



YFM700RV

SERVICE MANUAL

EBS00000

**YFM700RV
SERVICE MANUAL
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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 vehicle has a basic understanding of the mechanical ideas and the procedures of vehicle repair. Repairs attempted by anyone without this knowledge are likely to render the vehicle 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.

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 vehicle operator, a bystander or a person checking or repairing the vehicle.

CAUTION:

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

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 “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.

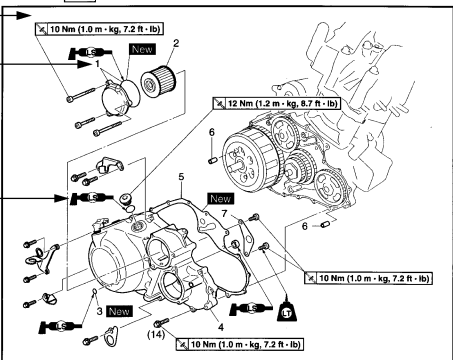
1. An easy-to-see exploded diagram ④ is provided for removal and disassembly jobs.
2. Numbers ⑤ are given in the order of the jobs in the exploded diagram. A number that is enclosed by a circle indicates a disassembly step.
3. An explanation of jobs and notes is presented in an easy-to-read way by the 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

①

CLUTCH ENG

CLUTCH

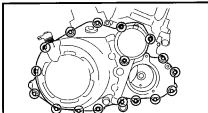


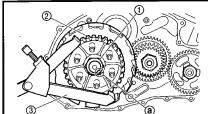
Order	Job/Part	Q'ty	Remarks
	Removing the clutch cover		Remove the parts in the order listed.
	Engine oil		Drain.
	Front fender		Refer to "SEAT, FENDERS AND FUEL TANK" in chapter 3.
	Rear brake light switch/Right foot rest/		Refer to "FRONT AND REAR BRAKES" in chapter 7.
	Brake pedal/spring		Refer to "CYLINDER HEAD".
	Oil delivery pipe		
1	Oil filter cover/O-ring	1/1	
2	Oil filter	1	
3	O-ring	1	
4	Clutch cover	1	
5	Clutch cover gasket	1	Refer to "REMOVING THE CLUTCH" and "INSTALLING THE CLUTCH".
6	Dowel pin	2	
7	Oil seal retainer	1	

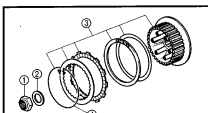
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CLUTCH ENG

REMOVING THE CLUTCH







1. Remove:

• clutch cover

NOTE:

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

2. Straighten the clutch boss nut staked point ⑥.

3. Loosen:

• clutch boss nut ①

NOTE:

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

Universal clutch holder
90890-04086, YM-91042

4. Remove:

• clutch boss nut ①

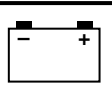
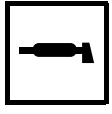
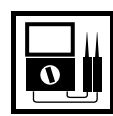
• conical spring washer ②

• clutch boss assembly ③

NOTE:

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

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① GEN INFO 	② SPEC 	
③ CHK ADJ 	④ ENG 	
⑤ COOL 	⑥ FI 	
⑦ CHAS 	⑧ ELEC 	
⑨ TRBL SHTG 	⑩ 	
⑪ 	⑫ 	
⑬ 	⑭ 	
⑮ 	⑯ 	⑰ 
⑱ 	⑲ 	⑳ 
㉑ 	㉒ 	㉓ 
㉔ 	㉕ New	

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SYMBOLS

The following symbols are not relevant to every vehicle.

Symbols ① to ⑨ indicate the subject of each chapter.

- ① General information
- ② Specifications
- ③ Periodic checks and adjustments
- ④ Engine
- ⑤ Cooling system
- ⑥ Fuel injection system
- ⑦ Chassis
- ⑧ Electrical
- ⑨ Troubleshooting

Symbols ⑩ to ⑰ indicate the following.

- ⑩ Serviceable with engine mounted
- ⑪ Filling fluid
- ⑫ Lubricant
- ⑬ Special tool
- ⑭ Tightening torque
- ⑮ Wear limit, clearance
- ⑯ Engine speed
- ⑰ Electrical data (Ω , V, A)

Symbols ⑱ to ㉓ in the exploded diagrams indicate the types of lubricants and lubrication points.

- ⑱ Apply engine oil
- ⑲ Apply gear oil
- ⑳ Apply molybdenum disulfide oil
- ㉑ Apply wheel bearing grease
- ㉒ Apply lithium-soap-based grease
- ㉓ Apply molybdenum disulfide grease

Symbols ㉔ to ㉕ in the exploded diagrams indicate where to apply a locking agent ㉔ and when to install a new part ㉕.

- ㉔ Apply the locking agent (LOCTITE®)
- ㉕ Replace

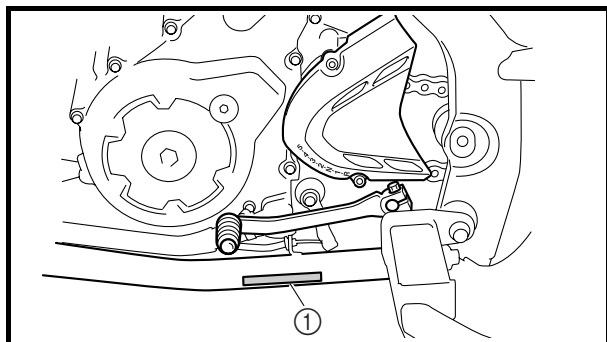
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CHAPTER 1

GENERAL INFORMATION

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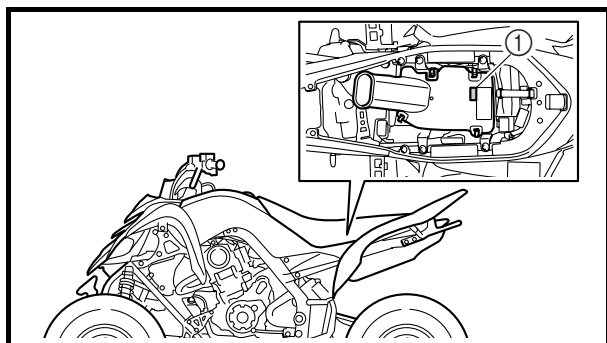
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GENERAL INFORMATION VEHICLE IDENTIFICATION

EBS00010

VEHICLE IDENTIFICATION NUMBER

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



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MODEL LABEL

The model label ① is affixed to the air filter case cover. This information will be needed to order spare parts.

EAS20170

FEATURES

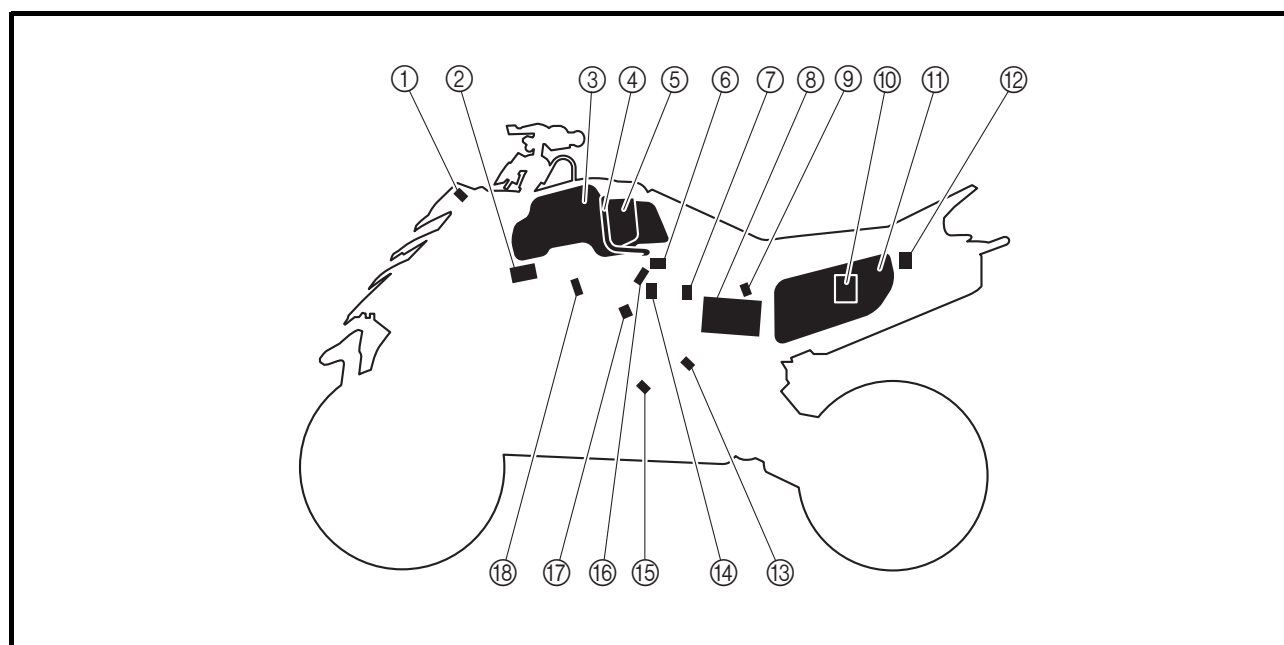
OUTLINE OF THE FI SYSTEM

The main function of a fuel supply system is to provide fuel to the combustion chamber at the optimum air-fuel ratio in accordance with the engine operating conditions and the atmospheric temperature. In the conventional carburetor system, the air-fuel ratio of the mixture that is supplied to the combustion chamber is created by the volume of the intake air and the fuel that is metered by the jet used in the respective carburetor.

Despite the same volume of intake air, the fuel volume requirement varies with the engine operating conditions, such as acceleration, deceleration, or operating under a heavy load. Carburetors that meter the fuel through the use of jets have been provided with various auxiliary devices, so that an optimum air-fuel ratio can be achieved to accommodate the constant changes in the operating conditions of the engine.

As the requirements for the engine to deliver more performance and cleaner exhaust gases increase, it becomes necessary to control the air-fuel ratio in a more precise and finely tuned manner. To accommodate this need, this model has adopted an electronically controlled fuel injection (FI) system, in place of the conventional carburetor system. This system can achieve an optimum air-fuel ratio required by the engine at all times by using a microprocessor that regulates the fuel injection volume according to the engine operating conditions detected by various sensors.

The adoption of the FI system has resulted in a highly precise fuel supply, improved engine response, better fuel economy, and reduced exhaust emissions.



- ① Engine trouble warning light
- ② Ignition coil
- ③ Fuel tank
- ④ Fuel hose
- ⑤ Fuel pump
- ⑥ Intake air pressure sensor
- ⑦ Lean angle sensor
- ⑧ Battery
- ⑨ Intake air temperature sensor

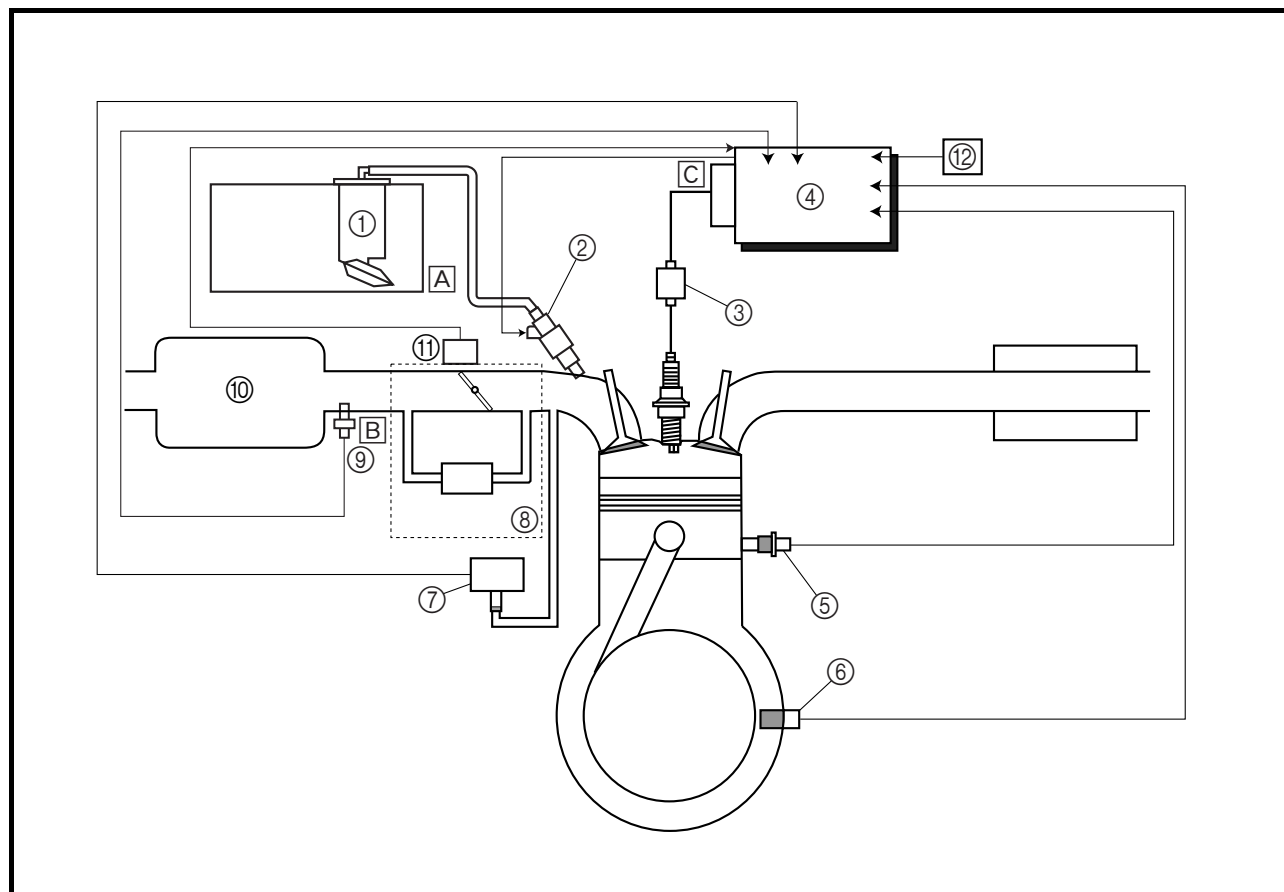
- ⑩ ECU (electronic control unit)
- ⑪ Air filter case
- ⑫ Relay unit (fuel pump relay)
- ⑬ Speed sensor
- ⑭ Throttle position sensor
- ⑮ Crankshaft position sensor
- ⑯ Fuel injector
- ⑰ Coolant temperature sensor
- ⑱ Spark plug

FI SYSTEM

The fuel pump delivers fuel to the fuel injector via the fuel filter. The pressure regulator maintains the fuel pressure that is applied to the fuel injector at only 324 kPa (3.24 kg/cm², 46.1 psi). Accordingly, when the energizing signal from the ECU energizes the fuel injector, the fuel passage opens, causing the fuel to be injected into the intake manifold only during the time the passage remains open. Therefore, the longer the length of time the fuel injector is energized (injection duration), the greater the volume of fuel that is supplied. Conversely, the shorter the length of time the fuel injector is energized (injection duration), the lesser the volume of fuel that is supplied.

The injection duration and the injection timing are controlled by the ECU. Signals that are input from the throttle position sensor, crankshaft position sensor, intake air pressure sensor, intake air temperature sensor, coolant temperature sensor and speed sensor enable the ECU to determine the injection duration. The injection timing is determined through the signals from the crankshaft position sensor. As a result, the volume of fuel that is required by the engine can be supplied at all times in accordance with the driving conditions.

Illustration is for reference only.



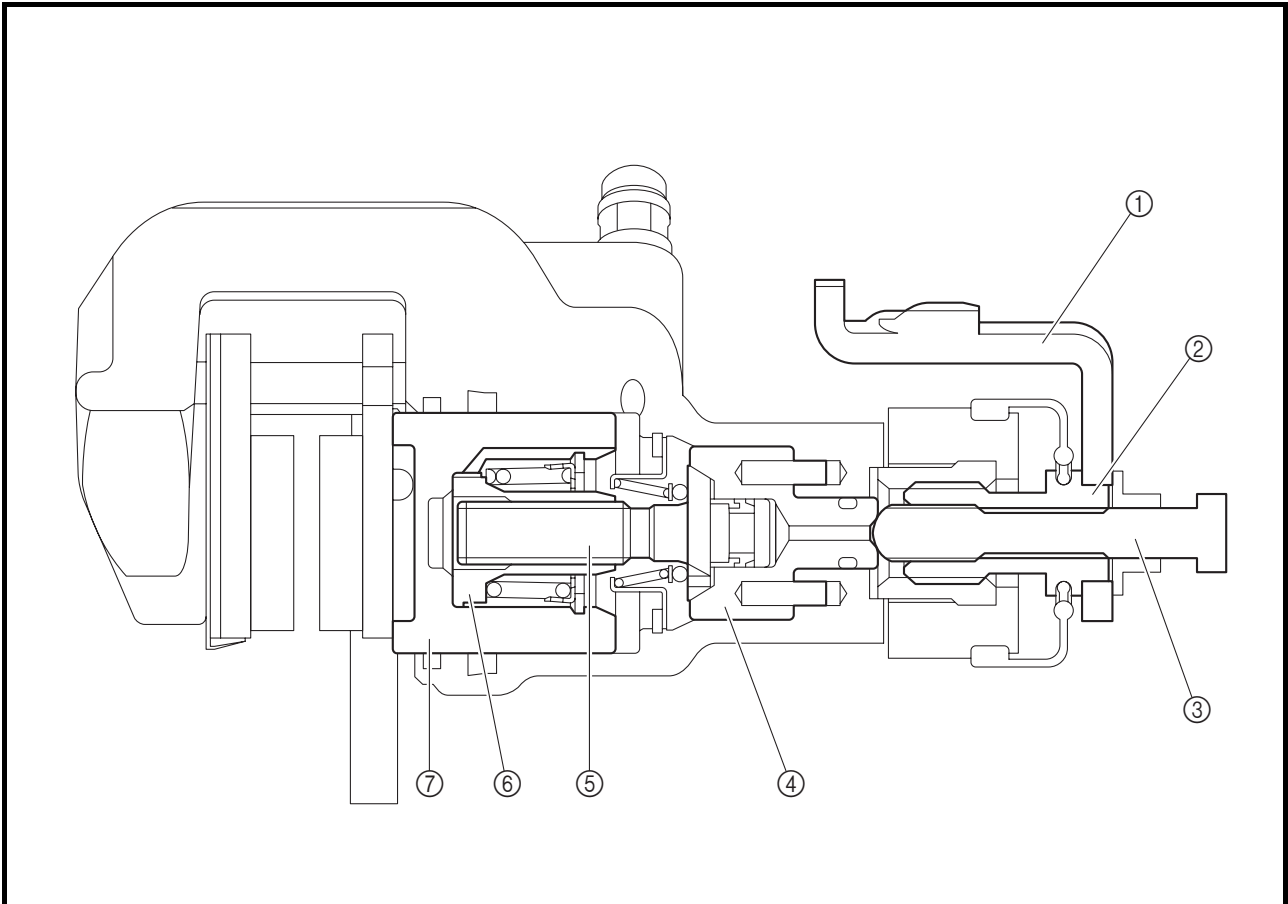
- ① Fuel pump
- ② Fuel injector
- ③ Ignition coil
- ④ ECU (electronic control unit)
- ⑤ Coolant temperature sensor
- ⑥ Crankshaft position sensor
- ⑦ Intake air pressure sensor
- ⑧ Throttle body

- ⑨ Intake air temperature sensor
- ⑩ Air filter case
- ⑪ Throttle position sensor
- ⑫ Speed sensor
- A Fuel system
- B Air system
- C Control system

SELF-ADJUSTING PARKING BRAKE MECHANISM

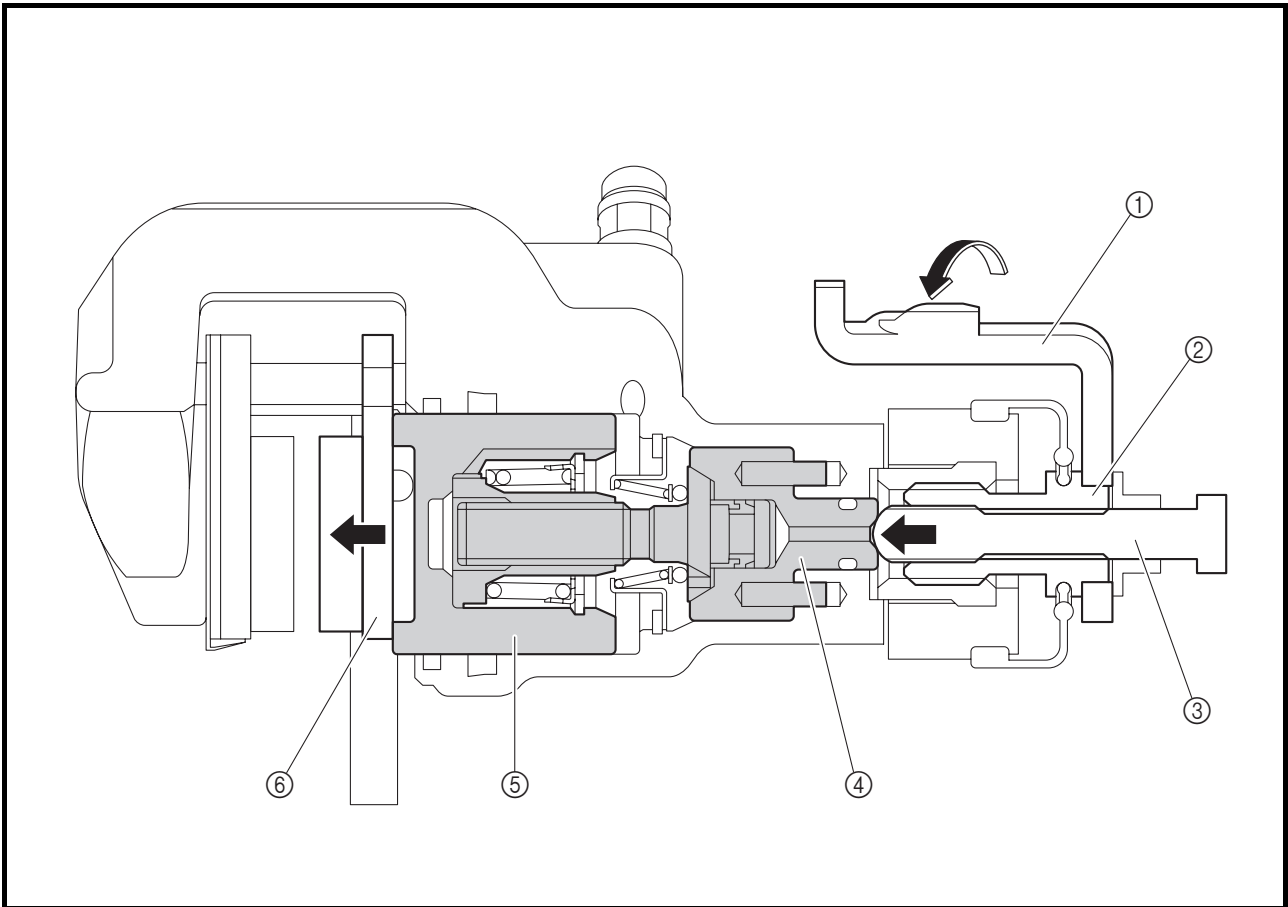
Usually, for vehicles equipped with a parking brake that must be adjusted manually, it is necessary to adjust the adjusting bolt ⑤ to achieve the proper clearance between the brake caliper piston ⑦ and the adjusting bolt ⑤.

This adjustment procedure is unnecessary for vehicles equipped with a self-adjusting parking brake mechanism. The proper clearance is automatically maintained at all times, ensuring stable braking performance when parking the vehicle.



- ① Parking brake arm
- ② Parking brake shaft
- ③ Adjusting bolt
- ④ Adjusting bolt sleeve

- ⑤ Adjusting bolt
- ⑥ Nut
- ⑦ Brake caliper piston

Parking Brake Operation

- ① Parking brake arm
- ② Parking brake shaft
- ③ Adjusting bolt

- ④ Adjusting bolt sleeve
- ⑤ Brake caliper piston
- ⑥ Brake pad

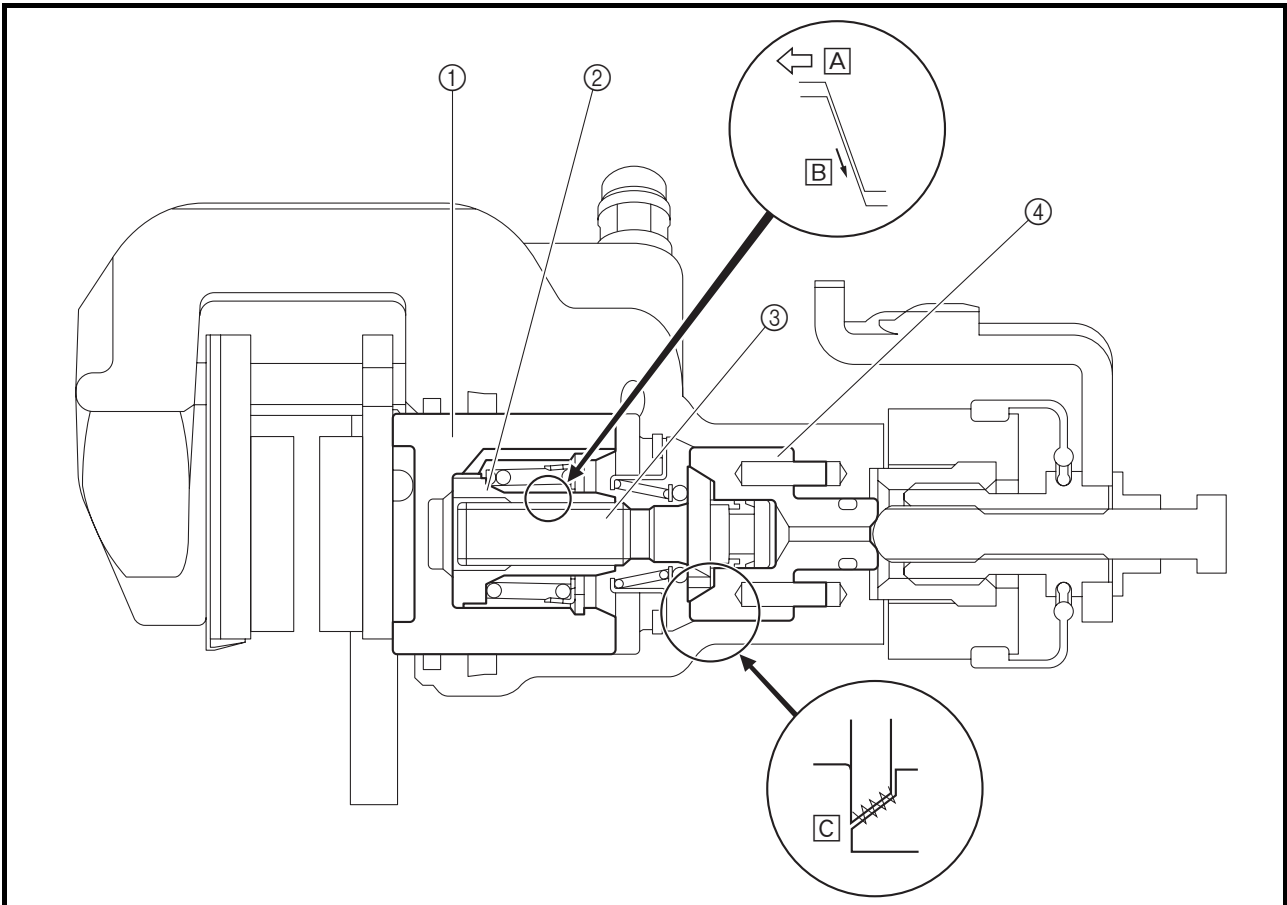
When the parking brake is operated, the parking brake cable turns the parking brake arm ①. The rotation of the parking brake arm is changed to axial thrust in the parking brake shaft ② and the adjusting bolt ③ is pushed against the adjusting bolt sleeve ④.

When the adjusting bolt sleeve receives the force, the dark shaded area in the above illustration is pushed and the brake pad ⑥ is pushed against the brake disc.

When the brake pad wears, the clearance between the brake caliper piston ⑤ and the brake pad becomes larger and the force applied to the brake pad becomes weaker.

If this occurs, the self-adjusting parking brake mechanism adjusts automatically to achieve the proper clearance.

Parking Brake Operation



- ① Brake caliper piston
② Nut

- ③ Adjusting bolt
④ Adjusting bolt sleeve

When the brake pedal is operated, the brake fluid pressure in the master cylinder increases and the brake caliper piston ① and the nut ② are pushed.

When there is proper clearance between the brake caliper piston and the brake pad, no other parts move because the movement of the brake caliper piston and the nut is absorbed by the backlash of the threads of the nut and the adjusting bolt ③.

When the movement of the nut is greater than the backlash between the nut and the adjusting bolt, the parking brake adjusts automatically.

The amount of the adjustment varies with brake fluid pressure. Operating the parking brake makes no adjustment.

The adjustment operation is as follows.

1. When the brake pedal is operated, the brake fluid pressure increases and the brake caliper piston and the nut move.
2. When the movement of the brake caliper piston and the nut is greater than the backlash of the threads of the nut and the adjusting bolt, the force **A** will be required to pull the adjusting bolt. The force to pull the adjusting bolt will be turned into the rotation torque **B** by the shape of the threads of the nut and the adjusting bolt.
3. At this time, the clutch torque **C** between the adjusting bolt and the adjusting bolt sleeve ④ will decrease depending on the force required to pull the adjusting bolt.

When the rotation torque exceeds the clutch torque, the adjusting bolt rotates and the clearance between the brake caliper piston and the brake pad decreases by the movement of the threads of the nut and the adjusting bolt.



EBS00013

IMPORTANT INFORMATION

PREPARATION FOR REMOVAL AND DISASSEMBLY

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

EBS00014

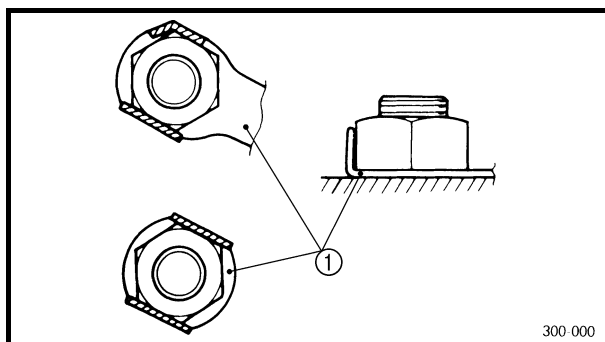
REPLACEMENT PARTS

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.

EBS00015

GASKETS, OIL SEALS AND O-RINGS

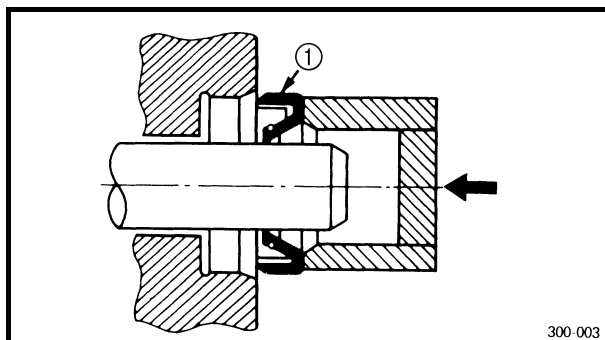
1. When overhauling the engine, replace all gaskets, seals and O-rings. All gasket surfaces, oil seal lips and O-rings must be cleaned.
2. During reassembly properly oil all mating parts and bearings, and lubricate the oil seal lips with grease.



EBS00016

LOCK WASHERS/PLATES AND COTTER PINS

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



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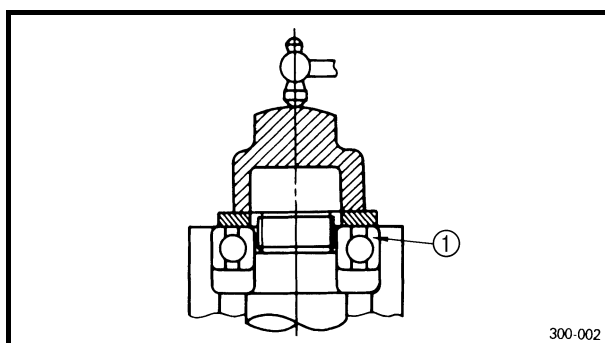
BEARINGS AND OIL SEALS

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

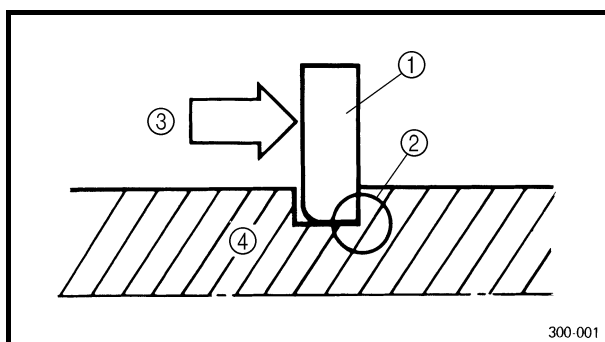
① Oil seal

CAUTION:

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



① Bearing

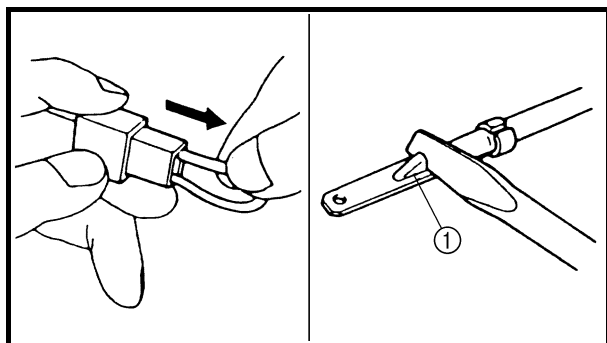
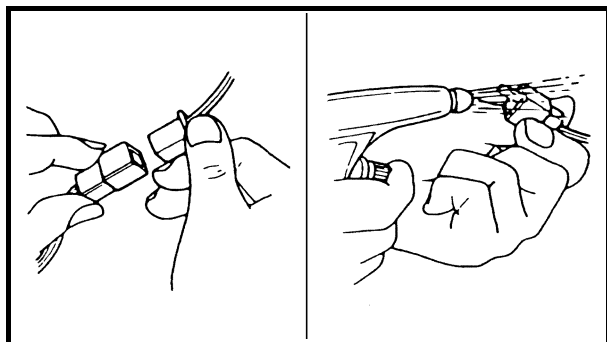


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CIRCLIPS

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

④ Shaft



EBS00019

CHECKING THE CONNECTIONS

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

1. Disconnect:

- lead
- coupler
- connector

2. Check:

- lead
- coupler
- connector

Moisture → Dry with an air blower.

Rust/stains → Connect and disconnect several times.

3. Check:

- all connections

Loose connection → Connect properly.

