly procedure.
③	Wheel bearings (left and right)	2	
	Spacer	1	



EAS00521

## REMOVING THE FRONT WHEEL

1. Stand the motorcycle on a level surface.

### **⚠ WARNING**

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

### **NOTE:**

Place the motorcycle on a suitable stand so that the front wheel is elevated.

2. Remove:

- Brake hose holders
- front reflectors
- left brake caliper
- right brake caliper
- wheel axle

### **NOTE:**

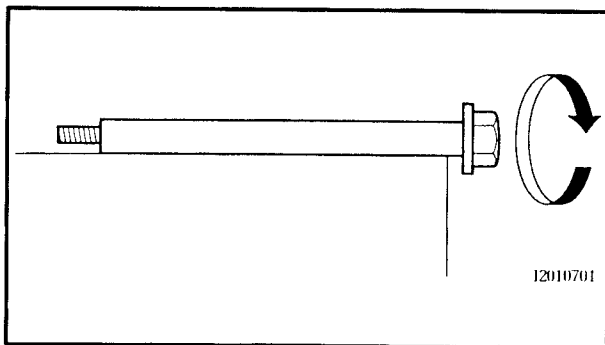
Do not squeeze the brake lever when removing the brake calipers.

3. Elevate:

- front wheel

### **NOTE:**

Place the motorcycle on a suitable stand so that the front wheel is elevated.



EAS00525

## CHECKING THE FRONT WHEEL

1. Check:

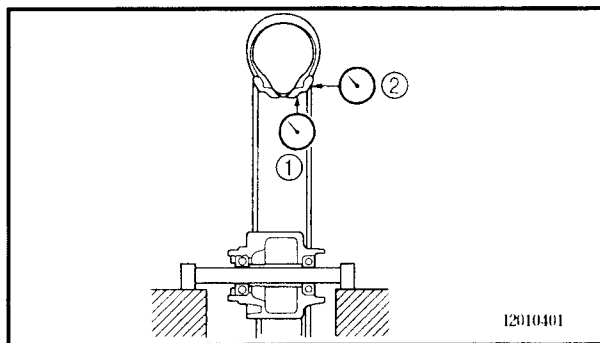
- wheel axle  
Roll the wheel axle on a flat surface.  
Bends → Replace.

### **⚠ WARNING**

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

2. Check:

- tire
- front wheel  
Damage/wear → Replace.  
Refer to "CHECKING THE TIRES" and "CHECKING THE WHEELS" in chapter 3.



## 3. Measure:

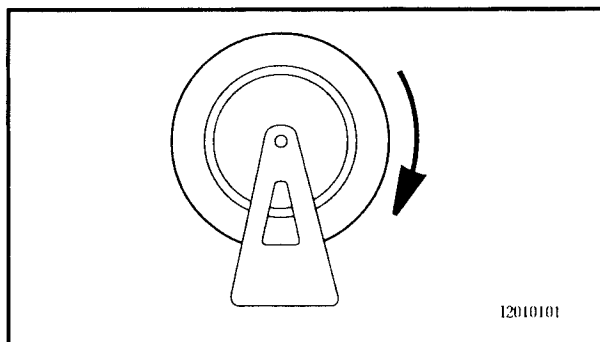
- radial wheel runout ①
- lateral wheel runout ②

Over the specified limits → Replace.



**Front radial wheel runout**  
**1.0 mm (0.04 in)**

**Front lateral wheel runout**  
**0.5 mm (0.02 in)**



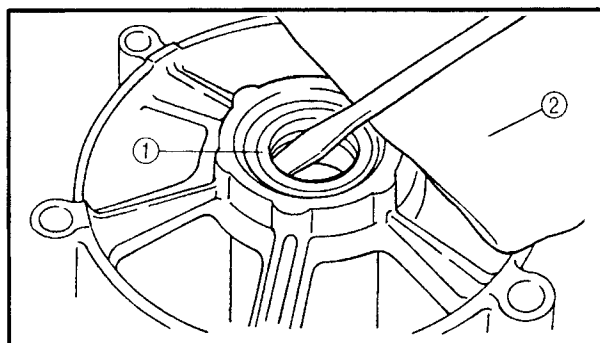
## 4. Check:

- wheel bearings

Front wheel turns roughly or is loose → Replace the wheel bearings.

- oil seals

Damage/wear → Replace.



## 5. Replace:

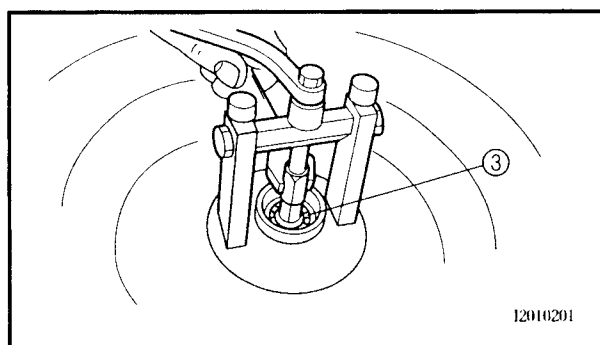
- wheel bearings **New**
- oil seals **New**

a. Clean the outside of the front wheel hub.

b. Remove the oil seals ① with a flat-head screwdriver.

## NOTE:

To prevent damaging the wheel, place a rag ② between the screwdriver and the wheel surface.



c. Remove the wheel bearings ③ with a general bearing puller.

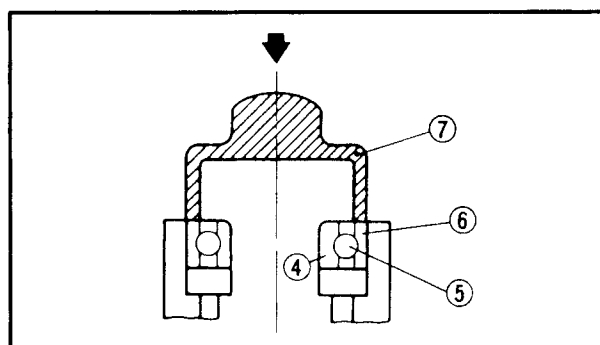
d. Install the new wheel bearings and oil seals in the reverse order of disassembly.

## CAUTION:

**Do not contact the wheel bearing center race ④ or balls ⑤. Contact should be made only with the outer race ⑥**

## NOTE:

Use a socket ⑦ that matches the diameter of the wheel bearing outer race and oil seal.





EAS00533

## CHECKING THE BRAKE DISCS

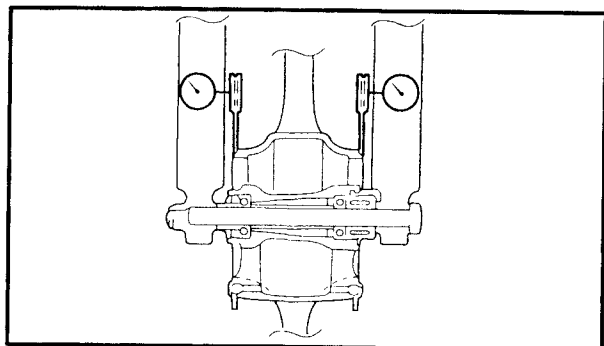
The following procedure applies to both of the brake discs.

### 1. Check:

- brake disc  
Damage/galling → Replace.

### 2. Measure:

- brake disc deflection  
Out of specification → Correct the brake disc deflection or replace the brake disc.

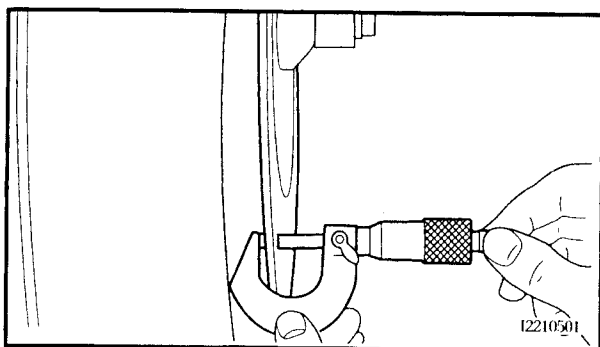


### Max. brake disc deflection

Front: 0.1 mm (0.0039 in)

Rear: 0.1 mm (0.0039 in)

- Place the motorcycle on a suitable stand so that the wheel is elevated.
- Before measuring the front brake disc deflection, turn the handlebars to the left or right to ensure that the front wheel is stationary.
- Remove the brake caliper.
- Hold the dial gauge at a right angle against the brake disc surface.
- Measure the deflection 1.5 mm (0.06 in) below the edge of the brake disc.



### 3. Measure:

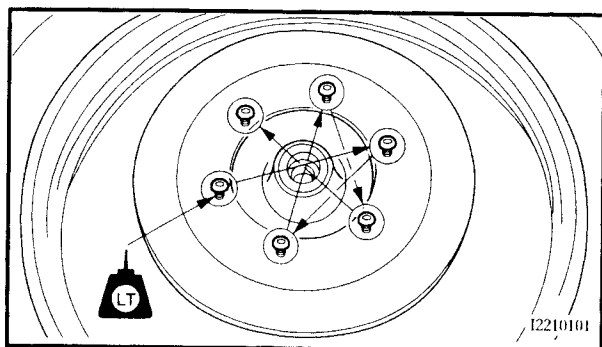
- brake disc thickness  
Measure the brake disc thickness at a few different locations.  
Out of specification → Replace.



### Min. brake disc thickness

Front: 4.5 mm (0.18 in)

Rear: 4.5 mm (0.18 in)



### 4. Adjust:

- brake disc deflection

- Remove the brake disc.
- Rotate the brake disc by one bolt hole.
- Install the brake disc.

### NOTE:

Tighten the brake disc bolts in stages and in a crisscross pattern.





- d. Measure the brake disc deflection.
- e. If out of specification, repeat the adjustment steps until the brake disc deflection is within specification.
- f. If the brake disc deflection cannot be brought within specification, replace the brake disc.


EAS00545

1. Lubricate:
  - wheel axle
  - oil seal lips



2. Tighten:
- wheel axle ①  72 Nm (7.2 m•kg, 52 ft•lb)
  - wheel axle pinch bolt ②  20 Nm (2.0 m•kg, 14 ft•lb)

**Before tightening the wheel axle nut, push down hard on the handlebars several times and check if the front fork rebounds smoothly.**

3. Install:
- brake calipers
  - front reflectors
  - brake hose holders
-  **40 Nm (4.0 m•kg, 29 ft•lb)**

**⚠ WARNING**

**Make sure that the brake hose is routed properly.**

EAS00549

**NOTE:**

- After replacing the tire, wheel or both, the front wheel static balance should be adjusted.
- Adjust the front wheel static balance with the brake discs installed.

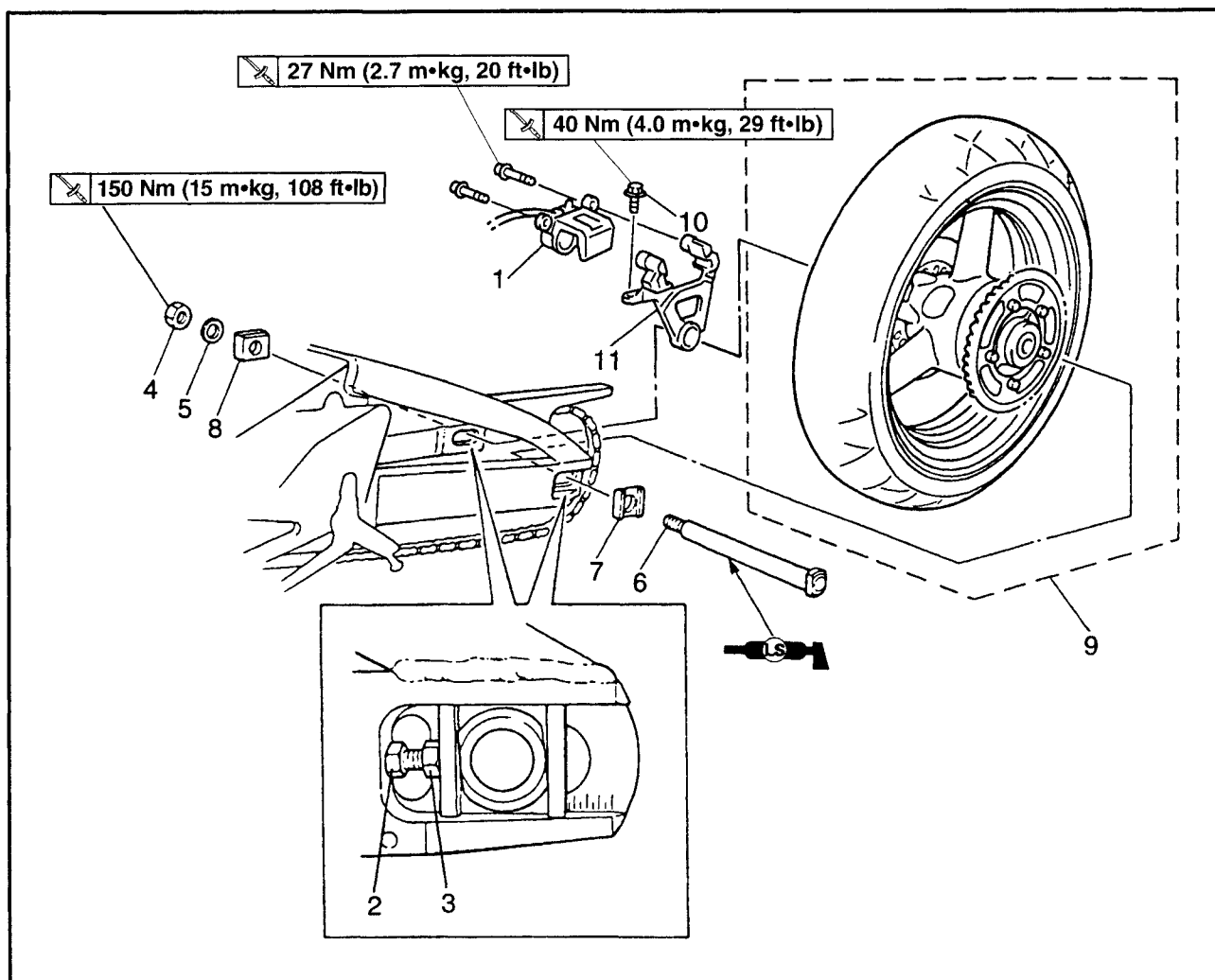




EAS00550

## REAR WHEEL, BRAKE DISC, AND REAR WHEEL SPROCKET

### REAR WHEEL

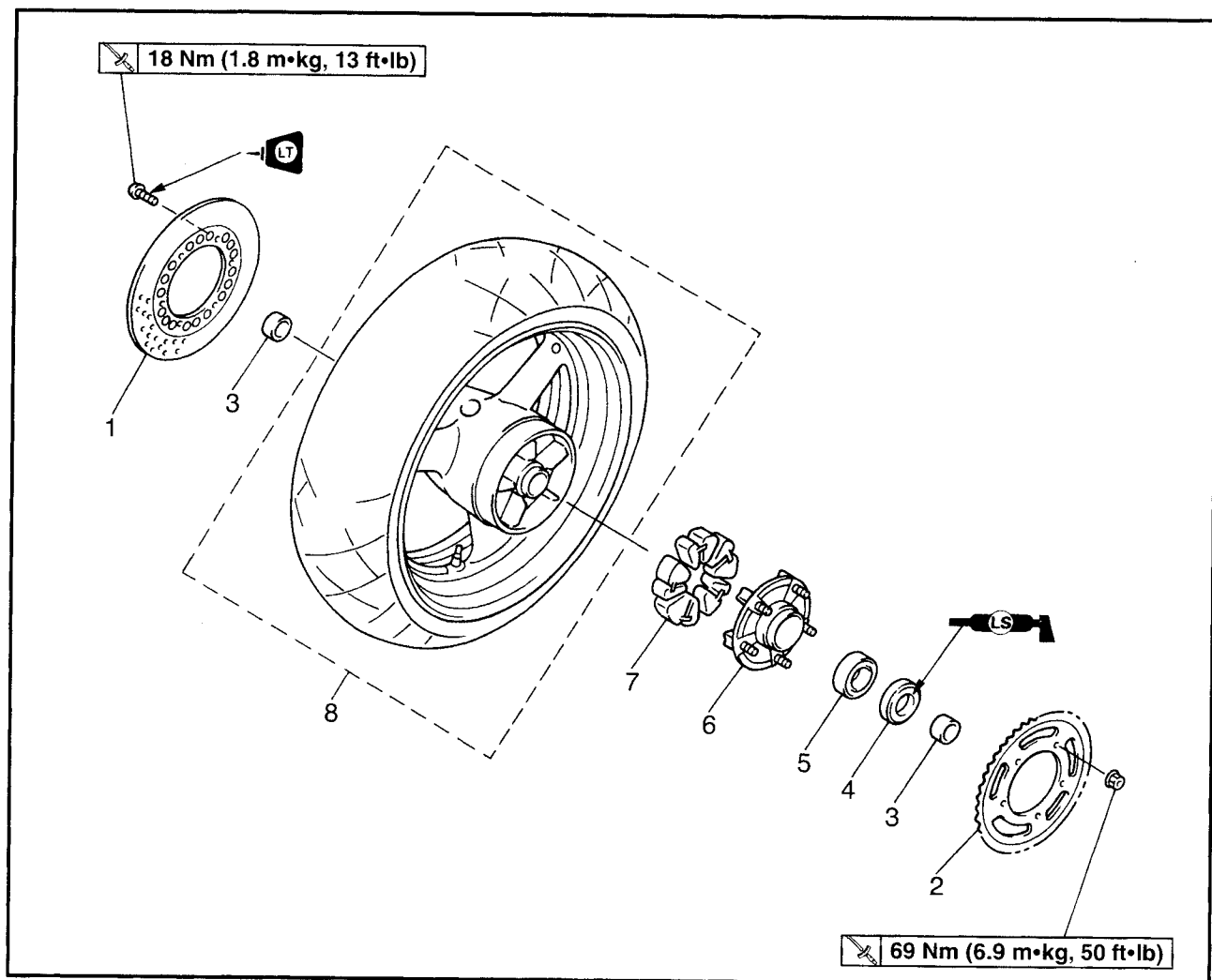


Order	Job/Part	Q'ty	Remarks
	<b>Removing the rear wheel</b>		Remove the parts in the order listed. <b>NOTE:</b> _____ Place the motorcycle on a suitable stand so that the rear wheel is elevated.
1	Brake caliper	1	
2	Locknuts (left and right)	2	Loosen.
3	Adjusting bolts (left and right)	2	Loosen.
4	Wheel axle nut	1	
5	Washer	1	
6	Rear wheel axle	1	
7	Left adjusting block	1	
8	Right adjusting block	1	
9	Rear wheel	1	<b>NOTE:</b> _____ Make sure that the tapered side of the right adjusting block faces the wheel.
10	Brake caliper bracket bolt	1	
11	Brake caliper bracket	1	For installation, reverse the removal procedure.

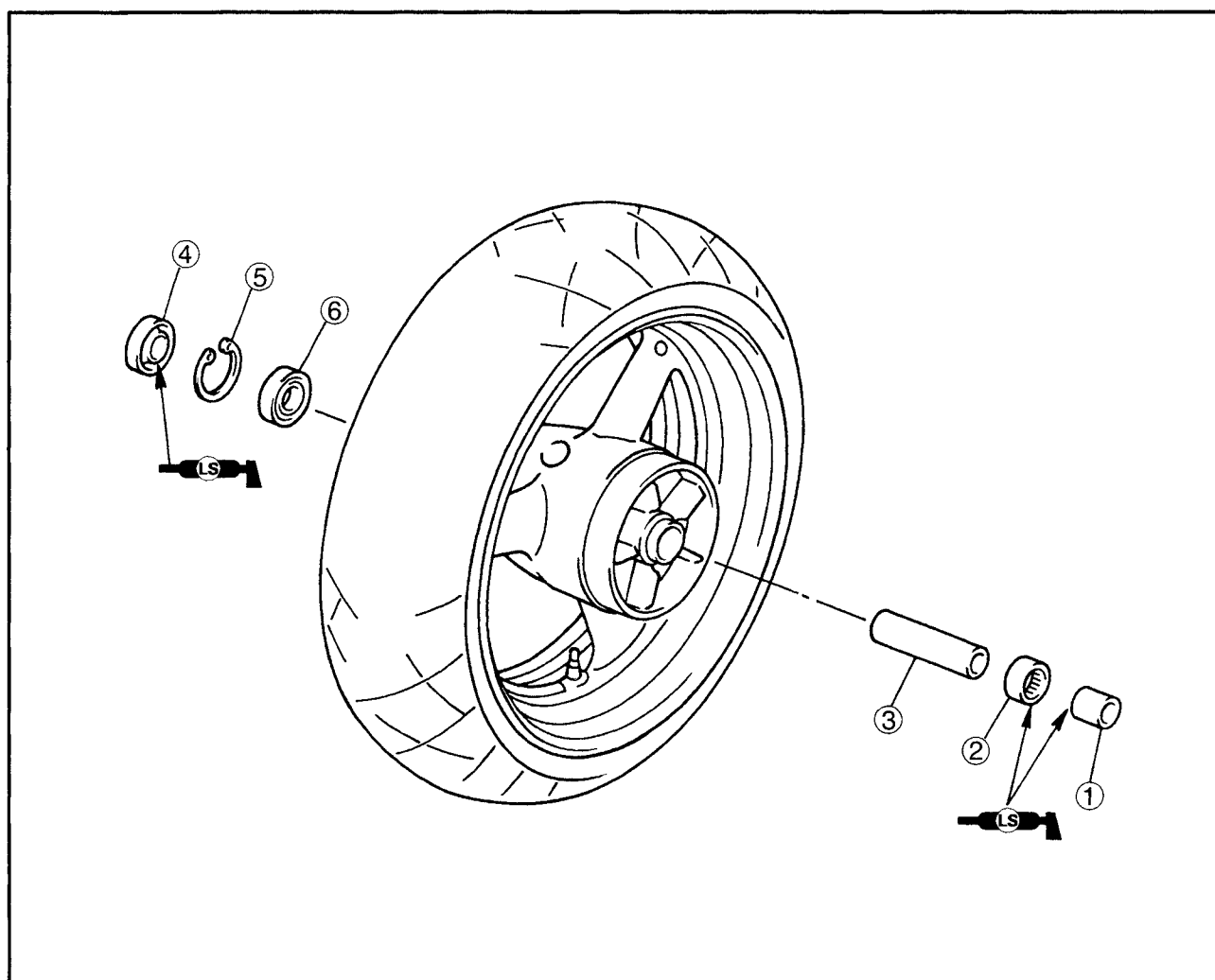


EAS00556

## BRAKE DISC AND REAR WHEEL SPROCKET



Order	Job/Part	Q'ty	Remarks
	<b>Removing the brake disc and rear wheel sprocket</b>		
1	Brake disc	1	Remove the parts in the order listed.
2	Rear wheel sprocket	1	
3	Spacers (left and right)	2	
4	Oil seal	1	
5	Bearing	1	
6	Rear wheel drive hub	1	
7	Rear wheel drive hub dampers	5	
8	Rear wheel	1	
			For installation, reverse the removal procedure.



Order	Job/Part	Q'ty	Remarks
	<b>Disassembling the rear wheel</b>		
①	Spacer	1	Disassemble the parts in the order listed.
②	Bearing	1	
③	Spacer	1	
④	Oil seal	1	
⑤	Circlip	1	
⑥	Bearing	1	For assembly, reverse the disassembly procedure.



EAS00561

## REMOVING THE REAR WHEEL

1. Stand the motorcycle on a level surface.

### **⚠ WARNING**

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

### **NOTE:**

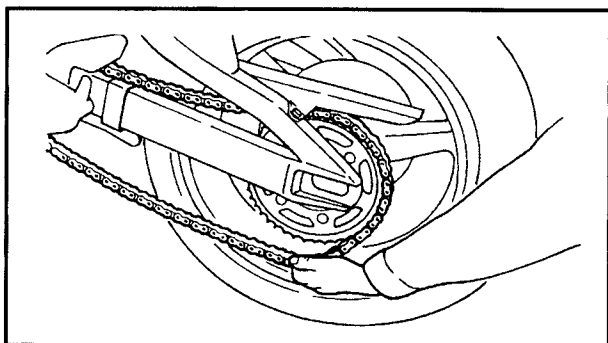
Place the motorcycle on a suitable stand so that the rear wheel is elevated.

2. Remove:

- brake caliper

### **NOTE:**

Do not depress the brake pedal when removing the brake caliper.



3. Remove:

- wheel axle nut
- washer
- wheel axle
- adjusting blocks
- brake caliper bracket.
- rear wheel

### **NOTE:**

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

EAS00565

## CHECKING THE REAR WHEEL

1. Check:

- wheel axle
- rear wheel
- wheel bearings
- oil seals
- brake disc

Refer to "BRAKE DISC AND REAR WHEEL SPROCKET".

2. Check:

- tire
- rear wheel

Damage/wear → Replace.

Refer to "CHECKING THE TIRES" and "CHECKING THE WHEELS" in chapter 3.





EAS00571

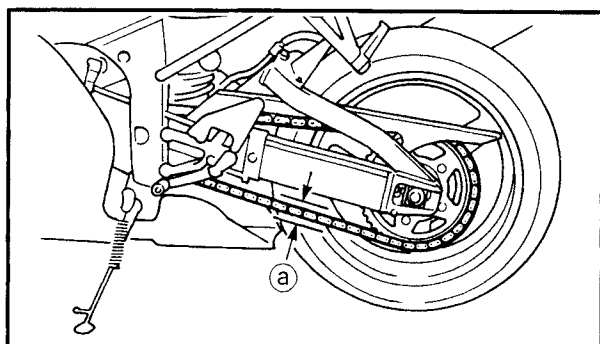
### INSTALLING THE REAR WHEEL

1. Lubricate:
  - wheel axle
  - wheel bearings
  - oil seal lips



**Recommended lubricant**  
**Lithium soap base grease**

2. Install:
  - rear wheel
  - brake caliper bracket
  - adjusting blocks
  - wheel axle
  - washer
  - wheel axle nut
  - brake caliper



3. Adjust:
  - drive chain slack (a)



**Drive chain slack**  
**40 ~ 50 mm (1.57 ~ 1.97 in)**

Refer to “ADJUSTING THE DRIVE CHAIN SLACK” in chapter 3.

4. Tighten:
  - wheel axle nut **150 Nm (15.0 m•kg, 108 ft•lb)**
  - brake caliper bolts **27 Nm (2.7 m•kg, 20 ft•lb)**
  - brake caliper bracket bolt **40 Nm (4.0 m•kg, 29 ft•lb)**

### **WARNING**

**Make sure that the brake hose is routed properly.**

EAS00575

### ADJUSTING THE REAR WHEEL STATIC BALANCE

#### NOTE:

- After replacing the tire, wheel or both, the rear wheel static balance should be adjusted.
- Adjust the rear wheel static balance with the brake disc and rear wheel drive hub installed.

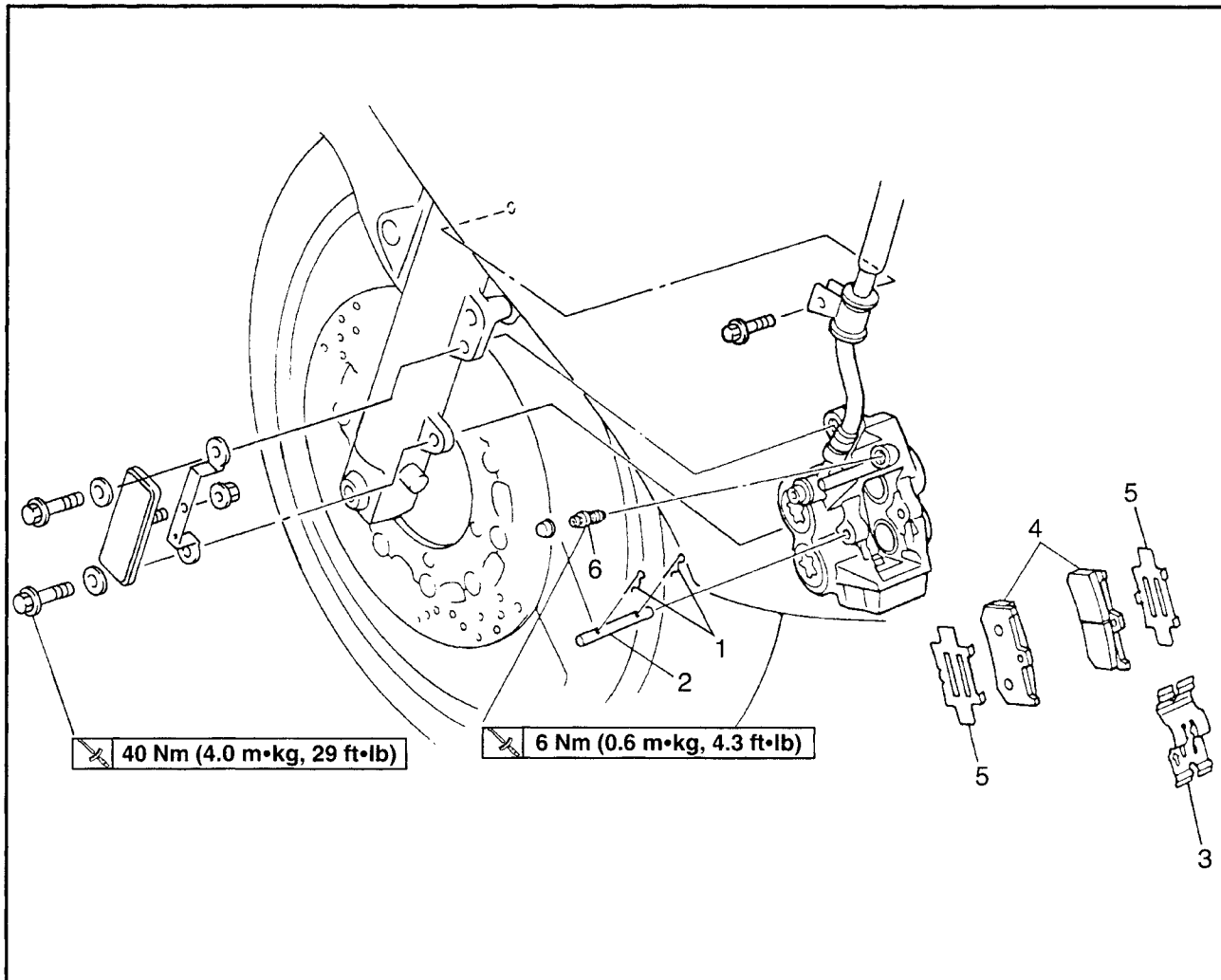
1. Adjust:
  - rear wheel static balance

Refer to “FRONT WHEEL”.

EAS00577

# FRONT AND REAR BRAKES

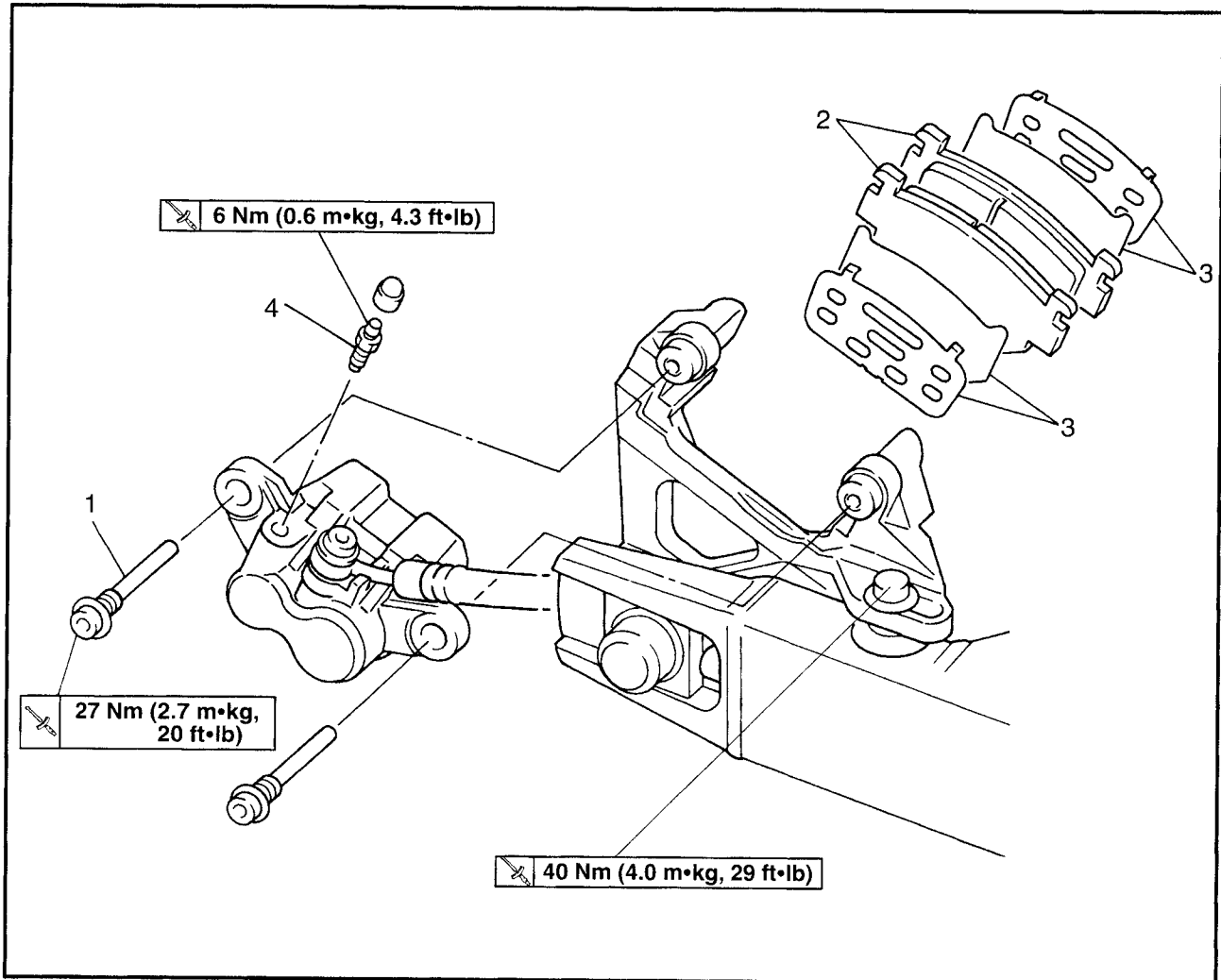
## FRONT BRAKE PADS



Order	Job/Part	Q'ty	Remarks
	<b>Removing the front brake pads</b>		Remove the parts in the order listed. The following procedure applies to both of the front brake calipers.
1	Brake pad clips	2	Refer to "REPLACING THE FRONT BRAKE PADS".
2	Brake pad pin	1	
3	Brake pad spring	1	
4	Brake pads	2	
5	Brake pad shims	2	
6	Bleed screw	1	
			For installation, reverse the removal procedure.

EAS00578

## REAR BRAKE PADS



Order	Job/Part	Q'ty	Remarks
	<b>Removing the rear brake pads</b>		
1	Brake caliper bolts	2	Remove the parts in the order listed.
2	Brake pads	2	
3	Brake pad shims	4	Refer to "REPLACING THE REAR BRAKE PADS".
4	Bleed screw	1	
			For installation, reverse the removal procedure.



EAS00579

**CAUTION:**

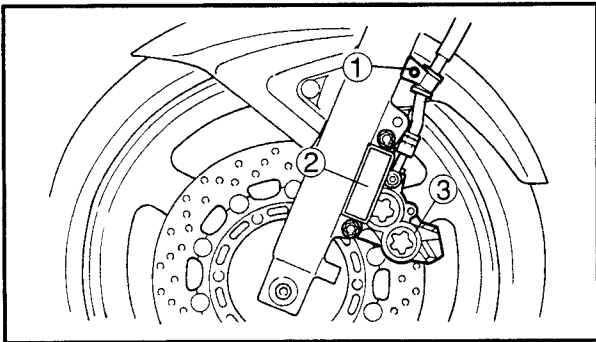
Disc brake components rarely require disassembly.

Therefore, always follow these preventive measures:

- Never disassemble brake components unless absolutely necessary.
- If any connection on the hydraulic brake system is disconnected, the entire brake system must be disassembled, drained, cleaned, properly filled, and bled after reassembly.
- Never use solvents on internal brake components.
- Use only clean or new brake fluid for cleaning brake components.
- Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.
- Avoid brake fluid coming into contact with the eyes as it can cause serious injury.

First aid for brake fluid entering the eyes:

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



EAS00582

**REPLACING THE FRONT BRAKE PADS**

The following procedure applies to both brake calipers.

**NOTE:**

When replacing the brake pads, it is not necessary to disconnect the brake hose or disassemble the brake caliper.

**1. Remove:**

- brake hose holder bolt ①
- front reflector ②
- brake caliper ③





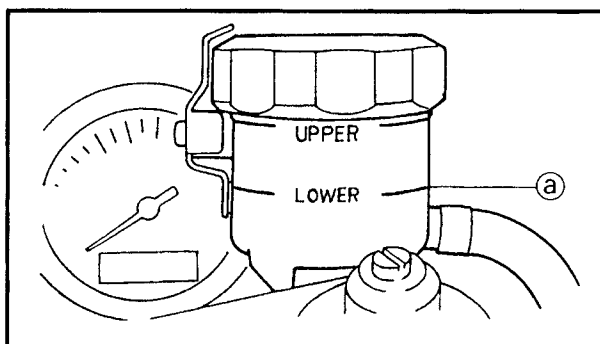
## 5. Install:

- brake pad pins
- brake pad clips
- brake caliper bolts

40 Nm (4.0 m•kg, 29 ft•lb)

- brake hose holder bolt

6 Nm (0.6 m•kg, 4.3 ft•lb)

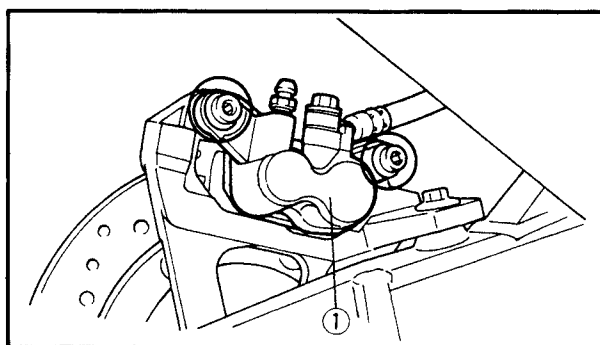


## 6. Check:

- brake fluid level  
Below the minimum level mark (a) → Add the recommended brake fluid to the proper level. Refer to "CHECKING THE BRAKE FLUID LEVEL" in chapter 3.

## 7. Check:

- brake lever operation  
Soft or spongy feeling → Bleed the brake system. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" in chapter 3.



EAS00583

## REPLACING THE REAR BRAKE PADS

### NOTE:

When replacing the brake pads, it is not necessary to disconnect the brake hose or disassemble the brake caliper.

## 1. Remove:

- brake caliper ①

## 2. Remove:

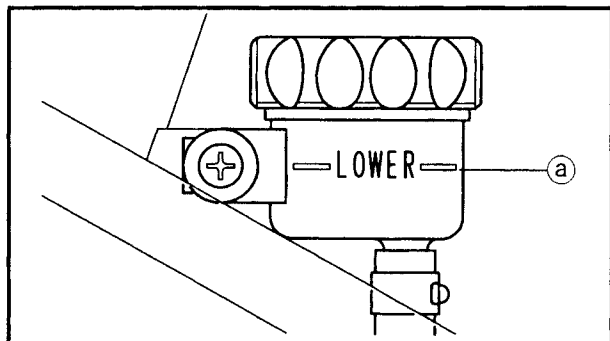
- brake pads  
(along with the brake pad shims)





5. Install:
  - brake caliper bolts

27 Nm (2.7 m•kg, 20 ft•lb)

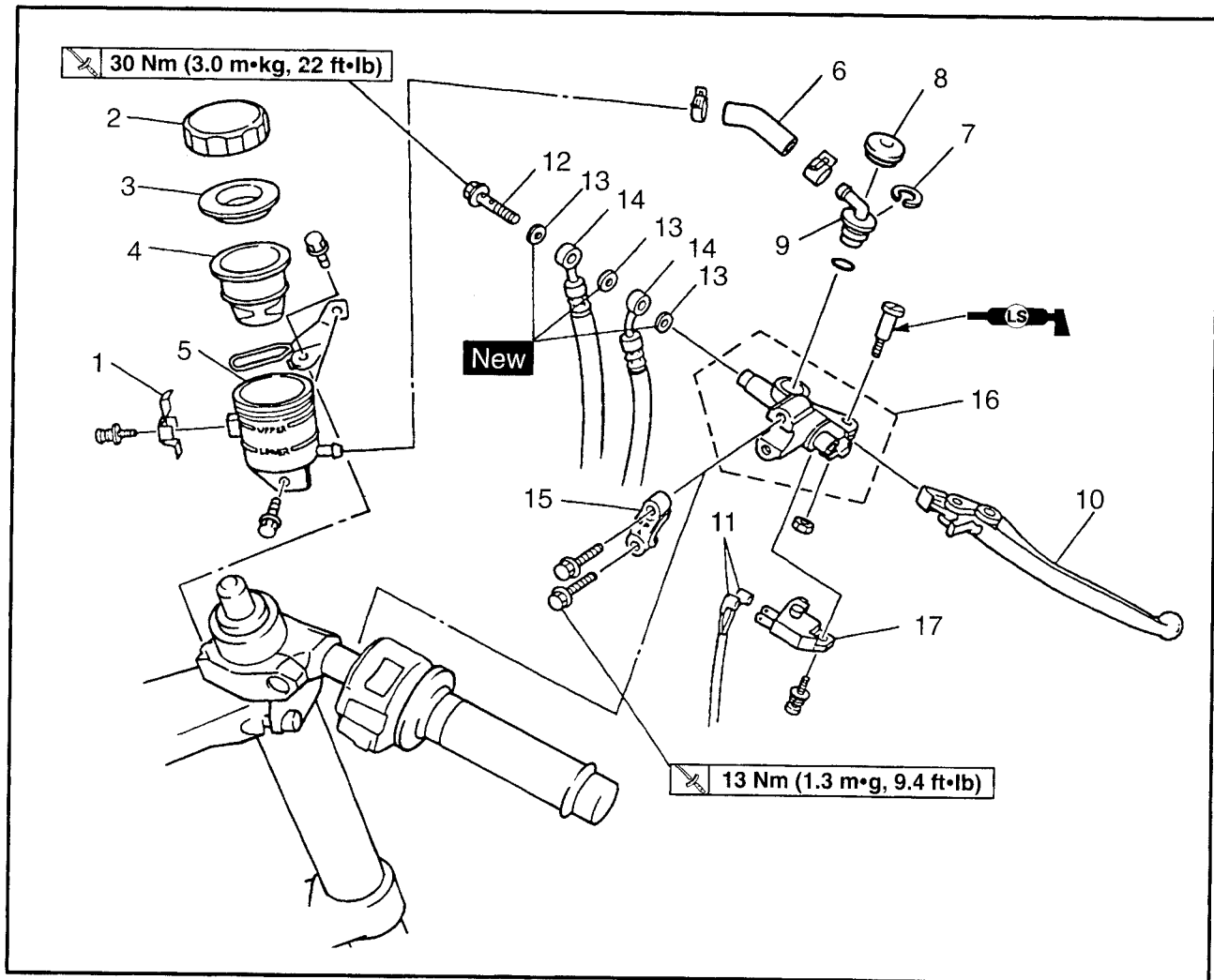


6. Check:
  - brake fluid level  
Below the minimum level mark (a) → Add the recommended brake fluid to the proper level.  
Refer to “CHECKING THE BRAKE FLUID LEVEL” in chapter 3.

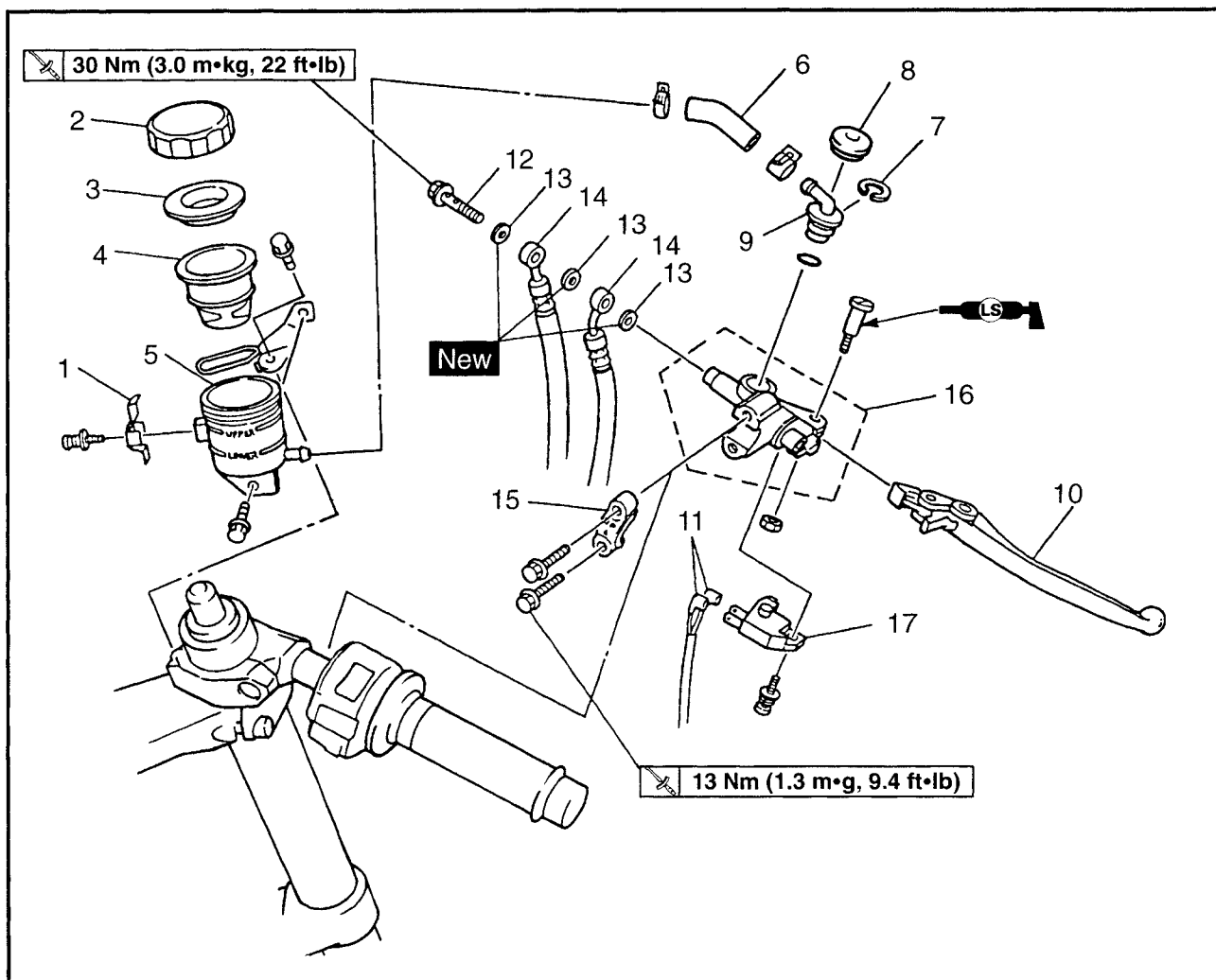
7. Check:
  - brake pedal operation  
Soft or spongy feeling → Bleed the brake system.  
Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” in chapter 3.

EAS00584

## FRONT BRAKE MASTER CYLINDER AND BRAKE FLUID RESERVOIR

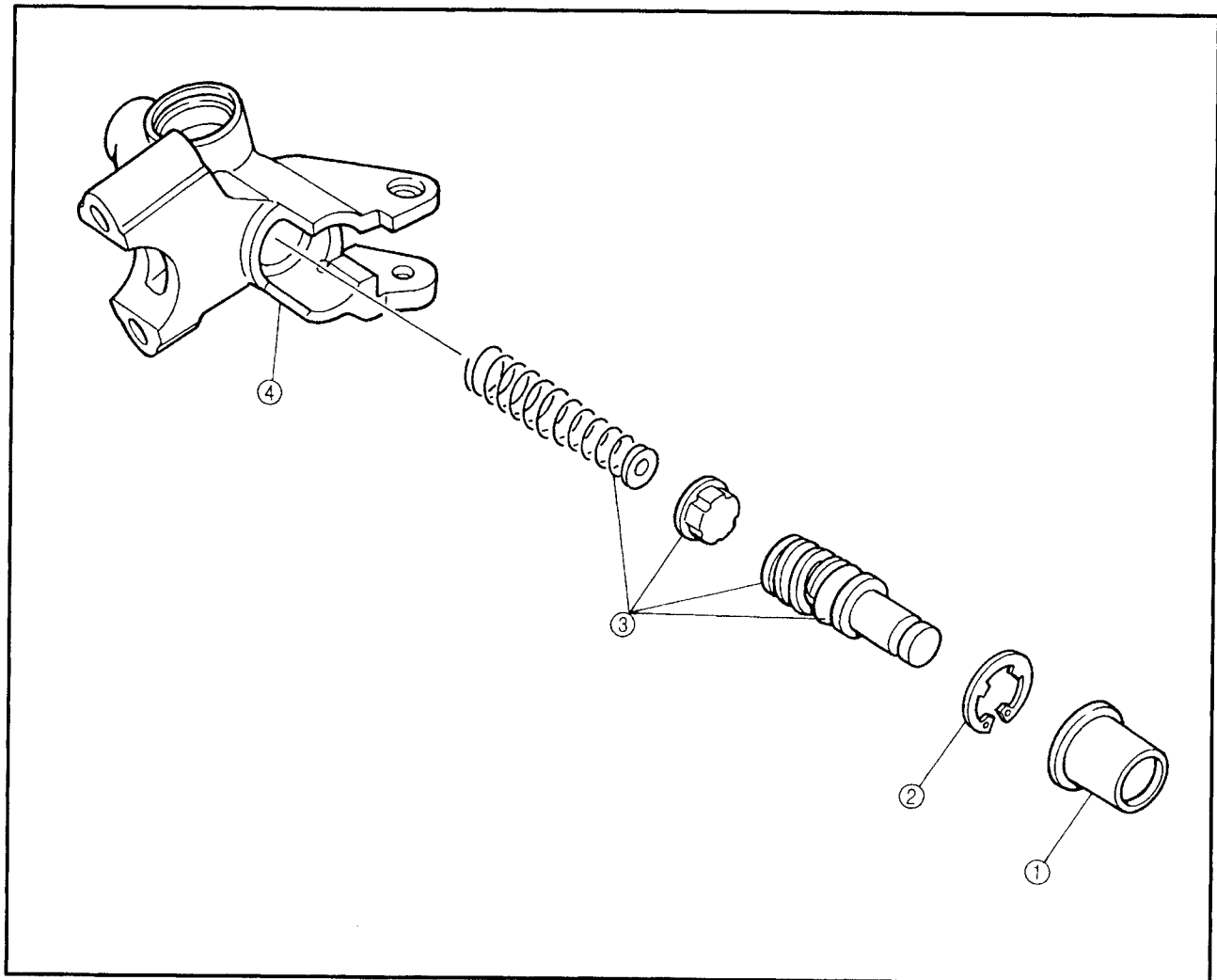


Order	Job/Part	Q'ty	Remarks
	<b>Removing the front brake master cylinder and brake fluid reservoir</b>		Remove the parts in the order listed.
	Brake fluid		Drain.
1	Brake fluid reservoir cap stopper	1	
2	Brake fluid reservoir cap	1	
3	Brake fluid reservoir diaphragm holder	1	
4	Brake fluid reservoir diaphragm	1	
5	Brake fluid reservoir	1	
6	Brake fluid reservoir hose	1	
7	Circlip	1	
8	Dust cover	1	
9	Hose joint	1	
10	Brake lever	1	
11	Front brake switch connector	2	Disconnect.
12	Union bolt	1	Refer to "INSTALLING THE FRONT BRAKE MASTER CYLINDER".
13	Copper washer	3	



Order	Job/Part	Q'ty	Remarks
14	Brake hose	2	Refer to "INSTALLING THE FRONT BRAKE MASTER SYLINDER".
15	Brake master cylinder holder	1	
16	Brake master cylinder	1	
17	Front brake switch	1	
			For installation, reverse the removal procedure.

EAS00585

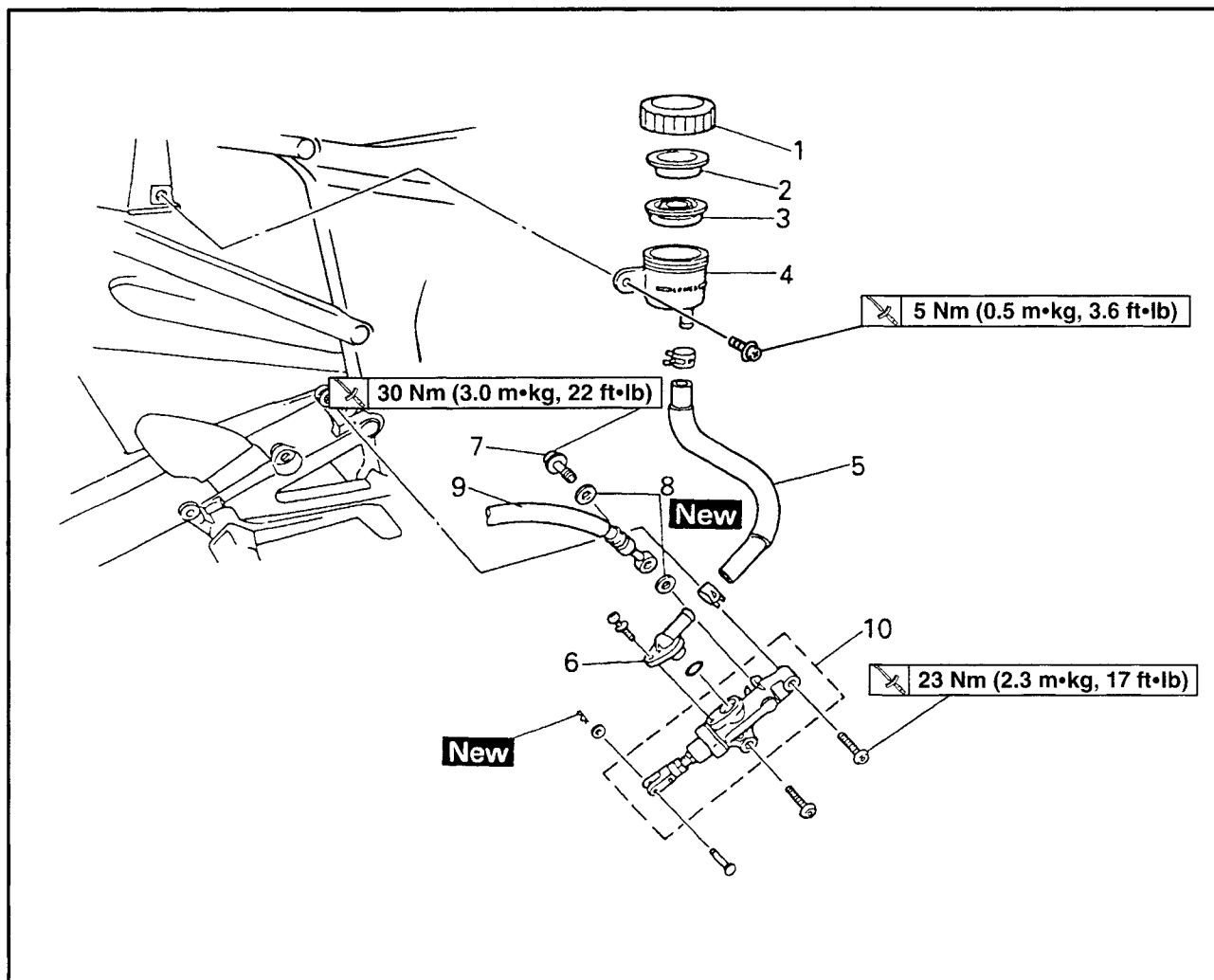


Order	Job/Part	Q'ty	Remarks
	<b>Disassembling the front brake master cylinder</b>		Remove the parts in the order listed.
①	Dust boot	1	
②	Circlip	1	
③	Brake master cylinder kit	1	
④	Brake master cylinder	1	
			For assembly, reverse the disassembly procedure.



EAS00596

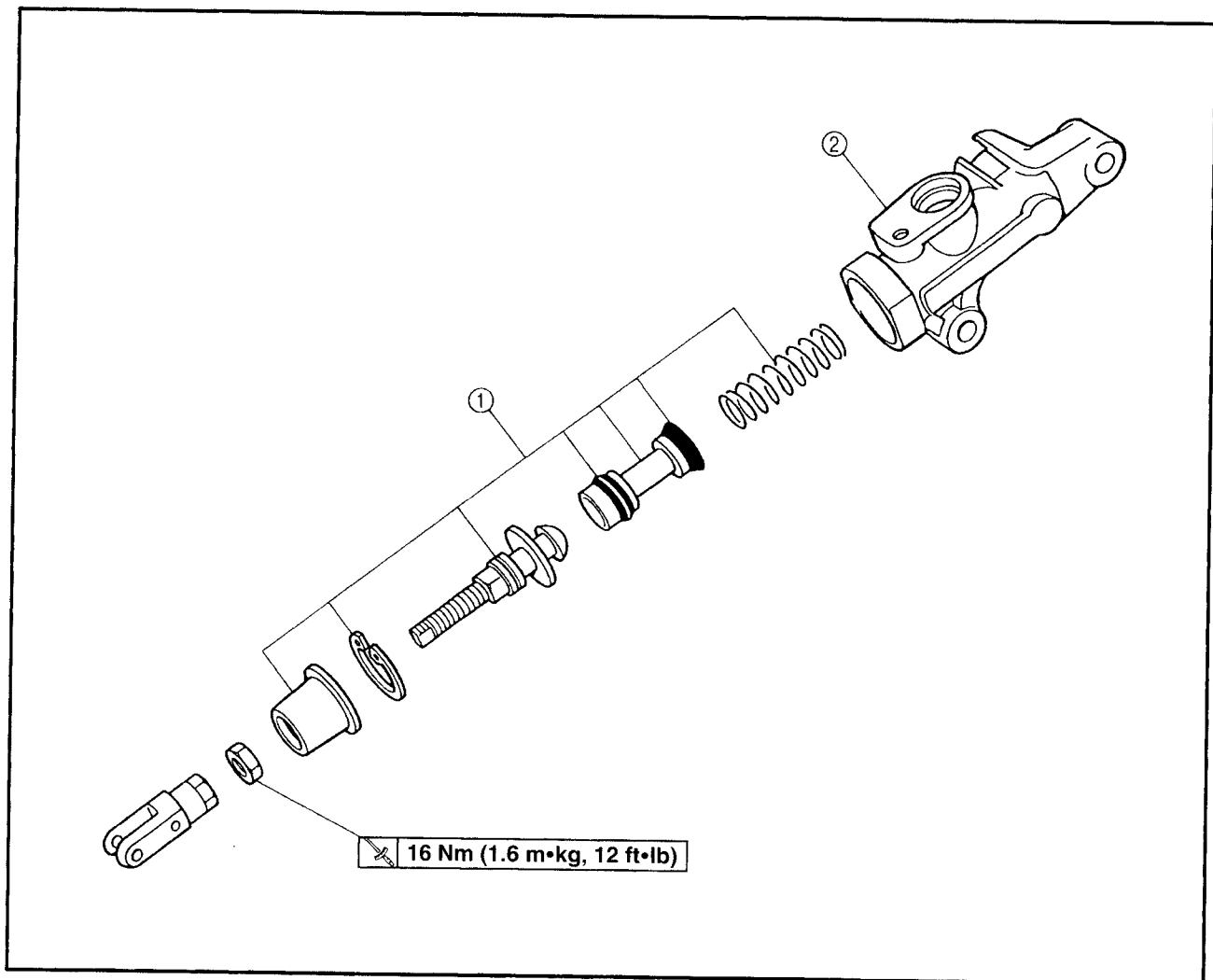
### REAR BRAKE MASTER CYLINDER AND BRAKE FLUID RESERVOIR



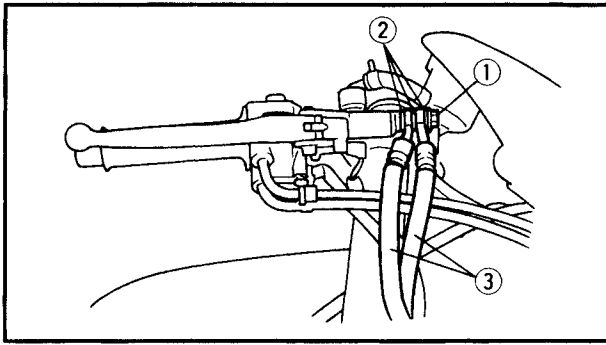
Order	Job/Part	Q'ty	Remarks
	<b>Removing the rear brake master cylinder and brake fluid reservoir</b>		Remove the parts in the order listed.
	Brake fluid		Drain.
1	Brake fluid reservoir cap	1	
2	Brake fluid reservoir diaphragm holder	1	
3	Brake fluid reservoir diaphragm	1	
4	Brake fluid reservoir	1	
5	Brake fluid reservoir hose	1	
6	Hose joint	1	
7	Union bolt	1	
8	Copper washer	2	Refer to "INSTALLING THE REAR BRAKE MASTER SYLINDER".
9	Brake hose	1	
10	Brake master cylinder	1	
			For installation, reverse the removal procedure.



EAS00587



Order	Job/Part	Q'ty	Remarks
①	<b>Disassembling the rear brake master cylinder</b>		
	Brake master cylinder kit	1	Remove the parts in the order listed.
②	Brake master cylinder	1	For assembly, reverse the disassembly procedure.



EAS00588

### REMOVING THE FRONT BRAKE MASTER CYLINDER

#### NOTE:

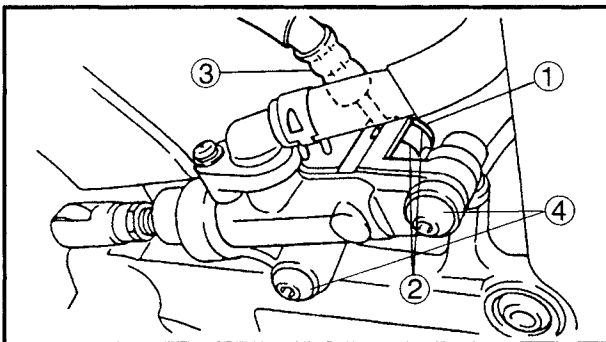
Before disassembling the front brake master cylinder, drain the brake fluid from the entire brake system.

#### 1. Remove:

- union bolt ①
- copper washers ②
- brake hoses ③
- master cylinder holder ④

#### NOTE:

To collect any remaining brake fluid, place a container under the master cylinder and the end of the brake hose.



EAS00589

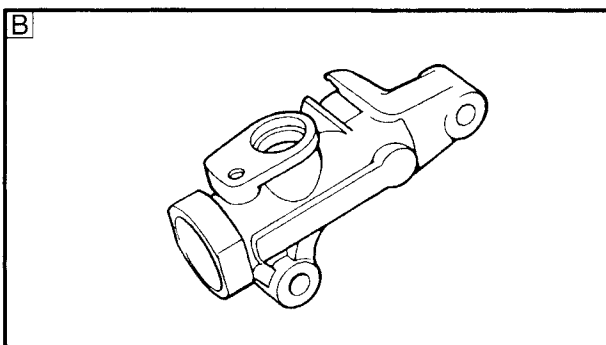
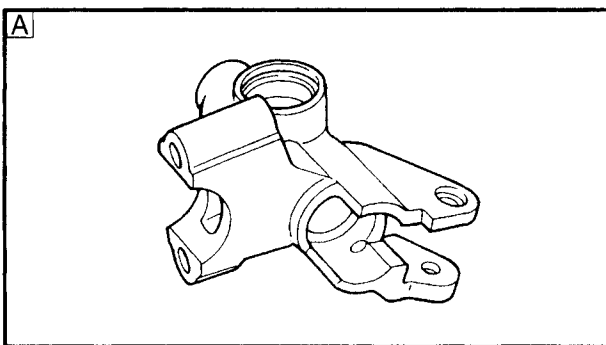
### REMOVING THE REAR BRAKE MASTER CYLINDER

#### 1. Remove:

- union bolt ①
- copper washers ②
- brake hose ③
- button head bolts ④

#### NOTE:

To collect any remaining brake fluid, place a container under the master cylinder and the end of the brake hose.



EAS00593

### CHECKING THE FRONT AND REAR BRAKE MASTER CYLINDERS

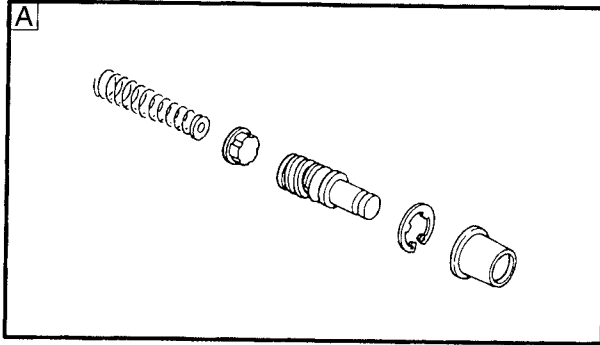
The following procedure applies to both of the brake master cylinders.

#### 1. Check:

- brake master cylinder  
Damage/scratches/wear → Replace.
- brake fluid delivery passages  
(brake master cylinder body)  
Obstruction → Blow out with compressed air.

**A** Front

**B** Rear

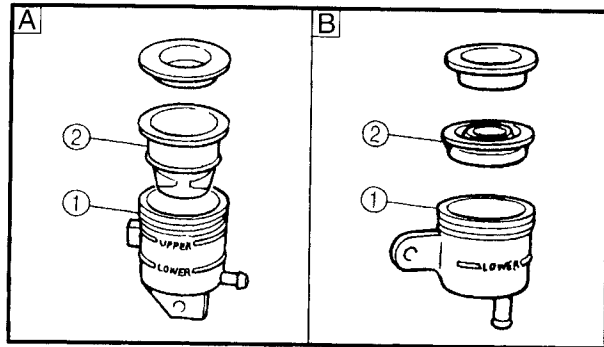
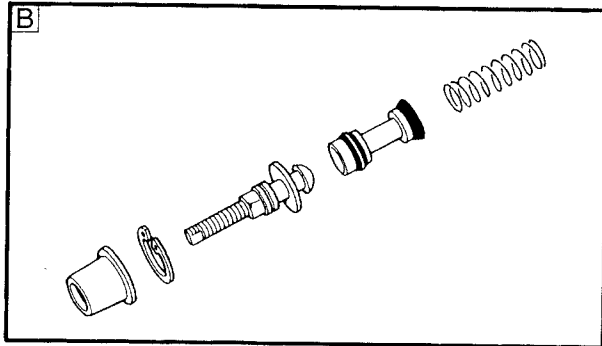


2. Check:

- brake master cylinder kit  
Damage/scratches/wear → Replace.

**A** Front

**B** Rear



3. Check:

- brake fluid reservoir ①  
Cracks/damage → Replace.
- brake fluid reservoir diaphragm ②  
Cracks/damage → Replace.

4. Check:

- brake hoses  
Cracks/damage/wear → Replace.

EAS00607

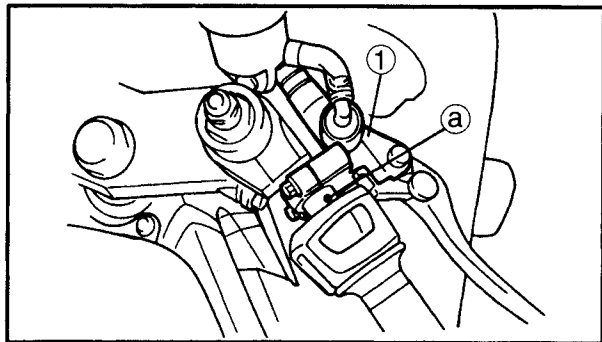
## INSTALLING THE FRONT BRAKE MASTER CYLINDER

### **⚠ WARNING**

- Before installation, all internal brake components should be cleaned and lubricated with clean or new brake fluid.
- Never use solvents on internal brake components.



Recommended brake fluid  
DOT 4



## 1. Install:

- brake master cylinder ①

13 Nm (1.3 m•kg, 9.4 ft•lb)

- brake master cylinder holder

**NOTE:**

- Install the brake master cylinder holder with the "UP" mark facing up.
- Align the end of the brake master cylinder holder with the punch mark ① in the right handlebar.
- First, tighten the upper bolt, then the lower bolt.

## 2. Install:

- copper washers **New**

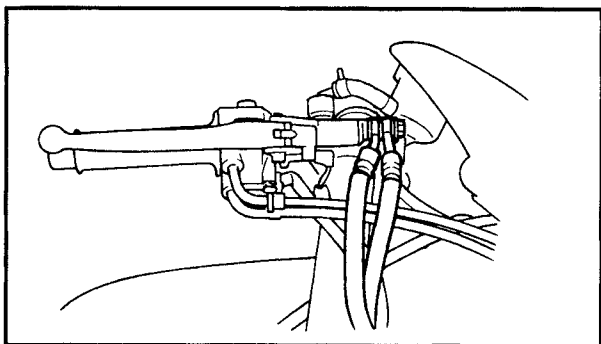
- brake hose

- union bolt

30 Nm (3.0 m•kg, 22 ft•lb)

**⚠ WARNING**

Proper brake hose routing is essential to insure safe motorcycle operation. Refer to "CABLE ROUTING".

**NOTE:**

- While holding the brake hose, tighten the union bolt as shown.
- Turn the handlebars to the left and to the right to make sure that the brake hose does not touch other parts (e.g., wire harness, cables, leads). Correct if necessary.

## 3. Fill:

- brake fluid reservoir  
(with the specified amount of the recommended brake fluid)



**Recommended brake fluid  
DOT 4**

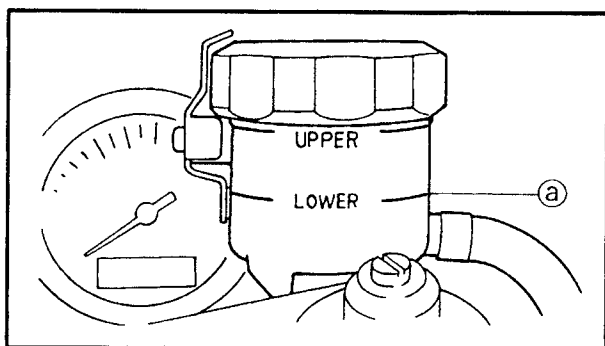
**⚠ WARNING**

- Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.
- Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor brake performance.
- When refilling, be careful that water does not enter the brake fluid reservoir. Water will significantly lower the boiling point of the brake fluid and could cause vapor lock.



## CAUTION:

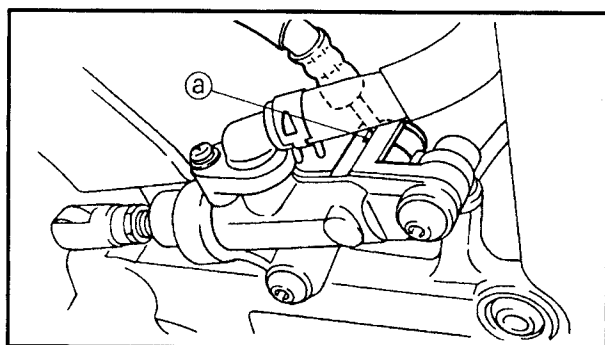
Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.



4. Bleed:
  - brake system
 Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" in chapter 3.

5. Check:
  - brake fluid level
 Below the minimum level mark (a) → Add the recommended brake fluid to the proper level. Refer to "CHECKING THE BRAKE FLUID LEVEL" in chapter 3.

6. Check:
  - brake lever operation
 Soft or spongy feeling → Bleed the brake system. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" in chapter 3.



EAS00608

## INSTALLING THE REAR BRAKE MASTER CYLINDER

1. Install:
  - copper washers **New**
  - brake hoses
  - union bolt **30 Nm (3.0 m•kg, 22 ft•lb)**
  - button head bolts

## ⚠ WARNING

Proper brake hose routing is essential to insure safe motorcycle operation. Refer to "CABLE ROUTING".

## CAUTION:

When installing the brake hose onto the brake master cylinder, make sure that the brake pipe touches the projection (a) as shown.



2. Fill:
- brake fluid reservoir



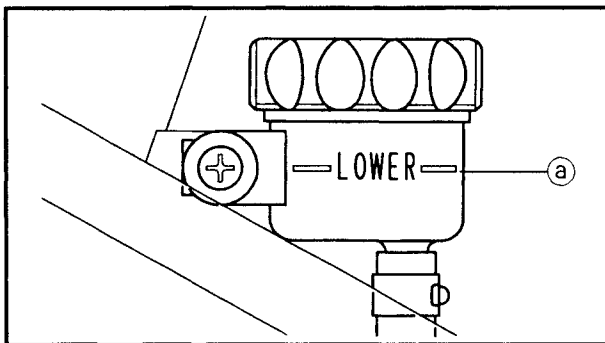
Recommended brake fluid  
DOT 4

### ⚠ WARNING

- Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.
- Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor brake performance.
- When refilling, be careful that water does not enter the reservoir. Water will significantly lower the boiling point of the brake fluid and could cause vapor lock.

### CAUTION:

Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.



3. Bleed:
- brake system  
Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" in chapter 3.
4. Check:
- brake fluid level  
Below the minimum level mark (a) → Add the recommended brake fluid to the proper level. Refer to "CHECKING THE BRAKE FLUID LEVEL" in chapter 3.
5. Adjust:
- brake pedal position  
Refer to "ADJUSTING THE REAR BRAKE" in chapter 3.



Brake pedal position (from the top of the brake pedal to the bottom of the rider footrest bracket bolt center)

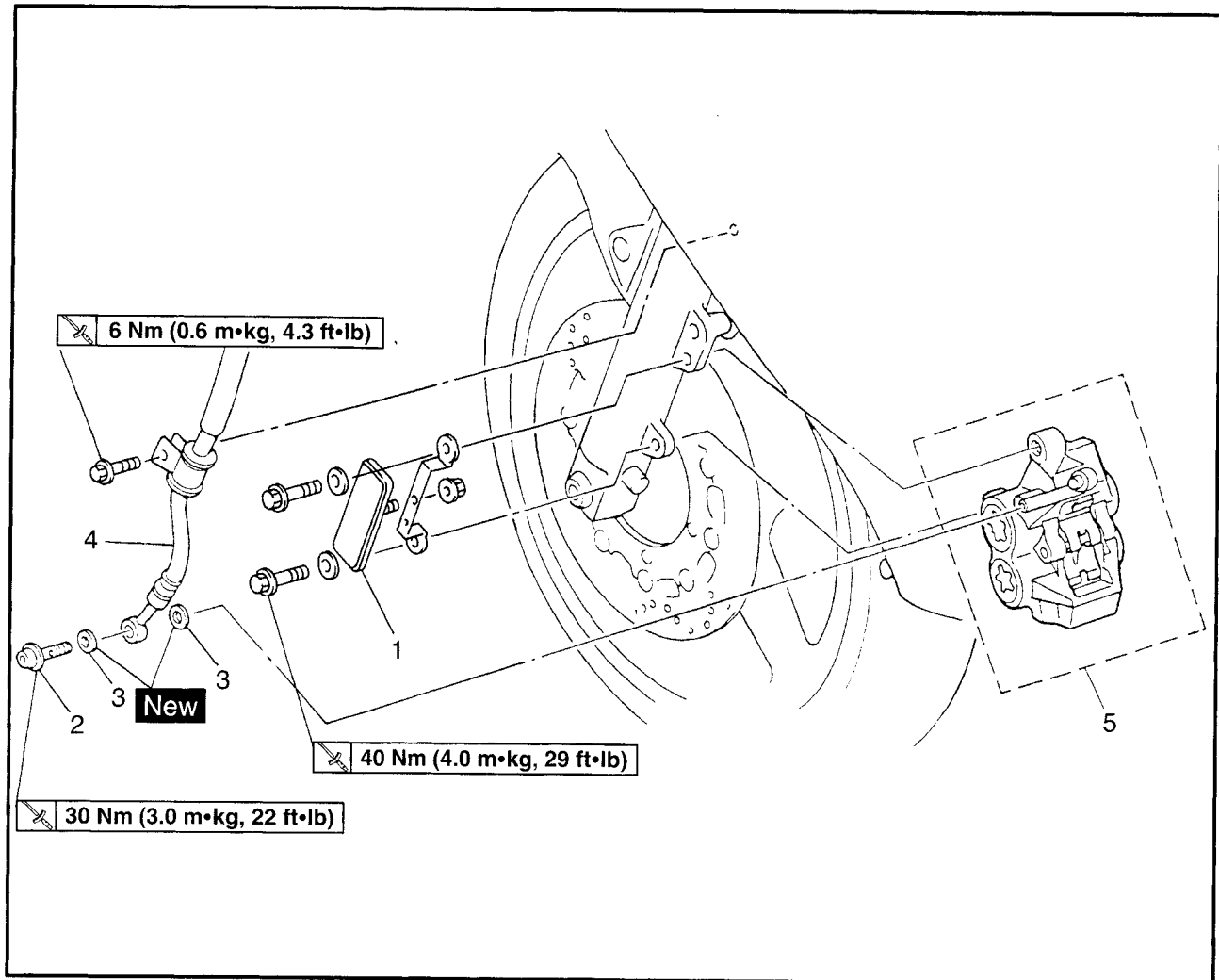
4.3 ~ 9.3 mm (0.17 ~ 0.37 in)

6. Adjust:
- rear brake light operation timing  
Refer to "ADJUSTING THE REAR BRAKE LIGHT SWITCH" in chapter 3.



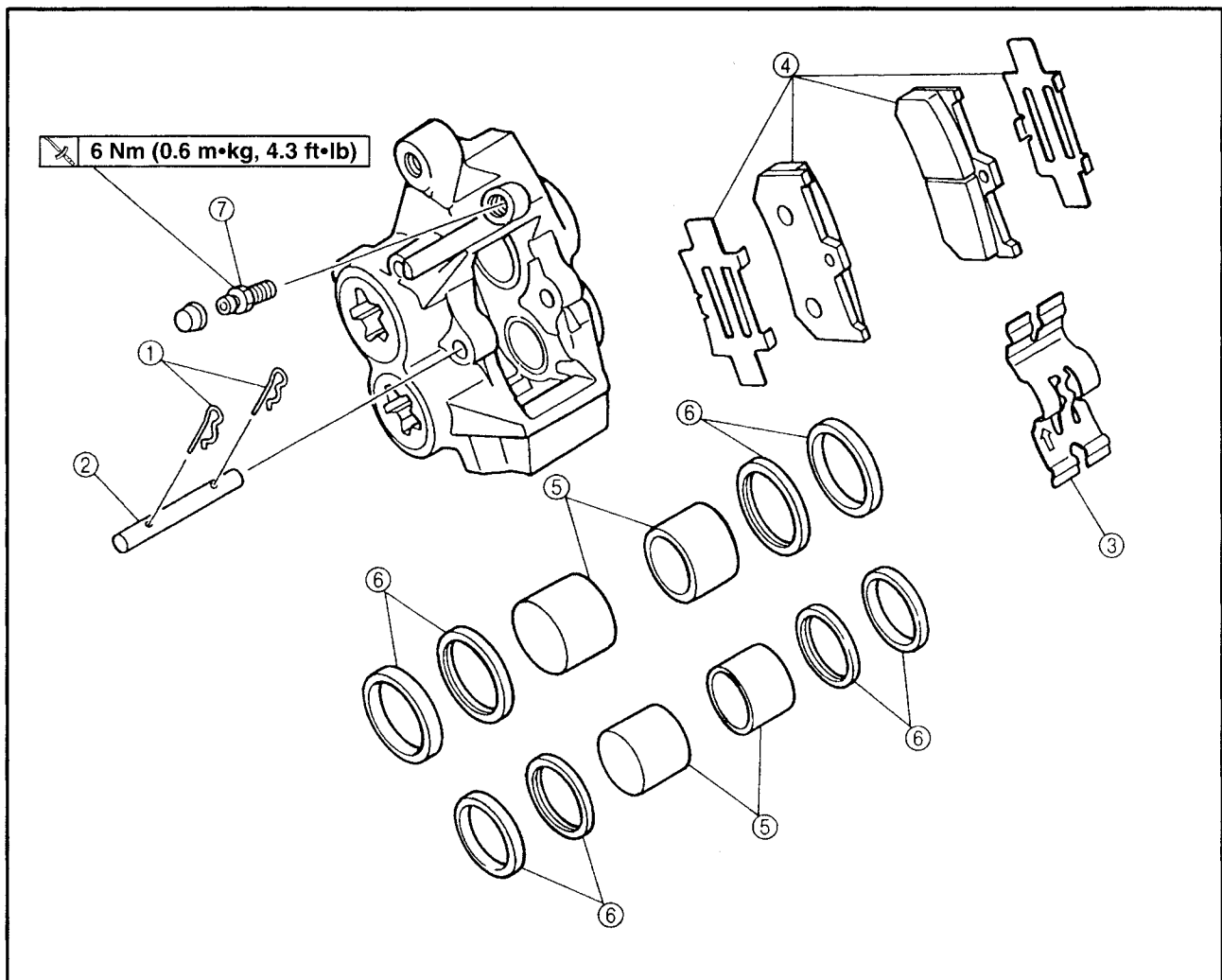
EAS00613

### FRONT BRAKE CALIPERS



Order	Job/Part	Q'ty	Remarks
	<b>Removing the front brake calipers</b>		
	Brake fluid		Remove the parts in the order listed.
1	Front refector	1	The following procedure applies to both of the front brake calipers.
2	Union bolt	1	Drain.
3	Copper washer	2	Refer to "INSTALLING THE FRONT BRAKE CALIPERS".
4	Brake hose	1	
5	Brake caliper	1	
			For installation, reverse the removal procedure.

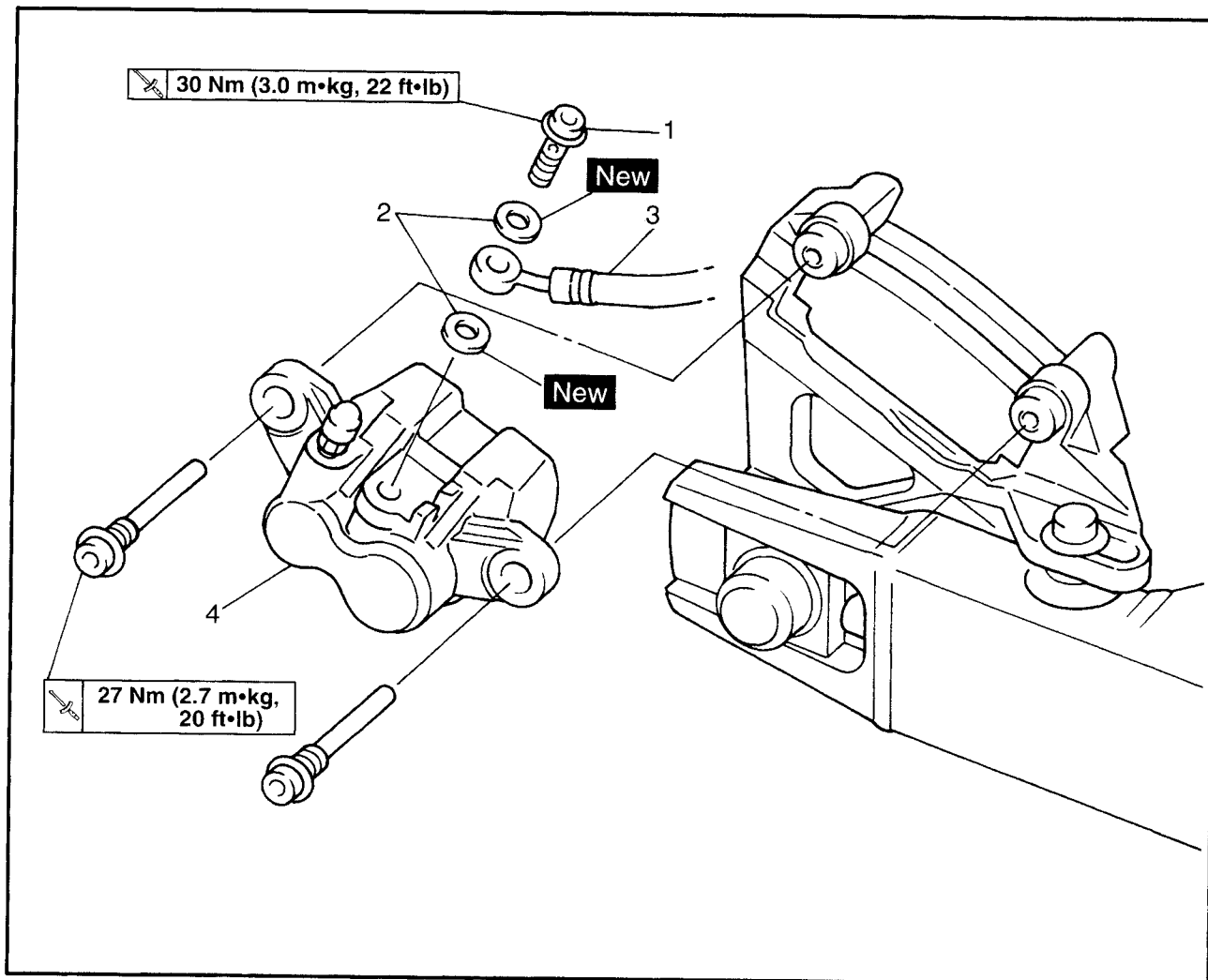
EAS00615



Order	Job/Part	Q'ty	Remarks
	<b>Disassembling the front brake calipers</b>		Disassemble the parts in the order listed.
①	Brake pad clip	2	The following procedure applies to both of the front brake calipers.  Refer to "REMOVING THE FRONT BRAKE CALIPERS".
②	Brake pad pin	1	
③	Brake pad spring	1	
④	Brake pad	2	
⑤	Brake caliper piston	4	
⑥	Brake caliper piston seal	8	
⑦	Bleed screw	1	
			For assembly, reverse the disassembly procedure.

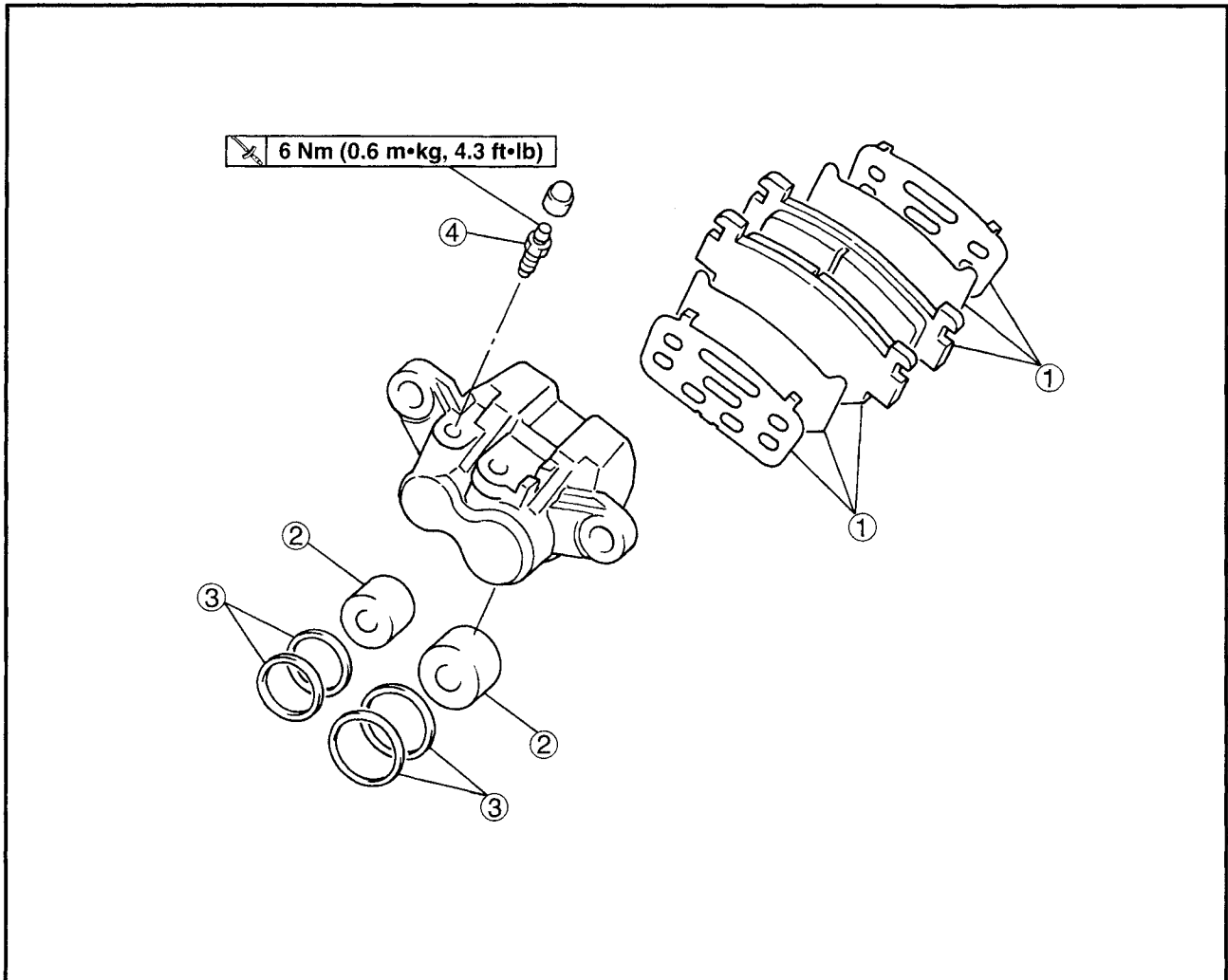
EAS00616

## REAR BRAKE CALIPER



Order	Job/Part	Q'ty	Remarks
	<b>Removing the rear brake caliper</b>		
	Brake fluid		Remove the parts in the order listed. Drain.
1	Union bolt	1	Refer to "INSTALLING THE REAR BRAKE CALIPERS".
2	Copper washer	2	
3	Brake hose	1	
4	Brake caliper	1	For installation, reverse the removal procedure.

EAS00617



Order	Job/Part	Q'ty	Remarks
①	<b>Disassembling the rear brake caliper</b>		Disassemble the parts in the order listed.
②	Brake pad	2	Refer to "REMOVING THE REAR BRAKE CALIPERS".
③	Brake caliper piston	2	
④	Brake caliper piston seal	4	
	Bleed screw	1	For assembly, reverse the disassembly procedure.





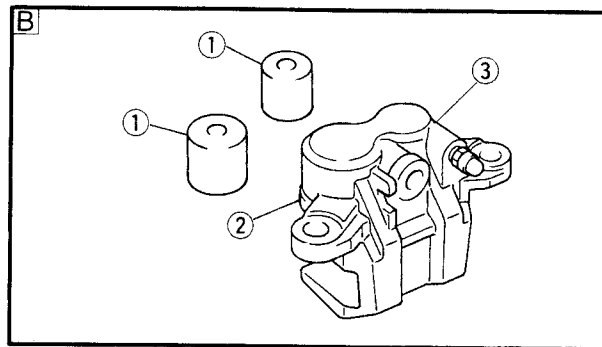
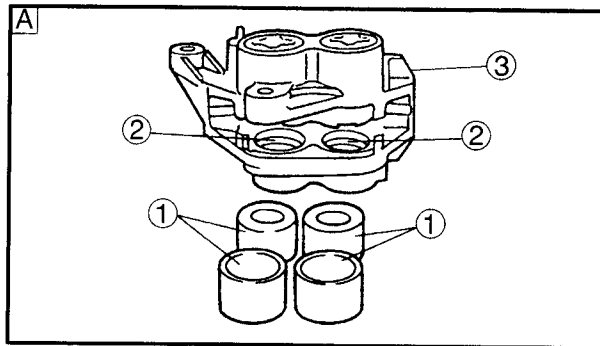


EAS00633

## CHECKING THE FRONT AND REAR BRAKE CALIPERS

### Recommended brake component replacement schedule

Brake pads	If necessary
Piston seals	Every two years
Brake hoses	Every four years
Brake fluid	Every two years and whenever the brake is disassembled



#### 1. Check:

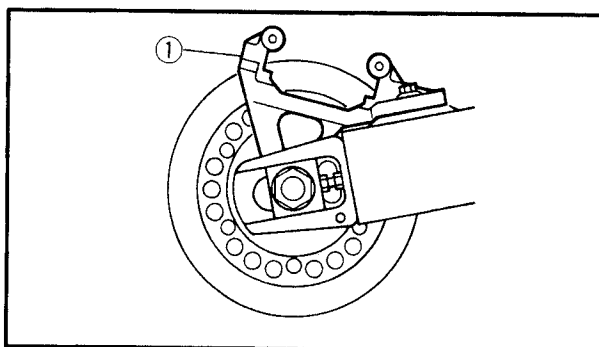
- brake caliper pistons (1)  
Rust/scratches/wear → Replace the brake caliper.
- brake caliper cylinders (2)  
Scratches/wear → Replace the brake caliper.
- brake calipers (3)  
Cracks/damage → Replace.
- brake fluid delivery passages (brake caliper body)  
Obstruction → Blow out with compressed air.

### ⚠ WARNING

Whenever a brake caliper is disassembled, replace the brake caliper piston seals.

A Front

B Rear



#### 2. Check:

- rear brake caliper bracket (1)  
Cracks/damage → Replace.



EAS00640

**INSTALLING THE FRONT BRAKE CALIPERS**

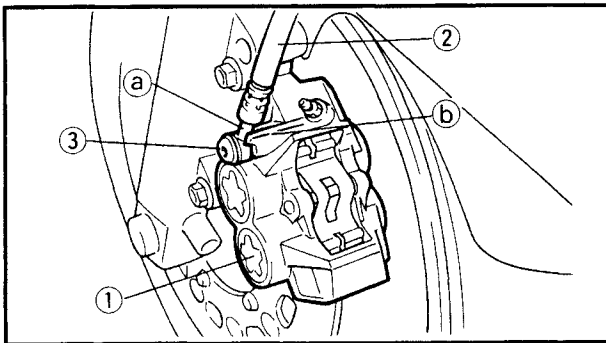
The following procedure applies to both of the brake calipers.

**⚠ WARNING**

- Before installation, all internal brake components should be cleaned and lubricated with clean or new brake fluid.
- Never use solvents on internal brake components as they will cause the piston seals to swell and distort.
- Whenever a brake caliper is disassembled, replace the brake caliper piston seals.



Recommended brake fluid  
DOT 4



## 1. Install:

- brake caliper ① (temporarily)
- copper washers **New**
- brake hose ②
- union bolt ③

30 Nm (3.0 m•kg, 22 ft•lb)

**⚠ WARNING**

Proper brake hose routing is essential to insure safe motorcycle operation. Refer to "CABLE ROUTING".

**CAUTION:**

When installing the brake hose onto the brake caliper ①, make sure that the brake pipe ① touches the projection ② on the brake caliper.

## 2. Remove:

- brake caliper

## 3. Install:

- brake pads
- brake pad spring
- brake caliper
- front refrector
- brake hose holder

40 Nm (4.0 m•kg, 29 ft•lb)

6 Nm (0.6 m•kg, 4.3 ft•lb)

Refer to "REPLACING THE FRONT BRAKE PADS".



## 4. Fill:

- brake fluid reservoir  
(with the specified amount of the recommended brake fluid)



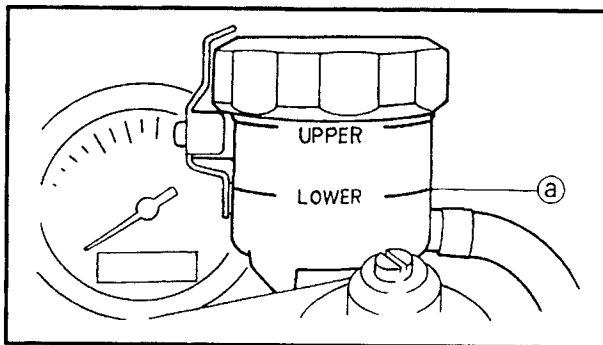
**Recommended brake fluid  
DOT 4**

**⚠ WARNING**

- Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.
- Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor brake performance.
- When refilling, be careful that water does not enter the brake fluid reservoir. Water will significantly lower the boiling point of the brake fluid and could cause vapor lock.

**CAUTION:**

Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.



## 5. Bleed:

- brake system

Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" in chapter 3.

## 6. Check:

- brake fluid level

Below the minimum level mark ① → Add the recommended brake fluid to the proper level. Refer to "CHECKING THE BRAKE FLUID LEVEL" in chapter 3.

## 7. Check;

- brake lever operation

Soft or spongy feeling → Bleed the brake system.

Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" in chapter 3.



EAS00642

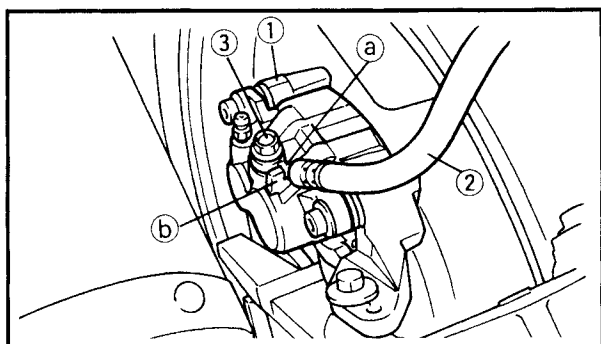
## INSTALLING THE REAR BRAKE CALIPER

### **⚠ WARNING**

- Before installation, all internal brake components should be cleaned and lubricated with clean or new brake fluid.
- Never use solvents on internal brake components as they will cause the piston seals to swell and distort.
- Whenever a brake caliper is disassembled, replace the brake caliper piston seals.



Recommended brake fluid  
DOT 4



### 1. Install:

- brake pads
- brake caliper ①
- copper washers **New**
- brake hose ②
- union bolt ③

30 Nm (3.0 m•kg, 22 ft•lb)

### **⚠ WARNING**

Proper brake hose routing is essential to insure safe motorcycle operation. Refer to "CABLE ROUTING".

### **CAUTION:**

When installing the brake hose onto the brake caliper ①, make sure that the brake pipe ① touches the projection ② on the brake caliper.



## 2. Fill:

- brake fluid reservoir  
(with the specified amount of the recommended brake fluid)



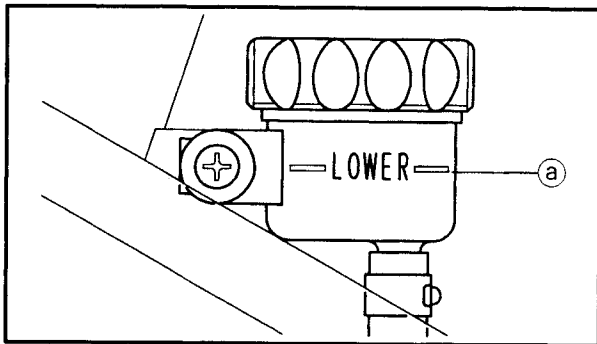
**Recommended brake fluid  
DOT 4**

**! WARNING**

- Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.
- Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor brake performance.
- When refilling, be careful that water does not enter the brake fluid reservoir. Water will significantly lower the boiling point of the brake fluid and could cause vapor lock.

**CAUTION:**

Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.



## 3. Bleed:

- brake system

Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" in chapter 3.

## 4. Check:

- brake fluid level

Below the minimum level mark (a) → Add the recommended brake fluid to the proper level. Refer to "CHECKING THE BRAKE FLUID LEVEL" in chapter 3.

## 5. Check:

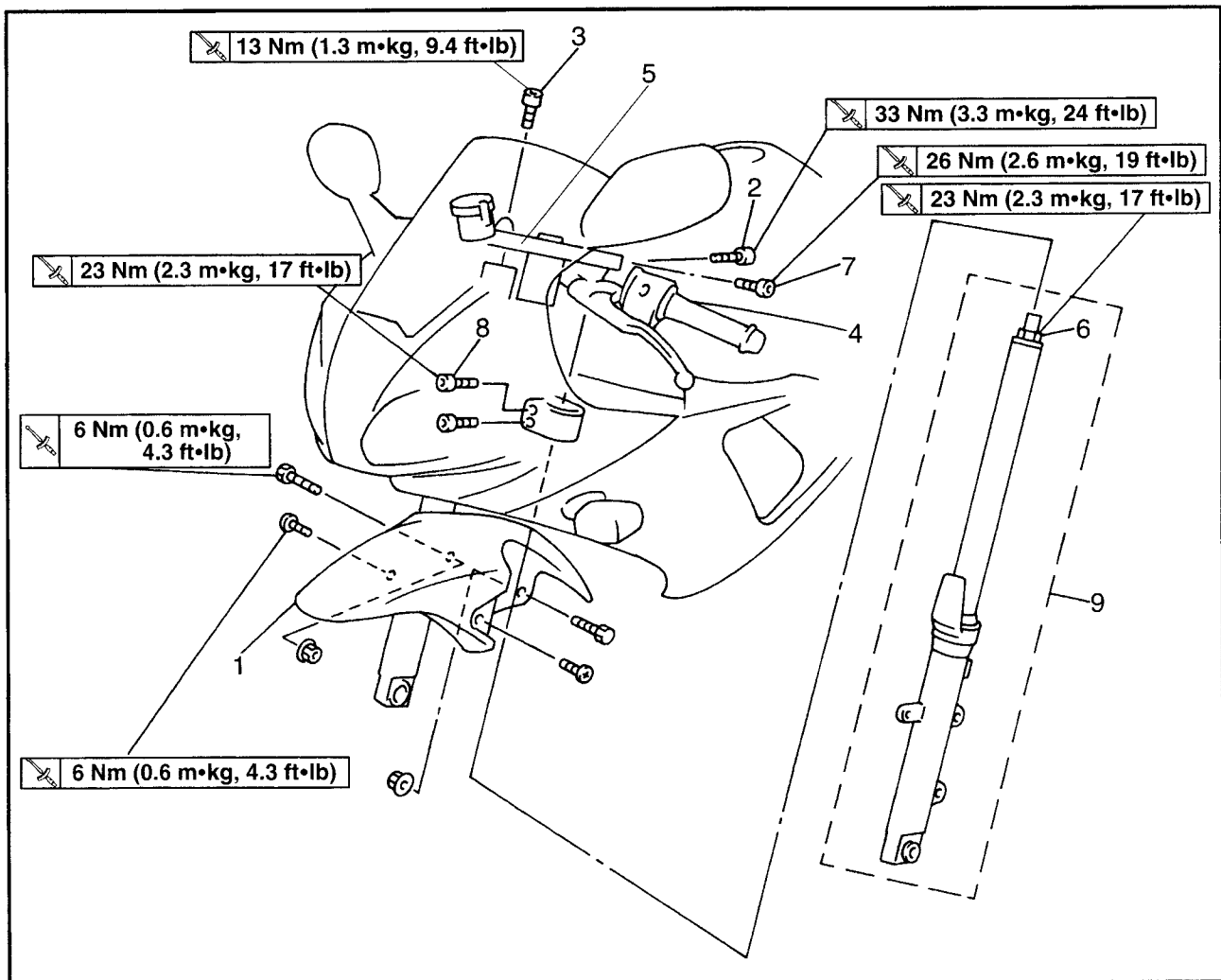
- brake pedal operation

Soft or spongy feeling → Bleed the brake system.

Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" in chapter 3.

# FRONT FORK

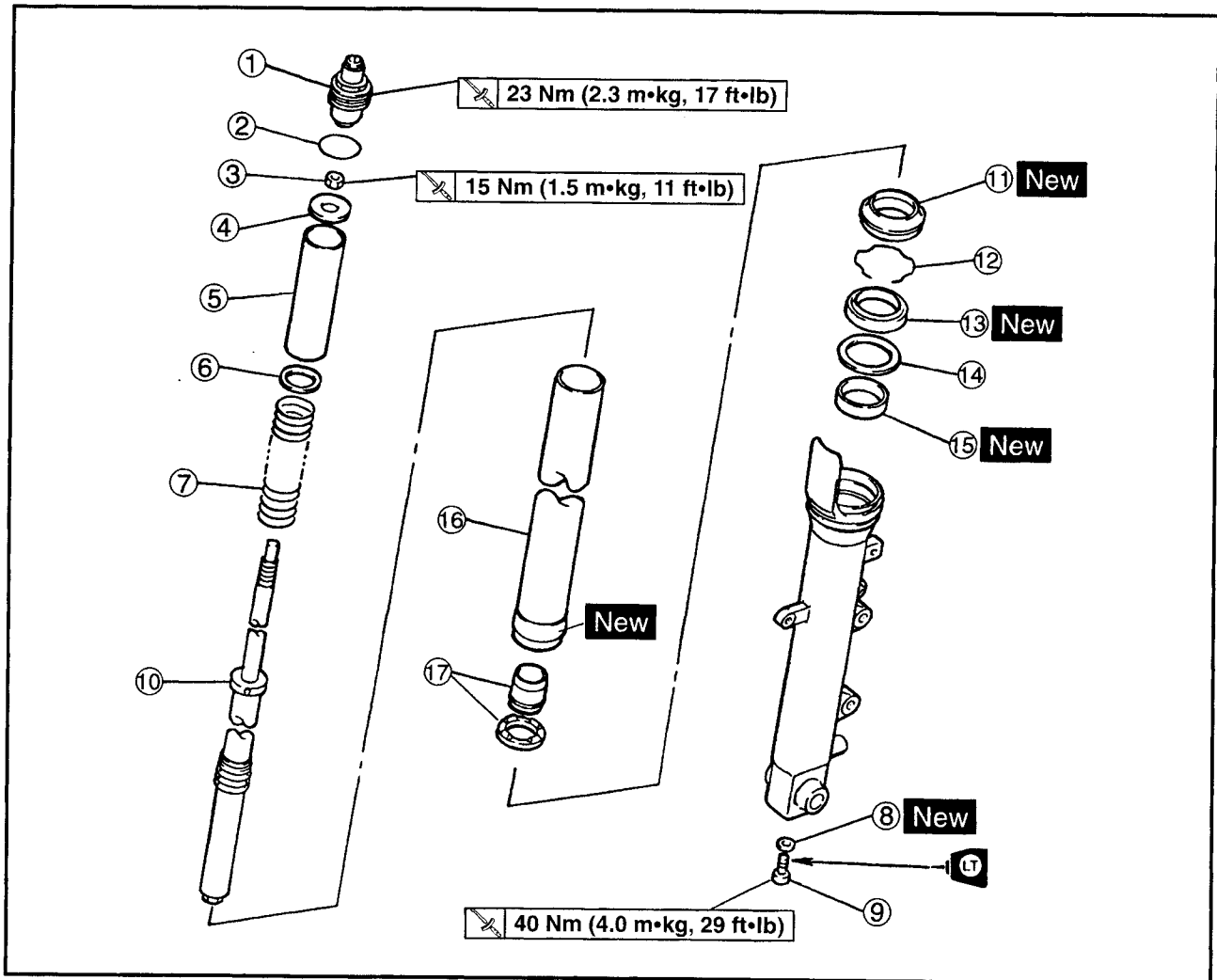
EAS00647



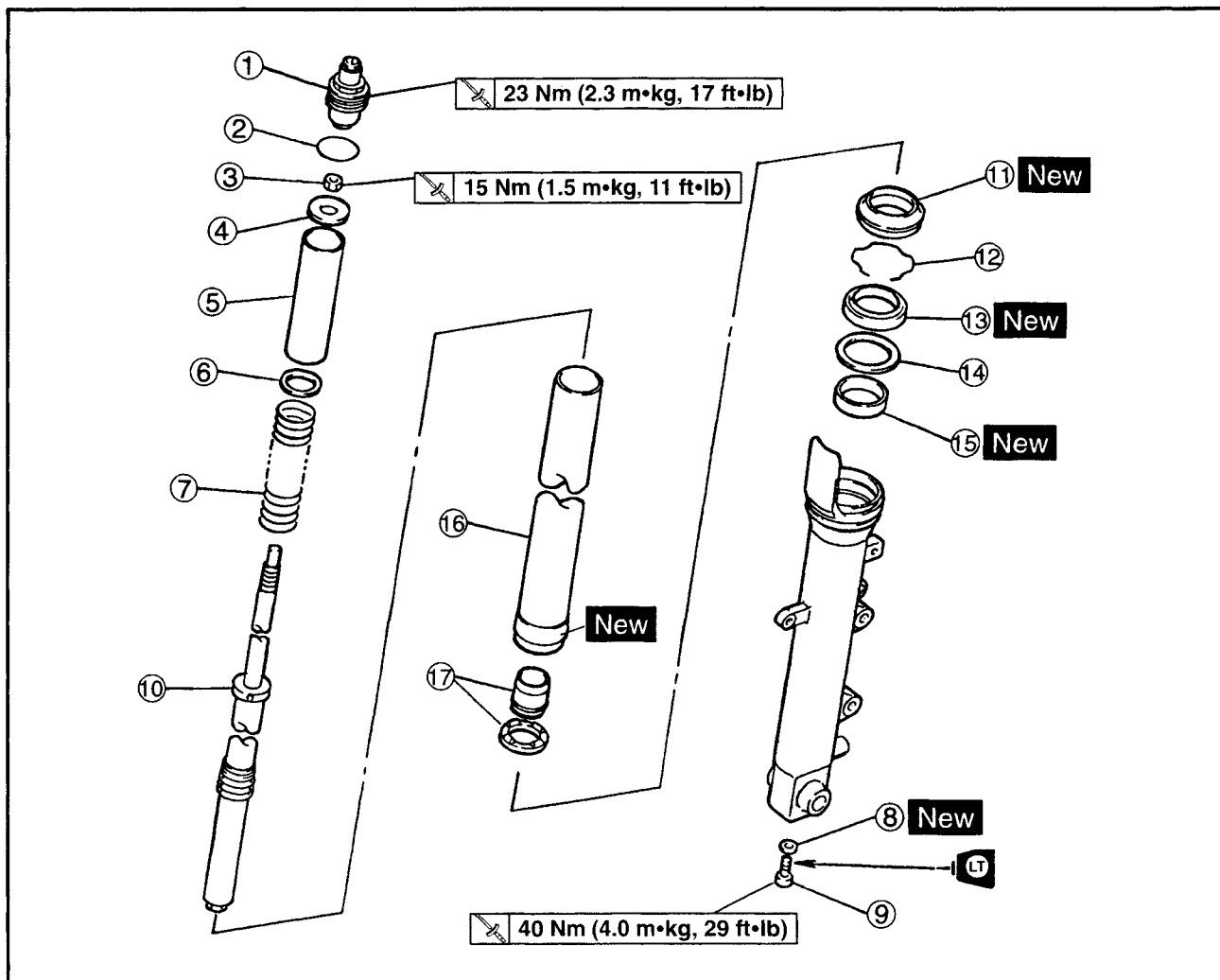
Order	Job/Part	Q'ty	Remarks
	<b>Removing the front fork legs</b>		Remove the parts in the order listed.
	Front brake calipers		The following procedure applies to both of the front fork legs.
	Front wheel		Refer to "FRONT WHEEL AND BRAKE DISCS".
	Front cowling inner panel		Refer to "COWLINGS" in chapter 3.
1	Front fender	1	
2	Handlebar pinch bolt	2	Loosen
3	Upper bracket bolt	2	
4	Handlebar (left)	1	
5	Handlebar (right)	1	
6	Cap bolts	2	Loosen
7	Upper bracket pinch bolts	2	Loosen
8	Lower bracket pinch bolts	4	Loosen
9	Front fork legs	2	
			For installation, reverse the removal procedure.



EB703002



Order	Job/Part	Q'ty	Remarks
	<b>Disassembling the front fork legs</b>		
①	Cap bolt	1	Remove the parts in the order listed. The following procedure applies to both of the front fork legs.  Refer to "DISASSEMBLING/ ASSEMBLING THE FRONT FORK LEGS".
②	O-ring	1	
③	Nut	1	
④	Washer	1	
⑤	Spacer	1	
⑥	Washer	1	
⑦	Fork spring	1	
⑧	Copper washer	1	
⑨	Damper rod assembly bolt	1	
⑩	Damper rod assembly	1	



Order	Job/Part	Q'ty	Remarks
⑪	Dust seal	1	Refer to "DISASSEMBLING/ ASSEMBLING THE FRONT FORK LEGS".
⑫	Oil seal clip	1	
⑬	Oil seal	1	
⑭	Washer	1	
⑮	Outer tube bushing	1	
⑯	Inner tube	1	
⑰	Oil lock piece	1	
			For assembly, reverse the disassembly procedure.

EAS00649

## REMOVING THE FRONT FORK LEGS

The following procedure applies to both of the front fork legs.

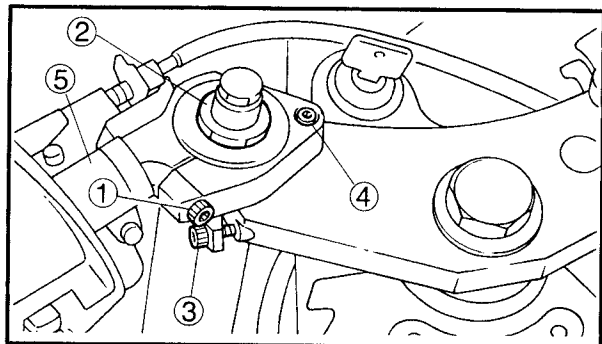
1. Stand the motorcycle on a level surface.

### **⚠ WARNING**

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

### NOTE:

Place the motorcycle on a suitable stand so that the front wheel is elevated.



2. Loosen:

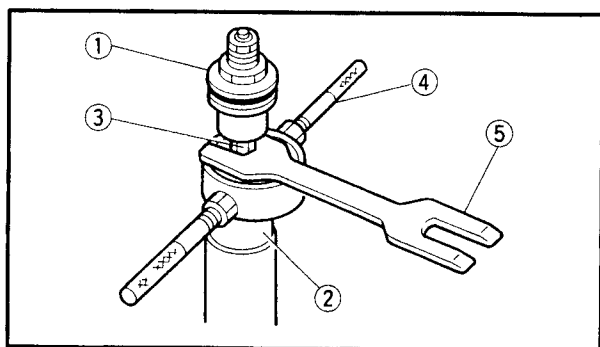
- upper bracket pinch bolt ③
- cap bolt ②
- handlebar pinch bolt ①
- lower bracket pinch bolt
- upper bracket bolt ④
- handlebar ⑤

### **⚠ WARNING**

Before loosening the upper and lower bracket pinch bolts and handlebar pinch bolt, support the front fork leg.

3. Remove:

- front fork leg



EAS00655

## DISASSEMBLING THE FRONT FORK LEGS

The following procedure applies to both of the front fork legs.

1. Remove:

- cap bolt ①  
(from the damper adjusting rod)
- spacer ②
- nut ③

- a. Press down on the spacer with the fork spring compressor ④.
- b. Install the rod holder ⑤ between the nut ③ and the spacer ②.



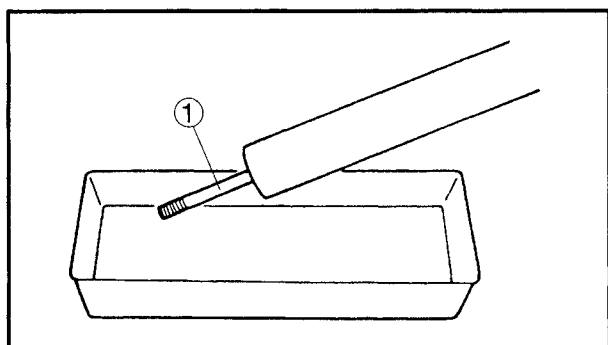
**Fork spring compressor**  
90890-01441  
**Rod holder**  
90890-01434

Use the side of the rod holder that is marked “B”.

- ⚠ WARNING**

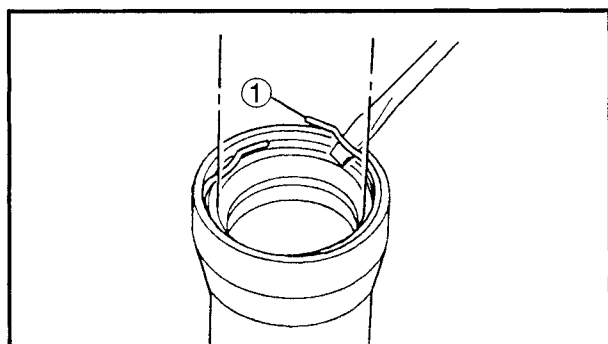
**The fork spring is compressed.**

- [illegible]

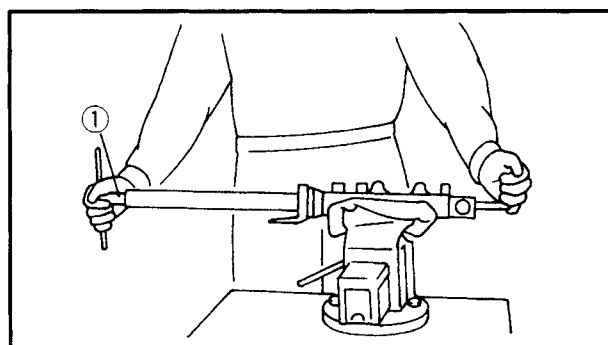


- NOTE:**

Stroke the damper rod ① several times while draining the fork oil.



3. Remove:
  - dust seal
  - oil seal clip ①
  - oil seal
  - washer  
(with a flat-head screwdriver)
  - Slide metal



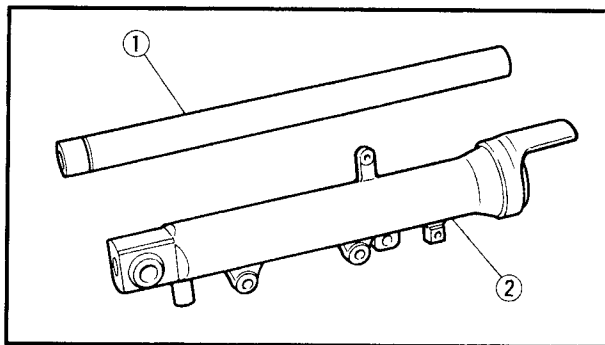
- Remove:
  - damper rod assembly bolt
  - copper washer

**NOTE:**

While holding the damper rod with the damper rod holder ①, loosen the damper rod assembly bolt.



