



**YAMAHA**

**XV16AL/XV16ALC  
XV16ATL/XV16ATLC**

**SERVICE MANUAL**

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## NOTICE

This manual was produced by the Yamaha Motor Company, Ltd. primarily for use by Yamaha dealers and their qualified mechanics. It is not possible to include all the knowledge of a mechanic in one manual. Therefore, anyone who uses this book to perform maintenance and repairs on Yamaha vehicles should have a basic understanding of mechanics and the techniques to repair these types of vehicles. Repair and maintenance work attempted by anyone without this knowledge is likely to render the vehicle unsafe and unfit for use.

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

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

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

**NOTE:**

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Designs and specifications are subject to change without notice.

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## IMPORTANT MANUAL INFORMATION

Particularly important information is distinguished in this manual by the following.



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



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



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

**NOTE:**

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

# HOW TO USE THIS MANUAL

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.

②

CLUTCH

①

ENG

④

⑤

⑥

⑦

Order	Job/Part	Q'ty	Remarks
<b>Removing the clutch cover</b>			
	Left side cover		Remove the parts in the order listed. Refer to "SEATS AND SIDE COVERS" in chapter 3.
	Engine left side cover		Refer to "ROCKER ARMS, PUSH RODS AND VALVE LIFTERS".
	Engine oil		Drain.
1	Clutch cable	1	Disconnect.
2	Pull lever	1	
3	Pull lever spring	1	
4	Pickup coil coupler	1	Disconnect.
5	Shift arm	1	
6	Clutch cable holder	1	
7	Clutch cover	1	

CLUTCH ENG

③

**REMOVING THE CLUTCH**

1. Remove:

- clutch cable holder ①
- clutch 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. Straighten the lock washer tab.

3. Loosen:

- clutch boss nut ①

**NOTE:**  
While holding the clutch boss ② with the universal clutch holder ③, loosen the clutch boss nut.

**Universal clutch holder YM-91042**

4. Remove:

- clutch boss nut ①
- lock washer ②
- clutch boss assembly ③







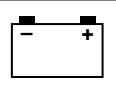


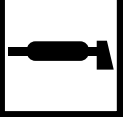












**NOTE:**  
There is a built-in damper between the clutch boss and the clutch plate. It is not necessary to remove the wire circlip ④ and disassemble the built-in damper unless there is serious clutch chattering.

⑧

**REMOVING THE PRIMARY DRIVE GEAR**

1. Remove:

- pickup coil rotor bolt ①

① GEN INFO 	② SPEC 	
③ CHK ADJ 	④ CHAS 	
⑤ ENG 	⑥ CARB 	
⑦ ELEC 	⑧ TRBL SHTG ?	
⑨ 	⑩ 	
⑪ 	⑫ 	
⑬ 	⑭ 	
⑮ 	⑯ 	
⑰ 	⑱ 	⑲ 
⑳ 	㉑ 	㉒ 
㉓ 	㉔ <b>New</b>	

\*\*\*\*\*

## SYMBOLS

The following symbols are not relevant to every vehicle.

Symbols ① to ⑧ indicate the subject of each chapter.

- ① General information
- ② Specifications
- ③ Periodic checks and adjustments
- ④ Chassis
- ⑤ Engine
- ⑥ Carburetor
- ⑦ Electrical system
- ⑧ Troubleshooting

Symbols ⑨ to ⑯ indicate the following.

- ⑨ Serviceable with engine mounted
- ⑩ Filling fluid
- ⑪ Lubricant
- ⑫ Special tool
- ⑬ Tightening torque
- ⑭ Wear limit, clearance
- ⑮ Engine speed
- ⑯ Electrical data

Symbols ⑰ to ㉒ in the exploded diagrams indicate the types of lubricants and lubrication points.









- ⑰ Engine oil
- ⑱ Gear oil
- ⑲ Molybdenum disulfide oil
- ⑳ Wheel bearing grease
- ㉑ Lithium soap base grease
- ㉒ Molybdenum disulfide grease

Symbols ㉓ to ㉔ in the exploded diagrams indicate the following.

- ㉓ Apply locking agent (LOCTITE®).
- ㉔ Replace the part.

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# TABLE OF CONTENTS

<b>GENERAL INFORMATION</b>	
	<b>GEN INFO 1</b>
<b>SPECIFICATIONS</b>	
	<b>SPEC 2</b>
<b>PERIODIC CHECKS AND ADJUSTMENTS</b>	
	<b>CHK ADJ 3</b>
<b>CHASSIS</b>	
	<b>CHAS 4</b>
<b>ENGINE</b>	
	<b>ENG 5</b>
<b>CARBURETION</b>	
	<b>CARB 6</b>
<b>ELECTRICAL SYSTEM</b>	
	<b>ELEC 7</b>
<b>TROUBLESHOOTING</b>	
	<b>TRBL SHTG 8</b>

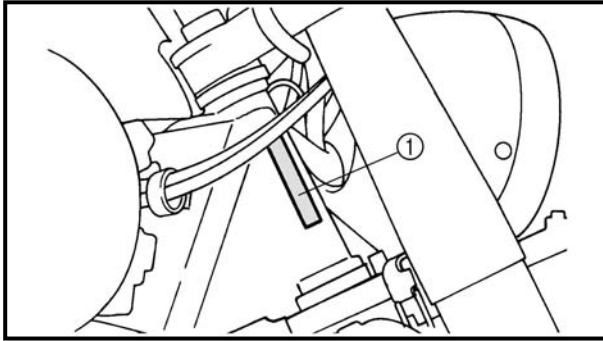
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# CONTENTS

## GENERAL INFORMATION

<b>MOTORCYCLE IDENTIFICATION</b> .....	1-1
VEHICLE IDENTIFICATION NUMBER .....	1-1
MODEL CODE .....	1-1
 <b>FEATURES</b> .....	 1-2
 <b>IMPORTANT INFORMATION</b> .....	 1-6
PREPARATION FOR REMOVAL AND DISASSEMBLY .....	1-6
REPLACEMENT PARTS .....	1-6
GASKETS, OIL SEALS AND O-RINGS .....	1-6
LOCK WASHERS/PLATES AND COTTER PINS .....	1-7
BEARINGS AND OIL SEALS .....	1-7
CIRCLIPS .....	1-7
 <b>CHECKING THE CONNECTIONS</b> .....	 1-8
 <b>SPECIAL TOOLS</b> .....	 1-9

1



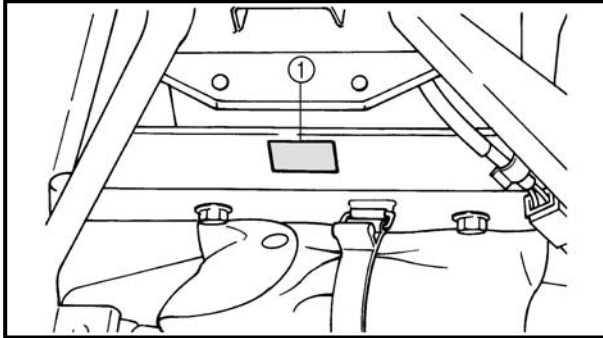
EAS00014

## GENERAL INFORMATION MOTORCYCLE IDENTIFICATION

EAS00017

### VEHICLE IDENTIFICATION NUMBER

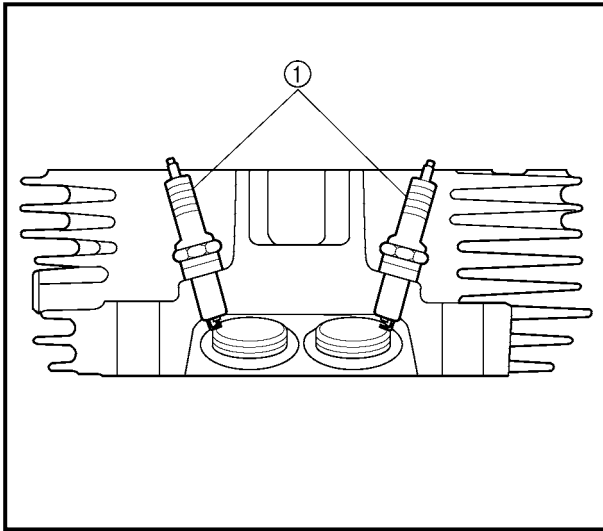
The vehicle identification number ① is stamped into the right side of the steering head pipe.



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### MODEL CODE

The model code label ① is affixed to the frame. This information will be needed to order spare parts.

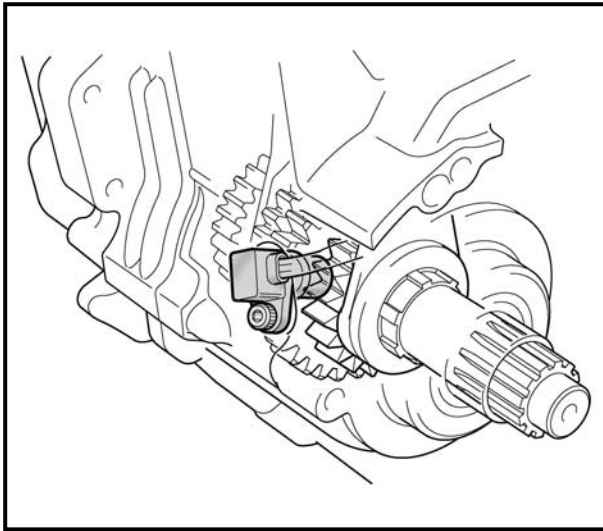


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**FEATURES**

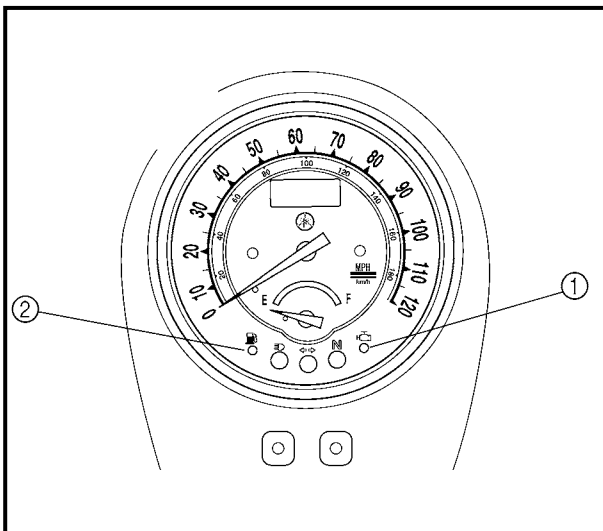
**Twin spark plugs**

For this model, two spark plugs are incorporated in each cylinder. By using two spark plugs, the combustion time in the combustion chamber is shortened in an attempt to improve torque.



**Speed sensor**

The speed sensor is installed to the crankcase and it detects the number of passing gears while the vehicle is running in 5th gear and sends the information out as an electrical signal to the ignitor unit.



**Self-diagnosis device**

This model is equipped with a self-diagnosis device that has four functions. The engine trouble indicator light will come on or flash if trouble occurs in an engine monitoring circuit.

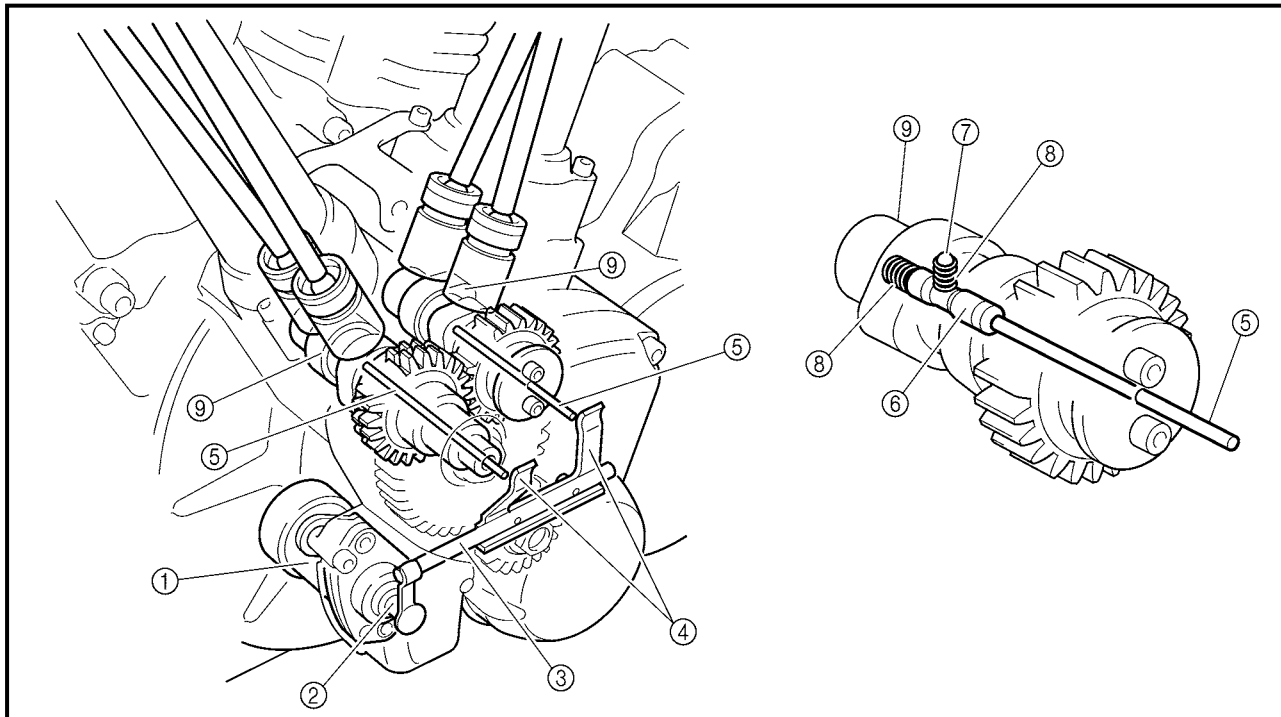
Circuit	Indicator lights	Number of flashes
Throttle position sensor	Engine trouble indicator light ①	3
Speed sensor	Engine trouble indicator light ①	4
Solenoid	Engine trouble indicator light ①	6
Fuel level meter	Fuel level indicator light ②	8



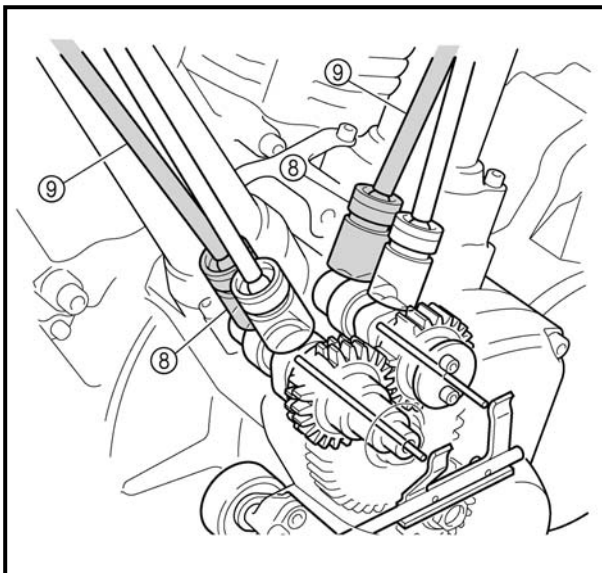
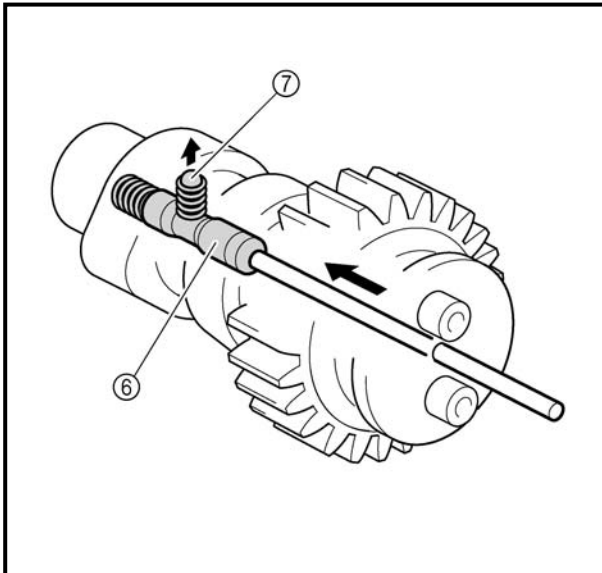
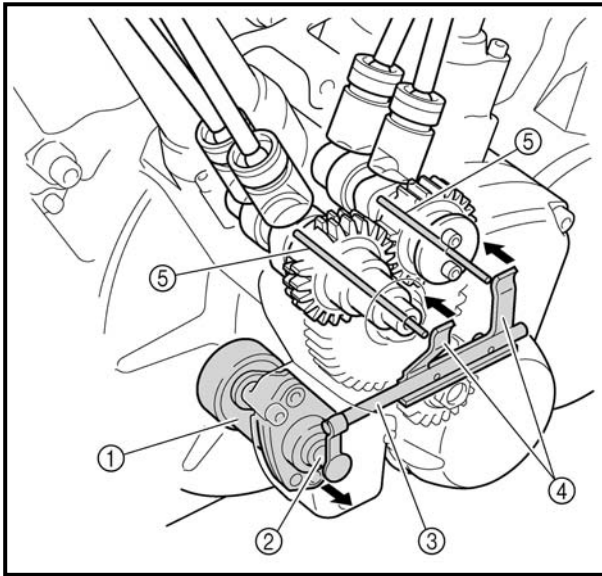
**Auto decompression mechanism**

The auto decompression mechanism occurs when the engine is started. When the engine is started, the decompression cam and pin raise the exhaust valve lifters, push the push rods, move the rocker arms, and lower the exhaust valves which compress the cylinder. When the cylinder is compressed, pressure is released immediately, resulting in smoother engine starting capabilities and smoother crankshaft revolutions.

1



- ① Decompression solenoid
- ② Decompression solenoid rod
- ③ Decompression connector
- ④ Decompression lever
- ⑤ Decompression push rod
- ⑥ Decompression cam
- ⑦ Pin
- ⑧ Spring
- ⑨ Camshaft



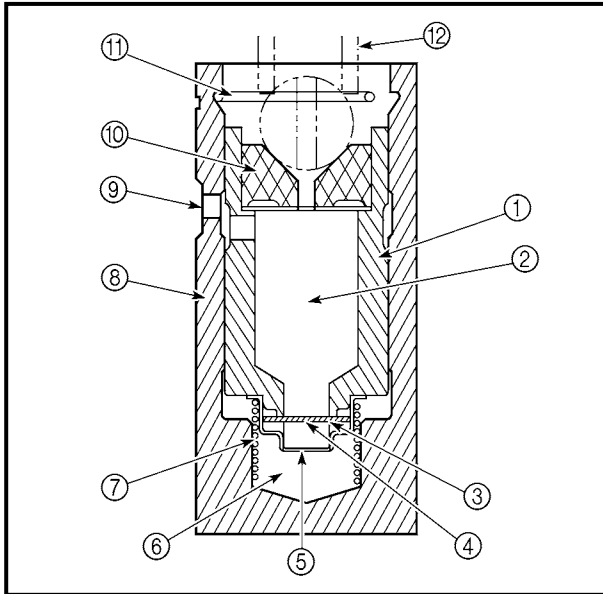
### Operation

1. When the starter switch is pushed, electricity is run to the decompression solenoid ① causing it to push out the decompression solenoid rod ②.
2. When the decompression solenoid rod is pushed out, the decompression connector ③ moves the decompression levers ④ in the direction indicated by the arrows, and then the levers push the decompression rods ⑤ toward the camshaft side.
3. The decompression cam ⑥ is pushed in the direction indicated by the arrow, and then the pin ⑦ raises the projection of the decompression cam.
4. When the camshaft is rotated by the self-timing motor, the exhaust valve lifters ⑧ are lifted by the pin just before top dead center (TDC) and the exhaust valve push rod ⑨ and valve rocker arms are operated. Thus, opening the exhaust valve becomes easy.
5. When the engine starts and reaches a specific engine speed the decompression solenoid is turned off and the decompression system stops operating.

## Hydraulic valve lifters

Since the hydraulic valve-lifting mechanism maintains a valve clearance of zero, periodic valve clearance adjustments are unnecessary.

The advantages of this system as compared to conventional techniques include the following: mechanical noise is reduced, the camshaft action on the valves remains unaffected by engine speed or temperature, and the valve timing is kept stable.



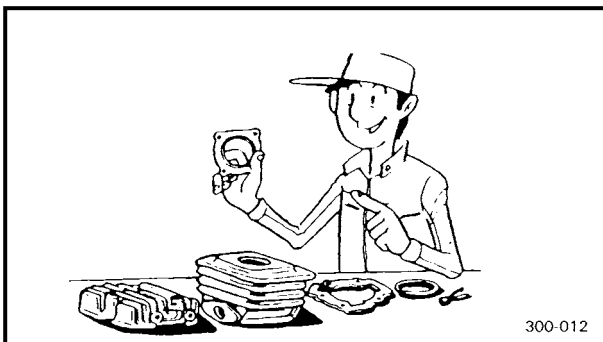
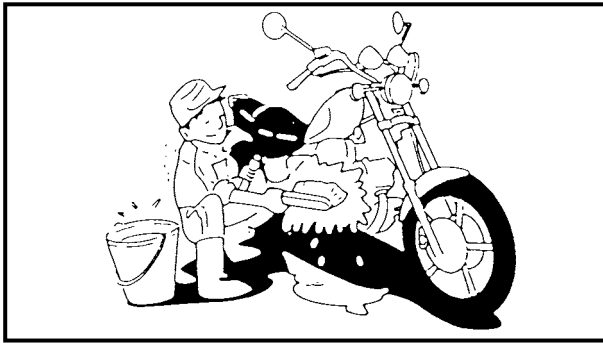
- ① Plunger
- ② Oil reservoir
- ③ Check valve spring
- ④ Check valve
- ⑤ Spring retainer
- ⑥ High-pressure chamber
- ⑦ Plunger spring
- ⑧ Valve lifter body
- ⑨ Oil supply inlet
- ⑩ Push rod cup
- ⑪ Plunger retaining clip
- ⑫ Valve push rod

The hydraulic valve-lifting system functions as follows:

1. As the camshaft rotates, the valve lifter is pushed up by the passing cam lobe.
2. Since the check valve ④ prevents the engine oil contained inside the high-pressure chamber from escaping, the plunger ① moves up along with the valve lifter body ⑧ and pushes up the push rod, causing the valve to be lifted.
3. As the camshaft continues to rotate, the valve lifter moves back down to its original position, where it remains while the cam heel passes.

When a positive valve clearance is caused by either heat expansion of the cylinder head or engine oil leaking from the valve lifter during stage 2, the plunger, which no longer receives pressure from the push rod, is pushed up by the plunger spring ⑦. As a result, the valve clearance is zeroed and engine oil is allowed to return to the high-pressure chamber from the reservoir ② through the check valve ④.

When, on the contrary, a negative valve clearance occurs (this is the case when the cam heel is passing the valve lifter, but the rocker arm, pushed by the push rod, is lifting the valve), the plunger ① continues to receive pressure from the valve push rod. As engine oil contained inside the high-pressure chamber leaks from the gaps between the valve lifter body ⑧ and the plunger ① as well as between the valve lifter body ⑧ and the check valve ④, the plunger ① moves down and the valve clearance is zeroed.



EAS00020

**IMPORTANT INFORMATION**

**PREPARATION FOR REMOVAL AND DISASSEMBLY**

1. Before removal and disassembly, remove all dirt, mud, dust, and foreign material.
2. Use only the proper tools and cleaning equipment. Refer to "SPECIAL TOOLS".
3. When disassembling, always keep mated parts together. This includes gears, cylinders, pistons, and other parts that have been "mated" through normal wear. Mated parts must always be reused or replaced as an assembly.
4. During disassembly, clean all of the parts and place them in trays in the order of disassembly. This will speed up assembly and allow for the correct installation of all parts.
5. Keep all parts away from any source of fire.

EAS00021

**REPLACEMENT PARTS**

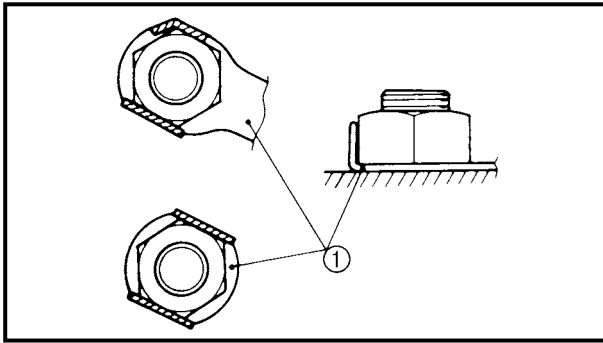
Use only genuine Yamaha parts for all replacements. Use oil and grease recommended by Yamaha for all lubrication jobs. Other brands may be similar in function and appearance, but inferior in quality.

EAS00022

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

1. When overhauling the engine, replace all gaskets, seals, and O-rings. All gasket surfaces, oil seal lips, and O-rings must be cleaned.
2. During reassembly, properly oil all mating parts and bearings and lubricate the oil seal lips with grease.

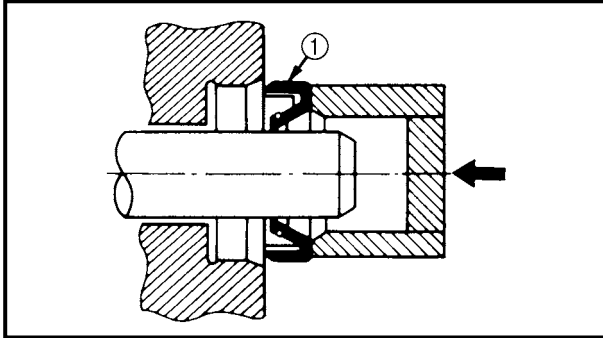
1



EAS00023

**LOCK WASHERS/PLATES AND COTTER PINS**

After removal, replace all lock washers/plates ① and cotter pins. After the bolt or nut has been tightened to specification, bend the lock washer tabs and the cotter pin ends along a flat of the bolt or nut.

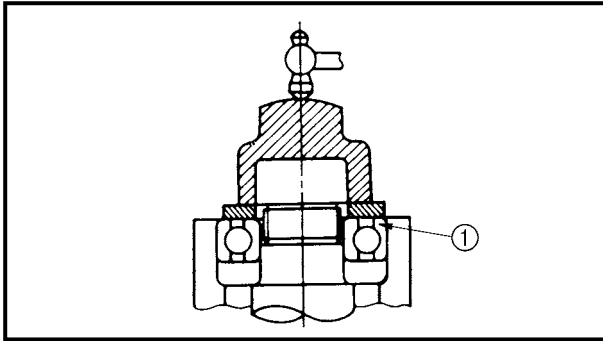


EAS00024

**BEARINGS AND OIL SEALS**

1. Install bearings and oil seals so that the manufacturer's marks or numbers are visible. When installing oil seals, lubricate the oil seal lips with a light coat of lithium soap base grease. Oil bearings liberally when installing, if appropriate.

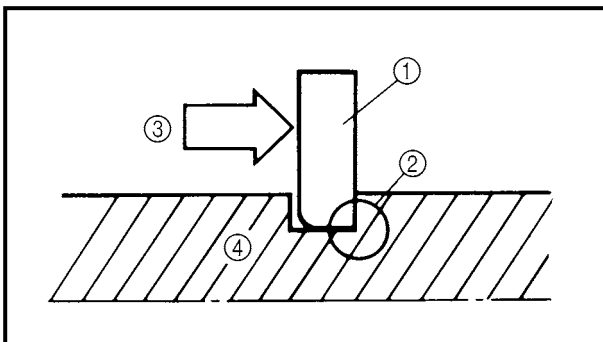
① Oil seal



**CAUTION:**

**Do not spin bearings with compressed air because this will damage the bearing surfaces.**

① Bearing



EAS00025

**CIRCLIPS**

Before reassembly, check all circlips carefully and replace damaged or distorted circlips. Always replace piston pin clips after one use. When installing a circlip ①, make sure the sharp-edged corner ② is positioned opposite the thrust ③ that the circlip receives.

④ Shaft

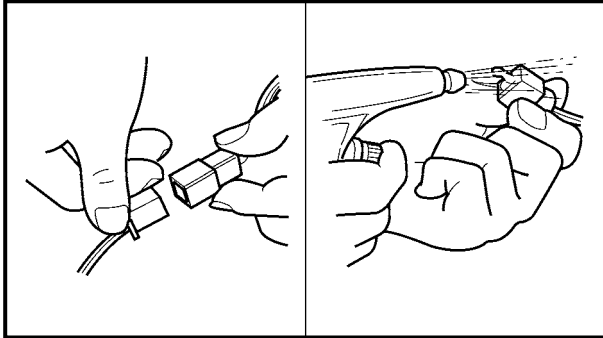
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**CHECKING THE CONNECTIONS**

Check the leads, couplers, and connectors for stains, rust, moisture, etc.

1. Disconnect:

- lead
- coupler
- connector

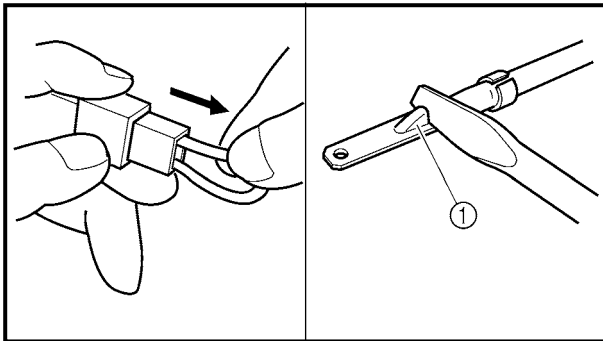


2. Check:

- lead
- coupler
- connector

Moisture → Dry with an air blower.

Rust/stains → Connect and disconnect several times.



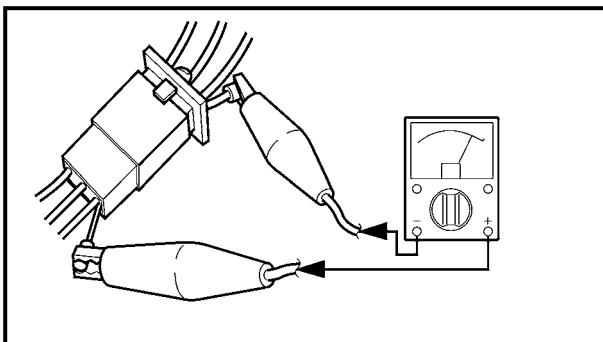
3. Check:

- all connections

Loose connection → Connect properly.

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

If the pin ① on the terminal is flattened, bend it up.



4. Connect:

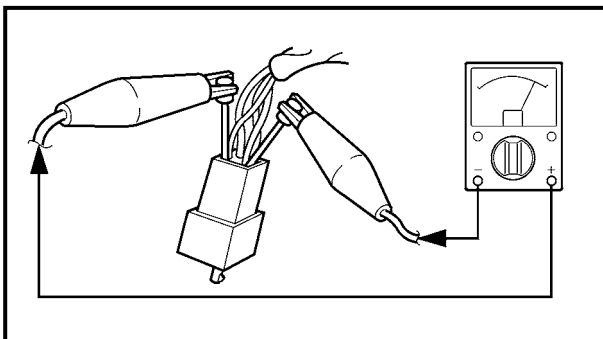
- lead
- coupler
- connector

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

Make sure all connections are tight.

5. Check:

- continuity  
(with the pocket tester)



	<b>Pocket tester YU-03112</b>
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**NOTE:** \_\_\_\_\_

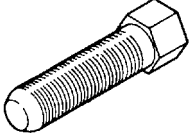
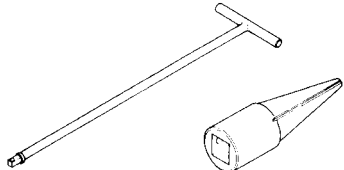
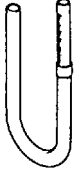
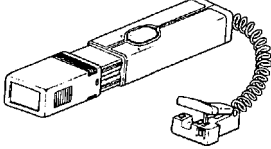
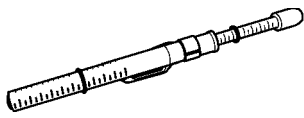
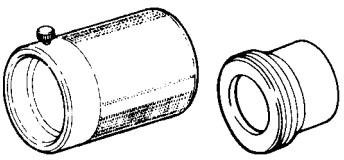
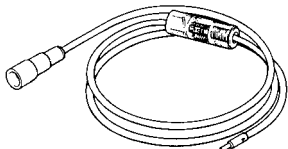
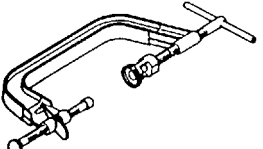
- If there is no continuity, clean the terminals.
- When checking the wire harness, perform steps (1) to (3).
- As a quick remedy, use a contact revitalizer available at most part stores.

EAS00027

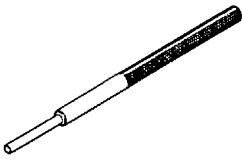
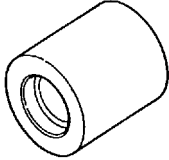
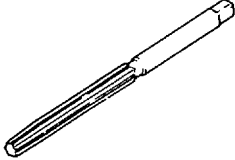
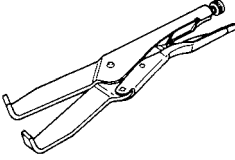
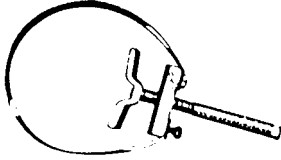
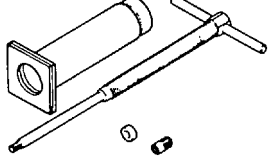

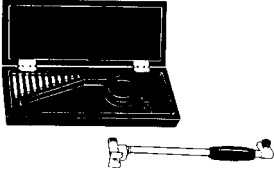
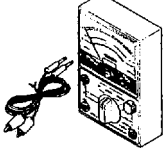
## SPECIAL TOOLS

The following special tools are necessary for complete and accurate tune-up and assembly. Use only the appropriate special tools as this will help prevent damage caused by the use of inappropriate tools or improvised techniques. Special tools, part numbers, or both may differ depending on the country.

When placing an order, refer to the list provided below to avoid any mistakes.

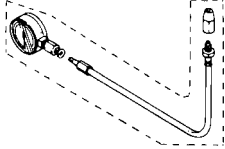
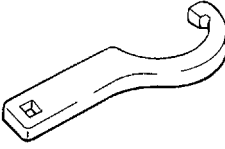
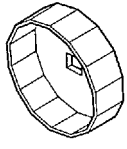
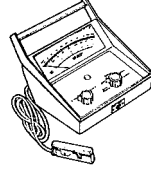
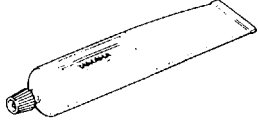
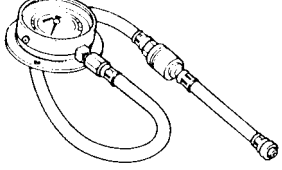
Tool No.	Tool name/Function	Illustration
YM-01080-A	Flywheel puller  This tool is used to remove the generator rotor.	
T-handle YM-01326 Damper rod holder YM-1300-1	T-handle Damper rod holder These tools are used to hold the cartridge cylinder when loosening or tightening the cartridge cylinder bolt.	
YM-01312-A	Fuel level gauge  This tool is used to measure the fuel level in the float chamber.	
YM-33277-A	Timing light  This tool is used to check the ignition timing.	
YM-03170	Belt tension gauge  This tool is used to measure the drive belt slack.	
Fork seal driver weight YM-33963 Adapter YM-8020	Fork seal driver weight Adapter These tools are used to install the front fork's oil seal and dust seal.	
YM-34487	Dynamic spark tester  This tool is used to check the ignition system components.	
YM-04019	Valve spring compressor  This tool is used to remove or install the valve assemblies.	



Tool No.	Tool name/Function	Illustration
YM-4064-A	Valve guide remover (6 mm) This tool is used to remove or install the valve guides.	
YM-4065-A	Valve guide installer This tool is used to install the valve guides.	
YM-4066	Valve guide reamer This tool is used to rebores the new valve guides.	
YM-91042	Universal clutch holder This tool is used to hold the clutch boss when removing or installing the clutch boss nut.	
YS-01880	Sheave holder This tool is used to hold the generator rotor when removing or installing the generator rotor bolt, generator shaft bolt or pickup coil rotor bolt.	
YU-01304	Piston pin puller This tool is used to remove the piston pins.	
YU-03009	Micrometer (75 ~ 100 mm) This tool is used to measure the piston skirt diameter.	
YU-03017	Cylinder bore gauge (50 ~ 100 mm) This tool is used to measure the cylinder bore.	
YU-03112	Pocket tester This tool is used to check the electrical system.	





Tool No.	Tool name/Function	Illustration
Compression gauge YU-33223 Compression gauge adapter YU-33223-3	Compression gauge  These tools are used to measure engine compression.	
YU-33975	Steering nut wrench  This tool is used to loosen or tighten the steering stem ring nuts.	
YU-38411	Oil filter wrench  This tool is needed to loosen or tighten the oil filter cartridge.	
YU-8036-A	Inductive tachometer  This tool is used to check engine speed.	
ACC-11001-05-01	Quick Gasket®  This sealant is used to seal two mating surfaces (e. g., crankcase mating surfaces).	
90890-03153	Oil pressure gauge  This tool is used to measure the engine oil pressure.	



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## CONTENTS SPECIFICATIONS

<b>GENERAL SPECIFICATIONS .....</b>	<b>2-1</b>
<b>ENGINE SPECIFICATIONS .....</b>	<b>2-2</b>
<b>CHASSIS SPECIFICATIONS .....</b>	<b>2-11</b>
<b>ELECTRICAL SPECIFICATIONS .....</b>	<b>2-15</b>
<b>TIGHTENING TORQUES .....</b>	<b>2-18</b>
GENERAL TIGHTENING TORQUES .....	2-18
ENGINE TIGHTENING TORQUES .....	2-19
CHASSIS TIGHTENING TORQUES .....	2-21
<b>LUBRICATION POINTS AND LUBRICANT TYPES .....</b>	<b>2-23</b>
ENGINE LUBRICATION POINTS AND LUBRICANT TYPES .....	2-23
CHASSIS LUBRICATION POINTS AND LUBRICANT TYPES .....	2-24
<b>ENGINE OIL LUBRICATION CHART .....</b>	<b>2-25</b>
<b>ENGINE OIL FLOW DIAGRAMS .....</b>	<b>2-26</b>
<b>TRANSFER GEAR OIL FLOW DIAGRAMS .....</b>	<b>2-30</b>
<b>CABLE ROUTING .....</b>	<b>2-32</b>



## SPECIFICATIONS

### GENERAL SPECIFICATIONS

Item	Standard	Limit
<b>Dimensions</b>		
Overall length	2,500 mm (98.4 in)	----
Overall width	980 mm (38.6 in)	----
Overall height	1,140 mm (44.9 in): XV16A	----
	1,500 mm (59.1 in): XV16AT	----
Seat height	710 mm (28.0 in)	----
Wheelbase	1,685 mm (66.3 in)	----
Minimum ground clearance	145 mm (5.71 in)	----
Minimum turning radius	3,200 mm (126 in)	----
<b>Weight</b>		
Wet (with oil and a full fuel tank)	332 kg (732 lb): XV16A	----
	347 kg (765 lb): XV16AT	----
Dry (without oil and fuel)	307 kg (678 lb): XV16A	----
	322 kg (710 lb): XV16AT	----
Maximum load (total of cargo, rider, passenger, and accessories)	196 kg (432 lb): XV16A	----
	181 kg (399 lb): XV16AT	----



## ENGINE SPECIFICATIONS

Item	Standard	Limit
<b>Engine</b>		
Engine type	Air-cooled, 4-stroke, OHV	----
Displacement	1,602 cm <sup>3</sup>	----
Cylinder arrangement	V-type 2-cylinder	----
Bore × stroke	95 × 113 mm (3.74 × 4.45 in)	----
Compression ratio	8.3:1	----
Engine idling speed	850 ~ 950 r/min	----
Vacuum pressure at engine idling speed	52 kPa (390 mm Hg, 15.4 in Hg)	----
Standard compression pressure (at sea level)	1,200 kPa (12.0 kgf/cm <sup>2</sup> , 171 psi) at 200 r/min	----
<b>Fuel</b>		
Recommended fuel	Unleaded fuel (for USA) Regular unleaded gasoline (for CDN)	----
Fuel tank capacity		
Total (including reserve)	20 L (17.6 Imp qt, 21.1 US qt)	----
Reserve only	3.5 L (3.08 Imp qt, 3.70 US qt)	----
<b>Engine oil</b>		
Lubrication system	Dry sump	----
Recommended oil		----
	Yamalube 4 (20W40) or SAE 20W40 type SE motor oil (40°F/5°C or above) (Non-Friction modified)	
Quantity		
Total amount	5.0 L (4.4 Imp qt, 5.3 US qt)	----
Without oil filter cartridge replacement	3.7 L (3.3 Imp qt, 3.9 US qt)	----
With oil filter cartridge replacement	4.1 L (3.6 Imp qt, 4.3 US qt)	----
Oil pressure (hot)	60 kPa (0.6 kgf/cm <sup>2</sup> , 8.5 psi) at 900 r/min	----
Relief valve opening pressure	0.60 MPa (6.0 kgf/cm <sup>2</sup> , 85 psi)	----
<b>Transfer gear oil</b>		
Recommended oil	SAE80API "GL-4" hypoid gear oil	----
Quantity	0.4 L (0.35 Imp qt, 0.42 US qt)	----
<b>Oil filter</b>		
Oil filter type	Cartridge (paper)	----
Bypass valve opening pressure	80 ~ 120 kPa (0.8 ~ 1.2 kgf/cm <sup>2</sup> , 11.3 ~ 17.1 psi)	----

# ENGINE SPECIFICATIONS

**SPEC**



**2**

Item	Standard	Limit
<b>Engine oil pump</b>		
Oil pump type	Trochoidal	----
Inner rotor to outer rotor tip clearance	0.00 ~ 0.12 mm (0.000 ~ 0.005 in)	0.17 mm (0.007 in)
Inner rotor outer rotor 2 to oil pump housing clearance (feed pump)	0.03 ~ 0.08 mm (0.001 ~ 0.003 in)	0.13 mm (0.005 in)
Inner rotor outer rotor 1 to oil pump housing clearance (scavenging pump)	0.06 ~ 0.11 mm (0.002 ~ 0.004 in)	0.16 mm (0.006 in)
<b>Transfer oil pump</b>		
Oil pump type	Trochoidal	----
Inner rotor to outer rotor tip clearance	0.07 ~ 0.12 mm (0.003 ~ 0.005 in)	0.17 mm (0.007 in)
Inner rotor outer rotor to oil pump housing clearance	0.03 ~ 0.08 mm (0.001 ~ 0.003 in)	0.16 mm (0.006 in)
<b>Starting system type</b>		
	Electric starter	
<b>Spark plugs</b>		
Model	DPR7EA-9/X22EPR-U9	----
Manufacturer	NGK/DENSO	----
Quantity	4	----
Spark plug gap	0.8 ~ 0.9 mm (0.031 ~ 0.035 in)	----
<b>Cylinder heads</b>		
Max. warpage	----	0.10 mm (0.004 in)
<b>Camshafts</b>		
Drive system	Gear drive	----
Crankcase hole inside diameter	25.000 ~ 25.021 mm (0.9843 ~ 0.9851 in)	----
Camshaft cover hole inside diameter	28.000 ~ 28.021 mm (1.1024 ~ 1.1032 in)	----
Camshaft journal diameter (crankcase side)	24.937 ~ 24.950 mm (0.9818 ~ 0.9823 in)	----
Camshaft journal diameter (camshaft cover side)	27.967 ~ 27.980 mm (1.1011 ~ 1.1016 in)	----
Camshaft to crankcase clearance	0.050 ~ 0.084 mm (0.0020 ~ 0.0033 in)	----
Camshaft to camshaft cover clearance	0.020 ~ 0.054 mm (0.0008 ~ 0.0021 in)	----
Camshaft intake cam dimensions		



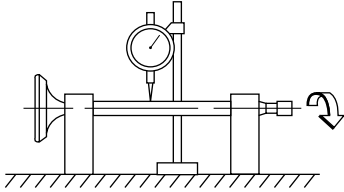
Item	Standard	Limit
Measurement A	36.594 ~ 36.649 mm (1.4407 ~ 1.4429 in)	36.494 mm (1.4368 in)
Measurement B	31.950 ~ 32.050 mm (1.2579 ~ 1.2618 in)	31.850 mm (1.2539 in)
Camshaft exhaust cam dimensions		
Measurement A	36.554 ~ 36.654 mm (1.4391 ~ 1.4431 in)	36.454 mm (1.4352 in)
Measurement B	31.950 ~ 32.050 mm (1.2579 ~ 1.2618 in)	31.850 mm (1.2539 in)
<b>Rocker arms, Rocker arm shafts</b>		
Rocker arm inside diameter	15.000 ~ 15.018 mm (0.5906 ~ 0.5913 in)	15.036 mm (0.5920 in)
Rocker arm shaft outside diameter	14.981 ~ 14.991 mm (0.5898 ~ 0.5902 in)	14.97 mm (0.5894 in)
Rocker arm to rocker arm shaft clearance	0.009 ~ 0.037 mm (0.0004 ~ 0.0015 in)	0.08 mm (0.003 in)
<b>Valves, valve seats, valve guides</b>		
Valve clearance (cold)		
Intake	0 ~ 0.04 mm (0 ~ 0.0016 in)	----
Exhaust	0 ~ 0.04 mm (0 ~ 0.0016 in)	----
Valve dimensions		
Head Diameter		
Face Width		
Seat Width		
Margin Thickness		
Valve head diameter A		
Intake	33.9 ~ 34.1 mm (1.3346 ~ 1.3425 in)	----
Exhaust	27.9 ~ 28.1 mm (1.0984 ~ 1.1063 in)	----
Valve face width B		
Intake	1.3 ~ 2.3 mm (0.0512 ~ 0.0906 in)	----
Exhaust	1.2 ~ 2.4 mm (0.0472 ~ 0.0945 in)	----
Valve seat width C		
Intake	0.9 ~ 1.1 mm (0.035 ~ 0.043 in)	2.0 mm (0.079 in)
Exhaust	0.9 ~ 1.1 mm (0.035 ~ 0.043 in)	2.0 mm (0.079 in)

# ENGINE SPECIFICATIONS

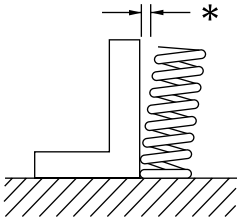

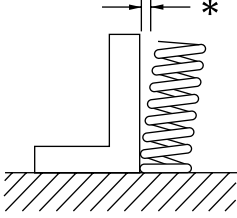
**SPEC**



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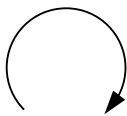
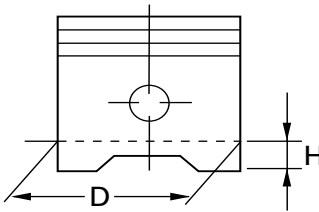
Item	Standard	Limit
Valve margin thickness D		
Intake	0.7 ~ 1.3 mm (0.028 ~ 0.051 in)	0.4 mm (0.016 in)
Exhaust	0.7 ~ 1.3 mm (0.028 ~ 0.051 in)	0.4 mm (0.016 in)
Valve stem diameter		
Intake	5.975 ~ 5.990 mm (0.2352 ~ 0.2358 in)	5.945 mm (0.2341 in)
Exhaust	5.960 ~ 5.975 mm (0.2346 ~ 0.2352 in)	5.920 mm (0.2331 in)
Valve guide inside diameter		
Intake	6.000 ~ 6.012 mm (0.2362 ~ 0.2367 in)	6.05 mm (0.2382 in)
Exhaust	6.000 ~ 6.012 mm (0.2362 ~ 0.2367 in)	6.05 mm (0.2382 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 (0.0010 ~ 0.0020 in)	0.1 mm (0.004 in)
Valve stem runout	----	0.01 mm (0.0004 in)
		
Valve seat width		
Intake	0.9 ~ 1.1 mm (0.035 ~ 0.043 in)	----
Exhaust	0.9 ~ 1.1 mm (0.035 ~ 0.043 in)	----
<b>Valve springs</b>		
Inner springs		
Free length		
Intake	38.26 mm (1.51 in)	36.26 mm (1.43 in)
Exhaust	38.26 mm (1.51 in)	36.26 mm (1.43 in)
Installed length (valve closed)		
Intake	29.0 mm (1.14 in)	----
Exhaust	29.0 mm (1.14 in)	----
Compressed spring force (installed)		
Intake	63 ~ 73 N (6.3 ~ 7.3 kgf, 13.9~ 16.1 lb)	----
Exhaust	63 ~ 73 N (6.3 ~ 7.3 kgf, 13.9~ 16.1 lb)	----



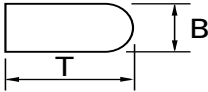
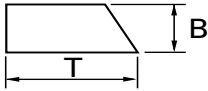
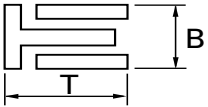
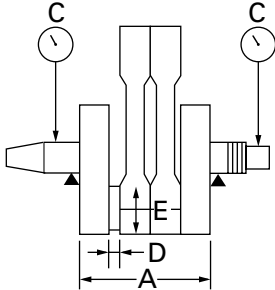
Item	Standard	Limit
<p>Spring tilt</p> 		
Intake	----	2.5° /2.4 mm (2.5°/0.094 in)
Exhaust	----	2.5° /2.4 mm (2.5°/0.094 in)
Winding direction (top view)		
Intake	Counterclockwise	----
Exhaust	Counterclockwise	----
		
Outer springs		
Free length		
Intake	43.25 mm (1.70 in)	41.26 mm (1.62 in)
Exhaust	43.25 mm (1.70 in)	41.26 mm (1.62 in)
Installed length (valve closed)		
Intake	31.0 mm (1.22 in)	----
Exhaust	31.0 mm (1.22 in)	----
Compressed spring force (installed)		
Intake	139 ~ 161 N (13.9 ~ 16.1 kgf, 30.6 ~ 35.5 lb)	----
Exhaust	139 ~ 161 N (13.9 ~ 16.1 kgf, 30.6 ~ 35.5 lb)	----
Spring tilt		
		
Intake	----	2.5° /2.4 mm (2.5°/0.094 in)
Exhaust	----	2.5° /2.4 mm (2.5°/0.094 in)





Item	Standard	Limit
Winding direction (top view) Intake Exhaust	Clockwise Clockwise 	---- ----
<b>Valve lifters</b>		
Valve lifter outside diameter	22.9680 ~ 22.9744 mm (0.9043 ~ 0.9045 in)	----
Valve lifter case inside diameter	22.990 ~ 23.010 mm (0.9051 ~ 0.9059 in)	----
Valve lifter-to-valve lifter case clearance	0.0156 ~ 0.0420 mm (0.0006 ~ 0.0017 in)	----
<b>Valve push rods</b>		
Valve push rod length	293.45 ~ 293.95 mm (11.553 ~ 11.573 in)	----
Valve push rod runout	0.3 mm (0.012 in)	----
<b>Cylinders</b>		
Bore	95.000 ~ 95.010 mm (3.7402 ~ 3.7406 in)	----
Max. taper	----	0.05 mm (0.0016 in)
Max. out of round	----	0.05 mm (0.0016 in)
<b>Pistons</b>		
Piston-to-cylinder clearance	0.025 ~ 0.050 mm (0.001 ~ 0.002 in)	0.15 mm (0.006 in)
Diameter D 	94.960 ~ 94.975 mm (3.7386 ~ 3.7392 in)	----
Height H	5 mm (0.20 in)	----
Piston pin bore (in the piston) Diameter	22.004 ~ 22.015 mm (0.8663 ~ 0.8667 in)	22.045 mm (0.8679 in)
Offset	1.0 mm (0.04 in)	----
Piston pins Outside diameter	21.991 ~ 22.000 mm (0.8658 ~ 0.8661 in)	21.971 mm (0.8650 in)
Piston pin-to-piston pin bore clearance	0.004 ~ 0.024 mm (0.00016 ~ 0.00094 in)	0.074 mm (0.0029 in)



Item	Standard	Limit
<p><b>Piston rings</b></p> <p><b>Top ring</b></p>  <p>Ring type                      Dimensions (B × T)                      End gap (installed)                      Ring side clearance</p> <p><b>2nd ring</b></p>  <p>Ring type                      Dimensions (B × T)                      End gap (installed)                      Ring side clearance</p> <p><b>Oil ring</b></p>  <p>Dimensions (B × T)                      End gap (installed)</p>	<p>Barrel</p> <p>1.2 × 3.8 mm (0.047 × 0.150 in)</p> <p>0.30 ~ 0.45 mm (0.012 ~ 0.018 in)</p> <p>0.03 ~ 0.08 mm (0.0012 ~ 0.0031 in)</p> <p>Taper</p> <p>1.2 × 3.8 mm (0.047 × 0.150 in)</p> <p>0.30 ~ 0.45 mm (0.012 ~ 0.018 in)</p> <p>0.03 ~ 0.07 mm (0.0012 ~ 0.0028 in)</p> <p>2.5 × 3.4 mm (0.098 × 0.134 in)</p> <p>0.2 ~ 0.7 mm (0.008 ~ 0.028 in)</p>	<p>----</p> <p>----</p> <p>0.65 mm (0.026 in)</p> <p>0.12 mm (0.0047 in)</p> <p>----</p> <p>----</p> <p>0.8 mm (0.031 in)</p> <p>0.12 mm (0.0047 in)</p> <p>----</p> <p>----</p>
<p><b>Connecting rods</b></p> <p>Crankshaft pin-to-big end bearing clearance</p> <p>Bearing color code</p> <p>Connecting rod length</p>	<p>0.037 ~ 0.074 mm (0.0015 ~ 0.0029 in)</p> <p>1 = Blue, 2 = Black, 3 = Brown, 4 = Green, 5 = Yellow.</p> <p>191.95 ~ 192.05 mm (7.557 ~ 7.561 in)</p>	<p>----</p> <p>----</p>
<p><b>Crankshaft</b></p>  <p>Width A</p> <p>Max. runout C</p> <p>Big end side clearance D</p>	<p>132.8 ~ 133.2 mm (5.228 ~ 5.244 in)</p> <p>0.320 ~ 0.474 mm (0.013 ~ 0.019 in)</p>	<p>----</p> <p>0.04 mm (0.0016 in)</p> <p>----</p>

# ENGINE SPECIFICATIONS

**SPEC**



Item	Standard	Limit
Big end radial clearance E	0.037 ~ 0.074 mm (0.0015 ~ 0.0029 in)	0.09 mm (0.0035 in)
Crankshaft journal-to-crankshaft-journal bearing clearance	0.030 ~ 0.062 mm (0.0012 ~ 0.0024 in)	0.1 mm (0.0040 in)
<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 (0.114 ~ 0.122 in)	2.8 mm (0.110 in)
Plate quantity	9	----
Clutch plates		
Thickness	2.2 ~ 2.4 mm (0.087 ~ 0.094 in)	----
Plate quantity	8	----
Max. warpage	----	0.2 mm (0.008 in)
Clutch springs		
Free length	7 mm (0.276 in)	----
Spring quantity	1	----
Min. length		6.5 mm (0.256 in)
<b>Transmission</b>		
Transmission type	Constant mesh, 5-speed	----
Primary reduction system	Spur gear	----
Primary reduction ratio	72/47 (1.532)	----
Secondary reduction system	Belt drive	----
Secondary reduction ratio	35/32 × 70/33 (2.320)	----
Operation	Left-foot operation	----
Gear ratios		
1st gear	39/16 (2.437)	----
2nd gear	30/19 (1.578)	----
3rd gear	29/25 (1.160)	----
4th gear	29/32 (0.906)	----
5th gear	21/28 (0.750)	----
Max. main axle runout	----	0.08 mm (0.003 in)
Max. drive axle runout	----	0.08 mm (0.003 in)

2

# ENGINE SPECIFICATIONS

**SPEC**



**2**

Item	Standard	Limit
<b>Shifting mechanism</b>		
Shift mechanism type	Guide bar	----
Max. shift fork guide bar bending	----	0.025 mm (0.001 in)
Shift fork thickness	6.26 ~ 6.39 mm (0.246 ~ 0.252 in)	----
<b>Air filter type</b>		
	Dry element	----
<b>Fuel pump</b>		
Pump type	Electrical	----
Model (manufacturer)	4WM (MITSUBISHI)	----
Output pressure	15 ~ 20 kPa (0.15 ~ 0.20 kgf/cm <sup>2</sup> , 2.1 ~ 2.8 psi)	----
<b>Carburetor</b>		
Model (manufacturer) × quantity	BSR40 (MIKUNI) × 1	----
Throttle cable free play (at the flange of the throttle grip)	3 ~ 5 mm (0.12 ~ 0.20 in)	----
ID mark	4WM1 00 4WM2 10 (for California)	----
Main jet	#165	----
Main air jet	#60	----
Jet needle	6HDC26	----
Needle jet	X-2	----
Pilot air jet	#100	----
Pilot outlet	1.0 (XV16A), 1.1 (XV16AT)	----
Pilot jet	#35	----
Bypass 1	0.9	----
Bypass 2	1.0	----
Bypass 3	0.9	----
Pilot screw turns out	2-1/2	----
Valve seat size	2.0	----
Starter jet 1	#57.5	----
Starter jet 2	1.0	----
Butterfly valve size	#110	----
Fuel level (below the float chamber mating surface)	2.0 ~ 3.0 mm (0.079 ~ 0.12 in)	----



2

CHASSIS SPECIFICATIONS

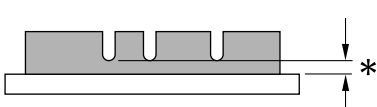
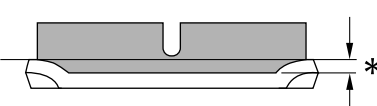
Item	Standard	Limit
<b>Frame</b>		
Frame type	Double cradle	----
Caster angle	32°	----
Trail	142 mm (5.59 in)	----
<b>Front wheel</b>		
Wheel type	Spoke wheel	----
Rim		
Size	16 × MT3.00	----
Material	Steel	----
Wheel travel	140 mm (5.51 in)	----
Wheel runout		
Max. radial wheel runout	----	1 mm (0.04 in)
Max. lateral wheel runout	----	0.5 mm (0.02 in)
<b>Rear wheel</b>		
Wheel type	Spoke wheel	----
Rim		
Size	16 × MT3.50	----
Material	Steel	----
Wheel travel	110 mm (4.33 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	With tube	----
Size	130/90 - 16 67H	----
Model (manufacturer)	D404FL (DUNLOP)/ G703F (BRIDGESTONE)	----
Tire pressure (cold)		
0 ~ 90 kg (0 ~ 198 lb)	250 kPa (2.5 kg/cm <sup>2</sup> , 36 psi)	----
90 kg (198 lb) ~ Maximum load*	250 kPa (2.5 kg/cm <sup>2</sup> , 36 psi)	----
High-speed riding	250 kPa (2.5 kg/cm <sup>2</sup> , 36 psi)	----
	* Load is the total weight of the cargo, rider, passenger and accessories.	
Min. tire tread depth	----	1.6 mm (0.06 in)

# CHASSIS SPECIFICATIONS

**SPEC**



**2**

Item	Standard	Limit
<b>Rear tire</b>		
Tire type	With tube	----
Size	150/80 B16 71H	----
Model (manufacturer)	D404 (DUNLOP)/ G702 (BRIDGESTONE)	----
Tire pressure (cold)		
0 ~ 90 kg (0 ~ 198 lb)	250 kPa (2.5 kg/cm <sup>2</sup> , 36 psi)	----
90 kg (198 lb) ~ Maximum load*	280 kPa (2.8 kg/cm <sup>2</sup> , 40 psi)	----
High-speed riding	280 kPa (2.8 kg/cm <sup>2</sup> , 40 psi)	----
	* Load is the total weight of the cargo, rider, passenger and accessories.	
Min. tire tread depth	----	1.6 mm (0.06 in)
<b>Front brakes</b>		
Brake type	Dual-disc brake	----
Operation	Right-hand operation	----
Brake lever free play (lever end)	2 ~ 5 mm (0.08 ~ 0.20 in)	----
Recommended fluid	DOT 4	----
Brake discs		
Diameter × thickness	298 × 5 mm (11.7 × 0.20 in)	----
Min. thickness	----	4.5 mm (0.18 in)
Max. deflection	----	0.1 mm (0.004 in)
Brake pad lining thickness	6.0 mm (0.24 in)	0.5 mm (0.02 in)
		
Master cylinder inside diameter	15.8 mm (0.62 in)	----
Caliper cylinder inside diameter	30.1 mm (1.19 in) and 33.3 mm (1.31 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 board)	100 mm (3.9 in)	----
Recommended fluid	DOT 4	----
Brake discs		
Diameter × thickness	320 × 7 mm (12.6 × 0.28 in)	----
Min. thickness	----	6.5 mm (0.26 in)
Max. deflection	----	0.1 mm (0.004 in)
Brake pad lining thickness	7.5 mm (0.30 in)	0.5 mm (0.02 in)
		

# CHASSIS SPECIFICATIONS

**SPEC**



Item	Standard	Limit
Master cylinder inside diameter	12.7 mm (0.5 in)	----
Caliper cylinder inside diameter	33.9 mm (1.33 in) and 30.2 mm (1.19 in)	----
<b>Steering</b>		
Steering bearing type	Taper roller bearings	----
<b>Front suspension</b>		
Suspension type	Telescopic fork	----
Front fork type	Coil spring/oil damper	----
Front fork travel	140 mm (5.51 in)	----
Spring		
Free length	571 mm (22.5 in)	566 mm (22.3 in)
Spring rate (K1)	6.8 N/mm (0.7 kgf/mm, 39.2 lb/in)	
Spring stroke (K1)	0 ~ 140 mm (0 ~ 5.51 in)	----
Optional spring available	No	----
Fork oil		
Recommended oil	Yamaha fork oil 5WT	----
Quantity (each front fork leg)	554 cm <sup>3</sup> (19.5 Imp oz, 18.7 US oz)	----
Level (from the top of the inner tube, with the inner tube fully compressed, and without the fork spring)	110 mm (4.33 in)	----
Inner tube outer diameter	43 mm (1.69 in)	----
<b>Rear suspension</b>		
Suspension type	Swingarm (link suspension)	----
Rear shock absorber assembly type	Coil spring/gas-oil damper	----
Rear shock absorber assembly travel	50 mm (1.97 in)	----
Spring		
Free length	187 mm (7.36 in)	182 mm (7.17 in)
Installed length	172 mm (6.77 in): XV16A 169 mm (6.65 in): XV16AT	----
Spring rate (K1)	127 N/mm (13 kgf/mm, 728 lb/in)	----
Spring stroke (K1)	0 ~ 50 mm (0 ~ 1.97 in)	----
Optional spring available	No	----
Standard spring preload gas/air pressure	1,000 kPa (10 kgf/cm <sup>2</sup> , 142 psi)	----
<b>Swingarm</b>		
Free play (at the end of the swingarm)		
Radial	----	1 mm (0.04 in)
Axial	----	1 mm (0.04 in)

2

# CHASSIS SPECIFICATIONS

**SPEC**



Item	Standard	Limit
<b>Drive belt</b>		
Model (manufacturer)	UBD-0568	----
Drive belt slack (on a sidestand)	7.5 ~ 13 mm (0.30 ~ 0.51 in)	----
Drive belt slack (on a suitable stand)	14 ~ 21 mm (0.55 ~ 0.83 in)	----

**2**





## ELECTRICAL SPECIFICATIONS

Item	Standard	Limit
<b>System voltage</b>	12 V	----
<b>Ignition system</b>		
Ignition system type	Transistorized coil ignition (TCI)	----
Ignition timing	10° BTDC at 1,000 r/min	----
Advanced timing	40° BTDC at 4,000 r/min	----
Advancer type	Throttle position sensor and electrical	----
Pickup coil resistance/color	248 ~ 372 Ω / Gy-B	----
Transistorized coil ignition unit model (manufacturer)	J4T098 (MITSUBISHI)	----
<b>Ignition coils</b>		
Model (manufacturer)	J0383 (DENSO)	----
Minimum ignition spark gap	6 mm (0.24 in)	----
Primary coil resistance	1.53 ~ 2.07 Ω	----
Secondary coil resistance	12 ~ 18 kΩ	----
<b>Spark plug caps</b>		
Material	Resin	----
Resistance	10 kΩ	----
<b>Throttle position sensor standard resistance</b>	4.0 ~ 6.0 kΩ	----
<b>Charging system</b>		
System type	AC magneto	----
Model (manufacturer)	F4T363 (MITSUBISHI)	----
Nominal output	14 V / 21 A at 5,000 r/min	----
Stator coil resistance	0.45 ~ 0.55 Ω at 20°C (68°F)	----
<b>Voltage regulator</b>		
Regulator type	Semiconductor, short circuit	----
Model	SH650D-11	----
No-load regulated voltage	14.1 ~ 14.9 V	----
<b>Rectifier</b>		
Model	SH650D-11	----
Rectifier capacity	18 A	----
Withstand voltage	200 V	----
<b>Battery</b>		
Battery type	YTX20L-BS	----
Battery voltage/capacity	12V / 18AH	----
<b>Headlight type</b>	Halogen bulb	
<b>Indicator light type × quantity</b>	Bulb × 3 and LED × 2	
<b>Bulbs (voltage/wattage × quantity)</b>		
Headlight	12 V 60 W / 55 W × 1	----
Tail/brake light	12 V 8 W / 27 W × 1	----
Front turn signal/position light	12 V 27 W / 8 W × 2	----
Rear turn signal light	12 V 27 W × 2	----
Meter light	14 V 1.7 W × 3	----

# ELECTRICAL SPECIFICATIONS

**SPEC**



2

Item	Standard	Limit
Neutral indicator light	12 V 1.7 W × 1	
Turn signal indicator light	12 V 1.7 W × 1	
High beam indicator light	12 V 1.7 W × 1	
Fuel level indicator light	LED	
Engine trouble indicator light	LED	
<b>Electric starting system</b>		
System type	Constant mesh	----
Starter motor		
Model (manufacturer)	SM-13 (MITSUBA)	----
Power output	0.8 kW	----
Brushes		
Overall length	10 mm (0.40 in)	5 mm (0.20 in)
Spring force	7.65 ~ 10.01 N (765 ~ 1,001 gf, 27.0 ~ 35.3 oz)	----
Commutator resistance	25 ~ 35 mΩ	----
Commutator diameter	28 mm (1.10 in)	27 mm (1.06 in)
Mica undercut	0.7 mm (0.03 in)	----
<b>Starter relay</b>		
Model (manufacturer)	MS5F-411 (JIDECO)	----
Amperage	100 A	----
Coil resistance	4.18 ~ 4.62 Ω	----
<b>Horn</b>		
Horn type	Eddy	----
Model (manufacturer) × quantity	YP-12 (NIKKO) × 2	----
Max. amperage	2 A	----
<b>Turn signal relay</b>		
Relay type	Semi-transistor	----
Model (manufacturer)	FB257H (DENSO)	----
Self-cancelling device built-in	Yes	----
Turn signal blinking frequency	75 ~ 95 cycles/min.	----
Wattage	27 W × 2 + 3.4 W, 21 (23) W × 2 + 3.4 W	----
<b>Fuel sender</b>		
Model (manufacturer)	4WM (NIPPON SEIKI)	----
Resistance	13 ~ 140 Ω at 20 °C (68 °F)	----
<b>Sidestand relay</b>		
Model (manufacturer)	G8R-30Y-B (OMRON)	----
Coil resistance	202 ~ 248 Ω	----
<b>Diode</b>		
	Yes	----
<b>Fuel pump maximum amperage</b>		
	1 A	----
<b>Fuel pump relay model (manufacturer)</b>		
	G8R-30Y-B (OMRON)	----
<b>Thermo switch model (manufacturer)</b>		
	4TR (NIPPON TEXISAS INSTALLMENTS)	----

# ELECTRICAL SPECIFICATIONS

**SPEC**



Item	Standard	Limit
<b>Fuses (amperage × quantity)</b>		
Main fuse	30 A × 1	----
Headlight fuse	15 A × 1	----
Signaling system fuse	10 A × 1	----
Ignition fuse	15 A × 1	----
Carburetor heater fuse	10 A × 1	----
Backup fuse (odometer)	5 A × 1	----
Reserve fuse	30 A, 15 A, 10 A, 5 A × 1	----

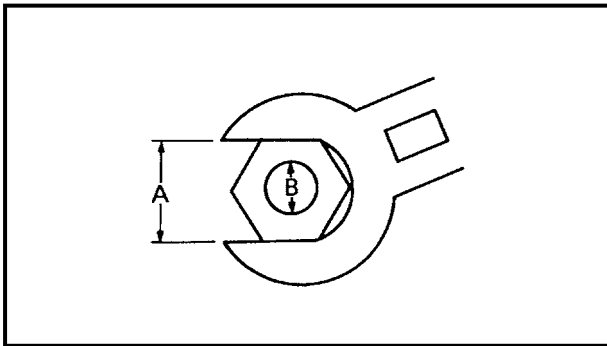
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## TIGHTENING TORQUES

### 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
17 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·kgf	ft·lb	
Spark plug	–	M12	4	18	1.8	13	
Cylinder head	Nut	M12	8	50	5.0	36	
Cylinder head	Nut	M10	4	39	3.9	28	
Cylinder head (exhaust pipe)	Stud bolt	M8	4	15	1.5	11	
Camshaft driven gear	Nut	M14	1	52	5.2	37	
Camshaft drive gear	Bolt	M10	1	30	3.0	22	
Connecting rod	Bolt	M8	4	38.5	3.85	28	
Rocker arm adjusting screw	Nut	M7	4	20	2.0	14	
Front cylinder camshaft end cover	Bolt	M5	2	10	1.0	7.2	
Engine oil drain bolt (crankcase)	–	M14	1	43	4.3	31	
Engine oil drain bolt (oil tank)	–	M14	1	43	4.3	31	
Oil filter cartridge	–	M20	1	17	1.7	12	
Oil filter bolt	–	M20	1	70	7.0	50	
Oil filter bracket	Bolt	M6	4	10	1.0	7.2	
Oil delivery pipe (generator cover-to-crankcase)	Nut	M20	1	40	4.0	29	
Joint bolt	–	M16	1	40	4.0	29	
Oil delivery pipe (cylinder head-to-crankcase)	Union bolt	M10	2	21	2.1	15	
Oil delivery pipe (cylinder head-to-crankcase)	Union bolt	M8	1	18	1.8	13	
Carburetor joint	Bolt	M6	4	12	1.2	8.7	
Carburetor joint clamp	Screw	M4	1	3	0.3	2.2	
Air filter case	Bolt	M6	3	7	0.7	5.1	
Air filter case clamp	Screw	M4	1	3	0.3	2.2	
Exhaust pipe	Nut	M6	4	20	2.0	14	
Muffler	Bolt	M10	2	25	2.5	18	
Muffler clamp	Bolt	M10	2	30	3.0	22	
Crankcase (cylinder head)	Stud bolt	M12	8	–	–	–	 *1
Crankcase (cylinder head)	Stud bolt	M10	4	–	–	–	 *1
Crankcase (transfer gear case)	Stud bolt	M8	1	13	1.3	9.4	 *2
Pickup coil	Screw	M6	2	7	0.7	5.1	
Pickup coil lead holder	Screw	M6	7	7	0.7	5.1	
Stator coil assembly	Screw	M6	3	7	0.7	5.1	
Stator coil assembly lead holder	Bolt	M6	1	7	0.7	5.1	
Starter clutch	Bolt	M8	6	24	2.4	17	

2

# TIGHTENING TORQUES

**SPEC**



Item	Fastener	Thread size	Q'ty	Tightening torque			Remarks
				Nm	m·kgf	ft·lb	
Generator rotor	Bolt	M12	1	160	16.0	115	
Generator shaft	Bolt	M8	1	28	2.8	20	
Pickup coil rotor	Bolt	M12	1	115	11.5	85	
Baffle plate	Bolt	M6	4	10	1.0	7.2	
Clutch boss	Nut	M20	1	70	7.0	50	Use a lock washer.
Clutch spring plate	Bolt	M6	6	8	0.8	5.8	
Pull lever	Bolt	M6	1	10	1.0	7.2	
Transfer gear oil drain bolt	–	M8	1	18	1.8	13	
Middle drive gear	Nut	M22	1	85	8.5	61	Use a lock washer.
Transfer gear case	Bolt	M8	4	30	3.0	22	
Transfer gear case	Nut	M8	1	30	3.0	22	
Transfer gear oil checking bolt	–	M6	1	8	0.8	5.8	
Transfer gear oil pump cover	Screw	M6	2	7	0.7	5.1	
Transfer gear oil pump	Bolt	M6	5	10	1.0	7.2	
Drive pulley case	Bolt	M8	7	30	3.0	22	
Drive pulley	Nut	M22	1	85	8.5	61	Use a lock washer.
Drive pulley cover bracket	Bolt	M8	2	30	3.0	22	
Shift arm	Bolt	M6	1	10	1.0	7.2	
Shift rod locknut	–	M8	2	12	1.2	8.7	
Shift shaft spring stopper	Bolt	M8	1	22	2.2	16	
Stopper lever	Bolt	M6	1	10	1.0	7.2	
Neutral switch	Screw	M6	2	7	0.7	5.1	

2

**NOTE:**

- \*1: When installing the crankcase stud bolts (cylinder head), make sure that their installed length is 140.5 ~ 142.5 mm (5.53 ~ 5.61 in).
- \*2: When installing the crankcase stud bolts (transfer gear case), make sure that their installed length is 68.3 ~ 70.3 mm (2.69 ~ 2.77 in).




## CHASSIS TIGHTENING TORQUES

Item	Thread size	Tightening torque			Remarks
		Nm	m·kgf	ft·lb	
Upper bracket and inner tube	M6	10	1.0	7.2	See NOTE.
Upper bracket and steering shaft	M22	130	13.0	94	
Handlebar holder (lower) and handlebar holder (upper)	M8	23	2.3	17	
Ring nut (steering shaft)	M25	3	0.3	2.2	
Brake hose joint and lower bracket	M6	7	0.7	5.1	
Front brake master cylinder cap	M4	2	0.2	1.4	
Handlebar holder (lower)	M12	40	4.0	29	
Front brake master cylinder	M6	10	1.0	7.2	
Union bolt (brake hose)	M10	30	3.0	22	
Engine mounting:					
Mounting bolt (cylinder head and engine stay)	M10	48	4.8	35	
Mounting bolt (crankcase and engine stay)	M12	88	8.8	64	
Mounting bolt (crankcase and frame)	M12	88	8.8	64	
Engine stay and frame	M10	48	4.8	35	
Transfer gear case stay and frame	M8	30	3.0	22	
Muffler stay and frame	M8	26	2.6	19	
Muffler stay and muffler	M10	30	3.0	22	
Ignition coil	M6	7	0.7	5.1	
Swingarm pivot shaft	M18	125	12.5	90	
Relay arm and swingarm	M12	59	5.9	43	
Relay arm and connecting rod	M12	59	5.9	43	
Relay arm and rear shock absorber	M10	40	4.0	29	
Rear shock absorber, connecting rod and frame	M12	59	5.9	43	
Drive belt case (upper) and swingarm	M6	10	1.0	7.2	
Drive belt case (lower) and swingarm	M6	7	0.7	5.1	
Mud guard and swingarm	M6	7	0.7	5.1	
Fuel petcock and fuel tank	M6	7	0.7	5.1	
Fuel sender and fuel tank	M6	7	0.7	5.1	
Fuel tank (rear) and frame	M6	7	0.7	5.1	
Meter cover and fuel tank	M6	7	0.7	5.1	
Side cover and frame	M6	7	0.7	5.1	
Starter relay and battery positive lead	M6	7	0.7	5.1	
Starter relay and starter motor lead	M6	7	0.7	5.1	
Rear fender side mold and rear fender stay	M8	30	3.0	22	
Sidestand bolt and nut	M10	48	4.8	35	
Footrest bracket and frame	M10	48	4.8	35	
Rear footrest and frame	M8	23	2.3	17	

## TIGHTENING TORQUES

**SPEC**



Item	Thread size	Tightening torque			Remarks
		Nm	m·kgf	ft·lb	
Rear master cylinder and rear brake bracket	M8	23	2.3	17	
Rear brake reservoir tank	M6	4	0.4	2.9	
Union bolt (rear brake hose)	M10	30	3.0	22	
Footrest bracket and rear brake bracket	M8	16	1.6	11	
Footrest bracket and shift rod bracket	M8	16	1.6	11	
Front wheel axle	M18	78	7.8	56	
Front wheel axle pinch bolt	M8	19	1.9	13	
Rear wheel axle nut	M18	150	15.0	110	
Front brake caliper	M10	40	4.0	29	
Rear brake caliper	M10	40	4.0	29	
Brake disc and wheel	M8	23	2.3	17	
Caliper bleed screw	M8	6	0.6	4.3	
Driven pulley and rear wheel clutch hub	M12	95	9.5	68	
Rear brake caliper bracket and swingarm	M10	48	4.8	35	

**NOTE:**

1. First, tighten the ring nut to approximately 52 Nm (5.2 m · kg, 37 ft · lb) with a torque wrench, then loosen the ring nut completely.
2. Retighten the ring nut to specification.

2





**LUBRICATION POINTS AND LUBRICANT TYPES**

**ENGINE LUBRICATION POINTS AND LUBRICANT TYPES**

Lubrication point	Lubricant
Oil seal lips	
O-rings	
Bearings	
Connecting rod bolts and nuts	
Connecting rod small end and big end	
Crankshaft pins	
Crankshaft journals	
Piston surfaces	
Piston pins	
Camshaft cam lobes and camshaft journals	
Valve push rods	
Valve push rod end balls	
Valve stems (intake and exhaust)	
Valve stem ends (intake and exhaust)	
Valve lifters	
Oil pump rotors (inner and outer) and oil pump housing	
Oil strainer	
Starter clutch idle gear inner surface	
Starter clutch idle gear shaft	
Starter clutch roller and starter clutch gear outer surface	
Clutch pull rod	
Pressure plate bearing	
Transmission gears (wheel and pinion)	
Shift drum	
Shift forks and shift fork guide bars	
Shift shaft	
Shift pedal	
Shift lever joint	
Crankcase mating surface	Sealant (Quick Gasket®)
Stator coil lead grommet	Sealant (Quick Gasket®)
Pickup coil lead grommet	Sealant (Quick Gasket®)

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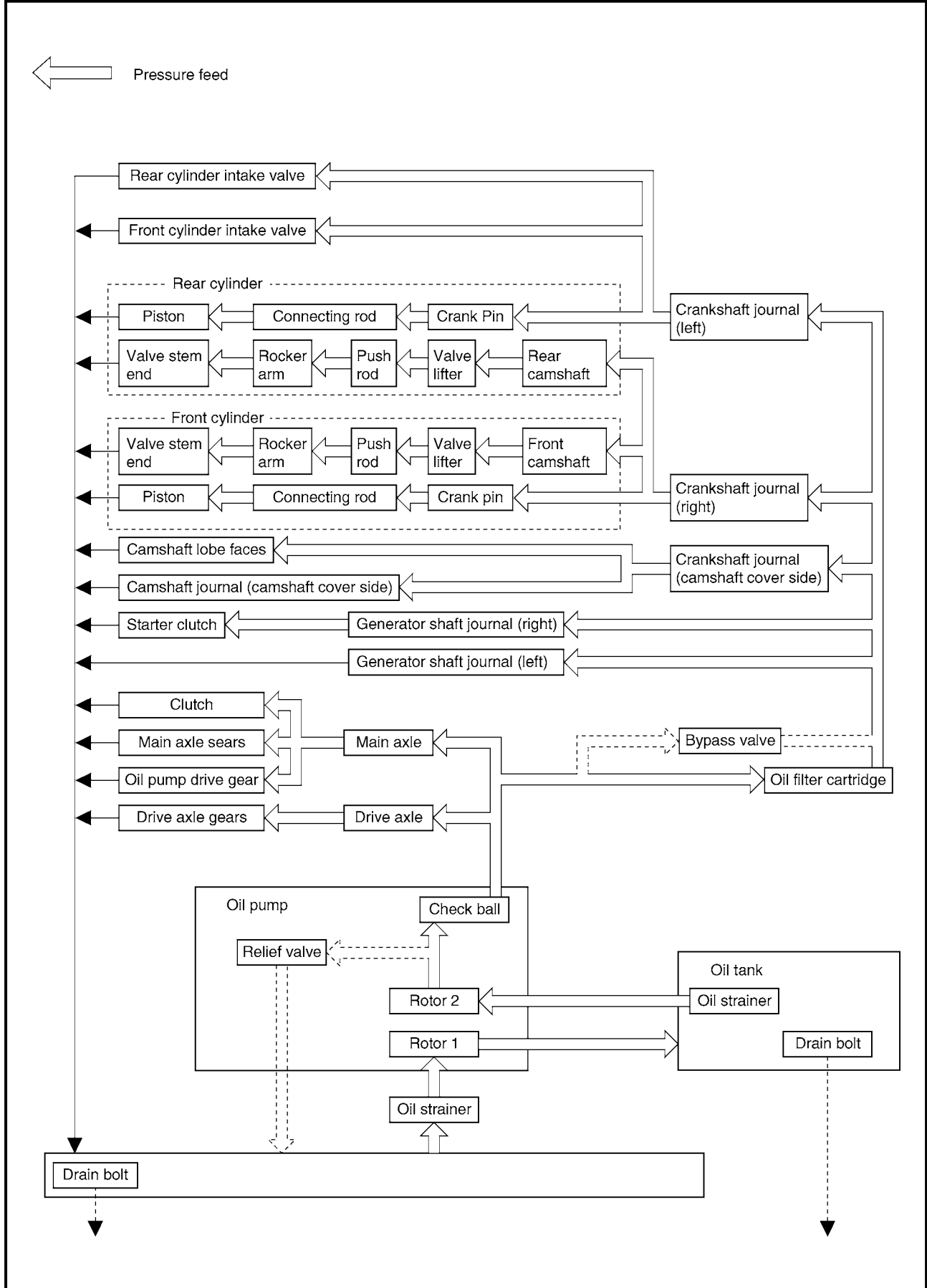
## CHASSIS LUBRICATION POINTS AND LUBRICANT TYPES

Lubrication point	Lubricant
Steering bearings and bearing races (upper and lower)	
Steering bearing cover	
Steering head pipe lower oil seal	
Front wheel oil seal (right and left)	
Rear wheel oil seal	
Rear wheel drive hub mating surface	
Rear brake pedal shaft	
Shift pedal	
Front footrest pivot	
Sidestand sliding surface	
Tube guide (throttle grip) inner surface	
Brake lever pivot bolt, contact surface	
Clutch lever pivot bolt, contact surface	
Swingarm pivot shaft	
Swingarm pivot bearing	
Swingarm pivot oil seal	
Relay arm bearing (inner)	
Rear shock absorber bearing (inner)	
Connecting rod bearing (inner)	



ENGINE OIL LUBRICATION CHART

← Pressure feed

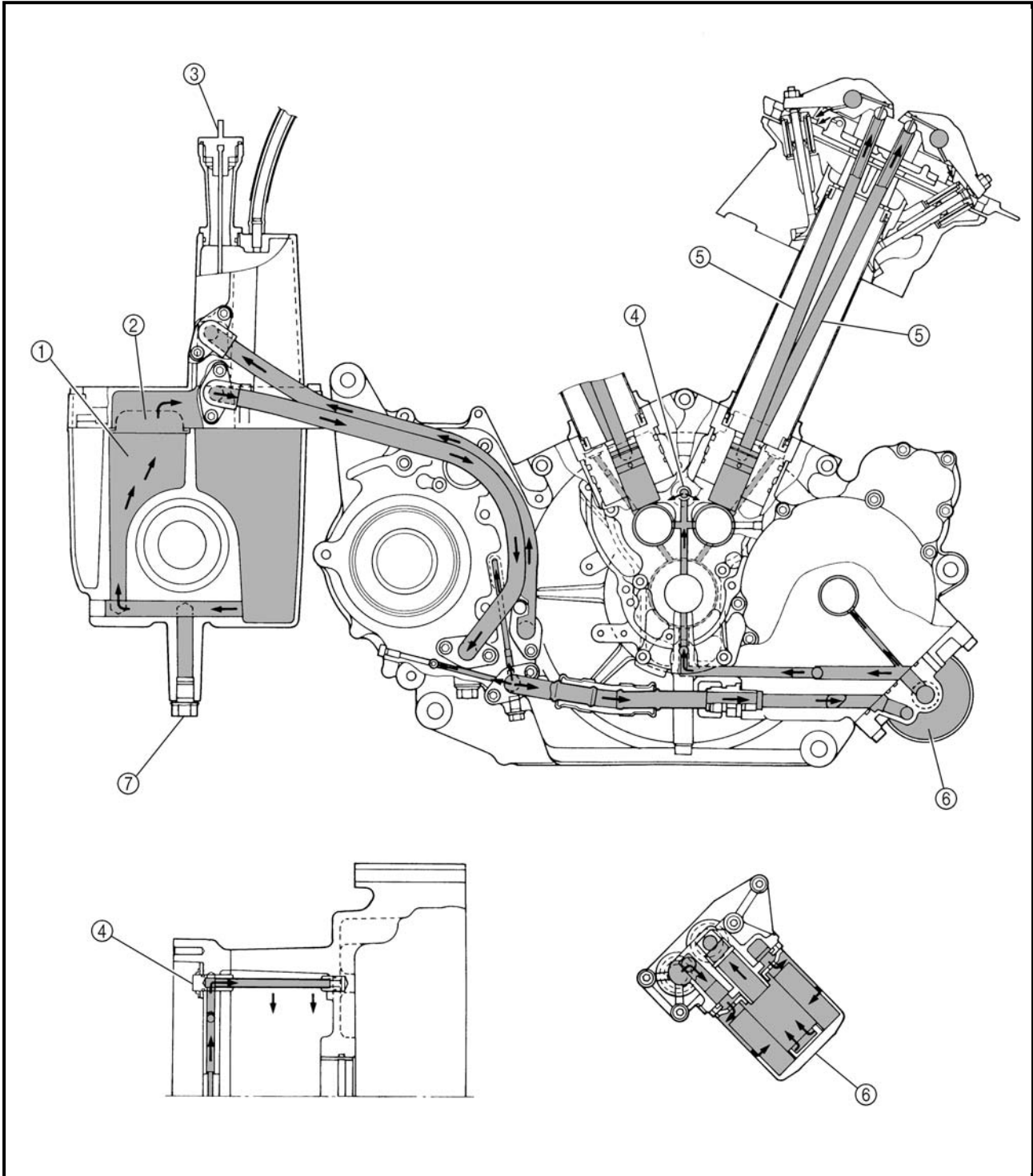


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**ENGINE OIL FLOW DIAGRAMS**

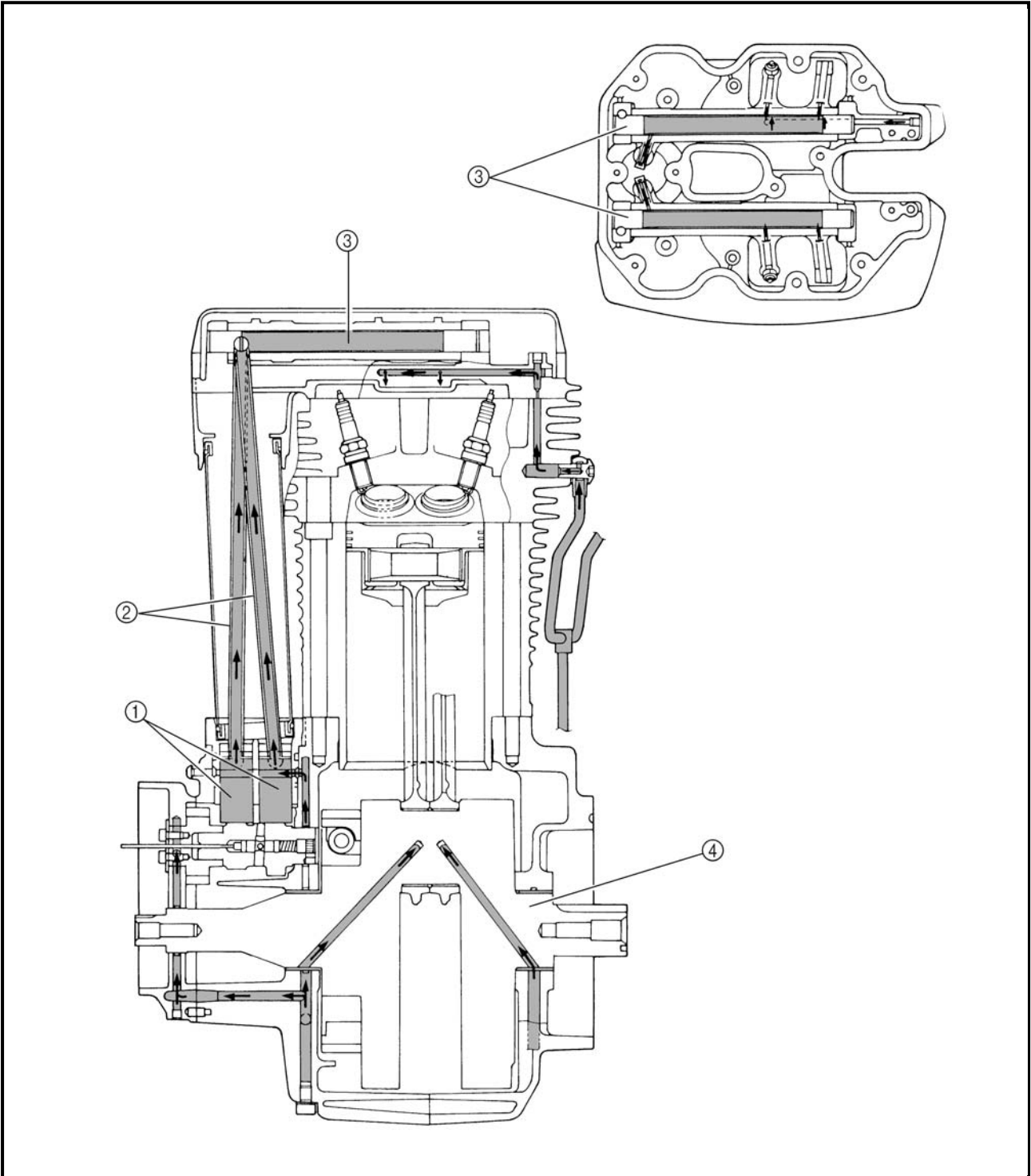
- ① Oil tank
- ② Oil strainer
- ③ Dipstick
- ④ Oil delivery pipe
- ⑤ Push rod
- ⑥ Oil filter cartridge
- ⑦ Engine oil drain bolt (oil tank)





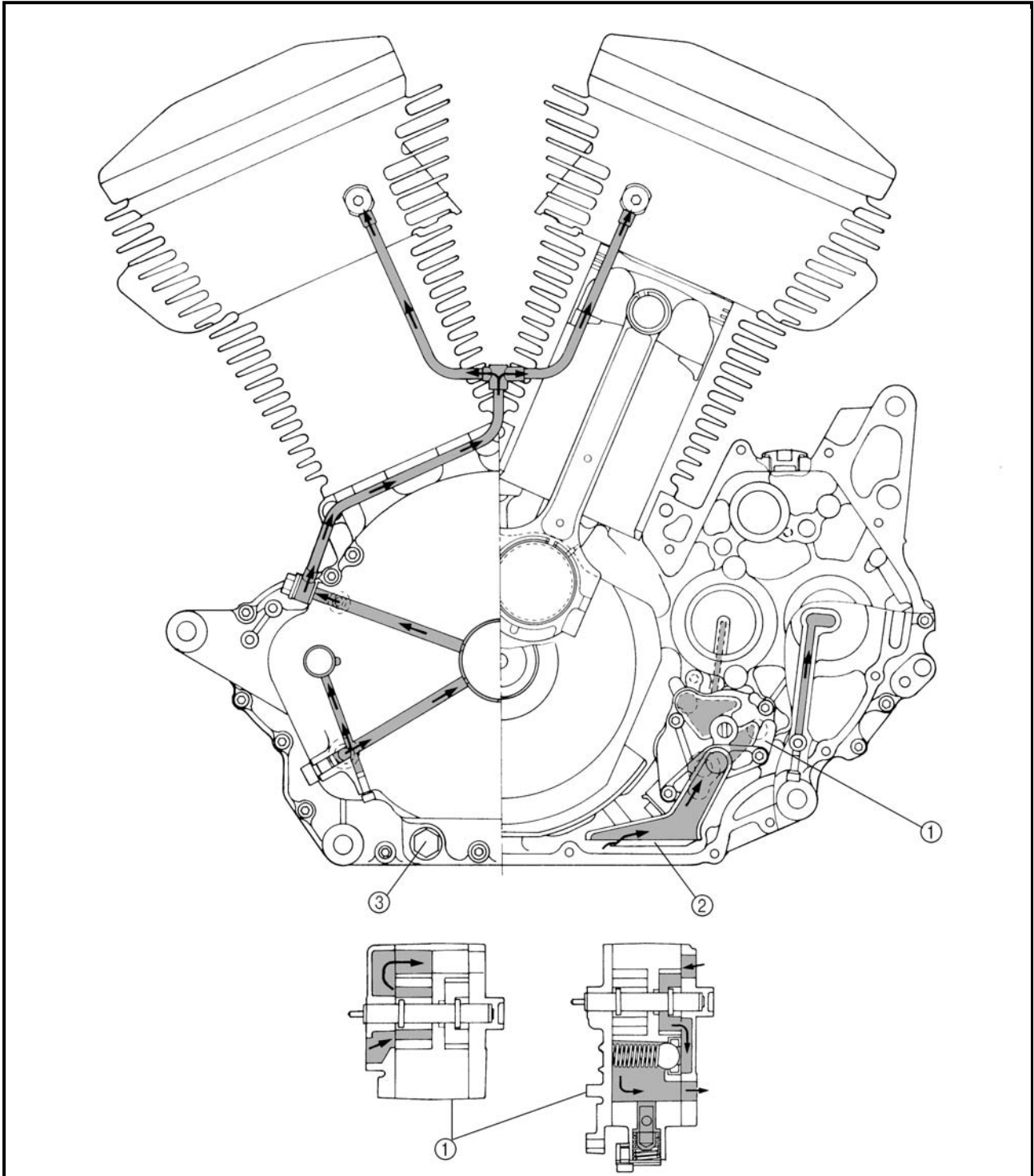
- ① Valve lifter
- ② Push rod
- ③ Rocker arm shaft
- ④ Crankshaft

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- ① Engine oil pump
- ② Oil strainer
- ③ Engine oil drain bolt (engine)

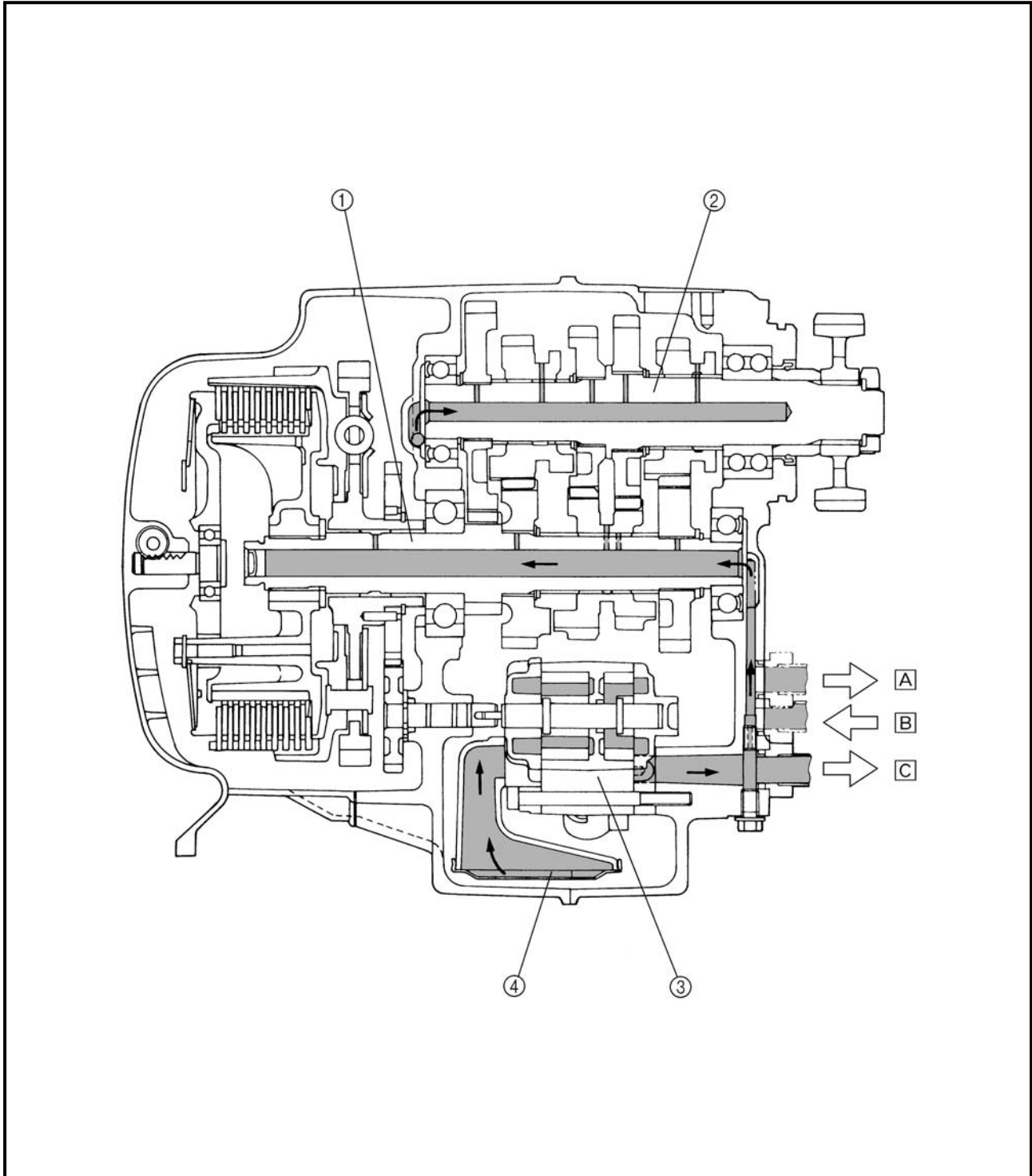




- ① Main axle
- ② Drive axle
- ③ Engine oil pump
- ④ Oil strainer

- A To oil tank
- B From oil tank
- C To oil filter cartridge

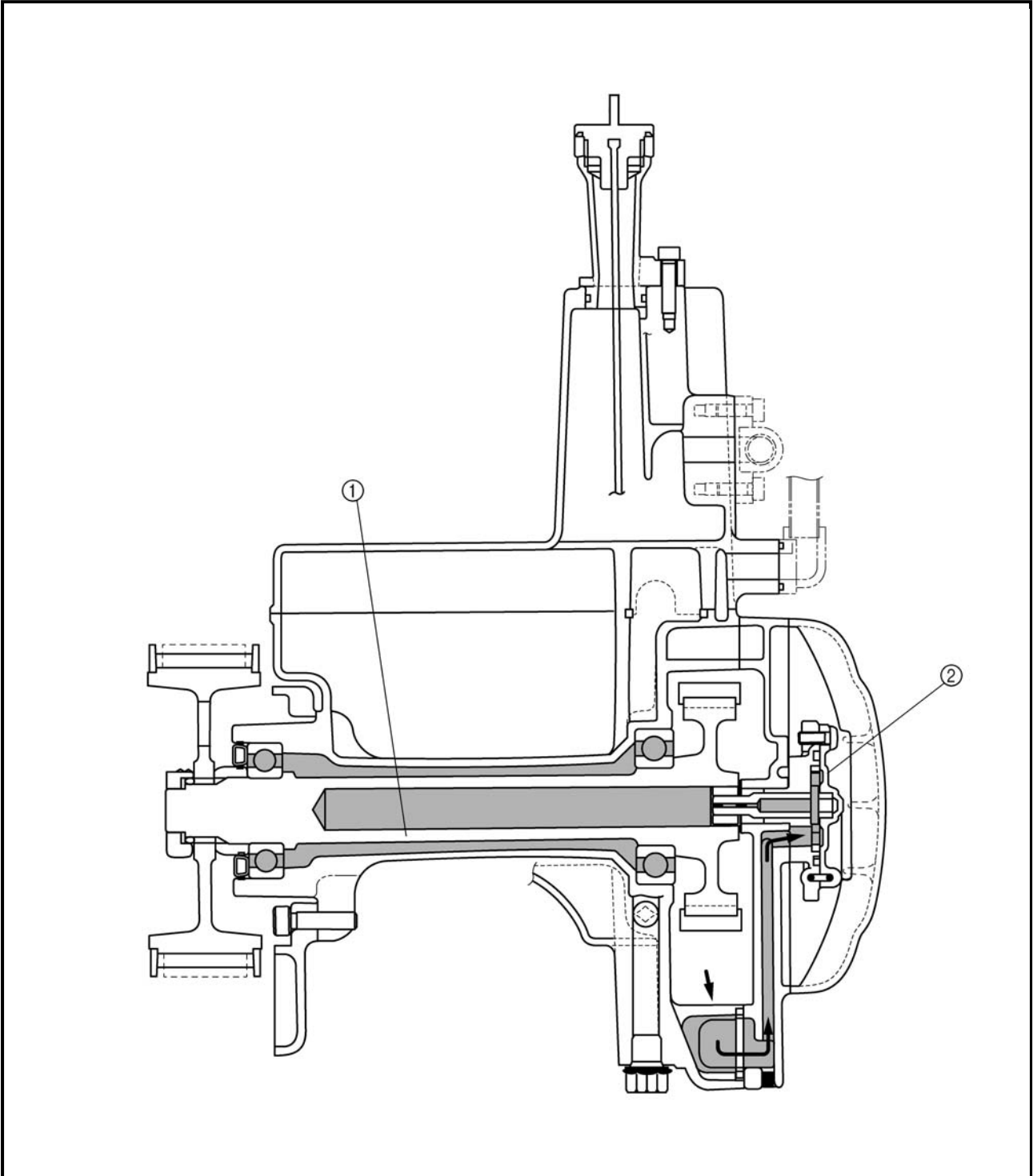
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TRANSFER GEAR OIL FLOW DIAGRAMS

- ① Middle driven shaft
- ② Transfer gear oil pump

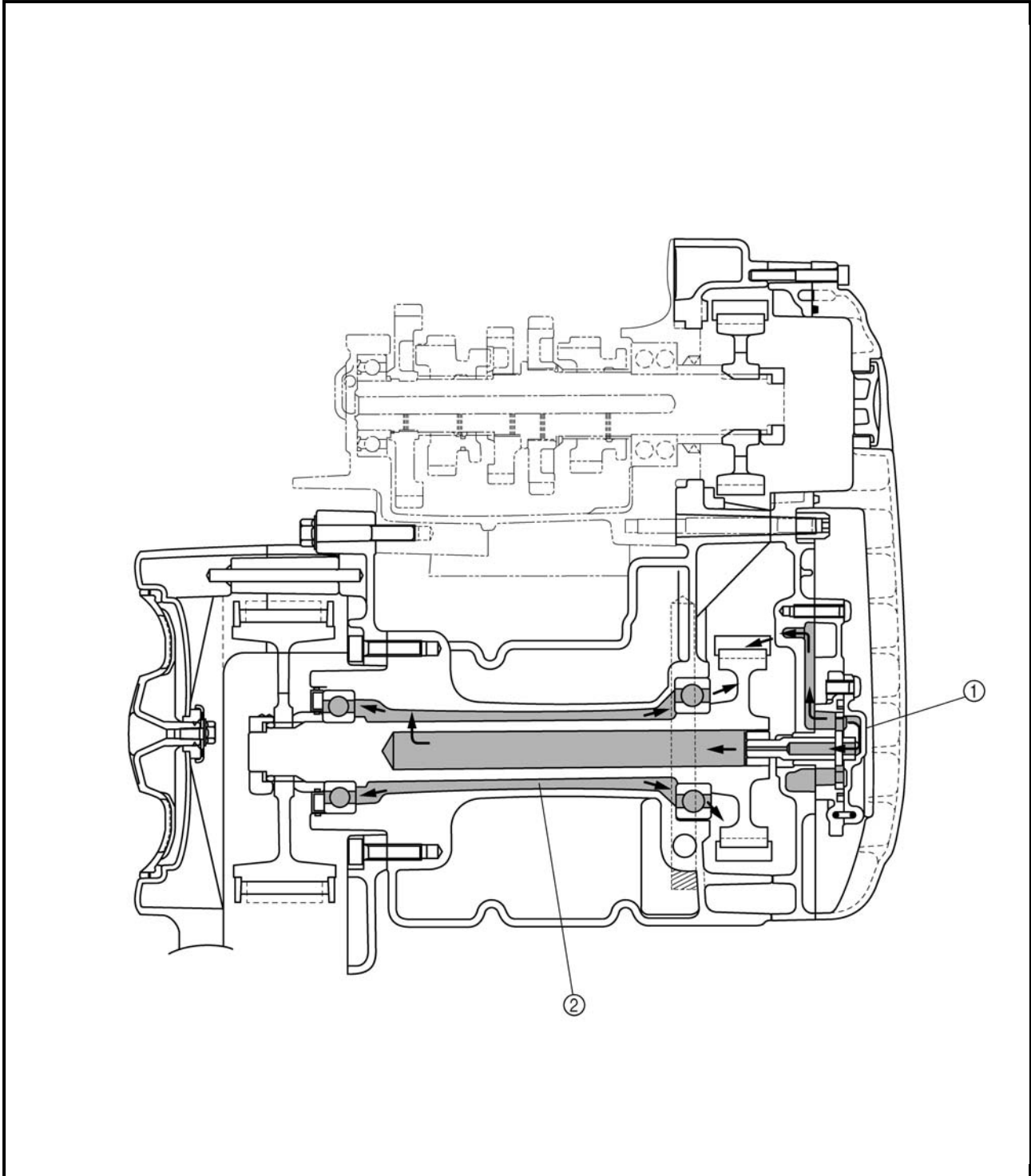






- ① Transfer gear oil pump
- ② Middle driven shaft

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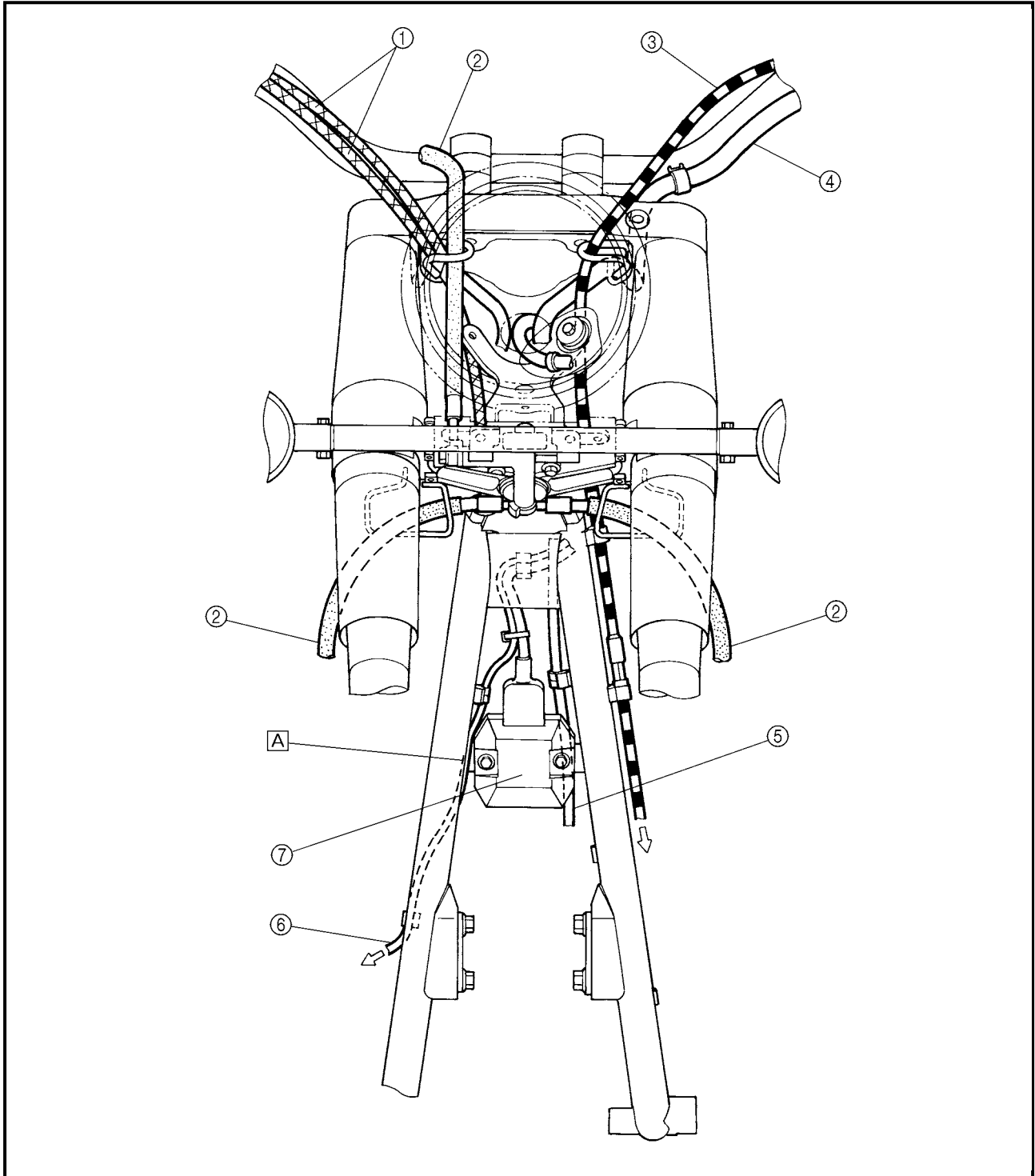


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**CABLE ROUTING**

- ① Throttle cables
- ② Brake hose
- ③ Clutch cable
- ④ Left handlebar switch lead
- ⑤ Vacuum hose (air induction system)
- ⑥ Rear brake light switch lead
- ⑦ Rectifier/regulator

**A** Route the rear brake light switch lead in front of the rectifier/regulator bracket on the frame.

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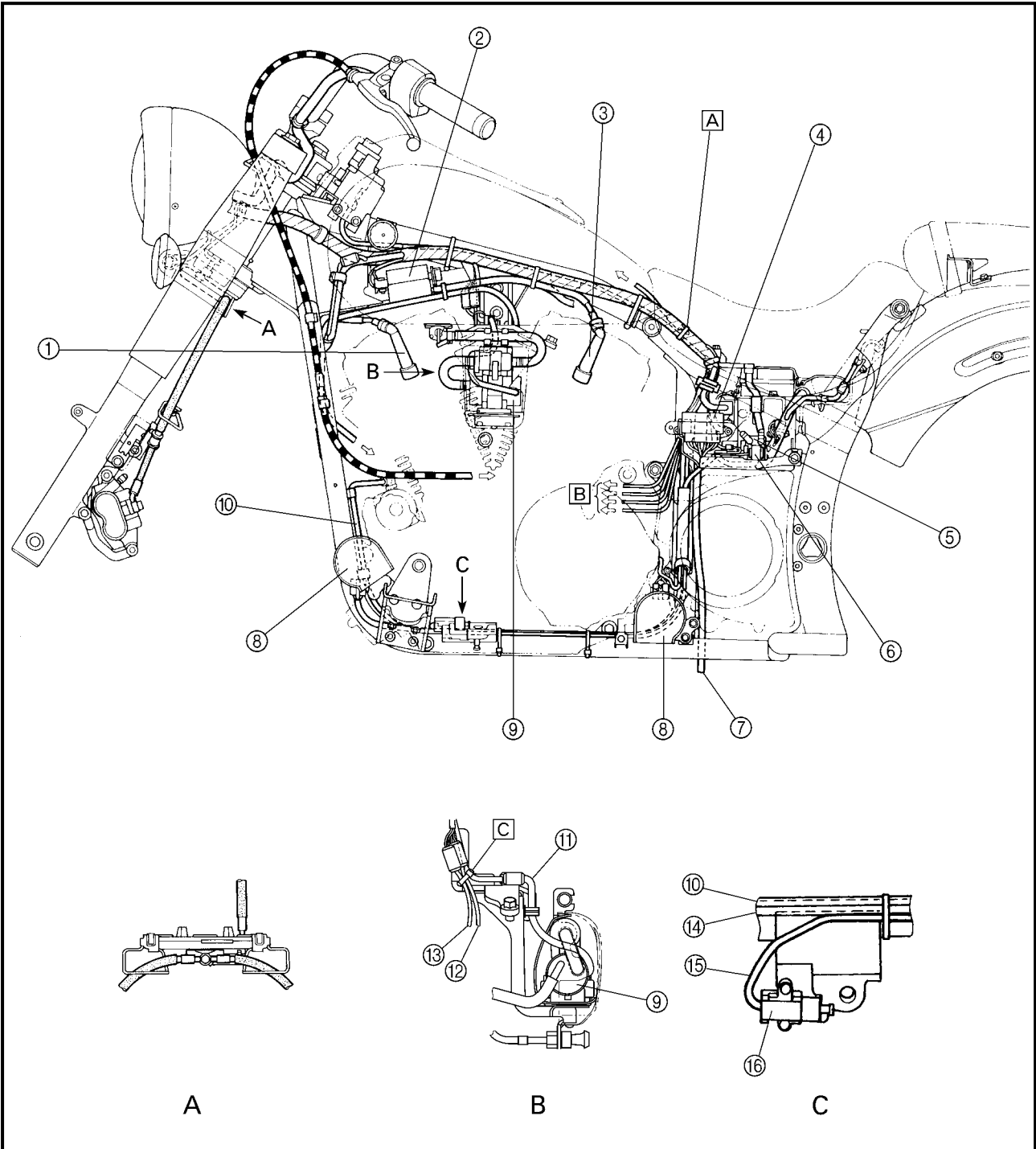


- ① Spark plug cap #3
- ② Ignition coil (rear cylinder)
- ③ Spark plug cap #1
- ④ Fuse box
- ⑤ Starter relay
- ⑥ Thermo switch
- ⑦ Fuel tank breather hose
- ⑧ Horns
- ⑨ Fuel pump
- ⑩ Starter motor lead
- ⑪ Fuel pump lead

- ⑫ Carburetor heater lead
- ⑬ Throttle position sensor lead
- ⑭ Horn lead
- ⑮ Sidestand switch lead
- ⑯ Sidestand switch

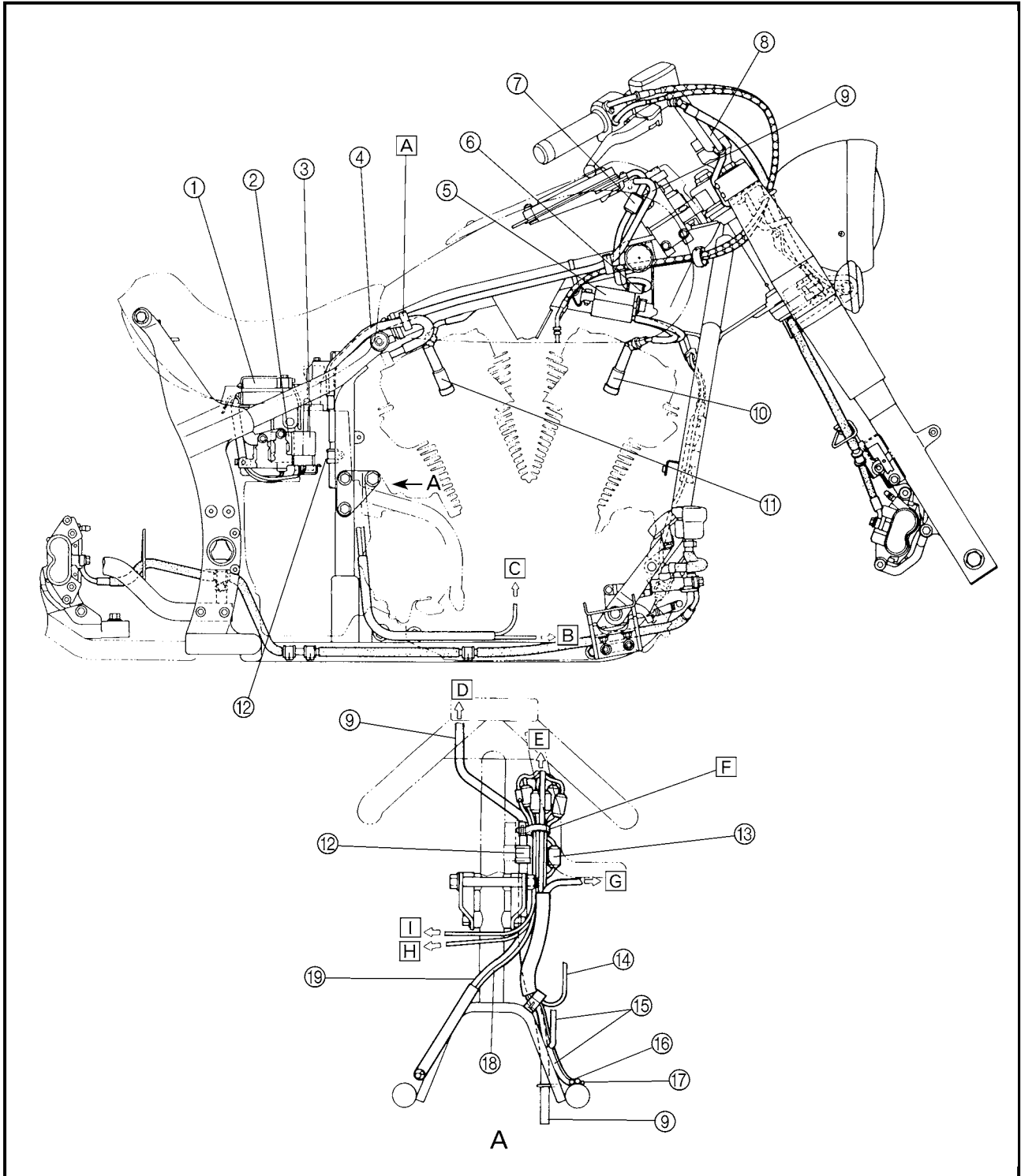
- [A] Fasten the wire harness, fuel sender lead (wire harness side) and seat lock cable with a plastic locking tie.
- [B] To the speed sensor, neutral switch, stator coil and decompression solenoid.
- [C] Fasten the throttle position sensor lead, carburetor heater lead and fuel pump lead with a plastic locking tie to the engine bracket.

2





- ① Battery
- ② Turn signal relay
- ③ Relay unit
- ④ Oil tank breather hose
- ⑤ Ignition coil (front cylinder)
- ⑥ Main switch coupler
- ⑦ Meter assembly couplers
- ⑧ Right handlebar switch lead
- ⑨ Fuel tank breather hose
- ⑩ Spark plug cap #4
- ⑪ Spark plug cap #2
- ⑫ Sidestand switch coupler
- ⑬ Pickup coil lead
- ⑭ Horn leads
- ⑮ Starter motor lead
- ⑯ Sidestand switch lead
- ⑰ Decompression solenoid lead
- ⑱ Stator coil lead
- ⑲ Rollover valve

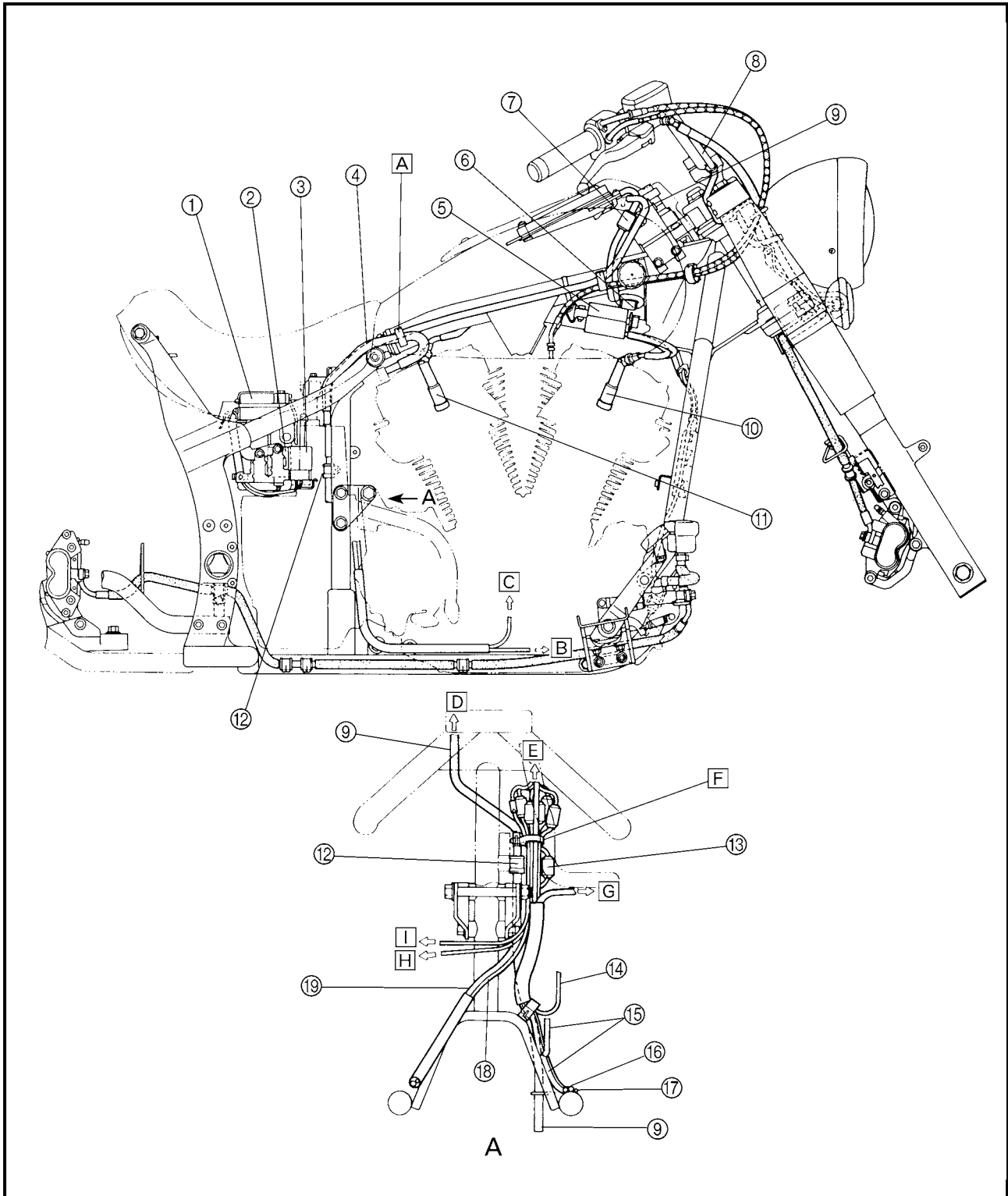




- A Fasten the fuel tank breather and oil tank breather hose with a plastic clamp and then insert the clamp into the frame.
- B To the stator coil.
- C To the decompression solenoid.
- D To the fuel tank.
- E To the wire harness.

- F Fasten the starter motor lead, stator coil lead, decompression solenoid lead, pickup coil lead speed sensor lead and neutral switch lead with a plastic clamp and then insert the clamp into the frame.
- G To the starter relay.
- H To the decompression solenoid.
- I To the speed sensor.

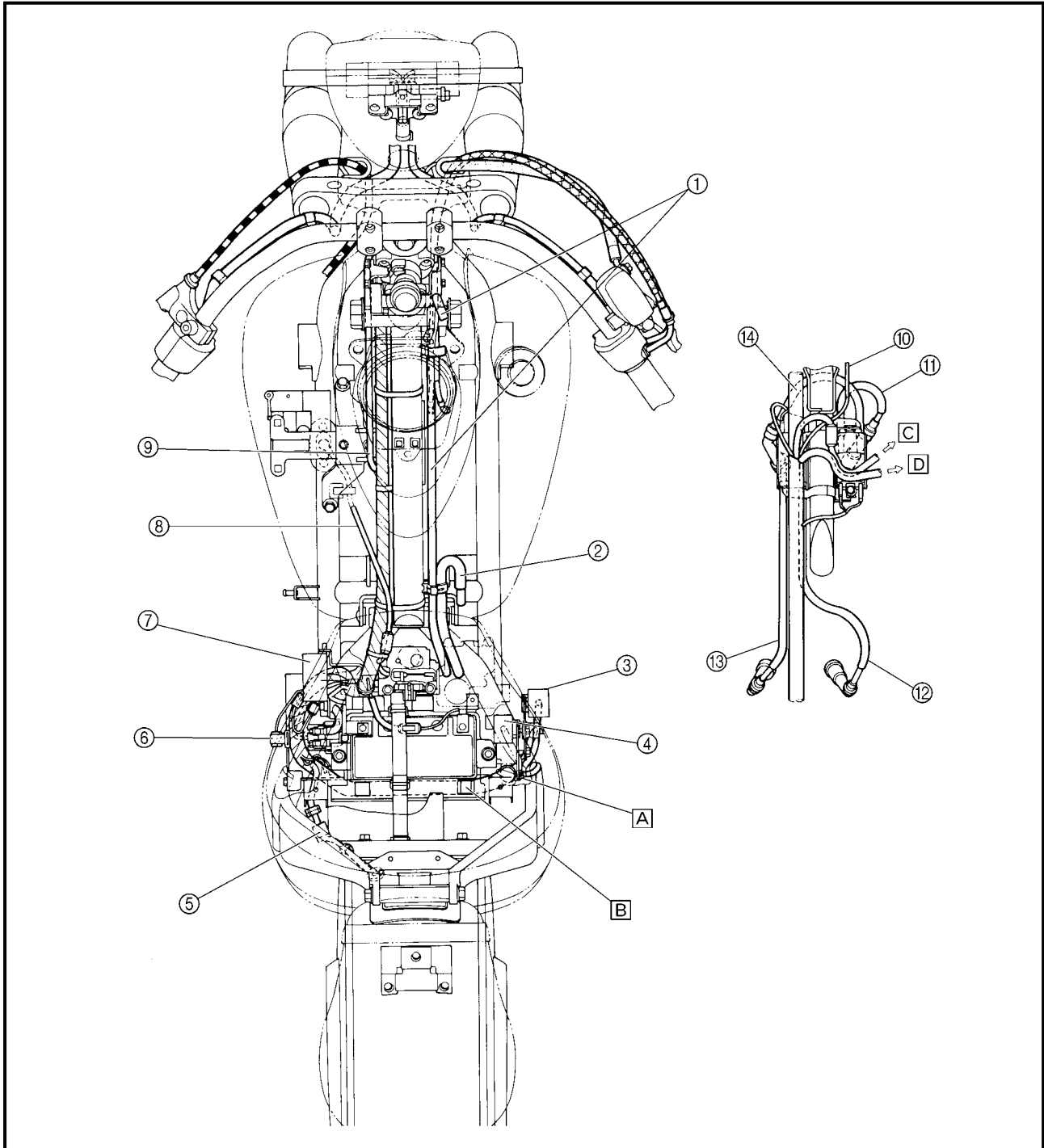
2





- ① Fuel tank breather hose
- ② Oil tank breather hose
- ③ Relay unit
- ④ Turn signal relay
- ⑤ Tail/brake light and rear turn signal light sub-wire harness coupler
- ⑥ Thermo switch
- ⑦ Fuse box
- ⑧ Fuel sender lead
- ⑨ Vacuum hose (air induction system)
- ⑩ Solenoid valve lead (California only)
- ⑪ Spark plug lead #4

- ⑫ Spark plug lead #2
- ⑬ Spark plug lead #1
- ⑭ Spark plug lead #3
- A Fasten the wire harness with a plastic clamp and then insert the clamp into the relay bracket.
- B Position the white tape on the wire harness with the hole on battery box, as shown.
- C To the main switch.
- D To the meter assembly.

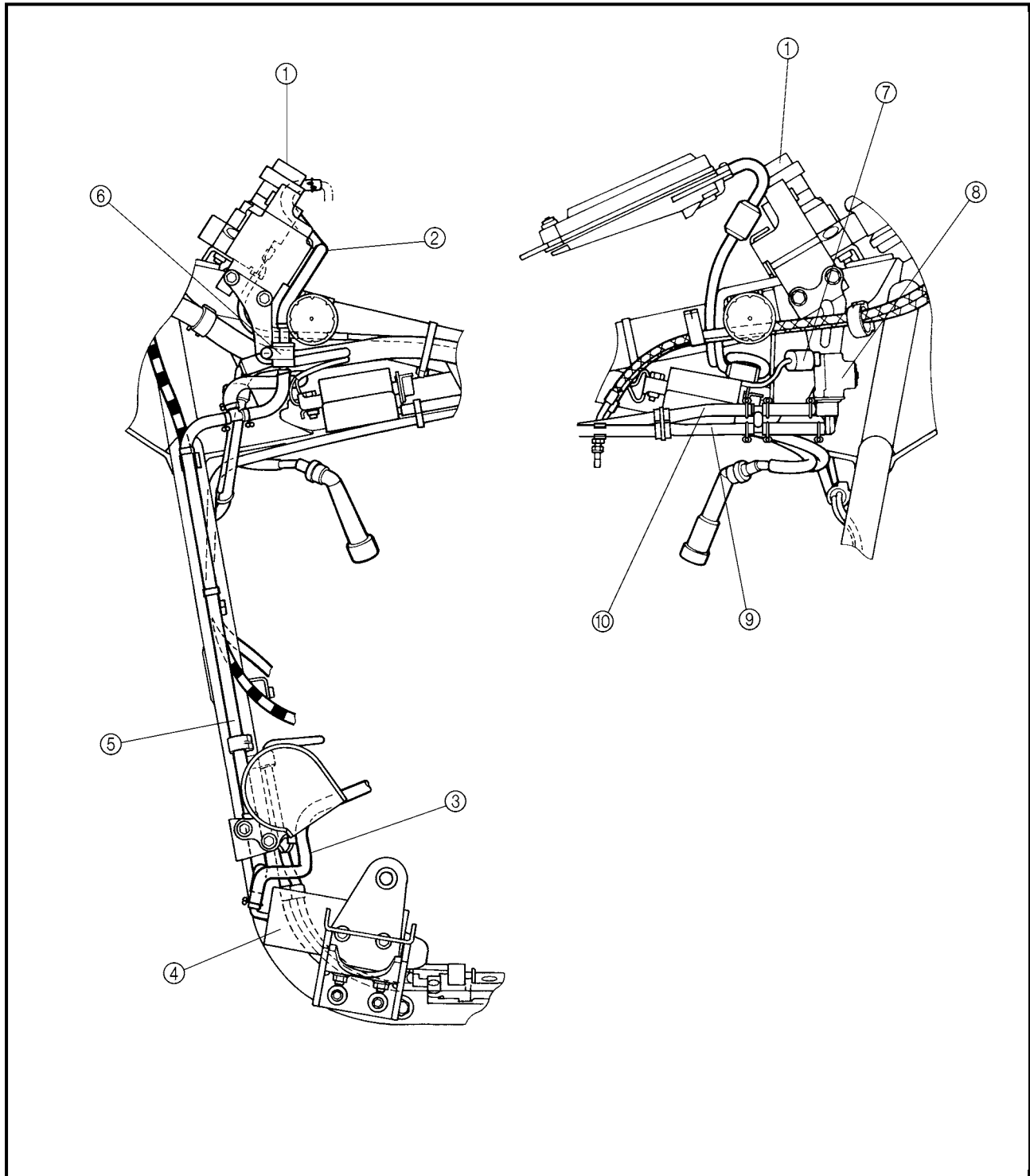




**Evaporative emission control system (California only)**

- ① Main switch
- ② Fuel tank breather hose
- ③ Charcoal canister to carburetor hose
- ④ Charcoal canister
- ⑤ Charcoal canister to rollover valve hose
- ⑥ Rollover valve
- ⑦ Solenoid valve coupler
- ⑧ Solenoid valve
- ⑨ Solenoid valve to air filter case hose
- ⑩ Solenoid valve to carburetor hose

2



# CONTENTS

## PERIODIC CHECKS AND ADJUSTMENTS

<b>INTRODUCTION</b> .....	3-1
<b>PERIODIC MAINTENANCE/LUBRICATION INTERVALS</b> .....	3-1
<b>GENERAL MAINTENANCE AND LUBRICATION CHART</b> .....	3-1
<b>SEATS AND SIDE COVERS</b> .....	3-3
<b>XV16AT ACCESSORY PARTS</b> .....	3-4
<b>FUEL TANK</b> .....	3-6
<b>AIR FILTER CASE</b> .....	3-7
<b>ENGINE</b> .....	3-8
ADJUSTING THE VALVE CLEARANCE .....	3-8
ADJUSTING THE ENGINE IDLING SPEED .....	3-12
ADJUSTING THE THROTTLE CABLE FREE PLAY .....	3-13
CHECKING THE SPARK PLUGS .....	3-14
CHECKING THE IGNITION TIMING .....	3-16
MEASURING THE COMPRESSION PRESSURE .....	3-18
CHECKING THE ENGINE OIL LEVEL .....	3-20
CHANGING THE ENGINE OIL .....	3-22
MEASURING THE ENGINE OIL PRESSURE .....	3-25
CHECKING THE TRANSFER GEAR OIL LEVEL .....	3-26
CHANGING THE TRANSFER GEAR OIL .....	3-27
ADJUSTING THE CLUTCH CABLE FREE PLAY .....	3-28
CLEANING THE AIR FILTER ELEMENT .....	3-29
CHECKING THE CARBURETOR JOINT .....	3-30
CHECKING THE FUEL HOSES AND FUEL FILTER .....	3-30
CHECKING THE CYLINDER HEAD BREATHER HOSE AND TRANSFER GEAR CASE BREATHER HOSE .....	3-31
CHECKING THE EXHAUST SYSTEM .....	3-31
<b>CHASSIS</b> .....	3-32
ADJUSTING THE FRONT BRAKE .....	3-32
ADJUSTING THE REAR BRAKE .....	3-33
CHECKING THE BRAKE FLUID LEVEL .....	3-34



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CHECKING THE FRONT BRAKE PADS .....	3-35
CHECKING THE REAR BRAKE PADS .....	3-35
ADJUSTING THE REAR BRAKE LIGHT SWITCH .....	3-35
CHECKING THE BRAKE HOSE .....	3-36
BLEEDING THE HYDRAULIC BRAKE SYSTEM .....	3-37
ADJUSTING THE SHIFT PEDAL .....	3-39
ADJUSTING THE DRIVE BELT SLACK .....	3-39
CHECKING AND ADJUSTING THE STEERING HEAD .....	3-41
CHECKING THE FRONT FORK .....	3-43
ADJUSTING THE REAR SHOCK ABSORBER ASSEMBLY .....	3-44
CHECKING THE TIRES .....	3-45
CHECKING AND TIGHTENING THE SPOKES .....	3-48
CHECKING AND LUBRICATING THE CABLES .....	3-49
LUBRICATING THE LEVERS AND PEDALS .....	3-50
LUBRICATING THE SIDESTAND .....	3-50
LUBRICATING THE REAR SUSPENSION .....	3-50
<b>ELECTRICAL SYSTEM</b> .....	3-51
CHECKING AND CHARGING THE BATTERY .....	3-51
CHECKING THE FUSES .....	3-56
REPLACING THE HEADLIGHT BULB .....	3-58
ADJUSTING THE HEADLIGHT BEAM .....	3-59
<b>INSTRUMENT FUNCTIONS</b> .....	3-61
INDICATOR LIGHTS .....	3-61
COMBINATION METER .....	3-61

EAS00036

## 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.

EAS00037

### PERIODIC MAINTENANCE/LUBRICATION INTERVALS

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 (See page 3-8.)	<ul style="list-style-type: none"> <li>Check valve clearance when engine is cold.</li> <li>Adjust if necessary.</li> </ul>	Every 15,000 mi (24,000 km)					
2	Spark plug (See page 3-14.)	<ul style="list-style-type: none"> <li>Check condition.</li> <li>Adjust gap and clean.</li> <li>Replace at 8,000 mi (13,000 km) or 12 months and thereafter every 8,000 mi (13,000 km) or 12 months.</li> </ul>		√	Replace	√	Replace	√
3 *	Crankcase ventilation system (See page 3-31.)	<ul style="list-style-type: none"> <li>Check breather hose for cracks or damage.</li> <li>Replace if necessary.</li> </ul>		√	√	√	√	√
4 *	Fuel line (See page 3-30.)	<ul style="list-style-type: none"> <li>Check fuel hose for cracks or damage.</li> <li>Replace if necessary.</li> </ul>		√	√	√	√	√
5 *	Fuel filter (See page 3-30.)	<ul style="list-style-type: none"> <li>Replace initial 20,000 mi (31,000 km) and thereafter every 20,000 mi (31,000 km).</li> </ul>						Replace
6 *	Exhaust system (See page 3-31.)	<ul style="list-style-type: none"> <li>Check for leakage.</li> <li>Retighten if necessary.</li> <li>Replace gasket(s) if necessary.</li> </ul>		√	√	√	√	√
7 *	Idle speed (See page 3-12.)	<ul style="list-style-type: none"> <li>Check and adjust engine idle speed.</li> <li>Adjust cable free play.</li> </ul>	√	√	√	√	√	√
8 *	Evaporative Emission control system (For California only)	<ul style="list-style-type: none"> <li>Check control system for damage.</li> <li>Replace if necessary.</li> </ul>				√		√

\* Since these items require special tools, data and technical skills, they should be serviced by a Yamaha dealer.

### GENERAL MAINTENANCE AND LUBRICATION CHART

No.	ITEM	ROUTINE	TYPE	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 (See page 3-22.)	<ul style="list-style-type: none"> <li>Replace</li> </ul>	See page 3-21.	√	√	√	√	√	√
2 *	Oil filter	<ul style="list-style-type: none"> <li>Replace</li> </ul>	—	√		√		√	
3 *	Air filter (See page 3-29.)	<ul style="list-style-type: none"> <li>Clean with compressed air.</li> <li>Replace if necessary.</li> </ul>	—		√	√	√	√	√
4 *	Front brake (See page 3-32.)	<ul style="list-style-type: none"> <li>Check operation and fluid leakage. (See page 3-34)</li> <li>Correct if necessary.</li> </ul>	—	√	√	√	√	Replace brake fluid	√
5 *	Rear brake (See page 3-33.)	<ul style="list-style-type: none"> <li>Check operation and fluid leakage. (See page 3-34)</li> <li>Correct if necessary.</li> </ul>	—	√	√	√	√	Replace brake fluid	√

# GENERAL MAINTENANCE AND LUBRICATION CHART



No.	ITEM	ROUTINE	TYPE	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	
6 *	<b>Clutch</b> (See page 3-28.)	<ul style="list-style-type: none"> <li>Check operation and free play.</li> <li>Correct if necessary.</li> </ul>	—	√	√	√	√	√	√	
7 *	<b>Transfer case oil</b> (See page 3-26.)	<ul style="list-style-type: none"> <li>Check vehicle for leakage.</li> <li>Replace every 16,000 mi (25,000 km) or 24 months.</li> </ul>	SAE 80 API "GL-4" hypoid gear oil	Replace		Check		Replace		
8 *	<b>Control cable</b> (See page 3-49.)	<ul style="list-style-type: none"> <li>Apply chain lube thoroughly.</li> </ul>	Yamaha chain and cable lube or SAE 10W30 motor oil	√	√	√	√	√	√	
9 *	<b>Rear arm pivot bearing</b> (See page 4-84.)	<ul style="list-style-type: none"> <li>Check bearing assembly for looseness.</li> <li>Moderately repack every 16,000 mi (25,000 km).</li> </ul>	Medium weight wheel bearing grease			√		Repack		
10	<b>Brake/Clutch lever pivot shaft</b> (See page 3-50.)	<ul style="list-style-type: none"> <li>Apply chain lube lightly.</li> </ul>	Yamaha chain and cable lube or SAE 10W30 motor oil		√	√	√	√	√	
11	<b>Brake pedal and shift pedal shaft</b> (See page 3-50.)	<ul style="list-style-type: none"> <li>Lubricate</li> <li>Apply chain lube lightly.</li> </ul>	Yamaha chain and cable lube or SAE 10W30 motor oil		√	√	√	√	√	
12 *	<b>Sidestand pivot</b> (See page 3-50.)	<ul style="list-style-type: none"> <li>Check operation and lubricate.</li> <li>Apply chain lube lightly.</li> </ul>	Yamaha chain and cable lube or SAE 10W30 motor oil		√	√	√	√	√	
13 *	<b>Sidestand switch</b> (See page 3-50.)	<ul style="list-style-type: none"> <li>Check and clean or replace if necessary.</li> </ul>	—	√	√	√	√	√	√	
14 *	<b>Front fork</b> (See page 3-43.)	<ul style="list-style-type: none"> <li>Check operation and for leakage.</li> </ul>	—		√	√	√	√	√	
15 *	<b>Steering bearings</b> (See page 3-41.)	<ul style="list-style-type: none"> <li>Check bearing assembly for looseness.</li> <li>Moderately repack every 16,000 mi (25,000 km).</li> </ul>	Lithium soap base grease		√	√	√	Repack	√	
16 *	<b>Wheel bearings</b> (See page 4-5.)	<ul style="list-style-type: none"> <li>Check bearings for smooth rotation.</li> </ul>	—		√	√	√	√	√	
17 *	<b>Rear suspension link pivots</b> (See page 4-84.)	<ul style="list-style-type: none"> <li>Apply grease lightly.</li> </ul>	Molybdenum disulfide grease					√		
18 *	<b>Drive belt</b> (See page 3-39.)	<ul style="list-style-type: none"> <li>Check the belt tension.</li> <li>Adjust if necessary.</li> </ul>	—	√	Every 2,500 mi (4,000 km)					

\* Since these items require special tools, data and technical skills, they should be serviced by a Yamaha dealer.

## NOTE:

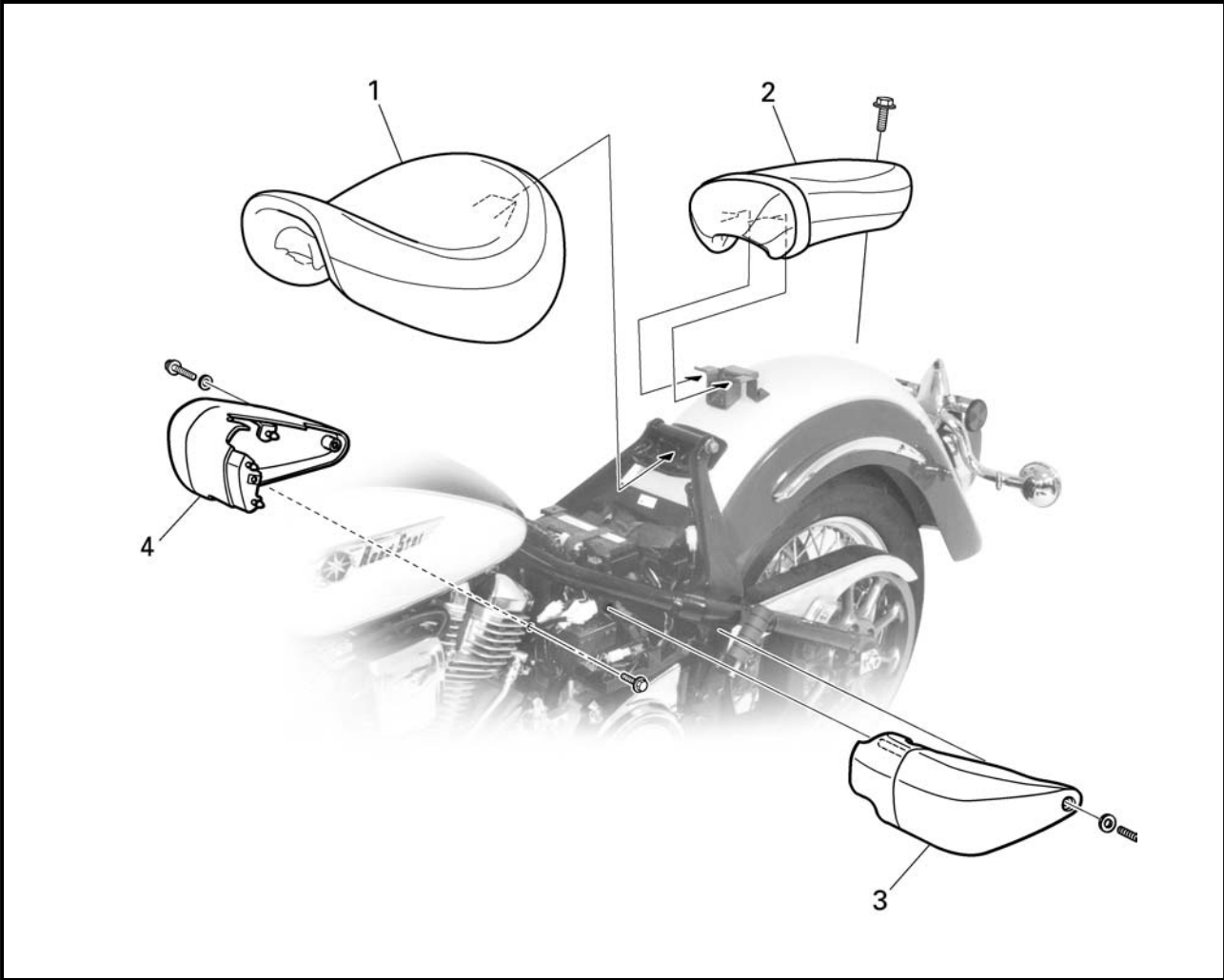
The air filter element needs more frequent service if you are riding in unusually wet or dry areas.

### 1. Hydraulic brake system

- Replace the brake fluid after disassembling the master cylinder or caliper cylinder.
- Check the brake fluid level and add fluid as required.
- Replace the master cylinder and caliper cylinder oil seals every two years.
- Replace the brake hoses every four years or if cracked or damaged.

