



**YAMAHA**

**YFM400FWA(M) 2000**

**5GH3-AE1**

**SERVICE MANUAL**

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**YFM400FWA(M) 2000  
SERVICE MANUAL**

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**First Edition, July 1999**

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## NOTICE

This manual was produced by the Yamaha Motor Company 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, so it is assumed that anyone who uses this book to perform maintenance and repairs on Yamaha machine has a basic understanding of the mechanical ideas and the procedures of machine repair. Repairs attempted by anyone without this knowledge are likely to render the machine unsafe and unfit for use.

Yamaha Motor Company, Ltd. is continually striving to improve all 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.

**NOTE:** \_\_\_\_\_  
Designs and specifications are subject to change without notice.

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## IMPORTANT INFORMATION

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



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 machine operator, a bystander or a person inspecting or repairing the machine.



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

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

# HOW TO USE THIS MANUAL

## MANUAL ORGANIZATION

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

1st title ①: This is the title of the chapter with its symbol in the upper right corner of each page.

2nd title ②: This title indicates the section of the chapter and only appears on the first page of each section. It is located in the upper left corner of the page.

3rd title ③: This title indicates a sub-section that is followed by step-by-step procedures accompanied by corresponding illustrations.

## EXPLODED DIAGRAMS

To help identify parts and clarify procedure steps, there are exploded diagrams at the start of each removal and disassembly section.

1. An easy-to-see exploded diagram ④ is provided for removal and disassembly jobs.
2. Numbers ⑤ are given in the order of the jobs in the exploded diagram. A number that is enclosed by a circle indicates a disassembly step.
3. An explanation of jobs and notes is presented in an easy-to-read way by the use of symbol marks ⑥. The meanings of the symbol marks are given on the next page.
4. A job instruction chart ⑦ accompanies the exploded diagram, providing the order of jobs, names of parts, notes in jobs, etc.
5. For jobs requiring more information, the step-by-step format supplements ⑧ are given in addition to the exploded diagram and the job instruction chart.

②

CLUTCH

①

ENG

④

⑤

⑦

Order	Job name/Part name	Q'ty	Remarks
<b>Clutch removal</b>			
Primary and secondary sheaves			
1	Cover	1	Remove the parts in the order below. Refer to "PRIMARY AND SECONDARY SHEAVES".
2	Clutch housing assembly	1	
3	Gasket/dowel pin	1/2	
4	One-way clutch bearing	1	
5	Nut	1	
6	Clutch carrier assembly	1	
For installation, reverse the removal procedure.			

⑥

③

CLUTCH

ENG

⑧

**CLUTCH REMOVAL**

1.Remove:

- Clutch housing assembly
- Gasket
- Dowel pins

**NOTE:**

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

2.Straighten:

- Punched portion of the nut ①.

3.Remove:

- Nut ①

**NOTE:**

Use a clutch holding tool ② to hold the clutch carrier assembly.

Clutch holding tool:  
P/N. YM-91642, 90890-04086

**CLUTCH INSPECTION**

1.Inspect:

- Clutch housing ①
- Heat damage/wear/damage → Replace.
- One-way clutch bearing ②
- Chafing/wear/damage → Replace.

**NOTE:**

- Replace the one-way clutch assembly and clutch housing as a set.
- The one-way clutch bearing must be installed with the flange side facing in.

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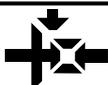
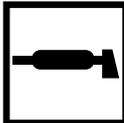
**Clutch operation:**

- Install the one-way clutch bearing and clutch carrier assembly to the clutch housing and hold the clutch carrier assembly.
- When turning the clutch housing clockwise (A), the clutch housing should turn freely.
- If not, the one-way clutch assembly is faulty. Replace it.
- When turning the clutch housing counter-clockwise (B), the clutch housing and crankshaft should be engaged.
- If not, the one-way clutch assembly is faulty. Replace it.

\*\*\*\*\*

4 - 51

4 - 52 \*\*\*\*\*

① GEN INFO 	② SPEC 	
③ INSP ADJ 	④ ENG 	
⑤ COOL 	⑥ CARB 	
⑦ DRIV 	⑧ CHAS 	
⑨ ELEC 	⑩ TRBL SHTG ?	
⑪ 	⑫ 	
⑬ 	⑭ 	
⑮ 	⑯ 	
⑰ 	⑱ 	
⑲ 	⑳ 	㉑ 
㉒ 	㉓ 	㉔ 
㉕ 	㉖ <b>New</b>	

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## ILLUSTRATED SYMBOLS

Illustrated symbols ① to ⑩ are printed on the top right of each page and indicate the subject of each chapter.

- ① General information
- ② Specifications
- ③ Periodic inspections and adjustments
- ④ Engine
- ⑤ Cooling system
- ⑥ Carburetion
- ⑦ Drive train
- ⑧ Chassis
- ⑨ Electrical
- ⑩ Troubleshooting

Illustrated symbols ⑪ to ⑱ are used to identify the specifications appearing in the text.

- ⑪ Can be serviced with engine mounted
- ⑫ Filling fluid
- ⑬ Lubricant
- ⑭ Special tool
- ⑮ Torque
- ⑯ Wear limit, clearance
- ⑰ Engine speed
- ⑱  $\Omega$ , V, A

Illustrated symbols ⑲ to ㉔ in the exploded diagrams indicate the types of lubricants and lubrication points.

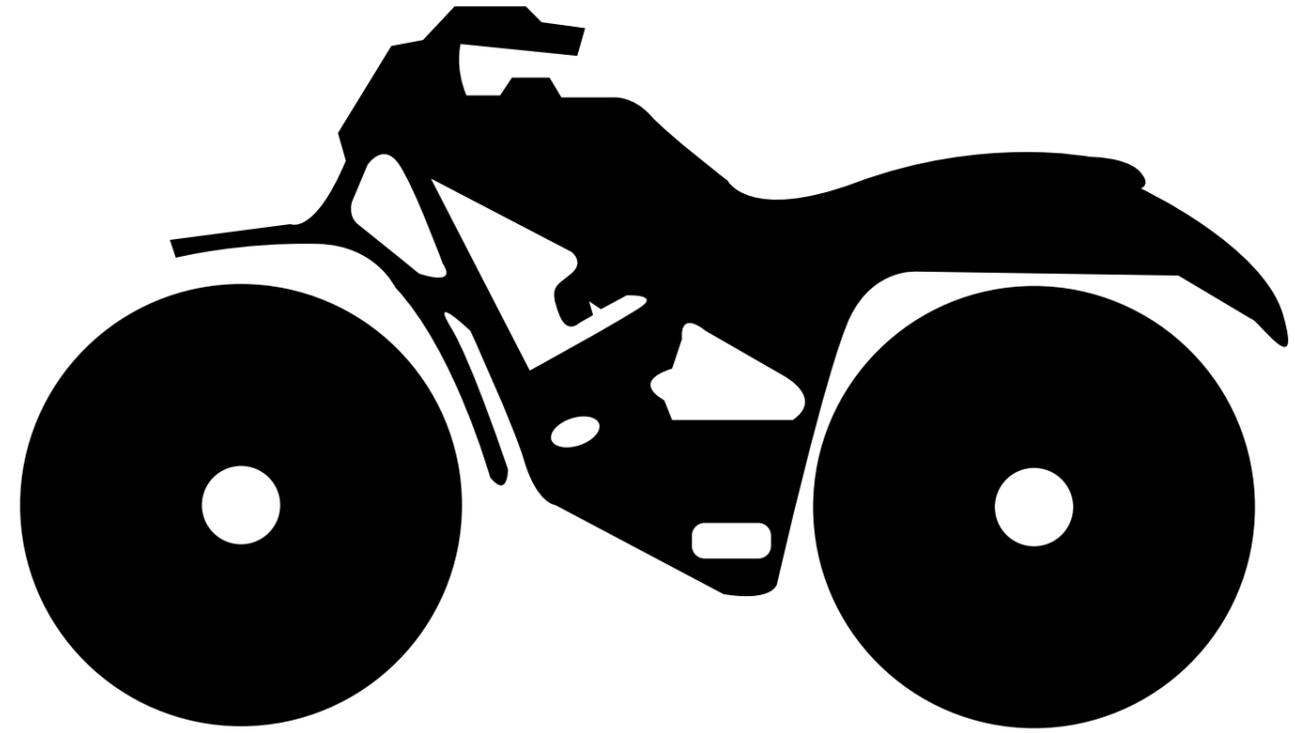
- ⑲ Apply engine oil
- ⑳ Apply gear oil
- ㉑ Apply molybdenum disulfide oil
- ㉒ Apply wheel bearing grease
- ㉓ Apply lightweight lithium-soap base grease
- ㉔ Apply molybdenum disulfide grease

Illustrated symbols ㉕ to ㉖ in the exploded diagrams indicate where to apply a locking agent ㉕ and when to install a new part ㉖.

- ㉕ Apply the locking agent (LOCTITE®)
- ㉖ Replace

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**GEN  
INFO**

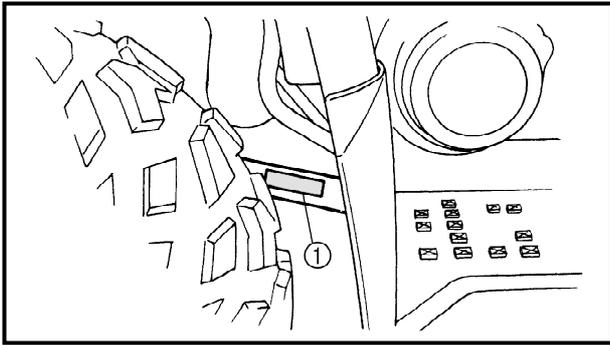
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## CHAPTER 1. GENERAL INFORMATION

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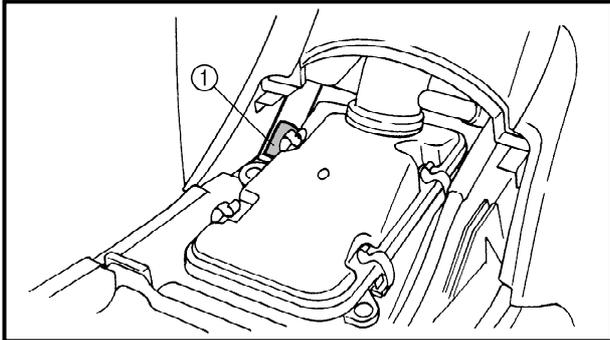




**GENERAL INFORMATION**  
**MACHINE IDENTIFICATION**

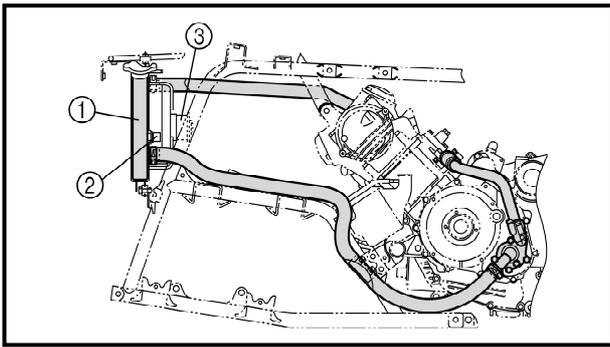
**VEHICLE IDENTIFICATION NUMBER**

The vehicle identification number ① is stamped into the left side of the frame.



**MODEL LABEL**

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

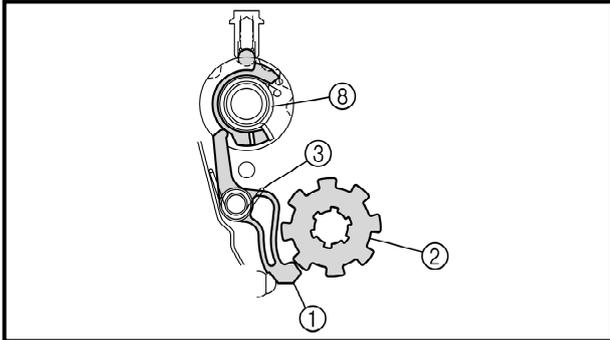


**FEATURES**

**LIQUID COOLING ENGINE**

Compact liquid cooled 45° inclined engine. A liquid cooling system has been incorporated for stable power and engine endurance.

- ① Radiator
- ② Thermo switch
- ③ Fan motor

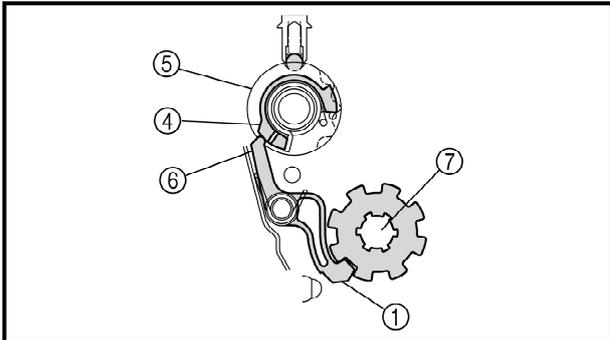


**PARK POSITION**

When the drive select lever is shifted into the park position, a stopper lever is engaged into the stopper gear preventing the drive select lever and transmission from moving.

When the drive select lever is at the "L", "H", "N", or "R" positions, the stopper lever end ① is moved away from the stopper gear ② by the return spring ③.

When the drive select lever is in the "P" position, the lever cam ④ at the side of the shift cam ⑤ lifts the stopper lever end ⑥ and the stopper lever end locks the drive axle ⑦.



When the stopper lever end ① is not synchronized, a torsion spring ⑧ retains the rotation force of the shift cam ⑤ until it is synchronized.



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## **IMPORTANT INFORMATION**

### **PREPARATION FOR REMOVAL**

#### **PROCEDURES**

1. Remove all dirt, mud, dust and foreign material before removal and disassembly.
2. Use proper tools and cleaning equipment. Refer to the "SPECIAL TOOLS" section.
3. When disassembling the machine, always keep mated parts together. This includes gears, cylinder, piston and other parts that have been "mated" through normal wear. Mated parts must always be reused or replaced as an assembly.
4. During machine disassembly, clean all 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.

EB101010

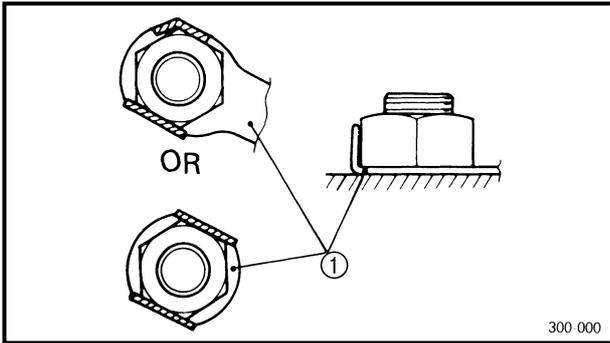
### **REPLACEMENT PARTS**

1. 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.

EB101020

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

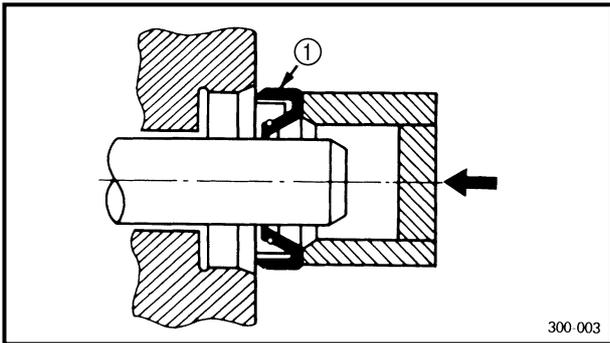
1. Replace all gaskets, seals and O-rings when overhauling the engine. All gasket surfaces, oil seal lips and O-rings must be cleaned.
2. Properly oil all mating parts and bearings during reassembly. Apply grease to the oil seal lips.



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**LOCK WASHERS/PLATES AND COTTER PINS**

1. Replace all lock washers/plates ① and cotter pins after removal. Bend lock tabs along the bolt or nut flats after the bolt or nut has been tightened to specification.



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**BEARINGS AND OIL SEALS**

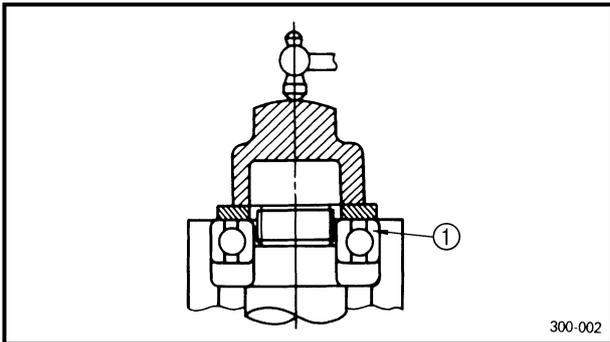
1. Install bearings and oil seals so that the manufacturer's marks or numbers are visible. When installing oil seals, apply a light coating of lightweight lithium base grease to the seal lips. Oil bearings liberally when installing, if appropriate.

① Oil seal

**CAUTION:**

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

① Bearing

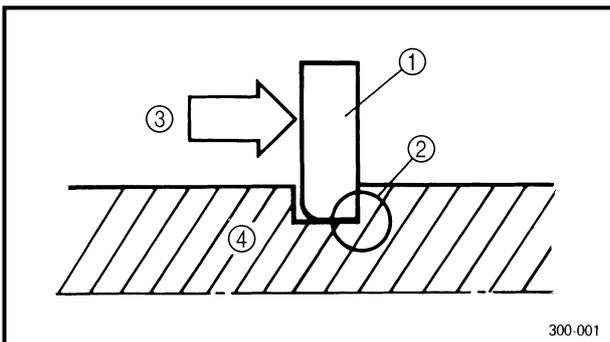


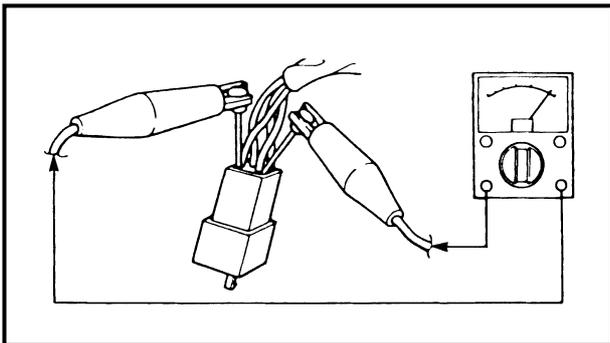
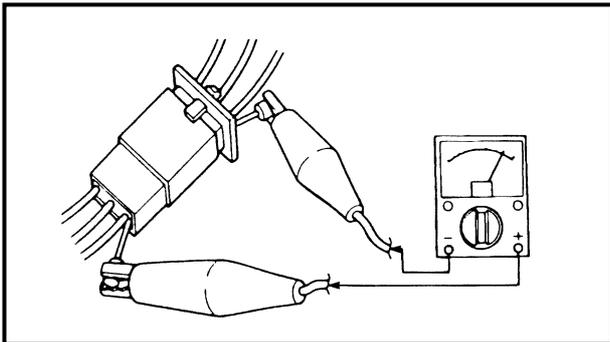
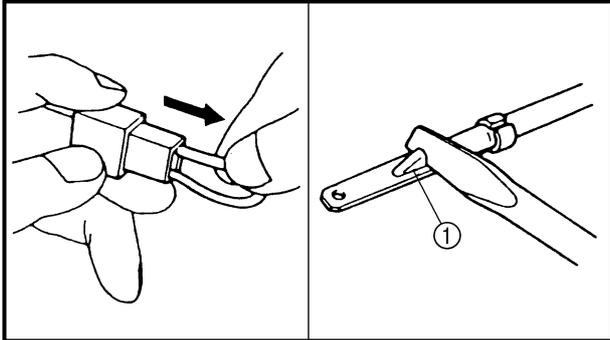
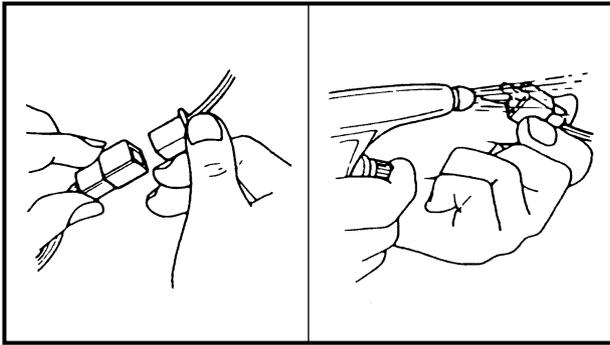
EB101050

**CIRCLIPS**

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

④ Shaft





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## CHECKING OF CONNECTIONS

Check the connectors for stains, rust, moisture, etc.

### 1. Disconnect:

- Connector

### 2. Check:

- Connector

Moisture → Dry each terminal with an air blower.

Stains/rust → Connect and disconnect the terminals several times.

### 3. Check:

- Connector leads

Looseness → Bend up the pin ① and connect the terminals.

### 4. Connect:

- Connector terminals

### NOTE:

The two terminals "click" together.

### 5. Check:

- Continuity (using a pocket tester)

### NOTE:

- If there is no continuity, clean the terminals.
- When checking the wire harness be sure to perform steps 1 to 3.
- As a quick remedy, use a contact revitalizer available at most part stores.
- Check the connector with a pocket tester as shown.

EB102001

**SPECIAL TOOLS**

The following special tools are necessary for complete and accurate tune-up and assembly. Use only the appropriate special tools; this will help prevent damage caused by the use of inappropriate tools or improvised techniques. Special tools may differ by shape and part number from country to country. In such a case, two types are provided.

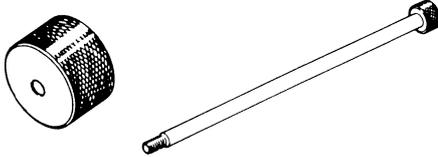
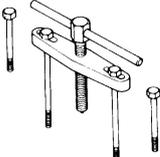
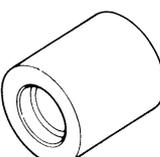
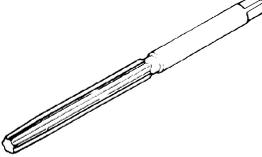
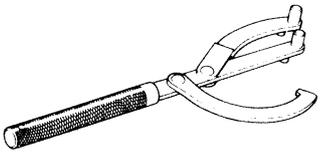
When placing an order, refer to the list provided below to avoid any mistakes.

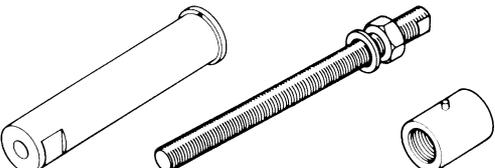
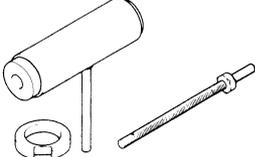
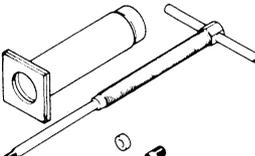
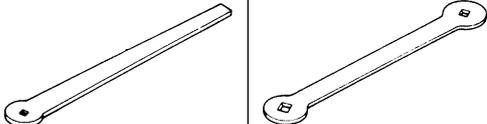
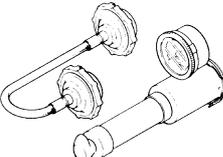
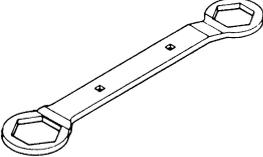
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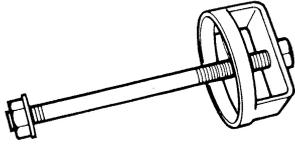
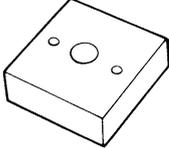
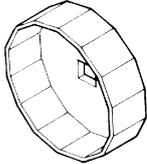
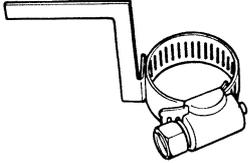
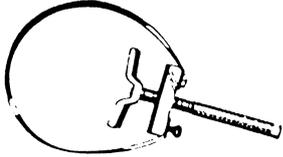
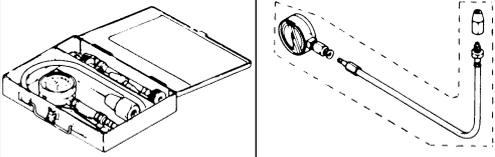
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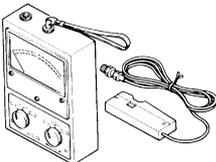
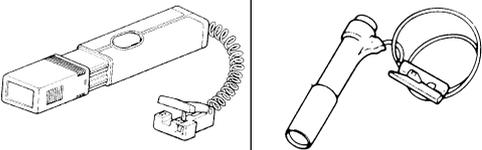
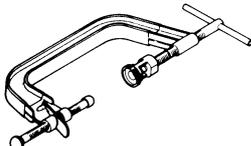
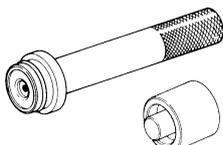
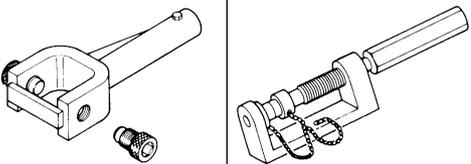
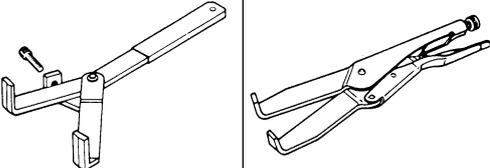
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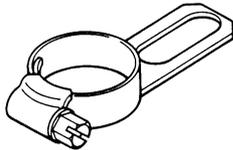
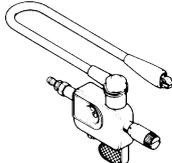
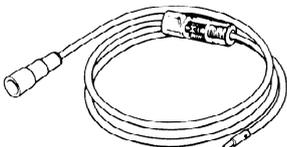
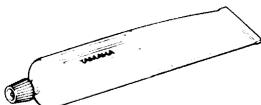
Tool No.	Tool name/How to use	Illustration
Bolt 90890-01083 Weight 90890-01084 Set YU-01083-A	Slide hammer bolt (M6)/weight/set  These tools are used to remove the rocker arm shaft.	
90890-01135 YU-01135-A	Crankcase separating tool  This tool is used to separate the crankcase.	
90890-01225 YM-01225-A	Valve guide remover (7.0 mm)  This tool is needed to remove and install the valve guide.	
90890-04017 YM-04017	Valve guide installer (7.0 mm)  This tool is needed to install the valve guide.	
90890-01227 YM-01227	Valve guide reamer (7.0 mm)  This tool is needed to rebores the new valve guide.	
90890-01231 YM-01231	Gear lash measurement tool  This tool is used to measure the gear lash.	
90890-01235 YU-01235	Rotor holding tool  This tool is needed to hold the starter puller when removing/installing the starter puller bolt or camshaft sprocket bolts.	

Tool No.	Tool name/How to use	Illustration
Kit 90890-04088 Bolt 90890-01275	Buffer boss installer set Crankshaft installer bolt  These tools are used to install the crankshaft.	
YU-90050	Crankshaft installer set  These tools are used to install the crankshaft.	
Adapter YM-33279 Spacer 90890-04060 YM-90070-A	Adapter (#11) Spacer (crankshaft installer)  These tools are used to install the crankshaft.	
90890-01304 YU-01304	Piston pin puller  This tool is used to remove the piston pin.	
90890-01311 YU-08035	Tappet adjusting tool (3 mm)  This tool is necessary for adjusting the valve clearance.	
90890-01312 YM-01312-A	Fuel level gauge  This gauge is used to measure the fuel level in the float chamber.	
90890-01325 YU-24460-01	Radiator cap tester  This tool is used to check the cooling system.	
90890-01352 YU-33984	Adapter  This tool is used to check the cooling system.	
90890-01348	Locknut wrench  This tool is needed when removing or installing the secondary sheave spring.	

Tool No.	Tool name/How to use	Illustration
90890-04134 YM-04134	Sheave spring compressor  This tool is needed when removing or installing the secondary sheave spring.	
90890-04135 YM-04135	Sheave fixed block  This tool is needed when removing or installing the secondary sheave spring.	
90890-01404 YM-01404	Flywheel puller  These tools are needed to remove the rotor.	
90890-01327 YM-01327	Damper rod holder (30 mm)  This tool is needed to loosen and tighten the steering stem bearing retainer.	
90890-01426 YU-38411	Oil filter wrench  This tool is needed to loosen or tighten the oil filter cartridge.	
90890-01430 YM-38404	Ring nut wrench  This tool is needed to removing and installing the middle driven shaft bearing retainer.	
90890-01467 YM-01467 90890-01475 YM-01475	Gear lash measurement tool  This tool is used to measure the gear lash.	
90890-01701 YU-01880	Sheave holder  This tool is needed to hold the primary sheave when removing or installing the sheave bolts.	
Set 90890-03081 YU-33223 Adapter 90890-04082 YU-33223-3	Compression gauge set Adapter  These tools are needed to measure engine compression.	

Tool No.	Tool name/How to use	Illustration	
90890-03112 YU-03112	<p>Pocket tester</p> <p>This instrument is needed for checking the electrical system.</p>		
90890-03113	<p>Engine tachometer</p> <p>This tool is needed for observing engine rpm.</p>		
YU-8036-A	<p>Inductive tachometer</p> <p>This tool is needed for observing engine rpm.</p>		
90890-03141 YM-33277-A	<p>Timing light</p> <p>This tool is necessary for checking ignition timing.</p>		
90890-04019 YM-04019	<p>Valve spring compressor</p> <p>This tool is needed to remove and install the valve assemblies.</p>		
<p>Middle driven shaft bearing driver 90890-04058 YM-04058-1 Mechanical seal installer 90890-04078 YM-33221</p>	<p>Middle driven shaft bearing driver Mechanical seal installer</p> <p>These tools are used to install the water pump seal.</p>		
90890-04050 YM-04050	<p>Bearing retainer wrench</p> <p>This tool is needed when removing or installing the final drive shaft bearing retainer.</p>		
90890-04062 YM-04062	<p>Universal joint holder</p> <p>This tool is needed when removing or installing the universal joint yoke nut.</p>		
90890-04086 YM-91042	<p>Clutch holding tool</p> <p>This tool is needed to hold the clutch carrier when removing or installing the carrier nut.</p>		



Tool No.	Tool name/How to use	Illustration
90890-04128 YM-04128	<p>Bearing retainer wrench</p> <p>This tool is needed when removing or installing the middle driven pinion gear bearing retainer.</p>	
90890-04129 YM-04129	<p>Pinion gear fix clamp</p> <p>This tool is used to hold the shift cam.</p>	
90890-06754	<p>Ignition checker</p> <p>This instrument is necessary for checking the ignition system components.</p>	
YM-34487	<p>Dynamic spark tester</p> <p>This instrument is necessary for checking the ignition system components.</p>	
Bond 90890-85505 Sealant ACC-11001-05-01	<p>Yamaha bond No. 1215 Sealant (Quick Gasket®)</p> <p>This sealant (bond) is used on crank-case mating surfaces, etc.</p>	



**SPEC**

**2**

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## **CHAPTER 2. SPECIFICATIONS**

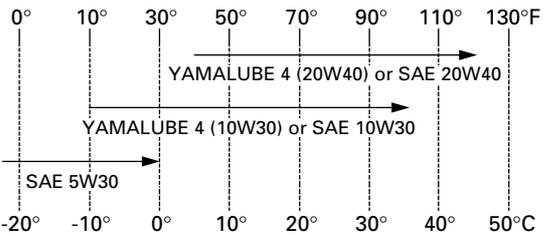
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**SPECIFICATIONS**

**GENERAL SPECIFICATIONS**

Item	Standard
Model code:	5GH3 : (For CDN) 5GH4 : (For GB, F, CH) 5GH5 : (For Oceania)
Dimensions: Overall length Overall width Overall height Seat height Wheelbase Minimum ground clearance Minimum turning radius	1,965 mm (77.36 in) 1,070 mm (42.13 in) 1,120 mm (44.09 in) 820 mm (32.28 in) 1,225 mm (48.23 in) 245 mm (9.65 in) 3,000 mm (118.11 in)
Basic weight: With oil and full fuel tank	262 kg (578 lb)
Engine: Engine type Cylinder arrangement Displacement Bore × stroke Compression ratio Starting system	Liquid-cooled 4-stroke, SOHC Forward-inclined single cylinder 401 cm <sup>3</sup> 84.5 × 71.5 mm (3.33 × 2.81 in) 10.5 : 1 Electric and recoil starter
Lubrication system:	Wet sump
Oil type or grade: Engine oil   Final gear oil Differential gear oil	API service SE, SF, SG type or higher  SAE 80API "GL-4" Hypoid Gear Oil SAE 80API "GL-4" Hypoid Gear Oil
Oil capacity: Engine oil Periodic oil change With oil filter replacement Total amount Final gear case oil Periodic oil change Total amount	2.3 L (2.0 Imp qt, 2.4 US qt) 2.4 L (2.1 Imp qt, 2.5 US qt) 2.6 L (2.3 Imp qt, 2.7 US qt)  0.19 L (0.17 Imp qt, 0.20 US qt) 0.22 L (0.19 Imp qt, 0.23 US qt)

# GENERAL SPECIFICATIONS

**SPEC**



Item	Standard
Differential gear case oil Periodic oil change Total amount Radiator capacity (including all routes)	0.35 L (0.31 Imp qt, 0.37 US qt) 0.40 L (0.35 Imp qt, 0.42 US qt) 1.1 L (0.97 Imp qt, 1.16 US qt)
Air filter:	Wet type element
Fuel: Type  Fuel tank capacity Fuel reserve amount	Regular unleaded gasoline (For CDN, GB, F, CH) Unleaded fuel only (For Oceania) 15 L (3.3 Imp gal, 3.9 US gal) 4.5 L (0.99 Imp gal, 1.19 US gal)
Carburetor: Type/quantity Manufacturer	BSR33/1 MIKUNI
Spark plug: Type/manufacturer  Spark plug gap	DR8EA/NGK (For CDN, GB, F, CH) D8EA/NGK (For Oceania) X24ES-U/DENSO (For Oceania) 0.6 ~ 0.7 mm (0.02 ~ 0.03 in)
Clutch type:	Wet, centrifugal automatic
Transmission: Primary reduction system Secondary reduction system Secondary reduction ratio Transmission type Operation Single speed automatic Sub transmission ratio  Reverse gear	V-belt Spur gear 39/24 × 24/18 × 33/9 (7.944) V-belt automatic Left hand operation 2.55 ~ 0.75 : 1 45/16 (2.813) 38/23 (1.652) 29/17 (1.706)
Chassis: Frame type Caster angle Camber angle Kingpin angle Kingpin offset Trail Tread (STD)  Toe-in	Steel tube frame 4.0° 1° 11° 1 mm (0.04 in) 21 mm (0.83 in) 850 mm (33.46 in) 825 mm (32.48 in) 0 ~ 10 mm (0 ~ 0.39 in)
Tire: Type Size	Tubeless AT25 × 8-12 AT25 × 10-12

**GENERAL SPECIFICATIONS****SPEC**

Item		Standard
Manufacturer	front	DUNLOP (For CDN, GB, F, CH) CHENG SHIN (For Oceania)
	rear	DUNLOP (For CDN, GB, F, CH) CHENG SHIN (For Oceania)
Type	front	KT123 (For CDN, GB, F, CH) C828 (For Oceania)
	rear	KT127 (For CDN, GB, F, CH) C828 (For Oceania)

# GENERAL SPECIFICATIONS

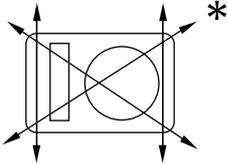
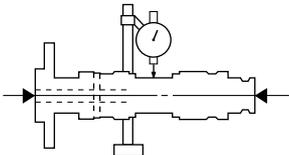
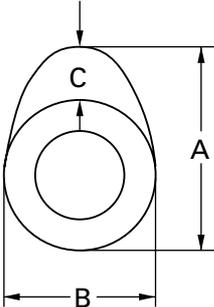
**SPEC**



Item	Standard
Tire pressure (cold tire): Maximum load* Off-road riding	210 kg (463 lb) 22 ~ 28 kPa (0.22 ~ 0.28 kg/cm <sup>2</sup> , 3.2 ~ 4.0 psi) 22 ~ 28 kPa (0.22 ~ 0.28 kg/cm <sup>2</sup> , 3.2 ~ 4.0 psi)
*Load in total weight of rider accessories	
Brake: Front brake Rear brake	type operation type operation Dual disc brake Right hand operation Single disc brake Left hand and right foot operation
Suspension: Front suspension Rear suspension	Double wishbone Swingarm (monocross)
Shock absorber: Front shock absorber Rear shock absorber	Coil spring/oil damper Coil spring/oil damper
Wheel travel: Front wheel travel Rear wheel travel	160 mm (6.30 in) 180 mm (7.09 in)
Electrical: Ignition system Generator system Battery type Battery capacity	C.D.I. A.C. magneto YTX20L-BS 12 V 18 AH
Headlight type:	Krypton bulb
Bulb wattage × quantity: Headlight Tail light Meter light Indicator lights Neutral Reverse Coolant temperature Four-wheel drive Park	12 V 30 W/30 W × 2 12 V 7.5 W × 1 14 V 3.4 W × 1 14 V 1.7 W × 1



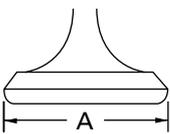
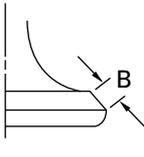
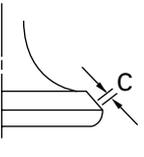
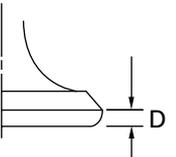
**MAINTENANCE SPECIFICATIONS**  
**ENGINE**

Item	Standard	Limit
Cylinder head: Warp limit 	----	0.03 mm (0.0012 in)
Cylinder: Bore size Taper limit Out of round limit	84.500 ~ 84.510 mm (3.3268 ~ 3.3272 in) ---- ----	84.600 mm (3.3307 in) 0.05 mm (0.0016 in) 0.01 mm (0.0004 in)
Camshaft: Drive method Cam dimensions  Intake  Exhaust  Camshaft runout limit 	Chain drive (Left)   "A" 40.62 ~ 40.72 mm (1.5992 ~ 1.6031 in) "B" 32.18 ~ 32.28 mm (1.2669 ~ 1.2709 in) "C" 8.61 ~ 8.73 mm (0.3390 ~ 0.3437 in) "A" 40.62 ~ 40.72 mm (1.5992 ~ 1.6031 in) "B" 32.18 ~ 32.28 mm (1.2669 ~ 1.2709 in) "C" 8.61 ~ 8.73 mm (0.3390 ~ 0.3437 in) ----	----  40.52 mm (1.5953 in) 32.08 mm (1.2630 in) ---- 40.52 mm (1.5953 in) 32.08 mm (1.2630 in) ---- 0.03 mm (0.0012 in)

# MAINTENANCE SPECIFICATIONS

**SPEC**



Item	Standard	Limit	
<b>Cam chain:</b>			
Cam chain type/No. of links	92RH2015/116	----	
Cam chain adjustment method	Automatic	----	
<b>Rocker arm/rocker arm shaft:</b>			
Shaft outside diameter	11.981 ~ 11.991 mm (0.4717 ~ 0.4721 in)	11.951 mm (0.4705 in)	
Arm-to-shaft clearance	0.009 ~ 0.037 mm (0.0004 ~ 0.0015 in)	0.08 mm (0.0031 in)	
<b>Valve, valve seat, valve guide:</b>			
Valve clearance (cold)			
IN	0.06 ~ 0.10 mm (0.0024 ~ 0.0039 in)	----	
EX	0.16 ~ 0.20 mm (0.0063 ~ 0.0079 in)	----	
<b>Valve dimensions</b>			
			
Head Diameter	Face Width	Seat Width	Margin Thickness
"A" head diameter	IN	39.9 ~ 40.1 mm (1.5708 ~ 1.5787 in)	----
	EX	33.9 ~ 34.1 mm (1.3346 ~ 1.3425 in)	----
"B" face width	IN	2.26 mm (0.0890 in)	----
	EX	2.26 mm (0.0890 in)	----
"C" seat width	IN	1.2 ~ 1.4 mm (0.0472 ~ 0.0551 in)	1.6 mm (0.0630 in)
	EX	1.2 ~ 1.4 mm (0.0472 ~ 0.0551 in)	1.6 mm (0.0630 in)
"D" margin thickness	IN	1.0 ~ 1.4 mm (0.0394 ~ 0.0551 in)	----
	EX	0.8 ~ 1.2 mm (0.0314 ~ 0.0472 in)	----
Stem outside diameter	IN	6.975 ~ 6.990 mm (0.2746 ~ 0.2752 in)	6.950 mm (0.2736 in)
	EX	6.955 ~ 6.970 mm (0.2738 ~ 0.2744 in)	6.915 mm (0.2722 in)
Guide inside diameter	IN	7.000 ~ 7.012 mm (0.2756 ~ 0.2761 in)	7.030 mm (0.2768 in)
	EX	7.000 ~ 7.012 mm (0.2756 ~ 0.2761 in)	7.030 mm (0.2768 in)
Stem-to-guide clearance	IN	0.010 ~ 0.037 mm (0.0004 ~ 0.0015 in)	0.08 mm (0.0031 in)
	EX	0.030 ~ 0.057 mm (0.0012 ~ 0.0022 in)	0.10 mm (0.0039 in)



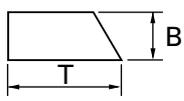
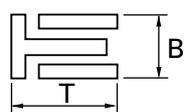
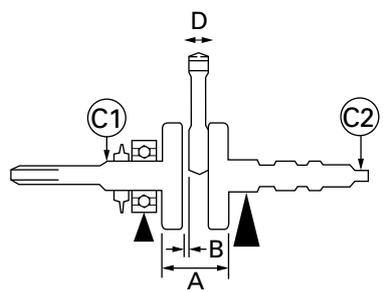
# MAINTENANCE SPECIFICATIONS

**SPEC**



Item	Standard	Limit												
Compressed pressure (installed) <table style="margin-left: 20px; border: none;"> <tr> <td style="width: 100px;">IN</td> <td>235.4 ~ 251.1 N (24.00 ~ 25.60 kg, 52.92 ~ 56.45 lb)</td> <td>----</td> </tr> <tr> <td>EX</td> <td>235.4 ~ 251.1 N (24.00 ~ 25.60 kg, 52.92 ~ 56.45 lb)</td> <td>----</td> </tr> </table>	IN	235.4 ~ 251.1 N (24.00 ~ 25.60 kg, 52.92 ~ 56.45 lb)	----	EX	235.4 ~ 251.1 N (24.00 ~ 25.60 kg, 52.92 ~ 56.45 lb)	----								
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Tilt limit * <table style="margin-left: 20px; border: none;"> <tr> <td style="width: 100px;">IN</td> <td>2.5°/1.6 mm (2.5°/0.06 in)</td> <td></td> </tr> <tr> <td>EX</td> <td>2.5°/1.6 mm (2.5°/0.06 in)</td> <td></td> </tr> </table>	IN	2.5°/1.6 mm (2.5°/0.06 in)		EX	2.5°/1.6 mm (2.5°/0.06 in)									
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EX	2.5°/1.6 mm (2.5°/0.06 in)													
Direction of winding (top view) <table style="margin-left: 20px; border: none;"> <tr> <td style="width: 100px;">IN</td> <td>Clockwise</td> <td>----</td> </tr> <tr> <td>EX</td> <td>Clockwise</td> <td>----</td> </tr> </table>	IN	Clockwise	----	EX	Clockwise	----								
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EX	Clockwise	----												
Piston: <table style="margin-left: 20px; border: none;"> <tr> <td style="width: 100px;">Piston to cylinder clearance</td> <td>0.040 ~ 0.065 mm (0.0016 ~ 0.0026 in)</td> <td>0.15 mm (0.0059 in)</td> </tr> <tr> <td>Piston size "D"</td> <td>84.445 ~ 84.460 mm (3.3246 ~ 3.3252 in)</td> <td>----</td> </tr> </table>	Piston to cylinder clearance	0.040 ~ 0.065 mm (0.0016 ~ 0.0026 in)	0.15 mm (0.0059 in)	Piston size "D"	84.445 ~ 84.460 mm (3.3246 ~ 3.3252 in)	----								
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Measuring point "H" <table style="margin-left: 20px; border: none;"> <tr> <td style="width: 100px;">Piston off-set</td> <td>0.5 mm (0.0200 in)</td> <td>----</td> </tr> <tr> <td>Piston pin bore inside diameter</td> <td>20.004 ~ 20.015 mm (0.7876 ~ 0.7880 in)</td> <td>20.045 mm (0.7892 in)</td> </tr> <tr> <td>Piston pin outside diameter</td> <td>19.993 ~ 20.000 mm (0.7871 ~ 0.7874 in)</td> <td>19.973 mm (0.7863 in)</td> </tr> </table>	Piston off-set	0.5 mm (0.0200 in)	----	Piston pin bore inside diameter	20.004 ~ 20.015 mm (0.7876 ~ 0.7880 in)	20.045 mm (0.7892 in)	Piston pin outside diameter	19.993 ~ 20.000 mm (0.7871 ~ 0.7874 in)	19.973 mm (0.7863 in)					
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Piston rings: <table style="margin-left: 20px; border: none;"> <tr> <td style="width: 100px;">Top ring</td> <td></td> <td></td> </tr> </table>	Top ring													
Top ring														
Type <table style="margin-left: 20px; border: none;"> <tr> <td style="width: 100px;">Dimensions (B × T)</td> <td>Barrel</td> <td>----</td> </tr> <tr> <td></td> <td>1.2 × 3.1 mm (0.0472 × 0.1220 in)</td> <td>----</td> </tr> <tr> <td>End gap (installed)</td> <td>0.2 ~ 0.4 mm (0.0079 ~ 0.0157 in)</td> <td>0.65 mm (0.0256 in)</td> </tr> <tr> <td>Side clearance (installed)</td> <td>0.03 ~ 0.08 mm (0.0012 ~ 0.0031 in)</td> <td>0.13 mm (0.0051 in)</td> </tr> </table>	Dimensions (B × T)	Barrel	----		1.2 × 3.1 mm (0.0472 × 0.1220 in)	----	End gap (installed)	0.2 ~ 0.4 mm (0.0079 ~ 0.0157 in)	0.65 mm (0.0256 in)	Side clearance (installed)	0.03 ~ 0.08 mm (0.0012 ~ 0.0031 in)	0.13 mm (0.0051 in)		
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Side clearance (installed)	0.03 ~ 0.08 mm (0.0012 ~ 0.0031 in)	0.13 mm (0.0051 in)												



Item	Standard	Limit
<p>2nd ring</p>  <p>Type</p> <p>Dimensions (B × T)</p> <p>End gap (installed)</p> <p>Side clearance</p> <p>Oil ring</p>  <p>Dimensions (B × T)</p> <p>End gap (installed)</p>	<p>Taper</p> <p>1.2 × 3.6 mm (0.0472 × 0.1417 in)</p> <p>0.4 ~ 0.6 mm (0.0157 ~ 0.0236 in)</p> <p>0.03 ~ 0.07 mm (0.0012 ~ 0.0028 in)</p> <p>2.8 × 2.8 mm (0.1102 × 0.1102 in)</p> <p>0.2 ~ 0.7 mm (0.0079 ~ 0.0276 in)</p>	<p>----</p> <p>----</p> <p>0.95 mm (0.0374 in)</p> <p>0.13 mm (0.0051 in)</p> <p>----</p> <p>----</p>
<p>Crankshaft:</p>  <p>Crank width "A"</p> <p>Runout limit C1</p> <p>C2</p> <p>Big end side clearance "D"</p> <p>Big end radial clearance "E"</p>	<p>62.95 ~ 63.00 mm (2.4783 ~ 2.4803 in)</p> <p>----</p> <p>----</p> <p>0.25 ~ 0.75 mm (0.0098 ~ 0.0295 in)</p> <p>0.010 ~ 0.025 mm (0.0004 ~ 0.0010 in)</p>	<p>----</p> <p>0.03 mm (0.0012 in)</p> <p>0.03 mm (0.0012 in)</p> <p>1.0 mm (0.0394 in)</p> <p>----</p>
<p>Balancer:</p> <p>Balancer drive method</p>	<p>Gear</p>	<p>----</p>
<p>Automatic centrifugal clutch:</p> <p>Clutch shoe thickness</p> <p>Clutch-in revolution</p> <p>Clutch-stall revolution</p>	<p>1.5 mm (0.06 in)</p> <p>1,900 ~ 2,300 r/min</p> <p>3,300 ~ 3,900 r/min</p>	<p>1.0 mm (0.04 in)</p> <p>----</p> <p>----</p>

# MAINTENANCE SPECIFICATIONS

**SPEC**

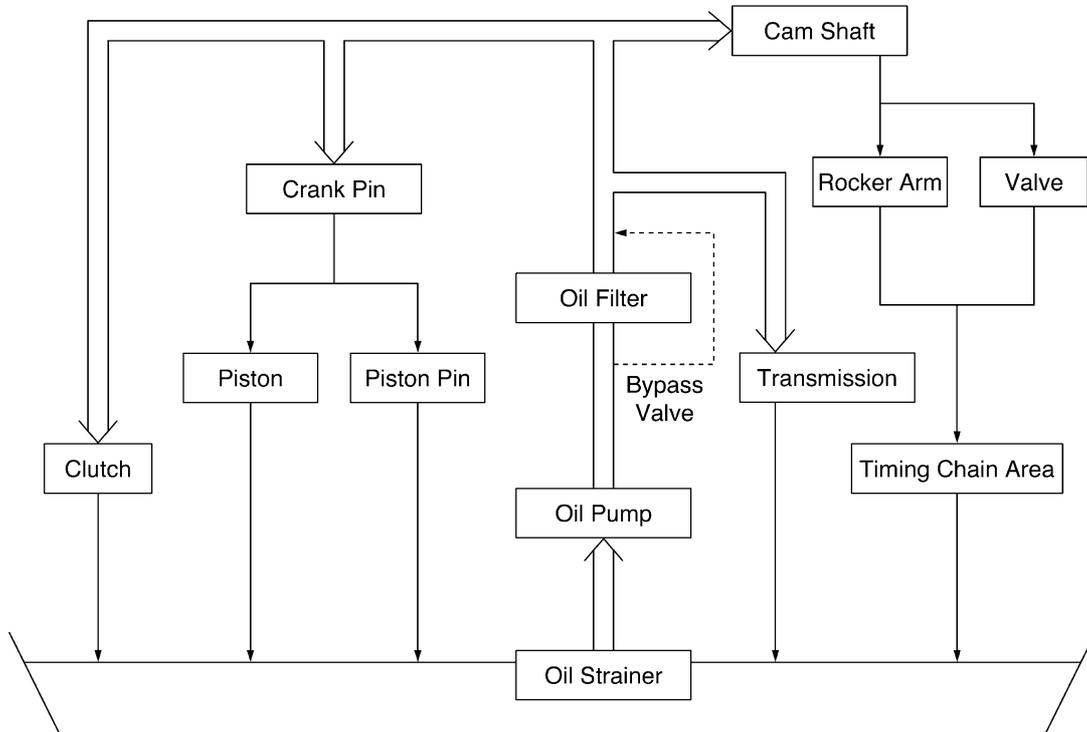
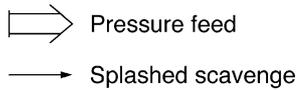


Item	Standard	Limit
Transmission: Main axle deflection limit	----	0.06 mm (0.0024 in)
Drive axle deflection limit	----	0.06 mm (0.0024 in)
Shifter: Shifter type	Cam drum and guide bar	----
Air filter oil grade:	Engine oil	----
Carburetor: I. D. mark	5GH1 00 (For CDN) 5GH4 20 (For GB, F, CH, Oceania)	----
Main jet (M.J)	#132.5	----
Main air jet (M.A.J)	#50	----
Jet needle (J.N)	5EP7-55-3	----
Needle jet (N.J)	P-0M	----
Pilot air jet (P.A.J.1)	#80	----
Pilot air jet (P.A.J.2)	1.3	----
Pilot outlet (P.O)	0.95	----
Pilot jet (P.J)	#17.5	----
Bypass 1 (B.P.1)	0.8	----
Bypass 2 (B.P.2)	0.8	----
Bypass 3 (B.P.3)	0.8	----
Pilot screw (P.S.)	2-1/2	----
Valve seat size (V.S)	2.0	----
Starter jet (G.S.1)	#70	----
Starter jet (G.S.2)	0.9	----
Throttle valve size (Th.V)	#90	----
Float height (F.H)	13 mm (0.51 in)	----
Fuel level (F.L)	2 ~ 3 mm (0.08 ~ 0.12 in)	----
Engine idle speed	1,450 ~ 1,550 r/min	----
Intake vacuum	32 kPa (240 mmHg, 9.45 inHg)	----
Oil pump: Oil pump type	Trochoid	----
Tip clearance "A" or "B"	0.15 mm (0.006 in)	0.2 mm (0.008 in)
Side clearance	0.04 ~ 0.09 mm (0.002 ~ 0.004 in)	----
Bypass valve setting pressure	78 ~ 118 kPa (0.78 ~ 1.18 kg/cm <sup>2</sup> , 11.3 ~ 17.11 psi)	----
Oil pressure (hot)	7 kPa (0.07 kg/cm <sup>2</sup> , 1.02 psi) at 1,500 r/min	----
Pressure check location	Cylinder head	----
Cooling system: Radiator core		
Width	300 mm (11.8 in)	----
Height	219 mm (8.62 in)	----
Thickness	16 mm (0.63 in)	----

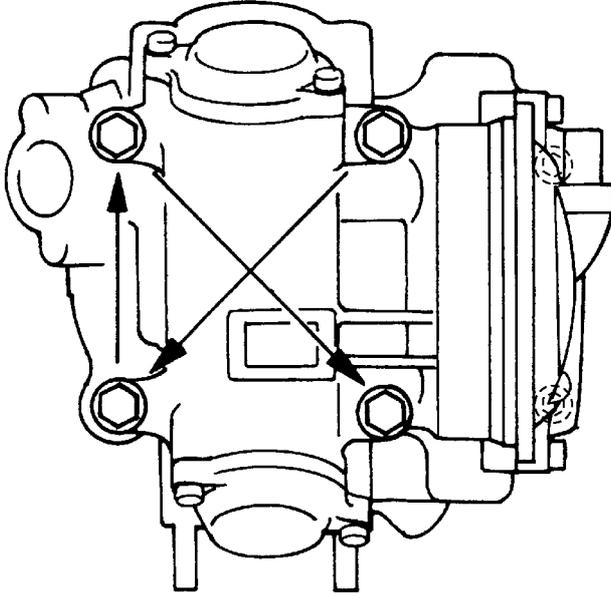


Item	Standard	Limit
Radiator cap opening pressure	93.3 ~ 122.7 kPa (0.933 ~ 1.227 kg/cm <sup>2</sup> , 13.53 ~ 17.79 psi)	----
Radiator capacity	0.55 L (0.48 Imp qt, 0.58 US qt)	----
Coolant reservoir Capacity	0.25 L (0.22 Imp qt, 0.26 US qt)	----
From low to full level	0.15 L (0.13 Imp qt, 0.16 US qt)	----
Water pump: Type	Single suction centrifugal pump	----
Reduction ratio	38/32 (1.188)	
Thermostat: Valve opening temperature	63.5 ~ 66.5 °C (146.3 ~ 151.7 °F)	----
Valve full open temperature	80 °C (176 °F)	----
Valve lift-full open	3 mm (0.12 in)	----
Shaft drive: Middle gear backlash	0.1 ~ 0.3 mm (0.004 ~ 0.012 in)	----
Final gear backlash	0.1 ~ 0.2 mm (0.004 ~ 0.008 in)	----
Differential gear backlash	0.08 ~ 0.39 mm (0.003 ~ 0.015 in)	----

Lubrication chart:





Item	Standard	Limit
<p>Cylinder head tightening sequence:</p> 		



### Tightening torques

Part to be tightened	Part name	Thread size	Q'ty	Tightening torque			Remarks
				Nm	m·kg	ft·lb	
Cylinder head oil passage	Union bolt	M6	1	7	0.7	5.1	
Cylinder head (exhaust pipe)	Stud bolt	M8	2	15	1.5	11	
Cylinder head	Bolt	M10	4	40	4.0	29	
	Bolt	M6	2	10	1.0	7.2	
Camshaft sprocket cover baffle plate	Bolt	M6	2	10	1.0	7.2	
Camshaft bearing retainer	Bolt	M6	2	8	0.8	5.8	
Spark plug	—	M12	1	18	1.8	13	
Cylinder drain screw	Screw	M6	1	10	1.0	7.2	
Starter clutch	Bolt	M10	1	50	5.0	36	
Camshaft sprocket	Bolt	M10	1	60	6.0	43	
Timing chain tensioner cap	Bolt	M11	1	23	2.3	17	
Timing chain tensioner	Bolt	M6	2	11	1.1	8.0	
Timing chain guide (intake)	Bolt	M6	2	10	1.0	7.2	
Valve adjusting screw	Nut	M7	2	20	2.0	14	
Radiator	Bolt	M6	2	7	0.7	5.1	
Oil pump assembly	Screw	M6	3	8	0.8	5.8	
Oil pump	Screw	M6	1	8	0.8	5.8	
Oil strainer cover	Plug	M35	1	32	3.2	23	
Oil drain plug	Bolt	M14	1	23	2.3	17	
Oil pump drive gear	Nut	M14	1	50	5.0	36	
Oil delivery pipe	Union bolt	M8	2	18	1.8	13	
Oil filter bolt	Union bolt	M20	1	63	6.3	46	
Oil filter cartridge	—	M20	1	17	1.7	12	
Carburetor joint	Bolt	M8	2	20	2.0	14	
Muffler and exhaust pipe	Bolt	M8	2	15	1.5	11	
Muffler and pipe	Bolt	M6	1	8	0.8	5.8	
Muffler protector 1, 2	Bolt	M6	7	14	1.4	10	
Exhaust pipe protector	Bolt	M6	3	14	1.4	10	
Exhaust pipe	Nut	M8	2	20	2.0	14	
Muffler	Bolt	M10	2	25	2.5	18	
Exhaust pipe stay	Bolt	M6	4	14	1.4	10	
Exhaust pipe protector stay	Bolt	M6	1	11	1.1	8.0	
Crankcase cover	Screw	M6	4	8	0.8	5.8	
Oil seal retainer	Screw	M5	3	7	0.7	5.1	
Drive belt case cover	Bolt	M6	12	10	1.0	7.2	
Crankcase oil passage plug	Plug	M18	1	55	5.5	40	
Bearing retainer (right crankcase)	Screw	M6	1	11	1.1	8.0	
Air duct (front)	Bolt	M6	1	4	0.4	2.9	
Air duct (rear)	Bolt	M6	2	5	0.5	3.6	
Plug (right crankcase)	Bolt	M8	1	15	1.5	11	
Bearing retainer (left crankcase)	Bolt	M6	2	10	1.0	7.2	

# MAINTENANCE SPECIFICATIONS

**SPEC**


Part to be tightened	Part name	Thread size	Q'ty	Tightening torque			Remarks
				Nm	m·kg	ft·lb	
Crankcase cover (left)	Bolt	M6	6	10	1.0	7.2	
Recoil starter	Bolt	M6	4	10	1.0	7.2	
Starter one-way clutch	Bolt	M8	6	30	3.0	22	
Clutch carrier assembly	Nut	M22	1	140	14	100	Stake
Middle drive shaft bearing retainer	Torx screw	M8	4	25	2.5	18	
Middle driven shaft drive pinion gear	Nut	M22	1	130	13	94	Stake
Middle drive shaft bearing housing	Bolt	M8	6	32	3.2	23	
Middle driven gear bearing retainer	Nut	M65	1	110	11	80	 Left-hand threads
Yoke (middle driven gear)	Nut	M14	1	97	9.7	70	
Middle driven gear bearing housing	Bolt	M8	4	25	2.5	18	
Middle driven shaft bearing retainer	Nut	M55	1	80	8.0	58	 Left-hand threads
Shift arm	Bolt	M6	1	14	1.4	10	
Shift rod	Nut	M8	2	15	1.5	11	
Primary sheave assembly	Nut	M16	1	100	10.0	72	
Secondary sheave assembly	Nut	M16	1	100	10.0	72	
Secondary sheave spring retainer	Nut	M36	1	90	9.0	65	
Shift lever	Bolt	M6	1	14	1.4	10	
Shift control cable	—	M12	1	6	0.6	4.3	
Select lever unit	Bolt	M8	3	15	1.5	11	
Shift cam ball holding bolt	—	M14	1	18	1.8	13	
CDI unit	Screw	M6	2	7	0.7	5.1	
Neutral switch	—	M10	1	20	2.0	14	
Reverse switch	—	M10	1	20	2.0	14	
Parking switch	—	M10	1	20	2.0	14	
Stator assembly	Screw	M6	3	7	0.7	5.1	
Pickup coil	Bolt	M5	2	7	0.7	5.1	
Ignition coil	Bolt	M6	2	7	0.7	5.1	
Thermo switch (cylinder head)	—	M1/8	1	8	0.8	5.8	
Speed sensor	Bolt	M6	1	10	1.0	7.2	
Thermo switch (radiator)	—	M18	1	28	2.8	20	
Speedometer gear unit	Bolt	M6	2	10	1.0	7.2	



**CHASSIS**

Item	Standard	Limit
Steering system: Steering bearing type	Bushings (top) Ball bearing (bottom)	----
Front suspension: Shock absorber travel	106 mm (4.17 in)	----
Fork spring free length	317.5 mm (12.50 in)	----
Spring fitting length	256.5 mm (10.09 in)	----
Spring rate (K1)	14 N/mm (1.43 kg/mm, 79.94 lb/in)	----
Stroke (K1)	0 ~ 106 mm (0 ~ 4.17 in)	----
Optional spring	No	----
Rear suspension: Shock absorber travel	130 mm (5.12 in)	----
Spring free length	319 mm (12.56 in)	----
Spring fitting length	285.5 mm (11.24 in)	----
Spring rate (K1)	31.4 N/mm (3.20 kg/mm, 179.29 lb/in)	----
Stroke (K1)	0 ~ 130 mm (0 ~ 5.12 in)	----
Optional spring	No	----
Swingarm: Free play limit	end	1 mm (0.04 in)
	side	1 mm (0.04 in)
Front wheel: Type	Panel wheel	----
Rim size	12 × 6.0 AT	----
Rim material	Steel	----
Rim runout limit	radial	2 mm (0.08 in)
	lateral	2 mm (0.08 in)
Rear wheel: Type	Panel wheel	----
Rim size	12 × 7.5 AT	----
Rim material	Steel	----
Rim runout limit	radial	2 mm (0.08 in)
	lateral	2 mm (0.08 in)

# MAINTENANCE SPECIFICATIONS

**SPEC**



Item	Standard	Limit
<b>Front disc brake:</b>		
Type	Dual	----
Disc outside diameter × thickness	180.0 × 3.5 mm (7.09 ~ 0.14 in)	----
Pad thickness                      inner	4.5 mm (0.18 in)	1 mm (0.04 in)
Pad thickness                      outer	4.5 mm (0.18 in)	1 mm (0.04 in)
Master cylinder inside diameter	14 mm (0.55 in)	----
Caliper cylinder inside diameter	32 mm (1.26 in)	----
Brake fluid type	DOT 4	----
<b>Rear disc brake:</b>		
Type	Single	----
Disc outside diameter × thickness	220.0 × 3.6 mm (8.66 ~ 0.14 in)	----
Pad thickness                      inner	5.6 mm (0.22 in)	1 mm (0.04 in)
Pad thickness                      outer	5.6 mm (0.22 in)	1 mm (0.04 in)
Master cylinder inside diameter	14 mm (0.55 in)	----
Caliper cylinder inside diameter	32 mm (1.26 in)	----
Brake fluid type	DOT 4	----
<b>Brake lever and brake pedal:</b>		
Brake lever free play (at lever end)	0 mm (0 in)	----
Brake lever free play (left)	0.5 ~ 2 mm (0.02 ~ 0.08 in)	----
Brake pedal position	53 ~ 60 mm (2.09 ~ 2.36 in)	----
Throttle lever free play	3 ~ 5 mm (0.12 ~ 0.20 in)	----



### Tightening torques

Part to be tightened	Thread size	Tightening torque			Remarks
		Nm	m·kg	ft·lb	
Engine bracket (front-upper) and frame	M8	33	3.3	24	
Engine bracket (front-lower) and frame	M8	33	3.3	24	
Engine bracket (front-upper) and engine	M10	42	4.2	30	
Engine bracket (front-lower) and engine	M10	42	4.2	30	
Engine and frame	M10	56	5.6	40	
Frame and bearing retainer (steering stem holder bearing)	M42	40	4.0	29	
Select lever assembly and frame	M8	23	2.3	17	
Pivot shaft and frame	M12	82	8.2	60	
Rear shock absorber and frame	M12	82	8.2	60	
Final gear case and swingarm	M10	57	5.7	41	
Final gear case and swingarm	M10	63	6.3	46	
Differential gear case and frame	M10	55	5.5	40	
Front arm and frame	M10	45	4.5	32	
Front shock absorber and frame	M10	45	4.5	32	
Front shock absorber and upper front arm	M10	45	4.5	32	
Steering stem, pitman arm and frame	M14	110	11.0	80	
Steering stem holder and frame	M8	23	2.3	17	Use lock washer
Steering stem and handlebar holder	M8	20	2.0	14	
Pitman arm and tie-rod end	M10	25	2.5	18	
Tie-rod and locknut	M10	15	1.5	11	
Steering knuckle and upper front arm	M10	25	2.5	18	
Steering knuckle and lower front arm	M10	48	4.8	35	
Steering knuckle and tie-rod	M10	25	2.5	18	
Fuel tank and fuel cock	M6	4	0.4	2.9	
Front wheel and wheel hub	M10	55	5.5	40	
Front axle and wheel hub	M16	150	15.0	110	
Steering knuckle and brake caliper	M8	30	3.0	22	
Front brake disc and wheel hub	M8	30	3.0	22	
Rear wheel and rear wheel hub	M10	55	5.5	40	
Rear axle and nut	M16	150	15	110	
Swingarm and rear brake caliper	M8	30	3.0	22	
Rear brake disc and brake disc bracket	M8	28	2.8	20	
Front brake pipe nut	M10	19	1.9	13	
Front brake hose union bolt	M10	27	2.7	19	
Rear brake hose union bolt	M10	30	3.0	22	
Bleed screw	M8	6	0.6	4.3	
Master cylinder and handlebar	M6	7	0.7	5.1	
Footrest and frame	M8	33	3.3	24	

# MAINTENANCE SPECIFICATIONS

**SPEC**



Part to be tightened	Thread size	Tightening torque			Remarks
		Nm	m·kg	ft·lb	
Front bumper and frame	M8	33	3.3	24	
Front carrier and frame	M8	33	3.3	24	
Front carrier and front bumper	M8	33	3.3	24	
Rear carrier and frame	M8	33	3.3	24	
Differential gear case filler bolt	M14	23	2.3	16	
Differential gear case drain bolt	M10	10	1.0	7	
Ring gear	M8	39	3.9	28	
Differential gear case and bearing housing	M8	25	2.5	18	
Gear motor	M8	13	1.3	9.4	
Four-wheel drive switch	M10	20	2.0	14	
Final gear case oil filler bolt	M14	23	2.3	16	
Final gear case oil drain bolt	M14	23	2.3	16	
Bearing retainer (drive pinion gear)	M65	100	10.0	72	
Final gear case and bearing housing	M10	40	4.0	29	
Final gear case and bearing housing	M8	23	2.3	17	



**ELECTRICAL**

Item	Standard	Limit
Voltage:	12 V	----
Ignition system:		
Ignition timing (B.T.D.C.)	10°/ 1,000 r/min	----
Advanced timing (B.T.D.C.)	33°/ 5,000 r/min	----
Advancer type	Digital type	----
C.D.I.:		
Magneto model/manufacture	F4T46471/MITSUBISHI	----
Pickup coil resistance/color	459 ~ 561 Ω at 20 °C (68 °F)/ White/Red – White/Green	----
Rotor rotation direction sensing coil resistance/color	0.104 ~ 0.127 Ω at 20 °C (68 °F)/ Red – White/Blue	----
C.D.I. unit model/manufacture	F8T36472/MITSUBISHI	----
Ignition coil:		
Model/manufacture	2JN/YAMAHA	----
Minimum spark gap	6 mm (0.24 in)	----
Primary winding resistance	0.18 ~ 0.28 Ω at 20 °C (68 °F)	----
Secondary winding resistance	6.32 ~ 9.48 kΩ at 20 °C (68 °F)	----
Spark plug cap:		
Type	Resin type	----
Resistance	10 kΩ	----
Charging system:		
Type	A.C. magneto generator	----
Model/manufacture	F4T464/MITSUBISHI	----
Nominal output	14 V 12 A at 3,000 r/min	----
Charging coil resistance/color	0.70 ~ 0.86 Ω at 20 °C (68 °F)/ White – White	----
Rectifier:		
Model/manufacture	SH640E-11/SHINDENGEN	----
Capacity	14 A	----
Withstand voltage	200 V	----
Electric starter system:		
Type	Constantmesh type	----
Starter motor		
Model/manufacture	SM-13/MITSUBA	----
I.D. number	SM-13486	----
Output	0.7 kW	----
Armature coil resistance	0.025 ~ 0.035 Ω at 20 °C (68 °F)	----
Brush overall length	10 mm (0.39 in)	5 mm (0.20 in)
Spring force	7.65 ~ 10.01 N (27.54 ~ 36.03 oz)	----
Commutator diameter	28 mm (1.10 in)	27 mm (1.06 in)
Mica undercut	0.7 mm (0.03 in)	----

# MAINTENANCE SPECIFICATIONS

**SPEC**



Item	Standard	Limit
<b>Starter relay</b> Model/manufacture Amperage rating Coil winding resistance	MS5F-561/JIDECO 180 A 4.18 ~ 4.62 Ω at 20 °C (68 °F)	---- ---- ----
<b>Horn:</b> Type Quantity Model/manufacture Maximum amperage Performance Coil winding resistance	Plane type 1 MF-12/NIKKO 1.5 A 100 ~ 108 db/2 m 4.35 ~ 4.80 Ω	---- ---- ---- ---- ---- ----
<b>Electric fan:</b> Running rpm	3,000 r/min	----
<b>Thermostat switch:</b> Model/manufacture	4BA/DENSO	----
<b>Circuit breaker:</b> Type Amperage for individual circuit Main fuse Headlight fuse Signal fuse Ignition fuse Auxiliary DC jack fuse Four-wheel drive fuse Reserve Reserve Reserve Reserve	Fuse 30 A × 1 15 A × 1 10 A × 1 10 A × 1 10 A × 1 3 A × 1 30 A × 1 15 A × 1 10 A × 1 3 A × 1	---- ---- ---- ---- ---- ---- ---- ---- ---- ----

# HOW TO USE THE CONVERSION TABLE/ GENERAL TORQUE SPECIFICATIONS

**SPEC**



EB201000

## HOW TO USE THE CONVERSION TABLE

All specification data in this manual are listed in SI and METRIC UNITS.

Use this table to convert METRIC unit data to IMPERIAL unit data.

Ex.

METRIC	MULTIPLIER	IMPERIAL
** mm	× 0.03937	= ** in
2 mm	× 0.03937	= 0.08 in

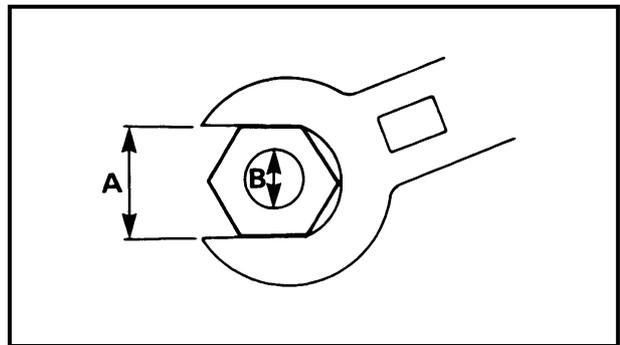
## CONVERSION TABLE

METRIC TO IMPERIAL			
	Metric unit	Multiplier	Imperial unit
Torque	m·kg	7.233	ft·lb
	m·kg	86.794	in·lb
	cm·kg	0.0723	ft·lb
	cm·kg	0.8679	in·lb
Weight	kg	2.205	lb
	g	0.03527	oz
Speed	km/hr	0.6214	mph
Distance	km	0.6214	mi
	m	3.281	ft
	m	1.094	yd
	cm	0.3937	in
	mm	0.03937	in
Volume/ Capacity	cc (cm <sup>3</sup> )	0.03527	oz (IMP liq.)
	cc (cm <sup>3</sup> )	0.06102	cu-in
	lt (liter)	0.8799	qt (IMP liq.)
	lt (liter)	0.2199	gal (IMP liq.)
Misc.	kg/mm	55.997	lb/in
	kg/cm <sup>2</sup>	14.2234	psi (lb/in <sup>2</sup> )
	Centigrade (°C)	9/5+32	Fahrenheit (°F)

EB202001

## GENERAL TORQUE SPECIFICATIONS

This chart specifies torque for standard fasteners with standard I.S.O. pitch threads. Torque specifications for special components or assemblies are provided for each chapter of this manual. To avoid warpage, tighten multi-fastener assemblies in a criss-cross fashion, in progressive stages, until the specified torque is reached. Unless otherwise specified, torque specifications require clean, dry threads. Components should be at room temperature.



A: Distance between flats

B: Outside thread diameter

A (nut)	B (bolt)	General torque specifications		
		Nm	m·kg	ft·lb
10 mm	6 mm	6	0.6	4.3
12 mm	8 mm	15	1.5	11
14 mm	10 mm	30	3.0	22
17 mm	12 mm	55	5.5	40
19 mm	14 mm	85	8.5	61
22 mm	16 mm	130	13.0	94



LUBRICATION POINTS AND LUBRICANT TYPES

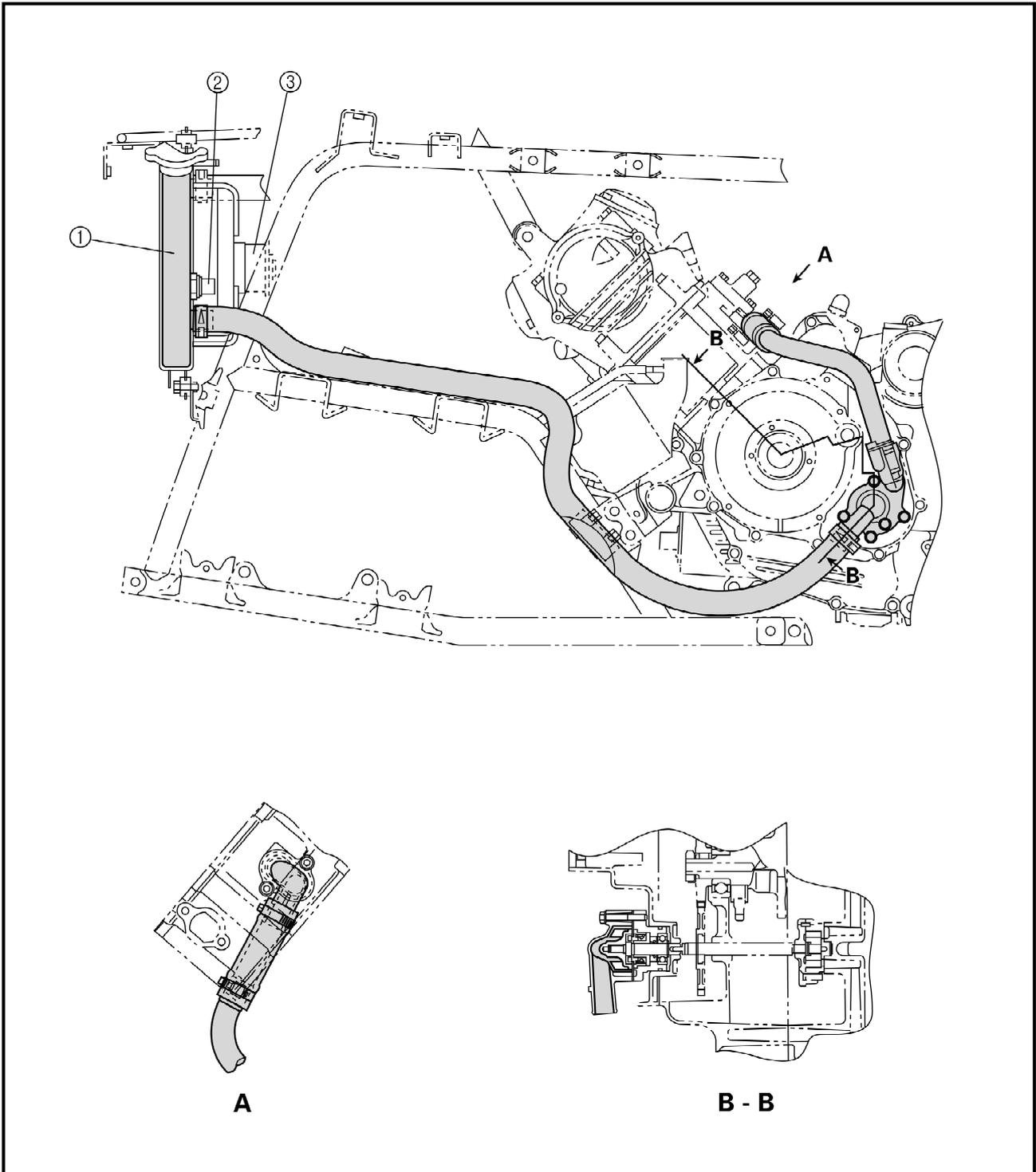
ENGINE

Lubrication points	Lubricant type
Oil seal lips (all)	
O-ring (all)	
Bearings (all)	
Crank pin	
Connecting rod (bearing)	
Camshaft sprocket	
Crankshaft	
Piston surface/piston rings	
Piston pin	
Buffer boss	
Valve stem/valve stem end	
Rocker arm shaft	
Rocker arm	
Camshaft lobe/journal	
Cylinder head bolt	
Oil pump shaft, rotor, housing	
Oil filter O-ring	
Starter idle gear shaft	
Transmission gear (wheel/pinion)	
Axle (main/drive)	
Shift fork/guide bar	
Shift cam/shift shaft/shift cam stopper ball	
Shift lever (select lever)/shift guide	
Shift cam lever	
Stopper lever	
Clutch housing	
One-way bearing	
Drive chain/sprocket	
Driven cam	
Front drive shaft collar	
Crankcase mating surfaces	Sealant (Quick Gasket®) Yamaha Bond No.1215
Stater lead grommet (left side crankcase)	Sealant (Quick Gasket®) Yamaha Bond No.1215



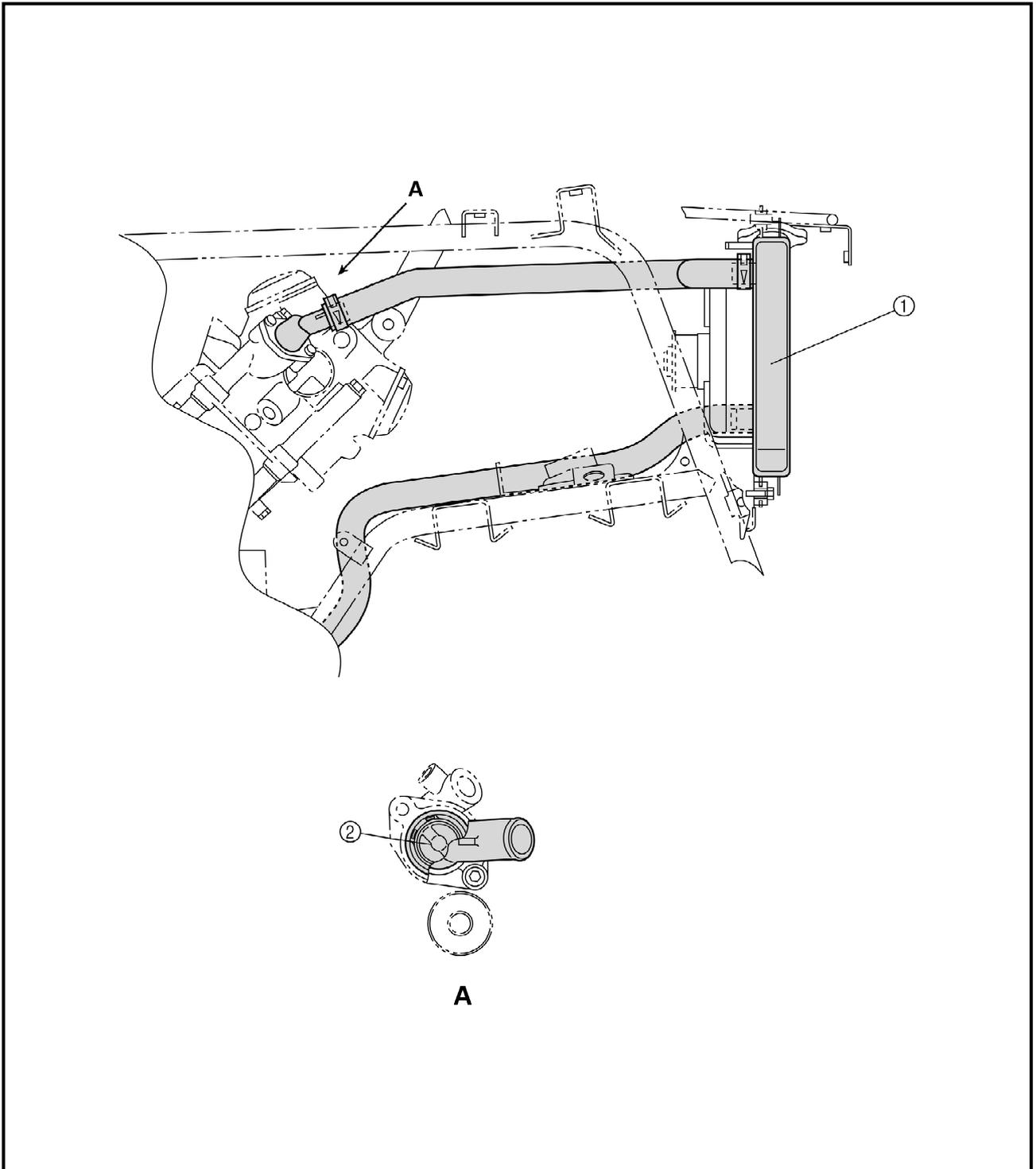
**COOLANT FLOW DIAGRAMS**

- ① Radiator
- ② Thermo switch
- ③ Fan motor





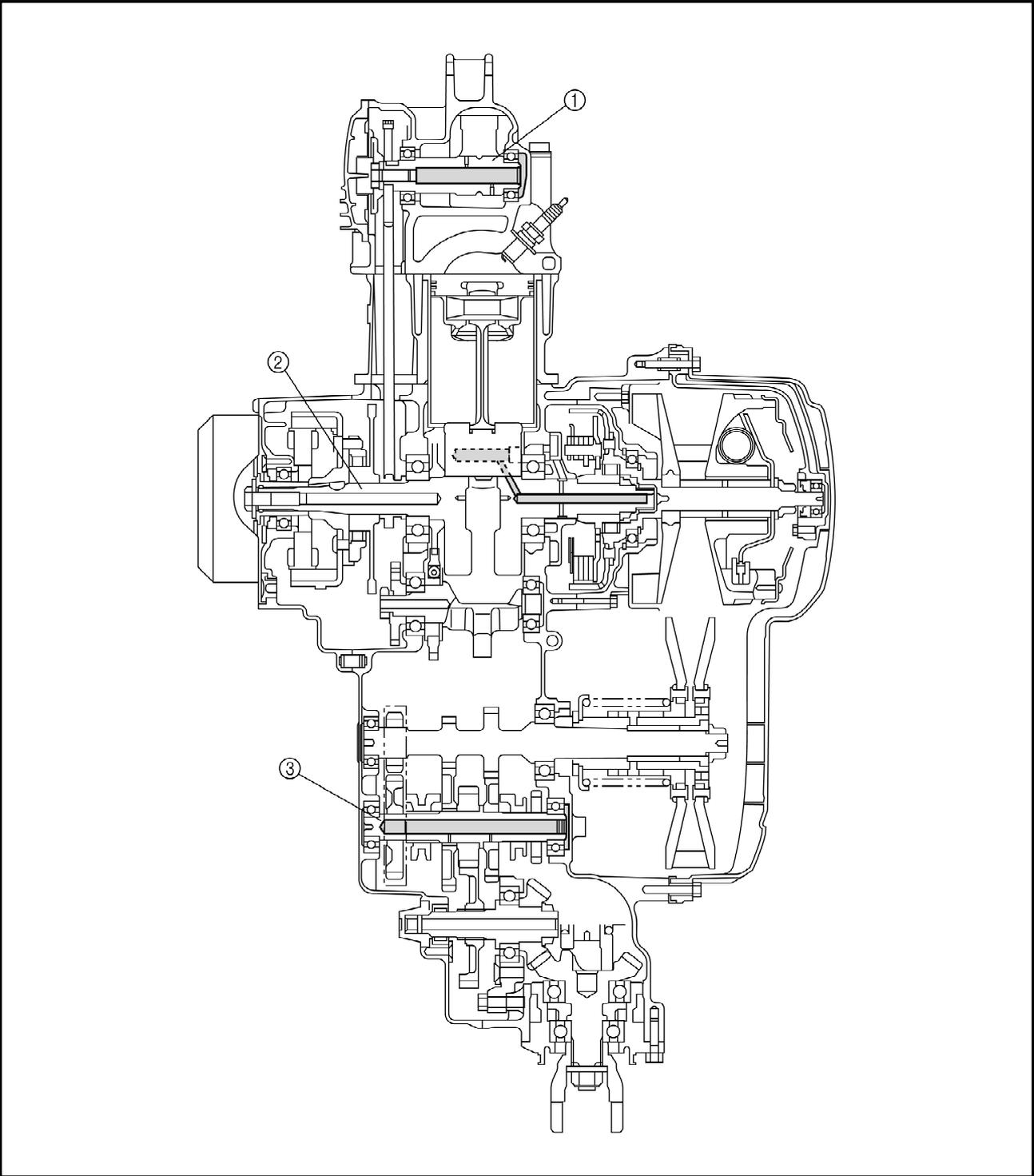
- ① Radiator
- ② Thermostat





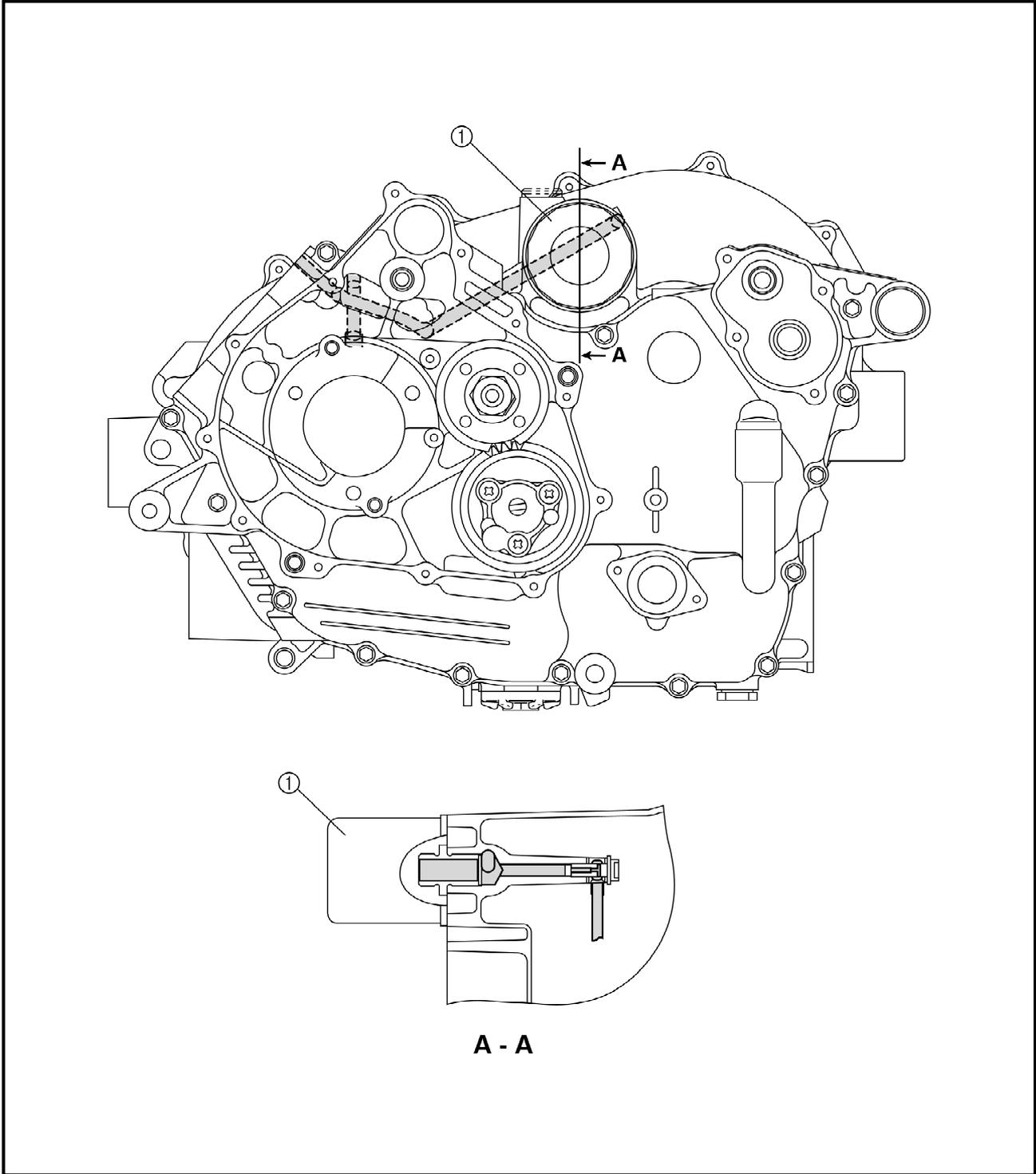
**OIL FLOW DIAGRAMS**

- ① Camshaft
- ② Crankshaft
- ③ Drive axle



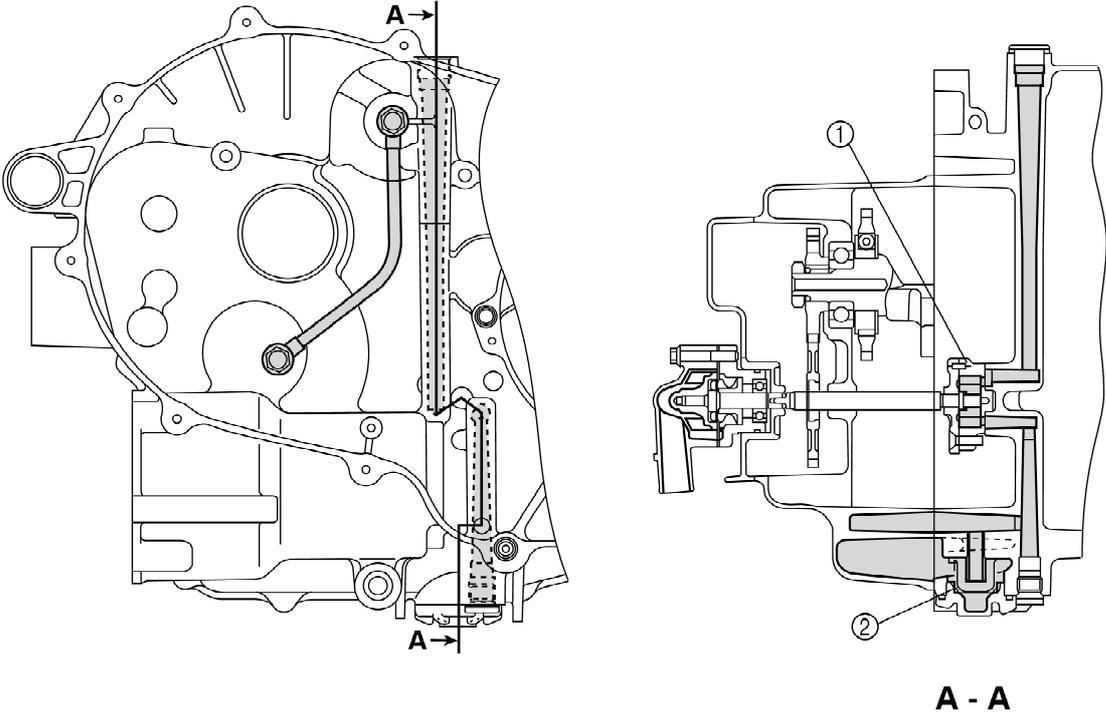


① Oil filter





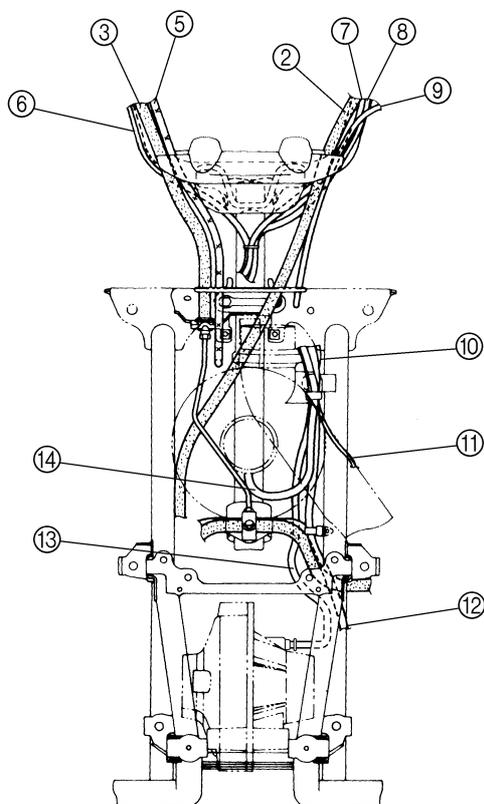
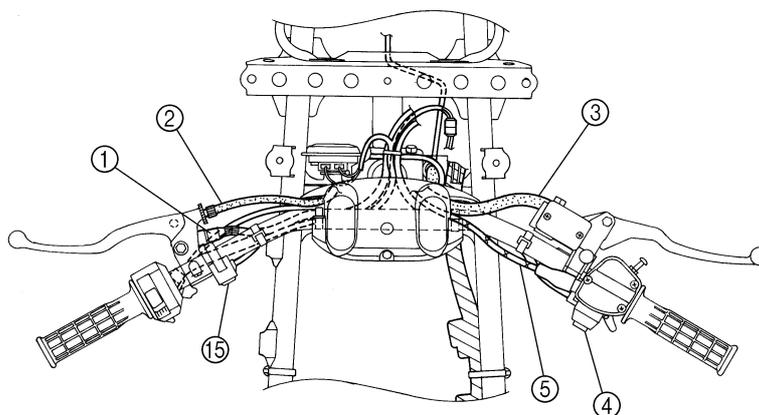
- ① Oil pump
- ② Oil strainer





**CABLE ROUTING**

- ① Rear brake switch
- ② Rear brake cable
- ③ Front brake hose
- ④ On command four-wheel drive switch
- ⑤ Throttle cable
- ⑥ On command four-wheel drive switch lead
- ⑦ Front brake switch lead
- ⑧ Handlebar switch
- ⑨ Starter cable
- ⑩ Coolant reservoir breather hose
- ⑪ Sub-wire harness 1 (to fan motor coupler)
- ⑫ Sub-wire harness 1 (to gear motor and four-wheel drive switch)
- ⑬ Differential gear case breather hose
- ⑭ Fan motor breather hose
- ⑮ Horn switch

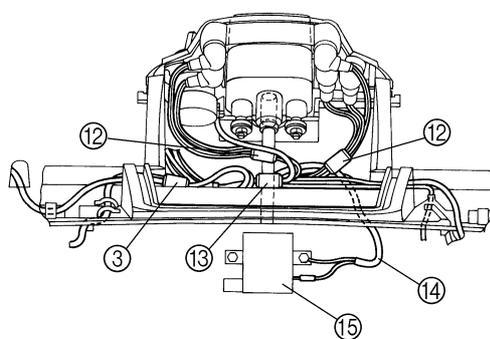
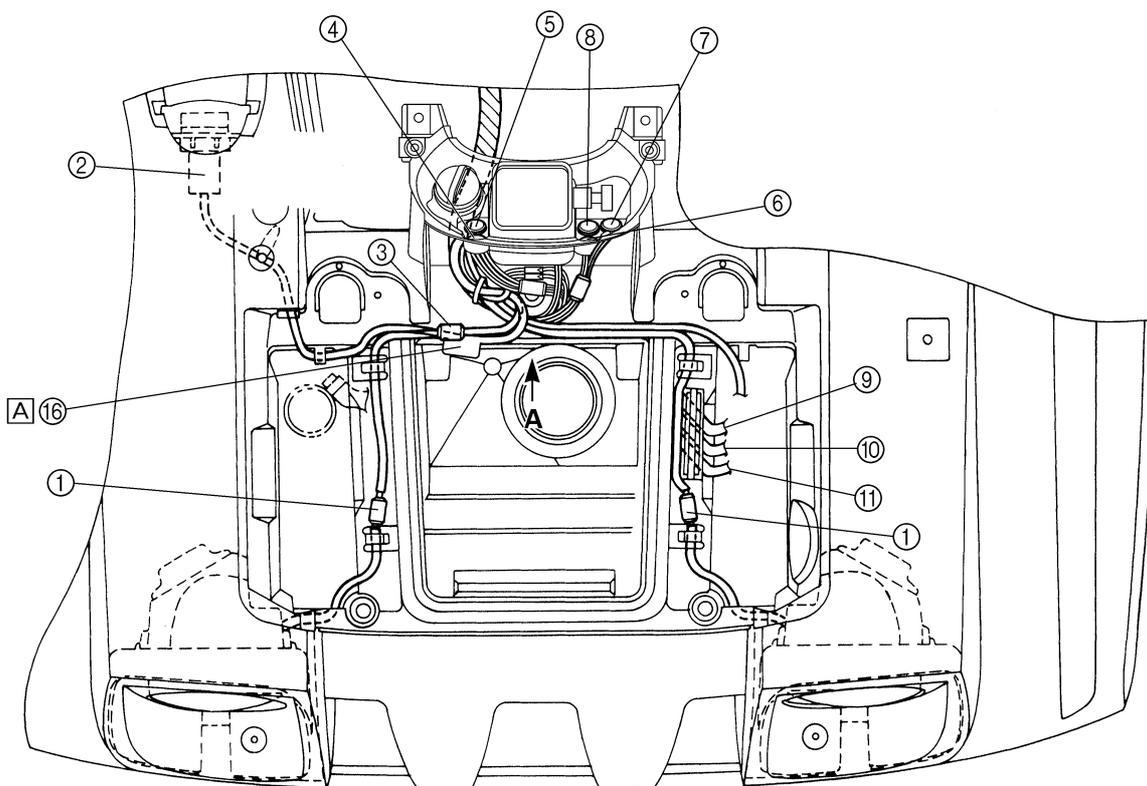




- ① Headlight coupler
- ② Terminal
- ③ Terminal coupler
- ④ Engine temperature warning light
- ⑤ Four-wheel drive indicator light
- ⑥ Neutral indicator light
- ⑦ Parking indicator light
- ⑧ Reverse indicator light
- ⑨ Coolant reservoir breather hose
- ⑩ Fan motor breather hose

- ⑪ Differential gear case breather hose
- ⑫ Indicator light coupler
- ⑬ Main switch coupler
- ⑭ Ignition coil lead
- ⑮ Ignition coil
- ⑯ Circuit breaker

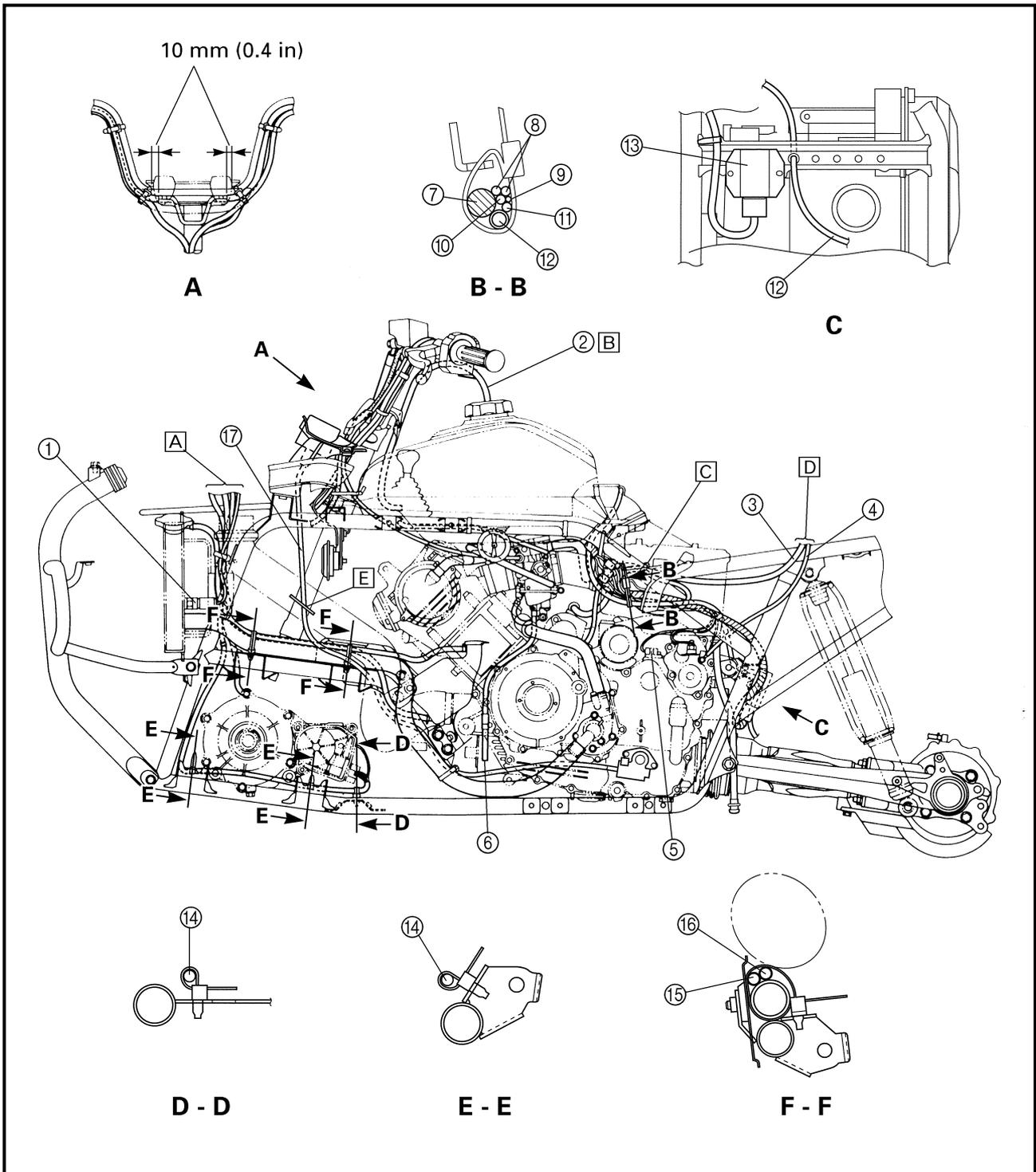
Ⓐ Connect the headlight lead of the circuit breaker to the headlight on the right side.



**A**

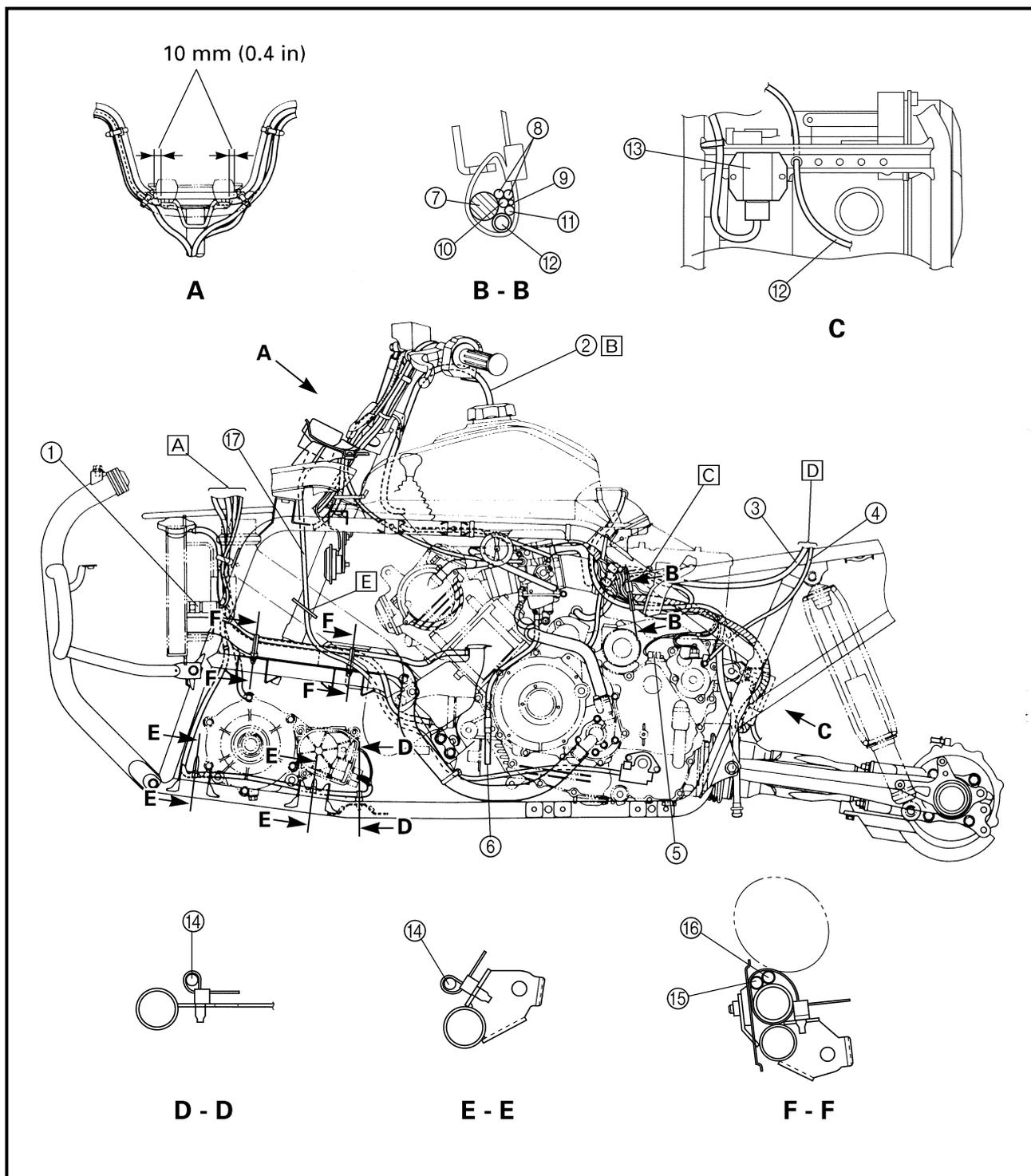


- |                           |                                       |
|---------------------------|---------------------------------------|
| ① Thermo switch           | ⑩ Speed sensor                        |
| ② Fuel tank breather hose | ⑪ CDI magneto lead                    |
| ③ Starter motor lead      | ⑫ Final drive gear case breather hose |
| ④ Negative battery lead   | ⑬ Rectifier/regulator                 |
| ⑤ Speed sensor            | ⑭ Sub-wire harness 1                  |
| ⑥ Carburetor drain hose   | ⑮ Coolant reservoir breather hose     |
| ⑦ Wire harness            | ⑯ Coolant reservoir hose              |
| ⑧ Sub-wire harness 2      | ⑰ Speedometer cable                   |
| ⑨ Ground lead             |                                       |



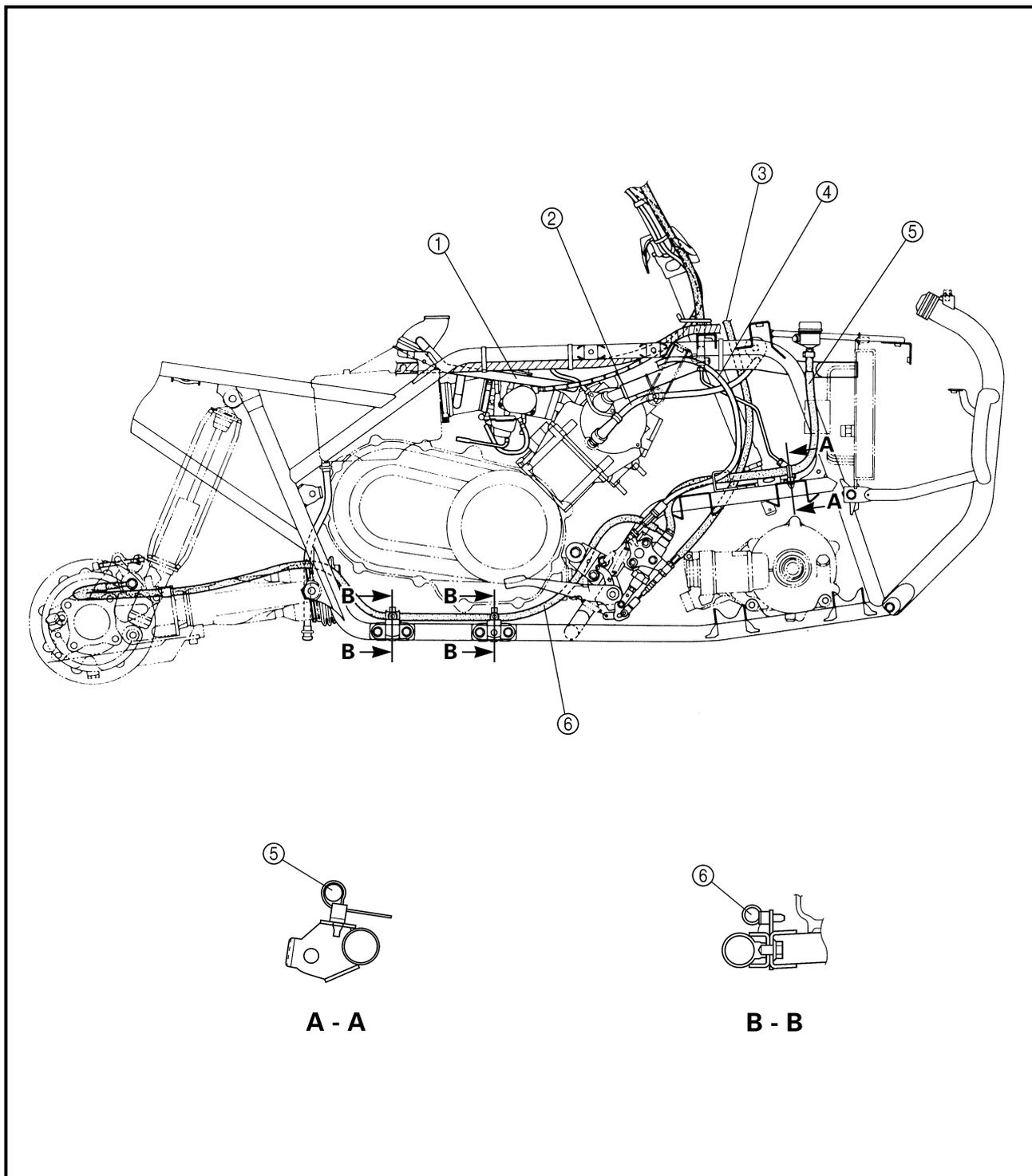


- A** To hole on the front fender.
- B** Insert the fuel tank into the hole in the handlebar cover.
- C** Fasten the CDI magneto lead and starter motor lead with a plastic band.
- D** To hole on the rear fender.
- E** Pass the speedometer cable through the guide on the air duct.





- ① Cylinder head breather hose
- ② Spark plug lead
- ③ Rear brake cable
- ④ Select lever control cable
- ⑤ Rear brake reservoir hose
- ⑥ Rear brake hose

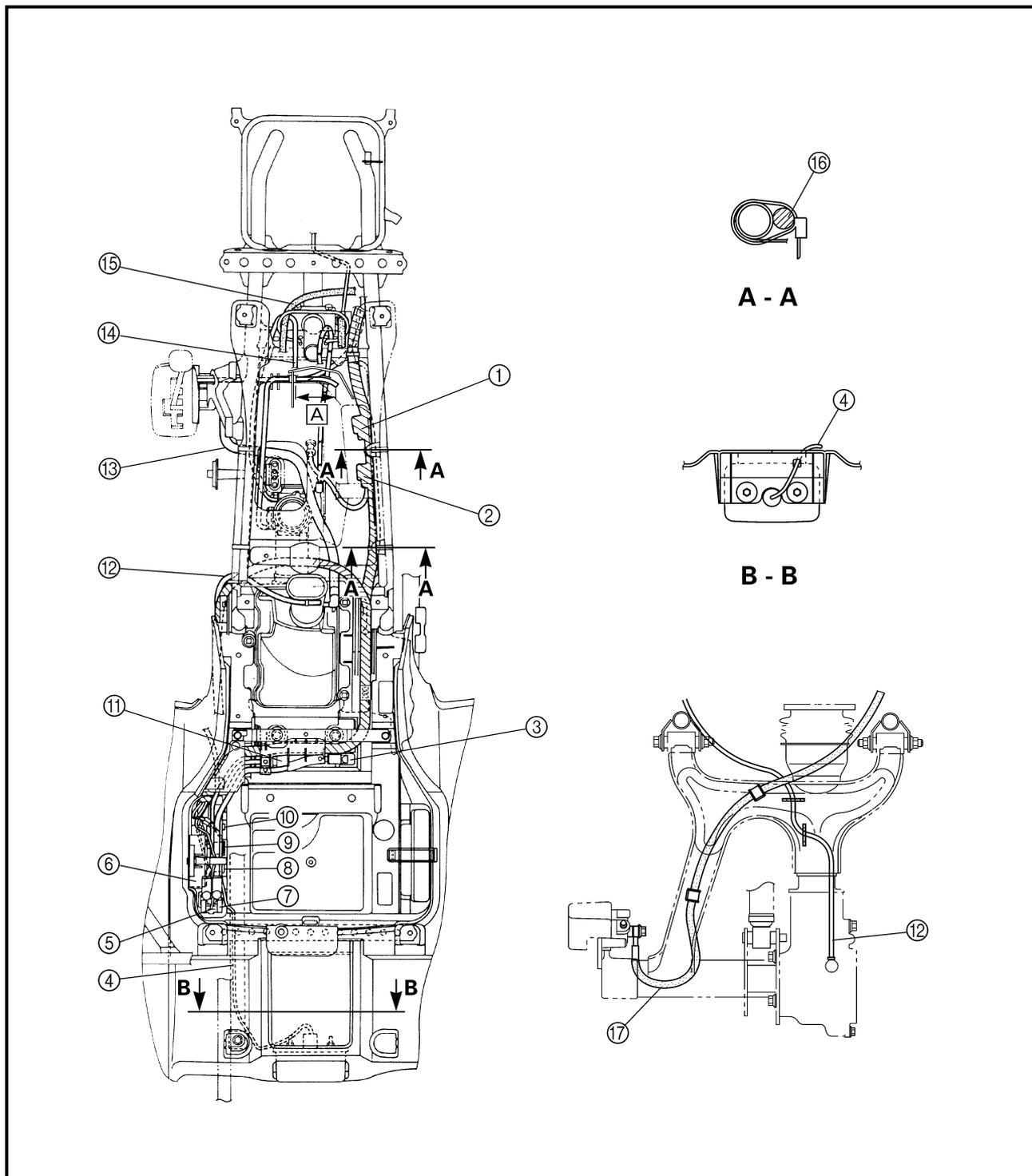




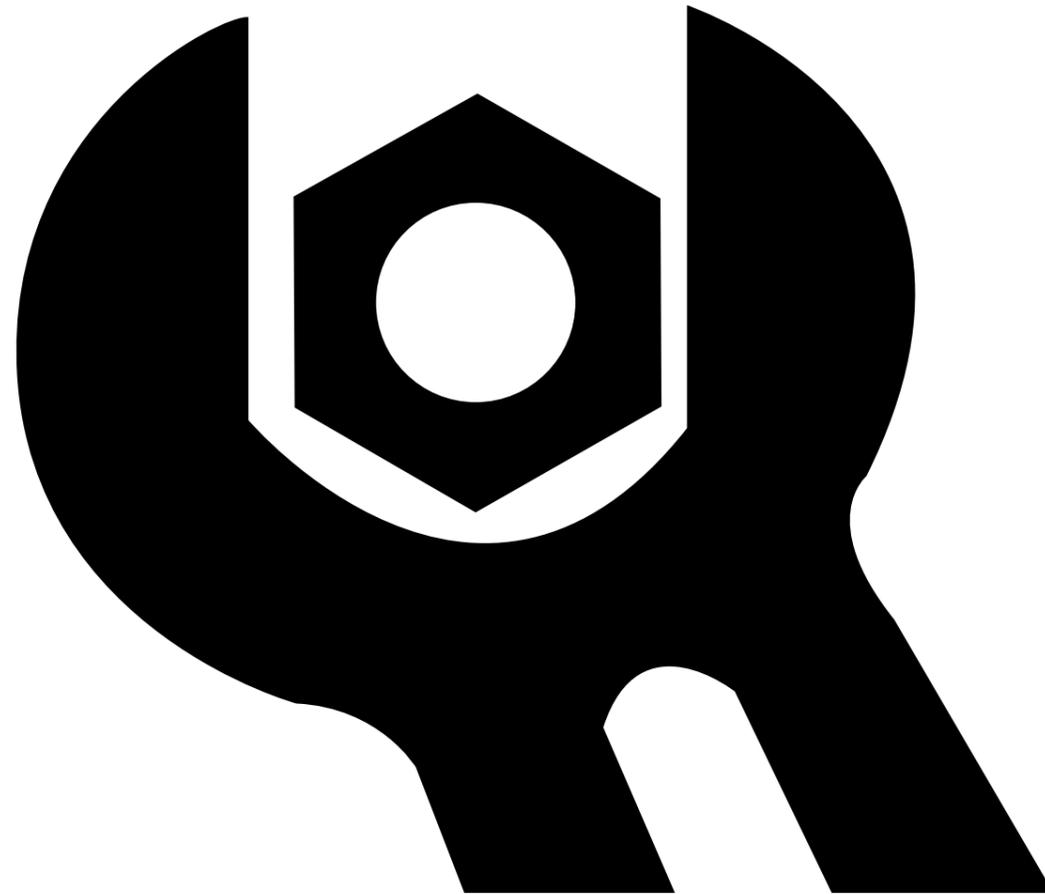
- ① Diode 1
- ② Diode 2
- ③ Positive battery lead
- ④ Taillight lead
- ⑤ Starter relay
- ⑥ CDI unit
- ⑦ Main fuse
- ⑧ Reverse relay
- ⑨ Starting circuit cut-off relay
- ⑩ Fuse box

- ⑪ Negative battery lead
- ⑫ Final drive gear case breather hose
- ⑬ Cylinder head breather hose
- ⑭ Starter cable
- ⑮ Rear brake cable
- ⑯ Wire harness
- ⑰ Rear brake hose

△ 65 ~ 75 mm (2.6 ~ 3.0 in)







**INSP**

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**ADJ**

**3**

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## CHAPTER 3. PERIODIC INSPECTIONS AND ADJUSTMENTS

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EB300000

## PERIODIC INSPECTIONS AND ADJUSTMENTS

### INTRODUCTION

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

EB301000

### PERIODIC MAINTENANCE/LUBRICATION INTERVALS

ITEM	ROUTINE	INITIAL			EVERY	
		1 month	3 months	6 months	6 months	1 year
<b>Valves*</b>	<ul style="list-style-type: none"> <li>• Check valve clearance.</li> <li>• Adjust if necessary.</li> </ul>	<input type="radio"/>		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Cooling system</b>	<ul style="list-style-type: none"> <li>• Check coolant leakage.</li> <li>• Repair if necessary.</li> <li>• Replace coolant every 24 months.</li> </ul>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Spark plug</b>	<ul style="list-style-type: none"> <li>• Check condition.</li> <li>• Adjust gap and clean.</li> <li>• Replace if necessary.</li> </ul>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Air filter</b>	<ul style="list-style-type: none"> <li>• Clean.</li> <li>• Replace if necessary.</li> </ul>	Every 20~40 hours (More often in wet or dusty areas.)				
<b>Carburetor*</b>	<ul style="list-style-type: none"> <li>• Check and adjust idle speed/starter operation.</li> <li>• Adjust if necessary.</li> </ul>		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Fuel line*</b>	<ul style="list-style-type: none"> <li>• Check fuel hose for cracks or damage.</li> <li>• Replace if necessary.</li> </ul>			<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Engine oil</b>	<ul style="list-style-type: none"> <li>• Replace (warm engine before draining).</li> </ul>	<input type="radio"/>		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Engine oil filter</b>	<ul style="list-style-type: none"> <li>• Replace.</li> </ul>	<input type="radio"/>		<input type="radio"/>		<input type="radio"/>
<b>Engine oil strainer*</b>	<ul style="list-style-type: none"> <li>• Clean.</li> </ul>	<input type="radio"/>		<input type="radio"/>		<input type="radio"/>
<b>Final gear oil</b>	<ul style="list-style-type: none"> <li>• Check oil level/oil leakage.</li> </ul>	<input type="radio"/>				<input type="radio"/>
<b>Differential gear oil</b>	<ul style="list-style-type: none"> <li>• Replace every 12 months.</li> </ul>					<input type="radio"/>
<b>Front brake*</b>	<ul style="list-style-type: none"> <li>• Check operation/fluid leakage.</li> <li>• Correct if necessary.</li> </ul>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Rear brake*</b>	<ul style="list-style-type: none"> <li>• Check operation/fluid leakage.</li> <li>• Correct if necessary.</li> </ul>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>V-belt*</b>	<ul style="list-style-type: none"> <li>• Check operation.</li> <li>• Check for cracks or damage every 12 months or 2,400 km (1,500 mi), whichever comes first.</li> </ul>	<input type="radio"/>				<input type="radio"/>
<b>Wheels*</b>	<ul style="list-style-type: none"> <li>• Check balance/damage/runout.</li> <li>• Repair if necessary.</li> </ul>	<input type="radio"/>		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Wheel bearing*</b>	<ul style="list-style-type: none"> <li>• Check bearing assemblies for looseness/damage.</li> <li>• Replace if damaged.</li> </ul>	<input type="radio"/>		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Front and rear suspension*</b>	<ul style="list-style-type: none"> <li>• Check operation.</li> <li>• Correct if necessary.</li> </ul>			<input type="radio"/>		<input type="radio"/>
<b>Steering system*</b>	<ul style="list-style-type: none"> <li>• Check operation/replace if damaged.</li> <li>• Check toe-in/adjust if necessary.</li> </ul>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Front axle boots*</b>	<ul style="list-style-type: none"> <li>• Check operation.</li> <li>• Replace if damaged.</li> </ul>	<input type="radio"/>				<input type="radio"/>
<b>Fittings and fasteners*</b>	<ul style="list-style-type: none"> <li>• Check all chassis fittings and fasteners.</li> <li>• Correct if necessary.</li> </ul>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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

## PERIODIC MAINTENANCE/LUBRICATION INTERVALS

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**NOTE:**

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- Recommended brake fluid: DOT 4
  - Brake fluid replacement:
    1. When disassembling the master cylinder or caliper cylinder, replace the brake fluid. Normally check the brake fluid level and add fluid as required.
    2. On the inner parts of the master cylinder and caliper cylinder, replace the oil seals every two years.
    3. Replace the brake hoses every four years, or if cracked or damaged.
- 

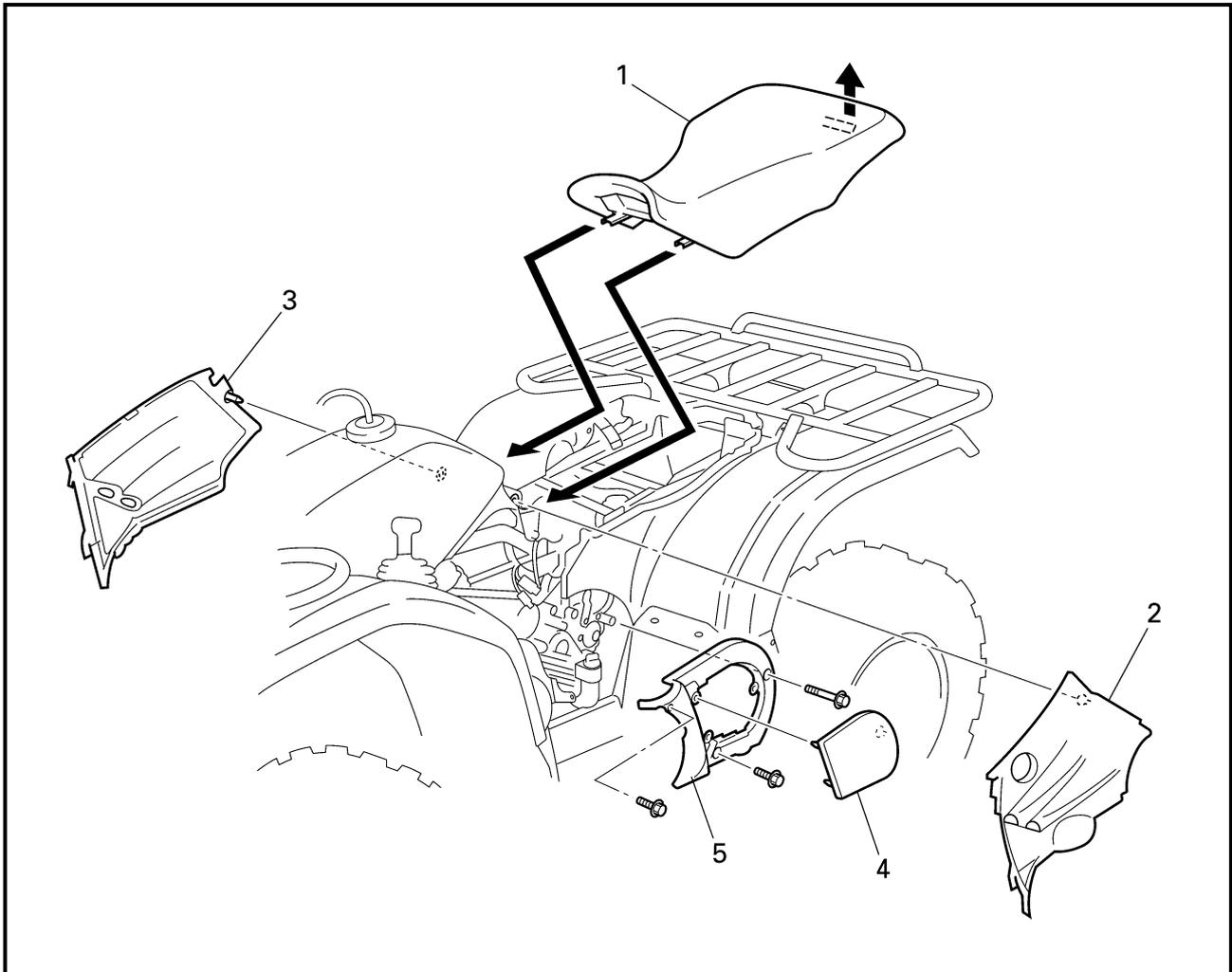
**⚠ WARNING**

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**Indicates a potential hazard that could result in serious injury or death.**

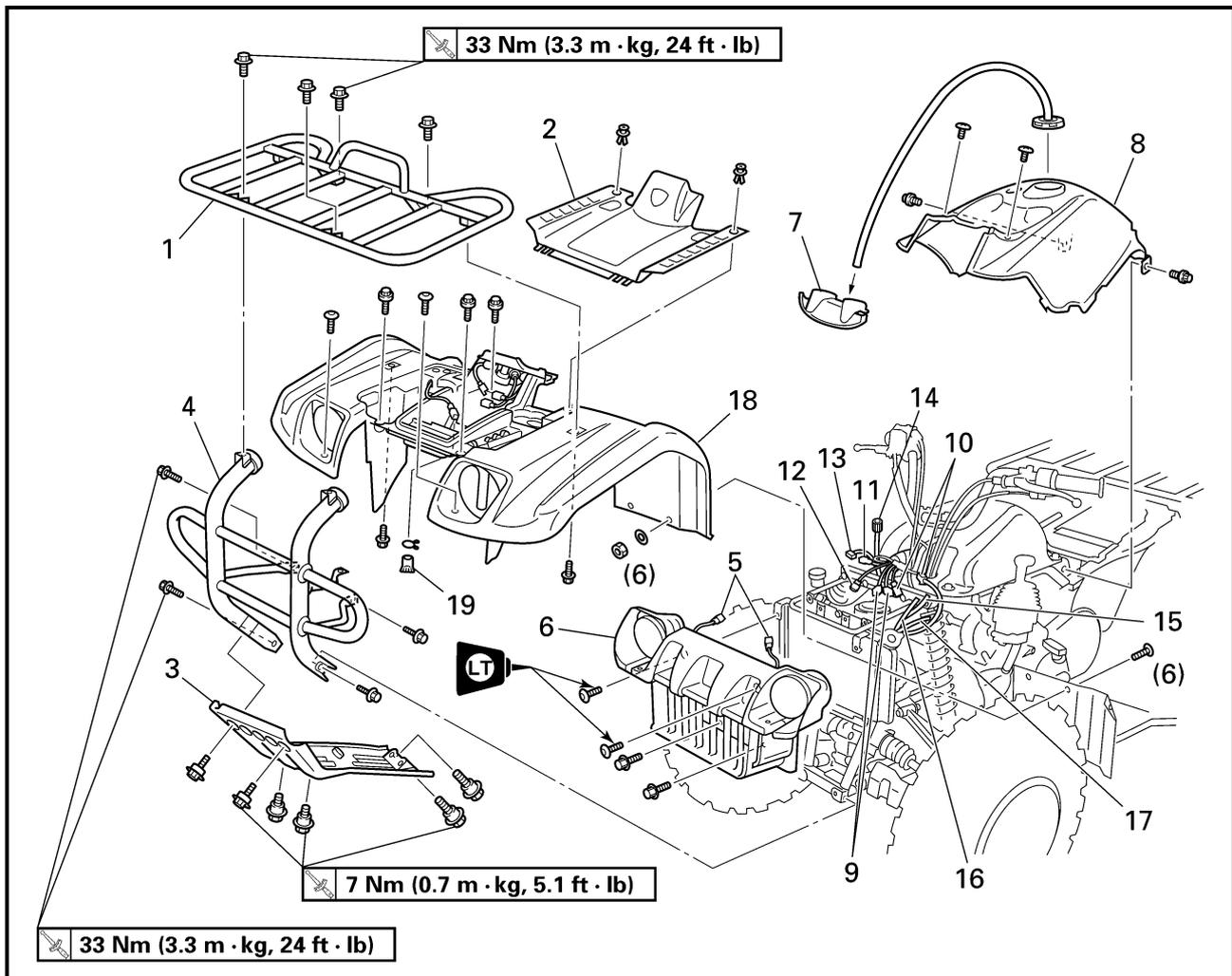
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**SEAT, CARRIERS, FENDERS AND FUEL TANK**  
SEAT AND SIDE PANELS

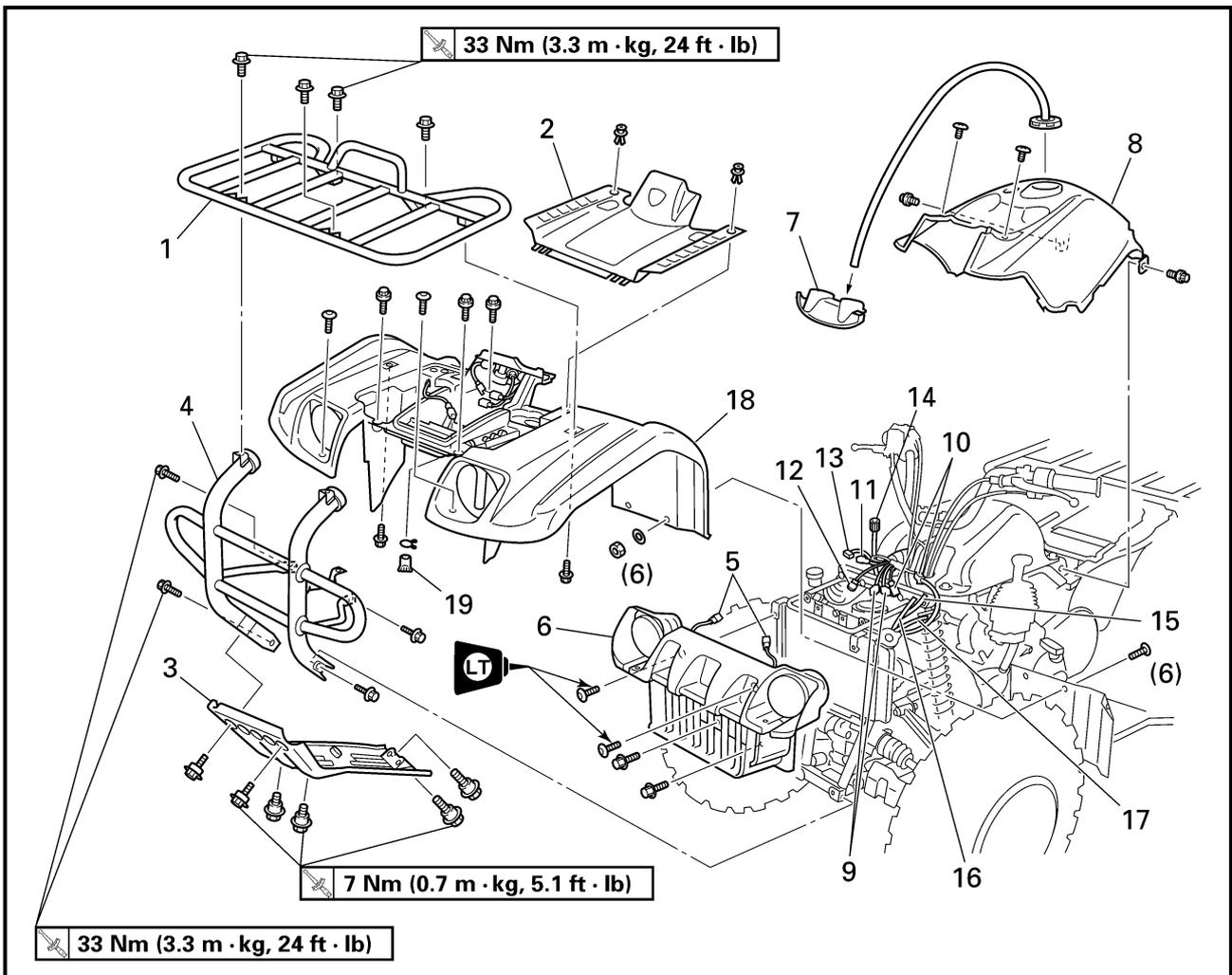


Order	Job name/Part name	Q'ty	Remarks
1	<b>Seat and side panels removal</b> Seat	1	Remove the parts in the order below. <b>NOTE:</b> _____ Pull up the seat lock lever, then pull up on the rear of the seat.
2	Fuel tank side panel (left)	1	
3	Fuel tank side panel (right)	1	
4	Engine side panel	1	
5	Engine side cover	1	
			For installation, reverse the removal procedure.