NOTE:

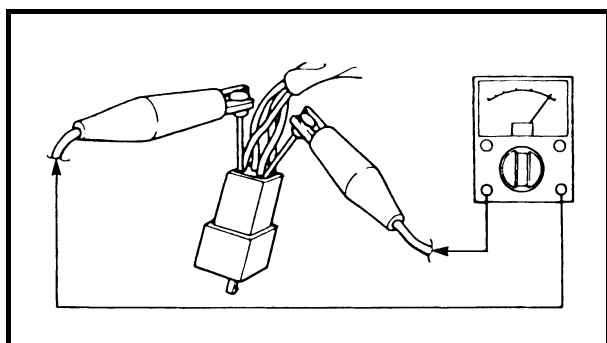
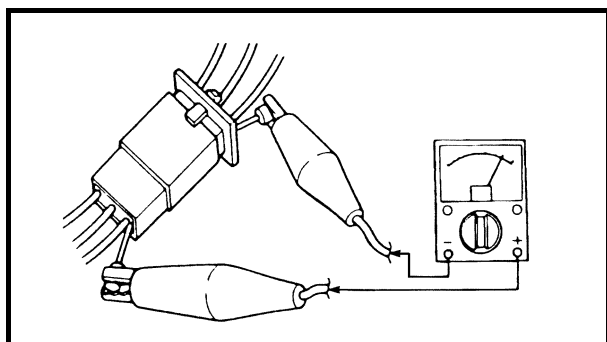
If the pin ① on the terminal is flattened, bend it up.

4. Connect:

- lead
- coupler
- connector

NOTE:

Make sure all connections are tight.



5. Check:

- continuity (with the pocket tester)



Pocket tester
90890-03112
Analog pocket tester
YU-03112-C

NOTE:

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

EBS00021

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.

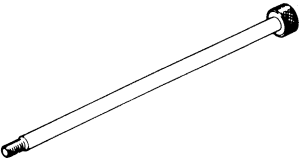
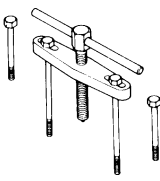
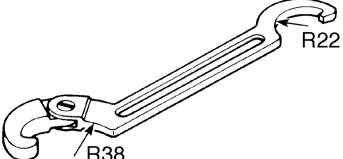
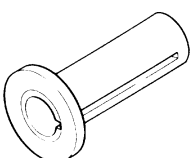
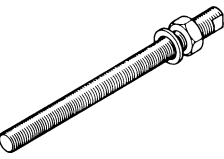
When placing an order, refer to the list provided below to avoid any mistakes.

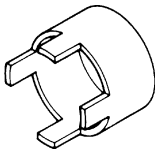
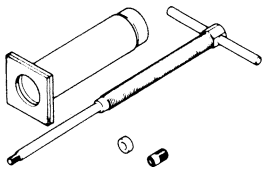
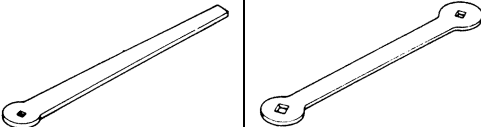
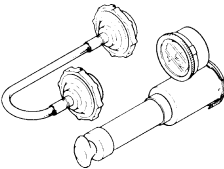
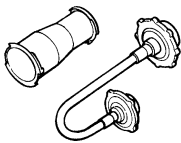
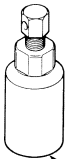
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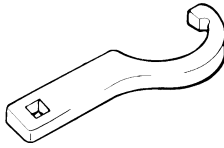
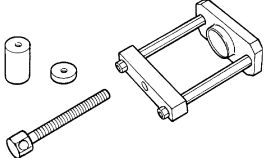
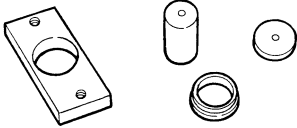
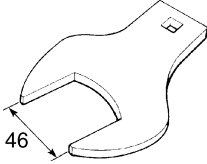
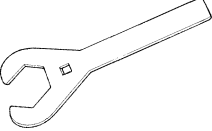
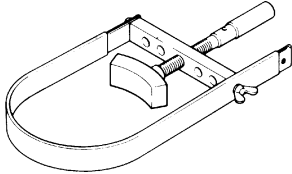
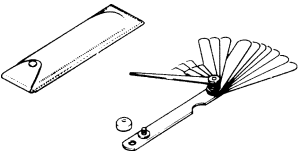
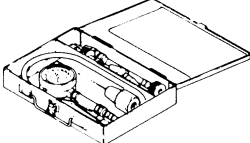
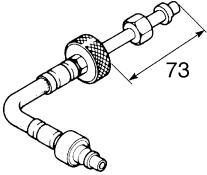
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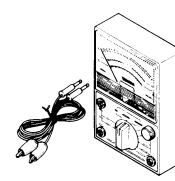
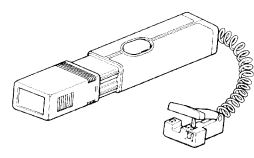
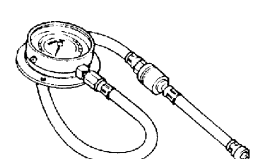
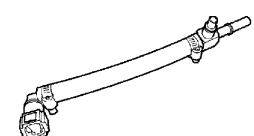
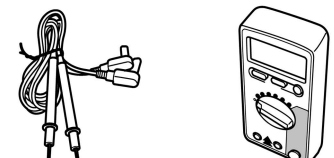
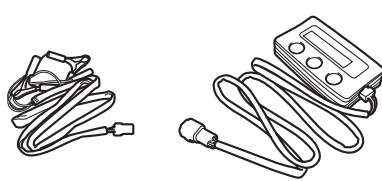
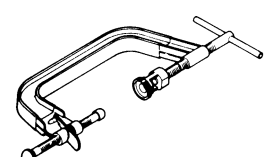
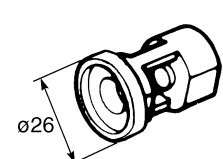
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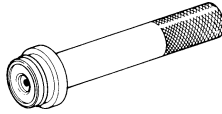
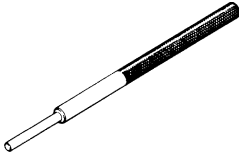
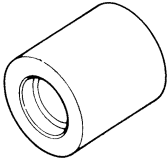
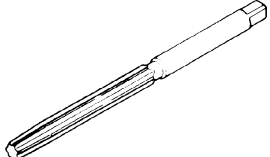
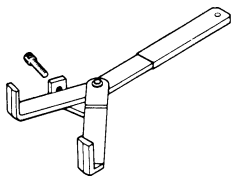
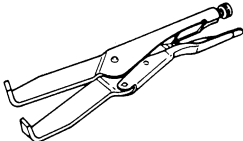
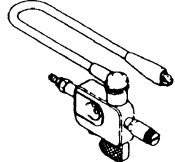
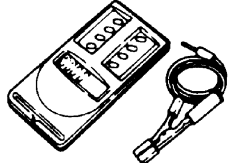
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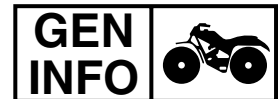
Tool No.	Tool name/Function	Illustration
90890-01083 YU-01083-1	Slide hammer bolt Slide hammer bolt (6 mm) This tool is used to remove the rocker arm shaft.	
90890-01084 YU-01083-3	Weight This tool is used to remove the rocker arm shaft.	
90890-01135 YU-01135-B	Crankcase separating tool Crankcase separator This tool is used to separate the crankcase.	
90890-01268 YU-01268	Ring nut wrench Spanner wrench This tool is used to loosen or tighten the rear shock absorber locknuts.	
90890-01274 YU-90058 YU-90059	Crankshaft installer pot Installer pot Pot installer This tool is used to install the crankshaft.	
90890-01275 YU-90060	Crankshaft installer bolt Bolt This tool is used to install the crankshaft.	

Tool No.	Tool name/Function	Illustration
90890-04130 YM-04059	Adapter (M16) Adapter #13 This tool is used to install the crankshaft.	
90890-04081 YM-91044	Spacer (crankshaft installer) Pot spacer This tool is used to install the crankshaft.	
90890-01304 YU-01304	Piston pin puller set Piston pin puller This tool is used to remove the piston pin.	
90890-01311 YM-08035-A	Tappet adjusting tool Valve adjuster (3 mm & 4 mm) This tool is necessary for adjusting the valve clearance.	
90890-01325 YU-24460-01	Radiator cap tester Radiator pressure tester This tool is used to check the cooling system.	
90890-01352 YU-33984	Radiator cap tester adapter Radiator pressure tester adapter This tool is used to check the cooling system.	
90890-01327 YM-01327	Damper rod holder (30 mm) This tool is needed to loosen and tighten the steering stem bearing retainer.	
90890-01404 YM-01404	Flywheel puller This tool is used to remove the A.C. magneto rotor.	 M35xP1.5

Tool No.	Tool name/Function	Illustration
90890-01443 YU-33975	Steering nut wrench Spanner wrench This tool is needed to loosen and tighten the front shock absorber and rear shock absorber locknuts.	
90890-01474 YM-01474	Ball joint remover This tool is used to remove or install the ball joints.	
90890-01480 YM-01480	Ball joint remover attachment set Ball joint adapter set These tools are used to remove or install the ball joints.	
90890-01498 YM-37134	Rear axle nut wrench (46 mm) Axle nut wrench (46 mm) This tool is needed to loosen or tighten the rear axle nut.	 
90890-01701 YS-01880-A	Sheave holder Primary clutch holder This tool is used to hold the A.C. magneto rotor when loosen or tighten the A.C. magneto rotor nut.	
90890-03079 YM-34483	Thickness gauge Narrow gauge set This tool is used to measure the valve clearance.	
90890-03081 YU-33223	Compression gauge Engine compression tester This tool is used to measure engine compression.	
90890-04082	Extension This tool is used to measure engine compression.	

Tool No.	Tool name/Function	Illustration
90890-03112 YU-03112-C	Pocket tester Analog pocket tester This instrument is needed for checking the electrical system.	
90890-03141 YU-03141	Timing light Inductive clamp timing light This tool is necessary for checking ignition timing.	
90890-03153 YU-03153	Pressure gauge This tool is used to measure fuel pressure.	
90890-03176 YM-03176	Fuel pressure adapter This tool is used to measure fuel pressure.	
90890-03174 YU-A1927	Digital circuit tester Model 88 Multimeter with tachometer This tool is used to check the electrical system.	
90890-03182 YU-03182	FI diagnostic tool This tool is used to check the diagnosis.	
90890-04019 YM-04019	Valve spring compressor This tool is needed to remove and install the valve assemblies.	
90890-01243 YM-01253-1	Valve spring compressor attachment Valve spring compressor adapter (26 mm) This tool is needed to remove and install the valve assemblies.	

Tool No.	Tool name/Function	Illustration
90890-04058 YM-04058	Middle driven shaft bearing driver Bearing driver (40 mm) This tool is used to install the water pump seal.	
90890-04132 YM-33221-A	Mechanical seal installer Water pump seal installer This tool is used to install the water pump seal.	
90890-04064 YM-4064-A	Valve guide remover (ø6) Valve guide remover (6.0 mm) This tool is needed to remove and install the valve guides.	
90890-04065 YM-4065-A	Valve guide installer (ø6) Valve guide installer (6.0 mm) This tool is needed to install the valve guides.	
90890-04066 YM-04066	Valve guide reamer (ø6) Valve guide reamer (6.0 mm) This tool is needed to rebore the new valve guides.	
90890-04086 YM-91042	Universal clutch holder This tool is needed to hold the clutch boss when removing or installing the clutch boss nut.	 
90890-06754 YM-34487	Ignition checker Opama pet-4000 spark checker This tool is used to check the ignition system components.	
90890-06760 YU-39951-B	Digital tachometer This tool is needed to observe engine rpm.	

SPECIAL TOOLS

Tool No.	Tool name/Function	Illustration
90890-85505	Yamaha bond No. 1215 (Three bond No. 1215) This bond is used on crankcase mating surfaces, etc.	A line drawing of a tube of Yamaha bond No. 1215. The tube is oriented horizontally, with a small cap on the left end. The word "YAMAHA" is visible on the side of the tube.

CHAPTER 2 SPECIFICATIONS

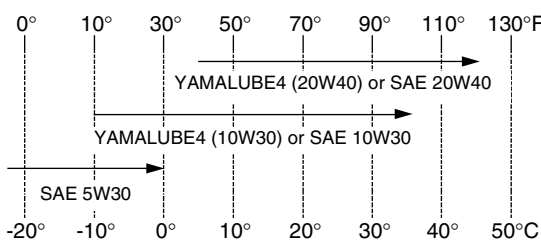
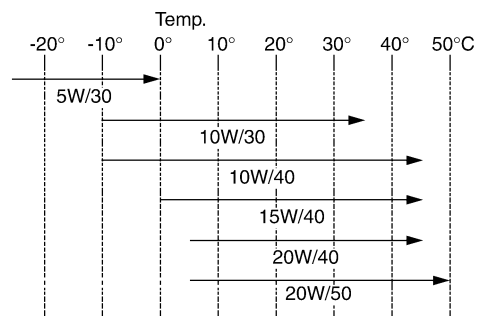
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EBS01001

SPECIFICATIONS

GENERAL SPECIFICATIONS

Item	Standard
Model code	1S31 (For Oceania) 1S32 (For CDN) 1S33 (For Europe)
Dimensions Overall length Overall width Overall height Seat height Wheelbase Minimum ground clearance Minimum turning radius	1,845 mm (72.6 in) 1,170 mm (46.1 in) 1,130 mm (44.5 in) 815 mm (32.1 in) 1,280 mm (50.4 in) 240 mm (9.45 in) 3,500 mm (137.8 in)
Basic weight With oil and full fuel tank	192 kg (423 lb)
Engine Engine type Cylinder arrangement Displacement Bore × stroke Compression ratio Standard compression pressure (at sea level) Starting system	Liquid-cooled 4-stroke, SOHC Forward-inclined single cylinder 686 cm ³ (41.86 cu in) 102.0 × 84.0 mm (4.02 × 3.31 in) 9.20:1 450 kPa (4.5 kg/cm ² , 64.0 psi) Electric starter
Lubrication system	Dry sump
Oil type or grade Engine oil For CDN  For Europe, Oceania 	API service SE, SF, SG type or higher

GENERAL SPECIFICATIONS

SPEC



Item	Standard
Oil capacity	
Engine oil	
Periodic oil change	1.75 L (1.54 Imp qt, 1.85 US qt)
With oil filter replacement	1.85 L (1.63 Imp qt, 1.96 US qt)
Total amount	2.30 L (2.02 Imp qt, 2.43 US qt)
Radiator capacity (including all routes)	1.61 L (1.42 Imp qt, 1.70 US qt)
Air filter	Wet type element
Fuel	
Type	Regular unleaded gasoline only (For CDN, Europe) Unleaded gasoline only (For Oceania)
Fuel tank capacity	11.0 L (2.42 Imp gal, 2.91 US gal)
Fuel reserve amount	2.6 L (0.57 Imp gal, 0.69 US gal)
Fuel injector	
Type/quantity	297500-0390/1
Manufacturer	DENSO
Spark plug	
Type/manufacturer	CR8E/NGK
Spark plug gap	0.7 ~ 0.8 mm (0.028 ~ 0.031 in)
Clutch type	Wet, multiple disc
Transmission	
Primary reduction system	Spur gear
Primary reduction ratio	77/34 (2.265)
Secondary reduction system	Chain drive
Secondary reduction ratio	38/14 (2.714)
Transmission type	Constant mesh, 5-speed/forward, 1 speed/reverse
Operation	Left foot operation
Gear ratio	
1st gear	38/13 (2.923)
2nd gear	28/14 (2.000)
3rd gear	25/17 (1.471)
4th gear	25/22 (1.136)
5th gear	22/24 (0.917)
Reverse gear	24/13 × 29/12 (4.462)
Chassis	
Frame type	Aluminum die-cast and steel tube frame
Caster angle	5°
Camber angle	-1.0°
Kingpin angle	14.8°
Kingpin offset	2.8 mm (0.11 in)
Trail	21.0 mm (0.83 in)
Tread front (STD)	940 mm (37.01 in)
Tread rear (STD)	900 mm (35.43 in)
Toe-in (with tires touching the ground)	2 ~ 12 mm (0.08 ~ 0.47 in)

GENERAL SPECIFICATIONS

SPEC

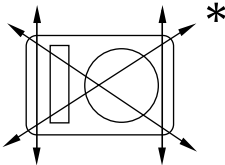
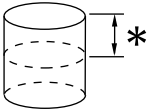
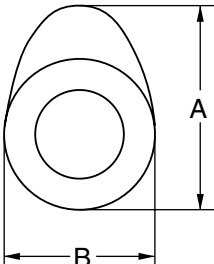
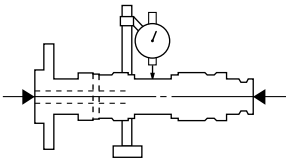


Item		Standard
Tire		
Type		Tubeless
Size	front	AT21 × 7-10
	rear	AT20 × 10-9
Manufacturer	front	DUNLOP
	rear	DUNLOP
Type	front	KT341 Radial
	rear	KT345 Radial
Tire pressure (cold tire)		
Maximum load*		100 kg (220 lb)
Off-road riding	front	27.5 kPa (0.28 kg/cm ² , 4.0 psi)
	rear	27.5 kPa (0.28 kg/cm ² , 4.0 psi)
*Load is total weight of cargo, rider and accessories		
Brake		
Front brake	type	Dual disc brake
	operation	Right hand operation
Rear brake	type	Single disc brake
	operation	Right foot operation
Suspension		
Front suspension		Double wishbone
Rear suspension		Swingarm (link suspension)
Shock absorber		
Front shock absorber		Coil spring/oil damper
Rear shock absorber		Coil spring/gas-oil damper
Wheel travel		
Front wheel travel		230 mm (9.06 in)
Rear wheel travel		256 mm (10.08 in)
Electrical system		
Ignition system		Transistorized coil ignition (digital)
Generator system		A.C. magneto
Battery type		GT9B-4
Battery capacity		12 V 8.0 Ah
Bulb type		Krypton bulb
Bulb voltage/wattage × quantity		
Headlight		12 V 30 W/30 W × 2
Tail/brake light		LED
Indicator light		
Neutral indicator light		LED
Fuel level warning light		LED
Reverse indicator light		LED
Coolant temperature warning light		LED
Engine trouble warning light		LED

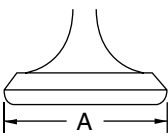
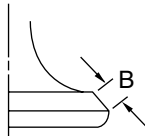
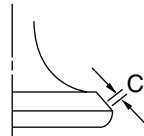
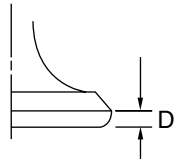


EBS01002

ENGINE SPECIFICATIONS

Item	Standard	Limit
Cylinder head Maximum warpage * 	----	0.03 mm (0.0012 in)
Cylinder Bore Measuring point *  Out of round	102.000 ~ 102.010 mm (4.0157 ~ 4.0161 in) 50.0 mm (1.97 in)	102.080 mm (4.0189 in) ---- 0.05 mm (0.002 in)
Camshaft Drive system Camshaft lobe dimensions  Intake measurement “A” “B” Exhaust measurement “A” “B” Maximum camshaft runout 	Chain drive (left) 43.300 ~ 43.400 mm (1.7047 ~ 1.7087 in) 37.026 ~ 37.126 mm (1.4577 ~ 1.4617 in) 43.129 ~ 43.229 mm (1.6980 ~ 1.7019 in) 37.057 ~ 37.157 mm (1.4589 ~ 1.4629 in) ----	---- 43.200 mm (1.7008 in) 36.926 mm (1.4538 in) 43.029 mm (1.6941 in) 36.957 mm (1.4550 in) 0.03 mm (0.0012 in)
Timing chain Model/number of links Tensioning system	98XRH2010/126 Automatic	---- ----

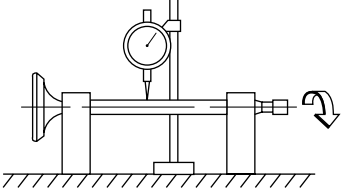
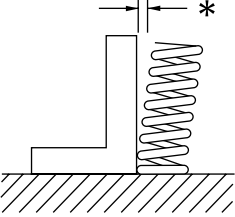


Item	Standard	Limit
Rocker arm/rocker arm shaft		
Rocker arm inside diameter	12.000 ~ 12.018 mm (0.4724 ~ 0.4731 in)	----
Shaft outside diameter	11.981 ~ 11.991 mm (0.4717 ~ 0.4721 in)	----
Arm-to-shaft clearance	0.009 ~ 0.037 mm (0.0004 ~ 0.0015 in)	----
Valve, valve seat, valve guide		
Valve clearance—intake (cold)	0.09 ~ 0.13 mm (0.0035 ~ 0.0051 in)	----
Valve clearance—exhaust (cold)	0.16 ~ 0.20 mm (0.0063 ~ 0.0079 in)	----
Valve dimensions		
   		
Head Diameter	Face Width	Seat Width
Margin Thickness		
Valve head diameter "A"		
Intake	37.9 ~ 38.1 mm (1.4921 ~ 1.5000 in)	----
Exhaust	31.9 ~ 32.1 mm (1.2559 ~ 1.2638 in)	----
Valve face width "B"		
Intake	2.26 mm (0.0890 in)	----
Exhaust	2.26 mm (0.0890 in)	----
Valve seat width "C"		
Intake	1.0 ~ 1.2 mm (0.0394 ~ 0.0472 in)	1.6 mm (0.063 in)
Exhaust	1.0 ~ 1.2 mm (0.0394 ~ 0.0472 in)	1.6 mm (0.063 in)
Valve margin thickness "D"		
Intake	0.8 ~ 1.2 mm (0.0315 ~ 0.0472 in)	----
Exhaust	0.8 ~ 1.2 mm (0.0315 ~ 0.0472 in)	----
Valve stem diameter		
Intake	5.975 ~ 5.990 mm (0.2352 ~ 0.2358 in)	5.945 mm (0.2341 in)
Exhaust	5.960 ~ 5.975 mm (0.2346 ~ 0.2352 in)	5.930 mm (0.2335 in)
Valve guide inside diameter		
Intake	6.000 ~ 6.012 mm (0.2362 ~ 0.2367 in)	6.050 mm (0.2382 in)
Exhaust	6.000 ~ 6.012 mm (0.2362 ~ 0.2367 in)	6.050 mm (0.2382 in)
Valve-stem-to-valve-guide clearance		
Intake	0.010 ~ 0.037 mm (0.0004 ~ 0.0015 in)	0.080 mm (0.0031 in)
Exhaust	0.025 ~ 0.052 mm (0.0010 ~ 0.0020 in)	0.100 mm (0.0039 in)

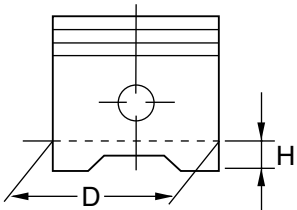
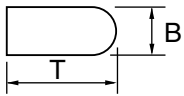
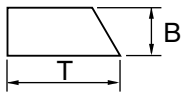
ENGINE SPECIFICATIONS

SPEC



Item	Standard	Limit
Valve stem runout 	----	0.01 mm (0.0004 in)
Valve seat width Intake Exhaust	1.0 ~ 1.2 mm (0.0394 ~ 0.0472 in) 1.0 ~ 1.2 mm (0.0394 ~ 0.0472 in)	1.6 mm (0.0630 in) 1.6 mm (0.0630 in)
Valve spring Free length Intake Exhaust Installed length (valve closed) Intake Exhaust Compressed spring force (installed) Intake Exhaust Spring tilt *  Intake Exhaust Winding direction (top view) Intake Exhaust	38.79 mm (1.53 in) 38.79 mm (1.53 in) 35.00 mm (1.38 in) 35.00 mm (1.38 in) 169.0 ~ 199.0 N (17.23 ~ 20.29 kg, 37.99 ~ 44.73 lb) 169.0 ~ 199.0 N (17.23 ~ 20.29 kg, 37.99 ~ 44.73 lb) ---- ---- Clockwise Clockwise	36.85 mm (1.45 in) 36.85 mm (1.45 in) ---- ---- ---- ---- 2.5°/1.70 mm (2.5°/0.067 in) 2.5°/1.70 mm (2.5°/0.067 in) ---- ----

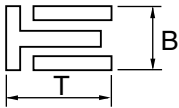
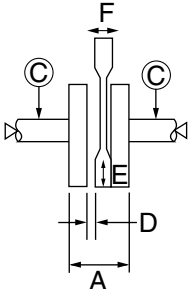


Item	Standard	Limit
Piston		
Piston-to-cylinder clearance	0.030 ~ 0.055 mm (0.0012 ~ 0.0022 in)	0.13 mm (0.0051 in)
Diameter "D"	101.955 ~ 101.970 mm (4.0140 ~ 4.0146 in)	----
		
Height "H"	10 mm (0.39 in)	----
Offset	0.5 mm (0.0197 in)	----
Offset direction	Intake side	----
Piston pin bore inside diameter	23.004 ~ 23.015 mm (0.9057 ~ 0.9061 in)	23.045 mm (0.9073 in)
Piston pin outside diameter	22.991 ~ 23.000 mm (0.9052 ~ 0.9055 in)	22.971 mm (0.9044 in)
Piston-pin-to-piston-pin-bore clearance	0.004 ~ 0.024 mm (0.0002 ~ 0.0009 in)	0.074 mm (0.0029 in)
Piston rings		
Top ring		
		
Ring type	Barrel	----
Dimensions (B × T)	1.20 × 3.80 mm (0.05 × 0.15 in)	----
End gap (installed)	0.20 ~ 0.35 mm (0.008 ~ 0.014 in)	0.60 mm (0.024 in)
Ring side clearance	0.030 ~ 0.070 mm (0.0012 ~ 0.0028 in)	0.12 mm (0.0047 in)
2nd ring		
		
Ring type	Taper	----
Dimensions (B × T)	1.20 × 4.00 mm (0.05 × 0.16 in)	----
End gap (installed)	0.35 ~ 0.50 mm (0.014 ~ 0.020 in)	0.85 mm (0.033 in)
Ring side clearance	0.030 ~ 0.070 mm (0.0012 ~ 0.0028 in)	0.13 mm (0.0051 in)

ENGINE SPECIFICATIONS

SPEC



Item	Standard	Limit
Oil ring  Dimensions (B × T) End gap (installed) Ring side clearance	 2.50 × 3.40 mm (0.10 × 0.13 in) 0.20 ~ 0.70 mm (0.008 ~ 0.028 in) 0.060 ~ 0.150 mm (0.0024 ~ 0.0059 in)	 ---- ---- ----
Crankshaft  Crank width "A" Maximum runout "C" Big end side clearance "D" Big end radial clearance "E" Small end free play "F"	 74.95 ~ 75.00 mm (2.951 ~ 2.953 in) ---- 0.350 ~ 0.650 mm (0.0138 ~ 0.0256 in) 0.010 ~ 0.025 mm (0.0004 ~ 0.0010 in) 0.16 ~ 0.40 mm (0.0063 ~ 0.0157 in)	 ---- 0.03 mm (0.0012 in) 1.00 mm (0.040 in) ---- ----
Balancer Balancer drive method	Gear	----
Clutch Friction plate 1 (inside dia.: 121 mm) Thickness Quantity Friction plate 2 (inside dia.: 128 mm) Thickness Quantity Clutch plate Thickness Quantity Maximum warpage Clutch spring Free length Quantity Clutch release method	 2.92 ~ 3.08 mm (0.115 ~ 0.121 in) 7 2.90 ~ 3.10 mm (0.114 ~ 0.122 in) 1 1.50 ~ 1.60 mm (0.059 ~ 0.063 in) 7 ---- 50.0 mm (1.97 in) 6 Outer pull, rack and pinion pull	 2.82 mm (0.111 in) ---- 2.80 mm (0.110 in) ---- ---- 0.20 mm (0.0079 in) 48.0 mm (1.89 in) ---- ----

ENGINE SPECIFICATIONS

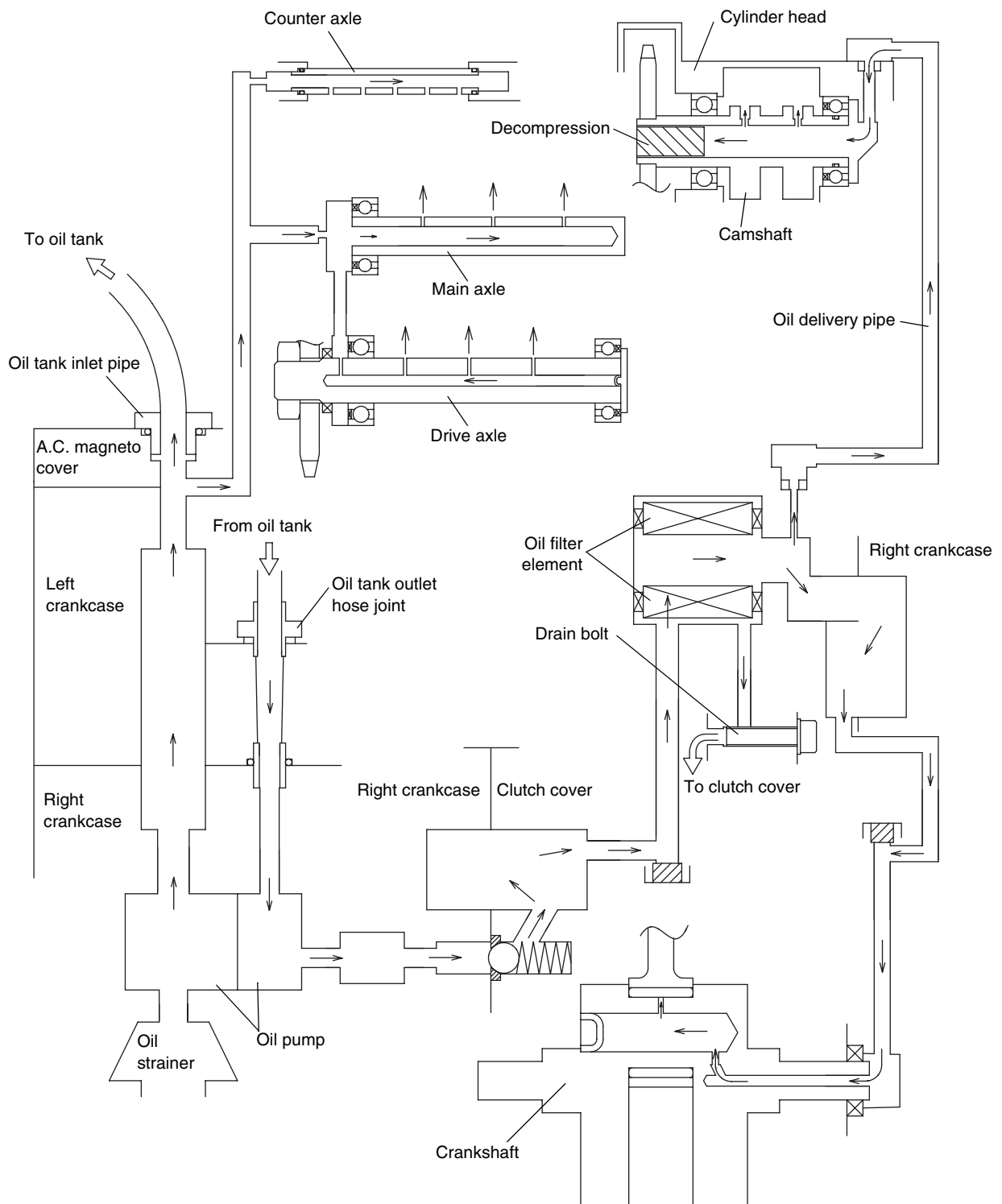
SPEC

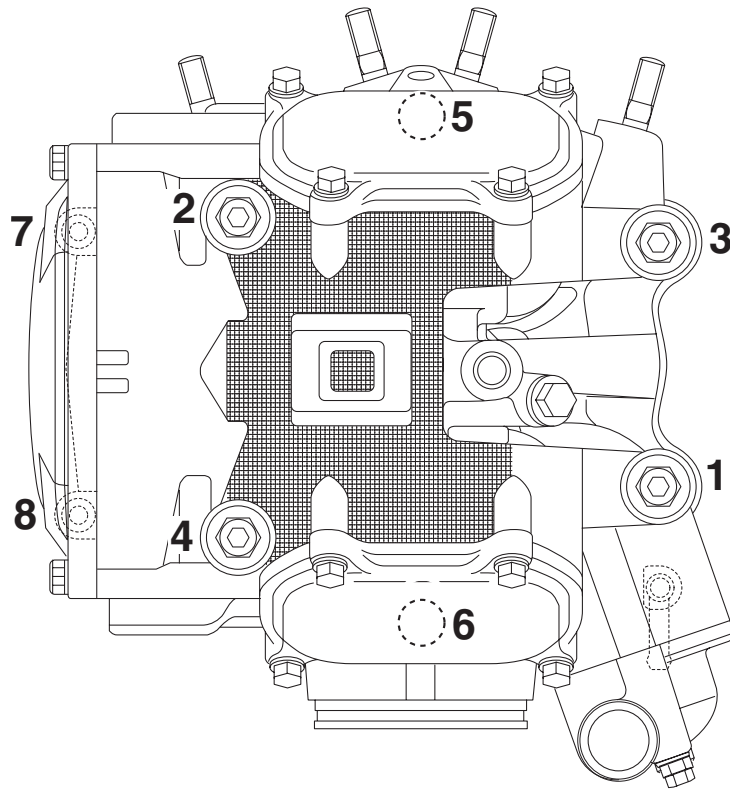


Item	Standard	Limit
Transmission		
Maximum main axle runout	----	0.08 mm (0.0031 in)
Maximum drive axle runout	----	0.08 mm (0.0031 in)
Shifting mechanism		
Shift mechanism type	Shift drum and guide bar	----
Decompression device		
Device type	Auto decomp	----
Air filter oil grade	Air-cooled 2-stroke engine oil	----
Throttle body		
Model/manufacturer × quantity	44EHS/MIKUNI × 1	----
Engine idle speed	1,500 ~ 1,700 r/min	----
Intake vacuum	37.8 kPa (284 mmHg, 11.2 inHg)	----
Fuel pump		
Pump type	Electrical	----
Model/manufacturer	1S3/DENSO	----
Maximum consumption amperage	4.8 A	----
Output pressure	324 kPa (3.24 kg/cm ² , 46.1 psi)	----
Oil filter type	Paper	----
Oil pump		
Oil pump type	Trochoid	----
Inner-rotor-to-outer-rotor-tip clearance	Less than 0.12 mm (0.0047 in)	0.20 mm (0.0079 in)
Outer-rotor-to-oil-pump-housing clearance	0.09 ~ 0.15 mm (0.0035 ~ 0.0059 in)	0.22 mm (0.0087 in)
Bypass valve opening pressure	40.0 ~ 80.0 kPa (0.40 ~ 0.80 kg/cm ² , 5.70 ~ 11.4 psi)	----
Oil pressure (hot)	40.0 kPa at 1,600 r/min (0.40 kg/cm ² at 1,600 r/min, 5.70 psi at 1,600 r/min)	----
Pressure check location	Element cover	----
Cooling system		
Radiator core		
Width	197 mm (7.76 in)	----
Height	300 mm (11.81 in)	----
Depth	22 mm (0.87 in)	----
Radiator cap opening pressure	93.3 ~ 122.7 kPa (0.933 ~ 1.227 kg/cm ² , 13.27 ~ 17.45 psi)	----
Coolant reservoir capacity		
Up to the maximum level mark	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		
Water pump type	Single-suction centrifugal pump	----
Reduction ratio	27/28 (0.964)	----