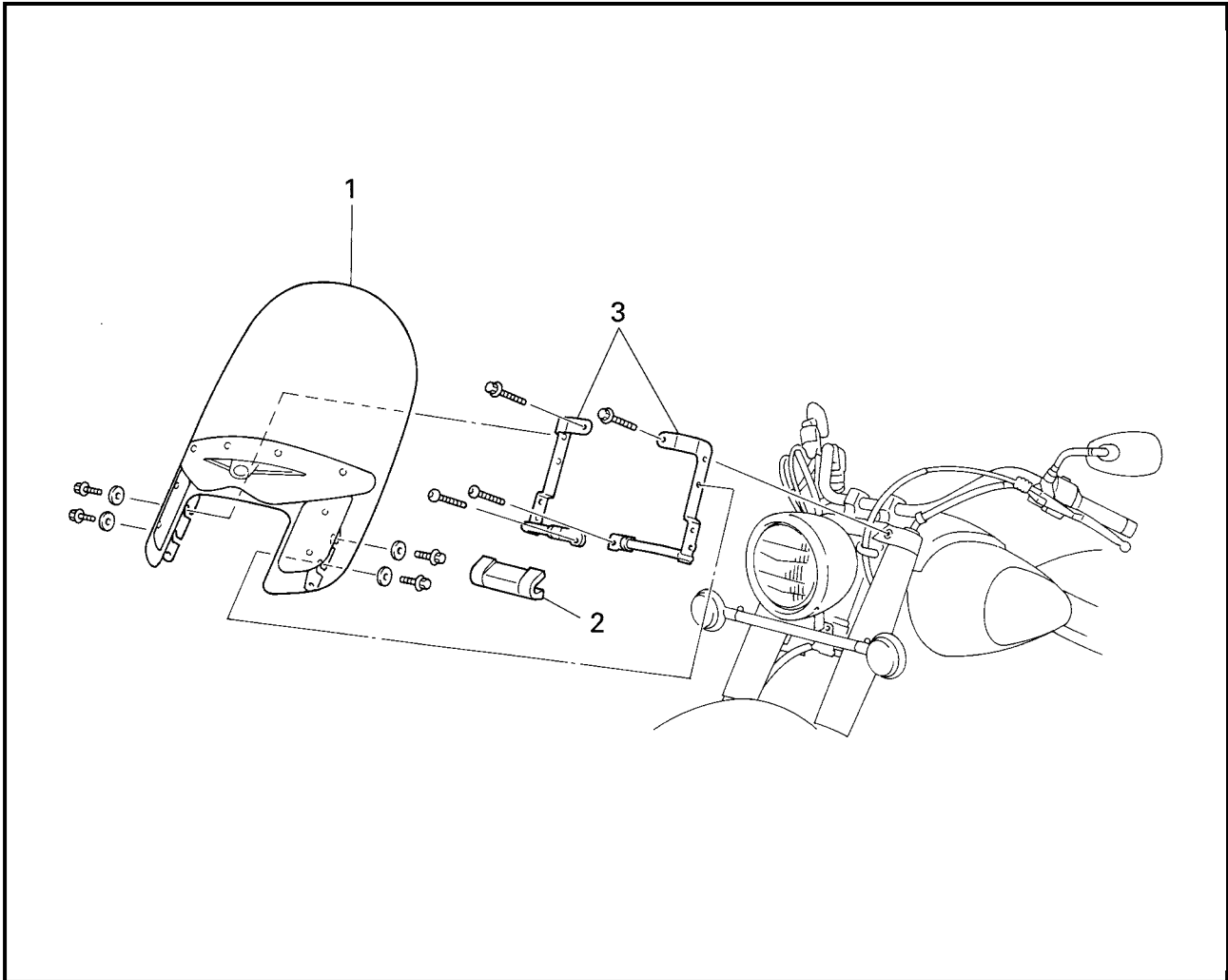
SEATS AND SIDE COVERS

3



Order	Job/Part	Q'ty	Remarks
	<b>Removing the seats and side covers</b>		Remove the parts in the order listed.
1	Rider seat	1	
2	Passenger seat	1	
3	Left side cover	1	
4	Right side cover	1	
			For installation, reverse the removal procedure.

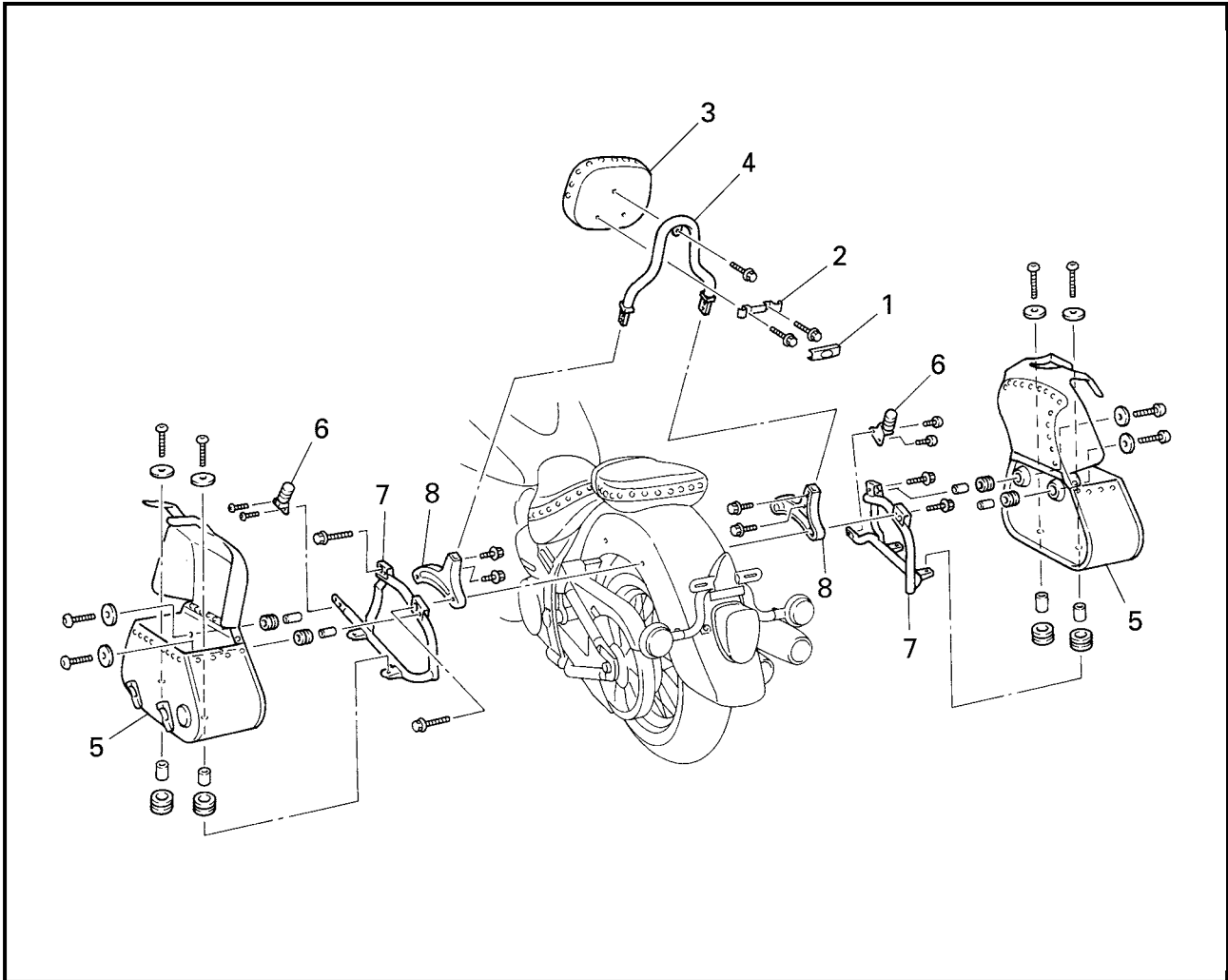
XV16AT ACCESSORY PARTS



3

Order	Job/Part	Q'ty	Remarks
	<b>Accessory parts removal (front)</b>		Remove the parts in the order listed.
1	Front windshield	1	
2	Chrome flasher bracket cover	1	
3	Windshield stay	2	
			For installation, reverse the removal procedure.

3

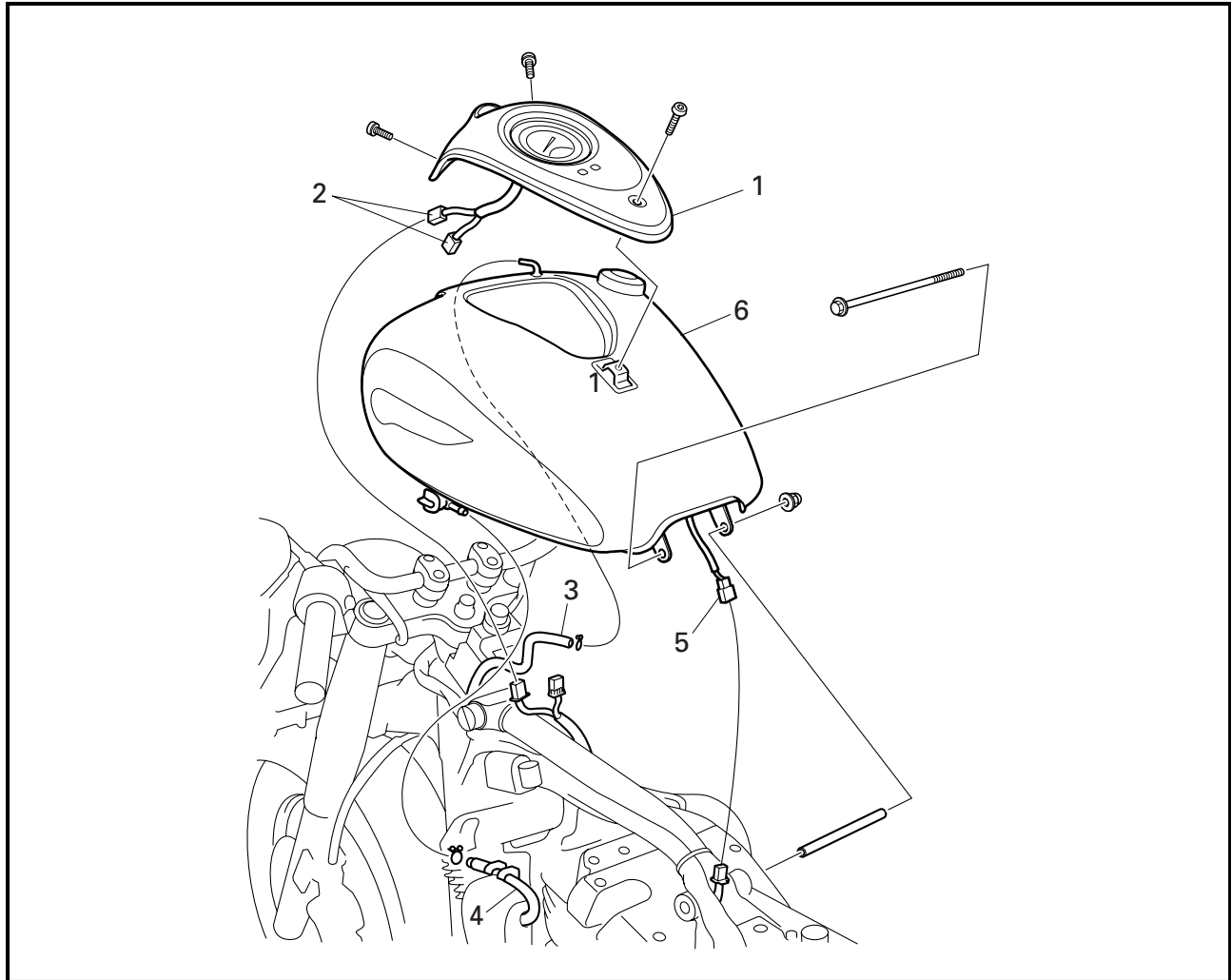


Order	Job/Part	Q'ty	Remarks
	<b>Accessory parts removal (rear)</b>		Remove the parts in the order listed.
1	Emblem	1	
2	Backrest holder	1	
3	Backrest	1	
4	Backrest stay	1	
5	Saddlebag	2	
6	Passenger footrest	2	
7	Saddlebag stay	2	
8	Grip	2	
			For installation, reverse the removal procedure.



EAS00040

FUEL TANK

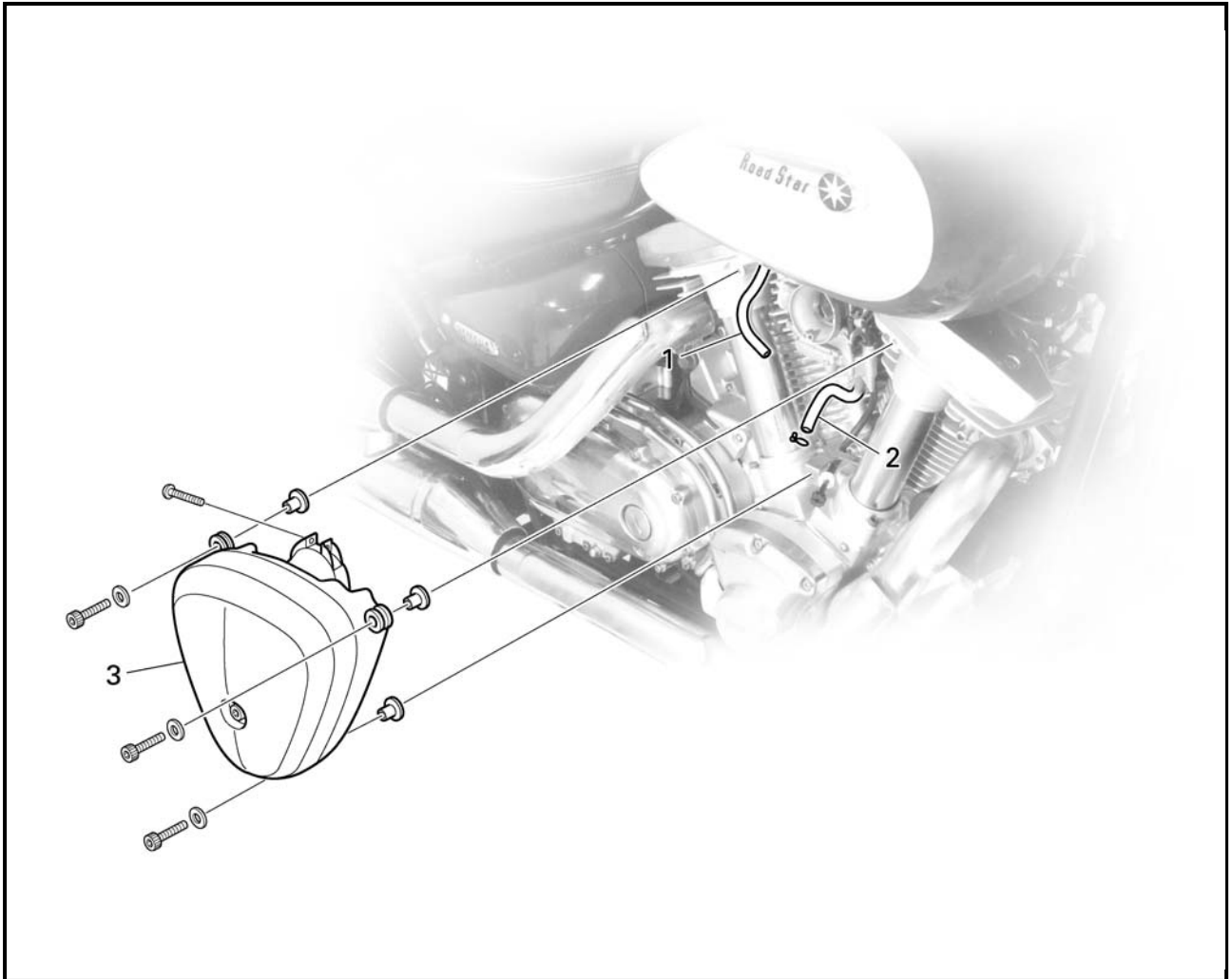


3

Order	Job/Part	Q'ty	Remarks
	<b>Removing the fuel tank</b>		Remove the parts in the order listed. Refer to "SEATS AND SIDE COVERS".
	Rider seat		
1	Meter assembly		
2	Meter assembly coupler	2	Disconnect.
3	Fuel tank breather hose	1	
4	Fuel hose		Disconnect.
			<b>NOTE:</b> _____ Before disconnecting the fuel hose, set the fuel cock to "OFF".
5	Fuel sender coupler	1	Disconnect.
6	Fuel tank	1	
			For installation, reverse the removal procedure.

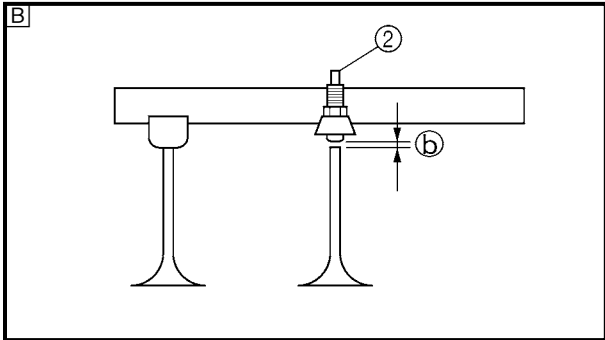
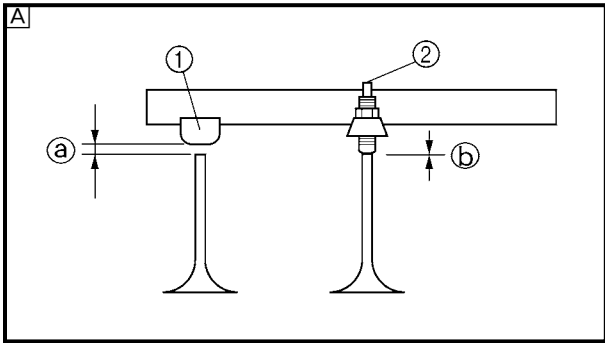
AIR FILTER CASE

3



Order	Job/Part	Q'ty	Remarks
	<b>Removing the air filter case</b>		Remove the parts in the order listed.
1	Vacuum chamber breather hose (air filter case to solenoid valve hose)	1	Disconnect.
2	Cylinder head breather hose	1	Disconnect.
3	Air filter case	1	For installation, reverse the removal procedure.





EAS00047

## ENGINE

### ADJUSTING THE VALVE CLEARANCE

The following procedure applies to all of the valves.

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

- The valve clearance is automatically adjusted by the hydraulic valve lifter. However, there are times that the valve clearance is needed to be adjusted manually. If this is the case, adjust the clearance of the two maladjusted or worn valves, of a rocker arm, with the adjusting screw.

- Ⓐ If clearance is on the slip side ①, loosen the adjusting screw and bring the valve clearance ② within specification. Check if the valve clearance ③ on the adjusting screw ④ side is within specification.
- Ⓑ If clearance is on the adjusting screw ④ side, tighten the adjusting screw and bring the valve clearance ③ within specification.

- 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:

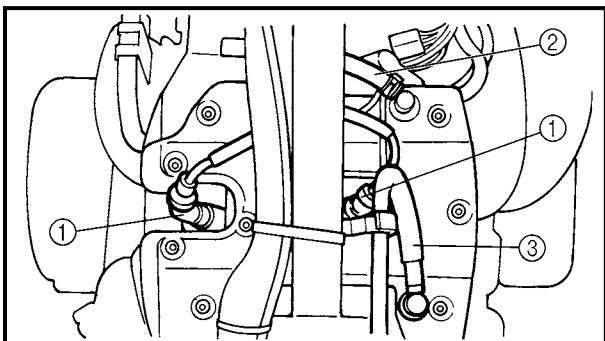
- rider seat  
Refer to "SEATS AND SIDE COVERS".
- fuel tank  
Refer to "FUEL TANK".

2. Disconnect:

- spark plug caps ①
- cylinder head breather hose ②
- oil tank breather hose ③

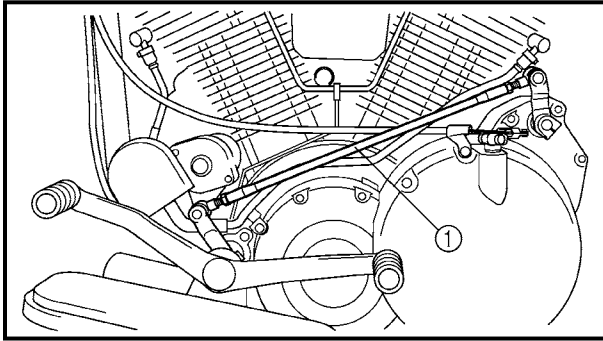
3. Remove:

- spark plugs
- cylinder head covers (upper)
- gaskets
- dowel pins

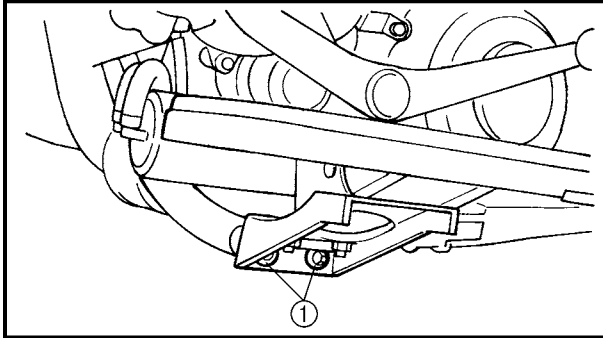


# ADJUSTING THE VALVE CLEARANCE

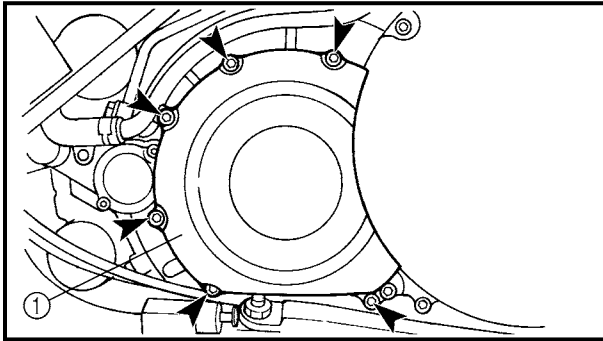
CHK  
ADJ



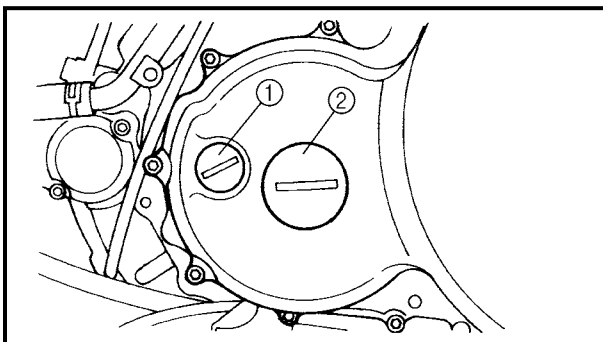
4. Remove:
- shift rod ①



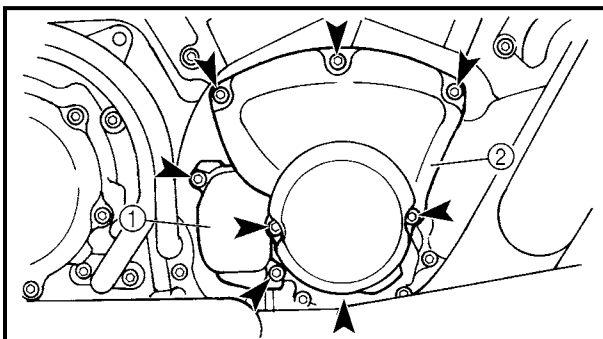
5. Remove:
- rider footrest (left) bolts ①



6. Remove:
- engine left side cover ①



7. Remove:
- timing mark accessing screw ①
  - crankshaft end cover ②

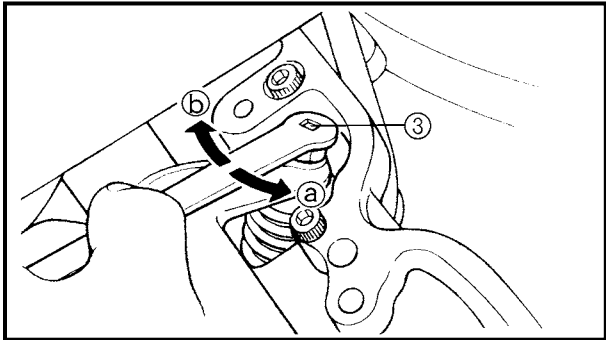
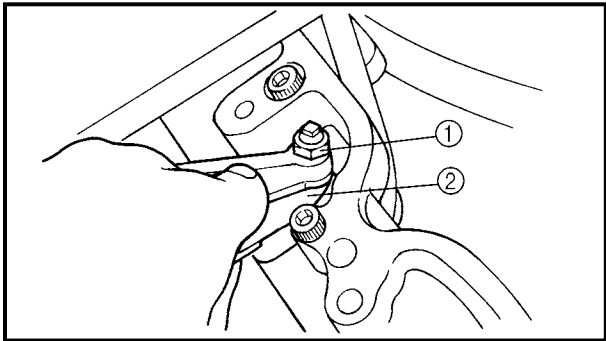


8. Remove:
- decompression solenoid cover ①
  - camshaft sprocket cover ②

3



# ADJUSTING THE VALVE CLEARANCE



**3**

10.Adjust:


- valve clearance



- Loosen the locknut ①.
- Insert a thickness gauge ② between the end of the adjusting screw and the valve tip.
- Turn the adjusting screw ③ in direction ① or ② until the specified valve clearance is obtained.

	Adjusting screw side	Slip side
Direction ①	Valve clearance is increased.	Valve clearance is decreased.
Direction ②	Valve clearance is decreased.	Valve clearance is increased.

- Hold the adjusting screw to prevent it from moving and tighten the locknut to specification.

	<b>Locknut</b> <b>20 Nm (2.0 m • kg, 14 ft • lb)</b>
---	---

- Measure the valve clearance again.
- If the valve clearance is still out of specification, repeat all of the valve clearance adjustment steps until the specified clearance is obtained.



11.Install:

- all removed parts

**NOTE:** \_\_\_\_\_  
For installation, reverse the removal procedure. Note the following points.

Refer to "ROCKER ARMS, PUSH RODS AND VALVE LIFTERS" in chapter 5.

12.Adjust:

- installed shift rod length

Refer to "ADJUSTING THE SHIFT PEDAL".





8. Adjust:
- throttle cable free play
- Refer to "ADJUSTING THE THROTTLE CABLE FREE PLAY".



**Throttle cable free play (at the flange of the throttle grip)**  
4 ~ 8 mm (0.16 ~ 0.31 in)

EAS00058

**ADJUSTING THE THROTTLE CABLE FREE PLAY**

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

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

1. Measure:
- throttle cable free play ①
- Out of specification → Adjust.



**Throttle cable free play (at the flange of the throttle grip)**  
4 ~ 8 mm (0.16 ~ 0.31 in)

2. Adjust:
- throttle cable free play

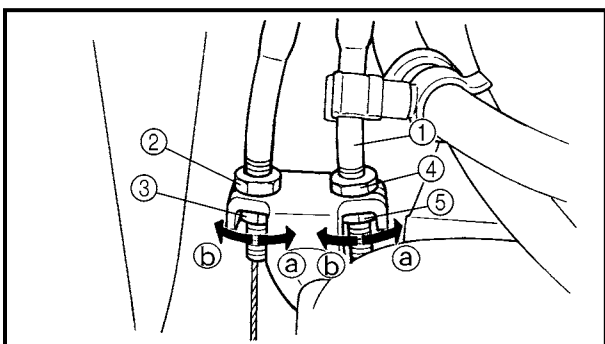
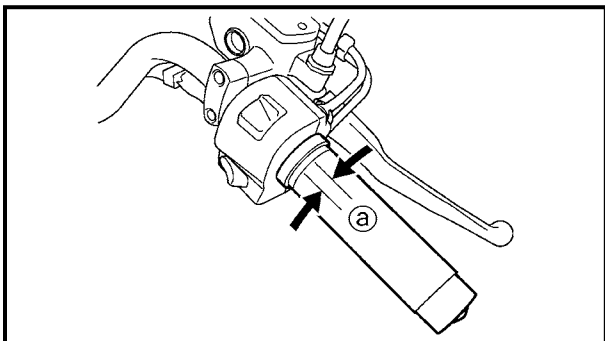


**NOTE:** \_\_\_\_\_

When the throttle is opened, the accelerator cable ① is pulled.

**Carburetor side**

- Remove the rider seat and fuel tank. Refer to "SEATS AND SIDE COVERS" and "FUEL TANK".
- Loosen the locknut ② on the decelerator cable.
- Turn the adjusting nut ③ in direction ④ or ⑤ to take up any slack on the decelerator cable.
- Loosen the locknut ④ on the accelerator cable.



- e. Turn the adjusting nut ⑤ in direction ③ or ④ until the specified throttle cable free play is obtained.

<b>Direction ③</b>	<b>Throttle cable free play is increased.</b>
<b>Direction ④</b>	<b>Throttle cable free play is decreased.</b>

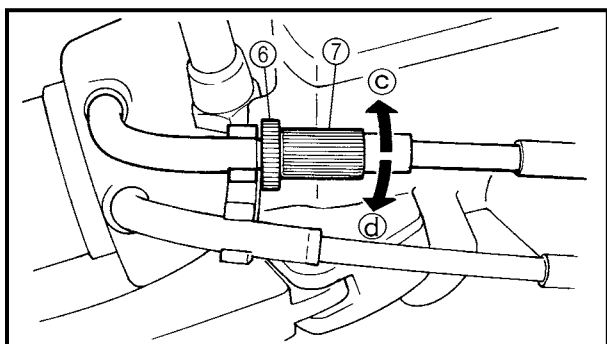
- f. Tighten the locknuts.

**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.

- g. Install the fuel tank and rider seat. Refer to "FUEL TANK" and "SEATS AND SIDE COVERS".

**3**



**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.

<b>Direction ③</b>	<b>Throttle cable free play is increased.</b>
<b>Direction ④</b>	<b>Throttle cable free play is decreased.</b>

- c. Tighten the locknut.

**⚠ WARNING** \_\_\_\_\_

**After adjusting the throttle cable free play, start the engine and turn the handlebar to the right and to the left to ensure that this does not cause the engine idling speed to change.**



EAS00059

**CHECKING THE SPARK PLUGS**

The following procedure applies to all of the spark plugs.

1. Remove:
  - rider seat
  - fuel tank
 Refer to "SEATS AND SIDE COVERS" and "FUEL TANK".


**3**

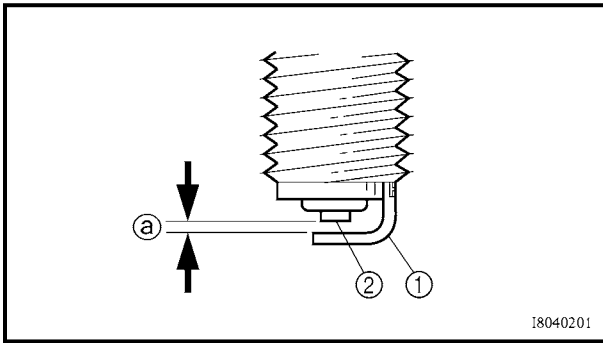
2. Disconnect:
  - spark plug cap
3. Remove:
  - spark plug

**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.

	<b>Spark plugs</b>
	<b>Model (manufacturer)</b>
	<b>DPR7EA-9 (NGK) X22EPR-U9 (DENSO)</b>



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 ③  
(with a wire gauge)  
Out of specification → Regap.

	<b>Spark plug gap</b>
	<b>0.8 ~ 0.9 mm (0.031 ~ 0.35 in)</b>

8. Install:
  - spark plug  **18 Nm (1.8 m · kg, 13 ft · lb)**

**NOTE:**

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

9. Connect:
  - spark plug cap
10. Install:
  - fuel tank
  - rider seat
  - Refer to "FUEL TANK" and "SEATS AND SIDE COVERS".



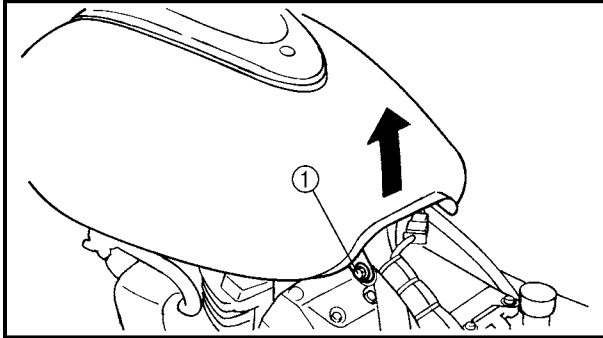
EAS00061

## CHECKING THE IGNITION TIMING

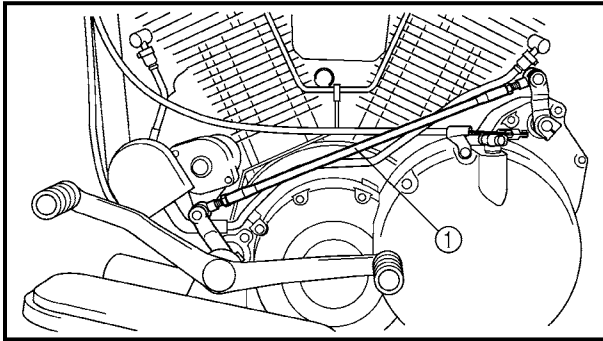
### NOTE:

Prior to checking the ignition timing, check the wiring connections of the entire ignition system. Make sure all connections are tight and free of corrosion.

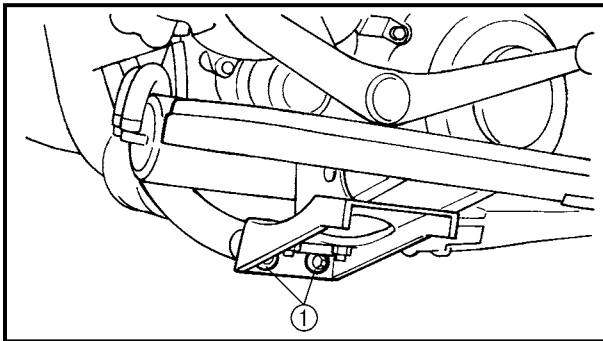
1. Remove:
  - rider seat  
Refer to "SEATS AND SIDE COVERS".
2. Remove:
  - fuel tank bolt ①
3. Lift up the fuel tank end.



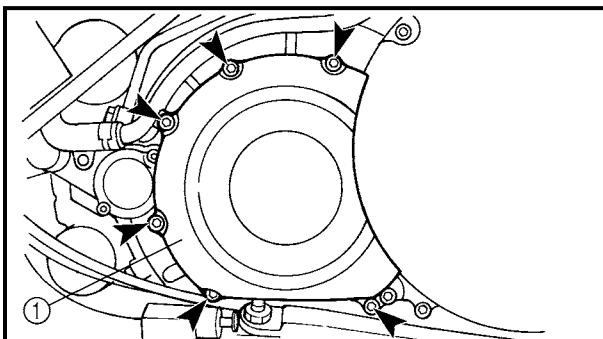
4. Remove:
  - shift rod ①



5. Remove:
  - rider footrest (left) bolts ①



6. Remove:
  - engine left side cover ①



**3**



11. Adjust:

- installed shift rod length

Refer to "ADJUSTING THE SHIFT PEDAL".

EAS00065

**MEASURING THE COMPRESSION  
PRESSURE**

The following procedure applies to all of the cylinders.

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

Insufficient compression pressure will result in a loss of performance.

1. Measure:

- valve clearance

Out of specification → Adjust.

Refer to "ADJUSTING THE VALVE CLEARANCE".

2. Start the engine, warm it up for several minutes, and then turn it off.

3. Remove:

- rider seat
- fuel tank

Refer to "SEATS AND SIDE COVERS" and "FUEL TANK".

4. Remove:

- camshaft sprocket cover

Refer to "ROCKER ARMS, PUSH RODS AND VALVE LIFTERS".

- decompression solenoid

Refer to "CAMSHAFTS".

5. Install:

- camshaft sprocket cover

Refer to "ROCKER ARMS, PUSH RODS AND VALVE LIFTERS".

6. Disconnect:

- spark plug cap

7. 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.**






Refer to the following table.

<b>Compression pressure (with oil applied into the cylinder)</b>	
<b>Reading</b>	<b>Diagnosis</b>
<b>Higher than without oil</b>	<b>Piston wear or damage → Repair.</b>
<b>Same as without oil</b>	<b>Piston rings, valves, cylinder head gasket, or piston possibly defective → Repair.</b>



10. Install:

- spark plug

 **18 Nm (1.8 m · kg, 13 ft · lb)**

11. Connect:

- spark plug cap

12. Remove:

- camshaft sprocket cover

Refer to "ROCKER ARMS, PUSH RODS AND VALVE LIFTERS".

13. Install:

- decompression solenoid

Refer to "CAMSHAFTS".

- camshaft sprocket cover

Refer to "ROCKER ARMS, PUSH RODS AND VALVE LIFTERS".

14. Install:

- fuel tank
- rider seat

Refer to "FUEL TANK" and "SEATS AND SIDE COVERS".

EAS00071

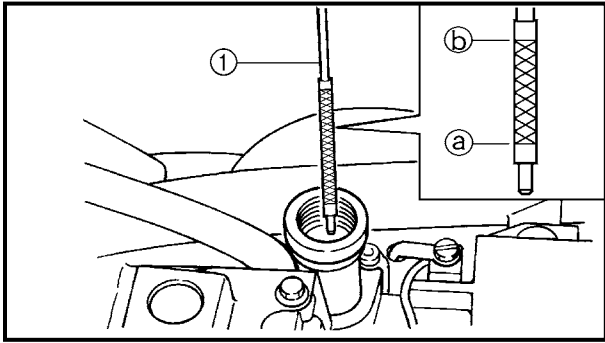
**CHECKING THE ENGINE OIL LEVEL**

1. Stand the motorcycle on a level surface.

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

- Place the motorcycle on a suitable stand.
- Make sure the motorcycle is upright.

2. Start the engine and warm it up by running the engine or letting the engine run at idle for 15 minutes until the engine oil inside of the oil tank has reached a temperature of 60 °C (140 °F) and then turn it off.



**3**

3. Remove:

- rider seat  
Refer to "SEATS AND SIDE COVERS".

4. Remove:

- dipstick ①


5. Check:

- engine oil level  
The engine oil level should be between the minimum level mark ③ and maximum level mark ④.

Below the minimum level mark → Add the recommended engine oil to the proper level.

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

- Before checking the engine oil level, wait a few minutes until the oil has settled.
- Do not screw the dipstick in when inspecting the oil level.

	<p><b>Recommended oil</b> Yamalube 4 (20W 40) or SAE 20W40 type SE motor oil</p>
---	--

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

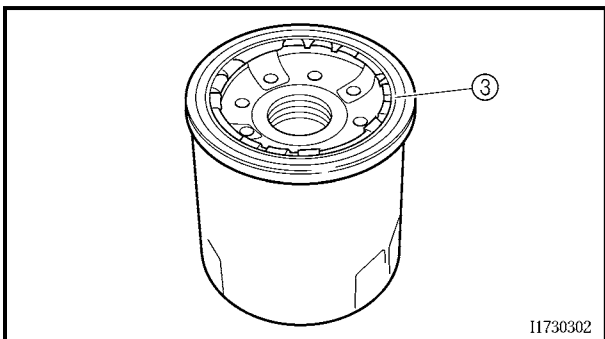
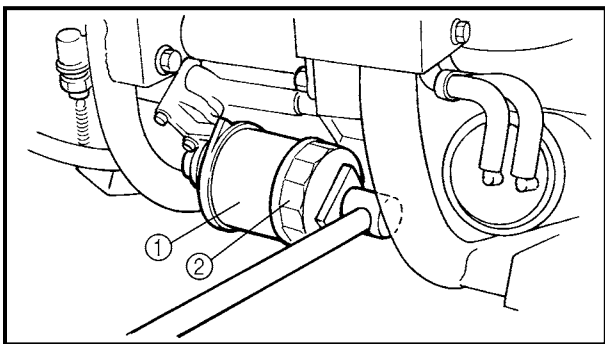
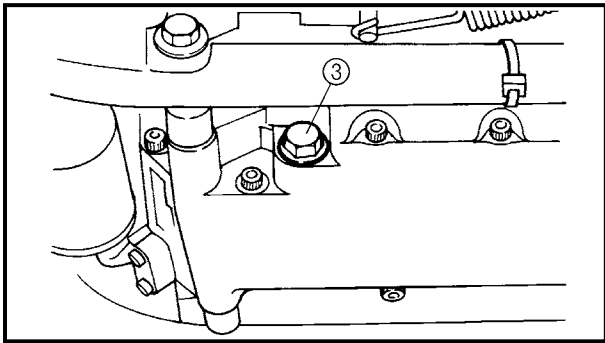
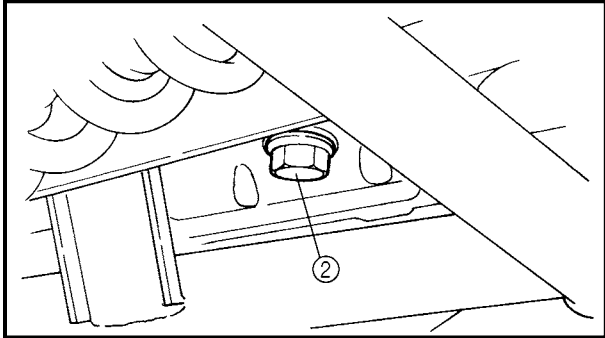
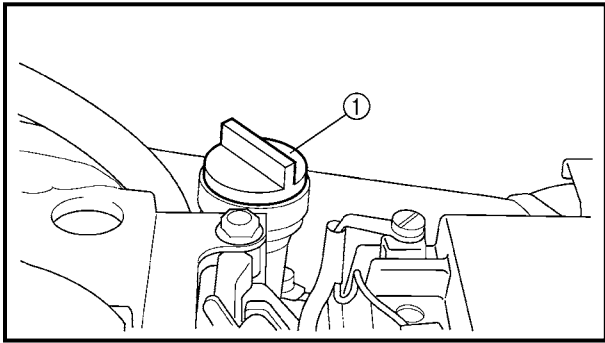
- Engine oil also lubricates the clutch and the wrong oil types or additives could cause clutch slippage. Therefore, do not add any chemical additives.
- Do not allow foreign materials to enter the crankcase.

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

API Service "SE", "SF" and "SG" type or equivalent (e.g., "SF-SE", "SF-SE-CC", "SF-SE-SD").

6. Install:

- dipstick



11730302

EAS00073

## CHANGING THE ENGINE OIL

1. Start the engine, warm it up for several minutes, and then turn it off.
2. Place a container under the engine oil drain bolt.
3. Remove:
  - dipstick ①
  - engine oil drain bolt (oil tank) ②
  - engine oil drain bolt (engine) ③
4. Drain:
  - engine oil (completely from the oil tank and crankcase)

**3**

5. 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.


	<p><b>Oil filter wrench</b> <b>YU-38411</b></p>
--	---

- b. Lubricate the O-ring ③ of the new oil filter cartridge with a thin coat of engine oil.

**CAUTION:**

**Make sure 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.

	<b>Oil filter cartridge</b> <b>17 Nm (1.7 m · kg, 12 ft · lb)</b>
---	--




- 6. Check:
  - engine oil drain bolt gasket  
Damage → Replace.

- 7. Install:
  - engine oil drain bolt

	<b>43 Nm (4.3 m · kg, 31 ft · lb)</b>
---	---------------------------------------

- 8. Fill:
  - oil tank  
(with the specified amount of the recommended engine oil)

	<b>Quantity</b> <b>Total amount</b> <b>5.0 L (4.4 Imp qt, 5.3 US qt)</b> <b>Periodic oil replacement</b> <b>3.7 L (3.3 Imp qt, 3.9 US qt)</b> <b>With oil filter cartridge replacement</b> <b>4.1 L (3.6 Imp qt, 4.3 US qt)</b>
---	---


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

- Pour the engine oil in several stages.
- First, pour in 2.5 L (2.2 Imp qt, 2.6 US qt) of oil, and then start the engine and rev it 3 to 5 times. Stop the engine, and then pour in the remainder of the specified amount.

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

**When starting the engine make sure the dipstick is securely fitted into the oil tank.**

- 9. Fill: (when the engine is disassembled)
  - crankcase and oil tank

	<b>Quantity</b> <b>Total amount</b> <b>5.0 L (4.4 Imp qt, 5.3 US qt)</b> <b>Oil tank</b> <b>2.0 L (1.8 Imp qt, 2.1 US qt)</b> <b>Crankcase</b> <b>3.0 L (2.6 Imp qt, 3.2 US qt)</b>
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EAS00077

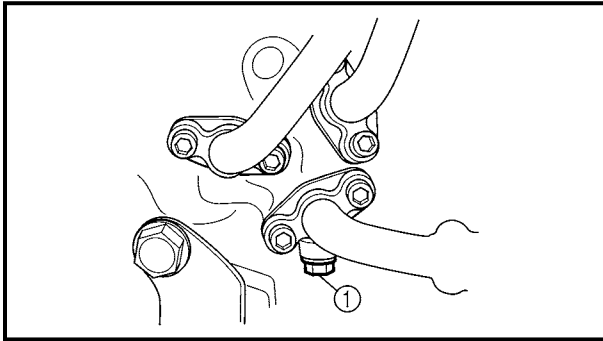
## MEASURING THE ENGINE OIL PRESSURE

1. Check:
  - engine oil level  
Refer to "CHECKING THE ENGINE OIL 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.

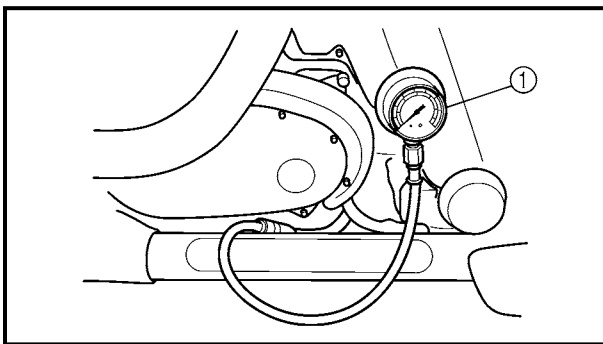
**3**



3. Remove:
  - oil gallery bolt ①

### WARNING

The engine, muffler and engine oil are extremely hot.



4. Install:
  - oil pressure gauge ①



**Oil pressure gauge**  
**90890-03153**

5. Measure:
  - engine oil pressure  
(at the following conditions)



**Engine oil pressure**  
**0.4 ~ 0.8 kPa (0.004 ~**  
**0.008 kg/cm<sup>2</sup>, 0.057 ~ 0.114 psi)**  
**Engine speed**  
**Approx. 900 r/min**  
**Engine oil temperature**  
**60 °C (140 °F)**




Out of specification → Adjust.

Engine oil pressure	Possible causes
<b>Below specification</b>	<ul style="list-style-type: none"> <li>• Faulty oil pump</li> <li>• Clogged oil filter</li> <li>• Leaking oil passage</li> </ul>
<b>Broken or damaged oil seal Above specification</b>	<ul style="list-style-type: none"> <li>• Leaking oil passage</li> <li>• Faulty oil filter</li> <li>• Oil viscosity too high</li> </ul>

6. Install:

- oil gallery bolt

 20 Nm (2.0 m · kg, 14 ft · lb)

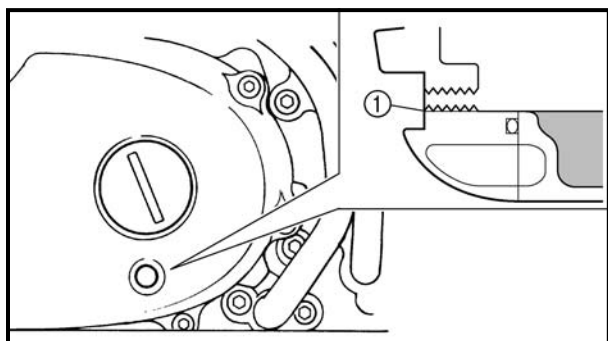
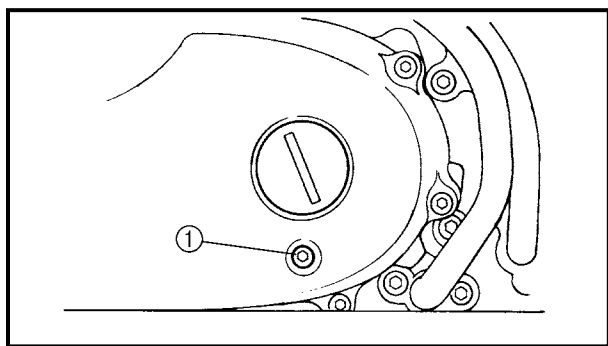
**3**

**CHECKING THE TRANSFER GEAR OIL LEVEL**

1. Stand the motorcycle on a level surface.

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

- Place the motorcycle on a suitable stand.
- Make sure the motorcycle is upright.



2. Remove:

- checking bolt ①

3. Check:

- transfer gear oil level  
The transfer gear oil level should be up to the brim ① of the hole.  
Below the brim → Add the recommended transfer gear oil to the proper level.


 **Recommended oil**  
**SAE80API "GL-4" Hypoid gear oil**



**CAUTION:**

Do not allow foreign materials to enter the transfer case.

4. Install:
- checking bolt

 8 Nm (0.8 m · kg, 5.8 ft · lb)

**CHANGING THE TRANSFER GEAR OIL**

1. Place a container under the transfer gear oil drain bolt.
2. Remove:
  - straight plug ①
  - transfer gear oil drain bolt ②
3. Drain:
  - transfer gear oil (completely from the transfer gear case)
4. Check:
  - transfer gear oil drain bolt gasket  
Damage → Replace.
5. Install:
  - transfer gear oil drain bolt

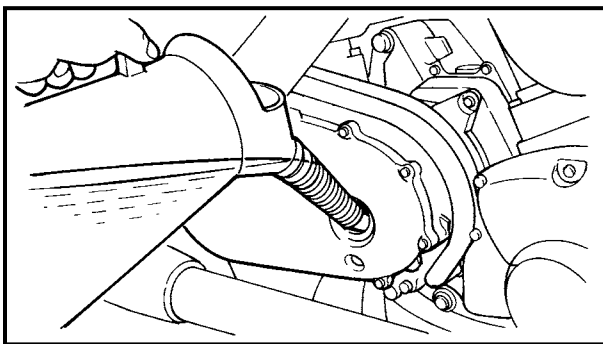
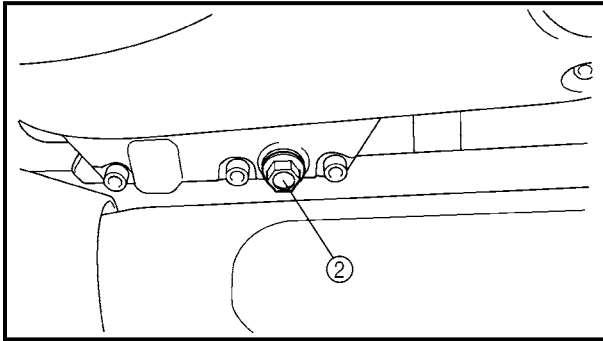
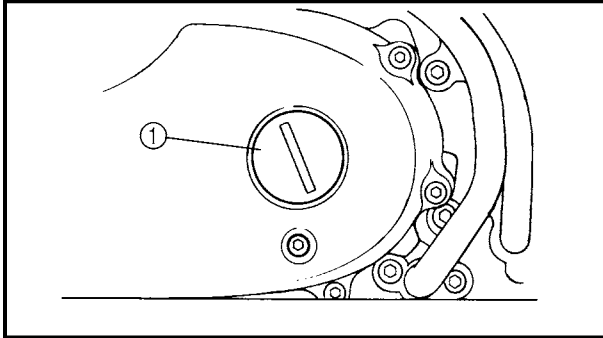
 18 Nm (1.8 m · kg, 13 ft · lb)

6. Fill:
  - transfer gear case (with the specified amount of the recommended transfer gear oil)

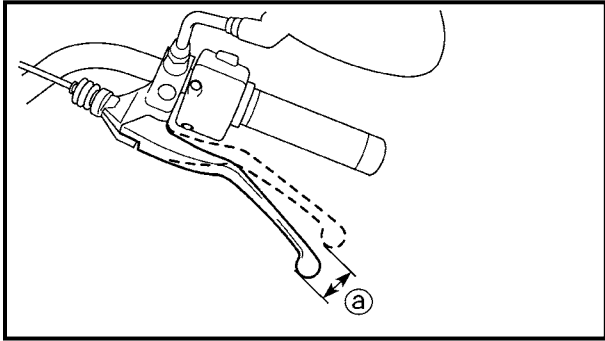


**Quantity**  
**Total amount**  
0.4 L (0.35 Imp qt, 0.42 US qt)

7. Install:
  - straight plug
8. Check:
  - transfer gear oil level  
Refer to "CHECKING THE TRANSFER GEAR OIL LEVEL".



# ADJUSTING THE CLUTCH CABLE FREE PLAY

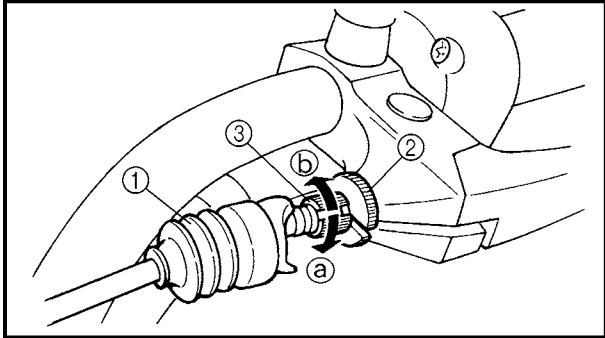


EAS00078

## ADJUSTING THE CLUTCH CABLE FREE PLAY

1. Measure:
  - clutch cable free play **a**
 Out of specification → Adjust.

	<b>Clutch cable free play (at the end of the clutch lever)</b> 10 ~ 15 mm (0.39 ~ 0.59 in)
---	---



2. Adjust:
  - clutch cable free play



### Handlebar side

- a. Pull the boot **1** off.
- b. Loosen the locknut **2**.
- c. Turn the adjusting bolt **3** in direction **a** or **b** until the specified clutch cable free play is obtained.

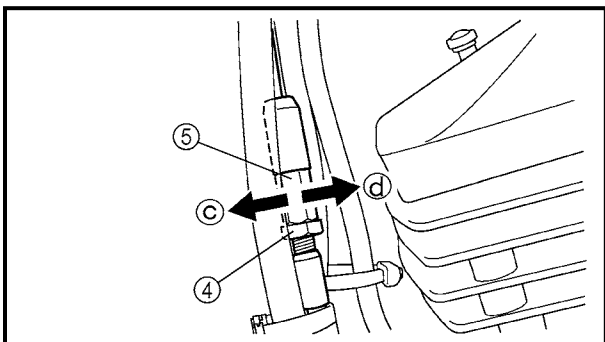
**3**

<b>Direction a</b>	<b>Clutch cable free play is increased.</b>
<b>Direction b</b>	<b>Clutch cable free play is decreased.</b>

- d. Tighten the locknut.

### 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.



- e. Pull the boot **1** in.

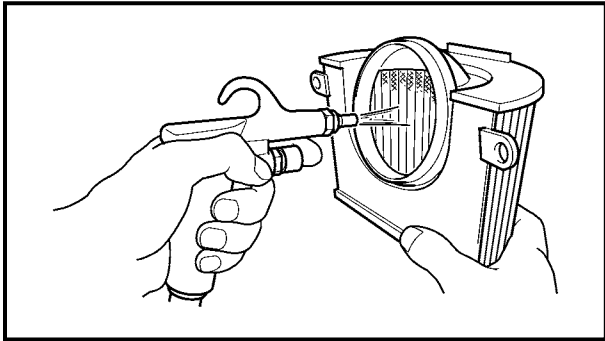
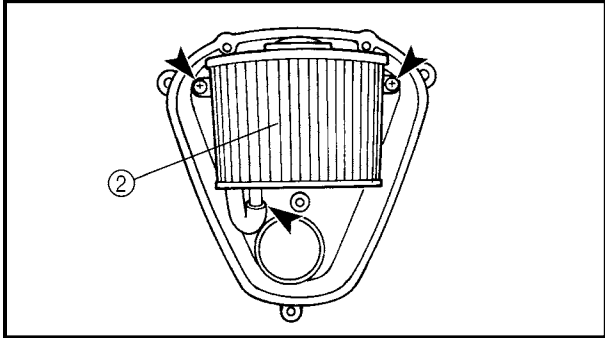
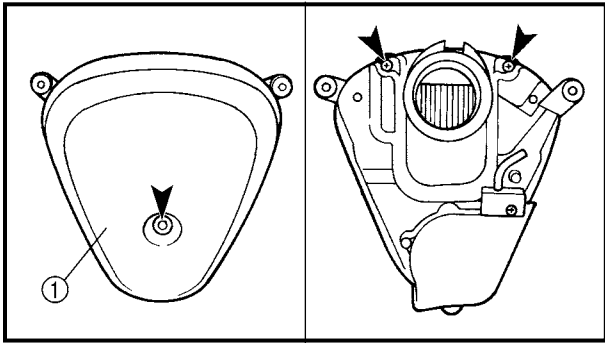
### Engine side

- a. Loosen the locknut **4**.
- b. Turn the adjusting bolt **5** in direction **c** or **d** until the specified clutch cable free play is obtained.

<b>Direction c</b>	<b>Clutch cable free play is increased.</b>
<b>Direction d</b>	<b>Clutch cable free play is decreased.</b>

- c. Tighten the locknut.





EAS00086

## CLEANING THE AIR FILTER ELEMENT

1. Remove:
  - air filter case  
Refer to "AIR FILTER CASE".
2. Remove:
  - air filter case cover ①
  - air filter element ②

3. Clean:
  - air filter element  
Apply compressed air to the outer surface of the air filter element.
4. Check:
  - air filter element  
Damage → Replace.
  - O-ring  
Damage → Replace.
5. Install:
  - air filter element
  - air filter case cover

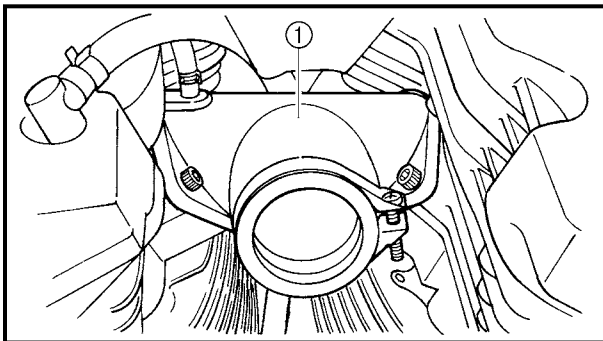
### CAUTION:

**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 their sealing surfaces are aligned to prevent any air leaks.

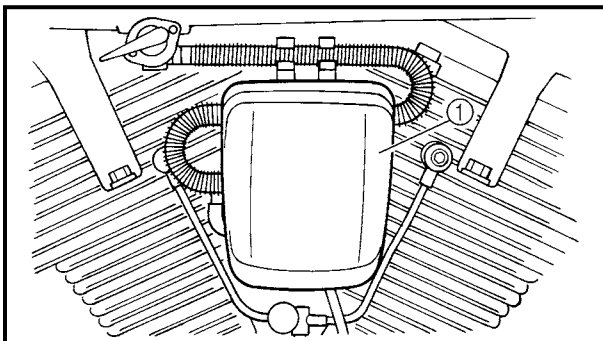
6. Install:
  - air filter case  
Refer to "AIR FILTER CASE".



EAS00094

## CHECKING THE CARBURETOR JOINT

1. Remove:
  - carburetor assembly  
Refer to "CARBURETOR" in chapter 6.
2. Check:
  - carburetor joint ①  
Cracks/damage → Replace.  
Refer to "CARBURETOR" in chapter 6.
3. Install:
  - carburetor assembly  
Refer to "CARBURETOR" in chapter 6.



EAS00097

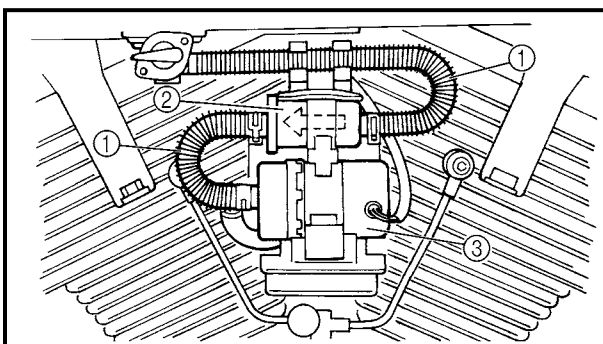
## CHECKING THE FUEL HOSES AND FUEL FILTER

The following procedure applies to all of the fuel hoses.

1. Remove:
  - fuel pump cover ①
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 ③ as shown.



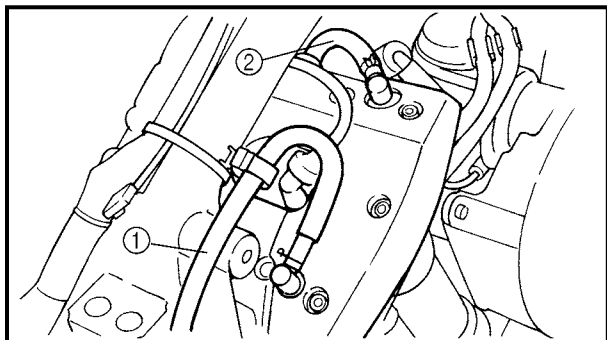
3. Install:
  - fuel pump cover



EAS00098

**CHECKING THE CYLINDER HEAD  
BREATHER HOSE AND TRANSFER GEAR  
CASE BREATHER HOSE**

1. Remove:
  - rider seat
  - fuel tank
 Refer to "SEATS AND SIDE COVERS"  
and "FUEL TANK".

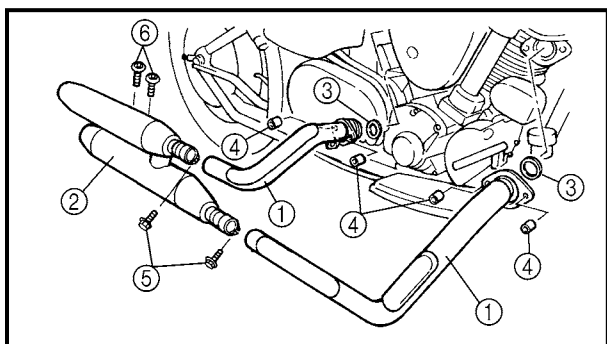


2. Check:
  - oil pump breather hose ①
  - cylinder head breather hose ②
 Cracks/damage → Replace.  
Loose connection → Connect properly.

**CAUTION:**

**Make sure the crankcase breather hose is  
routed correctly.**

3. Install:
  - fuel tank
  - rider seat
 Refer to "FUEL TANK" and "SEATS AND  
SIDE COVERS".



EAS00100

**CHECKING THE EXHAUST SYSTEM**

The following procedure applies to all of  
the exhaust pipes, mufflers and gaskets.

1. Check:
  - exhaust pipe ①
  - muffler ②
 Cracks/damage → Replace.
  - gasket ③
 Exhaust gas leaks → Replace.
2. Measure:
  - tightening torque



**Exhaust pipe nut ④**  
20 Nm (2.0 m • kg, 14 ft • lb)  
**Exhaust pipe and muffler bolt ⑤**  
25 Nm (2.5 m • kg, 18 ft • lb)  
**Muffler and muffler bracket bolt ⑥**  
30 Nm (3.0 m • kg, 22 ft • lb)







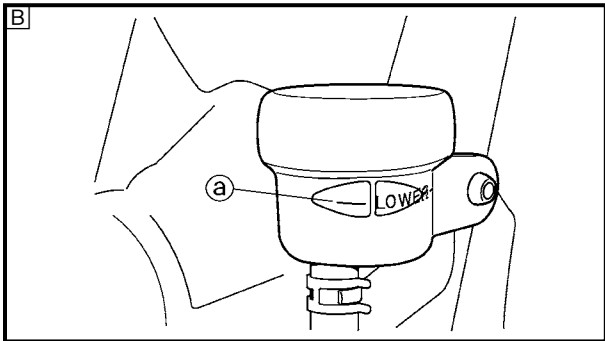
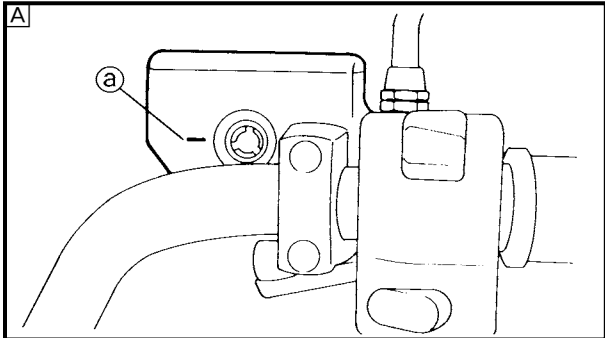
EAS00115

## CHECKING THE BRAKE FLUID LEVEL

1. Stand the motorcycle on a level surface.

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

- Place the motorcycle on a suitable stand.
- Make sure 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** \_\_\_\_\_

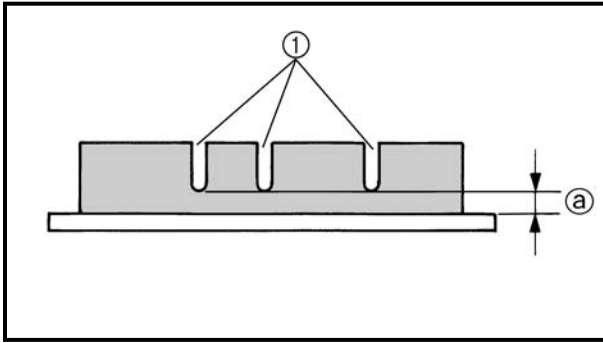
- **Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.**
- **Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor 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 the top of the brake fluid reservoir is horizontal.



EAS00120

**CHECKING THE FRONT BRAKE PADS**

The following procedure applies to all of the brake pads.

1. Operate the brake.
2. Check:

- brake pad

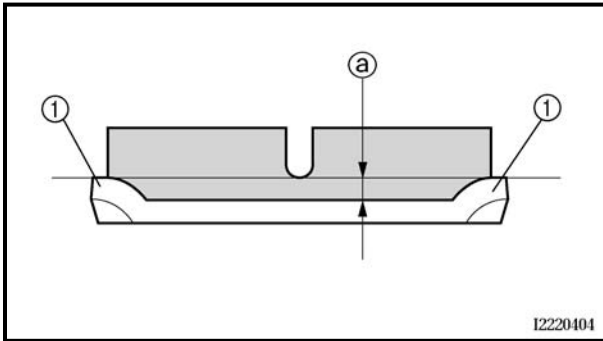
Wear indicator groove ① almost disappeared → Replace the brake pads as a set.

Refer to “REPLACING THE FRONT BRAKE PADS” in chapter 4.



**Brake pad wear limit ②**  
**0.5 mm (0.02 in)**

3



EAS00118

**CHECKING THE REAR BRAKE PADS**

The following procedure applies to all of the brake pads.

1. Operate the brake.
2. Check:

- brake pad

Wear indicators ① almost touch the brake disc → Replace the brake pads as a set.

Refer to “REPLACING THE REAR BRAKE PADS” in chapter 4.



**Brake pad wear limit ②**  
**0.5 mm (0.02 in)**

EAS00128

**ADJUSTING THE REAR BRAKE LIGHT SWITCH**

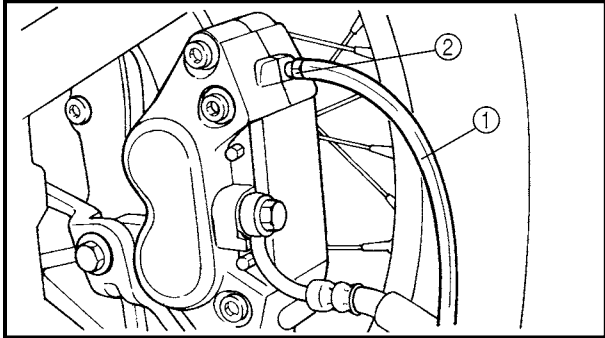
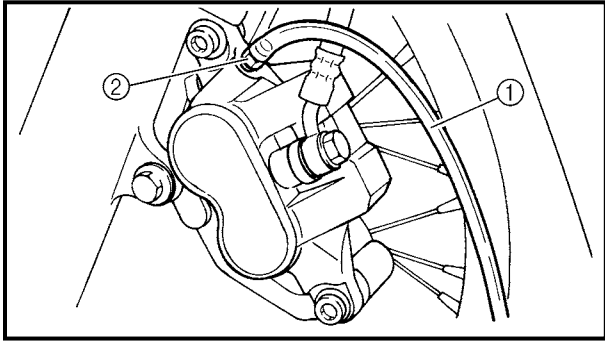
**NOTE:** \_\_\_\_\_

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

The rear brake light switch is properly adjusted when the brake light comes on just before the braking effect starts.







c. Connect a clear plastic hose ① tightly to the bleed screw ②.

**A** Front **B** Rear

d. Place the other end of the hose into a container.

e. Slowly apply the brake several times.

f. Fully squeeze the brake lever or fully depress the brake pedal and hold it in position.

g. Loosen the bleed screw.

**NOTE:** \_\_\_\_\_  
Loosening the bleed screw will release the pressure and cause the brake lever to contact the throttle grip or the brake pedal to fully extend.

h. Tighten the bleed screw and then release the brake lever or brake pedal.

i. Repeat steps (e) to (h) until all of the air bubbles have disappeared from the brake fluid in the plastic hose.

j. Tighten the bleed screw to specification.

 **Bleed screw**  
**6 Nm (0.6 m · kg, 4.3 ft · lb)**

k. Fill the brake fluid reservoir to the proper level with the recommended brake fluid.


Refer to "CHECKING THE BRAKE FLUID LEVEL".

**⚠ WARNING** \_\_\_\_\_

**After bleeding the hydraulic brake system, check the brake operation.**




4. Install:
- plastic clamps
  - muffler bracket


 **26 Nm (2.6 m · kg, 19 ft · lb)**

- muffler

5. Tighten:
- muffler bolts

 **30 Nm (3.0 m · kg, 22 ft · lb)**

- muffler clamp bolts

 **25 Nm (2.5 m · kg, 18 ft · lb)**





1. Stand the motorcycle on a level surface.

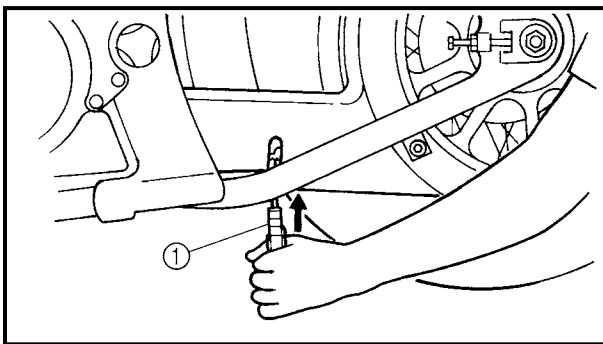
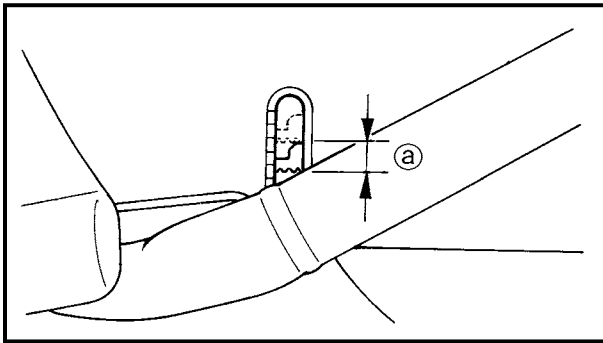
**⚠ WARNING**

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

**NOTE:**

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

2. Rotate the rear wheel several times and check the drive belt to locate its tightest point.



3. Measure:

- drive belt slack ②
- Out of specification → Adjust.

	<p><b>Drive belt slack</b></p> <p><b>On the sidestand</b></p> <p>7.5 ~ 13 mm at 4.5 kg (0.30 ~ 0.51 in at 10 lbs)</p> <p><b>On a suitable stand</b></p> <p>14 ~ 21 mm at 4.5 kg (0.55 ~ 0.83 in at 10 lbs)</p>
--	--

	<p><b>Belt tension gauge</b></p> <p><b>YM-03170</b></p>
--	---

**NOTE:**

- The level marks of the level window on the lower drive belt cover are in units of 5 mm (0.20 in). Use them as a standard for measuring the drive belt slack.
- Measure the drive belt slack when the drive belt has been pushed with 4.5 kg (10 lbs) of pressure using a belt tension gauge ①.

4. Adjust:

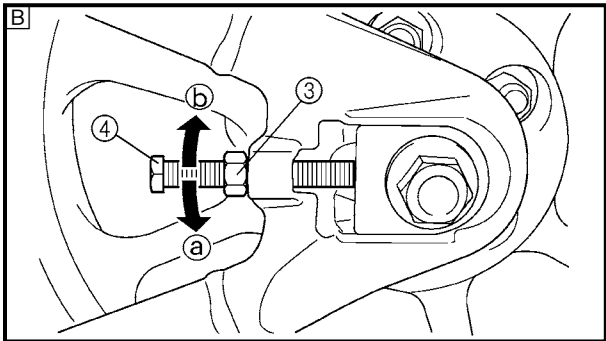
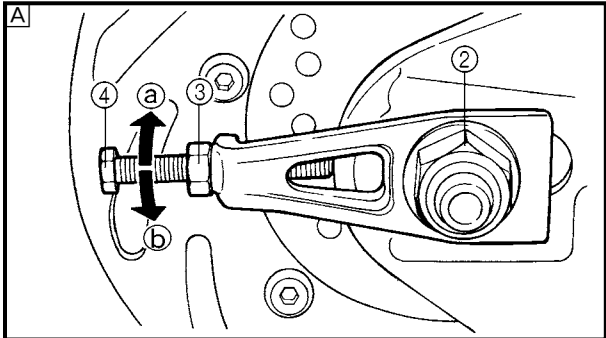
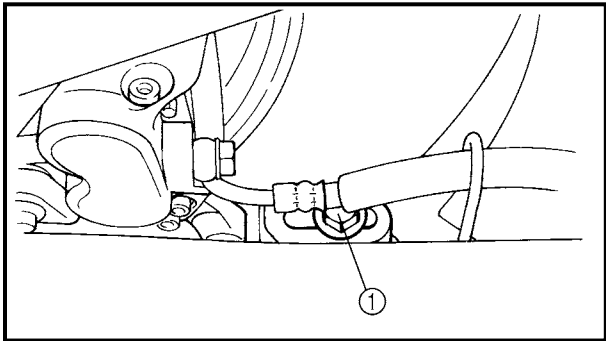
- drive belt slack



**NOTE:**

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

## ADJUSTING THE DRIVE BELT SLACK/ CHECKING AND ADJUSTING THE STEERING HEAD



- a. Loosen the brake caliper bracket bolt ①.
  - b. Loosen the wheel axle nut ②.
  - c. Loosen both locknuts ③.
- A Right                       B Left
- d. Turn both adjusting bolts ④ in direction ① or ② until the specified drive chain slack is obtained.

Direction ①	Drive belt slack is reduced.
Direction ②	Drive belt slack is increased.

**NOTE:** \_\_\_\_\_  
 To maintain the proper wheel alignment, adjust both sides evenly.

- e. Tighten both locknuts to specification.

	<b>Locknut</b> 32 Nm (3.2 m • kg, 23 ft • lb)
--	--

- f. Tighten the wheel axle nut to specification.

	<b>Wheel axle nut</b> 150 Nm (15.0 m • kg, 110 ft • lb)
--	--

- g. Tighten the brake caliper bracket bolt to specification.

	<b>Brake caliper bracket bolt</b> 40 Nm (4.0 m • kg, 29 ft • lb)
--	---



EAS00146

### CHECKING AND ADJUSTING THE STEERING HEAD

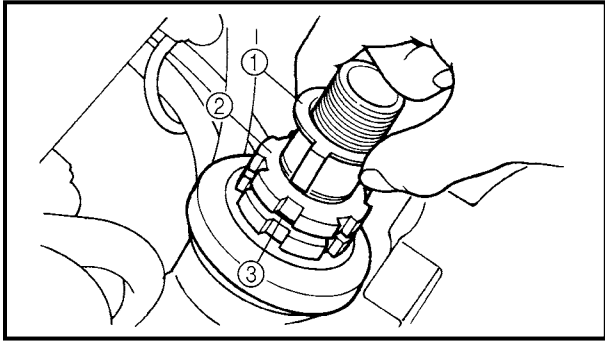
1. Stand the motorcycle on a level surface.

**⚠ 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.





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 4.


- e. Install the rubber 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 the lock washer tabs sit correctly in the ring nut slots.



7. Install:
- upper bracket
  - washer
  - steering stem nut

 130 Nm (13.0 m · kg, 94 ft · lb)

8. Tighten:
- upper bracket pinch bolt

 10 Nm (1.0 m · kg, 7.2 ft · lb)

9. Install:
- meter assembly
- Refer to "FUEL TANK".

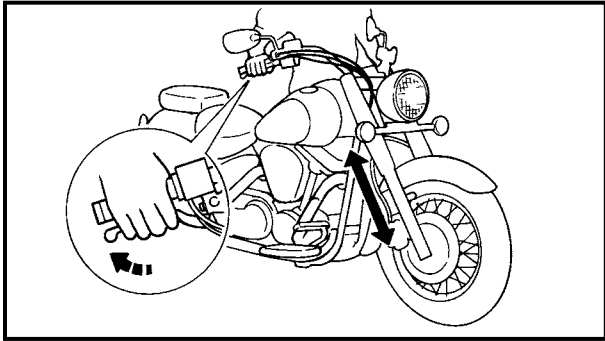
EAS00149

**CHECKING THE FRONT FORK**

1. Stand the motorcycle on a level surface.

**⚠ WARNING** \_\_\_\_\_

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



2. Check:
  - inner tube  
Damage/scratches → Replace.
  - oil seal  
Oil leakage → Replace.
3. Hold the motorcycle upright and apply the front brake.
4. Check:
  - front fork operation  
Push down hard on the handlebar several times and check if the front fork rebounds smoothly.  
Rough movement → Repair.  
Refer to "FRONT FORK" in chapter 4.

**ADJUSTING THE REAR SHOCK  
ABSORBER ASSEMBLY**

**⚠ WARNING**

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

**Spring preload**

**CAUTION:**

Never go beyond the maximum or minimum adjustment positions.

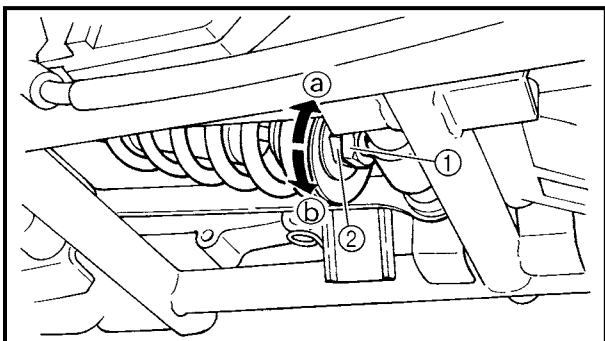
1. Adjust:
  - spring preload

**NOTE:**

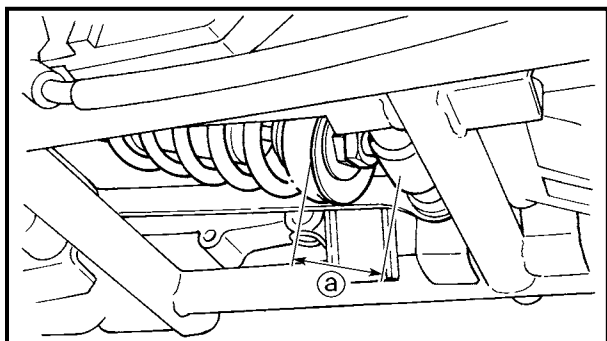
Adjust the spring preload with the special wrench and extension bar included in the owner's tool kit.



- a. Loosen the locknut ①
- b. Turn the adjusting ring ② in direction ③ or ④.



<b>Direction ③</b>	<b>Spring preload is increased (suspension is harder).</b>
<b>Direction ④</b>	<b>Spring preload is decreased (suspension is softer).</b>



**Adjusting length (a)**

Minimum 42.5 mm (1.67 in)

Standard 42.5 mm (1.67 in)

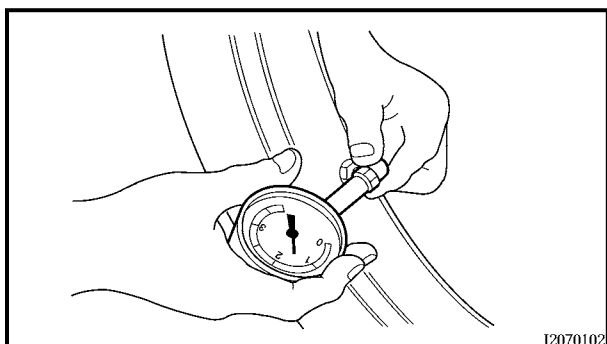
Maximum 51.5 mm (2.03 in)

**CAUTION:**

Never turn the adjusting ring beyond the maximum or minimum setting.



3



EAS00166

**CHECKING THE TIRES**

The following procedure applies to both of the tires.

1. Measure:
  - tire pressureOut 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.**

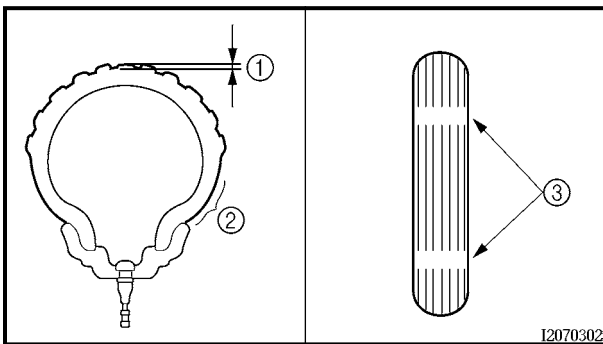


<b>Basic weight (with oil and a full fuel tank)</b>	332 kg (732 lb): XV16A 347 kg (765 lb): XV16AT	
<b>Maximum load*</b>	196 kg (432 lb): XV16A 181 kg (399 lb): XV16AT	
<b>Cold tire pres- sure</b>	<b>Front tire</b>	<b>Rear tire</b>
<b>Up to 90 kg load*</b>	250 kPa (2.5 kgf/cm <sup>2</sup> , 36 psi)	250 kPa (2.5 kgf/cm <sup>2</sup> , 36 psi)
<b>90 kg ~ maxi- mum load*</b>	250 kPa (2.5 kgf/cm <sup>2</sup> , 36 psi)	280 kPa (2.8 kgf/cm <sup>2</sup> , 40 psi)
<b>High-speed riding</b>	250 kPa (2.5 kgf/cm <sup>2</sup> , 36 psi)	280 kPa (2.8 kgf/cm <sup>2</sup> , 40 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.

	<b>Minimum tire tread depth 1.6 mm (0.06 in)</b>
---	--

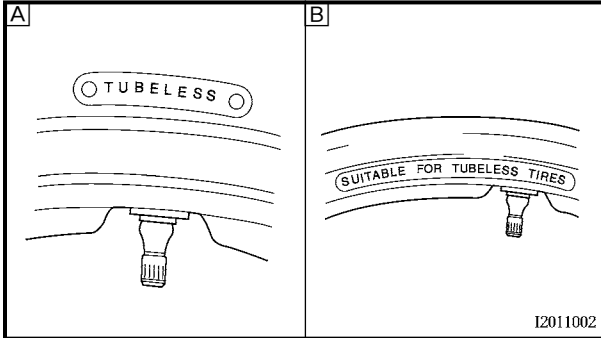
- ① Tire tread depth
- ② Side wall
- ③ Wear indicator

**⚠ 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 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.

**3**

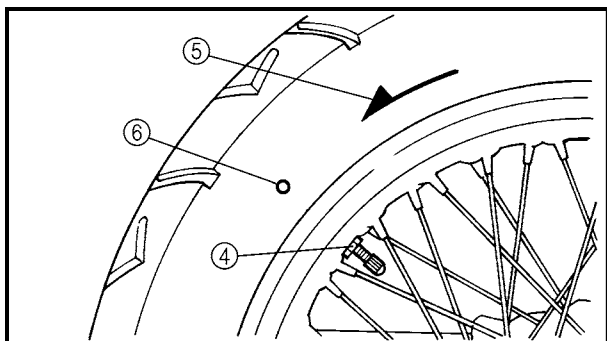
### Front tire

Manufacturer	Size	Model
BRIDGESTONE	130/90-16 67H	G703F
DUNLOP	130/90-16 67H	D404FL

### Rear tire

Manufacturer	Size	Model
BRIDGESTONE	150/80 B16 71H	G702
DUNLOP	150/80 B16 71H	D404





## ⚠ WARNING

- After mounting a new tire, ride conservatively for a while to become accustomed to the “feel” of the new tire and to allow the tire to seat itself properly in the rim. Failure to do so could lead to an accident with possible injury to the rider or damage to the motorcycle.
- After a tire has been repaired or replaced, be sure to tighten the tire air valve stem locknut ④ to specification.

## NOTE:

For tires with a direction of rotation mark ⑤:

- Install the tire with the mark pointing in the direction of wheel rotation.
- Align the mark ⑥ with the valve installation point.



**Tire air valve stem locknut**  
**1.5 Nm (0.5 m • kg, 1.1 ft • lb)**

EAS00169

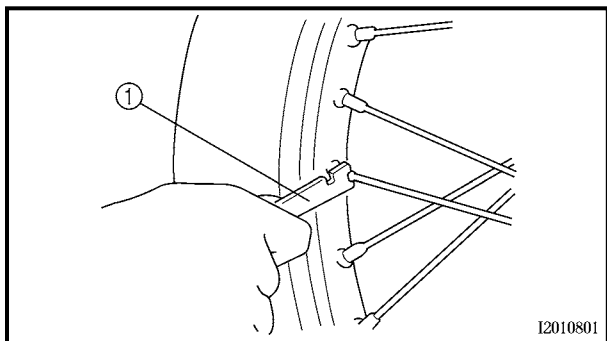
## CHECKING AND TIGHTENING THE SPOKES

The following procedure applies to all of the spokes.


1. Check:
  - spoke
    - Bends/damage → Replace.
    - Loose → Tighten.
    - Tap the spokes with a screwdriver.

## NOTE:

A tight spoke will emit a clear, ringing tone; a loose spoke will sound flat.



2. Tighten:
  - spokes  
(with a spoke wrench ①)

 **3 Nm (0.3 m · kg, 2.2 ft · lb)**

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

Be sure to tighten the spokes before and after break-in.

---

EAS00170

## 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.

---

EAS00171

**LUBRICATING THE LEVERS AND PEDALS**

Lubricate the pivoting point and metal-to-metal moving parts of the levers and pedals.

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

EAS00172

**LUBRICATING THE SIDESTAND**


Lubricate the pivoting point and metal-to-metal moving parts of the sidestand.

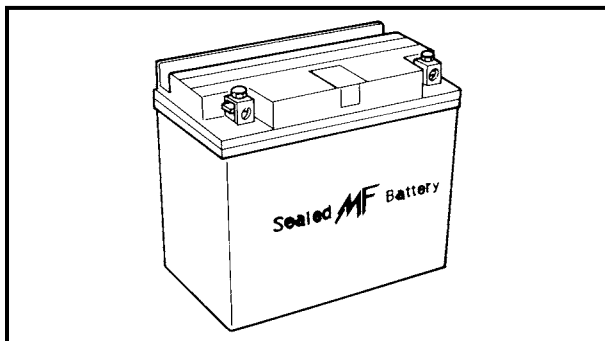
	<b>Recommended lubricant</b> <b>Lithium soap base grease</b>
---	---

EAS00174

**LUBRICATING THE REAR SUSPENSION**

Lubricate the pivoting point and metal-to-metal moving parts of the rear suspension.

	<b>Recommended lubricant</b> <b>Molybdenum disulfide grease</b>
---	--



EAS00178

**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.

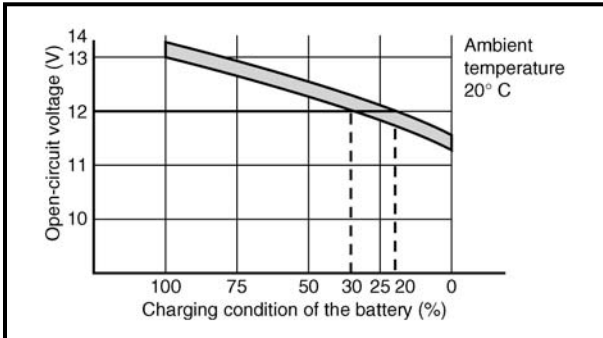
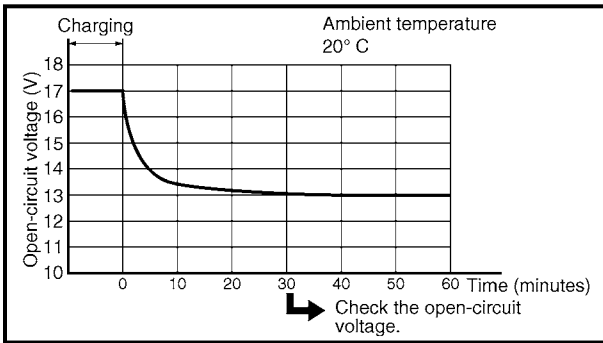
**INTERNAL**

- Drink large quantities of water or milk followed with milk of magnesia, beaten egg, or vegetable oil. Get immediate medical attention.
- This is a sealed battery. Never remove the sealing caps because the balance between cells will not be maintained and battery performance will deteriorate.

**CAUTION:**

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)

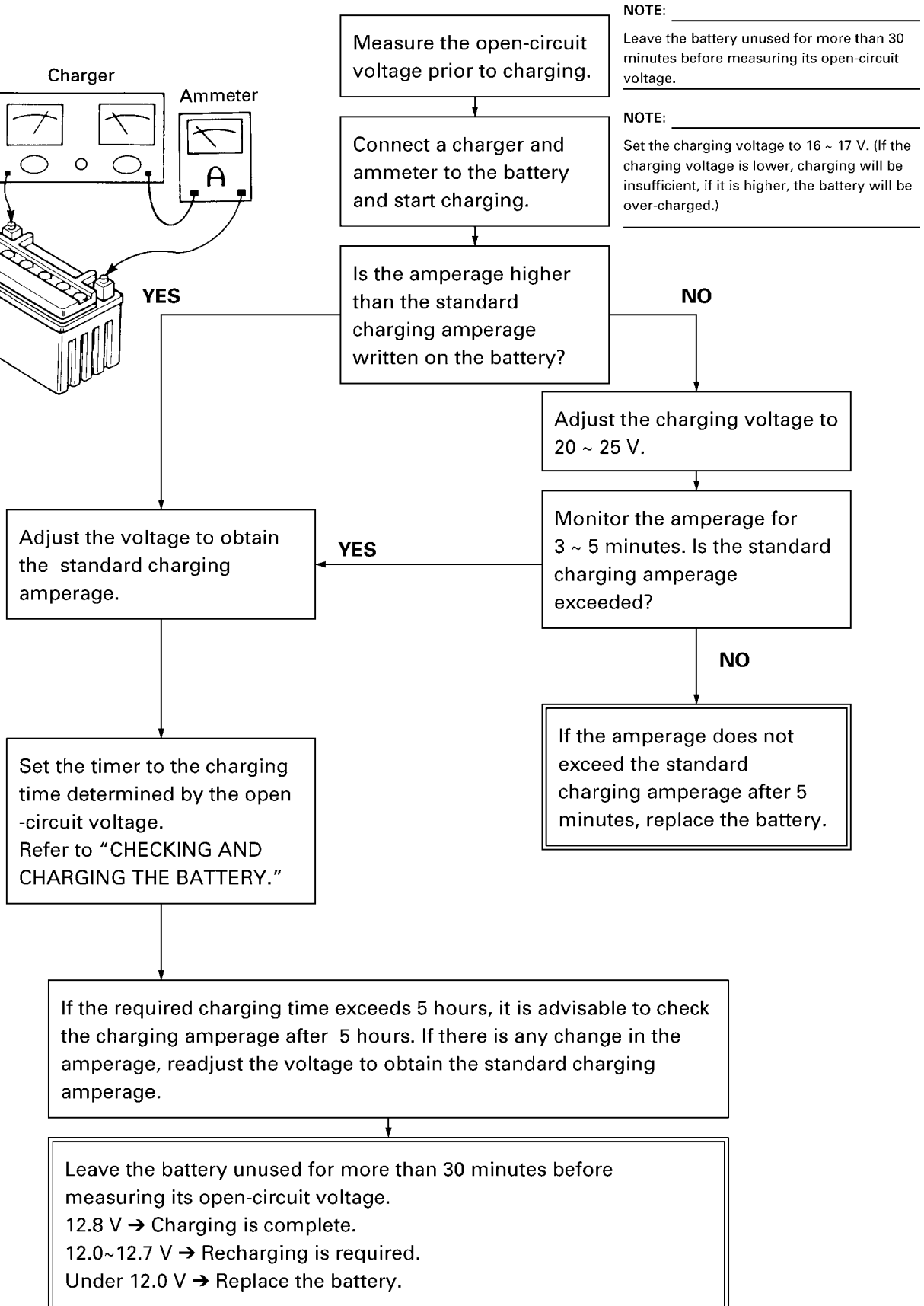
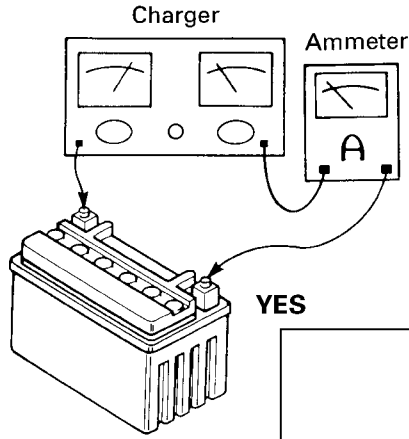
### ⚠ WARNING

**Do not quick charge a battery.**

### CAUTION:

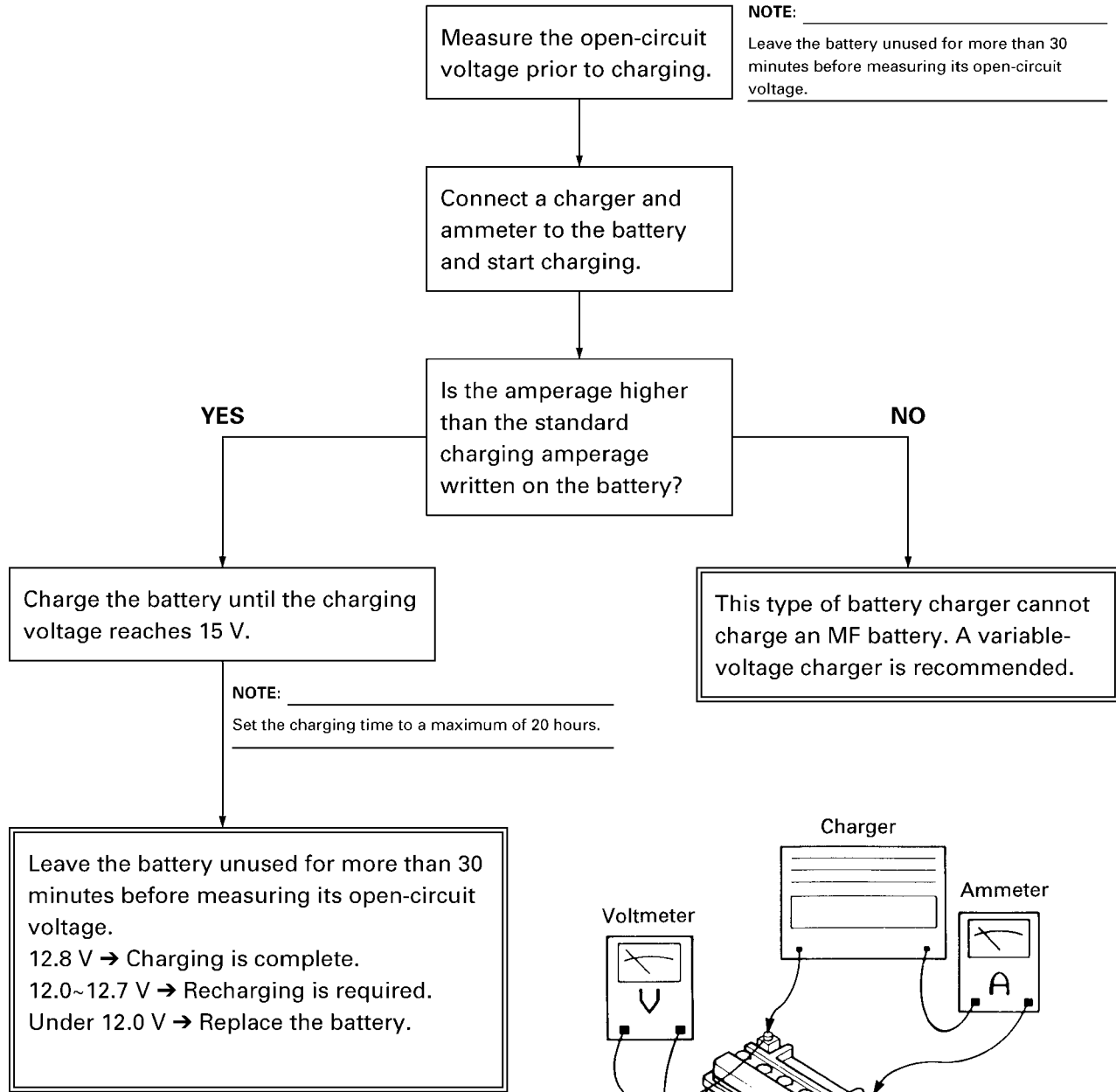
- Never remove the MF battery sealing caps.
- Do not use a high-rate battery charger since it forces a high-amperage current into the battery quickly and can cause battery overheating and battery plate damage.
- If it is impossible to regulate the charging current on the battery charger, be careful not 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 battery 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 the battery charger lead clips are in full contact with the battery terminals 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

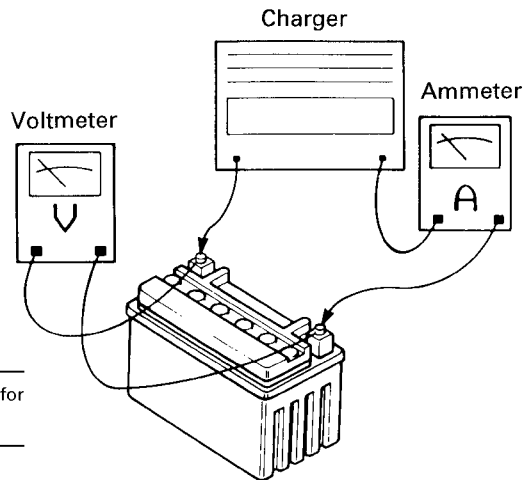


## Charging method using a constant voltage charger

**3**

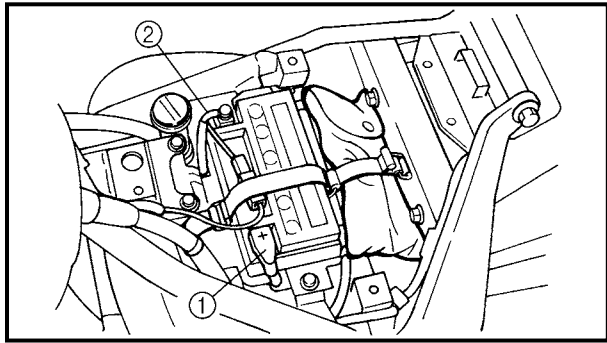


**CAUTION:** Constant amperage chargers are not suitable for charging MF batteries.





## CHECKING AND CHARGING THE BATTERY/ CHECKING THE FUSES



- 6. Install:
  - battery
  - battery band
- 7. Connect:
  - battery leads  
(to the battery terminals)

**CAUTION:**

**First, connect the positive battery lead (1), then the negative battery lead (2).**

- 8. Check:
  - battery terminals  
Dirt → Clean with a wire brush.  
Loose connection → Connect properly.
- 9. Lubricate:
  - battery terminals

	<b>Recommended lubricant Dielectric grease</b>
--	--

- 10. Install:
  - rider seat  
Refer to "SEATS AND SIDE COVERS".

3

EAS00181

### CHECKING THE FUSES

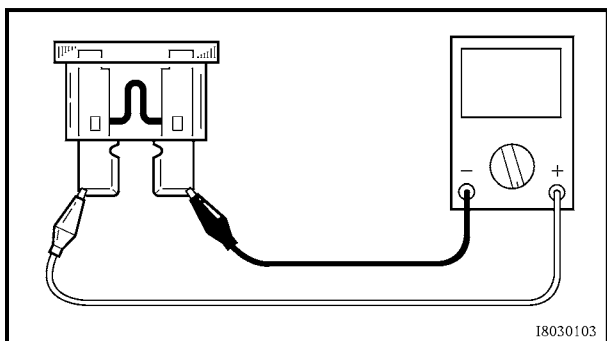
The following procedure applies to all of the fuses.

**CAUTION:**

**To avoid a short circuit, always set the main switch to "OFF" when checking or replacing a fuse.**

- 1. Remove:
  - left side cover  
Refer to "SEATS AND SIDE COVERS".
- 2. Check:
  - continuity

- a. Connect the pocket tester to the fuse and check the continuity.



**NOTE:** \_\_\_\_\_  
 Set the pocket tester selector to " $\Omega \times 1$ ".

	<b>Pocket tester</b> <b>YU-03112</b>
--	---

b. If the pocket tester indicates " $\infty$ ", replace the fuse.



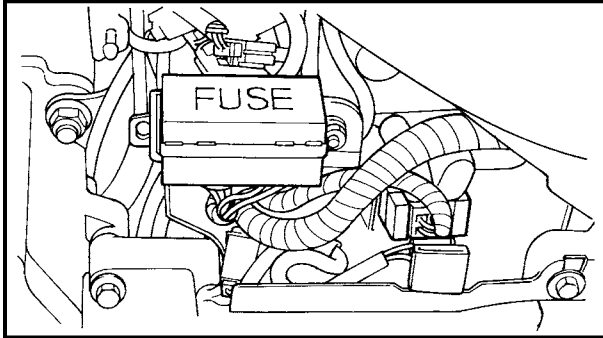
3. Replace:  
 • blown fuse

a. Set the main switch to "OFF".

b. Install a new fuse of the correct amperage.

c. Set the main switch to "ON" and verify if the electrical circuit is operational.

d. If the fuse immediately blows again, check the electrical circuit.



**3**

Item	Amperage	Q'ty
Main fuse	30A	1
Headlight fuse	15A	1
Ignition fuse	15A	1
Signaling system fuse	10A	1
Carburetor heater fuse	10A	1
Backup fuse	5A	1
Reserve fuse	30A	1
Reserve fuse	15A	1
Reserve fuse	10A	1
Reserve fuse	5A	1

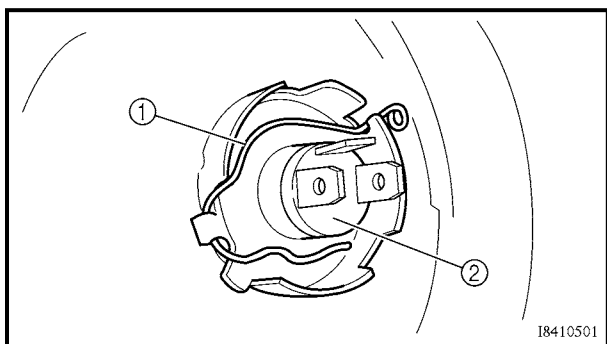
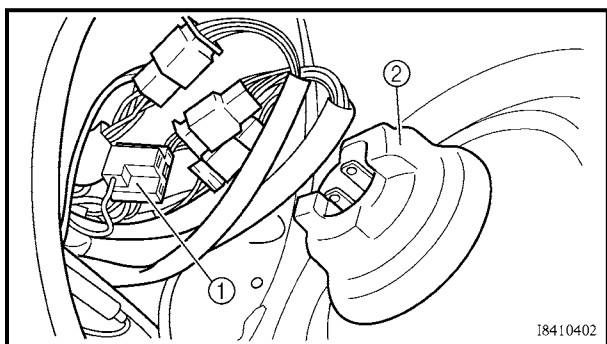
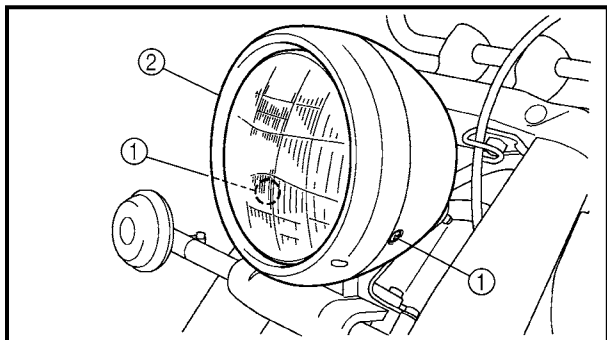


**⚠ WARNING** \_\_\_\_\_

Never use a fuse with an amperage other than that specified. Improvising or using a fuse with the wrong amperage may cause extensive damage to the electrical system, cause the lighting and ignition systems to malfunction and could possibly cause a fire.



4. Install:
  - left side coverRefer to "SEATS AND SIDE COVERS".



EAS00182

## REPLACING THE HEADLIGHT BULB

1. Remove:
  - screws ①
  - headlight lens unit ②
2. Disconnect:
  - headlight coupler ①
3. Remove:
  - headlight bulb holder cover ②
4. Detach:
  - headlight bulb holder ①
5. Remove:
  - headlight bulb ②

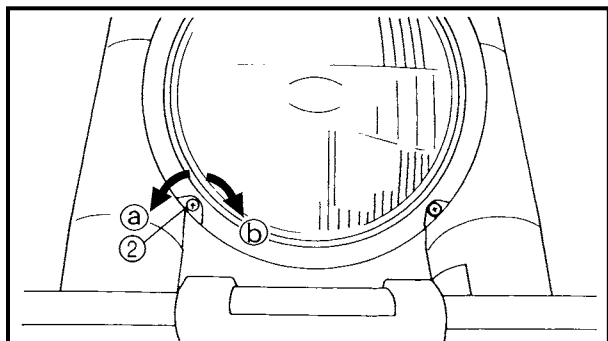
### **⚠ WARNING**

Since the headlight bulb gets extremely hot, keep flammable products and your hands away from the bulb until it has cooled down.

3



# ADJUSTING THE HEADLIGHT BEAM



- 2. Adjust:
  - headlight beam (horizontally)

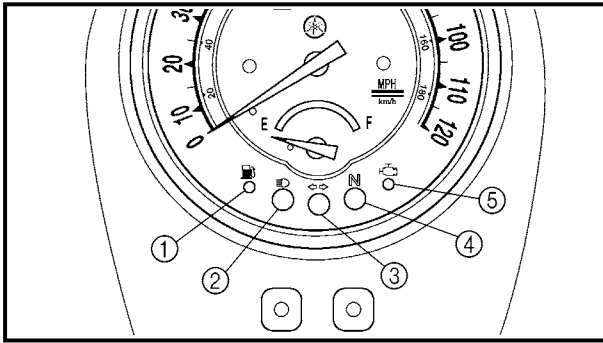


- a. Turn the adjusting knob ② in direction ③ or ④.

Direction ③	Headlight beam moves to the right.
Direction ④	Headlight beam moves to the left.







3



## INSTRUMENT FUNCTIONS

### INDICATOR LIGHTS

- ① Fuel indicator light “  ”
- ② High beam indicator light “  ”
- ③ Turn indicator light “  ”
- ④ Neutral indicator light “ N ”
- ⑤ Engine trouble indicator light “  ”

### Neutral indicator light “ N ”

This indicator comes on when the transmission is in neutral.

### High beam indicator light “ ”

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

### Turn indicator light “ ”

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

### Fuel level indicator light “ ”

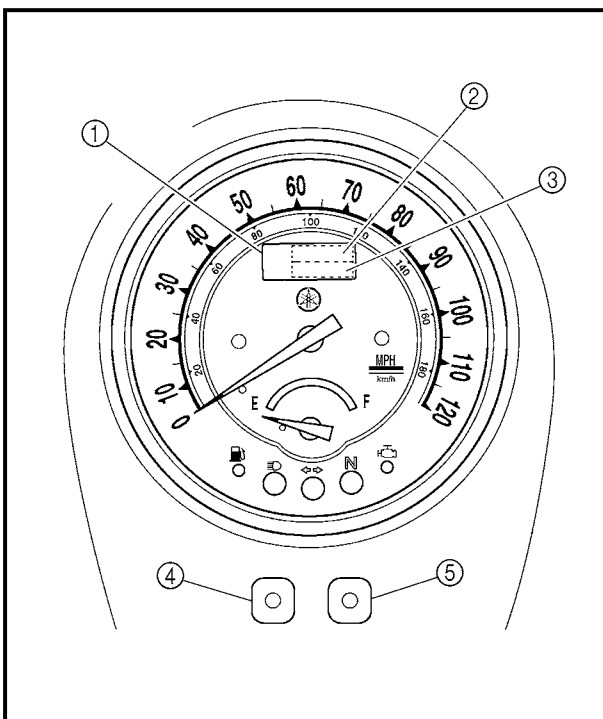
When the fuel level drops below approximately 3.5 L (0.8 Imp gal, 0.9 US gal), this light will come on. When this light comes on, turn the fuel cock to “RES”. Then, fill the tank at the first opportunity.

### Engine trouble indicator light “ ”

This indicator light will come on or flash if trouble occurs in a monitoring circuit. In such a case, take the motorcycle to a Yamaha dealer to have the self-diagnostic systems checked.

### COMBINATION METER

- ① Combination meter
- ② Clock
- ③ Odometer/trip meter
- ④ Mode button
- ⑤ Set button



This combination meter is equipped with an odometer and a twin trip meter. Pushing the mode button will change the display from one to the other as follows.

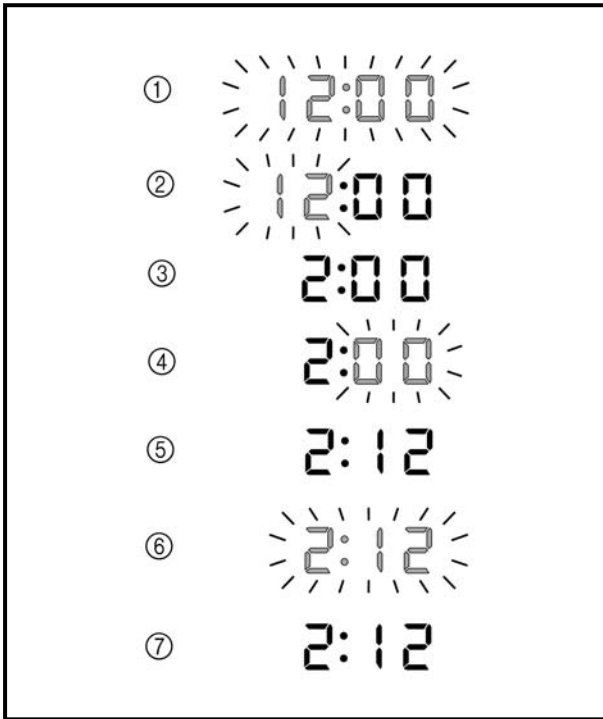
“ODO” → “TRIP A” → “TRIP B” → “ODO”

When set to “ODO”, it indicates the motorcycle’s total mileage. When set to “TRIP A” or “TRIP B”, it indicates the motorcycle’s mileage since the trip meter was last reset. Use the trip meter to estimate how far you can ride on a tank of fuel. This information will enable you to plan fuel stops in the future.

To reset the trip meter to "0", push the set button until it displays "TRIP A" or "TRIP B", then push mode button and hold it down for at least one second.

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

This motorcycle does not have a tachometer. However, it is equipped with an engine revolution limiter, which prevents the engine revolution from exceeding approximately 4,400 r/min.



**Setting the clock**

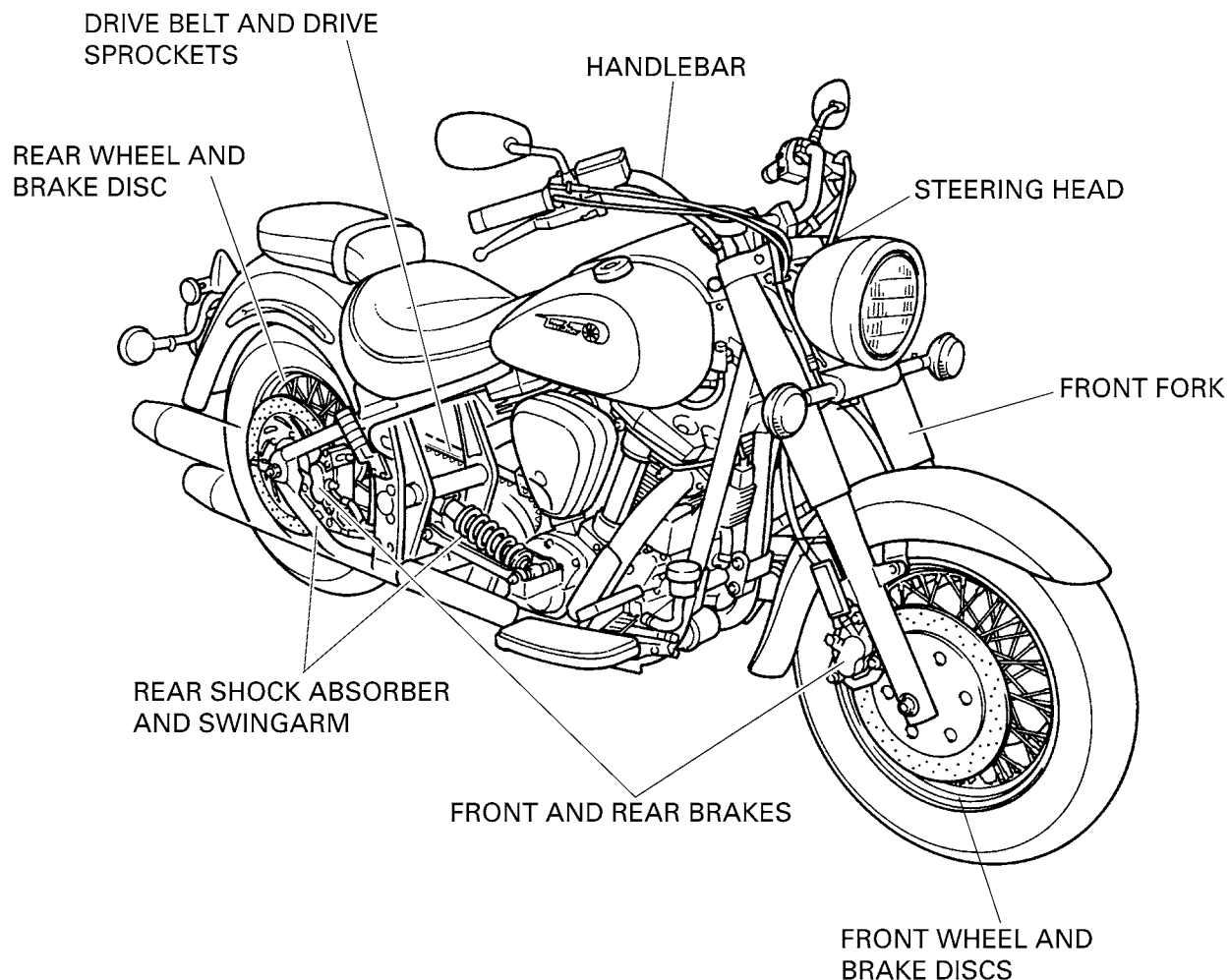
This clock always shows the time regardless of the main switch position.

1. Turn the main switch to "ON".
2. Press both left and right buttons simultaneously until both hours and minutes flash. ①
3. Push the left button and the hour display will flash. ②
4. Push the right button to change the hours. ③
5. Push the left button and the minute display will flash. ④
6. Push the right button to change the minutes. ⑤
7. Push the left button and both hours and minutes will flash. ⑥
8. Push the right button for two seconds to set the clock. ⑦



## CONTENTS

### CHASSIS



4

<b>FRONT WHEEL AND BRAKE DISCS</b> .....	4-1
REMOVING THE FRONT WHEEL .....	4-3
DISASSEMBLING THE FRONT WHEEL .....	4-3
CHECKING THE FRONT WHEEL .....	4-4
CHECKING THE BRAKE DISCS .....	4-6
ASSEMBLING THE FRONT WHEEL .....	4-7
INSTALLING THE FRONT WHEEL .....	4-7
ADJUSTING THE FRONT WHEEL STATIC BALANCE .....	4-9
<b>REAR WHEEL, BRAKE DISC AND REAR WHEEL PULLEY</b> .....	4-11
REMOVING THE REAR WHEEL .....	4-16
CHECKING THE REAR WHEEL .....	4-16
CHECKING THE REAR WHEEL DRIVE HUB .....	4-17
CHECKING AND REPLACING THE REAR WHEEL PULLEY .....	4-17
ASSEMBLING THE REAR WHEEL .....	4-18
INSTALLING THE REAR WHEEL .....	4-18
ADJUSTING THE REAR WHEEL STATIC BALANCE .....	4-21





<b>FRONT AND REAR BRAKES</b> .....	4-22
REPLACING THE FRONT BRAKE PADS .....	4-24
REPLACING THE REAR BRAKE PADS .....	4-27
DISASSEMBLING THE FRONT BRAKE MASTER CYLINDER .....	4-35
DISASSEMBLING THE REAR BRAKE MASTER CYLINDER .....	4-35
CHECKING THE FRONT AND REAR BRAKE MASTER CYLINDERS .....	4-36
ASSEMBLING AND INSTALLING THE FRONT BRAKE MASTER CYLINDER .....	4-37
ASSEMBLING AND INSTALLING THE REAR BRAKE MASTER CYLINDER .....	4-40
DISASSEMBLING THE FRONT BRAKE CALIPERS .....	4-47
DISASSEMBLING THE REAR BRAKE CALIPER .....	4-47
CHECKING THE FRONT AND REAR BRAKE CALIPERS .....	4-48
ASSEMBLING AND INSTALLING THE FRONT BRAKE CALIPERS .....	4-49
ASSEMBLING AND INSTALLING THE REAR BRAKE CALIPER .....	4-52
<b>FRONT FORK</b> .....	4-55
REMOVING THE FRONT FORK LEGS .....	4-59
DISASSEMBLING THE FRONT FORK LEGS .....	4-59
CHECKING THE FRONT FORK LEGS .....	4-60
ASSEMBLING THE FRONT FORK LEGS .....	4-61
INSTALLING THE FRONT FORK LEGS .....	4-64
<b>HANDLEBAR</b> .....	4-67
REMOVING THE HANDLEBAR .....	4-69
CHECKING THE HANDLEBAR .....	4-69
INSTALLING THE HANDLEBAR .....	4-69
<b>STEERING HEAD</b> .....	4-73
REMOVING THE LOWER BRACKET .....	4-75
CHECKING THE STEERING HEAD .....	4-75
INSTALLING THE STEERING HEAD .....	4-76
<b>REAR SHOCK ABSORBER AND SWINGARM</b> .....	4-79
HANDLING THE REAR SHOCK ABSORBER .....	4-83
DISPOSING OF A REAR SHOCK ABSORBER AND GAS CYLINDER .....	4-83
REMOVING THE REAR SHOCK ABSORBER AND SWINGARM .....	4-83
CHECKING THE REAR SHOCK ABSORBER .....	4-84
CHECKING THE REPLAY ARM AND CONNECTING ARM .....	4-85
CHECKING THE SWINGARM .....	4-85
INSTALLING THE REAR SHOCK ABSORBER AND SWINGARM .....	4-86



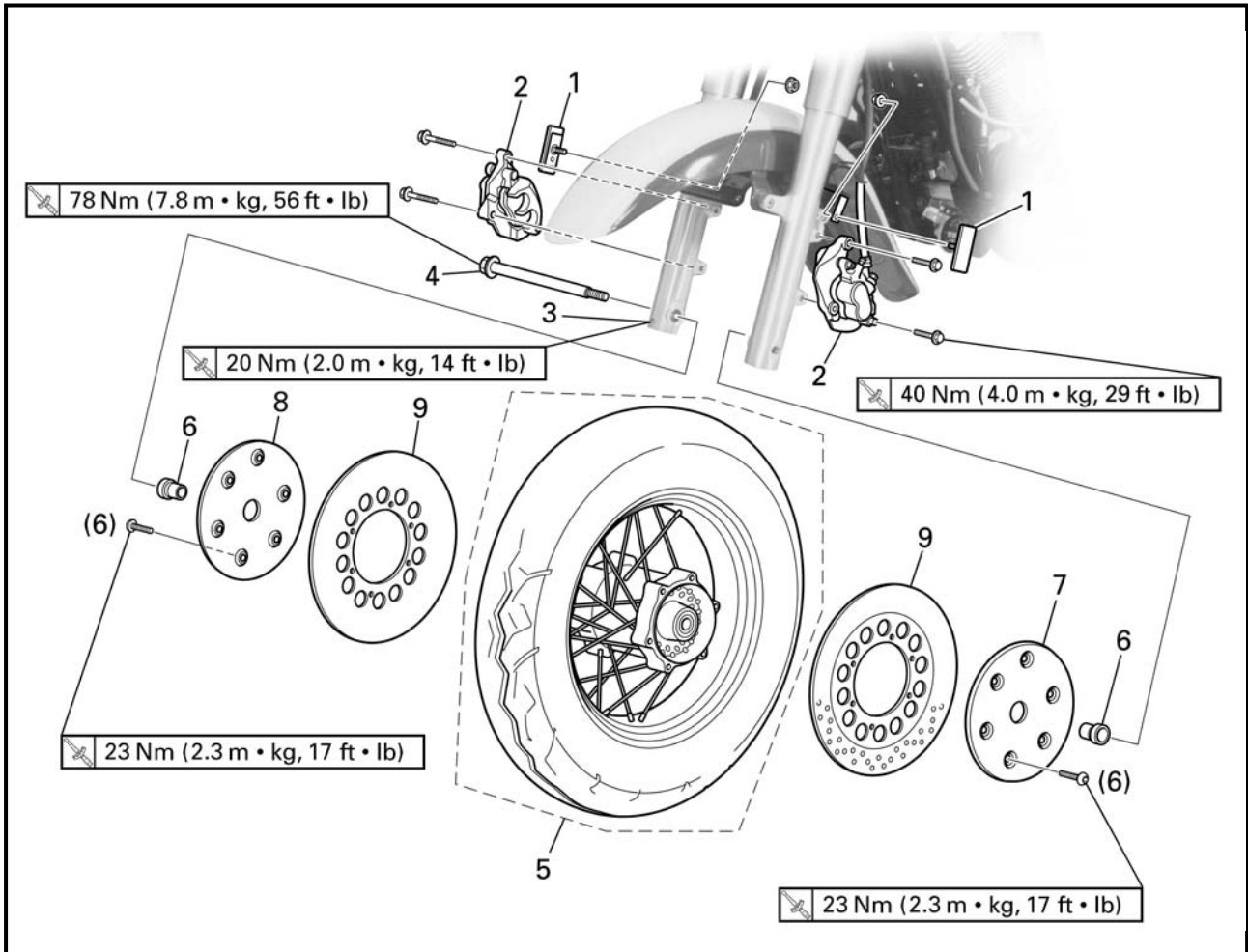
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<b>DRIVE BELT AND DRIVE PULLEY .....</b>	<b>4-90</b>
REMOVING THE DRIVE BELT AND DRIVE PULLEY .....	4-91
CHECKING THE DRIVE BELT .....	4-91
INSTALLING THE DRIVE BELT AND DRIVE PULLEY .....	4-92

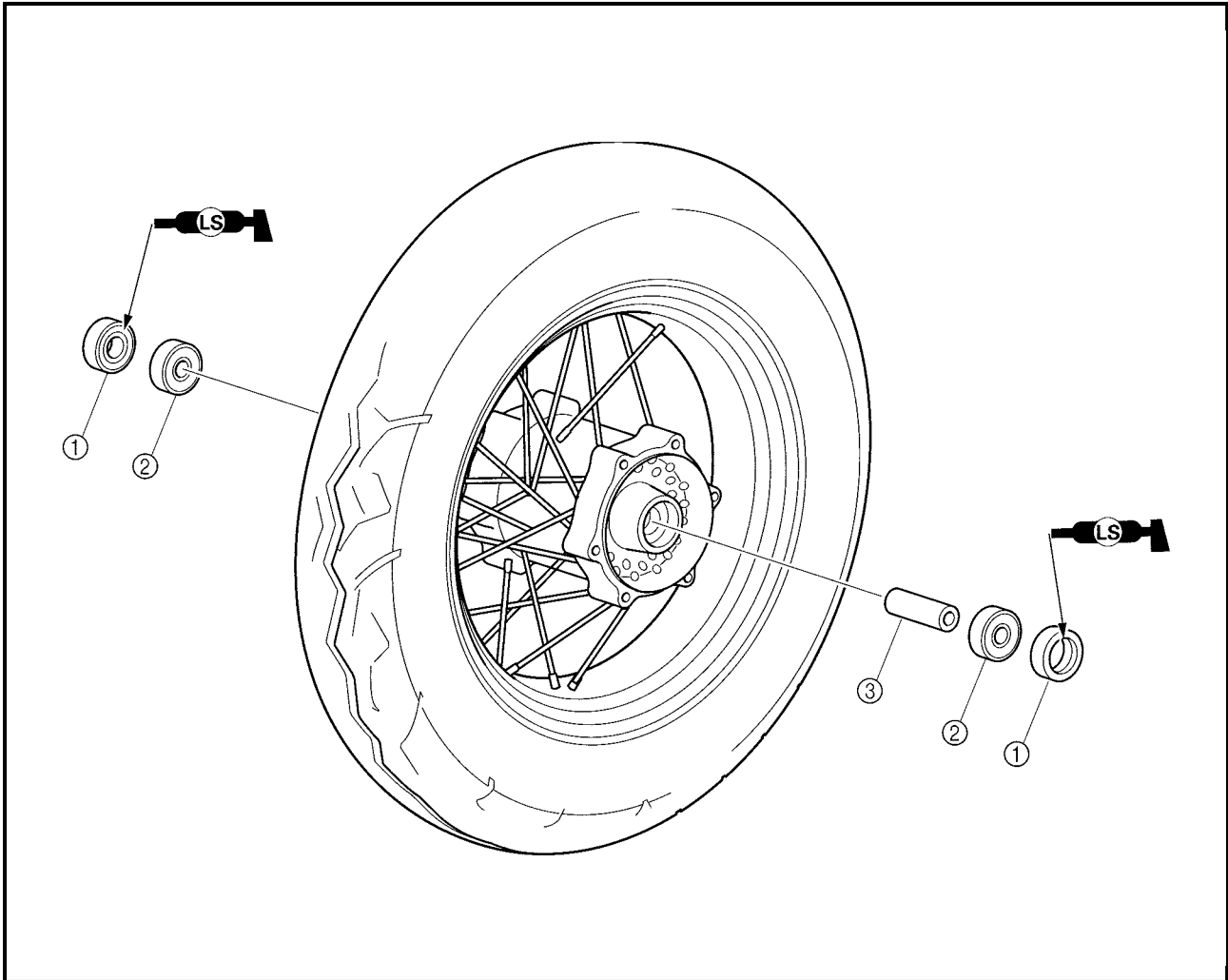
EAS00514

**CHASSIS**

**FRONT WHEEL AND BRAKE DISCS**



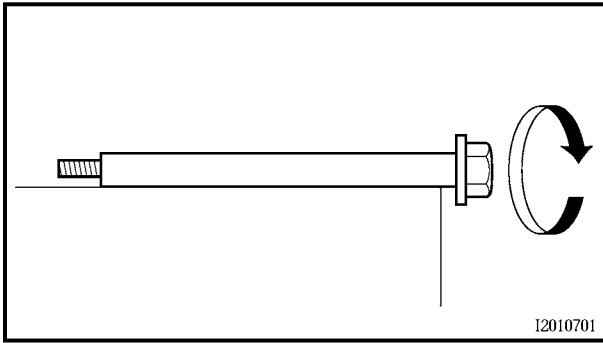
Order	Job/Part	Q'ty	Remarks
	<b>Removing the front wheel and brake discs</b>		Remove the parts in the order listed.
			<b>NOTE:</b> _____ Place the motorcycle on a suitable stand so that the front wheel is elevated.
1	Reflector (left and right)	2	Loosen.
2	Brake caliper (left and right)	2	
3	Wheel axle pinch bolt	1	
4	Front wheel axle	1	
5	Front wheel	1	
6	Collar (left and right)	2	For installation, reverse the removal procedure.
7	Brake disc cover (left)	1	
8	Brake disc cover (right-with weight)	1	
9	Brake disc (left and right)	2	



4

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





EAS00526

## CHECKING THE FRONT WHEEL

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

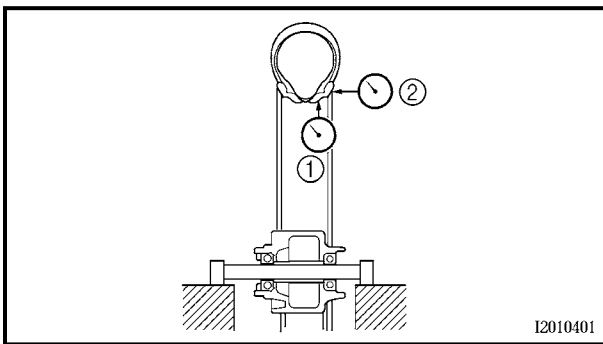
### **⚠ WARNING**

**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. Check:
  - spokes
    - Bends/damage → Replace.
    - Loose → Tighten.
    - Refer to “CHECKING AND TIGHTENING THE SPOKES” in chapter 3.

# 4



4. Measure:
  - radial wheel runout ①
  - lateral wheel runout ②
  - Over the specified limits → Replace.

	<b>Maximum radial wheel runout</b>
	<b>1.0 mm (0.04 in)</b>
	<b>Maximum lateral wheel runout</b>
	<b>0.5 mm (0.02 in)</b>


5. Check:
  - collars
    - Damage/wear → Replace.







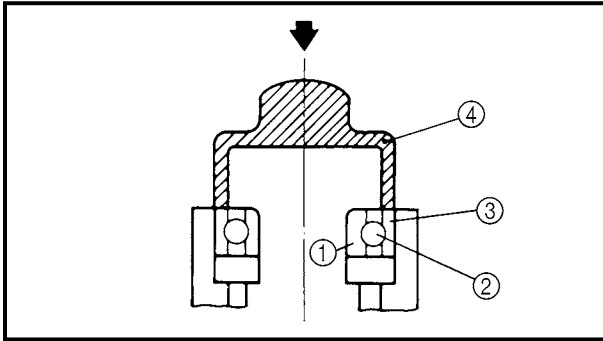
**NOTE:** \_\_\_\_\_  
Tighten the brake disc bolts in stages and in a crisscross pattern.

	<p><b>Brake disc bolt</b> 23 Nm (2.3 m · kg, 17 ft · lb) LOCTITE®</p>
---	---

- 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.



**4**



EAS00539  
**ASSEMBLING THE FRONT WHEEL**

1. Install:
  - wheel bearings
  - oil seals **New**
 Install the new wheel bearings and oil seals in the reverse order of disassembly.

**CAUTION:** \_\_\_\_\_  
**Do not contact the wheel bearing inner race ① or balls ②. Contact should be made only with the outer race ③.**

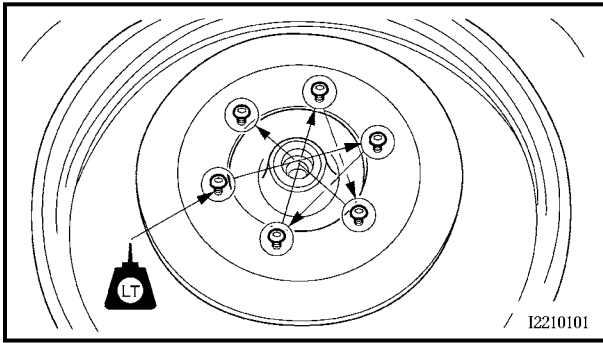
**NOTE:** \_\_\_\_\_  
Use a socket ④ that matches the diameter of the wheel bearing outer race and oil seal.

EAS00544  
**INSTALLING THE FRONT WHEEL**

The following procedure applies to both brake discs.

1. Lubricate:
  - wheel axle
  - oil seal lips

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

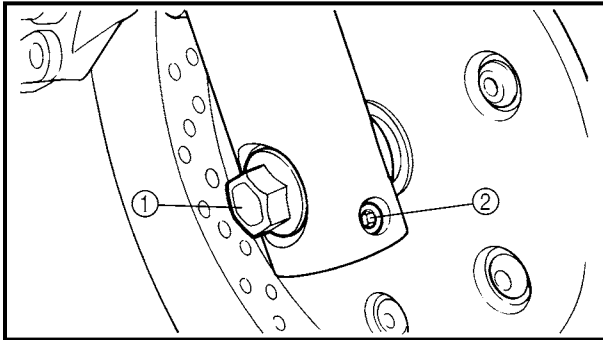


2. Install:
  - brake discs
  - brake disc covers

**23 Nm (2.3 m · kg, 17 ft · lb)**

**NOTE:**

- Apply locking agent (LOCTITE® 648) to the threads of the brake disc bolts.
- Tighten the brake disc bolts in stages and in a crisscross pattern.



3. Install:
  - collars
  - front wheel
  - front wheel axle

4. Tighten:
  - front wheel axle ①

**78 Nm (7.8 m · kg, 56 ft · lb)**

- wheel axle pinch bolt ②

**20 Nm (2.0 m · kg, 14 ft · lb)**

**CAUTION:**

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

**4**

5. Install:
  - brake calipers

**40 Nm (4.0 m · kg, 29 ft · lb)**

**⚠ WARNING**

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

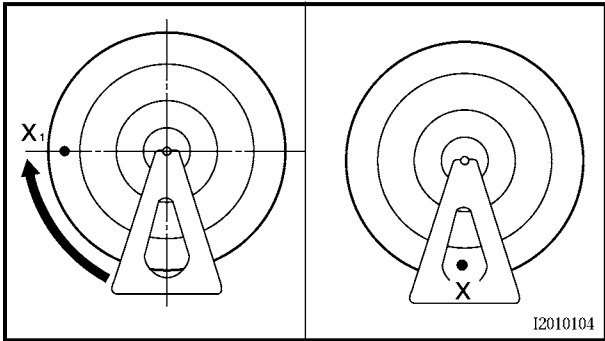
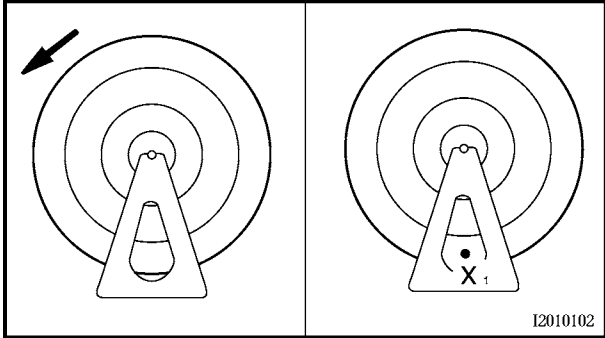
6. Install:
  - reflectors

EAS00549

**ADJUSTING THE FRONT WHEEL STATIC BALANCE**

**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.



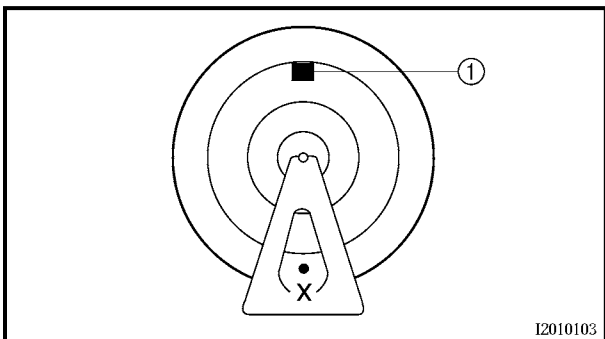
1. Remove:
  - balancing weight(s)
2. Find:
  - front wheel's heavy spot



- a. Place the front wheel on a suitable balancing stand.
- b. Spin the front wheel.
- c. When the front wheel stops, put an "X<sub>1</sub>" mark at the bottom of the wheel.
- d. Turn the front wheel 90° so that the "X<sub>1</sub>" mark is positioned as shown.
- e. Release the front wheel.
- f. When the wheel stops, put an "X<sub>2</sub>" mark at the bottom of the wheel.
- g. Repeat steps (b) through (f) several times until all the marks come to rest at the same spot.
- h. The spot where all the marks come to rest is the front wheel's heavy spot "X".



4



3. Adjust:
  - front wheel static balance

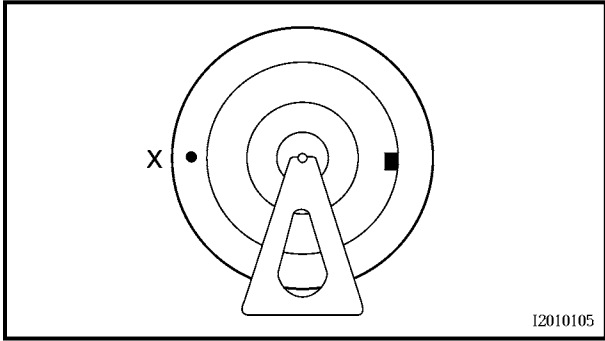


- a. Install a balancing weight ① onto the rim exactly opposite the heavy spot "X".

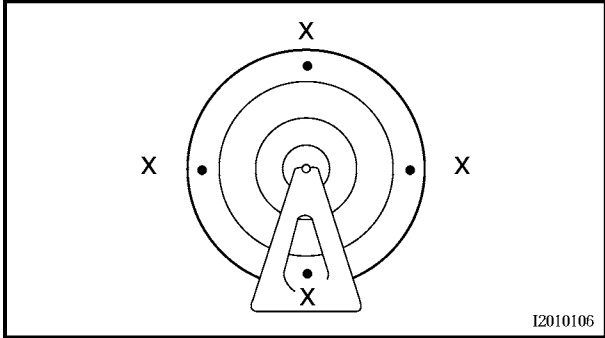
**NOTE:** \_\_\_\_\_

Start with the lightest weight.

- b. Turn the front wheel 90° so that the heavy spot is positioned as shown.



- c. If the heavy spot does not stay in that position, install a heavier weight.
- d. Repeat steps (b) and (c) until the front wheel is balanced.

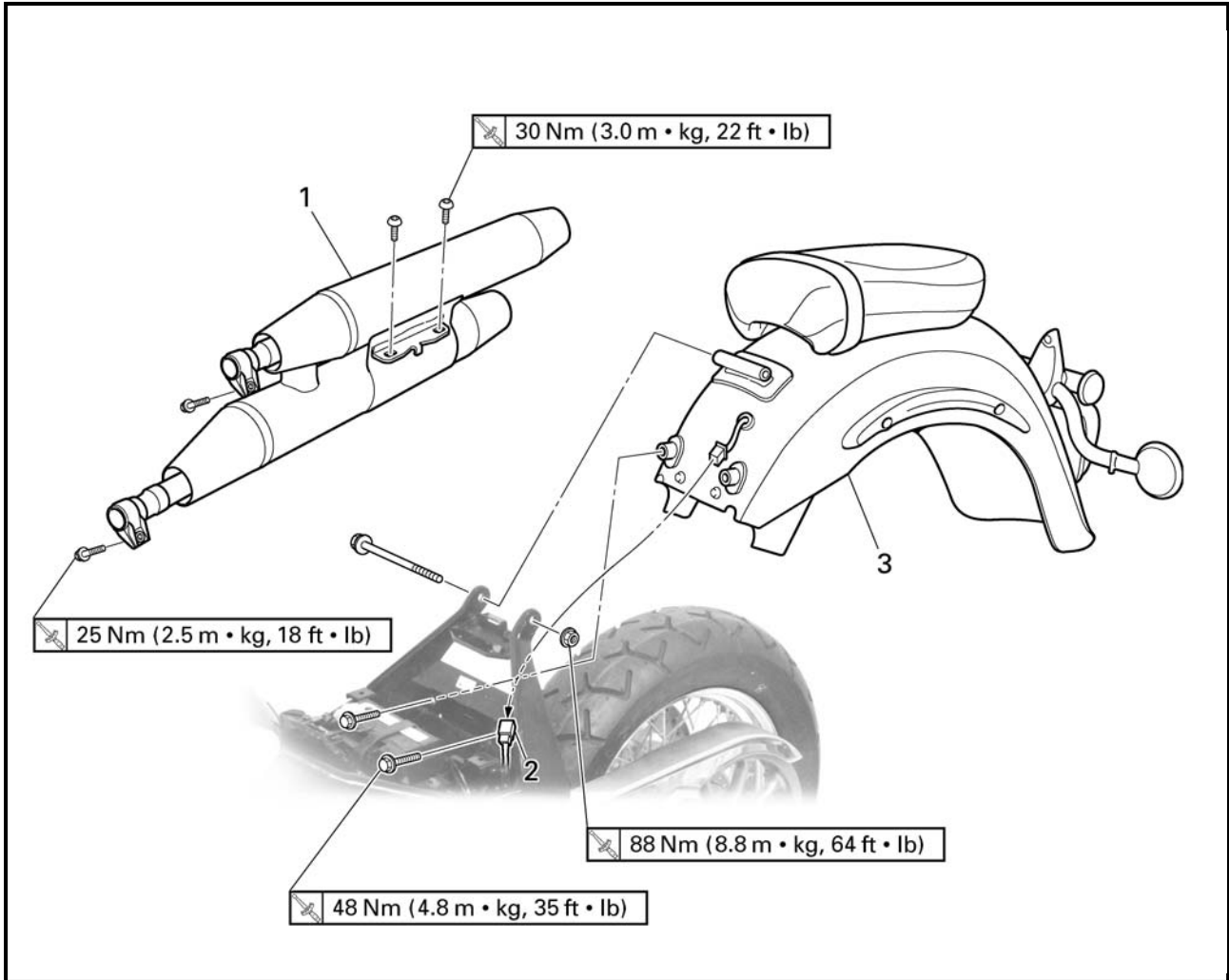


- 4. Check:
  - front wheel static balance
- a. Turn the front wheel and make sure it stays at each position shown.
- b. If the front wheel does not remain stationary at all of the positions, rebalance it.



EAS00550

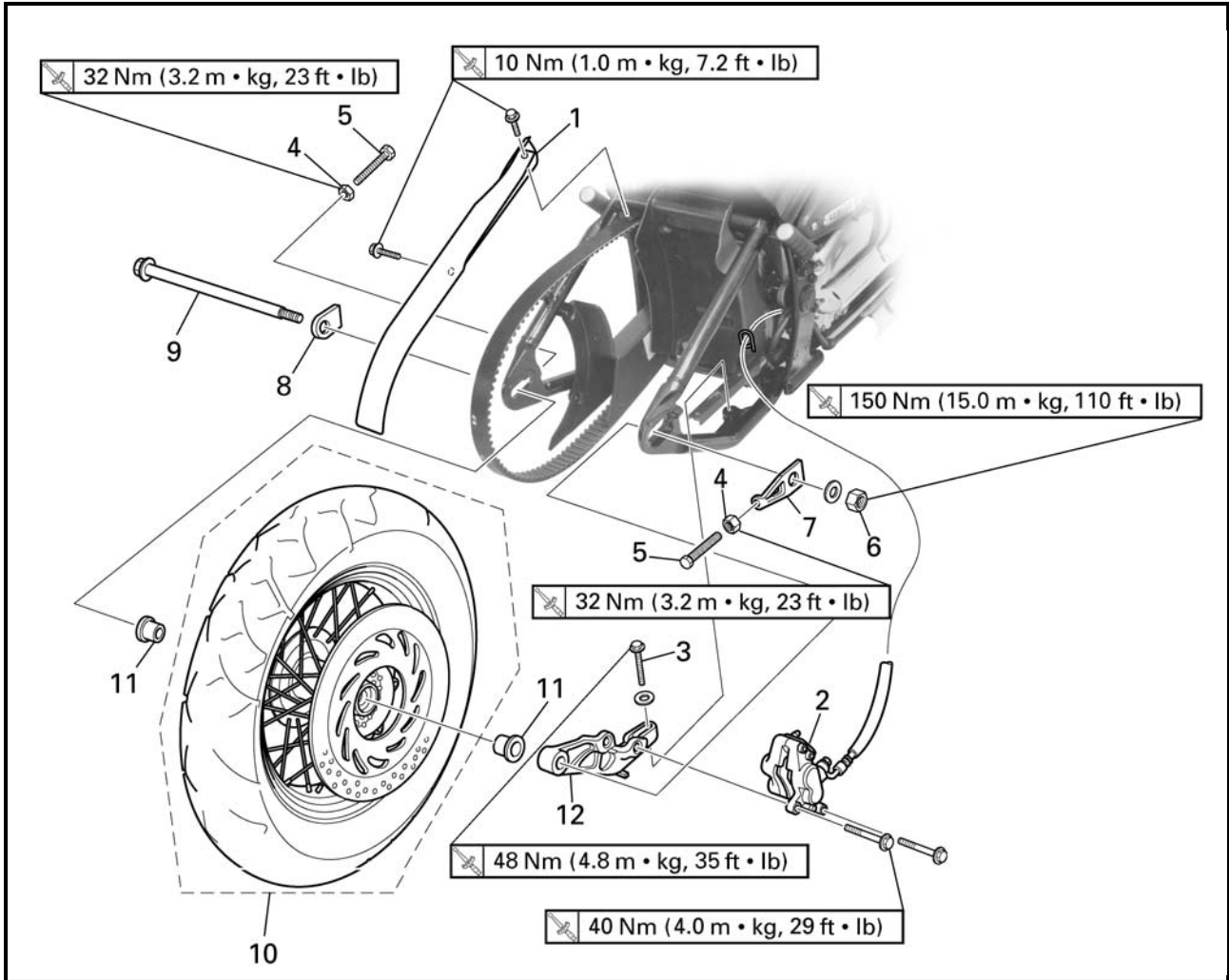
REAR WHEEL, BRAKE DISC AND REAR WHEEL PULLEY



4

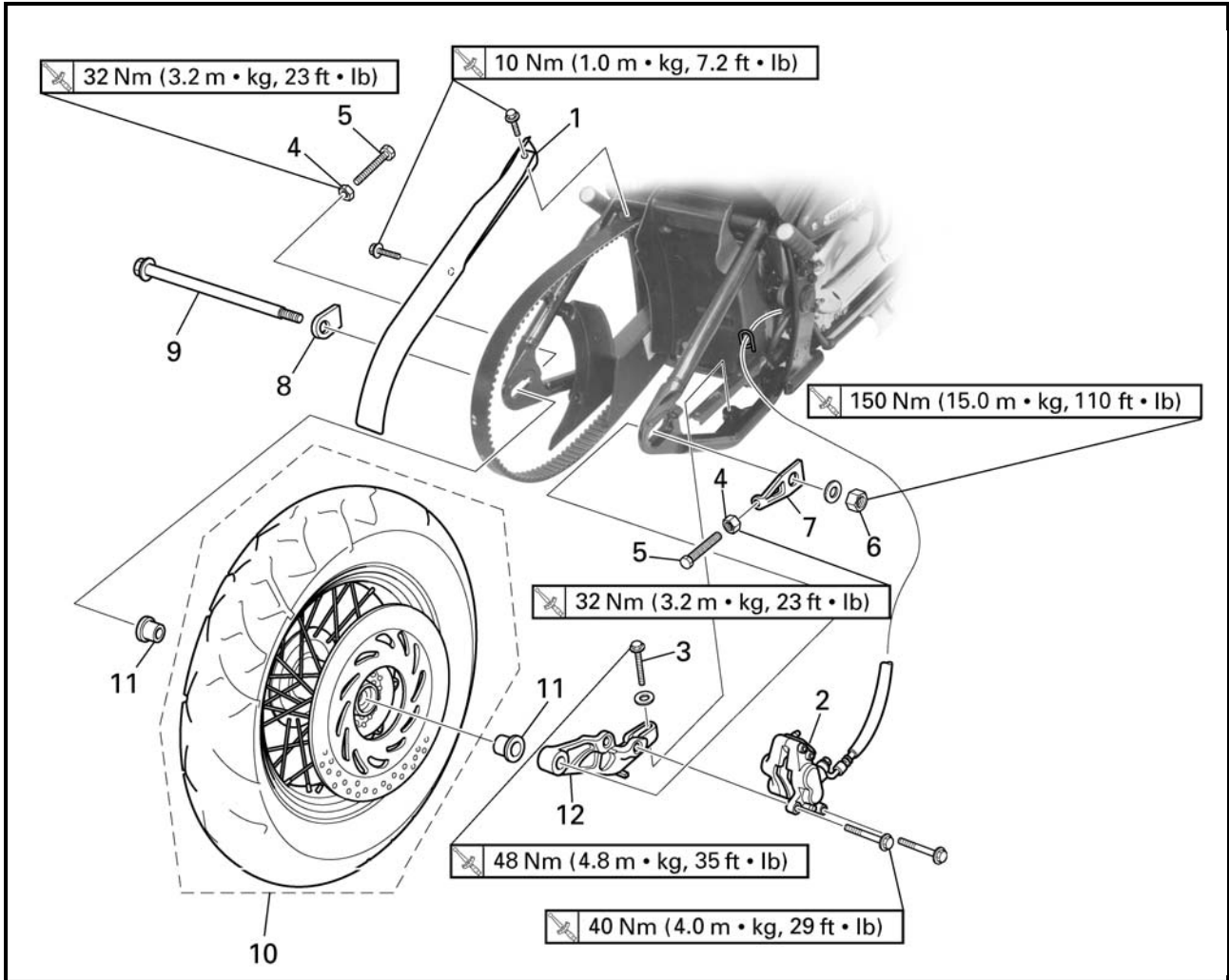
Order	Job/Part	Q'ty	Remarks
	<b>Removing the rear fender and muffler</b>		Remove the parts in the order listed.
	Rider seat		Refer to "SEATS AND SIDE COVERS" in chapter 3.
1	Muffler	1	
2	Tail/brake light and turn signal light sub-wire harness	1	Disconnect.
3	Rear fender assembly	1	For installation, reverse the removal procedure.