## FRONT CARRIER, FRONT BUMPER AND FRONT FENDER

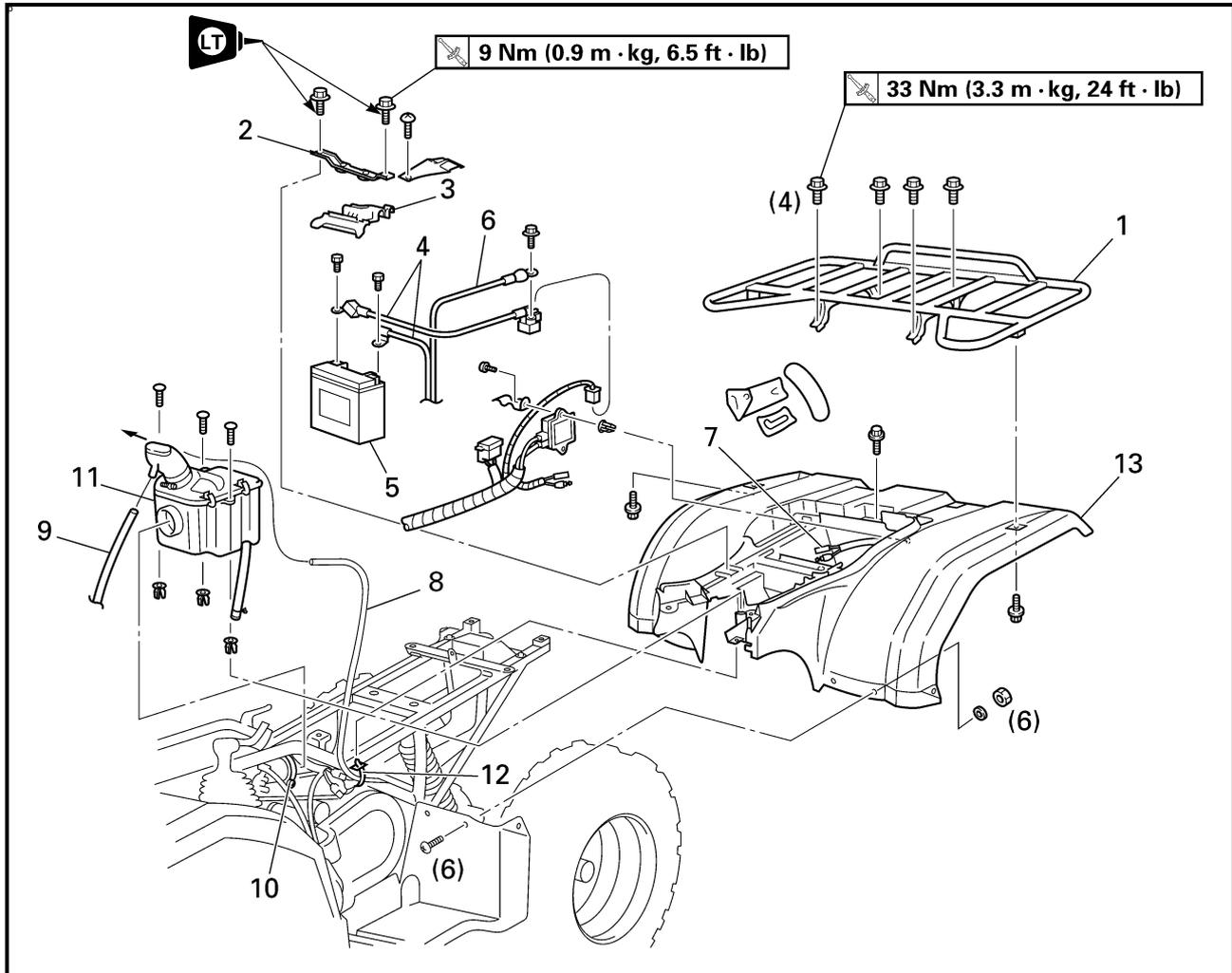


Order	Job name/Part name	Q'ty	Remarks
	<b>Front carrier, front bumper and front fender removal</b>		Remove the parts in the order below.
	Seat and fuel tank side panels		Refer to "SEAT AND SIDE PANELS".
1	Front carrier	1	
2	Front fender panel	1	
3	Engine skid plate (front)	1	
4	Front bumper	1	
5	Headlight coupler	2	
6	Front grill	1	
7	Handlebar cover	1	
8	Fuel tank cover	1	

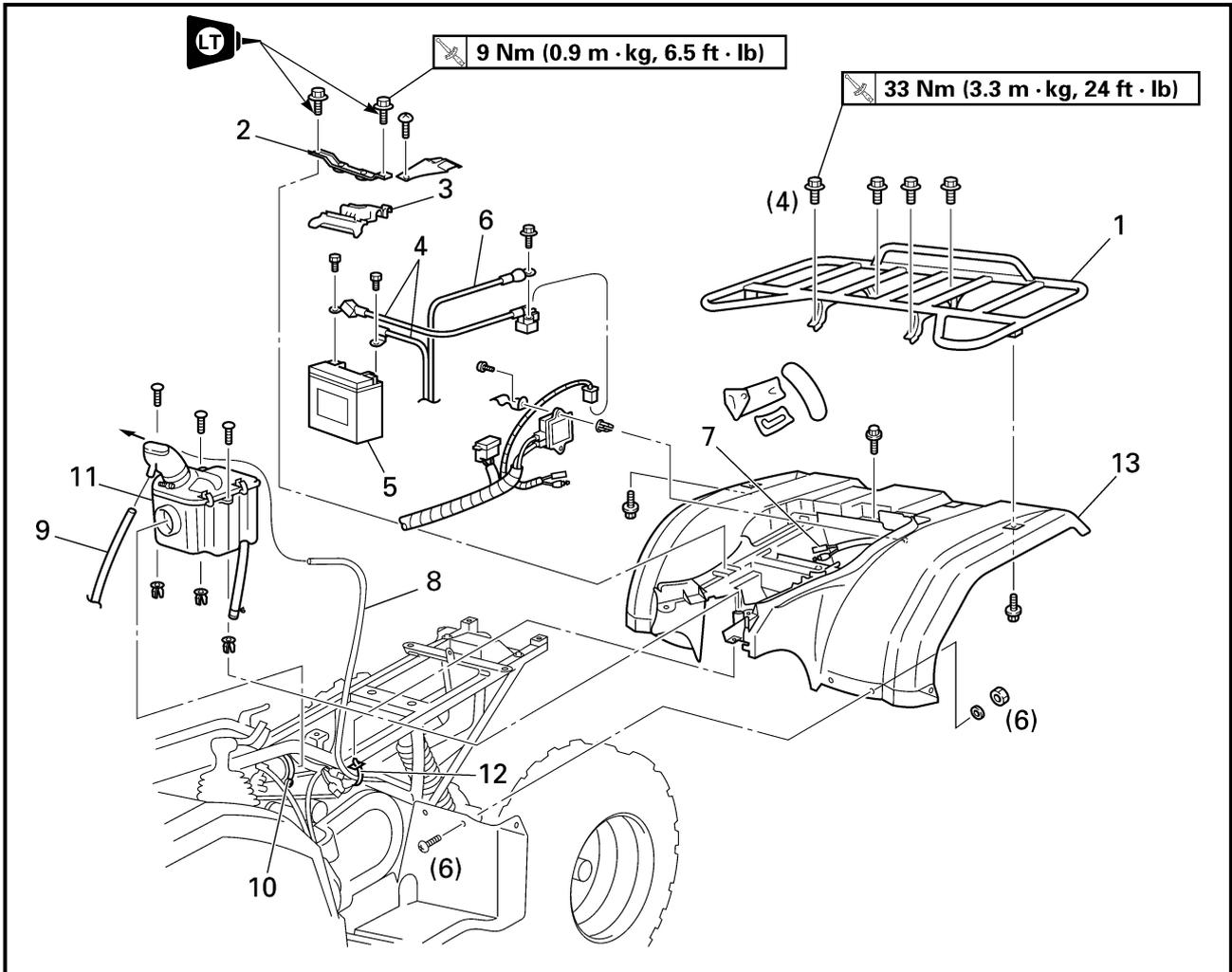


Order	Job name/Part name	Q'ty	Remarks
9	Indicator light coupler	2	Disconnect.
10	Sub-wire harness 1 coupler	1	Disconnect.
11	Main switch coupler	1	Disconnect.
12	Auxiliary DC jack coupler	1	Disconnect.
13	Speedometer light coupler	1	Disconnect.
14	Speedometer cable	1	Disconnect.
15	Coolant reservoir breather hose	1	
16	Fan motor breather hose	1	
17	Differential gear case breather hose	1	
18	Front fender	1	
19	Drain hose	1	
			For installation, reverse the removal procedure.

## REAR CARRIER AND REAR FENDER

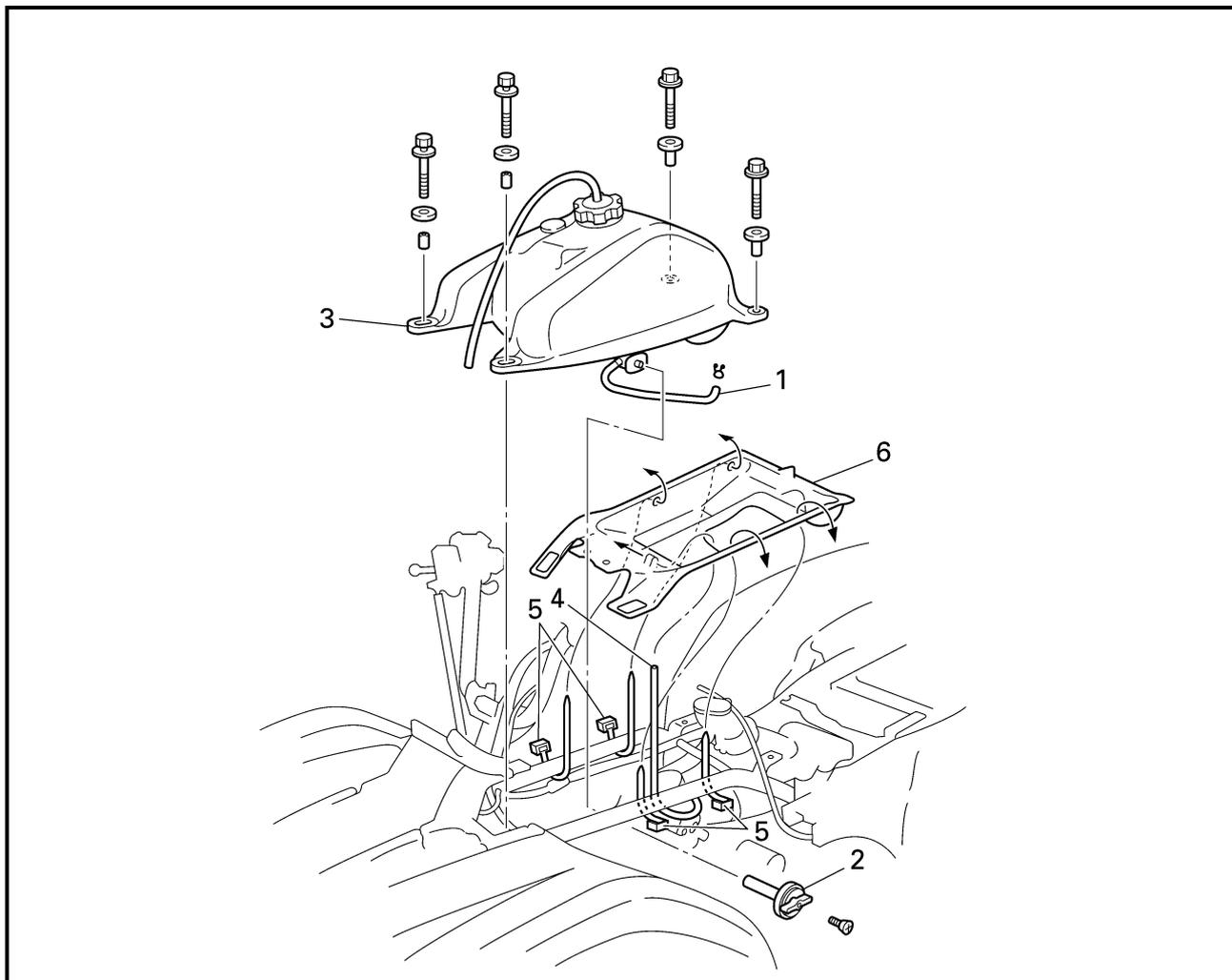


Order	Job name/Part name	Q'ty	Remarks
	<b>Rear carrier and rear fender removal</b>		Remove the parts in the order below.
	Seat and fuel tank side panels		Refer to "SEAT AND SIDE PANELS".
	Fuel tank		Refer to "FUEL TANK".
1	Rear carrier	1	
2	Battery holding bracket	1	
3	Battery lead cover	1	
4	Battery lead	2	Disconnect.
			<b>CAUTION:</b> _____
			<b>First disconnect the negative lead, then disconnect the positive lead.</b>
5	Battery	1	
6	Starter relay ground lead	1	
7	Taillight connector	2	



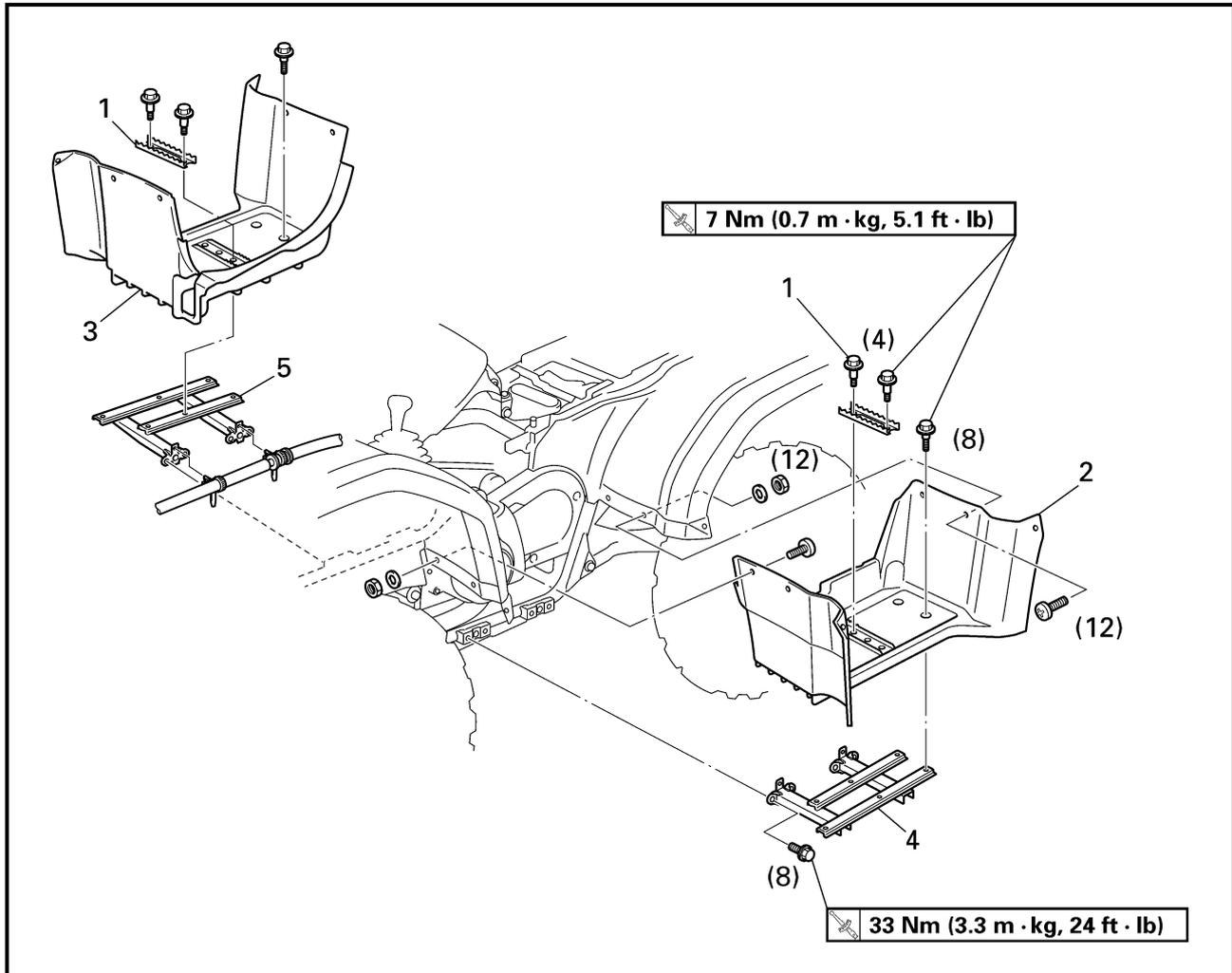
Order	Job name/Part name	Q'ty	Remarks
8	Final drive gear case breather hose	1	Loosen.
9	Cylinder head breather hose	1	
10	Clamp screw	1	
11	Air filter case	1	
12	Plastic band	1	
13	Rear fender	1	For installation, reverse the removal procedure.

FUEL TANK



Order	Job name/Part name	Q'ty	Remarks
	<b>Fuel tank removal</b>		
	Seat and side panels		
	Fuel tank cover		
1	Fuel hose	1	Remove the parts in the order below. Refer to "SEAT AND SIDE PANELS". Refer to "FRONT CARRIER, FRONT BUMPER AND FRONT FENDER". <b>NOTE:</b> _____ Before disconnecting the fuel hose, turn the fuel cock to "OFF".
2	Fuel cock	1	
3	Fuel tank	1	<b>NOTE:</b> _____ When installing the fuel tank, pass the fuel tank breather hose through the hole in the handlebar protector.
4	Vacuum chamber breather hose	1	
5	Plastic band	4	
6	Rubber cover	1	
			For installation, reverse the removal procedure.

FOOTREST BOARDS



Order	Job name/Part name	Q'ty	Remarks
	<b>Footrest boards removal</b>		Remove the parts in the order below. Refer to "SEAT AND SIDE PANELS".
1	Footrest	2	
2	Left footrest board	1	
3	Right footrest board	1	
4	Left footrest bracket	1	
5	Right footrest bracket	1	
			For installation, reverse the removal procedure.

## ENGINE

### VALVE CLEARANCE ADJUSTMENT

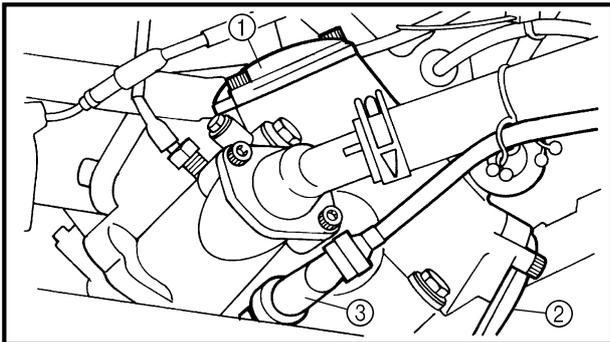
**NOTE:** \_\_\_\_\_

- The valve clearance must be adjusted when the engine is cool to the touch.
- Adjust the valve clearance when the piston is at the Top Dead Center (T.D.C.) on the compression stroke.

**1.Remove:**

- Seat
- Front carrier
- Front fender
- Fuel tank

Refer to "SEAT, CARRIERS, FENDERS AND FUEL TANK".



**2.Remove:**

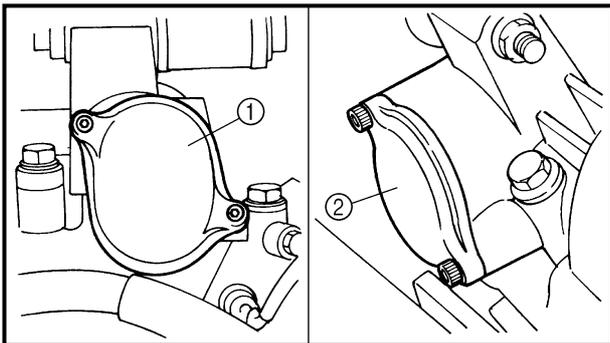
- Tappet cover (intake) ①
- Tappet cover (exhaust) ②

**3.Disconnect:**

- Spark plug cap ③

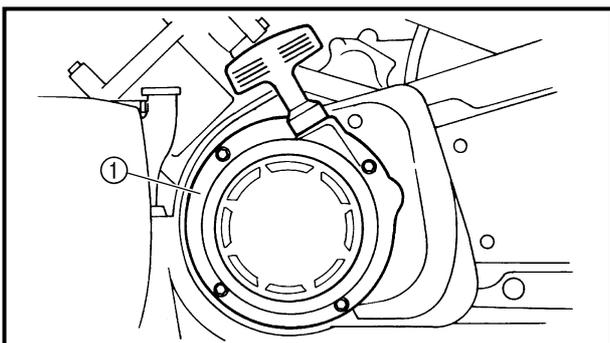
**4.Remove:**

- Spark plug

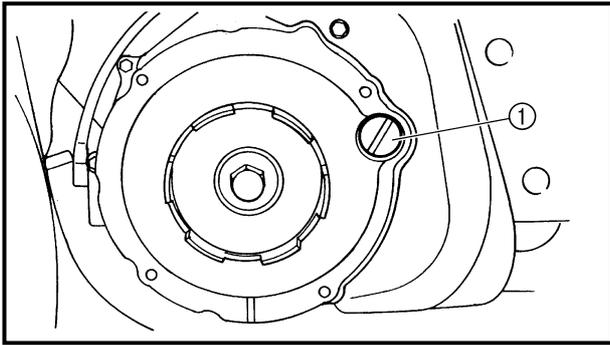


**5.Remove:**

- Recoil starter ①



# VALVE CLEARANCE ADJUSTMENT

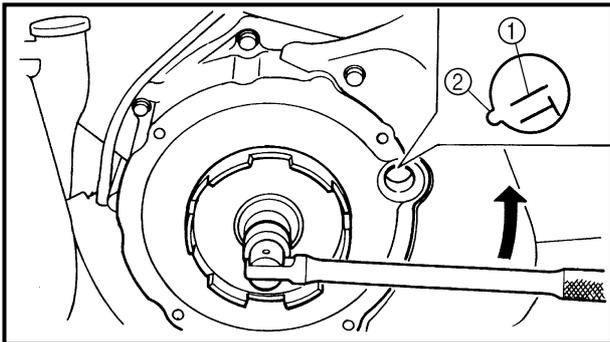


- 6.Remove:
- Timing plug ①

- 7.Check:
- Valve clearance
  - Out of specification → Adjust.

	<b>Valve clearance (cold):</b>
	<b>Intake:</b>
	0.06 ~ 0.10 mm (0.0024 ~ 0.0039 in)
	<b>Exhaust:</b>
	0.16 ~ 0.20 mm (0.0063 ~ 0.0079 in)

\*\*\*\*\*

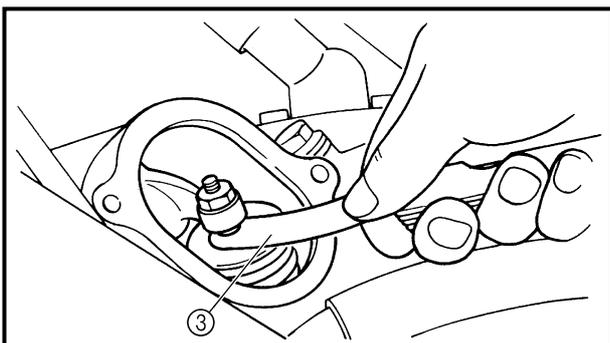


**Checking steps:**

- Turn the crankshaft counterclockwise with a wrench.
- Align the "T" mark ① on the rotor with the stationary pointer ② on the crankcase cover. When the "T" mark is aligned with the stationary pointer, the piston is at the Top Dead Center (T.D.C.).

**NOTE:**

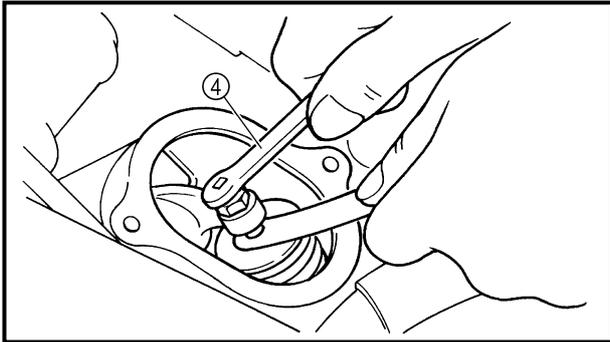
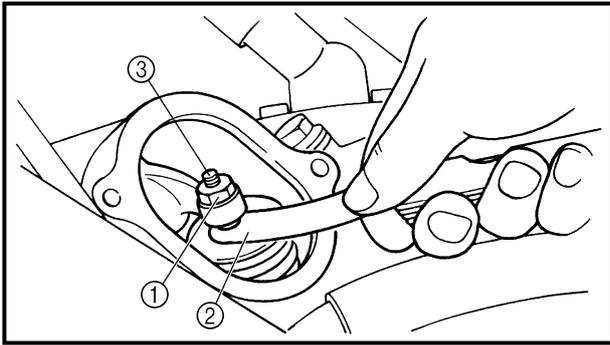
- When the piston is at the Top Dead Center (T.D.C.) on the compression stroke, there should be clearance between the valve stem tips and their respective rocker arm adjusting screws.
- If there is no clearance, rotate the crankshaft counterclockwise one turn.



- Measure the valve clearance using a feeler gauge ③.

\*\*\*\*\*

# VALVE CLEARANCE ADJUSTMENT



## 8.Adjust:

- Valve clearance

\*\*\*\*\*

### Adjustment steps:

- Loosen the locknut ①.
- Insert a feeler gauge ② between the adjuster end and the valve end.
- Turn the adjuster ③ clockwise or counter-clockwise with the valve adjusting tool ④ until the proper clearance is obtained.



**Valve adjusting tool:**  
P/N. YM-08035, 90890-01311

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



**Locknut:**  
20 Nm (2.0 m • kg, 14 ft • lb)

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

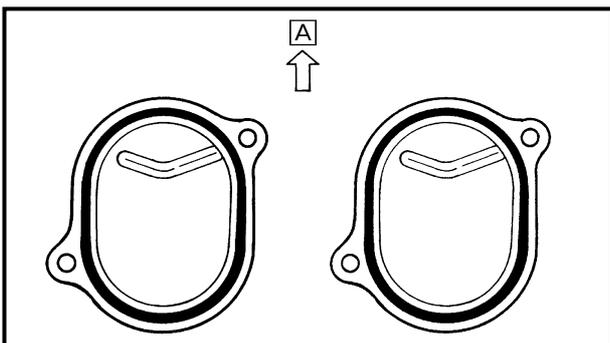
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## 9.Install:

- All removed parts

### NOTE:

Install all removed parts in the reverse order of their disassembly. Note the following points.



## 10.Install:

- Recoil starter

10 Nm (1.0 m • kg, 7.2 ft • lb)

- Spark plug

18 Nm (1.8 m • kg, 13 ft • lb)

- Tappet covers

10 Nm (1.0 m • kg, 7.2 ft • lb)

### NOTE:

Install the tappet covers with the ridge facing up **A**.

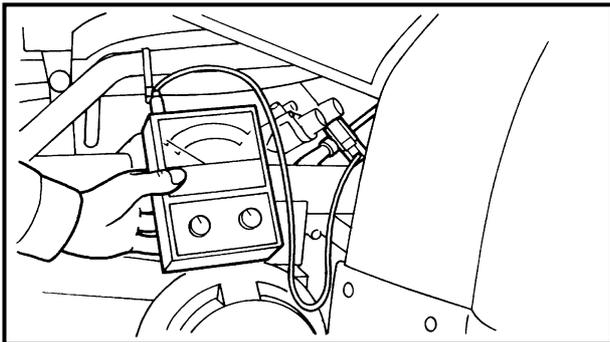
11.Install:

- Fuel tank
- Front fender
- Front carrier
- Seat

Refer to "SEAT, CARRIERS, FENDERS  
AND FUEL TANK".

### **TIMING CHAIN ADJUSTMENT**

Adjustment free.



### **IDLING SPEED ADJUSTMENT**

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

2.Remove:

- Seat
  - Fuel tank side panels
- Refer to "SEAT, CARRIERS, FENDERS  
AND FUEL TANK".

3.Attach:

- Inductive tachometer or engine tachometer  
(to the spark plug lead)



**Inductive tachometer:**  
**P/N. YU-8036-A**  
**Engine tachometer:**  
**P/N. 90890-03113**

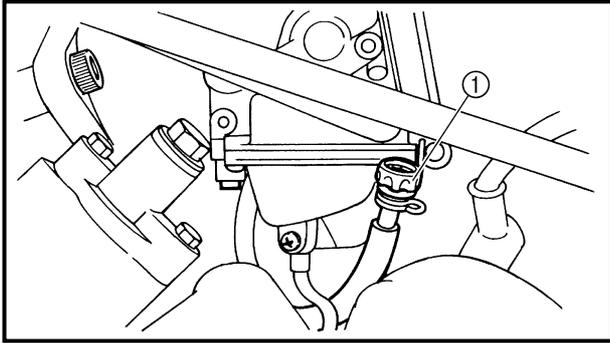
4.Check:

- Engine idling speed  
Out of specification → Adjust.



**Engine idling speed:**  
**1,450 ~ 1,550 r/min**

# IDLING SPEED ADJUSTMENT/ THROTTLE LEVER FREE PLAY ADJUSTMENT



- 5.Adjust:
- Engine idling speed

\*\*\*\*\*

**Adjustment steps:**

- Turn the throttle stop screw ① in or out until the specified idling speed is obtained.

Turning in	Idling speed becomes higher.
Turning out	Idling speed becomes lower.

\*\*\*\*\*

- 6.Detach:
- Inductive or engine tachometer

- 7.Adjust:
- Throttle lever free play  
Refer to "THROTTLE LEVER FREE PLAY ADJUSTMENT".

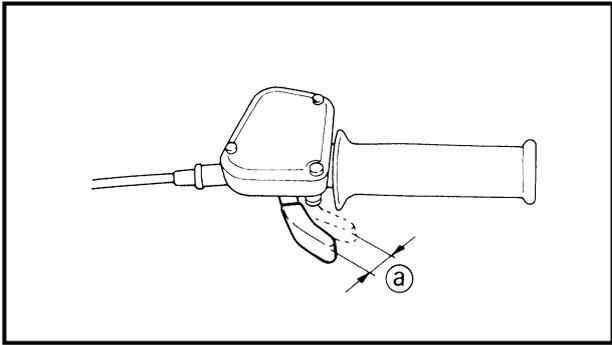
	<b>Throttle lever free play:</b> 3 ~ 5 mm (0.12 ~ 0.20 in)
--	---

- 8.Install:
- Fuel tank side panels
  - Seat  
Refer to "SEAT, CARRIERS, FENDERS AND FUEL TANK".

## THROTTLE LEVER FREE PLAY ADJUSTMENT

**NOTE:** \_\_\_\_\_  
Engine idling speed should be adjusted properly before adjusting the throttle lever free play.  
\_\_\_\_\_

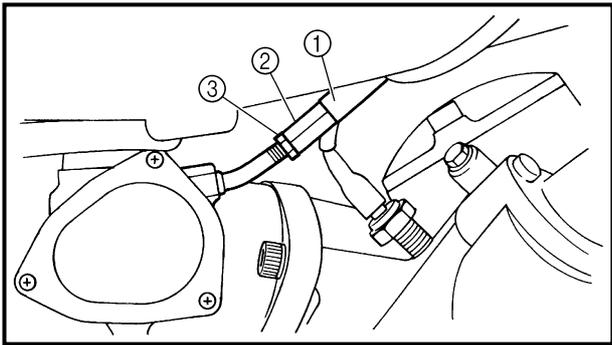
# THROTTLE LEVER FREE PLAY ADJUSTMENT



1. Check:
- Throttle lever free play ①
- Out of specification → Adjust.

	<b>Throttle lever free play:</b> 3 ~ 5 mm (0.12 ~ 0.20 in)
--	---

2. Remove:
- Seat
  - Fuel tank side panel (right)
- Refer to "SEAT, CARRIERS, FENDERS AND FUEL TANK".



3. Adjust:
- Throttle lever free play
- \*\*\*\*\*

**Adjustment steps:**

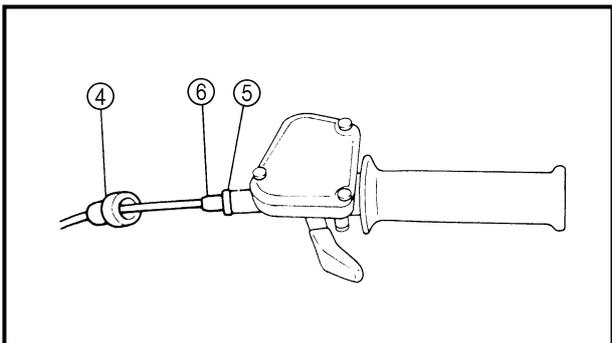
**First step:**

- Pull back the adjuster cover ①.
- Loosen the locknut ② on the carburetor side.
- Turn the adjuster ③ in or out until the correct free play is obtained.

<b>Turning in</b>	<b>Free play is increased.</b>
<b>Turning out</b>	<b>Free play is decreased.</b>

- Tighten the locknut ②.
- Push in the adjuster cover ①.

**NOTE:** \_\_\_\_\_  
If the free play cannot be adjusted here, adjust it at the throttle lever side of the cable.



**Second step:**

- Pull back the adjuster cover ④.
- Loosen the locknut ⑤.
- Turn the adjuster ⑥ in or out until the correct free play is obtained.

<b>Turning in</b>	<b>Free play is increased.</b>
<b>Turning out</b>	<b>Free play is decreased.</b>

- Tighten the locknut ⑤.
- Push in the adjuster cover ④.

**⚠ WARNING**

**After adjusting the free play, turn the handlebar to the right and left to make sure that the engine idling speed does not increase.**

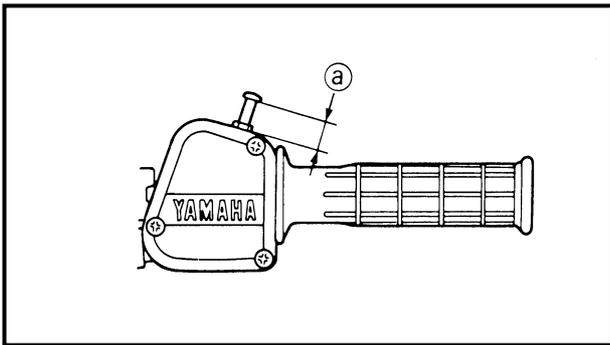
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**4.Install:**

- Fuel tank side panel (right)
- Seat  
Refer to "SEAT, CARRIERS, FENDERS AND FUEL TANK".

**SPEED LIMITER ADJUSTMENT**

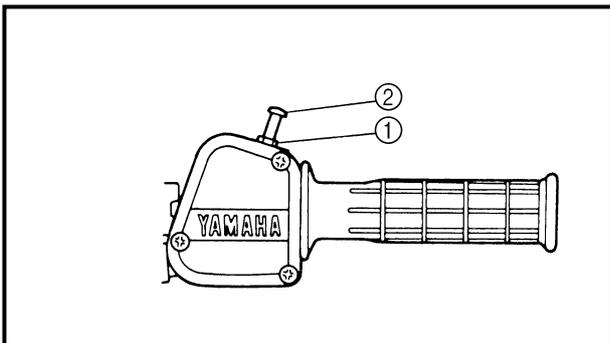
The speed limiter keeps the carburetor throttle from becoming fully-opened even when the throttle lever is applied to the maximum position. Screwing in the adjuster stops the engine speed from increasing.



**1.Check:**

- Speed limiter length ①  
Out of specification → Adjust.

	<b>Speed limiter length: 12 mm (0.47 in)</b>
---	--



**2.Adjust:**

- Speed limiter length

\*\*\*\*\*

**Speed limiter length adjustment steps:**

- Loosen the locknut ①.
- Turn the adjuster ② in or out until the specified speed limiter length is obtained.

# SPEED LIMITER ADJUSTMENT/ STARTER LEVER FREE PLAY ADJUSTMENT



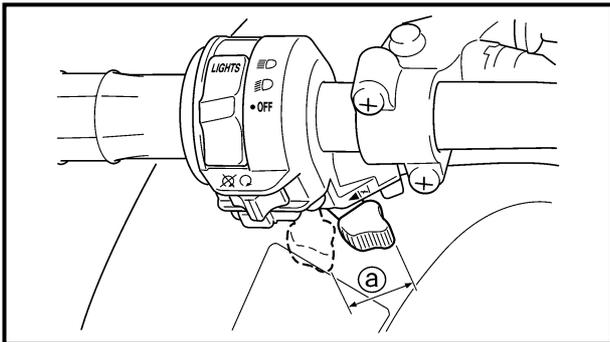
Turning in	Speed limiter length is decreased.
Turning out	Speed limiter length is increased.

- Tighten the locknut.

### ⚠ WARNING

- Particularly for a beginner rider, the speed limiter should be screwed in completely. Screw it out little by little as their riding technique improves. Never remove the speed limiter for a beginning rider.
- For proper throttle lever operation do not turn out the adjuster more than 12 mm (0.47 in). Also, always adjust the throttle lever free play to 3 ~ 5 mm (0.12 ~ 0.20 in).

\*\*\*\*\*



### STARTER LEVER FREE PLAY ADJUSTMENT

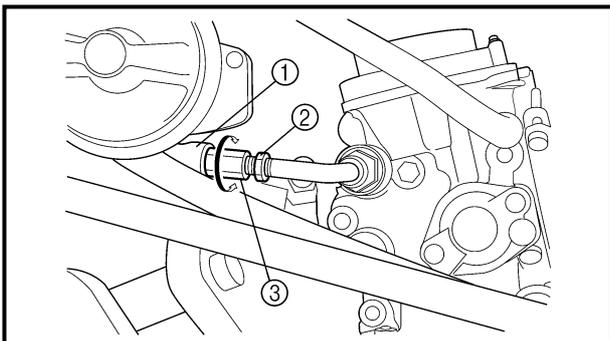
1. Check:

- Starter lever free play ①  
Out of specification → Adjust.

	<b>Starter lever free play:</b> 5.5 ~ 14.2 mm (0.22 ~ 0.56 in)
--	---

2. Remove:

- Seat
- Fuel tank side panel (left)  
Refer to "SEAT, CARRIERS, FENDERS AND FUEL TANK".



3. Adjust:

- Starter lever free play

\*\*\*\*\*

### Adjustment steps:

- Pull back the adjuster cover ①.
- Loosen the locknut ②.
- Turn the adjuster ③ in or out until the correct free play is obtained.

# STARTER LEVER FREE PLAY ADJUSTMENT/ SPARK PLUG INSPECTION



Turning in	Free play increased.
Turning out	Free play decreased.

- Tighten the locknut ②.
- Push in the adjuster cover ①.

## ⚠ WARNING

**After adjusting the free play, turn the handlebar to right and left, and make sure that the engine idling speed does not increase.**

\*\*\*\*\*

### 4.Install:

- Fuel tank side panel (left)
- Seat  
Refer to "SEAT, CARRIERS, FENDERS AND FUEL TANK".

## SPARK PLUG INSPECTION

### 1.Remove:

- Seat
- Fuel tank side panel (right)  
Refer to "SEAT, CARRIERS, FENDERS AND FUEL TANK".

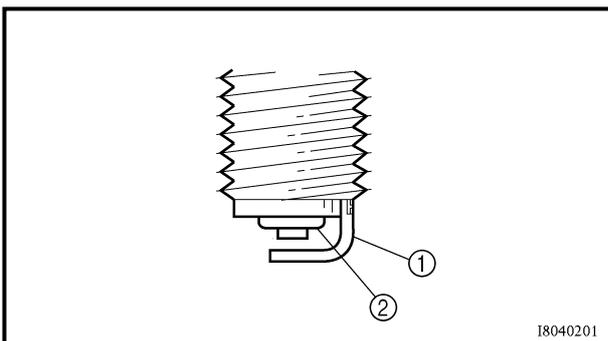
### 2.Remove:

- Spark plug

### 3.Inspect:

- Spark plug type  
Incorrect → Replace.

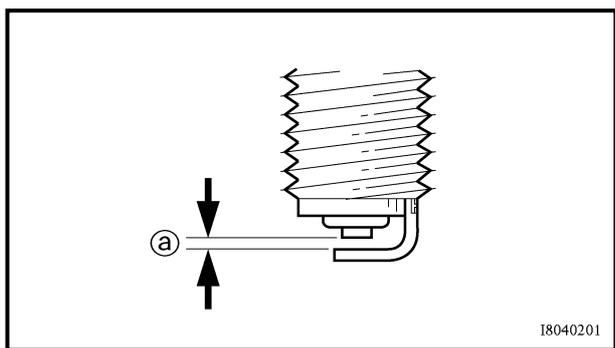
**Standard spark plug:**  
**DR8EA/NGK (For CDN, GB, F, CH)**  
**D8EA/NGK (For Oceania)**  
**X24ES-U/DENSO (For Oceania)**



### 4.Inspect:

- Electrode ①  
Wear/damage → Replace.
  - Insulator ②  
Abnormal color → Replace.  
Normal color is a medium-to-light tan color.
- 5.Clean the spark plug with a spark plug cleaner or wire brush.

## SPARK PLUG INSPECTION/ IGNITION TIMING CHECK



### 6.Measure:

- Plug gap ①  
Use a wire gauge or feeler gauge.  
Out of specification → Regap.



**Spark plug gap:**  
0.6 ~ 0.7 mm (0.024 ~ 0.028 in)

### 7.Tighten:

- Spark plug  **18 Nm (1.8 m • kg, 13 ft • lb)**

### NOTE:

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

### 8.Install:

- Fuel tank side panel (right)
- Seat  
Refer to "SEAT, CARRIERS, FENDERS AND FUEL TANK".

## IGNITION TIMING CHECK

### NOTE:

Engine idling speed and throttle cable free play should be adjusted properly before checking the ignition timing.

### 1.Remove:

- Seat
- Fuel tank side panel (right)  
Refer to "SEAT, CARRIERS, FENDERS AND FUEL TANK".

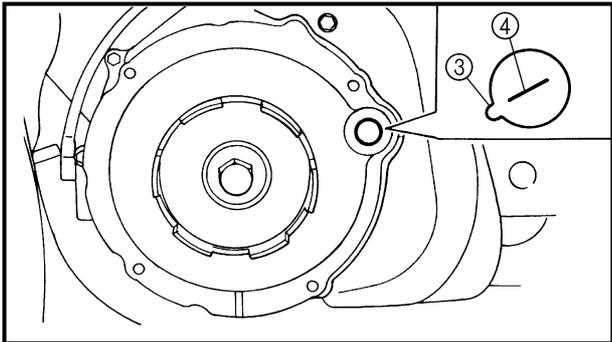
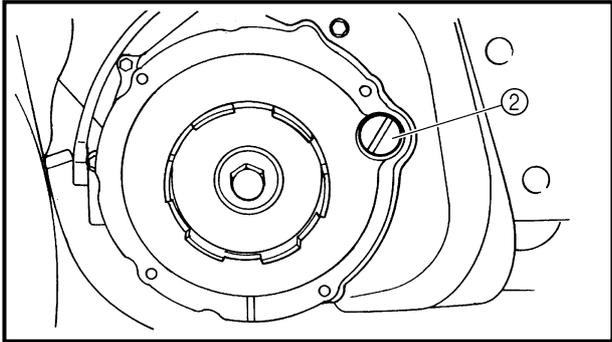
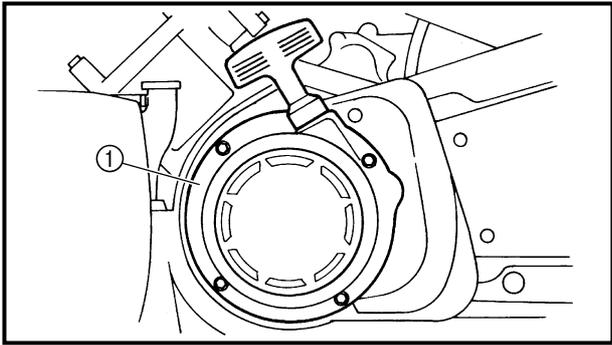
### 2.Attach:

- Inductive tachometer or engine tachometer
- Timing light  
(to spark plug lead)



**Inductive tachometer:**  
P/N. YU-8036-A  
**Engine tachometer:**  
P/N. 90890-03113  
**Timing light:**  
P/N. YM-33277-A, 90890-03141

# IGNITION TIMING CHECK/ COMPRESSION PRESSURE MEASUREMENT



### 3.Check:

- Ignition timing

\*\*\*\*\*

### Checking steps:

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

	<b>Engine speed:</b> 1,450 ~ 1,550 r/min
--	---

- Remove the recoil starter ①.
- Remove the timing plug ②.
- Visually check the stationary pointer ③ to verify it is within the required firing range ④ indicated on the flywheel.  
Incorrect firing range → Check the pulser coil assembly.
- Install the timing plug.
- Install the recoil starter.

	<b>Recoil starter bolt:</b> 10 Nm (1.0 m · kg, 7.2 ft · lb) LOCTITE®
--	--

\*\*\*\*\*

### 4.Detach:

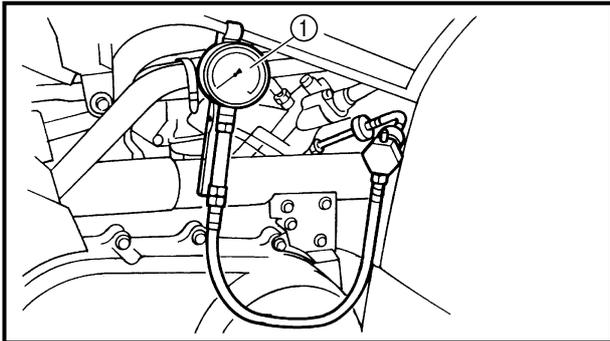
- Timing light
- Inductive tachometer or engine tachometer

### 5.Install:

- Seat
- Fuel tank side panel (right)  
Refer to "SEAT, CARRIERS, FENDERS AND FUEL TANK".

## COMPRESSION PRESSURE MEASUREMENT

**NOTE:** \_\_\_\_\_  
Insufficient compression pressure will result in a loss of performance.



1. Check:
  - Valve clearance  
Out of specification → Adjust.  
Refer to "VALVE CLEARANCE ADJUSTMENT".
2. Start the engine and let it warm up for several minutes.
3. Stop the engine.
4. Remove:
  - Seat  
Refer to "SEAT, CARRIERS, FENDERS AND FUEL TANK".
5. Remove:
  - Spark plug
6. Attach:
  - Adapter
  - Compression gauge ①



**Compression gauge:**  
P/N. YU-33223, 90890-03081  
**Adapter:**  
P/N. YU-33223-3, 90890-04082

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

<b>Compression pressure (with oil introduced into cylinder)</b>	
<b>Reading</b>	<b>Diagnosis</b>
<b>Higher than without oil</b>	<b>Worn or damaged pistons</b>
<b>Same as without oil</b>	<b>Defective ring(s), valves, cylinder head gasket or piston is possible.</b>

**Compression pressure (at sea level):**  
**Standard:**  
1,400 kPa (14 kg/cm<sup>2</sup>, 203 psi)  
**Minimum:**  
1,218 kPa (12.2 kg/cm<sup>2</sup>, 177 psi)  
**Maximum:**  
1,568 kPa (15.7 kg/cm<sup>2</sup>, 227 psi)

\*\*\*\*\*

**Measurement steps:**

- Crank over the engine with the electric starter (be sure the battery is fully charged) with the throttle wide-open until the compression reading on the gauge stabilizes.

**⚠ WARNING**

**When cranking the engine, ground the spark plug lead to prevent sparking.**

\*\*\*\*\*

**8. Install:**

- Spark plug  **18 Nm (1.8 m · kg, 13 ft · lb)**

**9. Remove:**

- Fuel tank side panel (right)
- Seat  
Refer to "SEAT, CARRIERS, FENDERS AND FUEL TANK".

**ENGINE OIL LEVEL INSPECTION**

1. Place the machine on a level surface.

**2. Remove:**

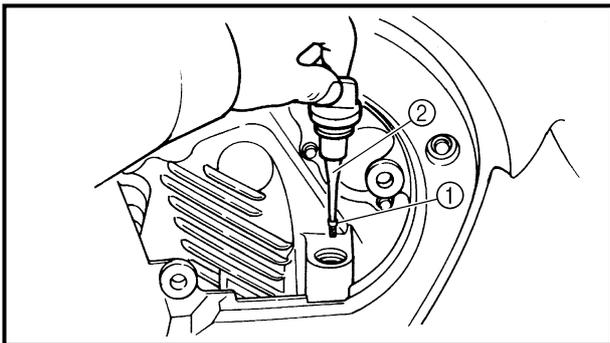
- Engine side panel  
Refer to "SEAT, CARRIERS, FENDERS AND FUEL TANK".

**3. Inspect:**

- Engine oil level  
Oil level should be between the maximum ① mark.  
Oil level low → Add oil to the proper level.

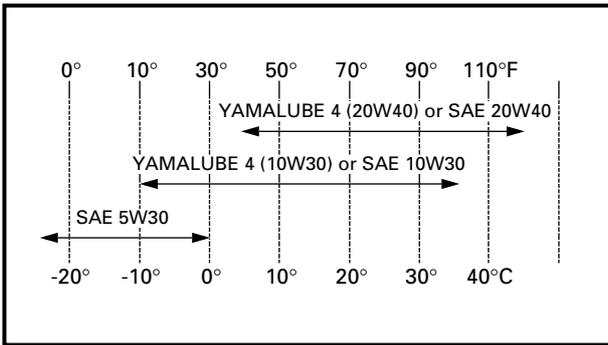
**NOTE:**

Do not screw the dipstick ② in when inspecting the oil level.



 **Recommended oil:  
Follow the left chart.**

## ENGINE OIL LEVEL INSPECTION/ ENGINE OIL REPLACEMENT



**NOTE:** \_\_\_\_\_  
Recommended oil classification:  
API Service "SE", "SF" type or equivalent  
(e.g. "SF-SE-CC", "SF-SE-SD" etc.)

**CAUTION:** \_\_\_\_\_  
**Do not allow foreign material to enter the  
crankcase.**

4. Start the engine and let it warm up for several minutes.
5. Stop the engine and inspect the oil level again.

**NOTE:** \_\_\_\_\_  
Wait a few minutes until the oil settles before inspecting the oil level.

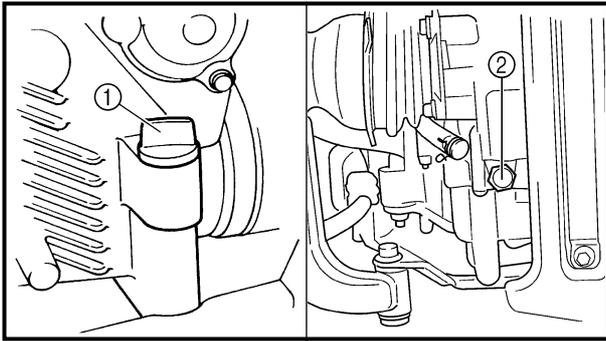
**⚠ WARNING** \_\_\_\_\_  
**Never remove the dipstick just after high speed operation because the heated oil could spurt out. Wait until the oil cools down before removing the dipstick.**

6. Install:
  - Engine side panel

### ENGINE OIL REPLACEMENT

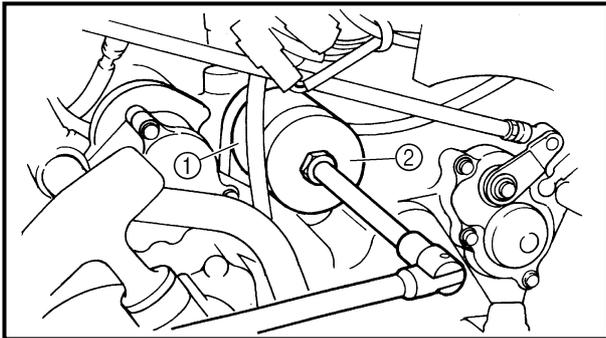
1. Start the engine and let it warm up for several minutes.
2. Stop the engine and place an oil pan under the engine.
3. Remove:
  - Seat
  - Fuel tank side panel (left)
  - Engine side coverRefer to "SEAT, CARRIERS, FENDERS AND FUEL TANK".

# ENGINE OIL REPLACEMENT



#### 4.Remove:

- Engine oil filler plug (dipstick) ①
  - Engine oil drain bolt ②
- Drain the crankcase of its oil.



5.If the oil filter cartridge is also to be replaced, perform the following procedure.

\*\*\*\*\*

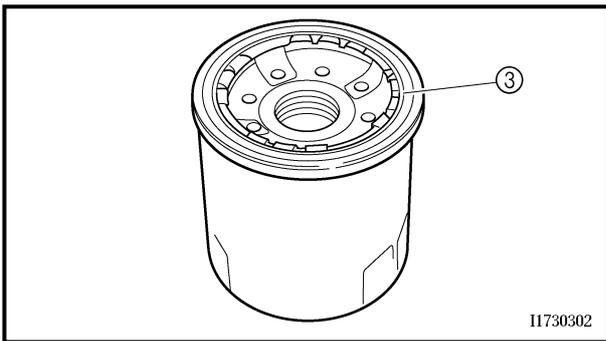
#### Replacement steps:

- Remove the oil filter cartridge ① with an oil filter wrench ②.



**Oil filter wrench:**  
P/N. YU-38411, 90890-01426

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



#### CAUTION:

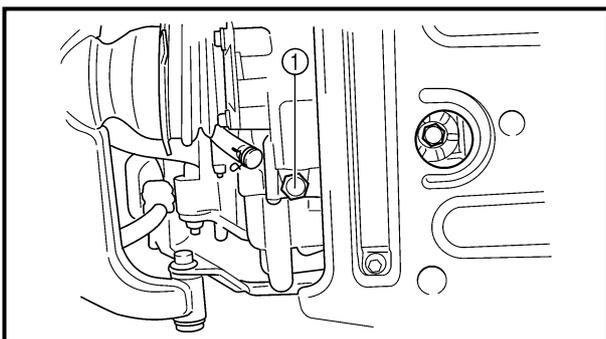
**Make sure that the O-ring ③ is positioned correctly in the groove of the oil filter cartridge.**

- Tighten the new oil filter cartridge to specification with an oil filter wrench.



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

\*\*\*\*\*



#### 6.Install:

- Engine oil drain bolt ①

23 Nm (2.3 m · kg, 17 ft · lb)

7.Fill:

- Crankcase  
Refer to "ENGINE OIL LEVEL INSPECTION".



**Oil quantity:**

**Periodic oil change:**  
2.3 L (2.0 Imp qt, 2.4 US qt)

**With oil filter replacement:**  
2.4 L (2.1 Imp qt, 2.5 US qt)

**Total amount:**  
2.6 L (2.3 Imp qt, 2.7 US qt)

8.Install:

- Engine oil filler plug

9.Warm up the engine for a few minutes, then stop the engine.

10.Inspect:

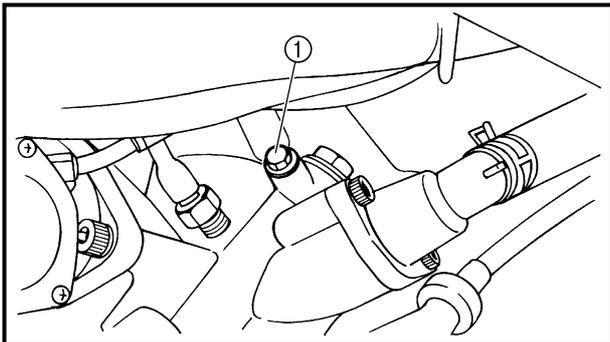
- Engine  
(for engine oil leaks)
- Oil level  
Refer to "ENGINE OIL LEVEL INSPECTION".

11.Check:

- Engine oil pressure

\*\*\*\*\*

- Slightly loosen the oil gallery bolt ①.
- Start the engine and keep it idling until engine oil starts to seep from the oil gallery bolt. If no engine oil comes out after one minute, turn the engine off so that it will not seize.
- Check the engine oil passages, the oil filter cartridge and the oil pump for damage or leakage. Refer to "OIL PAN AND OIL PUMP" in CHAPTER 4.
- Start the engine after solving the problem(-s) and check the engine oil pressure again.
- Tighten the oil gallery bolt to specification.



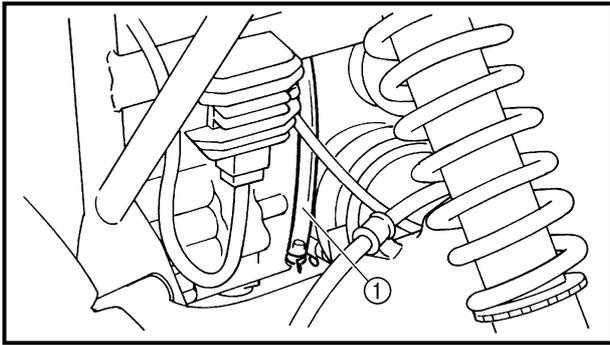
**Oil gallery bolt:**

**7 Nm (0.7 m • kg, 5.1 ft • lb)**

\*\*\*\*\*

12.Install:

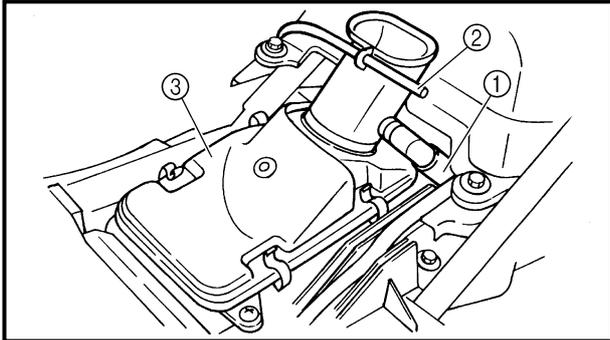
- Engine side cover
- Fuel tank side panel (left)
- Seat  
Refer to "SEAT, CARRIERS, FENDERS AND FUEL TANK".



## AIR FILTER CLEANING

### NOTE:

There is a check hose ① at the bottom of the air filter case. If dust and/or water collects in this hose, clean the air filter element and air filter case.



### 1.Remove:

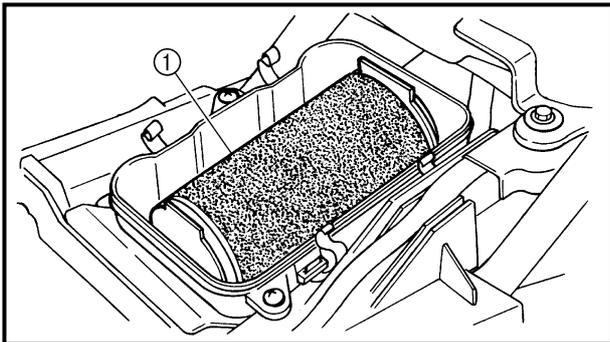
- Seat
  - Fuel tank cover
- Refer to "SEAT, CARRIERS, FENDERS AND FUEL TANK".

### 2.Disconnect:

- Cylinder head breather hose ①

### 3.Remove:

- Final drive gear case breather hose ②
- Air filter case cover ③

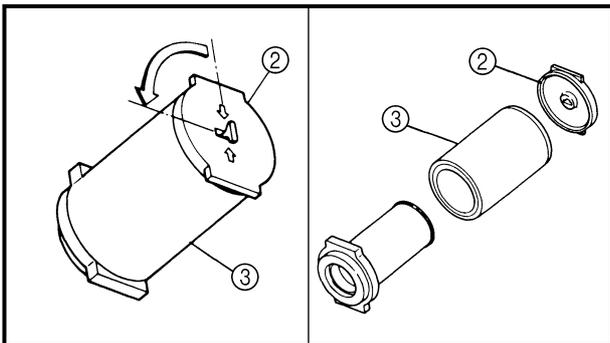


### 4.Remove:

- Air filter element assembly ①
- Air filter element cap
- Air filter element

### NOTE:

When removing the air filter element, rotate the air filter element cap 1/4 of a turn and remove the element.



② Air filter element cap

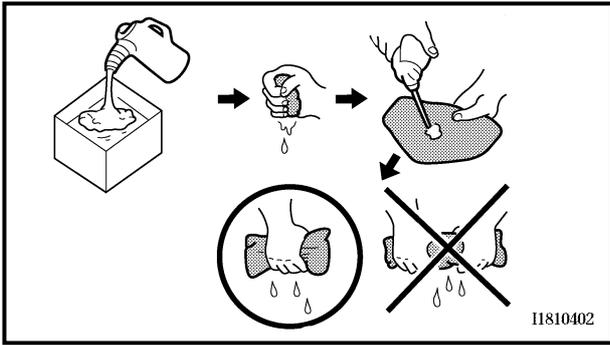
③ Air filter element

### CAUTION:

**Never operate the engine with the air filter element removed. This will allow unfiltered air to enter, causing rapid wear and possible engine damage. Additionally, operation without the filter element will affect carburetor tuning with subsequent poor performance and possible engine overheating.**

### 5.Inspect:

- Air filter element
- Damaged → Replace.



- 6.Clean:
- Air filter element

\*\*\*\*\*

**Cleaning steps:**

- Wash the element gently, but thoroughly in solvent.

**⚠ WARNING**

Use a cleaning solvent which is designed to clean parts only. Never use gasoline or low flash point solvents as they may cause a fire or explosion.

- Squeeze the excess solvent out of the element and let it dry.

**CAUTION:**

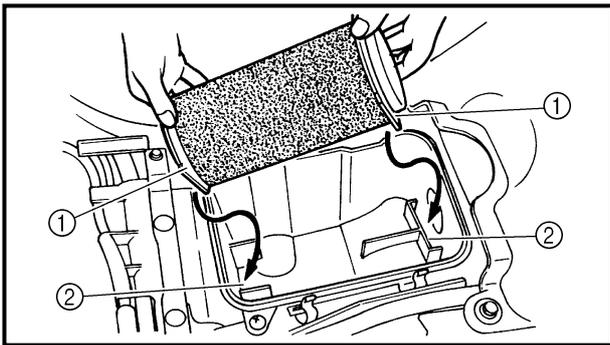
Do not twist or wring out the element. This could damage the foam material.

- Apply engine oil to the element.
- Squeeze out the excess oil.

**NOTE:**

The element should be wet but not dripping.

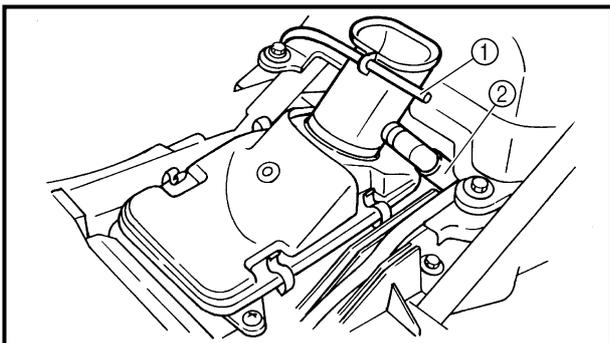
\*\*\*\*\*



- 7.Install:
- Air filter element
  - Air filter case cover

**NOTE:**

- Insert the lobes ① on the filter element into the receptacles ② on the filter case.
- To prevent air leaks make sure that the sealing surface of the element matches the sealing surface of the case.

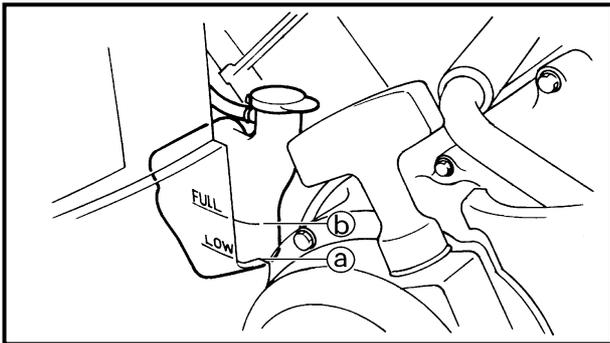


- 8.Install:
- Final drive gear case breather hose ①
- 9.Connect:
- Cylinder head breather hose ②

- 10.Install:
- Fuel tank cover
  - Seat
- Refer to "SEAT, CARRIERS, FENDERS AND FUEL TANK".

## COOLANT LEVEL INSPECTION

1. Place the machine on a level surface.
2. Remove:
  - Seat
  - Fuel tank side panel (left)



3. Inspect:
  - Coolant level  
The coolant level should be between the minimum level mark (a) and maximum level mark (b).  
Below the minimum level mark → Add the recommended coolant to the proper level.

### CAUTION:

- Adding water instead of coolant lowers the antifreeze content of the coolant. If water is used instead of coolant, check and if necessary, correct the antifreeze concentration of the coolant.
- Use only distilled water. However, soft water may be used if distilled water is not available.

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

5. Inspect:
  - Coolant level

### NOTE:

Before inspecting the coolant level, wait a few minutes until the coolant has settled.

6. Install:
  - Fuel tank side panel (left)
  - Seat  
Refer to "SEAT, CARRIERS, FENDERS AND FUEL TANK".

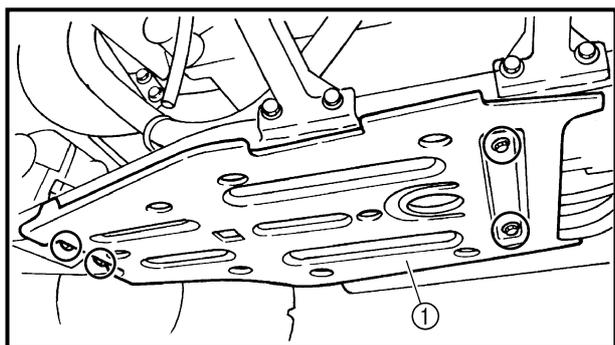
## COOLANT REPLACEMENT

1.Remove:

- Seat
- Fuel tank side panel (left)
- Engine side cover
- Front carrier
- Front fender

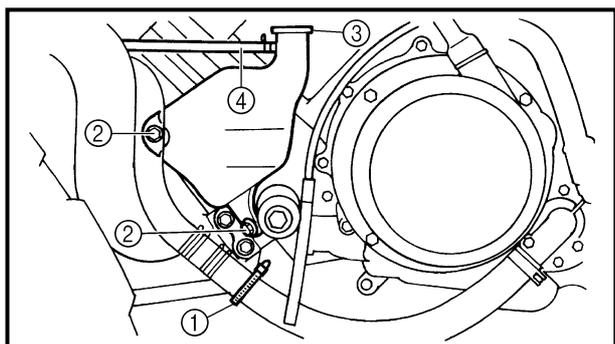
Refer to "SEAT, CARPIERS, FENDERS AND FUEL TANK".

- Left footrest board  
Refer to "FOOTREST BOARDS".



2.Remove:

- Engine skid plate (rear) ①

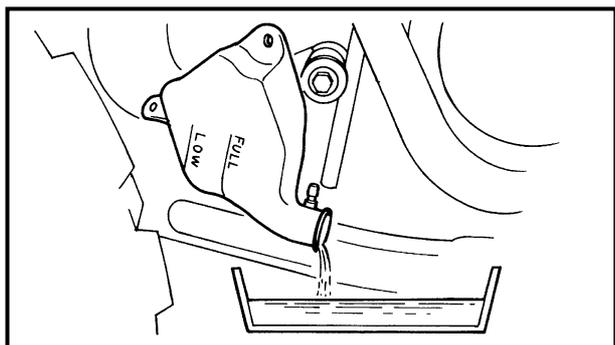


3.Remove:

- Plastic band ①
- Coolant reservoir bolts ②
- Coolant reservoir cap ③

4.Disconnect:

- Coolant reservoir breather hose ④



5.Drain:

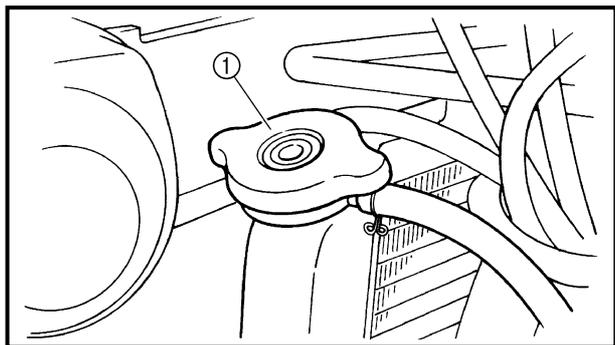
- Coolant  
(from the coolant reservoir)

6.Connect:

- Coolant reservoir breather hose

7.Install:

- Coolant reservoir bolts
- Plastic band

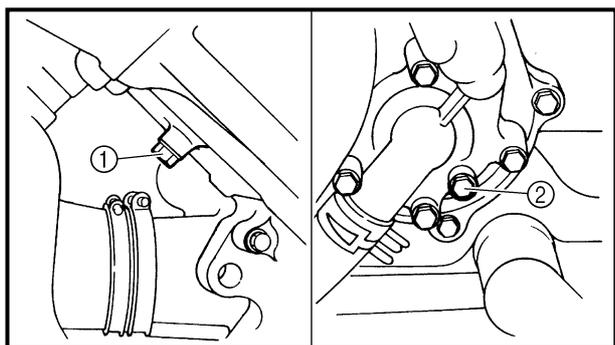


- 8.Remove:
- Radiator cap ①

**⚠ WARNING**

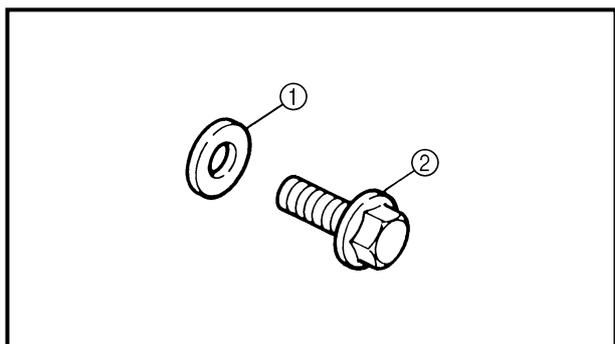
**A hot radiator is under pressure. Therefore, do not remove the radiator cap when the engine is hot. Scalding hot fluid and steam may be blown out, which could cause serious injury. When the engine has cooled, open the radiator cap as follows:**

**Place a thick rag or a towel over the radiator cap and slowly turn the radiator cap counterclockwise toward the detent to allow any residual pressure to escape. When the hissing sound has stopped, turn the radiator cap counterclockwise while pressing down on it and then remove it.**



- 9.Remove:
- Coolant drain bolt (cylinder) ① (along with the copper washer)
  - Coolant drain bolt (water pump) ② (along with the copper washer)

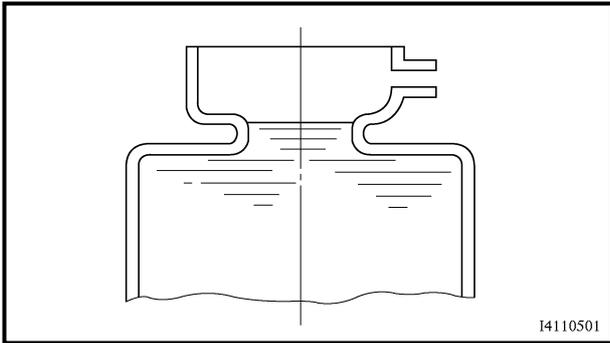
- 10.Drain:
- Coolant



- 11.Check:
- Copper washer ①
  - Coolant drain bolt ②  
Damage → Replace.

12.Install:

- Coolant drain bolt (water pump)  
**10 Nm (1.0 m • kg, 7.2 ft • lb)**
- Coolant drain bolt (cylinder)  
**10 Nm (1.0 m • kg, 7.2 ft • lb)**



### 13.Fill:

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



**Recommended antifreeze**  
High-quality ethylene glycol antifreeze containing corrosion inhibitors for aluminum engines

**Mixing ratio**

1:1 (antifreeze:water)

**Quantity**

**Total amount**

1.1 L

(0.97 Imp qt, 1.16 US qt)

**Coolant reservoir capacity**

0.25 L

(0.22 Imp qt, 0.26 US qt)

### Handling notes for coolant

Coolant is potentially harmful and should be handled with special care.

### **⚠ WARNING**

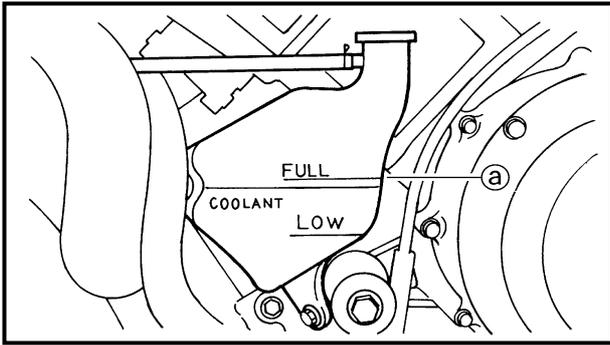
- If coolant splashes in your eyes, thoroughly wash them with water and consult a doctor.
- If coolant splashes on your clothes, quickly wash it away with water and then with soap and water.
- If coolant is swallowed, induce vomiting and get immediate medical attention.

### **CAUTION:**

- Adding water instead of coolant lowers the antifreeze content of the coolant. If water is used instead of coolant, check, and if necessary, correct the antifreeze concentration of the coolant.
- Use only distilled water. However, soft water may be used if distilled water is not available.
- If coolant comes into contact with painted surfaces, immediately wash them with water.
- Do not mix different types of antifreeze.

### 14.Install:

- Radiator cap



15.Fill:

- Coolant reservoir  
(with the recommended coolant to the maximum level mark (a))

16.Install:

- Coolant reservoir cap

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

18.Inspect:

- Coolant level  
Refer to "CHECKING THE COOLANT LEVEL".

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

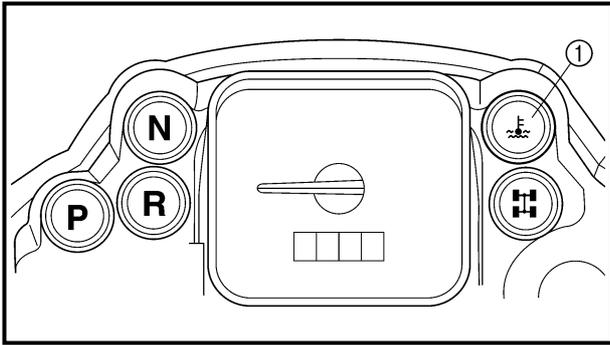
Before inspecting the coolant level, wait a few minutes until the coolant has settled.

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19.Install:

- Engine skid plate (rear)
- Left footrest board  
Refer to "FOOTREST BOARDS".
- Front fender
- Front carrier
- Engine side cover
- Fuel tank side panel (left)
- Seat  
Refer to "SEAT, CARRIERS, FENDERS AND FUEL TANK".

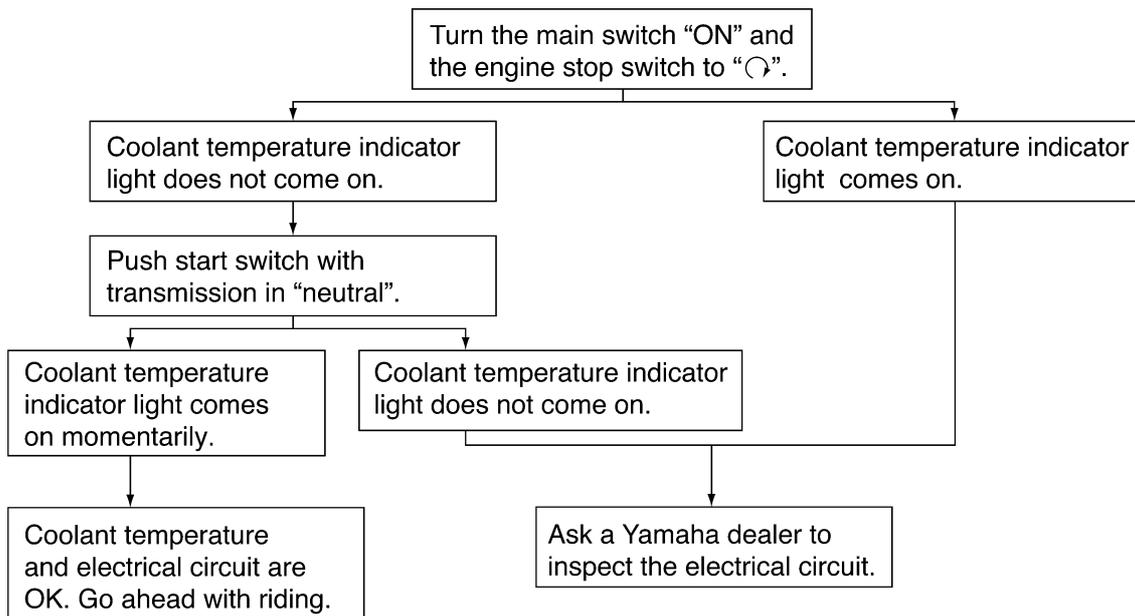
# COOLANT TEMPERATURE INDICATOR LIGHT CHECK/ V-BELT INSPECTION



## COOLANT TEMPERATURE INDICATOR LIGHT CHECK

① Coolant temperature indicator light

### Coolant temperature indicator light checking method



## V-BELT INSPECTION

1.Remove:

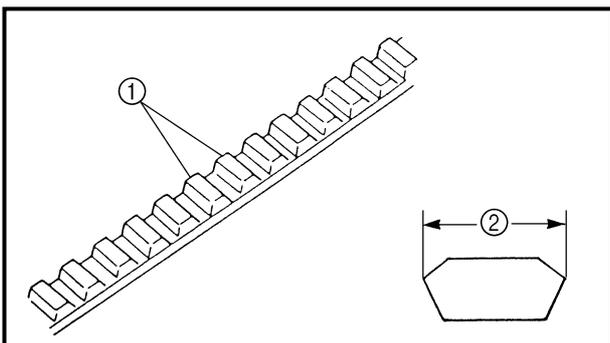
- Right footrest board
- Crankcase cover (right)  
Refer to "PRIMARY AND SECONDARY SHEAVES" in CHAPTER 4.

2.Inspect:

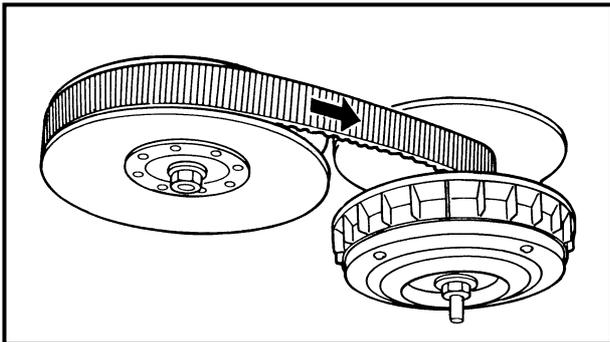
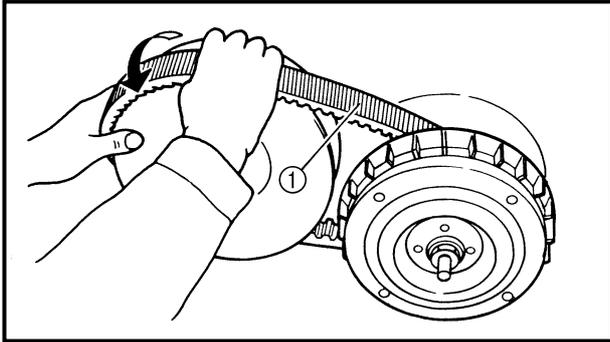
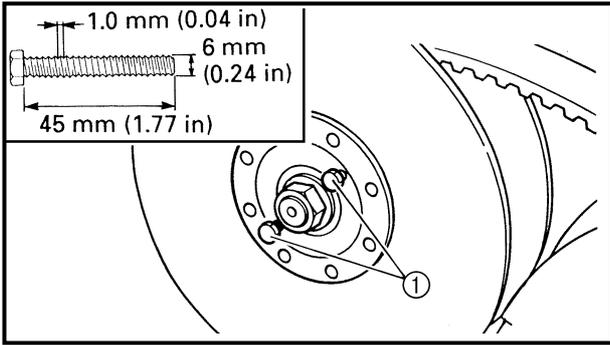
- V-belt ①  
Cracks/wear/scaling/chipping → Replace.  
Oil/grease → Check primary sheave and secondary sheave.

3.Measure:

- V-belt width ②  
Out of specification → Replace.



**V-belt width:**  
29.3 mm (1.15 in)  
<Limit>: 27.3 mm (1.07 in)



**4. Replace:**

- V-belt

\*\*\*\*\*

**Replacing steps:**

- Install the bolts ① (90101-06016) into the secondary fixed sheave hold.

**NOTE:**

Tightening the bolts ① will push the secondary sliding sheave away, causing the gap between the secondary fixed and sliding sheaves to widen.

- Remove the V-belt ① from the primary sheave and secondary sheave.

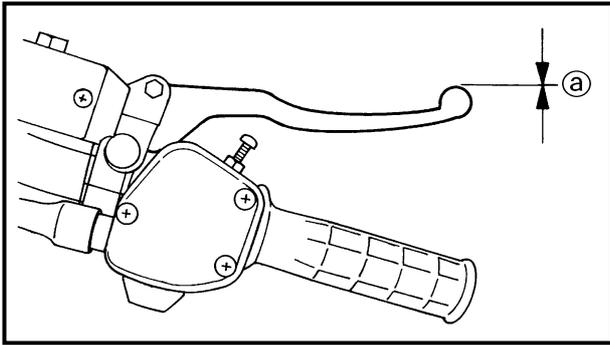
- Install the V-belt.

**NOTE:**

Install the V-belt so that its arrow faces the direction shown in the illustration.

- Remove the bolts.

\*\*\*\*\*



**CHASSIS**

**FRONT BRAKE ADJUSTMENT**

1.Check:

- Brake lever free play ①  
Out of specification → Bleed the front brake system.  
Refer to "AIR BLEEDING (HYDRAULIC BRAKE SYSTEM)".

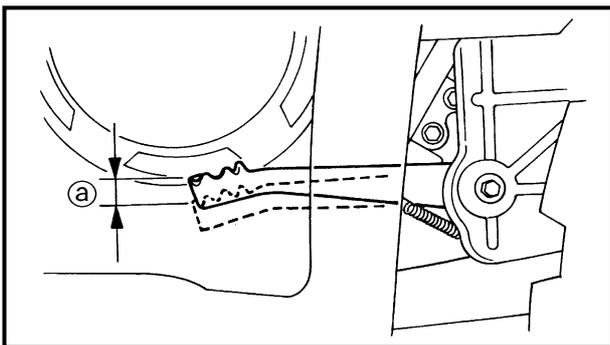


**Free play:**  
**0 mm (0 in)**  
**(at brake lever end)**

**REAR BRAKE ADJUSTMENT**

**⚠ WARNING**

**Always adjust both the brake pedal and the rear brake lever whenever adjusting the rear brake.**

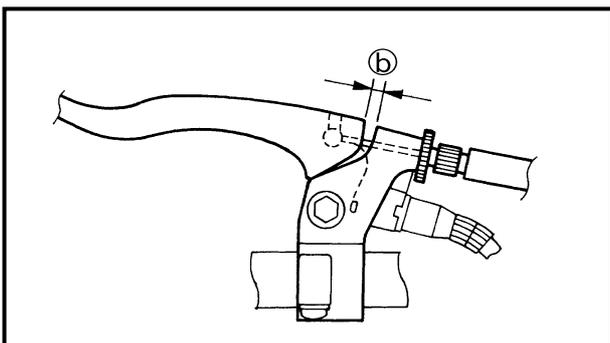


1.Check:

- Rear brake pedal free play ①  
Out of specification → Bleed the rear brake system.  
Refer to "AIR BLEEDING (HYDRAULIC BRAKE SYSTEM)".



**Rear brake pedal free play:**  
**5 ~ 7 mm (0.2 ~ 0.3 in)**



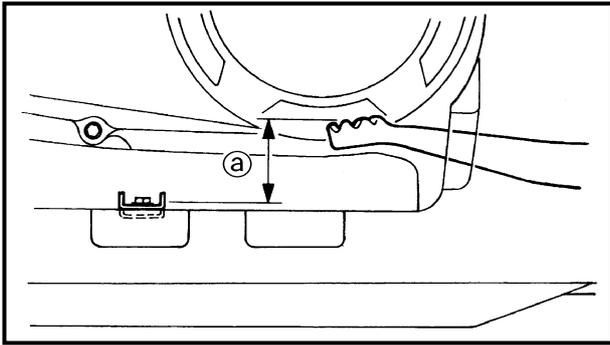
2.Check:

- Rear brake lever free play ②  
Out of specification → Adjust.



**Rear brake lever free play:**  
**0.5 ~ 2 mm (0.02 ~ 0.08 in)**

# REAR BRAKE ADJUSTMENT



### 3.Check:

- Rear brake pedal height ①  
Out of specification → Adjust.

	<b>Rear brake pedal height:</b> 53 ~ 60 mm (2.09 ~ 2.36 in)
--	--

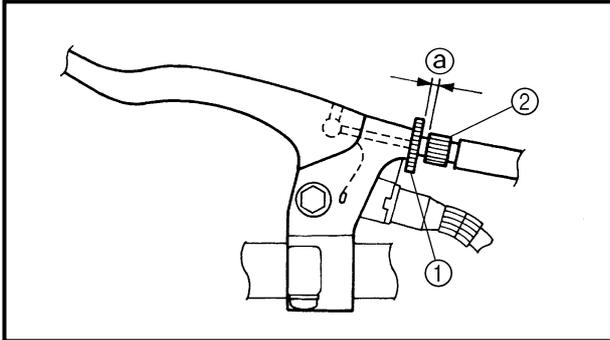
### 4.Adjust:

- Rear brake lever free play
- Rear brake pedal height

\*\*\*\*\*

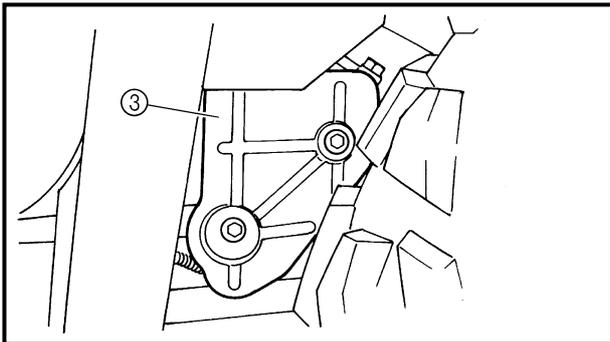
### Adjustment steps:

- Loosen the locknut (handlebar) ① and fully screw in the brake lever cable adjuster (handlebar) ② until the clearance ③ is within the specified limits.

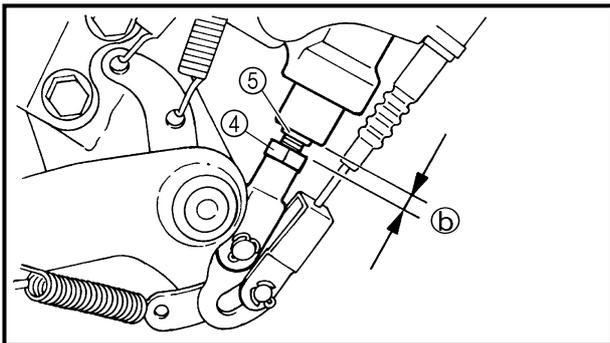


	<b>Clearance ③:</b> 0 mm (0 in)
--	------------------------------------

- Remove the rear brake master cylinder cover ④.



- Loosen the locknut ④.
- Turn the adjusting bolt ⑤ until the brake pedal height is within the specified limits.



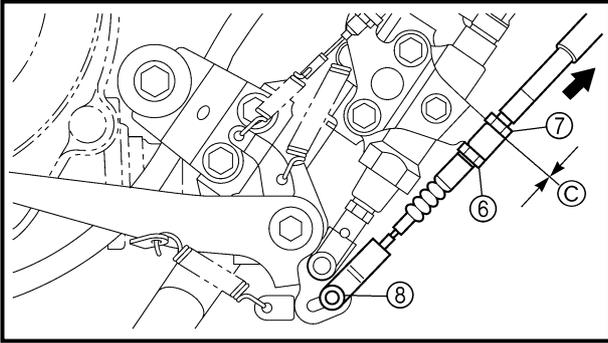
	<b>Brake pedal height:</b> 53 ~ 60 mm (2.09 ~ 2.36 in)
--	---

- Tighten the locknut ④.

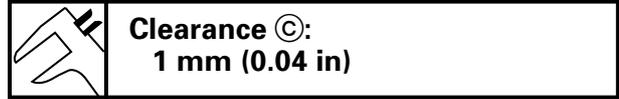
### NOTE:

When adjusting the brake pedal height make sure the locknut-to-adjusting bolt clearance ⑥ does not exceed 2 mm (0.08 in).

## REAR BRAKE ADJUSTMENT

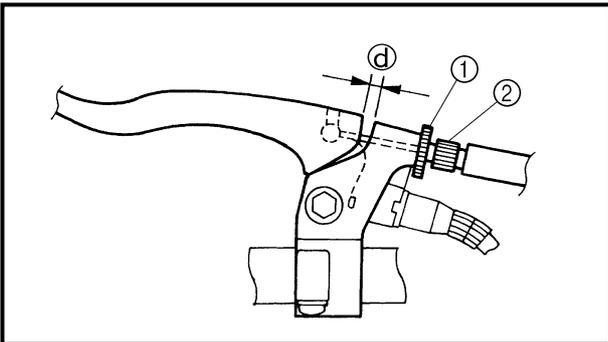


- Loosen the locknut ⑥.
- Pull up the brake outer cable and turn the brake cable adjusting (nut) ⑦ until the clearance ③ is within the specified limits.



**NOTE:** \_\_\_\_\_  
Make sure the pin ⑧ is all the way to the right of the link plate hole.

- Hold the adjusting nut ⑦ and tighten the locknut ⑥.



- Turn the brake lever cable adjuster (handlebar) ② until the rear brake lever free play ④ is within the specified limits.



- Tighten the locknut (handlebar) ①.
- Adjust the select lever control cable. Refer to "SELECT LEVER CONTROL CABLE AND SHIFT ROD ADJUSTMENT".
- Install the rear brake master cylinder cover.

### **⚠ WARNING**

**After this adjustment is performed, lift the front and rear wheels off the ground by placing a block under the engine, and spin the rear wheels to ensure there is no brake drag. If any brake drag is noticed perform the above steps again.**

\*\*\*\*\*

## BRAKE FLUID LEVEL INSPECTION

1. Place the machine on a level surface.

### NOTE:

When inspecting the brake fluid level, make sure that the top of the brake fluid reservoir top is horizontal.

2. Remove: (rear brake)

- Front carrier
  - Front fender panel
- Refer to "SEAT, CARRIERS, FENDERS AND FUEL TANK".

3. Inspect:

- Brake fluid level
- Fluid level is under "LOWER" level line ①  
→ Fill up.



**Recommended brake fluid:  
DOT 4**

### NOTE:

If DOT 4 is not available, DOT 3 can be used.

Ⓐ Front brake

Ⓑ Rear brake

### CAUTION:

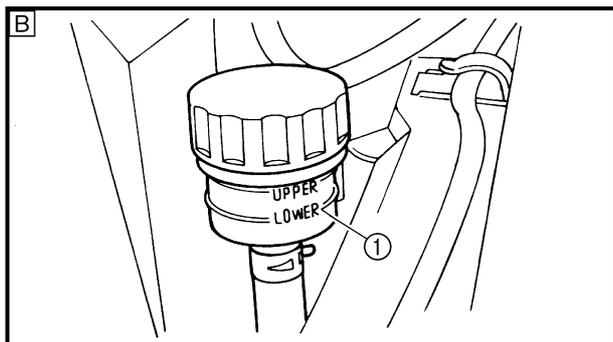
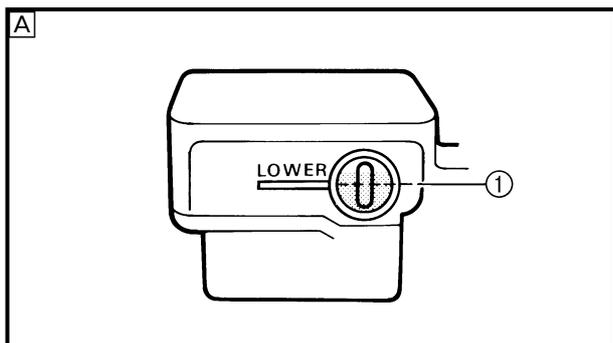
Brake fluid may erode painted surfaces or plastic parts. Always clean up spilled fluid immediately.

### ⚠ WARNING

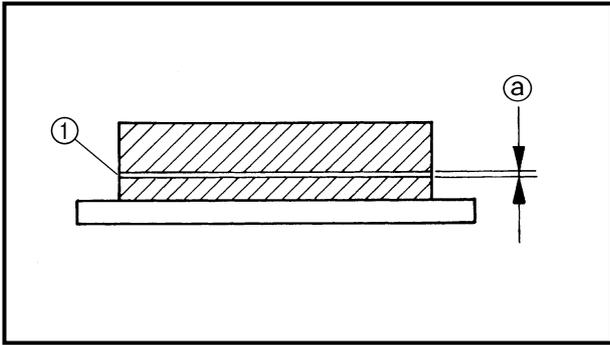
- Use only the designed quality brake fluid: otherwise, the rubber seals may deteriorate, causing leakage and poor brake performance.
- Refill with the same type of brake fluid; mixing fluids may result in a harmful chemical reaction and lead to poor performance.
- Be careful that water does not enter the master cylinder when refilling. Water will significantly lower the boiling point of the fluid and may result in a vapor lock.

4. Install: (rear brake)

- Front fender panel
  - Front carrier
- Refer to "SEAT, CARRIERS, FENDERS AND FUEL TANK".



# FRONT BRAKE PAD INSPECTION/REAR BRAKE PAD INSPECTION/BRAKE HOSE INSPECTION



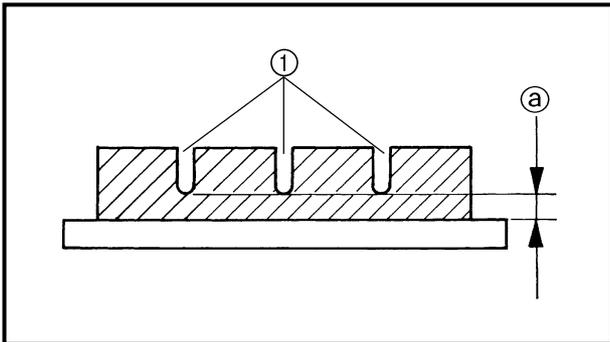
## FRONT BRAKE PAD INSPECTION

- 1.Remove:
  - Front wheels
- 2.Inspect:
  - Brake padWear indicators ① almost touch the brake disc → Replace the brake pads as a set. Refer to "FRONT AND REAR BRAKES" in CHAPTER 8.



**Brake pad wear limit (a):**  
**1 mm (0.04 in)**

- 3.Operate the brake lever.
- 4.Install:
  - Front wheels



## REAR BRAKE PAD INSPECTION

- 1.Remove:
  - Rear wheel (left)
- 2.Inspect:
  - Brake padWear indicator groove ① almost disappeared → Replace the brake pads as a set. Refer to "FRONT AND REAR BRAKES" in CHAPTER 8.



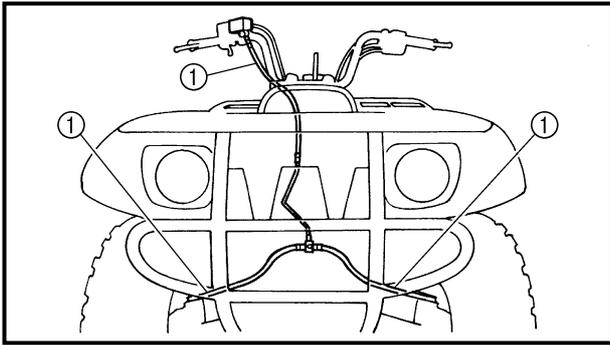
**Brake pad wear limit (a):**  
**1 mm (0.04 in)**

- 3.Operate the brake lever or brake pedal.
- 4.Install:
  - Rear wheel (left)

## BRAKE HOSE INSPECTION

- 1.Remove:
  - Seat
  - Front carrier
  - Front fenderRefer to "SEAT, CARRIERS, FENDERS AND FUEL TANK".
- Right footrest board
Refer to "FOOTREST BOARDS".

## BRAKE HOSE INSPECTION/ AIR BLEEDING (HYDRAULIC BRAKE SYSTEM)



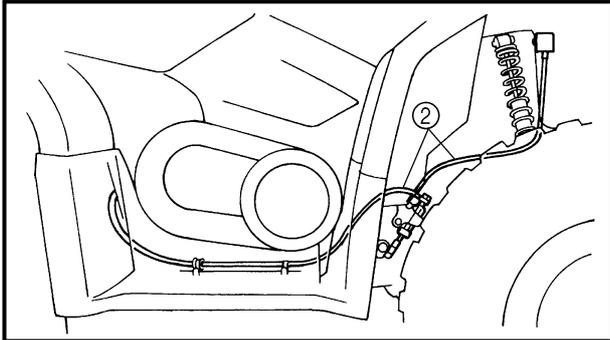
2. Inspect:

- Front brake hoses ①
  - Rear brake hoses ②
- Cracks/wear/damage → Replace.

3. Check:

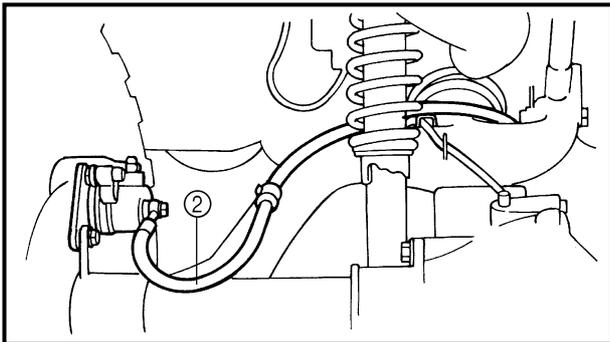
- Brake hose clamp
- Loosen → Tighten.

4. Hold the machine in an upright position and apply the front or rear brake.



5. Check:

- Brake hoses
- Active the brake lever several times.  
Fluid leakage → Replace the hose.  
Refer to "FRONT BRAKE" and "REAR BRAKE" in CHAPTER 7.



6. Install:

- Right footrest board  
Refer to "FOOTREST BOARDS".
- Front fender
- Front carrier
- Seat  
Refer to "SEAT, CARRIERS, FENDERS AND FUEL TANK".

### AIR BLEEDING (HYDRAULIC BRAKE SYSTEM)

#### **▲ WARNING**

**Bleed the brake system if:**

- The system has been disassembled.
- A brake hose or brake pipe have been loosened or removed.
- The brake fluid has been very low.
- The brake operation has been faulty.

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

1. Bleed:

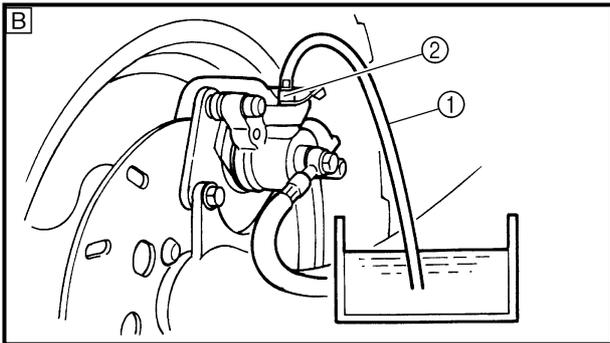
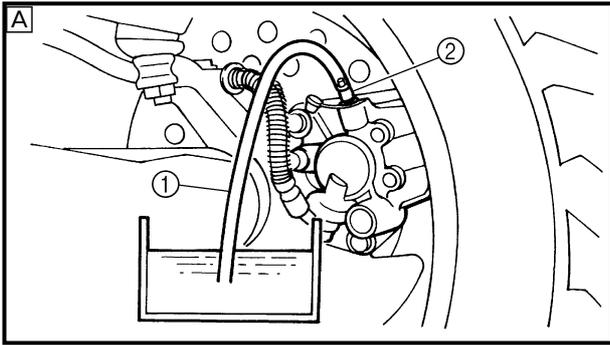
- Brake system

\*\*\*\*\*

#### **Air bleeding steps:**

- a. Add the proper brake fluid to the reservoir.

## AIR BLEEDING (HYDRAULIC BRAKE SYSTEM)



- b. Install the diaphragm. Be careful not to spill any fluid or allow the reservoir to overflow.
- c. Connect the clear plastic hose ① tightly to the caliper bleed screw ②.

- Ⓐ Front
- Ⓑ Rear

- d. Place the other end of the hose into a container.
- e. Slowly apply the brake lever or pedal several times.
- f. Pull the lever in or push down on the pedal and hold it.
- g. Loosen the bleed screw and allow the lever or pedal to travel towards its limit.
- h. Tighten the bleed screw when the lever or pedal limit has been reached, then release the lever or pedal.
- i. Repeat steps (e) to (h) until all the air bubbles have disappeared from the fluid.
- j. Tighten the bleed screw.



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

**NOTE:** \_\_\_\_\_  
If bleeding is difficult, it may be necessary to let the brake fluid settle for a few hours. Repeat the bleeding procedure when the tiny bubbles in the system have disappeared.

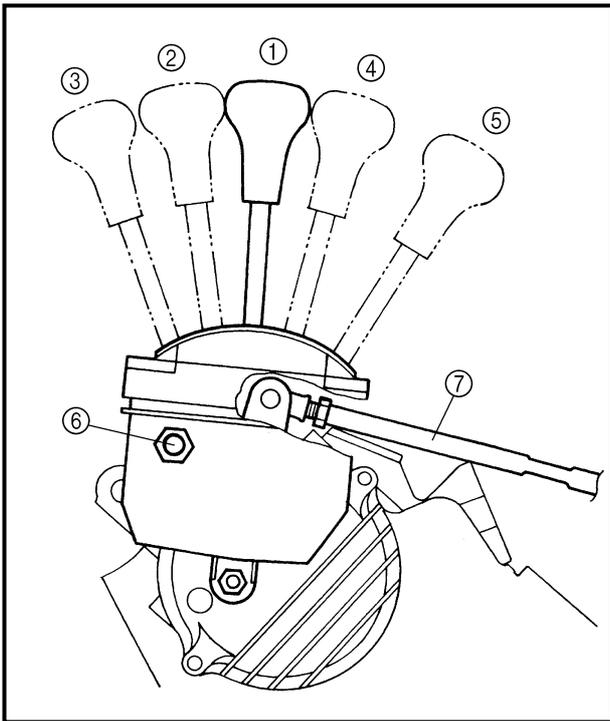
- k. Add brake fluid to the proper level. Refer to "BRAKE FLUID LEVEL INSPECTION".

### **⚠ WARNING** \_\_\_\_\_

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

\*\*\*\*\*

# SELECT LEVER CONTROL CABLE AND SHIFT ROD ADJUSTMENT



## SELECT LEVER CONTROL CABLE AND SHIFT ROD ADJUSTMENT

- ① NEUTRAL
- ② HIGH
- ③ LOW
- ④ REVERSE
- ⑤ PARK
- ⑥ Control cable
- ⑦ Select lever shift rod

### ⚠ WARNING

**Before moving the select lever, bring the machine to a complete stop and return the throttle lever to its closed position. Otherwise the transmission may be damaged.**

#### 1. Adjust:

- Rear brake pedal free play  
Refer to "REAR BRAKE LEVER AND PEDAL ADJUSTMENT".

#### 2. Adjust:

- Select lever control cable
- Select lever shift rod

\*\*\*\*\*

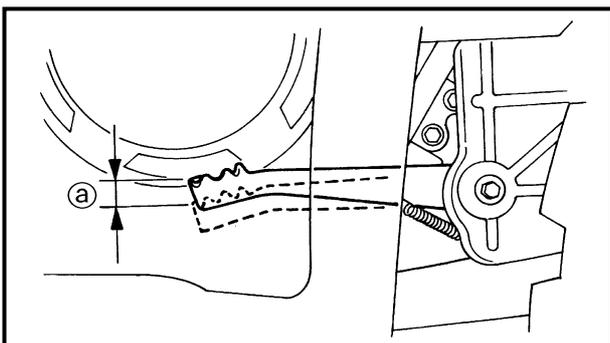
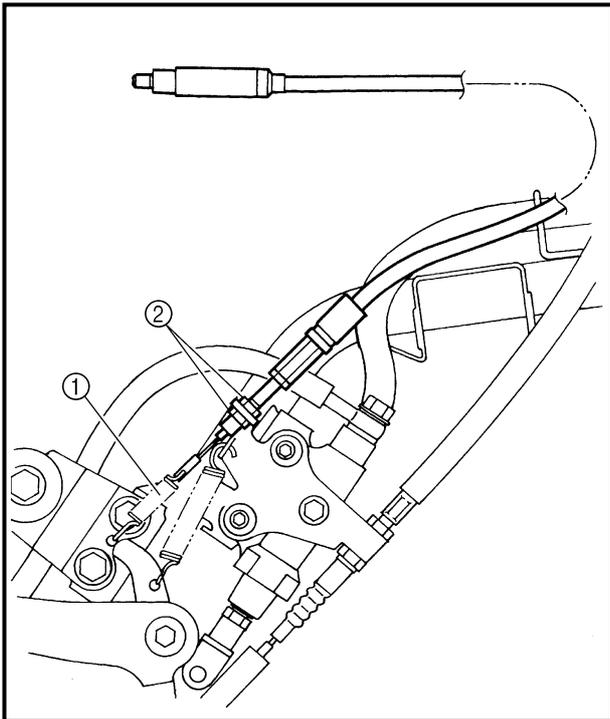
### Select lever control cable and select lever shift rod adjustment steps:

#### Control cable:

- Make sure the select lever is in NEUTRAL.
- Adjust the control cable so there is zero free play in the cable. When the adjustment is correct, slack in the return spring ① will be taken up.

#### NOTE:

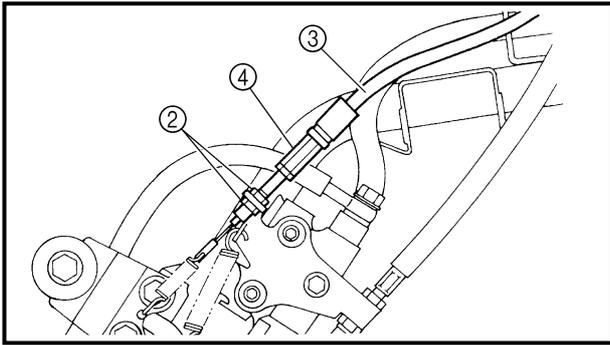
In some cases it will be necessary to further adjust the cable with the locknuts ② arrangement that holds the cable to its mount.



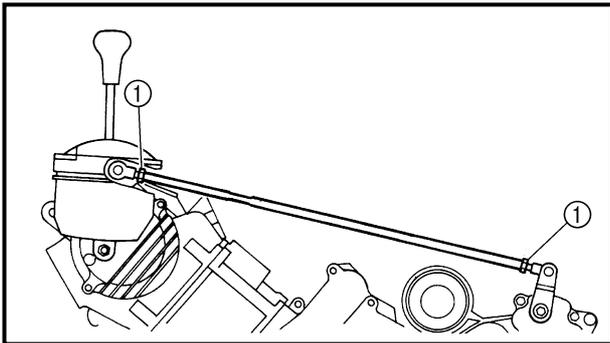
- When the brake begins to work " $a = 20 \sim 30 \text{ mm} (0.8 \sim 1.2 \text{ in})$ ", verify that the select lever can be shifted to REVERSE from NEUTRAL, to PARK from REVERSE and to NEUTRAL from REVERSE.

- Before the brake begins to work " $a = 0 \sim 20 \text{ mm} (0 \sim 0.8 \text{ in})$ ", verify that the select lever cannot be shifted to REVERSE from NEUTRAL, to REVERSE from PARK and to NEUTRAL from REVERSE.

# SELECT LEVER CONTROL CABLE AND SHIFT ROD ADJUSTMENT/FINAL GEAR OIL LEVEL INSPECTION



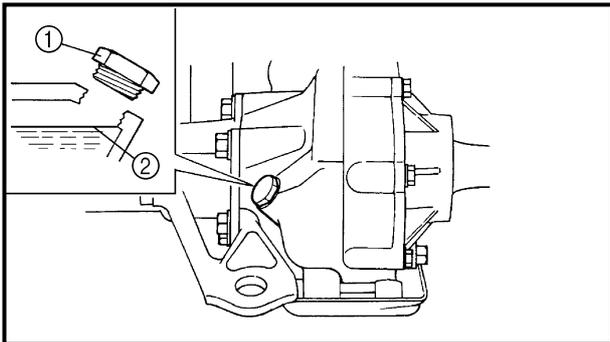
- Check that locknuts ② are tightened correctly.
- If the operation of the select lever is incorrect, adjust the select lever control cable ③ with the adjuster ④.



## Select lever shift rod:

- Make sure the select lever is in NEUTRAL.
- Loosen both locknuts ①.
- Adjust the shift rod length for smooth and correct shifting.
- Tighten the locknuts ①.

\*\*\*\*\*



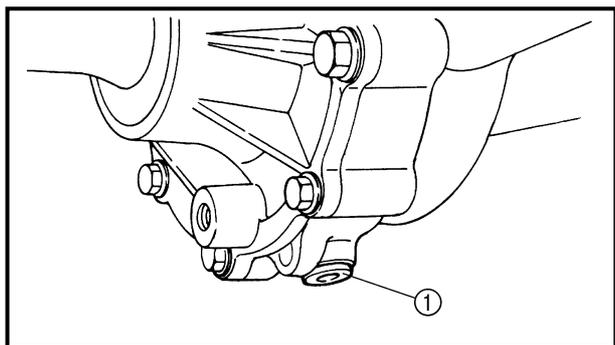
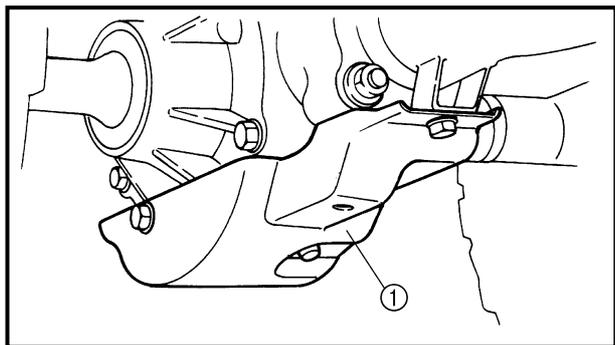
## FINAL GEAR OIL LEVEL INSPECTION

1. Place the machine on a level place.
2. Remove:
  - Oil filler bolt ①
3. Inspect:
  - Oil level
  - Oil level should be up to the bottom brim ② of the hole.
  - Oil level low → Add oil to the proper level.

	<b>Recommended oil:</b> SAE 80 API "GL-4" Hypoid gear oil
--	--

**CAUTION:** \_\_\_\_\_  
 Take care not allow foreign material to enter the final gear case.

4. Install:
  - Oil filler bolt 23 Nm (2.3 m • kg, 16 ft • lb)



## FINAL GEAR REPLACEMENT

1. Place the machine on a level surface.
2. Remove:
  - Final gear case protector ①
3. Place a receptacle under the final gear case.

4. Remove:
  - Oil filler bolt
  - Drain plug ①
5. Drain:
  - Final gear oil

6. Install:
  - Drain plug  **23 Nm (2.3 m • kg, 16 ft • lb)**

**NOTE:** \_\_\_\_\_  
 Check the gasket (drain plug). If it is damaged, replace it with a new one.

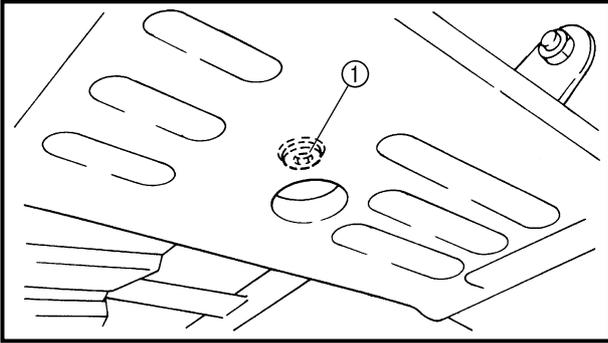
7. Fill:
  - Final gear case

	<b>Periodic oil change:</b>
	<b>0.19 L (0.17 Imp qt, 0.20 US qt)</b>
	<b>Total amount:</b>
	<b>0.22 L (0.19 Imp qt, 0.23 US qt)</b>
	<b>Recommended oil:</b>
	<b>SAE80 API "GL-4" Hypoid gear oil</b>

**CAUTION:** \_\_\_\_\_  
 Take care not to allow foreign material to enter the final gear case.

8. Inspect:
  - Oil level  
 Refer to "FINAL GEAR OIL LEVEL INSPECTION".
9. Install:
  - Oil filler bolt  **23 Nm (2.3 m • kg, 16 ft • lb)**
  - Final gear case protector  **23 Nm (2.3 m • kg, 16 ft • lb)**

# DIFFERENTIAL GEAR OIL INSPECTION/ DIFFERENTIAL GEAR OIL REPLACEMENT



## DIFFERENTIAL GEAR OIL INSPECTION

1. Place the machine on a level surface.

2. Remove:

- Oil filter bolt
- Oil drain plug ①

3. Drain:

- Differential gear oil

4. Install:

- Oil drain plug 10 Nm (1.0 m • kg, 7 ft • lb)

5. Fill:

- Differential gear oil

	<b>Recommended oil:</b> SAE 80 API "GL-4" Hypoid gear oil
	<b>Oil quantity (periodic oil change):</b> 0.35 L (0.31 Imp qt, 0.37 US qt)

### CAUTION:

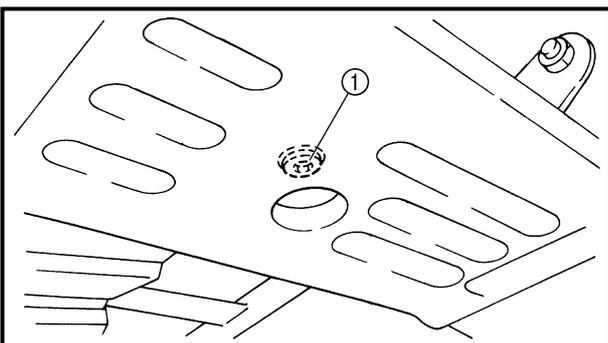
Take care not allow foreign material to enter the final gear case.

6. Install:

- Oil filter bolt 23 Nm (2.3 m • kg, 16 ft • lb)

### NOTE:

If gear oil is filled to the brim of the oil filler hole, oil may start leaking from the differential gear case breather hose. Therefore, check the quantity of the oil, not its level.



## DIFFERENTIAL GEAR OIL REPLACEMENT

1. Place the machine on a level surface.

2. Place a receptacle under the differential gear case.

3. Remove:

- Oil filler bolt
- Drain plug ①

**4.Drain:**

- Differential gear oil

**5.Install:**

- Drain plug  **10 Nm (1.0 m • kg, 7 ft • lb)**

**NOTE:**

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

**6.Fill:**

- Differential gear case



**Periodic oil change:**

**0.35 L (0.31 Imp qt, 0.37 US qt)**

**Total amount:**

**0.40 L (0.35 Imp qt, 0.42 US qt)**

**Recommended oil:**

**SAE 80 API "GL-4" Hypoid gear oil**

**NOTE:**

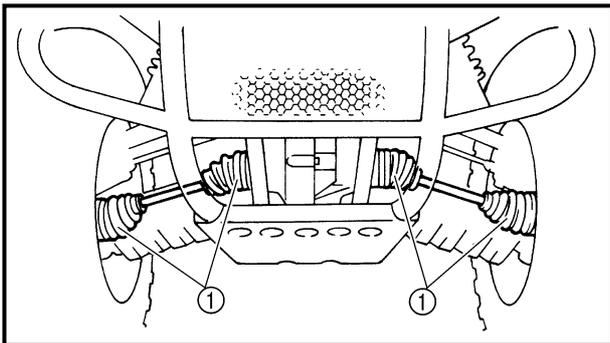
If gear oil is filled to the brim of the oil filler hole, oil may start leaking from the differential gear case breather hose. Therefore, check the quantity of the oil, not its level.

**CAUTION:**

**Take care not to allow foreign material to enter the differential gear case.**

**7.Install:**

- Oil filler bolt  **23 Nm (2.3 m • kg, 16 ft • lb)**



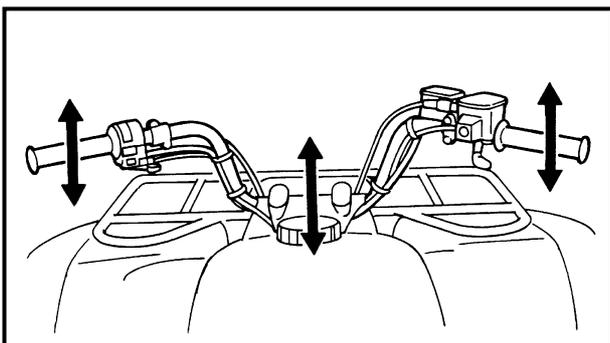
**CONSTANT VELOCITY JOINT DUST BOOT INSPECTION**

**1.Inspect:**

- Dust boots ①

Damage → Replace.

Refer to "DIFFERENTIAL GEAR AND CONSTANT VELOCITY JOINT" in CHAPTER 6.



**STEERING SYSTEM INSPECTION**

**1.Place the machine on a level surface.**

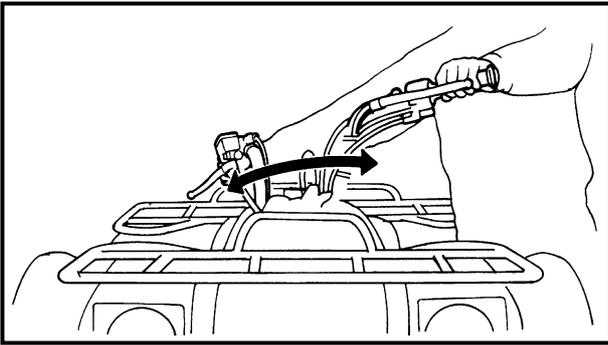
**2.Check:**

- Steering assembly bushings

Move the handlebar up and down, and/or back and forth.

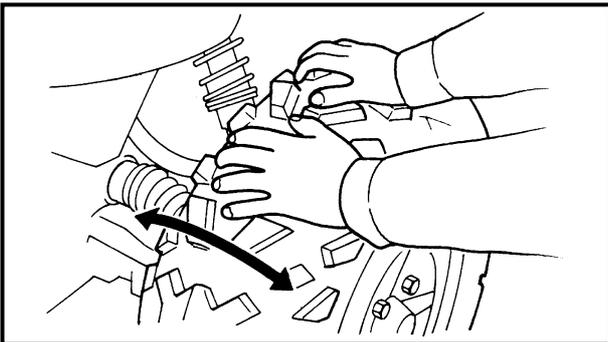
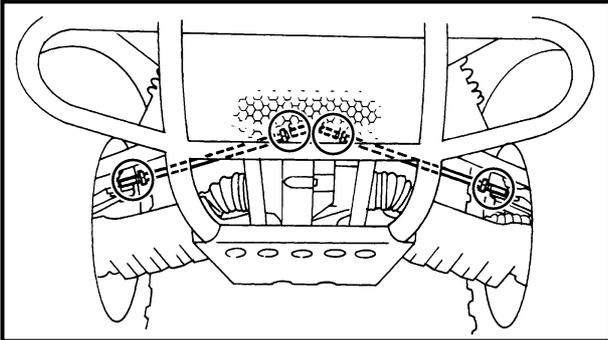
Excessive play → Replace the steering stem bushings.