**Damper rod holder**  
90890-01425, YM-01425



EAS00657

## CHECKING THE FRONT FORK LEGS

The following procedure applies to both of the front fork legs.

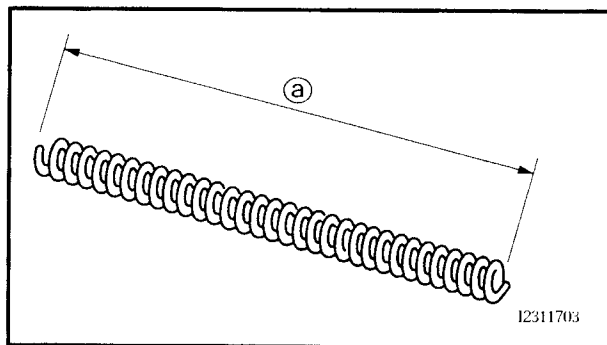
### 1. Check:

- inner tube ①
- outer tube ②

Bends/damage/scratches → Replace.

## ⚠ WARNING

**Do not attempt to straighten a bent inner tube as this may dangerously weaken it.**



### 2. Measure:

- spring free length ①

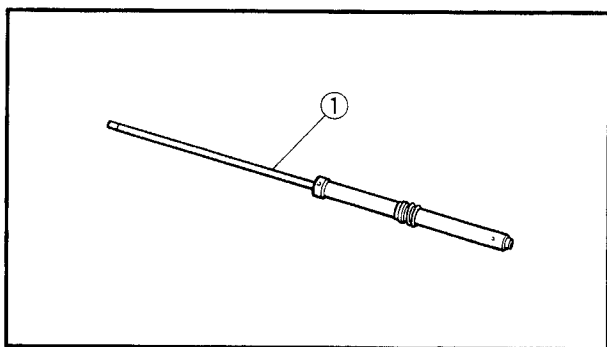
Out of specification → Replace.



**Spring free length limit**

**251.8 mm (9.91 in)**

**<Limit>: 246 mm (9.69 in)**



### 3. Check:

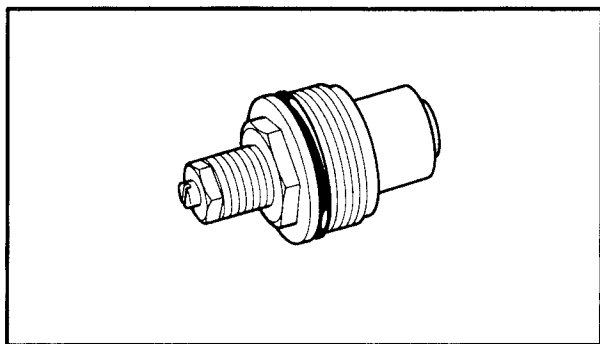
- damper rod ①

Damage/wear → Replace.

Obstruction → Blow out all of the oil passages with compressed air.

## CAUTION:

- The front fork leg has a built-in damper adjusting rod and a very sophisticated internal construction, which are particularly sensitive to foreign material.
- When disassembling and assembling the front fork leg, do not allow any foreign material to enter the front fork.



4. Check:
  - cap bolt O-ring
 Damage/wear → Replace.

EAS00661

### ASSEMBLING THE FRONT FORK LEGS

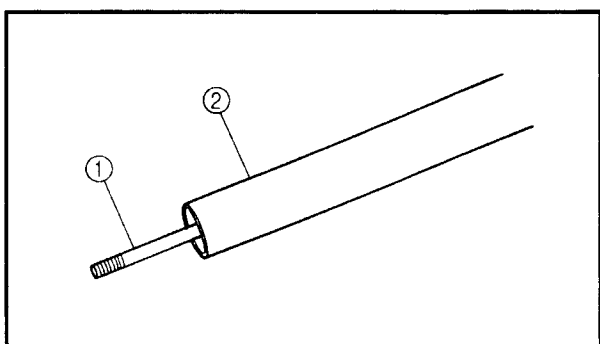
The following procedure applies to both of the front fork legs.

#### **⚠ WARNING**

- Make sure that the oil levels in both front fork legs are equal.
- Uneven oil levels can result in poor handling and a loss of stability.

#### **NOTE:**

- When assembling the front fork leg, be sure to replace the following parts:
  - inner tube bushing
  - outer tube bushing
  - oil seal
  - dust seal
- Before assembling the front fork leg, make sure that all of the components are clean.



1. Install:
  - oil lock piece
  - inner tube ②
  - damper rod assembly ①

#### **⚠ WARNING**

Always use new copper washers.

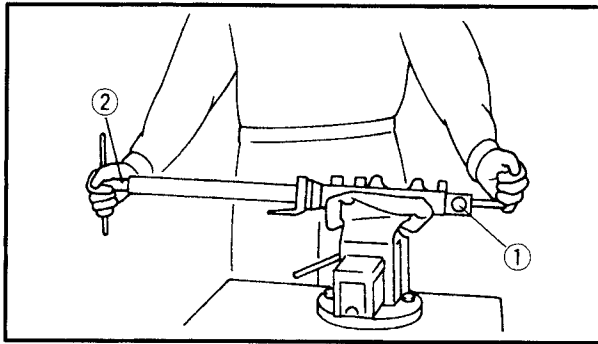
#### **CAUTION:**

Allow the damper rod assembly to slide slowly down the inner tube ② until it protrudes from the bottom of the inner tube. Be careful not to damage the inner tube.

2. Lubricate:
  - inner tube's outer surface



**Recommended lubricant**  
Yamaha fork and suspension oil  
01 or equivalent



## 3. Tighten:

- damper rod assembly bolt (1)



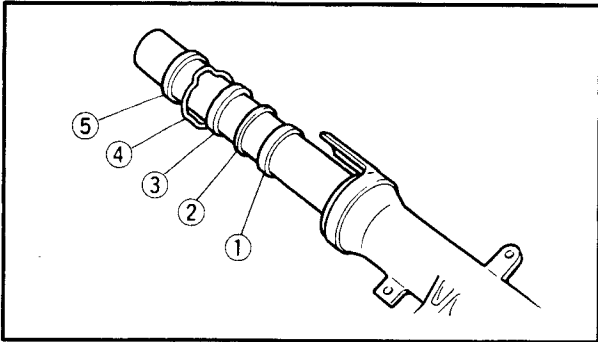
**40 Nm (4.0 m•kg, 29 ft•lb)**

## NOTE:

While holding the damper rod with the damper rod holder (2), tighten the damper rod assembly bolt.



**Damper rod holder**  
90890-01425, YM-01425



## 4. Install:

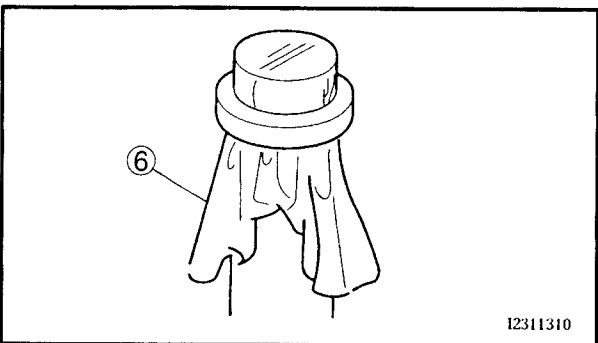
- outer tube bushing (1)
- washer (2)
- oil seal (3)
- oil seal clip (4)
- dust seal (5)

## CAUTION:

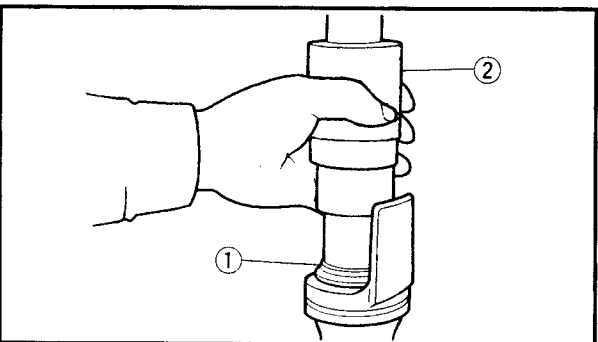
**Make sure that the numbered side of the oil seal faces up.**

## NOTE:

- Before installing the oil seal, lubricate its lips with lithium soap base grease.
- Lubricate the outer surface of the inner tube with fork oil.
- Before installing the oil seal, cover the top of the front fork leg with a plastic bag (6) to protect the oil seal during installation.



12311310

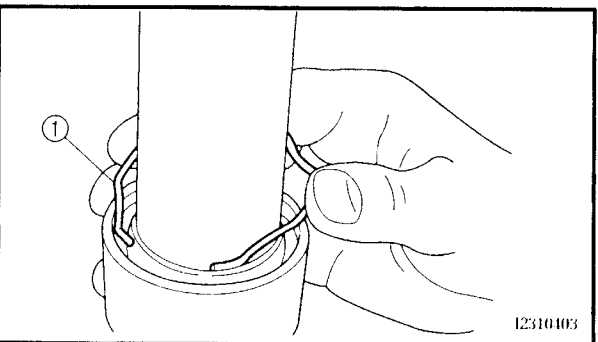


## 5. Install:

- washer
- oil seal (1)
- (with the fork seal driver (2))



**Fork seal driver weight**  
90890-01367, YM-33963  
**Fork seal driver attachment**  
90890-01374, YM-8020



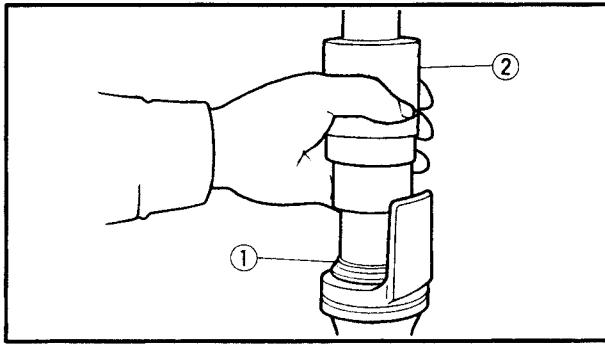
12310403

## 6. Install:

- oil seal clip (1)

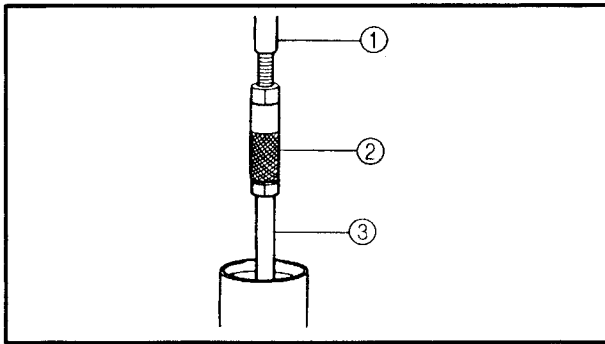
## NOTE:

Adjust the oil seal clip so that it fits into the outer tube's groove.



7. Install:

- dust seal ①  
(with the fork seal driver ②)



8. Install:

- rod puller ①
- adapter ②  
(onto the damper rod ③)



**Rod puller**

90890-01437, YM-01437

**Adapter**

90890-01436

9. Fully compress the front fork leg.

10. Fill:

- front fork leg  
(with the specified amount of the recommended fork oil)



**Quantity (each front fork leg)**

476 cm<sup>3</sup> (16.09356 US oz)

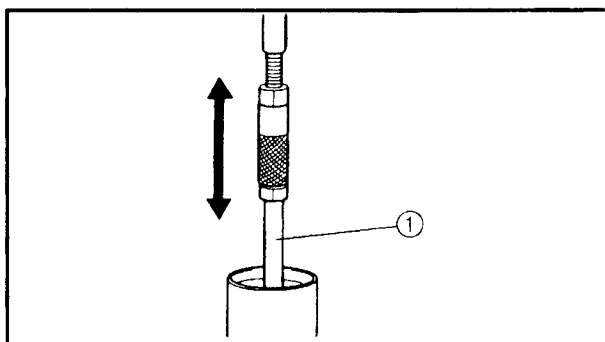
**Recommended oil**

Yamaha fork and suspension  
oil 01

or equivalent

### CAUTION:

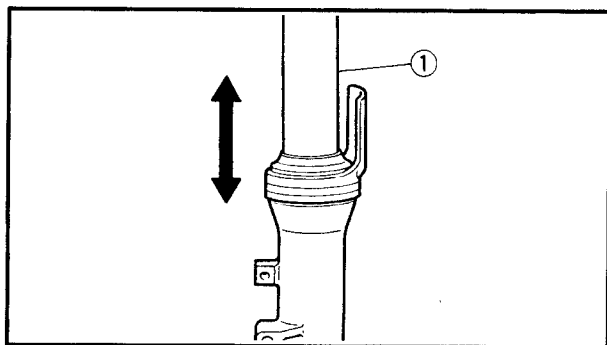
- Be sure to use the recommended fork oil. Other oils may have an adverse effect on front fork performance.
- When disassembling and assembling the front fork leg, do not allow any foreign material to enter the front fork.



11. After filling the front fork leg, slowly stroke the damper rod ① up and down (at least ten times) to distribute the fork oil.

**NOTE:**

Be sure to stroke the damper rod slowly because the fork oil may spurt out.



12. Slowly stroke the inner tube ① up and down to distribute the fork oil once more (1 stroke = about 100 mm (3.94 in)).

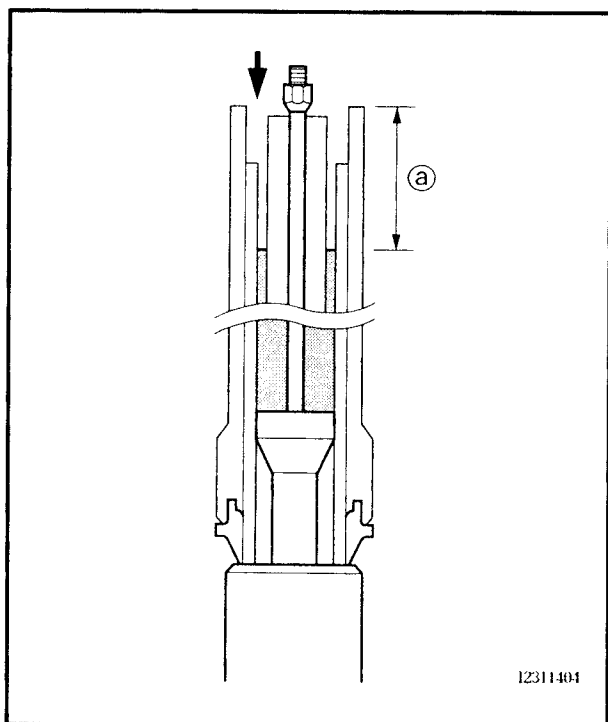
## NOTE:

Be careful not to stroke the inner tube over 100 mm (3.94 in) as this will cause air to enter. If the inner tube is stroked more than 100 mm (3.94 in), repeat steps (12) and (13).

13. Before measuring the fork oil level, wait ten minutes until the oil has settled and the air bubbles have dispersed.

## NOTE:

Be sure to bleed the front fork leg of any residual air.

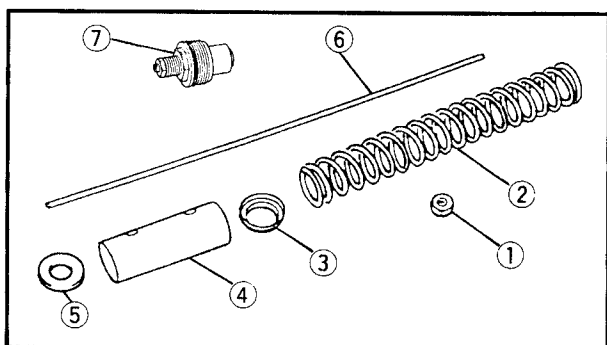


14. Measure:

- front fork leg oil level ①
- Out of specification → Correct.



**Front fork leg oil level (from the top of the inner tube, with the inner tube fully compressed, and without the spring)**  
107 mm (4.21 in)



15. Install:

- nut ①
- fork spring ②
- washer ③
- spacer ④
- washer ⑤
- damper adjusting rod ⑥
- cap bolt ⑦



- Remove the rod puller and adapter.
- Install the nut.

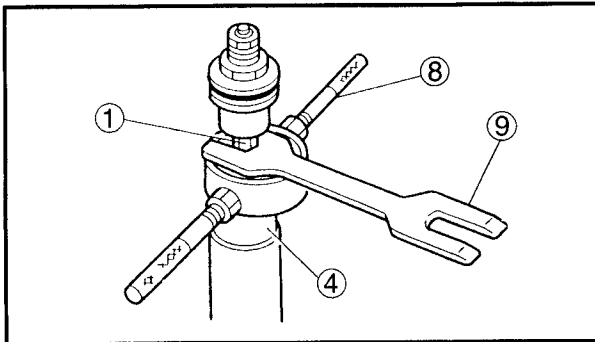
- c. Install the rod puller and adapter onto the damper rod.



**Rod puller**  
90890-01437, YM-01437  
**Adapter**  
90890-01436

- d. Install the fork spring, washers and spacer.  
e. Press down on the spacer with the fork spring compressor (8).  
f. Pull up the rod puller and install the rod holder (9) between the nut (1) and the spacer (4).

**NOTE:** Use the side of the rod holder that is marked "B".



**Fork spring compressor**  
90890-01441  
**Rod holder**  
90890-01434

- g. Remove the rod puller and adapter.  
h. Install the nut (1) and position it as specified (b).



**Distance (b)**  
25 mm (0.98 in)

- i. Install the damper adjusting rod and cap bolt, and then finger tighten the cap bolt.  
j. Hold the cap bolt and tighten the nut to specification.



**Nut:**  
15 Nm (1.5 m•kg, 11 ft•lb)

- k. Remove the rod holder and fork spring compressor.

## ⚠ WARNING

- The fork spring is compressed.
- Always use a new cap bolt O-ring.





16. Install:
- cap bolt  
(onto the inner tube)

**NOTE:**

Temporarily tighten the cap bolt.

EAS00662

**INSTALLING THE FRONT FORK LEGS**

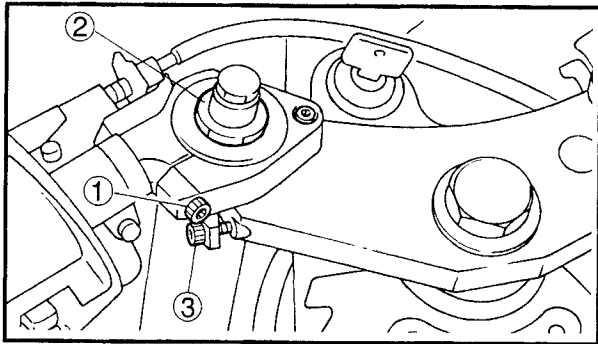
The following procedure applies to both of the front fork legs.

1. Install:

- front fork leg  
Temporarily tighten the upper and lower bracket pinch bolts.

**NOTE:**

Make sure that the inner fork tube is flush with the top of the handlebar.



2. Tighten:

- lower bracket pinch bolt

23 Nm (2.3 m•kg, 17 ft•lb)

- handlebar pinch bolt ①

33 Nm (3.0 m•kg, 24 ft•lb)

- cap bolt ②

23 Nm (2.3 m•kg, 17 ft•lb)

- upper bracket pinch bolt ③

26 Nm (2.6 m•kg, 19 ft•lb)

**⚠ WARNING**

Make sure that the brake hoses are routed properly.

3. Adjust:

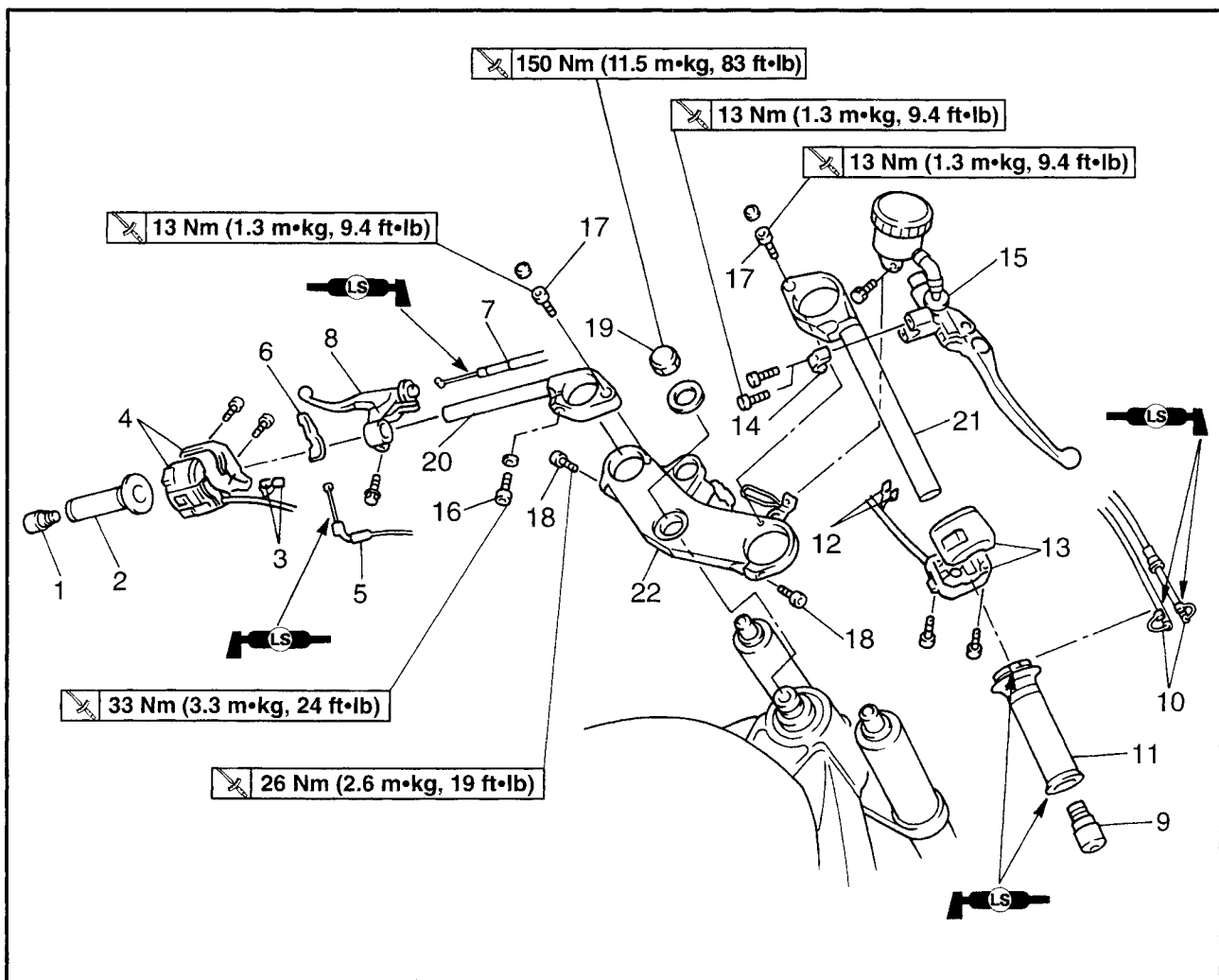
- spring preload
- rebound damping
- compression damping

Refer to "ADJUSTING THE FRONT FORK LEGS" in chapter 3.

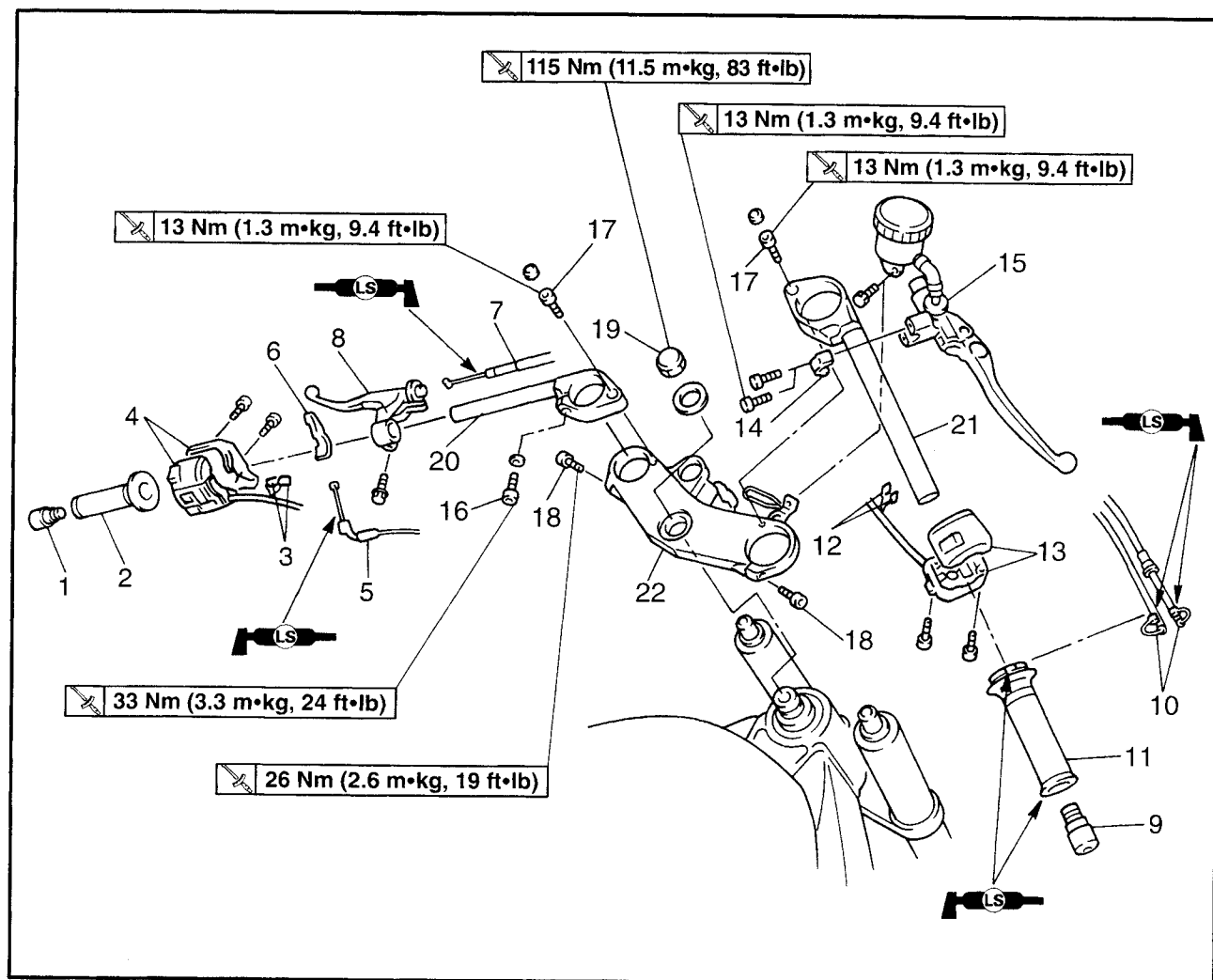


EAS00665

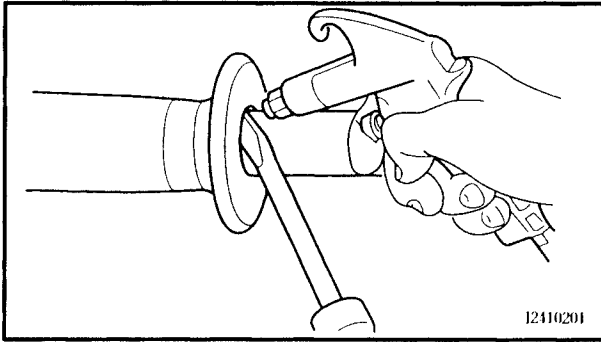
## HANDLEBARS



Order	Job/Part	Q'ty	Remarks
	<b>Removing the handlebars</b>		
1	Left grip end	1	Remove the parts in the order listed.
2	Handlebar grip	1	Refer to "REMOVING/INSTALLING THE HANDLEBARS".
3	Clutch switch connector	2	Disconnect.
4	Left handlebar switch	1	Refer to "INSTALLING THE HANDLEBARS".
5	Starter cable	1	Disconnect.
6	Starter lever	1	
7	Clutch cable	1	Disconnect.
8	Clutch lever holder	1	
9	Right grip end	1	Refer to "INSTALLING THE HANDLEBARS".
10	Throttle cable	2	
11	Throttle grip	1	



Order	Job/Part	Q'ty	Remarks
12	Front brake switch connector	2	Disconnect.
13	Right handlebar switch	1	Refer to "INSTALLING THE HANDLEBARS".
14	Brake master cylinder holder	1	
15	Brake master cylinder	1	
16	Handlebar pinch bolt	2	
17	Upper bracket bolt	2	
18	Upper bracket pinch bolt	2	
19	Steering stem nut	1	
20	Left handlebar	1	
21	Right handlebar	1	
22	Upper bracket	1	
			For installation, reverse the removal procedure.



EAS00667

**REMOVING THE HANDLEBARS**

1. Stand the motorcycle on a level surface.

**⚠ WARNING**

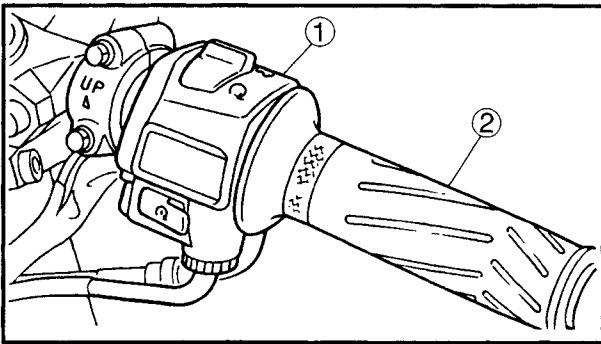
Securely support the motorcycle so that there is no danger of it falling over.

2. Remove:

- grip end
- handlebar grip
- left handlebar switch
- clutch lever holder

**NOTE:**

Blow compressed air between the left handlebar and the handlebar grip, and gradually push the grip off the handlebar.



3. Remove:

- grip end
- right handle switch ①
- throttle grip ②
- right handlebar switch
- brake master cylinder holder

EAS00669

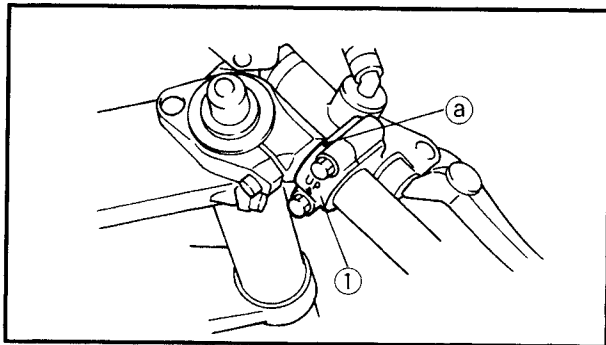
**CHECKING THE HANDLEBARS**

1. Check:

- left handlebar
  - right handlebar
- Bends/cracks/damage → Replace.

**⚠ WARNING**

Do not attempt to straighten bent handlebars as this may dangerously weaken them.



EAS00674

**INSTALLING THE HANDLEBARS****1. Install:**

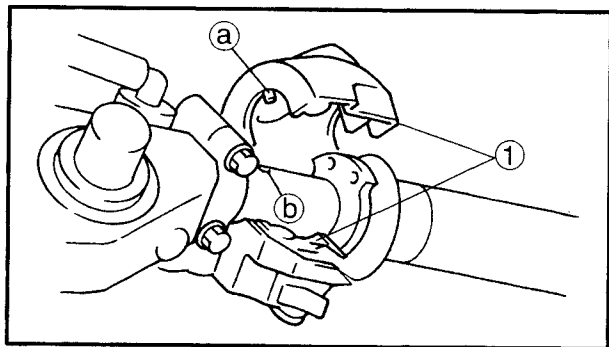
- brake master cylinder holder ①

**CAUTION:**

- Install the brake master cylinder holder with the "UP" mark facing up.
- First, tighten the upper bolt, then the lower bolt.

**NOTE:**

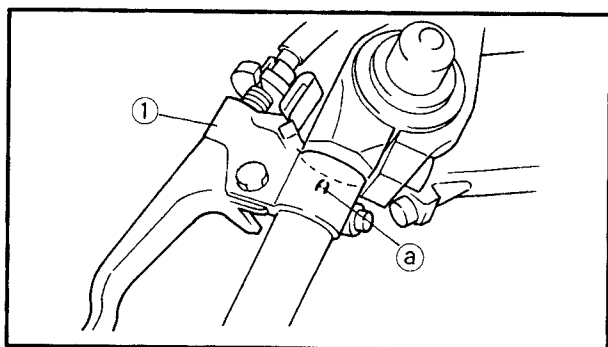
- Align the mating surfaces of the brake master cylinder holder with the punch mark (a) in the right handlebar.
- There should be 2 mm of clearance between the right handlebar switch and the brake master cylinder holder.

**2. Install:**

- right handlebar switch ①
- throttle cables
- grip end

**NOTE:**

Align the projection (a) on the throttle cable housing with the hole (b) in the right handlebar.

**3. Install:**

- clutch lever holder ①

**NOTE:**

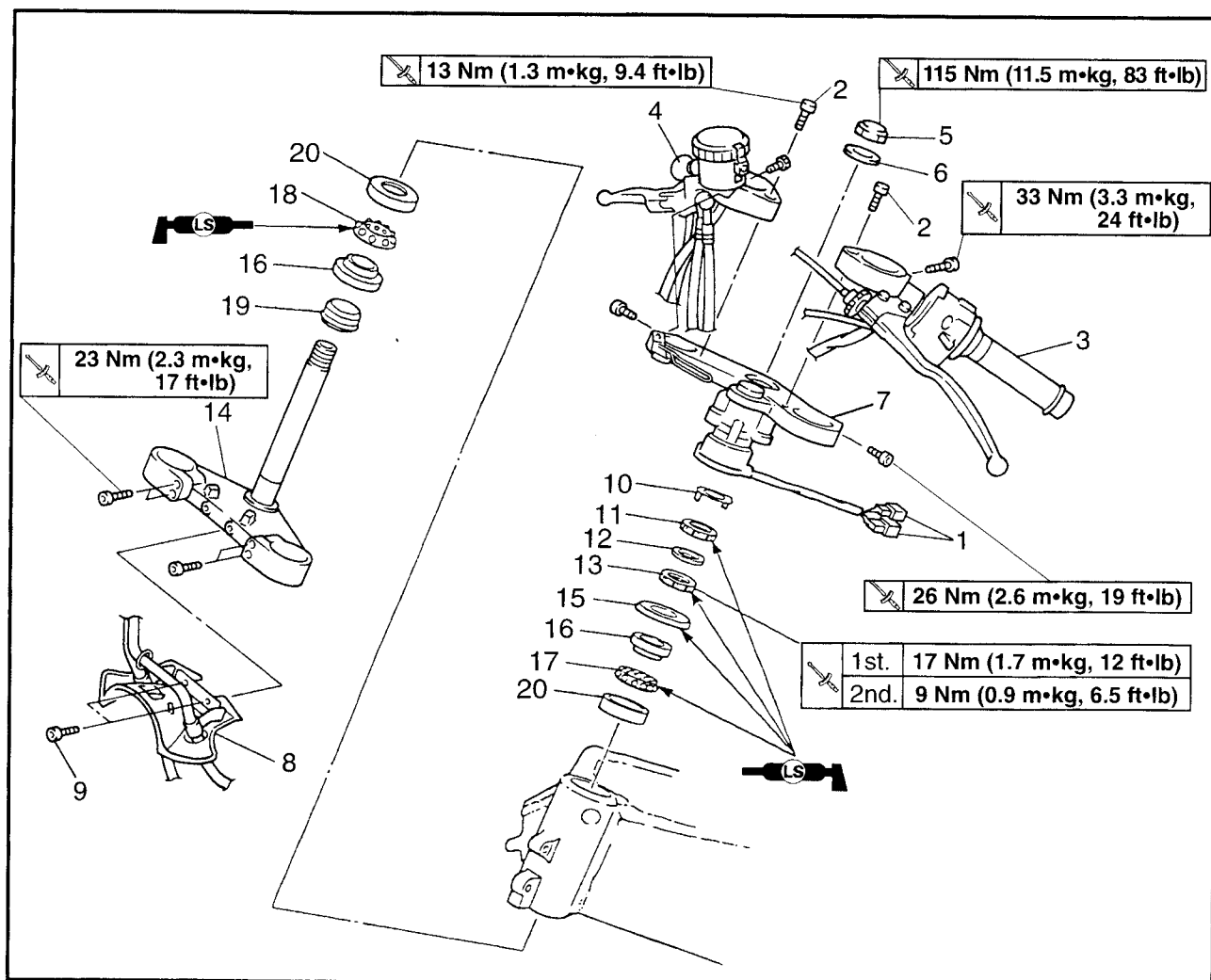
Align the slit in the clutch lever holder with the punch mark (a) in the left handlebar.



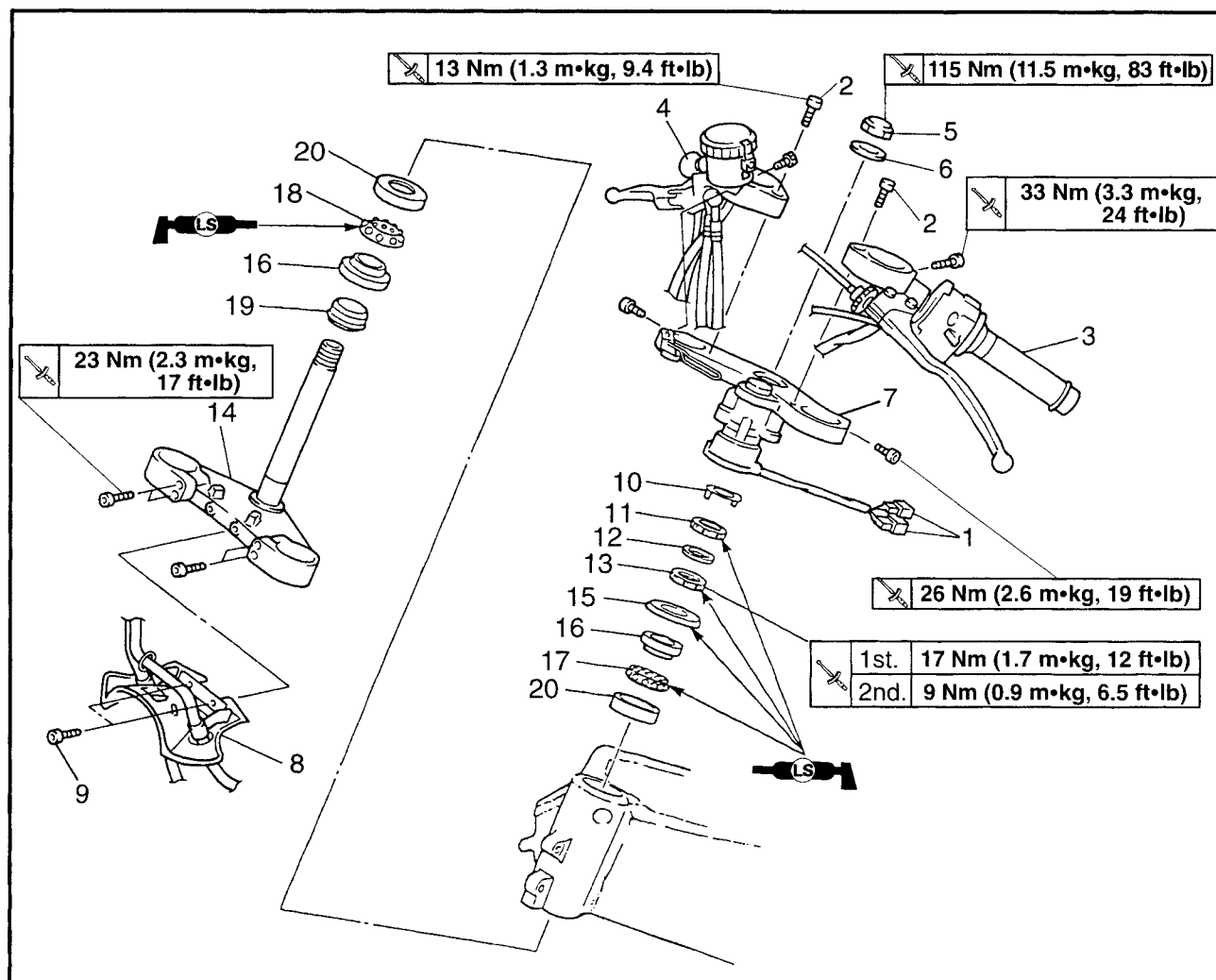


EAS00676

# STEERING HEAD LOWER BRACKET

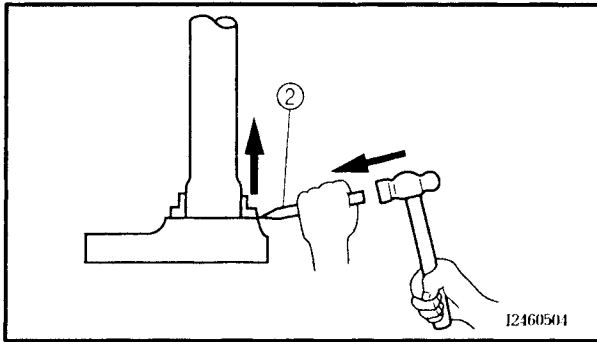


Order	Job/Part	Q'ty	Remarks
	<b>Removing the lower bracket</b>		
	Front wheel		Remove the parts in the order listed. Refer to "FRONT WHEEL AND BRAKE DISCS".
	Front fork legs		Refer to "FRONT FORK".
1	Main switch coupler	2	Disconnect.
2	Upper bracket bolt	2	
3	Left handlebar assembly	1	
4	Right handlebar assembly	1	
5	Steering stem nut	1	
6	Washer	1	
7	Upper bracket	1	
8	Lower bracket panel	1	
9	Brake hose holder bolt	2	
10	Lock washer	1	
11	Upper ring nut	1	Refer to "CHECK AND ADJUSTING THE STEERING HEAD" in chapter 3.
12	Rubber washer	1	



Order	Job/Part	Q'ty	Remarks
13	Lower ring nut	1	Refer to "CHECK AND ADJUSTING THE STEERING HEAD" in chapter 3.
14	Lower bracket	1	
15	Bearing cover	1	
16	Bearing inner race	2	
17	Upper bearing	1	
18	Lower bearing	1	
19	Dust seal	1	
20	Bearing outer race	2	For installation, reverse the removal procedure.





- b. Remove the bearing race from the lower bracket with a floor chisel ② and hammer.
- c. Install a new dust seal and new bearing races.

**CAUTION:**

If the bearing race is not installed properly, the steering head pipe could be damaged.

**NOTE:**

- Always replace the bearing balls and bearing races as a set.
- Whenever the steering head is disassembled, replace the dust seal.

4. Check:
  - upper bracket
  - lower bracket  
(along with the steering stem)
  - Bends/cracks/damage → Replace.

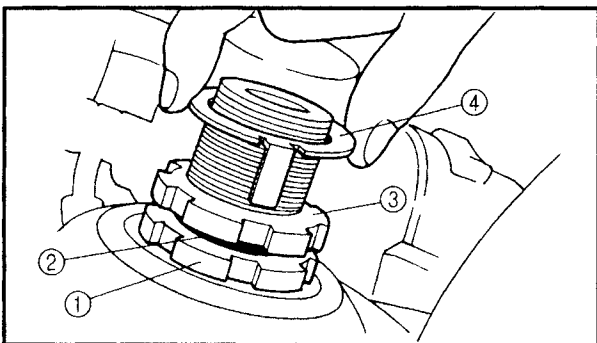
EAS00683

**INSTALLING THE STEERING HEAD**

1. Lubricate:
  - upper bearing
  - lower bearing
  - bearing races



**Recommended lubricant**  
**Lithium soap base grease**



2. Install:
  - bearing
  - bearing cover
  - lower ring nut ①
  - rubber washer ②
  - upper ring nut ③
  - lock washer ④

Refer to "CHECKING AND ADJUSTING THE STEERING HEAD" in chapter 3.



## 3. Install:

- upper bracket
- steering stem nut

**NOTE:**

Temporarily tighten the steering stem nut.

## 4. Install:

- front fork legs
- Refer to "FRONT FORK".

**NOTE:**

Temporarily tighten the upper and lower bracket pinch bolts, and handlebar pinch bolts.

## 5. Tighten:

- steering stem nut

115 Nm (11.5 m•kg, 83 ft•lb)

- lower bracket pinch bolt

23 Nm (2.3 m•kg, 17 ft•lb)

- upper bracket pinch bolt

26 Nm (2.6 m•kg, 19 ft•lb)

- upper bracket bolt

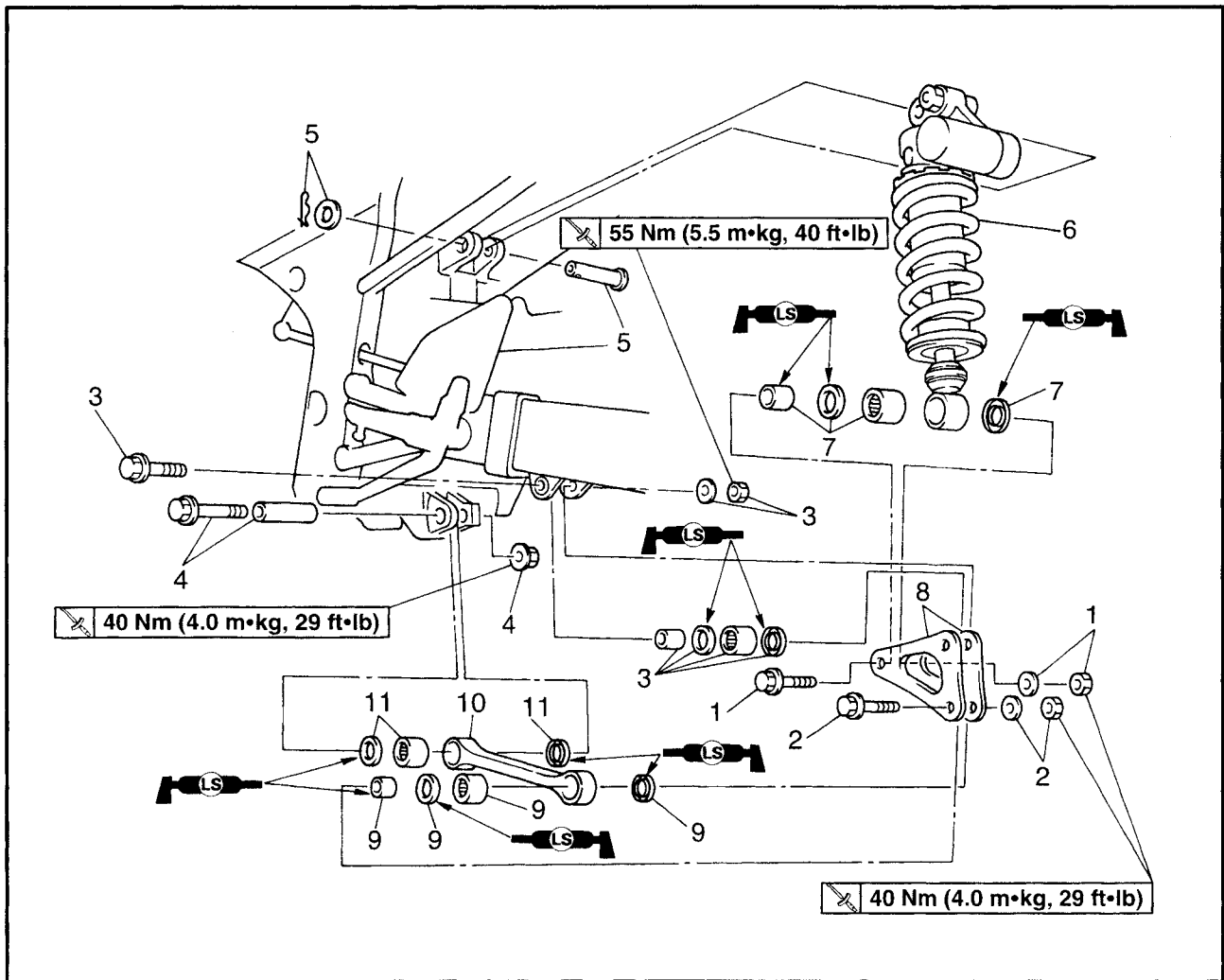
13 Nm (1.3 m•kg, 9.4 ft•lb)

- handlebar pinch bolt

33 Nm (3.3 m•kg, 24 ft•lb)

EAS00685

## REAR SHOCK ABSORBER ASSEMBLY



Order	Job/Part	Q'ty	Remarks
	<b>Removing the rear shock absorber assembly</b>		Remove the parts in the order listed.
	Rear wheel		Refer to "REMOVING THE REAR WHEEL".
1	Self-locking nut/bolt	1/1	Refer to "REMOVING THE REAR SHOCK ABSORBER ASSEMBLY".
2	Self-locking nut/bolt	1/1	
3	Self-locking nut/bolt/coller	1/1/1	
4	Self-locking nut/bolt	1/1	
5	Pin/clip/washer	1/1/1	
6	Rear shock absorber assembly	1	
7	Coller/oil seal/bearing	1/2/1	
8	Relay arm	2	
9	Coller/oil seal/bearing	1/2/1	
10	Connecting arm	1	
11	Coller/oil seal/bearing	1/2/1	For installation, reverse the removal procedure.



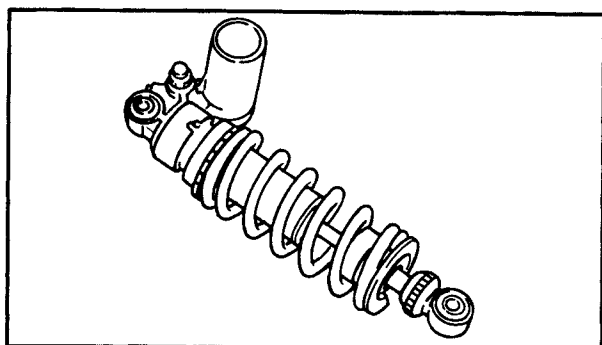
EAS00687

## HANDLING THE REAR SHOCK ABSORBER AND GAS CYLINDER

### **⚠ WARNING**

This rear shock absorber and gas cylinder contain highly compressed nitrogen gas. Before handling the rear shock absorber or gas cylinder, read and make sure you understand the following information. The manufacturer cannot be held responsible for property damage or personal injury that may result from improper handling of the rear shock absorber and gas cylinder.

- Do not tamper or attempt to open the rear shock absorber or gas cylinder.
- Do not subject the rear shock absorber or gas cylinder to an open flame or any other source of high heat. High heat can cause an explosion due to excessive gas pressure.
- Do not deform or damage the rear shock absorber or gas cylinder in any way. If the rear shock absorber, gas cylinder or both are damaged, damping performance will suffer.



EAS00689

## DISPOSING OF A REAR SHOCK ABSORBER AND GAS CYLINDER

Gas pressure must be released before disposing of a rear shock absorber and gas cylinder. To release the gas pressure, press on the gas valve needle with a suitable tool as shown, until all of the gas is released (the hissing has stopped).

### **⚠ WARNING**

Wear eye protection to prevent eye damage from released gas or metal chips.



EAS00694

## REMOVING THE REAR SHOCK ABSORBER ASSEMBLY

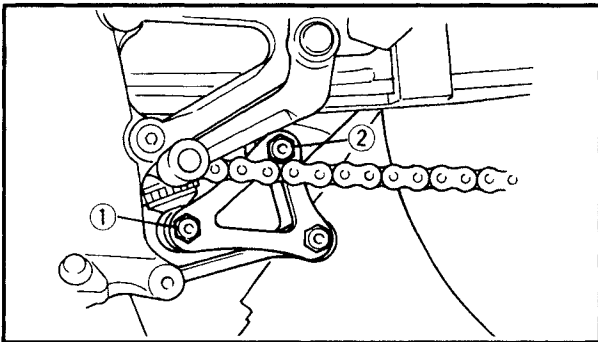
1. Stand the motorcycle on a level surface.

### **⚠ WARNING**

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

### **NOTE:**

Place the motorcycle on a suitable stand so that the rear wheel is elevated.

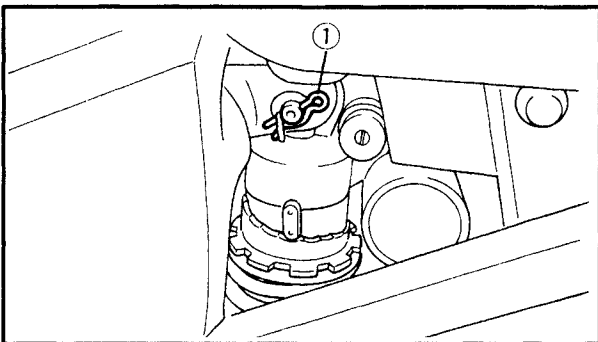


2. Remove:

- rear wheel
- rear shock absorber assembly lower bolt ①
- relay-arm-to-swingarm bolt ②

### **NOTE:**

While removing the rear shock absorber assembly lower bolt, hold the swingarm so that it does not drop down.

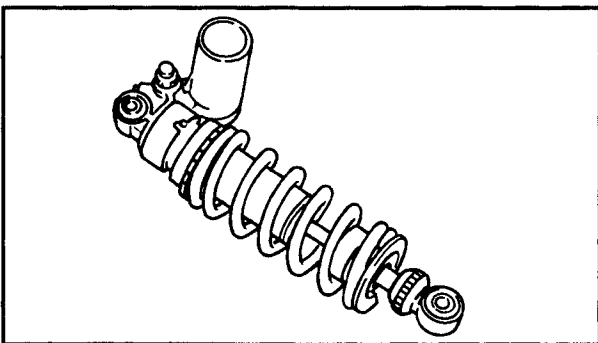


3. Remove:

- rear shock absorber assembly upper pin ①
- rear shock absorber assembly

### **NOTE:**

Raise the swingarm and then remove the rear shock absorber assembly from between the swingarm.

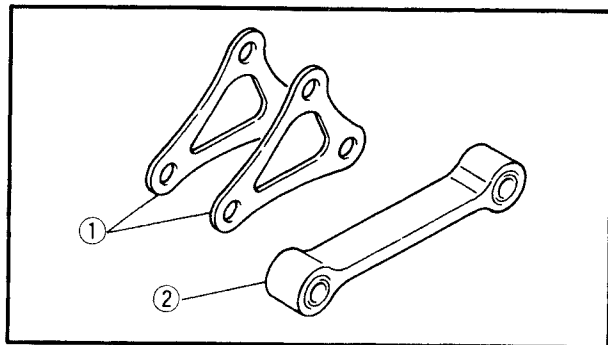


EAS00696

## CHECKING THE REAR SHOCK ABSORBER ASSEMBLY AND GAS CYLINDER

1. Check:

- rear shock absorber rod  
Bends/damage → Replace the rear shock absorber assembly.
- rear shock absorber  
Gas leaks/oil leaks → Replace the rear shock absorber assembly.
- spring  
Damage/wear → Replace the rear shock absorber assembly.
- gas cylinder  
Damage/gas leaks → Replace.
- bushings  
Damage/wear → Replace.
- dust seals  
Damage/wear → Replace.
- bolts  
Bends/damage/wear → Replace.




## CHECKING THE RELAY ARM AND CONNECTING ARM

1. Check:
  - relay arm ①
  - connecting arm ②
  - Damage/wear → Replace.
  - bearings
  - oil seals
  - Damage/pitting → Replace.
  - spacers
  - Damage/scratches → Replace.

EAS00698

## INSTALLING THE REAR SHOCK ABSORBER ASSEMBLY





1. Lubricate:
  - bearings
  - oil seals
  - spacers

	<b>Recommended lubricant</b> <b>Lithium soap base grease</b>
---	---

2. Install:
  - connecting arm
  - relay arm
  - rear shock absorber assembly

### NOTE:

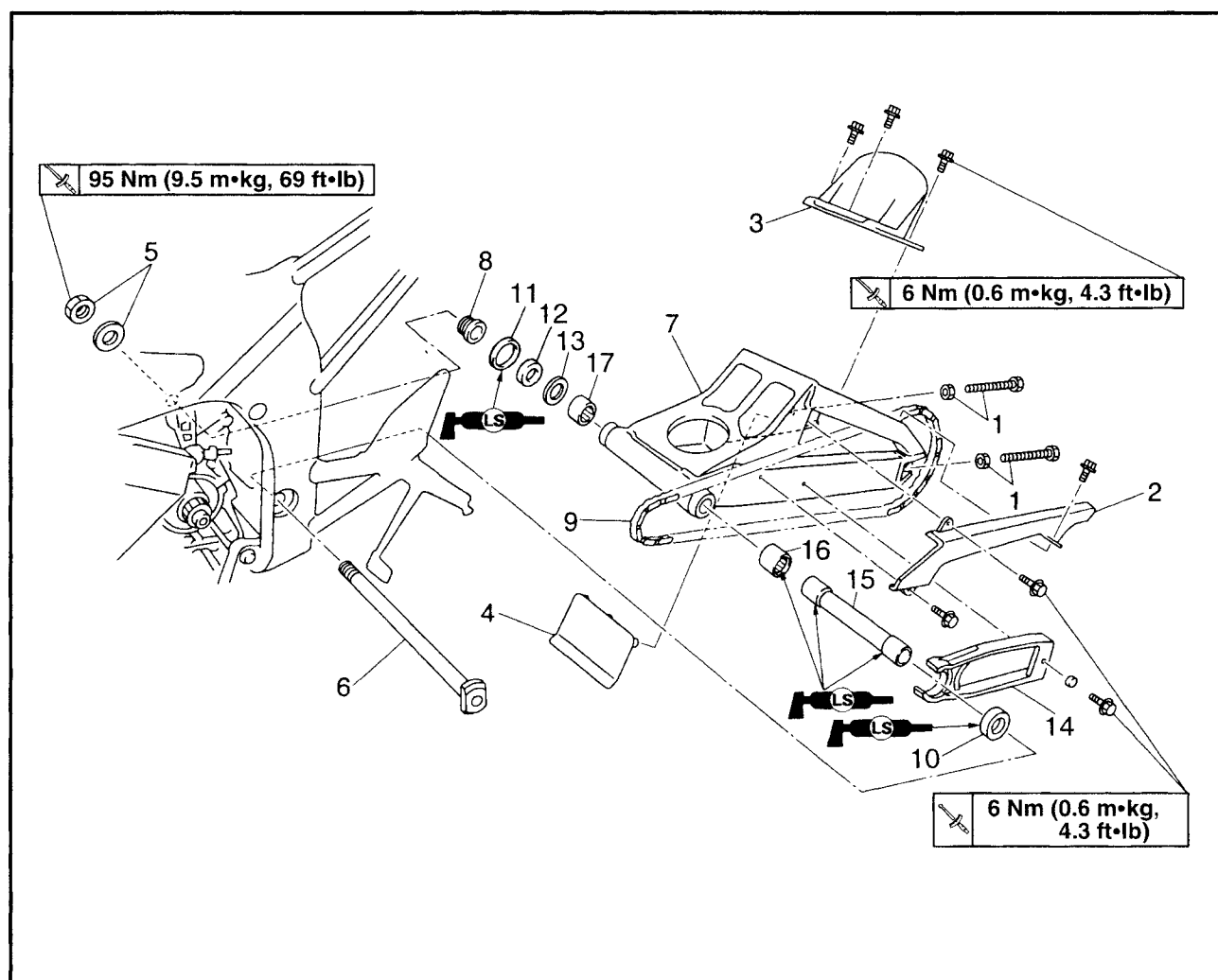
When installing the rear shock absorber assembly, lift up the swingarm.

3. Tighten:
  - connecting-arm-to-frame nut  
 **40 Nm (4.0 m•kg, 29 ft•lb)**
  - relay-arm-to-connecting-arm nut  
 **40 Nm (4.0 m•kg, 29 ft•lb)**
  - relay-arm-to-swingarm nut  
 **40 Nm (4.0 m•kg, 29 ft•lb)**
  - rear shock absorber assembly lower nut  
 **55 Nm (5.5 m•kg, 40 ft•lb)**

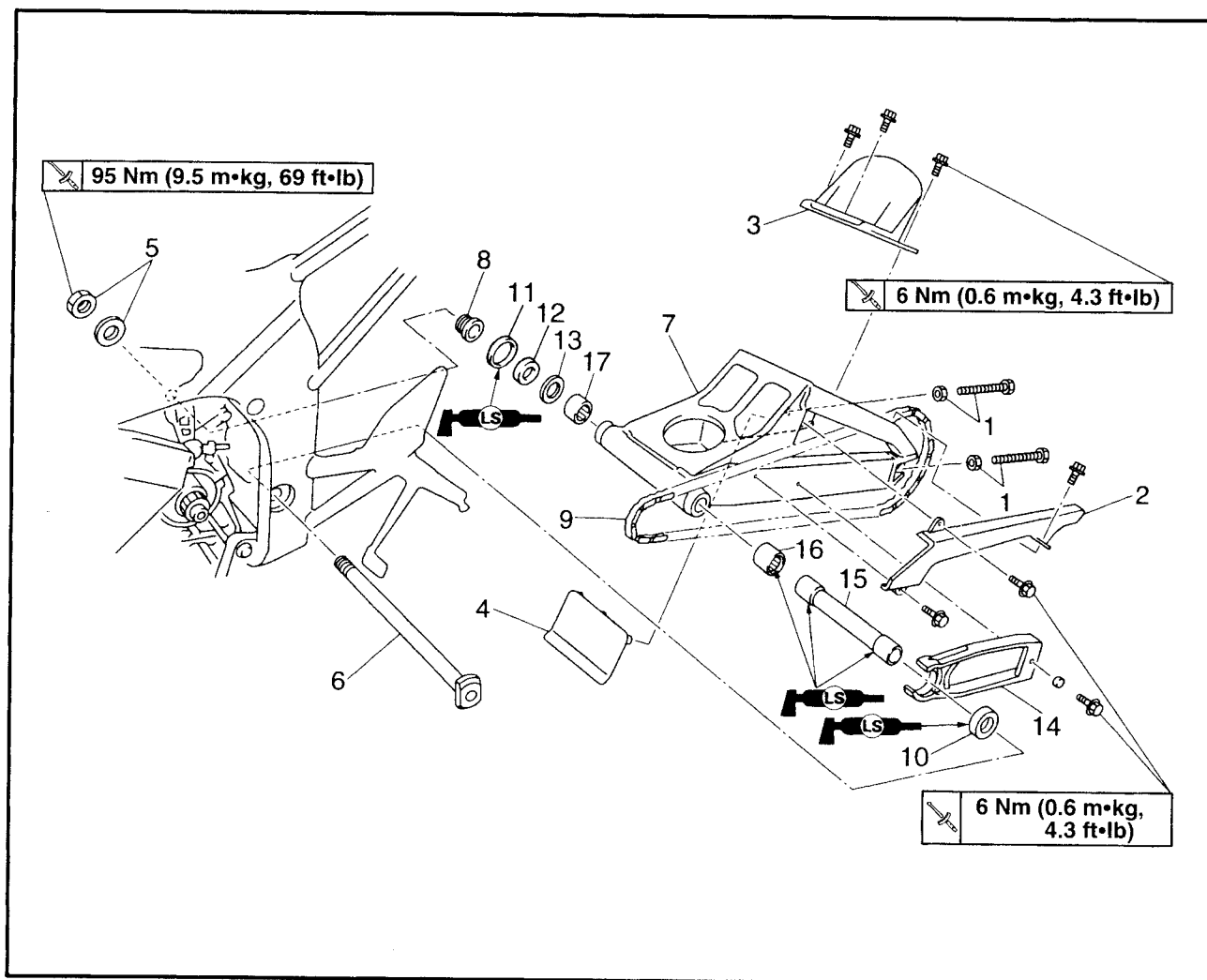


EAS00700

## SWINGARM AND DRIVE CHAIN



Order	Job/Part	Q'ty	Remarks
	<b>Removing the swingarm and drive chain</b>		Remove the parts in the order listed.
	Drive sprocket		Refer to "ENGINE" in chapter 4.
	Rear wheel		Refer to "REAR WHEEL, BRAKE DISC, AND REAR WHEEL SPROCKET".
	Rear shock absorber assembly		Refer to "REAR SHOCK ABSORBER ASSEMBLY".
1	Adjusting bolt/locknut	2/2	
2	Drive chain guard	1	
3	Rear fender	1	
4	Flap	1	
5	Pivot shaft nut/washer	1/1	
6	Pivot shaft	1	
7	Swingarm	1	

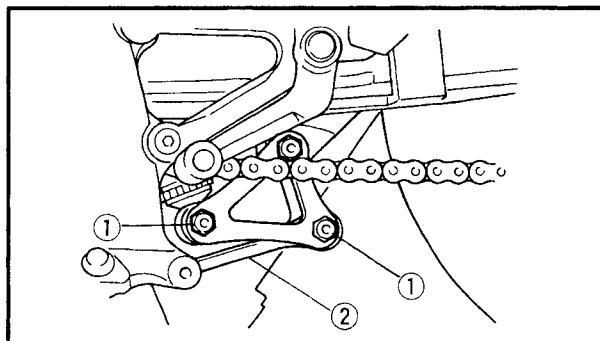


Order	Job/Part	Q'ty	Remarks
8	Pivot shaft adjust bolt	2	Refer to "REMOVING/INSTALLING THE SWINGARM".
9	Drive chain	1	
10	Dust cover	1	
11	Oil seal	1	
12	Bush	1	
13	Shim	1	
14	Drive chain guide	1	
15	Bush	1	
16	Left bearing	1	
17	Right bearing	1	
			For installation, reverse the removal procedure.



### NOTE:

Before removing the drive sprocket, drive chain, and rear wheel, measure the drive chain slack and the length of a tenlink section of the drive chain.



EC573000

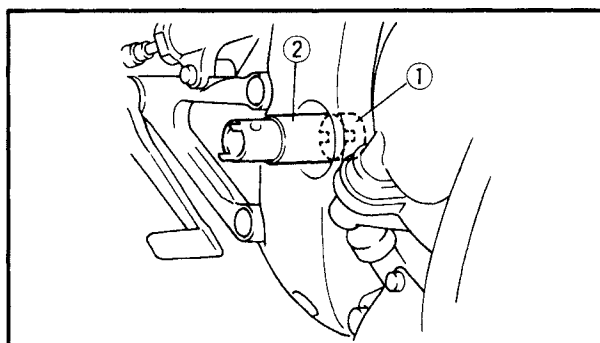
### REMOVING THE SWINGARM

#### 1. Remove:

- Bolt (connecting rod) ①
- Connecting rod ②

### NOTE:

Remove the bolt while holding the swingarm.



#### 2. Loosen:

- Pivot shaft adjust bolt ①

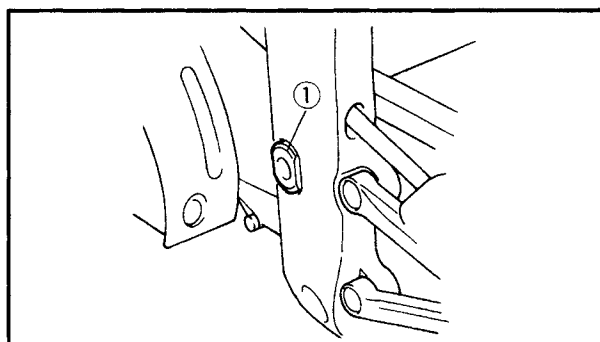
### NOTE:

Loosen the pivot shaft adjust bolt using a pivot shaft wrench ②



**Pivot shaft wrench:**

**90890-01471, YM-01471**



#### 3. Remove:

- Pivot shaft ①
- Swingarm

EAS00704

### REMOVING THE DRIVE CHAIN

#### 1. Remove:

- drive chain

### NOTE:

When replacing the swingarm, the drive chain is cut.

EAS00703

## CHECKING THE SWINGARM

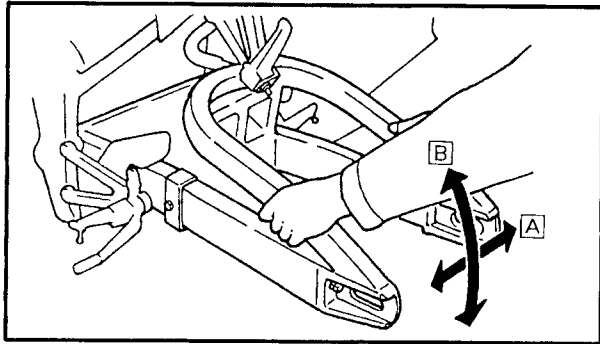
1. Stand the motorcycle on a level surface.

### WARNING

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

### NOTE:

Place the motorcycle on a suitable stand so that the rear wheel is elevated.



2. Measure:


- swingarm side play
- swingarm vertical movement

- a. Measure the tightening torque of the pivot shaft nut.



### Pivot shaft nut


95 Nm (9.5 m•kg, 69 ft•lb)

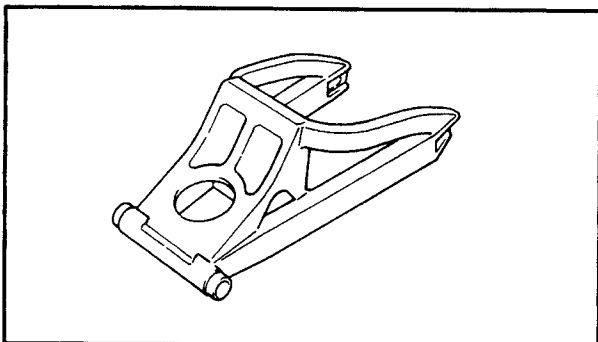
- b. Measure the swingarm side play  by moving the swingarm from side to side.
- c. If the swingarm side play is out of specification, check the spacers, bearings, washers, and dust covers.



### Swingarm side play (at the end of the swingarm)

1.0 mm (0.04 in)

- d. Check the swingarm vertical movement  by moving the swingarm up and down. If swingarm vertical movement is not smooth or if there is binding, check the spacers, bearings, washers, and dust covers.

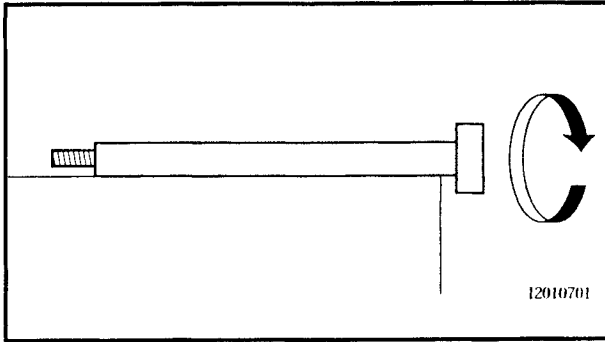


3. Check:

- swingarm
- Bends/cracks/damage → Replace.

### NOTE:

If the swingarm must be replaced, the drive chain must be cut with a drive chain cutter.



4. Check:
- pivot shaft
- Roll the pivot shaft on a flat surface.  
Bends → Replace.

## **⚠ WARNING**

**Do not attempt to straighten a bent pivot shaft.**

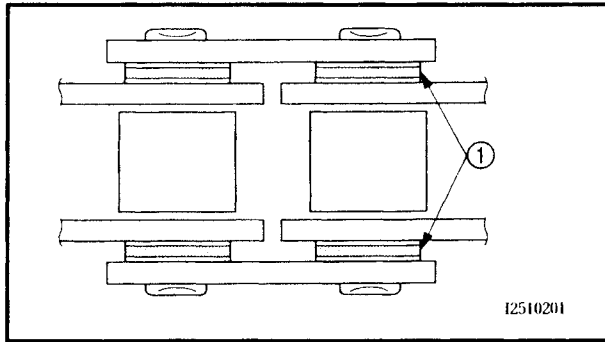
5. Wash:
- pivot shaft
  - pivot shaft adjust bolt
  - dust covers
  - spacer
  - bearings



**Recommended cleaning solvent**  
**Kerosine**

6. Check:
- dust covers
  - spacer
  - oil seals
- Damage/wear → Replace.
- bearings
- Damage/pitting → Replace.





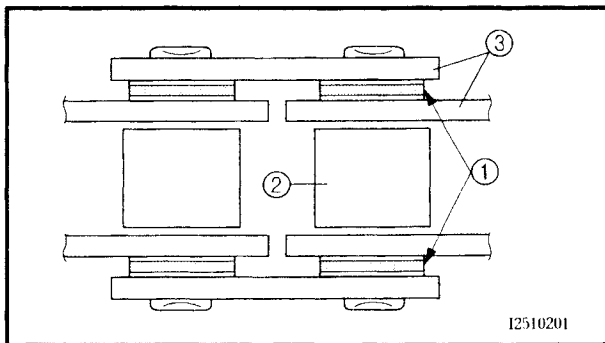
- c. Remove the drive chain from the kerosine and completely dry it.

### CAUTION:

This motorcycle has a drive chain with small rubber O-rings ① between the drive chain side plates. Never use high-pressure water or air, steam, gasoline, certain solvents (e.g., benzene), or a coarse brush to clean the drive chain.

High-pressure methods could force dirt or water into the drive chain's internals, and solvents will deteriorate the O-rings. A coarse brush can also damage the O-rings. Therefore, use only kerosine to clean the drive chain.

Don't soak drive chain in kerosine more than ten minutes. O-ring is damaged by kerosine.



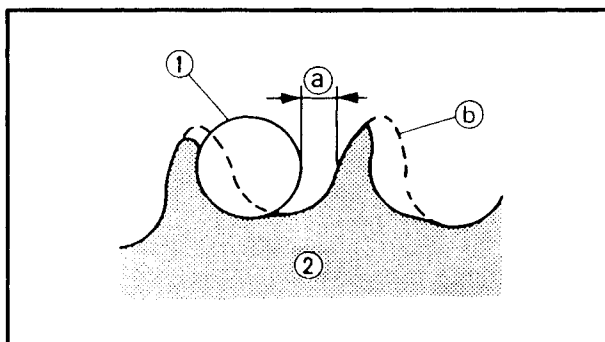
4. Check:
- O-rings ①  
Damage → Replace the drive chain.
  - drive chain rollers ②  
Damage/wear → Replace the drive chain.
  - drive chain side plates ③  
Cracks/damage/wear → Replace the drive chain.

5. Lubricate:
- drive chain

**Recommended lubricant**

**Engine oil or chain lubricant**

**suitable for O-ring chains**



6. Check:
- drive sprocket
  - rear wheel sprocket  
More than 1/4 tooth ① wear → Replace the drive chain sprockets as a set.  
Bent teeth → Replace the drive chain sprockets as a set.
- ① Correct
- ② Drive chain roller
- ③ Drive chain sprocket

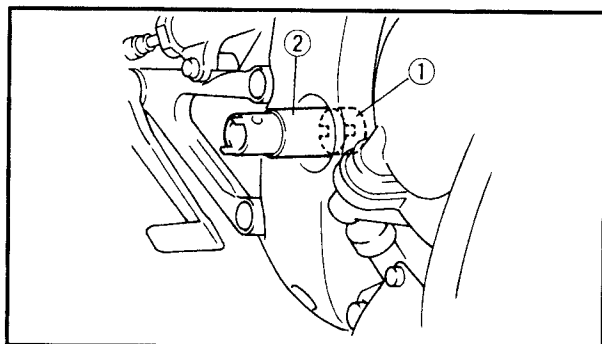


EAS00711

## INSTALLING THE SWINGARM

1. Lubricate:
  - bearings
  - spacers
  - dust covers
  - pivot shaft

	<b>Recommended lubricant</b> <b>Lithium soap base grease</b>
--	---



2. Install:
  - swingarm
  - pivot shaft
  - washer
  - pivot shaft adjust bolt ①
  - pivot shaft nut **95 Nm (9.5 m•kg, 69 ft•lb)**

### NOTE:

Use the pivot shaft wrench ② to tighten the pivot adjust bolt to finger tightness.

	<b>Pivot shaft wrench:</b> <b>90890-01471, YM-01471</b>
--	--

3. Install:
  - rear shock absorber assembly
  - rear wheel

Refer to "REAR SHOCK ABSORBER ASSEMBLY" and "REAR WHEEL".
4. Adjust:
  - drive chain slack

Refer to "ADJUSTING THE DRIVE CHAIN SLACK" in chapter 3.

	<b>Drive chain slack</b> <b>40 ~ 50 mm (1.5 ~ 1.97 in)</b>
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EAS00713

## INSTALLING THE DRIVE CHAIN

1. Lubricate:
  - drive chain
2. Install:
  - drive chain  
(with the drive chain riveter)



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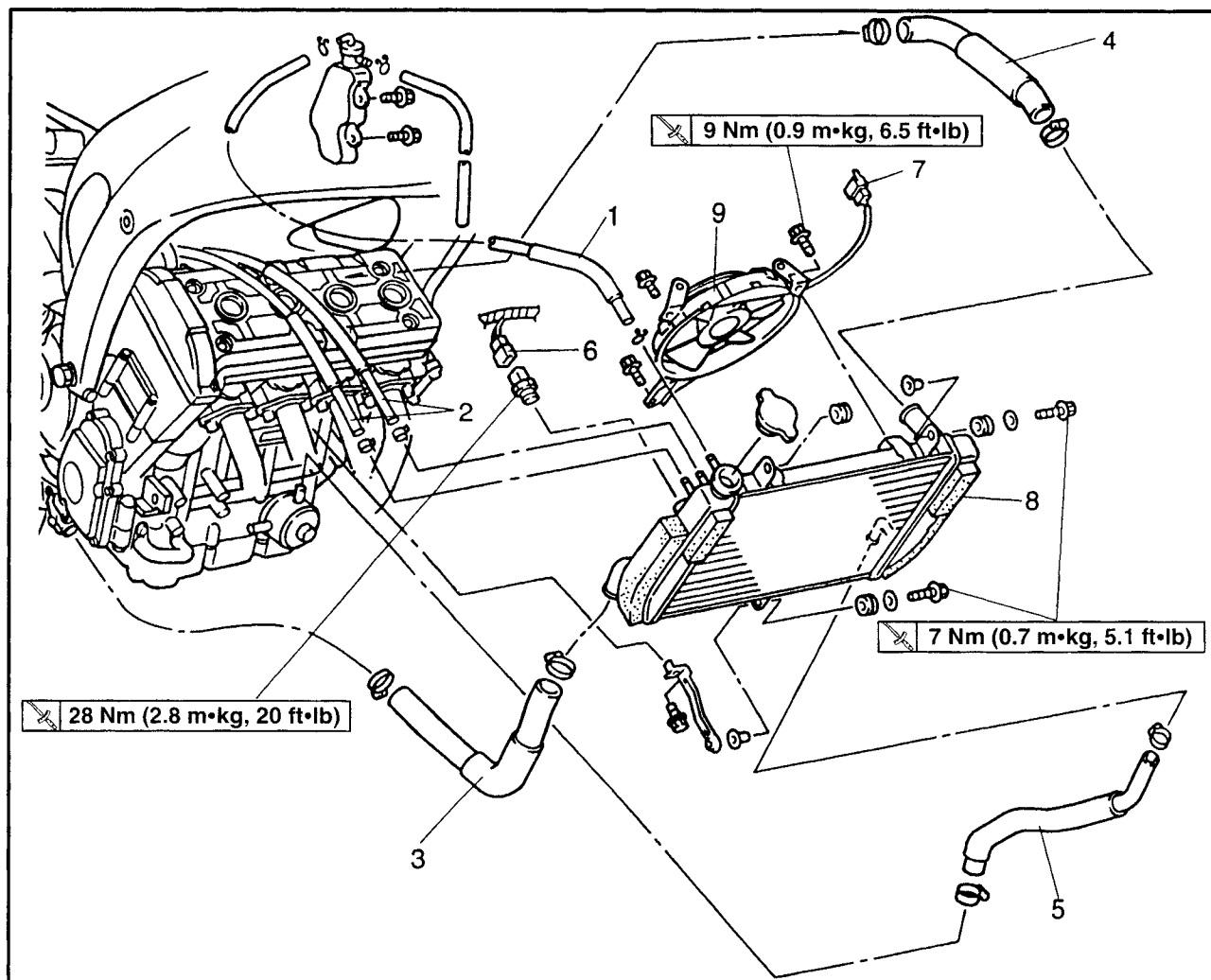
## CHAPTER 5. COOLING SYSTEM

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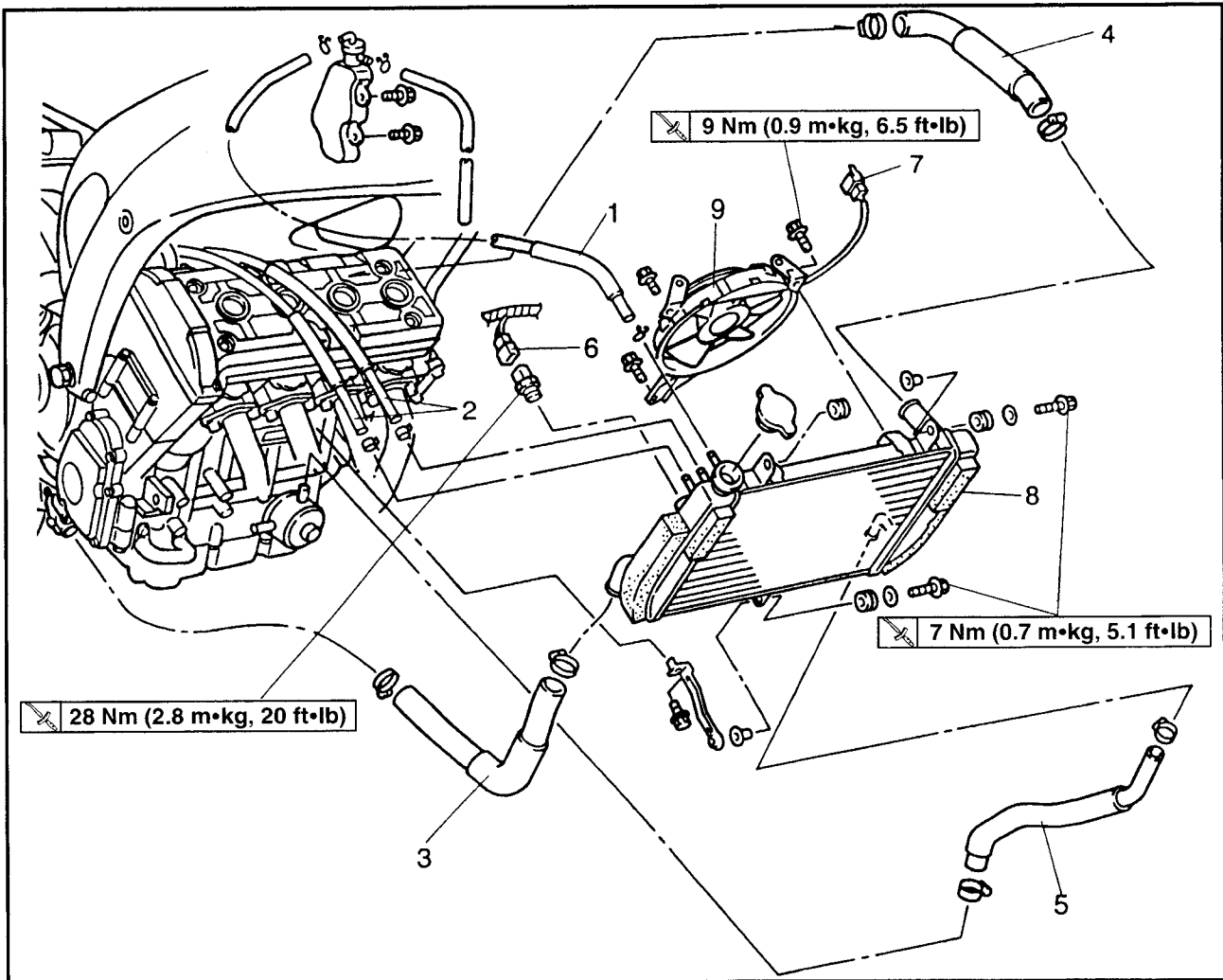


## COOLING SYSTEM

## RADIATOR



Order	Job/Part	Q'ty	Remarks
	<b>Removeing the radiator</b>		
	Rider seat and fuel tank		Remove the parts in the order listed. Refer to "SEATS" and "FUEL TANK" in chapter 3.
	Air filter case and heat protector plate		Refer to "AIRFILTER CASE AND IGNITION COILS" in chapter 3.
	Bottom cowl and side cowlings		Refer to "COWLINGS" in chapter 3.
	Coolant		Drain.
1	Coolant reserver hose	1	
2	Breather hose	2	
3	Radiator outlet hose	1	Disconnect.



Order	Job/Part	Q'ty	Remarks
4	Radiator inlet hose	1	Disconnect.
5	Oil cooler outlet hose	1	
6	Thermo switch coupler	1	Disconnect.
7	Radiator fan motor coupler	1	Disconnect.
8	Radiator	1	
9	Radiator fan	1	
			For installation reverse the removal procedure.





EAS00456

**INSTALLING THE RADIATOR****1. Fill:**

- cooling system  
(with the specified amount of the recommended coolant)

Refer to "CHANGING THE COOLANT" in chapter 3.

**2. Check:**

- cooling system  
Leaks → Repair or replace any faulty part.

**3. Measure:**

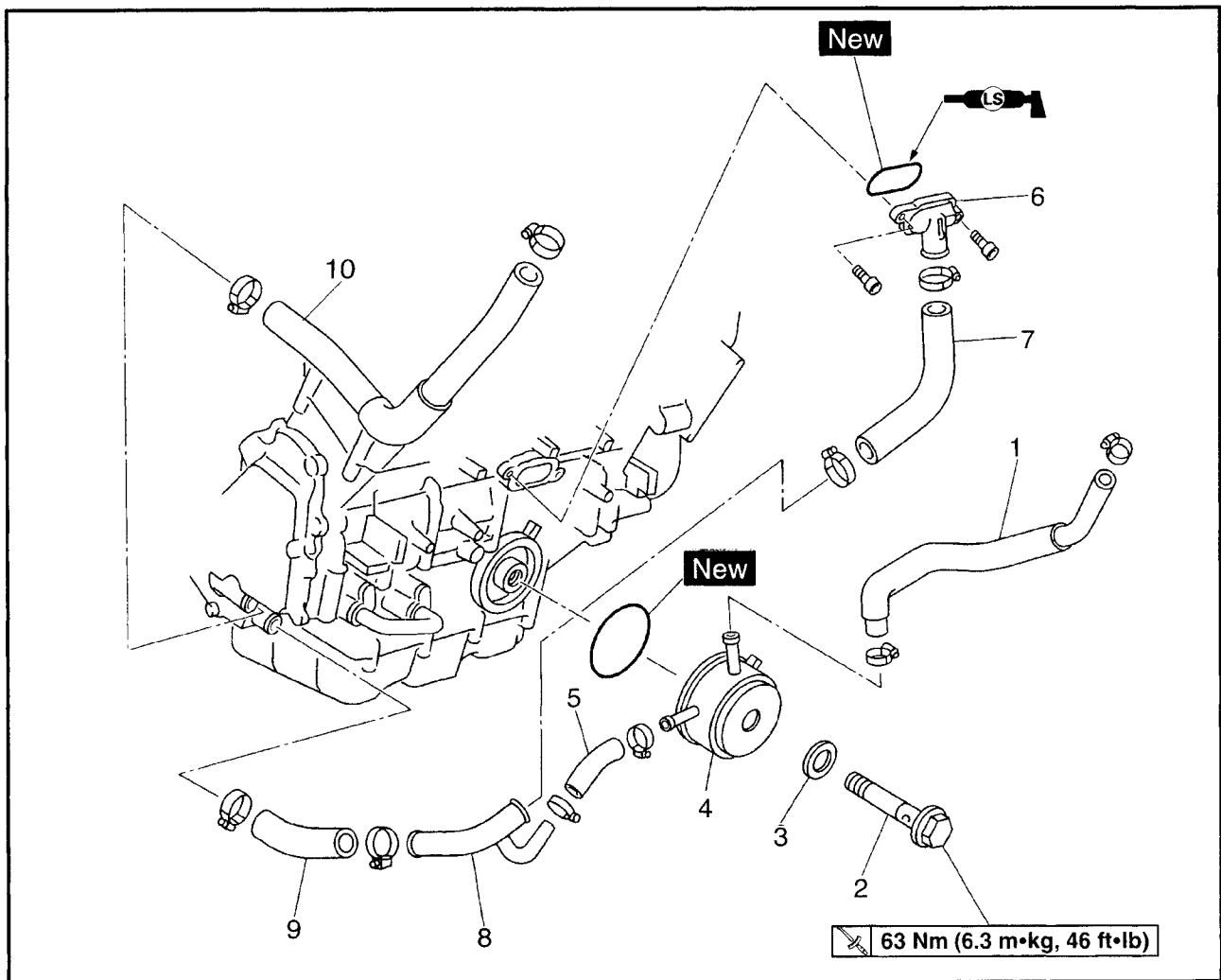
- radiator cap opening pressure  
Below the specified pressure → Replace the radiator cap.

Refer to "CHECKING THE RADIATOR".

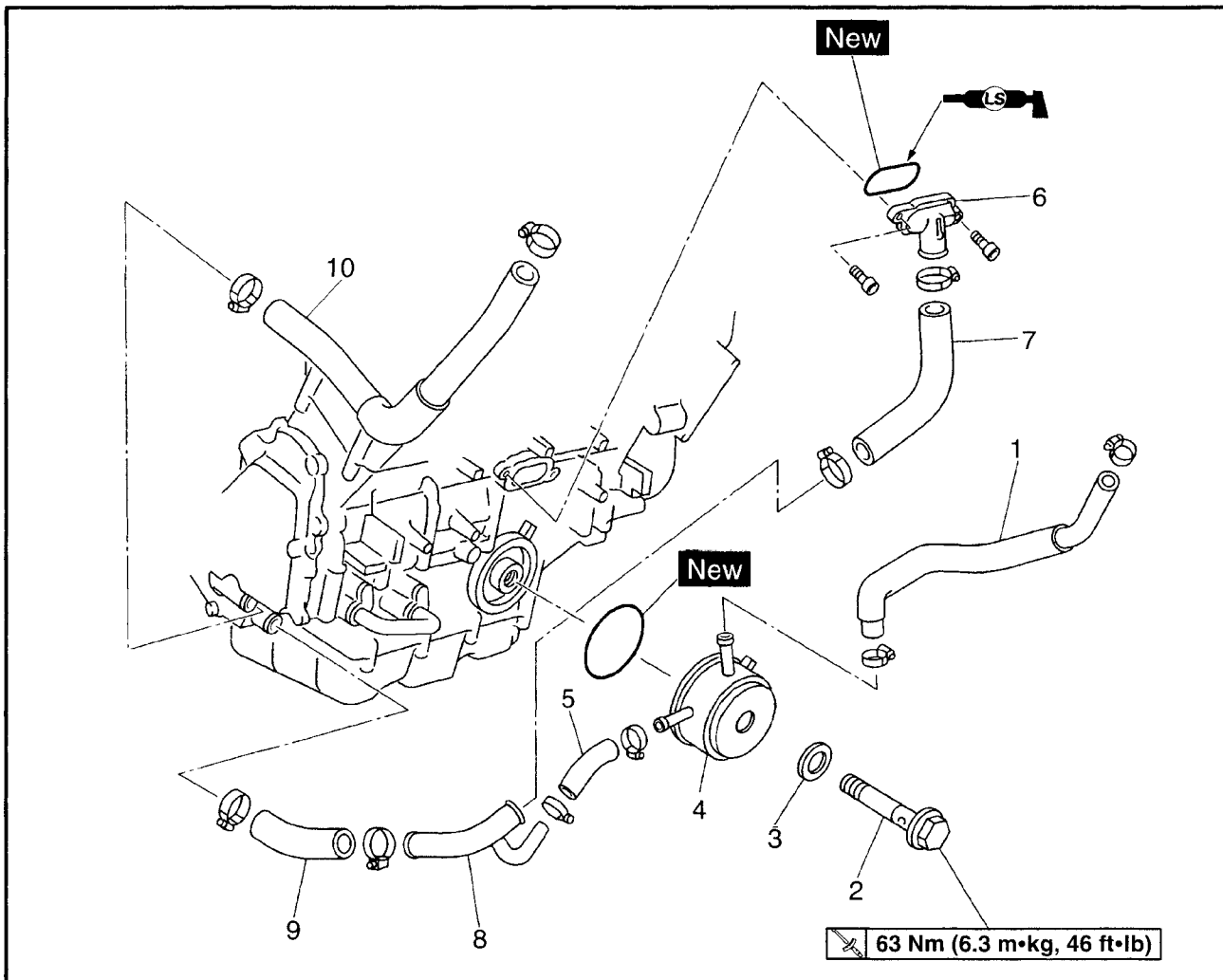


EAS00457

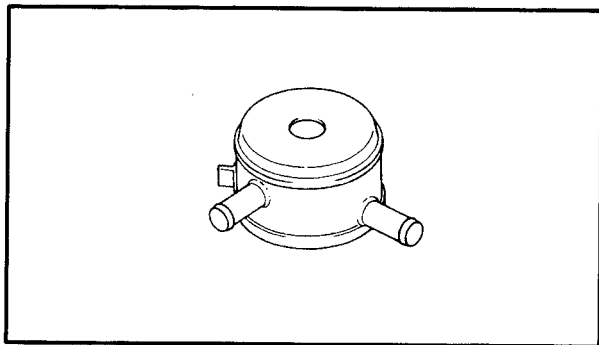
## OIL COOLER



Order	Job/Part	Q'ty	Remarks
	<b>Removing the oil cooler</b> Radiator assembly Exhaust pipe assembly Engine oil		Remove the parts in the order listed. Refer to "RADIATOR". Refer to "ENGINE" in chapter 4. Drain. Refer to "CHANGING THE ENGINE OIL" in chapter 3.
1	Oil cooler outlet hose	1	Refer to "INSTALLING THE OIL COOLER".
2	Bolt	1	
3	Washer	1	
4	Oil cooler	1	



Order	Job/Part	Q'ty	Remarks
5	Oil cooler inlet hose	1	
6	Water jacket joint	1	
7	Water jacket joint hose	1	
8	Water pump outlet pipe	1	
9	Water pump outlet hose	1	
10	Water pump inlet hose	1	
			For installation, reverse the removal procedure.



EAS00458

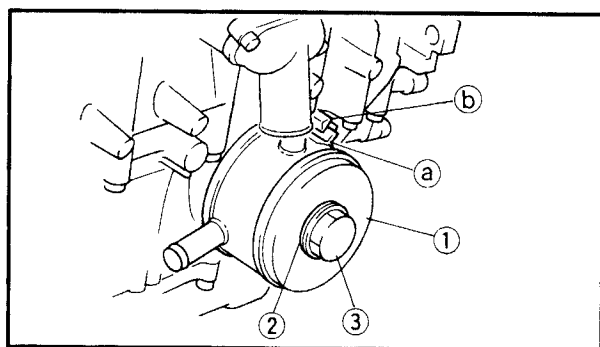
**CHECKING THE OIL COOLER**

1. Check:
  - oil cooler  
Cracks/damage → Replace.
2. Check:
  - oil cooler inlet hose
  - oil cooler outlet hose  
Cracks/damage/wear → Replace.
3. Check:
  - water jacket joint
  - water jacket joint inlet hose
  - water pump outlet hose  
Cracks/damage → Replace.

EBS00459

**INSTALLING THE OIL COOLER**

1. Clean:
  - mating surfaces of the oil cooler and the crankcase  
(with a cloth dampened with lacquer thinner)



2. Install:

- O-ring **New**
- oil cooler ①
- washer ② **New**
- bolt ③

**63 Nm (6.3 m•kg, 46 ft•lb)**
**NOTE:**

- Before installing the oil cooler, lubricate the oil cooler bolt and O-ring with a thin coat of engine oil.
- Make sure that the O-ring is positioned properly.
- Align the projection (a) on the oil cooler with the slot (b) in the crankcase.

3. Bend the lock washer tab along a flat side of the bolt.

**4. Fill:**

- cooling system

(with the specified amount of the recommended coolant)

Refer to "CHANGING THE COOLANT" in chapter 3.

- crankcase

(with the specified amount of the recommended engine oil)

Refer to "CHANGING THE ENGINE OIL" in chapter 3.

**5. Check:**

- cooling system

Leaks → Repair or replace any faulty part.

**6. Measure:**

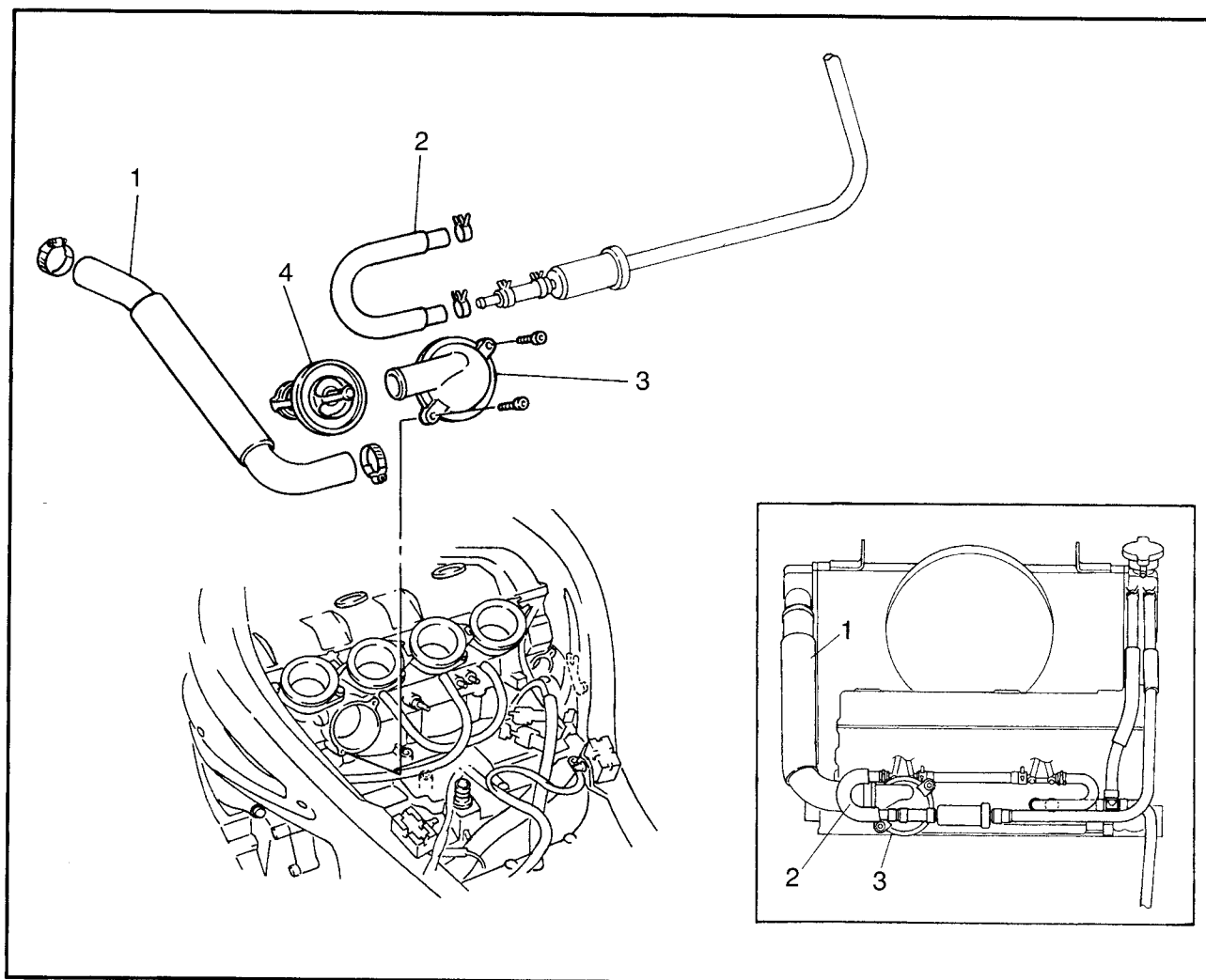
- radiator cap opening pressure

Below the specified pressure → Replace the radiator cap.

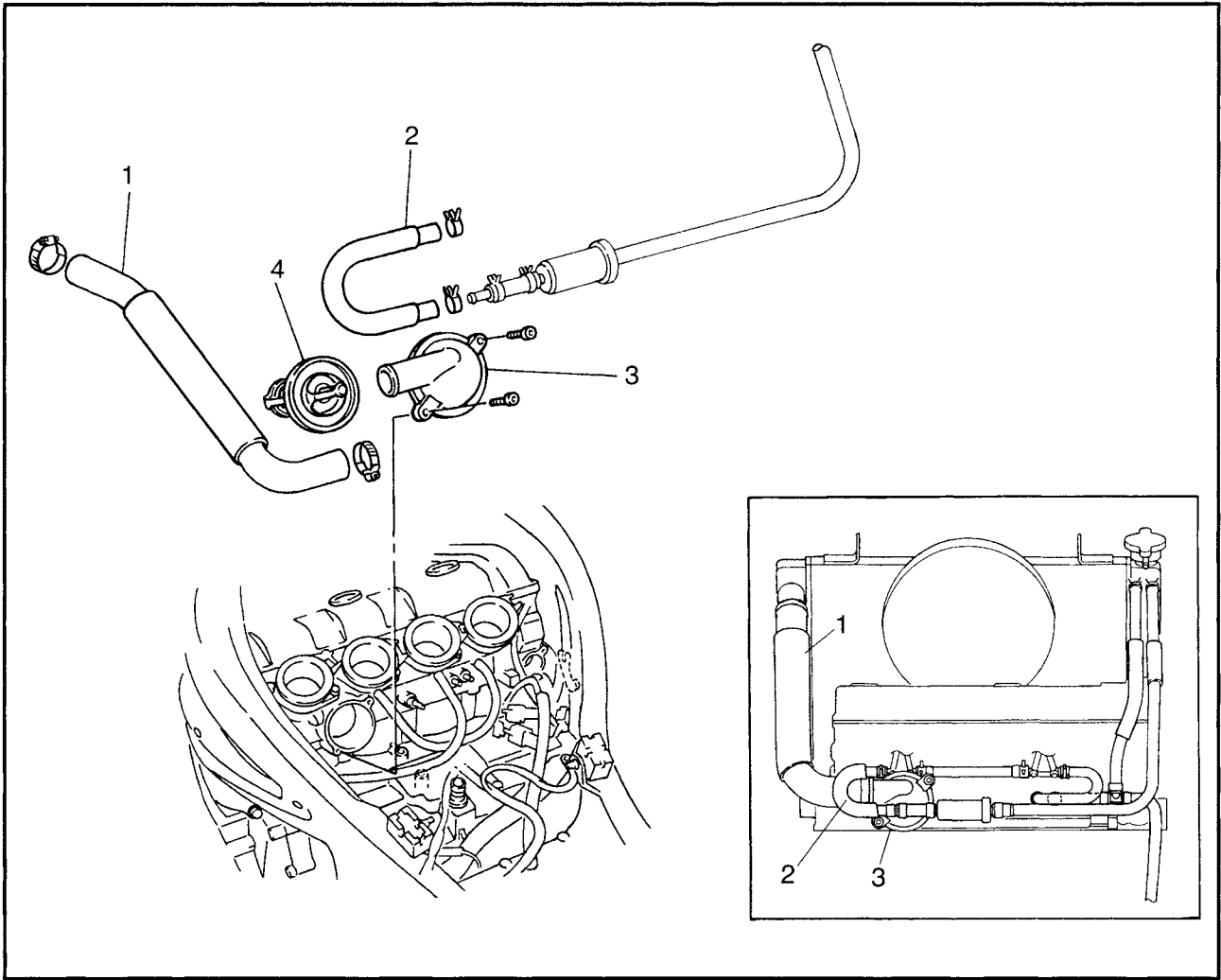
Refer to "CHECKING THE RADIATOR".



## THERMOSTAT



Order	Job/Part	Q'ty	Remarks
	<b>Removing the thermostat</b>		
	Rider seat and fuel tank		Remove the parts in the order listed. Refer to "SEAT" and "FUEL TANK" in chapter 3.
	Coolant		Drain. Refer to "CHANGING THE COOLANT" in chapter 3.
	Air filter case		Refer to "AIRFILTER CASE AND IGNITION COILS" in chapter 3.
	Carburetor assembly		Refer to "CARBURETORS" in chapter 6.



Order	Job/Part	Q'ty	Remarks
1	Radiator inlet hose	1	Refer to "INSTALLING THE THERMOSTAT" For installation, reverses the removal procedure.
2	Carburator outlet hose	1	
3	Thermostat cover	1	
4	Thermostat	1	





## 3. Fill:

- cooling system

(with the specified amount of the recommended coolant)

Refer to "CHANGING THE COOLANT" in chapter 3.

## 4. Check:

- cooling system

Leaks → Repair or replace any faulty part.

## 5. Measure:

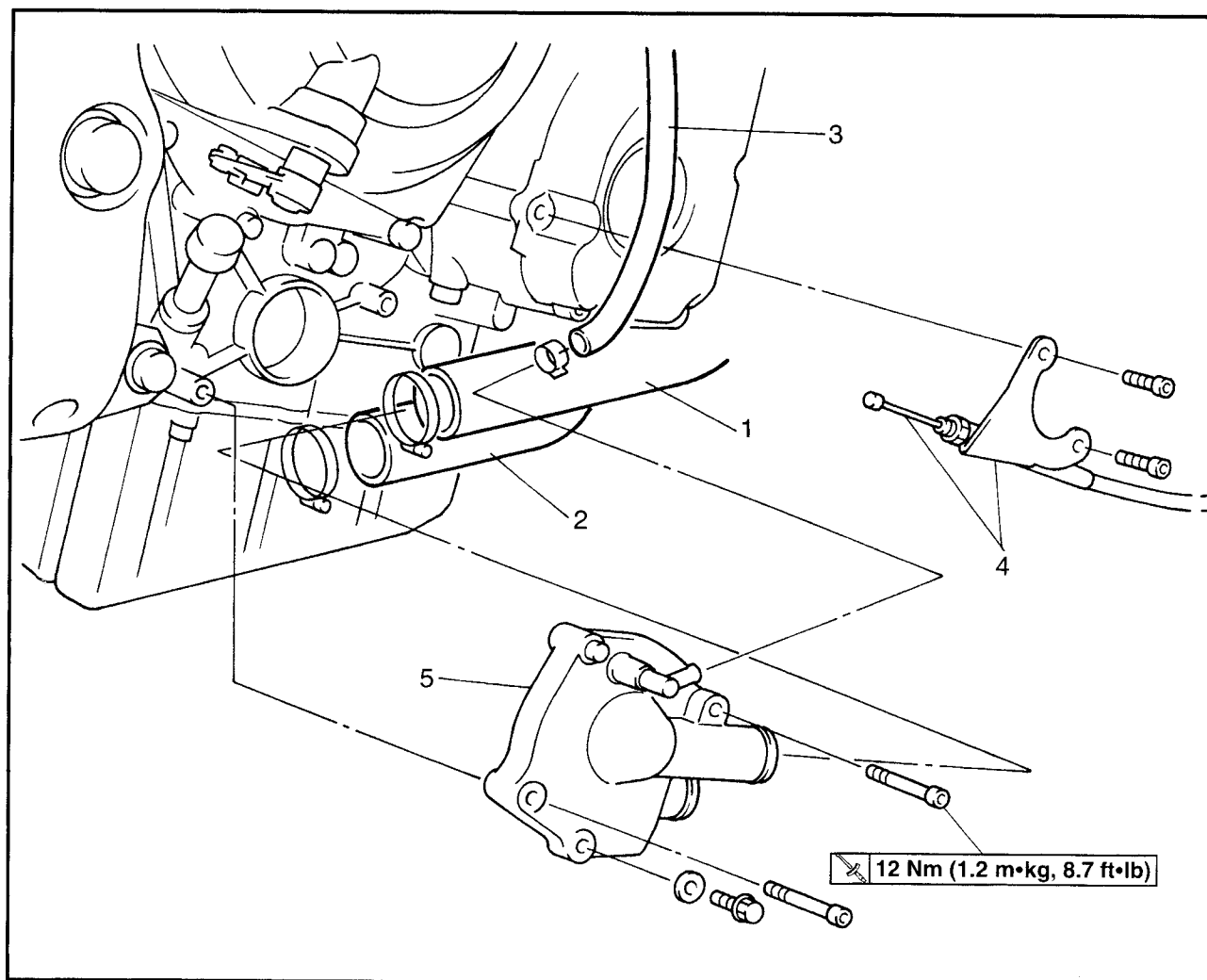
- radiator cap opening pressure

Below the specified pressure → Replace the radiator cap.

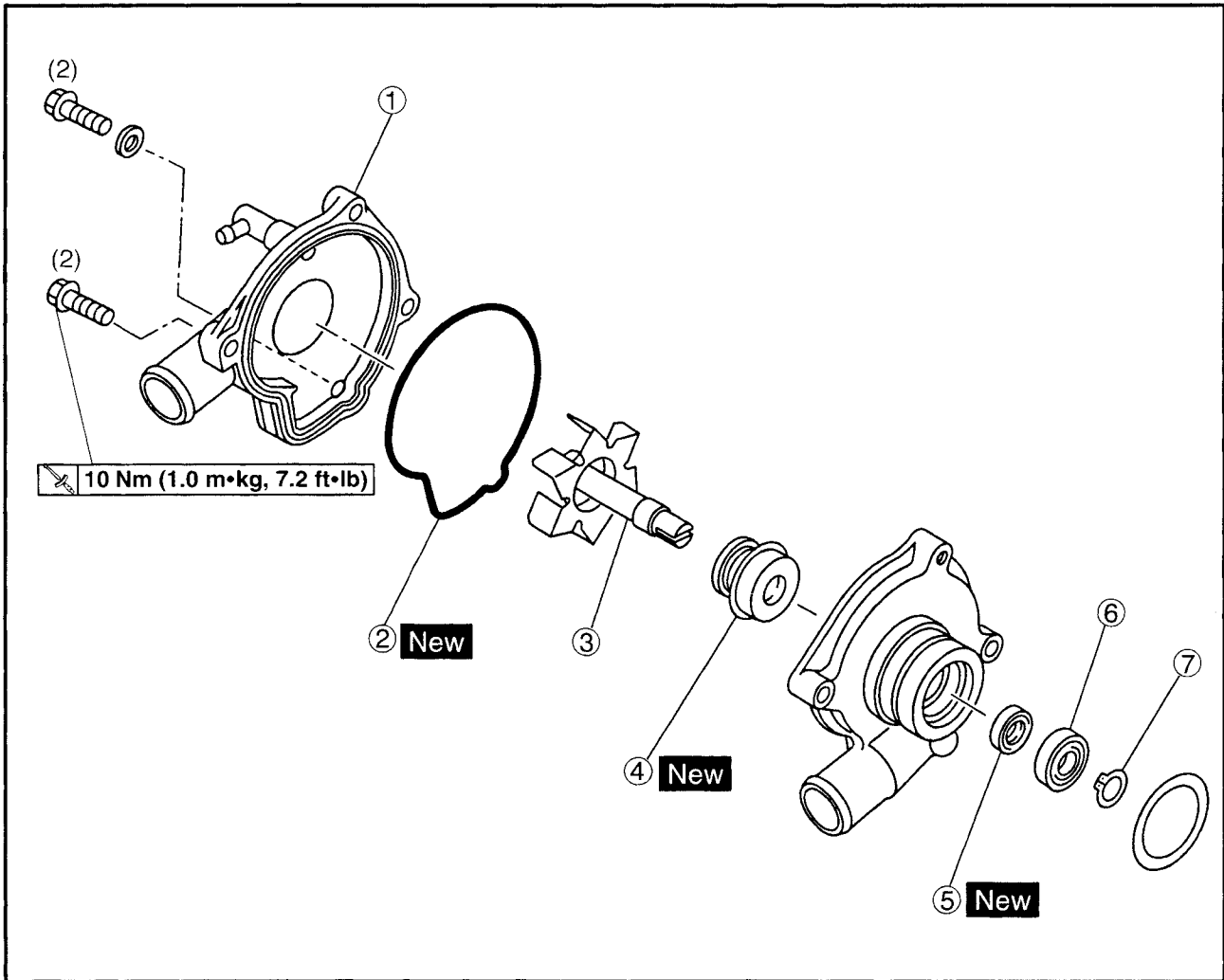
Refer to "CHECKING THE RADIATOR".



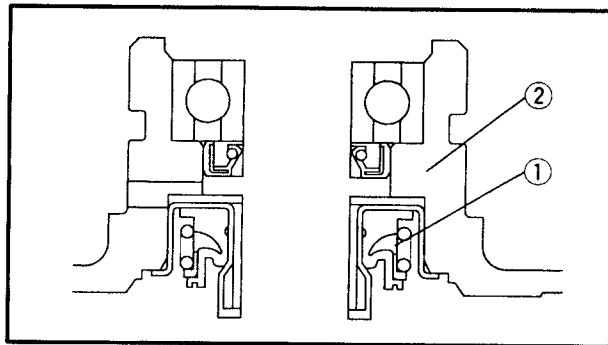
## WATER PUMP



Order	Job/Part	Q'ty	Remarks
	<b>Removing the water pump assembly</b> Coolant		Remove the parts in the order listed. Drain. Refer to "CHANGING THE COOLANT" in chapter 3.
1	Water pump inlet hose	1	
2	Water pump outlet hose	1	
3	Water pump hose	1	
4	Clutch wire and holder	1	
5	Water pump	1	
			For installation, reverse the removal procedure.



Order	Job/Part	Q'ty	Remarks
	<b>Disassembling the water pump assembly</b>		Disassemble the parts in the order listed.
①	Water pump cover	1	Refer to "DISASSEMBLING/ ASSEMBLING THE WATER PUMP".
②	O-ring	1	
③	Impeller shaft (along with the impeller)	1	
④	Water pump seal	1	
⑤	Oil seal	1	
⑥	Bearing	1	
⑦	Circlip	1	
			For assembly, reverse the disassembly procedure.



EAS00470

### DISASSEMBLING THE WATER PUMP

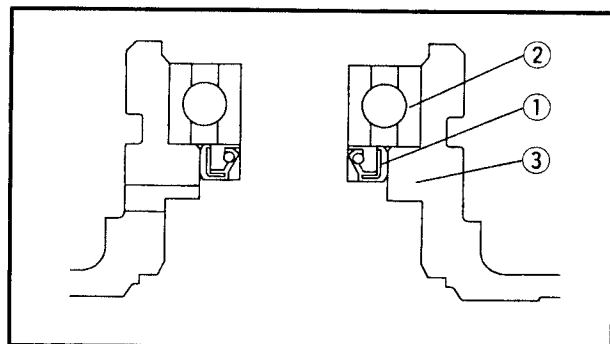
#### 1. Remove:

- water pump seal ①

#### NOTE:

Tap out the water pump seal from the inside of the water pump housing.

- ② Water pump housing



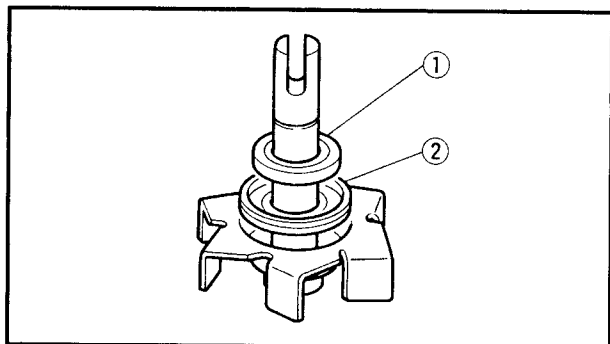
#### 2. Remove:

- oil seal ①
- circlip
- bearing ②

#### NOTE:

Tap out the bearing and oil seal from the outside of the water pump housing.

- ③ Water pump housing

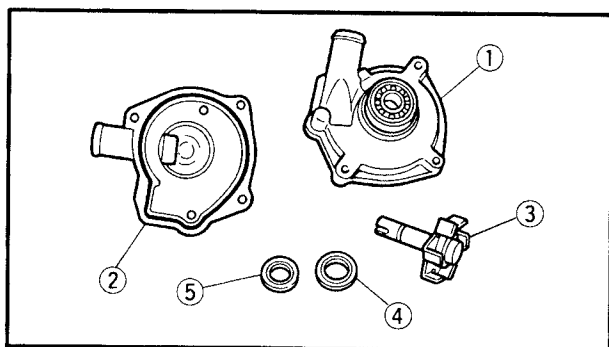


#### 3. Remove:

- rubber damper holder ①
- rubber damper ②  
(from the impeller, with a thin, flat-head screwdriver)

#### NOTE:

Do not scratch the impeller shaft.



EAS00474

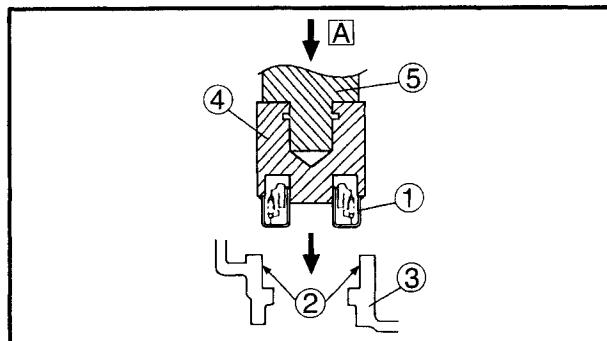
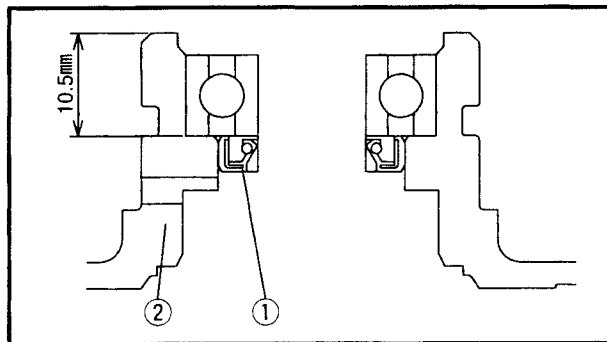
### CHECKING THE WATER PUMP

#### 1. Check:

- water pump housing cover ①
  - water pump housing ②
  - impeller ③
  - rubber damper ④
  - rubber damper holder ⑤
- Cracks/damage/wear → Replace.