EAS00550



4

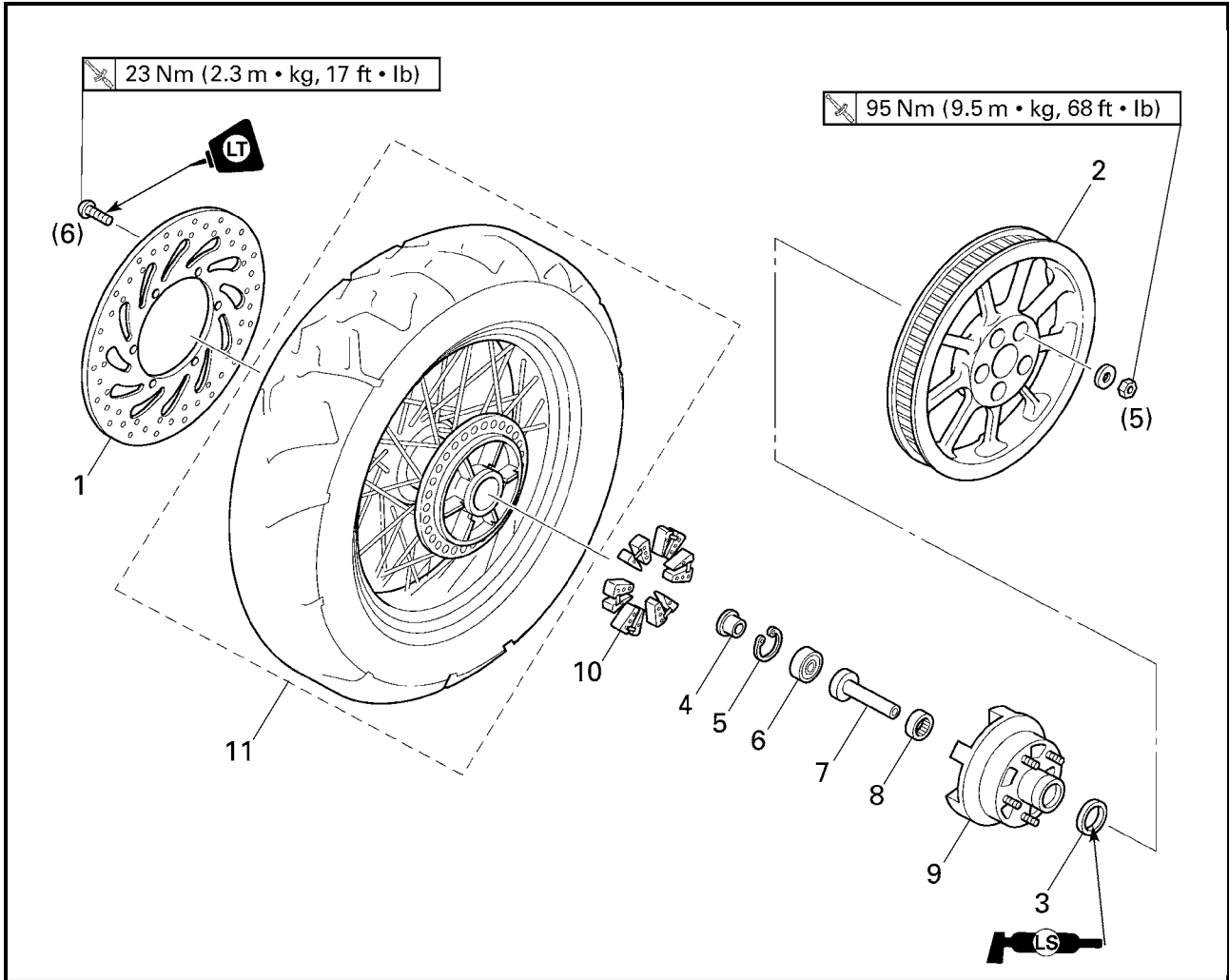
Order	Job/Part	Q'ty	Remarks
	<b>Removing the rear wheel</b>		Remove the parts in the order listed.
			<b>NOTE:</b> _____ Place the motorcycle on a suitable stand so that the rear wheel is elevated.
1	Upper drive belt cover	1	
2	Brake caliper	1	
3	Brake caliper bracket bolt	1	
4	Locknut (left and right)	2	Loosen.
5	Adjusting bolt (left and right)	2	Loosen.
6	Wheel axle nut	1	
7	Right adjusting plate	1	
8	Left adjusting plate	1	
9	Rear wheel axle	1	



4

Order	Job/Part	Q'ty	Remarks
10	Rear wheel	1	For installation, reverse the removal procedure.
11	Collar (left and right)	2	
12	Brake caliper bracket	1	

EAS00556



4

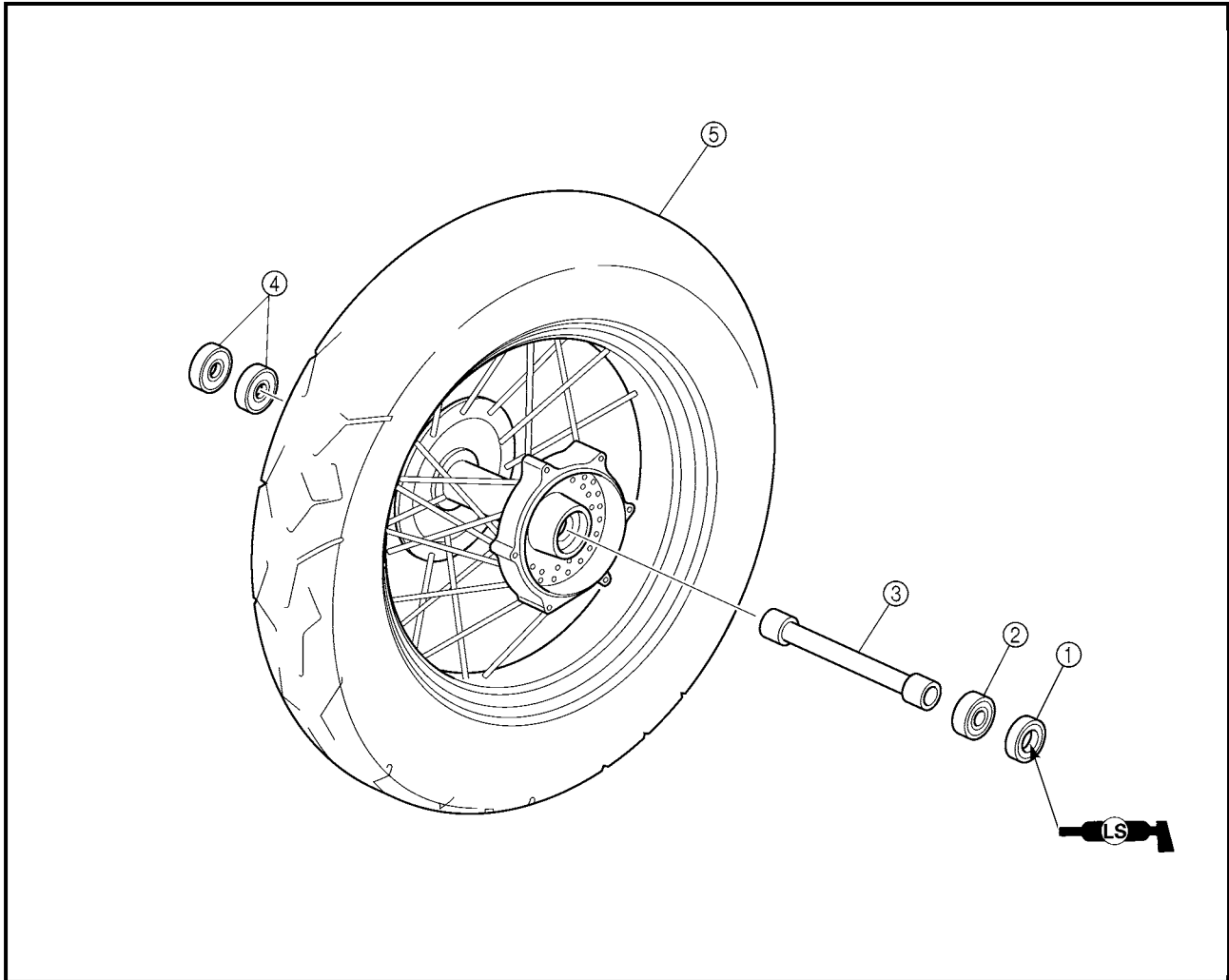
Order	Job/Part	Q'ty	Remarks
	<b>Removing the brake disc and rear wheel pulley</b>		Remove the parts in the order listed.
1	Brake disc	1	
2	Rear wheel pulley	1	
3	Oil seal	1	
4	Collar	1	
5	Circlip	1	
6	Bearing	1	
7	Collar	1	
8	Bearing	1	
9	Rear wheel drive hub	1	
10	Rear wheel drive hub damper	6	
11	Rear wheel	1	
			For installation, reverse the removal procedure.





EAS00560

4



Order	Job/Part	Q'ty	Remarks
	<b>Disassembling the rear wheel</b>		Remove the parts in the order listed.
①	Oil seal	1	
②	Bearing	1	
③	Spacer	1	
④	Bearing	4	
			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:**

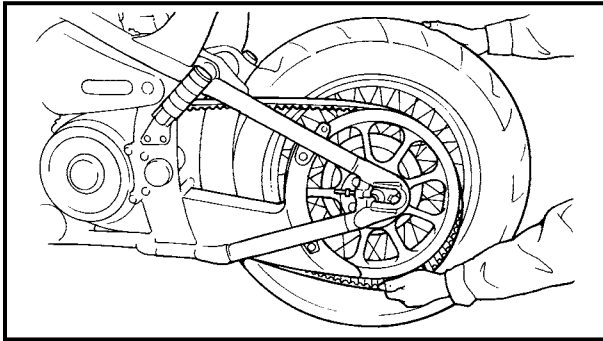
Place the motorcycle on a suitable stand so that the rear wheel is elevated.

2. Remove:

- brake caliper

### **NOTE:**

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



3. Remove:

- rear wheel

### **NOTE:**

Push the rear wheel forward and remove the drive belt from the rear wheel pulley.

4

EAS00566

## CHECKING THE REAR WHEEL

1. Check:

- wheel axle
- rear wheel
- wheel bearings
- oil seals

Refer to "FRONT WHEEL AND BRAKE DISCS".

2. Check:

- tire
- rear wheel

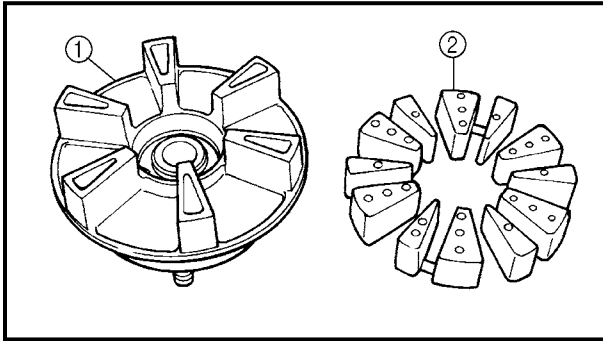
Damage/wear → Replace.

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

3. Check:
  - spokes
 Refer to "FRONT WHEEL AND BRAKE DISCS".

4. Measure:
  - radial wheel runout
  - lateral wheel runout
 Refer to "FRONT WHEEL AND BRAKE DISCS".

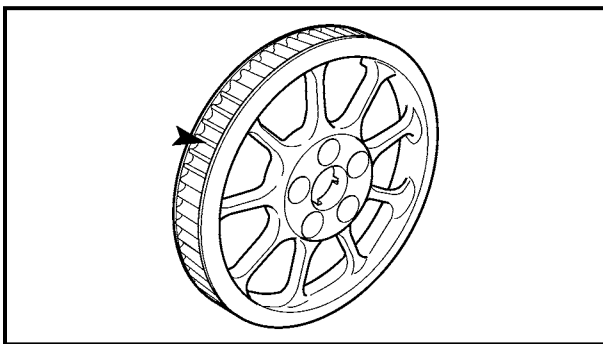
4



EAS00567

**CHECKING THE REAR WHEEL DRIVE HUB**

1. Check:
  - rear wheel drive hub ①  
Cracks/damage → Replace.
  - rear wheel drive hub dampers ②  
Damage/wear → Replace.



EAS00568

**CHECKING AND REPLACING THE REAR WHEEL PULLEY**

1. Check:
  - rear wheel pulley  
Surface plating has come off → Replace the rear wheel pulley.  
Bent teeth → Replace the rear wheel pulley.

2. Replace:
  - rear wheel pulley



- a. Remove the self-locking nuts and the rear wheel pulley.
- b. Clean the rear wheel drive hub with a clean cloth, especially the surfaces that contact the pulley.
- c. Install the new rear wheel pulley.

 **Rear wheel pulley self-locking nut**  
95 Nm (9.5 m • kg, 68 ft • lb)

**NOTE:** \_\_\_\_\_  
Tighten the self-locking nuts in stages and in a crisscross pattern.



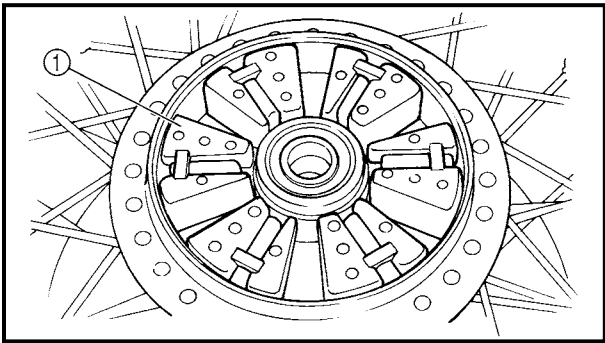
**ASSEMBLING THE REAR WHEEL**

- 1. Install:
  - bearings
  - spacer
  - bearing
  - oil seal **New**
 Refer to "FRONT WHEEL AND BRAKE DISCS".

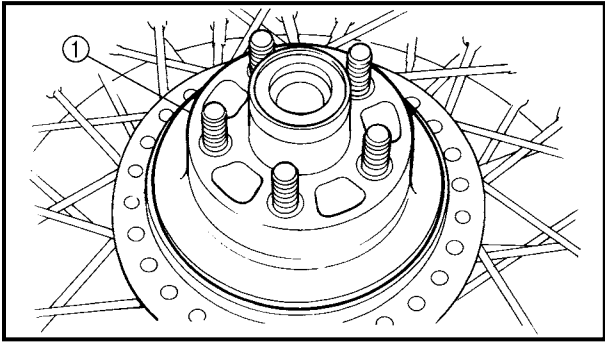
EAS00572  
**INSTALLING THE REAR WHEEL**

- 1. Lubricate:
  - oil seal lips

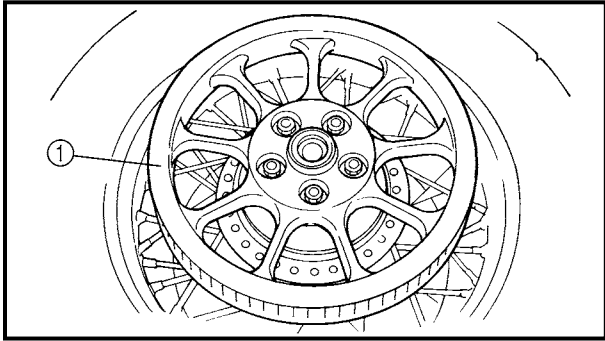
 **Recommended lubricant**  
Lithium soap base grease




- 2. Install:
  - rear wheel drive hub dampers ①



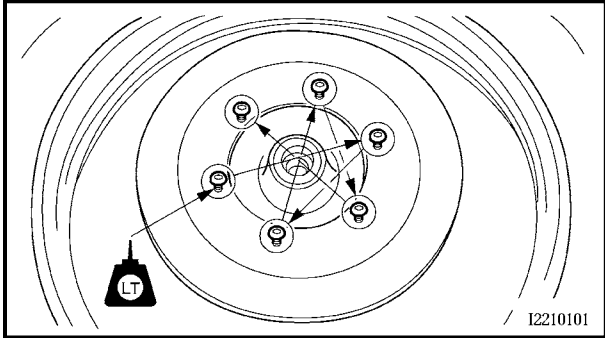
- 3. Install:
  - rear wheel drive hub assembly ①



4. Install:
- rear wheel pulley ①

 95 Nm (9.5 m · kg, 68 ft · lb)

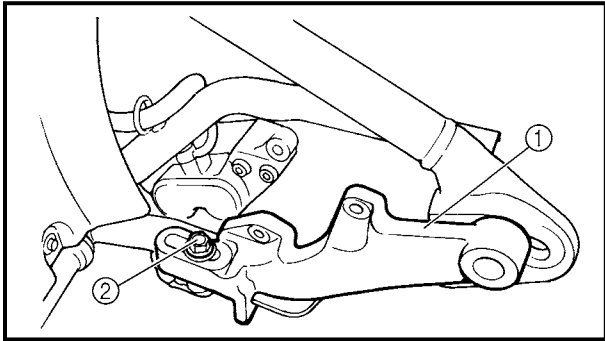
**NOTE:** \_\_\_\_\_  
Tighten the self-locking nuts in stages and in a crisscross pattern.



5. Install:
- brake disc

**NOTE:** \_\_\_\_\_  
• Apply locking agent (LOCTITE® 648) to the threads of the brake disc bolts.  
• Tighten the brake disc bolts in stages and in a crisscross pattern.

4



6. Install:
- brake caliper bracket ①
  - washer
  - brake caliper bracket bolt ②

**NOTE:** \_\_\_\_\_  
Temporarily tighten the brake caliper bracket bolt.


7. Install:
- collars
  - rear wheel
  - adjusting plates
  - rear wheel axle
  - washer
  - wheel axle nut

**NOTE:** \_\_\_\_\_  
Temporarily tighten the wheel axle nut.


8. Adjust:
- drive belt slack
- Refer to “ADJUSTING THE DRIVE BELT SLACK” in chapter 3.

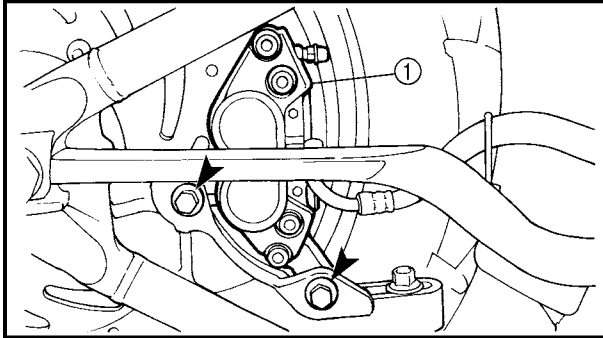
9. Tighten:

- wheel axle nut

 150 Nm (15.0 m · kg, 110 ft · lb)


- brake caliper bracket bolt

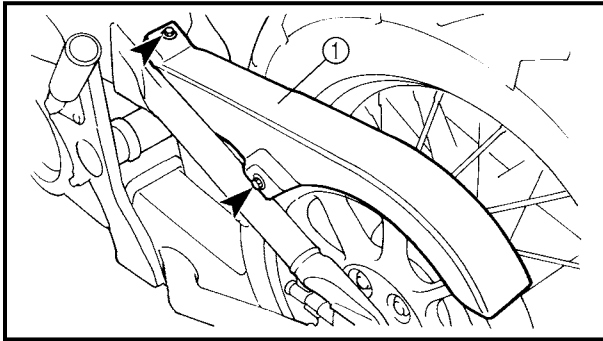
 48 Nm (4.8 m · kg, 35 ft · lb)



10. Install:


- brake caliper ①

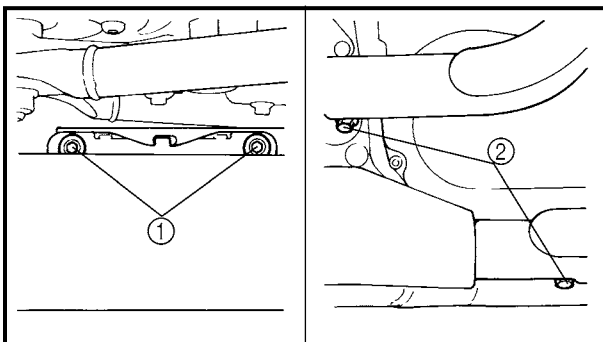
 40 Nm (4.0 m · kg, 29 ft · lb)



11. Install:

- upper drive belt cover ①

 10 Nm (1.0 m · kg, 7.2 ft · lb)




12. Install:


- muffler

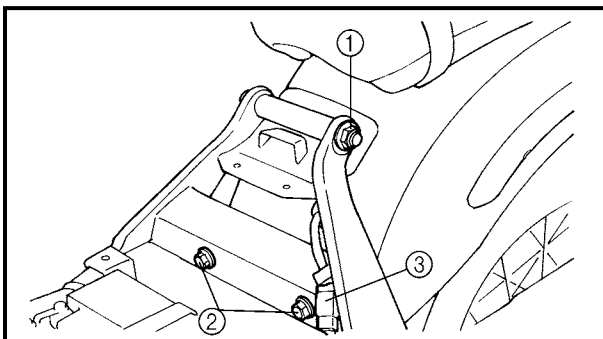
13. Tighten:

- muffler mounting bolt ①

 30 Nm (3.0 m · kg, 22 ft · lb)

- Clamp bolt ②

 25 Nm (2.5 m · kg, 18 ft · lb)




14. Install:


- rear fender assembly

15. Tighten:

- nut ①

 88 Nm (8.8 m · kg, 64 ft · lb)

- bolts ②

 48 Nm (4.8 m · kg, 35 ft · lb)

16. Connect:

- tail/brake light and turn signal light sub-wire harness coupler ③



17. Install:

- rider seat

Refer to "SEATS AND SIDE COVERS" in chapter 3.

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:

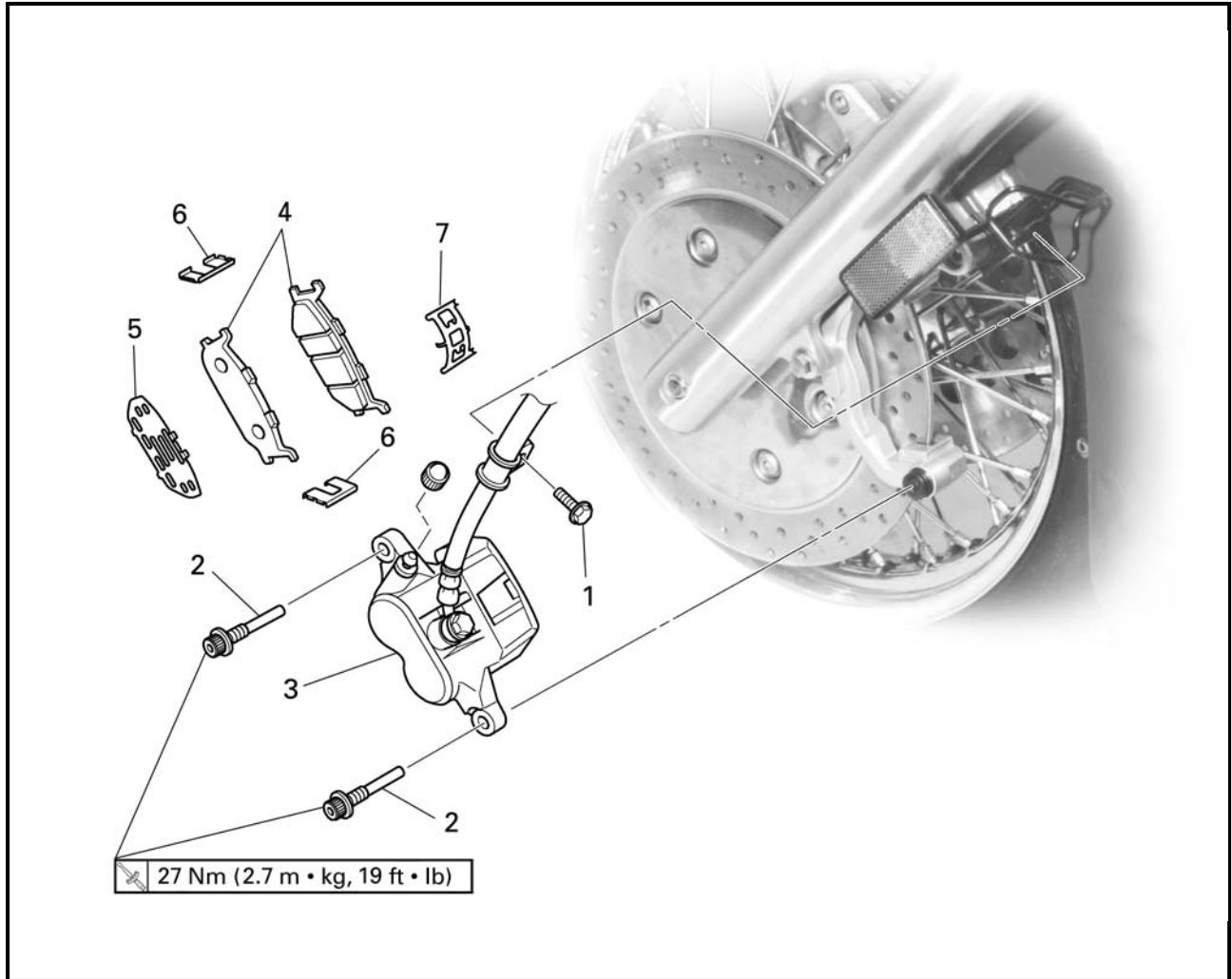
- rear wheel static balance

Refer to "FRONT WHEEL AND BRAKE DISCS".

EAS00577

**FRONT AND REAR BRAKES**

**FRONT BRAKE PADS**

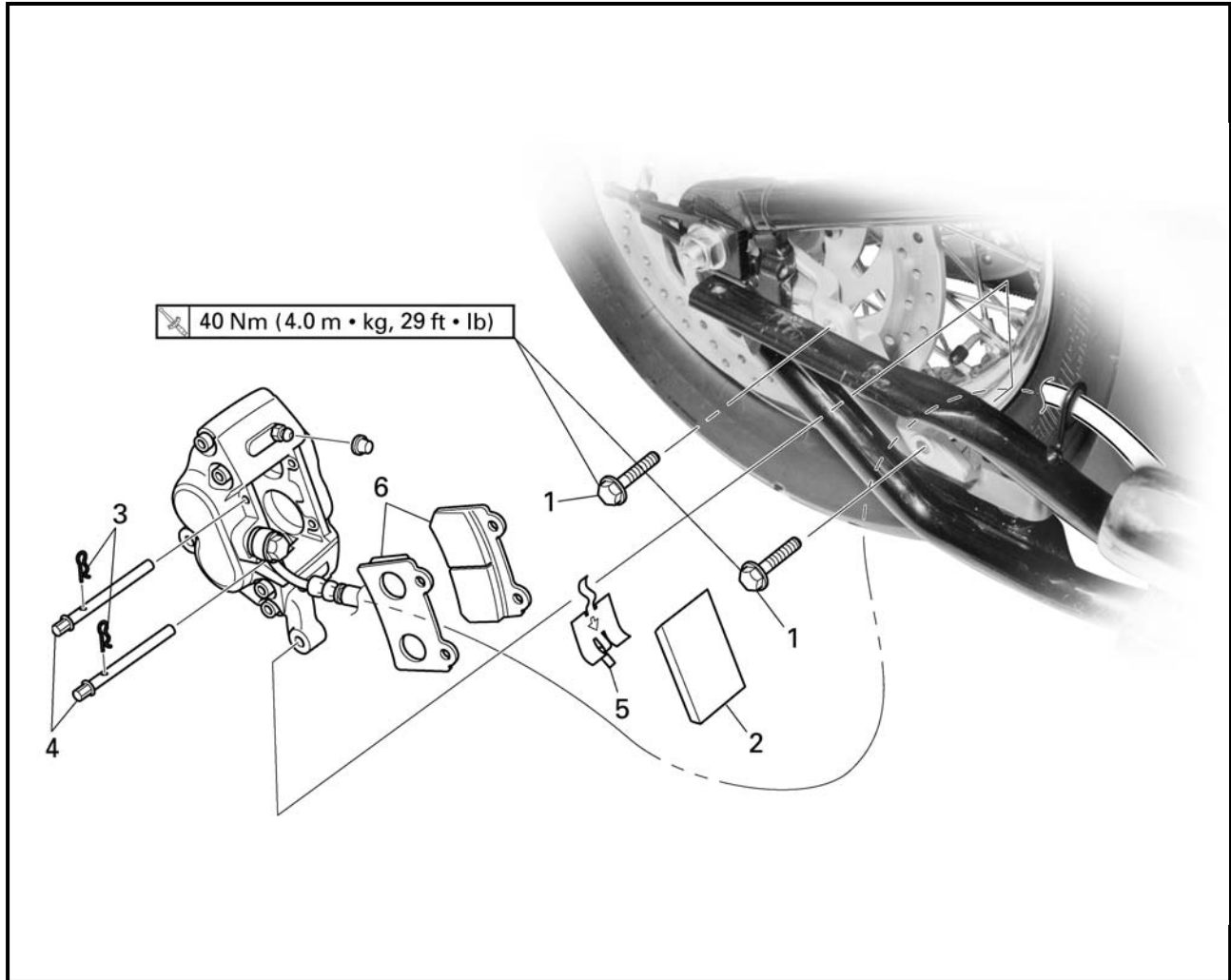


**4**

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 hose holder bolt	1	
2	Retaining bolt	2	
3	Brake caliper	1	
4	Brake pad	2	
5	Brake pad shim	1	
6	Brake pad spring	2	
7	Brake pad spring	1	
			For installation, reverse the removal procedure.



EAS00578  
**REAR BRAKE PADS**



**4**

Order	Job/Part	Q'ty	Remarks
	<b>Removing the rear brake pads</b>		
	Muffler		Remove the parts in the order listed. Refer to "REAR WHEEL, BRAKE DISC AND REAR WHEEL PULLEY".
1	Brake caliper bolt	2	
2	Brake pad cover	1	
3	Brake pad clip	2	
4	Brake pad pin	2	
5	Brake pad spring	1	
6	Brake pad	2	
			For installation, reverse the removal procedure.



EAS00579

**CAUTION:**

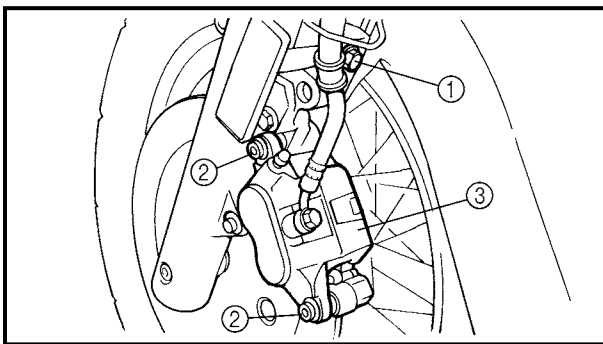
Disc brake components rarely require disassembly.

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.



EAS00580

**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
- brake caliper retaining bolts ②
- brake caliper ③





5. Lubricate:
- brake caliper retaining bolt



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

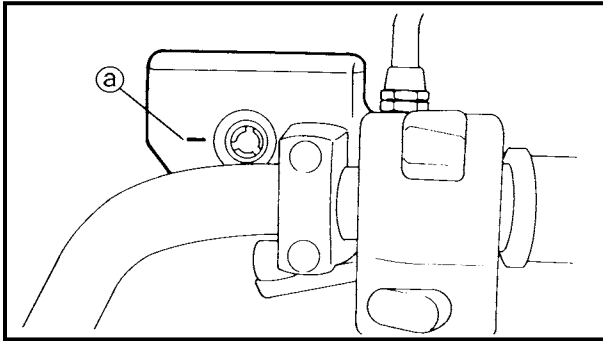
**CAUTION:**

- **Do not allow grease to contact the brake pads.**
- **Remove any excess grease.**

6. Install:
- brake caliper
  - brake caliper retaining bolts

**27 Nm (2.7 m · kg, 19 ft · lb)**

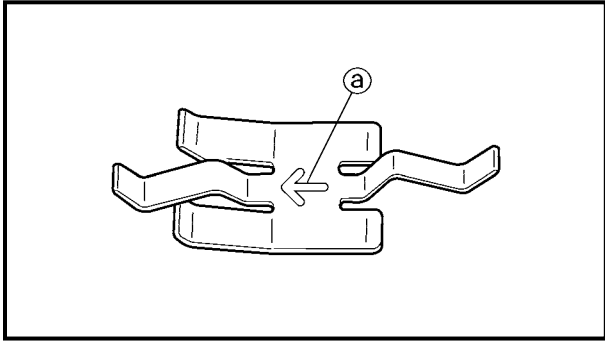
- brake hose holder bolt



7. Check:
- brake fluid level
- Below the minimum level mark **@** → Add the recommended brake fluid to the proper level.
- Refer to “CHECKING THE BRAKE FLUID LEVEL” in chapter 3.

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





- b. Loosen the bleed screw and push the brake caliper pistons into the brake caliper with your finger.
- c. Tighten the bleed screw.


	<p><b>Bleed screw</b>  <b>6 Nm (0.6 m · kg, 4.3 ft · lb)</b></p>
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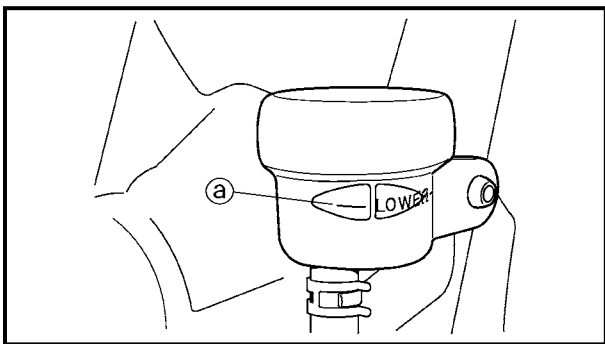
- d. Install new brake pads and a new brake pad spring.

**NOTE:** \_\_\_\_\_  
 The arrow Ⓐ on the brake pad spring must point in the direction of disc rotation.



- 6. Install:
  - brake pad pins
  - brake pad clips
  - brake pad cover
  - brake caliper

	<p><b>40 Nm (4.0 m · kg, 29 ft · lb)</b></p>
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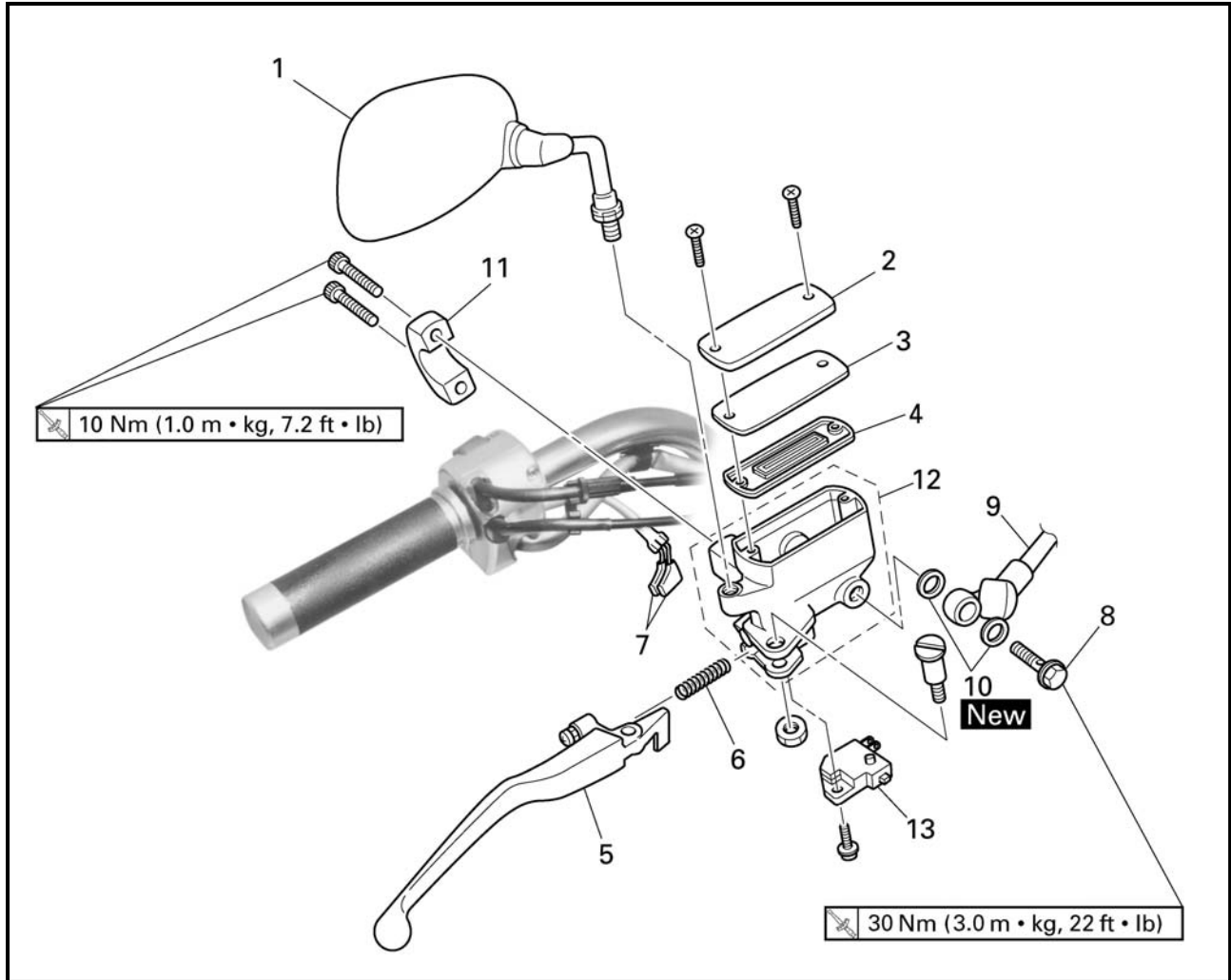


- 7. Check:
  - brake fluid level  
 Below the minimum level mark Ⓐ → Add the recommended brake fluid to the proper level.  
 Refer to “CHECKING THE BRAKE FLUID LEVEL” in chapter 3.

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

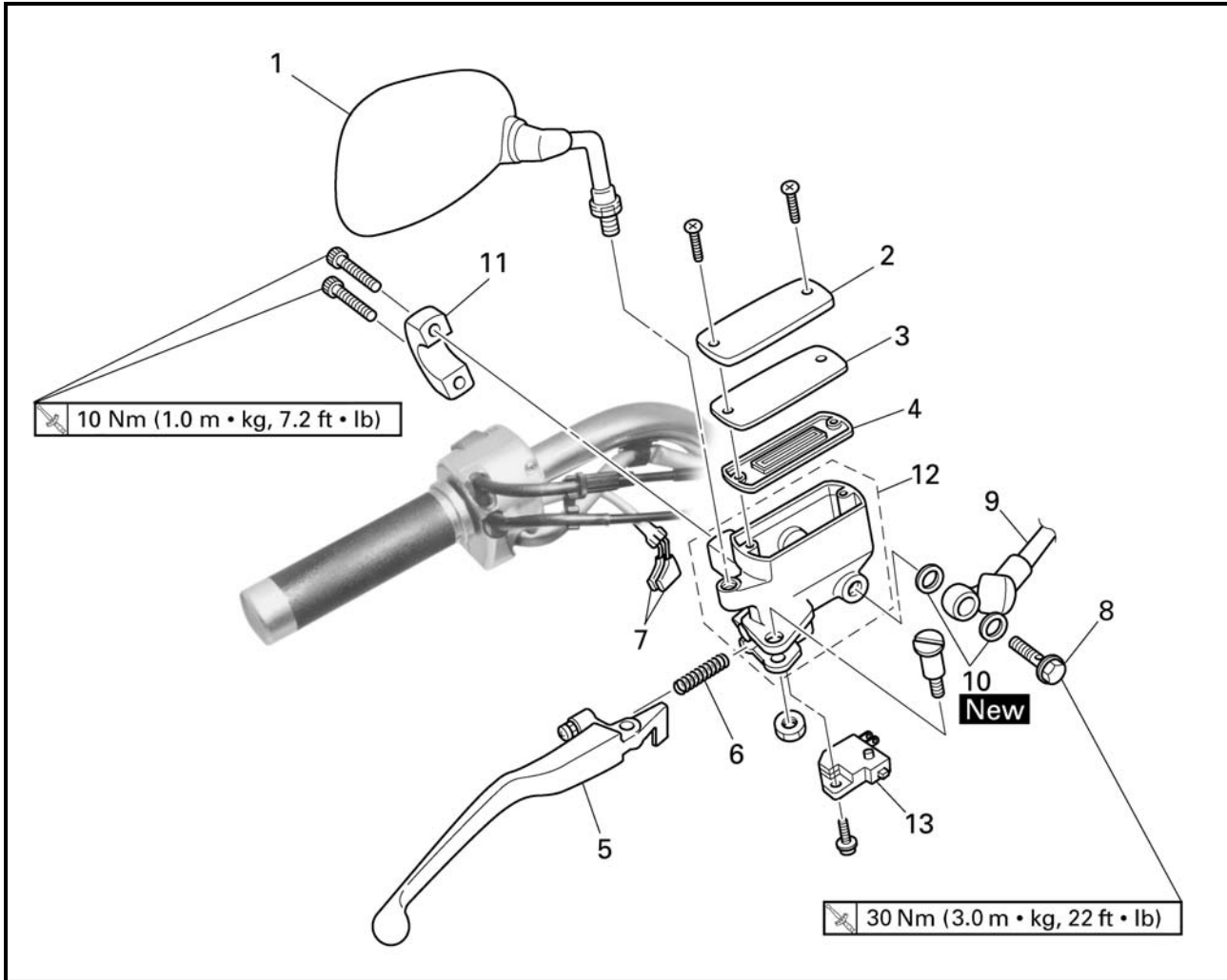
EAS00584

**FRONT BRAKE MASTER CYLINDER**



**4**

Order	Job/Part	Q'ty	Remarks
	<b>Removing the front brake master cylinder</b>		Remove the parts in the order listed.
	Brake fluid		Drain.
1	Rear view mirror	1	
2	Brake master cylinder reservoir cap	1	
3	Brake master cylinder reservoir diaphragm holder	1	
4	Brake master cylinder reservoir diaphragm	1	
5	Brake lever	2	
6	Brake lever spring	1	
7	Front brake light switch connector	2	Disconnect.
8	Union bolt	1	
9	Brake hose	1	Disconnect.
10	Copper washer	2	



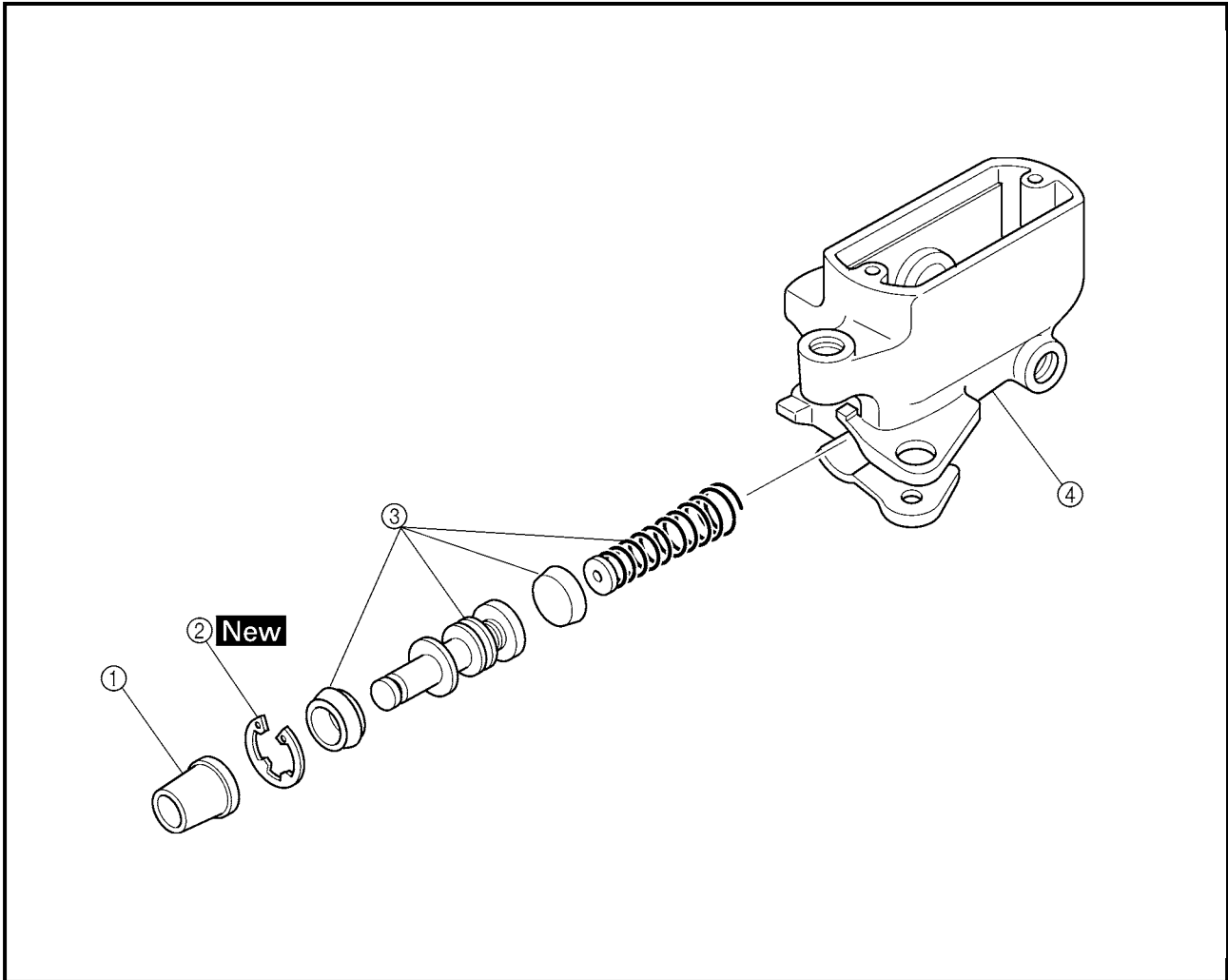
4

Order	Job/Part	Q'ty	Remarks
11	Brake master cylinder holder	1	For installation, reverse the removal procedure.
12	Brake master cylinder	1	
13	Front brake light switch	1	



EAS00585

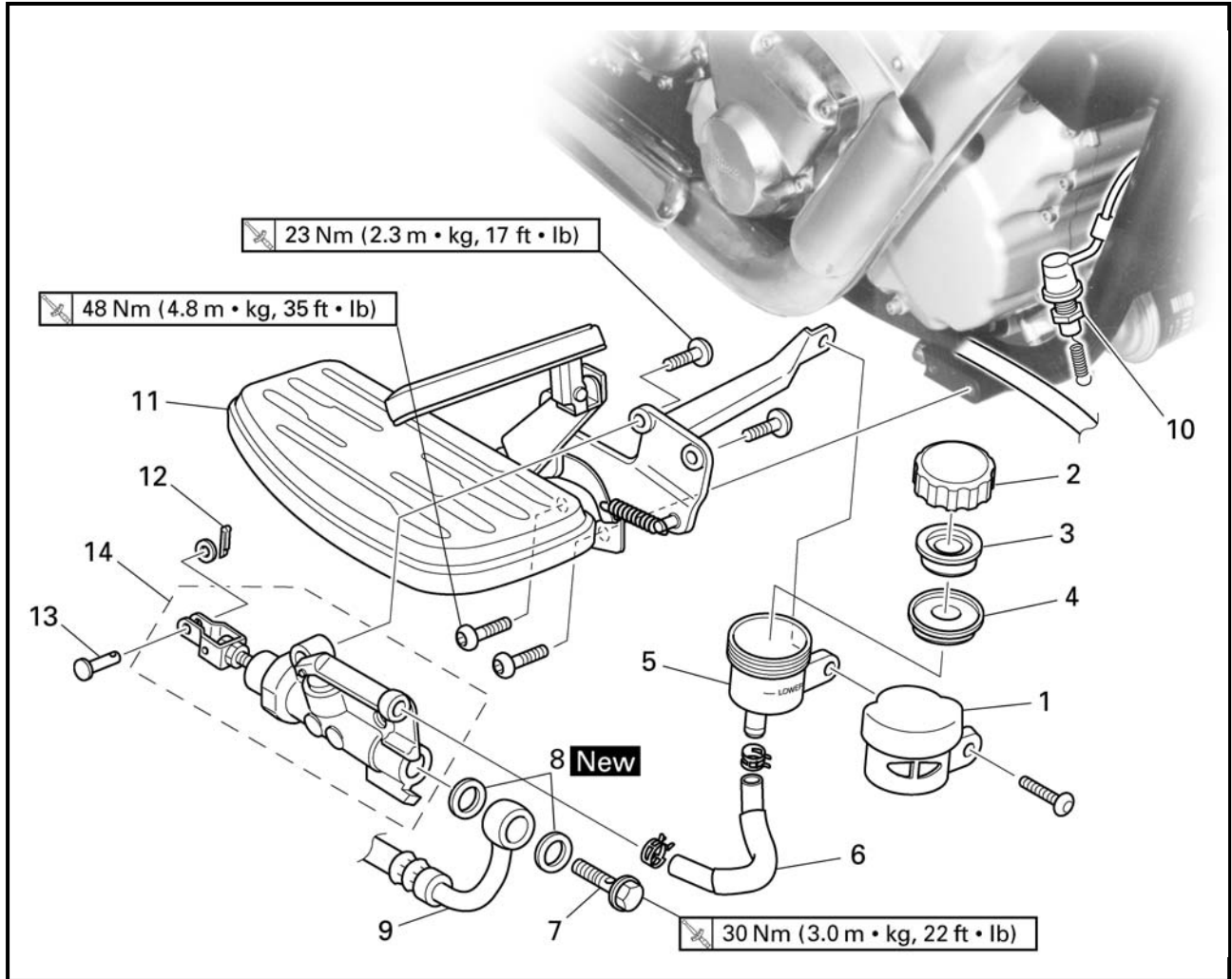
4



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.

EAS00586

REAR BRAKE MASTER CYLINDER

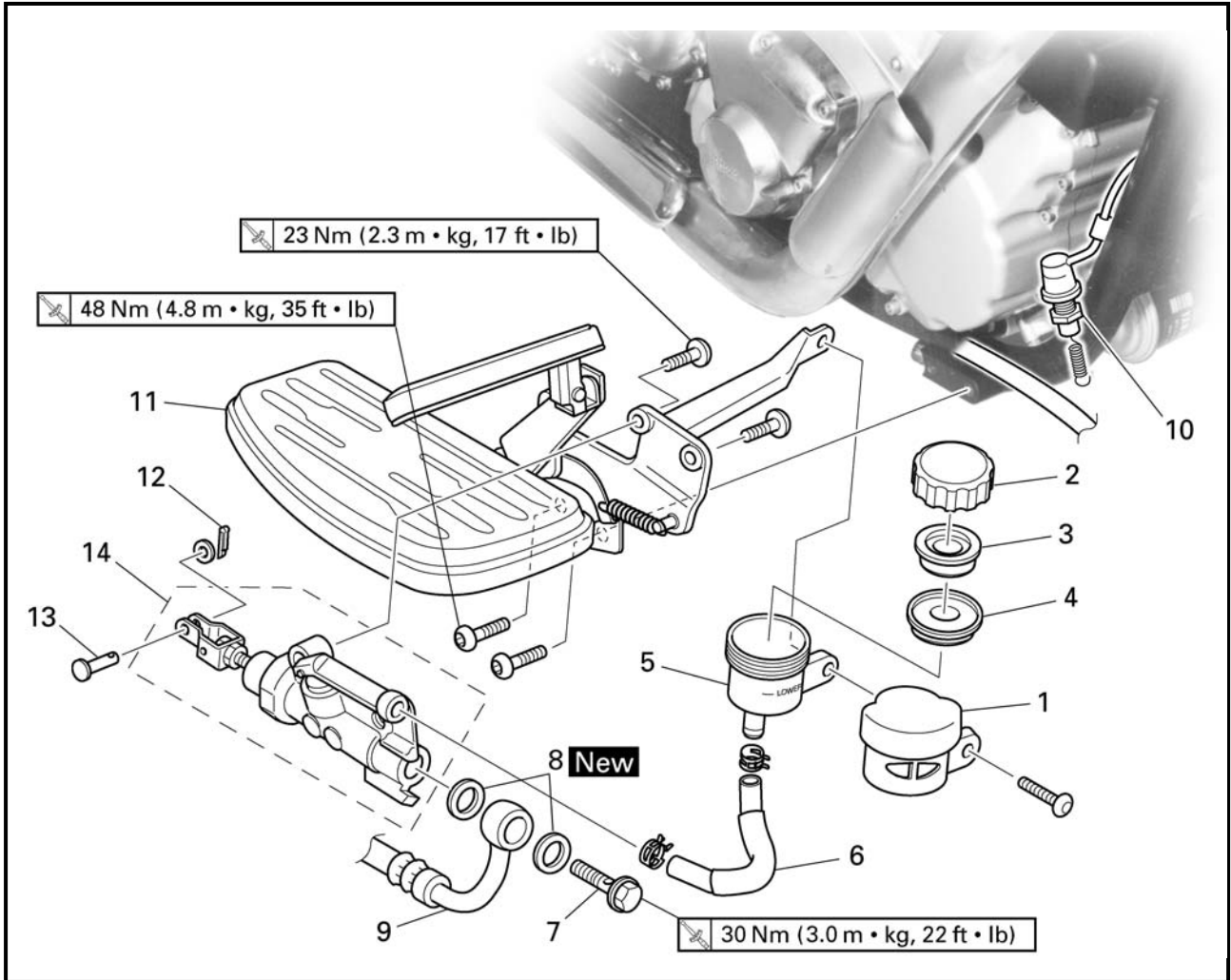


4

Order	Job/Part	Q'ty	Remarks
	<b>Removing the rear brake master cylinder</b>		Remove the parts in the order listed.
	Brake fluid		Drain.
1	Brake fluid reservoir cover	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	Union bolt	1	
8	Copper washer	2	
9	Brake hose	1	Disconnect.
10	Rear brake light switch	1	Disconnect.

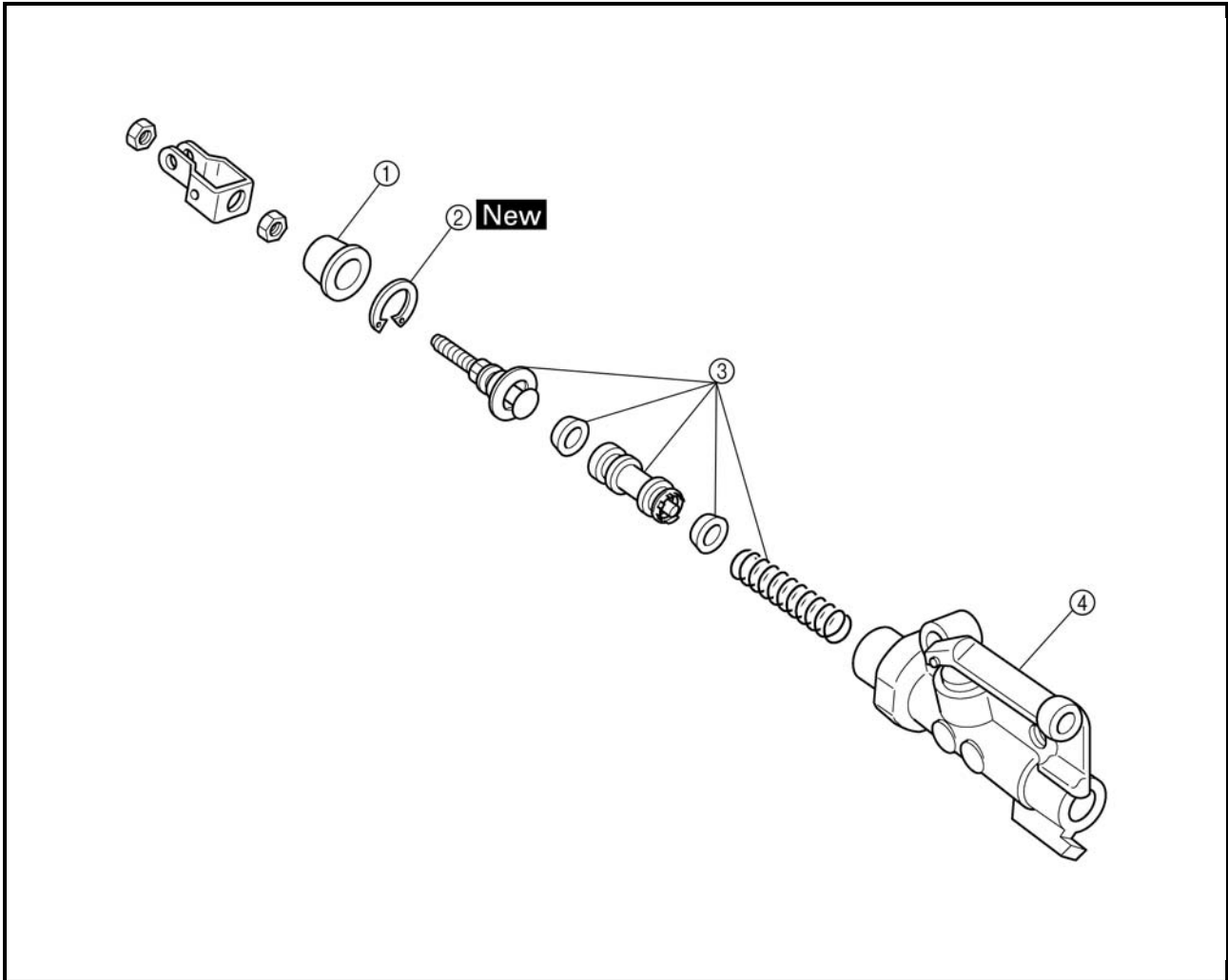


4



Order	Job/Part	Q'ty	Remarks
11	Left footrest assembly	1	For installation, reverse the removal procedure.
12	Cotter pin	1	
13	Pin	1	
14	Brake master cylinder	1	

EAS00587



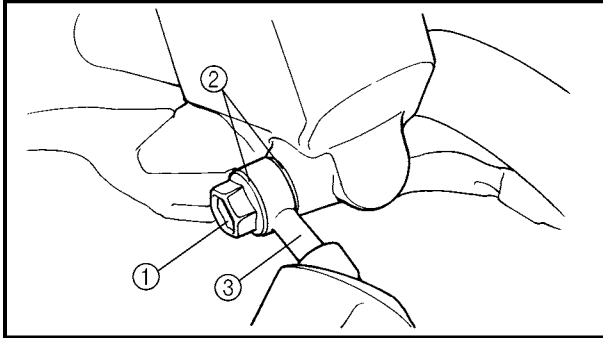
Order	Job/Part	Q'ty	Remarks
	<b>Disassembling the rear brake master cylinder</b>		Remove the parts in the order listed.
①	Dust boot	1	
②	Circlip	1	
③	Brake master cylinder kit	1	
④	Brake master cylinder	1	
			For assembly, reverse the disassembly procedure.



EAS00588

**DISASSEMBLING 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 hose ③

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

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

EAS00589

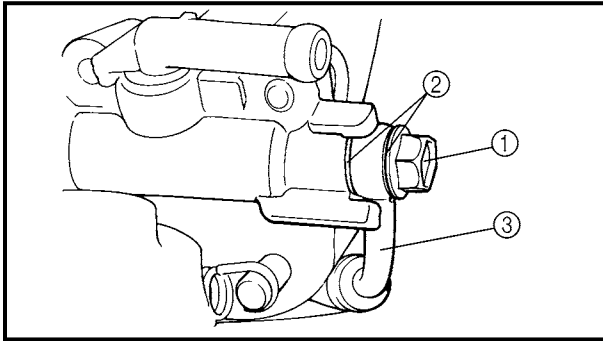
**DISASSEMBLING THE REAR BRAKE MASTER CYLINDER**

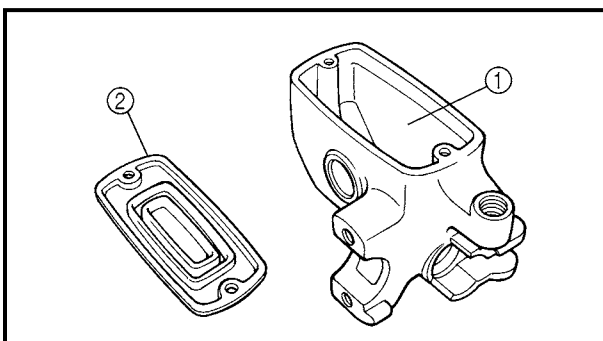
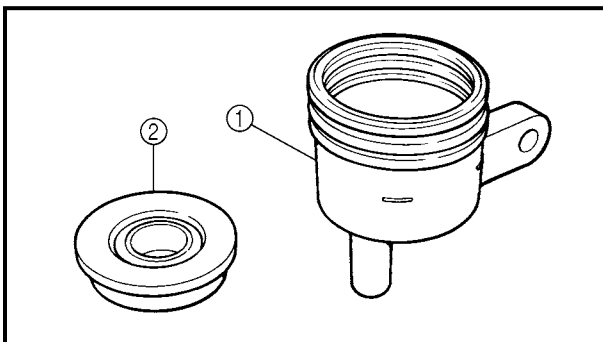
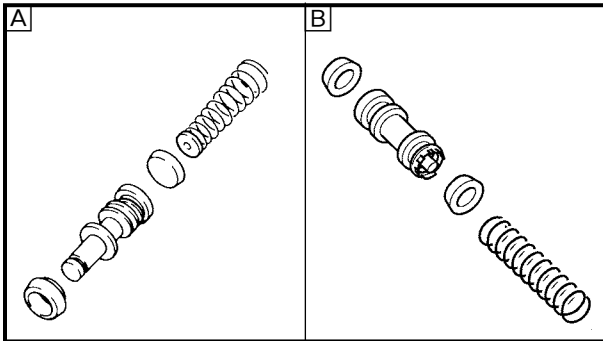
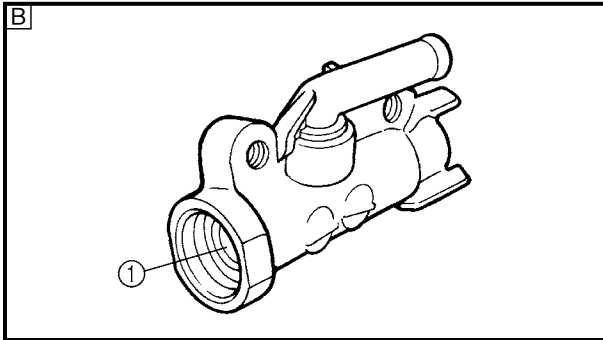
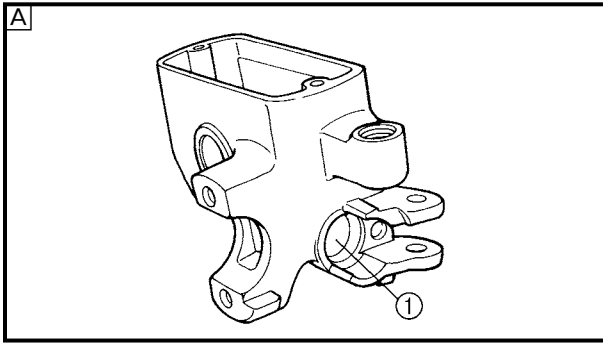
## 1. Remove:

- union bolt ①
- copper washers ②
- brake hose ③

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

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





EAS00592

**CHECKING THE FRONT AND REAR BRAKE MASTER CYLINDERS**

The following procedure applies to both brake master cylinders.

1. Check:
  - brake master cylinder ①  
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 ①  
Damage/scratches/wear → Replace.

- ▣ A Front
- ▣ B Rear

3. Check:
  - rear brake fluid reservoir ①  
Cracks/damage → Replace.
  - rear brake fluid reservoir diaphragm ②  
Cracks/damage → Replace.

4. Check:
  - front brake master cylinder reservoir ①  
Cracks/damage → Replace.
  - front brake master cylinder reservoir diaphragm ②  
Damage/wear → Replace.



5. Check:
  - brake hoses
  - brake fluid reservoir hose
 Cracks/damage/wear → Replace.

EAS00598

**ASSEMBLING AND INSTALLING THE FRONT BRAKE MASTER CYLINDER**

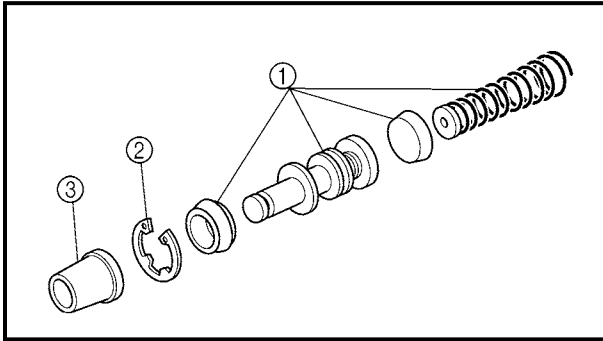
**⚠ WARNING**

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

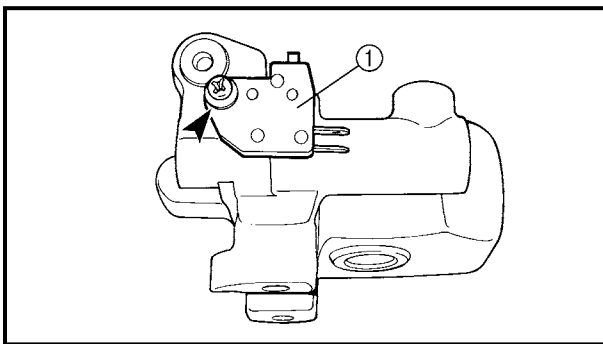


**Recommended brake fluid  
DOT 4**

1. Install:
  - brake master cylinder kit ①
  - circlip ② **New**
  - dust boot ③



2. Install:
  - front brake light switch ①

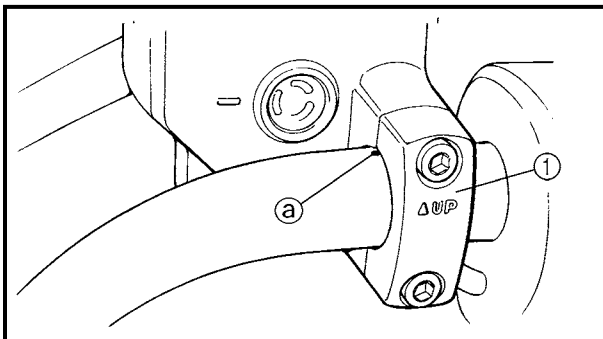


3. Install:
  - brake master cylinder
  - brake master cylinder holder ①

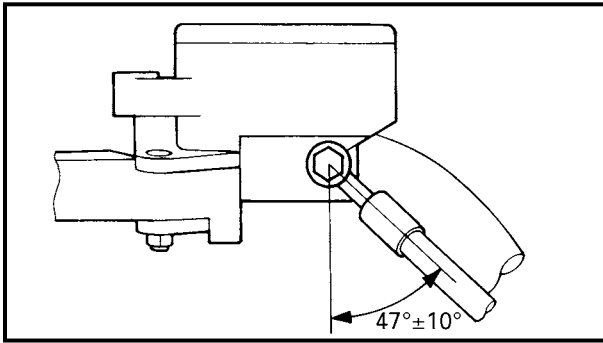
**10 Nm (1.0 m · kg, 7.2 ft · lb)**

**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 ② in the handlebar.
- First, tighten the upper bolt, then the lower bolt.



4



4. Install:

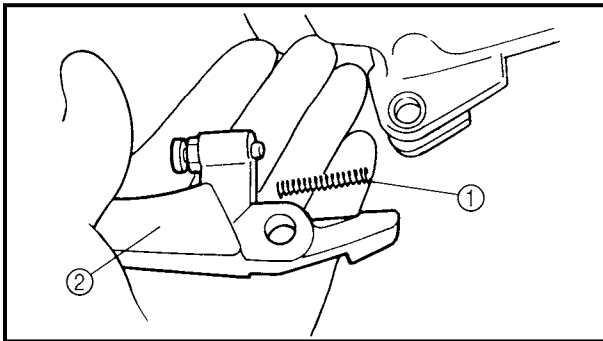
- copper washers **New**
- brake hose
- union bolt  **30 Nm (3.0 m · kg, 22 ft · lb)**

**⚠ WARNING**

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

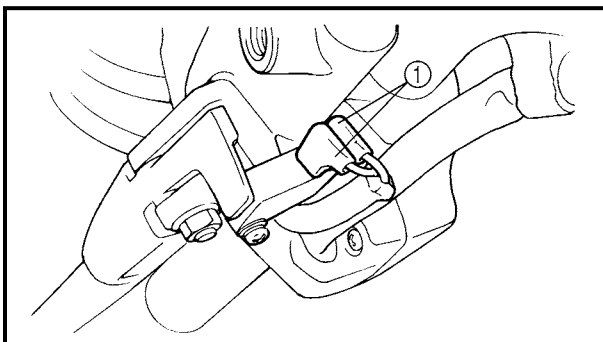
**NOTE:**

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



5. Install:

- brake lever spring ①
- brake lever ②



6. Connect:

- front brake light switch connectors ①

7. Fill:

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

	<p><b>Recommended brake fluid DOT 4</b></p>
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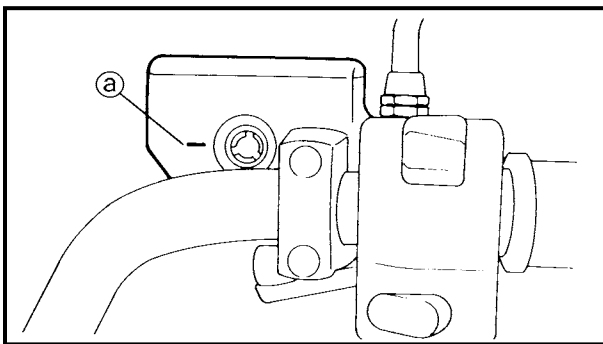
### ⚠ WARNING

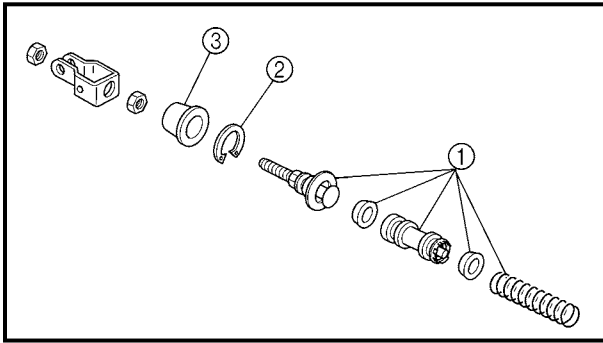
- Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.
- Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor brake performance.
- When refilling, be careful that water does not enter the brake master cylinder 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.

- Bleed:
  - brake system  
Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" in chapter 3.
- Install:
  - brake master cylinder diaphragm
  - brake master cylinder diaphragm holder
  - brake master cylinder cap
  - rear view mirror
- 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.
- Check:
  - brake lever operation  
Soft or spongy feeling → Bleed the brake system.  
Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" in chapter 3.

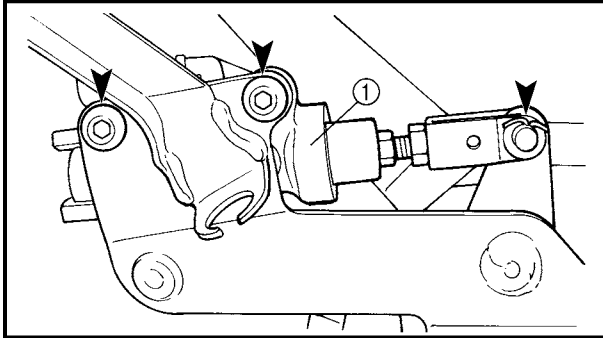




EAS00608

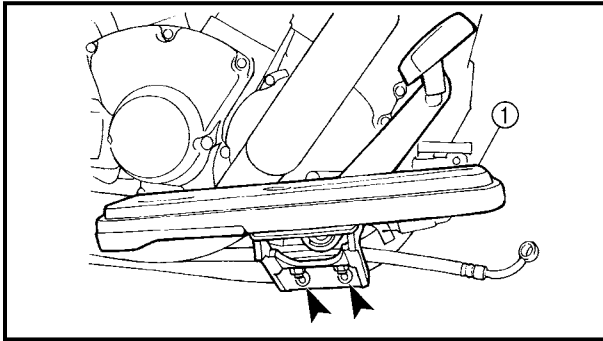
**ASSEMBLING AND INSTALLING THE REAR BRAKE MASTER CYLINDER**

1. Install:
- brake master cylinder kit ①
  - circlip ② **New**
  - dust boot ③



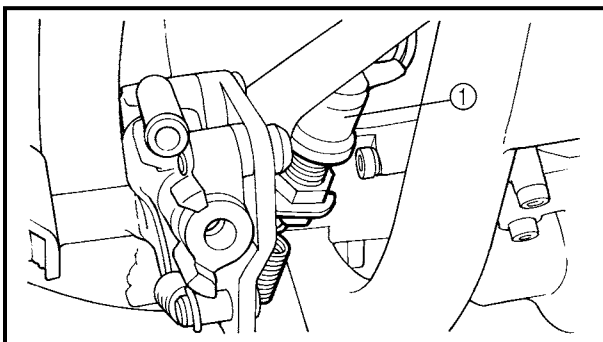
2. Install:
- brake master cylinder ①

23 Nm (2.3 m · kg, 17 ft · lb)



3. Install:
- left footrest assembly ①

48 Nm (4.8 m · kg, 35 ft · lb)

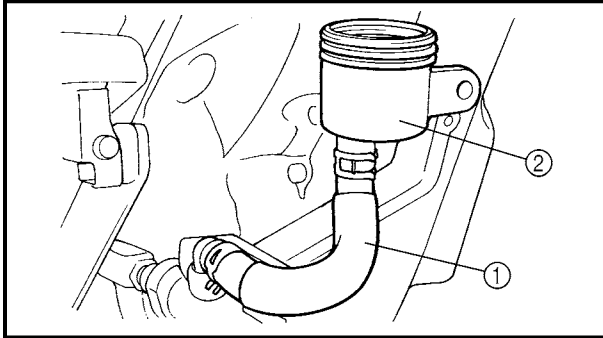
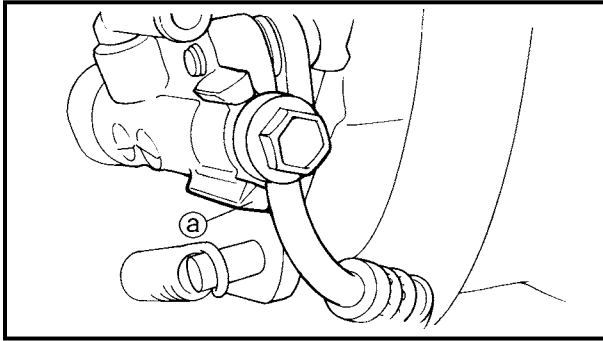


4. Install:
- rear brake light switch ①

5. 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".

**CAUTION:**

When installing the brake hose onto the brake master cylinder, make sure the brake pipe touches the projection ① as shown.

## 6. Install:

- brake fluid reservoir hose ①
- brake fluid reservoir ②

## 7. Fill:

- brake fluid reservoir  
(to the maximum level mark)



**Recommended brake fluid  
DOT 4**

**⚠ WARNING**

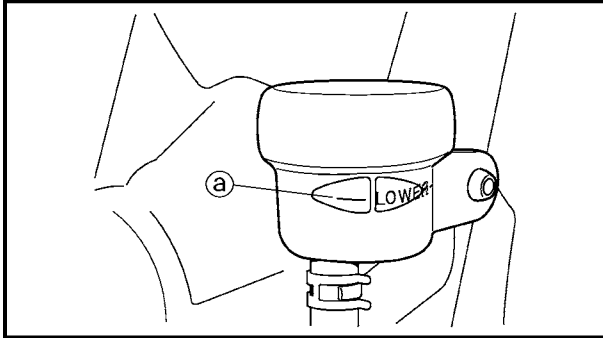
- Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.
- Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor brake 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:**

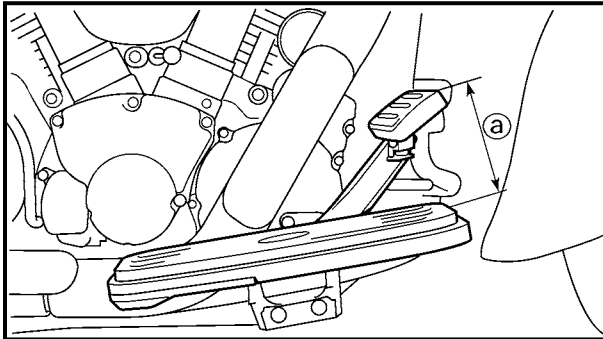
Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.



8. Bleed:
  - brake systemRefer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” in chapter 3.
9. Install:
  - brake fluid reservoir diaphragm
  - brake fluid reservoir diaphragm holder
  - brake fluid reservoir cap
  - brake fluid reservoir cover



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



11. Adjust:
  - brake pedal position (a)Refer to “ADJUSTING THE REAR BRAKE” in chapter 3.



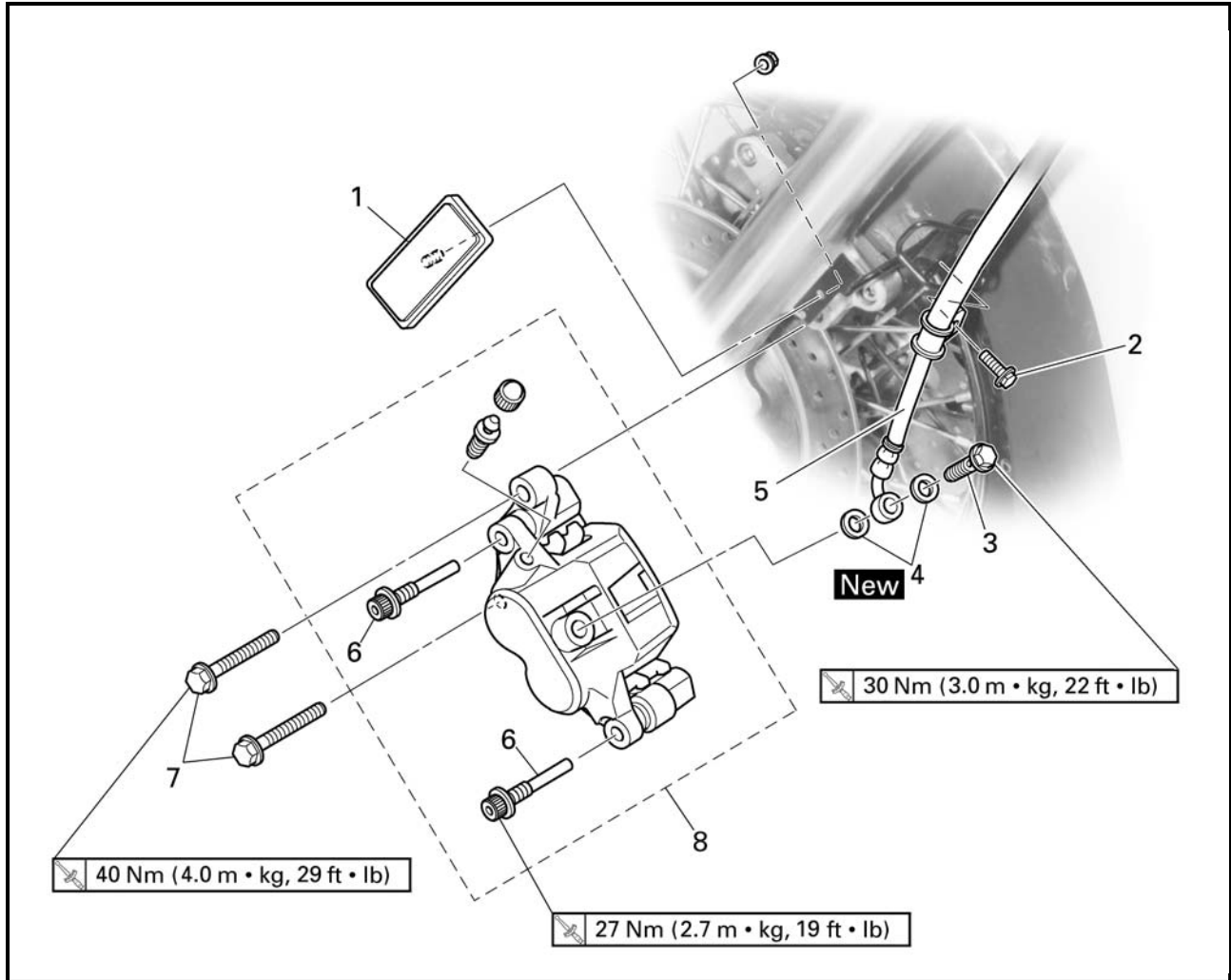
**Brake pedal position (below the top of the rider footrest)  
100 mm (3.9 in)**

12. Adjust:
  - rear brake light operation timingRefer to “ADJUSTING THE REAR BRAKE LIGHT SWITCH” in chapter 3.

EAS00613

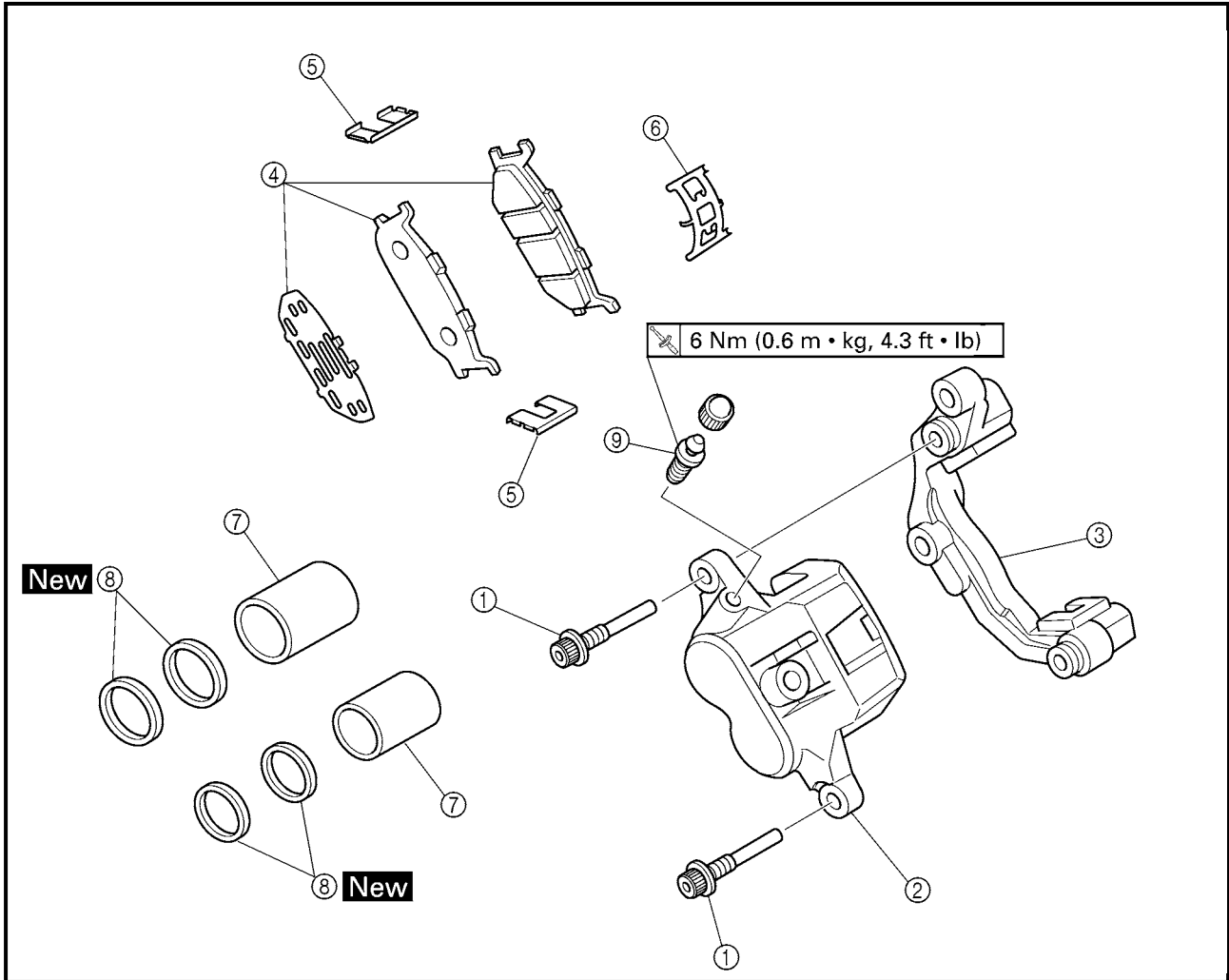
FRONT BRAKE CALIPERS

4



Order	Job/Part	Q'ty	Remarks
	<b>Removing the front brake calipers</b>		Remove the parts in the order listed. The following procedure applies to both of the front brake calipers. Drain.
	Brake fluid		
1	Reflector	1	
2	Brake hose holder bolt	1	
3	Union bolt	1	
4	Copper washer	2	
5	Brake hose	1	
6	Retaining bolt	2	Loosen.
7	Brake caliper bolt	2	
8	Brake caliper	1	
			For installation, reverse the removal procedure.

EAS00615



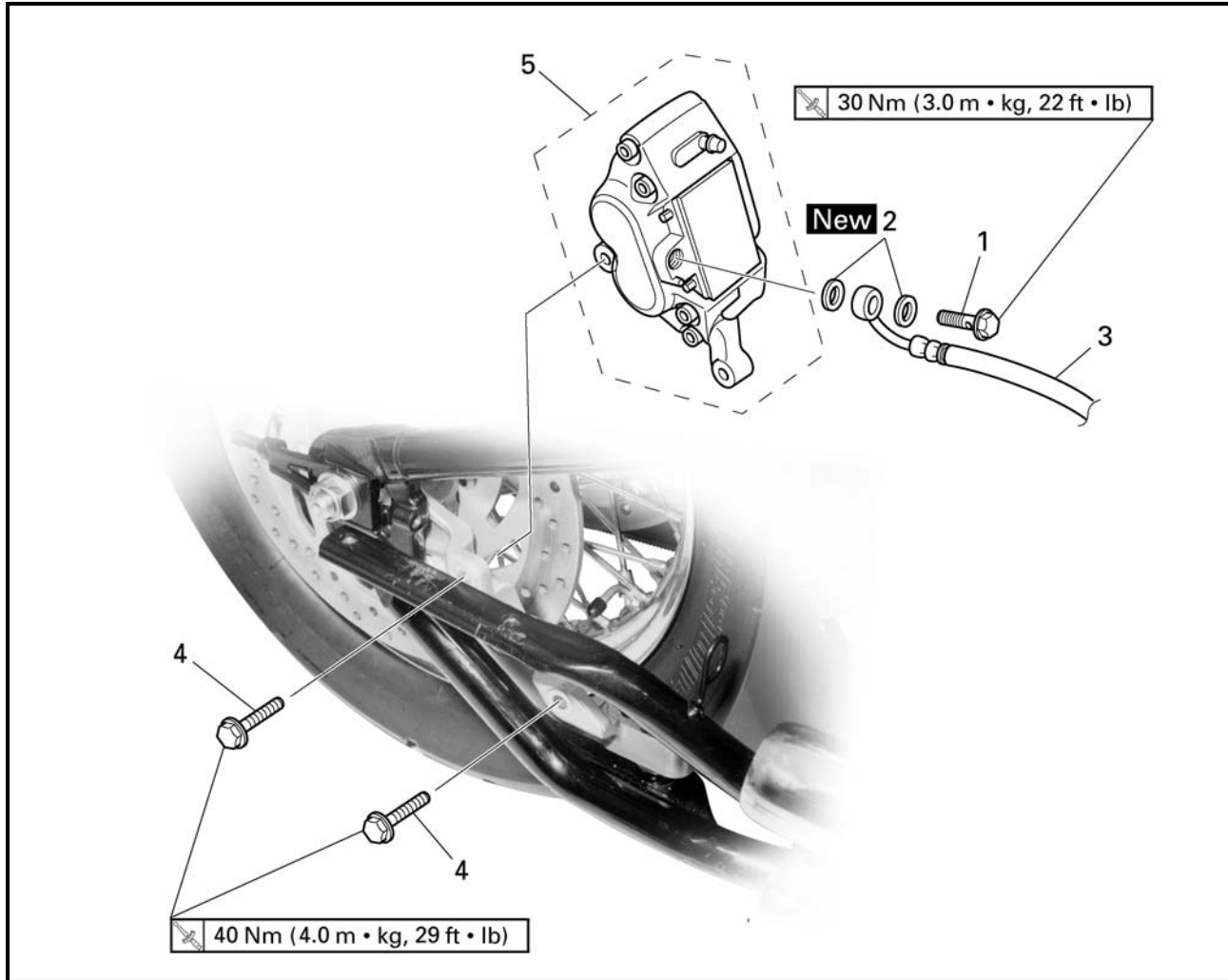
4

Order	Job/Part	Q'ty	Remarks
	<b>Disassembling the front brake calipers</b>		Remove the parts in the order listed.
			The following procedure applies to both of the front brake calipers.
①	Retaining bolt	2	
②	Brake caliper	1	
③	Brake caliper bracket	2	
④	Brake pad	2	
⑤	Brake pad spring	2	
⑥	Brake pad spring	1	
⑦	Brake caliper piston	2	
⑧	Brake caliper piston seal	4	
⑨	Bleed screw	1	
			For assembly, reverse the disassembly procedure.



EAS00616

REAR BRAKE CALIPER

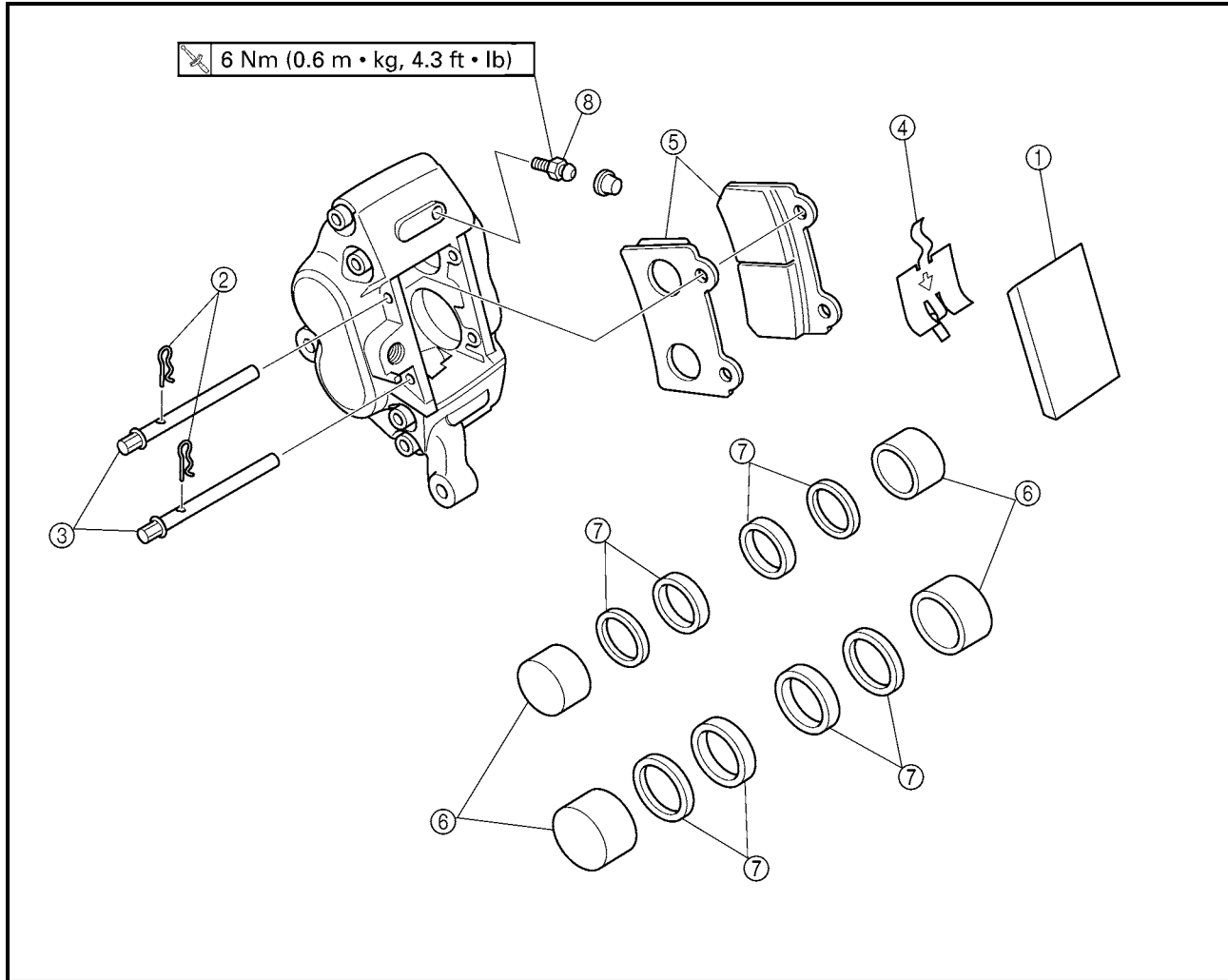


4

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



EAS00617



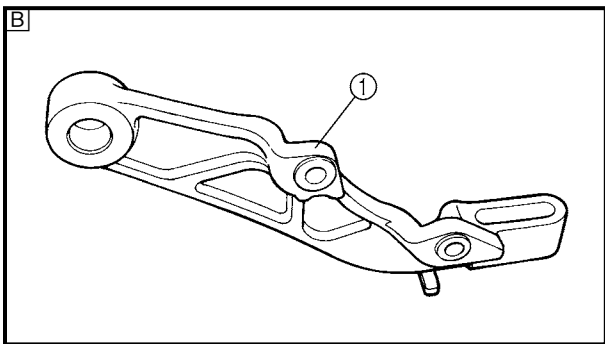
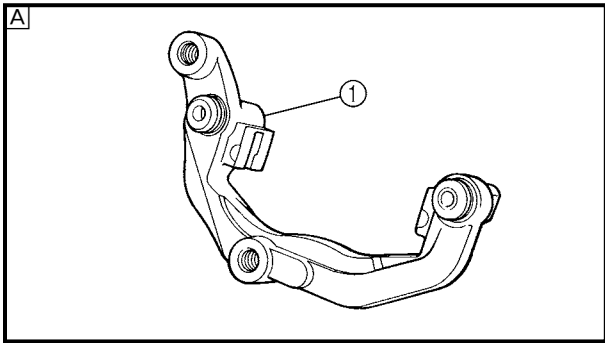
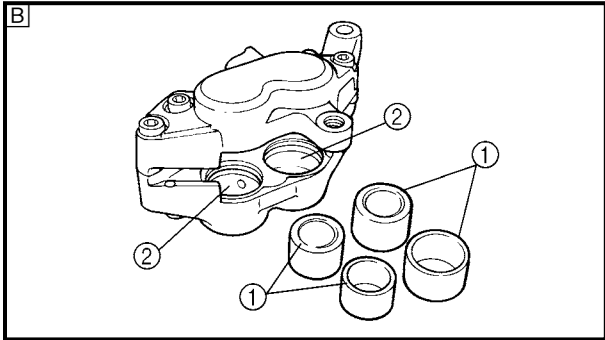
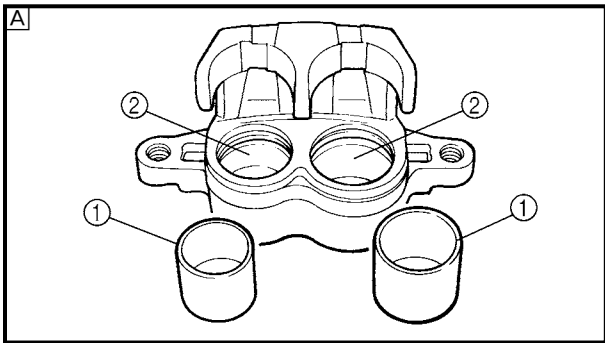
4

Order	Job/Part	Q'ty	Remarks
	<b>Disassembling the rear brake caliper</b>		Remove the parts in the order listed.
①	Brake pad cover	1	
②	Brake pad clip	2	
③	Brake pad pin	2	
④	Brake pad spring	1	
⑤	Brake pad	2	
⑥	Brake caliper piston	4	
⑦	Brake caliper piston seal	8	
⑧	Bleed screw	1	
			For assembly, reverse the disassembly procedure.









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  
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.**

Ⓐ Front

Ⓑ Rear

2. Check:

- brake caliper brackets ①  
Cracks/damage → Replace.

Ⓐ Front

Ⓑ Rear

EAS00638

**ASSEMBLING AND INSTALLING THE FRONT BRAKE CALIPERS**

The following procedure applies to both of the brake calipers.

**⚠ WARNING**

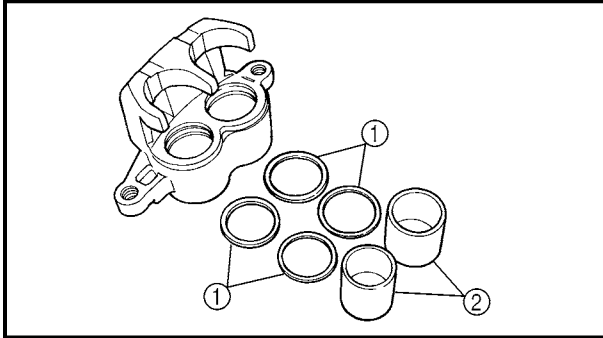
- **Before installation, all internal brake components should be cleaned and lubricated with clean or new brake fluid.**



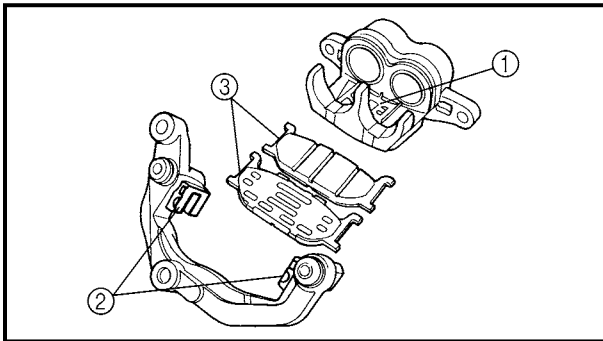
- Never use solvents on internal brake components as they will cause the piston seals to swell and distort.
- Whenever a brake caliper is disassembled, replace the brake caliper piston seals.



Recommended brake fluid  
DOT 4

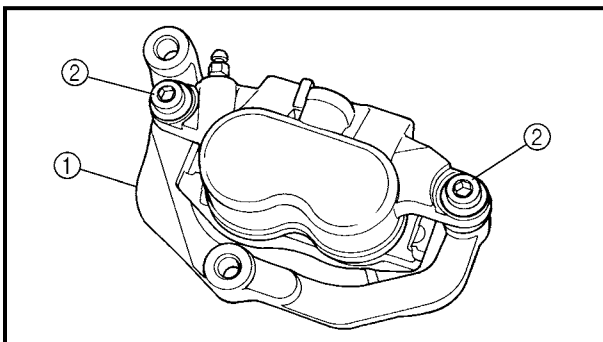


1. Install:
  - bleed screw
  - brake caliper piston seals ① **New**
  - brake caliper pistons ②



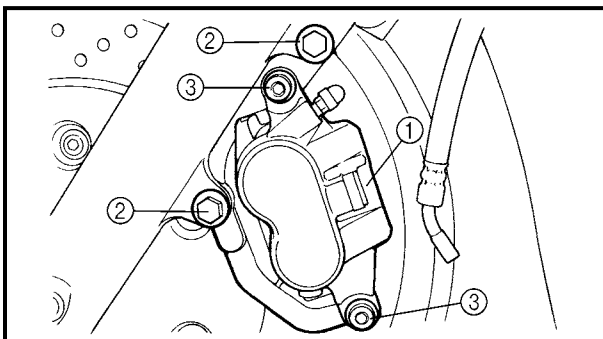
2. Install:
  - brake pad spring ①
  - brake pad springs ②
  - brake pads ③

**NOTE:** \_\_\_\_\_  
Install the brake pad with the attached brake pad shim on the brake caliper piston side.



3. Install:
  - brake caliper bracket ①
  - retaining bolts ②

**NOTE:** \_\_\_\_\_  
Temporarily tighten the retaining bolts.

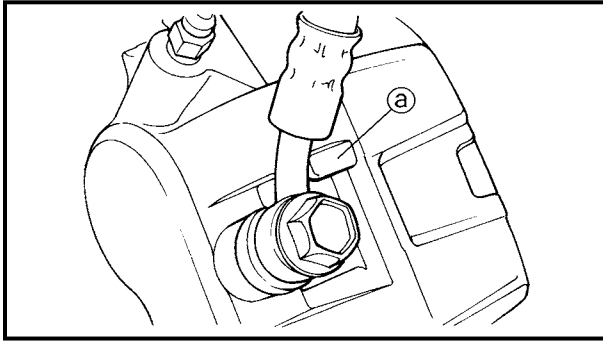


4. Install:
  - brake caliper ①
  - brake caliper bolts ②

40 Nm (4.0 m · kg, 29 ft · lb)

5. Tighten:
  - retaining bolts ③

27 Nm (2.7 m · kg, 19 ft · lb)



## 6. 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".

**CAUTION:**

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

## 7. Fill:

- brake master cylinder 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 master cylinder reservoir. Water will significantly lower the boiling point of the brake fluid and could cause vapor lock.

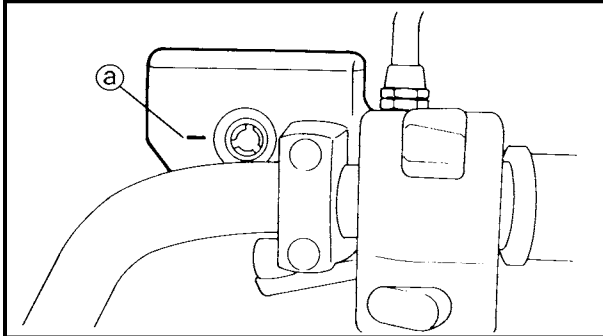
**CAUTION:**

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



8. Bleed:
  - brake system

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



9. 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.

10. Check:
  - brake lever operation

Soft or spongy feeling → Bleed the brake system.

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

EAS00642

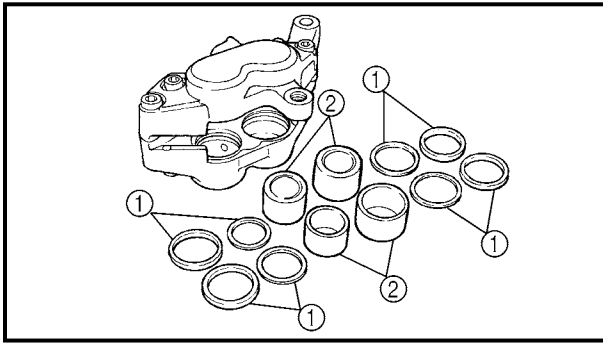
## ASSEMBLING AND INSTALLING THE REAR BRAKE CALIPER

### ⚠ WARNING

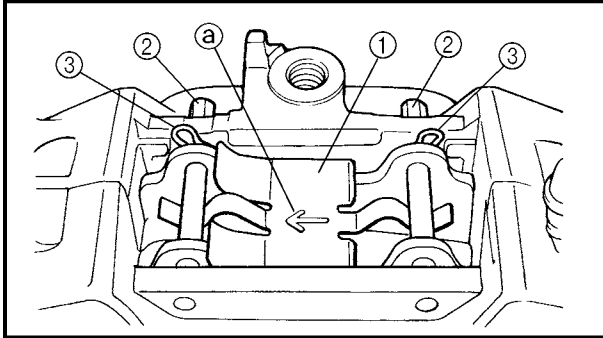
- Before installation, all internal brake components should be cleaned and lubricated with clean or new brake fluid.
- Never use solvents on internal brake components as they will cause the piston seals to swell and distort.
- Whenever a brake caliper is disassembled, replace the brake caliper piston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



Recommended brake fluid  
DOT 4



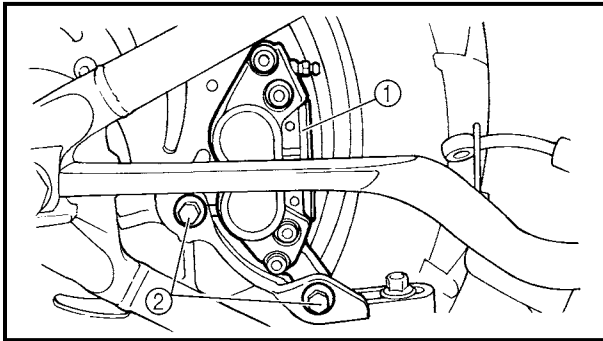
1. Install:
  - bleed screw
  - brake caliper piston seals ① **New**
  - brake caliper pistons ②



2. Install:
  - brake pads
  - brake pad spring ①
  - brake pad pins ②
  - brake pad clips ③

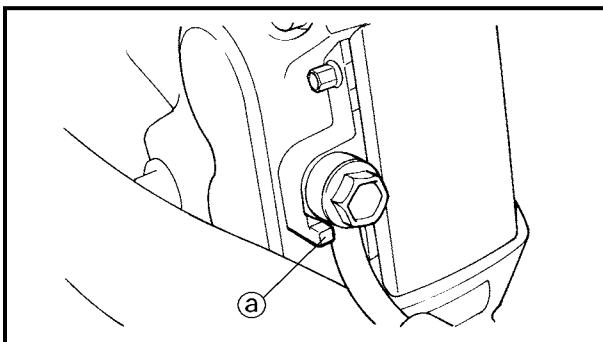
**NOTE:**

The arrow ① on the brake pad spring must point in the direction of disc rotation.



3. Install:
  - brake pad cover
4. Install:
  - brake caliper ①
  - brake caliper bolts ②

40 Nm (4.0 m · kg, 29 ft · lb)



5. 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".

**CAUTION:**

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

4



6. Fill:
- brake fluid reservoir  
(with the specified amount of the recommended brake fluid)



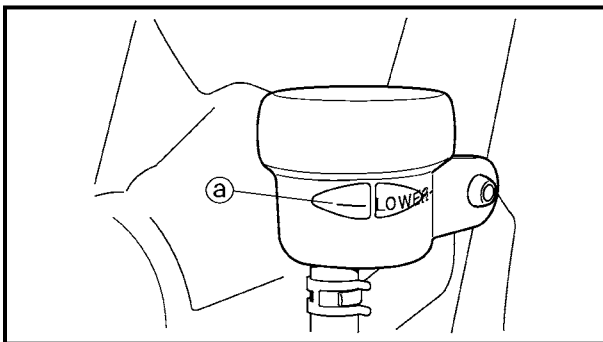
**Recommended brake fluid  
DOT 4**

### **⚠ 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.**



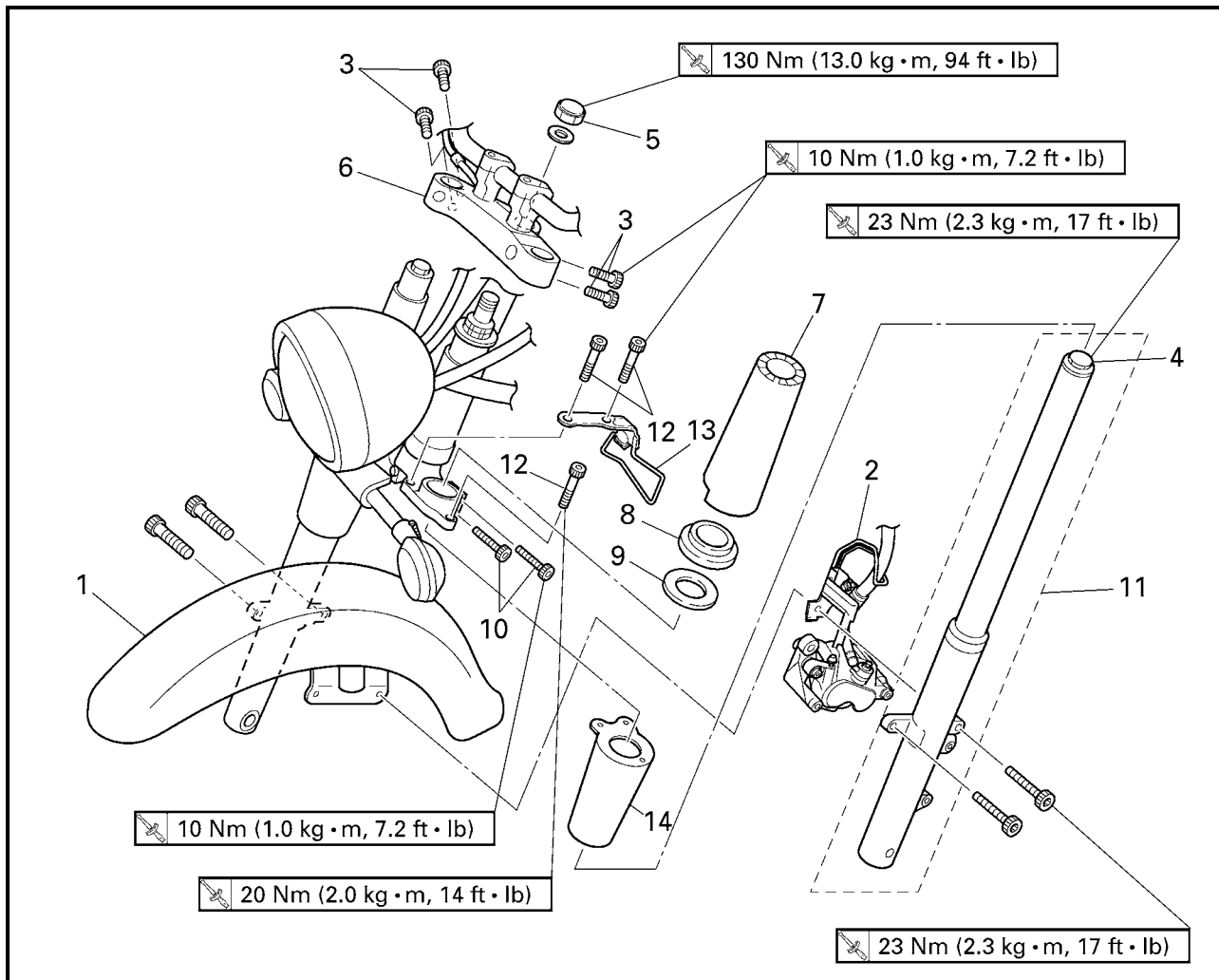
7. Bleed:
- brake system  
Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” in chapter 3.
8. Check:
- brake fluid level  
Below the minimum level mark (a) → Add the recommended brake fluid to the proper level.  
Refer to “CHECKING THE BRAKE FLUID LEVEL” in chapter 3.
9. Check:
- brake pedal operation  
Soft or spongy feeling → Bleed the brake system.  
Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” in chapter 3.



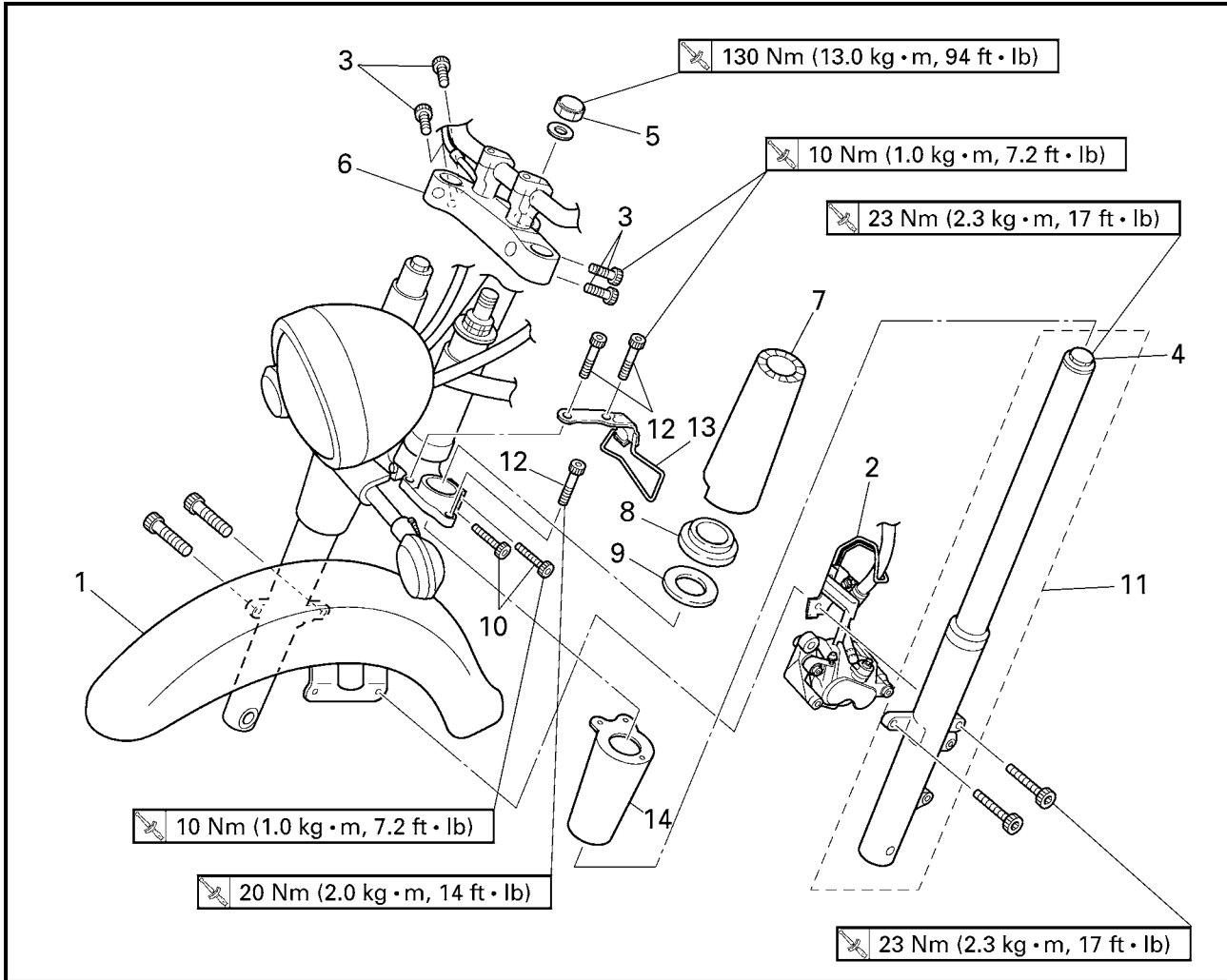
EAS00647

FRONT FORK

4



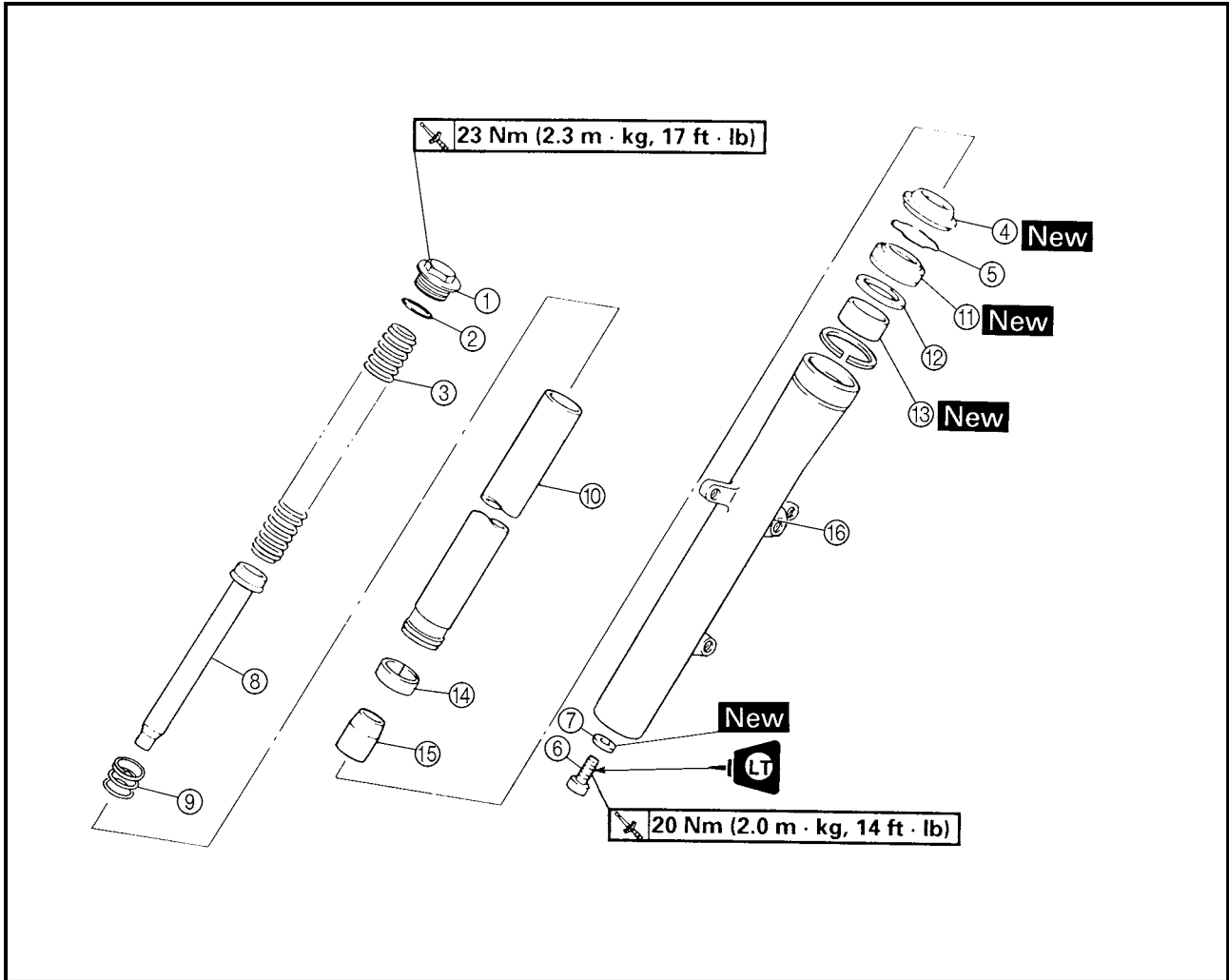
Order	Job/Part	Q'ty	Remarks
	<b>Removing the front fork legs</b>		Remove the parts in the order listed. The following procedure applies to both of the front fork legs.
	Front wheel		Refer to "FRONT WHEEL AND BRAKE DISCS".
	Meter assembly		Refer to "FUEL TANK" in chapter 3.
1	Front fender	1	Loosen.
2	Brake hose holder	1	
3	Upper bracket pinch bolt	4	
4	Cap bolt	1	
5	Steering stem nut	1	
6	Upper bracket	1	
7	Upper fork cover	1	
8	Upper fork cover spacer	1	
9	Upper fork cover washer	1	



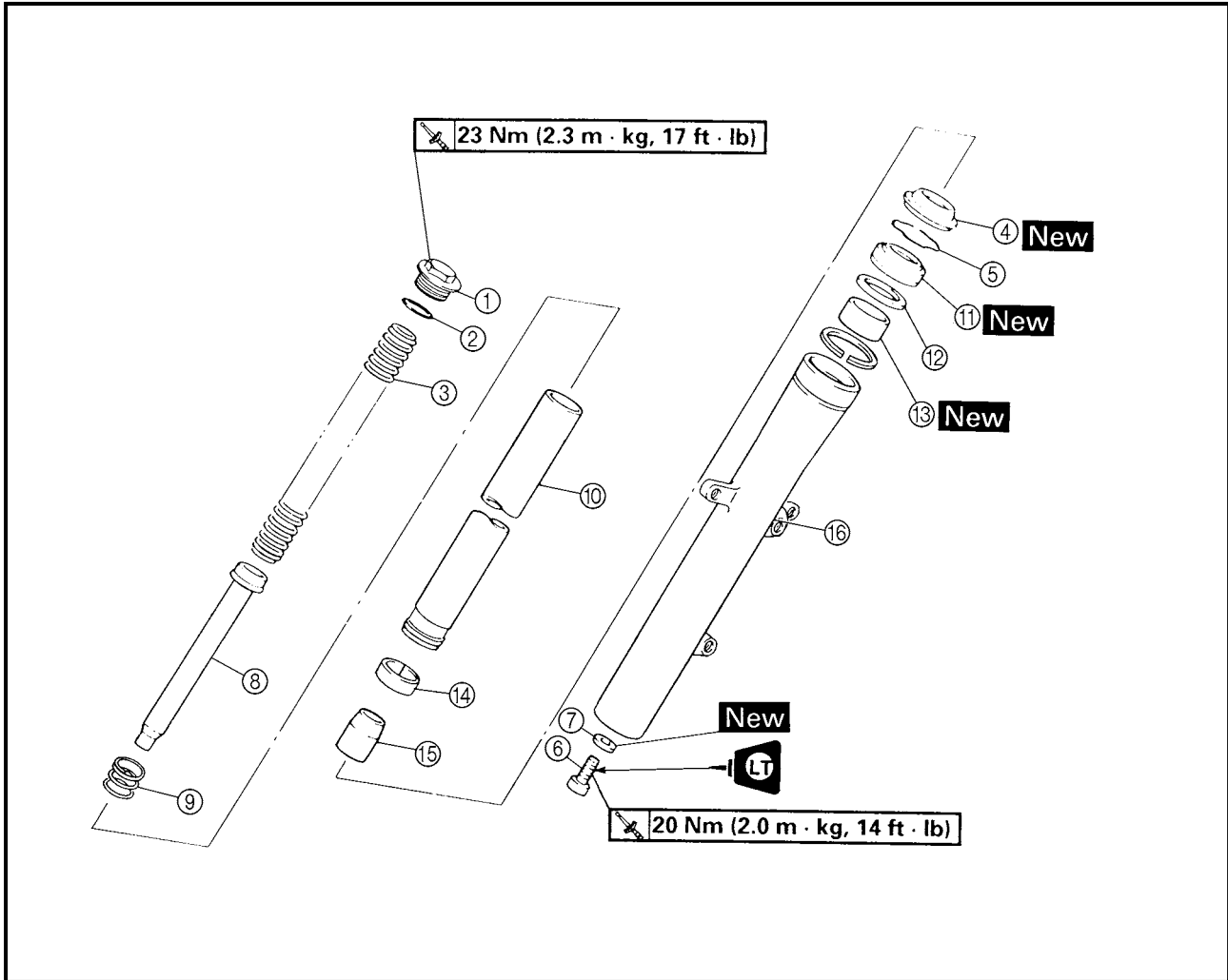
4

Order	Job/Part	Q'ty	Remarks
10	Lower bracket pinch bolt	2	Loosen.
11	Front fork leg	1	
12	Bolt	3	
13	Brake hose guide	1	
14	Lower fork cover	1	
			For installation, reverse the removal procedure.

4



Order	Job/Part	Q'ty	Remarks
	<b>Disassembling the front fork leg</b>		Remove the parts in the order listed. The following procedure applies to both of the front fork legs.
①	Cap bolt	1	
②	O-ring	1	
③	Fork spring	1	
④	Dust seal	1	
⑤	Oil seal clip	1	
⑥	Cartridge cylinder bolt	1	
⑦	Copper washer	1	
⑧	Cartridge cylinder	1	
⑨	Rebound spring	1	
⑩	Inner tube	1	



4

Order	Job/Part	Q'ty	Remarks
⑪	Oil seal	1	For assembly, reverse the disassembly procedure.
⑫	Seal spacer	1	
⑬	Outer tube bushing	1	
⑭	Inner tube bushing	1	
⑮	Oil flow stopper	1	
⑯	Outer tube	1	



EAS00649

**REMOVING THE FRONT FORK LEGS**

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

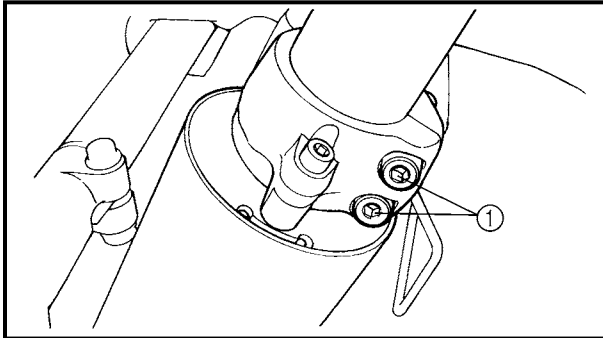
1. Stand the motorcycle on a level surface.

**⚠ 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.

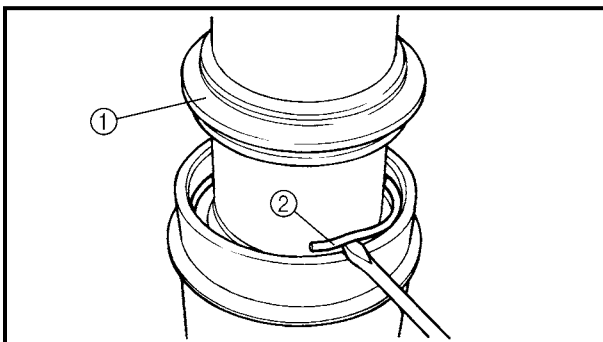


2. Loosen:
  - lower bracket pinch bolts ①

**⚠ WARNING**

**Before loosening the lower bracket pinch bolts, support the front fork leg.**

3. Remove:
  - front fork leg



EAS00652

**DISASSEMBLING THE FRONT FORK LEGS**

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

1. Remove:
  - dust seal ①
  - oil seal clip ②

(with a flat-head screwdriver)

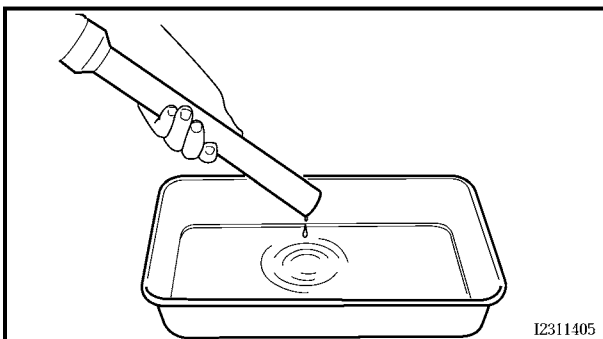
**CAUTION:**

**Do not scratch the inner tube.**

2. Drain:
  - fork oil

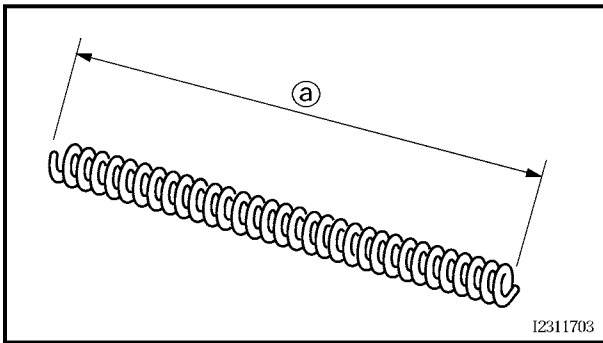
**NOTE:**

Stroke the outer tube several times while draining the fork oil.



I2311405



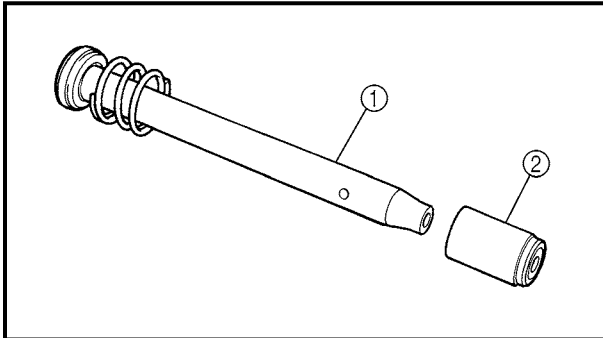


## 2. Measure:

- spring free length ①
- Out of specification → Replace.

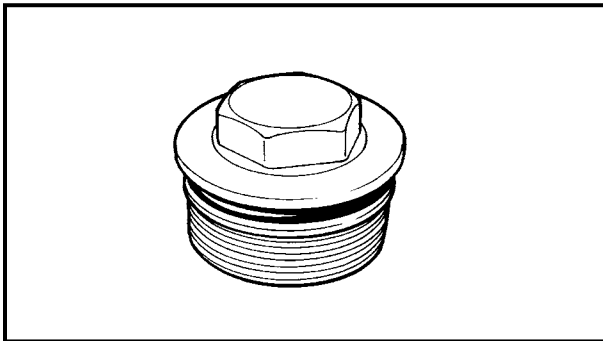


**Spring free length limit**  
**566 mm (22.3 in)**



## 3. Check:

- cartridge cylinder ①
- Damage/wear → Replace.  
Obstruction → Blow out all of the oil passages with compressed air.
- oil flow stopper ②
- Damage → Replace.



## 4. Check:

- cap bolt O-ring
- Damage/wear → Replace.

4

EAS00658

**ASSEMBLING THE FRONT FORK LEGS**

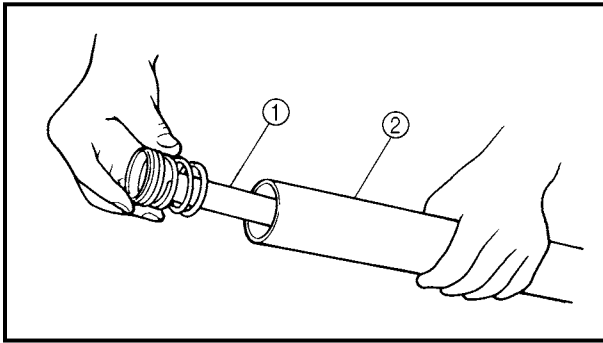
The following procedure applies to both of the front fork legs.

**⚠ WARNING**

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

**NOTE:**

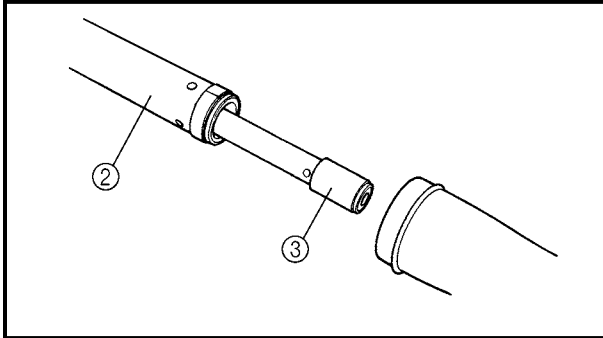
- When assembling the front fork leg, be sure to replace the following parts:
  - inner tube bushing
  - outer tube bushing
  - oil seal
  - dust seal
- Before assembling the front fork leg, make sure all of the components are clean.



1. Install:
  - cartridge cylinder ①

**CAUTION:**

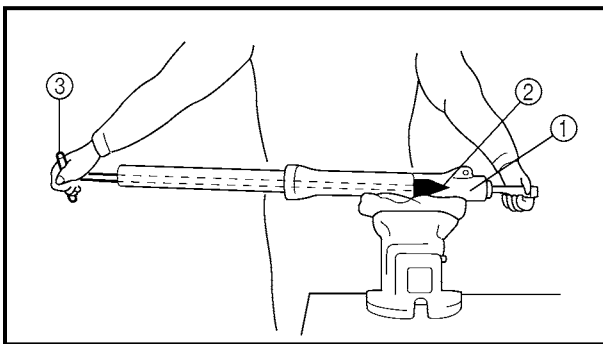
Allow the cartridge cylinder to slide slowly down the inner tube ② until it protrudes from the bottom of the inner tube. Be careful not to damage the inner tube.



2. Install:
  - oil flow stopper ③
3. Lubricate:
  - inner tube's outer surface

	<p><b>Recommended lubricant</b>                  Yamaha fork and shock oil 5WT                  or equivalent</p>
--	---

4. Install:
  - outer tube  
(onto the inner tube)
  - copper washer **New**
  - cartridge cylinder bolt



5. Tighten:
  - cartridge cylinder bolt ①

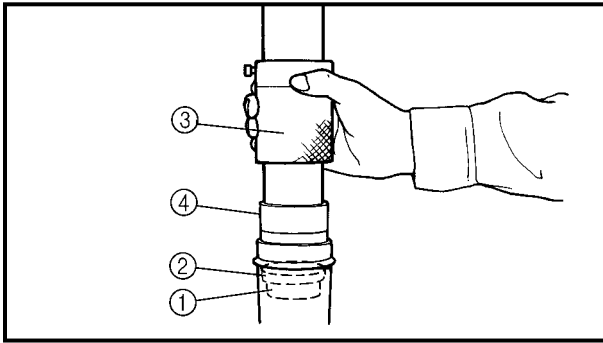
**20 Nm (2.0 m · kg, 14 ft · lb)**

**NOTE:**

- Apply the locking agent (LOCTITE® 204) to the threads of the cartridge cylinder bolt.
- While holding the cartridge cylinder with the damper rod holder ② and T-handle ③, tighten the cartridge cylinder bolt.

	<p><b>Damper rod holder</b>                  YM-1300-1  <b>T-handle</b>                  YM-01326</p>
--	---



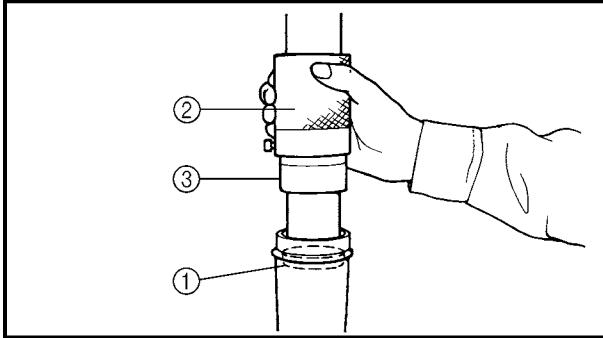


6. Install:

- outer tube bushing ① **New**
- seal spacer ②  
(with the fork seal driver weight ③ and adapter ④)



**Fork seal driver weight**  
YM-33963  
**Adapter**  
YM-8020



7. Install:

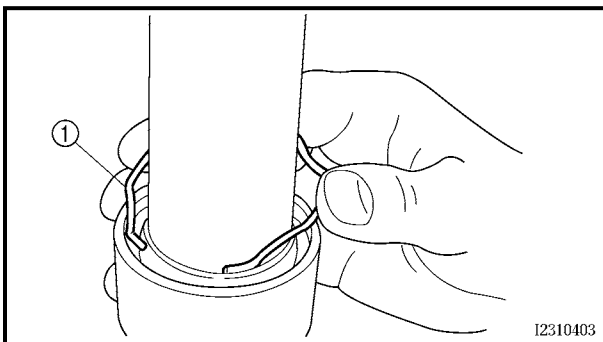
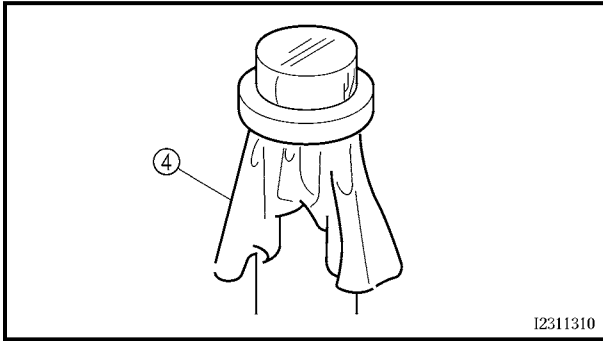
- oil seal ① **New**  
(with the fork seal driver weight ② and adapter ③)

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

**Make sure 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 ④ to protect the oil seal during installation.

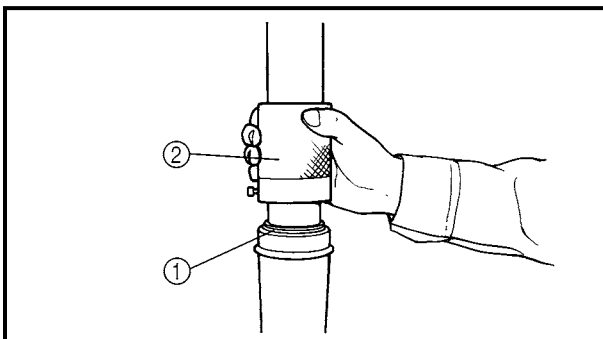


8. Install:

- oil seal clip ①

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

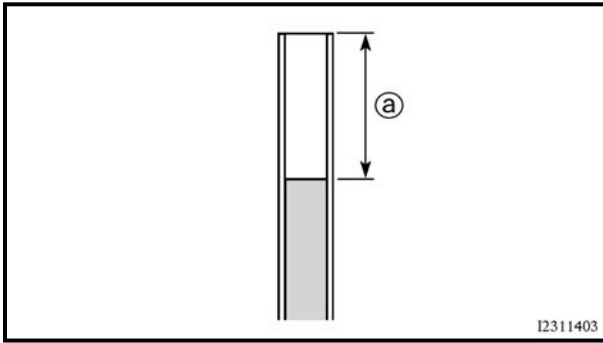
Adjust the oil seal clip so that it fits into the outer tube's groove.



9. Install:

- dust seal ① **New**  
(with the fork seal driver weight ②)

4



10.Fill:

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



**Quantity (each front fork leg)**  
554 L (488 Imp qt, 589 US qt)

**Front fork leg oil level <sup>a</sup>**  
(from the top of the inner tube, with the inner tube fully compressed, and without the fork spring)

**110 mm (4.33 in)**

**Recommended oil**

**Yamaha fork and shock oil 5WT or equivalent**

**NOTE:**

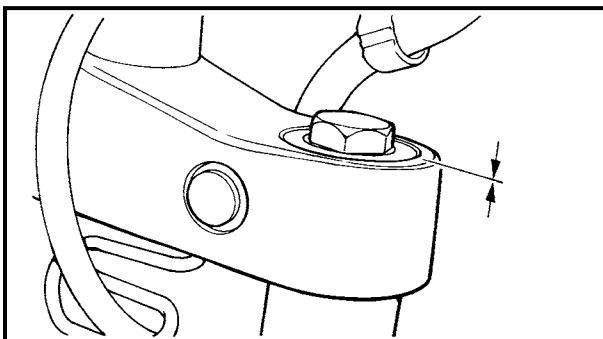
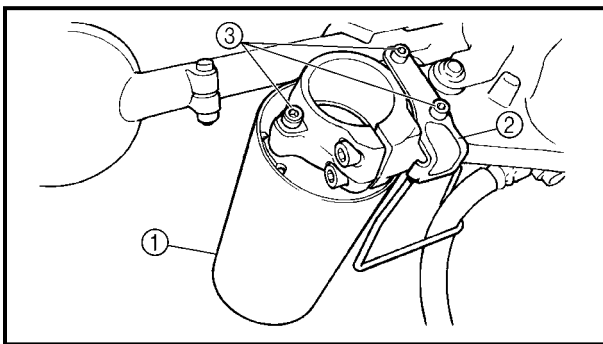
- While filling the front fork leg, keep it upright.
- After filling, slowly pump the front fork leg up and down to distribute the fork oil.

11.Install:

- fork spring
- cap bolt

**NOTE:**

- Before installing the cap bolt, lubricate its O-ring with grease.
- Temporarily tighten the cap bolt.



EAS00662

**INSTALLING THE FRONT FORK LEGS**

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

1. Install:

- lower fork cover ①
- brake hose guide ②
- bolts ③

**10 Nm (1.0 m · kg, 7.2 ft · lb)**

2. Install:

- front fork leg

**NOTE:**

- When aligning the fork tube do not install the upper fork cover.
- Temporarily tighten the lower bracket pinch bolts.

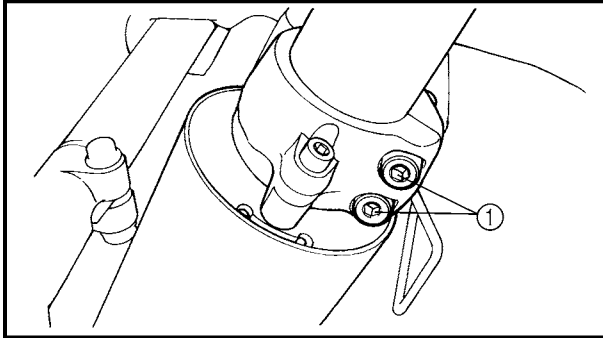


3. Install:
- Upper bracket
  - Steering stem nut

130 Nm (13.0 m · kg, 94 ft · lb)

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

Make sure the inner fork tube is flush with the top of the upper bracket.



4. Tighten:
- lower bracket pinch bolt ①

20 Nm (2.0 m · kg, 14 ft · lb)

- cap bolt

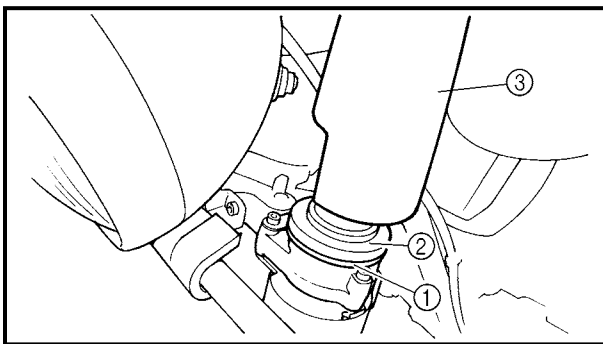
23 Nm (2.3 m · kg, 17 ft · lb)

**⚠ WARNING** \_\_\_\_\_

Make sure the brake hoses are routed properly.