# STEERING SYSTEM INSPECTION/ TOE-IN ADJUSTMENT



### 3. Check:

- Tie-rod ends  
Turn the handlebar to the left and/or right until it stops completely, then move the handlebar from the left to the right slightly. Tie-rod end has any vertical play → Replace the tie-rod end(s).



### 4. Raise the front end of the machine so that there is no weight on the front wheels.

### 5. Check:

- Ball joints and/or wheel bearings  
Move the wheels laterally back and forth. Excessive free play → Replace the front arms (upper and lower) and/or wheel bearings.

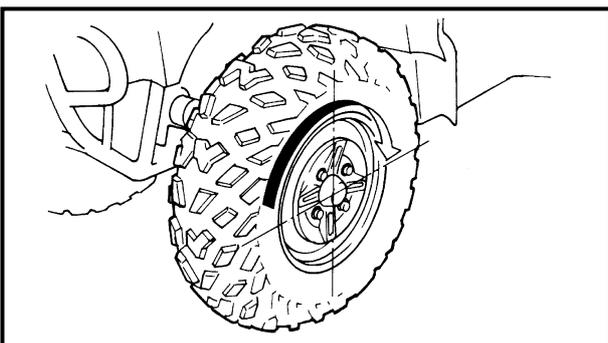
## TOE-IN ADJUSTMENT

1. Place the machine on a level surface.

2. Measure:

- Toe-in  
Out of specification → Adjust.

	<b>Toe-in:</b> <b>0 ~ 10 mm (0 ~ 0.40 in)</b>
--	--

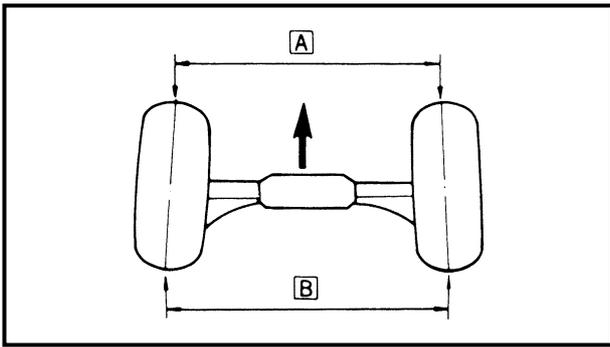


\*\*\*\*\*

### Toe-in measurement steps:

**NOTE:** \_\_\_\_\_  
Before measuring the toe-in, make sure that the tire pressure is correct.

- Mark both front tire tread centers.
- Raise the front end of the machine so that there is no weight on the front tires.



- Face the handlebar straight ahead.
- Measure the width **A** between the marks.
- Rotate the front tires 180° until the marks are exactly opposite one another.
- Measure the width **B** between the marks.
- Calculate the toe-in using the formula given below.

<b>Toe-in = <math>B - A</math></b>
------------------------------------

- If the toe-in is incorrect, adjust it.
- \*\*\*\*\*

### 3.Adjust:

- Toe-in

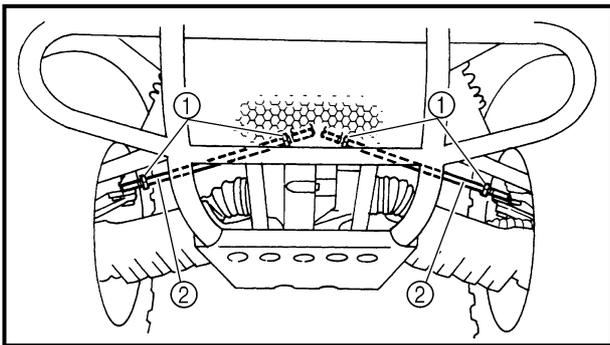
### **⚠ WARNING**

- Be sure that both tie-rods are turned the same amount. If not, the machine will drift right or left even though the handlebar is positioned straight. This may lead to mishandling and an accident.
- After setting the toe-in to specification, run the machine slowly for some distance with both hands lightly holding the handlebar and check that the handlebar responds correctly. If not, turn either the right or left tie-rod within the toe-in specification.

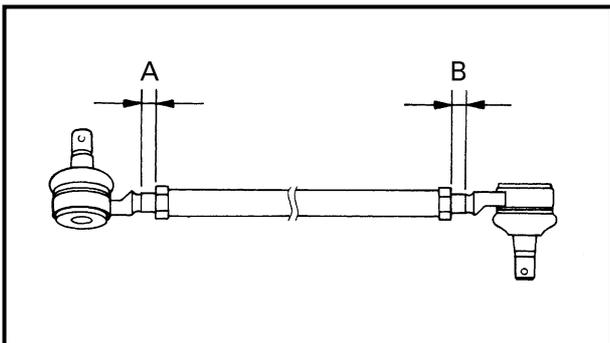
\*\*\*\*\*

### Adjustment steps:

- Mark both tie-rods ends.  
This reference point will be needed during adjustment.
- Loosen the locknuts (tie-rod end) ① of both tie-rods.
- The same number of turns should be given to both the right and left tie-rods ② until the specified toe-in is obtained. This is to keep the length of the rods the same.
- Tighten the rod end locknuts of both tie rods.



	<b>Locknut (rod end):</b> <b>15 Nm (1.5 m · kg, 11 ft · lb)</b>
---	--



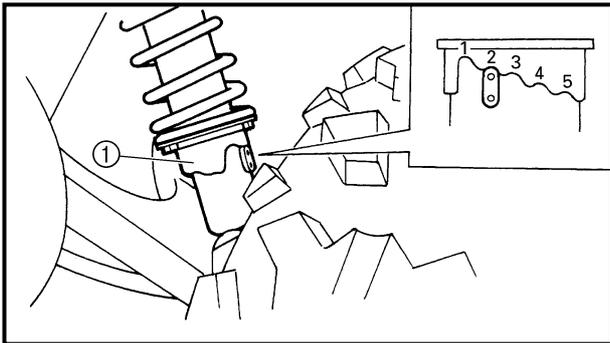
**NOTE:** \_\_\_\_\_  
Adjust the rod ends so that A and B are equal.

\*\*\*\*\*

**FRONT SHOCK ABSORBER ADJUSTMENT**

**⚠ WARNING**

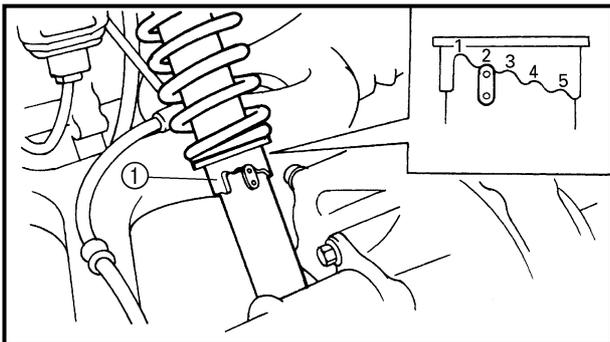
Always adjust both front shock absorber spring preload to the same setting. Uneven adjustment can cause poor handling and loss of stability.



1.Adjust:

- Spring preload  
Turn the adjuster ① to increase or decrease the spring preload.

**Standard position: 2  
Minimum (Soft) position: 1  
Maximum (Hard) position: 5**



**REAR SHOCK ABSORBER ADJUSTMENT**

1.Adjust:

- Spring preload  
Turn the adjuster ① to increase or decrease the spring preload.

**NOTE:**

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

**Standard position: 2  
Minimum (Soft) position: 1  
Maximum (Hard) position: 5**

**TIRE INSPECTION**

**⚠ WARNING**

This model is equipped with low pressure tires. It is important that they be inflated correctly and maintained at the proper pressures.

- TIRE CHARACTERISTICS

1) Tire characteristics influence the handling of ATV's. The tires listed below have been approved by Yamaha Motor Co., Ltd. for this model. If other tire combinations are used, they can adversely affect your machine's handling characteristics and are therefore not recommended.

	Manufacturer	Size	Type
Front	<b>DUNLOP</b> (For CDN, GB, F, CH)	AT25 × 8-12	KT123
	<b>CHENG SHIN</b> (For Oceania)	AT25 × 8-12	C828
Rear	<b>DUNLOP</b> (For CDN, GB, F, CH)	AT25 × 10-12	KT127
	<b>CHENG SHIN</b> (For Oceania)	AT25 × 10-12	C828

#### ● TIRE PRESSURE

1) Recommended tire pressure

Front 25 kPa (0.25 kg/cm<sup>2</sup>, 3.6 psi)

Rear 25 kPa (0.25 kg/cm<sup>2</sup>, 3.6 psi)

2) Tire pressure below the minimum specification could cause the tire to dislodge from the rim under severe riding conditions.

The following are minimums:

Front 22 kPa (0.22 kg/cm<sup>2</sup>, 3.2 psi)

Rear 22 kPa (0.22 kg/cm<sup>2</sup>, 3.2 psi)

3) Use no more than

Front 250 kPa (2.5 kg/cm<sup>2</sup>, 36 psi)

Rear 250 kPa (2.5 kg/cm<sup>2</sup>, 36 psi)

when seating the tire beads. Higher pressures may cause the tire to burst.

Inflate the tires slowly and carefully.

Fast inflation could cause the tire to burst.

#### ● MAXIMUM LOADING LIMIT

1) Vehicle load limit (total weight of cargo, rider and accessories, and tongue weight): 210 kg (463 lb)

2) Front carrier : 40 kg (88 lb)

3) Rear carrier : 80 kg (176 lb)

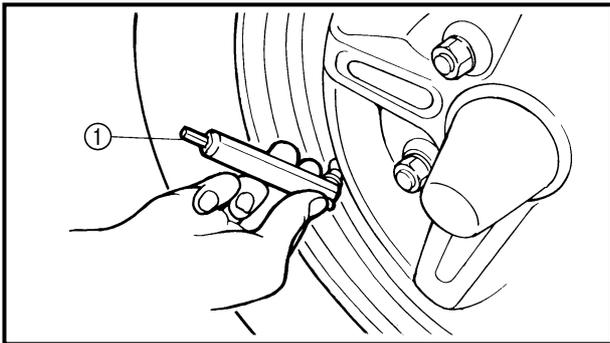
4) Storage box: 2.0 kg (4.4 lb)

5) Trailer hitch:

**Pulling load (total weight of trailer and cargo): 500 kg (1,102 lb)**

**Tongue weight (vertical weight on trailer hitch point): 15 kg (33 lb)**

**Be extra careful of the machine balance and stability when towing a trailer.**



1.Measure:

- Tire pressure (cold tire pressure)  
Out of specification → Adjust.

**NOTE:**

- The low-pressure tire gauge ① is included as standard equipment.
- If dust or the like is stuck to this gauge, it will not provide the correct readings. Therefore, take two measurements of the tire's pressure and use the second reading.

Cold tire pressure	Front	Rear
Standard	25 kPa (0.25 kg/cm <sup>2</sup> , 3.6 psi)	25 kPa (0.25 kg/cm <sup>2</sup> , 3.6 psi)
Minimum	22 kPa (0.22 kg/cm <sup>2</sup> , 3.2 psi)	22 kPa (0.22 kg/cm <sup>2</sup> , 3.2 psi)
Maximum	28 kPa (0.28 kg/cm <sup>2</sup> , 4.0 psi)	28 kPa (0.28 kg/cm <sup>2</sup> , 4.0 psi)

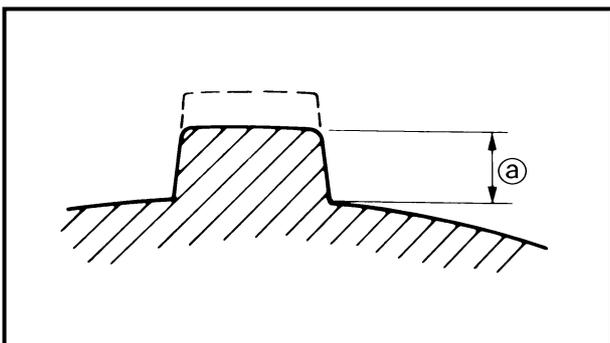
**⚠ WARNING**

Uneven or improper tire pressure may adversely affect the handling of this machine and may cause loss of control.

- Maintain proper tire pressures.
- Set tire pressures when the tires are cold.
- Tire pressures must be equal in both front tires and equal in both rear tires.

2.Inspect:

- Tire surfaces  
Wear/damage → Replace.

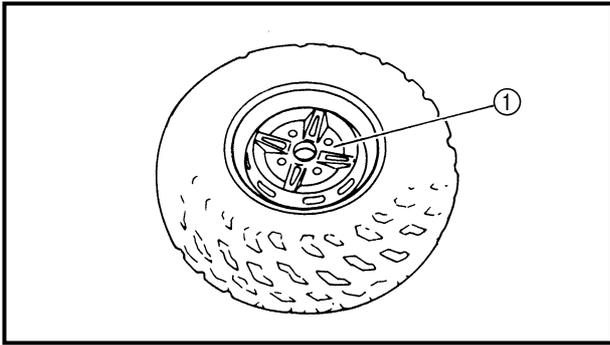


	<b>Tire wear limit ②:</b> Front and rear: 3.0 mm (0.12 in)
---	---

**⚠ WARNING**

It is dangerous to ride with a worn-out tire. When tire wear is out of specification, replace the tire immediately.

## WHEEL INSPECTION/ CABLE INSPECTION AND LUBRICATION



### WHEEL INSPECTION

1. Inspect:

- Wheels ①  
Damage/bends → Replace.

### NOTE:

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

### ⚠ WARNING

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

### CABLE INSPECTION AND LUBRICATION

### ⚠ WARNING

A damaged cable sheath may cause corrosion and interfere with the cable movement. An unsafe condition may result so replace a damaged cable as soon as possible.

1. Inspect:

- Cable sheath  
Damage → Replace.

2. Check:

- Cable operation  
Unsmooth operation → Lubricate or replace.



**Recommended lubricant:**  
Yamaha chain and cable lube or  
Engine oil

### NOTE:

Hold the cable end up and apply several drops of lubricant to the cable.

3. Apply:

- Lithium soap base grease  
(onto end of the cable)

## LEVERS, PEDAL, ETC. LUBRICATION

---

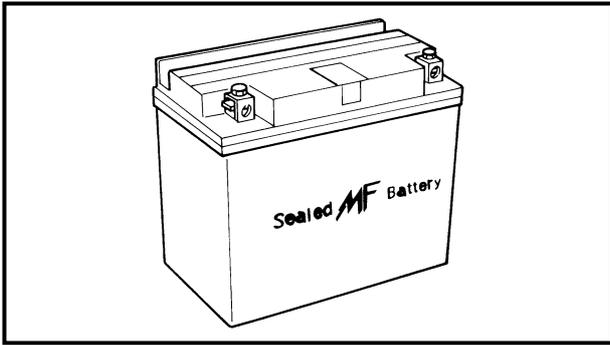


### LEVERS, PEDAL, ETC. LUBRICATION

1. Lubricate the pivoting parts.



**Recommended lubricant:**  
Yamaha chain and cable lube or  
Engine oil



EB305000

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

Since the MF battery is a sealed type battery, it is not possible to measure the specific gravity of the electrolyte in order to check the charge state of the battery. Therefore the charge of the battery has to be checked by measuring the voltage at the battery terminals.

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

- This is a sealed type battery. Never remove the sealing caps. If the sealing caps have been removed, the balance will not be maintained and battery performance will deteriorate.
- Charging time, charging current and charging voltage for the MF battery are different from those of general type batteries. The MF battery should be charged as explained in "CHARGING METHOD". If the battery is overcharged, the electrolyte level will drop considerably. Therefore, take special care when charging the battery.

**⚠ WARNING**

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

Always follow these preventive measures:

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

Antidote (EXTERNAL):

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

Antidote (INTERNAL):

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

Batteries generate explosive hydrogen gas. Always follow these preventive measures:

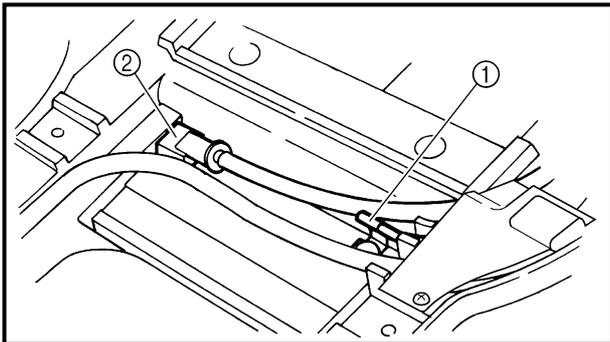
- Charge batteries in a well-ventilated area.
- Keep batteries away from fire, sparks or open flames (e.g., welding equipment, lighted cigarettes, etc.).
- DO NOT SMOKE when charging or handling batteries.

**KEEP BATTERIES AND ELECTROLYTE OUT OF REACH OF CHILDREN.**

1.Remove:

- Seat
- Battery holding bracket
- Battery lead cover

Refer to "SEAT, CARRIERS, FENDERS AND FUEL TANK".



2.Disconnect:

- Battery leads

**CAUTION:**

**First disconnect the negative lead ①, then disconnect the positive lead ②.**

3.Remove:

- Battery

4.Check:

- Battery condition

\*\*\*\*\*

**Battery condition checking steps:**

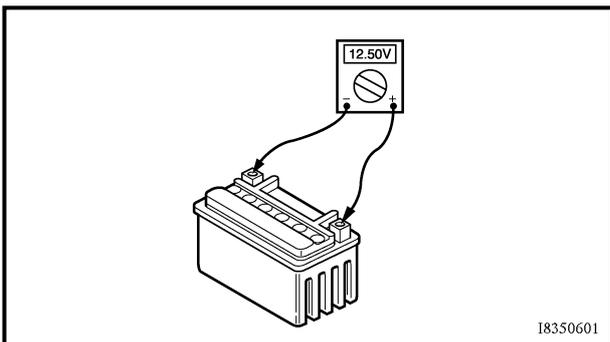
- Connect a digital voltmeter to the battery terminals.

**Tester (+) lead → battery (+) terminal**  
**Tester (-) lead → battery (-) terminal**

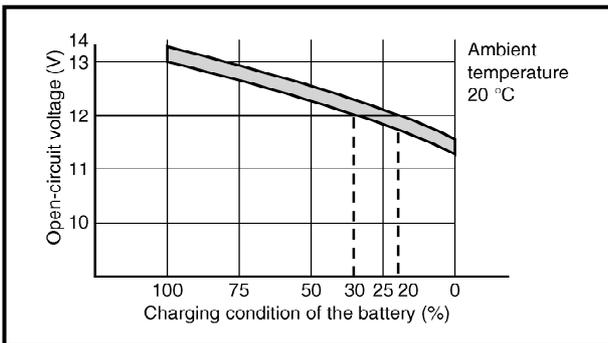
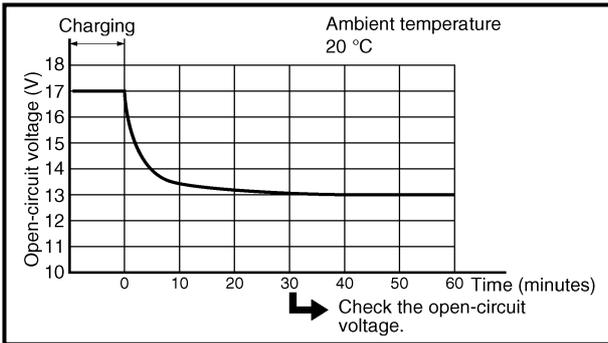
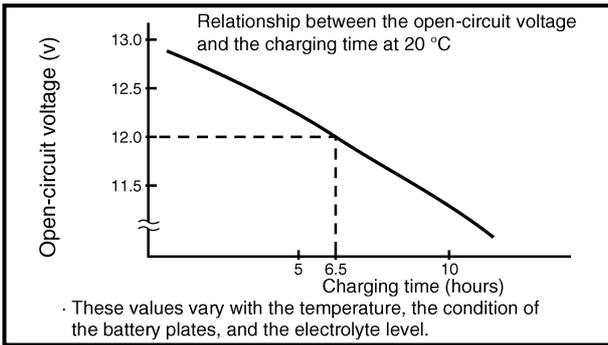
**NOTE:**

The charge state of an MF battery can be checked by measuring the open-circuit voltage (i.e. the voltage when the positive terminal is disconnected).

Open-circuit voltage	Charging time
12.8 V or higher	No charging is necessary.



18350601



- Check the condition of the battery using the following charts.

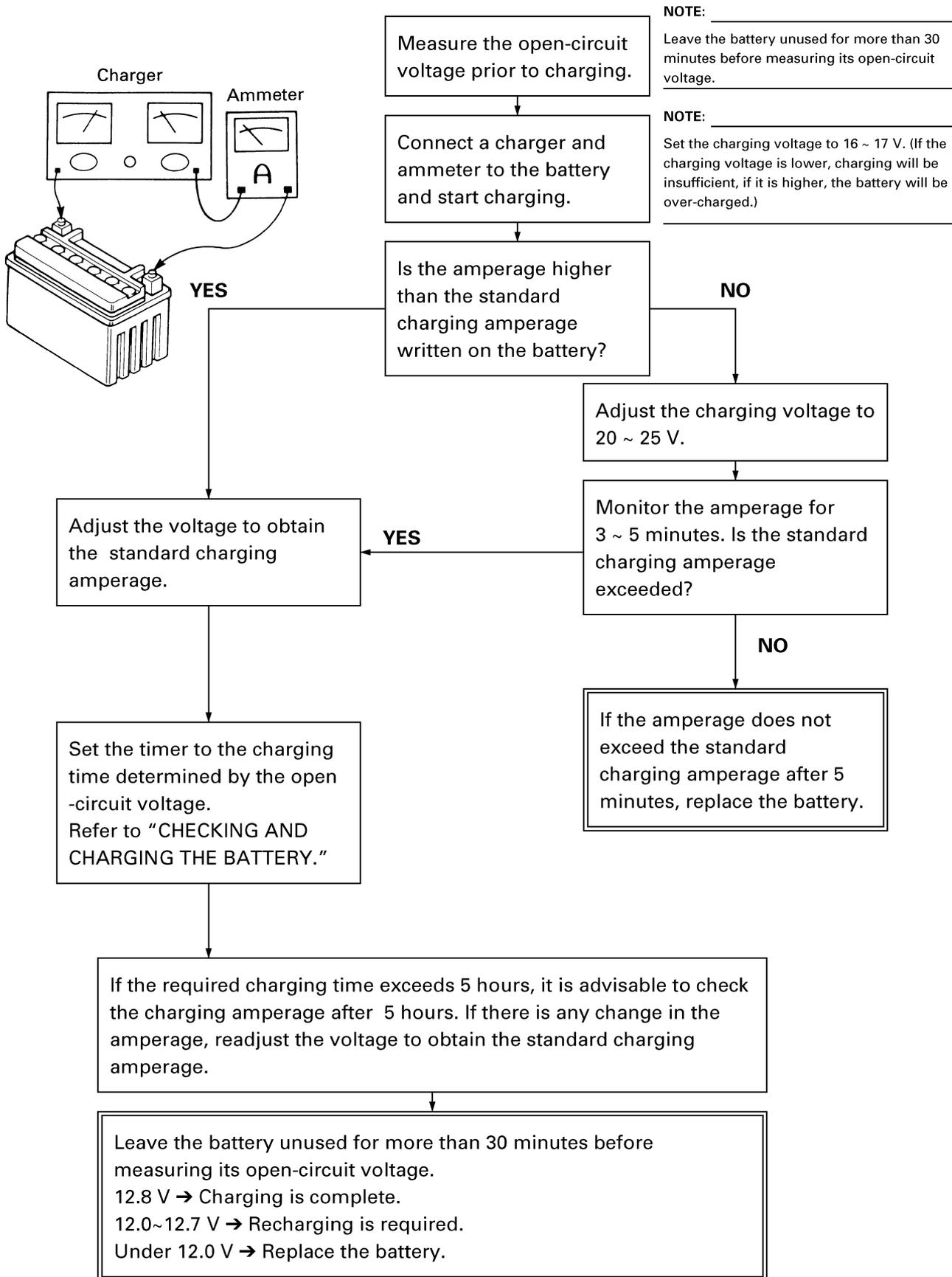
**Example:**

- Open-circuit voltage = 12.0 V
- Charging time = 6.5 hours
- Charge condition of the battery = 20 ~ 30%
- Charging method for MF batteries

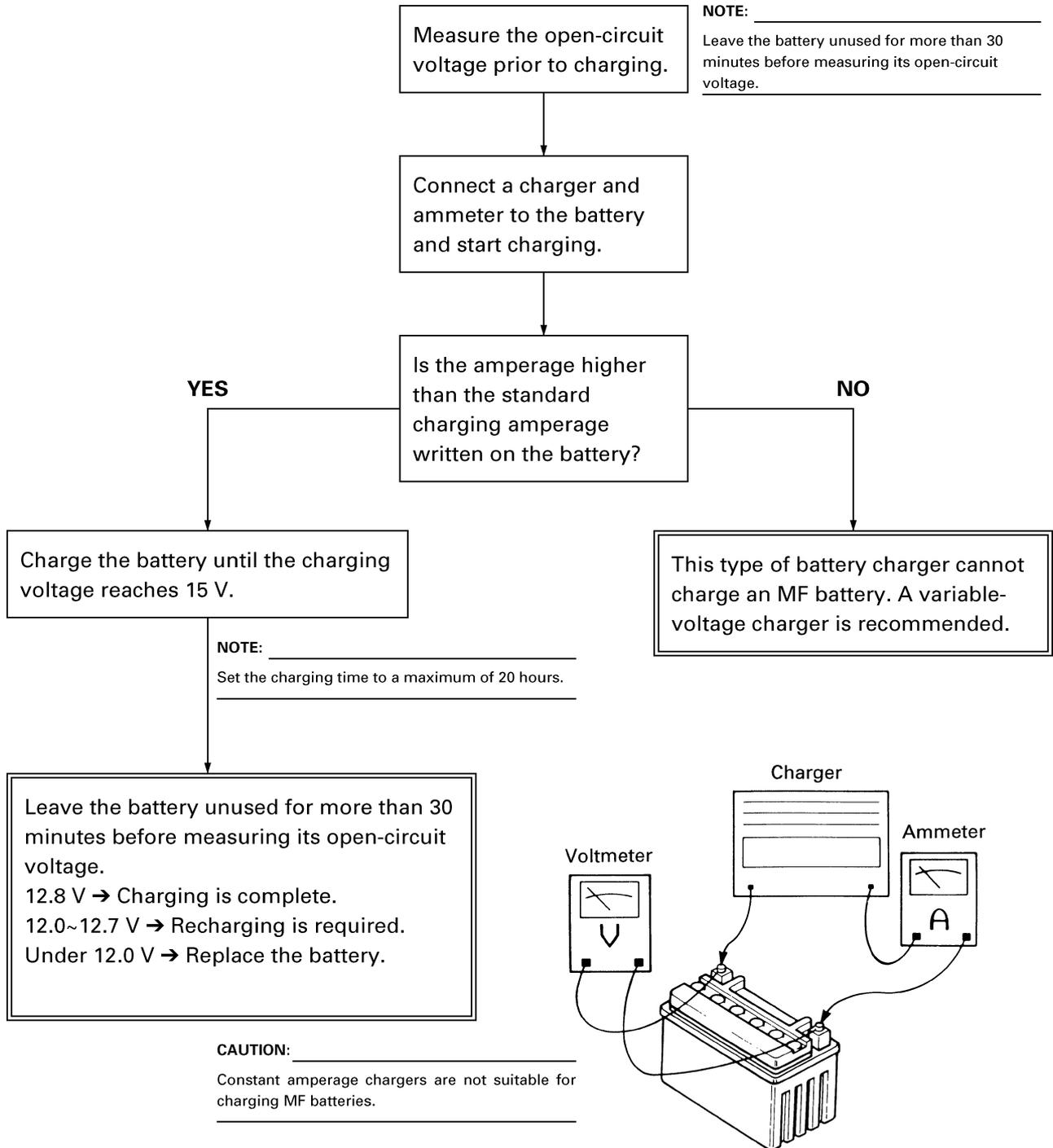
**CAUTION:**

- If it is impossible to set the standard charging current, be careful not to over-charge.
- When charging the battery, be sure to remove it from the motorcycle. (If charging has to be done with the battery mounted on the motorcycle, be sure to disconnect the wire at the negative terminal.)
- Never remove the sealing caps of an MF battery.
- Make sure that the charging clips are in full contact with the terminal and that they are not shorted together. (A corroded clip on the charger may cause the battery to generate heat in the contact area. A weak clip spring may cause sparks.)
- Before removing the clips from the battery terminals, be sure to turn off the charger's power switch.
- The open-circuit voltage variation for the MF battery, after charging, is shown below. As shown in the figure, the open-circuit voltage 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



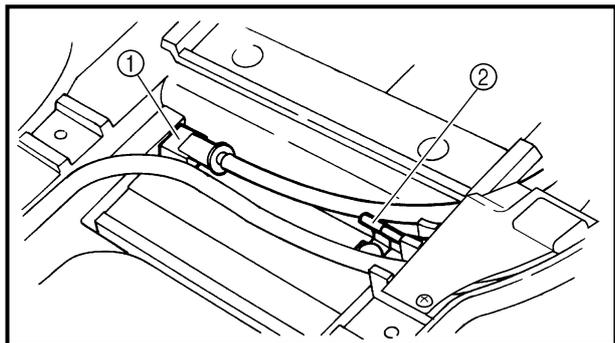
5. Inspect:

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

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

After cleaning the terminals, apply a light coat of grease.

---



6. Install:

- Battery

7. Connect:

- Battery leads

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

First, connect the positive lead ①, then connect the negative lead ②.

---

8. Install:

- Battery lead cover
- Battery holding bracket
- Seat  
Refer to "SEAT, CARRIERS, FENDERS AND FUEL TANK".

## FUSE INSPECTION

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

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

---

1. Remove:

- Seat  
Refer to "SEAT, CARRIERS, FENDERS AND FUEL TANK".

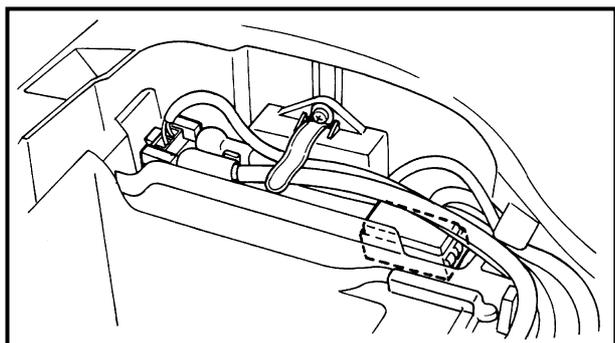
2. Inspect:

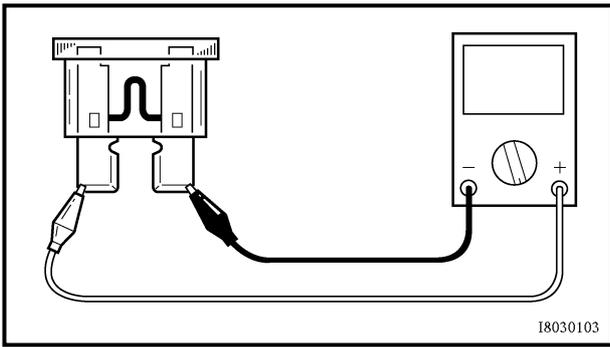
- Fuses

\*\*\*\*\*

**Inspection steps:**

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





**NOTE:** \_\_\_\_\_  
Set the tester to the “Ω × 1” position.

	<p><b>Pocket tester:</b> P/N. YU-03112, 90890-03112</p>
---	---

● If the tester indicates 0, replace the fuse.  
\*\*\*\*\*

**3. Replace:**

● Blown fuse  
\*\*\*\*\*

**Replacement steps:**

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

\*\*\*\*\*

Description	Current rating	Quantity
Main	30 A	1
Headlight	15 A	1
Ignition	10 A	1
Signal	10 A	1
Terminal (Auxiliary DC jack)	10 A	1
4WD (Four-wheel drive)	3 A	1
Reserve	30 A	1
Reserve	15 A	1
Reserve	10 A	1
Reserve	3 A	1

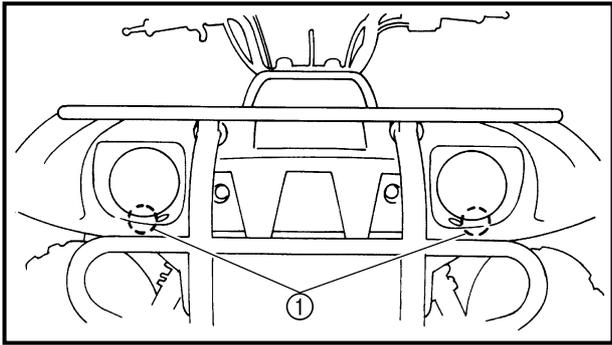
**⚠ WARNING** \_\_\_\_\_

Never use a fuse with a rating other than that specified. Never use other materials in place of a fuse. An improper fuse may cause extensive damage to the electrical system, a malfunction of the lighting and ignition systems and could possibly cause a fire.

**4. Install:**

- Seat  
Refer to “SEAT, CARRIERS, FENDERS AND FUEL TANK”.

# HEADLIGHT BEAM ADJUSTMENT/ HEADLIGHT BULB REPLACEMENT

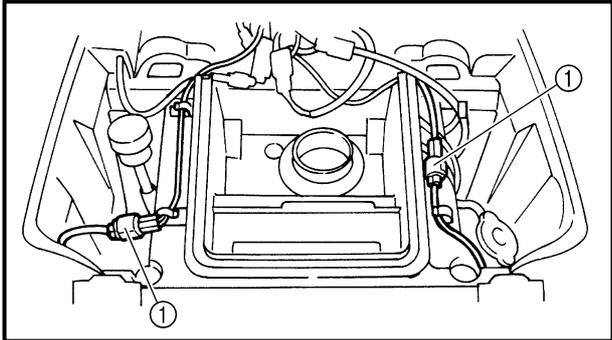


## HEADLIGHT BEAM ADJUSTMENT

1.Adjust:

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

Turning in	Headlight beam raised.
Turning out	Headlight beam lowered.



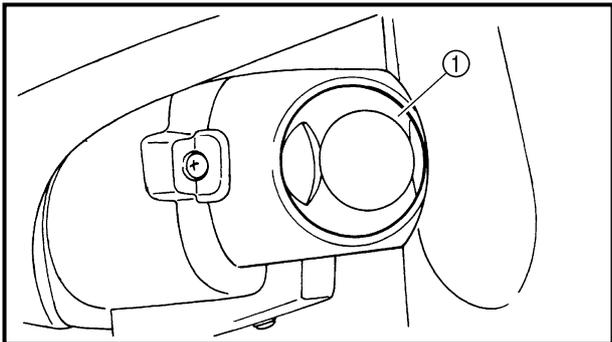
## HEADLIGHT BULB REPLACEMENT

1.Remove:

- Front carrier
- Front fender panel  
Refer to "SEAT, CARRIERS, FENDERS AND FUEL TANK".

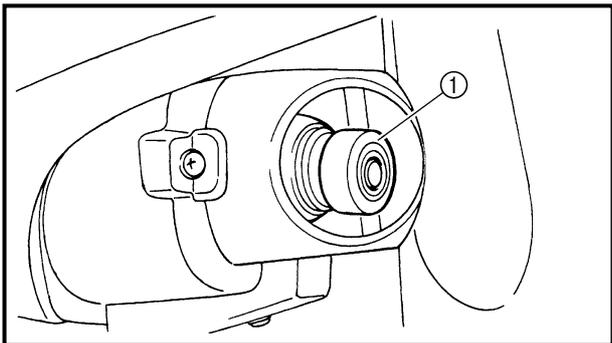
2.Disconnect:

- Headlight lead couplers ①



3.Remove:

- Cover ①



4.Remove:

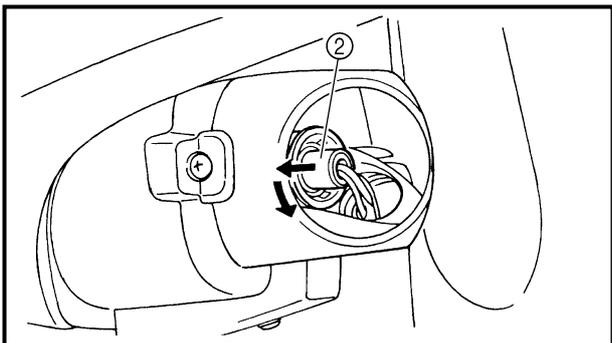
- Cover ①
- Bulb holder ②
- Bulb

### NOTE:

Turn the bulb holder counterclockwise and remove the defective bulb.

### ⚠ WARNING

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



5. Install:

- Bulb **New**

Secure the new bulb with the headlight unit.

**CAUTION:**

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

---

6. Install:

- Bulb holder
- Cover

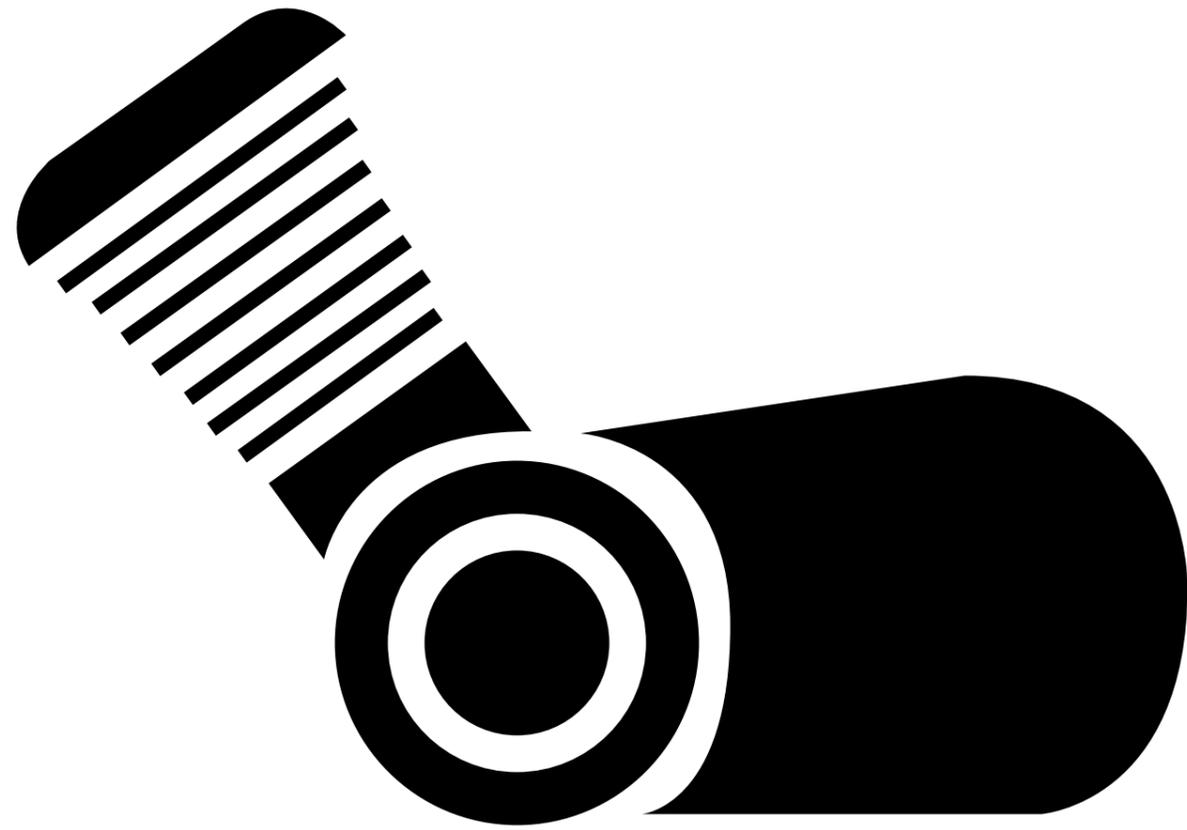
7. Connect:

- Headlight lead couplers

8. Install:

- Front fender panel
- Front carrier

Refer to "SEAT, CARRIERS, FENDERS AND FUEL TANK".



**ENG**

**4**



## CHAPTER 4. ENGINE

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**ENG**

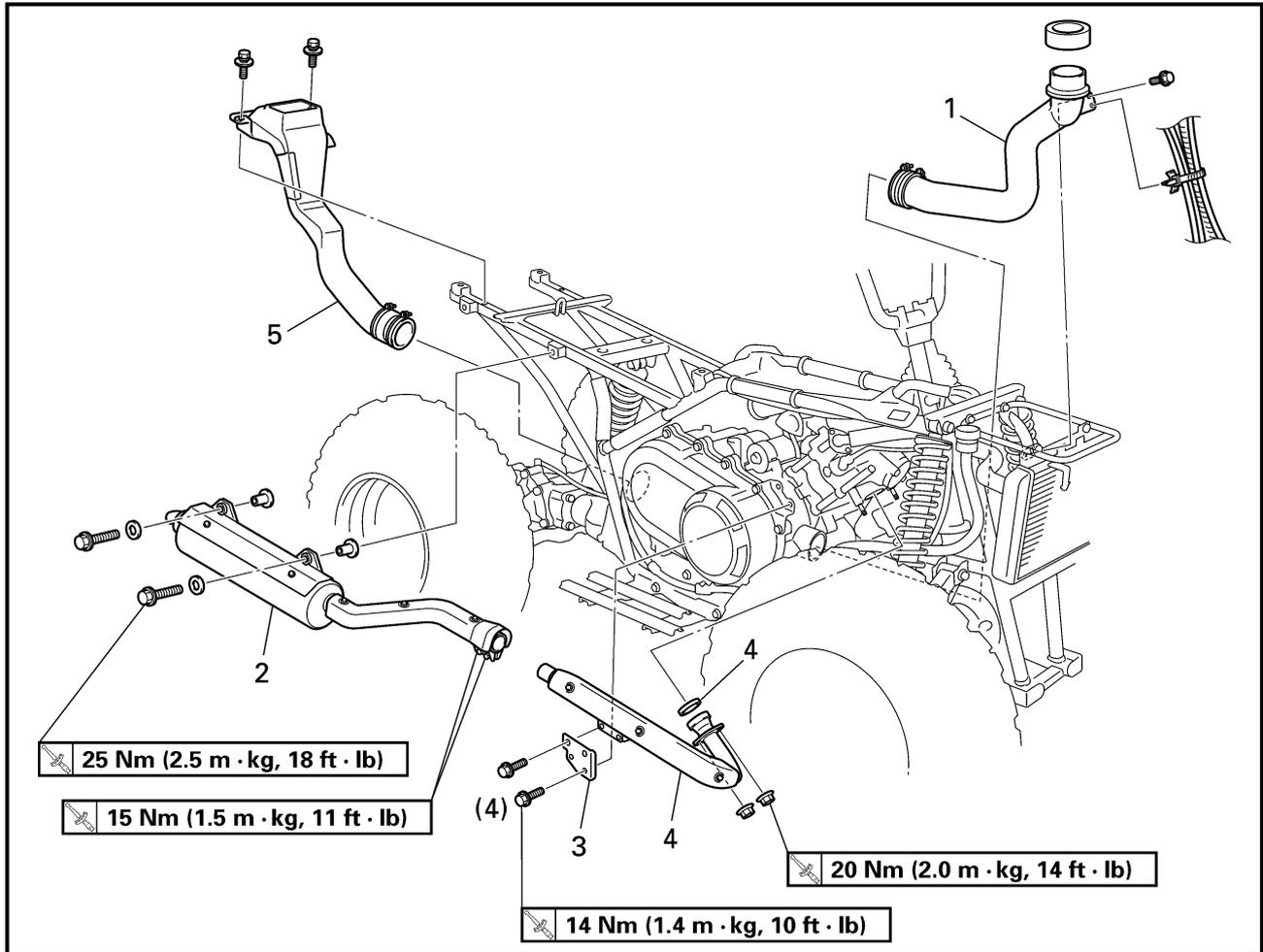




ENGINE

ENGINE REMOVAL

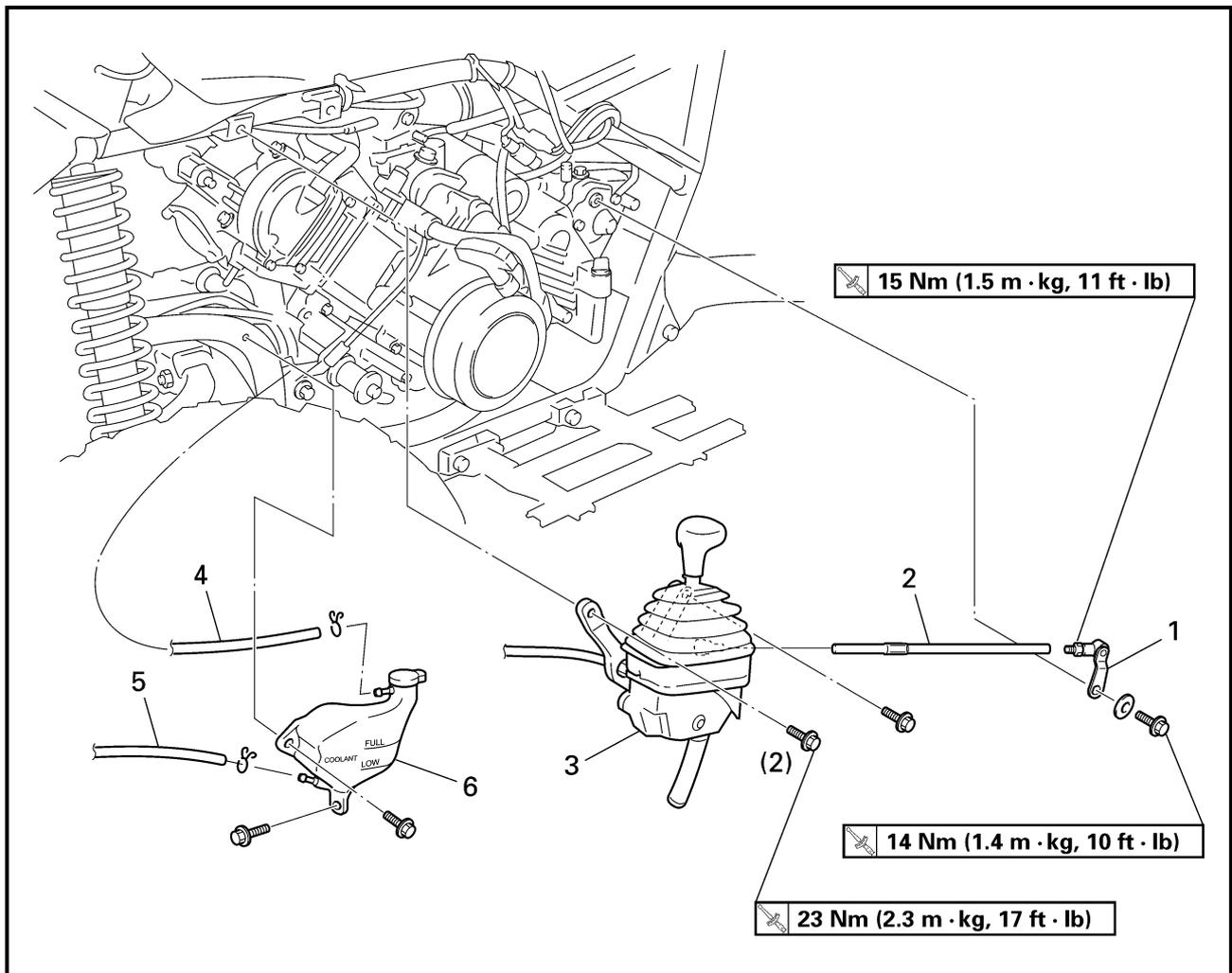
AIR DUCTS, MUFFLER AND EXHAUST PIPE



Order	Job name/Part name	Q'ty	Remarks
	<b>Air ducts, muffler and exhaust pipe removal</b>		Remove the parts in the order below.
	Engine oil		Refer to "ENGINE OIL REPLACEMENT" in CHAPTER 3.
	Front and rear fender/footrest boards		Refer to "SEAT, CARRIERS, FENDERS AND FUEL TANK" in CHAPTER 3.
	Fuel tank/rubber cover		
	Carburetor assembly		Refer to "CARBURETOR" in CHAPTER 6.
1	Air duct assembly 1	1	
2	Muffler	1	
3	Exhaust pipe stay 1	1	
4	Exhaust pipe/gasket	1/1	
5	Air duct assembly 2	1	
			For installation, reverse the removal procedure.



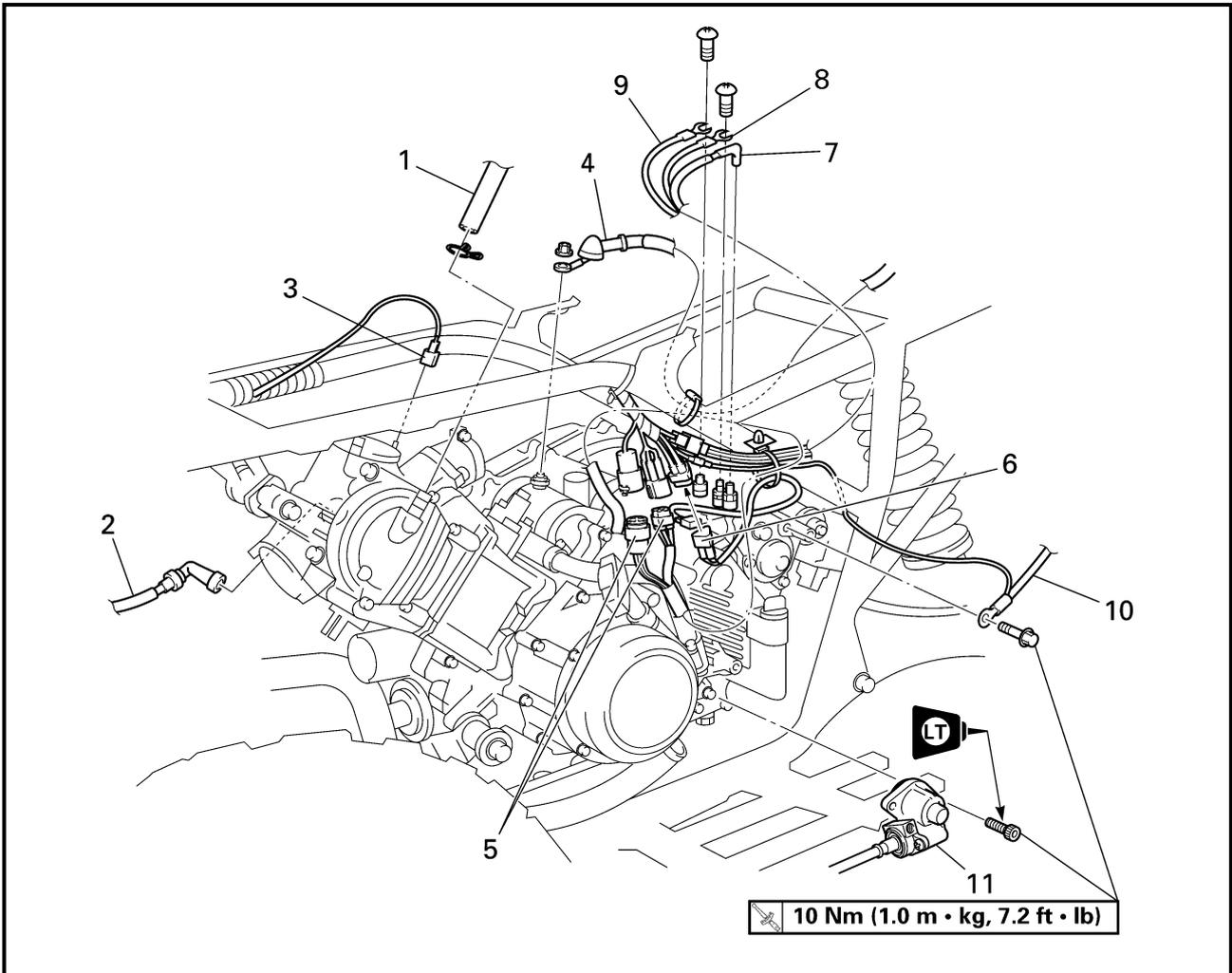
**SELECT LEVER UNIT AND COOLANT RESERVOIR**



Order	Job name/Part name	Q'ty	Remarks
	<b>Select lever unit and coolant reservoir removal</b>		Remove the parts in the order below.
1	Shift arm	1	
2	Select lever shift rod	1	
3	Select lever unit	1	
4	Coolant reservoir breather hose	1	
5	Coolant reservoir hose	1	
6	Coolant reservoir	1	
			For installation, reverse the removal procedure.



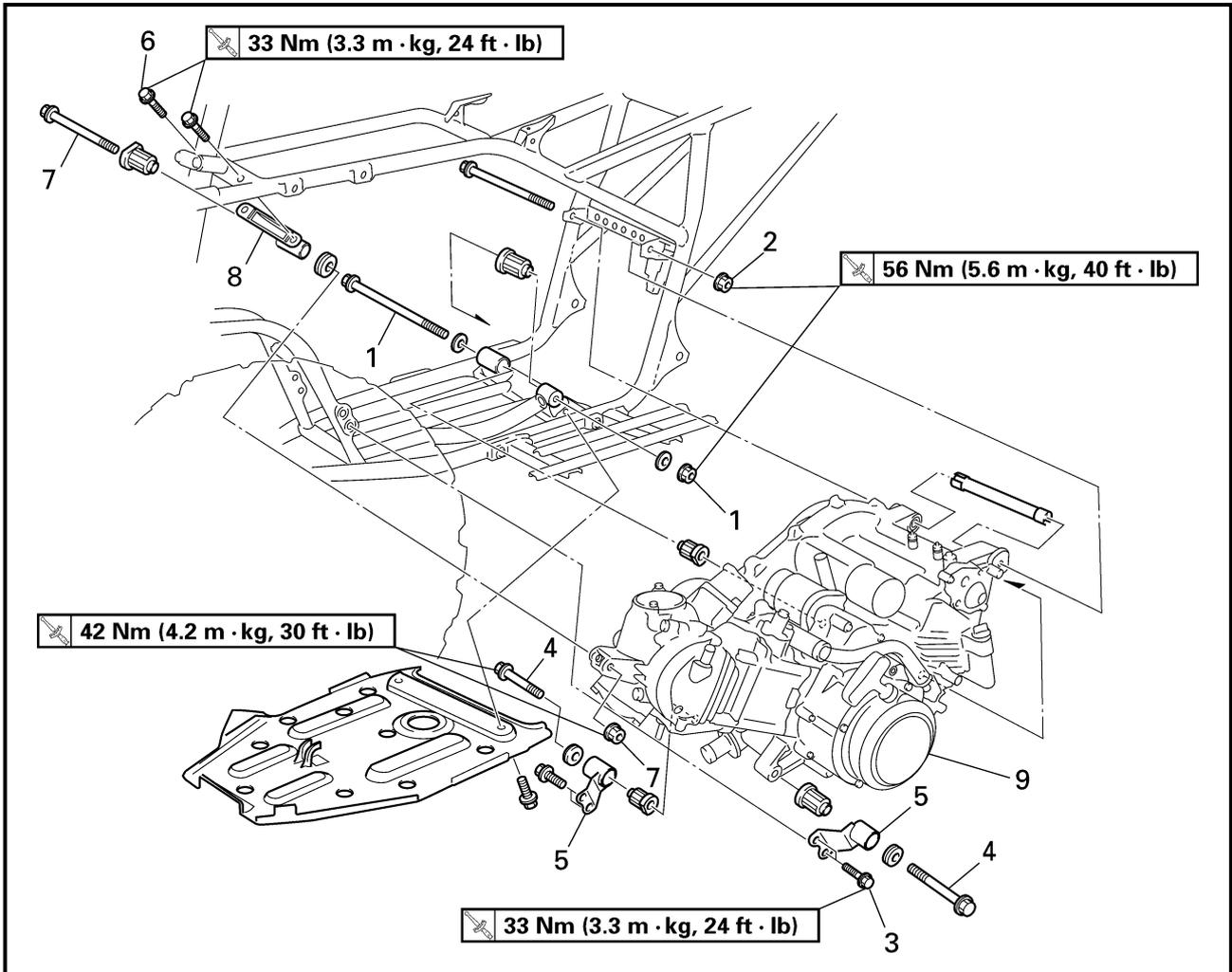
HOSES AND LEADS



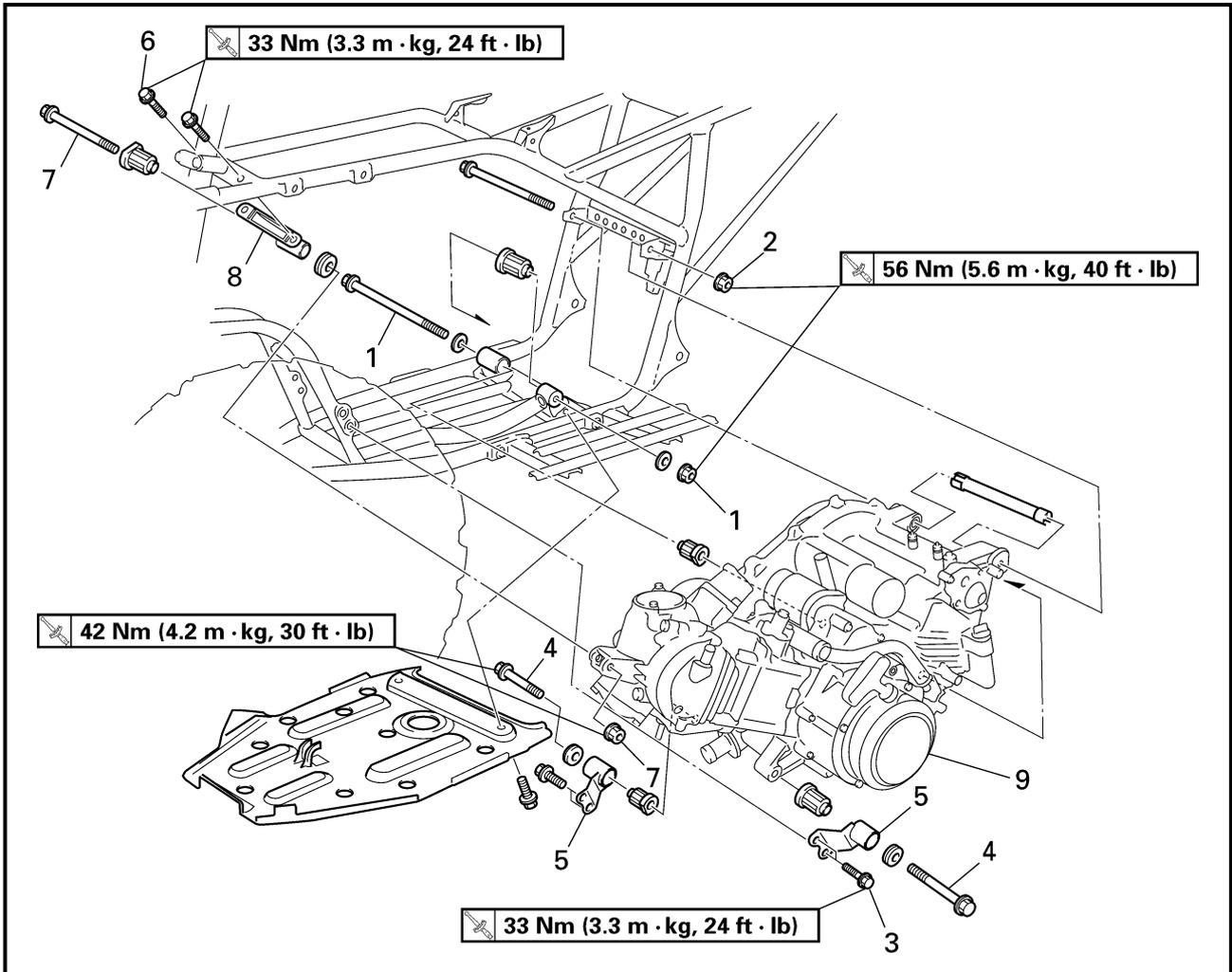
Order	Job name/Part name	Q'ty	Remarks
	<b>Hoses and leads removal</b>		Remove the parts in the order below. Refer to "WATER PUMP" in CHAPTER 5.
	Water pump inlet hose		
1	Cylinder head breather hose	1	
2	Spark plug lead	1	
3	Thermo switch lead	1	
4	Starter motor lead	1	
5	CDI magneto lead coupler	2	
6	Speed sensor lead coupler	1	
7	Neutral switch lead	1	Sky blue
8	Parking switch lead	1	Blue/Red
9	Reverse switch lead	1	Green/Blue
10	Engine ground lead	1	
11	Speedometer gear unit	1	
			For installation, reverse the removal procedure.



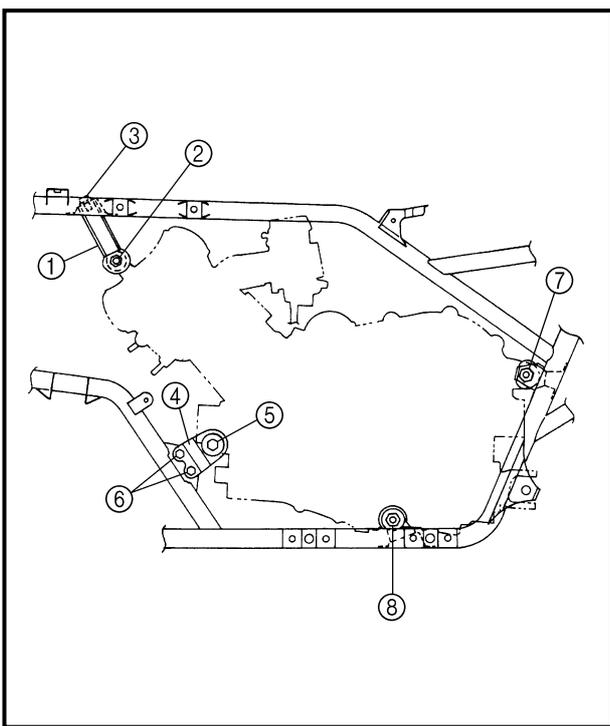
ENGINE MOUNTING BOLTS



Order	Job name/Part name	Q'ty	Remarks
	<b>Engine mounting bolt removal</b>		Remove the parts in the order below.
	Rear wheels		Refer to "FRONT AND REAR WHEELS" in CHAPTER 8.
	Swingarm		Refer to "REAR SHOCK ABSORBER AND SWINGARM" in CHAPTER 8.
1	Engine mounting bolt (rear-lower)/ nut	1/1	<p><b>CAUTION:</b> <u>Install all of the bolts/nuts and then tighten them to full torque specifications.</u></p> <p>Refer to "ENGINE INSTALLATION".</p>
2	Engine mounting bolt (rear-upper)/ nut	1/1	
3	Engine bracket bolt (front-lower)	4	
4	Engine mounting bolt (font-lower)	2	
5	Engine bracket (front-lower)	2	
6	Engine bracket bolt (front-upper)	2	
7	Engine mounting bolt (front-upper)/ nut	1/1	
8	Engine bracket (front-upper)	1	



Order	Job name/Part name	Q'ty	Remarks
9	Engine assembly	1	<p><b>NOTE:</b> _____                      Remove the engine assembly from the left side of the machine.</p> <p>_____</p> <p>For installation, reverse the removal procedure.</p>



## ENGINE INSTALLATION

### 1. Install:

- Engine bracket (front upper) ①
- Engine mount bolt (front upper)/nut ②
- Engine bracket bolt (front upper) ③
- Engine bracket (front lower) ④
- Engine mount bolt (front lower) ⑤
- Engine bracket bolt (front lower) ⑥
- Engine mount bolt (rear upper)/nut ⑦
- Engine mount bolt (rear lower)/nut ⑧

### NOTE:

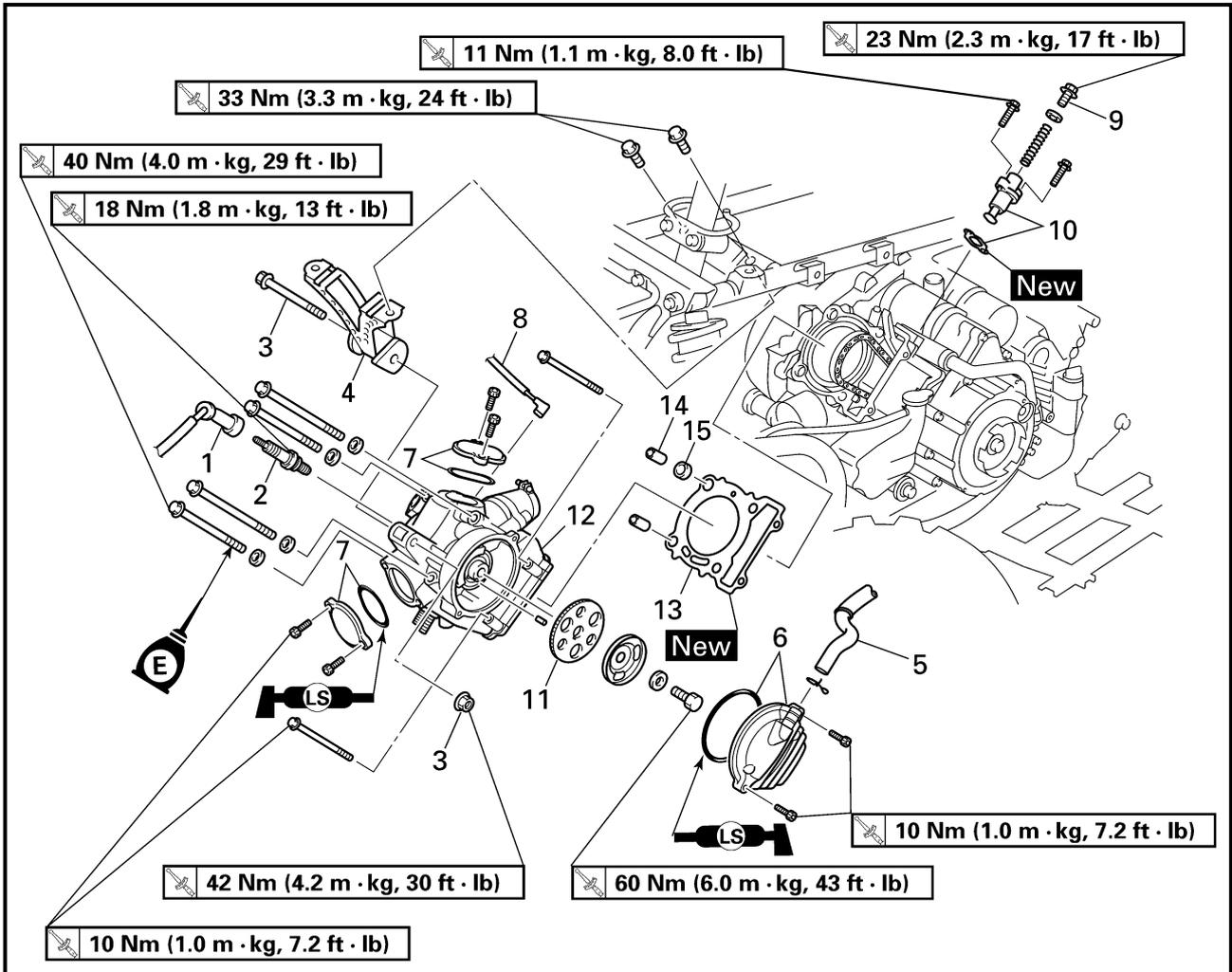
Do not fully tighten the bolts and nuts.

### 2. Tighten:

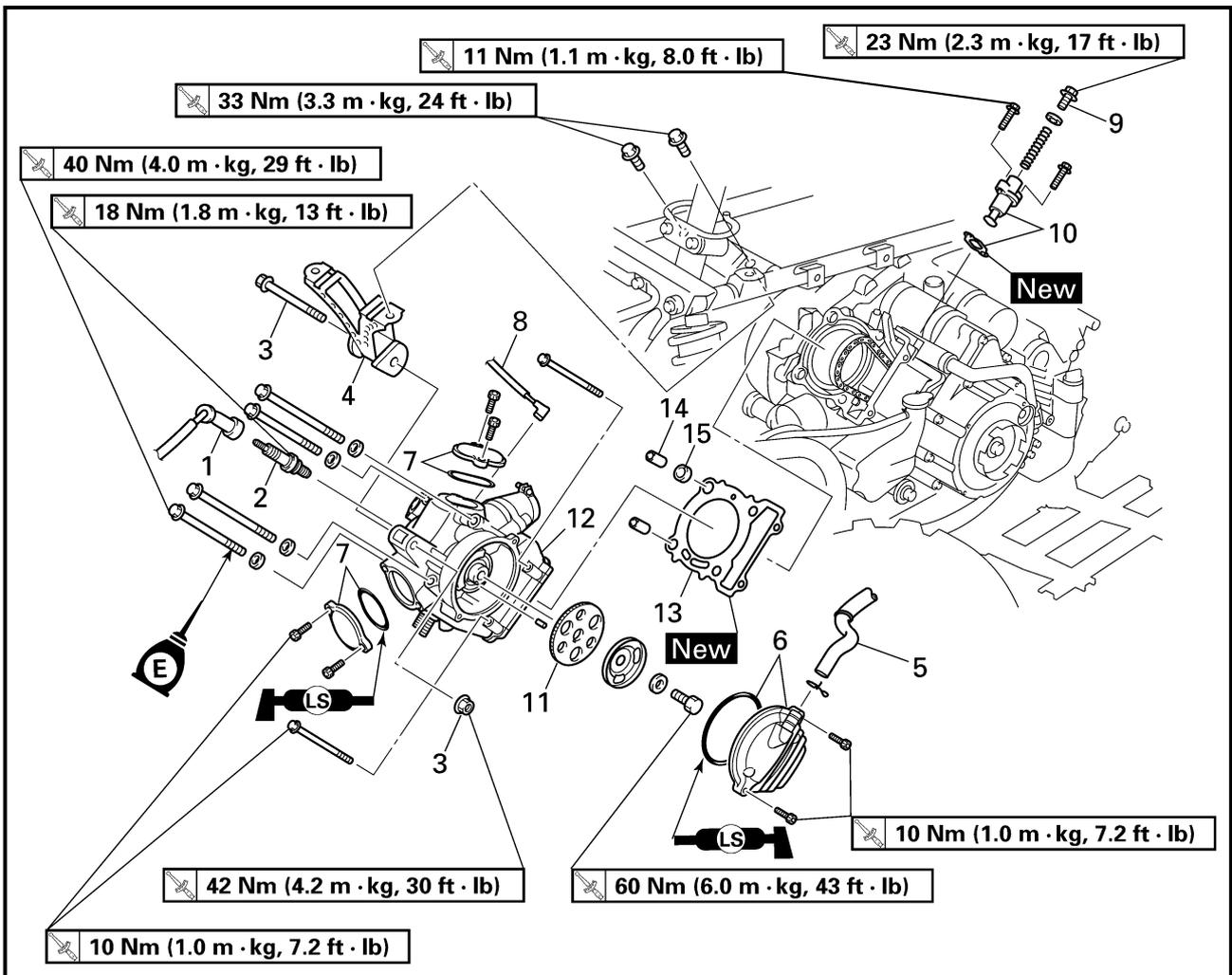
- Engine mount bolt (front upper)/nut ②  
🔧 42 Nm (4.2 m • kg, 30 ft • lb)
- Engine bracket bolt (front upper) ③  
🔧 33 Nm (3.3 m • kg, 24 ft • lb)
- Engine mount bolt (front lower) ⑤  
🔧 42 Nm (4.2 m • kg, 30 ft • lb)
- Engine bracket bolt (front lower) ⑥  
🔧 33 Nm (3.3 m • kg, 24 ft • lb)
- Engine mount bolt (rear upper)/nut ⑦  
🔧 56 Nm (5.6 m • kg, 40 ft • lb)
- Engine mount bolt (rear lower)/nut ⑧  
🔧 56 Nm (5.6 m • kg, 40 ft • lb)



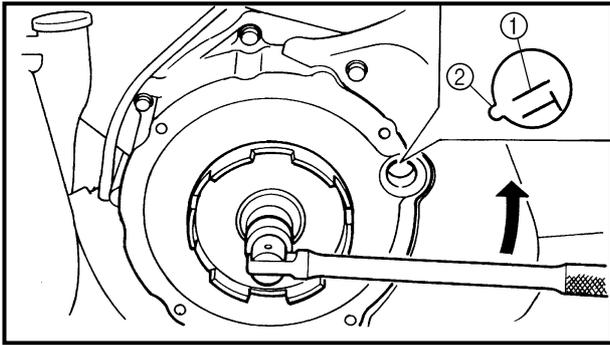
CYLINDER HEAD



Order	Job name/Part name	Q'ty	Remarks
	<b>Cylinder head removal</b>		Remove the parts in the order below.
	Fuel tank/rubber cover		Refer to "SEAT, CARRIERS, FENDERS AND FUEL TANK" in CHAPTER 3.
	Front fender/air filter case		
	Air duct assembly 1		Refer to "ENGINE REMOVAL".
	Exhaust pipe/muffler		
	Carburetor assembly		Refer to "CARBURETOR" in CHAPTER 6.
	Recoil starter/timing plug		
	Thermostat		Refer to "VALVE CLEARANCE ADJUSTMENT" in CHAPTER 3.
	1 Spark plug lead	1	
	2 Spark plug	1	Refer to "THERMOSTAT" in CHAPTER 5.
	3 Engine mount bolt (upper)/nut	1/1	
	4 Engine bracket (upper)	1	



Order	Job name/Part name	Q'ty	Remarks
5	Cylinder head breather hose	1	Refer to "CYLINDER HEAD REMOVAL/ INSTALLATION".  For installation, reverse the removal procedure.
6	Camshaft sprocket cover/O-ring	1/1	
7	Tappet cover/O-ring	2/2	
8	Thermo switch lead	1	
9	Timing chain tensioner cap bolt	1	
10	Timing chain tensioner/gasket	1/1	
11	Camshaft sprocket	1	
12	Cylinder head	1	
13	Cylinder head gasket	1	
14	Dowel pin	2	
15	O-ring	1	



**CYLINDER HEAD REMOVAL**

**1.Align:**

- "T" mark  
(with stationary pointer)

\*\*\*\*\*

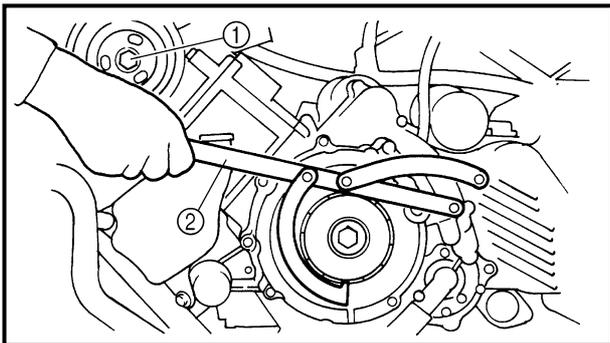
**Checking steps:**

- Turn the crankshaft counterclockwise with a wrench.
- Align the "T" mark ① on the rotor with the stationary pointer ② on the crankcase cover. When the "T" mark is aligned with the stationary pointer, the piston is at the Top Dead Center (T.D.C.).

**NOTE:**

- When the piston is at the Top Dead Center (T.D.C.) on the compression stroke, there should be clearance between the valve stem tips and their respective rocker arm adjusting screws.
- If there is no clearance, rotate the crankshaft counterclockwise one turn.

\*\*\*\*\*



**2.Loosen:**

- Camshaft sprocket bolt ①

**NOTE:**

Use the rotor holder ② to hold the starter pulley.

	<p><b>Rotor holder:</b> P/N. YU-01235, 90890-01235</p>
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**3.Loosen:**

- Timing chain tensioner cap bolt

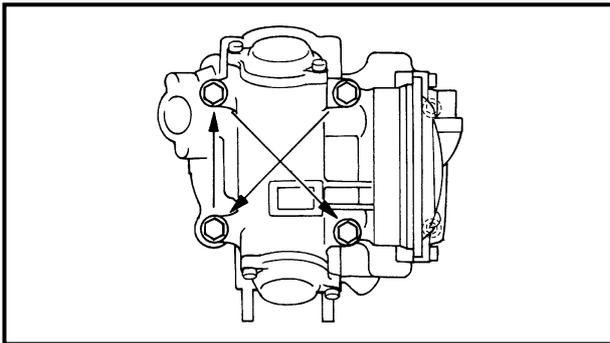
**4.Remove:**

- Timing chain tensioner
- Camshaft sprocket



**NOTE:**

- Fasten a safety wire to the timing chain to prevent it from falling into the crankcase.
- When removing the camshaft sprocket, it is not necessary to separate the timing chain.

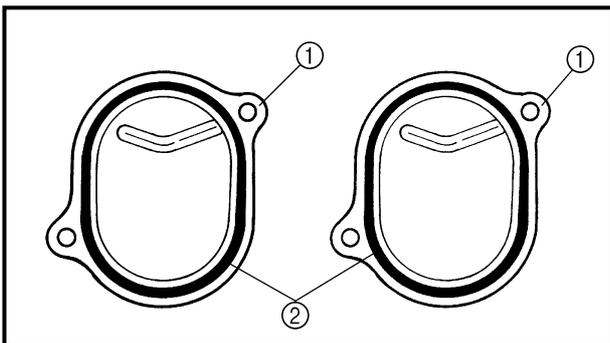


5.Remove:

- Cylinder head

**NOTE:**

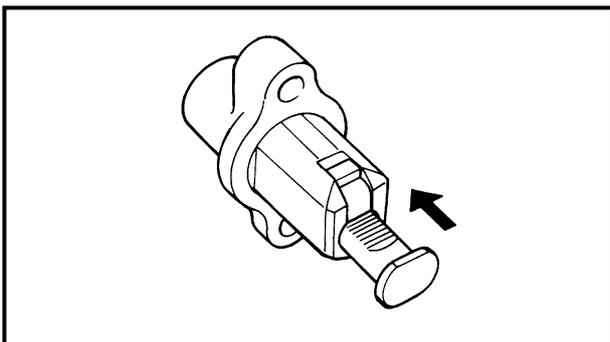
- Loosen the 6 mm bolts first.
- Working in a crisscross pattern, loosen each 10 mm bolt 1/4 of a turn. After all the bolts are loosened, remove them.



**TAPPET COVER INSPECTION**

1.Inspect:

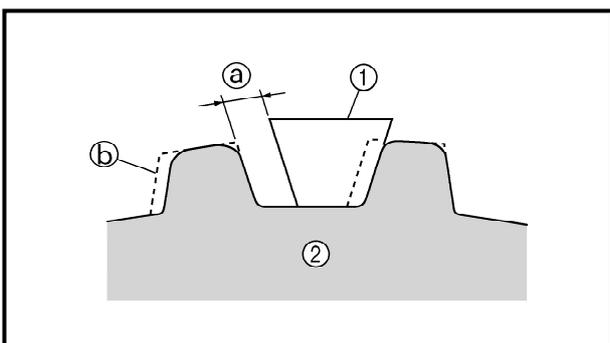
- Tappet covers ①
- O-rings ②
- Cracks/damage → Replace.



**TIMING CHAIN TENSIONER INSPECTION**

1.Check:

- One-way cam operation (tensioner)
- Unsmooth operation → Replace.

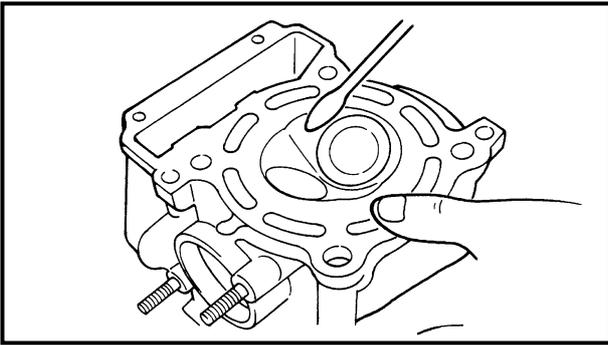


**CAMSHAFT SPROCKET INSPECTION**

1.Inspect:

- Camshaft sprocket
- Wear/damage → Replace the camshaft sprocket and timing chain as a set.

- ① 1/4 of a tooth
- ② Correct
- ① Timing chain
- ② Sprocket



**CYLINDER HEAD INSPECTION**

**1. Eliminate:**

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

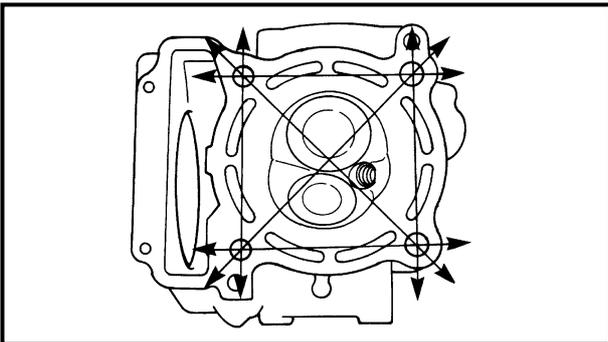
**NOTE:**

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

- Spark plug threads
- Valve seats

**2. Inspect:**

- Cylinder head  
Scratches/damage → Replace.
- Cylinder head water jacket  
Mineral deposits/rust → Eliminate.



**3. Measure:**

- Cylinder head warpage  
Out of specification → Resurface.

	<p><b>Cylinder head warpage:</b> <b>Less than 0.03 mm (0.0012 in)</b></p>
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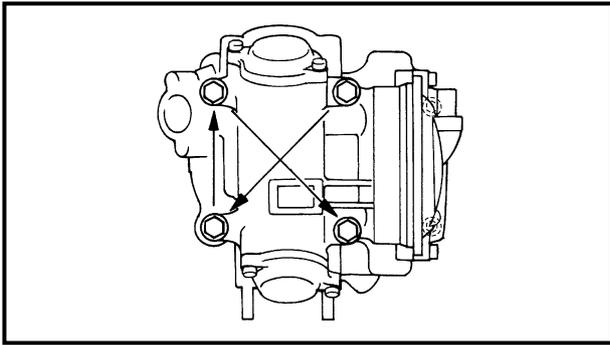
**Warpage measurement and resurfacement steps:**

- Place a straightedge and a feeler gauge across the cylinder head.
- Use a feeler gauge to measure the warpage.
- If the warpage is out of specification, resurface the cylinder head.
- Place a 400 ~ 600 grit wet sandpaper on the surface plate, and resurface the head using a figure-eight sanding pattern.

**NOTE:**

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

\*\*\*\*\*



**CYLINDER HEAD INSTALLATION**

1.Install:

- Cylinder head

- Bolt (M10)

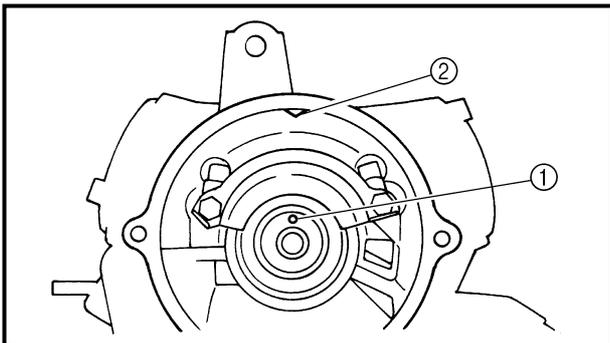
	<b>40 Nm (4.0 m · kg, 29 ft · lb)</b>
---	---------------------------------------

- Bolt (M6)

	<b>10 Nm (1.0 m · kg, 7.2 ft · lb)</b>
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**NOTE:**

- Lubricate the washer with engine oil.
- Tighten the bolts (M10) in two stages and a crisscross pattern.



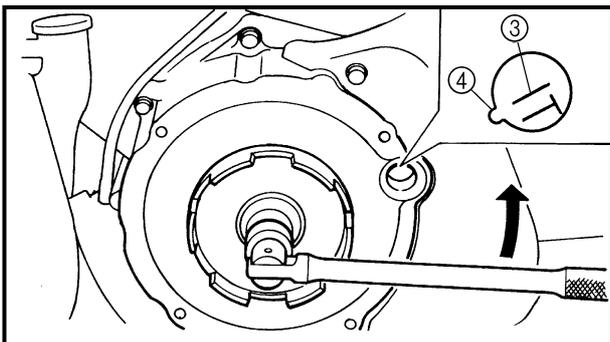
2.Install:

- Camshaft sprocket

\*\*\*\*\*

**Installing steps:**

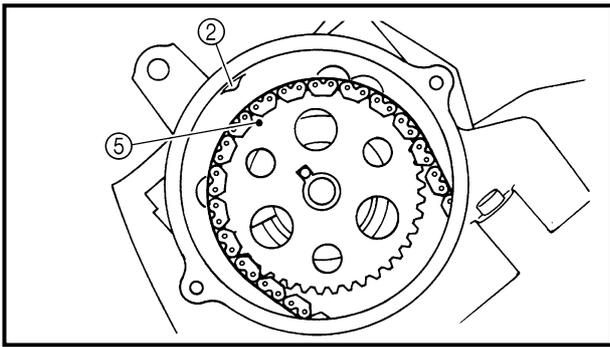
- Rotate the camshaft to align the camshaft pin ① with the cylinder head match mark ②.
- Turn the crankshaft counterclockwise with a wrench.
- Align the "T" mark ③ on the rotor with the stationary pointer ④ on the crankcase cover. When the "T" mark is aligned with the stationary pointer, the piston is at the Top Dead Center (T.D.C.).



**CAUTION:**

**Do not turn the crankshaft during the camshaft sprocket installation.**

- Place the timing chain onto the camshaft sprocket.
- Install the camshaft sprocket onto the camshaft and finger tighten the sprocket bolt.

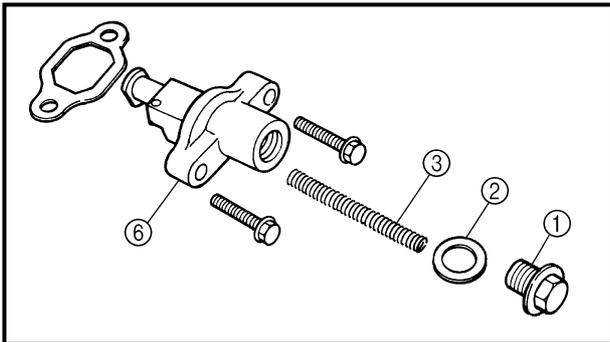


**NOTE:**

Be sure the punch mark (5) on the camshaft sprocket is aligned with the match mark (2) on the cylinder head.

- Force the camshaft clockwise and counterclockwise to remove timing chain slack.
- Insert a screwdriver into the timing chain tensioner hole and push the timing chain guide inward.
- While pushing the timing chain guide, be sure that the camshaft sprocket punch mark (5) is aligned with the cylinder head match mark (2).
- If the marks are aligned, tighten the camshaft sprocket bolt. If the marks are not aligned, change the meshing position of the camshaft sprocket and timing chain.

\*\*\*\*\*



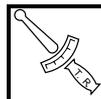
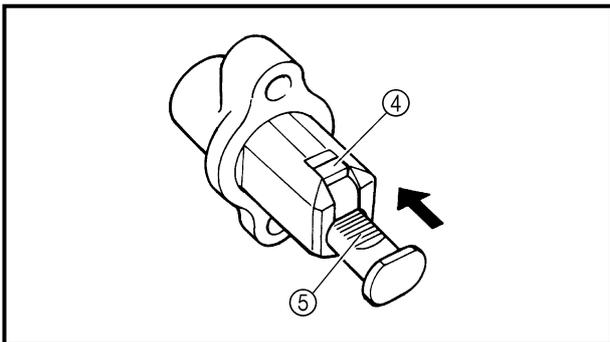
3.Install:

- Timing chain tensioner

\*\*\*\*\*

**Installation steps:**

- Remove the tensioner cap bolt (1), washer (2) and spring (3).
- Release the timing chain tensioner one-way cam (4) and push the tensioner rod (5) all the way in.
- Install the tensioner (6) with a new gasket into the cylinder.

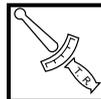


**Bolts (timing chain tensioner):**  
11 Nm (1.1 m · kg, 8.0 ft · lb)

**⚠ WARNING**

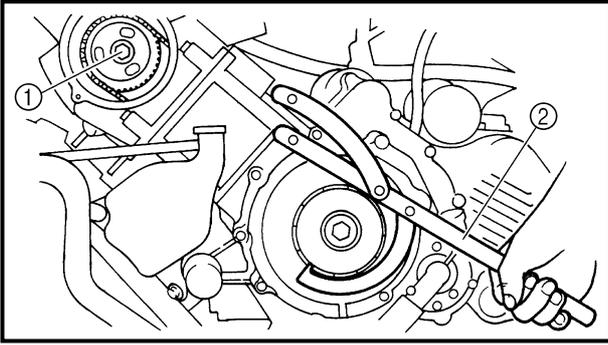
**Always use a new gasket.**

- Install the spring, washer and cap bolt.



**Cap bolt (timing chain tensioner):**  
23 Nm (2.3 m · kg, 17 ft · lb)

\*\*\*\*\*



## 4. Tighten:

- Camshaft sprocket bolt ①

 60 Nm (6.0 m • kg, 43 ft • lb)

**NOTE:**

Use the rotor holder ② to hold the starter pulley.

**Rotor holder:**

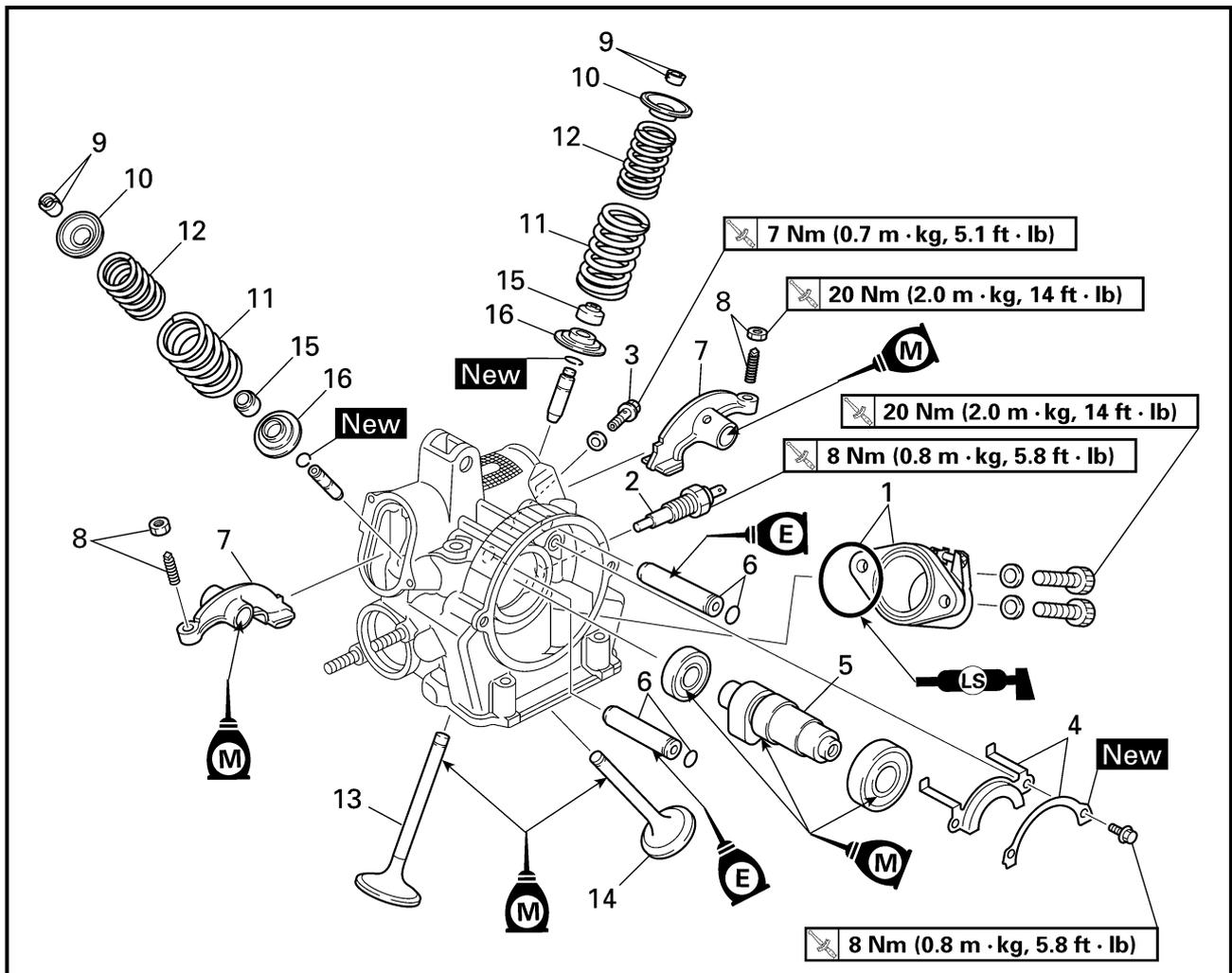
**P/N. YU-01235, 90890-01235**

## 5. Check:

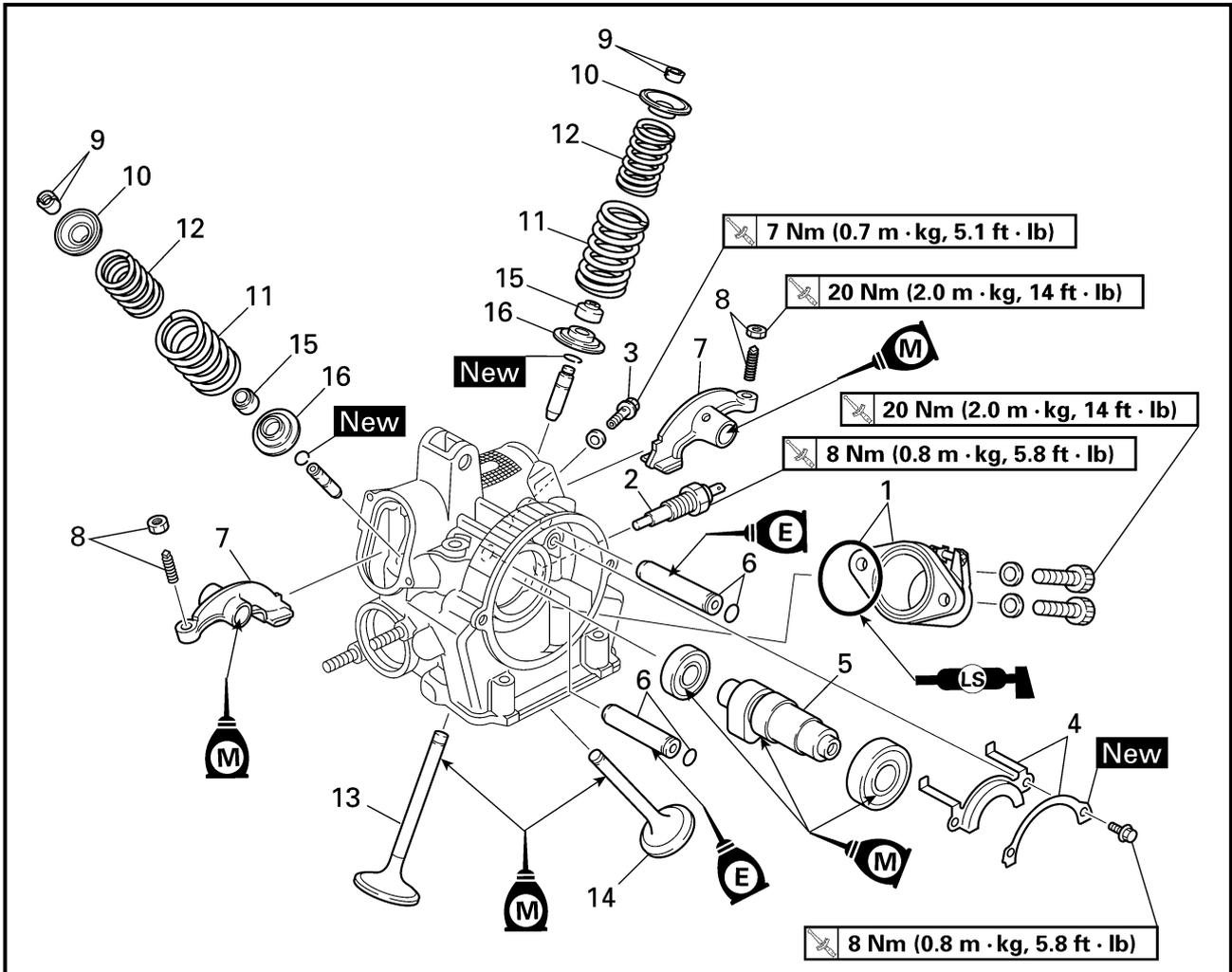
- Camshaft sprocket punch mark
  - Rotor "T" mark
- Out of alignment → Adjust.



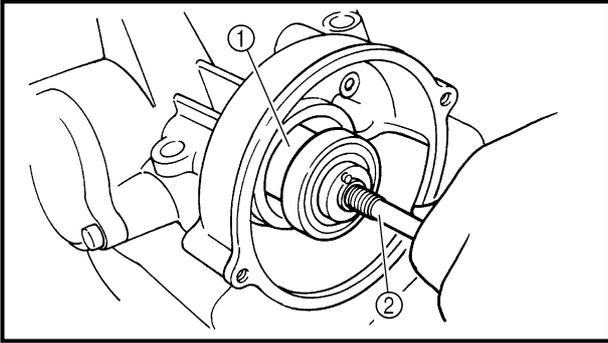
CAMSHAFT, ROCKER ARMS AND VALVES



Order	Job name/Part name	Q'ty	Remarks
	<b>Camshaft, rocker arms and valves removal</b>		Remove the parts in the order below.
1	Intake manifold/O-ring	1/1	
2	Thermo switch	1	
3	Oil check bolt	1	
4	Lock washer/bearing retainer	1/1	
5	Camshaft	1	
6	Rocker arm shaft/O-ring	2/2	Refer to "CAMSHAFT AND ROCKER ARM REMOVAL/INSTALLATION".
7	Rocker arm	2	
8	Locknut/valve adjuster	2/2	
9	Valve cotter	4	Refer to "VALVE AND VALVE SPRING REMOVAL/INSTALLATION".
10	Valve spring retainer	2	
11	Valve spring (outer)	2	



Order	Job name/Part name	Q'ty	Remarks
12	Valve spring (inner)	2	Refer to "VALVE AND VALVE SPRING REMOVAL/INSTALLATION".
13	Valve (intake)	1	
14	Valve (exhaust)	1	
15	Valve stem seal	2	
16	Valve spring seat	2	



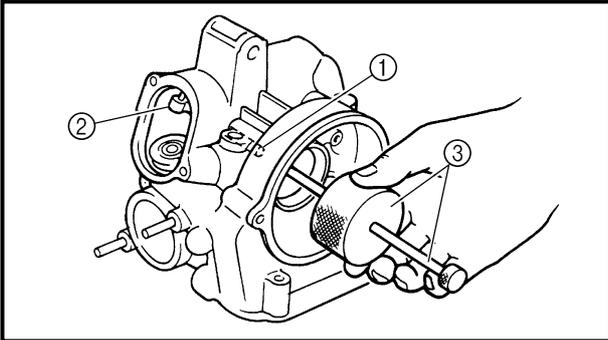
## CAMSHAFT AND ROCKER ARM REMOVAL

1.Remove:

- Camshaft ①

**NOTE:**

Screw in a M10 bolt ② into the thread hole on the camshaft, and pull out the camshaft.



2.Remove:

- Rocker arm shafts (intake and exhaust) ①
- Rocker arms ②

**NOTE:**

Use a slide hammer ③ to remove the rocker arm shafts.



**Slide hammer set:**

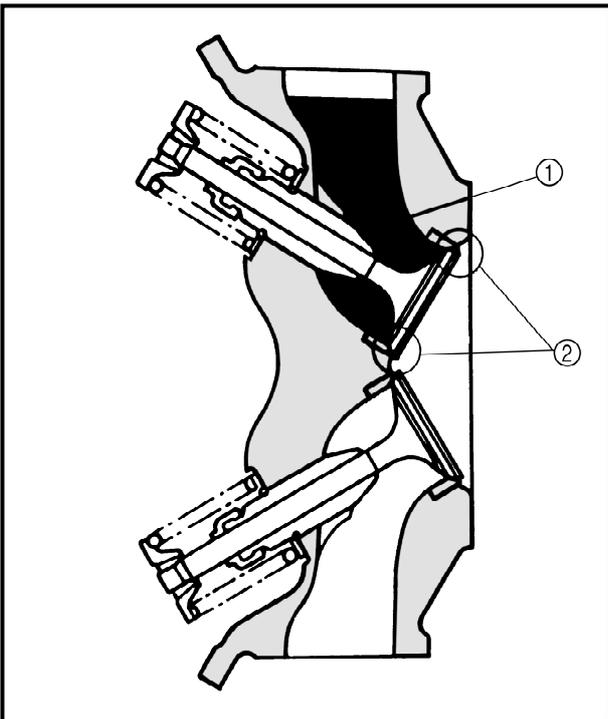
**P/N. YU-01083-A**

**Slide hammer bolt (M6):**

**P/N. 90890-01083**

**Weight:**

**P/N. 90890-01084**



## VALVE AND VALVE SPRING REMOVAL

1.Check:

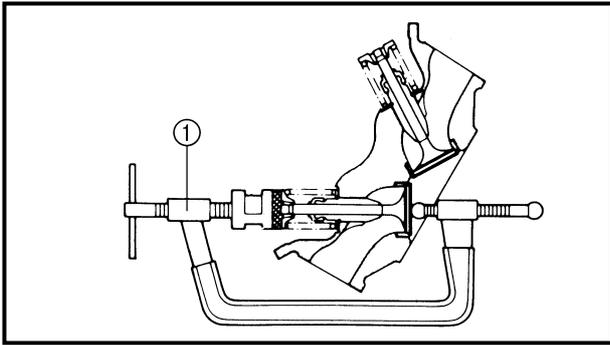
- Valve sealing  
Leakage at the valve seat → Inspect the valve face, valve seat and valve seat width.  
Refer to "VALVE AND VALVE SPRING INSPECTION".

\*\*\*\*\*

**Checking steps:**

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

\*\*\*\*\*



- 2.Remove:
- Valve cotters

**NOTE:**

Attach a valve spring compressor ① between the valve spring retainer and the cylinder head to remove the valve cotters.



**Valve spring compressor:**  
P/N. YM-04019, 90890-04019

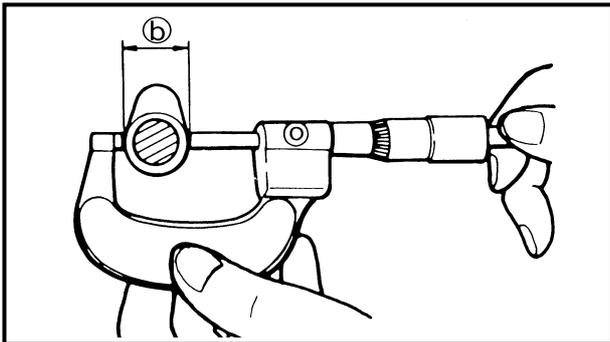
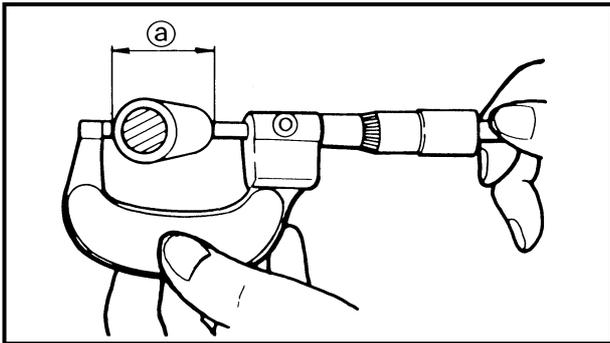
## CAMSHAFT INSPECTION

- 1.Inspect:

- Cam lobes  
Pitting/scratches/blue discoloration → Replace.

- 2.Measure:

- Cam lobes length ① and ②.  
Out of specification → Replace.



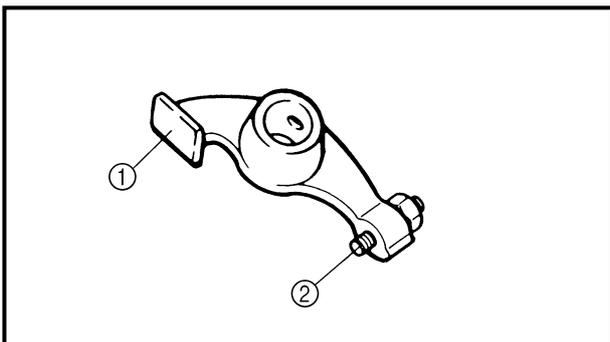
**Camshaft lobe limit:**

**Intake:**

- ① 40.52 mm (1.595 in)
- ② 32.08 mm (1.263 in)

**Exhaust:**

- ① 40.52 mm (1.595 in)
- ② 32.08 mm (1.263 in)



## ROCKER ARM AND CAMSHAFT INSPECTION

- 1.Inspect:

- Camshaft bushings  
Damage/wear → Replace.

- 2.Inspect:

- Camshaft lobes ①
- Valve adjusters ②  
Blue discoloration/pitting/scratches → Replace.

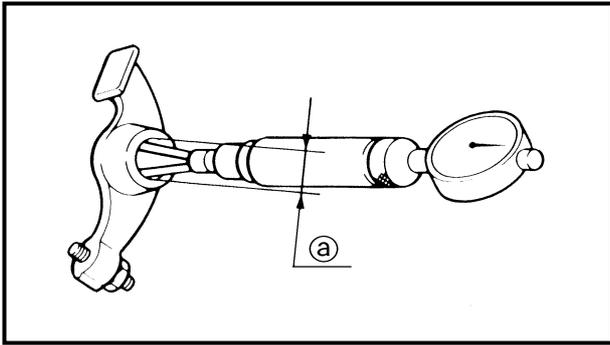
- 3.Inspect:

- Rocker arms
- Rocker arm shafts  
Damage/wear → Replace.

\*\*\*\*\*

**Inspection steps:**

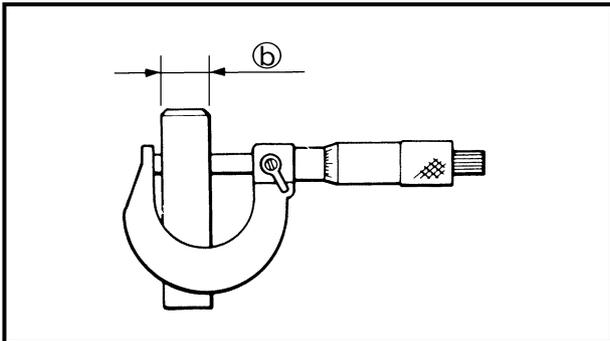
- Inspect the two contact areas on the rocker arms for signs of abnormal wear.
  - 1) Rocker arm shaft hole.
  - 2) Camshaft lobe contact surface.  
Excessive wear → Replace.



- Inspect the surface of the rocker arm shafts. Blue discoloration/pitting/scratches → Replace/check lubrication.
- Measure the inside diameter (a) of the rocker arm holes. Out of specification → Replace.



**Rocker arm inside diameter:**  
 12.000 ~ 12.018 mm  
 (0.4724 ~ 0.4731 in)



- Measure the outside diameter (b) of the rocker arm shafts. Out of specification → Replace.



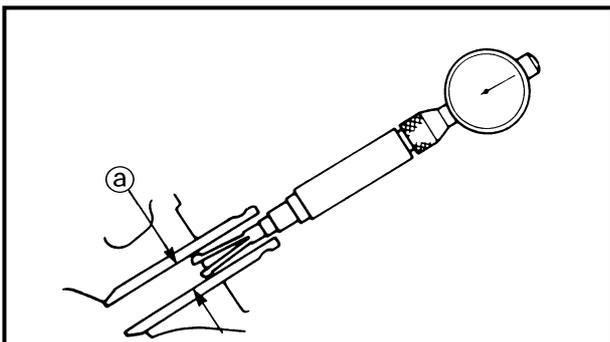
**Rocker arm outside diameter:**  
 11.981 ~ 11.991 mm  
 (0.4717 ~ 0.4721 in)

- Calculate the clearance by subtracting the rocker arm shaft outside diameter from the rocker arm inside diameter. Clearance greater than 0.08 mm (0.003 in) → Replace the defective part(s).



**Rocker arm to shaft standard clearance:**  
 0.009 ~ 0.037 mm  
 (0.0004 ~ 0.0015 in)

\*\*\*\*\*



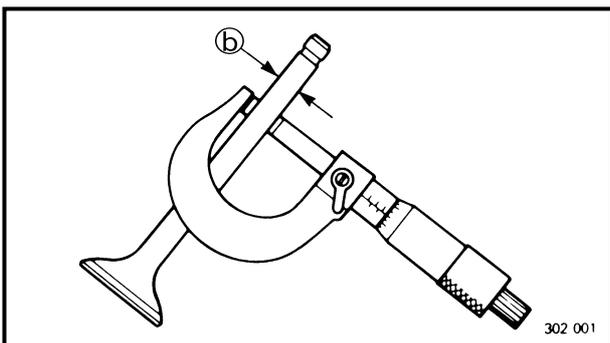
## VALVE AND VALVE SPRING INSPECTION

1.Measure:

- Stem-to-guide clearance

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

Out of specification → Replace the valve guide.



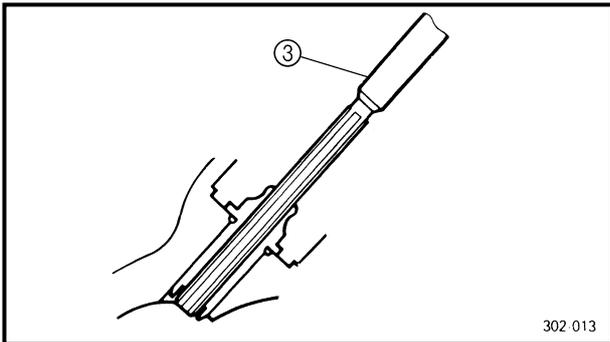
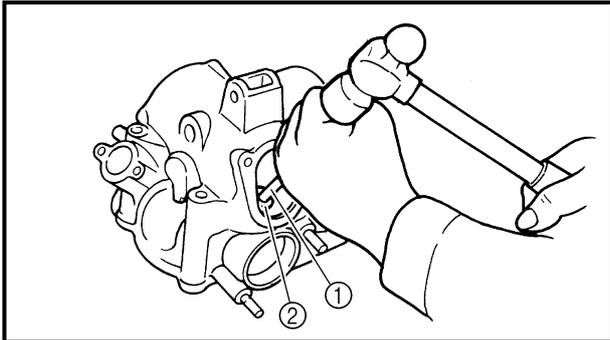
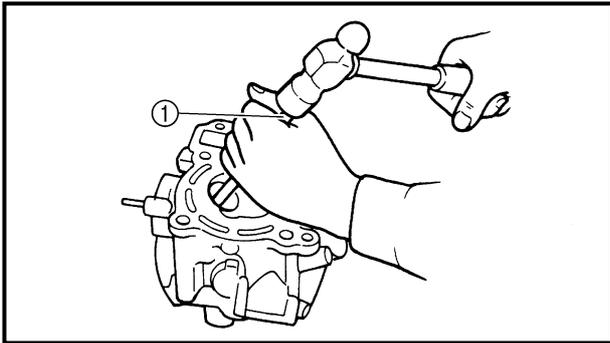
**Clearance (stem to guide):**

**Intake:**

0.010 ~ 0.037 mm  
 (0.0004 ~ 0.0015 in)  
 <Limit>: 0.08 mm (0.003 in)

**Exhaust:**

0.030 ~ 0.057 mm  
 (0.0012 ~ 0.0022 in)  
 <Limit>: 0.10 mm (0.004 in)



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## 2. Replace:

- Valve guide

\*\*\*\*\*

### Replacement steps:

#### NOTE:

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

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



**Valve guide remover (7 mm):**  
P/N. YM-01225-A, 90890-01225

**Valve guide installer:**  
P/N. YM-04017, 90890-04017

**Valve guide reamer (7 mm):**  
P/N. YM-01227, 90890-01227

#### NOTE:

After replacing the valve guide reface the valve seat.

\*\*\*\*\*

## 3. Inspect:

- Valve face  
Pitting/wear → Grind the face.
- Valve stem end  
Mushroom shape or diameter larger than the body of the stem → Replace.

## 4. Measure:

- Margin thickness (a)  
Out of specification → Replace.



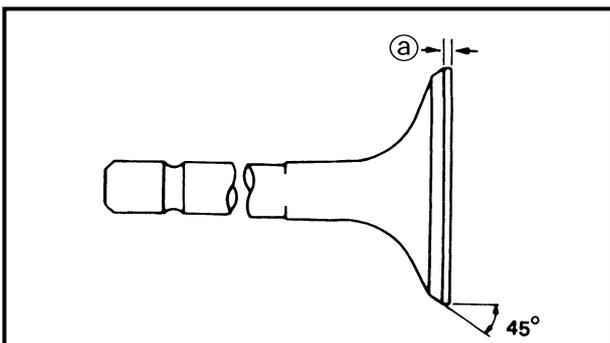
### Margin thickness:

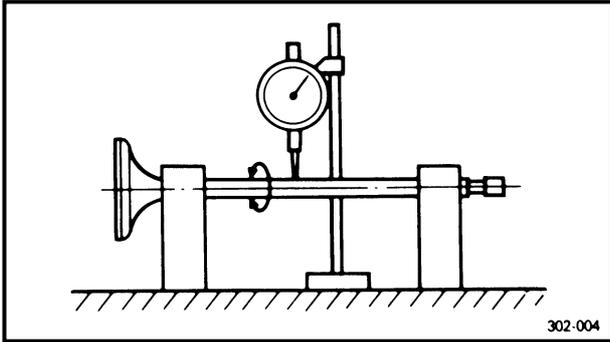
#### Intake:

1.0 ~ 1.4 mm (0.0394 ~ 0.0551 in)

#### Exhaust:

0.8 ~ 1.2 mm (0.0315 ~ 0.0472 in)





5.Measure:

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

	<p><b>Runout limit:</b> 0.01 mm (0.0004 in)</p>
--	---

**NOTE:**

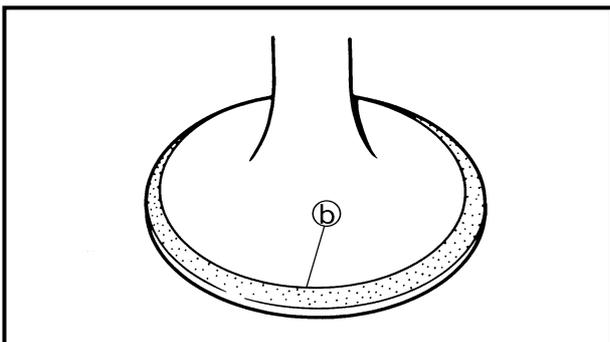
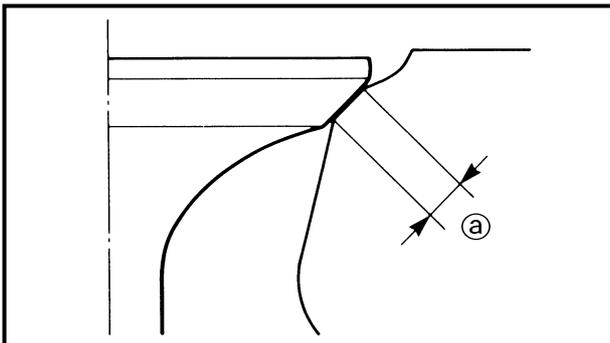
- When installing a new valve always replace the guide.
- If the valve is removed or replaced always replace the oil seal.

6.Eliminate:

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

7.Inspect:

- Valve seats  
Pitting/wear → Reface the valve seat.



8.Measure:

- Valve seat width (a)  
Out of specification → Reface the valve seat.

	<p><b>Valve seat width:</b>  <b>Intake:</b>                  1.2 ~ 1.4 mm (0.0472 ~ 0.0551 in)                  &lt;Limit&gt;: 1.6 mm (0.0630 in)  <b>Exhaust:</b>                  1.2 ~ 1.4 mm (0.0472 ~ 0.0551 in)                  &lt;Limit&gt;: 1.6 mm (0.0630 in)</p>
--	--

\*\*\*\*\*

**Measurement steps:**

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

\*\*\*\*\*



9.Lap:

- Valve face
- Valve seat

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

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

\*\*\*\*\*

**Lapping steps:**

- Apply a coarse lapping compound to the valve face.

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

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

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

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

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

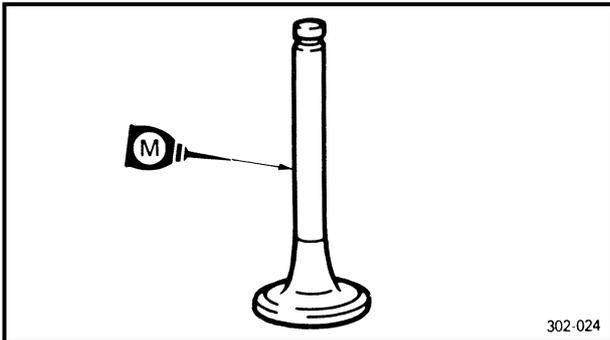
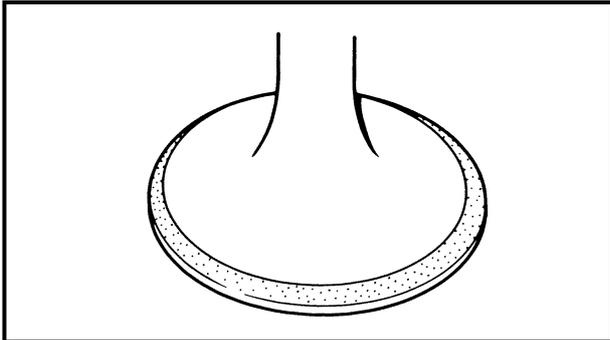
- Apply a fine lapping compound to the valve face and repeat the above steps.

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

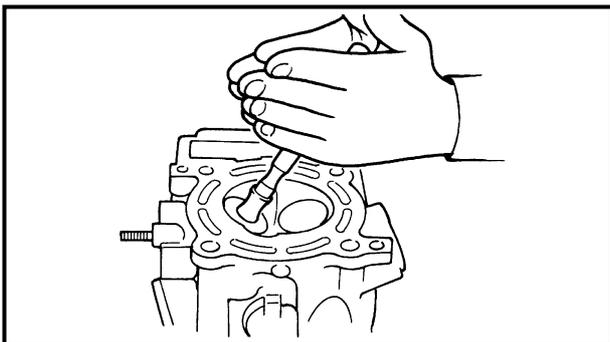
After every lapping operation be sure to clean off all of the compound from the valve face and valve seat.

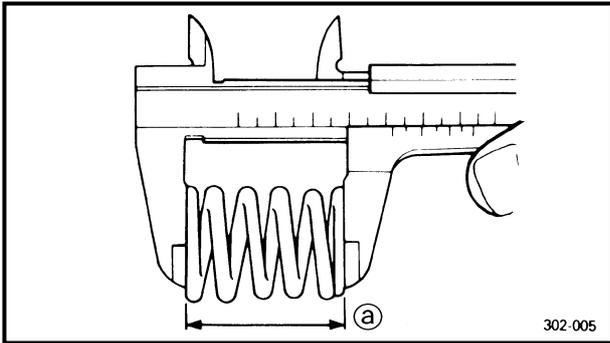
- Apply Mechanic's blueing dye (Dykem) to the valve face.
- Install the valve into the cylinder head.
- Press the valve through the valve guide and onto the valve seat to make a clear pattern.
- Measure the valve seat width again. If the valve seat width is out of specification, reface and relap the valve seat.

\*\*\*\*\*



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10. Measure:

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



**Free length (valve spring):**

**Inner:**

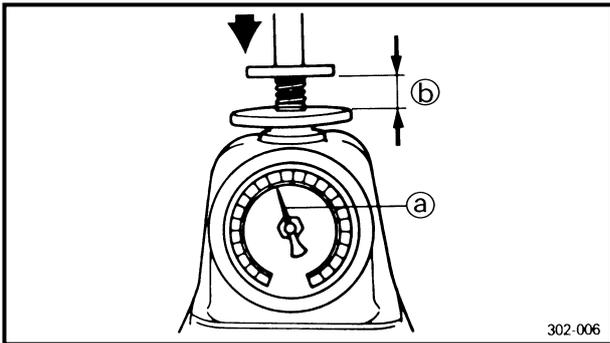
39.9 mm (1.57 in)

<Limit>: 37.9 mm (1.49 in)

**Outer:**

43.27 mm (1.71 in)

<Limit>: 41.27 mm (1.62 in)



11. Measure:

- Compressed spring force (a)  
Out of specification → Replace.
- ⓑ Installed length



**Compressed spring force:**

**Inner:**

104.9 ~ 120.6 N at 33.6 mm

(10.70 ~ 12.30 kg,

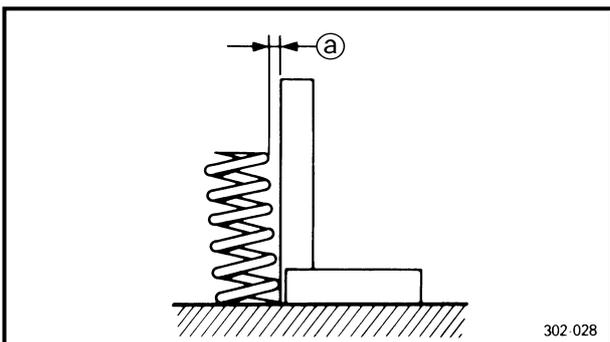
23.58 ~ 27.11 lb at 1.32 in)

**Outer:**

235.4 ~ 251.1 N at 36.6 mm

(24.00 ~ 25.60 kg,

52.92 ~ 56.45 lb at 1.44 in)



12. Measure:

- Spring tilt (a)  
Out of specification → Replace.



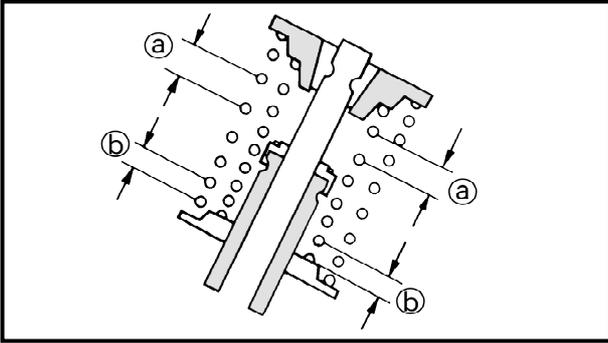
**Spring tilt limit:**

**Inner:**

2.5°/1.6 mm (0.06 in)

**Outer:**

2.5°/1.6 mm (0.06 in)



### VALVE AND VALVE SPRING INSTALLATION

#### 1. Apply:

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

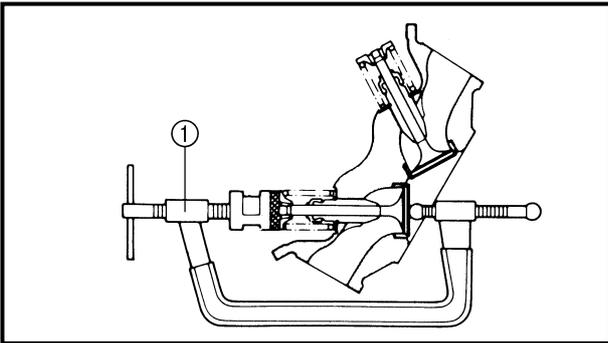
#### 2. Install:

- Valve spring seats
- Valve stem seals **New**
- Valves
- Valve springs (inner and outer)
- Valve spring retainers

#### NOTE:

Install the valve springs with the larger pitch ① facing upwards.

② Smaller pitch



#### 3. Install:

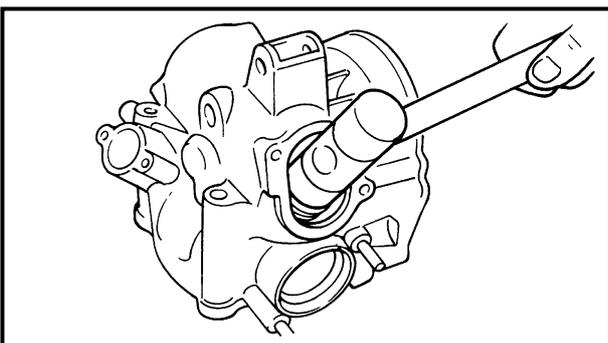
- Valve cotters

#### NOTE:

Install the valve cotters while compressing the valve spring with the valve spring compressor ①.



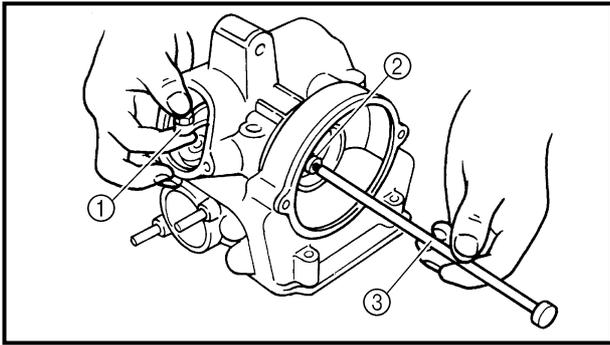
**Valve spring compressor:**  
P/N. YM-04019, 90890-04019



- To secure the valve cotters onto the valve stem, lightly tap the valve tip with a piece of wood.

#### CAUTION:

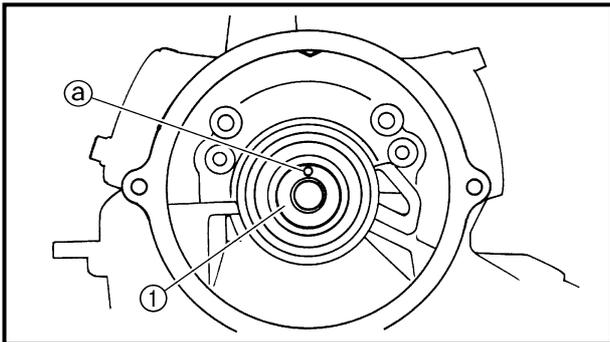
Hitting the valve tip with excessive force could damage the valve.