#### 2. Check:

- water pump seal
  - oil seal
- Cracks/damage/wear → Replace.
- bearing
- Rough movement → Replace.



EAS00475

**ASSEMBLING THE WATER PUMP****1. Install:**

- bearing
- oil seal ① **New**
- (into the water pump housing ②)

**NOTE:**

- Before installing the oil seal, apply tap water or coolant onto its outer surface.
- Install the oil seal with a socket that matches its outside diameter.

**2. Install:**

- water pump seal ① **New**

**CAUTION:**

**Never lubricate the water pump seal surface with oil or grease.**

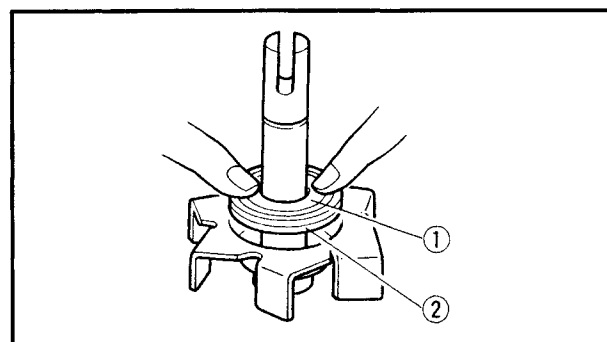
**NOTE:**

- Install the water pump seal with the special tools.
- Before installing the water pump seal, apply Yamaha bond No.1215 ② to the water pump housing ③.



**Mechanical seal installer**  
 90890-04078, YM-33221 ④  
**Middle driven shaft bearing driver**  
 90890-04058, YM-04058-1 ⑤  
 Yamaha bond No. 1215  
 90890-85505, ACC-1100-15-01

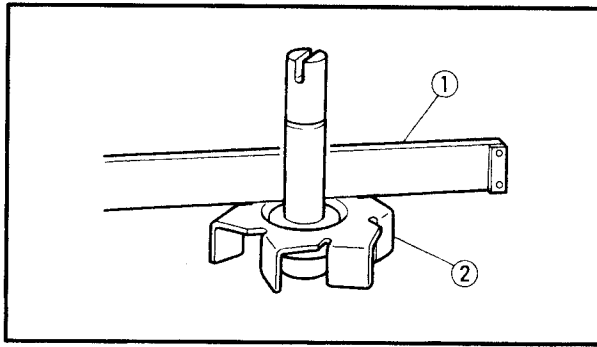
**A** Push down.

**3. Install:**

- rubber damper ① **New**
- rubber damper holder ② **New**

**NOTE:**

Before installing the rubber damper, apply tap water or coolant onto its outer surface.



## 4. Measure:

- impeller shaft tilt

Out of specification → Repeat steps (3) and (4).

**CAUTION:**

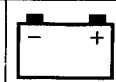
Make sure that the rubber damper and rubber damper holder are flush with the impeller.



Max. impeller shaft tilt  
0.15 mm (0.006 in)

① Straightedge

② Impeller



## CHAPTER 8. ELECTRICAL

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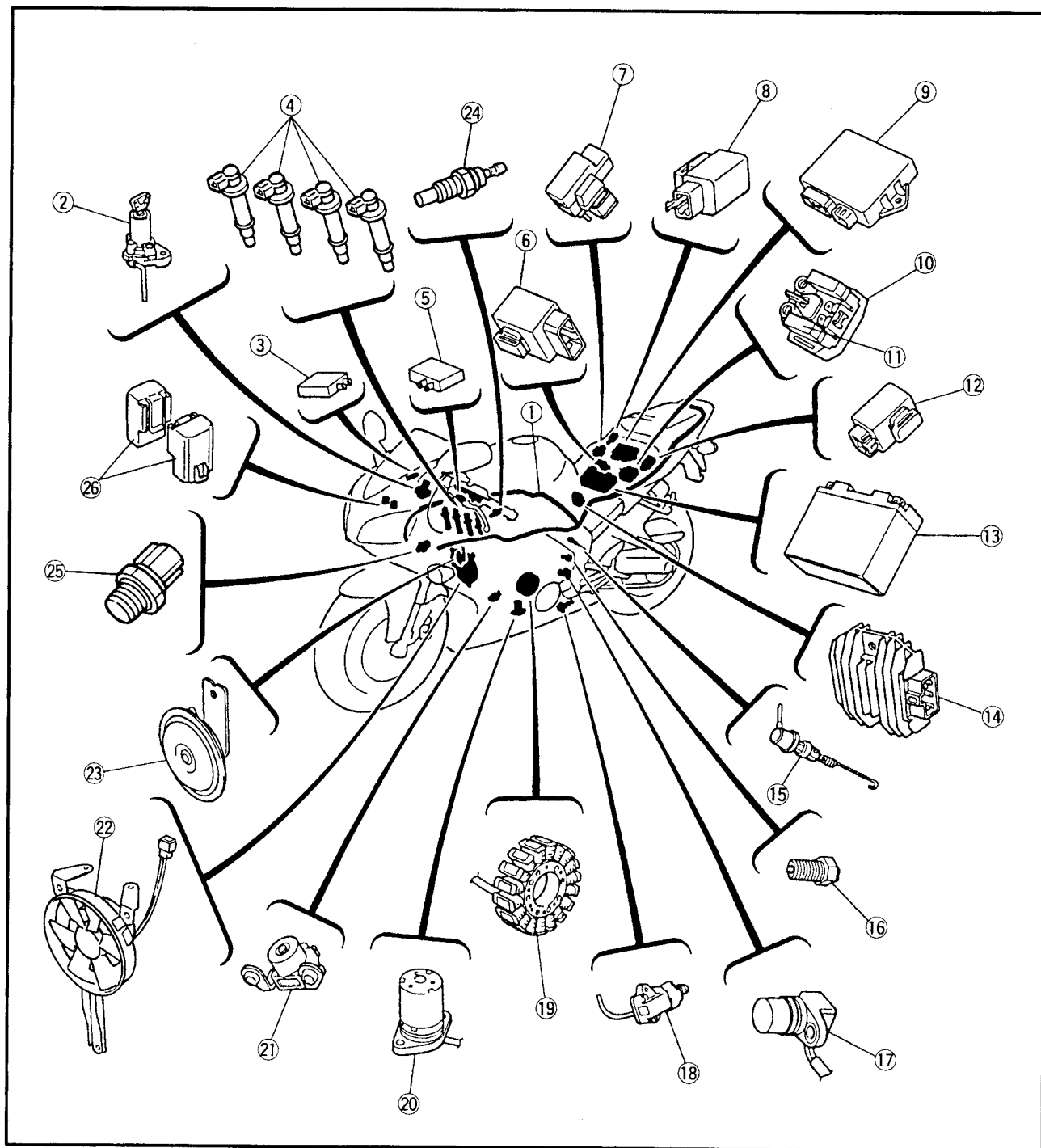


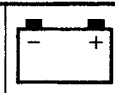
EB800000

## ELECTRICAL

## ELECTRICAL COMPONENTS

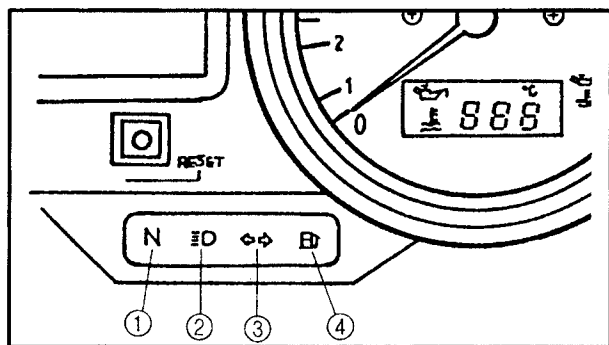
- |                                 |                           |                            |
|---------------------------------|---------------------------|----------------------------|
| ① Wire harness                  | ⑩ Starter relay           | ⑳ Oil level switch         |
| ② Main switch                   | ⑪ Main fuse               | ㉑ Pickup coil              |
| ③ Front brake light switch      | ⑫ Oil level relay         | ㉒ Radiator fan             |
| ④ Plug top ignition coils       | ⑬ Battery                 | ㉓ Horn                     |
| ⑤ Clutch switch                 | ⑭ Rectifier/regulator     | ㉔ Thermo unit              |
| ⑥ Starting circuit cutoff relay | ⑮ Rear brake light switch | ㉕ Thermo switch            |
| ⑦ Fuse box                      | ⑯ Neutral switch          | ㉖ Headlight relay (HI, LO) |
| ⑧ Flasher relay                 | ⑰ Speed sensor            |                            |
| ⑨ CDI unit                      | ⑱ Sidestand switch        |                            |
|                                 | ⑲ Stator coil assembly    |                            |





## INSTRUMENT FUNCTIONS

### INDICATOR LIGHTS



- ① Neutral indicator light "N"
- ② High beam indicator light "≡D"
- ③ Turn indicator light "◁ ▷"
- ④ Fuel indicator light "⛽"

#### Turn indicator light "◁ ▷"

This indicator flashes when the turn switch is moved to the left or right.

#### Neutral indicator light "N"

This indicator comes on when the transmission is in neutral.

#### High beam indicator light "≡D"

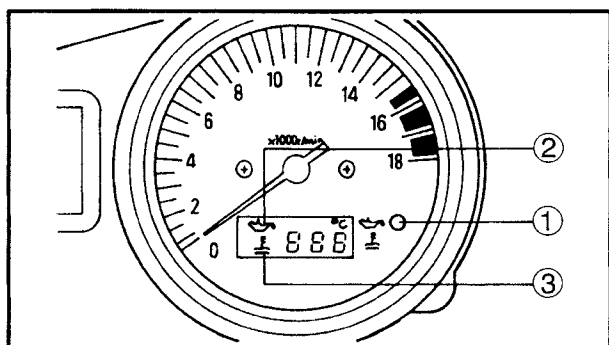
This indicator comes on when the headlight high beam is used.

#### Fuel indicator light "⛽"

When the fuel level drops below approximately 3.7 L, this light will come on.

When this light comes on, fill the fuel tank at the first opportunity.

### OIL LEVEL/COOLANT TEMPERATURE WARNING LIGHT



- ① Oil level/coolant temperature warning light "⚡"
- ② Oil level symbol "⛽"
- ③ Coolant temperature symbol "⌚"

This warning light has two functions.

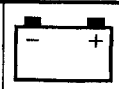
- The light will come on and symbol "⛽" will flash if the engine oil level is low. If this symbol flashes, stop the engine immediately and fill it with oil to the specified level.
- The light will come on and symbol "⌚" will flash if the coolant temperature is too high. The following chart shows the conditions of the indicator light, symbol and temperature display in accordance with the coolant temperature.

#### CAUTION:

- Do not run the motorcycle until you know it has sufficient engine oil.
- Do not run the motorcycle if the engine is overheated.

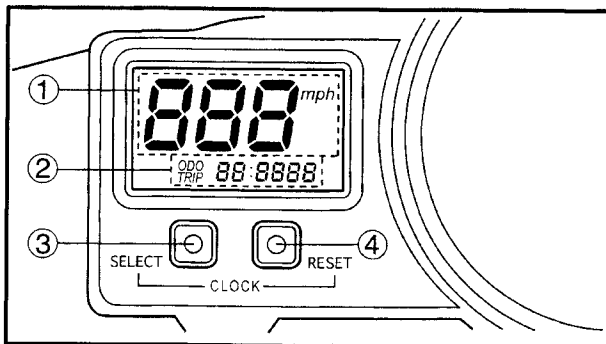
#### NOTE:

Even if the oil is filled to the specified level, the warning light may flicker when riding on a slope or during sudden acceleration or deceleration, but this is normal.



Coolant temperature	Display	Conditions	What to do
0°C ~ 40°C (0°F ~ 104°F)		Symbol is on and "LO" is displayed.	Go ahead with riding.
41°C ~ 117°C (106°F ~ 243°F)		Symbol is on and temperature is displayed.	Go ahead with riding.
118°C ~ 140°C (244°F ~ 284°F)		Symbol and temperature flashes and indicator light comes on.	Stop the motorcycle and allow it to idle until the coolant temperature goes down. If the temperature does not go down, stop the engine. Refer to "OVERHEATING" in chapter 9.
141°C ~ (286°F)		Symbol flashes, "HI" is displayed and flashes, and the indicator light comes on.	Stop the engine and allow it to cool. Refer to "OVERHEATING" in chapter 9.

## COMBINATION METER



- ① Speedometer
- ② Clock, odometer
- ③ "SELECT" button
- ④ "RESET" button

This combination meter is equipped with the following.

- A speedometer
- An odometer
- Two trip odometers
- A fuel reserve tripmeter
- A clock

To change the speedometer display from kilometers to miles, press the "SELECT" button for at least two seconds.

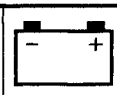
**Odometer and trip meters**

Use the trip meters to estimate how far you can ride on a tank of fuel.

Use the fuel reserve trip meter to see the distance traveled from when the fuel level dropped to the reserve level.

Push the "SELECT" button to change between the odometer mode "ODO" and the trip odometer modes "TRIP 1" and "TRIP 2" in the following order:

"ODO" → "TRIP 1" → "TRIP 2" → "ODO"



When the fuel level indicator light comes on the odometer display will automatically change to the fuel reserve trip meter mode "TRIP F" and start counting the distance traveled from that point. Push the "SELECT" button to change between the fuel odometer, trip odometer and odometer modes in the following order:

"TRIP F" → "TRIP 1" → "TRIP 2" → "ODO" → "TRIP F"

To reset a trip odometer to 0.0, select it by pushing the "SELECT" button and push the "RESET" button for at least one second. To reset the fuel reserve trip meter, select it by pushing the "SELECT" button and push the "RESET" button for at least one second.

The display will return to "TRIP 1". If you do not reset the fuel reserve trip meter manually, it will automatically reset and return to "TRIP 1" after refueling and the motorcycle has traveled both 5 km and for approximately 3 minutes.

#### **Clock**

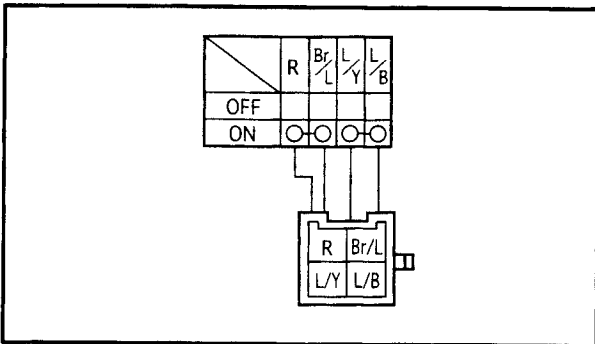
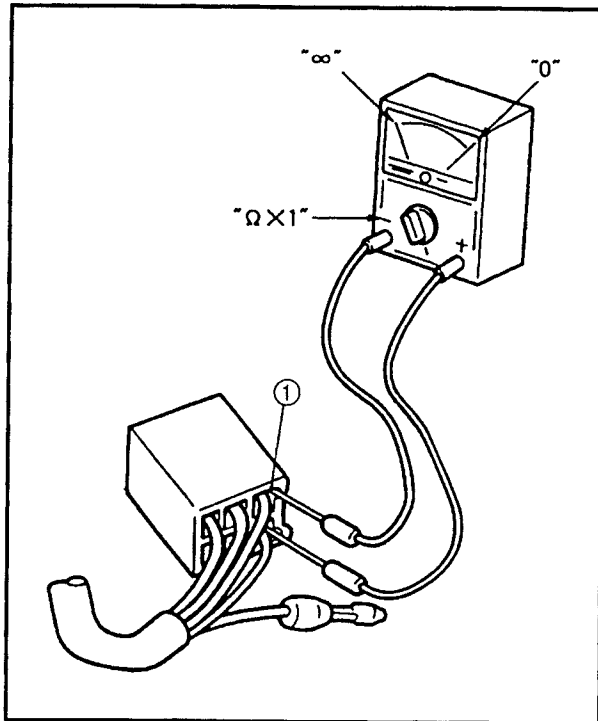
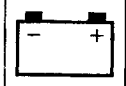
To change the display to the clock mode, push both the "SELECT" and "RESET" buttons.

To set the clock:

1. Push both the "SELECT" and "RESET" buttons for at least two seconds.
2. When the hour digits start flashing, push the "RESET" button to set the hours.
3. Push the "SELECT" button to change the minutes.
4. When the minute digits start flashing, push the "RESET" button to set the minutes.
5. Push the "SELECT" button to start the clock.

#### **NOTE:**

After setting the clock, be sure to push the "SELECT" button before turning the main switch to "OFF", otherwise the clock will not be set.



EB801000

**SWITCHES****CHECKING SWITCH CONTINUITY**

Check each switch for continuity with the pocket tester. If the continuity reading is incorrect, check the wiring connections and if necessary, replace the switch.

**CAUTION:**

Never insert the tester probes into the coupler terminal slots ①. Always insert the probes from the opposite end of the coupler, taking care not to loosen or damage the leads.



Pocket tester  
90890-03112

**NOTE:**

- Before checking for continuity, set the pocket tester to "0" and to the " $\Omega \times 1$ " range.
- When checking for continuity, switch back and forth between the switch positions a few times.

The terminal connections for switches (e.g., main switch, engine stop switch) are shown in an illustration similar to the one on the left.

The switch positions are shown in the far left column and the switch lead colors are shown in the top row in the switch illustration.

**NOTE:**

"○—○" indicates a continuity of electricity between switch terminals (i.e., a closed circuit at the respective switch position).

**The example illustration on the left shows that:**

There is continuity between blue/red and red when the switch is set to "P".

There is continuity between blue/red and blue, between brown/blue and red, and between blue/yellow and blue/black when the switch is set to "ON".



EB801010

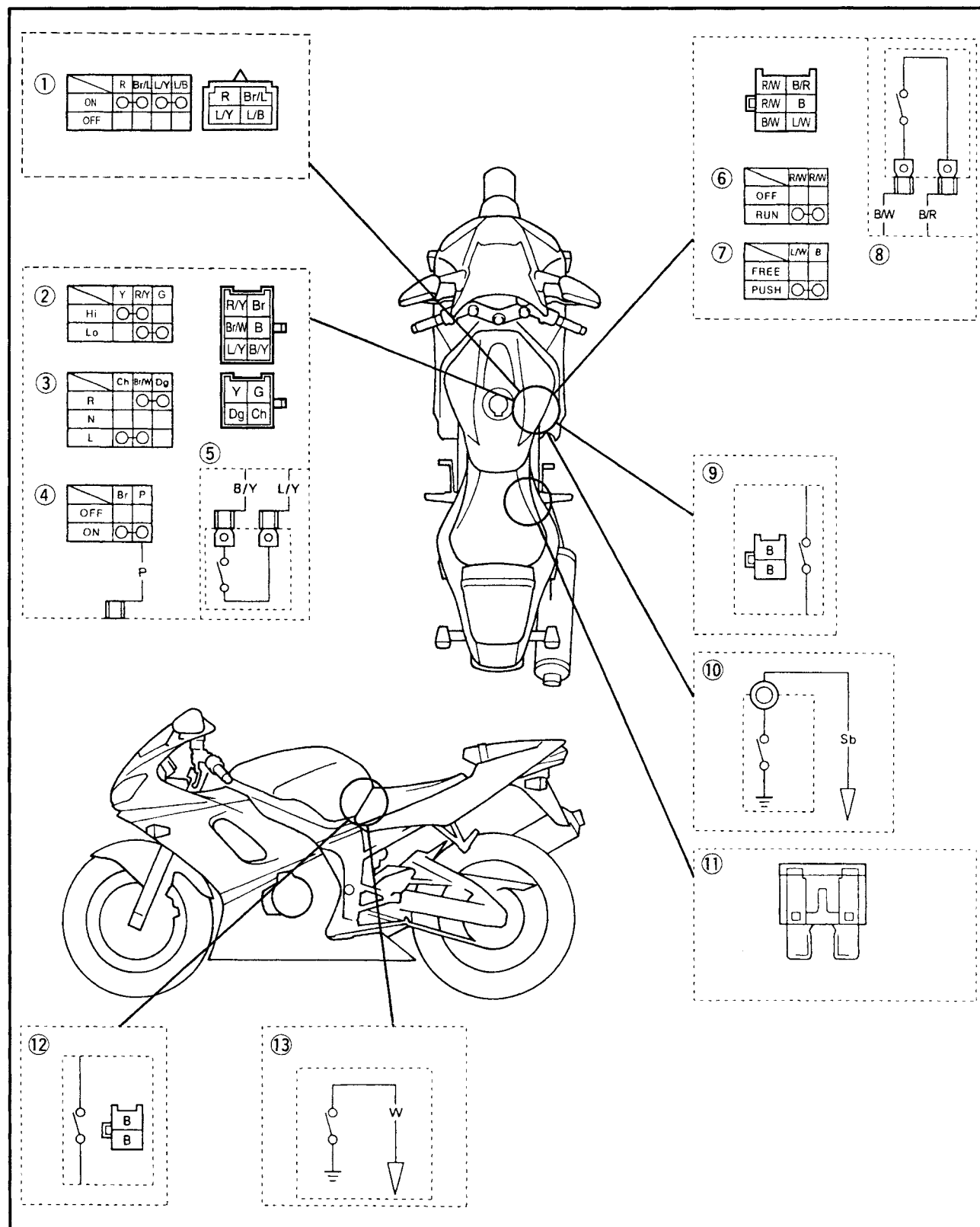
## CHECKING THE SWITCHES

Check each switch for damage or wear, proper connections, and also for continuity between the terminals. Refer to "CHECKING SWITCH CONTINUITY".

Damage/wear → Repair or replace the switch.

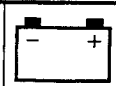
Improperly connected → Properly connect.

Incorrect continuity reading → Replace the switch.



## CHECKING THE SWITCHES

**ELEC**



- |                      |                            |
|----------------------|----------------------------|
| ① Main switch        | ⑦ Start switch             |
| ② Dimmer switch      | ⑧ Front brake light switch |
| ③ Turn signal switch | ⑨ Rear brake light switch  |
| ④ Horn switch        | ⑩ Neutral switch           |
| ⑤ Clutch switch      | ⑪ Fuse                     |
| ⑥ Engine stop switch | ⑫ Sidestand switch         |
|                      | ⑬ Oil level switch         |



EB801020

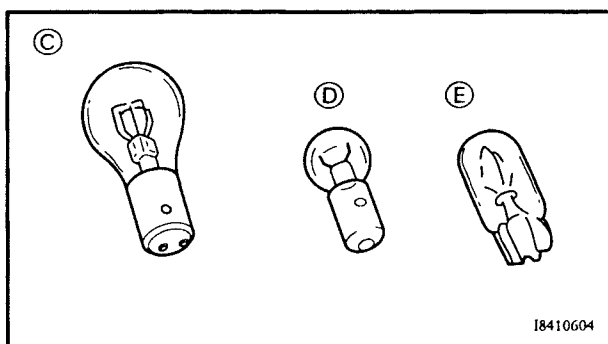
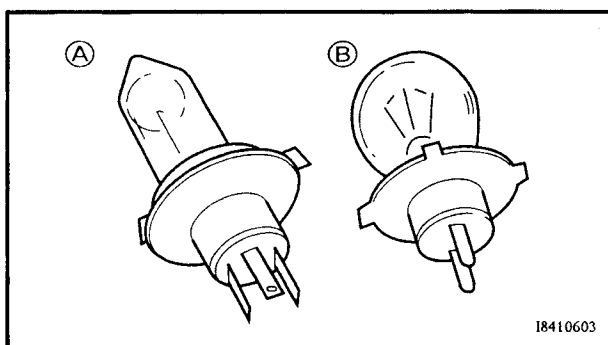
## CHECKING THE BULBS AND BULB SOCKETS

Check each bulb and bulb socket for damage or wear, proper connections, and also for continuity between the terminals.

Damage/wear → Repair or replace the bulb, bulb socket or both.

Improperly connected → Properly connect.

Incorrect continuity reading → Repair or replace the bulb, bulb socket or both.



### TYPES OF BULBS

The bulbs used on this motorcycle are shown in the illustration on the left.

- Bulbs (A) and (B) are used for headlights and usually use a bulb holder which must be detached before removing the bulb. The majority of these bulbs can be removed from their respective socket by turning them counterclockwise.
- Bulb (C) is used for turn signal and tail/brake lights and can be removed from the socket by pushing and turning the bulb counterclockwise.
- Bulbs (D) and (E) are used for meter and indicator lights and can be removed from their respective socket by carefully pulling them out.

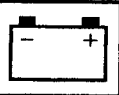
### CHECKING THE CONDITION OF THE BULBS

The following procedure applies to all of the bulbs.

1. Remove:
  - bulb

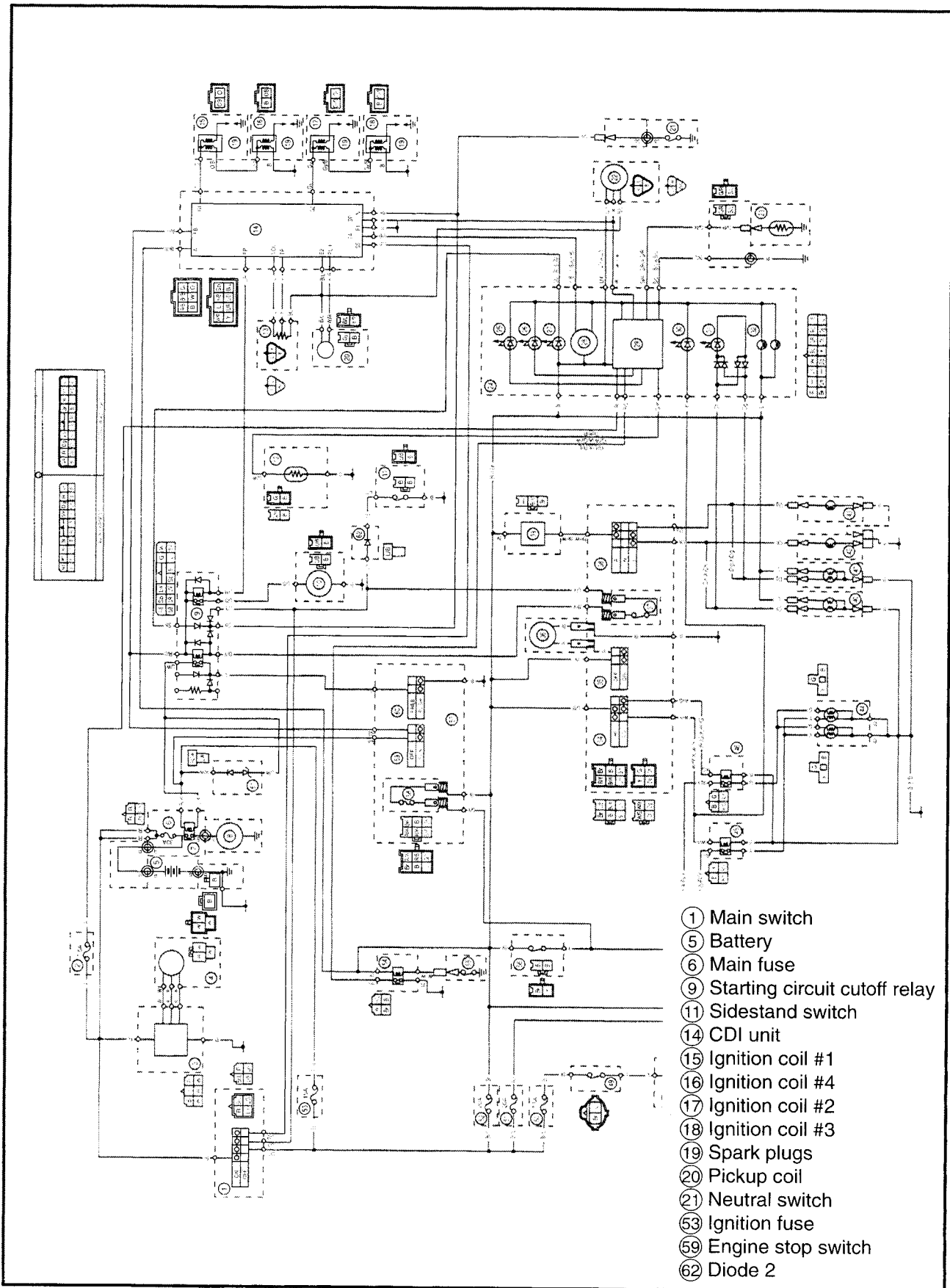






EB802001

### IGNITION SYSTEM CIRCUIT DIAGRAM





EB802011

### TROUBLESHOOTING

**The ignition system fails to operate (no spark or intermittent spark).**

Check:

1. main and ignition fuses
2. battery
3. spark plugs
4. ignition spark gap
5. spark plug cap resistance
6. ignition coil resistance
7. pickup coil resistance
8. main switch
9. engine stop switch
10. neutral switch
11. sidestand switch
12. starting circuit cutoff relay
13. wiring  
(of the entire ignition system)

#### NOTE:

- Before troubleshooting, remove the following part(-s):
  - 1) rider seat
  - 2) fuel tank
  - 3) air filter case
  - 4) heat protector plate
  - 5) front cowling inner panel (right)
  - 6) side cowling inner panel (right)
  - 7) side cowling (right)
- Troubleshoot with the following special tool (-s).



**Ignition checker**  
90890-06754  
**Pocket tester**  
90890-03112

EB802400

#### 1. Main and ignition fuses

- Check the main and ignition fuses for continuity.  
Refer to "CHECKING THE FUSES" in chapter 3.
- Are the main and ignition fuses OK?



YES



NO

Replace the fuse(-s).

EB802401

#### 2. Battery

- Check the condition of the battery.  
Refer to "CHECKING AND CHARGING THE BATTERY" in chapter 3.



**Min. open-circuit voltage**  
**12.8 V or more at 20°C (68°F)**

- Is the battery OK?



YES



NO

- Clean the battery terminals.
- Recharge or replace the battery.

EB802403

#### 3. Spark plugs

The following procedure applies to all of the spark plugs.

- Check the condition of the spark plug.
- Check the spark plug type.
- Measure the spark plug gap.  
Refer to "CHECKING THE SPARK PLUGS" in chapter 3.



**Standard spark plug**  
**CR10EK (NGK)**  
**CR9EK (NGK) (California)**  
**Spark plug gap**  
**0.6 ~ 0.7 mm (0.02 ~ 0.03 in)**

- Is the spark plug in good condition, is it of the correct type, and its gap within specification?

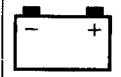


YES



NO

Re-gap or replace the spark plug.

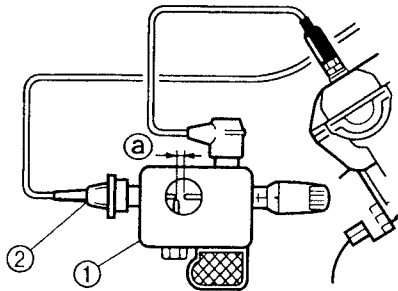


EB802405

### 4. Ignition spark gap

The following procedure applies to all of the spark plugs.

- Disconnect the spark plug cap from the spark plug.
- Connect the ignition checker ① as shown.
- ② Spark plug cap
- Set the main switch to "ON".
- Measure the ignition spark gap ③.
- Crank the engine by pushing the start switch and gradually increase the spark gap until a misfire occurs.



18110202



**Min. ignition spark gap**  
6 mm (0.24 in)

- Is there a spark and is the spark gap within specification?



NO



YES

The ignition system is OK.

EB802409

### 6. Ignition coil resistance

The following procedure applies to all of the ignition coils.

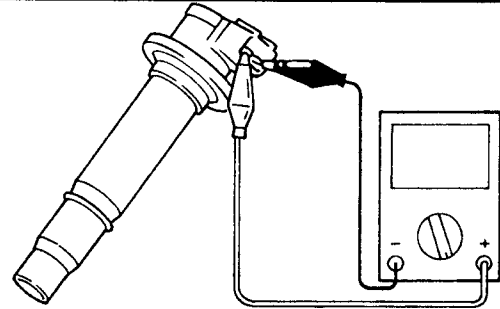
- Disconnect the ignition coil connectors from the ignition coil terminals.
- Connect the pocket tester ( $\Omega \times 1$ ) to the ignition coil as shown.

**Tester positive probe** →

**ignition coil terminal**

**Tester negative probe** →

**ignition coil terminal**



- Measure the primary coil resistance.



**Primary coil resistance**

0.238 ~ 0.322  $\Omega$  at 20°C (68°F)

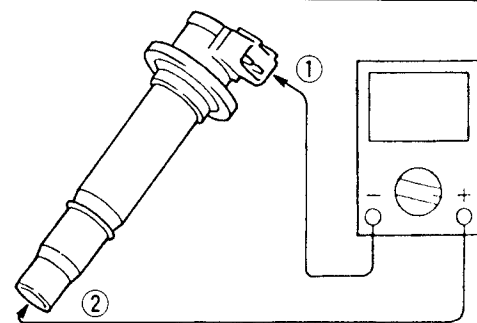
- Connect the pocket tester ( $\Omega \times 1k$ ) to the ignition coil as shown.
- Measure the secondary coil resistance.

**Tester positive probe** →

**ignition coil terminal ①**

**Tester positive probe** →

**spark plug terminal ②**



**Secondary coil resistance**

8.16 ~ 11.04 k $\Omega$  at 20°C (68°F)

- Is the ignition coil OK?

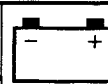


YES



NO

Replace the ignition coil.



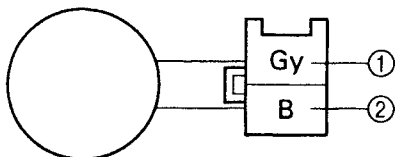
EB802410

### 7. Pickup coil resistance

- Disconnect the pickup coil coupler from the wire harness.
- Connect the pocket tester ( $\Omega \times 100$ ) to the pickup coil terminal.

Tester positive probe → gray ①

Tester negative probe → black ②



- Measure the pickup coil resistance.



**Pickup coil resistance**

248 ~ 372  $\Omega$  at 20°C (68°F)  
(between gray and black)

- Is the pickup coil OK?

↓ YES

↓ NO

Replace the pickup coil.

### 8. Main switch

- Check the main switch for continuity. Refer to "CHECKING THE SWITCHES".
- Is the main switch OK?

↓ YES

↓ NO

Replace the main switch.

EB802412

### 9. Engine stop switch

- Check the engine stop switch for continuity. Refer to "CHECKING THE SWITCHES".
- Is the engine stop switch OK?

↓ YES

↓ NO

Replace the right handlebar switch.

EB802413

### 10. Neutral switch

- Check the neutral switch for continuity. Refer to "CHECKING THE SWITCHES".
- Is the neutral switch OK?

↓ YES

↓ NO

Replace the neutral switch.

EB802414

### 11. Sidestand switch

- Check the sidestand switch for continuity. Refer to "CHECKING THE SWITCHES".
- Is the sidestand switch OK?

↓ YES

↓ NO

Replace the side-stand switch.



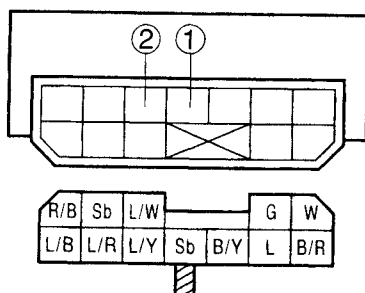
EB802415

### 12. Starting circuit cutoff relay

- Remove the relay unit from the wire harness.
- Connect the pocket tester ( $\Omega \times 1$ ) to the relay terminals as shown.
- Check the starting circuit cutoff relay for continuity.

Tester positive probe → sky blue ①	No continuity
Tester negative probe → blue/yellow ②	

Tester positive probe → blue/yellow ②	Continuity
Tester negative probe → sky blue ①	



#### NOTE:

When you switch the “-” and “+” leads of the digital pocket tester, the readings in the above chart will be reversed.

- Are the tester readings correct?

↓ YES

↓ NO

Replace the starting circuit cutoff relay.

EB802416

### 13. Wiring

- Check the entire ignition system's wiring. Refer to “CIRCUIT DIAGRAM”.
- Is the ignition system's wiring properly connected and without defects?



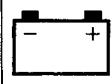
NO



YES

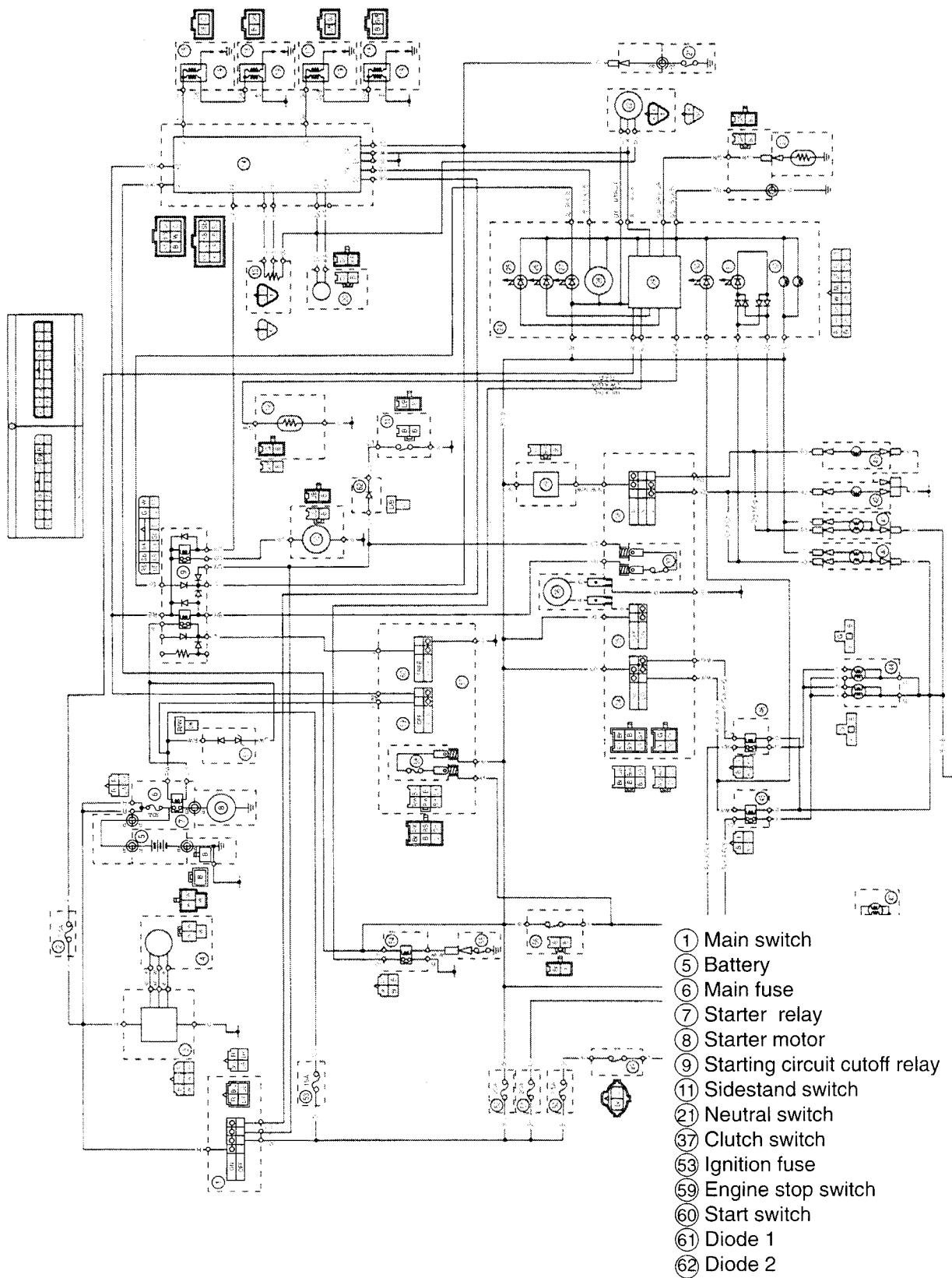
Properly connect or repair the ignition system's wiring.

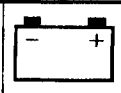
Replace the ignitor unit.



EB803000

# ELECTRIC STARTING SYSTEM CIRCUIT DIAGRAM





EB803010

### STARTING CIRCUIT CUTOFF SYSTEM OPERATION

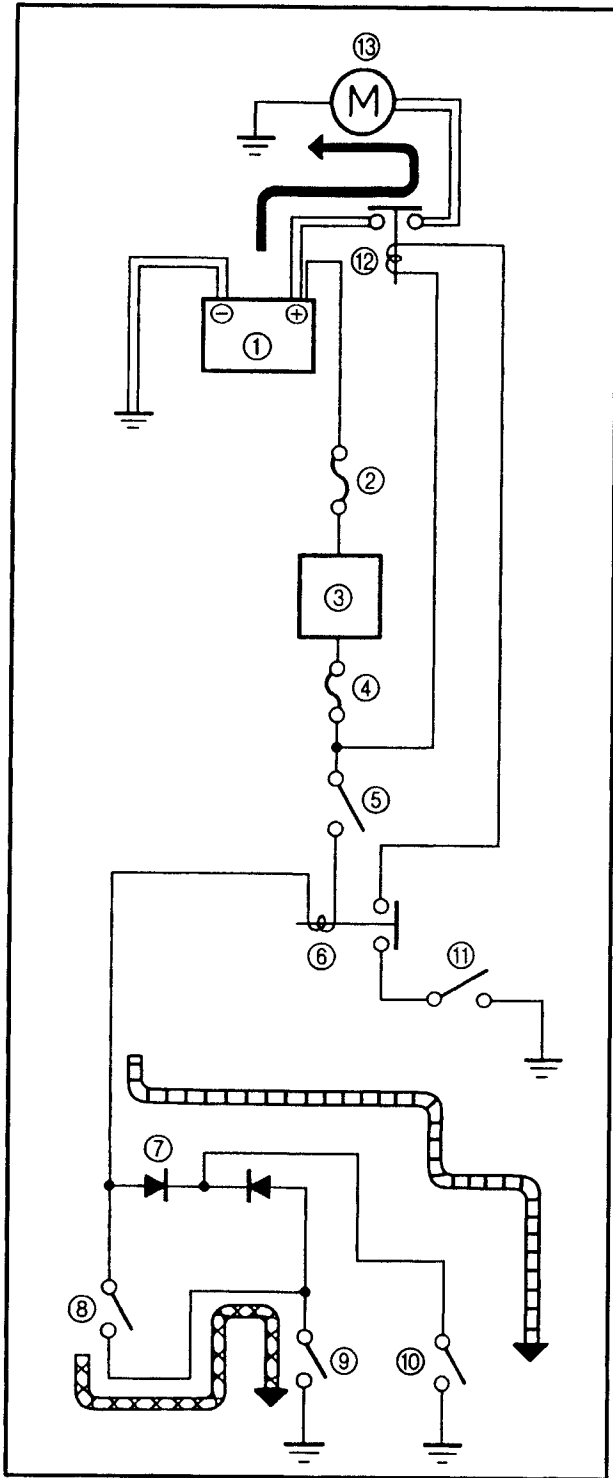
If the engine stop switch is set to "O" and the main switch is set to "ON" (both switches are closed), the starter motor can only operate if at least one of the following conditions is met:

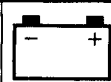
- The transmission is in neutral (the neutral switch is closed).
- The clutch lever is pulled to the handlebar (the clutch switch is closed) and the sidestand is up (the sidestand switch is closed).

The starting circuit cutoff relay prevents the starter motor from operating when neither of these conditions has been met. In this instance, the starting circuit cutoff relay is open so current cannot reach the starter motor. When at least one of the above conditions has been met the starting circuit cutoff relay is closed and the engine can be started by pressing the start switch.

- WHEN THE TRANSMISSION IS IN NEUTRAL  
 WHEN THE CLUTCH LEVER IS PULLED TO THE HANDLEBAR

- ① Battery
- ② Main fuse
- ③ Main switch
- ④ Ignition fuse
- ⑤ Engine stop switch
- ⑥ Starting circuit cutoff relay
- ⑦ Diode
- ⑧ Clutch switch
- ⑨ Sidestand switch
- ⑩ Neutral switch
- ⑪ Start switch
- ⑫ Starter relay
- ⑬ Starter motor





EB803020

## TROUBLESHOOTING

**The starter motor fails to turn.**

Check:

1. main and ignition fuses
2. battery
3. starter motor
4. starting circuit cutoff relay
5. Diode
6. starter relay
7. main switch
8. engine stop switch
9. neutral switch
10. sidestand switch
11. clutch switch
12. start switch
13. wiring  
(of the entire starting system)

**NOTE:**

- Before, troubleshooting, remove the following part(-s):
  - 1) rider seat
  - 2) fuel tank
  - 3) air filter case
  - 4) front cowling inner panels
  - 5) Side cowling inner panels
  - 6) Side cowlings
- Troubleshoot with the following special tool (-s).


**Pocket tester**  
**90890-03112**

EB802400

## 1. Main and ignition fuses

- Check the main and ignition fuses for continuity.  
Refer to "CHECKING THE FUSES" in chapter 3.
- Are the main and ignition fuses OK?

YES

NO

**Replace the fuse(-s).**

EB802401

## 2. Battery

- Check the condition of the battery.  
Refer to "CHECKING AND CHARGING THE BATTERY" in chapter 3.


**Open-circuit voltage**  
**12.8 V or more at 20°C (68°F)**

- Is the battery OK?

YES

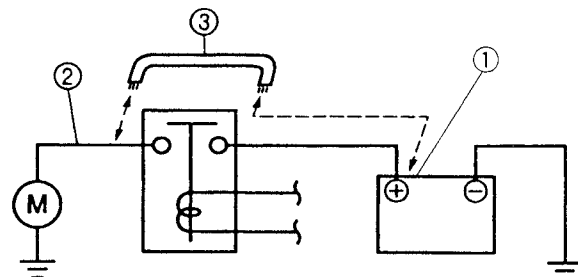
NO

- Clean the battery terminals.
- Recharge or replace the battery.

EB803400

## 3. Starter motor

- Connect the battery positive terminal ① and starter motor lead ② with a jumper lead ③.



18210801

**⚠ WARNING**

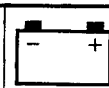
- A wire that is used as a jumper lead must have at least the same capacity of the battery lead, otherwise the jumper lead may burn.
- This check is likely to produce sparks, therefore make sure that no flammable gas or fluid is in the vicinity.

- Does the starter motor turn?

YES

NO

**Repair or replace the starter motor.**



EB803402

## 4. Starting circuit cutoff relay

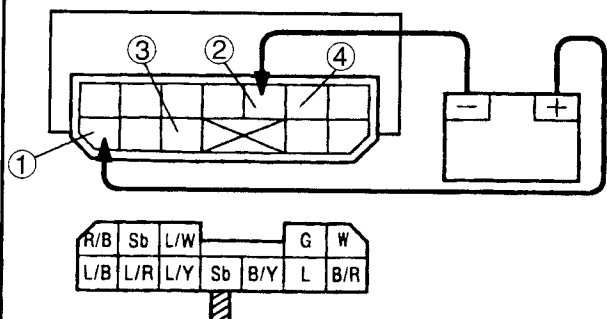
- Disconnect the relay from the coupler.
- Connect the pocket tester ( $\Omega \times 1$ ) and battery (12 V) to the relay terminals as shown.

**Battery positive terminal** → red/black ①

**Battery negative terminal** → black/yellow ②

**Tester positive probe** → blue/white ③

**Tester negative probe** → blue ④



- Does the starting circuit cutoff relay have continuity between black and blue/white?

↓ YES

↓ NO

Replace the starting circuit cutoff relay

EB803403

## 5. DIODE

- Disconnect the relay from the coupler.
- Connect the pocket tester ( $\Omega \times 1$ ) to the relay terminals as shown.
- Measure the starting circuit cutoff relay for continuity as follows.

**Tester positive probe** → sky blue ①

**Tester negative probe** → black/yellow ②

**Tester positive probe** → sky blue ①

**Tester negative probe** → blue/yellow ③

No continuity

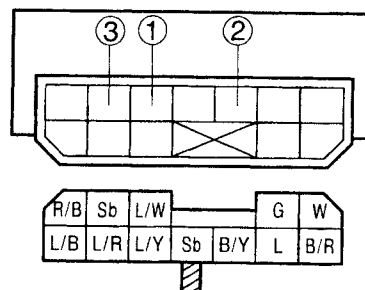
**Tester positive probe** → black/yellow ②

**Tester negative probe** → sky blue ①

**Tester positive probe** → blue/yellow ③

**Tester negative probe** → sky blue ①

Continuity



## NOTE:

When you switch the “-” and “+” leads of the digital pocket tester, the readings in the above chart will be reversed.

- Are the tester readings correct?

↓ YES

↓ NO

Replace the starting circuit cutoff relay



EB803404

## 6. Starter relay

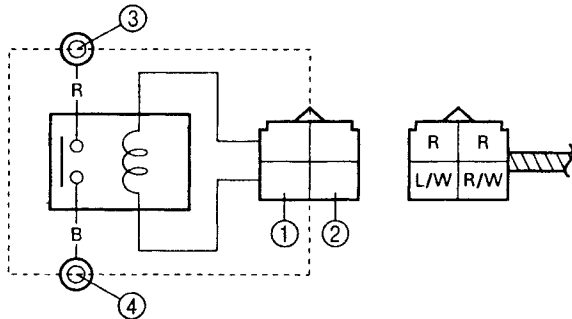
- Disconnect the starter relay from the coupler.
- Connect the pocket tester ( $\Omega \times 1$ ) and battery (12 V) to the starter relay coupler as shown.

**Battery positive terminal** → red/white ①

**Battery negative terminal** → blue/white ②

**Tester positive probe** → red ③

**Tester negative probe** → black ④



- Does the starter relay have continuity between red and black?

↓ YES

↓ NO

Replace the starter relay.

EB802411

## 7. Main switch

- Check the main switch for continuity. Refer to "CHECKING THE SWITCHES".
- Is the main switch OK?

↓ YES

↓ NO

Replace the main switch.

EB802412

## 8. Engine stop switch

- Check the engine stop switch for continuity. Refer to "CHECKING THE SWITCHES".
- Is the engine stop switch OK?

↓ YES

↓ NO

Replace the right handlebar switch.

EB802413

## 9. Neutral switch

- Check the neutral switch for continuity. Refer to "CHECKING THE SWITCHES".
- Is the neutral switch OK?

↓ YES

↓ NO

Replace the neutral switch.

## 10. Diode

- Check the diode for continuity.
- Disconnect the diode from the coupler.
- Connect the pocket tester ( $\Omega \times 1$ ) to the diode terminals as shown.
- Measure the diode for continuity as follows.

**Tester positive probe** → blue/yellow ①

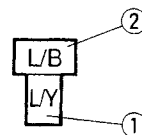
**Tester negative probe** → blue/black ②

No continuity

**Tester positive probe** → blue/black ②

**Tester negative probe** → blue/yellow ①

Continuity

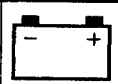


- Is the diode ok?

↓ YES

↓ NO

Replace the diode.



EB8022414

## 11. Sidestand switch

- Check the sidestand switch for continuity. Refer to "CHECKING THE SWITCHES".
- Is the sidestand switch OK?



YES



NO

Replace the  
sidestand switch.

EB803405

## 12. Clutch switch

- Check the clutch switch for continuity. Refer to "CHECKING THE SWITCHES".
- Is the clutch switch OK?



YES



NO

Replace the clutch  
switch.

EB803406

## 13. Start switch

- Check the start switch for continuity. Refer to "CHECKING THE SWITCHES".
- Is the start switch OK?



YES



NO

Replace the right  
handlebar switch.

EB803408

## 14. Wiring

- Check the entire starting system's wiring. Refer to "CIRCUIT DIAGRAM".
- Is the starting system's wiring properly connected and without defects?



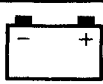
NO



YES

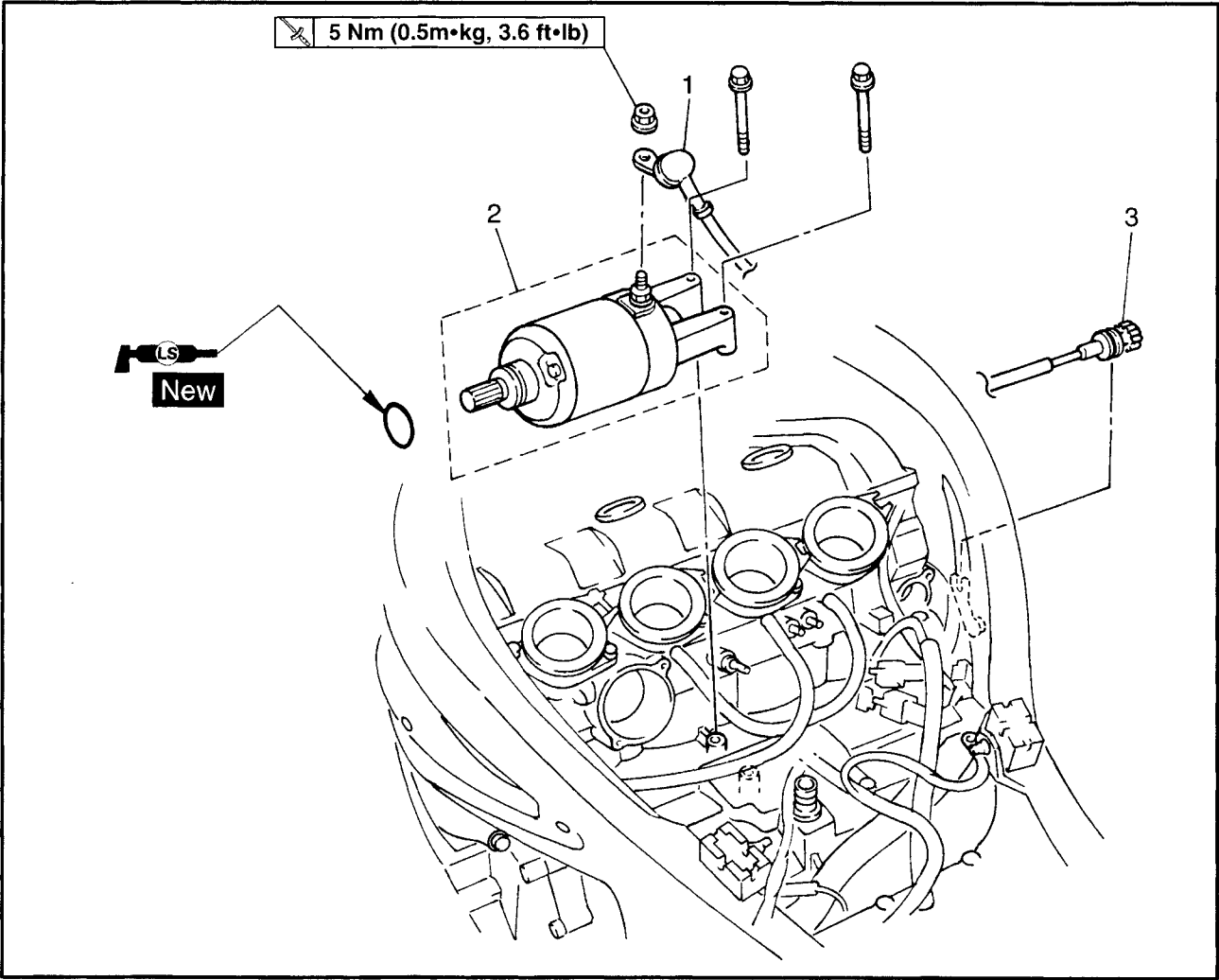
Properly connect or  
repair the starting  
system's wiring.

The starting system  
circuit is OK.

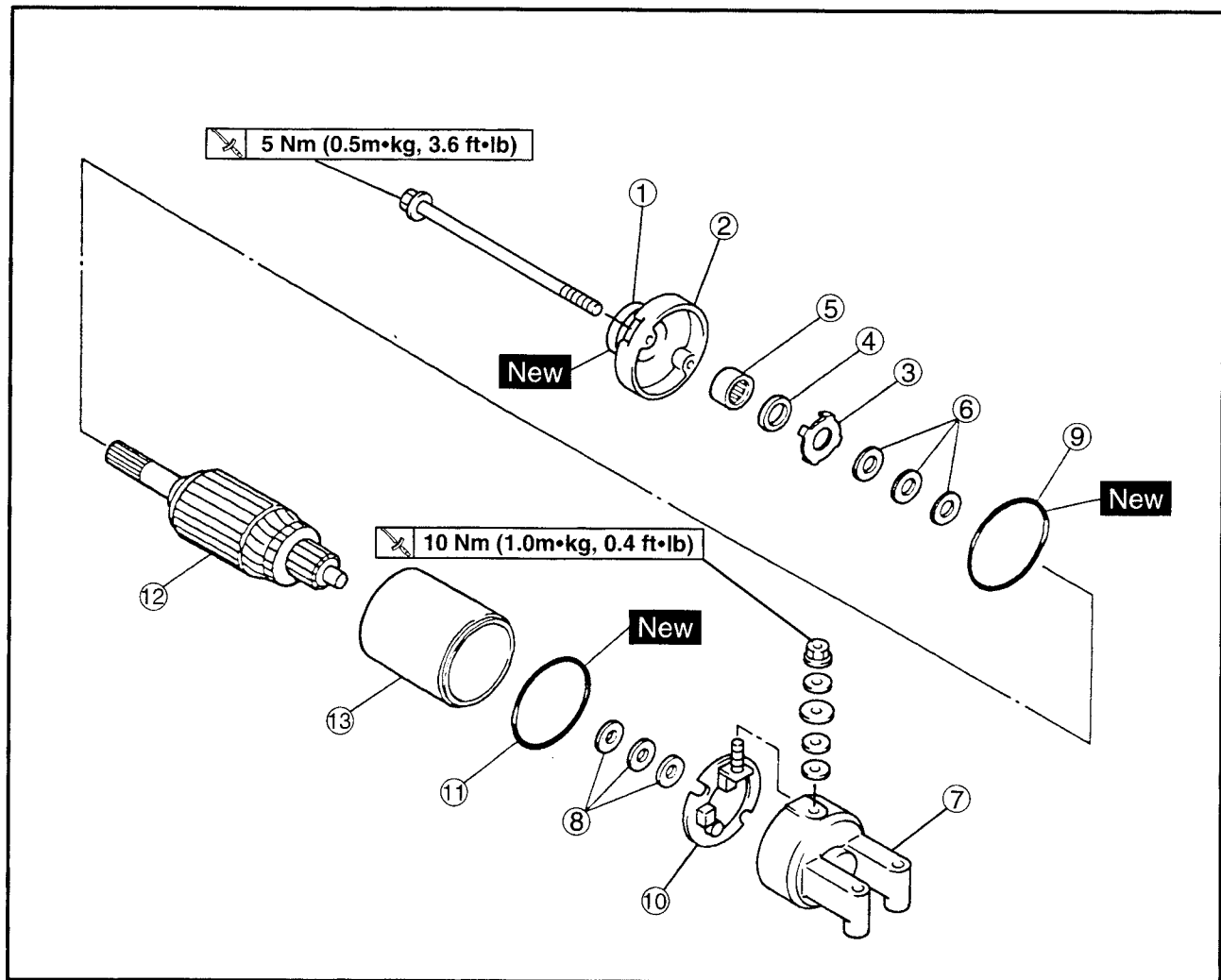
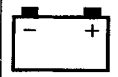


EAS00767

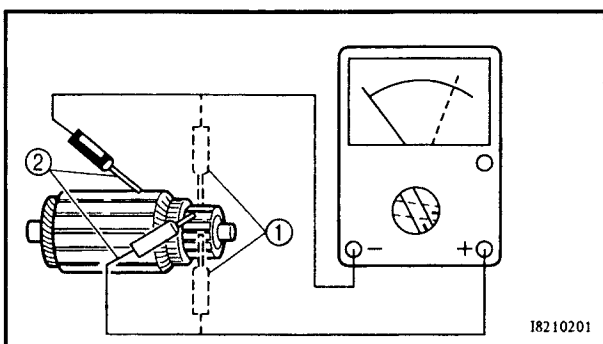
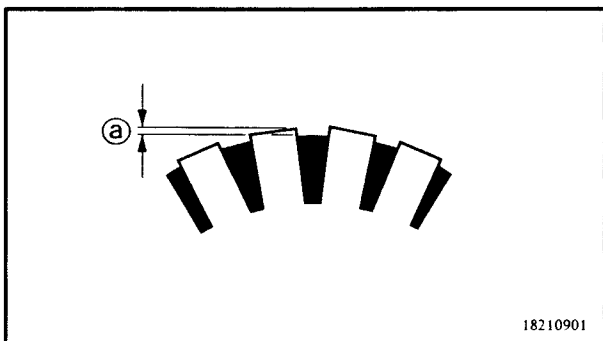
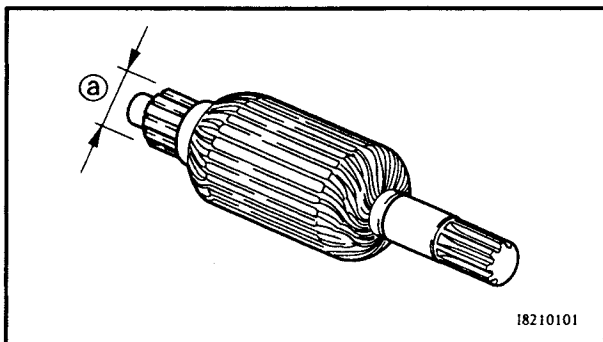
STARTER MOTOR



Order	Job/Part	Q'ty	Remarks
	<b>Removing the starter motor</b>		
	Rider seat		Remove the parts in the order listed.
	Fuel tank		Refer to "SEATS" in chapter 3.
	Carburetors		Refer to "FUEL TANK" in chapter 3.
	Coolant		Refer to "CARBURETORS" in chapter 6.
			Drain
			Refer to "CHANGING THE COOLANT" in chapter 3.
			Refer to "THERMOSTAT" in chapter 5.
1	Thermostat	1	
	Starter motor lead	1	
2	Starter motor assembly	1	
3	Throttle stop screw	1	
			For installation, reverse the removal procedure.



Order	Job/Part	Q'ty	Remarks
	<b>Disassembling the starter motor</b>		Remove the parts in the order listed.
①	O-ring	1	
②	Starter motor front cover	1	
③	Lock washer	1	
④	Oil seal	1	
⑤	Bearing	1	
⑥	Washer set	1	
⑦	Starter motor rear cover	1	
⑧	Washer set	1	
⑨	O-ring	2	
⑩	Brush holder set	1	
⑪	O-ring	1	
⑫	Armature assembly	1	
⑬	Starter motor yoke	1	
			For assembly, reverse the disassembly procedure.



EB803511

## CHECKING THE STARTER MOTOR

1. Check:
  - commutator  
Dirt → Clean with 600 grit sandpaper.
2. Measure:
  - commutator diameter (a)  
Out of specification → Replace the starter motor.



**Min. commutator diameter**  
**27 mm (1.06 in)**

3. Measure:
- mica undercut (a)  
Out of specification → Scrape the mica to the proper measurement with a hacksaw blade which has been grounded to fit the commutator.



**Mica undercut**  
**0.7 mm (0.03 in)**

**NOTE:**

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

4. Measure:
- armature assembly resistances (commutator and insulation)
- Out of specification → Replace the starter motor.

- a. Measure the armature assembly resistances with the pocket tester.

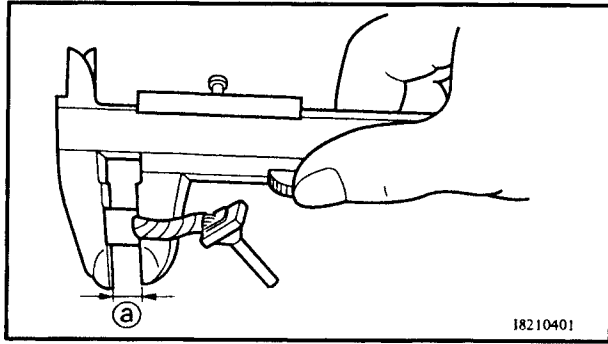
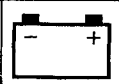


**Pocket tester**  
**90890-03112**



**Armature assembly**  
Commutator resistance ①  
0.012 ~ 0.022  $\Omega$  at 20°C (68°F)  
Insulation resistance ②  
Above 1 M $\Omega$  at 20°C (68°F)

- b. If any resistance is out of specification, replace the starter motor.



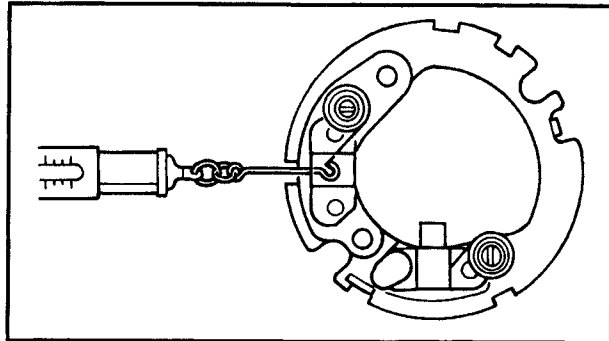
### 5. Measure:

- brush length (a)

Out of specification → Replace the brushes as a set.



**Min. brush length**  
3.5 mm (0.14 in)



### 6. Measure:

- brush spring force

Out of specification → Replace the brush springs as a set.



**Brush spring force**  
7.16 ~ 9.52 N (7.16 ~ 9.52 g,  
25.77 ~ 34.27 oz)

### 7. Check:

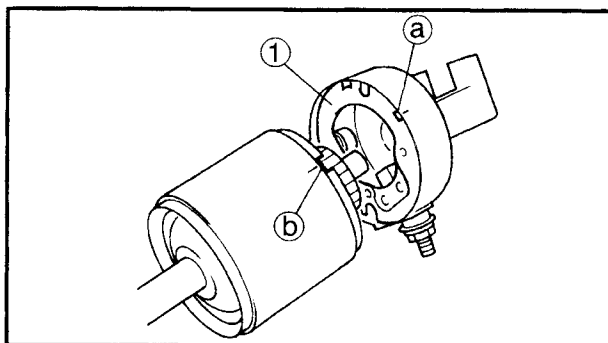
- gear teeth

Damage/wear → Replace the gear.

### 8. Check:

- bearing
- oil seal

Damage/wear → Replace the defective part(-s).



EB803701

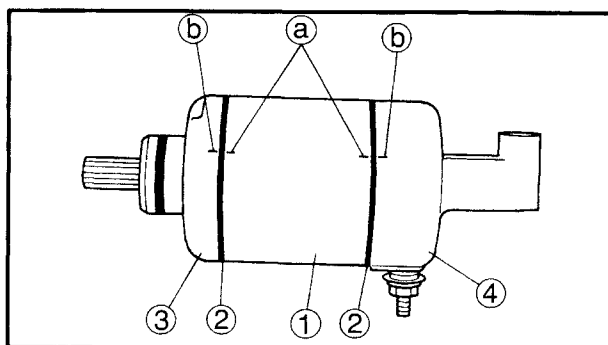
## ASSEMBLING THE STARTER MOTOR

### 1. Install:

- brush seat (1)

### NOTE:

Align the tab (a) on the starter motor rear cover with the slot (b) in the yoke.



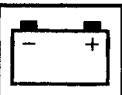
### 2. Install:

- starter motor yoke (1)
- O-rings (2) **New**
- starter motor front cover (3)
- starter motor rear cover (4)
- bolts

**5 Nm (0.5 m•kg, 3.6 ft•lb)**

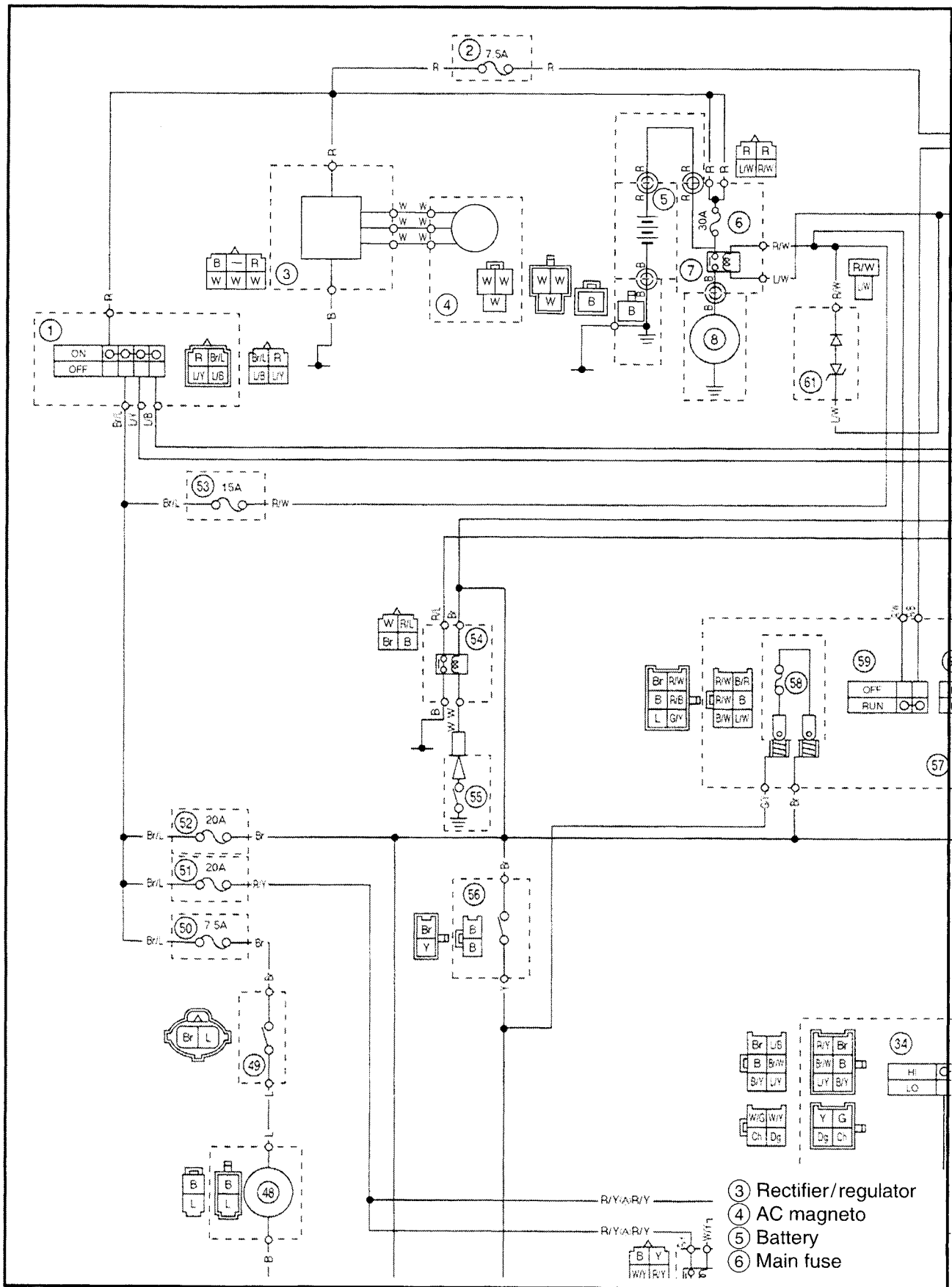
### NOTE:

Align the match marks (a) on the starter motor yoke with the match marks (b) on the front and rear covers.



EB804000

# CHARGING SYSTEM CIRCUIT DIAGRAM





EB804010

## TROUBLESHOOTING

**The battery is not being charged.**

Check:

1. main fuse
2. battery
3. charging voltage
4. stator coil assembly resistance
5. wiring  
(of the entire charging system)

**NOTE:**

- Before troubleshooting, remove the following part(-s):
  - 1) rider seat
  - 2) fuel tank
- Troubleshoot with the following special tool(-s).



**Engine tachometer**  
90793-80009  
**Pocket tester**  
90890-03112

EB802400

## 1. Main fuse

- Check the main fuse for continuity.  
Refer to "CHECKING THE FUSES" in chapter 3.
- Is the main fuse OK?



YES



NO

Replace the fuse.

EB802401

## 2. Battery

- Check the condition of the battery.  
Refer to "CHECKING AND CHARGING THE BATTERY" in chapter 3.



**Open-circuit voltage**  
12.8 V or more at 20°C (68°F)

- Is the battery OK?



YES



NO

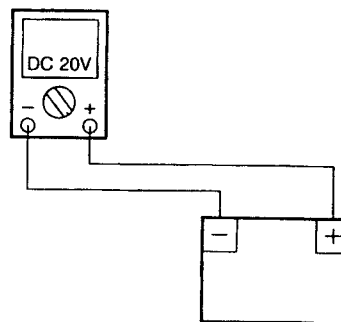
- Clean the battery terminals.
- Recharge or replace the battery.

EB804400

## 3. Charging voltage

- Connect the engine tachometer to the spark plug lead of cylinder #1.
- Connect the pocket tester (DC 20 V) to the battery as shown.

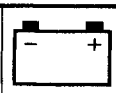
**Tester positive probe →**  
**battery positive terminal**  
**Tester negative probe →**  
**battery negative terminal**



- Start the engine and let it run at approximately 5,000 r/min.
- Measure the charging voltage.



**Charging voltage**  
14 V at 5,000 r/min

**NOTE:**

Make sure that the battery is fully charged.

- Is the charging voltage within specification?



NO



YES

The charging circuit is OK.

EB804401

**4. Stator coil assembly resistances**

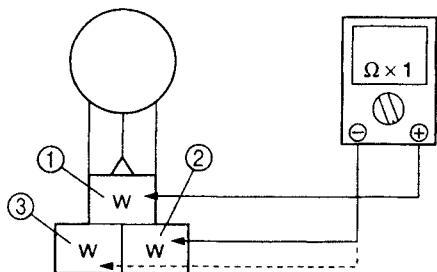
- Remove the generator cover.
- Connect the pocket tester ( $\Omega \times 1$ ) to the stator coil assembly coupler as shown.

Tester positive probe → white ①

Tester negative probe → white ②

Tester positive probe → white ①

Tester negative probe → white ③



- Measure the stator coil assembly resistances.

**Stator coil resistance**

0.27 ~ 0.33  $\Omega$  at 20°C (68°F)

- Is the stator coil assembly OK?



YES



NO

Replace the stator coil assembly.

EB804404

**5. Wiring**

- Check the wiring connections of the entire charging system. Refer to "CIRCUIT DIAGRAM".
- Is the charging system's wiring properly connected and without defects?



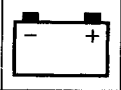
NO



YES

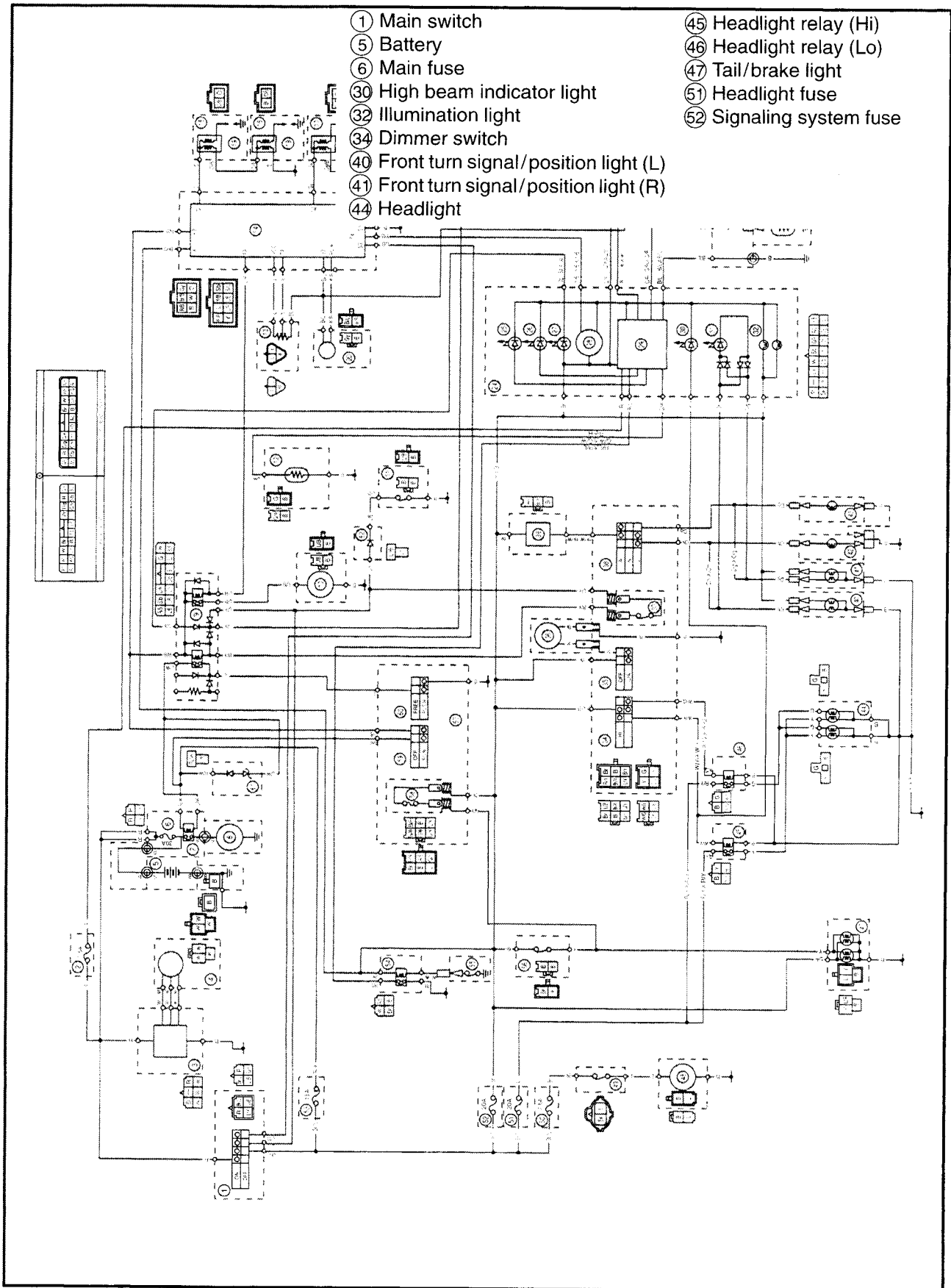
Properly connect or repair the charging system's wiring.

Replace the rectifier/regulator.



EB805000

### LIGHTING SYSTEM CIRCUIT DIAGRAM





EB805010

### TROUBLESHOOTING

**Any of the following fail to light: headlight, high beam indicator light, taillight, auxiliary light or meter light.**

Check:

1. main, signaling system, and headlight fuses
2. battery
3. main switch
4. dimmer switch
5. wiring  
(of the entire charging system)

#### NOTE:

- Before troubleshooting, remove the following part(-s):
  - 1) seats
  - 2) fuel tank
  - 3) air filter case
  - 4) front cowling inner panels
  - 5) front cowling
  - 6) rear cowling
- Troubleshoot with the following special tool(-s).



**Pocket tester**  
**90890-03112**

EB802400

**1. Main, signaling system, and headlight fuses**

- Check the main, signaling system, and headlight fuses for continuity. Refer to "CHECKING THE FUSES" in chapter 3.
- Are the main, signaling system, and headlight fuses OK?

↓ YES

↓ NO

Replace the fuse(-s).

EB802401

**2. Battery**

- Check the condition of the battery. Refer to "CHECKING AND CHARGING THE BATTERY" in chapter 3.



**Open-circuit voltage**  
**12.8 V or more at 20°C (68°F)**

- Is the battery OK?

↓ YES

↓ NO

- Clean the battery terminals.
- Recharge or replace the battery.

EB802411

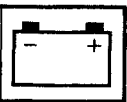
**3. Main switch**

- Check the main switch for continuity. Refer to "CHECKING THE SWITCHES".
- Is the main switch OK?

↓ YES

↓ NO

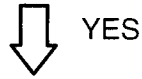
Replace the main switch.



EB805401

### 4. Dimmer switch

- Check the dimmer switch for continuity. Refer to "CHECKING THE SWITCHES".
- Is the dimmer switch OK?



YES



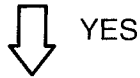
NO

The dimmer switch is faulty. Replace the left handlebar switch.

EB805404

### 5. Wiring

- Check the entire lighting system's wiring. Refer to "CIRCUIT DIAGRAM".
- Is the lighting system's wiring properly connected and without defects?



YES



NO

Check the condition of each of the lighting system's circuits. Refer to "CHECKING THE LIGHTING SYSTEM".

Properly connect or repair the lighting system's wiring.

## CHECKING THE LIGHTING SYSTEM

1. The headlight and the high beam indicator light fail to come on.

### 1. Headlight bulb and socket

- Check the headlight bulb and socket for continuity. Refer to "CHECKING THE BULBS AND BULB SOCKETS".
- Are the headlight bulb and socket OK?



YES



NO

Replace the headlight bulb, socket or both.

### 2. High beam indicator light LED

- Check the LED of the high beam indicator light. Refer to "CHECKING THE LEDs".
- Is the high beam indicator light LED OK?



YES



NO

Replace the meter assembly.

### 3. Voltage

- Connect the pocket tester (DC 20 V) to the headlight and high beam indicator light couplers as shown.

**A** When the dimmer switch is set to "☹️" (Low beam)

**B** When the dimmer switch is set to "☹️" (High beam)

#### Headlight

Tester positive probe →

yellow ① or green ②

Tester negative probe → black ③

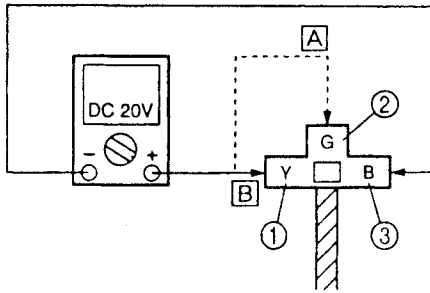
#### High beam indicator light

Tester positive probe → yellow ④

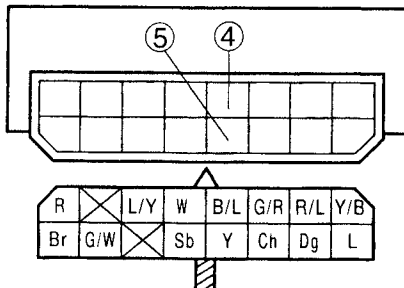
Tester negative probe → black/blue ⑤



### Headlight coupler (wire harness side)



### Meter assembly coupler (wire harness side)



- Set the main switch to "ON".
- Set the dimmer switch to "☹" or "☹".
- Measure the voltage (12 V) of yellow (green) ② on the headlight coupler (headlight side).
- Is the voltage within specification?

↓ YES

↓ NO

The wiring circuit from the main switch to the headlight coupler is faulty and must be repaired.

### 4. Headlight relay (Hi or Lo)

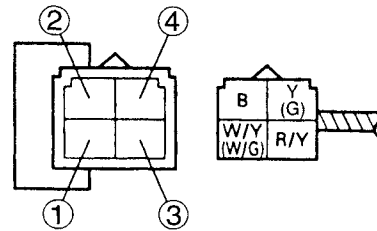
- Disconnect the headlight relay from the coupler.
- Connect the pocket tester ( $\Omega \times 1$ ) and battery (12 V) to the headlight relay terminals as shown.

Battery positive terminal → white/yellow (white/green) ①

Battery negative terminal → black ②

Tester positive probe → yellow (green) ④

Tester negative probe → red/yellow ③



- Does the headlight relay have continuity between yellow (green) and red/yellow?

↓ YES

↓ NO

This circuit is OK.

Replace the headlight relay.

EB805411

### 2. Illumination fails to come on.

#### 1. Meter light bulb and socket.

- Check the meter light bulb and socket for continuity. Refer to "CHECKING THE BULBS AND BULB SOCKETS".
- Are the meter light bulb and socket OK?

↓ YES

↓ NO

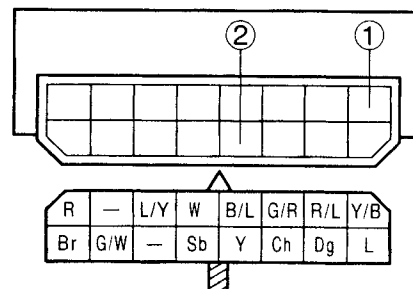
Replace the meter light bulb, socket or both.

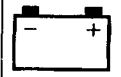
#### 2. Voltage

- Connect the pocket tester (20 V) to the meter assembly coupler (wire harness side) as shown.

Tester positive probe → blue ①

Tester negative probe → black/blue ②





- Set the main switch to "ON".
- Measure the voltage (12 V) of blue ① on the meter assembly coupler (wire harness side).
- Is the voltage within specification?

YES

This circuit is OK.

NO

The wiring circuit from the main switch to the meter assembly coupler is faulty and must be repaired.

- Set the main switch to "ON".
- Measure the voltage (12 V) of blue/red ① on the tail/brake light coupler (wire harness side).
- Is the voltage within specification?

YES

This circuit is OK.

NO

The wiring circuit from the main switch to the tail/brake light coupler is faulty and must be repaired.

EB805412

### 3. A tail/brake light fails to come on.

#### 1. Tail/brake light bulb and socket

- Check the tail/brake light bulb and socket for continuity. Refer to "CHECKING THE BULBS AND BULB SOCKETS".
- Are the tail/brake light bulb and socket OK?

YES

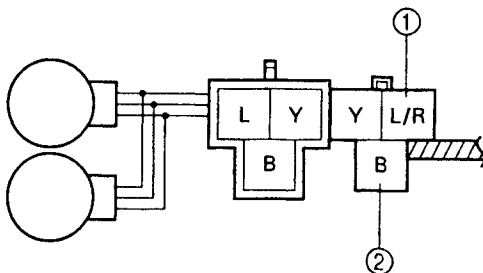
NO

Replace the tail/brake light bulb, socket or both.

#### 2. Voltage

- Connect the pocket tester (DC 20 V) to the tail/brake light coupler (wire harness side) as shown.

Tester positive probe → blue/red ①  
Tester negative probe → black ②



EB805413

### 4. The turn signal/position light fails to come on.

#### 1. Turn signal/position light bulb and socket

- Check the turn signal/position light bulb and socket for continuity. Refer to "CHECKING THE BULBS AND BULB SOCKETS".
- Are the turn signal/position light bulb and socket OK?

YES

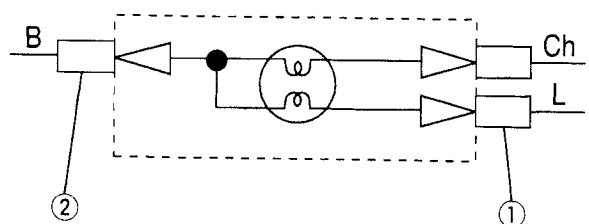
NO

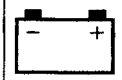
Replace the turn signal/position light bulb, socket or both.

#### 2. Voltage

- Connect the pocket tester (DC 20 V) to the turn signal/position light couplers (wire harness side) as shown.

Tester positive probe → blue ①  
Tester negative probe → black ②





- Set the main switch to "ON".
- Measure the voltage (12 V) of blue ① on the turn signal/position light couplers (wire harness side).
- Is the voltage within specification?



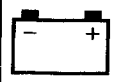
YES



NO

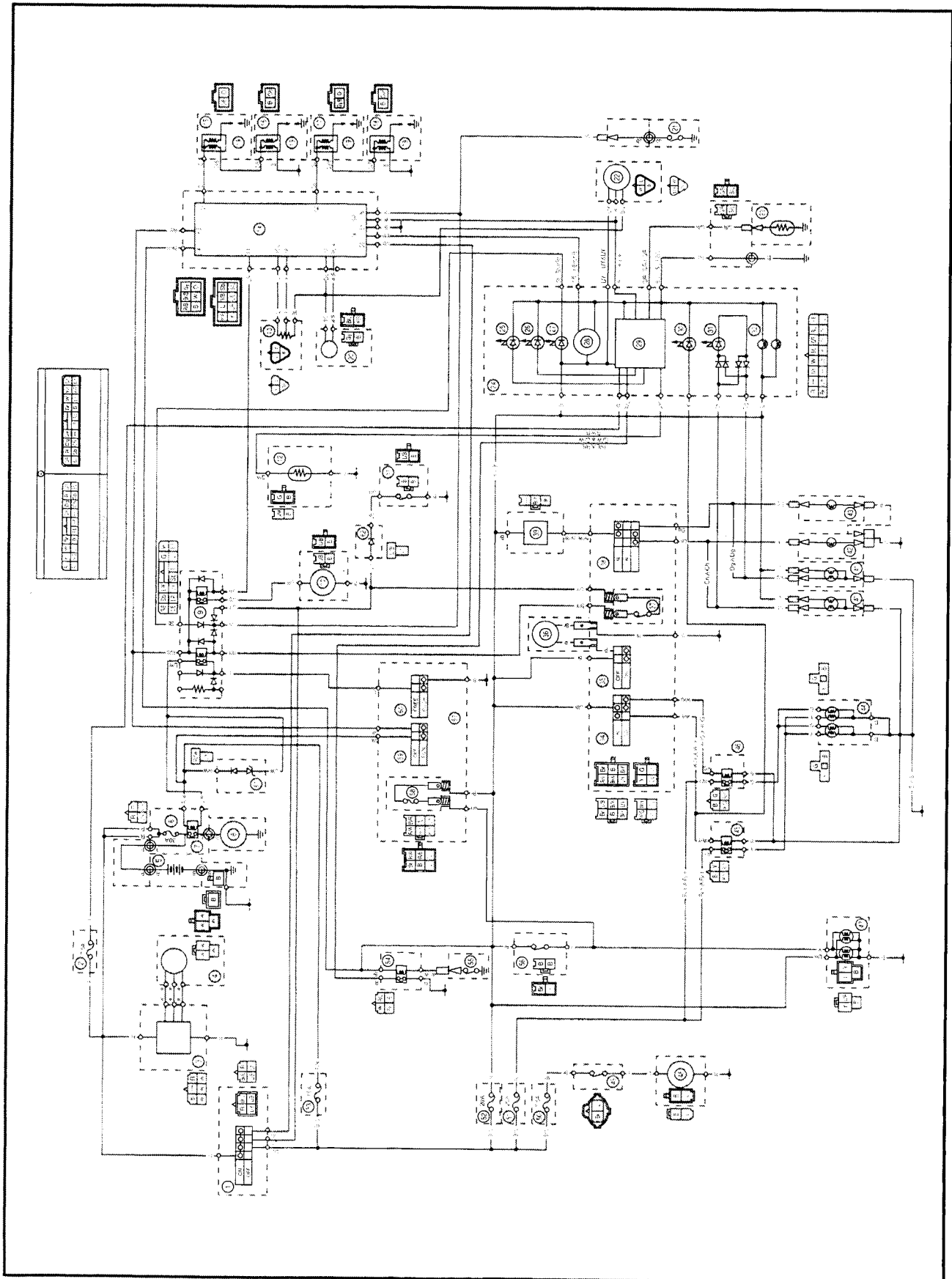
This circuit is OK.

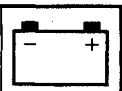
The wiring circuit from the main switch to the turn signal/position light connectors is faulty and must be repaired.



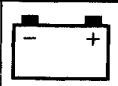
EB806000

### SIGNALING SYSTEM CIRCUIT DIAGRAM





- ① Main switch
- ⑤ Battery
- ⑥ Main fuse
- ⑨ Starting circuit cutoff relay
- ⑫ Fuel sender
- ⑳ Neutral switch
- ㉒ Speed sensor
- ㉕ Fuel level indicator light
- ㉖ Oil level/coolant temperature warning light
- ㉗ Neutral indicator light
- ㉘ Tachometer
- ㉙ Combination meter
- ㉚ Turn signal indicator light
- ㉜ Horn switch
- ㉝ Horn
- ㉞ Turn signal switch
- ㉟ Flasher relay
- ㊱ Front turn signal/position light (L)
- ㊲ Front turn signal/position light (R)
- ㊳ Rear turn signal light (L)
- ㊴ Rear turn signal light (R)
- ㊵ Tail/brake light
- ㊶ Signaling system fuse
- ㊷ Oil level relay
- ㊸ Oil level switch
- ㊹ Rear brake light switch
- ㊺ Front brake light switch



EB806010

### TROUBLESHOOTING

- Any of the following fail to light: turn signal light, brake light or an indicator light.
- The horn fails to sound.

Check:

1. main and signaling system fuses
2. battery
3. main switch
4. wiring  
(of the entire signaling system)

#### NOTE:

- Before troubleshooting, remove the following part(-s):
  - 1) seats
  - 2) fuel tank
  - 3) air filter case
  - 4) front cowling inner panels
  - 5) bottom cowling
  - 6) side cowling inner panels
  - 7) side cowlings
  - 8) windshield
  - 9) rear cowling
- Troubleshoot with the following special tool (-s).



**Pocket tester**  
**90890-03112**

EB802400

#### 1. Main and signaling system fuses

- Check the main and signaling system fuses for continuity.  
Refer to "CHECKING AND CHARGING THE FUSES" in chapter 3.
- Are the main and signaling system fuses OK?



YES



NO

Replace the fuse(-s).

EB802401

#### 2. Battery

- Check the condition of the battery.  
Refer to "CHECKING THE BATTERY" in chapter 3.



**Open-circuit voltage**  
**12.8 V or more at 20°C (68°F)**

- Is the battery OK?



YES



NO

- Clean the battery terminals.
- Recharge or replace the battery.

EB802411

#### 3. Main switch

- Check the main switch for continuity.  
Refer to "CHECKING THE SWITCHES".
- Is the main switch OK?



YES



NO

Replace the main switch.

EB806400

#### 4. Wiring

- Check the entire signaling system's wiring.  
Refer to "CIRCUIT DIAGRAM".
- Is the signaling system's wiring properly connected and without defects?



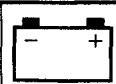
YES



NO

Check the condition of each of the signaling system's circuits.  
Refer to "CHECKING THE SIGNALING SYSTEM".

Properly connect or repair the signaling system's wiring.



EB806410

### CHECKING THE SIGNALING SYSTEM

#### 1. The horn fails to sound.

##### 1. Horn switch

- Check the horn switch for continuity. Refer to "CHECKING THE SWITCHES".
- Is the horn switch OK?



YES



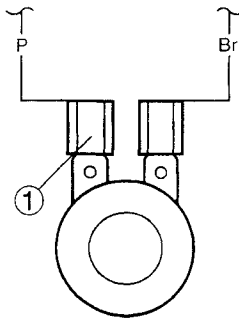
NO

Replace the left handlebar switch.

##### 2. Voltage

- Connect the pocket tester (DC 20 V) to the horn connector at the horn terminal as shown.

**Tester positive probe → pink ①**  
**Tester negative probe → ground**



- Set the main switch to "ON".
- Push the horn switch.
- Measure the voltage (12 V) of pink ① at the horn terminal.
- Is the voltage within specification?



YES

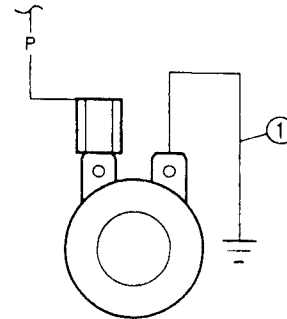


NO

The wiring circuit from the main switch to the horn connector is faulty and must be repaired.

##### 3. Horn

- Disconnect the black connector at the horn terminal.
- Connect a jumper lead ① to the horn terminal and ground the jumper lead.
- Set the main switch to "ON".
- Push the horn switch.
- Does the horn sound?



NO



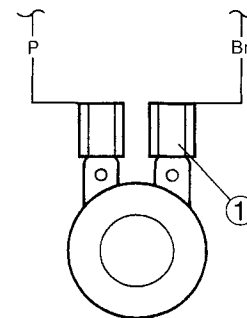
YES

The horn is OK.

##### 4. Voltage

- Connect the pocket tester (DC 20 V) to the horn connector at the black terminal as shown.

**Tester positive probe → black ①**  
**Tester negative probe → ground**



- Set the main switch to "ON".
- Measure the voltage (12 V) of brown ① at the horn terminal.
- Is the voltage within specification?



YES



NO

Repair or adjust the horn.

Replace the horn.



EB806411

### 2. A tail/brake light fails to come on.

#### 1. Tail/brake light bulb and socket

- Check the tail/brake light bulb and socket for continuity. Refer to "CHECKING THE BULBS AND BULB SOCKETS".
- Are the tail/brake light bulb and socket OK?

↓ YES

↓ NO

Replace the tail/brake light bulb, socket or both.

#### 2. Brake light switches

- Check the brake light switches for continuity. Refer to "CHECKING THE SWITCHES".
- Is the brake light switch OK?

↓ YES

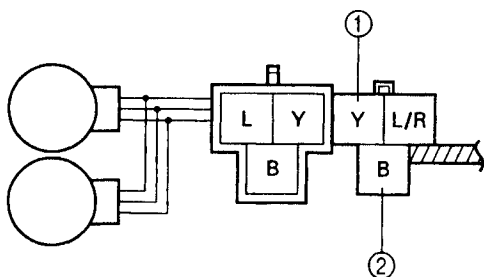
↓ NO

Replace the brake light switch.

#### 3. Voltage

- Connect the pocket tester (DC 20 V) to the tail/brake light coupler (wire harness side) as shown.

**Tester positive probe → yellow ①**  
**Tester negative probe → black ②**



- Set the main switch to "ON".
- Pull in the brake lever or push down on the brake pedal.
- Measure the voltage (12 V) of yellow at the tail/brake light coupler (wire harness side).
- Is the voltage within specification?

↓ YES

↓ NO

This circuit is OK.

The wiring circuit from the main switch to the tail/brake light coupler is faulty and must be repaired.

EB806413

### 3. A turn signal light, turn signal indicator light or both fail to blink.

#### 1. Turn signal light bulb and socket

- Check the turn signal light bulb and socket for continuity. Refer to "CHECKING THE BULBS AND BULB SOCKETS".
- Are the turn signal light bulb and socket OK?

↓ YES

↓ NO

Replace the turn signal light bulb, socket or both.

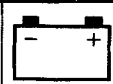
#### 2. Turn signal indicator light LED

- Check the LED of the turn signal indicator light. Refer to "CHECKING THE LEDs".
- Is the turn signal indicator light LED OK?

↓ YES

↓ NO

Replace the meter assembly.



### 3. Turn signal switch

- Check the turn signal switch for continuity. Refer to "CHECKING THE SWITCHES".
- Is the turn signal switch OK?



YES



NO

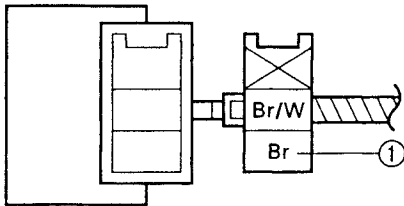
Replace the left handlebar switch.

### 4. Voltage

- Connect the pocket tester (DC 20 V) to the relay coupler (wire harness side) as shown.

**Tester positive probe → brown ①**

**Tester negative probe → ground**



- Set the main switch to "ON".
- Measure the voltage (12 V) of brown ① at the turn signal relay coupler (wire harness side).
- Is the voltage within specification?



YES



NO

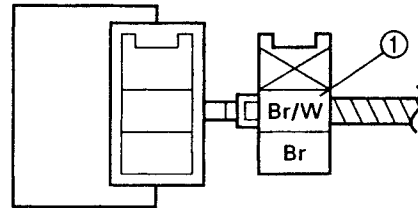
The wiring circuit from the main switch to the turn signal relay coupler (turn signal relay side) is faulty and must be repaired.

### 5. Voltage

- Connect the pocket tester (DC 20 V) to the turn signal relay coupler (wire harness side) as shown.

**Tester positive probe → brown/white ①**

**Tester negative probe → ground**



- Set the main switch to "ON".
- Set the turn signal switch to "←" or "→".
- Measure the voltage (12 V) or brown/white at the turn signal relay coupler (wire harness side).
- Is the voltage within specification?



YES



NO

The turn signal relay is faulty and must be replaced.

### 6. Voltage

- Connect the pocket tester (DC 20 V) to the turn signal light connectors or the meter assembly coupler (wire harness side) as shown.

**A** Turn signal light

**B** Turn signal indicator light

**Left turn signal light**

**Tester positive probe → chocolate ①**

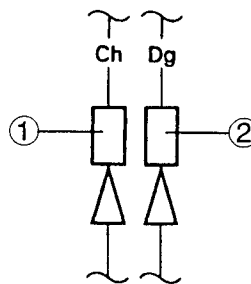
**Tester negative probe → ground**

**Right turn signal light**

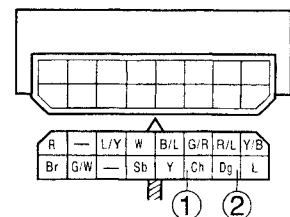
**Tester positive probe → dark green ②**

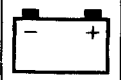
**Tester negative probe → ground**

**A**



**B**





- Set the main switch to "ON".
- Set the turn signal switch to "↵" or "↶".
- Measure the voltage (12 V) of chocolate ① or dark green ② at the turn signal light connector (wire harness side).
- Is the voltage within specification?



YES



NO

This circuit is OK.

The wiring circuit from the turn signal switch to the turn signal light connector is faulty and must be repaired.

EB806414

### 4. The neutral indicator light fails to come on.

#### 1. Neutral indicator light LED

- Check the LED of the neutral indicator light. Refer to "CHECKING THE LEDs".
- Is the neutral indicator light LED OK?



YES



NO

Replace the meter assembly.

#### 2. Neutral switch

- Check the neutral switch for continuity. Refer to "CHECKING THE SWITCHES".
- Is the neutral switch OK?



YES



NO

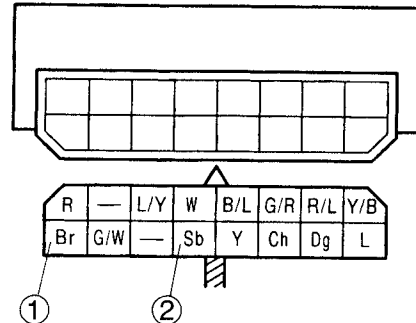
Replace the neutral switch.

### 3. Voltage

- Connect the pocket tester (DC 20 V) to the meter assembly coupler (wire harness side) as shown.

Tester positive probe → brown ①

Tester negative probe → sky blue ②



- Set the main switch to "ON".
- Measure the voltage (12 V) of brown ① and sky blue ② at the meter assembly coupler.
- Is the voltage within specification?



YES



NO

This circuit is OK.

The wiring circuit from the main switch to the meter light bulb coupler is faulty and must be repaired.

EB806416

### 5. The oil level warning light fails to come on.

#### 1. Oil level warning light LED

- Check the LED of the oil level warning light. Refer to "CHECKING THE LEDs".
- Is the oil level warning light LED OK?

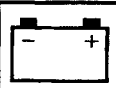


YES



NO

Replace the meter assembly.



### 2. Oil level switch

- Drain the engine oil and remove the oil level switch from the oil pan.
- Check the oil level switch for continuity. Refer to "CHECKING THE SWITCHES".
- Is the oil level switch OK?

↓ YES

↓ NO

Replace the oil level switch.

### 3. Oil level relay

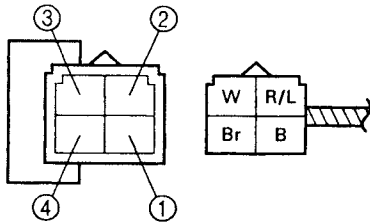
- Disconnect the oil level relay from the coupler.
- Connect the pocket tester ( $\Omega \times 1$ ) and battery (12 V) to the oil level relay terminals as shown.

**Battery positive terminal → brown ①**

**Battery negative terminal → white ②**

**Tester positive probe → red/blue ③**

**Tester negative probe → black ④**



- Does the oil level relay have continuity between red/blue and black?

↓ YES

↓ NO

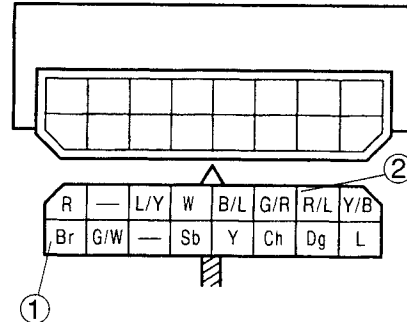
Replace the oil level relay.

### 4. Voltage

- Connect the pocket tester (DC 20 V) to the meter assembly coupler (wire harness side) as shown.

**Tester positive probe → brown ①**

**Tester negative probe → red/blue ②**



- Set the main switch to "ON".
- Measure the voltage (12 V) of brown ① and red/blue at the meter assembly coupler.
- Is the voltage within specification?

↓ YES

↓ NO

This circuit is OK.

The wiring circuit from the main switch to the meter assembly coupler is faulty and must be repaired.

EB806417

### 6. The fuel level indicator light fails to come on.

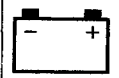
#### 1. Fuel level indicator light LED

- Check the LED of the fuel level indicator light. Refer to "CHECKING THE LEDs".
- Is the fuel level indicator light LED OK?

↓ YES

↓ NO

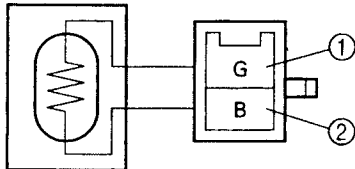
Replace the meter assembly.



### 2. Fuel sender

- Disconnect the fuel sender coupler from the wire harness.
- Drain the fuel from the fuel tank and remove the fuel sender from the fuel tank.
- Check the fuel sender for continuity.

**Tester positive probe → green ①**  
**Tester negative probe → black ②**



- Is the fuel sender OK?

YES

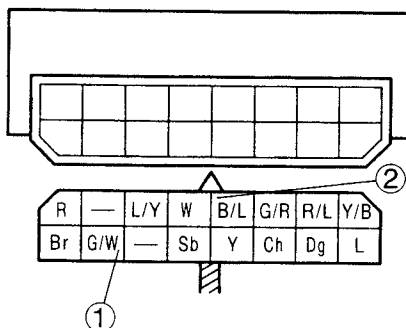
NO

Replace the fuel sender.

### 3. Voltage

Connect the pocket tester (DC 20 V) to the meter assembly coupler (wire harness side) as shown.

**Tester positive probe → green/white ①**  
**Tester negative probe → black/blue ②**



- Set the main switch to "ON".
- Measure the voltage (12 V).
- Is the voltage within specification?

YES

NO

This circuit OK.

The wiring circuit from the main switch to the meter assembly coupler is faulty and must be repaired.

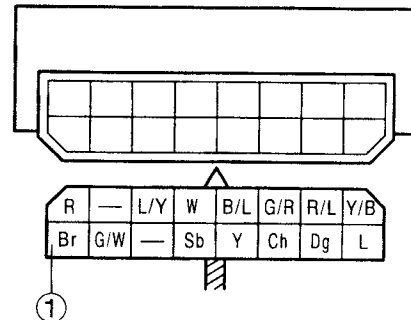
EAS00805

### 7. The clock fails to come on.

#### 1. Voltage

Connect the pocket tester (20 V DC) to the clock coupler (clock side) as shown.

**Tester positive probe → brown ①**  
**Tester negative probe → ground**



- Set the main switch to "ON".
- Measure the voltage (12 V).
- Is the voltage within specification?

YES

NO

The wiring circuit from the main switch to the clock coupler (clock side) is faulty and must be repaired.

#### 2. Clock

Check that the clock is operating properly. When setting the clock after its power source has been disconnected (e.g., when the battery is removed), first set the clock to 1:00 AM and then to the correct time. Is the clock operating properly?

YES

NO

This circuit is OK.

Replace the



EAS00806

### 8. The speedometer fails to come on.

#### 1. Speedometer bulb socket

- Check the speedometer bulb socket for continuity.
- Is the speedometer bulb socket OK?



YES



NO

Replace the speedometer bulb socket.

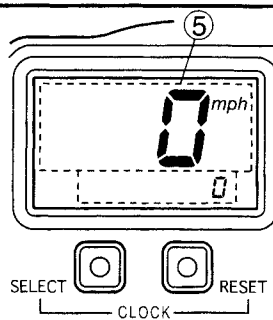
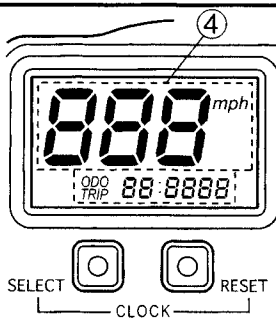
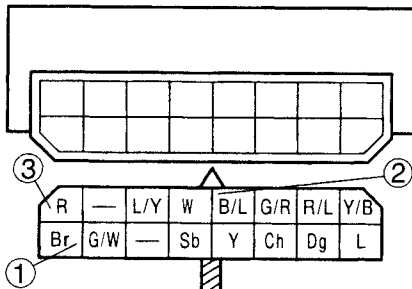
#### 2. Voltage

- Connect the pocket tester (20 V DC) to the speedometer coupler (wire harness side) as shown.

Battery positive lead → green/yellow ①

Battery negative lead → black/blue ②

Battery positive lead → red ③



#### NOTE:

First, connect the battery to the brown ① and black/blue ② coupler terminals, then connect the battery positive lead to the red ③ terminal.

When connecting the battery, check whether the startup display ④ appears first and then after approximately three seconds the normal display appears ⑤.

Does the startup display appear first and then after approximately three seconds the normal display appears?



YES



NO

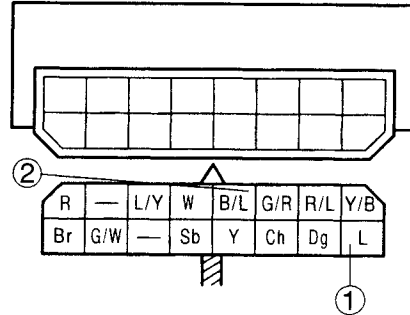
Replace the speedometer.

#### 3. Voltage

- Connect the pocket tester (20 V DC) to the speedometer bulb socket coupler (wire harness side) as shown.

Tester positive probe → blue ①

Tester negative probe → black/blue ②



- Set the main switch to "ON".

- Measure the voltage (12 V) of blue ① on the speedometer bulb socket coupler (wire harness side).

- Is the voltage within specification?



YES



NO

The wiring circuit from the main switch to the speedometer bulb socket coupler (wire harness side) is faulty, repair it.

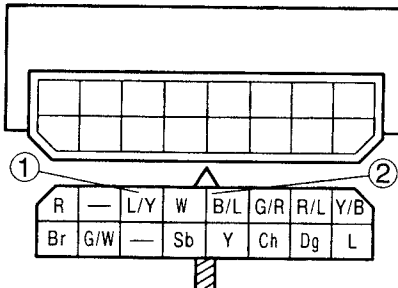


### 4. Speedometer sensor

- Connect the pocket tester (20 V DC) to the speedometer coupler (wire harness side) as shown.

**Tester positive probe → blue/yellow ①**

**Tester negative probe → black/blue ②**



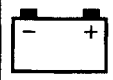
- Set the main switch to "ON".
- Elevate the rear wheel and slowly rotate it.
- Measure the voltage (5 V) of blue/yellow and black/blue. With each full rotation of the rear wheel, the voltage reading should cycle from 0 V to 5 V to 0 V to 5 V.
- Does the voltage reading cycle correctly?

↓ YES

↓ NO

This circuit is OK.

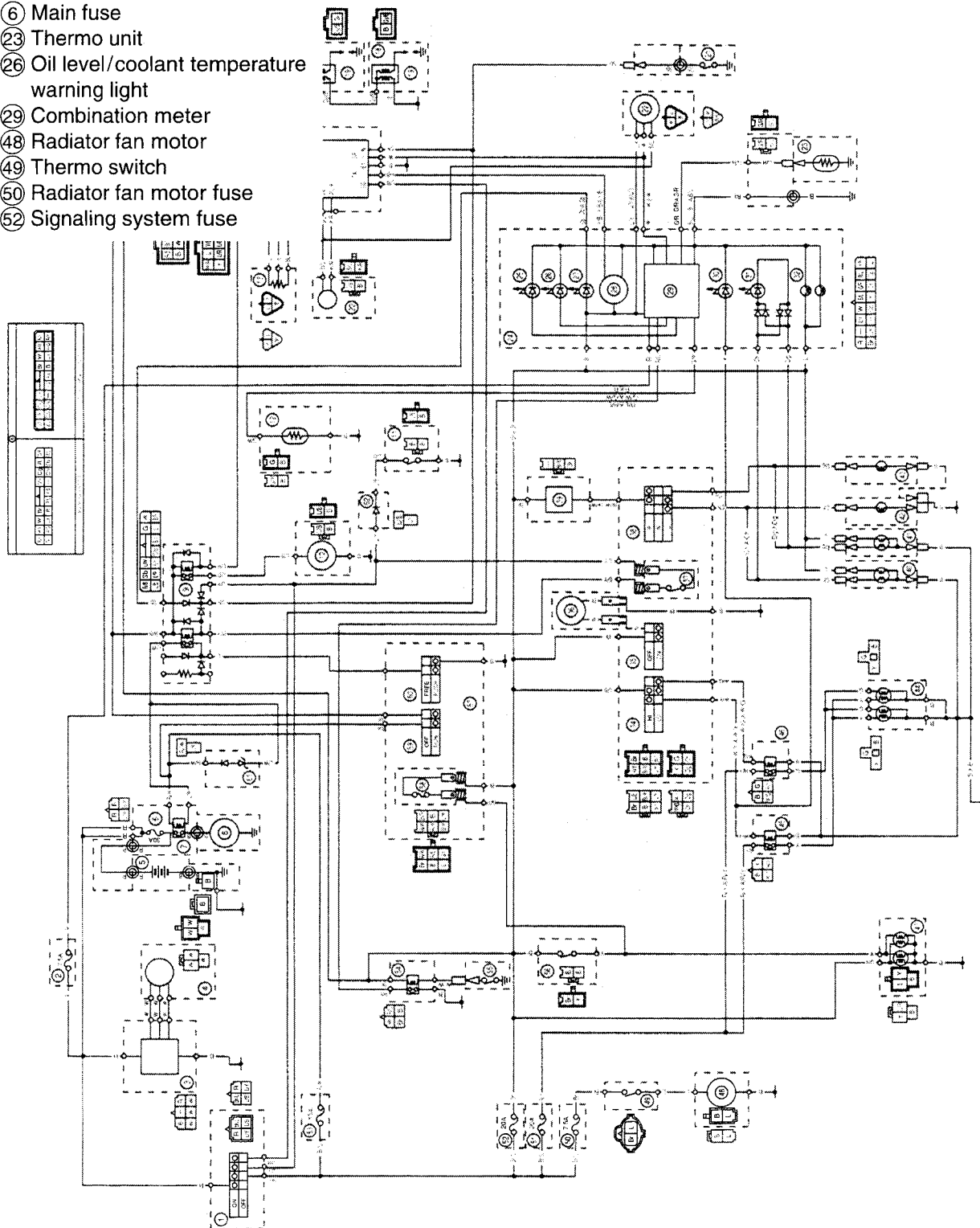
Replace the speedometer sensor.

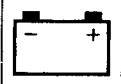


EB807000

# COOLING SYSTEM CIRCUIT DIAGRAM

- ① Main switch
- ⑤ Battery
- ⑥ Main fuse
- ②③ Thermo unit
- ②⑥ Oil level/coolant temperature warning light
- ②⑨ Combination meter
- ④⑧ Radiator fan motor
- ④⑨ Thermo switch
- ⑤⑩ Radiator fan motor fuse
- ⑤② Signaling system fuse





EB807010

## TROUBLESHOOTING

- The radiator fan motor fails to turn.
- The coolant temperature display and/or warning light fails to indicate when the engine is warm.

Check:

1. main, signal system, and radiator fan motor fuses
2. battery
3. main switch
4. radiator fan motor
5. thermo switch
6. thermo unit
7. wiring  
(the entire cooling system)

**NOTE:**

- Before troubleshooting, remove the following part(-s):
  - 1) rider seat
  - 2) bottom cowling
  - 3) front cowling inner panels
  - 4) side cowling inner panels
  - 5) side cowlings
  - 6) windshield
- Troubleshoot with the following special tool (-s).



**Pocket tester**  
**90890-03112**

EB802400

1. Main, signal system and radiator fan motor fuses

- Check the main, signal system, and radiator fan motor fuses for continuity. Refer to "CHECKING THE FUSES" in chapter 3.
- Are the main, signal system, and radiator fan motor fuses OK?

↓ YES

↓ NO

Replace the fuse(-s).

EB802401

2. Battery

- Check the condition of the battery. Refer to "CHECKING AND CHARGING THE BATTERY" in chapter 3.



**Open-circuit voltage**  
**12.8 V or more at 20°C (68°F)**

- Is the battery OK?

↓ YES

↓ NO

- Clean the battery terminals.
- Recharge or replace the battery.

EB802411

3. Main switch

- Check the main switch for continuity. Refer to "CHECKING THE SWITCHES".
- Is the main switch OK?

↓ YES

↓ NO

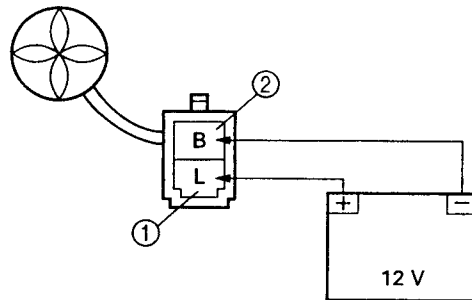
Replace the main switch.

EB807400

4. Radiator fan motor (test 1)

- Disconnect the radiator fan motor coupler from the wire harness.
- Connect the battery (12 V) as shown.

**Battery positive lead → blue ①**  
**Battery negative lead → black ②**



- Does the radiator fan motor turn?