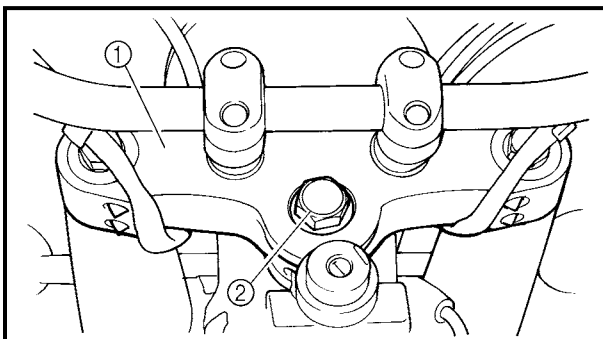
5. Remove:
- steering stem nut
  - upper bracket

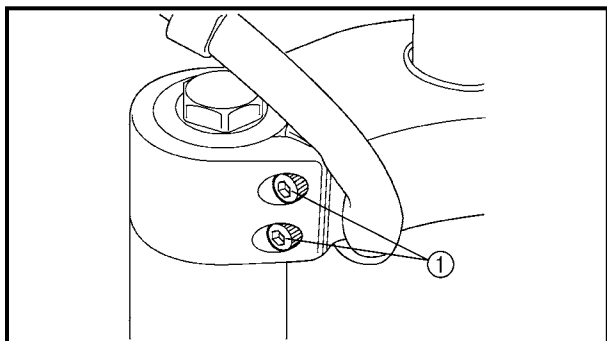
6. Install:
- upper fork washer ①
  - upper fork spacer ②
  - upper fork cover ③



7. Install:
- upper bracket ①
  - steering stem nut ②

130 Nm (13.0 m · kg, 94 ft · lb)

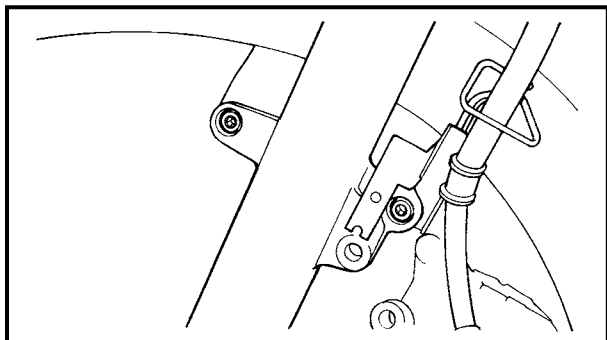




## 8. Tighten:

- upper bracket pinch bolts ①

10 Nm (1.0 m · kg, 7.2 ft · lb)



## 9. Install:

- brake hose holder
- front fender

23 Nm (2.3 m · kg, 17 ft · lb)

## 10. Install:

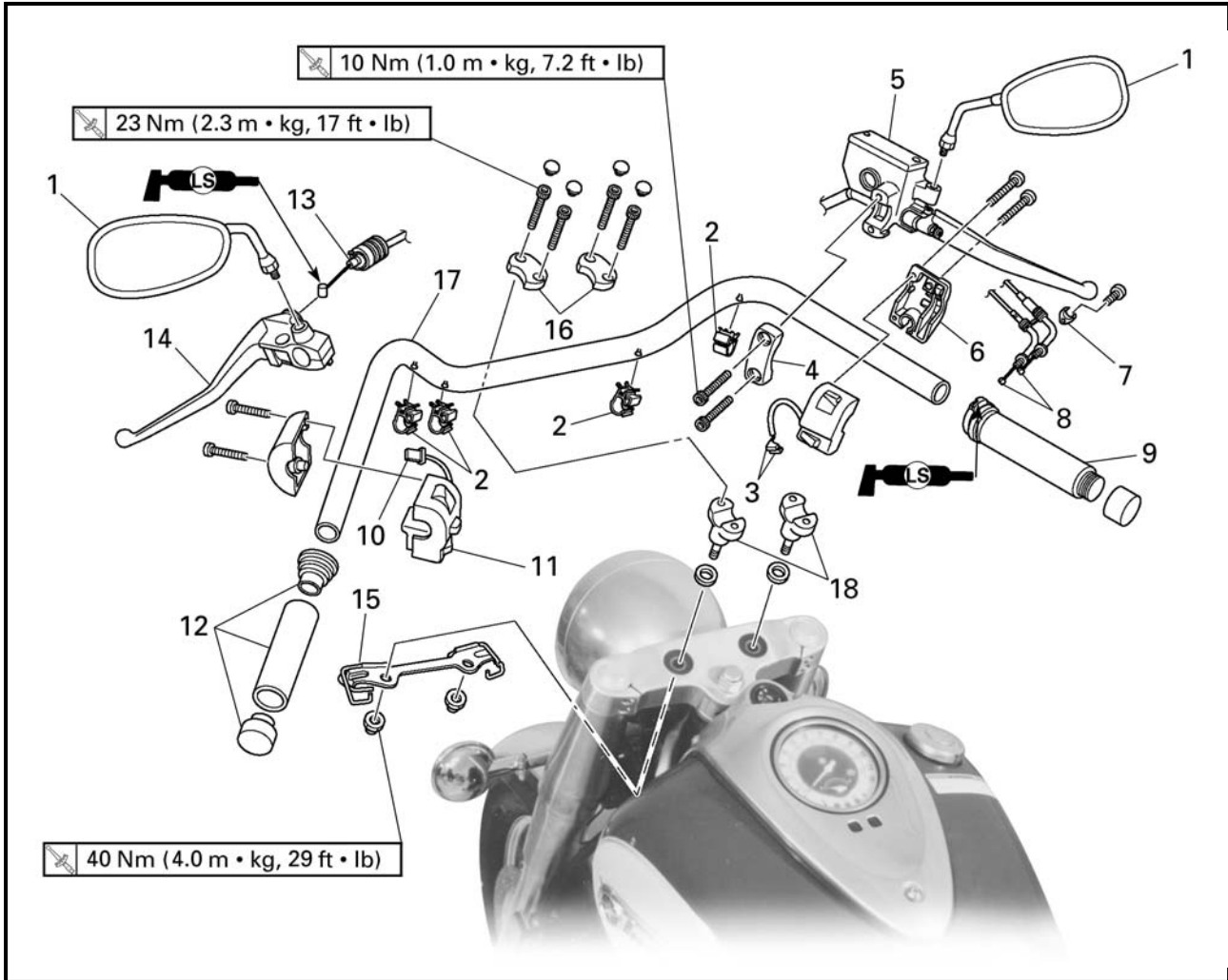
- front wheel

Refer to "FRONT WHEEL AND BRAKE DISCS".



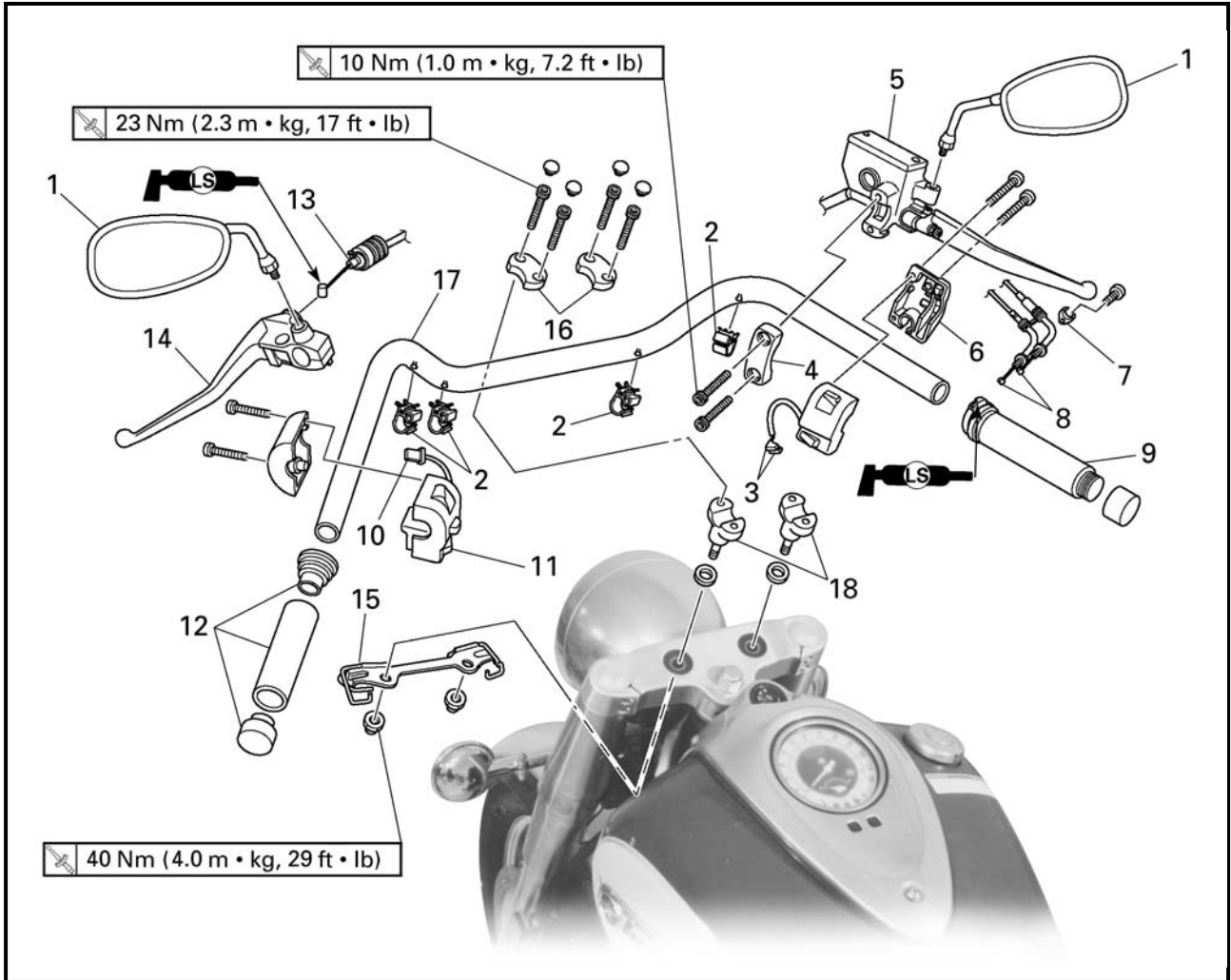
EAS00664

HANDLEBAR



4

Order	Job/Part	Q'ty	Remarks
	<b>Removing the handlebar</b>		Remove the parts in the order listed.
1	Rear view mirror (left and right)	2	
2	Plastic clamp	4	
3	Front brake light switch connector	2	Disconnect.
4	Brake master cylinder holder	1	
5	Brake master cylinder	1	
6	Right handlebar switch	1	
7	Throttle cable holder	1	
8	Throttle cable	2	Disconnect.
9	Throttle grip	1	
10	Clutch switch connector	1	Disconnect.



4

Order	Job/Part	Q'ty	Remarks
11	Left handlebar switch	1	
12	Handlebar grip	1	
13	Clutch cable	1	Disconnect.
14	Clutch lever holder	1	
15	Cable guide	1	
16	Upper handlebar holder	2	
17	Handlebar	1	
18	Lower handlebar holder	2	
			For installation, reverse the removal procedure.



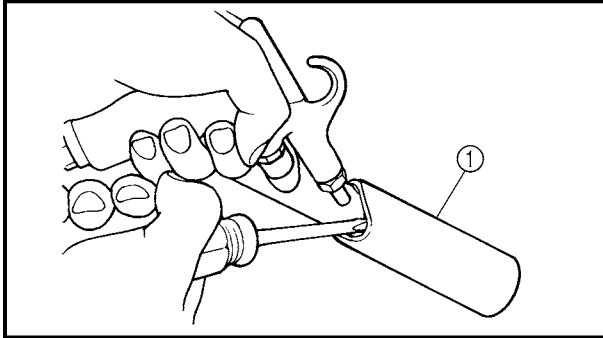
EAS00666

**REMOVING THE HANDLEBAR**

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:
  - handlebar grip ①

**NOTE:**

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

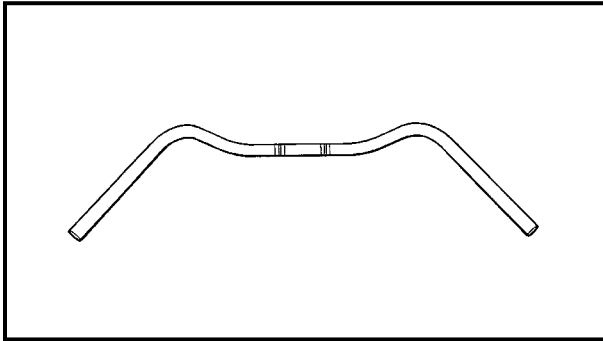
EAS00668

**CHECKING THE HANDLEBAR**

1. Check:
  - handlebar
 Bends/cracks/damage → Replace.

**⚠ WARNING**

Do not attempt to straighten a bent handlebar as this may dangerously weaken it.



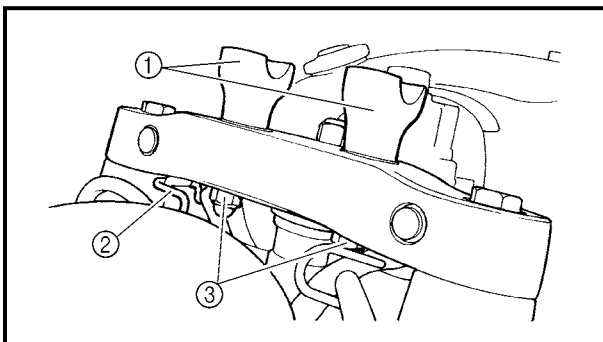
EAS00670

**INSTALLING THE HANDLEBAR**

1. Install:
  - washers
  - lower handlebar holders ①
  - cable guide ②

**NOTE:**

Temporarily tighten the nuts ③.

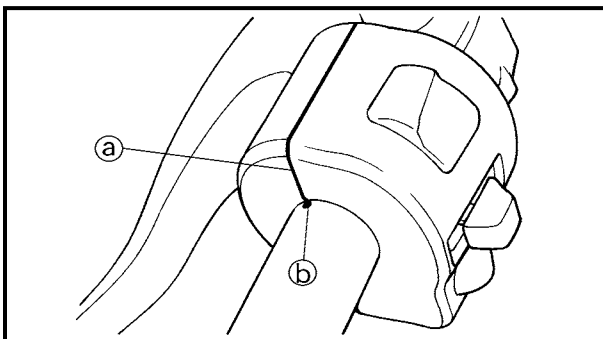
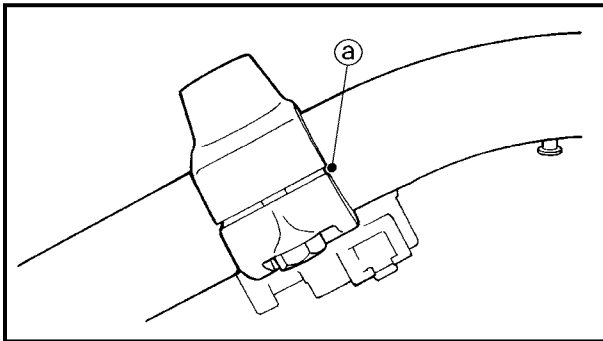
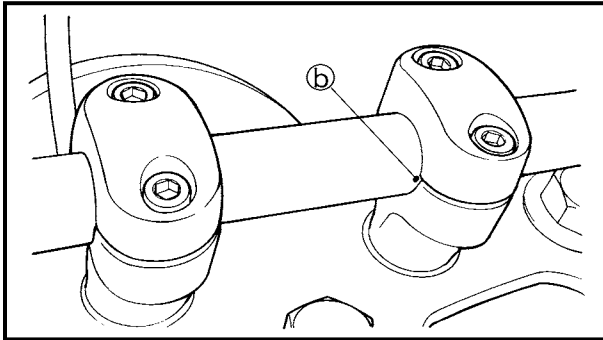
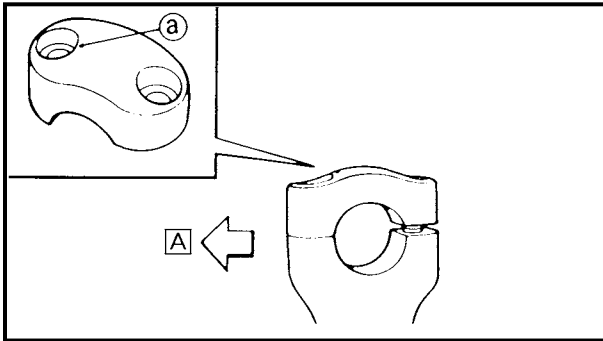


2. Install:
  - handlebar
  - upper handlebar holders

23 Nm (2.3 m · kg, 17 ft · lb)

**CAUTION:**

- First, tighten the bolts on the front side of the handlebar holder, then on the rear side.
- Turn the handlebar all the way to the left and right. If there is any contact with the fuel tank, adjust the handlebar position.

**NOTE:**

- The upper handlebar holders should be installed with the arrows ① facing forward ②.
- Align the match marks ③ on the handlebar with the upper surface of the lower handlebar holders.

## 3. Tighten:

- lower handlebar holder nuts

40 Nm (4.0 m · kg, 29 ft · lb)

## 4. Install:

- clutch lever

**NOTE:**

Align the slit of clutch lever holder with the punch mark ① on the handlebar.

## 5. Install:

- clutch cable

**NOTE:**

Lubricate the end of the clutch cable with a thin coat of lithium soap base grease.

## 6. Install:

- left handlebar switch

**NOTE:**

Align the end ① of the left handlebar switch with the punch mark ② on the handlebar.

## 7. Connect:

- clutch switch connector







- First, tighten the upper bolt, then the lower bolt.

### 13.Connect:

- front brake light switch connector

### 14.Install:

- plastic clamp
- rear view mirrors

### 15.Adjust:

- clutch cable free play

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



**Clutch cable free play (at the end of the clutch lever)**

**10 ~ 15 mm (0.39 ~ 0.59 in)**

### 16.Adjust:

- throttle cable free play

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



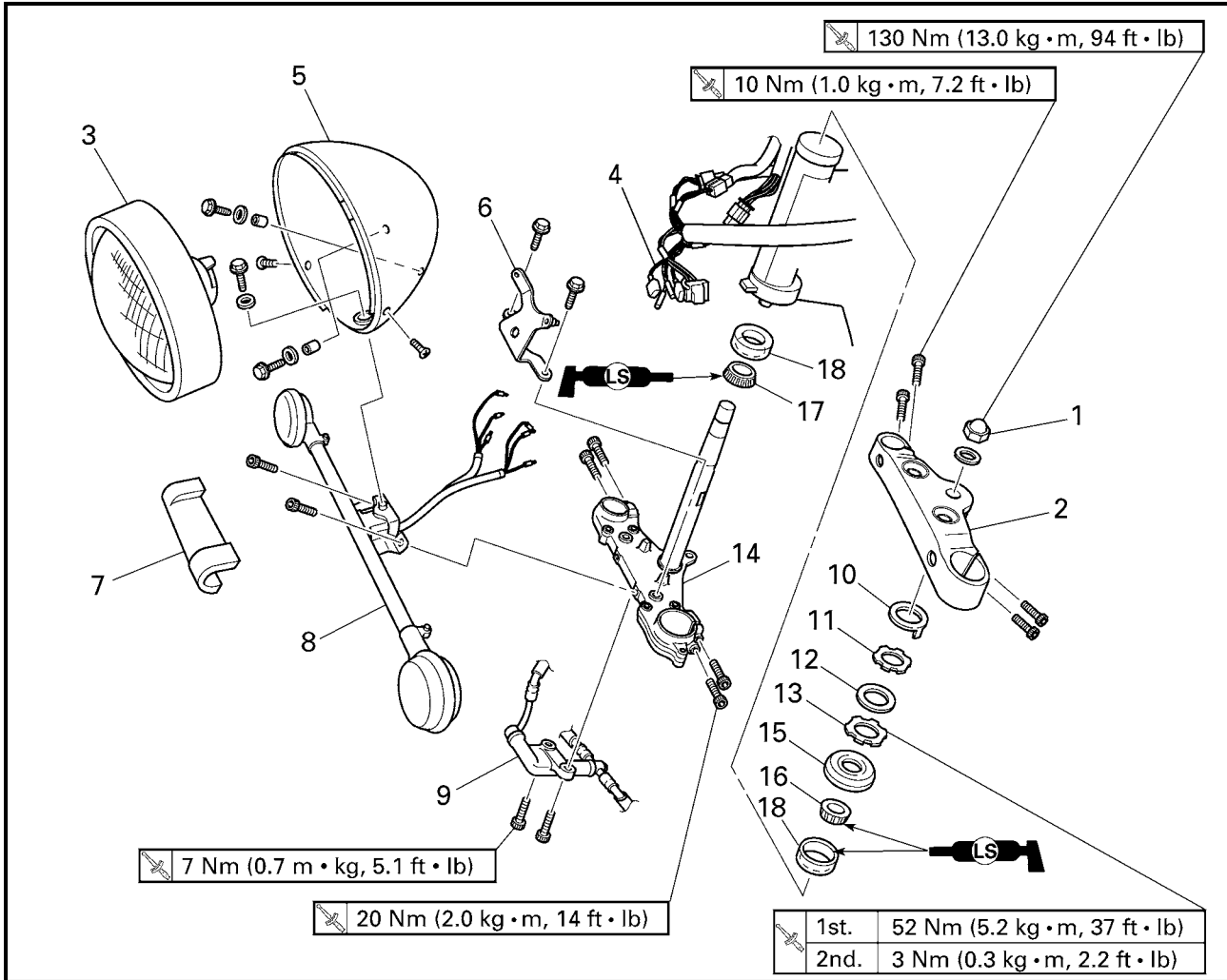
**Throttle cable free play (at the flange of the throttle grip)**

**4 ~ 8 mm (0.16 ~ 0.31 in)**



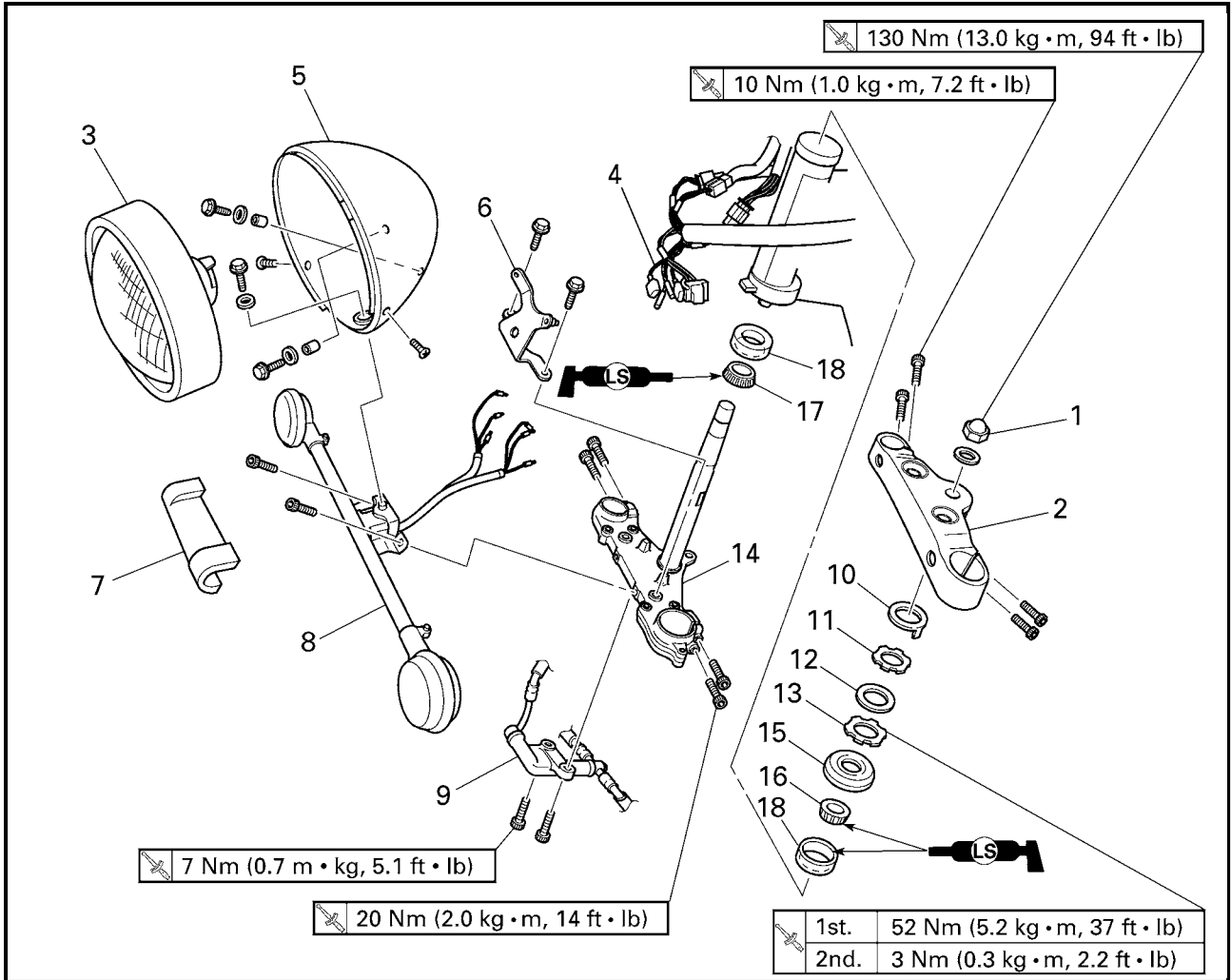
EAS00676

STEERING HEAD



4

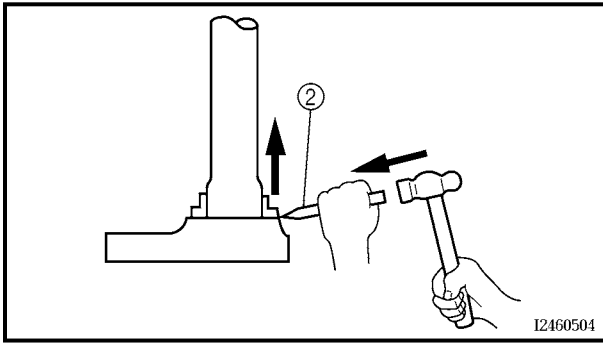
Order	Job/Part	Q'ty	Remarks
	<b>Removing the lower bracket</b>		Remove the parts in the order listed.
	Meter assembly		Refer to "FUEL TANK" in chapter 3.
	Front fork legs/fork covers		Refer to "FRONT FORK".
	Front wheel		Refer to "FRONT WHEEL AND BRAKE DISCS".
	Handlebar/handlebar holders		Refer to "HANDLEBAR".
1	Steering stem nut	1	
2	Upper bracket	1	
3	Headlight lens unit	1	
4	Lead (in the headlight body)	1	
5	Headlight body	1	
6	Headlight bracket	1	
7	Chrome turn signal light bracket cover	1	
8	Turn signal light bracket assembly	1	



4

Order	Job/Part	Q'ty	Remarks
9	Brake hose joint	1	
10	Lock washer	1	
11	Upper ring nut	1	
12	Rubber washer	1	
13	Lower ring nut	1	
14	Lower bracket	1	
15	Bearing cover	1	
16	Upper bearing	1	
17	Lower bearing	1	
18	Bearing outer race	2	
			For installation, reverse the removal procedure.





- c. Install a new rubber 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 bearings and bearing races as a set.
- Whenever the steering head is disassembled, replace the rubber seal.

4. Check:

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

EAS00683

**INSTALLING THE STEERING HEAD**

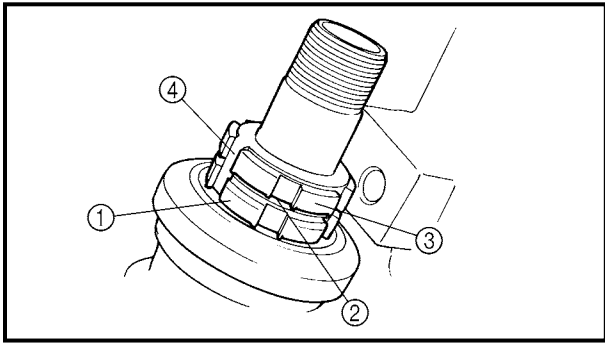
1. Lubricate:

- upper bearing
- lower bearing
- bearing races

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

2. Install:

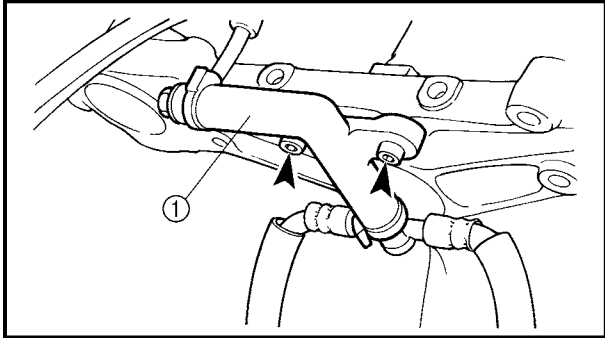
- upper bearing
- lower bearing
- bearing races
- bearing cover
- lower bracket



3. Install:

- lower ring nut ①
- rubber washer ②
- upper ring nut ③
- lock washer ④

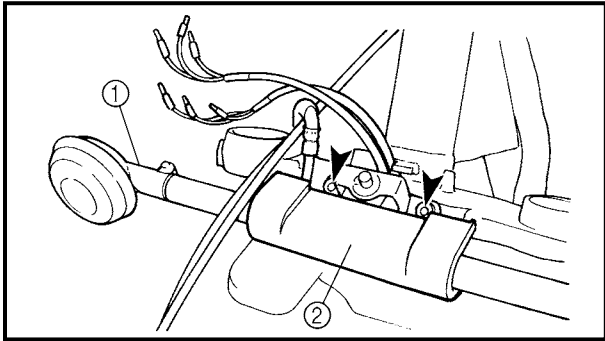
Refer to "CHECKING AND ADJUSTING THE STEERING HEAD" in chapter 3.



4. Install:

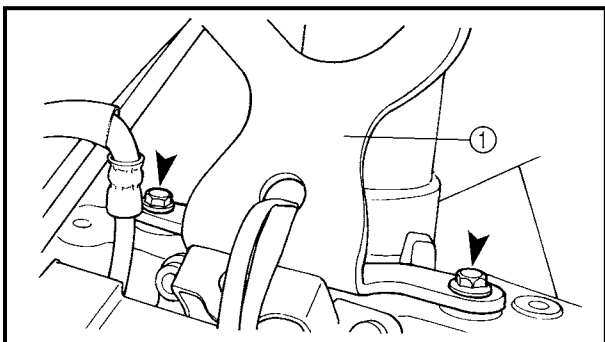
- brake hose joint ①

7 Nm (0.7 m · kg, 5.1 ft · lb)



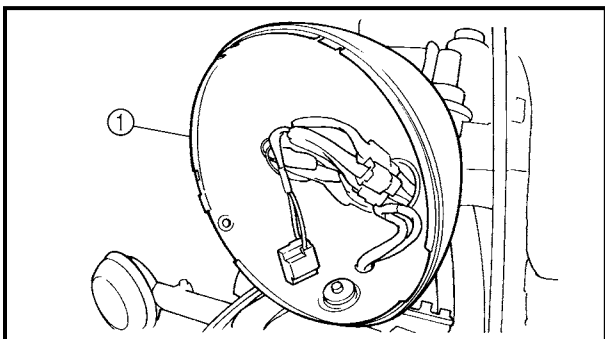
5. Install:

- turn signal light bracket assembly ①
- chrome turn signal light bracket cover ②



6. Install:

- headlight bracket ①



7. Install:

- headlight body ①

8. Connect:

- leads  
(in the headlight body)

9. Install:

- headlight lens unit

**10.Install:**

- upper bracket
- steering stem nut
- front fork legs

Refer to "FRONT FORK".

**11.Install:**

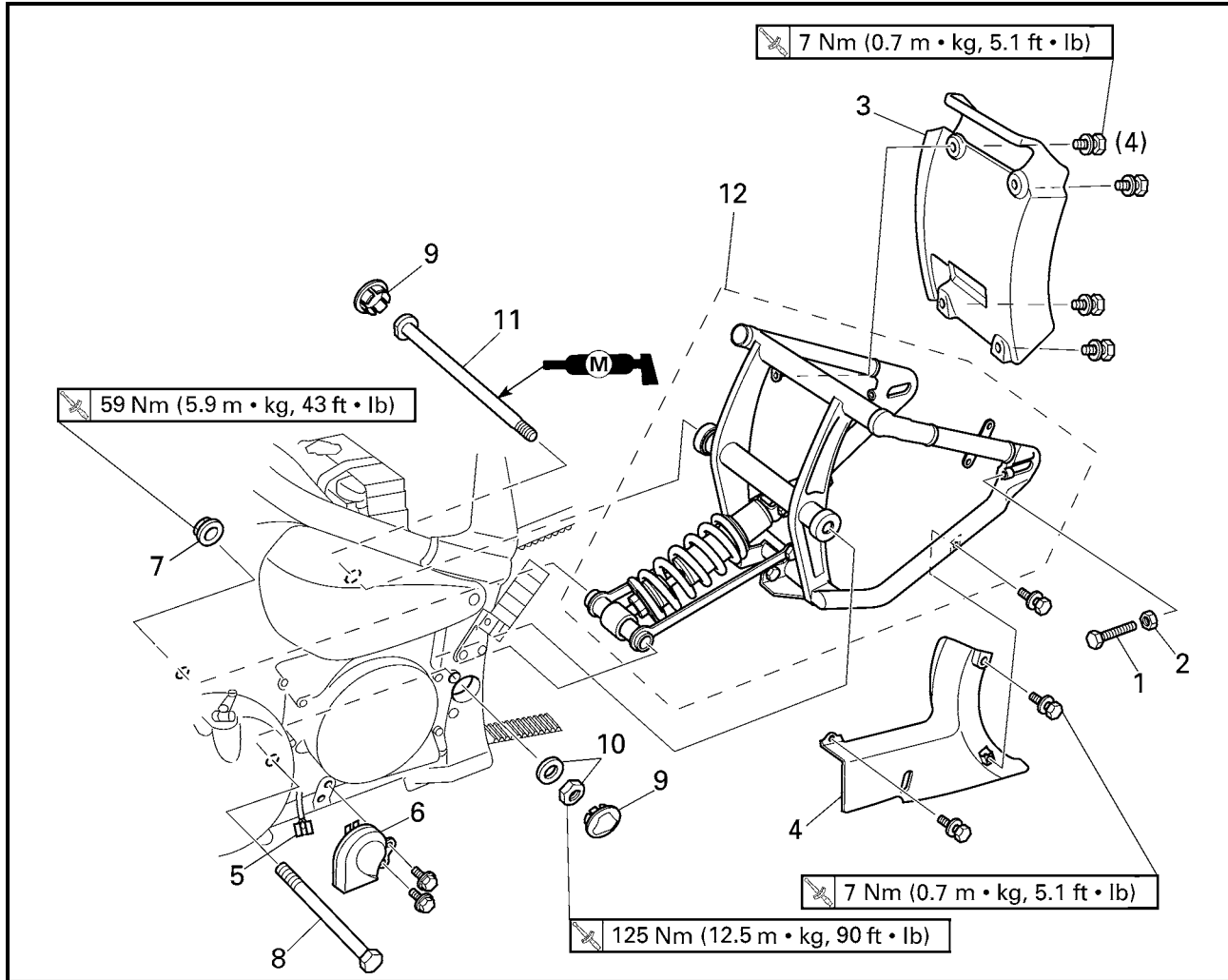
- handlebar  
Refer to "HANDLEBAR".
- front fork legs  
Refer to "FRONT FORK".
- meter assembly

Refer to "FUEL TANK" in chapter 3.



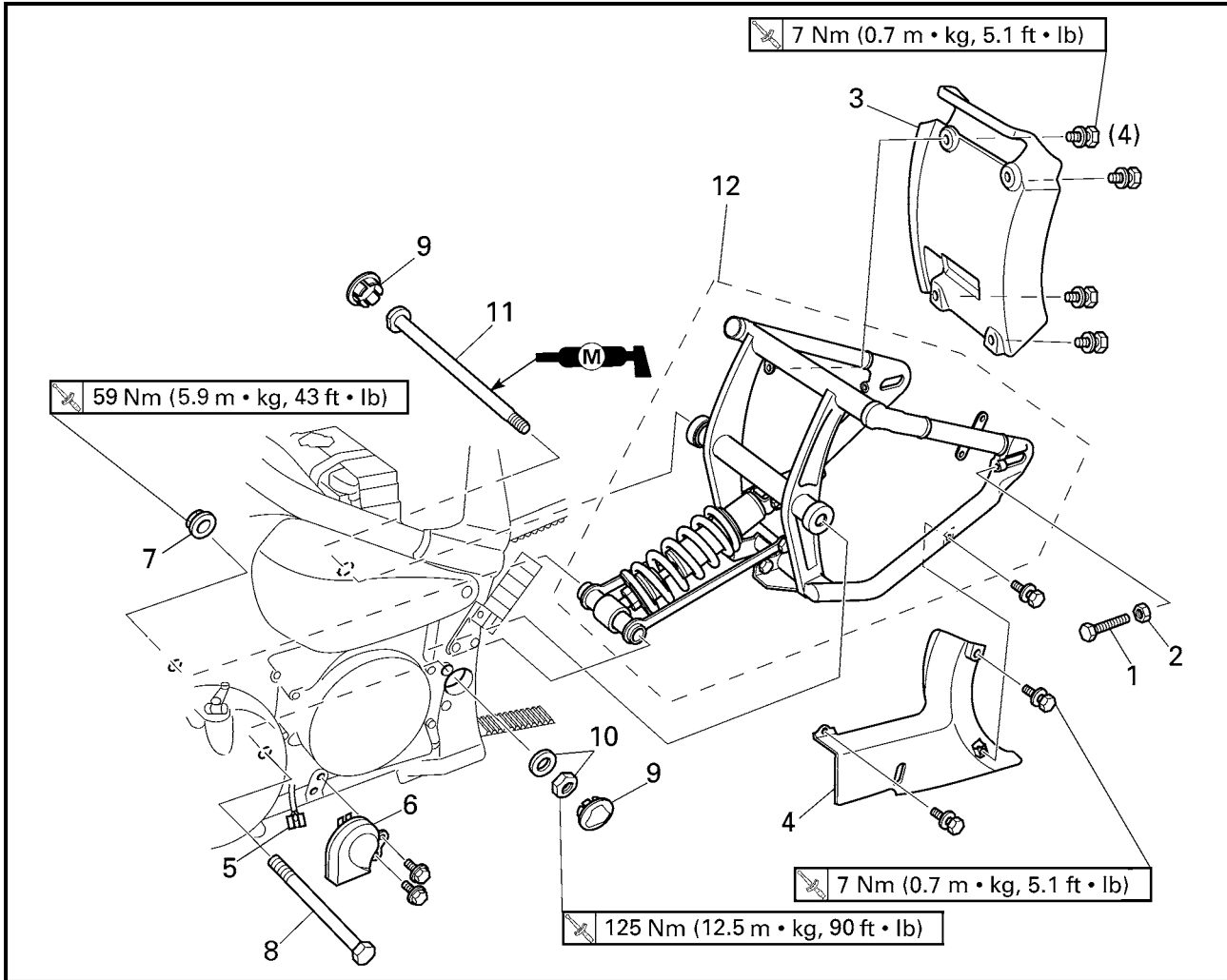
\*\*\*\*\*

REAR SHOCK ABSORBER AND SWINGARM



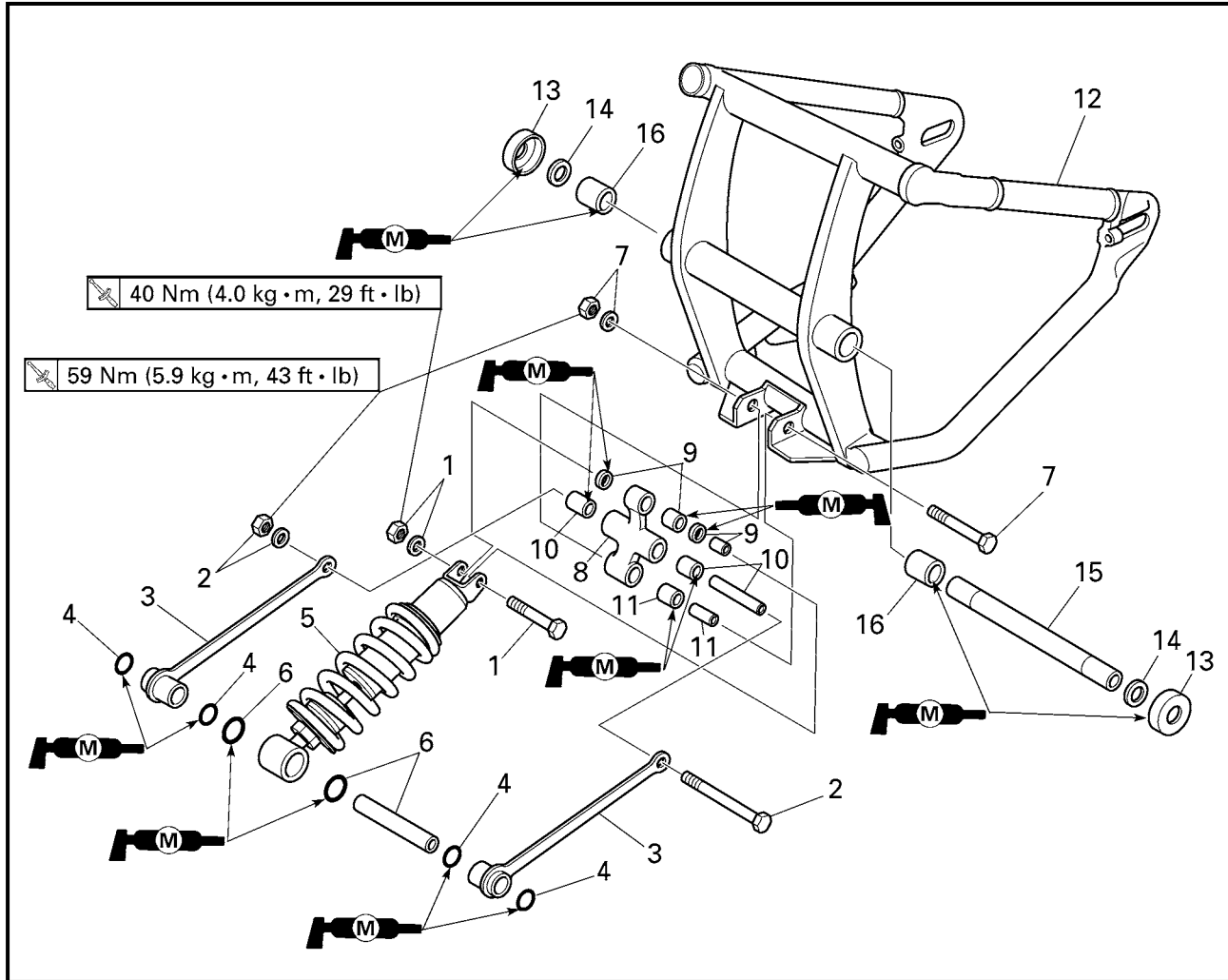
4

Order	Job/Part	Q'ty	Remarks
	<b>Removing the rear shock absorber and swingarm</b>		Remove the parts in the order listed.
	Rear wheel		Refer to "REAR WHEEL, BRAKE DISC AND REAR WHEEL PULLEY".
1	Adjusting bolt	1	
2	Locknut	1	
3	Mud guard	1	
4	Lower drive belt cover	1	
5	Horn coupler	1	Disconnect.
6	Horn	1	
7	Self-locking nut	1	
8	Bolt (shock absorber-connecting arm-frame)	1	$l = 158 \text{ mm (6.22 in)}$
9	Cover (left and right)	2	
10	Pivot shaft nut/washer	1/1	



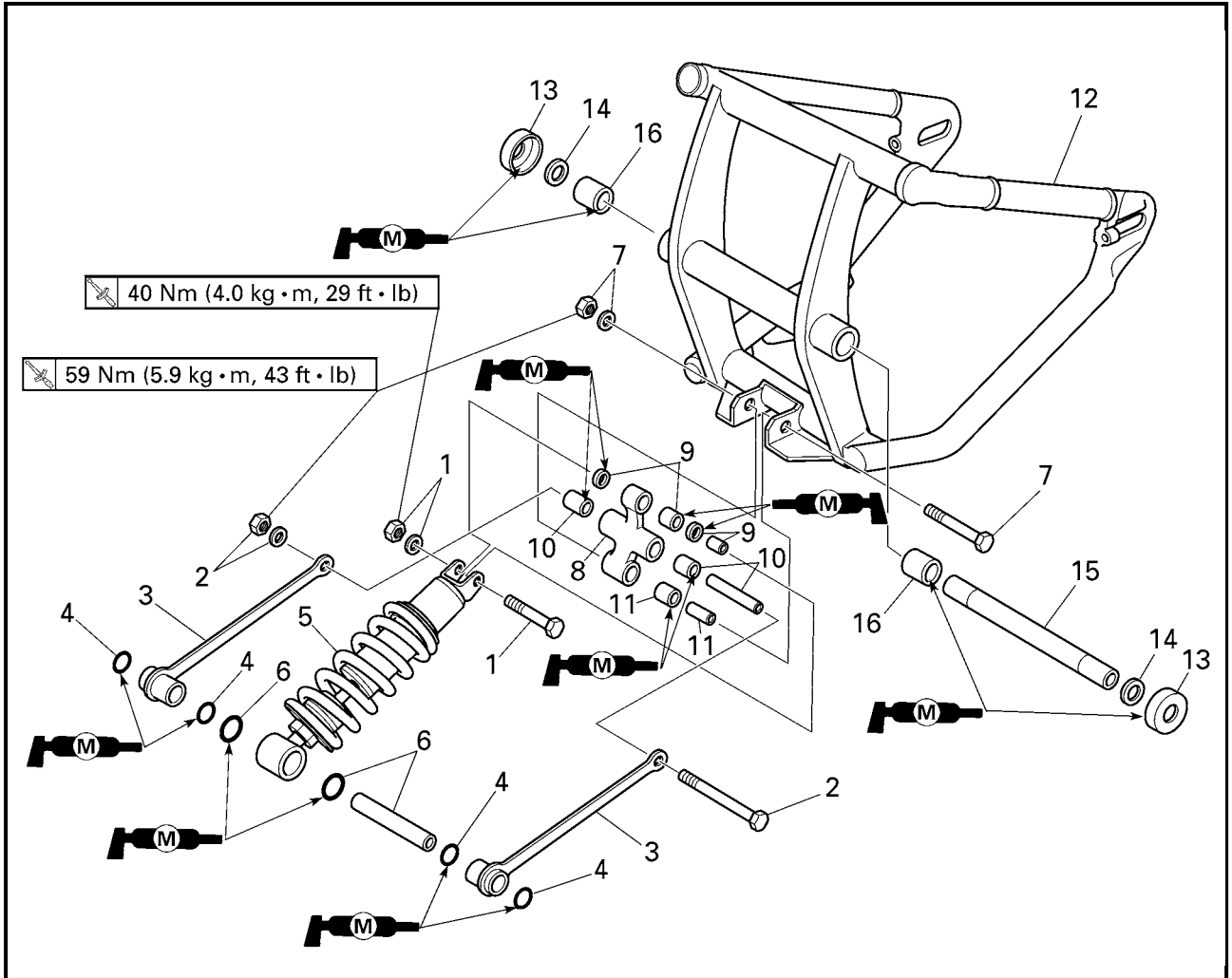
4

Order	Job/Part	Q'ty	Remarks
11	Pivot shaft	1	For installation, reverse the removal procedure.
12	Rear shock absorber and swingarm assembly	1	



4

Order	Job/Part	Q'ty	Remarks
	<b>Removing the rear shock absorber and swingarm</b>		Remove the parts in the order listed.
1	Self-locking nut/washer/bolt	1/1/1	Bolt $l = 53$ mm (2.19 in)
2	Self-locking nut/washer/bolt	1/1/1	Bolt $l = 124$ mm (4.88 in)
3	Connecting arm	2	
4	O-ring	4	
5	Rear shock absorber	1	
6	Spacer/O-ring	1/2	
7	Self-locking nut/washer/bolt	1/1/1	Bolt $l = 77$ mm (3.03 in)
8	Relay arm	1	
9	Spacer/oil seal/bearing	1/2/1	
10	Spacer/bearing	1/2	



4

Order	Job/Part	Q'ty	Remarks
11	Spacer/bearing	1/1	
12	Swingarm	1	
13	Dust cover	2	
14	Washer	2	
15	Spacer	1	
16	Bearing	2	
			For installation, reverse the removal procedure.

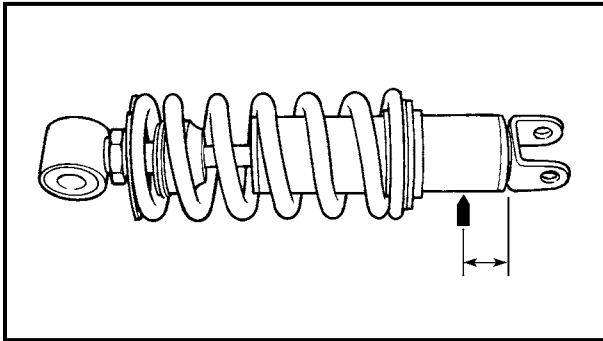
EAS00686

## HANDLING THE REAR SHOCK ABSORBER

### **⚠ WARNING**

This rear shock absorber contains highly compressed nitrogen gas. Before handling the rear shock absorber, 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.

- Do not tamper or attempt to open the rear shock absorber.
- Do not subject the rear shock absorber 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 in any way. Rear shock absorber damage will result in poor damping performance.



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, drill a 2 ~ 3-mm (0.08 ~ 0.12 in) hole through the gas cylinder at a point 15 mm (0.6 in) from its end as shown.

### **⚠ WARNING**

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

EAS00703

## REMOVING THE REAR SHOCK ABSORBER AND 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:

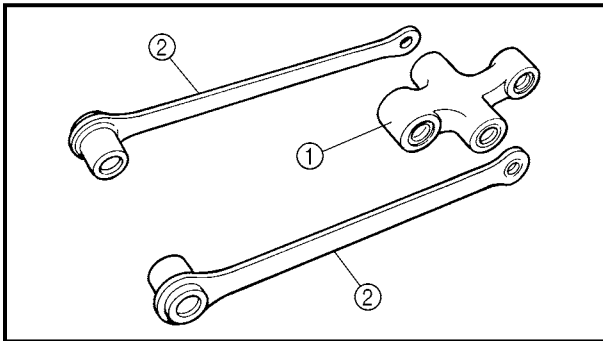
Place the motorcycle on a suitable stand so that the rear wheel is elevated.





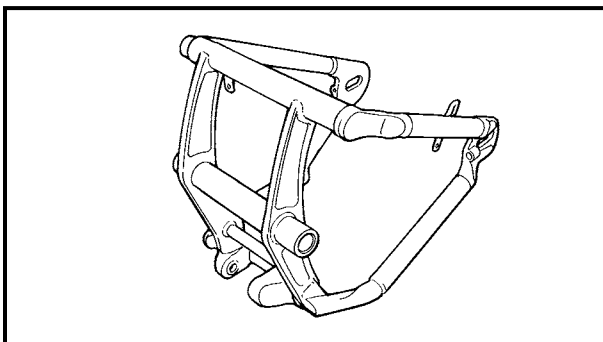
- spring  
Damage/wear → Replace the rear shock absorber assembly.
- gas cylinder  
Damage/gas leaks → Replace.
- bushings  
Damage/wear → Replace.
- O-ring  
Damage/wear → Replace.
- bolts  
Bends/damage/wear → Replace.

4



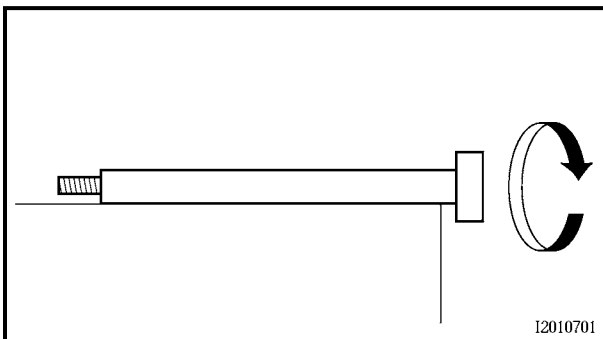
### CHECKING THE RELAY ARM AND CONNECTING ARM

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



### CHECKING THE SWINGARM

1. Check:
  - swingarm  
Bends/cracks/damage → Replace.



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

**⚠ WARNING**

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



3. Wash:
- pivot shaft
  - dust covers
  - spacer
  - bearings



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

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

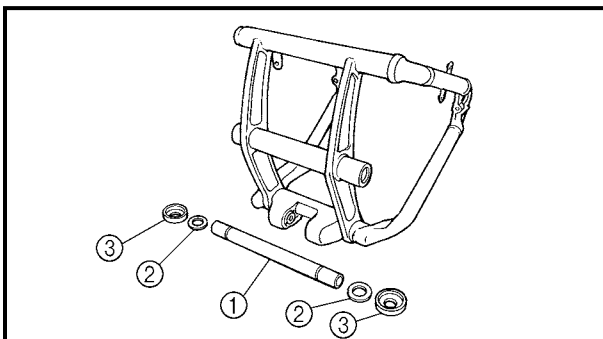
EAS00711

## INSTALLING THE REAR SHOCK ABSORBER AND SWINGARM

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

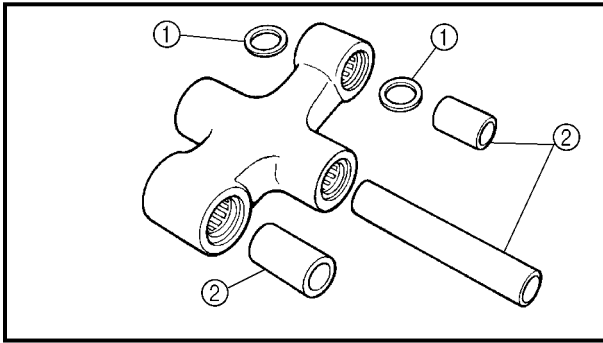


**Recommended lubricant**  
**Molybdenum disulfide grease**

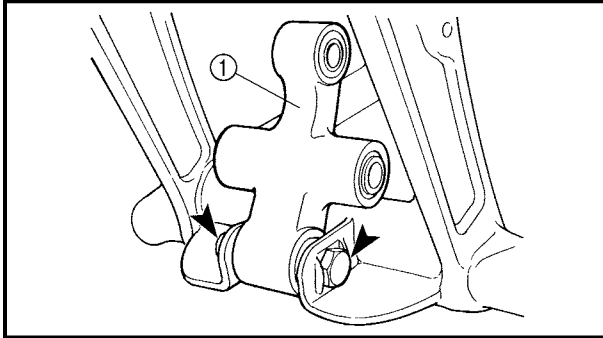


2. Install:
- bearings
  - spacer ①
  - washers ②
  - dust covers ③



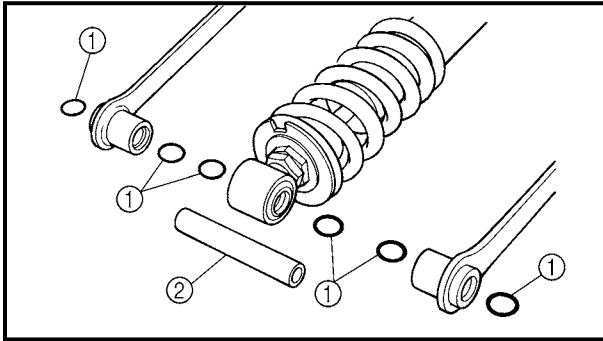


3. Install:
- bearings
  - oil seals ①
  - spacers ②

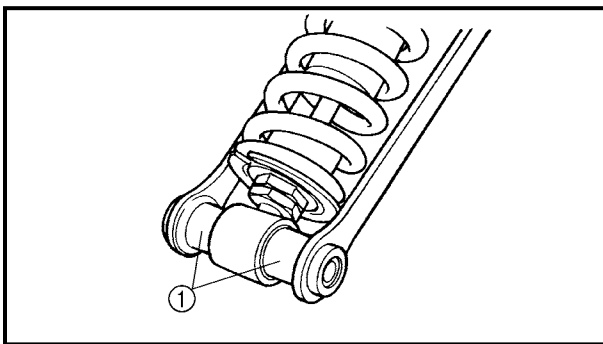


4. Install:
- relay arm ①  
(onto the swingarm)

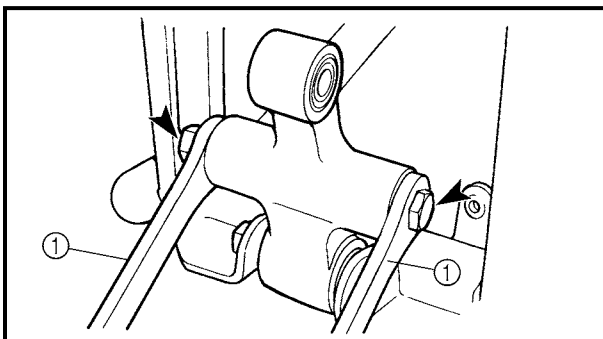
59 Nm (5.9 m · kg, 43 ft · lb)



5. Install:
- o-rings ①
  - spacer ②



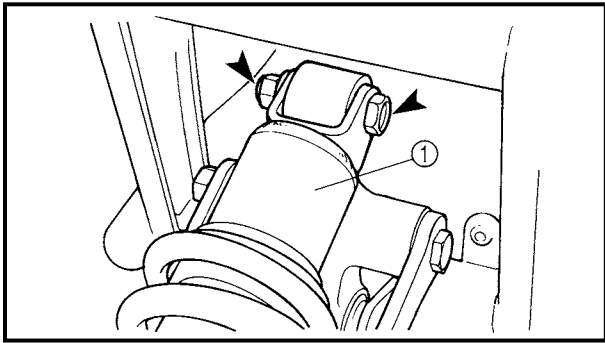
6. Install:
- connecting arms ①  
(onto the rear shock absorber)



7. Install:
- connecting arms ①  
(onto the relay arm)

59 Nm (5.9 m · kg, 43 ft · lb)

4



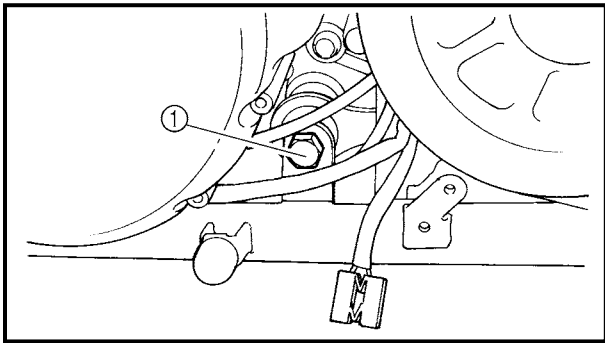
8. Install:
- rear shock absorber ①  
(onto the relay arm)

40 Nm (4.0 m · kg, 29 ft · lb)

9. Install:
- rear shock absorber and swingarm assembly
  - pivot shaft
  - washer
  - pivot shaft nut

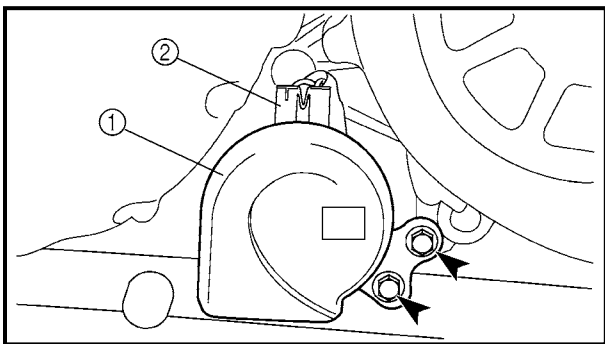
125 Nm (12.5 m · kg, 90 ft · lb)

- covers

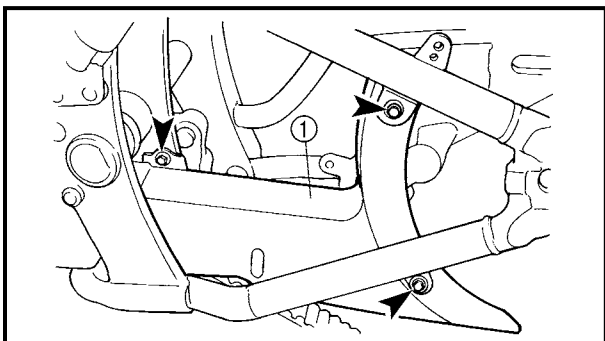


10. Install:
- bolt (shock absorber - connecting arm - frame) ①

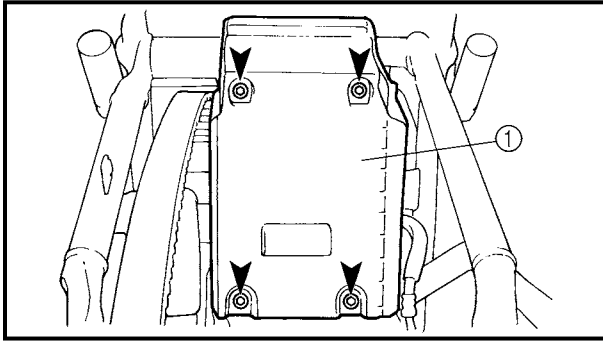
**NOTE:** \_\_\_\_\_  
When installing the bolt (shock absorber - connecting arm - frame), hold the swingarm so that it does not drop down.  
\_\_\_\_\_



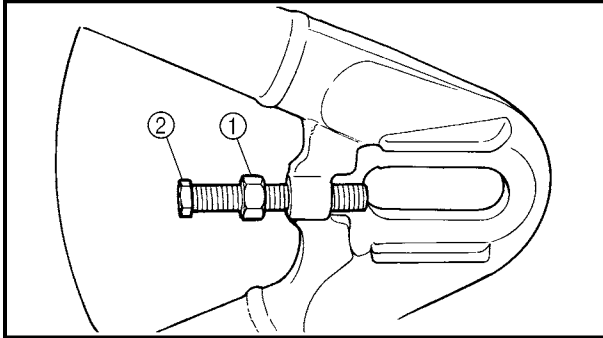
11. Install:
- horn ①
12. Connect:
- horn coupler ②



13. Install:
- lower drive belt cover ①



- 14.Install:
- mud guard ①

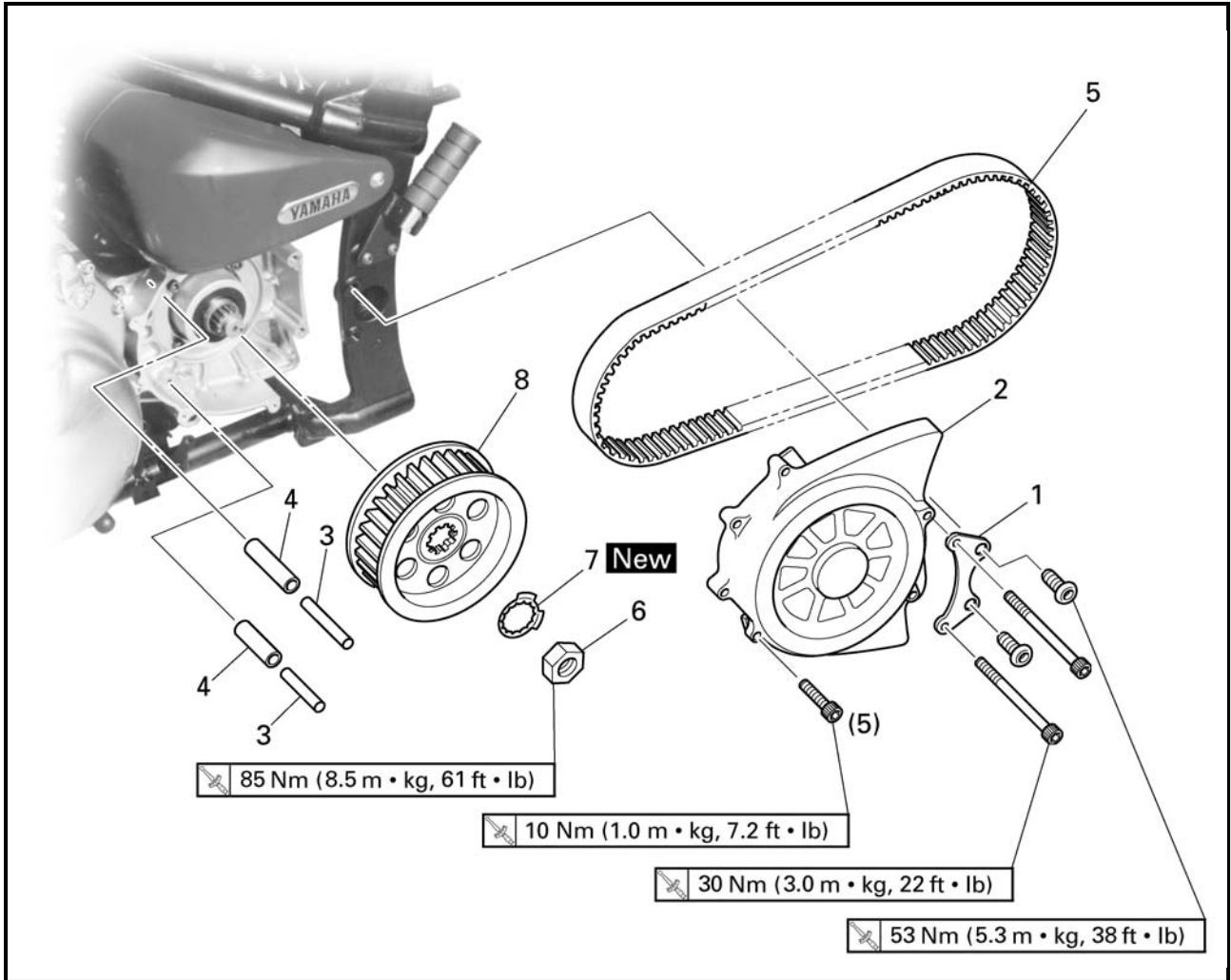


- 15.Install:
- locknut ①
  - adjusting bolt ②

- 16.Install:
- rear wheel  
Refer to "REAR WHEEL, BRAKE DISC AND REAR WHEEL PULLEY".

- 17.Adjust:
- drive belt slack  
Refer to "ADJUSTING THE DRIVE BELT SLACK" in chapter 3.

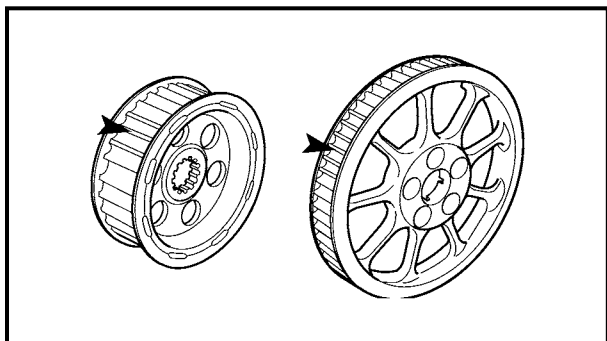
DRIVE BELT AND DRIVE PULLEY



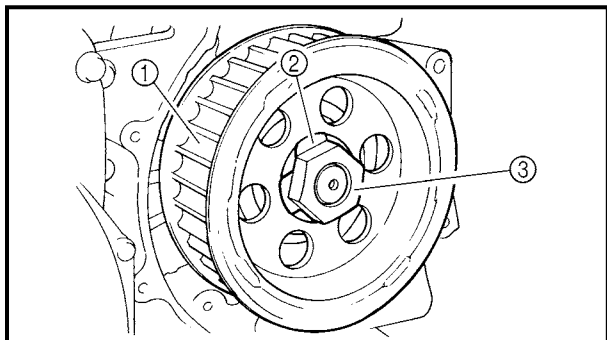
4

Order	Job/Part	Q'ty	Remarks
	<b>Removing the drive belt and drive pulley</b>		Remove the parts in the order listed.
	Rear wheel		Refer to "REAR WHEEL, BRAKE DISC AND REAR WHEEL PULLEY".
	Rear shock absorber and swingarm assembly		Refer to "REAR SHOCK ABSORBER AND SWINGARM".
1	Drive pulley cover bracket	1	
2	Drive pulley cover	1	
3	Slider	2	
4	Dowel pin	2	
5	Drive belt	1	
6	Drive pulley nut	1	
7	Lock washer	1	
8	Drive pulley	1	
			For installation, reverse the removal procedure.



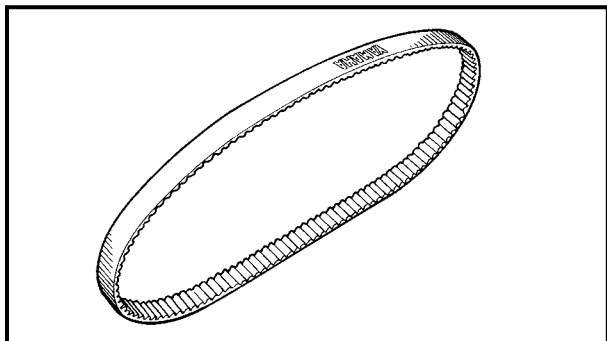


3. Check:
  - drive pulley
  - rear wheel pulley
 Bent teeth → Replace the drive belt and pulleys as a set.



**INSTALLING THE DRIVE BELT AND DRIVE PULLEY**

1. Install:
  - drive pulley ①
  - lock washer ② **New**
  - drive pulley nut ③



2. Install:
  - drive belt

**CAUTION:**

**Install the drive belt facing the same way it was removed.**

**4**

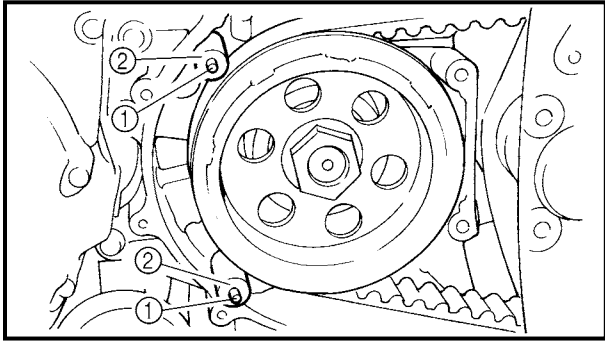
3. Install:
  - rear shock absorber and swingarm assembly  
Refer to "REAR SHOCK ABSORBER AND SWINGARM".
  - rear wheel  
Refer to "REAR WHEEL, BRAKE DISC AND SWINGARM".

4. Tighten:
  - drive pulley nut

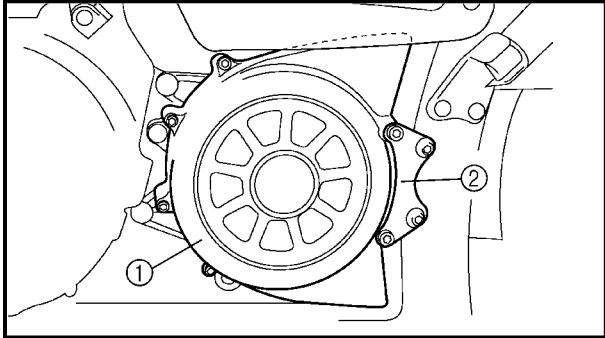
**85 Nm (8.5 m · kg, 61 ft · lb)**

**NOTE:**  
When tightening the drive pulley nut, press down on the brake pedal so the drive pulley does not move.

5. Bend the lock washer tab along a flat side of the nut.



6. Install:
- dowel pins ①
  - sliders ②



7. Install:
- drive pulley cover ①

10 Nm (1.0 m · kg, 7.2 ft · lb)

- drive pulley cover bracket ②

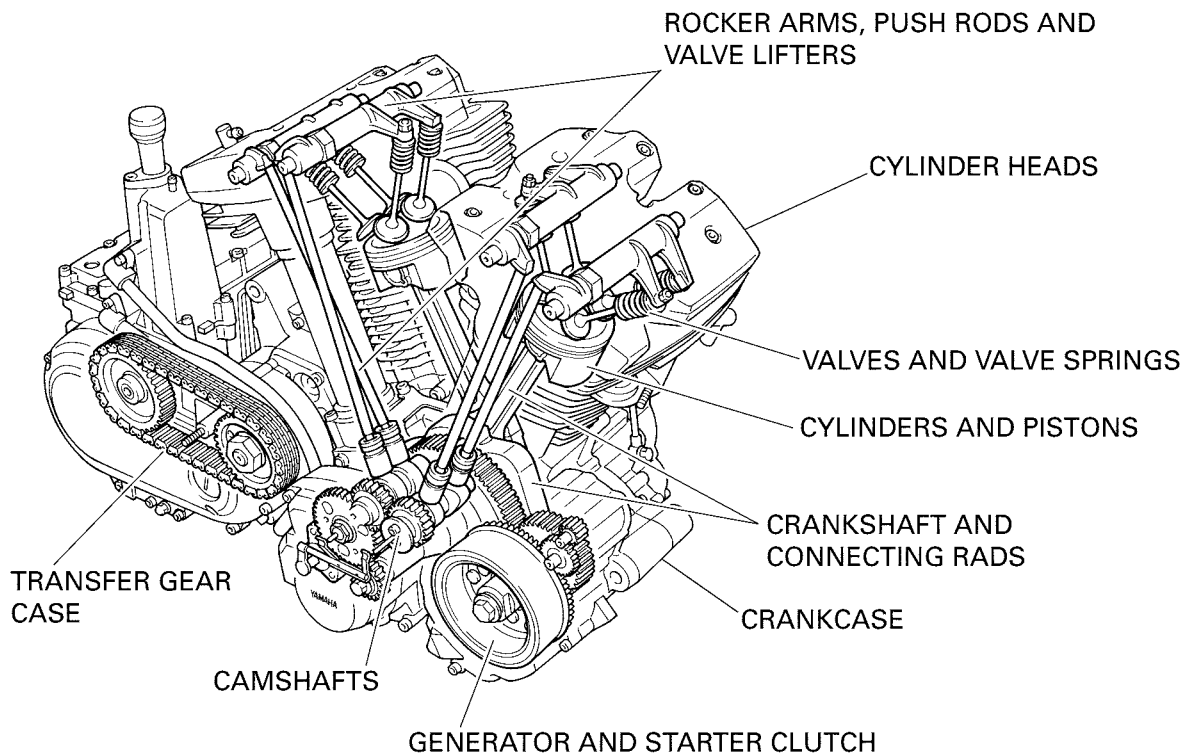
• bolts (M10) 53 Nm (5.3 m · kg, 38 ft · lb)

• bolts (M8) 30 Nm (3.0 m · kg, 22 ft · lb)

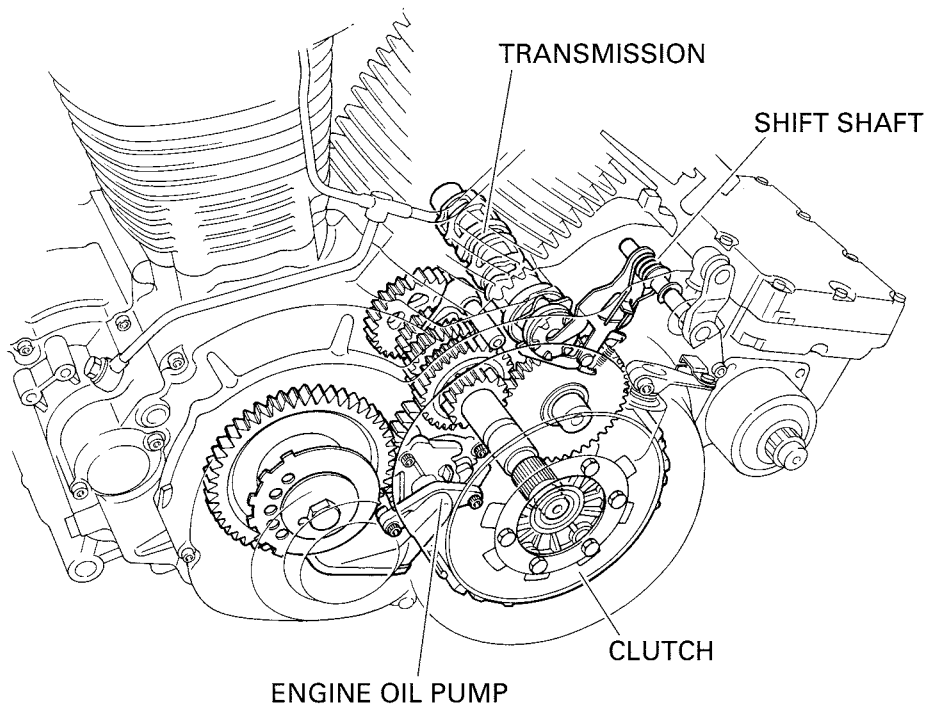


# CONTENTS

## ENGINE



5



<b>ENGINE</b> .....	5-1
<b>INSTALLING THE ENGINE</b> .....	5-8





<b>ROCKER ARMS, PUSH RODS AND VALVE LIFTERS</b> .....	5-12
REMOVING THE ROCKER ARMS, PUSH RODS AND VALVE LIFTERS .....	5-18
CHECKING THE ROCKER ARMS AND ROCKER ARM SHAFTS .....	5-18
CHECKING THE ROCKER ARM BASES .....	5-20
CHECKING THE PUSH RODS .....	5-20
CHECKING THE VALVE LIFTERS AND VALVE LIFTER CASES .....	5-20
BLEEDING THE VALVE LIFTER .....	5-21
CHECKING THE PUSH ROD COVERS .....	5-23
INSTALLING THE VALVE LIFTERS AND PUSH ROD COVERS .....	5-23
INSTALLING THE ROCKER ARMS AND PUSH RODS .....	5-24
INSTALLING THE CYLINDER HEAD COVERS .....	5-26
INSTALLING THE CAMSHAFT SPROCKET COVER AND ENGINE LEFT SIDE COVER .....	5-27
<b>CAMSHAFTS</b> .....	5-29
REMOVING THE CAMSHAFTS .....	5-31
CHECKING THE CAMSHAFTS .....	5-32
CHECKING THE DECOMPRESSION SYSTEM .....	5-34
CHECKING THE OIL DELIVERY PIPE .....	5-35
INSTALLING THE CAMSHAFTS .....	5-35
<b>CYLINDER HEADS</b> .....	5-39
REMOVING THE CYLINDER HEADS .....	5-41
CHECKING THE CYLINDER HEADS .....	5-41
CHECKING THE OIL DELIVERY PIPE .....	5-42
INSTALLING THE CYLINDER HEADS .....	5-42
<b>VALVES AND VALVE SPRINGS</b> .....	5-44
REMOVING THE VALVES .....	5-45
CHECKING THE VALVES AND VALVE GUIDES .....	5-46
CHECKING THE VALVE SEATS .....	5-48
CHECKING THE VALVE SPRINGS .....	5-50
INSTALLING THE VALVES .....	5-51
<b>CYLINDERS AND PISTONS</b> .....	5-53
REMOVING THE CYLINDERS AND PISTONS .....	5-54
CHECKING THE CYLINDERS AND PISTONS .....	5-54
CHECKING THE PISTON RINGS .....	5-56
CHECKING THE PISTON PINS .....	5-57
INSTALLING THE PISTONS AND CYLINDERS .....	5-58



<b>CLUTCH</b> .....	5-60
REMOVING THE CLUTCH .....	5-65
REMOVING THE PRIMARY DRIVE GEAR .....	5-65
CHECKING THE FRICTION PLATES .....	5-66
CHECKING THE CLUTCH PLATES .....	5-66
CHECKING THE CLUTCH SPRING PLATE .....	5-67
CHECKING THE CLUTCH HOUSING .....	5-67
CHECKING THE CLUTCH BOSS .....	5-67
CHECKING THE PRESSURE PLATE .....	5-67
CHECKING THE PULL LEVER SHAFT AND PULL ROD .....	5-68
CHECKING THE PRIMARY DRIVE .....	5-68
INSTALLING THE PICKUP COIL AND PULL LEVER SHAFT .....	5-68
INSTALLING THE PRIMARY DRIVE GEAR .....	5-69
INSTALLING THE CLUTCH .....	5-70
<b>SHIFT SHAFT</b> .....	5-74
CHECKING THE SHIFT SHAFT .....	5-75
CHECKING THE STOPPER LEVER .....	5-75
INSTALLING THE STOPPER LEVER AND SHIFT SHAFT .....	5-75
<b>GENERATOR AND STARTER CLUTCH</b> .....	5-77
REMOVING THE GENERATOR .....	5-80
CHECKING THE STARTER CLUTCH .....	5-80
INSTALLING THE GENERATOR .....	5-81
<b>TRANSFER GEAR CASE</b> .....	5-85
REMOVING THE BATTERY .....	5-91
REMOVING THE MIDDLE DRIVEN SHAFT .....	5-91
CHECKING THE MIDDLE DRIVE .....	5-91
CHECKING THE OIL STRAINER .....	5-92
CHECKING THE OIL PUMP .....	5-92
CHECKING THE OIL PIPE .....	5-93
ASSEMBLING THE OIL PUMP .....	5-93
INSTALLING THE TRANSFER GEAR CASE .....	5-94
INSTALLING THE OIL TANK COVER .....	5-97
INSTALLING THE BATTERY .....	5-98
<b>CRANKCASE</b> .....	5-100
DISASSEMBLING THE CRANKCASE .....	5-103
CHECKING THE CRANKCASE .....	5-104
CHECKING THE BEARINGS AND OIL SEAL .....	5-104
CHECKING THE OIL DELIVERY PIPE .....	5-105
CHECKING THE ENGINE OIL PUMP DRIVE .....	5-105
ASSEMBLING THE CRANKCASE .....	5-105



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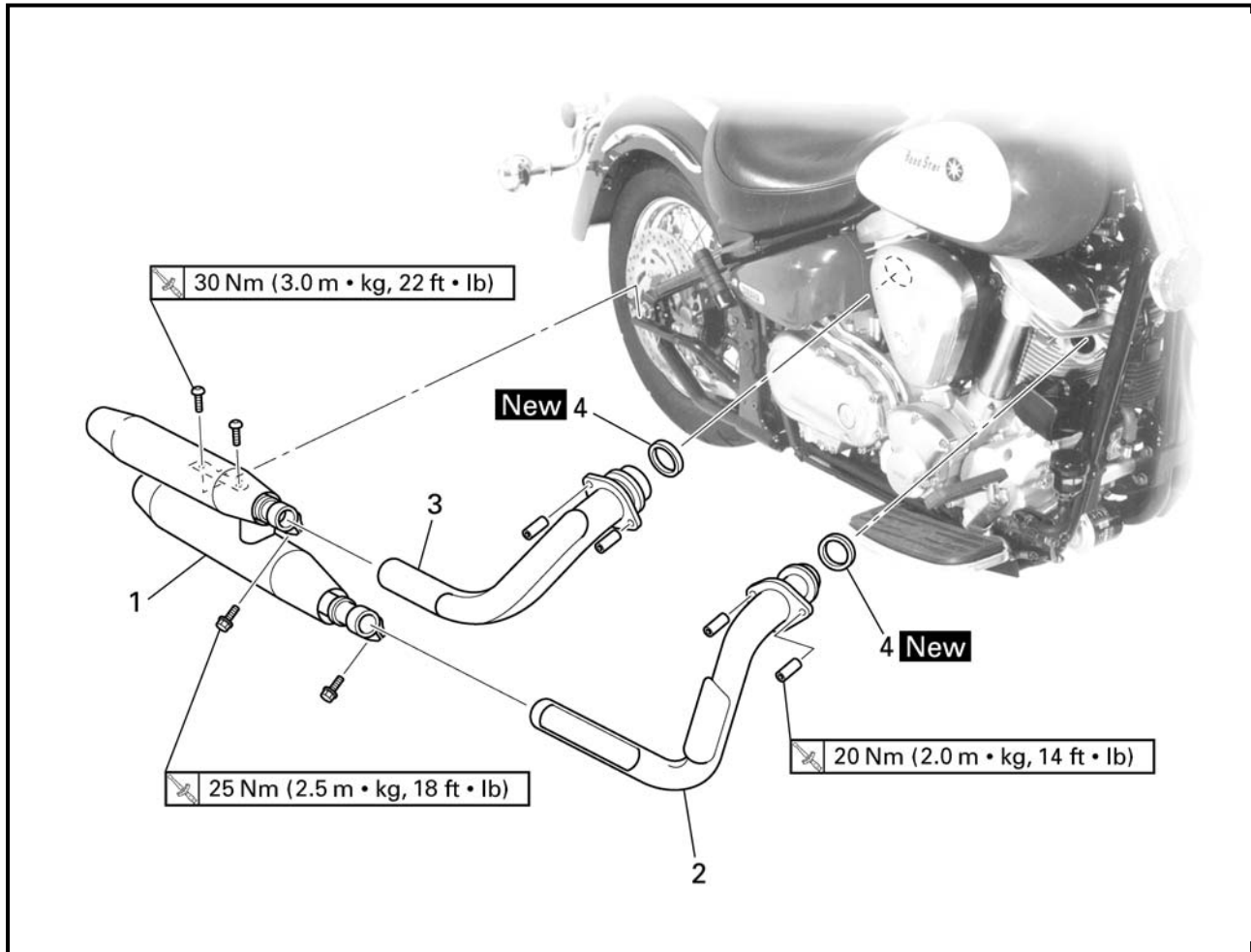
<b>ENGINE OIL PUMP</b> .....	5-108
CHECKING THE OIL PUMP .....	5-111
CHECKING THE RELIEF VALVE .....	5-111
CHECKING THE OIL STRAINER .....	5-112
ASSEMBLING THE OIL PUMP .....	5-112
INSTALLING THE OIL PUMP .....	5-113
INSTALLING THE OIL STRAINER .....	5-113
<b>CRANKSHAFT AND CONNECTING RODS</b> .....	5-114
REMOVING THE CRANKSHAFT .....	5-115
REMOVING THE CONNECTING RODS .....	5-115
CHECKING THE CRANKSHAFT AND CONNECTING RODS .....	5-115
INSTALLING THE CONNECTING RODS .....	5-119
INSTALLING THE CRANKSHAFT .....	5-121
<b>TRANSMISSION</b> .....	5-122
CHECKING THE SHIFT FORKS .....	5-125
CHECKING THE SHIFT DRUM ASSEMBLY .....	5-125
CHECKING THE TRANSMISSION .....	5-126
INSTALLING THE TRANSMISSION, SHIFT DRUM ASSEMBLY AND SHIFT FORKS .....	5-126



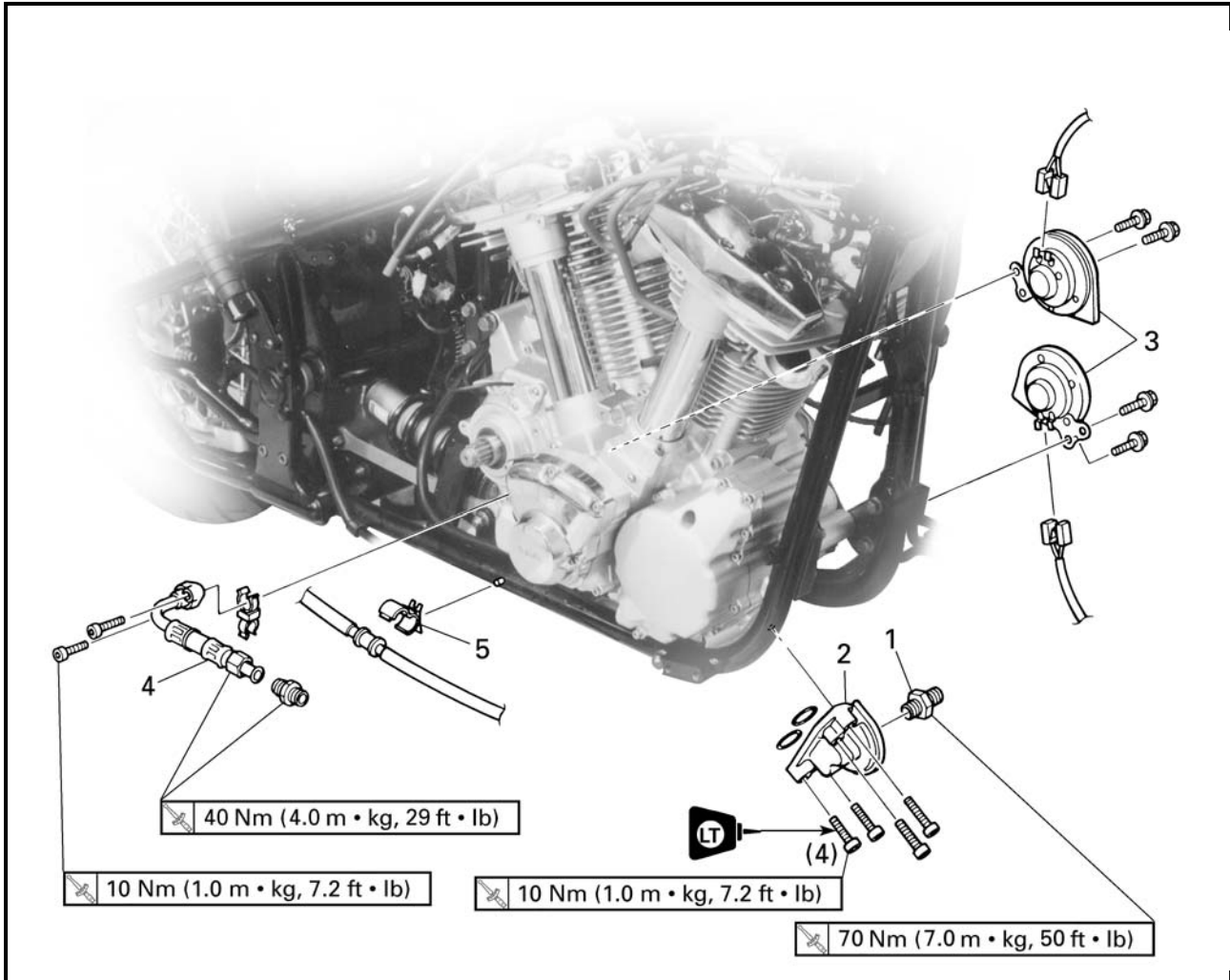
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## ENGINE

## ENGINE

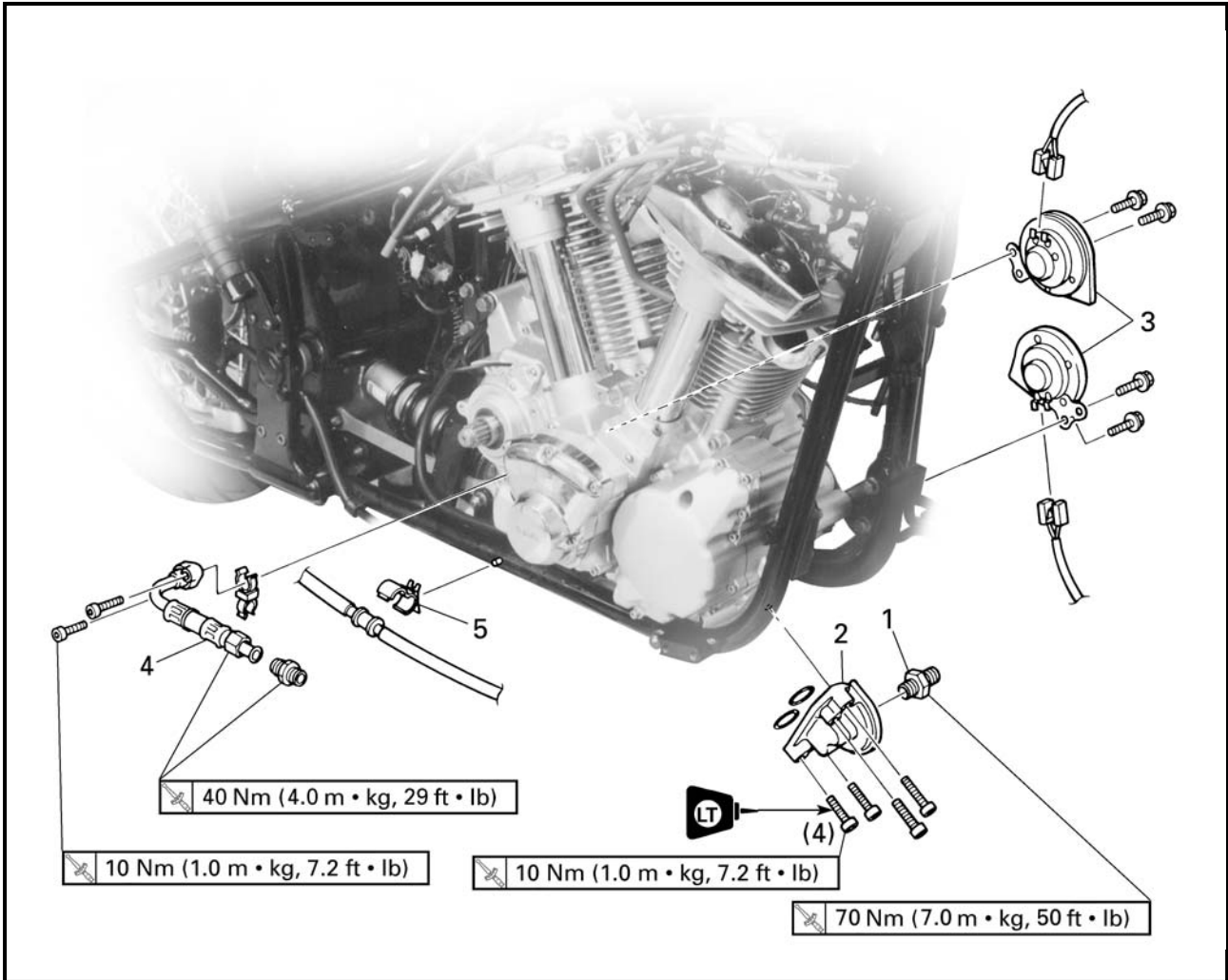


Order	Job/Part	Q'ty	Remarks
	<b>Removing the muffler and exhaust pipes</b>		Remove the parts in the order listed.
1	Muffler	1	
2	Front exhaust pipe	1	
3	Rear exhaust pipe	1	
4	Gasket	2	
			For installation, reverse the removal procedure.



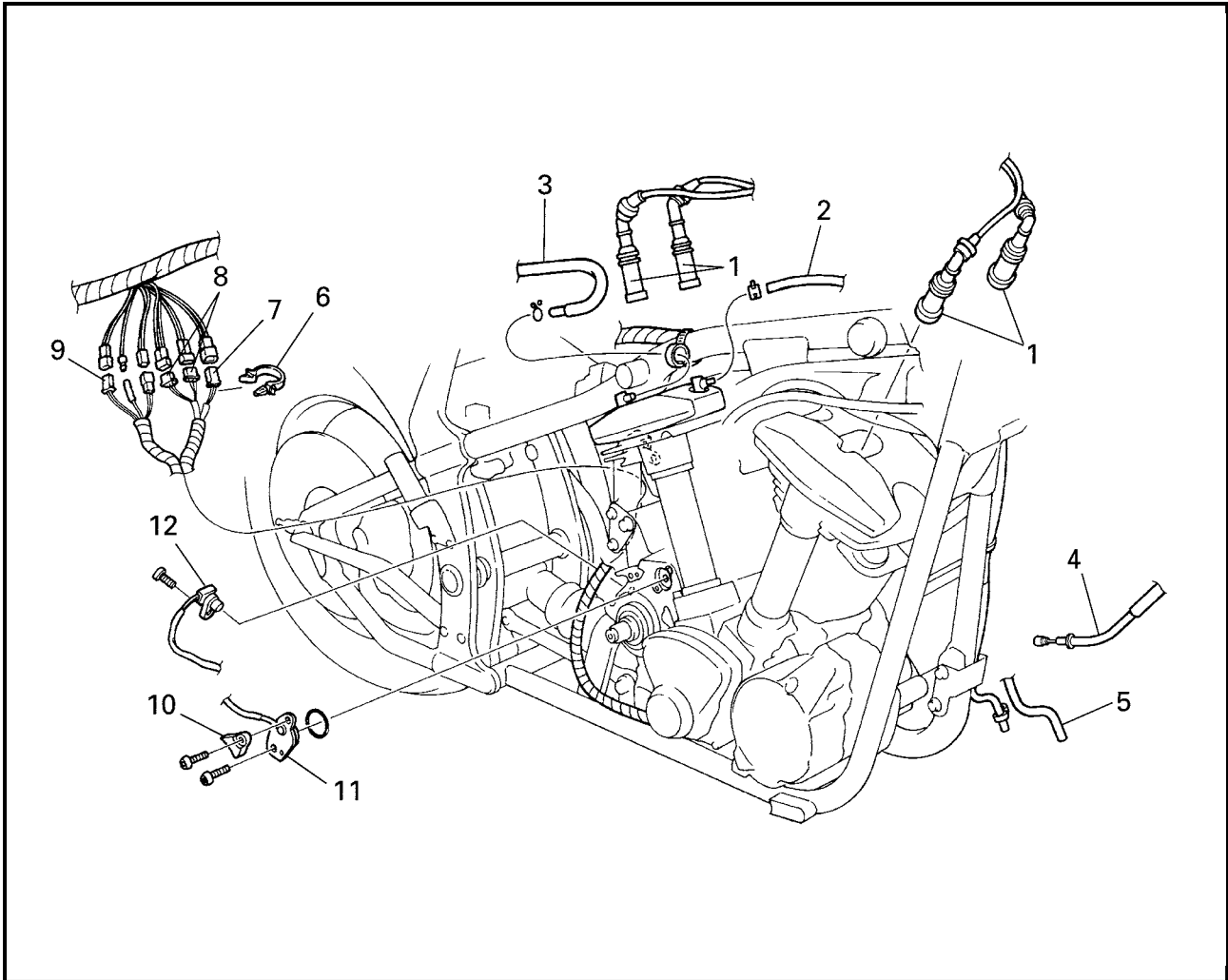
5

Order	Job/Part	Q'ty	Remarks
	<b>Removing the oil filter bracket and horns</b>		
	Rider seat/side covers		Refer to "SEATS AND SIDE COVERS" in chapter 3.
	Fuel tank		Refer to "FUEL TANK" in chapter 3.
	Air filter case		Refer to "AIR FILTER CASE" in chapter 3.
	Carburetor/carburetor joint		Refer to "CARBURETOR" in chapter 6.
	Air induction system parts		Refer to "AIR INDUCTION SYSTEM" in chapter 6.
	Starter motor		Refer to "STARTER MOTOR" in chapter 7.



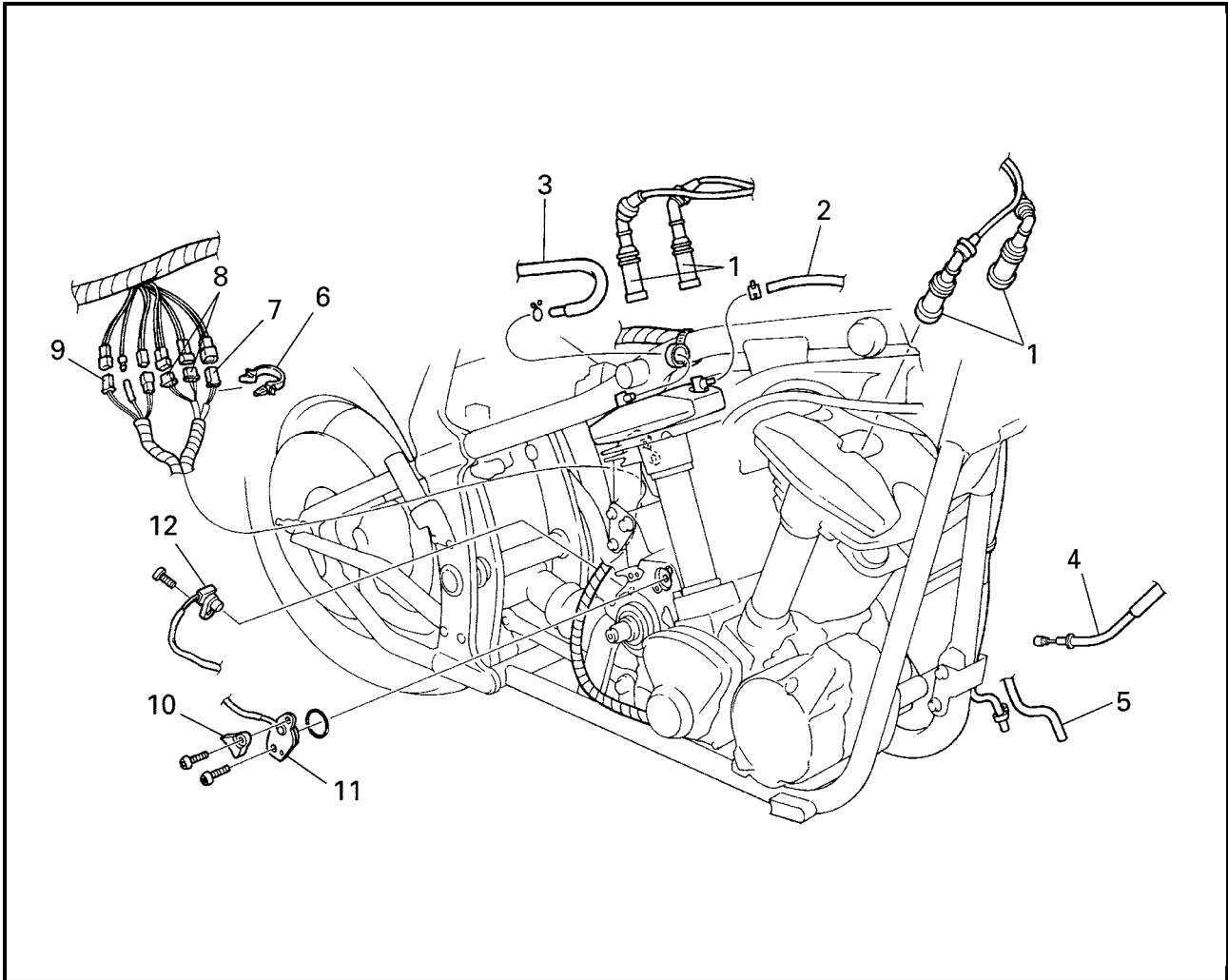
5

Order	Job/Part	Q'ty	Remarks
	Engine oil/oil filter cartridge		Drain.
	Transfer gear oil		Drain.
	Transfer gear case		Refer to "TRANSFER GEAR CASE".
	Rider footrest (left)		Refer to "ROCKER ARMS, PUSH RODS AND VALVE LIFTERS".
	Rider footrest (right)		Refer to "GENERATOR AND STARTER CLUTCH".
1	Oil filter bolt	1	
2	Oil filter bracket	1	
3	Horn	2	
4	Oil delivery pipe	1	
5	Brake hose holder	1	
			For installation, reverse the removal procedure.



5

Order	Job/Part	Q'ty	Remarks
	<b>Disconnecting the leads and hoses</b>		Disconnect the parts in the order listed.
1	Spark plug caps	4	
2	Cylinder head breather hose	1	
3	Oil tank breather hose	1	
4	Clutch cable	1	
5	Charcoal canister hose (carburetor to charcoal canister)	1	
6	Plastic clamp	1	
7	Stator coil coupler	1	
8	Decompression solenoid coupler	2	
9	Pickup coil coupler	1	



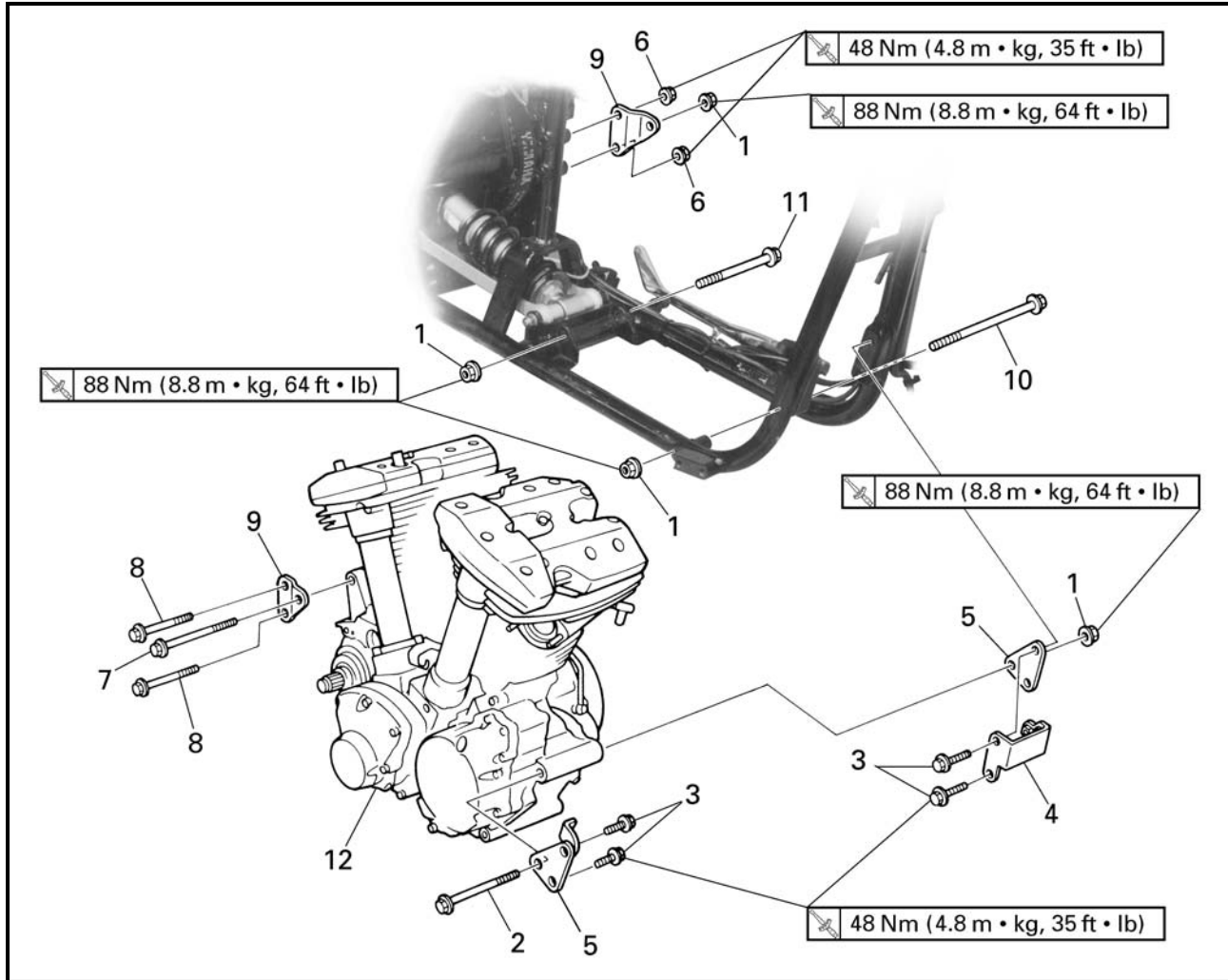
5

Order	Job/Part	Q'ty	Remarks
10	Neutral switch cover	1	For connecting, reverse the disconnection procedure.
11	Neutral switch	1	
12	Speed sensor	1	



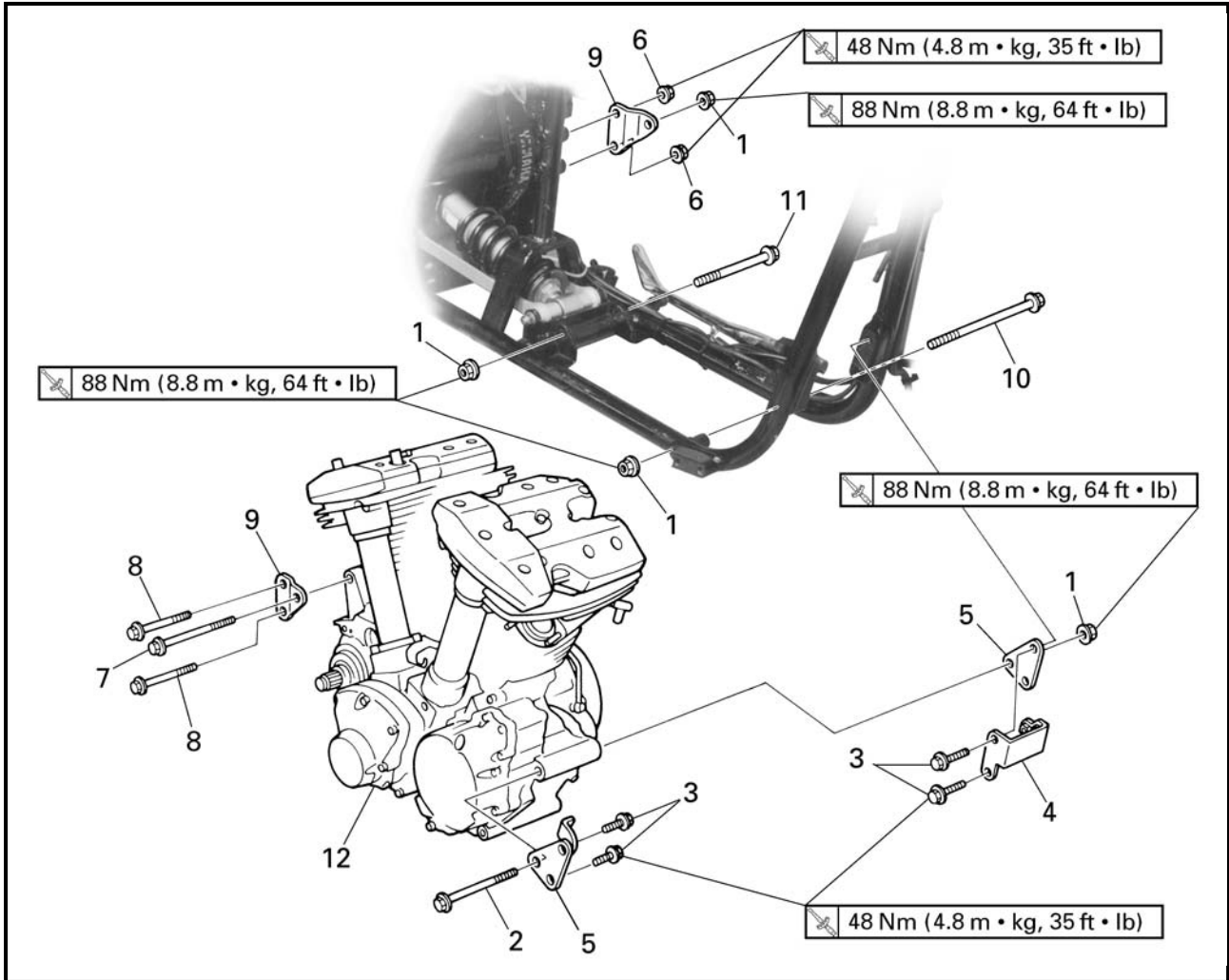


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ENGINE



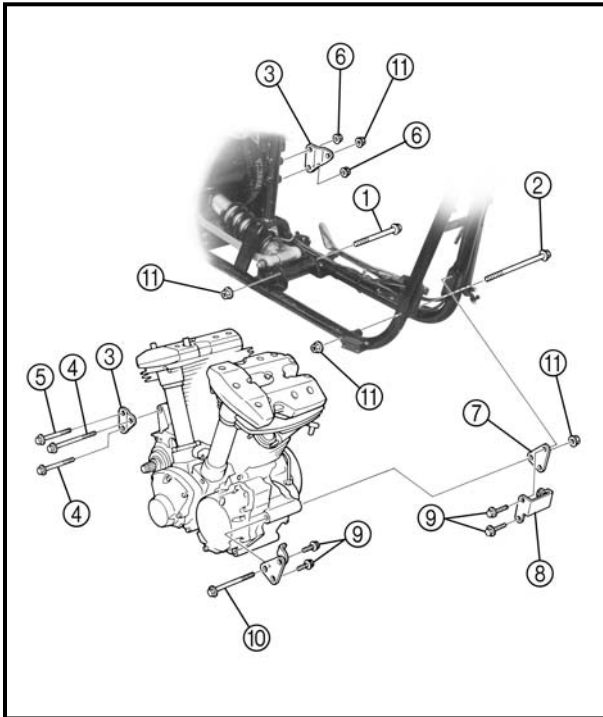
5

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	Self-locking nut	4	
2	Upper front mounting bolt	1	
3	Front engine bracket bolt	4	
4	Horn bracket	1	
5	Front engine bracket	2	
6	Self-locking nut	2	
7	Upper rear mounting bolt	1	
8	Rear engine bracket bolt	2	



5

Order	Job/Part	Q'ty	Remarks
9	Rear engine bracket	2	
10	Lower front mounting bolt	1	
11	Lower rear mounting bolt	1	
12	Engine	1	Refer to "INSTALLING THE ENGINE". For installation, reverse the removal procedure.



## INSTALLING THE ENGINE

### 1. Install:


- lower rear mounting bolt ①
- lower front mounting bolt ②
- rear engine brackets ③
- rear engine bracket bolts ④
- upper rear mounting bolt ⑤
- self-locking nuts ⑥
- front engine brackets ⑦
- horn bracket ⑧
- front engine bracket bolts ⑨
- upper front mounting bolt ⑩
- self-locking nuts ⑪

### NOTE:


Do not fully tighten the bolts and nuts.

### 2. Tighten:


- front engine bracket bolts ⑨

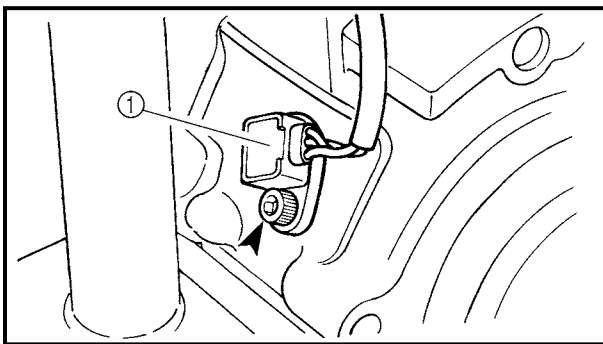
 48 Nm (4.8 m · kg, 35 ft · lb)

- self-locking nut ⑥

 48 Nm (4.8 m · kg, 35 ft · lb)

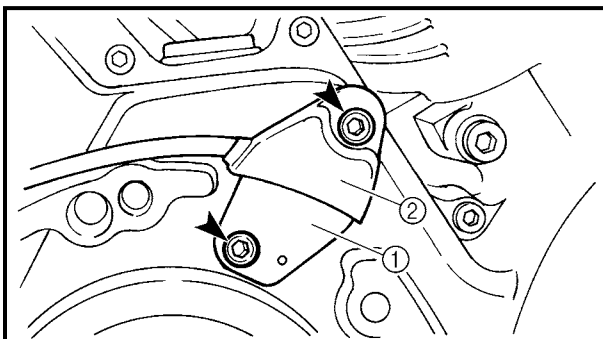
- self-locking nuts ⑪

 88 Nm (8.8 m · kg, 64 ft · lb)



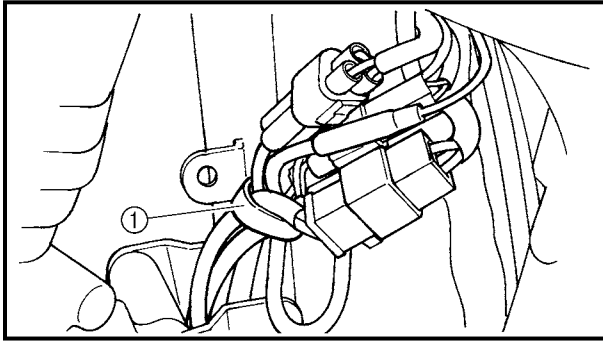
### 3. Install:

- speed sensor ①



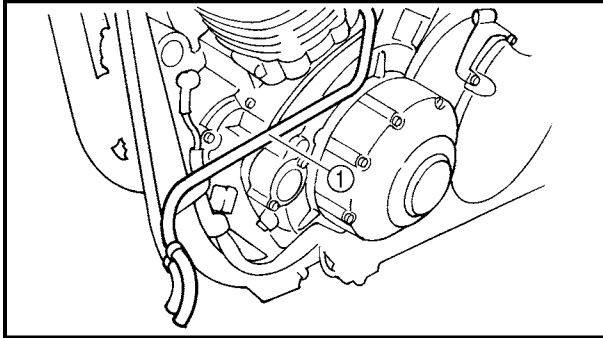
### 4. Install:

- neutral switch ①
- neutral switch cover ②

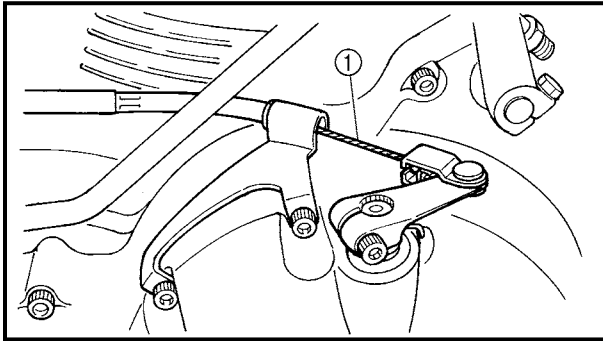


5. Connect:
- speed sensor coupler
  - neutral switch connector
  - pickup coil coupler
  - decompression solenoid coupler
  - stator coil coupler

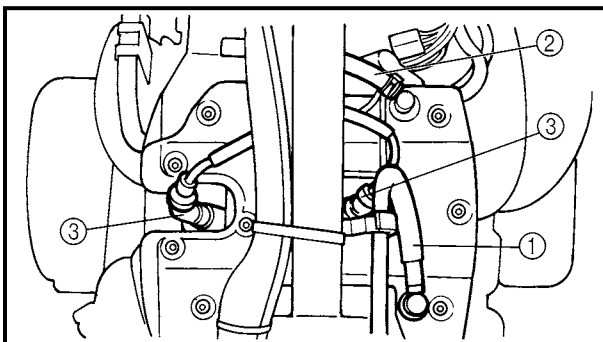
6. Install:
- plastic clamp ①



7. Connect:
- charcoal canister hose (carburetor to charcoal canister) ①

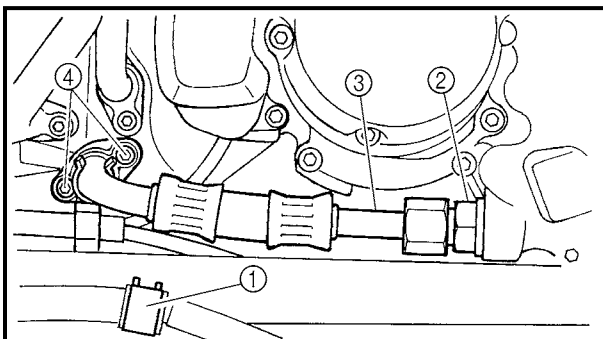





8. Connect:
- clutch cable ①

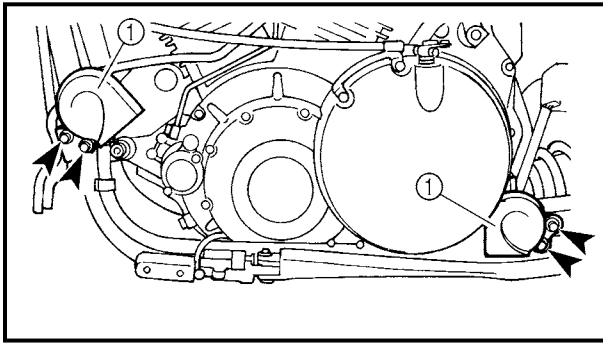


9. Connect:
- oil tank breather hose ①
  - cylinder head breather hose ②
  - spark plug caps ③

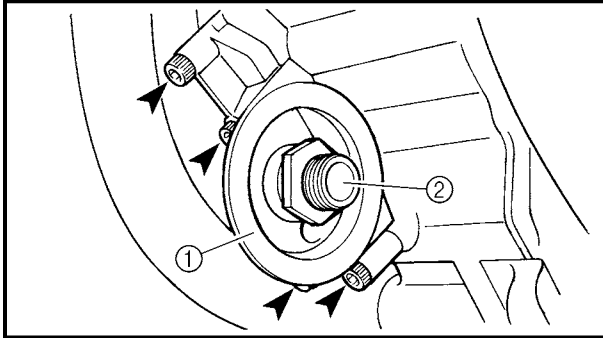
**NOTE:** \_\_\_\_\_  
Refer to "CABLE ROUTING" in chapter 2.




10. Install:
- brake hose holder ①
  - joint bolt ②  40 Nm (4.0 m · kg, 29 ft · lb)
  - oil delivery pipe ③  40 Nm (4.0 m · kg, 29 ft · lb)
  - bolts ④  10 Nm (1.0 m · kg, 7.2 ft · lb)




- 11.Install:
- horns ①
- 12.Connect:
- horn couplers



- 13.Install:
- oil filter bracket ①

 10 Nm (1.0 m · kg, 7.2 ft · lb)

- oil filter bolt ②

 70 Nm (7.0 m · kg, 50 ft · lb)

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

Apply locking agent (LOCTITE®) to the threads of the oil filter bracket bolts.

- 14.Install:
- rider footrest (right)  
Refer to "GENERATOR AND STARTER CLUTCH".
  - rider footrest (left)  
Refer to "ROCKER ARMS, PUSH RODS AND VALVE LIFTERS".
  - transfer gear case  
Refer to "TRANSFER GEAR CASE".

- 15.Fill:
- transfer gear case  
(with the specified amount of the recommended transfer gear oil)  
Refer to "CHANGING THE TRANSFER GEAR OIL" in chapter 3.

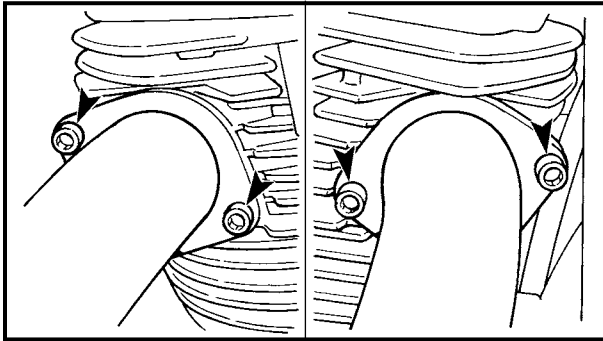
- 16.Install:
- oil filter cartridge

- 17.Fill:
- oil tank  
(with the specified amount of the recommended engine oil)  
Refer to "CHANGING THE ENGINE OIL" in chapter 3.



## 18. Install:

- starter motor  
Refer to "STARTER MOTOR" in chapter 7.
- air induction system parts  
Refer to "AIR INDUCTION SYSTEM" in chapter 6.
- carburetor joint
- carburetor  
Refer to "CARBURETOR" in chapter 6.
- air filter case  
Refer to "AIR FILTER CASE" in chapter 3.
- fuel tank  
Refer to "FUEL TANK" in chapter 3.
- side covers
- rider seat  
Refer to "SEATS AND SIDE COVERS" in chapter 3.

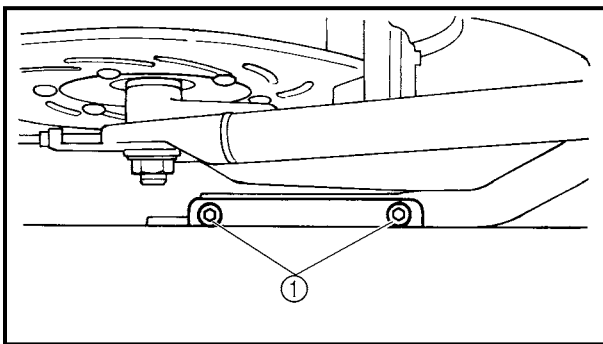


## 19. Install:

- gaskets
- exhaust pipes


**NOTE:**

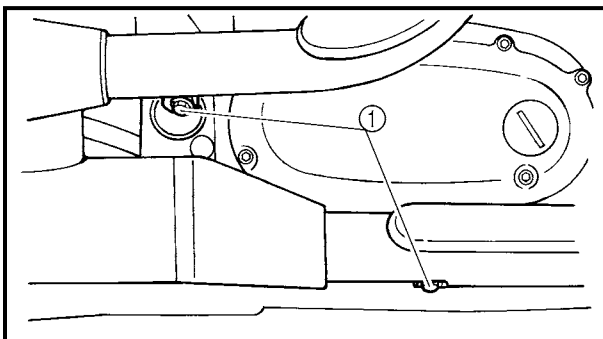
Finger tighten the exhaust pipe nuts.



## 20. Install:


- muffler
- bolts ①

 30 Nm (3.0 m · kg, 22 ft · lb)




## 21. Tighten:

- exhaust pipe nuts

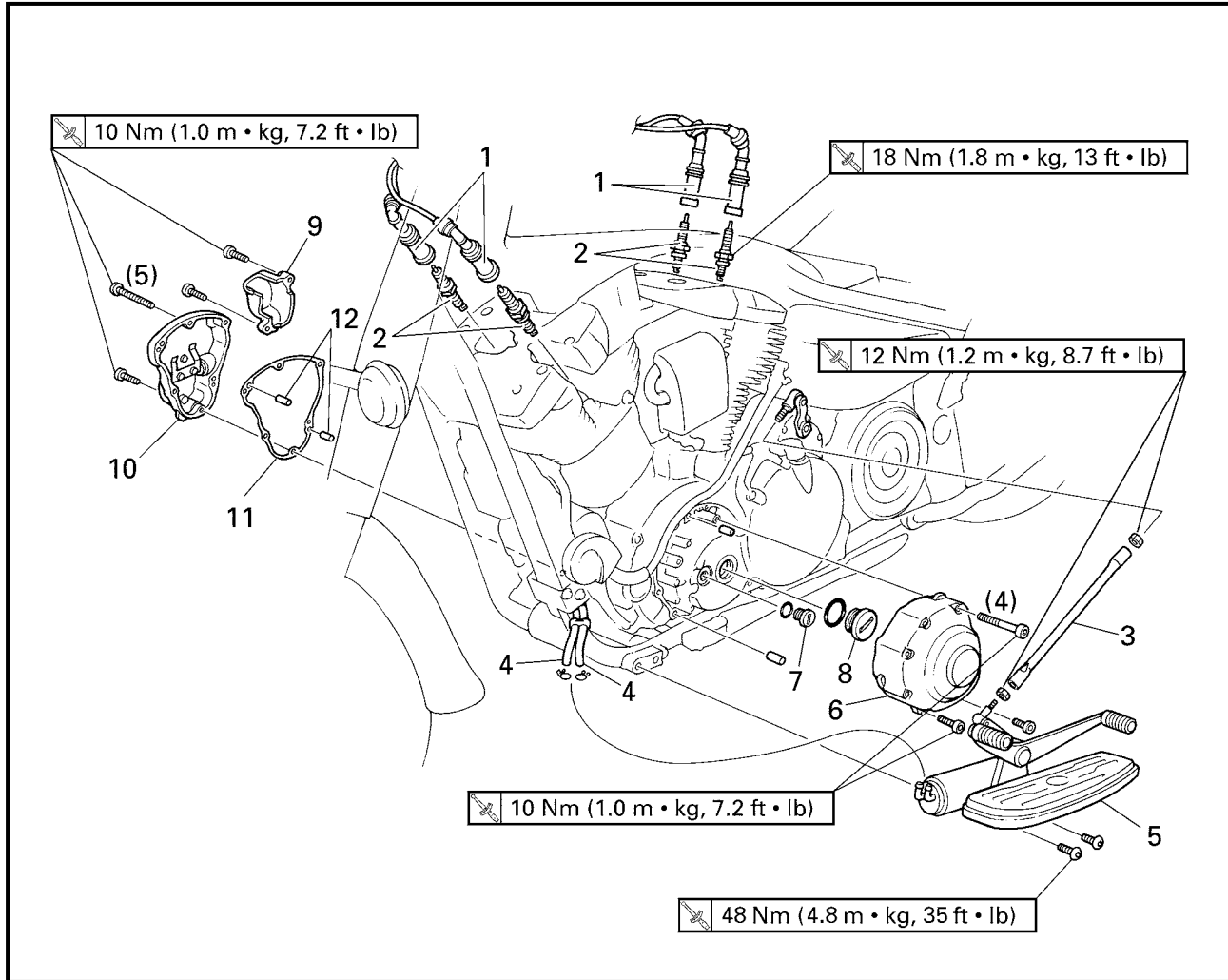
 20 Nm (2.0 m · kg, 14 ft · lb)

- clamp bolts ①

 25 Nm (2.5 m · kg, 18 ft · lb)

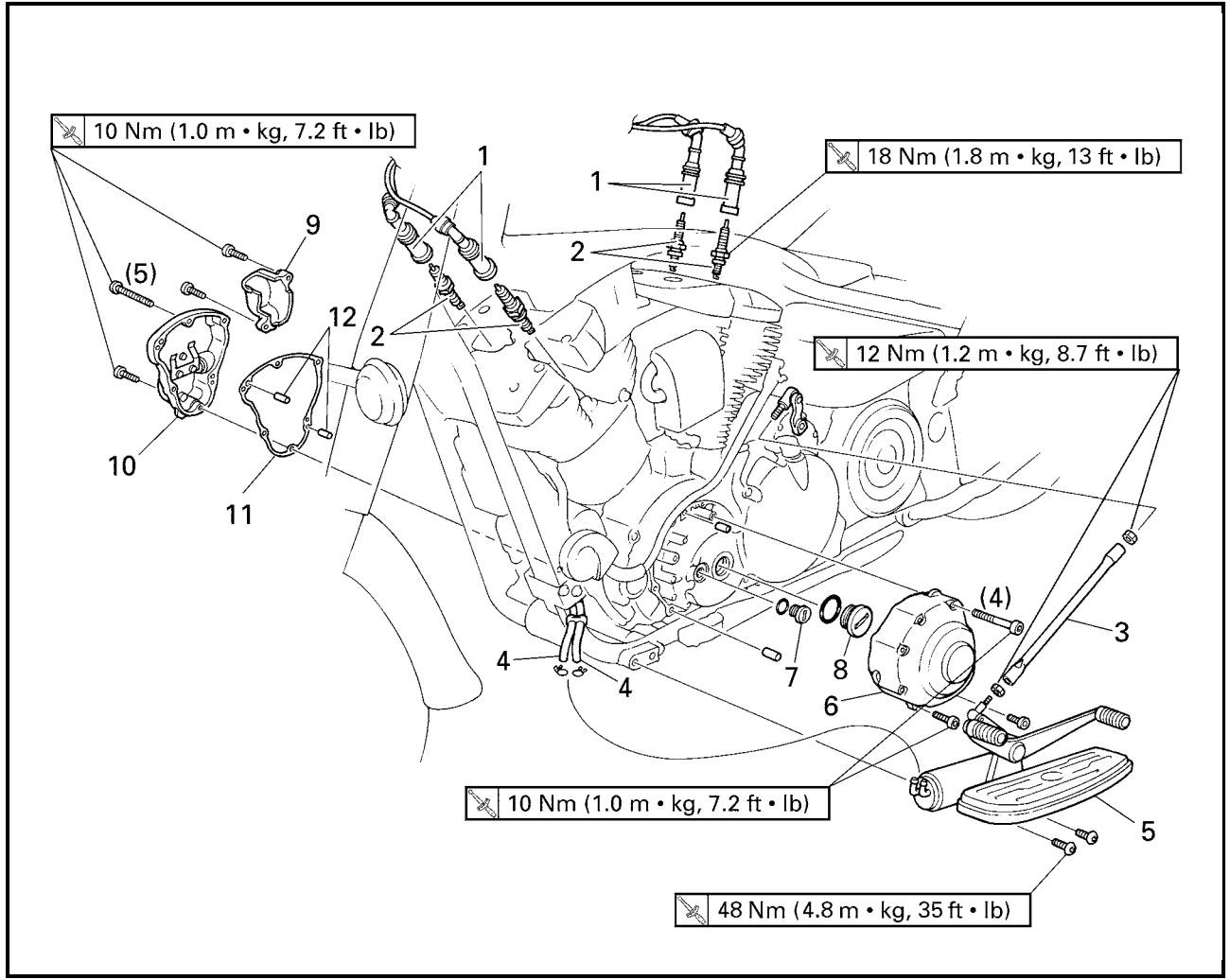


## ROCKER ARMS, PUSH RODS AND VALVE LIFTERS



5

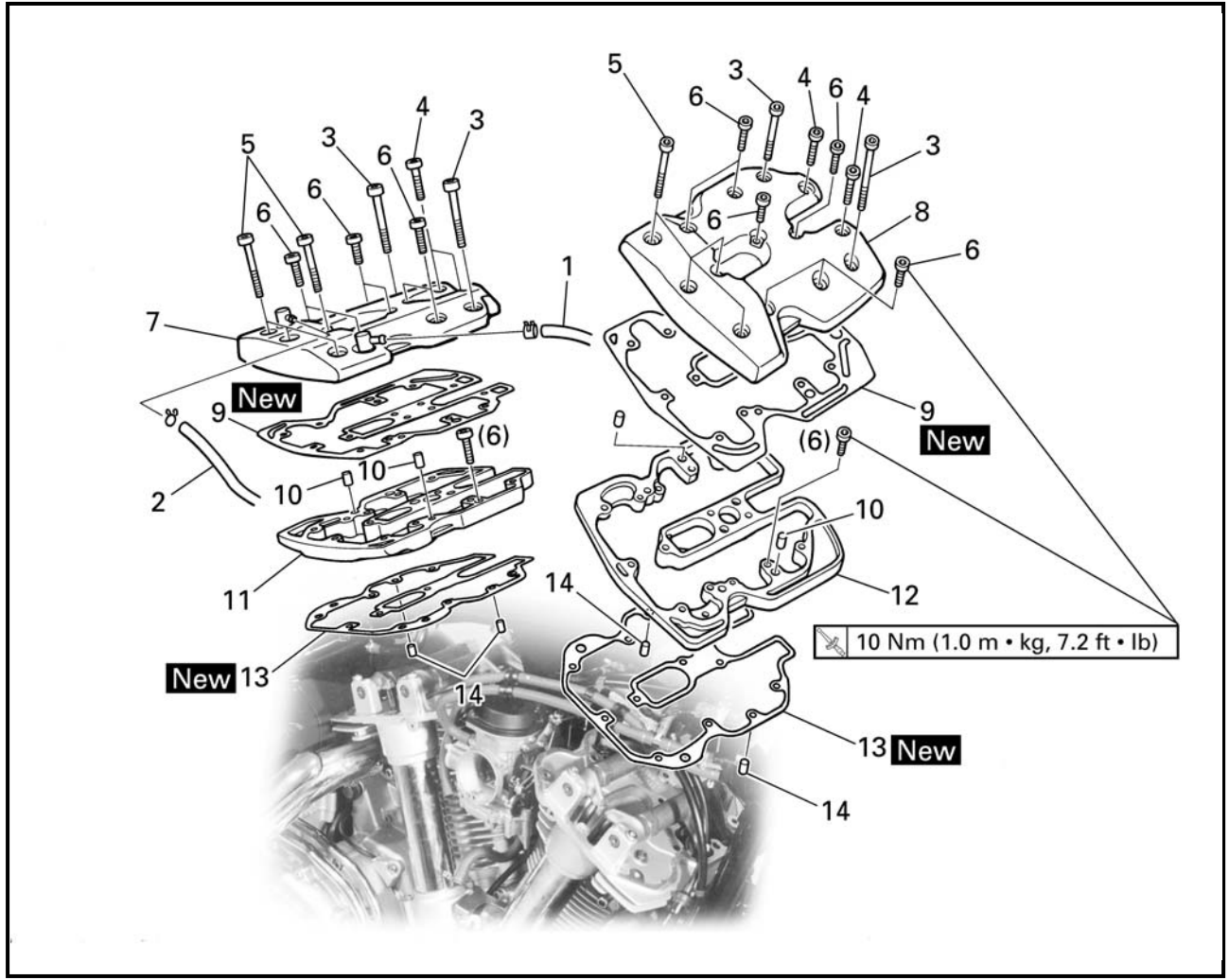
Order	Job/Part	Q'ty	Remarks
	<b>Removing the engine left side cover and camshaft sprocket cover</b>		Remove the parts in the order listed.
	Rider seat/fuel tank/air filter case		Refer to "SEATS AND SIDE COVER", "FUEL TANK" and "AIR FILTER CASE" in chapter 3.
	Engine oil		Drain.
1	Spark plug cap	4	Disconnect.
2	Spark plug	4	
3	Shift rod	1	
4	Charcoal canister hose	2	Disconnect.
5	Rider footrest (left)	1	
6	Engine left side cover	1	
7	Timing mark accessing screw	1	
8	Crankshaft end cover	1	



5

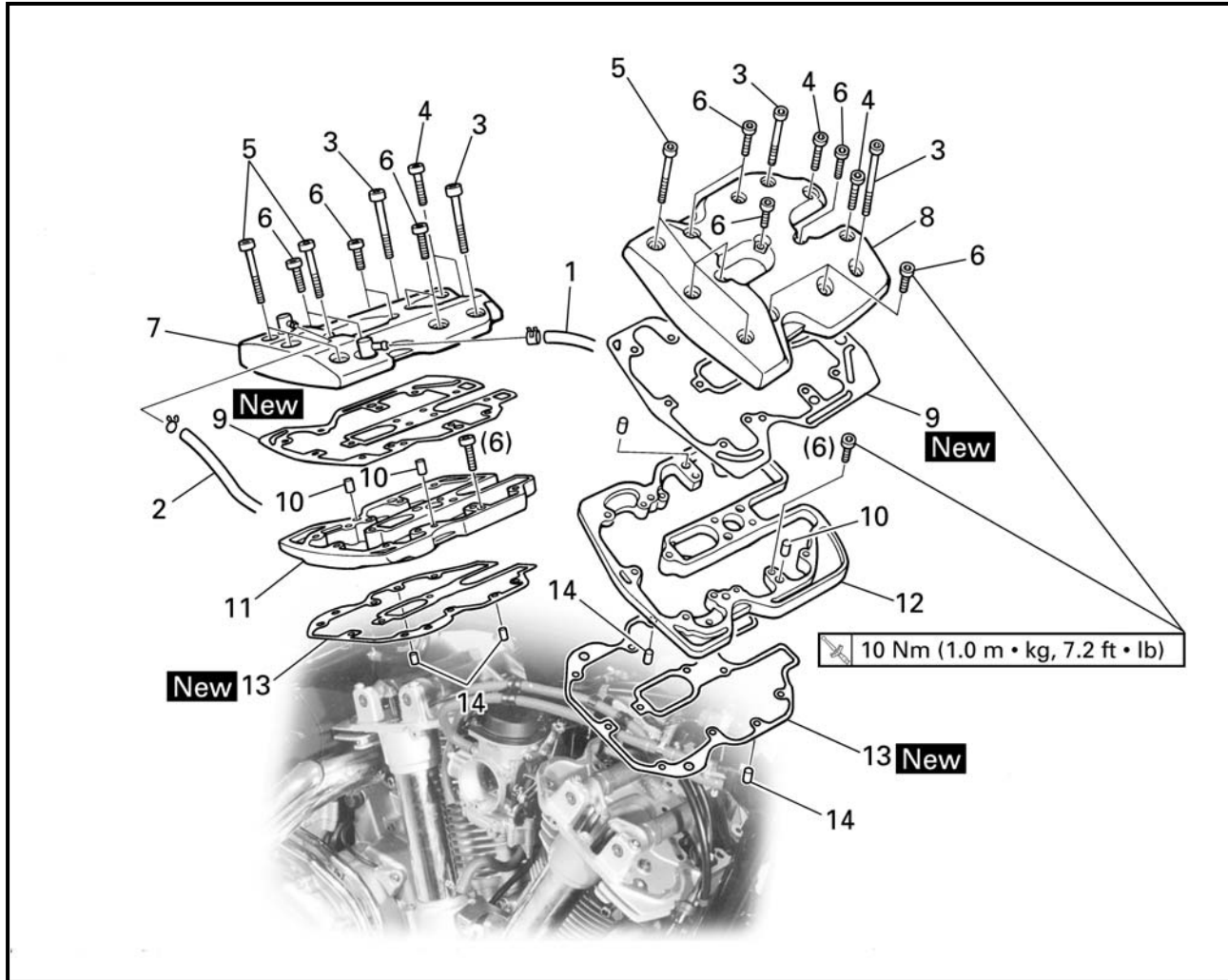
Order	Job/Part	Q'ty	Remarks
9	Decompression solenoid cover	1	For installation, reverse the removal procedure.
10	Camshaft sprocket cover	1	
11	Camshaft sprocket cover gasket	1	
12	Dowel pin	2	





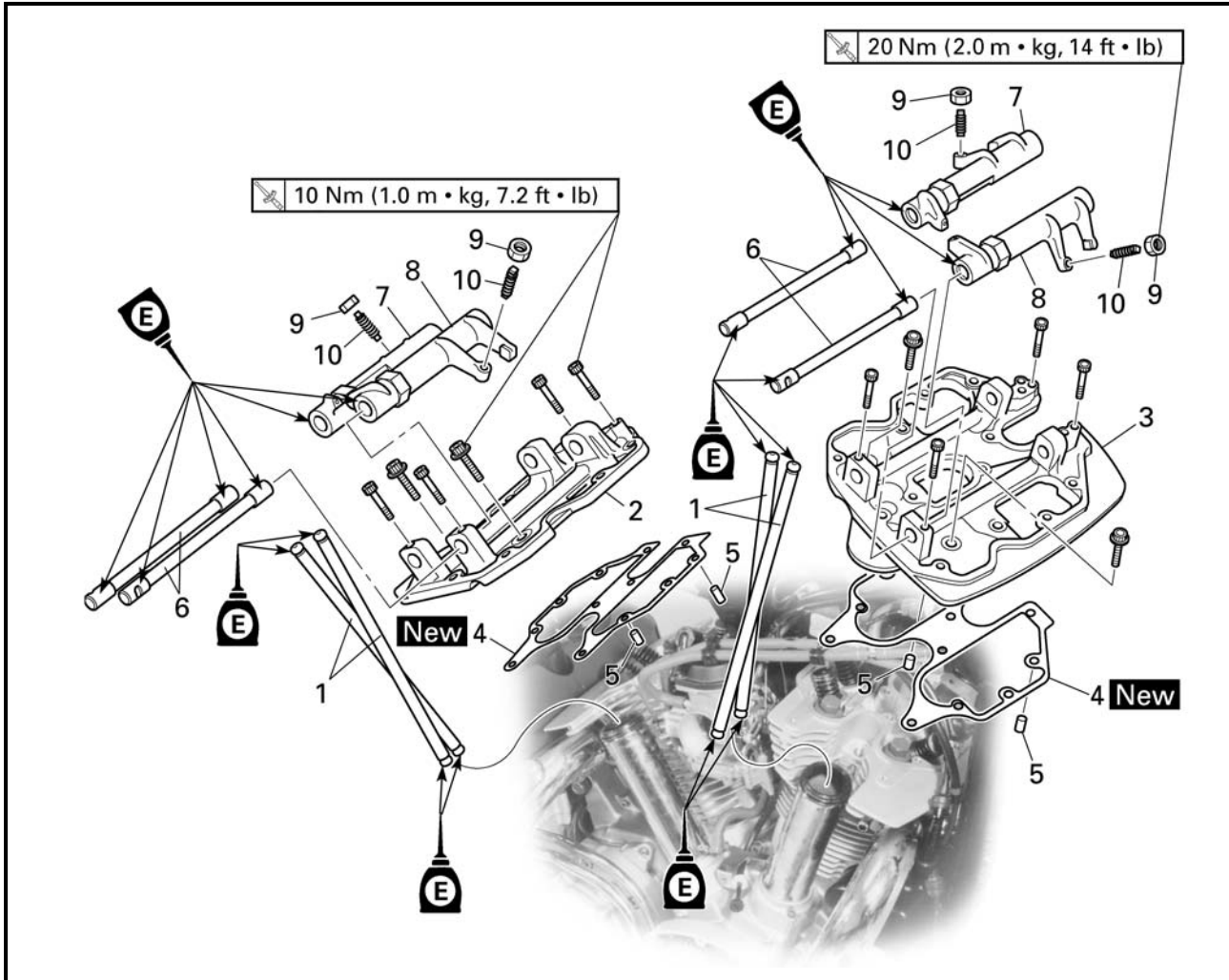
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Order	Job/Part	Q'ty	Remarks
	<b>Removing cylinder head covers</b>		Remove the parts in the order listed.
1	Cylinder head breather hose	1	
2	Oil tank breather hose	1	
3	Bolt	4	$l = 65 \text{ mm (2.56 in)}$
4	Bolt	4	$l = 35 \text{ mm (1.38 in)}$
5	Bolt	4	$l = 50 \text{ mm (1.97 in)}$
6	Bolt	12	$l = 25 \text{ mm (0.98 in)}$
7	Rear cylinder head cover	1	
8	Front cylinder head cover	1	
9	Cylinder head cover gasket	2	
10	Dowel pin	4	



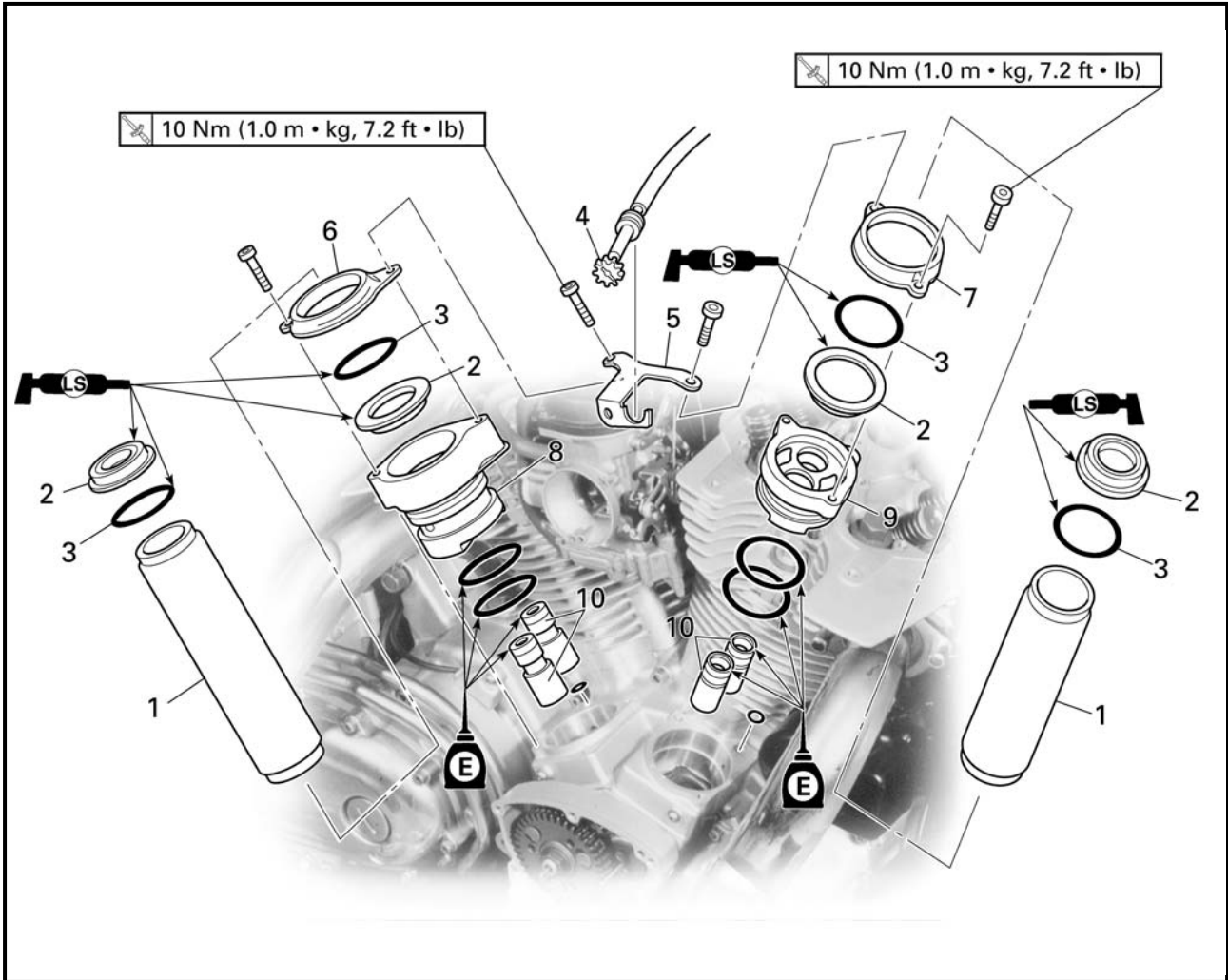
5

Order	Job/Part	Q'ty	Remarks
11	Rear cylinder head cover spacer	1	For installation, reverse the removal procedure.
12	Front cylinder head cover spacer	1	
13	Cylinder head cover spacer gasket	2	
14	Dowel pin	4	



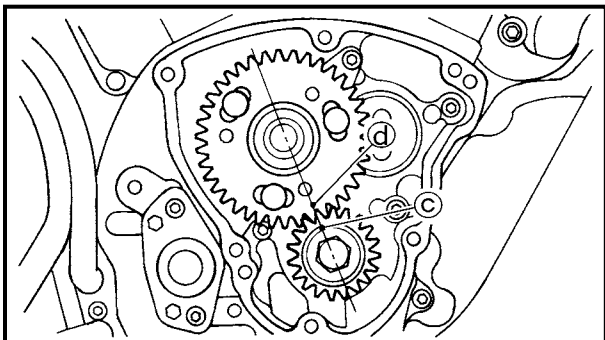
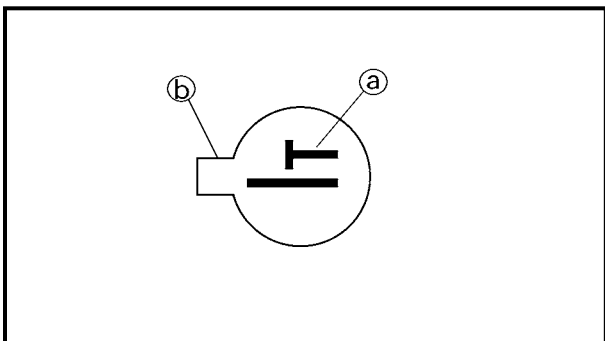
# 5

Order	Job/Part	Q'ty	Remarks
	<b>Removing the push rods and rocker arms</b>		Remove the parts in the order listed.
1	Push rod	4	
2	Rear rocker arm base	1	
3	Front rocker arm base	1	
4	Rocker arm base gasket	2	
5	Dowel pin	4	
6	Rocker arm shaft	4	
7	Rocker arm 1	2	
8	Rocker arm 2	2	
9	Locknut	2	
10	Adjusting screw	2	
			For installation, reverse the removal procedure.