### CAMSHAFT AND ROCKER ARM INSTALLATION

1. Apply:
  - Engine oil  
(onto the rocker arm shafts)
2. Install:
  - Rocker arms ①
  - Rocker arm shafts (intake and exhaust) ②

**NOTE:** \_\_\_\_\_  
 Use a slide hammer bolt ③ to install the rocker arm shaft.  
 \_\_\_\_\_

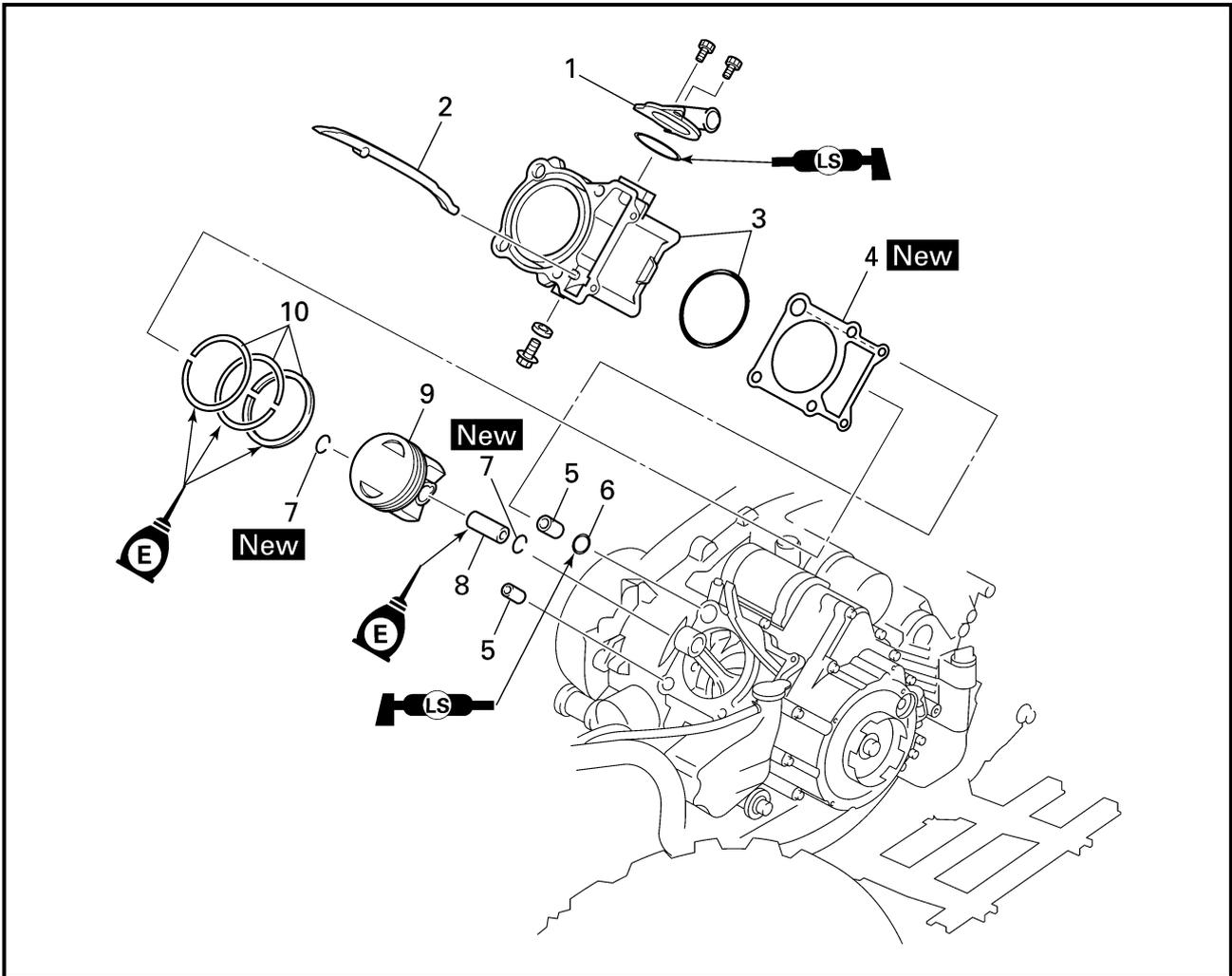


3. Install:
  - Camshaft ①

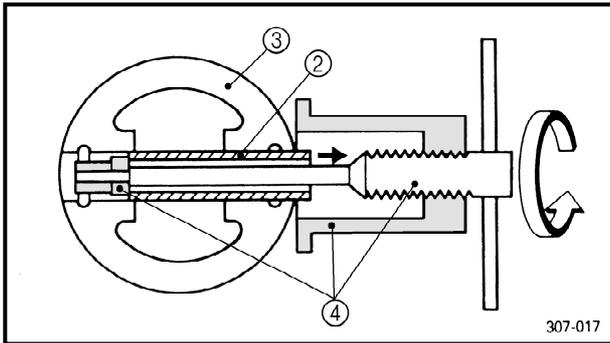
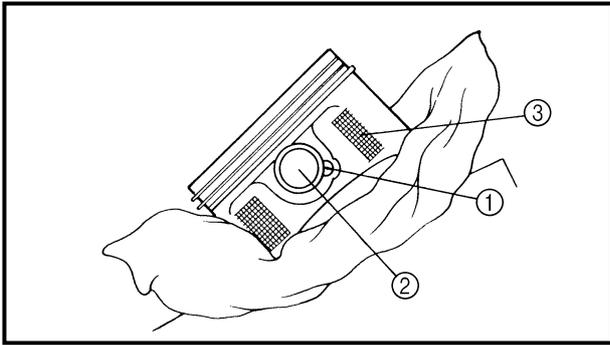
**NOTE:** \_\_\_\_\_  
 Install the camshaft pin hole ② facing up.  
 \_\_\_\_\_



CYLINDER AND PISTON



Order	Job name/Part name	Q'ty	Remarks
	<b>Cylinder and piston removal</b>		Remove the parts in the order below.
	Cylinder head		Refer to "CYLINDER HEAD".
	Water pump outlet hose/pipe		Refer to "WATER PUMP" in CHAPTER 5.
1	Cooling water inlet joint	1	
2	Timing chain guide (exhaust)	1	
3	Cylinder/O-ring	1/1	Refer to "CYLINDER INSTALLATION".
4	Cylinder gasket	1	
5	Dowel pin	2	
6	O-ring	1	
7	Piston pin clip	2	
8	Piston pin	1	Refer to "PISTION REMOVAL/INSTALLATION".
9	Piston	1	
10	Piston ring set	1	
			For installation, reverse the removal procedure.



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**PISTON REMOVAL**

1.Remove:

- Piston pin clips ①
- Piston pin ②
- Piston ③

**NOTE:**

Before removing piston pin, deburr the clip groove and pin hole area. If the piston pin groove is deburred and the piston pin is still difficult to remove, use the piston pin puller ④.



**Piston pin puller:**  
P/N. YU-01304, 90890-01304

**CAUTION:**

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

2.Remove:

- Piston rings

**NOTE:**

Spread the end gaps apart while at the same time lifting the piston ring over the top of the piston crown.

**TIMING CHAIN GUIDE INSPECTION**

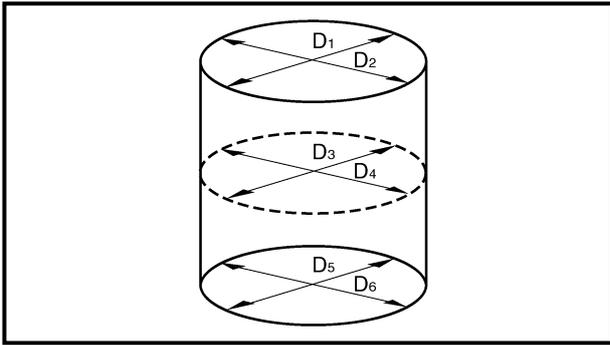
1.Inspect:

- Exhaust side timing chain guide  
Wear/damage → Replace.

**CYLINDER AND PISTON INSPECTION**

1.Inspect:

- Cylinder and piston walls  
Vertical scratches → Rebore or replace the cylinder and the piston.
- Cylinder water jacket  
Mineral deposits/rust → Eliminate.



2.Measure:

- Piston-to-cylinder clearance

\*\*\*\*\*

**Measurement steps:**

**1st step:**

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

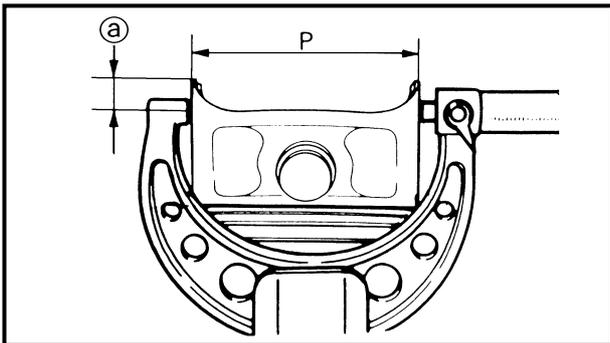
**NOTE:**

Measure cylinder bore "C" by taking side-to-side and front-to-back measurements of the cylinder. Then, find the average of the measurements.

Cylinder bore "C"	84.500 ~ 84.510 mm (3.3268 ~ 3.3272 in)
Max. taper "T"	0.05 mm (0.0016 in)
Out of round "R"	0.01 mm (0.0004 in)

"C" = maximum of D <sub>1</sub> ~ D <sub>6</sub>
"T" = maximum of D <sub>1</sub> , or D <sub>2</sub> – maximum of D <sub>5</sub> or D <sub>6</sub>
"R" = maximum of D <sub>1</sub> , D <sub>3</sub> or D <sub>5</sub> – minimum of D <sub>2</sub> , D <sub>4</sub> or D <sub>6</sub>

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



**2nd step:**

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

Ⓐ 5.0 mm (0.20 in) from the piston bottom edge

	<b>Piston skirt diameter "P"</b>
Standard	84.445 ~ 84.460 mm (3.3246 ~ 3.3252 in)

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

**3rd step:**

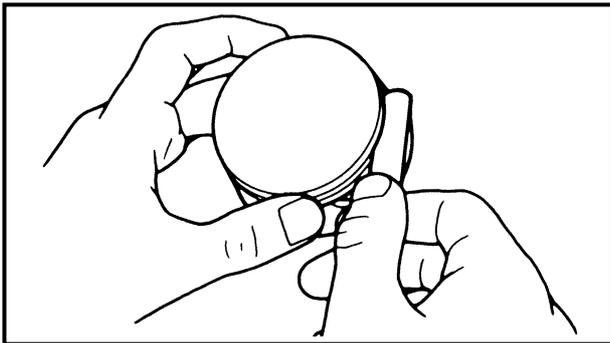
- Find the piston-to-cylinder clearance with the following formula.

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

 **Piston-to-cylinder clearance:**  
0.040 ~ 0.065 mm  
(0.0016 ~ 0.0026 in)  
<Limit>: 0.15 mm (0.0059 in)

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

\*\*\*\*\*



**PISTON RING INSPECTION**

1.Measure:

- Ring side clearance  
Use a feeler gauge.  
Out of specification → Replace the piston and rings as a set.

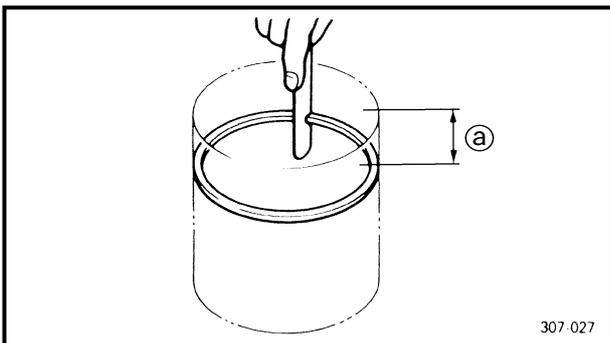
**NOTE:** \_\_\_\_\_  
Clean carbon from the piston ring grooves and rings before measuring the side clearance.

	Side clearance	
	Standard	Limit
<b>Top ring</b>	<b>0.03 ~ 0.08 mm (0.001 ~ 0.003 in)</b>	<b>0.13 mm (0.005 in)</b>
<b>2nd ring</b>	<b>0.03 ~ 0.07 mm (0.001 ~ 0.003 in)</b>	<b>0.13 mm (0.005 in)</b>

2.Position:

- Piston ring  
(in cylinder)

**NOTE:** \_\_\_\_\_  
Insert a ring into the cylinder and push it approximately 40 mm (1.6 in) into the cylinder. Push the ring with the piston crown so that the ring will be at a right angle to the cylinder bore.



① 40 mm (1.6 in)

3.Measure:

- Ring end gap  
Out of specification → Replace.

**NOTE:**

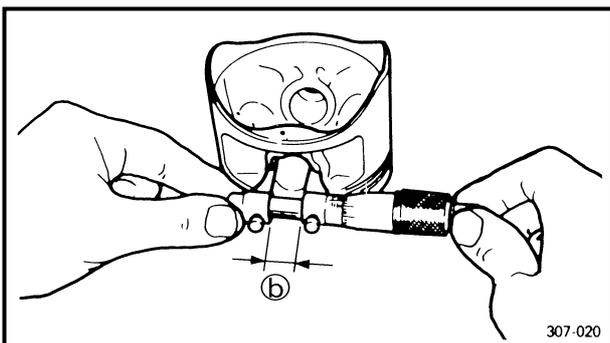
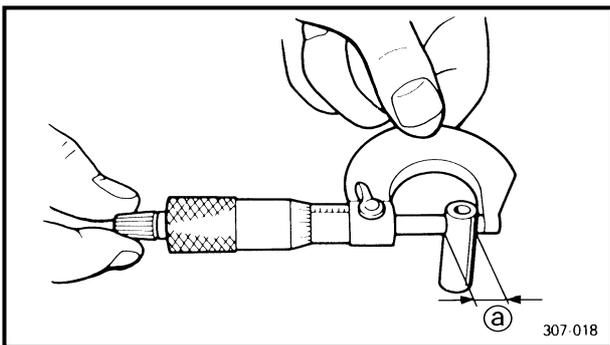
You cannot measure the end gap on the expander spacer of the oil control ring. If the oil control ring rails show excessive gap, replace all three rings.

	End gap	
	Standard	Limit
Top ring	0.2 ~ 0.4 mm (0.008 ~ 0.016 in)	0.65 mm (0.026 in)
2nd ring	0.4 ~ 0.6 mm (0.016 ~ 0.024 in)	0.95 mm (0.037 in)
Oil ring	0.2 ~ 0.7 mm (0.008 ~ 0.028 in)	—

**PISTON PIN INSPECTION**

1.Inspect:

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



2.Measure:

- Piston pin-to-piston clearance

\*\*\*\*\*

**Measurement steps:**

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

	<b>Outside diameter (piston pin):</b> 19.993 ~ 20.000 mm (0.7871 ~ 0.7874 in)
---	---

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

<b>Piston pin-to-piston clearance =</b> Bore size (piston pin) (b) – Outside diameter (piston pin) (a)
--

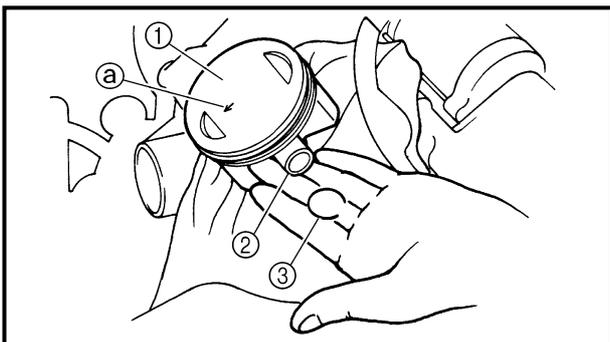
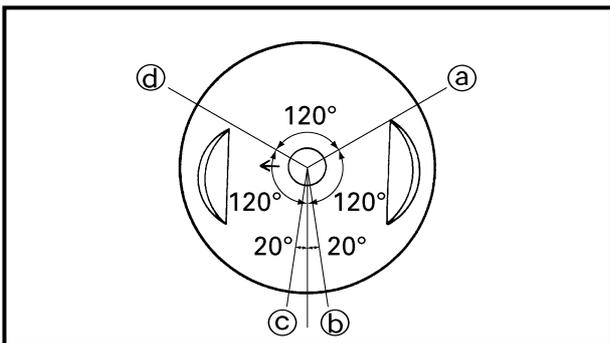
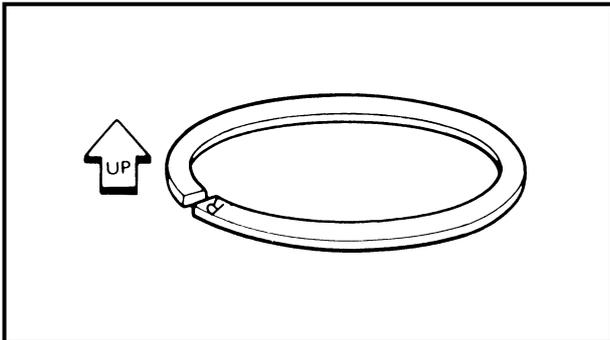


- If out of specification, replace the piston.



**Piston pin-to-piston clearance:**  
**0.004 ~ 0.022 mm**  
**(0.00016 ~ 0.00087 in)**  
**<Limit>: 0.07 mm (0.003 in)**

\*\*\*\*\*



**PISTON INSTALLATION**

**1.Install:**

- Piston rings  
 (onto the piston)

**NOTE:**

- Be sure to install the piston rings so that the manufacturer's marks or numbers are located on the upper side of the rings.
- Lubricate the piston and piston rings liberally with engine oil.

**2.Position:**

- Top ring
  - 2nd ring
  - Oil ring
- Offset the piston ring end gaps as shown.

- Ⓐ Top ring end
- Ⓑ Oil ring end (upper)
- Ⓒ Oil ring end (lower)
- Ⓓ 2nd ring end

**3.Install:**

- Piston ①
- Piston pin ②
- Piston pin clips ③ **New**

**NOTE:**

- Apply engine oil onto the piston pin, piston ring and piston.
- Be sure that the arrow mark Ⓐ on the piston points to the exhaust side of the engine.
- Before installing the piston pin clip, cover the crankcase with a clean rag to prevent the piston pin clip from falling into the crankcase.



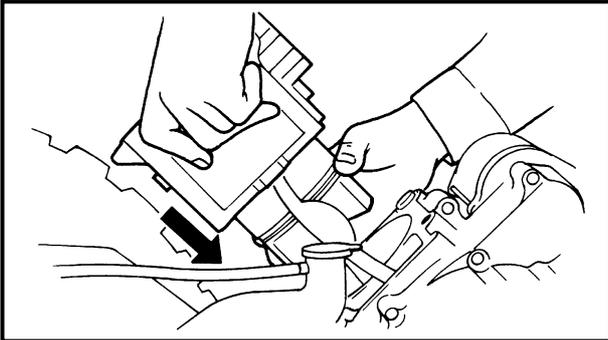
4. Lubricate:

- Piston
- Piston rings
- Cylinder

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

Apply a liberal coating of engine oil.

---



### CYLINDER INSTALLATION

1. Install:

- Cylinder

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

Install the cylinder with one hand while compressing the piston rings with the other hand.

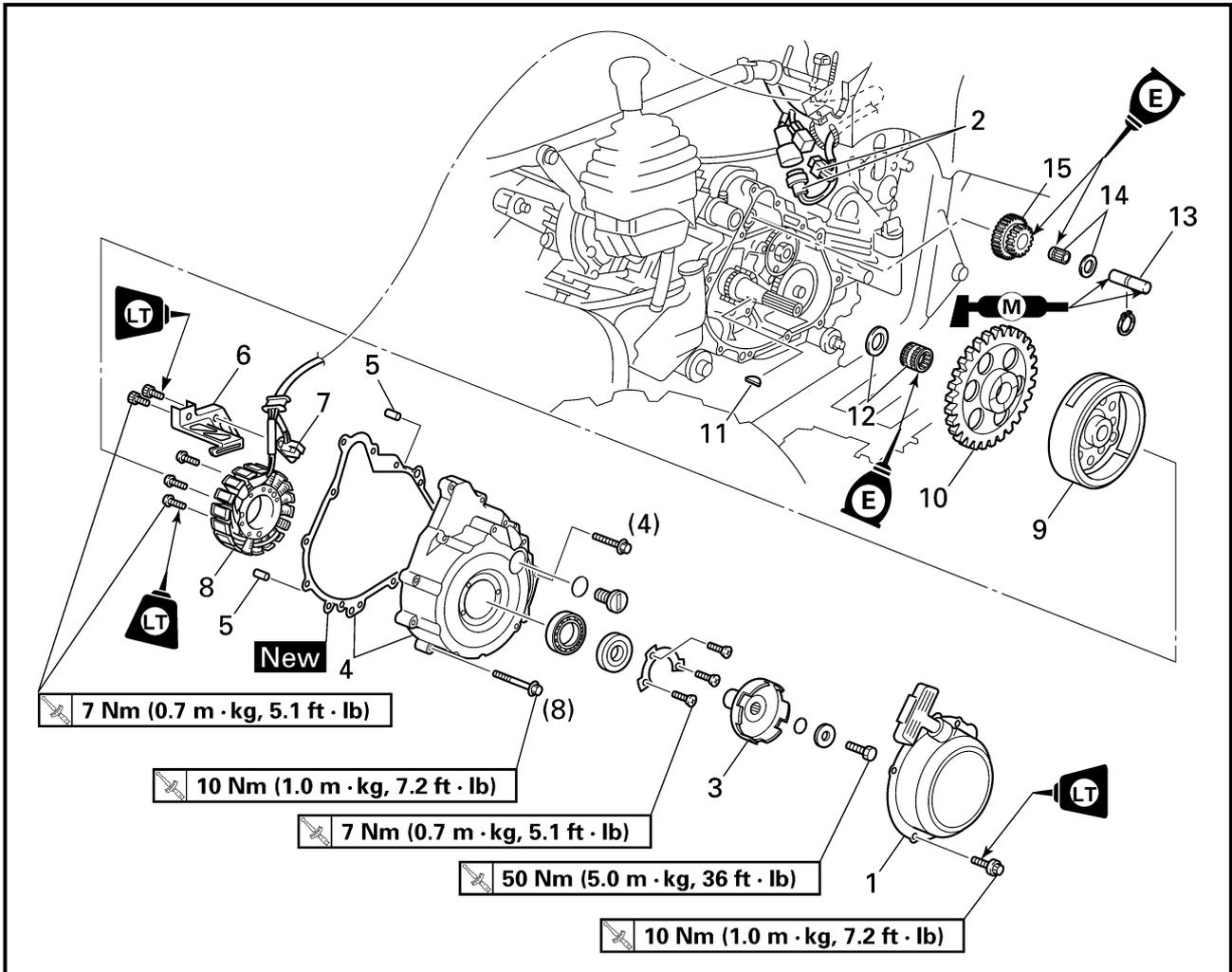
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**CAUTION:** \_\_\_\_\_

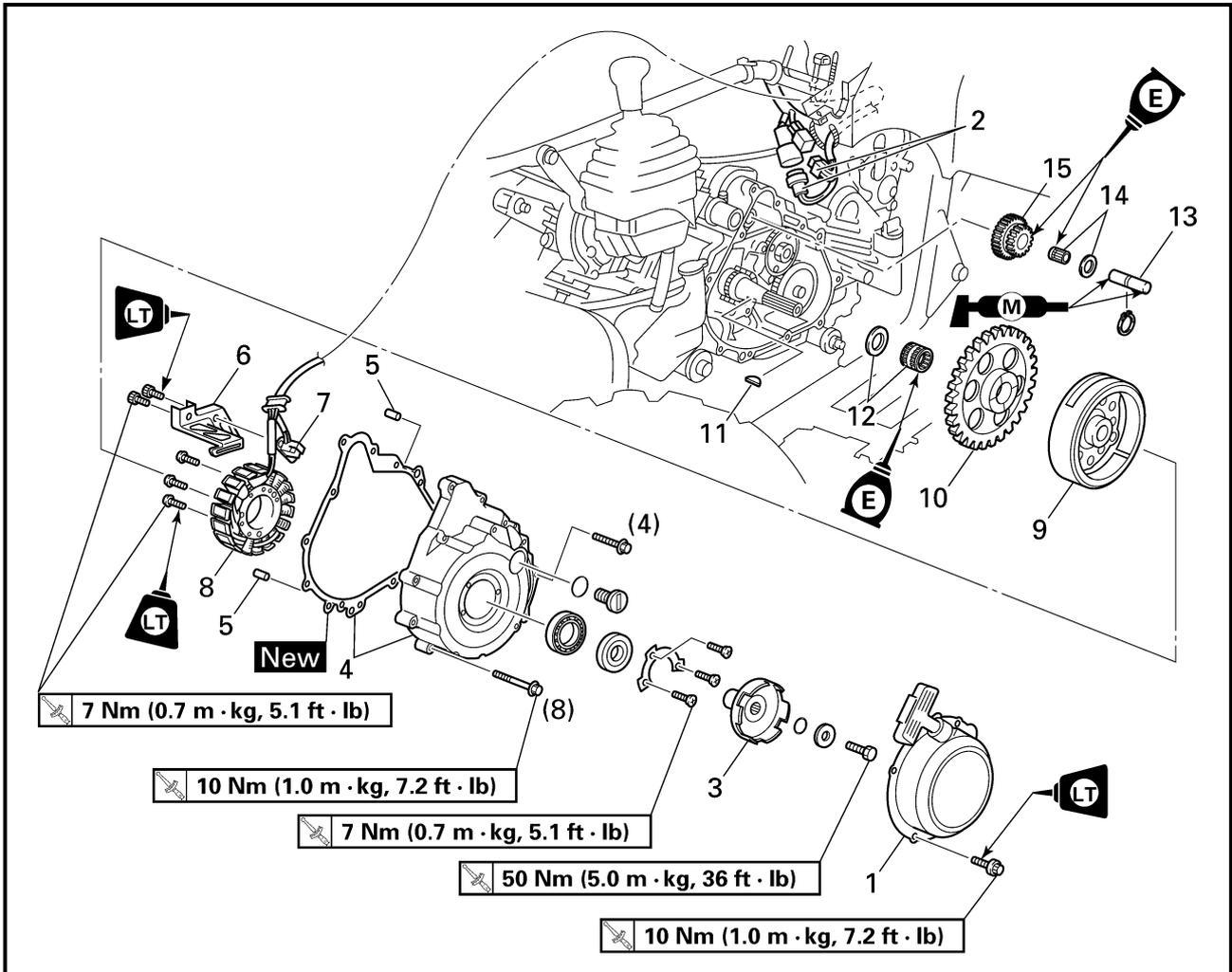
- Be careful not to damage the timing chain damper during installation.
  - Pass the timing chain through the timing chain cavity.
-



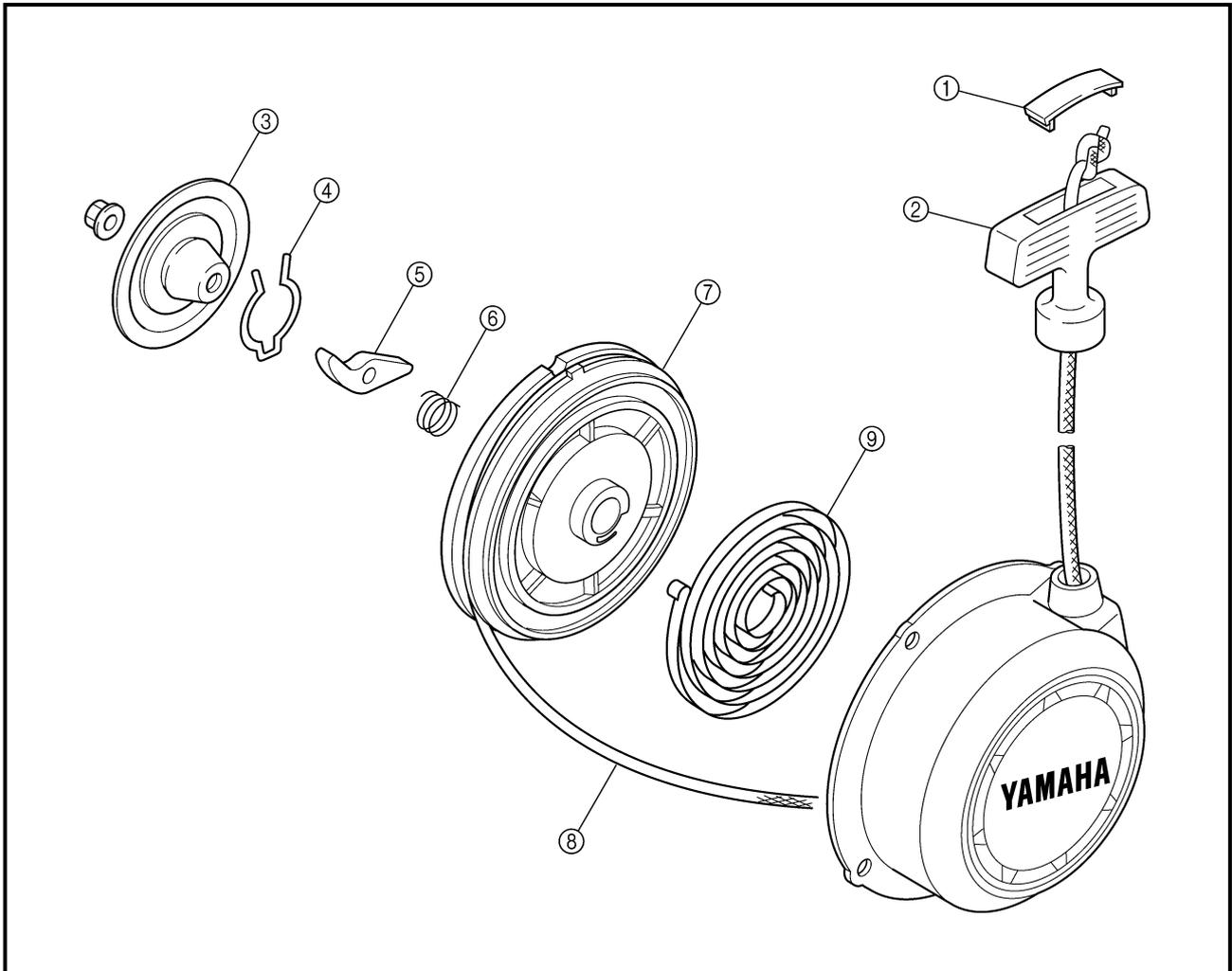
RECOIL STARTER AND CDI MAGNETO



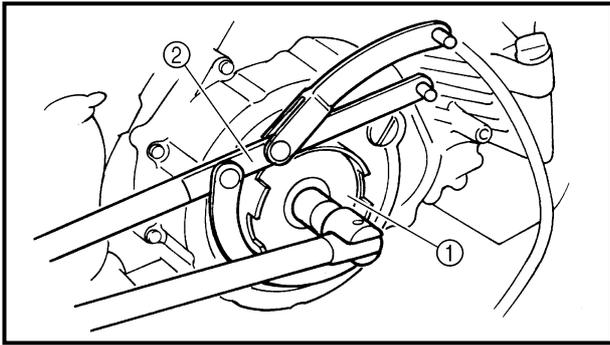
Order	Job name/Part name	Q'ty	Remarks
	<b>CDI magneto removal</b>		Remove the parts in the order below.
	Engine oil		Drain. Refer to "ENGINE OIL REPLACEMENT" in CHAPTER 3.
	Seat and side panels		Refer to "SEAT AND SIDE PANELS" in CHAPTER 3.
	Left footrest board		Refer to "FOOTREST BOARDS" in CHAPTER 3.
1	Recoil starter assembly	1	Refer to "CDI MAGNETO REMOVAL/INSTALLATION".
2	CDI magneto coupler	2	
3	Starter pulley	1	
4	Crankcase cover (left)/gasket	1/1	
5	Dowel pin	2	
6	Lead holder	1	



Order	Job name/Part name	Q'ty	Remarks
7	Pickup coil	1	Refer to "CDI MAGNETO REMOVAL/ INSTALLATION".  For installation, reverse the removal procedure.
8	Stator assembly	1	
9	CDI rotor	1	
10	Starter wheel gear	1	
11	Woodruff key	1	
12	Bearing/washer	1/1	
13	Starter idle gear shaft	1	
14	Washer/bearing	1/1	
15	Starter idle gear	1	



Order	Job name/Part name	Q'ty	Remarks
	<b>Recoil starter disassembly</b>		Disassemble the parts in the order below.
①	Cap	1	Refer to "RECOIL STARTER DISASSEMBLY/ASSEMBLY".
②	Starter handle	1	
③	Friction plate	1	
④	Pawl spring	1	
⑤	Drive pawl	1	
⑥	Spring	1	
⑦	Sheave drum	1	
⑧	Rope	1	
⑨	Coil spring	1	
			For assembly, reverse the disassembly procedure.



## CDI MAGNETO REMOVAL

1.Remove:

- Starter pulley ①

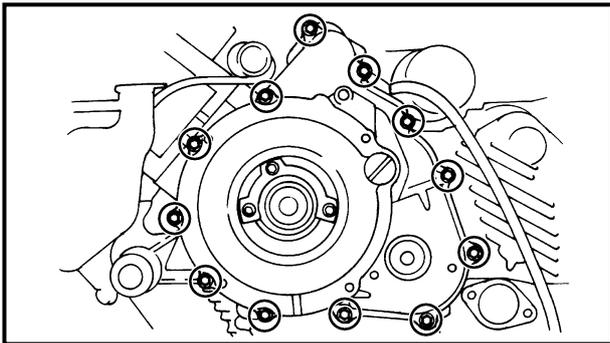
**NOTE:** \_\_\_\_\_

Use the rotor holder ② to hold the starter pulley.



**Rotor holder:**

**P/N. YU-01235, 90890-01235**

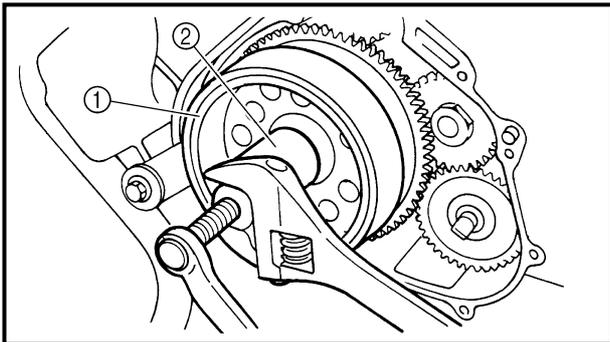


2.Remove:

- Crankcase cover (left)
- Gasket
- Dowel pins

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

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



3.Remove:

- CDI rotor ①

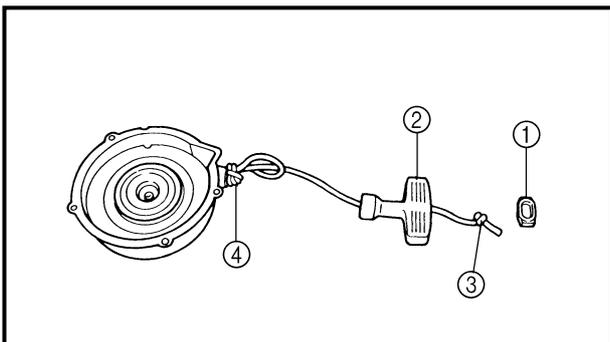
**NOTE:** \_\_\_\_\_

Use the flywheel puller ②.



**Flywheel puller:**

**P/N. YM-01404, 90890-01404**



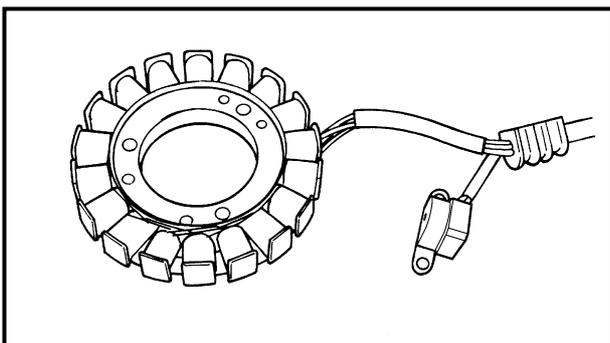
## RECOIL STARTER DISASSEMBLY

1.Remove:

- Cap ①
- Starter handle ②

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

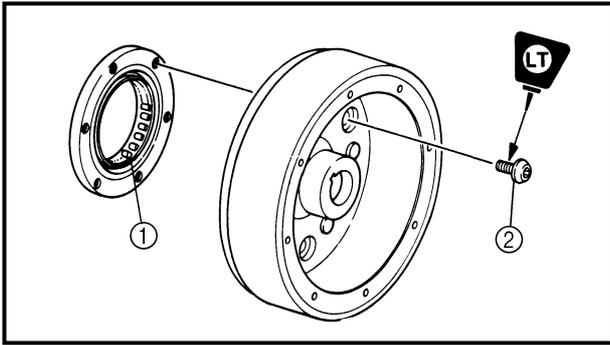
Before untying the knot ③ above the starter handle, make a knot ④ in the rope so that the rope is not pulled into the case.



## CDI MAGNETO INSPECTION

1.Inspect:

- Starter coil
  - Pickup coil
- Damage → Replace.



### STARTER CLUTCH INSPECTION

1. Inspect:

- Starter one-way clutch ①  
Cracks/damage → Replace.
- Bolts ② (starter clutch)  
Loose → Replace with a new one, and clinch the end of the bolt.

#### NOTE:

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



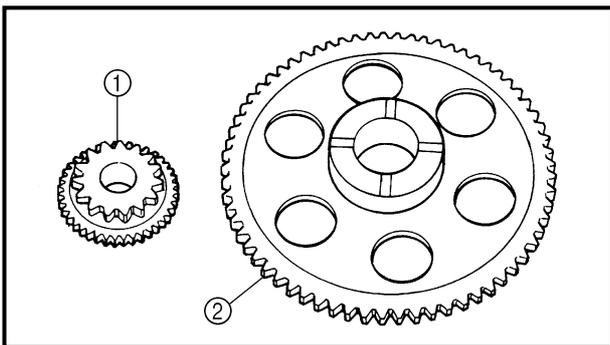
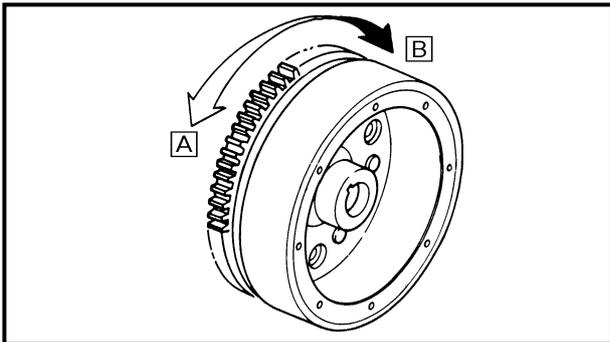
**Bolts (starter clutch):**  
30 Nm (3.0 m · kg, 22 ft · lb)  
LOCTITE®

\*\*\*\*\*

#### Inspection steps:

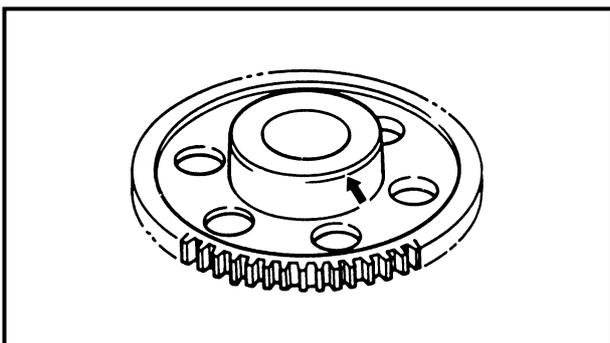
- Install the starter wheel gear to the starter clutch, and hold the starter clutch.
- When turning the starter wheel gear counter clockwise **A**, the starter clutch and the wheel gear should be engaged. If not, the starter clutch is faulty. Replace it.
- When turning the starter wheel gear clockwise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

\*\*\*\*\*



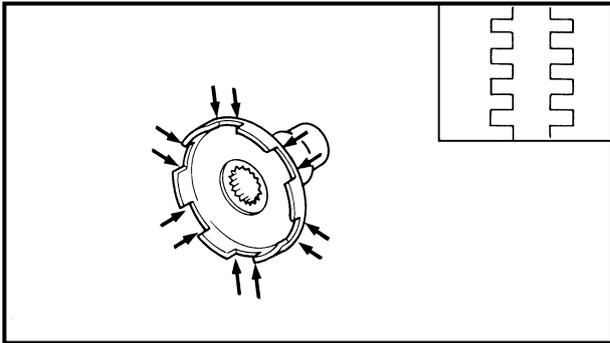
2. Inspect:

- Gear teeth (starter idle) ①
- Gear teeth (starter wheel) ②  
Burrs/clips/roughness/wear → Replace.



3. Inspect:

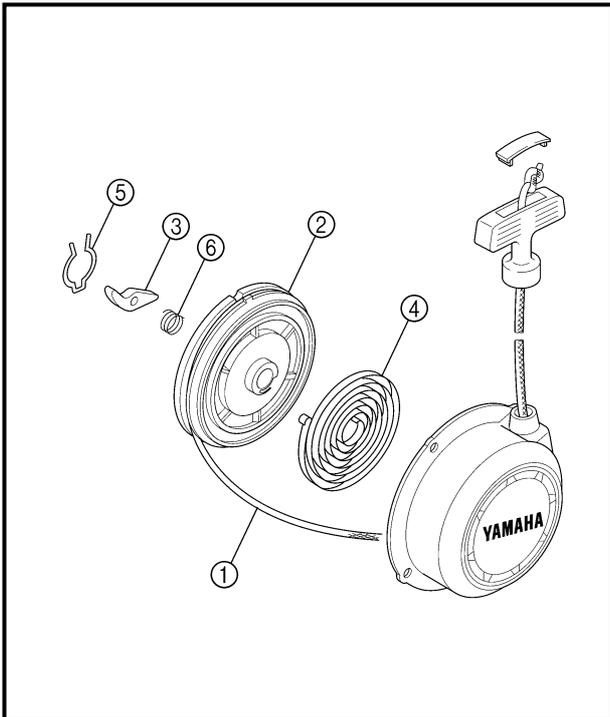
- Starter wheel gear (contacting surface)  
Damage/pitting/wear → Replace.



### STARTER PULLEY INSPECTION

1. Inspect:

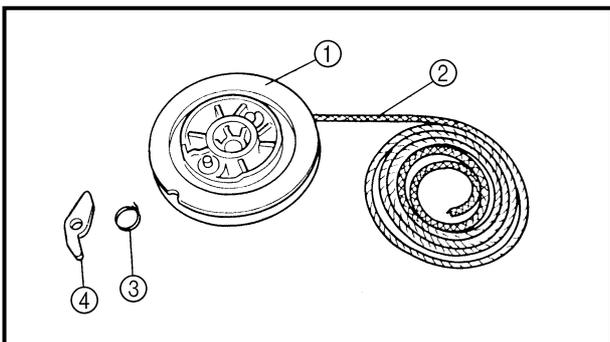
- Starter pulley  
Cracks/pitting → Deburr or replace.



### RECOIL STARTER INSPECTION

1. Inspect:

- Rope ①
- Sheave drum ②
- Drive pawl ③
- Wear/damage → Replace.
- Coil spring ④
- Pawl spring ⑤
- Spring ⑥
- Fatigue → Replace.



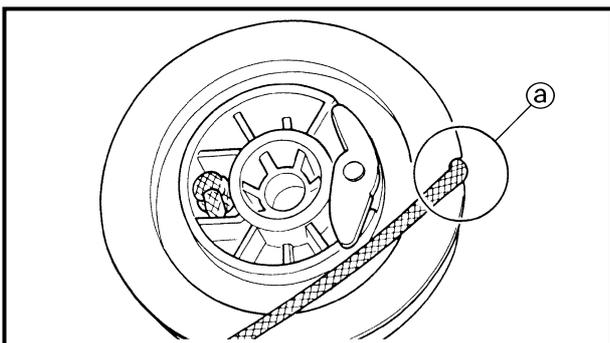
### RECOIL STARTER ASSEMBLY

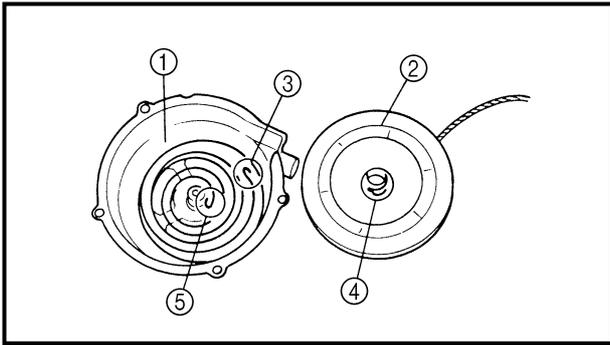
1. Install:

- Sheave drum ①
- Rope ②
- Pawl spring ③
- Drive pawl ④

#### NOTE:

Wind the rope 4-1/2 turns clockwise around the sheave drum. Then insert the rope into the drum slit (a).



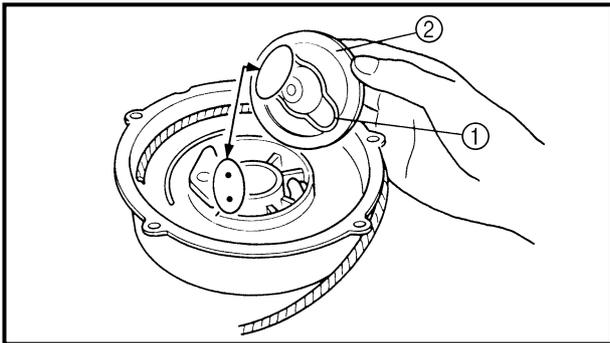


2.Install:

- Starter spring ①
- Sheave drum assembly ②

**NOTE:**

- Mesh the spring hook ③ with the case slit, then wind the spring clockwise into the case from the larger to smaller diameter.
- Mesh the sheave drum hook ④ with the spring hook ⑤.

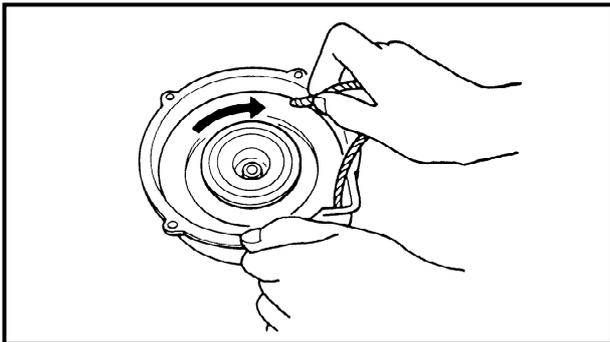


3.Install:

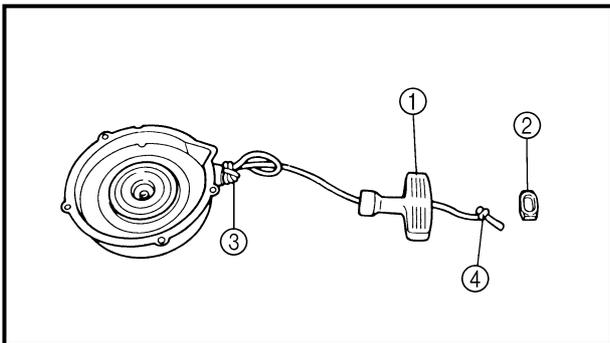
- Spring ①
- Friction plate ②
- Nut

**NOTE:**

Insert the spring hooks into the pawl side holes.



4.Turn the sheave drum 3-turn clockwise to give preload to the spring.

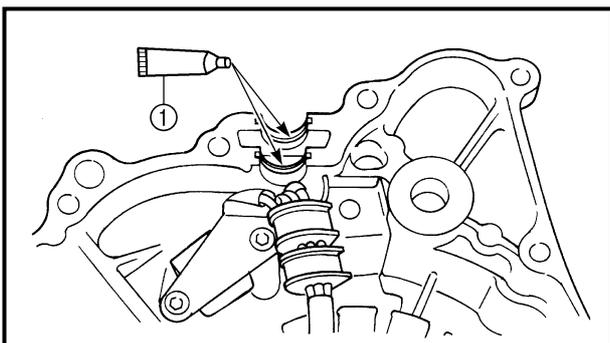


5.Install:

- Starter handle ①
- Cap ②

**NOTE:**

- Pass the rope through the case hole and make a knot ③ on the rope so that the rope is not pulled into the case.
- Untie the knot ③ after making a knot ④ above the handle.



## CDI MAGNETO INSTALLATION

1.Apply:

- Sealant (Quick Gasket®) ① (into the slit)



**Sealant (Quick Gasket®):**  
**P/N. ACC-11001-05-01**  
**Yamaha bond No. 1215®:**  
**P/N. 90890-85505**

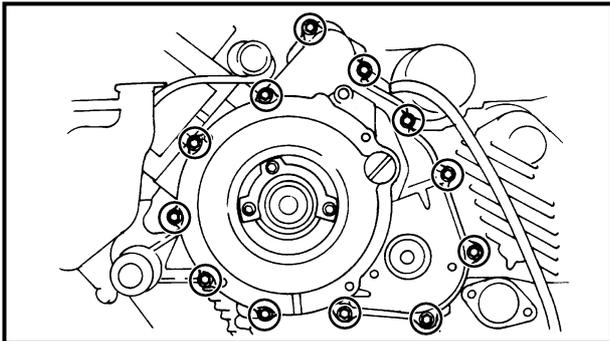


### 2.Install:

- Woodruff key
- CDI rotor

### NOTE:

- Before installing the rotor, clean the outside of the crankshaft and the inside of the rotor.
- After installing the rotor, check that the rotor rotates smoothly. If not, reinstall the key and rotor.



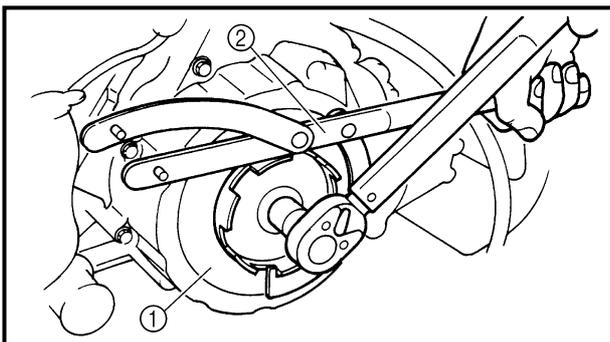
### 3.Install:

- Dowel pins
- Gasket **New**
- Crankcase cover (left)

**10 Nm (1.0 m • kg, 7.2 ft • lb)**

### NOTE:

- When installing the crankcase cover (left), use a long rod to hold the CDI rotor in position from the outside. This will make assembly easier. Be careful not to damage the oil seal.
- Tighten the bolts in stages, using a criss-cross pattern.



### 4.Install:

- Starter pulley ①

**50 Nm (5.0 m • kg, 36 ft • lb)**

### NOTE:

Use a rotor holder ② to hold the starter pulley.



**Rotor holder:**  
P/N. YU-01235, 90890-01235

### NOTE:

Before installing the starter pulley, do not forget to install the O-ring.



### 5.Install:

- Select lever unit
- Select lever shift rod

### **NOTE:**

Before installing the select lever shift rod, make sure that the select lever and shift cam is in the NEUTRAL position.

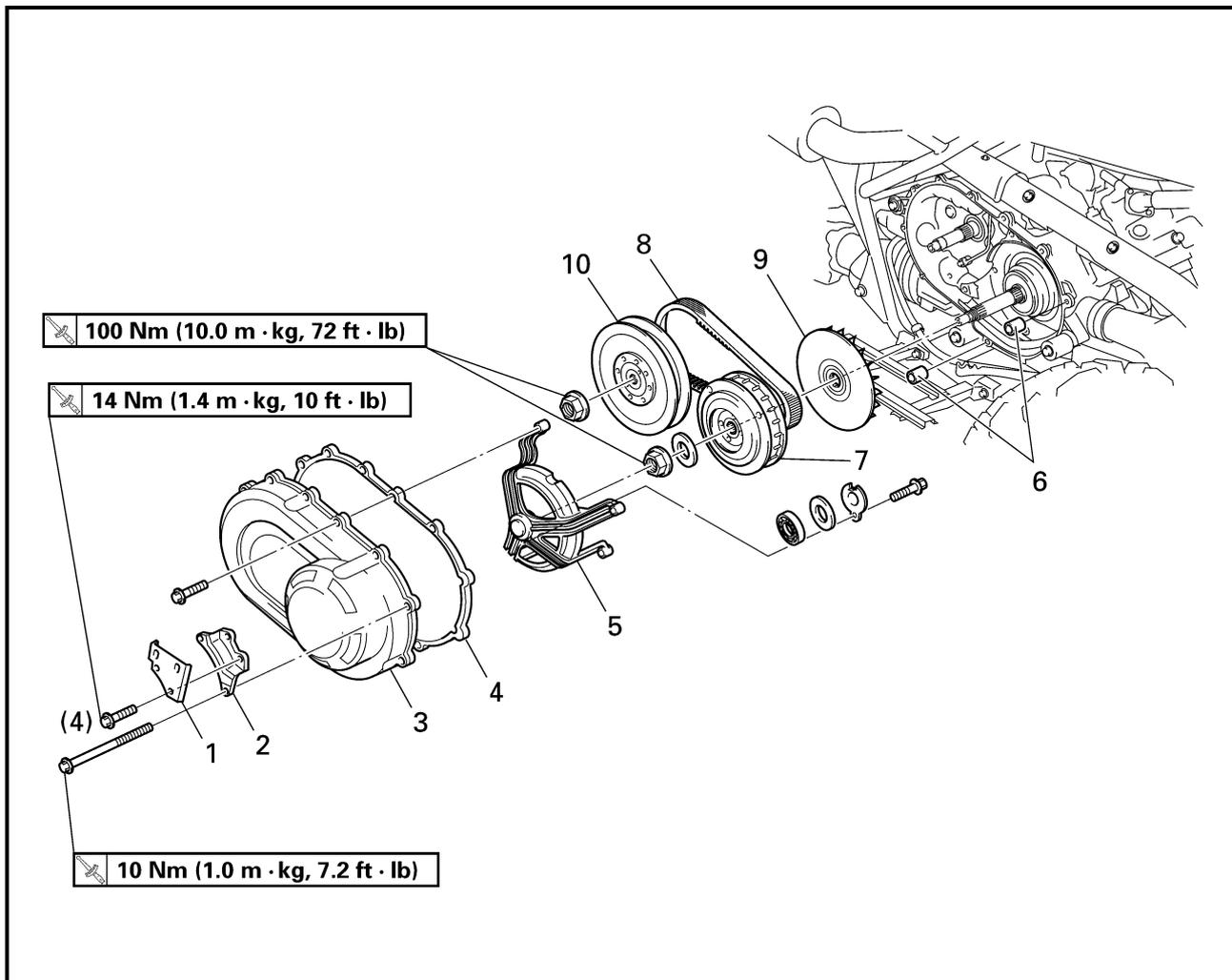
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### 6.Adjust:

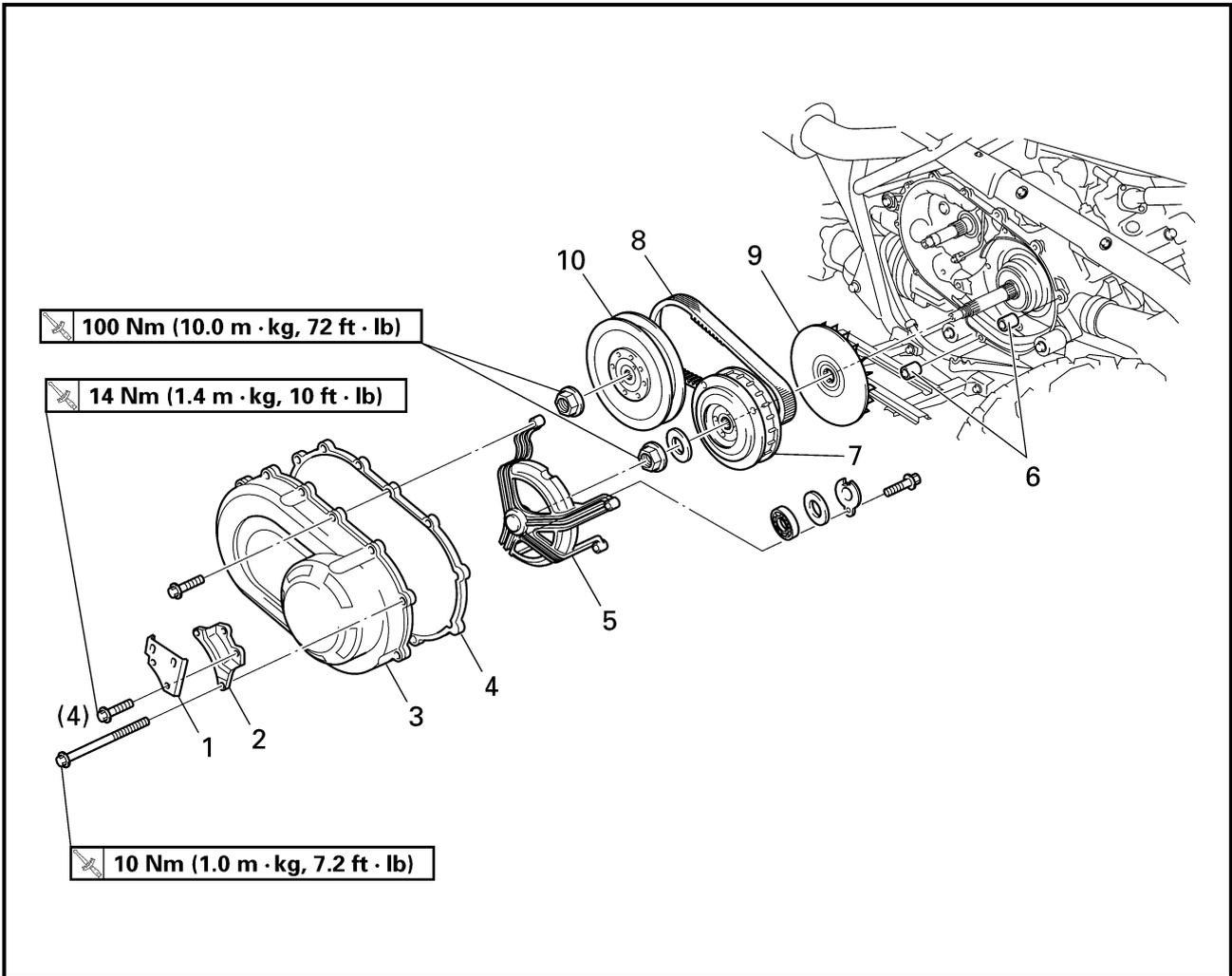
- Select lever shift rod  
Refer to "SELECT LEVER CONTROL CABLE AND SHIFT ROD" in CHAPTER 3.



PRIMARY AND SECONDARY SHEAVES



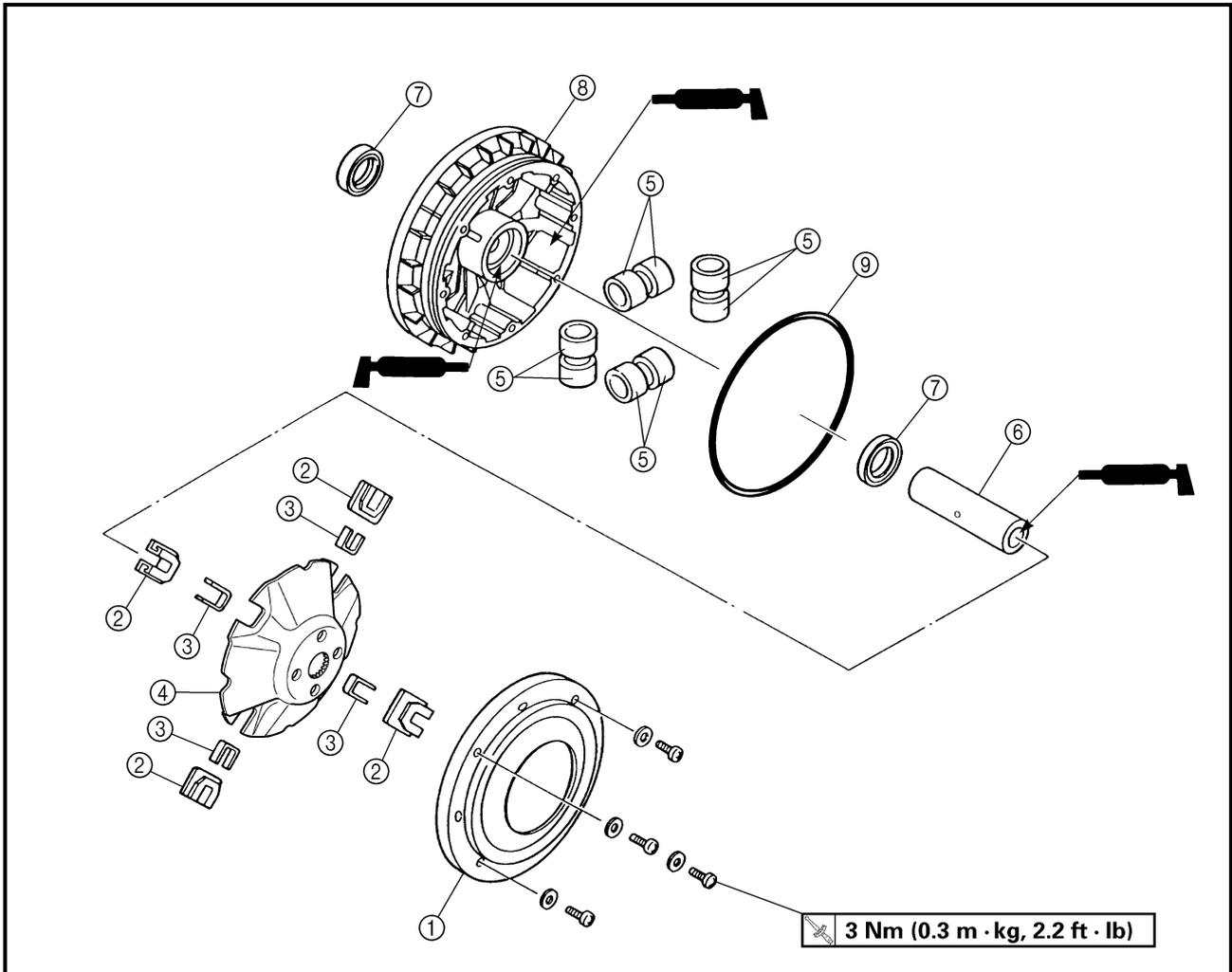
Order	Job name/Part name	Q'ty	Remarks
	<b>Primary and secondary sheave removal</b>		Remove the parts in the order below.
	Front fender		Refer to "SEAT, CARRIERS, FENDERS AND FUEL TANK" in CHAPTER 3.
	Rear fender		
	Right footrest boards		
1	Exhaust pipe stay 1	1	Refer to "PRIMARY AND SECONDARY SHEAVES REMOVAL/INSTALLATION".
2	Exhaust pipe stay 2	1	
3	Drive belt cover	1	
4	Rubber gasket	1	
5	Bearing housing	1	
6	Dowel pin	2	
7	Primary sheave assembly	1	
8	V-belt	1	



Order	Job name/Part name	Q'ty	Remarks
9	Primary fixed sheave	1	Refer to "PRIMARY AND SECONDARY SHEAVES REMOVAL/INSTALLATION". For installation, reverse the removal procedure.
10	Secondary sheave assembly	1	



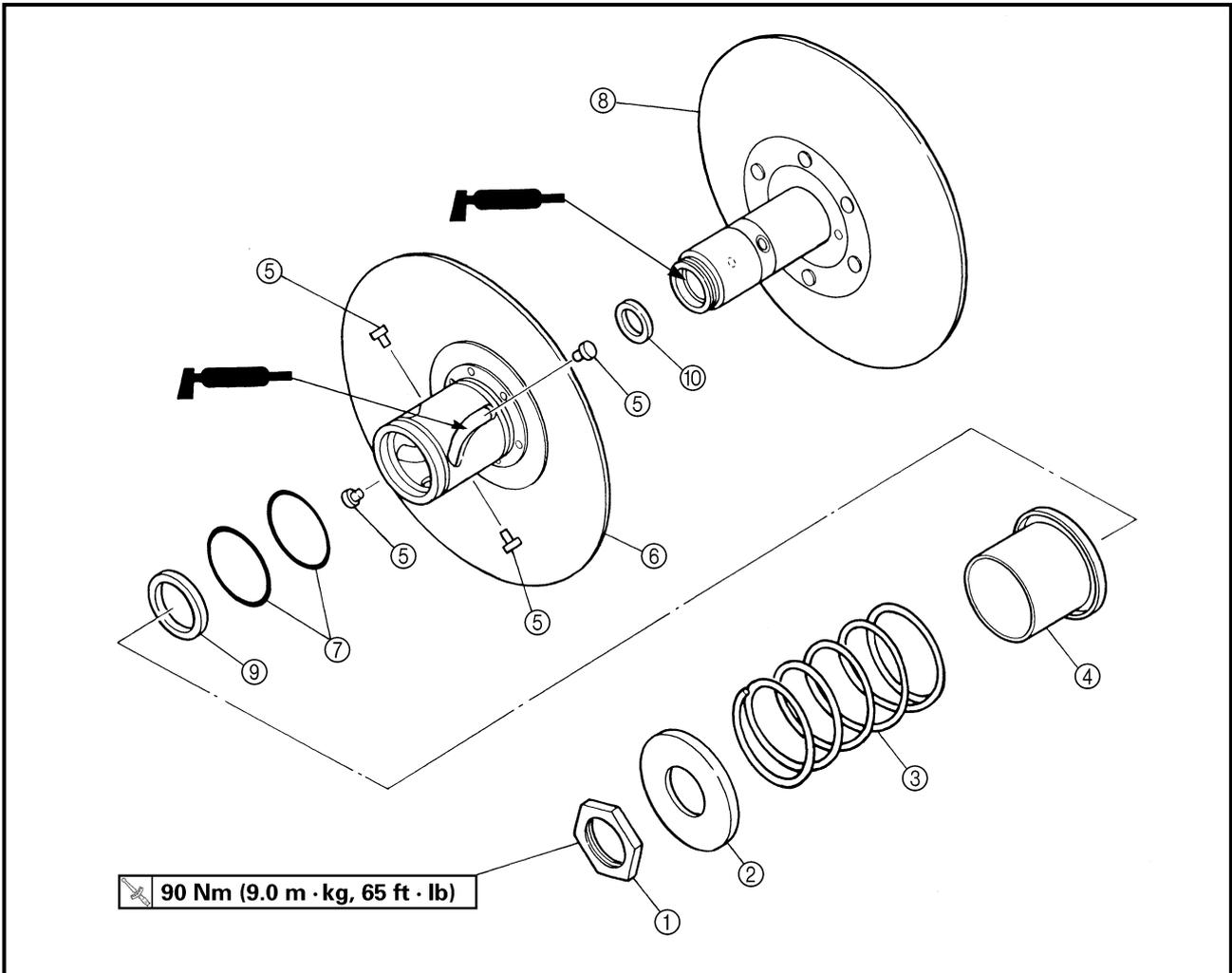
PRIMARY SHEAVE



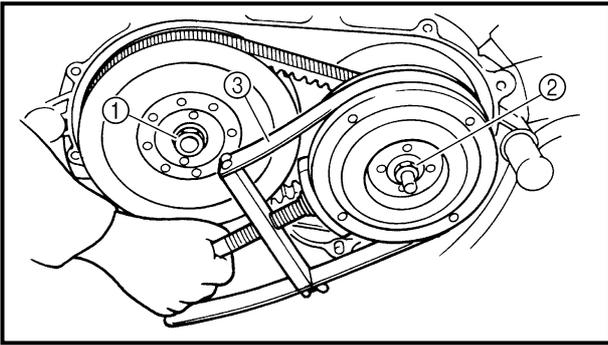
Order	Job name/Part name	Q'ty	Remarks
	<b>Primary sheave disassembly</b>		Disassemble the parts in the order below.
①	Primary pulley sheave cap	1	Refer to "PRIMARY SHEAVE ASSEMBLY".
②	Primary pulley slider	4	
③	Spacer	4	
④	Primary pulley cam	1	
⑤	Primary pulley weight	8	
⑥	Collar	1	
⑦	Oil seal	2	
⑧	Primary sliding sheave	1	
⑨	O-ring	1	
			For assembly, reverse the disassembly procedure.



SECONDARY SHEAVE



Order	Job name/Part name	Q'ty	Remarks
	<b>Secondary sheave disassembly</b>		Disassemble the parts in the order below.
①	Nut	1	Refer to "SECONDARY SHEAVE DIS-ASSEMBLY/ASSEMBLY".
②	Spring seat	1	
③	Compression spring	1	
④	Spring seat	1	
⑤	Guide pin	4	
⑥	Secondary sliding sheave	1	
⑦	O-ring	2	
⑧	Secondary fixed sheave	1	
⑨	Oil seal	1	
⑩	Oil seal	1	
			For assembly, reverse the disassembly procedure.



**PRIMARY AND SECONDARY SHEAVES  
REMOVAL**

1. Loosen:

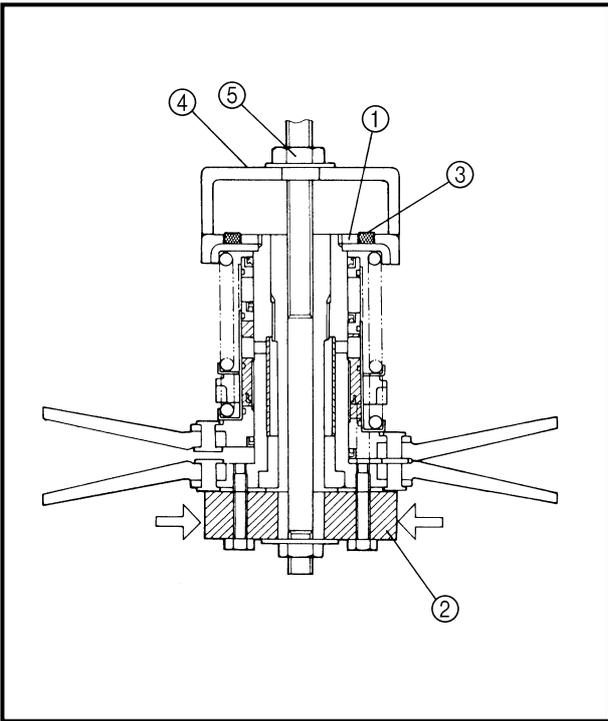
- Nut (secondary sheave) ①
- Nut (primary sheave) ②

**NOTE:**

- Use the sheave holder ③ to hold the primary sheave.
- First, loosen the nut (secondary sheave) ②, then loosen the nut (primary sheave) ①.



**Sheave holder:  
P/N. YU-01880, 90890-01701**



**SECONDARY SHEAVE DISASSEMBLY**

1. Remove:

- Nut ①

\*\*\*\*\*

**Removing steps:**

- Attach the sheave fixed block ②, locknut wrench ③ and sheave spring compressor ④ to the secondary sheave assembly.



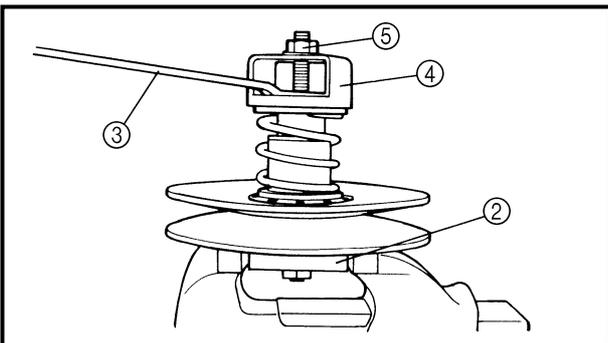
**Sheave fixed block:  
P/N. YM-04135, 90890-04135**

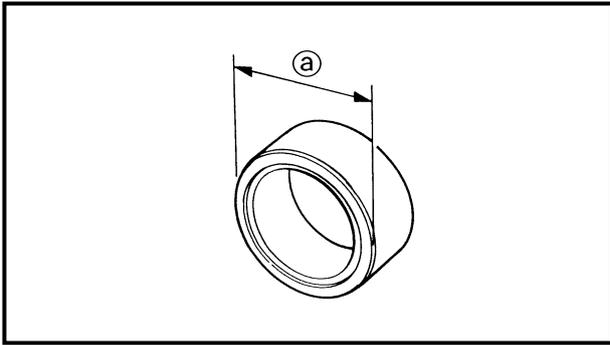
**Locknut wrench:  
P/N. 90890-01348**

**Sheave spring compressor:  
P/N. YM-04134, 90890-04134**

- Place the sheave fixed block in a vise and secure it.
- Tighten the sheave spring compressor nut ⑤ and compress the spring.
- Loosen the nut ① with the locknut wrench ③.
- Remove the nut ①.
- Remove the sheave spring compressor and locknut wrench.

\*\*\*\*\*





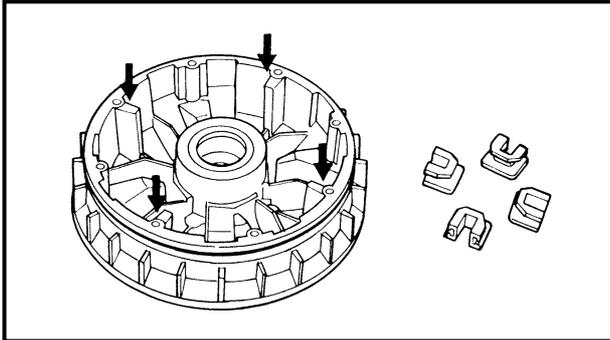
## PRIMARY SHEAVE INSPECTION

1. Inspect:

- Weight outside diameter Ⓐ  
Out of specification → Replace the weight.

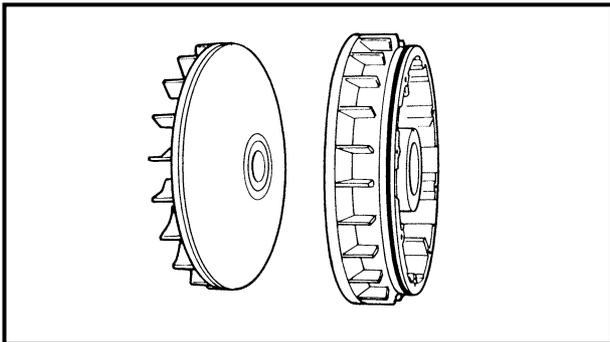


**Weight outside diameter:**  
**30 mm (1.18 in)**  
**<Limit>: 29.5 mm (1.16 in)**



2. Inspect:

- Primary puller slider
- Primary sliding sheave splines  
Wear/cracks/damage → Replace.
- Spacer
- Primary puller cam  
Cracks/damage → Replace.



3. Inspect:

- Primary sliding sheave
- Primary fixed sheave  
Cracks/damage → Replace.

## SECONDARY SHEAVE INSPECTION

1. Inspect:

- Secondary fixed sheave smooth operation
- Secondary sliding sheave smooth operation  
Scratches/damage → Replace as a set.

2. Inspect:

- Torque cam groove ①  
Wear/damage → Replace.

3. Inspect:

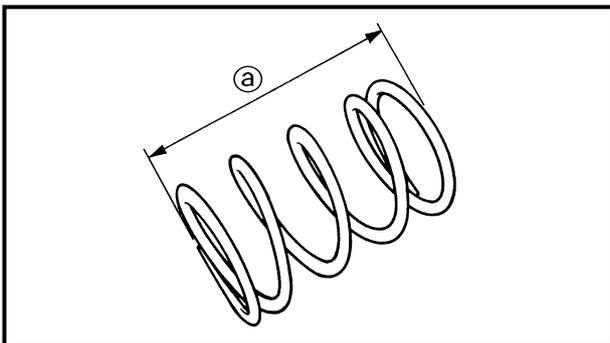
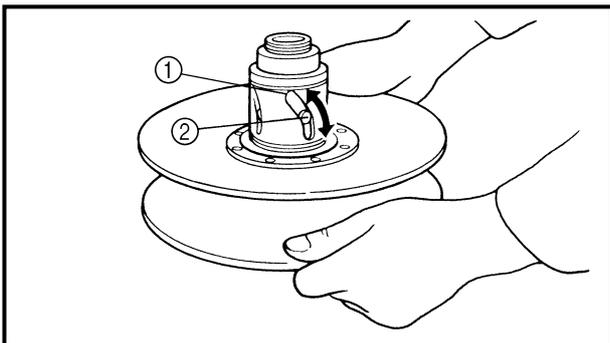
- Guide pin ②  
Wear/damage → Replace.

4. Inspect:

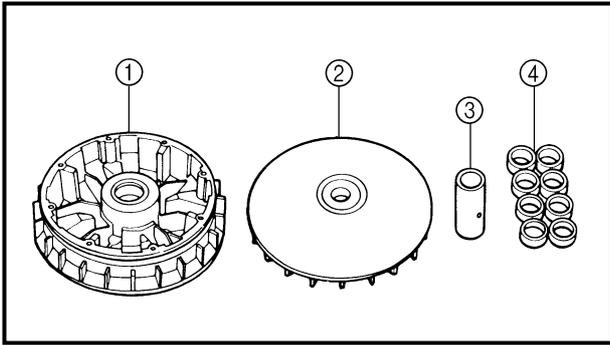
- Secondary sheave spring  
Damage → Replace.

5. Measure:

- Secondary sheave spring free length Ⓐ  
Out of specification → Replace the secondary sheave spring.



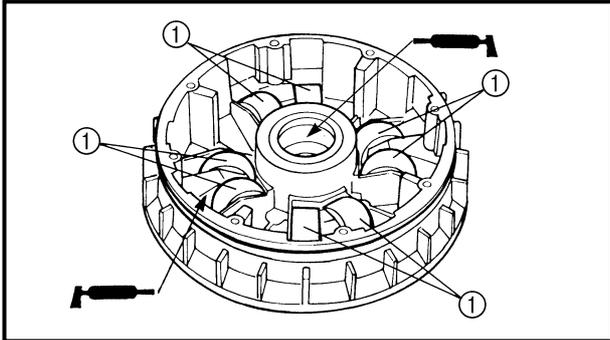
**Free length:**  
**121.4 mm (4.78 in)**  
**<Limit>: 118.4 mm (4.66 in)**



**PRIMARY SHEAVE ASSEMBLY**

1. Clean:

- Primary sliding sheave face ①
- Primary fixed sheave face ②
- Collar ③
- Weight ④
- Primary sliding sheave cam face

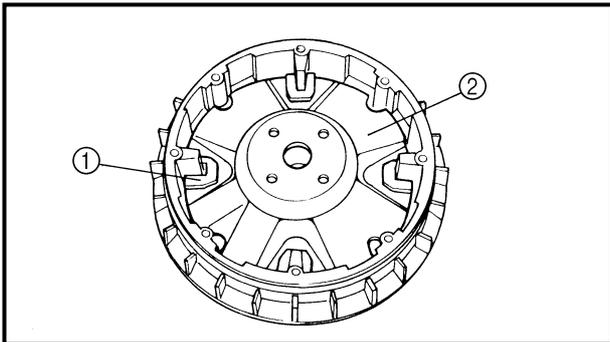


2. Install:

- Weight ①

**NOTE:**

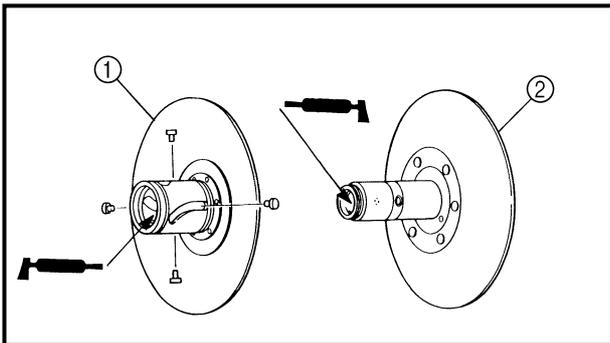
- Apply Shell SSG-2656-2 grease (120 g) to the whole outer surface of the weight and install.
- Apply SSG-2656-2 grease to the inner surface of the collar.
- Apply SSG-2656-2 grease to the inner surface of the primary sliding sheave.
- Remove any excess grease.



3. Install:

- Spacer
- Slider ①
- Cam ②
- Primary sliding sheave cap

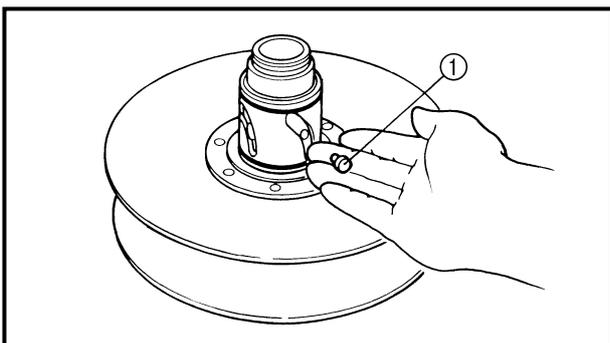
**3 Nm (0.3 m · kg, 2.2 ft · lb)**



**SECONDARY SHEAVE ASSEMBLY**

1. Apply:

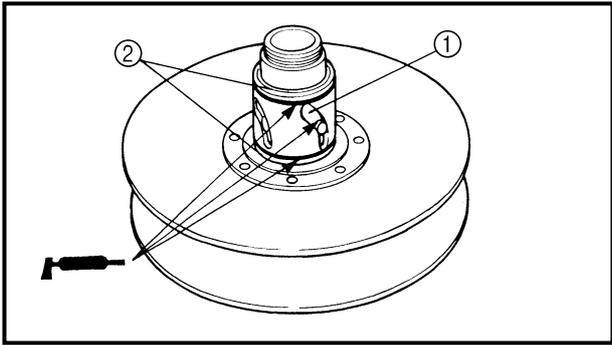
- BEL-RAY assembly lube® (to the secondary sliding sheave ① inner surface and oil seals)
- BEL-RAY assembly lube® (to the bearings, oil seals and inner surface of the secondary fixed sheave ②)



2. Install:

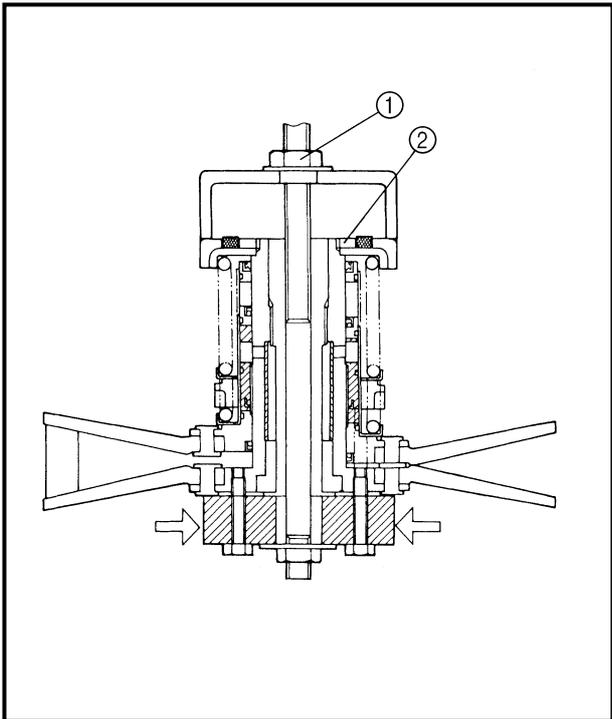
- Guide pin ①

# PRIMARY AND SECONDARY SHEAVES



### 3. Apply:

- BEL-RAY assembly lube®  
(to the guide pin sliding groove ①, and o-ring ② **New** )



### 4. Install:

- Spring seat
- Compression spring
- Spring seat
- Nut

\*\*\*\*\*

### Installing steps:

- Attach the sheave fixed block, locknut wrench and sheave spring compressor to the secondary sheave assembly.



**Sheave fixed block:**  
P/N. YM-04135, 90890-04135  
**Locknut wrench:**  
P/N. 90890-01348  
**Sheave spring compressor:**  
P/N. YM-04134, 90890-04134

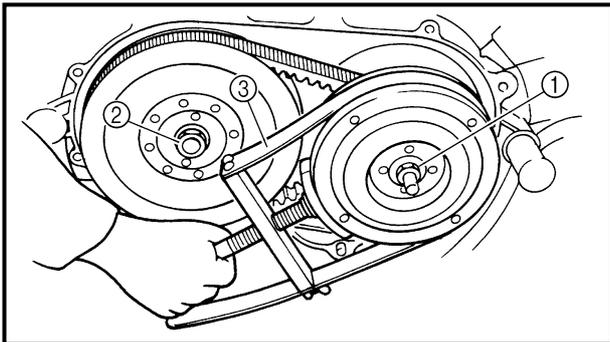
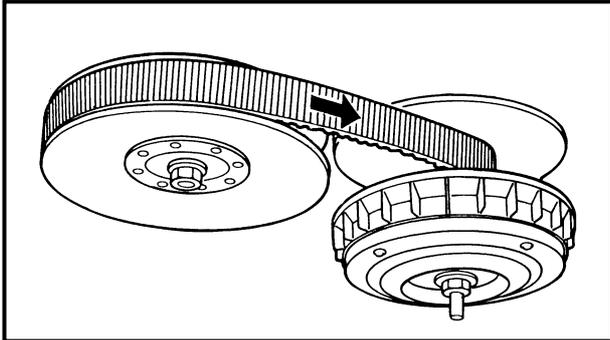
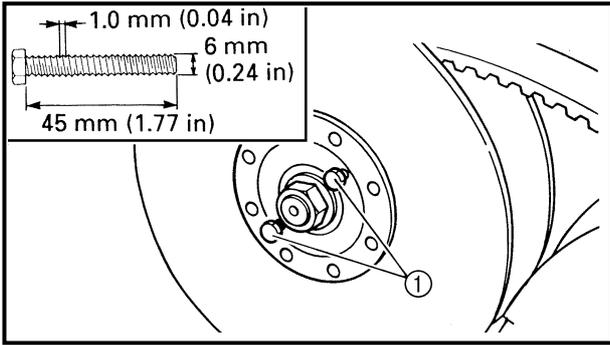
- Place the sheave fixed block in a vise and secure it.
- Tighten the sheave spring compressor nut ① and compress the spring.
- Install the nut ② and tighten it to the specified torque using the locknut wrench.



**Nut:**  
**90 Nm (9.0 m • kg, 65 ft • lb)**

- Remove the sheave spring compressor, locknut wrench, and sheave fixed block.

\*\*\*\*\*



## PRIMARY AND SECONDARY SHEAVES INSTALLATION

### 1. Install:

- Secondary sheave assembly
- V-belt
- Primary sheave assembly

### NOTE:

- Tightening the bolts ① will push the secondary sliding sheave away, causing the gap between the secondary fixed and sliding sheaves to widen.
- Install the V-belt so that its arrow faces the direction show in the illustration.

### 2. Tighten:

- Nut (primary sheave) ①

100 Nm (10.0 m • kg, 72 ft • lb)

- Nut (secondary sheave) ②

100 Nm (10.0 m • kg, 72 ft • lb)

### NOTE:

- Use the sheave holder ③ to hold the primary sheave.
- First, tighten the nut (primary sheave) ①, then tighten the nut (secondary sheave) ②.

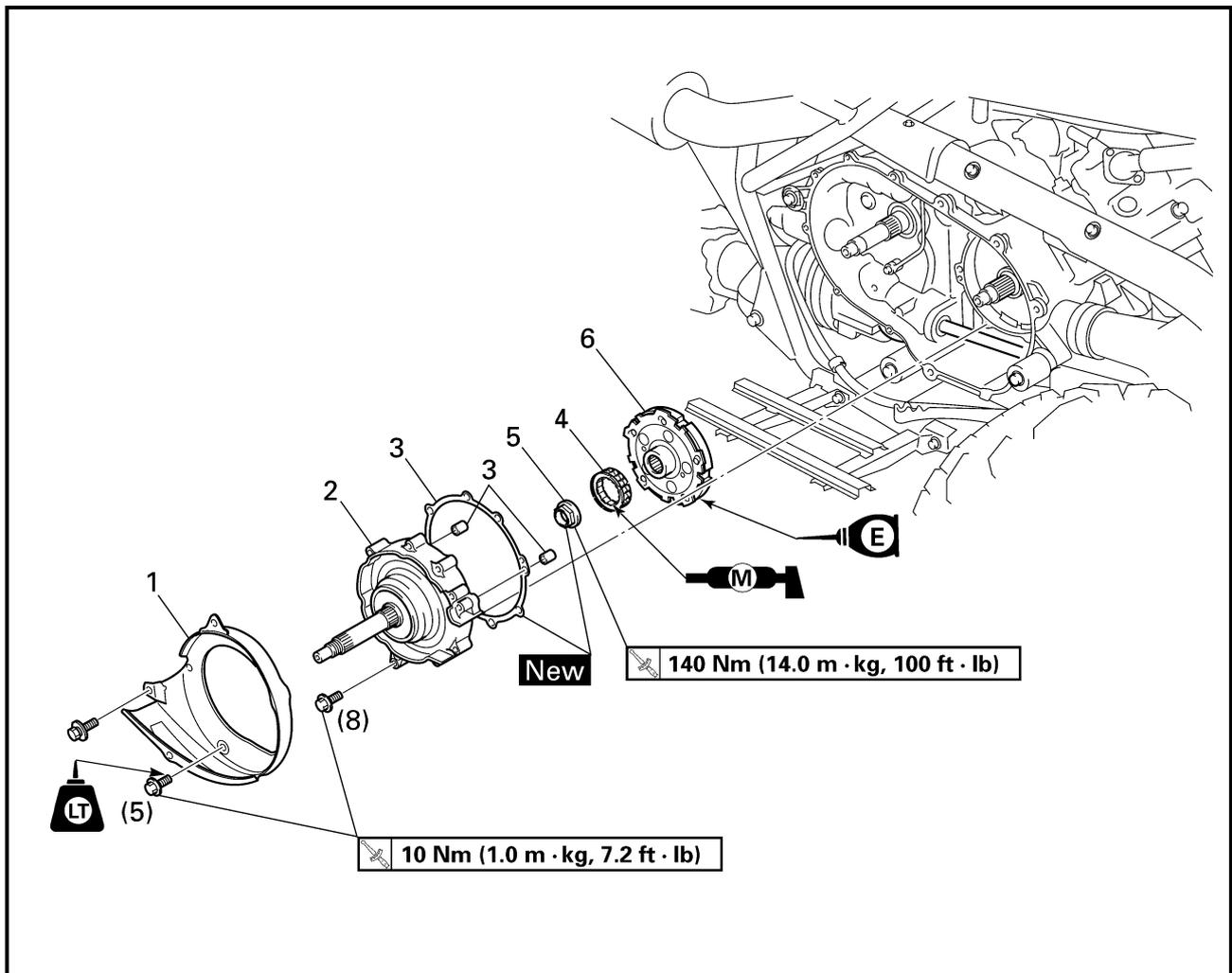


**Sheave holder:**

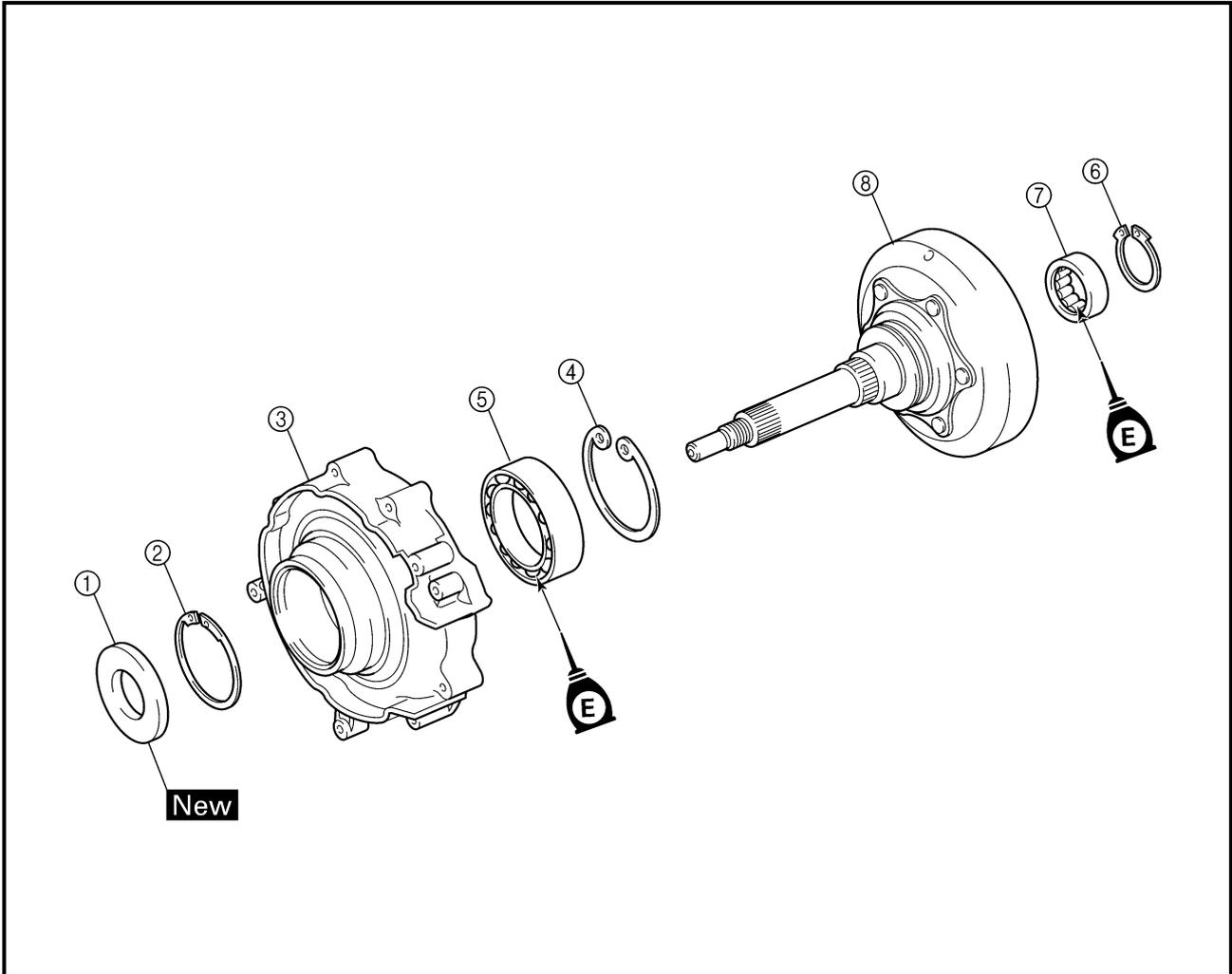
**P/N. YU-01880, 90890-01701**



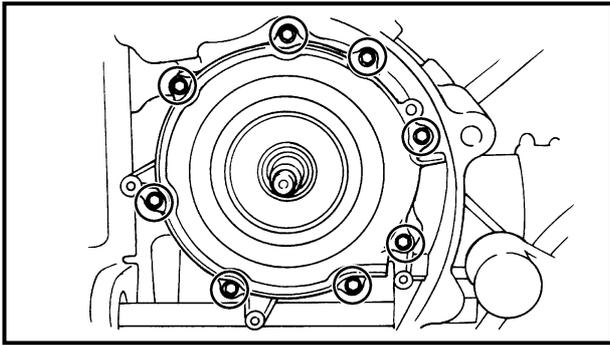
CLUTCH



Order	Job name/Part name	Q'ty	Remarks
	<b>Clutch removal</b>		Remove the parts in the order below. Refer to "PRIMARY AND SECONDARY SHEAVES".
	Primary and secondary sheaves		
1	Cover	1	Refer to "CLUTCH REMOVAL/INSTALLATION".
2	Clutch housing assembly	1	
3	Gasket/dowel pin	1/2	
4	One-way clutch bearing	1	
5	Nut	1	
6	Clutch carrier assembly	1	
			For installation, reverse the removal procedure.



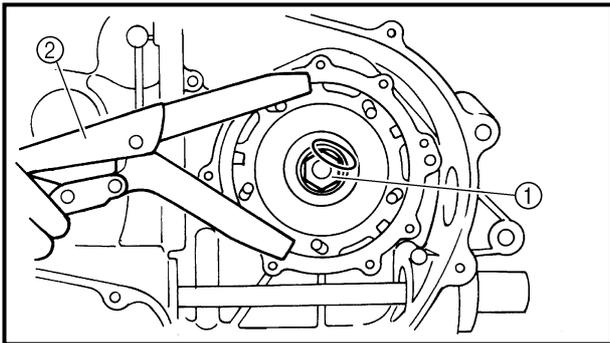
Order	Job name/Part name	Q'ty	Remarks
	<b>Clutch housing disassembly</b>		Disassemble the parts in the order below.
①	Oil seal	1	
②	Circlip	1	
③	Bearing housing	1	
④	Circlip	1	
⑤	Bearing	1	
⑥	Circlip	1	
⑦	Bearing	1	
⑧	Clutch housing	1	
			For assembly, reverse the disassembly procedure.



**CLUTCH REMOVAL**

- 1.Remove:
- Clutch housing assembly
  - Gasket
  - Dowel pins

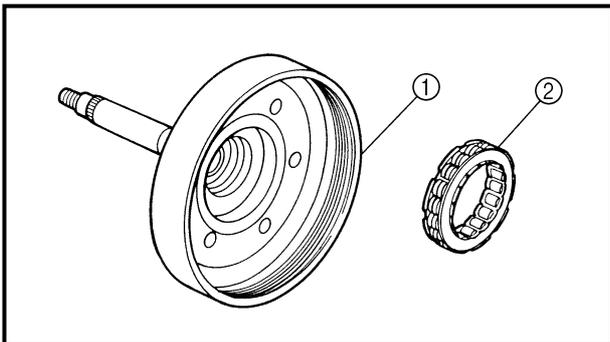
**NOTE:** Working in crisscross pattern, loosen each bolt 1/4 of a turn. Remove them after all of them are loosened.



- 2.Straighten:
- Punched portion of the nut ①.
- 3.Remove:
- Nut ①

**NOTE:** Use a clutch holding tool ② to hold the clutch carrier assembly.

	<p><b>Clutch holding tool:</b> P/N. YM-91042, 90890-04086</p>
--	---

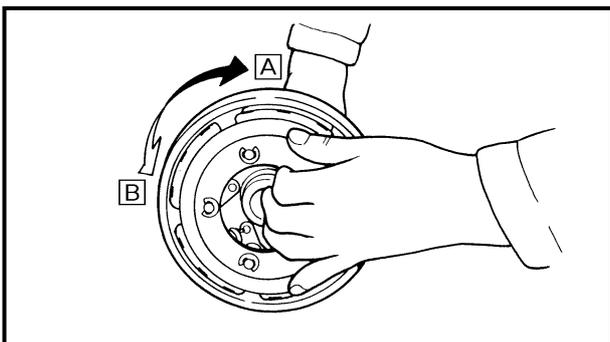


**CLUTCH INSPECTION**

- 1.Inspect:
- Clutch housing ①  
Heat damage/wear/damage → Replace.
  - One-way clutch bearing ②  
Chafing/wear/damage → Replace.

**NOTE:**

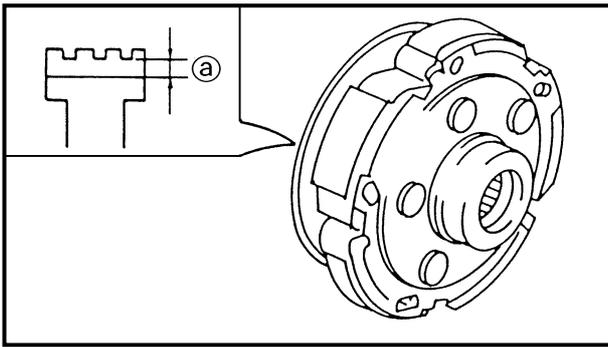
- Replace the one-way clutch assembly and clutch housing as a set.
- The one-way clutch bearing must be installed with the flange side facing in.



\*\*\*\*\*

**Clutch operation:**

- Install the one-way clutch bearing and clutch carrier assembly to the clutch housing and hold the clutch carrier assembly.
- When turning the clutch housing clockwise **A**, the clutch housing should turn freely.  
If not, the one-way clutch assembly is faulty.  
Replace it.
- When turning the clutch housing counter-clockwise **B**, the clutch housing and crankshaft should be engaged.  
If not, the one-way clutch assembly is faulty.  
Replace it.



## 2. Inspect:

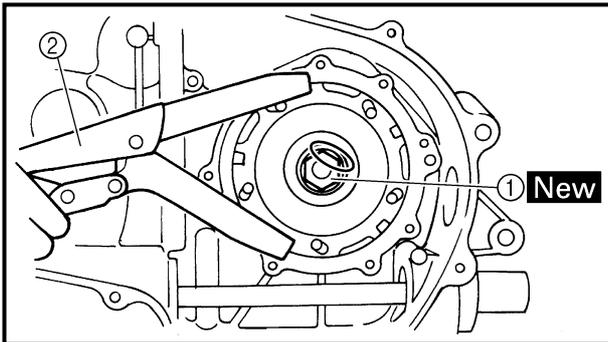
- Clutch shoe
- Heat damage → Replace.

## 3. Measure:

- Clutch shoe thickness
- Out of specification → Replace.



**Clutch shoe thickness:**  
1.5 mm (0.06 in)  
**Clutch shoe wear limit (a):**  
1.0 mm (0.04 in)



## CLUTCH INSTALLATION

## 1. Install:

- Collar
- Clutch carrier assembly
- Nut ① **New**  140 Nm (14.0 m · kg, 100 ft · lb)

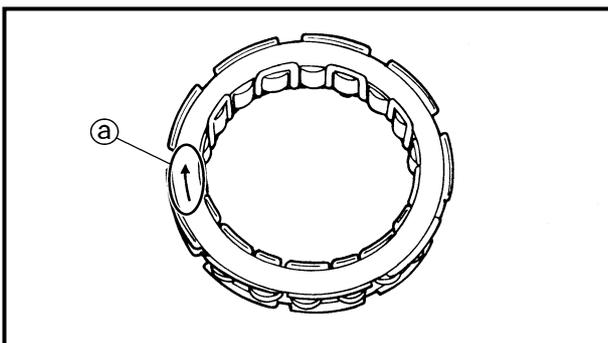
**NOTE:**

Use a clutch holding tool ② to hold the clutch carrier assembly.



**Clutch holding tool:**  
P/N. YM-91042, 90890-04086

- 2. Lock the threads with a drift punch.

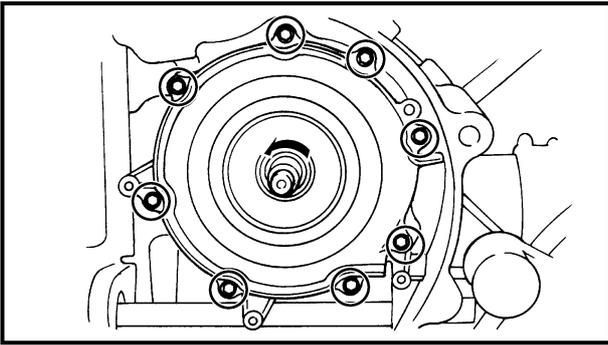


## 3. Install:

- One-way clutch bearing

**NOTE:**

The one-way clutch bearing should be installed in the clutch carrier assembly with the arrow mark ① facing toward the clutch housing.

**4.Install:**

- Dowel pins
- Gasket **New**
- Clutch housing assembly

 **10 Nm (1.0 m • kg, 7.2 ft • lb)**

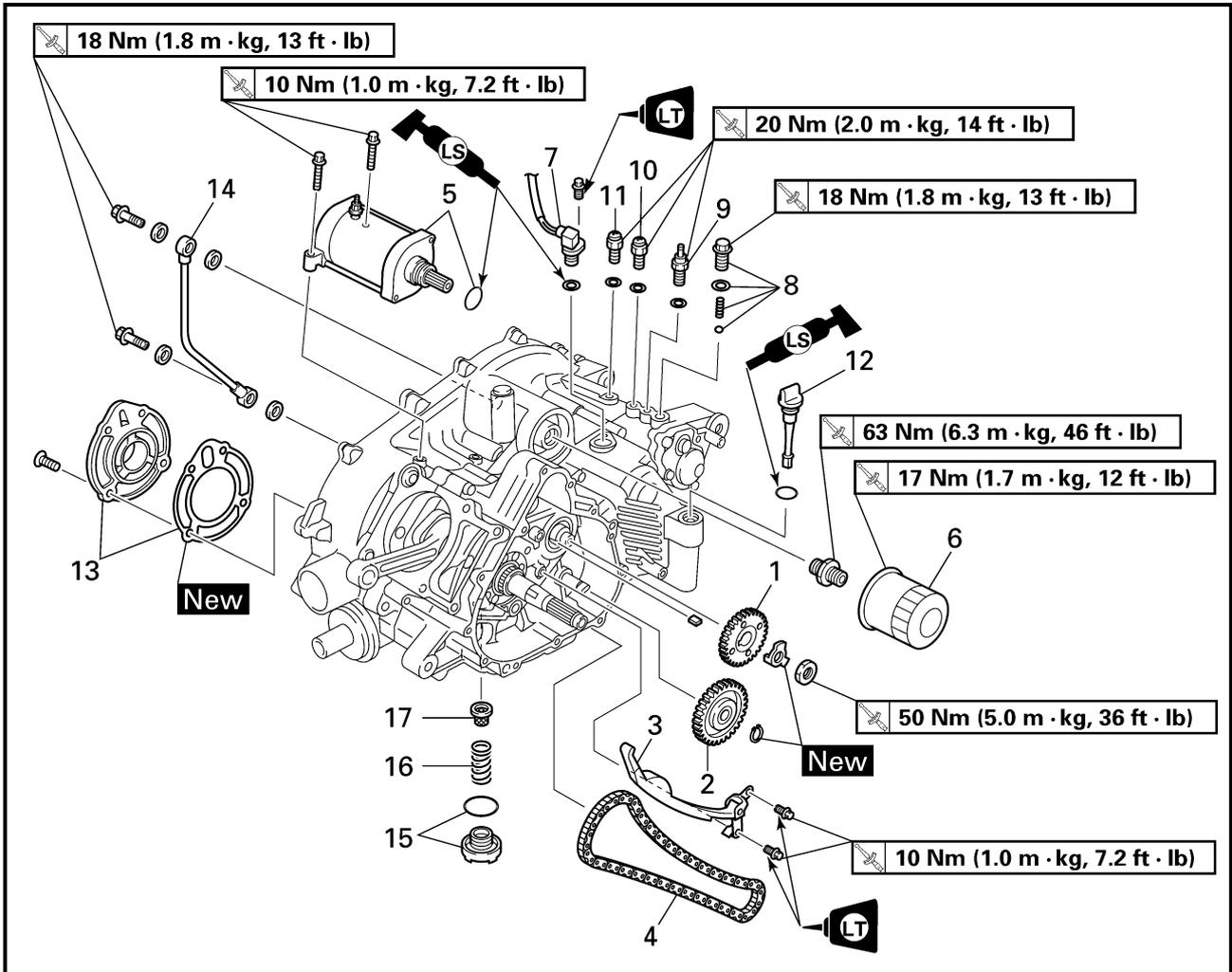
**NOTE:**

- Tighten the bolts in stages, using a criss-cross pattern.
- After tightening the bolts, check that the clutch housing assembly to counterclockwise rotates smoothly.

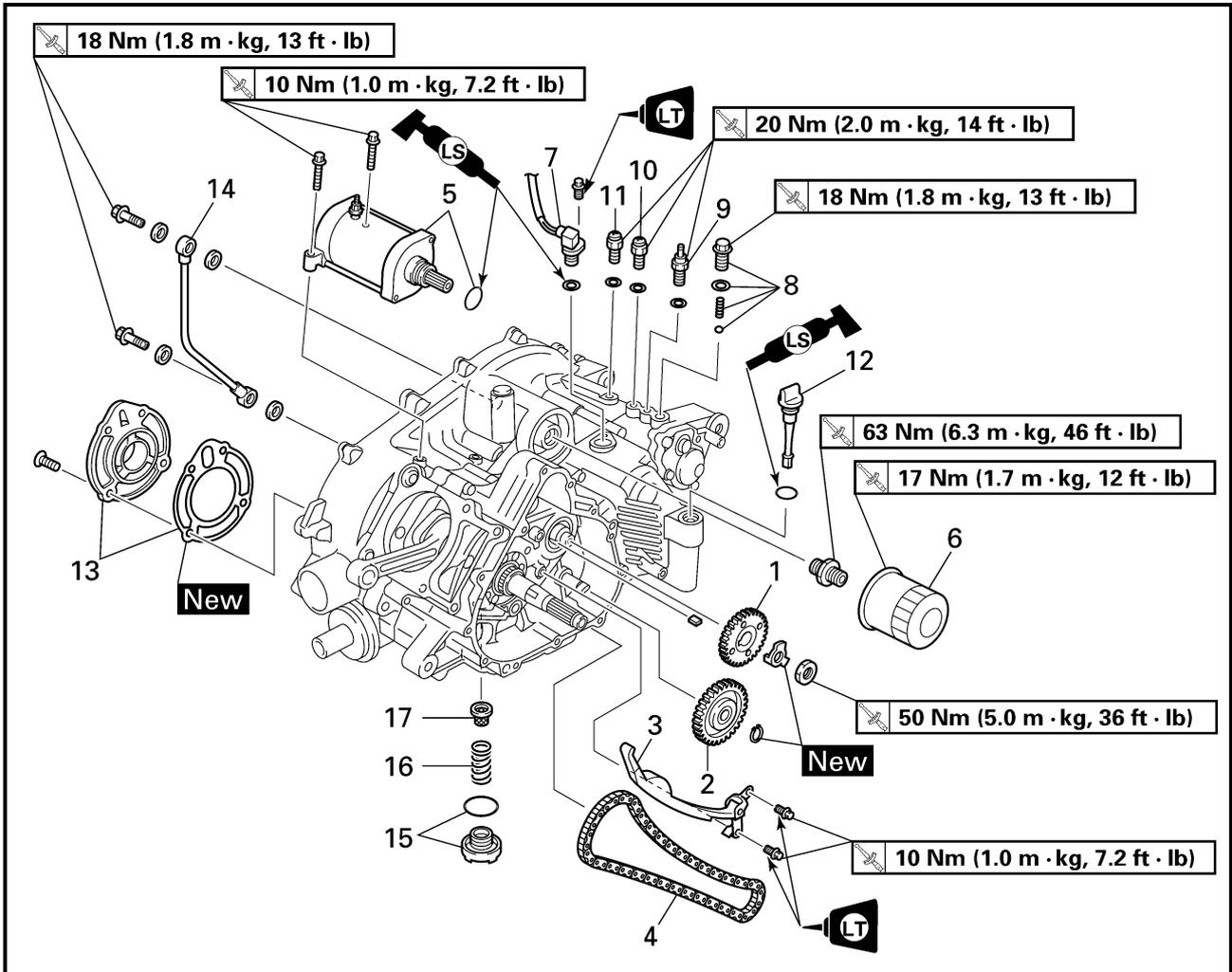


**CRANKCASE**

**STARTER MOTOR, TIMING CHAIN AND OIL FILTER**



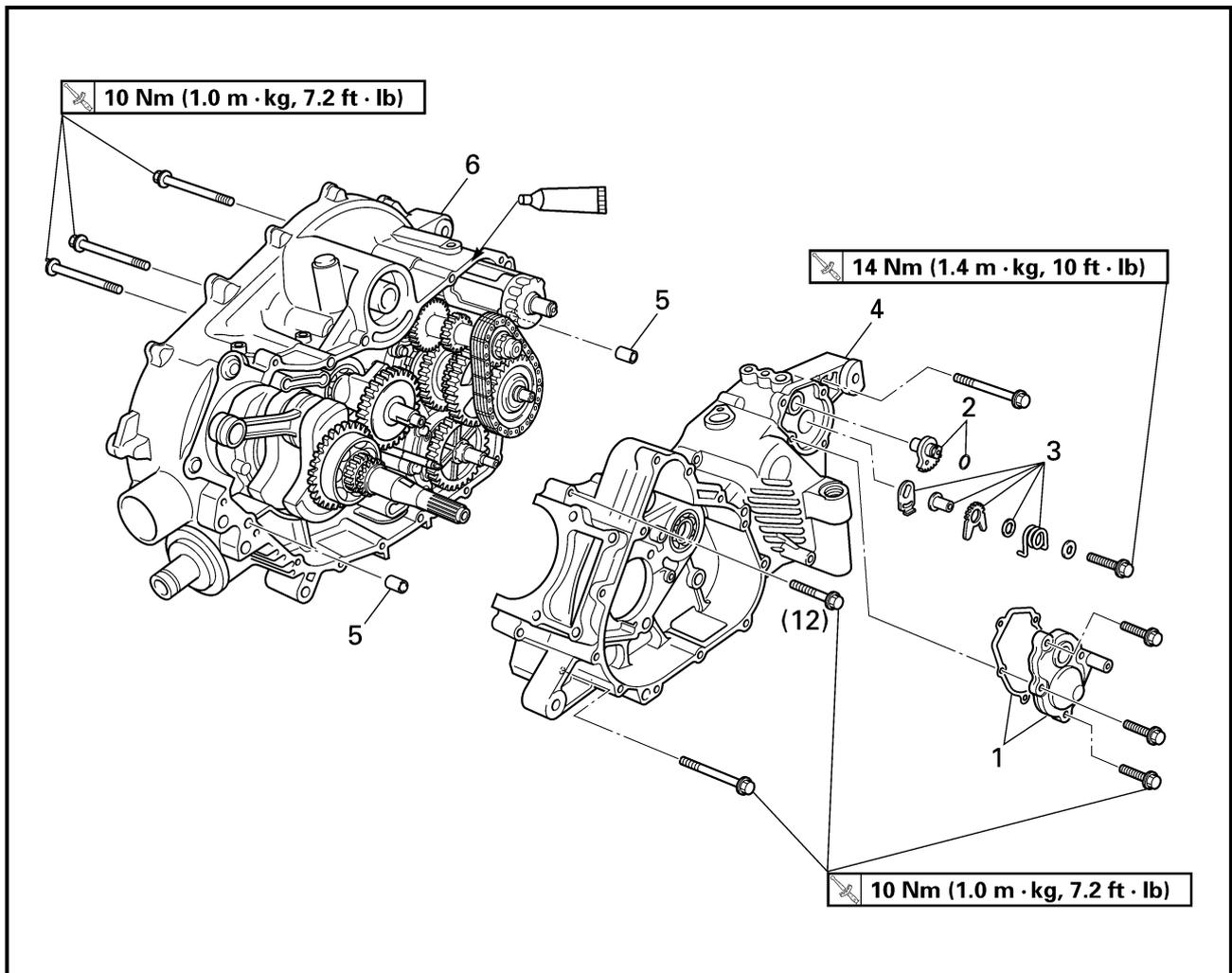
Order	Job name/Part name	Q'ty	Remarks
	<b>Starter motor, timing chain and oil filter removal</b>		Remove the parts in the order below.
	Engine assembly		Refer to "ENGINE REMOVAL".
	Cylinder head		Refer to "CYLINDER HEAD".
	Cylinder and piston		Refer to "CYLINDER AND PISTON".
	Recoil starter and CDI rotor		Refer to "RECOIL STARTER AND CDI MAGNETO".
	Primary and secondary sheaves		Refer to "PRIMARY AND SECONDARY SHEAVES".
	Clutch carrier assembly		Refer to "CLUTCH".
1	Oil pump drive gear/straight key	1/1	Refer to "OIL PUMP DRIVE GEAR REMOVAL/INSTALLATION".
2	Oil pump driven gear	1	
3	Timing chain guide	1	
4	Timing chain	1	
5	Starter motor/O-ring	1/1	



Order	Job name/Part name	Q'ty	Remarks
6	Oil filter	1	
7	Speed sensor	1	
8	Shift cam stopper	1	
9	Neutral switch	1	
10	Park switch	1	
11	Reverse switch	1	
12	Oil filler cap	1	
13	Bearing cover/gasket	1/1	
14	Oil delivery pipe	1	
15	Drain plug/O-ring	1/1	
16	Compression spring	1	
17	Oil strainer	1	
			For installation, reverse the removal procedure.



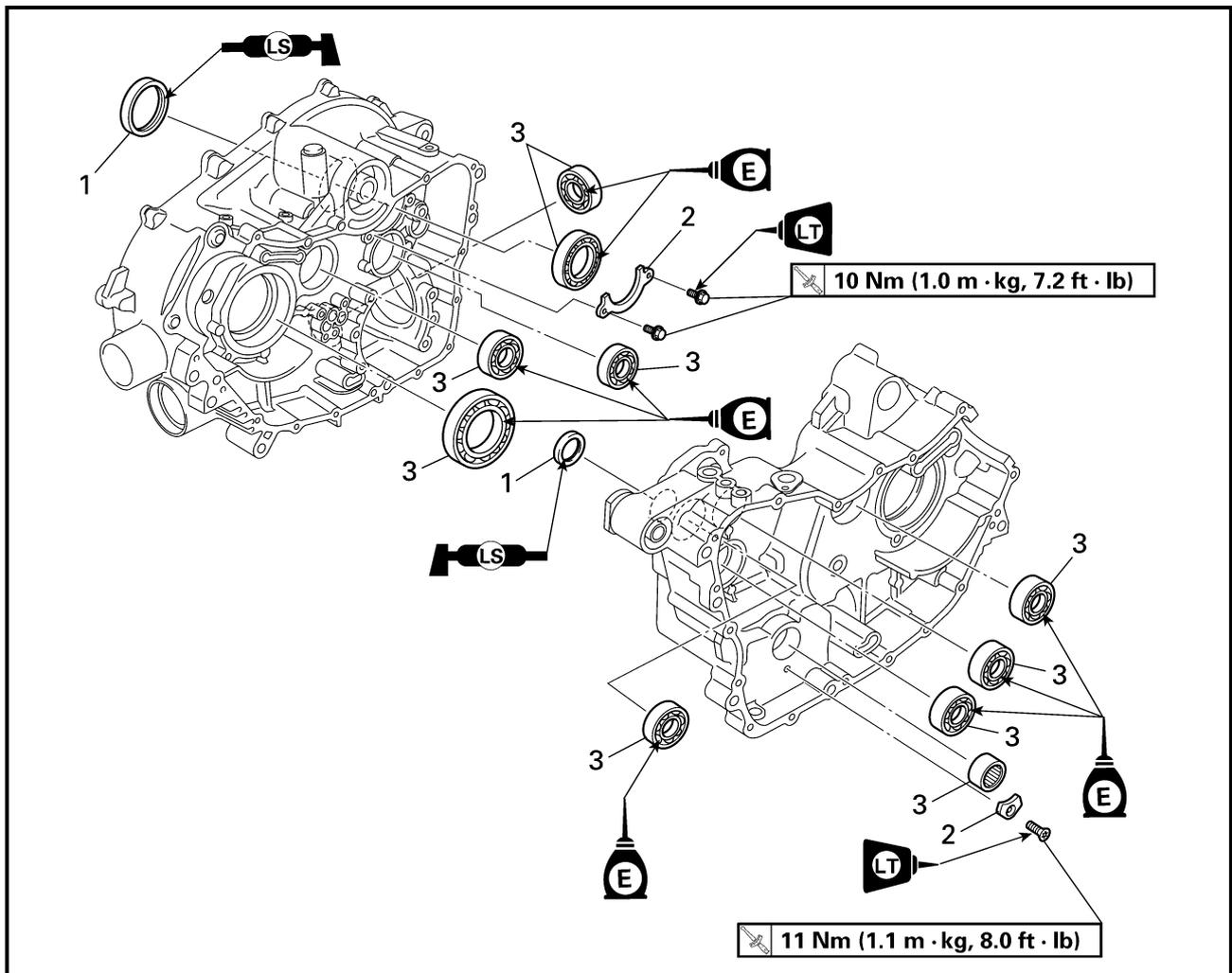
CRANKCASE



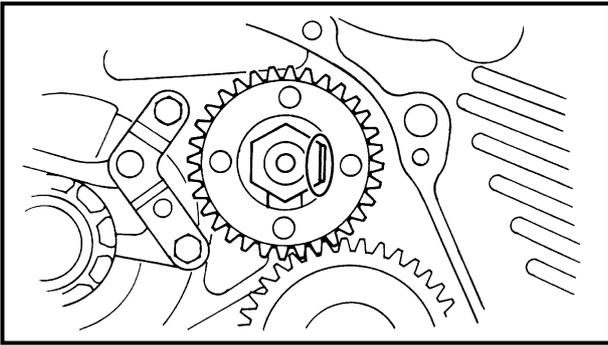
Order	Job name/Part name	Q'ty	Remarks
	<b>Crankcase separation</b>		Remove the parts in the order below.
1	Shift lever cover/gasket	1/1	Refer to "SHIFT LEVER INSTALLATION".
2	Shift lever 1/O-ring	1/1	
3	Shift lever 2 assembly	1	
4	Crankcase (left)	1	Refer to "CRANKCASE SEPARATION/ASSEMBLY".
5	Dowel pin	2	
6	Crankcase (right)	1	For installation, reverse the removal procedure.



CRANKCASE BEARING



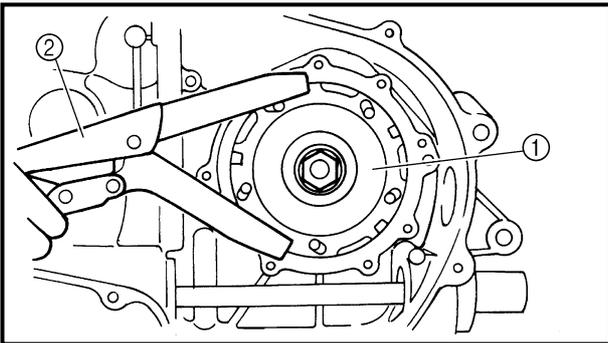
Order	Job name/Part name	Q'ty	Remarks
	<b>Crankcase bearing removal</b>		Remove the parts in the order below.
	Crankshaft and oil pump		Refer to "CRANKSHAFT AND OIL PUMP".
	Transmission		Refer to "TRANSMISSION".
	Middle drive/driven shaft		Refer to "MIDDLE GEAR".
1	Oil seal	2	
2	Bearing retainer	2	
3	Bearing	10	
			For installation, reverse the removal procedure.



**OIL PUMP DRIVE GEAR REMOVAL**

**1. Straighten:**

- Lock washer tab



**2. Remove:**

- Oil pump drive gear nut

\*\*\*\*\*

**Removal steps:**

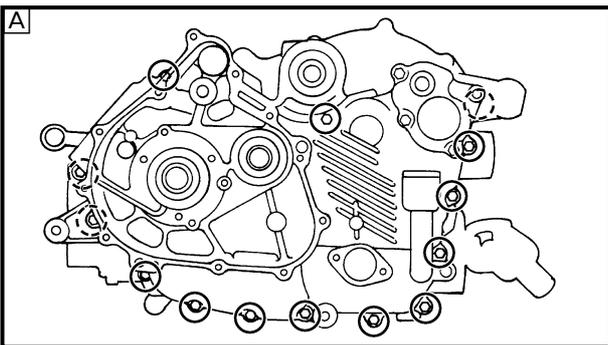
- Temporarily install the clutch carrier assembly ①.
- Hold the clutch carrier assembly with a clutch holding tool ② and loosen the oil pump drive gear nut.



**Clutch holding tool:  
P/N. YM-91042, 90890-04086**

- Remove the clutch carrier assembly.

\*\*\*\*\*



**CRANKCASE SEPARATION**

**1. Separate:**

- Left crankcase
- Right crankcase

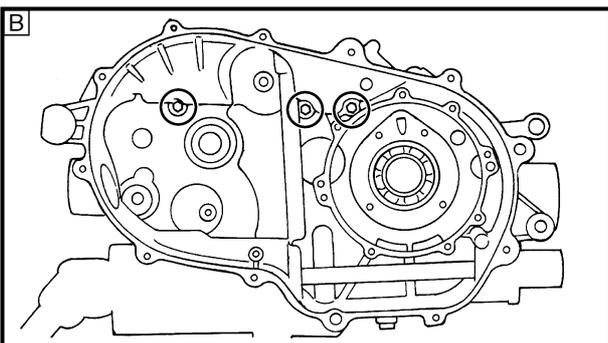
\*\*\*\*\*

**Separation steps:**

- Remove the crankcase bolts.

**NOTE:**

- Loosen each bolt 1/4 of a turn at a time and after all the bolts are loosened, remove them.
- Loosen the bolts in stages, using a criss-cross pattern.



- A** Left crankcase
- B** Right crankcase



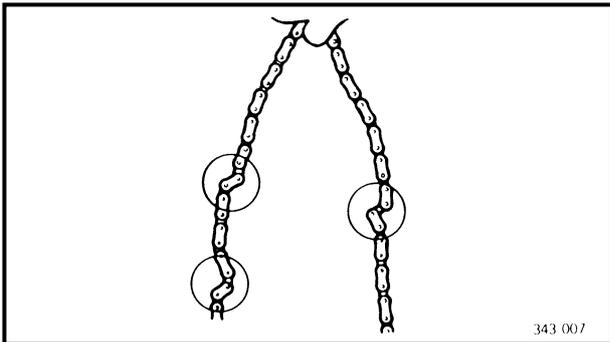
- Remove the left crankcase.

**CAUTION:**

Use a soft hammer to tap on one side of the crankcase. Tap only on reinforced portions of the crankcase. Do not tap on the crankcase mating surfaces. Work slowly and carefully. Make sure that the crankcase halves separate evenly.

- Remove the dowel pins.

\*\*\*\*\*



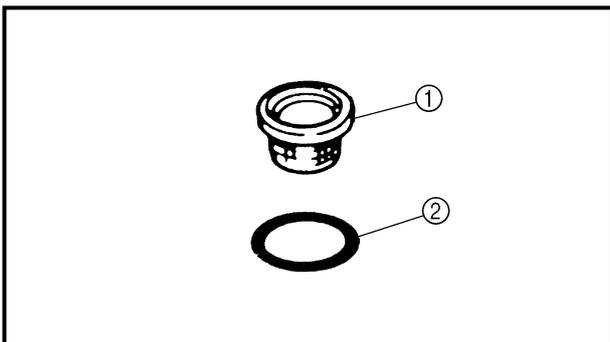
**TIMING CHAIN AND GUIDE INSPECTION**

1. Inspect:

- Timing chain  
Cracks/stiff → Replace the timing chain and camshaft sprocket as a set.

2. Inspect:

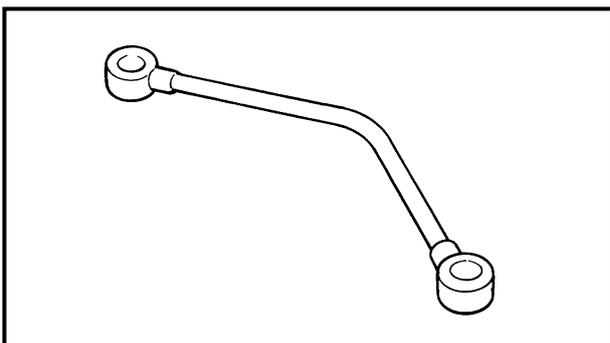
- Intake side timing chain guide  
Wear/damage → Replace.



**OIL STRAINER AND OIL DELIVERY PIPE INSPECTION**

1. Inspect:

- Oil strainer ①
- O-rings ②  
Damage → Replace.



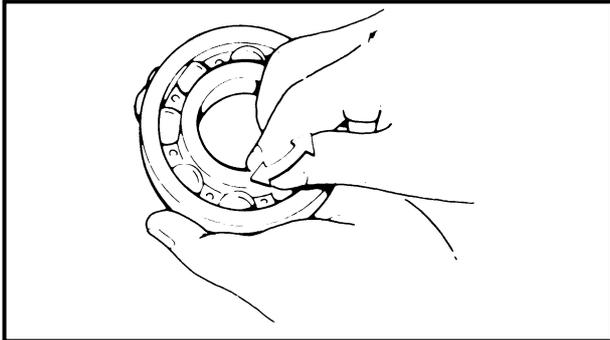
2. Inspect:

- Oil delivery pipe  
Cracks/damage → Replace.  
Clogged → Blow out with compressed air.