↓ YES

↓ NO

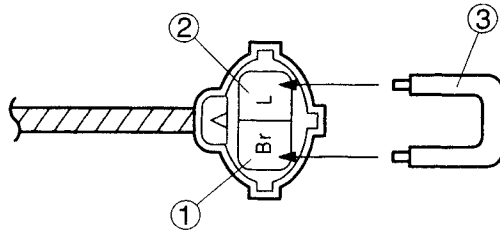
The radiator fan motor is faulty and must be replaced.



FB807400

### 5. Radiator fan motor (test 2)

- Disconnect the thermo switch coupler.
- Set the main switch to "ON".
- Connect the brown ① and blue ② terminals with a jumper lead ③ as shown.



- Does the radiator fan motor turn?

↓ YES

↓ NO

The wiring circuit from the main switch to the radiator fan motor coupler is faulty and must be repaired.

### 6. Thermo switch

- Remove the thermo switch from the radiator.
- Connect the pocket tester ( $\Omega \times 1$ ) to the thermo switch ① as shown.
- Immerse the thermo switch in a container filled with coolant ②.

#### NOTE:

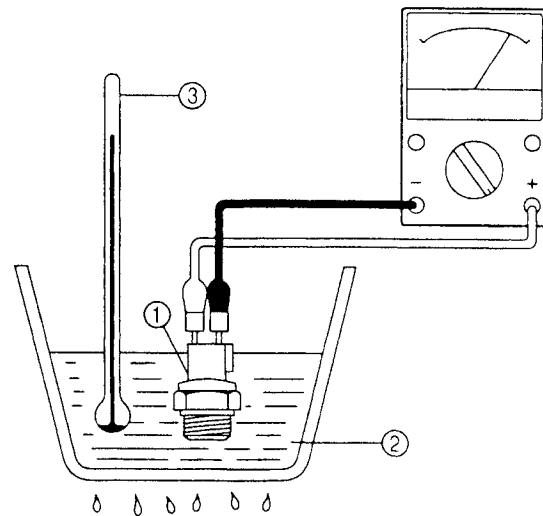
Make sure that the thermo switch terminals do not get wet.

- Place a thermometer ③ in the coolant.
- Slowly heat the coolant, then let it cool to the specified temperature as indicated in the table.
- Check the thermo switch for continuity at the temperatures indicated in the table.

Test step	Coolant temperature	Continuity
	Thermo switch	
1	0 ~ 105 ± 3°C (0 ~ 221 ± 5.4°F)	NO
2	More than 105 ± 3°C (221 ± 5.4°F)	YES
3*	105 ± 3°C to 100 ± 3°C (221 ± 5.4°F to 212 ± 5.4°F)	YES
4*	Less than 100 ± 3°C (212 ± 5.4°F)	NO

Test steps 1 & 2: Heating phase

Test steps 3\* & 4\*: Cooling phase



#### ⚠ WARNING

- Handle the thermo switch with special care.
- Never subject the thermo switch to strong shocks. If the thermo switch is dropped, replace it.

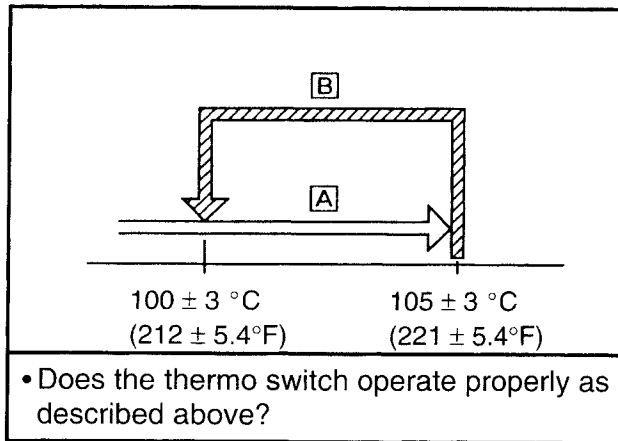
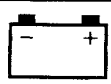


#### Thermo switch

28 Nm (2.8 m•kg, 20 ft•lb)

Three bond sealock® 10

- [A] The thermo switch circuit is open and the radiator fan is off.
- [B] The thermo switch circuit is closed and the radiator fan is on.



YES



NO

Replace the thermo switch.

### 7. Thermo unit

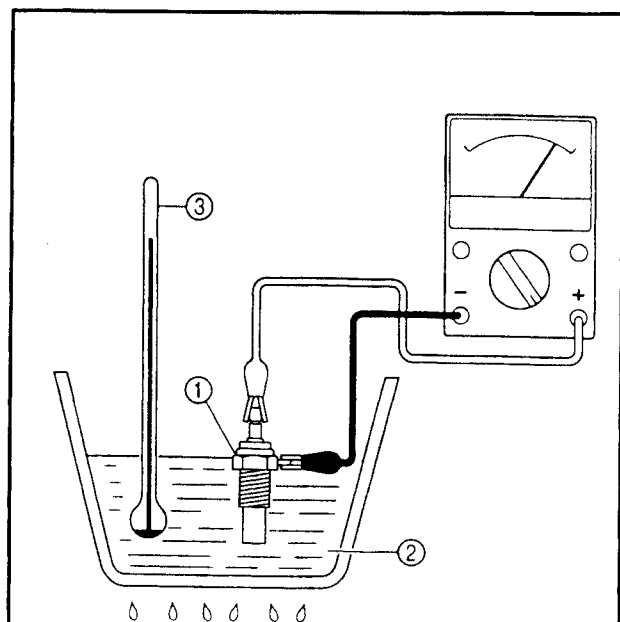
- Remove the temperature sender from the cylinder head.
- Connect the pocket tester ( $\Omega \times 10$ ) to the thermo unit ① as shown.
- Immerse the thermo unit in a container filled with coolant ②.
- Place a thermometer ③ in the coolant.
- Slowly heat the water, then let it cool down to the specified temperature.
- Check the thermo unit for continuity at the temperatures indicated below.



#### Thermo unit resistance

50.6 ~ 64.2  $\Omega$  at 80°C (176°F)

17.3 ~ 16.1  $\Omega$  at 120°C (248°F)



### ⚠ WARNING

Handle the temperature sender with special care.

Never subject the temperature sender to strong shocks. If the temperature sender is dropped, replace it.



#### Temperature sender

15 Nm (1.5 m•kg, 11 ft•lb)

Three bond sealock® 10



YES



NO

Replace the temperature sender.

EB807403

### 8. Wiring

- Check the entire cooling system's wiring. Refer to "CIRCUIT DIAGRAM".
- Is the cooling system's wiring properly connected and without defects?



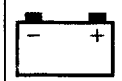
YES



NO

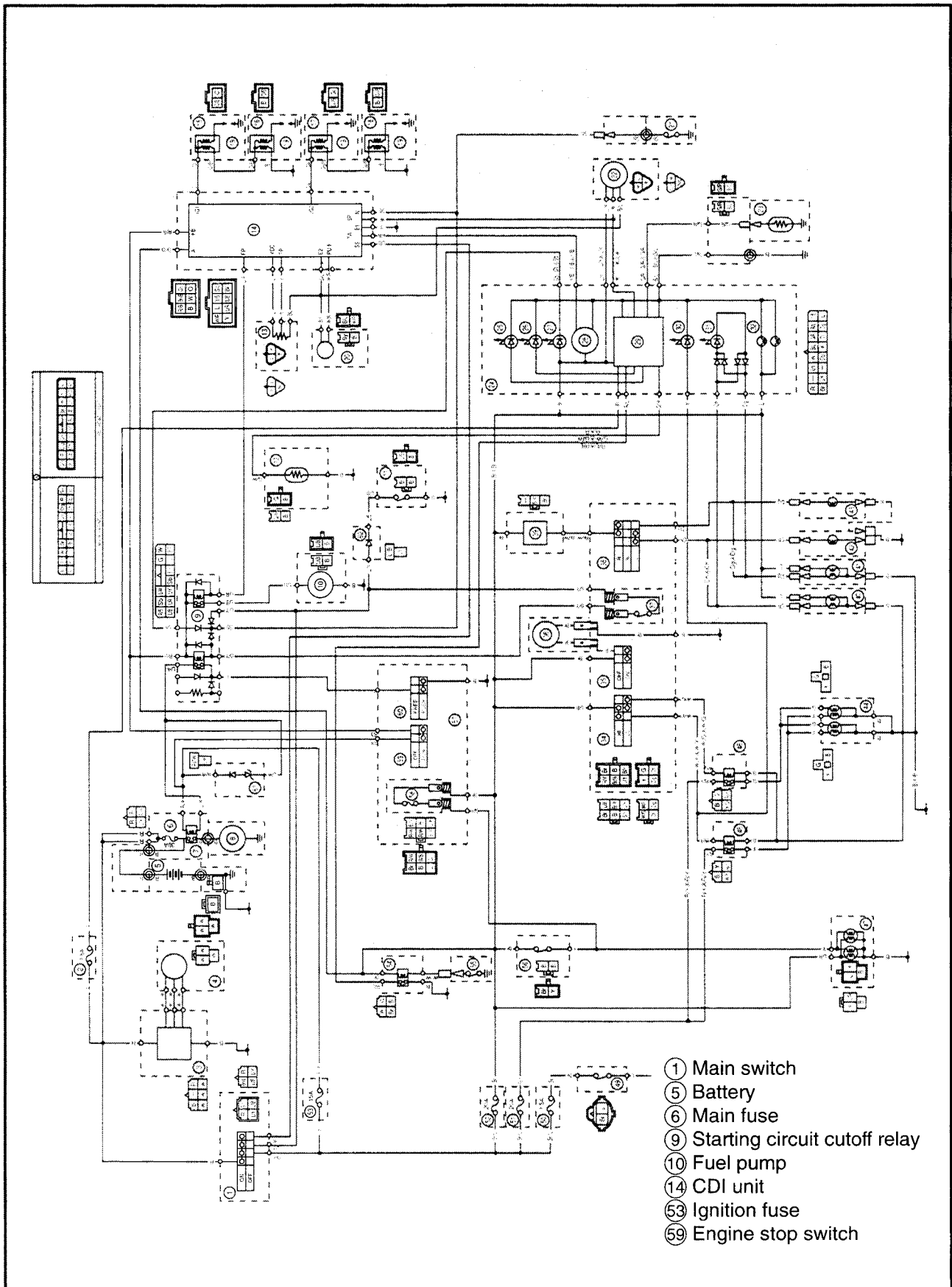
Replace the combination meter.

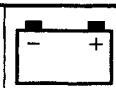
Properly connect or repair the cooling system's wiring.



EB808000

# FUEL PUMP SYSTEM CIRCUIT DIAGRAM



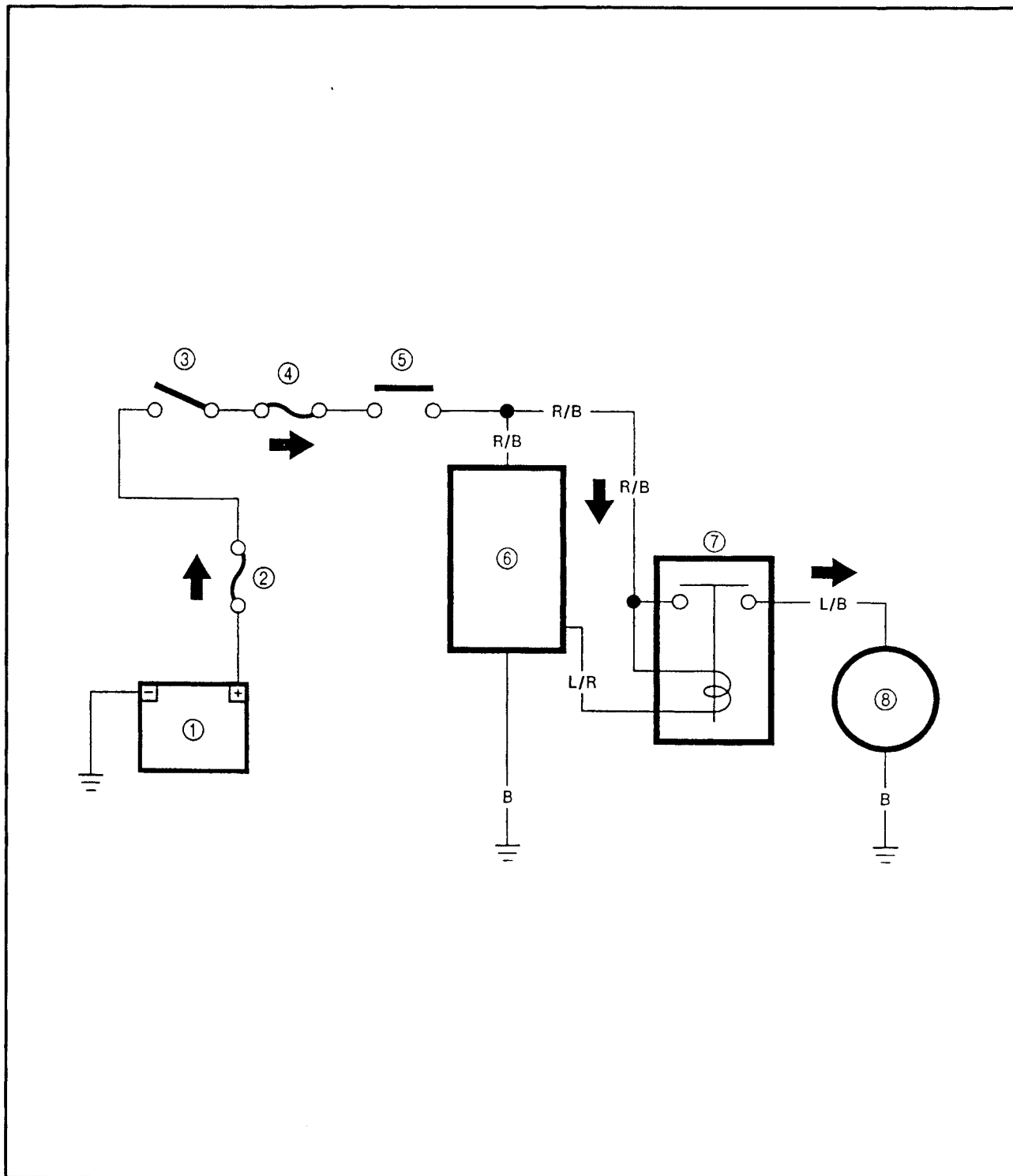


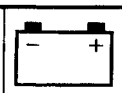
EB808010

**FUEL PUMP CIRCUIT OPERATION**

The CDI unit includes the control unit for the fuel pump.

- ① Battery
- ② Main fuse
- ③ Main switch
- ④ Ignition fuse
- ⑤ Engine stop switch
- ⑥ CDI unit
- ⑦ Starting circuit cutoff relay
- ⑧ Fuel pump





EB806020

## TROUBLESHOOTING

**The fuel pump fails to operate.**

Check:

1. main and ignition fuses
2. battery
3. main switch
4. engine stop switch
5. starting circuit cutoff relay
6. fuel pump
7. wiring  
(the entire fuel pump system)

**NOTE:**

- Before troubleshooting, remove the following part(-s):
  - 1) rider seat
  - 2) fuel tank
  - 3) air filter case
  - 4) front cowling inner panel (left)
- Troubleshoot with the following special tool(-s).


**Pocket tester**  
**90890-03112**

EB802400

## 1. Main and ignition fuses

- Check the main and ignition fuses for continuity. Refer to "CHECKING THE FUSES" in chapter 3.
- Are the main and ignition fuses OK?

YES

NO

Replace the fuse(-s).

EB802401

## 2. Battery

- Check the condition of the battery. Refer to "CHECKING AND CHARGING THE BATTERY" in chapter 3.


**Open-circuit voltage**  
**12.8 V or more at 20°C (68°F)**

- Is the battery OK?

YES

NO

- Clean the battery terminals.
- Recharge or replace the battery.

EB802411

## 3. Main switch

- Check the main switch for continuity. Refer to "CHECKING THE SWITCHES".
- Is the main switch OK?

YES

NO

Replace the main switch.

EB802412

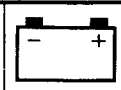
## 4. Engine stop switch

- Check the engine stop switch for continuity. Refer to "CHECKING THE SWITCHES".
- Is the engine stop switch OK?

YES

NO

Replace the right handlebar switch.



### 5. Starting circuit cutoff relay

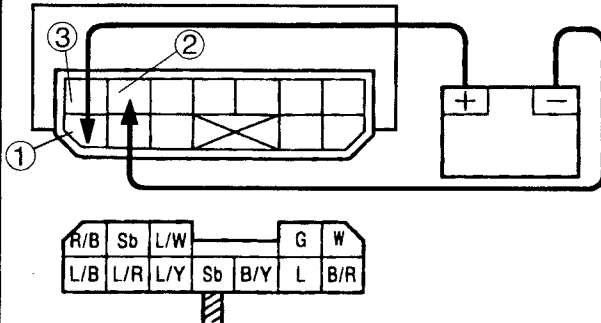
- Disconnect the relay from the coupler.
- Connect the pocket tester ( $\Omega \times 1$ ) and battery (12 V) to the relay terminals as shown.

**Battery positive terminal** → red/black ①

**Battery negative terminal** → blue/red ②

**Tester positive probe** → red/black ①

**Tester negative probe** → blue/black ③



- Does the fuel pump relay have continuity between red/black and blue/black?

↓ YES

↓ NO

Replace the starting circuit cutoff relay.

- Measure the fuel pump resistance.



### Fuel pump resistance

4 ~ 30  $\Omega$  at 20°C (68°F)

- Is the fuel pump OK?

↓ YES

↓ NO

Replace the fuel pump.

EB808401

### 7. Wiring

- Check the entire fuel pump system's wiring. Refer to "CIRCUIT DIAGRAM".
- Is the fuel pump system's wiring properly connected and without defects?

↓ YES

↓ NO

Replace the CDI unit.

Properly connect or repair the fuel pump system's wiring.

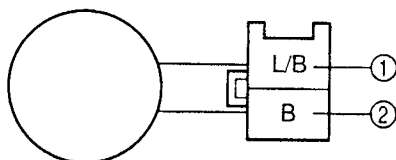
EB808400

### 6. Fuel pump resistance

- Disconnect the fuel pump coupler from the wire harness.
- Connect the pocket tester ( $\Omega \times 1$ ) to the fuel pump coupler (fuel pump side) as shown.

**Tester positive probe** → blue/black ①

**Tester negative probe** → black ②







EB812000

## SELF-DIAGNOSIS

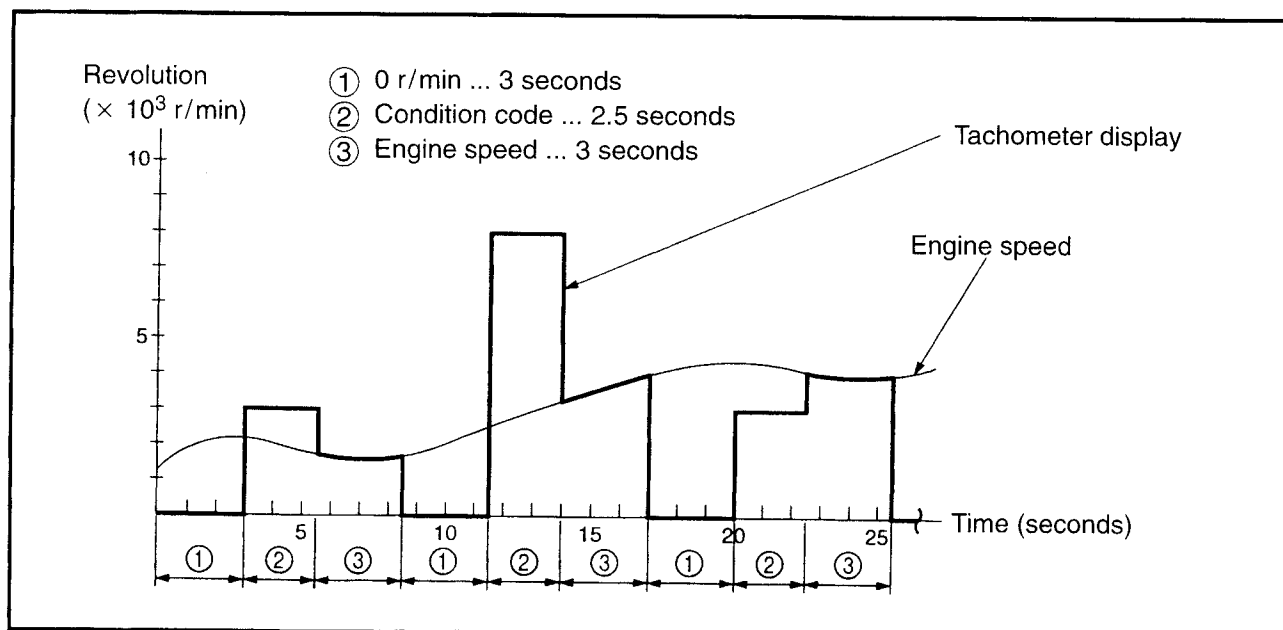
The YZF-R6 L/YZF-R6CL features a self-diagnosing system for the following circuit(-s):

- throttle position sensor
- fuel level indicator light

If any of these circuits are defective, their respective condition codes will be displayed on the tachometer when the main switch is set to "ON" (irrespective of whether the engine is running or not)

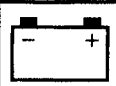
Circuit	Defect(-s)	System response	Condition code
Throttle position sensor	<ul style="list-style-type: none"> <li>• Disconnected</li> <li>• Short-circuit</li> <li>• Locked</li> </ul>	<ul style="list-style-type: none"> <li>• The ignitor unit stays set to the wide-open throttle ignition timing. The motorcycle can be ridden.</li> <li>• The tachometer displays the condition code.</li> </ul>	3,000 r/min
Fuel level indicator light	<ul style="list-style-type: none"> <li>• Improper connection</li> </ul>	<ul style="list-style-type: none"> <li>• The tachometer displays the condition code.</li> </ul>	8,000 r/min

### Tachometer display sequence



When more than one item is being monitored, the tachometer needle displays the condition codes in ascending order, cycling through the sequence repeatedly.

If the engine is stopped, the engine speed ③ is 0 r/min.



EB812010

### TROUBLESHOOTING

**The tachometer starts to display the self-diagnosis sequence.**

Check:

1. throttle position sensor
2. fuel level indicator light

#### NOTE:

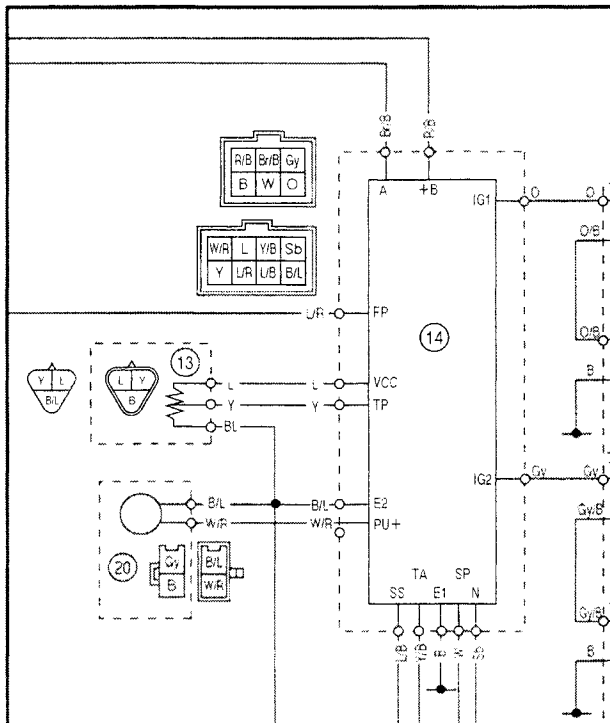
- Before troubleshooting, remove the following part(-s):
  - 1) rider seat
  - 2) fuel tank
  - 3) air filter case
  - 4) right side cowling inner panel
  - 5) right side cowling
- Troubleshoot with the following special tool(-s).



**Pocket tester**  
**90890-03112**

EB812020

### 1. Throttle position sensor CIRCUIT DIAGRAM



⑬ Throttle position sensor

⑭ CDI unit

### 1. Wire harness

- Check the wire harness for continuity. Refer to "CIRCUIT DIAGRAM".
- Is the wire harness OK?



YES



NO

Repair or replace the wire harness.

EB812401

### 2. Throttle position sensor

- Check the throttle position sensor for continuity. Refer to "CHECKING AND ADJUSTING THE THROTTLE POSITION SENSOR" in chapter 6.
- Is the throttle position sensor OK?



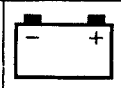
YES



NO

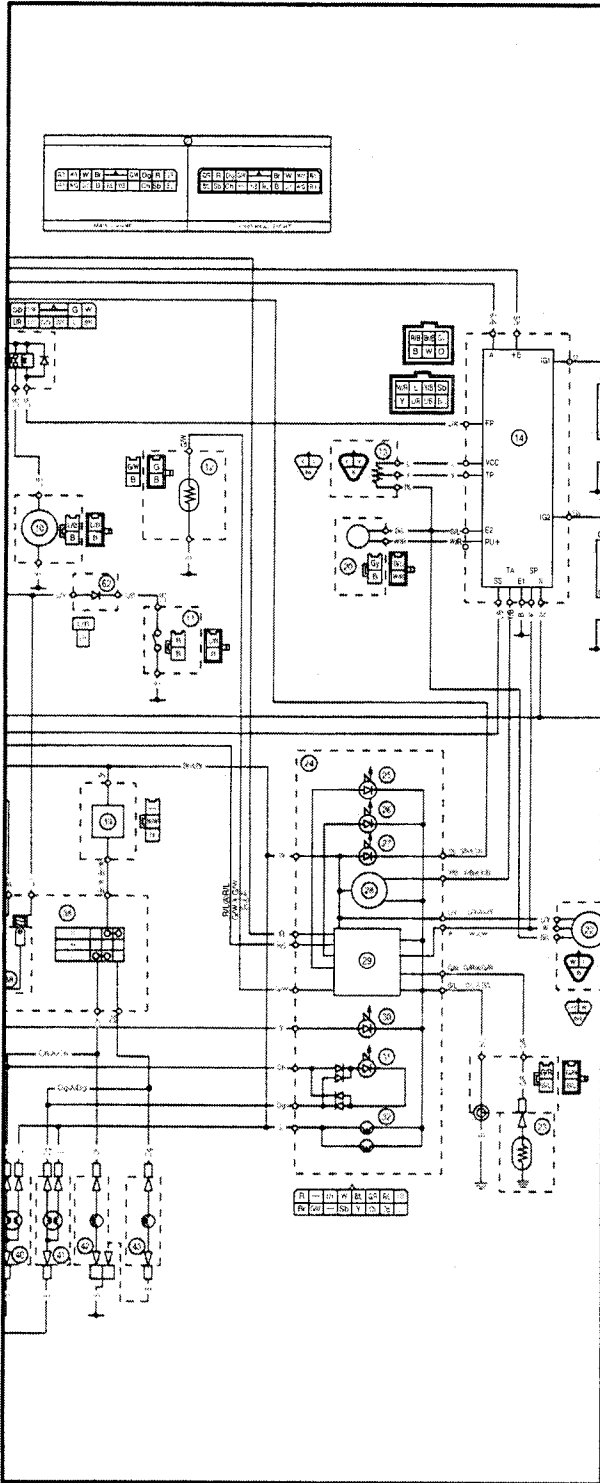
Replace the CDI unit.

Replace the throttle position sensor.



EB812040

### 2. Fuel level indicator light CIRCUIT DIAGRAM



- ⑫ Fuel sender
- ⑭ CDI unit
- ⑫ Fuel level indicator light
- ⑫ Combination meter

EB812403

#### 1. Fuel level indicator light LED

- Check the LED of the fuel level indicator light. Refer to "CHECKING THE LEDs".
- Is the fuel level indicator light LED OK?



YES



NO

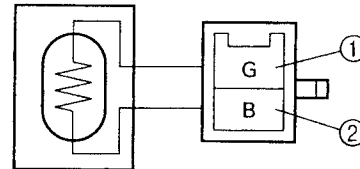
Repair the fuel level indicator light LED.

EB812404

#### 2. Fuel sender

- Disconnect the fuel sender coupler from the wire harness.
- Connect the pocket tester (W × 1) to the fuel sender coupler as shown.

Tester positive probe → green ①  
Tester negative probe → black ②



- Check the fuel sender for continuity.
- Is the fuel sender OK?



YES



NO

Replace the fuel sender.



EB812405

**3. Wire harness**

- Check the wire harness for continuity.  
Refer to "CIRCUIT DIAGRAM".
- Is the wire harness OK?



YES



NO

Replace the CDI unit.

Replace or replace  
the wire harness.



## CHAPTER 4. ENGINE OVERHAUL

<b>ENGINE</b> .....	4-1
DRIVE SPROCKET .....	4-1
EXHAUST ASSEMBLY .....	4-2
LEAD AND HOSES .....	4-3
ENGINE .....	4-5
INSTALLING THE ENGINE .....	4-6
<b>CAMSHAFTS</b> .....	4-7
CYLINDER HEAD COVER .....	4-7
CAMCHAFTS .....	4-8
REMOVING THE CAMSHAFTS .....	4-10
CHECKING THE CAMSHAFTS .....	4-11
CHECKING THE CAMSHAFT SPROCKETS AND TIMING CHAIN GUIDES .....	4-12
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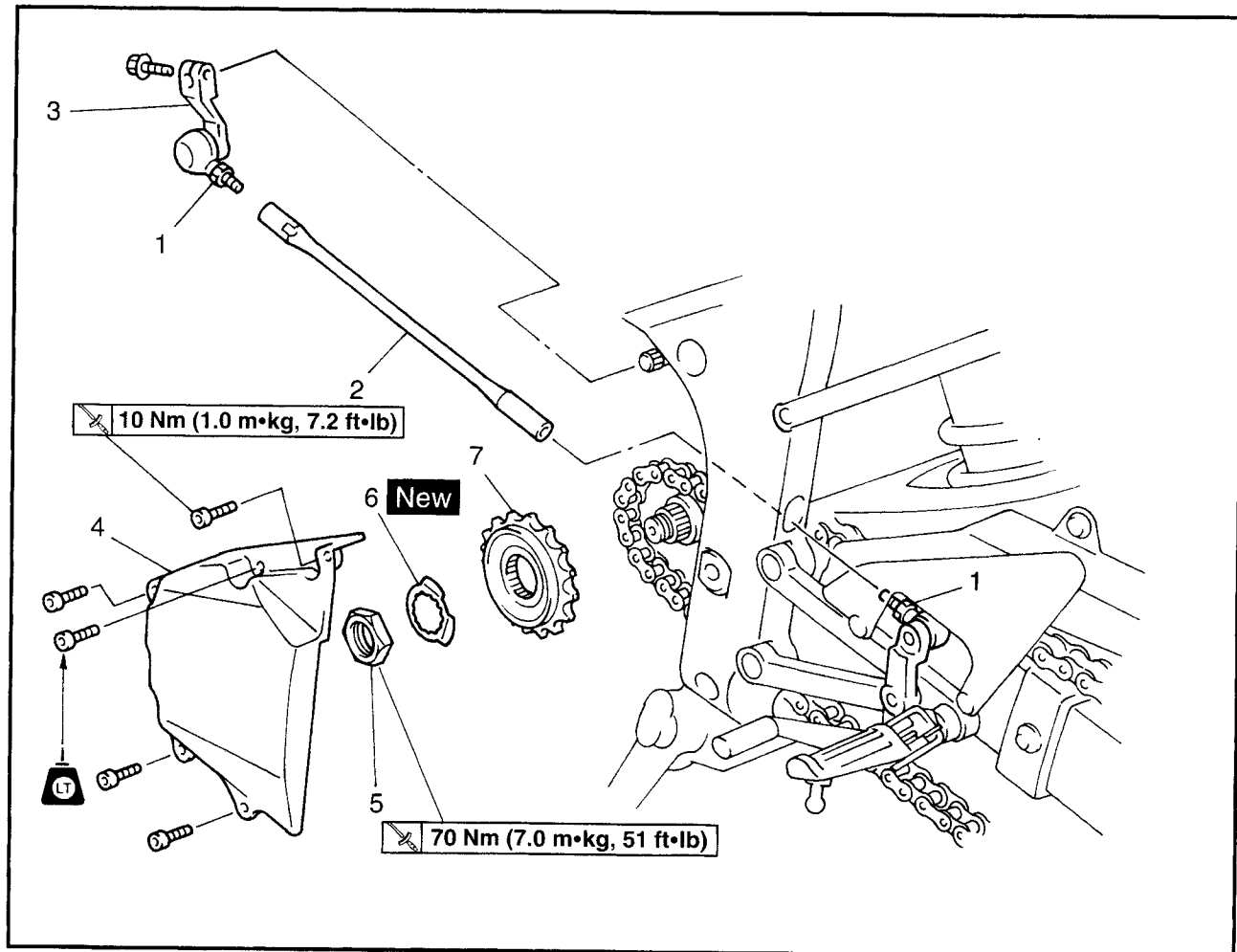


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# ENGINE OVERHAUL

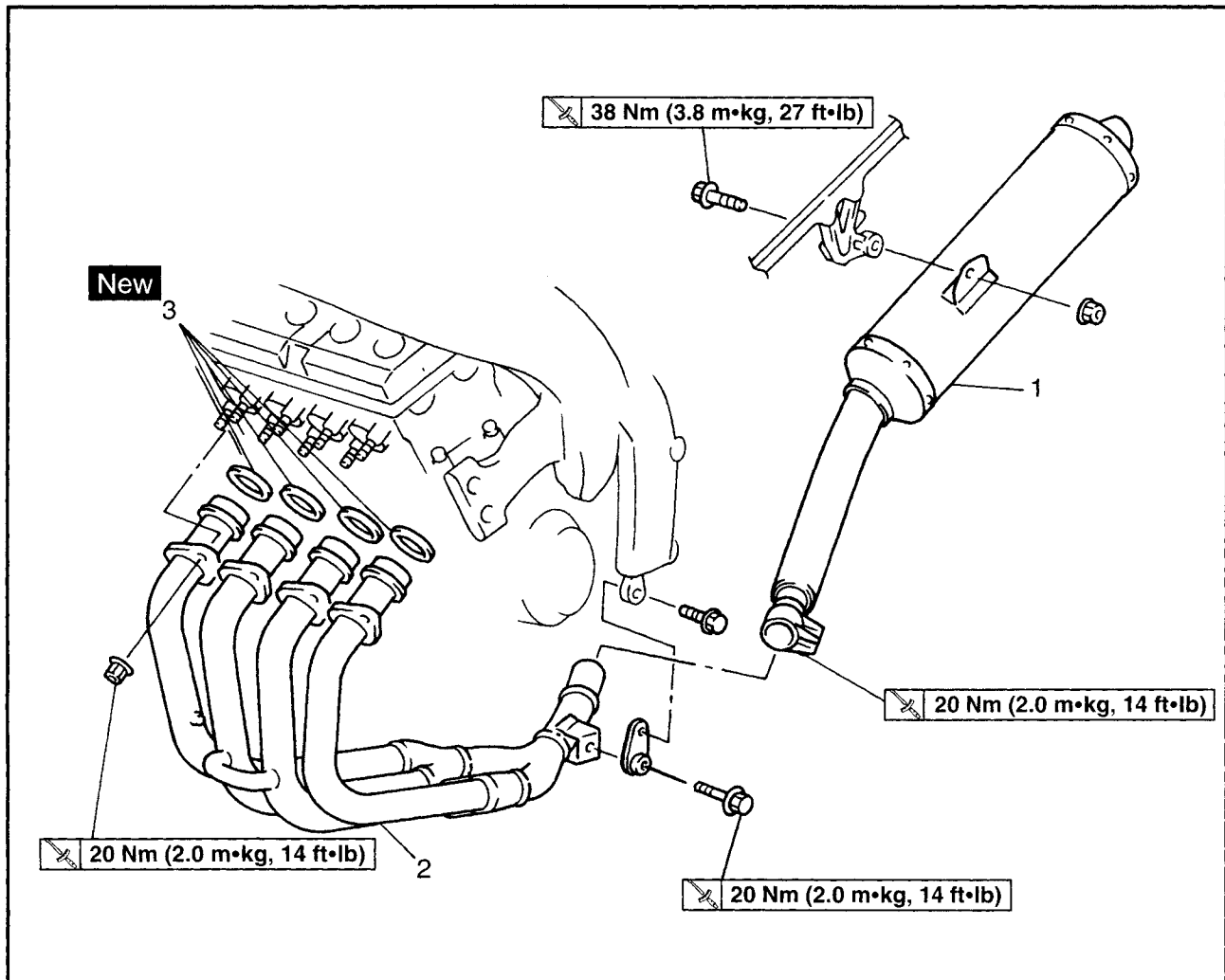
## ENGINE DRIVE SPROCKET



Order	Job/Part	Q'ty	Remarks
	<b>Removing the drive sprocket</b>		
	Reserve tank		Remove the parts in the order listed. Refer to "CHANGING THE COOLANT"
1	Locknut	2	
2	Shift rod	1	
3	Shift arm	1	
4	Drive sprocket cover	1	
5	Nut	1	
6	Lock washer	1	
7	Drive sprocket	1	For installation reverse the remove procedure.



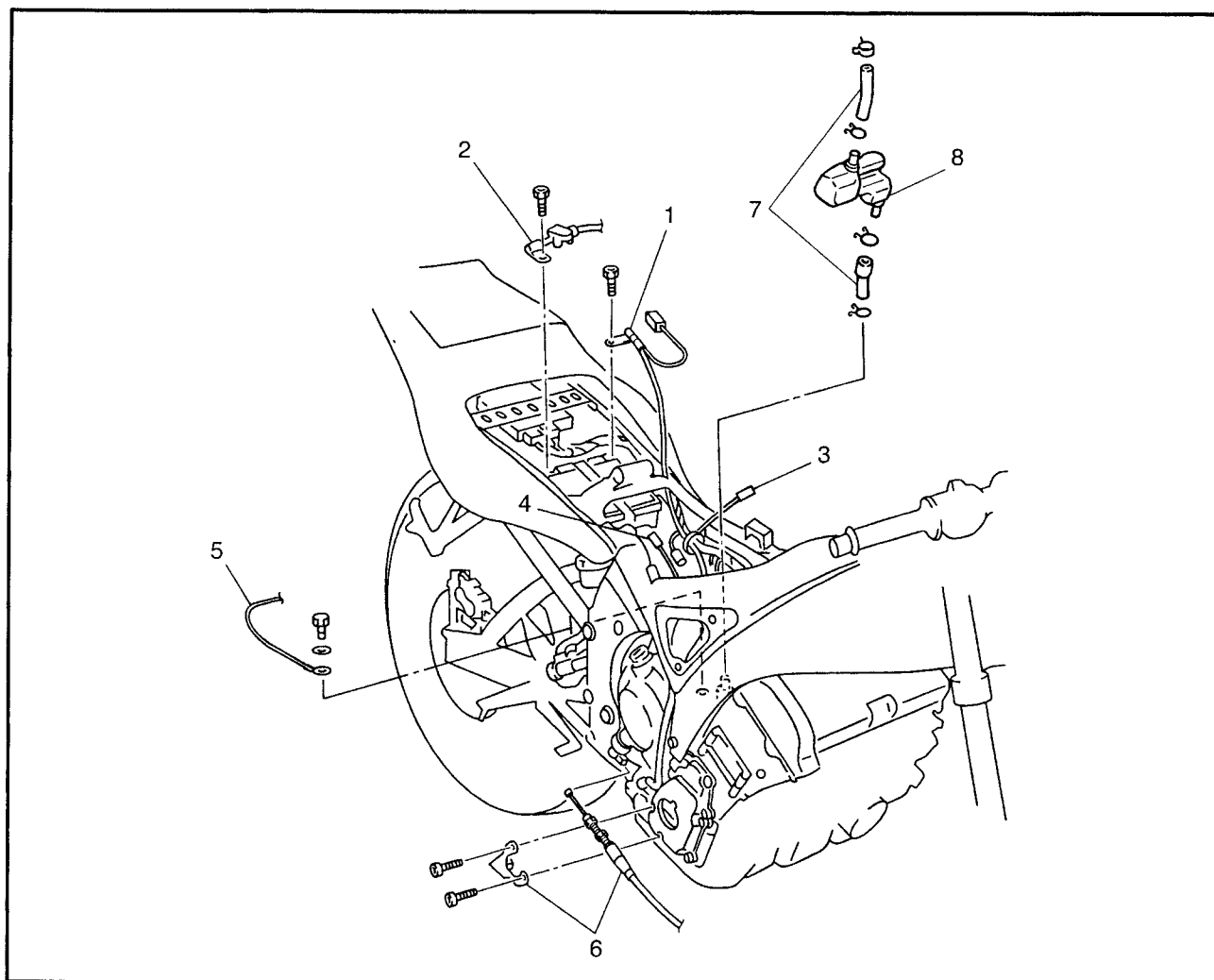
## EXHAUST ASSEMBLY



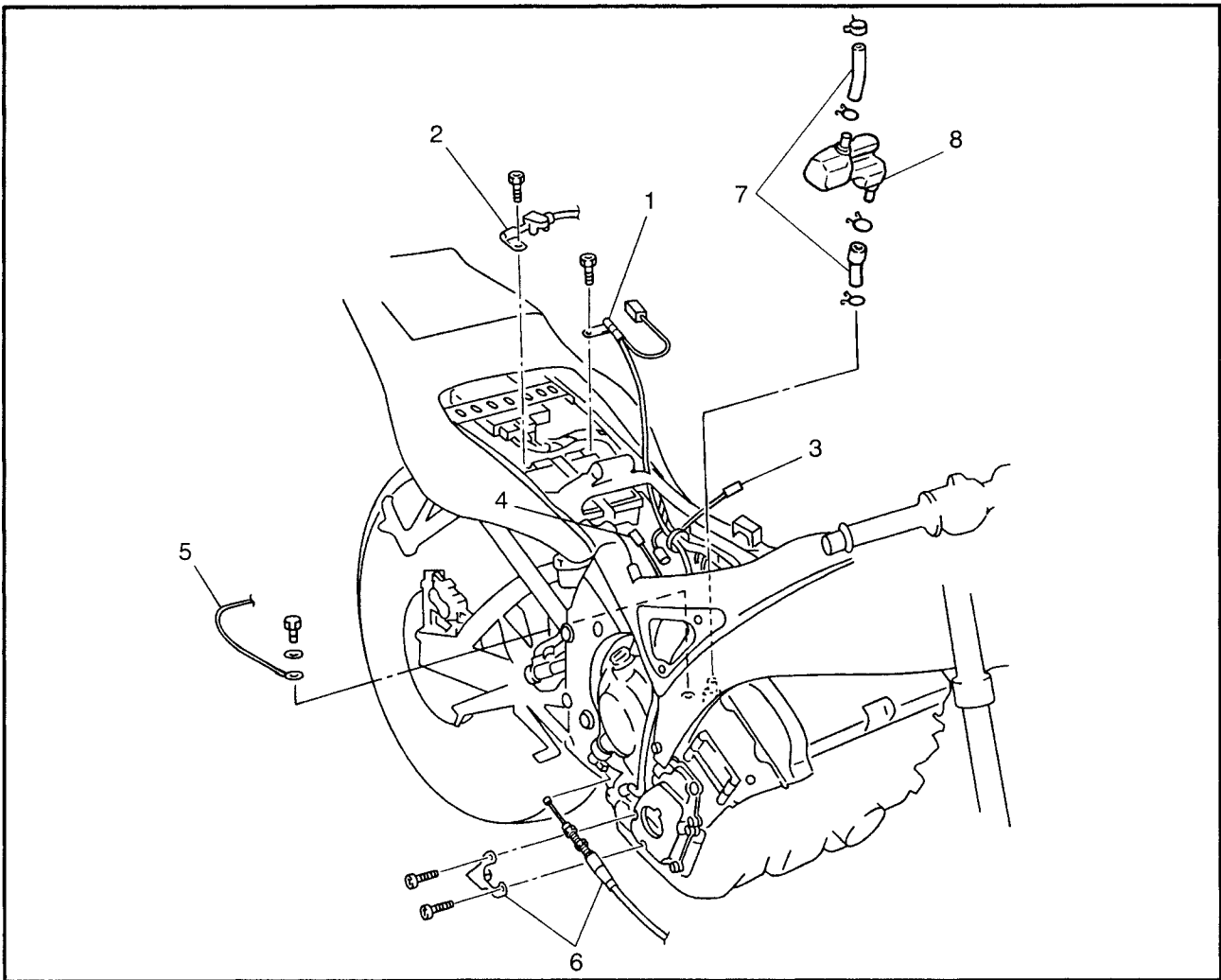
Order	Job/Part	Q'ty	Remarks
	<b>Removing the exhaust assembly</b> Bottom cowl and side cowlings Coolant		Remove the parts in the order listed. Refer to "COWLINGS" in chapter 3 Drain. Refer to "CHANGING THE COOLANT" in chapter 3. Refer to "RADIATOR" in chapter 5.
1	Radiator assembly	1	
2	Muffler	1	
3	Exhaust pipe assembly	1	
	Exhaust pipe gasket	4	
			For installation reverse the removal procedure.




## LEADS AND HOSES



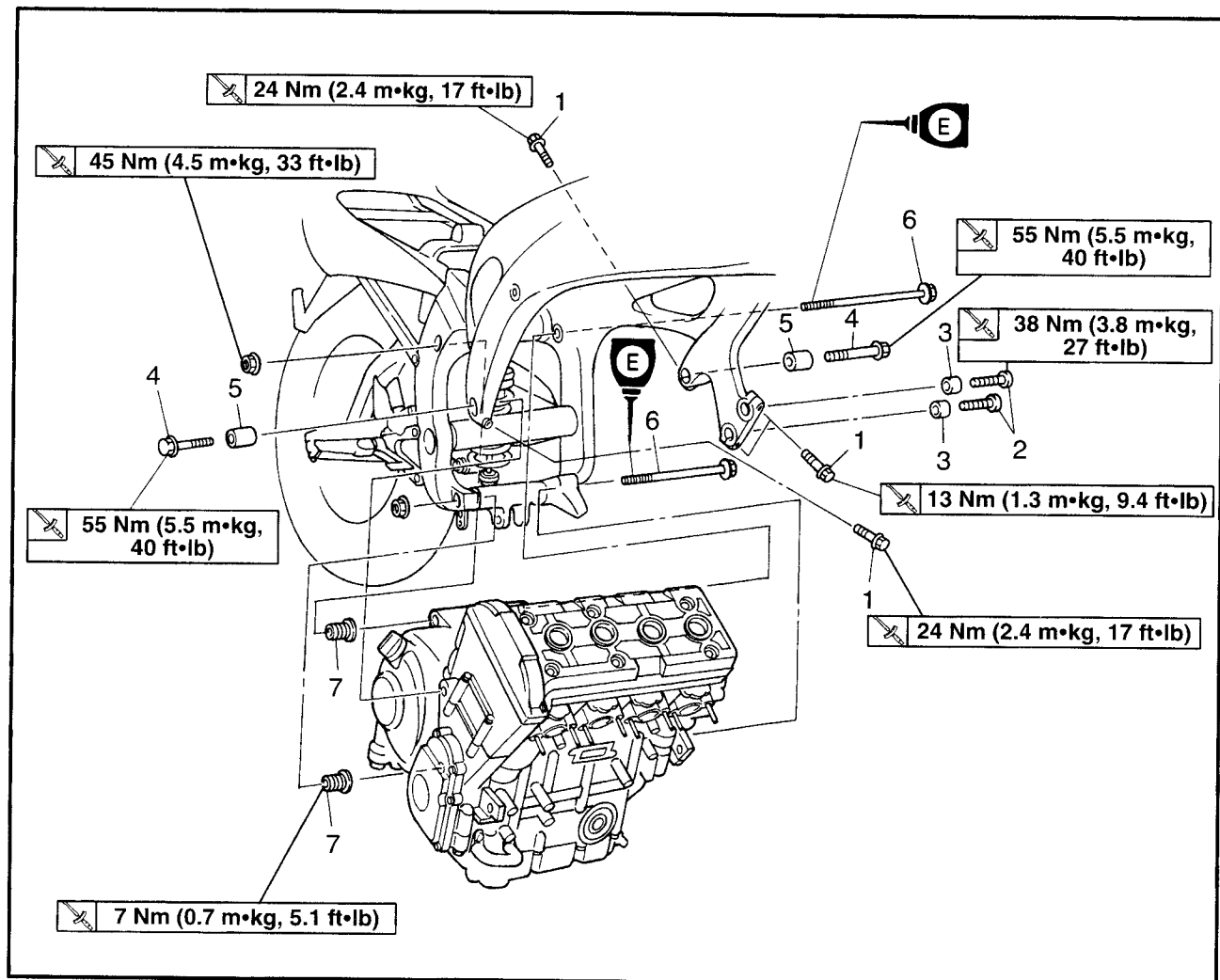
Order	Job/Part	Q'ty	Remarks
	<b>Disconnecting the leads and hoses</b>		
	Fuel tank		Disconnect the parts in the order listed.
	Air filter case		Refer to "FUEL TANK" in chapter 3.
	Carburetor assembly and joints		Refer to "AIR FILTER CASE AND IGNITION COILS" in chapter 3.
	Engine oil and oil filter cartridge		Refer to "CARBURETORS" in chapter 6.
	Oil cooler		Drain.
			Refer to "CHANGING THE ENGINE OIL" in chapter 3.
			Refer to "OIL COOLER" in chapter 5.



Order	Job/Part	Q'ty	Remarks
1	Battery negative lead	1	<b>CAUTION:</b>  _____ <b>First, disconnect the negative lead, then the positive lead.</b> _____  For connecting reverse the disconnecting procedure.
2	Battery positive lead	1	
3	Stator coil assembly coupler	1	
4	Pickup coil coupler	1	
5	Engine earth	1	
6	Clutch wire and holder	1	
7	Crankcase breather hose	1	
8	Separator	1	



## ENGINE



Order	Job/Part	Q'ty	Remarks
	<b>Removing the engine</b>		Remove The Parts In The Order Listed. <b>NOTE:</b> _____ Place a suitable stand under the frame and engine.
1	Pinch bolts	4	Refer to "INSTALLING THE ENGINE".
2	Button head bolts	2	
3	Collars	2	
4	Front mounting bolts	2	
5	Collars	2	
6	Rear mounting bolts	2	
7	Engine mounting adjust bolts	2	
			<b>NOTE:</b> _____ Use the point shaft wrench to loosen the engine mounting adjust bolt.
			For Installation, Reverse The Removal Procedure.



EAS00192

## INSTALLING THE ENGINE

### 1. Install:

- engine mounting adjust bolts ①
- rear mounting bolts ②
- self-locking nuts ③
- collars ④
- front mounting bolts ⑤
- collars ⑥
- button head bolts ⑦
- pinch bolts ⑧

### NOTE:

- Lubricate the rear mounting bolt threads with lithium soap base grease.
- Do not fully tighten the nuts and bolts.

### 2. Tighten:

- self-locking nut 45 Nm (4.5 m•kg, 33 ft•lb)
- front mounting bolts 55 Nm (5.5 m•kg, 40 ft•lb)
- button head bolt 38 Nm (3.8 m•kg, 27 ft•lb)
- pinch bolt M8 24 Nm (2.4 m•kg, 17 ft•lb)
- M6 13 Nm (1.3 m•kg, 9.4 ft•lb)
- engine adjusting bolts

### NOTE:

Use the pivot shaft wrench ① to tighten the engine mounting adjust bolt to finger tightness.



**Pivot shaft wrench**  
90890-01471

### 3. Install:

- drive sprocket 70 Nm (7.0 m•kg, 51 ft•lb)

### 4. Install:

- drive sprocket cover 10 Nm (1.0 m•kg, 7.2 ft•lb)

### NOTE:

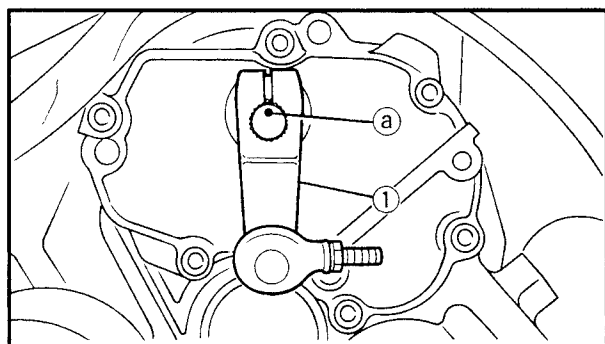
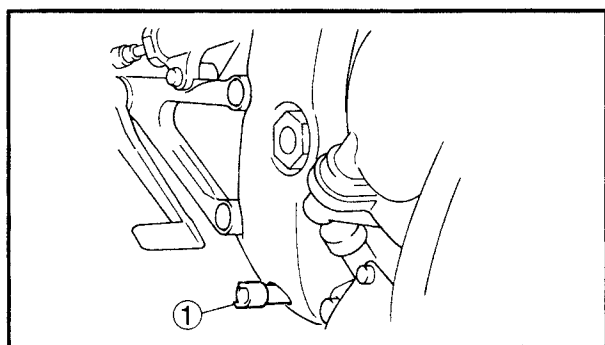
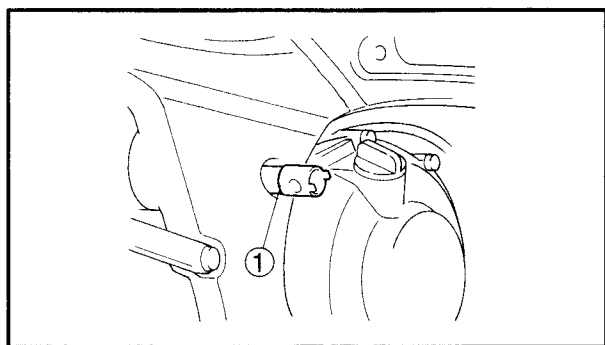
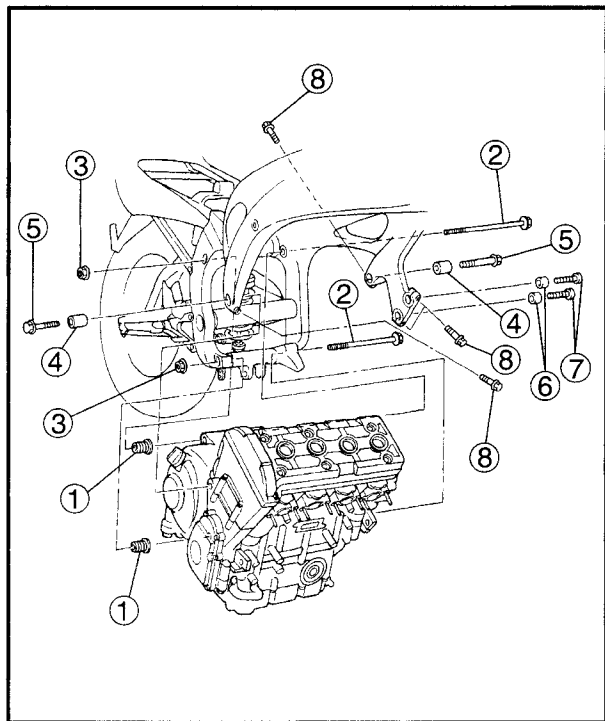
Refer to "CABLE ROUTING" in chapter 2.

### 5. Install:

- shift arm ① 10 Nm (1.0 m•kg, 7.2 ft•lb)

### NOTE:

Align the punch mark ② in the shift shaft with the slot in the shift arm.

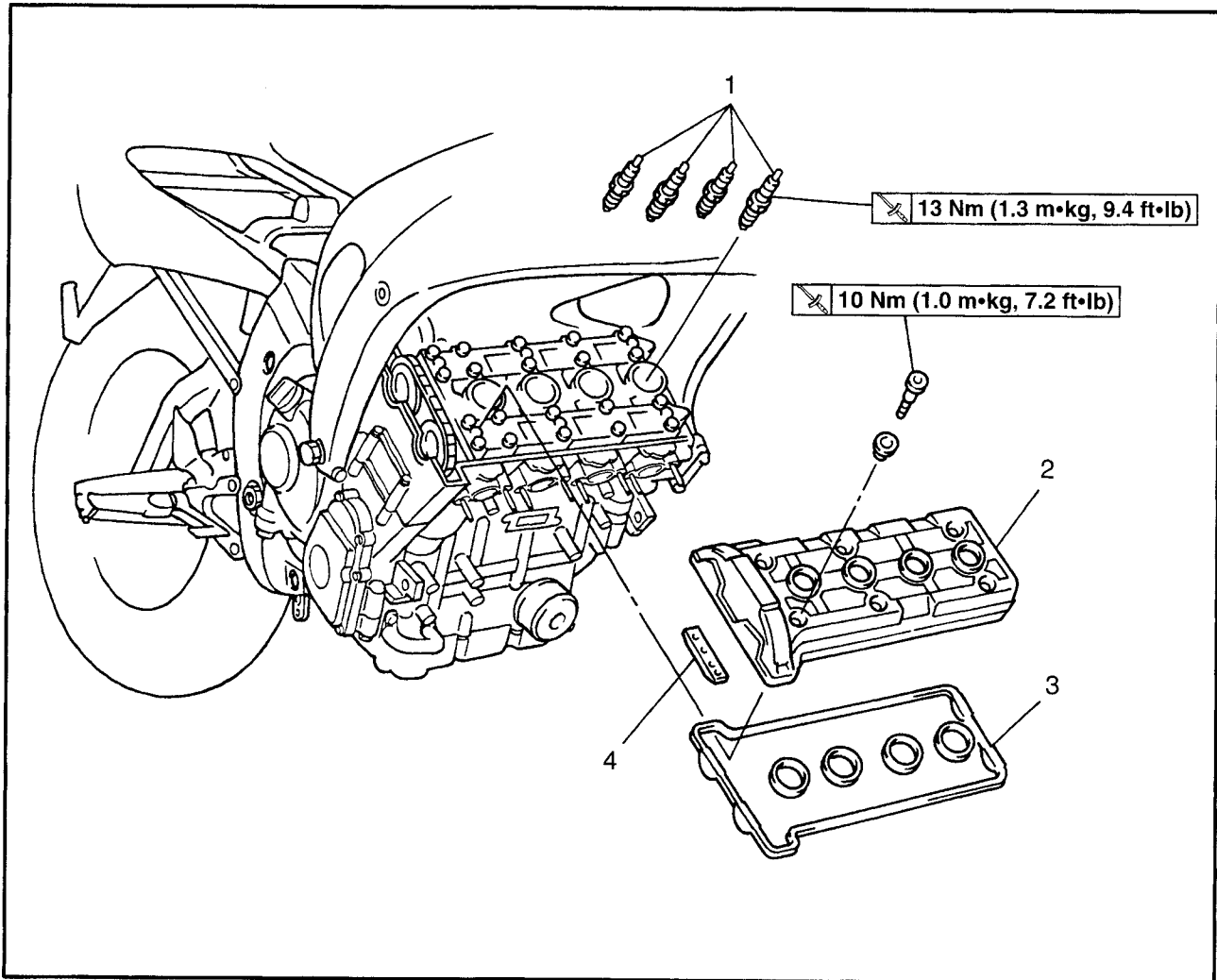




EAS00194

# CAMSHAFTS

## CYLINDER HEAD COVER

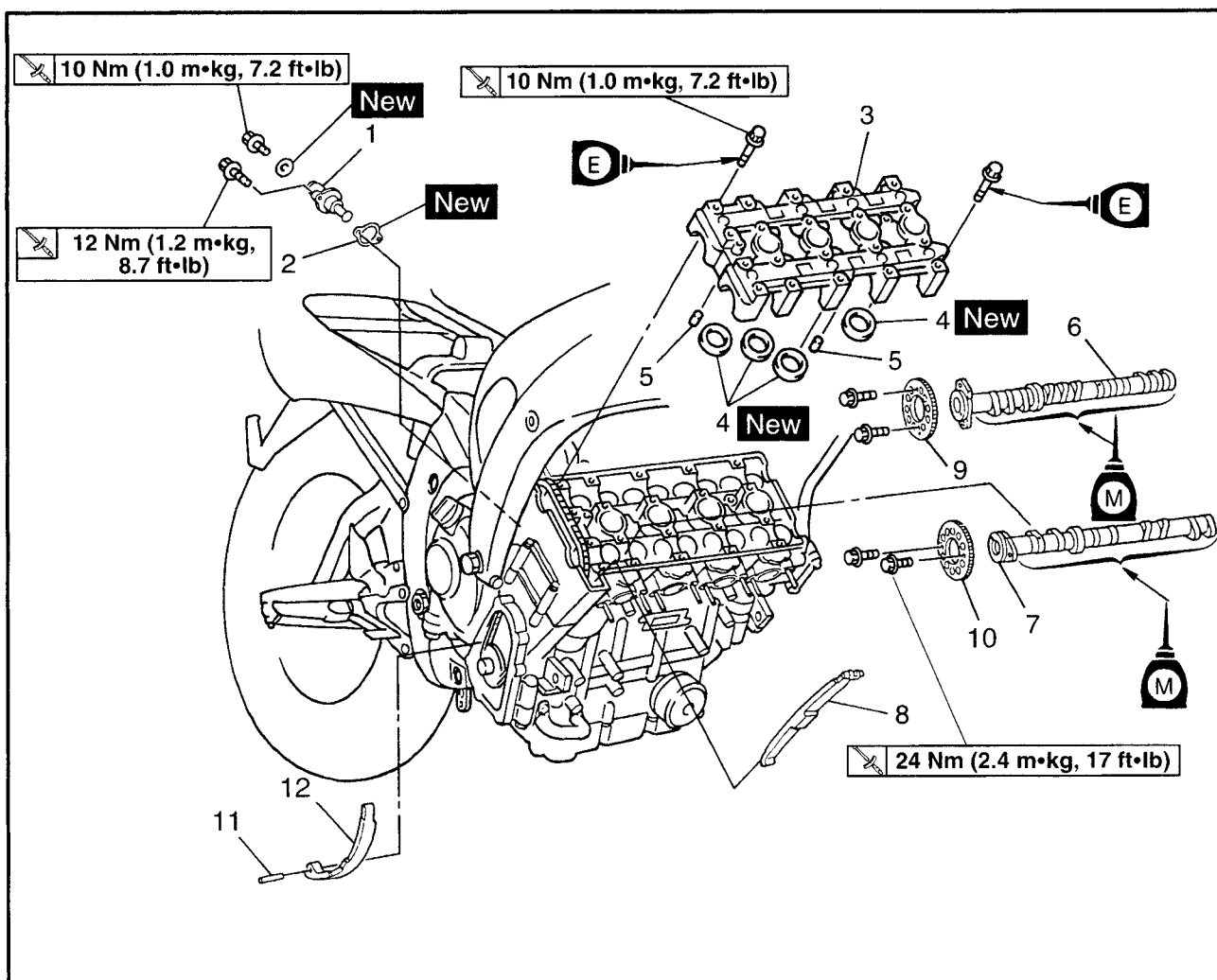


Order	Job/Part	Q'ty	Remarks
	<b>Removing the cylinder head cover</b>		
	Carburetor assembly		Remove the parts in the order listed.
	Radiator assembly		Refer to "CARBURETORS" in chapter 6.
1	Spark plugs	4	Refer to "RADIATOR" in chapter 5.
2	Cylinder head cover	1	
3	Cylinder head cover gasket	1	
4	Timing chain guide (top side)	1	
			For installation reverse the removal procedure.

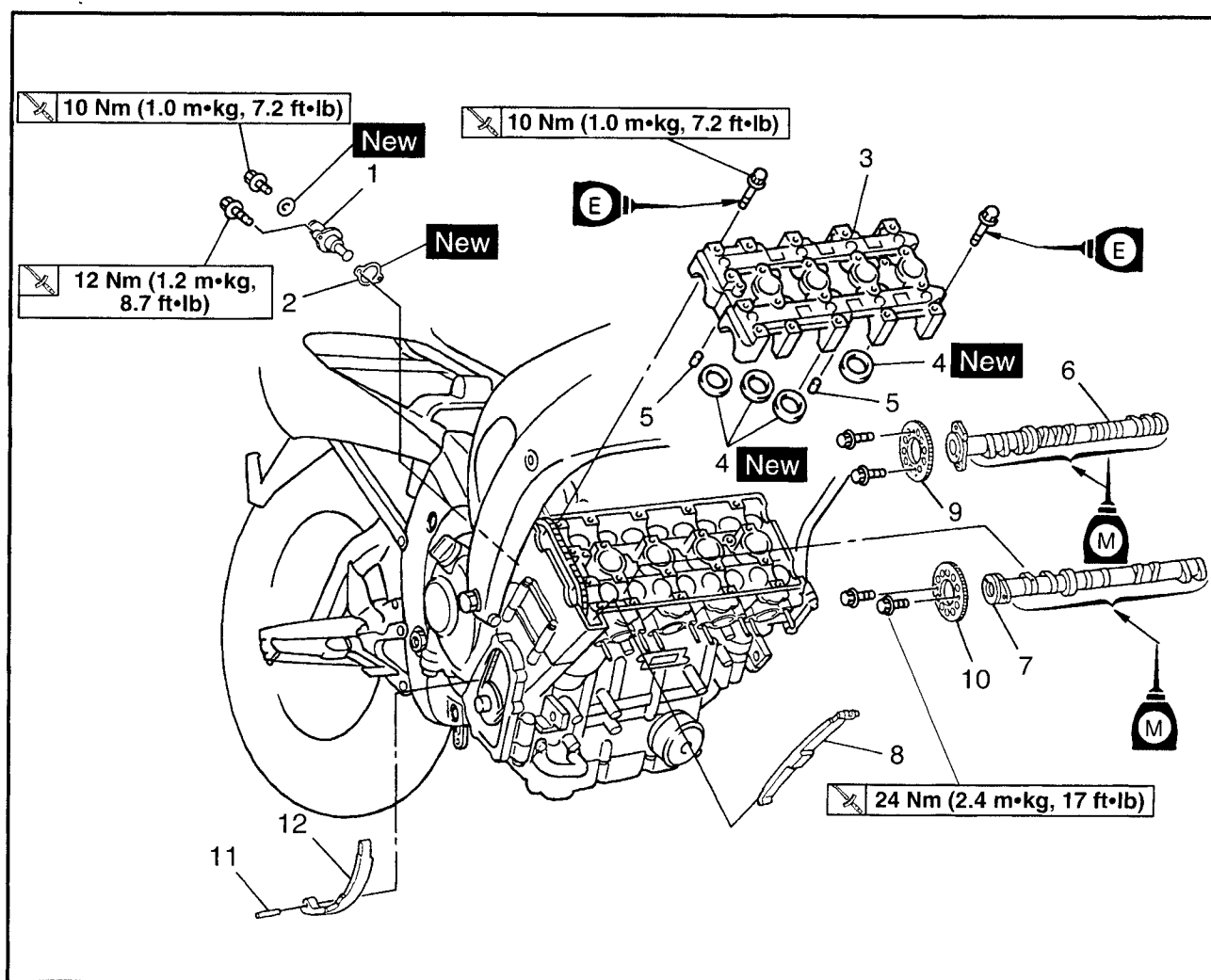


EAS00196

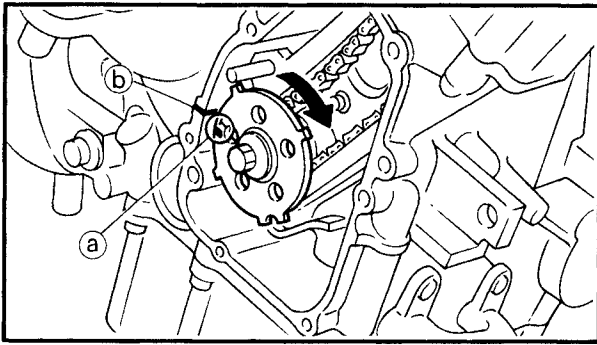
## CAMSHAFTS



Order	Job/Part	Q'ty	Remarks
	<b>Removing the camshafts</b>		
	Pickup coil rotor cover		Remove the parts in the order listed. Refer to "PICKUP COIL AND PICK UP COIL COVER".
1	Timing chain tensioner	1	Refer to "REMOVING/INSTALLING THE CAMSHAFTS". <b>NOTE:</b> During removal, the dowel pins may still be connected to the camshaft cap.
2	Timing chain tensioner gasket	1	
3	Camshaft cap	1	
4	Camshaft cap gasket	4	
5	Dowel pin	2	
6	Intake camshaft	1	Refer to "REMOVING/INSTALLING THE CAMSHAFT".
7	Exhaust camshaft	1	
8	Timing chain guide (exhaust side)	1	



Order	Job/Part	Q'ty	Remarks
9	Intake camshaft sprocket	1	Refer to "INSTALLING THE CAMSHAFTS".
10	Exhaust camshaft sprocket	1	
11	Pin	1	
12	Timing chain guide (intake side)	1	
			For installation reverse the removal procedure.



EAS00198

**REMOVING THE CAMSHAFTS**

## 1. Align:

- TDC mark on the pickup coil rotor (with the crankcase mating surface)

## a. Turn the crankshaft clockwise.

- b. When piston #1 is at TDC on the compression stroke, align the mark (a) on the pickup coil rotor with the crankcase mating surface (b).

**NOTE:**

TDC on the compression stroke can be found when the camshaft lobes are turned away from each other.

## 2. Remove:

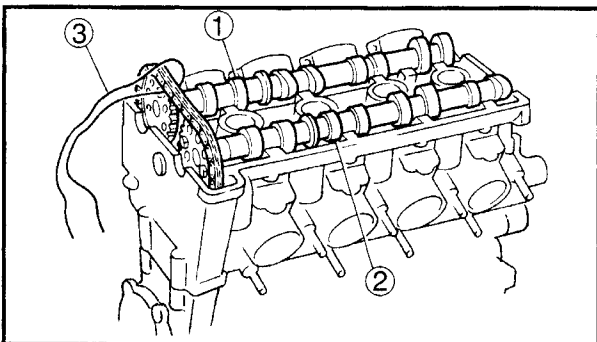
- timing chain tensioner

## 3. Remove:

- camshaft cap
- dowel pins

**CAUTION:**

To prevent damage to the cylinder head, camshafts or camshaft cap, loosen the camshaft cap bolts in stages and in a crisscross pattern, working from the outside in.



## 4. Remove:

- intake camshaft (1)
- exhaust camshaft (2)

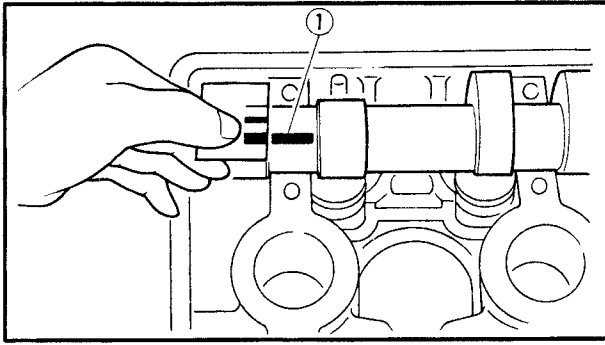
**NOTE:**

To prevent the timing chain from falling into the crankcase, fasten it with a wire (3).

## 5. Remove:

- timing chain guide (exhaust side)





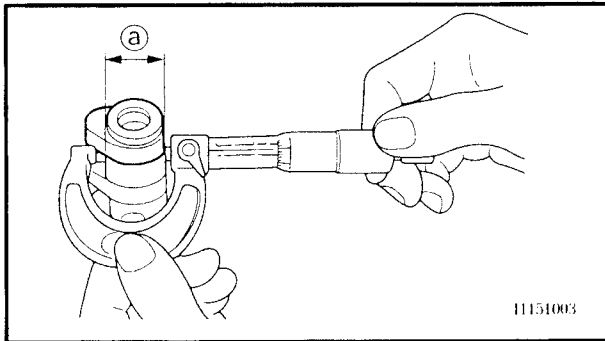
**NOTE:**

- Tighten the camshaft cap bolts in stages and in a crisscross pattern, working from the inner caps out.
- Do not turn the camshaft when measuring the camshaft-journal-to-camshaft-cap clearance with the Plastigauge®.



**Camshaft cap bolt**  
**10 Nm (1.0 m•kg, 7.2 ft•lb)**

- d. Remove the camshaft caps and then measure the width of the Plastigauge® ①.



5. Measure:

- camshaft journal diameter (a)  
 Out of specification → Replace the camshaft.  
 Within specification → Replace the cylinder head and the camshaft caps as a set.



**Camshaft journal diameter**  
**22.967 ~ 22.980 mm**  
**(0.9042 ~ 0.9047 in)**

EAS00208

## CHECKING THE CAMSHAFT SPROCKETS, AND TIMING CHAIN GUIDES


The following procedure applies to all of the camshaft sprockets and timing chain guides.





## INSTALLING THE CAMSHAFTS

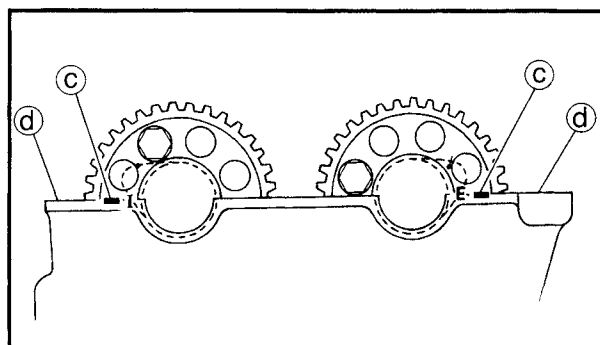
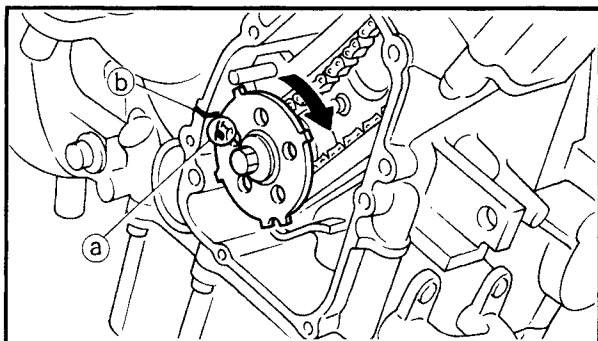
1. Install:
  - timing chain guide (intake side)
  - timing chain guide (exhaust side)
2. Install:
  - intake camshaft sprocket
  - exhaust camshaft sprocket

	24 Nm (2.4 m•kg, 17 ft•lb)
---	----------------------------

 24 Nm (2.4 m•kg, 17 ft•lb)

**NOTE:**

Cam sprocket timing mark is outside and align the cam sprocket hole to camshaft hole.



3. Install:
- exhaust camshaft
  - intake camshaft
  - camshaft cap gasket
  - camshaft cap

a. Turn the crankshaft clockwise.

b. When piston #1 is at TDC on the compression stroke, align the (a) mark on the pickup coil rotor with the crankcase mating surface (b).

c. Install the timing chain onto both camshaft sprockets and then install the camshaft sprockets onto the camshafts.

**CAUTION:**

**Do not turn the crankshaft when installing the camshaft to avoid damage or improper valve timing.**

- d. Install the exhaust and intake camshaft cap.



**Camshaft cap bolt**  
10 Nm (1.0 m•kg, 7.2 ft•lb)

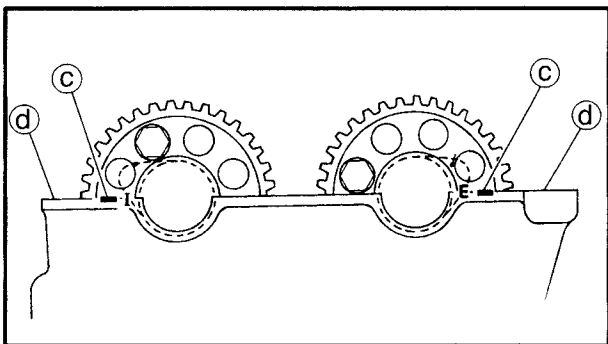
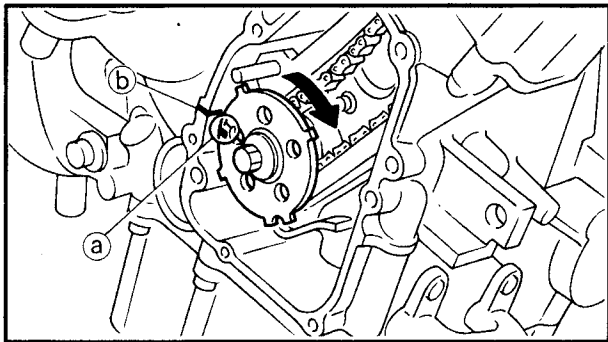
**NOTE:**

Make sure that the camshaft sprocket timing marks ③ are aligned with the cylinder head edge ④

Out of alignment → Reinstall.

- e. Remove the wire from the timing chain.





## 6. Check:

- TDC mark (a)  
Make sure that the TDC mark is aligned with the crankcase mating surface (b).
- camshaft sprocket timing mark (c)  
Make sure that the camshaft sprocket timing mark is aligned with the cylinder head edge (d)  
Out of alignment → Adjust.  
Refer to the installation steps above.

## 7. Measure:

- valve clearance  
Out of specification → Adjust.  
Refer to "ADJUSTING THE VALVE CLEARANCE" in chapter 3.

## 8. Install:

- cylinder head cover gasket
- cylinder head cover

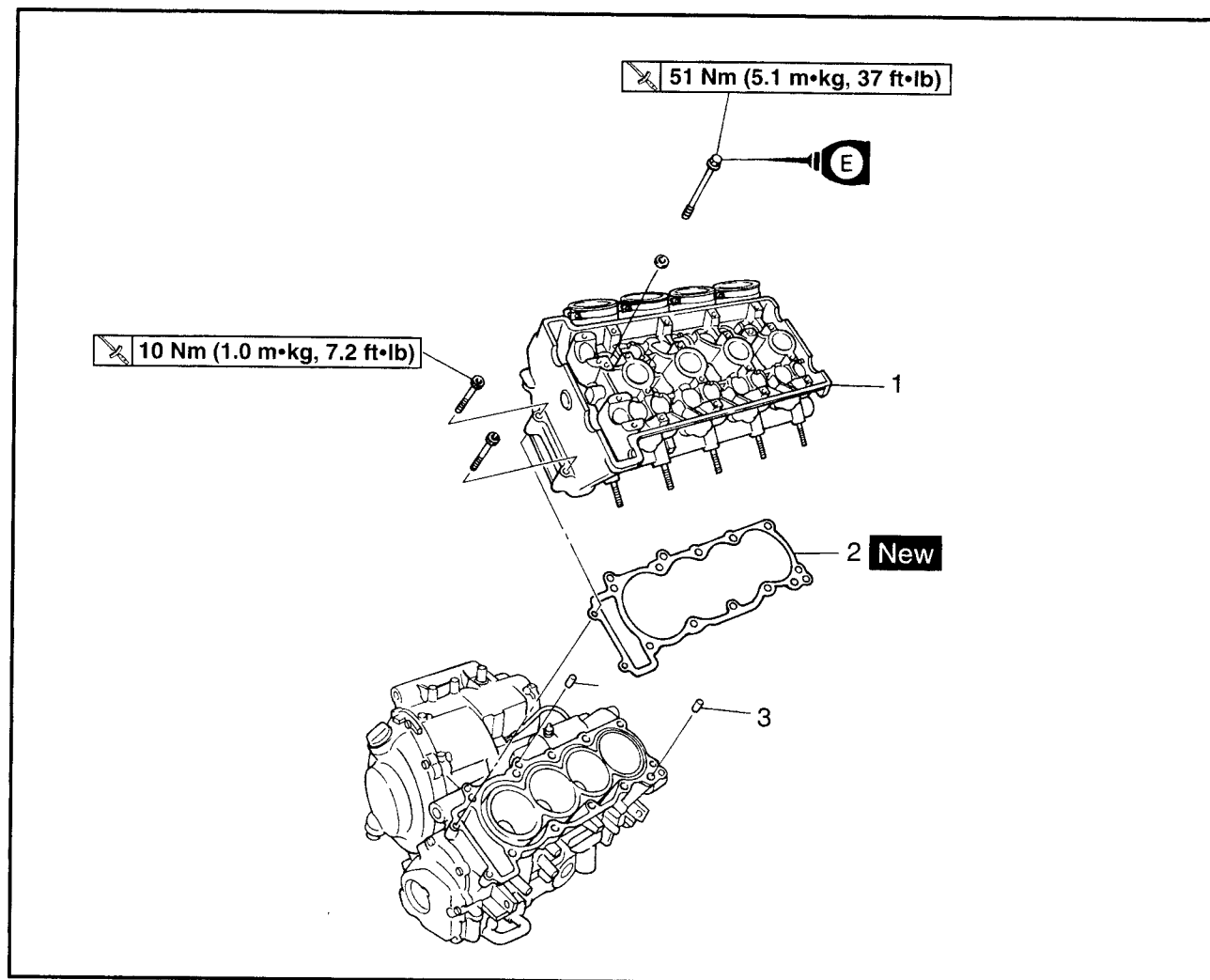
**NOTE:**

- Apply bond TB1541 onto the mating surfaces of the cylinder head cover and cylinder head cover gasket.
- Apply bond 1215B onto the mating surfaces of the cylinder head cover gasket and cylinder head.
- Tighten the cylinder head cover bolts in stages and in a crisscross pattern.

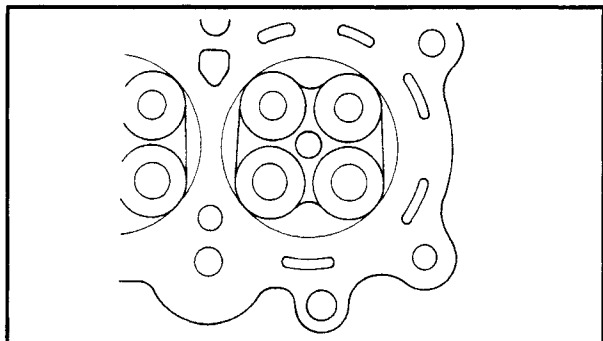
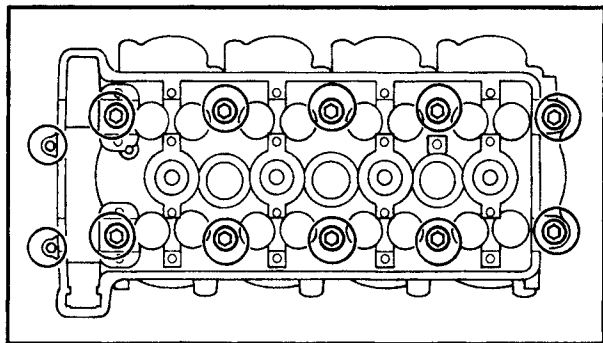


EAS00220

## CYLINDER HEAD



Order	Job/Part	Q'ty	Remarks
1	<b>Removing the cylinder head</b> Intake and exhaust camshafts Water hose Temp sensor lead Front mounting bolt Cylinder head	1	Remove the parts in the order listed. Refer to "CAMSHAFTS". Disconnect Disconnect Refer to "ENGINE". Refer to "REMOVING/INSTALLING THE CYLINDER HEAD".
2	Cylinder head gasket	1	
3	Dowel pin	2	For installation reverse the removal procedure.



EAS00223

**REMOVING THE CYLINDER HEAD**

## 1. Remove:

- cylinder head bolts
- cylinder head

**NOTE:**

Loosen each bolt and nut 1/2 of a turn at a time, in stages and in a crisscross pattern. After all of the bolts and nuts are fully loosened, remove them.

EAS00229

**CHECKING THE CYLINDER HEAD**

## 1. Eliminate:

- combustion chamber carbon deposits (with a rounded scraper)

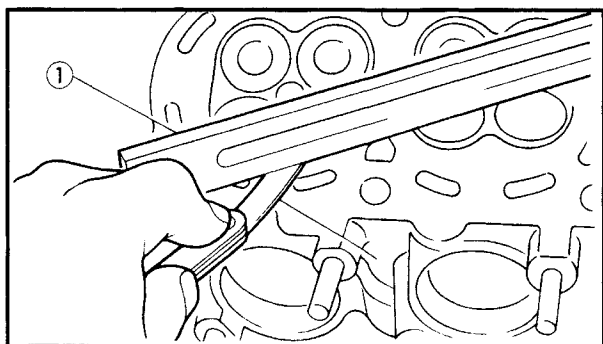
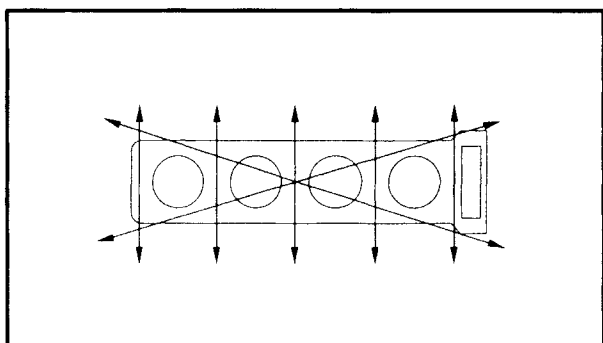
**NOTE:**

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

- spark plug bore threads
- valve seats

## 2. Check:

- cylinder head  
Damage/scratches → Replace.
- cylinder head water jacket  
Mineral deposits/rust → Eliminate.



## 3. Measure:

- cylinder head warpage  
Out of specification → Resurface the cylinder head.



**Max. cylinder head warpage**  
**0.05 mm (0.002 in)**

- Place a straightedge ① and a thickness gauge ② across the cylinder head.
- Measure the warpage.
- If the limit is exceeded, resurface the cylinder head as follows.



- d. Place a 400 ~ 600 grit wet sandpaper on the surface plate and resurface the cylinder head using a figure-eight sanding pattern.

**NOTE:**


To ensure an even surface, rotate the cylinder head several times.




EAS00223

**INSTALLING THE CYLINDER HEAD****1. Install:**

- cylinder head gasket
- cylinder head
- cylinder headbolt

(M10)  51 Nm (5.1 m•kg, 37 ft•lb)

(M6)  10 Nm (1.0 m•kg, 7.2 ft•lb)

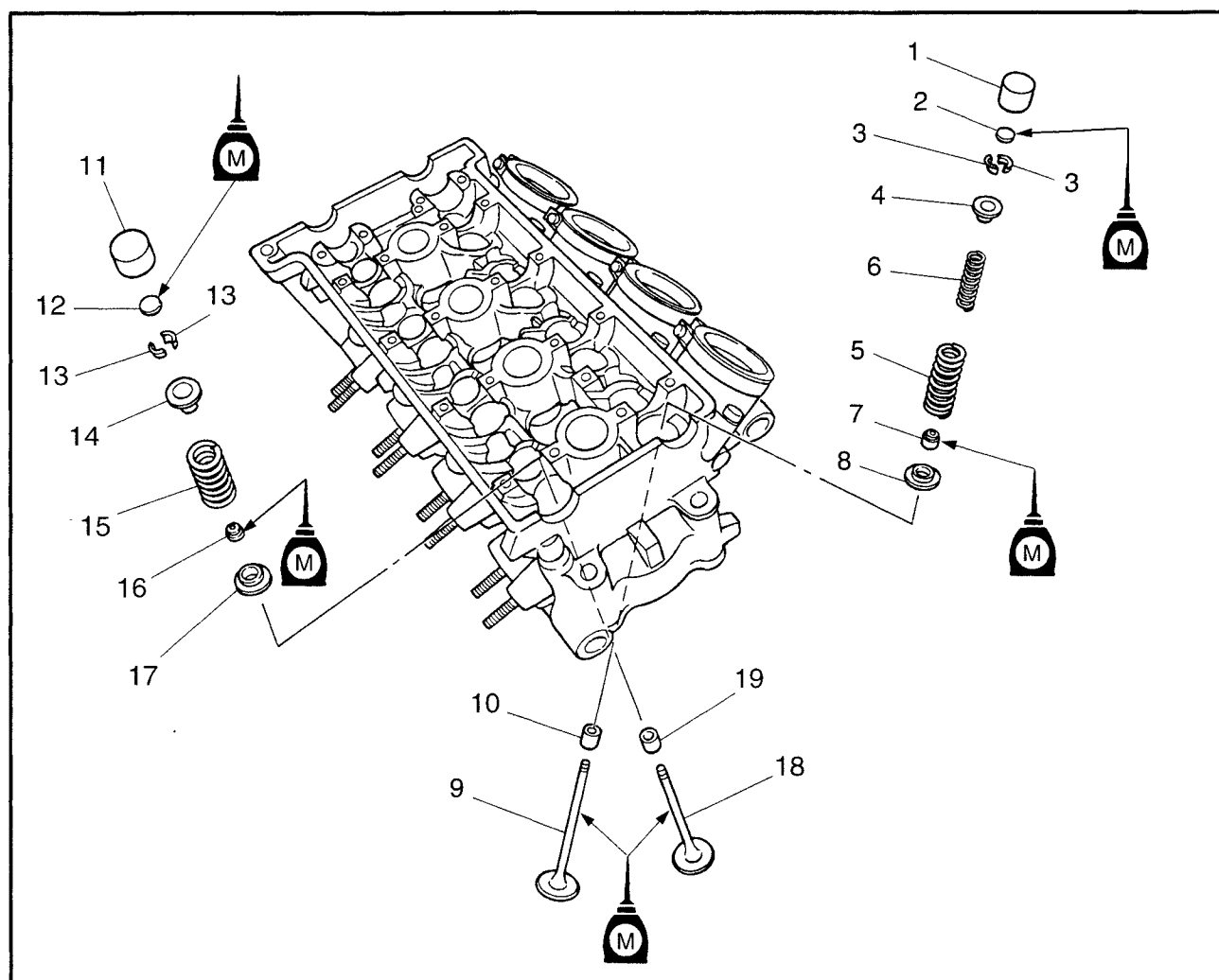
**NOTE:**

- Lubricate the cylinder head nuts with engine oil.
- Tighten the cylinder head nuts and bolts in two stages and in a crisscross pattern.

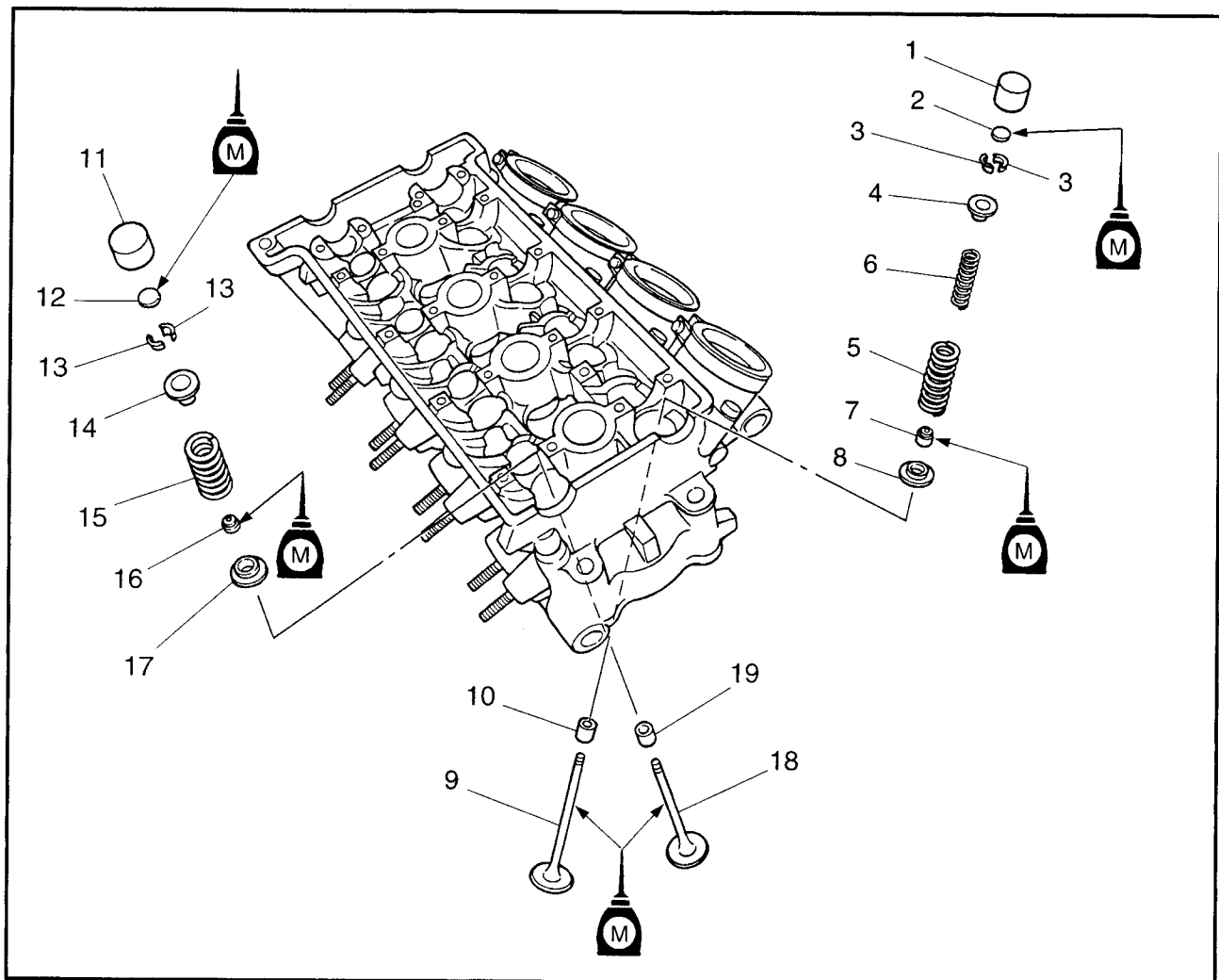


EAS00236

## VALVES AND VALVE SPRINGS



Order	Job/Part	Q'ty	Remarks
	<b>Removing the valves and valve springs</b>		
	Cylinder head		Remove the parts in the order listed.
			Refer to "CYLINDER HEAD".
1	Intake valve lifter	8	Refer to "REMOVING/INSTALLING THE VALVES".
2	Intake valve pad	8	
3	Intake valve cotter	16	
4	Intake valve upper spring seat	8	
5	Intake valve spring outer	8	
6	Intake valve spring inner	8	
7	Intake valve oil seal	8	
8	Intake valve lower spring seat	8	
9	Intake valve	8	
10	Intake valve guide	8	



Order	Job/Part	Q'ty	Remarks
11	Exhaust valve lifter	8	Refer to "REMOVING/INSTALLING THE VALVES".
12	Exhaust valve pad	8	
13	Exhaust valve cotter	16	
14	Exhaust valve upper spring seat	8	
15	Exhaust valve spring	8	
16	Exhaust valve oil seal	8	
17	Exhaust valve lower spring seat	8	
18	Exhaust valve	8	For installation, reverse the removal procedure.
19	Exhaust valve guide	8	



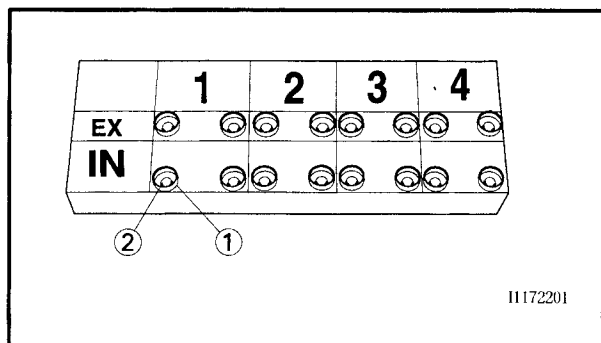
EAS00237

## REMOVING THE VALVES

The following procedure applies to all of the valves and related components.

**NOTE:**

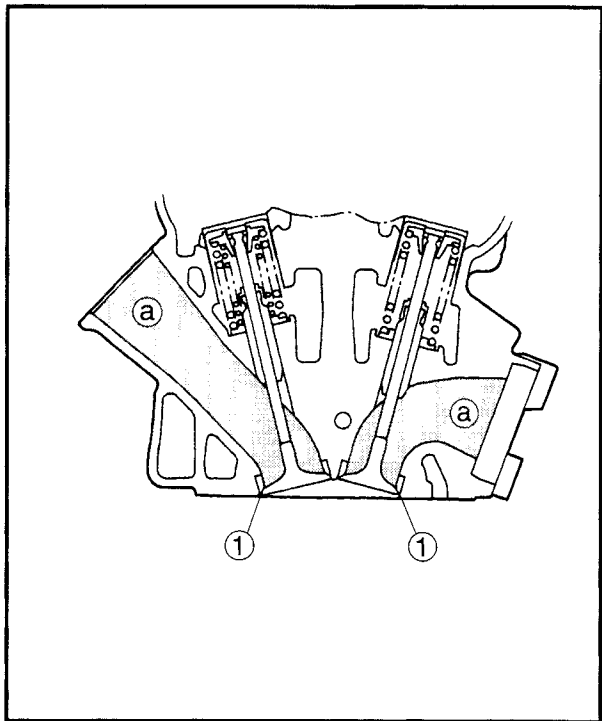
Before removing the internal parts of the cylinder head (e.g., valves, valve springs, valve seats), make sure that the valves properly seal.



1. Remove:
  - valve lifter ①
  - valve pad ②

**NOTE:**

Make a note of the position of each valve lifter and valve pad so that they can be reinstalled in their original place.

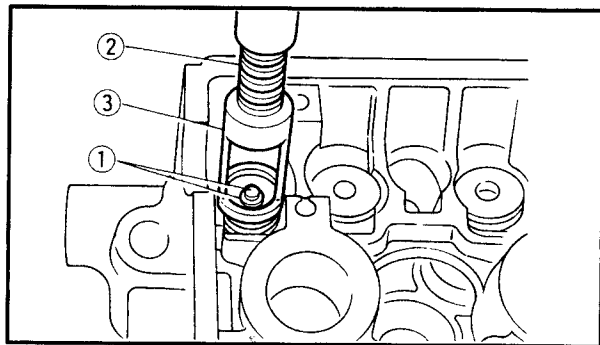


2. Check:
- valve (for leakage)  
Leakage at the valve seat → Check the valve face, valve seat, and valve seat width.  
Refer to “CHECKING THE VALVE SEATS”.

- Pour a clean solvent (a) into the intake and exhaust ports.
- Check that the valves properly seal.

**NOTE:**

There should be no leakage at the valve seat  
①.



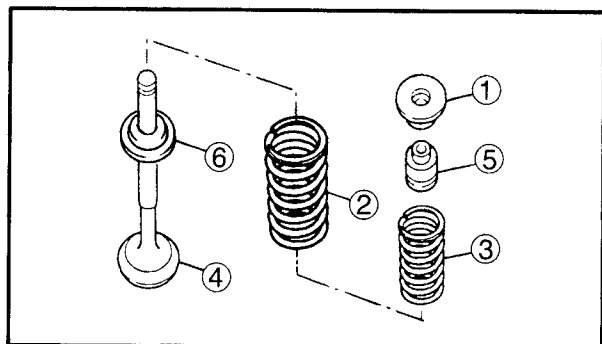
3. Remove:
- valve cotteners ①

## NOTE:

Remove the valve cotteners by compressing the valve spring with the valve spring compressor ② and attachment ③.



**Valve spring compressor**  
90890-04019, YM-04019  
**Attachment**  
90890-04114, YM-01253-1



4. Remove:
- upper spring seat ①
  - valve spring outer ②
  - valve spring inner (intake only) ③
  - valve ④
  - oil seal ⑤
  - lower spring seat ⑥

## NOTE:

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

EAS00239

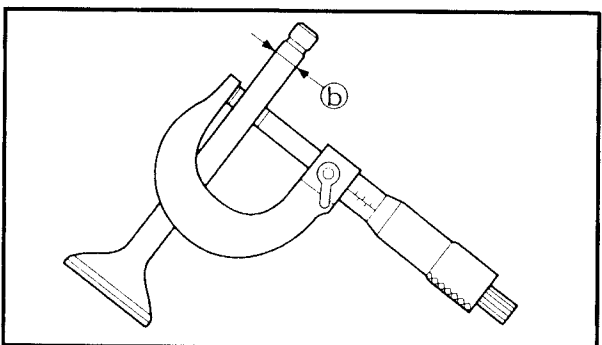
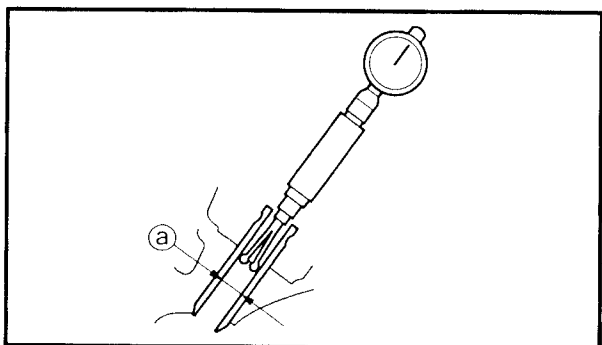
## CHECKING THE VALVES AND VALVE GUIDES

The following procedure applies to all of the valves and valve guides.

1. Measure:
- valve-stem-to-valve-guide clearance

**Valve-stem-to-valve-guide clearance =**  
**Valve guide inside diameter (a) –**  
**Valve stem diameter (b)**

Out of specification → Replace the valve guide.



## Valve-stem-to-valve-guide clearance

### Intake

0.010 ~ 0.037 mm  
(0.0004 ~ 0.0015 in)

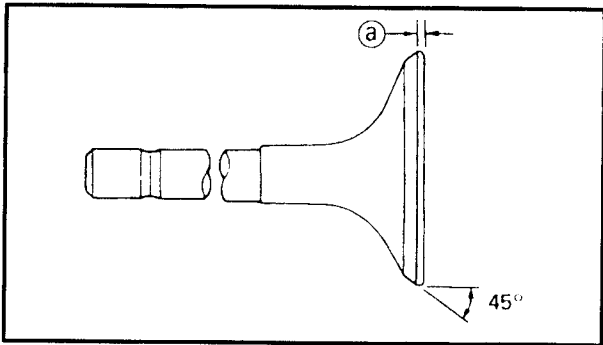
<Limit> : 0.08 mm (0.0031 in)

### Exhaust

0.025 ~ 0.052 mm  
(0.001 ~ 0.002 in)

<Limit>: 0.1 mm (0.0039 in)





5. Measure:

- valve margin thickness (a)

Out of specification → Replace the valve.

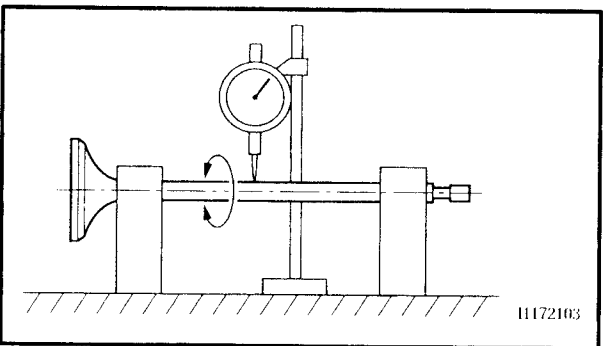


## Valve margin thickness

0.6 mm ~ 0.8 mm

(0.0236 ~ 0.0315 in)

<LIMIT>: 0.5 mm (0.02 in)



6. Measure:

- valve stem runout

Out of specification → Replace the valve.

## NOTE:

- When installing a new valve, always replace the valve guide.
- If the valve is removed or replaced, always replace the oil seal.



## Valve stem runout

0.04 mm (0.0016 in)

EAS00240

## CHECKING THE VALVE SEATS

The following procedure applies to all of the valves and valve seats.

1. Eliminate:

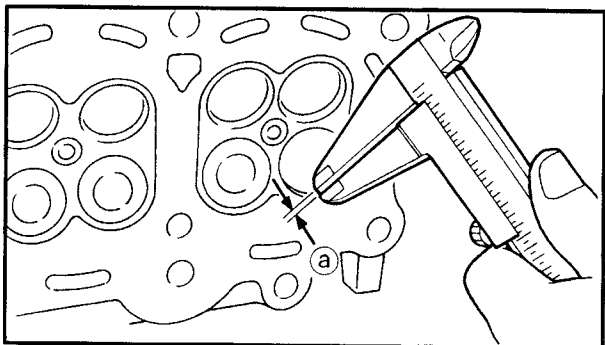
- carbon deposits  
(from the valve face and valve seat)

2. Check:

- valve seat  
Pitting/wear → Replace the cylinder head.

3. Measure:

- valve seat width (a)  
Out of specification → Replace the cylinder head.



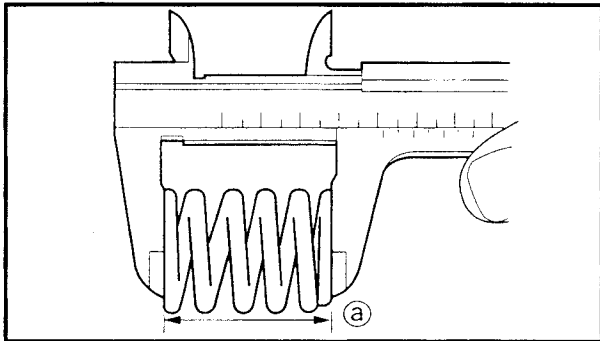
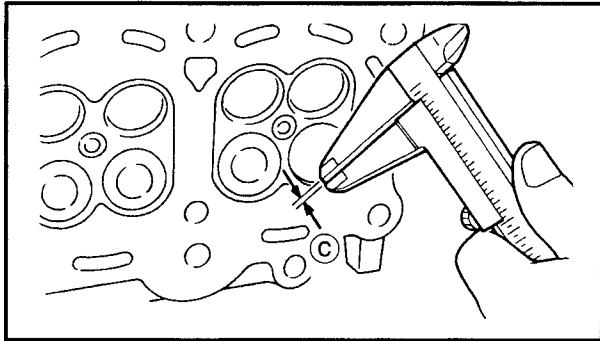
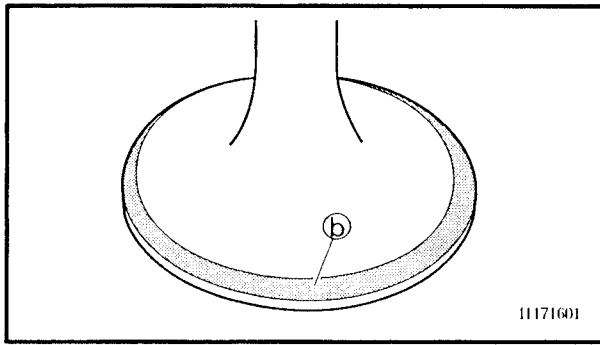
## Valve seat width

Intake: 0.9 ~ 1.1 mm

(0.0354 ~ 0.0433 in)

<Limit>: 1.6 mm (0.06 in)





- e. Apply a fine lapping compound to the valve face and repeat the above steps.
- f. After every lapping procedure, be sure to clean off all of the lapping compound from the valve face and valve seat.
- g. Apply Mechanic's blueing dye (Dykem) ⑥ onto the valve face.
- h. Install the valve into the cylinder head.
- i. Press the valve through the valve guide and onto the valve seat to make a clear impression.
- j. Measure the valve seat width ⑦ again. If the valve seat width is out of specification, reface and lap the valve seat.

EAS00241

## CHECKING THE VALVE SPRINGS

The following procedure applies to all of the valve springs.

1. Measure:
  - valve spring free length (a)  
Out of specification → Replace the valve spring.



### Valve spring free length

**Intake valve spring (inner)**

**37.0 mm (1.46 in)**

**<Limit>: 35mm (1.38 in)**

**Intake valve spring (outer)**

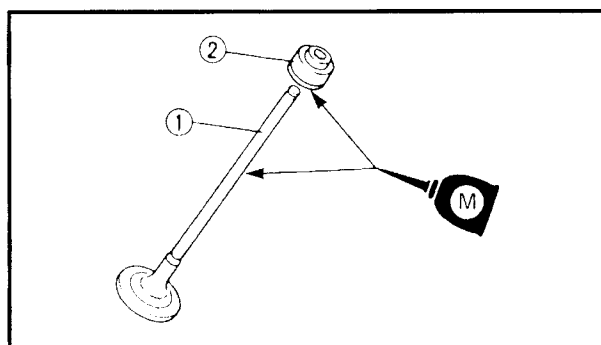
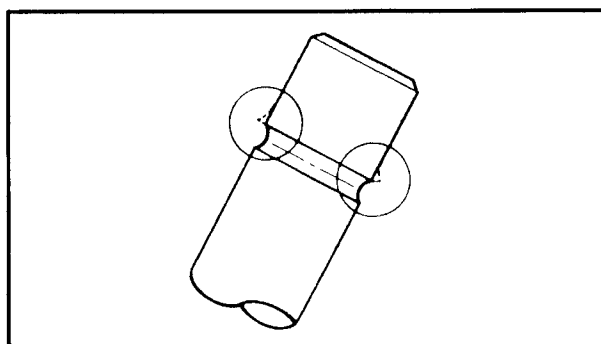
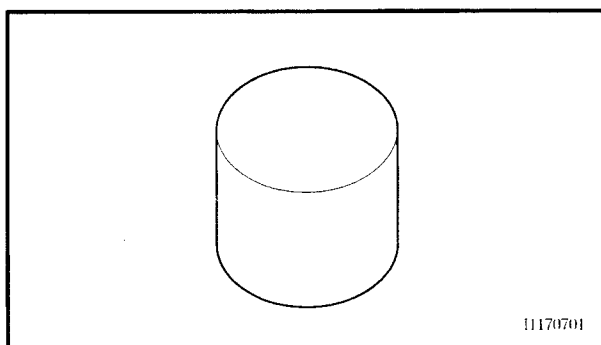
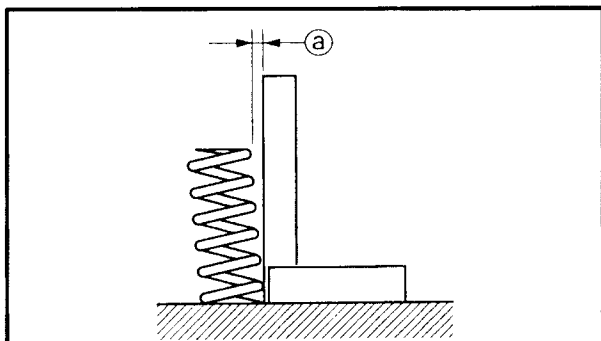
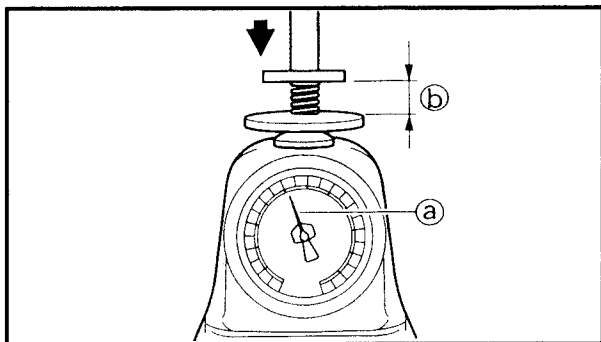
**38.4 mm (1.51 in)**

**<Limit>: 36.5mm (1.44 in)**

### Exhaust valve spring

**41.7 mm (1.64 in)**

**<Limit>: 39.5mm (1.56 in)**



## 2. Measure:

- compressed spring force (a)

Out of specification → Replace the valve spring.

## (b) Installed length



### Compressed spring force (installed)

#### Intake valve spring inner

69 ~ 79 N (15.51 ~ 17.76 lb,  
7.04 ~ 8.06 kg) at 30.0 mm  
(1.18 in)

#### Intake valve spring outer

114 ~ 132 N (25.63 ~ 29.67 lb,  
11.62 ~ 13.46 kg) at 32.5 mm  
(1.28 in)

#### Exhaust valve spring

160 ~ 184 N (35.97 ~ 41.36 lb,  
16.32 ~ 18.76 kg) at 36.1 mm  
(1.42 in)

## 3. Measure:

- valve spring tilt (a)

Out of specification → Replace the valve spring.



### Max. Spring tilt

#### Intake valve spring inner

2.5° / 1.6 mm (0.06 in)

#### Intake valve spring outer

2.5° / 1.7 mm (0.07 in)

#### Exhaust valve spring

2.5° / 1.8 mm (0.07 in)

EAS00242

## CHECKING THE VALVE LIFTERS

The following procedure applies to all of the valve lifters.

## 1. Check:

- valve lifter

Damage/scratches → Replace the valve lifters and cylinder head.

EAS00247

## INSTALLING THE VALVES

The following procedure applies to all of the valves and related components.

## 1. Deburr:

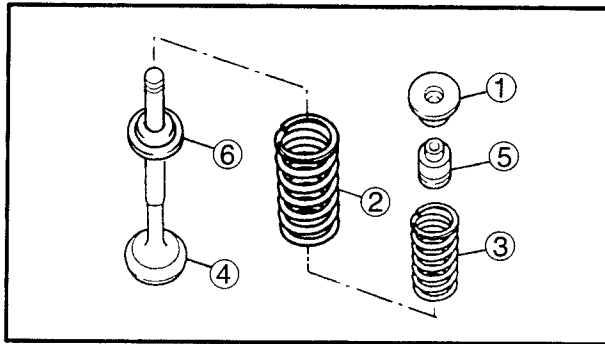
- valve stem end  
(with an oil stone)

## 2. Lubricate:

- valve stem (1)
- oil seal (2)  
(with the recommended lubricant)



**Recommended lubricant**  
Molybdenum disulfide oil

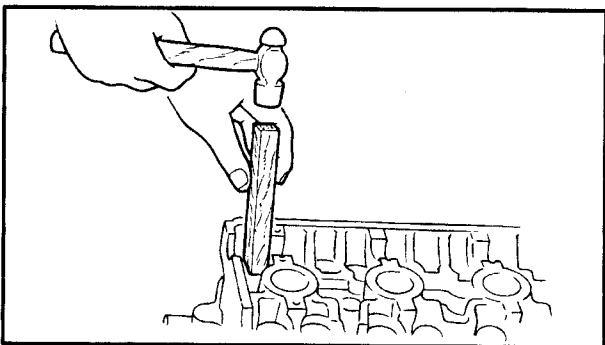
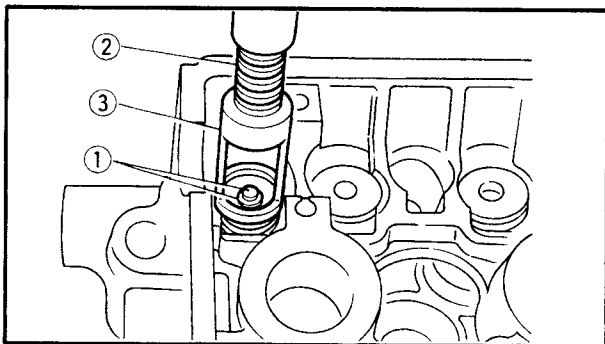
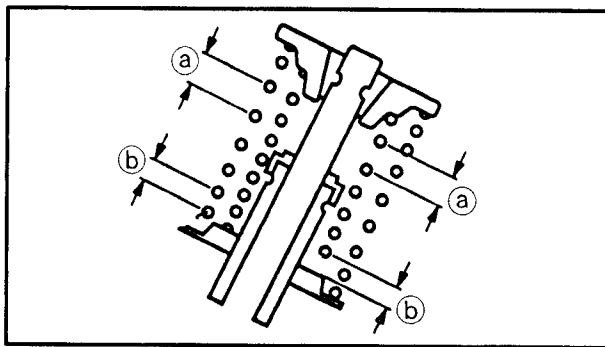


3. Install:
- lower spring seat ⑥
  - oil seal ⑤ **New**
  - valve ④
  - valve spring inner (intake only) ③
  - valve spring outer ②
  - upper spring seat ①  
(into the cylinder head)

**NOTE:**

- Make sure that each valve is installed in its original place. Refer to the following embossed marks.
- Install the valve spring with the larger pitch ② facing up.

② Smaller pitch



4. Install:
- valve coppers ①

**NOTE:**

Install the valve coppers by compressing the valve spring with the valve spring compressor ② and attachment ③.



**Valve spring compressor**  
90890-04019, YM-04019  
**Attachment**  
90890-04114, YM-01253-1

5. To secure the valve coppers ① onto the valve stem, lightly tap the valve tip with a soft-face hammer.

**CAUTION:**

Hitting the valve tip with excessive force could damage the valve.