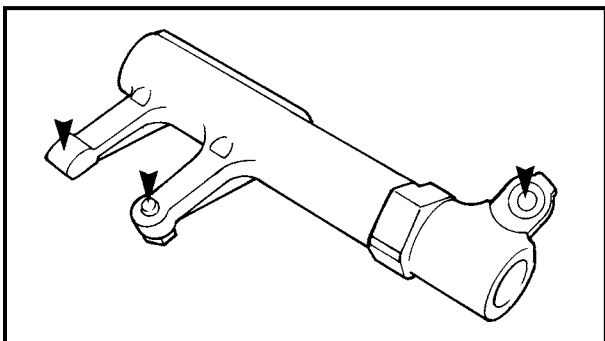
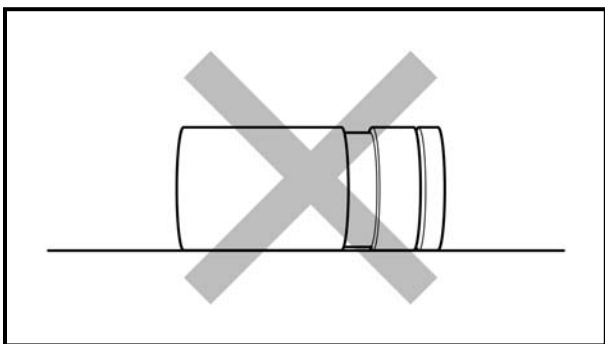


5

Order	Job/Part	Q'ty	Remarks
	<b>Removing the valve lifters</b>		Remove the parts in the order listed.
1	Push rod cover	2	
2	Oil seal	4	
3	O-ring	4	
4	Throttle stop screw	1	Unhook.
5	Throttle stop screw holder	1	
6	Rear valve lifter case cover	1	
7	Front valve lifter case cover	1	
8	Rear valve lifter case	1	
9	Front valve lifter case	1	
10	Valve lifter	4	
			For installation, reverse the removal procedure.



	R	F
EX		
IN		



## REMOVING THE ROCKER ARMS, PUSH RODS AND VALVE LIFTERS

- Align:
  - TDC mark **a** on the pickup coil rotor (with the pointer **b** on the clutch/pickup coil rotor cover)



- Turn the crankshaft clockwise.
- When piston #1 is at TDC on the compression stroke, align the TDC mark **a** on the pickup coil rotor with the pointer **b** on the clutch/pickup coil rotor cover.
- Check the camshaft drive gear mark **c** position and camshaft driven gear mark **d** position as shown. If the marks are not aligned, turn the crankshaft counterclockwise 360 degrees and recheck step b.



- Remove:
  - rocker arm bases (with the rocker arms)
- Remove:
  - valve lifters

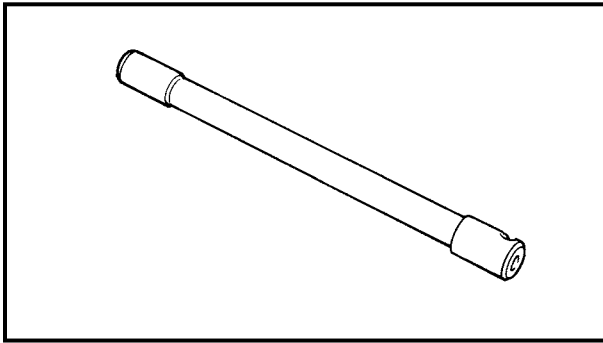
**NOTE:** \_\_\_\_\_  
 Make a note of the position of each valve lifter so that they can be installed in the correct place.

**CAUTION:** \_\_\_\_\_  
**Do not lay the removed valve lifter on its side.**

## CHECKING THE ROCKER ARMS AND ROCKER ARM SHAFTS

The following procedure applies to all of the rocker arms and rocker arm shafts.

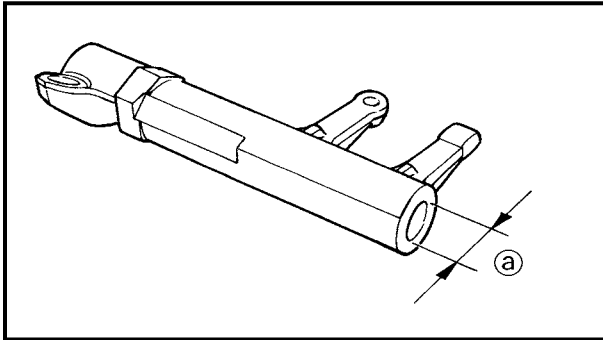
- Check:
  - rocker arm  
 Damage/wear → Replace.



## 2. Check:

- rocker arm shaft

Blue discoloration/excessive wear/pitting/scratches → Replace or check the lubrication system.



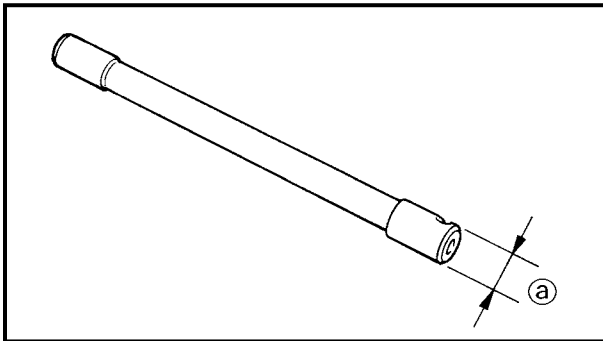
## 3. Measure:

- rocker arm inside diameter <sup>Ⓐ</sup>

Out of specification → Replace.



**Rocker arm inside diameter**  
**15.000 ~ 15.018 mm**  
**(0.5906 ~ 0.5913 in)**



## 4. Measure:

- rocker arm shaft outside diameter

Out of specification → Replace.



**Rocker arm shaft outside diameter**  
**14.981 ~ 14.991 mm**  
**(0.5898 ~ 0.5902 in)**

## 5. Calculate:

- rocker arm to rocker arm shaft clearance

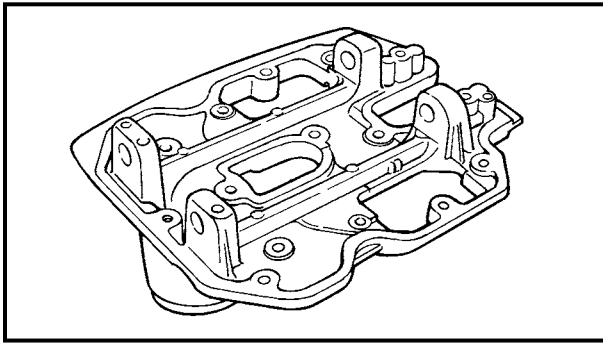
**NOTE:**

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

Above 0.08 mm (0.003 in) → Replace the defective part(s).

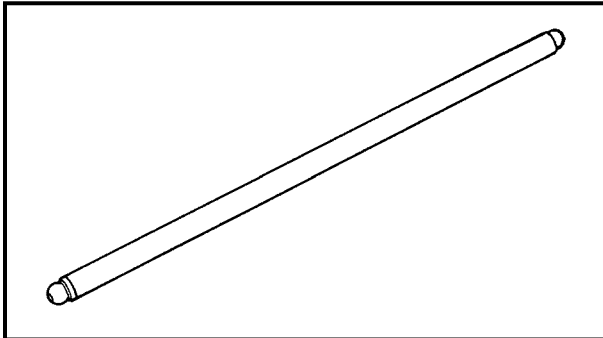


**Rocker arm to rocker arm shaft clearance**  
**0.009 ~ 0.037 mm**  
**(0.0003 ~ 0.0015 in)**



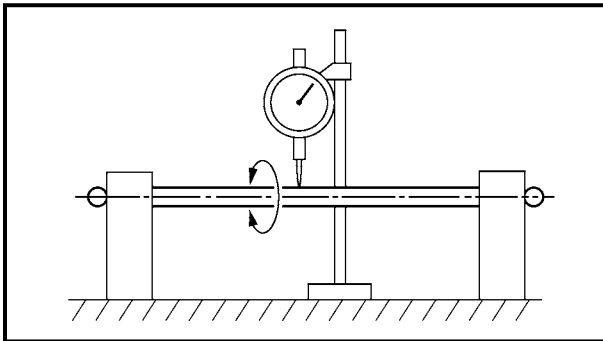
## CHECKING THE ROCKER ARM BASES

1. Check:
  - rocker arm base  
Cracks/damage → Replace.



## CHECKING THE PUSH RODS

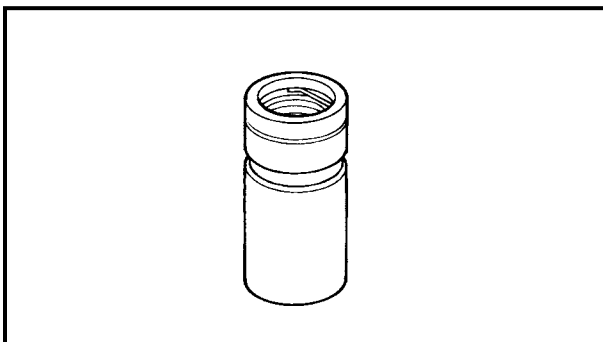
1. Check:
  - push rod
  - push rod end  
Bends/damage → Replace.



2. Measure:
  - push rod runout  
Out of specification → Replace.

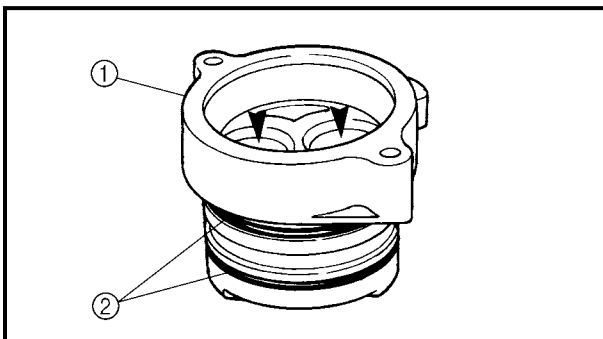


**Push rod runout**  
**0.3 mm (0.012 in)**

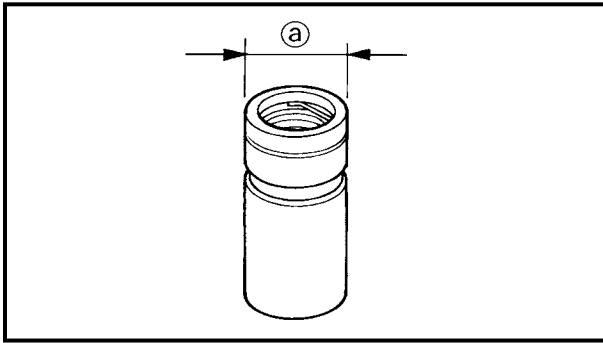


## CHECKING THE VALVE LIFTERS AND VALVE LIFTER CASES

1. Check:
  - valve lifter  
Blue discoloration/excessive wear/pitting/scratches → Replace or check the lubrication system.



2. Check:
  - valve lifter case ①  
Damage/wear → Replace the valve lifter case.
  - O-ring ②  
Damage/wear → Replace the O-ring.

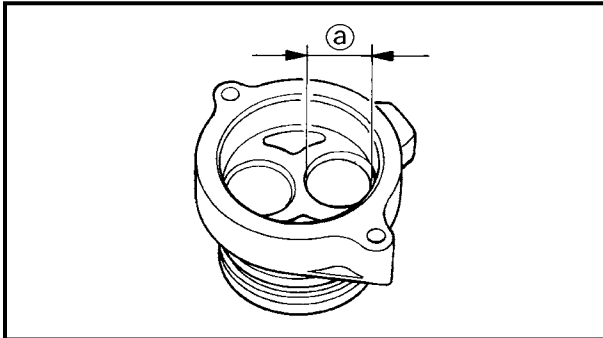


## 3. Measure:

- valve lifter outside diameter (a)
- Out of specification → Replace.



**Valve lifter case outside diameter**  
 22.9680 ~ 22.9744 mm  
 (0.9043 ~ 0.9045 in)



## 4. Measure:

- valve lifter case inside diameter (a)
- Out of specification → Replace.



**Valve lifter case inside diameter**  
 22.990 ~ 23.010 mm  
 (0.9051 ~ 0.9059 in)

## 5. Calculate:

- valve lifter-to-valve lifter case clearance

**NOTE:**

Calculate the clearance by subtracting the valve lifter case outside diameter.

Above 0.072 mm (0.0028 in) → Replace the defective part(s)



**Valve lifter-to-valve lifter case clearance**  
 0.0156 ~ 0.042 mm  
 (0.0006 ~ 0.0017 in)

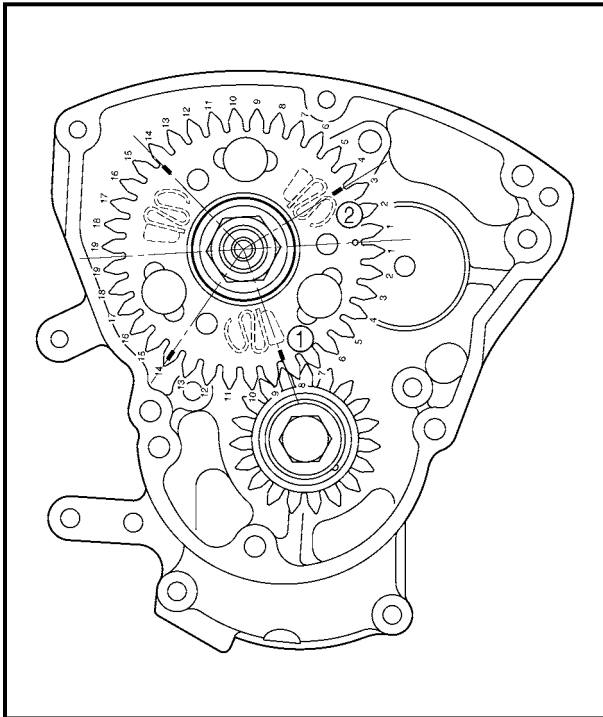
**BLEEDING A VALVE LIFTER**

A valve lifter must be bled in the following cases.

- When installing a new valve lifter
- When the valve lifter leaks oil







h. Rotate the crankshaft until the mark (on the camshaft driven gear) for the valve lifter to be bled aligns with the camshaft drive gear as shown.

Example: For bleeding the cylinder #2 intake valve lifter, align mark ① as shown.

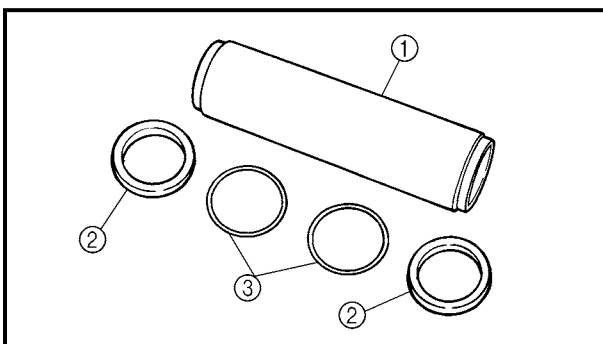
- ① Cylinder #2 intake valve at its highest point
- ② Piston #1 TDC punch mark

i. Leave the camshaft drive and driven gears aligned for five minutes to allow the valve lifter to bleed.

j. If necessary, repeat steps "h" and "i" to bleed other valve lifters.



# 5



## CHECKING THE PUSH ROD COVERS

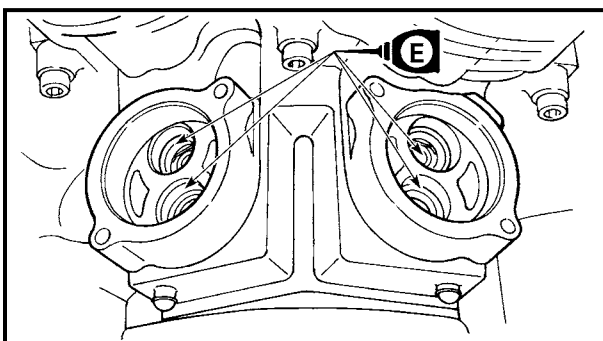
1. Check:

- push rod cover ①  
Cracks/damage → Replace.

- oil seal ②

- O-ring ③

Damage/wear → Replace the oil seal and O-ring as a set.



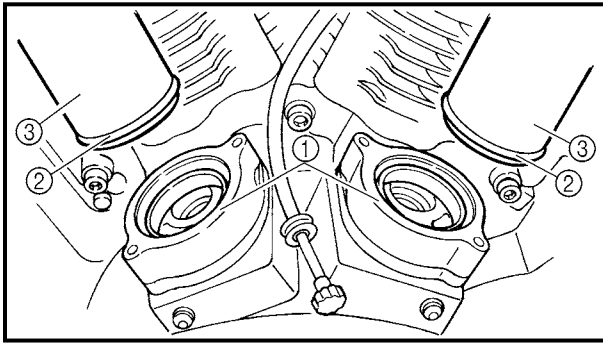
## INSTALLING THE VALVE LIFTERS AND PUSH ROD COVERS

1. Install:

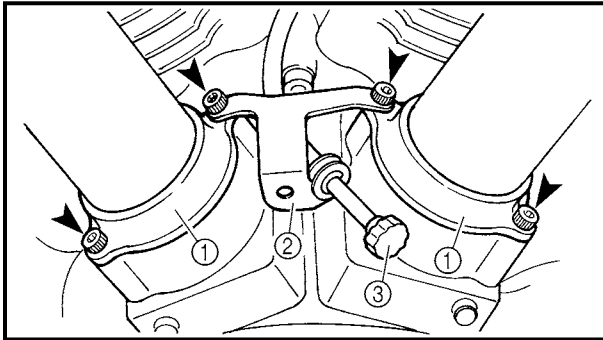
- valve lifter cases (front and rear)
- valve lifters

### NOTE:

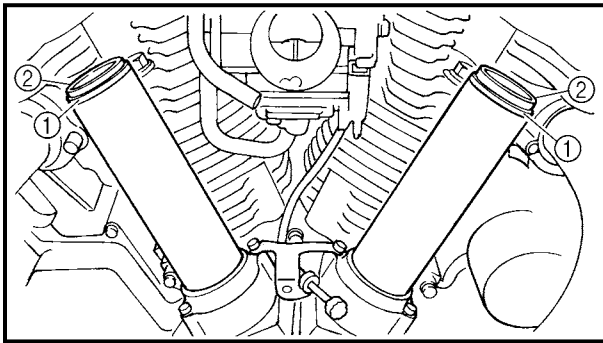
- Install the valve lifter in the correct place.
- After installing the valve lifters, fill the tops of them with engine oil.



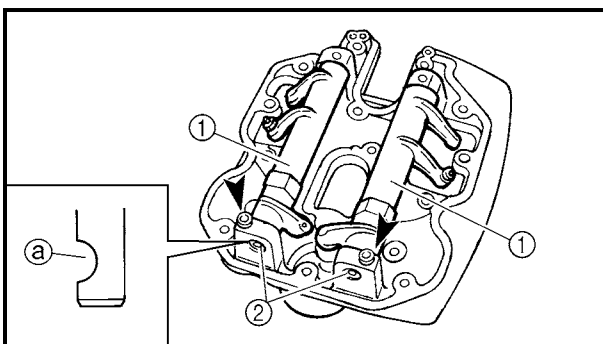
2. Install:
- oil seals ①
  - O-rings ②
  - push rod covers ③



3. Install:
- valve lifter case covers ①
  - throttle stop screw holder ②
4. Hook:
- throttle stop screw ③



5. Install:
- O-rings ①
  - oil seals ②



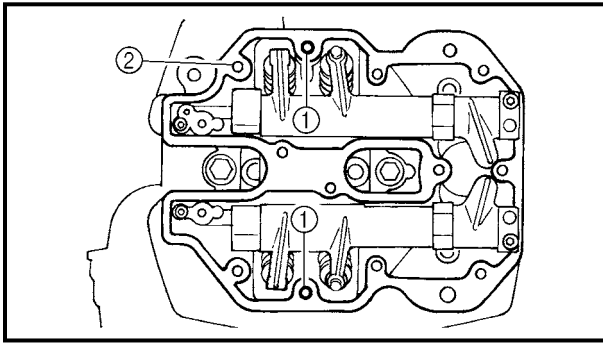
## INSTALLING THE ROCKER ARMS AND PUSH RODS

The following procedure applies to both cylinders.

1. Install:
- rocker arms ①
  - rocker arm shafts ②  
(onto rocker arm base)

**NOTE:** \_\_\_\_\_  
 The thread hole ③ of the rocker arm shaft must face to the outside.





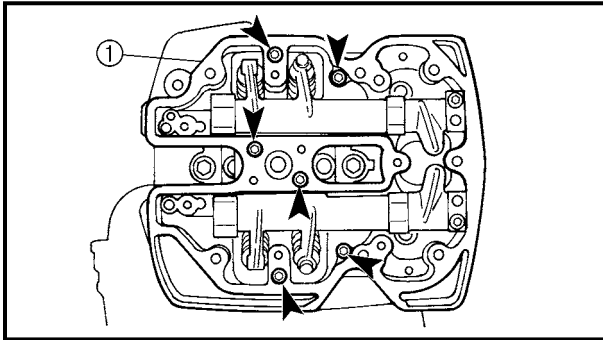
## INSTALLING THE CYLINDER HEAD COVERS

The following procedure applies to both cylinders.

1. Install:

- dowel pins ①
- cylinder head cover spacer gasket ②

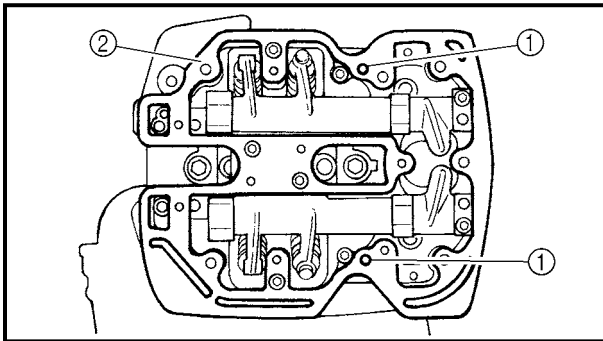
**New**



2. Install:

- cylinder head cover spacer ①

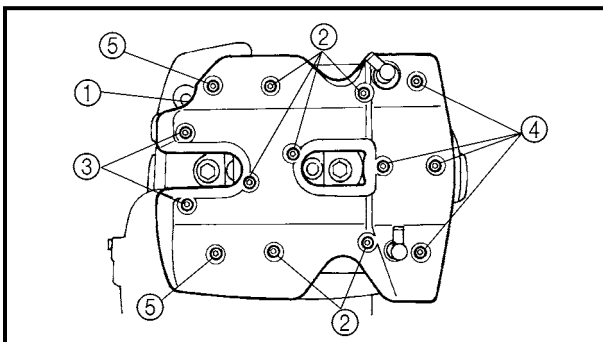
**10 Nm (1.0 m · kg, 7.2 ft · lb)**



3. Install:

- dowel pins ①
- cylinder head cover gasket ②

**New**



4. Install:

- cylinder head cover ①

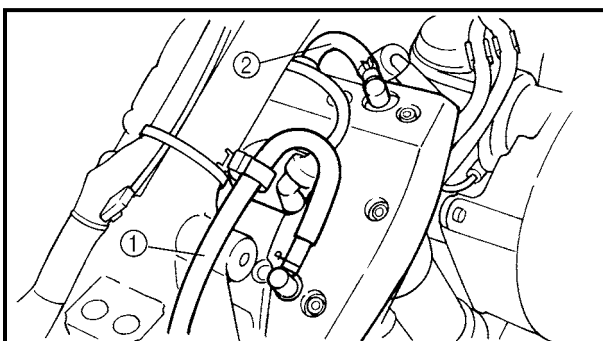
**10 Nm (1.0 m · kg, 7.2 ft · lb)**

Bolts ②:  $l = 25 \text{ mm (0.98 in)}$

Bolts ③:  $l = 35 \text{ mm (1.38 in)}$

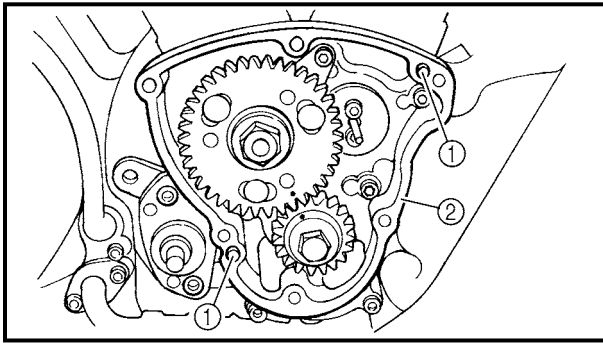
Bolts ④:  $l = 50 \text{ mm (1.97 in)}$

Bolts ⑤:  $l = 65 \text{ mm (2.56 in)}$



5. Connect:

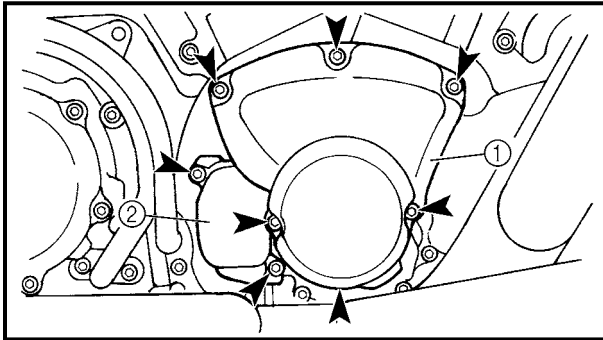
- oil tank breather hose ①
- cylinder head breather hose ②



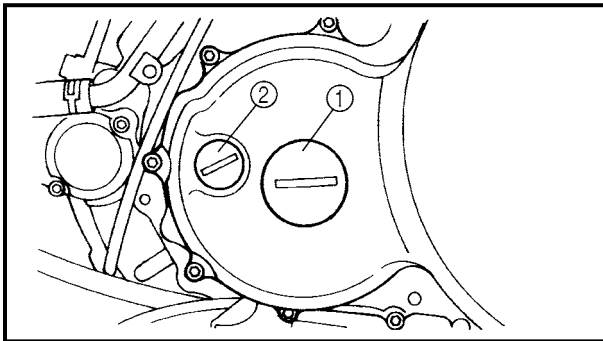
## INSTALLING THE CAMSHAFT SPROCKET COVER AND ENGINE LEFT SIDE COVER

1. Install:
  - dowel pins ①
  - camshaft sprocket cover gasket ②

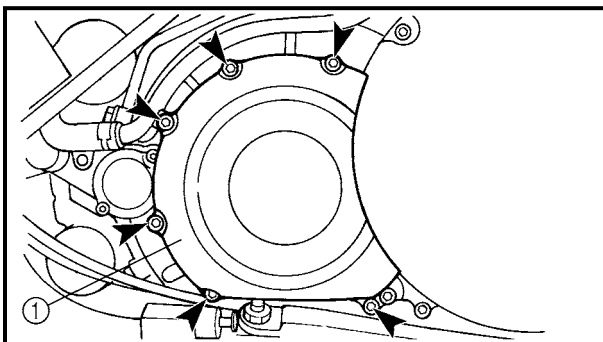
**New**



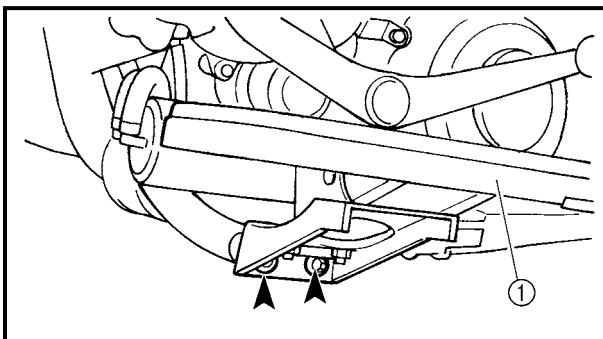
2. Install:
  - camshaft sprocket cover ①
  - decompression solenoid cover ②



3. Install:
  - crankshaft end cover ①
  - timing mark accessing screw ②

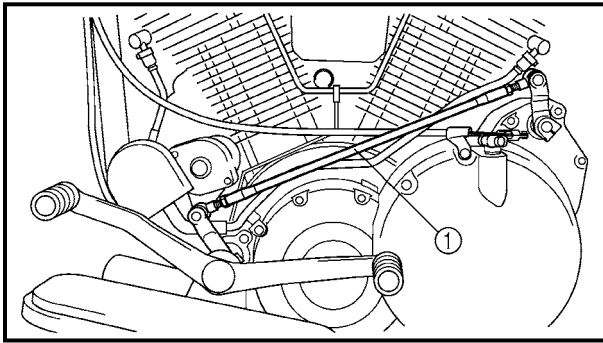


4. Install:
  - engine left side cover ①

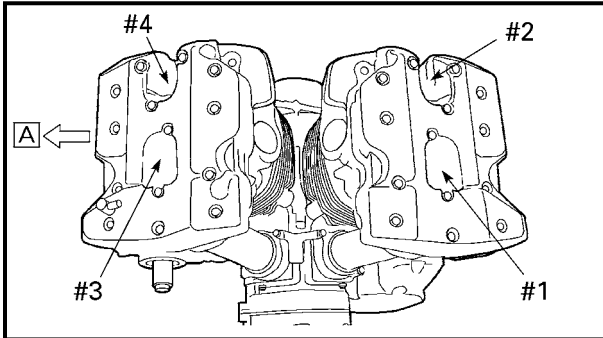


5. Install:
  - rider footrest (left) ①
6. Connect:
  - charcoal canister hoses

**5**



7. Install:
- shift rod ①



8. Install:
- spark plugs
9. Connect:
- spark plug caps

**NOTE:** \_\_\_\_\_  
Refer to "CABLE ROUTING" in chapter 2.

**A** Forward

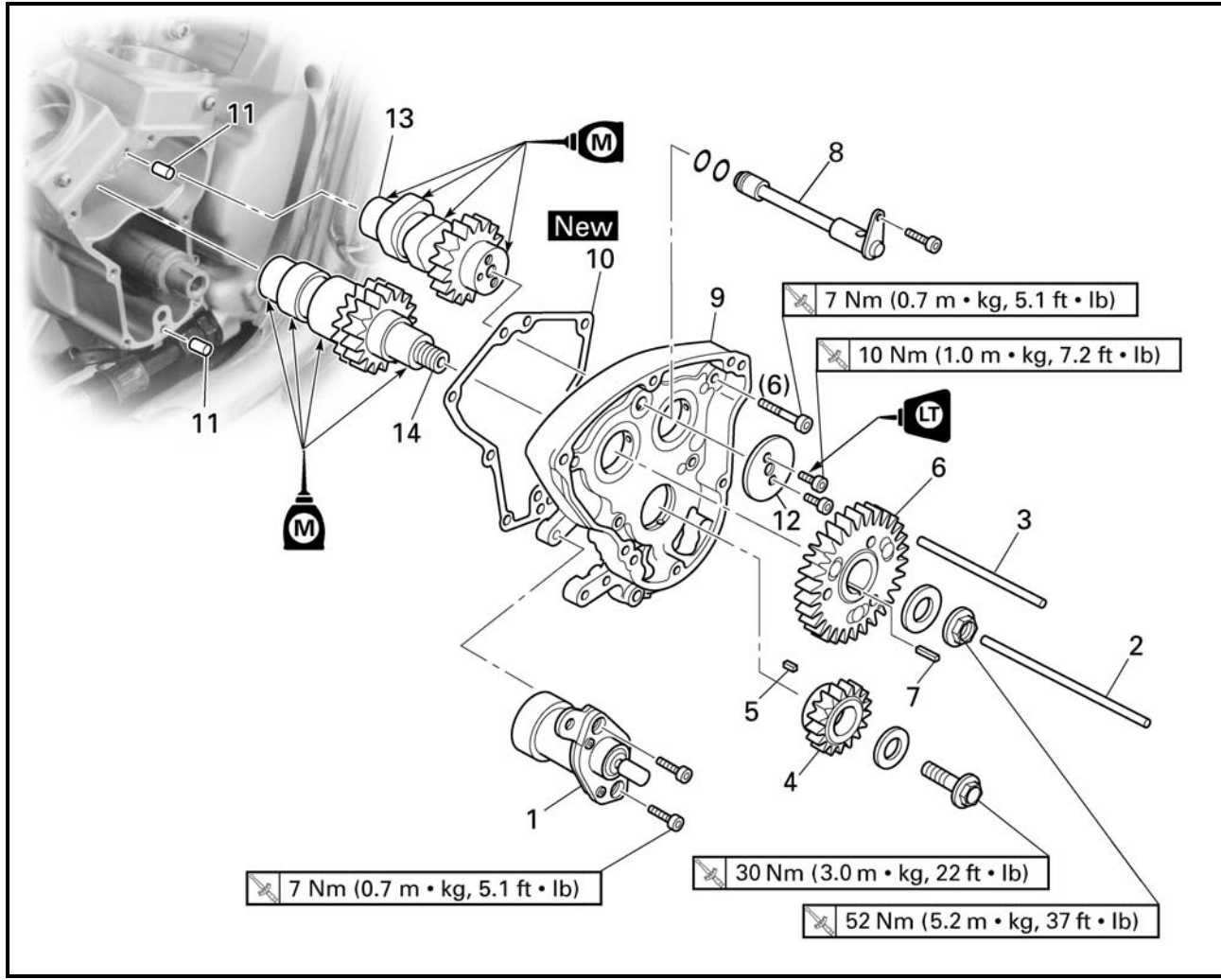
- 10.Fill:
- oil tank  
(with the specified amount of the recommended engine oil)  
Refer to "CHANGING THE ENGINE OIL" in chapter 3.

- 11.Install:
- air filter case
  - fuel tank
  - rider seat  
Refer to "AIR FILTER CASE", "FUEL TANK" and "SEATS AND SIDE COVERS" in chapter 3.

- 12.Adjust:
- installed shift rod length  
Refer to "ADJUSTING THE SHIFT PEDAL" in chapter 3.



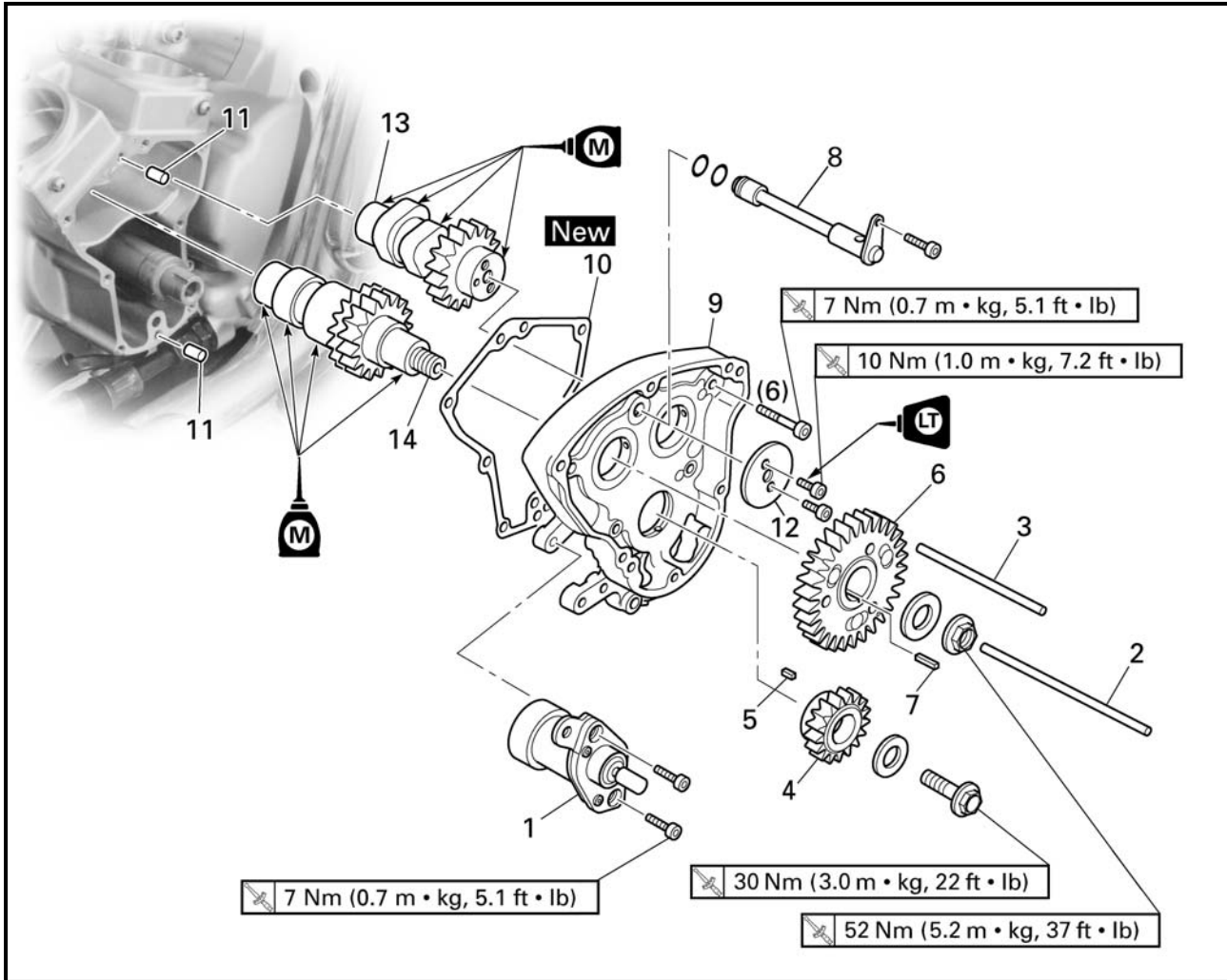
CAMSHAFTS



5

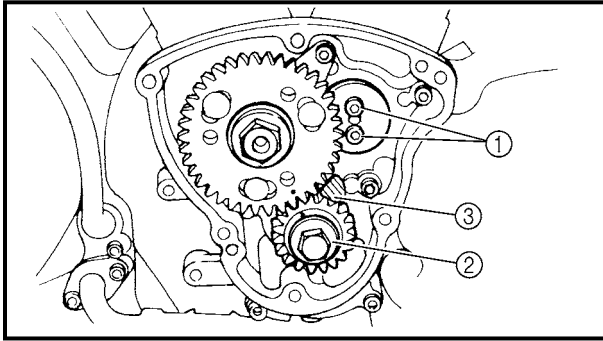
Order	Job/Part	Q'ty	Remarks
	<b>Removing the camshafts</b>		
	Valve lifters		Refer to "ROCKER ARMS, PUSH RODS AND VALVE LIFTERS".
	Muffler/exhaust pipes		Refer to "ENGINE".
1	Decompression solenoid	1	
2	Long decompression push rod	1	92 mm (3.6 in)
3	Short decompression push rod	1	78 mm (3.1 in)
4	Camshaft drive gear	1	
5	Straight key	1	
6	Camshaft driven gear	1	
7	Straight key	1	
8	Oil delivery pipe	1	





5

Order	Job/Part	Q'ty	Remarks
9	Camshaft cover	1	For installation, reverse the removal procedure.
10	Camshaft cover gasket	1	
11	Dowel pin	1	
12	Front cylinder camshaft end cover	1	
13	Front cylinder camshaft	1	
14	Rear cylinder camshaft	1	



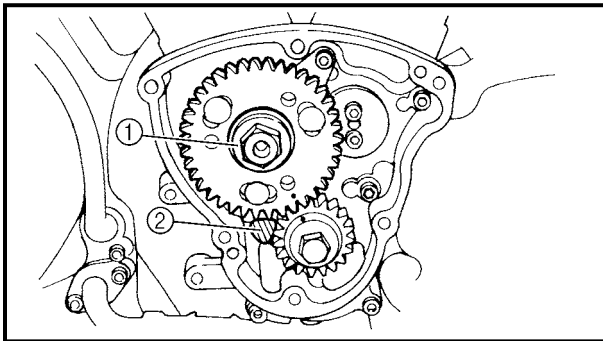
## REMOVING THE CAMSHAFTS

### 1. Loosen:

- front cylinder camshaft end cover bolts ①
- camshaft drive gear bolt ②

### NOTE:

- Place a folded copper washer ③ between the teeth of the camshaft drive gear and camshaft driven gear in order to lock them.
- Do not damage the teeth of the camshaft drive and camshaft driven gears.

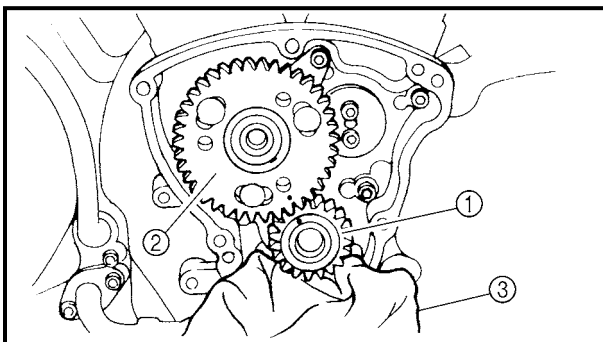


### 2. Loosen:

- camshaft driven gear nut ①

### NOTE:

- Place a folded copper washer ② between the teeth of the camshaft drive gear and camshaft driven gear in order to lock them.
- Do not damage the teeth of the camshaft drive and camshaft driven gears.

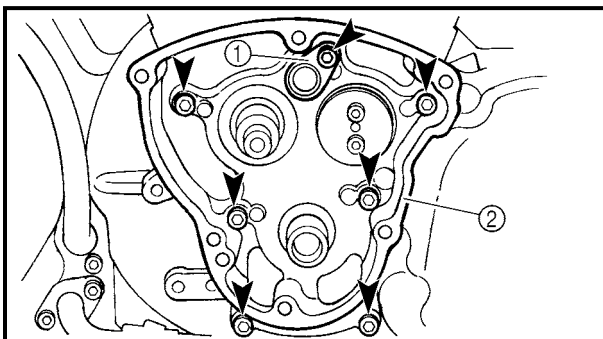


### 3. Remove:

- front cylinder camshaft end cover
- camshaft drive gear ①
- camshaft driven gear ②
- straight keys

### NOTE:

Cover the crankcase hole with a clean rag ③ to prevent the straight keys from falling into the crankcase.



### 4. Remove:

- oil delivery pipe ①
- camshaft cover ②  
(along with the camshafts)

### 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.



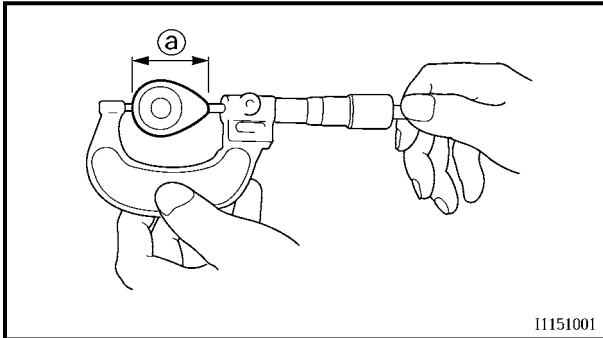
EAS00204

**CHECKING THE CAMSHAFTS**

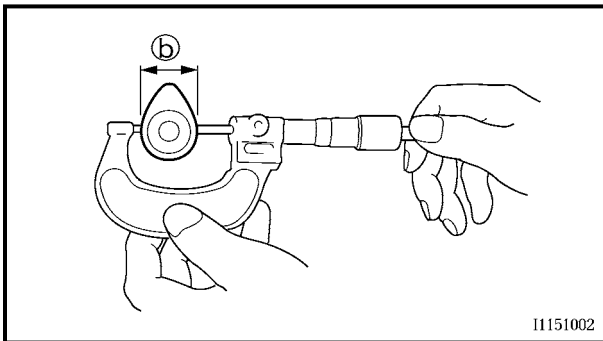
## 1. Check:

- cams

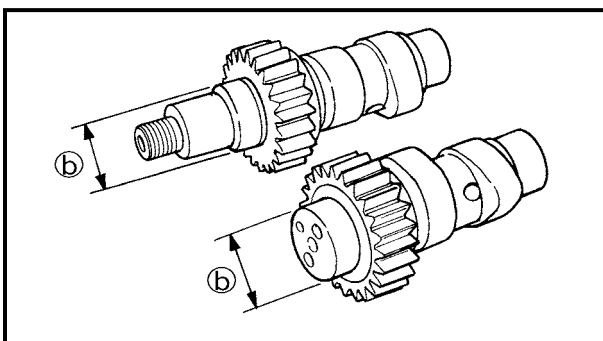
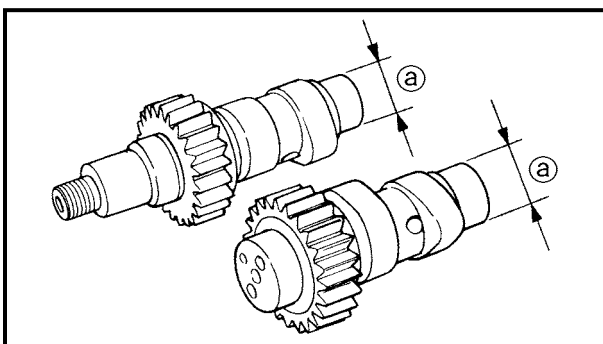
Blue discoloration/pitting/scratches →  
Replace the camshaft.



I1151001



I1151002



## 2. Measure:

- cam dimensions ① and ②

Out of specification → Replace the camshaft.

**Minimum cam lobe dimensions****Intake cam**

① 36.494 mm (1.4368 in)

② 31.850 mm (1.2539 in)

**Exhaust cam**

① 36.454 mm (1.4352 in)

② 31.850 mm (1.2539 in)

## 3. Measure:

- camshaft journal diameter (crankcase side) ①

Out of specification → Replace the camshaft.

**Camshaft journal diameter  
(crankcase side)**

24.937 ~ 24.950 mm

(0.9818 ~ 0.9823 in)

## 4. Measure:

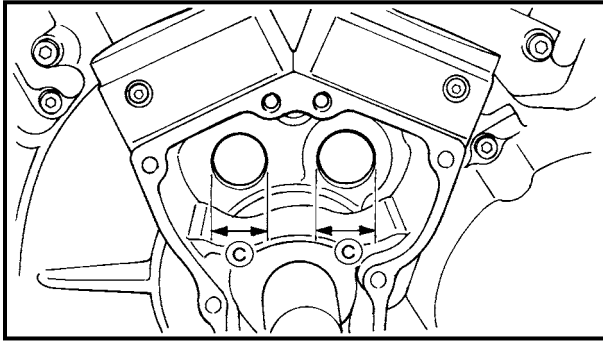
- camshaft journal diameter (camshaft cover side) ②

Out of specification → Replace the camshaft.

**Camshaft journal diameter  
(camshaft cover side)**

27.967 ~ 27.980 mm

(1.1011 ~ 1.1016 in)

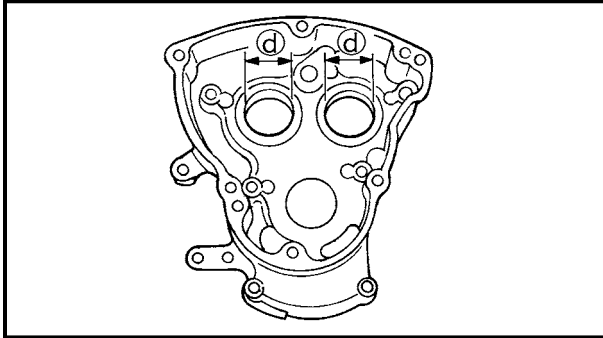


5. Measure:

- crankcase hole inside diameter ©  
Out of specification → Replace the crankcase.



**Crankcase hole inside diameter**  
25.000 ~ 25.021 mm  
(0.9843 ~ 0.9851 in)



6. Measure:

- camshaft cover hole inside diameter ©  
Out of specification → Replace the camshaft cover.



**Camshaft cover hole inside diameter**  
28.000 ~ 28.021 mm  
(1.1024 ~ 1.1032 in)

7. Calculate:

- camshaft-to-crankcase clearance  
Out of specification → Replace the defective part(s).

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

Calculate the clearance by subtracting the crankcase side camshaft journal diameter (crankcase side) from the crankcase hole inside diameter.



**Camshaft to crankcase clearance**  
0.050 ~ 0.084 mm  
(0.0020 ~ 0.0033 in)

8. Calculate:

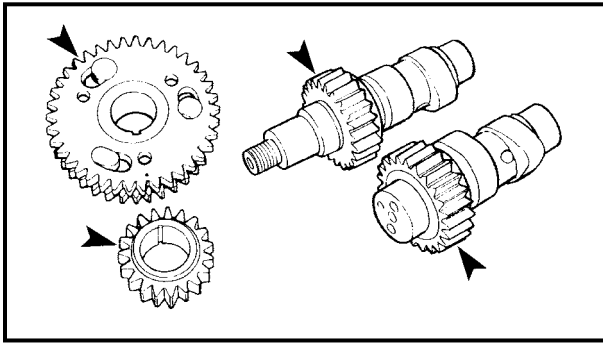
- camshaft-to-camshaft cover clearance  
Out of specification → Replace the defective part(s).

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

Calculate the clearance by subtracting the camshaft journal diameter (camshaft cover side) from the camshaft cover hole inside diameter.



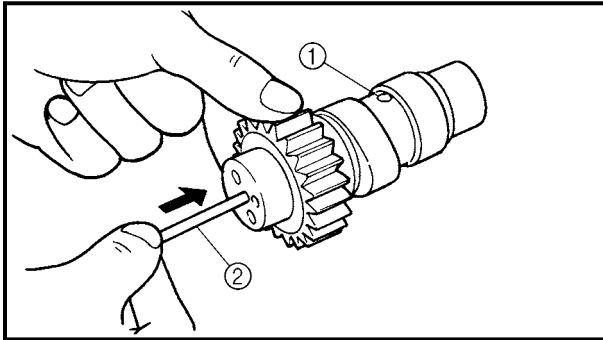
**Camshaft to camshaft cover clearance**  
0.020 ~ 0.054 mm  
(0.0008 ~ 0.0021 in)



## 9. Check:

- camshaft drive gears
- camshaft driven gears

Chips/pitting/roughness/wear → Replace the defective part(s).

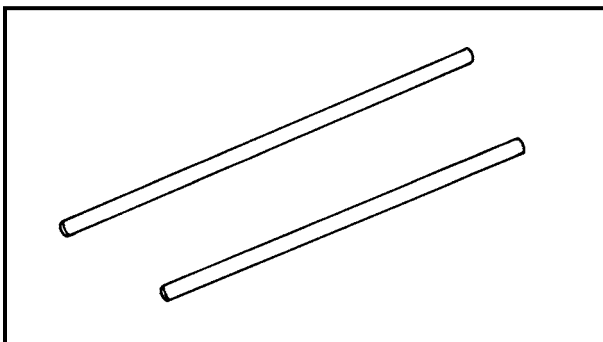
**CHECKING THE DECOMPRESSION SYSTEM**

## 1. Check:

- decompression system

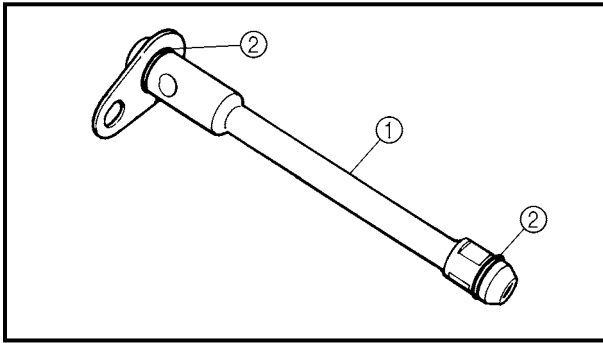
**NOTE:**

- Check the decompression system while the decompression push rod is installed in the camshaft.
- Check that the decompression pin ① projects from the camshaft.
- Check that the decompression push rod ② moves smoothly.



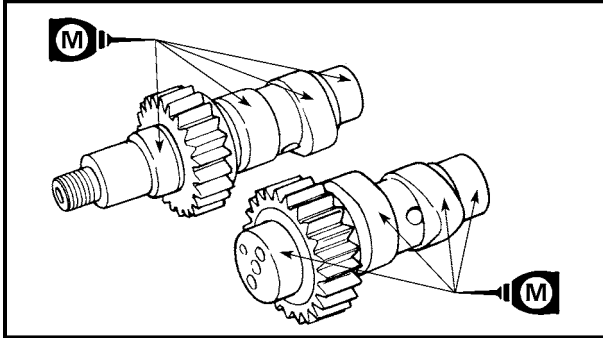
## 2. Check:

- decompression push rods
- Bends/damage → Replace.

**CHECKING THE OIL DELIVERY PIPE**

## 1. Check:

- oil delivery pipe ①  
Damage → Replace.  
Obstruction → Wash and blow out with compressed air.
- O-rings ②  
Damage/wear → Replace.

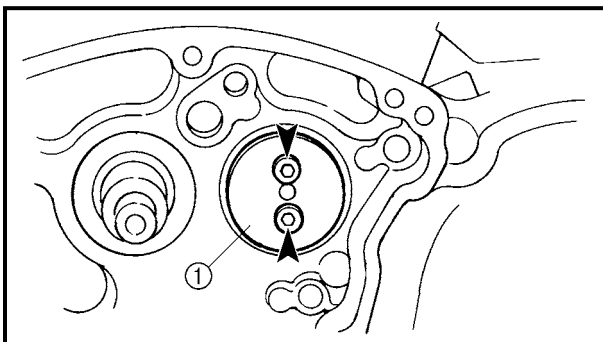
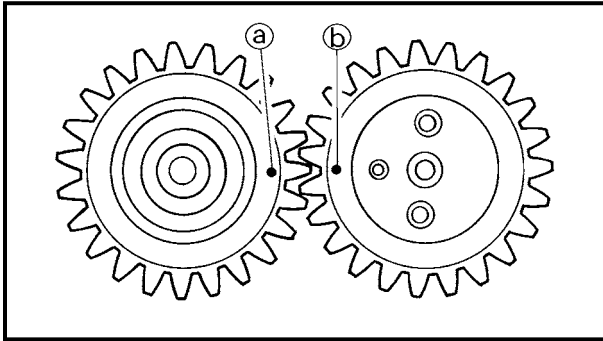
**INSTALLING THE CAMSHAFTS**

## 1. Install:

- camshafts  
(to the camshaft cover)
- front cylinder camshaft end cover

**NOTE:**

- Apply molybdenum disulfide oil onto the camshaft journals and cam lobes.
- Align the punch mark ① on the rear cylinder camshaft with the punch mark ② on the front cylinder camshaft.

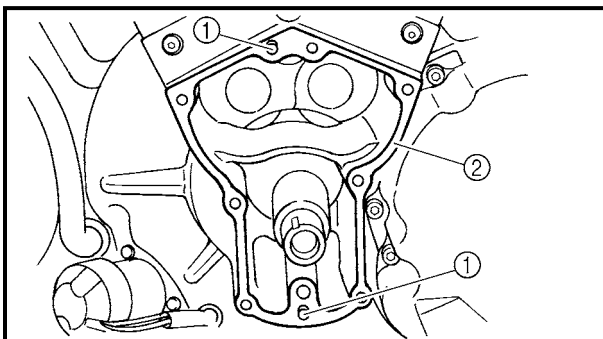


## 2. Install:

- front cylinder camshaft end cover ①

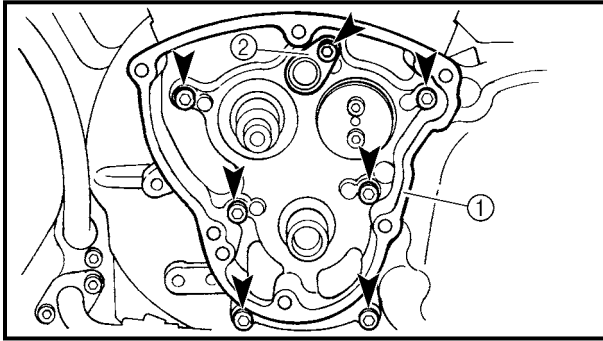
**NOTE:**

Finger tighten the end cover bolts.



## 3. Install:

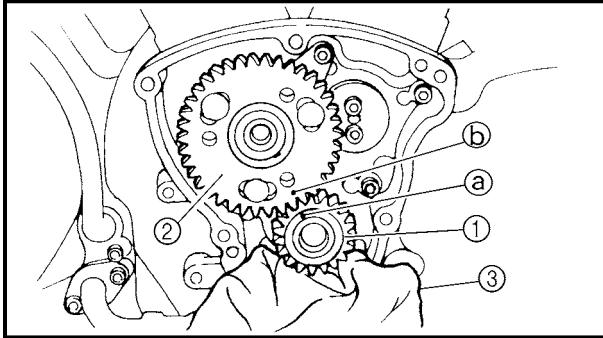
- dowel pins ①
- camshaft cover gasket ② **New**



4. Install:
- camshaft cover ①  
(along with the camshafts)
  - oil delivery pipe ②

**NOTE:**

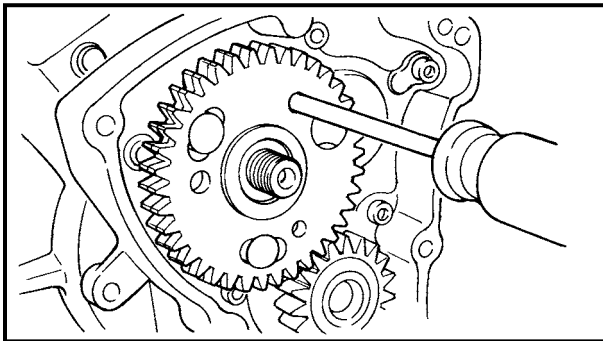
Tighten the camshaft cover bolts in stages and in a crisscross pattern.



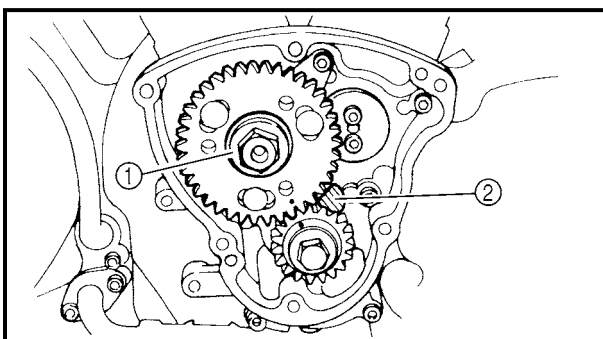
5. Install:
- straight keys ③
  - camshaft drive gear ①
  - camshaft driven gear ②

**NOTE:**


- Cover the crankcase hole with a clean rag ③ to prevent the straight keys from falling into the crankcase.
- Align the punch mark ④ on the camshaft drive gear ① with the punch mark ⑤ on the camshaft driven gear ②.
- Insert a cross-headed screwdriver into one of the holes in the outer camshaft driven gear and rotate the gear until the teeth of both driven gears are aligned. The teeth of both camshaft driven gears must be aligned for installation.



6. Install:
- washers
  - camshaft drive gear bolt
  - camshaft driven gear nut

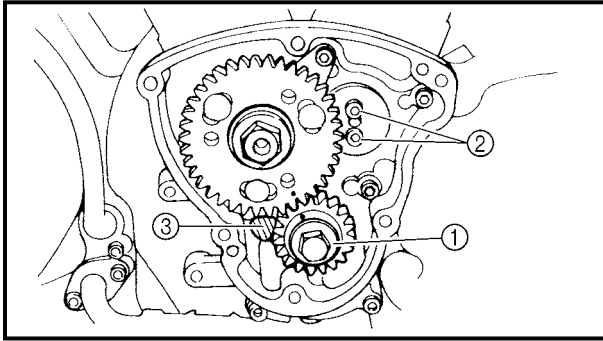


7. Tighten:
- camshaft driven gear nut ①

 52 Nm (5.2 m · kg, 37 ft · lb)


**NOTE:**

- Place a folded copper washer ② between the teeth of the camshaft drive gear and camshaft driven gear in order to lock them.
- Do not damage the teeth of the camshaft drive and camshaft driven gear.



## 8. Tighten:

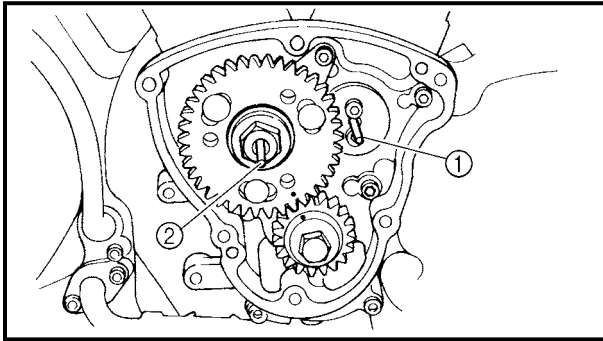
- camshaft drive gear bolt ①

 30 Nm (3.0 m · kg, 22 ft · lb)

- front cylinder camshaft end cover bolts ②

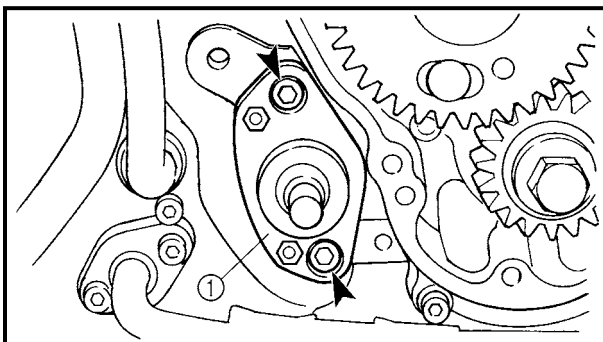
**NOTE:**

- Place a folded copper washer ③ between the teeth of the camshaft drive gear and camshaft driven gear in order to lock them.
- Do not damage the teeth of the camshaft drive and camshaft driven gear.



## 9. Install:

- short decompression push rod ①
- long decompression push rod ②



## 10. Install:

- decompression solenoid ①

## 11. Install:

- valve lifters
- push rods
- rocker arms
- cylinder head covers  
Refer to "ROCKER ARMS, PUSH RODS AND VALVE LIFTERS".
- exhaust pipes
- muffler  
Refer to "ENGINE".



**12.Fill:**

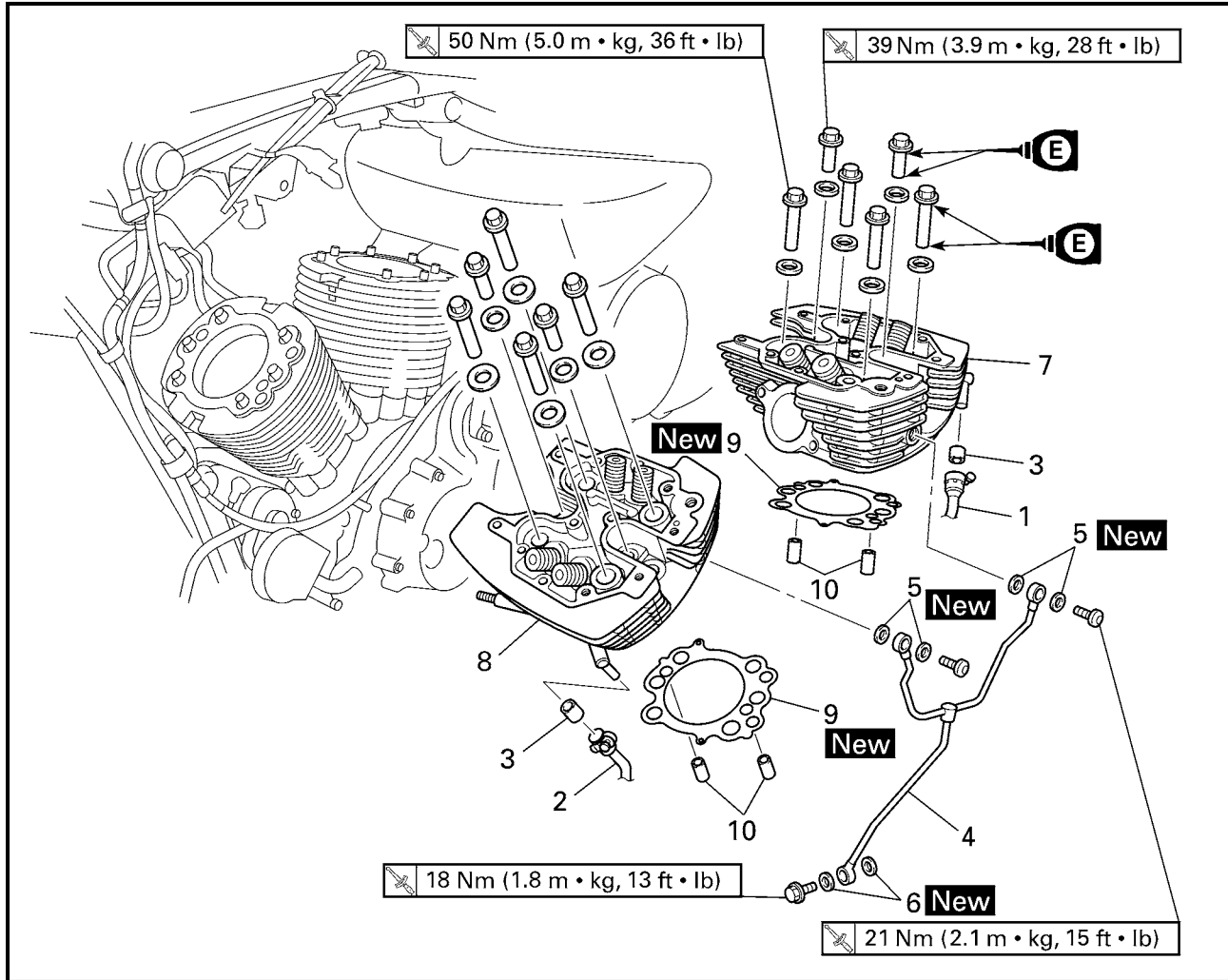
- oil tank  
(with the specified amount of the recommended engine oil)  
Refer to "CHANGING THE ENGINE OIL" in chapter 3.

**13.Install:**

- air filter case
  - fuel tank
  - rider seat
- Refer to "AIR FILTER CASE", "FUEL TANK" and "SEATS AND SIDE COVERS" in chapter 3.

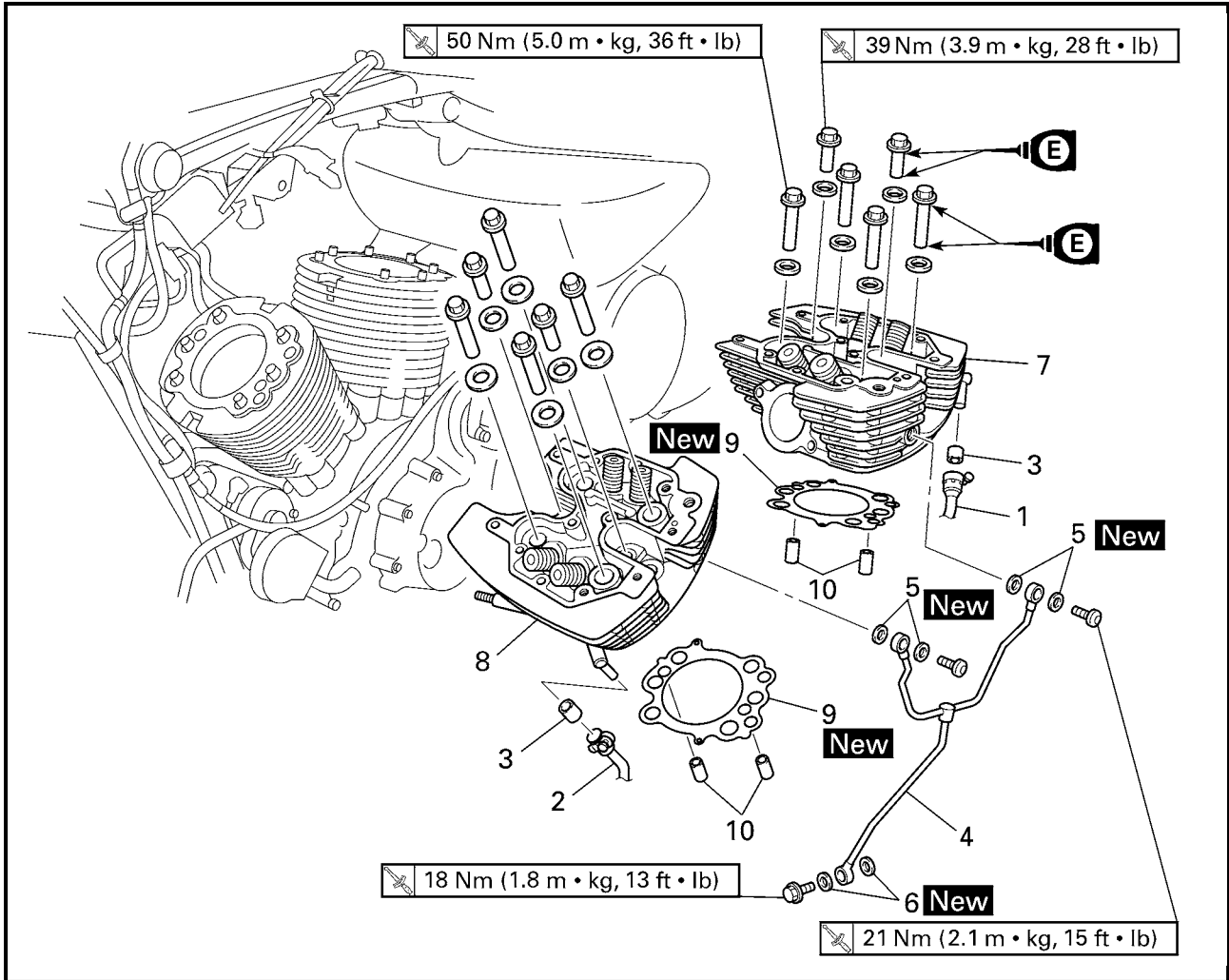


CYLINDER HEADS



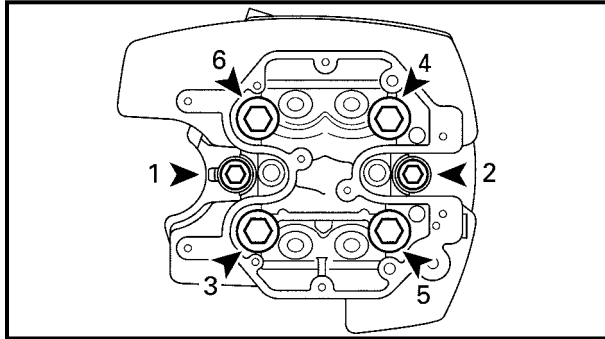
5

Order	Job/Part	Q'ty	Remarks
	<b>Removing the cylinder head</b>		Remove the parts in the order listed.
	Rider seat/fuel tank/air filter case		Refer to "SEATS AND SIDE COVERS", "FUEL TANK" and "AIR FILTER CASE" in chapter 3.
	Carburetor/carburetor joint		Refer to "CARBURETOR" in chapter 6.
	Muffler/exhaust pipes		Refer to "ENGINE".
	Rocker arms/push rod cover		Refer to "ROCKER ARMS, PUSH RODS AND VALVE LIFTERS".
1	Reed valve case to rear cylinder pipe	1	Disconnect.
2	Reed valve case to front cylinder pipe	1	Disconnect.
3	Gasket	2	
4	Oil delivery pipe	1	
5	Copper washer	4	



5

Order	Job/Part	Q'ty	Remarks
6	Copper washer	2	For installation, reverse the removal procedure.
7	Rear cylinder head	1	
8	Front cylinder head	1	
9	Cylinder head gasket	2	
10	Dowel pin	4	

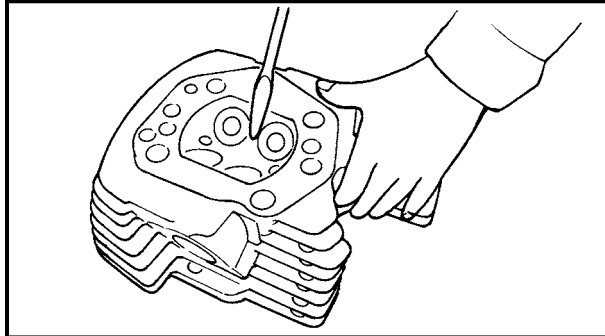


**REMOVING THE CYLINDER HEADS**

1. Remove:
- cylinder head

**NOTE:**

- Loosen the nuts in the proper sequence.
- Follow the numerical order shown in the illustration. Loosen each bolt 1/4 of a turn at a time until all of the nuts are loose.



EAS00228

**CHECKING THE CYLINDER HEADS**

The following procedure applies to each cylinder head.

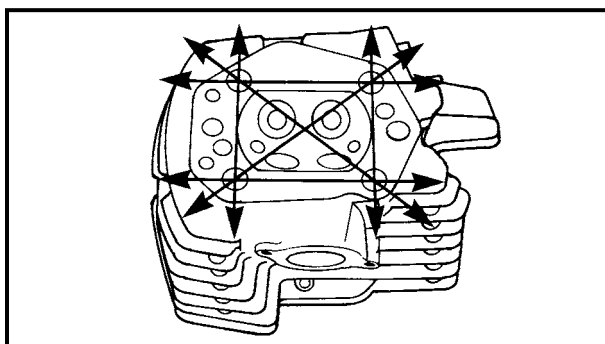
1. Eliminate:
- combustion chamber carbon deposits (with a rounded scraper)

**NOTE:**

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

- spark plug bore threads
- valve seats

**5**



2. Check:
- cylinder head  
Damage/scratches → Replace.
3. Measure:
- cylinder head warpage  
Out of specification → Resurface the cylinder head.



**Maximum cylinder head warpage  
0.10 mm (0.0039 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:** \_\_\_\_\_

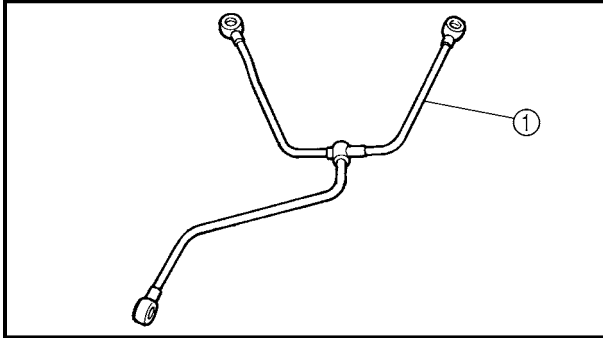
To ensure an even surface, rotate the cylinder head several times.



**CHECKING THE OIL DELIVERY PIPE**

1. Check:

- oil delivery pipe ①  
Damage → Replace.  
Obstruction → Wash and blow out with compressed air.

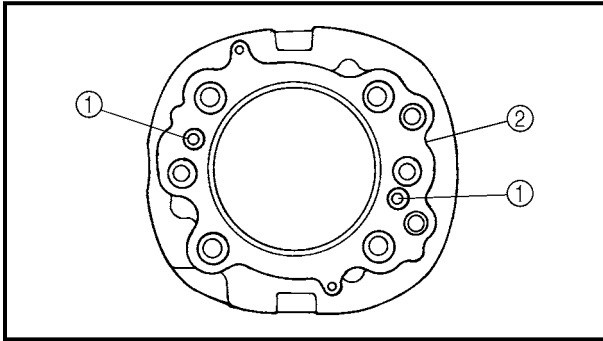


EAS00232

**INSTALLING THE CYLINDER HEADS**

1. Install:

- dowel pins ①
- gasket ② **New**



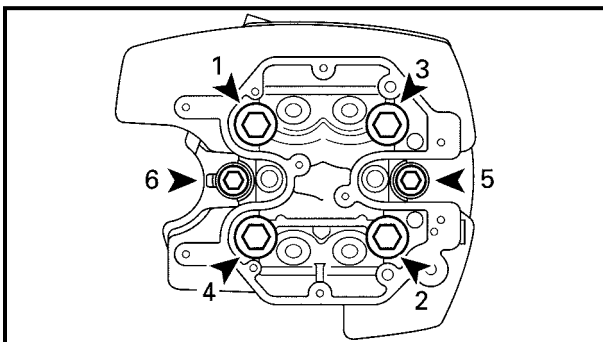
2. Install:

- cylinder heads
- washers
- cylinder head nuts (M12: 1 ~ 4)

50 Nm (5.0 m · kg, 36 ft · lb)

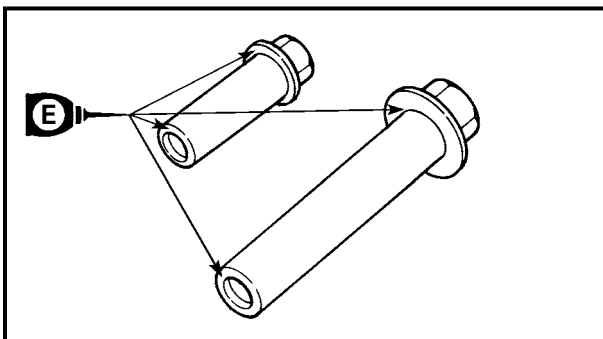
- cylinder head nuts (M10: 5, 6)

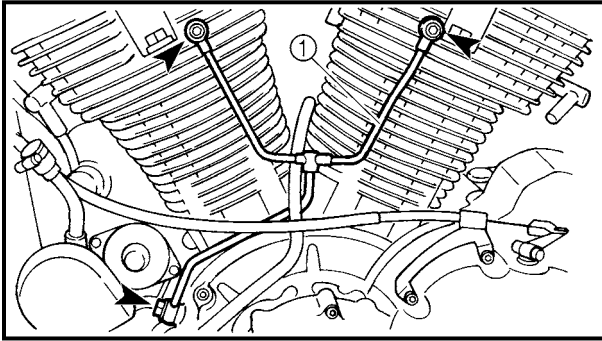
39 Nm (3.9 m · kg, 28 ft · lb)



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

- Lubricate the cylinder head nuts with engine oil.
- Tighten the cylinder head nuts in the proper tightening sequence as shown and torque them in two stages.





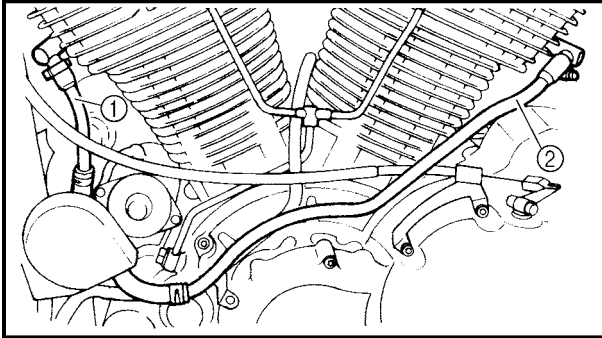
## 3. Install:

- copper washers **New**
- oil delivery pipe ①
- oil delivery pipe bolts (M10)

21 Nm (2.1 m · kg, 15 ft · lb)

- oil delivery pipe bolt (M8)

18 Nm (1.8 m · kg, 13 ft · lb)



## 4. Install:

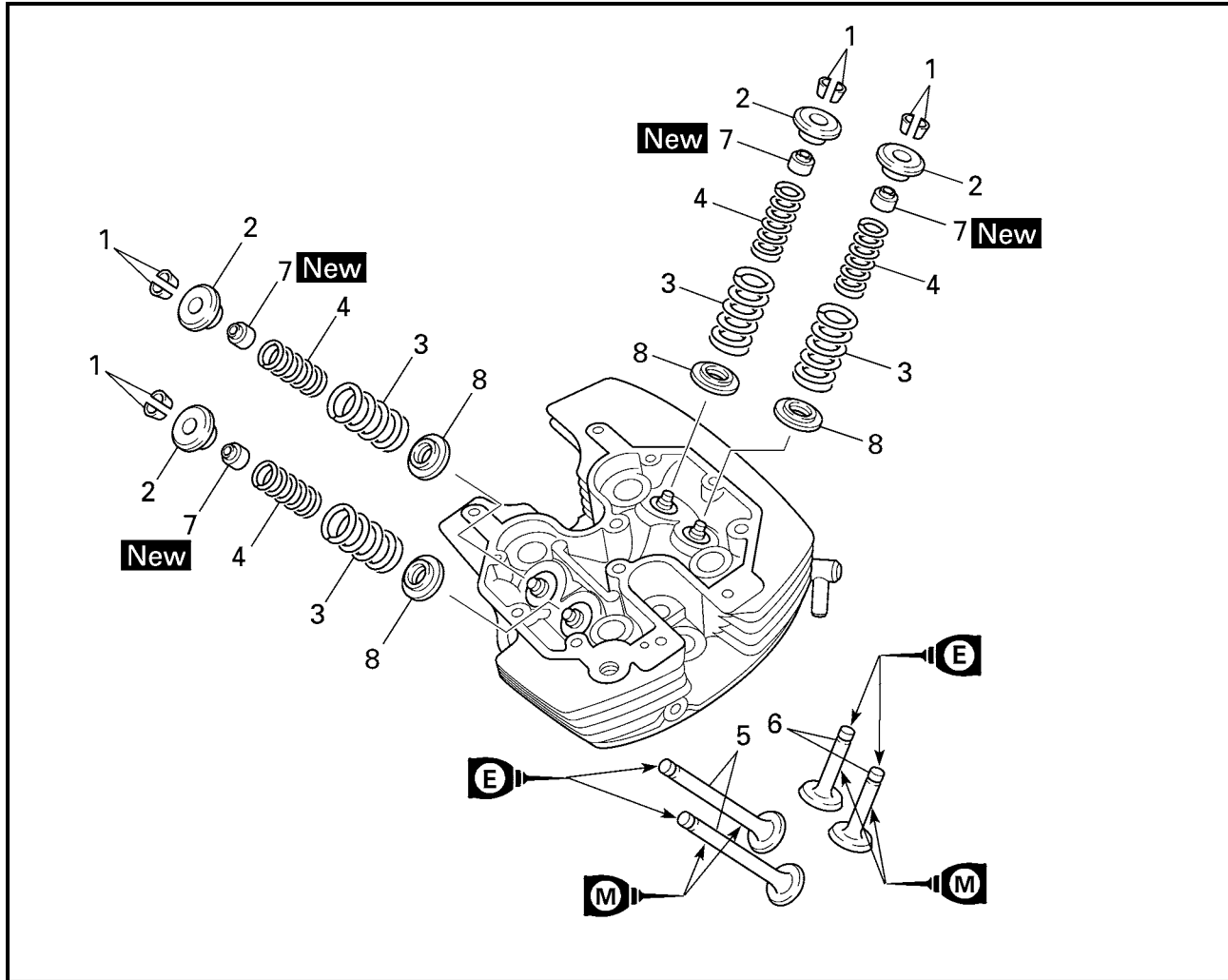
- gaskets
- reed valve case to front cylinder pipe ①
- reed valve case to rear cylinder pipe ②

## 5. Install:

- rocker arms
- cylinder head covers  
Refer to "ROCKER ARMS, PUSH RODS AND VALVE LIFTERS".
- muffler
- exhaust pipes  
Refer to "ENGINE".
- carburetor  
Refer to "CARBURETOR" in chapter 6.
- air filter case
- fuel tank
- rider seat  
Refer to "AIR FILTER CASE", "FUEL TANK" and "SEATS AND SIDE COVERS" in chapter 3.



VALVES AND VALVE SPRINGS



5

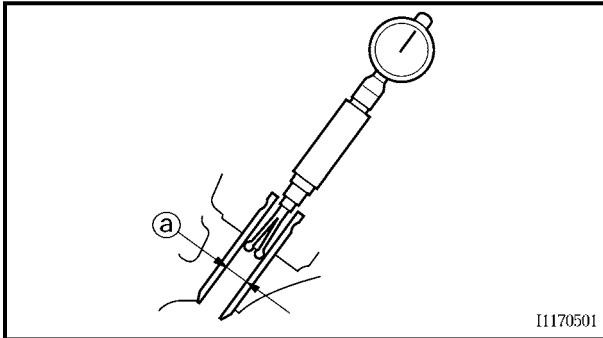
Order	Job/Part	Q'ty	Remarks
	<b>Removing the valves and valve springs</b>		Remove the parts in the order listed.
	Cylinder head		The following procedure applies to both cylinders. Refer to "CYLINDER HEADS".
1	Valve cotter	4	
2	Upper spring seat	4	
3	Outer valve spring	4	
4	Inner valve spring	4	
5	Intake valve	2	
6	Exhaust valve	2	
7	Valve oil seal	4	
8	Lower spring seat	4	
			For installation, reverse the removal procedure.



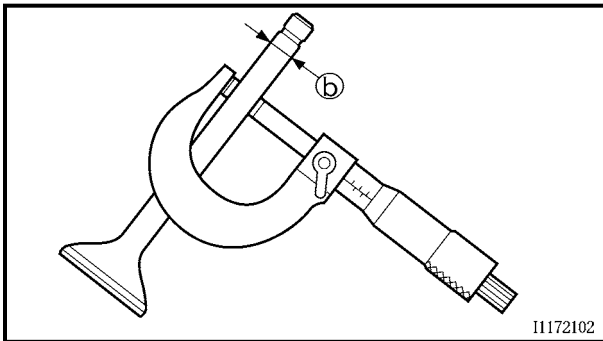




**NOTE:** \_\_\_\_\_  
 Identify the position of each part very carefully so that it can be reinstalled in its original place.



I1170501



I1172102

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

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

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  
 (0.0006 ~ 0.0020 in)  
 <Limit>: 0.1 mm (0.004 in)

2. Replace:
  - valve guide

**NOTE:** \_\_\_\_\_  
 To ease valve guide removal and installation, and to maintain the correct fit, heat the cylinder head to 100 °C (212 °F) in an oven.

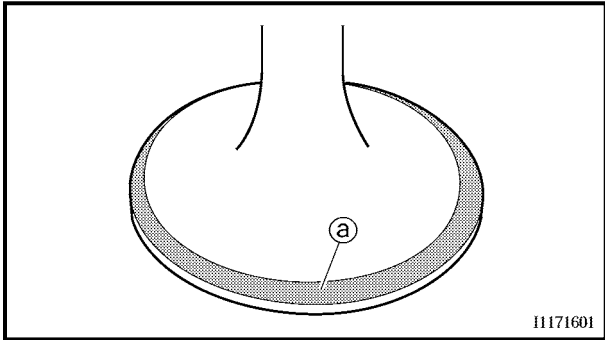




d. Measure the valve seat width.

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

Where the valve seat and valve face contacted one another, the blueing will have been removed.



4. Lap:
- valve face
  - valve seat

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

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



- a. Apply a coarse lapping compound @ to the valve face.

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

**Do not let the lapping compound enter the gap between the valve stem and the valve guide.**

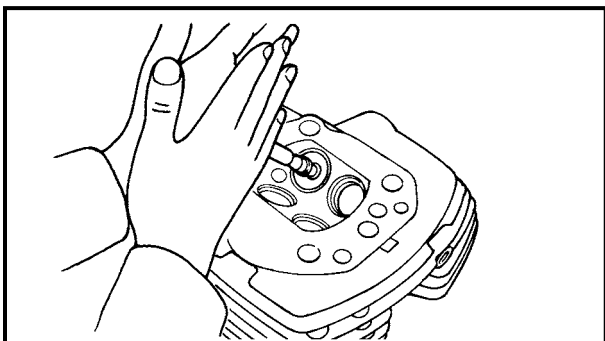
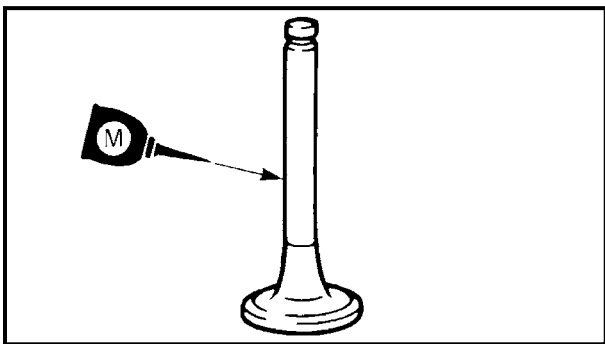
- b. Apply molybdenum disulfide oil onto the valve stem.
- c. Install the valve into the cylinder head.
- d. Turn the valve until the valve face and valve seat are evenly polished, then clean off all of the lapping compound.

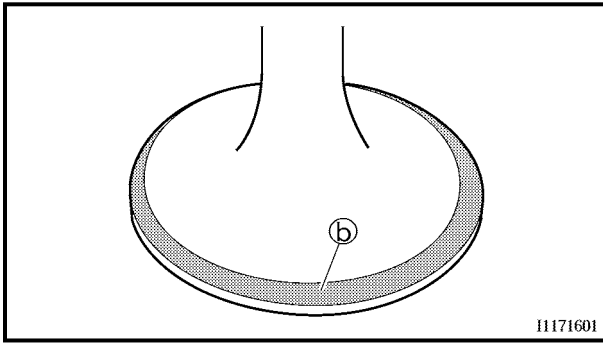
**NOTE:** \_\_\_\_\_

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

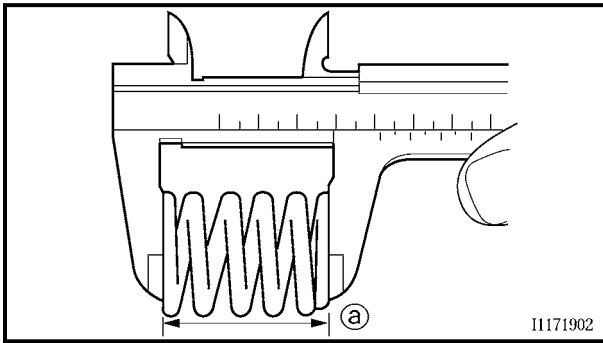
- e. Apply a fine lapping compound to the valve face and repeat the above steps.
- f. After every lapping procedure, be sure to clean off all of the lapping compound from the valve face and valve seat.

5





- g. Apply Mechanic's blueing dye (Dykem) **(b)** 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 again. If the valve seat width is out of specification, reface and lap the valve seat.



EAS00241

**CHECKING THE VALVE SPRINGS**

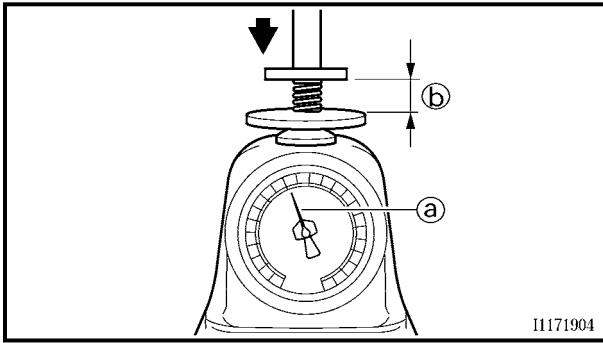
The following procedure applies to all of the valve springs.

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



**Valve spring free length (intake and exhaust)**

- Inner valve spring**
- 38.26 mm (1.51 in)
- <Limit>: 36.26 mm (1.43 in)
- Outer valve spring**
- 43.25 mm (1.70 in)
- <Limit>: 41.26 mm (1.62 in)



2. Measure:

- compressed valve spring force (a)  
Out of specification → Replace the valve spring.

(b) Installed length



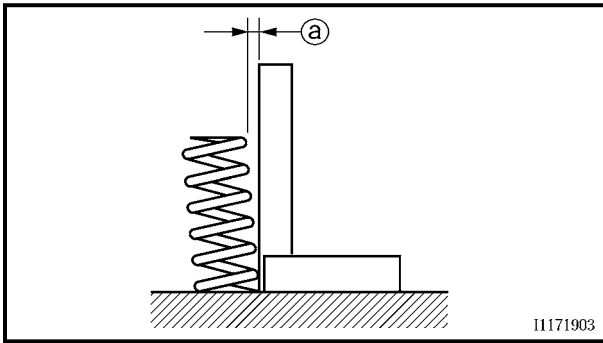
**Compressed valve spring force (installed)**

**Intake and exhaust inner valve spring**

6.3 ~ 7.3 kg at 29.0 mm  
(13.9 ~ 16.1 lb at 1.14 in)

**Intake and exhaust outer valve spring**

13.9 ~ 16.1 kg at 31.0 mm  
(30.6 ~ 35.5 lb at 1.22 in)



3. Measure:

- valve spring tilt (a)  
Out of specification → Replace the valve spring.



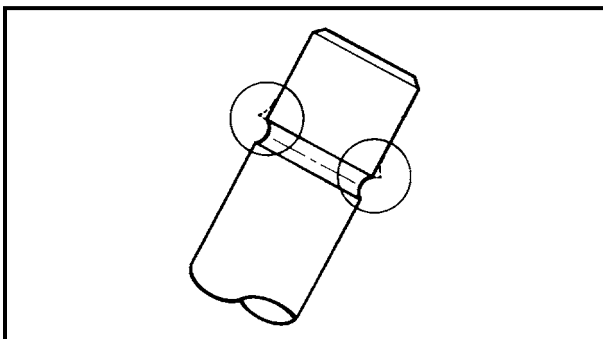
**Maximum valve spring tilt**

**Intake and exhaust inner valve spring**

2.4 mm (0.094 in)

**Intake and exhaust outer valve spring**

2.4 mm (0.094 in)



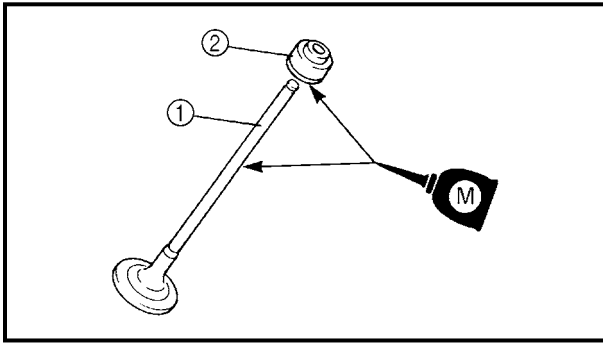
EAS00246

**INSTALLING THE VALVES**

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

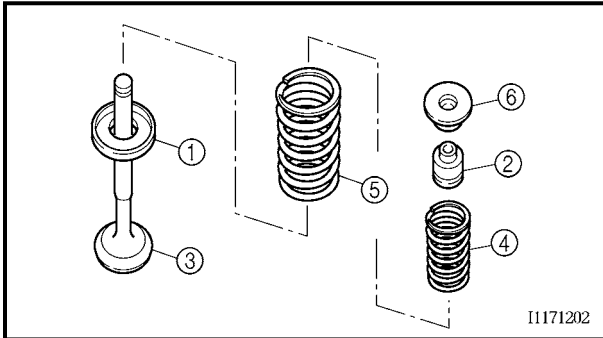
1. Deburr:

- valve stem end  
(with an oil stone)



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

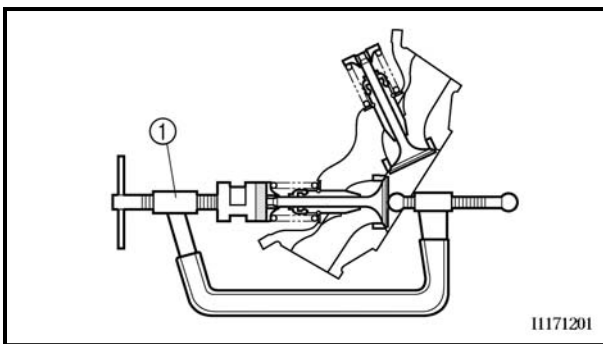
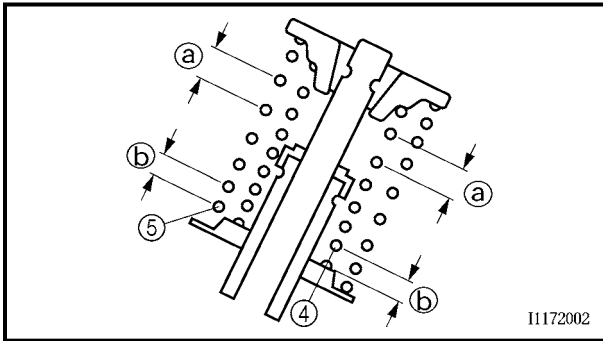
	<b>Recommended lubricant</b> Molybdenum disulfide oil
--	--



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

**NOTE:** \_\_\_\_\_  
Install the valve springs with the larger pitch **a** facing up.

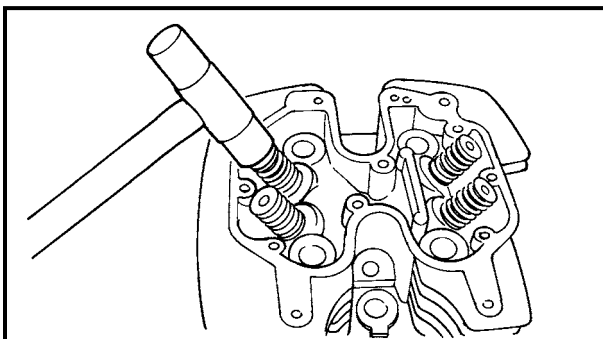
**b** Smaller pitch



4. Install:
  - valve cotters

**NOTE:** \_\_\_\_\_  
Install the valve cotters by compressing the valve springs with the valve spring compressor ①.

	<b>Valve spring compressor</b> YM-04019
--	--



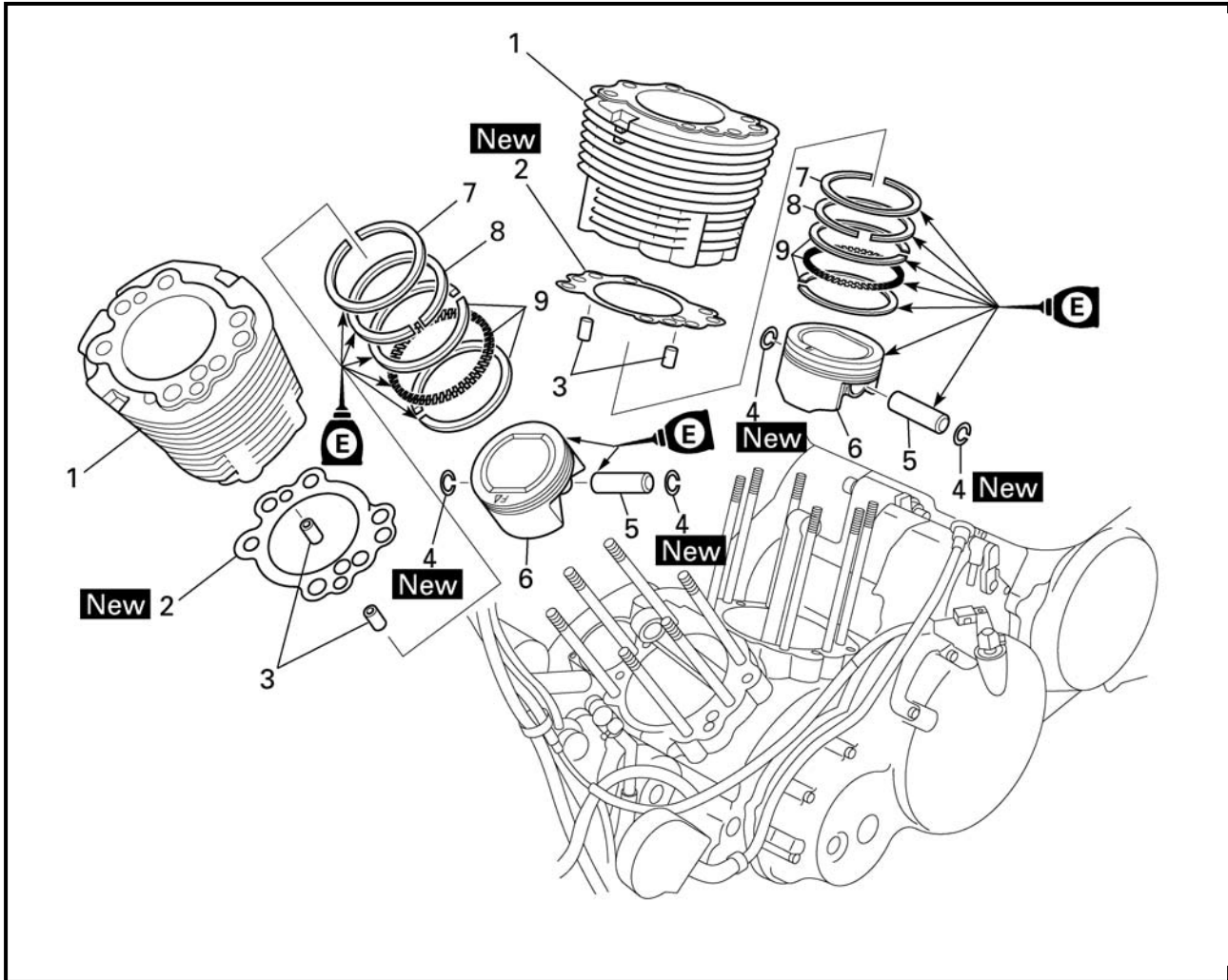
5. To secure the valve cotters onto the valve stem, lightly tap the valve tip with a soft-face hammer.

**CAUTION:** \_\_\_\_\_  
**Hitting the valve tip with excessive force could damage the valve.**

6. Install:
  - cylinder head  
Refer to "CYLINDER HEADS".

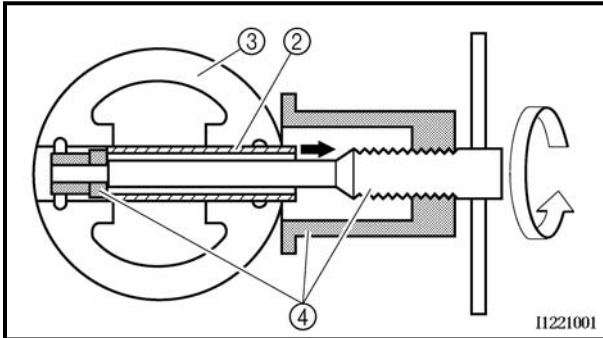
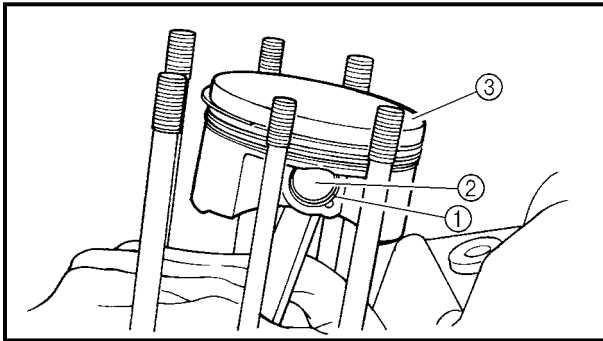
EAS00251

CYLINDERS AND PISTONS



Order	Job/Part	Q'ty	Remarks
	<b>Removing the cylinders and pistons</b>		Remove the parts in the order listed. Refer to "CYLINDER HEAD".
1	Cylinder	2	
2	Cylinder gasket	2	
3	Dowel pin	4	
4	Piston pin clip	4	
5	Piston pin	2	
6	Piston	2	
7	Top ring	2	
8	2nd ring	2	
9	Oil ring	2	
			For installation, reverse the removal procedure.





EAS00254

**REMOVING THE CYLINDERS AND PISTONS**

The following procedure applies to all of the cylinders and pistons.

1. Remove:
  - piston pin clip ①
  - piston pin ②
  - piston ③

**CAUTION:**

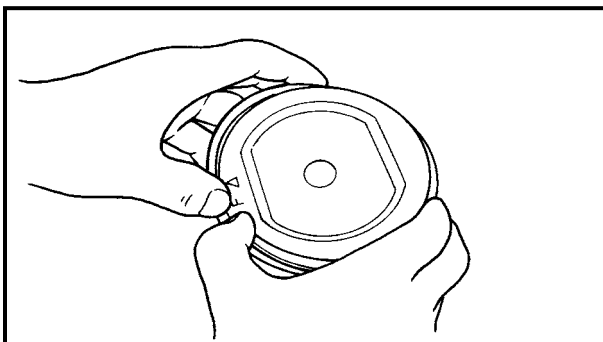
**Do not use a hammer to drive the piston pin out.**

**NOTE:**

- Before removing the piston pin clip, cover the crankcase opening with a clean rag to prevent the piston pin clip from falling into the crankcase.
- For reference during installation, put an identification mark on each piston crown.
- Before removing the piston pin, deburr the piston pin clip groove and the piston pin bore area. 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  
YU-01304**



2. Remove:
  - top ring
  - 2nd ring
  - oil ring

**NOTE:**

When removing a piston ring, open the end gap with your fingers and lift the other side of the ring over the piston crown.

EAS00258

**CHECKING THE CYLINDERS AND PISTONS**

The following procedure applies to all of the cylinders and pistons.

1. Check:
  - piston wall
  - cylinder wall

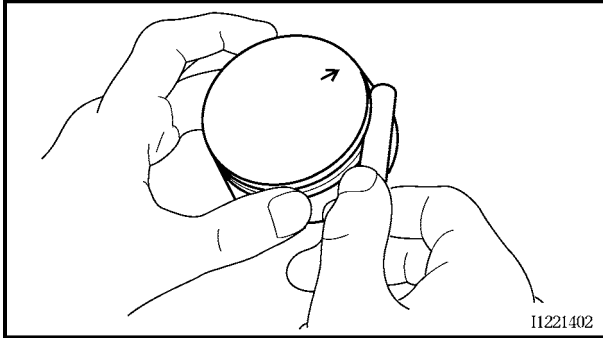
Vertical scratches → Replace the cylinder, and the piston and piston rings as a set.





**Piston-to-cylinder clearance**  
 0.025 ~ 0.050 mm  
 (0.001 ~ 0.002 in)  
 <Limit>: 0.15 mm (0.006 in)

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



I1221402

EAS00263

**CHECKING THE PISTON RINGS**

1. Measure:

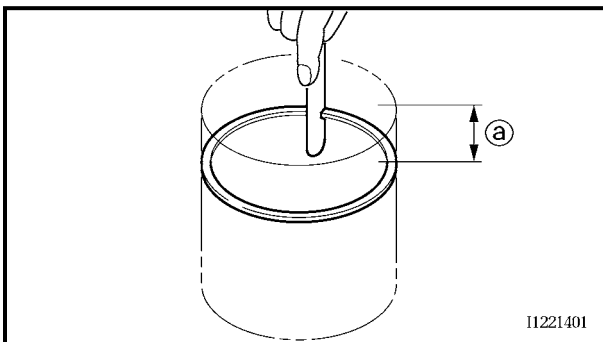
- piston ring side clearance  
 Out of specification → Replace the piston and piston rings as a set.

**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**  
 0.03 ~ 0.08 mm  
 (0.0012 ~ 0.0031 in)  
 <Limit>: 0.12 mm (0.0047 in)  
**2nd ring**  
 0.03 ~ 0.07 mm  
 (0.0012 ~ 0.0028 in)  
 <Limit>: 0.12 mm (0.0047 in)



I1221401

2. Install:

- piston ring  
 (into the cylinder)

**NOTE:**

Level the piston ring in the cylinder with the piston crown.

① 10 mm (0.39 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**

0.30 ~ 0.45 mm (0.012 ~ 0.018 in)

<Limit>: 0.65 mm (0.026 in)

**2nd ring**

0.30 ~ 0.45 mm (0.012 ~ 0.018 in)

<Limit>: 0.80 mm (0.031 in)

**Oil ring**

0.2 ~ 0.7 mm (0.008 ~ 0.028 in)

EAS00266

**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 ①

Out of specification → Replace the piston pin.



**Piston pin outside diameter**

21.991 ~ 22.000 mm

(0.8658 ~ 0.8661 in)

<Limit>: 21.971 mm (0.8650 in)

3. Measure:

- piston pin bore diameter (in the piston) ②

Out of specification → Replace the piston pin.

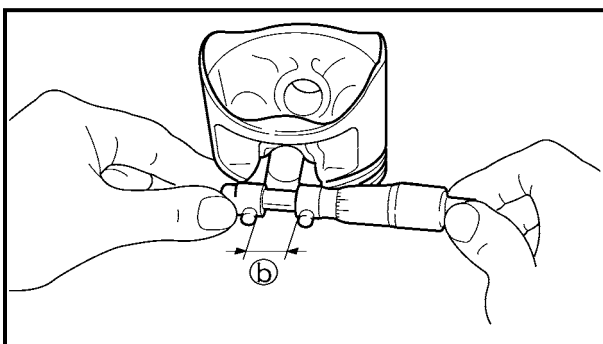
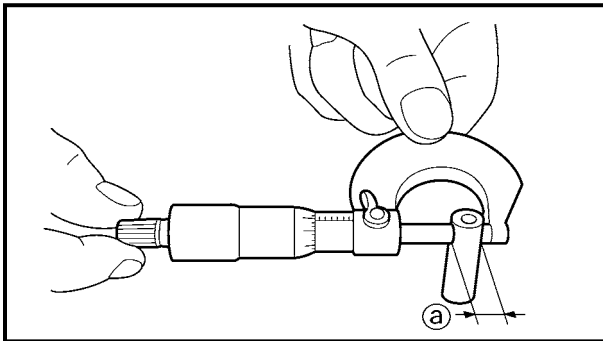


**Piston pin bore diameter (in the piston)**

22.004 ~ 22.015 mm

(0.8663 ~ 0.8667 in)

<Limit>: 22.045 mm (0.8679 in)



5



4. Calculate:

- piston pin-to-piston pin bore clearance  
Out of specification → Replace the piston pin.

$$\text{Piston pin-to-piston pin bore clearance} = \text{Piston pin bore diameter (in the piston) } \textcircled{b} - \text{Piston pin outside diameter } \textcircled{a}$$

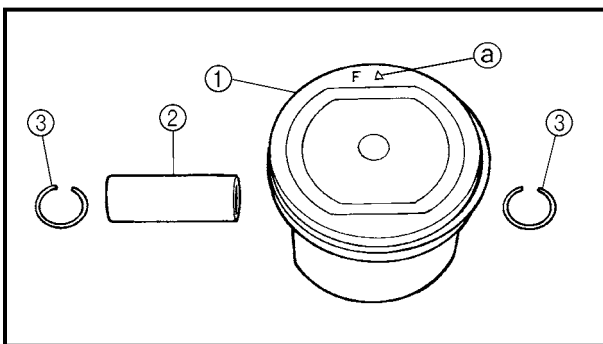
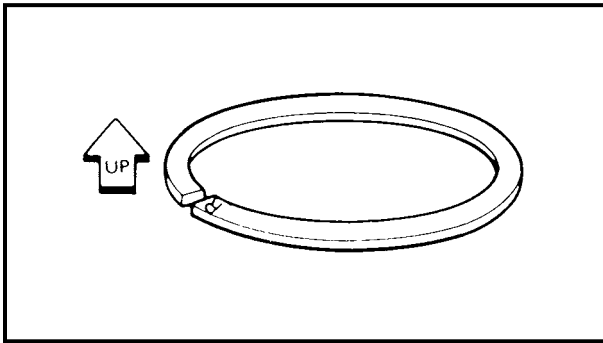


**Piston pin-to-piston pin bore clearance**

0.004 ~ 0.024 mm

(0.00016 ~ 0.00094 in)

<Limit>: 0.074 mm (0.0029 in)



EAS00268

### INSTALLING THE PISTONS AND CYLINDERS

The following procedure applies to all of the pistons and cylinders.

1. Install:

- top ring
- 2nd ring
- lower oil ring rail
- upper oil ring rail
- oil ring expander

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

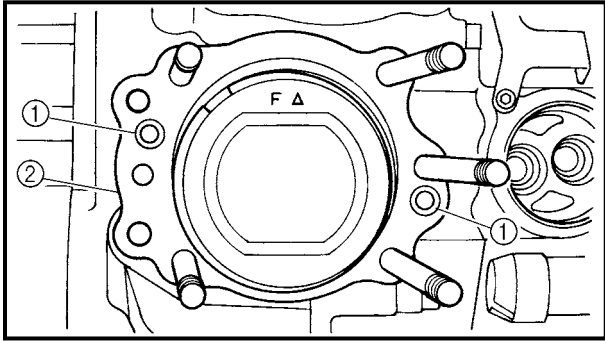
Be sure to install the piston rings so that the manufacturer's marks or numbers face up.

2. Install:

- piston ①
- piston pin ②
- piston pin clip ③ **New**

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

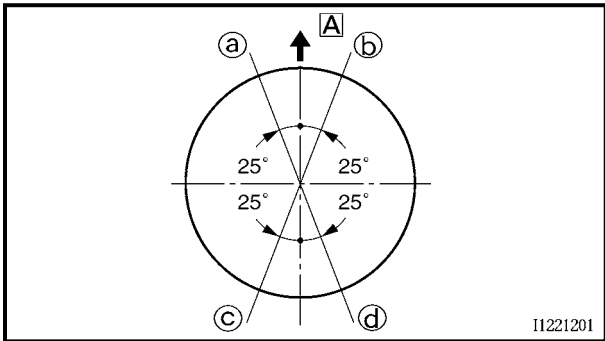
- Apply engine oil onto the piston pin.
- Make sure the "arrow" mark ④ on the piston faces towards the front of the motorcycle.
- Before installing the piston pin clip, cover the crankcase opening with a clean rag to prevent the clip from falling into the crankcase.



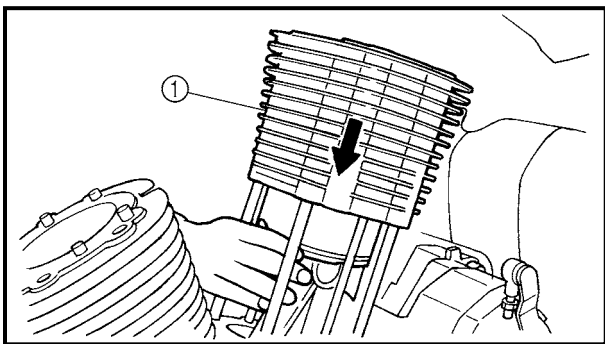
3. Install:
- dowel pins ①
  - gasket ② **New**

4. Lubricate:
- piston
  - piston rings
  - cylinder  
(with the recommended lubricant)

	<b>Recommended lubricant</b> Engine oil
--	--



5. Offset:
- piston ring end gaps
- Ⓐ Top ring  
 Ⓑ Lower oil ring rail  
 Ⓒ Upper oil ring rail  
 Ⓓ 2nd ring  
 Ⓐ Front of the motorcycle



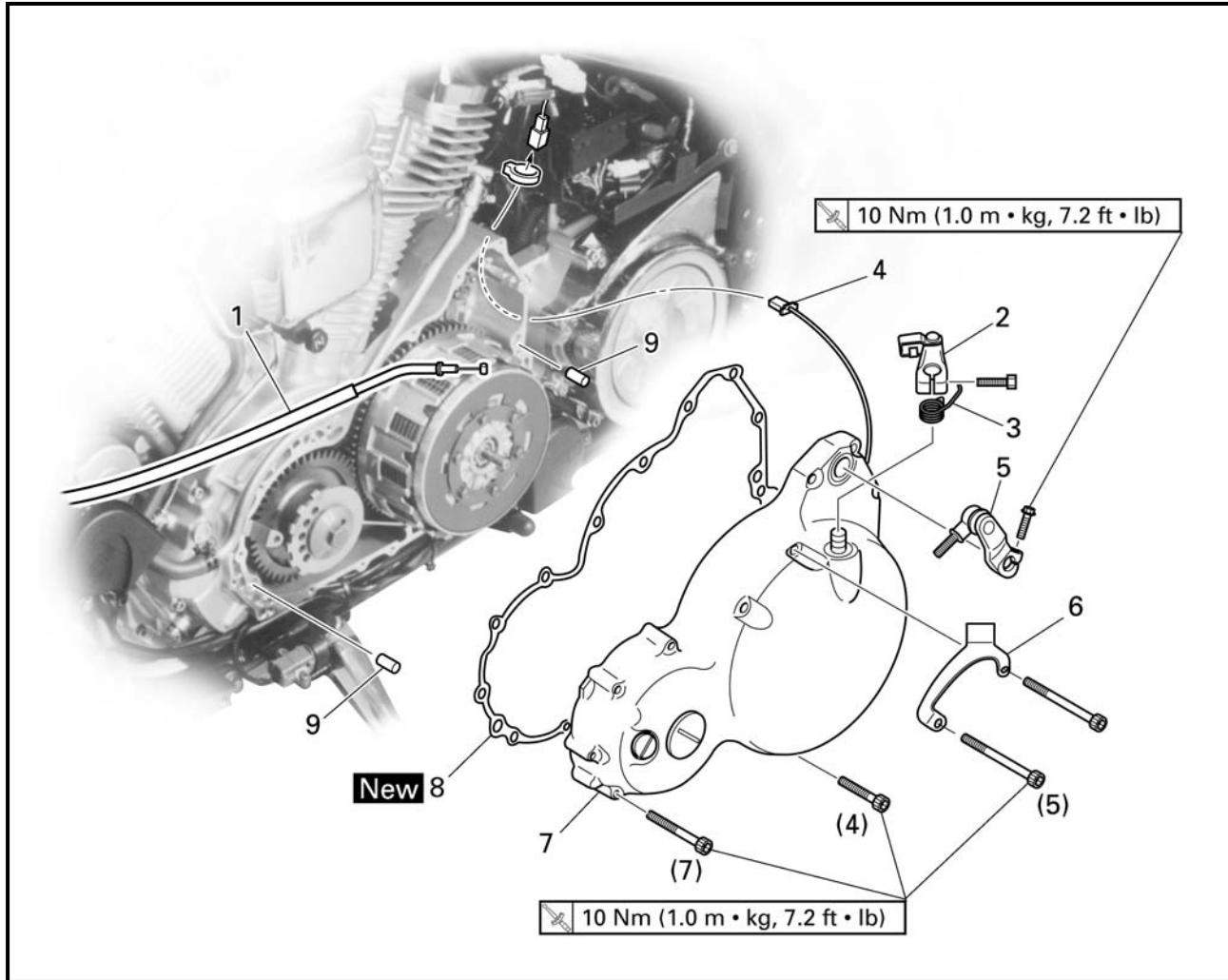
6. Install:
- cylinder ①

**NOTE:** \_\_\_\_\_  
 While compressing the piston rings with one hand, install the cylinder with the other hand.  
 \_\_\_\_\_

5

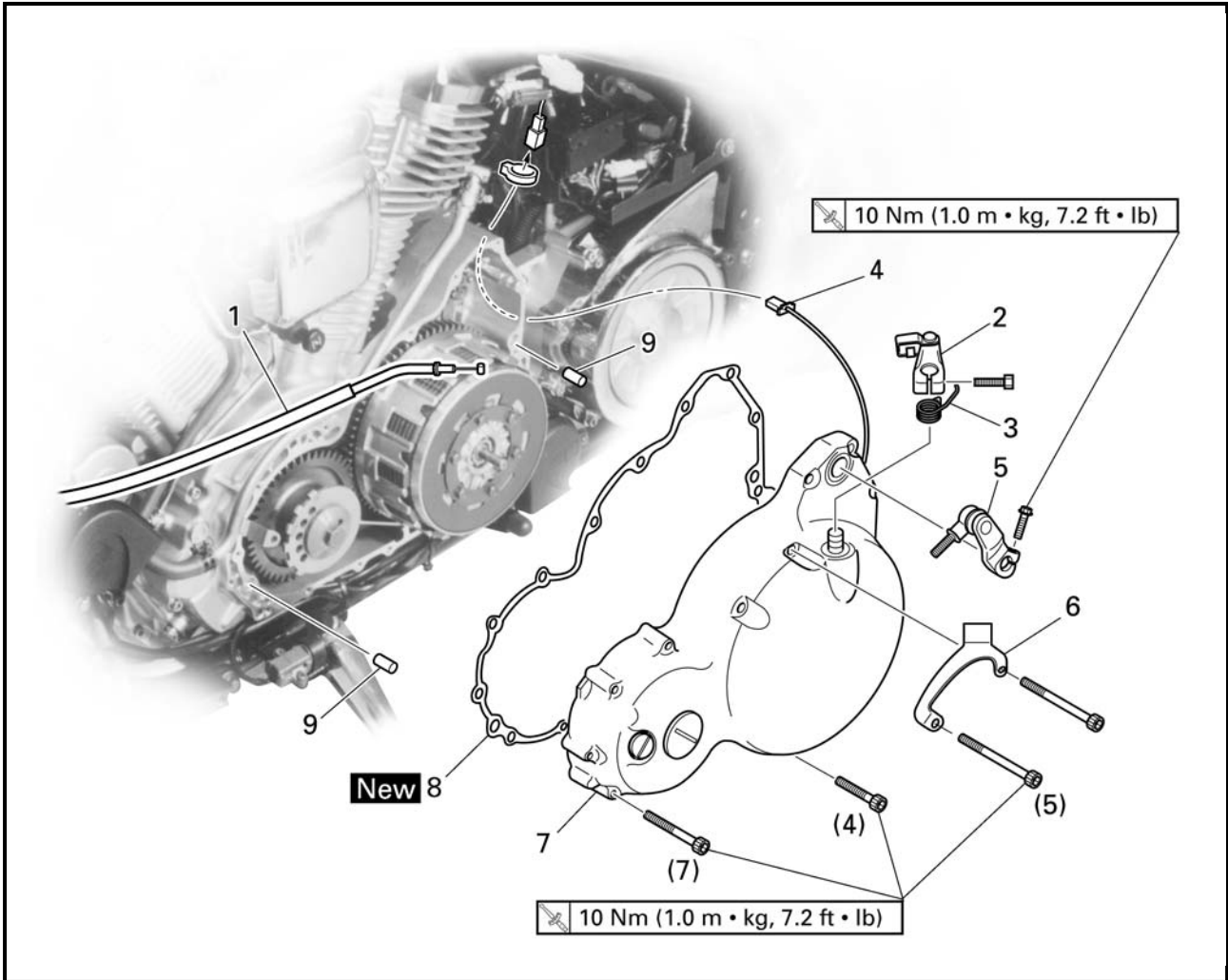


EAS00273



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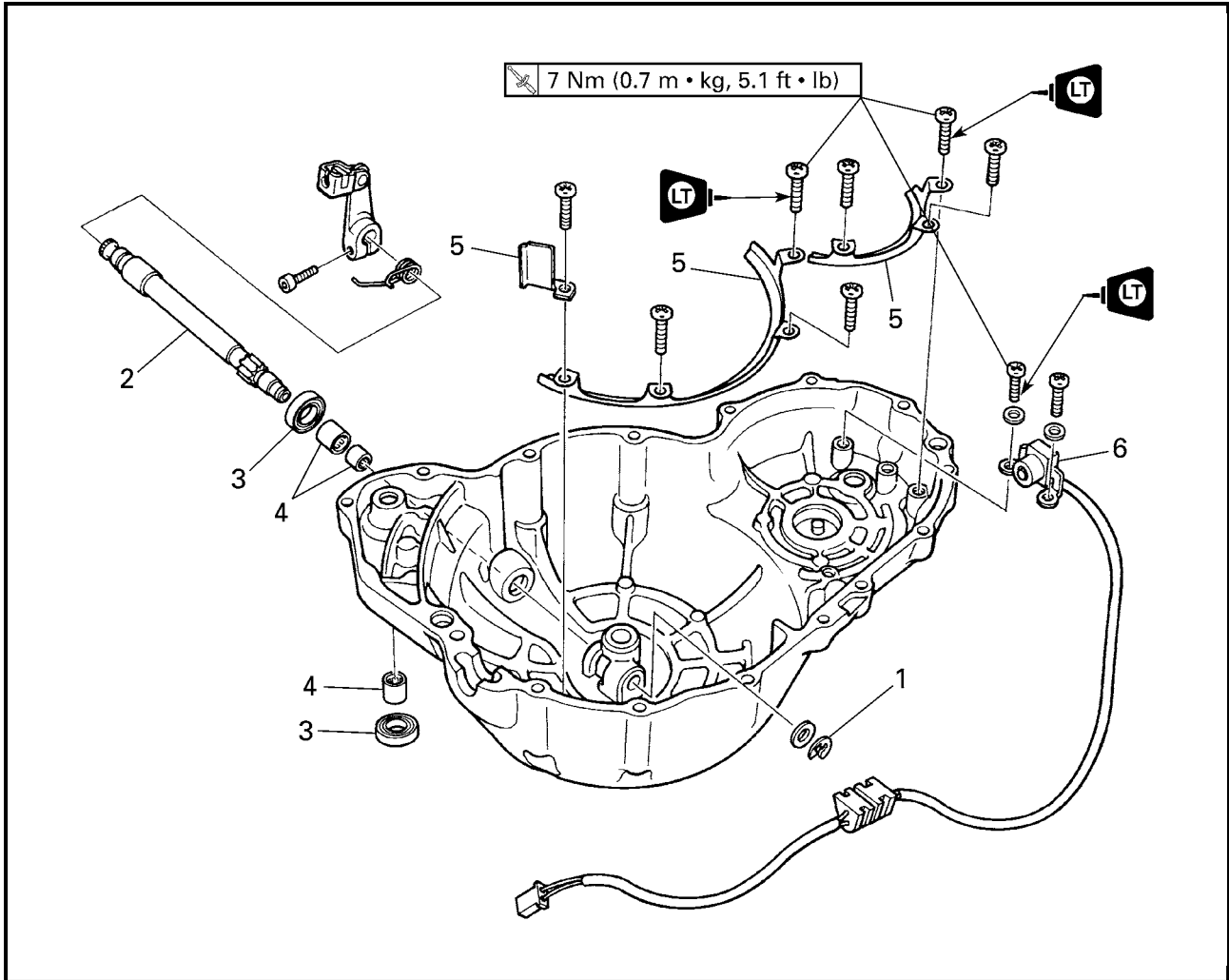
Order	Job/Part	Q'ty	Remarks
	<b>Removing the clutch cover</b>		Remove the parts in the order listed.
	Left side cover		Refer to "SEATS AND SIDE COVERS" in chapter 3.
	Engine left side cover		Refer to "ROCKER ARMS, PUSH RODS AND VALVE LIFTERS".
	Engine oil		Drain.
1	Clutch cable	1	Disconnect.
2	Pull lever	1	
3	Pull lever spring	1	
4	Pickup coil coupler	1	Disconnect.
5	Shift arm	1	
6	Clutch cable holder	1	
7	Clutch cover	1	



5

Order	Job/Part	Q'ty	Remarks
8	Clutch cover gasket	1	For installation, reverse the removal procedure.
9	Dowel pin	1	



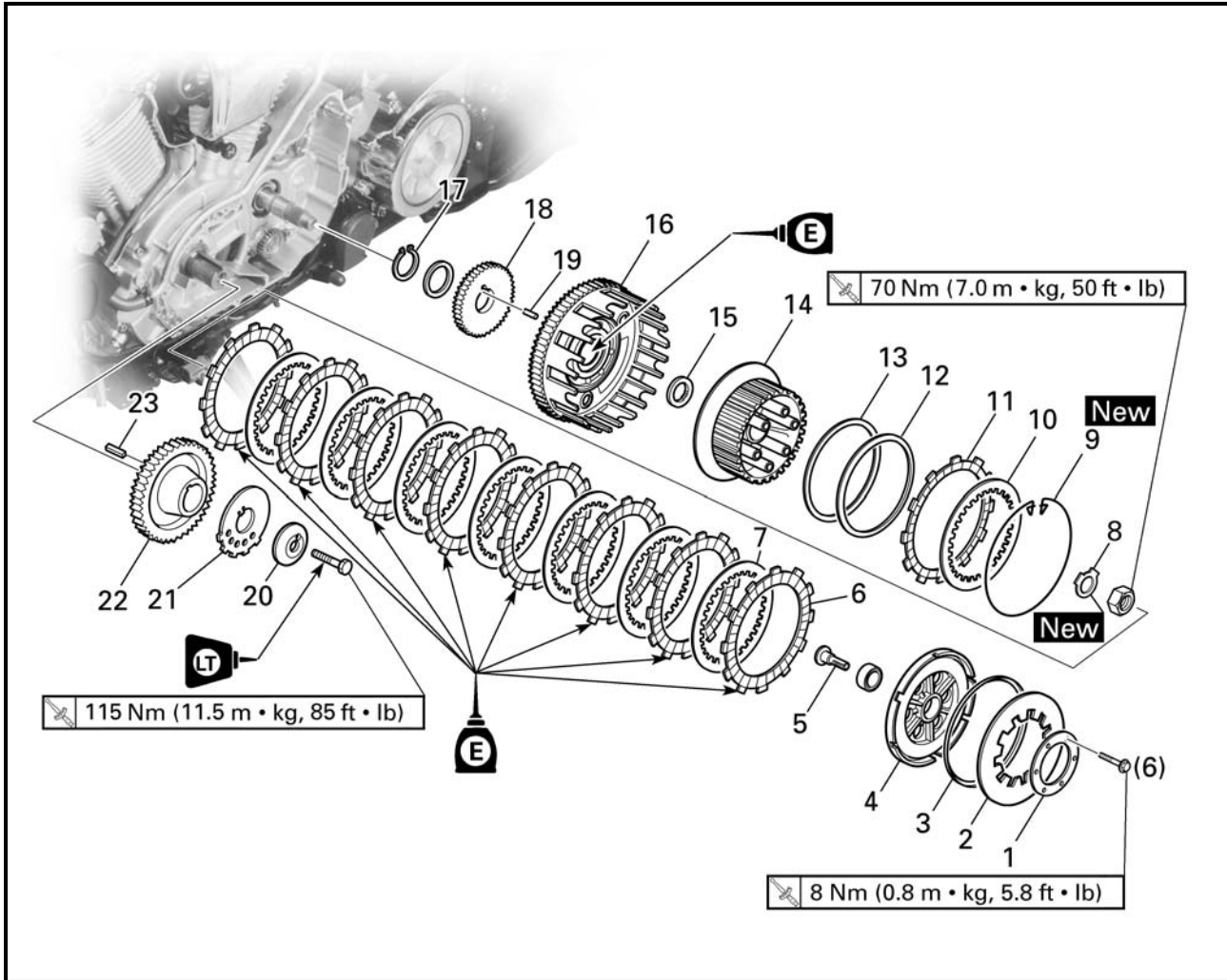


5

Order	Job/Part	Q'ty	Remarks
	<b>Removing the pull lever shaft and pickup coil</b>		Remove the parts in the order listed.
	Pull lever	1	
	Pull lever spring	1	
1	Circlip	1	
2	Pull lever shaft	1	
3	Oil seal	2	
4	Bearing	3	
5	Pickup coil lead holder	3	
6	Pickup coil	1	
			For installation, reverse the removal procedure.

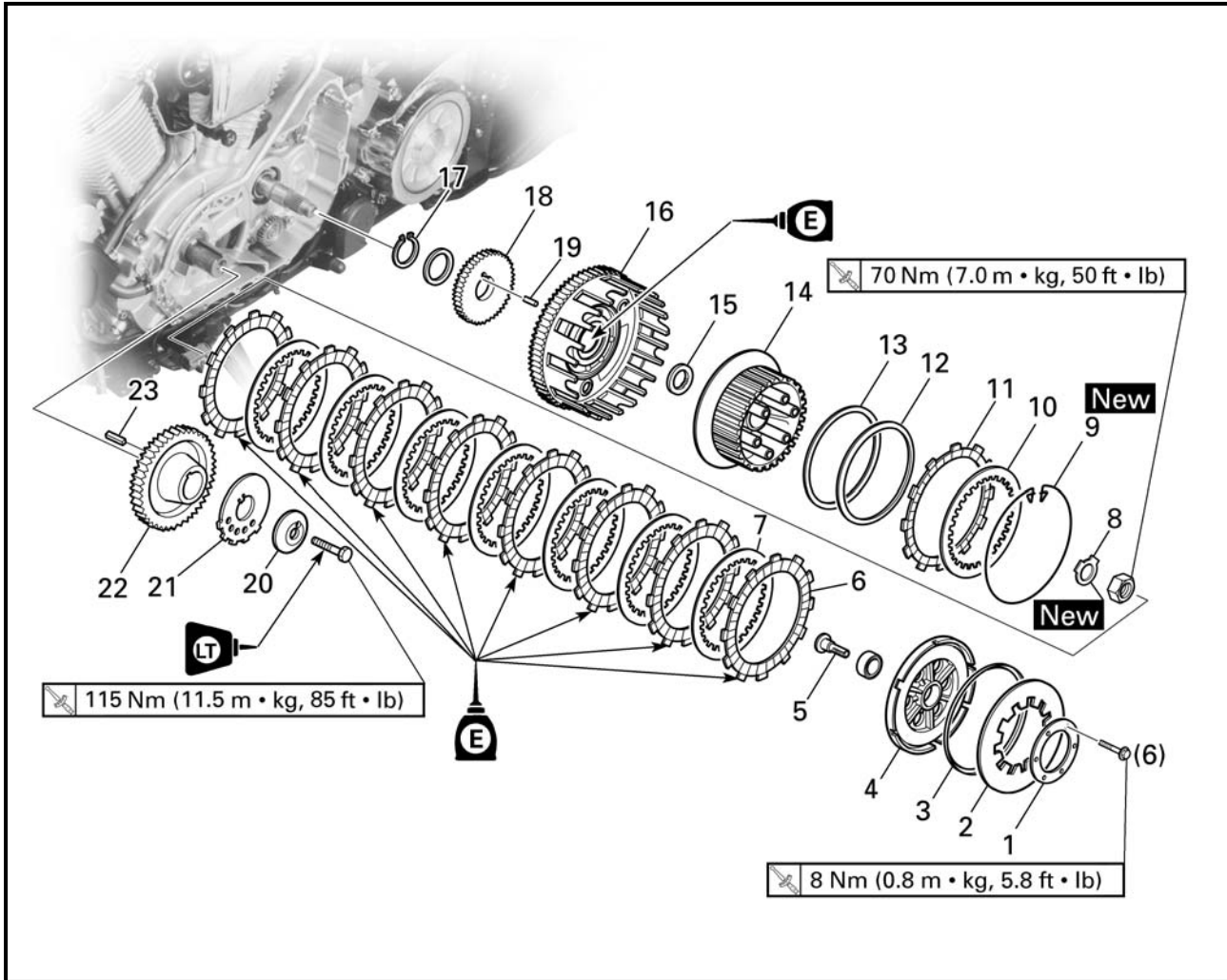


EAS00274



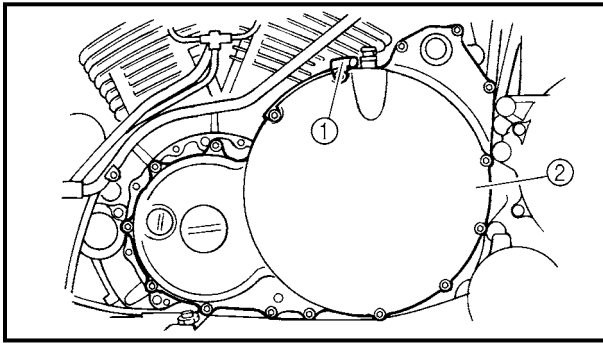
5

Order	Job/Part	Q'ty	Remarks
	<b>Removing the clutch</b>		Remove the parts in the order listed. Refer to "GENERATOR".
1	Clutch spring plate retainer	1	
2	Clutch spring plate	1	
3	Clutch spring plate seat	1	
4	Pressure plate	1	
5	Pull rod	1	
6	Friction plate	7	
7	Clutch plate	6	
8	Lock washer	1	
9	Wire circlip	1	
10	Clutch plate	1	
11	Friction plate	1	
12	Clutch damper spring	1	



5

Order	Job/Part	Q'ty	Remarks
13	Clutch damper spring seat	1	For installation, reverse the removal procedure.
14	Clutch boss	1	
15	Thrust washer	1	
16	Clutch housing	1	
17	Circlip	1	
18	Oil pump drive gear	1	
19	Dowel pin	1	
20	Spacer	1	
21	Pickup coil rotor	1	
22	Primary drive gear	1	
23	Straight key	1	



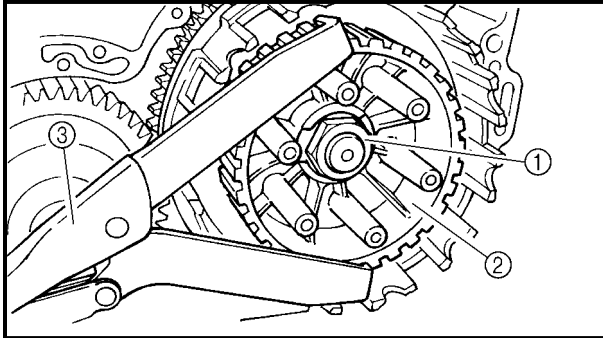
EAS00277

**REMOVING THE CLUTCH**

- Remove:
  - clutch cable holder ①
  - clutch 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.



- Straighten the lock washer tab.

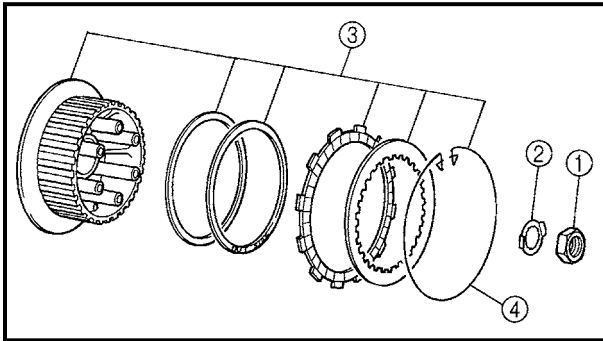
- Loosen:
  - clutch boss nut ①

**NOTE:**

While holding the clutch boss ② with the universal clutch holder ③, loosen the clutch boss nut.



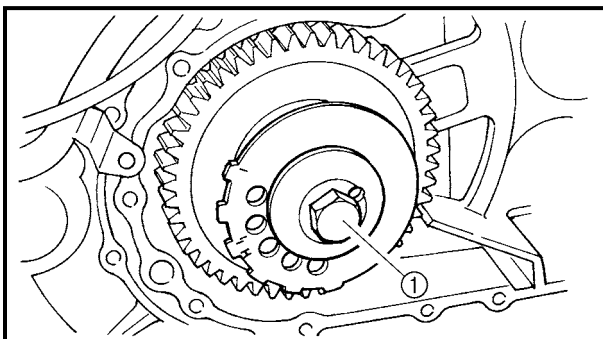
**Universal clutch holder**  
**YM-91042**



- Remove:
  - clutch boss nut ①
  - lock washer ②
  - clutch boss assembly ③

**NOTE:**

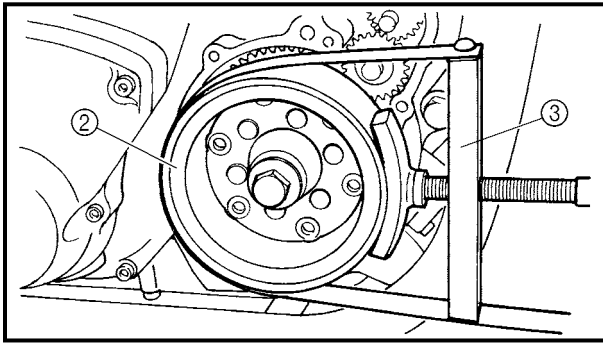
There is a built-in damper between the clutch boss and the clutch plate. It is not necessary to remove the wire circlip ④ and disassemble the built-in damper unless there is serious clutch chattering.



EAS00279

**REMOVING THE PRIMARY DRIVE GEAR**

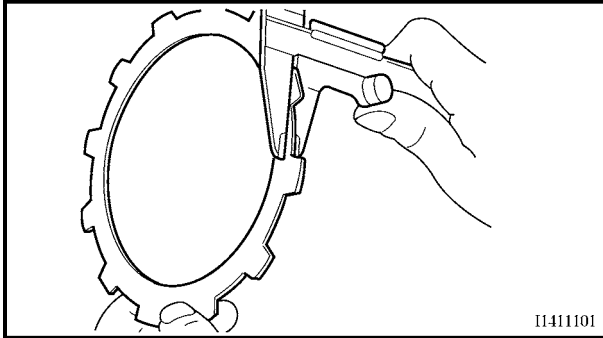
- Remove:
  - pickup coil rotor bolt ①

**NOTE:**

While holding the generator rotor ② with the sheave holder ③, loosen the pickup coil rotor bolt.



**Sheave holder  
YS-01880**



II411101

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

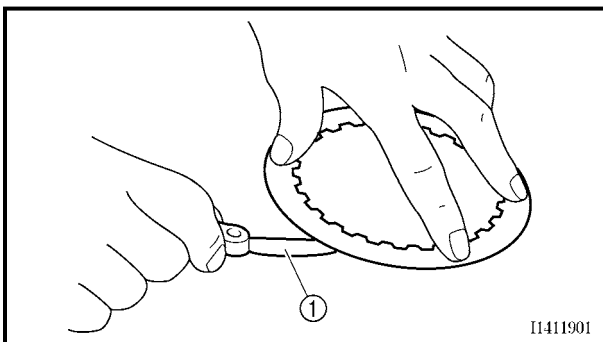
Out of specification → Replace the friction plates as a set.

**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 (0.110 in)



II411901

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:

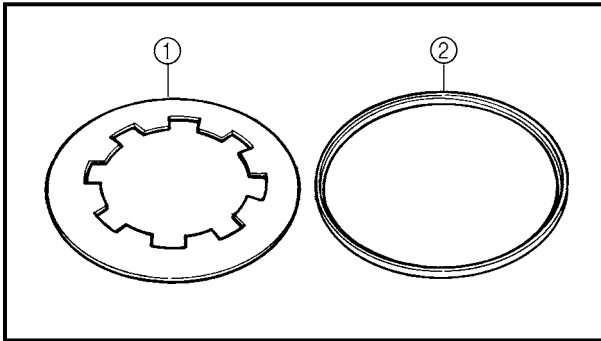
- clutch plate warpage

(with a surface plate and thickness gauge ①)

Out of specification → Replace the clutch plates as a set.



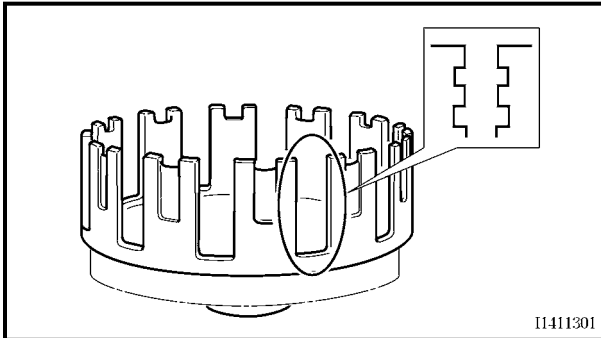
**Maximum clutch plate warpage**  
0.2 mm (0.008 in)



EAS00283

**CHECKING THE CLUTCH SPRING PLATE**

1. Check:
  - clutch spring plate ①  
Damage → Replace.
2. Check:
  - clutch spring plate seat ②  
Damage → Replace.



EAS00284

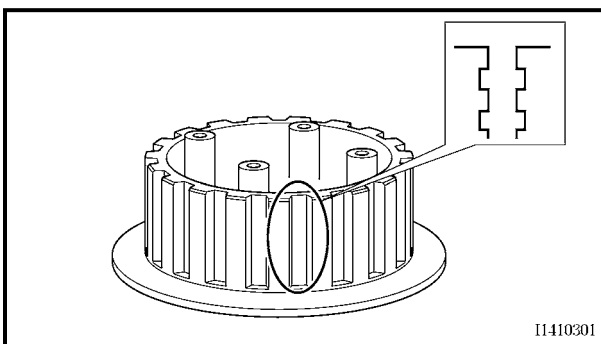
**CHECKING THE CLUTCH HOUSING**

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 bearing and clutch housing.



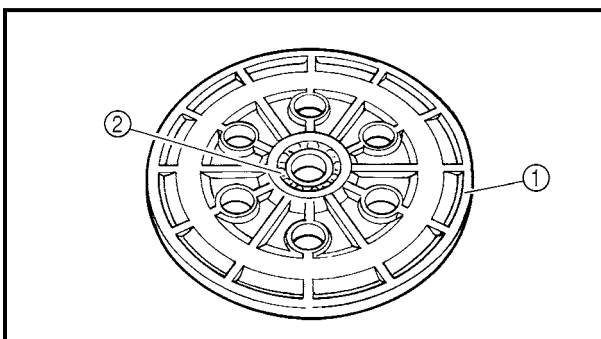
EAS00285

**CHECKING THE CLUTCH BOSS**

1. Check:
  - clutch boss splines  
Damage/pitting/wear → Replace the clutch boss.

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

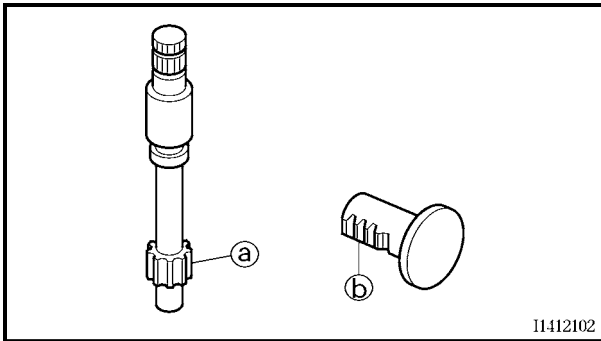
Pitting on the clutch boss splines will cause erratic clutch operation.