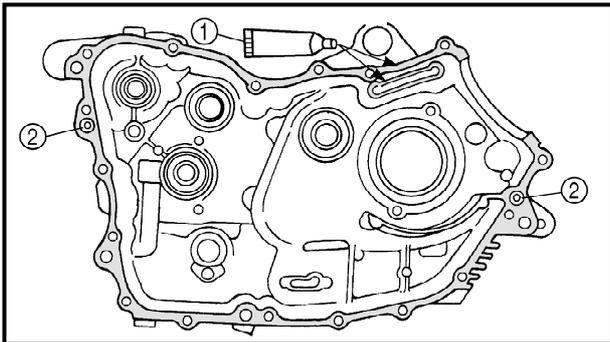
**CRANKCASE INSPECTION**

1. Thoroughly wash the case halves in a mild solvent.
2. Clean all the gasket mating surfaces and crankcase mating surfaces thoroughly.
3. Inspect:
  - Crankcase  
Cracks/damage → Replace.
  - Oil delivery passages  
Clogged → Blow out with compressed air.



**BEARINGS AND OIL SEALS INSPECTION**

1. Inspect:
  - Bearing  
Clean and lubricate, then rotate the inner race with a finger.  
Roughness → Replace.
2. Inspect:
  - Oil seals  
Damage/wear → Replace.



**CRANKCASE ASSEMBLY**

1. Apply:
  - Sealant (Quick Gasket®) ①  
(to the mating surfaces of both case halves)



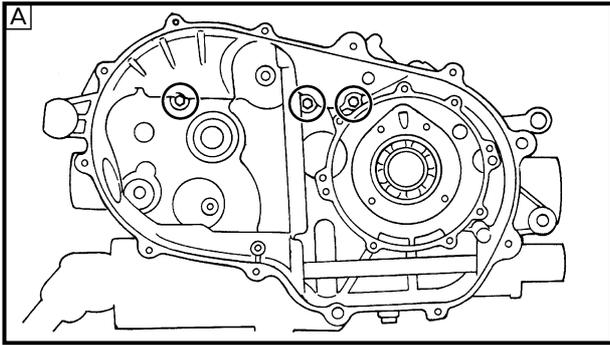
**Sealant (Quick Gasket®):**  
**P/N. ACC-11001-05-01**  
**Yamaha bond No. 1215:**  
**P/N. 90890-85505**

2. Install:
  - Dowel pin ②

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

**CAUTION:**

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



#### 4. Tighten:

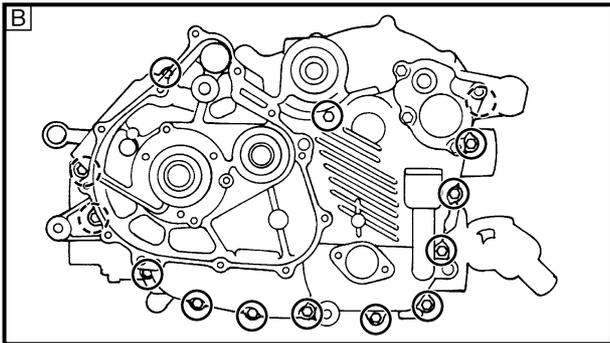
- Crankcase bolts  
(follow the proper tightening sequence)

10 Nm (1.0 m • kg, 7.2 ft • lb)

- ▣ A Right crankcase
- ▣ B Left crankcase

#### NOTE:

Tighten the bolts in stages, using a criss-cross pattern.

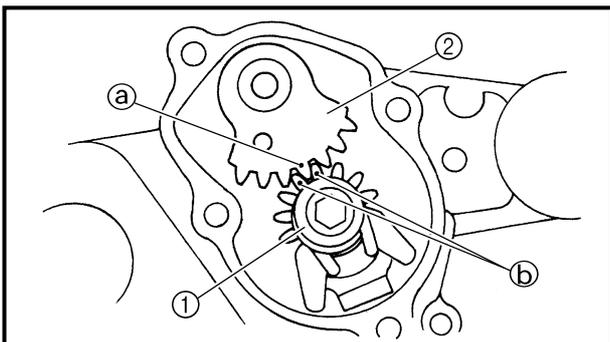


#### 5. Apply:

- 4-stroke engine oil  
(to the crank pin, bearing and oil delivery hole)

#### 6. Check:

- Crankshaft and transmission operation  
Unsmooth operation → Repair.



### SHIFT LEVER INSTALLATION

#### 1. Install:

- Shift lever 2 assembly ①

14 Nm (1.4 m • kg, 10 ft • lb)

- Shift lever 1 ②

#### NOTE:

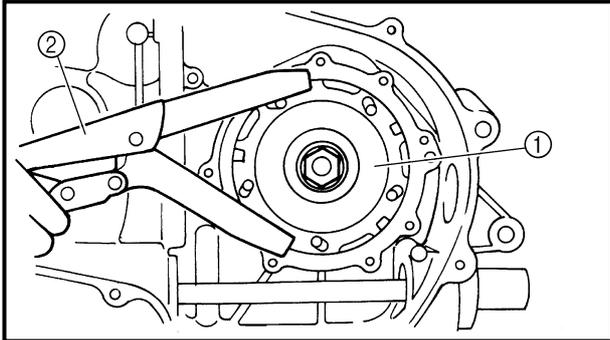
When installing the shift lever 1, align the punch mark ① on the shift lever 1 with the punch marks ② on the shift lever 2.



**OIL PUMP DRIVE GEAR INSTALLATION**

**1.Install:**

- Straight key
- Oil pump drive gear
- Lock washer **New**
- Oil pump drive gear nut



**2.Tighten:**

- Oil pump drive gear nut

 **50 Nm (5.0 m • kg, 36 ft • lb)**

\*\*\*\*\*

**Tightening steps:**

- Temporary install the clutch carrier assembly ①.
- Hold the clutch carrier assembly with a clutch holding tool ② and tighten the oil pump drive gear nut.



**Clutch holding tool:**  
**P/N. YM-91042, 90890-04086**

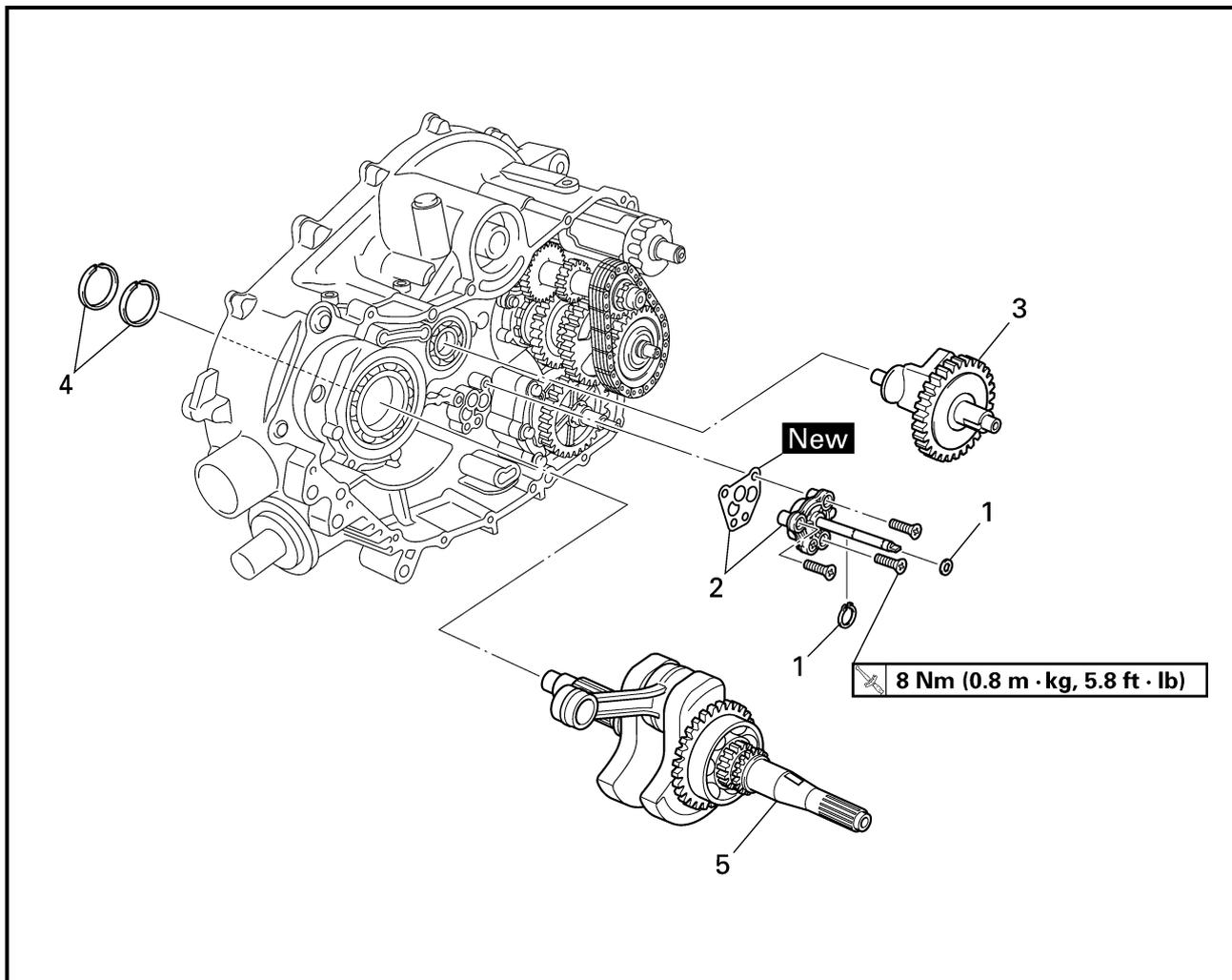
- Remove the clutch carrier assembly.

\*\*\*\*\*

**3.Bend the lock washer tab.**

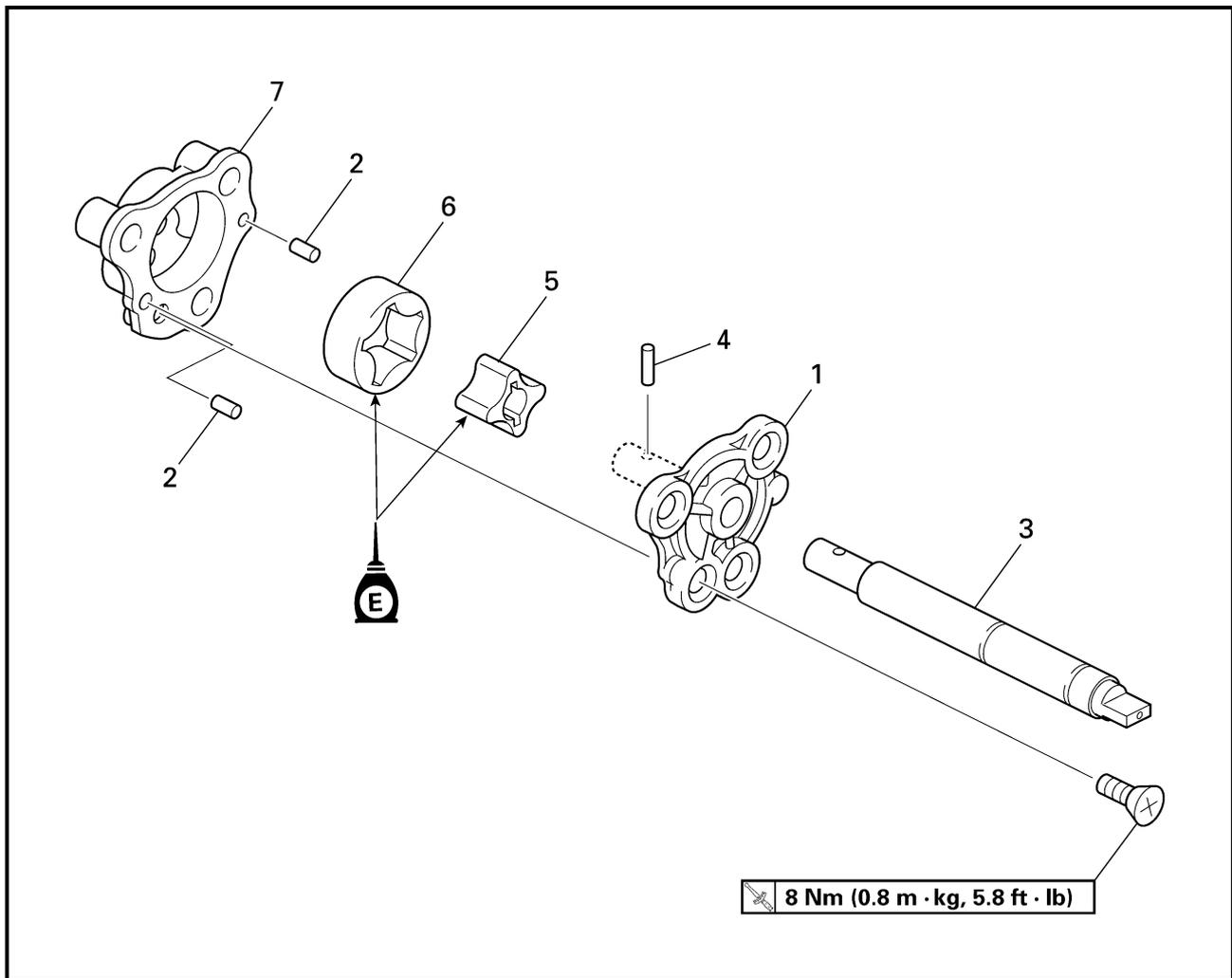


CRANKSHAFT AND OIL PUMP

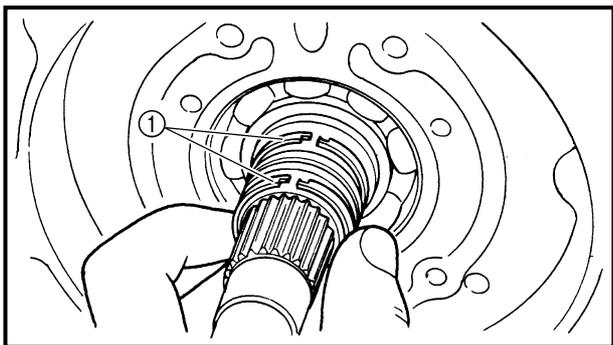


Order	Job name/Part name	Q'ty	Remarks
	<b>Crankshaft and oil pump removal</b>		Remove the parts in the order below. Refer to "CRANKCASE".
1	Crankcase separation		
1	Washer/circlip	1/1	
2	Oil pump assembly/gasket	1/1	
3	Balancer	1	Refer to "CRANKSHAFT REMOVAL/ CRANKSHAFT AND BALANCER INSTALLATION".
4	Crankshaft seal	2	
5	Crankshaft	1	
			For installation, reverse the removal procedure.

OIL PUMP



Order	Job name/Part name	Q'ty	Remarks
	<b>Oil pump disassembly</b>		Disassemble the parts in the order below.
1	Rotor cover	1	
2	Pin	2	
3	Shaft	1	
4	Pin	1	
5	Inner rotor	1	
6	Outer rotor	1	
7	Oil pump housing	1	
			For assembly, reverse the disassembly procedure.

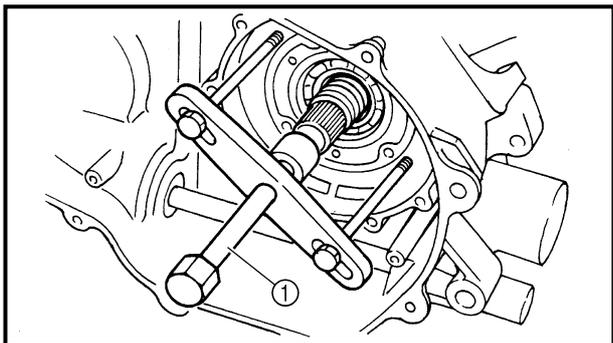


### CRANKSHAFT REMOVAL

- 1.Remove:
- Crankshaft seal ①

#### NOTE:

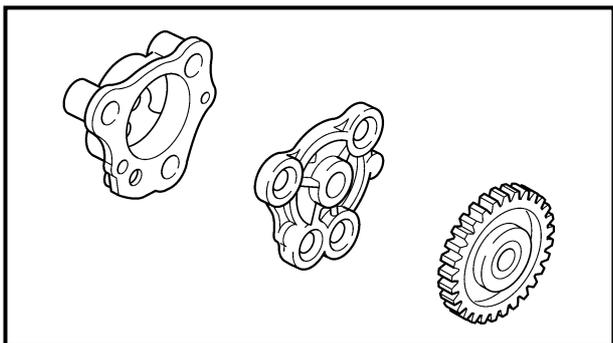
Mark a note of the position of each crankshaft seal so that they can be installed in the correct place and in the correct direction.



- 2.Remove:
- Crankshaft
- Use a crankcase separating tool ①.

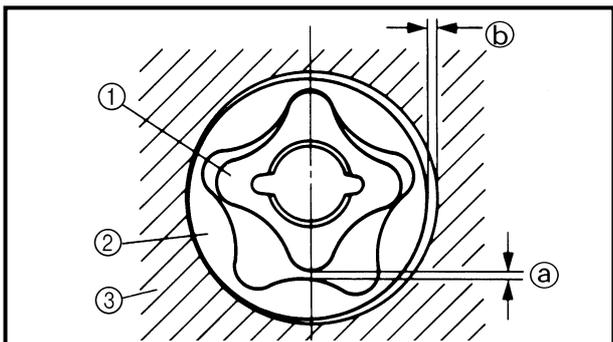


**Crankcase separating tool:**  
P/N. YU-01135-A, 90890-01135



### OIL PUMP INSPECTION

- 1.Inspect:
- Oil pump driven gear
  - Rotor housings
  - Rotor cover
- Cracks/wear/damage → Replace.



- 2.Measure:
- Tip clearance ①  
(between the inner rotor ① and the outer rotor ②)
  - Side clearance ②  
(between the outer rotor ② and the pump housing ③)
- Out of specification → Replace the oil pump.

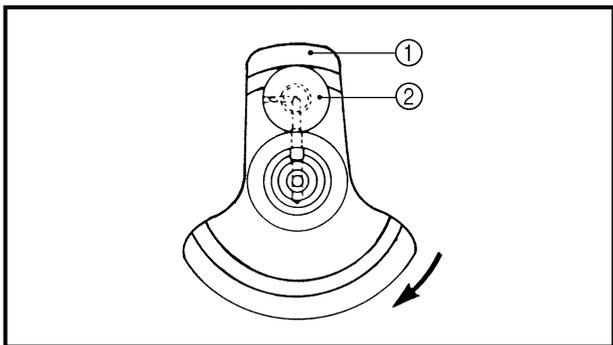
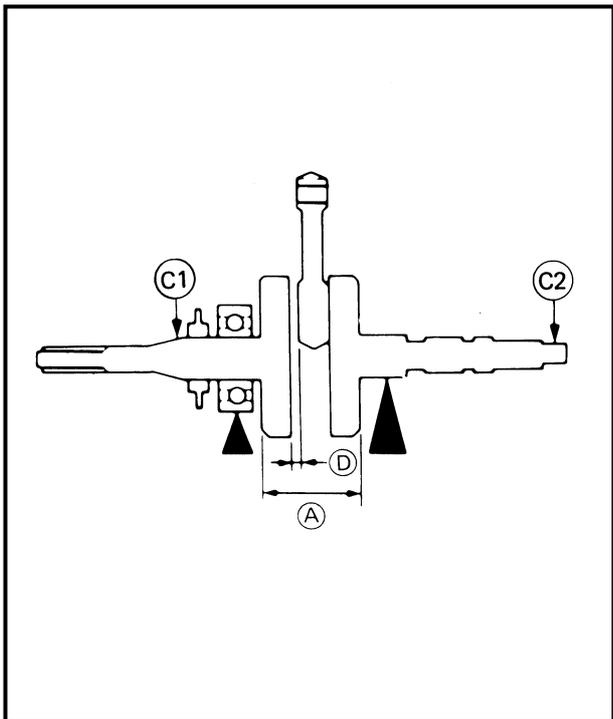


**Tip clearance ①:**  
0.15 mm (0.006 in)  
<Limit>: 0.2 mm (0.008 in)  
**Side clearance ②:**  
0.04 ~ 0.09 mm (0.002 ~ 0.004 in)



3.Check:

- Oil pump operation  
Unsmooth → Repeat steps #1 and #2 or replace the defective parts.



**CRANKSHAFT INSPECTION**

1.Measure:

- Crank width (A)  
Out of specification → Replace the crankshaft.



**Crank width:**  
62.95 ~ 63.00 mm  
(2.478 ~ 2.480 in)

- Side clearance (D)  
Out of specification → Replace the crankshaft.



**Big end side clearance:**  
0.25 ~ 0.75 mm (0.010 ~ 0.030 in)  
<Limit>: 1.0 mm (0.040 in)

- Runout (C)  
Out of specification → Replace the crankshaft.



**Runout limit:**  
C1: 0.03 mm (0.0012 in)  
C2: 0.03 mm (0.0012 in)

\*\*\*\*\*

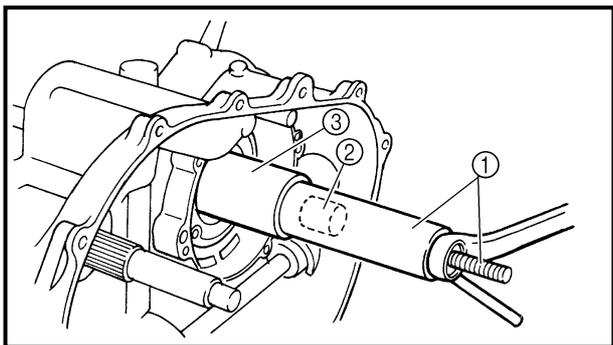
**Crankshaft reassembling point:**

The crankshaft ① and the crank pin ② oil passages must be properly interconnected with a tolerance of less than 1 mm (0.04 in).

\*\*\*\*\*

**CAUTION:**

The buffer boss and woodruff key should be replaced when removed from the crankshaft.



## CRANKSHAFT AND BALANCER INSTALLATION

1.Install:

- Crankshaft



**Crankshaft installer set ①:**

**P/N. YU-90050**

**Buffer boss installer set ②:**

**P/N. 90890-04088**

**Adapter #11 ③:**

**P/N. YM-33279**

**Crank pot spacer ④:**

**P/N. YM-90070-A, 90890-04060**

### NOTE:

Hold the connecting rod at the Top Dead Center (T.D.C.) with one hand while turning the nut of the installing tool with the other. Operate the installing tool until the crankshaft bottoms against the bearing.

### CAUTION:

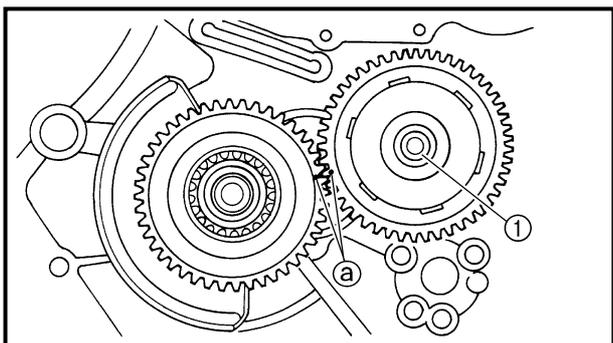
Apply engine oil to each bearing to protect the crankshaft against scratches and to make installation easier.

2.Install:

- Crankshaft seal

### NOTE:

Install the crankshaft seals in the correct place and in the correct direction.



3.Install:

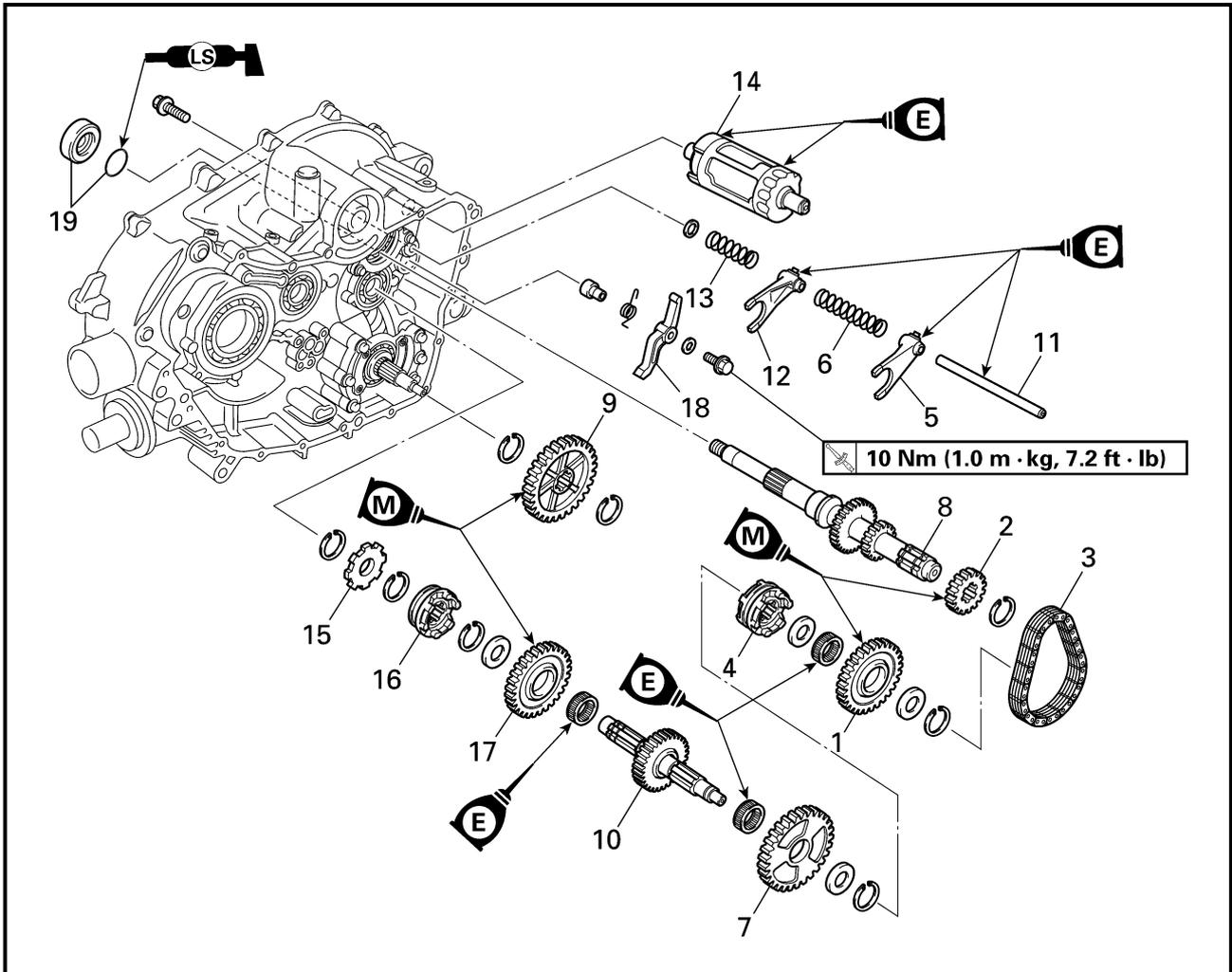
- Balancer ①

### NOTE:

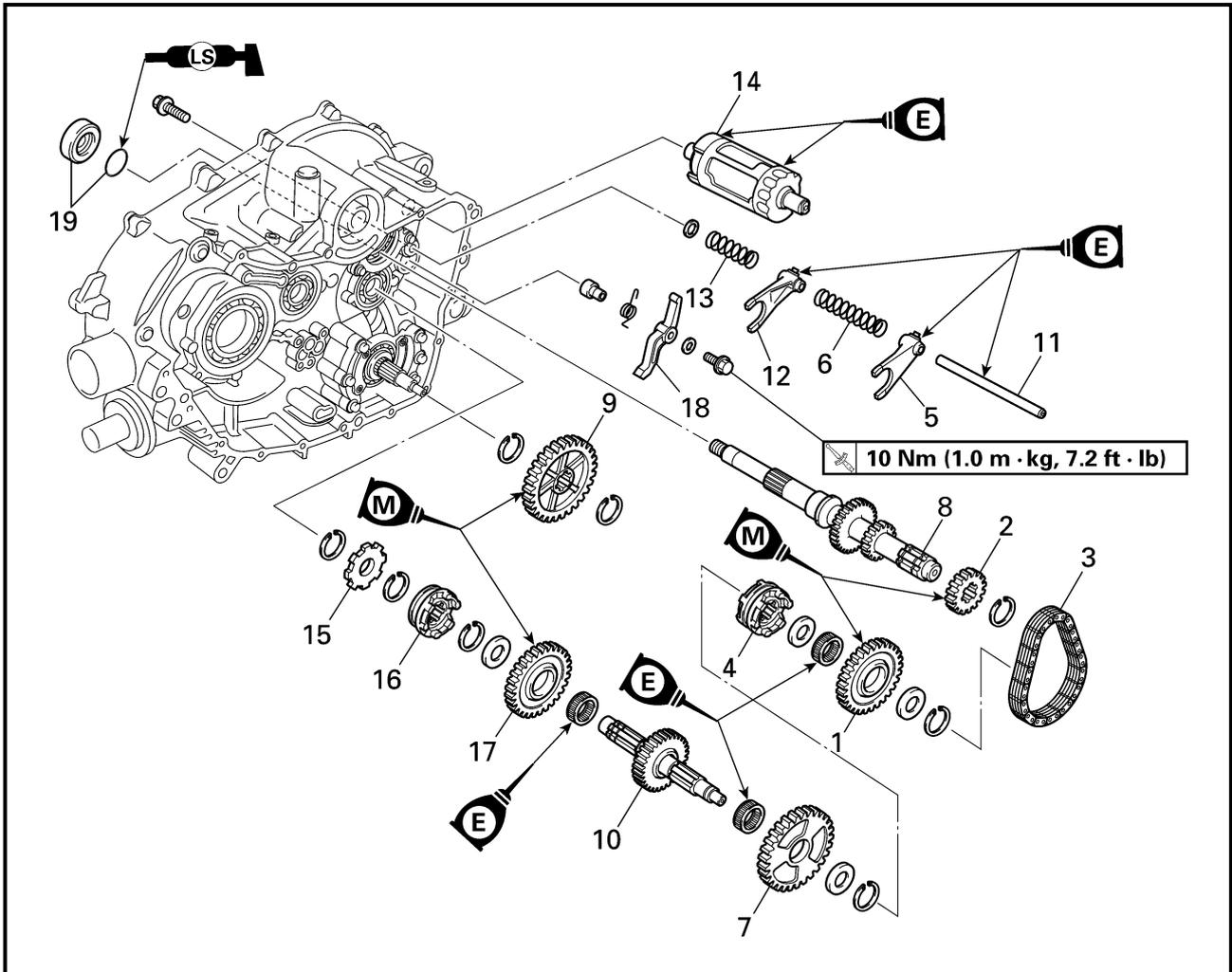
Align the punch marks ② on the drive and driven gear.



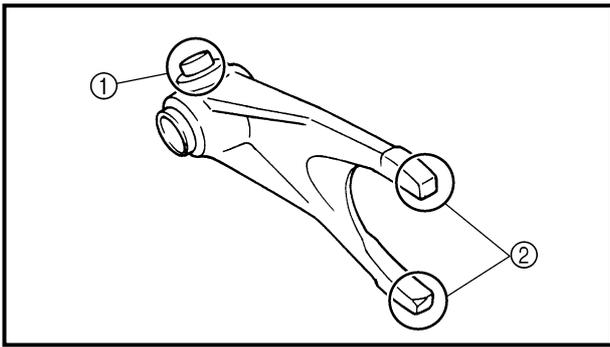
TRANSMISSION



Order	Job name/Part name	Q'ty	Remarks
	<b>Transmission removal</b>		Remove the parts in the order below. Refer to "CRANKCASE".
	Crankcase separation		
1	Driven sprocket	1	
2	Drive sprocket	1	
3	Chain	1	
4	Clutch dog 2	1	
5	Shift fork "L"	1	
6	Spring	1	
7	Low wheel gear	1	
8	Secondary shaft	1	
9	Middle driven gear	1	
10	Drive axle assembly	1	
11	Guide bar	1	



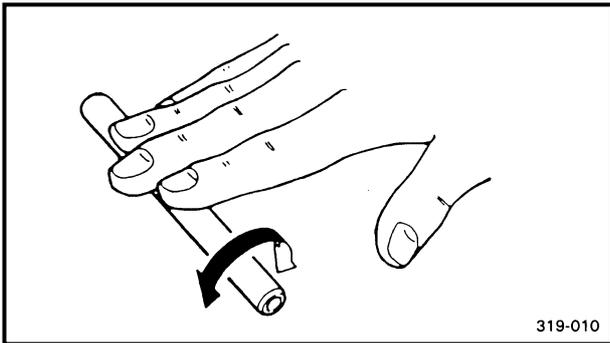
Order	Job name/Part name	Q'ty	Remarks
12	Shift fork "R"	1	For installation, reverse the removal procedure.
13	Spring	1	
14	Shift cam	1	
15	Stopper wheel	1	
16	Clutch dog 1	1	
17	High wheel gear	1	
18	Stopper lever	1	
19	Spacer/O-ring	1/1	



**SHIFT FORK INSPECTION**

1. Inspect:

- Shift fork cam follower ①
  - Shift fork pawl ②
- Scoring/bends/wear/damage → Replace.

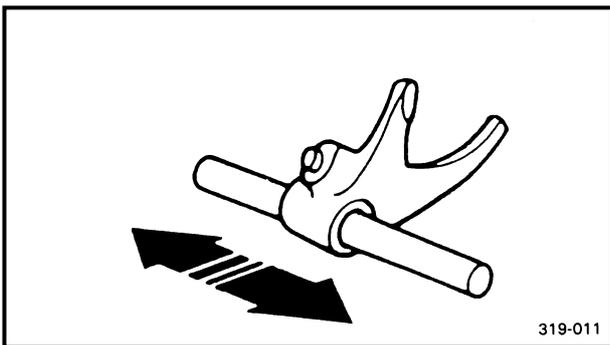


2. Inspect:

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

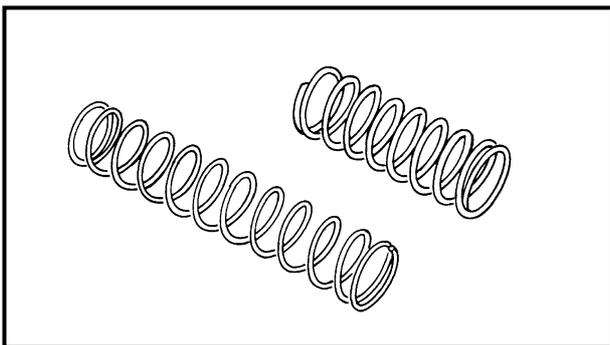
**⚠ WARNING**

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



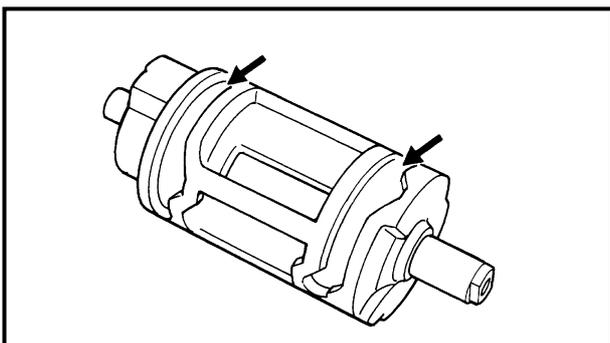
3. Check:

- Shift fork movement (on the guide bar)
- Unsmooth operation → Replace the shift fork and the guide bar.



4. Inspect:

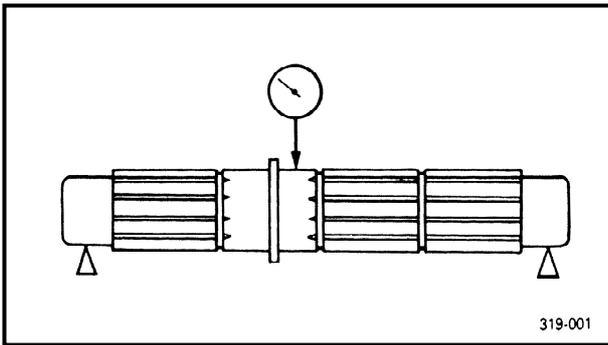
- Spring
- Cracks/damage → Replace.



**SHIFT CAM INSPECTION**

1. Inspect:

- Shift cam grooves
- Scratches/wear/damage → Replace.

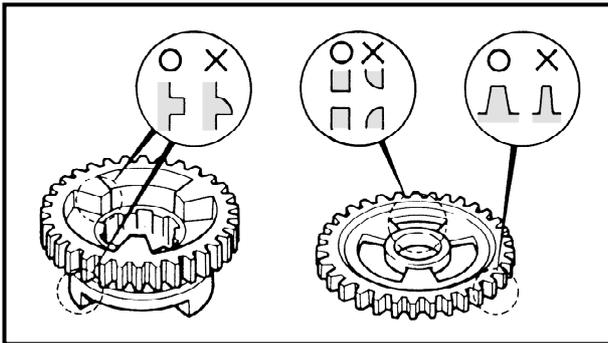


**TRANSMISSION INSPECTION**

1.Measure:

- Axle runout  
Use a centering device and a dial gauge.  
Out of specification → Replace the bent axle.

	<b>Runout limit (drive axle): 0.03 mm (0.001 in)</b>
--	--



2.Inspect:

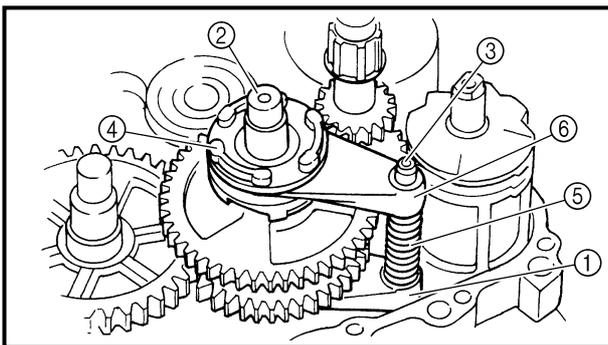
- Gear teeth  
Blue discoloration/pitting/wear → Replace.
- Mated dogs  
Rounded edges/cracks/missing portions → Replace.

3.Check:

- Gear movement  
Unsmooth → Repeat steps #1 and #2 or replace the defective parts.

4.Inspect:

- Circlip  
Bends/looseness/damage → Replace.



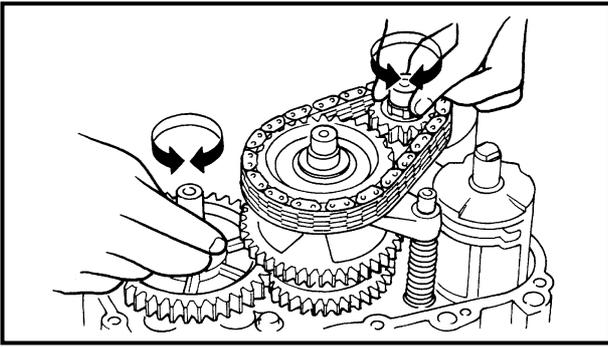
**TRANSMISSION INSTALLATION**

1.Install:

- Shift cam
- Washer
- Spring (short)
- Shift fork "R" ①
- Drive axle assembly ②
- Guide bar ③
- Clutch dog ④
- Spring (long) ⑤
- Shift fork "L" ⑥

**NOTE:**

Install the shift fork with the "R" mark facing towards the right side of the crankcase and the shift fork with the "L" mark facing towards the left side of the crankcase. Be sure that the shift fork guide pin is properly seated in the shift drum groove.

**2.Check:**

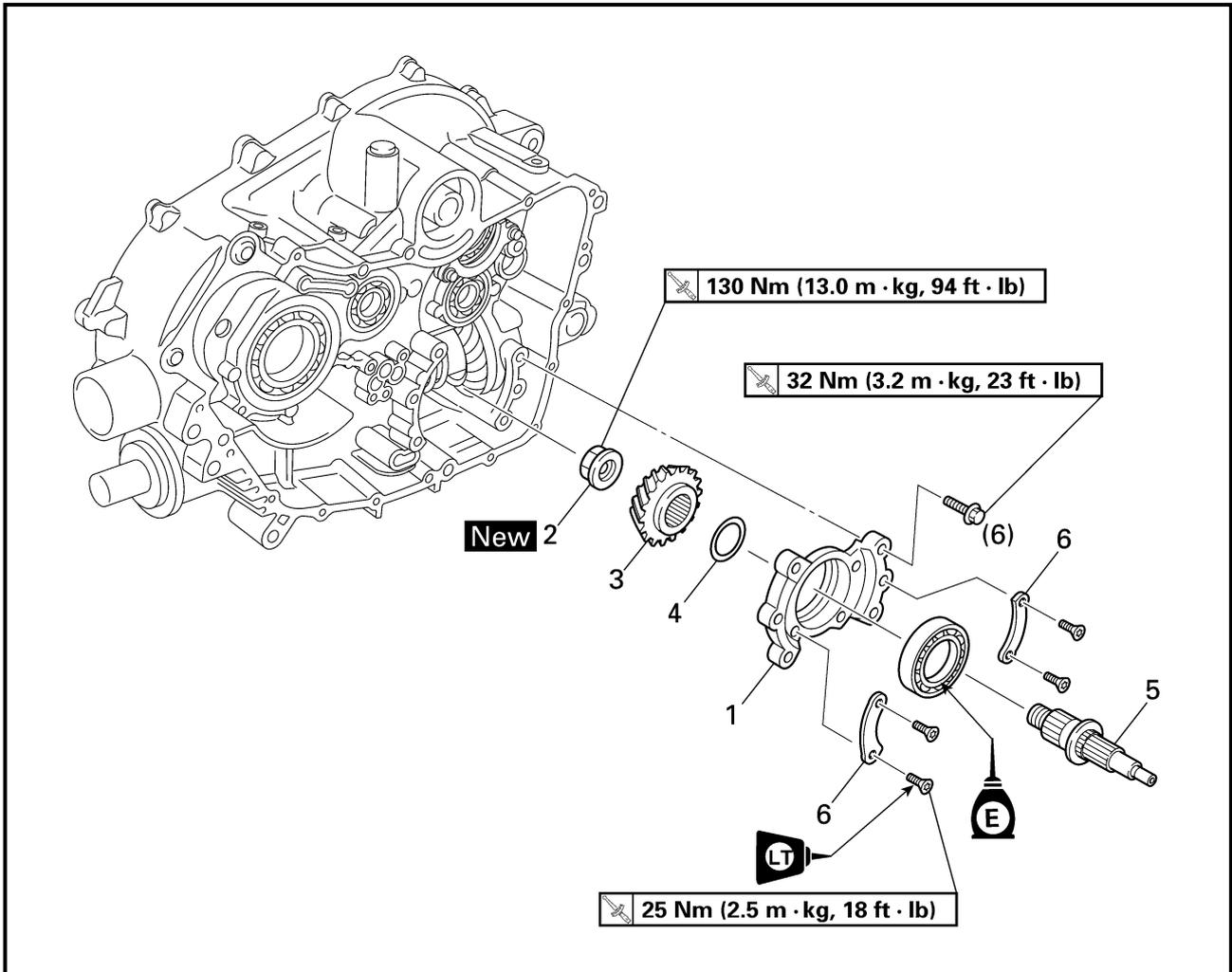
- Shift operation  
Unsmooth operation → Repair.

**NOTE:**

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



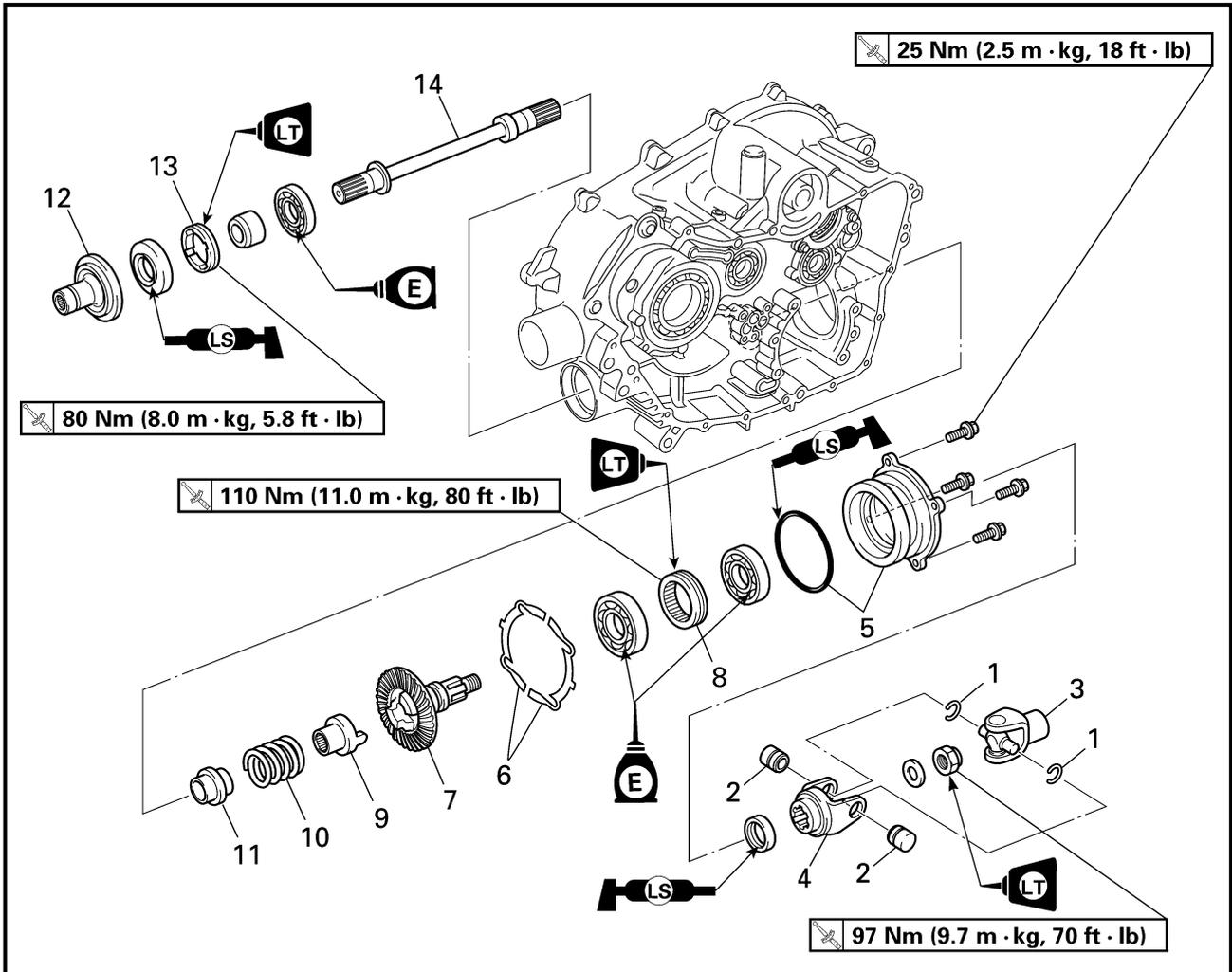
**MIDDLE GEAR**  
**MIDDLE DRIVE SHAFT**



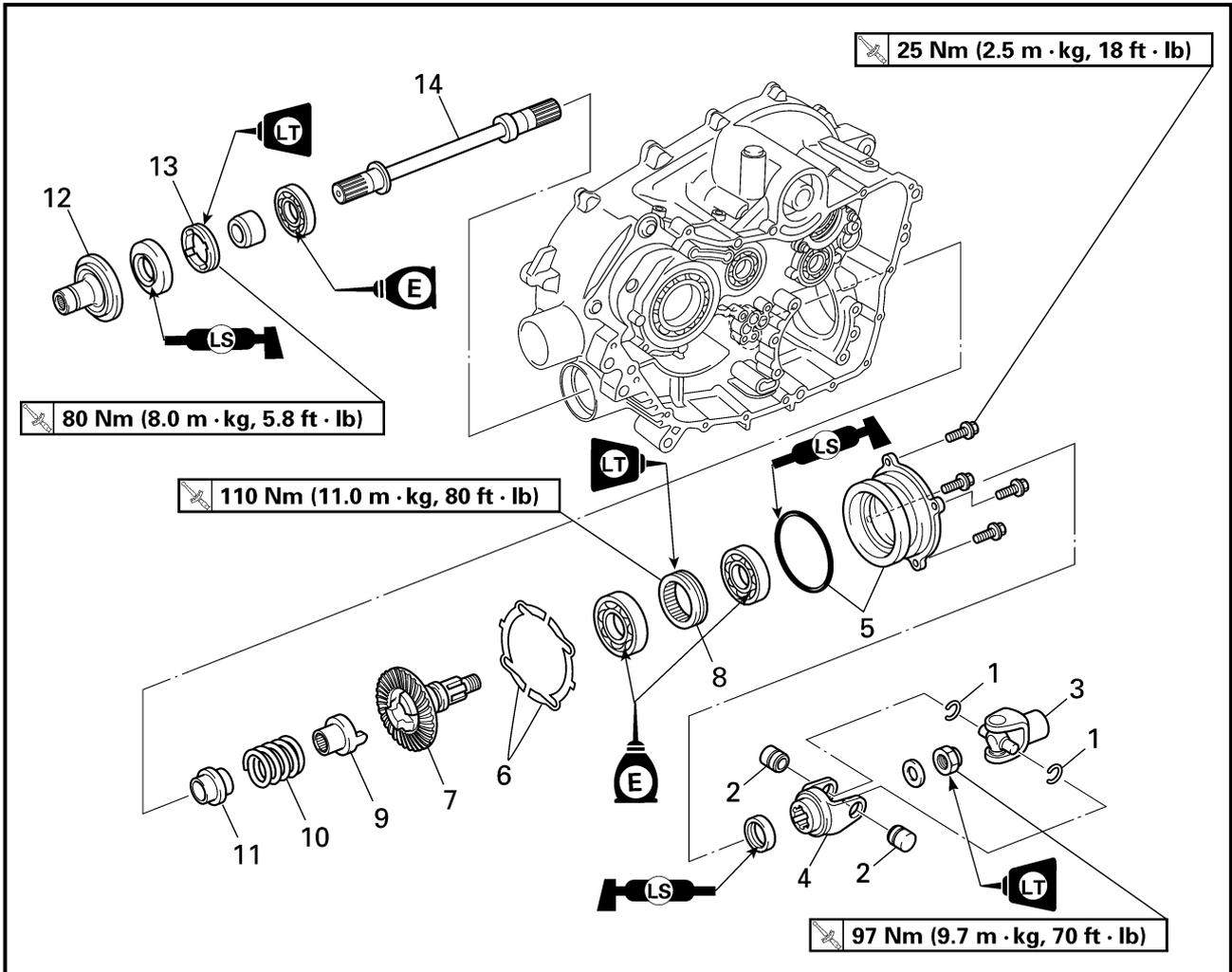
Order	Job name/Part name	Q'ty	Remarks
	<b>Middle drive shaft removal</b>		Remove the parts in the order below.
	Crankcase separation		Refer to "CRANKCASE".
	Transmission		Refer to "TRANSMISSION".
1	Bearing housing assembly	1	Refer to "MIDDLE DRIVE SHAFT REMOVAL/INSTALLATION".
2	Nut	1	
3	Middle drive pinion gear	1	
4	Shim		
5	Middle drive shaft	1	Refer to "MIDDLE DRIVE AND DRIVEN GEAR SHIM SELECTION".
6	Bearing retainer	2	For installation, reverse the removal procedure.



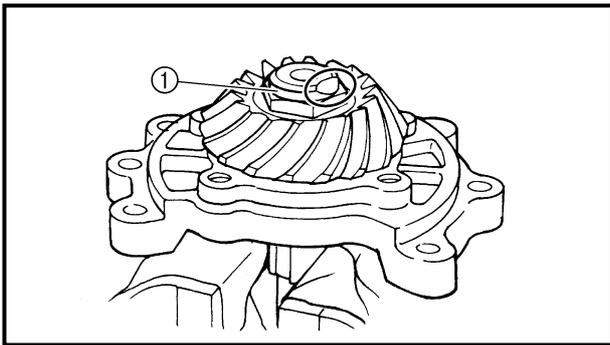
MIDDLE DRIVEN SHAFT



Order	Job name/Part name	Q'ty	Remarks
	<b>Middle driven shaft assembly</b>		
	Crankcase separation		Remove the parts in the order below. Refer to "CRANKCASE".
1	Circlip	2	Refer to "MIDDLE DRIVEN SHAFT REMOVAL/INSTALLATION".
2	Bearing	2	
3	Universal joint	1	
4	Universal joint yoke	1	
5	Bearing housing/O-ring	1/1	
6	Shim		Refer to "MIDDLE DRIVE AND DRIVEN GEAR SHIM SELECTION".
7	Middle drive pinion gear	1	Refer to "MIDDLE DRIVEN SHAFT REMOVAL/INSTALLATION".
8	Bearing retainer	1	
9	Damper cam	1	
10	Spring	1	
11	Gear coupling	1	



Order	Job name/Part name	Q'ty	Remarks
12	Front drive shaft coupling	1	
13	Bearing retainer	1	
14	Middle driven shaft	1	
			For installation, reverse the removal procedure.



**MIDDLE DRIVE SHAFT REMOVAL**

1. Straighten:

- Punched portion of the nut (middle drive pinion gear)

2. Loosen:

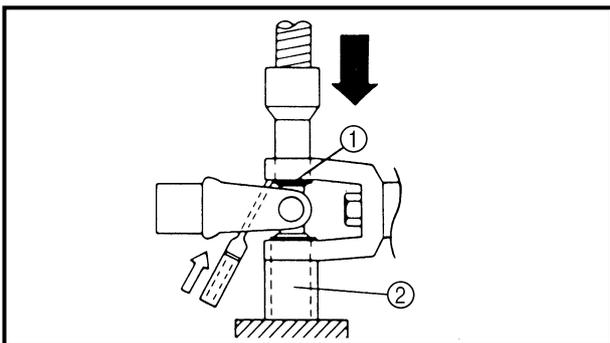
- Nut (middle drive pinion gear) ①

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

Secure the middle drive shaft in the vise with a clean rag.

3. Remove:

- Nut (middle drive pinion gear)
- Middle drive pinion gear
- Shim(s)



**MIDDLE DRIVEN SHAFT REMOVAL**

1. Remove:

- Universal joint

\*\*\*\*\*

**Universal joint removal steps:**

- Remove the circlips ①.
- Place the U-joint in a press.
- With a suitable diameter pipe ② beneath the yoke ③, press the bearing ④ into the pipe as shown.

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

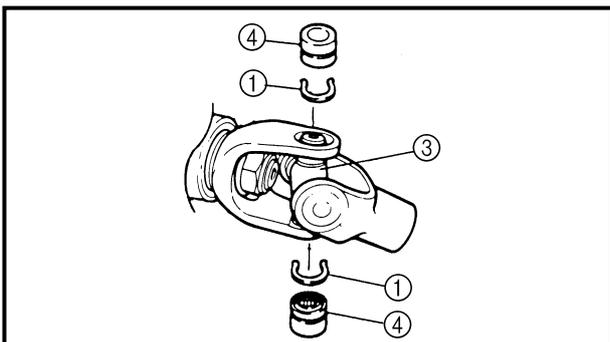
It may be necessary to lightly tap the yoke with a punch.

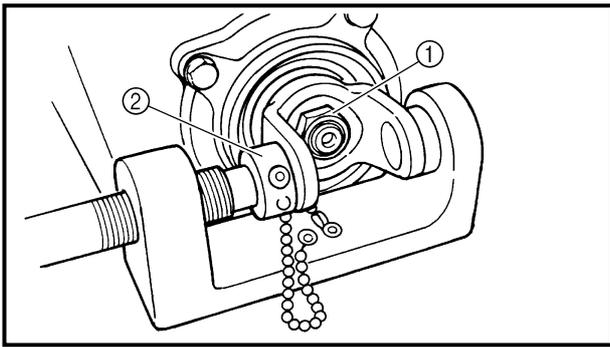
- Repeat the steps for the opposite bearing.
- Remove the yoke.

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

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

\*\*\*\*\*





2.Remove:

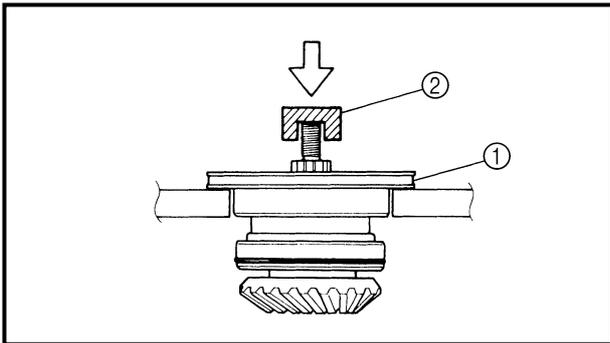
- Nut ①
- Washer
- Universal joint yoke

**NOTE:**

Use the universal joint holder ② to hold the universal joint yoke.



**Universal joint holder:**  
P/N. YM-04062, 90890-04062



3.Remove:

- Bearing housing assembly ①

\*\*\*\*\*

**Bearing housing removal steps:**

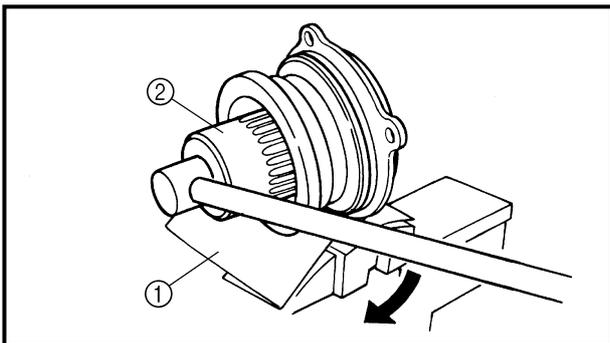
- Clean the outside of the middle driven shaft.
- Place the middle driven shaft onto a hydraulic press.

**CAUTION:**

- Never directly press the shaft end with a hydraulic press, this will result in damage to the shaft thread.
- Install the suitable socket ② on the shaft end to protect the thread from damage.

- Press the shaft end and remove the bearing housing.

\*\*\*\*\*



4.Remove:

- Bearing retainer
- Bearing

\*\*\*\*\*

**Removal steps:**

- Attach the folded rag ①.
- Secure the bearing housing edge in the vise.
- Attach the bearing retainer wrench ②.



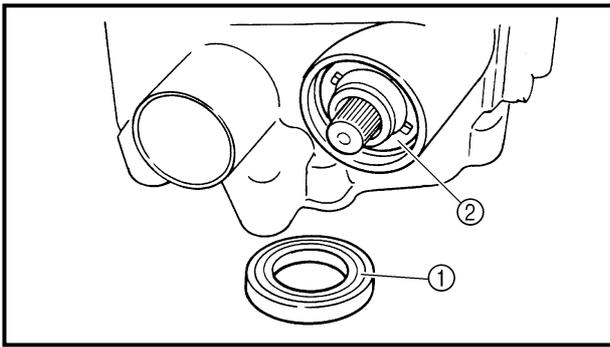
**Bearing retainer wrench:**  
P/N. YM-04128, 90890-04128

**CAUTION:**

The middle driven shaft bearing retainer has left-handed threads. To loosen the retainer turn it clockwise.

- Remove the bearing retainer and bearing.

\*\*\*\*\*



5.Remove:

- Front drive shaft coupling
- Bearing retainer ①
- Bearing ②

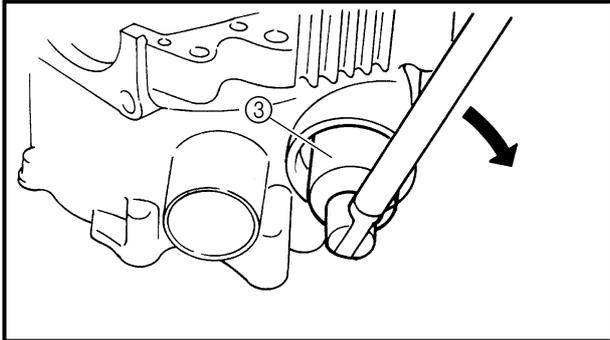
**NOTE:** \_\_\_\_\_

Attach the ring nut wrench ③.



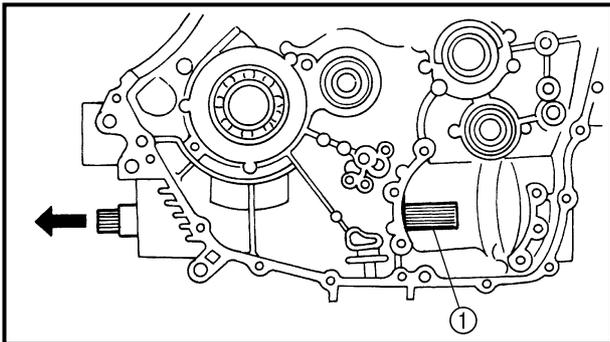
**Ring nut wrench:**

P/N. YM-38404, 90890-01430



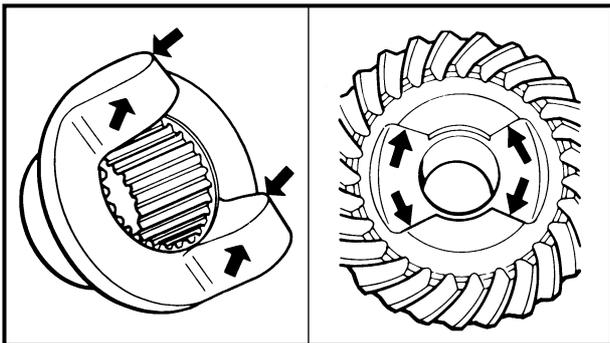
**CAUTION:** \_\_\_\_\_

The middle driven shaft bearing retainer has left-handed threads. To loosen the retainer turn it clockwise.



6.Remove:

- Middle drive shaft ①  
(with bearing)



### INSPECTION

1.Inspect:

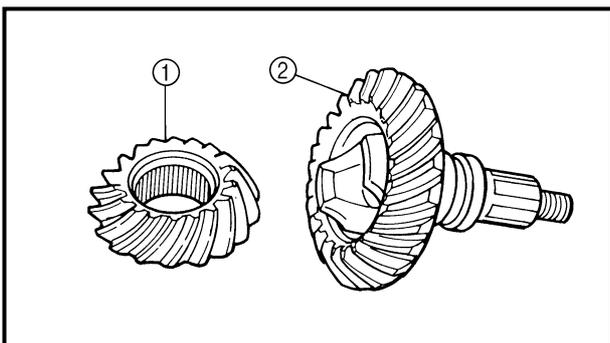
- Damper cam surfaces  
Wear/scratches → Replace damper and driven pinion gear as a set.

2.Inspect:

- Damper spring  
Damage/cracks → Replace.

3.Inspect:

- Gear teeth (drive pinion gear) ①
- Gear teeth (driven pinion gear) ②  
Pitting/galling/wear → Replace.



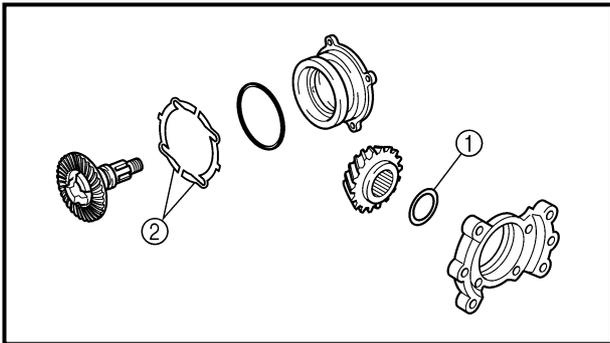


4. Inspect:

- O-ring  
Damage → Replace.
- Bearings  
Pitting/damage → Replace.

5. Check:

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



**MIDDLE DRIVE AND DRIVEN GEAR SHIM SELECTION**

When the drive and driven gear, bearing housing assembly and/or crankcase replaced, be sure to adjust the gear shim ①.

1. Select:

- Middle drive gear shim ①
- Middle driven gear shim ②

\*\*\*\*\*

**Middle drive and driven gear shim selection steps:**

- Position middle drive and driven gear by using shims ① and ② with their respective thickness calculated from information marked on crankcase, bearing housing and drive gear end.

① Shim thickness "A"

② Shim thickness "B"

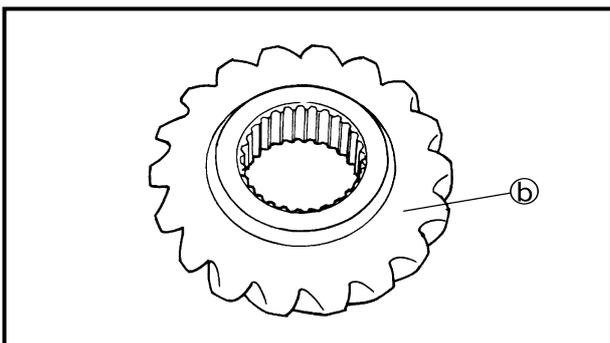
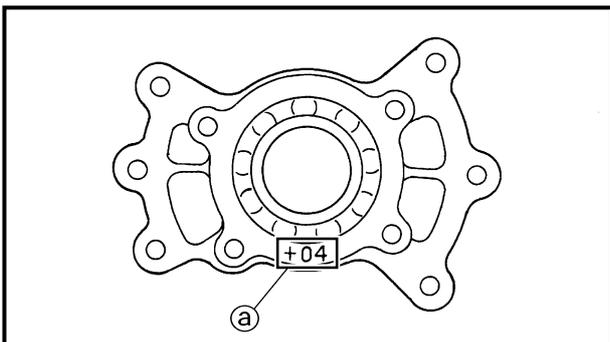
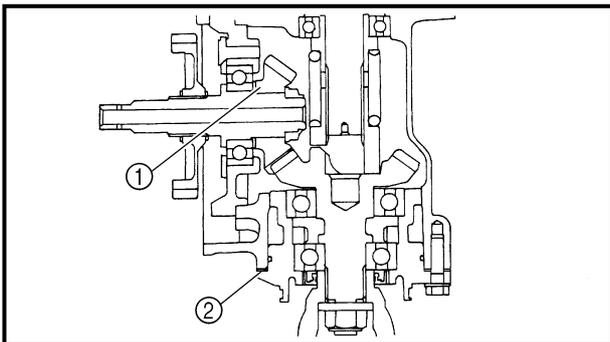
- To find shim thickness "A" use following formula:

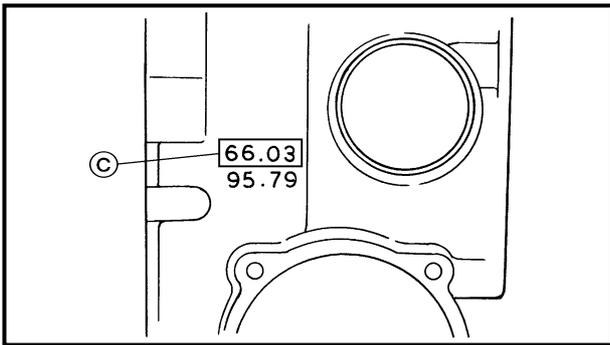
**Middle drive pinion gear shim thickness:**  

$$"A" = C - a - b$$

Where:

- ① = a numeral (usually a decimal number) on the bearing housing is either added to or subtracted from "10.5".
- ② = drive pinion gear to driven pinion gear center distance (considered constant).
- ③ = a numeral (usually a decimal number) on the right crankcase specifies a thickness of "66".





Example:

- 1) If the bearing housing is marked "+04",  
..... Ⓐ is 10.54,
- 2) Ⓑ is 55
- 3) If the crankcase (right) is marked  
"66.03",  
..... Ⓒ is 66.03.
- 4) Therefore, the shim thickness is 0.47 mm.

$$A = 66.03 - 10.54 - 55 = 0.49$$

- 5) Round off hundredths digit and select appropriate shim(s).

In the example above, the calculated shim thickness is 0.49 mm. The chart instructs you, however, to round off 9 to 10.

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

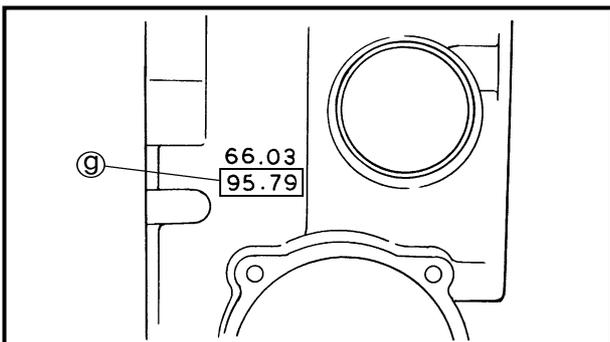
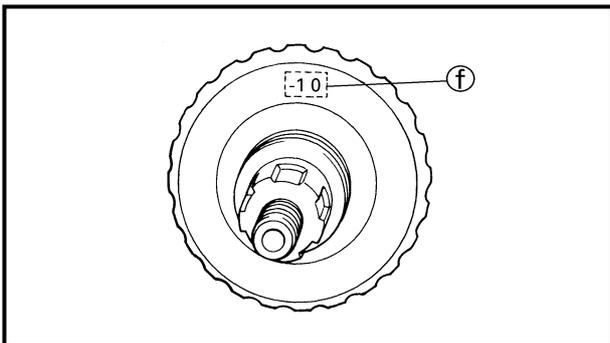
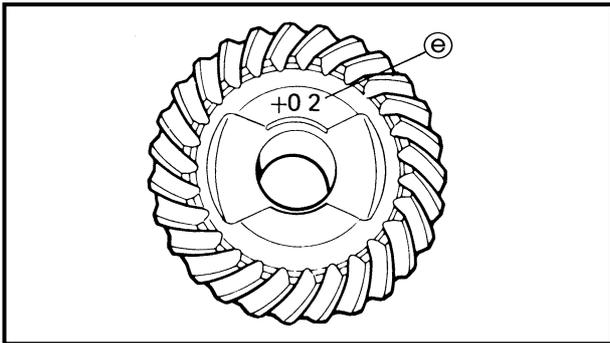
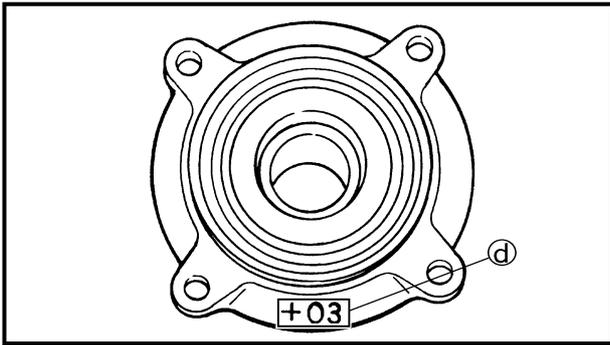
Shims are supplied in the following thickness.

 <b>Middle drive pinion gear shim</b>		
<b>Thickness (mm)</b>	<b>0.10</b>	<b>0.30</b>
	<b>0.15</b>	<b>0.40</b>
	<b>0.20</b>	<b>0.50</b>

- To find shim thickness "B" use the following formula:

**Middle driven pinion gear shim thickness:**

$$"B" = \text{Ⓓ} - \text{Ⓔ} + \text{Ⓕ} - \text{Ⓖ} - 0.05$$



Where:

- ⓓ = a numeral (usually a decimal number) on the bearing housing is either added to or subtracted from "76".
- ⓔ = a numeral (usually a decimal number) on the middle driven pinion gear is either added to or subtracted from "59".
- ⓕ = a numeral (usually a decimal number) on the middle driven pinion gear is either added to or subtracted from "79.5".
- ⓖ = a numeral (usually a decimal number) on the left crankcase specifies a thickness of "95.8".

Example:

- 1) If the bearing housing is marked "+03",  
..... ⓓ is 76.03.
- 2) If the driven pinion gear is marked "+02",  
..... ⓔ is 59.02.
- 3) If the driven pinion gear is marked "-10",  
..... ⓕ is 79.40.
- 4) If the crankcase (left) is marked "95.79",  
..... ⓖ is 95.79.
- 5) Therefore, the shim thickness is 0.63 mm.

$$B = 76.03 - 59.02 + 79.40 - 95.79 - 0.05 = 0.57$$

- 6) Round off hundredths digit and select appropriate shim(s).

In the example above, the calculated shim thickness is 0.57 mm. The chart instructs you, however, to round off 7 to 5.

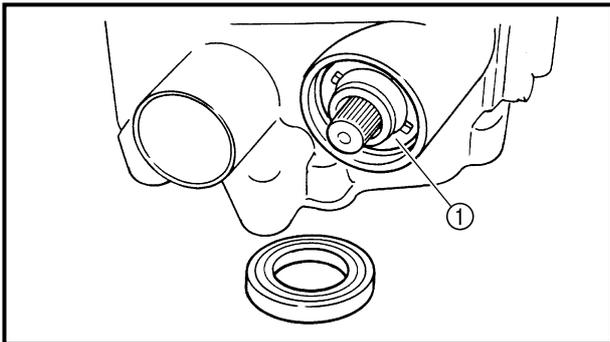
Hundredths	Round value
0, 1, 2	0
3, 4, 5, 6, 7	5
8, 9	10



Shims are supplied in the following thickness.

	<b>Middle drive pinion gear shim</b>	
<b>Thickness (mm)</b>	<b>0.10</b>	<b>0.40</b>
	<b>0.15</b>	<b>0.50</b>
	<b>0.20</b>	<b>0.60</b>
	<b>0.30</b>	

\*\*\*\*\*



**MIDDLE DRIVEN SHAFT INSTALLATION**

1.Install:

- Bearing retainer ① 

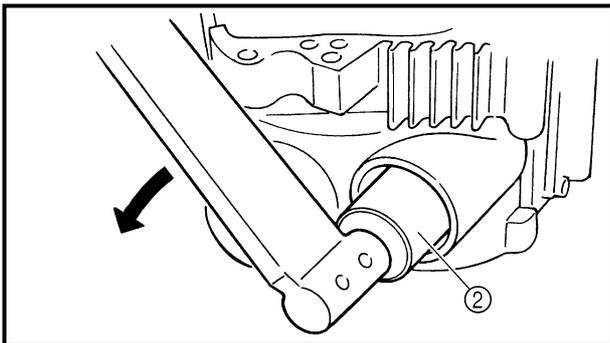
 **80 Nm (8.0 m • kg, 58 ft • lb)**

**NOTE:**

Attach the ring nut wrench ②.

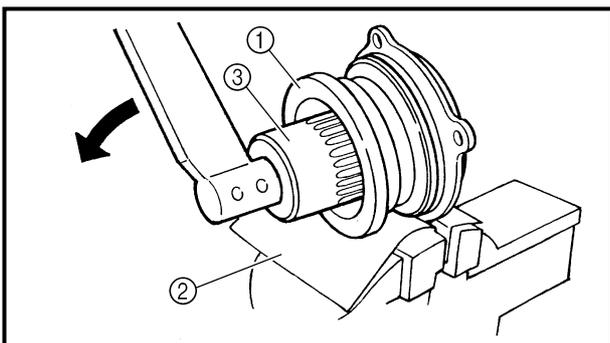


**Ring nut wrench:**  
P/N. YM-38404, 90890-01430



**CAUTION:**

The middle driven shaft bearing retainer has left-handed threads. To tighten the retainer turn it counterclockwise.



2.Install:

- Bearing retainer ① 

\*\*\*\*\*

**Installation steps:**

- Secure the bearing housing edge in the vise with a clean ②.
- Attach the bearing retainer wrench ③.



**Bearing retainer wrench:**  
P/N. YM-04128, 90890-04128



- Tighten the bearing retainer.

**CAUTION:**

The middle driven shaft bearing retainer has left-handed threads. To tighten the retainer turn it counterclockwise.

	<b>Bearing retainer:</b> 110 Nm (11.0 m • kg, 80 ft • lb)
---	--

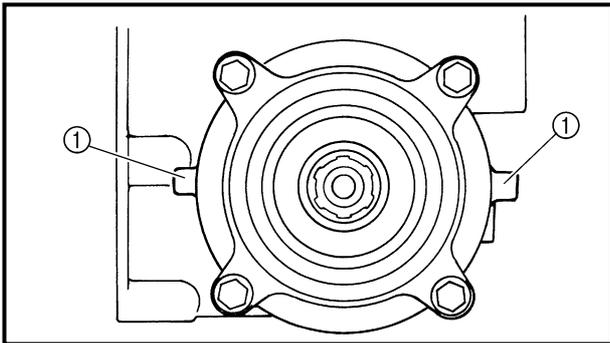
\*\*\*\*\*

3.Install:

- Shims ①
- Bearing housing

**NOTE:**

Install the shims so that the tabs are positioned as shown in the illustration.

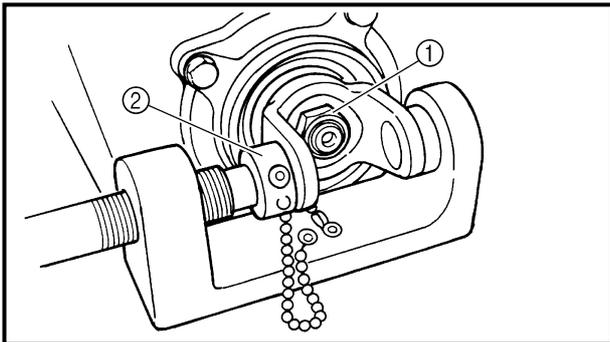


4.Install:

- Universal joint yoke (rear side)
- Washer
- Nut ①  **97 Nm (9.7 m • kg, 70 ft • lb)**

**NOTE:**

Use the universal joint holder ② to hold the yoke.



	<b>Universal joint holder:</b> P/N. YM-04062, 90890-04062
---	--

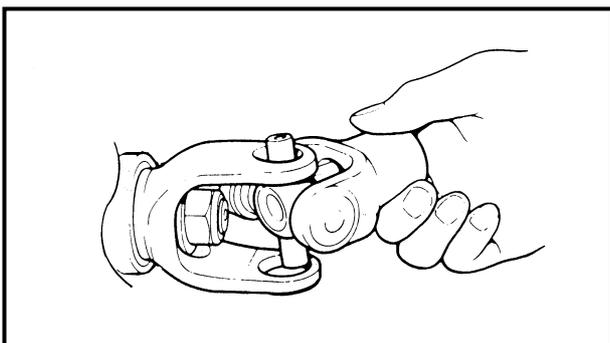
5.Install:

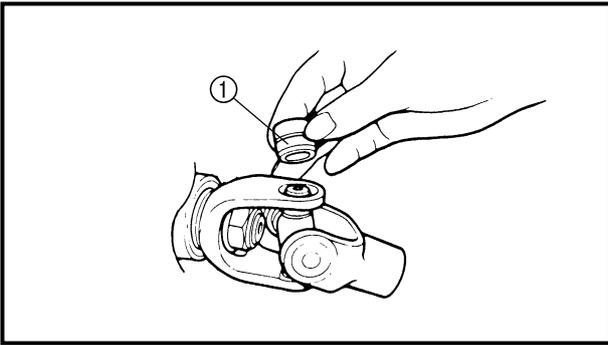
- Universal joint

\*\*\*\*\*

**Universal joint installation steps:**

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

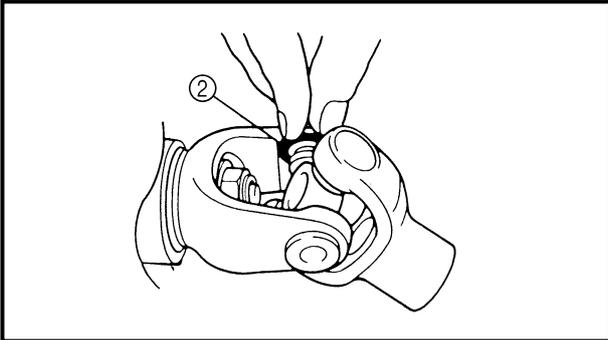




- Install the bearing ① onto the yoke.

**CAUTION:**

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



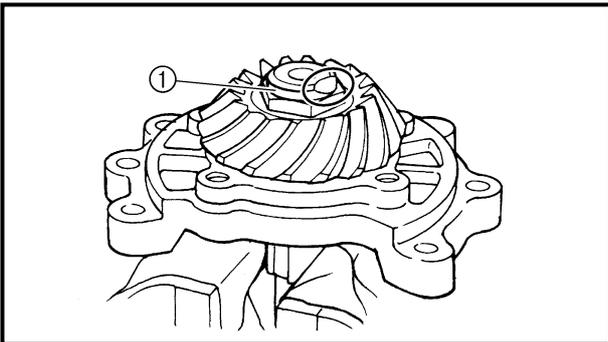
- Press each bearing into the U-joint using a suitable socket.

**NOTE:**

The bearing must be inserted far enough into the U-joint so that the circlip can be installed.

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

\*\*\*\*\*



**MIDDLE DRIVE SHAFT INSTALLATION**

1.Tighten:

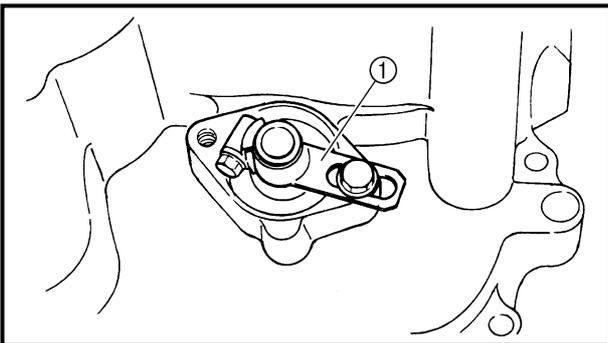
- Nut (middle drive pinion gear) ① **New**

**145 Nm (14.5 m • kg, 105 ft • lb)**

**NOTE:**

Secure the middle drive shaft in the vise with a clean rag.

2.Lock the threads with a drift punch.



**GEAR LASH MEASUREMENT**

1.Measure:

- Gear lash



**Middle gear lash:  
0.1 ~ 0.3 mm (0.004 ~ 0.012 in)**

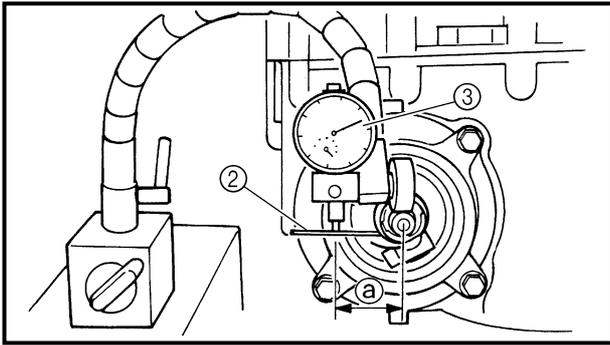
\*\*\*\*\*

**Measurement steps:**

- Temporarily install the left crankcase.
- Attach the pinion gear fix clamp ① to the middle drive shaft.



**Pinion gear fix clamp:  
P/N. YM-04129, 90890-04129**



- Attach the gear lash measurement tool ② and dial gauge ③.

	<p><b>Gear lash measurement tool:</b> P/N. YM-01467, 90890-01467</p>
--	--

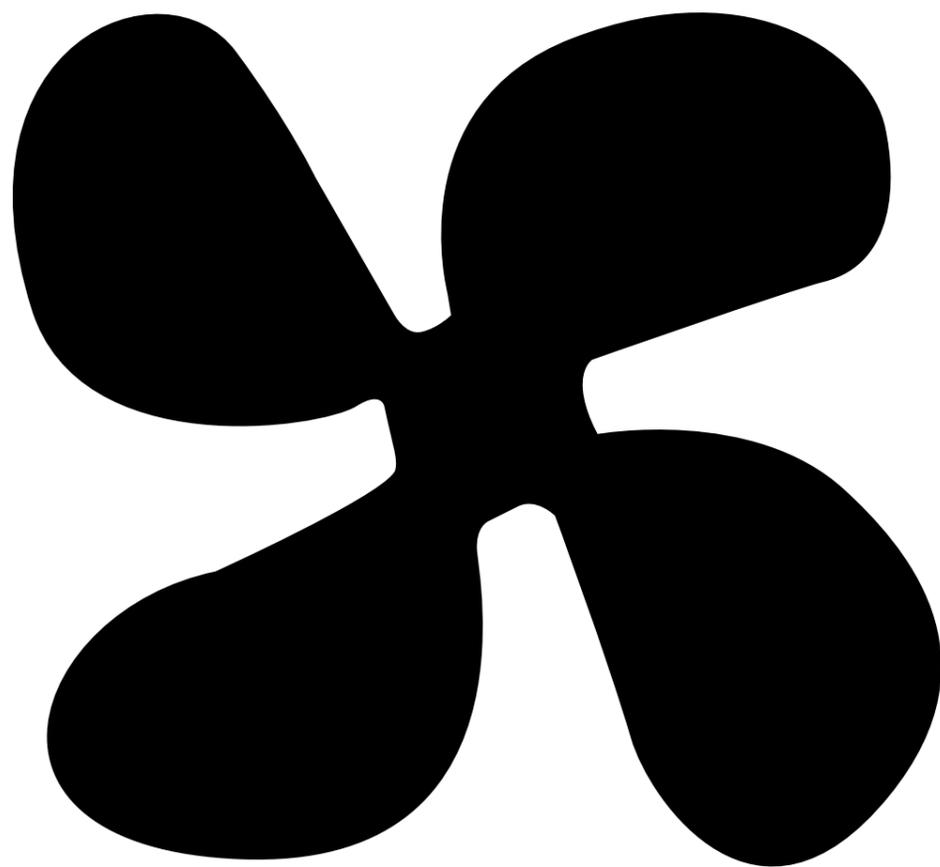
- ① 46 mm (1.8 in)
- Measure the gear lash while rotating the middle driven shaft back and forth.

**NOTE:** \_\_\_\_\_  
Measure the gear lash at 4 positions. Rotate the middle driven gear 90° each time.

- If the gear lash is incorrect, adjust the gear lash by middle driven pinion gear shims and/or middle drive pinion gear shim(s).

\*\*\*\*\*





**COOL**

**5**

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## CHAPTER 5. COOLING SYSTEM

**RADIATOR** .....5-1  
    RADIATOR INSPECTION .....5-3  
    RADIATOR INSTALLATION .....5-4

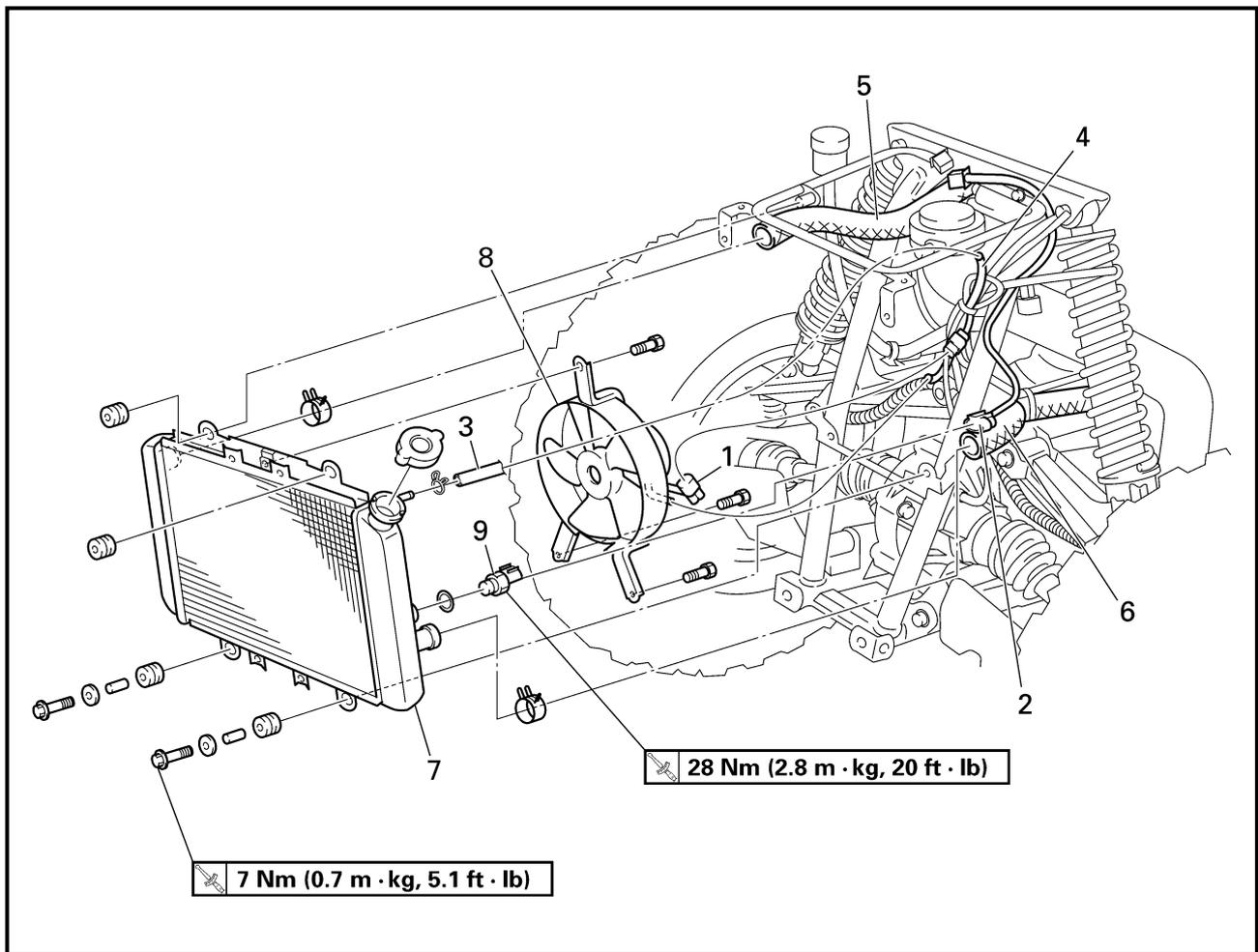
**THERMOSTAT** .....5-5  
    THERMOSTAT INSPECTION .....5-6  
    THERMOSTAT INSTALLATION .....5-6

**WATER PUMP** .....5-7  
    WATER PUMP DISASSEMBLY .....5-9  
    WATER PUMP INSPECTION .....5-9  
    WATER PUMP ASSEMBLY .....5-10

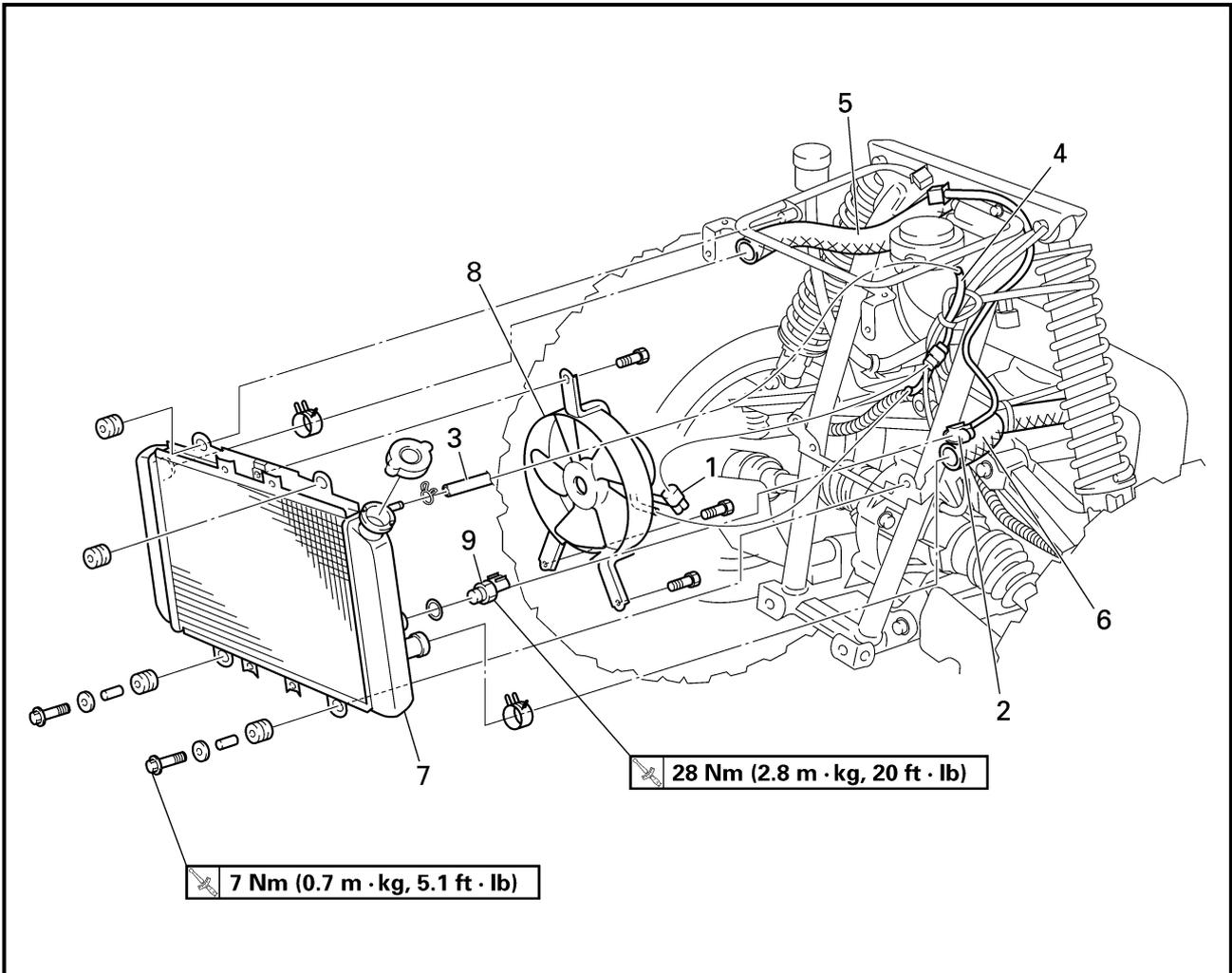


# COOLING SYSTEM

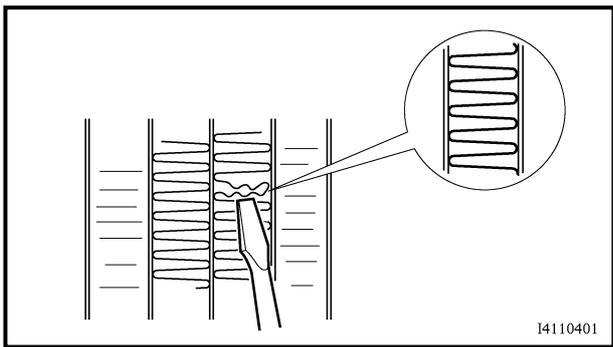
## RADIATOR



Order	Job name/Part name	Q'ty	Remarks
	<b>Radiator removal</b>		Remove the parts in the order below.
	Seat and side panels		Refer to "SEAT AND SIDE PANELS" in CHAPTER 3.
	Front carrier, front bumper and front fender		Refer to "FRONT CARRIER, FRONT BUMPER AND FRONT FENDER" in CHAPTER 3.
	Left footrest board		Refer to "FOOTREST BOARDS" in CHAPTER 3.
	Coolant		Drain. Refer to "COOLANT REPLACEMENT" in CHAPTER 3.
1	Radiator fan coupler	1	Disconnect.
2	Thermo switch coupler	1	Disconnect.
3	Coolant reservoir hose	1	Disconnect.
4	Radiator fan breather hose	1	



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



**RADIATOR INSPECTION**

1. Inspect:

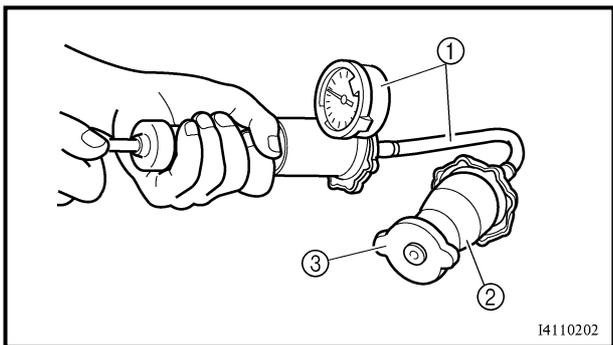
- Radiator fins
  - Obstruction → Clean.
  - Apply compressed air to the rear of the radiator.
  - Damage → Repair or replace.

**NOTE:**

Straighten any flattened fins with a thin, flat-head screwdriver.

2. Inspect:

- Radiator hoses
  - Cracks/damage → Replace.



3. Measure:

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



**Radiator cap opening pressure:**  
 93.3 ~ 122.7 kPa  
 (0.933 ~ 1.227 kg/cm<sup>2</sup>,  
 13.53 ~ 17.79 psi)

\*\*\*\*\*

**Measurement steps:**

- Install the radiator cap tester ① and adapter ② onto the radiator cap ③.



**Radiator cap tester:**  
 P/N. YU-24460-01, 90890-01325  
**Adapter:**  
 P/N. YU-33984, 90890-01352

- Apply the specified pressure for ten seconds and make sure that there is no drop in pressure.

\*\*\*\*\*

4. Check:

- Radiator fan
  - Damage → Replace.
  - Malfunction → Check and repair.
  - Refer to “COOLING SYSTEM” in CHAPTER 9.

**RADIATOR INSTALLATION****1.Fill:**

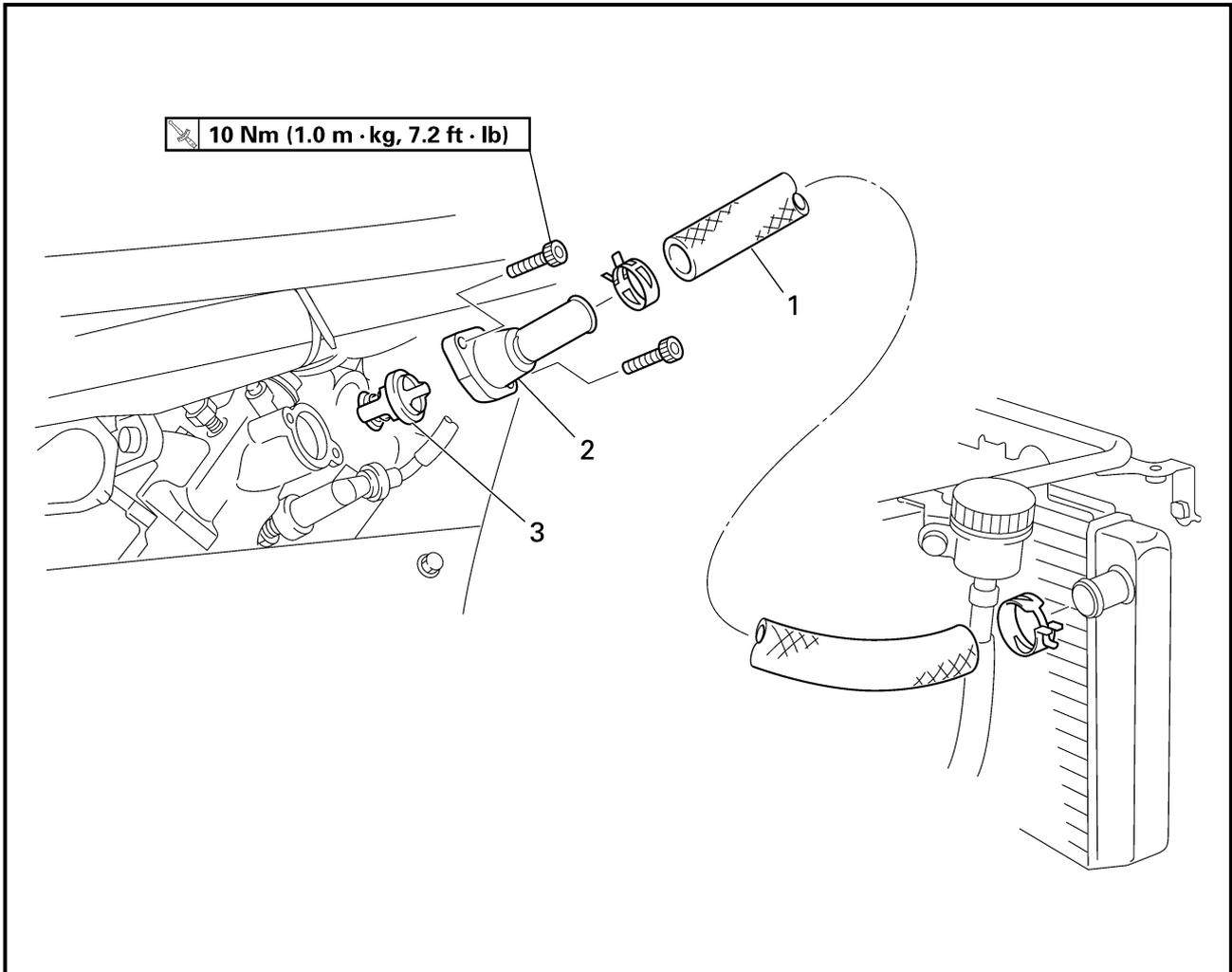
- Cooling system  
(with the specified amount of the recommended coolant)  
Refer to "COOLANT REPLACEMENT" in CHAPTER 3.

**2.Check:**

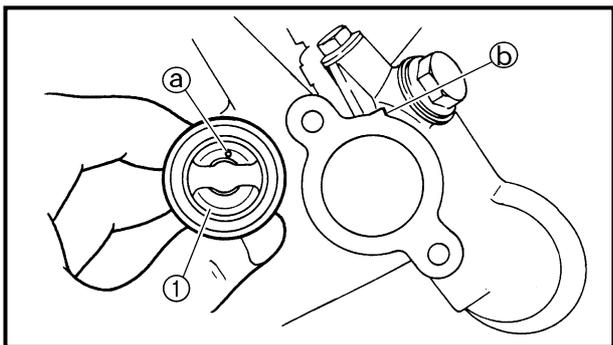
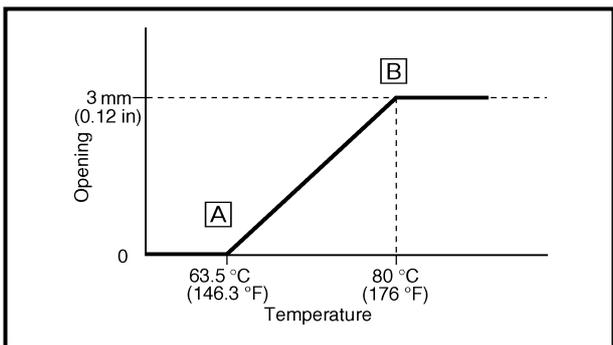
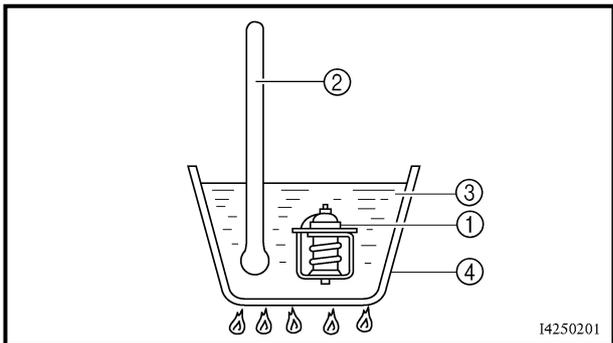
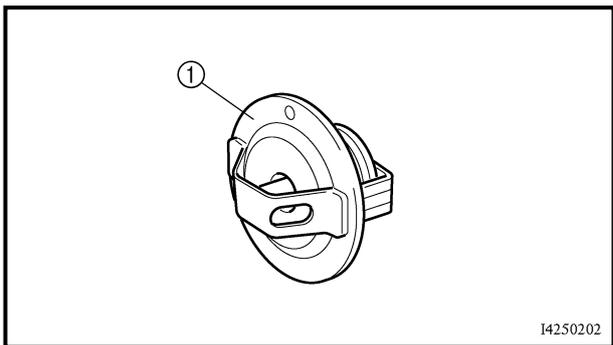
- Cooling system  
Leaks → Repair or replace any faulty part.



## THERMOSTAT



Order	Job name/Part name	Q'ty	Remarks
	<b>Thermostat removal</b>		Remove the parts in the order below. Refer to "SEAT AND SIDE PANELS" in CHAPTER 3. Drain. Refer to "COOLANT REPLACEMENT" in CHAPTER 3.
	Seat and fuel tank side panel (right)		
	Coolant		
1	Radiator inlet hose	1	For installation, reverse the removal procedure.
2	Thermostat cover	1	
3	Thermostat	1	



**THERMOSTAT INSPECTION**

1. Check:

- Thermostat ①  
Does not open at 63.5 ~ 65.5 °C (146.3 ~ 149.9 °F) → Replace.

\*\*\*\*\*

**Checking steps:**

- Suspend the thermostat in a container filled with water.
- Slowly heat the water.
- Place a thermometer in the water.
- While stirring the water, observe the thermostat and thermometer's indicated temperature.

\*\*\*\*\*

- ① Thermostat
- ② Thermometer
- ③ Water
- ④ Container
- Ⓐ Fully closed
- Ⓑ Fully open

**NOTE:**

\_\_\_\_\_ If the accuracy of the thermostat is in doubt, replace it. A faulty thermostat could cause serious overheating or overcooling. \_\_\_\_\_

2. Inspect:

- Thermostat housing cover
- Thermostat housing  
Cracks/damage → Replace.

**THERMOSTAT INSTALLATION**

1. Install:

- Thermostat ①
- Thermostat housing cover

**NOTE:**

\_\_\_\_\_ Install the thermostat with its breather hole Ⓐ toward the projection Ⓑ. \_\_\_\_\_

2. Fill:

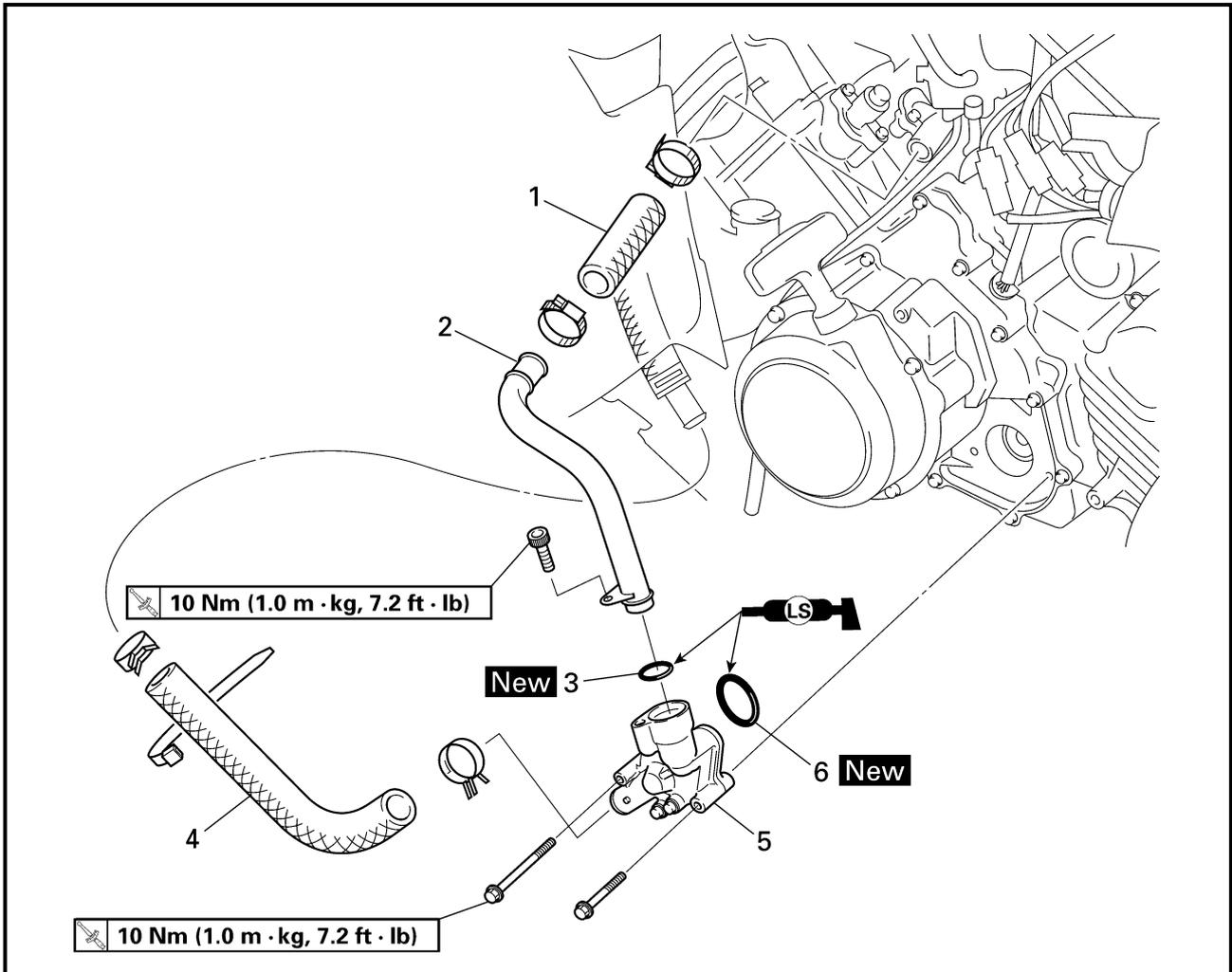
- Cooling system  
(with the specified amount of the recommended coolant)  
Refer to "COOLANT REPLACEMENT" in CHAPTER 3.

3. Check:

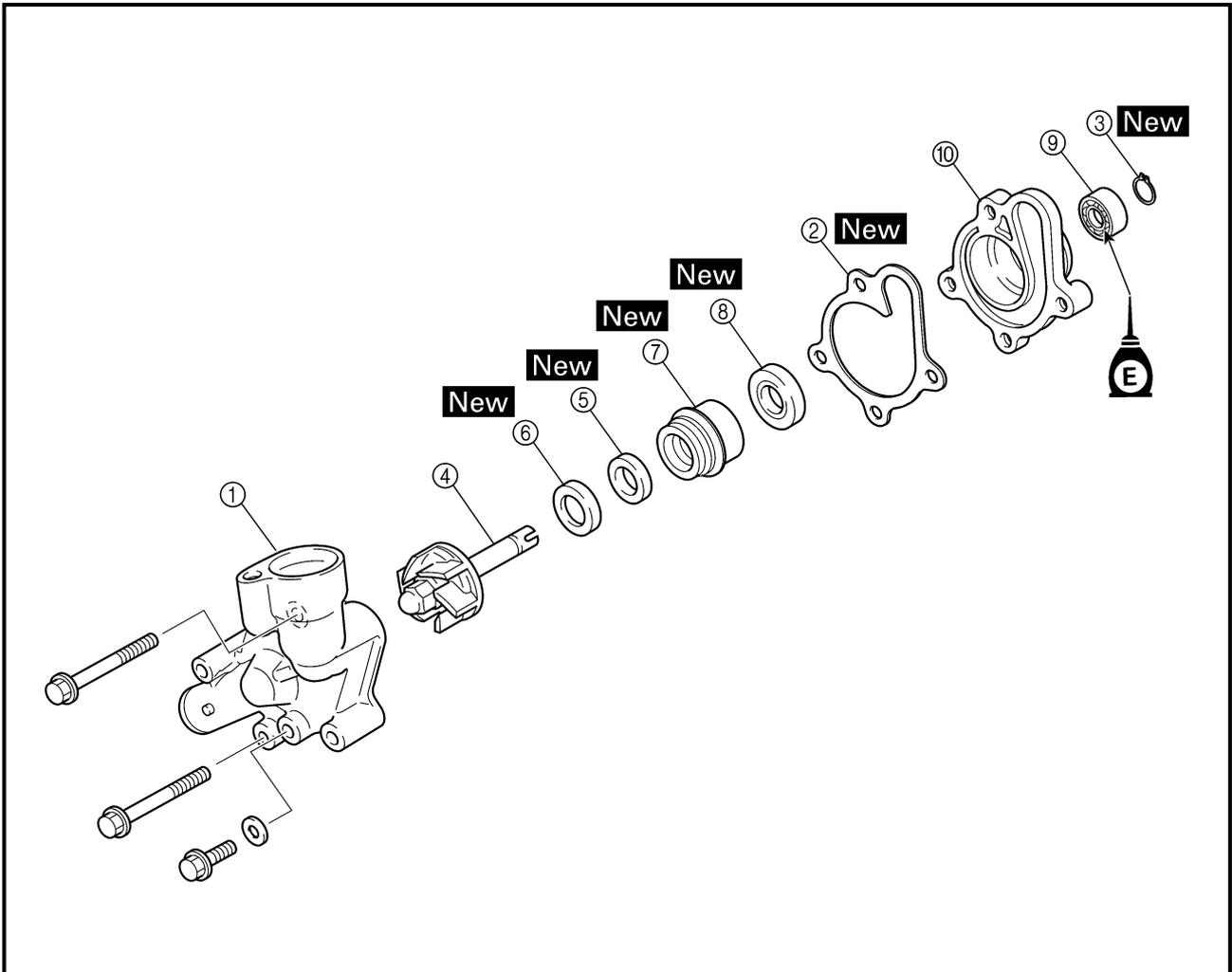
- Cooling system  
Leak → Repair or replace any faulty part.



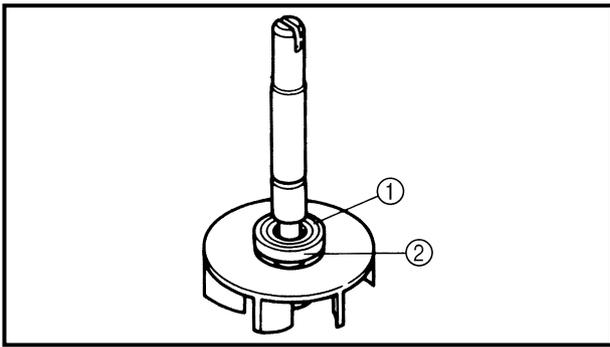
WATER PUMP



Order	Job name/Part name	Q'ty	Remarks
	<b>Water pump removal</b>		Remove the parts in the order below.
	Seat, fuel tank side panel (left) and engine side cover		Refer to "SEAT AND SIDE PANELS" in CHAPTER 3.
	Left footrest board		Refer to "FOOTREST BOARDS" in CHAPTER 3.
1	Water pump outlet hose	1	
2	Water pump outlet pipe	1	
3	O-ring	1	
4	Water pump inlet hose	1	
5	Water pump assembly	1	
6	O-ring	1	
			For installation, reverse the removal procedure.



Order	Job name/Part name	Q'ty	Remarks
	<b>Water pump disassembly</b>		Remove the parts in the order below.
①	Water pump housing cover	1	
②	Gasket	1	
③	Circlip	1	
④	Impeller	1	
⑤	Rubber damper holder	1	
⑥	Rubber damper	1	
⑦	Water pump seal	1	
⑧	Oil seal	1	
⑨	Bearing	1	
⑩	Water pump housing	1	
			For assembly, reverse the disassembly procedure.

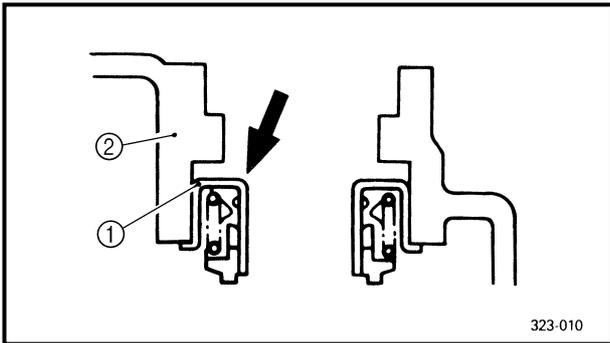


## WATER PUMP DISASSEMBLY

1.Remove:

- Rubber damper holder ①
- Rubber damper ②  
(from the impeller, with a thin, flathead screwdriver)

**NOTE:** \_\_\_\_\_  
Do not scratch the impeller shaft.

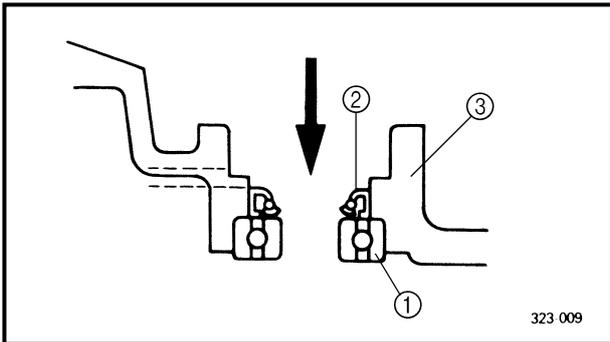


2.Remove:

- Water pump seal ①

**NOTE:** \_\_\_\_\_  
Tap out the water pump seal from the inside of the water pump housing.

- ② Water pump housing

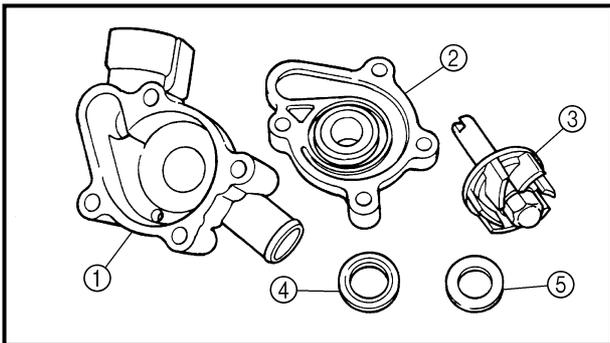


3.Remove:

- Oil seal ①
- Bearing ②

**NOTE:** \_\_\_\_\_  
Tap out the bearing and oil seal from the outside of the water pump housing.

- ③ Water pump housing



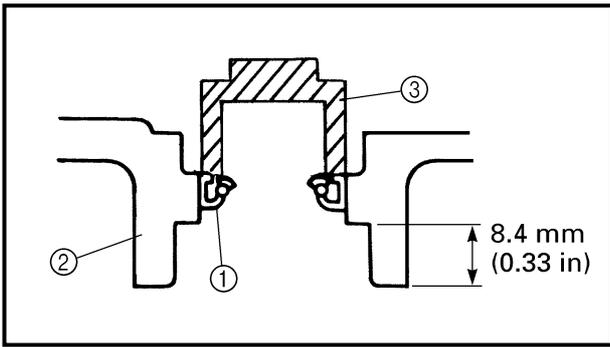
## WATER PUMP INSPECTION

1.Inspect:

- Water pump housing cover ①
- Water pump housing ②
- Impeller ③
- Rubber damper ④
- Rubber damper holder ⑤  
Cracks/damage/wear → Replace.

2.Inspect:

- Water pump seal
- Oil seal
- Water pump outlet pipe  
Cracks/damage/wear → Replace.
- Bearing  
Rough movement → Replace.



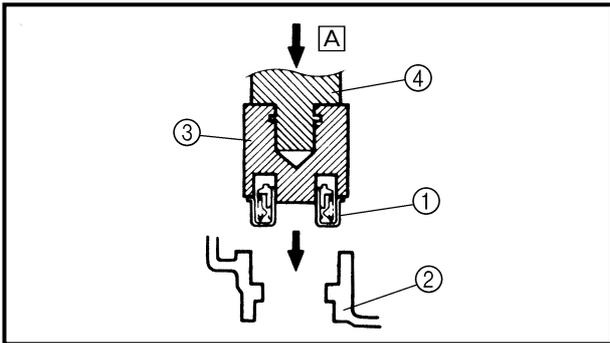
**WATER PUMP ASSEMBLY**

1.Install:

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

**NOTE:**

- Before installing the oil seal, apply tap water or coolant onto its outer surface.
- Install the oil seal with a socket ③ that matches its outside diameter.



2.Install:

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

**CAUTION:**

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

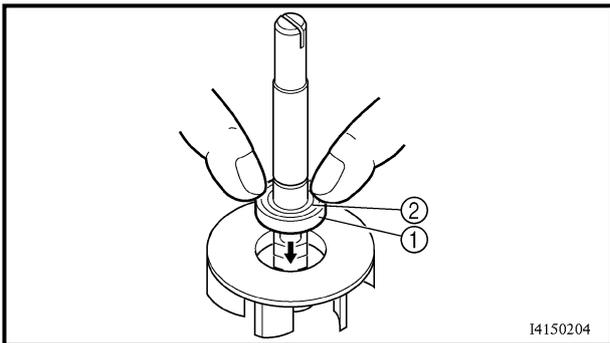
**NOTE:**

Install the water pump seal with the special tools.



**Mechanical seal installer ③:**  
P/N. YM-33221, 90890-04078  
**Middle driven shaft bearing driver ④:**  
P/N. YM-04058-1, 90890-04058

**A** Push down.



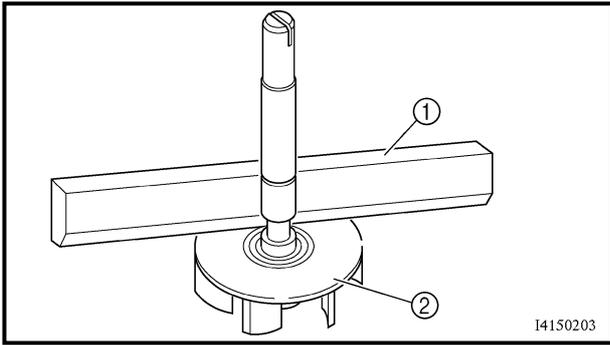
3.Install:

- Rubber damper ① **New**
- Rubber damper holder ② **New**

**NOTE:**

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

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**4.Measure:**

- Impeller shaft tilt  
Out of specification → Repeat steps (3) and (4).