Lubrication chart



**Cylinder head tightening sequence**



EBS01003

CHASSIS SPECIFICATIONS

Item	Standard	Limit
Steering system		
Steering bearing type	Ball and race bearing	----
Front suspension		
Shock absorber travel	115.0 mm (4.53 in)	----
Spring free length	269.0 mm (10.59 in)	----
Installed length	260.5 mm (10.26 in)	----
Spring rate (K1)	21.60 N/mm (2.20 kg/mm, 123.33 lb/in)	----
Spring rate (K2)	29.40 N/mm (3.00 kg/mm, 167.87 lb/in)	----
Optional spring available	No	----
Rear suspension		
Shock absorber travel	110.0 mm (4.33 in)	----
Spring free length	255.0 mm (10.04 in)	----
Installed length	236.0 mm (9.29 in)	----
Spring rate (K1)	46.00 N/mm (4.69 kg/mm, 262.66 lb/in)	----
Spring stroke (K1)	0 ~ 110.0 mm (0 ~ 4.33 in)	----
Optional spring available	No	----
Swingarm		
Free play limit (radial)	----	1.0 mm (0.04 in)
Free play limit (axial)	----	1.0 mm (0.04 in)
Front wheel		
Type	Panel wheel	----
Rim size	10 × 5.5 AT	----
Rim material	Aluminum	----
Maximum radial wheel runout	----	2.0 mm (0.08 in)
Maximum lateral wheel runout	----	2.0 mm (0.08 in)
Rear wheel		
Type	Panel wheel	----
Rim size	9 × 8.5 AT	----
Rim material	Aluminum	----
Maximum radial wheel runout	----	2.0 mm (0.08 in)
Maximum lateral wheel runout	----	2.0 mm (0.08 in)
Drive chain		
Type/manufacturer	520MXV/DAIDO	----
Link quantity	98	----
Drive chain slack	25 ~ 35 mm (0.98 ~ 1.38 in)	----

CHASSIS SPECIFICATIONS

SPEC



Item	Standard	Limit
Front disc brake		
Type	Dual	----
Disc outside diameter × thickness	161.0 × 3.5 mm (6.34 × 0.14 in)	----
Pad thickness inner	4.3 mm (0.17 in)	1.0 mm (0.04 in)
Pad thickness outer	4.3 mm (0.17 in)	1.0 mm (0.04 in)
Master cylinder inside diameter	12.70 mm (0.50 in)	----
Caliper cylinder inside diameter	25.40 mm (1.00 in)	----
Brake fluid type	DOT 4	----
Rear disc brake		
Type	Single	----
Disc outside diameter × thickness	200.0 × 3.6 mm (7.87 × 0.14 in)	----
Pad thickness inner	5.6 mm (0.22 in)	1.0 mm (0.04 in)
Pad thickness outer	5.6 mm (0.22 in)	1.0 mm (0.04 in)
Master cylinder inside diameter	12.70 mm (0.50 in)	----
Caliper cylinder inside diameter	32.03 mm (1.26 in)	----
Brake fluid type	DOT 4	----
Brake lever and brake pedal		
Brake pedal position	15.3 mm (0.60 in)	----
Parking brake cable end length	58 ~ 60 mm (2.28 ~ 2.36 in)	----
Clutch lever free play (lever end)	5 ~ 10 mm (0.20 ~ 0.39 in)	----
Throttle lever free play	2 ~ 4 mm (0.08 ~ 0.16 in)	----
Speed limiter length	Less than 12 mm (0.47 in)	----
Shift pedal height	48 mm (1.89 in)	----



EBS01004

ELECTRICAL SPECIFICATIONS

Item	Standard	Limit
System voltage	12 V	----
Ignition system		
Ignition timing (B.T.D.C.)	9.0°/1,600 r/min	----
Advancer type	Digital type	----
Transistorized coil ignition		
Crankshaft position sensor resistance/color	192 ~ 288 Ω at 20 °C (68 °F)/ blue/yellow-green/white	----
ECU		
Model/manufacture	TBDF18/DENSO	----
Ignition coil		
Model/manufacture	JO267/DENSO	----
Minimum ignition spark gap	6.0 mm (0.24 in)	----
Primary winding resistance	3.4 ~ 4.6 Ω at 20 °C (68 °F)	----
Secondary winding resistance	10.4 ~ 15.6 kΩ at 20 °C (68 °F)	----
Spark plug cap		
Material	Resin	----
Resistance	10.0 kΩ	----
A.C. magneto		
Model/manufacture	LMX58/DENSO	----
Standard output	14 V 17.2 A at 5,000 r/min	----
Stator coil resistance/color	0.248 ~ 0.372 Ω at 20 °C (68 °F)/ white-white	----
Rectifier/regulator		
Type	Semiconductor, short-circuit type	----
Model/manufacture	SH650D-11/SHINDENGEN	----
No load regulated voltage (DC)	14.1 ~ 14.9 V	----
Rectifier capacity	18.0 A	----
Withstand voltage	200.0 V	----
Electric starting system		
Type	Constant mesh type	----
Starter motor		
Model/manufacture	SM-13/MITSUBA	----
Power output	0.80 kW	----
Armature coil resistance	0.0250 ~ 0.0350 Ω at 20 °C (68 °F)	----
Brush overall length	12.5 mm (0.49 in)	5.00 mm (0.20 in)
Spring force	7.65 ~ 10.01 N (780 ~ 1,021 gf, 27.54 ~ 36.03 oz)	----
Commutator diameter	28.0 mm (1.10 in)	27.0 mm (1.06 in)
Mica undercut	0.70 mm (0.03 in)	----

ELECTRICAL SPECIFICATIONS

SPEC



Item	Standard	Limit
Starter relay		
Model/manufacturer	2768106-A/JIDECO	----
Amperage rating	180.0 A	----
Coil winding resistance	4.18 ~ 4.62 Ω at 20 °C (68 °F)	----
Circuit breaker		
Circuit breaker type	Fuse	----
Fuses		
Main fuse	20 A	----
Headlight fuse	15 A	----
Signaling system fuse	10 A	----
Ignition fuse	10 A	----
Fuel injection system fuse	10 A	----
Spare fuse	20 A	----
	15 A	----
	10 A	----

TIGHTENING TORQUES

SPEC



EBS01005

TIGHTENING TORQUES

ENGINE TIGHTENING TORQUES

Part to be tightened	Part name	Thread size	Q'ty	Tightening torque			Remarks
				Nm	m · kg	ft · lb	
Cylinder head (exhaust pipe)	Stud bolt	M8	4	15	1.5	11	
Cylinder head	Bolt	M9	4	35	3.5	25	
Cylinder head	Bolt	M9	2	38	3.8	27	
Cylinder head	Bolt	M6	2	10	1.0	7.2	
Spark plug	—	M10	1	13	1.3	9.4	
Oil gallery bolt	Union bolt	M8	1	10	1.0	7.2	
Tappet cover	Bolt	M6	8	10	1.0	7.2	
Camshaft sprocket cover	Bolt	M6	2	10	1.0	7.2	
Camshaft sprocket	Bolt	M7	2	20	2.0	14	
Decompressor assembly	Bolt	M7	2	20	2.0	14	See NOTE.
Cylinder	Bolt	M10	4	50	5.0	36	
Cylinder	Bolt	M6	2	10	1.0	7.2	
Cable guide	Bolt	M6	1	7	0.7	5.1	
Water jacket joint	Bolt	M6	2	10	1.0	7.2	
A.C. magneto rotor	Nut	M16	1	60	6.0	43	
A.C. magneto cover	Bolt	M6	14	10	1.0	7.2	Use a lock washer.
Balancer driven gear	Nut	M16	2	60	6.0	43	
Breather plate	Bolt	M6	3	10	1.0	7.2	
Primary drive gear	Nut	M20	1	110	11.0	80	Use a lock washer.
Valve adjusting screw	Nut	M6	4	14	1.4	10	
Camshaft bearing retainer	Bolt	M6	2	10	1.0	7.2	
Timing chain guide (intake side)	Bolt	M6	2	10	1.0	7.2	
Timing chain tensioner cap bolt	Bolt	M16	1	20	2.0	14	
Timing chain tensioner	Bolt	M6	2	10	1.0	7.2	
Water pump outlet hose clamp	Screw	M4	2	2	0.2	1.4	
Water pump	Bolt	M6	3	10	1.0	7.2	
Water pump housing cover	Bolt	M6	3	11	1.1	8.0	
Thermostat cover	Bolt	M6	2	10	1.0	7.2	
Radiator	Bolt	M6	2	7	0.7	5.1	
Engine oil drain bolt (crankcase)	Bolt	M14	1	23	2.3	17	
Engine oil drain bolt (oil tank)	Bolt	M8	1	19	1.9	13	
Oil baffle plate 1	Bolt	M5	2	4	0.4	2.9	
Oil baffle plate 2	Bolt	M6	2	10	1.0	7.2	
Oil pump	Bolt	M6	1	10	1.0	7.2	
Oil pump housing 2	Screw	M6	1	7	0.7	5.1	
Oil strainer	Bolt	M6	2	10	1.0	7.2	

TIGHTENING TORQUES

SPEC



Part to be tightened	Part name	Thread size	Q'ty	Tightening torque			Remarks
				Nm	m · kg	ft · lb	
Oil filter cover drain bolt	Bolt	M6	1	10	1.0	7.2	
Oil filter cover	Bolt	M6	2	10	1.0	7.2	
Check screw (oil filter cover)	Screw	M5	1	5	0.5	3.6	
Oil delivery pipe	Union bolt	M10	2	20	2.0	14	
Oil delivery pipe	Bolt	M6	1	10	1.0	7.2	
Oil pipe joint	Bolt	M14	1	50	5.0	36	
Oil tank inlet hose (oil tank side)	Bolt	M6	1	10	1.0	7.2	
Oil tank inlet hose (engine side)	Bolt	M6	1	10	1.0	7.2	
Oil tank outlet hose	Nut	M16	1	35	3.5	25	
Oil tank outlet hose	Bolt	M6	2	10	1.0	7.2	
Intake manifold clamp	Screw	M4	2	3	0.3	2.2	
Air filter case joint clamp	Screw	M5	1	4	0.4	2.9	
ECU bracket	Bolt	M6	2	7	0.7	5.1	
Exhaust pipe 2 and exhaust pipe 1	Bolt	M8	1	16	1.6	11	
Spark arrester	Bolt	M6	1	8	0.8	5.8	
Muffler and exhaust pipe 2	Bolt	M8	1	18	1.8	13	
Muffler	Bolt	M8	2	38	3.8	27	
Exhaust pipes	Nut	M8	4	20	2.0	14	
Muffler protector	Screw	M6	2	8	0.8	5.8	
Exhaust pipe protector	Bolt	M6	4	8	0.8	5.8	
Oil seal retainer (clutch cover)	Bolt	M6	2	10	1.0	7.2	
Timing mark accessing screw	Screw	M14	1	6	0.6	4.3	
Crankshaft end accessing screw	Screw	M36	1	10	1.0	7.2	
Crankcase bearing retainer	Screw	M6	2	10	1.0	7.2	
Crankcase bearing retainer	Bolt	M6	2	10	1.0	7.2	
Crankcase	Bolt	M6	17	10	1.0	7.2	
Engine oil filler bolt	Bolt	M20	1	12	1.2	8.7	
Starter clutch	Bolt	M8	3	30	3.0	22	
Clutch spring	Bolt	M6	6	8	0.8	5.8	
Clutch boss	Nut	M20	1	95	9.5	68	Stake
Clutch cover	Bolt	M6	14	10	1.0	7.2	
Drive sprocket	Nut	M22	1	85	8.5	61	Use a lock washer.
Oil seal retainer (left crankcase)	Bolt	M6	2	10	1.0	7.2	
Shift drum segment	Bolt	M8	1	30	3.0	22	
Shift guide	Bolt	M6	2	10	1.0	7.2	
Reverse shift lever	Bolt	M6	1	13	1.3	9.4	
Shift pedal	Bolt	M6	1	16	1.6	11	
Stator coil	Bolt	M6	3	7	0.7	5.1	
Crankshaft position sensor	Bolt	M5	2	7	0.7	5.1	
A.C. magneto lead holder	Bolt	M5	1	7	0.7	5.1	
Coolant temperature sensor	—	M12	1	18	1.8	13	
Starter motor	Bolt	M6	2	10	1.0	7.2	

TIGHTENING TORQUES**SPEC**

Part to be tightened	Part name	Thread size	Q'ty	Tightening torque			Remarks
				Nm	m · kg	ft · lb	
Reverse switch	—	M10	1	17	1.7	12	
Neutral switch	—	M10	1	17	1.7	12	

NOTE:

Temporarily tighten the cylinder bolts to 15 Nm (1.5 m · kg, 11 ft · lb), and then tighten them to 50 Nm (5.0 m · kg, 36 ft · lb).

TIGHTENING TORQUES

SPEC



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CHASSIS TIGHTENING TORQUES

Part to be tightened	Thread size	Tightening torque			Remarks
		Nm	m · kg	ft · lb	
Engine upper bracket	M8	33	3.3	24	
Engine mounting bolt (upper)	M10	40	4.0	29	
Engine lower bracket	M8	41	4.1	30	
Engine mounting bolt (middle)	M10	66	6.6	48	
Engine mounting bolt (lower)	M10	66	6.6	48	
Swingarm pivot shaft, engine, and frame	M16	100	10.0	72	
Middle frame and rear frame	M10	54	5.4	39	
Frame and oil tank	M6	7	0.7	5.1	
Frame and coolant reservoir	M6	7	0.7	5.1	
Rear shock absorber and frame	M12	55	5.5	40	
Relay arm and swingarm	M10	43	4.3	31	
Connecting arm and frame	M12	55	5.5	40	
Relay arm and rear shock absorber	M10	43	4.3	31	
Relay arm and connecting arm	M10	43	4.3	31	
Rear axle pinch bolt	M8	21	2.1	15	
Swingarm and guide pin	M12	55	5.5	40	
Swingarm skid plate and swingarm	M6	7	0.7	5.1	
Drive chain guide 1 and swingarm	M6	7	0.7	5.1	
Drive sprocket cover and engine	M6	10	1.0	7.2	
Upper front arm and frame	M10	38	3.8	27	
Lower front arm and frame	M10	55	5.5	40	
Front shock absorber and frame	M10	48	4.8	35	
Front shock absorber and lower front arm	M10	48	4.8	35	
Steering stem, pitman arm, and frame	M14	180	18.0	130	
Steering stem bushing and frame	M8	23	2.3	17	
Steering stem and handlebar holder	M8	23	2.3	17	
Tie-rod end and locknut	M12	18	1.8	13	
Steering knuckle and front wheel hub	M14	70	7.0	50	
Steering knuckle and front arm (upper and lower)	M10	25	2.5	18	
Steering knuckle and tie-rod ball joint	M10	25	2.5	18	
Pitman arm and tie-rod ball joint	M10	25	2.5	18	
Frame and bearing retainer	M42	65	6.5	47	
Fuel tank and fuel pump	M6	7	0.7	5.1	
Fuel tank and frame	M6	7	0.7	5.1	
Front wheel and front wheel hub	M10	45	4.5	32	
Steering knuckle and front brake caliper bracket	M8	28	2.8	20	
Front brake disc and front wheel hub	M8	28	2.8	20	
Rear brake caliper and brake caliper bracket	M8	34	3.4	24	
Rear axle and rear wheel hub	M16	200	20.0	145	See NOTE.
Rear wheel and rear wheel hub	M10	45	4.5	32	

TIGHTENING TORQUES

SPEC



Part to be tightened	Thread size	Tightening torque			Remarks
		Nm	m · kg	ft · lb	
Driven sprocket and sprocket bracket	M10	72	7.2	52	 
Front brake caliper and brake hose	M10	27	2.7	19	
Front brake pad retaining bolt	M10	17	1.7	12	
Brake caliper bleed screw	M8	6	0.6	4.3	
Front brake master cylinder and handlebar	M6	7	0.7	5.1	
Front brake master cylinder and brake lever	M6	6	0.6	4.3	
Front brake master cylinder and brake hose	M10	27	2.7	19	
Throttle lever assembly and handlebar	M5	4	0.4	2.9	
Clutch lever and handlebar	M5	4	0.4	2.9	
Parking brake lever and clutch lever	M6	7	0.7	5.1	
Front brake pipe nut	M10	19	1.9	13	  
Brake hose joint and frame	M6	10	1.0	7.2	
Brake hose holder and front upper arm	M6	7	0.7	5.1	
Footrest and frame	M10	78	7.8	56	
Foot protector and footrest	M6	13	1.3	9.4	
Foot protector and footrest	M8	16	1.6	11	
Foot protector and bracket	M6	12	1.2	8.7	
Engine skid plate and frame	M6	7	0.7	5.1	
Rear axle ring nut	M36	240	24.0	175	
Rear axle ring nut set bolt	M6	7	0.7	5.1	
Rear brake pad retaining bolt	M10	17	1.7	12	  
Rear brake caliper and brake hose	M10	30	3.0	22	
Parking brake case bracket and parking brake case	M8	22	2.2	16	
Rear brake master cylinder and frame	M6	20	2.0	14	
Rear brake master cylinder and brake hose	M10	30	3.0	22	
Rear brake master cylinder adjusting bolt and locknut	M8	17	1.7	12	
Parking brake adjusting bolt and locknut	M6	10	1.0	7.2	
Rear brake disc and brake disc bracket	M8	33	3.3	24	
Brake hose holder and swingarm	M6	7	0.7	5.1	
Front guard and frame	M8	12	1.2	8.7	
Front fender and frame	M6	7	0.7	5.1	         
Headlight and frame	M6	7	0.7	5.1	
Rear fender and frame	M6	7	0.7	5.1	
Rear fender and bracket	M6	7	0.7	5.1	
Battery holding bracket and frame	M6	7	0.7	5.1	
Air filter case and frame	M6	7	0.7	5.1	
Rear guard and frame	M8	32	3.2	23	
Battery box and lean angle sensor	M4	2	0.2	1.4	

**NOTE:**

1. Apply a rust preventive lubricant to the threads on both sides of the rear axle and to the wheel hub surfaces that contact the rear axle washers.
2. Tighten the rear axle nuts 200 Nm (20.0 m · kg, 145 ft · lb).
3. Loosen the rear axle nuts completely.
4. Retighten the rear axle nuts 200 Nm (20.0 m · kg, 145 ft · lb). Do not loosen the axle nuts after tightening them. If an axle nut slot is not aligned with the cotter pin hole on either side of the axle, further tighten the axle nut until a slot is aligned with the hole.

HOW TO USE THE CONVERSION TABLE/ GENERAL TIGHTENING TORQUE SPECIFICATIONS

SPEC



EBS00022

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 ³)	0.03527	oz (IMP liq.)
	cc (cm ³)	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 ²	14.2234	psi (lb/in ²)
	Centigrade (°C)	9/5+32	Fahrenheit (°F)

EBS00023

GENERAL TIGHTENING TORQUE SPECIFICATIONS

This chart specifies tightening torques for standard fasteners with a standard ISO thread pitch. Tightening torque specifications for special components or assemblies are provided for each chapter of this manual. To avoid warpage, tighten multi-fastener assemblies in a crisscross pattern and progressive stages until the specified tightening torque is reached. Unless otherwise specified, tightening torque specifications require clean, dry threads. Components should be at room temperature.

A: Distance between flats

B: Outside thread diameter

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



EBS00024

LUBRICATION POINTS AND LUBRICANT TYPES

ENGINE

Lubrication point	Lubricant
Oil seal lips	
O-rings	
Bearings	
Crankshaft pins	
Timing chain sprocket inner surface	
Connecting rod big end thrust surface	
Piston pin	
Piston surface	
Valve stems (intake and exhaust)	
Valve stem ends (intake and exhaust)	
Rocker arm shaft	
Camshaft lobes	
Decompressor lever pin	
Decompressor lever spring	
Water pump impeller shaft	
Oil pump rotors (inner rotor 2 and outer rotor 2) and pump	
Oil pump rotors (inner rotor 1 and outer rotor 1) and pump	
Torque limiter	
Starter idle gear and starter wheel gear inner surface	
Primary driven gear	
Clutch pull rod	
Transmission gears (wheel and pinion)	
Shift drum	
Shift forks	
Shift lever assembly	
Shift shaft	
Reverse shift shaft	
Crankcase mating surface	Yamaha bond No. 1215 (Three bond No. 1215)
A.C. magneto lead grommet (A.C. magneto cover)	Yamaha bond No. 1215 (Three bond No. 1215)

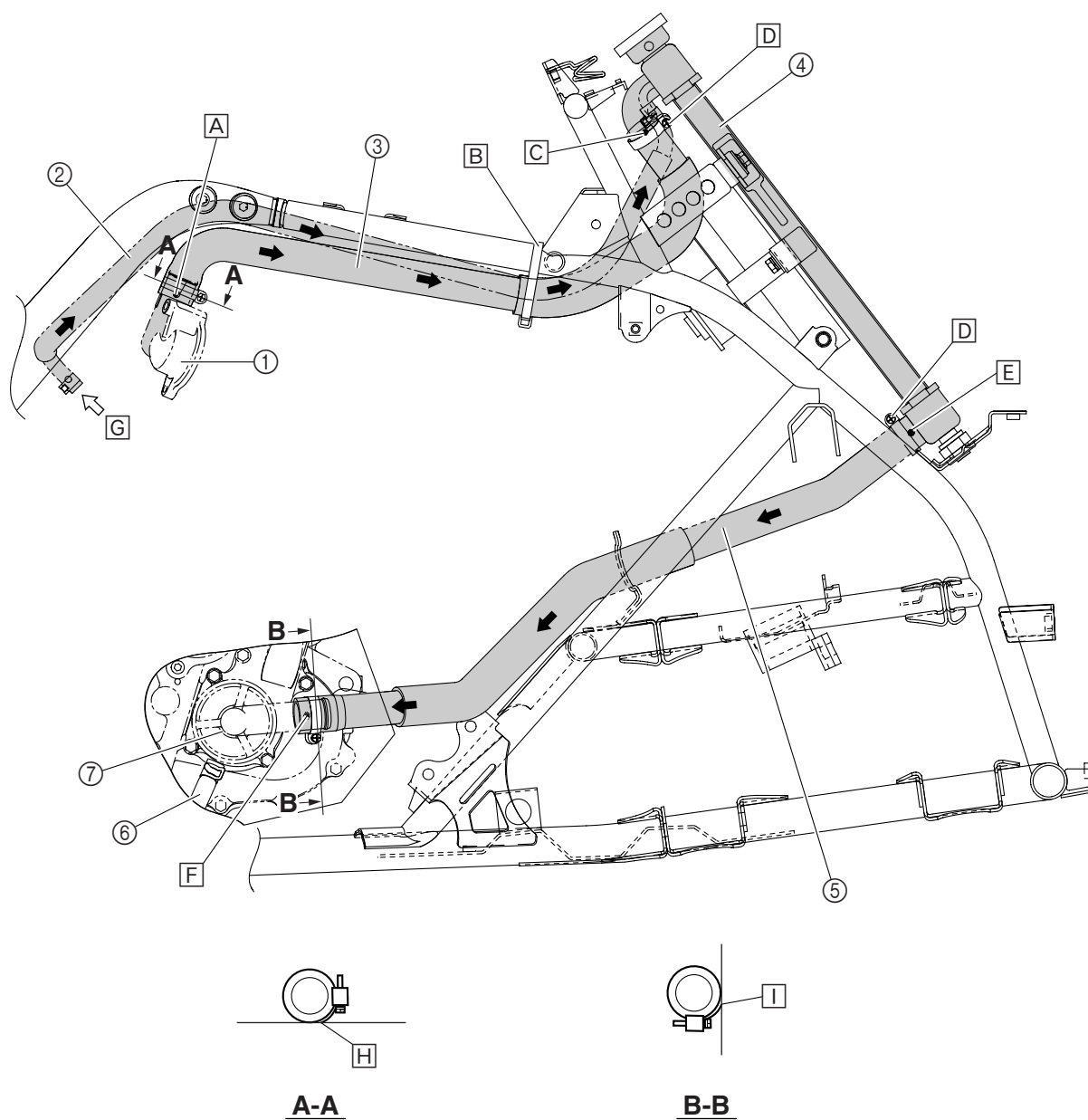


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COOLANT FLOW DIAGRAMS

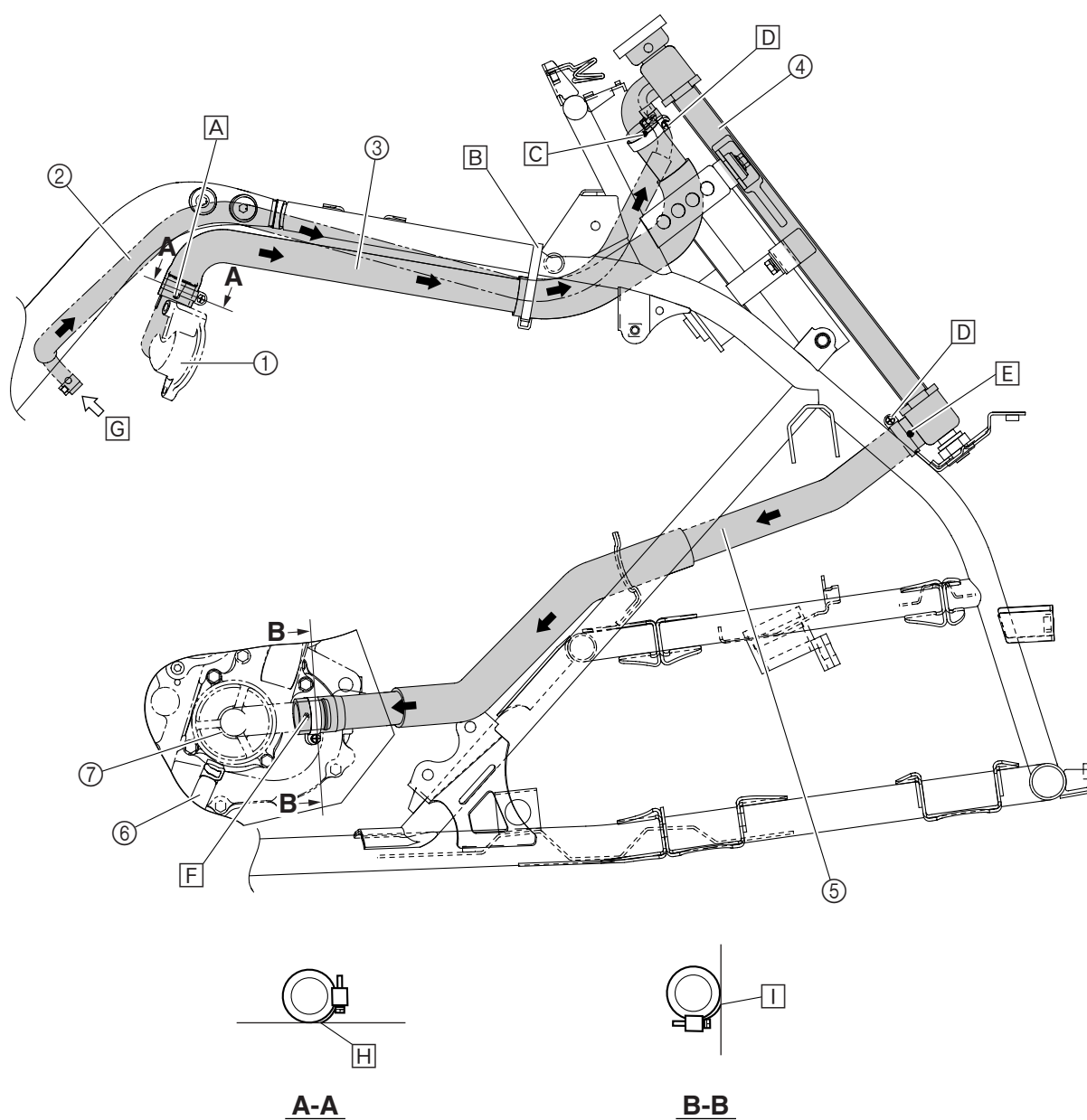
- ① Thermostat cover
- ② Fast idle plunger outlet hose
- ③ Radiator inlet hose
- ④ Radiator
- ⑤ Radiator outlet hose
- ⑥ Water pump breather hose
- ⑦ Water pump

- [A] Install the radiator inlet hose onto the thermostat cover pipe, making sure that it contacts the cover and its yellow paint mark is facing outward.
- [B] Fasten the fast idle plunger outlet hose and the radiator inlet hose with the plastic band.
- [C] Install the radiator inlet hose with its white paint mark facing outward.





- D** Position the screw clamp so that its screw can be tightened from the right side of the vehicle.
- E** Install the radiator outlet hose with its white paint mark facing outward.
- F** Install the radiator outlet hose with its yellow paint mark facing outward.
- G** From fast idle plunger
- H** Make sure that the end of the screw clamp does not protrude past the side of the radiator inlet hose.
- I** Make sure that the end of the screw clamp does not protrude past the side of the radiator outlet hose.



COOLANT FLOW DIAGRAMS

SPEC



- ① Radiator
- ② Radiator fan breather hose
- ③ Fuel tank shield
- ④ Coolant reservoir breather hose
- ⑤ Coolant reservoir
- ⑥ Coolant reservoir hose
- ⑦ Drain hose

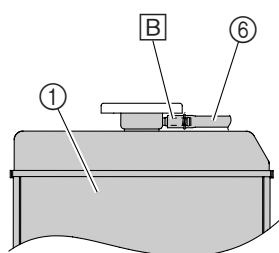
A Pass the radiator fan breather hose through the guide.

B Install the coolant reservoir hose onto the radiator pipe, making sure that it contacts the radiator.

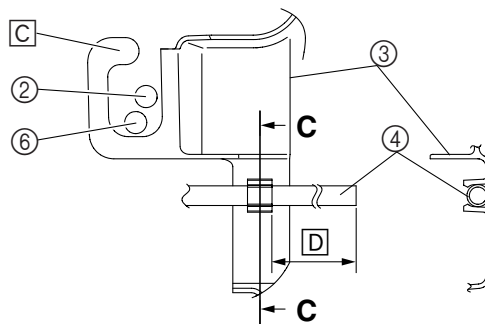
C Pass the coolant reservoir hose and radiator fan breather hose through the guide on the fuel tank shield.

D 60 mm (2.36 in)

E Pass the clamp through the hole in the stay on the frame, and then fasten the coolant reservoir hose and drain hose with the clamp.

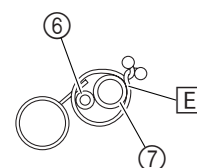


A

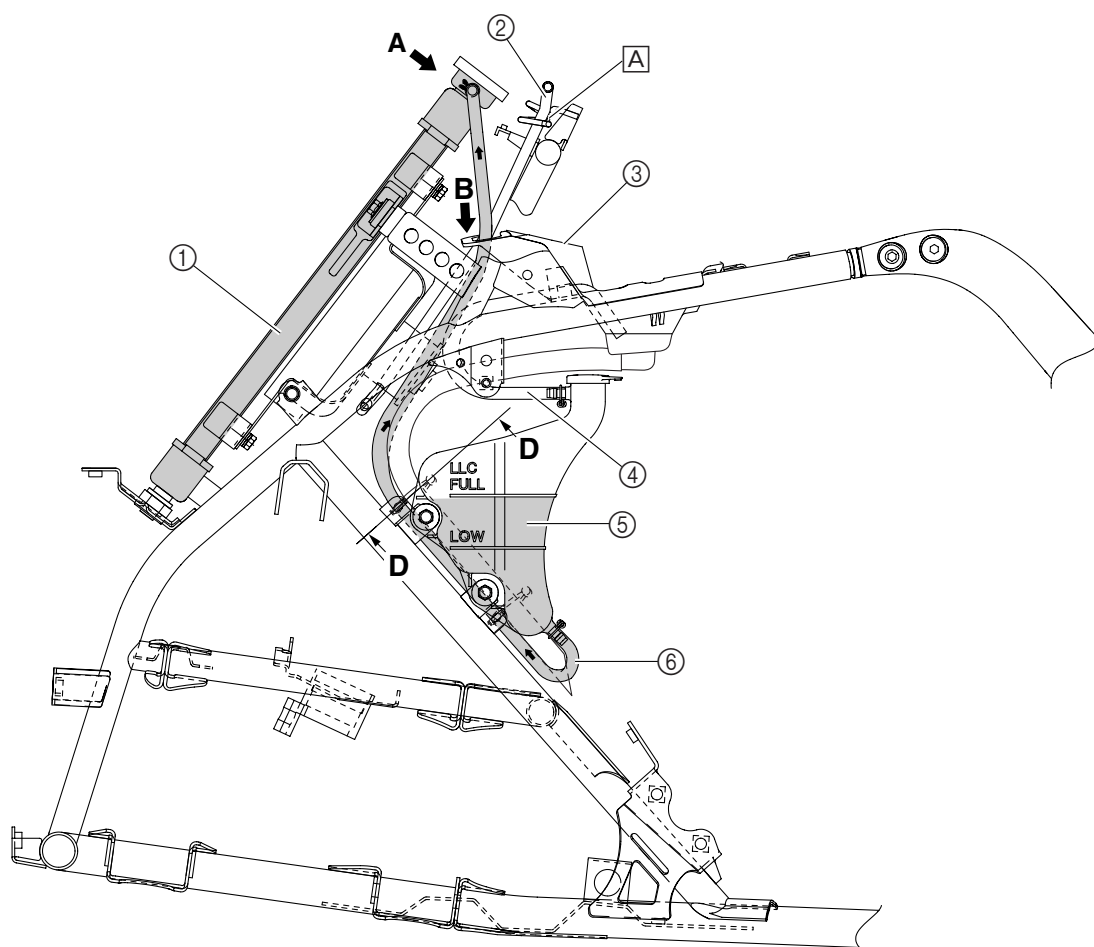


B

C-C



D-D



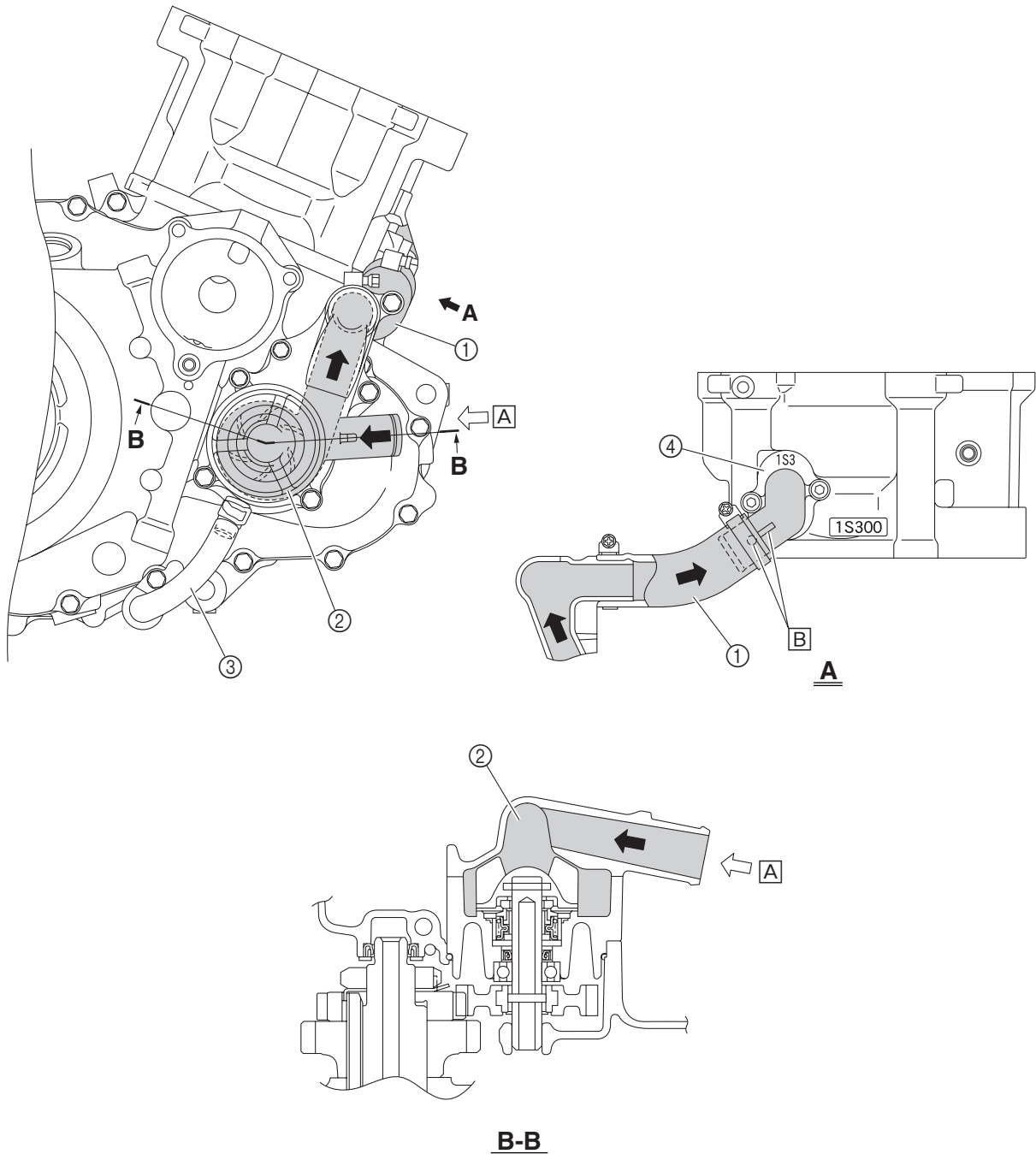
COOLANT FLOW DIAGRAMS

SPEC



- ① Water pump outlet hose
- ② Water pump
- ③ Water pump breather hose
- ④ Water jacket inlet housing

- A From radiator
- B Install the water pump outlet hose onto the water jacket inlet housing, making sure to align the yellow paint mark on the hose with the projection on the water jacket inlet housing.