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:

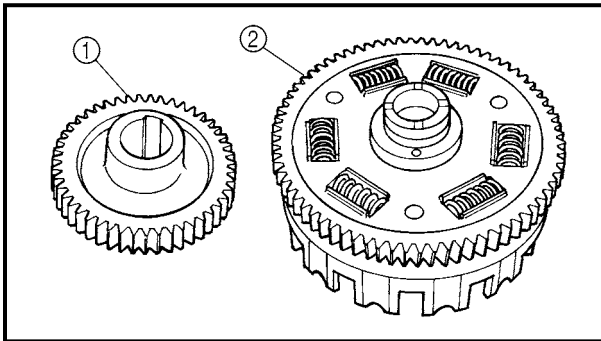
- pull lever shaft pinion gear teeth (a)
- pull rod teeth (b)

Damage/wear → Replace the pull lever shaft and pull rod as a set.

#### 2. Check:

- pull rod bearing

Damage/wear → Replace.



EAS00292

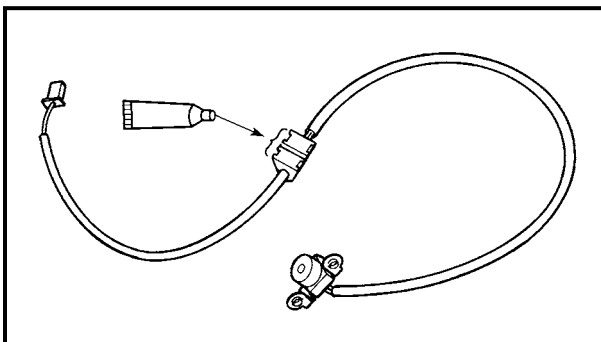
### CHECKING THE PRIMARY DRIVE

#### 1. Check:

- primary drive gear (1)
- primary driven gear (2)

Damage/wear → Replace the primary drive gear and clutch housing as a set.

Excessive noise during operation → Replace the primary drive gear and clutch housing as a set.



### INSTALLING THE PICKUP COIL AND PULL LEVER SHAFT


#### 1. Apply:


- sealant  
(onto the pickup coil lead grommet)

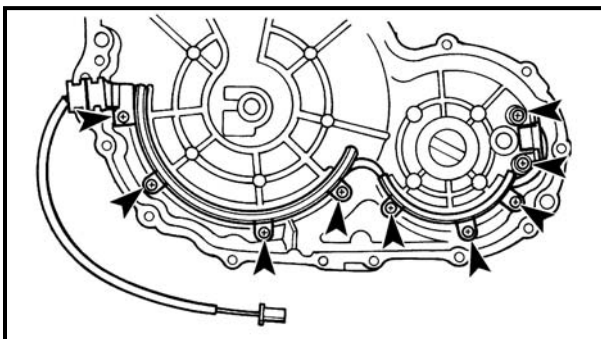


**Quick Gasket®**  
**ACC-11001-05-01**

#### 2. Install:

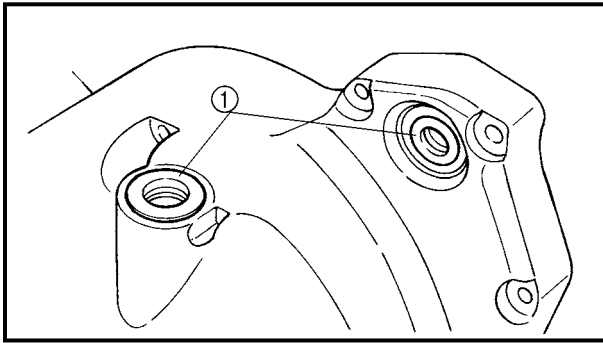
- pickup coil  7 Nm (0.7 m · kg, 5.1 ft · lb)
- pickup coil lead holder

 7 Nm (0.7 m · kg, 5.1 ft · lb)



#### NOTE:

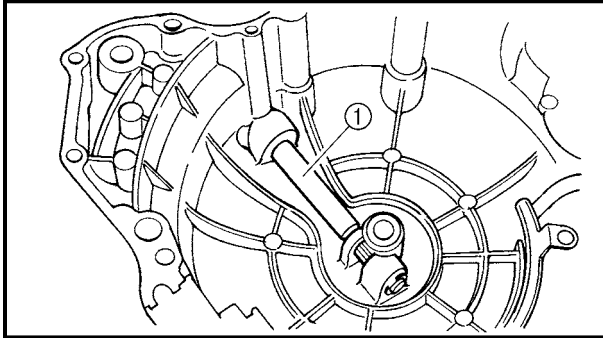
Apply locking agent (LOCTITE®) to the threads of the pickup coil bolts and pickup coil lead holder bolts.



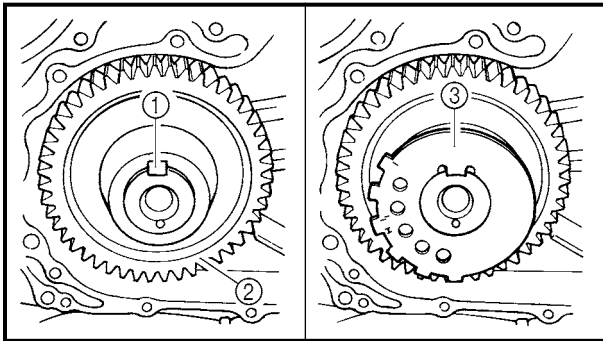
3. Install:
- bearings
  - oil seals ①

**NOTE:**

Lubricate the oil seal lips with lithium soap base grease.




4. Install:
- pull lever shaft ①
  - washer
  - circlip



EAS00303

**INSTALLING THE PRIMARY DRIVE GEAR**

1. Install:
- straight key ①
  - primary drive gear ②
  - pickup coil rotor ③
  - spacer ④
  - pickup coil rotor bolt ⑤

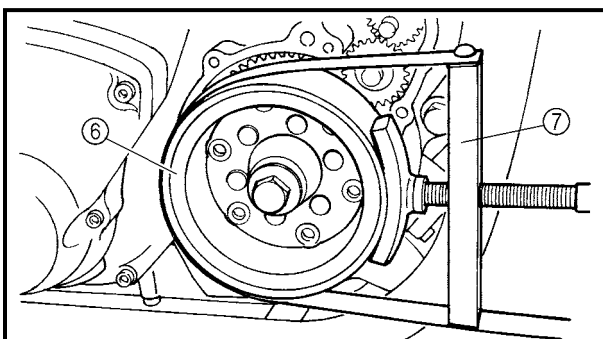
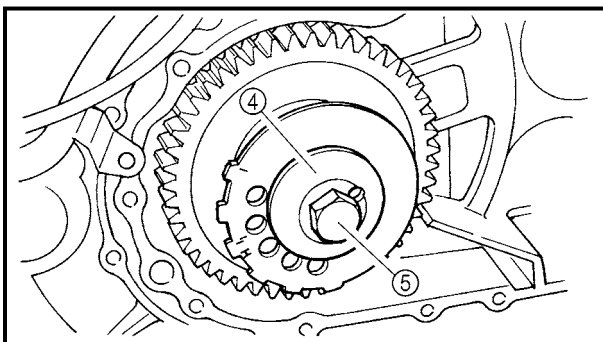
 115 Nm (11.5 m · kg, 85 ft · lb)

**CAUTION:**

The timing marks on the pickup coil rotor must face outside.

**NOTE:**

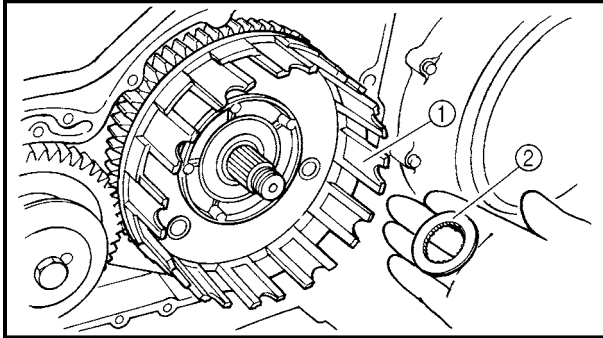
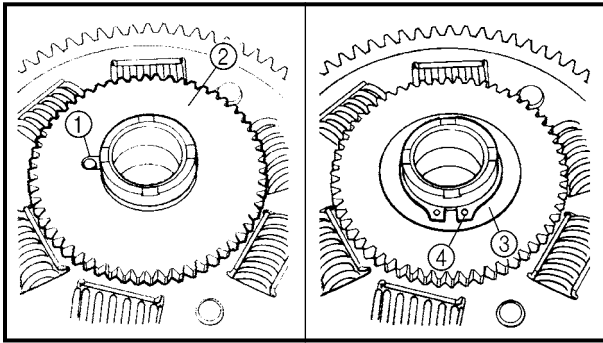
- Apply locking agent (LOCTITE®) to the threads of the pickup coil rotor bolt.
- While holding the generator rotor ⑥ with the sheave holder ⑦, tighten the pickup coil rotor bolt.



**Sheave holder  
YS-01880**

2. Bend the lock washer tab along a flat side of the nut.





EAS00296

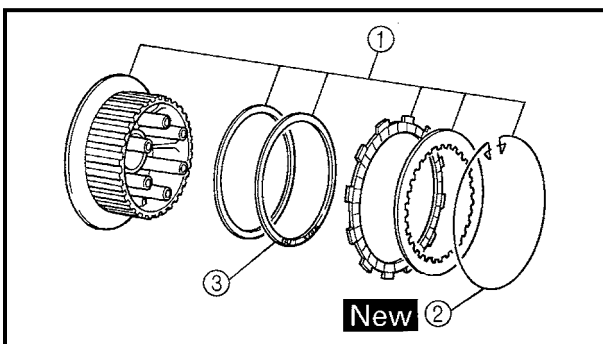
**INSTALLING THE CLUTCH**

1. Install:
  - dowel pin ①
  - oil pump drive gear ②
  - plate ③
  - circlip ④

2. Install:
  - clutch housing ①
  - thrust washer ②

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

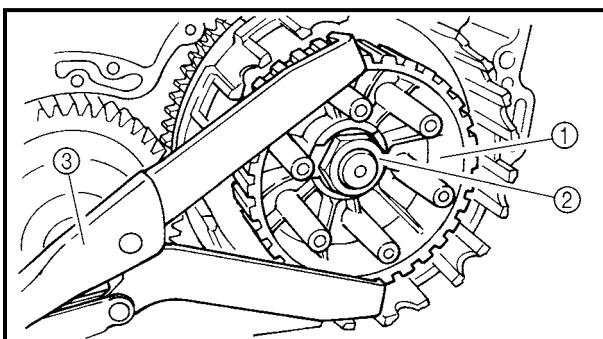
- Lubricate the clutch housing bearings with engine oil.
- Make sure that the primary driven gear teeth and primary drive gear teeth mesh correctly.
- Make sure that the oil pump drive gear teeth and oil pump driven gear teeth mesh correctly.



3. Install:
  - clutch boss assembly ①

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

- If the wire circlip ② has been removed, carefully install a new one.
- Install the clutch damper spring ③ with the "OUTSIDE" mark facing out.



4. Install:
  - clutch boss ①
  - lock washer **New**
  - clutch boss nut ②

**70 Nm (7.0 m · kg, 50 ft · lb)**
**NOTE:** \_\_\_\_\_

While holding the clutch boss with the universal clutch holder ③, tighten the clutch boss nut.

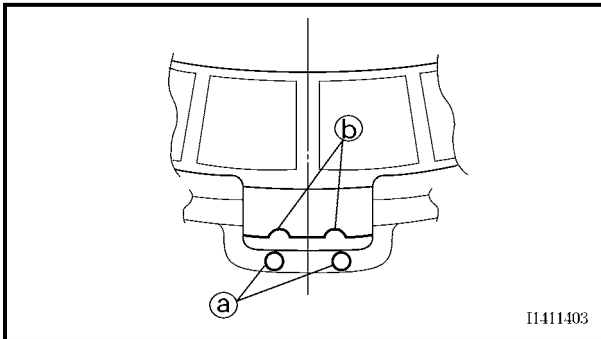


**Universal clutch holder  
YM-91042**

5. Bend the lock washer tab along a flat side of the nut.
6. Lubricate:
  - friction plates
  - clutch plates  
(with the recommended lubricant)



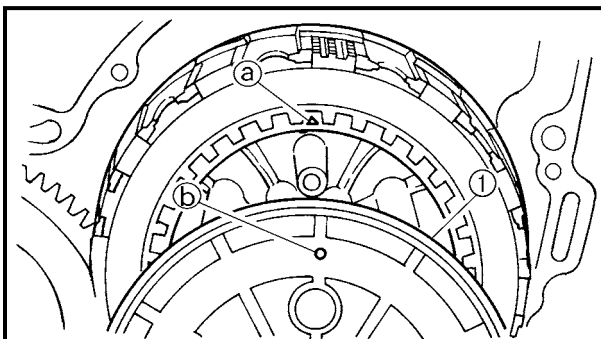
**Recommended lubricant  
Engine oil**



7. Install:
  - friction plates
  - clutch plates

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

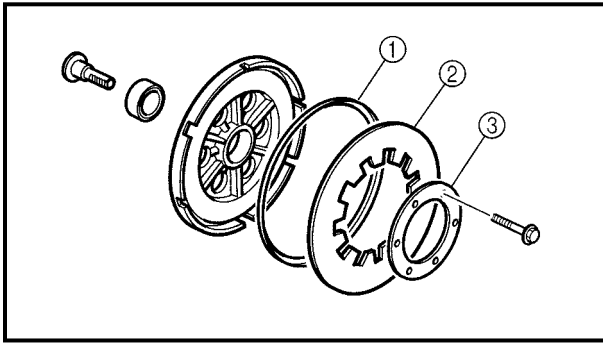
- First, install a friction plate and then alternate between a clutch plate and a friction plate.
- Align the two embossed mark (a) on the clutch housing with the two semicircular slots (b) in the friction plates.



8. Install:
  - pressure plate ①


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

- Align the punch mark (a) on the pressure plate with the punch mark (b) on the clutch boss.



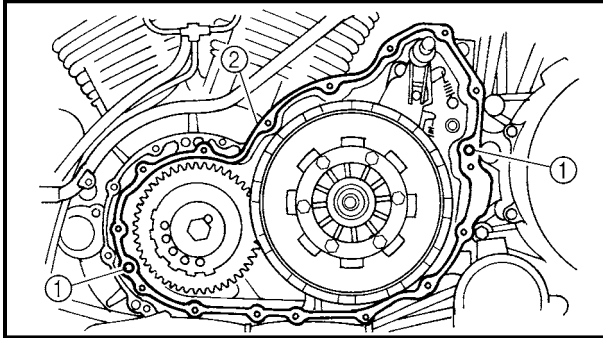
## 9. Install:

- clutch spring plate seat ①
- clutch spring plate ②
- clutch spring plate retainer ③

 8 Nm (0.8 m · kg, 5.8 ft · lb)

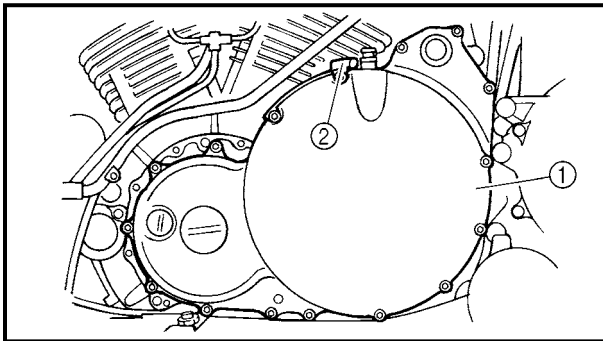
**NOTE:**

Tighten the clutch spring plate retainer bolts in stages and in a crisscross pattern.




## 10. Install:

- dowel pins ①
- clutch cover gasket ② **New**



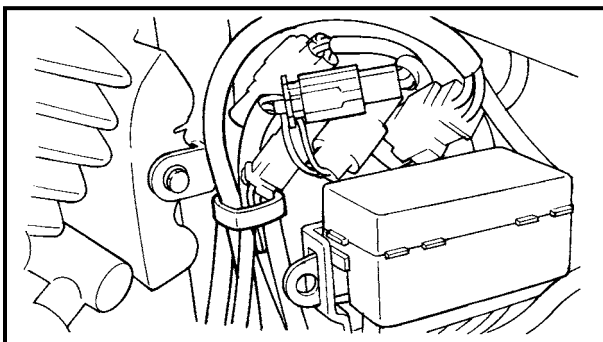
## 11. Install:

- clutch cover ①
- clutch cable holder ②

 10 Nm (1.0 m · kg, 7.2 ft · lb)

**NOTE:**

Tighten the clutch cover bolts in stages and in a crisscross pattern.

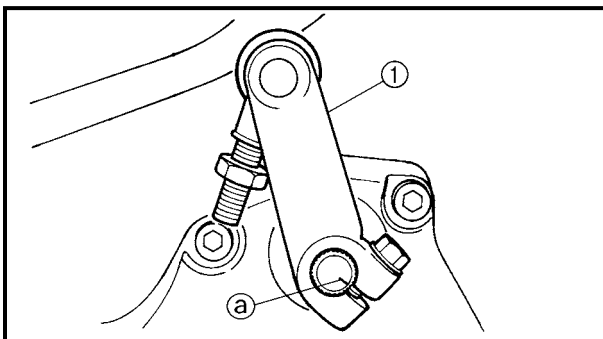


## 12. Connect:

- pickup coil coupler

**NOTE:**

Refer to "CABLE ROUTING" in chapter 2.

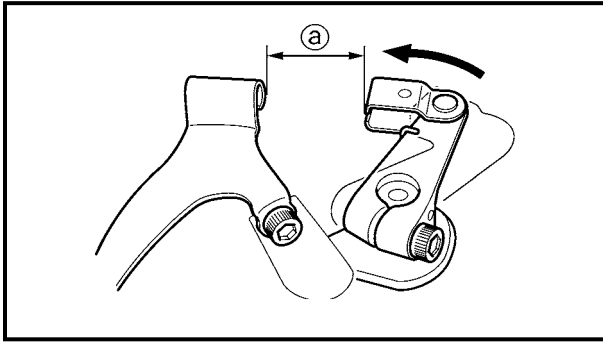


## 13. Install:

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

**NOTE:**

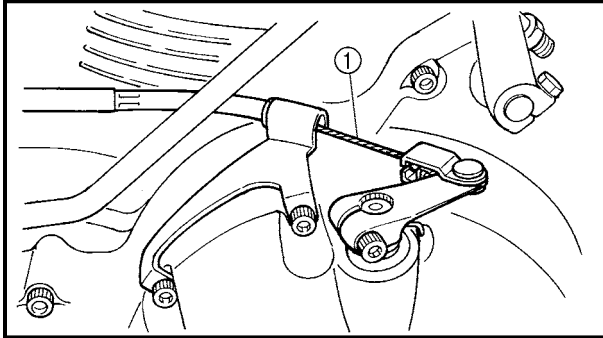
Align the mark (a) in the shift shaft with the slot in the shift arm.



- 14.Install:
- pull lever spring
  - pull lever

**NOTE:**

If there is no free play in the clutch, install the pull lever to the pull lever shaft in order to get the distance ② between the pull lever and clutch cable holder to 31.8 mm (1.25 in).



- 15.Connect:
- clutch cable ①

## 16.Fill:

- oil tank  
(with the specified amount of the recommended engine oil)  
Refer to "CHANGING THE ENGINE OIL" in chapter 3.

## 17.Install:

- engine left side cover  
Refer to "ROCKER ARMS, PUSH RODS AND VALVE LIFTERS".
- left side cover  
Refer to "SEATS AND SIDE COVERS" in chapter 3.

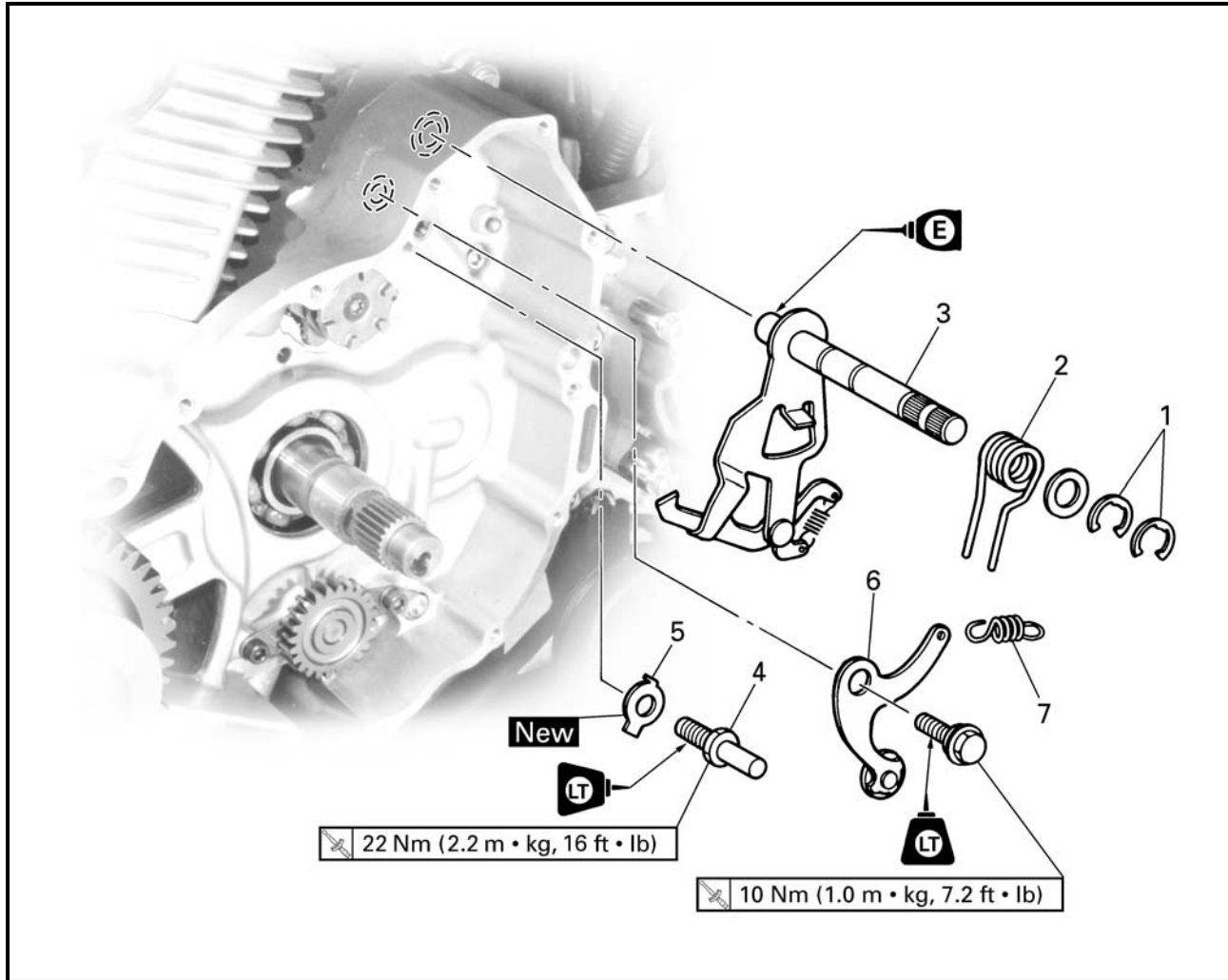
## 18.Adjust:

- clutch cable free play  
Refer to "ADJUSTING THE CLUTCH CABLE FREE PLAY" in chapter 3.



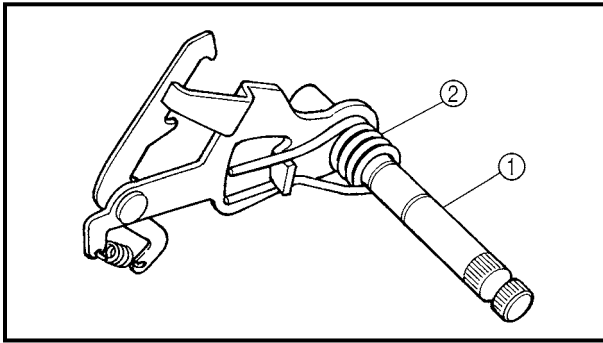
EAS00327

SHIFT SHAFT



5

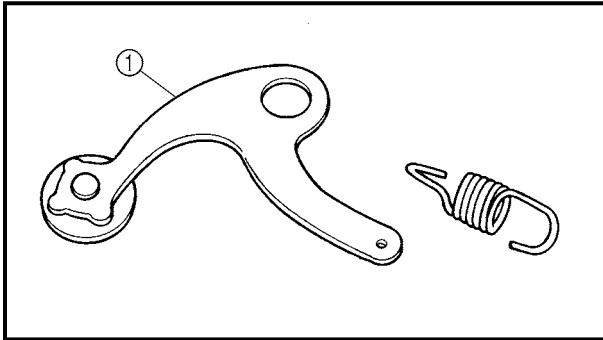
Order	Job/Part	Q'ty	Remarks
	<b>Removing the shift shaft and stopper lever</b>		Remove the parts in the order listed.
	Engine oil		Drain.
	Clutch housing		Refer to "CLUTCH".
1	Circlip	2	
2	Shift shaft spring	1	
3	Shift shaft	1	
4	Shift shaft spring stopper	1	
5	Lock washer	1	
6	Stopper lever	1	
7	Stopper lever spring	1	
			For installation, reverse the removal procedure.



EAS00328

## CHECKING THE SHIFT SHAFT

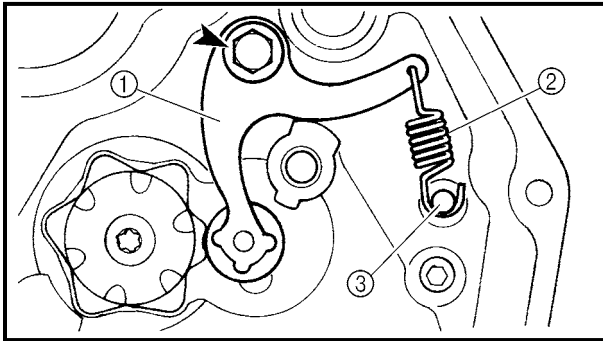
1. Check:
  - shift shaft ①  
Bends/damage/wear → Replace.
  - shift lever spring ②  
Damage/wear → Replace.



EAS00330

## CHECKING THE STOPPER LEVER

1. Check:
  - stopper lever ①  
Bends/damage → Replace.
  - Roller turns roughly → Replace the stopper lever.



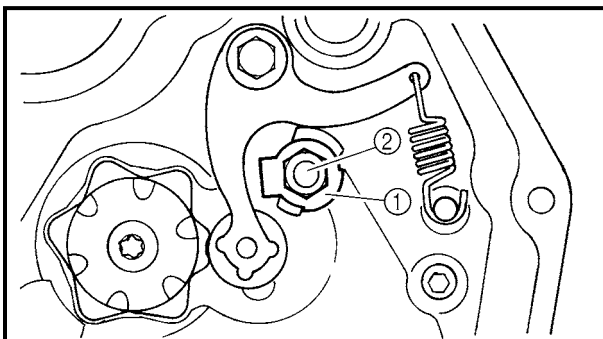
EAS00331

## INSTALLING THE STOPPER LEVER AND SHIFT SHAFT

1. Install:
  - stopper lever ①
  - stopper lever spring ②

### NOTE:

- Apply locking agent (LOCTITE®) to the threads of stopper lever bolt.
- Install the ends of the stopper lever spring onto the stopper lever and the crankcase boss ③.
- Mesh the stopper lever with the shift drum segment assembly.



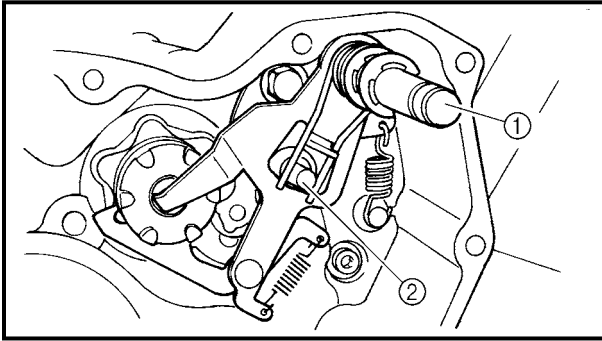
2. Install:
  - lock washer ① **New**
  - shift shaft spring stopper ②

22 Nm (2.2 m · kg, 16 ft · lb)

### NOTE:

Apply locking agent (LOCTITE®) to the threads of shift shaft spring stopper.

3. Bend the lock washer tab along a flat side of the shift shaft spring stopper.



4. Install:
  - shift shaft spring
  - circlips
  - shift shaft ①

**NOTE:**

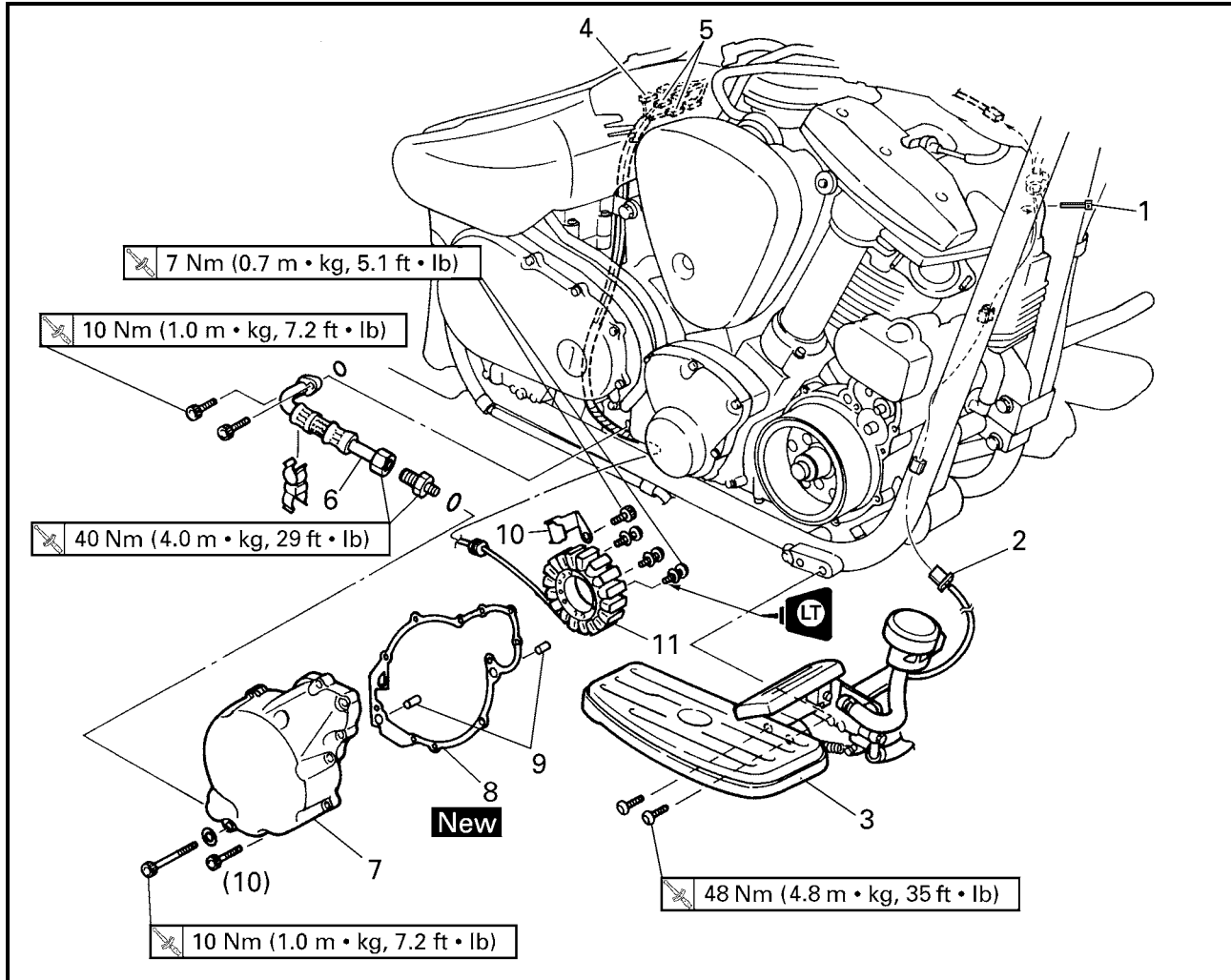
Install the end of the shift shaft spring onto the shift shaft spring stopper ②.

5. Install:
  - clutch housing  
Refer to "CLUTCH".
6. Fill:
  - oil tank  
Refer to "CHANGING THE ENGINE OIL".



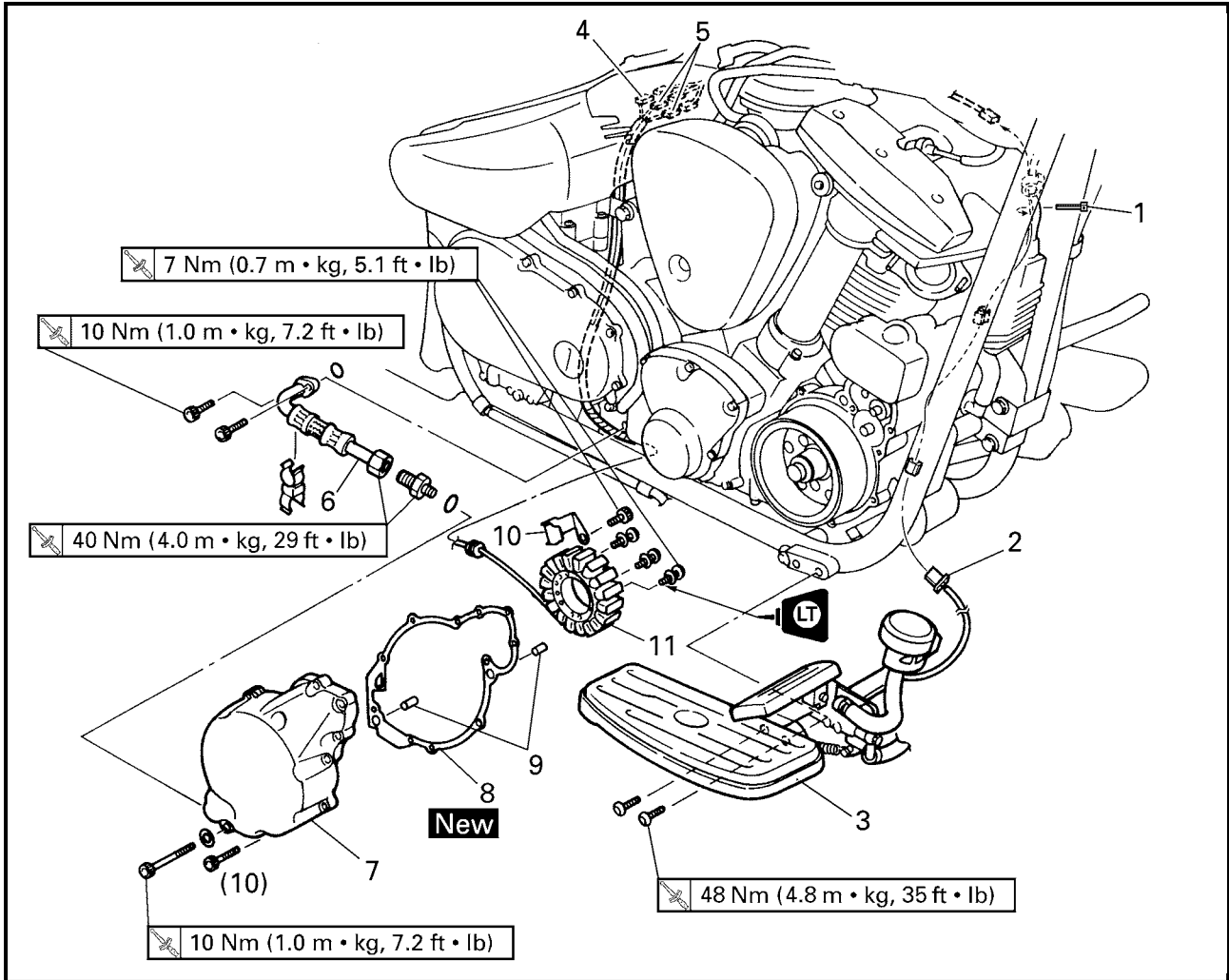
EAS00341

## GENERATOR AND STARTER CLUTCH



Order	Job/Part	Q'ty	Remarks
	<b>Removing the stator coil assembly</b>		Remove the parts in the order listed.
	Rider seat/left side cover/fuel tank		Refer to "SEATS AND SIDE COVERS" and "FUEL TANK" in chapter 3.
	Muffler/exhaust pipes		Refer to "ENGINE".
	Engine oil		Drain.
1	Plastic locking tie	1	
2	Rear brake light switch coupler	1	Disconnect.
3	Rider footrest (right)	1	
4	Stator coil assembly coupler	1	Disconnect.
5	Decompression solenoid coupler	2	Disconnect.
6	Oil delivery pipe	1	
7	Generator cover	1	
8	Generator cover gasket	1	
9	Dowel pin	2	



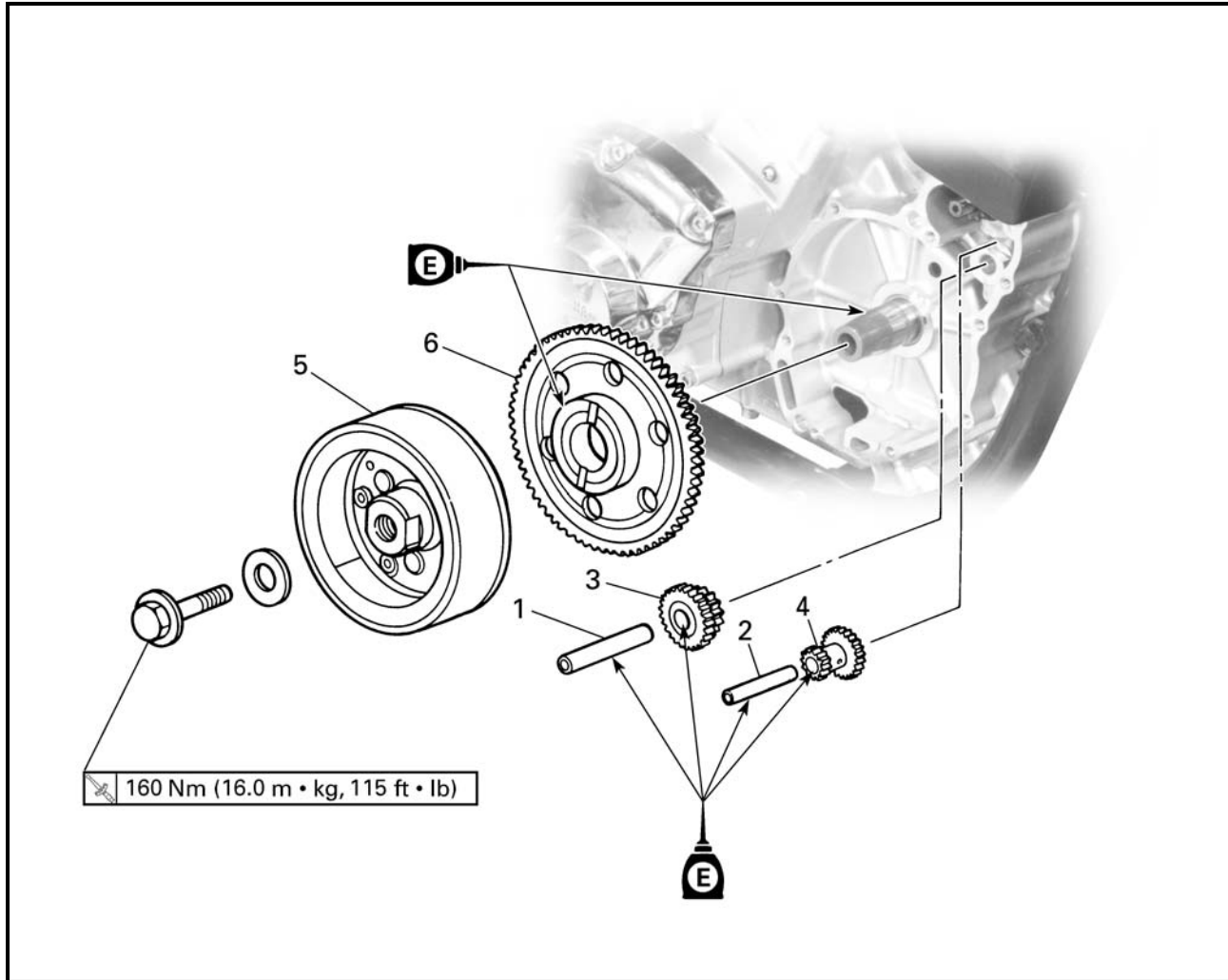


5

Order	Job/Part	Q'ty	Remarks
10	Stator coil assembly lead holder	1	For installation, reverse the removal procedure.
11	Stator coil assembly	1	



EAS00343



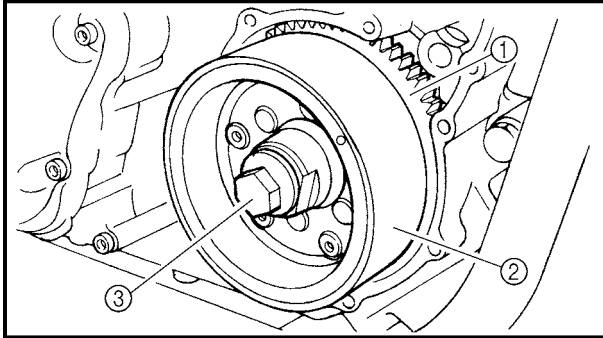
5

Order	Job/Part	Q'ty	Remarks
	<b>Removing the generator rotor</b>		Remove the parts in the order listed.
1	Starter clutch idle gear shaft #2	1	
2	Starter clutch idle gear shaft #1	1	
3	Starter clutch idle gear #2	1	
4	Starter clutch idle gear #1	1	
5	Generator rotor	1	
6	Starter clutch gear	1	
			For installation, reverse the removal procedure.





- c. When turning the starter clutch gear counterclockwise [B], it should turn freely, otherwise the starter clutch is faulty and must be replaced.




EAS00354

**INSTALLING THE GENERATOR**

1. Install:
  - starter clutch gear ①
  - generator rotor ②
  - washer
  - generator rotor bolt ③

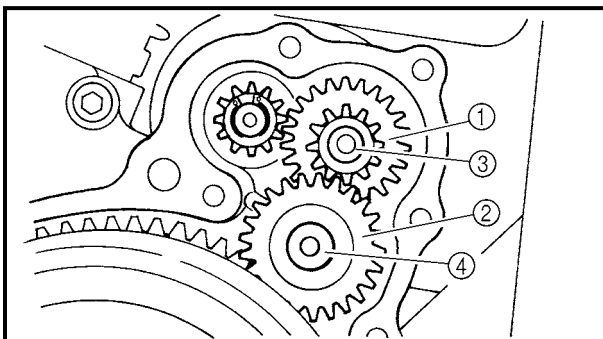
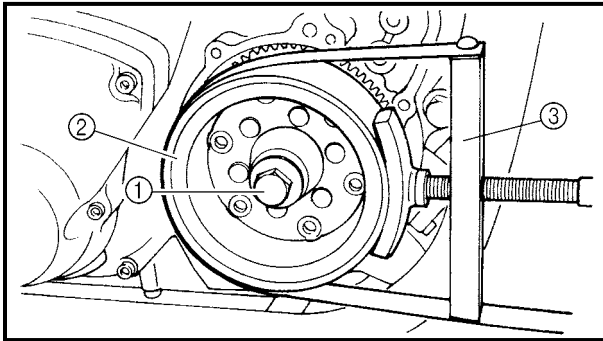
**NOTE:** \_\_\_\_\_  
Clean the tapered portion of the crankshaft and the generator rotor hub.

2. Tighten:
  - generator rotor bolt ①

 **160 Nm (16.0 m · kg, 115 ft · lb)**

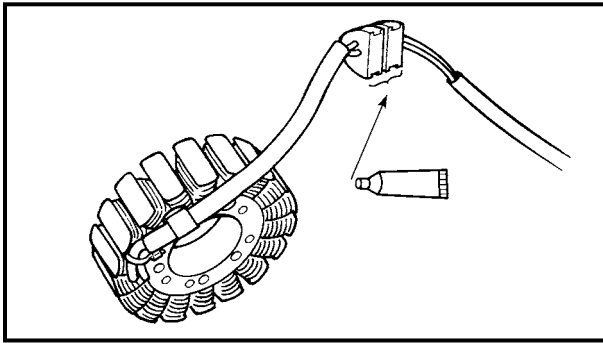
**NOTE:** \_\_\_\_\_  
While holding the generator rotor ② with the sheave holder ③, tighten the generator rotor bolt.

	<p><b>Sheave holder YS-01880</b></p>
--	--



3. Install:
  - starter clutch idle gear #1 ①
  - starter clutch idle gear #2 ②
  - starter clutch idle gear shaft #1 ③
  - starter clutch idle gear shaft #2 ④

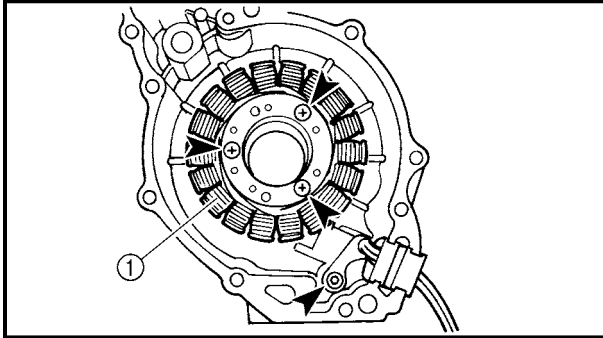
5



4. Apply:
- sealant  
(onto the stator coil assembly lead grommet)

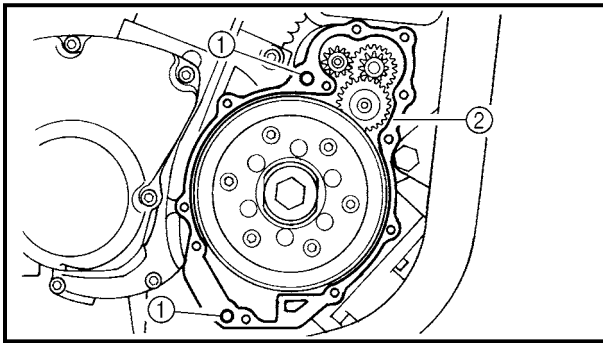


**Quick Gasket®**  
**ACC-11001-05-01**

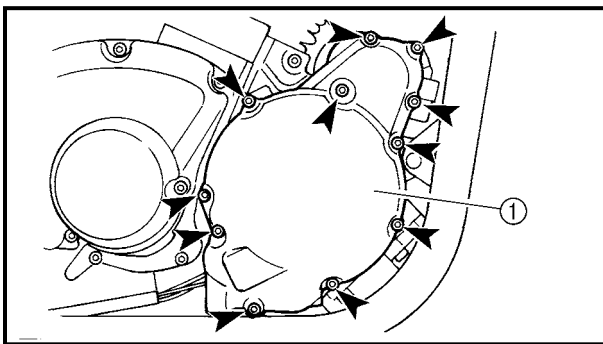


5. Install:
- stator coil assembly ①  
**7 Nm (0.7 m · kg, 5.1 ft · lb)**
  - stator coil assembly lead holder  
**7 Nm (0.7 m · kg, 5.1 ft · lb)**

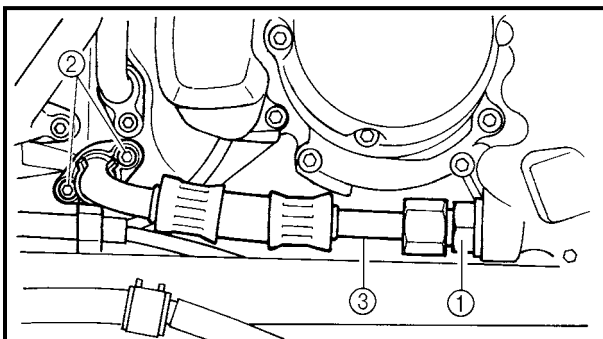
**NOTE:**  
Apply locking agent (LOCTITE®) to the threads of the stator coil assembly bolts.



6. Install:
- dowel pins ①
  - generator cover gasket ② **New**



7. Install:
- generator cover ①  
**10 Nm (1.0 m · kg, 7.2 ft · lb)**

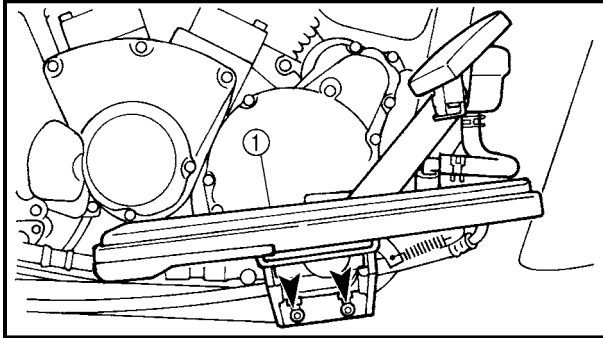


8. Install:
- oil delivery pipe joint ①  
**40 Nm (4.0 m · kg, 29 ft · lb)**
  - bolts ②  
**10 Nm (1.0 m · kg, 7.2 ft · lb)**
  - oil delivery pipe ③  
**40 Nm (4.0 m · kg, 29 ft · lb)**



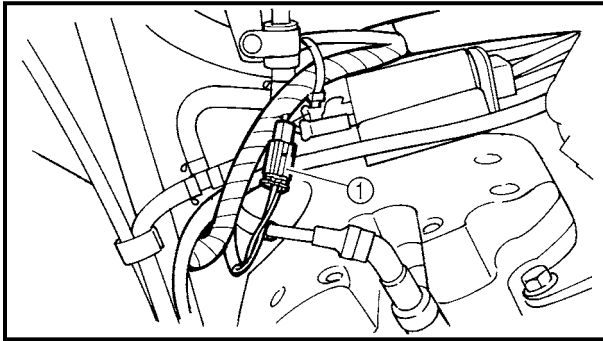
9. Connect:
- decompression solenoid couplers
  - stator coil assembly coupler

**NOTE:** \_\_\_\_\_  
 Refer to "CABLE ROUTING" in chapter 2.



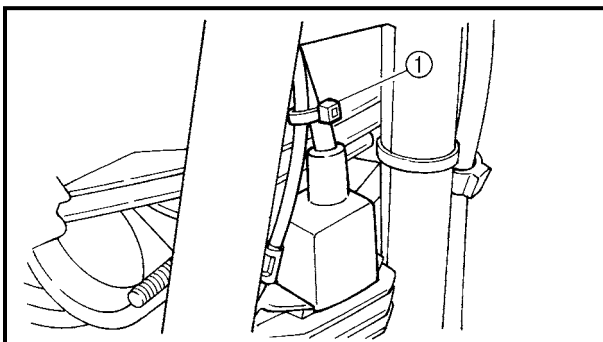
10. Install:
- rider footrest (right) ①

**48 Nm (4.8 m · kg, 35 ft · lb)**



11. Connect:
- rear brake light switch coupler ①

**NOTE:** \_\_\_\_\_  
 Refer to "CABLE ROUTING" in chapter 2.



12. Install:
- plastic locking tie ①

**NOTE:** \_\_\_\_\_  
 Fasten the rear brake light switch lead and wire harness.

13. Fill:
- oil tank  
 (with the specified amount of the recommended engine oil)  
 Refer to "CHANGING THE ENGINE OIL" in chapter 3.



14.Install:

- exhaust pipes
- muffler

Refer to "ENGINE".

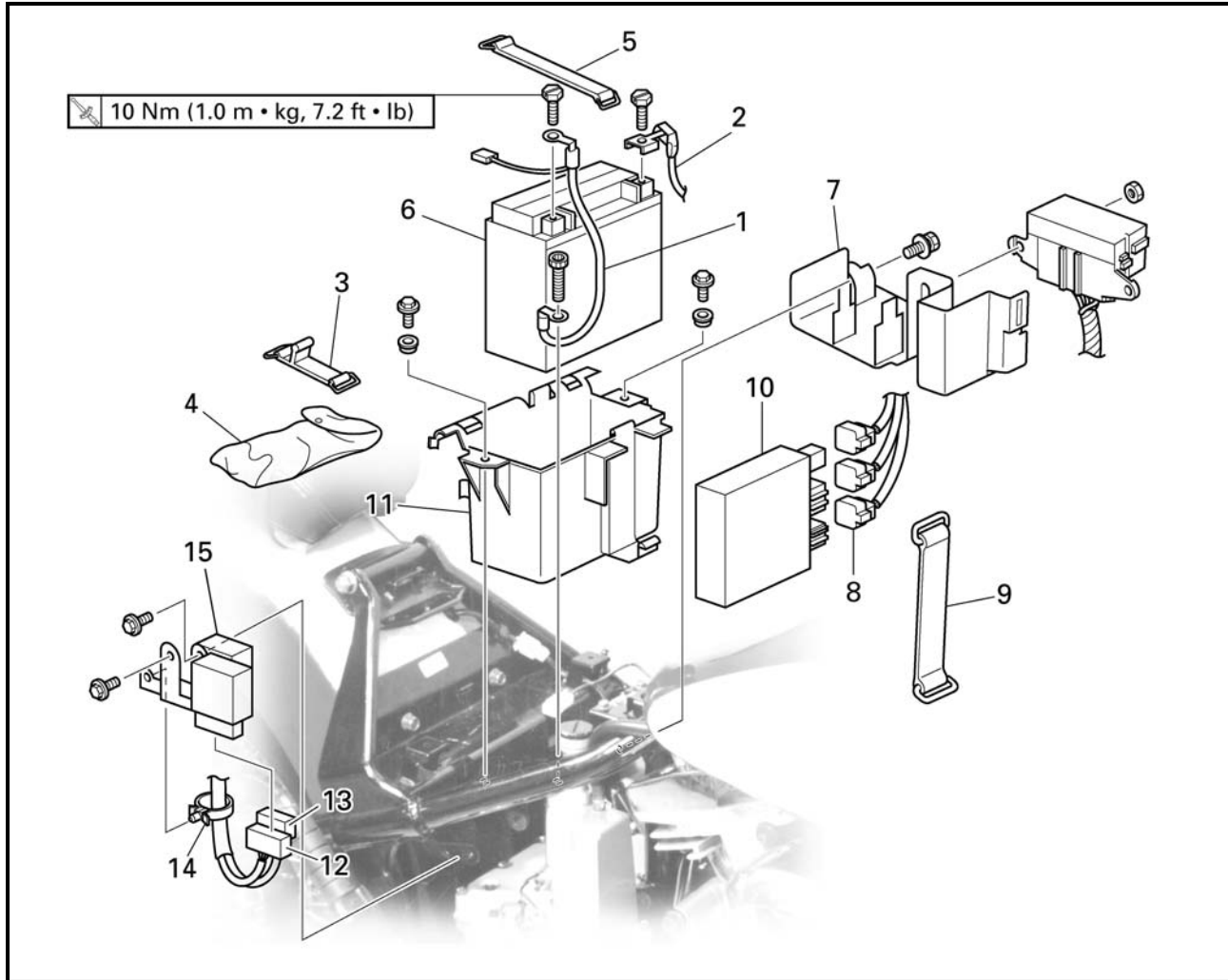
15.Install:

- fuel tank
- left side cover
- rider seat

Refer to "FUEL TANK" and "SEATS AND SIDE COVERS" in chapter 3.



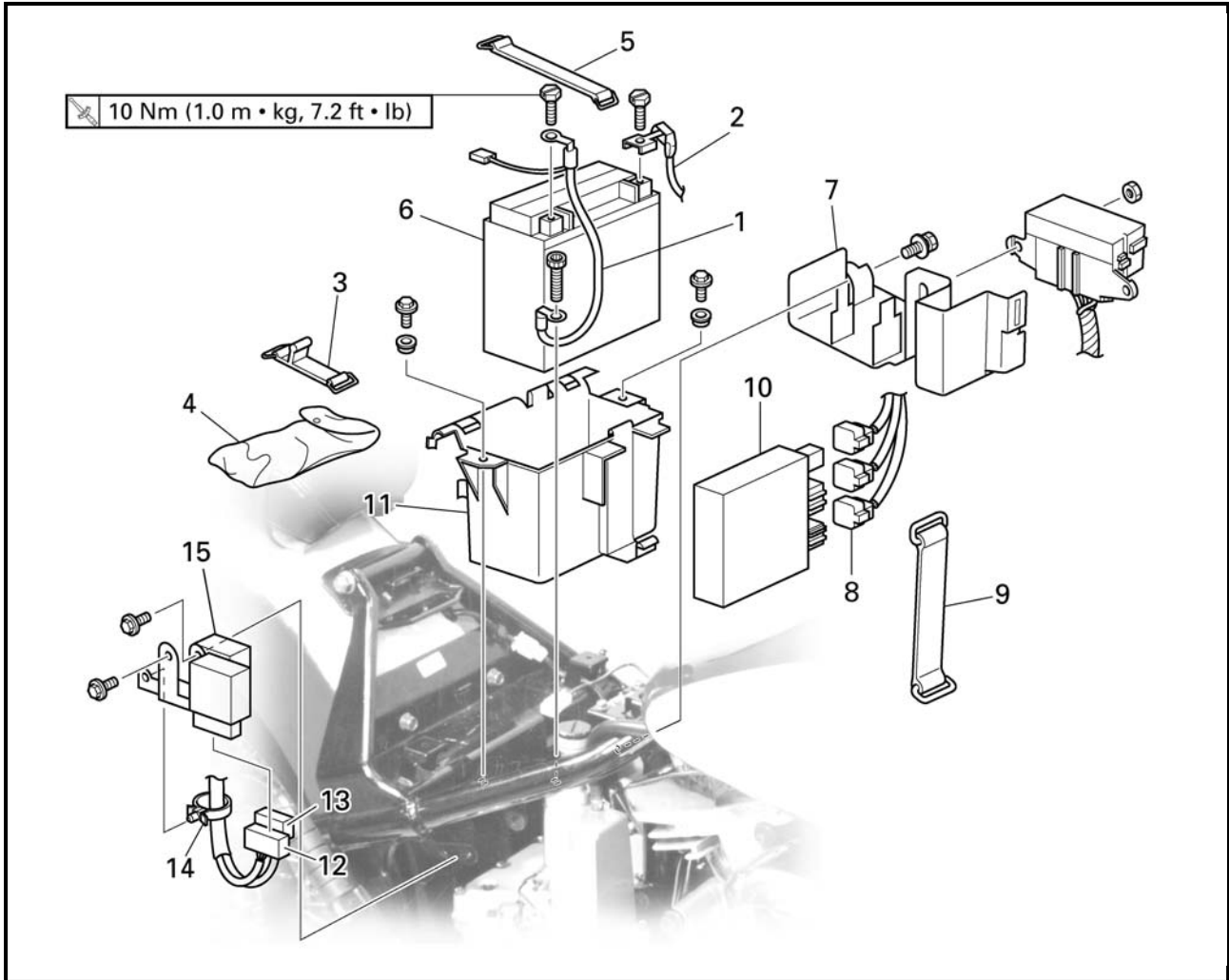
TRANSFER GEAR CASE



5

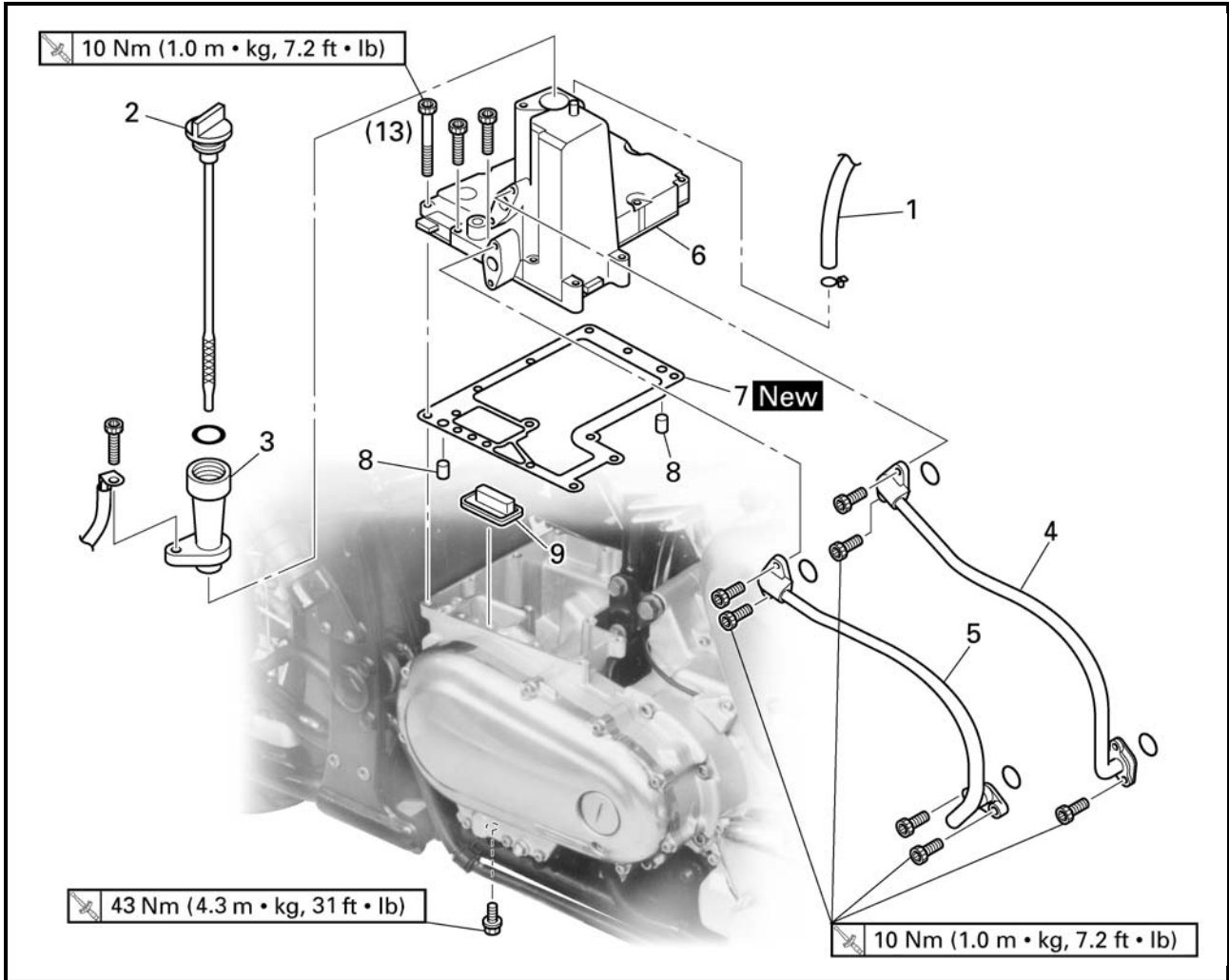
Order	Job/Part	Q'ty	Remarks
	<b>Removing the battery box</b>		Remove the parts in the order listed.
	Rider seat/side covers		Refer to "SEATS AND SIDE COVERS" in chapter 3.
1	Negative battery lead	1	
2	Positive battery lead	1	Disconnect.
3	Tool kit holder	1	
4	Tool kit	1	
5	Battery holder	1	
6	Battery	1	
7	Plastic bracket	1	
8	Ignitor unit coupler	3	Disconnect.
9	Ignitor unit holder	1	



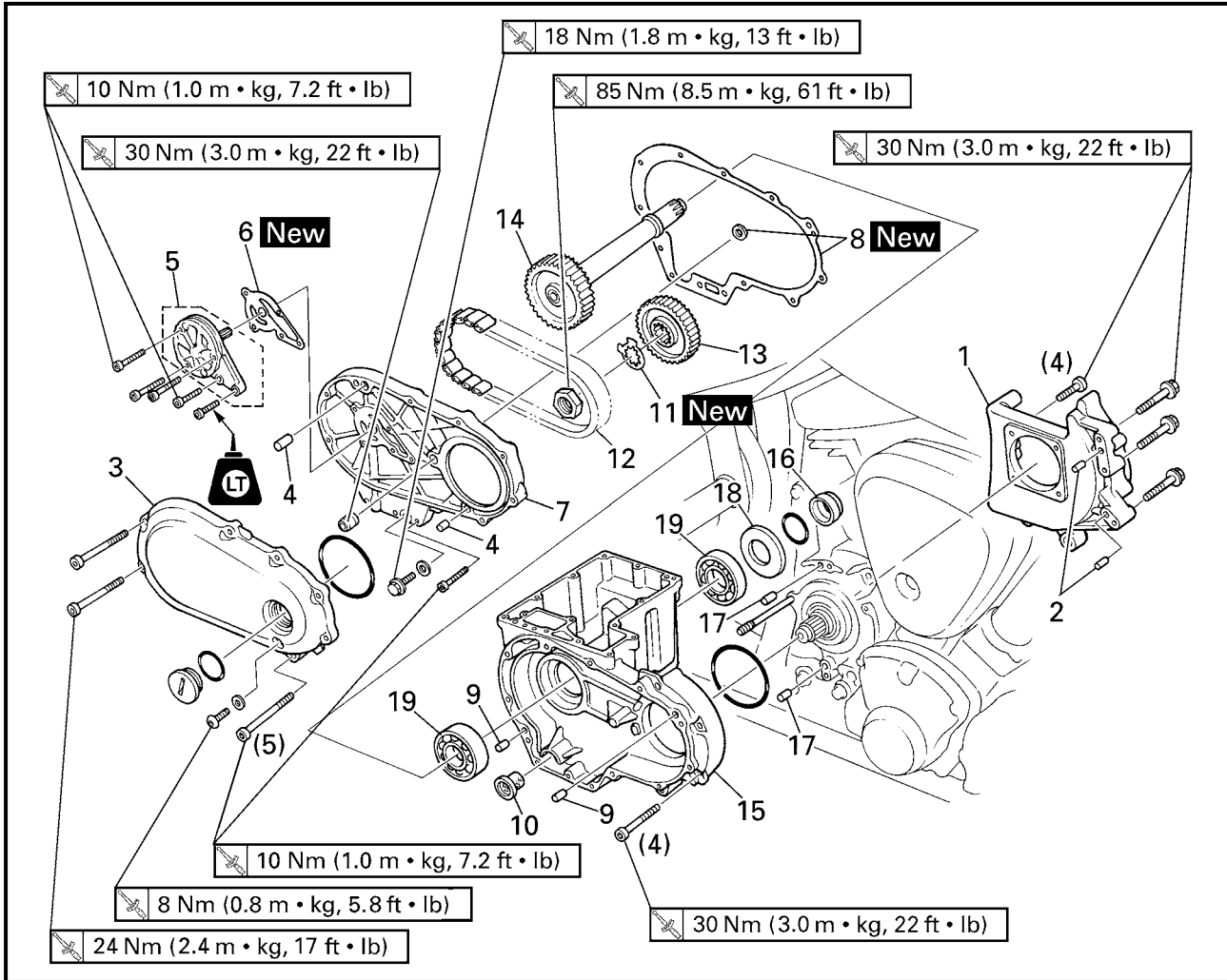


5

Order	Job/Part	Q'ty	Remarks
10	Ignitor unit	1	
11	Battery box	1	
12	Relay unit coupler	1	Disconnect.
13	Turn signal relay coupler	1	Disconnect.
14	Plastic clamp	1	
15	Relay bracket	1	
			For installation, reverse the removal procedure.

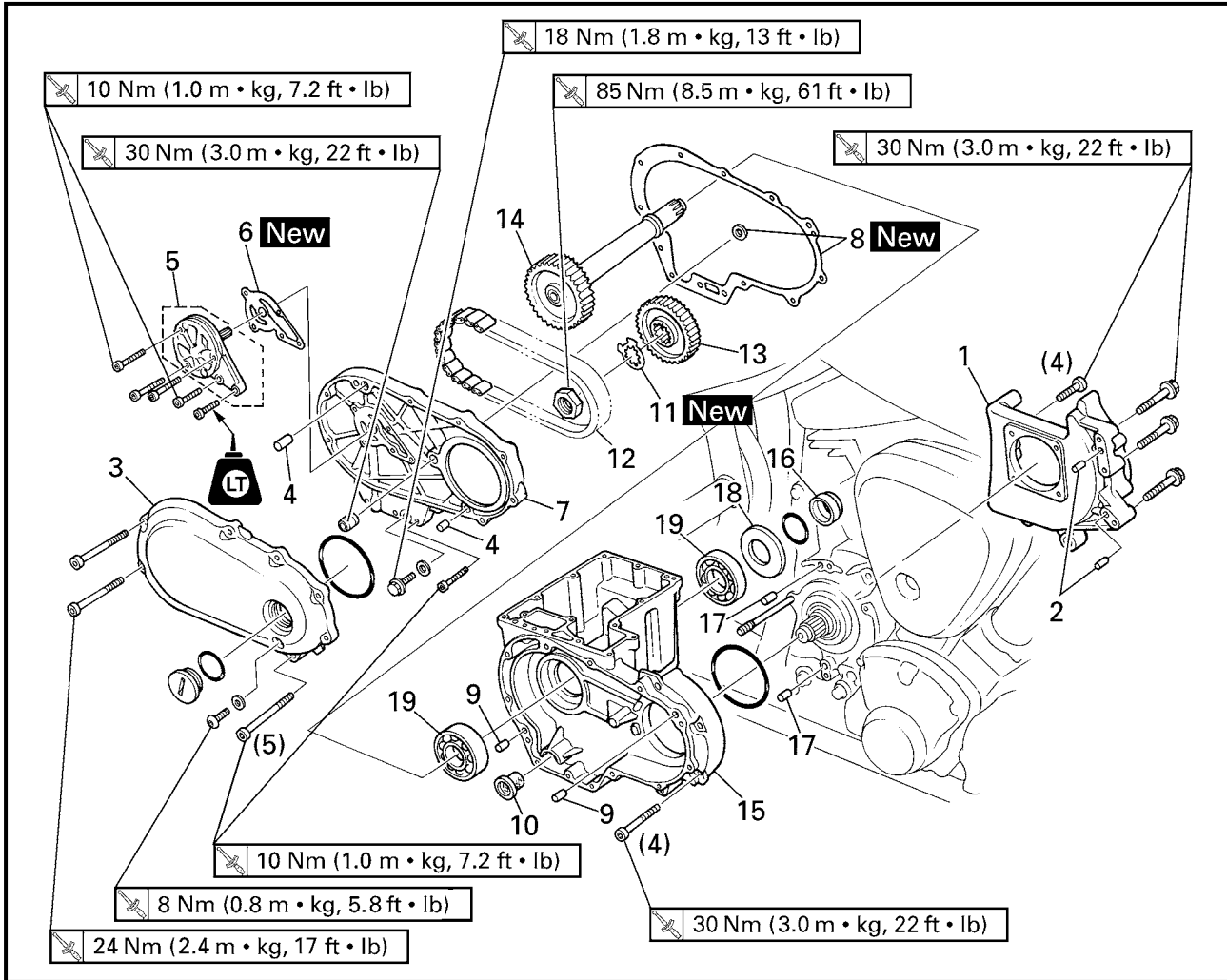


Order	Job/Part	Q'ty	Remarks
	<b>Removing the oil tank cover</b>		Remove the parts in the order listed.
	Muffler/exhaust pipes		Refer to "ENGINE".
	Engine oil		Drain.
1	Oil tank breather hose	1	Disconnect.
2	Dipstick	1	
3	Dipstick joint	1	
4	Oil pipe #1	1	
5	Oil pipe #2	1	
6	Oil tank cover	1	
7	Oil tank cover gasket	1	
8	Dowel pin	2	
9	Oil strainer	1	
			For installation, reverse the removal procedure.



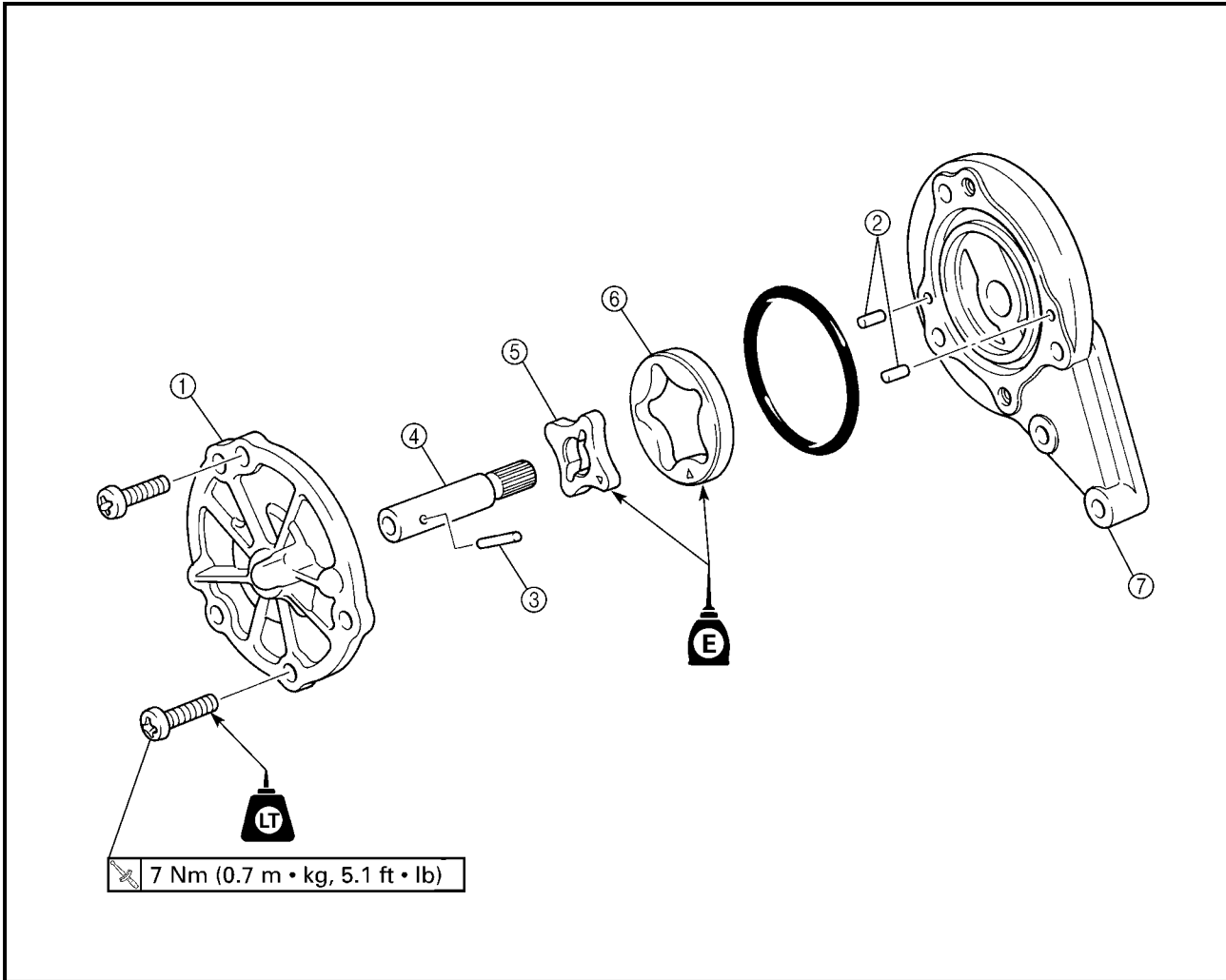
5

Order	Job/Part	Q'ty	Remarks
	<b>Removing the transfer gear case</b>		Remove the parts in the order listed.
	Transfer gear oil		Drain.
	Drive pulley		Refer to "DRIVE BELT AND DRIVE PULLEY" in chapter4.
1	Drive pulley case	1	
2	Dowel pin	2	
3	Cover	1	
4	Dowel pin	2	
5	Transfer gear oil pump	1	
6	Transfer gear oil pump gasket	1	
7	Transfer gear case cover	1	
8	Transfer gear case cover gasket	1	
9	Dowel pin	2	
10	Oil strainer	1	



5

Order	Job/Part	Q'ty	Remarks
11	Lock washer	1	
12	Primary chain	1	
13	Middle drive gear	1	
14	Middle driven shaft	1	
15	Transfer gear case	1	
16	Spacer	1	
17	Dowel pin	2	
18	Oil seal	1	
19	Bearing	2	
			For installation, reverse the removal procedure.



5

Order	Job/Part	Q'ty	Remarks
	<b>Disassembling the transfer gear case oil pump</b>		Remove the parts in the order listed.
①	Oil pump cover	1	
②	Pin	2	
③	Pin	1	
④	Oil pump shaft	1	
⑤	Oil pump inner rotor	1	
⑥	Oil pump outer rotor	1	
⑦	Oil pump housing	1	
			For assembly, reverse the disassembly procedure.

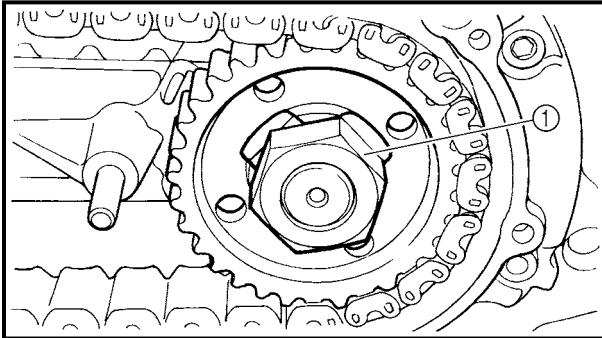


### REMOVING THE BATTERY

1. Disconnect:
  - battery leads  
(from the battery terminals)

#### **⚠ WARNING**

**First, disconnect the negative battery lead, then the positive battery lead.**



### REMOVING THE MIDDLE DRIVEN SHAFT

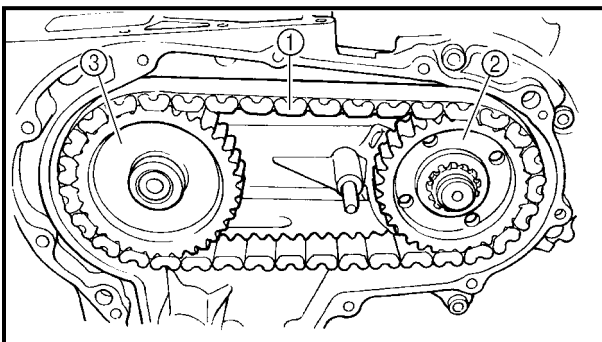
#### NOTE:

Loosen the middle drive gear nut before removing the drive pulley.

1. Straighten the lock washer tab.
2. Loosen:
  - middle drive gear nut ①

#### NOTE:

When loosening the middle drive gear nut, press down on the brake pedal so the middle drive gear does not move.

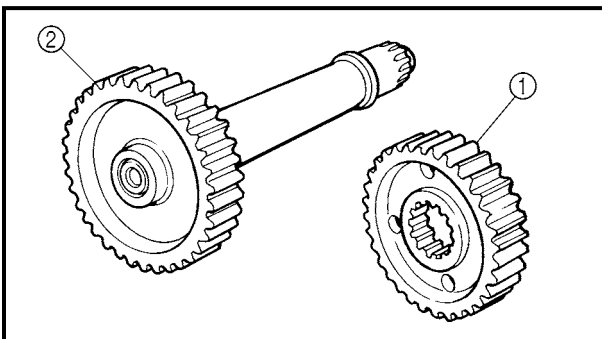


3. Remove:

- primary chain ①
- middle drive gear ②
- middle driven shaft ③

#### NOTE:

Remove the primary chain, middle drive gear and middle driven shaft at the same time.

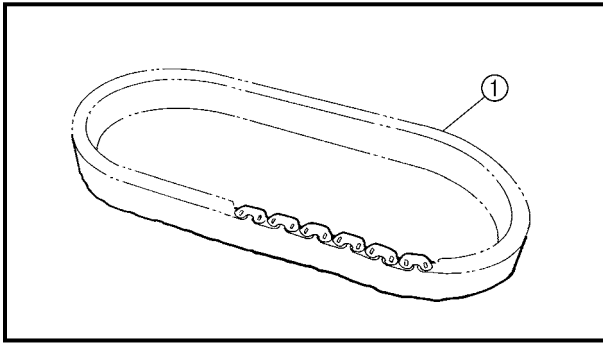


### CHECKING THE MIDDLE DRIVE

1. Check:

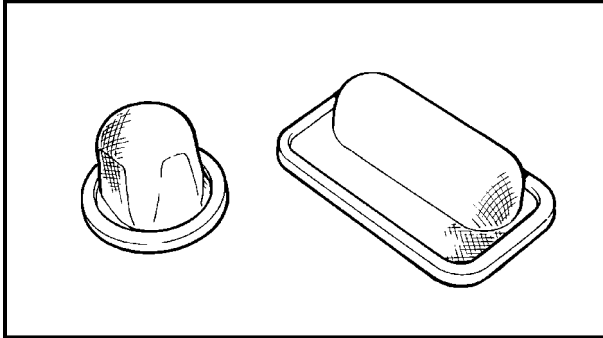
- middle drive gear ①
- middle driven gear ②

Damage/wear → Replace the middle drive gear, middle driven shaft and primary chain as a set.



## 2. Check:

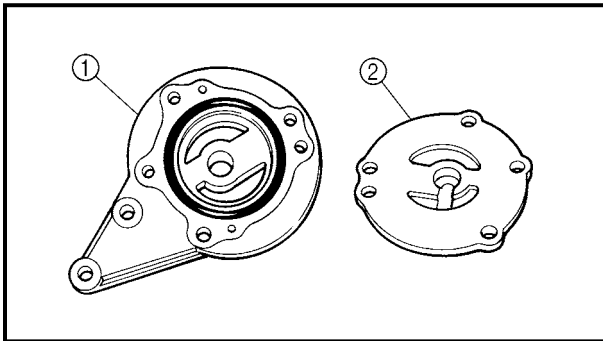
- primary chain ①  
Damage/stiffness → Replace the primary chain, middle drive gear and middle driven shaft as a set.



## CHECKING THE OIL STRAINER

### 1. Check:

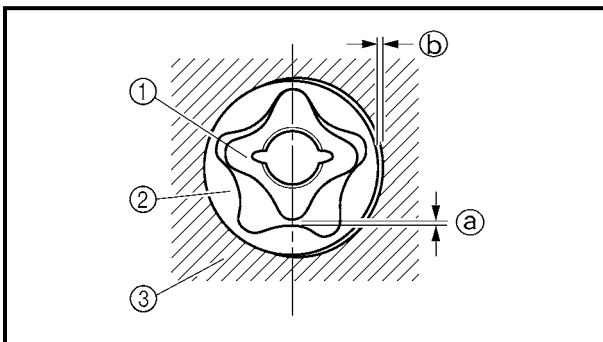
- oil strainer  
Damage → Replace.  
Contaminants → Clean with engine oil.



## CHECKING THE OIL PUMP

### 1. Check:

- oil pump housing ①
- oil pump cover ②  
Cracks/damage/wear → Replace the defective part(s).



### 2. Measure:

- inner rotor-to-outer rotor tip clearance ③
- outer rotor-to-oil pump housing clearance ②  
Out of specification → Replace the oil pump.

- ① Inner rotor
- ② Outer rotor
- ③ Oil pump housing

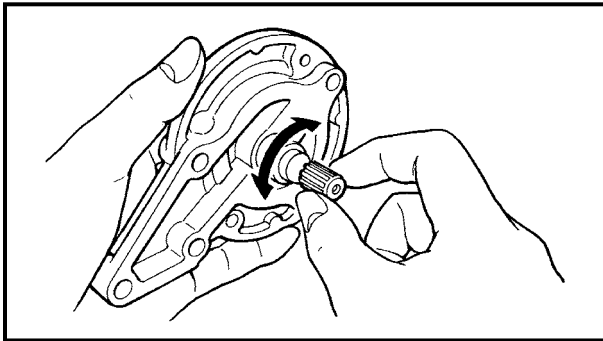


**Inner rotor-to-outer rotor tip clearance**

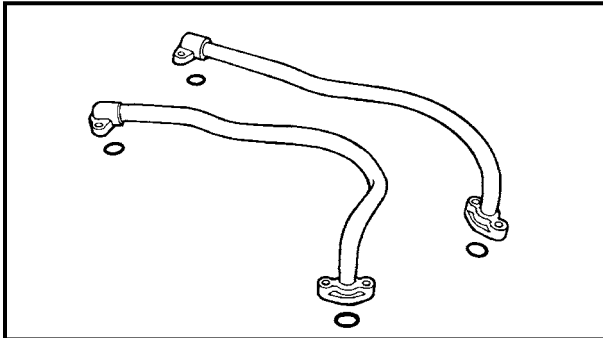
0.07 ~ 0.12 mm (0.003 ~ 0.005 in)

**Outer rotor-to-oil pump housing clearance**

0.03 ~ 0.08 mm (0.001 ~ 0.003 in)



3. Check:
  - oil pump operation  
Unsmooth → Repair or replace the defective part(s).



### CHECKING THE OIL PIPE

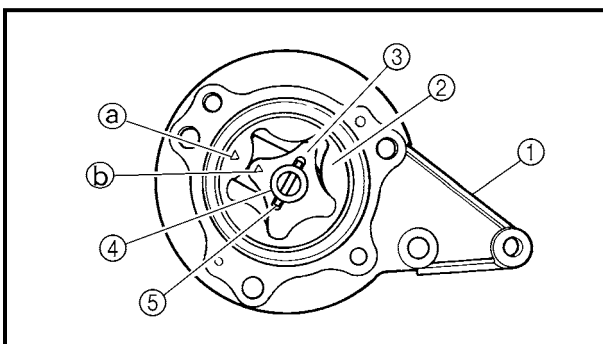
1. Check:
  - oil pipe  
Damage → Replace.

EAS00375

### ASSEMBLING THE OIL PUMP

1. Lubricate:
  - inner rotor
  - outer rotor
  - oil pump shaft  
(with the recommended lubricant)

	<b>Recommended lubricant</b> <b>Engine oil</b>
---	---

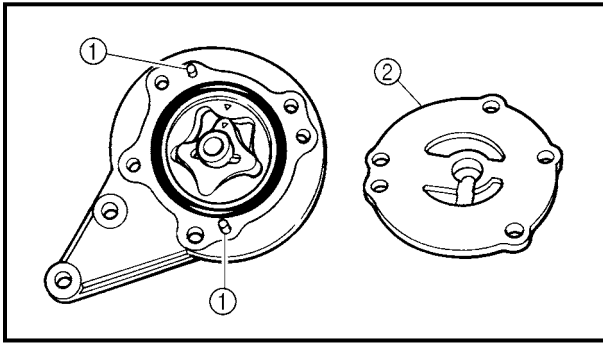


2. Install:
  - oil pump housing ①
  - oil pump outer rotor ②
  - oil pump inner rotor ③
  - oil pump shaft ④
  - pin ⑤

- NOTE:** \_\_\_\_\_
- When installing the oil pump shaft, align the pin in the oil pump shaft with the groove in the oil pump inner rotor.
  - Align the arrow ① on the oil pump outer rotor with the arrow ② on the oil pump inner rotor.

# 5





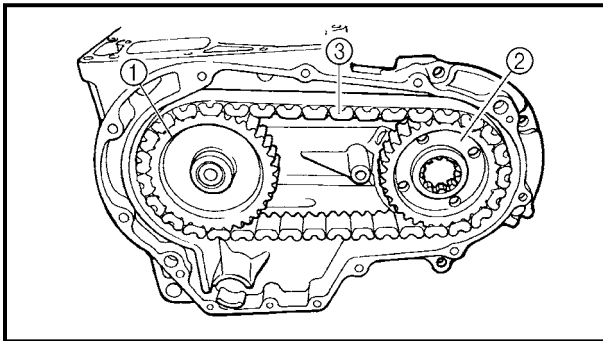
3. Install:
  - pins ①
  - oil pump cover ②

7 Nm (0.7 m · kg, 5.1 ft · lb)

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

Apply locking agent (LOCTITE®) to the threads of the oil pump cover screws.

4. Check:
  - oil pump operation
 Refer to "CHECKING THE OIL PUMP".

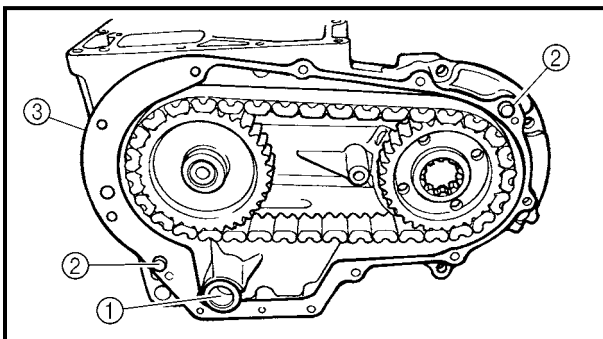
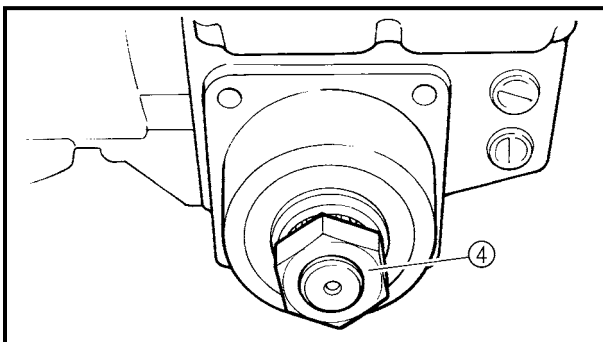


**INSTALLING THE TRANSFER GEAR CASE**

1. Install:
  - bearings
  - oil seal
2. Install:
  - middle driven shaft ①
  - middle drive gear ②
  - primary chain ③  
(into the transfer gear case)
  - O-ring
  - spacer
  - drive pulley nut ④

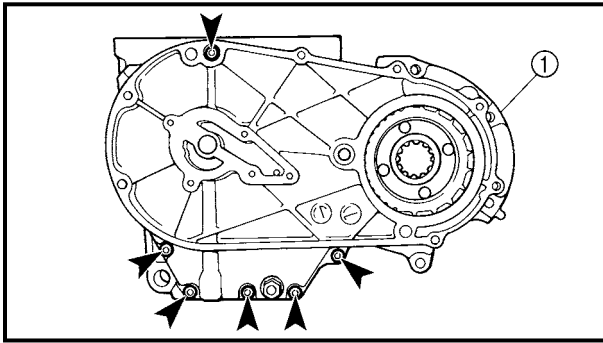
**NOTE:** \_\_\_\_\_

- Install the middle driven shaft, middle drive gear and primary chain at the same time.
- Temporarily install the drive pulley nut onto the middle driven shaft.



3. Install:
  - oil strainer ①
  - dowel pins ②
  - transfer gear case cover gasket ③

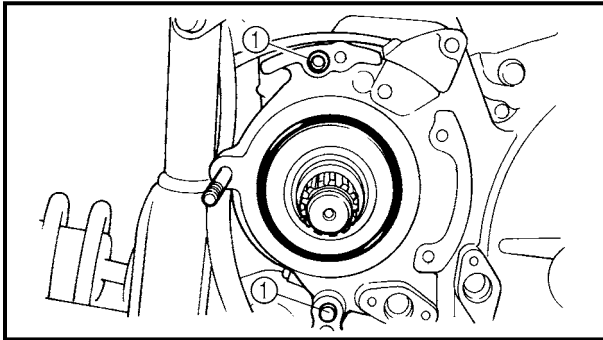
**New**



4. Install:

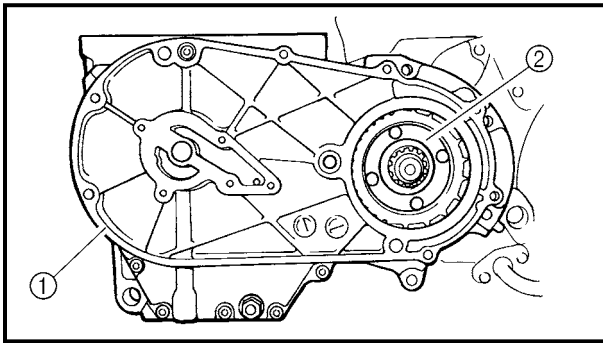
- transfer gear case cover ①

10 Nm (1.0 m · kg, 7.2 ft · lb)



5. Install:

- dowel pins ①

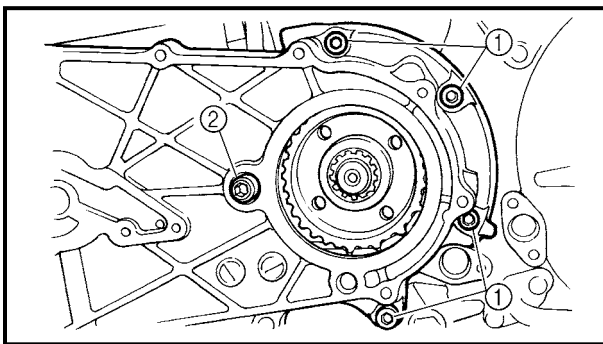


6. Install:

- transfer gear case assembly ①

**NOTE:**

- While installing the middle drive gear ② onto the drive axle, install the transfer gear case assembly onto the engine.
- Align the splines on the middle gear with the splines on the drive axle.



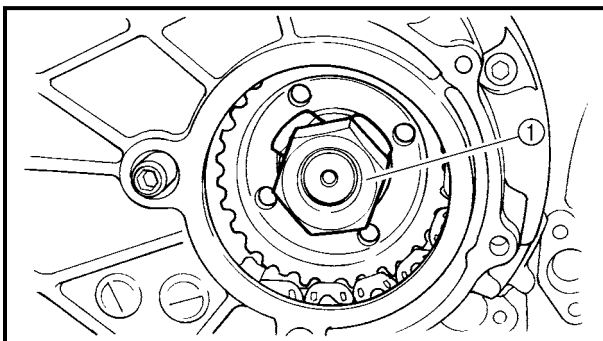
7. Install:

- transfer gear case bolts ①

30 Nm (3.0 m · kg, 22 ft · lb)

- nut ②

30 Nm (3.0 m · kg, 22 ft · lb)



8. Install:

- lock washer **New**
- middle drive gear nut ①

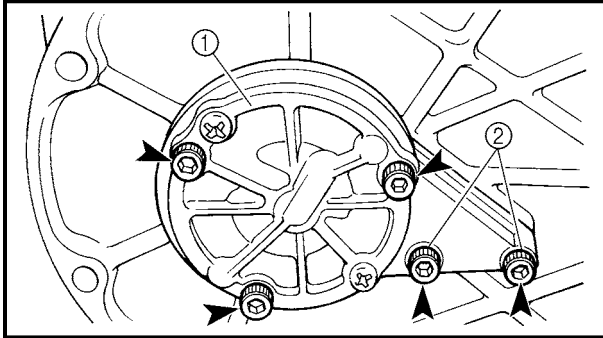
85 Nm (8.5 m · kg, 61 ft · lb)

9. Bend the lock washer tab along a flat side of the nut.

**5**



- 10.Remove:
- drive pulley nut

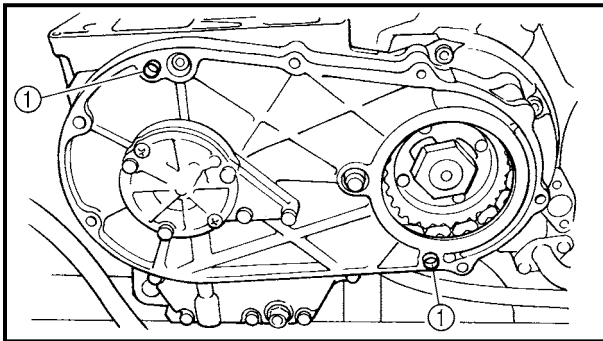


- 11.Install:
- transfer gear oil pump gasket **New**
  - transfer gear oil pump ①

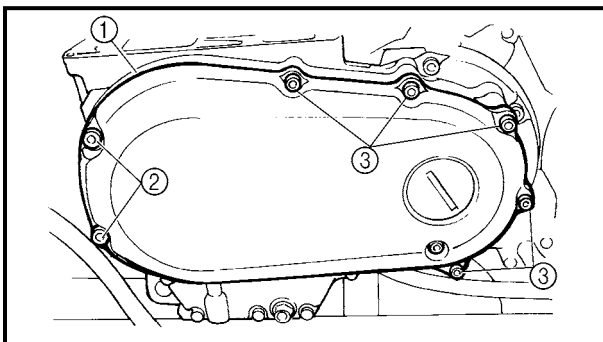
**10 Nm (1.0 m · kg, 7.2 ft · lb)**

**NOTE:**

Apply locking agent (LOCTITE®) only to the threads of the transfer gear oil pump bolts ② (M6 × 25 mm bolts).



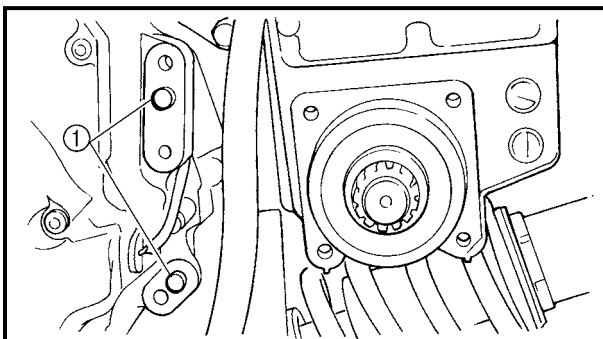
- 12.Install:
- dowel pins ①



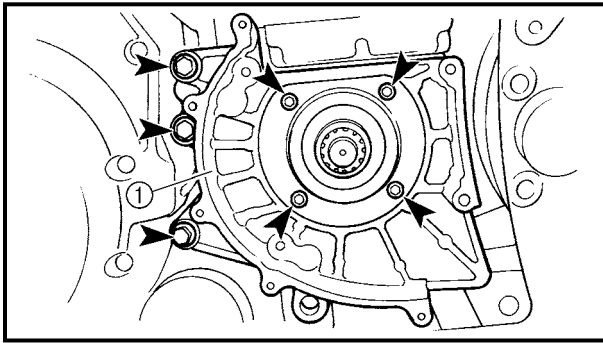
- 13.Install:
- cover ①
  - cover bolts (M8) ②
  - cover bolts (M6) ③

**24 Nm (2.4 m · kg, 17 ft · lb)**

**10 Nm (1.0 m · kg, 7.2 ft · lb)**



- 14.Install:
- dowel pins ①



15. Install:

- drive pulley case ①

30 Nm (3.0 m · kg, 22 ft · lb)

16. Install:

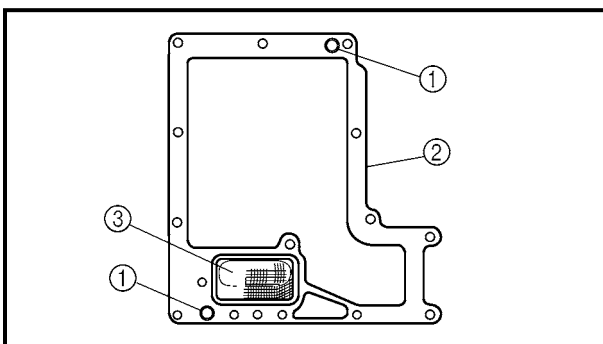
- drive pulley

Refer to “DRIVE BELT AND DRIVE PULLEY” in chapter 4.

17. Fill:

- transfer gear case  
(with the specified amount of the recommended transfer gear oil)  
Refer to “CHANGING THE TRANSFER GEAR OIL” in chapter 3.

# 5



## INSTALLING THE OIL TANK COVER

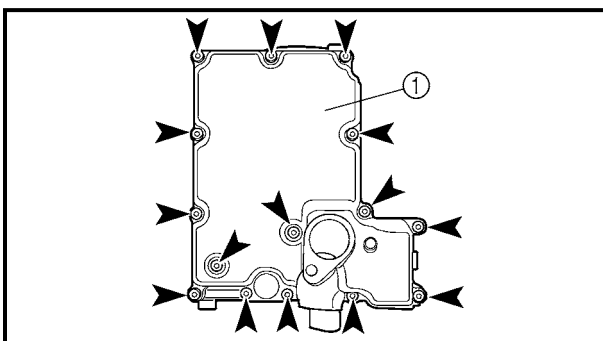
1. Install:

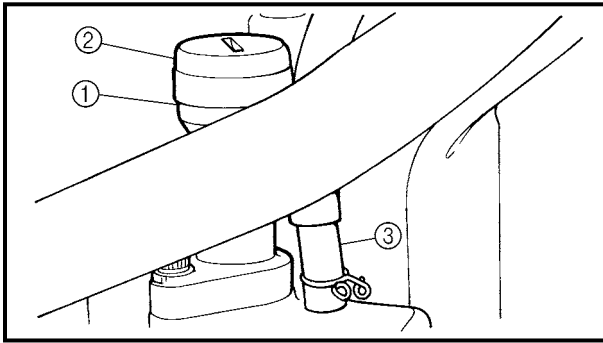
- dowel pins ①
- oil tank cover gasket ② **New**
- oil strainer ③

2. Install:

- oil tank cover ①

10 Nm (1.0 m · kg, 7.2 ft · lb)

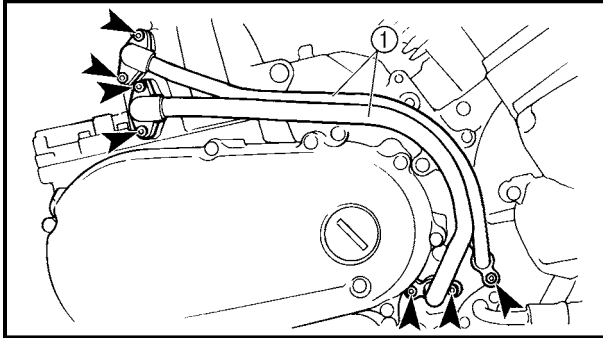





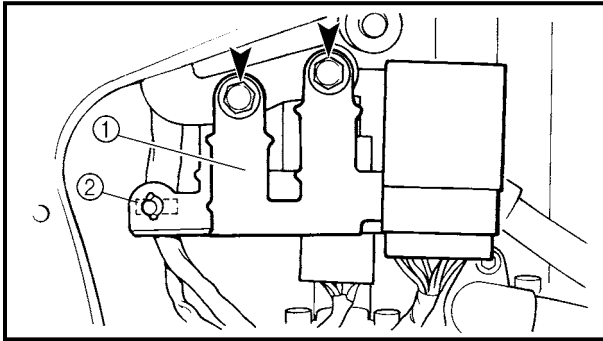
3. Install:
- dipstick joint ①
  - dipstick ②

**NOTE:** Finger tighten the dipstick joint bolt.

4. Connect:
- oil tank breather hose ③

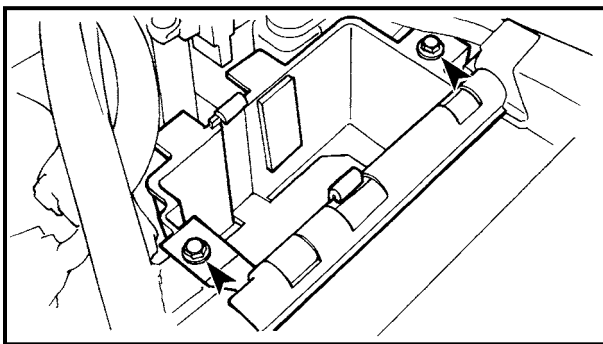


5. Install:
- oil pipes ①  **10 Nm (1.0 m · kg, 7.2 ft · lb)**

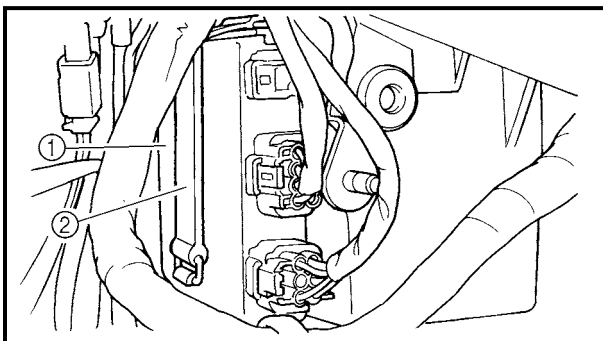


**INSTALLING THE BATTERY**

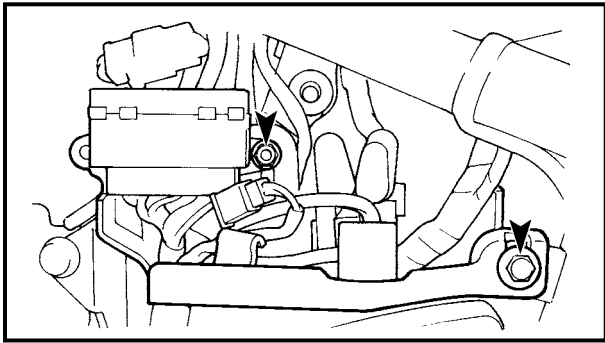
1. Install:
- relay bracket ①
  - plastic clamp ②
2. Connect:
- turn signal relay coupler
  - relay unit coupler



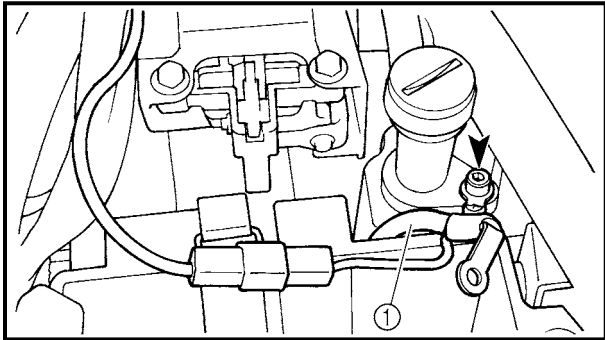
3. Install:
- battery box



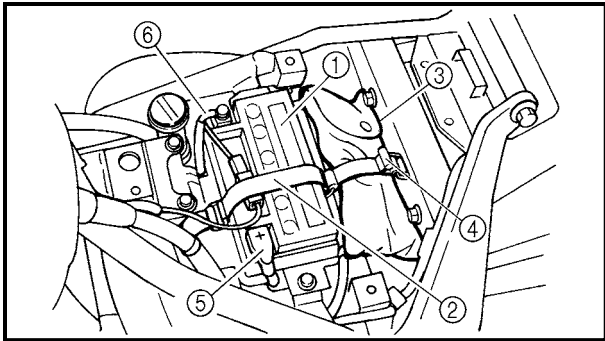
4. Install:
- ignitor unit ①
  - ignitor unit holder ②
5. Connect:
- ignitor unit couplers



6. Install:
- plastic bracket



7. Install:
- negative battery lead ①  
(to the dipstick joint)



8. Install:
- battery ①
  - battery holder ②
  - tool kit ③
  - tool kit holder ④
9. Connect:
- battery leads  
(to the battery terminals)

**CAUTION:**

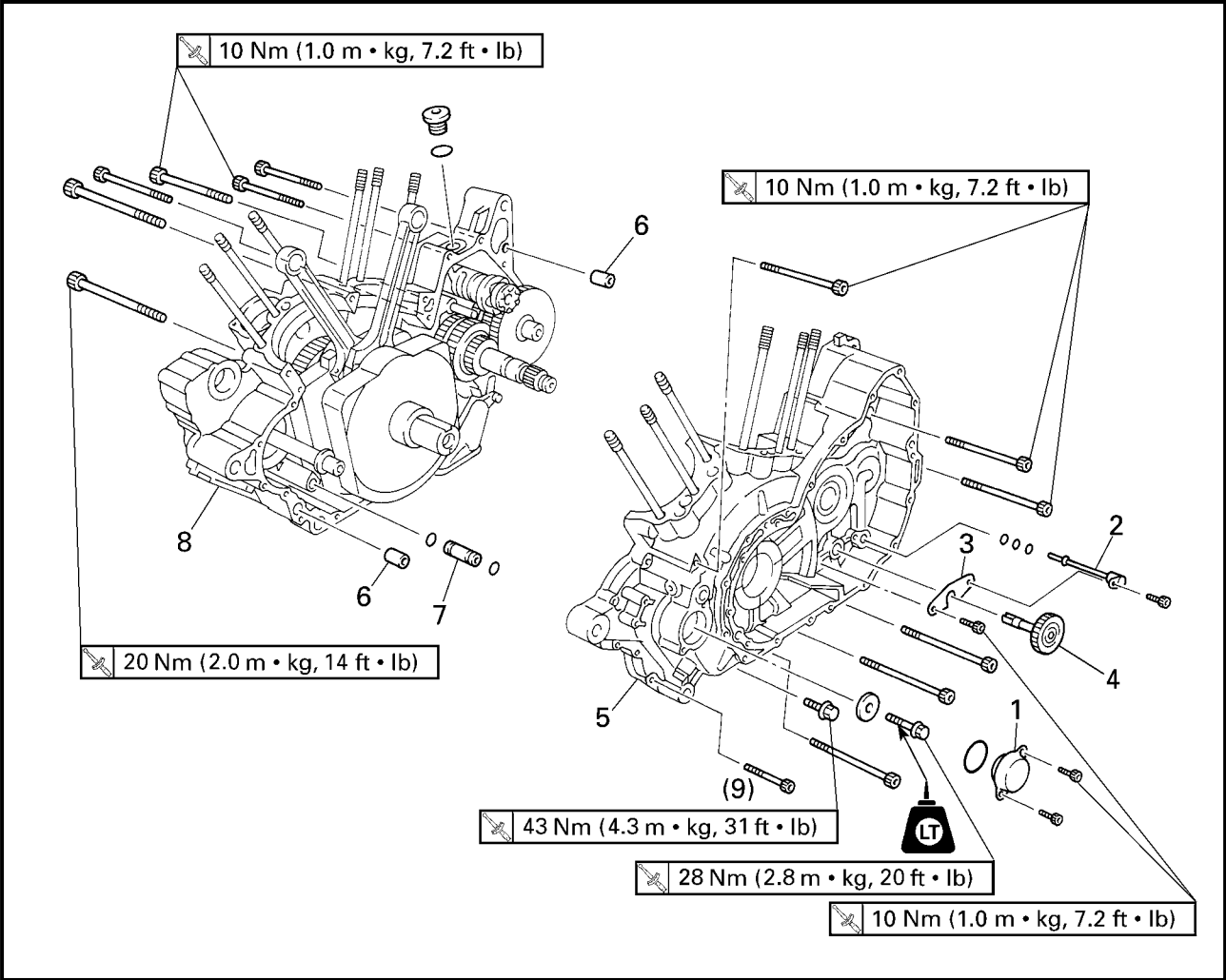
**First, connect the positive battery lead ⑤, then the negative battery lead ⑥.**

10. Check:
- battery terminals

5

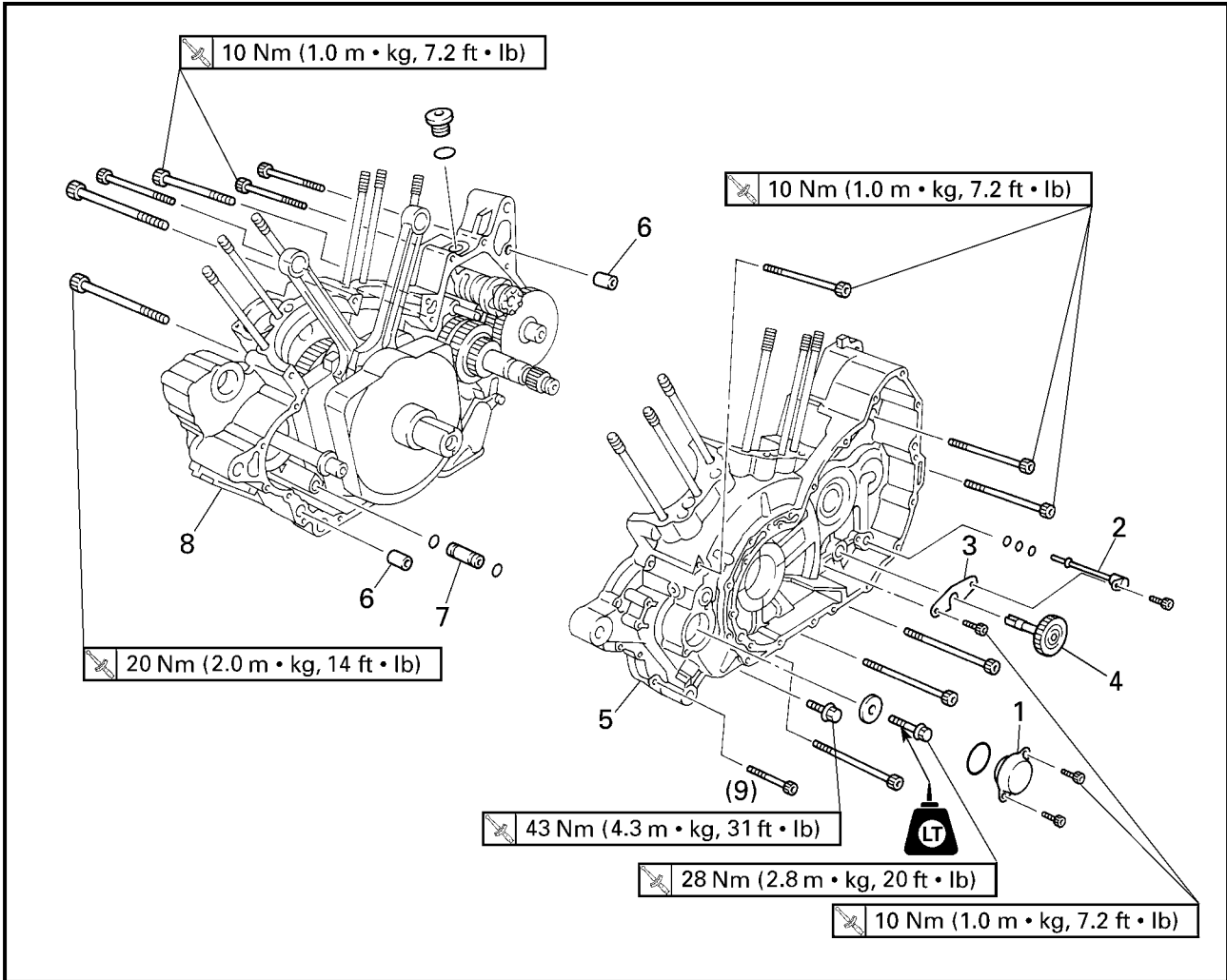


CRANKCASE



5

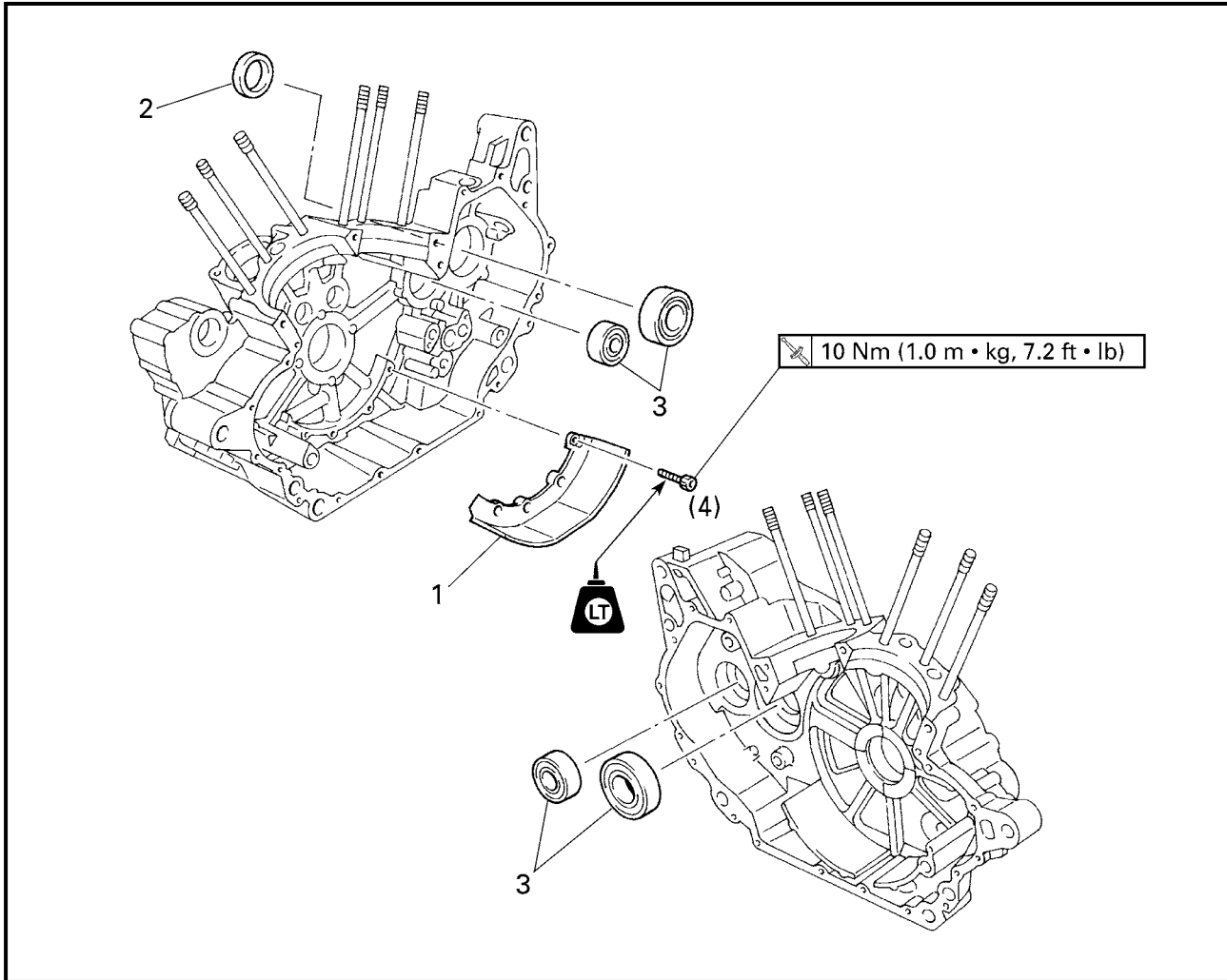
Order	Job/Part	Q'ty	Remarks
	<b>Separating the crankcase</b>		Remove the parts in the order listed.
	Engine		Refer to "ENGINE".
	Camshaft		Refer to "CAMSHAFTS".
	Piston		Refer to "CYLINDERS AND PISTONS".
	Shift shaft		Refer to "SHIFT SHAFT".
	Generator rotor		Refer to "GENERATOR AND STARTER CLUTCH".
1	Generator shaft end cover	1	
2	Oil delivery pipe	1	
3	Engine oil pump driven gear stopper	1	



5

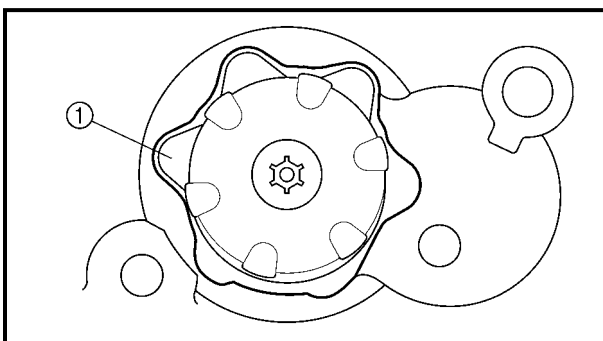
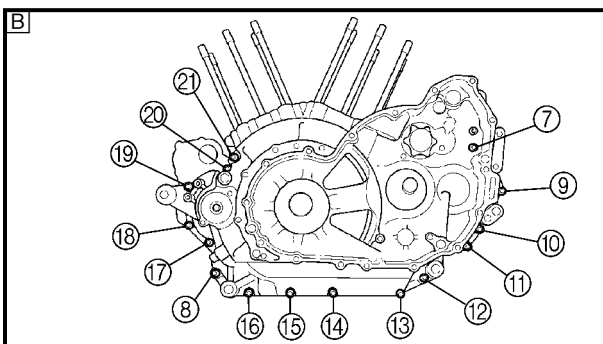
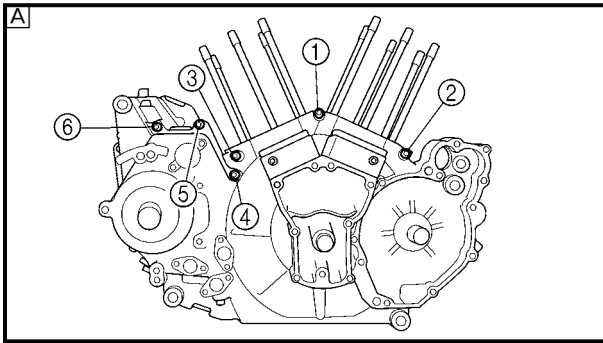
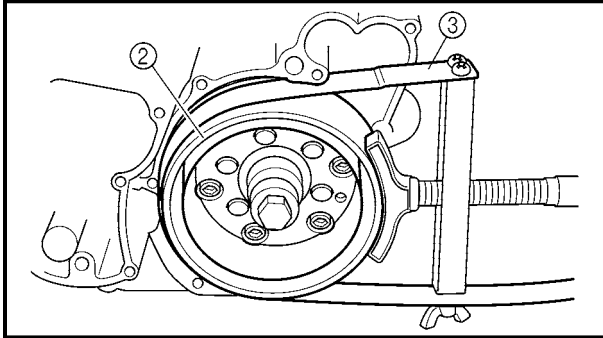
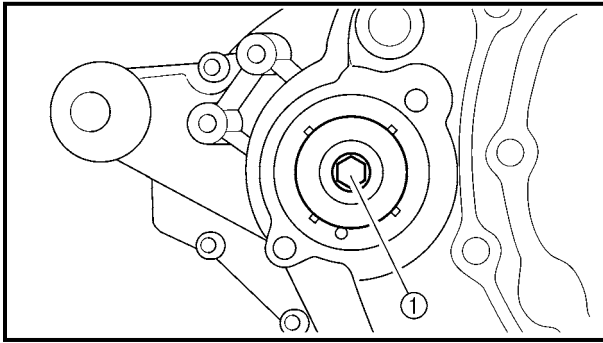
Order	Job/Part	Q'ty	Remarks
4	Engine oil pump driven gear	1	For installation, reverse the removal procedure.
5	Left crankcase	1	
6	Dowel	2	
7	Joint pipe	1	
8	Right crankcase	1	





5

Order	Job/Part	Q'ty	Remarks
	<b>Removing the baffle plate and bearings</b>		Remove the parts in the order listed.
	Crankshaft		Refer to "CRANKSHAFT".
	Transmission		Refer to "TRANSMISSION".
1	Baffle plate	1	
2	Oil seal	1	
3	Bearing	4	
			Installation, reverse the removal procedure.



EAS00386

**DISASSEMBLING THE CRANKCASE****NOTE:**

Loosen the generator shaft bolt before removing the generator rotor.

**1. Remove:**

- generator shaft bolt ①

**NOTE:**

While holding the generator rotor ② with the sheave holder ③, loosen the generator shaft bolt.



**Sheave holder  
YS-01880**

**2. Remove:**

- crankcase bolts

**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).

Ⓐ Right crankcase

Ⓑ Left crankcase

M8 × 100 mm bolts: ①, ②

M8 × 80 mm bolt: ③

M6 × 105 mm bolt: ②

M6 × 85 mm bolts: ⑨, ⑬

M6 × 75 mm bolts: ⑭, ⑮

M6 × 60 mm bolts: ④ ~ ⑦

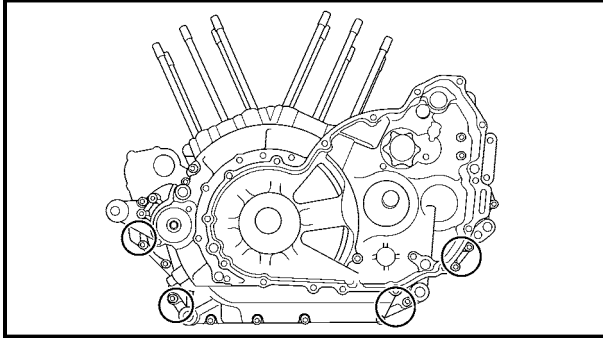
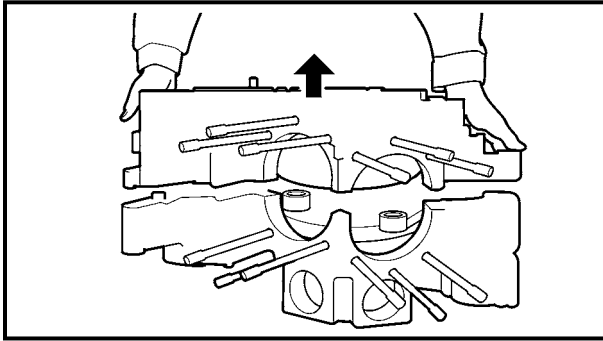
M6 × 40 mm bolts: ⑧, ⑩ ~ ⑫, ⑯ ~ ⑳

**3. Turn:**

- shift drum segment

**NOTE:**

Turn the shift drum segment ① to the position shown in the illustration. In this position, the shift drum segment's teeth will not contact the crankcase during crankcase separation.



4. Remove:
  - right crankcase

**CAUTION:**

- First check that the shift drum segment's teeth then remove the right crankcase.
- 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 the crankcase halves separate evenly.

EAS00399

**CHECKING THE CRANKCASE**

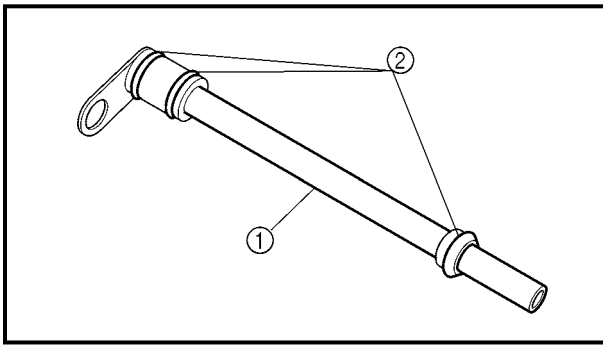
1. Thoroughly wash the crankcase halves in a mild solvent.
2. Thoroughly clean all the gasket surfaces and crankcase mating surfaces.
3. Check:
  - crankcase  
Cracks/damage → Replace.
  - oil delivery passages  
Obstruction → Blow out with compressed air.

**5**

EAS00401

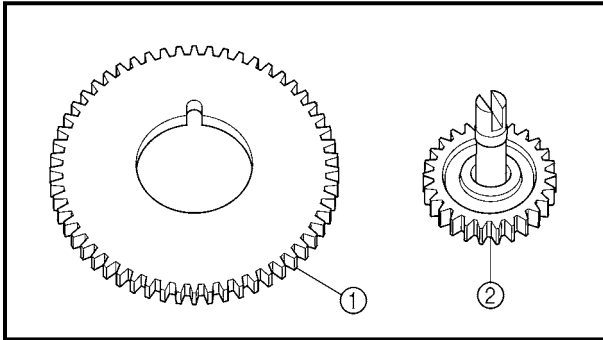
**CHECKING THE BEARINGS AND OIL SEAL**

1. Check:
  - bearings  
Clean and lubricate the bearings, then rotate the inner race with your finger.  
Rough movement → Replace.
2. Check:
  - oil seal  
Damage/wear → Replace.

**CHECKING THE OIL DELIVERY PIPE**

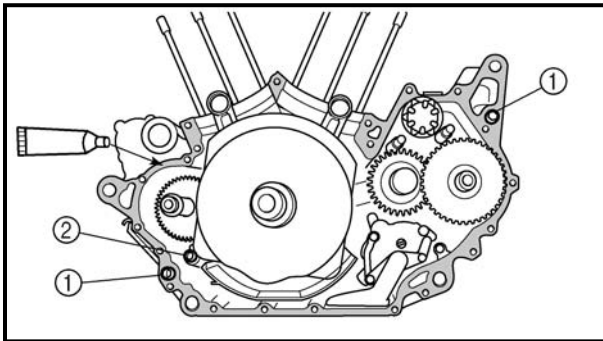
## 1. Check:

- oil delivery pipe ①  
Damage → Replace.  
Obstruction → Wash and blow out with compressed air.
- O-rings ②  
Damage/wear → Replace.

**CHECKING THE ENGINE OIL PUMP DRIVE**

## 1. Check:

- oil pump drive gear ①
- oil pump driven gear ②  
Chips/pitting/roughness/wear → Replace the defective part(s).



EAS00416

**ASSEMBLING THE CRANKCASE**

## 1. Apply:

- sealant  
(onto the crankcase mating surfaces)



**Quick Gasket®**  
**ACC-11001-05-01**

**NOTE:**

Do not allow any sealant to come into contact with the oil gallery.

## 2. Install:

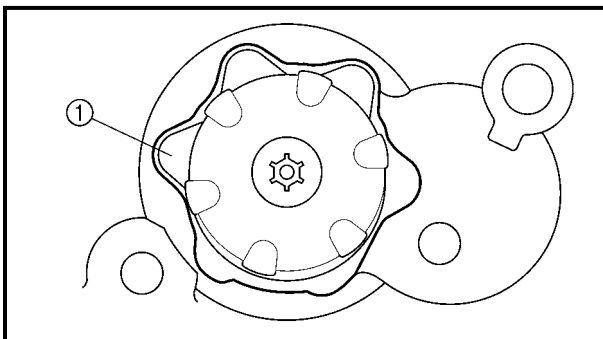
- dowel pins ①
- joint pipe ②

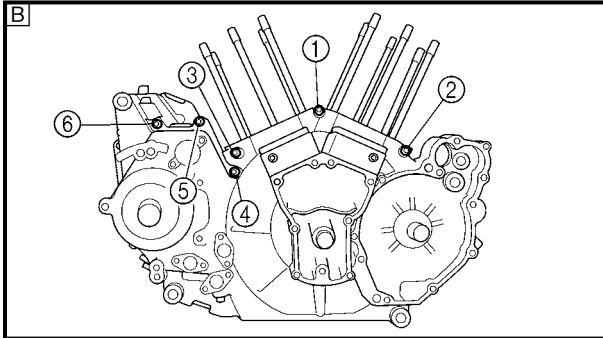
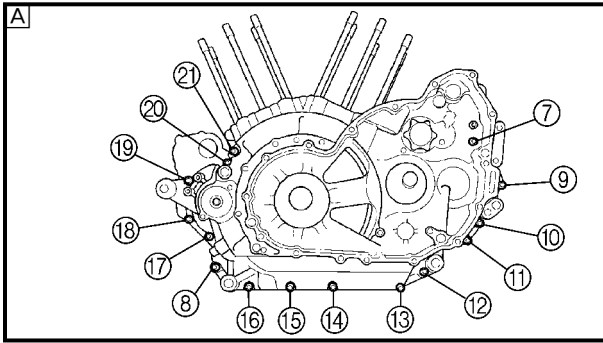
## 3. Install:

- left crankcase  
(onto the right crankcase)

**NOTE:**

- Turn the shift drum segment ① to the position shown in the illustration. In this position, the shift drum segment's teeth will not contact the crankcase during crankcase installation.
- Tap lightly on the left crankcase with a soft-face hammer.





4. Install:
- crankcase bolts

**NOTE:**

- Lubricate the bolt threads with engine oil.
- Tighten each bolt 1/4 of a turn at a time, in stages and in a crisscross pattern.
- Tighten the bolts in numerical order (refer to the numbers in the illustration).

**A** Left crankcase

**B** Right crankcase

M8 × 100 mm bolts: ①, ②

M8 × 80 mm bolt: ③

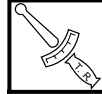
M6 × 105 mm bolt: ②

M6 × 85 mm bolts: ⑨, ⑬

M6 × 75 mm bolts: ⑭, ⑮

M6 × 60 mm bolts: ④ ~ ⑦

M6 × 40 mm bolts: ⑧, ⑩ ~ ⑫, ⑯ ~ ⑳



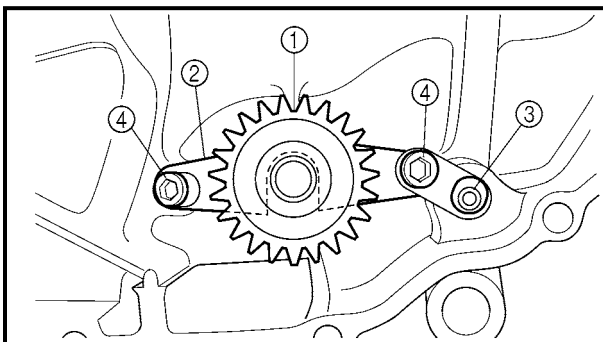
**Bolt ① ~ ③**

**24 Nm (2.4 m · kg, 17 ft · lb)**

**Bolt ④ ~ ⑳**

**10 Nm (1.0 m · kg, 7.2 ft · lb)**

5. Check:
- crankshaft and transmission operation
- Rough movement → Repair.



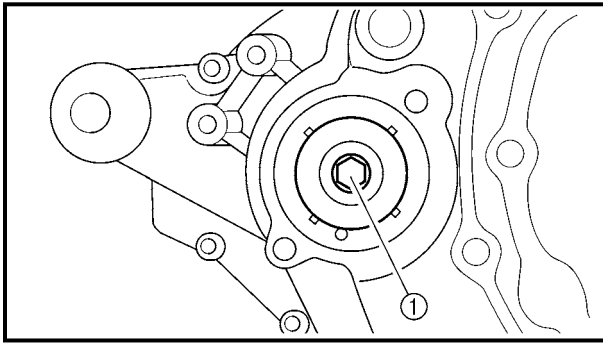
6. Install:

- engine oil pump driven gear ①
- engine oil pump driven gear stopper ②
- oil delivery pipe ③
- bolts ④


**10 Nm (1.0 m · kg, 7.2 ft · lb)**

7. Install:

- generator rotor
- Refer to "GENERATOR AND STARTER CLUTCH".

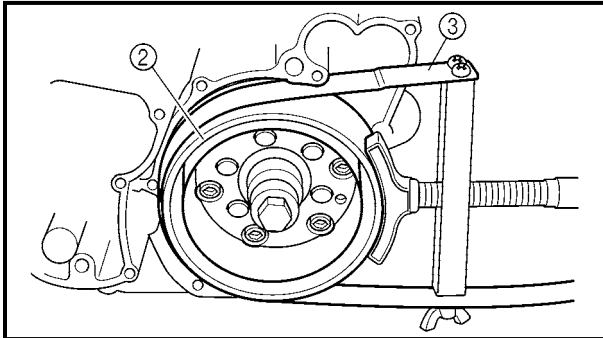


8. Install:
- washer
  - generator shaft bolt ①

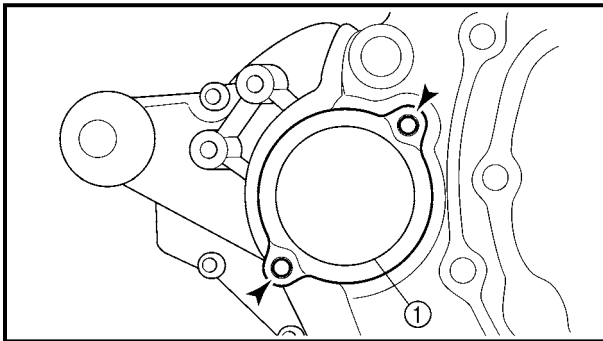
 28 Nm (2.8 m · kg, 20 ft · lb)

**NOTE:**

- Apply locking agent (LOCTITE®) to the threads of the generator shaft bolt.
- While holding the generator rotor ② with the sheave holder ③, tighten the generator shaft bolt.



**Sheave holder  
YS-01880**

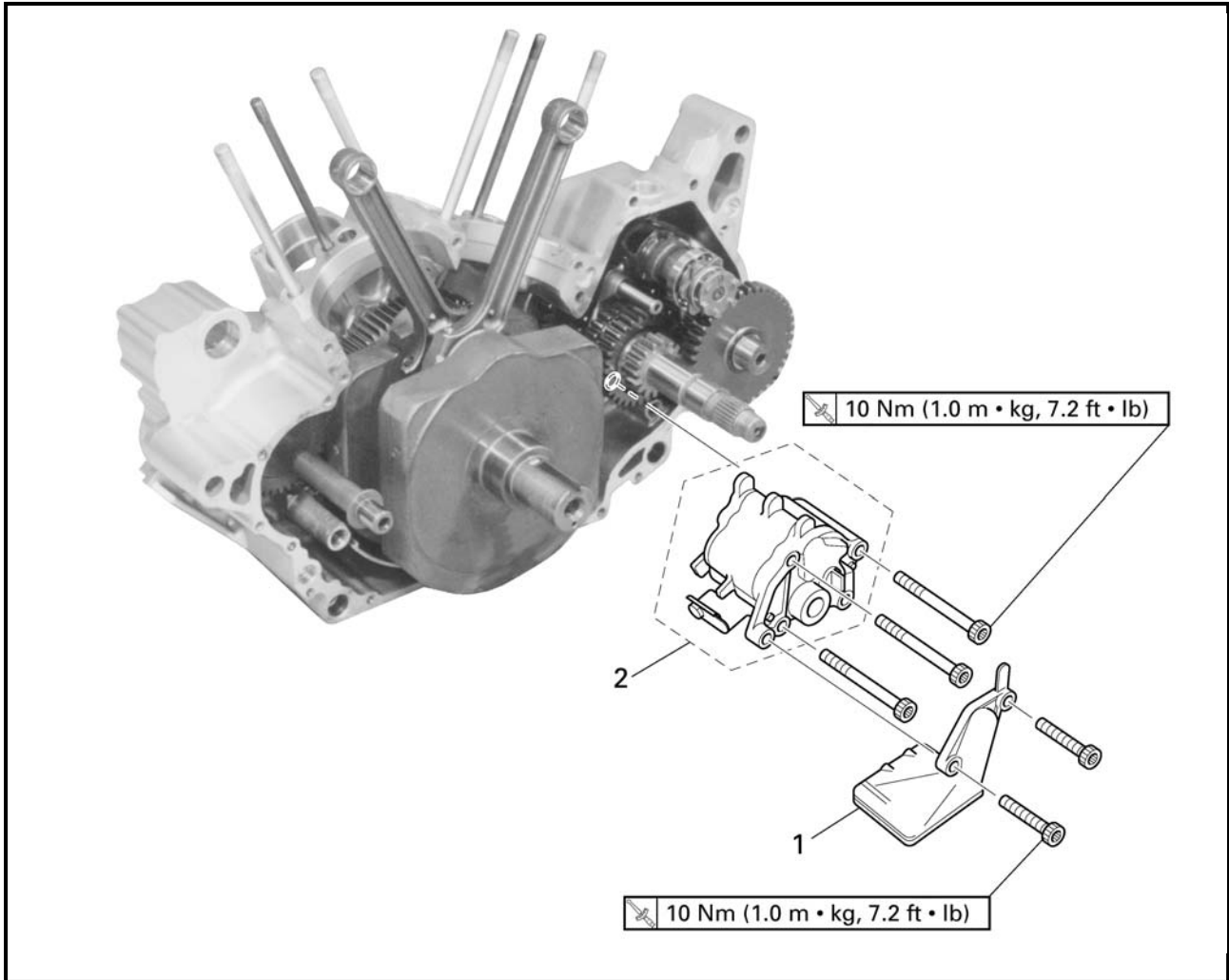


9. Install:
- generator shaft end cover ①

10. Install:
- shift shaft
  - clutch  
Refer to "SHIFT SHAFT" and "CLUTCH".
  - pistons
  - cylinders  
Refer to "CYLINDERS AND PISTONS".
  - camshaft  
Refer to "CAMSHAFTS".
  - cylinder head  
Refer to "ROCKER ARMS, PUSH RODS AND VALVE LIFTERS".
11. Install:
- engine  
Refer to "ENGINE".



ENGINE OIL PUMP

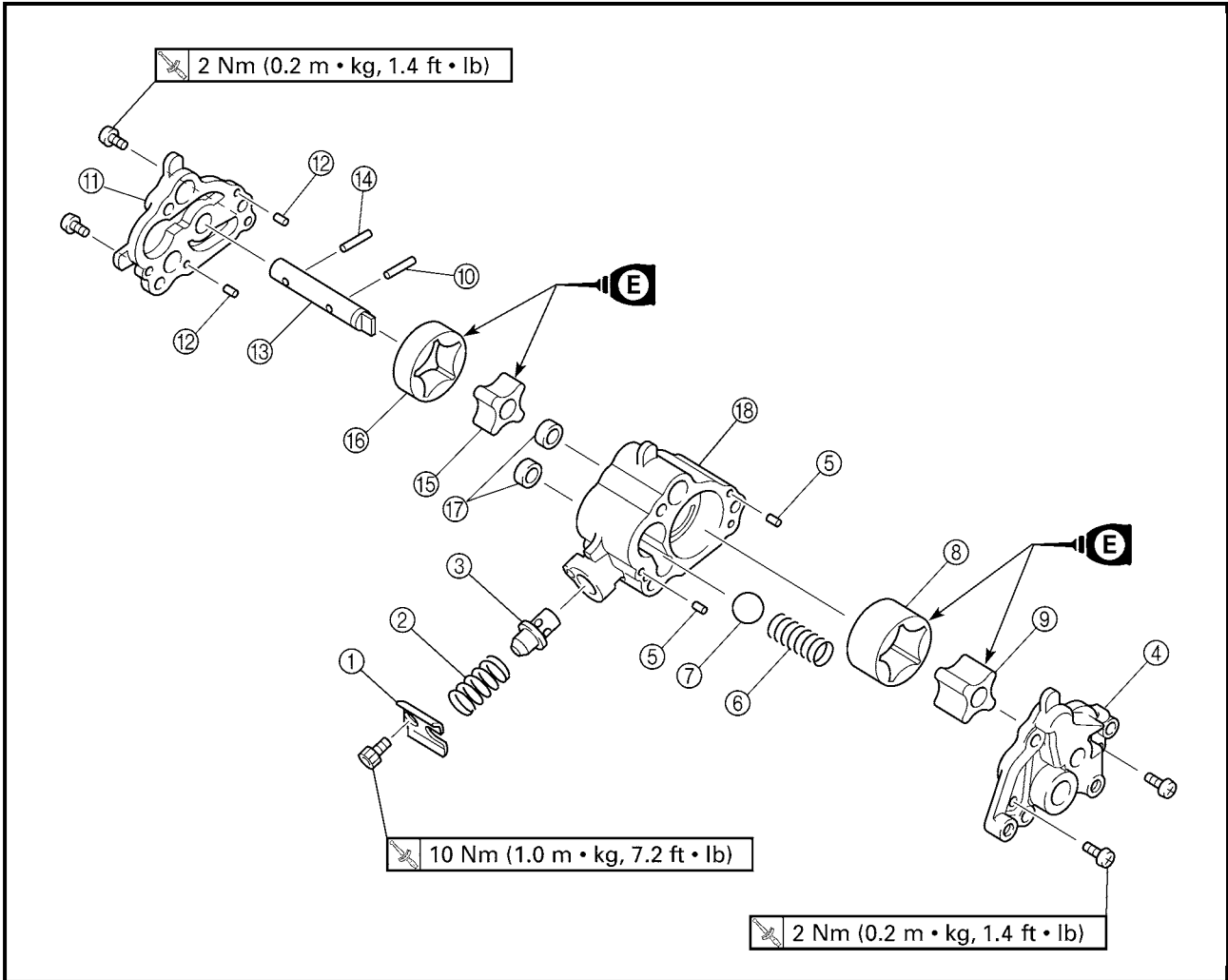


5

Order	Job/Part	Q'ty	Remarks
	<b>Removing the engine oil pump</b>		
	Crankcase		Remove the parts in the order listed. Separate. Refer to "CRANKCASE".
1	Oil strainer	1	
2	Engine oil pump assembly	1	
			Installation, reverse the removal procedure.