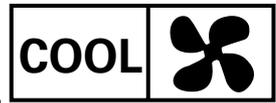
**CAUTION:**

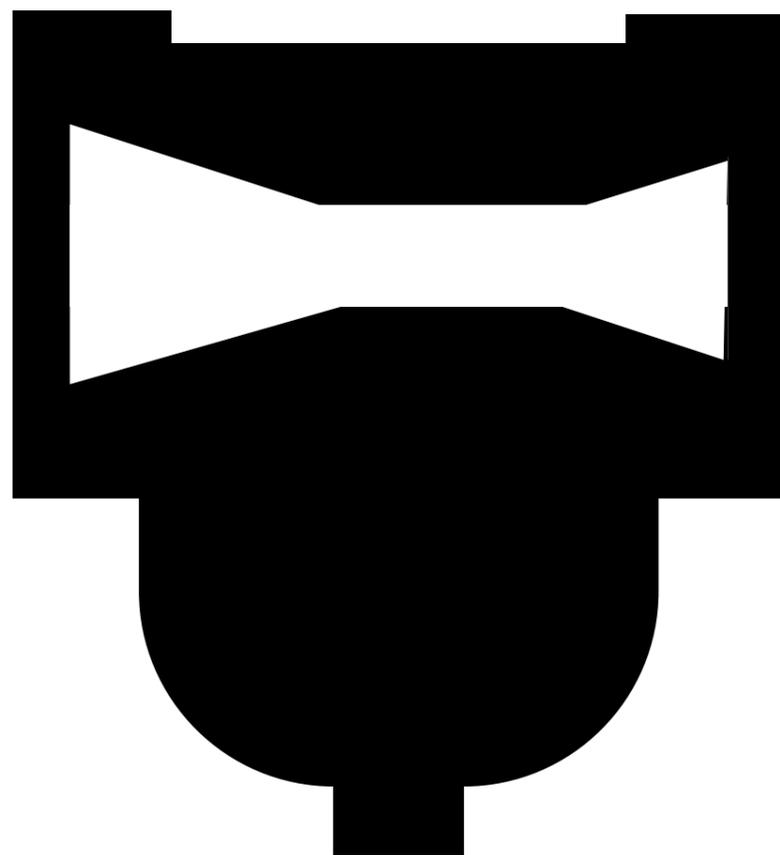
**Make sure that the rubber damper and rubber damper holder are flush with the impeller.**



**Max. impeller shaft tilt:  
0.15 mm (0.006 in)**

- ① Straightedge
- ② Impeller





**CARB**

**6**

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## **CHAPTER 6. CARBURETION**

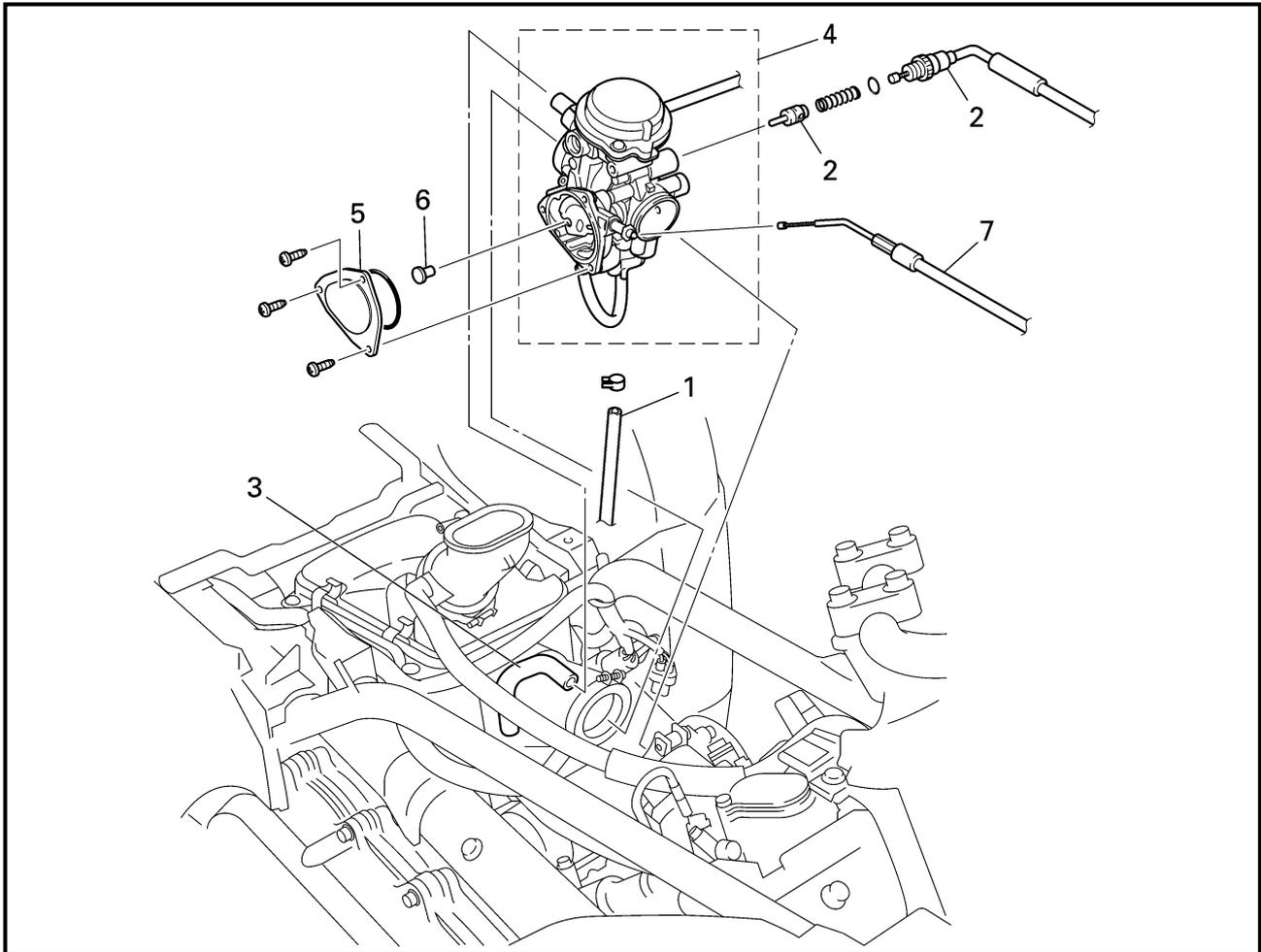
<b>CARBURETOR .....</b>	<b>6-1</b>
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FUEL LEVEL ADJUSTMENT .....	6-7



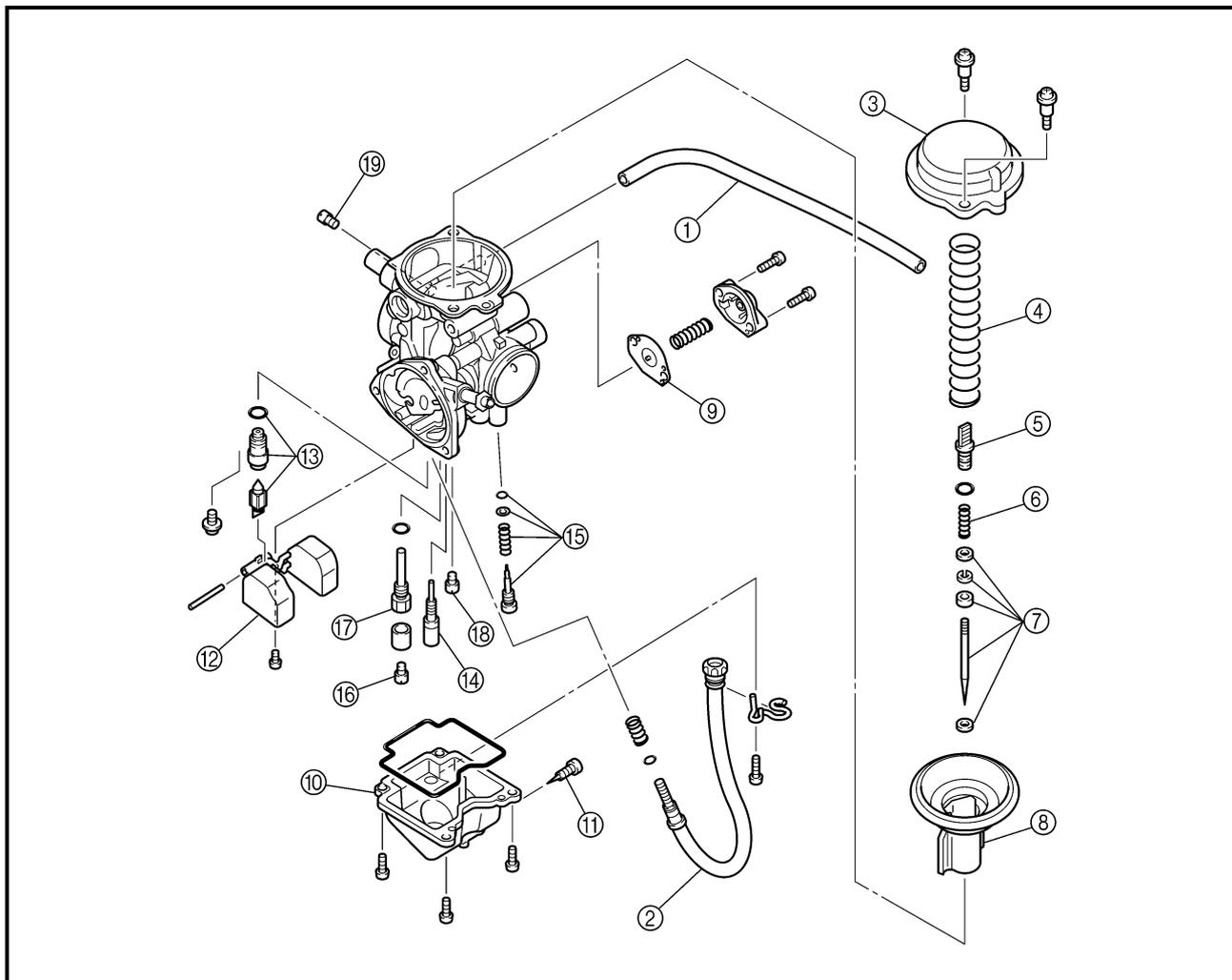


CARBURETION

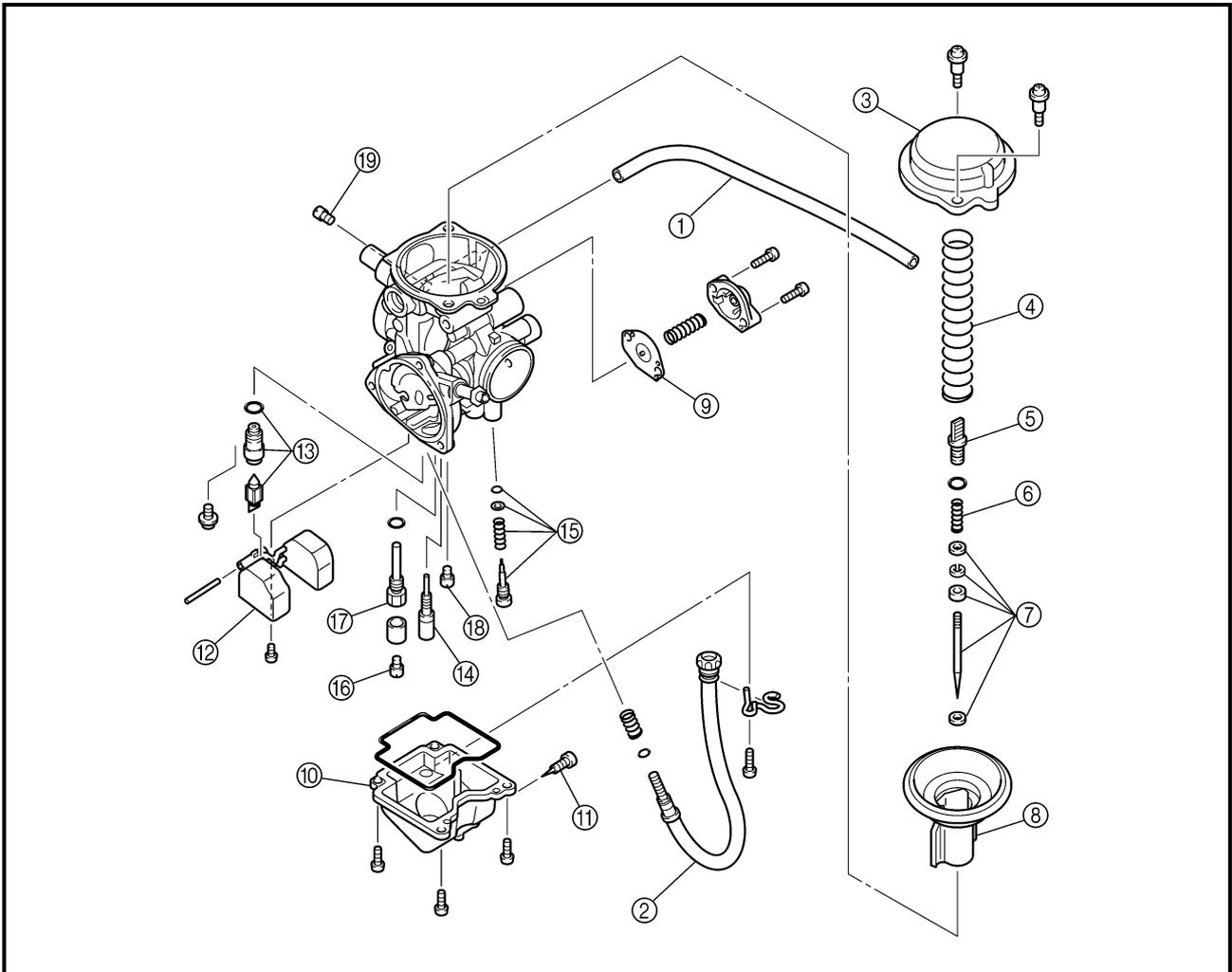
CARBURETOR



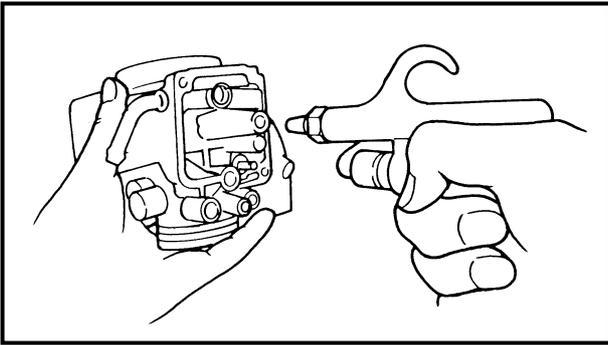
Order	Job name/Part name	Q'ty	Remarks
	<b>Carburetor removal</b>		Remove the parts in the order below. Refer to "SEAT, CARRIERS, FENDERS AND FUEL TANK" in CHAPTER 3.
	Seat/fuel tank side panels/fuel tank/rubber cover		
1	Drain hose	1	
2	Starter cable/starter plunger	1/1	
3	Air vent hose	1	
4	Carburetor assembly	1	
5	Throttle valve cover	1	
6	Throttle cable end	1	
7	Throttle cable	2	<b>NOTE:</b> _____ After removing the carburetor assembly, remove the throttle cable. _____ For installation, reverse the removal procedure.



Order	Job name/Part name	Q'ty	Remarks
	<b>Carburetor disassembly</b>		Disassemble the parts in the order below.
①	Air vent hose	1	
②	Throttle stop screw	1	
③	Vacuum chamber cover	1	
④	Spring	1	
⑤	Jet needle holder	1	
⑥	Spring	1	
⑦	Jet needle set	1	
⑧	Piston valve	1	
⑨	Coasting enricher	1	
⑩	Float chamber	1	
⑪	Drain screw	1	
⑫	Float	1	Refer to "CARBURETOR ASSEMBLY".
⑬	Needle valve set	1	



Order	Job name/Part name	Q'ty	Remarks
⑭	Pilot jet	1	
⑮	Pilot screw set	1	Refer to "CARBURETOR ASSEMBLY".
⑯	Main jet	1	
⑰	Needle jet	1	Refer to "CARBURETOR DISASSEMBLY/ASSEMBLY".
⑱	Starter jet	1	
⑲	Pilot air jet	1	
			For assembly, reverse the disassembly procedure.



**CARBURETOR INSPECTION**

**1. Inspect:**

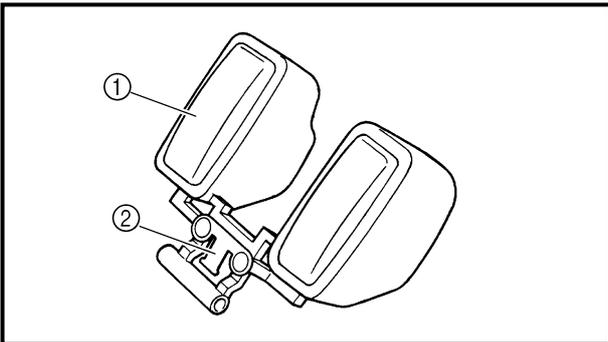
- Carburetor body  
Cracks/damage → Replace.
- Fuel passage  
Contamination → Clean as indicated.
- Fuel chamber body  
Contamination → Clean.

\*\*\*\*\*

**Cleaning steps:**

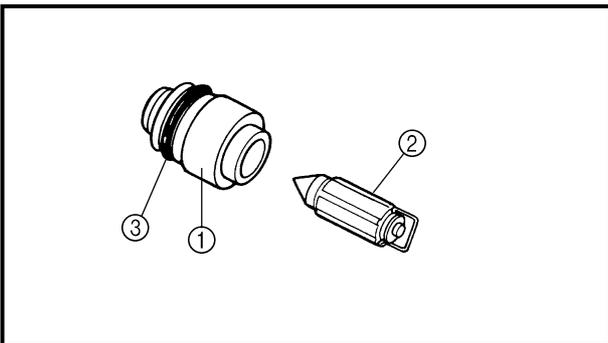
- Wash the carburetor in a petroleum based solvent.  
(Do not use any caustic carburetor cleaning solution.)
- Blow out all of the passages and jets with compressed air.

\*\*\*\*\*



**2. Inspect:**

- Float ①
- Float tang ②  
Damage → Replace.

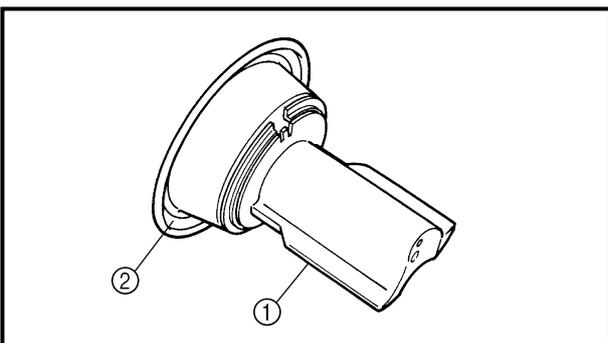


**3. Inspect:**

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

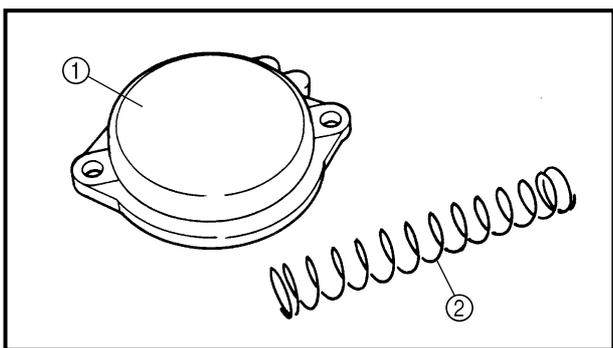
**NOTE:**

Always replace the needle valve and valve seat as a set.



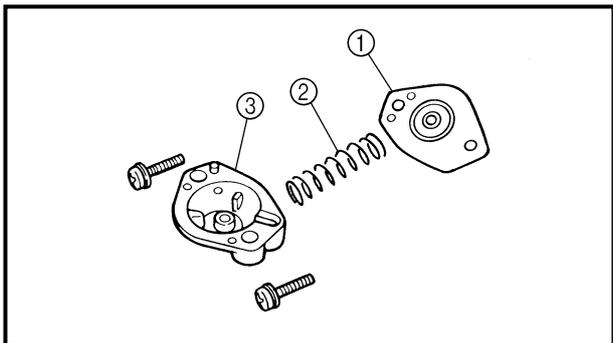
**4. Inspect:**

- Piston valve ①  
Scratches/wear/damage → Replace.
- Rubber diaphragm ②  
Tears → Replace.



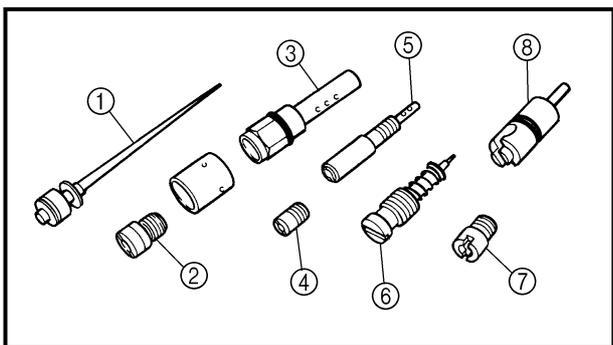
### 5. Inspect:

- Vacuum chamber cover ①
  - Spring ②
- Cracks/damage → Replace.



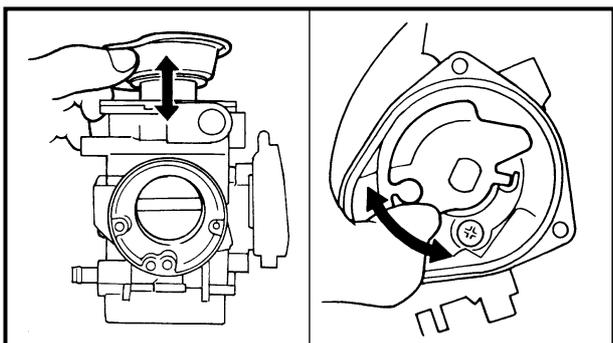
### 6. Inspect:

- Diaphragm (coasting enricher) ①
  - Spring ②
  - Cover ③
- Tears (diaphragm)/damage → Replace.



### 7. Inspect:

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



### 8. Check:

- Free movement (piston valve)
- Sticks → Replace the piston valve guide and the piston valve.
- Insert the piston valve into the carburetor body, and check for free movement.

### 9. Check:

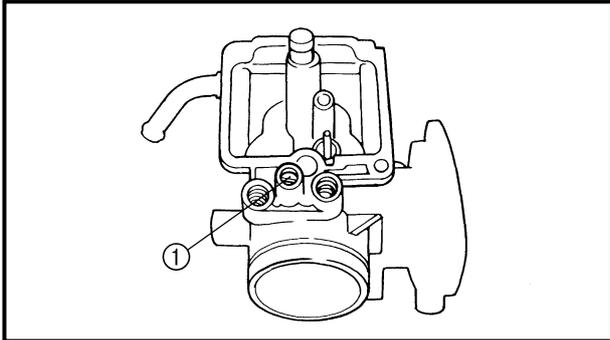
- Free movement (throttle valve)
- Sticks → Replace.



CARBURETOR ASSEMBLY

**CAUTION:**

Before reassembling, wash all of the parts in a clean petroleum based solvent.

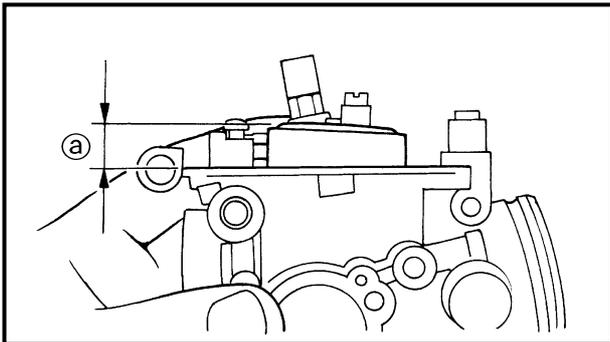


1. Install:

- Pilot screw ①



**Pilot screw:**  
2-1/2 turns out



2. Measure:

- Float height ②
- Out of specification → Adjust.



**Float height (F.H.):**  
13 mm (0.51 in)

\*\*\*\*\*

**Measurement and adjustment steps:**

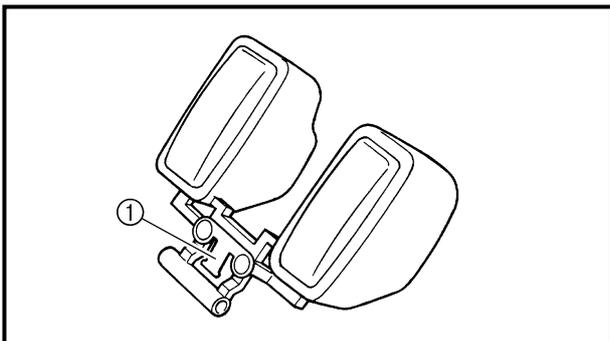
- Hold the carburetor in an upside down position.
- Measure the distance from the front mating surface of the float chamber (gasket removed) to the top of the float.

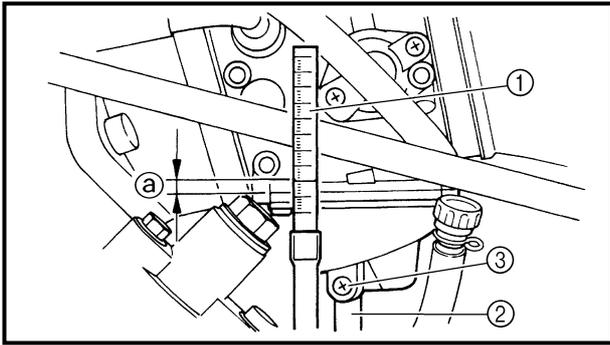
**NOTE:**

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

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

\*\*\*\*\*





**FUEL LEVEL ADJUSTMENT**

1.Measure:

- Fuel level (a)

Out of specification → Adjust.



**Fuel level:**

**2.0 ~ 3.0 mm (0.08 ~ 0.12 in)**

**Above the float chamber mating surface**

\*\*\*\*\*

**Fuel level measurement and adjustment**

**steps:**

- Place the machine on a level surface.
- Connect the fuel level gauge (1) to the drain pipe (2).

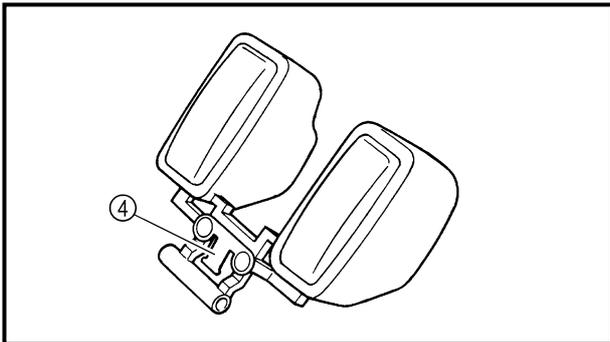


**Fuel level gauge:**

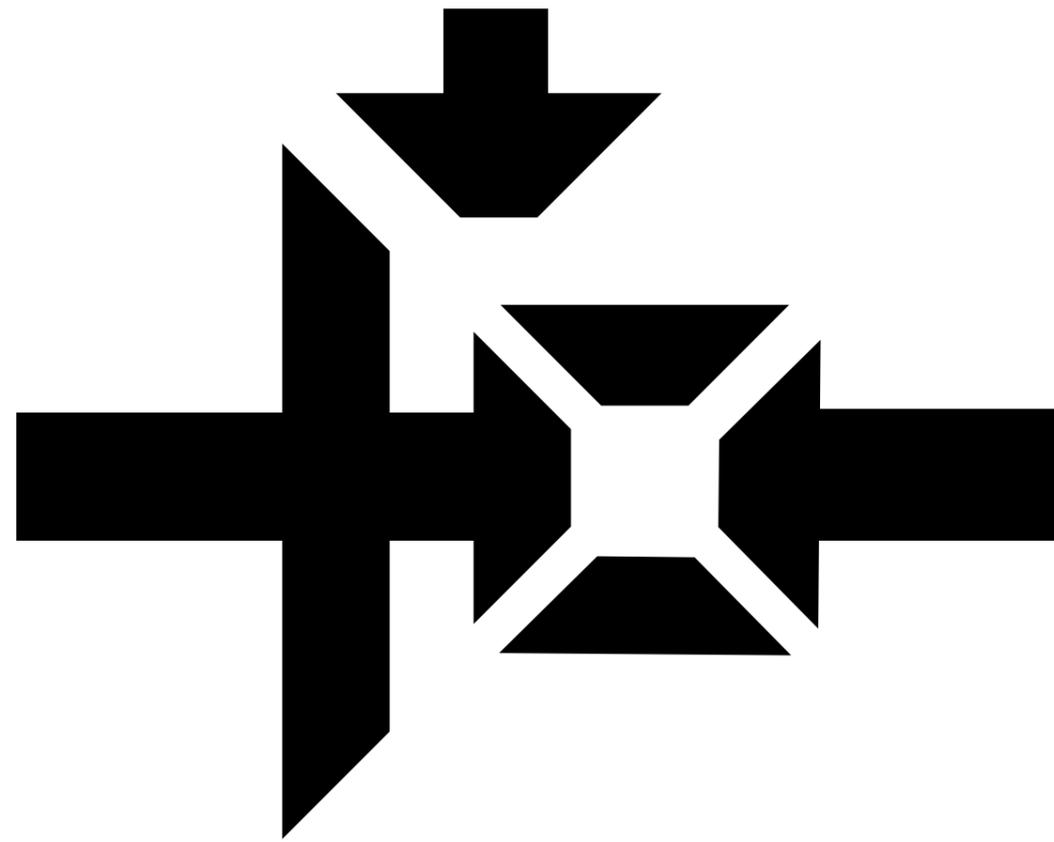
**P/N. YM-01312-A, 90890-01312**

- Loosen the drain screw (3).
- Hold the gauge vertically next to the float chamber line.
- Measure the fuel level (a) with the gauge.
- If the fuel level is incorrect, adjust the fuel level.
- Remove the carburetor.
- Inspect the valve seat and needle valve.
- If either is worn, replace them both.
- If both are fine, adjust the float level by bending the float tang (4) slightly.
- Install the carburetor.
- Recheck the fuel level.

\*\*\*\*\*







**DRIVE**

**7**

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## CHAPTER 7. DRIVE TRAIN

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**DRIVE TRAIN**

**TROUBLESHOOTING**

The following conditions may indicate damaged shaft drive components:

Symptoms	Possible Causes
1.A pronounced hesitation or “jerky” movement during acceleration, deceleration, or sustained speed. (This must not be confused with engine surging or transmission characteristics.) 2.A “rolling rumble” noticeable at low speed; a high-pitched whine; a “clunk” from a shaft drive component or area. 3.A locked-up condition of the shaft drive train mechanism, no power transmitted from the engine to the front and/or rear wheel.	A.Bearing damage. B.Improper gear lash. C.Gear tooth damage. D.Broken drive shaft. E. Broken gear teeth. F. Seizure due to lack of lubrication. G.Small foreign objects lodged between the moving parts.

**NOTE:**

Areas A, B, and C above may be extremely difficult to diagnose. The symptoms are quite subtle and difficult to distinguish from normal machine operating noise. If there is reason to believe these components are damaged, remove the components and inspect them.

**Inspection notes**

1.Investigate any unusual noises.

\*\*\*\*\*

**The following “noises” may indicate a mechanical defect:**

- a.A “rolling rumble” noise during coasting, acceleration, or deceleration. The noise increases with front and/or rear wheel speed, but it does not increase with higher engine or transmission speeds.  
 Diagnosis: Possible wheel bearing damage.
- b.A “whining” noise that varies with acceleration and deceleration.  
 Diagnosis: Possible incorrect reassembly, too-little gear lash.



**CAUTION:**

Too little gear lash is extremely destructive to the gear teeth. If a test ride following reassembly indicates this condition, stop riding immediately to minimize gear damage.

c.A slight “thunk” evident at low speed operation. This noise must be distinguished from normal machine operation. Diagnosis: Possible broken gear teeth.

**⚠ WARNING**

Stop riding immediately if broken gear teeth are suspected. This condition could result in the shaft drive assembly locking up, causing loss of control of the machine and possible injury to the rider.

\*\*\*\*\*

2.Inspect:

- Drained oil  
Drained oil shows large amounts of metal particles → Check the bearing for seizure.

**NOTE:**

A small amount of metal particles in the oil is normal.

3.Inspect:

- Oil leakage

\*\*\*\*\*

**Oil leakage inspection steps:**

- Clean the entire machine thoroughly, then dry it.
- Apply a leak-localizing compound or dry powder spray to the shaft drive.
- Road test the machine for the distance necessary to locate the leak.  
Leakage → Inspect the component housing, gasket, and/or seal for damage.  
Damage → Replace the component.

**NOTE:**

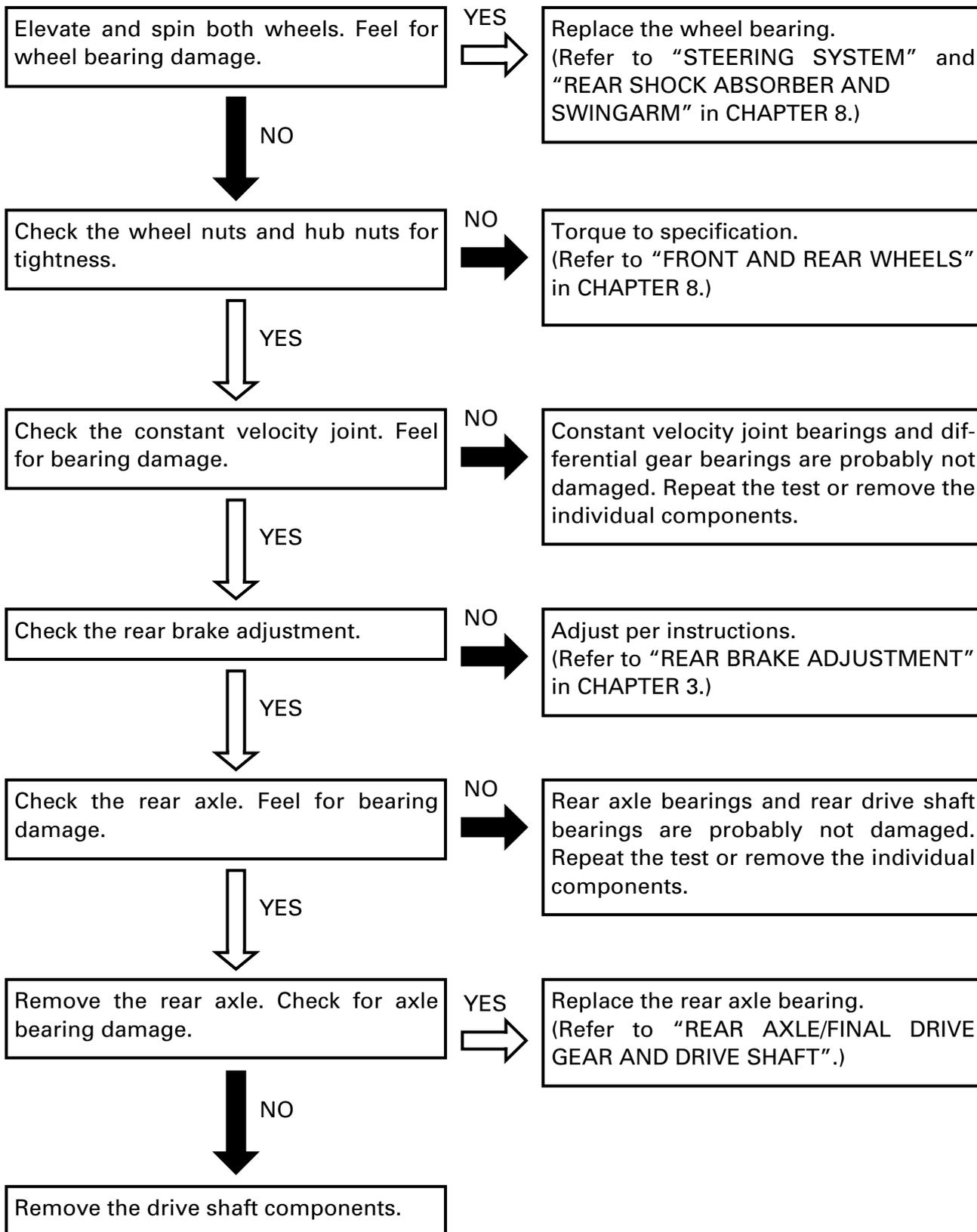
- An apparent oil leak on a new or nearly new machine may be the result of a rust-preventative coating or excessive seal lubrication.
- Always clean the machine and recheck the suspected location of an apparent leakage.

\*\*\*\*\*



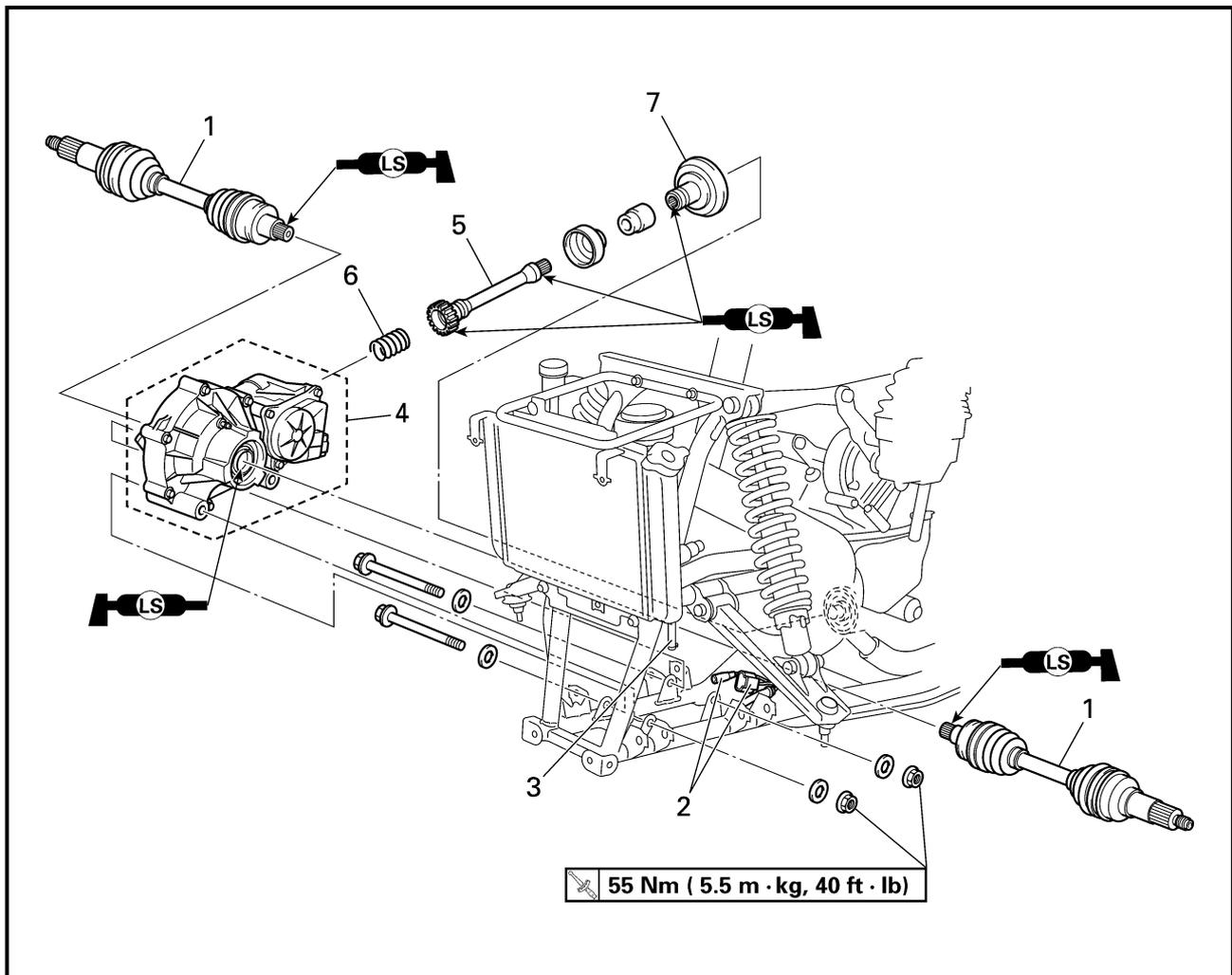
### Troubleshooting Chart

When basic condition "a" and "b" exist, check the following points:

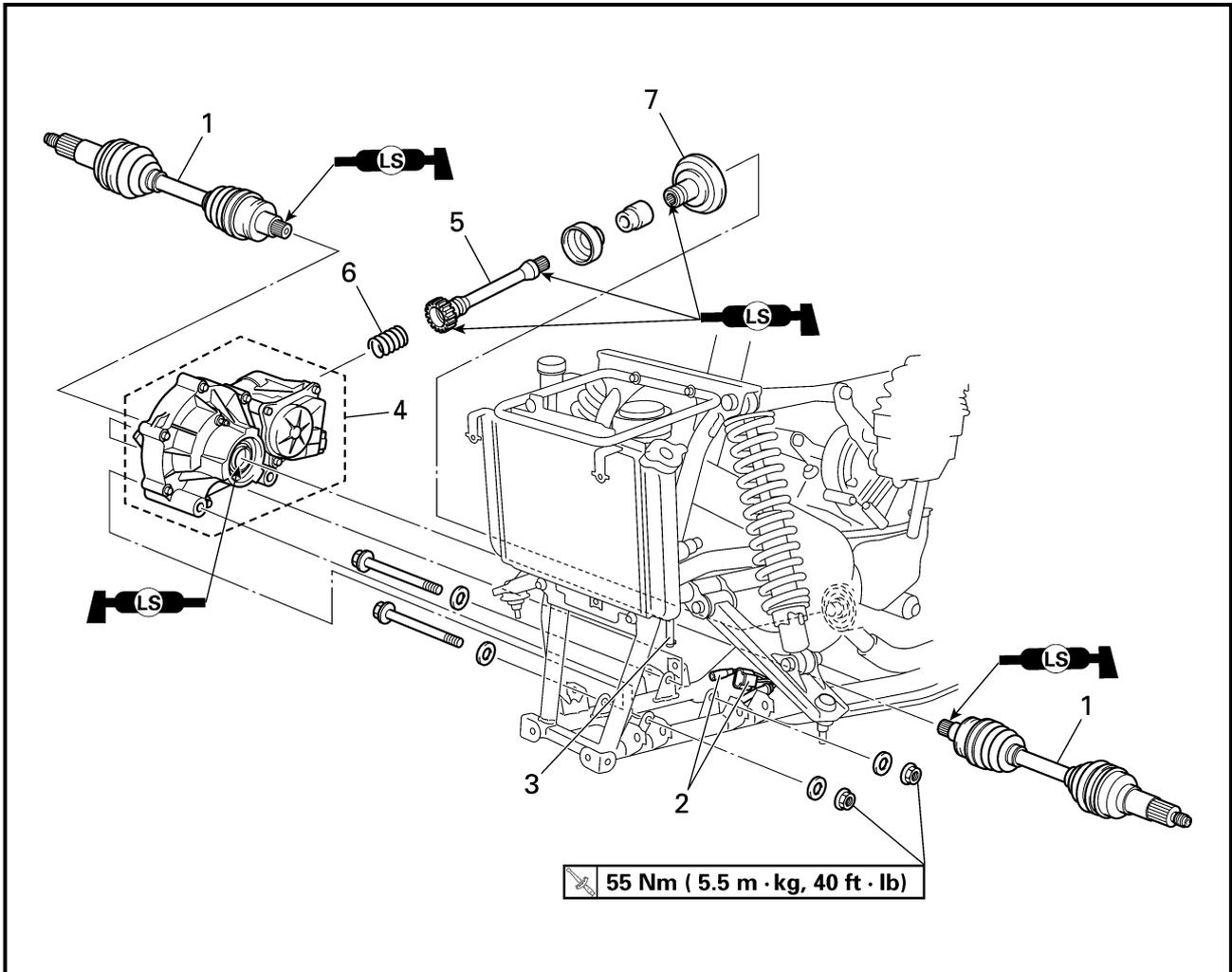




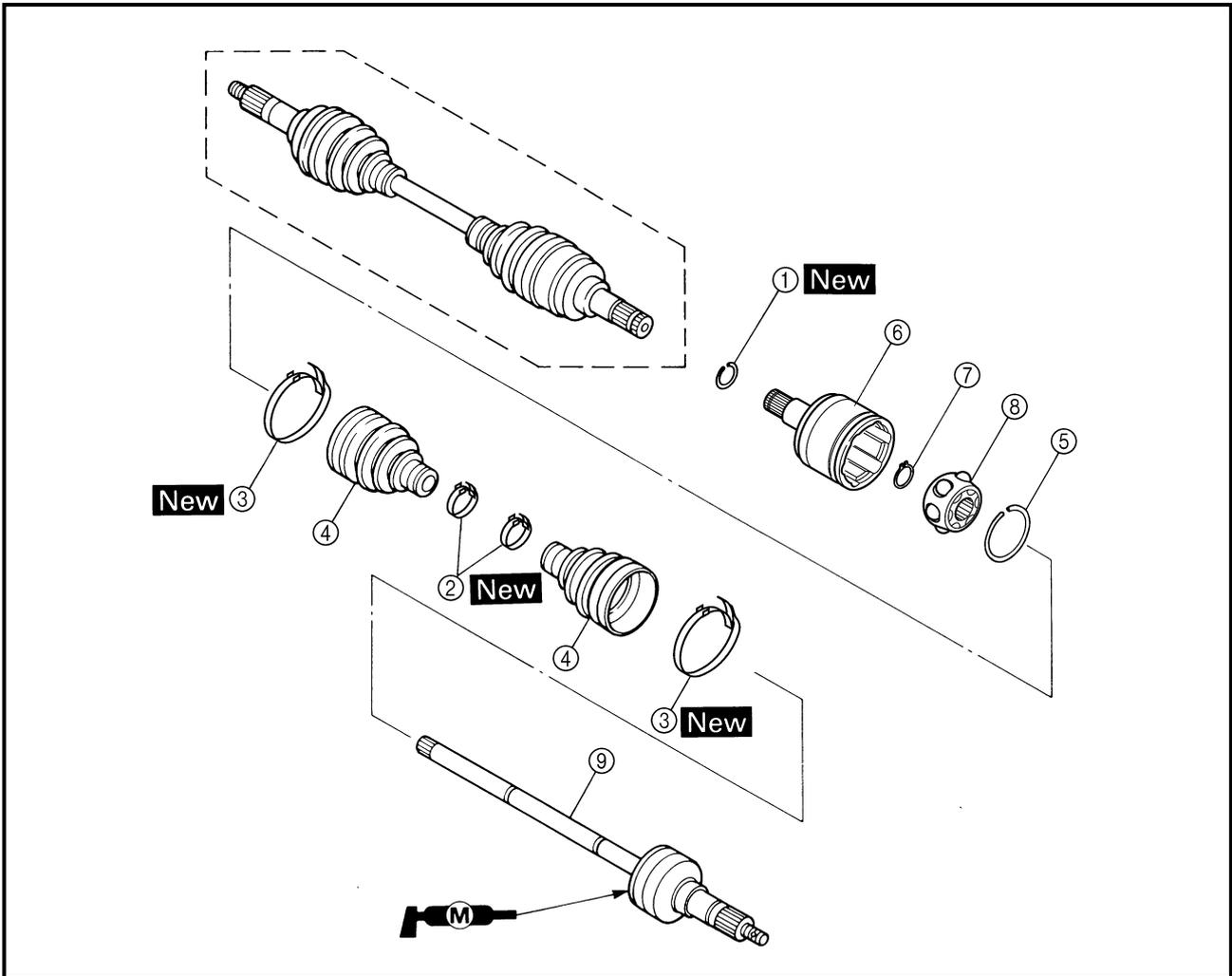
CONSTANT VELOCITY JOINTS AND DIFFERENTIAL GEAR



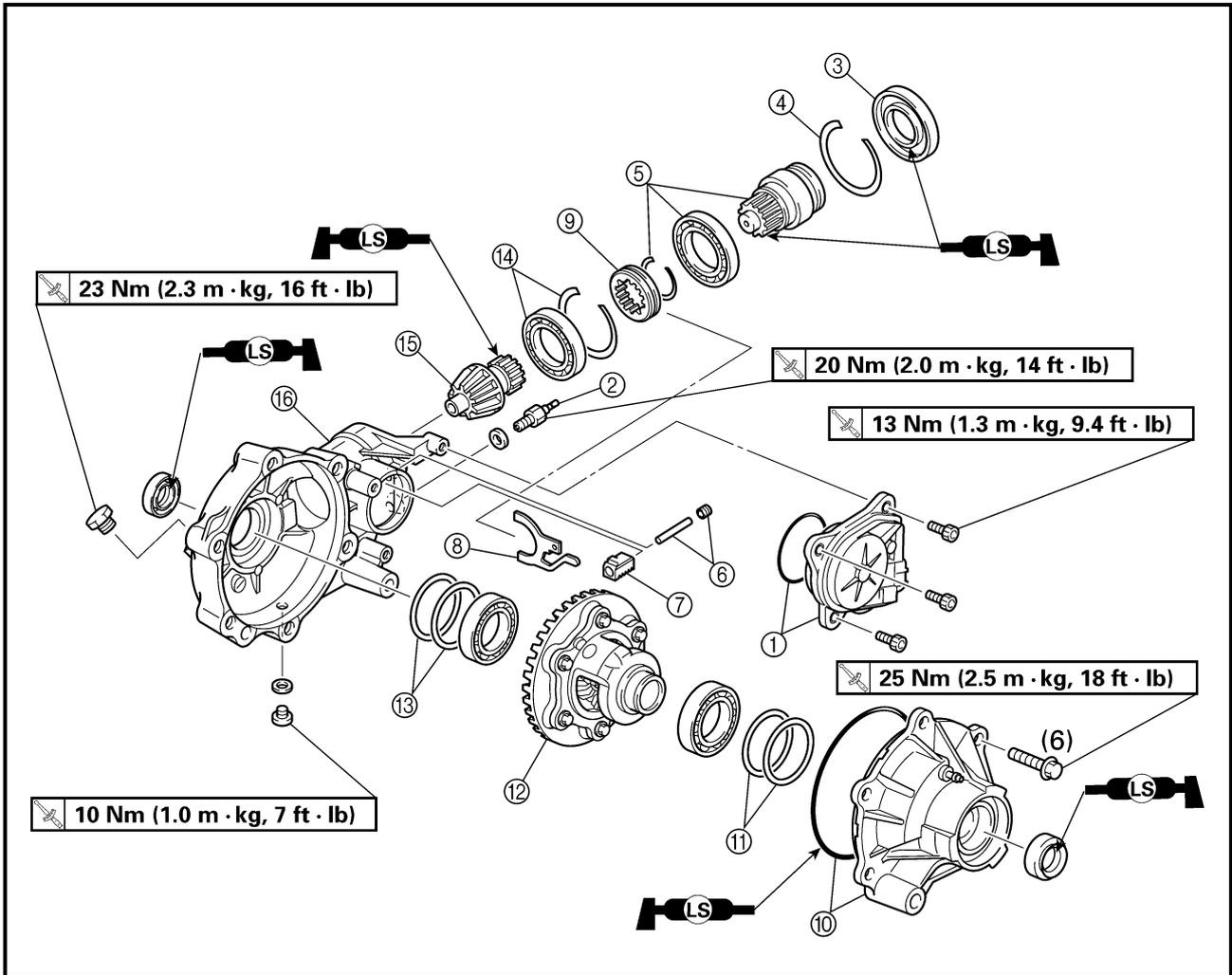
Order	Job name/Part name	Q'ty	Remarks
	<b>Constant velocity joint and differential gear removal</b>		Remove the parts in the order below.
	Engine skid plate (front)		Refer to "SEAT, CARRIERS, FENDERS AND FUEL TANK" in CHAPTER 3. Drain. Refer to "STEERING SYSTEM" in CHAPTER 8. Refer to "FRONT ARMS AND FRONT SHOCK ABSORBER" in CHAPTER 8.
	Front fender		
	Differential gear oil		
	Steering knuckle		
	Front arms (lower)		
1	Constant velocity joint	2	
2	Gear motor coupler/four-wheel drive switch lead	1/1	
3	Differential gear case breather hose	1	Disconnect.



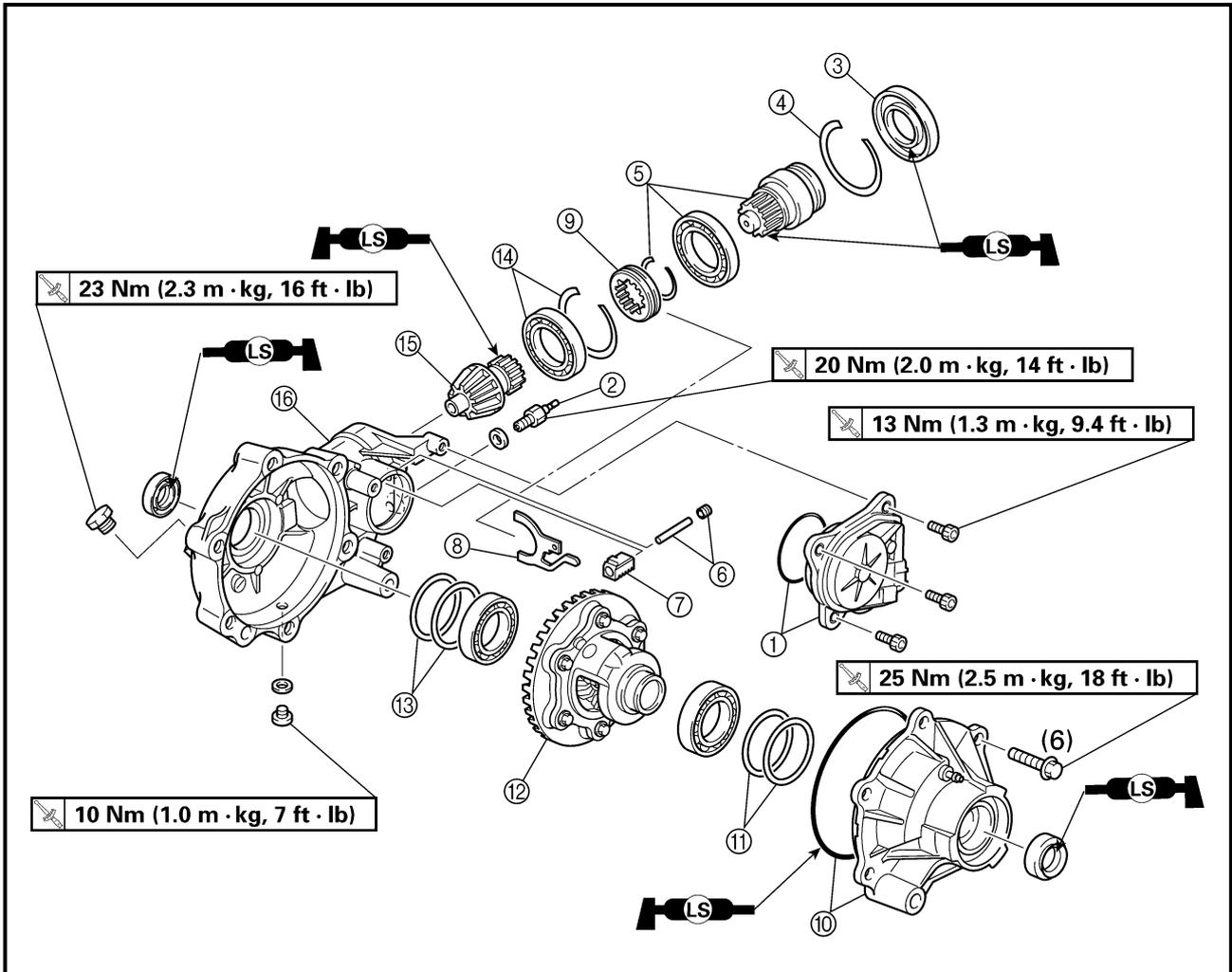
Order	Job name/Part name	Q'ty	Remarks
4	Differential gear	1	For installation, reverse the removal procedure.
5	Drive shaft	1	
6	Compression spring	1	
7	Coupling gear	1	



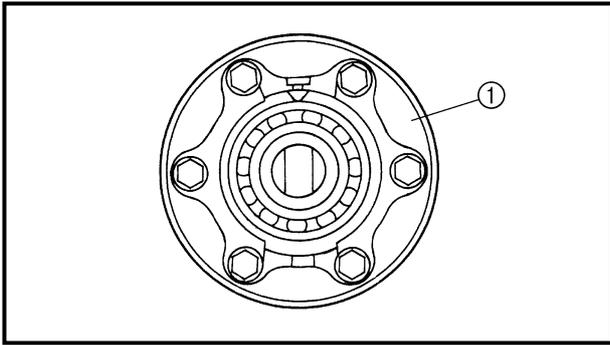
Order	Job name/Part name	Q'ty	Remarks
	<b>Constant velocity joint disassembly</b>		Disassemble the parts in the order below.
①	Circlip	1	Refer to "CONSTANT VELOCITY JOINT ASSEMBLY".
②	Boot band	2	
③	Boot band	2	
④	Dust boot	2	
⑤	Circlip	1	
⑥	Double off-set joint	1	
⑦	Snap ring	1	
⑧	Ball bearing	1	
⑨	Joint shaft assembly	1	
			For assembly, reverse the disassembly procedure.



Order	Job name/Part name	Q'ty	Remarks
	<b>Differential gear disassembly</b>		Disassembly the parts in the order below.
①	Gear motor/O-ring	1/1	
②	Four-wheel drive switch	1	
③	Dust seal	1	
④	Circlip	1	
⑤	Coupling gear/bearing/circlip	1/1/1	
⑥	Stopper bolt/shaft	1/1	
⑦	Shift fork sliding gear	1	
⑧	Shift fork	1	
⑨	2WD/4WD shift sleeve	1	
⑩	Differential gear case cover	1	
⑪	Shim (left)		
⑫	Differential gear assembly	1	



Order	Job name/Part name	Q'ty	Remarks
13	Shim (right)	1	For assembly, reverse the disassembly procedure.
14	Circlip/bearing	1/1	
15	Drive pinion gear	1	
16	Differential gear case	1	



## RING GEAR REMOVAL

1.Remove:

- Ring gear ①

### NOTE:

The ring gear and the differential gear cover should be fastened together. Do not disassemble the differential gear.

### CAUTION:

The differential gears are assembled into a proper unit at the factory by means of specialized equipment. Do not attempt to disassemble this unit. Disassembly will result in the malfunction of the unit.

## CONSTANT VELOCITY JOINT INSPECTION

1.Inspect:

- Double off-set joint spline
  - Ball joint spline
  - Shaft spline
- Wear/damage → Replace.

2.Inspect:

- Dust boots
- Cracks/damage → Replace.

### CAUTION:

**Always use a new boot band.**

3.Inspect:

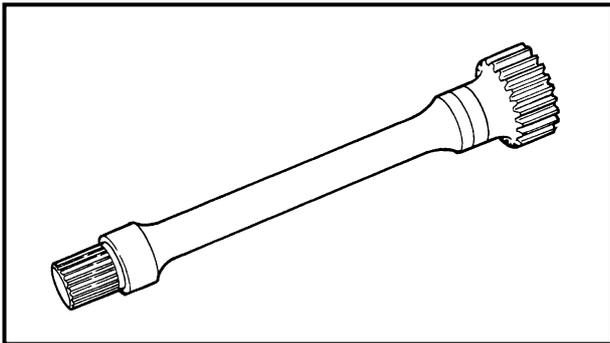
- Balls and ball races
  - Inner surface of double off-set joint
- Pitting/wear/damage → Replace.

## DIFFERENTIAL GEAR INSPECTION

1.Inspect:

- Gear teeth
- Pitting/galling/wear → Replace drive pinion gear and ring gear as a set.
- Bearing
- Pitting/damage → Replace.
- Oil seal
  - O-ring
- Damage → Replace.

2. Inspect:
- Drive shaft splines
  - Universal joints
  - Front drive gear splines  
Wear/damage → Replace.
  - Spring  
Fatigue → Replace.  
Move the spring up and down.



3. Inspect:
- Front drive shaft  
Bends → Replace.

**⚠ WARNING**

**Do not attempt to straighten a bent shaft; this may dangerously weaken the shaft.**

## CONSTANT VELOCITY JOINT ASSEMBLY

1. Apply:
- Molybdenum disulfide grease  
(into the ball joint assembly)

**NOTE:** Molybdenum disulfide grease is included in the repair kit.

2. Install:
- Dust boots ①
  - Boot bands ②, ③ **New**

\*\*\*\*\*

**Installation steps:**

- Apply molybdenum disulfide grease into the dust boots.

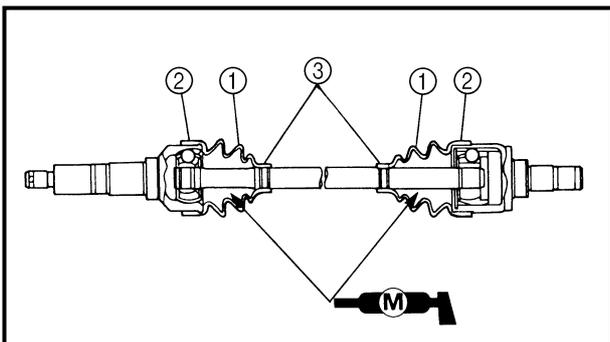
	<b>Molybdenum disulfide grease: 40 g (1.4 oz) per dust boot</b>
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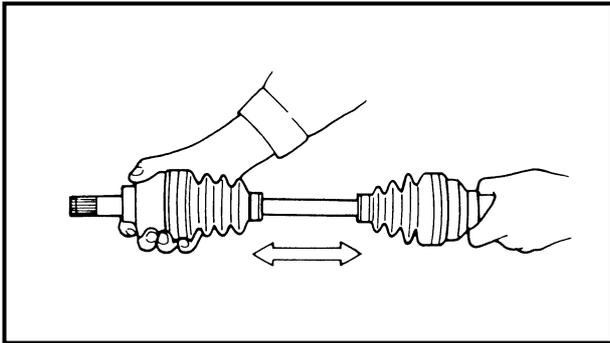
- Install the dust boots.
- Install the dust boot bands.

**NOTE:**

- The new boot bands may differ from the original ones.
- The dust boots should be fastened with the boot bands ③ at the grooves in the joint shaft.

\*\*\*\*\*

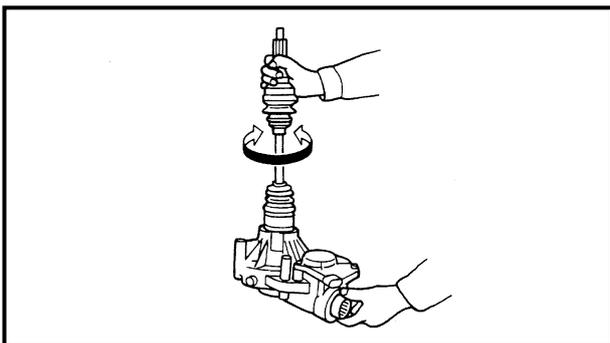




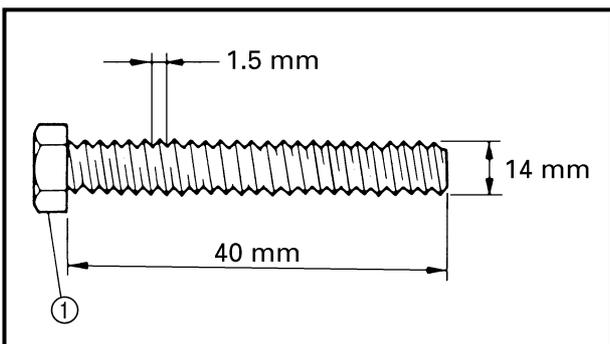
- 3.Check:
- Free play (thrust movement)  
Excessive play → Replace the joint assembly.

## DIFFERENTIAL GEAR ASSEMBLY

- 1.Measure:
- Gear lash  
Refer to "DIFFERENTIAL GEAR LASH MEASUREMENT AND ADJUSTMENT".
- 2.Install:
- Gear motor  
Refer to "FEATURES" in CHAPTER 1.



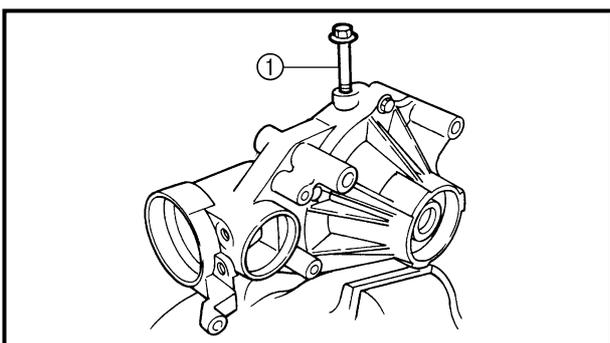
- 3.Check:
- Differential gear operation  
Unsmooth operation → Replace the differential gear assembly.  
Insert the double off-set joint into the differential gear, and turn the gear back and forth.



## DIFFERENTIAL GEAR LASH MEASUREMENT AND ADJUSTMENT

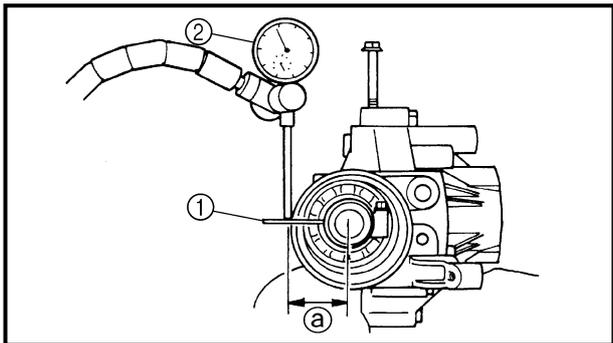
### Differential gear lash measurement

- 1.Secure the gear case in a vise or another supporting device.
- 2.Remove:
- Drain plug
  - Gasket
- 3.Install:
- A bolt of the specified size ①  
(into the drain plug hole)



**CAUTION:**

**Finger tighten the bolt until it holds the ring gear. Otherwise, the ring gear will be damaged.**



4. Attach:
- Gear lash measurement tool ①
  - Dial gauge ②

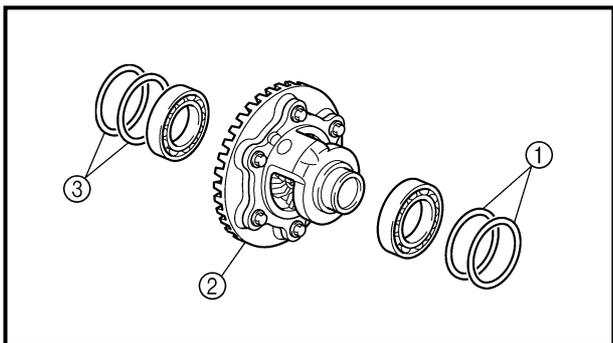
	<b>Gear lash measurement tool:</b> P/N. YM-01475, 90890-01475
---	--

① Measuring point is 30 mm (1.18 in)

5. Measure:
- Gear lash
- Gently rotate the gear coupling from engagement to engagement.

	<b>Differential gear lash:</b> 0.08 ~ 0.39 mm (0.003 ~ 0.015 in)
---	---

**NOTE:** \_\_\_\_\_  
Measure the gear lash at four positions. Rotate the shaft 90° each time.



**Differential gear lash adjustment**

1. Remove:
- Shim(s) (left) ①
  - Differential gear assembly ②
  - Shim(s) (right) ③

2. Adjust:
- Gear lash

\*\*\*\*\*

**Gear lash adjustment steps:**

- Select the suitable shims using the following chart.

<b>Too little gear lash</b>	<b>Reduce shim thickness.</b>
<b>Too large gear lash</b>	<b>Increase shim thickness.</b>

- If it is necessary to increase by more than 0.05 mm (0.002 in):  
Reduce right shim thickness by 0.1 mm (0.004 in) for every 0.1 mm (0.004 in) of left shim increase.
- If it is necessary to reduce by more than 0.1 mm (0.004 in):  
Increase right shim thickness by 0.1 mm (0.004 in) for every 0.1 mm of left shim decreased.

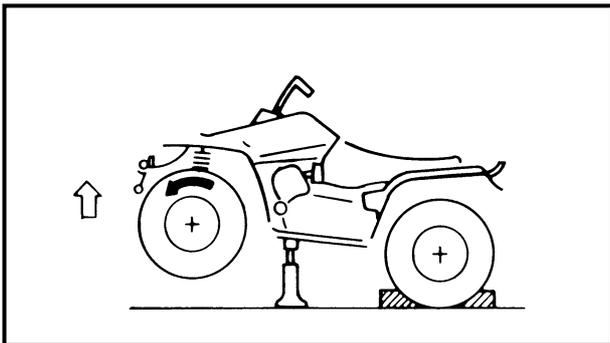
	<b>Ring gear shim (left and right)</b>	
<b>Thickness (mm)</b>	<b>0.1</b>	<b>1.0</b>
	<b>0.2</b>	<b>1.5</b>
	<b>0.3</b>	<b>2.0</b>
	<b>0.4</b>	<b>2.5</b>
	<b>0.5</b>	

**DIFFERENTIAL GEAR OPERATION CHECK**

1. Block the rear wheels, and elevate the front wheels by placing a suitable stand under the frame.
2. Remove the wheel cap and cotter pin from the axle nut (right or left).
3. Measure the starting torque of the front wheel (i.e., differential gear preload) with the torque wrench.

**NOTE:**

- Repeat this step several times to obtain an average figure.
- During this test, the other front wheel will turn in the opposite direction.



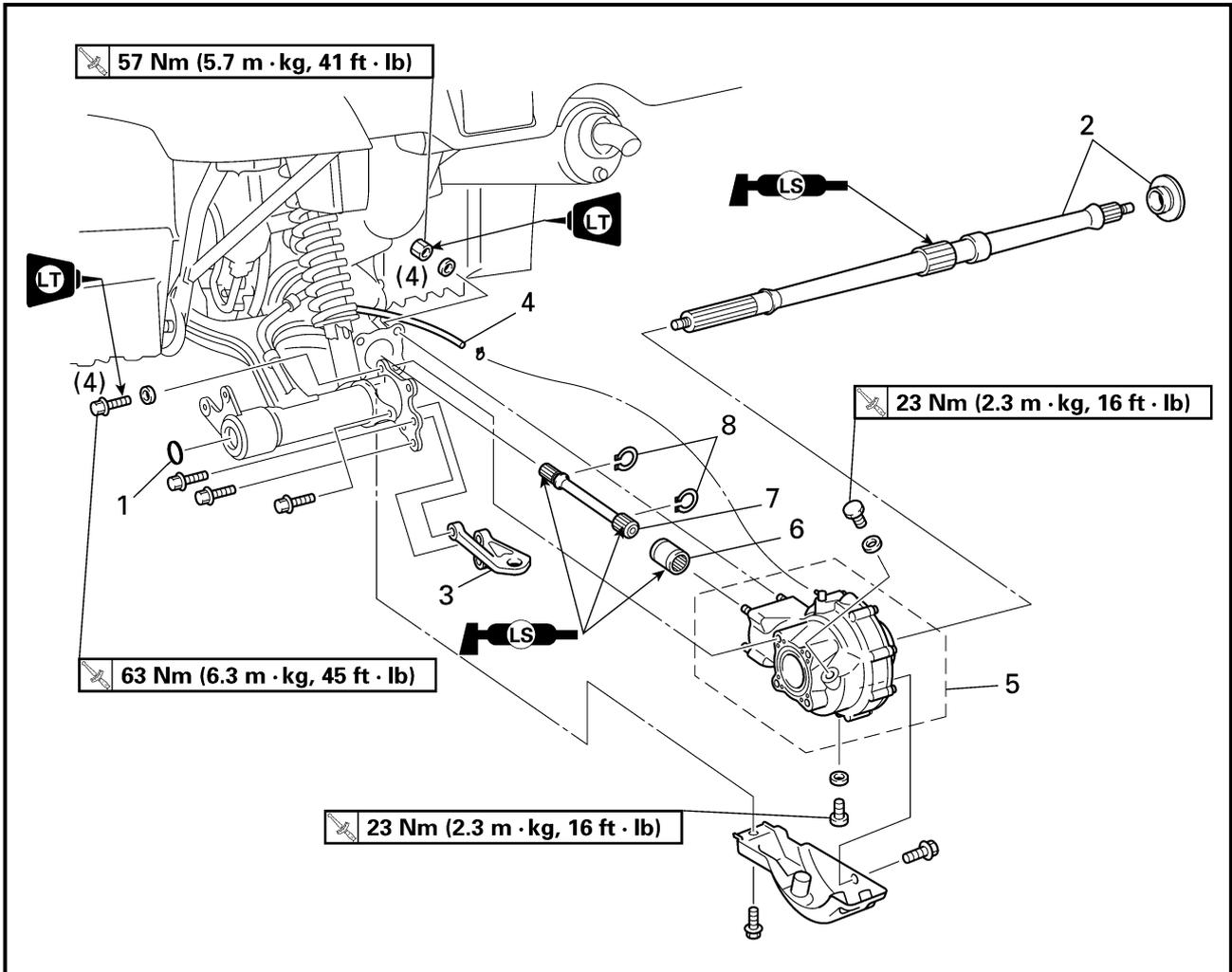
	<b>Front wheel starting torque (differential gear preload):</b>
	<b>New unit:</b>
	<b>17 ~ 25 Nm</b>
	<b>(1.7 ~ 2.5 m • kg, 12 ~ 18 ft • lb)</b>
	<b>Minimum:</b>
	<b>10 Nm (1.0 m • kg, 7.2 ft • lb)</b>

4. Out of specification → Replace the differential gear assembly.
5. Within specification → Install the new cotter pin and wheel cap.

# REAR AXLE/FINAL DRIVE GEAR AND DRIVE SHAFT



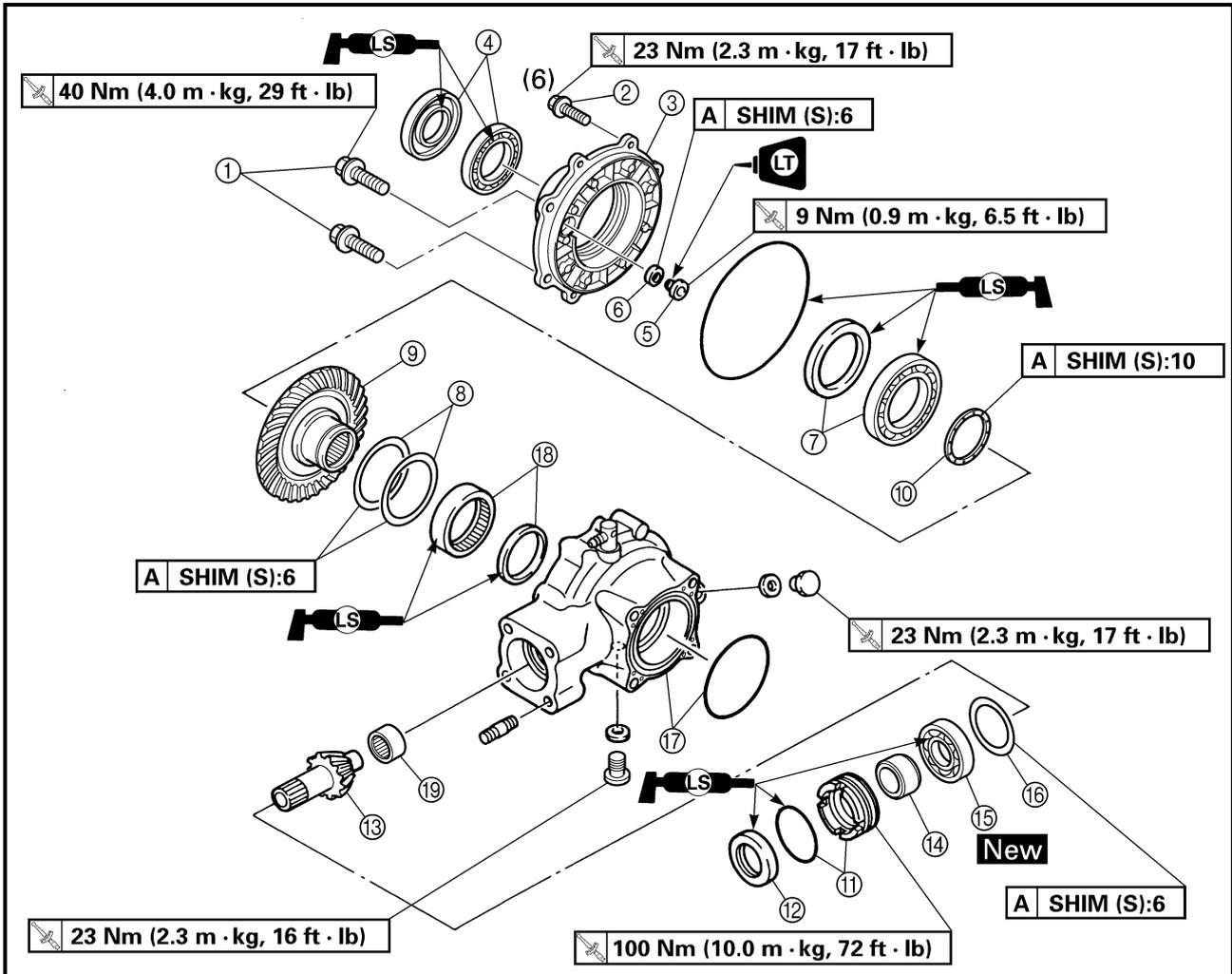
## REAR AXLE/FINAL DRIVE GEAR AND DRIVE SHAFT



Order	Job name/Part name	Q'ty	Remarks
	<b>Rear axle, final drive gear assembly and drive shaft removal</b>		Remove the parts in the order below.
	Final gear oil		Drain.
	Rear wheel hubs/brake disc		Refer to "FRONT AND REAR WHEELS" in CHAPTER 8.
1	O-ring	1	Disconnect. } Refer to "REAR AXLE REMOVAL/INSTALLATION".
2	Rear axle/dust cover	1/1	
3	Trailer hitch bracket	1	
4	Final drive gear case breather hose	1	
5	Final drive gear	1	
6	Coupling gear	1	
7	Drive shaft	1	
8	Circlip	2	
			For installation, reverse the removal procedure.

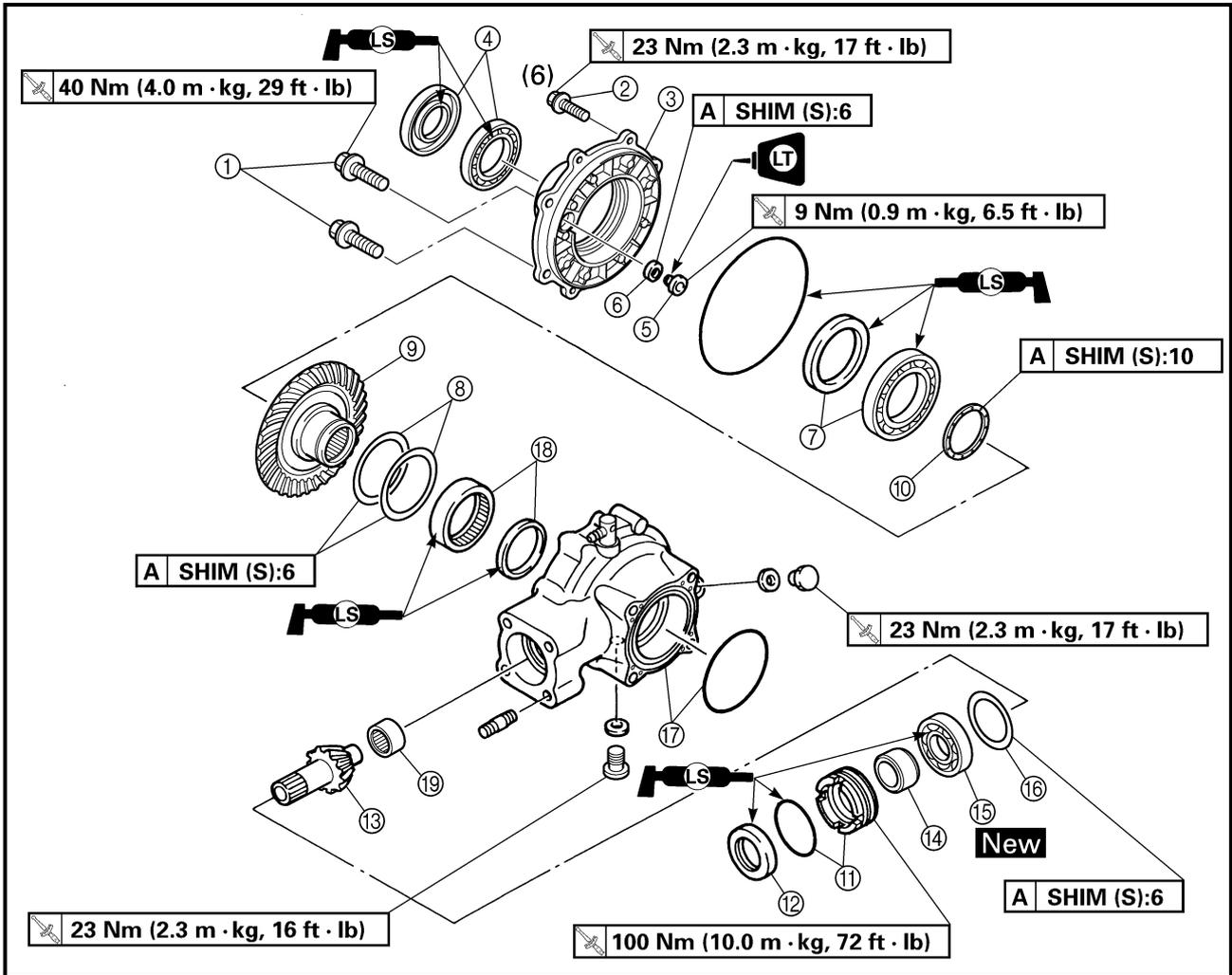
# REAR AXLE/FINAL DRIVE GEAR AND DRIVE SHAFT

DRIV



Order	Job name/Part name	Q'ty	Remarks
	<b>Final drive gear disassembly</b>		Disassemble the parts in the order below.
①	Bolt	2	<b>NOTE:</b> _____ Working in a crisscross pattern, loosen each bolt 1/4 of a turn. After all the bolts are loosened, remove them. _____
②	Bolt	6	
③	Bearing housing	1	
④	Oil seal/bearing	1/1	
⑤	Ring gear stopper	1	
⑥	Ring gear stopper shim	1	
⑦	Oil seal/bearing	1/1	
⑧	Ring gear shim	1	
⑨	Ring gear	1	
⑩	Thrust washer	1	

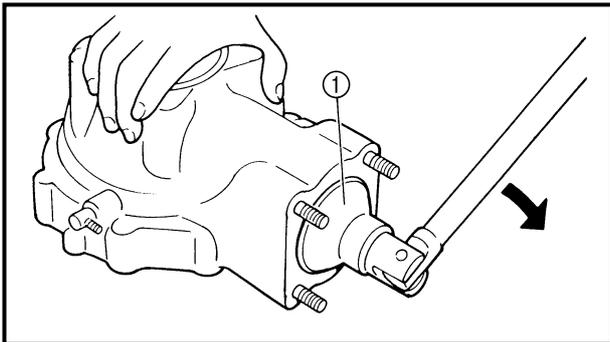
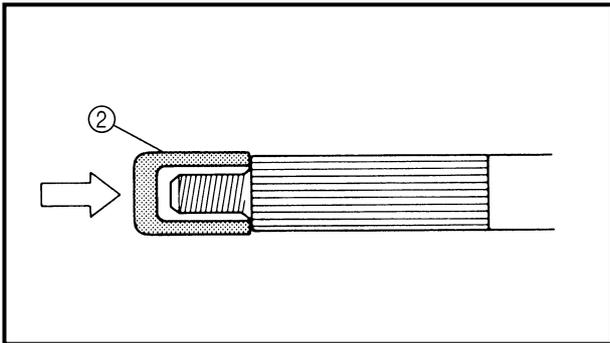
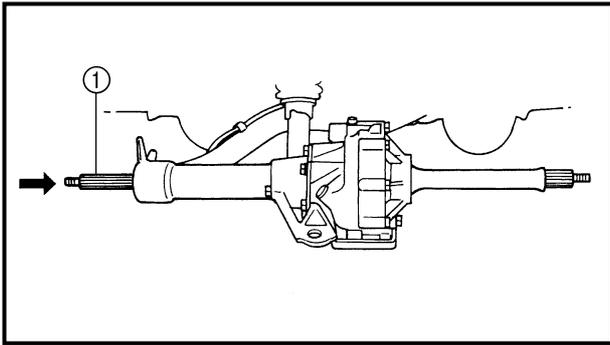
# REAR AXLE/FINAL DRIVE GEAR AND DRIVE SHAFT



Order	Job name/Part name	Q'ty	Remarks
⑪	Bearing retainer/O-ring	1/1	Refer to "FINAL DRIVE GEAR DISASSEMBLY/ASSEMBLY".
⑫	Oil seal	1	
⑬	Final drive pinion gear	1	
⑭	Collar	1	
⑮	Bearing	1	
⑯	Final drive pinion gear shim	1	
⑰	Final drive gear case/O-ring	1/1	Refer to "FINAL DRIVE ROLLER BEARING REMOVAL AND REASSEMBLY".
⑱	Bearing/oil seal	1/1	
⑲	Bearing	1	
			For assembly, reverse the disassembly procedure.

## REAR AXLE/FINAL DRIVE GEAR AND DRIVE SHAFT

DRIV



### REAR AXLE REMOVAL

1.Remove:

- Rear axle ① (with dust seal)
- O-ring

#### CAUTION:

- Never directly tap the axle end with a hammer, since this will result in damage to the axle thread and spline.
- Attach a suitable socket ② on the axle end and tap it with a soft hammer. Pull out the rear axle to the right.

### FINAL DRIVE GEAR DISASSEMBLY

1.Remove:

- Bearing retainer (final drive pinion gear)

#### NOTE:

Use a bearing retainer wrench ①.



Bearing retainer wrench:  
P/N. YM-04050, 90890-04050

#### CAUTION:

The final drive shaft bearing retainer has left-handed threads. To loosen the retainer, turn it clockwise.

2.Remove:

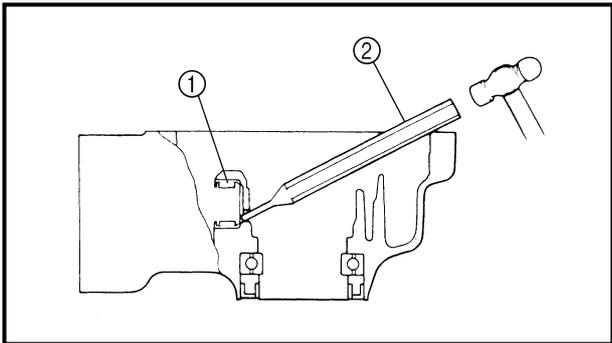
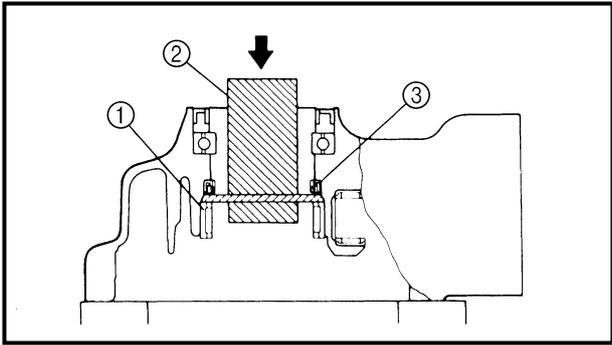
- Final drive pinion gear assembly  
With a soft hammer, lightly tap on the final drive pinion gear end.

#### CAUTION:

Removal of the final drive pinion gear should only be performed if gear replacement is necessary.

#### ⚠ WARNING

Always use new bearings and races.



## FINAL DRIVE ROLLER BEARING REMOVAL AND REASSEMBLY

1.Remove:

- Roller bearing (ring gear) ①  
Use a suitable press tool ② and an appropriate support for the main housing.
- Oil seal ③

2.Remove:

- Roller bearing (final drive pinion gear) ①

\*\*\*\*\*

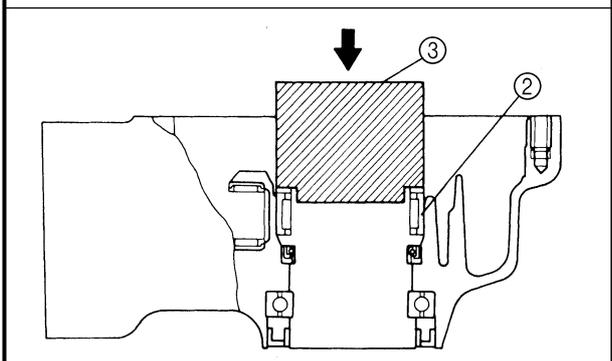
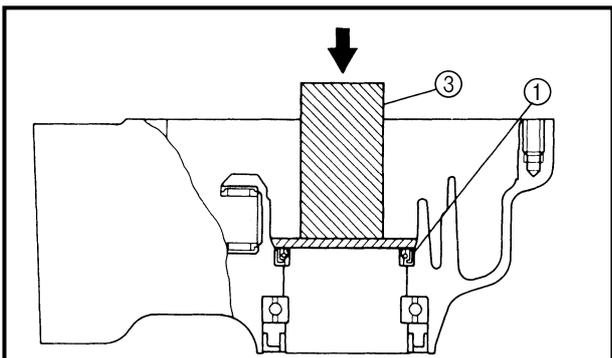
### Removal steps:

- Heat the main housing only to 150 °C (302 °F).
- Remove the roller bearing outer race with an appropriately shaped punch ②.
- Remove the inner race from the final drive pinion gear.

### NOTE:

The removal of the final drive pinion gear roller bearing is difficult and seldom necessary.

\*\*\*\*\*



3.Install:

- Roller bearing (final drive pinion gear) **New**

\*\*\*\*\*

### Installation steps:

- Heat the main housing only to 150 °C (302 °F).
- Install the roller bearing outer race using the proper adapter.
- Install the inner race onto the drive pinion gear.

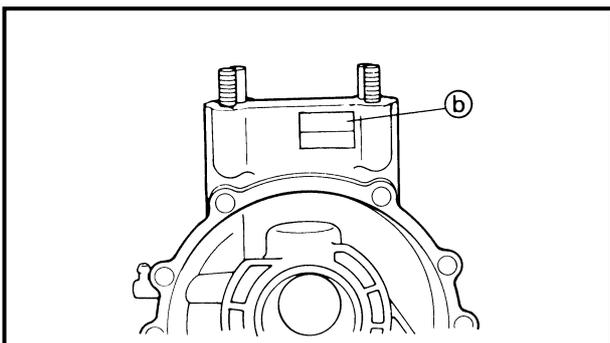
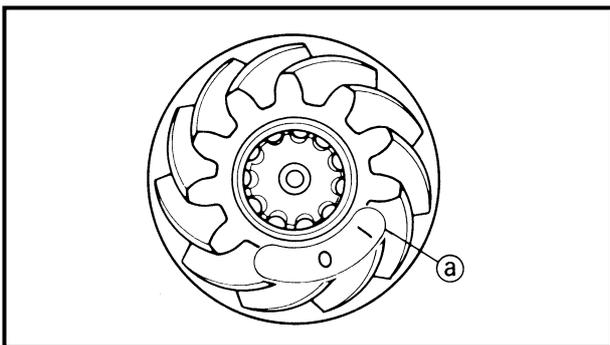
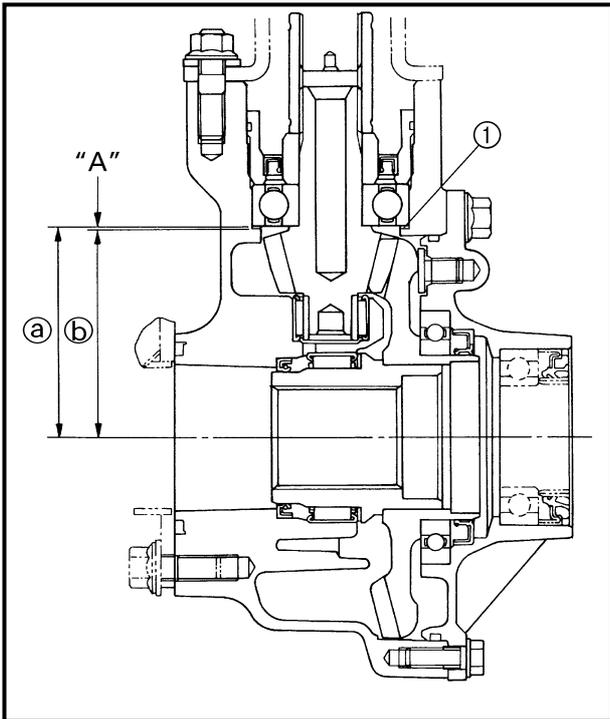
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4.Install:

- Oil seal ① **New**
- Roller bearing ②  
Use a suitable press tool ③ and a press to install the above components into the main housing.

**FINAL DRIVE PINION GEAR AND RING GEAR POSITIONING**

When the final drive pinion gear, ring gear, final gear case and/or ring gear bearing housing are replaced, be sure to adjust the positions of the final drive pinion gear and ring gear using the shim(s).



**Final drive pinion gear shim selection**

1. Select:

- Final drive pinion gear shim(s) ①

\*\*\*\*\*

**Shim selection steps:**

- To find the final drive pinion gear shim thickness "A", use the following formula.

**Final drive pinion gear shim thickness:**

$$"A" = a - b$$

- ① = a numeral (usually a decimal number) on the final drive pinion gear either added to or subtracted from "84"
- ② = a numeral (usually a decimal number) on the final gear case either added to or subtracted from "83"

Example:

- 1) If "01" is stamped on the final drive pinion gear,  
 $a = 84 + 0.01 = 84.01$
- 2) If "50" is stamped on the final gear case,  
 $b = 83 + 0.50 = 83.50$
- 3) Therefore, "A" is 0.51.  
 $"A" = 84.01 - 83.50 = 0.51$
- 4) Round off the hundredth digit and select the appropriate shim(s).  
 In the example above, the calculated number is 0.51. The chart instructs you to round off 1 to 0 at the hundredth place. Thus, the shim thickness is 0.50 mm.

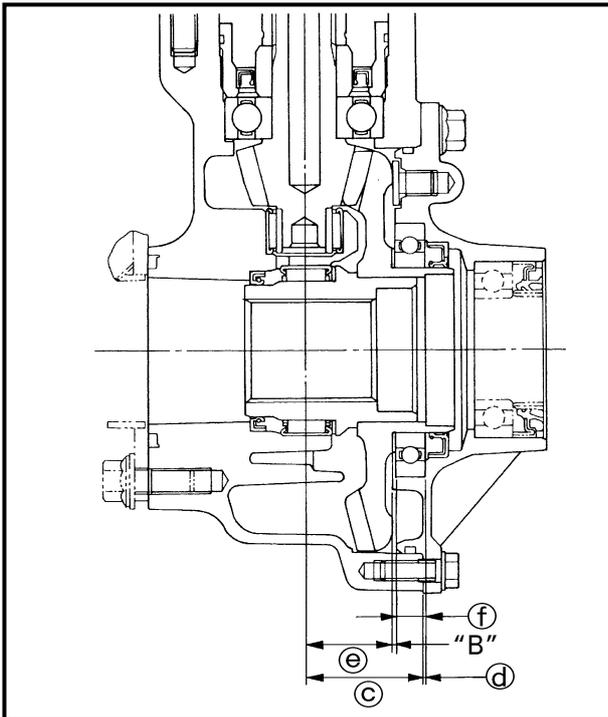
Hundredths	Rounded value
0, 1, 2	0
3, 4, 5, 6, 7	5
8, 9	10



Shims are supplied in the following thicknesses.

	<b>Final drive pinion gear shim</b>		
<b>Thickness (mm)</b>	<b>0.15</b>	<b>0.30</b>	<b>0.40</b>
	<b>0.45</b>	<b>0.50</b>	<b>0.60</b>

\*\*\*\*\*



### Ring gear shim selection

1. Select:

- Ring gear shim(s) ①

\*\*\*\*\*

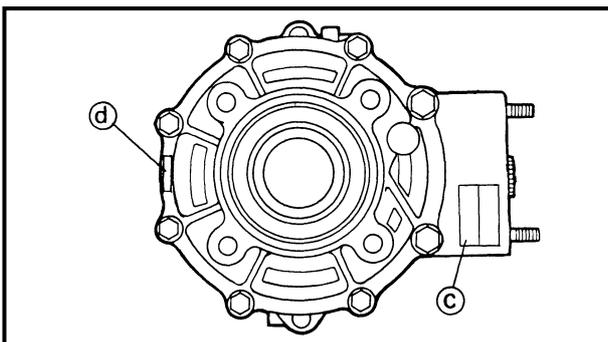
### Shim selection steps:

- To find the ring gear shim thickness "B", use the following formula.

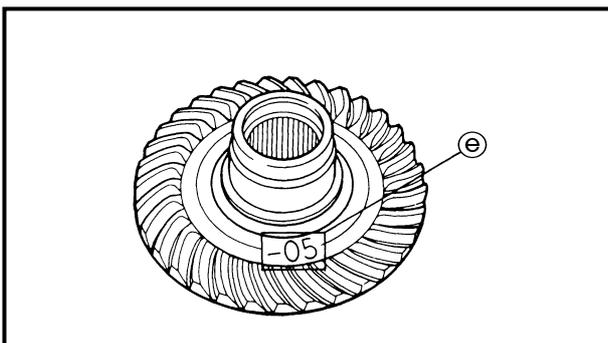
#### Ring gear shim thickness:

$$"B" = c + d - (e + f)$$

- ① = a numeral (usually a decimal number) on the final gear case either added to or subtracted from 45
- ② = a numeral (usually a decimal number) on the outside of the ring gear bearing housing and added to 1
- ③ = a numeral (usually a decimal number) on the inside of the ring gear either added to or subtracted from 35.00
- ④ = bearing thickness (considered constant)



	<b>Bearing thickness ④:</b> <b>11.00 mm</b>
---	--



Example:

- 1) If "53" is stamped on the final gear case,  
 $c = 45 + 0.53 = 45.53$
- 2) If "05" is stamped on the ring gear bearing housing,  
 $d = 1 + 0.05 = 1.05$
- 3) If "-05" is stamped on the ring gear,  
 $e = 35 - 0.05 = 34.95$
- 4) ④ = 11.00.



- 5) Therefore, shim thickness "B" is 0.63.  

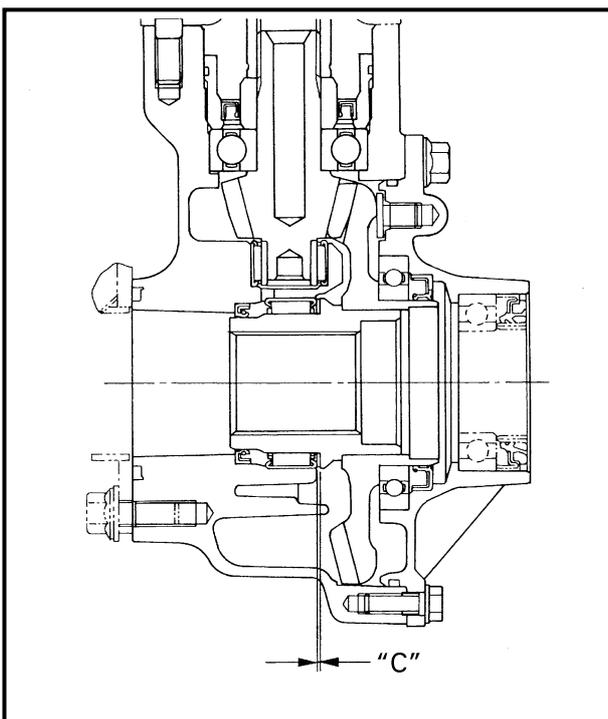
$$\begin{aligned} \text{"B"} &= 45.53 + 1.05 - (34.95 + 11.00) \\ &= 46.58 - 45.95 \\ &= 0.63 \end{aligned}$$
- 6) Round off the hundredth digit and select the appropriate shim(s).  
 In the example above, the calculated number is 0.63. The chart instructs you to round off 3 to 5 at the hundredth place.  
 Thus, the shim thickness is 0.65 mm.

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

Shims are supplied in the following thicknesses.

 <b>Ring gear shim</b>				
Thickness (mm)	0.25	0.30	0.35	
	0.40	0.45	0.50	

\*\*\*\*\*



### Thrust washer selection

1.Measure/select:

- Ring gear thrust clearance "C"

\*\*\*\*\*

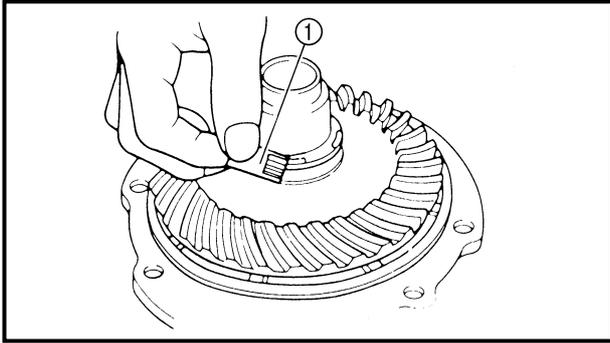
### Thrust clearance measurement steps:

- Place four pieces of Plastigage® between the originally fitted thrust washer and the ring gear.
- Install the ring gear assembly and tighten the bolts to specification.

	<b>M8 Bolts (bearing housing):</b>
	<b>23 Nm (2.3 m • kg, 17 ft • lb)</b>
	<b>M10 Bolts (bearing housing):</b>
	<b>40 Nm (4.0 m • kg, 29 ft • lb)</b>

### NOTE:

Do not turn the drive pinion gear and ring gear when measuring the clearance with Plastigage®.



- Remove the ring gear assembly.
- Measure the thrust clearance. Calculate the width of the flattened Plastigauge® ①.

	<b>Ring gear thrust clearance:</b> 0.1 ~ 0.2 mm (0.004 ~ 0.008 in)
---	---

- If out of specification, select the correct washer.

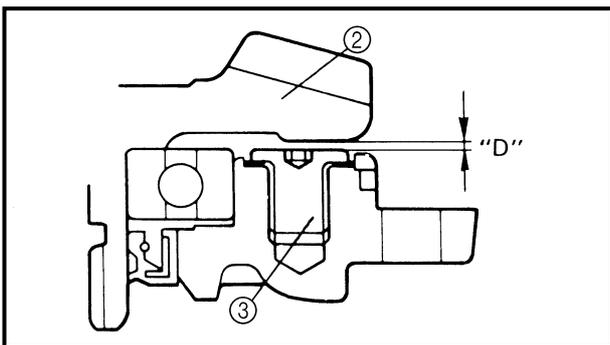
### Thrust washer selection steps:

- Select a suitable thrust washer using the following chart.

	<b>Thrust washer</b>		
<b>Thickness (mm)</b>	1.2 1.5 1.8 2.1	1.3 1.6 1.9	1.4 1.7 2.0

- Repeat the measurement steps until the ring gear thrust clearance is within the specified limits.

\*\*\*\*\*



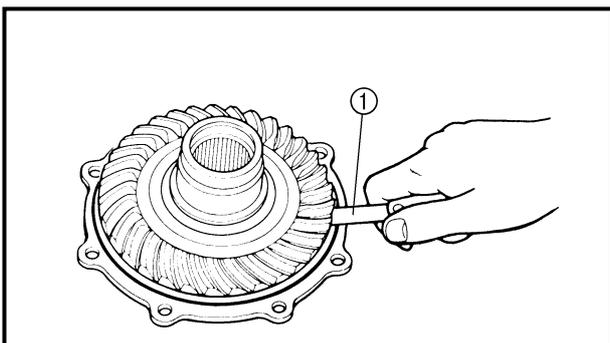
### Ring gear stopper shim selection

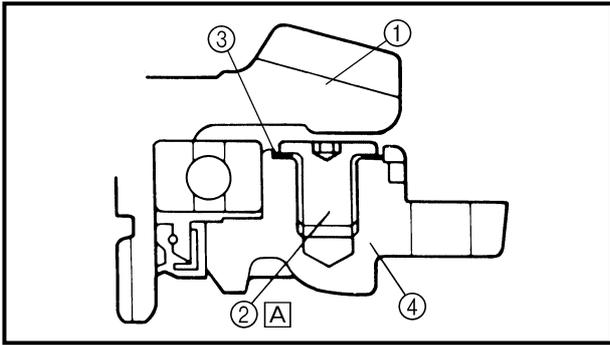
1.Measure:

- Ring gear stopper clearance "D"  
Use a feeler gauge ①.  
Out of specification → Adjust.

	<b>Ring gear stopper clearance "D":</b> 0.30 ~ 0.60 mm (0.012 ~ 0.024 in)
---	--

- ② Ring gear
- ③ Ring gear stopper





## Ring gear stopper clearance adjustment

1.Remove:

- Ring gear ①
- Ring gear stopper ②
- Shim(s) ③
- ④ Bearing housing
- Ⓐ Left-hand threads

2.Select:

- Suitable shim(s)

 Shim				
Thickness (mm)	0.10	0.15	0.20	
	0.30	0.40	0.50	

3.Install:

- Shim(s)
- Ring gear stopper (left-hand threads)

 9 Nm (0.9 m · kg, 6.5 ft · lb)

- Ring gear

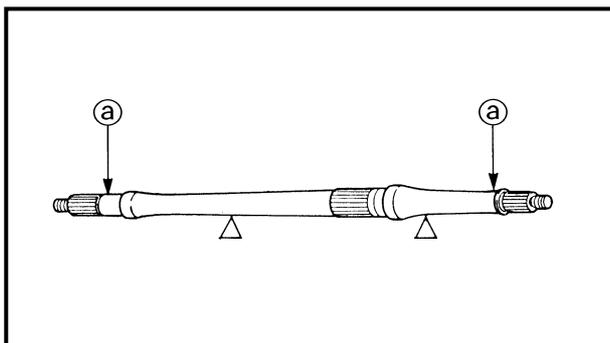
### NOTE:

Use LOCTITE® on the ring gear stopper.

4.Measure:

- Ring gear stopper clearance  
Out of specification → Repeat adjustment steps.

 Ring gear stopper clearance: 0.30 ~ 0.60 mm (0.012 ~ 0.024 in)
---



## REAR AXLE INSPECTION

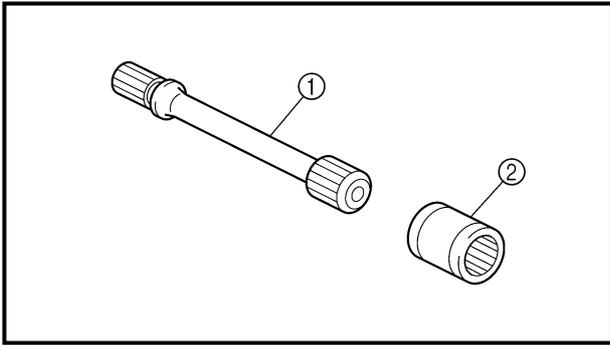
1.Inspect:

- Rear axle runout Ⓐ  
Out of specification → Replace.

### ⚠ WARNING

Do not attempt to straighten a bent axle.

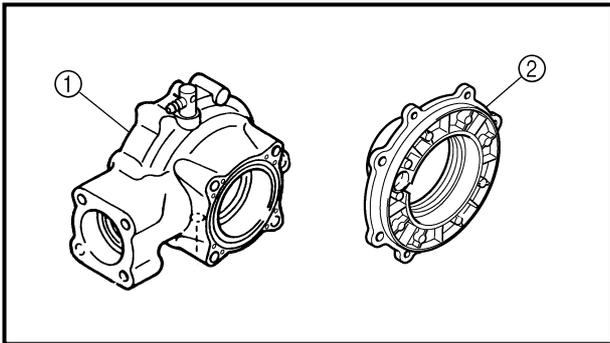
 Rear axle runout limit: 1.5 mm (0.06 in)
---



## DRIVE SHAFT INSPECTION

1. Inspect:

- Drive shaft (splines) ①
  - Coupling gear (splines) ②
- Wear/damage → Replace.



## FINAL DRIVE GEAR INSPECTION

1. Inspect:

- Final gear case ①
  - Bearing housing (ring gear) ②
- Cracks/damage → Replace.

### NOTE:

When the final gear case and/or the ring gear bearing housing are replaced, be sure to adjust the shim of the final drive pinion gear and/or ring gear.

2. Inspect:

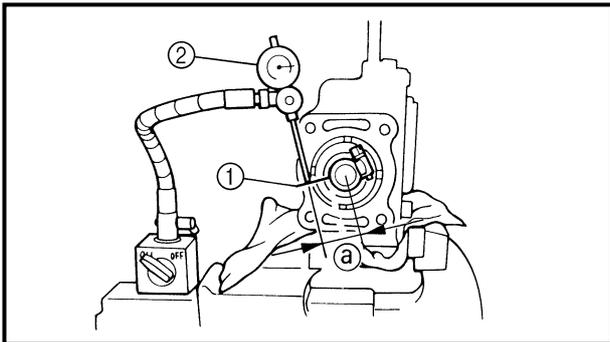
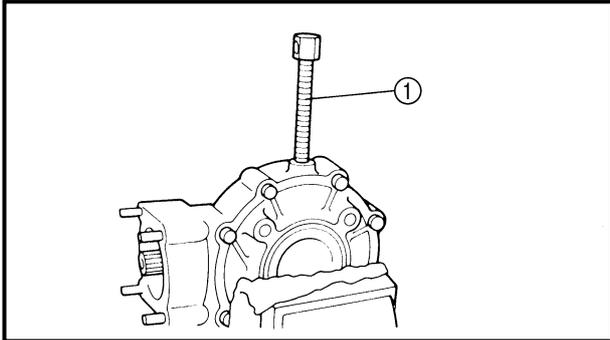
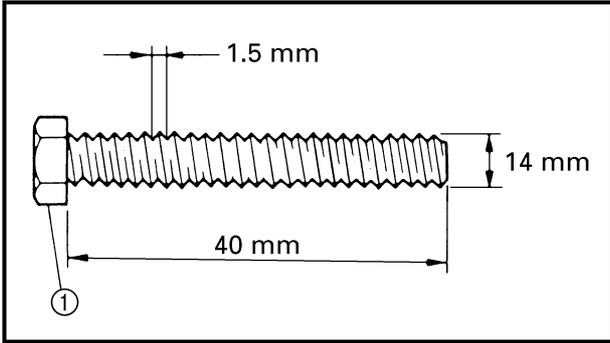
- Gear teeth
- Pitting/galling/wear → Replace the drive pinion gear and ring gear as a set.
- Oil seals
  - O-rings
- Damage → Replace.

3. Inspect:

- Bearings
- Damage → Replace.

### NOTE:

- Reusing roller bearings is acceptable, but Yamaha recommends installing new ones. Do not reuse the oil seal.
- When the final drive pinion gear and/or ring gear are replaced, be sure to adjust the shim of the final drive pinion gear and/or ring gear.



## FINAL GEAR LASH MEASUREMENT AND ADJUSTMENT

### Final gear lash measurement

1. Secure the gear case in a vise or another supporting device.
2. Remove:
  - Drain plug
  - Gasket
3. Install:
  - A bolt of the specified size ① (into the drain plug hole)

**CAUTION:**

**Finger tighten the bolt until it holds the ring gear. Otherwise, the ring gear will be damaged.**

4. Attach:

- Gear lash measurement tool ①
- Dial gauge ②



**Gear lash measurement tool:  
P/N. YM-01231, 90890-01231**

Ⓐ Measuring point is 27 mm (1.06 in)

5. Measure:

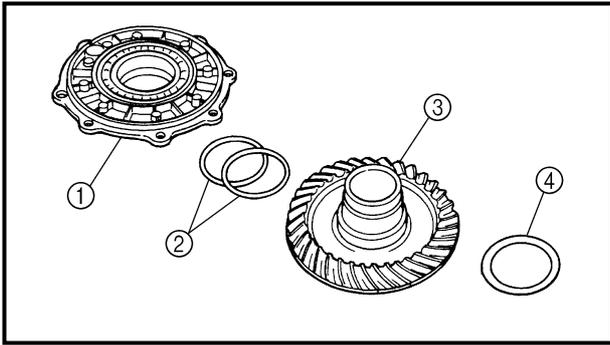
- Gear lash  
Gently rotate the gear coupling from engagement to engagement.



**Final gear lash:  
0.1 ~ 0.2 mm (0.004 ~ 0.008 in)**

**NOTE:**

Measure the gear lash at four positions. Rotate the shaft 90° each time.



## Final gear lash adjustment

1.Remove:

- Bearing housing ①
- Ring gear shim(s) ②
- Ring gear ③
- Thrust washer ④

2.Adjust:

- Gear lash

\*\*\*\*\*

### Adjustment steps:

- Select a suitable shim(s) and thrust washer(s) using the following chart.

<b>Too little gear lash</b>	<b>Reduce shim thickness.</b>
<b>Too large gear lash</b>	<b>Increase shim thickness.</b>

- If increased by more than 0.2 mm (0.008 in):

Reduce the thrust washer thickness by 0.2 mm (0.008 in) for every 0.2 mm of ring gear shim increase.

- If reduced by more than 0.2 mm (0.008 in): Increase the thrust washer thickness by 0.2 mm (0.008 in) for every 0.2 mm that the ring gear shim is decreased.

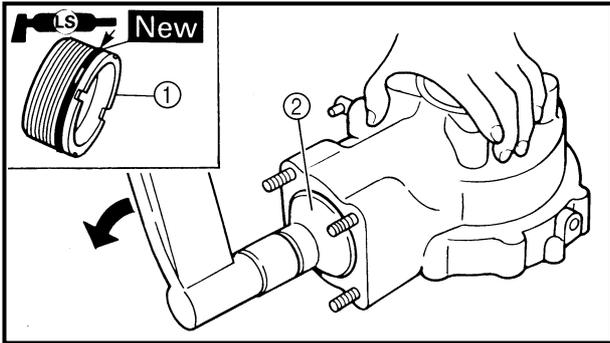
	<b>Ring gear shim</b>			
<b>Thickness (mm)</b>	<b>0.25</b>	<b>0.30</b>	<b>0.35</b>	<b>0.40</b>
	<b>0.40</b>	<b>0.45</b>	<b>0.50</b>	

	<b>Thrust washer</b>			
<b>Thickness (mm)</b>	<b>1.2</b>	<b>1.3</b>	<b>1.4</b>	<b>1.5</b>
	<b>1.5</b>	<b>1.6</b>	<b>1.7</b>	<b>1.8</b>
	<b>1.8</b>	<b>1.9</b>	<b>2.0</b>	
	<b>2.1</b>			

\*\*\*\*\*

## REAR AXLE/FINAL DRIVE GEAR AND DRIVE SHAFT

DRIV



### FINAL DRIVE GEAR ASSEMBLY

#### 1.Install:

- Drive pinion gear (with shim(s) and bearing)
- Bearing retainer (drive pinion gear) ①

100 Nm (10.0 m · kg, 72 ft · lb)

Use a bearing retainer wrench ②.

### CAUTION:

- Always use a new bearing.
- The final drive shaft bearing retainer has left-hand threads. Turn the retainer counterclockwise to tighten it.



**Bearing retainer wrench:**  
P/N. YM-04050, 90890-04050

#### 2.Adjust:

- Final gear lash  
Refer to "FINAL GEAR LASH MEASUREMENT AND ADJUSTMENT".

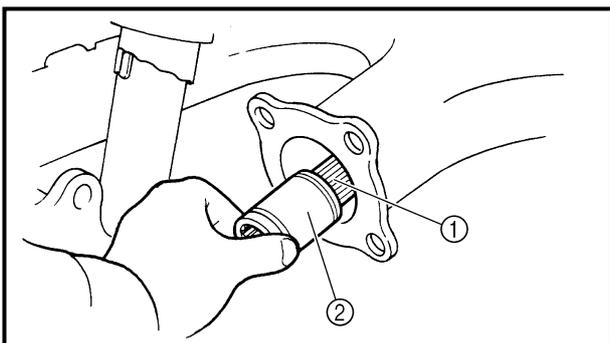
### FINAL DRIVE GEAR INSTALLATION

#### 1.Lubricate:

- Drive shaft
- Coupling gear
- O-ring
- Oil seal
- Bearing



**Lithium-soap base grease**

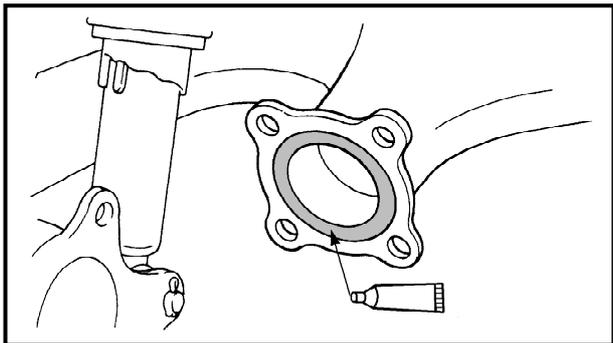
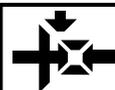


#### 2.Install:

- Drive shaft ①
- Coupling gear ②  
(to the universal joint)

## REAR AXLE/FINAL DRIVE GEAR AND DRIVE SHAFT

DRIV



### 3. Apply:

- Sealant (Quick Gasket®)  
(to the mating surfaces of the swingarm and the final drive gear case)



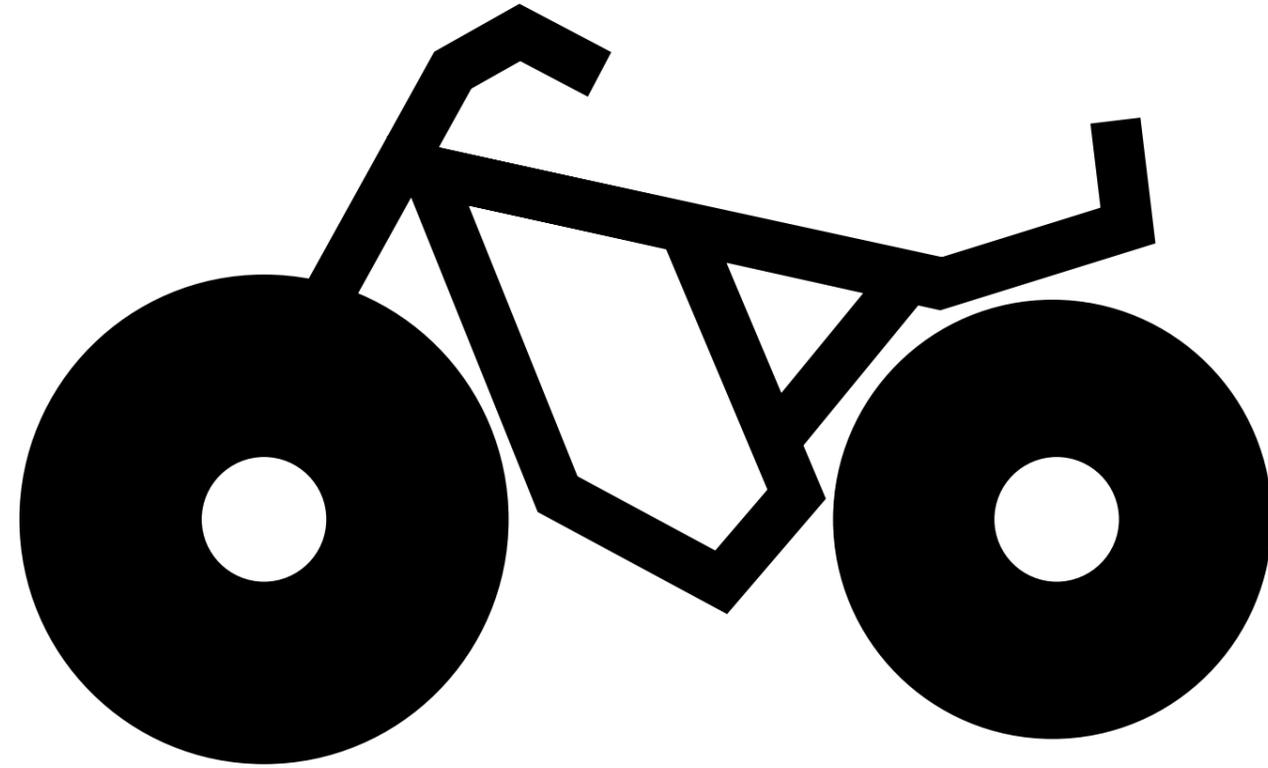
**Sealant (Quick gasket®):**  
**P/N. ACC-11001-05-01**  
**Yamaha bond No.1215®:**  
**P/N. 90890-85505**

### 4. Install:

- Final drive gear

• Nuts   **57 Nm (5.7 m · kg, 41 ft · lb)**

• Bolts   **63 Nm (6.3 m · kg, 45 ft · lb)**



**CHAS**

**88**

## CHAPTER 8. CHASSIS

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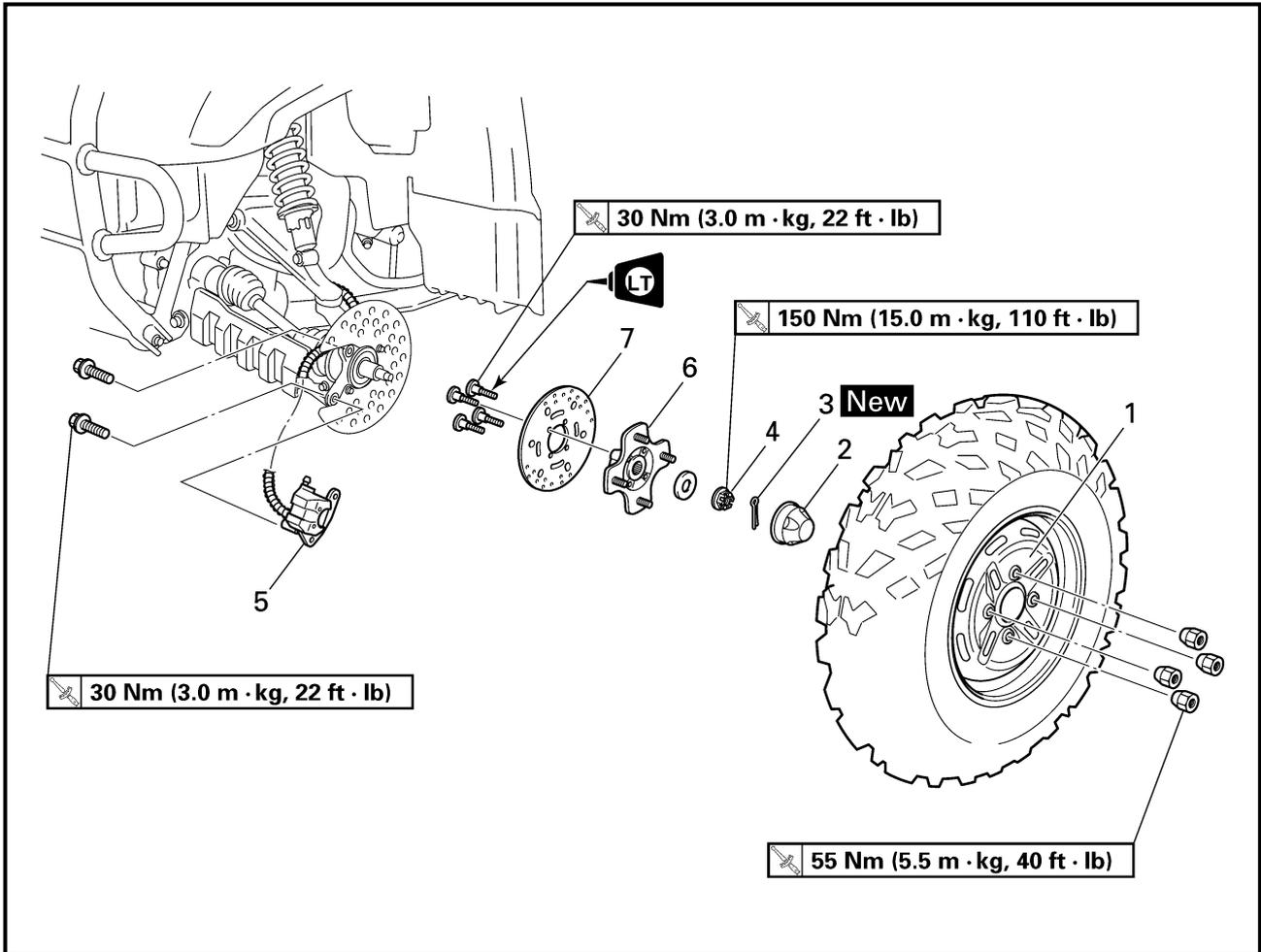
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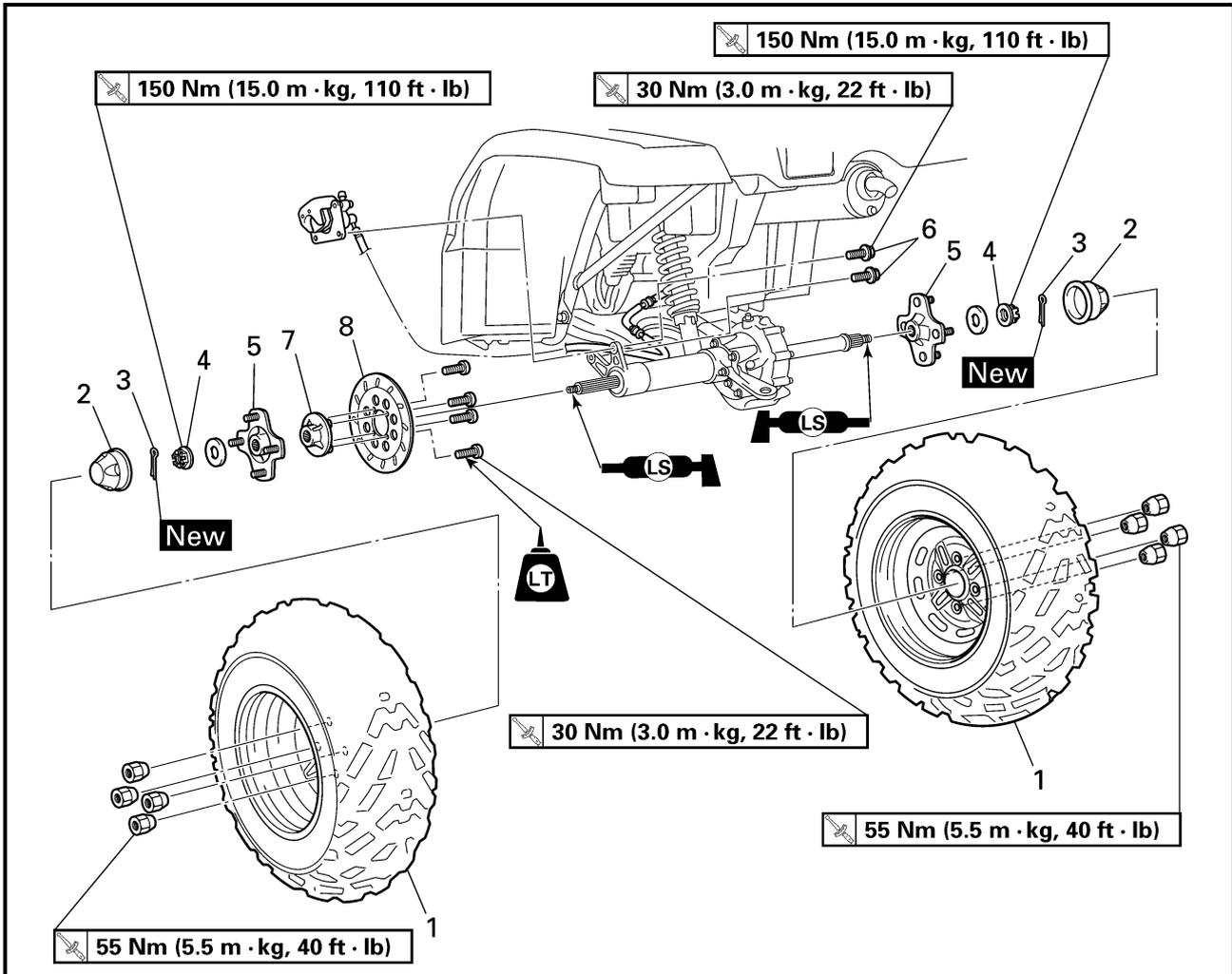
**FRONT AND REAR WHEELS**

**FRONT WHEELS**

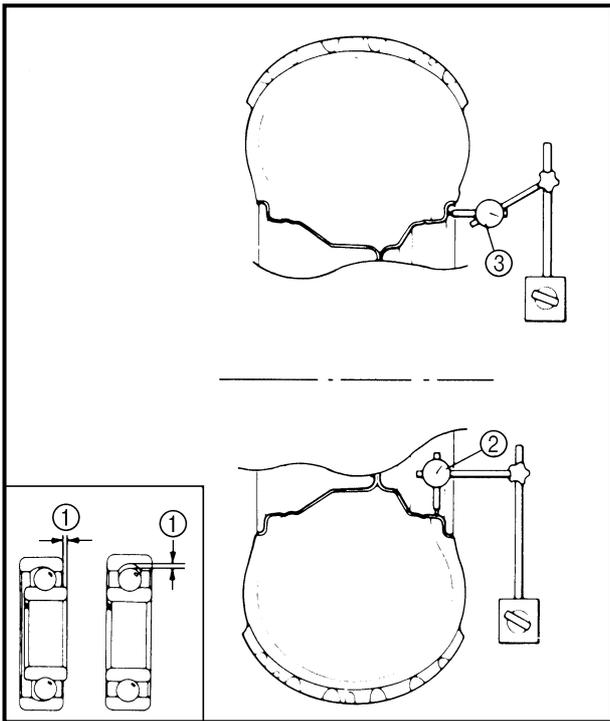


Order	Job name/Part name	Q'ty	Remarks
	<b>Front wheel removal</b>		Remove the parts in the order below. Place the machine on a level surface.
			<b>⚠ WARNING</b> _____ Securely support the machine so there is no danger of it falling over.
1	Front wheel	1	Refer to "WHEEL INSTALLATION".
2	Wheel cap	1	Refer to "WHEEL HUB/BRAKE DRUM INSTALLATION".
3	Cotter pin	1	
4	Axle nut	1	
5	Brake caliper assembly	1	
			<b>NOTE:</b> _____ Do not squeeze the brake lever when the brake caliper is off of the brake disc as the brake pads will be forced shut.
6	Wheel hub	1	For installation, reverse the removal procedure.
7	Brake disc	1	

REAR WHEELS



Order	Job name/Part name	Q'ty	Remarks
	<b>Rear wheel removal</b>		Remove the parts in the order below. Place the machine on a level surface.
			<b>⚠ WARNING</b> Securely support the machine so there is no danger of it falling over.
1	Rear wheel	2	Refer to "WHEEL INSTALLATION".
2	Wheel cap	2	
3	Cotter pin	2	
4	Axle nut	2	
5	Wheel hub	2	
6	Brake caliper mounting bolt	2	
7	Brake disc bracket	1	
8	Brake disc	1	
			For installation, reverse the removal procedure.



## WHEEL INSPECTION

1. Inspect:

- Wheel

2. Measure:

- Wheel runout

Over the specified limit → Replace the wheel or check the wheel bearing play ①.



**Wheel runout limit:**

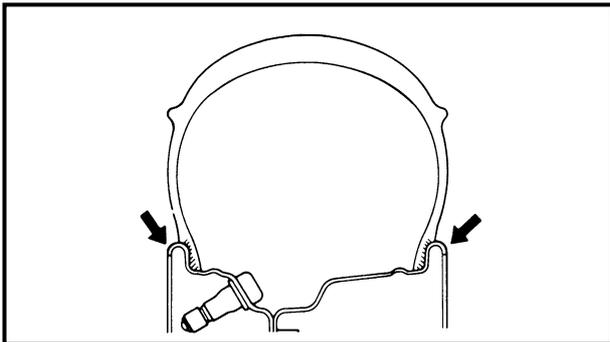
**Radial ②: 2.0 mm (0.08 in)**

**Lateral ③: 2.0 mm (0.08 in)**

3. Check:

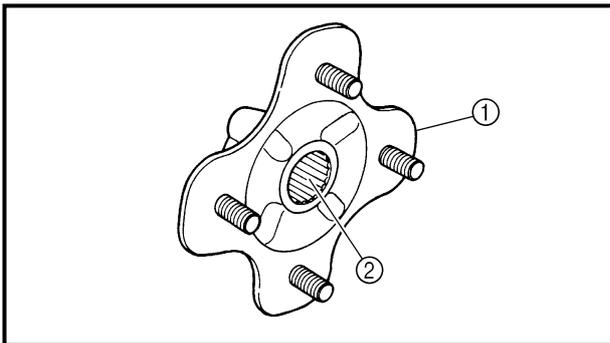
- Wheel balance

Out of balance → Adjust.



## ⚠ WARNING

After replacing the tire, ride conservatively to allow the tire to be properly seated in the rim. Failure to do so may cause an accident resulting in machine damage and possible operator injury.