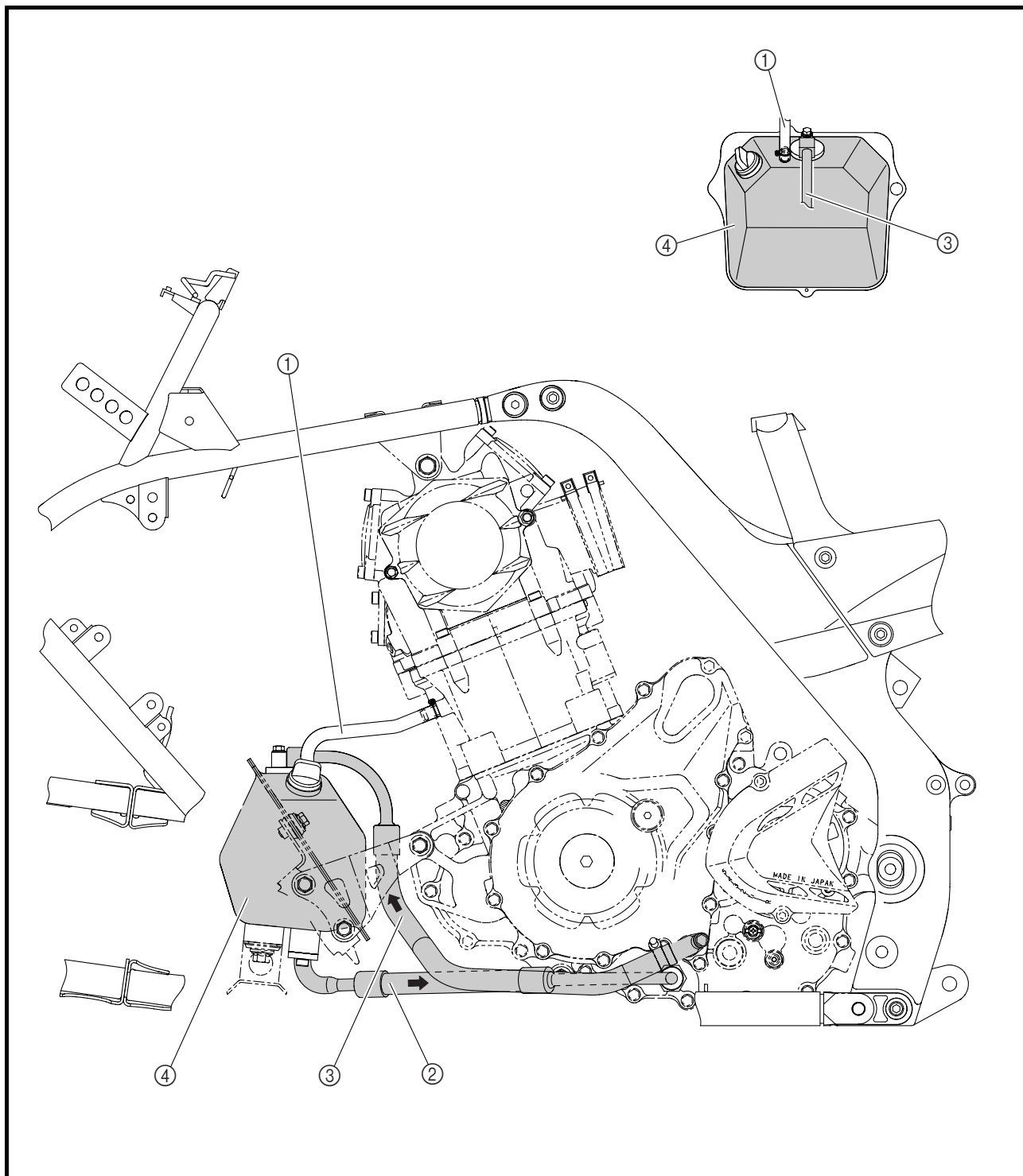




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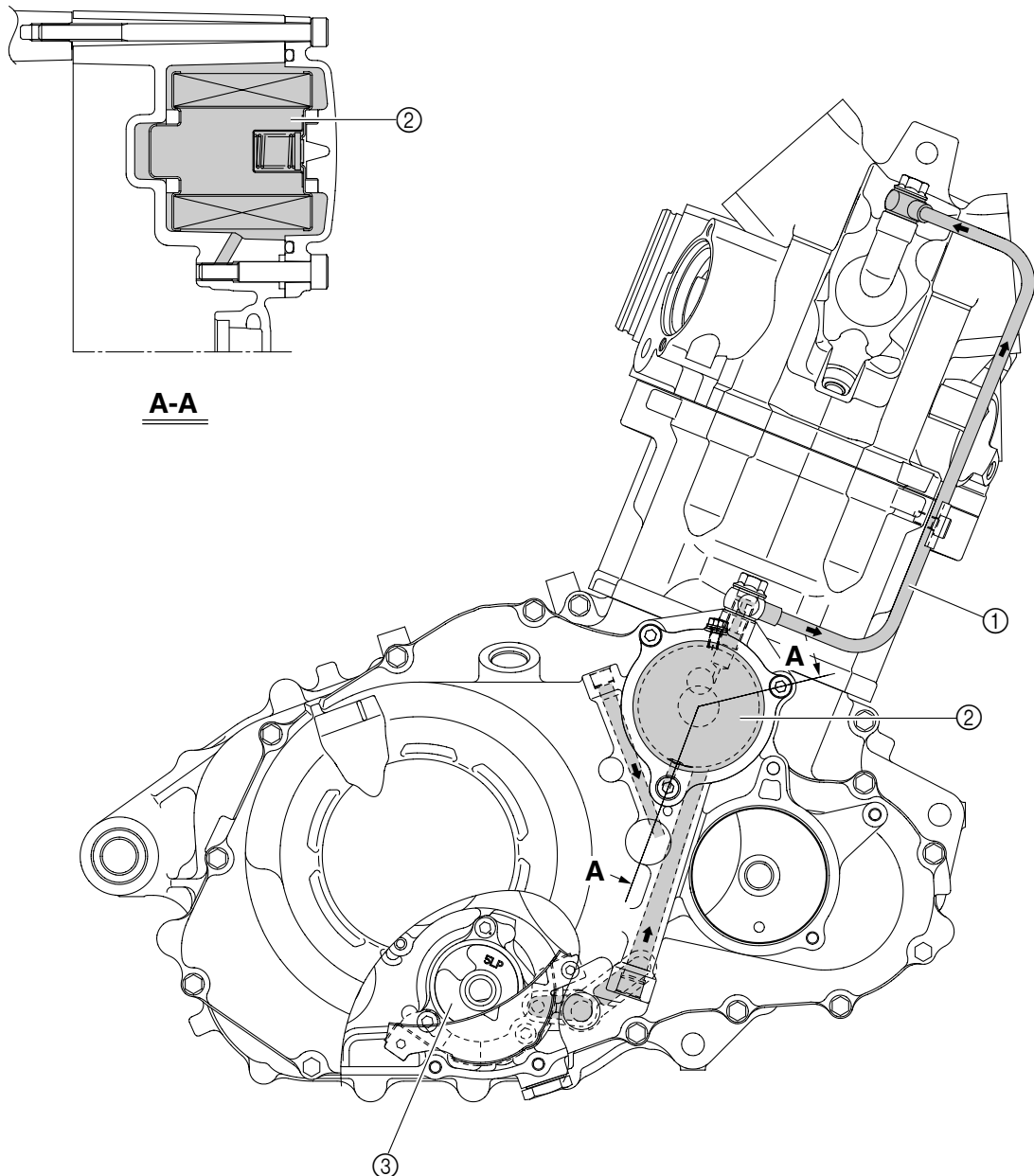
OIL FLOW DIAGRAMS

- ① Oil tank breather hose
- ② Oil tank outlet hose
- ③ Oil tank inlet hose
- ④ Oil tank



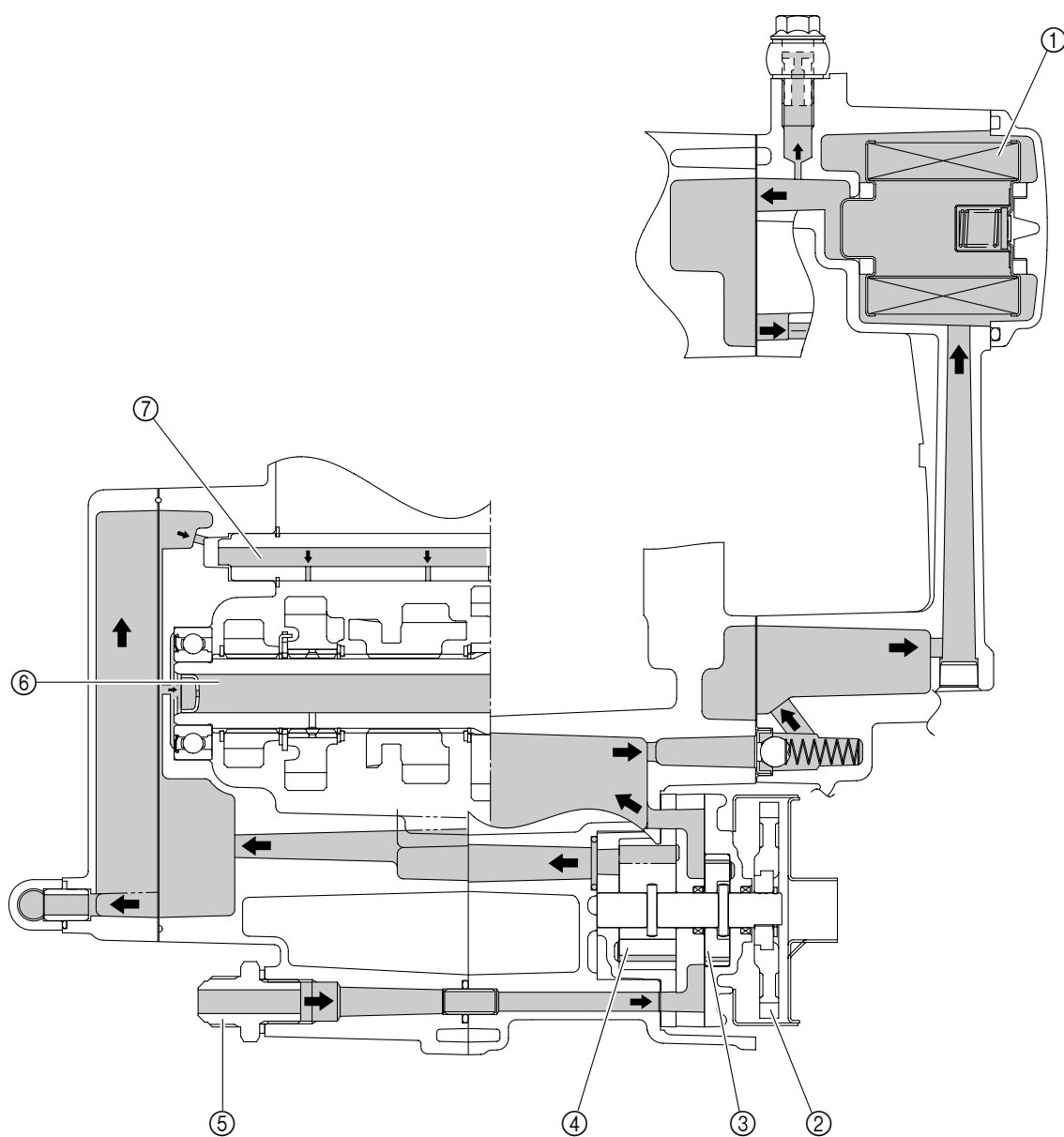


- ① Oil delivery pipe
- ② Oil filter
- ③ Oil pump





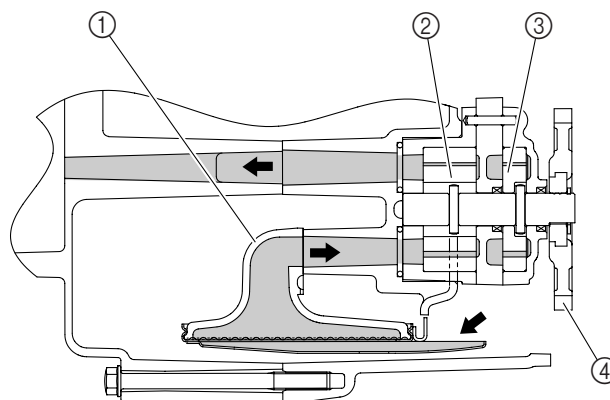
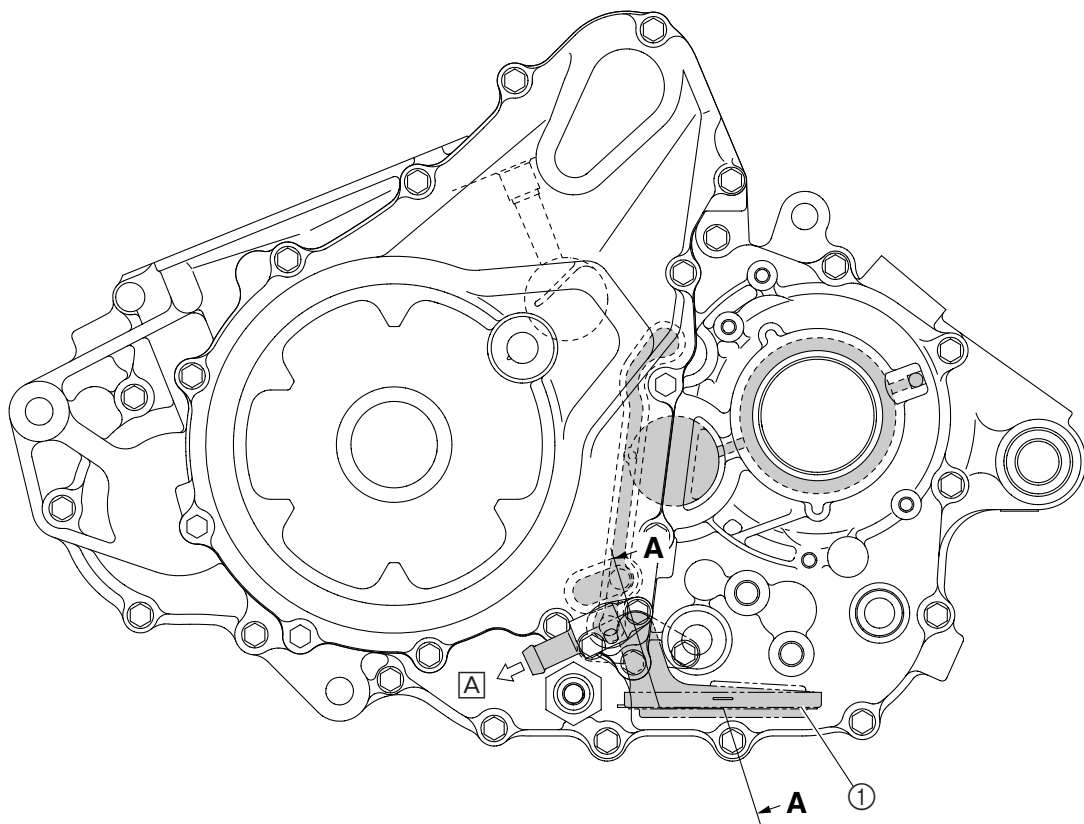
- ① Oil filter
- ② Oil pump driven gear
- ③ Oil pump rotor 1
- ④ Oil pump rotor 2
- ⑤ Oil pipe joint
- ⑥ Main axle
- ⑦ Counter axle





- ① Oil strainer
- ② Oil pump rotor 2
- ③ Oil pump rotor 1
- ④ Oil pump driven gear

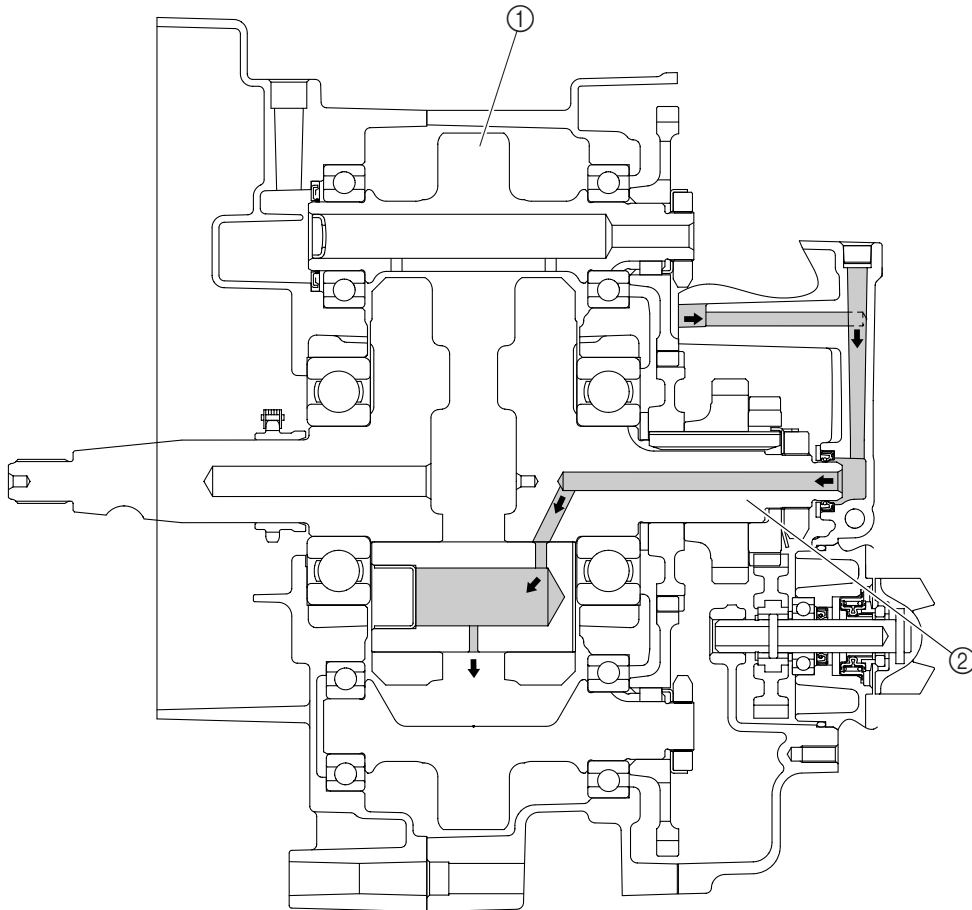
A To oil tank



A-A



- ① Balancer 1
- ② Crankshaft

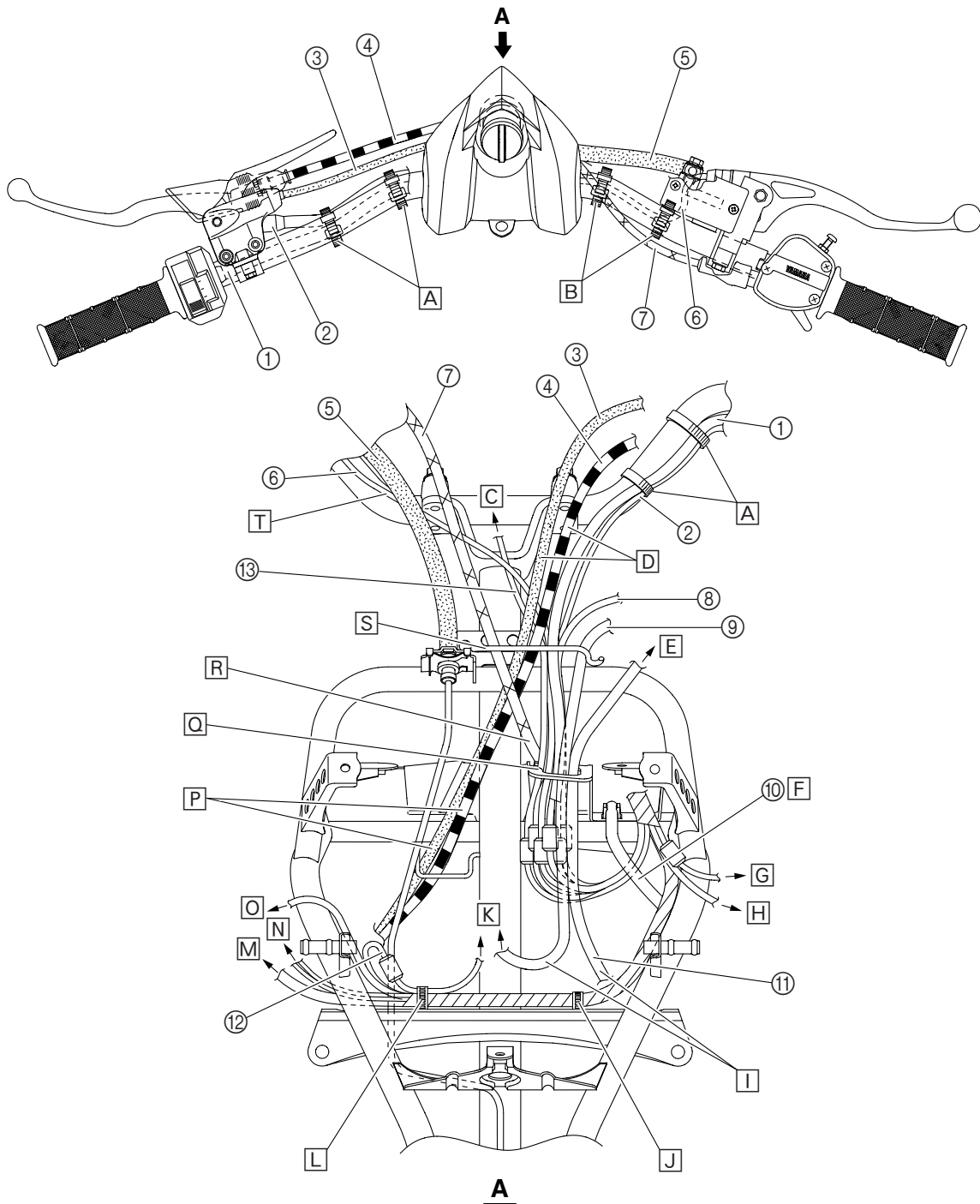




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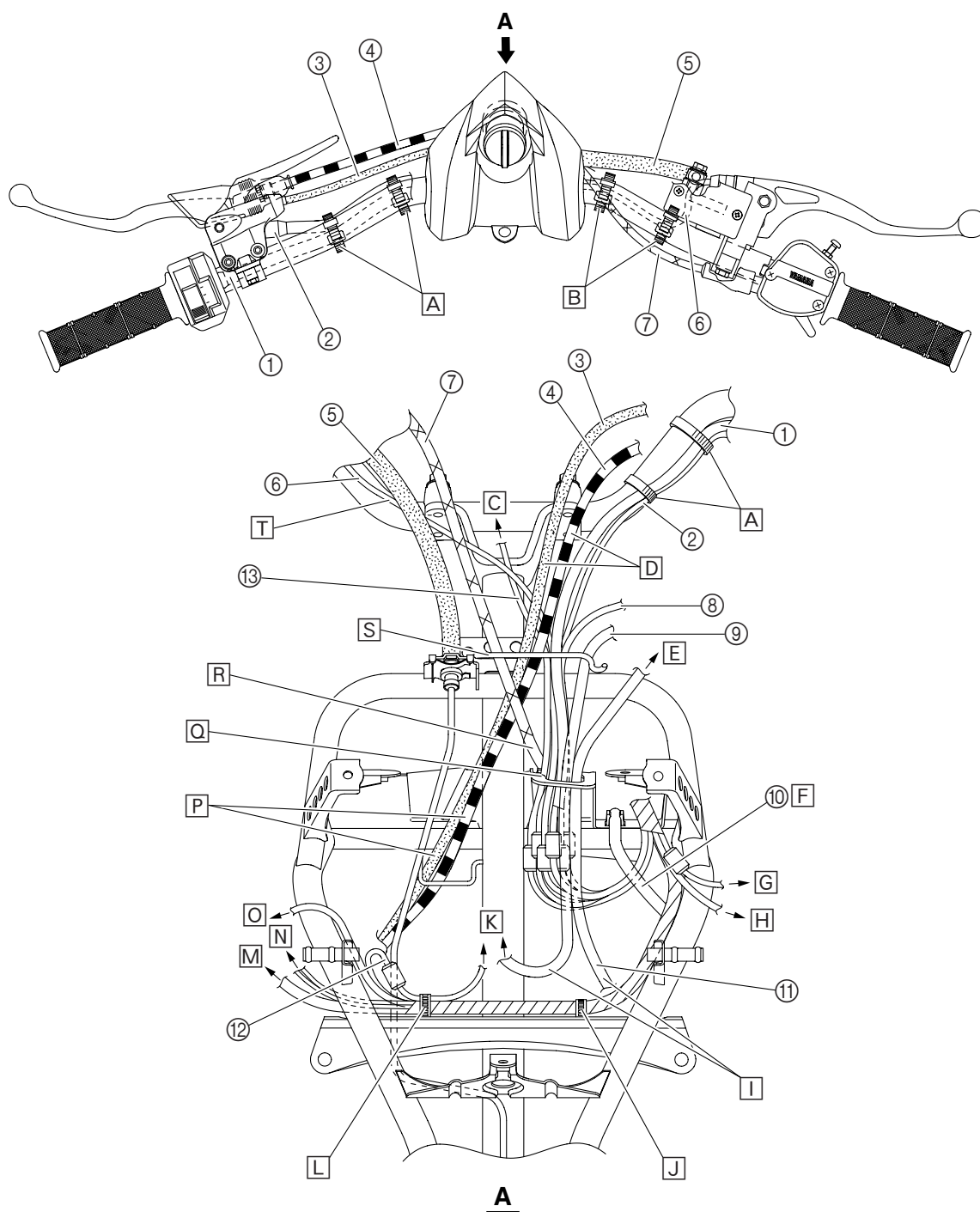
CABLE ROUTING

- | | |
|---------------------------------|-----------------------------------|
| ① Handlebar switch lead | ⑩ Coolant reservoir breather hose |
| ② Clutch switch lead | ⑪ Coolant reservoir hose |
| ③ Parking brake cable | ⑫ Radiator fan motor lead |
| ④ Clutch cable | ⑬ Main switch lead |
| ⑤ Front brake hose | |
| ⑥ Front brake light switch lead | |
| ⑦ Throttle cable | |
| ⑧ Indicator light assembly lead | |
| ⑨ Radiator fan breather hose | |



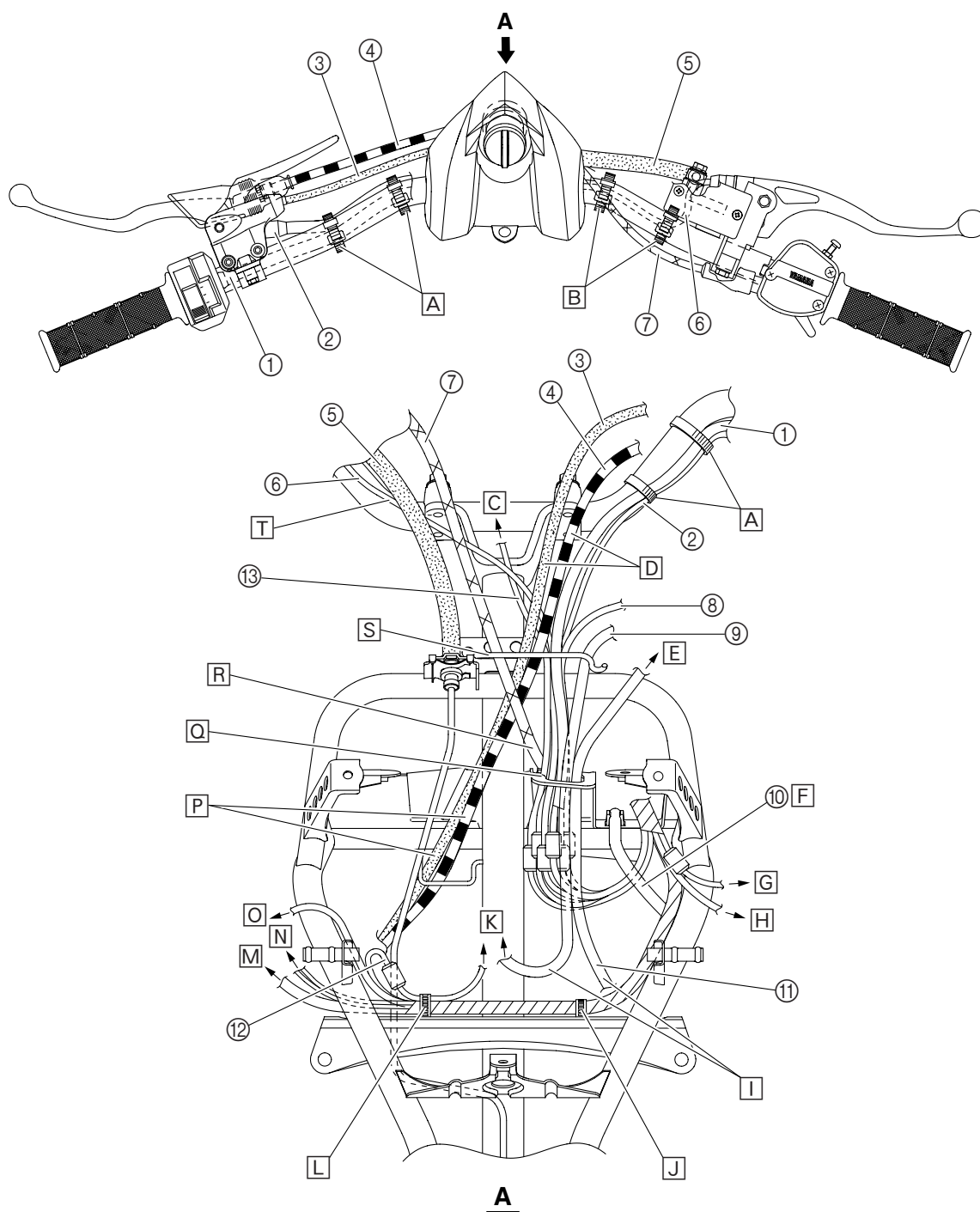


- [A] Fasten the handlebar switch lead and clutch switch lead with the plastic bands at the bends in the handlebar.
- [B] Fasten the front brake light switch lead with the plastic band at the bend in the handlebar.
- [C] To main switch
- [D] Route the parking brake cable and clutch cable in front of the front brake light switch and main switch lead.
- [E] To radiator
- [F] Route the coolant reservoir breather hose under the wire harness and over the handlebar switch lead, clutch switch lead, front brake light switch lead, main switch lead and indicator light assembly lead and then fasten the hose with the holder on the fuel tank shield.
- [G] To resistor
- [H] To left headlight





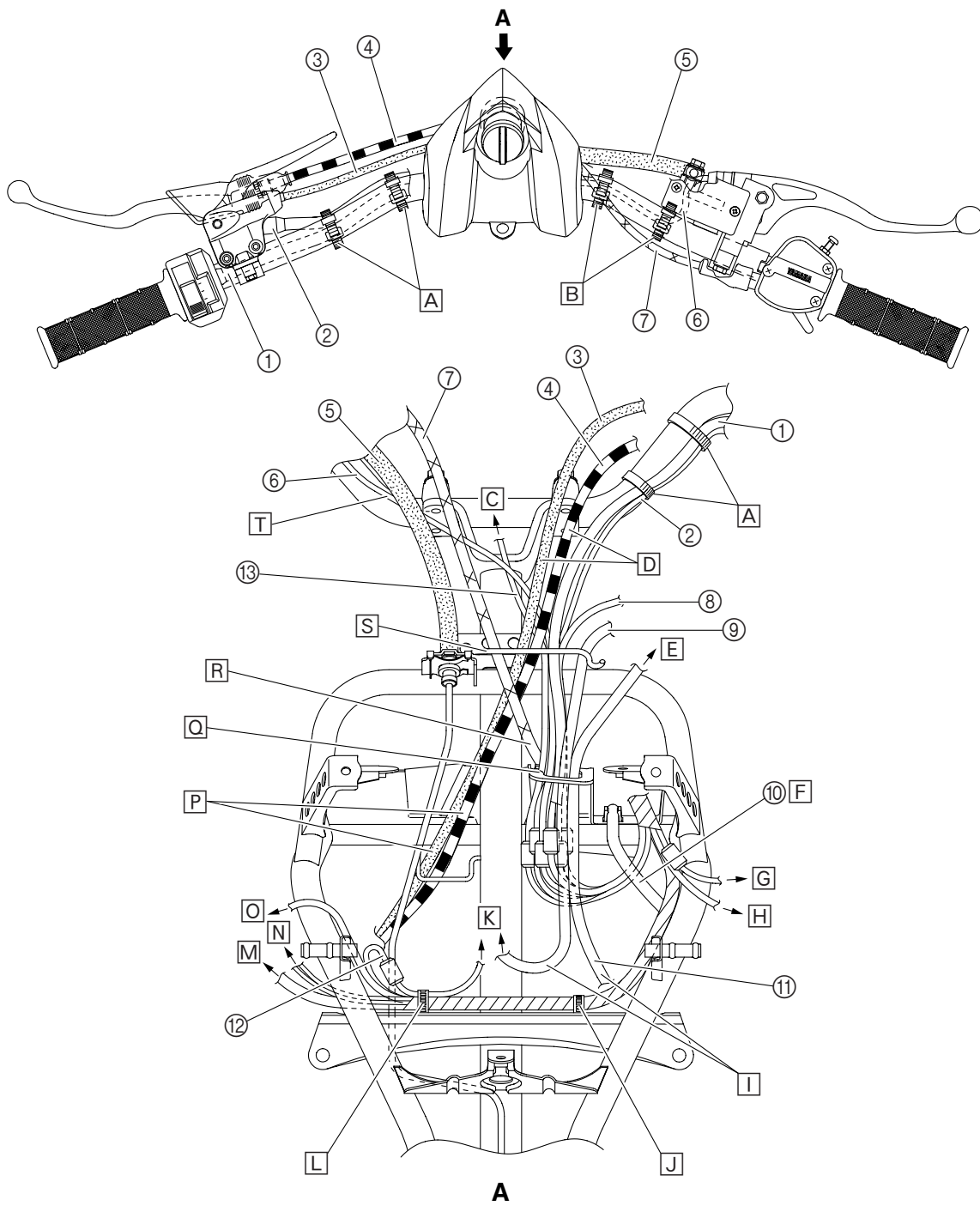
- I** Route the radiator fan breather hose and coolant reservoir hose in front of the front brake light switch lead, main switch lead, handlebar switch lead, clutch switch lead and indicator light assembly lead.
- J** Secure the plastic band by inserting the projection on the band into the hole in the frame, and then fasten the wire harness with the band, making sure to face the end of the band backward.
- K** To radiator fan
- L** Secure the plastic band by inserting the projection on the band into the hole in the frame, and then fasten the wire harness and radiator fan motor lead with the band, making sure to face the end of the band backward.
- M** To rectifier/regulator
- N** To ignition coil
- O** To right headlight
- P** Pass the clutch cable and parking brake cable through the wire guide.