6. Lubricate:

- valve pad  
(with the recommended lubricant)



**Recommended lubricant**  
**Molybdenum disulfide oil**

7. Install:

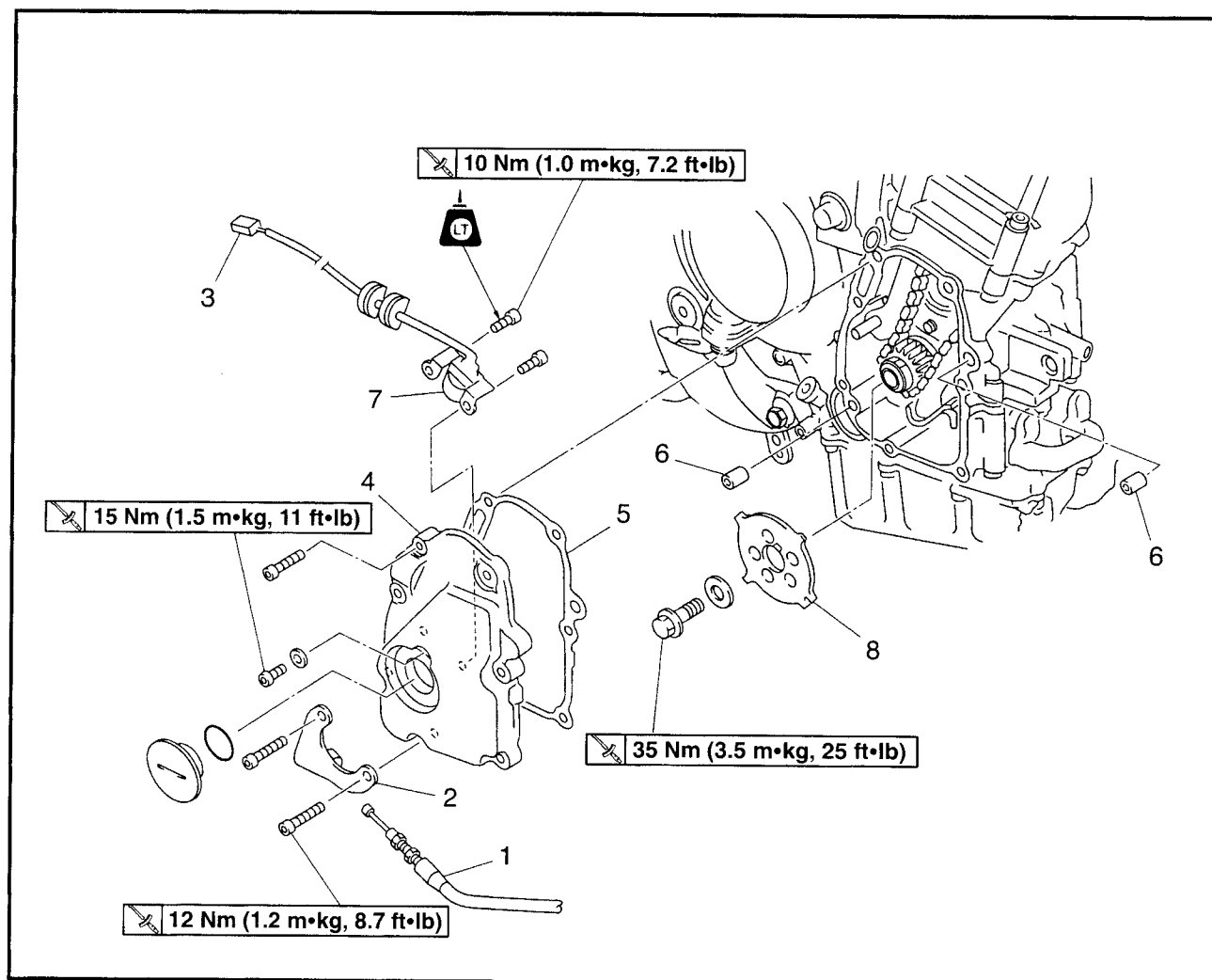
- valve pad
- valve lifter

**NOTE:**

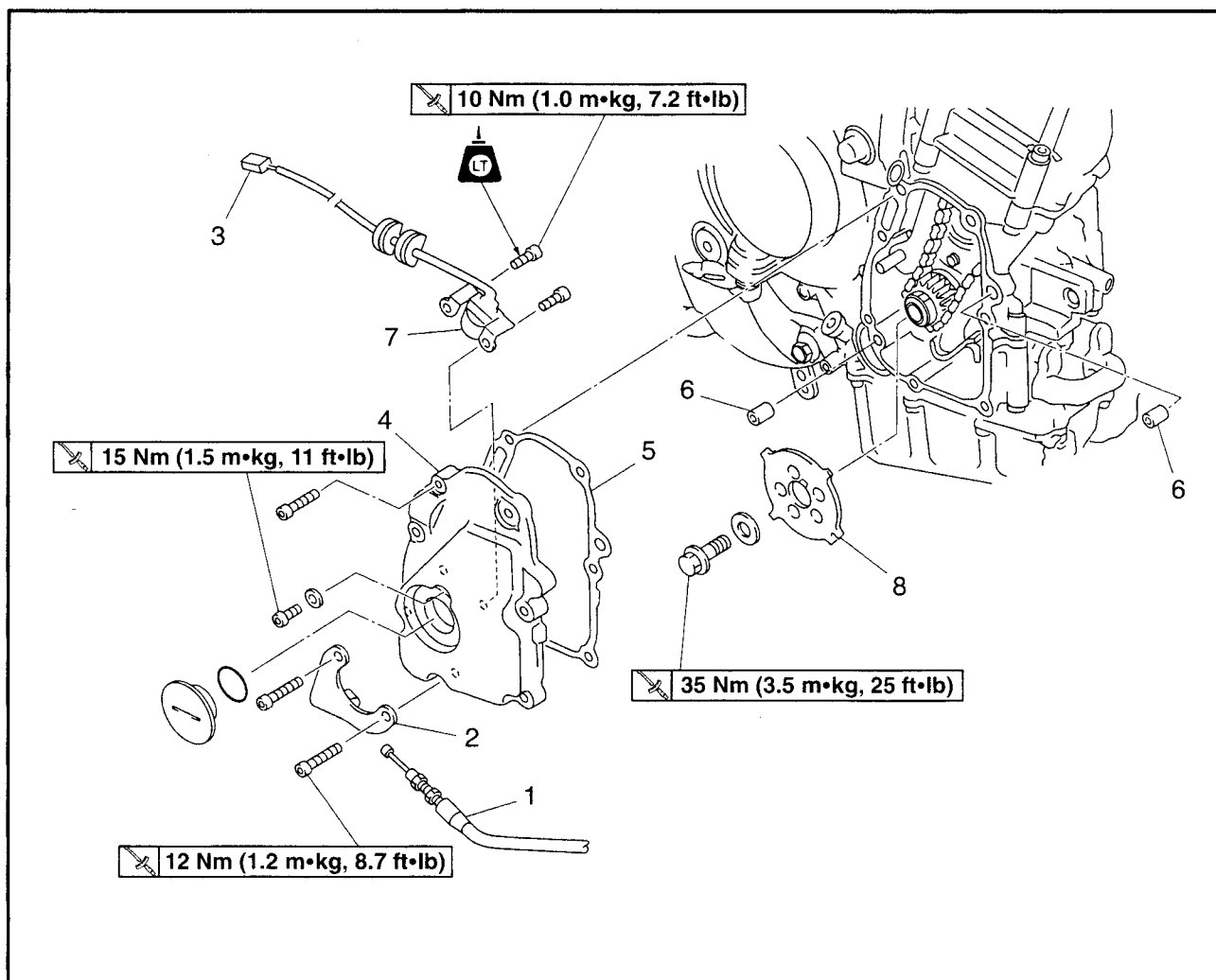
- The valve lifter must move smoothly when rotated with a finger.
- Each valve lifter and valve pad must be reinstalled in its original position.



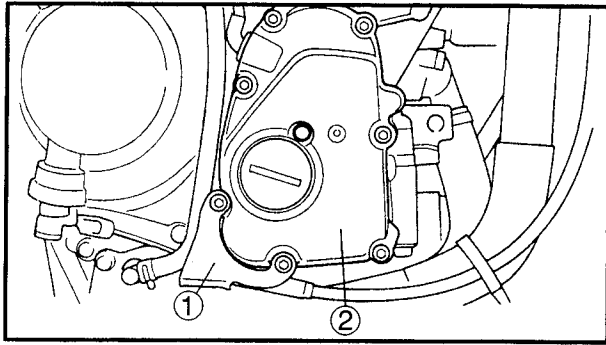
## PICKUP COIL AND PICKUP COIL ROTOR



Order	Job/Part	Q'ty	Remarks
	<b>Removing the pickup coil and pickup coil rotor</b> Riders seat and fuel tank  Bottom cowl and right side cowl Engine oil  Generator cover		Remove the parts in the order listed.  Refer to "SEATS" and "FUEL TANK" in chapter 3. Refer to "COWLINGS" in chapter 3.  Drain. Refer to "CHANGING THE ENGINE OIL" in chapter 3. Refer to "STARTER CLUTCH AND GENERATOR".



Order	Job/Part	Q'ty	Remarks
1	Clutch cable	1	Disconnect
2	Clutch cable holder	1	
3	Pickup coil coupler	1	
4	Pickup coil cover	1	Refer to "REMOVING/INSTALLING THE PICKUP COIL ROTOR".
5	Pickup coil cover gasket	1	
6	Dowel pin	2	
7	Pickup coil	1	
8	Pickup rotor	1	
			For installation reverse the removal procedure.



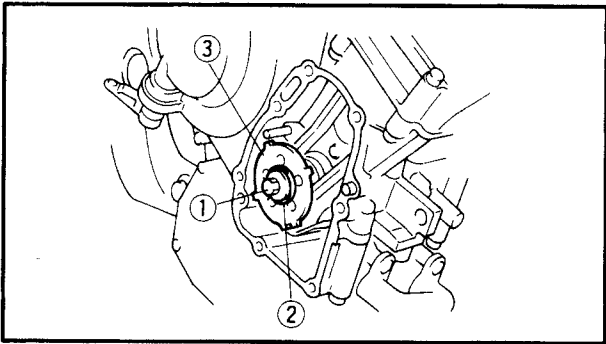
### REMOVING THE PICKUP COIL ROTOR

1. Remove:

- clutch cable holder ①
- pickup coil cover ②

#### NOTE:

Loosen each bolt 1/4 of a turn at a time, in stages and in a crisscross pattern. After all of the bolts are fully loosened, remove them.

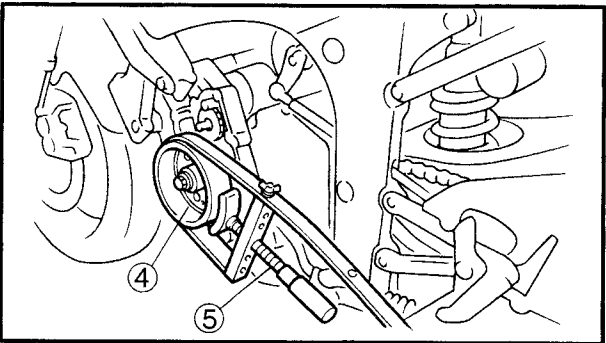


2. Remove:

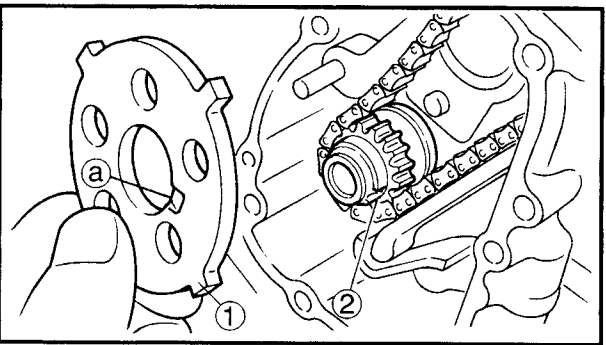
- pickup coil rotor bolt ①
- plain washer ②
- pickup coil rotor ③

#### NOTE:

While holding the generator rotor ④ with the rotor holding tool ⑤, loosen the pickup coil rotor bolt.



**Sheave holder**  
90890-01701, YS-01880



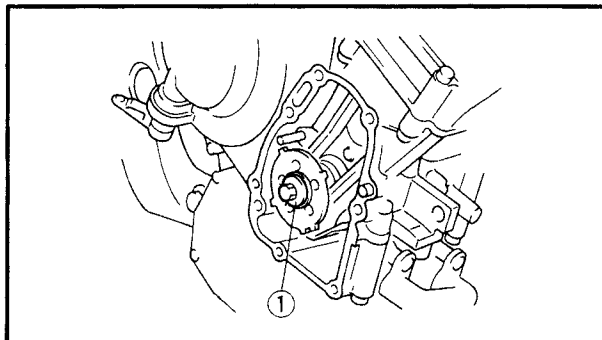
### INSTALLING THE PICKUP COIL ROTOR

1. Install:

- pickup coil rotor ①
- plain washer
- pickup coil rotor bolt


#### NOTE:

When installing the pickup coil rotor, align the pin ② in the crankshaft sprocket with the groove @ in the pickup coil rotor.



2. Tighten:

- pickup coil rotor bolt ①

 35 Nm (3.5 m•kg, 25 ft•lb)

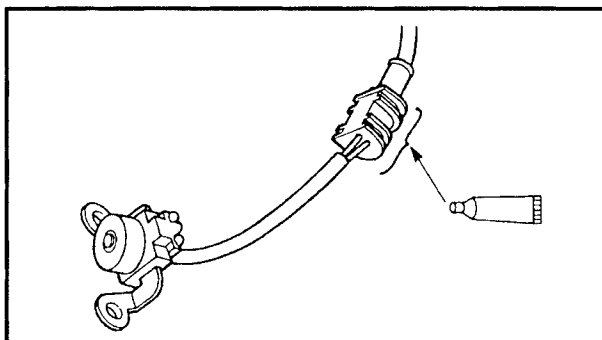
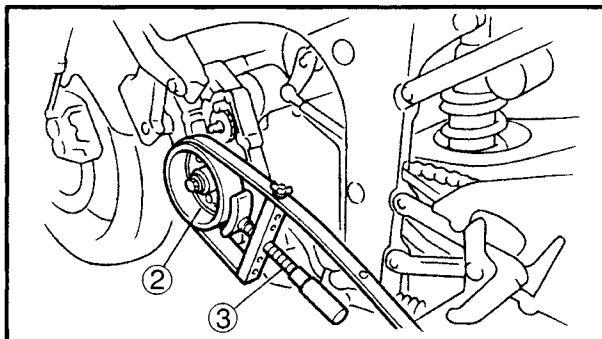
### NOTE:

While holding the generator rotor ② with the sheave holder ③, tighten the pickup coil rotor bolt.



**Sheave holder**

90890-01701, YS-01880



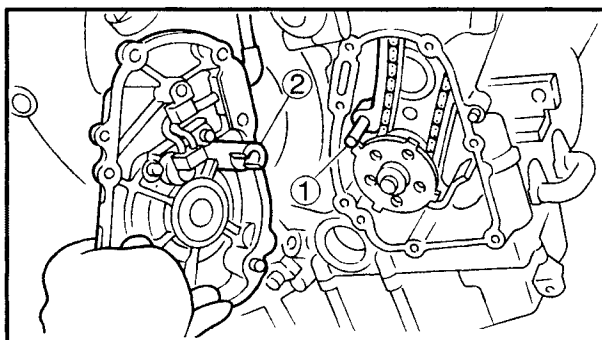
3. Apply:

- sealant  
(onto the pickup coil lead grommet)



**Yamaha bond No.1215**

90890-85505, ACC-1100-15-01



4. Install:

- pickup coil cover
- clutch cable holder

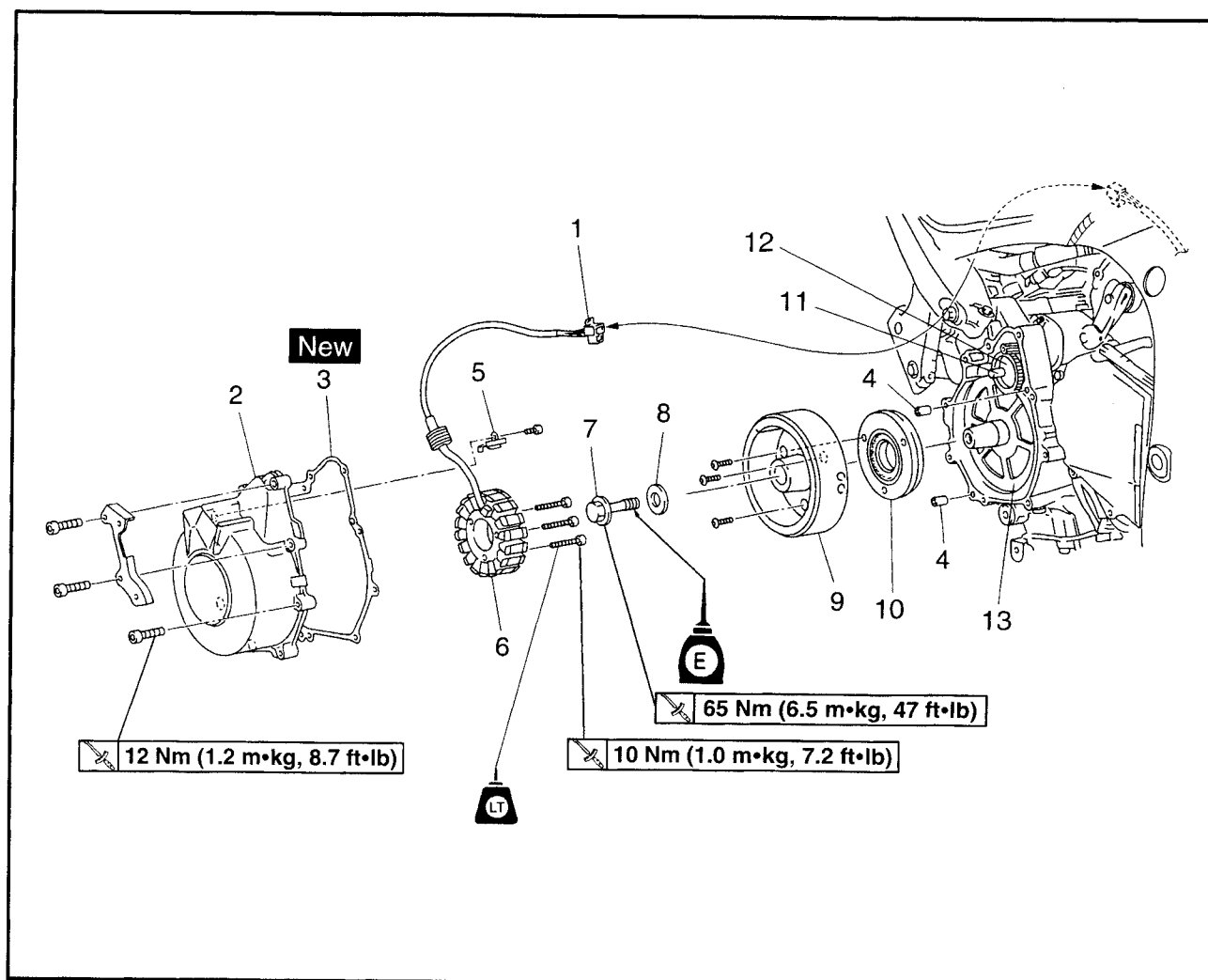
### NOTE:

- When installing the pickup coil cover, align the timing chain guide (intake side) pin ① of the with the hole ② in the pickup coil cover.
- Tighten the pickup coil cover bolts in stages and in a crisscross pattern.

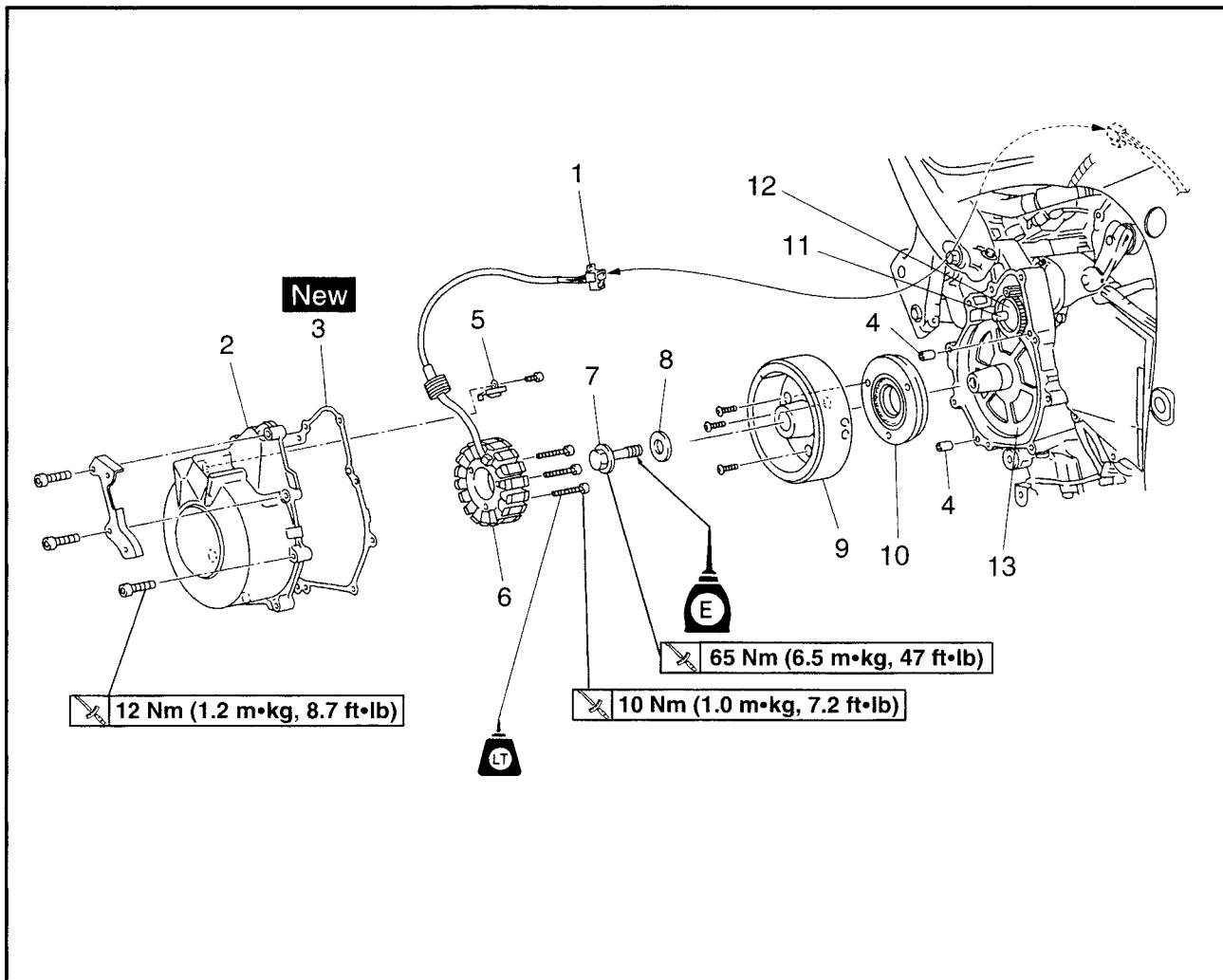


EAS00341

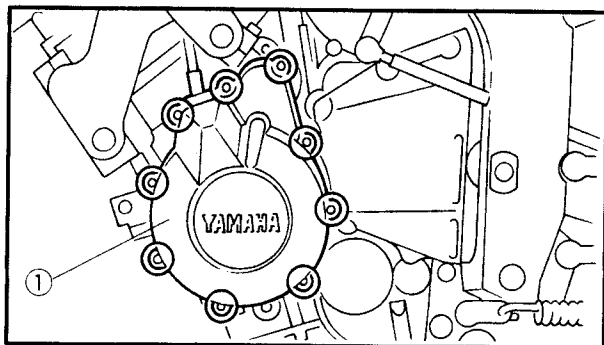
## STARTER CLUTCH AND GENERATOR



Order	Job/Part	Q'ty	Remarks
	<b>Removing the starter clutch and generator</b>		Remove the parts in the order listed.
	Riders seat and fuel tank		Refer to "SEATS" and "FUEL TANK" in chapter 3.
	Bottom and left side cowlings		Refer to "COWLINGS" in chapter 3.
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" in chapter 3.
	Coolant reservoir		Drain. Refer to "CHANGING THE COOLANT" in chapter 3.
1	Stator coil assembly coupler	1	Disconnect.
2	Generator cover	1	Refer to "REMOVING/INSTALLING THE GENERATOR".
3	Generator rotor cover gasket	1	
4	Dowel pin	2	
5	Stator coil assembly lead holder	1	
6	Stator coil assembly	1	



Order	Job/Part	Q'ty	Remarks
7	Generator rotor bolt	1	Refer to "REMOVING/INSTALLING THE GENERATOR".
8	Plain washer	1	
9	Generator rotor	1	
10	Starter one-way assy	1	
11	Idler gear shaft	1	
12	Idler gear	1	
13	Starter clutch gear	1	For installation reverse the removal proceduer.



EAS00346

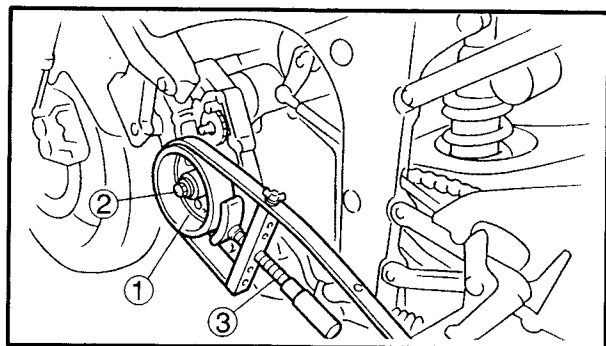
**REMOVING THE GENERATOR**

1. Remove:

- generator rotor cover ①

**NOTE:**

Loosen each bolt 1/4 of a turn at a time, in stages and in a crisscross pattern. After all of the bolts are fully loosened, remove them.



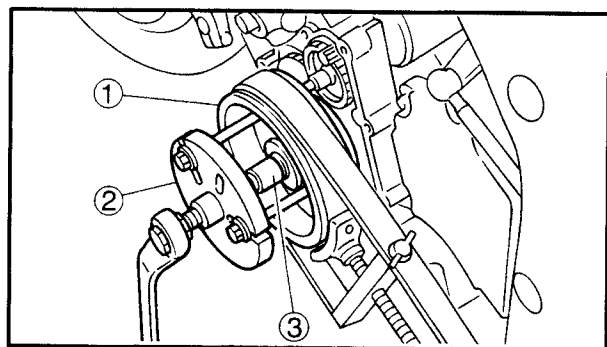
2. Remove:

- generator rotor bolt ①
- Plain washer

**NOTE:**

While holding the generator rotor ② with the sheave holder ③, loosen the generator rotor bolt.

Do not allow the sheave holder to touch the projection on the generator rotor.

**Sheave holder**

90890-01701, YS-01880

3. Remove:

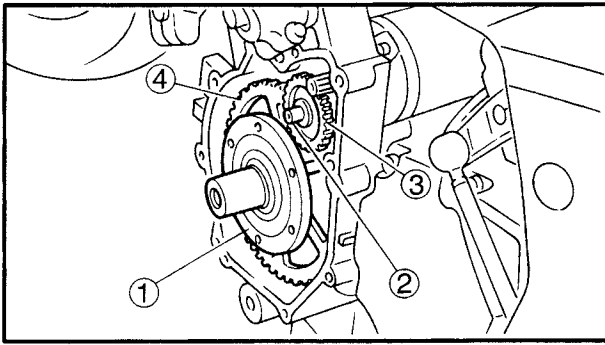
- generator rotor ①
- (with the flywheel puller ② and adapter ③)

**Flywheel puller**

90890-01362, YU-33270

**Flywheel puller attachment**

90890-04089, YM-33282



EAS00345

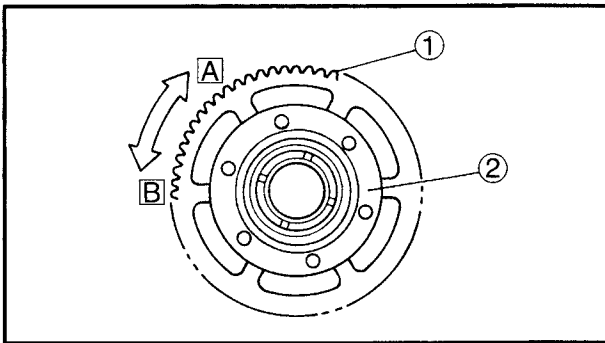
## REMOVING THE STARTER CLUTCH

1. Remove:
  - Generator
  - Starter one-way assy ①
  - Idler gear shaft ②
  - Idler gear ③
  - Starter clutch gear ④

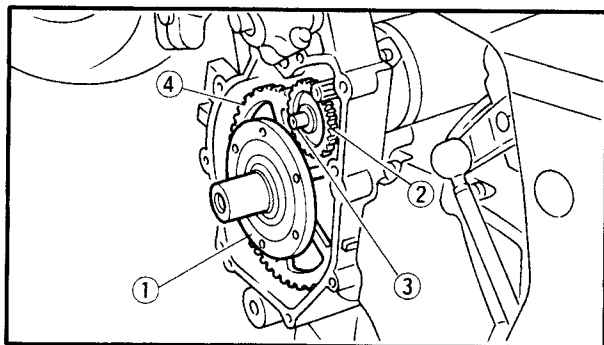
EAS00351

## CHECKING THE STARTER CLUTCH

1. Check:
  - Starter one-way assy  
Damage/wear → Replace.
2. Check:
  - Idler gear
  - Idler gear shaft
  - starter clutch gear  
Pitting/Burrs/chips/roughness/wear → Replace the defective parts.
3. Check:  
Starter clutch operation



- Install the starter clutch gear ① onto the starter clutch ② and hold the starter clutch.
- When turning the starter clutch drive gear clockwise **A**, the starter clutch and the starter clutch gear should engage.  
If the starter clutch gear and starter clutch do not engage, the starter clutch is faulty and must be replaced.
- When turning the starter clutch drive gear counterclockwise **B**, it should turn freely. If the starter clutch drive gear does not turn freely, the starter clutch is faulty and must be replaced.



EAS00355

### INSTALLING THE STARTER CLUTCH

1. Install:
  - starter clutch gear (1)
  - idler gear (2)
  - idler gear shaft (3)
  - starter one-way assy (4)

EAS00354

### INSTALLING THE GENERATOR

1. Install:
  - generator rotor (1)
  - washer (2)
  - generator rotor bolt (3)

#### NOTE:

Clean the tapered portion of the crankshaft and the generator rotor hub with lacquer thinner.

2. Tighten:

- generator rotor bolt (3)

65 Nm (6.5 m•kg, 47 ft•lb)

#### NOTE:

While holding the generator rotor (2) with the sheave holder (3), tighten the generator rotor bolt.

Do not allow the sheave holder to touch the projection on the generator rotor.



**Sheave holder**  
90890-01701, YS-01880

3. Apply:
  - sealant  
(onto the stator coil assembly lead grommet)

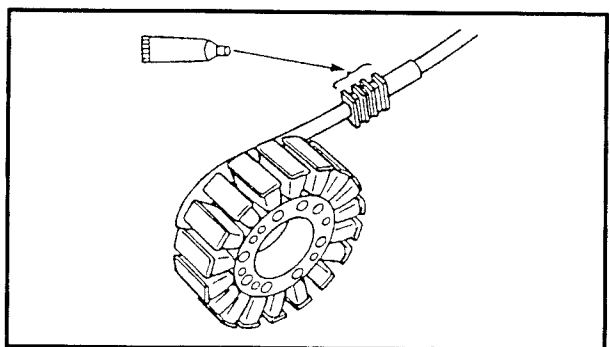
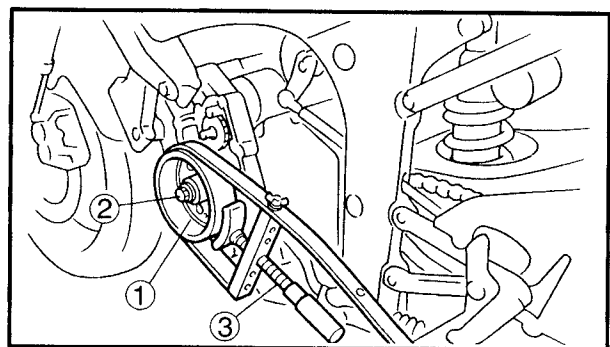
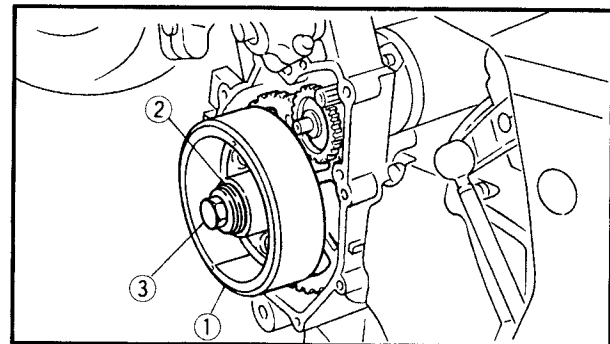


**Yamaha bond No.1215**  
90890-85505, ACC-1100-15-01

4. Install:
  - stator coil
5. Install:
  - generator rotor cover

#### NOTE:

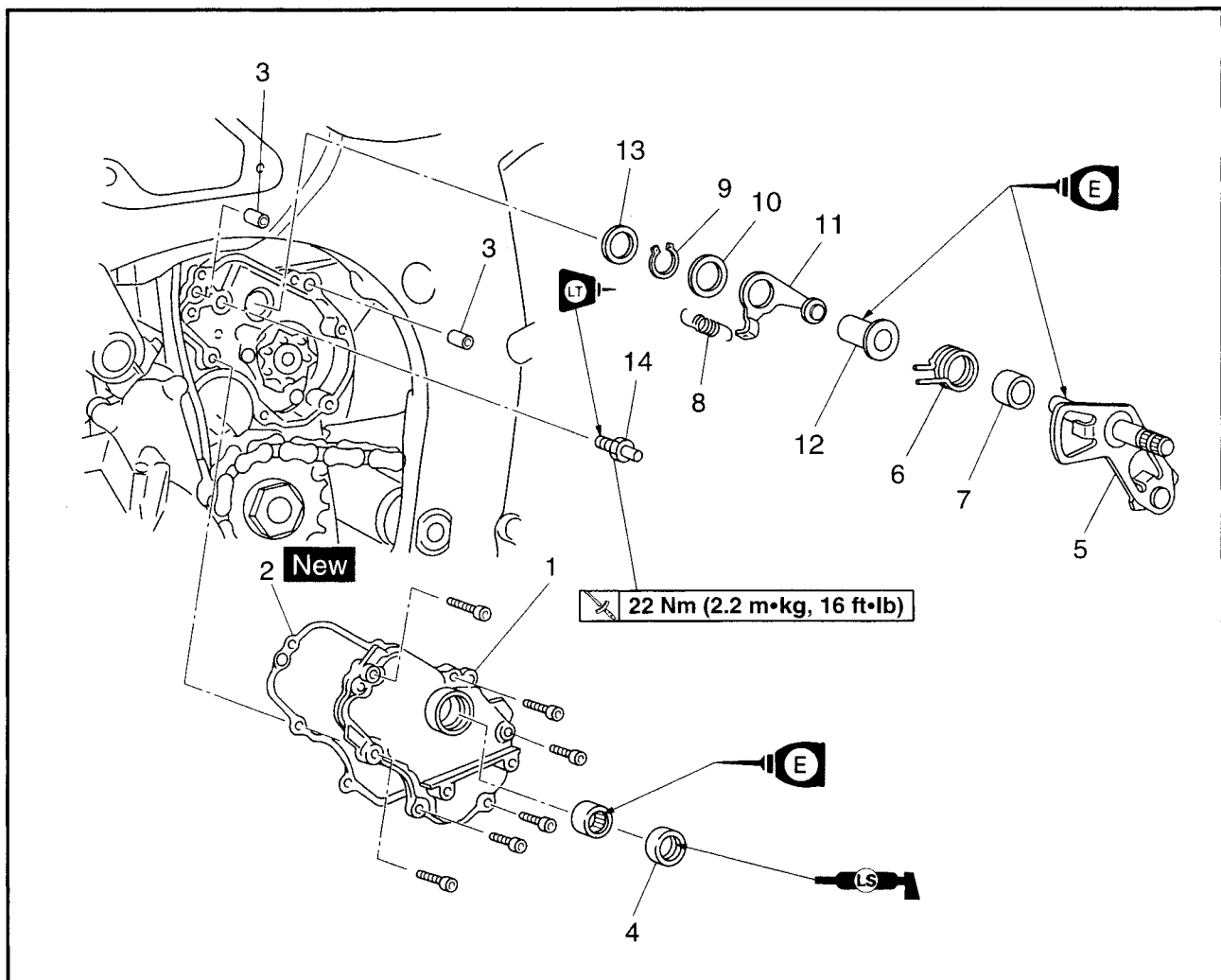
Tighten the generator rotor cover bolts in stages and in a crisscross pattern.



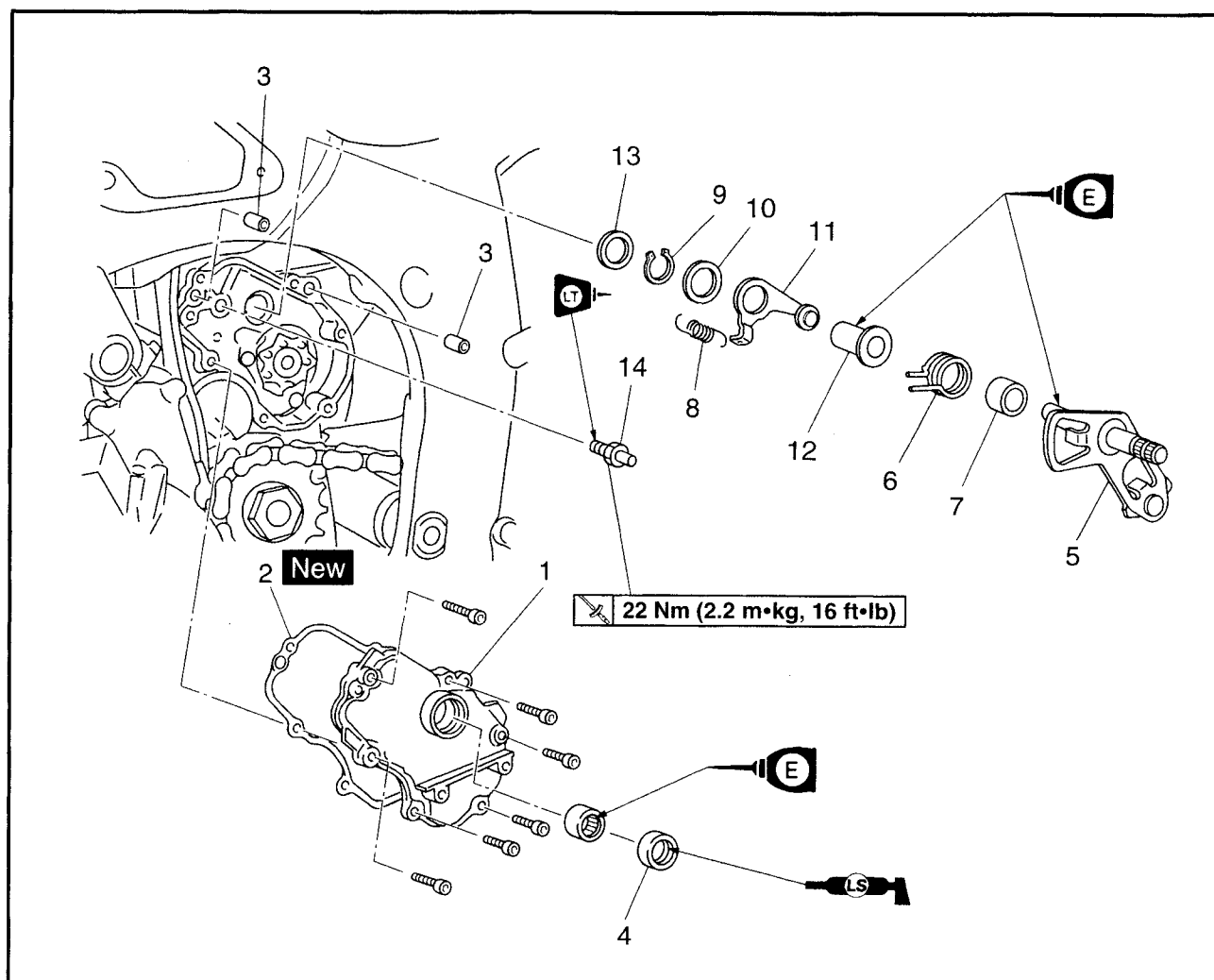


EAS00327

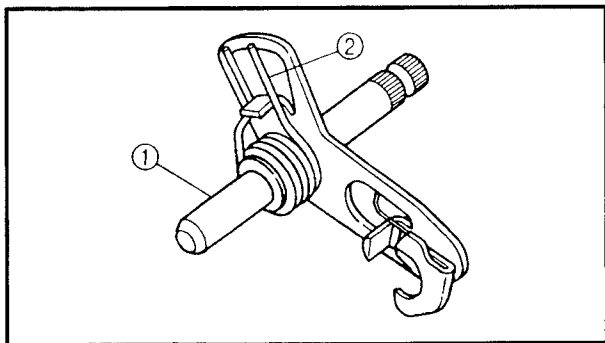
## SHIFT SHAFT



Order	Job/Part	Q'ty	Remarks
	<b>Removing the shift shaft</b>		
	Coolant reserver		Remove the parts in the order listed. Drain. Refer to "CHANGING THE COOLANT" in chapter 3. Refer to "ENGINE".
	Drive sprocket cover, sift rod and sift arm.		
1	Shift shaft cover	1	
2	Shift shaft cover gasket	1	
3	Dowel pin	2	
4	Oil seal	1	
5	Sift shaft	1	Refer to "INSTALLING THE SHIFT SHAFT".



Order	Job/Part	Q'ty	Remarks
6	Shift shaft spring	1	Refer to "INSTALLING THE SHIFT SHAFT".
7	Collar	1	
8	Stopper lever spring	1	
9	Circrip	1	
10	Washer	1	
11	Stopper lever	1	
12	Collar	1	
13	Washer	1	
14	Shift shaft spring stopper	1	For installation reverse the removal procedure.

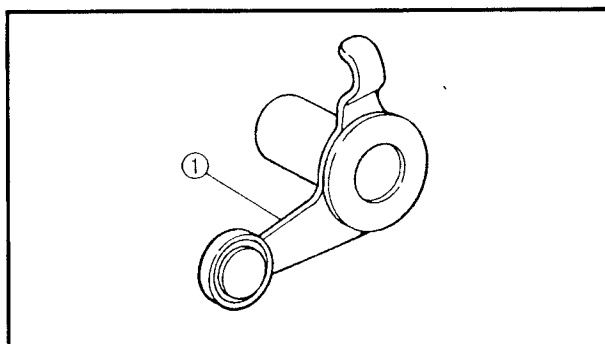


EAS00329

**CHECKING THE SHIFT SHAFT**

## 1. Check:

- shift shaft ①  
Bends/damage/wear → Replace.
- shift shaft spring ②  
Damage/wear → Replace.

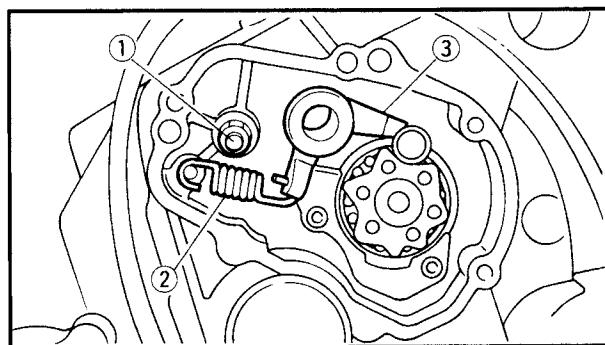


EAS00330

**CHECKING THE STOPPER LEVER**

## 1. Check:

- stopper lever ①  
Bends/damage → Replace.  
Roller turns roughly → Replace the stopper lever.



EAS00334

**INSTALLING THE SHIFT SHAFT**

## 1. Install:

- shift shaft spring stopper ①

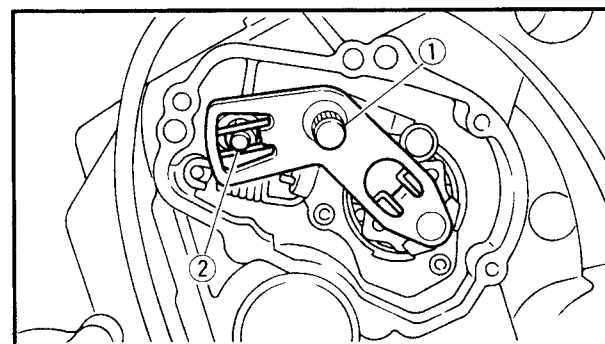


**22 Nm (2.2 m•kg, 16 ft•lb)**

- stopper lever spring ②
- washer
- stopper lever ③

**NOTE:**

- Apply LOCTITE® to the threads of the shift shaft spring stopper.
- Hook the ends of the stopper lever spring onto the stopper lever and the crankcase boss.
- Mesh the stopper lever with the shift drum segment assembly.



## 2. Install:

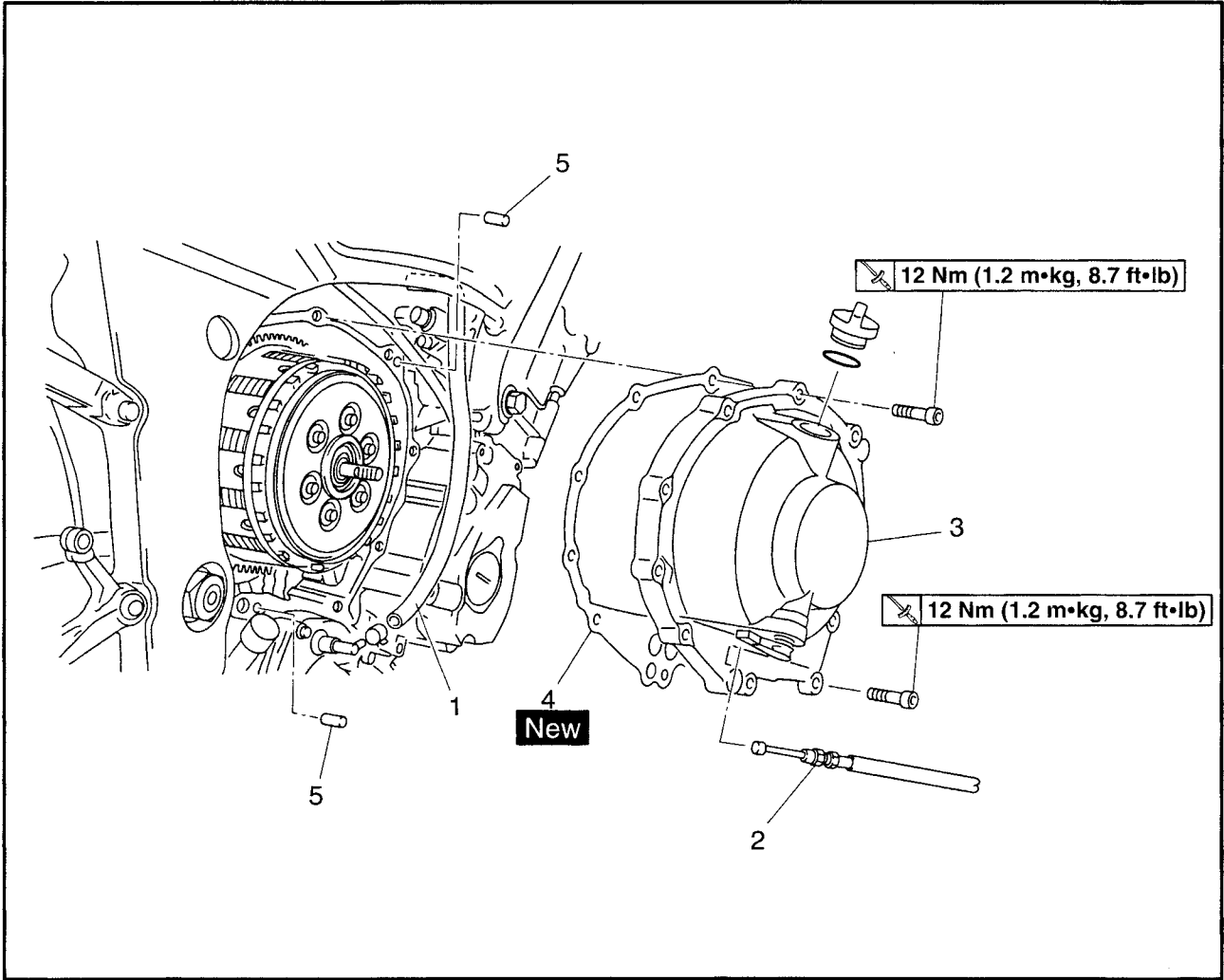
- shift shaft ①
- collar

**NOTE:**

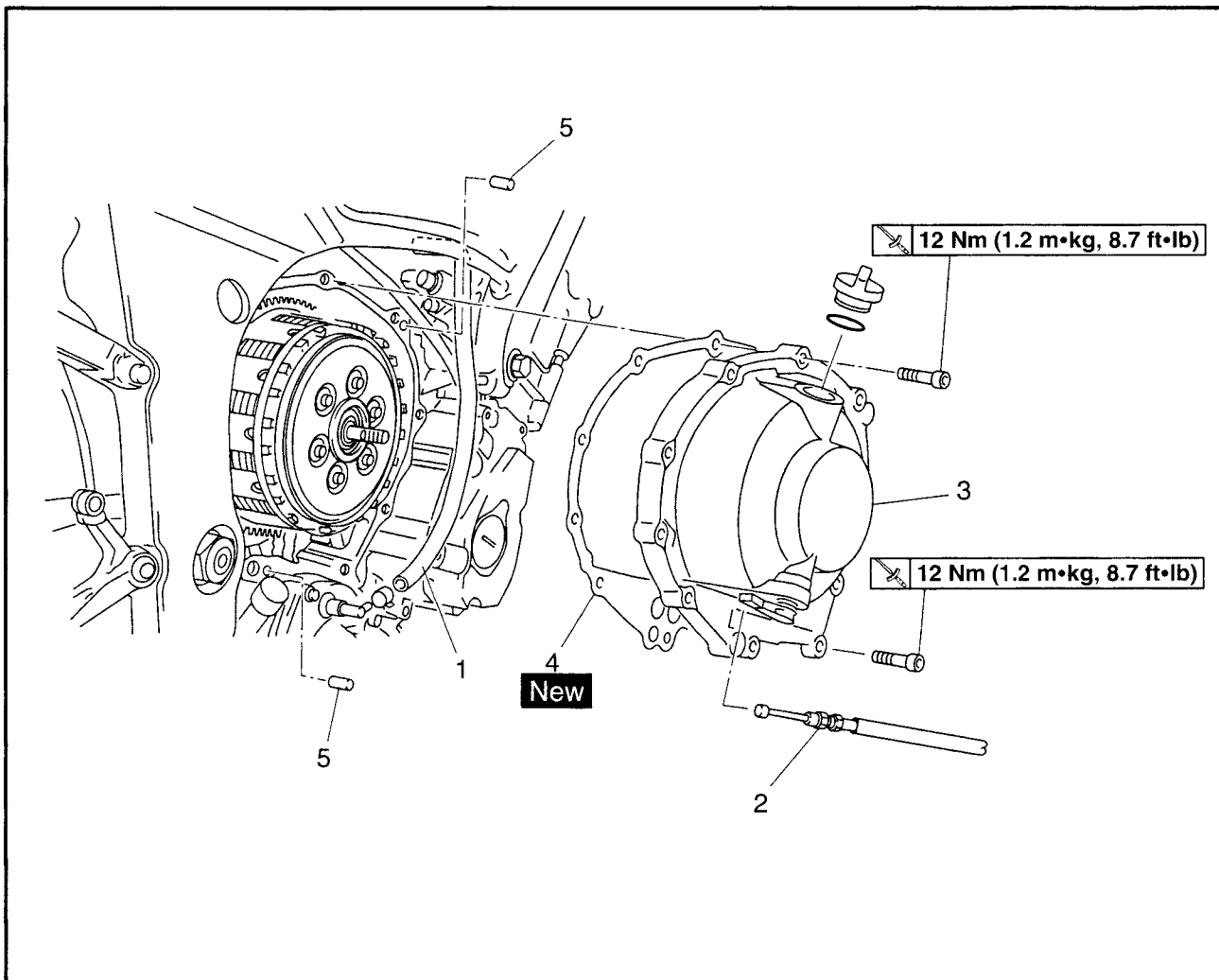
- Lubricate the oil seal lips with lithium soap base grease.
- Install the end of the shift shaft spring onto the shift shaft spring stopper ②



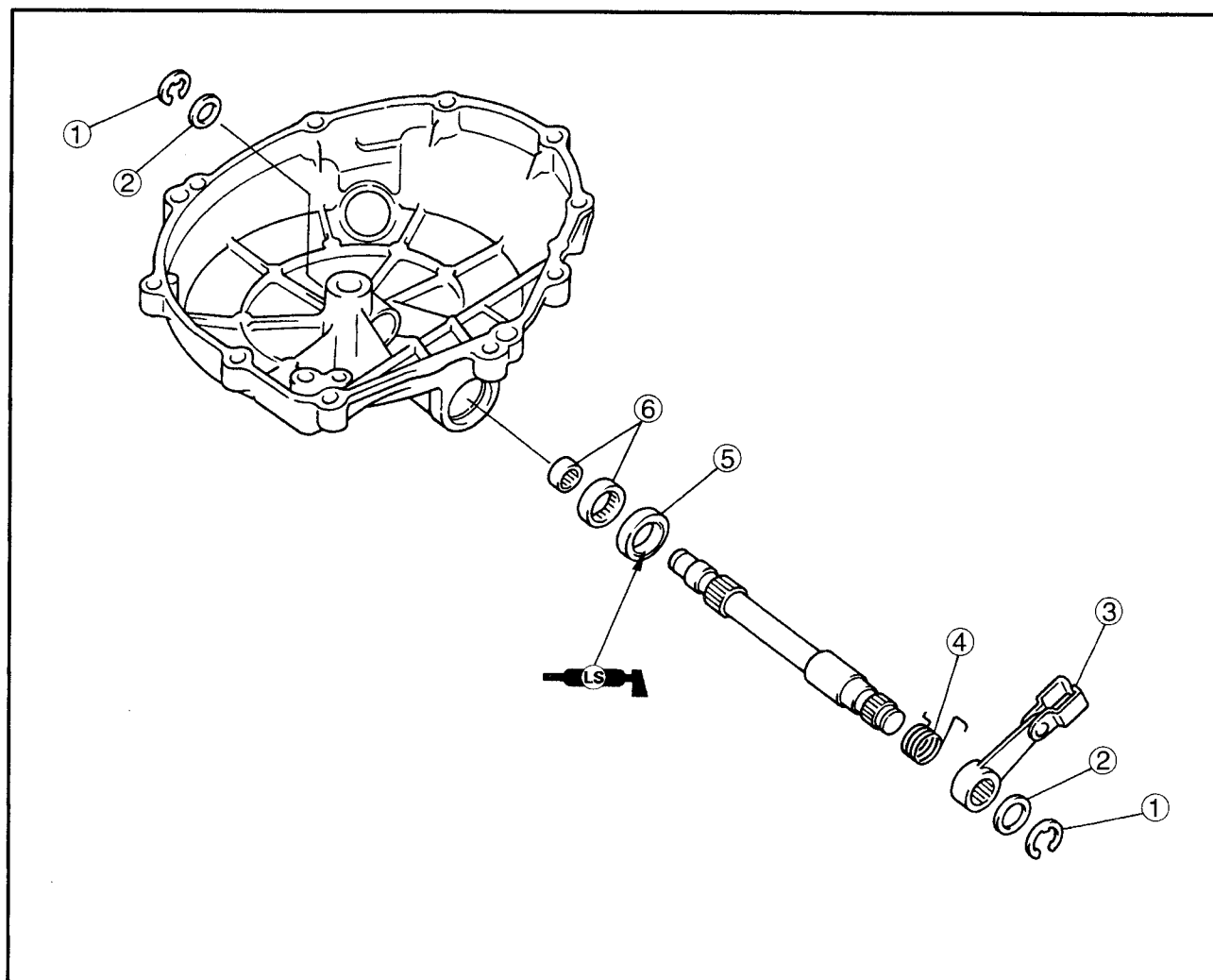
EB405000  
**CLUTCH**  
**CLUTCH COVER**



Order	Job/Part	Q'ty	Remarks
	<b>Removing the clutch cover</b> Bottom coving and right side coving Engine oil  Coolant		Remove the parts in the order listed. Refer to "COWLINGS" in chapter 3. Drain. Refer to "CHANGING THE ENGINE OIL" in chapter 3. Drain. Refer to "CHANGING THE COOLANT" in chapter 3.
1	Therm bypass hose	1	
2	Clutch cable	1	



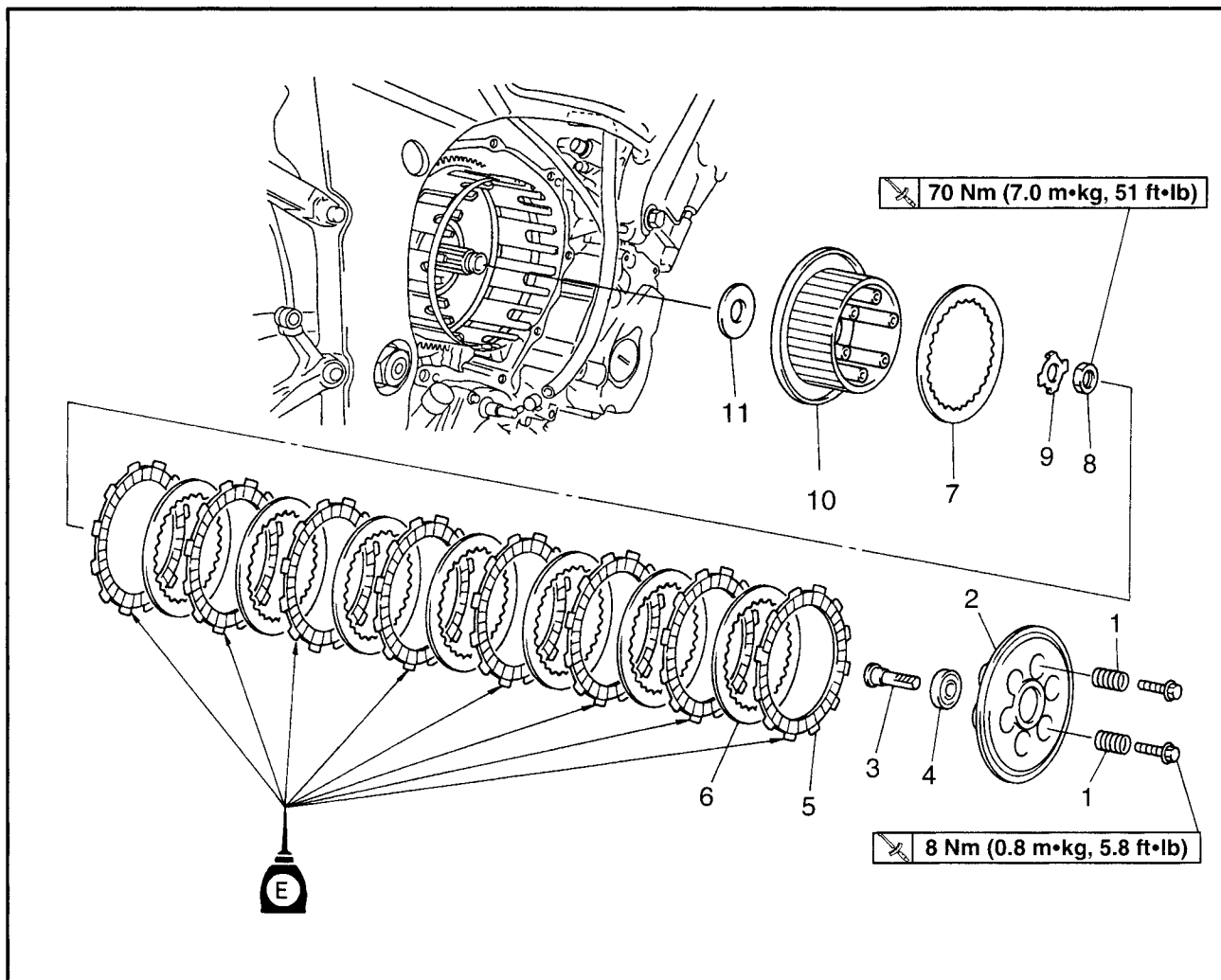
Order	Job/Part	Q'ty	Remarks
3	Clutch cover	1	Refer to "REMOVING/INSTALLING THE CLUTCH".  For installation reverse the removal procedure.
4	Clutch cover gasket	1	
5	Dowel pin	2	



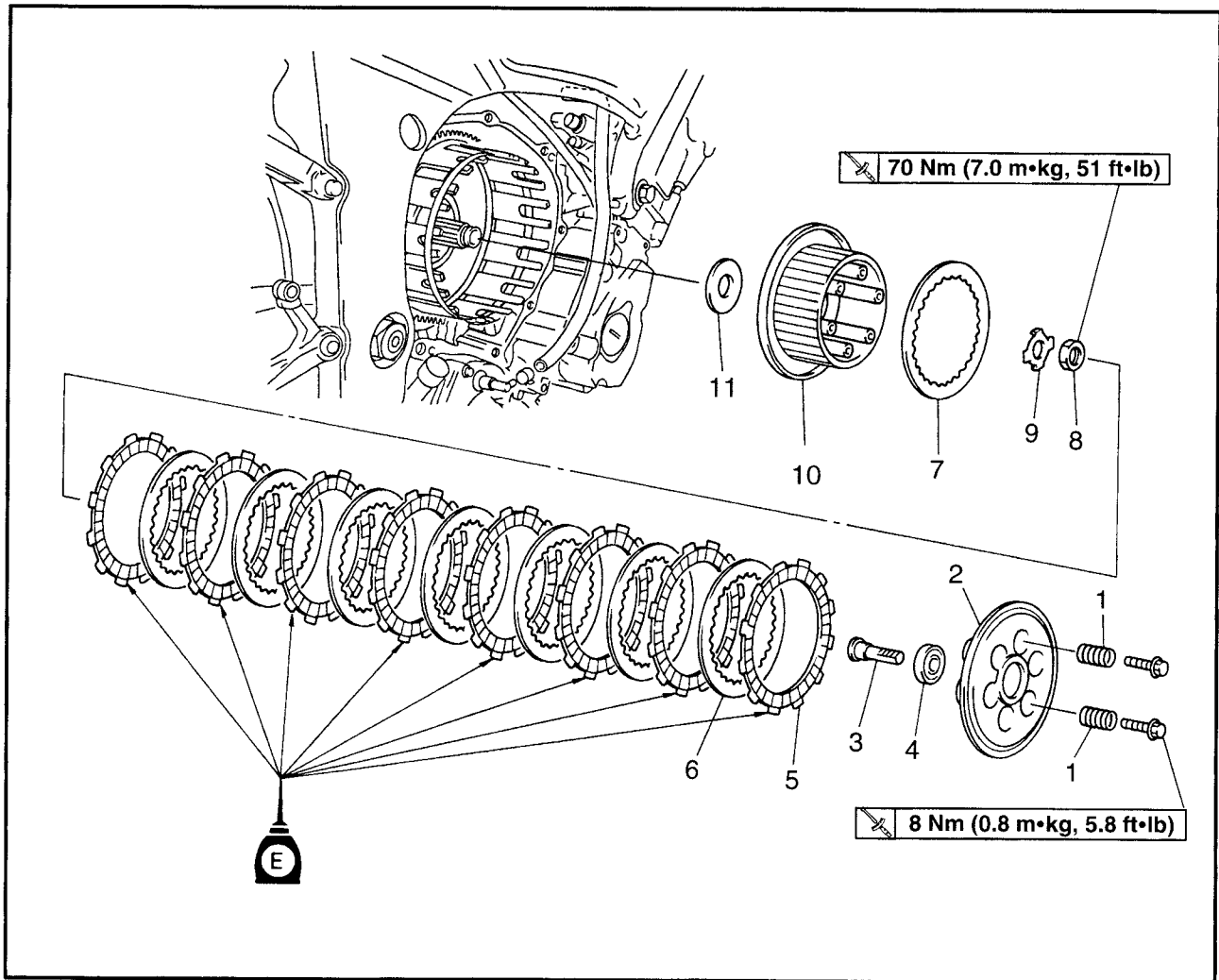
Order	Job/Part	Q'ty	Remarks
	<b>Disassembling the clutch cover assembly</b>		Disassemble the parts in the order listed.
①	Circlip	2	
②	Plain washer	2	
③	Pull lever	1	Refer to "INSTALLING THE CLUTCH".
④	Pull lever spring	1	
⑤	Oil seal	1	
⑥	Bearing	2	For assembly, reverse the disassembly procedure.



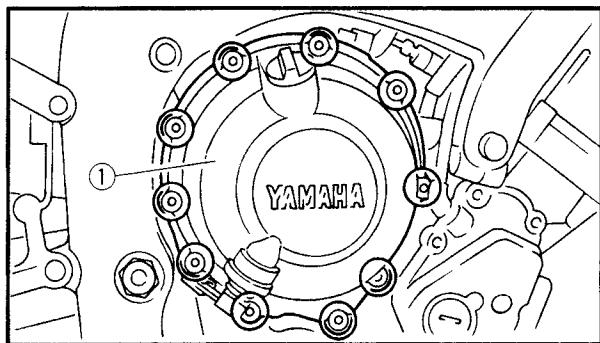
## CLUTCH



Order	Job/Part	Q'ty	Remarks
	<b>Removing the clutch</b>		
1	Compression spring	6	Remove the parts in the order listed.
2	Pressure plate	1	
3	Pull rod	1	Refer to "INSTALLING THE CLUTCH".
4	Bearing	1	
5	Friction plate	8	
6	Clutch plate	7	
7	Clutch plate	1	Refer to "REMOVING/INSTALLING THE CLUTCH".
8	Clutch boss nut	1	
9	Look washer	1	
10	Clutch boss	1	



Order	Job/Part	Q'ty	Remarks
11	Thrust plate	1	For installation, reverse the removal procedure.



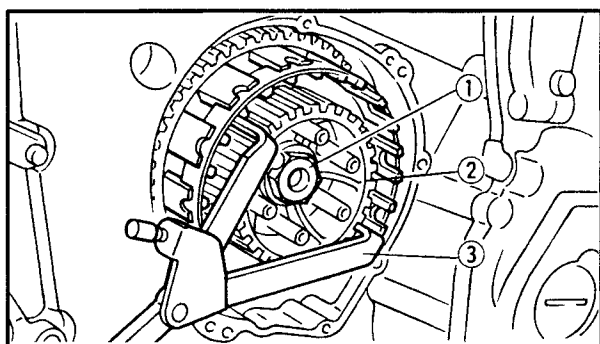
EAS00277

**REMOVING THE CLUTCH**

1. Remove:
  - clutch cover ①

**NOTE:**

Loosen each bolt 1/4 of a turn at a time, in stages and in a crisscross pattern.  
After all of the bolts are fully loosened, remove them.



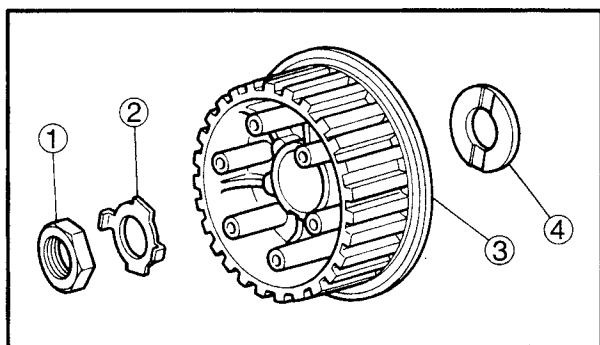
- Pressure plate
  - Friction and clutch plates
2. Straighten the lock washer tab.
  3. Loosen:
    - clutch boss nut ①

**NOTE:**

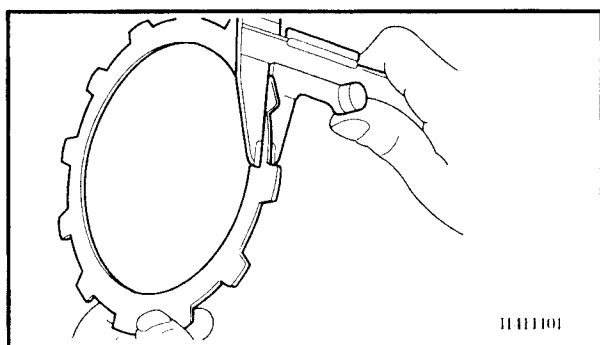
While holding the clutch boss ② with the clutch holding tool ③, loosen the clutch boss nut.



**Clutch holding tool**  
90890-04086, YM-91042



4. Remove:
  - clutch boss nut ①
  - lock washer ②
  - clutch boss ③
  - thrust plate ④



EAS00280

**CHECKING THE FRICTION PLATES**

The following procedure applies to all of the friction plates.

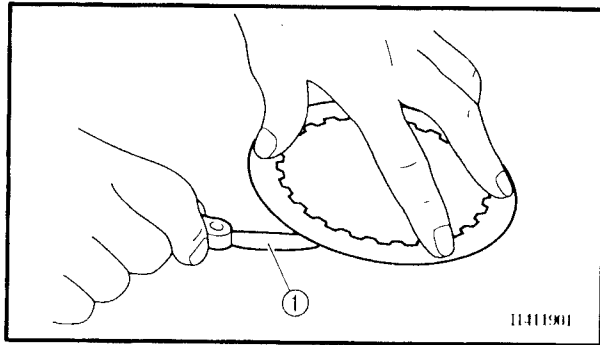
1. Check:
  - friction plate  
Damage/wear → Replace the friction plates as a set.
2. Measure:
  - friction plate thickness  
Out of specification → Replace the friction plates as a set.

**NOTE:**

Measure the friction plate at four places.



**Friction plate thickness**  
2.9 ~ 3.1 mm (0.114 ~ 0.122 in)  
<Limit>: 2.8 mm (0.11 in)



EAS00281

**CHECKING THE CLUTCH PLATES**

The following procedure applies to all of the clutch plates.

## 1. Check:

- clutch plate

Damage → Replace the clutch plates as a set.

## 2. Measure:

- clutch plate warpage

(with a surface plate and thickness gauge ①)

Out of specification → Replace the clutch plates as a set.



**Max. clutch plate warpage**  
0.1 mm (0.0039 in)

EAS00282

**CHECKING THE CLUTCH SPRINGS**

The following procedure applies to all of the clutch springs.

## 1. Check:

- clutch spring

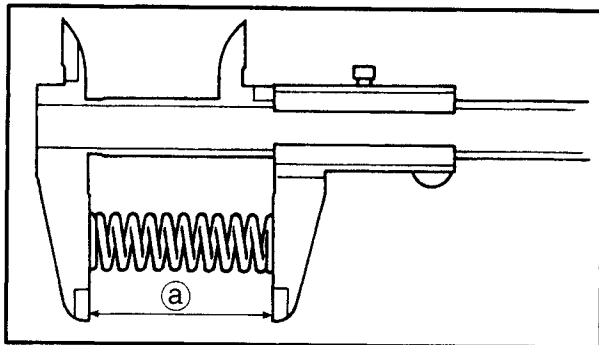
Damage → Replace the clutch springs as a set.

## 2. Measure:

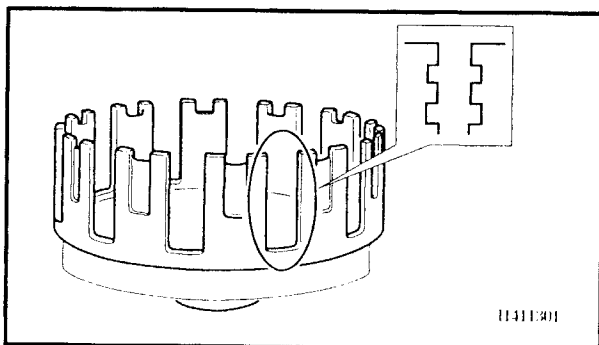
- clutch spring free length ②

Out of specification → Replace the clutch springs as a set.

Clutch spring free length



**Clutch spring free length**  
55 mm (2.17 in)  
<Limit>: 54 mm (2.13 in)



EAS00284

**CHECKING THE CLUTCH HOUSING**

## 1. Check:

- clutch housing dogs

Damage/pitting/wear → Deburr the clutch housing dogs or replace the clutch housing.

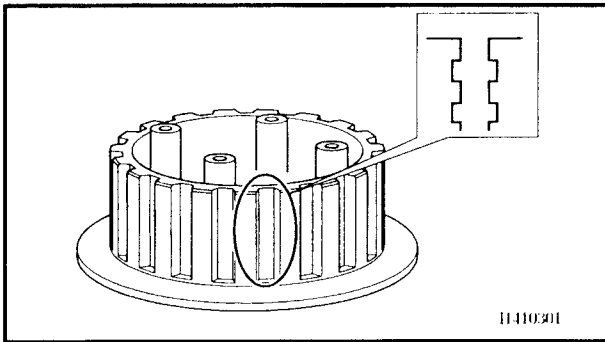
**NOTE:**

Pitting on the clutch housing dogs will cause erratic clutch operation.

## 2. Check:

- bearing

Damage/wear → Replace the clutch housing.



EAS00285

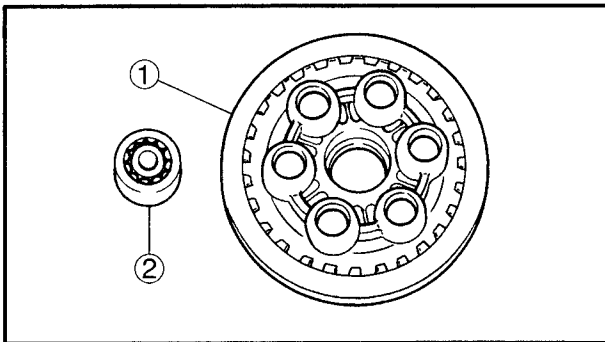
**CHECKING THE CLUTCH BOSS**

## 1. Check:

- clutch boss splines  
Damage/pitting/wear → Replace the clutch boss.

**NOTE:**

Pitting on the clutch boss splines will cause erratic clutch operation.

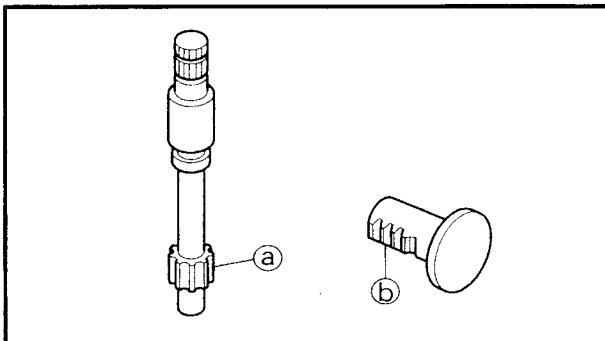


EAS00286

**CHECKING THE PRESSURE PLATE**

## 1. Check:

- pressure plate ①  
Cracks/damage → Replace.
- bearing ②  
Damage/wear → Replace.



EAS00287

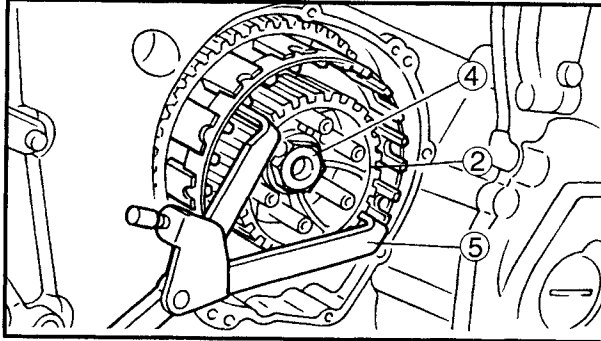
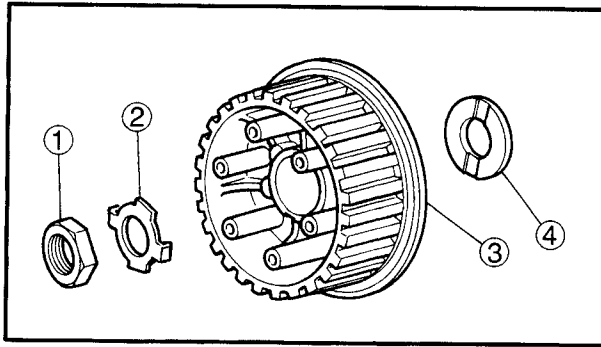
**CHECKING THE PULL LEVER SHAFT AND PULL ROD**

## 1. Check:

- pull lever shaft pinion gear teeth (a)
- pull rod teeth (b)  
Damage/wear → Replace the pull rod and pull lever shaft as a set.

## 2. Check:

- pull rod bearing  
Damage/wear → Replace.



EAS00296

**INSTALLING THE CLUTCH**

## 1. Install:

- thrust plate ①
- clutch boss ②

## 2. Install:

- lock washer ③ **New**
- clutch boss nut ④

**70 Nm (7.0 m•kg, 51 ft•lb)**
**NOTE:**

While holding the clutch boss ② with the clutch holding tool ⑤, tighten the clutch boss nut.



**Clutch holding tool**  
90890-04086, YM-91042

## 3. Bend the lock washer tab along a flat side of the nut.

## 4. Lubricate:

- friction plates
  - clutch plates
- (with the recommended lubricant)



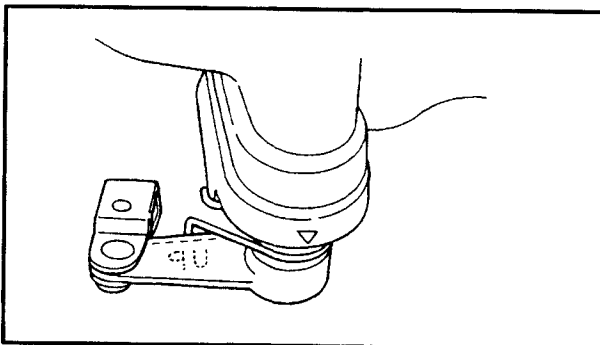
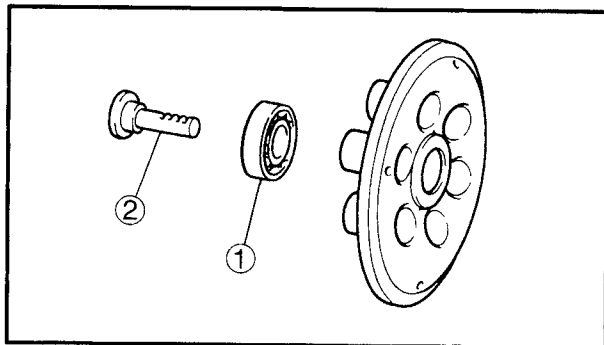
**Recommended lubricant**  
**Engine oil**

## 5. Install:

- friction plates
- clutch plates

**NOTE:**

First, install a friction plate and then alternate between a clutch plate and a friction plate.

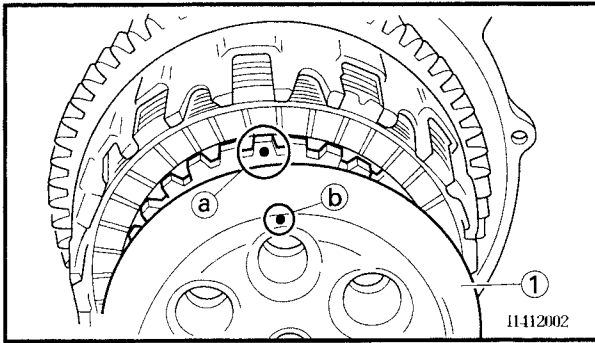
**NOTE:**

Install the pull rod so that the teeth face towards the rear of the motorcycle. Then, install the clutch cover.

Tighten the clutch cover bolts in stages and in a crisscross pattern.

Apply oil onto the bearing.

Apply molybdenum disulfide grease onto the pull rod.



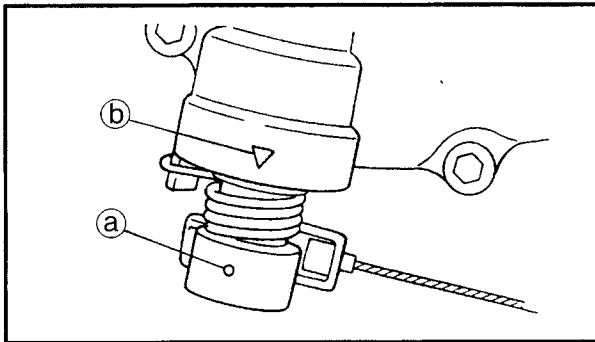
7. Install:
- pressure plate ①
  - clutch springs
  - clutch spring bolts

8 Nm (0.8 m•kg, 5.8 ft•lb)

**NOTE:**

Tighten the clutch spring bolts in stages and in a criss cross pattern.

Align the punch mark ⑥ in the pressure plate with the punch mark ⑤ in the clutch boss.



8. Install:
- clutch cover

12 Nm (1.2 m•kg, 8.7 ft•lb)

**NOTE:**

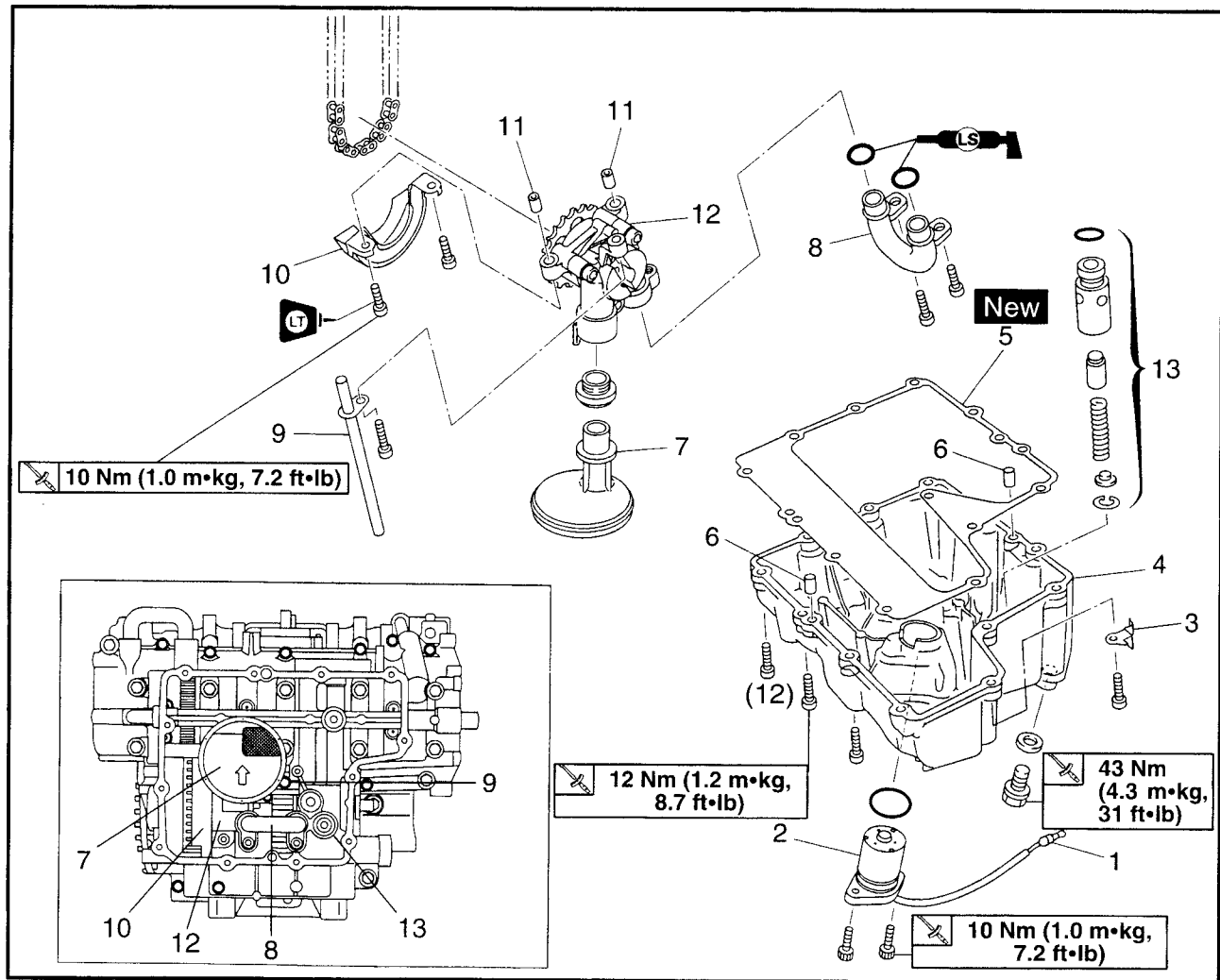
• When installing the clutch cover, push the pull lever and check that the punch mark ⑤ on the pull lever aligns with the mark ⑥ on the clutch cover. Make sure that the pull rod teeth and pull lever shaft pinion gear are engaged.

• Tighten the clutch cover bolts in stages and in a crisscross pattern.

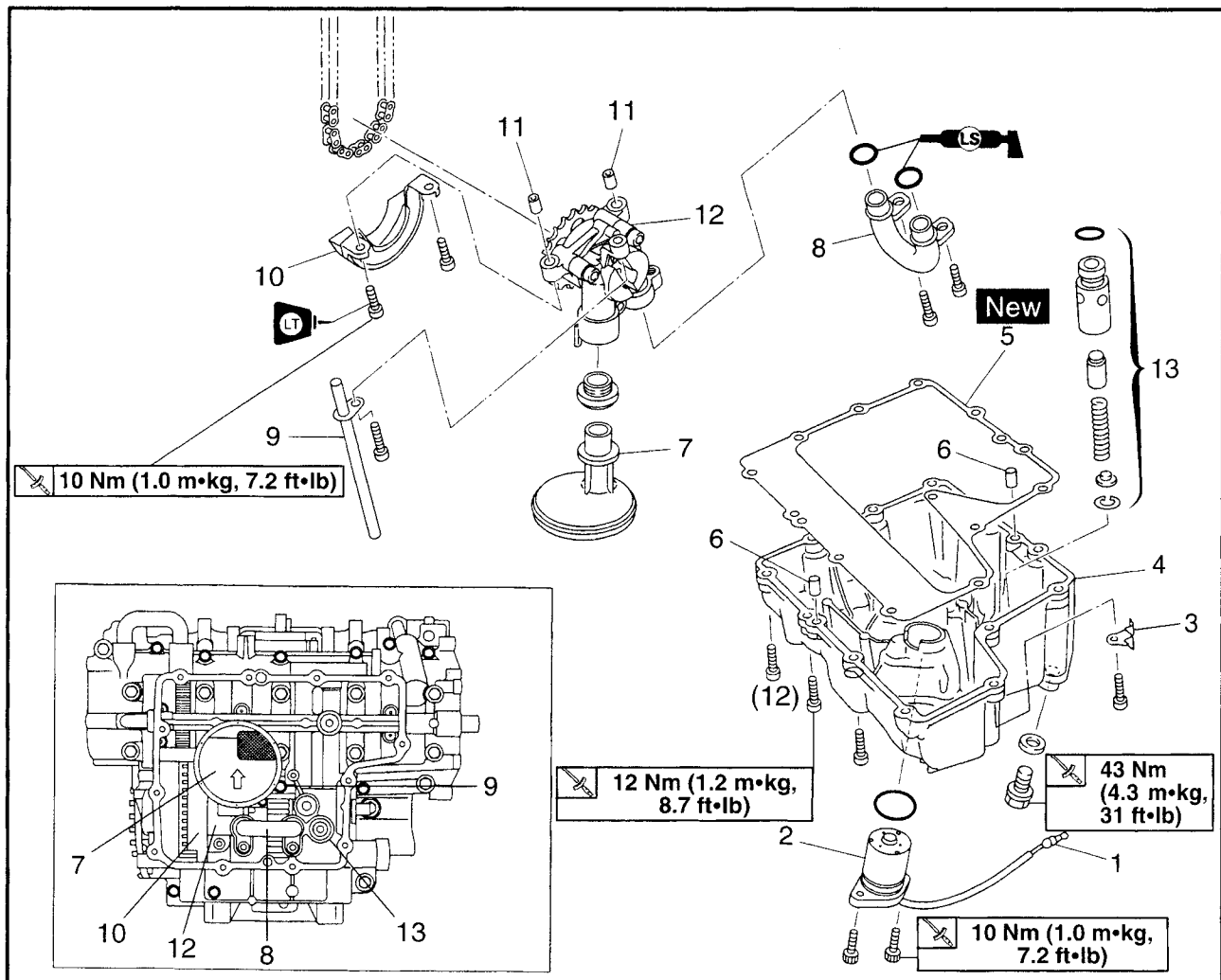


EAS00356

## OIL PAN AND OIL PUMP



Order	Job/Part	Q'ty	Remarks
	<b>Removing the oil pan and oil pump</b>		
	Engine oil		Remove the parts in the order listed. Drain. Refer to "CHANGING THE ENGINE OIL" in chapter 3.
	Coolant		Drain. Refer to "CHANGING THE COOLANT" in chapter 3.
	Radiator assembly and water pump assembly		Refer to "RADIATOR" and "WATER PUMP" in chapter 5.
	Exhaust pipe assembly		Refer to "ENGINE".
1	Oil level switch coupler	1	Disconnect.
2	Oil level switch	1	

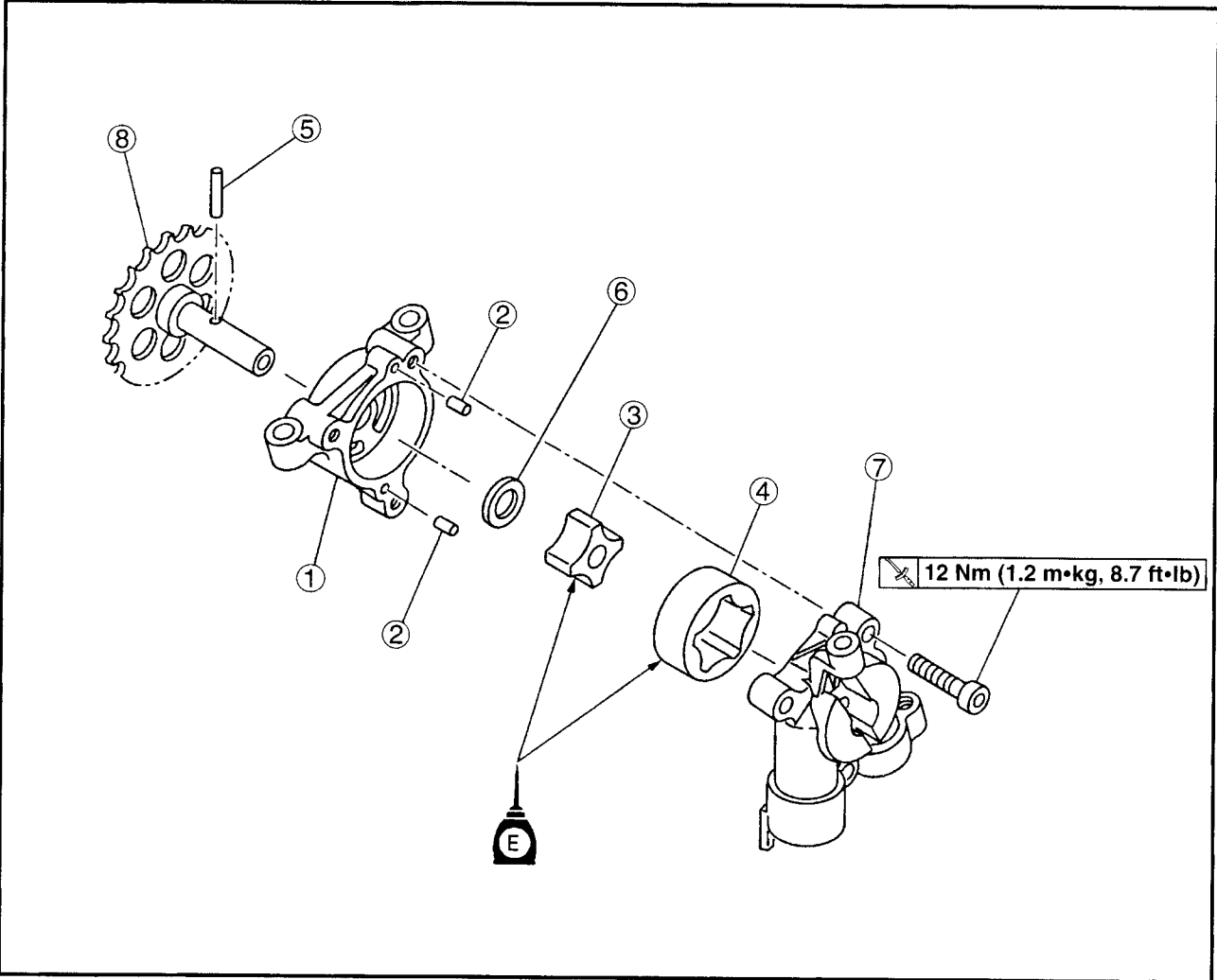


Order	Job/Part	Q'ty	Remarks
3	Oil level switch lead holder	1	Refer to "REMOVEING/INSTALLING THE OIL PAN."
4	Oil pan	1	
5	Oil pan gasket	1	
6	Dowel pin	2	
7	Oil strainer	1	Refer to "INSTALLING THE OIL STRAINER".
8	Oil pipe	1	Refer to "INSTALLING THE OIL PUMP".
9	Oil delivery pipe	1	
10	Gear cover	1	
11	Dowel pin	2	
12	Oil pump assembly	1	For installation, reverse the removal procedure.
13	Relief valve assembly	1	

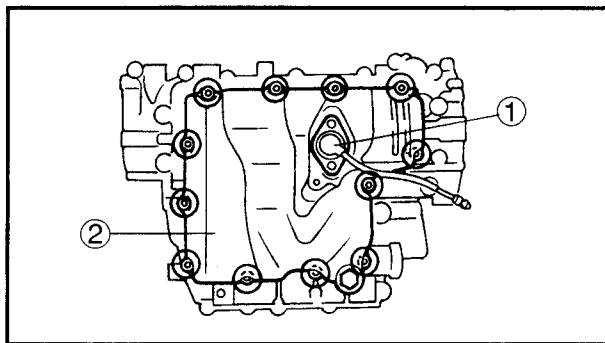


EB411010

OIL PUMP



Order	Job/Part	Q'ty	Remarks
	<b>Disassembling the oil pump assembly</b>		Disassemble the parts in the order listed.
①	Oil pump rotor housing	1	
②	Dowel pin	2	
③	Oil pump inner rotor	1	
④	Oil pump outer rotor	1	
⑤	Dowel pin	1	
⑥	Washer	1	
⑦	Oil pump cover	1	
⑧	Driver gear	1	
			For assembly reverse the disassembly procedure.



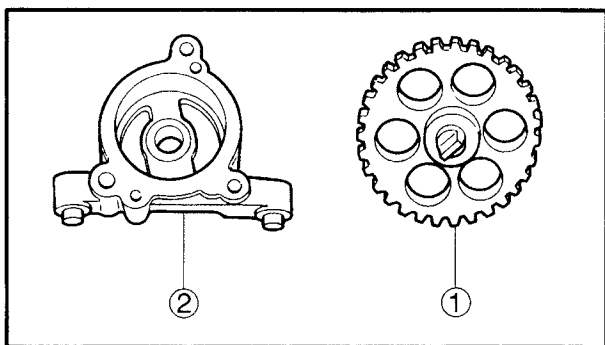
EAS00362

**REMOVING THE OIL PAN**

1. Remove:
  - oil level switch ①
  - oil pan ②
  - oil pan gasket
  - dowel pins

**NOTE:**

Loosen each bolt 1/4 of a turn at a time, in stages and in a crisscross pattern.  
After all of the bolts are fully loosened, remove them.

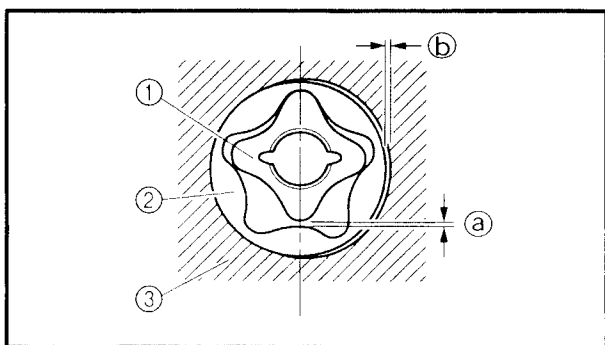


EAS00364

**CHECKING THE OIL PUMP**

1. Check:
  - oil/pump driven gear ①
  - rotor housing ②

Cracks/damage/wear → Replace the defective part(-s).



2. Measure:
  - inner-rotor-to-outer-rotor-tip clearance (a)
  - outer-rotor-to-oil-pump-cover clearance (b)

Out of specification → Replace the oil pump.

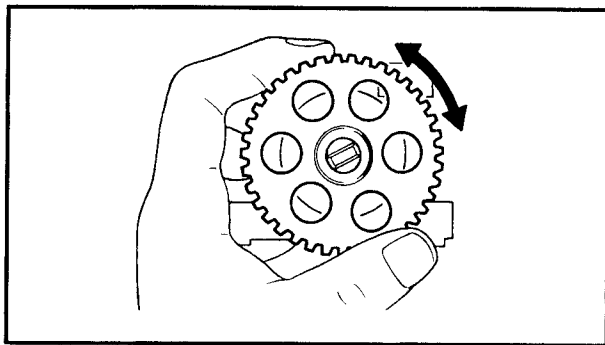
- ① Inner rotor
- ② Outer rotor
- ③ Oil pump cover

**Inner-rotor-to-outer-rotor-tip clearance**

0.03 ~ 0.09 mm  
(0.0012 ~ 0.0035 in)  
<Limit>: 0.15 mm (0.0059 in)

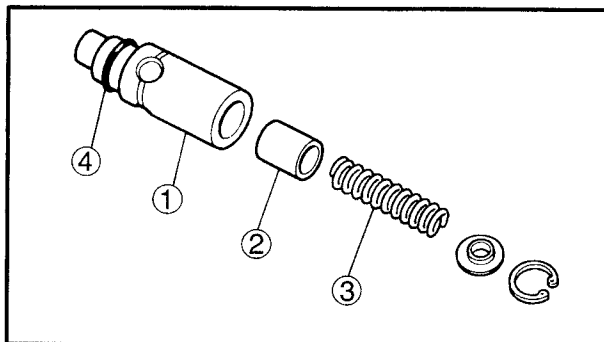
**Outer-rotor-to-oil-pump-cover clearance**

0.03 ~ 0.08 mm  
(0.0012 ~ 0.0031 in)  
<Limit>: 0.15 mm (0.0059 in)



## 3. Check:

- oil pump operation  
Unsmooth → Repair or replace the defective part(s).



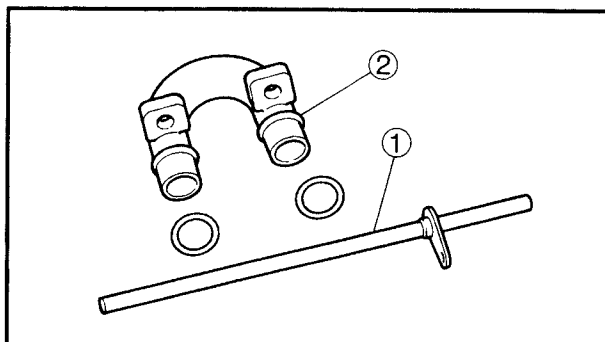
EAS00365

**CHECKING THE RELIEF VALVE**

## 1. Check:

- relief valve body ①
- relief valve ②
- spring ③
- O-ring ④

Damage/wear → Replace the defective part(s).



EAS00367

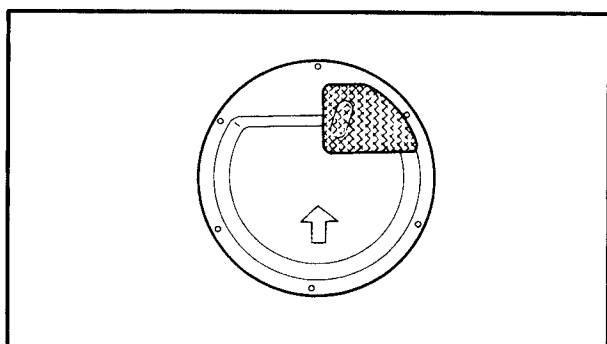
**CHECKING THE OIL DELIVERY PIPE AND OIL PIPE**

## 1. Check:

- oil delivery pipe ①
- oil pipe ②

Damage → Replace.

Obstruction → Wash and blow out with compressed air.



EAS00368

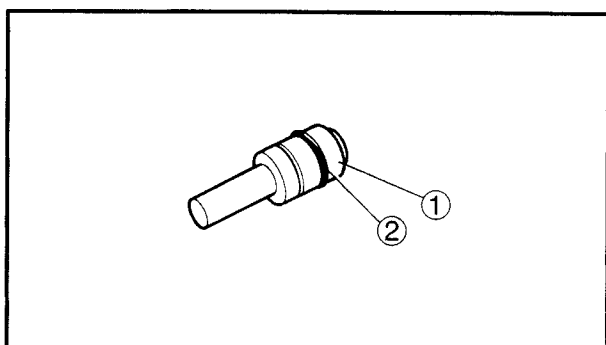
**CHECKING THE OIL STRAINER**

## 1. Check:

- oil strainer ①

Damage → Replace.

Contaminants → Clean with engine oil.



EAS00373

**CHECKING THE OIL NOZZLES**

The following procedure applies to all of the oil nozzles.

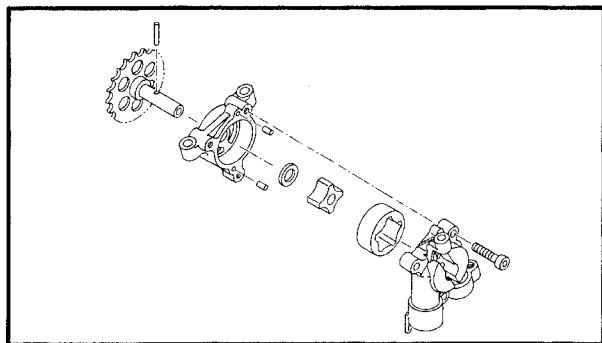
## 1. Check:

- oil nozzle ①
- O-ring ②

Damage/wear → Replace the oil nozzle.

oil nozzle passage

Obstruction → Blow out with compressed air.



EAS00375

**ASSEMBLING THE OIL PUMP**

1. Lubricate:
  - inner rotor
  - outer rotor
  - impeller shaft  
(with the recommended lubricant)




**Recommended lubricant**  
**Engine oil**

2. Check:
  - oil pump operation
 Refer to "CHECKING THE OIL PUMP".

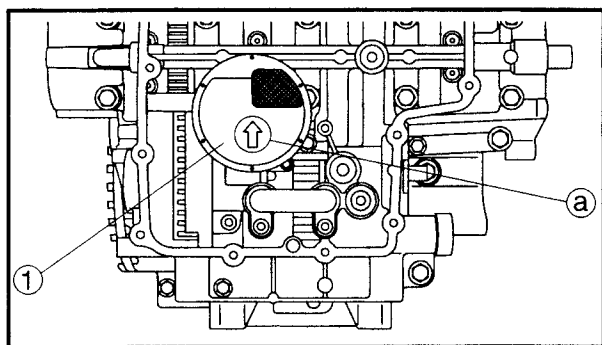
EAS00376

**INSTALLING THE OIL PUMP**

1. Install:
  - oil pump ①  **12 Nm (1.2 m•kg, 8.7 ft•lb)**

**NOTE:**

Install the oil pump assembly drive chain onto the oil pump assembly driven sprocket.



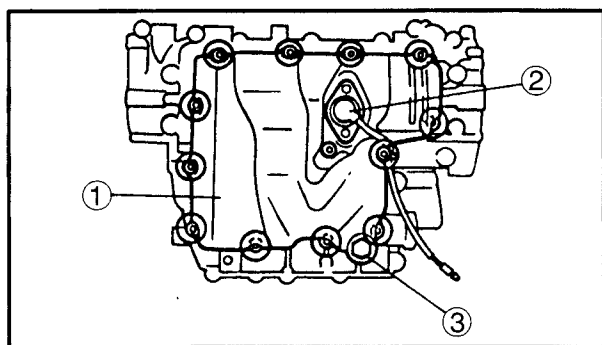
EAS00378

**INSTALLING THE OIL STRAINER**

1. Install:
  - oil strainer ①




**NOTE:**

The arrow ① on the oil strainer housing must point towards the front of the engine.



EAS00380

**INSTALLING THE OIL PAN**

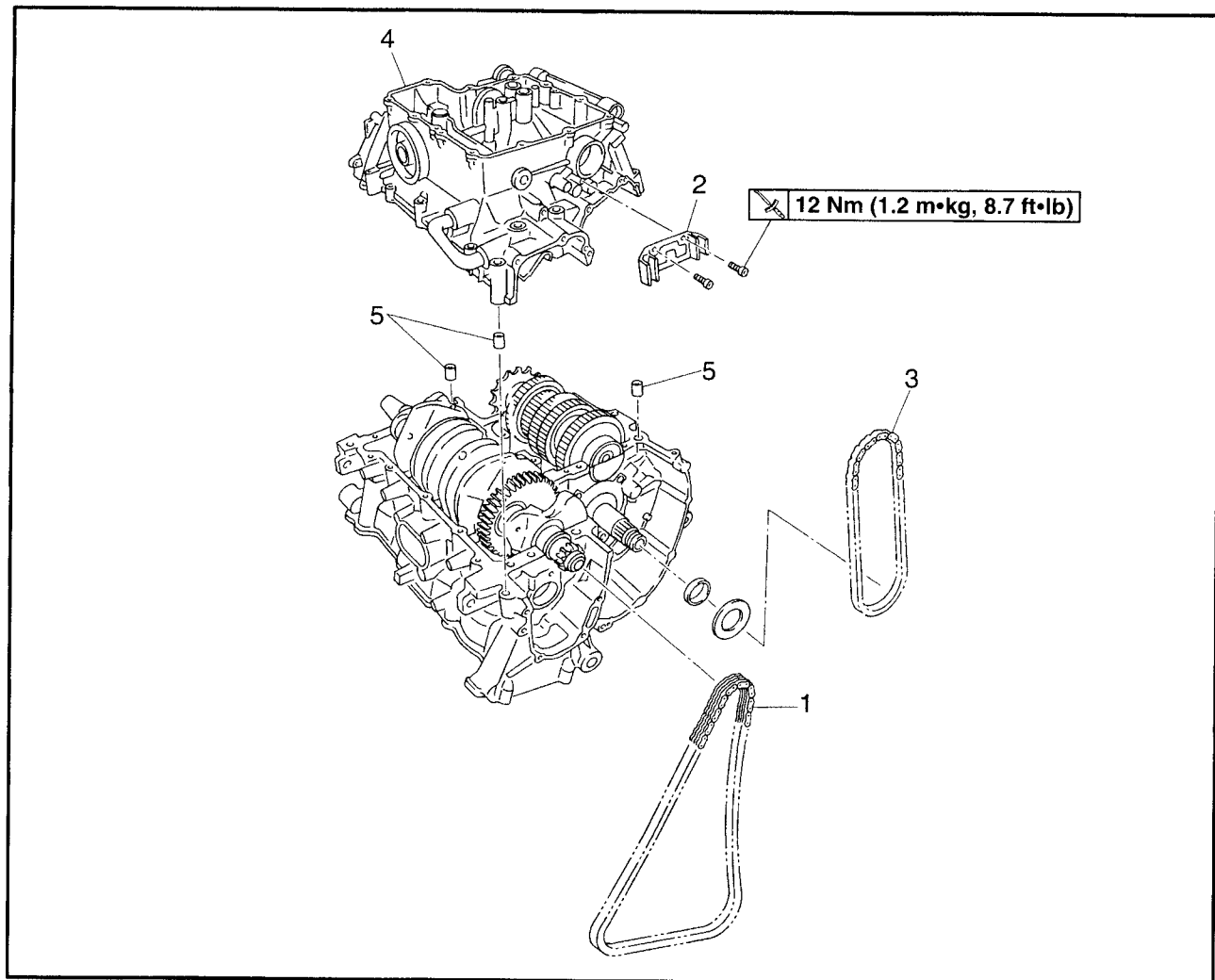
1. Install:
  - dowel pins
  - oil pan gasket **New**
  - oil pan ①  **12 Nm (1.2 m•kg, 8.7 ft•lb)**
  - oil level switch ②  **10 Nm (1.0 m•kg, 7.2 ft•lb)**
  - engine oil drain bolt ③  **43 Nm (4.3 m•kg, 31 ft•lb)**

**NOTE:**

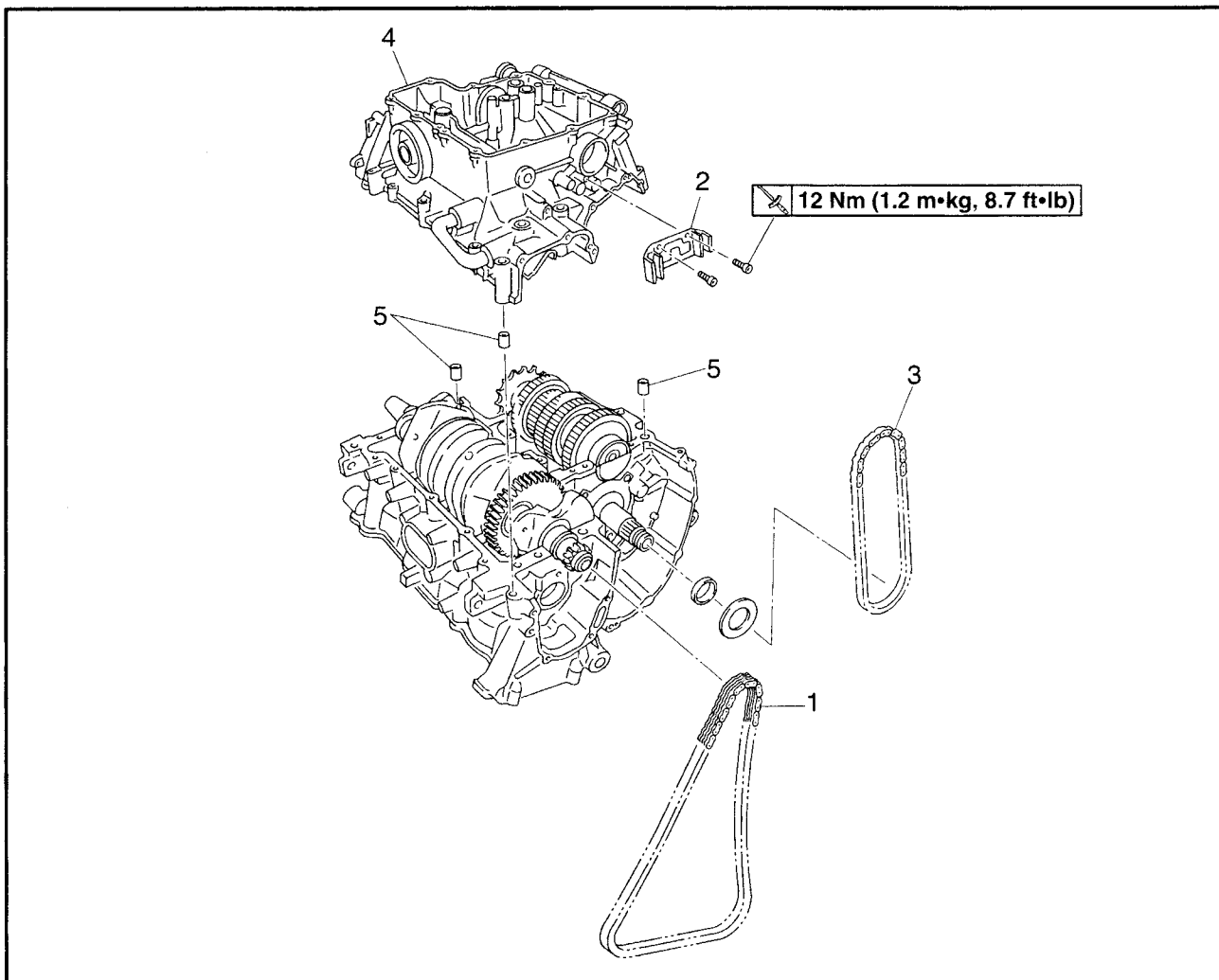
- Tighten the oil pan bolts in stages and in a crisscross pattern.
- Lubricate the oil level switch O-ring with lithium soap base grease.



## CRANKCASE



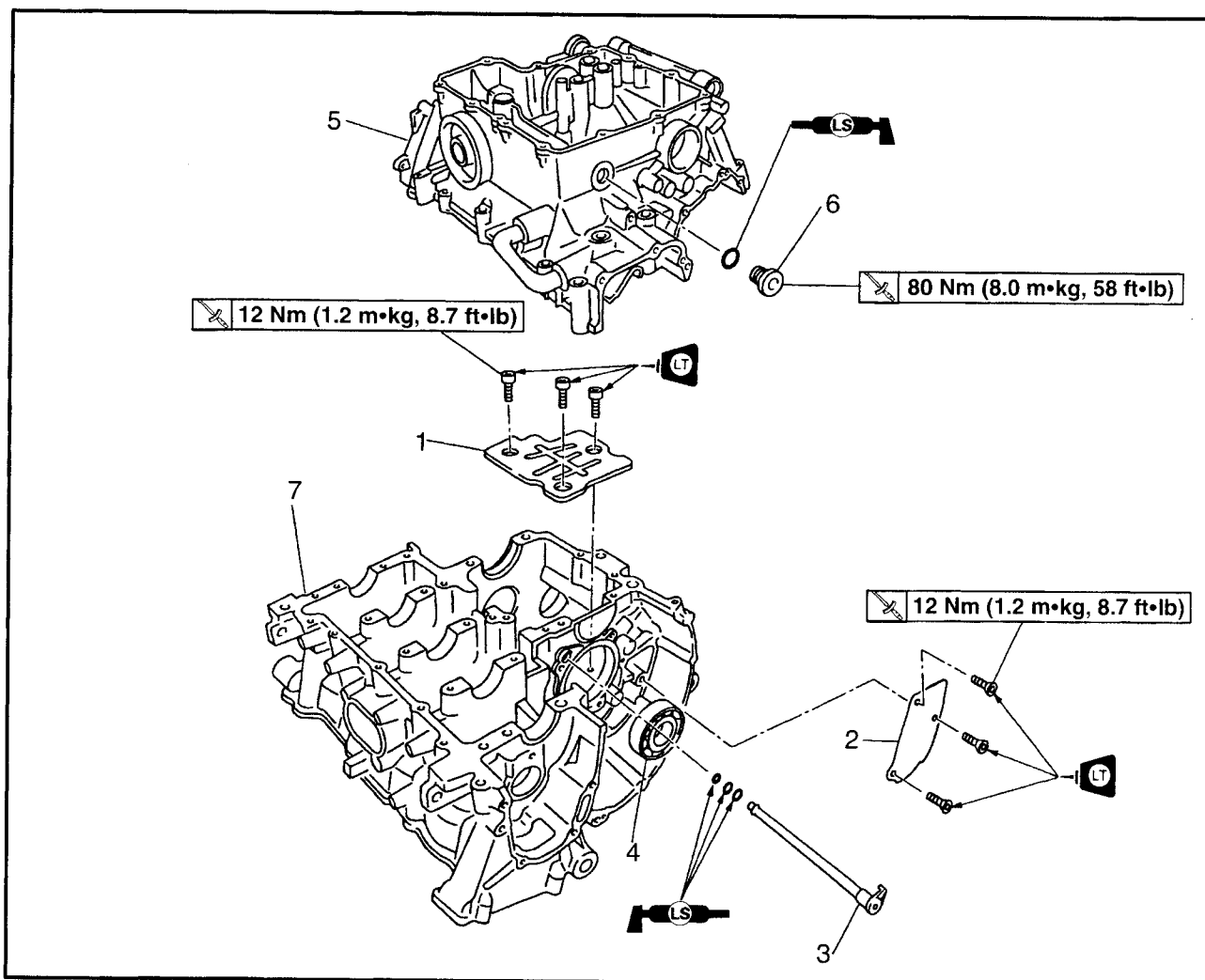
Order	Job/Part	Q'ty	Remarks
	<b>Separating the crankcase</b>		
	Engine		Remove the parts in the order listed.
	Cylinder head		Refer to "ENGINE".
	Starter clutch and generator		Refer to "CYLINDER HEAD".
			Refer to "STARTER CLUTCH AND GENERATOR".
	Shift shaft		Refer to "SHIFT SHAFT".
	Pickup coil and pickup rotor		Refer to "PICKUP COIL AND PICKUP ROTOR".
	Clutch assembly		Refer to "CLUTCH".
	Water pump assembly		Refer to "WATER PUMP" in chapter 5.
	Oil pan and oil pump		Refer to "OIL PAN AND OIL PUMP".



Order	Job/Part	Q'ty	Remarks
1	Timing chain	1	Refer to "DISASSEMBLY/ASSEMBLY THE CRANKCASE".
2	Oil pump drive chain guide	1	
3	Oil pump drive chain	1	
4	Lower crankcase	1	
5	Dowel pin	3	For installation, reverse the removal procedure.



## OIL BAFFLE PLATES AND OIL FILTER BOLT



Order	Job/Part	Q'ty	Remarks
	<b>Removing the oil baffle plates and oil filter bolt</b>		Remove the parts in the order listed.
	Transmission		Refer to "TRANSMISSION".
1	Oil baffle plate	1	
2	Oil baffle plate	1	
3	Oil delivery pipe	1	
4	Bearing	1	
5	Lower crankcase	1	
6	Oil filter bolt	1	
7	Upper crankcase	1	
			For instalation, reverse the removal procedure.



EAS00384

**DISASSEMBLING THE CRANKCASE**

1. Place the engine upside down.

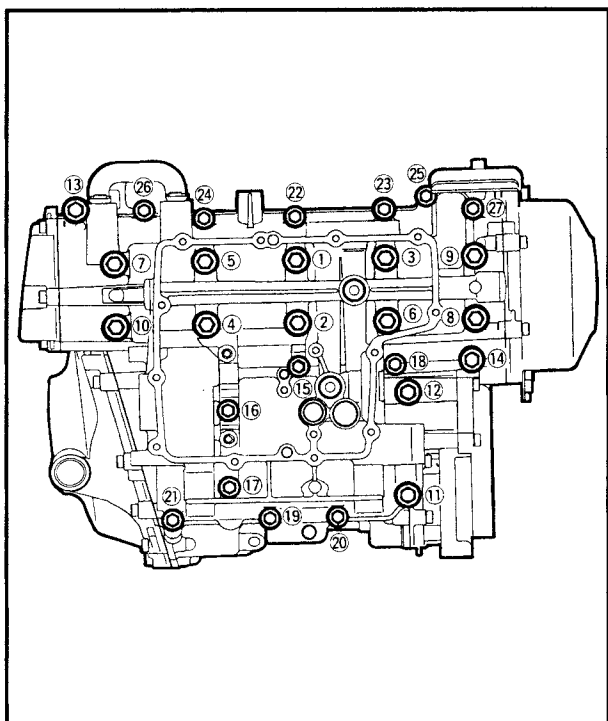
**NOTE:**

- Loosen each bolt 1/4 of a turn at a time, in stages and in a crisscross pattern. After all of the bolts are fully loosened, remove them.
- Loosen the bolts in decreasing numerical order (refer to the numbers in the illustration).
- The numbers embossed on the crankcase indicate the crankcase tightening sequence.