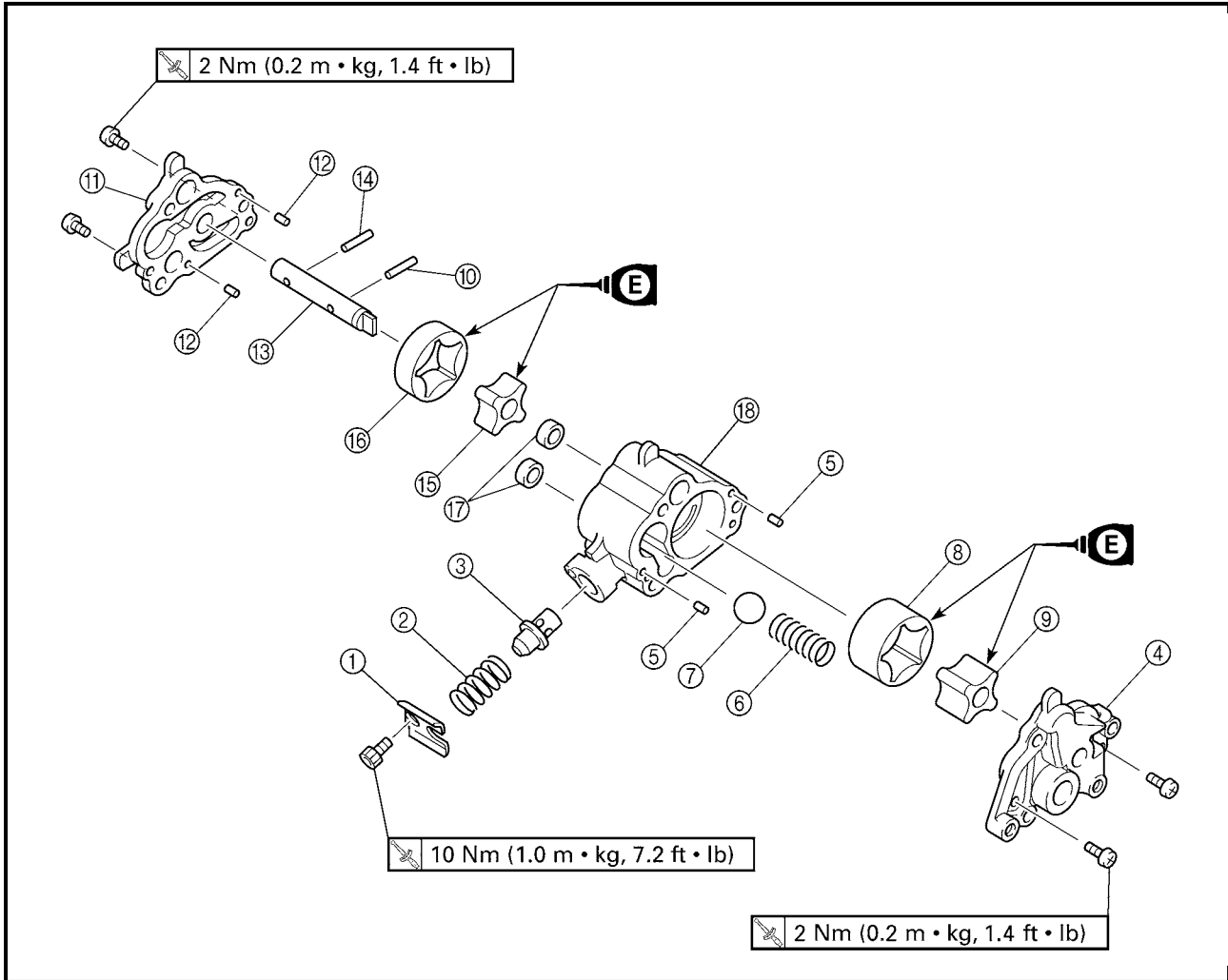


5



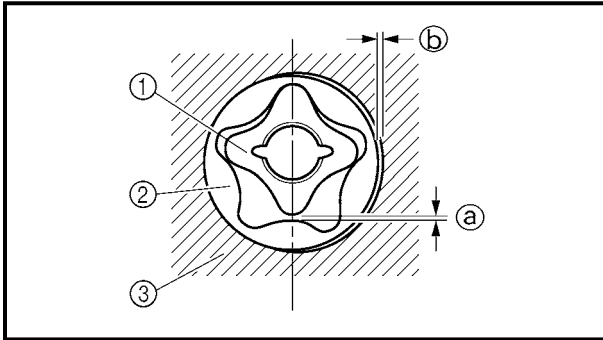
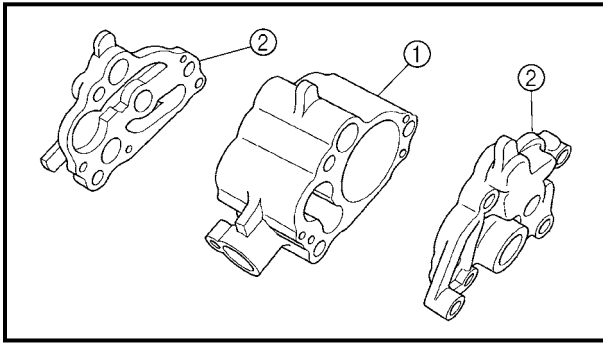
Order	Job/Part	Q'ty	Remarks
	<b>Disassembling the engine oil pump</b>		Remove the parts in the order listed.
①	Spring retainer	1	
②	Spring	1	
③	Relief valve	1	
④	Oil pump housing cover 1	1	
⑤	Pin	2	
⑥	Spring	1	
⑦	Ball	1	
⑧	Oil pump outer rotor 1	1	
⑨	Oil pump inner rotor 1	1	
⑩	Pin	1	





5

Order	Job/Part	Q'ty	Remarks
①	Oil pump housing cover 2	1	For assembly, reverse the disassembly procedure.
②	Pin	2	
③	Oil pump shaft	1	
④	Pin	1	
⑤	Oil pump inner rotor 2	1	
⑥	Oil pump outer rotor 2	1	
⑦	Oil seal	2	
⑧	Oil pump housing	1	



EAS00363

**CHECKING THE OIL PUMP**

1. Check:

- oil pump housing ①
- oil pump housing covers ②

Cracks/damage/wear → Replace the defective part(s).

2. Measure:

- inner rotor-to-outer rotor tip clearance ③
- outer rotor-to-oil pump housing clearance ④

Out of specification → Replace the oil pump.

- ① Inner rotor
- ② Outer rotor
- ③ Oil pump housing



**Inner rotor-to-outer rotor tip clearance**

0 ~ 0.12 mm (0 ~ 0.005 in)

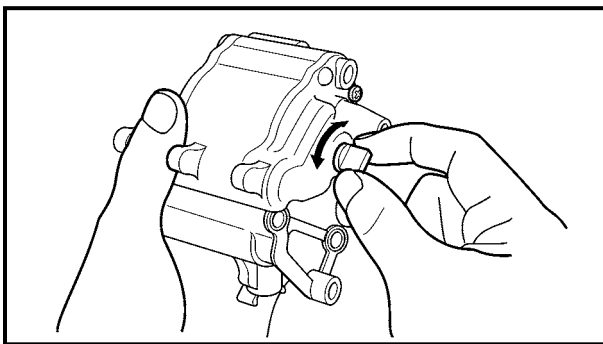
**Outer rotor-to-oil pump housing clearance (feed pump)**

0.03 ~ 0.08 mm (0.001 ~ 0.003 in)

**Outer rotor-to-oil pump housing clearance (scavenging pump)**

0.06 ~ 0.11 mm (0.001 ~ 0.004 in)

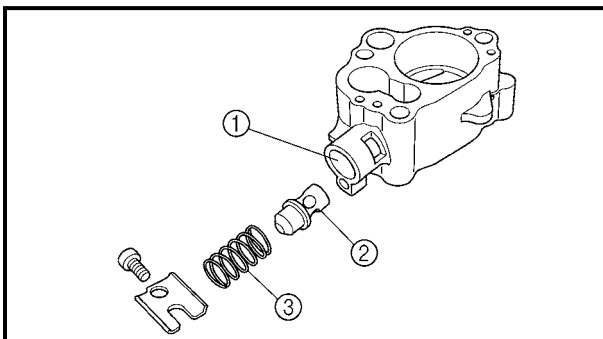
5



3. Check:

- oil pump operation

Rough movement → Repeat steps (1) and (2) or replace the defective part(s).



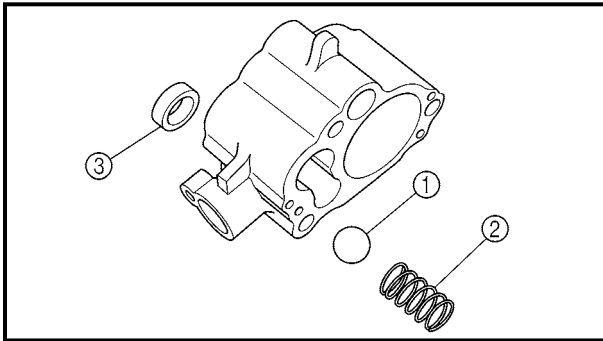
EAS00365

**CHECKING THE RELIEF VALVE**

1. Check:

- relief valve body ①
- relief valve ②
- spring ③

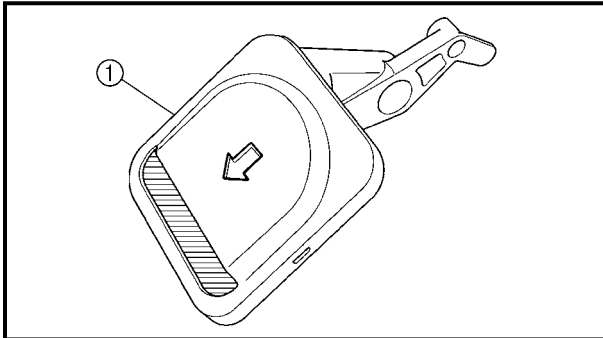
Damage/wear → Replace the defective part(s).



2. Check:

- ball ①
- spring ②
- oil seal ③

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



EAS00368

**CHECKING THE OIL STRAINER**

1. Check:

- oil strainer ①

Damage → Replace.

Contaminants → Clean with engine oil.

EAS00374

**ASSEMBLING THE OIL PUMP**

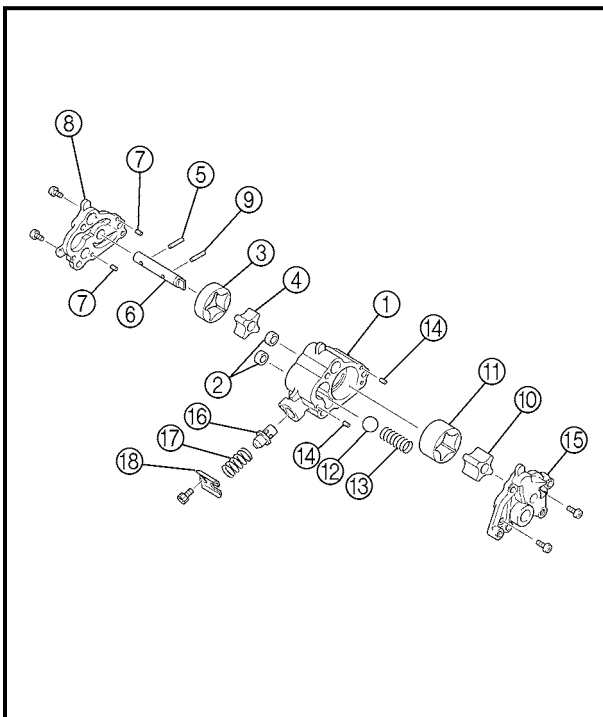
1. Lubricate:

- inner rotor
- outer rotor
- oil pump shaft

(with the recommended lubricant)


	<b>Recommended lubricant Engine oil</b>
---	---

**5**




2. Install:

- oil pump housing ①
- oil seals ②
- oil pump outer rotor 2 ③
- oil pump inner rotor 2 ④
- pin ⑤
- oil pump shaft ⑥
- pins ⑦
- oil pump housing cover 2 ⑧

 **2 Nm (0.2 m · kg, 1.4 ft · lb)**


- pin ⑨
- oil pump inner rotor 1 ⑩
- oil pump outer rotor 1 ⑪
- ball ⑫
- spring ⑬
- pins ⑭
- oil pump housing cover 1 ⑮

 **2 Nm (0.2 m · kg, 1.4 ft · lb)**

- relief valve ⑯



- spring ⑰
- spring retainer ⑱

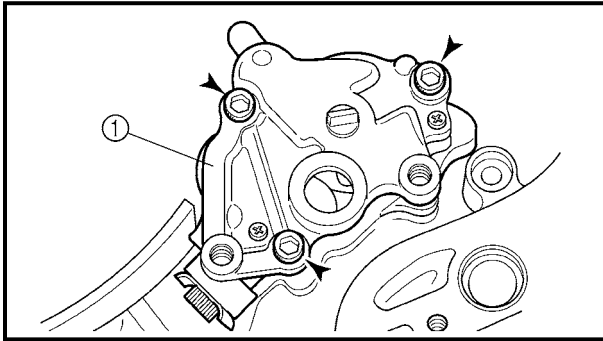
 10 Nm (1.0 m · kg, 7.2 ft · lb)

**NOTE:**

When installing the inner rotor, align the pin in the oil pump shaft with the groove in the inner rotor.

## 3. Check:


- oil pump operation  
Refer to "CHECKING THE OIL PUMP".

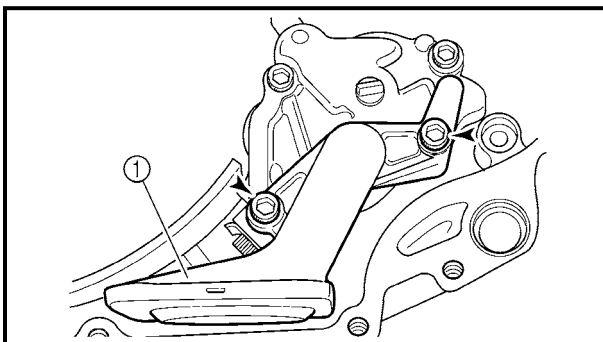


EAS00376

**INSTALLING THE OIL PUMP**

## 1. Install:

- oil pump ①  10 Nm (1.0 m · kg, 7.2 ft · lb)




EAS00378

**INSTALLING THE OIL STRAINER**

## 1. Install:

- oil strainer ①

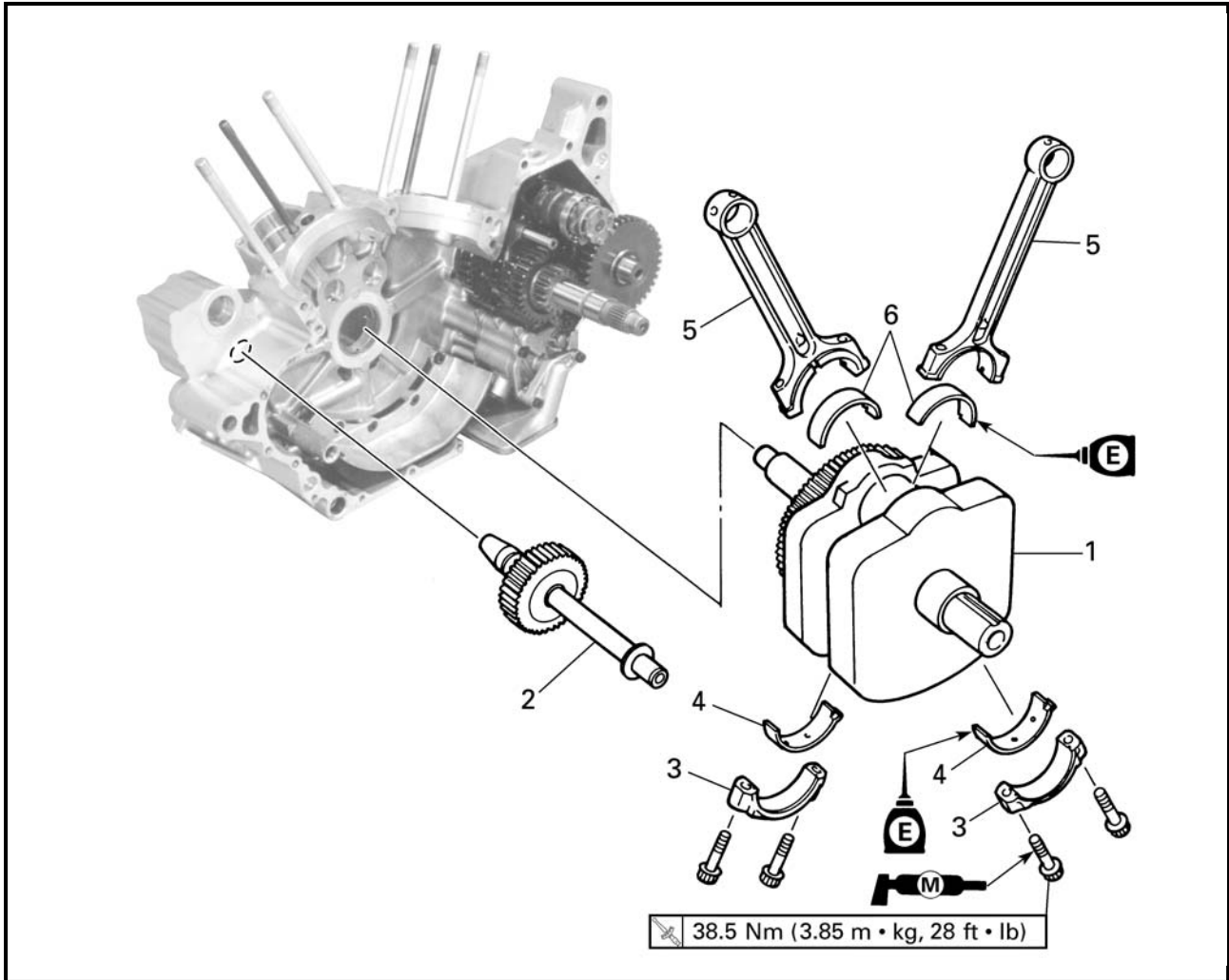
 10 Nm (1.0 m · kg, 7.2 ft · lb)

**NOTE:**

The arrow @ on the oil strainer cover must point towards the rear of the engine.

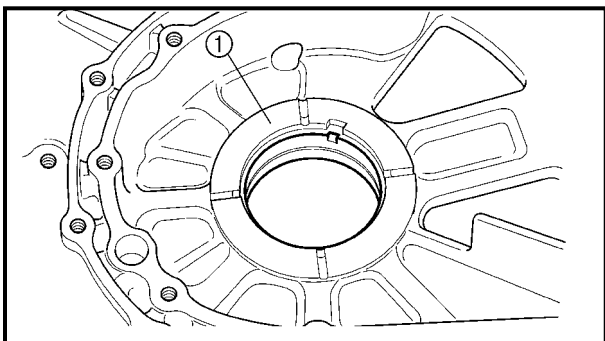


CRANKSHAFT AND CONNECTING RODS



5

Order	Job/Part	Q'ty	Remarks
	<b>Removing the crankshaft and connecting rods</b>		Remove the parts in the order listed.
	Crankcase		Separate. Refer to "CRANKCASE".
1	Crankshaft	1	
2	Generator shaft	1	
3	Connecting rod cap	2	
4	Big end lower bearing	2	
5	Connecting rod	2	
6	Big end upper bearing	2	
			For installation, reverse the removal procedure.

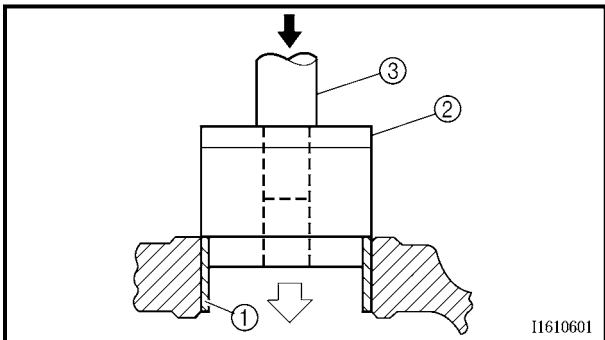


### REMOVING THE CRANKSHAFT

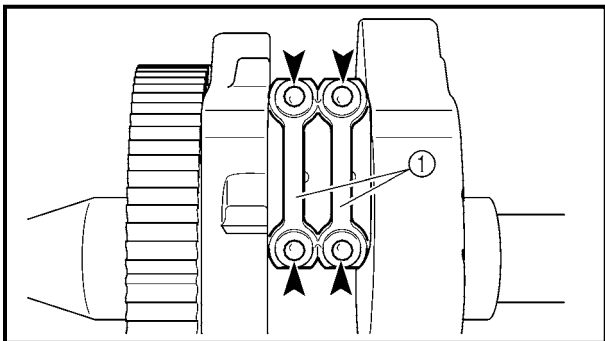
1. Remove:
  - crankshaft journal bearing ①

#### NOTE:

Remove the crankshaft journal bearing with the bearing remover and installer ② and bearing driver ③.



**Bearing remover and installer**  
**YM-28898**  
**Bearing driver**  
**YM-04058**



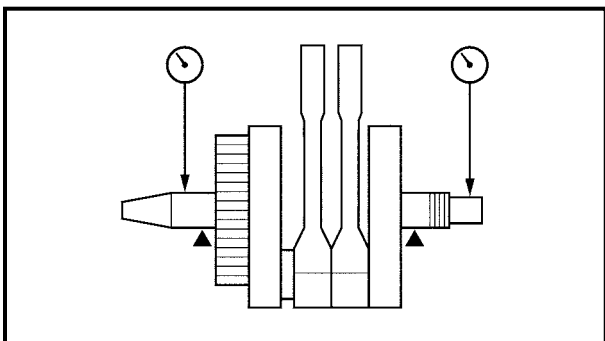
EAS00391

### REMOVING THE CONNECTING RODS

1. Remove:
  - connecting rod caps ①
  - connecting rods
  - big end bearings

#### NOTE:

Identify the position of each big end bearing so that it can be reinstalled in its original place.



EAS00398

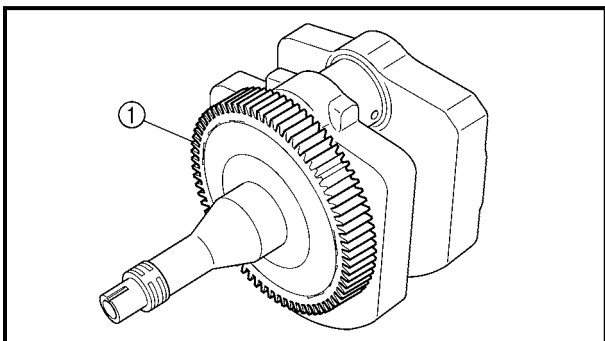
### CHECKING THE CRANKSHAFT AND CONNECTING RODS

1. Measure:
  - crankshaft runout

Out of specification → Replace the crankshaft.



**Maximum crankshaft runout**  
**0.04 mm (0.0016 in)**



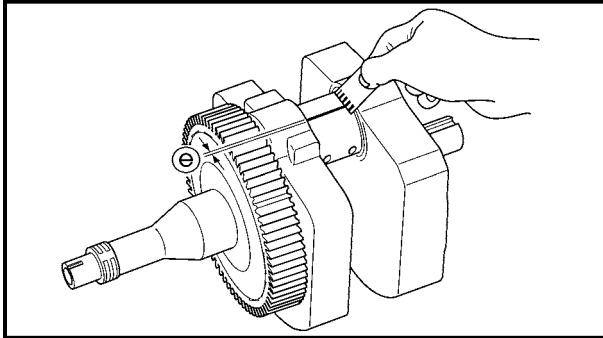
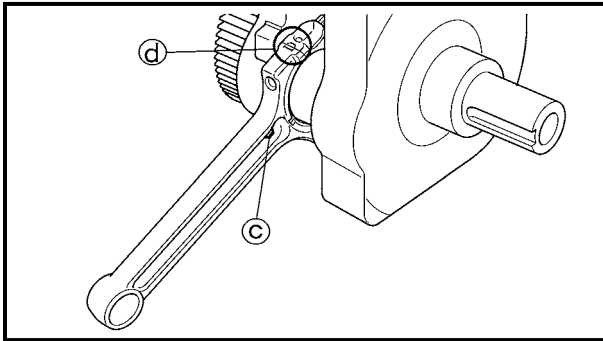
2. Check:
  - crankshaft journal surfaces
  - crankshaft pin surfaces
  - bearing surfaces

Scratches/wear → Replace the crankshaft and bearings.

  - generator shaft drive gear ①

Damage/wear → Replace the crankshaft.





e. Tighten the connecting rod bolts.

**CAUTION:**

- When tightening the connecting rod bolts, be sure to use an F-type torque wrench.
- Without pausing, tighten the connecting rod bolts to the specified torque. Apply continuous torque between 3.3 and 4.0 m • kg (24 and 29 ft • lb). Once you reach 3.3 m • kg (24 ft • lb), DO NOT STOP TIGHTENING until the specified torque is reached. If the tightening is interrupted between 3.3 and 4.0 m • kg (24 and 29 ft • lb), loosen the connecting rod bolts to less than 3.3 m • kg (24 ft • lb) and start again.

Refer to "INSTALLING THE CONNECTING RODS".



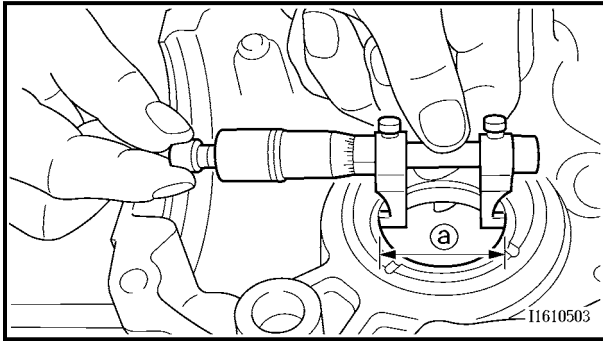
**Connecting rod bolt**  
**38.5 Nm (3.85 m • kg, 28 ft • lb)**

- f. Remove the connecting rod and big end bearings.  
 Refer to "REMOVING THE CONNECTING RODS".
- g. Measure the compressed Plastigauge® width © on each crankshaft pin.  
 If the crankshaft pin-to-big end bearing clearance is out of specification, select replacement big end bearings.









6. Measure:

- crankshaft journal bearing inside diameter @

Out of specification → Replace the crankcase assembly.



**Crankshaft journal bearing inside diameter**

**50.01 ~ 50.03 mm**  
**(1.969 ~ 1.970 in)**

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

Measure the inside diameter of each crankshaft journal bearing at two places.

7. Calculate:

- crankshaft journal-to-crankshaft journal bearing clearance

Out of specification → Replace the crankshaft and crankshaft journal bearings as a set.

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

Calculate the clearance by subtracting the crankshaft journal diameter from the crankshaft journal bearing inside diameter.



**Crankshaft journal-to-crankshaft journal bearing clearance**

**0.030 ~ 0.062 mm**  
**(0.0012 ~ 0.0024 in)**

## INSTALLING THE CONNECTING RODS

1. Lubricate:

- bolt threads and seats

(with the recommended lubricant)

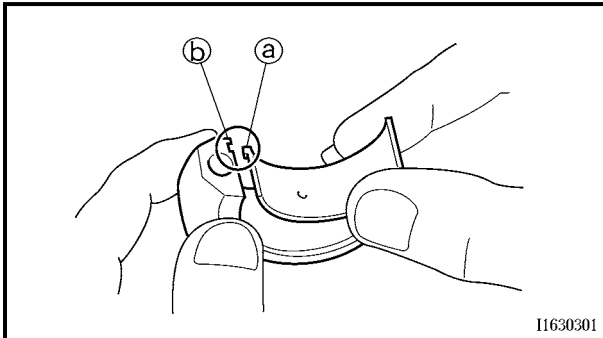


**Recommended lubricant**  
**Molybdenum disulfide grease**

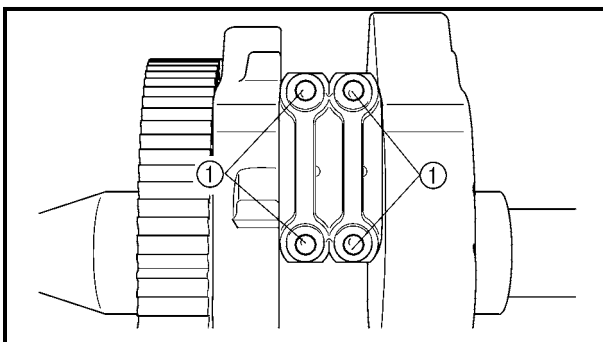
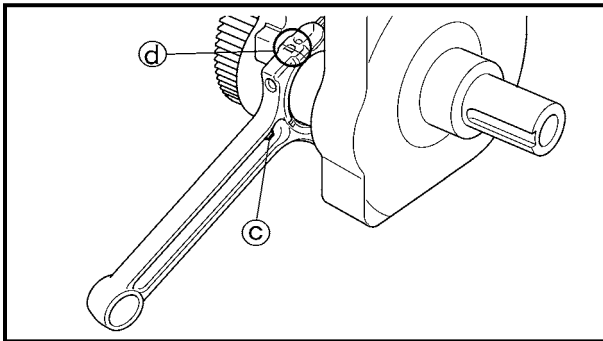


2. Lubricate:
  - crankshaft pins
  - big end bearings
  - connecting rod inner surface  
(with the recommended lubricant)

	<b>Recommended lubricant</b> <b>Engine oil</b>
---	---



11630301




3. Install:
  - big end bearings
  - connecting rods
  - connecting rod caps  
(onto the crankshaft pins)

**NOTE:**

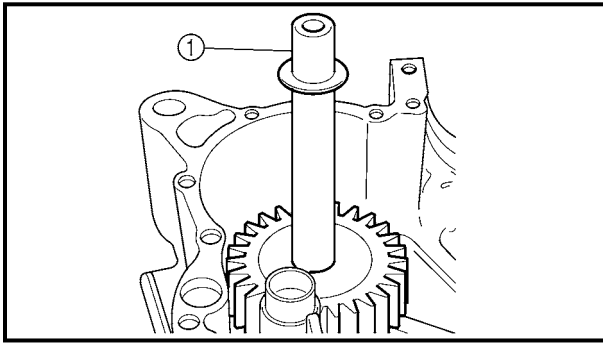
- Align the projections **a** on the big end bearings with the notches **b** in the connecting rods and connecting rod caps.
- Be sure to reinstall each big end bearing in its original place.
- Make sure the projection **c** on the connecting rods face towards the left side of the crankshaft.
- Make sure the characters **d** on both the connecting rod and connecting rod cap are aligned.

4. Tighten:
  - connecting rod bolt ①

 **40 Nm (4.0 m · kg, 29 ft · lb)**

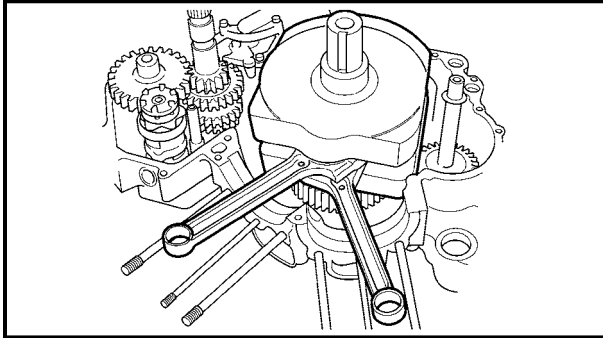
**CAUTION:**

- **When tightening the connecting rod bolts, be sure to use an F-type torque wrench.**
- **Without pausing, tighten the connecting rod bolts to the specified torque. Apply continuous torque between 3.3 and 4.0 m · kg (24 and 29 ft · lb). Once you reach 3.3 m · kg (24 ft · lb), DO NOT STOP TIGHTENING until the specified torque is reached. If the tightening is interrupted between 3.3 and 4.0 m · kg (24 and 29 ft · lb), loosen the connecting rod bolts to less than 3.3 m · kg (24 ft · lb) and start again.**

**INSTALLING THE CRANKSHAFT**

1. Install:

- generator shaft ①



2. Install:

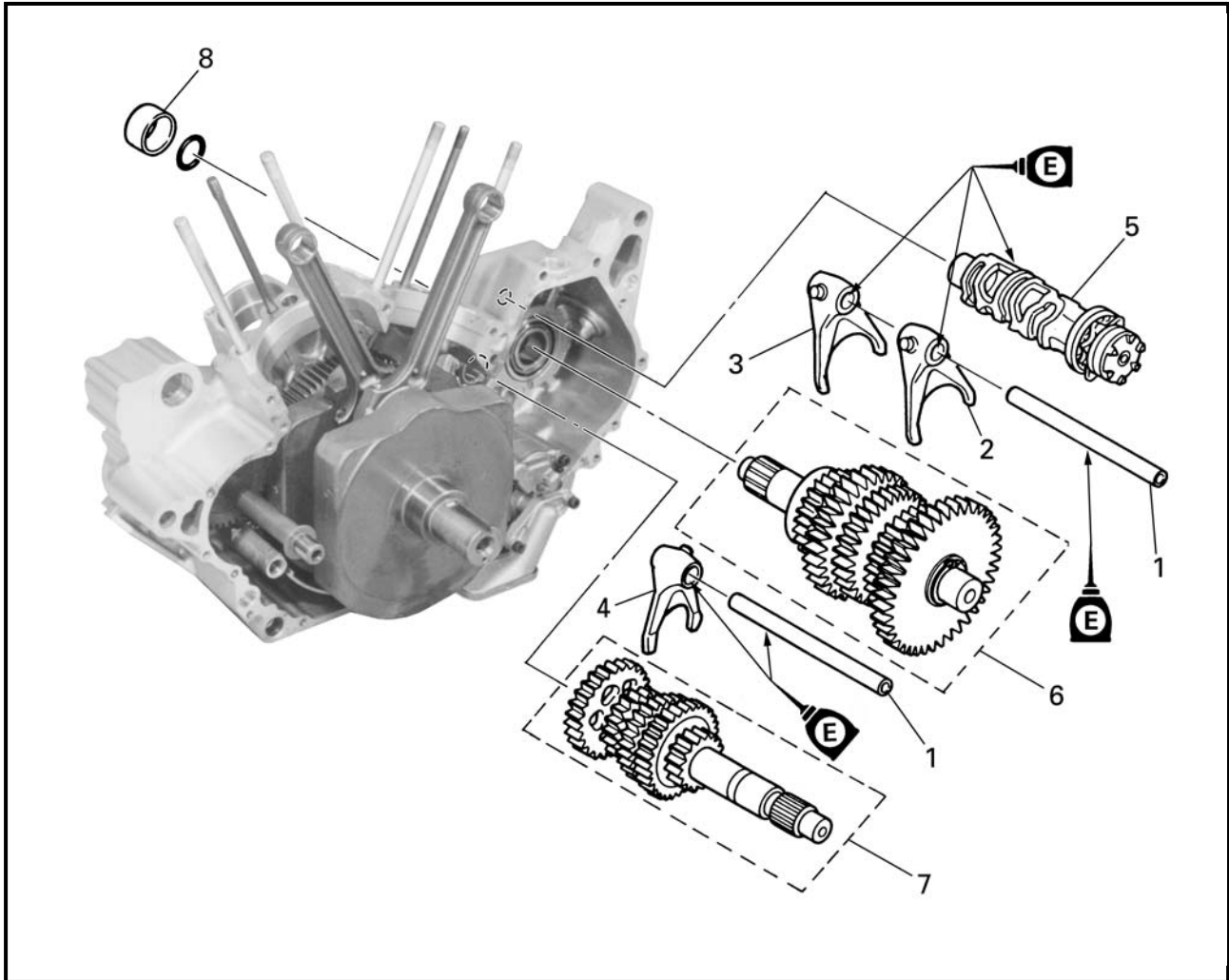
- crankshaft

**NOTE:**

- Make sure that the generator shaft drive gear teeth and generator shaft driven gear teeth mesh correctly.
- Align the right connecting rod with the front cylinder sleeve hole.

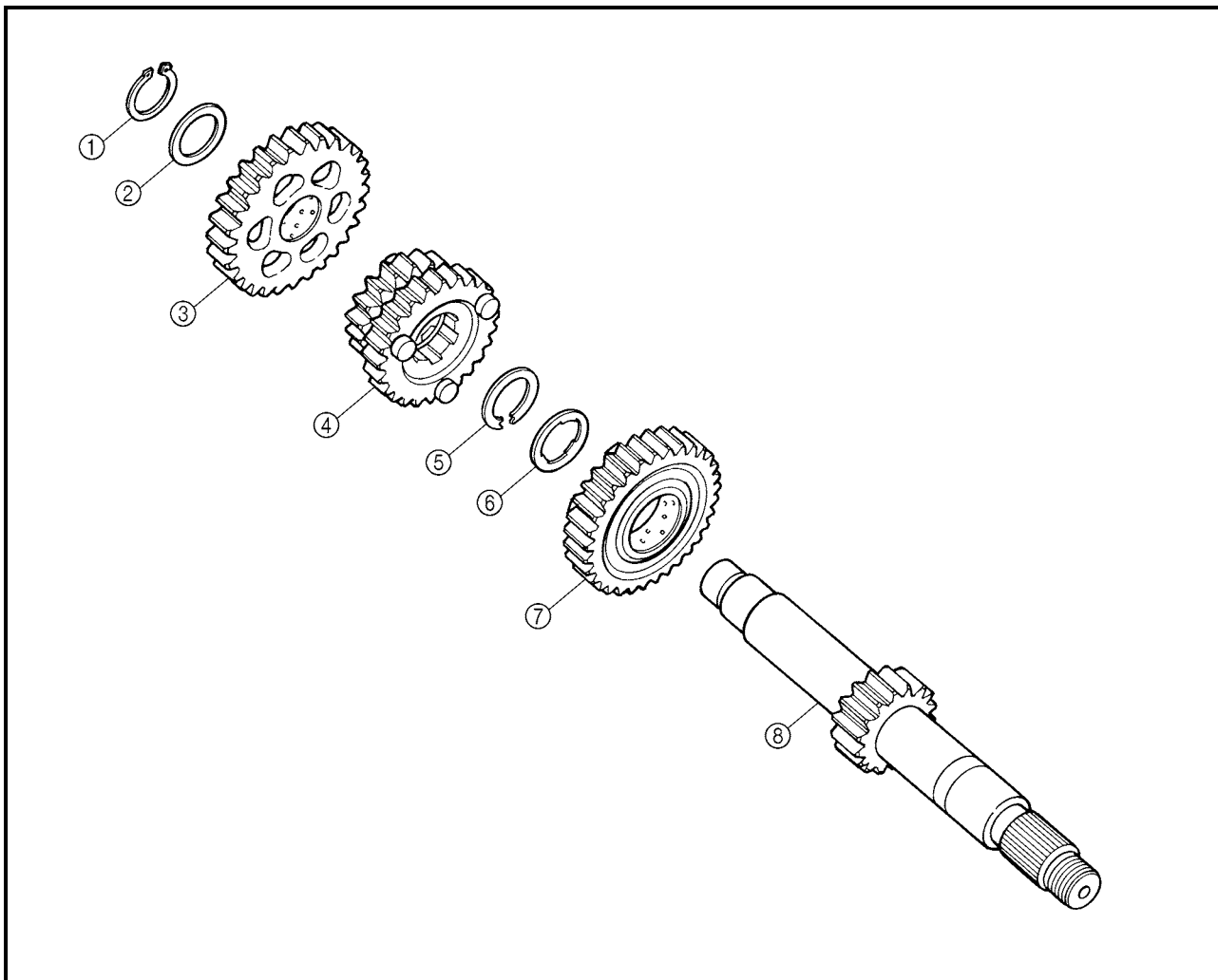


TRANSMISSION



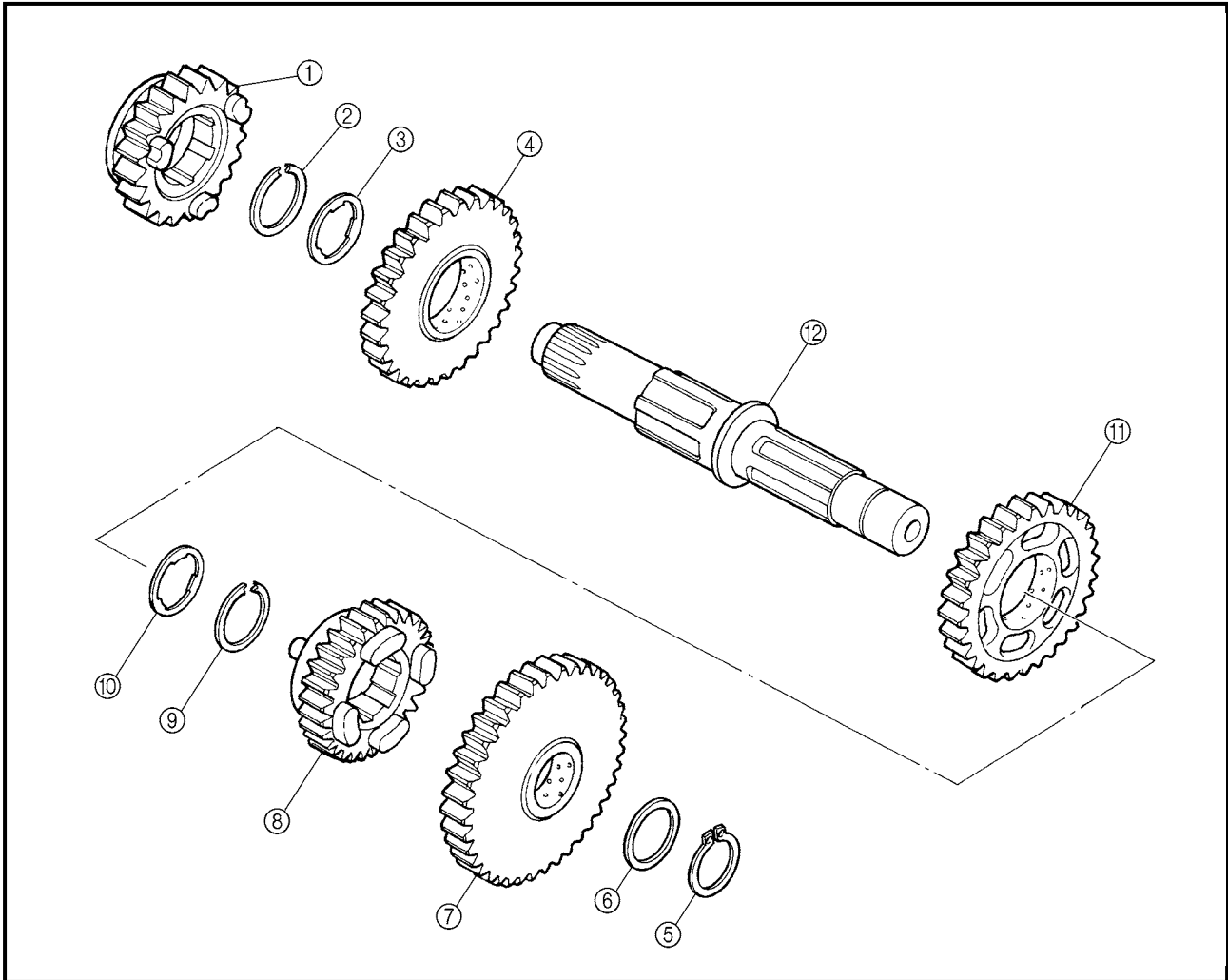
5

Order	Job/Part	Q'ty	Remarks
	<b>Removing the shift forks, shift drum assembly and transmission</b>		Remove the parts in the order listed.
	Crankcase		Separate. Refer to "CRANKCASE".
1	Shift fork guide bar	2	
2	Shift fork "L"	1	
3	Shift fork "R"	1	
4	Shift fork "C"	1	
5	Shift drum assembly	1	
6	Drive axle assembly	1	
7	Main axle assembly	1	
8	Spacer	1	
			For installation, reverse the removal procedure.



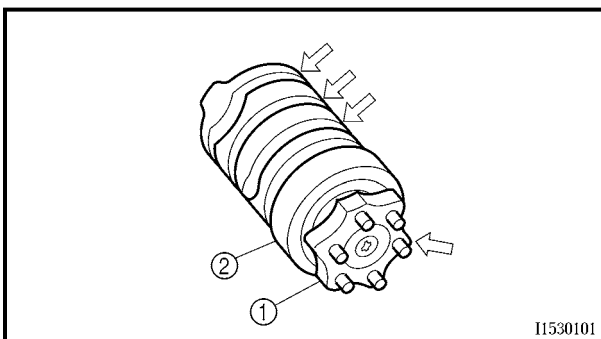
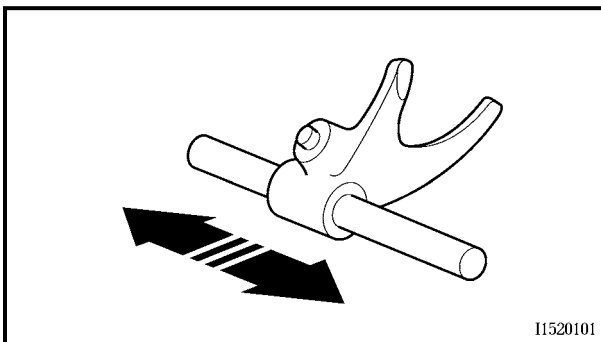
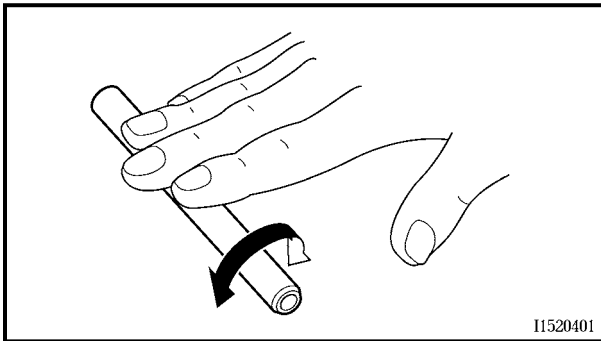
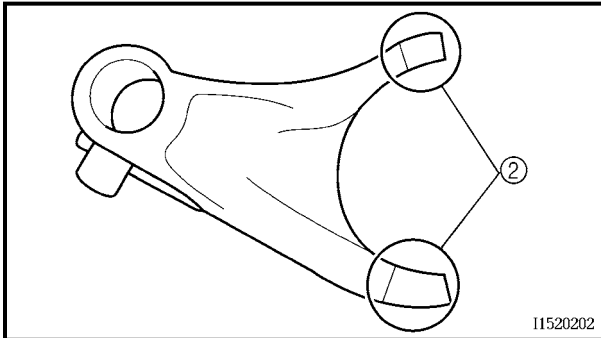
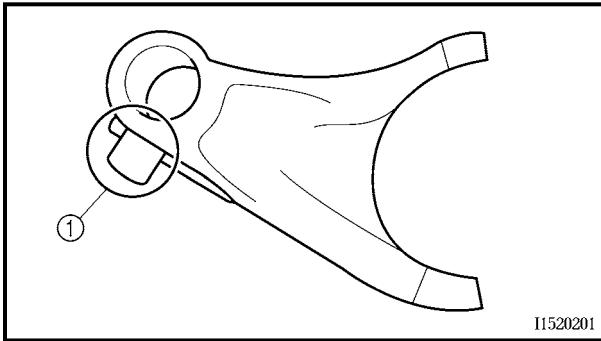
5

Order	Job/Part	Q'ty	Remarks
	<b>Disassembling the main axle assembly</b>		Remove the parts in the order listed.
①	Circlip	1	
②	Washer	1	
③	5th pinion gear	1	
④	2nd/3rd pinion gear	1	
⑤	Circlip	1	
⑥	Washer	1	
⑦	4th pinion gear	1	
⑧	Main axle/1st pinion gear	1	
			For assembly, reverse the disassembly procedure.



5

Order	Job/Part	Q'ty	Remarks
	<b>Disassembling the drive axle assembly</b>		Remove the parts in the order listed.
①	5th wheel gear	1	
②	Circlip	1	
③	Washer	1	
④	2nd wheel gear	1	
⑤	Circlip	1	
⑥	Washer	1	
⑦	1st wheel gear	1	
⑧	4th wheel gear	1	
⑨	Circlip	1	
⑩	Washer	1	
⑪	3rd wheel gear	1	
⑫	Drive axle	1	
			For assembly, reverse the disassembly procedure.



EAS00421

**CHECKING THE SHIFT FORKS**

The following procedure applies to all of the shift forks.

## 1. Check:

- shift fork cam follower ①
- shift fork pawl ②

Bends/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(s) as a set.

EAS00422

**CHECKING THE SHIFT DRUM ASSEMBLY**

## 1. Check:

- shift drum grooves

Damage/scratches/wear → Replace the shift drum assembly.

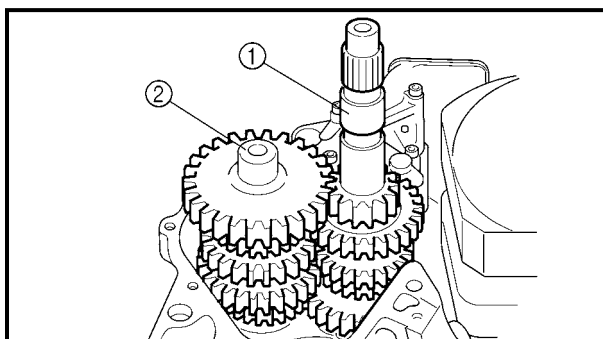
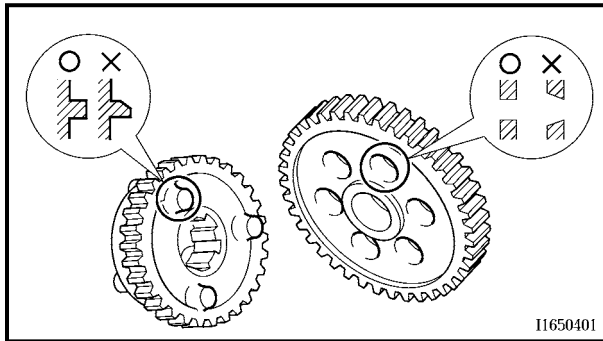
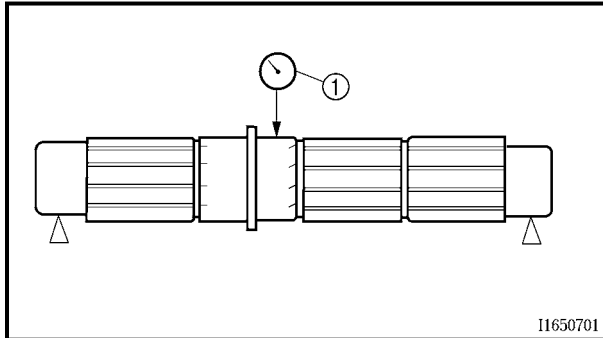
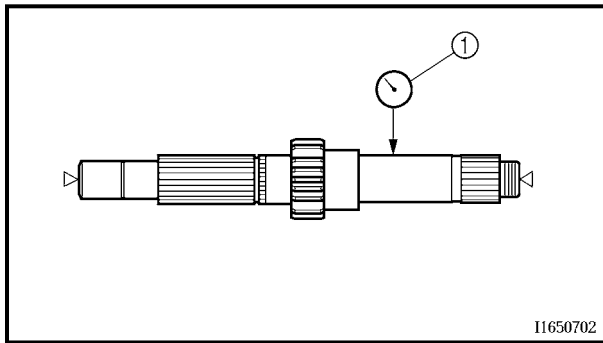
- shift drum segment ①

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.



**Maximum main axle runout  
0.08 mm (0.003 in)**

## 2. Measure:

- drive axle runout  
(with a centering device and dial gauge ①)  
Out of specification → Replace the drive axle.



**Maximum drive axle runout  
0.08 mm (0.003 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).

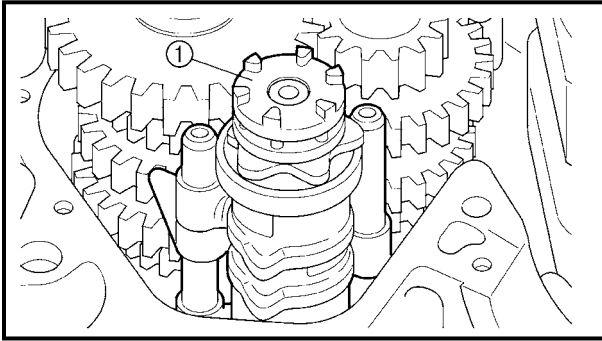
## 6. Check:

- circlips  
Bends/damage/looseness → Replace.

**INSTALLING THE TRANSMISSION, SHIFT DRUM ASSEMBLY AND SHIFT FORKS**

## 1. Install:

- main axle assembly ①
- drive axle assembly ②
- O-ring
- spacer

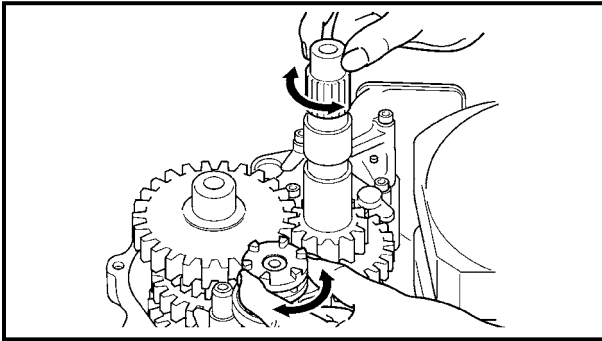


2. Install:
- shift drum assembly ①
  - shift fork "R"
  - shift fork "C"
  - shift fork "L"
  - shift fork guide bars

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

The embossed marks on the shift forks should face towards the right side of the engine and be in the following sequence: "R", "C", "L".

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3. Check:
- transmission  
Rough movement → Repair.

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

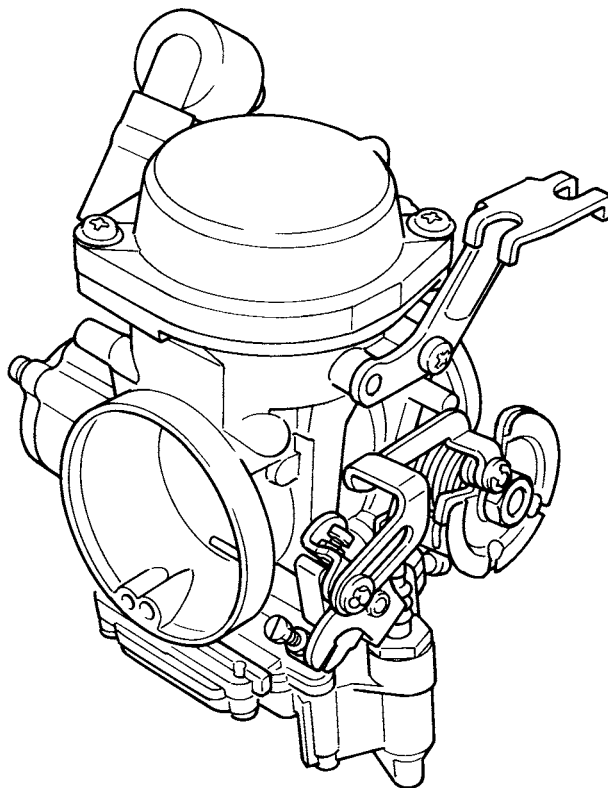
Oil each gear, shaft, and bearing thoroughly.

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## CONTENTS

### CARBURETOR



<b>CARBURETOR</b> .....	6-1
CHECKING THE CARBURETOR .....	6-6
CHECKING THE CARBURETOR JOINT .....	6-8
ASSEMBLING THE CARBURETOR .....	6-8
INSTALLING THE CARBURETOR JOINT .....	6-12
INSTALLING THE CARBURETOR .....	6-12
MEASURING AND ADJUSTING THE FUEL LEVEL .....	6-14
CHECKING AND ADJUSTING THE THROTTLE POSITION	
SENSOR .....	6-15
CHECKING THE FUEL PUMP .....	6-19
CHECKING THE FUEL COCK .....	6-19
CHECKING THE FUEL COCK OPERATION .....	6-20
 <b>AIR INDUCTION SYSTEM</b> .....	 6-21
AIR INJECTION .....	6-21
AIR CUTOFF VALVE .....	6-21



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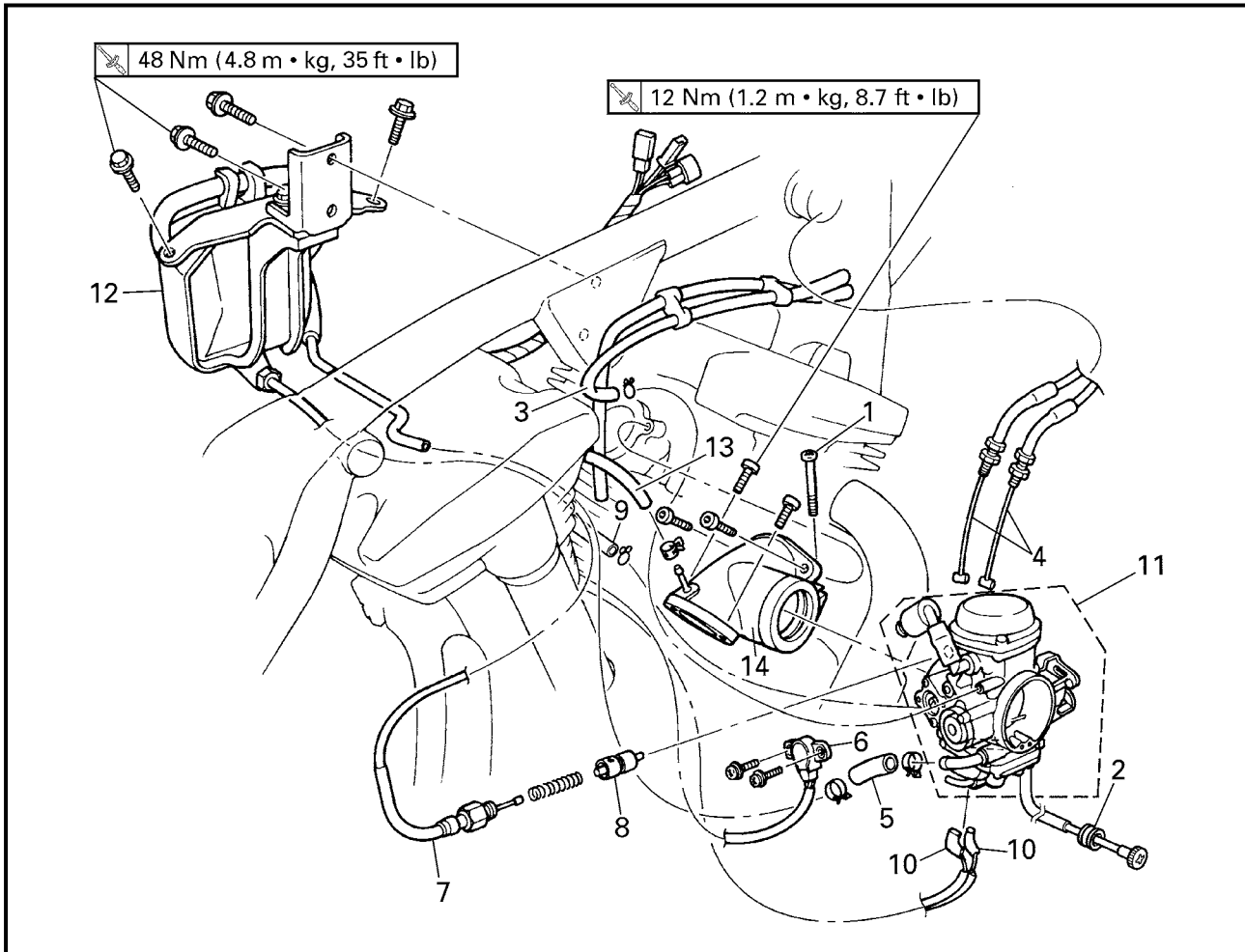
CHECKING THE AIR INDUCTION SYSTEM .....	6-26
INSTALLING THE AIR INDUCTION SYSTEM .....	6-26



EAS00480

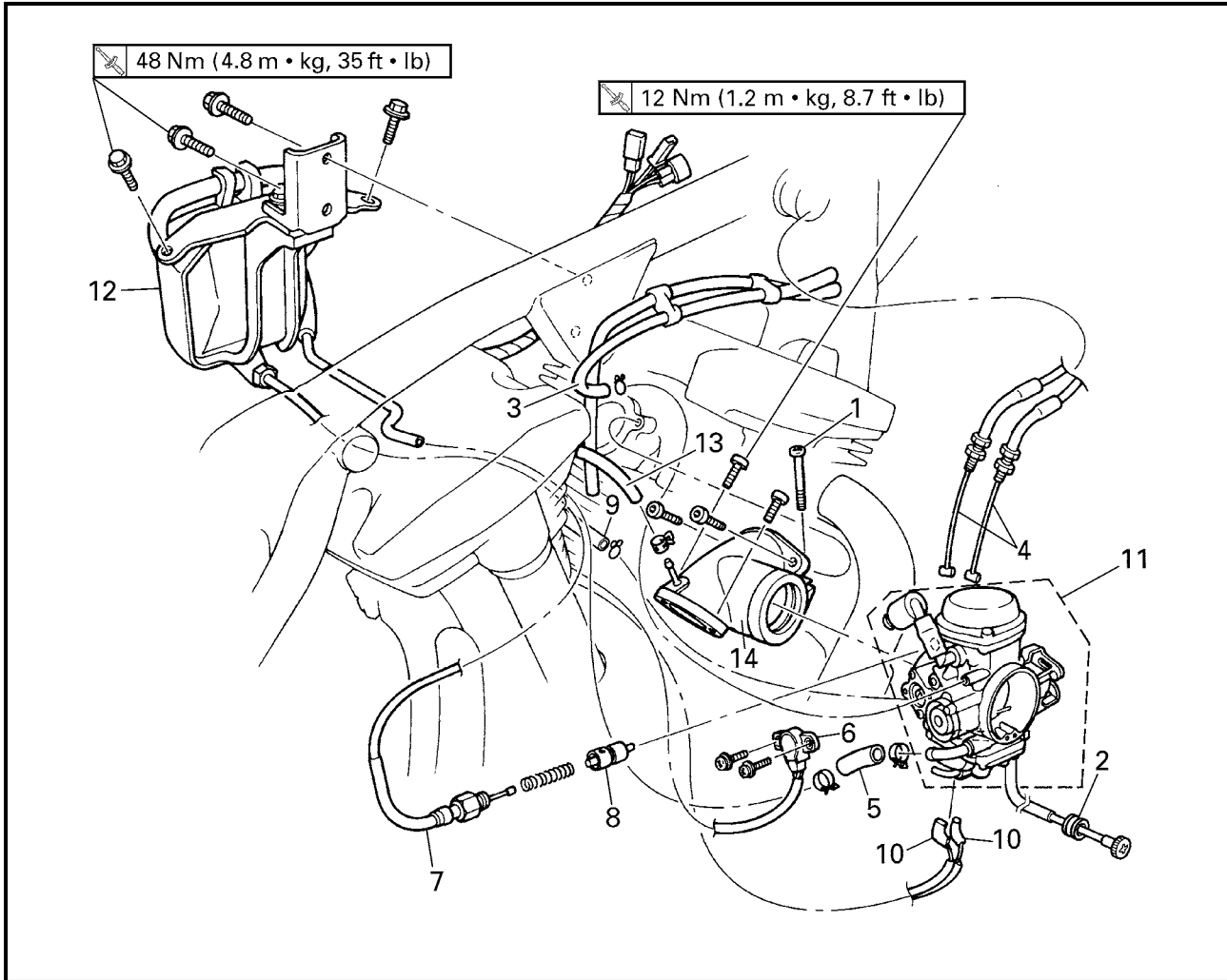
# CARBURETOR

## CARBURETOR



# 6

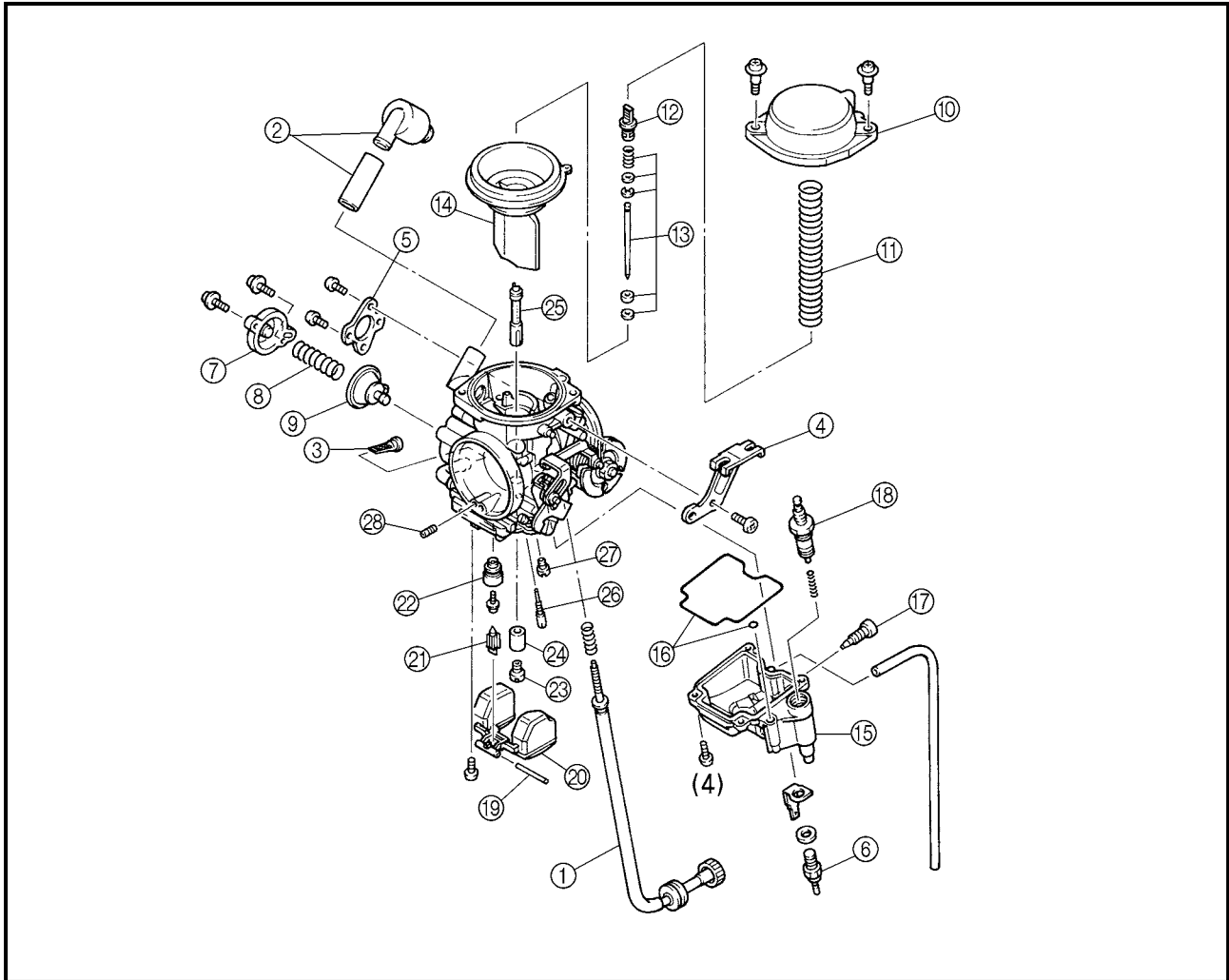
Order	Job/Part	Q'ty	Remarks
	<b>Removing the carburetor</b>		Remove the parts in the order listed.
	Rider seat		Refer to "SEATS AND SIDE COVERS" in chapter 3.
	Fuel tank		Refer to "FUEL TANK" in chapter 3.
	Air filter case		Refer to "AIR FILTER CASE" in chapter 3.
	Fuel (from the carburetor)		Drain.
1	Carburetor joint clamp screw	1	Loosen.
2	Throttle stop screw	1	Unhook.
3	Vacuum chamber breather hose (carburetor to solenoid valve hose)	1	Disconnect.
4	Throttle cable	2	Disconnect.
5	Fuel hose	1	
6	Throttle position sensor	1	
7	Starter cable	1	Disconnect.
8	Starter plunger	1	



Order	Job/Part	Q'ty	Remarks
9	Charcoal canister hose (carburetor to charcoal canister)	1	Disconnect.
10	Carburetor heater connector	2	Disconnect.
11	Carburetor	1	
12	Fuel pump bracket assembly (with fuel pump)	1	
13	Vacuum hose	1	Disconnect.
14	Carburetor joint	1	
			For installation, reverse the removal procedure.



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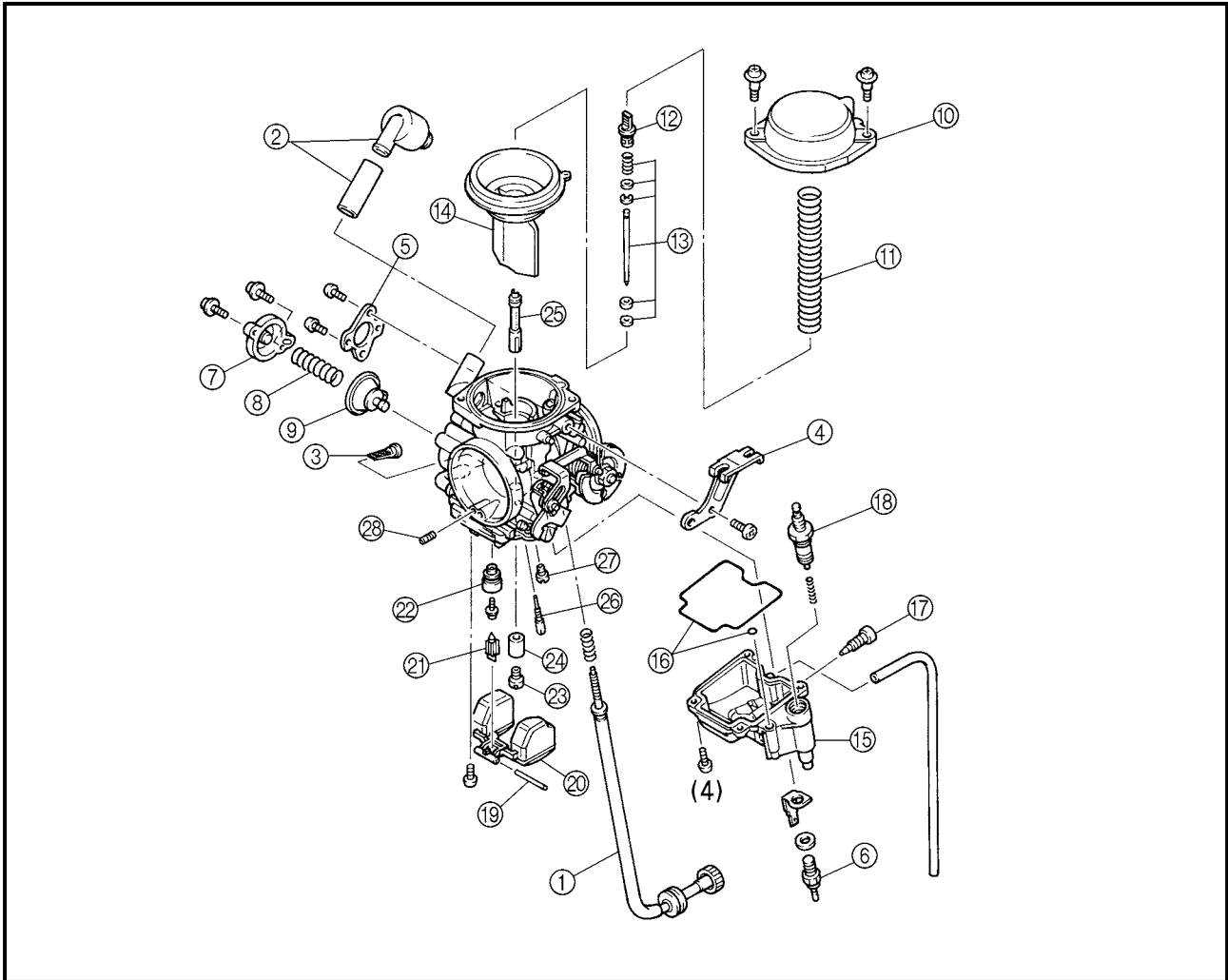


6

Order	Job/Part	Q'ty	Remarks
	<b>Disassembling the carburetor</b>		Remove the parts in the order listed.
①	Throttle stop screw	1	
②	Vacuum chamber air vent hose	1	
③	Fuel strainer	1	
④	Throttle cable holder	1	
⑤	Throttle position sensor bracket	1	
⑥	Carburetor heater	1	
⑦	Coasting enricher cover	1	
⑧	Coasting enricher spring	1	
⑨	Coasting enricher	1	



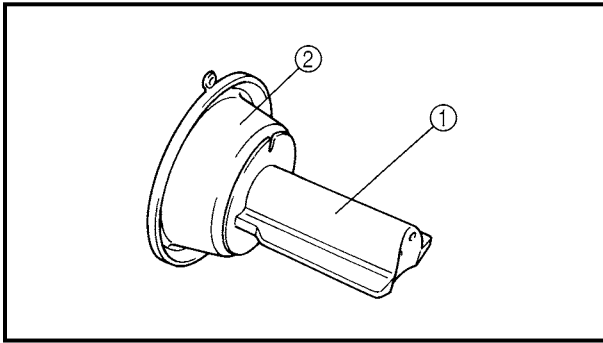




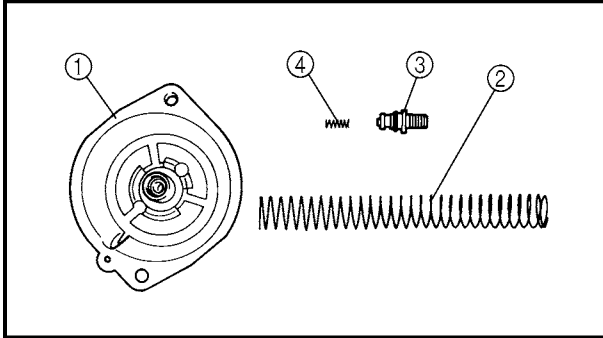
6

Order	Job/Part	Q'ty	Remarks
⑳	Float	1	For assembly, reverse the disassembly procedure.
㉑	Needle valve	1	
㉒	Needle valve seat	1	
㉓	Main jet	1	
㉔	Spacer	1	
㉕	Needle jet	1	
㉖	Pilot jet	1	
㉗	Starter jet	1	
㉘	Pilot air jet	1	

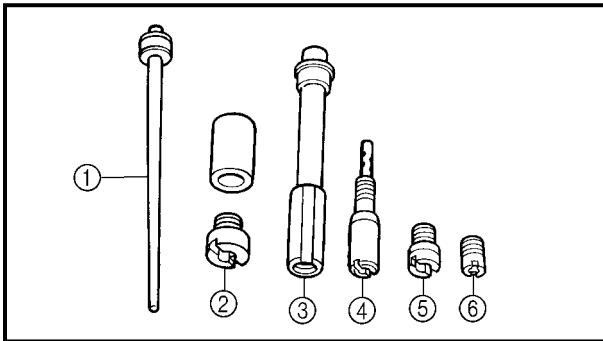




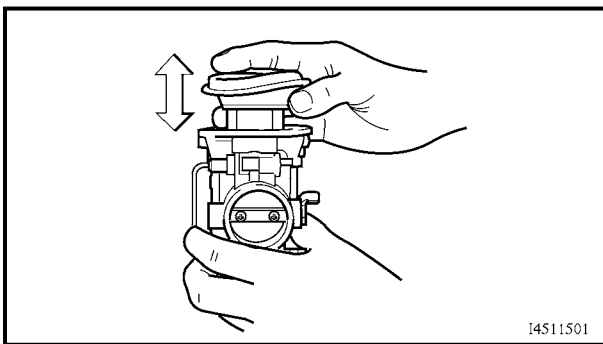
8. Check:
- piston valve ①  
Damage/scratches/wear → Replace.
  - piston valve diaphragm ②  
Cracks/tears → Replace.



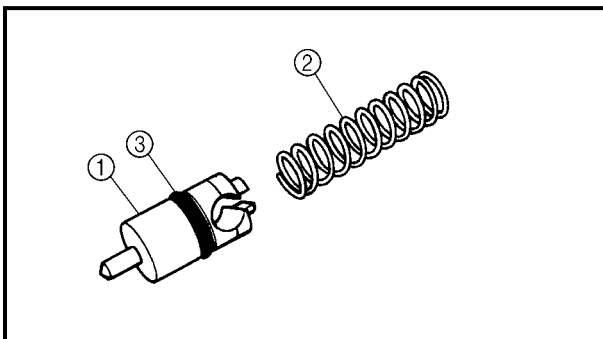
9. Check:
- vacuum chamber cover ①
  - piston valve spring ②
  - jet needle holder ③
  - jet needle spring ④  
Cracks/damage → Replace.



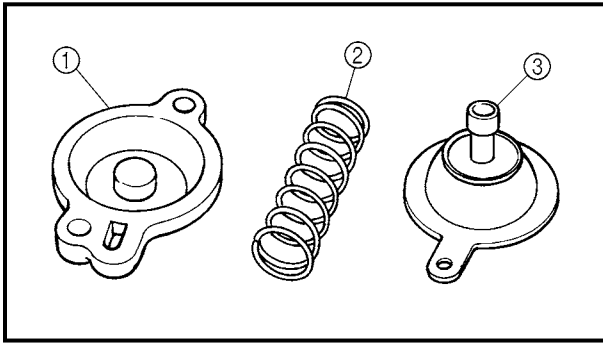
10. Check:
- jet needle kit ①
  - main jet ②
  - needle jet ③
  - pilot jet ④
  - starter jet ⑤
  - pilot air jet ⑥  
Bends/damage/wear → Replace.  
Obstruction → Clean.  
Blow out the jets with compressed air.



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

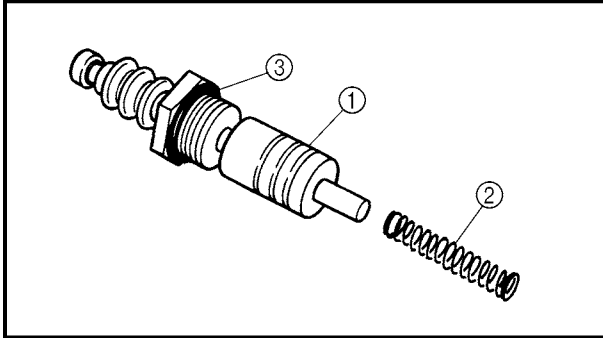


12. Check:
- starter plunger ①
  - starter plunger spring ②  
Bends/cracks/damage → Replace.
  - O-ring ③  
Damage/wear → Replace.



13. Check:

- coasting enricher cover ①
- coasting enricher spring ②  
Cracks/damage → Replace.
- coasting enricher ③  
Cracks/tears/damage → Replace.

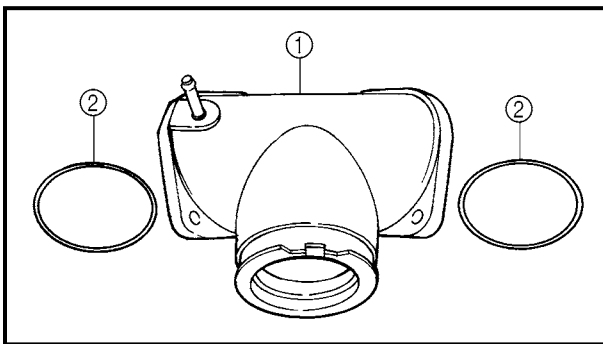


14. Check:

- accelerator plunger ①
- accelerator plunger spring ②  
Bends/cracks/damage → Replace.
- O-ring ③  
Damage/wear → Replace.

15. Check:

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



CHECKING THE CARBURETOR JOINT

1. Check:

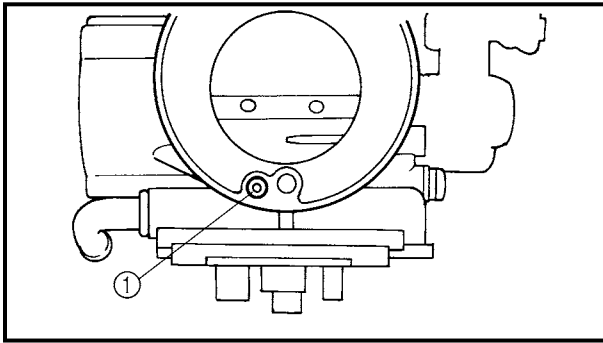
- carburetor joint ①  
Cracks/damage → Replace.
- O-rings ②  
Damage/wear → Replace the O-ring.

EAS00487

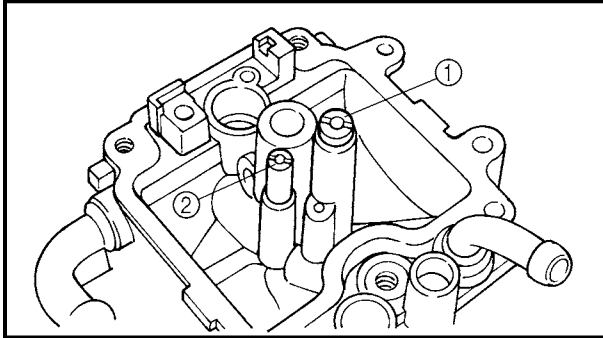
ASSEMBLING THE CARBURETOR

**CAUTION:**

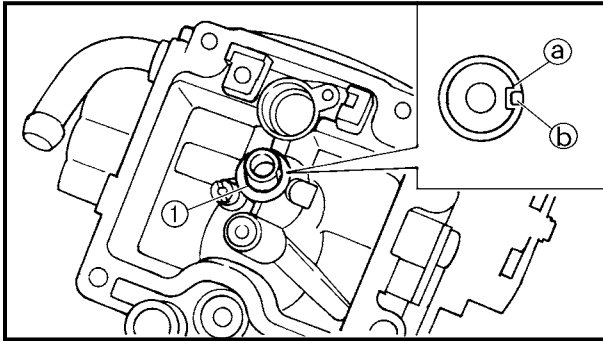
- Before assembling the carburetor, wash all the parts in a petroleum-based solvent.
- Always use a new gasket.



1. Install:
  - pilot air jet ①

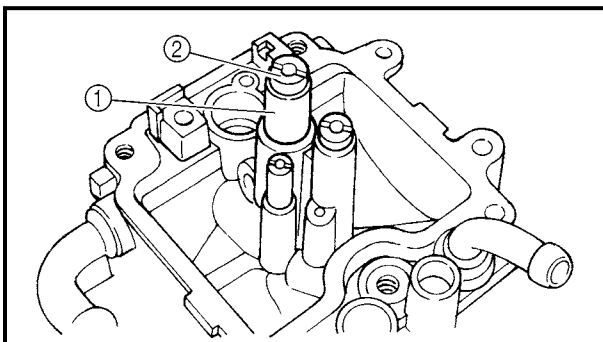


2. Install:
  - starter jet ①
  - pilot jet ②

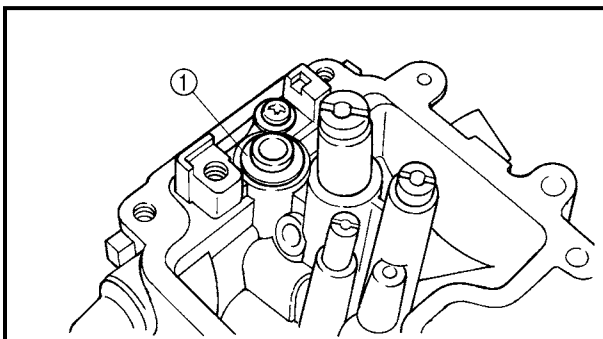


3. Install:
  - needle jet ①

**NOTE:** \_\_\_\_\_  
Align the slot ① on the needle jet with the projection ② on the carburetor body.  
\_\_\_\_\_

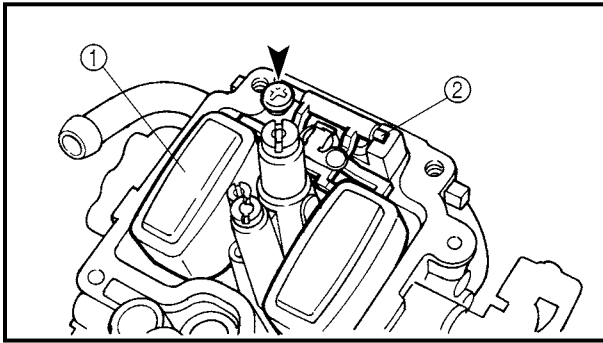


4. Install:
  - spacer ①
  - main jet ②

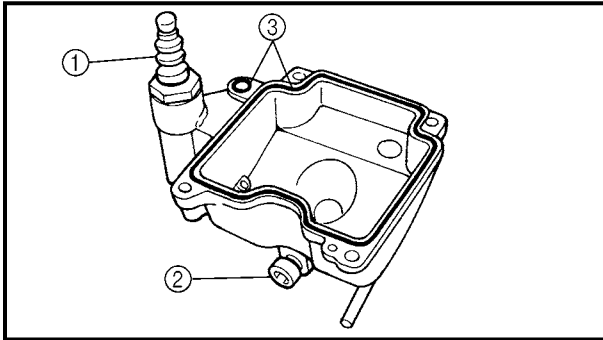


5. Install:
  - needle valve seat ①

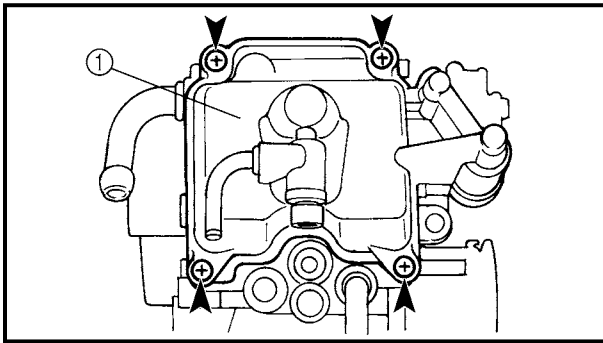
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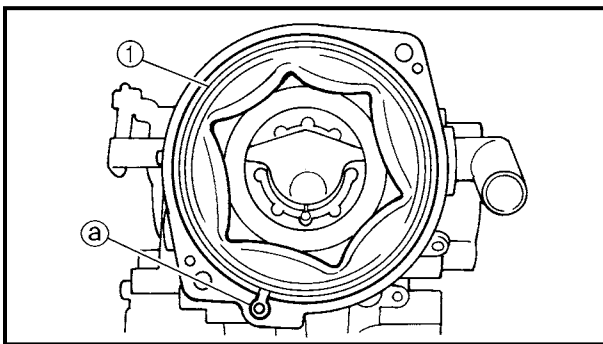
6. Install:
- needle valve
  - float ①
  - float pin ②



7. Install:
- accelerator plunger ①
  - drain bolt ②
  - float chamber rubber gasket ③



8. Install:
- float chamber ①

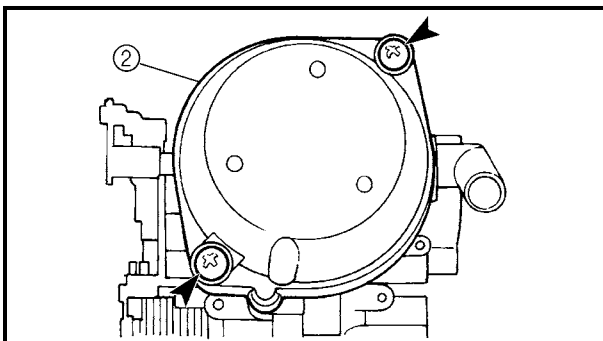


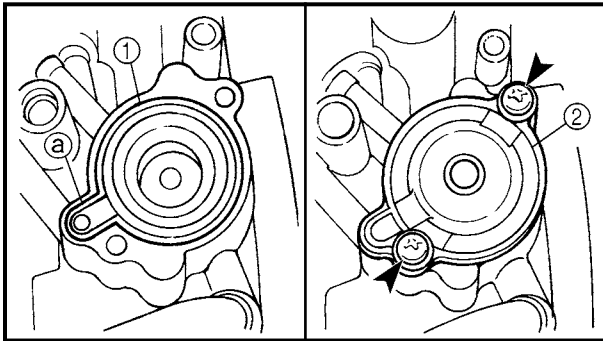
9. Install:
- piston valve ①
  - jet needle kit
  - jet needle holder
  - piston valve spring
  - vacuum chamber cover ②

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

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

\_\_\_\_\_



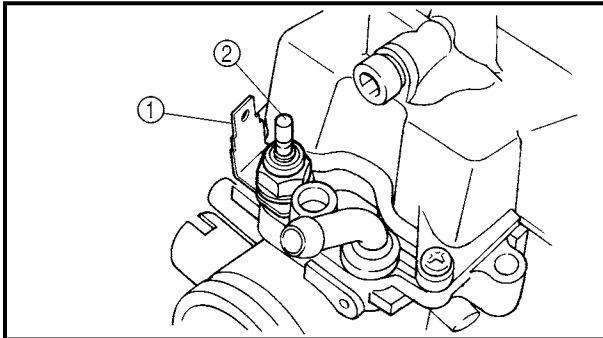


10.Install:

- coasting enricher ①
- coasting enricher spring
- coasting enricher cover ②

**NOTE:**

Align the tab (a) on the coasting enricher with the recess (b) in the carburetor body.



11.Install:

- terminal ①
- washer
- carburetor heater ②

2.5 Nm (0.25 m · kg, 2.0 ft · lb)

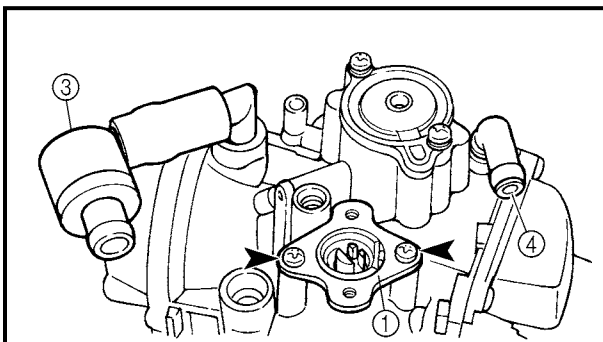
**NOTE:**

Use "Heat Sink" when installing the carburetor heater.



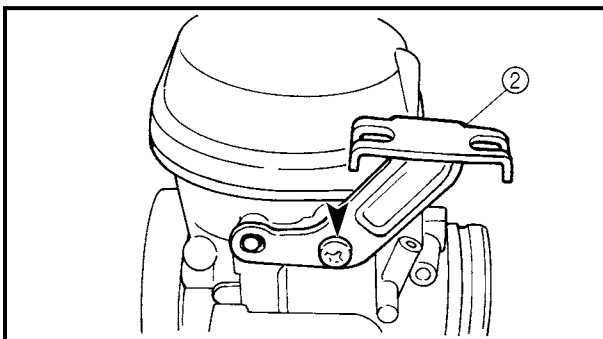
**Heat Sink**

**6**



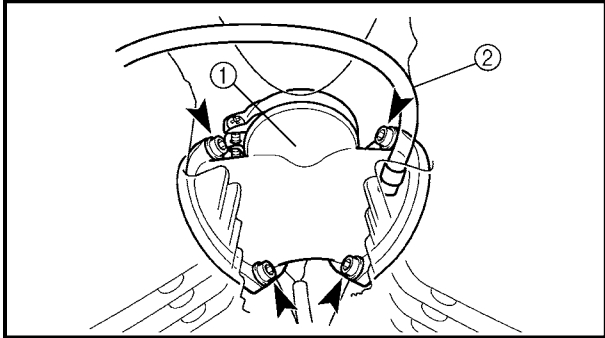
12.Install:

- throttle position sensor bracket ①
- throttle cable holder ②
- fuel strainer ③
- vacuum chamber air vent hose ④





13. Install:
- throttle stop screw
  - drain hose

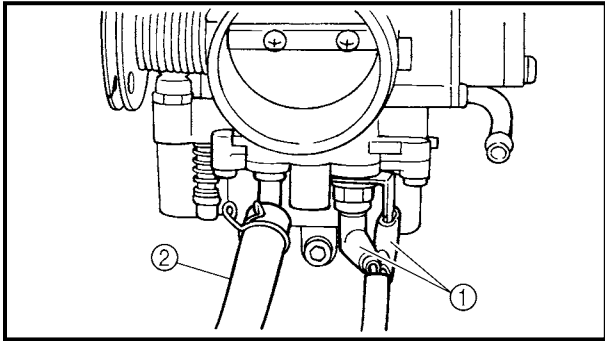


**INSTALLING THE CARBURETOR JOINT**

1. Install:
- carburetor joint ①

12 Nm (1.2 m · kg, 8.7 ft · lb)

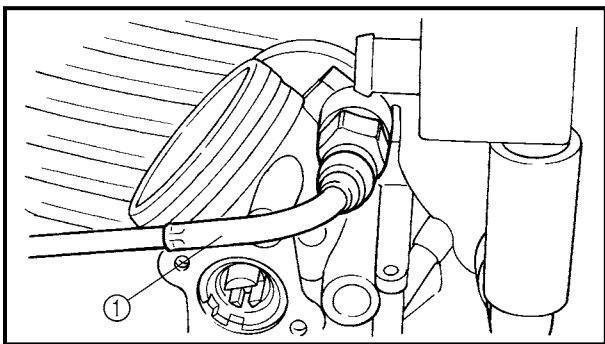
2. Connect:
- vacuum hose ②



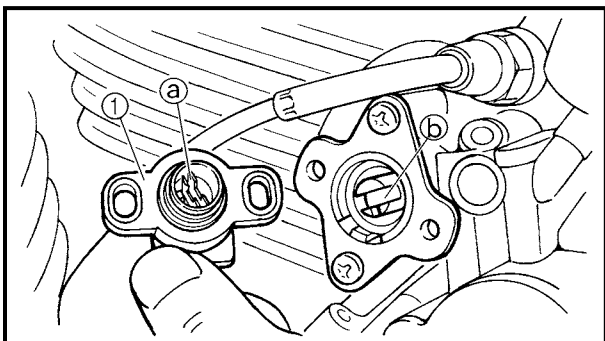
EAS00492

**INSTALLING THE CARBURETOR**

1. Connect:
- carburetor heater connectors ①
  - charcoal canister hose (carburetor to charcoal canister) ②



2. Install:
- starter plunger
3. Connect:
- starter cable ①

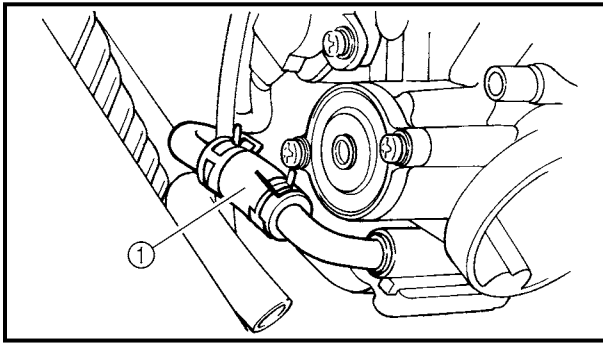


4. Install:
- throttle position sensor

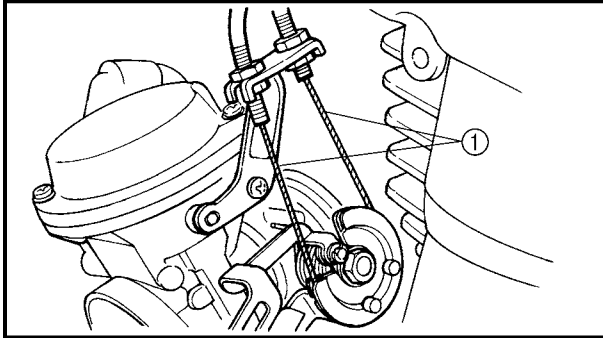
**NOTE:** \_\_\_\_\_

- Align the slot ① of the throttle position sensor with the projection ② of the throttle lever shaft.
- For the correct installation, refer to "CHECKING AND ADJUSTING THE THROTTLE POSITION SENSOR".

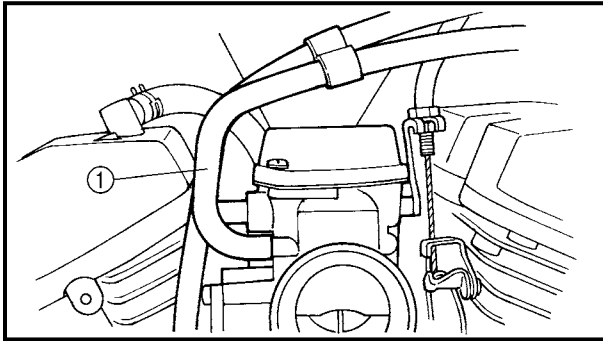




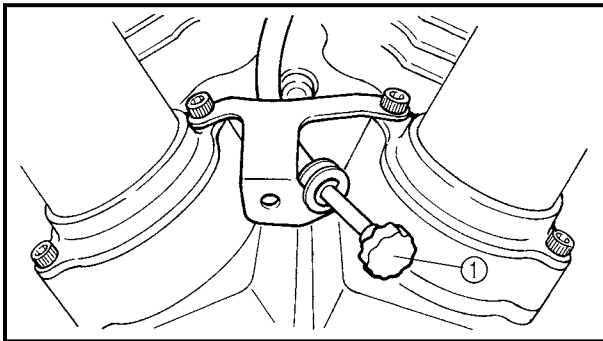
5. Connect:
- fuel hose ①



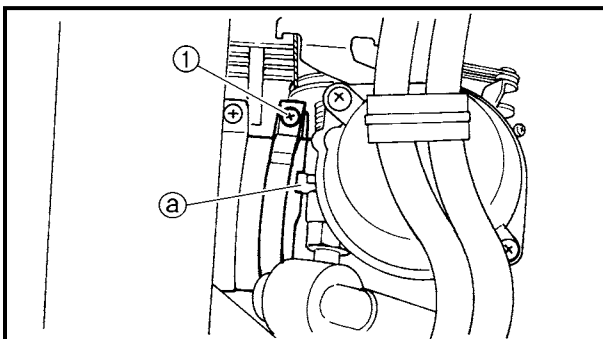
6. Connect:
- throttle cables ①



7. Connect:
- float chamber breather hose (carburetor to solenoid valve) ①



8. Hook:
- throttle stop screw ①



9. Install:
- carburetor

**NOTE:** \_\_\_\_\_  
Align the projection @ of the carburetor with slot of the carburetor joint.  
\_\_\_\_\_

10. Tighten:
- carburetor joint clamp screw ①

6







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

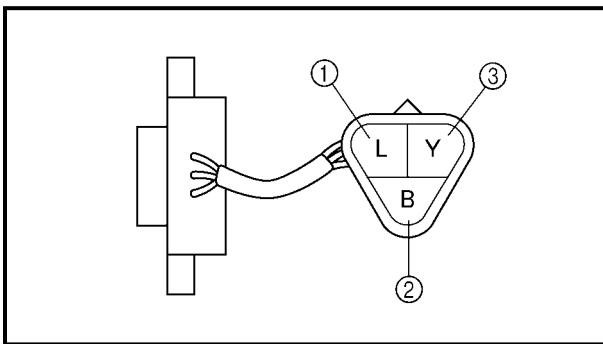
**Positive tester probe** → yellow terminal ③  
**Negative tester probe** → black terminal ②

- e. 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 below.

**Throttle position sensor resistance**  
 (520 ~ 900  $\Omega$ ) ~ (4.0 ~ 6.0 k $\Omega$ ) at  
 20 °C (68 °F)  
 (yellow — black/blue)



- 2. Check:
  - throttle position sensor (removed from the carburetor)



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

**Positive tester probe** → blue terminal ①  
**Negative tester probe** → black terminal ②



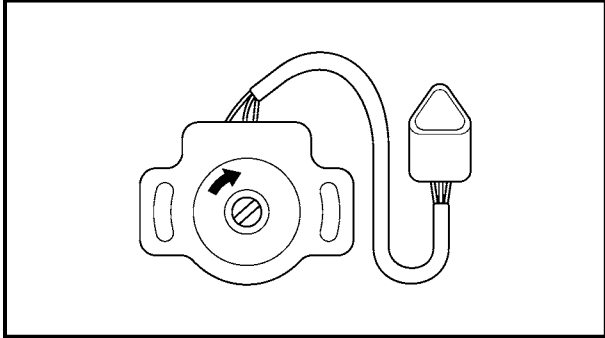
- d. Measure the maximum throttle position sensor resistance.

Out of specification → Replace the throttle position sensor.

	<b>Maximum throttle position sensor resistance</b>
	<b>4.0 ~ 6.0 kΩ at 20 °C (68 °F)</b>
	<b>(blue — black/blue)</b>

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

<b>Positive tester probe → yellow terminal ③</b> <b>Negative tester probe → black terminal ②</b>
---

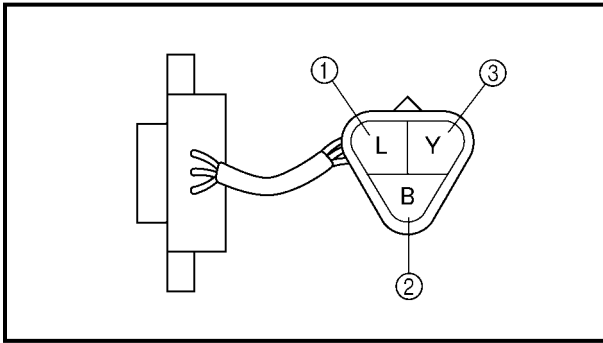


- f. While slowly opening the throttle, check that the throttle position sensor resistance is within the specified range.  
The resistance does not change or it changes abruptly → Replace the throttle position sensor.  
The slot is worn or broken → Replace the throttle position sensor.

**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.

	<b>Throttle position sensor resistance</b>
	<b>0 ~ 5 ± 1.0 kΩ at 20 °C (68 °F)</b>
	<b>(yellow — black/blue)</b>





3. Adjust:

- throttle position sensor angle

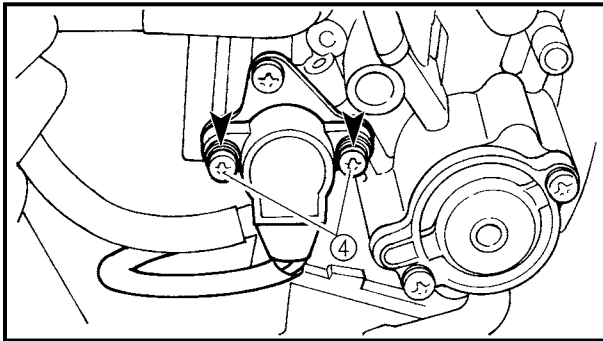


- Disconnect the throttle position sensor coupler from the wire harness.
- Connect the pocket tester ( $\Omega \times 1k$ ) to the throttle position sensor coupler.

**Positive tester probe** → blue terminal ①  
**Negative tester probe** → black terminal ②

- Measure the throttle position sensor maximum resistance.
- Calculate the throttle position sensor maximum resistance when the throttle is fully closed.

**Throttle position sensor maximum resistance (throttle is fully closed) = Maximum resistance  $\times$  (0.13 ~ 0.15)**



Example:

If the maximum resistance = 5 k $\Omega$ , then the throttle position sensor's maximum resistance when the throttle is fully closed should be:

$$5 \text{ k}\Omega \times (0.13 \sim 0.15) = 650 \sim 750 \Omega$$

Lift the carburetor assembly slightly out of the intake manifolds.

Loosen the throttle position sensor screws ④. Connect the pocket tester ( $\Omega \times 100$ ) to the throttle position sensor.

**Positive tester probe** → yellow terminal ③  
**Negative tester probe** → black terminal ①

- Adjust the throttle position sensor angle so that the measured resistance is within the specified range.



**Throttle position sensor resistance**  
**650 ~ 750  $\Omega$**   
**(yellow — black terminal)**

After adjusting the throttle position sensor angle, tighten the throttle position sensor screws.











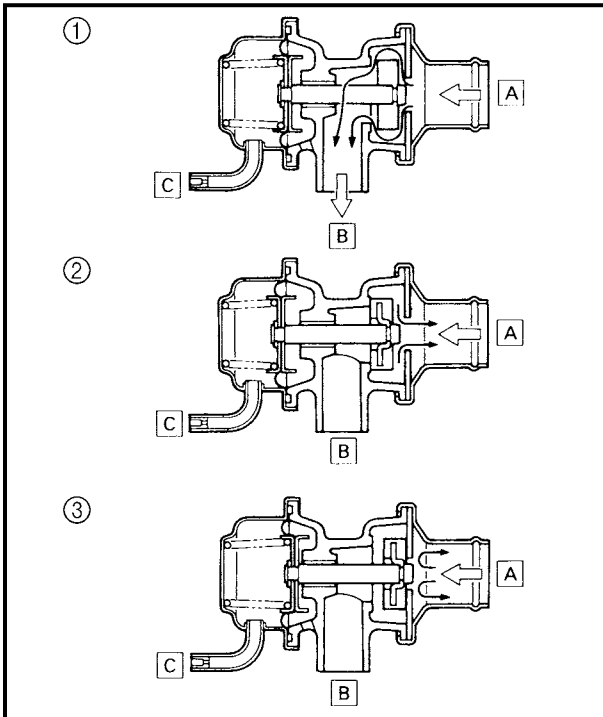
EAS00507

**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 (1,112 to 1,292 °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 butterfly 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 (Exhaust Gas Recirculation).

① During normal operation, the air cutoff valve is open.

② During sudden deceleration (the butterfly valve suddenly closes), the air cutoff valve closes.

③ At high engine speeds and when the pressure decreases, the air cutoff valve is closed.

Ⓐ From the air cleaner

Ⓑ To the reed valve

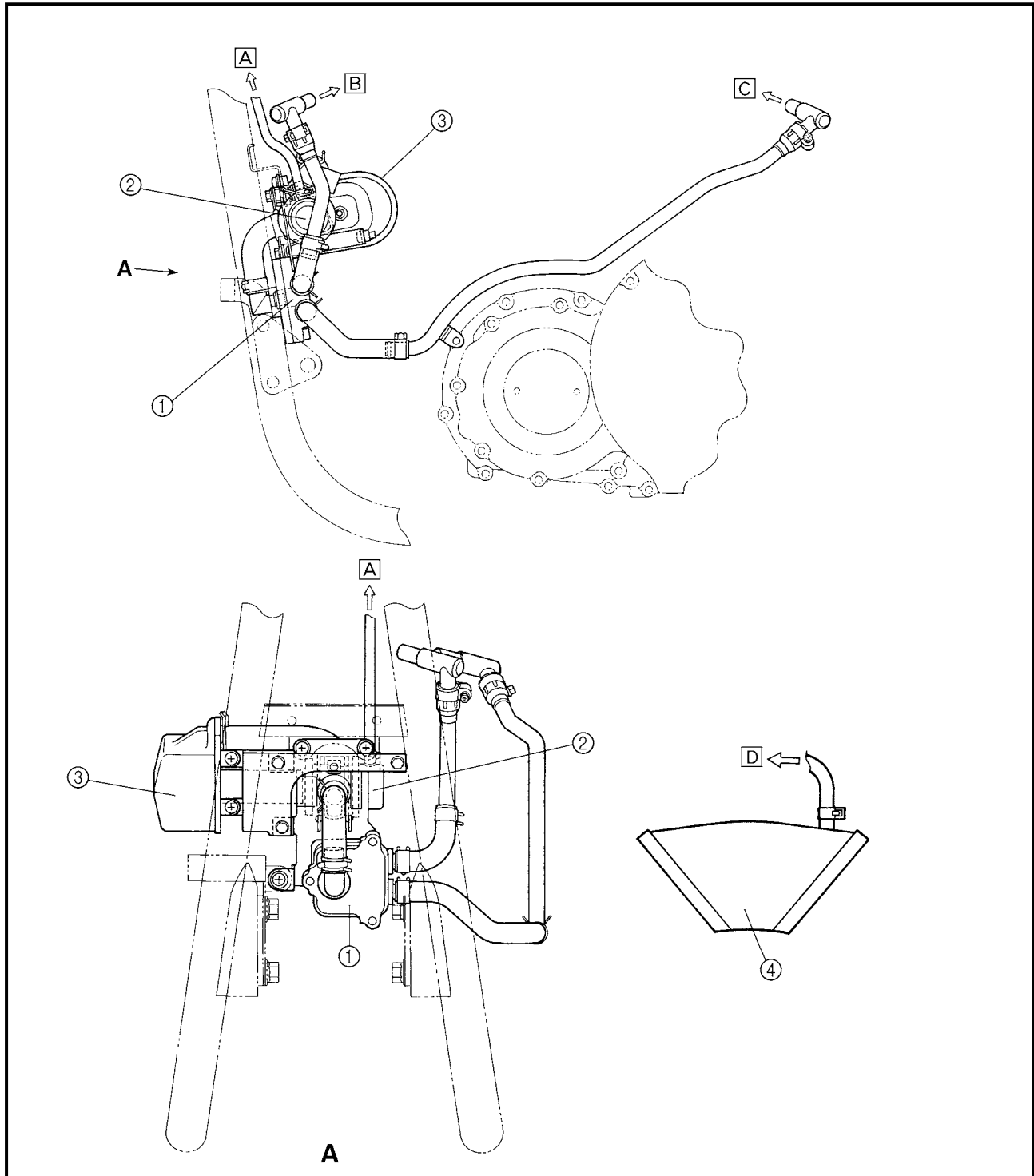
Ⓒ To the carburetor joint

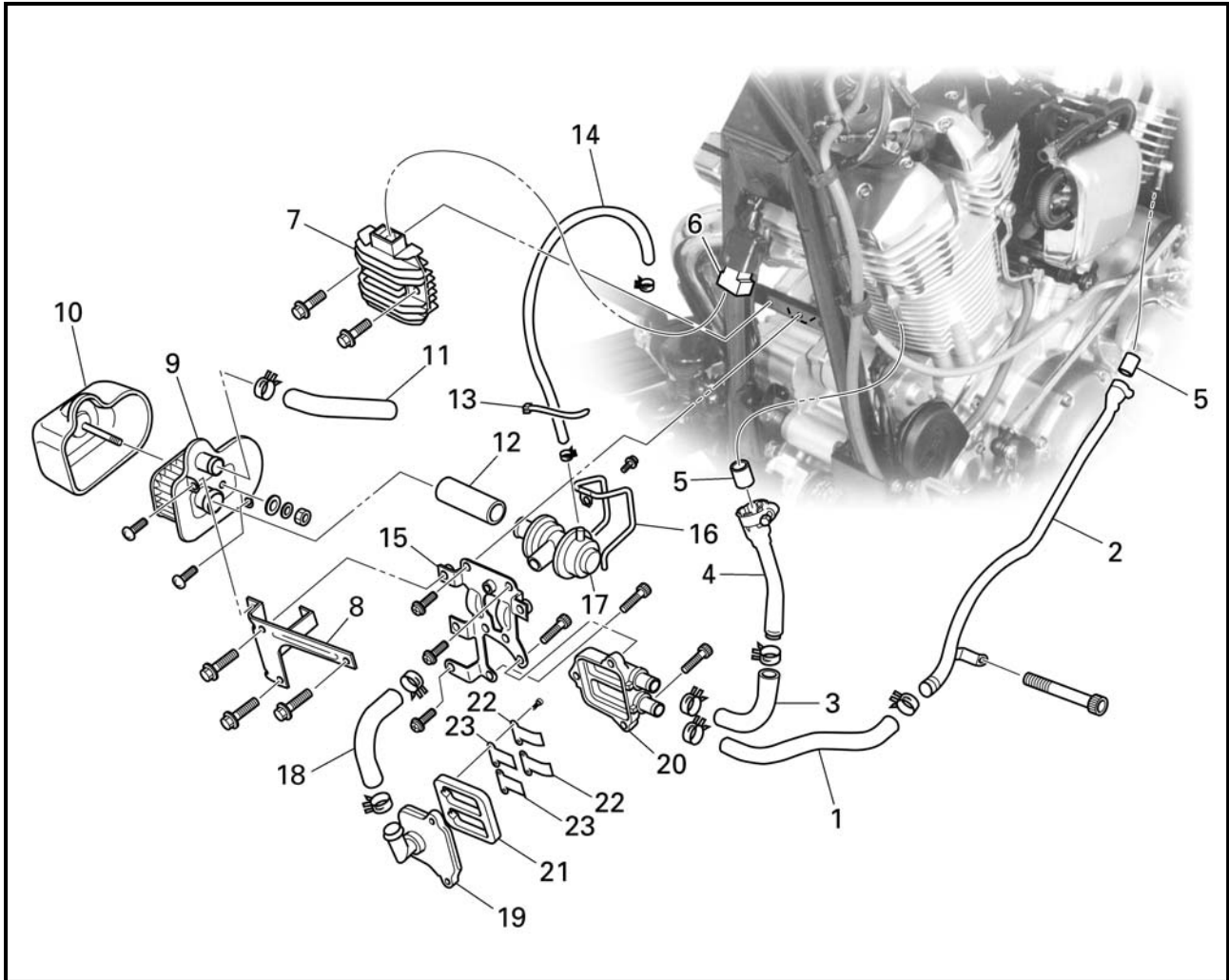


EAS00509

AIR INDUCTION SYSTEM DIAGRAMS

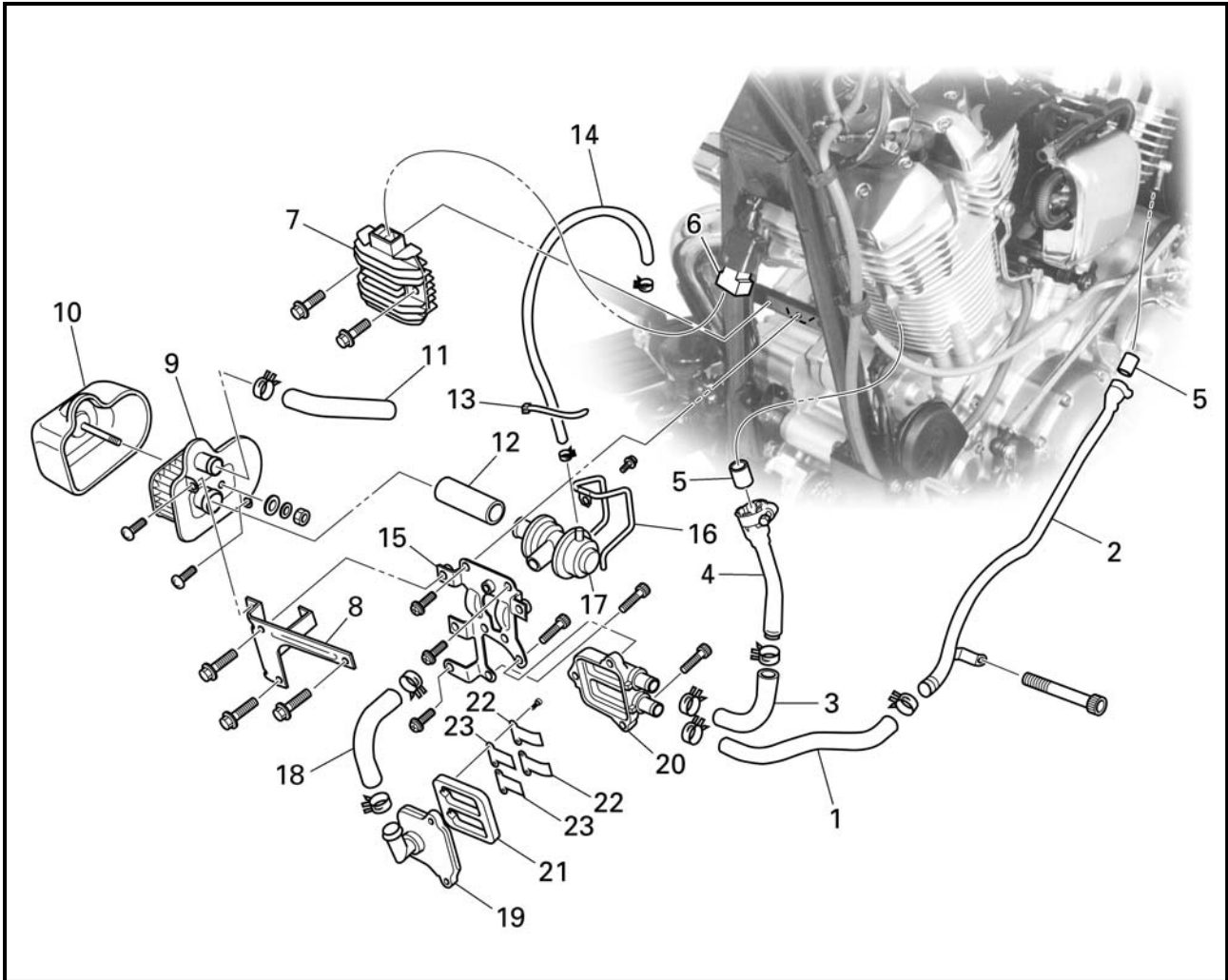
- ① Reed valve
- ② Air cut valve
- ③ Air cleaner
- ④ Carburetor joint
- Ⓐ To the carburetor joint
- Ⓑ To the front cylinder head
- Ⓒ To the rear cylinder head
- Ⓓ To the air cut valve



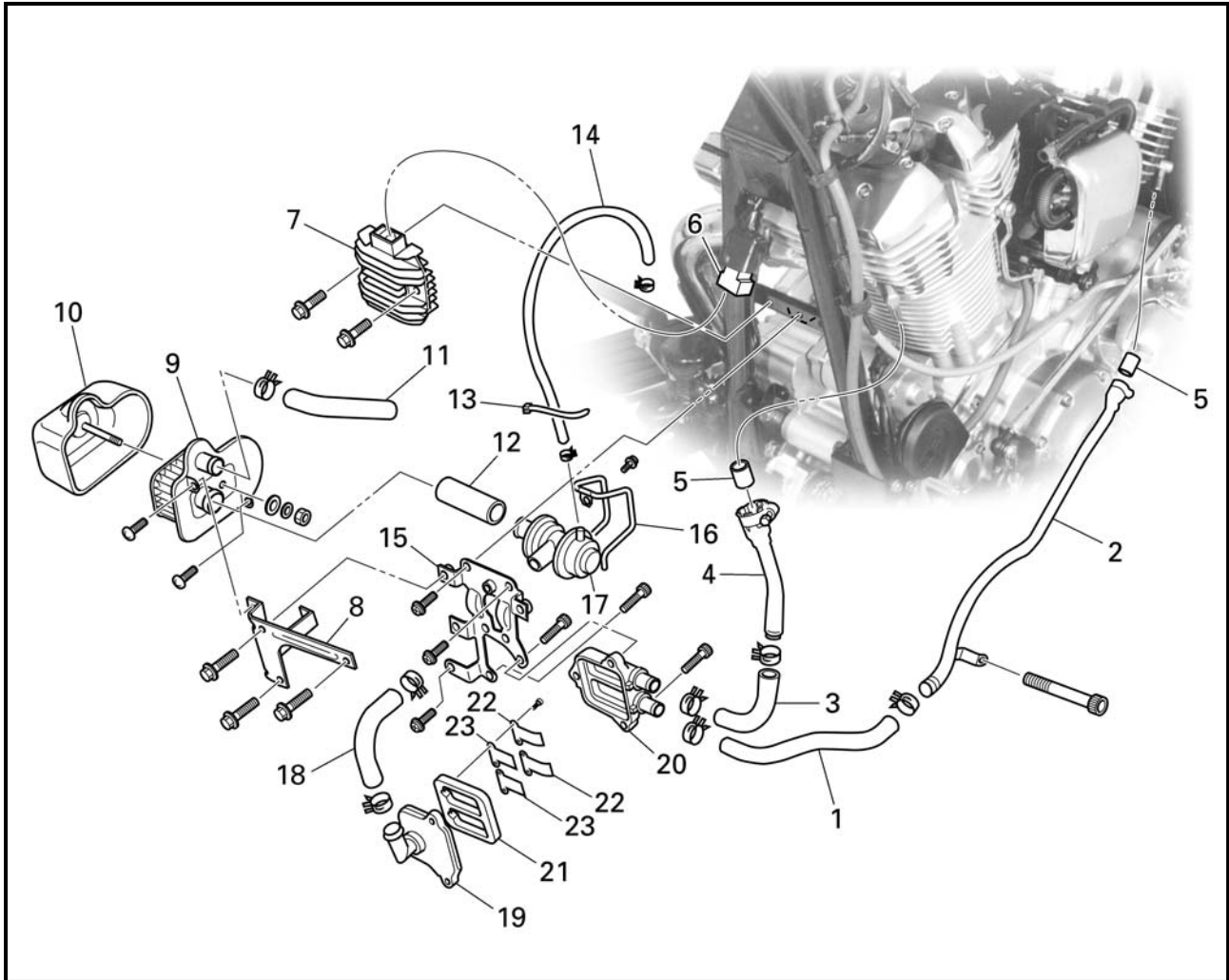


6

Order	Job/Part	Q'ty	Remarks
	<b>Removing the air induction system</b>		
	fuel tank		Remove the parts in the order listed. Refer to "FUEL TANK" in chapter 3.
1	Reed valve case to rear cylinder head hose	1	
2	Reed valve case to rear cylinder head pipe	1	
3	Reed valve case to front cylinder head hose	1	
4	Reed valve case to front cylinder head hose	1	
5	Gasket	2	
6	Rectifier/regulator coupler	1	Disconnect.
7	Rectifier/regulator	1	
8	Air filter bracket	1	



Order	Job/Part	Q'ty	Remarks
9	Air filter	1	
10	Air filter cover	1	
11	Air filter hose	1	
12	Air cut valve to air filter hose	1	
13	Plastic locking tie	1	
14	Vacuum hose	1	
15	Bracket	1	
16	Air cut valve holder	1	
17	Air cut valve	1	
18	Air cut valve to reed valve cover hose	1	
19	Reed valve cover	1	
20	Reed valve case	1	



6

Order	Job/Part	Q'ty	Remarks
21	Reed valve base	1	For installation, reverse the removal procedure.
22	Reed valve stopper	2	
23	Reed valve	2	

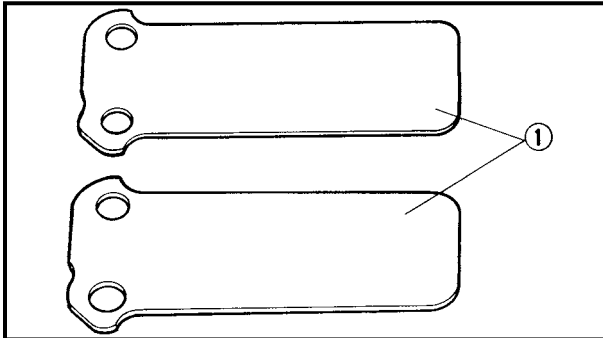


EAS00510

**CHECKING THE AIR INDUCTION SYSTEM**

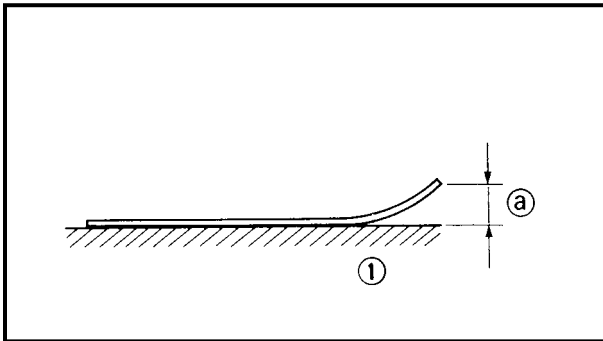
1. Check:

- hoses  
Loose connection → Connect properly.  
Cracks/damage → Replace.
- pipes  
Cracks/damage → Replace.



2. Check:

- fibre reed ①
- fibre reed stopper
- reed valve seat  
Cracks/damage → Replace the reed valve.



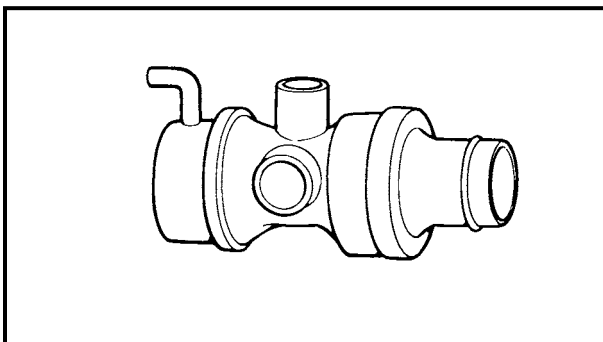
3. Measure:

- fibre reed bending ②  
Out of specification → Replace the reed valve.



**Maximum fibre reed bending  
0.4 mm (0.016 in)**

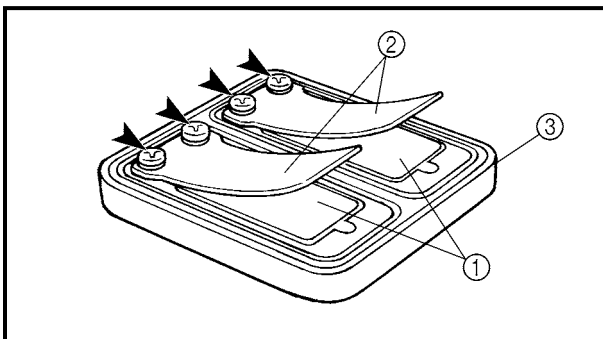
① Surface plate



4. Check:

- air cutoff valve  
Cracks/damage → Replace.

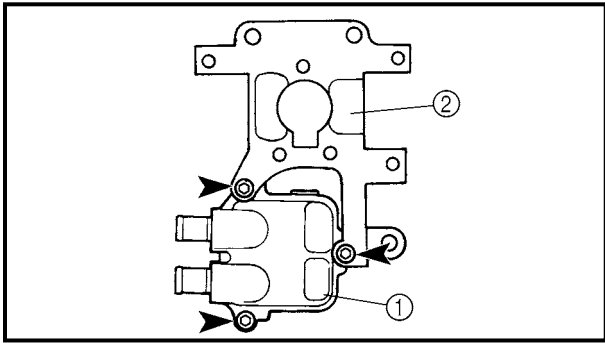
**6**



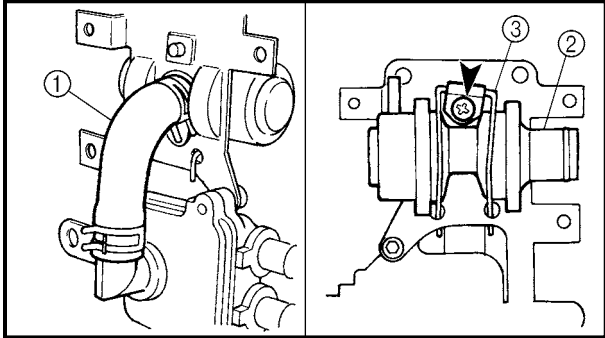
**INSTALLING THE AIR INDUCTION SYSTEM**

1. Install:

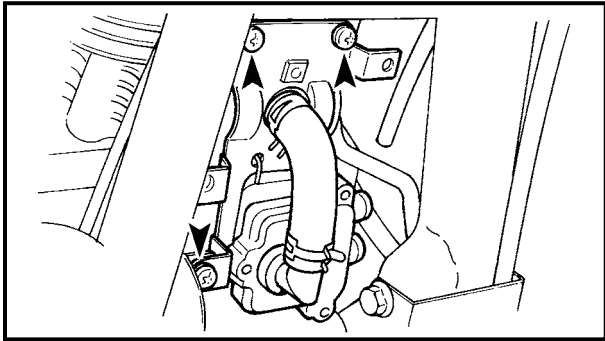
- reed valves ①
- reed valve stoppers ②
- reed valve base ③



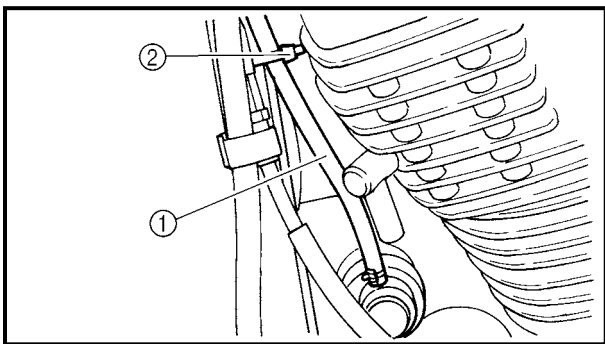
2. Install:
- reed valve case ①
  - reed valve cover
  - bracket ②



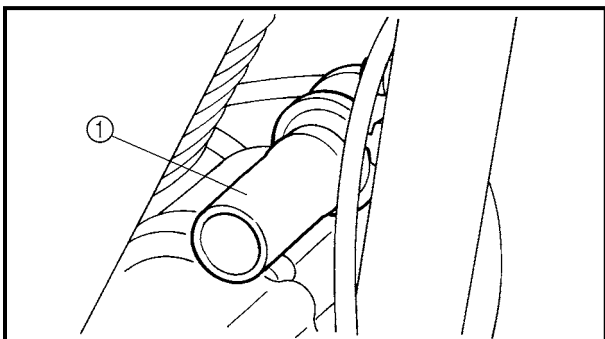
3. Install:
- air cut valve to reed valve cover hose ①
  - air cut valve ②
  - air cut valve holder ③



4. Install:
- bracket (with the air cut valve and reed valve)

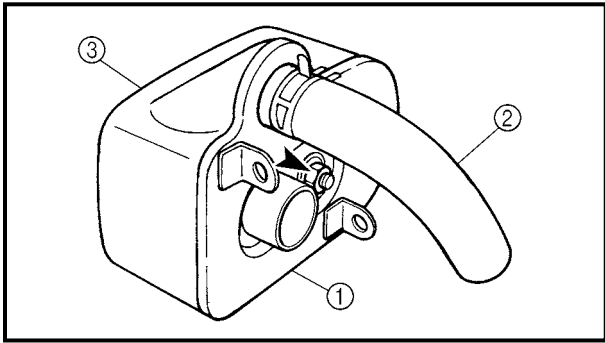


5. Install:
- vacuum hose ①
  - plastic locking tie ②

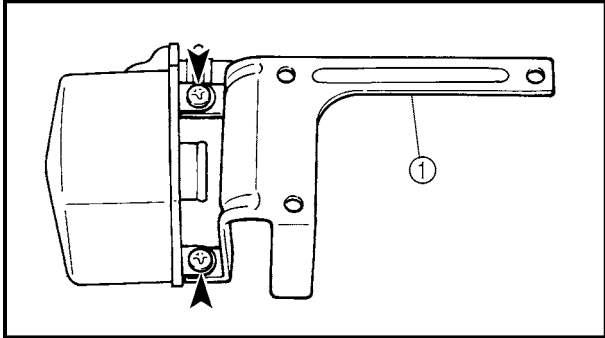


6. Install:
- air cut valve to air filter hose ①

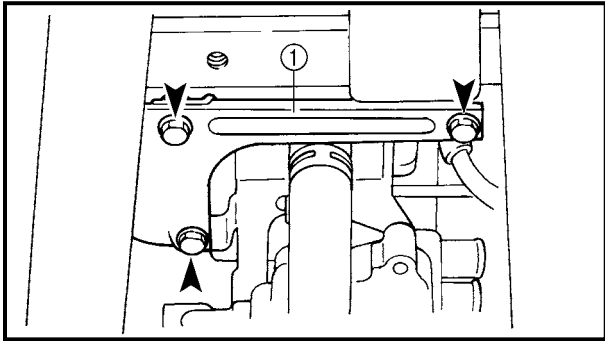
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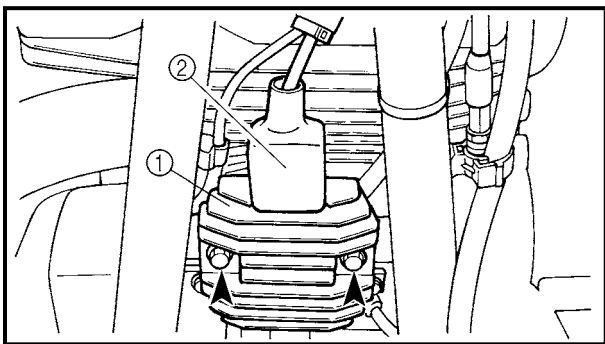
7. Install:
- air filter ①
  - air filter hose ②
  - air filter cover ③



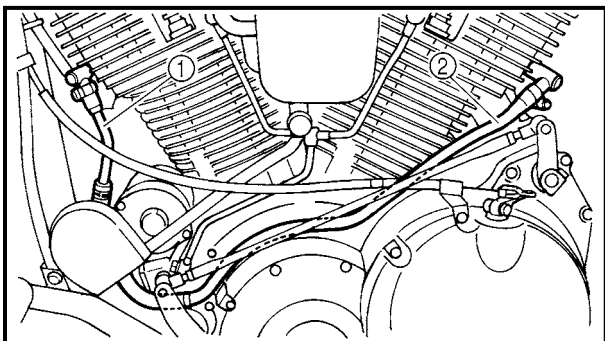
8. Install:
- air filter bracket ①



9. Install:
- air filter case assembly ①



10. Install:
- rectifier/regulator ①
11. Connect:
- rectifier/regulator coupler ②



12. Install:
- gaskets
  - reed valve case to front cylinder head pipe ①
  - reed valve case to front cylinder head hose
  - reed valve case to rear cylinder head pipe ②
  - reed valve case to rear cylinder head hose

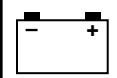




13.Install:

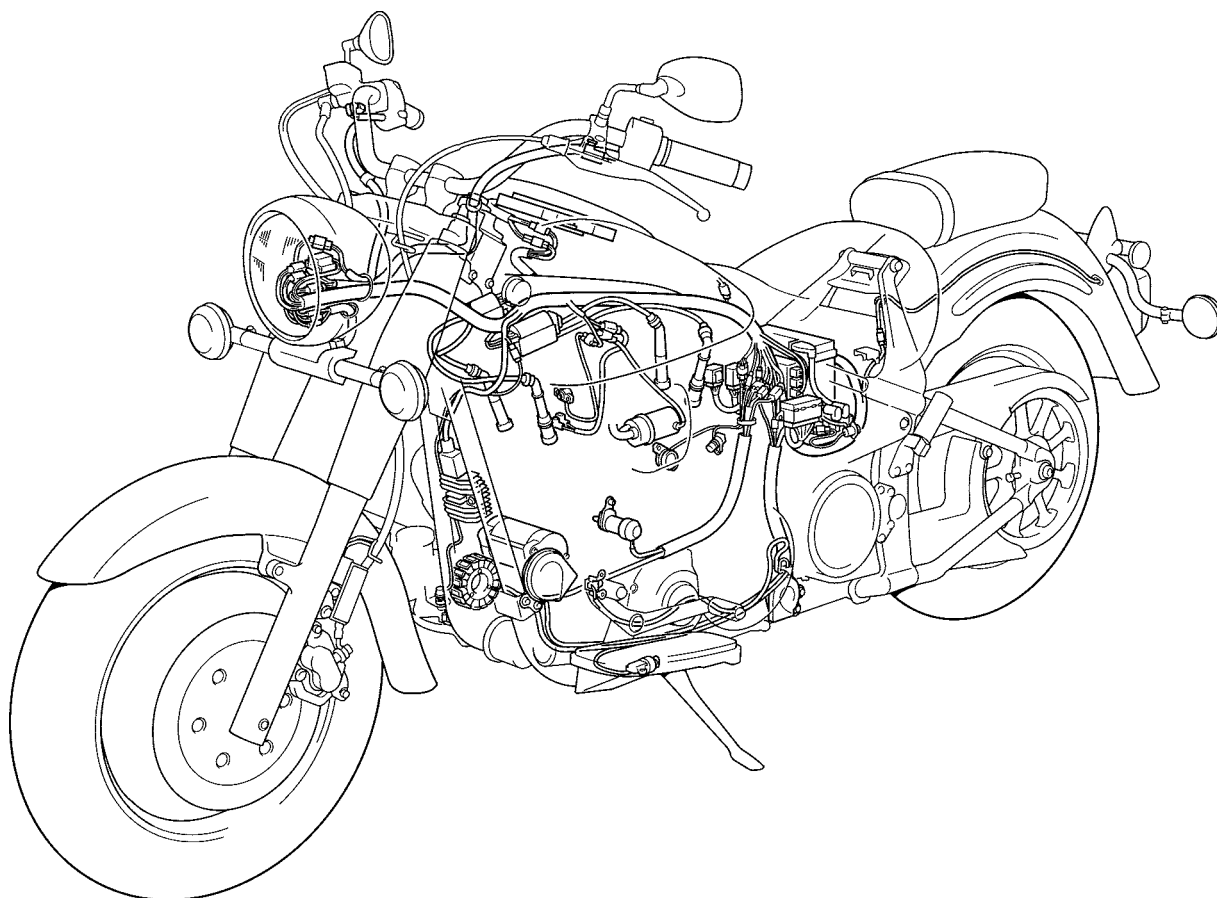
- fuel tank

Refer to "FUEL TANK" in chapter 3.