- Q** Pass the radiator fan breather hose, coolant reservoir hose, front brake light switch lead, main switch lead, handlebar switch lead, clutch switch lead, and indicator light assembly lead through the guide on the fuel tank shield, and then connect the leads below the guide.
- R** Route the throttle cable in front of the clutch cable and parking brake cable.

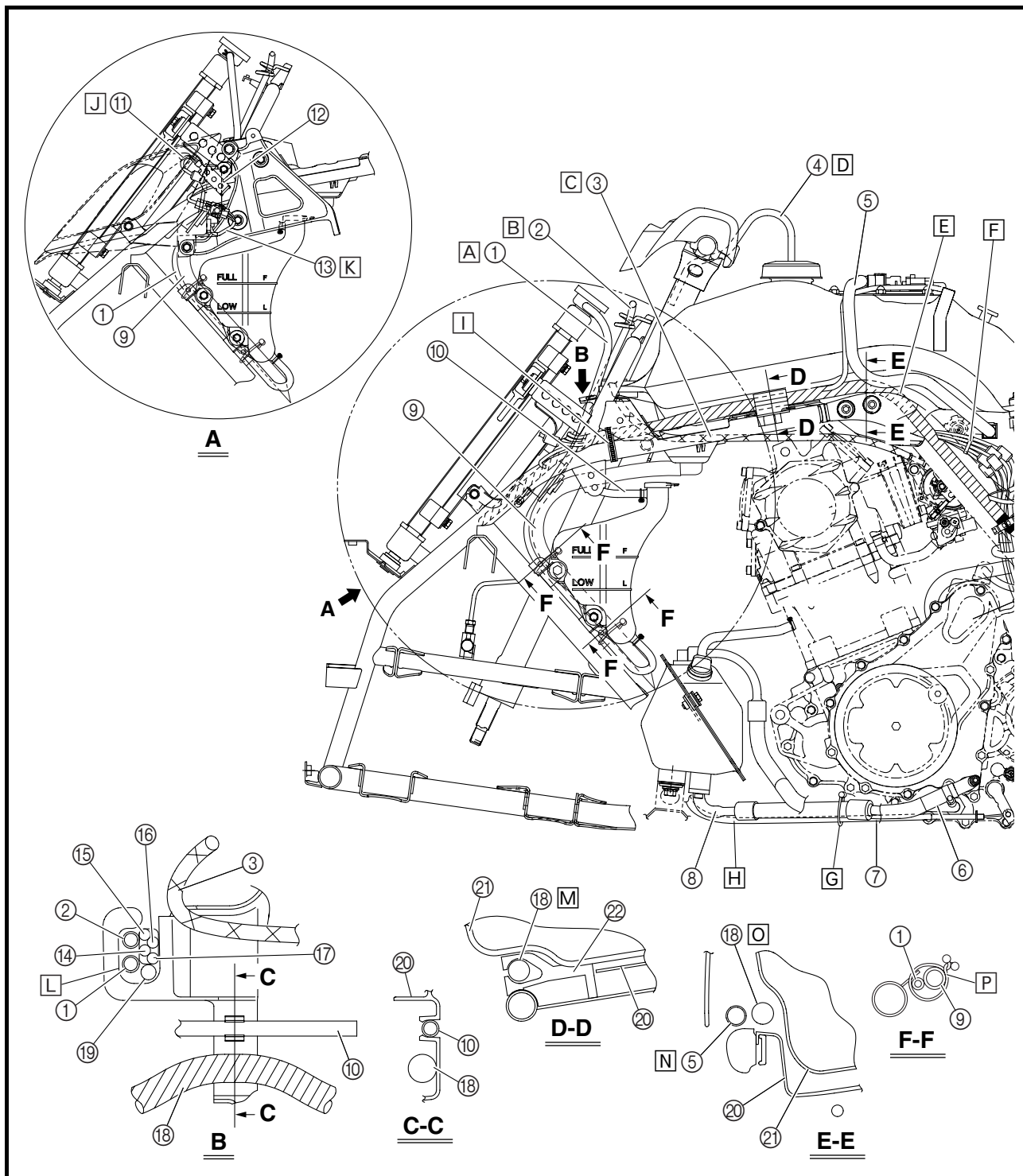
- S** Pass the throttle cable, clutch cable, parking brake cable, front brake light switch lead, main switch lead, handlebar switch lead, clutch switch lead, indicator light assembly lead and radiator fan breather hose through the wire guide.
- T** Route the front brake light switch lead behind the front brake hose and throttle cable.





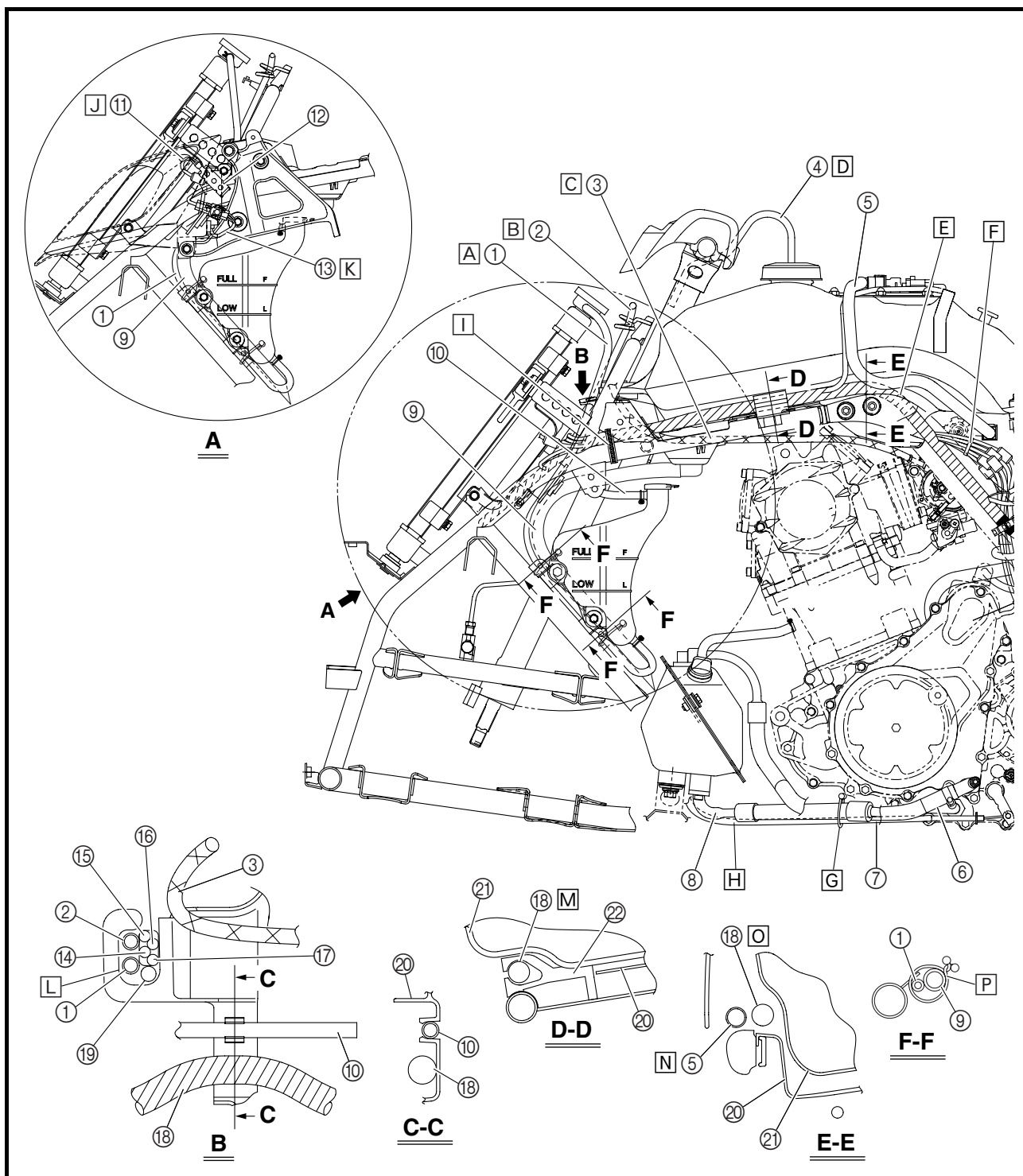
- ① Coolant reservoir hose
- ② Radiator fan breather hose
- ③ Throttle cable
- ④ Fuel tank breather hose
- ⑤ Fuel hose
- ⑥ Oil tank inlet hose
- ⑦ Reverse control cable
- ⑧ Oil tank outlet hose
- ⑨ Drain hose
- ⑩ Coolant reservoir breather hose
- ⑪ Resistor lead

- ⑫ Resistor
- ⑬ Headlight lead
- ⑭ Main switch lead
- ⑮ Handlebar switch lead
- ⑯ Clutch switch lead
- ⑰ Front brake light switch lead
- ⑱ Wire harness
- ⑲ Indicator assembly lead
- ⑳ Fuel tank shield
- ㉑ Fuel tank
- ㉒ Rubber damper





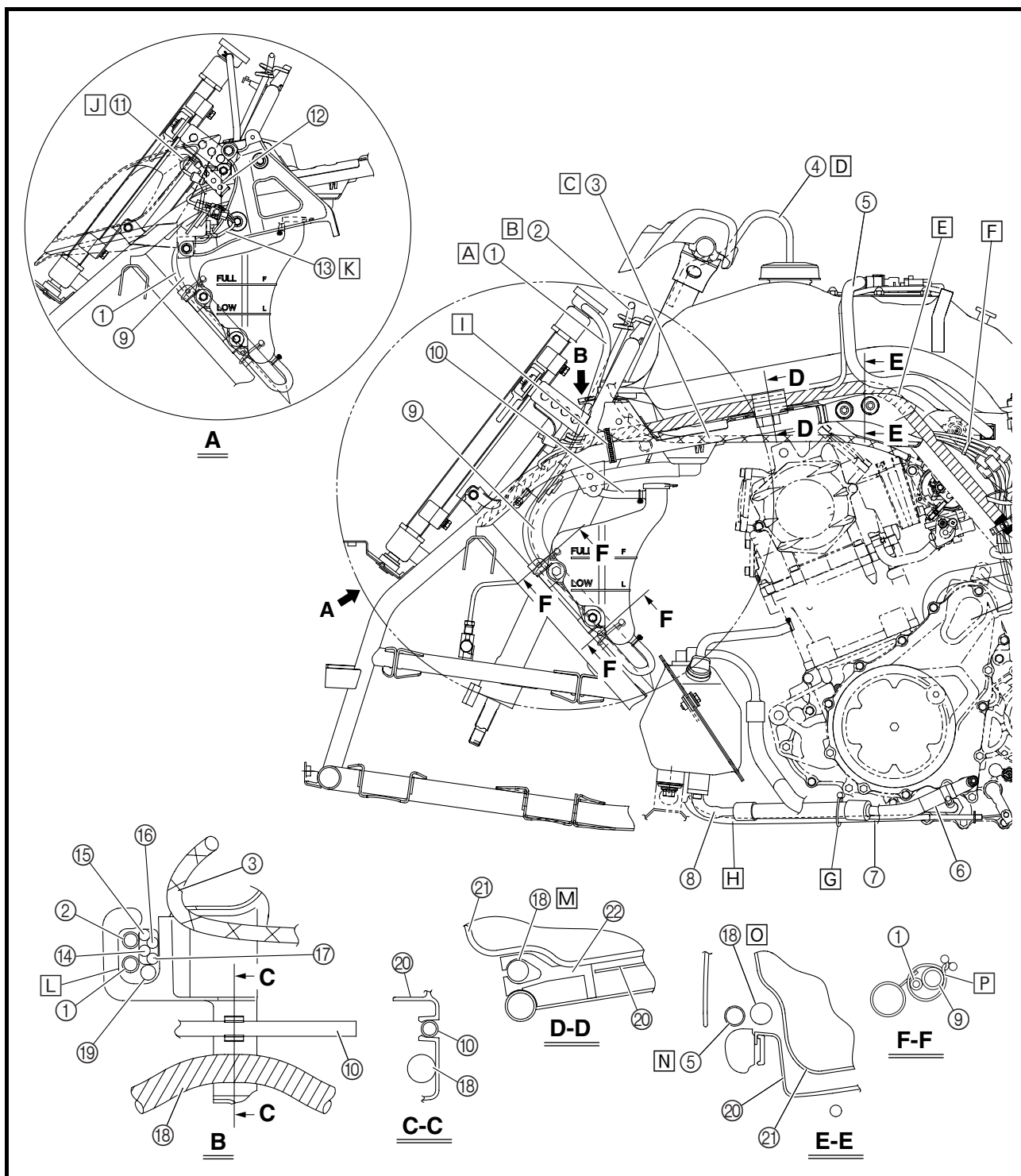
- A** Route the coolant reservoir hose in front of the radiator fan breather hose, and then connect it to the radiator.
- B** Pass the radiator fan breather hose through the wire guide.
- C** Route the throttle cable on top of the fuel tank shield.
- D** Pass the fuel tank breather hose through the hole in the handlebar cover, and then insert the end of the hose into the steering stem.
- E** Route the wire harness to the inside of the frame.
- F** Connect the A.C. magneto lead, wire sub lead, rear brake switch lead, and speed sensor lead, and then fasten the leads with the plastic band. Face the end of the plastic band inward.
- G** Fasten the oil tank outlet hose and reverse control cable with the clamp, making sure that the reverse control cable does not contact the edge of the engine stay.





- [H] Route the reverse control cable under the oil tank outlet hose.
- [I] Pass the plastic band through the space between the frame and the frame support, and then fasten the wire harness to the frame with the band, making sure to face the end of the band inward.

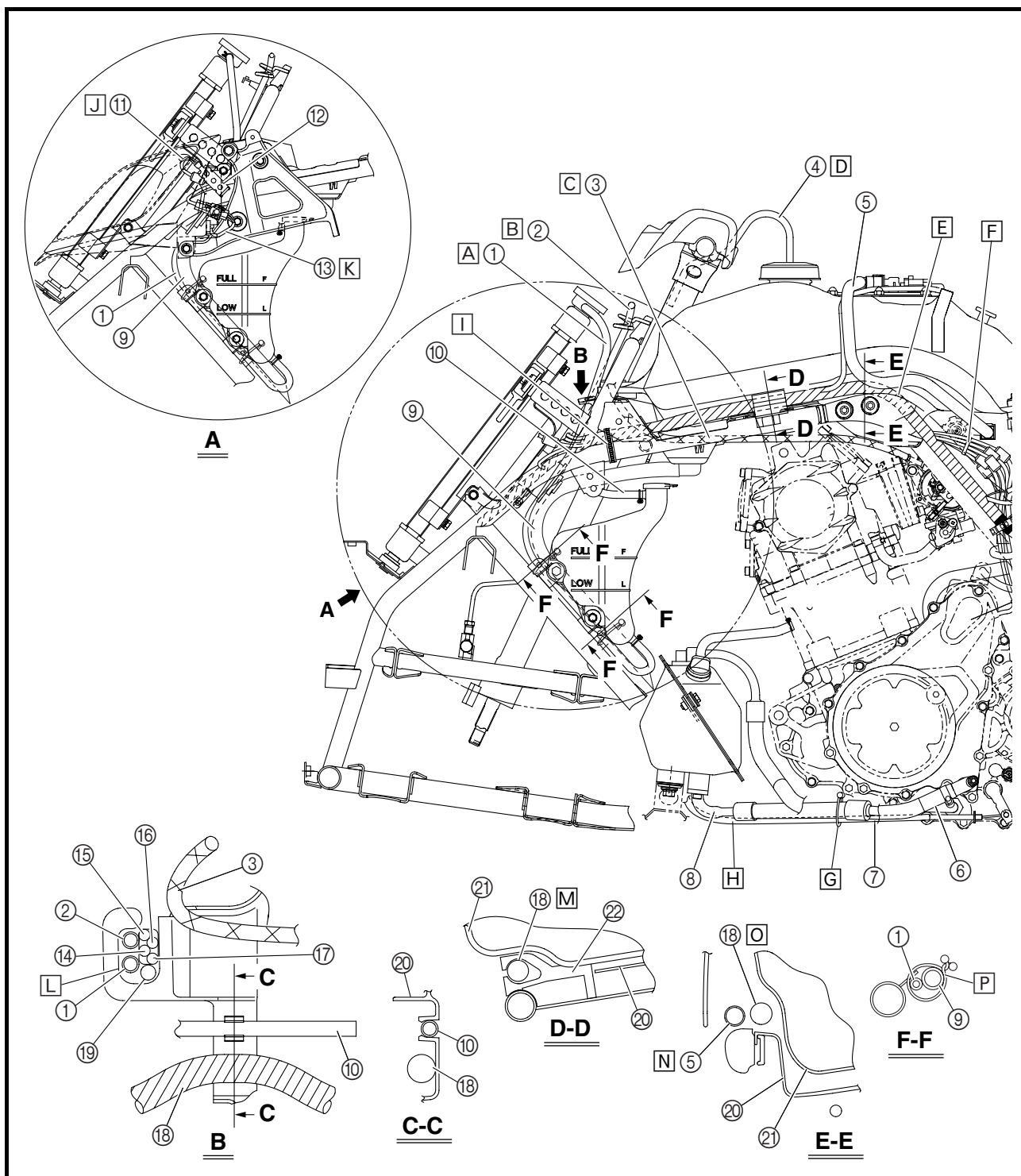
- [J] Route the resistor lead over the frame, making sure that its coupler is positioned to the inside of the frame.
- [K] Route the headlight lead over the frame, connect the headlight coupler, and then insert the projection on the coupler into the hole in the stay on the front fender bracket.





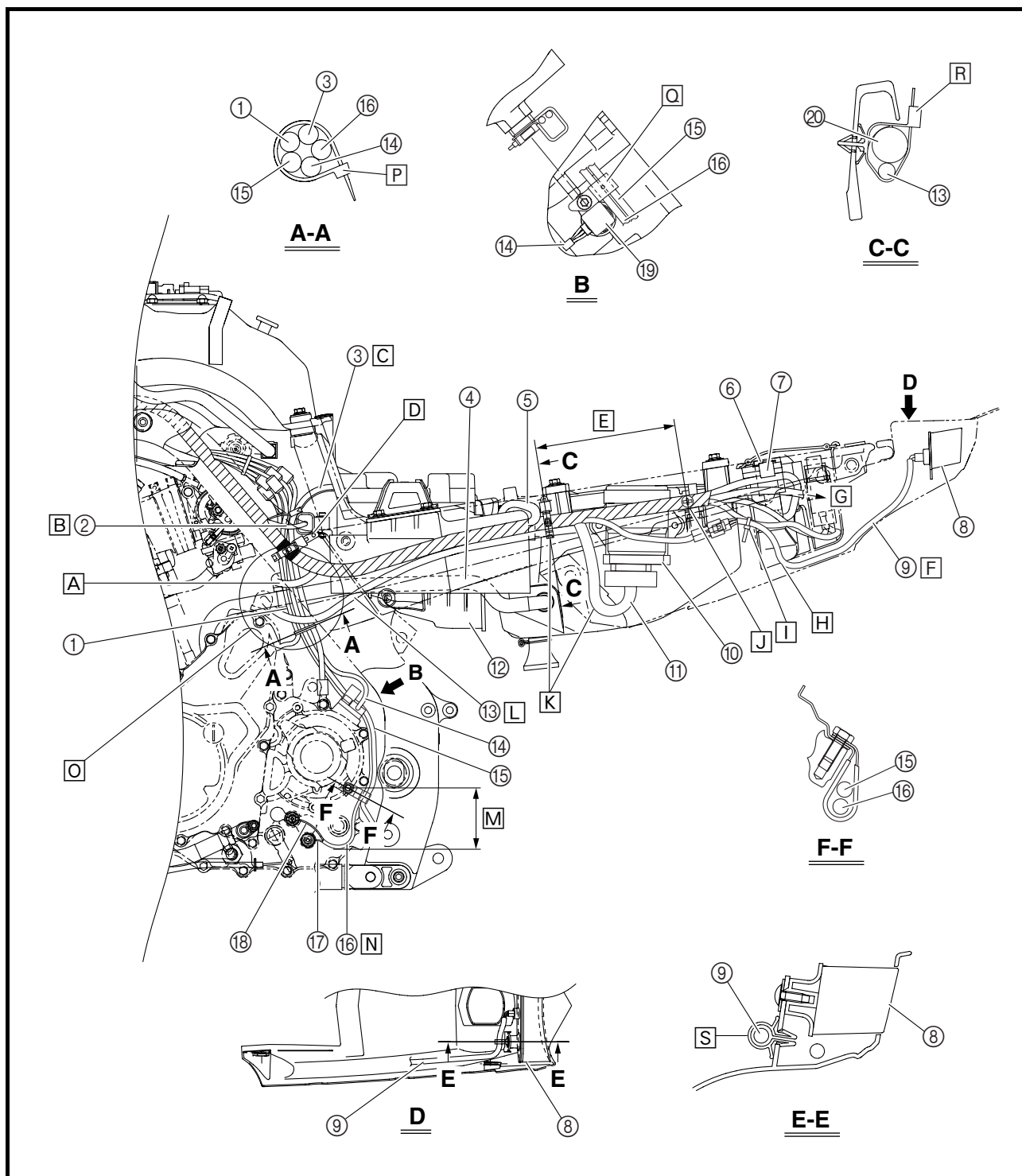
L Pass the radiator fan breather hose and coolant reservoir hose, then the front brake light switch lead, main switch lead, handlebar switch lead, clutch switch lead, and indicator light assembly lead through the guide on the fuel tank shield, making sure to route the hoses in front of leads. Do not pinch or crush the radiator fan breather hose or coolant reservoir hose. Route the indicator light assembly lead to the left of the other leads.

M Pass the wire harness through the rubber damper.
N Route the fuel hose to the outside of the wire harness.
O Route the wire harness above the fuel tank shield.
P Pass the clamp through the hole in the stay on the frame, and then fasten the coolant reservoir hose and drain hose with the clamp.



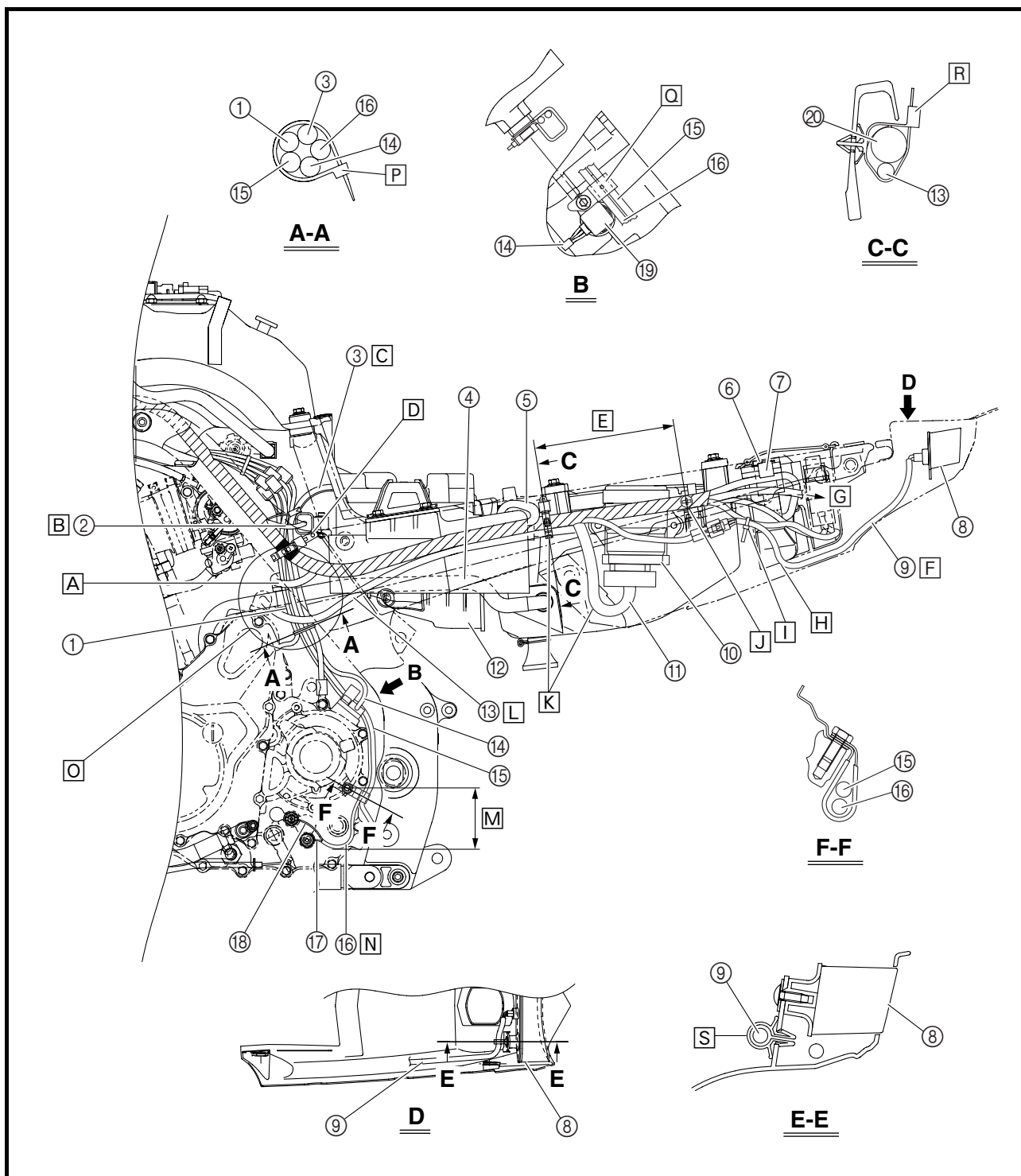


- | | |
|------------------------------|--------------------------------|
| ① A.C. magneto lead | ⑫ Battery box |
| ② Lean angle sensor lead | ⑬ Starter motor lead |
| ③ Negative battery lead | ⑭ Speed sensor lead |
| ④ Crankcase breather hose | ⑮ Rear brake light switch lead |
| ⑤ Starter relay lead | ⑯ Wire sub lead |
| ⑥ Relay unit | ⑰ Reverse switch lead |
| ⑦ Self-diagnosis signal lead | ⑱ Neutral switch lead |
| ⑧ Tail/brake light | ⑲ Speed sensor |
| ⑨ Tail/brake light lead | ⑳ Wire harness |
| ⑩ ECU | |
| ⑪ ECU lead | |





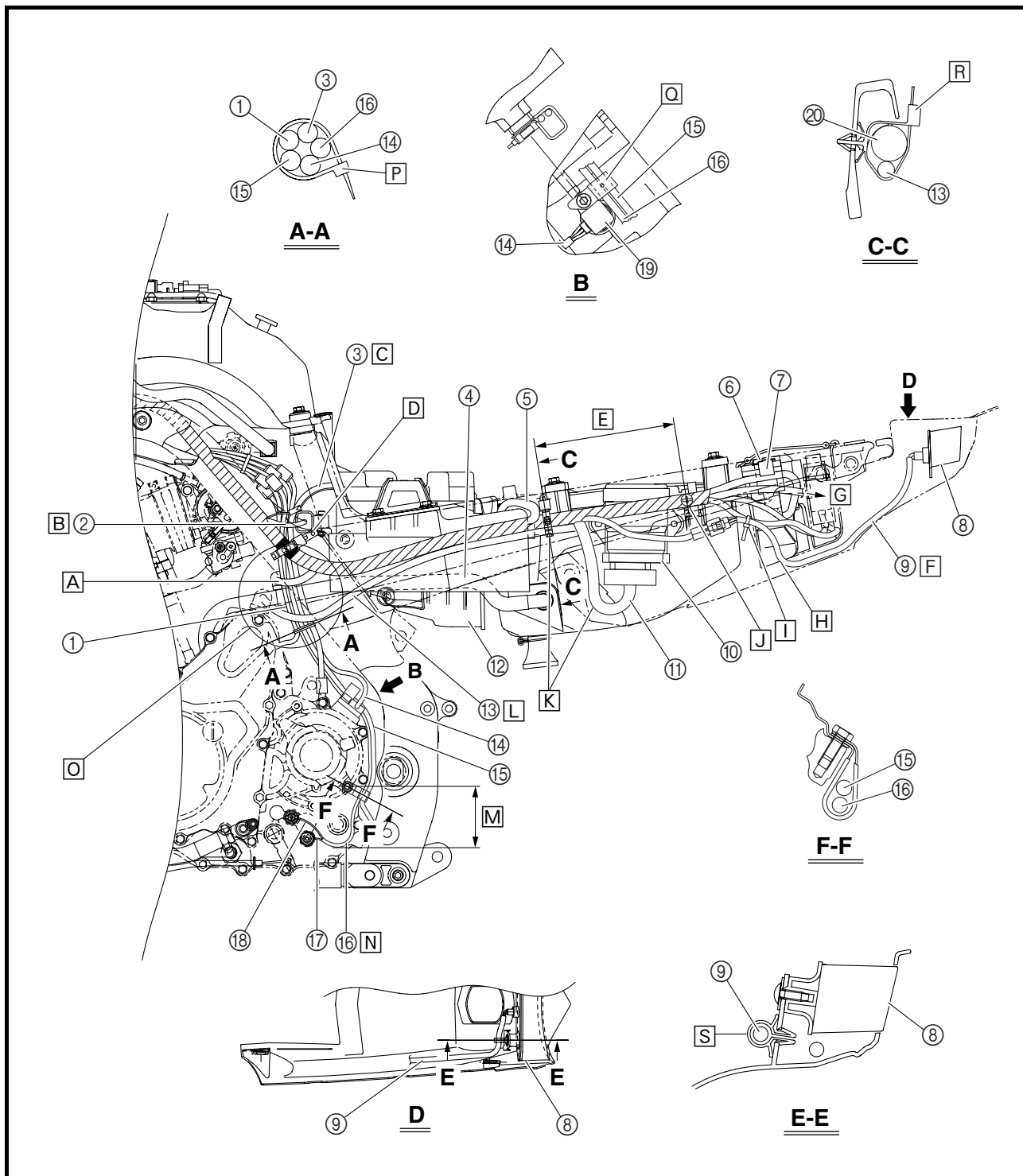
- A** Route the leads that branch off from the wire harness over the crankcase breather hose, then towards the right side of the vehicle, making sure that they do not contact the frame.
- B** Route the lean angle sensor lead to the outside of the A.C. magneto lead, negative battery lead, wire sub lead, rear brake light switch lead, and speed sensor lead.
- C** Connect the negative battery lead to the negative battery terminal.
- D** Secure the plastic band by inserting the projection on the band into the hole in the frame, and then fasten the wire harness at the center of its positioning tape with the band, making sure that the end of the band faces rearward and the leads that branch off from the wire harness do not contact the frame.
- E** Make sure that there is no slack in the wire harness in the area shown in the illustration.





- [F] When installing the tail/brake light cover and rear fender, be sure not to pinch the tail/brake light lead between the frame and the cover.
- [G] To fuse box
- [H] Make sure that the tail/brake light lead is not pulled taut when installing the rear fender.