## WHEEL HUB INSPECTION

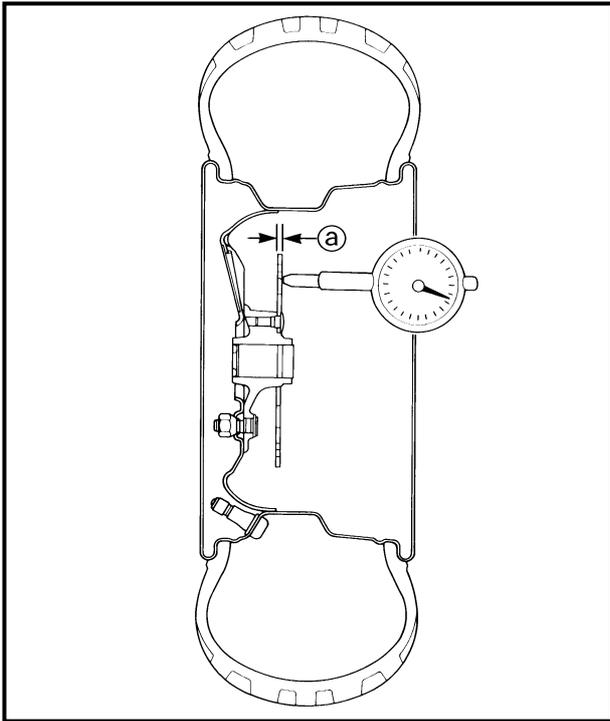
1. Inspect:

- Wheel hub ①

Cracks/damage → Replace.

- Splines (wheel hub) ②

Wear/damage → Replace.



## BRAKE DISC INSPECTION

1. Inspect:

- Brake disc  
Galling/damage → Replace.

2. Measure:

- Brake disc deflection  
Out of specification → Inspect the wheel runout.  
If wheel runout is within the limits, replace the brake disc.

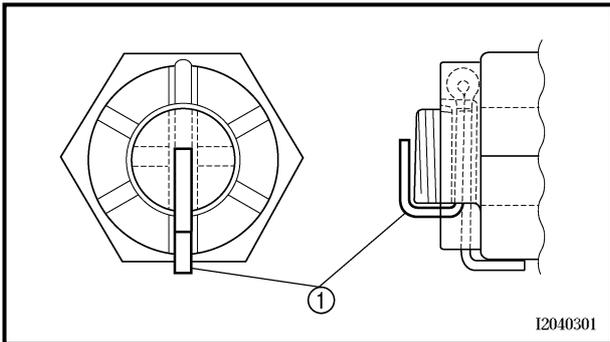


**Brake disc maximum deflection:  
0.15 mm (0.006 in)**

- Brake disc thickness ①  
Out of specification → Replace.



**Brake disc minimum thickness:  
3 mm (0.12 in)**



## WHEEL HUB/BRAKE DRUM INSTALLATION

1. Install:

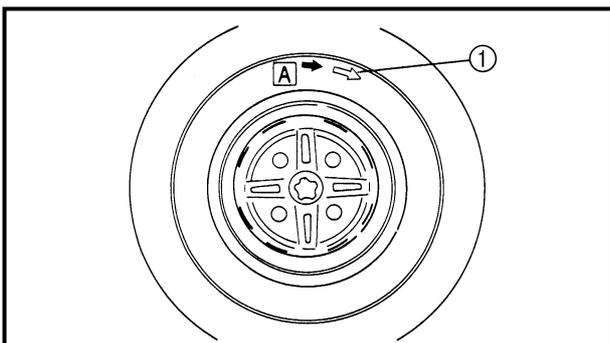
- Cotter pin ① **New**

**NOTE:**

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

2. Adjust:

- Front brake lever free play  
Refer to "FRONT BRAKE ADJUSTMENT" in CHAPTER 3.
- Rear brake lever and pedal free play  
Refer to "REAR BRAKE LEVER AND PEDAL ADJUSTMENT" in CHAPTER 3.



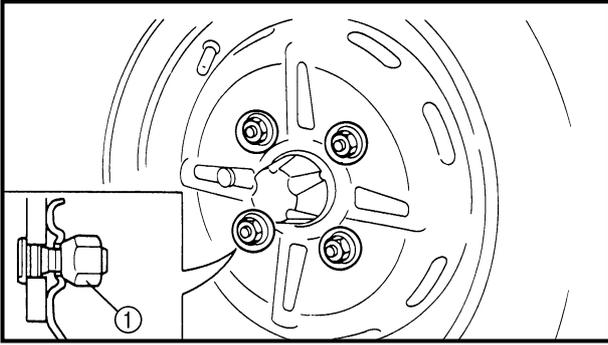
## WHEEL INSTALLATION

1. Install:

- Wheel

**NOTE:**

The arrow mark ① on the tire must point in the direction of rotation **A** of the wheel.



2.Tighten:

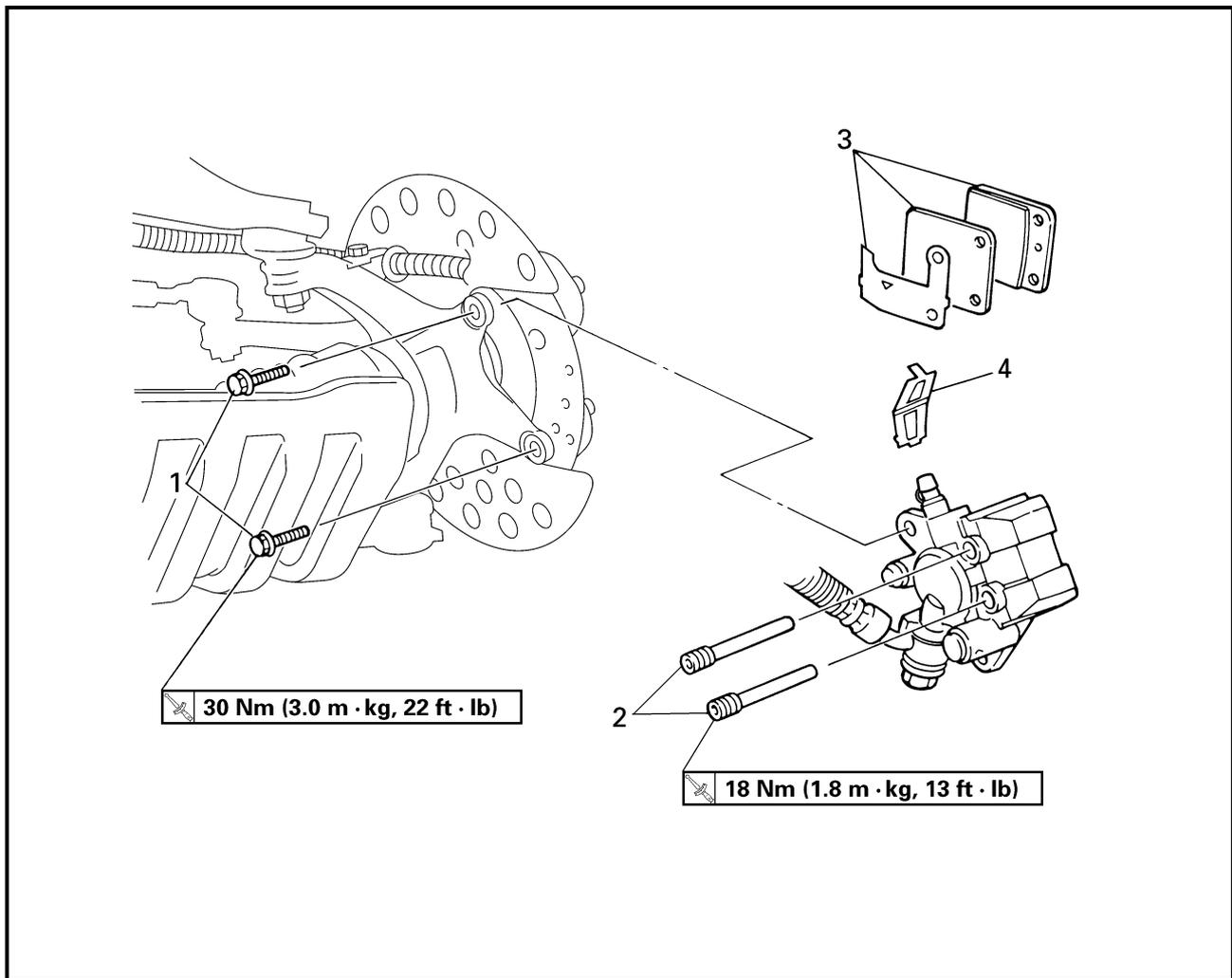
- Nuts (wheel) ①

**⚠ WARNING**

**Tapered wheel nuts ① are used for both the front and rear wheels. Install each nut with its tapered side towards the wheel.**

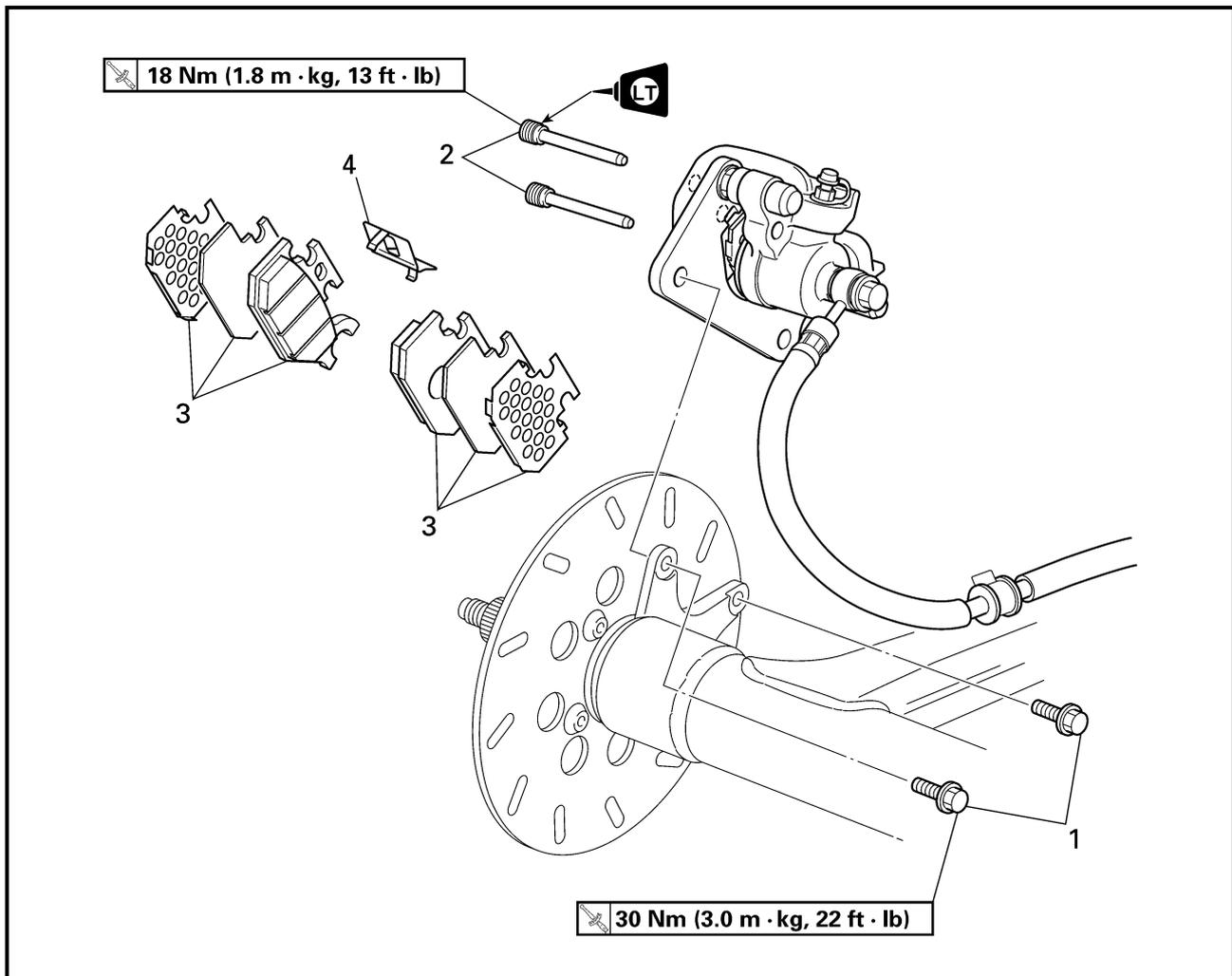
**FRONT AND REAR BRAKES**

**FRONT BRAKE PADS**



Order	Job name/Part name	Q'ty	Remarks
	<b>Front brake pads removal</b>		Remove the parts in the order below. Refer to "FRONT AND REAR WHEELS".
	Front wheel		
1	Brake caliper mounting bolt	2	Refer to "FRONT BRAKE PAD REPLACEMENT".
2	Brake pad holding bolt	2	
3	Brake pad/pad shim	2/1	
4	Pad spring	1	
			For installation, reverse the removal procedure.

REAR BRAKE PADS



Order	Job name/Part name	Q'ty	Remarks
	<b>Rear brake pads removal</b> Rear wheel (left)		Remove the parts in the order below. Refer to "FRONT AND REAR WHEELS".
1	Brake caliper mounting bolt	2	Refer to "REAR BRAKE PAD REPLACEMENT".
2	Brake pad holding bolt	2	
3	Brake pad/insulator/pad shim	2/2/2	
4	Pad spring	1	
			For installation, reverse the removal procedure.



**CAUTION:**

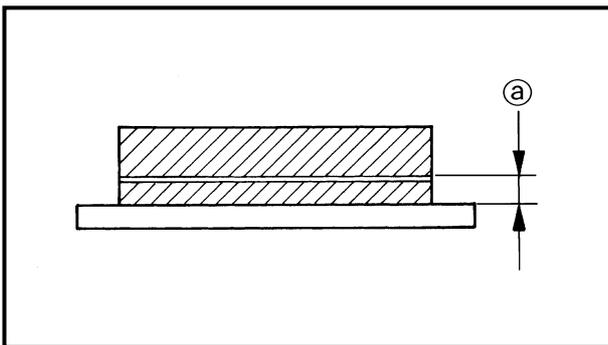
Disc brake components rarely require disassembly. **DO NOT:**

- disassemble components unless absolutely necessary;
- use solvents on internal brake components;
- use spent brake fluid for cleaning; (use only clean brake fluid)
- allow brake fluid to come in contact with the eyes, as this may cause eye injury;
- splash brake fluid onto painted surfaces or plastic parts, as this may cause damage;
- disconnect any hydraulic connection, as this would require the entire brake system to be disassembled, drained, cleaned, properly filled and bled after reassembly.

## FRONT BRAKE PAD REPLACEMENT

**NOTE:**

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



1.Measure:

- Brake pad wear limit (a)  
Out of specification → Replace the brake pad as a set.



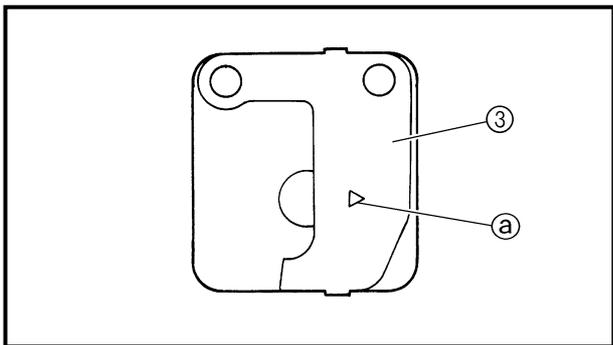
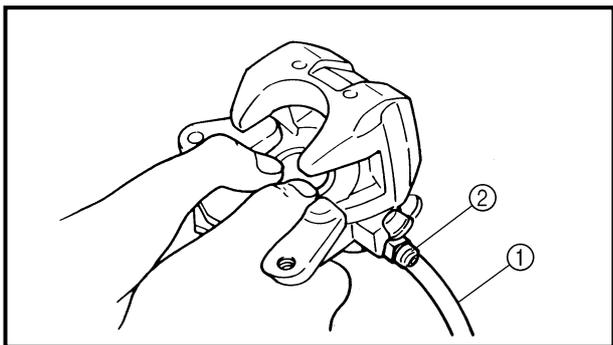
**Brake pad wear limit:  
1 mm (0.04 in)**

2.Install:

- Brake pads
- Brake pad spring

**NOTE:**

Always install new brake pads, brake pad shim and brake pad spring as a set.



\*\*\*\*\*

**Installation steps:**

- Connect a suitable hose ① tightly to the brake caliper bleed screw ②. Put the other end of this hose into an open container.
- Loosen the brake caliper bleed screw and, using a finger, push the caliper piston into the brake caliper.
- Tighten the brake caliper bleed screw.



**Brake caliper bleed screw:**  
**6 Nm (0.6 m · kg, 4.3 ft · lb)**

- Install new brake pads, new pad shims ③ and a new brake pad spring.
- Install the retaining bolts and brake caliper.

**NOTE:**

The arrow mark ① on the pad shim must point in the direction of the disc rotation.



**Brake pad holding bolt:**  
**18 Nm (1.8 m · kg, 13 ft · lb)**  
**Brake caliper mounting bolt:**  
**30 Nm (3.0 m · kg, 22 ft · lb)**

\*\*\*\*\*

**3. Inspect:**

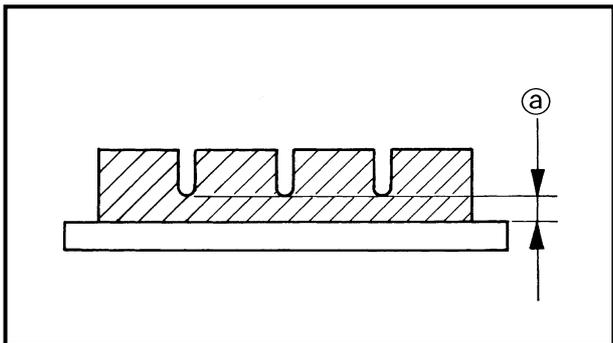
- Brake fluid level  
 Refer to "BRAKE FLUID LEVEL INSPECTION" in CHAPTER 3.

**4. Check:**

- Brake lever operation  
 Soft or spongy feeling → Bleed the front brake system.  
 Refer to "AIR BLEEDING (HYDRAULIC BRAKE SYSTEM)" in CHAPTER 3.

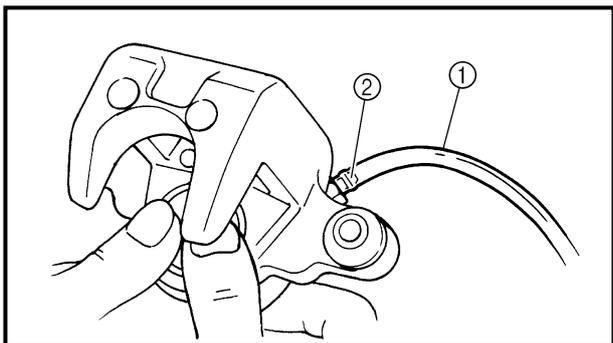
**REAR BRAKE PAD REPLACEMENT**

**NOTE:** \_\_\_\_\_  
It is not necessary to disassemble the brake caliper and brake hose to replace the brake pads.



- 1.Measure:
- Brake pad wear limit (a)  
Out of specification → Replace the brake pad as a set.

	<b>Brake pad wear limit:</b> 1 mm (0.04 in)
---	--



- 2.Install:
- Brake pads
  - Brake pad spring

**NOTE:** \_\_\_\_\_  
Always install new brake pads, brake pad shims, insulator and brake pad spring as a set.

\*\*\*\*\*

**Installation steps:**

- Connect a suitable hose (1) tightly to the brake caliper bleed screw (2). Put the other end of this hose into an open container.
- Loosen the brake caliper bleed screw and, using a finger, push the caliper piston into the brake caliper.
- Tighten the brake caliper bleed screw.

	<b>Brake caliper bleed screw:</b> 6 Nm (0.6 m · kg, 4.3 ft · lb)
---	---

- Install new brake pads, new insulator, new pad shims and a new brake pad spring.
- Install the retaining bolts and brake caliper.

	<b>Brake pad holding bolt:</b> 18 Nm (1.8 m · kg, 13 ft · lb)
	<b>Brake caliper mounting bolt:</b> 30 Nm (3.0 m · kg, 22 ft · lb)

\*\*\*\*\*



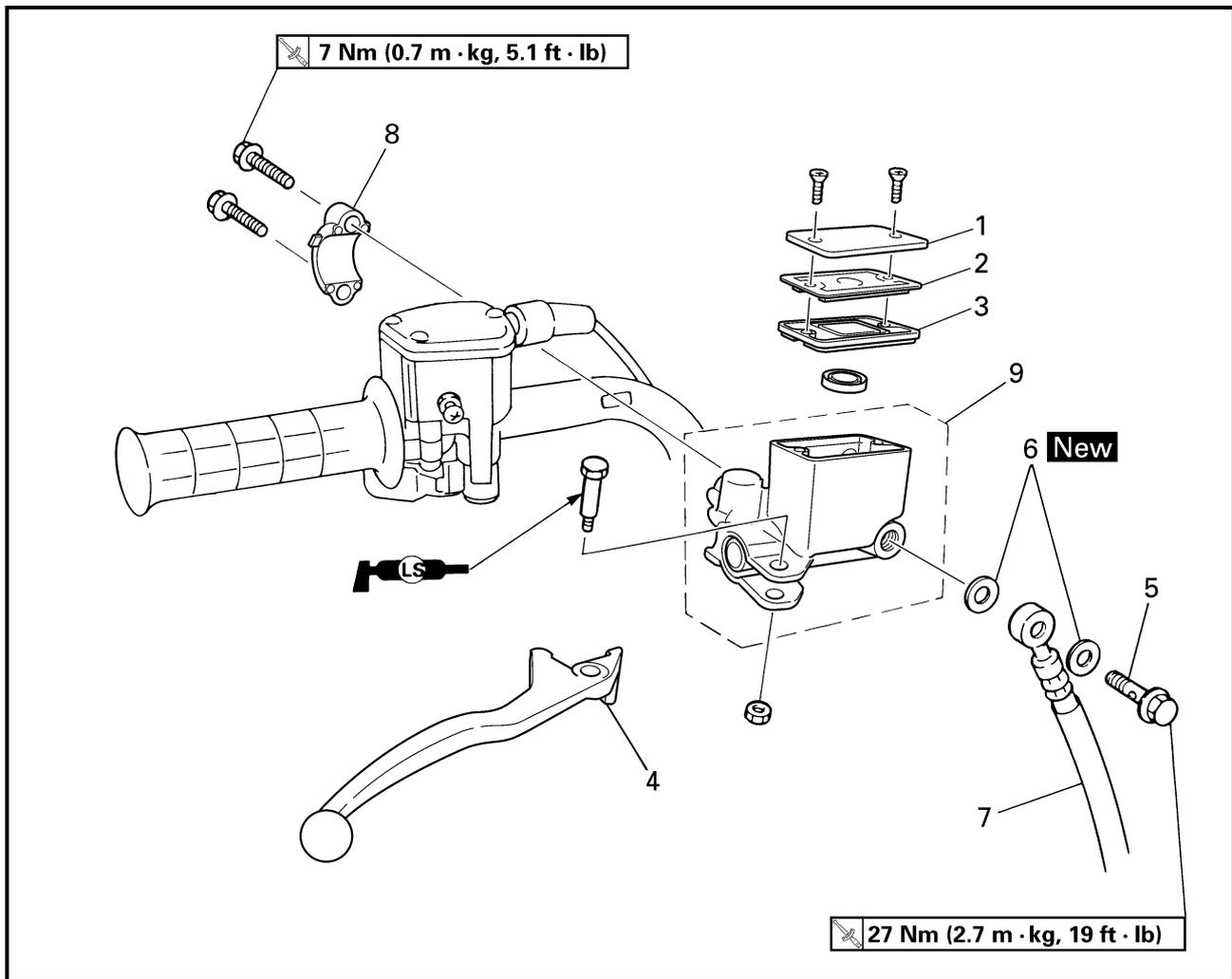
### 3. Inspect:

- Brake fluid level  
Refer to "BRAKE FLUID LEVEL INSPECTION" in CHAPTER 3.

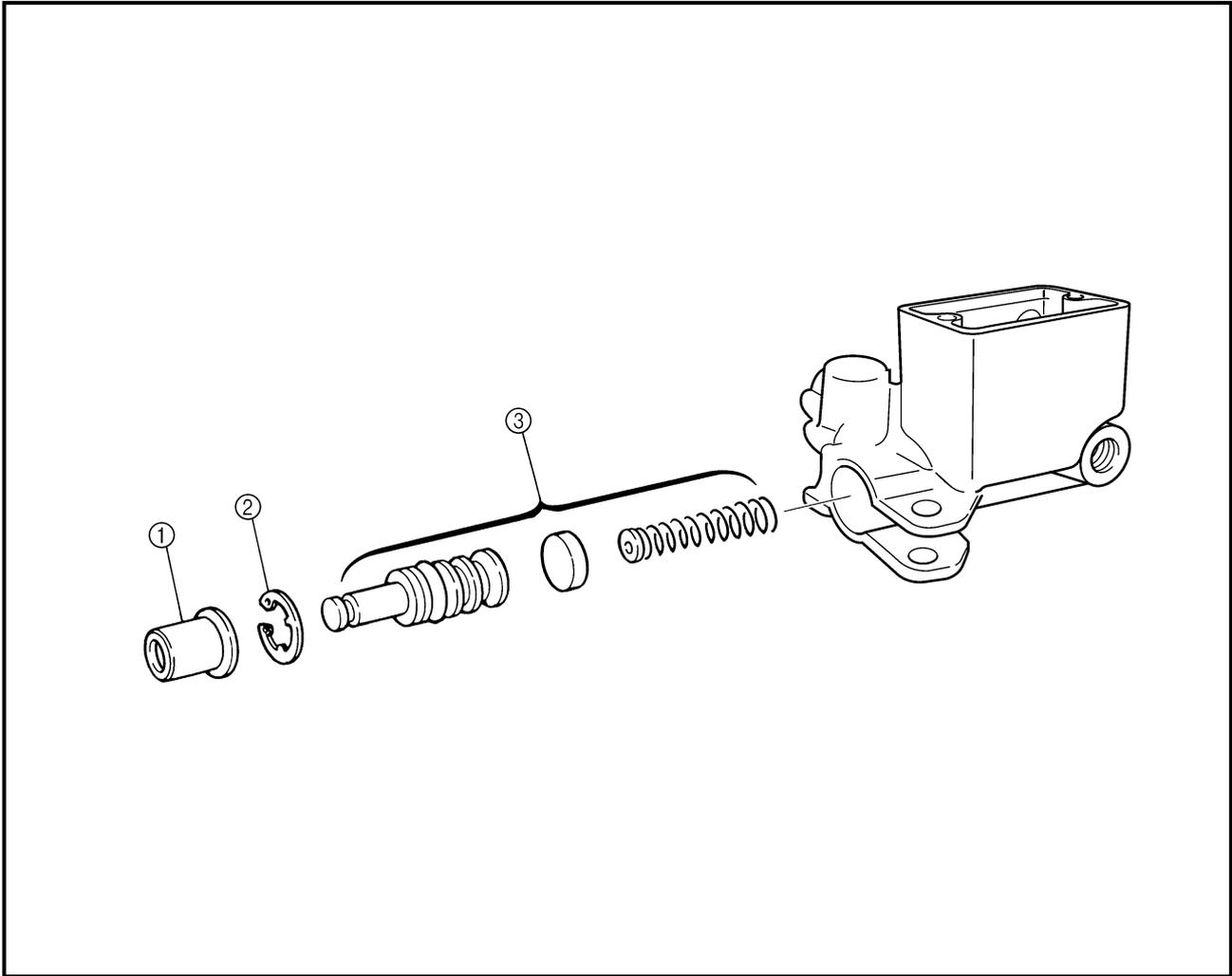
### 4. Check:

- Brake lever or brake pedal operation  
Soft or spongy feeling → Bleed the rear brake system.  
Refer to "AIR BLEEDING (HYDRAULIC BRAKE SYSTEM)" in CHAPTER 3.

FRONT BRAKE MASTER CYLINDER

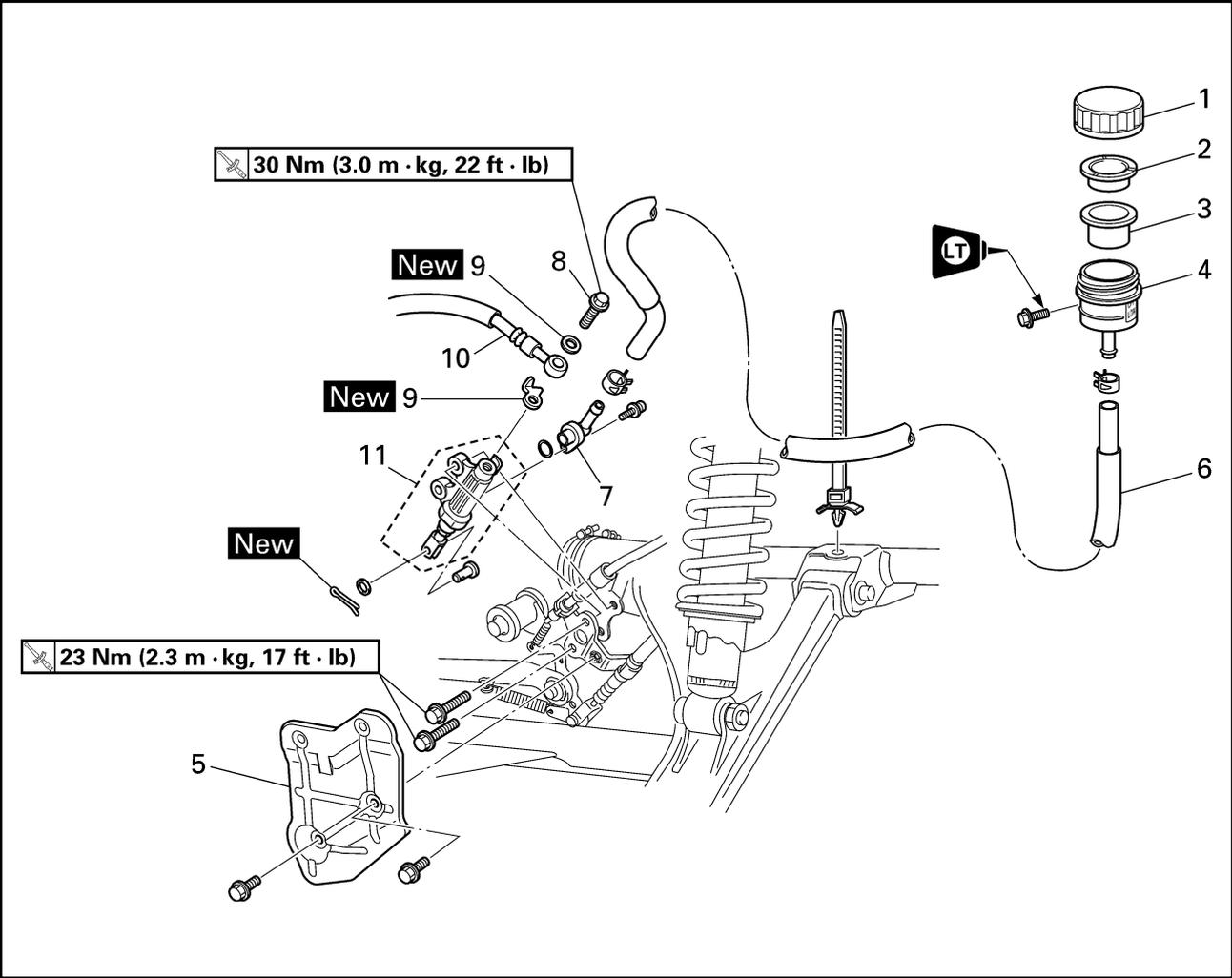


Order	Job name/Part name	Q'ty	Remarks
	<b>Front brake master cylinder removal</b>		Remove the parts in the order below.
	Brake fluid		Drain.
1	Brake fluid reservoir cap	1	
2	Brake fluid reservoir diaphragm holder	1	
3	Brake fluid reservoir diaphragm	1	
4	Brake lever	1	
5	Union bolt	1	
6	Copper washer	2	Refer to "FRONT BRAKE MASTER CYLINDER INSTALLATION".
7	Brake hose	1	
8	Brake master cylinder bracket	1	
9	Brake master cylinder	1	
			For installation, reverse the removal procedure.

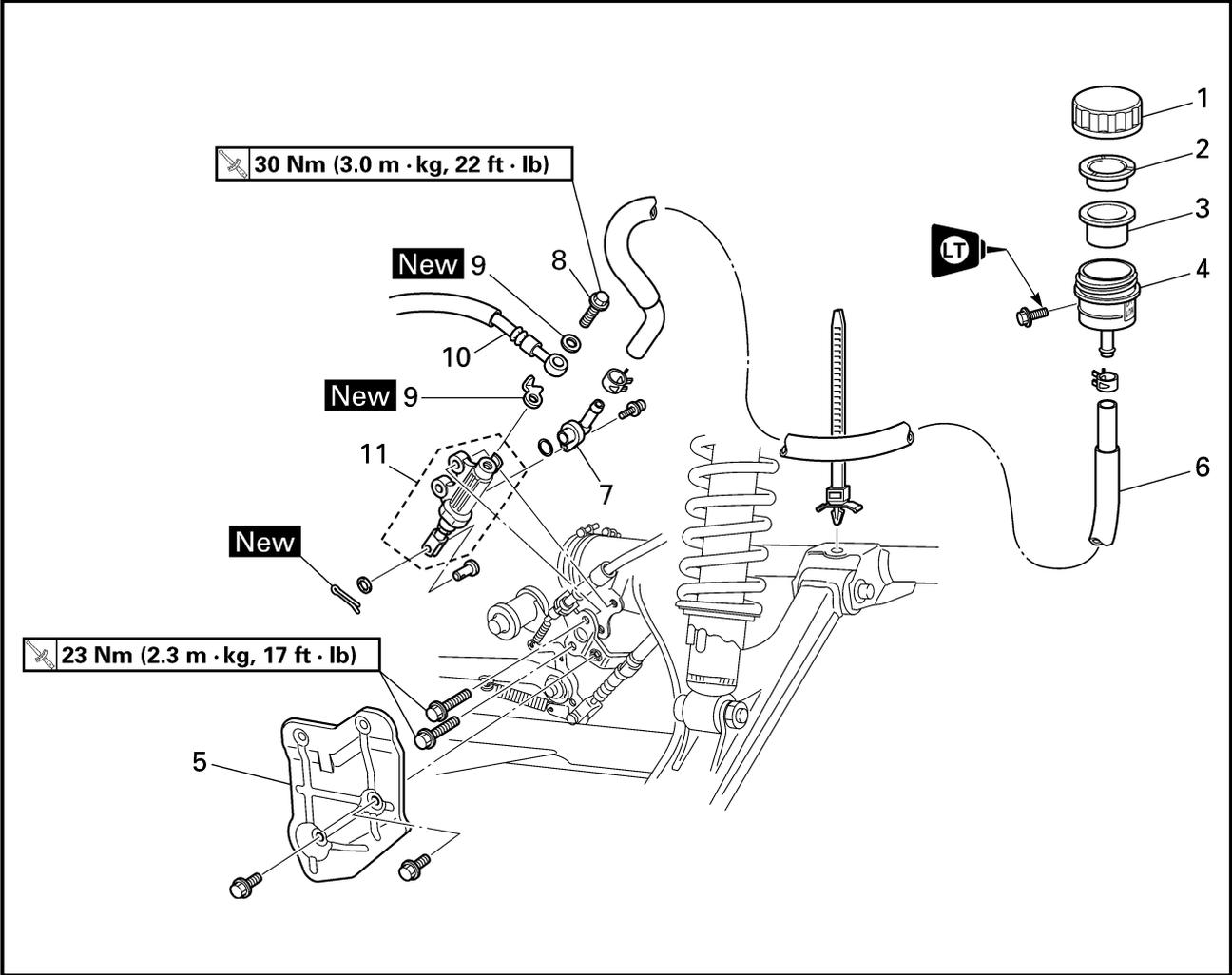


Order	Job name/Part name	Q'ty	Remarks
	<b>Front brake master cylinder disassembly</b>		Disassemble the parts in the order below.
①	Dust boot	1	Refer to "FRONT BRAKE MASTER CYLINDER ASSEMBLY".
②	Circlip	1	
③	Brake master cylinder kit	1	
			For assembly, reverse the disassembly procedure.

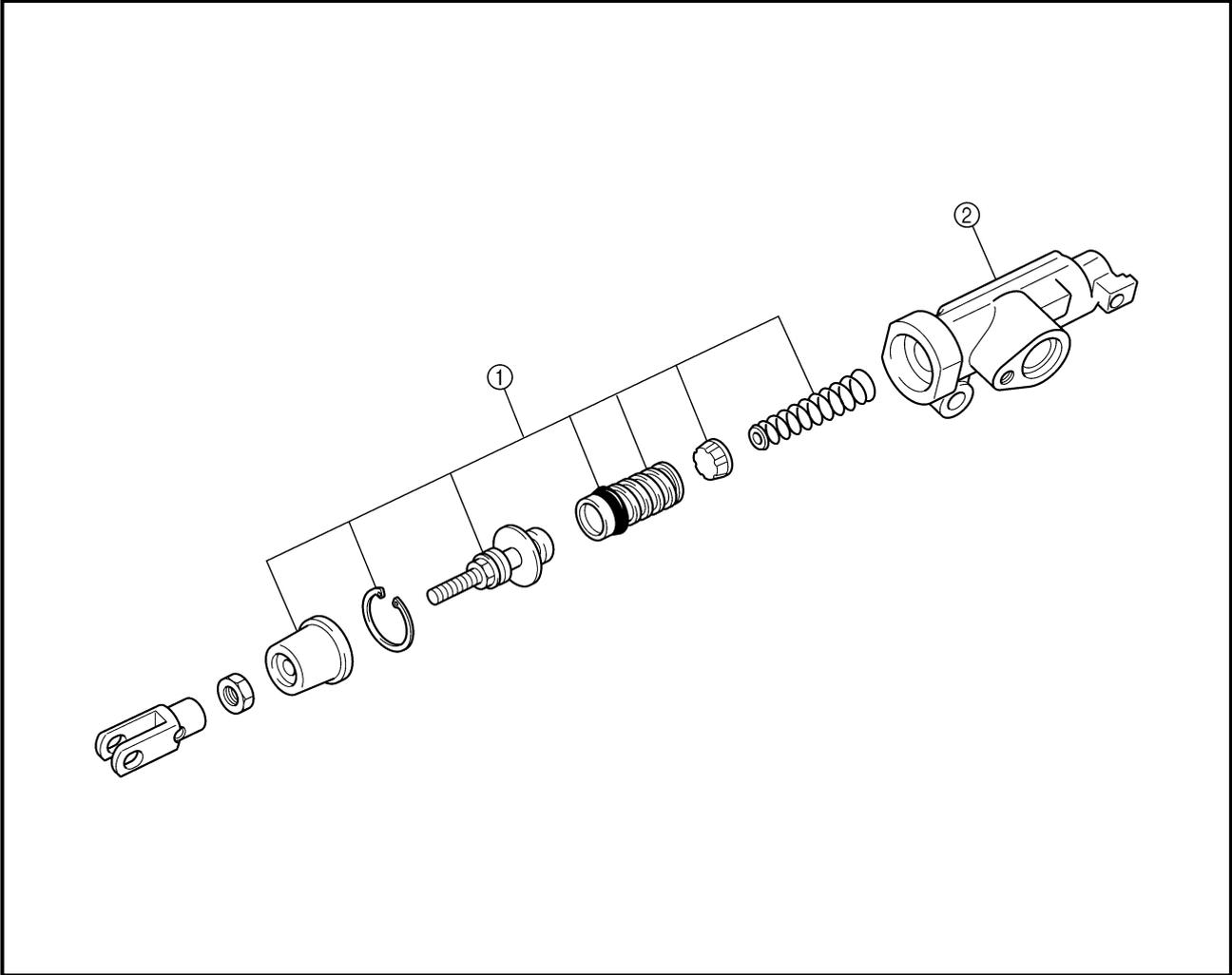
REAR BRAKE MASTER CYLINDER



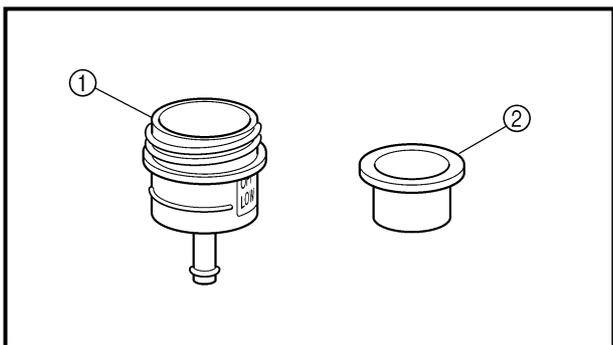
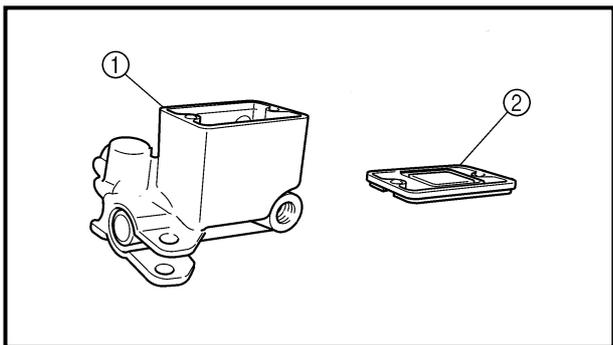
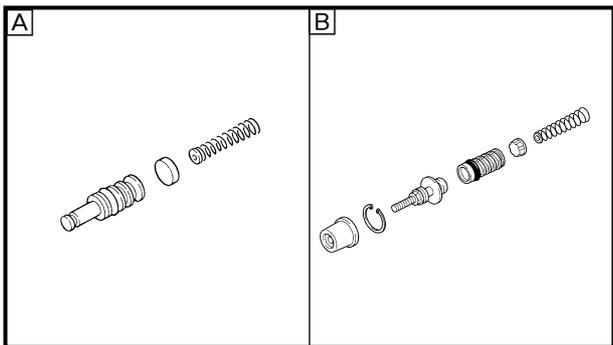
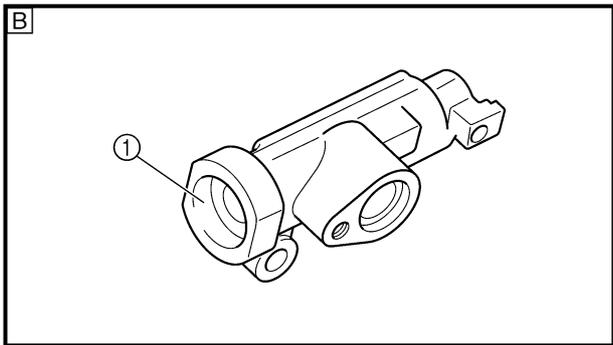
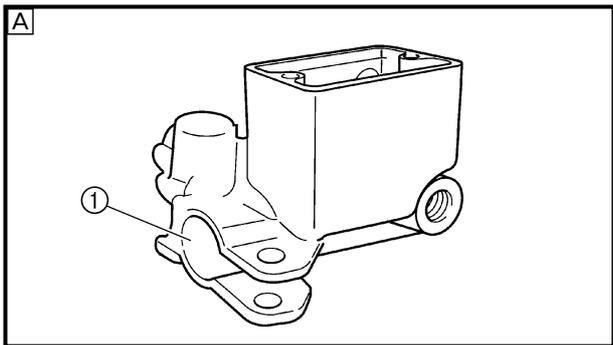
Order	Job name/Part name	Q'ty	Remarks
	<b>Rear brake master cylinder removal</b>		Remove the parts in the order below.
	Front fender panel		Refer to "SEAT, CARRIERS, FINDERS AND FUEL TANK" in CHAPTER 3.
	Brake fluid		Drain.
1	Brake fluid reservoir cap	1	
2	Brake fluid reservoir diaphragm holder	1	
3	Brake fluid reservoir diaphragm	1	
4	Brake fluid reservoir	1	
5	Brake master cylinder cover	1	
6	Brake fluid reservoir hose	1	
7	Hose joint	1	



Order	Job name/Part name	Q'ty	Remarks
8	Union bolt	1	Refer to "REAR BRAKE MASTER CYLINDER INSTALLATION".
9	Copper washer	2	
10	Brake hose	1	
11	Brake master cylinder	1	
			For installation, reverse the removal procedure.



Order	Job name/Part name	Q'ty	Remarks
	<b>Front brake master cylinder disassembly</b>		Disassemble the parts in the order below.
①	Brake master cylinder kit	1	Refer to "REAR BRAKE MASTER CYLINDER ASSEMBLY".
②	Brake master cylinder	1	
			For assembly, reverse the disassembly procedure.



**MASTER CYLINDER INSPECTION**

1. Inspect:

- Brake master cylinder ①  
Wear/scratches → Replace the brake master cylinder assembly.
- Brake master cylinder body  
Cracks/damage → Replace.
- Brake fluid delivery passage (brake master cylinder body)  
Blockage → Blow out with compressed air.

- A Front
- B Rear

2. Inspect:

- Brake master cylinder kit  
Scratches/wear/damage → Replace as a set.

- A Front
- B Rear

3. Inspect:

- Front brake master cylinder reservoir ①
- Front brake master cylinder reservoir diaphragm ②  
Cracks/damage → Replace.

4. Inspect:

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

EB702060

**FRONT BRAKE MASTER CYLINDER ASSEMBLY**

**⚠ WARNING**

- All internal brake components should be cleaned and lubricated with new brake fluid only before installation.



**Recommended brake fluid:  
DOT 4**

- Whenever a master cylinder is disassembled, replace the piston seals and dust seals.

EB702060

**REAR BRAKE MASTER CYLINDER ASSEMBLY**

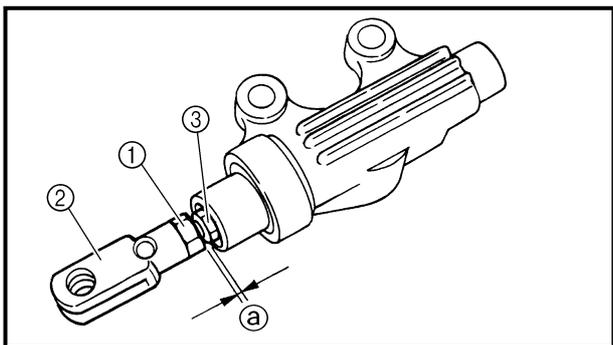
**⚠ WARNING**

- All internal brake components should be cleaned and lubricated with new brake fluid only before installation.



**Recommended brake fluid:  
DOT 4**

- Whenever a master cylinder is disassembled, replace the piston seals and dust seals.



**1. Install:**

- Brake master cylinder kit
- Nut ①
- Joint ②

**NOTE:**

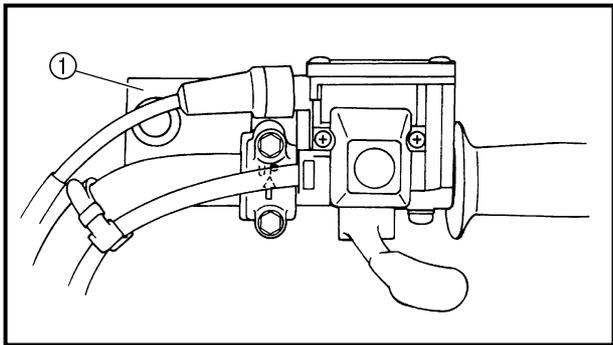
Turn the adjusting bolt ③ until the clearance ④ is within the specified limits when install the joint ②.



**Clearance ④:  
1 ~ 2 mm (0.04 ~ 0.08 in)**

**2. Tighten:**

- Nut ②



**FRONT BRAKE MASTER CYLINDER INSTALLATION**

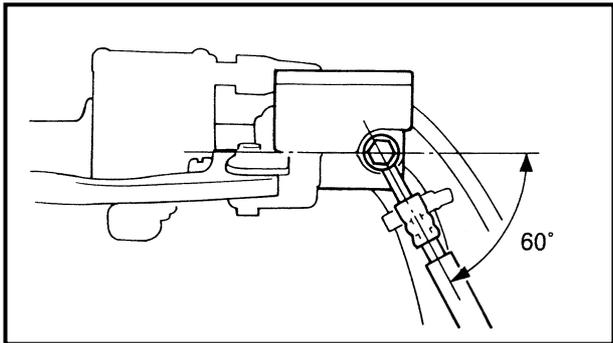
1. Install:

- Brake master cylinder ①

 7 Nm (0.7 m • kg, 5.1 ft • lb)

**NOTE:**

The “UP” mark on the brake master cylinder bracket should face up.



2. Install:

- Copper washers **New**
- Brake hose
- Union bolt  27 Nm (2.7 m • kg, 19 ft • lb)

**NOTE:**

- Tighten the union bolt while holding the brake hose as shown.
- Turn the handlebar to the left and to the right to check that the brake hose does not touch other parts (throttle cable, wire harness, leads, etc.). Correct if necessary.

**⚠ WARNING**

Proper brake hose routing is essential to insure safe machine operation. Refer to “CABLE ROUTING”.

3. Fill:

- Brake fluid reservoir



**Recommended brake fluid:  
DOT 4**

**CAUTION:**

Brake fluid may damage painted surfaces or plastic parts. Always clean up spilled brake fluid immediately.

**⚠ WARNING**

- Use only the designated quality brake fluid: other brake fluids may deteriorate the rubber seals, causing leakage and poor brake performance.
- Refill with the same type of brake fluid: mixing brake fluids may result in a harmful chemical reaction and lead to poor brake performance.



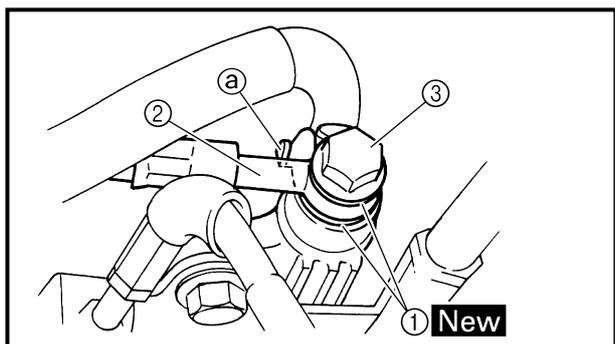
- Be careful that water does not enter the brake master cylinder when refilling. Water will significantly lower the boiling point of the brake fluid and may result in vapor lock.

#### 4. Air bleed:

- Brake system  
Refer to "AIR BLEEDING (HYDRAULIC BRAKE SYSTEM)" in CHAPTER 3.

#### 5. Inspect:

- Brake fluid level  
Brake fluid level is under the "LOWER" level line → Fill up.  
Refer to "BRAKE FLUID LEVEL INSPECTION" in CHAPTER 3.



### REAR BRAKE MASTER CYLINDER INSTALLATION

#### 1. Install:

- Copper washers ① **New**
- Brake hose ②
- Union bolt ③ **30 Nm (3.0 m · kg, 22 ft · lb)**

#### CAUTION:

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

#### ⚠ WARNING

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



## 2.Fill:

- Brake fluid reservoir



**Recommended brake fluid:  
DOT 4**

### **CAUTION:**

**Brake fluid may damage painted surfaces or plastic parts. Always clean up spilled brake fluid immediately.**

### **⚠ WARNING**

- **Use only the designated quality brake fluid: other brake fluids may deteriorate the rubber seals, causing leakage and poor brake performance.**
- **Refill with the same type of brake fluid: mixing brake fluids may result in a harmful chemical reaction and lead to poor brake performance.**
- **Be careful that water does not enter the brake master cylinder when refilling. Water will significantly lower the boiling point of the brake fluid and may result in vapor lock.**

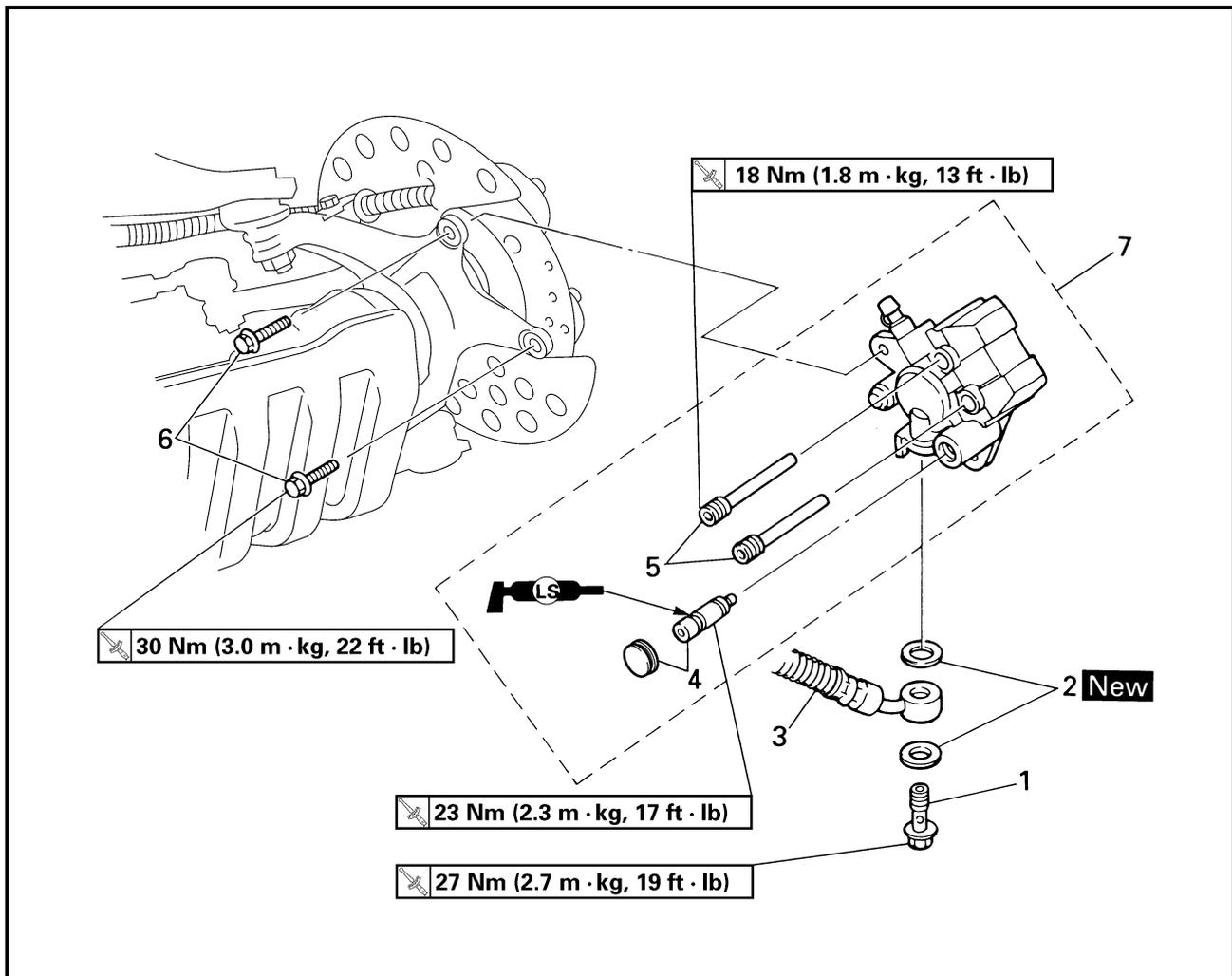
## 3.Air bleed:

- Brake system  
Refer to "AIR BLEEDING (HYDRAULIC BRAKE SYSTEM)" in CHAPTER 3.

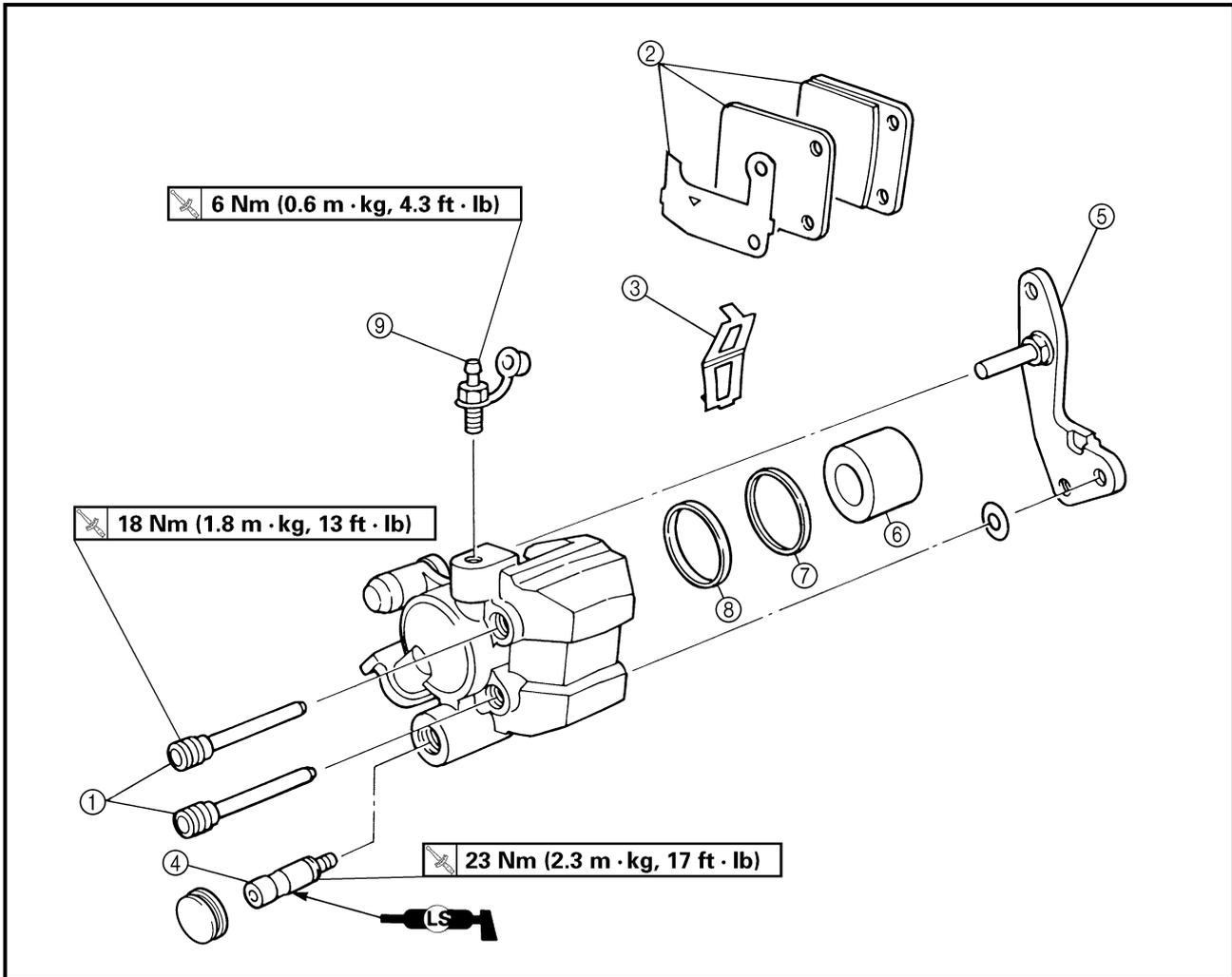
## 4.Inspect:

- Brake fluid level  
Brake fluid level is under the "LOWER" level line → Fill up.  
Refer to "BRAKE FLUID LEVEL INSPECTION" in CHAPTER 3.

FRONT BRAKE CALIPER

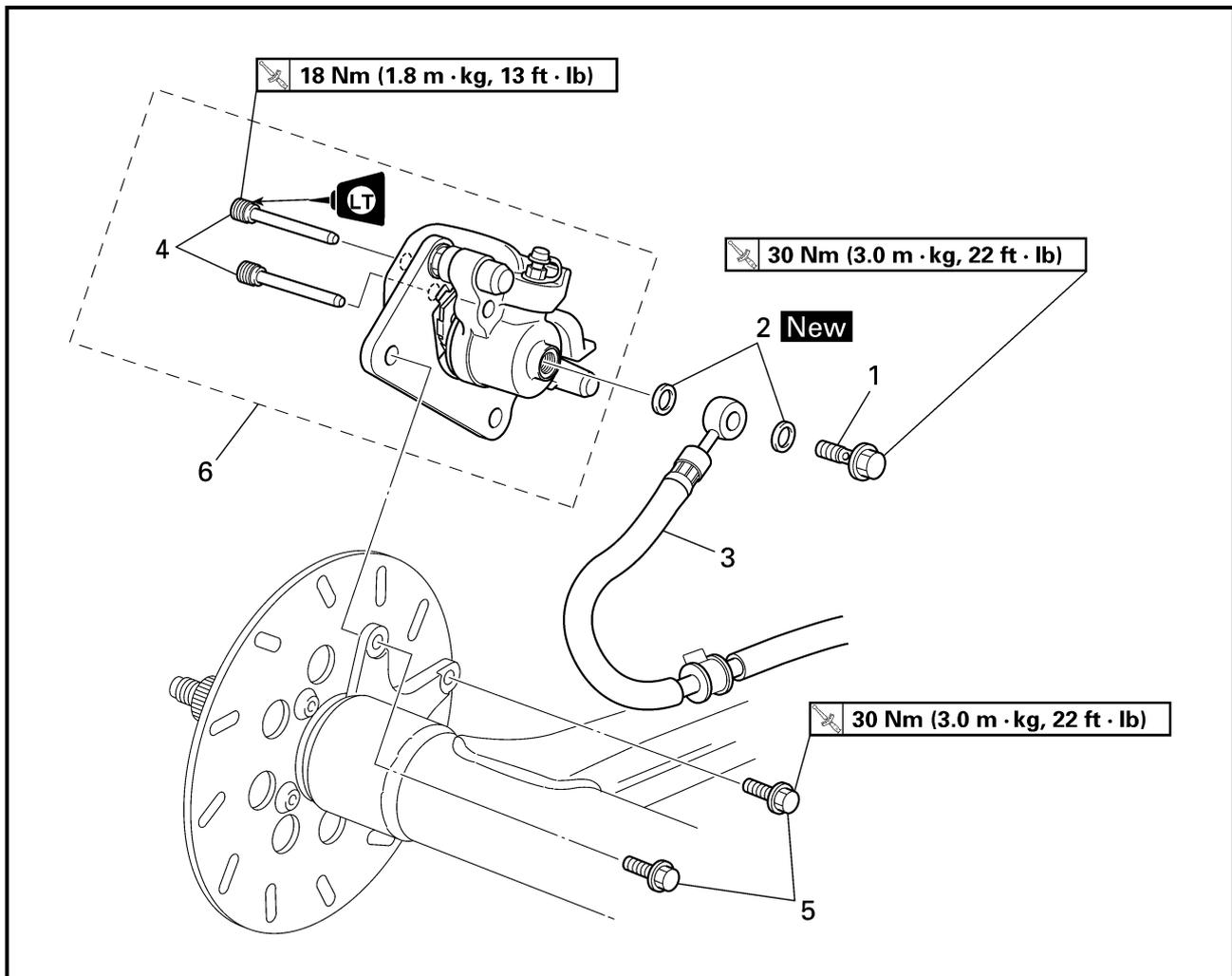


Order	Job name/Part name	Q'ty	Remarks
	<b>Front brake caliper removal</b>		Remove the parts in the order below.
	Brake fluid		Drain.
	Front wheel		Refer to "FRONT AND REAR WHEELS".
1	Union bolt	1	Disconnect. Refer to "FRONT BRAKE CALIPER INSTALLATION". Loosen. Loosen. For installation, reverse the removal procedure.
2	Copper washer	2	
3	Brake hose	1	
4	Cap/retaining bolt	1/1	
5	Brake pad holding bolt	2	
6	Brake caliper mounting bolt	2	
7	Brake caliper assembly	1	

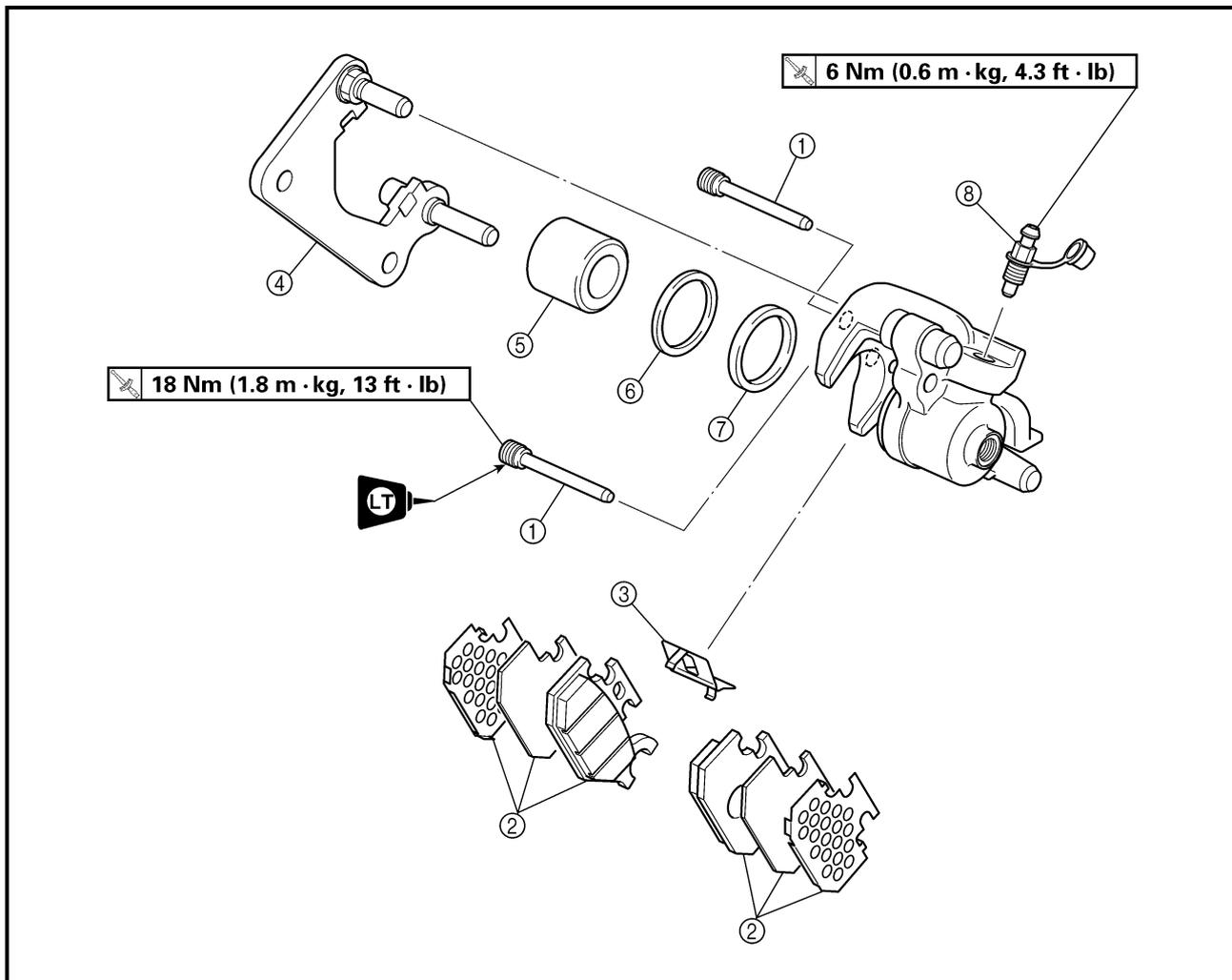


Order	Job name/Part name	Q'ty	Remarks
	<b>Front brake caliper disassembly</b>		Disassemble the parts in the order below.
①	Brake pad holding bolt	2	Refer to "FRONT AND REAR BRAKE CALIPER DISASSEMBLY/ASSEMBLY".  For assembly, reverse the disassembly procedure.
②	Brake pad/pad shim	2/1	
③	Pad spring	1	
④	Retaining bolt	1	
⑤	Caliper bracket	1	
⑥	Brake caliper piston	1	
⑦	Dust seal	1	
⑧	Caliper piston seal	1	
⑨	Bleed screw	1	

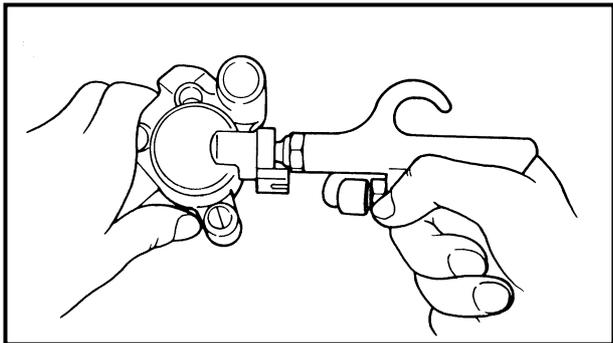
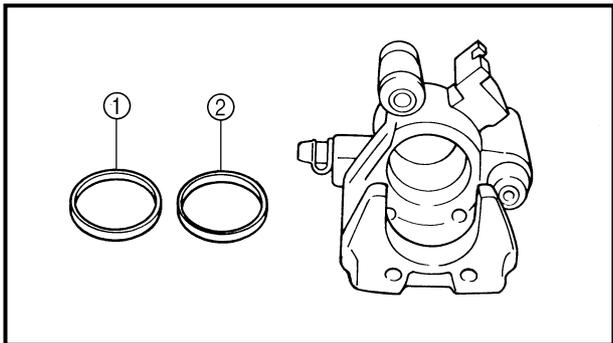
REAR BRAKE CALIPER



Order	Job name/Part name	Q'ty	Remarks
	<b>Rear brake caliper removal</b>		Remove the parts in the order below.
	Brake fluid		Drain.
	Rear wheel		Refer to "FRONT AND REAR WHEELS".
1	Union bolt	1	Disconnect. } Refer to "REAR BRAKE CALIPER INSTALLATION". Loosen.
2	Copper washer	2	
3	Brake hose	1	
4	Brake pad holding bolt	2	
5	Brake caliper mounting bolt	2	
6	Brake caliper assembly	1	For installation, reverse the removal procedure.



Order	Job name/Part name	Q'ty	Remarks
	<b>Rear brake caliper disassembly</b>		Disassemble the parts in the order below.
①	Brake pad holding bolt	2	Refer to "FRONT AND REAR BRAKE CALIPER DISASSEMBLY/ASSEMBLY".  For assembly, reverse the disassembly procedure.
②	Brake pad/insulator/pad shim	2/2/2	
③	Pad spring	1	
④	Caliper bracket	1	
⑤	Brake caliper piston	1	
⑥	Dust seal	1	
⑦	Caliper piston seal	1	
⑧	Bleed screw	1	



**FRONT AND REAR BRAKE CALIPER DISASSEMBLY**

1.Remove:

- Brake caliper piston
- Dust seal ①
- Caliper piston seal ②

\*\*\*\*\*

**Removal steps:**

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

**⚠ WARNING**

- Never try to pry out the caliper piston.
- Cover the caliper piston with a rag. Be careful not to get injured when the piston is expelled from the master cylinder.

- Remove the caliper piston seals.

\*\*\*\*\*

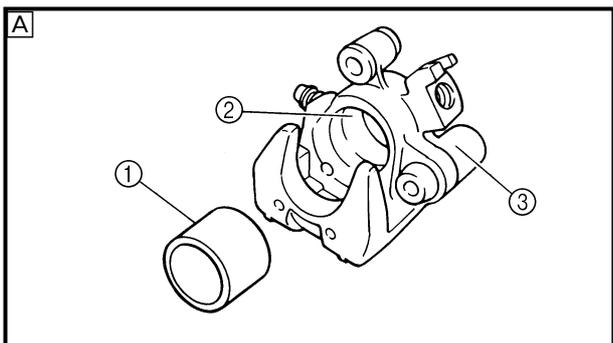
EB702040

**FRONT AND REAR BRAKE CALIPER INSPECTION**

Recommended brake component replacement schedule:	
Brake pads	As required
Piston seal, dust seal	Every two years
Brake hoses	Every two years
Brake fluid	Replace when brakes are disassembled.

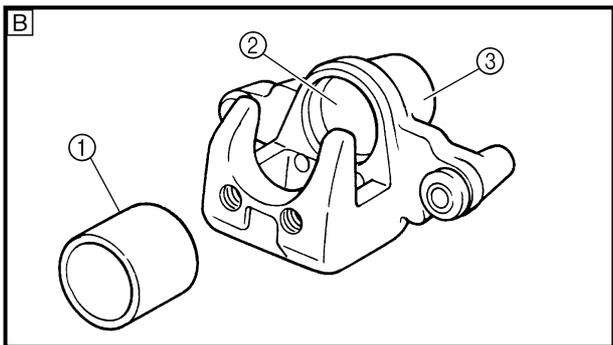
**⚠ WARNING**

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



1.Inspect:

- Brake caliper piston ①  
Scratches/rust/wear → Replace the brake caliper assembly.
- Brake caliper cylinder ②  
Wear/scratches → Replace the brake caliper assembly.
- Brake caliper body ③  
Cracks/damage → Replace.



- Brake fluid delivery passage (brake caliper body)  
Blockage → Blow out with compressed air.

**⚠ WARNING**

Replace the caliper piston seal and dust seal whenever the brake caliper is disassembled.

Ⓐ Front

Ⓑ Rear

**FRONT AND REAR BRAKE CALIPER ASSEMBLY**

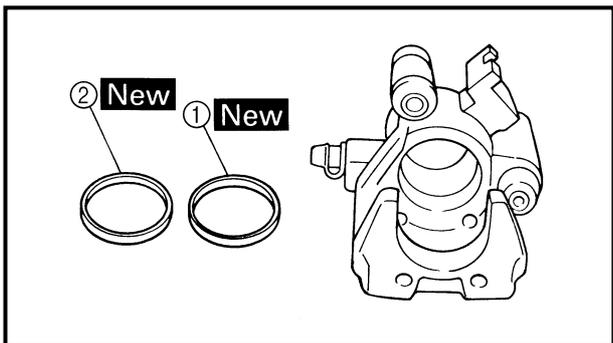
**⚠ WARNING**

- All internal brake components should be cleaned and lubricated with new brake fluid only before installation.



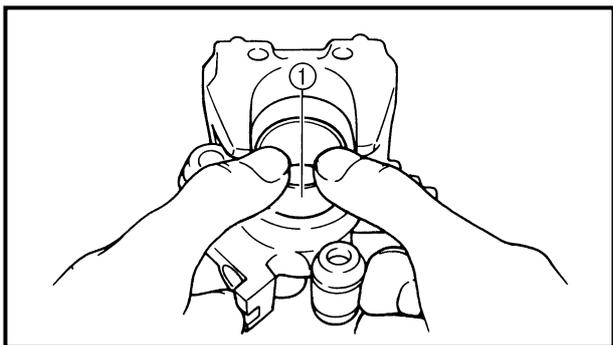
Recommended brake fluid:  
DOT 4

- Replace the caliper piston seal whenever a brake caliper is disassembled.



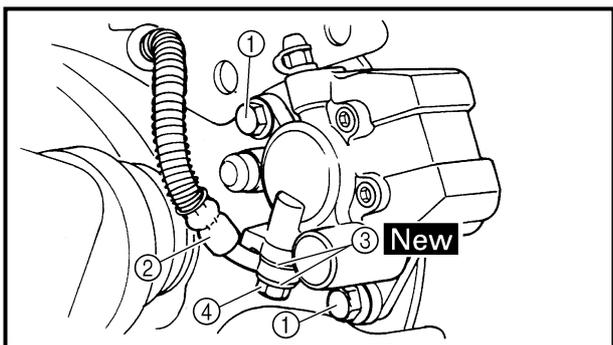
1.Install:

- Caliper piston seal ① **New**
- Dust seal ② **New**



2.Install:

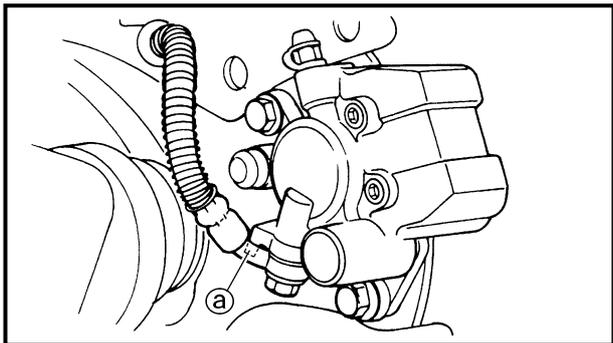
- Brake caliper piston ①



**FRONT BRAKE CALIPER INSTALLATION**

1.Install:

- Brake caliper assembly
- Brake caliper mounting bolt ① **30 Nm (3.0 m • kg, 22 ft • lb)**
- Brake hose ②
- Copper washers ③ **New**
- Union bolt ④ **27 Nm (2.7 m • kg, 19 ft • lb)**

**CAUTION:**

When installing the brake hose on the brake caliper, make sure that the brake pipe touches the projection (a) on the brake caliper.

**⚠ WARNING**

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

## 2.Fill:

- Brake reservoir



**Recommended brake fluid:  
DOT 4**

**CAUTION:**

Brake fluid may damage painted surfaces or plastic parts. Always clean up spilled brake fluid immediately.

**⚠ WARNING**

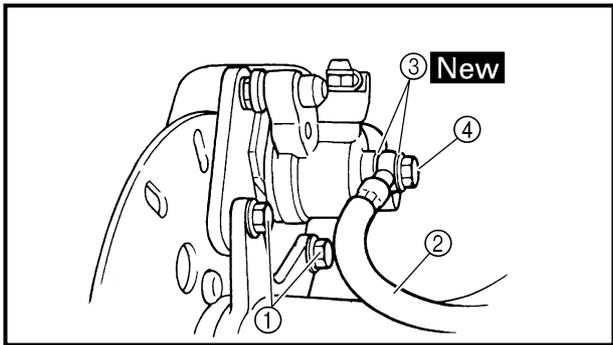
- Use only the designated quality brake fluid: other brake fluids may deteriorate the rubber seals, causing leakage and poor brake performance.
- Refill with the same type of brake fluid: mixing brake fluids may result in a harmful chemical reaction and lead to poor brake performance.
- Be careful that water does not enter the master cylinder when refilling. Water will significantly lower the boiling point of the brake fluid and may result in vapor lock.

## 3.Air bleed

- Brake system  
Refer to "AIR BLEEDING (HYDRAULIC BRAKE SYSTEM)" in CHAPTER 3.

## 4.Inspect:

- Brake fluid level  
Brake fluid level is under the "LOWER" level line → Fill up.  
Refer to "BRAKE FLUID LEVEL INSPECTION" in CHAPTER 3.



**REAR BRAKE CALIPER INSTALLATION**

1.Install:

- Brake caliper assembly
- Brake caliper mounting bolt ① 30 Nm (3.0 m • kg, 22 ft • lb)
- Brake hose ②
- Copper washers ③ New
- Union bolt ④ 30 Nm (3.0 m • kg, 22 ft • lb)

2.Fill:

- Brake reservoir

	<b>Recommended brake fluid: DOT 4</b>
---	---

**CAUTION:**

Brake fluid may damage painted surfaces or plastic parts. Always clean up spilled brake fluid immediately.

**⚠ WARNING**

- Use only the designated quality brake fluid: other brake fluids may deteriorate the rubber seals, causing leakage and poor brake performance.
- Refill with the same type of brake fluid: mixing brake fluids may result in a harmful chemical reaction and lead to poor brake performance.
- Be careful that water does not enter the master cylinder when refilling. Water will significantly lower the boiling point of the brake fluid and may result in vapor lock.

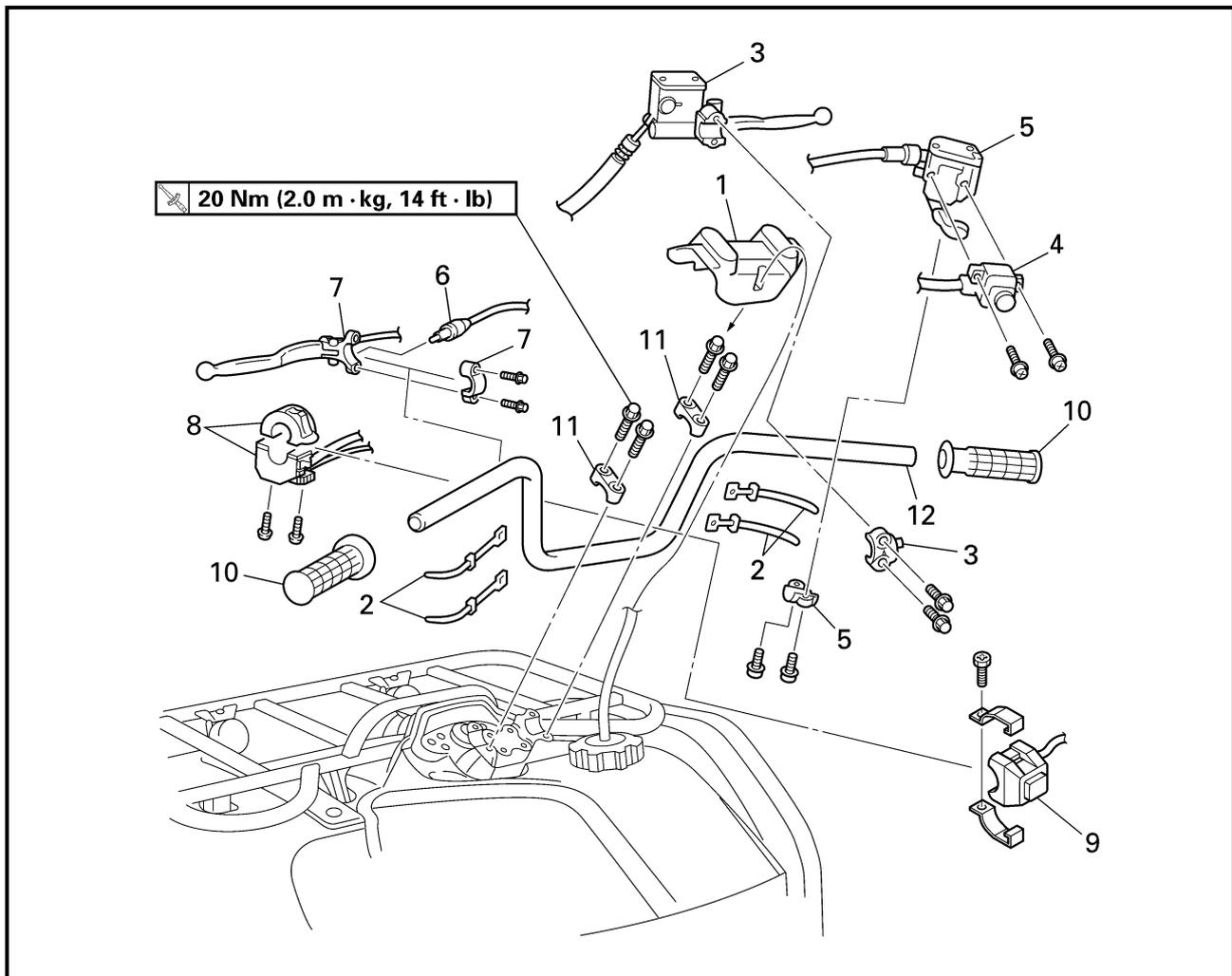
3.Air bleed

- Brake system  
Refer to "AIR BLEEDING (HYDRAULIC BRAKE SYSTEM)" in CHAPTER 3.

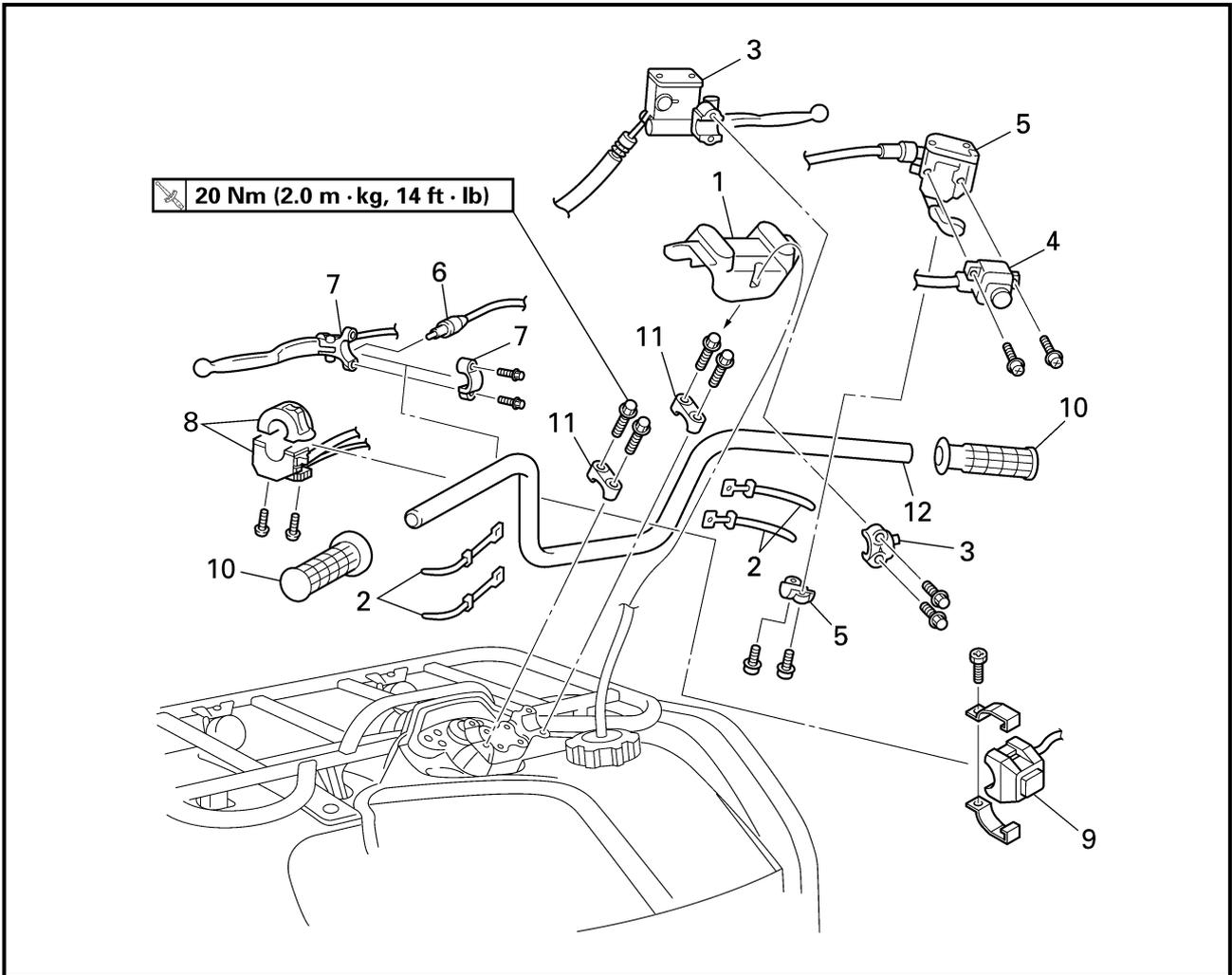
4.Inspect:

- Brake fluid level  
Brake fluid level is under the "LOWER" level line → Fill up.  
Refer to "BRAKE FLUID LEVEL INSPECTION" in CHAPTER 3.

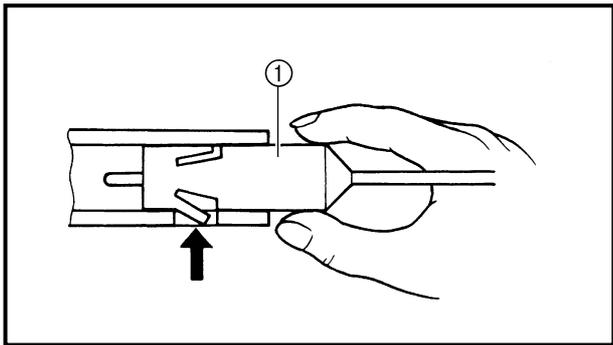
**STEERING SYSTEM**  
**HANDLEBAR**



Order	Job name/Part name	Q'ty	Remarks
	<b>Handlebar removal</b>		Remove the parts in the order below.
1	Handlebar cover	1	Refer to "MASTER CYLINDER ASSEMBLY INSTALLATION".
2	Band	4	
3	Master cylinder assembly/bracket	1/1	
4	On command four-wheel drive switch	1	
5	Throttle lever assembly/bracket	1/1	
6	Rear brake switch	1	Refer to "REAR BRAKE SWITCH REMOVAL".
7	Rear brake lever/bracket	1/1	Refer to "REAR BRAKE LEVER INSTALLATION".
8	Handlebar switch	1	
9	Horn switch	1	For GB, F, CH, Oceania
10	Handlebar grip	2	



Order	Job name/Part name	Q'ty	Remarks
11	Handlebar holder	2	Refer to "HANDLEBAR INSTALLATION".
12	Handlebar	1	Refer to "HANDLEBAR INSTALLATION". For installation, reverse the removal procedure.



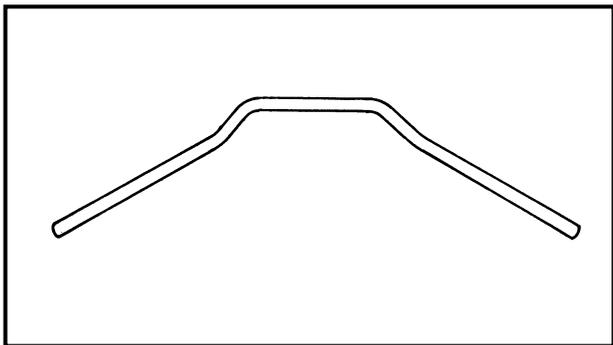
**REAR BRAKE SWITCH REMOVAL**

1.Remove:

- Rear brake switch ①

**NOTE:**

Push the fastener when removing the rear brake switch out of the rear brake lever holder.



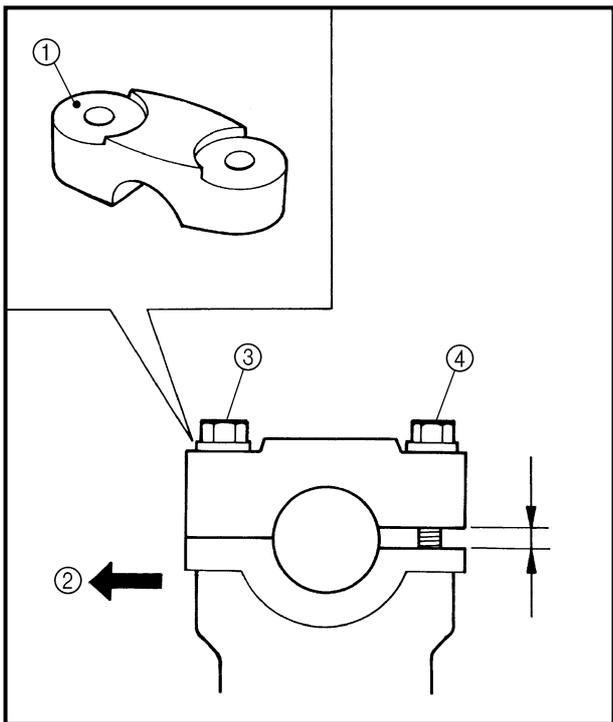
**HANDLEBAR INSPECTION**

1.Inspect:

- Handlebar
- Bends/cracks/damage → Replace.

**⚠ WARNING**

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



**HANDLEBAR INSTALLATION**

1.Install:

- Handlebar
- Handlebar holders

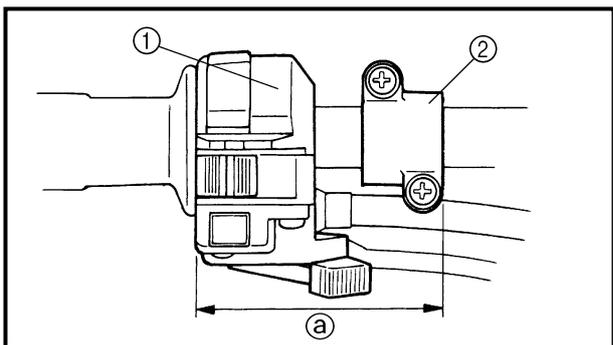
 20 Nm (2.0 m • kg, 14 ft • lb)

**NOTE:**

The upper handlebar holder should be installed with the punched mark ① forward ②.

**CAUTION:**

First tighten the bolts ③ on the front side of the handlebar holder, and then tighten the bolts ④ on the rear side.



**REAR BRAKE LEVER INSTALLATION**

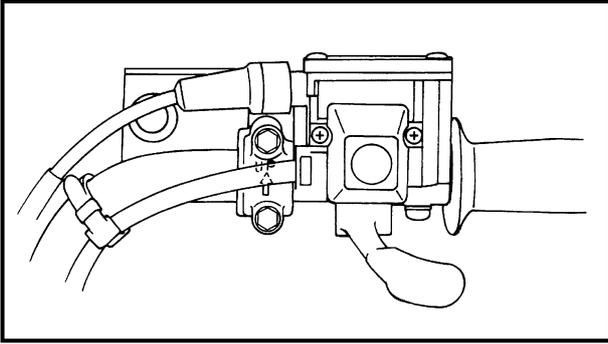
1.Install:

- Handlebar switch ①
- Rear brake lever
- Lever bracket ②

**NOTE:**

Install the lever bracket as shown.

② 80 mm (3.1 in)

**MASTER CYLINDER ASSEMBLY  
INSTALLATION**

1. Install:

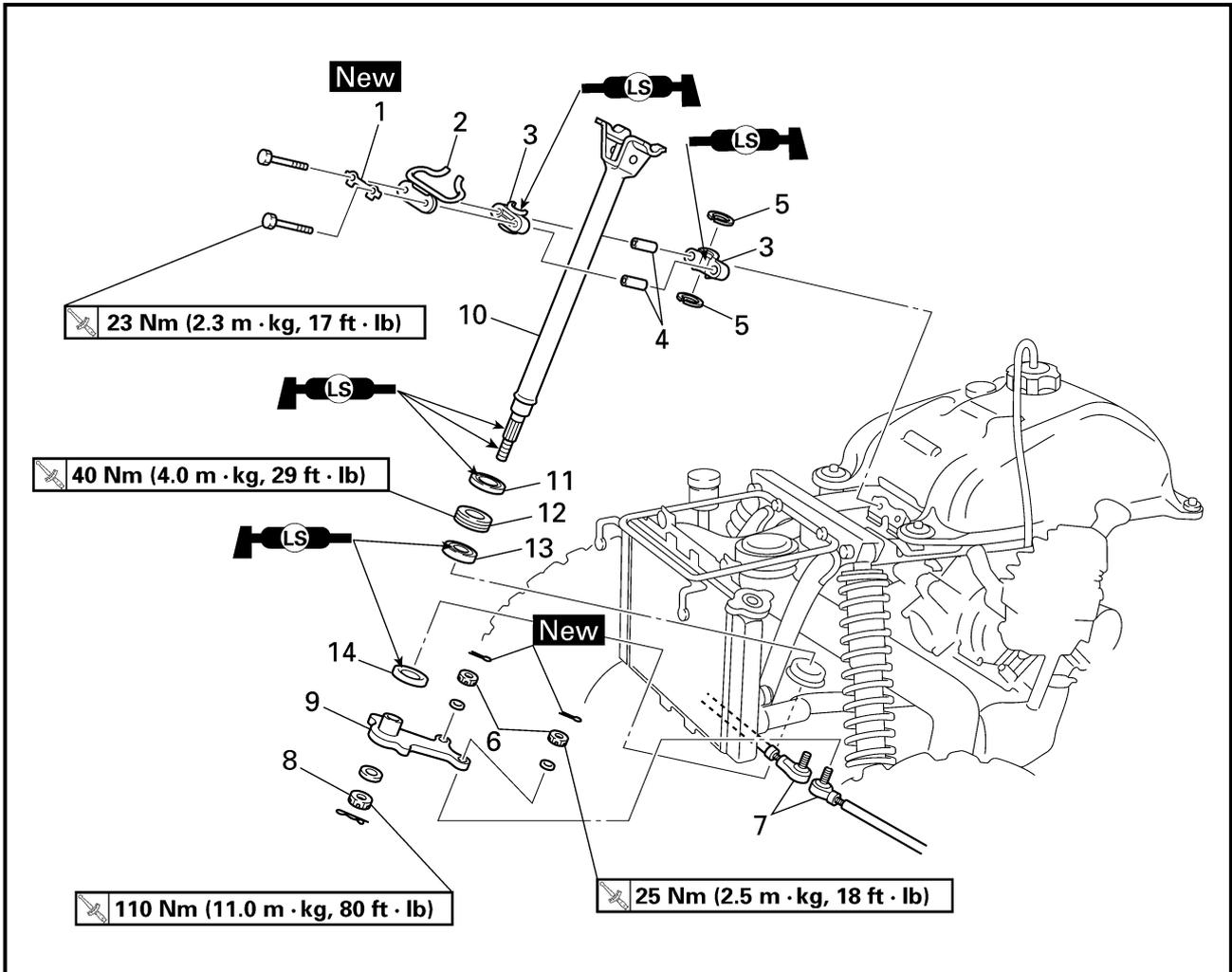
- Throttle lever assembly
- Master cylinder assembly

 **7 Nm (0.7 m • kg, 5.1 ft • lb)****NOTE:**

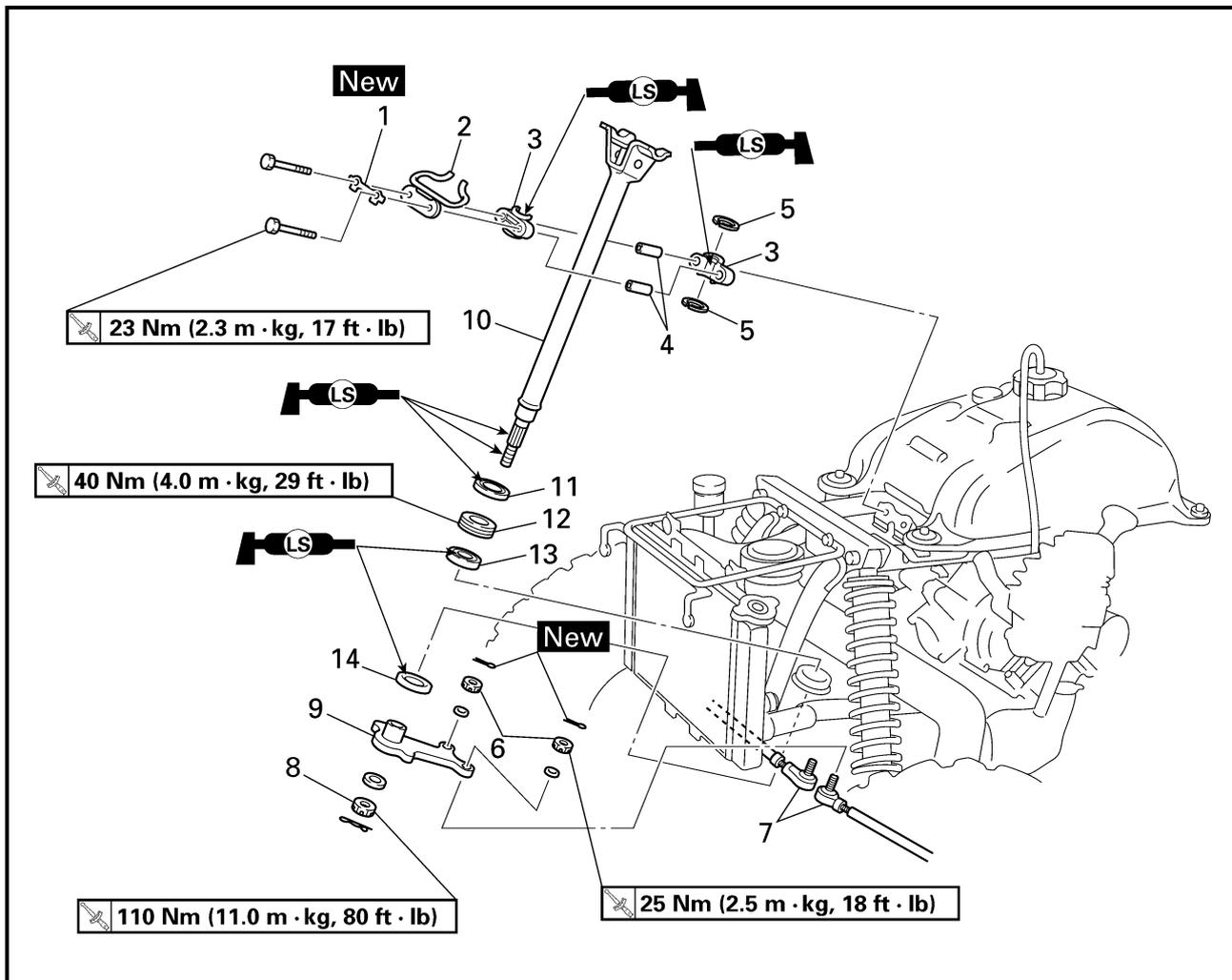
The "UP" mark on the master cylinder bracket should face up.



STEERING STEM



Order	Job name/Part name	Q'ty	Remarks
	<b>Steering removal</b>		
	Handlebar		Remove the parts in the order below. Refer to "HANDLEBAR".
	Seat		Refer to "SEAT, CARRIERS, FENDERS AND FUEL TANK" in CHAPTER 3.
	Front fender		
	Lock washer	1	
1	Cable guide	1	Refer to "CABLE GUIDE INSTALLATION".
2	Steering stem bushing	2	
3	Collar	2	
4	Oil seal	2	
5	Tie rod end nut	2	
6	Tie rod	2	Disconnect.
7	Steering stem nut	1	
8	Pitman arm	1	
9	Steering stem	1	



Order	Job name/Part name	Q'ty	Remarks
11	Oil seal	1	
12	Bearing retainer	1	Refer to "BEARING RETAINER REMOVAL/INSTALLATION".
13	Bearing	1	
14	Oil seal	1	
			For installation, reverse the removal procedure.



## BEARING RETAINER REMOVAL

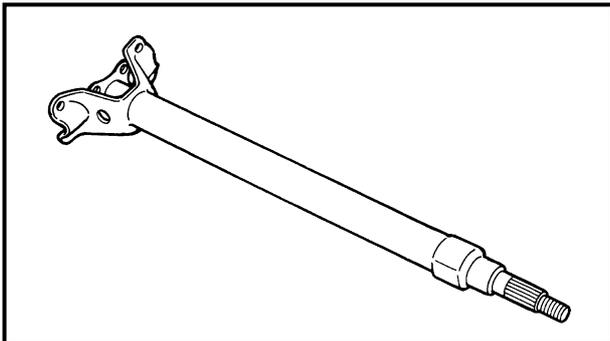
1.Remove:

- Bearing retainer (steering stem)



**Damper rod holder:**

**P/N. YM-01327, 90890-01327**



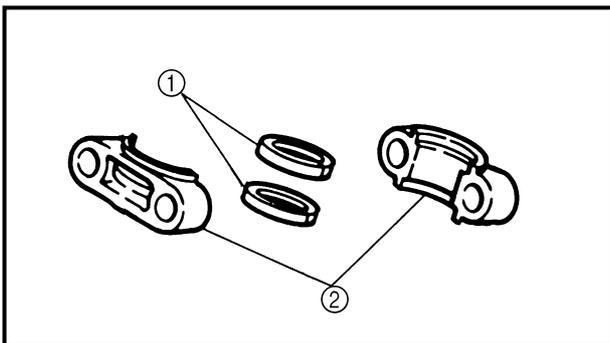
## STEERING STEM INSPECTION

1.Inspect:

- Steering stem  
Bends → Replace.

### **⚠ WARNING**

**Do not attempt to straighten a bent stem; this may dangerously weaken the stem.**



2.Inspect:

- Oil seals ①
- Steering stem bushings ②  
Wear/damage → Replace.

## BEARING RETAINER INSTALLATION

1.Install:

- Bearing retainer (steering stem)

**⚙ 40 Nm (4.0 m • kg, 29 ft • lb)**



**Damper rod holder:**

**P/N. YM-01327, 90890-01327**

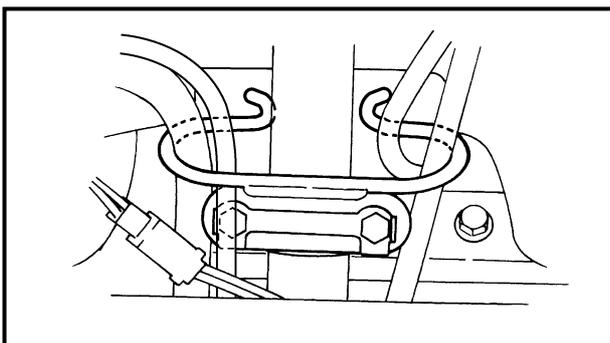
## CABLE GUIDE INSTALLATION

1.Install

- Cable guide
- Lock washer **New**

**⚙ 23 Nm (2.3 m • kg, 17 ft • lb)**

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

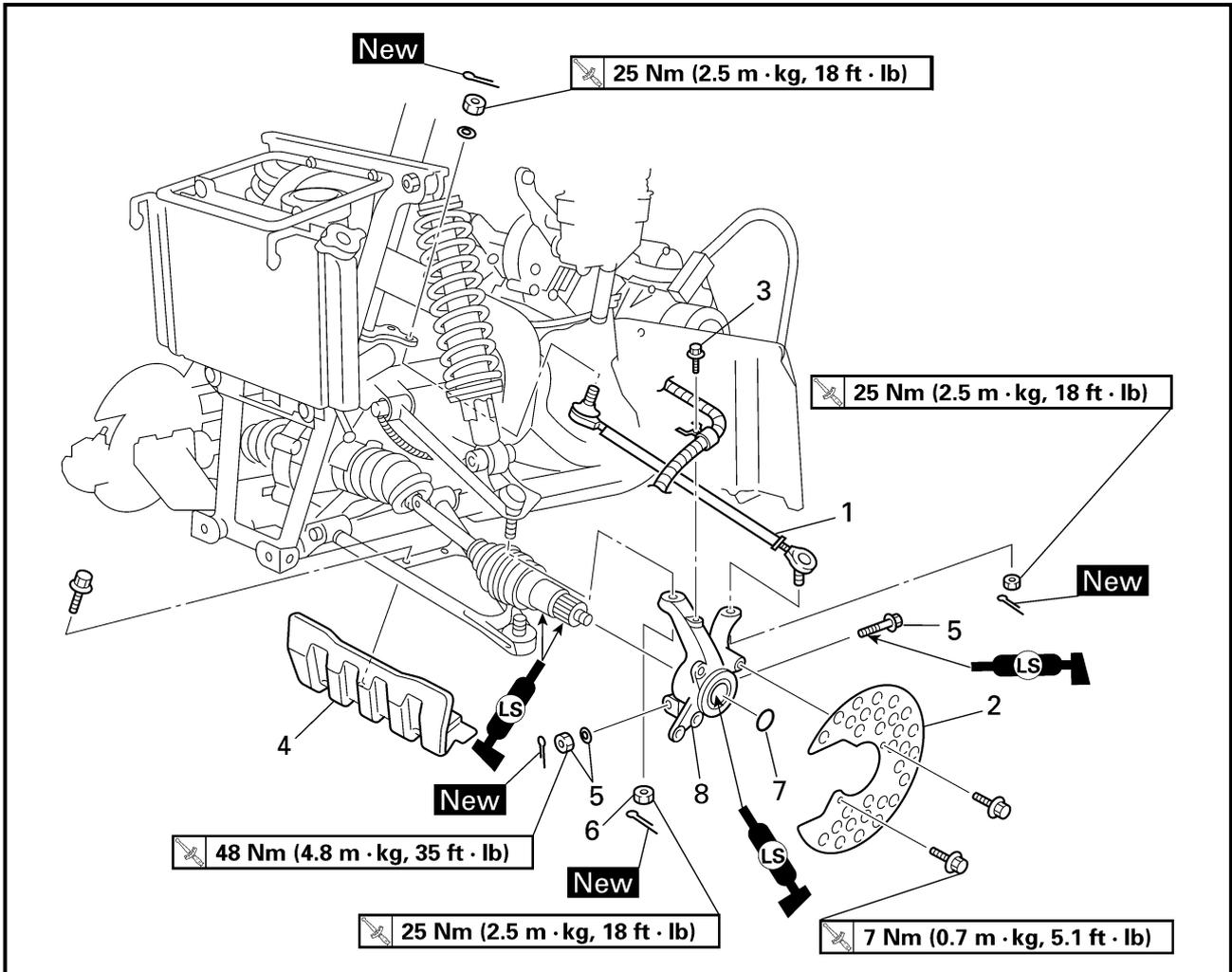


### **NOTE:**

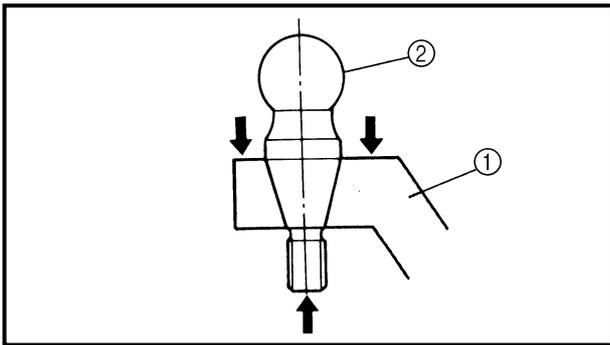
Pass the cables and hoses through the cable guide. Refer to "CABLE ROUTING" in CHAPTER 2.



TIE ROD AND STEERING KNUCKLE



Order	Job name/Part name	Q'ty	Remarks
	<b>Tie rod and steering knuckle removal</b>		Remove the parts in the order below.
	Front fender		Refer to "SEAT, CARRIERS, FENDERS AND FUEL TANK" in CHAPTER 3.
	Front wheel/brake disc		Refer to "FRONT AND REAR WHEELS".
1	Tie rod	1	Refer to "TIE ROD INSTALLATION".
2	Brake disc guard	1	
3	Brake hose holder bolt	1	
4	Protector	1	
5	Bolt/washer/nut	1/1/1	
6	Nut	1	
7	O-ring	1	
8	Steering knuckle	1	Refer to "STEERING KNUCKLE REMOVAL". For installation, reverse the removal procedure.



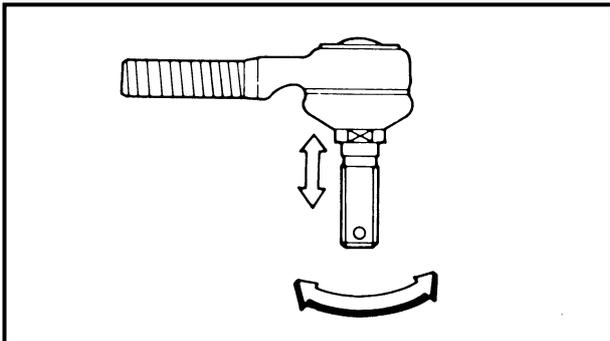
**STEERING KNUCKLE REMOVAL**

1.Remove:

- Steering knuckle ①

**NOTE:**

Use a general puller to separate the ball joint ② and steering knuckle.



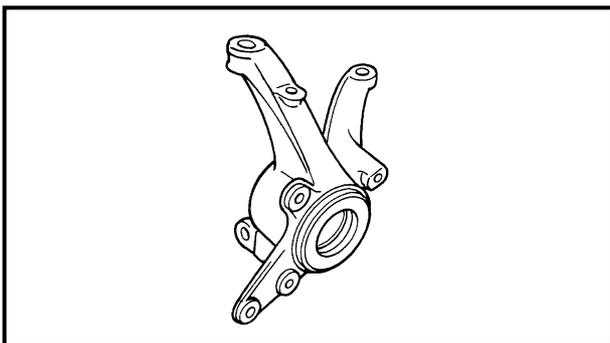
**TIE ROD INSPECTION**

1.Check:

- Tie rod free play and movement  
Free play → Replace the tie rod end.  
Turns roughly → Replace the tie rod end.

2.Inspect:

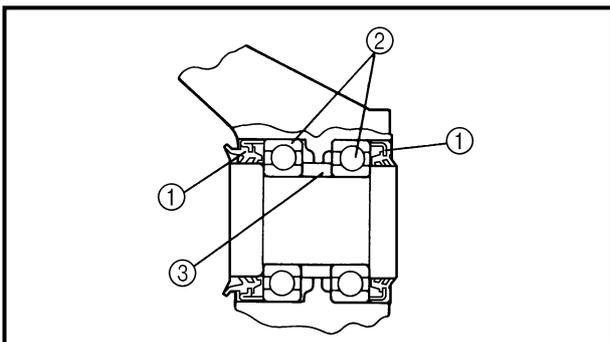
- Tie rod
- Bends/damage → Replace.



**STEERING KNUCKLE INSPECTION**

1.Inspect:

- Steering knuckle  
Damage/pitting → Replace.



2.Inspect:

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

\*\*\*\*\*

**Front wheel bearing replacement steps:**

- Clean the outside of the steering knuckle.
- Remove the oil seals ①.
- Drive out the bearings ②.

**⚠ WARNING**

Eye protection is recommended when using striking tools.

- Remove the spacer ③.
- Apply lithium base grease to the bearings and oil seals.
- Install the spacer to the steering knuckle.

- Install the new bearings.

**NOTE:** \_\_\_\_\_  
Install the outside bearing first.

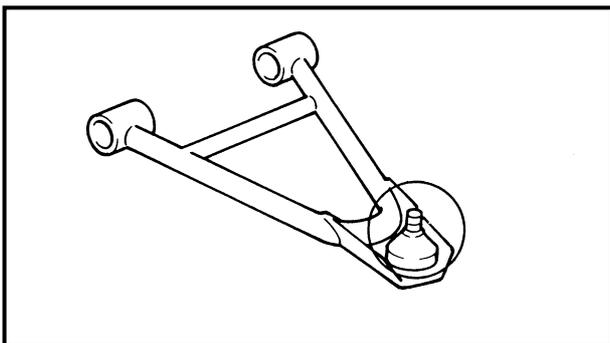
**CAUTION:** \_\_\_\_\_

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

- Install a new oil seal.

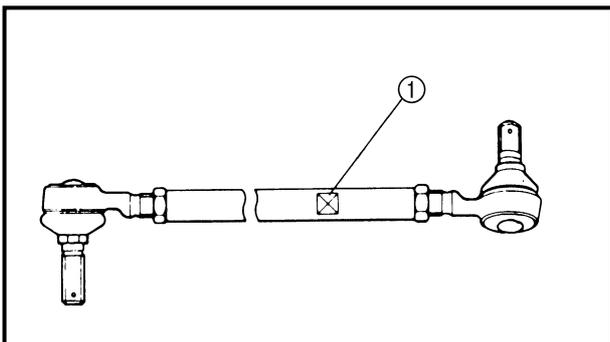
**NOTE:** \_\_\_\_\_  
When installing the oil seals, the "seal side" of the oil seal faces out.

\*\*\*\*\*



**BALL JOINT INSPECTION**

1. Inspect:
- Ball joint
    - Damage/pitting → Replace the front arm.
    - Free play → Replace the front arm.
    - Turns roughly → Replace the front arm.



**TIE ROD INSTALLATION**

1. Install:
- Tie rods (left and right)

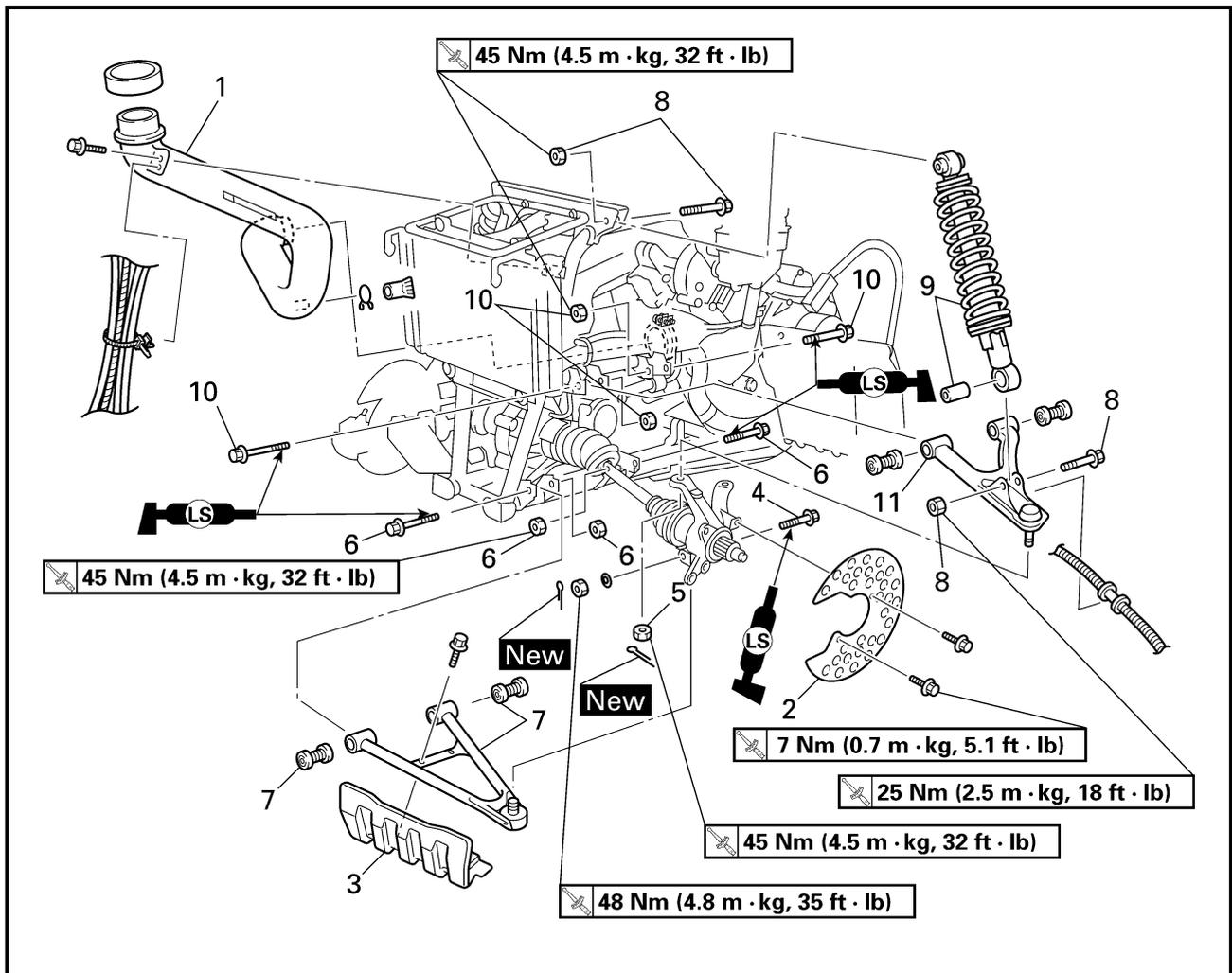
 **25 Nm (2.5 m · kg, 18 ft · lb)**

**NOTE:** \_\_\_\_\_  
The tie rod which must be installed on the out side has grooves ①.

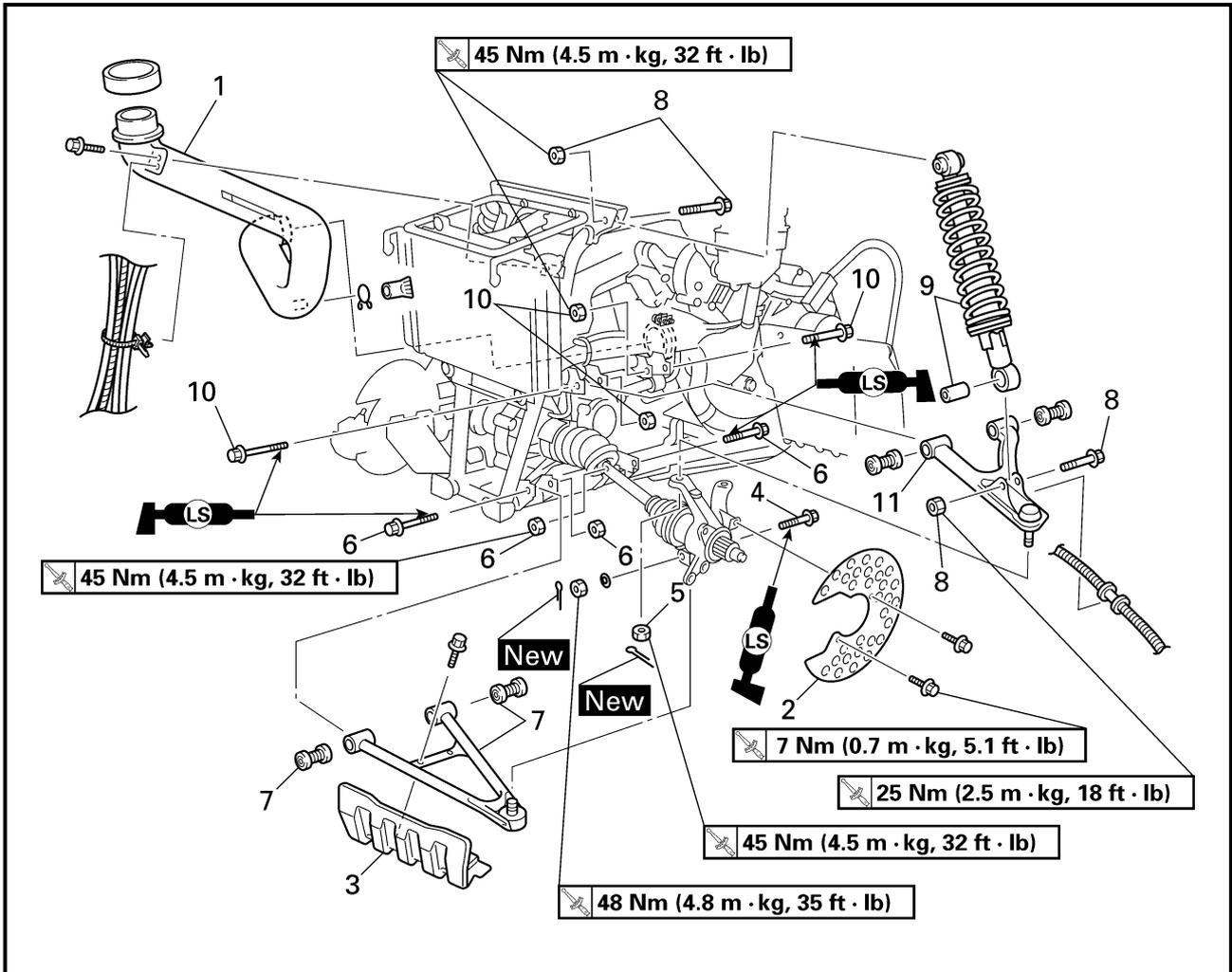
2. Adjust:
- Toe-in
    - Refer to "TOE-IN ADJUSTMENT" in CHAPTER 3.



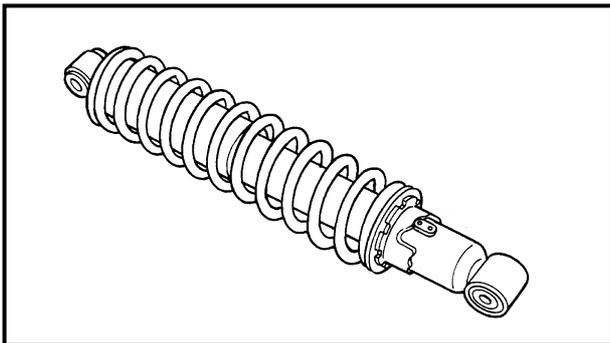
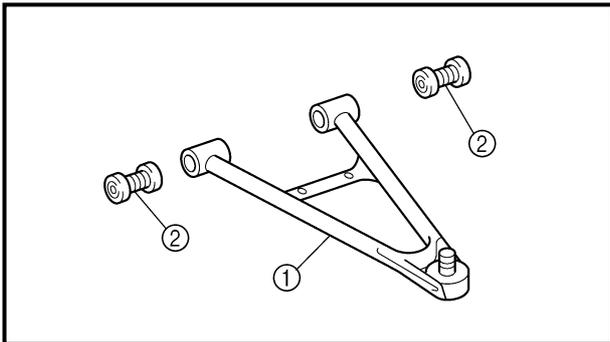
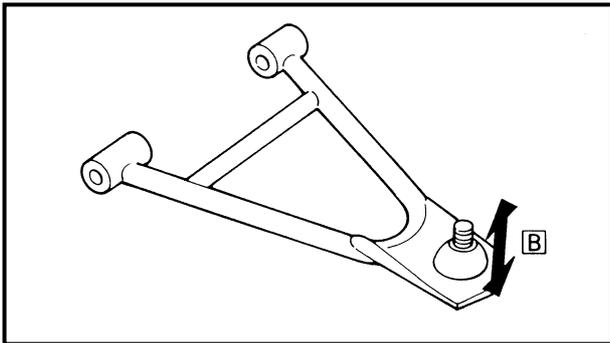
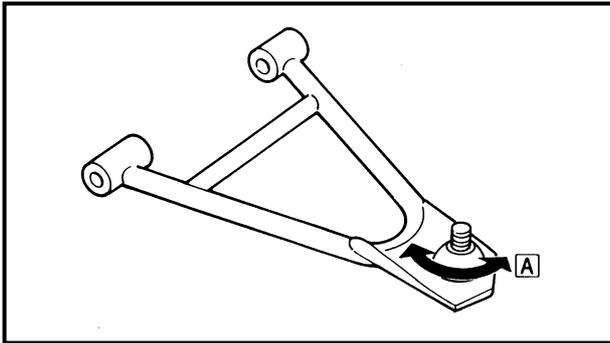
FRONT ARMS AND FRONT SHOCK ABSORBER



Order	Job name/Part name	Q'ty	Remarks
	<b>Front arms and front shock absorber removal</b>		Remove the parts in the order below.
	Engine skid plate (front)		Refer to "SEAT, CARRIERS, FENDERS AND FUEL TANK" in CHAPTER 3.
	Front fender		
	Front wheel/brake disc		
1	Air duct	1	Refer to "FRONT AND REAR WHEELS".
2	Brake disc guard	1	
3	Protector	1	



Order	Job name/Part name	Q'ty	Remarks
4	Bolt	1	Refer to "FRONT ARMS REMOVAL" and "FRONT ARMS AND FRONT SHOCK ABSORBER INSTALLATION".
5	Nut	1	
6	Bolt/nut	2/2	
7	Front arm (lower)/bushing	1/2	
8	Nut/bolt	2/2	
9	Front shock absorber/collar	1/1	
10	Bolt/nut	2/2	
11	Front arm (upper)/bushing	1/2	
			For installation, reverse the removal procedure.



## FRONT ARMS REMOVAL

1. Check:

- Front arm free play

\*\*\*\*\*

### Checking steps:

- Check the front arm side play **A** by moving it from side to side.  
If side play is noticeable, check the bushings.

- Check the front arm vertical movement **B** by moving it up and down.

If the vertical movement is tight or rough, or if there is binding, check the bushings.

\*\*\*\*\*

2. Remove:

- Front arms

## FRONT ARM INSPECTION

1. Inspect:

- Front arms **1**  
Bends/damage → Replace.

2. Inspect:

- Bushings **2**  
Wear/damage → Replace.