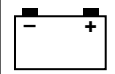


# CONTENTS

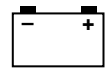
## ELECTRICAL SYSTEM



<b>ELECTRICAL COMPONENTS .....</b>	<b>7-1</b>
<b>ARRANGEMENT OF THE ELECTRICAL COMPONENTS AND COUPLERS .....</b>	<b>7-2</b>
<b>SWITCHES .....</b>	<b>7-6</b>
CHECKING SWITCH CONTINUITY .....	7-6
<b>CHECKING THE SWITCHES .....</b>	<b>7-7</b>
<b>CHECKING THE BULBS AND BULB SOCKETS .....</b>	<b>7-9</b>
TYPES OF BULBS .....	7-9
CHECKING THE CONDITION OF THE BULBS .....	7-9
CHECKING THE CONDITION OF THE BULB SOCKETS .....	7-11
CHECKING THE LEDs .....	7-11



<b>IGNITION SYSTEM</b> .....	7-12
CIRCUIT DIAGRAM .....	7-12
TROUBLESHOOTING .....	7-13
<b>ELECTRIC STARTING SYSTEM</b> .....	7-17
CIRCUIT DIAGRAM .....	7-17
STARTING CIRCUIT CUTOFF SYSTEM OPERATION .....	7-18
TROUBLESHOOTING .....	7-19
<b>STARTER MOTOR</b> .....	7-23
CHECKING THE STARTER MOTOR .....	7-25
ASSEMBLING THE STARTER MOTOR .....	7-26
INSTALLING THE STARTER MOTOR .....	7-27
<b>CHARGING SYSTEM</b> .....	7-28
CIRCUIT DIAGRAM .....	7-28
TROUBLESHOOTING .....	7-29
<b>LIGHTING SYSTEM</b> .....	7-31
CIRCUIT DIAGRAM .....	7-31
TROUBLESHOOTING .....	7-32
CHECKING THE LIGHTING SYSTEM .....	7-33
<b>SIGNALING SYSTEM</b> .....	7-37
CIRCUIT DIAGRAM .....	7-37
TROUBLESHOOTING .....	7-39
CHECKING THE SIGNALING SYSTEM .....	7-40
<b>FUEL PUMP SYSTEM</b> .....	7-46
CIRCUIT DIAGRAM .....	7-46
FUEL PUMP CIRCUIT OPERATION .....	7-47
TROUBLESHOOTING .....	7-48
CHECKING THE FUEL PUMP .....	7-50
<b>CARBURETOR HEATING SYSTEM</b> .....	7-51
CIRCUIT DIAGRAM .....	7-51
TROUBLESHOOTING .....	7-52
<b>SELF-DIAGNOSIS</b> .....	7-55
TROUBLESHOOTING .....	7-57

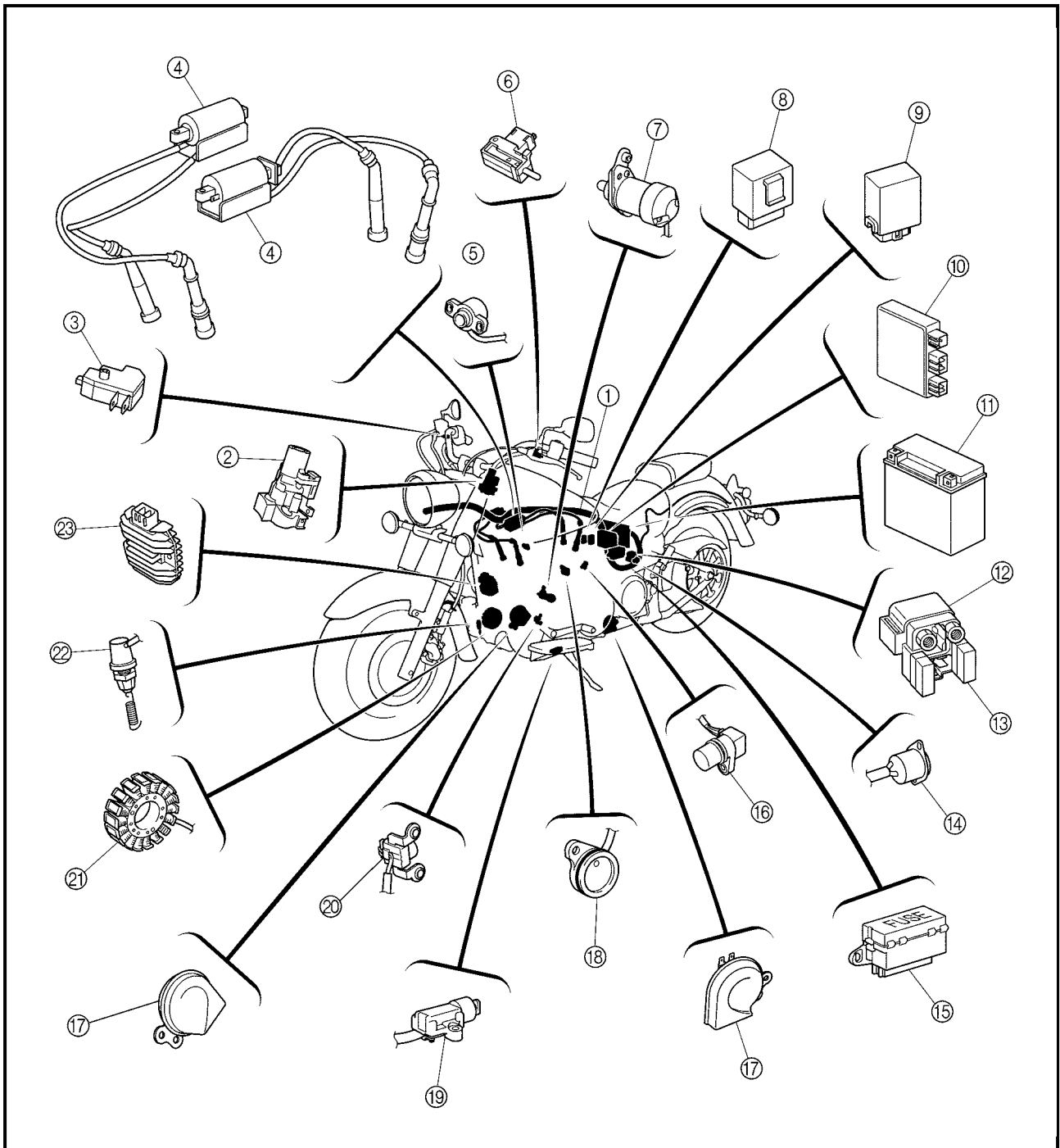


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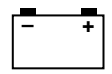
# ELECTRICAL SYSTEM

## ELECTRICAL COMPONENTS

- |                            |                    |                           |
|----------------------------|--------------------|---------------------------|
| ① Wire harness             | ⑪ Battery          | ⑳ Stator coil assembly    |
| ② Main switch              | ⑫ Starter relay    | ㉑ Rear brake light switch |
| ③ Front brake light switch | ⑬ Main fuse        | ㉒ Rectifier/regulator     |
| ④ Ignition coils           | ⑭ Thermo switch    |                           |
| ⑤ Throttle position sensor | ⑮ Fuse box         |                           |
| ⑥ Clutch switch            | ⑯ Speed sensor     |                           |
| ⑦ Decompression solenoid   | ⑰ Horns            |                           |
| ⑧ Relay unit               | ⑱ Neutral switch   |                           |
| ⑨ Turn signal relay        | ㉓ Sidestand switch |                           |
| ⑩ Ignitor unit             | ㉔ Pickup coil      |                           |

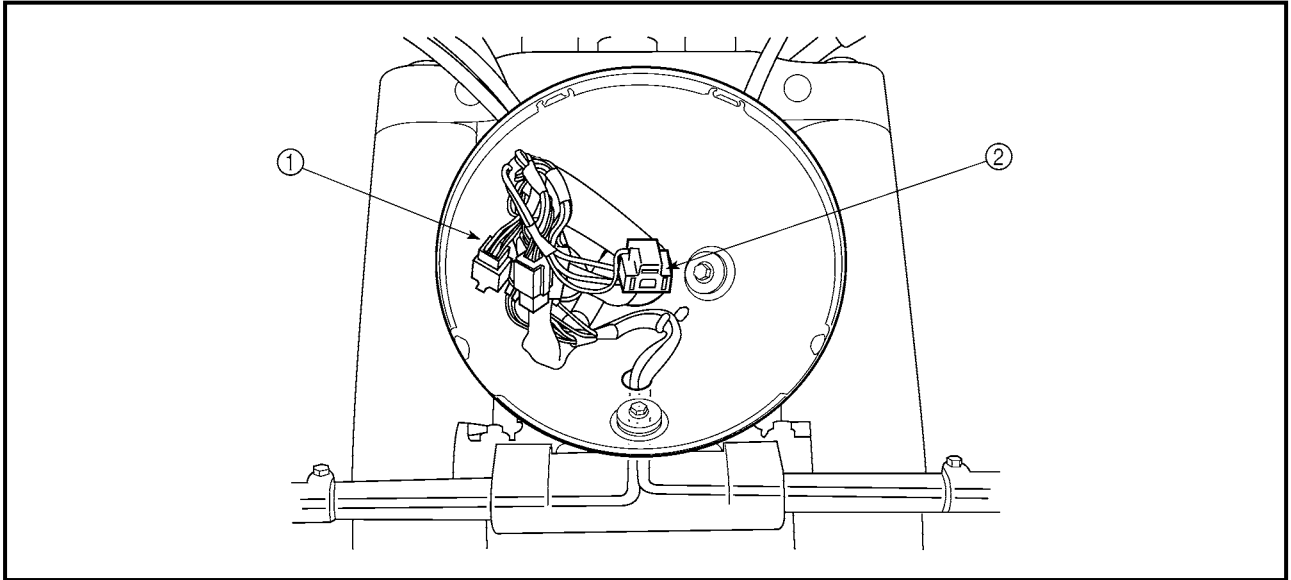


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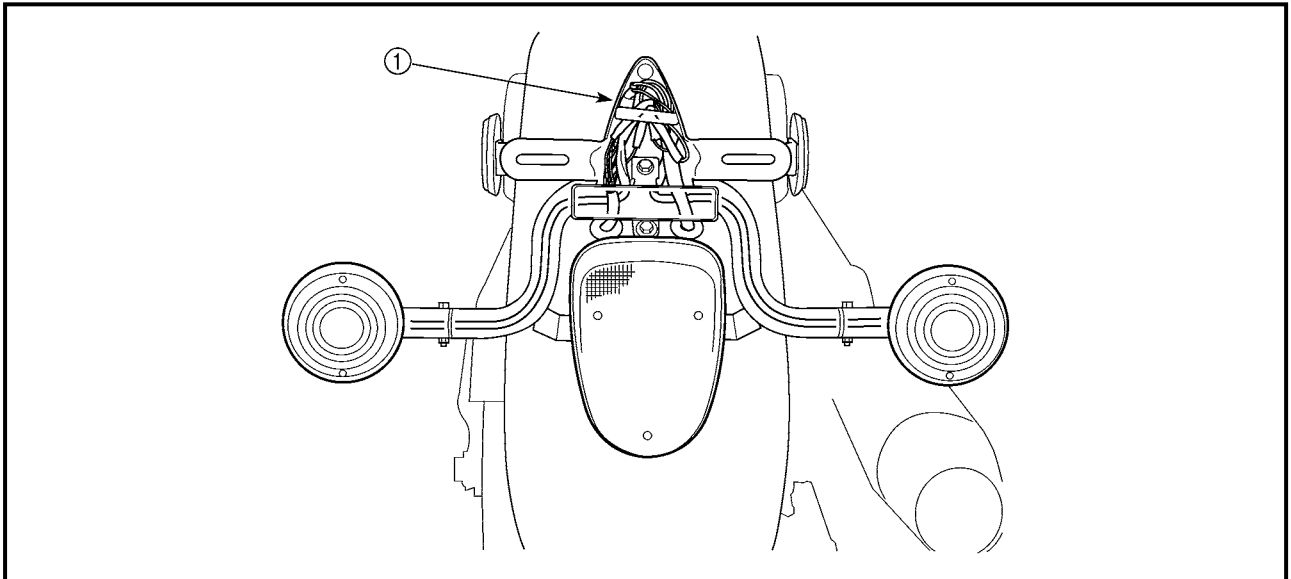


**ARRANGEMENT OF THE ELECTRICAL COMPONENTS AND COUPLERS**

- ① Right handlebar switch coupler, left handlebar switch couplers and front turn signal connectors
- ② Headlight coupler

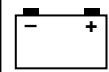


- ① Tail/brake light connectors and rear turn signal connectors

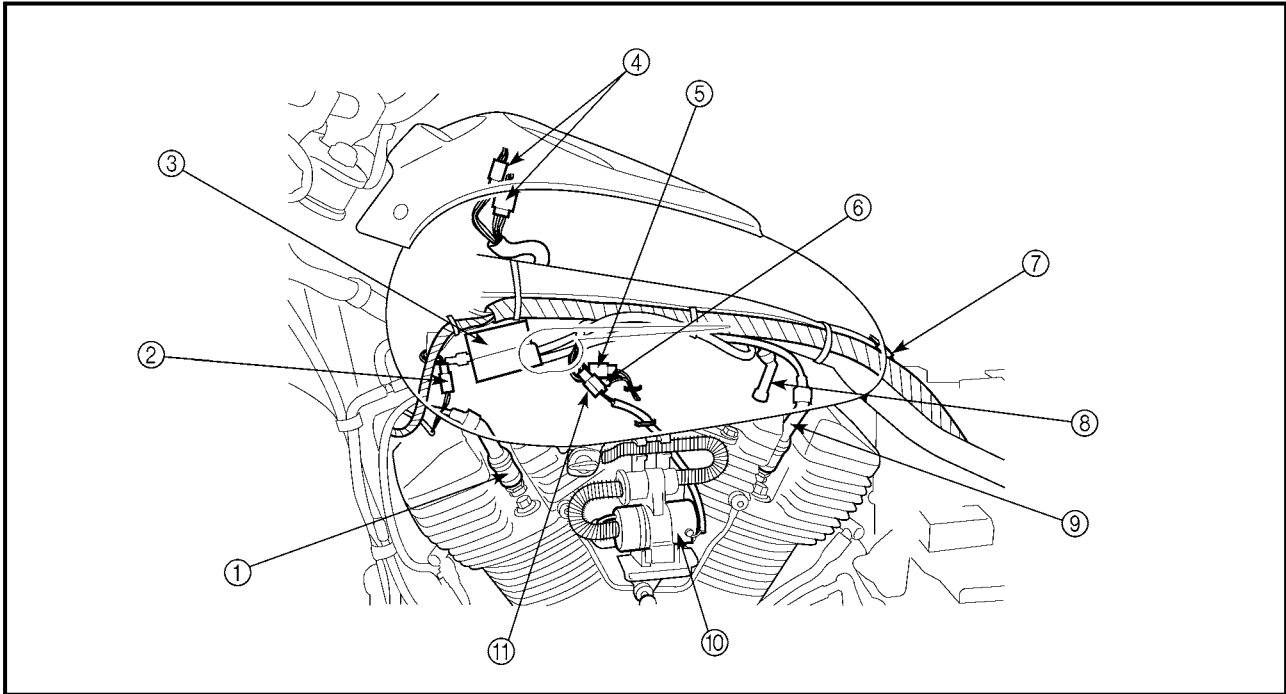


# ARRANGEMENT OF THE ELECTRICAL COMPONENTS AND COUPLERS

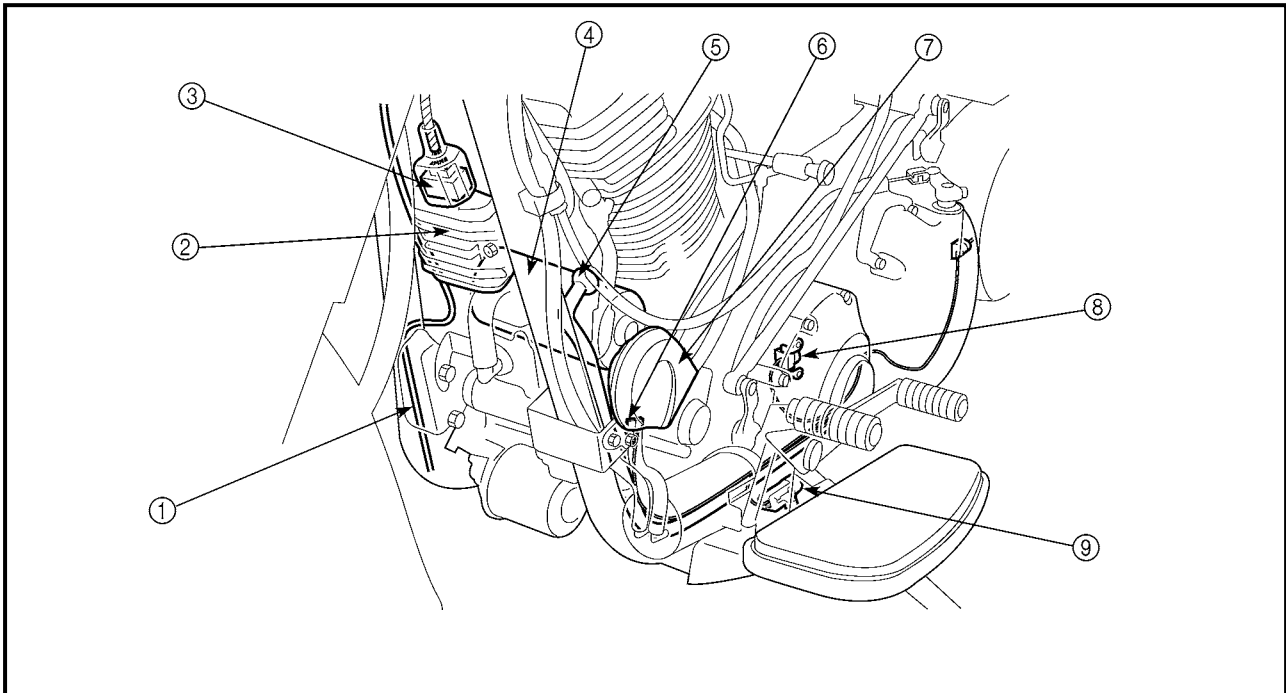
**ELEC**



- |                                   |  |                     |
|-----------------------------------|--|---------------------|
| ① Spark plug cap #3               | ⑤ Carburetor heater sub-wire harness coupler | ⑧ Spark plug cap #2 |
| ② Rear brake light switch coupler | ⑥ Throttle position sensor coupler           | ⑨ Spark plug cap #1 |
| ③ Ignition coil (front cylinder)  | ⑦ Fuel sender coupler                        | ⑩ Fuel pump         |
| ④ Meter assembly couplers         |  | ⑪ Fuel pump coupler |



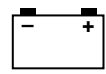
- |                                |                    |
|--------------------------------|--------------------|
| ① Rear brake light switch lead | ⑥ Horn coupler     |
| ② Rectifier/regulator          | ⑦ Horn             |
| ③ Rectifier/regulator coupler  | ⑧ Pickup coil      |
| ④ Starter motor                | ⑨ Sidestand switch |
| ⑤ Starter motor lead           |                    |



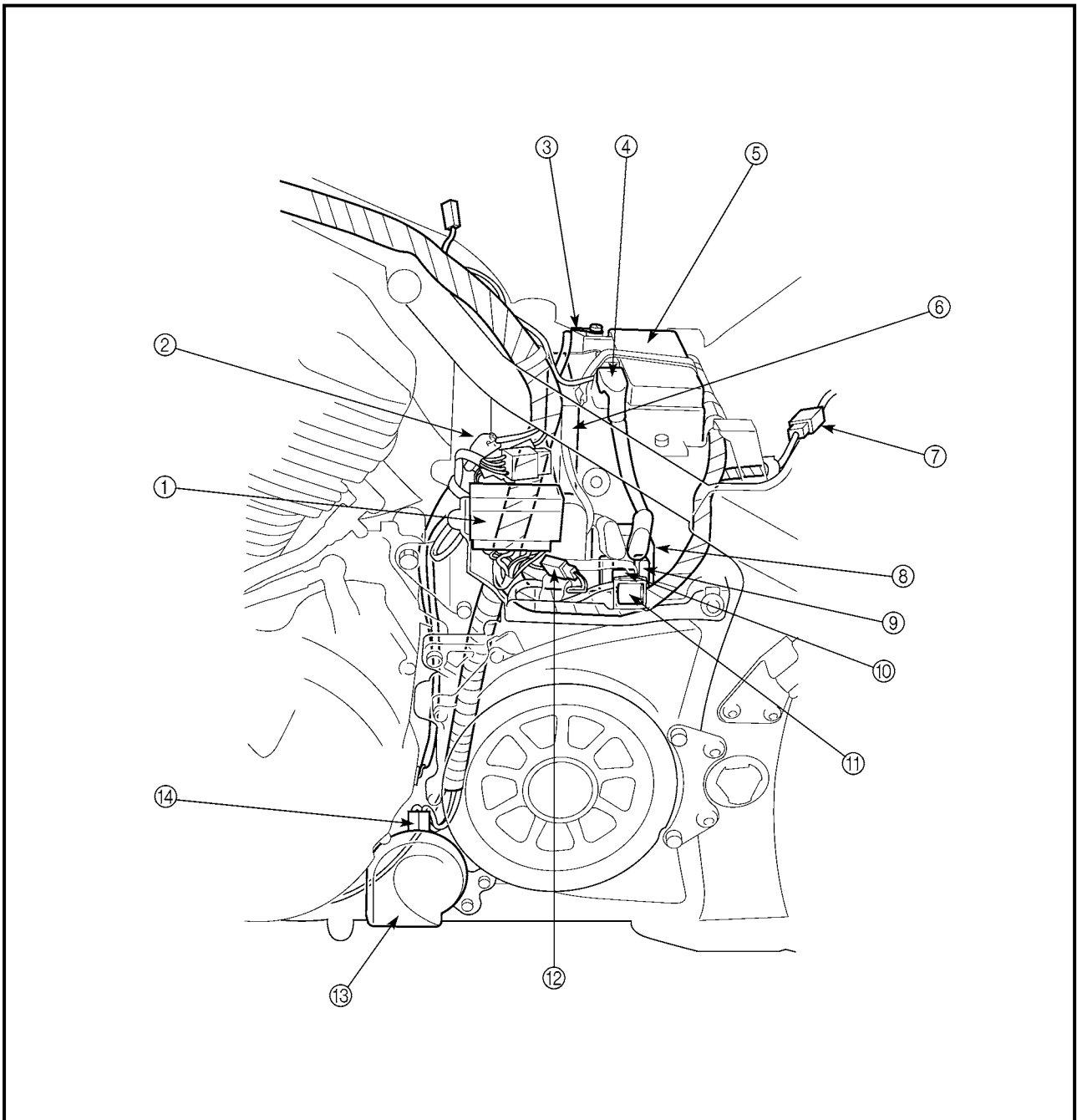
**7**

# ARRANGEMENT OF THE ELECTRICAL COMPONENTS AND COUPLERS

ELEC



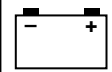
- ① Fuse box
- ② Stator coil coupler, decompression solenoid couplers, pickup coil coupler, speed sensor coupler, neutral switch connector and sidestand switch coupler
- ③ Battery negative lead
- ④ Battery positive lead
- ⑤ Battery
- ⑥ Ignitor unit
- ⑦ Tail/brake light and rear turn signal light sub-wire harness coupler
- ⑧ Starter relay
- ⑨ Main fuse
- ⑩ Starter relay coupler
- ⑪ Thermo switch
- ⑫ Thermo switch coupler
- ⑬ Horn
- ⑭ Horn coupler



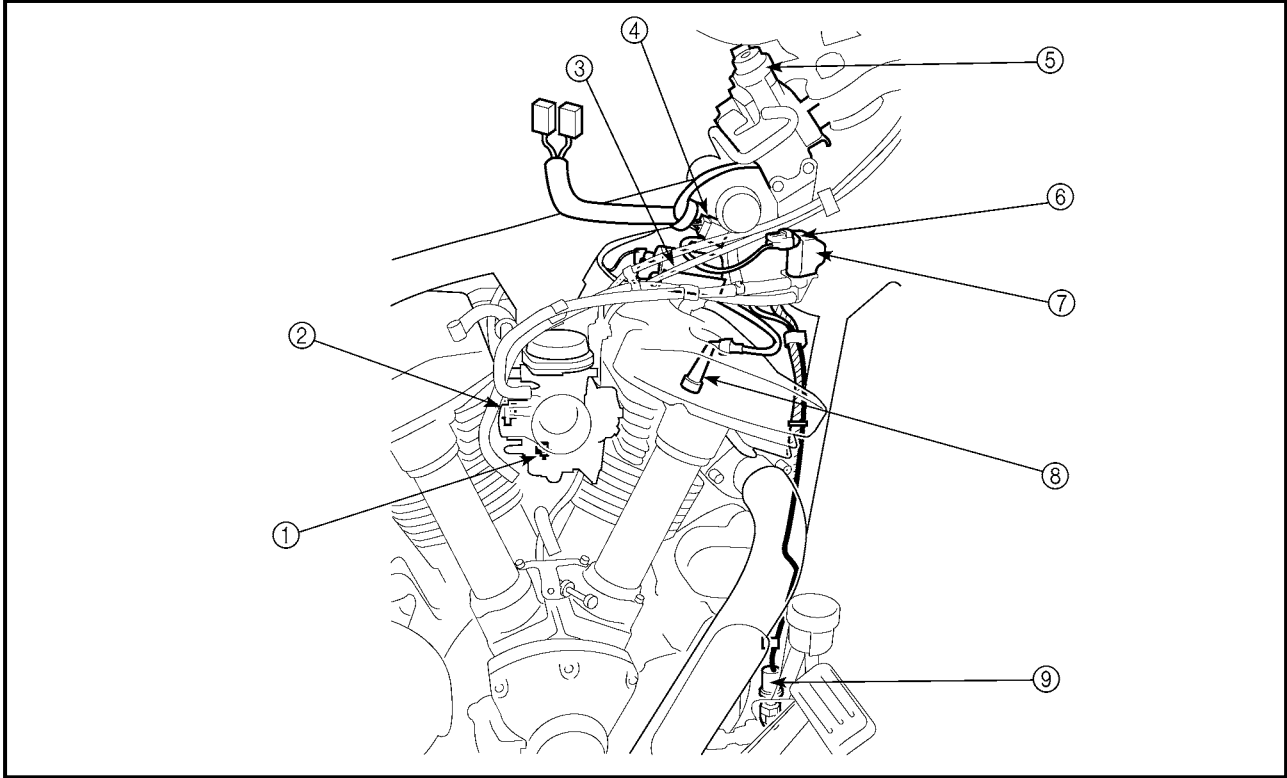
7

# ARRANGEMENT OF THE ELECTRICAL COMPONENTS AND COUPLERS

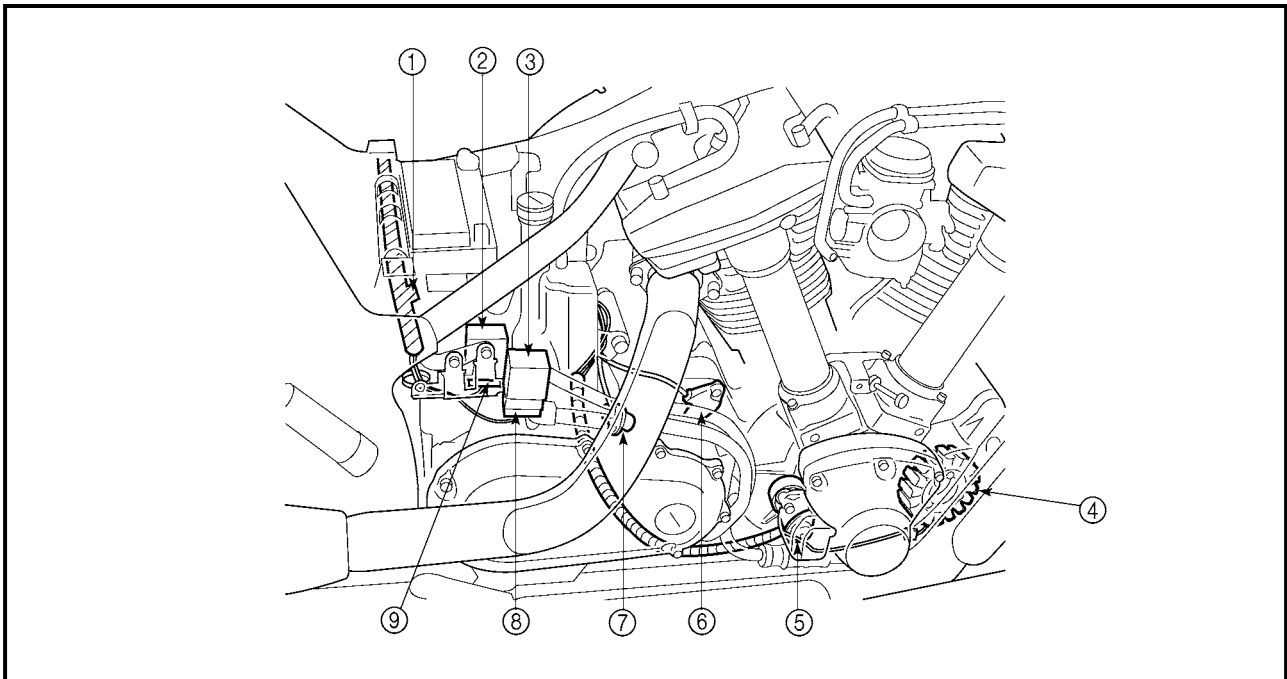
**ELEC**



- ① Carburetor heater
- ② Throttle position sensor
- ③ Ignition coil (rear cylinder)
- ④ Main switch coupler
- ⑤ Main switch
- ⑥ Solenoid valve coupler
- ⑦ Solenoid valve
- ⑧ Spark plug cap #4
- ⑨ Rear brake light switch

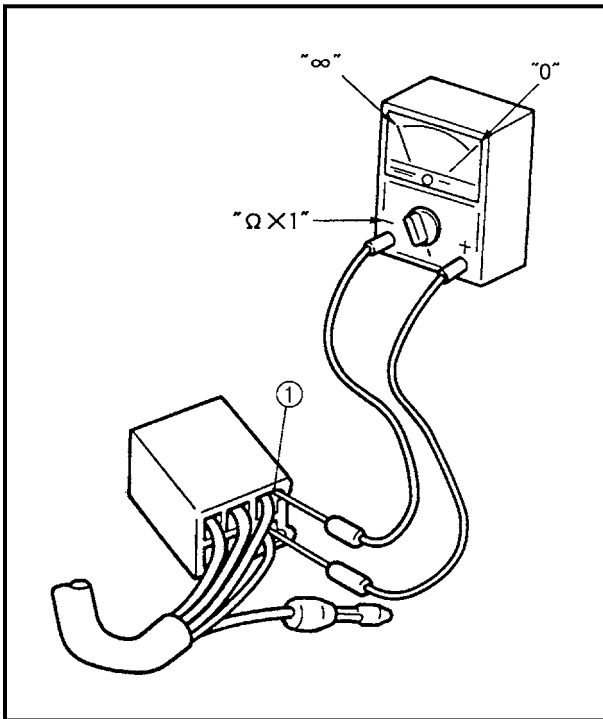
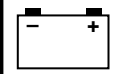


- ① Diode
- ② Turn signal relay
- ③ Relay unit
- ④ Stator coil
- ⑤ Decompression solenoid
- ⑥ Neutral switch
- ⑦ Speed sensor
- ⑧ Relay unit coupler
- ⑨ Turn signal relay coupler



**7**





EAS00730

## 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:**

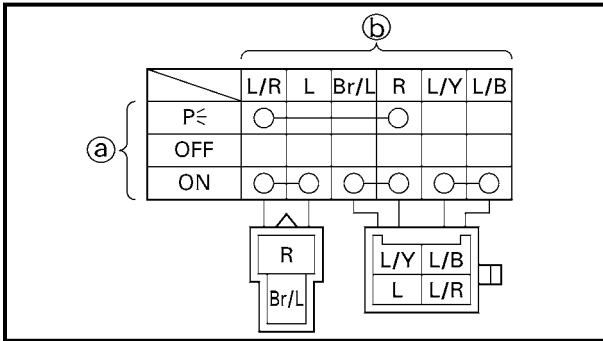
Never insert the tester probes into the coupler terminal slots ①. Always insert the probes from the opposite end of the coupler, taking care not to loosen or damage the leads.



Pocket tester  
YU-03112

**NOTE:**

- Before checking for continuity, set the pocket tester to "0" and to the "Ω × 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.

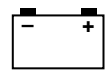
The switch positions ① are shown in the far left column and the switch lead colors ② are shown in the top row in the switch illustration.

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



EAS00731

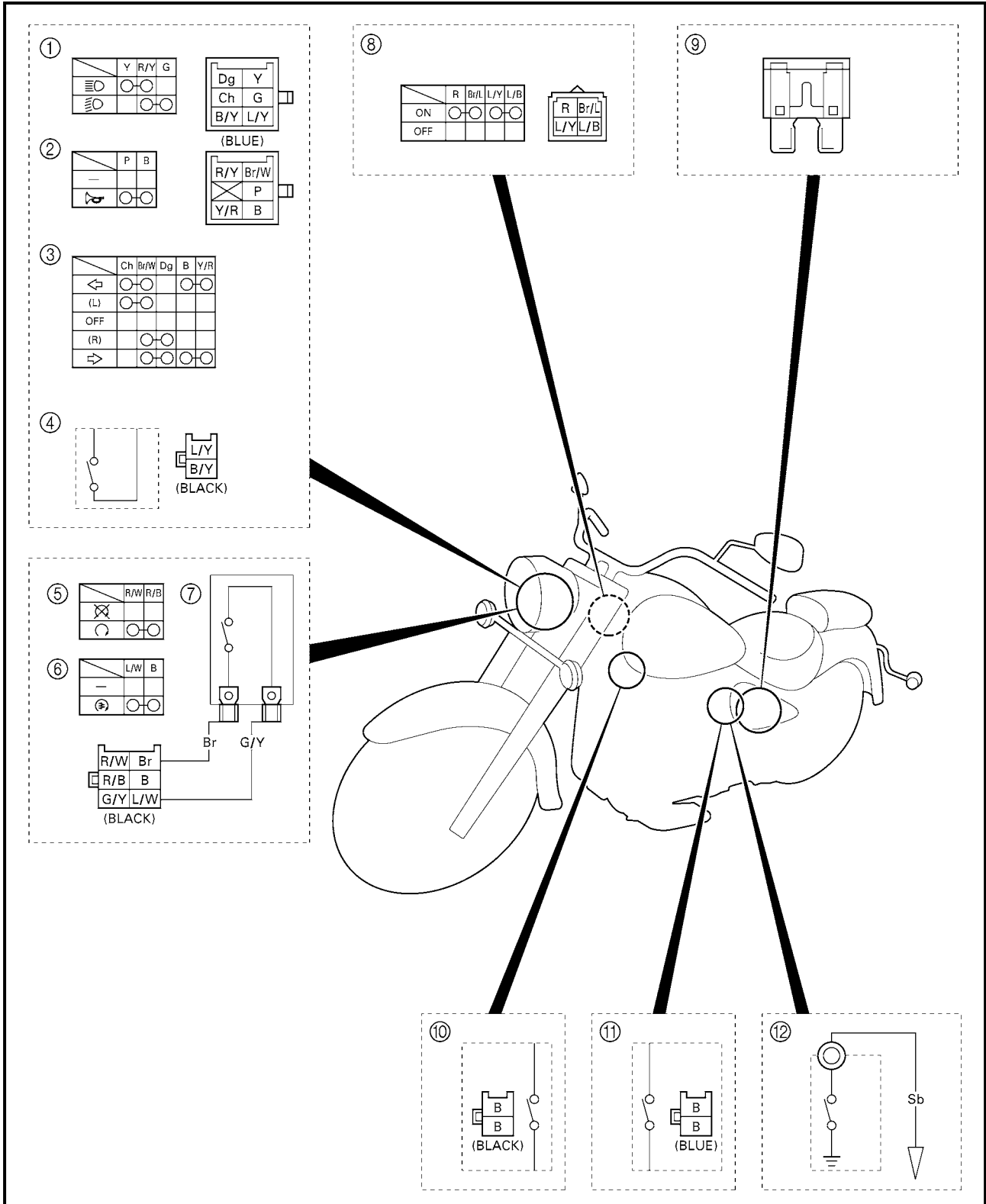
# CHECKING THE SWITCHES

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

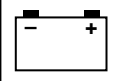
Damage/wear → Repair or replace the switch.

Improperly connected → Properly connect.

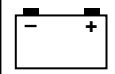
Incorrect continuity reading → Replace the switch.



7



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



EAS00732

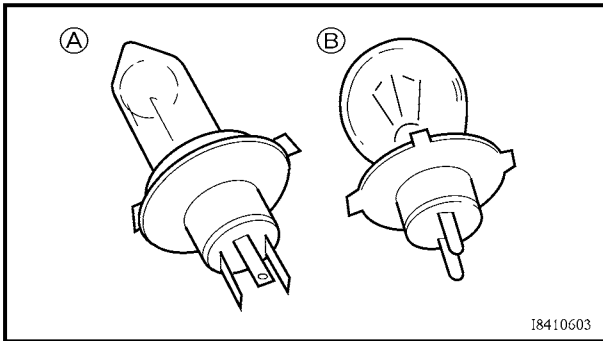
## CHECKING THE BULBS AND BULB SOCKETS

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

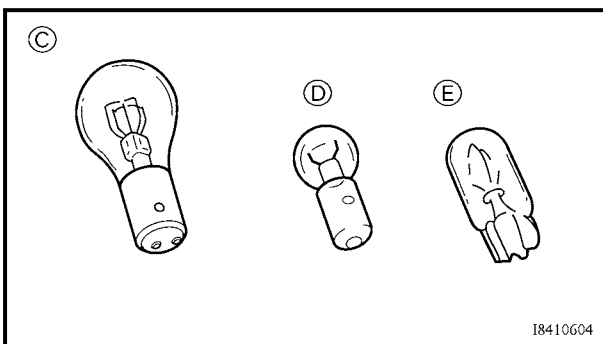
Damage/wear → Repair or replace the bulb, bulb socket or both.

Improperly connected → Properly connect.

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



I8410603



I8410604

### TYPES OF BULBS

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

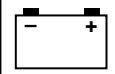
- Bulbs ① and ② are used for the headlights and usually use a bulb holder which must be detached before removing the bulb. The majority of these bulbs can be removed from their respective socket by turning them counterclockwise.
- Bulb ③ is used for turn signal and tail/brake lights and can be removed from the socket by pushing and turning the bulb counterclockwise.
- Bulbs ④ and ⑤ 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





**CHECKING THE CONDITION OF THE BULB SOCKETS**

The following procedure applies to all of the bulb sockets.

1. Check:
  - bulb socket (for continuity) (with the pocket tester)
  - No continuity → Replace.



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

Check each bulb socket for continuity in the same manner as described in the bulb section; however, note the following.



- a. Install a good bulb into the bulb socket.
- b. Connect the pocket tester probes to the respective leads of the bulb socket.
- c. Check the bulb socket for continuity. If any of the readings indicate no continuity, replace the bulb socket.



**CHECKING THE LEDs**

The following procedure applies to all of the LEDs.

1. Check: LED (for proper operation)

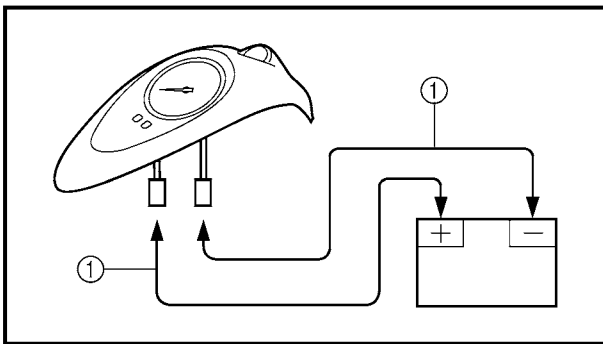


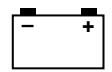
- a. Disconnect the meter assembly coupler (meter assembly side).
- b. Connect two jumper leads ① from the battery terminals to the respective coupler terminals as shown.

**⚠ 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.

- c. When the jumper leads are connected to the terminals the respective LED should illuminate.  
Does not light → Replace the meter assembly.

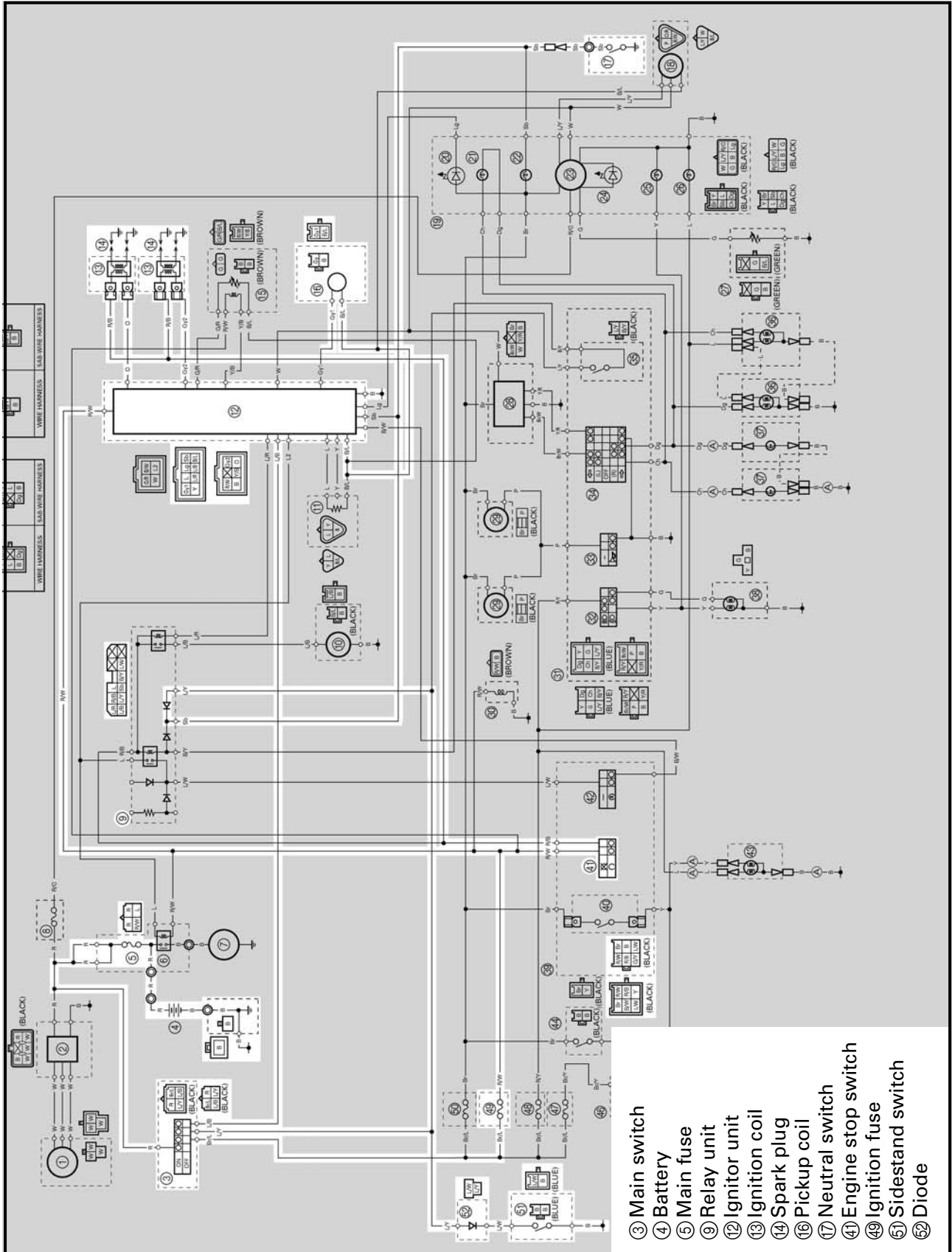




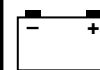
EB802001

IGNITION SYSTEM

CIRCUIT DIAGRAM



- ③ Main switch
- ④ Battery
- ⑥ Main fuse
- ⑨ Relay unit
- ⑫ Ignitor unit
- ⑬ Ignition coil
- ⑭ Spark plug
- ⑯ Pickup coil
- ⑰ Neutral switch
- ⑳ Engine stop switch
- ㉑ Ignition fuse
- ㉒ Sidestand switch
- ㉓ Diode



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. diode
13. relay unit (diode)
14. wiring  
(of the entire ignition system)

**NOTE:**

- Before troubleshooting, remove the following part(s):
  - 1) rider seat
  - 2) fuel tank
  - 3) side covers
  - 4) ignition coils
  - 5) headlight lens unit
- Troubleshoot with the following special tool(s).



**Dynamic spark tester  
YM-34487  
Pocket tester  
YU-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?



Replace the fuse(s).

EB802401

**2. Battery**

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



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

- Is the battery OK?



- 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.



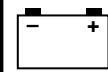
**Standard spark plug  
DPR7EA-9 (NGK)  
X22EPR-U9 (DENSO)  
Spark plug gap  
0.8 ~ 0.9 mm (0.031 ~ 0.035 in)**

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



Re-gap or replace the spark plug.



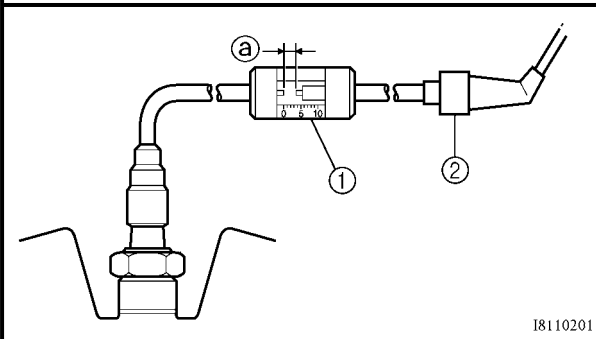


EB802405

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 dynamic spark tester 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.



18110201



**Minimum ignition spark gap  
6 mm (0.24 in)**

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



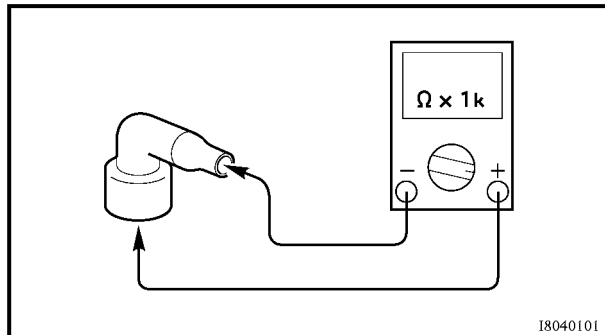
The ignition system is OK.

EB802407

5. Spark plug cap resistance

The following procedure applies to all of the spark plug caps.

- Disconnect the spark plug cap from the spark plug.
- Connect the pocket tester ( $\Omega \times 1k$ ) to the spark plug cap as shown.
- Measure the spark plug cap resistance.

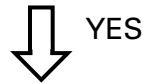


18040101



**Spark plug cap resistance  
10 k $\Omega$  at 20 °C (68 °F)**

- Is the spark plug cap OK?



Replace the spark plug cap.

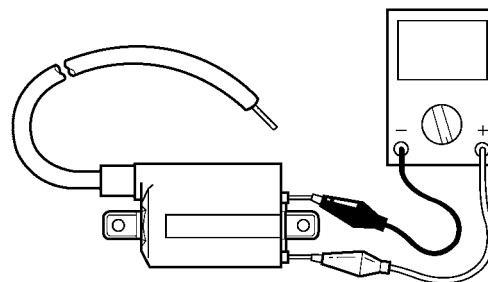
EB802409

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 → red/black  
Tester negative probe → orange (gray)**



18110104

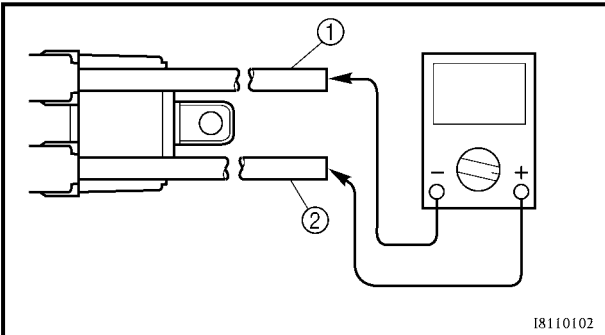
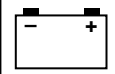
- Measure the primary coil resistance.



**Primary coil resistance  
1.53 ~ 2.07  $\Omega$  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 → spark plug lead ①  
Tester negative probe → spark plug lead ②**



I8110102



**Secondary coil resistance**  
12 ~ 18 kΩ at 20 °C (68 °F)

- Is the ignition coil OK?



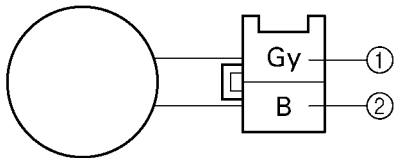
Replace the ignition coil.

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 coupler.

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



- Measure the pickup coil resistance.



**Pickup coil resistance**  
248 ~ 372 Ω at 20 °C (68 °F)  
(between gray and black)

- Is the pickup coil OK?



Replace the pickup coil.

EB802411

8.Main switch

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



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?



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?

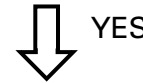


Replace the neutral switch.

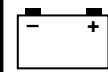
EB802414

11.Sidestand switch

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



Replace the side-stand switch.



EB802415

### 12.Diode

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

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

**NOTE:** \_\_\_\_\_  
When you switch the tester's positive and negative probes, the readings in the above chart will be reversed.

• Are the tester readings correct?



Replace the diode.



### 13.Relay unit (diode)

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

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

**NOTE:** \_\_\_\_\_  
When you switch the tester's positive and negative probes, the readings in the above chart will be reversed.

• Are the tester readings correct?



Replace the relay unit.



EAS00754

### 14.Wiring

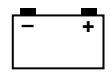
- Check the entire ignition system's wiring. Refer to "CIRCUIT DIAGRAM".
- Is the ignition system's wiring properly connected and without defects?

↓ YES

Replace the ignitor unit.

↓ NO

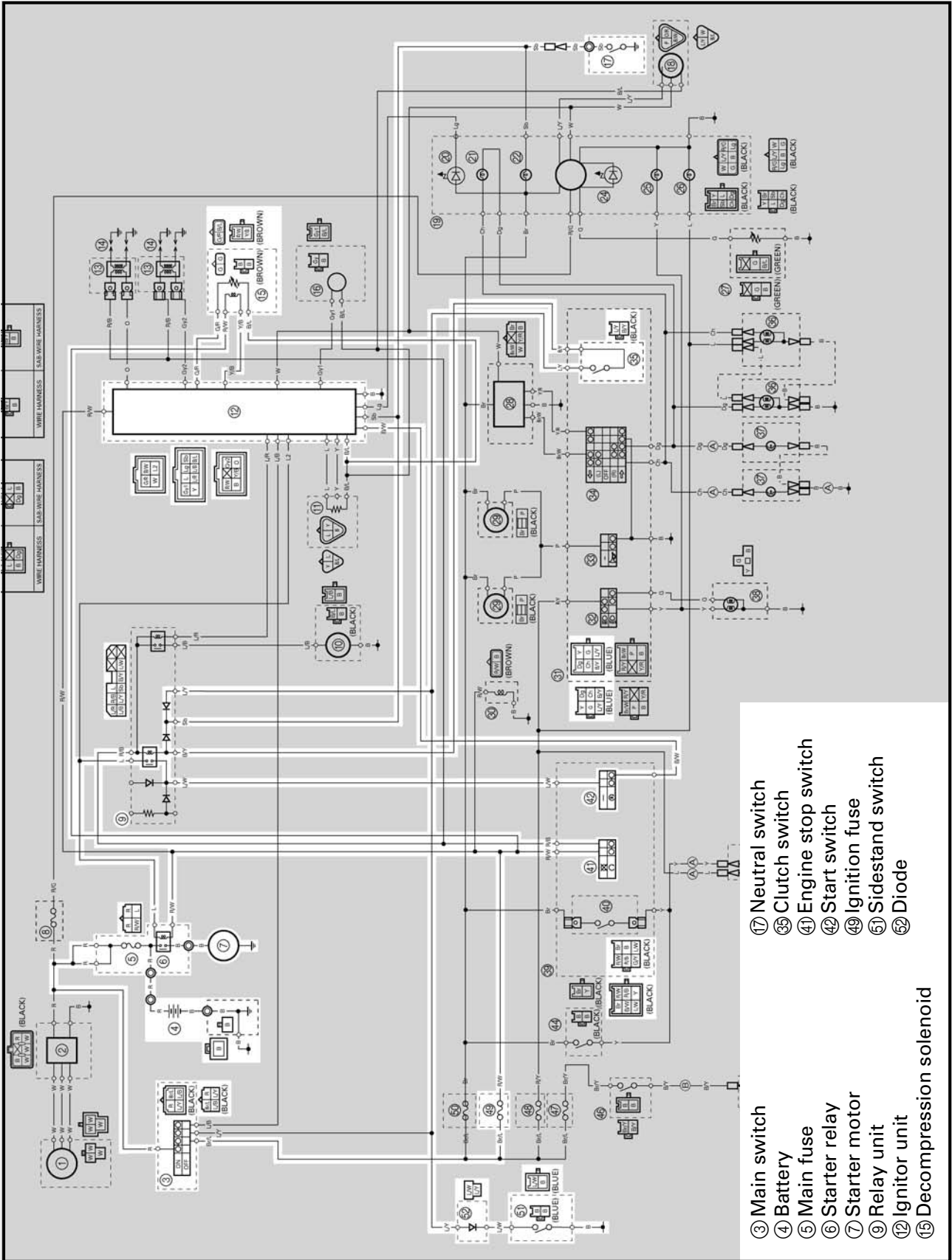
Properly connect or repair the ignition system's wiring.



EB803000

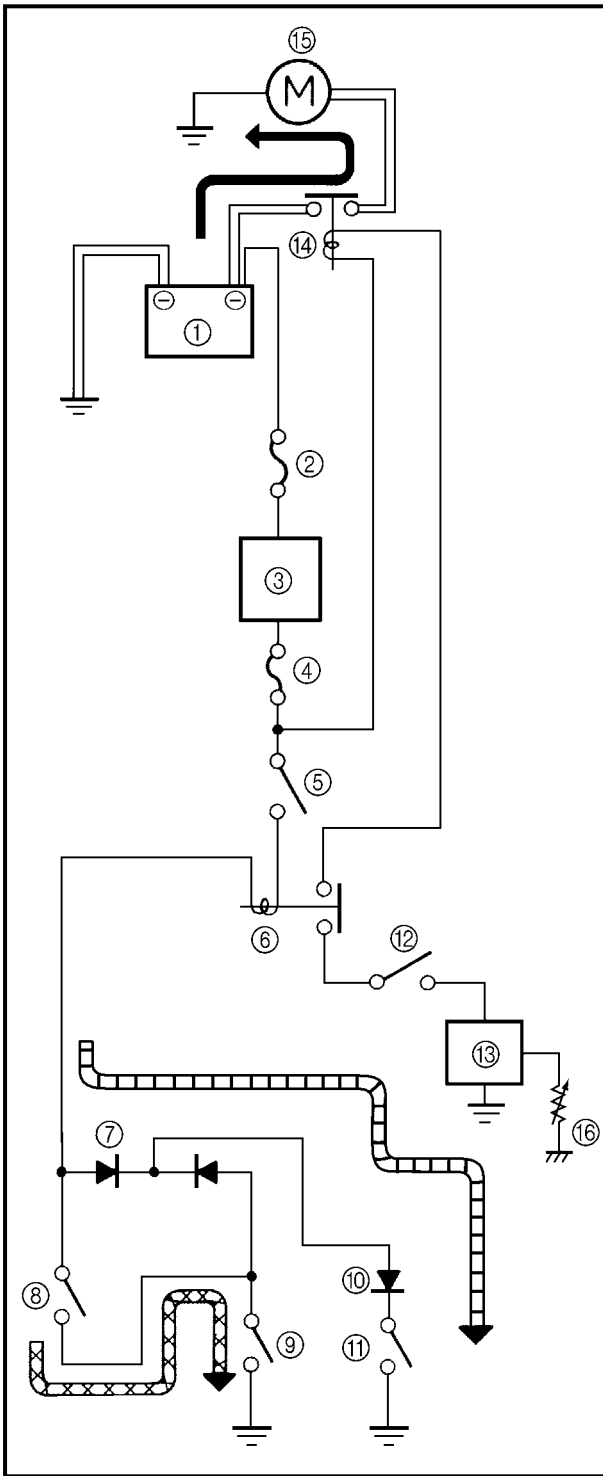
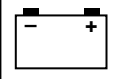
ELECTRIC STARTING SYSTEM

CIRCUIT DIAGRAM



- ③ Main switch
- ④ Battery
- ⑤ Main fuse
- ⑥ Starter relay
- ⑦ Starter motor
- ⑨ Relay unit
- ⑫ Ignitor unit
- ⑮ Decompression solenoid
- ⑰ Neutral switch
- ⑳ Clutch switch
- ㉑ Engine stop switch
- ㉒ Start switch
- ㉓ Ignition fuse
- ㉔ Sidestand switch
- ㉕ Diode

7



EB803010

**STARTING CIRCUIT CUTOFF SYSTEM OPERATION**

If the engine stop switch is set to "⌚" 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:

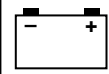
- The transmission is in neutral (the neutral switch is closed).
- The clutch lever is pulled to the handlebar (the clutch switch is closed) and the sidestand is up (the sidestand switch is closed).

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 SIDESTAND IS UP AND 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 (relay unit)
- ⑦ Diode (relay unit)
- ⑧ Clutch switch
- ⑨ Sidestand switch
- ⑩ Diode
- ⑪ Neutral switch
- ⑫ Start switch
- ⑬ Ignitor unit
- ⑭ Starter relay
- ⑮ Starter motor
- ⑯ Decompression solenoid thermistor



EB803020

## TROUBLESHOOTING

**The starter motor fails to turn.**

Check:

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

### NOTE:

- Before troubleshooting, remove the following part(s):
  - 1) rider seat
  - 2) fuel tank
  - 3) side covers
  - 4) headlight lens unit
- Troubleshoot with the following special tool(s).



**Pocket tester  
YU-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?



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?

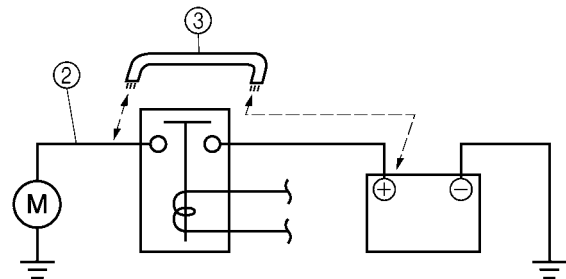


- Clean the battery terminals.
- Recharge or replace the battery.

EB803400

### 3. Starter motor

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



18210801

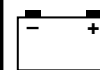
### ⚠ WARNING

- 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?



Repair or replace the starter motor.



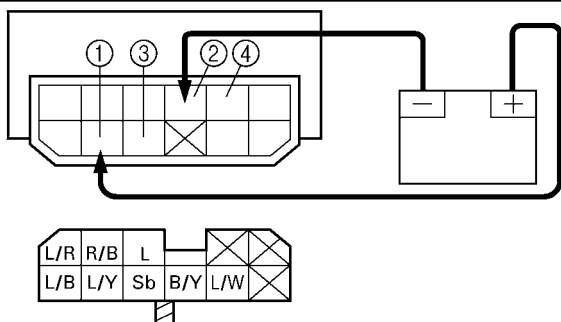
EB803402

4. Relay unit (starting circuit cutoff relay)

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

Battery positive terminal → red/black ①  
 Battery negative terminal → black/yellow ②

Tester positive probe → blue ③  
 Tester negative probe → blue/white ④



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



Replace the relay unit.

EB803403

5. Relay unit (diode)

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

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

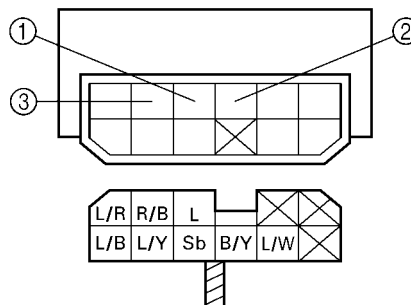
Tester positive probe → sky blue ①  
 Tester negative probe → blue/yellow ③

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

No continuity

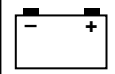


**NOTE:** \_\_\_\_\_  
 When you switch the tester's positive and negative probes, the readings in the above chart will be reversed.

- Are the tester readings correct?



Replace the relay unit.



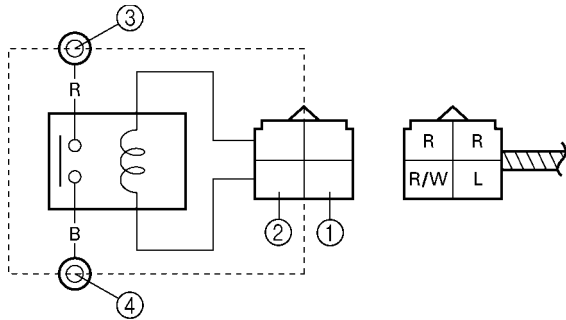
EB803404

### 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 terminals as shown.

**Battery positive terminal** → red/white ①  
**Battery negative terminal** → blue 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.

EB802414

### 10. Sidestand switch

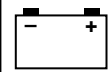
- Check the sidestand switch for continuity. Refer to "CHECKING THE SWITCHES".
- Is the sidestand switch OK?

↓ YES

↓ NO

Replace the sidestand switch.





**11.Diode**

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

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

**NOTE:** \_\_\_\_\_  
When you switch the tester's positive and negative probes, the readings in the above chart will be reversed.

- Are the tester readings correct?

YES NO

Replace the diode.

**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.

**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.

**14.Wiring**

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

YES NO

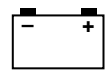
Properly connect or repair the starting system's wiring.

**15.Decompression solenoid (thermistor)**

- Check the decompression solenoid for continuity. Refer to "SELF-DIAGNOSIS".
- Is the decompression solenoid OK?

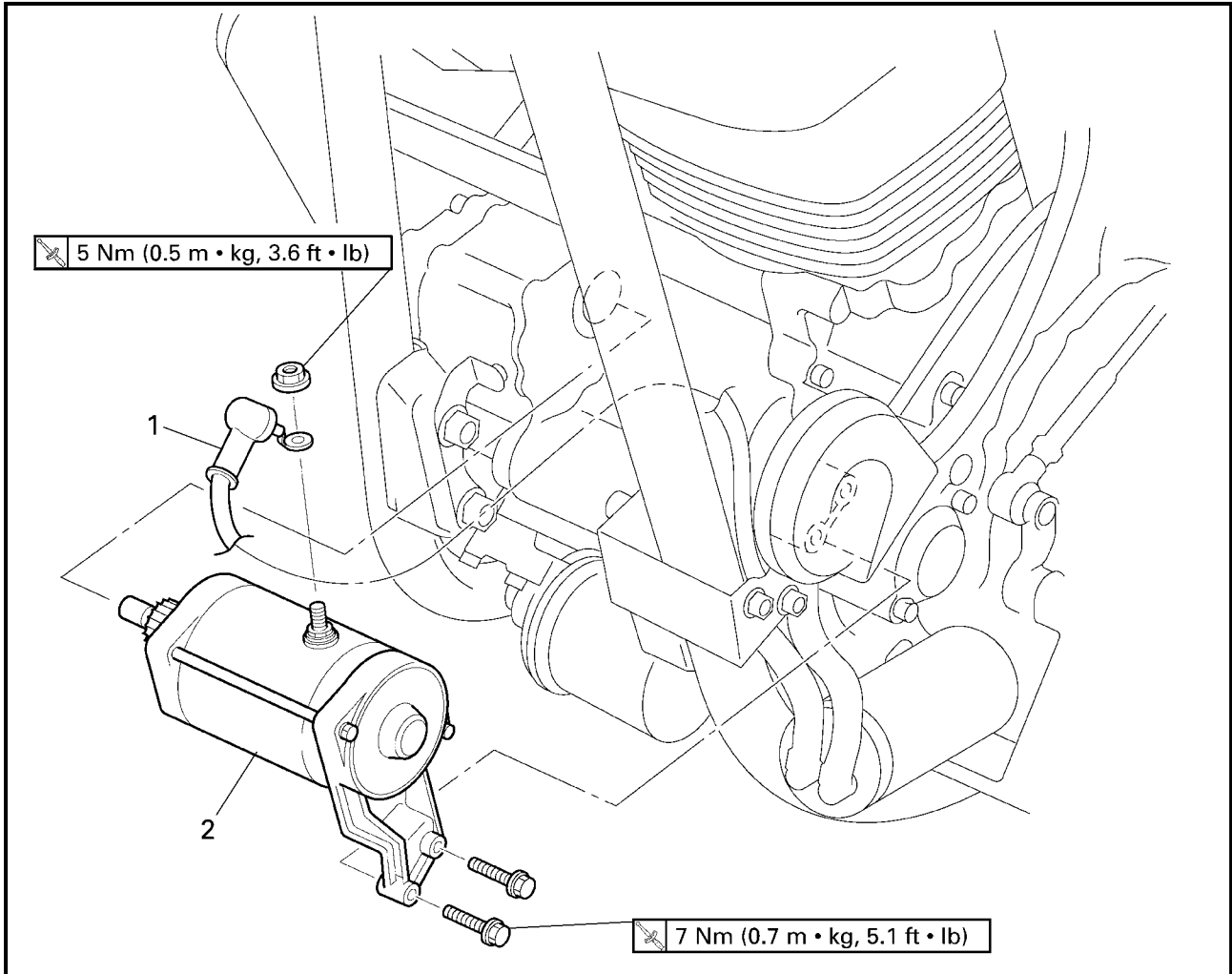
YES NO

Replace the ignitor unit. Replace the decompression solenoid.



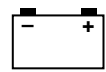
EB803500

STARTER MOTOR

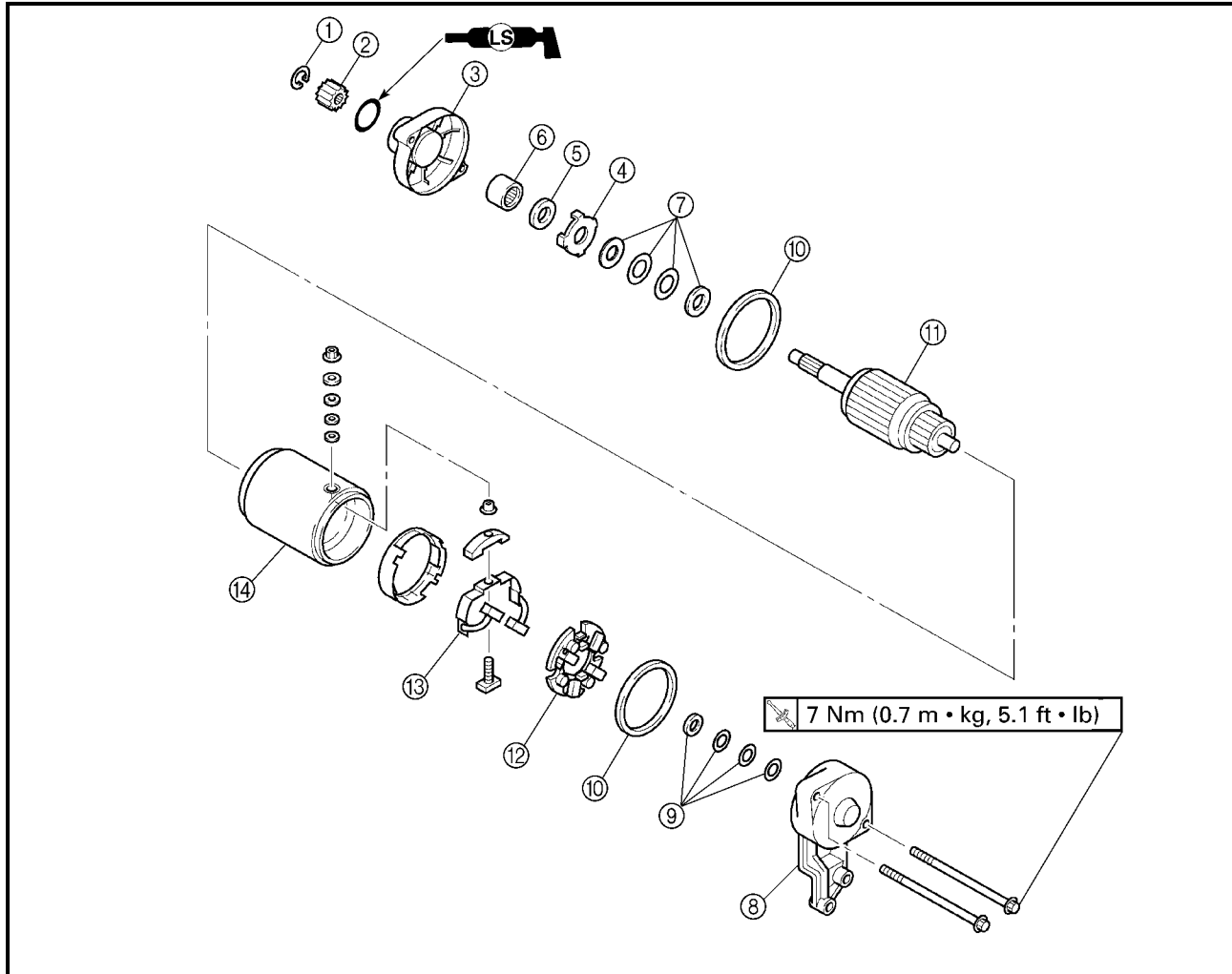


Order	Job/Part	Q'ty	Remarks
	<b>Removing the starter motor</b>		
1	Starter motor lead	1	Remove the parts in the order listed.
2	Starter motor assembly	1	
			For installation, reverse the removal procedure.

7

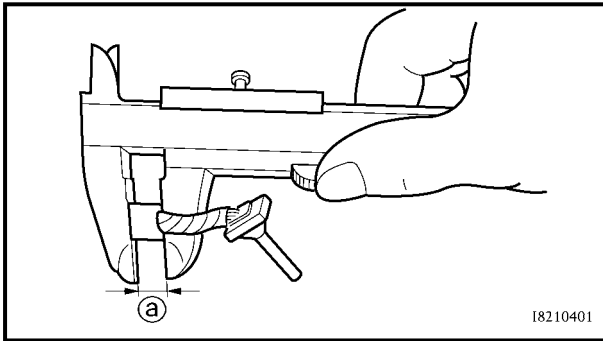
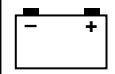


EB803501



Order	Job/Part	Q'ty	Remarks
	<b>Disassembling the starter motor</b>		Remove the parts in the order listed.
①	Circlip	1	
②	Starter motor	1	
③	Starter motor rear cover	1	
④	Lock washer	1	
⑤	Oil seal	1	
⑥	Bearing	1	
⑦	Washer set	1	
⑧	Starter motor front cover	1	
⑨	Washer set	1	
⑩	O-ring	2	
⑪	Armature assembly	1	
⑫	Brush seat (along with the brushes)	1	
⑬	Brush holder (along with the brushes)	1	
⑭	Starter motor yoke	1	
			For assembly, reverse the disassembly procedure





I8210401

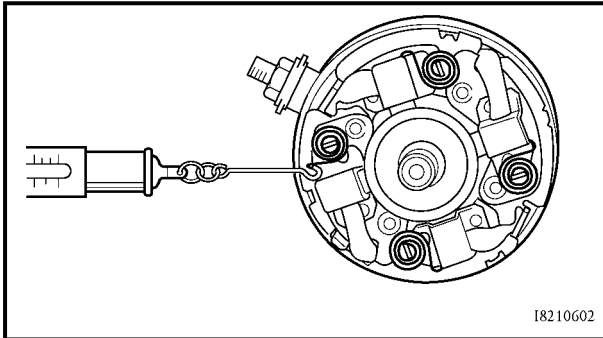
5. Measure:

- brush length ①

Out of specification → Replace the brushes as a set.



**Minimum brush length**  
5 mm (0.20 in)



I8210602

6. Measure:

- brush spring force

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



**Brush spring force**  
7.65 ~ 10.01 N  
(765 ~ 1,001 gf, 27.0 ~ 35.3 oz)

7. Check:

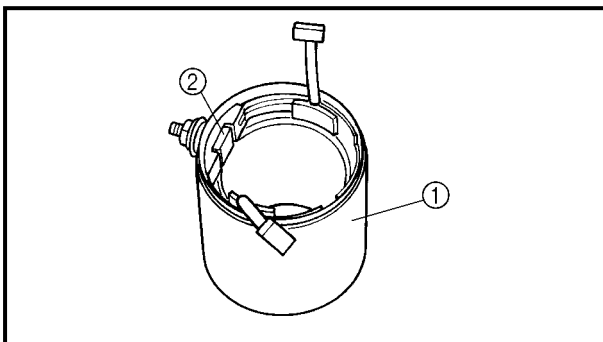
- gear teeth

Damage/wear → Replace the gear.

8. Check:

- bearing
- oil seal

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

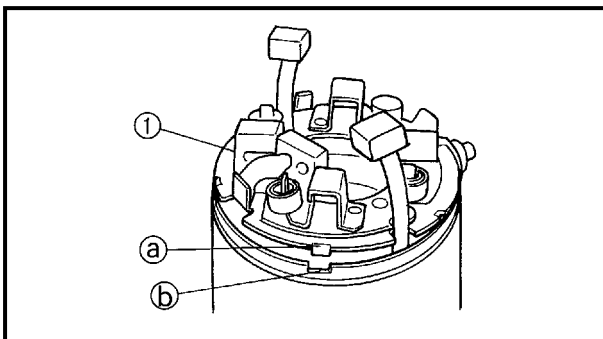


EB803701

**ASSEMBLING THE STARTER MOTOR**

1. Install:

- starter motor yoke ①
- bush holder ②

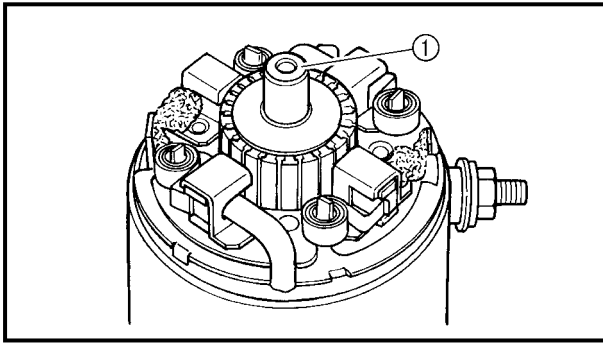
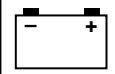


2. Install:

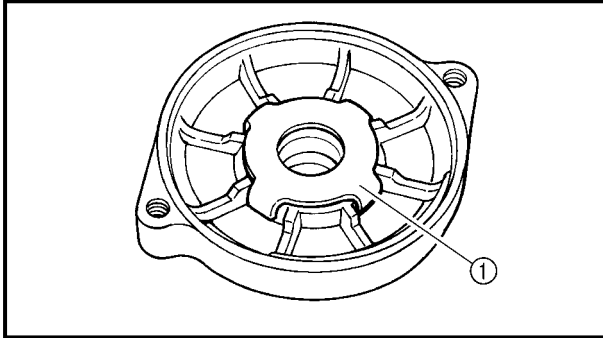
- brush seat ①

**NOTE:**

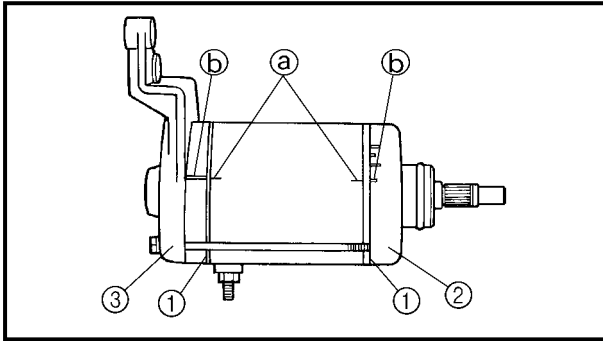
Align the tab ① on the brush seat with the slot ② in the starter motor rear cover.



3. Install:
- armature assembly

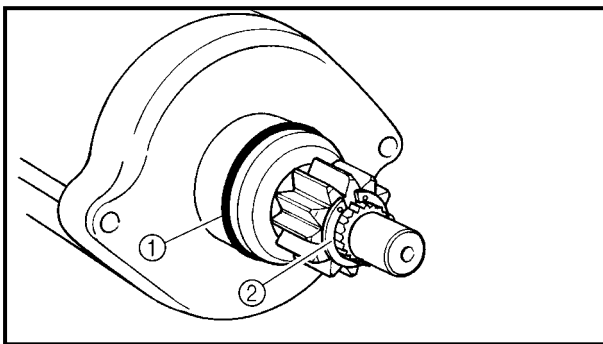


4. Install:
- bearing
  - oil seal
  - lock washer ①

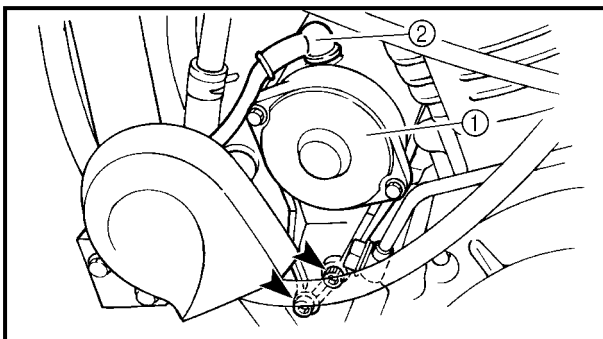


5. Install:
- O-rings ① **New**
  - starter motor rear cover ②
  - starter motor front cover ③
  - bolts **7 Nm (0.7 m · kg, 5.1 ft · lb)**

**NOTE:** Align the match marks ① on the starter motor yoke with the match marks ② on the front and rear covers.

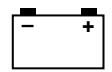


6. Install:
- starter motor gear ①
  - circlip ②



**INSTALLING THE STARTER MOTOR**

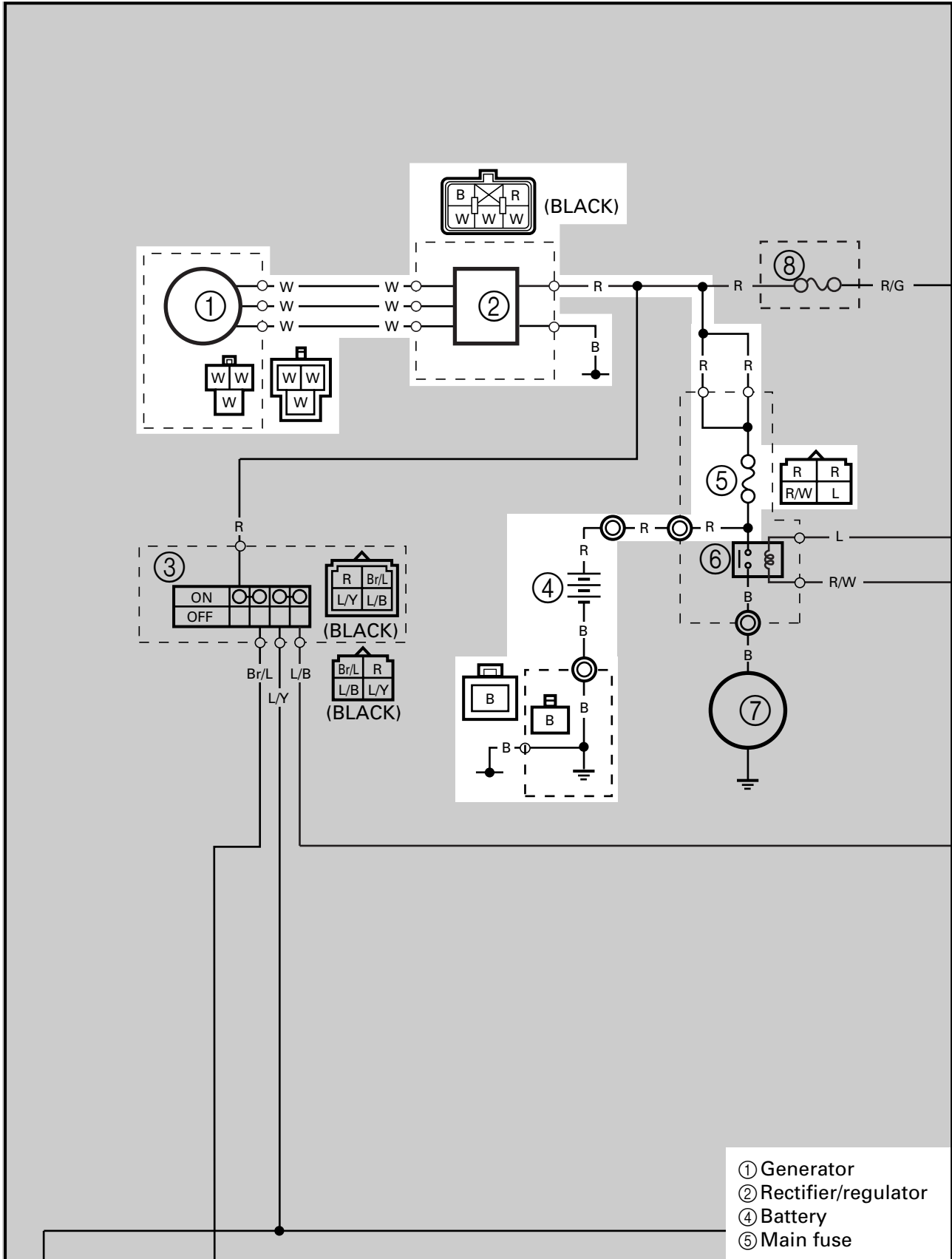
1. Install:
- starter motor ① **7 Nm (0.7 m · kg, 5.1 ft · lb)**
2. Connect:
- starter lead ② **5 Nm (0.5 m · kg, 3.6 ft · lb)**

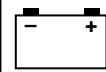


EB804000

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) left side cover
- Troubleshoot with the following special tool(s).



**Inductive tachometer  
YU-8036-A  
Pocket tester  
YU-03112**

EB802400

**1.Main fuse**

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



**Replace the fuse.**

EB802401

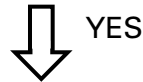
**2.Battery**

- 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?



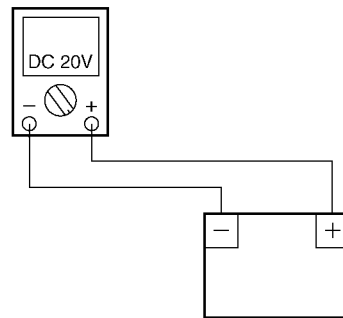
- Clean the battery terminals.
- Recharge or replace the battery.

EB804400

**3.Charging voltage**

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

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

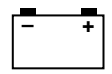


- Start the engine and let it run at approximately 5,000 r/min.
- Measure the charging voltage.



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





**NOTE:**

Make sure that the battery is fully charged.

- Is the charging voltage within specification?



The charging circuit is OK.

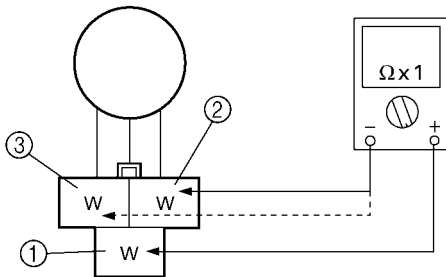
EB804401

**4. Stator coil assembly resistances**

- Disconnect the generator coupler from the wire harness.
- 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**  
 0.45 ~ 0.55  $\Omega$  at 20 °C (68 °F)

- Is the stator coil assembly OK?

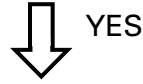


Replace the stator coil assembly.

EB804404

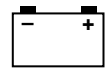
**5. Wiring**

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



Replace the rectifier/regulator.

Properly connect or repair the charging system's wiring.

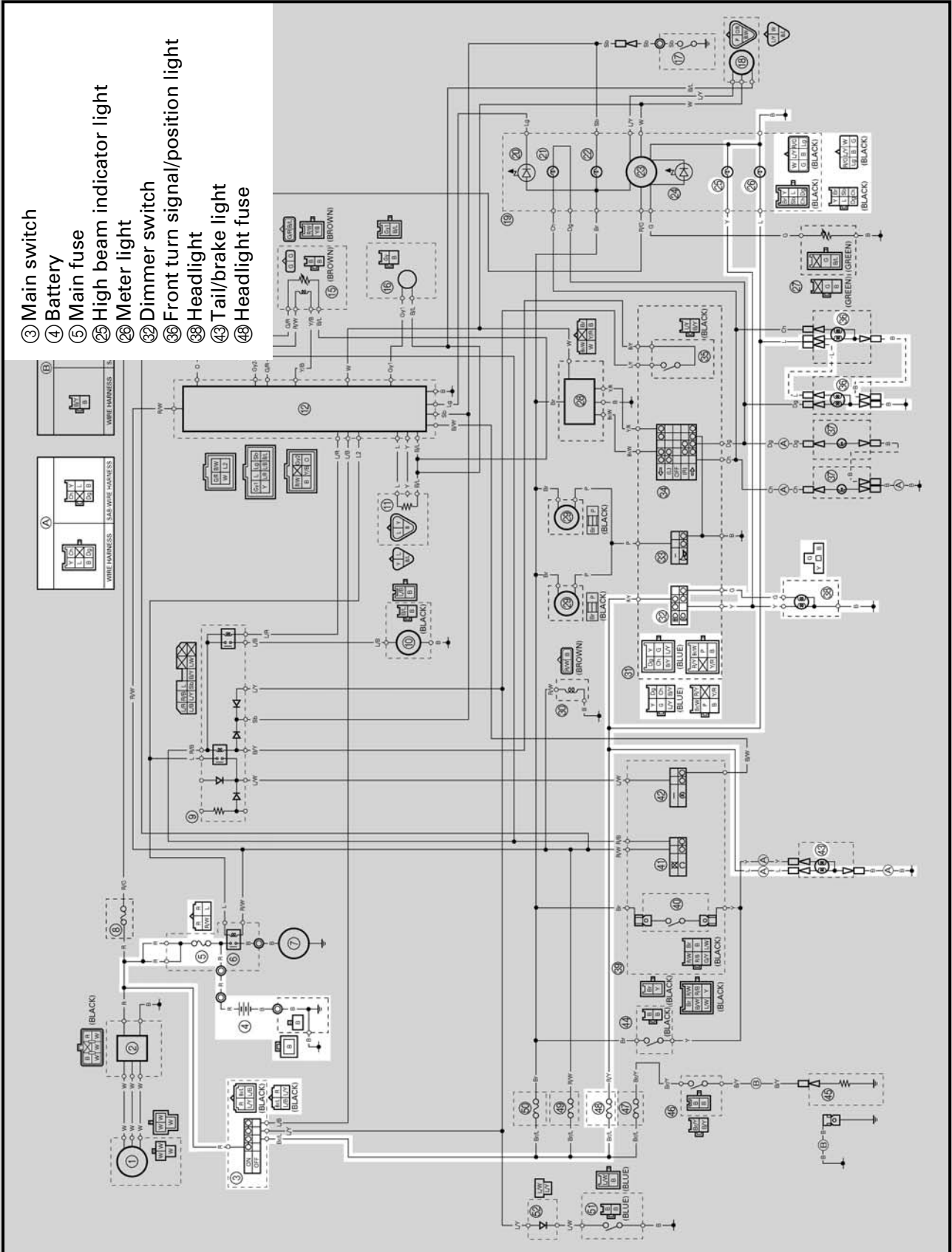


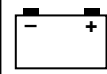
EB805000

# LIGHTING SYSTEM

## CIRCUIT DIAGRAM

- ③ Main switch
- ④ Battery
- ⑤ Main fuse
- ⑭ High beam indicator light
- ⑮ Meter light
- ⑯ Dimmer switch
- ⑰ Front turn signal/position light
- ⑱ Headlight
- ⑲ Tail/brake light
- ⑳ Headlight fuse





EB805010

**TROUBLESHOOTING**

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

Check:

1. main, 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) rider seat
  - 2) fuel tank
  - 3) left side cover
  - 4) headlight lens unit
- Troubleshoot with the following special tool(s).



**Pocket tester  
YU-03112**

EB802400

**1.Main and headlight fuses**

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



Replace the fuse(s).

EB802401

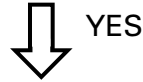
**2.Battery**

- 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?



- 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?



Replace the main switch.

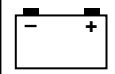
EB805401

**4.Dimmer switch**

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



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?



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.

EB805410

CHECKING THE LIGHTING SYSTEM

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

1.Headlight bulb and socket

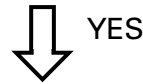
- Check the headlight bulb and socket for continuity. Refer to “CHECKING THE BULBS AND BULB SOCKETS”.
- Is the headlight bulb and socket OK?



Replace the headlight bulb, socket or both.

2.High beam indicator light bulb and socket

- Check the high beam indicator light bulb and socket for continuity. Refer to “CHECKING THE BULBS AND BULB SOCKETS”.
- Is the high beam indicator light bulb and socket OK?



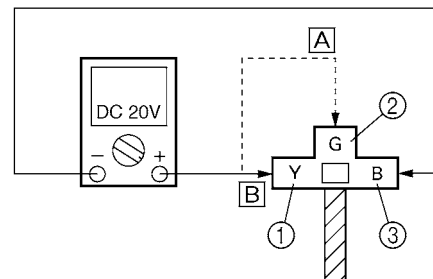
Replace the high beam indicator light bulb, socket or both.

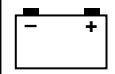
3.Voltage

- Connect the pocket tester (DC 20 V) to the headlight coupler and the meter assembly couplers as shown.

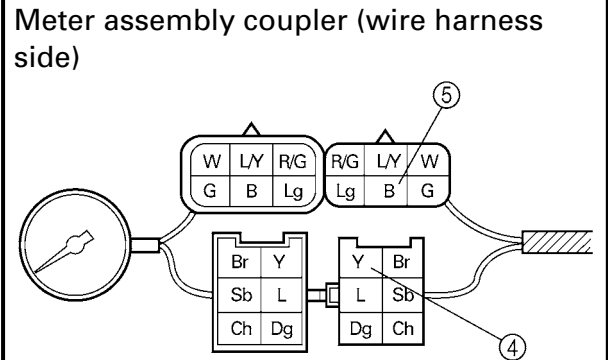
- Ⓐ When the dimmer switch is set to “”
- Ⓑ When the dimmer switch is set to “”

Headlight coupler





**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 ⑤**



- 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 and yellow ④ on the meter assembly coupler.
- Is the voltage within specification?

↓ YES                      ↓ NO

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

EB805411  
 2. A meter light fails to come on.

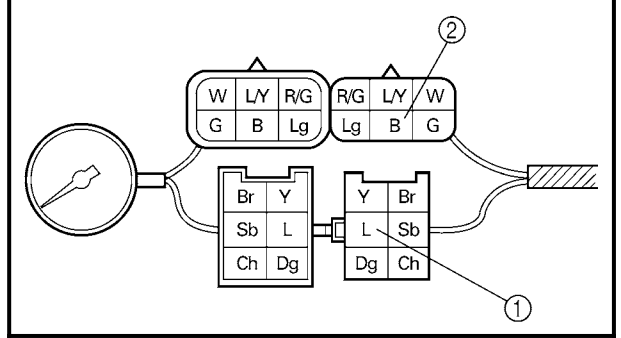
1. Meter light bulb and socket
- Check the meter light bulb and socket for continuity. Refer to "CHECKING THE BULBS AND BULB SOCKETS".
  - Are the meter light bulb and socket OK?

↓ 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 ②**

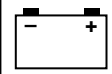


- Set the main switch to "ON".
- Measure the voltage (12 V) of blue ① on the meter assembly coupler (wire harness side).
- Is the voltage within specification?

↓ YES                      ↓ NO

This circuit is OK.

The wiring circuit from the main switch to the meter assembly 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?

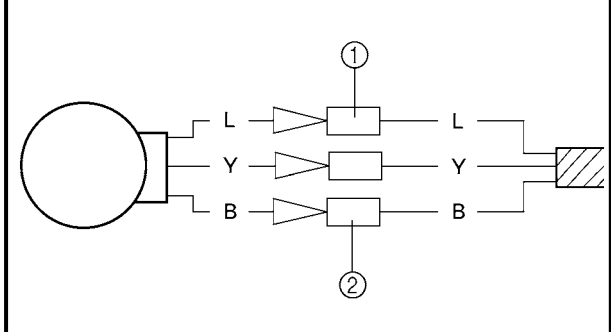


Replace the tail/brake light bulb, socket or both.

2. Voltage

- Connect the pocket tester (DC 20 V) to the tail/brake light connectors (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 tail/brake light coupler (wire harness side).
- Is the voltage within specification?



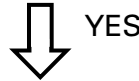
This circuit is OK.

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

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

1. Front turn signal/position light bulb and socket

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

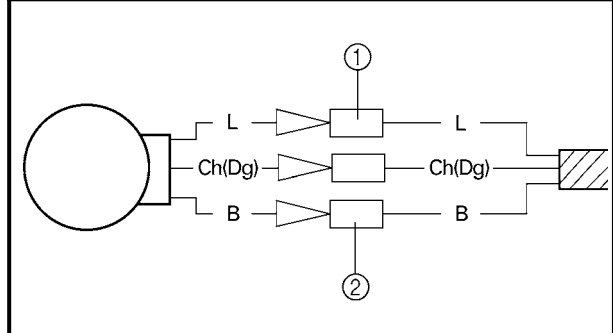


Replace the front turn signal/position light bulb, socket or both.

2. Voltage

- Connect the pocket tester (DC 20 V) to the front turn signal/position light connectors (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 front turn signal/position light connectors (wire harness side).
- Is the voltage within specification?

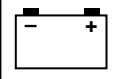


This circuit is OK.

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

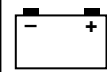
**7**





- ③ Main switch
- ④ Battery
- ⑤ Main fuse
- ⑧ Backup fuse
- ⑫ Ignitor unit
- ⑰ Neutral switch
- ⑳ Engine trouble indicator light
- ㉑ Turn signal indicator light
- ㉒ Neutral indicator light
- ㉓ Speedometer assembly (speedometer, combination meter and fuel level meter)
- ㉔ Fuel level indicator light
- ㉗ Fuel sender
- ㉘ Turn signal relay
- ㉙ Horn
- ㉚ Horn switch
- ㉛ Turn signal switch
- ㉜ Front turn signal/position light
- ㉝ Rear turn signal light
- ㉞ Front brake light switch
- ㉟ Tail/brake light
- ㊱ Rear brake light switch
- ㊲ Signaling system fuse





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

**NOTE:**

- Before troubleshooting, remove the following part(s):
  - 1) rider seat
  - 2) fuel tank
  - 3) side covers
  - 4) headlight lens unit
- Troubleshoot with the following special tool(s).

	<b>Pocket tester YU-03112</b>
---	-----------------------------------




EB802400

<b>1.Main, signaling system and backup fuses</b>
<ul style="list-style-type: none"> <li>• Check the main, signaling system and backup fuses for continuity. Refer to "CHECKING AND CHARGING THE FUSES" in chapter 3.</li> <li>• Are the main, signaling system and backup fuses OK?</li> </ul>



Replace the fuse(s).

EB802401

<b>2.Battery</b>		
<ul style="list-style-type: none"> <li>• Check the condition of the battery. Refer to "CHECKING THE BATTERY" in chapter 3.</li> </ul>		
<table border="1"> <tr> <td style="text-align: center;"></td> <td><b>Open-circuit voltage 12.8 V or more at 20 °C (68 °F)</b></td> </tr> </table>		<b>Open-circuit voltage 12.8 V or more at 20 °C (68 °F)</b>
	<b>Open-circuit voltage 12.8 V or more at 20 °C (68 °F)</b>	
<ul style="list-style-type: none"> <li>• Is the battery OK?</li> </ul>		



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

EB802411

<b>3.Main switch</b>
<ul style="list-style-type: none"> <li>• Check the main switch for continuity. Refer to "CHECKING THE SWITCHES".</li> <li>• Is the main switch OK?</li> </ul>



Replace the main switch.

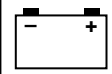
EB806400

<b>4.Wiring</b>
<ul style="list-style-type: none"> <li>• Check the entire signaling system's wiring. Refer to "CIRCUIT DIAGRAM".</li> <li>• Is the signaling system's wiring properly connected and without defects?</li> </ul>



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?

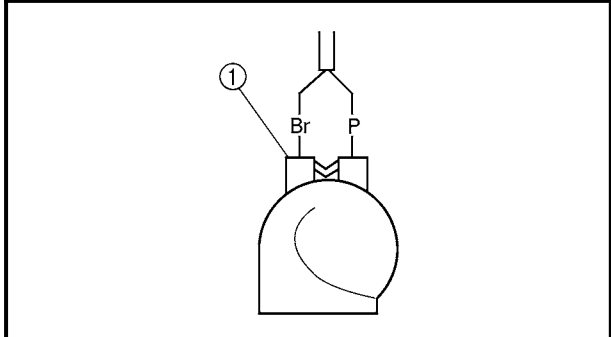


Replace the left handlebar switch.

**2.Voltage**

- Connect the pocket tester (DC 20 V) to the horn coupler as shown.

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



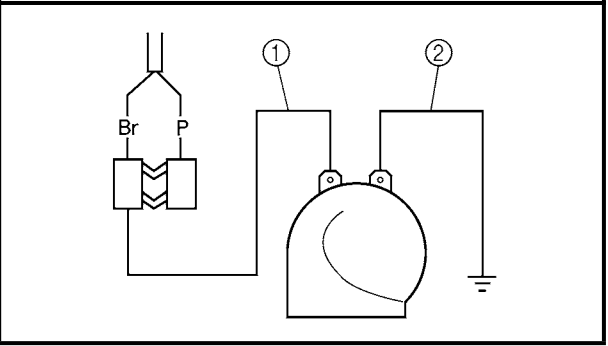
- Set the main switch to "ON".
- Push the horn switch.
- Measure the voltage (12 V) of brown on the horn coupler.
- Is the voltage within specification?



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

**3.Horn**

- Disconnect the horn coupler at the horn.
- Connect a jumper lead ① to the brown terminal in the horn coupler and the horn terminal.
- Connect a jumper lead ② to the horn terminal and ground the jumper lead.
- Set the main switch to "ON".
- Push the horn switch.
- Does the horn sound?

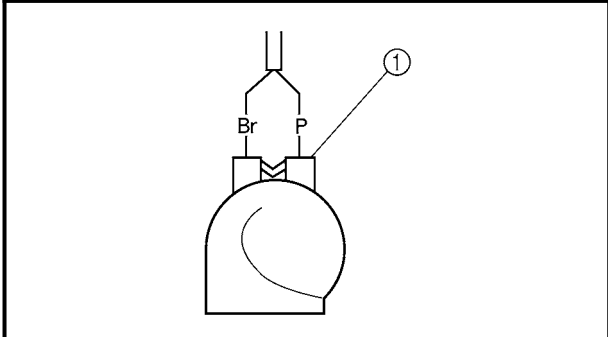


The horn is OK.

**4.Voltage**

- Connect the pocket tester (DC 20 V) to the horn coupler as shown.

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

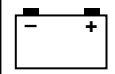


- Set the main switch to "ON".
- Measure the voltage (12 V) of pink ① on the horn coupler.
- Is the voltage within specification?



Repair or replace 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?



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?

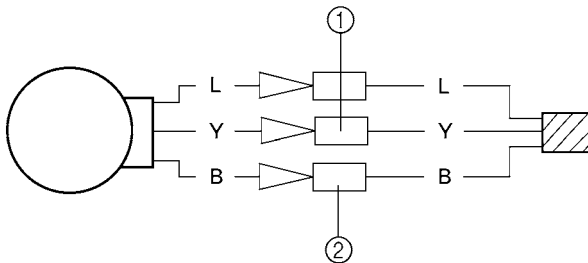


Replace the brake light switch.

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?



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?



Replace the turn signal light bulb, socket or both.

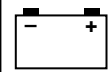
2. Turn signal indicator light bulb and socket

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



Replace the turn signal indicator light bulb, socket or both.

7



3. Turn signal switch

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

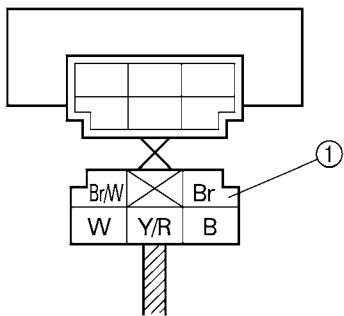


Replace the left handlebar switch.

4. Voltage

- Connect the pocket tester (DC 20 V) to the turn signal relay coupler 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.
- Is the voltage within specification?

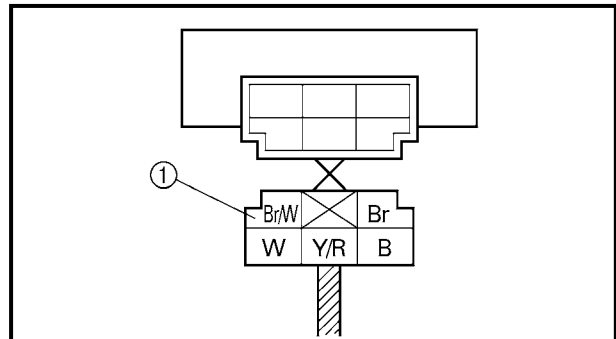


The wiring circuit from the main switch to the turn signal relay coupler is faulty and must be repaired.

5. Voltage

- Connect the pocket tester (DC 20 V) to the turn signal relay coupler 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) of brown/white at the turn signal relay coupler.
- Is the voltage within specification?



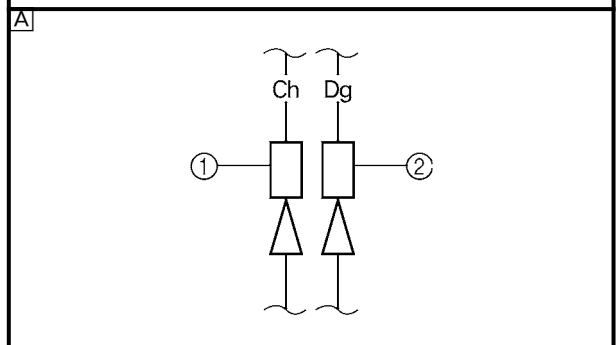
The turn signal relay is faulty and must be replaced.

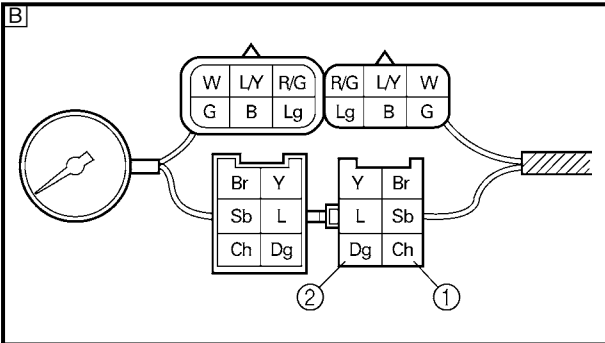
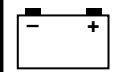
6. Voltage

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

- Turn signal light
- 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**





- 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 connectors (wire harness side) or the meter assembly coupler.
- 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 or the meter assembly coupler are faulty and must be repaired.

2. Neutral switch

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

YES

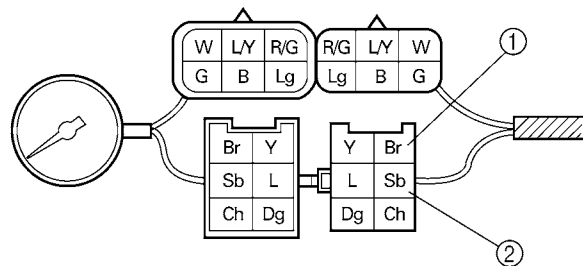
NO

Replace the neutral switch.

3. Voltage

- Connect the pocket tester (DC 20 V) to the meter assembly coupler 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 assembly coupler is faulty and must be repaired.

EB806414

4. The neutral indicator light fails to come on.

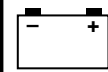
1. Neutral indicator light bulb and socket

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

YES

NO

Replace the neutral indicator light bulb, socket or both.



EB806417

5. The fuel level indicator light, fuel level meter or both fail to come on.

**1. Fuel level indicator light LED**

- Check the LED of the fuel level indicator light.  
Refer to "CHECKING THE BULBS AND BULB SOCKETS".
- Is the fuel level indicator light LED OK?

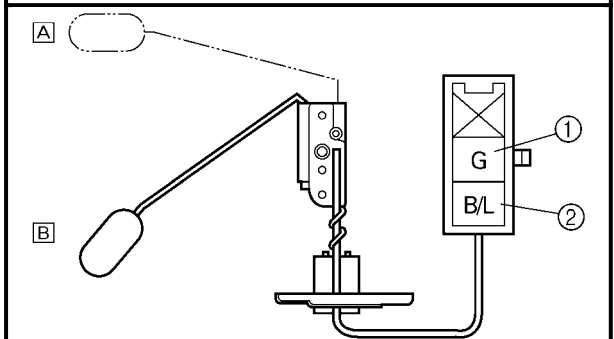


Replace the meter assembly.

**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.
- Connect the pocket tester ( $\Omega \times 10$ ) to the fuel sender coupler.

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



- Measure the fuel sender resistance.

**Fuel sender resistance**

**Full position of the float [A]**  
 11 ~ 13  $\Omega$  at 20 °C (68 °F)

**Empty position of the float [B]**  
 140 ~ 143  $\Omega$  at 20 °C (68 °F)

- Is the fuel sender OK?

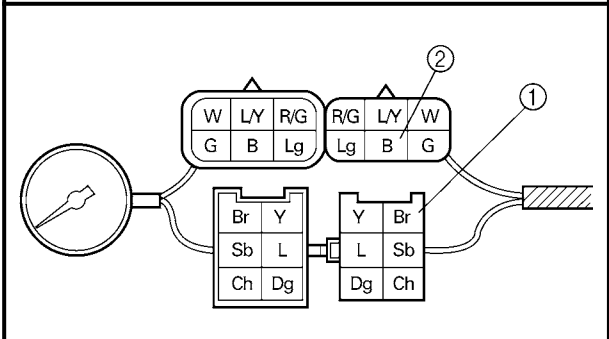


Replace the fuel sender.

**3. Voltage**

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

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



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



Replace the meter assembly.

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

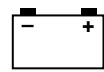
6. An engine trouble indicator light fails to come on.

**1. Engine trouble indicator LED**

- Check the LED of the engine indicator light.  
Refer to "CHECKING THE BULBS AND BULB SOCKETS".



Replace the meter assembly.



EAS00843

2.Wire harness

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



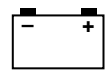
YES



NO

Replace the ignitor unit.

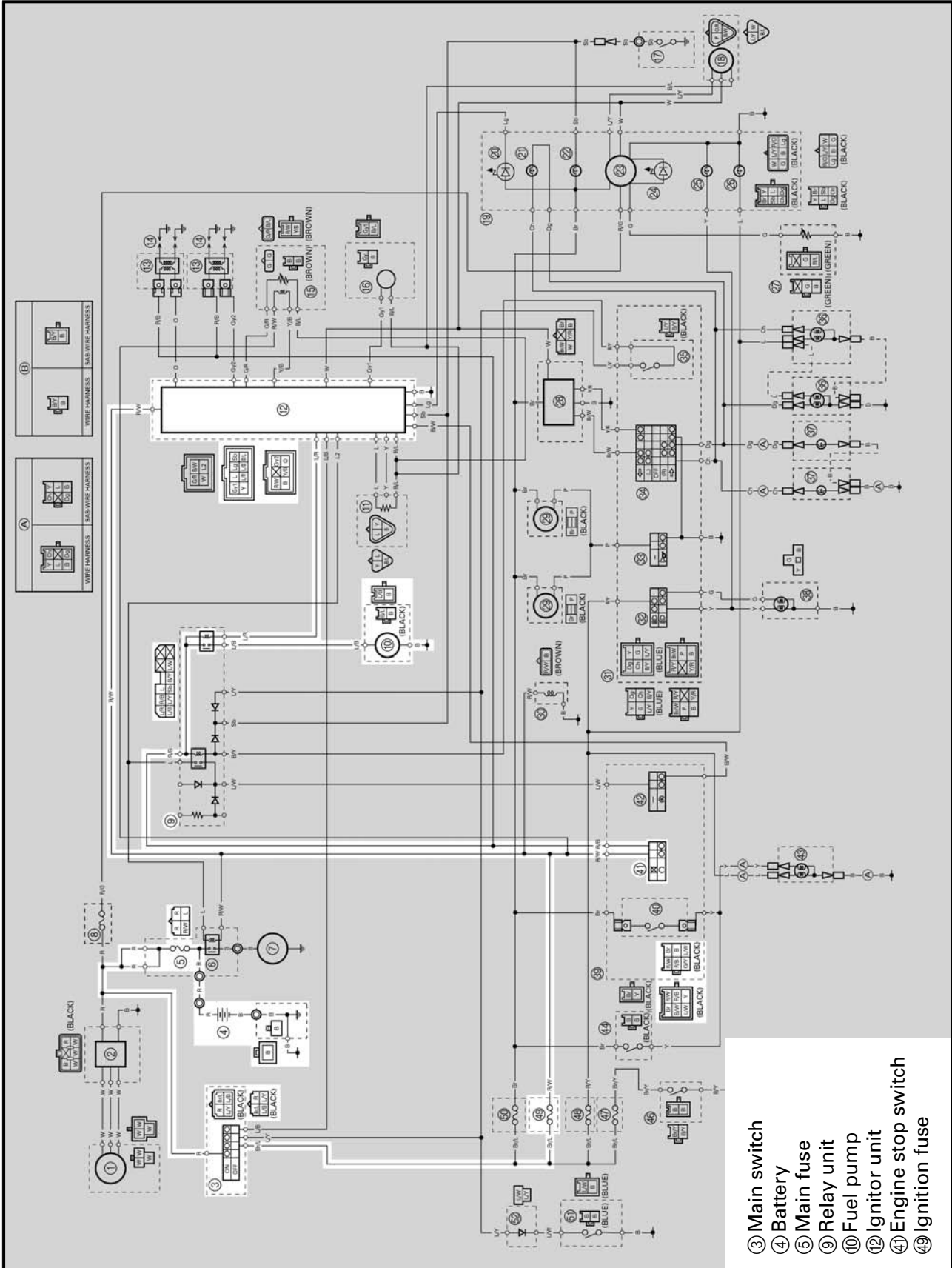
Repair or replace the wire harness.



EB808000

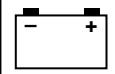
FUEL PUMP SYSTEM

CIRCUIT DIAGRAM



- ③ Main switch
- ④ Battery
- ⑤ Main fuse
- ⑥ Relay unit
- ⑩ Fuel pump
- ⑫ Ignitor unit
- ⑭ Engine stop switch
- ⑮ Ignition fuse



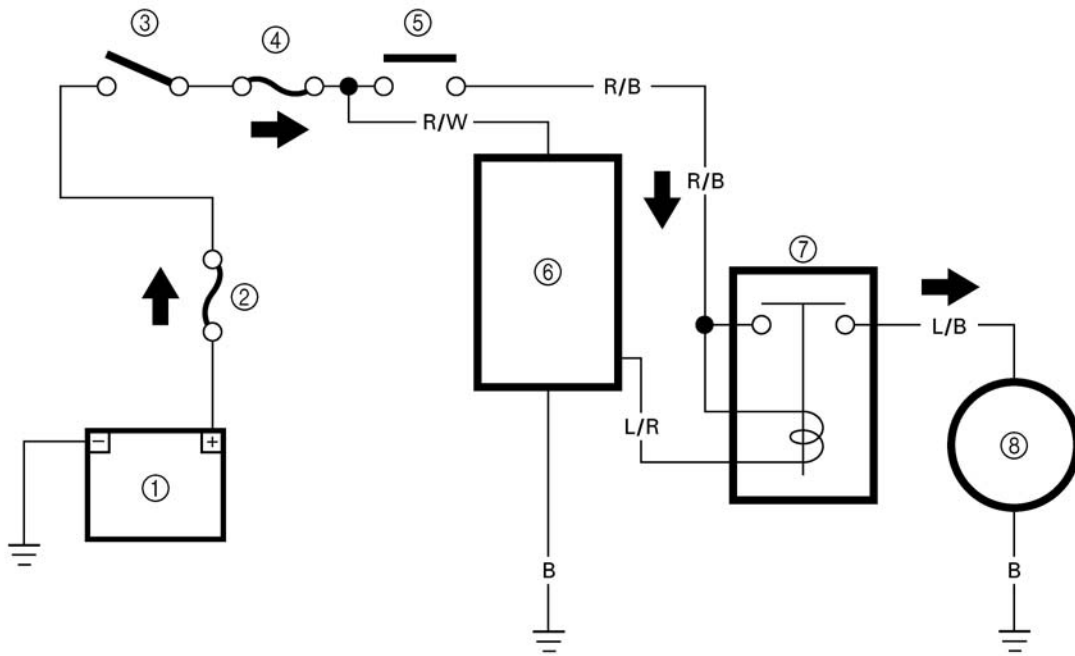


EB808010

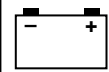
**FUEL PUMP CIRCUIT OPERATION**

The ignitor 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 Ignitor unit
- ⑦ Fuel pump relay
- ⑧ Fuel pump



7



EB808020

### TROUBLESHOOTING

**The fuel pump fails to operate.**

Check:

1. main and ignition fuses
2. battery
3. main switch
4. engine stop switch
5. relay unit (fuel pump 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) side covers
  - 4) headlight lens unit
- Troubleshoot with the following special tool(s).



**Pocket tester  
YU-03112**

EAS00738

#### 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?



Replace the fuse(s).

EAS00739

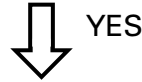
#### 2.Battery

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



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

- Is the battery OK?



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

EAS00749

#### 3.Main switch

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



Replace the main switch.

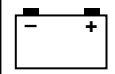
EAS00750

#### 4.Engine stop switch

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



Replace the right handlebar switch.

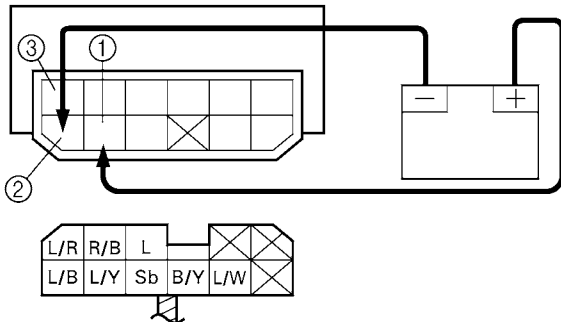


5. Relay unit (fuel pump relay)

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

- Measure the fuel pump resistance.



**Fuel pump resistance**  
 1.6 ~ 2.2  $\Omega$  at 20 °C (68 °F)

- Is the fuel pump OK?

↓ YES

↓ NO

Replace the fuel pump.

EAS00754

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 ignitor unit.

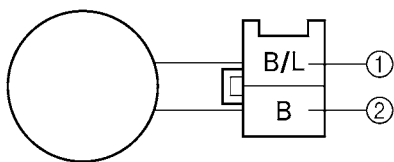
Properly connect or repair the fuel pump system's wiring.

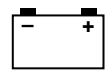
EB808400

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





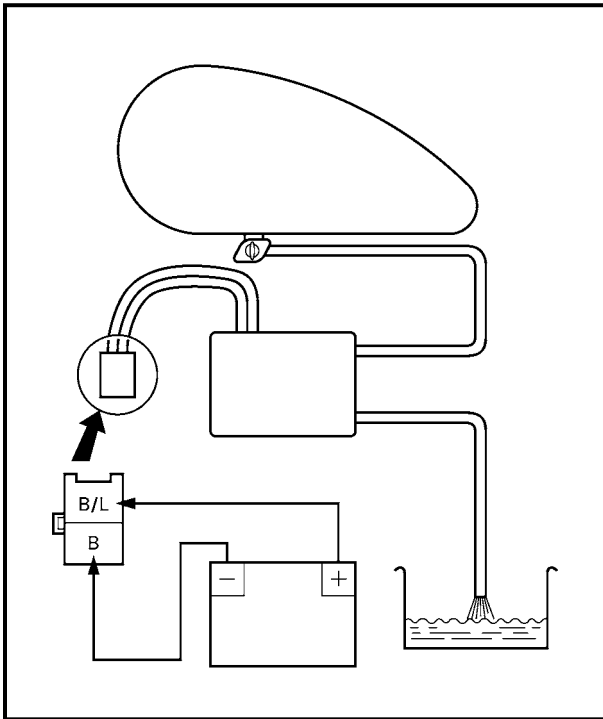
EB808410

**CHECKING THE FUEL PUMP**

**⚠ WARNING**

Gasoline is extremely flammable and under certain circumstances there can be a danger of an explosion or fire. Be extremely careful and note the following points:

- Stop the engine before refuelling.
- Do not smoke and keep away from open flames, sparks or any other source of fire.
- If you do accidentally spill gasoline, wipe it up immediately with dry rags.
- If gasoline touches the engine when it is hot, a fire may occur. Therefore, make sure that the engine is completely cool before performing the following test.



1. Check:

- fuel pump operation

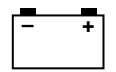


- a. Fill the fuel tank.
- b. Put the end of the fuel hose into an open container.
- c. Turn the fuel cock to "ON" or "RES".
- d. Connect the battery (12 V) to the fuel pump coupler as shown.

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

- e. If fuel flows out of the fuel hose, the fuel pump is OK. If fuel does not flow, replace the fuel pump.

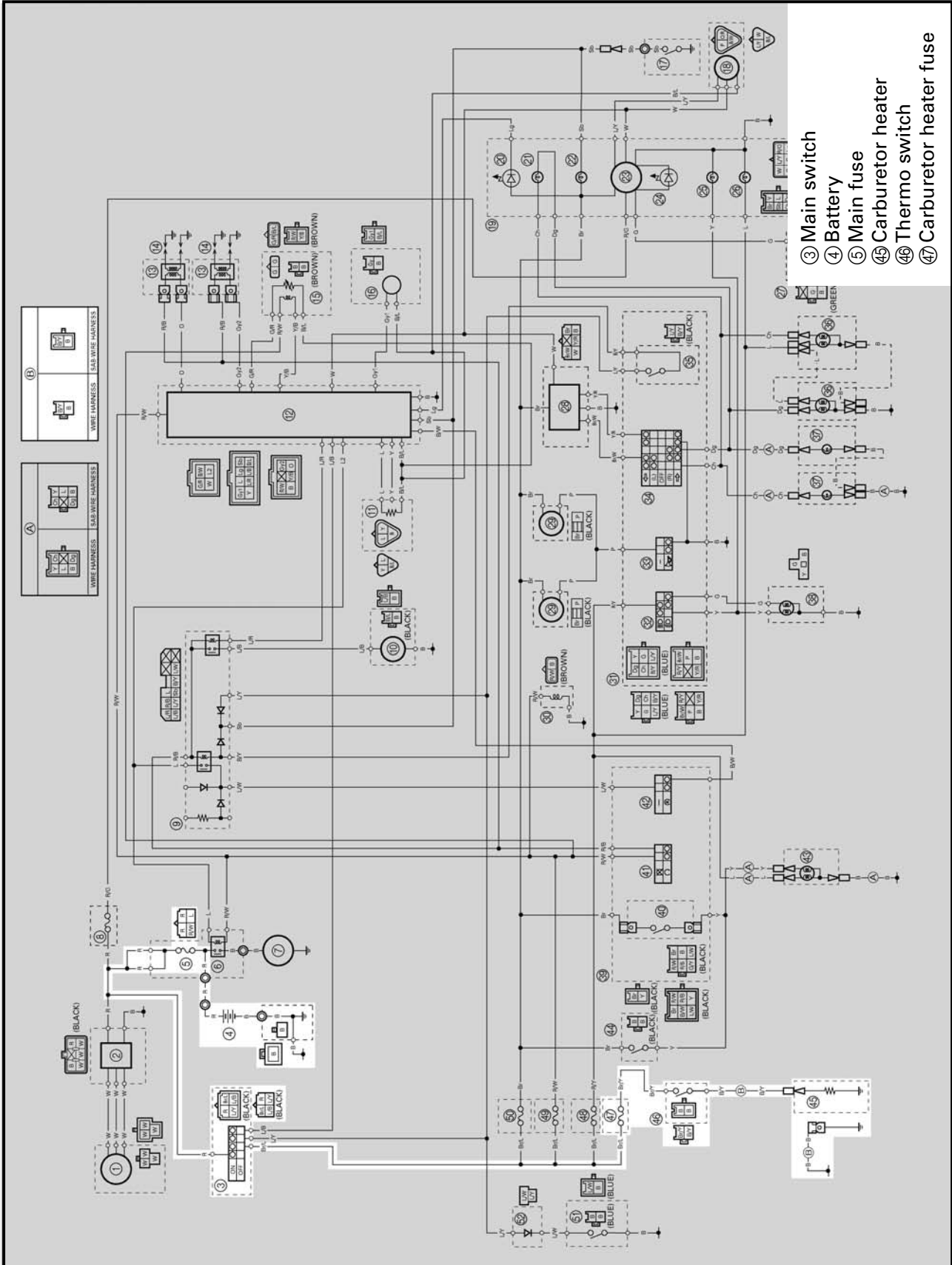




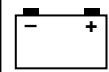
EAS00820

## CARBURETOR HEATING SYSTEM

### CIRCUIT DIAGRAM



7



EAS00821

### TROUBLESHOOTING

**The carburetor heating system fails to operate.**

Check:

1. Main and carburetor heater fuses
2. Battery
3. Main switch
4. Thermo switch
5. Carburetor heater
6. Wiring  
(of the entire carburetor heating system)

**NOTE:**

- Before troubleshooting, remove the following part(s).
  - 1) rider seat
  - 2) fuel tank
  - 3) carburetor
  - 4) left side cover
- Troubleshoot with the following special tool(s).



**Pocket tester  
YU-03112**

EAS00738

#### 1. Main and carburetor heater fuses

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



Replace the fuse(s).

EAS00739

#### 2. Battery

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



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

- Is the battery OK?



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

EAS00749

#### 3. Main switch

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



Replace the main switch.

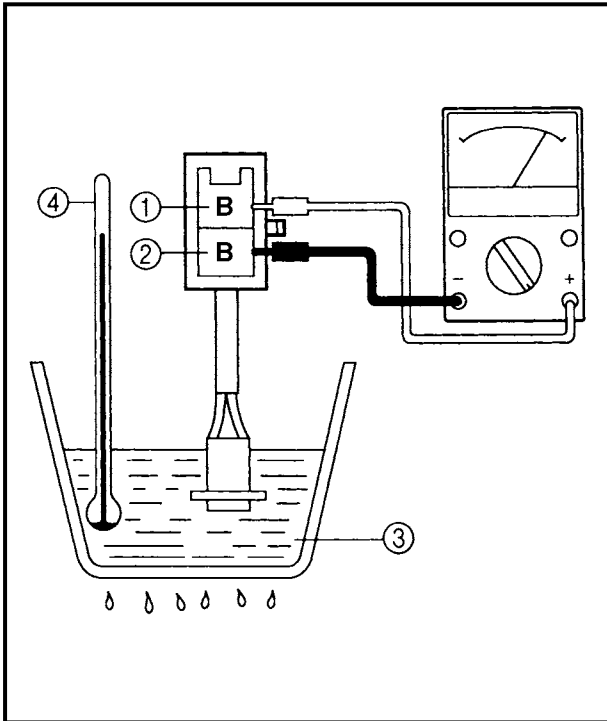
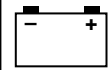
EAS00823

#### 4. Thermo switch

- Remove the thermo switch from the plastic bracket.
- Connect the pocket tester to the thermo switch coupler as shown.

**Tester positive lead → black ①**  
**Tester negative lead → black ②**

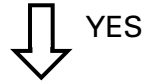
- Immerse the thermo switch in a container filled with water ③.
- Place a thermometer ④ in the water.
- Slowly heat the water, then let it cool to the specified temperature as indicated in the table.
- Check the thermo switch for continuity at the temperatures indicated in the table.



### ⚠ WARNING

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

- Does the thermo switch operate properly?

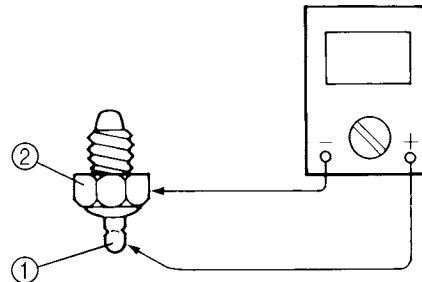


Replace the thermo switch.

### 5. Carburetor heater

- Remove the carburetor heater from the carburetor.
- Connect the pocket tester to the carburetor heater as shown.

Tester positive probe → carburetor heater terminal ①  
 Tester negative probe → carburetor heater body ②



- Measure carburetor heater resistance.

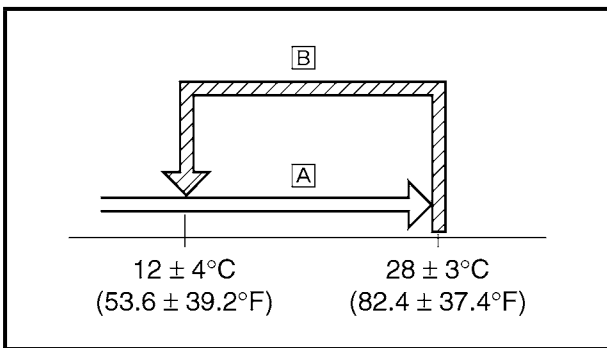


**Carburetor heater resistance**  
 12 V 30 W: 6 ~ 10 Ω at 20°C (68°F)

- Is the carburetor heater OK?



Replace the carburetor heater.

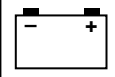


- Ⓐ The thermo switch circuit is open.
- Ⓑ The thermo switch circuit is closed.

Test step	Water temperature	Continuity
1	Less than 23 ± 3 °C (73.4 ± 5.4 °F)	YES
2	More than 23 ± 3 °C (73.4 ± 5.4 °F)	NO
3	More than 12 ± 4 °C (53.6 ± 7.2 °F)	NO
4	Less than 12 ± 4 °C (53.6 ± 7.2 °F)	YES

Test steps 1 & 2: Heating phase  
 Test steps 3 & 4: Cooling phase

7



EAS00754

## 6.Wiring

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

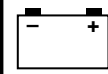


This circuit is OK.



Properly connect or repair the carburetor heating system's wiring.





EB812000

**SELF-DIAGNOSIS**

The XV16AL/XV16ALC/XV16ATL/XV16ATLC features a self-diagnosing system for the following circuit(s):

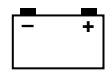
- throttle position sensor
- speed sensor
- decompression solenoid
- fuel level meter

If any of these circuits is defective, the respective condition code will be displayed by the engine trouble indicator light or fuel level indicator light when the main switch is set to "ON" (irrespective of whether the engine is running or not).

Indicator light	Circuit	Defect(s)	System response	Condition code	
				When engine is stopped	When engine is running
	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 engine trouble indicator light displays the condition code.</li> </ul>	Blinks in patterns of 3	Lights up
	Speed sensor	<ul style="list-style-type: none"> <li>• Abnormal pulse</li> <li>• Disconnected</li> <li>• Short-circuit</li> </ul>	<ul style="list-style-type: none"> <li>• The engine speed limiter sets in approximately 4,400 rpm.</li> <li>• The engine trouble indicator light displays the condition code.</li> </ul>	Blinks in patterns of 4	Lights up
	Decompression solenoid	<ul style="list-style-type: none"> <li>• Disconnected</li> <li>• Short-circuit</li> <li>• Over heated solenoid</li> <li>• Disconnected thermistor in solenoid</li> <li>• Short-circuited thermistor in solenoid</li> </ul>	<ul style="list-style-type: none"> <li>• The decompression solenoid does not move.</li> <li>• The starter motor does not operate.</li> <li>• The engine trouble indicator light displays the condition code.</li> </ul>	Blinks in patterns of 6	Lights up
	Fuel level meter	<ul style="list-style-type: none"> <li>• Disconnected</li> <li>• Short-circuit</li> </ul>	<ul style="list-style-type: none"> <li>• The fuel level meter displays the empty position.</li> <li>• The fuel level indicator light displays the condition code.</li> </ul>	Blinks in patterns of 8	Blinks in patterns of 8

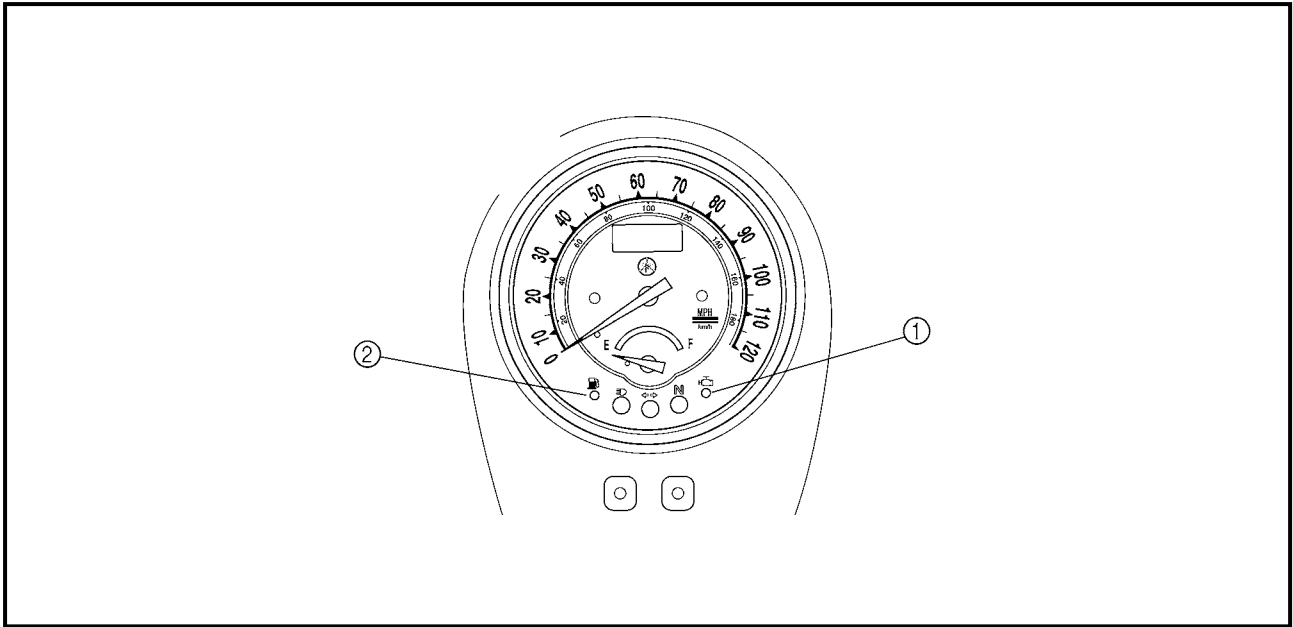
**NOTE:**

When the main switch is turned on, the engine trouble indicator light and fuel level indicator light in the meter assembly normally come on for 1.4 seconds and then go off. However, if there is a malfunction, the corresponding indicator light then begins flashing when the engine is stopped or comes on when the engine is running.

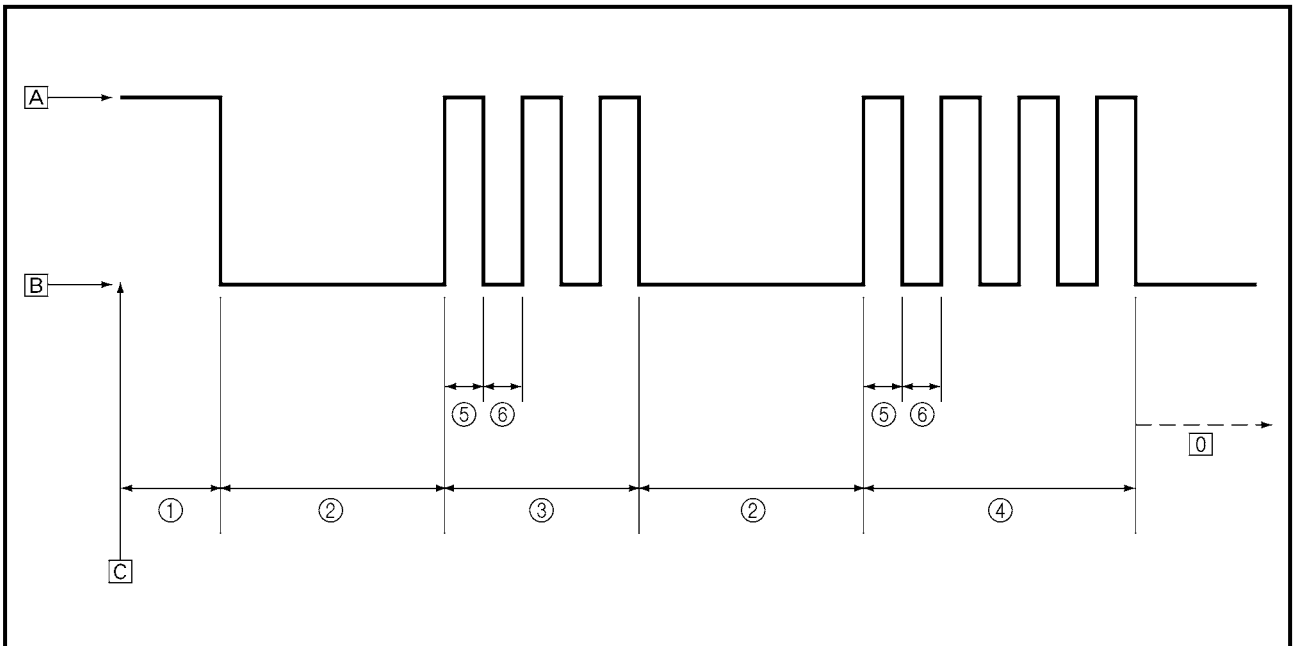


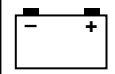
**Display order on the engine trouble indicator light and fuel level indicator light**

- ① Engine trouble indicator light
- ② Fuel level indicator light



- ① Indicator lights check..... 1.4 seconds
- ② Light off ..... 3 seconds
- ③ Condition code..... First fault code (3 = throttle position sensor)
- ④ Condition code..... Next fault code (4 = speed sensor)
- ⑤ Light on ..... 0.5 second
- ⑥ Light off ..... 0.5 second
- A Light on
- B Light off
- C Main switch is turned on
- D Repetition





EB812010

**TROUBLESHOOTING**

**The engine trouble indicator light or the fuel level indicator light starts to blink, display the self-diagnosis sequence.**

Check:

1. throttle position sensor
2. speed sensor
3. decompression solenoid
4. fuel level meter

**NOTE:**

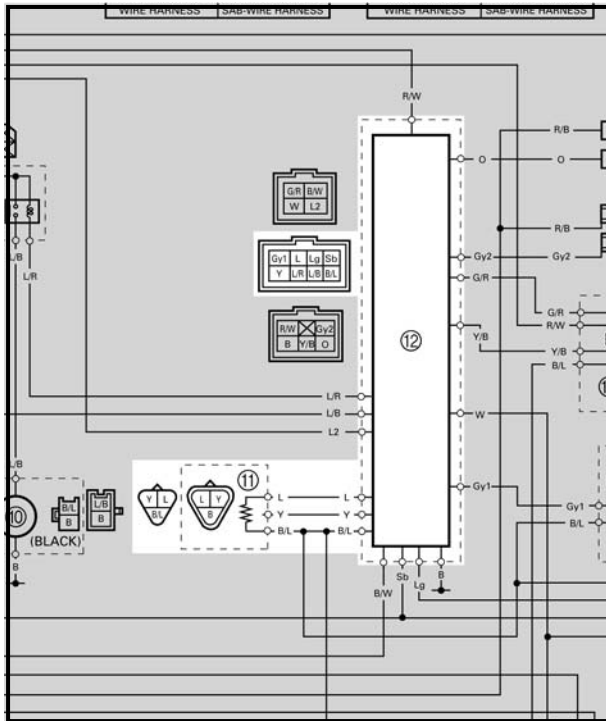
- Before troubleshooting, remove the following part(s):
  - 1) rider seat
  - 2) fuel tank
  - 3) left side cover
- Troubleshoot with the following special tool(s).



**Pocket tester  
YU-03112**

EB812020

**1. Throttle position sensor  
CIRCUIT DIAGRAM**



- ⑪ Throttle position sensor
- ⑫ Ignitor unit

EAS00843

**1. Wire harness**

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



Repair or replace the wire harness.

EB812401

**2. Throttle position sensor**

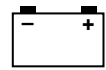
- Check the throttle position sensor for continuity. Refer to "CHECKING AND ADJUSTING THE THROTTLE POSITION SENSOR" in chapter 6.
- Is the throttle position sensor OK?



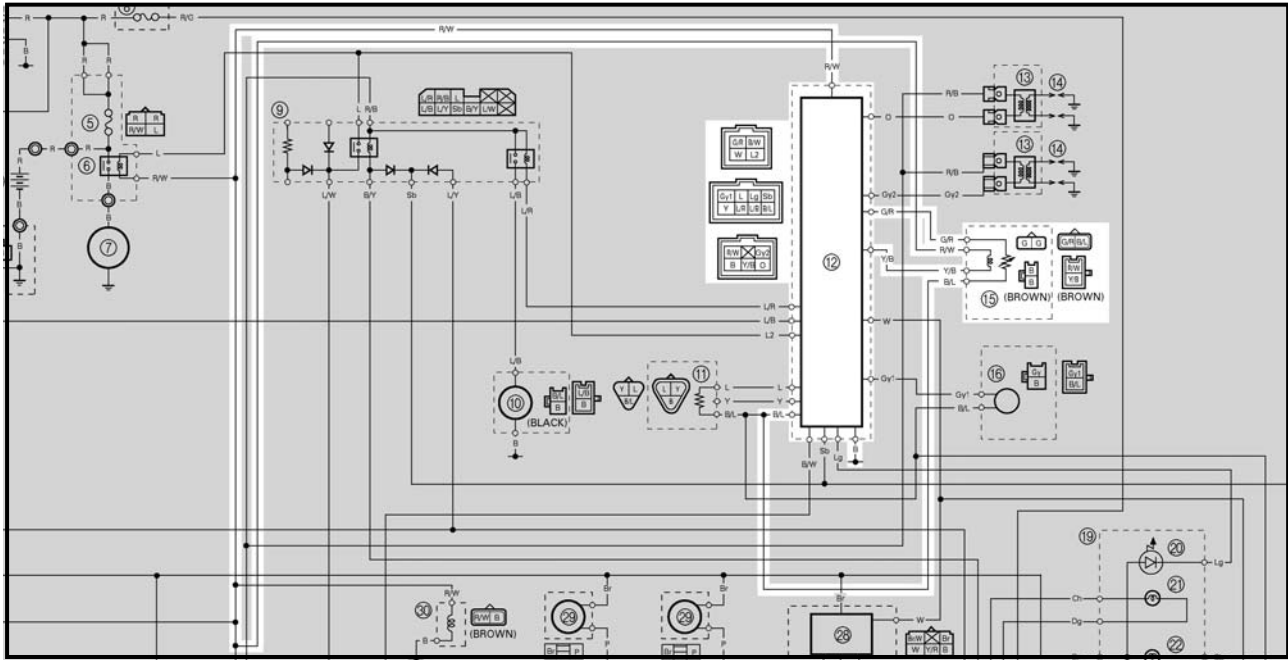
Replace the ignitor unit.

Replace the throttle position sensor.





**3. Decompression solenoid**  
CIRCUIT DIAGRAM



- ⑫ Ignitor unit
- ⑮ Decompression solenoid

EAS00843

**1. Wire harness**

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

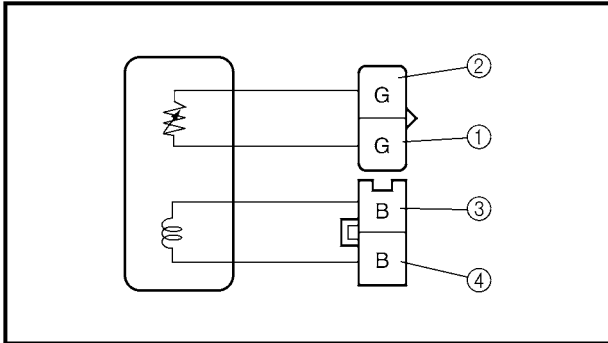


Repair or replace the wire harness.

**2. Decompression solenoid (thermistor)**

- Disconnect the decompression solenoid couplers from the wire harness.
- Connect the pocket tester ( $\Omega \times 10$ ) to the decompression solenoid coupler as shown.

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



- Measure the decompression solenoid resistance.



**Decompression solenoid resistance (thermistor)**  
**68.75 ~ 78.75  $\Omega$  at 25 °C (77 °F)**

**NOTE:**  
The resistance value for the thermistor changes when the temperature changes; therefore, measure the decompression solenoid resistance at the specified temperature.

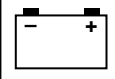
- Connect the pocket tester ( $\Omega \times 1$ ) to the decompression solenoid coupler as shown.

**Tester positive probe** → black ③  
**Tester negative probe** → black ④



**Decompression solenoid resistance**  
**1.2  $\Omega$  at 20 °C (68 °F)**





EAS00843

3.Wire harness

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



Replace the meter assembly.

Replace or replace the wire harness.

# CONTENTS

## TROUBLESHOOTING

<b>STARTING PROBLEMS</b> .....	8-1
ENGINE .....	8-1
FUEL SYSTEM .....	8-1
ELECTRICAL SYSTEMS .....	8-2
<b>INCORRECT ENGINE IDLING SPEED</b> .....	8-2
ENGINE .....	8-2
FUEL SYSTEM .....	8-2
ELECTRICAL SYSTEMS .....	8-2
<b>POOR MEDIUM-AND-HIGH-SPEED PERFORMANCE</b> .....	8-3
ENGINE .....	8-3
FUEL SYSTEM .....	8-3
<b>FAULTY GEAR SHIFTING</b> .....	8-3
SHIFTING IS DIFFICULT .....	8-3
SHIFT PEDAL DOES NOT MOVE .....	8-3
JUMPS OUT OF GEAR .....	8-3
<b>FAULTY CLUTCH</b> .....	8-3
CLUTCH SLIPS .....	8-3
CLUTCH DRAGS .....	8-3
<b>OVERHEATING</b> .....	8-4
ENGINE .....	8-4
FUEL SYSTEM .....	8-4
CHASSIS .....	8-4
ELECTRICAL SYSTEMS .....	8-4
<b>POOR BRAKING PERFORMANCE</b> .....	8-4
<b>FAULTY FRONT FORK LEGS</b> .....	8-4
LEAKING OIL .....	8-4
MALFUNCTION .....	8-4
<b>UNSTABLE HANDLING</b> .....	8-5



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<b>FAULTY LIGHTING OR SIGNALING SYSTEM</b> .....	8-5
HEADLIGHT DOES NOT LIGHT .....	8-5
HEADLIGHT BULB BURNT OUT .....	8-5
TAIL/BRAKE LIGHT DOES NOT LIGHT .....	8-5
TAIL/BRAKE LIGHT BULB BURNT OUT .....	8-5
TURN SIGNAL DOES NOT LIGHT .....	8-5
TURN SIGNAL BLINKS SLOWLY .....	8-5
TURN SIGNAL REMAINS LIT .....	8-5
TURN SIGNAL BLINKS QUICKLY .....	8-5
HORN DOES NOT SOUND .....	8-5

## 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 heads (See page 5-39 to 5-43 and 5-53 to 5-59)

- Loose spark plug
- Loose cylinder head or cylinder
- Damaged cylinder head gasket
- Damaged cylinder 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 (See page 5-53 to 5-59)

- Incorrectly installed piston ring
- Damaged, worn, or fatigued piston ring
- Seized piston ring
- Seized or damaged piston

#### Air filter (See page 3-7 and 3-29)

- Incorrectly installed air filter
- Clogged air filter element

#### Crankcase and crankshaft (See page 5-100 to 5-107 and 5-114 to 5-121)

- Incorrectly assembled crankcase
- Seized crankshaft

### FUEL SYSTEM

#### Fuel tank (See page 3-6)

- Empty fuel tank
- Clogged fuel filter
- Clogged fuel strainer
- Clogged fuel tank breather hose
- Clogged rollover valve
- Clogged rollover valve hose
- Deteriorated or contaminated fuel

#### Fuel pump (See page 7-46 to 7-50)

- Faulty fuel pump
- Faulty fuel pump relay

#### Fuel cock (See page 6-19 to 6-20)

- Clogged or damaged fuel hose

#### Carburetor (See page 6-1 to 6-20)

- 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 (See page 3-51 to 3-56)**

- Faulty battery
- Discharged battery

**Fuses (See page 3-56 to 3-58)**

- Blown, damaged, or incorrect fuse
- Incorrectly installed fuse

**Spark plugs (See page 3-14 to 3-15)**

- 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 (See page 7-14 to 7-15)**

- Damaged ignition coil
- Broken or shorted primary or secondary coils
- Faulty spark plug lead

**Ignition system (See page 7-12 to 7-16)**

- Faulty ignitor unit
- Faulty pickup coil

**Switches and wiring (See page 7-7 to 7-8)**

- 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 (See page 7-17 to 7-27)**

- Faulty starter motor
- Faulty starter relay
- Faulty starting circuit cutoff relay
- Faulty starter clutch

EAS00846

**INCORRECT ENGINE IDLING SPEED**

**ENGINE**

**Cylinders and cylinder heads (See page 5-39 to 5-43 and 5-53 to 5-59)**

- Incorrect valve clearance
- Damaged valve train components

**Air filter (See page 3-7 and 3-29)**

- Clogged air filter element

**FUEL SYSTEM**

**Carburetor (See page 6-1 to 6-20)**

- Faulty starter plunger
- Loose or clogged pilot jet
- Loose or clogged pilot air jet
- Damaged or loose carburetor joint
- Incorrectly adjusted engine idling speed (throttle stop screw)
- Incorrect throttle cable free play
- Flooded carburetor
- Faulty air induction system

**ELECTRICAL SYSTEMS**

**Battery (See page 3-51 to 3-56)**

- Incorrectly charged battery
- Faulty battery

**Spark plugs (See page 3-14 to 3-15)**

- 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 (See page 7-14 to 7-15)**

- Broken or shorted primary or secondary coils
- Faulty spark plug lead
- Damaged ignition coil

**Ignition system (See page 7-12 to 7-16)**

- Faulty ignitor unit
- Faulty pickup coil

EAS00848

## **POOR MEDIUM-AND-HIGH-SPEED PERFORMANCE**

Refer to "STARTING PROBLEMS".

### **ENGINE**

#### **Air filter (See page 3-7 and 3-29)**

- Clogged air filter element

### **FUEL SYSTEM**

#### **Carburetor (See page 6-1 to 6-20)**

- Faulty diaphragm
- Incorrect fuel level
- Loose or clogged main jet

#### **Fuel pump (See page 7-46 to 7-50)**

- Faulty fuel pump

EAS00850

## **FAULTY GEAR SHIFTING**

### **SHIFTING IS DIFFICULT**

Refer to "CLUTCH DRAGS".

### **SHIFT PEDAL DOES NOT MOVE**

#### **Shift shaft (See page 5-74 to 5-76)**

- Incorrectly adjusted shift rod
- Bent shift shaft

#### **Shift drum and shift forks (See page 5-122 to 5-127)**

- Foreign object in a shift drum groove
- Seized shift fork
- Bent shift fork guide bar

#### **Transmission (See page 5-122 to 5-127)**

- Seized transmission gear
- Foreign object between transmission gears
- Incorrectly assembled transmission

### **JUMPS OUT OF GEAR**

#### **Shift shaft (See page 5-74 to 5-76)**

- Incorrect shift pedal position
- Incorrectly returned stopper lever

#### **Shift forks (See page 5-122 to 5-127)**

- Worn shift fork

#### **Shift drum (See page 5-122 to 5-127)**

- Incorrect axial play
- Worn shift drum groove

#### **Transmission (See page 5-122 to 5-127)**

- Worn gear dog

EAS00851

## **FAULTY CLUTCH**

### **CLUTCH SLIPS**

#### **Clutch (See page 5-60 to 5-73)**

- Incorrectly assembled clutch
- Incorrectly adjusted clutch cable
- Loose or fatigued clutch spring
- Worn friction plate
- Worn clutch plate

#### **Engine oil (See page 3-20 to 3-21)**

- Incorrect oil level
- Incorrect oil viscosity (low)
- Deteriorated oil

### **CLUTCH DRAGS**

#### **Clutch (See page 5-60 to 5-73)**

- Unevenly tensioned clutch springs
- Warped pressure plate
- Bent clutch plate
- Swollen friction plate
- Bent clutch push rod
- Damaged clutch boss
- Burnt primary driven gear bushing
- Match marks not aligned

#### **Engine oil (See page 3-20 to 3-21)**

- Incorrect oil level
- Incorrect oil viscosity (high)
- Deteriorated oil

EAS00855

## **OVERHEATING**

### **ENGINE**

**Cylinder heads and pistons (See page 5-53 to 5-59)**

- Heavy carbon buildup

**Engine oil (See page 3-20 to 3-21)**

- Incorrect oil level
- Incorrect oil viscosity
- Inferior oil quality

### **FUEL SYSTEM**

**Carburetor (See page 6-1 to 6-20)**

- Incorrect main jet setting
- Incorrect fuel level
- Damaged or loose carburetor joint

**Air filter (See page 3-7 and 3-29)**

- Clogged air filter element

### **CHASSIS**

**Brakes (See page 3-34 to 3-38 and 4-22 to 4-54)**

- Dragging brake

### **ELECTRICAL SYSTEMS**

**Spark plugs (See page 3-14 to 3-15)**

- Incorrect spark plug gap
- Incorrect spark plug heat range

**Ignition system (See page 7-12 to 7-16)**

- Faulty ignitor unit

EAS00857

## **POOR BRAKING PERFORMANCE (See page 3-34 to 3-38 and 4-22 to 4-54)**

- Worn brake pad
- Worn brake disc
- Air in hydraulic brake system
- Leaking brake fluid
- Faulty brake caliper 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

EAS00860

## **FAULTY FRONT FORK LEGS (See page 3-43 to 3-44 and 4-55 to 4-66)**

### **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 cartridge cylinder 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 cartridge
- Incorrect oil viscosity
- Incorrect oil level

EAS00864

**UNSTABLE HANDLING**

**Handlebar (See page 4-67 to 4-72)**

- Bent or incorrectly installed handlebar

**Steering head components (See page 3-41 to 3-43 and 4-73 to 4-78)**

- Incorrectly installed upper bracket
- Incorrectly installed lower bracket (incorrectly tightened ring nut)
- Bent steering stem
- Damaged ball bearing or bearing race

**Front fork legs (See page 3-43 to 3-44 and 4-55 to 4-66)**

- 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 (See page 4-79 to 4-89)**

- Worn bearing or bushing
- Bent or damaged swingarm

**Rear shock absorber assembly (See page 4-79 to 4-89)**

- Faulty rear shock absorber spring
- Leaking oil or gas

**Tires (See page 3-45 to 3-48)**

- Uneven tire pressures (front and rear)
- Incorrect tire pressure
- Uneven tire wear

**Wheels (See page 3-48 to 3-49 and 4-1 to 4-21)**

- 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

EAS00866

**FAULTY LIGHTING OR SIGNALING SYSTEM (See page 7-31 to 7-45)**

**HEADLIGHT DOES NOT LIGHT**

- Wrong headlight bulb
- Too many electrical accessories
- Hard charging
- Incorrect connection
- Incorrectly grounded circuit
- Poor contacts (main or dimmer switch)
- Burnt-out headlight bulb

**HEADLIGHT BULB BURNT OUT**

- Wrong headlight bulb
- Faulty battery
- Faulty rectifier/regulator
- Incorrectly grounded circuit
- Faulty main switch
- Faulty dimmer 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 turn signal relay
- Faulty main switch
- Faulty turn signal switch
- Incorrect turn signal bulb

**TURN SIGNAL REMAINS LIT**

- Faulty turn signal relay
- Burnt-out turn signal bulb

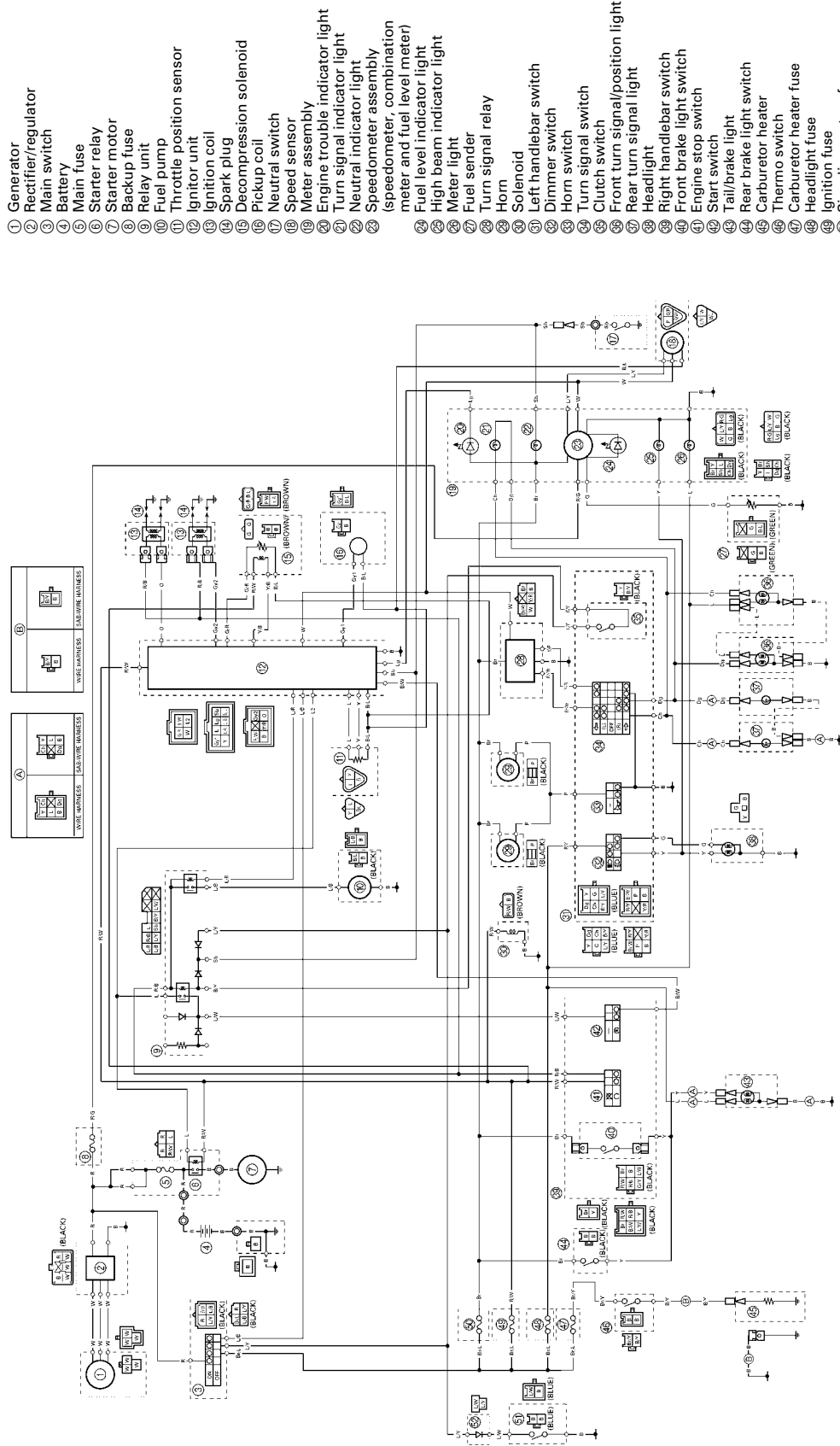
**TURN SIGNAL BLINKS QUICKLY**

- Incorrect turn signal bulb
- Faulty turn signal 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

# XV16AL/XV16ALC/XV16ATL/XV16ATLC WIRING DIAGRAM (For USA and CDN)



- ① Generator
- ② Rectifier/regulator
- ③ Main switch
- ④ Battery
- ⑤ Main fuse
- ⑥ Starter relay
- ⑦ Starter motor
- ⑧ Backup fuse
- ⑨ Relay unit
- ⑩ Fuel pump
- ⑪ Throttle position sensor
- ⑫ Ignitor unit
- ⑬ Spark plug
- ⑭ Decompression solenoid
- ⑮ Pickup coil
- ⑯ Neutral switch
- ⑰ Speed sensor
- ⑱ Meter assembly
- ⑲ Engine trouble indicator light
- ⑳ Turn signal indicator light
- ㉑ Neutral indicator light
- ㉒ Speedometer assembly
- ㉓ Speedometer, combination meter and fuel level meter)
- ㉔ Fuel level indicator light
- ㉕ High beam indicator light
- ㉖ Meter light
- ㉗ Fuel sender
- ㉘ Turn signal relay
- ㉙ Horn
- ㉚ Solenoid
- ㉛ Left handlebar switch
- ㉜ Dimmer switch
- ㉝ Horn switch
- ㉞ Turn signal switch
- ㉟ Clutch switch
- ㊱ Front turn signal/position light
- ㊲ Rear turn signal light
- ㊳ Headlight
- ㊴ Right handlebar switch
- ㊵ Front brake light switch
- ㊶ Engine stop switch
- ㊷ Start switch
- ㊸ Tail/brake light
- ㊹ Rear brake light switch
- ㊺ Carburetor heater
- ㊻ Thermo switch
- ㊼ Carburetor heater fuse
- ㊽ Headlight fuse
- ㊾ Signaling system fuse
- ㊿ Sidestand switch
- ① Diode

**COLOR CODE**

B	.....	black
Br	.....	brown
Ch	.....	chocolate
Dg	.....	dark green
G	.....	green
Gy	.....	gray
L	.....	blue
Lg	.....	light green
O	.....	orange
P	.....	pink
R	.....	red
Sb	.....	sky blue
W	.....	white
Y	.....	yellow
B/L	.....	black/blue
B/R	.....	black/red
B/W	.....	black/white
B/Y	.....	black/yellow
Br/B	.....	brown/black
Br/L	.....	brown/blue
Br/W	.....	brown/white
Br/Y	.....	brown/yellow
G/B	.....	green/black
G/R	.....	green/red
G/Y	.....	green/yellow
L/B	.....	blue/black
L/R	.....	blue/red
L/W	.....	blue/white
L/Y	.....	blue/yellow
R/B	.....	red/black
R/G	.....	red/green
R/W	.....	red/white
R/Y	.....	red/yellow
Y/B	.....	yellow/black
Y/R	.....	yellow/red



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EAS00001

**XV16AL/XV16ALC  
XV16ATL/XV16ATLC  
SERVICE MANUAL**

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