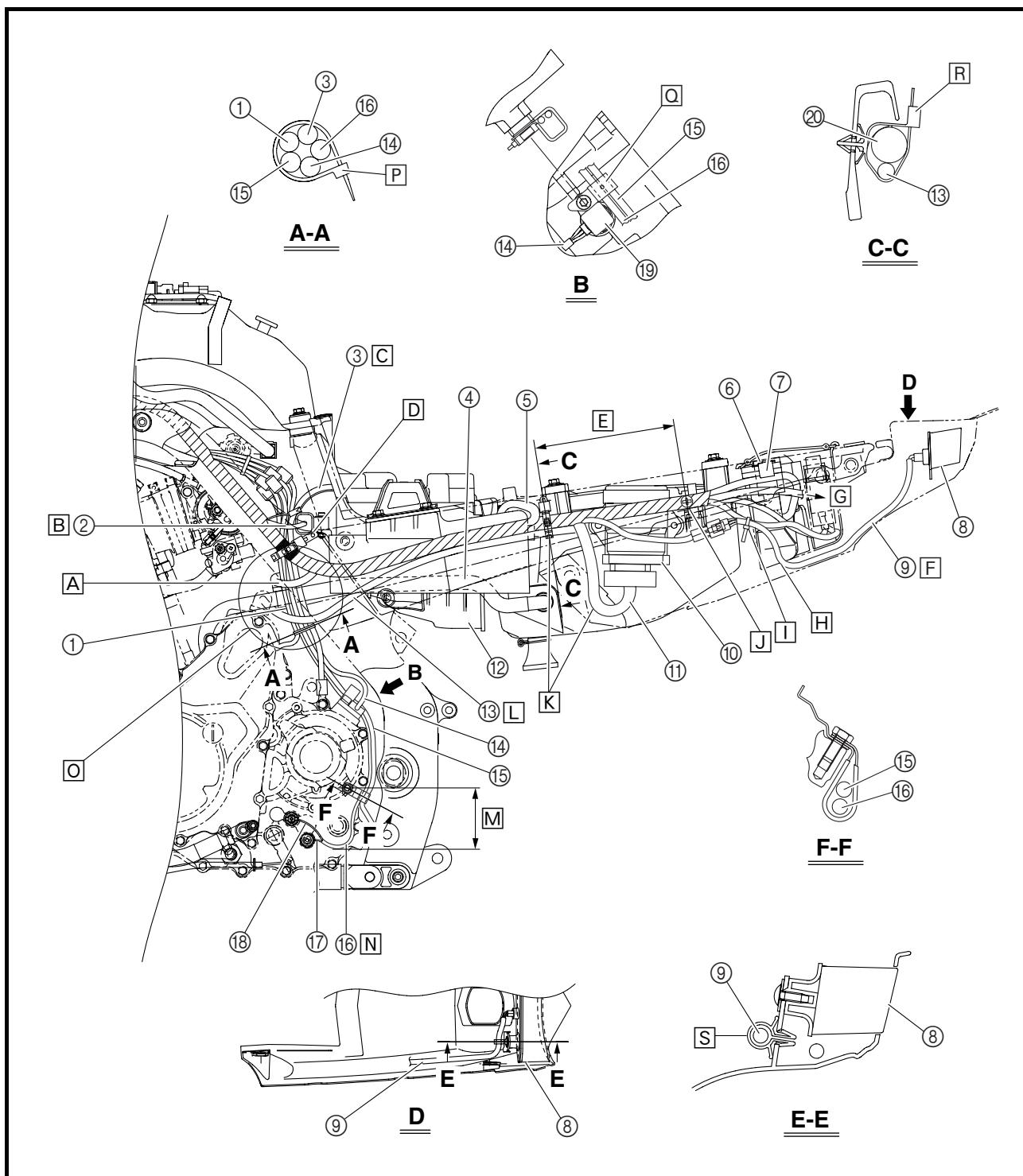
- [I] Fasten the radiator fan motor relay lead and tail/brake light lead with the plastic band, making sure to face the end of the band downward. Fasten the leads near the tail/brake light coupler and after the split in the wire harness, making sure to install the plastic band around the protective sleeve of the tail/brake light lead, not the lead itself.





- [J] Secure the plastic band by inserting the projection on the band into the hole in the frame.
- [K] Fasten the wire harness with the plastic band so that the ECU lead is routed downward.
- [L] Route the starter motor lead between the frame and the battery box, then under the crankcase breather hose.
- [M] Make sure that there is not excessive slack in the wire sub lead in the area shown in the illustration.

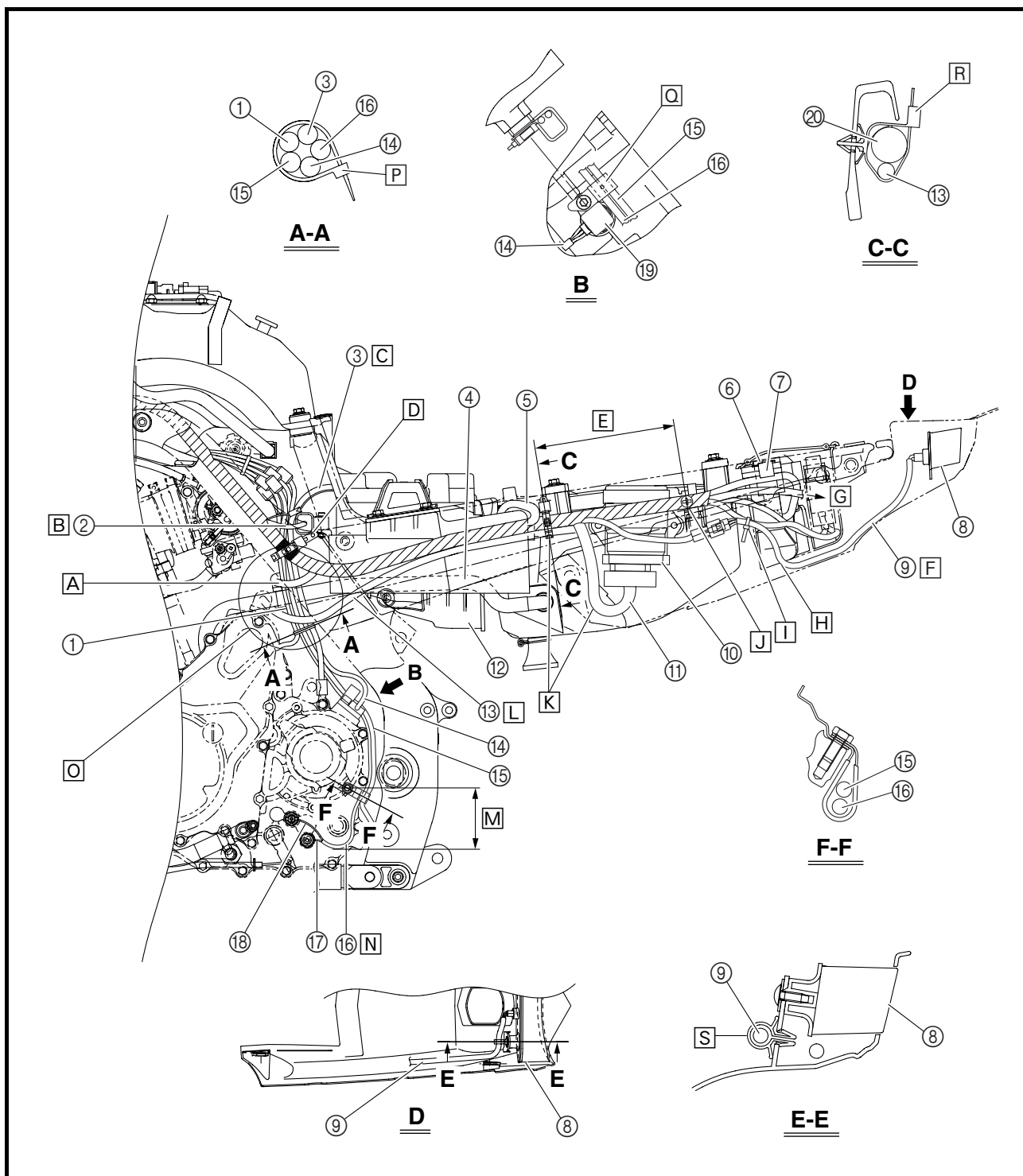
- [N] Route the wire sub lead as shown in the illustration. The longer lead past the end of the protective sleeve is the neutral switch lead and the shorter lead is the reverse switch lead.
- [O] Route the A.C. magneto lead, negative battery lead, wire sub lead, rear brake light switch lead, and speed sensor lead between the crankcase breather hose and the starter motor lead, and to the rear of the leads that branch off from the wire harness.





- [P] Fasten the speed sensor lead, rear brake light switch lead, A.C. magneto lead, negative battery lead and wire sub lead with the plastic band. Face the end of the plastic band inward.
- [Q] Fasten the rear brake light switch lead and wire sub lead with the holder.

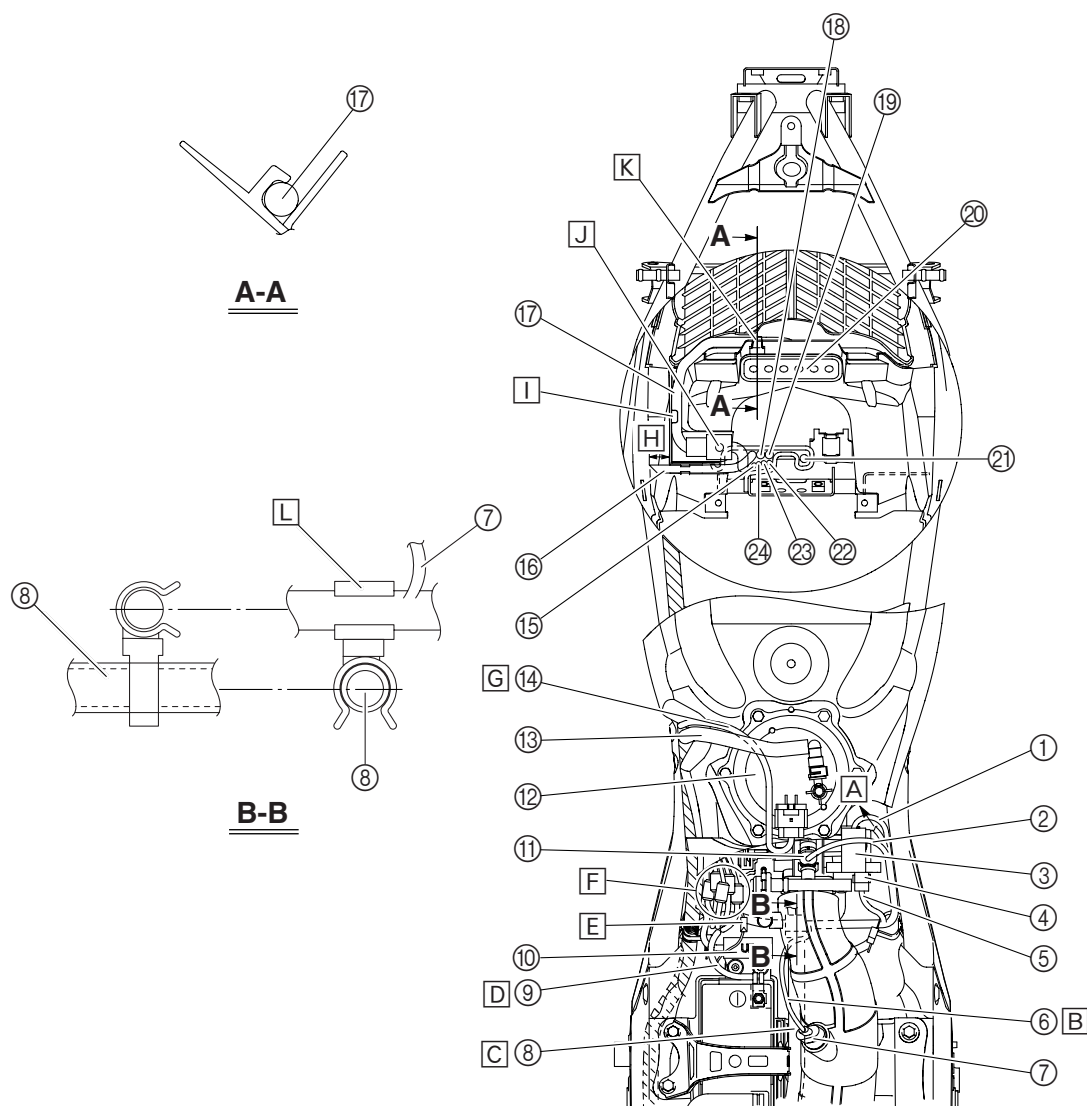
- [R] Secure the plastic band by inserting the projection on the band into the hole in the frame, and then fasten the wire harness and starter motor lead with the band, making sure to face the end of the band upward and to fasten the wire harness between the sections where the starter relay lead and ECU lead branch off from the wire harness.
- [S] Fasten the tail/brake light lead with the plastic band.



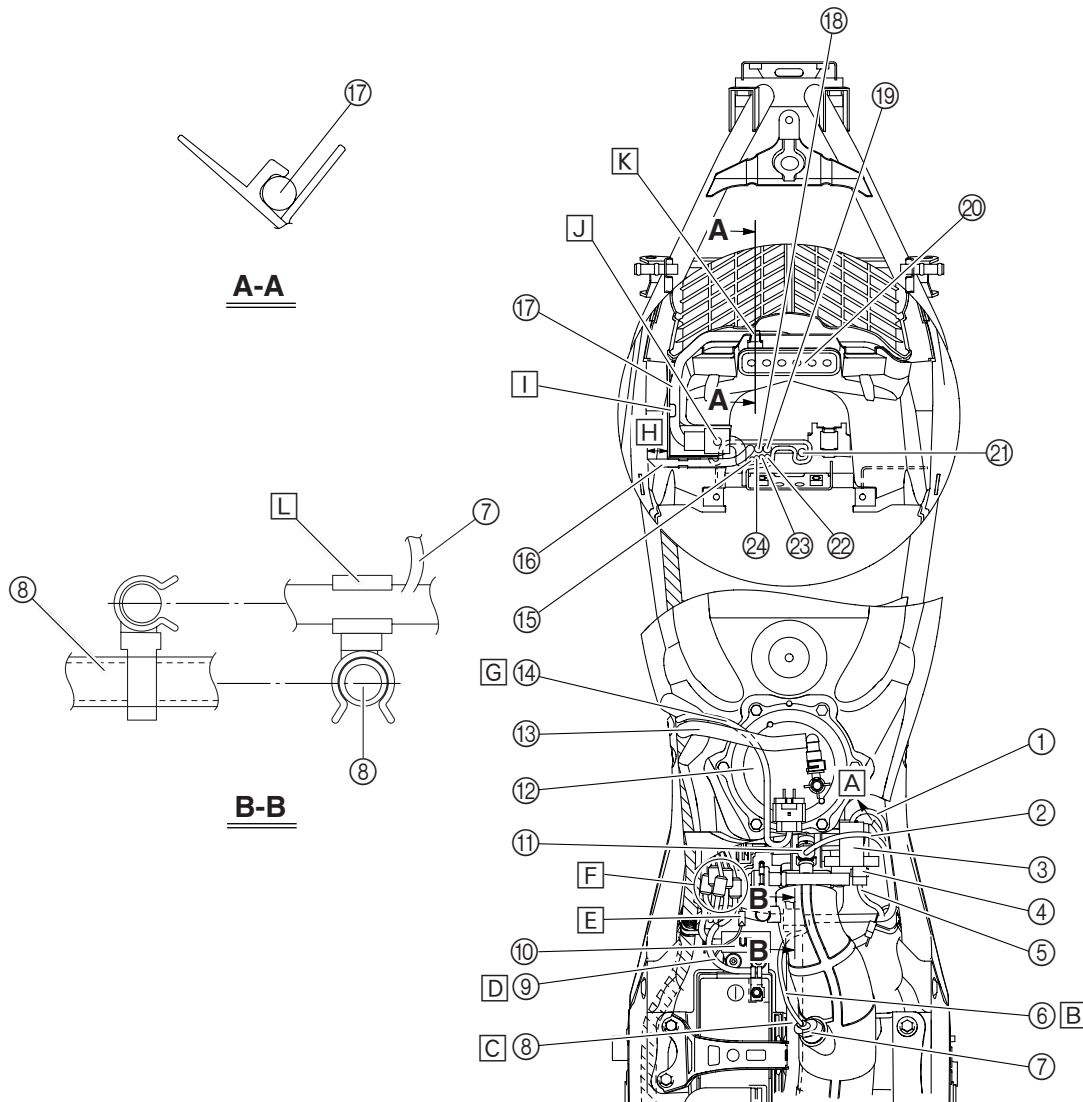


- ① Intake air pressure sensor lead
- ② Fuel injector lead
- ③ Intake air pressure sensor
- ④ Throttle position sensor
- ⑤ Throttle position sensor lead
- ⑥ Intake air temperature sensor lead
- ⑦ Intake air temperature sensor
- ⑧ Crankcase breather hose
- ⑨ Negative battery lead
- ⑩ Lean angle sensor
- ⑪ Fuel injector

- ⑫ Fuel pump
- ⑬ Fuel hose
- ⑭ Fuel pump lead
- ⑮ Front brake light switch lead
- ⑯ Radiator fan breather hose
- ⑰ Indicator light assembly lead
- ⑱ Clutch cable
- ⑲ Parking brake cable
- ⑳ Indicator light assembly
- ㉑ Throttle cable
- ㉒ Handlebar switch lead

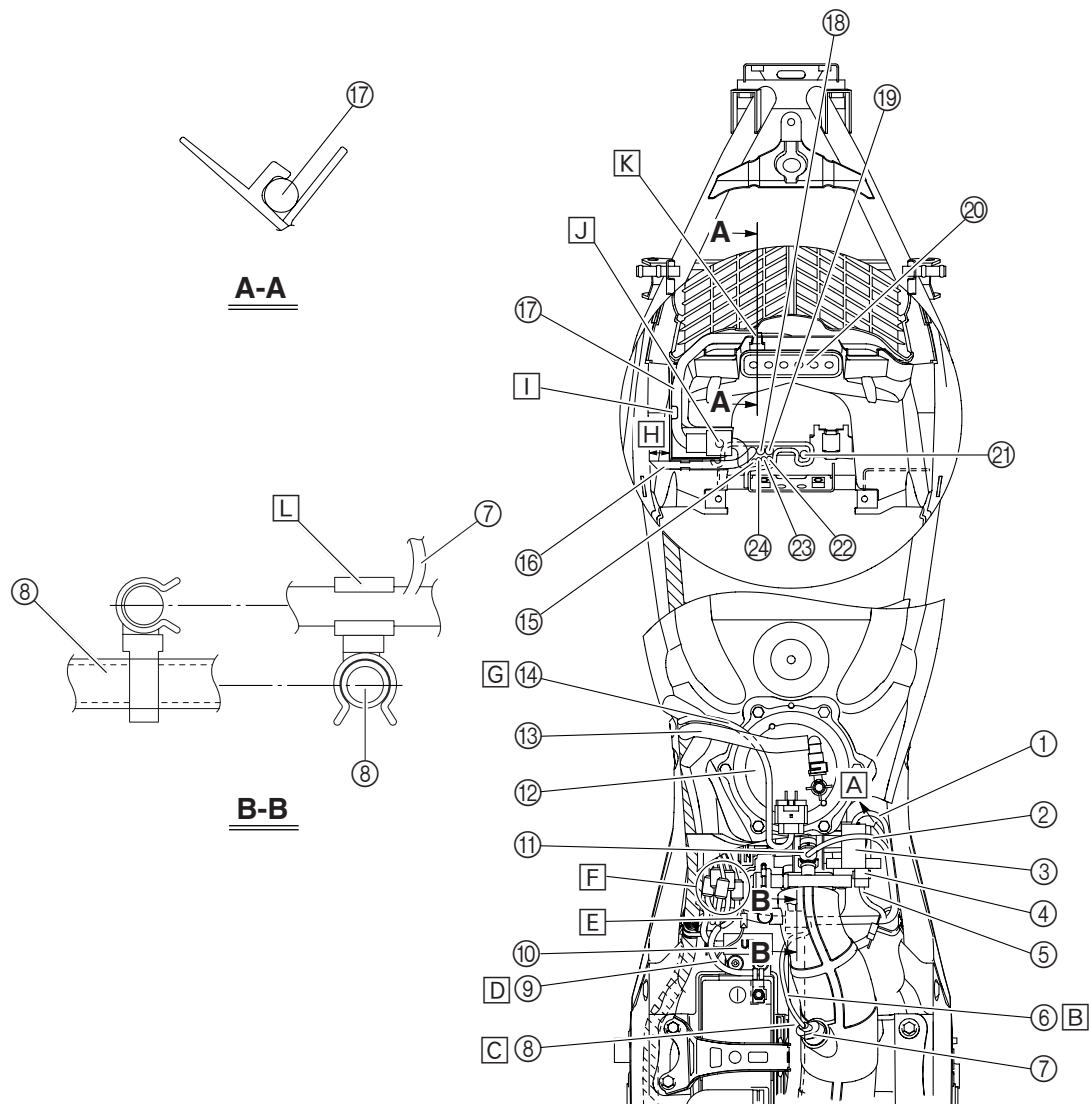


- ②③ Clutch switch lead
- ②④ Main switch lead
- Ⓐ To coolant temperature sensor
- Ⓑ Leave some slack in the intake air temperature sensor lead in the area shown in the illustration.
- Ⓒ Route the crankcase breather hose between the battery box and the air filter joint, and under the wire harness.
- Ⓓ Route the negative battery lead between the lean angle sensor and the wire harness.
- Ⓔ Route the negative battery lead connector as shown.
- Ⓕ Connect the A.C. magneto lead, wire sub lead, rear brake switch lead, and speed sensor lead in front of the lean angle sensor.
- Ⓖ Route the fuel pump lead under the fuel hose.
- Ⓗ 10 mm (0.39 in)
- Ⓘ Pass the indicator light assembly lead through the guide on the front fender.
- ⓵ Insert the projection on the indicator light assembly coupler into the hole in the front fender.





- [K] Pass the indicator light assembly lead through the guide on the radiator cover.
- [L] Fasten the leads with the holder at the section before the intake air temperature sensor lead branches off from the other leads.

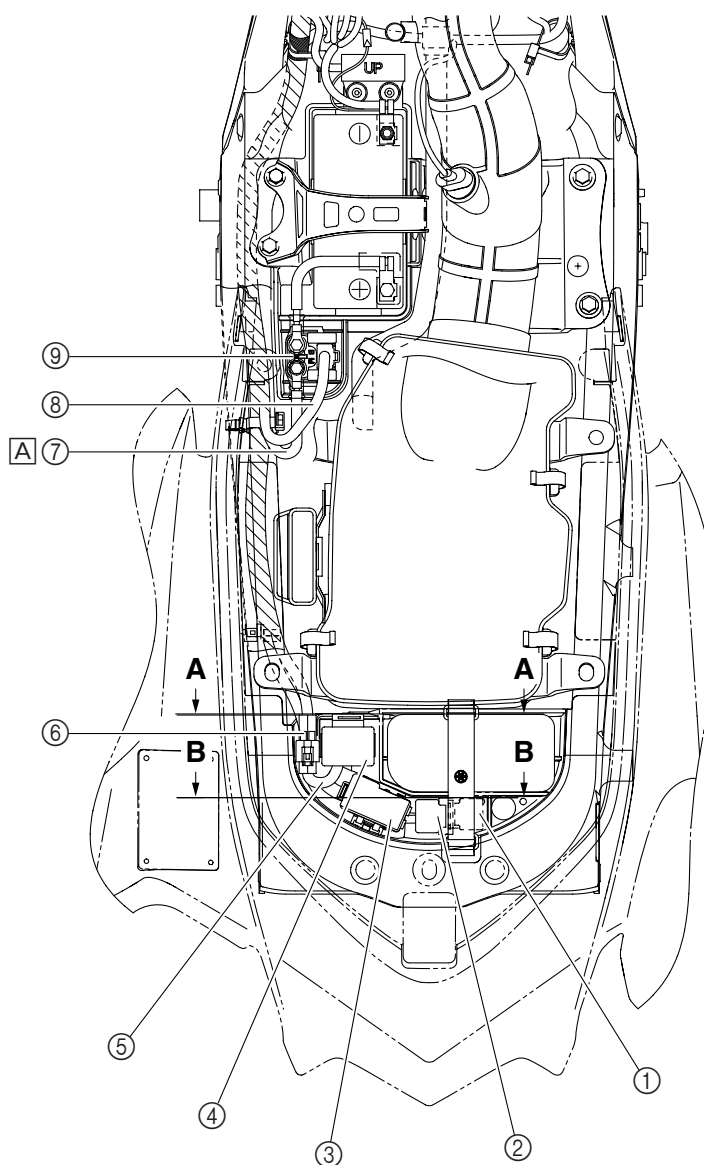
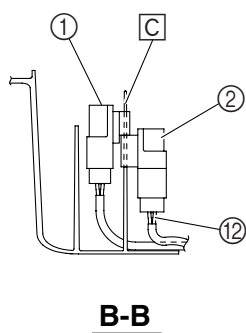
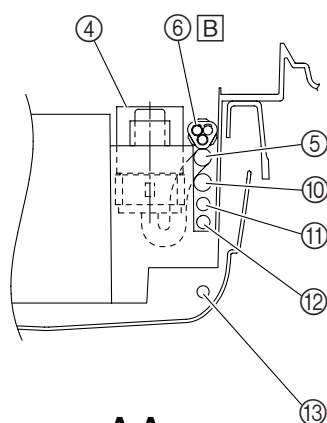




- ① Radiator fan motor relay
- ② Headlight relay
- ③ Fuse box
- ④ Relay unit
- ⑤ Relay unit lead
- ⑥ Self-diagnosis signal lead
- ⑦ Starter motor lead
- ⑧ Starter relay lead
- ⑨ Starter relay
- ⑩ Fuse box lead
- ⑪ Headlight relay lead
- ⑫ Radiator fan motor relay lead

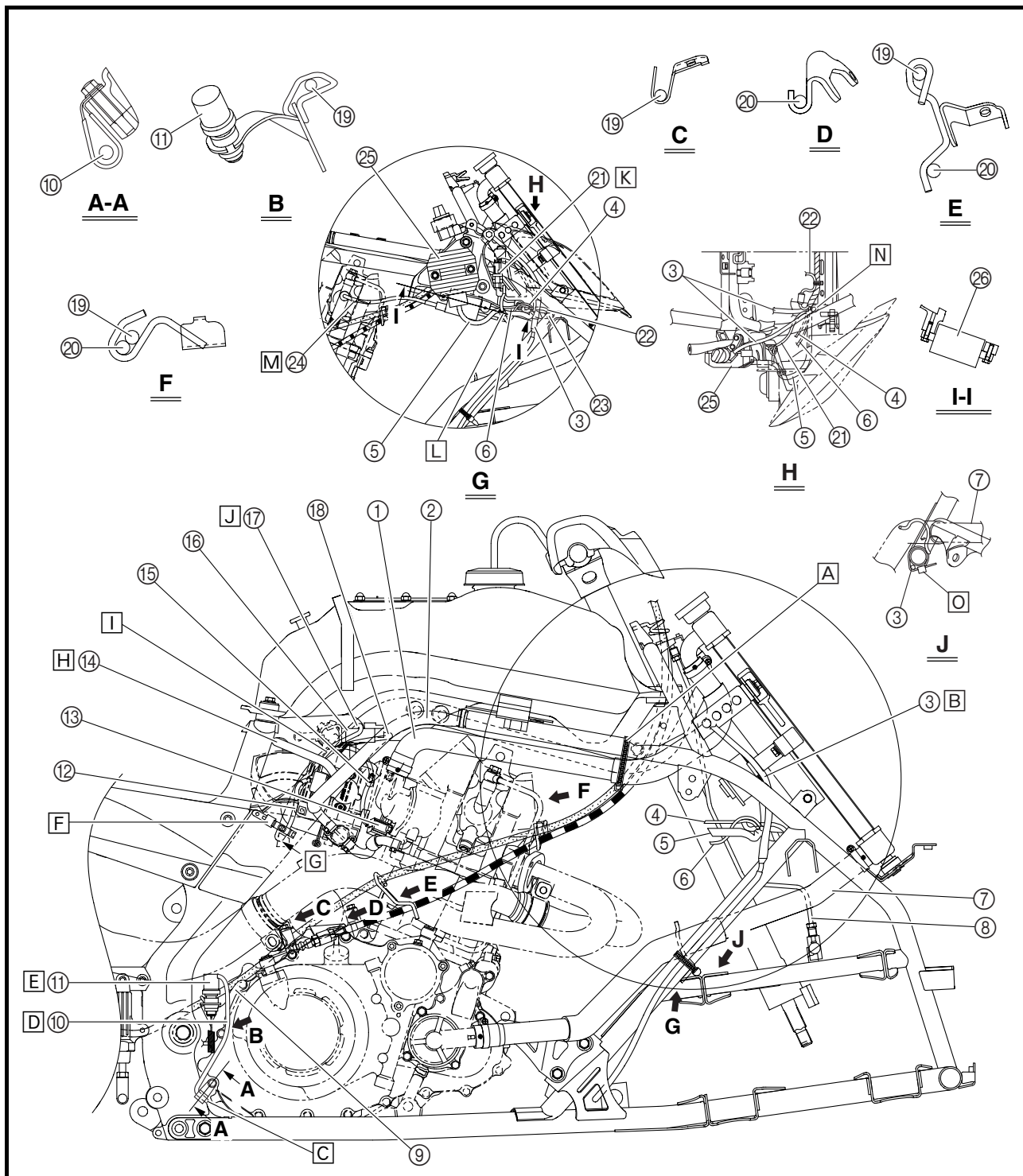
- ⑬ Tail/brake light lead

- [A] Route the starter motor lead under the starter relay lead.
- [B] Make sure that the self-diagnosis signal coupler is positioned above the relay unit lead, fuse box lead, headlight relay lead, and radiator fan motor relay lead.
- [C] Install the headlight relay, then the radiator fan motor relay, onto the tab on the rear fender. The headlight relay is identified by the presence of white tape wrapped around its lead.





- | | |
|----------------------------------|---|
| ① Radiator inlet hose | ⑫ Throttle position sensor lead |
| ② Fast idle plunger outlet hose | ⑬ Coolant temperature sensor |
| ③ Reverse control cable | ⑭ Hose (air-filter-joint-to-throttle-body-right-side) |
| ④ Ignition coil lead (red/black) | ⑮ Coolant temperature sensor lead |
| ⑤ Rectifier/regulator lead | ⑯ Intake air pressure sensor |
| ⑥ Ignition coil lead (orange) | ⑰ Fuel injector lead |
| ⑦ Radiator outlet hose | ⑱ Intake air pressure sensor lead |
| ⑧ Brake pipe | ⑲ Parking brake cable |
| ⑨ Rear brake light switch holder | ⑳ Clutch cable |
| ⑩ Rear brake light switch lead | ㉑ Headlight lead |
| ⑪ Rear brake light switch | ㉒ Radiator fan motor lead |

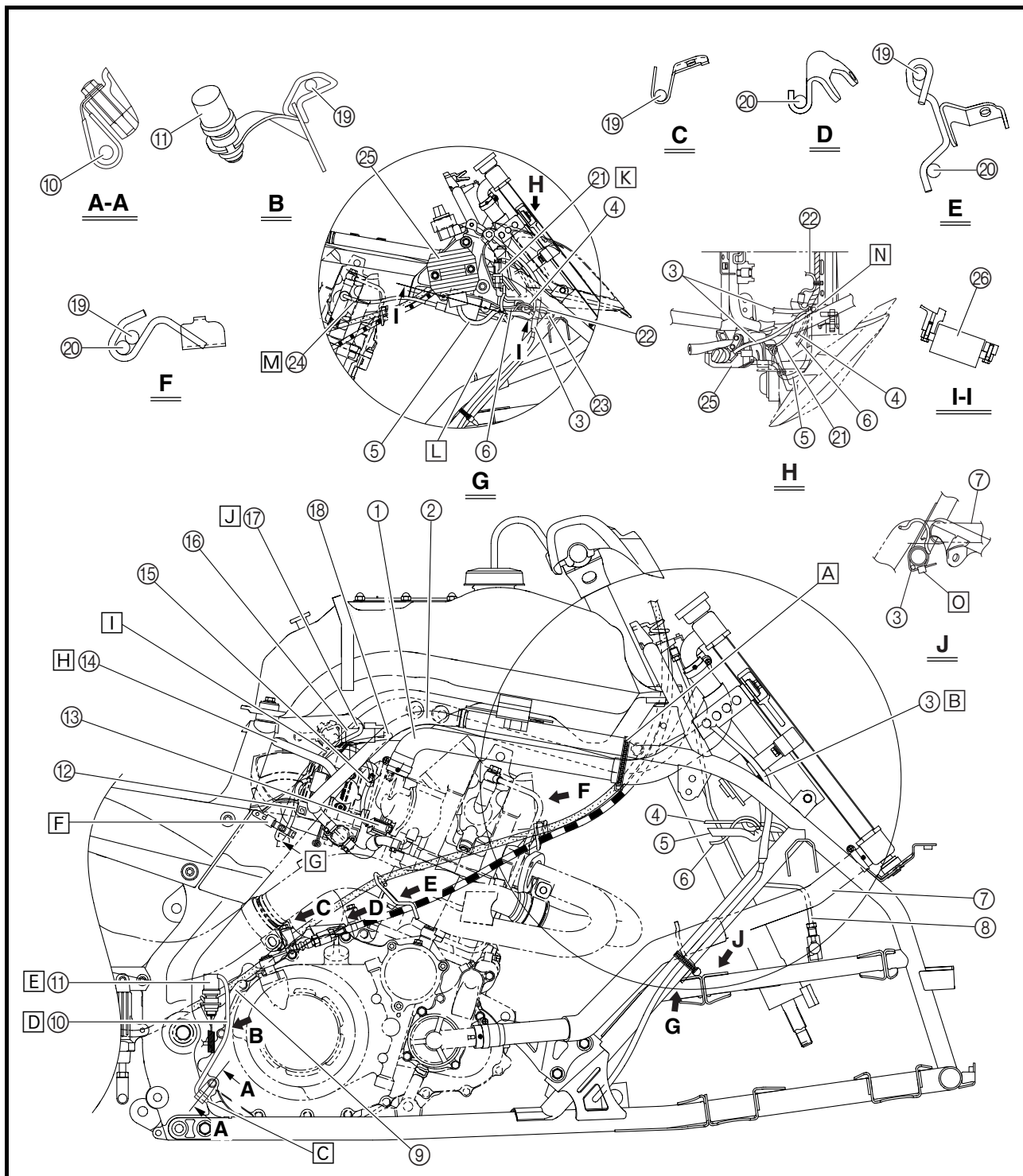




- ②③ Wire harness
- ②④ Spark plug lead
- ②⑤ Rectifier/regulator
- ②⑥ Ignition coil

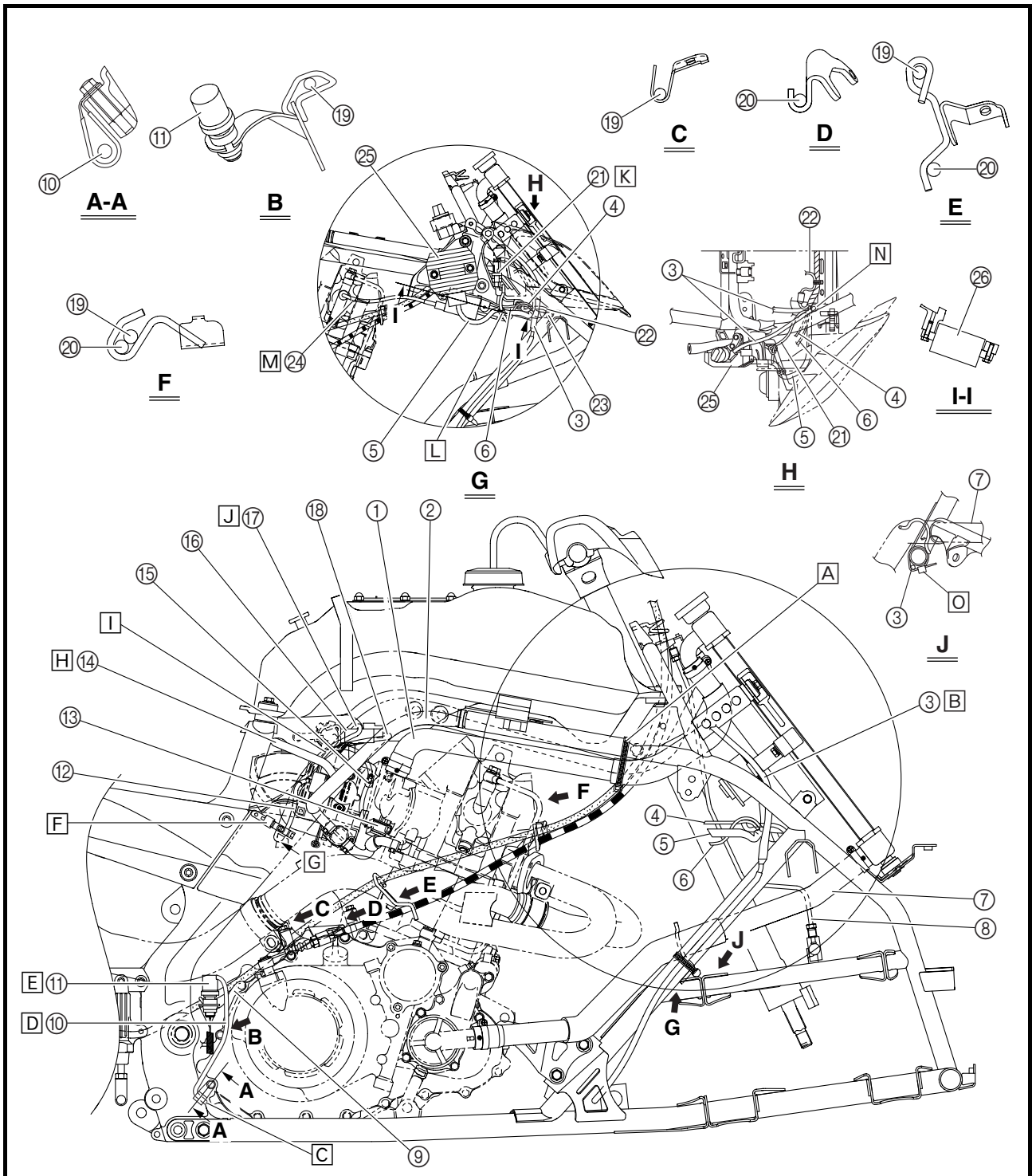
- A** Fasten the fast idle plunger outlet hose and radiator inlet hose with the plastic band, making sure not to pinch or crush the hoses.
- B** Route the reverse control cable to the inside of the frame.