2. Remove:  
crankcase bolts
3. Remove:  
• lower crankcase

**CAUTION:**

Tap on one side of the crankcase with a soft-face hammer. Tap only on reinforced portions of the crankcase, not on the crankcase mating surfaces. Work slowly and carefully and make sure that the crankcase halves separate evenly.



M8 × 85 mm bolts: ① ~ ⑦ ⑩  
 M8 × 115 mm bolts: ⑧ ⑨  
 M8 × 65 mm bolt: ⑪ ⑫  
 M6 × 65 mm bolts: ⑬ ⑭ ⑰ ⑳  
 M6 × 55 mm bolts: ⑮ ㉒ ~ ㉔  
 M6 × 45 mm bolt: ⑯ ㉑ ~ ㉓  
 M6 × 75 mm bolt: ⑱

4. Remove:  
• dowel pins



EAS00399

**CHECKING THE CRANKCASE**

1. Thoroughly wash the crankcase halves in a mild solvent.
2. Thoroughly clean all the gasket surfaces and crankcase mating surfaces.
3. Check:
  - upper crankcase
  - lower crankcase
  - Cracks/damage → Replace.
  - oil delivery passages
  - Obstruction → Blow out with compressed air.

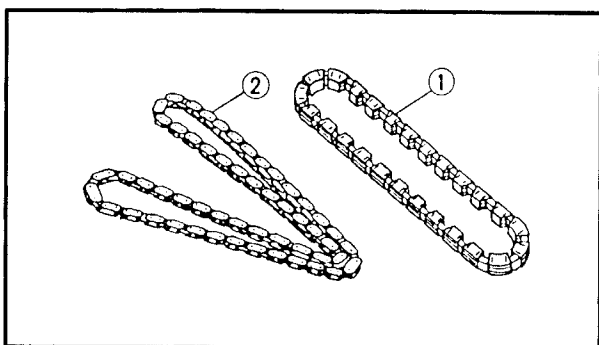
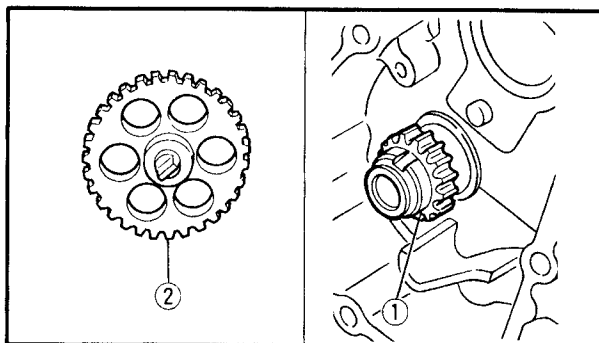
EAS00401

**CHECKING THE BEARINGS AND OIL SEALS**

1. Check:
  - bearings
  - Clean and lubricate the bearings, then rotate the inner race with your finger.
  - Rough movement → Replace.
2. Check:
  - oil seals
  - Damage/wear → Replace.

**CHECKING THE SPROCKETS AND CHAINS**

1. Check:
  - crankshaft sprocket ①
  - oil/water pump assembly drive sprocket ②
  - Cracks/damage/wear → Replace the defective part(-s).



2. Check:
  - timing chain ①
  - Damage/stiffness → Replace the timing chain and crankshaft sprocket as a set.
  - oil/water pump assembly drive chain ②
  - Damage/stiffness → Replace the oil/water pump assembly drive chain and oil/water pump assembly drive sprocket as a set.



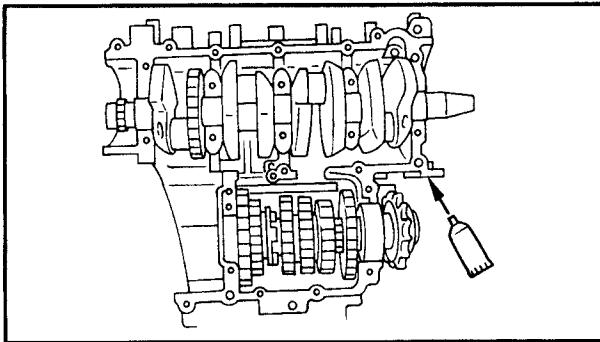
EAS00415

**ASSEMBLING THE CRANKCASE****1. Lubricate:**

- crankshaft journal bearings  
(with the recommended lubricant)



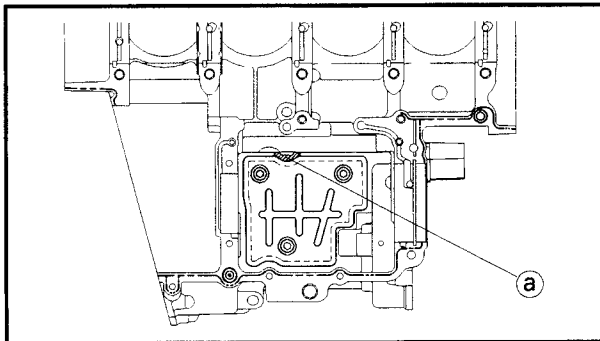
**Recommended lubricant**  
**Engine oil**

**2. Apply:**

- sealant  
(onto the crankcase mating surfaces and the groove (a) of the oil baffle plate)



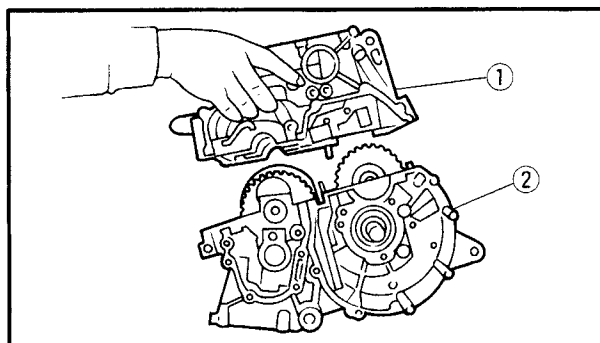
**Yamaha bond No. 1215**  
**90890-85505, ACC-1100-15-01**

**NOTE:**

Do not allow any sealant to come into contact with the oil gallery or crankshaft journal bearings. Do not apply sealant to within 2 ~ 3 mm of the crankshaft journal bearings.

**3. Install:**

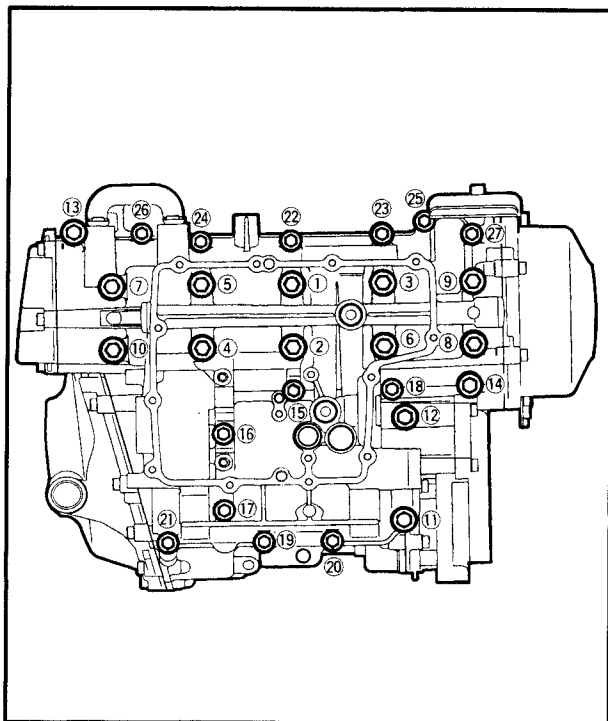
- dowel pin

**4. Set the shift drum assembly and transmission gears in the neutral position.****5. Install:**

- lower crankcase ①  
(onto the upper crankcase ②)

**CAUTION:**

**Before tightening the crankcase bolts, make sure that the transmission gears shift correctly when the shift drum assembly is turned by hand.**



6. Install:

- crankcase bolts

**NOTE:**

- Lubricate the bolt threads with engine oil.
- Install a washer on bolts ① ~ ⑩.
- Install a gasket on bolt ②①.
- Not lubricate seal bolts ⑬ ⑭
- Tighten the bolts in the tightening sequence cast on the crankcase.

M8 × 85 mm bolts: ① ~ ⑦ ⑩

M8 × 115 mm bolts: ⑧ ⑨

M8 × 65 mm bolt: ⑪ ⑫

M6 × 65 mm bolts: ⑬ ⑭ ⑰ ⑳

M6 × 55 mm bolts: ⑮ ⑯ ~ ⑳

M6 × 45 mm bolts: ⑰ ⑱ ~ ㉑

M6 × 75 mm bolts: ㉒



**Bolt ⑮ ~ ㉒**

**12 Nm (1.2 m•kg, 8.7 ft•lb)**

**Bolt ⑬ ~ ⑭**

**14 Nm (1.4 m•kg, 10 ft•lb)**

**Bolt ① ~ ⑫**

**24 Nm (2.4 m•kg, 17 ft•lb)**

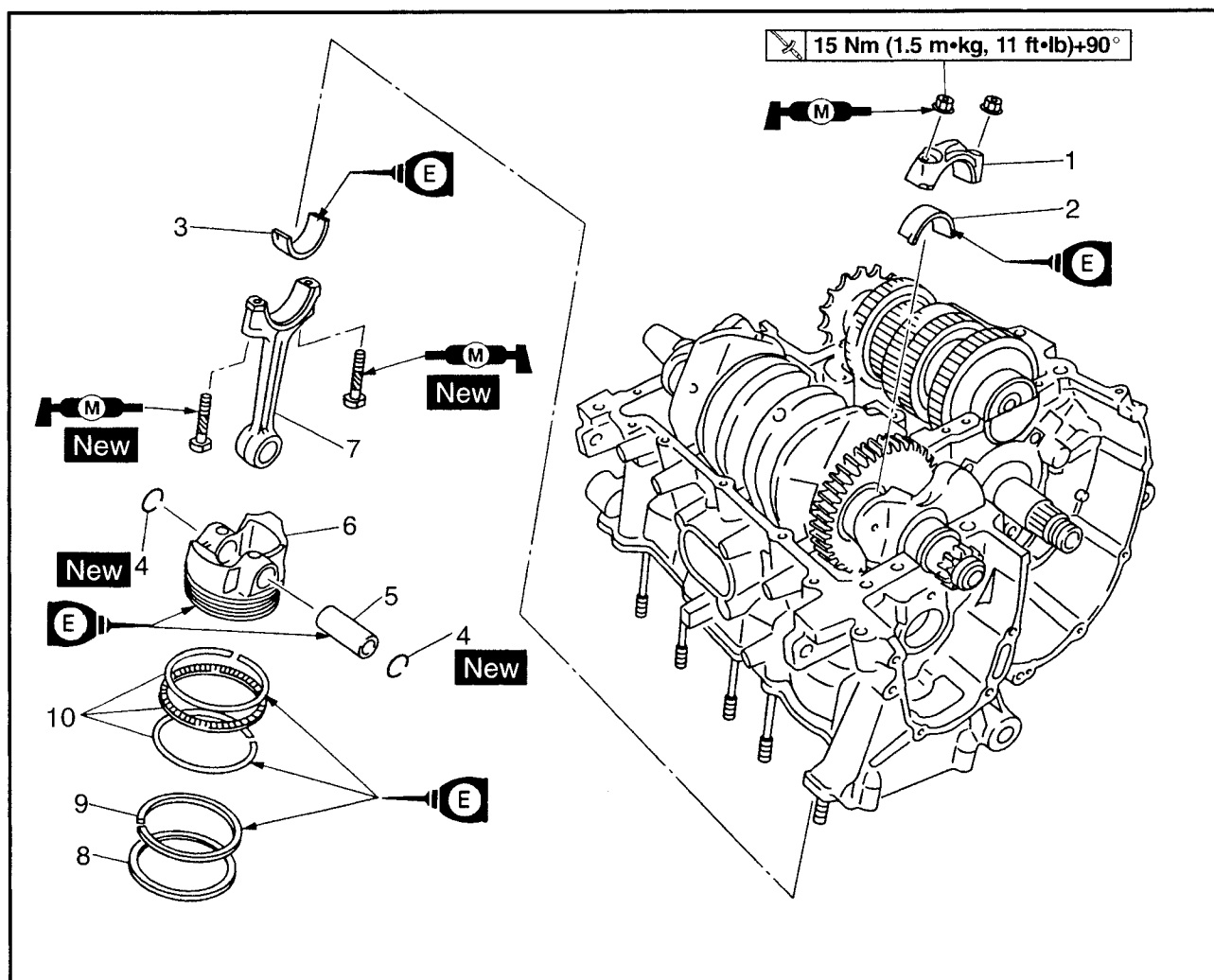
**⚠ WARNING**

**Always use new copper washers.**

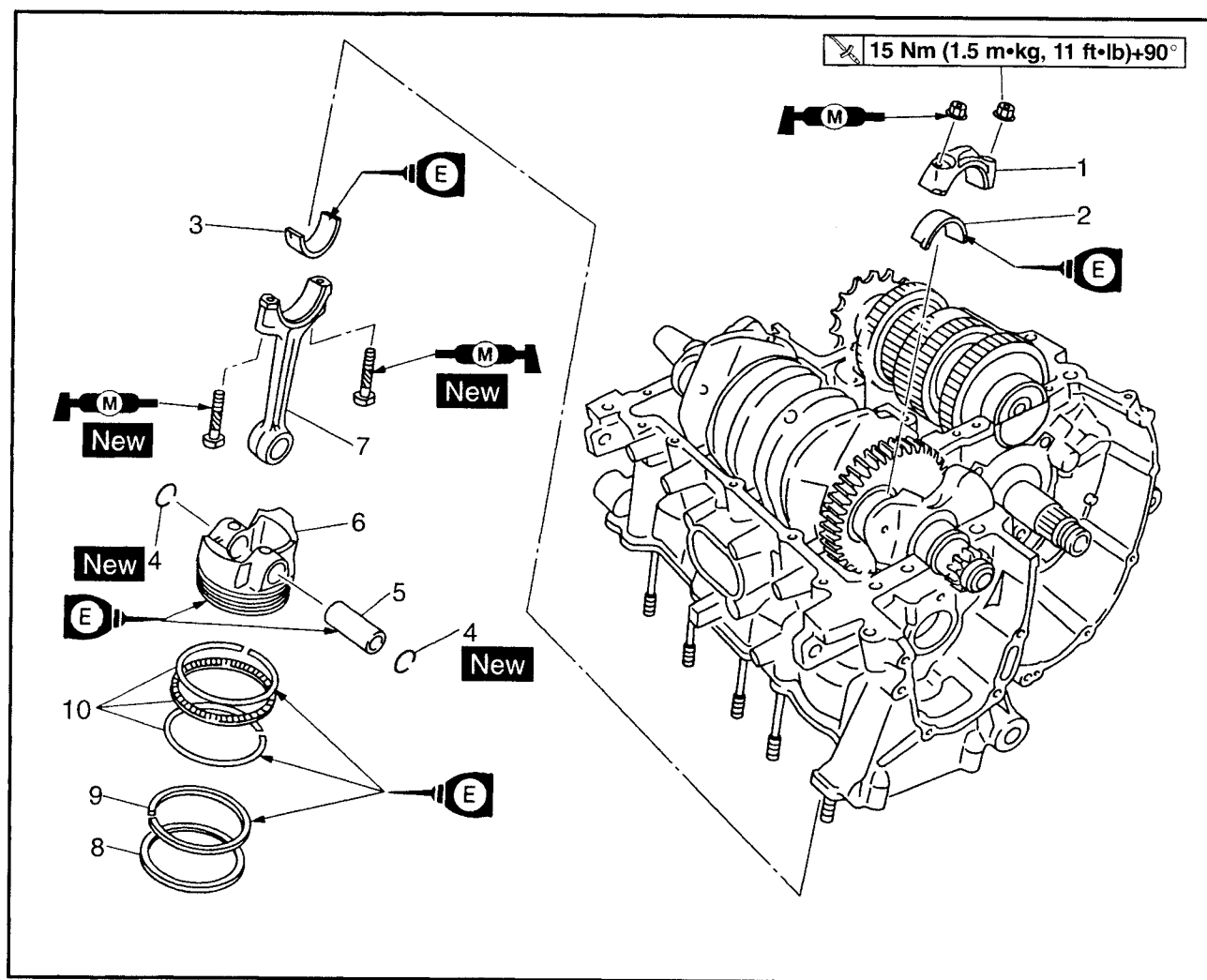


EAS00252

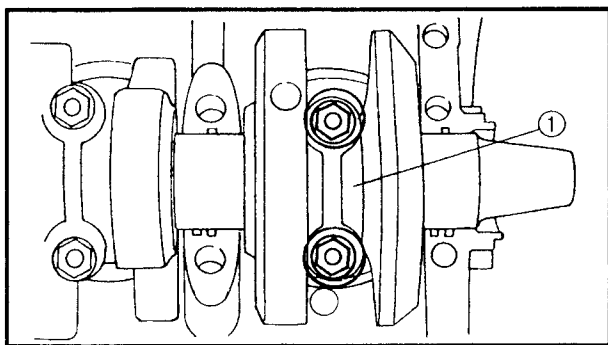
## CONNECTING RODS AND PISTONS



Order	Job/Part	Q'ty	Remarks
	<b>Removing the connecting rods and pistons</b>		
	Lower crankcase		Remove the parts in the order listed.
			Separate.
			Refer to "CRANKCASE".
1	Connecting rod cap	4	Refer to "REMOVING/INSTALLING THE CONNECTING RODS AND PISTONS".
2	Big end lower bearing	4	
3	Big end upper bearing	4	
4	Piston pin clip	8	
5	Piston pin	4	
6	Piston	4	
7	Connecting rod	4	



Order	Job/Part	Q'ty	Remarks
8	Top ring	4	Refer to "REMOVING/INSTALLING THE CONNECTING RODS AND PISTONS". For installation, reverse the removal procedure.
9	2nd ring	4	
10	Oil ring	4	



EAS00393

## REMOVING THE CONNECTING RODS AND PISTONS

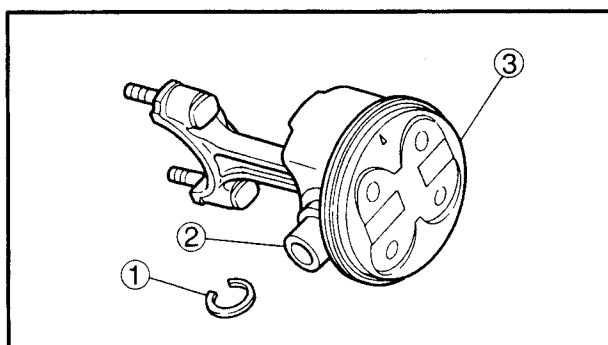
The following procedure applies to all of the connecting rods and pistons.

### 1. Remove:

- connecting rod cap ①
- big end bearings

### NOTE:

Identify the position of each big end bearing so that it can be reinstalled in its original place.



### 2. Remove:

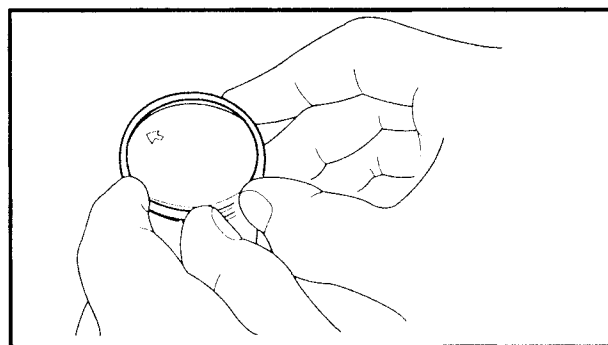
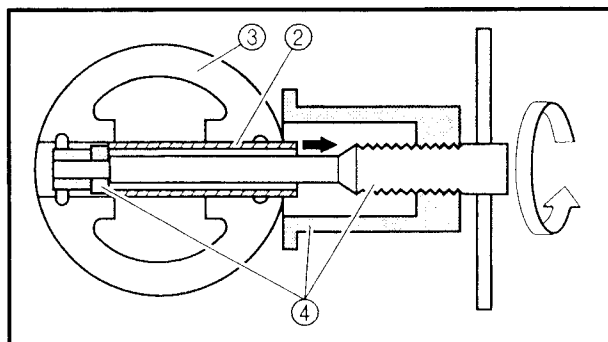
- piston pin clips ①
- piston pin ②
- piston ③
- connecting rod

### CAUTION:

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

### NOTE:

- For reference during installation, put identification marks on the piston crown.
- Before removing the piston pin, deburr the piston pin clip groove and the piston pin bore area in the piston. If both areas are deburred and the piston pin is still difficult to remove, remove it with the piston pin puller ④.



**Piston pin puller**  
90890-01304, YU-01304

### 3. Remove:

- top ring
- 2nd ring
- oil ring

### NOTE:

To remove a piston ring, open the end gap with your fingers and lift the other side of the ring over the piston crown.



EAS00262

## CHECKING THE CYLINDER AND PISTONS

The following procedure applies to all of the cylinders and pistons.

1. Check:

- piston wall
- cylinder wall

Vertical scratches → Replace the crankcases, and the piston and piston rings as a set.

2. Measure:

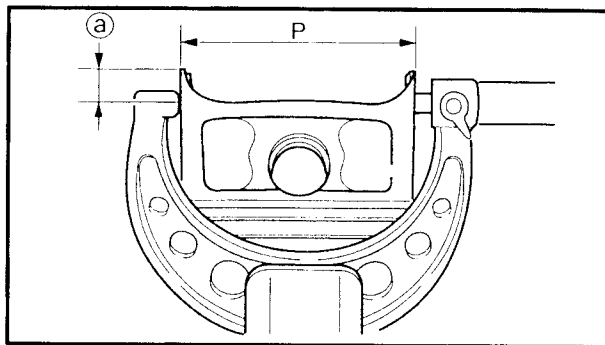
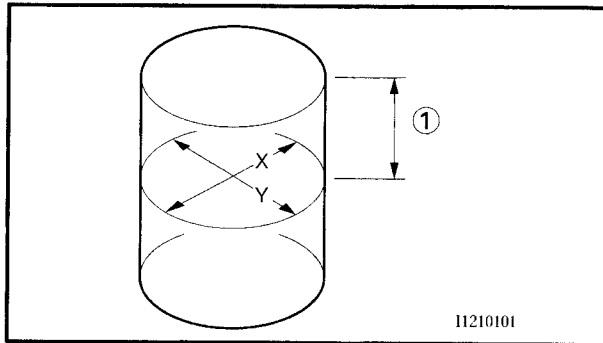
- piston-to-cylinder clearance



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

**NOTE:**

Measure cylinder bore “C” by taking side-to-side and front-to-back measurements of the cylinder. Then, find the average of the measurements.



**Cylinder bore gauge**  
90890-03017, YU-03017

Cylinder bore “C”	65.50 ~ 65.51 mm (25.787 ~ 25.791 in)
Max. taper “T”	0.05 mm (0.002 in)
Out of round “R”	0.05 mm (0.002 in)

- b. If out of specification, replace the crankcases, and the piston and piston rings as a set.
- c. Measure piston skirt diameter "P" with the micrometer.



**Micrometer**  
90890-03008, YU-03008

- ④ 4 mm from the bottom edge of the piston

	<b>Piston size "P"</b>
<b>Standard</b>	<b>65.460 ~ 65.475 mm (2.5772 ~ 2.5778 in)</b>

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



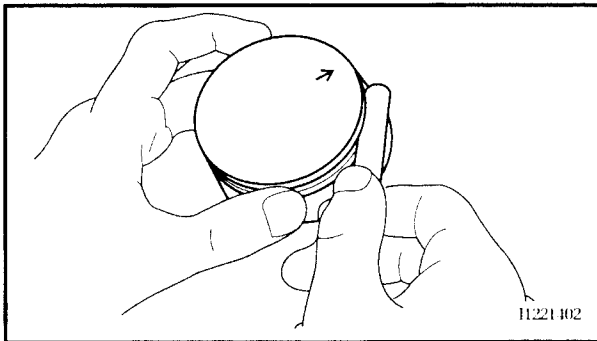
- e. Calculate the piston-to-cylinder clearance with the following formula.

**Piston-to-cylinder clearance =  
Cylinder bore “C” –  
Piston skirt diameter “P”**



**Piston-to-cylinder clearance**  
**0.025 ~ 0.050 mm**  
**(0.001 ~ 0.002 in)**  
**<Limit>: 0.07 mm (0.0028 in)**

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



EAS00263

## CHECKING THE PISTON RINGS

1. Measure:
  - piston ring side clearance  
Out of specification → Replace the piston and piston rings as a set.

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

Before measuring the piston ring side clearance, eliminate any carbon deposits from the piston ring grooves and piston rings.



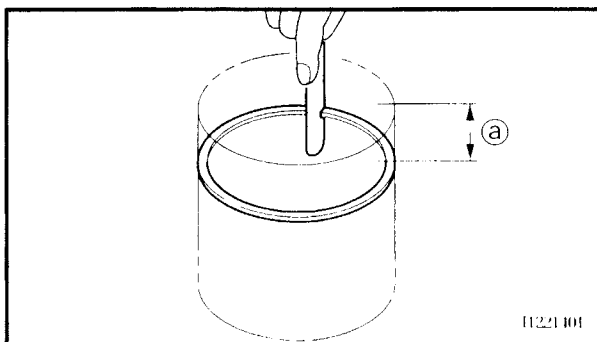
**Piston ring side clearance**

**Top ring**  
0.030 ~ 0.065 mm  
(0.0012 ~ 0.0026 in)  
<Limit>: 0.115 mm (0.005 in)

**2nd ring**  
0.020 ~ 0.055 mm  
(0.0008 ~ 0.0022 in)  
<Limit>: 0.115 mm (0.005 in)

2. Install:
  - piston ring  
(into the cylinder)

**NOTE:** \_\_\_\_\_  
Level the piston ring in the cylinder with the piston crown.



Ⓐ 5 mm (0.20 in)



## 3. Measure:

- piston ring end gap

Out of specification → Replace the piston ring.

**NOTE:**

The oil ring expander spacer's end gap cannot be measured. If the oil ring rail's gap is excessive, replace all three piston rings.

**Piston ring end gap****Top ring**

0.15 ~ 0.25 mm

(0.006 ~ 0.009 in)

<Limit>: 0.50 mm (0.02 in)

**2nd ring**

0.40 ~ 0.50 mm

(0.016 ~ 0.02 in)

<Limit>: 0.85 mm (0.033 in)

**Oil ring**

0.10 ~ 0.35 mm

(0.004 ~ 0.014 in)

ABS00266

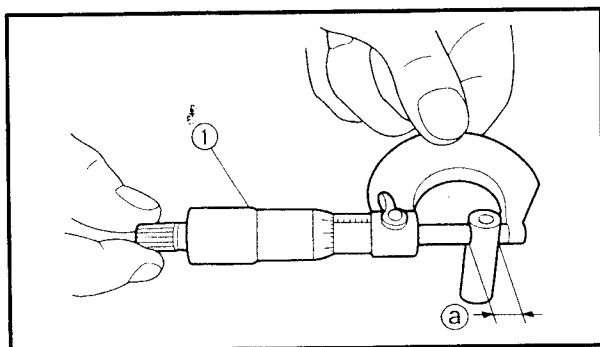
**CHECKING THE PISTON PINS**

The following procedure applies to all of the piston pins.

## 1. Check:

- piston pin

Blue discoloration/grooves → Replace the piston pin and then check the lubrication system.



## 2. Measure:

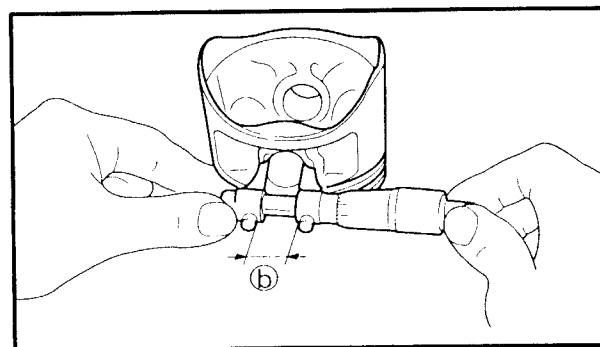
- piston pin outside diameter (a)

Out of specification → Replace the piston pin.

**Piston pin outside diameter**

15.991 ~ 16.000 mm

(0.6296 ~ 0.6299 in)



## 3. Measure:

- piston pin bore diameter (in the piston)

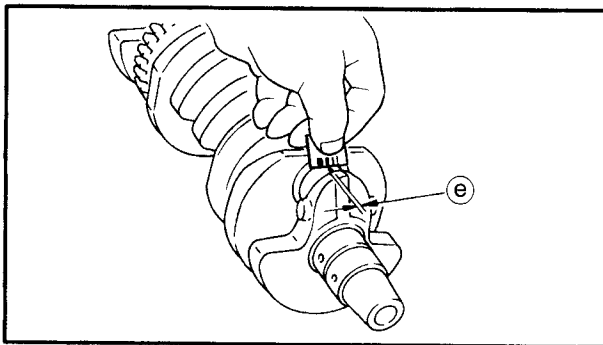
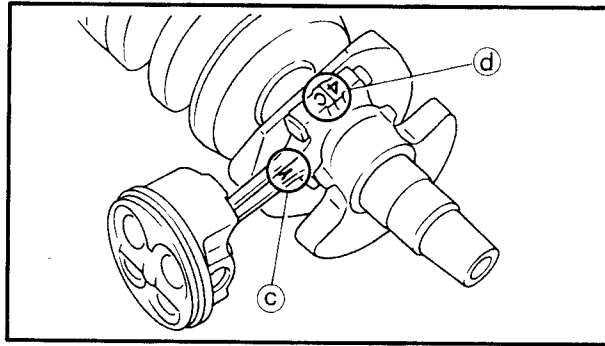
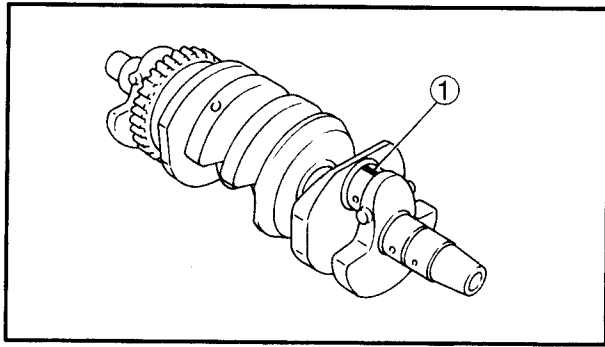
Out of specification → Replace the piston pin.

**Piston pin bore diameter  
(in the piston)**

16.002 ~ 16.013 mm

(0.6300 ~ 0.6304 in)





- c. Put a piece of Plastigauge® ① on the crankshaft pin.
- d. Assemble the connecting rod halves.

**NOTE:**

- Do not move the connecting rod or crankshaft until the clearance measurement has been completed.
- Lubricate the bolt threads and nut seats with molybdenum disulfide grease.
- Make sure that the “Y” mark (C) on the connecting rod faces towards the left side of the crankshaft.
- Make sure that the characters (d) on both the connecting rod and connecting rod cap are aligned.

- e. Tighten the connecting rod nuts.

**CAUTION:**

- When tightening the connecting rod nuts, be sure to use an F-type torque wrench.
- After tightening the connecting rod nut to the specified torque, turn the connecting rod nut another  $+90^{\circ}$ .

Refer to "INSTALLING THE PISTONS AND CONNECTING RODS".

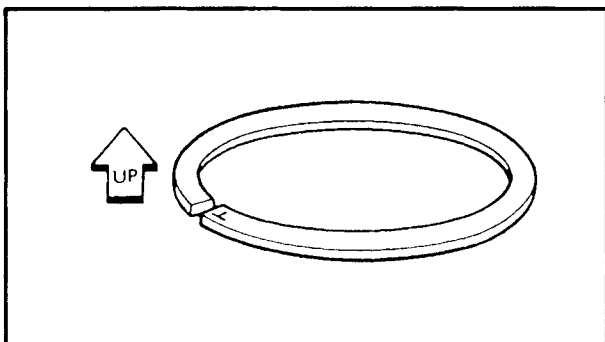
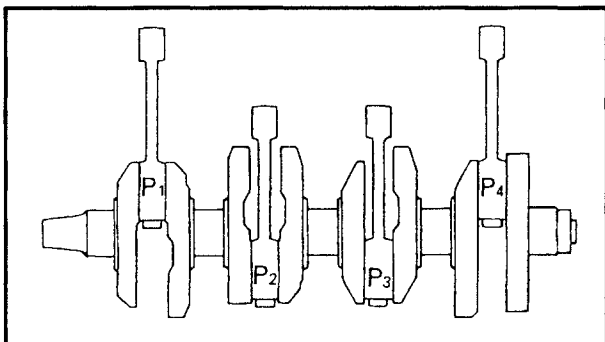
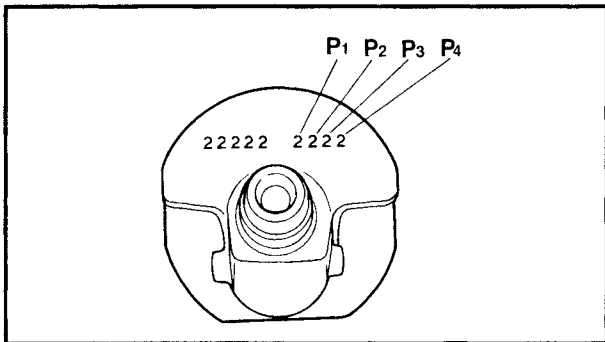
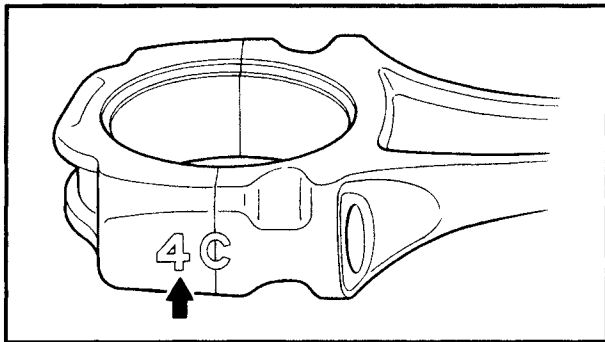


### Connecting rod nut

**15 Nm (1.5 m•kg, 11 ft•lb) + 90°**

- f. Remove the connecting rod and big end bearings.  
Refer to “REMOVING THE CONNECTING RODS AND PISTONS”.
- g. Measure the compressed Plastigauge® width ⑤ on the crankshaft pin.  
If the crankshaft-pin-to-big-end-bearing clearance is out of specification, select replacement big end bearings.





## 2. Select:

- big end bearings ("P<sub>1</sub>" ~ "P<sub>4</sub>")

**NOTE:**

- The numbers stamped into the crankshaft web and the numbers on the connecting rods are used to determine the replacement big end bearing sizes.
- "P<sub>1</sub>" ~ "P<sub>4</sub>" refer to the bearings shown in the crankshaft illustration.

For example, if the connecting rod "P<sub>1</sub>" and the crankshaft web "P<sub>1</sub>" numbers are "5" and "1" respectively, then the bearing size for "P<sub>1</sub>" is:

$$\text{"P}_1\text{" (connecting rod) - "P}_1\text{" (crankshaft) = } 5 - 1 = 4$$

**BIG END BEARING COLOR CODE**

1	blue
2	black
3	brown
4	green

EAS00271

**INSTALLING THE PISTONS AND CONNECTING RODS**

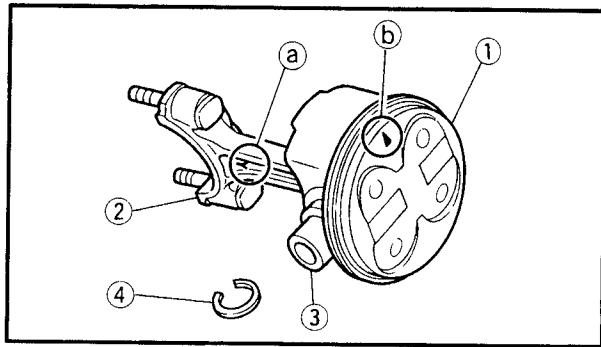
The following procedure applies to all of the pistons and cylinders.

## 1. Install:

- top ring
- 2nd ring
- oil ring

**NOTE:**

Be sure to install the piston rings so that the manufacturer's marks or numbers face up.

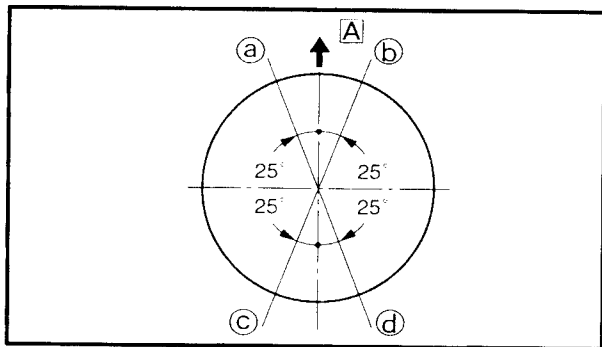


### 2. Install:

- piston ①  
(onto the respective connecting rod ②)
- piston pin ③
- piston pin clip ④ **New**

### NOTE:

- Apply engine oil onto the piston pin.
- Make sure that the "Y" mark (a) on the connecting rod faces left when the arrow mark (b) on the piston is pointing up. Refer to the illustration.
- Reinstall each piston into its original cylinder (numbering order starting from the left: #1 to #4).




### 3. Offset:

- piston ring end gaps

- (a) Top ring
- (b) Lower oil ring rail
- (c) Upper oil ring rail
- (d) 2nd ring
- (A) Intake side


### 4. Lubricate:

- piston
- piston rings
- cylinder  
(with the recommended lubricant)

	<b>Recommended lubricant</b> <b>Engine oil</b>
---	---

### 5. Lubricate:

- bolt threads
- nut seats  
(with the recommended lubricant)

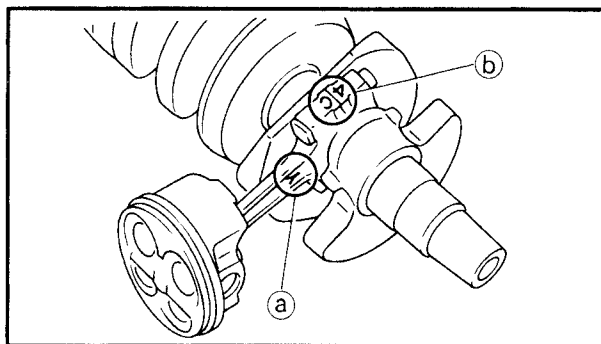
	<b>Recommended lubricant</b> <b>Molybdenum disulfide grease</b>
---	--



6. Lubricate:
- crankshaft pins
  - big end bearings
  - connecting rod big end inner surface (with the recommended lubricant)



**Recommended lubricant**  
**Engine oil**




7. Install:
  - big end bearings
  - connecting rod assembly  
(into the cylinder and onto the crankshaft pin).
  - connecting rod cap  
(onto the connecting rod)

**NOTE:**

- Align the projections on the big end bearings with the notches in the connecting rods and connecting rod caps.
- Be sure to reinstall each big end bearing in its original place.
- While compressing the piston rings with one hand, install the connecting rod assembly into the cylinder with the other hand.
- Make sure that the “Y” marks (a) on the connecting rods face towards the left side of the crankshaft.
- Make sure that the characters (b) on both the connecting rod and connecting rod cap are aligned.

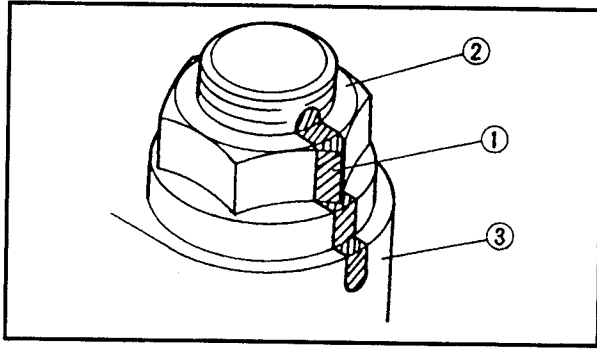
8. Align:
  - bolt heads  
(with the connecting rod caps)
9. Tighten:
  - connecting rod nuts

	15 Nm (1.5 m•kg, 11 ft•lb)+90°
---	--------------------------------

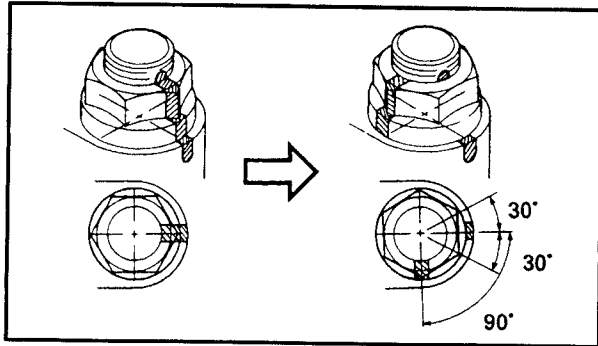
- a. Replace the connecting rod bolts and nuts with new ones.

**CAUTION:**

**Tighten the connecting rod bolts using the plastic-region tightening angle method. Always install new bolts and nuts.**



- b. Clean the connecting rod bolts and nuts.
- c. Tighten the connecting rod nuts.
- d. Put a mark ① on the corner of the connecting rod nut ② and the connecting rod ③.



- e. Tighten the nut further to reach the specified angle (90°).

### ⚠ WARNING

When the nut is tightened more than the specified angle, do not loosen the nut and then retighten it.

Replace the bolt with a new one and perform the procedure again.

### CAUTION:

- Do not use a torque wrench to tighten the nut to the specified angle.
- Tighten the nut until it is at the specified angles.

### NOTE:

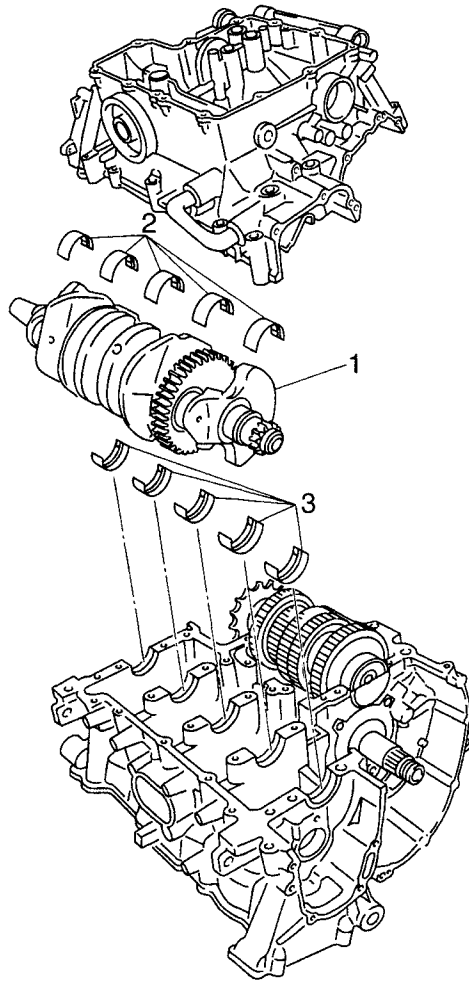
When using a hexagonal nut, note that the angle from one corner to another is 60°.



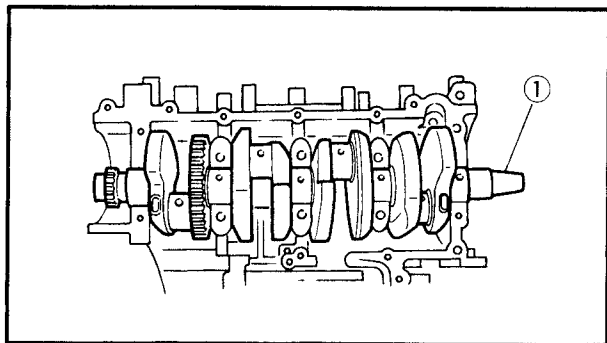


EAS00381

## CRANKSHAFT



Order	Job/Part	Q'ty	Remarks
	<b>Removing the crankshaft</b>		
	Crankcase lower		Remove the parts in the order listed. Separate. Refer to "CRANKCASE".
	Connecting rods and pistons		Refer to "CONNECTING RODS AND PISTONS".
1	Crankshaft	1	Refer to "REMOVING/INSTALLING THE CRANKSHAFT".
2	Crankshaft journal lower bearing	5	
3	Crankshaft journal upper bearing	5	
			For installation, reverse the removal procedure.



EAS00387

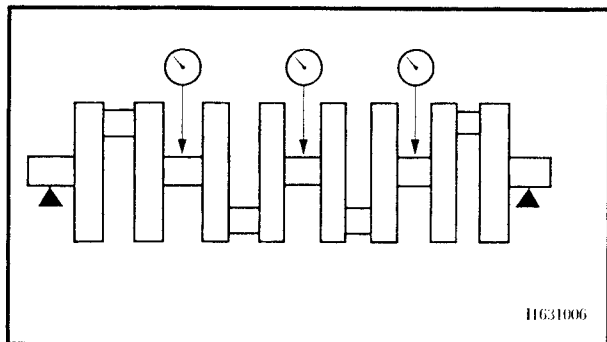
**REMOVING THE CRANKSHAFT**

## 1. Remove:

- crankshaft ①
- crankshaft journal upper bearings (from the upper / lower crankcase)

**NOTE:**

Identify the position of each crankshaft journal upper bearing so that it can be reinstalled in its original place.



EAS00397

**CHECKING THE CRANKSHAFT**

## 1. Measure:

- crankshaft runout

Out of specification → Replace the crankshaft.



**Max. crankshaft runout**  
**0.03 mm (0.0012 in)**

## 2. Check:

- crankshaft journal surfaces
- crankshaft pin surfaces
- bearing surfaces

Scratches/wear → Replace the crankshaft.

**CHECKING THE CRANKSHAFT JOURNAL BEARINGS**

## 1. Measure:

- crankshaft-journal-to-crankshaft-journal-bearing clearance

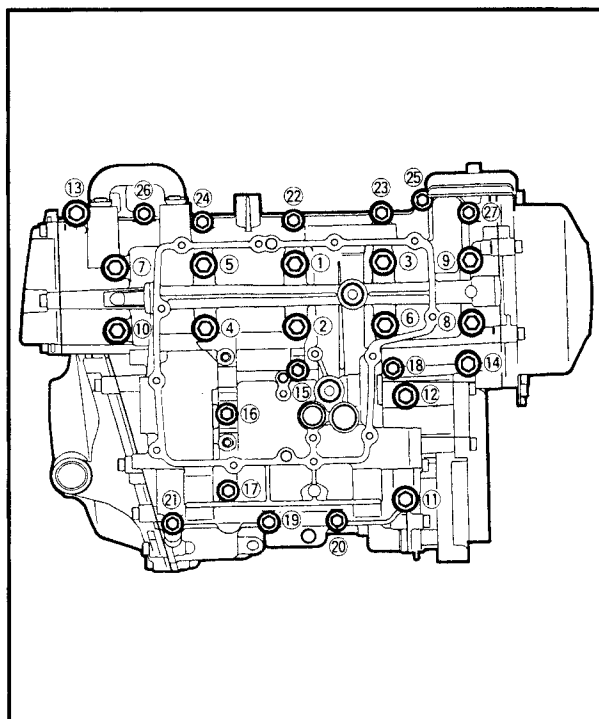
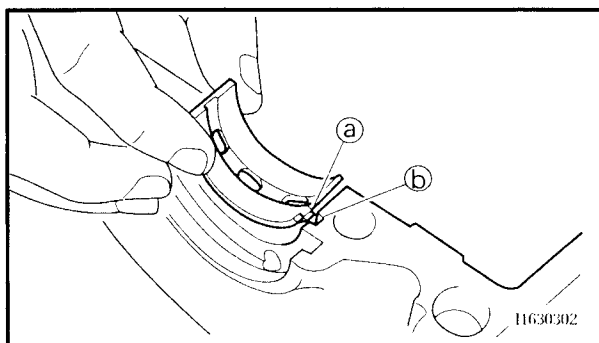
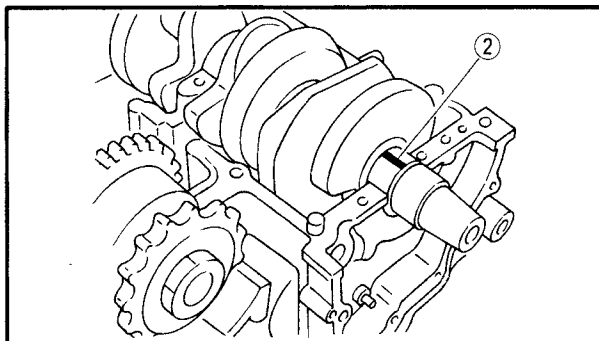
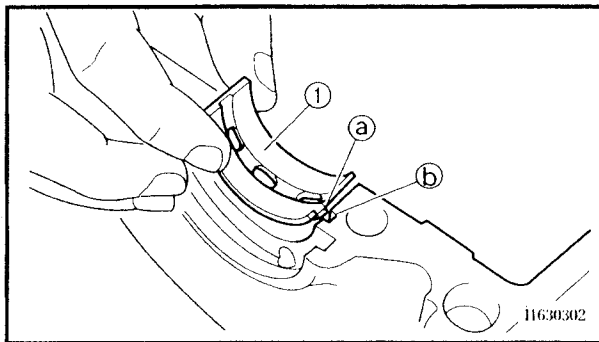
Out of specification → Replace the crankshaft journal bearings.



**Crankshaft-journal-to-crankshaft-journal-bearing clearance**  
**0.034 ~ 0.058 mm**  
**(0.0013 ~ 0.0023 in)**

**CAUTION:**

Do not interchange the crankshaft journal bearings. To obtain the correct crankshaft-journal-to-crankshaft-journal-bearing clearance and prevent engine damage, the crankshaft journal bearings must be installed in their original positions.



- a. Clean the crankshaft journal bearings, crankshaft journals, and bearing portions of the crankcase.
- b. Place the upper crankcase upside down on a bench.
- c. Install the crankshaft journal upper bearings ① and the crankshaft into the upper crankcase.

## NOTE:

Align the projections ① on the crankshaft journal upper bearings with the notches ② in the upper crankcase.

- d. Put a piece of Plastigauge® ② on each crankshaft journal.

## NOTE:

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

- e. Install the crankshaft journal lower bearings into the lower crankcase and assemble the crankcase.

## NOTE:

- Align the projections ① on the crankshaft journal lower bearings with the notches ② in the lower crankcase.
- Do not move the crankshaft until the clearance measurement has been completed.

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



**Bolt ⑮ ~ ⑳**

**12 Nm (1.2 m•kg, 8.7 ft•lb)**

**Bolt ⑬ ⑭**

**14 Nm (1.4 m•kg, 10 ft•lb)**

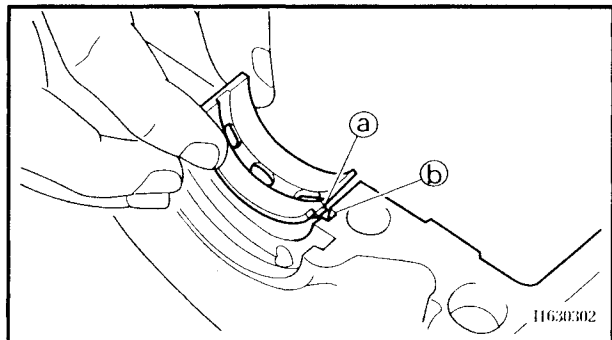
**Bolt ① ~ ⑫**

**24 Nm (2.4 m•kg, 17 ft•lb)**

## NOTE:

Lubricate the crankcase bolt threads with engine oil.





EAS00407

**INSTALLING THE CRANKSHAFT****1. Install:**

- crankshaft journal upper bearings  
(into the upper / lower crankcase)

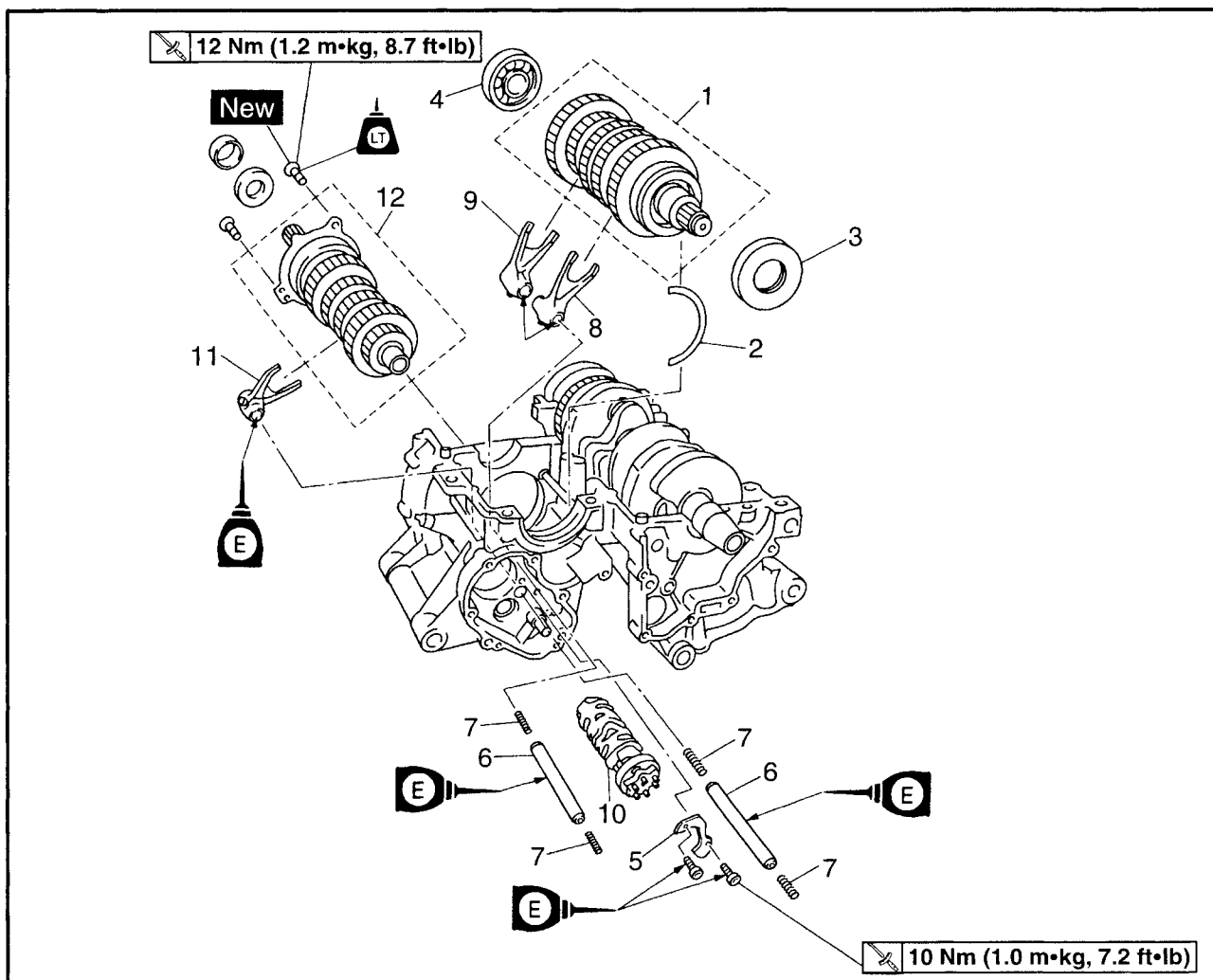
**NOTE:**

- Align the projections (a) on the crankshaft journal upper bearings with the notches (b) in the upper crankcase.
- Be sure to install each crankshaft journal upper bearing in its original place.

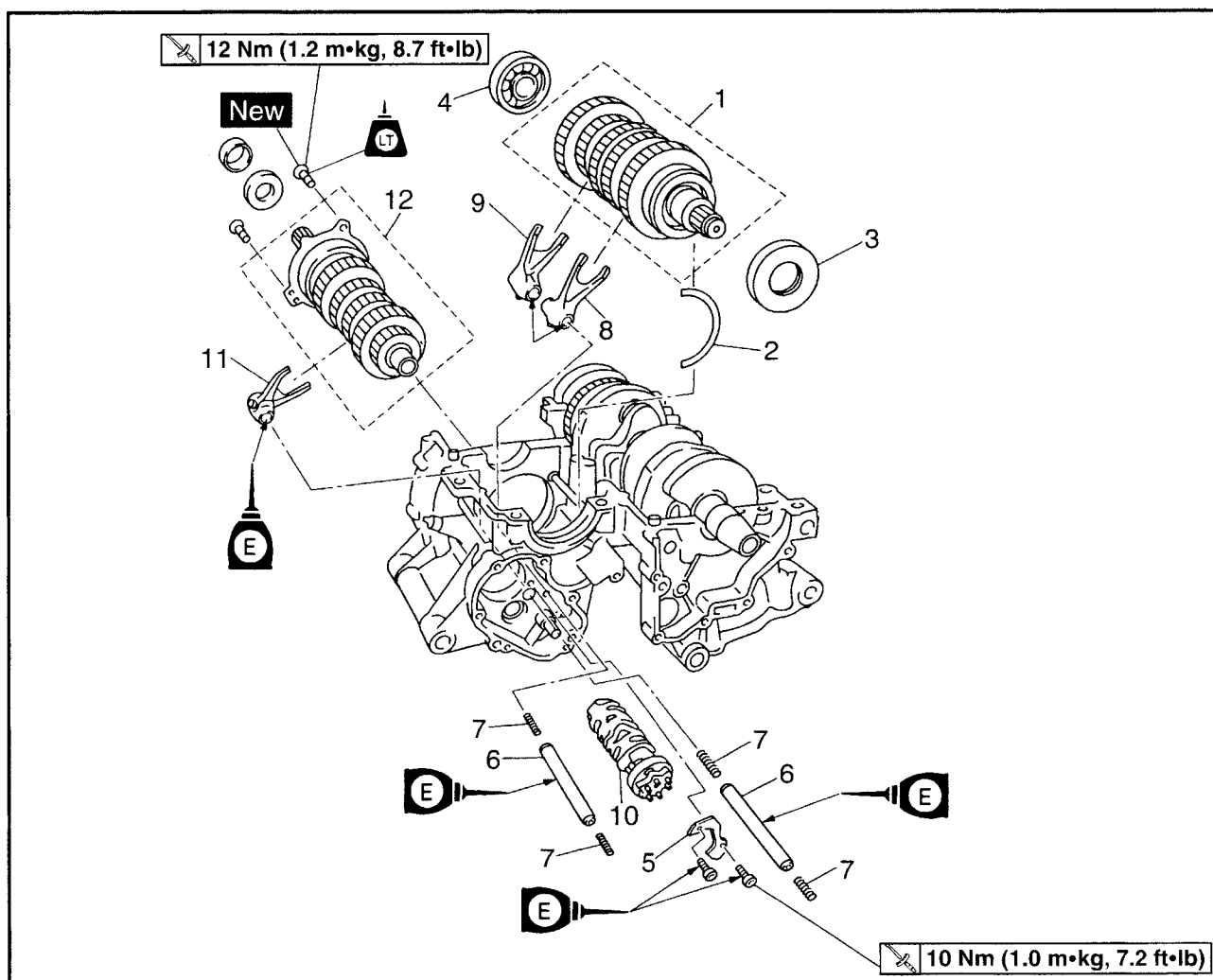


EAS00419

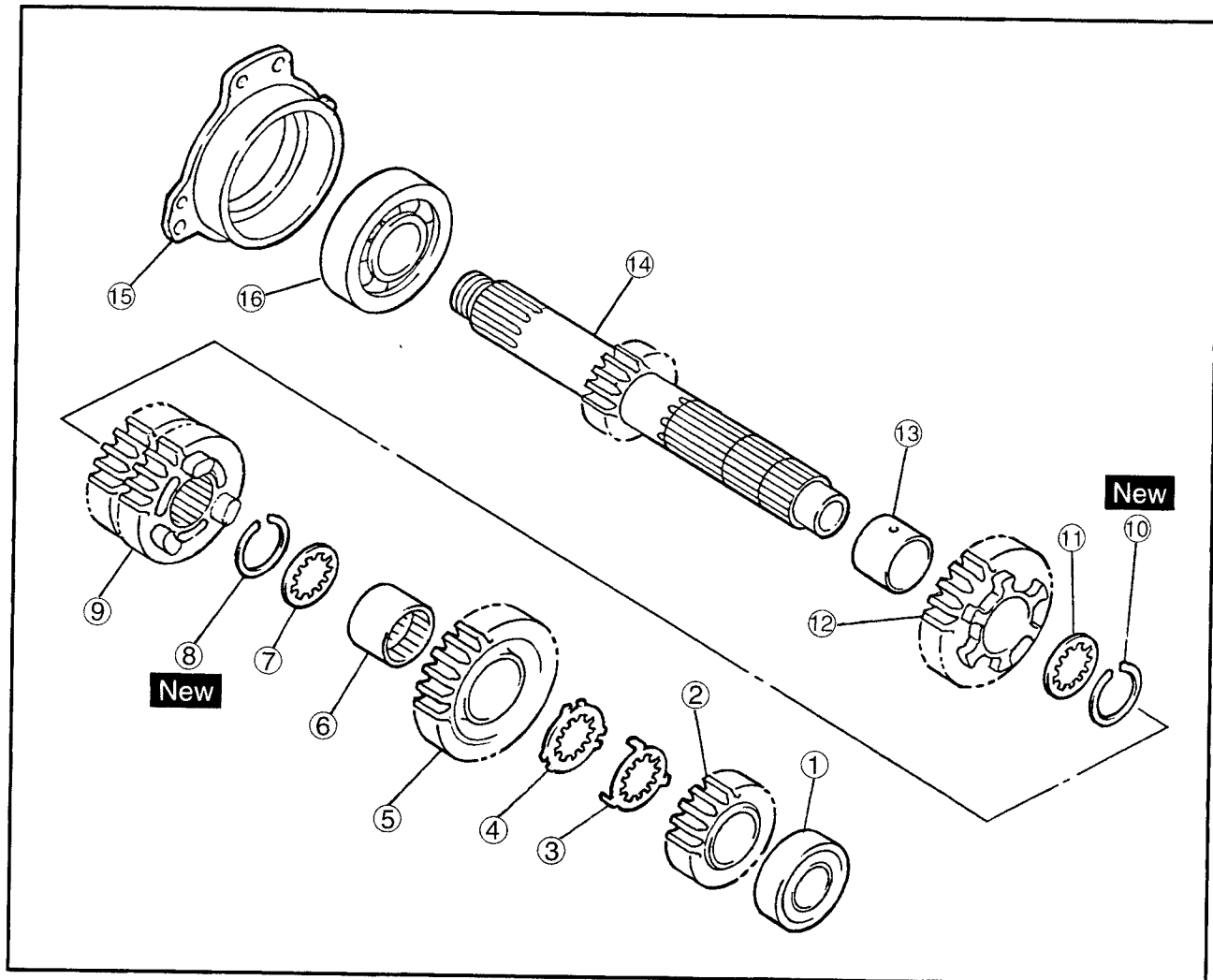
# TRANSMISSION



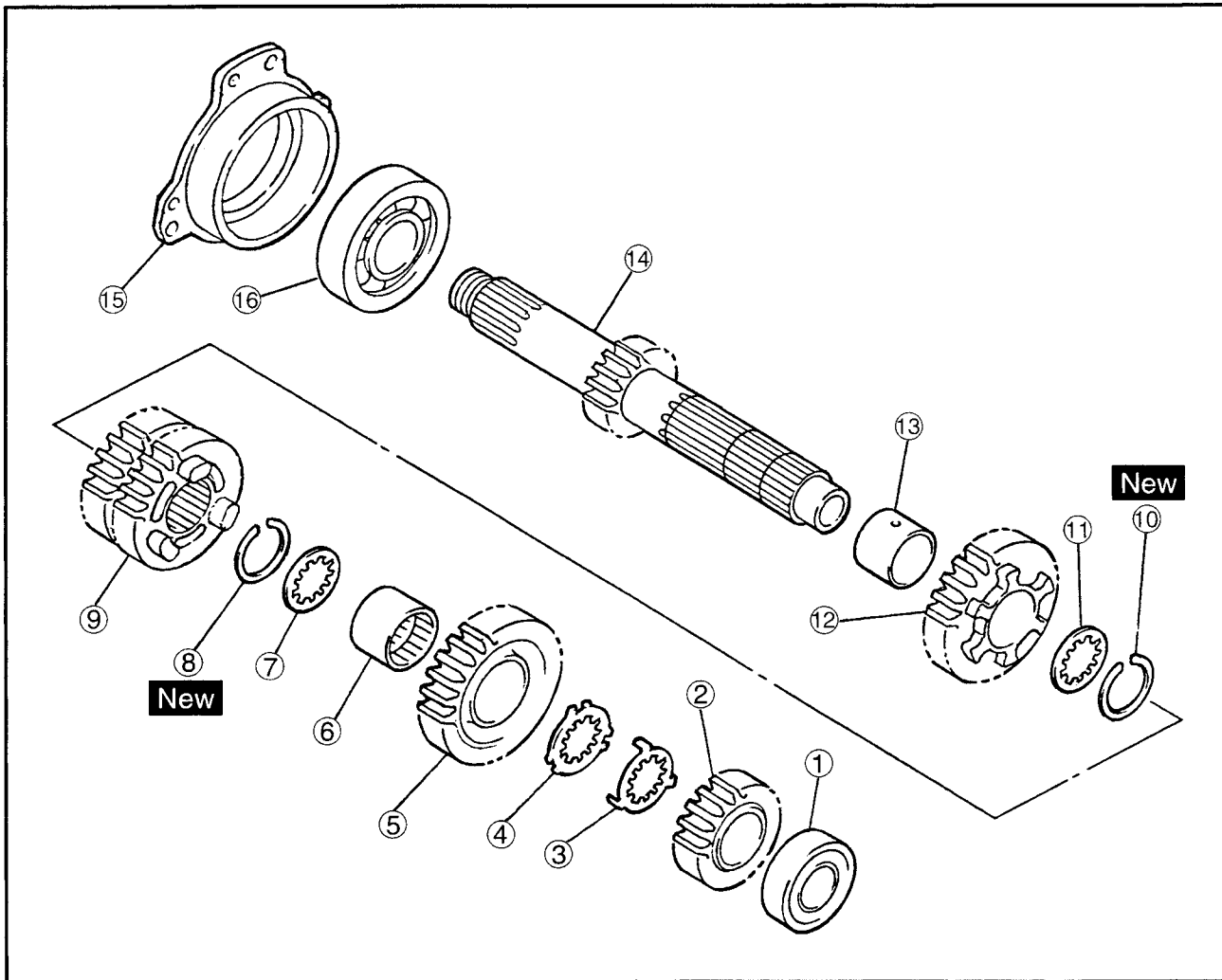
Order	Job/Part	Q'ty	Remarks
	<b>Removing the transmission</b>		
	Crankcase lower		Remove the parts in the order listed. Separate. Refer to "CRANKCASE".
1	Shift shaft and stopper lever	1	Refer to "SHIFT SHAFT".
2	Drive axle assembly	1	
3	Circlip	1	
4	Oil seal	1	
5	Bearing	1	
6	Shift bar stopper	1	
7	Shift fork guide bar	2	



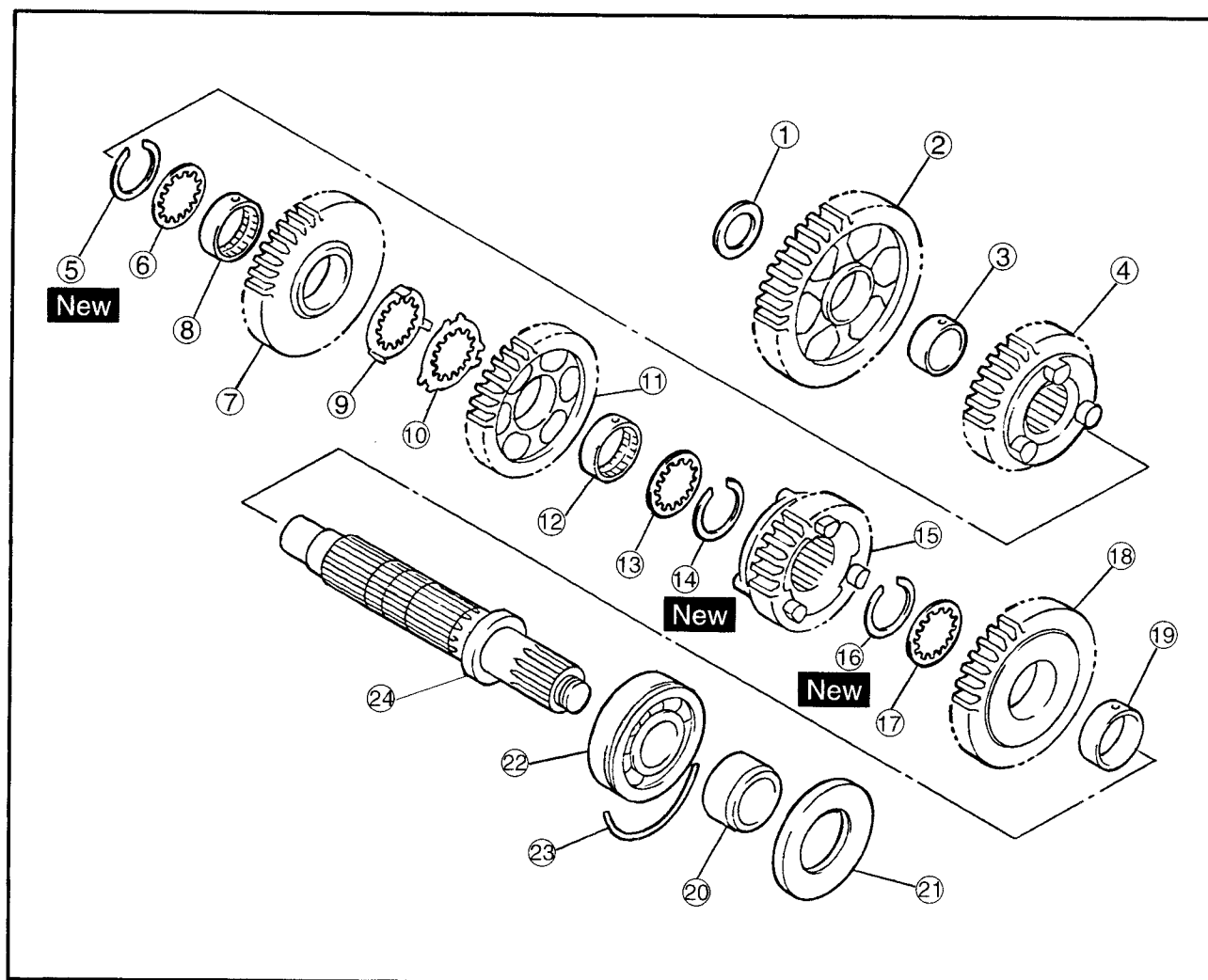
Order	Job/Part	Q'ty	Remarks
7	Spring	4	Refer to "INSTALLING THE TRANSMISSION". Refer to "REMOVING THE TRANSMISSION".
8	Shift fork "L"	1	
9	Shift fork "R"	1	
10	Shift drum assembly	1	
11	Shift fork "C"	1	
12	Main axle assembly	1	For installation, reverse the removal procedure.



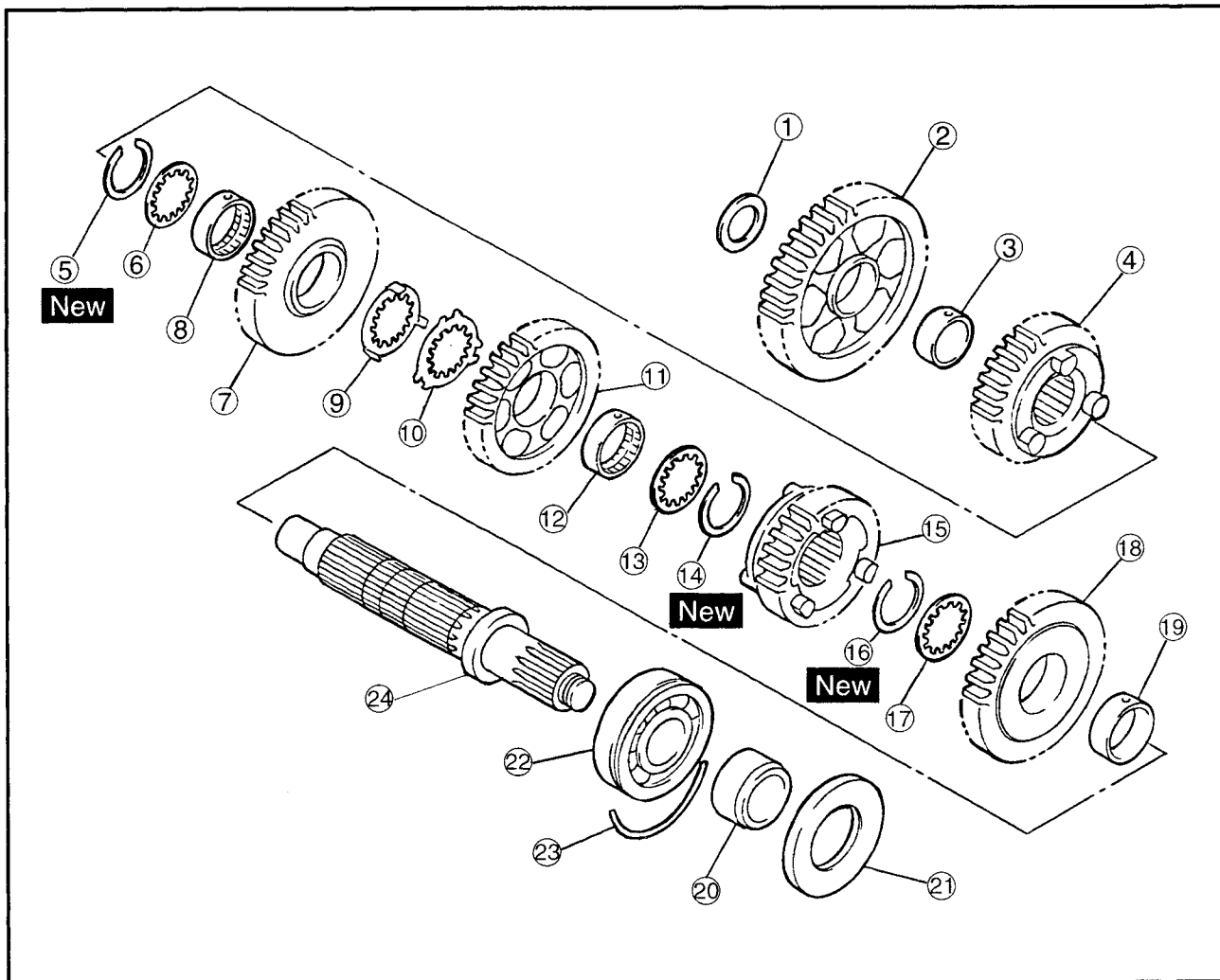
Order	Job/Part	Q'ty	Remarks
	<b>Disassembling the main axle assembly</b>		Remove the parts in the order listed.
①	Bearing	1	
②	2nd pinion gear	1	
③	Toothed lock washer	1	
④	Toothed lock washer retainer	1	
⑤	6th pinion gear	1	
⑥	Collar	1	
⑦	Washer	1	
⑧	Circlip	1	
⑨	3rd pinion gear	1	
⑩	Circlip	1	



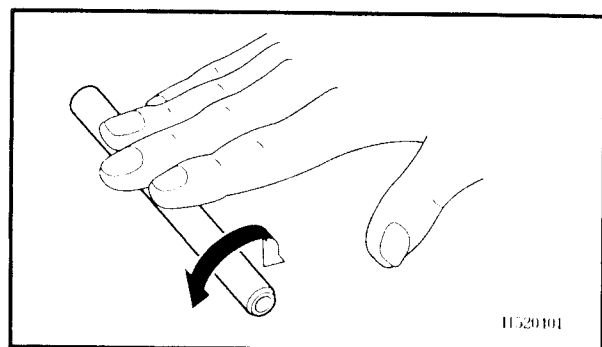
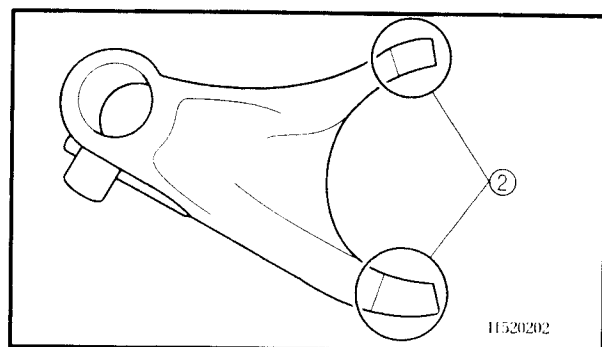
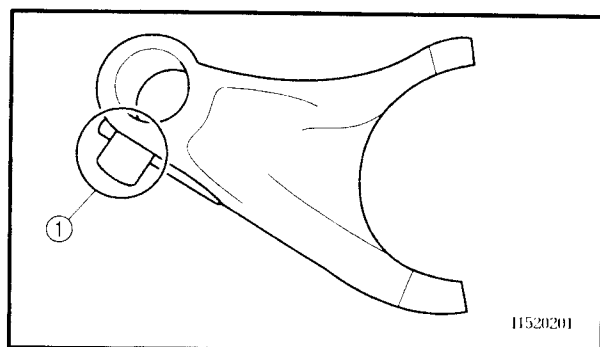
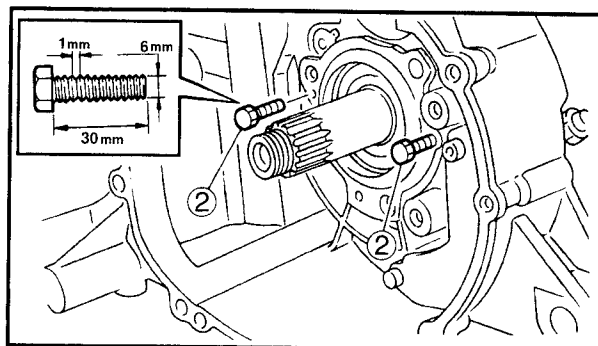
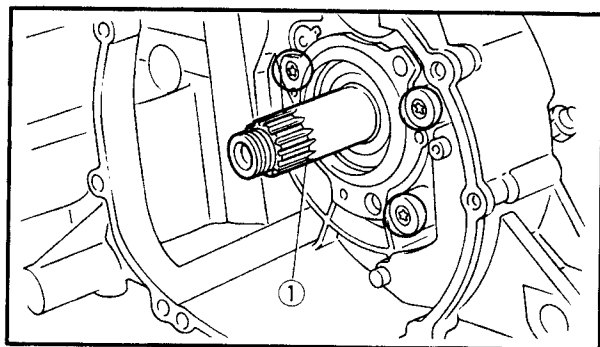
Order	Job/Part	Q'ty	Remarks
⑪	Washer	1	For installation, reverse the removal procedure.
⑫	5th pinion gear	1	
⑬	Collar	1	
⑭	Main axle	1	
⑮	Bearing housing	1	
⑯	Bearing	1	



Order	Job/Part	Q'ty	Remarks
	<b>Disassembling the drive axle assembly</b>		Remove the parts in the order listed.
①	Washer	1	
②	1st wheel gear	1	
③	Collar	1	
④	5th wheel gear	1	
⑤	Circlip	1	
⑥	Washer	1	
⑦	3rd wheel gear	1	
⑧	Collar	1	
⑨	Toothed lock washer	1	
⑩	Toothed lock washer retainer	1	
⑪	4th wheel gear	1	



Order	Job/Part	Q'ty	Remarks
⑫	Collar	1	For installation, reverse the removal procedure.
⑬	Washer	1	
⑭	Circrip	1	
⑮	6th wheel gear	1	
⑯	Circrip	1	
⑰	washer	1	
⑱	2nd wheel gear	1	
⑲	Collar	1	
⑳	Collar	1	
㉑	Oil seal	1	
㉒	Bearing	1	
㉓	Circrip	1	
㉔	Drive axle	1	



EAS00420

1. Remove:
  - drive axle assembly

2. Remove:
- main axle assembly ①  
(with the Torx® wrench T30)

- Insert two bolts ② of the proper size, as shown in the illustration, into the main axle assembly bearing housing.
- Tighten the bolts until they contact the crankcase surface.
- Continue tightening the bolts until the main axle assembly comes free from the upper crankcase.

EAS00421

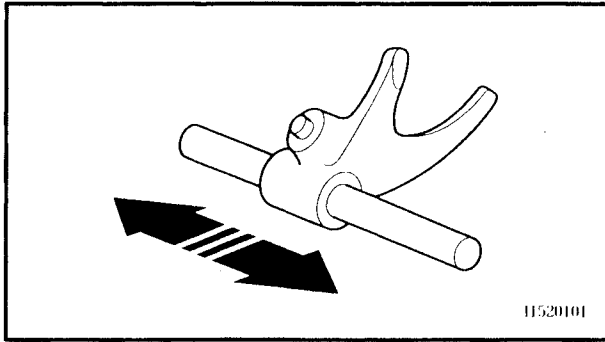
The following procedure applies to all of the shift forks.

1. Check:
  - shift fork cam follower ①
  - shift fork pawl ②Bends/damage/scoring/wear → Replace the shift fork.

2. Check:
- shift fork guide bar  
Roll the shift fork guide bar on a flat surface.  
Bends → Replace.

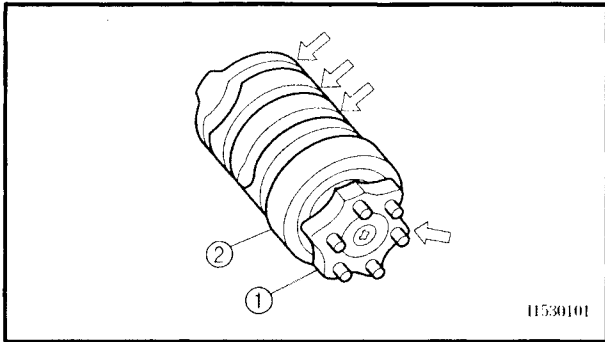
**⚠ WARNING**

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



## 3. Check:

- shift fork movement  
(along the shift fork guide bar)  
Rough movement → Replace the shift fork(-s) and shift fork guide bar as a set.



EAS00422

**CHECKING THE SHIFT DRUM ASSEMBLY**

## 1. Check:

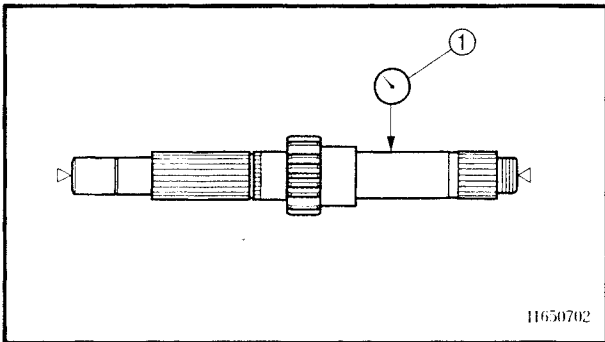
- shift drum grooves  
Damage/scratches/wear → Replace the shift drum assembly.
- shift drum segment ①  
Damage/wear → Replace the shift drum assembly.
- shift drum bearing ②  
Damage/pitting → Replace the shift drum assembly.

EAS00425

**CHECKING THE TRANSMISSION**

## 1. Measure:

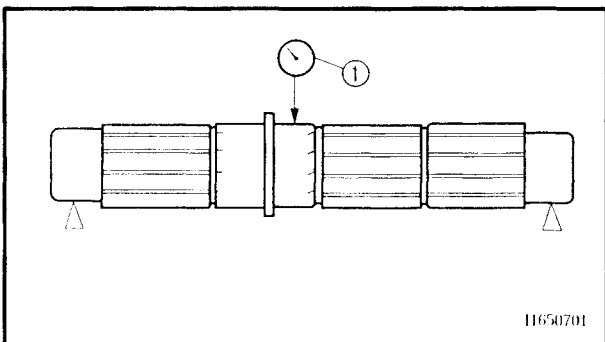
- main axle runout  
(with a centering device and dial gauge ①)  
Out of specification → Replace the main axle.



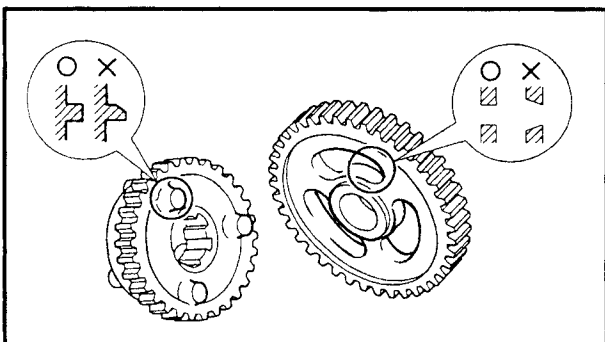
**Max. main axle runout**  
**0.02 mm (0.0008 in)**

## 2. Measure:

- drive axle runout  
(with a centering device and dial gauge ①)  
Out of specification → Replace the drive axle.



**Max. drive axle runout**  
**0.02 mm (0.0008 in)**



## 3. Check:

- transmission gears  
Blue discoloration/pitting/wear → Replace the defective gear(-s).
- transmission gear dogs  
Cracks/damage/rounded edges → Replace the defective gear(-s).



4. Check:
  - transmission gear engagement  
(each pinion gear to its respective wheel gear)  
Incorrect → Reassemble the transmission axle assemblies.
5. Check:
  - transmission gear movement  
Rough movement → Replace the defective part(-s).
6. Check:
  - circlips  
Bends/damage/looseness → Replace.

## INSTALLING THE TRANSMISSION

1. Install:
  - main axle assembly
  - shift fork "C"
  - shift drum assembly
  - shift fork "R"
  - shift fork "L"
  - springs
  - shift fork guide bars
  - drive axle assembly

### NOTE:

- Carefully position the shift forks so that they are installed correctly into the transmission gears.
- Install shift fork "C" into the groove in the 3rd and 4th pinion gear on the main axle.
- Install shift fork "L" into the groove in the 6th wheel gear and shift fork "R" into the groove in the 5th wheel gear on the drive axle.
- Make sure that the drive axle bearing circlip is inserted into the grooves in the upper crankcase.

2. Check:
  - transmission  
Rough movement → Repair.

### NOTE:

Oil each gear, shaft, and bearing thoroughly.



**YAMAHA**

**YZF-R6L**  
**YZF-R6CL**  
**Service Manual**



## HOW TO USE THIS MANUAL

This manual is intended as a handy, easy-to-read reference book for the mechanic. Comprehensive explanations of all installation, removal, disassembly, assembly, repair and check procedures are laid out with the individual steps in sequential order.

① The manual is divided into chapters. An abbreviation and symbol in the upper right corner of each page indicate the current chapter.

Refer to "SYMBOLS".

② Each chapter is divided into sections. The current section title is shown at the top of each page, except in Chapter 3 ("PERIODIC CHECKS AND ADJUSTMENTS"), where the sub-section title(-s) appears.

③ Sub-section titles appear in smaller print than the section title.

④ To help identify parts and clarify procedure steps, there are exploded diagrams at the start of each removal and disassembly section.

⑤ Numbers are given in the order of the jobs in the exploded diagram. A circled number indicates a disassembly step.

⑥ Symbols indicate parts to be lubricated or replaced.

Refer to "SYMBOLS".

⑦ A job instruction chart accompanies the exploded diagram, providing the order of jobs, names of parts, notes in jobs, etc.

⑧ Jobs requiring more information (such as special tools and technical data) are described sequentially.

⑥ ② ①

CLUTCH ENG

CLUTCH ENG

④

⑤

⑦

Order	Job/Part	Qty	Remarks
<b>Removing the clutch cover</b>			
Bottom cowl and right side cowl			
Engine oil			
1	Clutch cable	1	Remove the parts in the order listed. Refer to "COWLINGS" in chapter 3. Refer to "CHANGING THE ENGINE OIL" in chapter 3.
2	Clutch cover	1	
3	Clutch cover gasket	1	
4	Dowel pin	2	
For installation, reverse the removal procedure.			

③

⑧

**REMOVING THE CLUTCH**

1. Remove

- clutch cover 1

**NOTE:**

Loosen each bolt 1/4 of a turn at a time, in stages and in a crisscross pattern. After all of the bolts are fully loosened, remove them.

2. Straighten the lock washer tab

3. Loosen

- clutch boss nut 1

**NOTE:**

While holding the clutch boss 2 with the clutch holding tool 3, loosen the clutch boss nut.

**Clutch holding tool**  
90890-04086

4. Remove

- clutch boss nut 1
- lock washer 2
- clutch boss assembly 3

**NOTE:**

There is a built-in damper between the clutch boss and the friction plate. It is not necessary to remove the wire circlip 4, and disassemble the built-in damper unless there is serious clutch chattering.

**CHECKING THE FRICTION PLATES**

The following procedure applies to all of the friction plates.

1. Check

- Friction plate

Damage/wear → Replace the friction plates as a set.

2. Measure








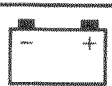




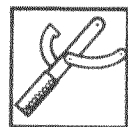
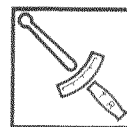

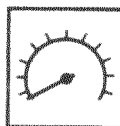








- Friction plate thickness

Out of specification → Replace the friction plates as a set.

**NOTE:**

Measure the friction plate at four places.

**Friction plate thickness**  
2.9 - 3.1 mm  
Limits: 2.8 mm

① GEN INFO 	② SPEC 	
③ CHK ADJ 	④ ENG 	
⑤ COOL 	⑥ CARB 	
⑦ CHAS 	⑧ ELEC 	
⑨ TRBL SHTG 	⑩ 	
⑪ 	⑫ 	
⑬ 	⑭ 	
⑮ 	⑯ 	⑰ 
⑱ 	⑲ 	⑳ 
㉑ 	㉒ 	㉓ 
㉔ 	㉕ New	

## SYMBOLS

The following symbols are not relevant to every vehicle.

Symbols ① to ⑨ indicate the subject of each chapter.

- ① General information
- ② Specifications
- ③ Periodic checks and adjustments
- ④ Engine
- ⑤ Cooling system
- ⑥ Carburetor(-s)
- ⑦ Chassis
- ⑧ Electrical system
- ⑨ Troubleshooting

Symbols ⑩ to ⑰ indicate the following.

- ⑩ Serviceable with engine mounted
- ⑪ Filling fluid
- ⑫ Lubricant
- ⑬ Special tool
- ⑭ Tightening torque
- ⑮ Wear limit, clearance
- ⑯ Engine speed
- ⑰ Electrical data










Symbols ⑱ to ㉓ in the exploded diagrams indicate the types of lubricants and lubrication points.

- ⑱ Engine oil
- ⑲ Gear oil
- ⑳ Molybdenum disulfide oil
- ㉑ Wheel bearing grease
- ㉒ Lithium soap base grease
- ㉓ Molybdenum disulfide grease

Symbols ㉔ to ㉕ in the exploded diagrams indicate the following.

- ㉔ Apply locking agent (LOCTITE®)
- ㉕ Replace the part

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	CHK ADJ	<b>3</b>
ENGINE OVERHAUL		
	ENG	<b>4</b>
COOLING SYSTEM		
	COOL	<b>5</b>
CARBURETORS		
	CARB	<b>6</b>
CHASSIS		
	CHAS	<b>7</b>
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## CHAPTER 3.

### PERIODIC CHECKS AND ADJUSTMENTS

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EB300000

## PERIODIC CHECKS AND ADJUSTMENTS

### INTRODUCTION

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

EB301000

### PERIODIC MAINTENANCE CHART FOR EMISSION CONTROL SYSTEM

No.	ITEM	ROUTINE	INITIAL	ODOMETER READINGS					
			600 mi (1,000 km) or 1 month	4,000 mi (7,000 km) or 6 months	8,000 mi (13,000 km) or 12 months	12,000 mi (19,000 km) or 18 months	16,000 mi (25,000 km) or 24 months	20,000 mi (31,000 km) or 30 months	
1	* Valve clearance	• Check and adjust valve clearance when engine is cold.	Every 26,600 mi (42,000 km)						
2	Spark plugs	• Check condition. • Adjust gap and clean. • Replace at 8,000 mi (13,000 km) or 12 months and thereafter every 8,000 mi (12,000 km) or 12 months.		✓	Replace	✓	Replace	✓	
3	* Crankcase ventilation system	• Check ventilation hose for cracks or damage. • Replace if necessary.		✓	✓	✓	✓	✓	
4	* Fuel line	• Check fuel hose for cracks or damage. • Replace if necessary.		✓	✓	✓	✓	✓	
5	* Fuel filter	• Replace initial 20,000 mi (31,000 km) and thereafter every 20,000 mi (31,000 km).						Replace	
6	* Exhaust system	• Check for leakage. • Retighten if necessary. • Replace gasket(s) if necessary.		✓	✓	✓	✓	✓	
7	* Carburetor Synchronization	• Adjust synchronization of carburetors.	✓	✓	✓	✓	✓	✓	
8	* Idle speed	• Check and adjust engine idle speed. • Adjust throttle cable free play.		✓	✓	✓	✓	✓	
9	* Evaporative emission control system**	• Check control system for damage. • Replace if necessary.				✓		✓	

\* Since these items require special tools, data and technical skills, they should be serviced by a Yamaha dealer.

\*\* California only.



## GENERAL MAINTENANCE AND LUBRICATION CHART

No.	ITEM	ROUTINE	INITIAL	ODOMETER READINGS					
			600 mi (1,000 km) or 1 month	4,000 mi (7,000 km) or 6 months	8,000 mi (13,000 km) or 12 months	12,000 mi (19,000 km) or 18 months	16,000 mi (25,000 km) or 24 months	20,000 mi (31,000 km) or 30 months	
1		Engine oil	• Replace. Warm engine before draining.	✓	✓	✓	✓	✓	✓
2	*	Engine oil filter	• Replace at 600 mi (1,000 km) or 1 month, and thereafter every 8,000 mi (12,000 km) or 12 months.	✓		✓		✓	
3	*	Air filter/ Surge tank	• Clean. • Replace if necessary.		✓	✓	✓	✓	✓
4	*	Cooling system	• Check hose for cracks or damage. • Replace if necessary.		✓	✓	✓	✓	✓
			• Replace coolant every 24 months. • Ethylene glycol anti-freeze coolant.					Replace	
5	*	Brake system	• Check operation, pad wear, and fluid leakage. (See NOTE.) • Correct if necessary.	✓	✓	✓	✓	✓	✓
6	*	Clutch	• Check operation. • Correct if necessary.	✓	✓	✓	✓	✓	✓
7	*	Control cable	• Apply chain lube thoroughly. • Yamaha chain and cable lube or SAE 10 W 30 motor oil.	✓	✓	✓	✓	✓	✓
8	*	Swing arm pivot bearing	• Check bearing assembly for looseness. • Moderately repack every 16,000 mi (24,000 km) or 24 months. • Lithium soap base grease.			✓		Repack	
9	*	Rear suspension link pivots	• Check operation. • Correct if necessary.			✓		✓	
10	*	Rear shock absorber	• Check operation and oil leakage. • Replace if necessary.		✓	✓	✓	✓	✓
11	*	Front fork	• Check operation and leakage. • Replace if necessary.		✓	✓	✓	✓	✓
12	*	Steering bearings	• Check bearing assembly for looseness. • Correct accordingly. • Moderately repack every 16,000 mi (24,000 km). • Lithum soap base grease.		✓	✓	✓	Repack	✓
13		Brake/clutch lever pivot shaft	• Apply chain lube lightly. • Yamaha chain and cable lube or SAE 10 W 30 motor oil.		✓	✓	✓	✓	✓
14		Brake pedal and shift pedal shafts	• Apply chain lube lightly. • Yamaha chain and cable lube or SAE 10 W 30 motor oil.		✓	✓	✓	✓	✓
15	*	Drive chain	• Check chain slack/alignment condition. • Adjust and lubricate chain throughly. • SAE 30 W-50 W motor oil.	Every 600 mi (1,000 km) and after washing the motorcycle or riding in the rain					
16	*	Wheel bearings	• Check bearing for smooth rotation.		✓	✓	✓	✓	✓
17	*	Sidestand pivot	• Check operation and lubricate. • Apply chain lube lightly. • Yamaha chain and cable lube or SAE 10 W 30 motor oil.		✓	✓	✓	✓	✓
18	*	Sidestand switch	• Check and clean or replace if necessary.	✓	✓	✓	✓	✓	✓
19	*	Chassis fasteners	• Check all chassis fittings and fasteners. • Correct if necessary.		✓	✓	✓	✓	✓

\* Since these items require special tools, data and technical skills, they should be serviced by a Yamaha dealer.

### NOTE:

For odometer readings or time periods higher than 20,000 mi (31,000 km) or 30 months, repeat the same maintenance as listed in the chart from the 4,000 mi (7,000 km) or 6 months interval.

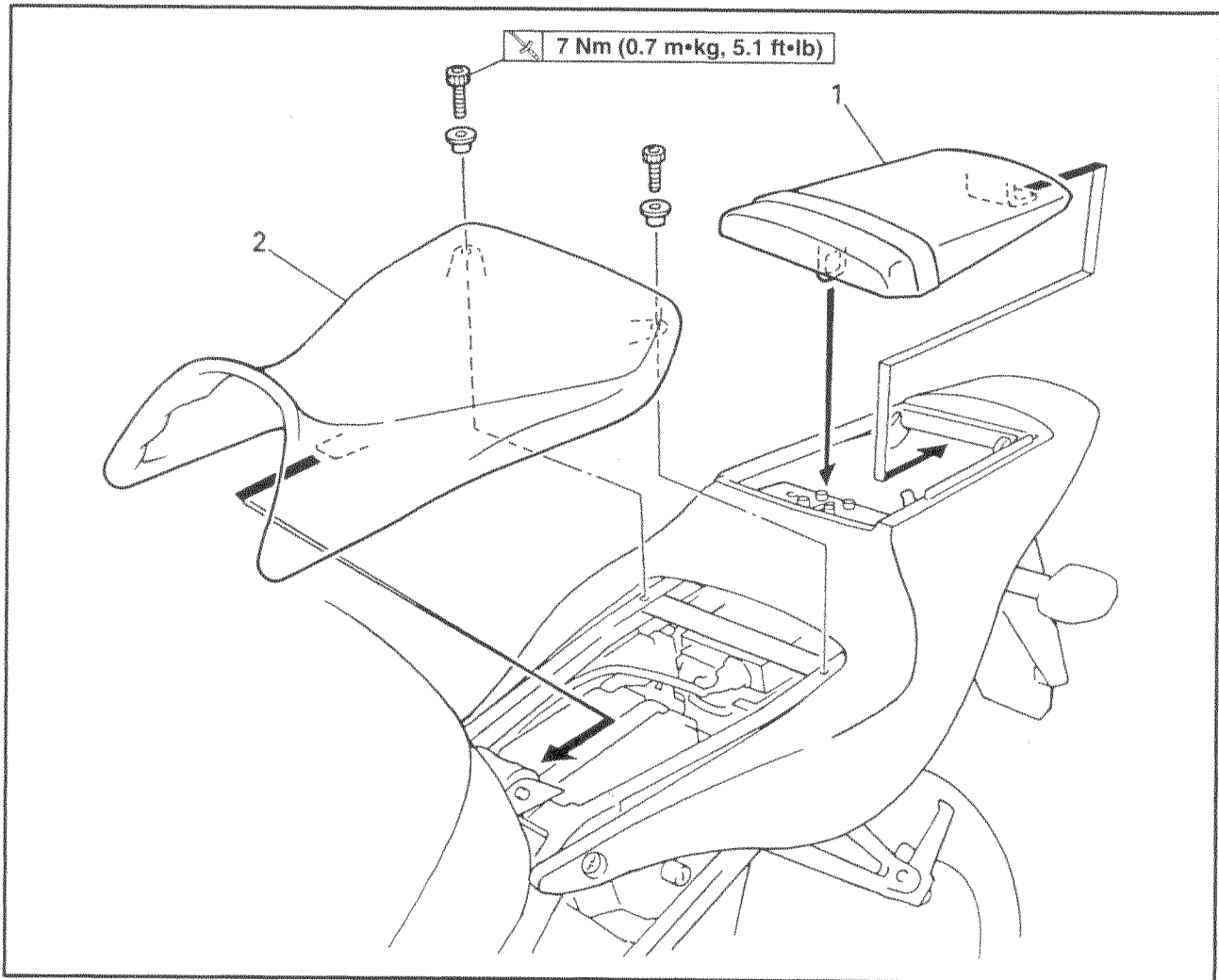
### NOTE:

- The air filter needs more frequent service if you are riding in unusually wet or dusty areas.
- Hydraulic brake system
  - When disassembling the master cylinder or caliper cylinder, always replace the brake fluid. Check the brake fluid level regularly and fill as required.
  - Replace the oil seals on the inner parts of the master cylinder and caliper cylinder every two years.
  - Replace the brake hoses every four years or if cracked or damaged.



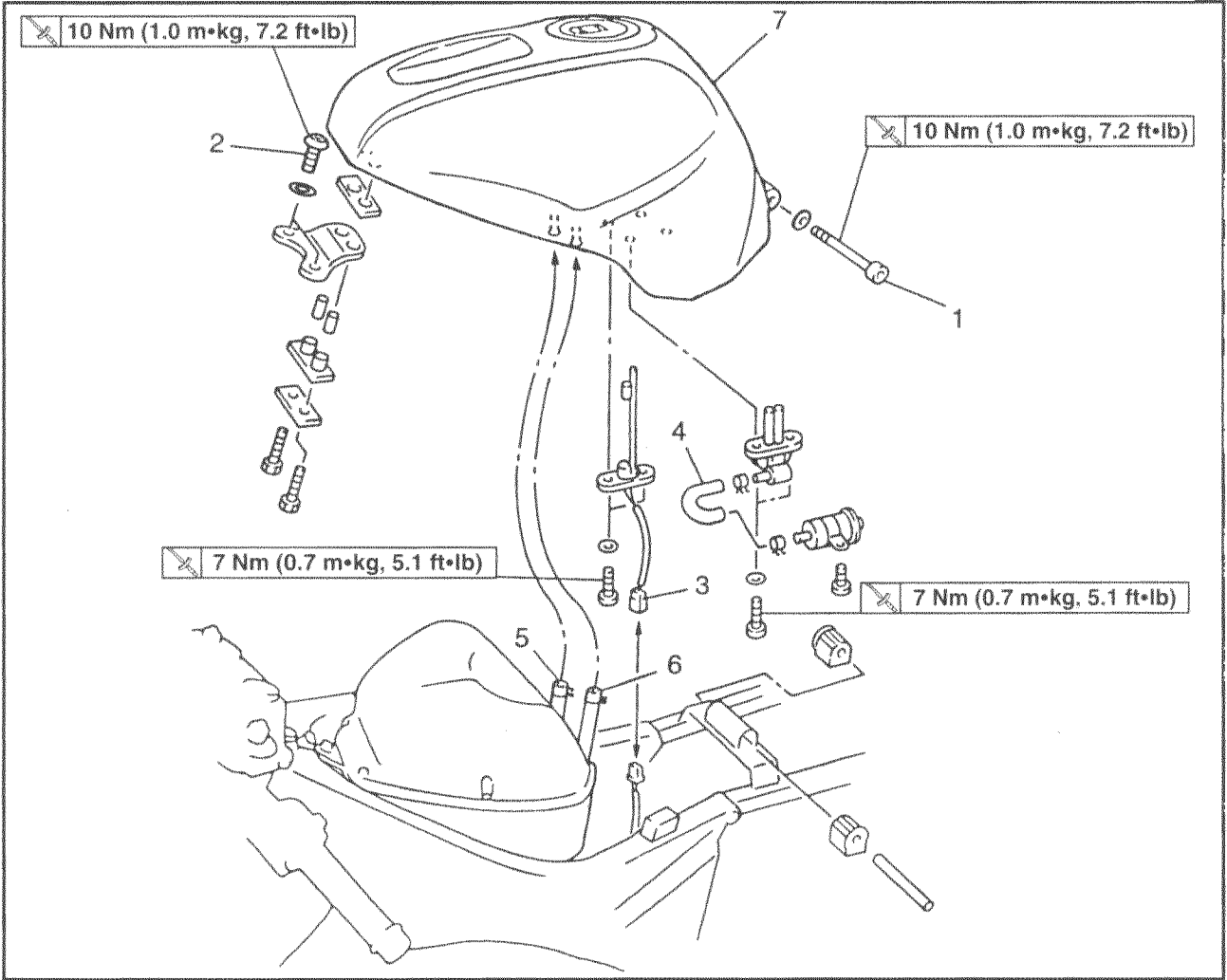
EB302000

## RIDER AND PASSENGER SEATS



Order	Job/Part	Q'ty	Remarks
	<b>Removing the rider and passenger seats</b>		Remove the parts in the order listed.
1	Passenger seat	1	
2	Rider seat	1	For installation, reverse the removal procedure.

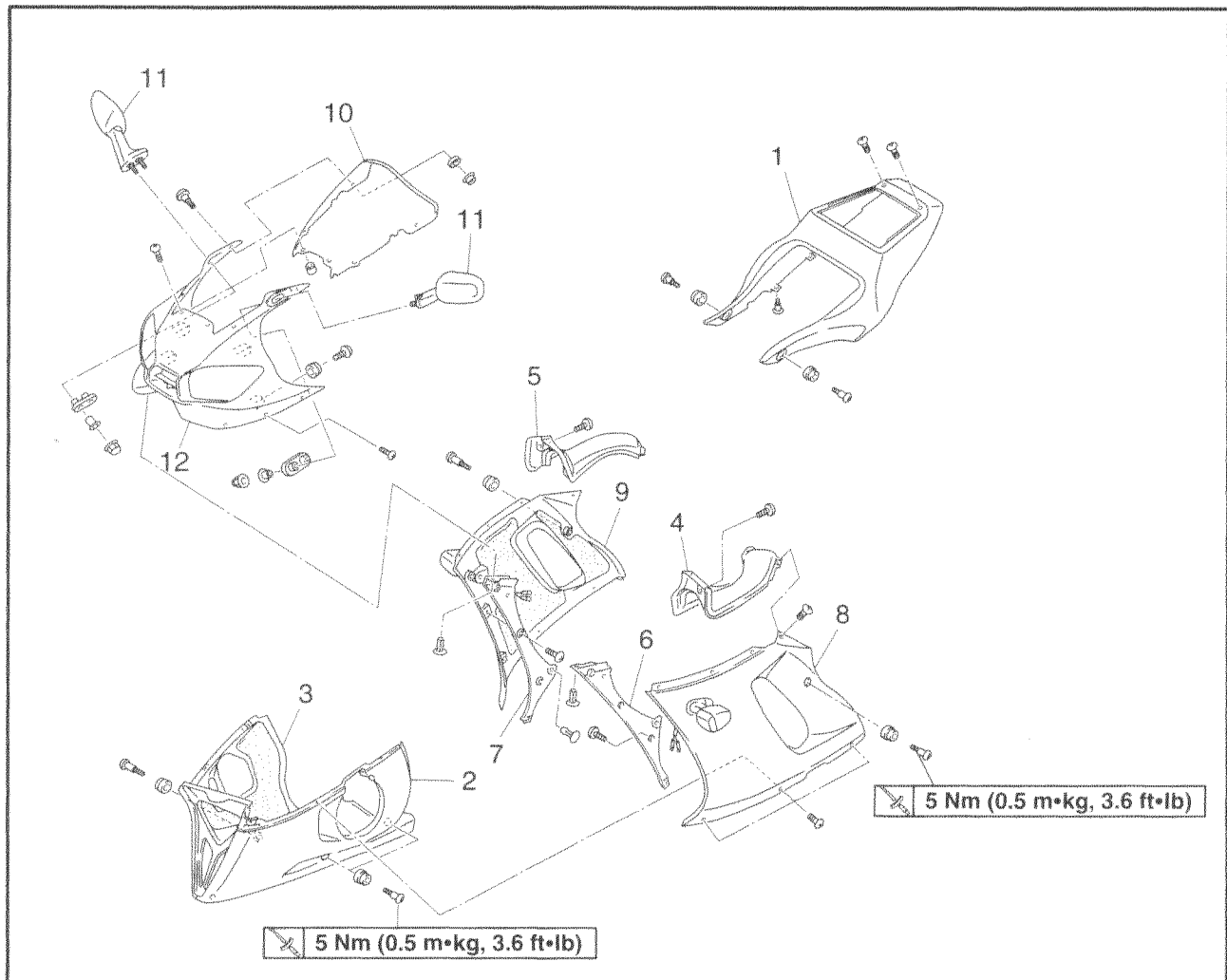
FUEL TANK



Order	Job/Part	Q'ty	Remarks
	<b>Removing the fuel tank</b>		
	Rider seat		Remove the parts in the order listed Refer to "SEATS".
1	Bolt	1	
2	Bolts	2	
3	Fuel sender coupler	1	Disconnect.
4	Fuel hose	1	<b>NOTE:</b> _____ Before disconnecting the fuel hose, set the fuel cock "OFF".
5	Fuel tank overflow hose	1	
6	Fuel tank breather hose	1	
7	Fuel tank	1	For installation reverse the removal procedure.



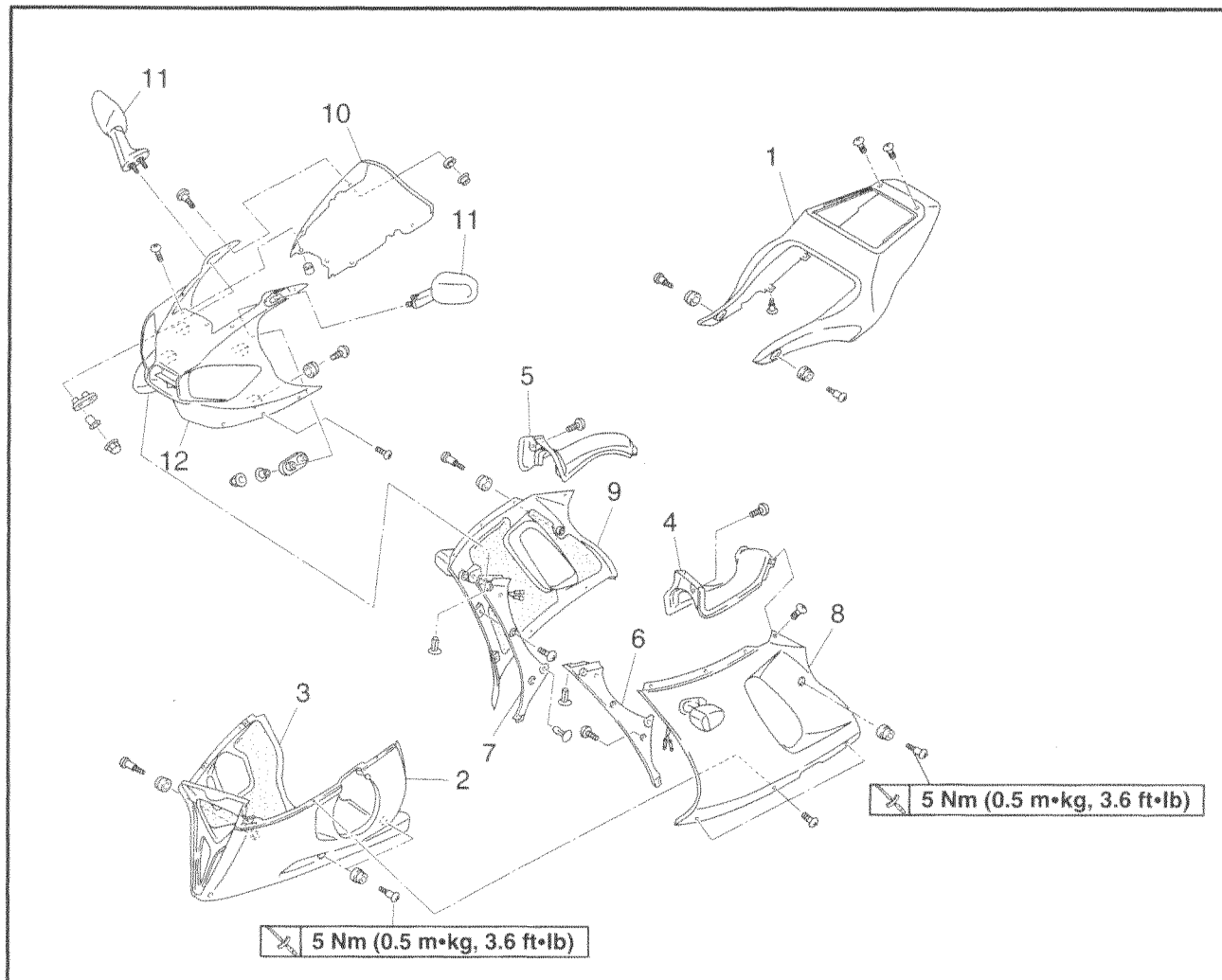
## COWLINGS



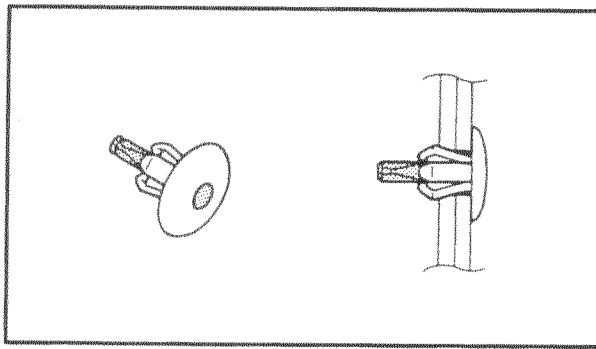
Order	Job/Part	Q'ty	Remarks
	<b>Removing the cowlings</b>		
	Rider and passenger seats		Remove the parts in the order listed Refer to "SEATS".
1	Rear cowl	1	
2	Bottom cowl (left)	1	
3	Bottom cowl (right)	1	
4	Front cowl inner panel (left)	1	
5	Front cowl inner panel (right)	1	
6	Side cowl inner panel (left)	1	
7	Side cowl inner panel (right)	1	



## COWLINGS



Order	Job/Part	Q'ty	Remarks
8	Left side cowl	1	For installation, reverse the removal procedure.
9	Right side cowl	1	
10	Windshield	1	
11	Rear view mirror	2	
12	Front cowl	1	

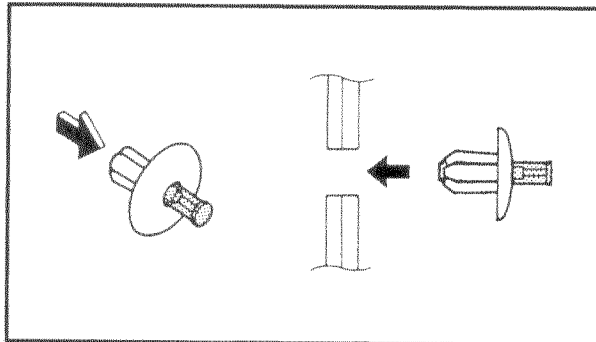
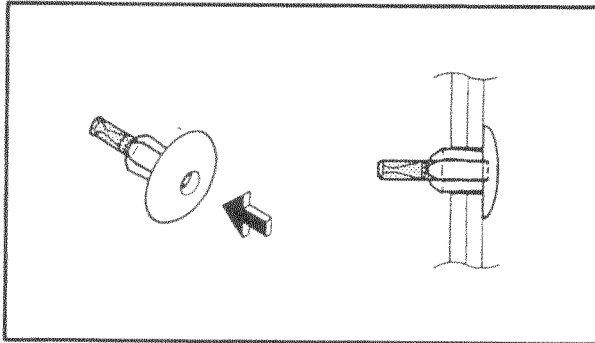
**REMOVAL**

1. Remove:

- rear cowl
- side cowlings

**NOTE:**

To remove the quick fastener, turn its center to 90° with a screwdriver, then pull the fastener out.

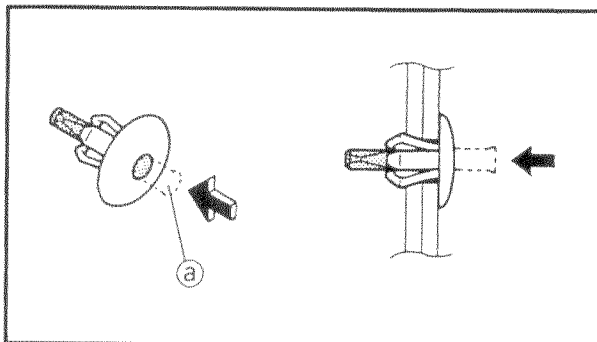
**INSTALLATION**

1. Install:

- side cowlings
- rear cowl

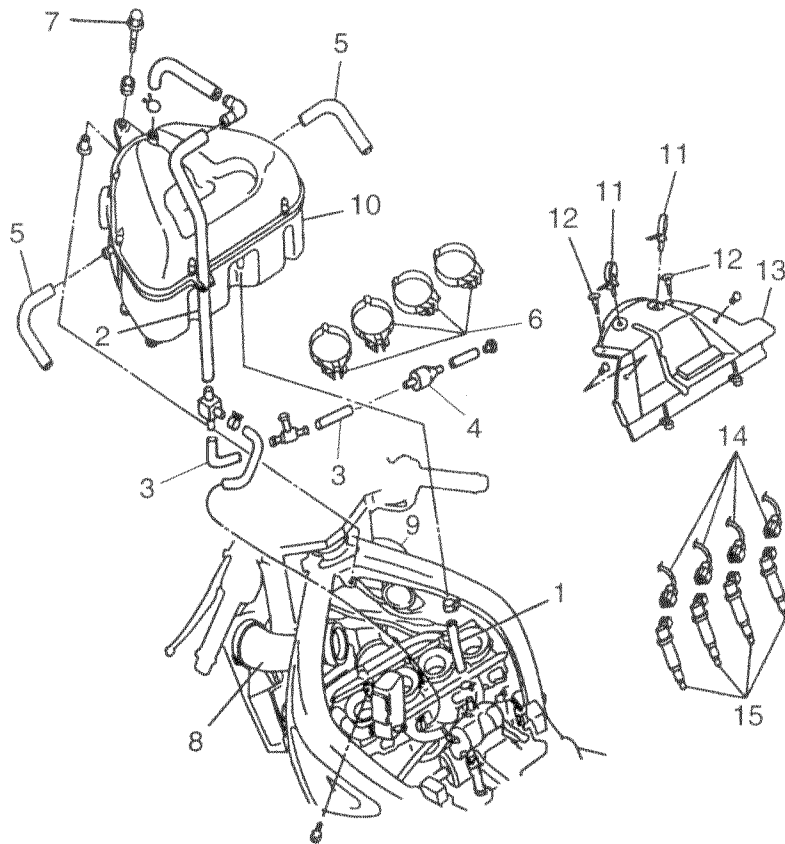
**NOTE:**

To install the quick fastener, push its pin so that it protrudes from the fastener head, then insert the fastener into the cowl and push the pin (a) in with a screwdriver. Make sure that the pin is flush with the fastener's head.