## FRONT SHOCK ABSORBER INSPECTION

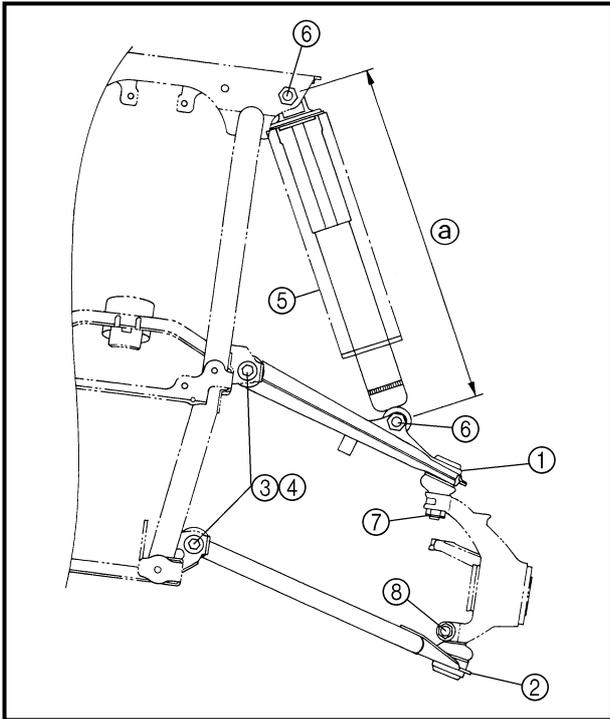
1. Inspect:

- Shock absorber rod  
Bends/damage → Replace the shock absorber assembly.

- Shock absorber assembly  
Oil leaks → Replace the shock absorber assembly.

- Spring  
Fatigue → Replace the shock absorber assembly.

Move the spring up and down.



## FRONT ARMS AND FRONT SHOCK ABSORBER INSTALLATION

1. Install:

- Front arms
- Front shock absorber

\*\*\*\*\*

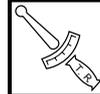
### Installation steps:

- Install the front arm (upper) ① and front arm (lower) ②.

### NOTE:

- Lubricate the bolts ③ with lithium soap base grease.
- Be sure to position the bolts ③ so that the bolt head faces outward.
- Temporarily tighten the nuts ④.

- Install the front shock absorber ⑤.



**Nut ⑥:**  
45 Nm (4.5 m • kg, 32 ft • lb)

- Install the ball joints.



**Nut ⑦:**  
25 Nm (2.5 m • kg, 18 ft • lb)  
**Nut ⑧:**  
48 Nm (4.8 m • kg, 35 ft • lb)

- Install the new cotter pins.
- Tighten the nuts ④.

### NOTE:

Before tightening the nuts ④, adjust the length ① to 318 mm (12.5 in).

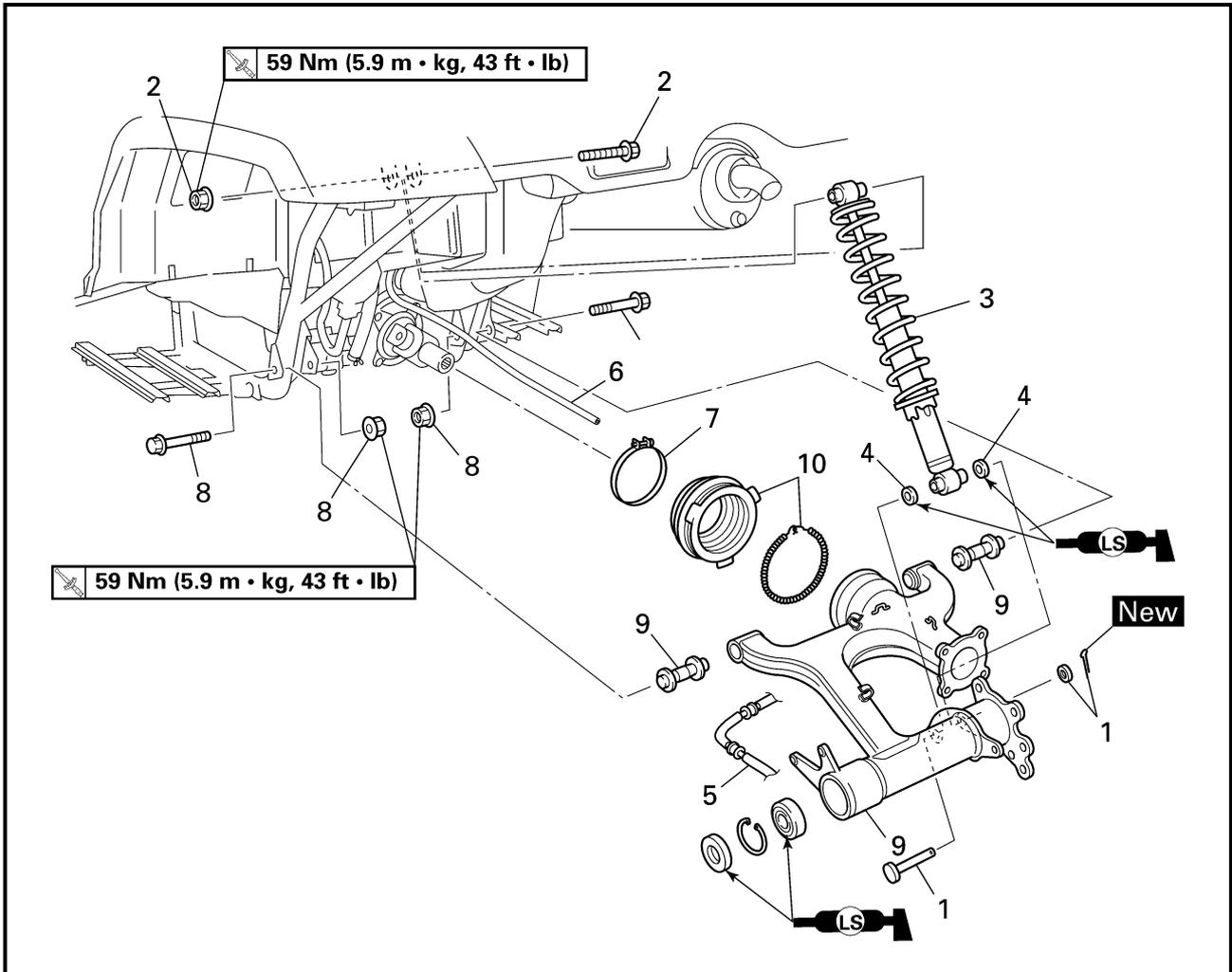


**Nut ④:**  
45 Nm (4.5 m • kg, 32 ft • lb)

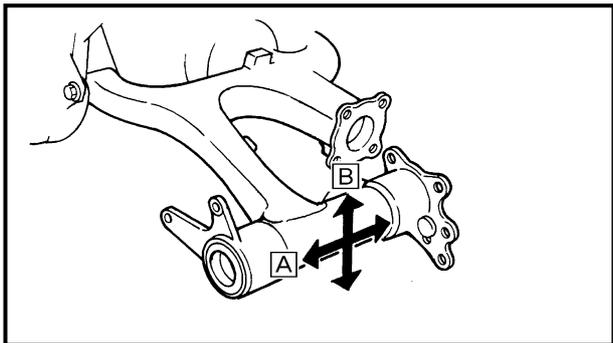
\*\*\*\*\*



REAR SHOCK ABSORBER AND SWINGARM



Order	Job name/Part name	Q'ty	Remarks
	<b>Rear shock absorber and swingarm removal</b>		Remove the parts in the order below.
	Rear wheel hubs/brake disc		Refer to "FRONT AND REAR WHEELS".
	Final drive gear assembly		Refer to "REAR AXLE/FINAL DRIVE GEAR AND DRIVE SHAFT" in CHAPTER 7.
1	Clip/washer/pin	1/1/1	Refer to "SWINGARM REMOVAL".
2	Nut/bolt	1/1	
3	Rear shock absorber	1	
4	Collar	2	
5	Rear brake hose	1	
6	Final drive gear case breather hose	1	
7	Metal clamp	1	
8	Nut/bolt	2/2	
9	Swingarm/bushing	1/2	
10	Spring/rubber boot	1/1	
			For installation, reverse the removal procedure.



## SWINGARM REMOVAL

1. Inspect:

- Swingarm free play

\*\*\*\*\*

### Inspection steps:

- Check the tightening torque of the nuts (swingarm).



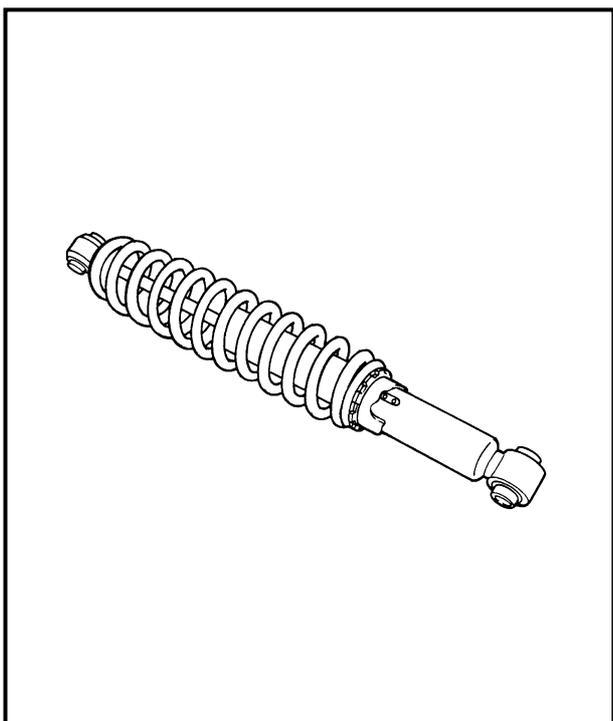
**Nut (swingarm):**  
**59 Nm (5.9 m • kg, 43 ft • lb)**

- Check the swingarm side play [A] by moving it from side to side.  
 If side play is noticeable, check the bushing and frame pivot.
- Check the swingarm vertical movement [B] by moving it up and down.  
 If vertical movement is tight or rough, or if there is binding, check the bushing and frame pivot.

\*\*\*\*\*

2. Remove:

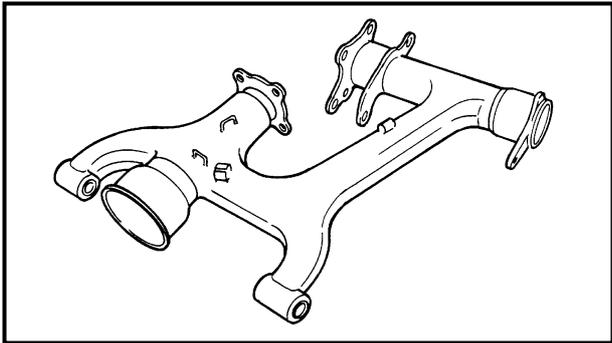
- Nuts
- Bolts
- Swingarm



## REAR SHOCK ABSORBER INSPECTION

1. Inspect:

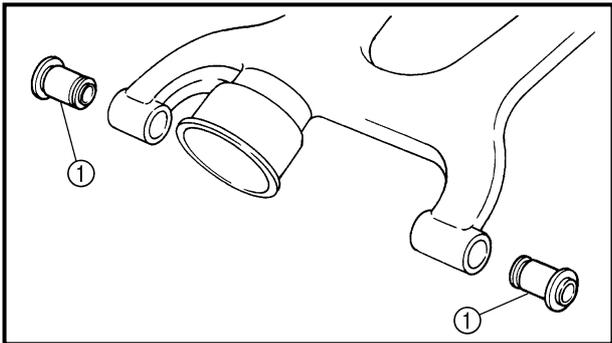
- Shock absorber  
 Oil leaks → Replace the shock absorber assembly.
- Shock absorber rod  
 Bends/damage → Replace the shock absorber assembly.
- Spring  
 Fatigue → Replace the shock absorber assembly.  
 Move the spring up and down.



## SWINGARM INSPECTION

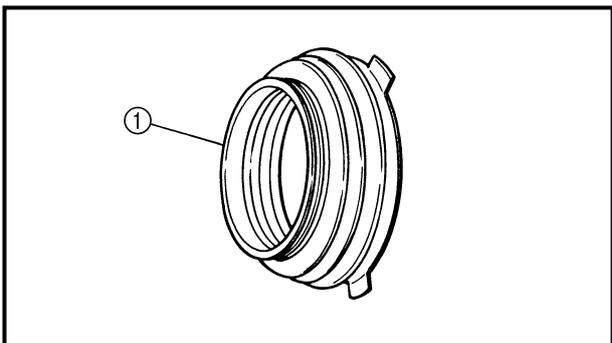
1. Inspect:

- Swingarm  
Bends/cracks/damage → Replace.



2. Inspect:

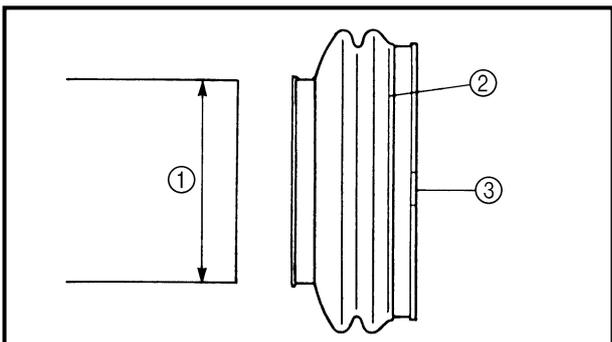
- Bushings ①  
Wear/damage → Replace.



## RUBBER BOOT INSPECTION

1. Inspect:

- Rubber boot ①  
Damage → Replace.



## RUBBER BOOT INSTALLATION

1. Apply:

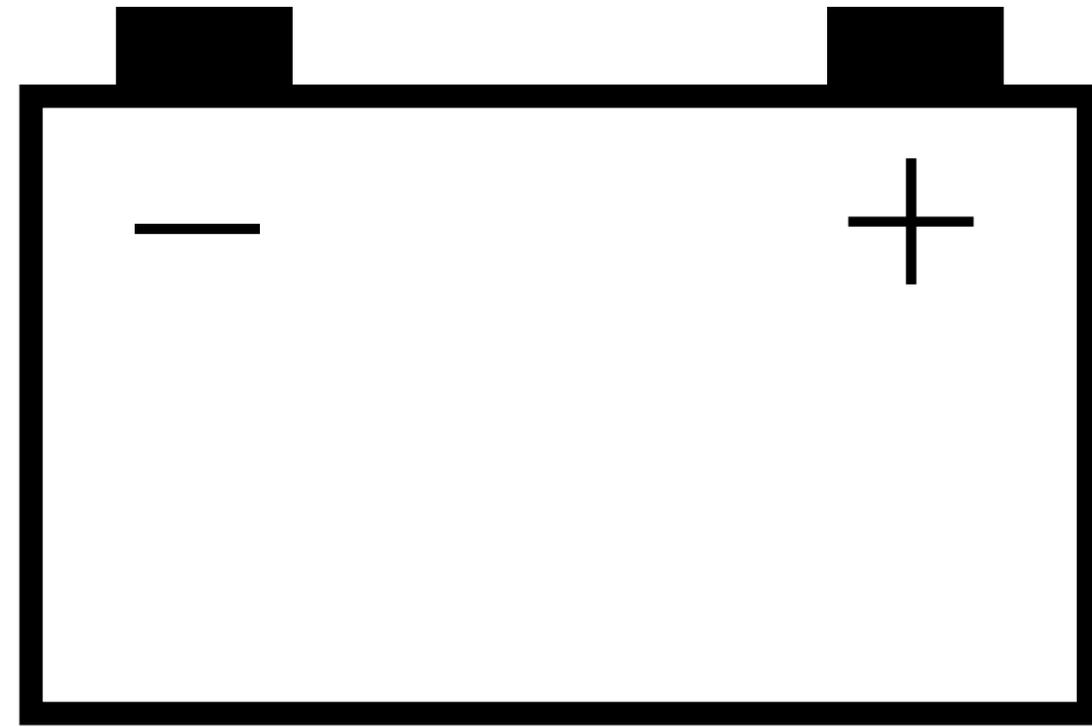
- Adhesive (for rubber)  
(to the engine ①)

2. Install:

- Rubber boot ②

### NOTE:

Be sure to position the rubber boot so that the tang ③ faces towards the left.



**ELEC**

**9**



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## CHAPTER 9. ELECTRICAL

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**ELEC**



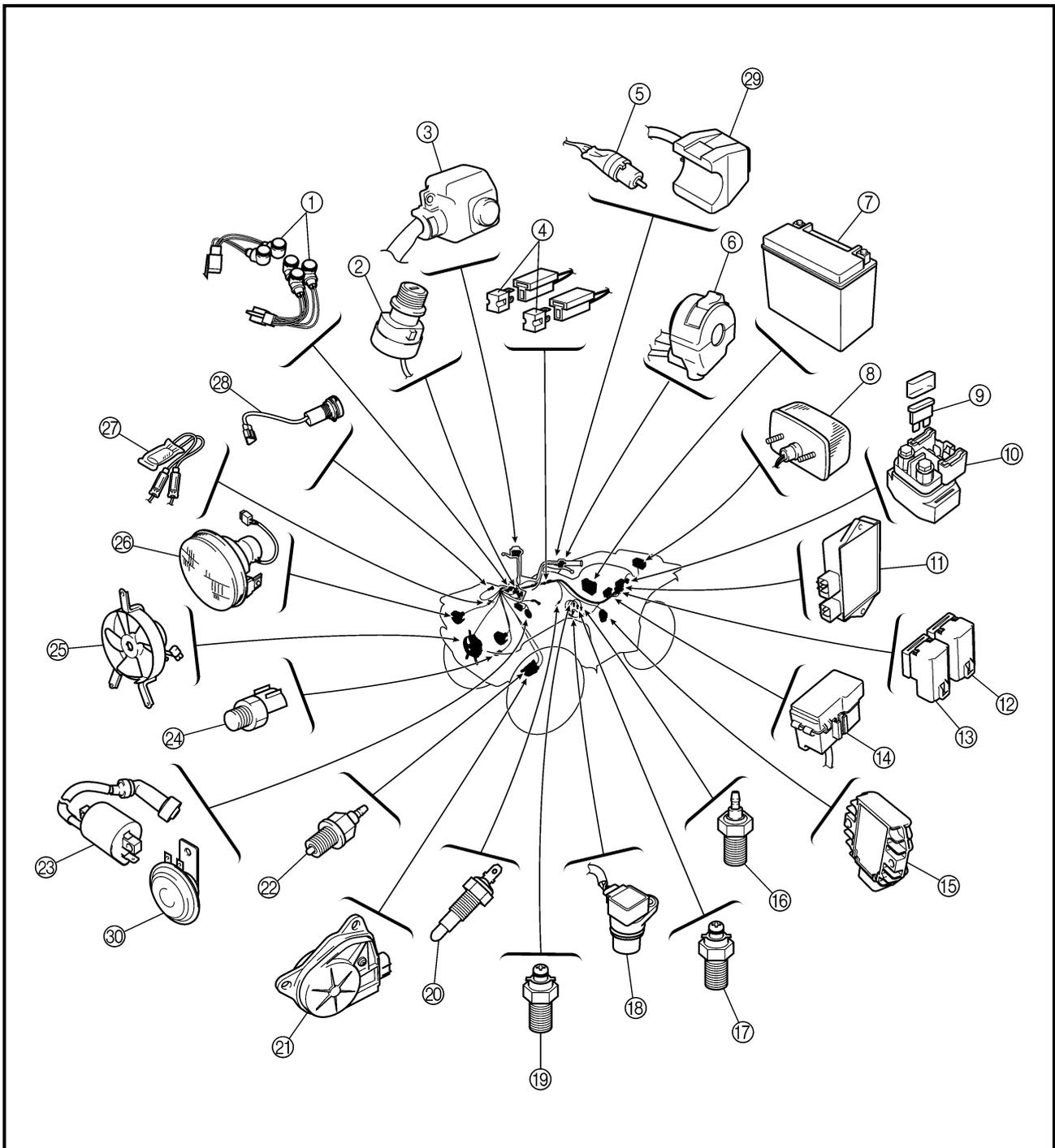


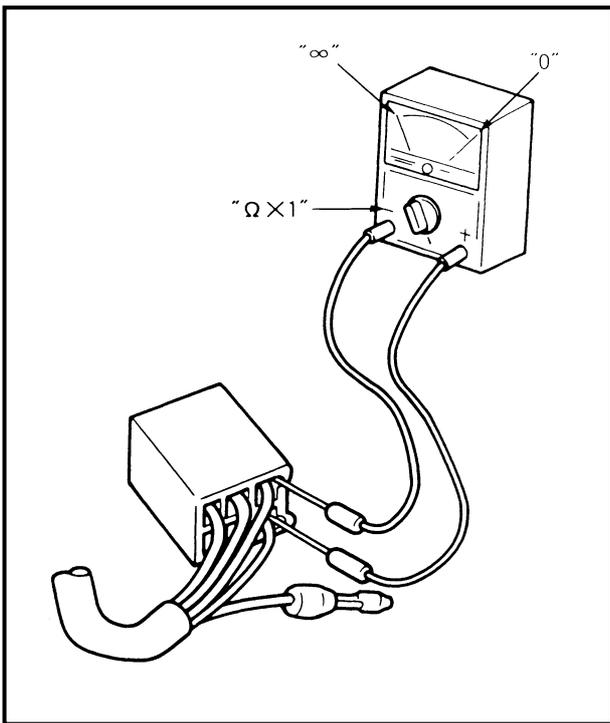
EB800000

ELECTRICAL

ELECTRICAL COMPONENTS

- |                                      |                                  |                           |                          |
|--------------------------------------|----------------------------------|---------------------------|--------------------------|
| ① Indicator light                    | ⑨ Main fuse                      | ⑰ Park switch             | ⑳ Fan                    |
| ② Main switch                        | ⑩ Starter relay                  | ⑱ Speed sensor            | ㉑ Headlight              |
| ③ On command four-wheel drive switch | ⑪ CDI unit                       | ⑲ Reverse switch          | ㉒ Circuit breaker (fan)  |
| ④ Diode                              | ⑫ Starting circuit cut-off relay | ⑳ Thermo switch           | ㉓ Auxiliary DC jack      |
| ⑤ Rear brake switch                  | ⑬ Reverse relay                  | ㉑ Gear motor              | ㉔ Horn switch            |
| ⑥ Handlebar switch (left)            | ⑭ Fuse box                       | ㉒ Four-wheel drive switch | (For GB, F, CH, Oceania) |
| ⑦ Battery                            | ⑮ Rectifier/regulator            | ㉓ Ignition coil           | ㉕ Horn                   |
| ⑧ Taillight                          | ⑯ Neutral switch                 | ㉔ Thermo switch           | (For GB, F, CH, Oceania) |





**SWITCH INSPECTION**

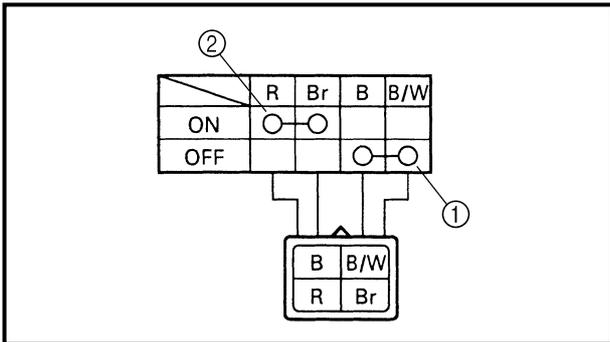
**SWITCH INSPECTION**

Use a pocket tester to check the terminals for continuity. If the continuity is faulty at any point, replace the switch.

	<p><b>Pocket tester:</b> P/N. YU-03112, 90890-03112</p>
--	---

**NOTE:**

- Set the pocket tester to "0" before starting the test.
- The pocket tester should be set to the "Ω x 1" range when testing the switch for continuity.
- Turn the switch on and off a few times when checking it.



**INSPECTING A SWITCH SHOWN IN THE MANUAL**

The terminal connections for switches (main switch, handlebar switch, engine stop switch, light switch, etc.) are shown in a chart similar to the one on the left.

This chart shows the switch positions in the column and the switch lead colors in the top row.

For each switch position, "○—○" indicates the terminals with continuity.

**The example chart shows that:**

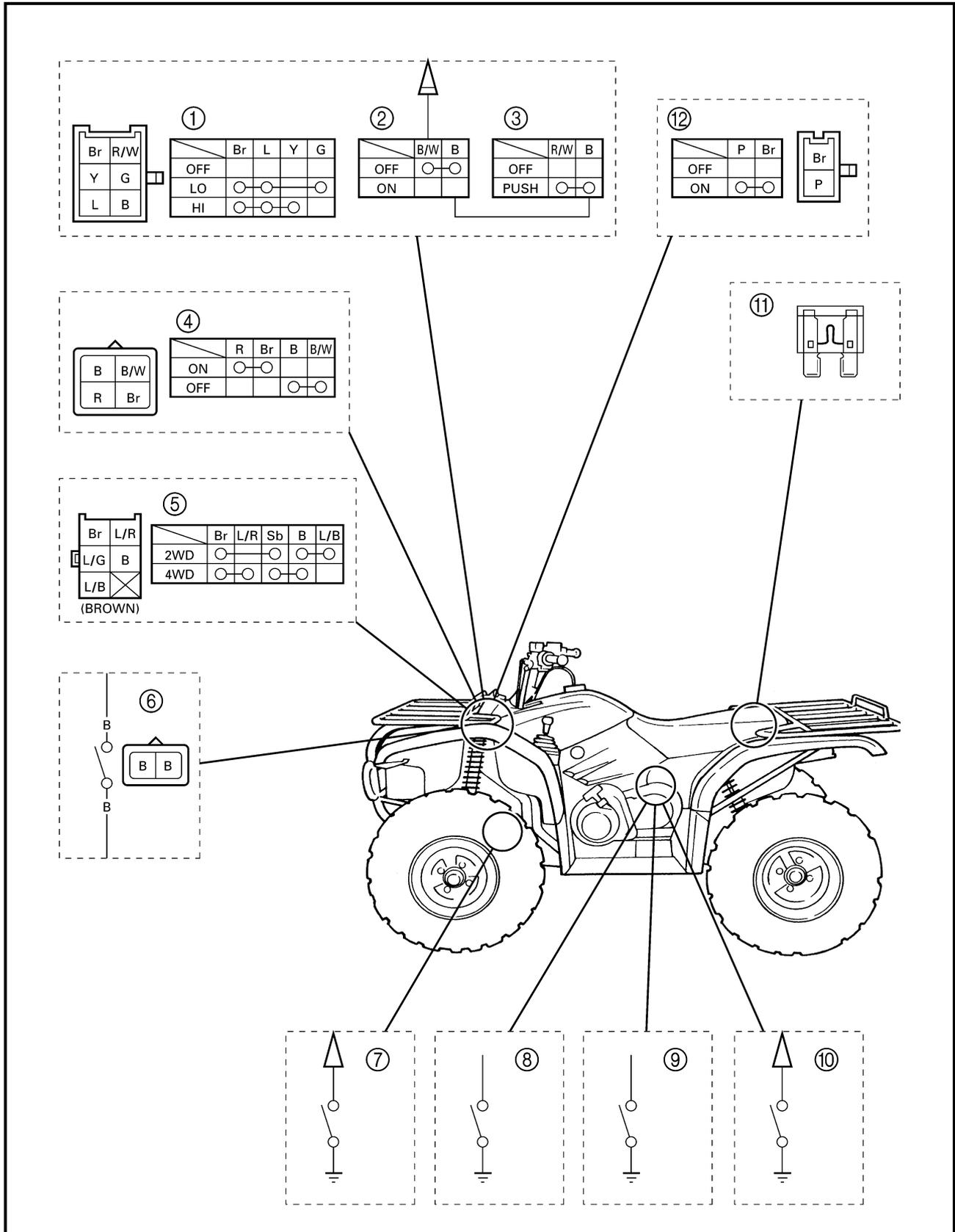
- ① There is continuity between the "Black and Black/White" leads when the switch is set to "OFF".
- ② There is continuity between the "Red and Brown" leads when the switch is set to "ON".

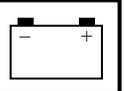


## SWITCH CONTINUITY INSPECTION

Refer to "SWITCH INSPECTION" and check for continuity between lead terminals.  
 Poor connection, no continuity → Correct or replace.

\* The coupler locations are circled.





- ① Lights switch
- ② Engine stop switch
- ③ Starter switch
- ④ Main switch
- ⑤ On command four-wheel drive switch
- ⑥ Rear brake switch
- ⑦ Four-wheel drive switch
- ⑧ Reverse switch
- ⑨ Park switch
- ⑩ Neutral switch
- ⑪ Fuse
- ⑫ Horn switch (For GB, F, CH, Oceania)





EB802010  
**TROUBLESHOOTING**

**IF THE IGNITION SYSTEM FAILS TO OPERATE (NO SPARK OR INTERMITTENT SPARK):**

**Procedure**

Check:

1. Fuse (main, ignition)
2. Battery
3. Spark plugs
4. Ignition spark gap
5. Spark plug cap resistance
6. Ignition coil resistance
7. Engine stop switch
8. Main switch
9. Pickup coil resistance
10. Charging/rotor rotation direction detection coil resistance
11. Wiring connection (the entire ignition system)

**NOTE:**

- Remove the following part(s) before troubleshooting:
  - 1) Seat
  - 2) Fuel tank side panels
  - 3) Front carrier
  - 4) Front fender
- Use the following special tool(s) for troubleshooting.



**Dynamic spark tester:**  
P/N. YM-34487  
**Ignition checker:**  
P/N. 90890-06754  
**Pocket tester:**  
P/N. YU-03112, 90890-03112

EB802011

1. Fuse (main, ignition)  
Refer to "SWITCH INSPECTION".

CONTINUITY

EB802012

2. Battery

- Check the battery condition. Refer to "BATTERY INSPECTION" in CHAPTER 3.

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

CORRECT

3. Spark plug

- Check the spark plug condition.
- Check the spark plug type.
- Check the spark plug gap. Refer to "SPARK PLUG INSPECTION" in CHAPTER 3.

NO CONTINUITY

Replace the fuse.

INCORRECT

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

**Standard spark plug:**  
**D8EA/NGK, X24ES-U/DENSO**

# IGNITION SYSTEM

**ELEC**



 **Spark plug gap:**  
0.6 ~ 0.7 mm (0.02 ~ 0.03 in)

↓ CORRECT

INCORRECT



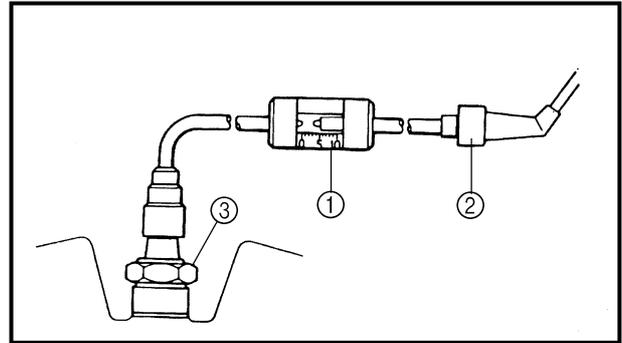
Repair or replace the spark plug.

For CDN

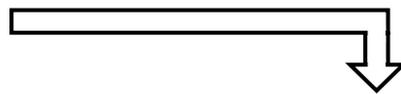
## 4. Ignition spark gap

- Disconnect the spark plug cap from the spark plug.
- Connect the dynamic spark tester ① as shown.
- ② Spark plug cap
- ③ Spark plug
- Turn the main switch to "ON".
- Check the ignition spark gap.
- Crank the engine by pushing the starter switch, and increase the spark gap until a misfiring occurs.

 **Minimum spark gap:**  
6.0 mm (0.24 in)



MEETS SPECIFICATION



The ignition system is not faulty.

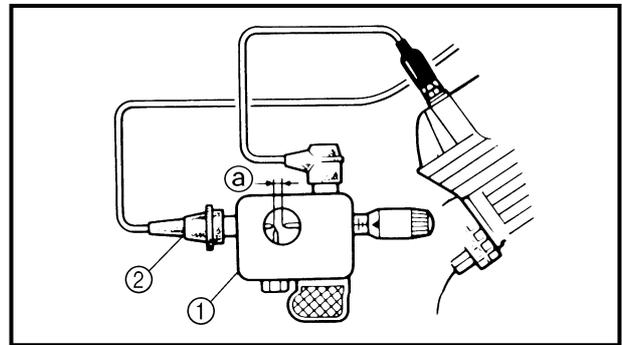
↓ OUT OF SPECIFICATION OR NO SPARK

For GB, F, CH, Oceania

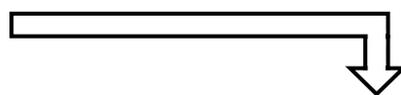
## 4. Ignition spark gap

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

 **Minimum spark gap:**  
6.0 mm (0.24 in)

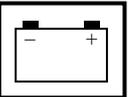


MEETS SPECIFICATION



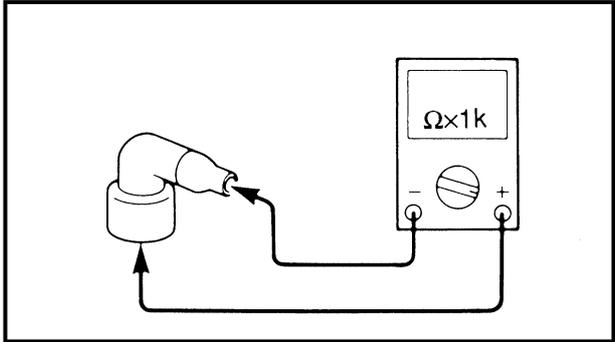
The ignition system is not faulty.

↓ OUT OF SPECIFICATION OR NO SPARK  
\*



5. Spark plug cap resistance

- Remove the spark plug cap.
- Connect the pocket tester ( $\Omega \times 1k$ ) to the spark plug cap.



- Check that the spark plug cap has the specified resistance.

**Spark plug cap resistance:**  
10 k $\Omega$  at 20 °C (68 °F)



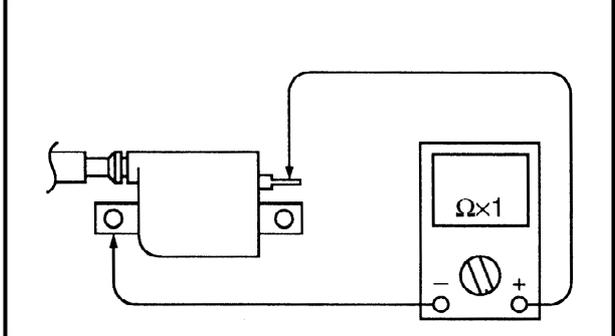
Replace the spark plug cap.



6. Ignition coil resistance

- Disconnect the ignition coil connector from the wire harness.
- Connect the pocket tester ( $\Omega \times 1$ ) to the ignition coil.

**Tester (+) lead → Orange lead terminal**  
**Tester (-) lead → Ignition coil base**

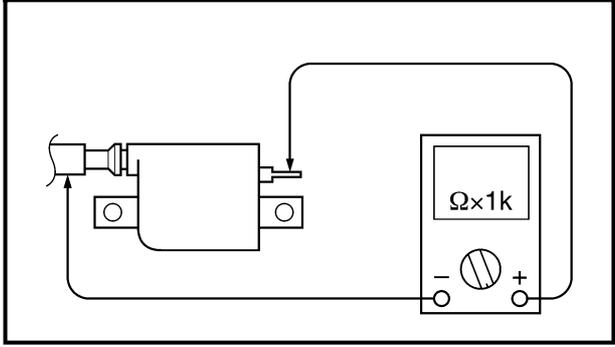


- Check that the primary coil has the specified resistance.

**Primary coil resistance:**  
0.18 ~ 0.28  $\Omega$  at 20 °C (68 °F)

- Connect the pocket tester ( $\Omega \times 1k$ ) to the ignition coil.

**Tester (+) lead → Orange lead terminal**  
**Tester (-) lead → Spark plug lead**



# IGNITION SYSTEM

**ELEC**



• Check that the secondary coil has the specified resistance.



**Secondary coil resistance:**  
6.32 ~ 9.48 kΩ at 20 °C (68 °F)

↓ BOTH MEET SPECIFICATION

7.Engine stop switch  
Refer to "SWITCH INSPECTION".

↓ CORRECT

8.Main switch  
Refer to "SWITCH INSPECTION".

↓ CORRECT

9.Pickup coil resistance

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

**Tester (+) lead → White/Red terminal ①**  
**Tester (-) lead → White/Green terminal ②**

OUT OF SPECIFICATION

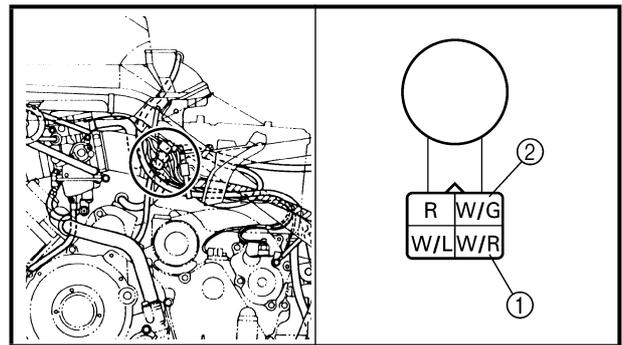
Replace the ignition coil.

INCORRECT

Replace the handlebar switch (left).

INCORRECT

Replace the main switch.



• Check the pickup coil for the specified resistance.

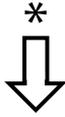


**Pickup coil resistance:**  
459 ~ 561 Ω at 20 °C (68 °F)  
(White/Red – White/Green)

↓ MEETS SPECIFICATION  
\*

OUT OF SPECIFICATION

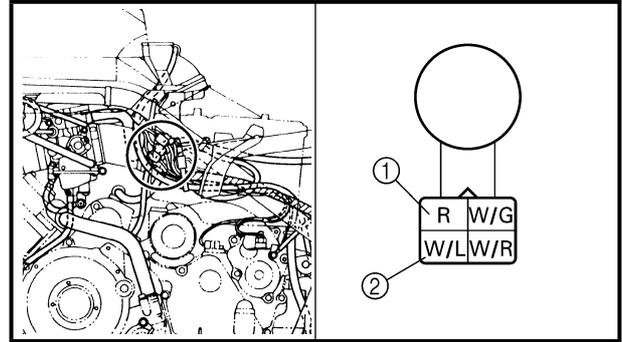
Replace the pickup coil/starter assembly.



10. Charging/rotor rotation direction detection coil resistance

- Disconnect the CDI magneto coupler from the wire harness.
- Connect the pocket tester ( $\Omega \times 100$ ) to the charging/rotor rotation direction detection coil terminal.

**Tester (+) lead → Red terminal ①**  
**Tester (-) lead → White/Blue terminal ②**



- Check the charging/rotor rotation direction detection coil for the specified resistance.



**Rotor rotation direction sensing coil resistance:**  
**0.104 ~ 0.127  $\Omega$  at 20 °C (68 °F)**  
**(Red – White/Blue)**

OUT OF SPECIFICATION

Replace the pickup coil/starter assembly.

MEETS SPECIFICATION

11. Wiring connection

- Check the connections of the entire ignition system. Refer to "CIRCUIT DIAGRAM".

POOR CONNECTION

Properly connect the ignition system.

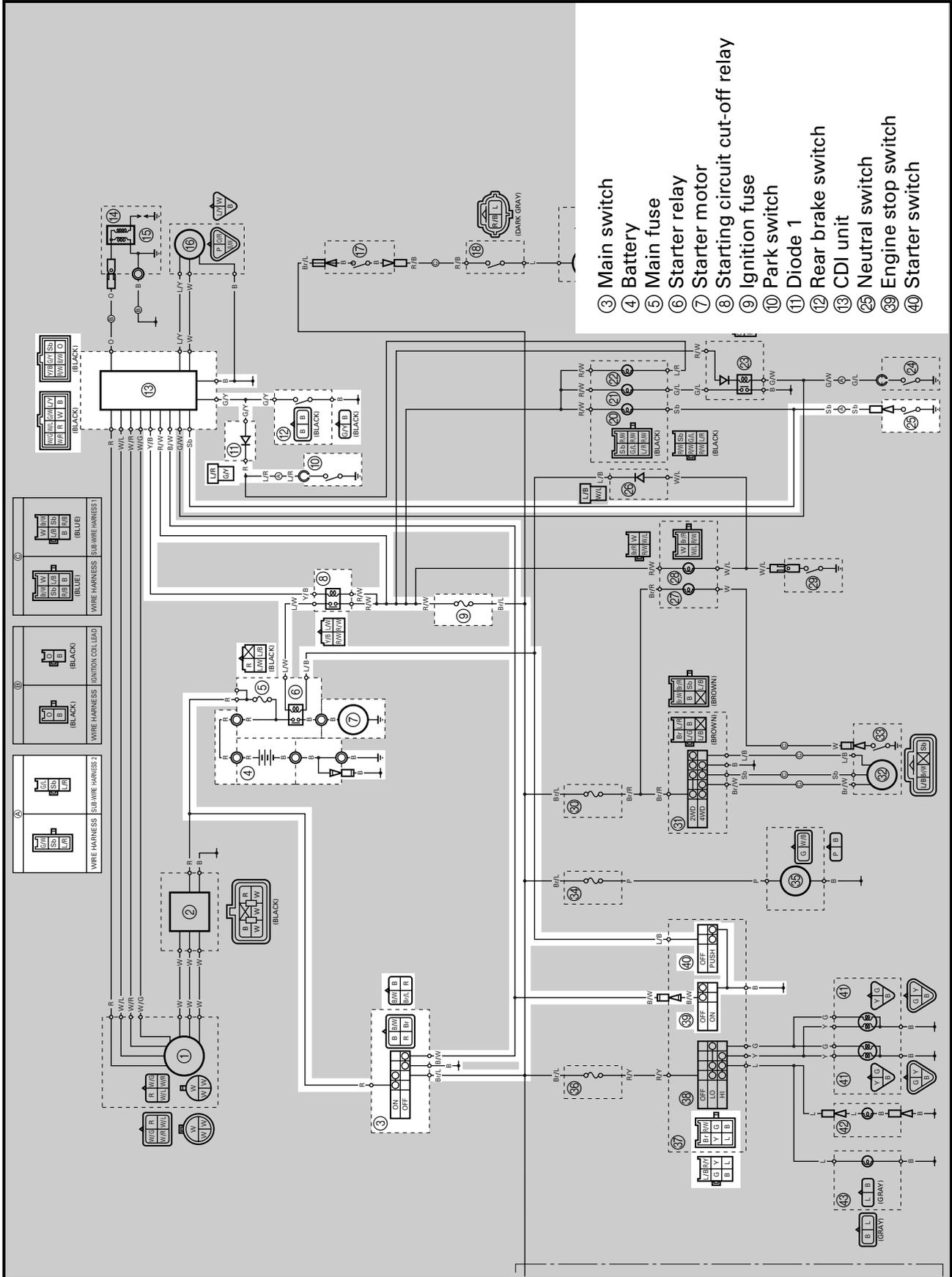
CORRECT

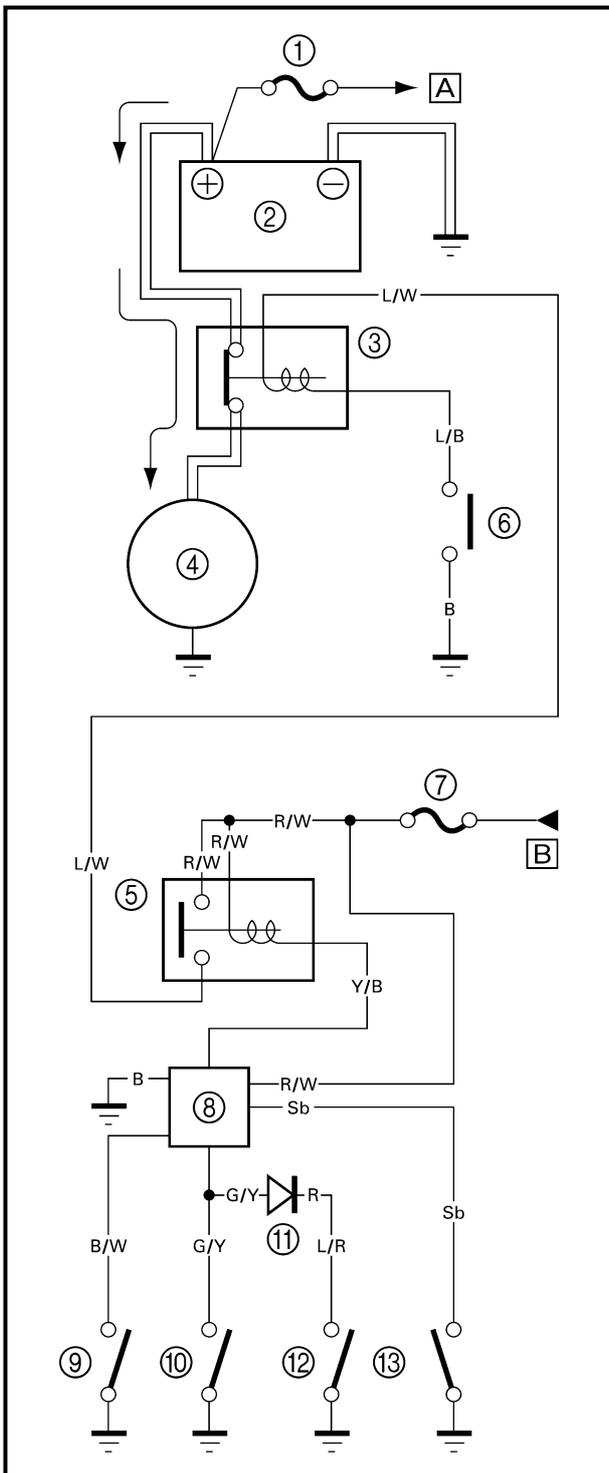
Replace the CDI unit.



EB803000

## ELECTRIC STARTING SYSTEM CIRCUIT DIAGRAM





## STARTING CIRCUIT OPERATION

The starting circuit on this model consists of the starter motor, starter relay, starting circuit cut-off relay, rear brake switch, park switch CDI unit and neutral switch. If the main switch is on and the engine stop switch is in the RUN position, the starter motor can be operated only if:

- The transmission is in neutral (the neutral switch is closed).
- or**
- The transmission is in park (the park switch is closed).
  - You pull in the rear brake lever (the rear brake switch is closed).

The starting circuit cut-off relay prevents the starter from operating when the select lever is in gear or in reverse and the rear brake lever is free. In this instance, the starting circuit cut-off relay is off so that current cannot reach the starter motor.

- ① Main fuse
- ② Battery
- ③ Starter relay
- ④ Starter motor
- ⑤ Starting circuit cut-off relay
- ⑥ Start switch
- ⑦ Ignition fuse
- ⑧ CDI unit
- ⑨ Engine stop switch
- ⑩ Rear brake switch
- ⑪ Diode
- ⑫ Park switch
- ⑬ Neutral switch
- [A] TO MAIN SWITCH
- [B] FROM MAIN SWITCH



EB803020

### TROUBLESHOOTING

#### IF THE STARTER MOTOR FAILS TO OPERATE:

#### Procedure

Check:

- |   |   |
|---|---|
| <ol style="list-style-type: none"> <li>1.Fuse (main, ignition)</li> <li>2.Battery</li> <li>3.Starter motor</li> <li>4.Starting circuit cut-off relay</li> <li>5.Starter relay</li> <li>6.Main switch</li> <li>7.Engine stop switch</li> </ol> | <ol style="list-style-type: none"> <li>8.Neutral switch</li> <li>9.Rear brake switch</li> <li>10.Park switch</li> <li>11.Start switch</li> <li>12.Diode</li> <li>13.Wiring connection<br/>(the entire starting system)</li> </ol> |
|---|---|

#### NOTE:

- Remove the following part(s) before troubleshooting:

- 1)Seat
- 2)Fuel tank side panels
- 3)Fuel tank
- 4)Air cleaner case
- 5)Front carrier
- 6)Front fender panel

- Use the following special tool(s) for troubleshooting.



**Pocket tester:**

**P/N. YU-03112, 90890-03112**

EB802011

1.Fuse (main, ignition)  
Refer to "SWITCH INSPECTION".

CONTINUITY

NO CONTINUITY

Replace the fuse.

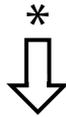
EB802012

2.Battery  
• Check the battery condition.  
Refer to "BATTERY INSPECTION" in CHAPTER 3.  
**Open-circuit voltage:  
12.8 V or more at 20 °C (68 °F)**

CORRECT  
\*

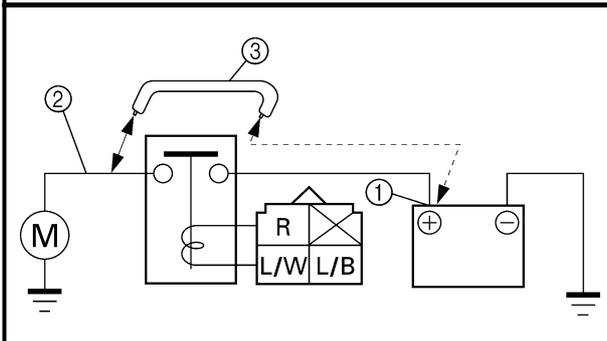
INCORRECT

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



### 3. Starter motor

- Connect the battery positive terminal ① and starter motor cable ② using a jumper lead ③ \*.
- Check the operation of the starter motor.



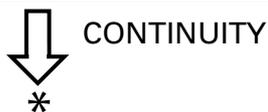
### 4. Starting circuit cut-off relay

- Remove the starting circuit cut-off relay from the wire harness.
- Connect the pocket tester ( $\Omega \times 1$ ) and the battery (12 V) to the starting circuit cut-off relay terminals.

**Battery (+) terminal** → Red/White terminal ①  
**Battery (-) terminal** → Yellow/Black terminal ②

**Tester (+) lead** → Red/White terminal ③  
**Tester (-) lead** → Blue/White terminal ④

- Check the starting circuit cut-off relay for continuity.



\*

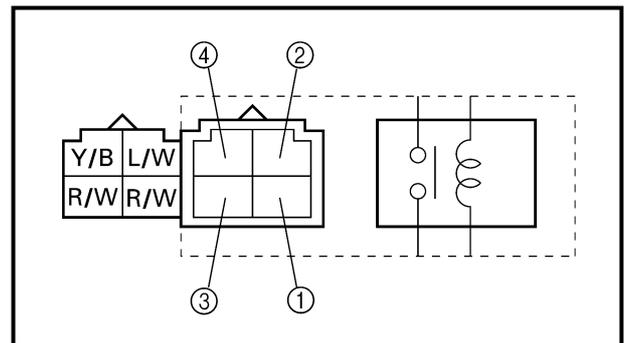
### ⚠ WARNING

- A wire that is used as a jumper lead must have the equivalent capacity or more as that of the battery lead, otherwise the jumper lead may burn.
- This check is likely to produce sparks, so be sure that no flammable gas or fluid is in the vicinity.

DOES NOT TURN



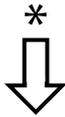
Repair or replace the starter motor.



NO CONTINUITY

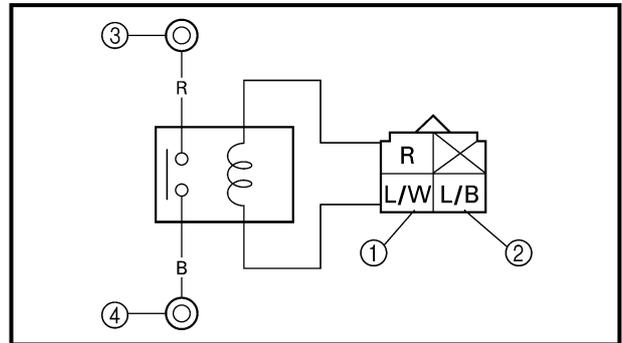


Replace the starting circuit cut-off relay.



**5. Starter relay**

- Remove the starter relay from the wire harness.
- Connect the pocket tester ( $\Omega \times 1$ ) and the battery (12 V) to the starter relay terminals.



**Battery (+) terminal** → **Blue/White terminal** ①  
**Battery (-) terminal** → **Blue/Black terminal** ②

**Tester (+) lead** → **Red terminal** ③  
**Tester (-) lead** → **Black terminal** ④

- Check the starter relay for continuity.

NO CONTINUITY

Replace the starter relay.

CONTINUITY

**6. Main switch**  
 Refer to "SWITCH INSPECTION".

INCORRECT

Replace the main switch.

CORRECT

**7. Engine stop switch**  
 Refer to "SWITCH INSPECTION".

INCORRECT

Replace the handlebar switch (right).

CORRECT

**8. Neutral switch**  
 Refer to "SWITCH INSPECTION".

INCORRECT

Replace the neutral switch.

CORRECT

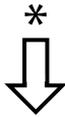
**9. Rear brake switch**  
 Refer to "SWITCH INSPECTION".

INCORRECT

Replace the rear brake switch.

CORRECT

\*



10. Park switch  
Refer to "SWITCH INSPECTION".



CORRECT

INCORRECT

Replace the park switch.

11. Start switch  
Refer to "SWITCH INSPECTION".



CORRECT

INCORRECT

Replace the handlebar switch (left).

12. Diode

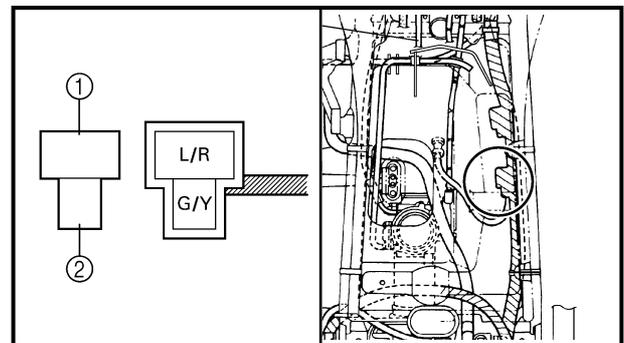
- Remove the diode from the coupler.
- Connect the pocket tester ( $\Omega \times 1$ ) to the diode terminals as shown.
- Check the diode for continuity as follows.

Tester positive probe → Blue/Red ①	Continuity
Tester negative probe → Green/Yellow ②	

Tester positive probe → Green/Yellow ②	No continuity
Tester negative probe → Blue/Red ①	



CORRECT



**NOTE:**

When you switch the tester's positive and negative probes, the readings in the left chart will be reversed.

INCORRECT

Replace the diode.

EB803028

13. Wiring connection

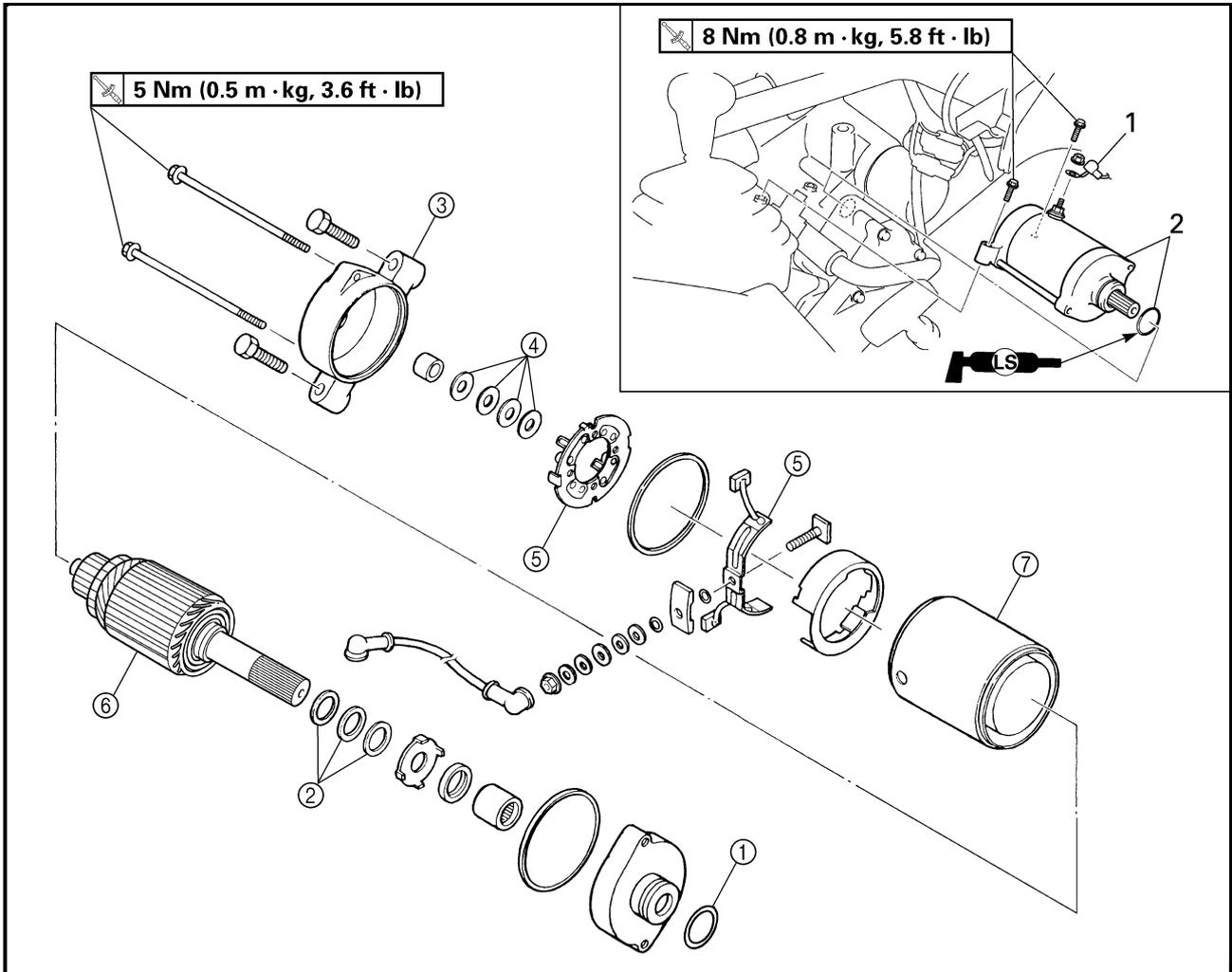
- Check the connections of the entire starting system.
- Refer to "CIRCUIT DIAGRAM".

POOR CONNECTION

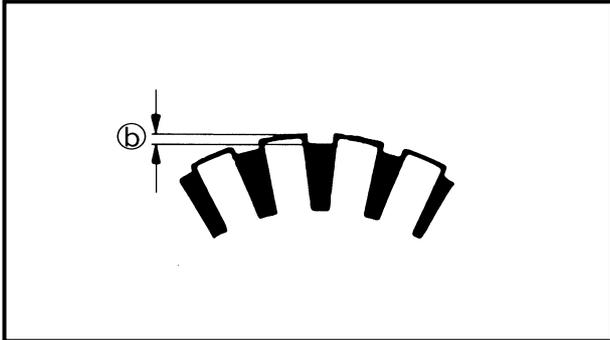
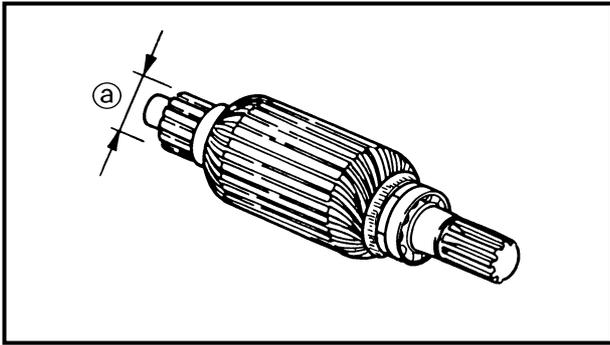
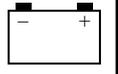
Properly connect the starting system.



STARTER MOTOR



Order	Job name/Part name	Q'ty	Remarks
	<b>Starter motor removal</b>		Remove the parts in the order below.
1	Starter motor lead	1	
2	Starter motor/O-ring	1/1	For installation, reverse the removal procedure.
	<b>Starter motor disassembly</b>		Disassemble the parts in the order below.
①	Bracket 1	1	Refer to "STARTER MOTOR ASSEMBLY".
②	Washer kit		
③	Bracket 2	1	
④	Shims		
⑤	Brush seat 1/brush seat 2	1/2	
⑥	Armature coil	1	
⑦	Yoke	1	
			For assembly, reverse the disassembly procedure.



**STARTER MOTOR INSPECTION**

1. Inspect:

- Commutator  
Dirty → Clean it with #600 grit sandpaper.

2. Measure:

- Commutator diameter (a)  
Out of specification → Replace the starter motor.



**Outside diameter:**  
28 mm (1.10 in)  
**<Wear limit>:**  
27 mm (1.06 in)

3. Measure:

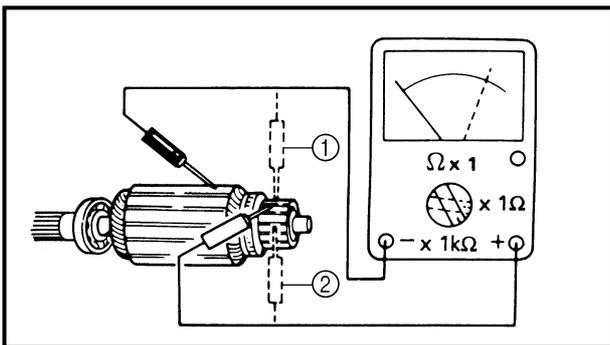
- Mica undercut (b)  
Out of specification → Scrape the mica using a hacksaw blade.



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

**NOTE:**

Scrape the mica to the proper measurement using a hacksaw blade which has been grounded to fit the commutator.



4. Inspect:

- Armature coil (insulation/continuity)  
Defects → Replace the starter motor.

\*\*\*\*\*

**Armature coil inspection steps:**

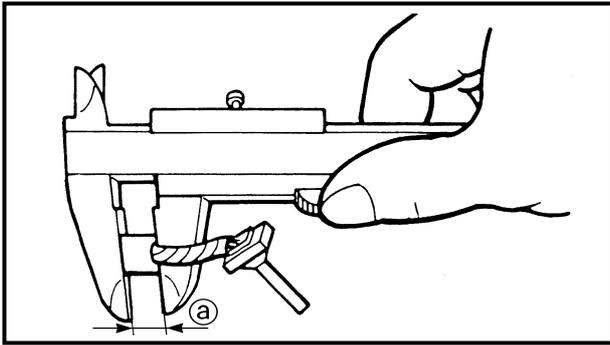
- Connect the pocket tester for the continuity check (1) and insulation check (2).
- Measure the armature resistances.



**Armature coil resistance:**  
**Continuity check (1):**  
0.025 ~ 0.035 Ω at 20 °C (68 °F)  
**Insulation check (2):**  
More than 1 MΩ at 20 °C (68 °F)

- If the resistance is incorrect, replace the starter motor.

\*\*\*\*\*



5.Measure:

- Brush length ① (each)

Out of specification → Replace the brush.



**Brush length:**  
 12.5 mm (0.49 in)  
**<Wear limit>:**  
 5 mm (0.20 in)

6.Measure:

- Brush spring force

Fatigue/out of specification → Replace as a set.

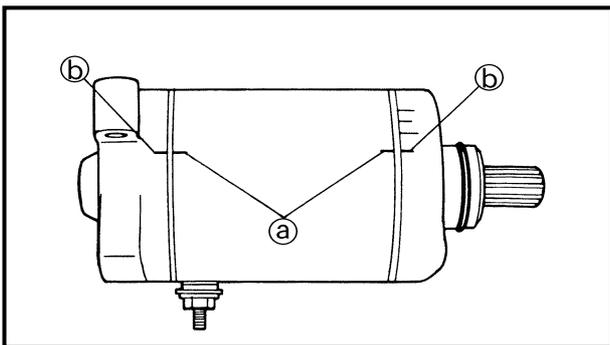


**Brush spring force:**  
 7.65 ~ 10.01 Nm  
 (780 ~ 1,020 g, 27.5 ~ 36.0 oz)

7.Inspect:

- Oil seal
- Bushing
- Bearing
- O-rings

Wear/damage → Replace.



## STARTER MOTOR ASSEMBLY

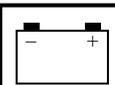
1.Install:

- Yoke
- Brackets

**NOTE:**

Align the match marks ① on the yoke with the match marks ② on the brackets.





EB804010

### TROUBLESHOOTING

#### IF THE BATTERY IS NOT CHARGED:

#### Procedure

Check:

1. Fuse (main)
2. Battery
3. Charging voltage
4. Charging coil resistance
5. Wiring connections  
(the entire charging system)

#### NOTE:

- Remove the following part(s) before troubleshooting:
  - 1) Seat
  - 2) Fuel tank side panels
- Use the following special tool(s) for troubleshooting.



**Inductive tachometer:**  
P/N. YU-8036-A  
**Engine tachometer:**  
P/N. 90890-03113  
**Pocket tester:**  
P/N. YU-03112, 90890-03112

EB802011

1. Fuse (main)  
Refer to "SWITCH INSPECTION".



EB802012

2. Battery

- Check the battery condition. Refer to "BATTERY INSPECTION" in CHAPTER 3.

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



EB804011

3. Charging voltage

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

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

NO CONTINUITY

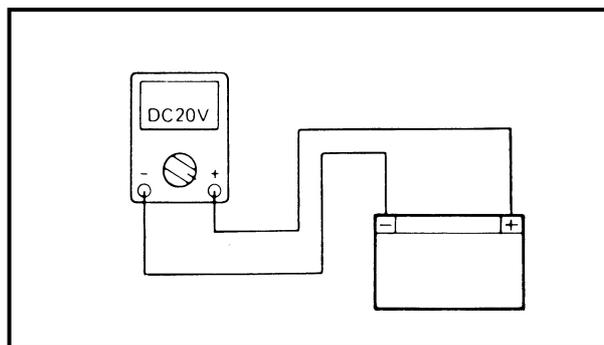


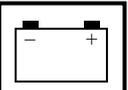
Replace the fuse.

INCORRECT



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





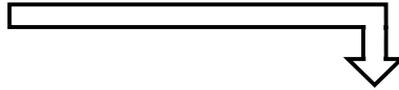
• Start the engine and accelerate to about 3,000 r/min.



**Charging voltage:**  
14 V at 1,000 r/min

**NOTE:** \_\_\_\_\_  
Use a fully charged battery.

MEETS SPECIFICATION



The charging circuit is not faulty.

OUT OF SPECIFICATION



EB804012

### 4. Charging coil resistance

- Disconnect the CDI magneto coupler from the wire harness.
- Connect the pocket tester ( $\Omega \times 1$ ) to the charging coils.

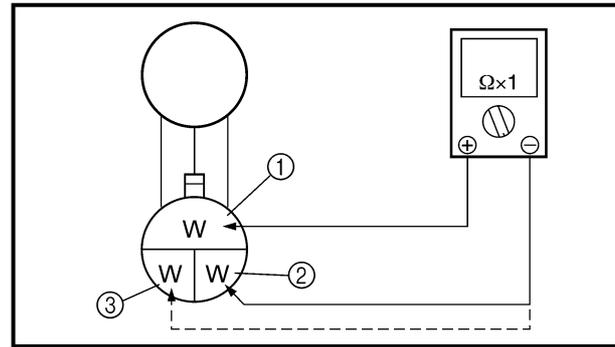
**Tester (+) lead** → White terminal ①  
**Tester (-) lead** → White terminal ②

**Tester (+) lead** → White terminal ①  
**Tester (-) lead** → White terminal ③

- Measure the stator coil resistance.



**Charging coil resistance:**  
0.70 ~ 0.86  $\Omega$  at 20 °C (68 °F)



OUT OF SPECIFICATION



Replace the pickup coil/stator assembly.

MEETS SPECIFICATION



EB804015

### 5. Wiring connections

- Check the connections of the entire charging system. Refer to "CIRCUIT DIAGRAM".

POOR CONNECTION



Properly connect the charging system.

CORRECT



Replace the rectifier/regulator.





**EB805010  
TROUBLESHOOTING**

**IF THE HEADLIGHT, TAILLIGHT AND/OR METER LIGHT FAIL TO COME ON:**

**Procedure**

Check:

- 1.Fuse (main)
- 2.Battery
- 3.Main switch
- 4.Lights switch
- 5.Wiring connections  
(the entire lighting system)

**NOTE:**

- Remove the following part(s) before troubleshooting:
  - 1)Seat
  - 2)Front carrier
  - 3)Front fender panel
- Use the following special tool(s) for troubleshooting.



**Pocket tester:  
P/N. YU-03112, 90890-03112**

**EB802011**

1.Fuse (main, headlight)  
Refer to "SWITCH INSPECTION".

CONTINUITY

NO CONTINUITY

Replace the fuse.

**EB802012**

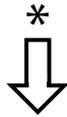
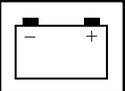
2.Battery  
• Check the battery condition.  
Refer to "BATTERY INSPECTION" in CHAPTER 3.

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

CORRECT  
\*

INCORRECT

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



3. Main switch  
Refer to "SWITCH INSPECTION".

INCORRECT



Replace the main switch.

CORRECT



4. Lights switch  
Refer to "SWITCH INSPECTION".

INCORRECT



Lights switch is faulty, replace the handle-bar switch (left).

CORRECT



EB805013

5. Wiring connection  
• Check the connections of the entire lighting system.  
Refer to "WIRING DIAGRAM".

POOR CONNECTION



Properly connect the lighting system.

CORRECT



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



EB805020

**LIGHTING SYSTEM CHECK**

1.If the headlights fail to come on:

**1.Bulb and bulb socket**

- Check the bulb and bulb socket for continuity.

NO CONTINUITY



Replace the bulb and/or bulb socket.

CONTINUITY



**2.Voltage**

- Connect the pocket tester (DC 20 V) to the headlight couplers.

**A**

**B**

**Tester (+) lead** → **Green terminal ① or Yellow terminal ②**  
**Tester (-) lead** → **Black terminal ③**

**A** When the lights switch is on "LO".  
**B** When the lights switch is on "HI".

- Turn the main switch to "ON".
- Turn the lights switch to "LO" or "HI".
- Check the voltage (12 V) of the "Green" and "Yellow" leads on the bulb socket connector.

OUT OF SPECIFICATION

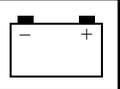


The wiring circuit from the main switch to the bulb socket connector is faulty, repair it.

MEETS SPECIFICATION



This circuit is not faulty.



EB805021

2.If the taillight fails to come on:

1.Bulb and bulb socket

- Check the bulb and bulb socket for continuity.

CONTINUITY

2.Voltage

- Connect the pocket tester (20 V) to the bulb socket coupler.

Tester (+) lead → Blue lead ①  
 Tester (-) lead → Black lead ②

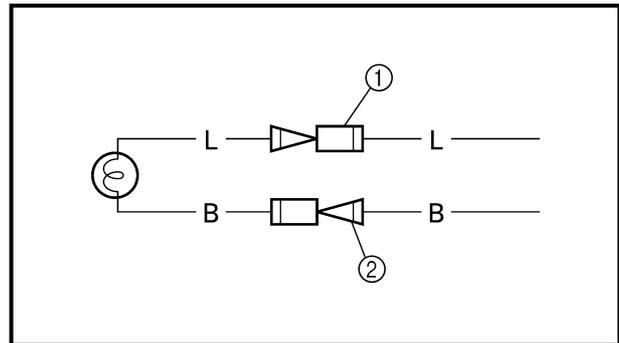
- Turn the main switch to "ON".
- Turn the lights switch to "LO" or "HI".
- Check the voltage (12 V) of the "Blue" lead on the bulb socket connector.

MEETS SPECIFICATION

This circuit is not faulty.

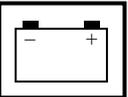
NO CONTINUITY

Replace the bulb and/or bulb socket.



OUT OF SPECIFICATION

The wiring circuit from the main switch to the bulb socket connector is faulty, repair it.



3.If the speedometer light (option) fails to come on:

1.Bulb and bulb socket

- Check the bulb and bulb socket for continuity.

CONTINUITY

2.Voltage

- Connect the pocket tester (20 V) to the bulb socket coupler.

**Tester (+) lead** → **Blue terminal** ①  
**Tester (-) lead** → **Black terminal** ②

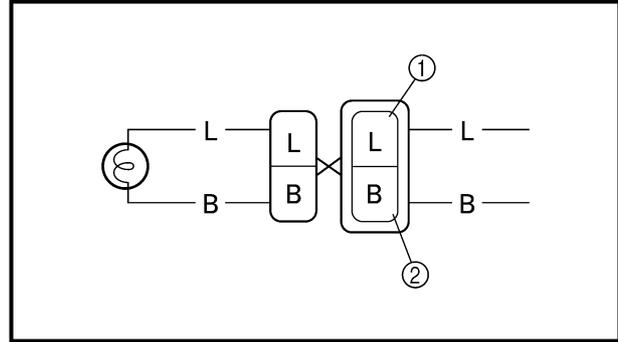
- Turn the main switch to "ON".
- Turn the lights switch to "LO" or "HI".
- Check the voltage (12 V) of the "Blue" lead on the bulb socket connector.

MEETS SPECIFICATION

This circuit is not faulty.

NO CONTINUITY

Replace the bulb and/or bulb socket.



OUT OF SPECIFICATION

The wiring circuit from the main switch to the bulb socket connector is faulty, repair it.



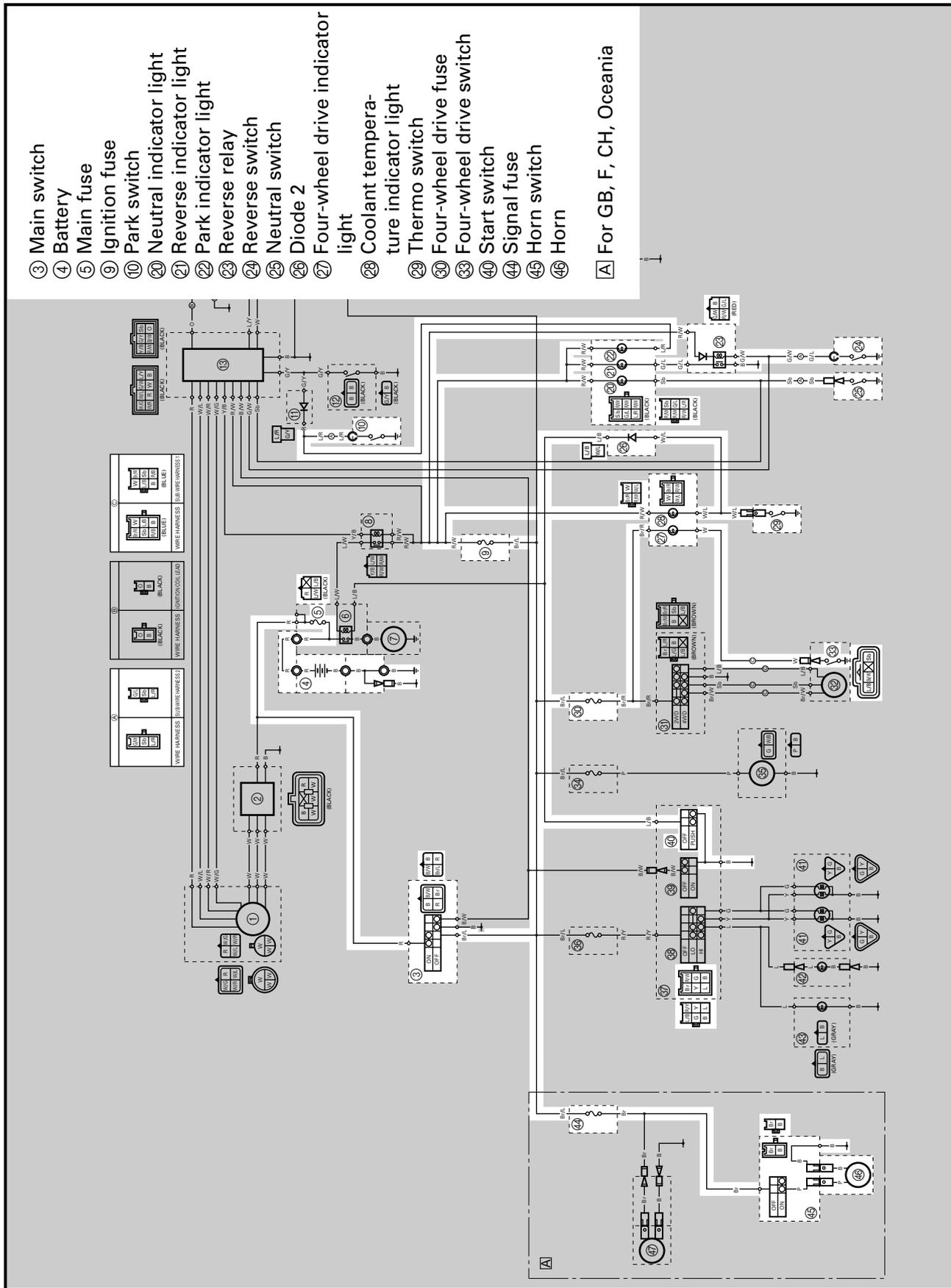
EB806000

**SIGNAL SYSTEM**

**CIRCUIT DIAGRAM**

- ③ Main switch
- ④ Battery
- ⑤ Main fuse
- ⑨ Ignition fuse
- ⑩ Park switch
- ⑩ Neutral indicator light
- ⑩ Reverse indicator light
- ⑩ Park indicator light
- ⑩ Reverse relay
- ⑩ Reverse switch
- ⑩ Neutral switch
- ⑩ Diode 2
- ⑩ Four-wheel drive indicator light
- ⑩ Coolant temperature indicator light
- ⑩ Thermo switch
- ⑩ Four-wheel drive fuse
- ⑩ Four-wheel drive switch
- ⑩ Start switch
- ⑩ Signal fuse
- ⑩ Horn switch
- ⑩ Horn

A For GB, F, CH, Oceania





EB806010

**TROUBLESHOOTING**

**IF THE INDICATOR LIGHT FAILS TO COME ON:**

**Procedure**

Check:

- 1.Fuse (main, ignition, signal, four-wheel drive)
- 2.Battery
- 3.Main switch
- 4.Wiring connections  
(the entire signal system)

**NOTE:**

- Remove the following part(s) before troubleshooting:
  - 1)Seat
  - 2)Fuel tank
  - 3)Air cleaner case
  - 4)Front carrier
  - 5)Front fender panel
- Use the following special tool(s) for troubleshooting.



**Pocket tester:**  
P/N. YU-03112, 90890-03112

EB802011

1.Fuse (main, ignition, signal, four-wheel drive)  
Refer to "SWITCH INSPECTION".

CONTINUITY

NO CONTINUITY

Replace the fuse.

EB802012

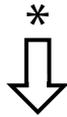
2.Battery  
• Check the battery condition.  
Refer to "BATTERY INSPECTION" in CHAPTER 3.

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

CORRECT  
\*

INCORRECT

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



3. Main switch  
Refer to "SWITCH INSPECTION".

INCORRECT



Replace the main switch.

CORRECT



EB806011

4. Wiring connections  
• Check the connections of the entire signal system.  
Refer to "CIRCUIT DIAGRAM".

POOR CONNECTION



Properly connect the signal system.

CORRECT



Check the condition of each of the signal system's circuits.  
Refer to "SIGNAL SYSTEM".



**SIGNAL SYSTEM CHECK**

1. Horn does not sound.

1. "HORN" switch.  
Refer to "SWITCH INSPECTION".



CORRECT

2. Voltage

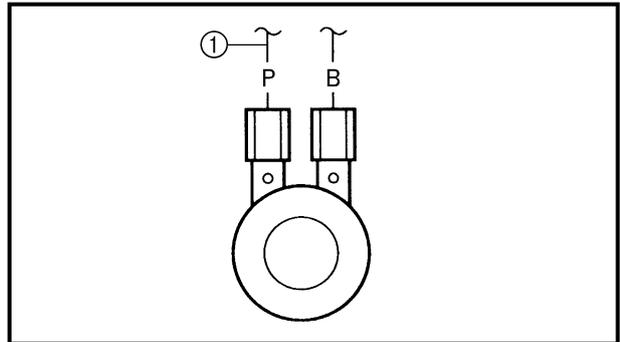
- Connect the pocket tester (DC 20 V) to the horn lead.

**Tester (+) lead → Pink lead ①**  
**Tester (-) lead → Frame ground**

INCORRECT



Replace the horn switch.



- Turn the main switch to "ON".
- Push the "HORN" switch.
- Check for voltage (12 V) on the "Pink" lead at the horn terminal.



MEETS SPECIFICATION

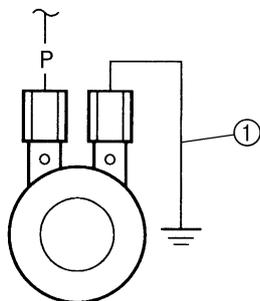
OUT OF SPECIFICATION



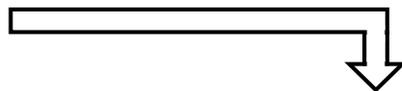
Wiring circuit from main switch to horn terminal is faulty, repair.

3. Horn

- Disconnect the "Black" lead at the horn terminal.
- Connect a jumper lead ① to the horn terminal and ground the jumper lead.
- Turn the main switch to "ON".
- Push the "HORN" switch.



HORN IS SOUNDED



The horn is not faulty.



HORN IS NOT SOUNDED

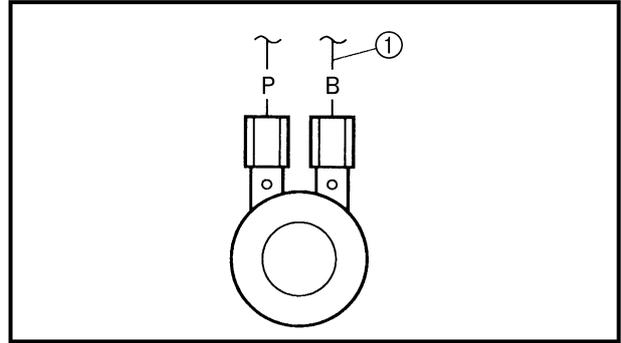
\*



4.Voltage

- Connect the pocket tester (DC 20 V) to the horn at the "Black" terminal.

**Tester (+) lead → Black lead ①**  
**Tester (-) lead → Frame ground**



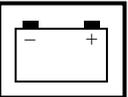
- Turn the main switch to "ON".
- Push the "HORN" switch.
- Check for voltage (12 V) on the "Black" lead at the horn terminal.

MEETS SPECIFICATION

Adjust or replace the horn.

OUT OF SPECIFICATION

Replace the horn.



EB806024

2.If the neutral indicator light fails to come on:

1.Bulb and bulb socket  
 • Check the bulb and bulb socket for continuity.

CONTINUITY

NO CONTINUITY

Replace the bulb and/or bulb socket.

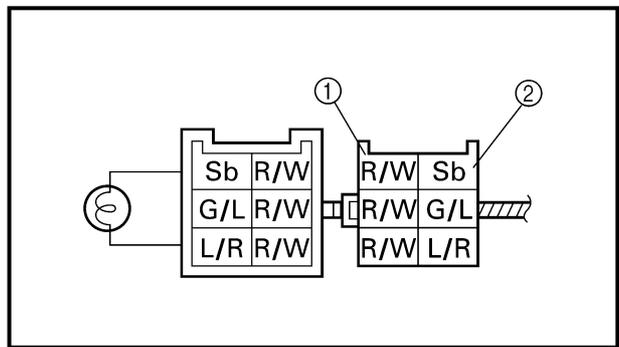
2.Neutral switch  
 Refer to "SWITCH INSPECTION".

CONTINUITY

NO CONTINUITY

Replace the neutral switch.

3.Voltage  
 • Connect the pocket tester (DC 20 V) to the bulb socket coupler.  
**Tester (+) lead** → **Red/White terminal** ①  
**Tester (-) lead** → **Sky blue terminal** ②



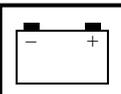
• Turn the main switch to "ON".  
 • Check the voltage (12 V).

MEETS SPECIFICATION

OUT OF SPECIFICATION

This circuit is not faulty.

The wiring circuit from the main switch to the bulb socket connector is faulty, repair it.



3.If the reverse indicator light fails to come on:

1.Bulb and bulb socket

- Check the bulb and bulb socket for continuity.

CONTINUITY

2.Reverse switch

Refer to "SWITCH INSPECTION".

CONTINUITY

3.Reverse relay

- Remove the reverse relay from the wire harness.
- Connect the pocket tester ( $\Omega \times 1$ ) and battery (12 V) to the reverse relay terminals.

Battery (+) terminal → Red/White terminal ①

Battery (-) terminal → Green/White terminal ②

Tester (+) lead → Green/Blue terminal ③

Tester (-) lead → Black terminal ④

- Check the reverse relay for continuity.

CONTINUITY

4.Voltage

- Connect the pocket tester (DC 20V) to the bulb socket coupler.

Tester (+) lead → Red/White terminal ①

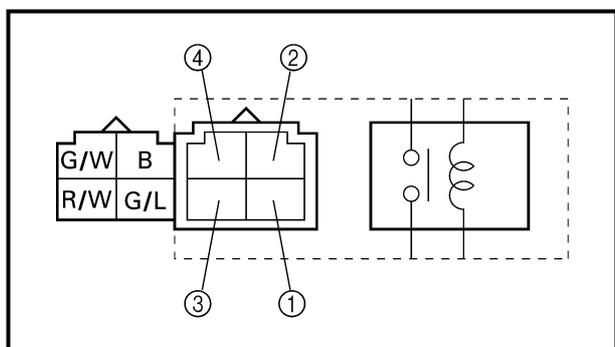
Tester (-) lead → Green/Blue terminal ②

NO CONTINUITY

Replace the bulb and/or bulb socket.

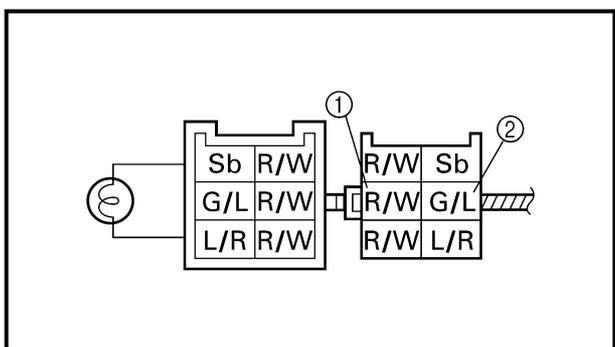
NO CONTINUITY

Replace the reverse switch.



NO CONTINUITY

Replace the reverse relay.



# SIGNAL SYSTEM

**ELEC**



- Turn the main switch to "ON".
- Check the voltage (12 V).

MEETS SPECIFICATION

This circuit is not faulty.

OUT OF SPECIFICATION

The wiring circuit from the main switch to the bulb socket connector is faulty, repair it.

4.If the park indicator light fails to come on:

- 1.Bulb and bulb socket
- Check the bulb and bulb socket for continuity.

CONTINUITY

NO CONTINUITY

Replace the bulb and/or bulb socket.

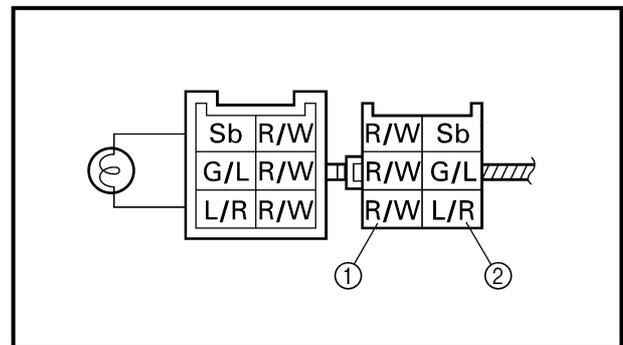
- 2.Park switch
- Refer to "SWITCH INSPECTION".

CONTINUITY

NO CONTINUITY

Replace the park switch.

- 3.Voltage
- Connect the pocket tester (DC 20 V) to the bulb socket coupler.
- Tester (+) lead** → **Red/White terminal** ①
- Tester (-) lead** → **Blue/Red terminal** ②



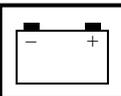
- Turn the main switch to "ON".
- Check the voltage (12 V).

MEETS SPECIFICATION

This circuit is not faulty.

OUT OF SPECIFICATION

The wiring circuit from the main switch to the bulb socket connector is faulty, repair it.



5.If the coolant temperature indicator light does not come on when the start switch is pushed on, or if the coolant temperature indicator light does not come on when the temperature is high (more than 107 ~ 113 °C (224.6 ~ 235.4 °F)):

1.Bulb and bulb socket

- Check the bulb and bulb socket for continuity.

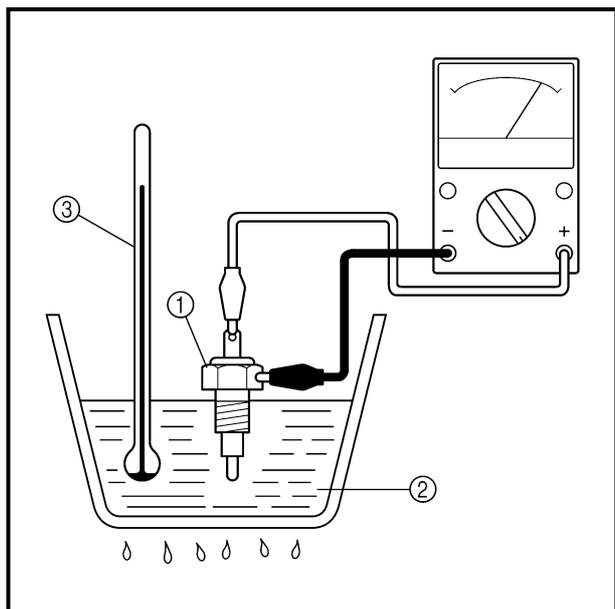
CONTINUITY

NO CONTINUITY

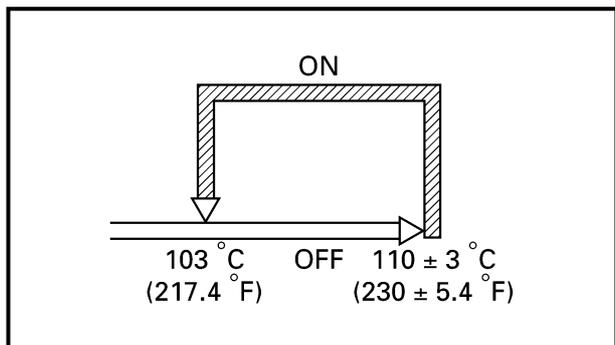
Replace the bulb and/or bulb socket.

2.Thermo switch

- Remove the thermo switch from the cylinder head.
- Connect the pocket tester ( $\Omega \times 1$ ) to the thermo switch ①.
- Immerse the thermo switch in coolant ②.
- Check the thermo switch for continuity. While heating the coolant use a thermometer ③ to record the temperatures.



Test step	Water temperature	Good condition
	Thermo switch	
1	0 ~ 103 °C (32 ~ 217.4 °F)	×
2	More than 110 ± 3 °C (230 ± 5.4 °F)	○
3*	110 ~ 103 °C (230 ~ 217.4 °F)	○
4*	Less than 103 °C (217.4 °F)	×



Tests 1 & 2; Heat-up tests  
Tests 3\* & 4\*; Cool-down tests  
○: Continuity      ×: No continuity

**⚠ WARNING**

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

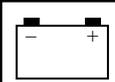


Thermo switch:  
8 Nm (0.8 m · kg, 5.8 ft · lb)  
Three bond sealock® #10

BAD CONDITION

Replace the thermo switch.

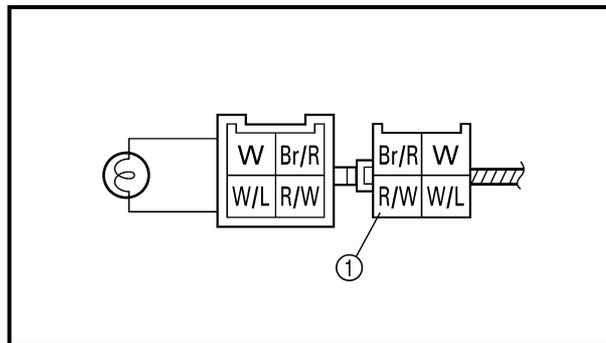
GOOD CONDITION



**3.Voltage**

- Connect the pocket tester (DC 20V) to the bulb socket connector.

**Tester (+) lead → Red/White lead ①**  
**Tester (-) lead → Frame ground**



- Turn the main switch to "ON".
- Check the voltage (12 V).



OUT OF SPECIFICATION

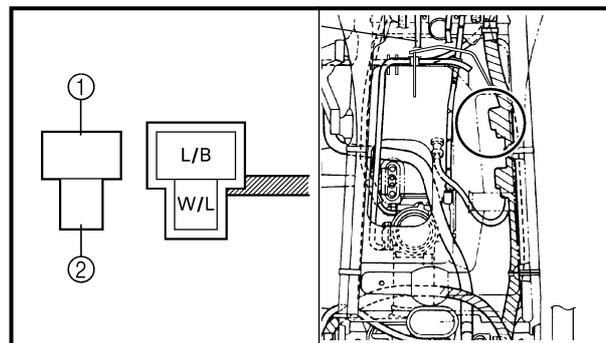


The wiring circuit from the main switch to the bulb socket connector is faulty, repair it.

**4.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.

<p><b>Tester positive probe → Blue/Black ①</b>  <b>Tester negative probe → White/Blue ②</b></p>	<p><b>Continuity</b></p>
<p><b>Tester positive probe → White/Blue ②</b>  <b>Tester negative probe → Blue/Black ①</b></p>	<p><b>No continuity</b></p>

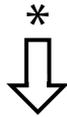
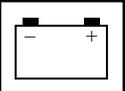


**NOTE:** When you switch the tester's positive and negative probes, the readings in the left chart will be reversed.

INCORRECT



Replace the diode.



5. Start switch  
Refer to "SWITCH INSPECTION".



This circuit is not faulty.

INCORRECT

Replace the handlebar switch (left).

6. If the four-wheel drive indicator light fails to come on:

1. Bulb and bulb socket  
• Check the bulb and bulb socket for continuity.



2. Four-wheel drive switch  
Refer to "SWITCH INSPECTION".



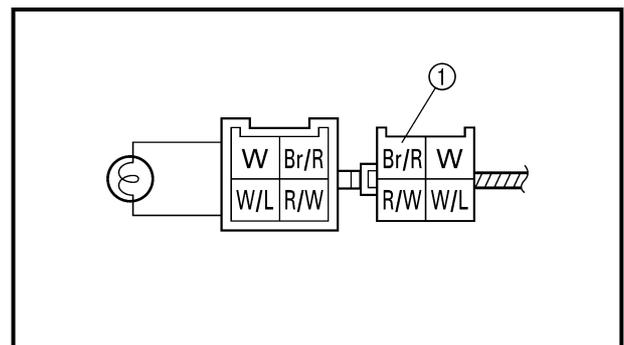
3. Voltage  
• Connect the pocket tester (DC 20 V) to the bulb socket lead.  
**Tester (+) lead** → **Brown/Red terminal** ①  
**Tester (-) lead** → **Frame ground**

NO CONTINUITY

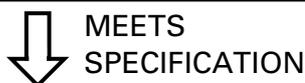
Replace the bulb and/or bulb socket.

NO CONTINUITY

Replace the four-wheel drive switch.



• Turn the main switch to "ON".  
• Check the voltage (12 V).



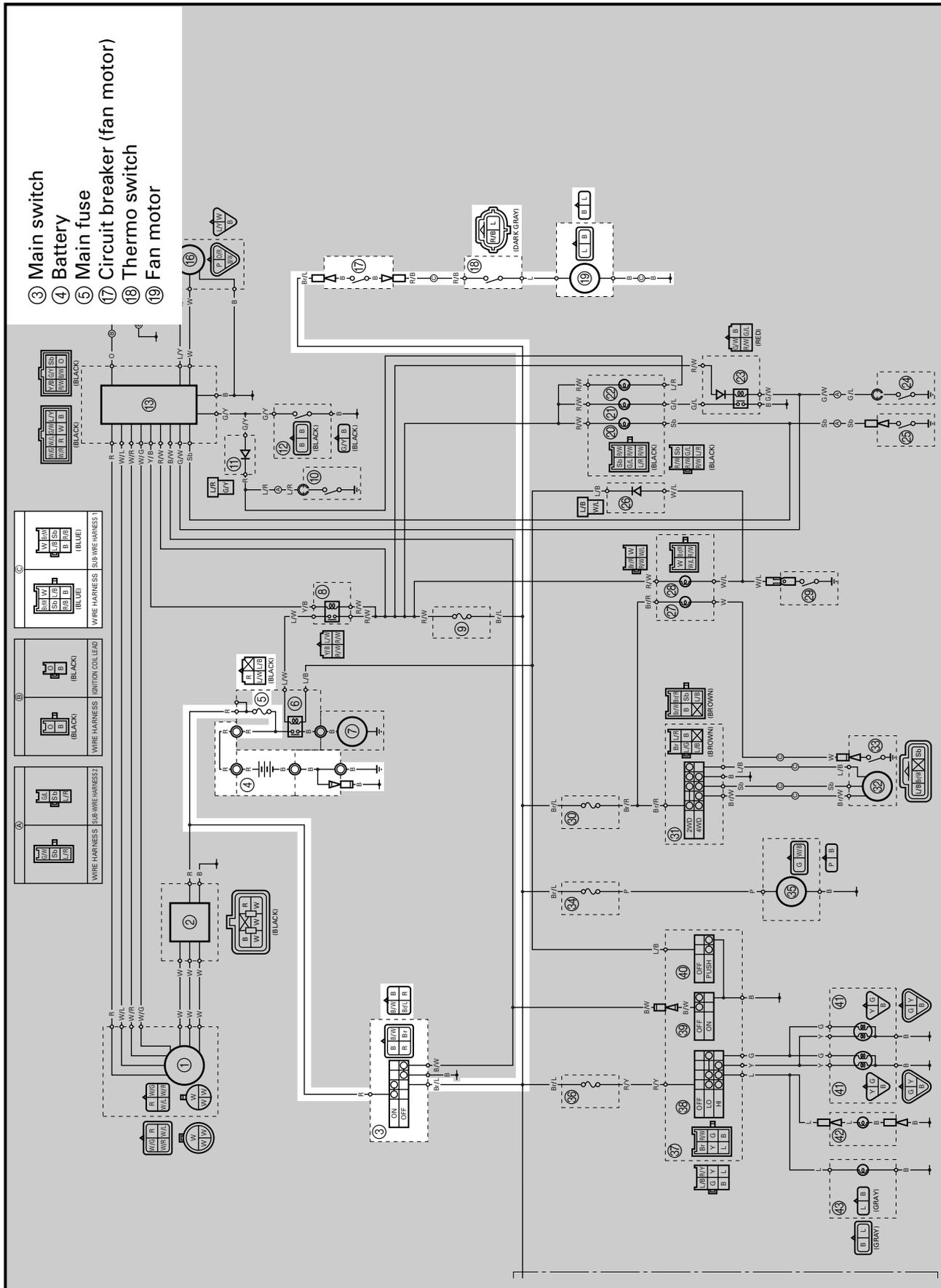
This circuit is not faulty.

OUT OF SPECIFICATION

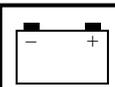
The wiring circuit from the main switch to the bulb socket connector is faulty, repair it.



**COOLING SYSTEM  
CIRCUIT DIAGRAM**



- ③ Main switch
- ④ Battery
- ⑤ Main fuse
- ⑬ Circuit breaker (fan motor)
- ⑰ Thermo switch
- ⑲ Fan motor



**TROUBLESHOOTING**

**IF THE FAN MOTOR DOES NOT MOVE:**

**Procedure**

Check:

- 1.Fuse (main)
- 2.Battery
- 3.Main switch
- 4.Fan motor
- 5.Circuit breaker (fan motor)
- 6.Thermo switch
- 7.Wiring connection (the entire cooling system)

**NOTE:**

- Remove the following part(s) before troubleshooting.
  - 1)Seat
  - 2)Front carrier
  - 3)Front fender
- Use the following special tool(s) for troubleshooting.



**Pocket tester:**  
P/N. YU-03112, 90890-03112

EB802011

1.Fuse (main)  
Refer to "SWITCH INSPECTION".

CONTINUITY

NO CONTINUITY

Replace the fuse.

EB802012

2.Battery  
• Check the battery condition. Refer to "BATTERY INSPECTION" in CHAPTER 3.  
**Open-circuit voltage:**  
**12.8 V or more at 20 °C (68 °F)**

CORRECT

INCORRECT

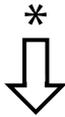
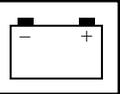
- Clean the battery terminals.
- Recharge or replace the battery.

3.Main switch  
Refer to "SWITCH INSPECTION".

CORRECT  
\*

INCORRECT

Replace the main switch.



**4. Fan motor**

- Disconnect the fan motor coupler.
- Connect the battery (12 V) as shown.

**Battery (+) lead → Blue terminal ①**  
**Battery (-) lead → Black terminal ②**

- Check the operation of the fan motor.

DOES NOT TURN



Replace the fan motor.



**5. Circuit breaker (fan motor)**

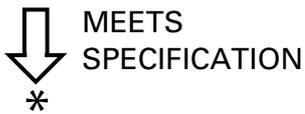
- Remove the circuit breaker from the wire harness.
- Connect the pocket tester ( $\Omega \times 1$ ) to the circuit breaker.

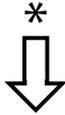
**Circuit breaker resistance:**  
**Zero  $\Omega$  at 20 °C (68 °F)**

OUT OF SPECIFICATION



Replace the circuit breaker.





6. Thermo switch

- Remove the thermo switch from the radiator.
- Connect the pocket tester ( $\Omega \times 10$ ) to the thermo switch ①.
- Immerse the thermo switch in coolant ②.
- Check the thermo switch for continuity. While heating the coolant use a thermometer ③ to record the temperatures.

Test step	Water temperature Thermo switch	Good condition
1	0 ~ $92 \pm 3 \text{ }^\circ\text{C}$ ( $32 \sim 197.6 \pm 5.4 \text{ }^\circ\text{F}$ )	×
2	More than $98 \pm 3 \text{ }^\circ\text{C}$ ( $208.4 \pm 5.4 \text{ }^\circ\text{F}$ )	○
3*	98 to $92 \pm 3 \text{ }^\circ\text{C}$ ( $208.4$ to $197.6 \pm 5.4 \text{ }^\circ\text{F}$ )	○
4*	Less than $29 \pm 3 \text{ }^\circ\text{C}$ ( $197.6 \pm 5.4 \text{ }^\circ\text{F}$ )	×

Tests 1 & 2; Heat-up tests

Tests 3\* & 4\*; Cool-down tests

○: Continuity      ×: No continuity

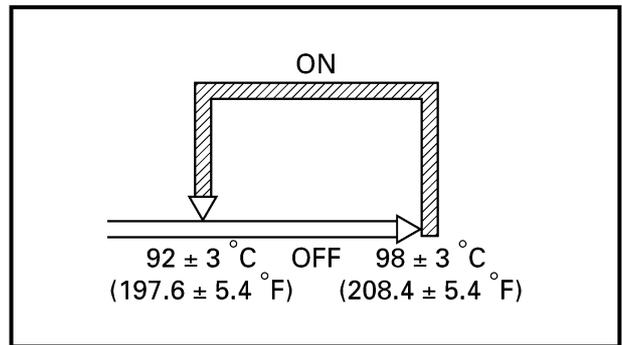
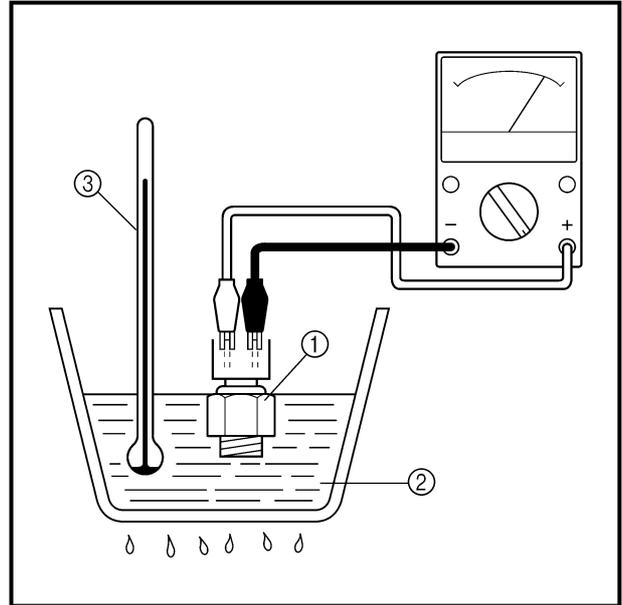
**⚠ WARNING**

Handle the thermo switch with special care.

Never subject it to a strong shock or allow it to be dropped. Should it be dropped, it must be replaced.

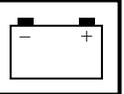


Thermo switch:  
28 Nm (2.8 m · kg, 20 ft · lb)  
Three bond sealock® #10



BAD CONDITION

Replace the thermo switch.



EB803028

7.Wiring connection

- Check the connections of the entire starting system.  
Refer to "CIRCUIT DIAGRAM".



CORRECT

This circuit is not faulty.

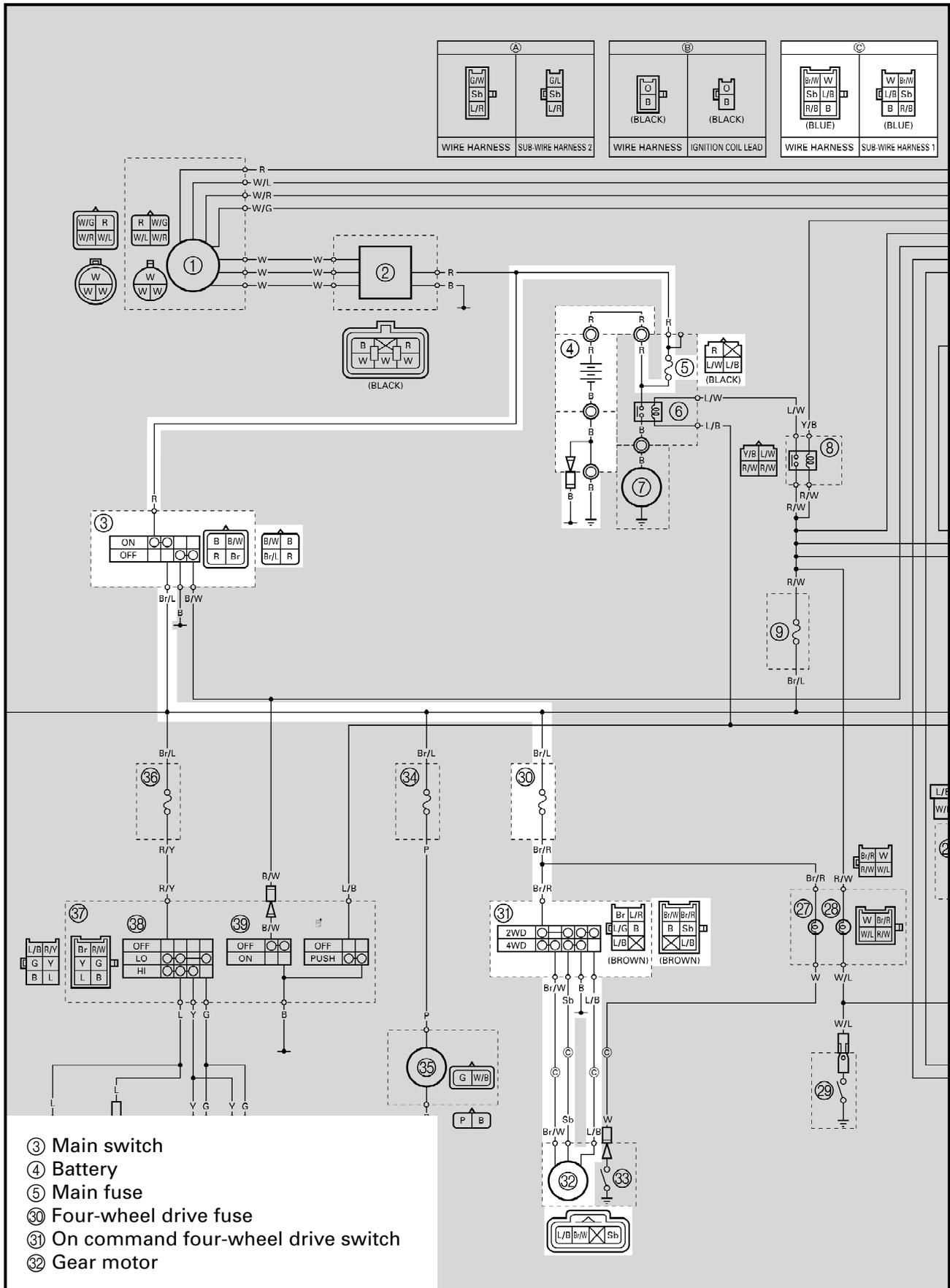
POOR CONNECTION



Properly connect the cooling system.



## 2WD/4WD SELECTING SYSTEM CIRCUIT DIAGRAM





EB803020

### TROUBLESHOOTING

#### IF THE FOUR-WHEEL DRIVE INDICATOR LIGHT FAILS TO COME ON:

#### Procedure

Check:

- |   |  |
|---|--|
| <ol style="list-style-type: none"> <li>1.Fuse (main, four-wheel drive)</li> <li>2.Battery</li> <li>3.Main switch</li> <li>4.On command four-wheel drive switch</li> </ol> | <ol style="list-style-type: none"> <li>5.Gear motor</li> <li>6.Wiring connections<br/>(the entire 2WD/4WD selecting system)</li> </ol> |
|---|--|

#### NOTE:

- Remove the following part(s) before troubleshooting:
  - 1)Seat
  - 2)Front carrier
  - 3)Front fender
- Use the following special tool(s) for troubleshooting.

	<b>Pocket tester:</b> <b>P/N. YU-03112, 90890-03112</b>
--	--

EB802011

1.Fuse (main, four-wheel drive)
Refer to "SWITCH INSPECTION".

↓ CONTINUITY

NO CONTINUITY



Replace the fuse.

EB802012

2.Battery
<ul style="list-style-type: none"> <li>• Check the battery condition. Refer to "BATTERY INSPECTION" in CHAPTER 3.</li> </ul>
<b>Open-circuit voltage:</b> <b>12.8 V or more at 20 °C (68 °F)</b>

↓ CORRECT

INCORRECT



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

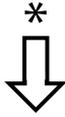
3.Main switch
Refer to "SWITCH INSPECTION".

↓ CORRECT  
\*

INCORRECT



Replace the main switch.



4. On command four-wheel drive switch  
Refer to "SWITCH INSPECTION".



INCORRECT

Replace the on command four-wheel drive select switch.

5. Gear motor

- Check that the shift fork sliding gear is in the 2WD position.
- Disconnect the gear motor coupler.
- Remove the gear motor from the differential gear case.
- Connect the battery (12 V) to the gear motor terminals.

**2WD → 4WD:**  
**Battery (+) terminal → Brown/White terminal ①**  
**Battery (-) terminal → Sky blue terminal ②**

**4WD → 2WD:**  
**Battery (+) terminal → Sky blue terminal ②**  
**Battery (-) terminal → Blue/Black terminal ③**

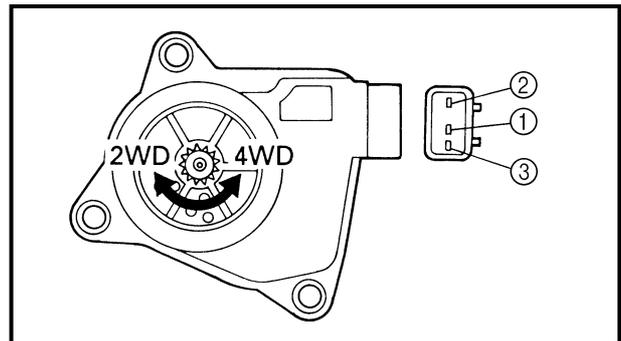
- Make sure that the drive gear (shift fork sliding gear) operates correctly.

**NOTE:** \_\_\_\_\_  
 When installing the differential gear case in the gear motor, refer to "CONSTANT VELOCITY JOINTS AND DIFFERENTIAL GEAR" in CHAPTER 7.  
 \_\_\_\_\_



INCORRECT

Replace the gear motor.



EB803028

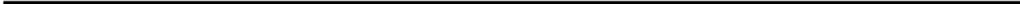
6. Wiring connection

- Check the connections of the entire 2WD/4WD selecting system. Refer to "CIRCUIT DIAGRAM".

POOR CONNECTION

Properly connect the 2WD/4WD selecting system.

**ELEC**



**?**

**TRBL**

**SHTG**

**10**

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## CHAPTER 10. TROUBLESHOOTING

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POOR MEDIUM AND HIGH-SPEED PERFORMANCE .....	10-2
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**TROUBLESHOOTING**

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**NOTE:**

The following troubleshooting does not cover all the possible causes of trouble. It should be helpful, however, as a guide to troubleshooting. Refer to the relative procedure in this manual for inspection, adjustment and replacement of parts.

---

**STARTING FAILURE/HARD STARTING****FUEL SYSTEM****Fuel tank**

- Empty
- Clogged fuel filter
- Clogged fuel strainer
- Clogged fuel breather hose
- Deteriorated or contaminated fuel

**Fuel cock**

- Clogged fuel hose

**Carburetor**

- Deteriorated or contaminated fuel
- Clogged pilot jet
- Clogged pilot air passage
- Sucked-in air
- Deformed float
- Worn needle valve
- Improperly sealed valve seat
- Improperly adjusted fuel level
- Improperly set pilot jet
- Clogged starter jet
- Starter plunger malfunction

**Air filter**

- Clogged air filter element

**ELECTRICAL SYSTEM****Spark plug**

- Improper plug gap
- Worn electrodes
- Wire between terminals broken
- Improper heat range
- Faulty spark plug cap

**Ignition coil**

- Broken or shorted primary/secondary
- Faulty spark plug lead
- Broken body

**CDI system**

- Faulty CDI unit
- Faulty pickup coil
- Broken woodruff key

**Switches and wiring**

- Faulty main switch
- Faulty engine stop switch
- Broken or shorted wiring
- Faulty neutral switch
- Faulty start switch
- Faulty rear brake switch

**Starter motor**

- Faulty starter motor
- Faulty starter relay
- Faulty starter circuit cut-off relay
- Faulty starter clutch

## **COMPRESSION SYSTEM**

### **Cylinder and cylinder head**

- Loose spark plug
- Loose cylinder head or cylinder
- Broken cylinder head gasket
- Worn, damaged or seized cylinder

### **Piston and piston rings**

- Improperly installed piston ring
- Worn, fatigued or broken piston ring
- Seized piston ring
- Seized or damaged piston

### **Valve, camshaft and crankshaft**

- Improperly sealed valve
- Improperly contacted valve and valve seat
- Improper valve timing
- Broken valve spring
- Seized camshaft
- Seized crankshaft

## **POOR IDLE SPEED PERFORMANCE**

### **POOR IDLE SPEED PERFORMANCE**

#### **Carburetor**

- Improperly returned starter plunger
- Loose pilot jet
- Clogged pilot jet
- Clogged pilot air jet
- Improperly adjusted idle speed (Throttle stop screw)
- Improper throttle cable play
- Flooded carburetor

#### **Electrical system**

- Faulty spark plug
- Faulty CDI unit
- Faulty pickup coil
- Faulty ignition coil

#### **Valve train**

- Improperly adjusted valve clearance

#### **Air filter**

- Clogged air filter element

## **POOR MEDIUM AND HIGH-SPEED PERFORMANCE**

### **POOR MEDIUM AND HIGH-SPEED PERFORMANCE**

Refer to "STARTING FAILURE/HARD STARTING" and "POOR IDLE SPEED PERFORMANCE-VALVE TRAIN".

#### **Carburetor**

- Improper jet needle clip position
- Improperly adjusted fuel level
- Clogged or loose main jet
- Deteriorated or contaminated fuel

#### **Air filter**

- Clogged air filter element

**FAULTY DRIVE TRAIN**

The following conditions may indicate damaged shaft drive components:

Symptoms	Possible Causes
1.A pronounced hesitation or “jerky” movement during acceleration, deceleration, or sustained speed. (This must not be confused with engine surging or transmission characteristics.) 2.A “rolling rumble” noticeable at low speed; a high-pitched whine; a “clunk” from a shaft drive component or area. 3.A locked-up condition of the shaft drive mechanism, no power transmitted from the engine to the front and/or rear wheels.	A.Bearing damage. B.Improper gear lash. C.Gear tooth damage. D.Broken drive shaft. E.Broken gear teeth. F.Seizure due to lack of lubrication. G.Small foreign objects lodged between the moving parts.

**NOTE:**

Areas A, B, and C above may be extremely difficult to diagnose. The symptoms are quite subtle and difficult to distinguish from normal machine operating noise. If there is reason to believe these components are damaged, remove the components and inspect them.

## **FAULTY GEAR SHIFTING**

### **HARD SHIFTING**

Refer to "CLUTCH SLIPPING/Dragging-CLUTCH DRAGGING".

### **SHIFT LEVER DOES NOT MOVE**

#### **Shift cam, shift fork**

- Groove jammed with impurities
- Seized shift fork
- Bent shift fork guide bar

#### **Transmission**

- Seized transmission gear
- Jammed impurities
- Incorrectly assembled transmission

#### **Shift guide**

- Broken shift guide

### **JUMPS OUT OF GEAR**

#### **Shift fork**

- Worn shift fork

#### **Shift cam**

- Improper thrust play
- Worn shift cam groove

#### **Transmission**

- Worn gear dog

## **FAULTY CLUTCH PERFORMANCE**

### **ENGINE OPERATES BUT MACHINE WILL NOT MOVE**

#### **V-belt**

- Bent, damaged or worn V-belt
- V-belt slips

#### **Primary pulley cam and primary pulley slider**

- Damaged or worn primary pulley cam
- Damaged or worn primary pulley slider

#### **Transmission**

- Damaged transmission gears

### **CLUTCH SLIPPING**

#### **Clutch spring**

- Damaged, loose or worn clutch shoe spring

#### **Clutch shoe**

- Damaged or worn clutch shoe

#### **Primary sliding sheave**

- Seized primary sliding sheave

### **POOR STARTING PERFORMANCE**

#### **V-belt**

- V-belt slips
- Oil or grease on the V-belt

#### **Primary sliding sheave**

- Faulty operation
- Worn pin groove
- Worn pin

#### **Clutch shoe**

- Bent, damaged or worn clutch shoe

# FAULTY CLUTCH PERFORMANCE/OVERHEATING/ OVER COOLING/FAULTY BRAKE

TRBL  
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## POOR SPEED PERFORMANCE

### V-belt

- Oil or grease on the V-belt

### Primary pulley weight

- Faulty operation
- Worn primary pulley weight

### Primary fixed sheave

- Worn primary fixed sheave

### Primary sliding sheave

- Worn primary sliding sheave

### Secondary fixed sheave

- Worn secondary fixed sheave

### Secondary sliding sheave

- Worn secondary sliding sheave

## OVERHEATING

### OVERHEATING

#### Ignition system

- Improper spark plug gap
- Improper spark plug heat range
- Faulty CDI unit

#### Fuel system

- Improper carburetor main jet (improper setting)
- Improper fuel level
- Clogged air filter element

#### Compression system

- Heavy carbon build-up

#### Engine oil

- Improper oil level
- Improper oil viscosity
- Inferior oil quality

#### Brake

- Brake drag

#### Cooling system

- Low coolant level
- Clogged or damaged radiator
- Damaged or faulty water pump
- Thermostat stays closed

## OVER COOLING

### COOLING SYSTEM

#### Thermostat

- Thermostat stays open

## FAULTY BRAKE

### POOR BRAKING EFFECT

#### Disc brake

- Worn brake pads
- Worn disc
- Air in brake fluid
- Leaking brake fluid
- Faulty master cylinder kit cup
- Faulty caliper kit seal
- Loose union bolt
- Broken brake hose and pipe
- Oily or greasy disc/brake pads
- Improper brake fluid level

# SHOCK ABSORBER MALFUNCTION/ UNSTABLE HANDLING/LIGHTING SYSTEM

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## SHOCK ABSORBER MALFUNCTION

### MALFUNCTION

- Bent or damaged damper rod
- Damaged oil seal lip
- Fatigued shock absorber spring

## UNSTABLE HANDLING

### UNSTABLE HANDLING

#### Handlebar

- Improperly installed or bent

#### Steering

- Incorrect toe-in
- Bent steering stem
- Improperly installed steering stem
- Damaged bearing or bearing race
- Bent tie rods
- Deformed steering knuckles

#### Tires

- Uneven tire pressures on both sides
- Incorrect tire pressure
- Uneven tire wear

#### Wheels

- Deformed wheel
- Loose bearing
- Bent or loose wheel axle
- Excessive wheel runout

#### Frame

- Bent
- Damaged frame

#### Swingarm

- Worn bearing or bushing
- Bent or damaged

## LIGHTING SYSTEM

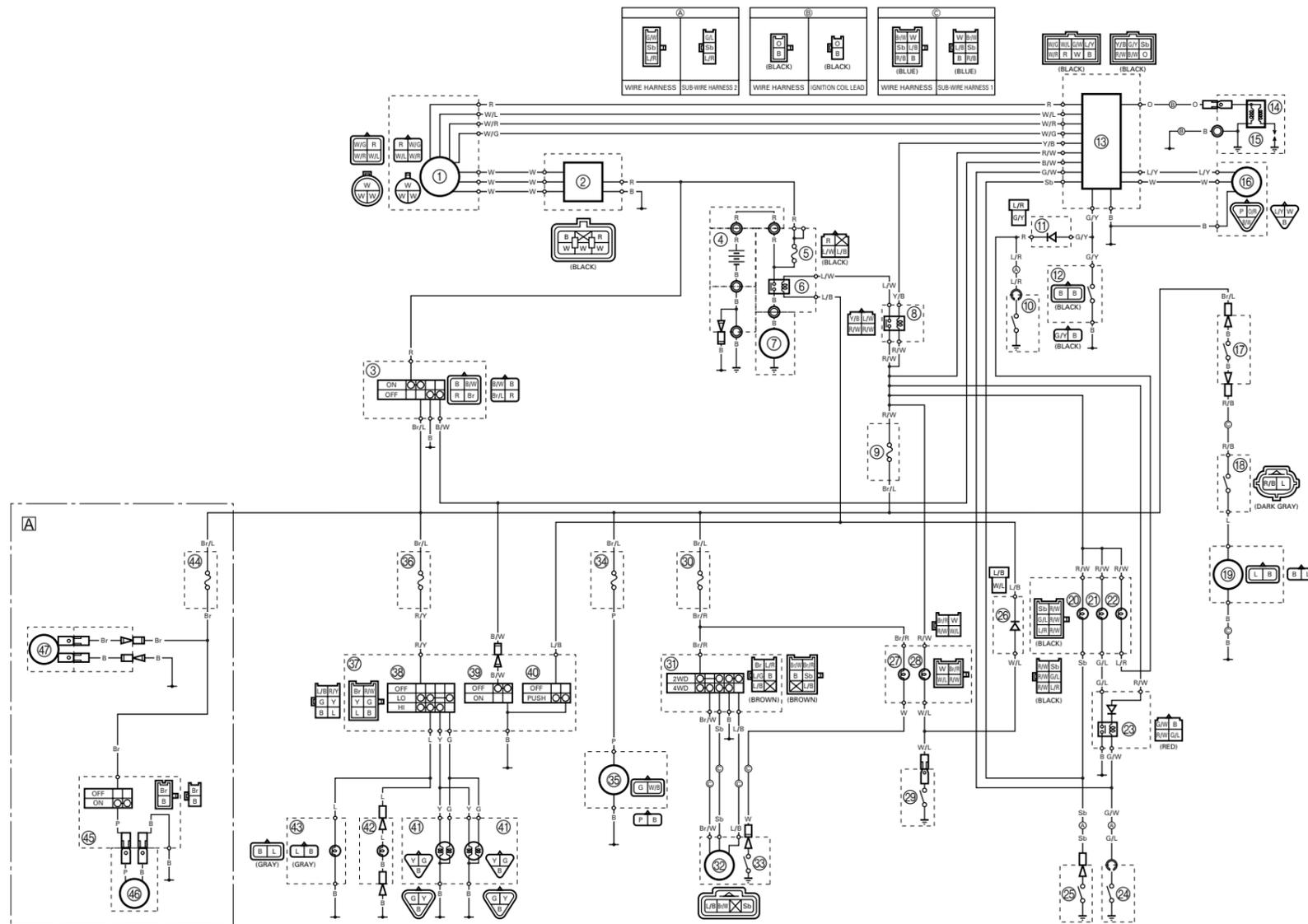
### HEADLIGHT DARK

- Improper bulb
- Too many electric accessories
- Hard charging (broken charging coil and/or faulty rectifier/regulator)
- Incorrect connection
- Improperly grounded
- Poor contacts (main or lights switch)
- Bulb life expired

### BULB BURNT OUT

- Improper bulb
- Faulty battery
- Faulty rectifier/regulator
- Improperly grounded
- Faulty main and/or lights switch
- Bulb life expired

# YFM400FWA(M) WIRING DIAGRAM



- ① CDI magneto
- ② Rectifier/regulator
- ③ Main switch
- ④ Battery
- ⑤ Main fuse
- ⑥ Starter relay
- ⑦ Starter motor
- ⑧ Starting circuit cut-off relay
- ⑨ Ignition fuse
- ⑩ Park switch
- ⑪ Diode 1
- ⑫ Rear brake switch
- ⑬ CDI unit
- ⑭ Ignition coil
- ⑮ Spark plug
- ⑯ Speed sensor
- ⑰ Circuit breaker (fan motor)
- ⑱ Thermo switch
- ⑲ Fan motor
- ⑳ Neutral indicator light
- ㉑ Reverse indicator light
- ㉒ Park indicator light
- ㉓ Reverse relay
- ㉔ Reverse switch
- ㉕ Neutral switch
- ㉖ Diode 2
- ㉗ Four-wheel drive indicator light
- ㉘ Coolant temperature indicator light
- ㉙ Thermo switch
- ㉚ Four-wheel drive fuse
- ㉛ On command four-wheel drive select switch
- ㉜ Gear motor
- ㉝ Four-wheel drive switch
- ㉞ Auxiliary DC jack fuse
- ㉟ Auxiliary DC jack
- ㊱ Headlight fuse
- ㊲ Handlebar switch (left)
- ㊳ Lights switch
- ㊴ Engine stop switch
- ㊵ Start switch
- ㊶ Headlight
- ㊷ Taillight
- ㊸ Speedometer light
- ㊹ Signal fuse
- ㊺ Horn switch
- ㊻ Horn
- ㊼ Hour meter (optional)
- Ⓐ For GB, F, CH, Oceania

## COLOR CODE

B..... Black  
 Br..... Brown  
 G..... Green  
 L..... Blue  
 O..... Orange  
 P..... Pink  
 R..... Red  
 Sb..... Sky blue

W..... White  
 Y..... Yellow  
 B/W..... Black/White  
 Br/L..... Brown/Blue  
 Br/R..... Brown/Red  
 Br/W..... Brown/White  
 G/L..... Green/Blue  
 G/W..... Green/White

G/Y..... Green/Yellow  
 L/B..... Blue/Black  
 L/G..... Blue/Green  
 L/R..... Blue/Red  
 L/W..... Blue/White  
 L/Y..... Blue/Yellow  
 O/R..... Orange/Red  
 R/B..... Red/Black

R/W..... Red/White  
 R/Y..... Red/Yellow  
 W/B..... White/Black  
 W/G..... White/Green  
 W/L..... White/Blue  
 W/R..... White/Red  
 Y/B..... Yellow/Black