- C** Make sure that the rear brake light switch lead does not contact the swingarm. There should be no slack in the rear brake light switch lead between the holder shown in the illustration and the holder on the left side of the vehicle.
- D** Route the rear brake light switch lead behind the spring.
- E** Route the rear brake light switch lead to the right of the rear brake light switch holder.



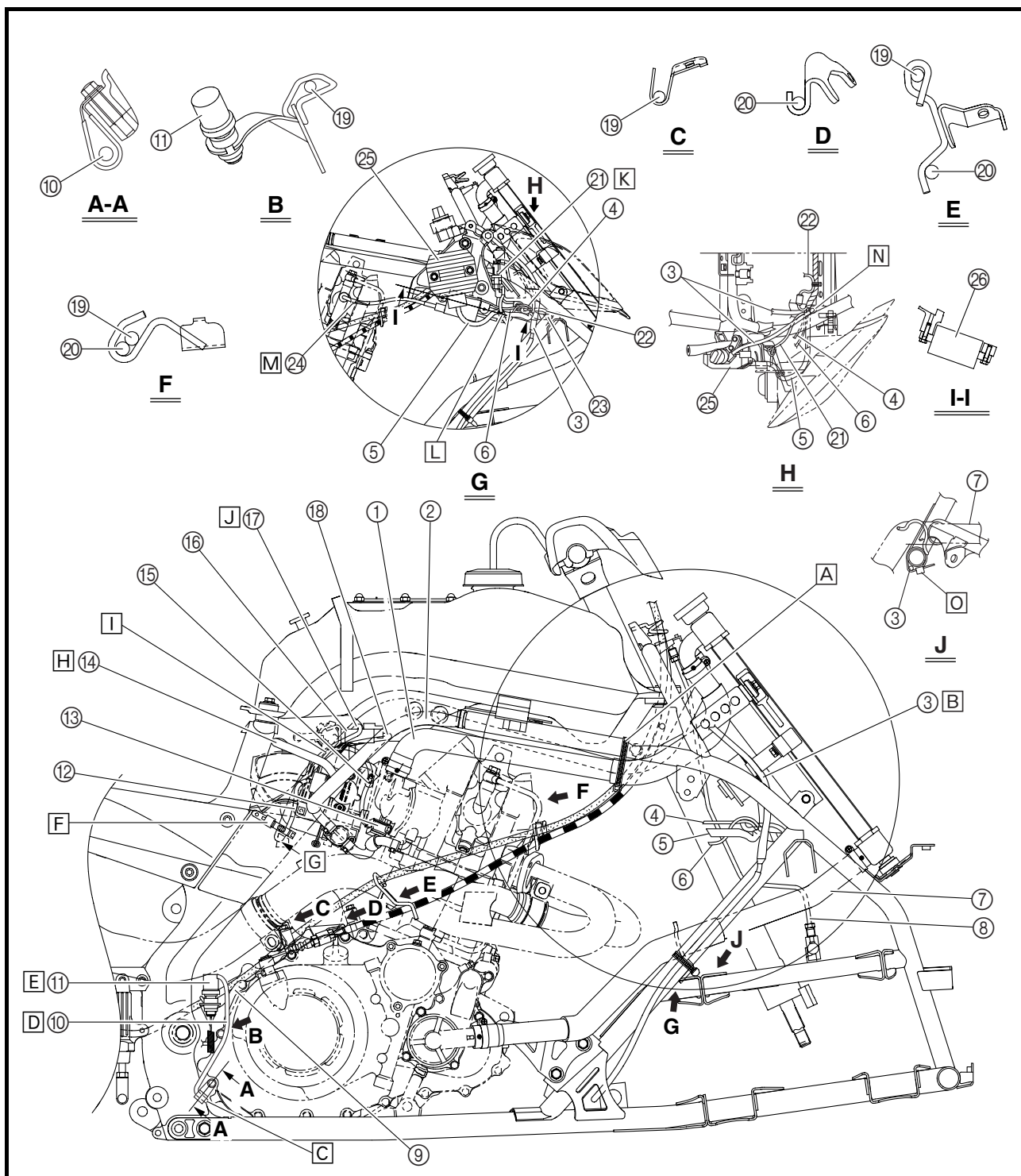


- F** Secure the plastic band by inserting the projection on the band into the hole in the frame, and then fasten the leads where the throttle position sensor lead branches off from the other leads, making sure to face the end of the band rearward.
- G** From the left side of the vehicle
- H** Install the hose (air filter joint to right side of throttle body) onto the pipe on the air filter joint.
- I** Route the leads that branch off from the wire harness over the fast idle plunger outlet hose and to the right of the hose (air filter joint to right side of throttle body).
- J** Route the fuel injector lead over the intake air pressure sensor.
- K** Route the headlight lead over the frame, connect the headlight coupler, and then insert the projection on the coupler into the hole in the stay on the front fender bracket.





- L** Fasten the rectifier/regulator lead with the plastic band. Face the end of the plastic band downward.
- M** Route the spark plug lead to the right of the clutch cable and parking brake cable, making sure that the lead does not contact the cylinder head.
- N** Route the reverse control cable in front of the wire harness.
- O** Fasten the reverse control cable to the frame with the plastic band, making sure to face the end of the band downward.



CHAPTER 3

PERIODIC CHECKS AND ADJUSTMENTS

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INTRODUCTION/PERIODIC MAINTENANCE CHART FOR THE EMISSION CONTROL SYSTEM



EBS00029

PERIODIC CHECKS AND ADJUSTMENTS

INTRODUCTION

This chapter includes all information necessary to perform recommended checks 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.

For CDN

PERIODIC MAINTENANCE CHART FOR THE EMISSION CONTROL SYSTEM

NOTE:

- For ATVs not equipped with an odometer or an hour meter, follow the month maintenance intervals.
- For ATVs equipped with an odometer or an hour meter, follow the km (mi) or hours maintenance intervals. However, keep in mind that if the ATV isn't used for a long period of time, the month maintenance intervals should be followed.
- Items marked with an asterisk should be performed by a Yamaha dealer as they require special tools, data and technical skills.

ITEM	ROUTINE	Whichever comes first ⇒		INITIAL			EVERY	
			month	1	3	6	6	12
			km (mi)	320 (200)	1300 (800)	2500 (1600)	2500 (1600)	5000 (3200)
			hours	20	80	160	160	320
Fuel line*	• Check fuel hose for cracks or damage. • Replace if necessary.				○	○	○	
Spark plug	• Check condition. • Adjust gap and clean. • Replace if necessary.		○	○	○	○	○	
Valves*	• Check valve clearance. • Adjust if necessary.		○		○	○	○	
Fuel injection*	• Check and adjust engine idle speed.		○	○	○	○	○	
Crankcase breather system*	• Check breather hose for cracks or damage. • Replace if necessary.				○	○	○	
Exhaust system*	• Check for leakage. • Tighten if necessary. • Replace gasket if necessary.				○	○	○	
Spark arrester	• Clean.				○	○	○	

GENERAL MAINTENANCE AND LUBRICATION CHART



GENERAL MAINTENANCE AND LUBRICATION CHART

ITEM	ROUTINE	Whichever comes first ⇒	INITIAL			EVERY		
			month	1	3	6	6	12
			km (mi)	320 (200)	1300 (800)	2500 (1600)	2500 (1600)	5000 (3200)
			hours	20	80	160	160	320
Air filter element	• Clean. • Replace if necessary.	Every 20 ~ 40 hours (more often in wet or dusty areas)						
Clutch*	• Check operation. • Adjust if necessary.	○		○	○	○		
Front brake*	• Check free play/operation/fluid leakage/See NOTE. • Correct if necessary.	○	○	○	○	○		
Rear brake*	• Check operation/fluid leakage/See NOTE. • Correct if necessary.	○	○	○	○	○		
Wheels*	• Check balance/damage/runout. • Replace if necessary.	○		○	○	○		
Wheel bearings*	• Check bearing assemblies for looseness/damage. • Replace if damaged.	○		○	○	○		
Rear arm pivots*	• Lubricate every 6 months with lithium-soap-based grease.			○	○	○		
Upper and lower arm pivot and steering shaft*	• Lubricate every 6 months with lithium-soap-based grease.			○	○	○		
Drive chain	• Check and adjust slack/alignment/clean/lube.	○	○	○	○	○		
Fittings and fasteners*	• Check all chassis fittings and fasteners. • Correct if necessary.	○	○	○	○	○		
Front and rear suspension*	• Check operation. • Correct if necessary.			○		○		
Steering system*	• Check operation. • Repair if damaged. • Check toe-in. • Adjust if necessary.	○	○	○	○	○		
Engine oil	• Replace (Warm engine before draining).	○		○	○	○		
Engine oil filter element	• Replace.	○		○		○		
Cooling system	• Check coolant leakage. • Repair if necessary. • Replace coolant every 24 months.	○	○	○	○	○		
Lights and switches*	• Check operation. • Adjust headlight beams.	○	○	○	○	○		

NOTE:

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



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

PERIODIC MAINTENANCE/LUBRICATION



For Europe and Oceania

PERIODIC MAINTENANCE/LUBRICATION

NOTE:

- For ATVs not equipped with an odometer or an hour meter, follow the month maintenance intervals.
- For ATVs equipped with an odometer or an hour meter, follow the km (mi) or hours maintenance intervals. However, keep in mind that if the ATV isn't used for a long period of time, the month maintenance intervals should be followed.
- Items marked with an asterisk should be performed by a Yamaha dealer as they require special tools, data and technical skills.

ITEM	ROUTINE	Whichever comes first ⇒		INITIAL			EVERY	
			month	1	3	6	6	12
			km (mi)	320 (200)	1,200 (750)	2,400 (1,500)	2,400 (1,500)	4,800 (3,000)
			hours	20	75	150	150	300
Fuel line*	• Check fuel hose for cracks or damage. • Replace if necessary.					○	○	○
Spark plug	• Check condition. • Adjust gap and clean. • Replace if necessary.		○	○	○	○	○	
Valves*	• Check valve clearance. • Adjust if necessary.		○		○	○	○	
Fuel injection*	• Check and adjust engine idle speed.		○	○	○	○	○	
Crankcase breather system*	• Check breather hose for cracks or damage. • Replace if necessary.				○	○	○	
Exhaust system*	• Check for leakage. • Tighten if necessary. • Replace gasket if necessary.				○	○	○	
Air filter element	• Clean. • Replace if necessary.		Every 20 ~ 40 hours (More often in wet or dusty areas.)					
Clutch*	• Check operation. • Adjust if necessary.		○		○	○	○	
Front brake*	• Check free play/operation/fluid leakage/See NOTE. • Correct if necessary.		○	○	○	○	○	
Rear brake*	• Check operation/fluid leakage/See NOTE. • Correct if necessary.		○	○	○	○	○	
Wheels*	• Check balance/damage/runout. • Replace if necessary.		○		○	○	○	
Wheel bearings*	• Check bearing assemblies for looseness/damage. • Replace if damaged.		○		○	○	○	
Rear arm pivot*	• Lubricate with lithium-soap-based grease.				○	○	○	
Upper and lower arm pivot and steering shaft*	• Lubricate with lithium-soap-based grease.				○	○	○	
Drive chain	• Check and adjust slack/alignment/clean/lube.		○	○	○	○	○	
Fittings and fasteners*	• Check all chassis fittings and fasteners. • Correct if necessary.		○	○	○	○	○	
Front and rear suspension*	• Check operation. • Correct if necessary.				○		○	
Steering system*	• Check operation. • Repair if damaged. • Check toe-in. • Adjust if necessary.		○	○	○	○	○	

PERIODIC MAINTENANCE/LUBRICATION



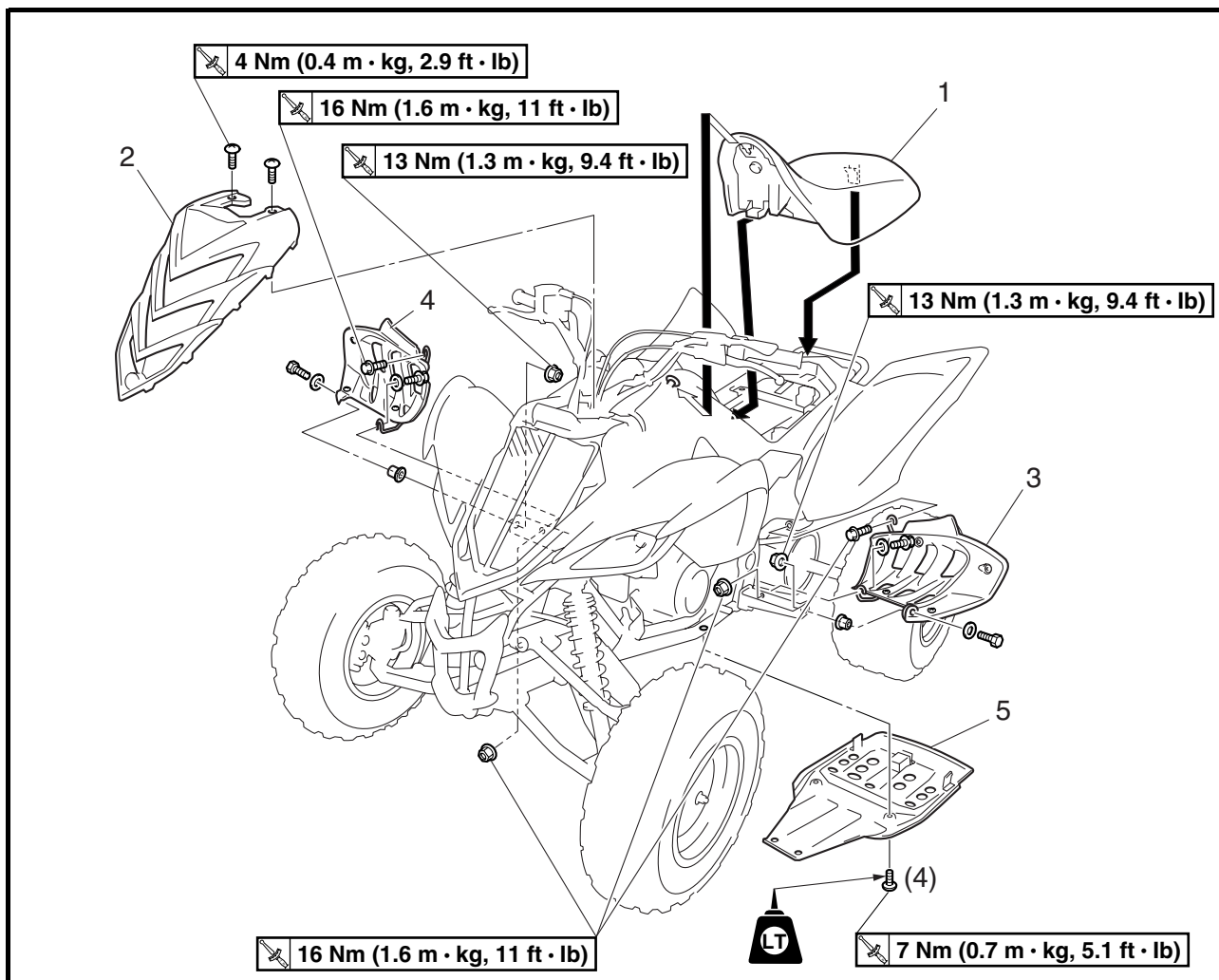
ITEM	ROUTINE	Whichever comes first ⇒	INITIAL			EVERY		
			month	1	3	6	6	12
			km (mi)	320 (200)	1,200 (750)	2,400 (1,500)	2,400 (1,500)	4,800 (3,000)
			hours	20	75	150	150	300
Engine oil	• Replace (Warm engine before draining).		☐		☐	☐	☐	
Engine oil filter element	• Replace.		☐		☐		☐	
Cooling system	• Check coolant leakage. • Repair if necessary. • Replace coolant every 24 months.		☐	☐	☐	☐	☐	
Lights and switches*	• Check operation. • Adjust headlight beams.		☐	☐	☐	☐	☐	

NOTE:

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

EBS00033

SEAT, FENDERS AND FUEL TANK

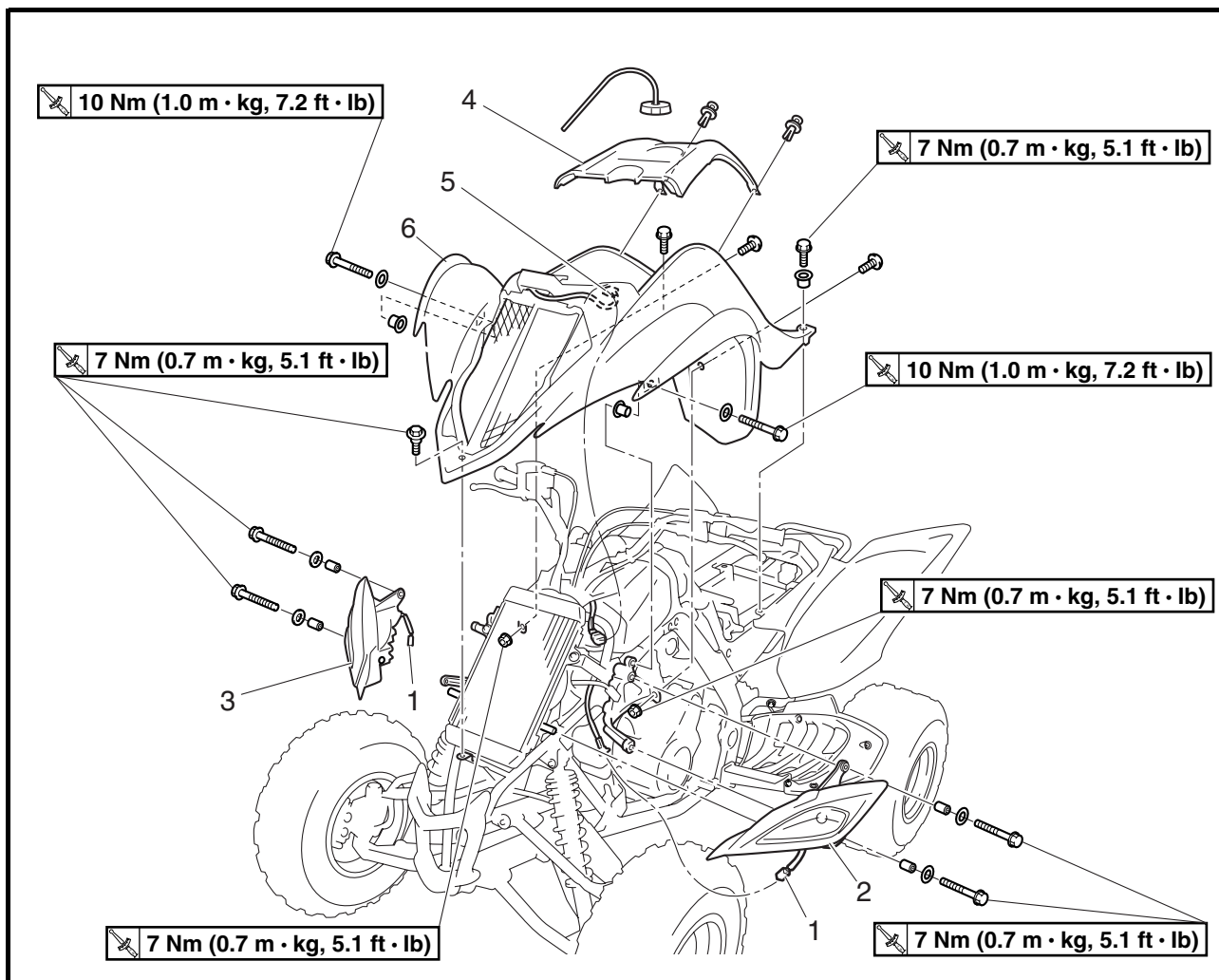


Order	Job/Part	Q'ty	Remarks
1	Removing the seat, front panel, foot protectors and engine skid plate Seat	1	Remove the parts in the order listed. NOTE: _____ Pull back the seat lock lever, then pull up on the rear of the seat. _____
2	Front panel	1	
3	Left foot protector	1	
4	Right foot protector	1	
5	Engine skid plate	1	For installation, reverse the removal procedure.

SEAT, FENDERS AND FUEL TANK

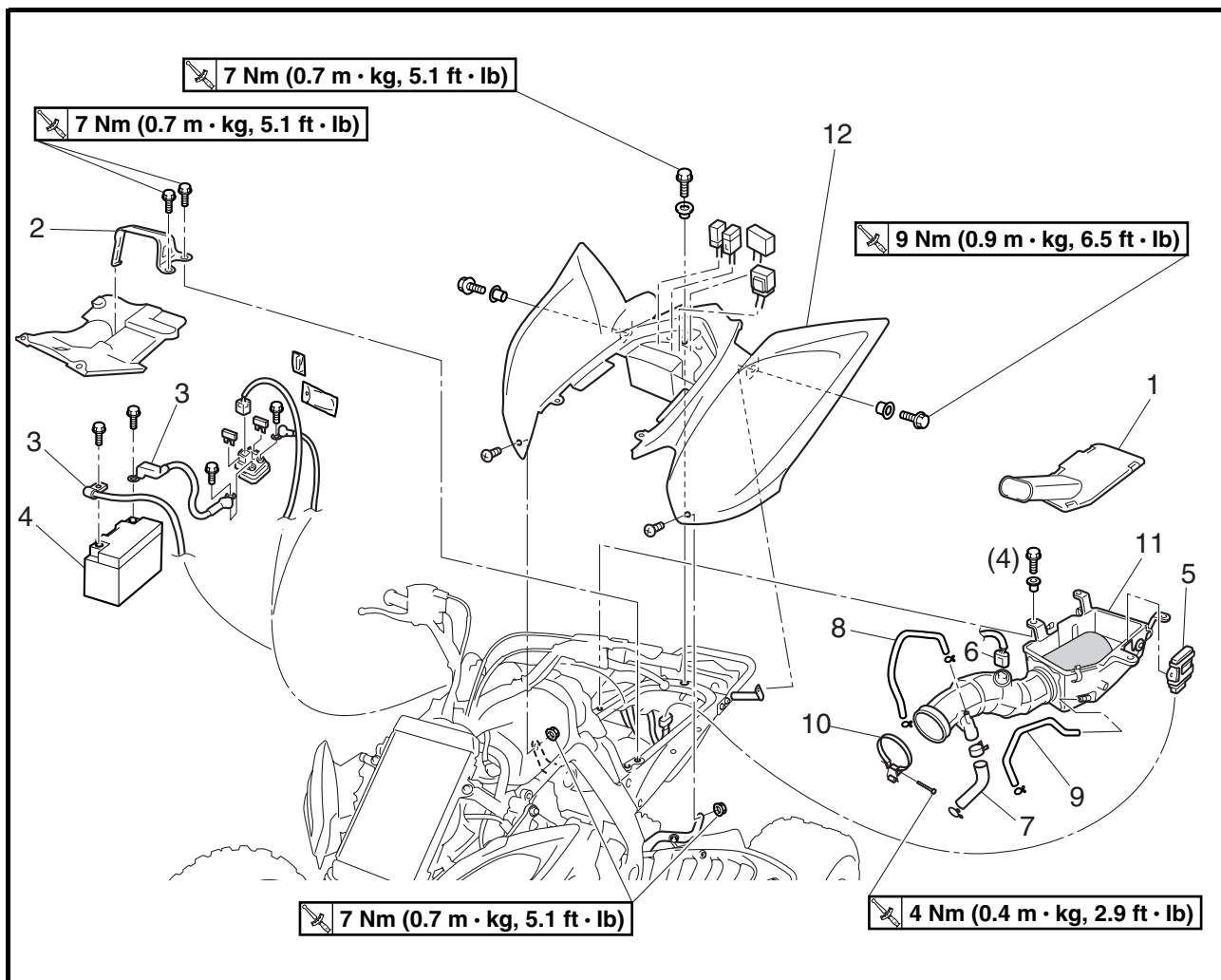


EBS00036

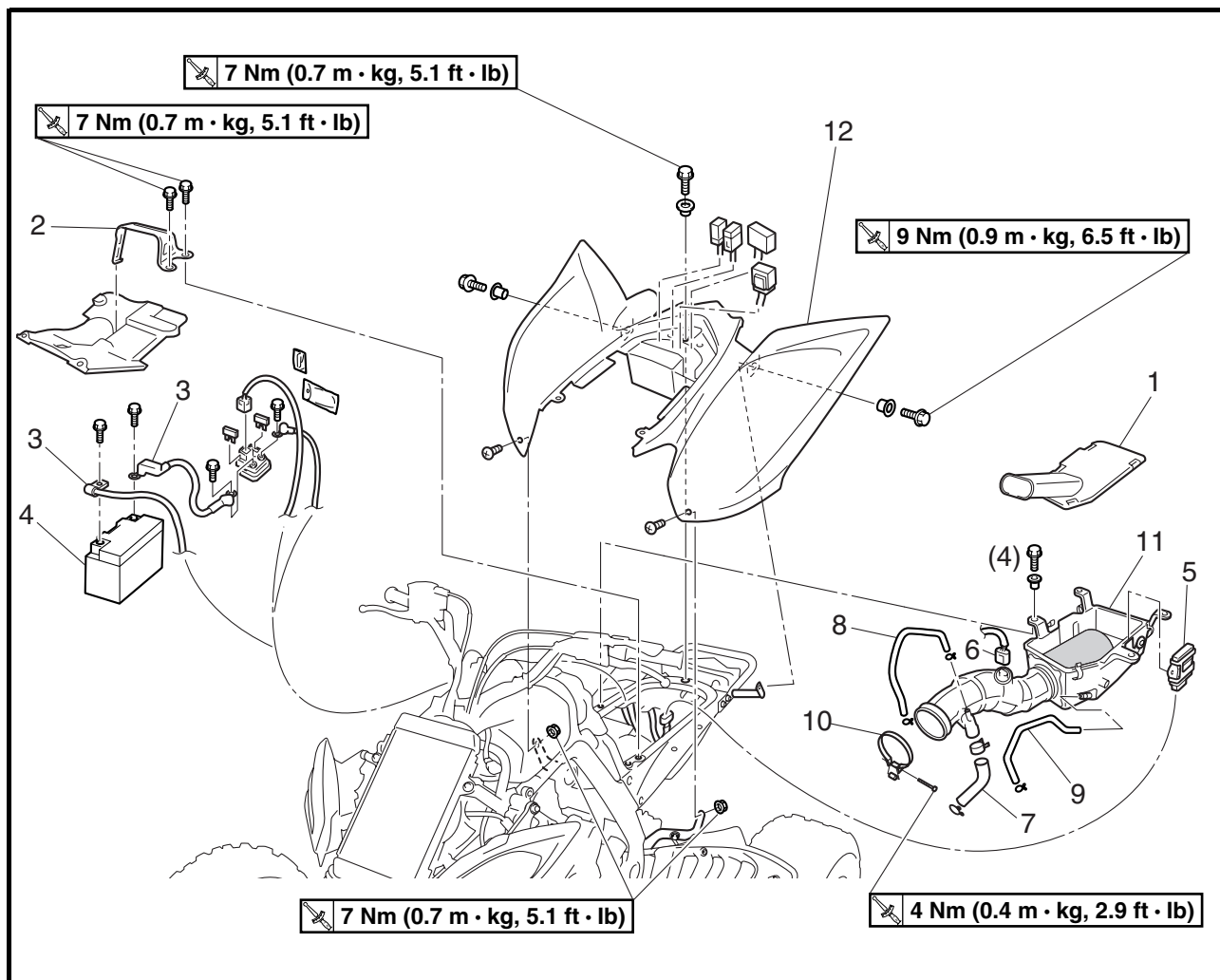


Order	Job/Part	Q'ty	Remarks
	Removing the headlights and front fender		Remove the parts in the order listed.
	Seat/front panel		Refer to "SEAT, FENDERS AND FUEL TANK".
1	Headlight coupler	2	Disconnect.
2	Left headlight	1	
3	Right headlight	1	
4	Fuel tank top panel	1	
5	Indicator light assembly coupler	1	Disconnect.
6	Front fender	1	
			For installation, reverse the removal procedure.

EBS00039



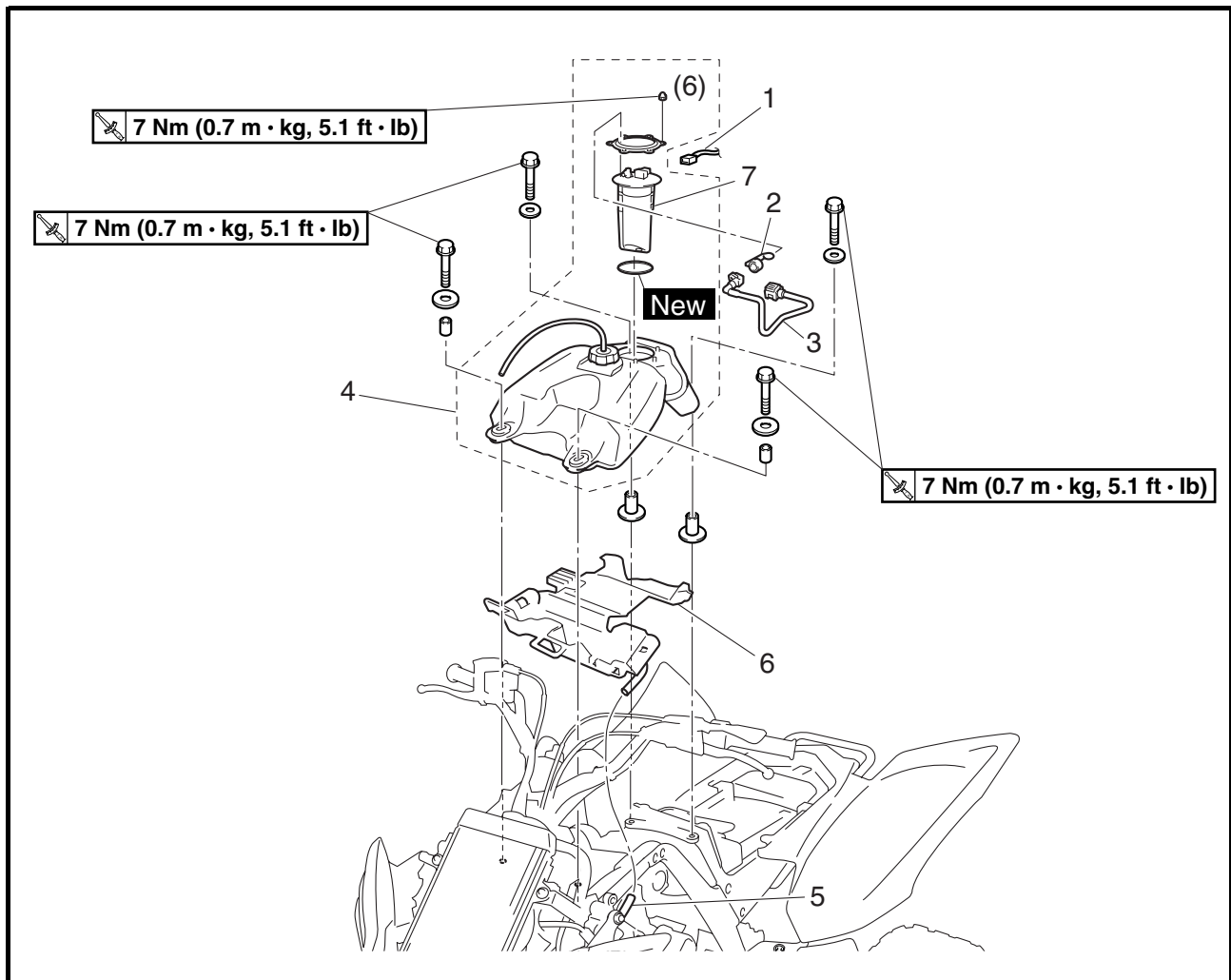
Order	Job/Part	Q'ty	Remarks
	Removing the rear fender		Remove the parts in the order listed. Refer to "SEAT, FENDERS AND FUEL TANK".
1	Air filter case cover	1	
2	Battery holding bracket	1	
3	Battery lead	2	Disconnect.
			CAUTION: First disconnect the negative lead, then disconnect the positive lead.
4	Battery	1	
5	ECU	1	
6	Intake air temperature sensor coupler	1	



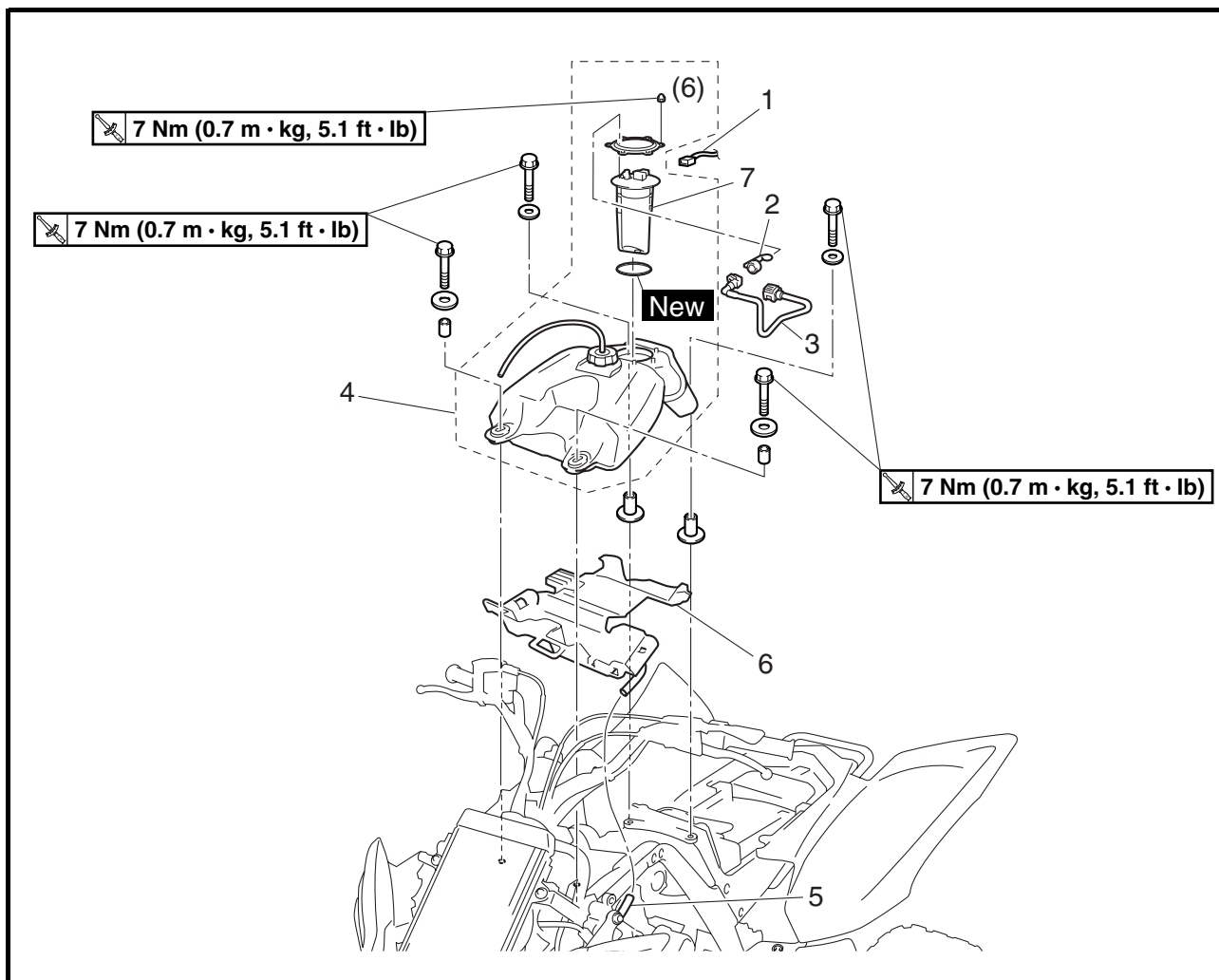
Order	Job/Part	Q'ty	Remarks
7	Hose (throttle-body-joint-to-throttle-body-left side)	1	Loosen
8	Hose (throttle-body-joint-to-throttle-body-right side)	1	
9	Crankcase breather hose	1	
10	Clamp (throttle body joint)	1	
11	Air filter case	1	
12	Rear fender	1	For installation, reverse the removal procedure.