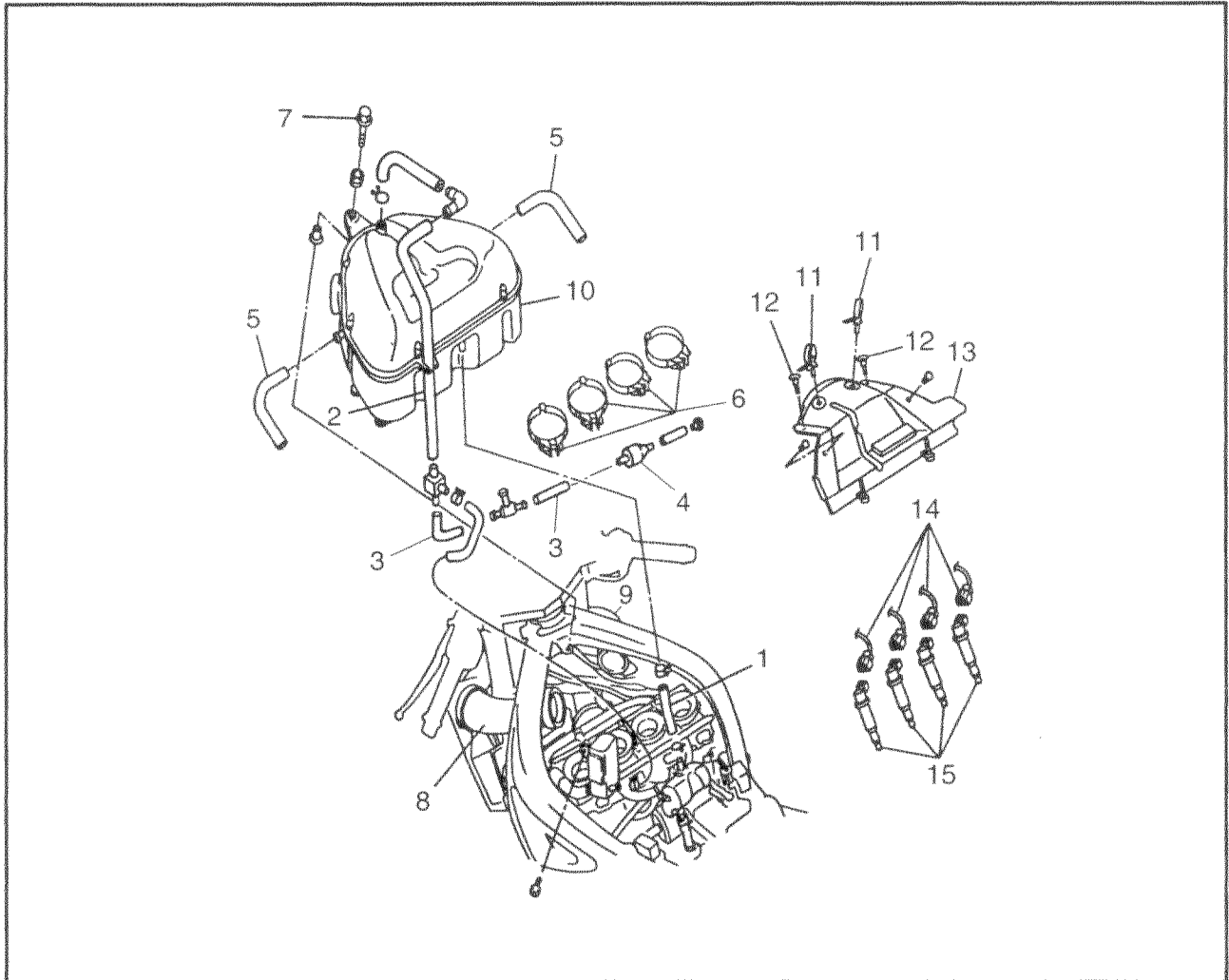




## AIR FILTER CASE AND IGNITION COILS



Order	Job/Part	Q'ty	Remarks
	<b>Removing the air filter case and ignition coils</b>		Remove the parts in the order listed.
	Rider seat and fuel tank		Refer to "SEATS" and "FUEL TANK".
	Front cowling inner panel (left)		Refer to "COWLINGS".
	Front cowling inner panel (right)		
1	Crankcase breather hose	1	
2	Air vent hose	1	
3	Hoses	2	
4	Drain cup	1	
5	Air filter case balance hose	2	
6	Clamp screw	4	Loosen.
7	Bolt	1	
8	Surge tank joint (left)	1	
9	Surge tank joint (right)	1	
10	Air filter case	1	
11	Clamp	2	
12	Quick fastener	2	



Order	Job/Part	Q'ty	Remarks
13	Heat protector plate	1	For installation, reverse the removal procedure.
14	Ignition coil coupler	4	
15	Ignition coil	4	



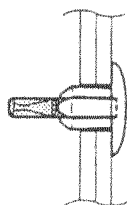
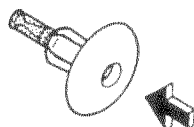
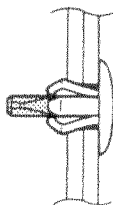
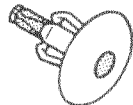
## REMOVAL

1. Remove:

- heat protector plate

## NOTE:

To remove the quick fastener, push its center in with a screwdriver, then pull the fastener out.



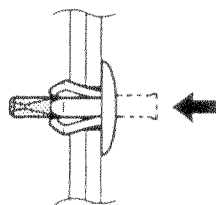
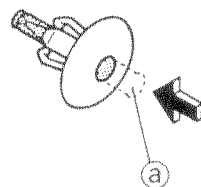
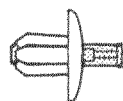
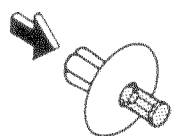
## INSTALLATION

1. Install:

- heat protector plate

## NOTE:

To install the quick fastener, push its pin so that it protrudes from the fastener head, then insert the fastener into the rubber baffle and push the pin ① in with a screwdriver. Make sure that the pin is flush with the fastener's head.





EB303001

**ENGINE****ADJUSTING THE VALVE CLEARANCE**

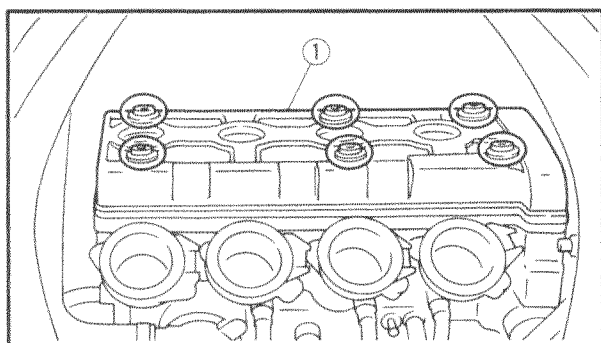
The following procedure applies to all of the valves.

**NOTE:**

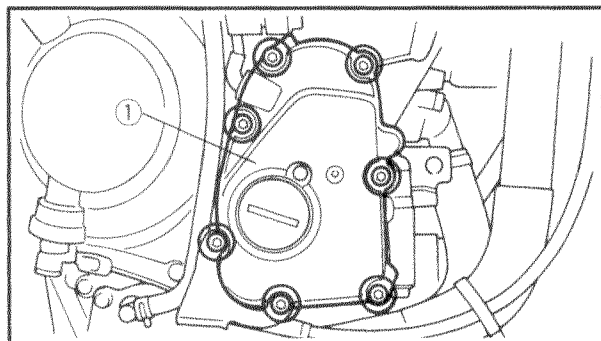
- Valve clearance adjustment should be made on a cold engine, at room temperature.
- When the valve clearance is to be measured or adjusted, the piston must be at top dead center (TDC) on the compression stroke.

**1. Remove:**

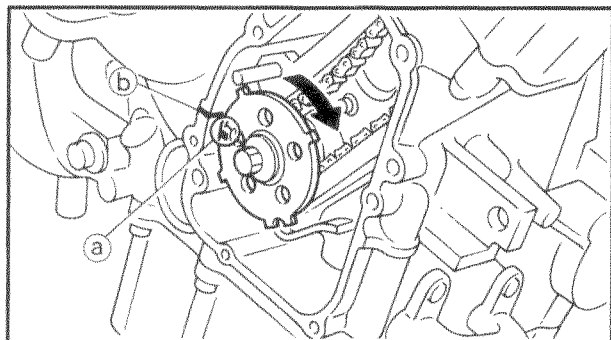
- rider seat
- fuel tank  
Refer to "SEATS" and "FUEL TANK".
- air filter case
- heat protector plate  
Refer to "AIR FILTER CASE AND IGNITION COILS".
- bottom cowlings
- side cowlings  
Refer to "COWLINGS".
- carburetor assembly  
Refer to "CARBURETORS" in chapter 6.
- radiator assembly  
Refer to "RADIATOR" in chapter 5.

**2. Remove:**

- ignition coils
- spark plugs
- cylinder head cover (1)
- cylinder head cover gasket

**3. Remove:**

- pickup coil rotor cover (1)



## 4. Measure:

- valve clearance

Out of specification → Adjust



## Valve clearance (cold)

### Intake valve

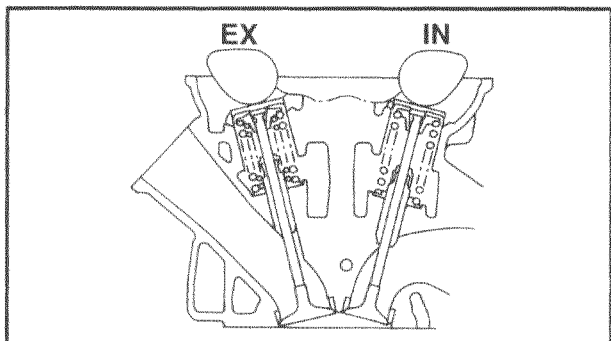
0.11 ~ 0.20 mm

(0.0043 ~ 0.0079 in)

### Exhaust valve

0.21 ~ 0.30 mm

(0.0083 ~ 0.0118 in)



a. Turn the crankshaft clockwise.

b. When piston #1 is at TDC on the compression stroke, align the TDC mark (a) on the pickup coil rotor with the crankcase mating surface (b).

## NOTE:

TDC on the compression stroke can be found when the camshaft lobes are turned away from each other.

c. Measure the valve clearance with a thickness gauge (1).

## NOTE:

- If the valve clearance is incorrect, record the measured reading.
- Measure the valve clearance in the following sequence.

## Valve clearance measuring sequence

Cylinder #1 → #2 → #4 → #3

A Front

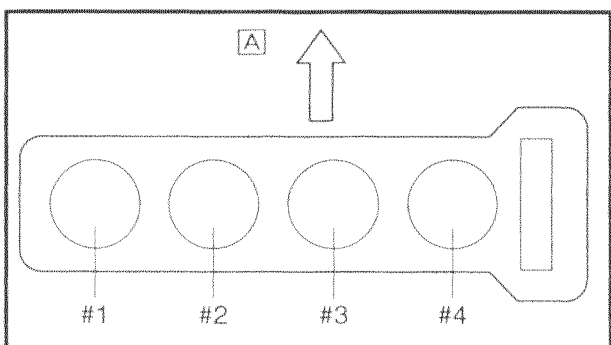
d. To measure the valve clearances of the other cylinders, starting with cylinder #1 at TDC, turn the crankshaft counterclockwise as specified in the following table.

B Degrees that the crankshaft is turned counterclockwise

C Cylinder

D Combustion cycle

Cylinder #2	180°
Cylinder #4	360°
Cylinder #3	540°



B →		0°	180°	360°	540°	720°
C	#1	D				
	#2		D			
	#3				D	
	#4			D		

[117010]

CHK  
ADJ

- NOTE:**

- a. Remove the valve lifter ① and the valve pad ②.

- Cover the timing chain opening with a rag to prevent the valve pad from falling into the crankcase.

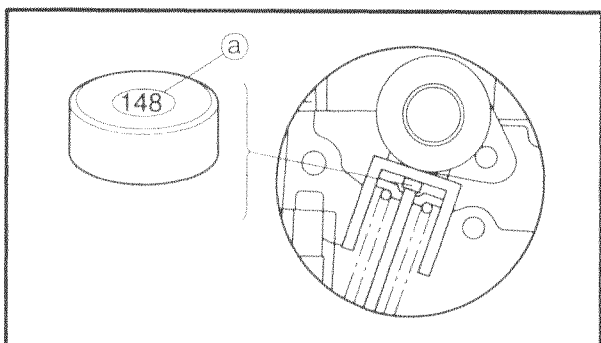
- Make a note of the position of each valve lifter ① and valve pad ② so that they can be installed in the correct place.

- b. Select the proper valve pad from the following table.

Valve pad thickness range		Available valve pads
Nos. 120 ~ 240	1.20 ~ 2.40 mm	25 thicknesses in 0.05 mm increments

**NOTE:**

- The thickness (a) of each valve pad is marked in hundredths of millimeters on the side that touches the valve lifter.
- Since valve pads of various sizes are originally installed, the valve pad number must be rounded in order to reach the closest equivalent to the original.





- c. Round off the original valve pad number according to the following table.

Last digit	Rounded value
0 or 2	0
5	5
8	10

**EXAMPLE:**

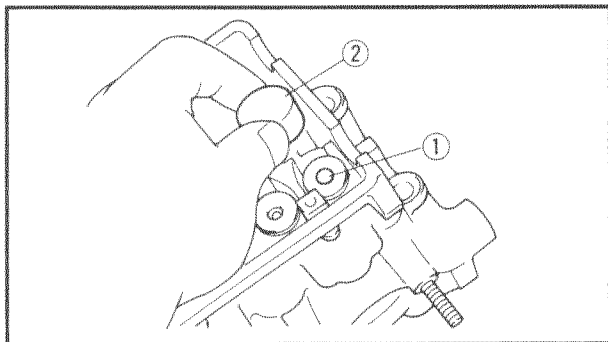
Original valve pad number = 148 (thickness = 1.48 mm)

Rounded value = 150

- d. Locate the rounded number of the original valve pad and the measured valve clearance in the valve pad selection table. The point where the column and row intersect is the new valve pad number.

**NOTE:**

The new valve pad number is only an approximation. The valve clearance must be measured again and the above steps should be repeated if the measurement is still incorrect.



- e. Install the new valve pad ① and the valve lifter ②.

**NOTE:**

- Lubricate the valve pad with molybdenum disulfide grease.
- Lubricate the valve lifter with molybdenum disulfide oil.
- The valve lifter must turn smoothly when rotated by hand.
- Install the valve lifter and the valve pad in the correct place.

- f. Install the exhaust and intake camshafts, timing chain and camshaft caps.



**Camshaft cap bolt**  
10 Nm (1.0 m•kg, 7.2 ft•lb)

**NOTE:**

- Refer to "CAMSHAFTS" in chapter 4.
- Lubricate the camshaft lobes and camshaft journals.
- First, install the exhaust camshaft.
- Align the camshaft marks with the camshaft cap marks.
- Turn the crankshaft counterclockwise several full turns to seat the parts.

# ADJUSTING THE VALVE CLEARANCE

CHK  
ADJ



## VALVE PAD SELECTION TABLE INTAKE

[B] MEASURED VALVE CLEARANCE	[A] ORIGINAL VALVE PAD NUMBER																									
	120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240	
0.00 ~ 0.02					120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225
0.03 ~ 0.07				120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230
0.08 ~ 0.10		120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	
0.11 ~ 0.20																										
	[C] STANDARD CLEARANCE																									
0.21 ~ 0.22	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240		
0.23 ~ 0.27	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240			
0.28 ~ 0.32	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240				
0.33 ~ 0.37	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240					
0.38 ~ 0.42	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240						
0.43 ~ 0.47	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240							
0.48 ~ 0.52	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240								
0.53 ~ 0.57	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240									
0.58 ~ 0.62	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240										
0.63 ~ 0.67	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240											
0.68 ~ 0.72	175	180	185	190	195	200	205	210	215	220	225	230	235	240												
0.73 ~ 0.77	180	185	190	195	200	205	210	215	220	225	230	235	240													
0.78 ~ 0.82	185	190	195	200	205	210	215	220	225	230	235	240														
0.83 ~ 0.87	190	195	200	205	210	215	220	225	230	235	240															
0.88 ~ 0.92	195	200	205	210	215	220	225	230	235	240																
0.93 ~ 0.97	200	205	210	215	220	225	230	235	240																	
0.98 ~ 1.02	205	210	215	220	225	230	235	240																		
1.03 ~ 1.07	210	215	220	225	230	235	240																			
1.08 ~ 1.12	215	220	225	230	235	240																				
1.13 ~ 1.17	220	225	230	235	240																					
1.18 ~ 1.22	225	230	235	240																						
1.23 ~ 1.27	230	235	240																							
1.28 ~ 1.32	235	240																								
1.33 ~ 1.37	240																									

Example:

Valve Clearance (cold)

0.11 ~ 0.20 mm

Rounded value 150

Measured valve clearance is 0.24 mm

Replace pad 150 with pad 160

Pad No. 150 = 1.50 mm

Pad No. 160 = 1.60 mm

Always install the valve pad with the number facing down.

Example:

Valve Clearance (cold)

0.11 ~ 0.20 mm

Rounded value 150

Measured valve clearance is 0.24 mm

Replace pad 150 with pad 160

Pad No. 150 = 1.50 mm

Pad No. 160 = 1.60 mm

Always install the valve pad with the number facing down.

## EXHAUST

[B] MEASURED VALVE CLEARANCE	[A] ORIGINAL VALVE PAD NUMBER																								
	120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240
0.00 ~ 0.02						120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215
0.03 ~ 0.07					120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220
0.08 ~ 0.12				120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225
0.13 ~ 0.17			120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230
0.18 ~ 0.20		120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235
0.21 ~ 0.30																									
	[C] STANDARD CLEARANCE																								
0.31 ~ 0.32	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240	
0.33 ~ 0.37	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240		
0.38 ~ 0.42	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240			
0.43 ~ 0.47	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240				
0.48 ~ 0.52	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240					
0.53 ~ 0.57	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240						
0.58 ~ 0.62	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240							
0.63 ~ 0.67	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240								
0.68 ~ 0.72	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240									
0.73 ~ 0.77	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240										
0.78 ~ 0.82	175	180	185	190	195	200	205	210	215	220	225	230	235	240											
0.83 ~ 0.87	180	185	190	195	200	205	210	215	220	225	230	235	240												
0.88 ~ 0.92	185	190	195	200	205	210	215	220	225	230	235	240													
0.93 ~ 0.97	190	195	200	205	210	215	220	225	230	235	240														
0.98 ~ 1.02	195	200	205	210	215	220	225	230	235	240															
1.03 ~ 1.07	200	205	210	215	220	225	230	235	240																
1.08 ~ 1.12	205	210	215	220	225	230	235	240																	
1.13 ~ 1.17	210	215	220	225	230	235	240																		
1.18 ~ 1.22	215	220	225	230	235	240																			
1.23 ~ 1.27	220	225	230	235	240																				
1.28 ~ 1.32	225	230	235	240																					
1.33 ~ 1.37	230	235	240																						
1.38 ~ 1.42	235	240																							
1.43 ~ 1.47	240																								

Example:

Valve Clearance (cold)

0.21 ~ 0.30 mm

Rounded value 175

Measured valve clearance is 0.35 mm

Replace pad 150 with pad 185

Pad No. 175 = 1.75 mm

Pad No. 185 = 1.85 mm

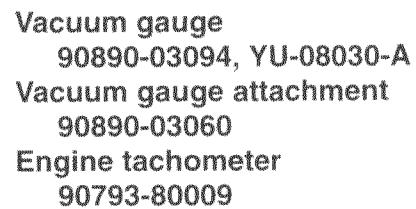
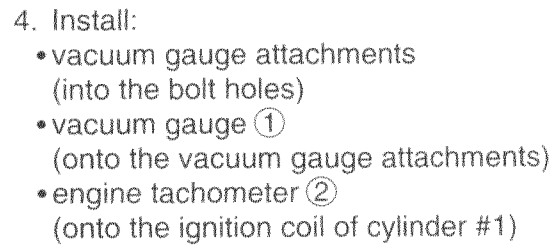
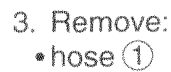
Always install the valve pad with the number facing down.

Example:

Valve Clearance (cold)

0.21 ~ 0.30 mm



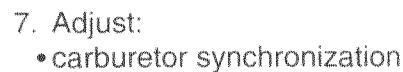
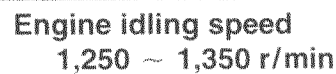


5. Start the engine and let it warm up for several minutes.

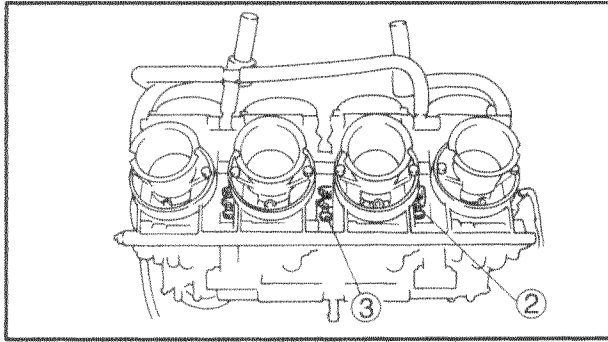
6. Measure:

- engine idling speed

Out of specification → Adjust.  
Refer to “ADJUSTING THE ENGINE IDLING SPEED”.



a. Synchronize carburetor #1 to carburetor #2 by turning the synchronizing screw ① in either direction until both gauges read the same.

**NOTE:**

After each step, rev the engine two or three times, each time for less than a second, and check the synchronization again.

- b. Synchronize carburetor #4 to carburetor #3 by turning the synchronizing screw ② in either direction until both gauges read the same.
- c. Synchronize carburetor #2 to carburetor #3 by turning the synchronizing screw ③ in either direction until both gauges read the same.



**Vacuum pressure at engine  
idling speed**

**24.0 kPa (0.24 kg/cm<sup>2</sup>, 3.41 psi)**

**NOTE:**

The difference in vacuum pressure between two carburetors should not exceed 1.33 kPa (10 mm Hg).



8. Measure:
  - engine idling speed  
Out of specification → Adjust.
9. Stop the engine and remove the measuring equipment.
10. Adjust:
  - throttle cable free play  
Refer to "ADJUSTING THE THROTTLE CABLE FREE PLAY".



**Throttle cable free play  
(at the flange of the throttle grip)**

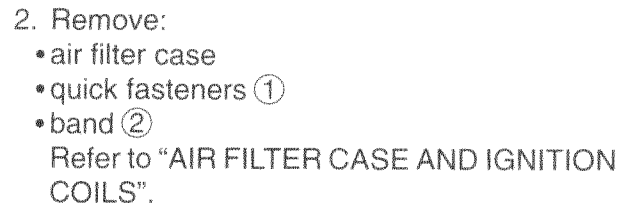
**6 ~ 8 mm (0.24 ~ 0.31 in)**

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**ADJUSTING THE ENGINE IDLING SPEED****NOTE:**

Prior to adjusting the engine idling speed, the carburetor synchronization should be adjusted properly, the air filter element should be clean, and the engine should have adequate compression.

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



- |   |  |
|---|--|
|  | <b>Engine tachometer</b><br><b>90793-80009</b> |
|---|--|

- |   |   |
|---|---|
|  | <b>Engine idling speed</b><br>1,250 ~ 1,350 r/min |
|---|---|

- a. Turn the throttle stop screw (2) in direction (a) or (b) until the specified engine idling speed is obtained.

Direction (a)	Engine idling speed is decreased.
Direction (b)	Engine idling speed is increased.



7. Adjust:

- throttle cable free play

Refer to "ADJUSTING THE THROTTLE CABLE FREE PLAY".



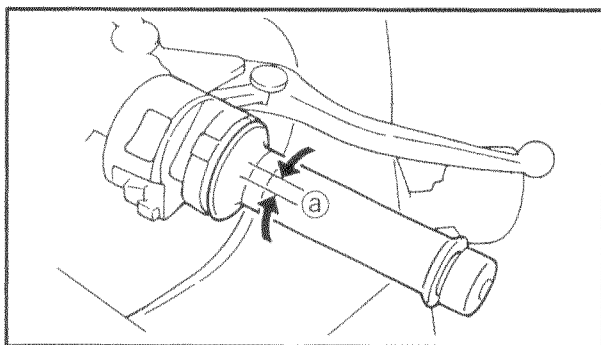
**Throttle cable free play**  
**(at the flange of the throttle grip)**  
6 ~ 8 mm (0.24 ~ 0.31 in)

EB303031

**ADJUSTING THE THROTTLE CABLE FREE PLAY**

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

Prior to adjusting the throttle cable free play, the engine idling speed and carburetor synchronization should be adjusted properly.



1. Measure:

- throttle cable free play (a)

Out of specification → Adjust.



**Throttle cable free play**  
**(at the flange of the throttle grip)**  
6 ~ 8 mm (0.24 ~ 0.31 in)

2. Remove:

- rider seat
- fuel tank

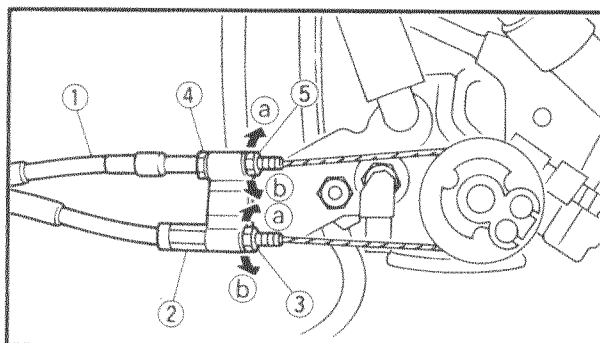
Refer to "SEATS" and "FUEL TANK".

- air filter case
- heat protector plate

Refer to "AIR FILTER CASE AND IGNITION COILS".

# ADJUSTING THE THROTTLE CABLE FREE PLAY

CHK  
ADJ



3. Adjust:
  - throttle cable free play

## NOTE:

When the throttle is opened, the accelerator cable ① is pulled.

## Carburetor side

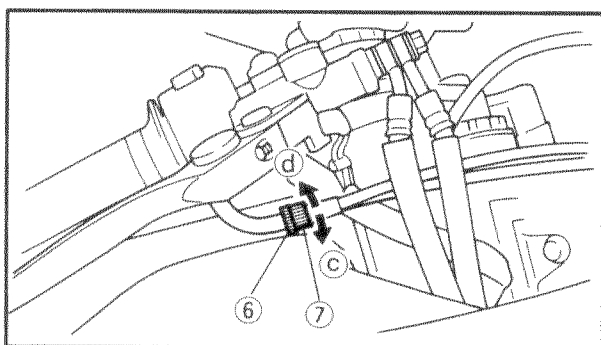
- a. Loosen the locknut ② on the decelerator cable.
- b. Turn the adjusting nut ③ in direction ① or ② to take up any slack on the decelerator cable.
- c. Loosen the locknut ④ on the accelerator cable.
- d. Turn the adjusting nut ⑤ in direction ① or ② until the specified throttle cable free play is obtained.

Direction ①	Throttle cable free play is increased.
Direction ②	Throttle cable free play is decreased.

- e. Tighten the locknuts.

## NOTE:

If the specified throttle cable free play cannot be obtained on the carburetor side of the cable, use the adjusting nut on the handlebar side.



## Handlebar side

- a. Loosen the locknut ⑥.
- b. Turn the adjusting nut ⑦ in direction ③ or ④ until the specified throttle cable free play is obtained.

Direction ③	Throttle cable free play is increased.
Direction ④	Throttle cable free play is decreased.

- d. Tighten the locknut.

## ⚠ WARNING

After adjusting the throttle cable free play, start the engine and turn the handlebars to the right and to the left to ensure that this does not cause the engine idling speed to change.



EB303040

**CHECKING THE SPARK PLUGS**

The following procedure applies to all of the spark plugs.

## 1. Remove:

- rider seat
- fuel tank

Refer to "SEATS" and "FUEL TANK".

- air filter case
- heat protector plate

Refer to "AIR FILTER CASE AND IGNITION COILS".

## 2. Disconnect:

- Ignition coils

## 3. Remove:

- spark plug

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

- Remove the coupler.
- Turn the coil counterclockwise. (5 to 6 turns would be adequate.)
- Pull out the coil upward.  
Never pry the coupler with a screw driver.
- Press the coil in the plug hole by hand as far as it will go.
- Turn the coil clockwise and screw it in, 5 to 6 turns would be adequate.
- Reinstall the coupler.  
Do not strike on the coil with a hammer or the like.

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

**Before removing the spark plugs, blow away any dirt accumulated in the spark plug wells with compressed air to prevent it from falling into the cylinders.**

## 4. Check:

- spark plug type

Incorrect → Change.

**Spark plugs**

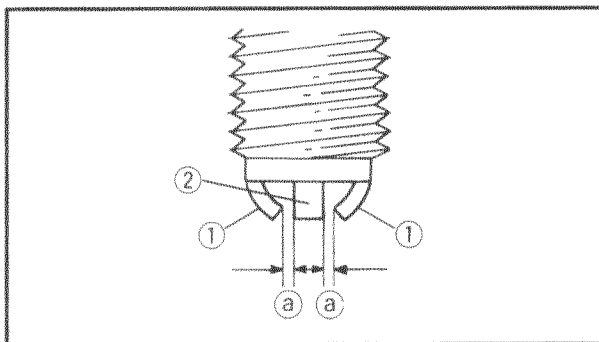
**type (manufacturer)**

**CR10EK (NGK)**

**CR9EK (NGK) (California)**

## CHECKING THE SPARK PLUGS/ CHECKING THE IGNITION TIMING

CHK  
ADJ



5. Check:
  - electrodes (1)  
Damage/wear → Replace the spark plug.
  - insulator (2)  
Abnormal color → Replace the spark plug.  
Normal color is medium-to-light tan.
6. Clean:
  - spark plug  
(with a spark plug cleaner or wire brush)
7. Measure:
  - spark plug gap (a)  
(with a wire gauge)  
Out of specification → Regap.



### Spark plug gap

0.6 ~ 0.7 mm (0.02 ~ 0.03 in)

8. Install:

- spark plug

 13 Nm (1.3 m•kg, 9.4 ft•lb)

### NOTE:

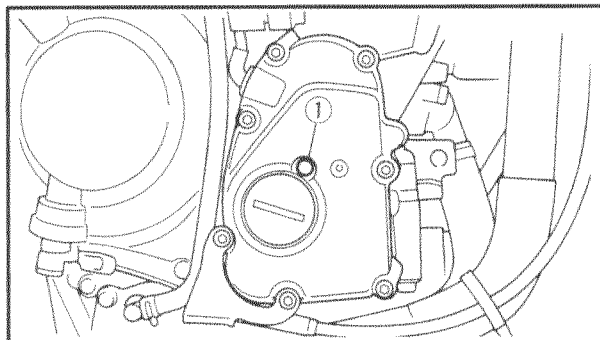
Before installing the spark plug, clean the spark plug and gasket surface.

EB303050

## CHECKING THE IGNITION TIMING

### NOTE:

Prior to checking the ignition timing, check the wiring connections of the entire ignition system. Make sure that all connections are tight and free of corrosion.



1. Remove:
  - bottom cowlings  
Refer to "COWLINGS".
  - rider seat
  - fuel tank  
Refer to "SEATS" and "FUEL TANK".
  - air filter case  
Refer to "AIR FILTER CASE AND IGNITION COILS".
  - timing mark accessing screw (1)

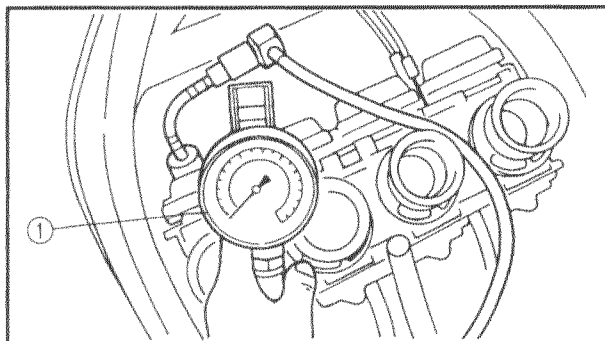




4. Remove:
  - spark plug

## CAUTION:

Before removing the spark plugs, use compressed air to blow away any dirt accumulated in the spark plug wells to prevent it from falling into the cylinders.



5. Install:
  - compression gauge ①



**Compression gauge**  
90890-03081, YU-33223  
**Adapter**  
90890-04136

6. Measure:
  - compression pressure
  - Out of specification → Refer to steps (c) and (d).



## Compression pressure (at sea level)

### Minimum

1300 kPa (13.0 kg/cm<sup>2</sup>,  
184.90 psi)

### Standard

1550 kPa (15.5 kg/cm<sup>2</sup>,  
224.75 psi)

### Maximum

1600 kPa (16.0 kg/cm<sup>2</sup>,  
227.57 psi)

- a. Set the main switch to "ON".
- b. With the throttle wide open, crank the engine until the reading on the compression gauge stabilizes.

## ⚠ WARNING

To prevent sparking, ground all spark plug leads before cranking the engine.

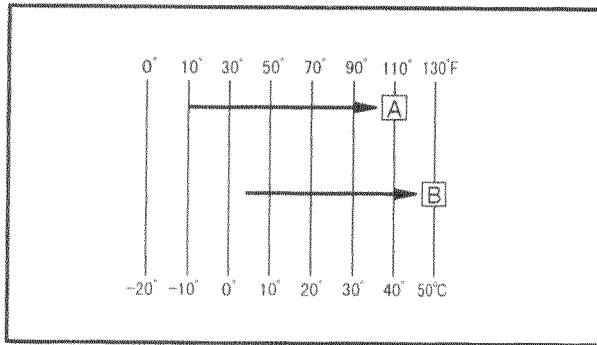
## NOTE:

The difference in compression pressure between cylinders should not exceed 100 kPa (1 kg/cm<sup>2</sup>, 14.22 psi).



## CHECKING THE ENGINE OIL LEVEL/ CHANGING THE ENGINE OIL

**CHK**  
**ADJ**



### Recommended oil:

At  $-10^{\circ}\text{C}$  ( $10^{\circ}\text{F}$ ) or higher **A**:

Yamalube 4 (10W-30)  
or SAE

10W-30 type SE motor oil

At  $5^{\circ}\text{C}$  ( $40^{\circ}\text{F}$ ) or higher **B**:

Yamalube 4 (20W-40)  
or SAE

20W-40 type SE motor oil

### CAUTION:

- Engine oil also lubricates the clutch and the wrong oil types or additives could cause clutch slippage. Therefore, do not add any chemical additives.
- Do not allow foreign materials to enter the crankcase.

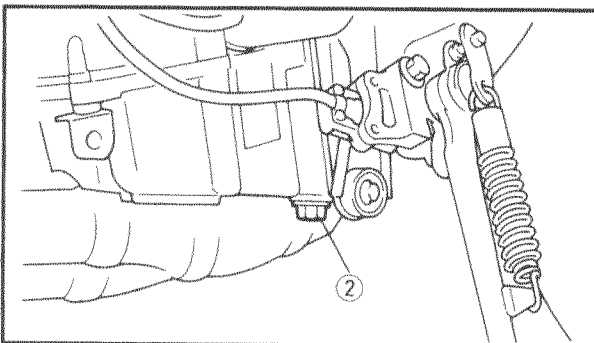
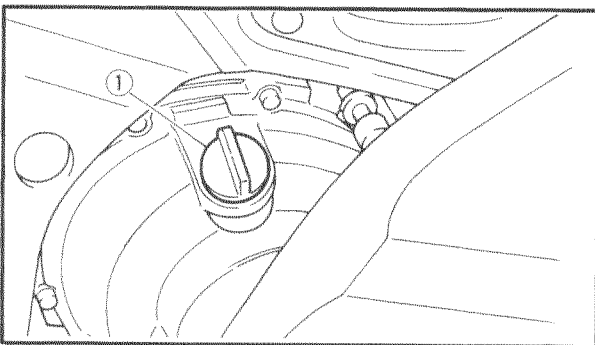
### NOTE:

API Service "SE", "SF" and "SG" type or equivalent (e. g., "SF-SE", "SF-SE-CC", "SF-SE-SD")

4. Start the engine, warm it up for several minutes, and then turn it off.
5. Check:
  - engine oil level

### NOTE:

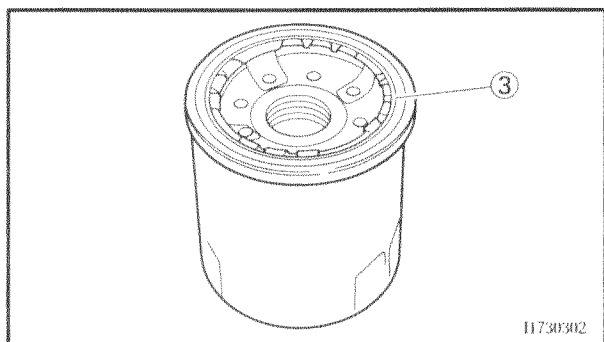
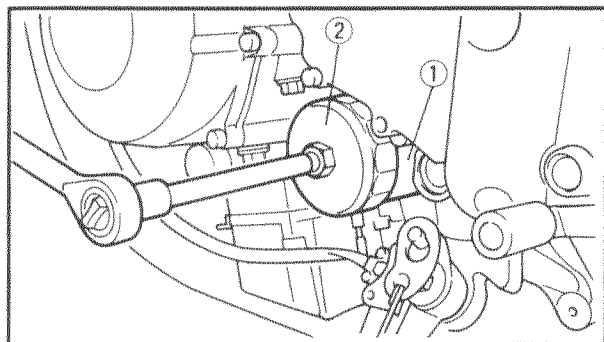
Before checking the engine oil level, wait a few minutes until the oil has settled.



EB303081

## CHANGING THE ENGINE OIL

1. Remove:
  - bottom cowling  
Refer to "COWLINGS".
2. Start the engine, warm it up for several minutes, and then turn it off.
3. Place a container under the engine oil drain bolt.
4. Remove:
  - engine oil filler cap (1)
  - engine oil drain bolt (2)  
(along with the washer)
5. Drain:
  - engine oil  
(completely from the crankcase)



11730302

6. If the oil filter cartridge is also to be replaced, perform the following procedure.

- a. Remove the oil filter cartridge ① with an oil filter wrench ②.



**Oil filter wrench**  
90890-01426, YU-38411

- b. Lubricate the O-ring ③ of the new oil filter cartridge with a thin coat of engine oil.

## CAUTION:

**Make sure that the O-ring ③ is positioned correctly in the groove of the oil filter cartridge.**

- c. Tighten the new oil filter cartridge to specification with an oil filter wrench.



**Oil filter cartridge**  
17 Nm (1.7 m•kg, 12 ft•lb)

7. Check:

- engine oil drain bolt washer  
Damage → Replace.

8. Install:

- engine oil drain bolt

43 Nm (4.3 m•kg, 31 ft•lb)

9. Fill:

- crankcase  
(with the specified amount of the recommended engine oil)



## Quantity

**Total amount**

3.5 L (3.7 US qt)

**Without oil filter cartridge replacement**

2.5 L (2.64 US qt)

**With oil filter cartridge replacement**

2.7 L (2.85 US qt)

10. Install:

- engine oil filler cap

11. Start the engine, warm it up for several minutes, and then turn it off.

12. Check:

- engine  
(for engine oil leaks)



13. Check:

- engine oil level

Refer to "CHECKING THE ENGINE OIL LEVEL".

14. Install:

- bottom cowling

Refer to "COWLINGS".

EB303090

## MEASURING THE ENGINE OIL PRESSURE

1. Check:

- engine oil level

Below the minimum level mark → Add the recommended engine oil to the proper level.

2. Start the engine, warm it up for several minutes, and then turn it off.

### CAUTION:

When the engine is cold, the engine oil will have a higher viscosity, causing the engine oil pressure to increase. Therefore, be sure to measure the engine oil pressure after warming up the engine.

3. Remove:

- oil gallery bolt ①

### ⚠ WARNING

The engine, muffler and engine oil are extremely hot.

4. Install:

- oil pressure gauge ①
- adapter ②



Oil pressure gauge

90890-03153

Adapter

90890-03139

5. Measure:

- engine oil pressure  
(at the following conditions)



Engine oil pressure

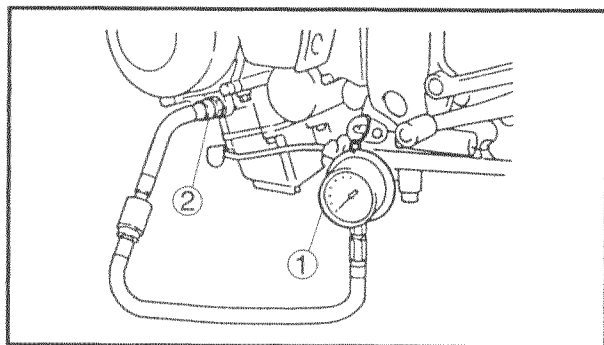
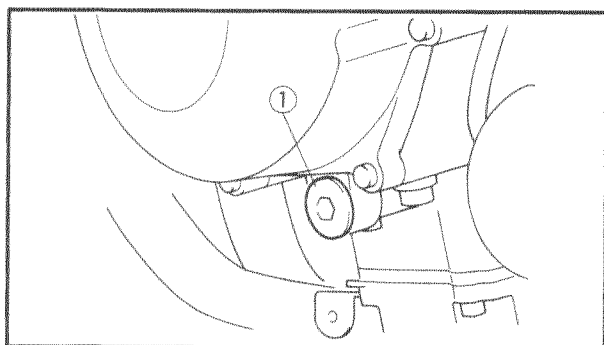
240 kpa (2.4 kg/cm<sup>2</sup>, 34.1 psi)

Engine speed

Approx. 6000 r/min

Engine oil temperature

96°C (205°F)





## NOTE:

Regarding the oil pressure as its own data may fluctuate depending on the oil temperature and viscosity, the oil pressure may fluctuate when measuring. The following data should be used only as a reference when measuring the engine oil pressure.

Out of specification → Adjust.

Engine oil pressure	Possible cause
Below specification	Faulty oil pump Clogged oil filter Leaking oil passage Broken or damaged oil seal
Above specification	Leaking oil passage Faulty oil filter Oil viscosity too high

6. Tighten the oil gallery bolt

20 Nm (2.0 m•kg, 14 ft•lb)

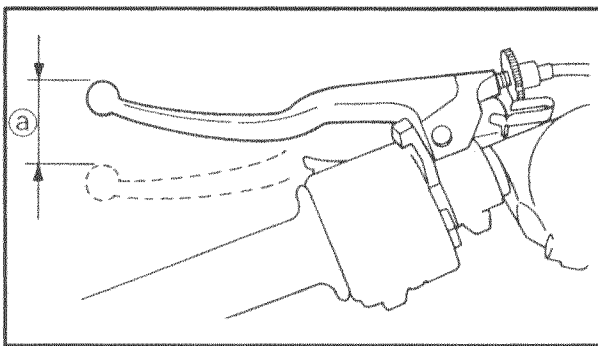
EB903100

## ADJUSTING THE CLUTCH CABLE FREE PLAY

1. Measure:

- clutch cable free play (a)

Out of specification → Adjust.



**Clutch cable free play (at the end of the clutch lever)**  
10 ~ 15 mm (0.39 ~ 0.59 in)

2. Adjust:

- clutch cable free play

## Handlebar side

a. Turn the adjusting bolt (1) in direction (a) or (b) until the specified clutch cable free play is obtained.

Direction (a)	Clutch cable free play is increased.
Direction (b)	Clutch cable free play is decreased.

## NOTE:

If the specified clutch cable free play cannot be obtained on the handlebar side of the cable, use the adjusting nut on the engine side.

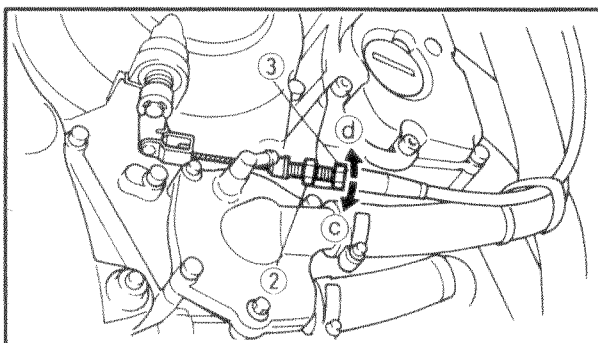
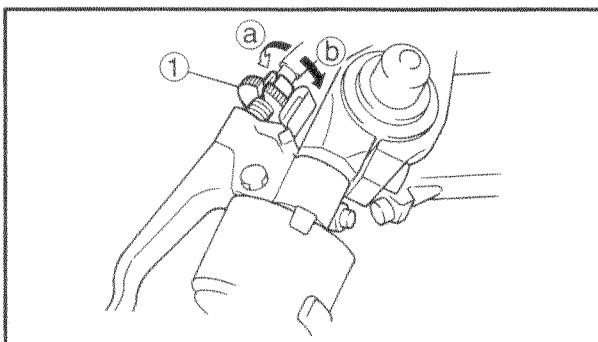
## Engine side

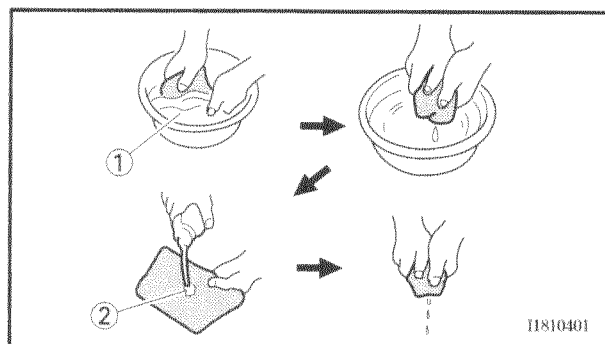
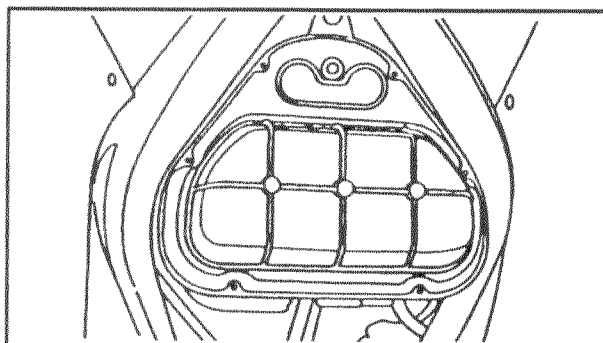
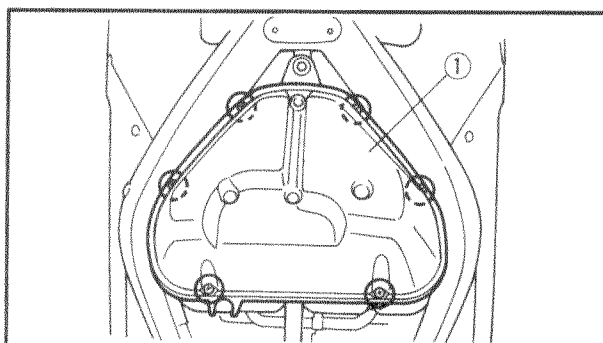
a. Loosen the locknut (2).

b. Turn the adjusting nut (3) in direction (c) or (d) until the specified clutch cable free play is obtained.

Direction (c)	Clutch cable free play is increased.
Direction (d)	Clutch cable free play is decreased.

c. Tighten the locknut.





EB303130

## CLEANING THE AIR FILTER ELEMENT

1. Remove:
  - fuel tank  
Refer to "FUEL TANK".
  - air filter case cover ①
  - air filter element
2. Clean:
  - air filter element  
Use solvent to clean the air filter element. After cleaning the air filter element, remove the solvent from the air filter element.
3. Apply the engine oil to the entire surface of the filter and remove the excess oil. The air filter should be wet but not dripping.
4. Check:
  - air filter element  
Damage → Replace.
5. Install:
  - air filter element
  - air filter case cover

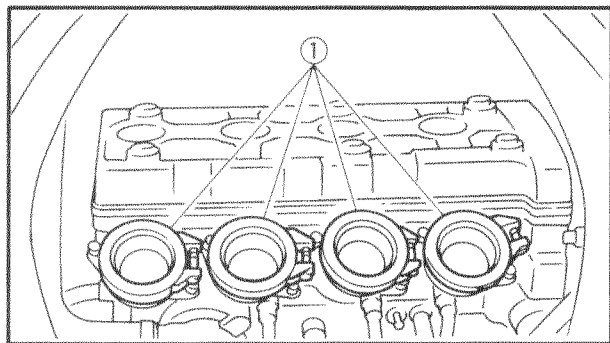
### CAUTION:

Never operate the engine without the air filter element installed. Unfiltered air will cause rapid wear of engine parts and may damage the engine. Operating the engine without the air filter element will also affect the carburetor tuning, leading to poor engine performance and possible overheating.

### NOTE:

When installing the air filter element into the air filter case cover, make sure that their sealing surfaces are aligned to prevent any air leaks.

6. Install:
  - fuel tank  
Refer to "FUEL TANK".



EB303171

### CHECKING THE CARBURETOR JOINTS

The following procedure applies to all of the carburetor joints and intake manifolds.

1. Remove:
  - carburetor assembly  
Refer to "CARBURETORS" in chapter 6.
2. Check:
  - carburetor joint ①  
Cracks/damage → Replace.  
Refer to "CARBURETORS" in chapter 6.
3. Install:
  - carburetor assembly  
Refer to "CARBURETORS" in chapter 6.

EB303181

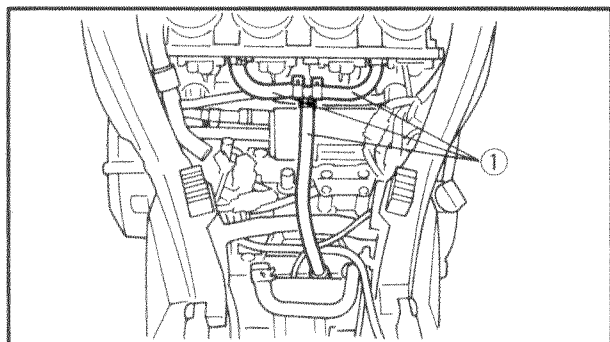
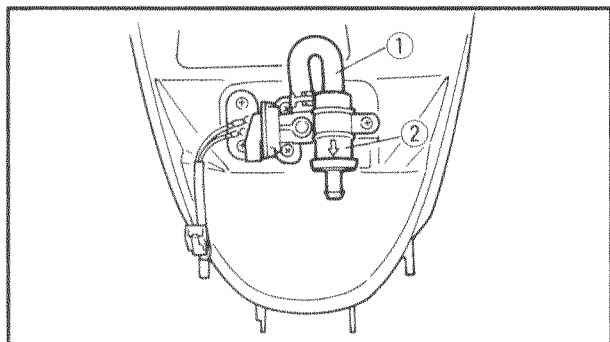
### CHECKING THE FUEL HOSES AND FUEL FILTER

The following procedure applies to all of the fuel hoses.

1. Remove:
  - fuel tank  
Refer to "FUEL TANK".
2. Check:
  - fuel hose ①  
Cracks/damage → Replace.
  - fuel filter ②  
Contaminants/damage → Replace.

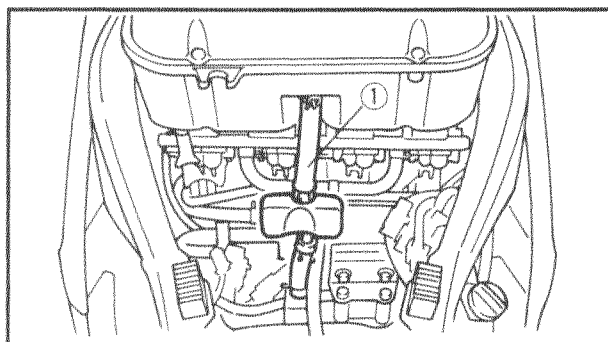
#### NOTE:

- Drain and flush the fuel tank if abrasive damage to any components of the fuel line is evident.
- The arrow mark on the fuel filter must point towards the fuel pump as shown.



## CHECKING THE CRANKCASE BREATHER HOSE/ CLEANING THE AIR INTAKE SYSTEM

CHK  
ADJ



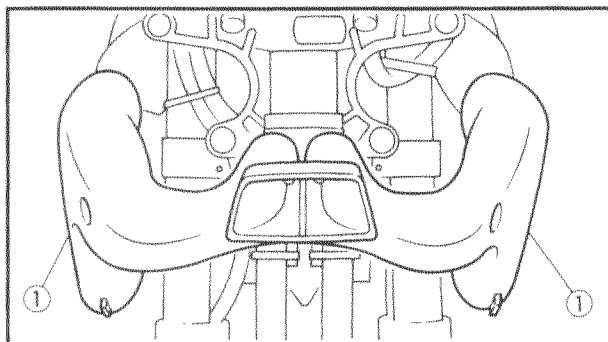
EB303190

### CHECKING THE CRANKCASE BREATHER HOSE

1. Remove:
  - fuel tank  
Refer to "FUEL TANK".
2. Check:
  - crankcase breather hose (1)  
Cranks/damage → Replace.  
Loose connection → Connect properly.

### CAUTION:

**Make sure that the crankcase breather hose is routed correctly.**

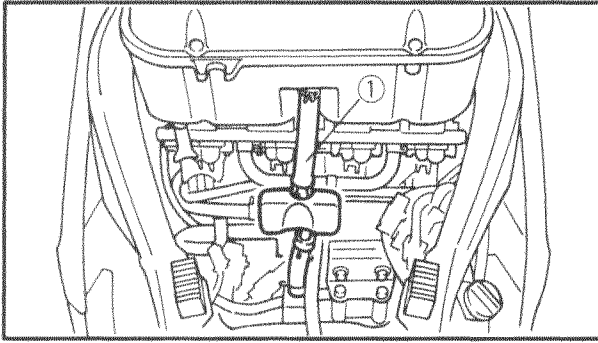


EAS00092

### CLEANING THE AIR INTAKE SYSTEM

The following procedure applies to both air intake system.

1. Remove:
  - side cowling inner covers
  - side cowlings
  - front cowling inner covers
  - front cowling
  - fuel tank
2. Loosen:
  - clamps  
(on the inside of the front cowling)
3. Remove:
  - air intake system air ducts (1)
4. Clean:
  - air intake system air ducts
  - a. Thoroughly flush out the air intake system air ducts with clean water.
  - b. Hold the air intake system air ducts upside down to allow the water to drain out.
  - c. Repeat the flushing steps until the excess water is clear and free of debris.
  - d. Place the air intake system air ducts in an upright position to allow any remaining water to drain out of the lower drain tube.
  - e. Keep the air intake system air ducts upright to allow it to dry sufficiently.
5. Install:
  - air intake system air ducts
  - fuel tank
  - front cowling
  - front cowling inner covers
  - side cowlings
  - side cowlings inner covers



2. Check:

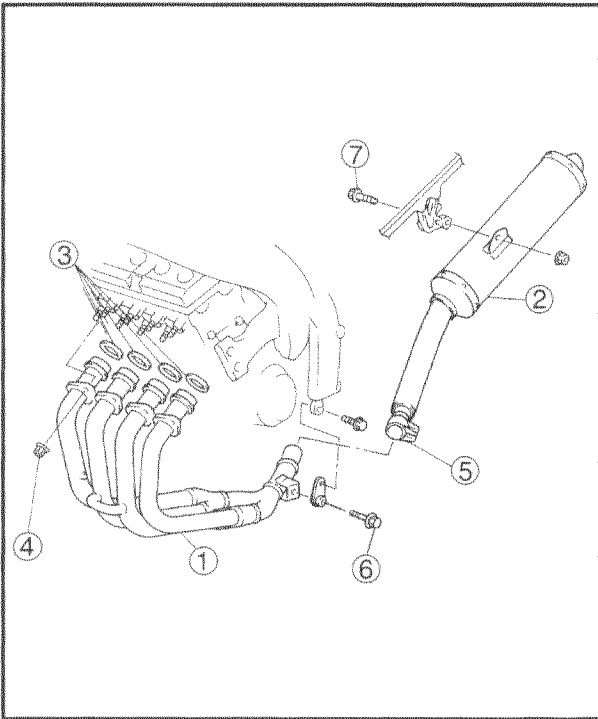
- crankcase breather hose (1)  
Cracks/damage → Replace.  
Loose connection → Connect properly.

**CAUTION:**

**Make sure that the crankcase breather hose is routed correctly.**

3. Install:

- fuel tank  
Refer to "FUEL TANK"



EB303200

**CHECKING THE EXHAUST SYSTEM**

The following procedure applies to all of the exhaust pipes and gaskets.

1. Remove:

- radiator assembly  
Refer to "RADIATOR" in chapter 5.

2. Check:

- exhaust pipe (1)  
Cracks/damage → Replace.
- muffler (2)  
Cracks/damage → Replace.
- gasket (3)  
Exhaust gas leaks → Replace.

3. Measure:

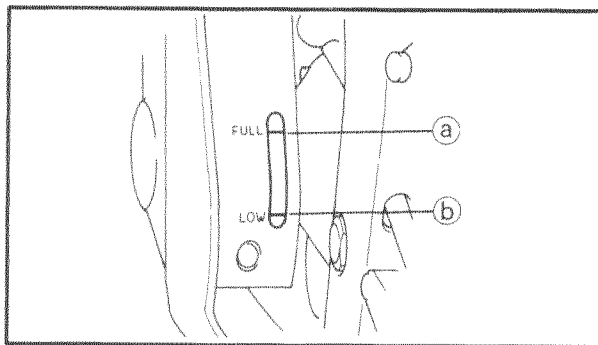
- tightening torque



<b>Exhaust pipe nut (4)</b>
20 Nm (2.0 m•kg, 14 ft•lb)
<b>Muffler clamp bolt (5)</b>
20 Nm (2.0 m•kg, 14 ft•lb)
<b>Exhaust pipe bolt (6)</b>
20 Nm (2.0 m•kg, 14 ft•lb)
<b>Muffler bolt (7)</b>
38 Nm (3.8 m•kg, 27 ft•lb)

4. Install:

- radiator assembly  
Refer to "RADIATOR" in chapter 5



EB303220

## CHECKING THE COOLANT LEVEL

1. Stand the motorcycle on a level surface.

### NOTE:

- Place the motorcycle on a suitable stand.
- Make sure that the motorcycle is upright.

2. Check:

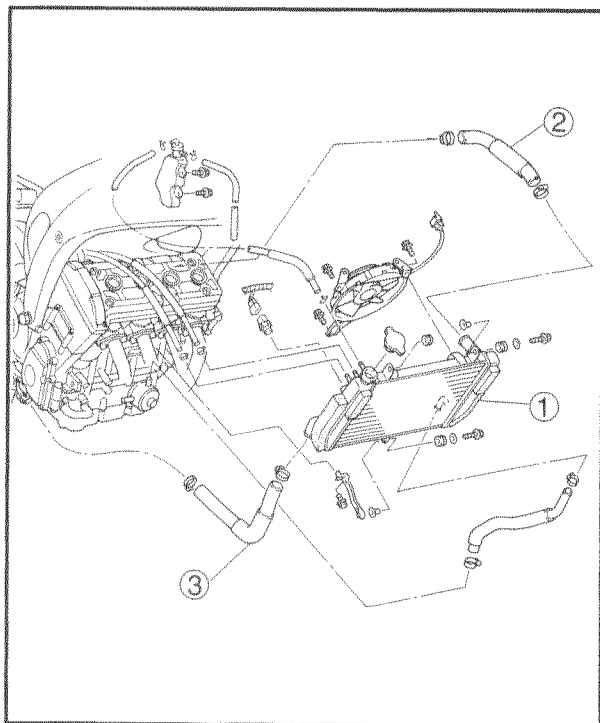
- coolant level

The coolant level should be between the maximum level mark (a) and minimum level marks (b).

Below the minimum level mark → Add the recommended coolant to the proper level.

### CAUTION:

- Adding water instead of coolant lowers the antifreeze content of the coolant. If water is used instead of coolant, check and correct the antifreeze concentration of the coolant.
- Use only distilled water. Soft water may be used if distilled water is not available.



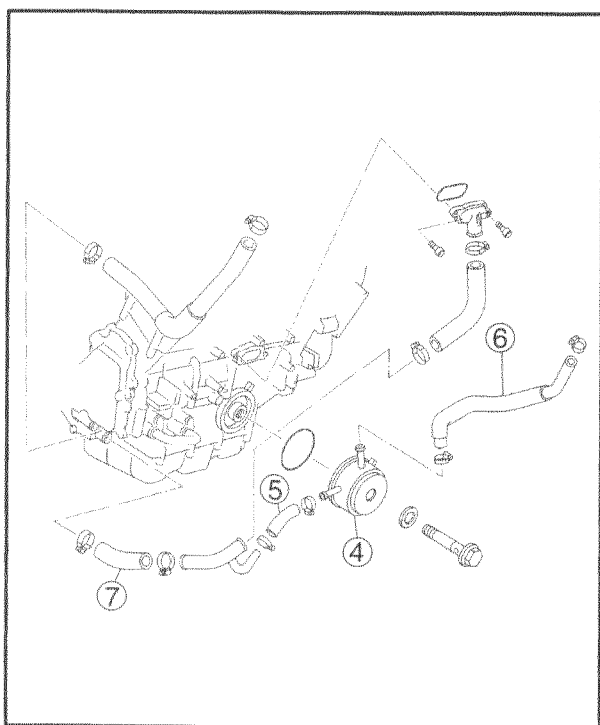
3. Start the engine, warm it up for several minutes, and then turn it off.

4. Check:

- coolant level

### NOTE:

Before checking the coolant level, wait a few minutes until it settles.



EB303230

## CHECKING THE COOLING SYSTEM

1. Remove:

- bottom cowlings
  - side cowlings
- Refer to "COWLINGS".

2. Check:

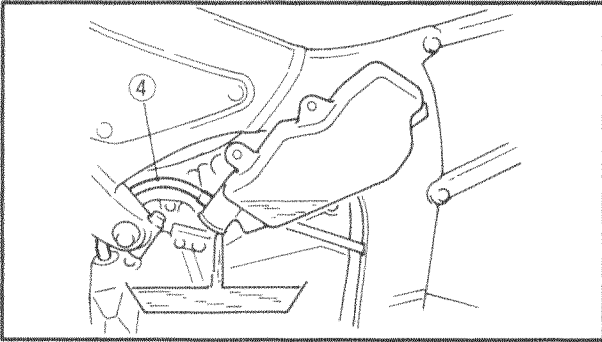
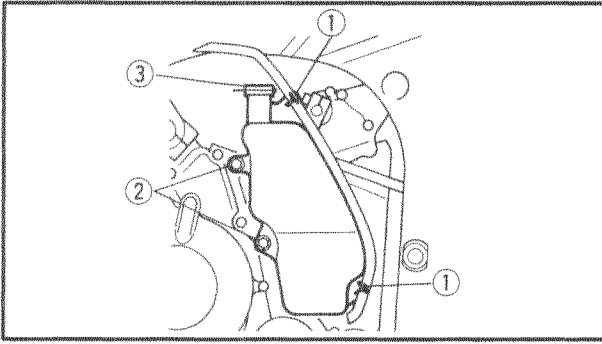
- radiator (1)
- radiator inlet hose (2)
- radiator outlet hose (3)
- oil cooler (4)
- oil cooler inlet hose (5)
- oil cooler outlet hose (6)
- water pump outlet hose (7)

Cracks/damage → Replace.

Refer to "COOLING SYSTEM" in chapter 5.

3. Install:

- side cowlings
  - bottom cowlings
- Refer to "Cowlings".



EB303240

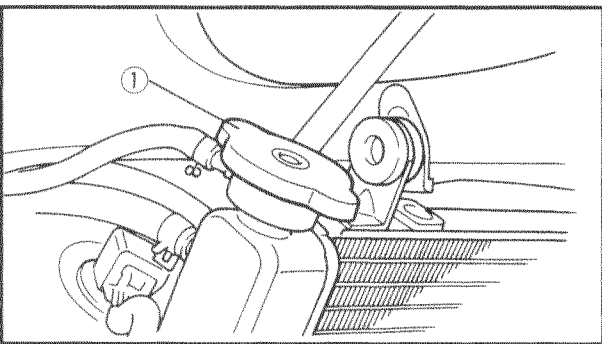
**CHANGING THE COOLANT**

1. Remove:
  - bottom cowling
  - left side cowling  
Refer to "COWLINGS".
  - reservoir hose clamps (1)
2. Remove:
  - coolant reservoir bolts (2)
  - coolant reservoir cap (3)

**NOTE:**

When draining the coolant from the coolant reservoir, be sure to tilt the reservoir so that coolant cannot flow through the coolant reservoir breather hose (4).

3. Drain:
  - coolant  
(from the coolant reservoir)
4. Install:
  - coolant reservoir bolts
  - reservoir cover



5. Remove:
  - radiator cap (1)

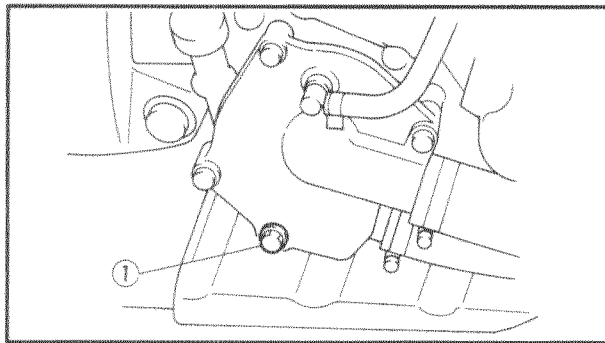
**⚠ WARNING**

A hot radiator is under pressure. Therefore, do not remove the radiator cap when the engine is hot. Scalding hot fluid and steam may be blown out, which could cause serious injury. When the engine has cooled, open the radiator cap as follows:

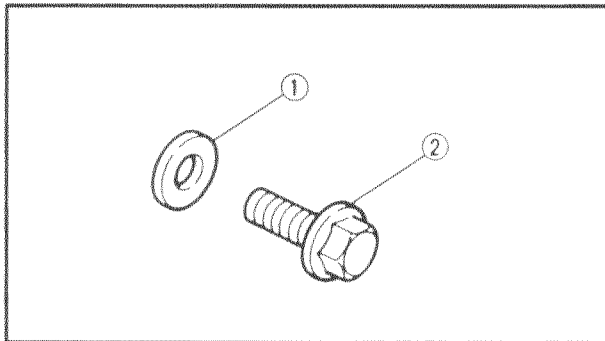
Place a thick rag or a towel over the radiator cap and slowly turn the radiator cap counterclockwise toward the detent to allow any residual pressure to escape. When the hissing sound has stopped, turn the radiator cap counterclockwise while pressing down on it and then remove it.

## CHANGING THE COOLANT


CHK  
ADJ

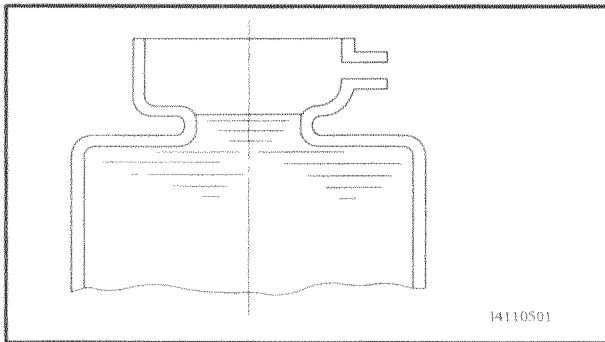


6. Remove:
  - coolant drain bolt ①  
(along with the copper washer)
7. Drain:
  - coolant
8. Check:
  - copper washer ①
  - coolant drain bolt ②Damage → Replace



9. Install:
  - coolant drain bolt

 7 Nm (0.7 m•kg, 5.1 ft•lb)



10. Fill:
  - cooling system  
(with the specified amount of the recommended coolant)



**Recommended antifreeze**  
High-quality ethylene glycol  
antifreeze containing corrosion  
inhibitors for aluminum engines  
**Mixing ratio**  
1:1 (antifreeze: water)  
**Quantity**  
Total amount  
2.15 L (2.27 US qt)  
Coolant reservoir capacity  
0.44 L (0.47 US qt)

### Handling notes for coolant

Coolant is potentially harmful and should be handled with special care.

### WARNING

- If coolant splashes in your eyes, thoroughly wash them with water and consult a doctor.
- If coolant splashes on your clothes, quickly wash it away with water and then with soap and water.
- If coolant is swallowed, induce vomiting and get immediate medical attention.

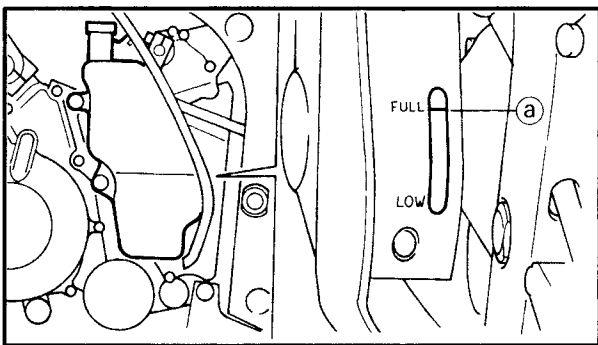


## CAUTION:

- Adding water instead of coolant lowers the antifreeze content of the coolant. If water is used instead of coolant, check, and if necessary, correct the antifreeze concentration of the coolant.
- Use only distilled water. However, soft water may be used if distilled water is not available.
- If coolant comes into contact with painted surfaces, immediately wash them with water.
- Do not mix different types of antifreeze.

### 11. Install:

- radiator cap



### 12. Fill:

- coolant reservoir  
(with the recommended coolant to the maximum level mark (a))

### 13. Install:

- coolant reservoir cap

### 14. Start the engine, warm it up for several minutes, and then turn it off.

### 15. Check:

- coolant level  
Refer to "CHECKING THE COOLANT LEVEL".

## NOTE:

Before checking the coolant level, wait a few minutes until the coolant has settled.

### 16. Install:

- left side cowl
  - bottom cowl
- Refer to "COWLINGS".







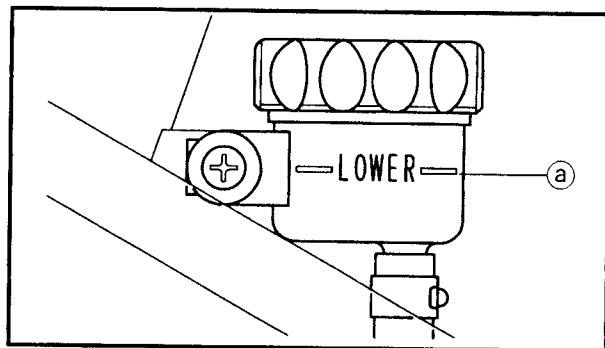
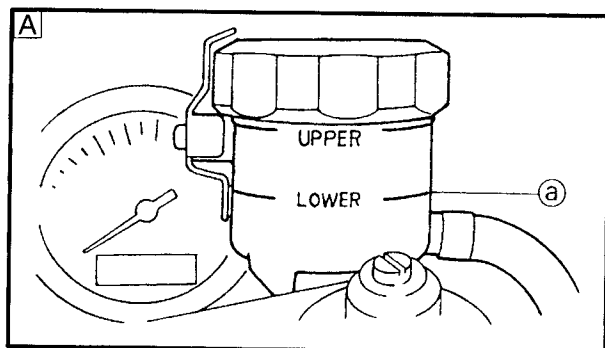
EB304020

## CHECKING THE BRAKE FLUID LEVEL

1. Stand the motorcycle on a level surface.

### NOTE:

- Place the motorcycle on a suitable stand.
- Make sure that the motorcycle is upright.



2. Check:

- brake fluid level

Below the minimum level mark (a) → Add the recommended brake fluid to the proper level.



**Recommended brake fluid**  
**DOT 4**

**A** Front brake

**B** Rear brake

### ! WARNING

- Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.
- Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor brake performance.
- When refilling, be careful that water does not enter the brake fluid reservoir. Water will significantly lower the boiling point of the brake fluid and could cause vapor lock.

### CAUTION:

Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.

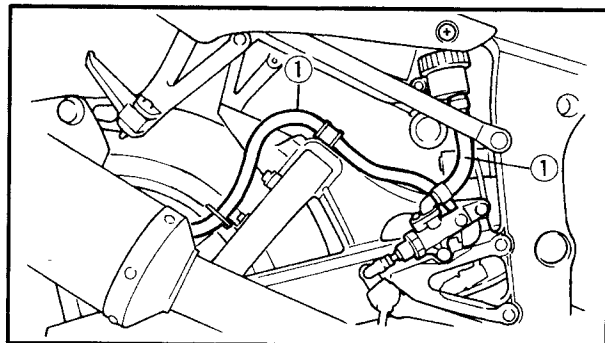
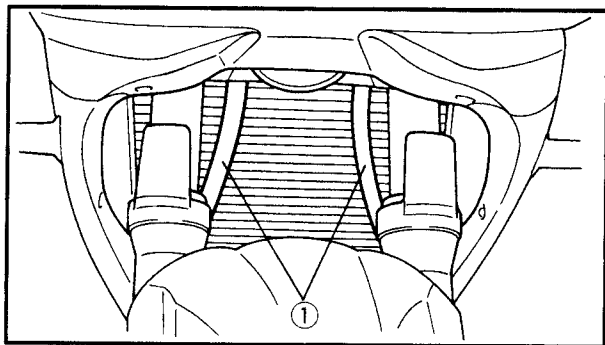
### NOTE:

In order to ensure a correct reading of the brake fluid level, make sure that the top of the brake fluid reservoir is horizontal.



## CHECKING THE BRAKE HOSES/ BLEEDING THE HYDRAULIC BRAKE SYSTEM

CHK  
ADJ



EB304062

### CHECKING THE BRAKE HOSES

The following procedure applies to all of the brake hoses and brake hose clamps.

1. Check:
  - brake hose ①  
Cracks/damage/wear → Replace.
2. Check:
  - brake hose clamp  
Loose → Tighten the clamp bolt.
3. Hold the motorcycle upright and apply the brake several times.
4. Check:
  - brake hose  
Brake fluid leakage → Replace the damaged hose.  
Refer to "FRONT AND REAR BRAKES" in chapter 7.

EB304072

### BLEEDING THE HYDRAULIC BRAKE SYSTEM

#### WARNING

Bleed the hydraulic brake system whenever:

- the brake system was disassembled,
- a brake hose was loosened, disconnected or replaced,
- the brake fluid level is very low,
- brake operation is faulty.

#### NOTE:

- Be careful not to spill any brake fluid or allow the brake fluid reservoir to overflow.
- When bleeding the hydraulic brake system, make sure that there is always enough brake fluid before applying the brake. Ignoring this precaution could allow air to enter the hydraulic brake system, considerably lengthening the bleeding procedure.
- If bleeding is difficult, it may be necessary to let the brake fluid settle for a few hours. Repeat the bleeding procedure when the tiny bubbles in the hose have disappeared.





**NOTE:**

1. Measure:

- 

2. Adjust:

- installed shift rod length

- a. Loosen both locknuts ①.
- b. Turn the shift rod ② in direction ⑥ or ⑦ to obtain the correct shift pedal position.

c. Tighten both locknuts.

- d. Make sure that the installed shift rod length is within specification.

**NOTE:**

The drive chain slack must be checked at the tightest point on the chain.

**CAUTION:**

**A drive chain that is too tight will overload the engine and other vital parts, and one that is too loose can skip and damage the swingarm or cause an accident. Therefore, keep the drive chain slack within the specified limits.**

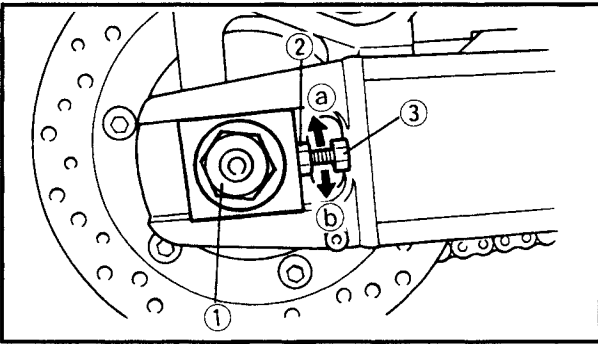
1. Stand the motorcycle on a level surface.

**⚠ WARNING**

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

**NOTE:**

Place the motorcycle on a suitable stand so that the rear wheel is elevated.



2. Rotate the rear wheel several times and check the drive chain to locate its tightest point.
3. Measure:
  - drive chain slack (a)Out of specification → Adjust.



**Drive chain slack**  
40 ~ 50 mm (1.57 ~ 1.97 in)

- 4. Adjust:
  - drive chain slack

- Loosen the wheel axle nut ①.
- Loosen both locknuts ②.
- Turn both adjusting bolts ③ in direction ④ or ⑤ until the specified drive chain slack is obtained.

Direction (a)	Drive chain slack is reduced.
Direction (b)	Drive chain slack is increased.

**NOTE:**

To maintain the proper wheel alignment, adjust both sides evenly.

- d. Tighten both locknuts to specification.



**Locknut**  
**16 Nm (1.6 m•kg, 12 ft•lb)**

- e. Tighten the wheel axle nut to specification.



**Wheel axle nut**  
**150 Nm (15.0 m•kg, 108 ft•lb)**



EB304100

### **LUBRICATING THE DRIVE CHAIN**

The drive chain consists of many interacting parts. If the drive chain is not maintained properly, it will wear out rapidly. Therefore, the drive chain should be serviced, especially when the motorcycle is used in dusty areas. This motorcycle has a drive chain with small rubber O-rings between each side plate. Steam cleaning, high-pressure washing, certain solvents, and the use of a coarse brush can damage these O-rings. Therefore, use only kerosine to clean the drive chain. Wipe the drive chain dry and thoroughly lubricate it with engine oil or chain lubricant that is suitable for O-ring chains. Do not use any other lubricants on the drive chain since they may contain solvents that could damage the O-rings.



**Recommended lubricant**  
**Engine oil or chain lubricant**  
**suitable for O-ring chains**

EB304130

### **CHECKING AND ADJUSTING THE STEERING HEAD**

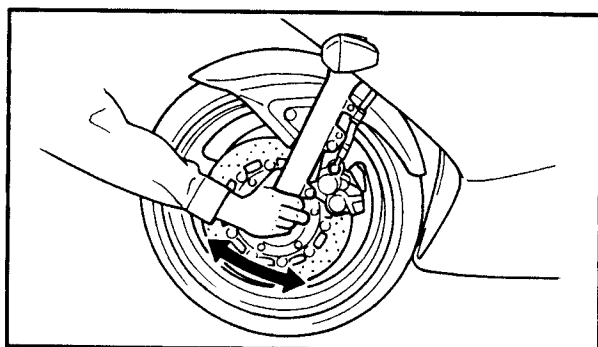
1. Stand the motorcycle on a level surface.

#### **⚠ WARNING**

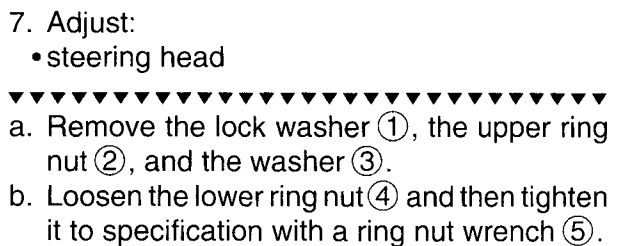
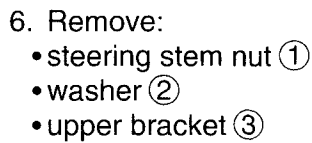
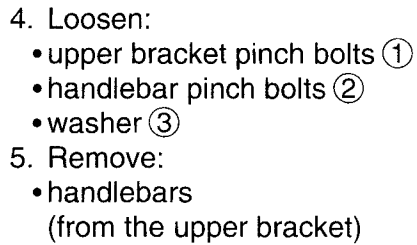
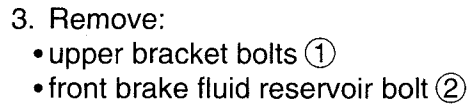
**Securely support the motorcycle so that there is no danger of it falling over.**

#### **NOTE:**

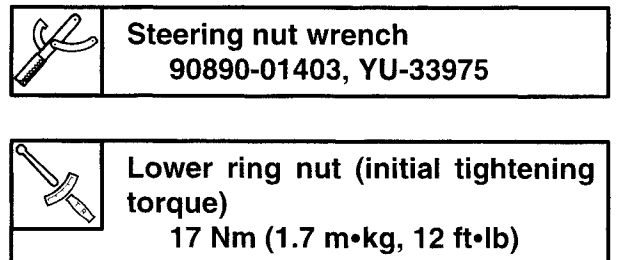
Place the motorcycle on a suitable stand so that the front wheel is elevated.



2. Check:
  - steering headGrasp the bottom of the front fork legs and gently rock the front fork.  
Looseness/binding → Adjust the steering head.



**NOTE:** \_\_\_\_\_  
Set the torque wrench at a right angle to the steering nut wrench.





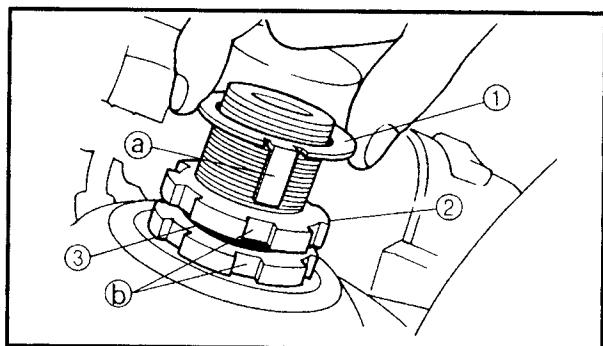
- c. Loosen the lower ring nut completely, then tighten it to specification.

## ⚠ WARNING

Do not overtighten the lower ring nut.



**Lower ring nut (final tightening torque)**  
**9 Nm (0.9 m•kg, 6.5 ft•lb)**



- d. Check the steering head for looseness or binding by turning the front fork all the way in both directions. If any binding is felt, remove the lower bracket and check the upper and lower bearings.

Refer to "STEERING HEAD" in chapter 7.

- e. Install the washer (3).  
f. Install the upper ring nut (2).  
g. Finger tighten the upper ring nut (2), then align the slots of both ring nuts.  
If necessary, hold the lower ring nut and tighten the upper ring nut until their slots are aligned.

- h. Install the lock washer (1).

## NOTE:

Make sure that the lock washer tabs (a) sit correctly in the ring nut slots (b).

8. Install:

- steering stem nut

**115 Nm (11.5 m•kg, 83 ft•lb)**

- upper bracket bolt

**13 Nm (1.3 m•kg, 9.4 ft•lb)**

- handlebar pinch bolt

**13 Nm (1.3 m•kg, 9.4 ft•lb)**

- upper bracket pinch bolt

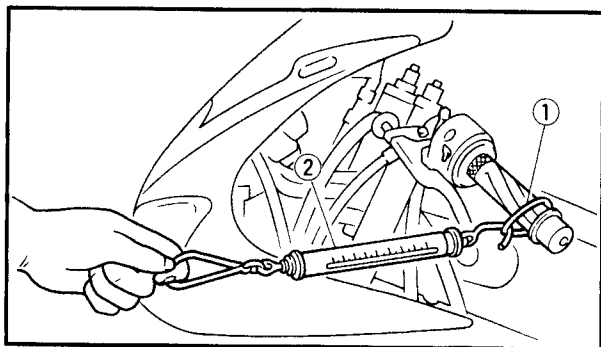
**23 Nm (2.3 m•kg, 17 ft•lb)**

9. Measure:

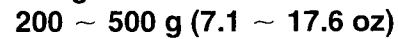
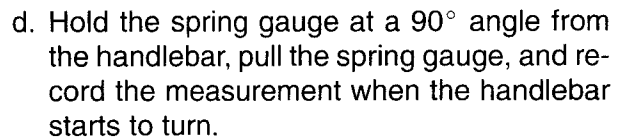
- steering head tension  
(with the motorcycle still on the stand)

## NOTE:

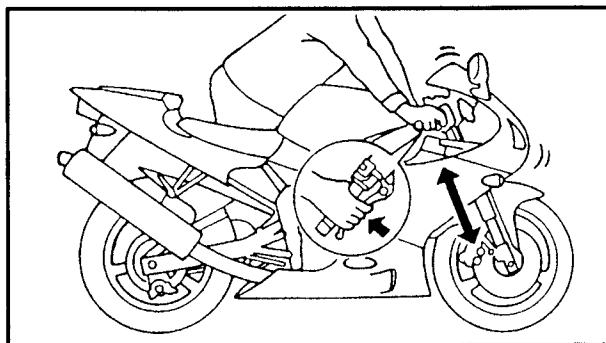
Make sure that all of the cables and wires are properly routed.



- a. Point the front wheel straight ahead.  
b. Install a plastic locking tie (1) loosely around the end of the handlebar as shown.  
c. Hook a spring gauge (2) onto the plastic locking tie.



- [illegible]



## CHECKING THE FRONT FORK

- ⚠ WARNING**

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

- 3-50

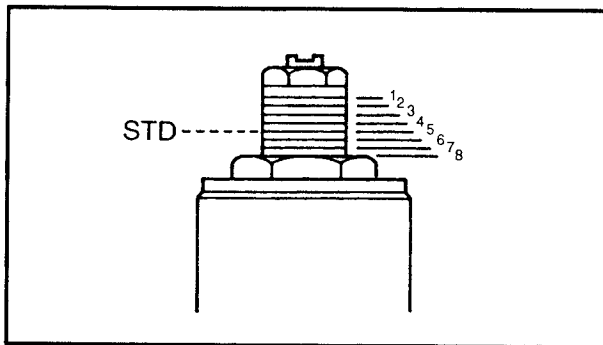
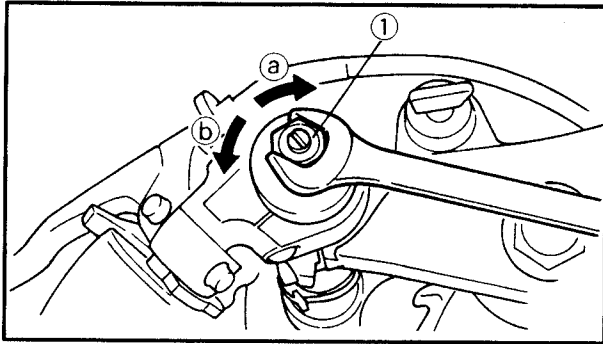
EB304153

## ADJUSTING THE FRONT FORK LEGS

The following procedure applies to both of the front fork legs.

**⚠ WARNING**

- Always adjust both front fork legs evenly. Uneven adjustment can result in poor handling and loss of stability.
- Securely support the motorcycle so that there is no danger of it falling over.



## Spring preload

**CAUTION:**

- Grooves are provided to indicate the adjustment position.
- Never go beyond the maximum or minimum adjustment positions.

1. Adjust:
  - spring preload

- a. Turn the adjusting bolt ① in direction ② or ③.

Direction (a)	Spring preload is increased (suspension is harder).
Direction (b)	Spring preload is decreased (suspension is softer).

	Hard							Standard	Soft
Adjusting position	1	2	3	4	5	6	7	8	





**Maximum: 1 clicks out\***

**NOTE:**

[illegible]

## ER304162

**⚠ WARNING**

## Spring preload

**Never go beyond the maximum or minimum adjustment positions.**

- NOTE:**

- Turn the adjusting ring ① in direction ③ or ④.
- Align the desired position on the adjusting ring with the position indicator ②.

<b>Direction (a)</b>	<b>Spring preload is increased (suspension is harder).</b>
<b>Direction (b)</b>	<b>Spring preload is decreased (suspension is softer).</b>

Minimum: 1  
Standard: 4  
Maximum: 9





**Minimum: 13 clicks out\***

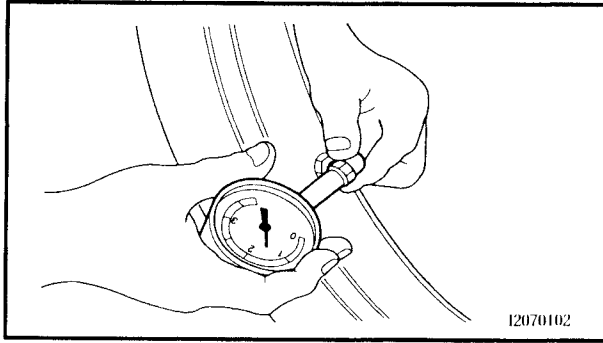
**Standard: 7 clicks out\***

**Maximum: 1 click out\***

**NOTE:**

Although the number of clicks between the minimum and maximum settings may vary with each individual shock absorber and may not exactly match these specifications, it is always the full damping force range that extends over the actual number of clicks.





EB304170

**CHECKING THE TIRES**

The following procedure applies to both of the tires.

## 1. Measure:

- tire pressure

Out of specification → Regulate.

**⚠ WARNING**

- The tire pressure should only be checked and regulated when the tire temperature equals the ambient air temperature.
- The tire pressure and the suspension must be adjusted according to the total weight (including cargo, rider, passenger and accessories) and the anticipated riding speed.
- Operation of an overloaded motorcycle could cause tire damage, an accident or an injury.

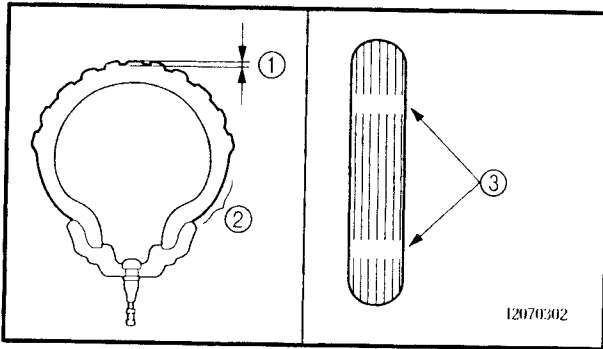
**NEVER OVERLOAD THE MOTORCYCLE.**

Basic weight (with oil and a full fuel tank)	188 kg	
Maximum load*	187 kg	
Cold tire pressure	Front	Rear
Up to 90 kg (198 lb) load*	250 kPa (2.5 kg/cm <sup>2</sup> , 36.3 psi)	250 kPa (2.5 kg/cm <sup>2</sup> , 36.3 psi)
90 kg (198 lb) ~ maximum load*	250 kPa (2.5 kg/cm <sup>2</sup> , 36.3 psi)	290 kPa (2.9 kg/cm <sup>2</sup> , 42.1 psi)
High-speed riding	250 kPa (2.5 kg/cm <sup>2</sup> , 36.3 psi)	250 kPa (2.5 kg/cm <sup>2</sup> , 36.3 psi)

\* total of cargo, rider, passenger and accessories

**⚠ WARNING**

It is dangerous to ride with a worn-out tire. When the tire tread reaches the wear limit, replace the tire immediately.



## 2. Check:

- tire surfaces

Damage/wear → Replace the tire.



**Minimum tire tread depth**  
**1.6 mm (0.06 in)**

① Tire tread depth

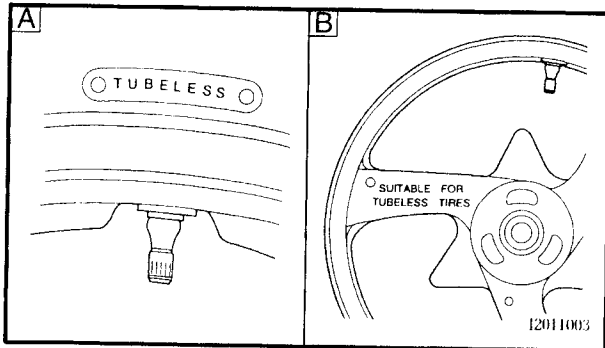
② Side wall

③ Wear indicator

## ⚠ WARNING

- Do not use a tubeless tire on a wheel designed only for tube tires to avoid tire failure and personal injury from sudden deflation.
- When using a tube tire, be sure to install the correct tube.
- Always replace a new tube tire and a new tube as a set.
- To avoid pinching the tube, make sure that the wheel rim band and tube are centered in the wheel groove.
- Patching a punctured tube is not recommended. If it is absolutely necessary to do so, use great care and replace the tube as soon as possible with a good quality replacement.

A Tire B Wheel



Tube wheel	Tube tire only
Tubeless wheel	Tube or tubeless tire

- After extensive tests, the tires listed below have been approved by Yamaha Motor Co., Ltd. for this model. The front and rear tires should always be by the same manufacturer and of the same design. No guarantee concerning handling characteristics can be given if a tire combination other than one approved by Yamaha is used on this motorcycle.

## Front tire

Manufacturer	Size	Model
BRIDGESTONE	120/60 ZR17 (55W)	BT56F•E
DUNLOP	120/60 ZR17 (55W)	D207F•J



## Rear tire

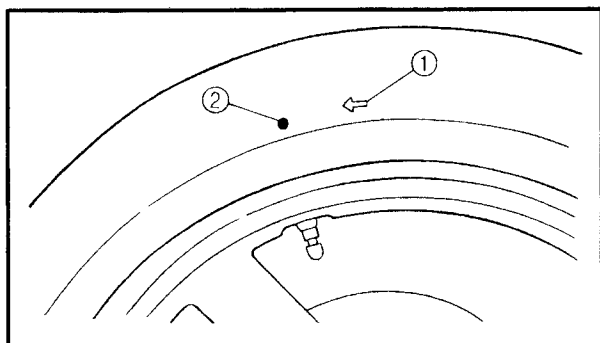
Manufacturer	Size	Model
BRIDGESTONE	180/55 ZR17 (73W)	BT56R•E
DUNLOP	180/55 ZR17 (73W)	D207•N

**⚠ WARNING**

New tires have a relatively low grip on the road surface until they have been slightly worn. Therefore, approximately 100 km could be traveled at normal speed before any highspeed riding is done.

**NOTE:**

- For tires with a direction of rotation mark ①:
- Install the tire with the mark pointing in the direction of wheel rotation.
  - Align the mark ② with the valve installation point.



EB304180

**CHECKING THE WHEELS**

The following procedure applies to both of the wheels.

1. Check:
  - wheelDamage/out-of-round → Replace.

**⚠ WARNING**

Never attempt to make any repairs to the wheel.

**NOTE:**

After a tire or wheel has been changed or replaced, always balance the wheel.



EB304200

## CHECKING AND LUBRICATING THE CABLES

The following procedure applies to all of the cable sheaths and cables.

### WARNING

Damaged cable sheaths may cause the cable to corrode and interfere with its movement. Replace damaged cable sheaths and cables as soon as possible.

1. Check:
  - cable sheath  
Damage → Replace.
2. Check:
  - cable operation  
Rough movement → Lubricate.



**Recommended lubricant**  
Engine oil or a suitable cable lubricant

### NOTE:

Hold the cable end upright and pour a few drops of lubricant into the cable sheath or use a suitable lubing device.

EB304210

## LUBRICATING THE LEVERS AND PEDALS

Lubricate the pivoting point and metal-to-metal moving parts of the levers and pedals.



**Recommended lubricant**  
Lithium soap base grease

EB304220

## LUBRICATING THE SIDESTAND

Lubricate the pivoting point and metal-to-metal moving parts of the sidestand.



**Recommended lubricant**  
Lithium soap base grease

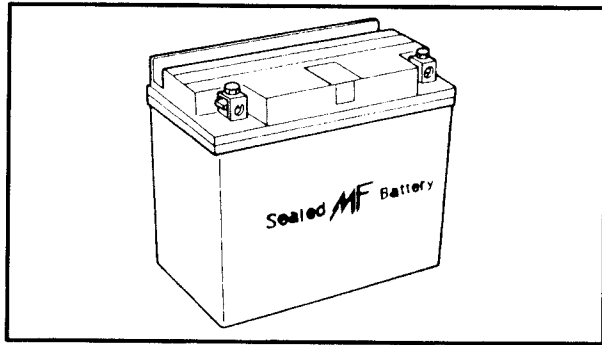
EB304240

## LUBRICATING THE REAR SUSPENSION

Lubricate the pivoting point and metal-to-metal moving parts of the rear suspension.



**Recommended lubricant**  
Lithium soap base grease



EB305020

**ELECTRICAL SYSTEM****CHECKING AND CHARGING THE BATTERY****⚠ WARNING**

Batteries generate explosive hydrogen gas and contain electrolyte which is made of poisonous and highly caustic sulfuric acid. Therefore, always follow these preventive measures:

- Wear protective eye gear when handling or working near batteries.
- Charge batteries in a well-ventilated area.
- Keep batteries away from fire, sparks or open flames (e.g., welding equipment, lighted cigarettes).
- DO NOT SMOKE when charging or handling batteries.
- KEEP BATTERIES AND ELECTROLYTE OUT OF REACH OF CHILDREN.
- Avoid bodily contact with electrolyte as it can cause severe burns or permanent eye injury.

**FIRST AID IN CASE OF BODILY CONTACT:  
EXTERNAL**

- Skin – Wash with water
- Eyes – Flush with water for 15 minutes and get immediate medical attention.

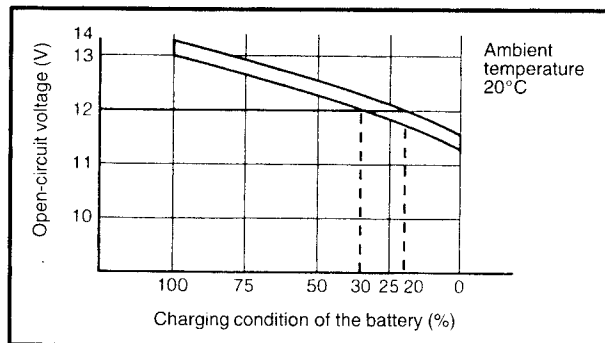
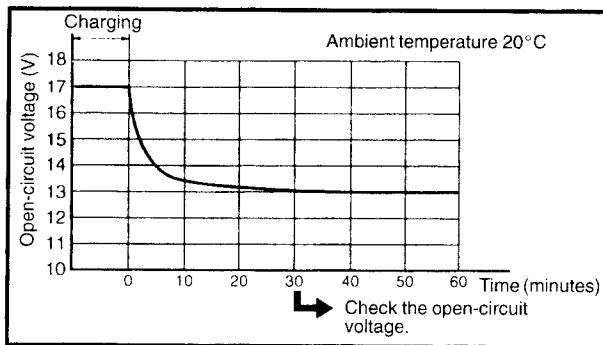
**INTERNAL**

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

**CAUTION:**

- This is a sealed battery. Never remove the sealing caps because the balance between cells will not be maintained and battery performance will deteriorate.
- Charging time, charging amperage and charging voltage for an MF battery are different from those of conventional batteries. The MF battery should be charged as explained in the charging method illustrations. If the battery is overcharged, the electrolyte level will drop considerably. Therefore, take special care when charging the battery.





## 5. Charge:

- battery

(refer to the appropriate charging method illustration)

### ⚠ WARNING

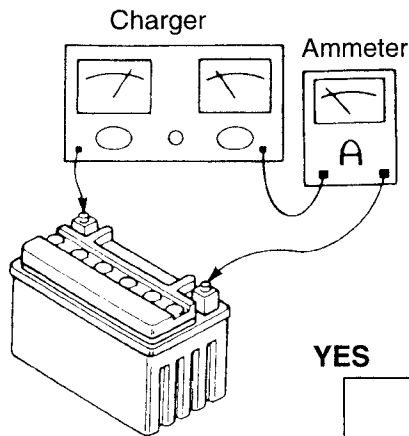
Do not quick charge a battery.

### CAUTION:

- Never remove the MF battery sealing caps.
- Do not use a high-rate battery charger since it forces a high-amperage current into the battery quickly and can cause battery overheating and battery plate damage.
- If it is impossible to regulate the charging current on the battery charger, be careful not to overcharge the battery.
- When charging a battery, be sure to remove it from the motorcycle. (If charging has to be done with the battery mounted on the motorcycle, disconnect the negative lead from the battery terminal.)
- To reduce the chance of sparks, do not plug in the battery charger until the battery charger leads are connected to the battery.
- Before removing the battery charger lead clips from the battery terminals, be sure to turn off the battery charger.
- Make sure that the battery charger lead clips are in full contact with the battery terminal and that they are not shorted. A corroded battery charger lead clip may generate heat in the contact area and a weak clip spring may cause sparks.
- If the battery becomes hot to the touch at any time during the charging process, disconnect the battery charger and let the battery cool before reconnecting it. Hot batteries can explode!
- As shown in the following illustration, the open-circuit voltage of an MF battery stabilizes about 30 minutes after charging has been completed. Therefore, wait 30 minutes after charging is completed before measuring the open-circuit voltage.



## Charging method using a variable-voltage charger



Measure the open-circuit voltage prior to charging.

Connect a charger and ammeter to the battery and start charging.

Is the amperage higher than the standard charging amperage written on the battery?

YES

NO

Adjust the voltage to obtain the standard charging amperage.

YES

Adjust the charging voltage to 20 ~ 25 V.

Monitor the amperage for 3 ~ 5 minutes. Is the standard charging amperage exceeded?

NO

Set the timer to the charging time determined by the open-circuit voltage. Refer to "CHECKING AND CHARGING THE BATTERY".

If the amperage does not exceed the standard charging amperage after 5 minutes, replace the battery.

If the required charging time exceeds 5 hours, it is advisable to check the charging amperage after 5 hours. If there is any change in the amperage, readjust the voltage to obtain the standard charging amperage.

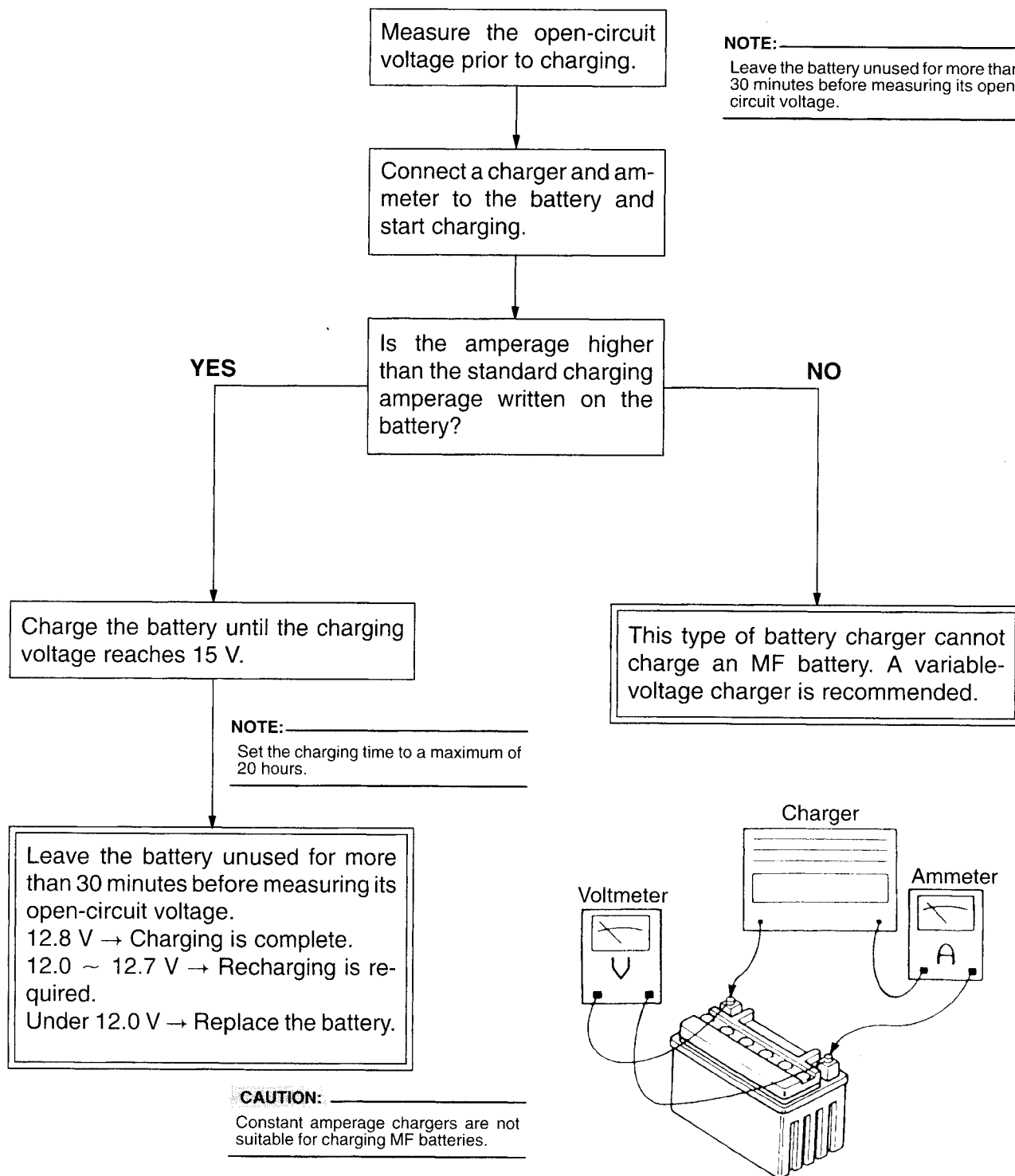
Leave the battery unused for more than 30 minutes before measuring its open-circuit voltage.  
12.8 V → Charging is complete.  
12.0 ~ 12.7 V → Recharging is required.  
Under 12.0 V → Replace the battery.

**NOTE:**  
Leave the battery unused for more than 30 minutes before measuring its open-circuit voltage.

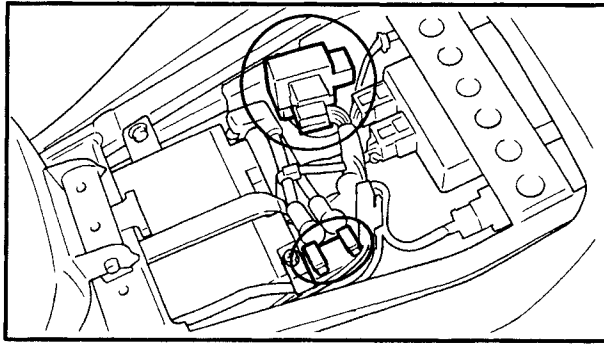
**NOTE:**  
Set the charging voltage to 16 ~ 17 V. (If the charging voltage is lower, charging will be insufficient, if it is higher, the battery will be over-charged.)



## Charging method using a constant-voltage charger







- 3. Replace:
  - blown fuse

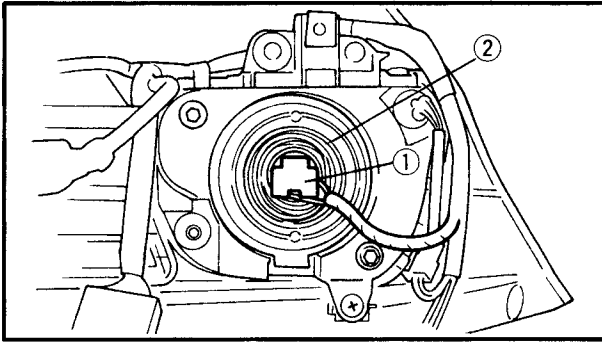
- Set the main switch to "OFF".
- Install a new fuse of the correct amperage.
- Set the main switch to "ON" and verify if the electrical circuit is operational.
- If the fuse immediately blows again, check the electrical circuit.

Item	Amperage	Q'ty
Main fuse	30 A	1
Headlight fuse	20 A	1
Signaling system fuse	20 A	1
Ignition fuse	15 A	1
Radiator fan motor fuse	7.5 A	1
Backup fuse (odometer)	7.5 A	1

**⚠ WARNING**

**Never use a fuse with an amperage other than that specified. Improvising or using a fuse with the wrong amperage rating may cause extensive damage to the electrical system, cause the lighting and ignition systems to malfunction and could possibly cause a fire.**

4. Install:
- rider seat
- Refer to "SEATS".

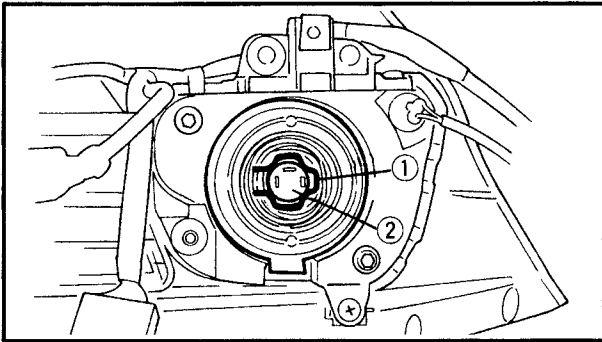


EB305051

## REPLACING THE HEADLIGHT BULBS

The following procedure applies to both of the headlight bulbs.

1. Disconnect:
  - headlight coupler ①
  - headlight bulb holder cover ②



2. Detach:
  - headlight bulb holder ①
3. Remove:
  - headlight bulb ②

### **⚠ WARNING**

Since the headlight bulb gets extremely hot, keep flammable products and your hands away from the bulb until it has cooled down.

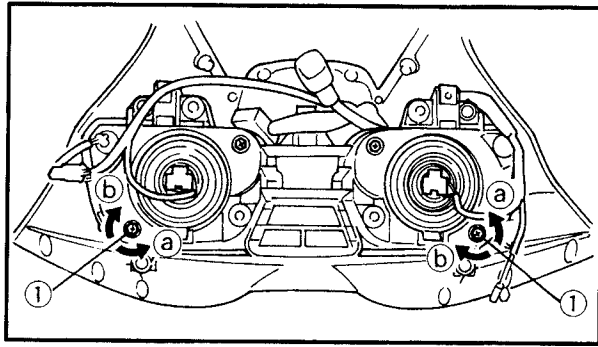
4. Install:
  - headlight bulb **New**

Secure the new headlight bulb with the headlight bulb holder.

### **CAUTION:**

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

5. Attach:
  - headlight bulb holder
6. Install:
  - headlight bulb holder cover
7. Connect:
  - headlight coupler



EB305061

## ADJUSTING THE HEADLIGHT BEAMS

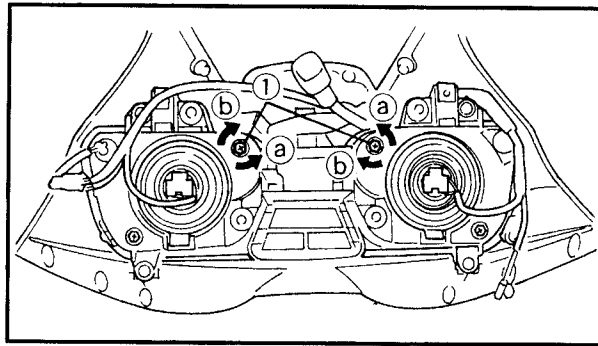
The following procedure applies to both of the headlights.

### 1. Adjust:

- headlight beam (vertically)

a. Turn the adjusting screw ① in direction ① or ②.

Direction ①	Headlight beams is raised.
Direction ②	Headlight beams is lowered.



### 2. Adjust:

- headlight beam (horizontally)

a. Turn the adjusting knob ① in direction ① or ②.

Left headlight

Direction ①	Headlight beam moves to the right.
Direction ②	Headlight beams moves to the left.

Right headlight

Direction ①	Headlight beam moves to the left.
Direction ②	Headlight beam moves to the right.



## CHAPTER 2. SPECIFICATIONS

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## SPECIFICATIONS

## GENERAL SPECIFICATIONS

Item	Standard	Limit
<b>Model code</b>	YZF-R6L: 5GV1 (U.S.A.)	...
	YZF-R6CL: 5GV2 (California)	...
	YZF-R6L: 5GV3 (Canada)	...
<b>Dimensions</b>		
Overall length	2025 mm (79.7 in)	...
Overall width	690 mm (27.2 in)	...
Overall height	1105 mm (43.5 in)	...
Seat height	820 mm (32.3 in)	...
Wheelbase	1380 mm (54.3 in)	...
	1385 mm (54.5 in) (California)	...
Minimum ground clearance	135 mm (5.3 in)	...
Minimum turning radius	3400 mm (133.9 in)	...
<b>Weight</b>		
Wet (with oil and a full fuel tank)	188 kg (415 lb)	...
	189 kg (417 lb) (California)	...
Dry (without oil and fuel)	169 kg (373 lb)	...
	170 kg (375 lb) (California)	...
Maximum load (total of cargo, rider, passenger, and accessories)	375 kg (827 lb)	...



## ENGINE SPECIFICATIONS

Item	Standard	Limit
<b>Engine</b>		
Engine type	Liquid-cooled, 4-stroke, DOHC	...
Displacement	600 cm <sup>3</sup> (36.61 cu.in)	...
Cylinder arrangement	Forward-inclined parallel 4-cylinder	...
Bore × stroke	65.5 × 44.5 mm (2.58 × 1.75 in)	...
Compression ratio	12.4 : 1	...
Engine idling speed	1,250 ~ 1,350 r/min	...
Vacuum pressure at engine idling speed	24.0 kPa (180 mmHg, 7.0866 in Hg)	...
Standard compression pressure (at sea level)	1550 kPa (15.5 kg/cm <sup>2</sup> , 224.75 psi) at 400 r/min	...
<b>Fuel</b>		
Recommended fuel	Regular gasoline	...
Fuel tank capacity		
Total (including reserve)	17 L (3.74 Imp gal, 4.49 US gal)	...
Reserve only	3.5 L (0.77 Imp gal, 0.93 US gal)	...
<b>Engine oil</b>		
Lubrication system	Wet sump	...
Recommended oil		...
<p> <b>A</b> : Yamalube 4 (10 W 30) or SAE 10 W 30 type SE motor oil (–10°C (10°F) or higher)  <b>B</b> : Yamalube 4 (20 W 40) or SAE 20 W 40 type SE motor oil (5°C (40°F) or higher)         </p>		
<b>Quantity</b>		
Total amount	3.5 L (3.08 Imp qt, 3.70 US qt)	...
Without oil filter cartridge replacement	2.5 L (2.20 Imp qt, 2.64 US qt)	...
With oil filter cartridge replacement	2.7 L (2.38 Imp qt, 2.85 US qt)	...
Oil pressure (hot)	80 kPa (0.8 kg/cm <sup>2</sup> , 11.6 psi) at 1300 r/min	...
Relief valve opening pressure	450 ~ 550 kPa (4.5 ~ 5.5 kg/cm <sup>2</sup> , 65.3 ~ 79.8 psi)	...

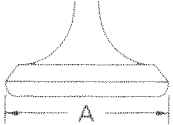

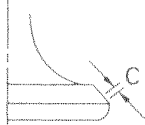

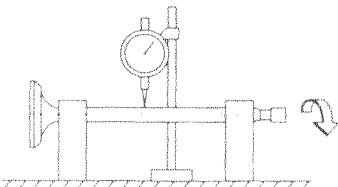


Item	Standard	Limit
<b>Oil filter</b>		
Oil filter type	Cartridge (paper)	...
Bypass valve opening pressure	80 ~ 120 kPa (0.8 ~ 1.2 kg/cm <sup>2</sup> , 11.6 ~ 17.4 psi)	...
<b>Oil pump</b>		
Oil pump type	Trochoidal	...
Inner-rotor-to-outer-rotor-tip clearance	0.03 ~ 0.09 mm (0.0012 ~ 0.0035 in)	0.15 mm (0.0059 in)
Outer-rotor-to-oil-pump-housing clearance	0.03 ~ 0.08 mm (0.0012 ~ 0.0031 in)	0.15 mm (0.0059 in)
<b>Cooling system</b>		
Radiator capacity	2.15 L (2.27 US qt)	
Radiator cap opening pressure	110 ~ 140 kPa (1.10 ~ 1.40 kg/cm <sup>2</sup> , 16.0 ~ 20.3 psi)	...
Radiator core		
Width	320 mm (12.6 in)	...
Height	258 mm (10.2 in)	...
Depth	24 mm (0.94 in)	...
Coolant reservoir		
Capacity	0.44 L (0.47 US qt)	...
Water pump		
Water pump type	Single-suction centrifugal pump	...
Reduction ratio	86/44 × 31/31 (1.955)	...
<b>Starting system type</b>	Electric starter	
<b>Spark plugs</b>		
Model (manufacturer) × quantity	CR10EK/NGK × 4	...
	CR9EK/NGK × 4 (California)	...
Spark plug gap	0.6 ~ 0.7 mm (0.02 ~ 0.03 in)	...
<b>Cylinder head</b>		
Max. warpage	...	0.05 mm (0.002 in)

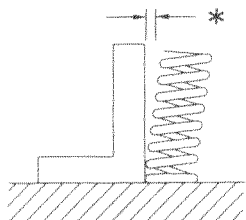


Item	Standard	Limit
<b>Camshafts</b>		
Drive system	Chain drive (right)	...
Camshaft cap inside diameter	23.000 ~ 23.021 mm (0.9055 ~ 0.9063 in)	...
Camshaft journal diameter	22.967 ~ 22.980 mm (0.9042 ~ 0.9047 in)	...
Camshaft-journal-to-camshaftcap clearance	0.020 ~ 0.054 mm (0.0008 ~ 0.0021 in)	0.08 mm (0.0031 in)
Intake camshaft lobe dimensions		
Measurement A	33.05 ~ 33.15 mm (1.3012 ~ 1.3051 in)	33.0 mm (1.3 in)
Measurement B	25.14 ~ 25.24 mm (0.9898 ~ 0.9937 in)	25.09 mm (0.99 in)
Measurement C	7.81 ~ 8.01 mm (0.3075 ~ 0.3154 in)	...
Exhaust camshaft lobe dimensions		
Measurement A	32.55 ~ 32.65 mm (1.2815 ~ 1.2854 in)	32.50 mm (1.28 in)
Measurement B	25.07 ~ 25.17 mm (0.9870 ~ 0.9909 in)	25.02 mm (0.99 in)
Measurement C	7.38 ~ 7.58 mm (0.2906 ~ 0.2984 in)	...
Max. camshaft runout	...	0.06 mm (0.0024 in)

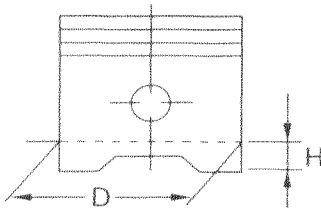





Item	Standard	Limit
<b>Timing chain</b> Model/number of links Tensioning system	RH2015/120 Automatic	... ...
<b>Valves, valve seats, valve guides</b> Valve clearance (cold) Intake Exhaust Valve dimensions	0.11 ~ 0.20 mm (0.0043 ~ 0.0079 in) 0.21 ~ 0.30 mm (0.0083 ~ 0.0118 in)	... ...
   		
Head Diameter		
Valve head diameter A		
Intake	24.9 ~ 25.1 mm (0.9803 ~ 0.9882 in)	...
Exhaust	21.9 ~ 22.1 mm (0.8622 ~ 0.8701 in)	...
Valve face width B		
Intake	1.14 ~ 1.98 mm (0.0449 ~ 0.0780 in)	...
Exhaust	1.14 ~ 1.98 mm (0.0449 ~ 0.0780 in)	...
Valve seat width C		
Intake	0.9 ~ 1.1 mm (0.0354 ~ 0.0433 in)	1.6 mm (0.06 in)
Exhaust	0.9 ~ 1.1 mm (0.0354 ~ 0.0433 in)	1.6 mm (0.06 in)
Valve margin thickness D		
Intake	0.6 ~ 0.8 mm (0.0236 ~ 0.0315 in)	0.5 mm (0.02 in)
Exhaust	0.6 ~ 0.8 mm (0.0236 ~ 0.0315 in)	0.5 mm (0.02 in)
Valve stem diameter		
Intake	3.975 ~ 3.990 mm (0.1565 ~ 0.1571 in)	3.950 mm (0.1555 in)
Exhaust	3.960 ~ 3.975 mm (0.1559 ~ 0.1565 in)	3.935 mm (0.1549 in)
Valve guide inside diameter		
Intake	4.000 ~ 4.012 mm (0.1575 ~ 0.1580 in)	4.042 mm (0.1591 in)
Exhaust	4.000 ~ 4.012 mm (0.1575 ~ 0.1580 in)	4.042 mm (0.1591 in)
Valve-stem-to-valve-guide clearance		
Intake	0.010 ~ 0.037 mm (0.0004 ~ 0.0015 in)	0.08 mm (0.0031 in)
Exhaust	0.025 ~ 0.052 mm (0.001 ~ 0.002 in)	0.1 mm (0.0039 in)
Valve stem runout	...	0.04 mm (0.0016 in)
		
Valve seat width		
Intake	0.9 ~ 1.1 mm (0.0354 ~ 0.0433 in)	1.6 mm (0.06 in)
Exhaust	0.9 ~ 1.1 mm (0.0354 ~ 0.0433 in)	1.6 mm (0.06 in)

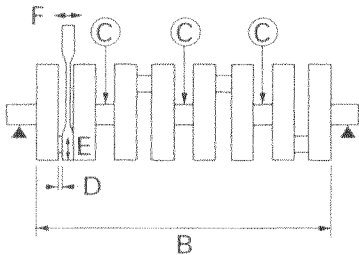


Item	Standard	Limit
Valve springs		
Free length		
Intake (inner)	37.0 mm (1.46 in)	35 mm (1.38 in)
(outer)	38.4 mm (1.51 in)	36.5 mm (1.44 in)
Exhaust	41.7 mm (1.64 in)	39.5 mm (1.56 in)
Installed length (valve closed)		
Intake (inner)	30.0 mm (1.18 in)	...
(outer)	32.5 mm (1.28 in)	...
Exhaust	36.1 mm (1.42 in)	...
Compressed spring force (installed)		
Intake (inner)	69 ~ 79 N (15.51 ~ 17.76 lb, 7.04 ~ 8.06 kg)	...
(outer)	114 ~ 132 N (25.63 ~ 29.67 lb, 11.62 ~ 13.46 kg)	...
Exhaust	160 ~ 184 N (35.97 ~ 41.36 lb, 16.32 ~ 18.76 kg)	...
Spring tilt		
		
Intake (inner)	...	2.5°/1.6 mm (0.06 in)
(outer)	...	2.5°/1.7 mm (0.07 in)
Exhaust	...	2.5°/1.8 mm (0.07 in)
Winding direction (top view)		
Intake (inner)	Counter clockwise	...
(outer)	Clockwise	...
Exhaust	Clockwise	...
<b>Cylinders</b>		
Cylinder arrangement	Forward-inclined, parallel 4-cylinder	...
Bore × stroke	65.5 × 45.5 mm (2.58 × 1.75 in)	...
Compression ratio	12.4 : 1	...
Bore	65.50 ~ 65.51 mm (2.5787 ~ 2.5791 in)	...
Max. taper	...	0.05 mm (0.002 in)
Max. out-of-round	...	0.05 mm (0.002 in)



Item	Standard	Limit
<b>Pistons</b>		
Piston-to-cylinder clearance	0.025 ~ 0.050 mm (0.001 ~ 0.002 in)	0.07 mm (0.0028 in)
Diameter D	65.460 ~ 65.475 mm (2.5772 ~ 2.5778 in)	...
		
Height H	4 mm (0.16 in)	...
Piston pin bore (in the piston)		
Diameter	16.002 ~ 16.013 mm (0.6300 ~ 0.6304 in)	...
Offset	0.5 mm (0.0197 in)	...
Offset direction	Intake side	...
Piston pins		
Outside diameter	15.991 ~ 16.000 mm (0.6296 ~ 0.6299 in)	...
Piston-pin-to-piston-pin-bore clearance	0.002 ~ 0.022 mm (0.00008 ~ 0.0009 in)	0.072 mm (0.0028 in)
Piston rings		
Top ring		
		
Ring type	Barrel	...
Dimensions (B × T)	0.80 × 2.45 mm (0.03 × 0.10 in)	...
End gap (installed)	0.15 ~ 0.25 mm (0.006 ~ 0.009 in)	0.50 mm (0.02 in)
Ring side clearance		0.115 mm (0.05 in)
2nd ring	0.030 ~ 0.065 mm (0.0012 ~ 0.0026 in)	
		
Ring type	Taper	...
Dimensions (B × T)	0.8 × 2.5 mm (0.03 × 0.10 in)	...
End gap (installed)	0.40 ~ 0.50 mm (0.016 ~ 0.020 in)	0.85 mm (0.033 in)
Ring side clearance		0.115 mm (0.05 in)
Oil ring	0.020 ~ 0.055 mm (0.0008 ~ 0.0022 in)	
		
Dimensions (B × T)	1.5 × 2.3 mm (0.06 × 0.09 in)	...
End gap (installed)	0.10 ~ 0.35 mm (0.004 ~ 0.014 in)	...



Item	Standard	Limit
<b>Connecting rods</b>		
Crankshaft-pin-to-big-end-bearing clearance	0.028 ~ 0.052 mm (0.0011 ~ 0.0020 in)	...
Bearing color code	1 = Blue 2 = Black 3 = Brown 4 = Green	...
<b>Crankshaft</b>		
 <p>Width B Max. runout C</p> <p>Big end side clearance D Crankshaft-journal-to-crankshaft-journal-bearing clearance Bearing color code</p>	<p>268.8 ~ 270.0 mm (10.58 ~ 10.63 in)</p> <p>0.160 ~ 0.262 mm (0.0063 ~ 0.0103 in) 0.034 ~ 0.058 mm (0.0013 ~ 0.0023 in)</p> <p>0 = White 1 = Blue 2 = Black 3 = Brown 4 = Green</p>	<p>...</p> <p>0.03 mm (0.0012 in)</p> <p>...</p> <p>...</p>
<b>Clutch</b>		
Clutch type	Wet, multiple disc	...
Clutch release method	Rack and pinion (pull rod type)	...
Clutch release method operation	Cable operation	...
Operation	Left hand operation	...
Clutch cable free play (at the end of the clutch lever)	10 ~ 15 mm (0.39 ~ 0.59 in)	...
Friction plates		
Thickness	2.9 ~ 3.1 mm (0.11 ~ 0.12 in)	2.8 mm (0.1102 in)
Plate quantity	8	...
Clutch plates		
Thickness	1.9 ~ 2.1 mm (0.07 ~ 0.08 in)	...
Plate quantity	7	...
Max. warpage	...	0.1 mm (0.0039 in)
Clutch plate		
Thickness	2.2 ~ 2.4 mm (0.087 ~ 0.094 in)	
Plate quantity	1	
Max. warpage	...	0.1 mm (0.0039 in)
Clutch springs		
Free length	55 mm (2.17 in)	54 mm (2.13 in)
Spring quantity	6	...



Item	Standard	Limit
<b>Transmission</b>		
Transmission type	Constant mesh, 6-speed	...
Primary reduction system	Spur gear	...
Primary reduction ratio	86/44 (1.9545)	...
Secondary reduction system	Chain drive	...
Secondary reduction ratio	48/16 (3.000)	...
Operation	Left-foot operation	...
Gear ratios		
1st gear	37/13 (2.846)	...
2nd gear	37/19 (1.947)	...
3rd gear	28/18 (1.555)	...
4th gear	32/24 (1.333)	...
5th gear	25/21 (1.190)	...
6th gear	26/24 (1.083)	...
Max. main axle runout	...	0.02 mm (0.0008 in)
Max. drive axle runout	...	0.02 mm (0.0008 in)
<b>Shifting mechanism</b>		
Shift mechanism type	Cam drum	...
Max. shift fork guide bar bending	...	0.05 mm (0.002 in)
installed shift rod length	242 mm (9.52 in)	...
<b>Air filter type</b>		
	Wet element	...
<b>Fuel pump</b>		
Pump type	Electrical	...
Model (manufacturer)	5EB (MITSUBISHI)	...
Output pressure	15 ~ 20 kPa (0.15 ~ 0.2 kg/cm <sup>2</sup> , 2.2 ~ 2.9 psi)	...
<b>Carburetors</b>		
Model (manufacturer) × quantity	CVRD37 (KEIHIN) × 4	...
Throttle cable free play (at the flange of the throttle grip)	6 ~ 8 mm (0.24 ~ 0.31 in)	...
ID mark	5GV101, 5GV210 (California)	...
Main jet	Carburetors 1 and 4: #152, #148 (California) Carburetors 2 and 3: #148	...
Main air jet	#110	...
Jet needle	Carburetors 1 and 4: N7SB Carburetors 2 and 3: N7SA	...
Needle jet	2.6	...
Pilot air jet	Carburetors 1 and 4: #105 Carburetors 2 and 3: #110	...
Pilot outlet	0.9	...
Pilot jet	#38, #35 (California)	...
Bypass 1	0.8	...
Bypass 2	0.8	...
Bypass 3	0.8	...
Valve seat size	1.2	...





Item	Standard	Limit
Starter jet 1	#50	...
Starter jet 2	0.6	...
Butterfly valve size	#110	...
Fuel level (below the line on the float chamber)	17.5 ~ 18.5 mm (0.69 ~ 0.73 in)	...



## CHASSIS SPECIFICATIONS

Item	Standard	Limit
<b>Frame</b>		
Frame type	Diamond	...
Caster angle	24°	...
Trail	81 mm (3.19 in)	...
<b>Front wheel</b>		
Wheel type	Cast wheel	...
Rim		
Size	17 × MT3.50	...
Material	Aluminum	...
Wheel travel	130 mm (5.12 in)	...
Wheel runout		
Max. radial wheel runout	...	1 mm (0.04 in)
Max. lateral wheel runout	...	0.5 mm (0.02 in)
<b>Rear wheel</b>		
Wheel type	Cast wheel	...
Rim		
Size	17 × MT5.50	...
Material	Aluminum	...
Wheel travel	120 mm (4.72 in)	...
Wheel runout		
Max. radial wheel runout	...	1 mm (0.04 in)
Max. lateral wheel runout	...	0.5 mm (0.02 in)
<b>Front tire</b>		
Tire type	Tubeless	...
Size	120/60ZR17 (55W)	...
Model (manufacturer)	BRIDGESTON BT56FE DUNLOP D207F-J	...
Tire pressure (cold)		
0 ~ 90 kg (0 ~ 198 lb)	250 kPa (2.5 kg/cm <sup>2</sup> , 36.3 psi)	...
90 ~ 187 kg (198 ~ 412 lb)	250 kPa (2.5 kg/cm <sup>2</sup> , 36.3 psi)	...
High-speed riding	250 kPa (2.5 kg/cm <sup>2</sup> , 36.3 psi)	...
Min. tire tread depth	...	1.6 mm. (0.06 in)



Item	Standard	Limit
<b>Rear tire</b>		
Tire type	Tubeless	...
Size	180/55 ZR17 (73 W)	...
Model (manufacturer)	BRIDGESTON BT56R-E DUNLOP D207-N	...
Tire pressure (cold)		
0 ~ 90 kg (0 ~ 198 lb)	250 kPa (2.5 kg/cm <sup>2</sup> , 36.3 psi)	...
90 ~ 187 kg (198 ~ 412 lb)	290 kPa (2.9 kg/cm <sup>2</sup> , 42.1 psi)	...
High-speed riding	250 kPa (2.5 kg/cm <sup>2</sup> , 36.3 psi)	...
Min. tire tread depth	...	1.6 mm (0.06 in)
<b>Front brakes</b>		
Brake type	Dual-disc brake	...
Operation	Right-hand operation	...
Recommended fluid	DOT 4	...
Brake discs		
Diameter × thickness	298 × 5 mm (11.73 × 0.20 in)	...
Min. thickness	...	4.5 mm (0.18 in)
Max. deflection	...	0.1 mm (0.0039 in)
Brake pad lining thickness	5.5 mm (0.22 in)	0.5 mm (0.02 in)
		
Master cylinder inside diameter	14 mm (0.55 in)	...
Caliper cylinder inside diameter	30.2 mm (1.19 in) and 27 mm (1.06 in)	...
<b>Rear brake</b>		
Brake type	Single-disc brake	...
Operation	Right-foot operation	...
Brake pedal position (from the top of the brake pedal to the bottom of the rider footrest bracket bolt center.)	4.3 ~ 9.3 mm (0.17 ~ 0.37 in)	...
Recommended fluid	DOT 4	...
Brake discs		
Diameter × thickness	220 × 5 mm (8.66 × 0.20 in)	...
Min. thickness	...	4.5 mm (0.18 in)
Max. deflection	...	0.1 mm (0.0039 in)
Brake pad lining thickness	5 mm (0.2 in)	0.8 mm (0.03 in)
		
Master cylinder inside diameter	12.7 mm (0.5 in)	...
Caliper cylinder inside diameter	27.0 mm (1.06 in) and 22.2 mm (0.87 in)	...



Item	Standard	Limit
<b>Front suspension</b>		
Suspension type	Telescopic fork	...
Front fork type	Coil spring/oil damper	...
Front fork travel	130 mm (5.12 in)	...
Spring		
Free length	251.8 mm (9.91 in)	246 mm (9.69 in)
Spacer length	125 mm (4.92 in)	...
Installed length	247.8 mm (9.76 in)	...
Spring rate (K1)	7.5 N/mm (0.75 kg/mm, 42.83 lb/in)	
Spring stroke (K1)	0 ~ 130 mm (0.00 ~ 5.12 in)	...
Optional spring available	No	...
Fork oil		
Recommended oil	Suspension oil "01" or equivalent	...
Quantity (each front fork leg)	476 cm <sup>3</sup> (16.09356 US oz)	...
Level (from the top of the innertube, with the inner tube fully compressed, and without the fork spring)	107 mm (4.21 in)	...
Damper adjusting rod locknut distance	25 mm (0.98 in)	...
Spring preload adjusting positions		
Minimum	8	...
Standard	7.5	...
Maximum	1	...
Rebound damping adjusting positions		
Minimum*	9	...
Standard*	6	...
Maximum*	1	...
Compression damping adjusting positions		
Minimum*	10	...
Standard*	6	...
Maximum*	1	...
*from the fully turned-in position		



Item	Standard	Limit
<b>Steering</b>		
Steering bearing type	Angular ball bearings	...
<b>Rear suspension</b>		
Suspension type	Swingarm (link suspension)	...
Rear shock absorber assemblytype	Coil spring/gas-oil damper	...
Rear shock absorber assemblytravel	60 mm (2.36 in)	...
Spring		
Free length		
Installed length	169.5 mm (6.67 in)	...
Spring rate (K1)	159 mm (6.26 in)	...
Spring stroke (K1)	95.1 N/mm (9.51 kg/mm, 543.02 lb/in)	...
Optional spring available	0 ~ 60 mm (0.00 ~ 2.36 in)	...
Standard spring preload gas/air pressure	No	...
	1,200 kPa (12 kg/cm <sup>2</sup> , 174 psi)	...
Spring preload adjusting positions		
Minimum	1	...
Standard	4	...
Maximum	9	...
Rebound damping adjusting positions		
Minimum*	25	...
Standard*	9	...
Maximum*	1	...
Compression damping adjusting positions		
Minimum*	13	...
Standard*	7	...
Maximum*	1	...
*from the fully turned-in position		
<b>Swingarm</b>		
Free play (at the end of the swingarm)		
Radial	...	1 mm (0.04 in)
Axial	...	1 mm (0.04 in)
<b>Drive chain</b>		
Model (manufacturer)	532ZLV KAI (DID)	...
Link quantity	116	...
Drive chain slack	40 ~ 50 mm (1.57 ~ 1.97 in)	...
Maximum ten-link section	149 mm (5.87 in)	...



## ELECTRICAL SPECIFICATIONS

Item	Standard	Limit
<b>System voltage</b>	12 V	...
<b>Ignition system</b>		
Ignition system type	C.D.I.	...
Ignition timing	10° BTDC at 1300 r/min	...
	5° BTDC at 1300 r/min (California)	...
Advanced timing	55° BTDC at 5250 r/min	...
Advancer type	Throttle position sensor and electrical	...
Pickup coil resistance/color	248 ~ 372 Ω/Gy-B	...
Transistorized coil ignition unit model (manufacturer)	F8T362 (MITSUBISHI)	...
<b>Ignition coils</b>		
Model (manufacturer)	F6T549 (MITSUBISHI)	...
Minimum ignition spark gap	6 mm (0.24 in)	...
Primary coil resistance	0.204 ~ 0.276 Ω	...
Secondary coil resistance	8.5 ~ 11.5 kΩ	...
<b>Throttle position sensor standard resistance</b>	4 ~ 6 kΩ	...
<b>Charging system</b>		
System type	AC magneto	...
Model (manufacturer)	F4T366 (MITSUBISHI)	...
Nominal output	14 V/320W at 5,000 r/min	...
Stator coil resistance	0.27 ~ 0.33 Ω at 20°C (68°F)	...
<b>Voltage regulator</b>		
Regulator type	Semiconductor, short circuit type	...
Model (manufacturer)	SH650A-12 (SHINDENGEN)	...
No-load regulated voltage	14.1 ~ 14.9 V	...
<b>Rectifier</b>		
Model	SH650A-12	...
Rectifier capacity	18 A	...
Withstand voltage	200 V	...
<b>Battery</b>		
Battery type	GT12B-4	...
Battery voltage/capacity	12 V/10 AH	...
<b>Headlight type</b>	Halogen bulb	
<b>Indicator light type × quantity</b>	LED × 6	
<b>Bulbs (voltage/wattage × quantity)</b>		
Headlight	12 V 60 W/55 W × 2	...
Tail/brake light	12 V 21 W/5 W × 2	...
Turn signal/position light	12 V 27 W/8 W × 2 (front)	...
	12 V 27 W × 2 (rear)	...



Item	Standard	Limit
Meter light	12 V 1.4 W × 2	...
<b>Electric starting system</b>		
System type	Constant mesh	...
Starter motor		
Model (manufacturer)	SM-14 (MITSUBA)	...
Power output	0.6 kW	...
Brushes		
Overall length	10 mm (0.39 in)	3.5 mm (0.14 in)
Spring force	7.16 ~ 9.52 N (730 ~ 970 g, 25.77 ~ 34.27 oz)	...
Commutator resistance	0.012 ~ 0.022 Ω	...
Commutator diameter	28 mm (1.1 in)	27 mm (1.06 in)
Mica undercut	0.7 mm (0.03 in)	...
<b>Starter relay</b>		
Model (manufacturer)	MS5F-631 (JIDECO)	...
Amperage	180 A	...
Coil resistance	4.18 ~ 4.62 Ω	...
<b>Horn</b>		
Horn type	Plain	...
Model (manufacturer) × quantity	YF-12 (NIKKO) × 1	...
Max. amperage	3 A	...
<b>Flasher relay</b>		
Relay type	Full-transistor	...
Model (manufacturer)	FE246BH (DENSO)	...
Self-cancelling device built-in	No	...
Turn signal blinking frequency	75 ~ 95 cycles/min.	...
Wattage	27 W × 2 + 3.4 W	...
<b>Oil level switch model (manufacturer)</b>	5EB (DENSO)	...
<b>Fuel sender</b>		
Model (manufacturer)	1UF (NIPPON SEIKI)	...
Resistance	0.7 ~ 1.1 kΩ GW-B	...
<b>Sidestand relay</b>		
Model	G8R-30Y-K	...
Coil resistance	162 ~ 198 Ω	...
<b>Fuel pump maximum amperage</b>	1 A	...
<b>Fuel pump relay model (manufacturer)</b>	G8R-30Y-K (OMRON)	...
<b>Resistance</b>	162 ~ 198 Ω	
<b>Radiator fan model (manufacturer)</b>	4XV (TOYO RADIATOR)	...
<b>Thermo switch model (manufacturer)</b>	5EB (NIPPON THERMOSTAT)	...
<b>Headlight relay (manufacturer)</b>	ACA12115 (MATSUSHITA)	...
<b>Resistance</b>	72 ~ 88 Ω	



Item	Standard	Limit
<b>Temperature sender</b>		
Model (manufacturer)	11H (NIPPON SEIKI)	...
Resistance	50.6 ~ 64.2 $\Omega$ at 80°C (176°F) 16.1 ~ 17.3 $\Omega$ at 120°C (248°F)	...
<b>Fuses (amperage × quantity)</b>		
Main fuse	30 A × 1	...
Headlight fuse	20 A × 1	...
Signaling system fuse	20 A × 1	...
Ignition fuse	15 A × 1	...
Radiator fan fuse	7.5 A × 1	...
Backup fuse (odometer)	7.5 A × 1	...



EB201000

EB202001

## CONVERSION TABLE

All specification data in this manual are listed in SI and METRIC UNITS.

Use this table to convert METRIC unit data to IMPERIAL unit data.

Ex.

METRIC	MULTIPLIER	IMPERIAL
**mm	× 0.03937	= **in
2 mm	× 0.03937	= 0.08 in

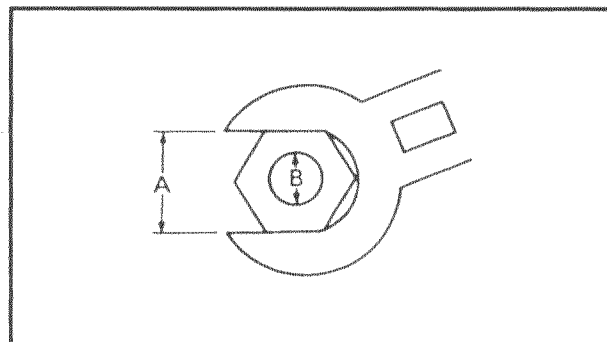
## CONVERSION TABLE

METRIC TO IMPERIAL			
	Metric unit	Multiplier	Imperial unit
Tightening torque	m•kg	7.233	ft•lb
	m•kg	86.794	in•lb
	cm•kg	0.0723	ft•lb
	cm•kg	0.8679	in•lb
Weight	kg	2.205	lb
	g	0.03527	oz
Speed	km/hr	0.6214	mph
Distance	km	0.6214	mi
	m	3.281	ft
	m	1.094	yd
	cm	0.3937	in
	mm	0.03937	in
Volume/ Capacity	cc (cm <sup>3</sup> )	0.03527	oz (IMP liq.)
	cc (cm <sup>3</sup> )	0.06102	cu•in
	lt (liter)	0.8799	qt (IMP liq.)
	lt (liter)	0.2199	gal (IMP liq.)
Misc.	kg/mm	55.997	lb/in
	kg/cm <sup>2</sup>	14.2234	psi (lb/in <sup>2</sup> )
	Centigrade (°C)	9/5 + 32	Fahrenheit (°F)

## TIGHTENING TORQUES

### GENERAL TIGHTENING TORQUES

This chart specifies tightening torques for standard fasteners with a standard ISO thread pitch. Tightening torque specifications for special components or assemblies are provided for each chapter of this manual. To avoid warpage, tighten multi-fastener assemblies in a crisscross pattern and progressive stages until the specified tightening torque is reached. Unless otherwise specified, tightening torque specifications require clean, dry threads. Components should be at room temperature.



A: Width across flats

B: Thread diameter

A (nut)	B (bolt)	General tightening torques		
		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
18 mm	12 mm	55	5.5	40
19 mm	14 mm	85	8.5	61
22 mm	16 mm	130	13.0	94



## ENGINE TIGHTENING TORQUES

Item	Fastener	Thread size	Q'ty	Tightening torque			Remarks
				Nm	m•kg	ft•lb	
Spark plugs	—	M10	4	13	1.3	9.4	
Cylinder head	Bolt	M10	10	51	5.1	37	
Cylinder head	Bolt	M6	2	10	1.0	7.2	
Camshaft caps	Bolt	M6	20	10	1.0	7.2	
Cylinder head cover	Bolt	M6	6	10	1.0	7.2	
Oil passage check bolt	Bolt	M8	1	20	2.0	14	
Cylinder head (exhaust pipe)	Stud bolt	M8	8	15	1.5	11	
Connecting rod caps	Nut	M7		See NOTE			
Generator rotor	Bolt	M12	1	65	6.5	47	
Pickup rotor	Bolt	M8	1	35	3.5	25	
Cap bolt (timing chain tensioner)	Bolt	M6	1	10	1.0	7.2	
Timing chain tensioner bolt	Bolt	M6	2	12	1.2	8.7	
Camshaft sprocket	Bolt	M7	4	24	2.4	17	
Oil pump	Bolt	M6	3	12	1.2	8.7	
Oil cooler	Bolt	M20	1	63	6.3	46	
Engine oil drain bolt	—	M14	1	43	4.3	31	
Oil pump assembly driven sprocket cover	Bolt	M6	2	10	1.0	7.2	
Oil pipe	Bolt	M6	2	15	1.5	11	
Oil filter bolt	Bolt	M20	1	80	8.0	58	
Oil filter cartridge	—	M20	1	17	1.7	12	
Exhaust pipes	Nut	M8	8	20	2.0	14	
Muffler clamp	Bolt	M8	1	20	2.0	14	
Exhaust pipe emission check bolts	Bolt	M6	4	10	1.0	7.2	
Exhaust pipe bracket	Bolt	M8	1	20	2.0	14	
Crankcase	Bolt	M6	2	14	1.4	10	
Crankcase	Bolt	M6	12	12	1.2	8.7	
Crankcase	Bolt	M8	12	24	2.4	17	
Generator rotor cover	Bolt	M6	9	12	1.2	8.7	
Drive sprocket cover	Bolt	M6	5	10	1.0	7.2	

## NOTE:

After tightening to 15 Nm (1.5 m•kg, 11 ft•lb), tighten another 90°

# TIGHTENING TORQUES

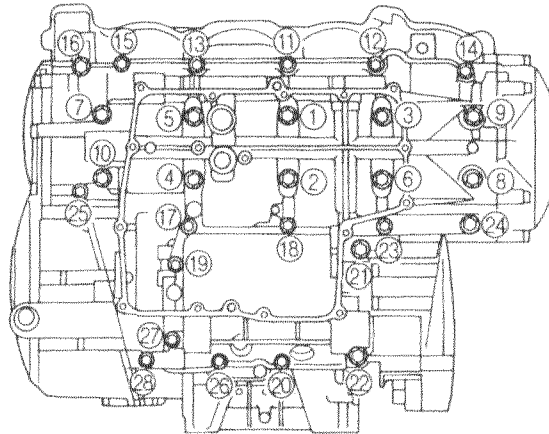
SPEC



Item	Fastener	Thread size	Q'ty	Tightening torque			Remarks
				Nm	m•kg	ft•lb	
Clutch cover	Bolt	M6	10	12	1.2	8.7	 Use a lock washer.
Pickup coil rotor cover	Bolt	M6	5	12	1.2	8.7	
Shift shaft cover	Bolt	M6	6	12	1.2	8.7	
Breather plate 2	—	M6	3	12	1.2	8.7	
Starter clutch	Bolt	M8	3	32	3.2	23	
Clutch boss	Nut	M20	1	70	7.0	51	
Clutch springs	Bolt	M6	6	8	0.8	5.8	 Use a lock washer.
Drive sprocket	Nut	M18	1	70	7.0	51	
Main axle bearing housing	Screw	M6	3	12	1.2	8.7	  
Shift bar stopper	Bolt	M6	2	10	1.0	7.2	
Shift shaft spring stopper	Bolt	M8	1	22	2.2	16	
Shift rod locknut	Nut	M6	1	7	0.7	5.1	
		M8	1	10	1.0	7.2	
Oil level switch	Bolt	M6	2	10	1.0	7.2	
Shift arm	Bolt	M6	1	10	1.0	7.2	
Stator coil	Bolt	M6	3	10	1.0	7.2	
Ignitor unit	Bolt	M6	1	10	1.0	7.2	
Neutral switch	Screw	M6	2	4.0	0.4	2.9	
Pickup coil	Bolt	M5	2	10	1.0	7.2	
Thermo unit	—	PT1/8	1	15	1.5	11	
Thermo switch	—	M18 × 1.5	1	28	2.8	20	



Crankcase tightening sequence:





## CHASSIS TIGHTENING TORQUES

Item	Thread size	Tightening torque			Remarks
		Nm	m•kg	ft•lb	
Upper bracket pinch bolts	M8	26	2.6	19	See NOTE.
Steering stem nut	M28	115	11.5	83	
Handlebar pinch bolts	M8	33	3.3	24	
Lower ring nut	M30	9	0.9	6.5	
Lower bracket pinch bolts	M8	23	2.3	17	
Brake fluid reservoir cap stopper	M4	12	1.2	8.7	
Front brake hose union bolts	M10	30	3.0	22	
Front brake master cylinder	M6	13	1.3	9.4	
Engine mounting					
Front mounting bolts	M12	55	5.5	40	
	M12	55	5.5	40	
Rear mounting bolts	M10	45	4.5	33	
Pinch bolts	M8	24	2.4	17	
	M6	13	1.3	9.4	
Button head bolt	M10	39	3.9	28	
Exhaust pipe bracket	M8	20	2.0	14	
Pivot shaft nut	M18	95	9.5	69	
Connecting arms	M10	40	4.0	29	
Relay arm and connecting arms	M10	40	4.0	29	
Relay arm	M10	40	4.0	29	
Rear shock absorber and relay arm	M10	55	5.5	40	
Fuel cock	M6	7	0.7	5.1	
Fuel sender and fuel tank	M6	7	0.7	5.1	
Coolant reservoir and radiator	M6	5	0.5	3.6	
Rider footrest bracket	M8	28	2.8	20	
Passenger footrest bracket	M8	28	2.8	20	
Rear master cylinder	M8	23	2.3	17	
Rear brake hose union bolts	M10	30	3.0	22	
Sidestand	M10	60	6.0	43	
Front wheel axle	M18	72	7.2	52	
Rear wheel axle nut	M24	150	15.0	108	
Front brake caliper and front fork	M10	40	4.0	29	
Rear brake caliper and bracket	M10	27	2.7	20	
Brake disc and wheel	M6	18	1.8	13	
Rear wheel sprocket and rear wheel drive hub	M10	69	6.9	50	
Brake caliper and bleed screw	M8	6	0.6	4.3	
Pinch bolt (front wheel axle)	M8	23	2.3	17	

## NOTE:

1. First, tighten the ring nut to approximately 17 Nm (1.7 m•kg, 12 ft•lb) with a torque wrench, then loosen the ring nut completely.
2. Retighten the ring nut to specification.



EB202000

# LUBRICATION POINTS AND LUBRICANT TYPES

## ENGINE LUBRICATION POINTS AND LUBRICANT TYPES

Lubrication point	Lubricant
Oil seal lips	
O-rings	
Bearings	
Crankshaft pins	
Piston surfaces	
Piston pins	
Connecting rod bolts and nuts	
Crankshaft journals	
Camshaft lobes	
Camshaft journals	
Valve stems (intake and exhaust)	
Valve stem ends (intake and exhaust)	
Water pump impeller shaft	
Oil pump rotors (inner and outer)	
Oil pump housing	
Oil strainer	
Starter clutch idle gear inner surface	
Starter clutch assembly	
Primary driven gear	
Transmission gears (wheel and pinion)	
Main axle and drive axle	
Shift drum	
Shift forks and shift fork guide bars	
Shift shaft	
Shift shaft boss	
Engine mounting bolts (rear)	
Cylinder head cover mating surface	Yamaha bond No.1215
Crankcase mating surface	Yamaha bond No.1215
Clutch cover (crankcase mating surface)	Yamaha bond No.1215
Generator rotor cover (crankcase mating surface)	Yamaha bond No.1215
Cylinder head cover	Yamaha bond No.1215



EB202010

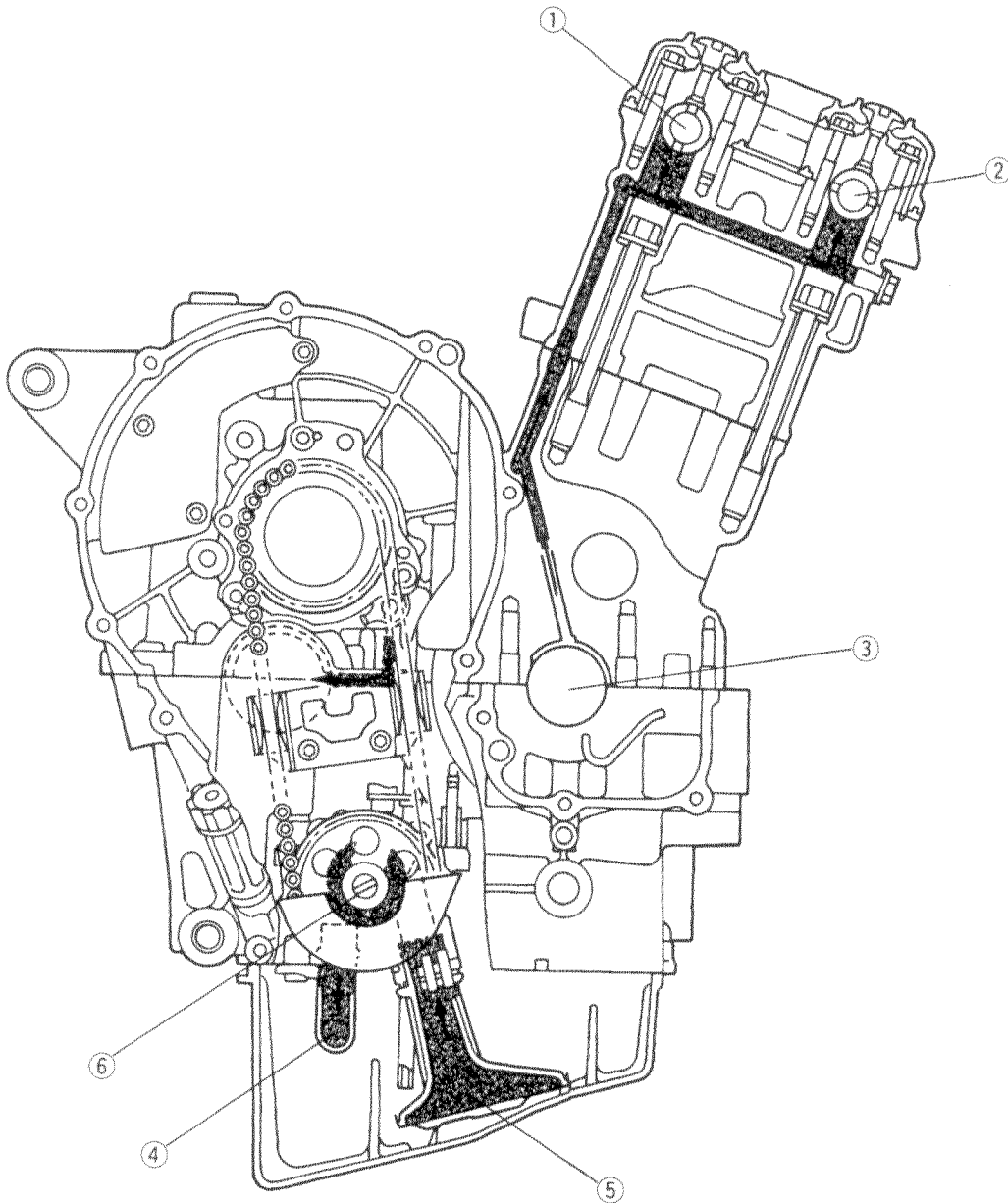
## CHASSIS LUBRICATION POINTS AND LUBRICANT TYPES

Lubrication	Lubricant
Steering bearings and bearing races (upper and lower)	
Front wheel oil seal (right and left)	
Rear wheel oil seal	
Rear wheel drive hub oil seal	
Rear wheel drive hub mating surface	
Rear brake pedal	
Sidestand pivoting point and metal-to-metal moving parts	
Throttle grip inner surface	
Brake lever pivoting point and metal-to-metal moving parts	
Clutch lever pivoting point and metal-to-metal moving parts	
Rear shock absorber assembly oil seal	
Rear shock absorber assembly bearing	
Rear shock absorber assembly spacer	
Pivot shaft	
Connecting arm bearing (left and right)	
Spacer (relay arm and connecting arm)	
Oil seal (relay arm and connecting arm)	



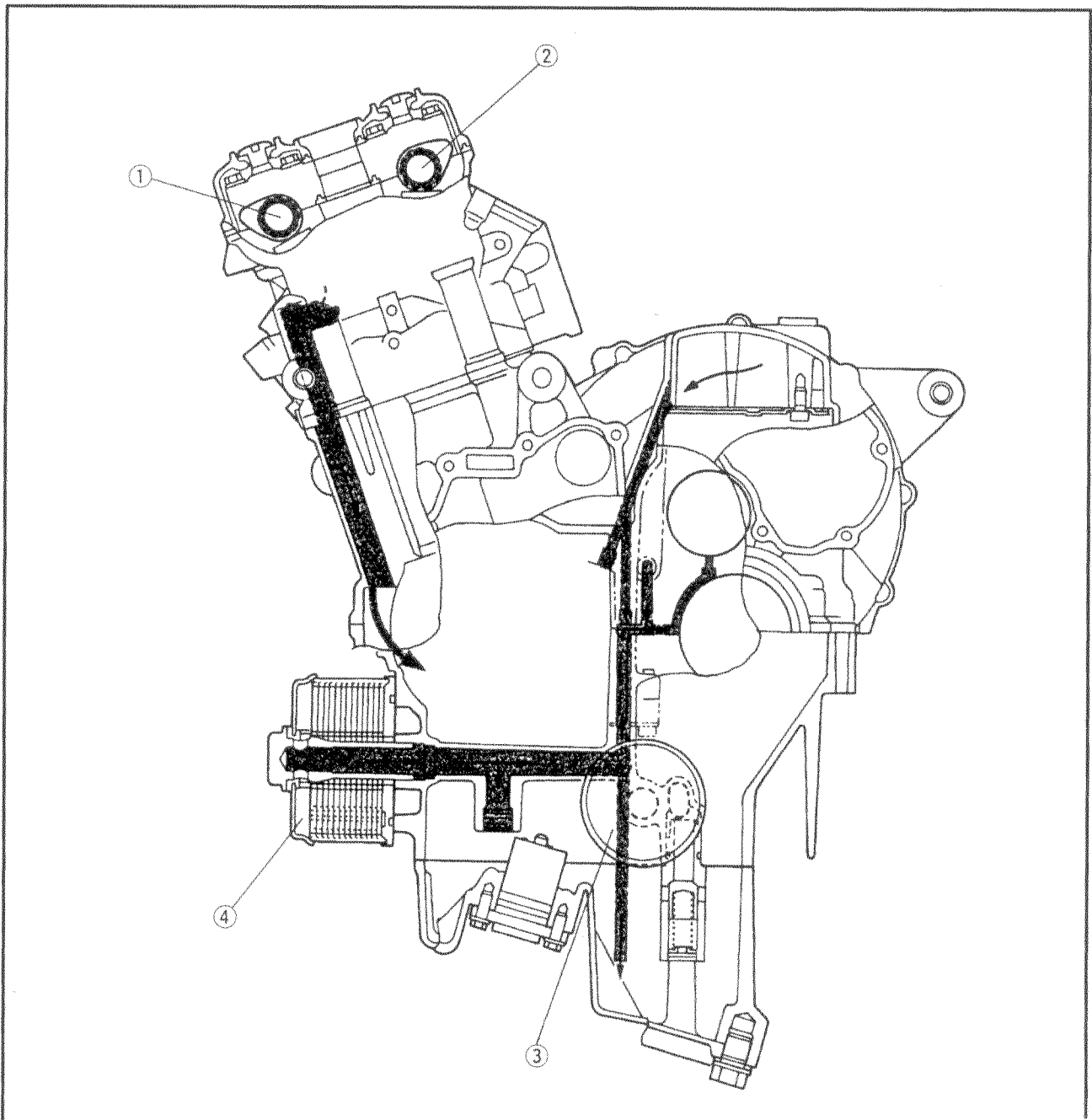
## OIL FLOW DIAGRAMS

- ① Intake camshaft
- ② Exhaust camshaft
- ③ Crankshaft
- ④ Oil pipe
- ⑤ Oil strainer
- ⑥ Oil pump



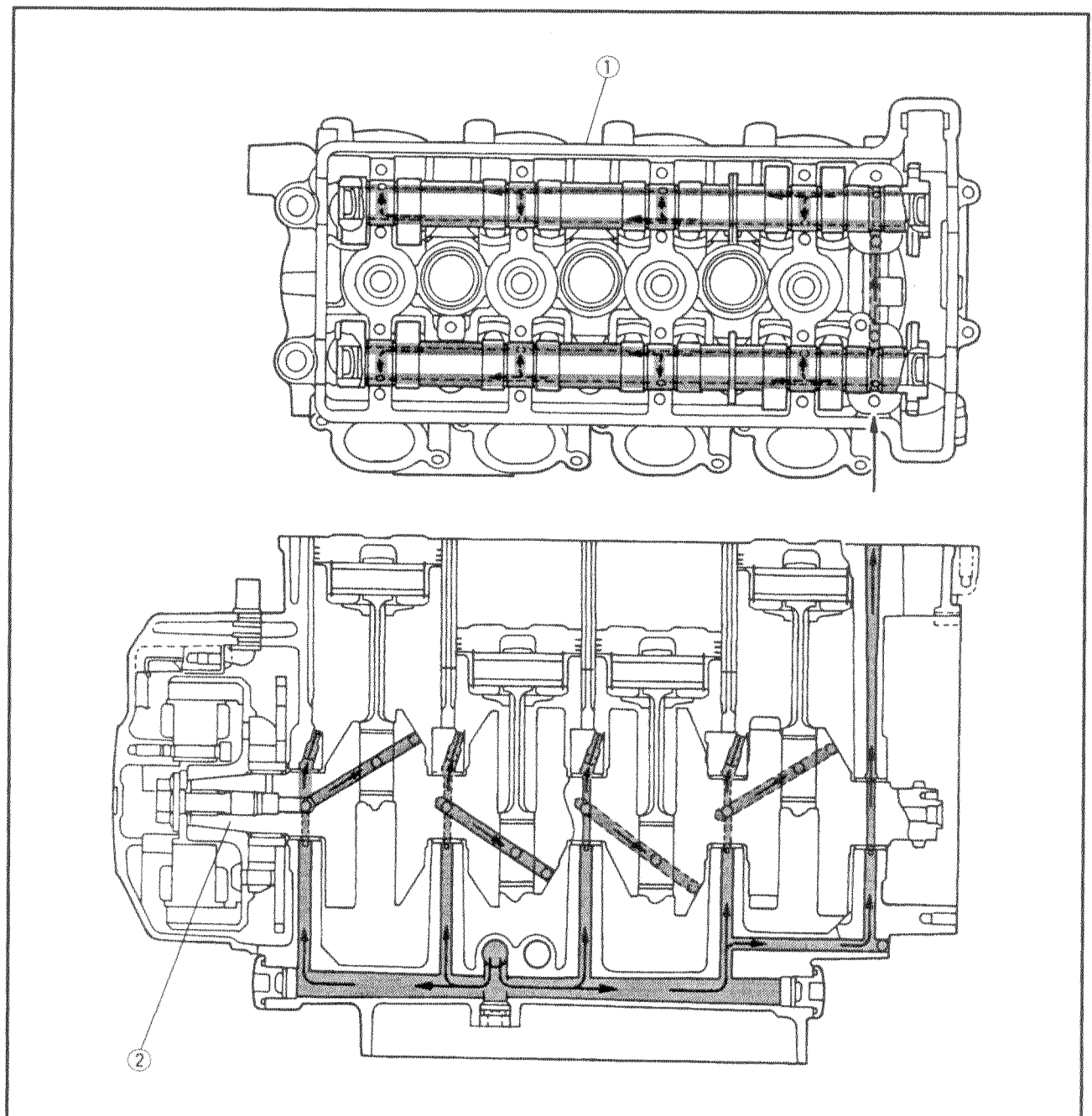


- ① Exhaust camshaft
- ② Intake camshaft
- ③ Oil filter
- ④ Oil cooler



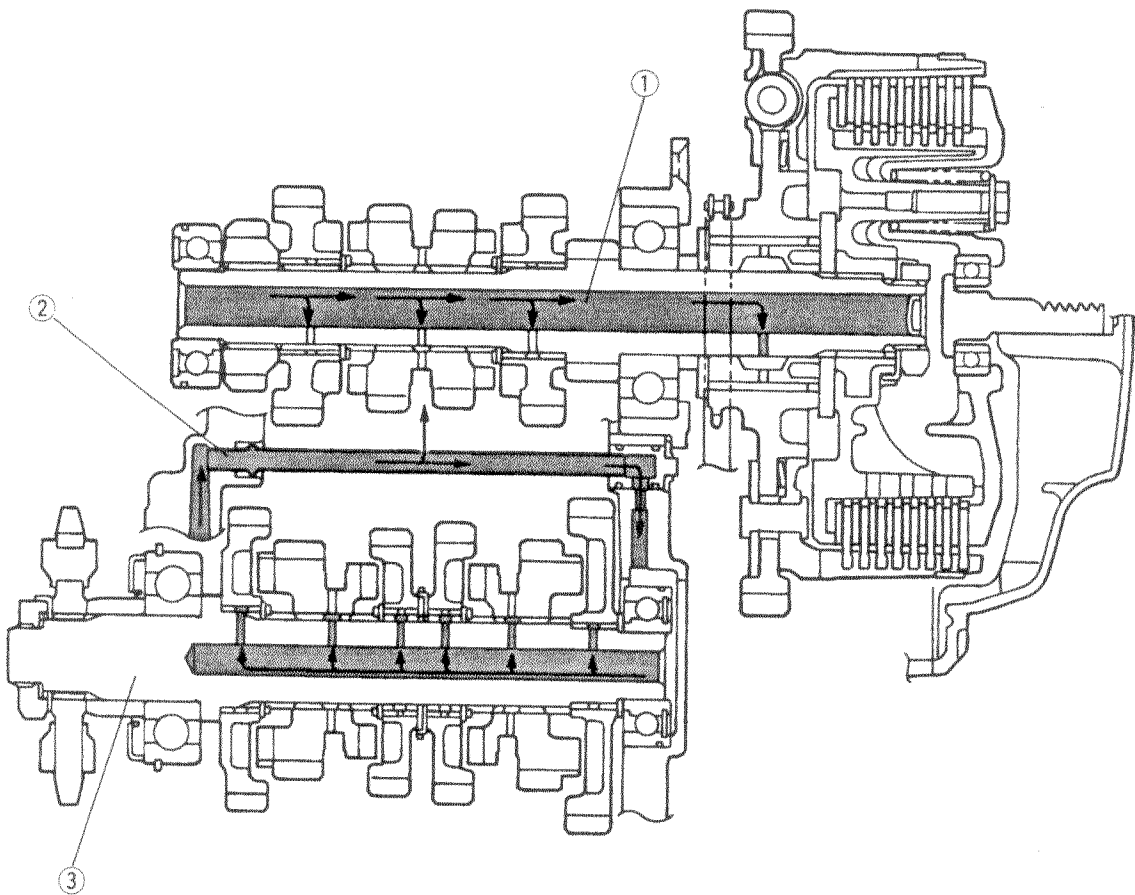


- ① Cylinder head
- ② Crankshaft



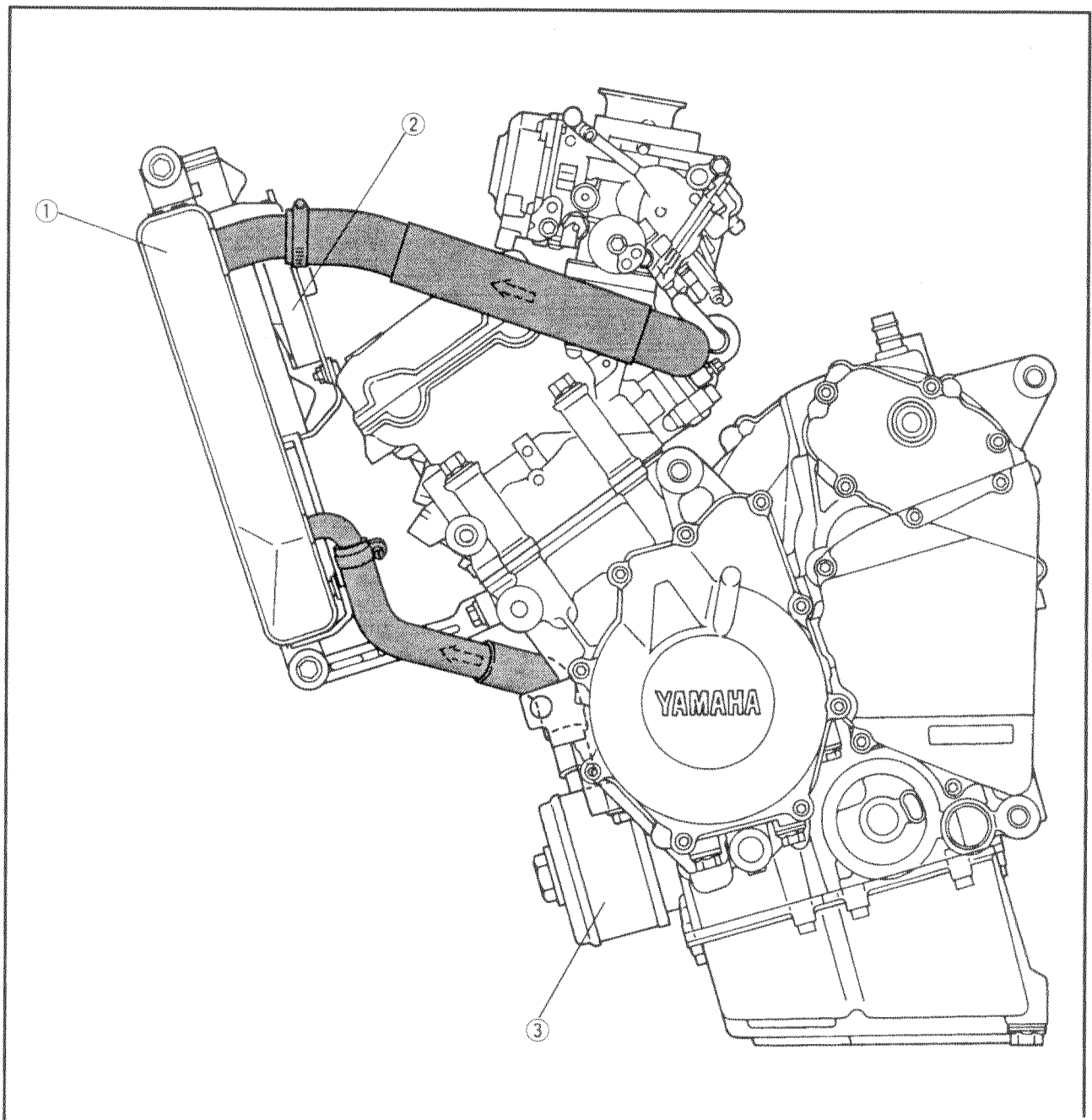


- ① Main axle
- ② Oil delivery pipe
- ③ driveaxle



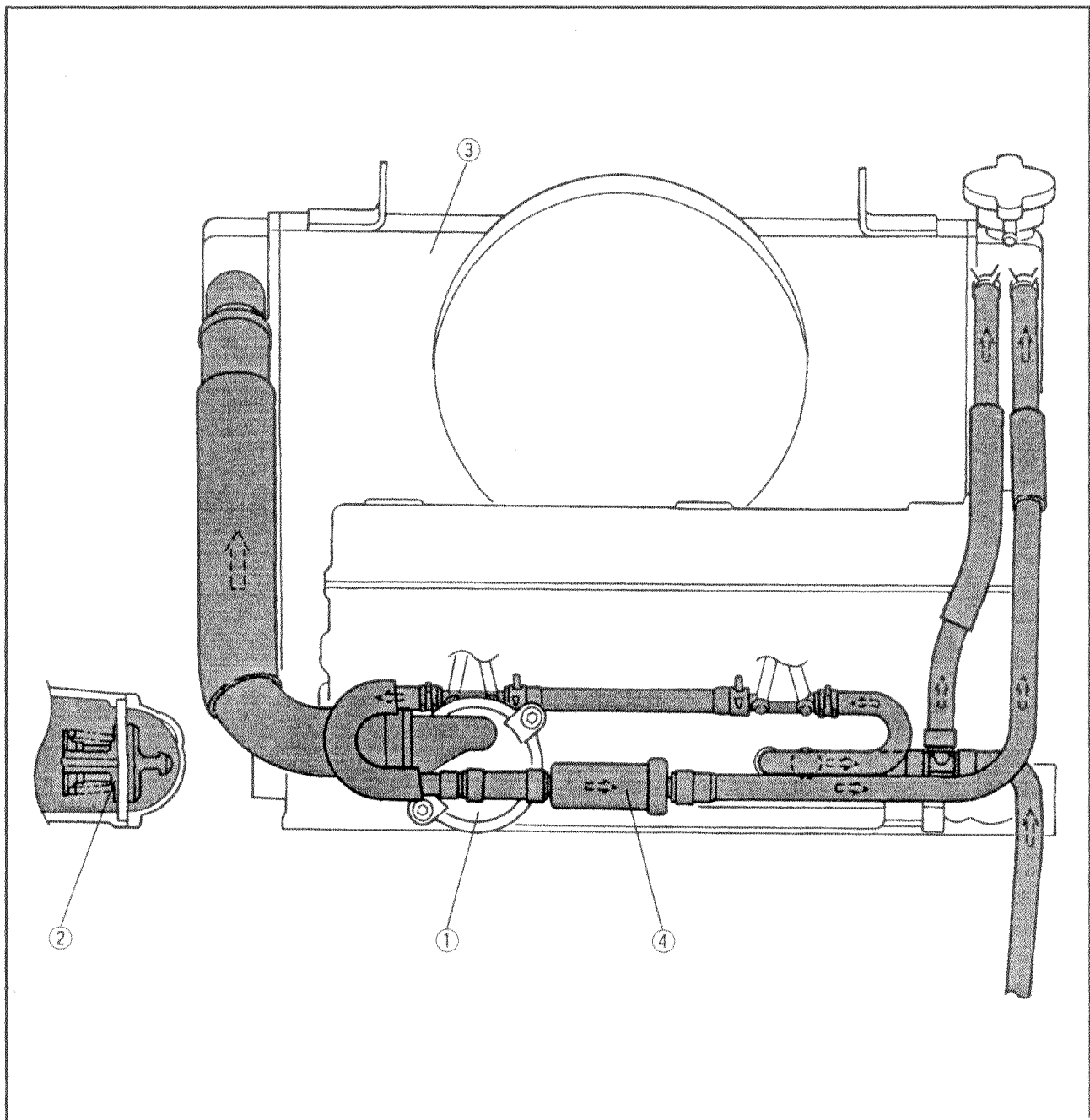
**COOLANT FLOW DIAGRAMS**

- ① Radiator
- ② Radiator fan
- ③ Oil cooler



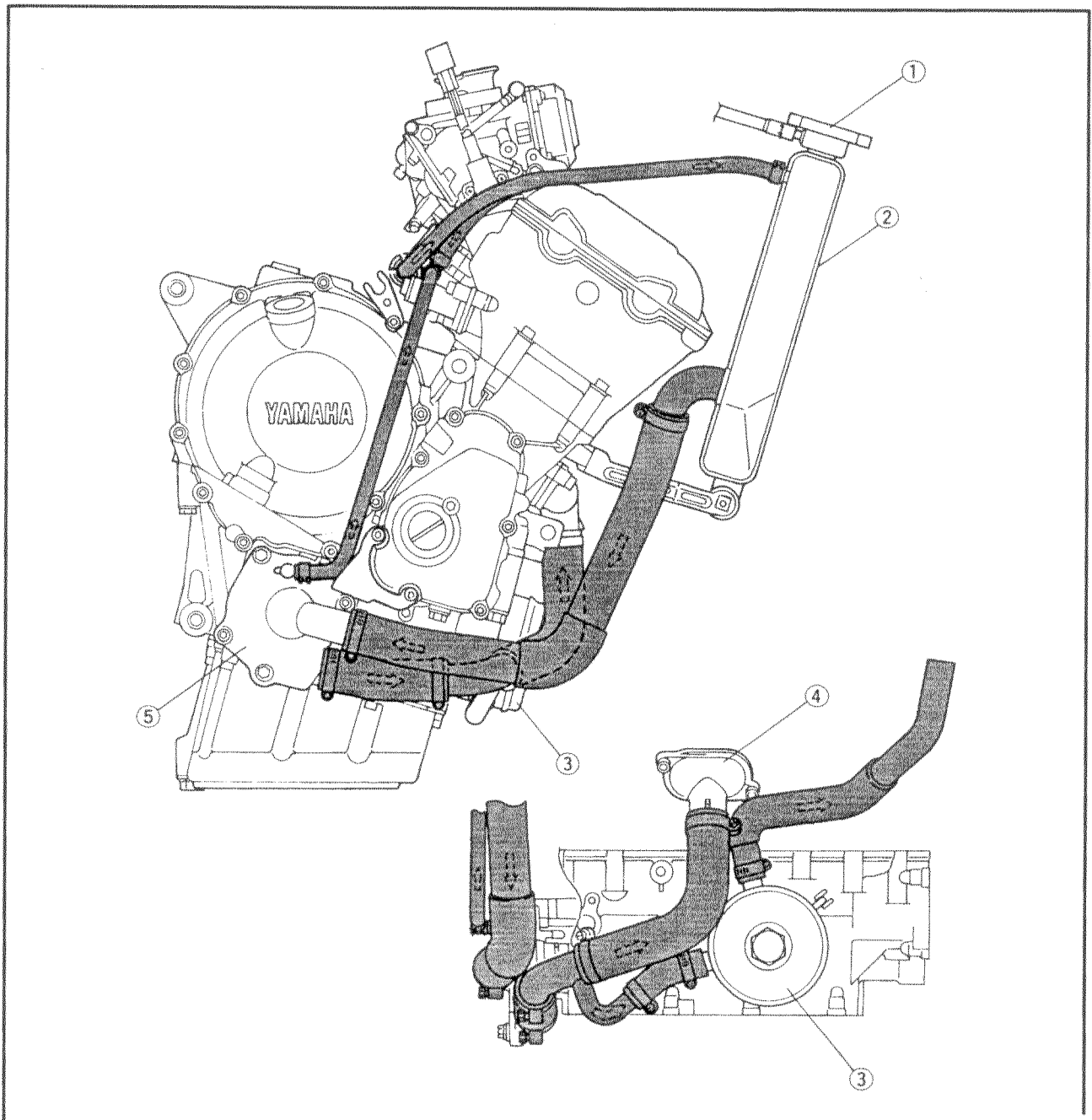


- ① Thermostat housing
- ② Thermostat
- ③ Radiator
- ④ Therm



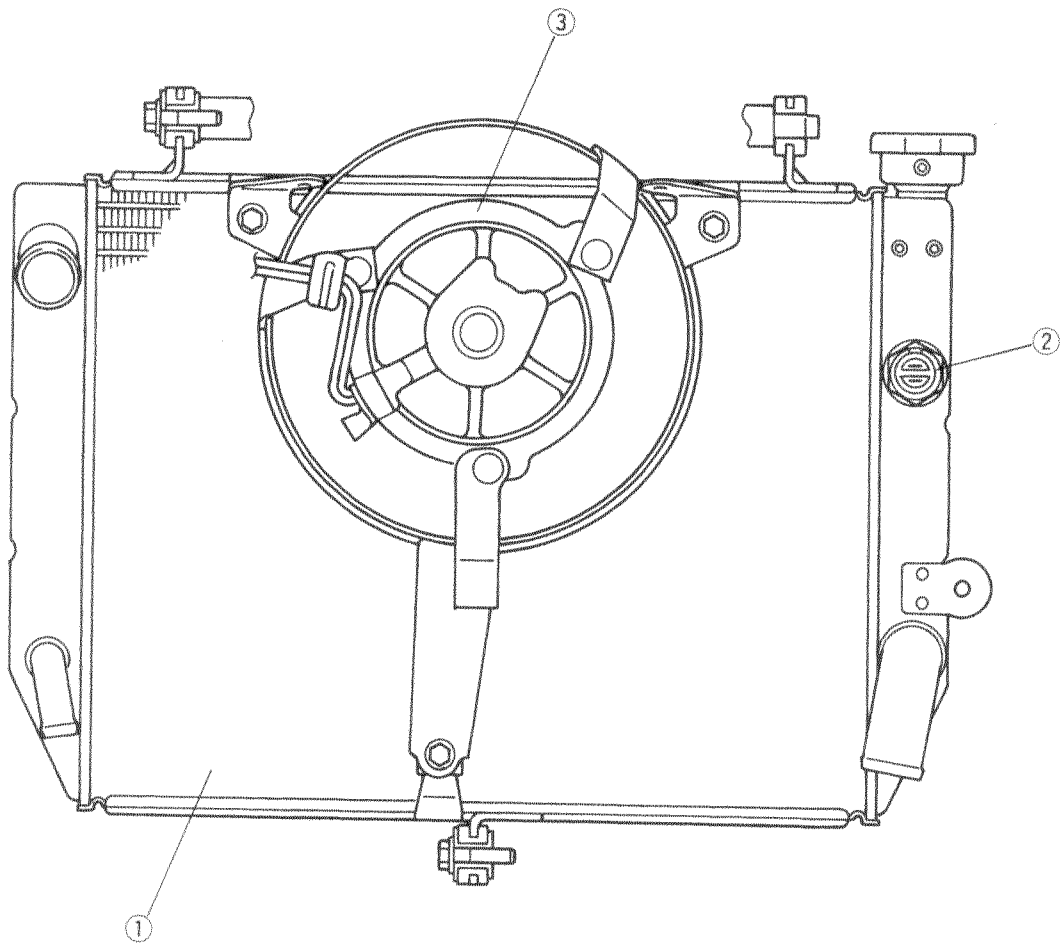


- ① Radiator cap
- ② Radiator
- ③ Oil cooler
- ④ Water jacket joint
- ⑤ Water pump





- ① Radiator
- ② Radiator fan switch
- ③ Radiator fan



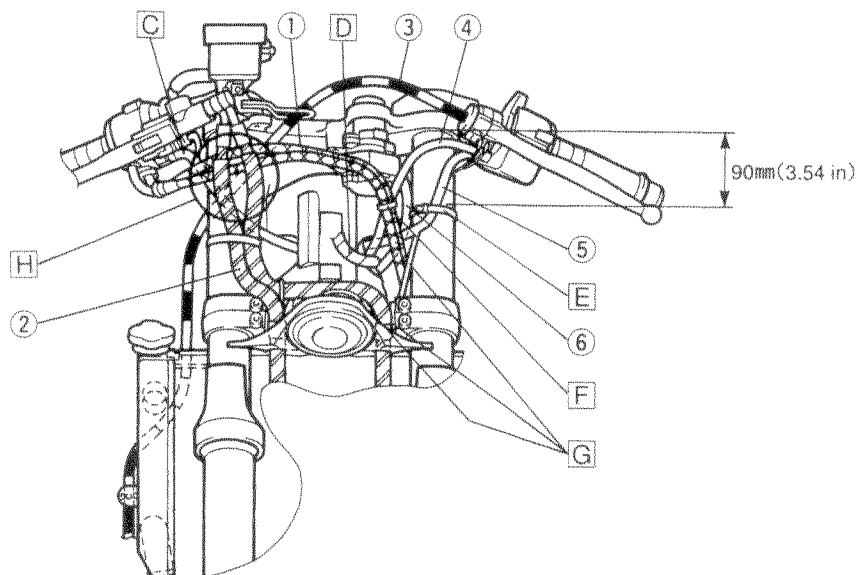
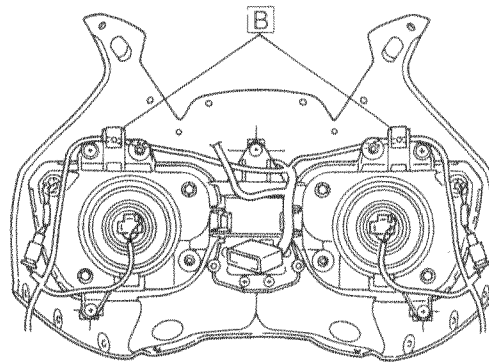
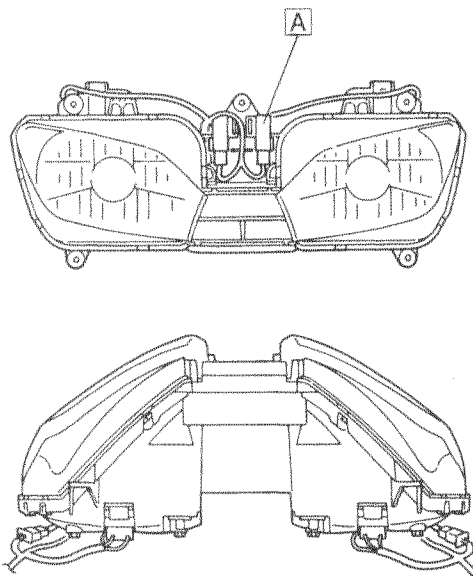


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## CABLE ROUTING

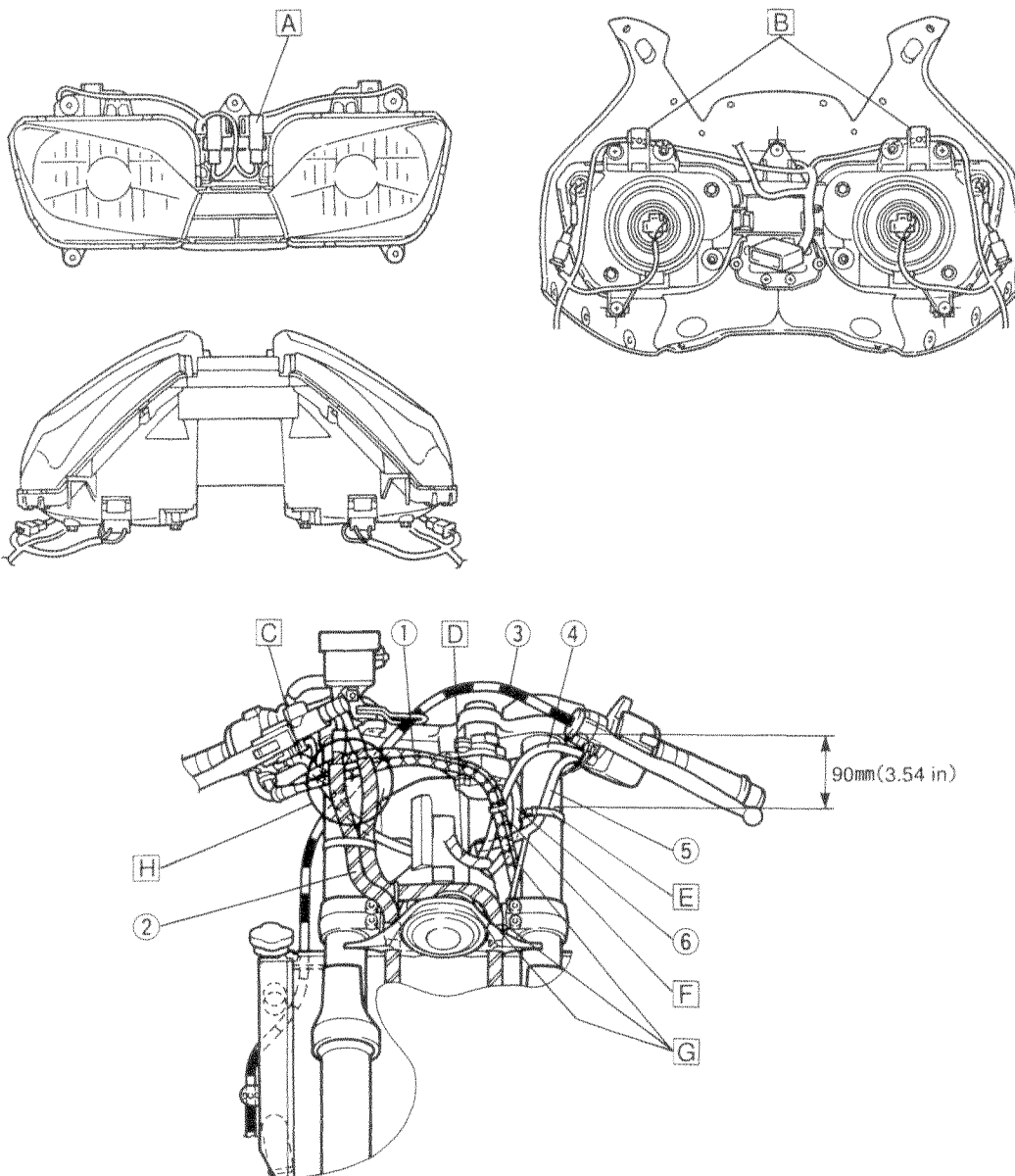
- ① Throttle cables
- ② Front brake hose
- ③ Clutch cable
- ④ Starter cable
- ⑤ Left handlebar switch lead
- ⑥ Main switch lead

- A Install the headlight relays onto the headlight housing bridge.
- B Route the headlight lead through the plastic guide.
- C Route the right handlebar switch lead in front of the front fork inner tube.
- D Route the wire harness through under the left handlebar switch lead and starter cable.
- E Fasten the left handlebar switch lead to the front fork with a plastic locking tie and cut the end of locking tie.
- F Fasten the throttle cables and starter cable with a band. Locate the end of band to forward.





- G** Route the horn lead outside the throttle cables and fasten it to the under bracket with a plastic locking tie. Cut the end of locking tie. And then, route the horn lead under the brake hose and clamp it to the under cover.
- H** Route the throttle cables between the brake hose and right handlebar switch lead.

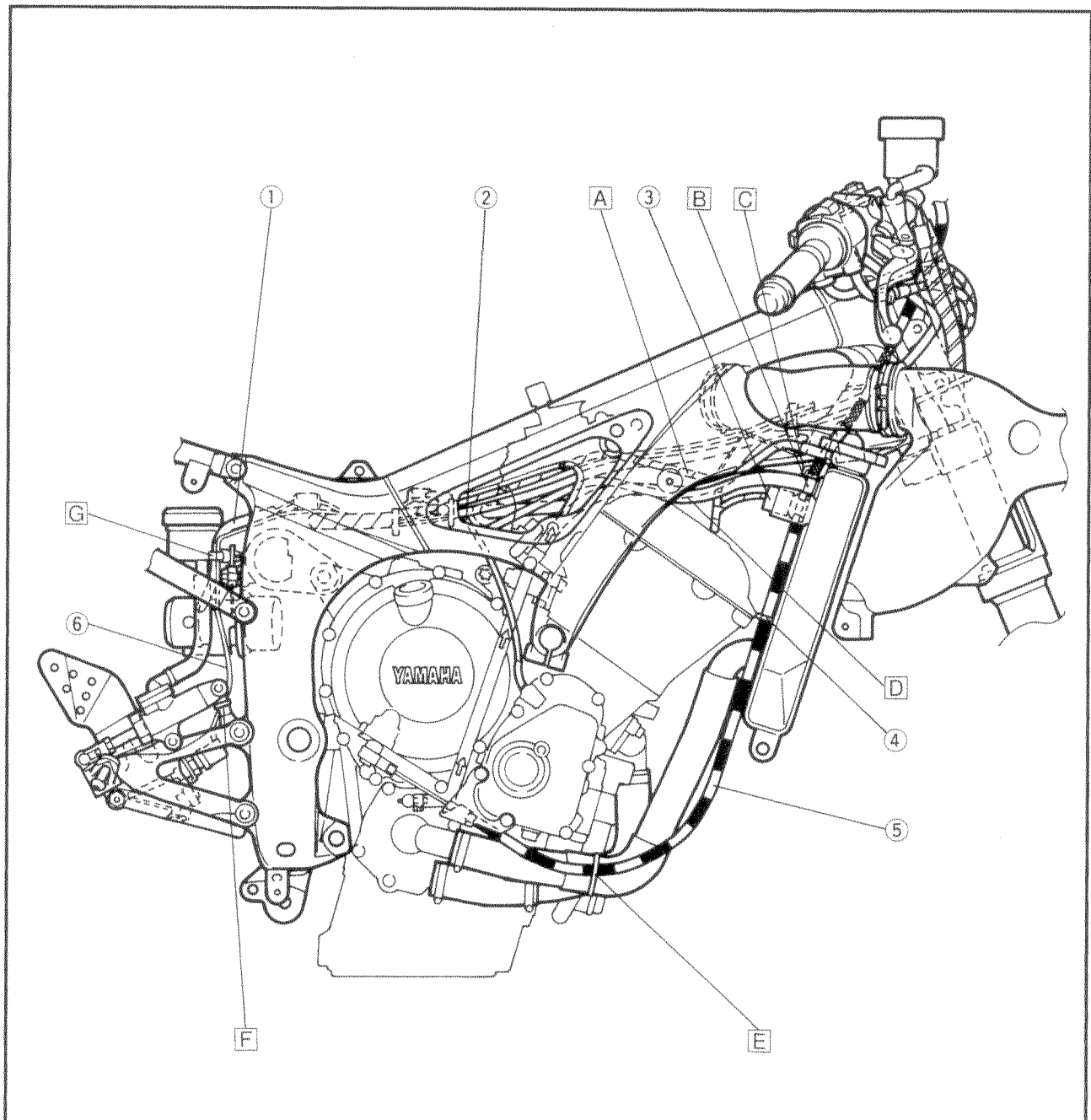




- ① Fuel pump lead
- ② Pickup coil lead
- ③ Thermo switch
- ④ Plastic clamp
- ⑤ Clutch cable
- ⑥ Rear brake switch lead

- Ⓔ Fasten the clutch cable to the coolant hose protector with a plastic band.
- Ⓕ Fasten the rear brake switch lead to the footrest bracket with a plastic locking tie and cut the end of locking tie.
- Ⓖ Fasten the fuel pump lead and rear brake switch lead with a plastic band on the fuel pump bracket.

- Ⓐ Route the ignition coil lead and thermo switch lead over the heat protector plate.
- Ⓑ Position the face of steel clip up ward.
- Ⓒ Route the clutch cable through the guide on the frame.
- Ⓓ Route the coolant hose under the heat protector plate.





- ① Oil lever switch lead
- ② Sidestand switch lead
- ③ Reservoir tank breather hose
- ④ AC magneto lead
- ⑤ Neutral switch lead
- ⑥ Fuel pump lead
- ⑦ Speed sensor lead

**A** Route the throttle cable through inside of the radiator bracket and outside of the wireharness.

**B** Fasten the wireharness, radiator hose and fan motor lead with a plastic band.

**C** Do not touch the wireharness with the throttle cable pulley.

Route the wireharness under the radiator hose.

**D** Pass the fuel tank drain hose and the fuel tank breather hose between the reservoir tank breather hose and the coolant breather hose, and kept outside the leads.

**E** Route the wireharness through the slit of rear fender.

**F** Pass the fuel tank drain hose and the fuel tank breather hose inside the curved under cowling.

**G** Put the fuel tank drain hose and fuel tank breather hose into the reservoir tank by passing through the tank holder.

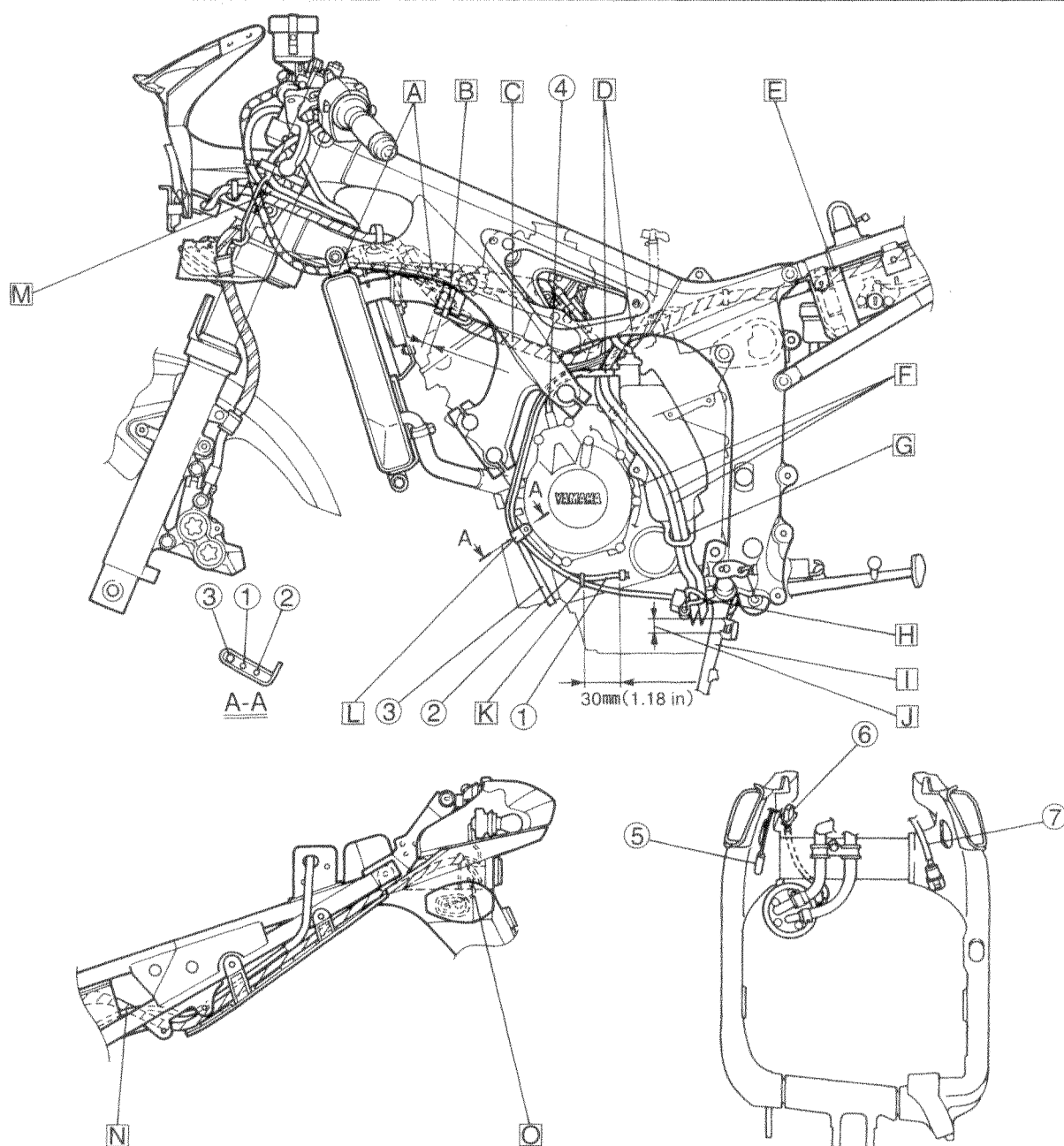
No fixed order required.

Do not twist the hoses.

**H** Put the fuel tank drain hose and the fuel tank breather hose through the hook and the side stand's holder.

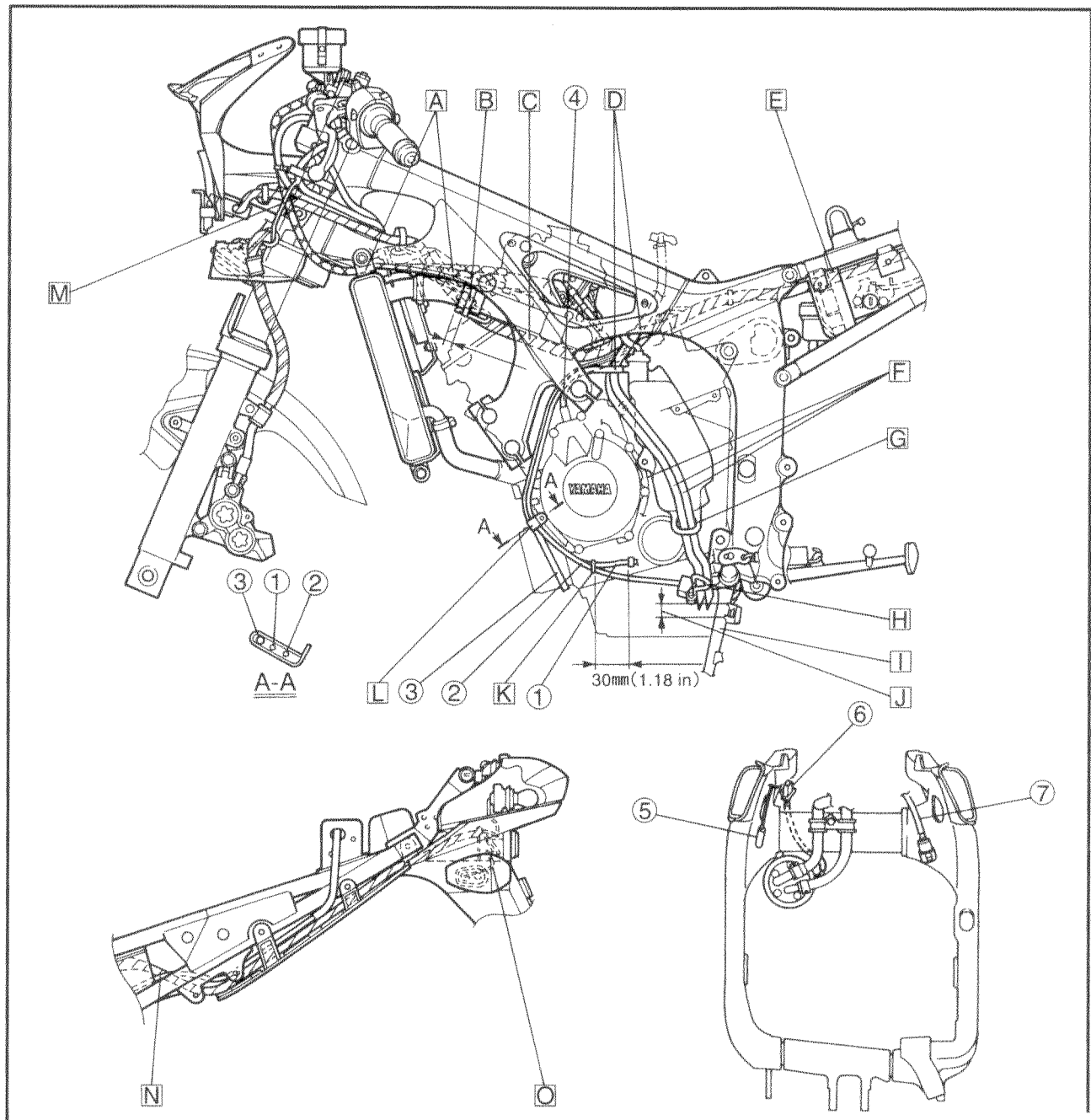
No fixed order required.

Do not twist the hoses.





- ☐ I When the sidestand is down.
- ☐ J The end of the drain hose must be located in between.
- ☐ K Fasten the sidestand switch lead and oil level sensor lead with a band.
- ☐ L Route the fuel tank drain hose, fuel tank breather hose, reservoir tank breather hose, oil level switch lead and sidestand switch lead through the guide on the frame.
- ☐ M Route the starter cable between the main switch lead and left handlebar switch lead.
- ☐ N Route the seat lock cable outside of the wireharness.
- ☐ O Route the rear turn signal light leads (left and right) through the hole of rear fender.



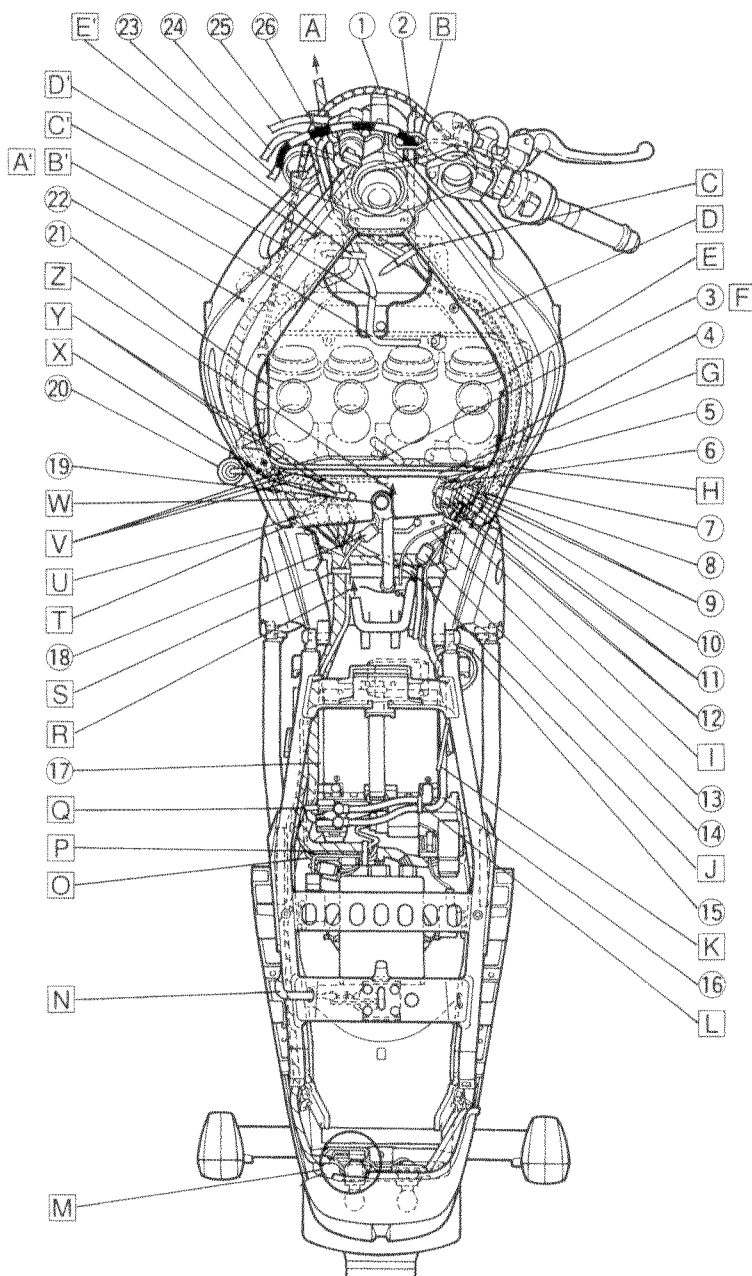


- ① Throttle cable
- ② Handlebar switch lead (right)
- ③ Coolant temperature sensor lead
- ④ Coolant reservoir breather hose
- ⑤ Idle adjust screw
- ⑥ Pickup coil connector
- ⑦ Neutral switch connector
- ⑧ Rear brake switch connector
- ⑨ Handlebar switch (right) connectors
- ⑩ Throttle position sensor connector
- ⑪ Main switch connectors
- ⑫ Handlebar switch (left) connectors
- ⑬ Neutral switch lead
- ⑭ Fuel pump connector
- ⑮ Rear brake switch lead

- ⑯ Starter motor lead
- ⑰ Battery negative (-) cable
- ⑱ Fuel sender connector
- ⑲ Crankcase breather hose
- ⑳ Coolant reservoir tank cap
- ㉑ Heat protector
- ㉒ Fan motor lead connector
- ㉓ Clutch cable
- ㉔ Handlebar switch lead (left)
- ㉕ Starter cable
- ㉖ Main switch lead

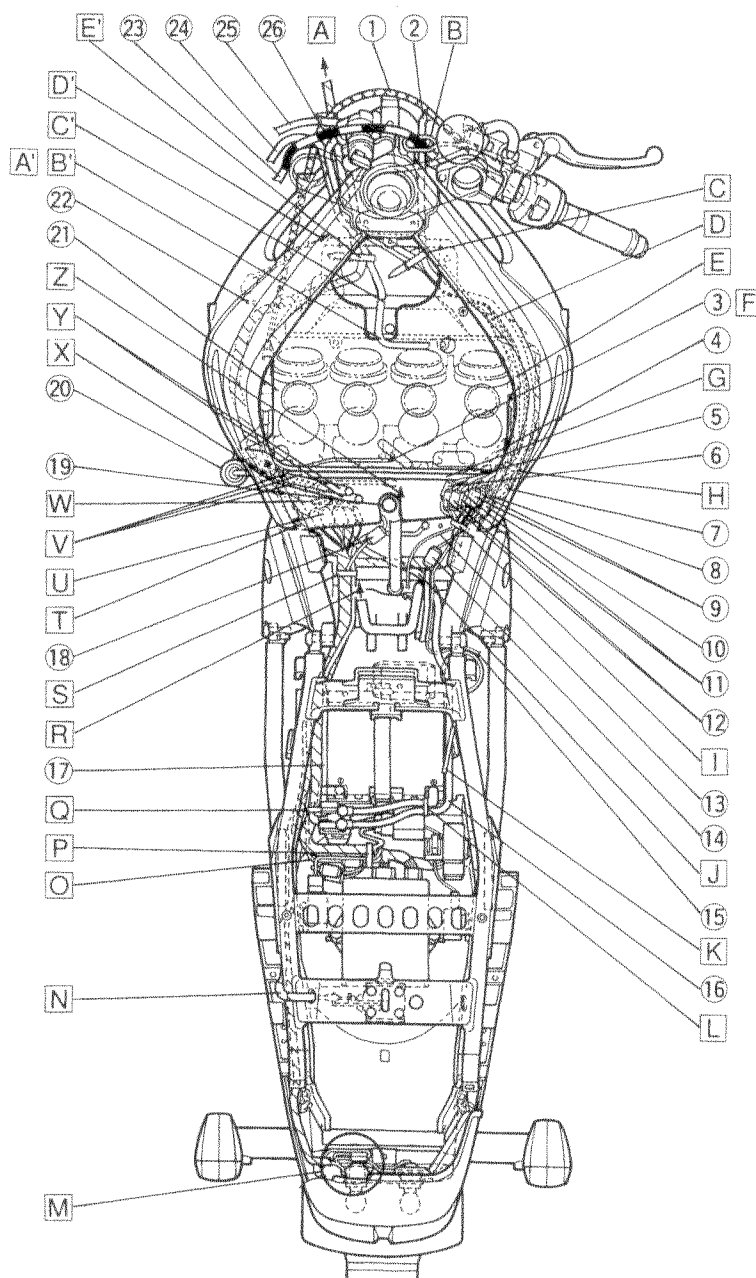
A To headlight lead

B Route the clutch cable through the guide.



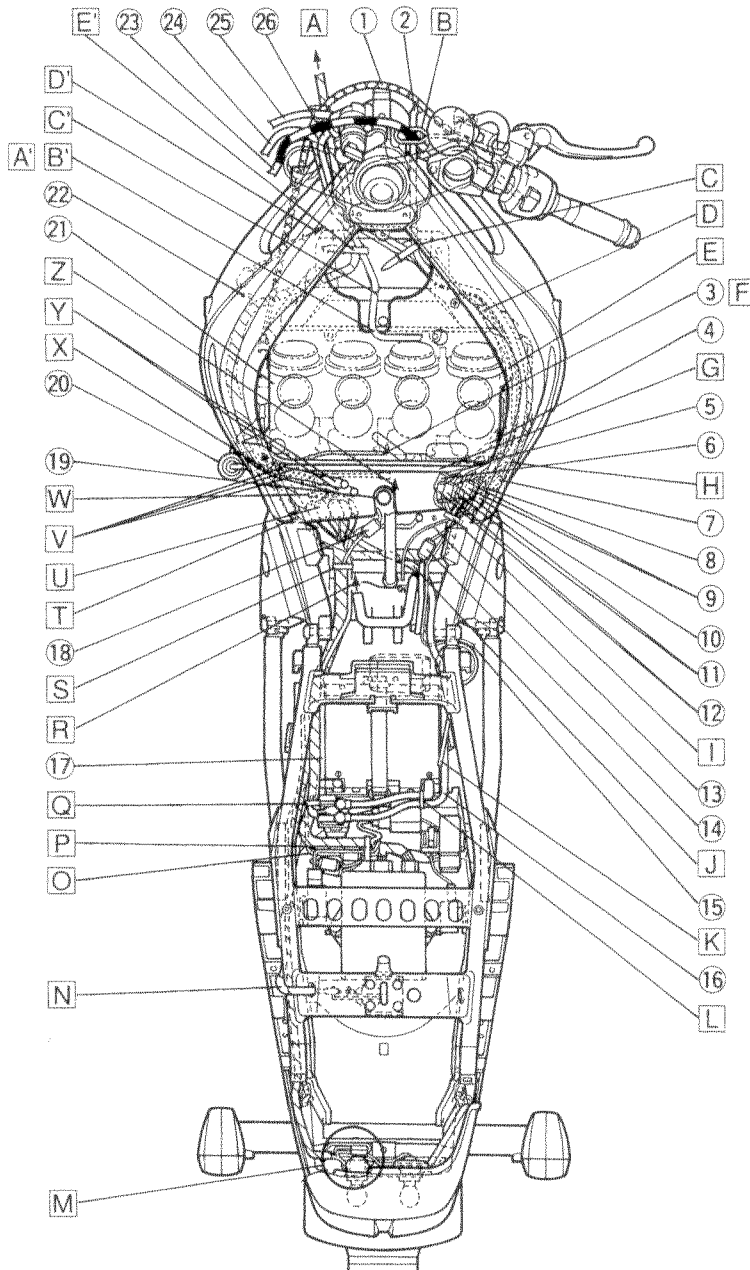


- C** Fasten the handlebar switch leads (left and right) and main switch lead with a band.
- D** Route the ignition coil lead and handlebar switch leads (left and right) over the heat protection plate.
- E** Route the reservoir tank hose, carburetor heater hoses under the heat protector plate.
- F** Route the coolant temperature lead upper the heat protection plate.
- G** Route the coolant breather hose upper the heat protection plate.
- H** Fasten the neutral switch lead, right handlebar switch lead, main switch lead, TPS lead, left handlebar switch lead, pickup coil lead and main harness with a band.
- I** Insert the projection of the band to the hole of the frame and fasten the wireharness, neutral switch lead, handlebar switch leads (left and right), main switch lead, throttle position sensor lead, rear brake switch lead and pickup coil lead with them.
- J** Route the starter motor lead under the wireharness.
- K** Fasten the starter motor to the rear fender with a band.
- L** Fasten the battery positive (+) cable and starter motor cable with a plastic band.
- M** Position the rear turn signal light connectors (left and right) and taillight connector between the rear fender and taillight bracket.
- N** Install the seat lock cable to the frame bracket with protector side.





- ☐ O Fasten the battery negative lead after passing under the main harness and oil level sensor lead.
- ☐ P Fasten the main harness, oil level sensor lead and ground lead with a band.
- ☐ Q Fasten the starter relay lead and battery negative (-) lead to the wireharness with a plastic band.
- ☐ R To fuel filter
- ☐ S Fasten the battery negative (-) lead and wireharness with a plastic band.
- ☐ T Insert the projection of the band (wireharness) into the hole of the frame.
- ☐ U 1: Speed sensor connector  
2: AC magneto connector  
3: Sidestand switch connector  
4: Oil level switch connector  
5: Meter ground lead
- ☐ V The fuel tank drain hose, coolant temperature lead and the coolant breather hose must be located over the groove.
- ☐ W Fasten the leads (above 1 – 5) and starter motor lead with a steel band on the engine.
- ☐ X Route the coolant breather hose upper the main harness.
- ☐ Y Route the fuel tank breather hose and fuel tank drain hose over the wireharness.
- ☐ Z To carburetor
- ☐ A' The starter cable must not be out off the guide groove of the cover.
- ☐ B' Route the starter cable upper the heat protection plate.
- ☐ C' Insert the starter cable to the guide.
- ☐ D' To fan motor
- ☐ E' Route the starter cable and main harness through the guide of the heat protection plate.



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## TROUBLESHOOTING

**NOTE:**

The following guide for troubleshooting does not cover all the possible causes of trouble. It should be helpful, however, as a guide to basic troubleshooting. Refer to the relative procedure in this manual for checks, adjustments, and replacement of parts.

**STARTING PROBLEMS****ENGINE****Cylinders and cylinder head(-s)**

- Loose spark plug
- Loose cylinder head
- Damaged cylinder head gasket
- Worn or damaged cylinder
- Incorrect valve clearance
- Incorrectly sealed valve
- Incorrect valve-to-valve-seat contact
- Incorrect valve timing
- Faulty valve spring
- Seized valve

**Pistons and piston rings**

- Incorrectly installed piston ring
- Damaged, worn or fatigued piston ring
- Seized piston ring
- Seized or damaged piston

**Air filter**

- Incorrectly installed air filter
- Clogged air filter element

**Crankcase and crankshaft**

- Incorrectly assembled crankcase
- Seized crankshaft

**FUEL SYSTEM****Fuel tank**

- Empty fuel tank
- Clogged fuel filter
- Clogged fuel tank breather hose
- Deteriorated or contaminated fuel

**Fuel pump**

- Faulty fuel pump
- Faulty fuel pump relay

**Fuel cock**

- Clogged or damaged fuel hose

**Carburetors**

- Deteriorated or contaminated fuel
- Clogged pilot jet
- Clogged pilot air passage
- Sucked-in air
- Damaged float
- Worn needle valve
- Incorrectly installed needle valve seat
- Incorrect fuel level
- Incorrectly installed pilot jet
- Clogged starter jet
- Faulty starter plunger
- Incorrectly adjusted starter cable

**ELECTRICAL SYSTEMS****Battery**

- Faulty battery
- Discharged battery

**Fuses**

- Blown, damaged or incorrect fuse
- Incorrectly installed fuse

**Spark plugs**

- Incorrect spark plug gap
- Incorrect spark plug heat range
- Fouled spark plug
- Worn or damaged electrode
- Worn or damaged insulator
- Faulty spark plug cap

**Ignition coils**

- Damaged ignition coil
- Broken or shorted primary or secondary coils

**Ignition system**

- Faulty CDI 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 sidestand switch
- Faulty clutch switch
- Incorrectly grounded circuit
- Loose connections

**Starting system**

- Faulty starter motor
- Faulty starter relay
- Faulty starting circuit cutoff relay
- Faulty starter clutch

EB901000

## **INCORRECT ENGINE IDLING SPEED**

### **ENGINE**

#### **Cylinders and cylinder head**

- Incorrect valve clearance
- Damaged valve train components

#### **Air filter**

- Clogged air filter element

### **FUEL SYSTEM**

#### **Carburetors**

- Faulty starter plunger
- Loose or clogged pilot jet
- Loose or clogged pilot air jet
- Damaged or loose carburetor joint
- Incorrectly synchronized carburetors
- Incorrectly adjusted engine idling speed (throttle stop screw)
- Incorrect throttle cable free play
- Flooded carburetor

### **ELECTRICAL SYSTEMS**

#### **Battery**

- Faulty battery
- Discharged battery

#### **Spark plugs**

- Incorrect spark plug gap
- Incorrect spark plug heat range
- Fouled spark plug
- Worn or damaged electrode
- Worn or damaged insulator
- Faulty spark plug cap

#### **Ignition coils**

- Broken or shorted primary or secondary coils
- Faulty spark plug lead
- Damaged ignition coil

#### **Ignition system**

- Faulty ignition unit
- Faulty pickup coil

EB902000

## **POOR MEDIUM-AND-HIGH-SPEED PERFORMANCE**

Refer to "STARTING PROBLEMS".

### **ENGINE**

#### **Air filter**

- Clogged air filter element

#### **Air intake system**

- Clogged air ducts

### **FUEL SYSTEM**

#### **Carburetors**

- Faulty diaphragm
- Incorrect fuel level
- Loose or clogged main jet

#### **Fuel pump**

- Faulty fuel pump

EB903000

## **FAULTY GEAR SHIFTING**

### **SHIFTING IS DIFFICULT**

Refer to "CLUTCH DRAGS".

### **SHIFT PEDAL DOES NOT MOVE**

#### **Shift shaft**

- Incorrectly adjusted shift rod
- Bent shift shaft

#### **Shift drum and shift forks**

- Foreign object in a shift drum groove
- Seized shift fork
- Bent shift fork guide bar

#### **Transmission**

- Seized transmission gear
- Foreign object between transmission gears
- Incorrectly assembled transmission

### **JUMPS OUT OF GEAR**

#### **Shift shaft**

- Incorrect shift pedal position
- Incorrectly returned stopper lever

#### **Shift forks**

- Worn shift fork

#### **Shift drum**

- Incorrect axial play
- Worn shift drum groove

#### **Transmission**

- Worn gear dog

EB904000

## **FAULTY CLUTCH**

### **CLUTCH SLIPS**

#### **Clutch**

- Incorrectly assembled clutch
- Incorrectly adjusted clutch cable
- Loose or fatigued clutch spring
- Worn friction plate
- Worn clutch plate

#### **Engine oil**

- Incorrect oil level
- Incorrect oil viscosity (low)
- Deteriorated oil

### **CLUTCH DRAGS**

#### **Clutch**

- Unevenly tensioned clutch spring plate
- Warped pressure plate
- Bent clutch plate
- Swollen friction plate
- Bent clutch pull rod
- Damaged clutch boss
- Burnt primary driven gear bushing
- Match marks not aligned

#### **Engine oil**

- Incorrect oil level
- Incorrect oil viscosity (high)
- Deteriorated oil

EB905001

## **OVERHEATING**

### **ENGINE**

#### **Clogged coolant passages**

#### **Cylinder head(-s) and piston(-s)**

- Heavy carbon buildup

#### **Engine oil**

- Incorrect oil level
- Incorrect oil viscosity
- Inferior oil quality

### **COOLING SYSTEM**

#### **Coolant**

- Low coolant level

#### **Radiator**

- Damaged or leaking radiator
- Faulty radiator cap
- Bent or damaged radiator fin

#### **Water pump**

- Damaged or faulty water pump

#### **Thermostat**

- Thermostat stays closed

#### **Oil cooler**

- Clogged or damaged oil cooler

#### **Hoses and pipes**

- Damaged hose
- Incorrectly connected hose
- Damaged pipe
- Incorrectly connected pipe

### **FUEL SYSTEM**

#### **Carburetors**

- Incorrect main jet setting
- Incorrect fuel level
- Damaged or loose carburetor joint

#### **Air filter**

- Clogged air filter element

### **CHASSIS**

#### **Brakes**

- Dragging brake

### **ELECTRICAL SYSTEMS**

#### **Spark plugs**

- Incorrect spark plug gap
- Incorrect spark plug heat range

#### **Ignition system**

- Faulty CDI unit

EB906000

## **OVERCOOLING**

### **COOLING SYSTEM**

#### **Thermostat**

- Thermostat stays open

EB907000

## **POOR BRAKING PERFORMANCE**

- Worn brake pad
- Worn brake disc
- Air in hydraulic brake system
- Leaking brake fluid
- Faulty brake caliper piston seal
- Loose union bolt
- Damaged brake hose
- Oil or grease on the brake disc
- Oil or grease on the brake pad
- Incorrect brake fluid level

EB908001

## **FAULTY FRONT FORK LEGS**

### **LEAKING OIL**

- Bent, damaged or rusty inner tube
- Damaged outer tube
- Incorrectly installed oil seal
- Damaged oil seal lip
- Incorrect oil level (high)
- Loose damper rod assembly bolt
- Damaged damper rod assembly bolt copper washer
- Damaged cap bolt O-ring

### **MALFUNCTION**

- Bent or damaged inner tube
- Bent or damaged outer tube
- Damaged fork spring
- Worn or damaged outer tube bushing
- Bent or damaged damper rod
- Incorrect oil viscosity
- Incorrect oil level

EB909001

## **UNSTABLE HANDLING**

### **Handlebars**

- Bent or incorrectly installed right handlebar
- Bent or incorrectly installed left handlebar

### **Steering head components**

- Incorrectly installed upper bracket
- Incorrectly installed lower bracket (incorrectly tightened ring nut)
- Bent steering stem
- Damaged ball bearing or bearing race

### **Front fork legs**

- Uneven oil levels (both front fork legs)
- Unevenly tensioned fork spring (both front fork legs)
- Damaged fork spring
- Bent or damaged inner tube
- Bent or damaged outer tube

### **Swingarm**

- Worn bearing or bushing
- Bent or damaged swingarm

### **Rear shock absorber assembly**

- Faulty rear shock absorber spring
- Leaking oil or gas

### **Tires**

- Uneven tire pressures (front and rear)
- Incorrect tire pressure
- Uneven tire wear

### **Wheels**

- Incorrect wheel balance
- Deformed cast wheel
- Damaged wheel bearing
- Bent or loose wheel axle
- Excessive wheel runout

### **Frame**

- Bent frame
- Damaged steering head pipe
- Incorrectly installed bearing race

EB910000

## **FAULTY LIGHTING AND SIGNALING SYSTEMS**

### **HEADLIGHT DOES NOT LIGHT**

- Wrong headlight bulb
- Too many electrical accessories
- Hard charging
- Incorrect connection
- Incorrectly grounded circuit
- Poor contacts (main or light switch)
- Burnt-out headlight bulb

### **HEADLIGHT BULB BURNT OUT**

- Wrong headlight bulb
- Faulty battery
- Faulty rectifier/regulator
- Incorrectly grounded circuit
- Faulty main switch
- Faulty light switch
- Headlight bulb life expired

### **TAIL/BRAKE LIGHT DOES NOT LIGHT**

- Wrong tail/brake light bulb
- Too many electrical accessories
- Incorrect connection
- Burnt-out tail/brake light bulb

### **TAIL/BRAKE LIGHT BULB BURNT OUT**

- Wrong tail/brake light bulb
- Faulty battery
- Incorrectly adjusted rear brake light switch
- Tail/brake light bulb life expired

### **TURN SIGNAL DOES NOT LIGHT**

- Faulty turn signal switch
- Faulty turn signal relay
- Burnt-out turn signal bulb
- Incorrect connection
- Damaged or faulty wire harness
- Incorrectly grounded circuit
- Faulty battery
- Blown, damaged or incorrect fuse

### **TURN SIGNAL BLINKS SLOWLY**

- Faulty flasher relay
- Faulty main switch
- Faulty turn signal switch
- Wrong turn signal bulb

### **TURN SIGNAL REMAINS LIT**

- Faulty flasher relay
- Burnt-out-turn signal bulb

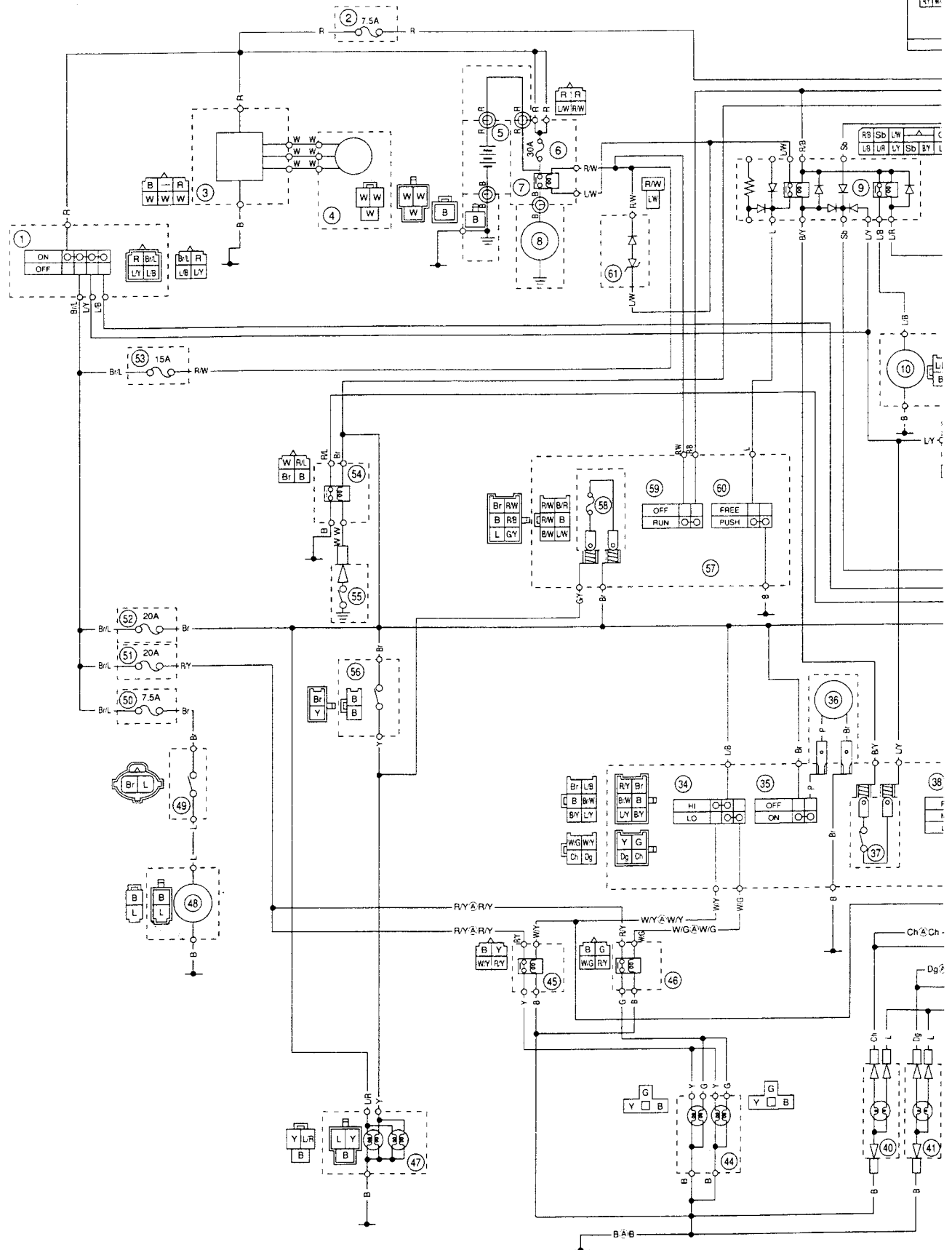
### **TURN SIGNAL BLINKS QUICKLY**

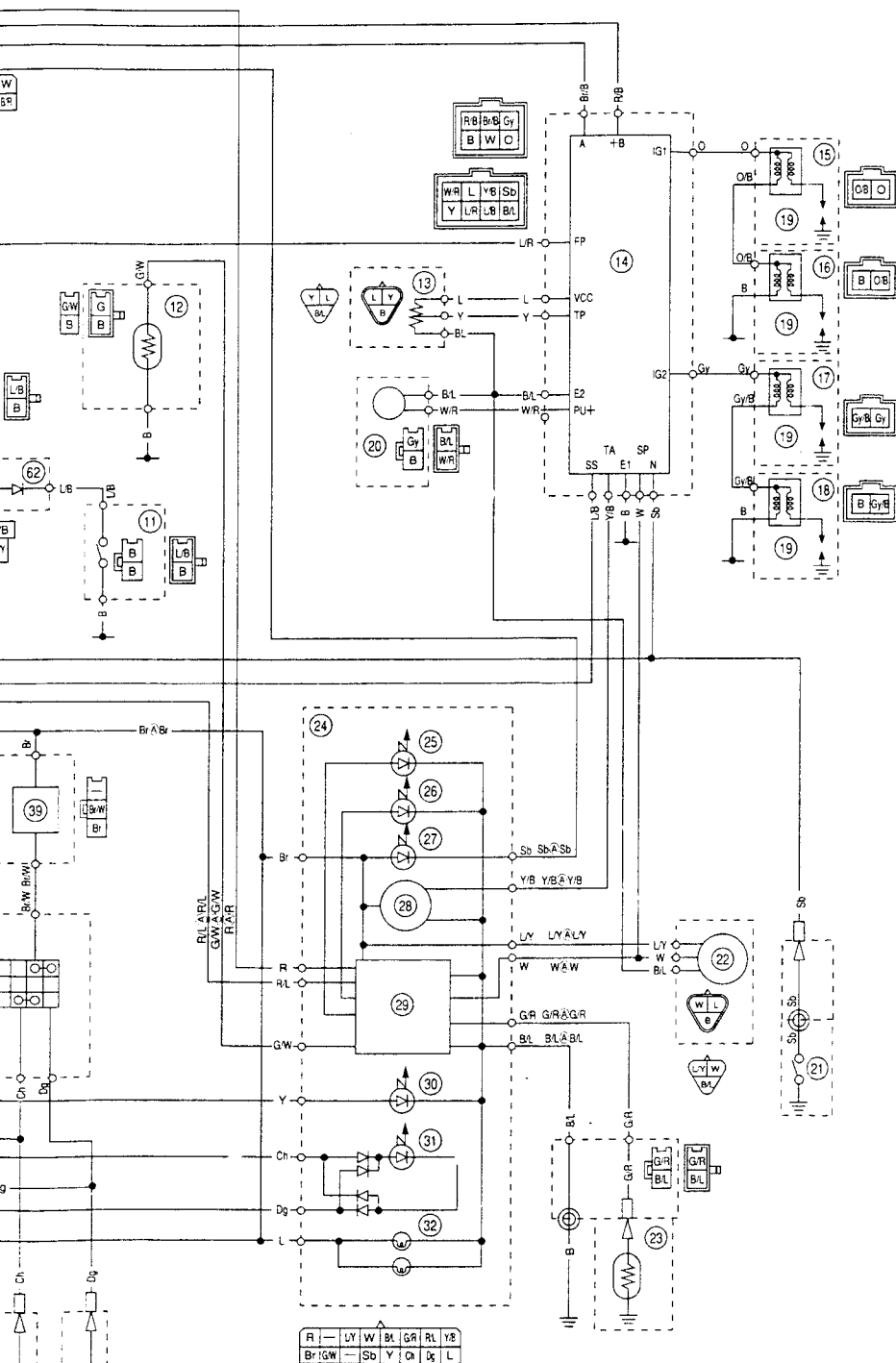
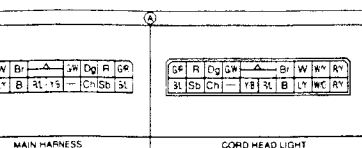
- Incorrect turn signal bulb
- Faulty flasher relay
- Burnt-out turn signal bulb

### **HORN DOES NOT SOUND**

- Incorrectly adjusted horn
- Damaged or faulty horn
- Faulty main switch
- Faulty horn switch
- Faulty battery
- Blown, damaged or incorrect fuse
- Faulty wire harness

२५	४०
२५	४०





- ① Main switch
- ② Fuse (backup)
- ③ Rectifier/regulator
- ④ AC magneto
- ⑤ Battery
- ⑥ Fuse (main)
- ⑦ Starter relay
- ⑧ Starter motor
- ⑨ Starting circuit cutoff relay
- ⑩ Fuel pump
- ⑪ Sidestand switch
- ⑫ Fuel sender
- ⑬ Throttle position sensor
- ⑭ CDI unit
- ⑮ Ignition coil #1
- ⑯ Ignition coil #4
- ⑰ Ignition coil #2
- ⑱ Ignition coil #3
- ⑲ Spark plug
- ⑳ Pickup coil
- ㉑ Neutral switch
- ㉒ Speed sensor
- ㉓ Thermo unit
- ㉔ Meter assembly
- ㉕ Fuel level indicator light
- ㉖ Oil level/coolant temperature warning light
- ㉗ Neutral indicator light
- ㉘ Tachometer
- ㉙ Combination meter
- ㉚ High beam indicator light
- ㉛ Turn signal indicator light
- ㉜ Illumination light
- ㉝ Handlebar switch (left)
- ㉞ Dimmer switch
- ㉟ Horn switch
- ㊱ Horn
- ㊲ Clutch switch
- ㊳ Turn signal switch
- ㊴ Flasher relay
- ㊵ Front turn signal/position light (L)
- ㊶ Front turn signal/position light (R)
- ㊷ Rear turn signal light (L)
- ㊸ Rear turn signal light (R)
- ㊹ Headlight
- ㊺ Headlight relay (Hi)
- ㊻ Headlight relay (Lo)
- ㊼ Tail/brake light
- ㊽ Radiator fan motor
- ㊾ Thermo switch
- ㊿ Fuse (radiator fan motor)
- 1 Fuse (headlight)
- 2 Fuse (signaling system)
- 3 Fuse (ignition)
- 4 Oil level relay
- 5 Oil level switch
- 6 Rear brake light switch
- 7 Handlebar switch (right)
- 8 Front brake light switch
- 9 Engine stop switch
- 0 Start switch
- 1 Diode 1
- 2 Diode 2

### COLOR CODE

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