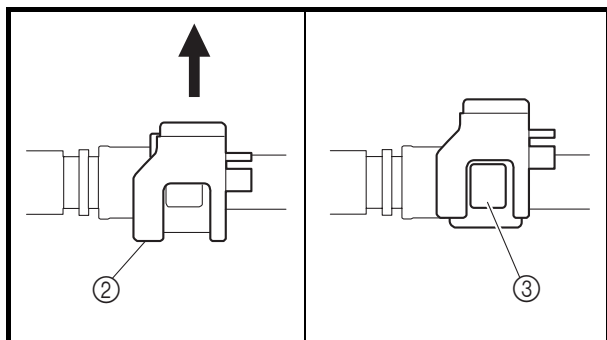
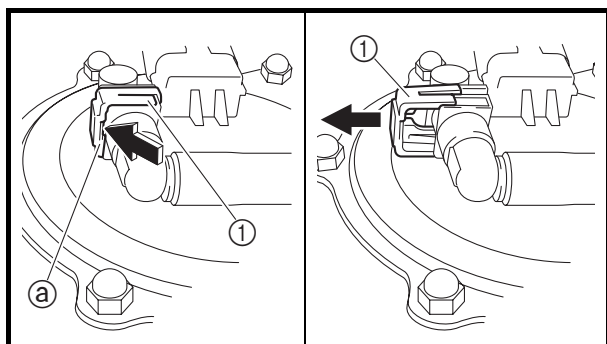
EBS00042



Order	Job/Part	Q'ty	Remarks
	Removing the fuel tank		Remove the parts in the order listed.
	Seat/front panel/fuel tank top panel/ front fender		Refer to "SEAT, FENDERS AND FUEL TANK".
1	Fuel pump coupler	1	Disconnect.
2	Fuel hose connector holder	1	Refer to "REMOVING THE FUEL TANK" and "INSTALLING THE FUEL HOSE".
3	Fuel hose	1	
4	Fuel tank	1	NOTE: _____ When installing the fuel tank, pass the fuel tank breather hose through the hole in the handlebar cover, and then insert the end of the hose into the steering stem.
5	Drain hose	1	
6	Fuel tank shield	1	



Order	Job/Part	Q'ty	Remarks
7	Fuel pump	1	Refer to "REMOVING THE FUEL PUMP" and "INSTALLING THE FUEL PUMP". For installation, reverse the removal procedure.



REMOVING THE FUEL TANK

1. Extract the fuel in the fuel tank through the fuel tank cap with a pump.
2. Remove:
 - fuel hose connector holder
 - fuel hose

CAUTION:

- Be sure to disconnect the fuel hose by hand. Do not forcefully disconnect the hose with tools.
- Although the fuel has been removed from the fuel tank be careful when removing the fuel hose, since there may be fuel remaining in it.

NOTE:

- When removing the fuel hose from the fuel pump, remove the fuel hose connector holder first, and next, insert a slotted head screwdriver etc. in the slot part (a) of the fuel hose connector cover (1), then slide the screwdriver in the direction of the arrow, and remove the fuel hose.
- To remove the fuel hose from the throttle body, slide the fuel hose connector cover (2) on the end of the hose in direction of the arrow shown, press the two buttons (3) on the sides of the connector, and then remove the hose.
- Before removing the hose, place a few rags in the area under where it will be removed.

3. Remove:
 - fuel tank

NOTE:

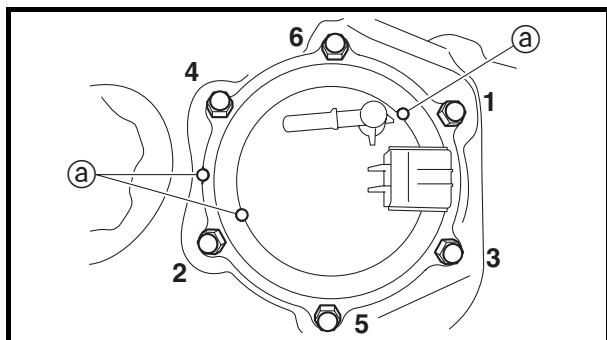
Do not set the fuel tank down on the installation surface of the fuel pump. Be sure to lean the fuel tank against a wall or like.

REMOVING THE FUEL PUMP

1. Remove:
 - fuel pump bracket
 - fuel pump
 - fuel pump gasket

CAUTION:

- Do not drop the fuel pump or give it a strong shock.
- Do not touch the base section of the fuel sender.



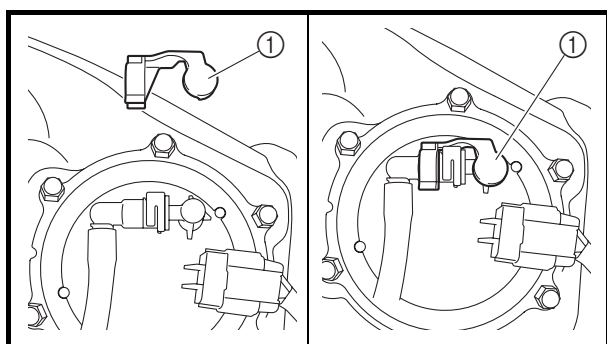
INSTALLING THE FUEL PUMP

1. Install:

- fuel pump gasket **New**
- fuel pump  **7 Nm (0.7 m · kg, 5.1 ft · lb)**
- fuel pump bracket

NOTE:

- Do not damage the installation surface of the fuel tank when installing the fuel pump.
- Always use a new fuel pump gasket.
- Install the fuel pump bracket by aligning the projection (a) on the fuel pump with the projection on the fuel tank.
- Tighten the bolts to the specified torque in the proper tightening sequence as shown.
- Install the fuel pump in the direction shown in the illustration.



INSTALLING THE FUEL HOSE

1. Install:

- fuel hose
- fuel hose holder
- fuel pump coupler

CAUTION:

When installing the fuel hose, make sure that it is securely connected, and that the fuel hose holder is in the correct position, otherwise the fuel hose will not be properly installed.

NOTE:

Install the fuel hose connector cover (1) securely onto the fuel tank until a distinct “click” is heard, and then make sure that it does not come loose.

EAS00049

ENGINE

ADJUSTING THE VALVE CLEARANCE

The following procedure applies to all of the valves.

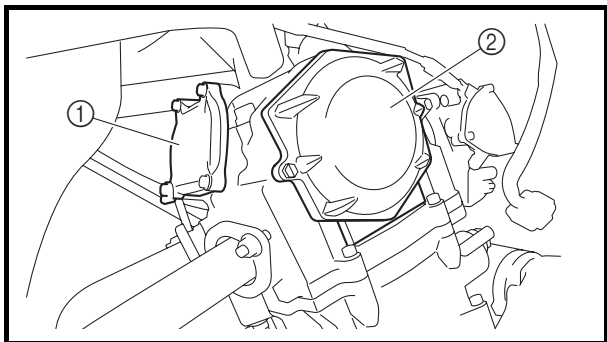
NOTE:

- Valve clearance adjustment should be made on a cold engine, at room temperature.
- When the valve clearance is to be measured or adjusted, the piston must be at top dead center (TDC) on the compression stroke.

1. Remove:

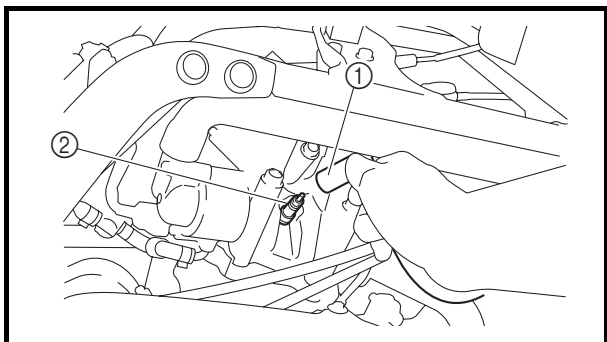
- seat
- front fender
- fuel tank

Refer to "SEAT, FENDERS AND FUEL TANK".



2. Remove:

- intake tappet cover
- exhaust tappet cover ①
- camshaft sprocket cover ②

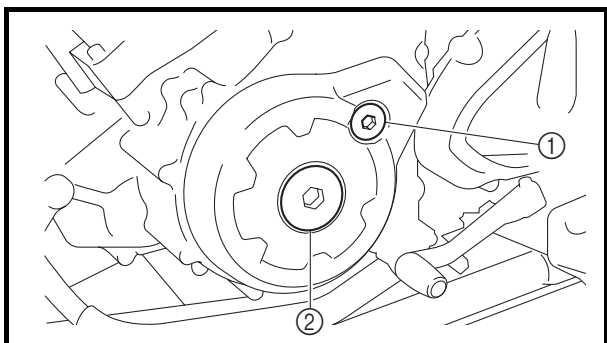


3. Disconnect:

- spark plug cap ①

4. Remove:

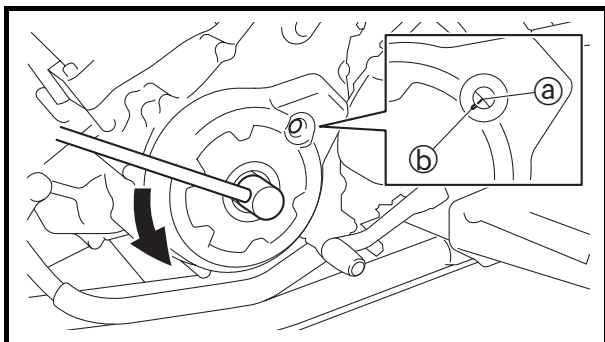
- spark plug ②



5. Remove:

- timing mark accessing screw ①
- crankshaft end accessing screw ②

ADJUSTING THE VALVE CLEARANCE



6. Measure:

- valve clearance

Out of specification → Adjust.



Valve clearance (cold)

Intake valve

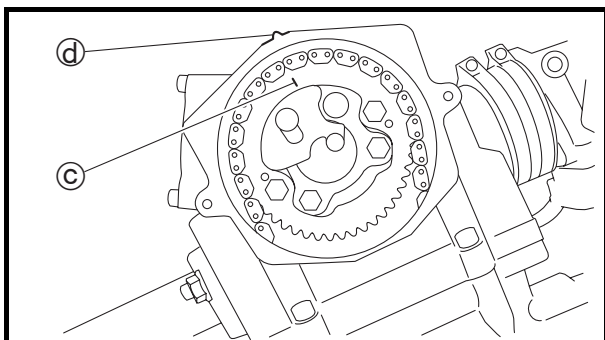
0.09 ~ 0.13 mm

(0.0035 ~ 0.0051 in)

Exhaust valve

0.16 ~ 0.20 mm

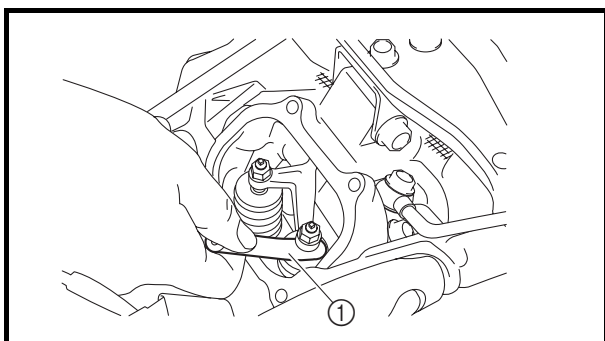
(0.0063 ~ 0.0079 in)



- Turn the crankshaft counterclockwise.
- When the piston is at the top dead center (TDC) on the compression stroke, align the "I" mark ③ on the A.C. magneto rotor with the stationary pointer ⑤ on the A.C. magneto cover.

NOTE:

To position the piston at top dead center (TDC) on the compression stroke, align the "I" mark ③ on the camshaft sprocket with the stationary pointer ④ on the cylinder head, as shown in the illustration.



- Measure the valve clearance with a thickness gauge ①.



Thickness gauge

90890-03079

Narrow gauge set

YM-34483

Out of specification → Adjust.

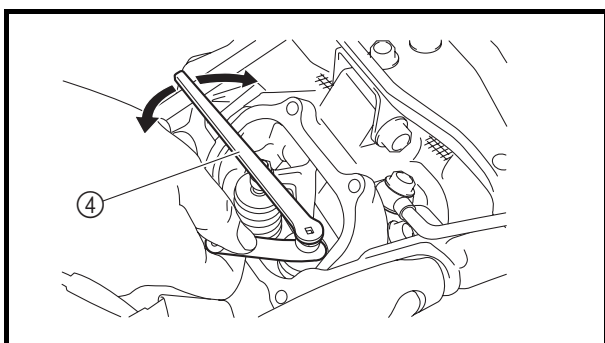
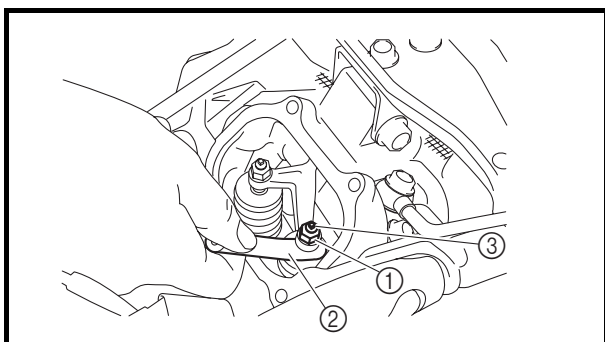


7. Adjust:

- valve clearance



- Loosen the locknut ①.
- Insert a thickness gauge ② between the end of the adjusting screw and the valve tip.
- Turn the adjusting screw ③ with the tappet adjusting tool ④ until the specified valve clearance is obtained.



Tappet adjusting tool

90890-01311

Valve adjuster (3 mm & 4 mm)

YM-08035-A

ADJUSTING THE VALVE CLEARANCE



- d. Hold the adjusting screw to prevent it from moving and tighten the locknut to the specified torque.



Locknut
14 Nm (1.4 m · kg, 10 ft · lb)

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



8. Install:
 - timing mark accessing screw

6 Nm (0.6 m · kg, 4.3 ft · lb)

- crankshaft end accessing screw

10 Nm (1.0 m · kg, 7.2 ft · lb)

9. Install:

- spark plug

13 Nm (1.3 m · kg, 9.4 ft · lb)

10. Connect:

- spark plug cap

11. Install:

- O-ring **New**

- camshaft sprocket cover

10 Nm (1.0 m · kg, 7.2 ft · lb)

- O-ring ① **New**

- intake tappet cover

10 Nm (1.0 m · kg, 7.2 ft · lb)

- O-ring **New**

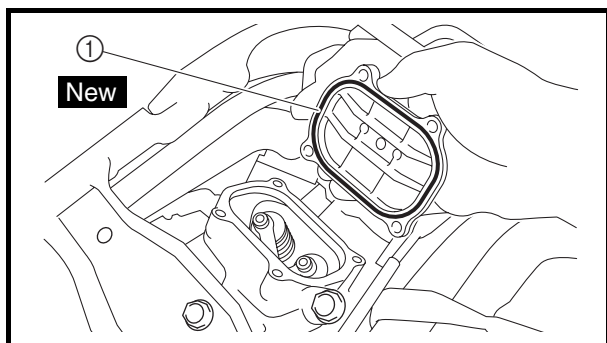
- exhaust tappet cover

10 Nm (1.0 m · kg, 7.2 ft · lb)

12. Install:

- fuel tank
- front fender
- seat

Refer to “SEAT, FENDERS AND FUEL TANK”.

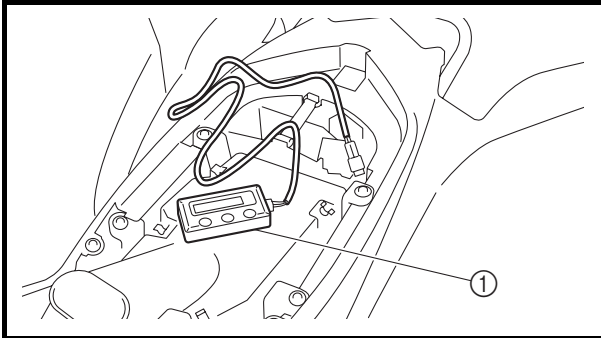


EAS00869

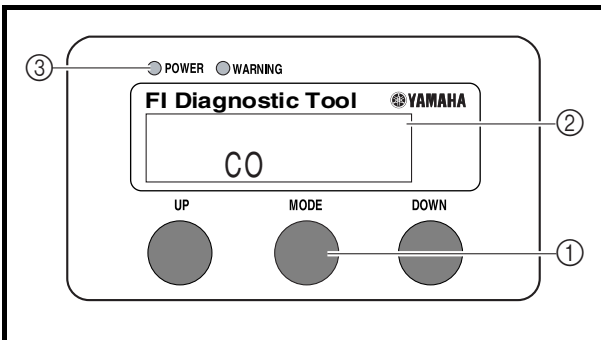
ADJUSTING THE EXHAUST GAS VOLUME (For Europe and Oceania only)

NOTE:

Be sure to set the CO density level to standard, and then adjust the exhaust gas volume.



1. Remove the seat.
Refer to “SEAT, FENDERS AND FUEL TANK”.
2. Turn the main switch to “OFF” and set the engine stop switch to “RUN”.
3. Remove the self-diagnosis signal coupler cap, and then connect the FI diagnostic tool ① as shown.



4. While pressing the “MODE” button ①, turn the main switch to “ON”.

NOTE:

- “DIAG” appears on the LCD ② of the FI diagnostic tool.
- “POWER” LED (green) ③ comes on.

5. Press the “UP” button to select the CO adjustment mode “CO” or the diagnostic mode “DIAG”.
6. After selecting “CO”, press the “MODE” button.
7. Check that “C1” appears on the LCD of the FI diagnostic tool, and then press the “MODE” button.
8. Start the engine.

CAUTION:

Perform the adjustment after the battery has been sufficiently charged.

ADJUSTING THE ENGINE IDLING SPEED/ ADJUSTING THE THROTTLE LEVER FREE PLAY



5. Detach:
 - tachometer
6. Adjust:
 - throttle lever free play
 Refer to "ADJUSTING THE THROTTLE LEVER FREE PLAY".



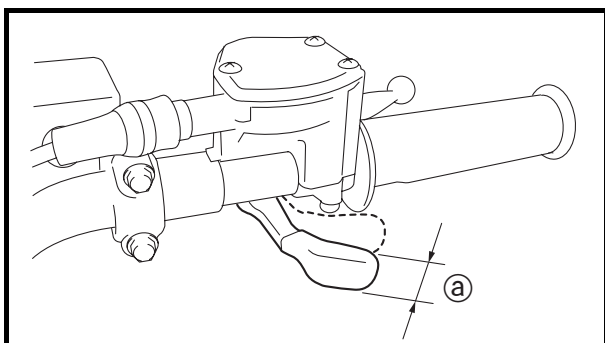
Throttle lever free play
2 ~ 4 mm (0.08 ~ 0.16 in)

EBS00052

ADJUSTING THE THROTTLE LEVER FREE PLAY

NOTE:

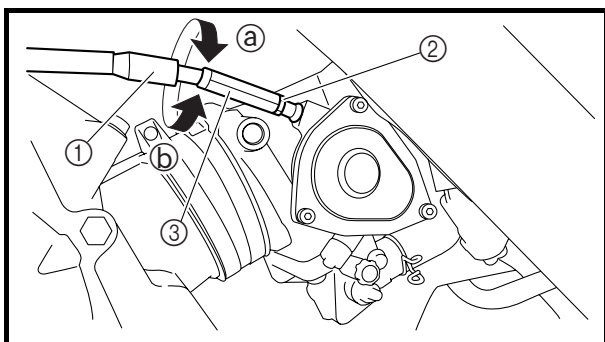
Engine idling speed should be adjusted properly before adjusting the throttle lever free play.



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



Throttle lever free play
2 ~ 4 mm (0.08 ~ 0.16 in)



2. Adjust:
 - throttle lever free play

First step:

- a. Slide back the rubber cover ①.
- b. Loosen the locknut ② on the throttle body side.
- c. Turn the adjusting nut ③ in direction ① or ② until the correct free play is obtained.

Direction ①

Free play is increased.

Direction ②

Free play is decreased.

- d. Tighten the locknut.

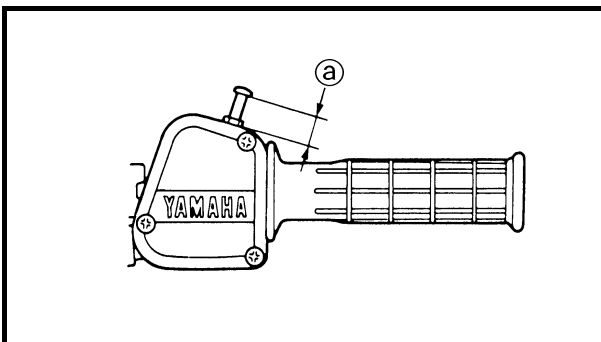
CHK
ADJ

- NOTE:**

Second step:

-
- A detailed line drawing of a hydraulic cylinder assembly. Label 'd' points to a mounting bracket on the left. Label '4' points to a circular seal or gasket at the base of the cylinder. Label '5' points to the main body of the cylinder. Label '6' points to a small, cylindrical component, likely a check valve or pilot valve, mounted on the side of the cylinder body.

⚠ WARNING

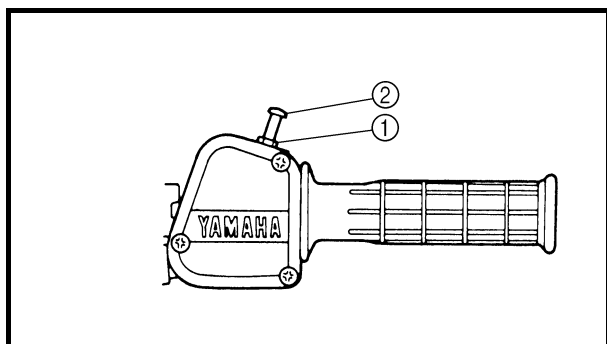


EBS00053

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 adjusting screw stops the engine speed from increasing.

- | | |
|---|--|
|  | Speed limiter length
Less than 12 mm (0.47 in) |
|---|--|

ADJUSTING THE SPEED LIMITER/ CHECKING THE SPARK PLUG



2. Adjust:
 - speed limiter length



- a. Loosen the locknut ①.
- b. Turn the adjusting screw ② in or out until the specified speed limiter length is obtained.

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

- c. 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 adjusting screw more than 12 mm (0.47 in). Also, always adjust the throttle lever free play to 2 ~ 4 mm (0.08 ~ 0.16 in).

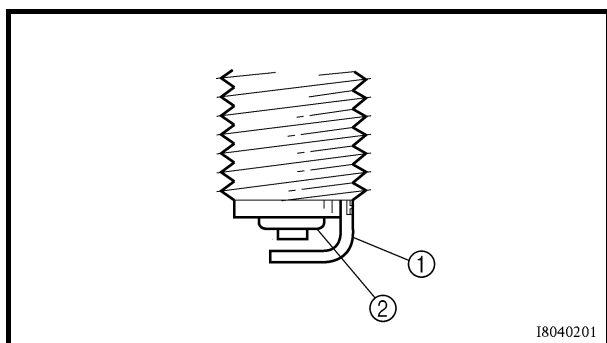


EBS00057

CHECKING THE SPARK PLUG

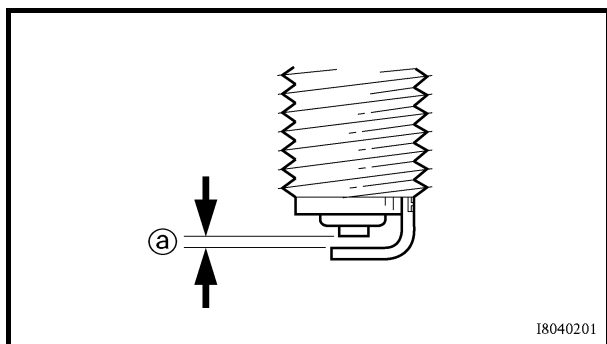
1. Remove:
 - spark plug
2. Check:
 - spark plug type
Incorrect → Change.

**Standard spark plug
CR8E/NGK**



3. Check:
 - electrode ①
Wear/damage → Replace.
 - insulator ②
Abnormal color → Replace.
Normal color is a medium-to-light tan color.
4. Clean:
 - spark plug
(with a spark plug cleaner or wire brush)

CHECKING THE SPARK PLUG/ CHECKING THE IGNITION TIMING



5. Measure:

- spark plug gap ①
Use a wire gauge or thickness gauge.
Out of specification → Regap.



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

6. Tighten:

- spark plug  **13 Nm (1.3 m · kg, 9.4 ft · lb)**

NOTE:

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

EBS00058

CHECKING THE IGNITION TIMING

NOTE:

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

1. Attach:

- tachometer
- timing light
(to spark plug lead)



Digital tachometer
90890-06760, YU-39951-B
Timing light
90890-03141
Inductive clamp timing light
YU-03141

2. Check:

- ignition timing

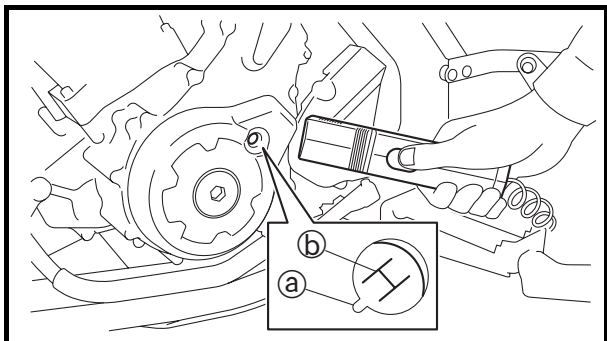
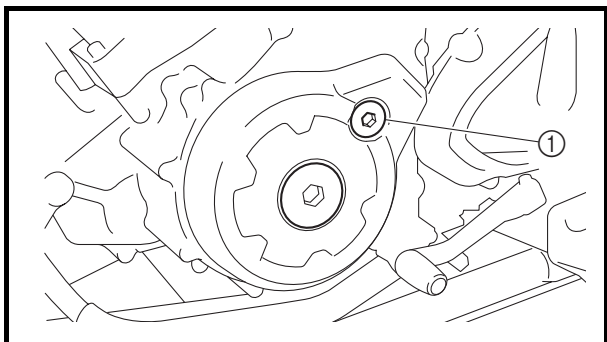


- Warm up the engine and keep it at the specified speed.



Engine speed
1,500 ~ 1,700 r/min

CHECKING THE IGNITION TIMING/ MEASURING THE COMPRESSION PRESSURE



- b. Remove the timing mark accessing screw ①.
- c. Visually check the stationary pointer ① to verify it is within the required firing range ② indicated on the flywheel.
Incorrect firing range → Check the pulser coil assembly.

NOTE:

When checking the ignition timing, make sure that the timing light cord does not come in contact with the exhaust muffler.

- d. Install the timing mark accessing screw.



3. Detach:
 - timing light
 - tachometer

EBS00061

MEASURING THE COMPRESSION PRESSURE

NOTE:

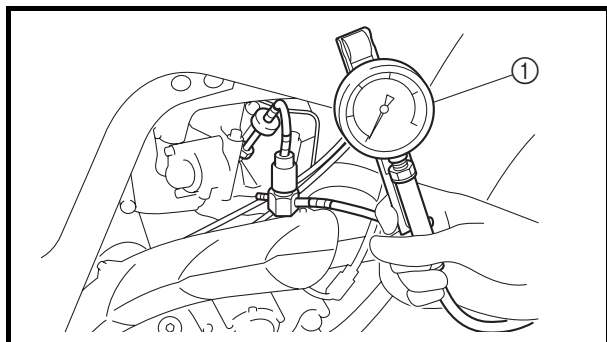
Insufficient compression pressure will result in a loss of performance.

1. Measure:
 - valve clearance
Out of specification → Adjust.
Refer to “ADJUSTING THE VALVE CLEARANCE”.
2. Start the engine, warm it up for several minutes, and then turn it off.
3. Disconnect:
 - spark plug cap
4. Remove:
 - spark plug

CAUTION:

Before removing a spark plug, use compressed air to blow away any dirt accumulated in the spark plug well to prevent it from falling into the cylinder.

CHK
ADJ



- 

6. Measure:

- compression pressure
Out of specification → Refer to steps (c) and (d).



- a. Set the main switch to “ON”.
- b. With the throttle wide open, crank the engine until the reading on the compression gauge stabilizes.

WARNING

To prevent sparking, ground the spark plug lead before cranking the engine.

- 3 - 23**

CHK
ADJ

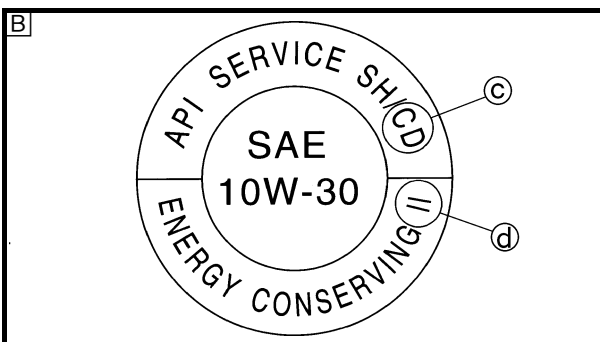
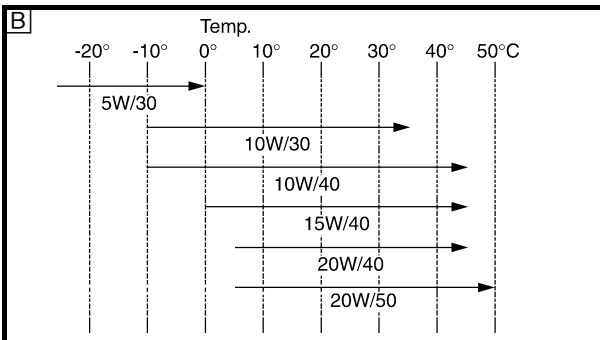
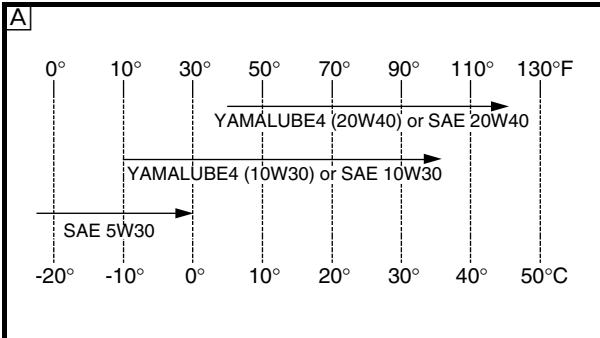
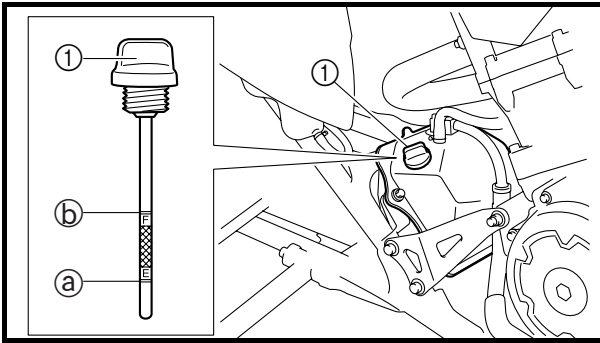
- | Compression pressure
(with oil applied into the cylinder) | |
|--|--|
| Reading | Diagnosis |
| Higher than without oil | Piston ring(s) wear or damage → Repair. |
| Same as without oil | Piston rings, valves, cylinder head gasket or piston possibly defective → Repair. |

 **13 Nm (1.3 m · kg, 9.4 ft · lb)**

- spark plug cap

To achieve the proper engine oil temperature for an accurate oil level reading, the engine must have first completely cooled down, and then warmed up again for several minutes to normal operating temperature.

CHECKING THE ENGINE OIL LEVEL



3. Check:

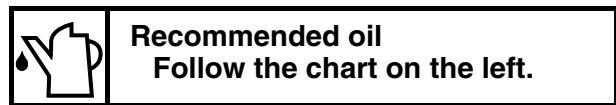
- engine oil level

Oil level should be between the minimum level mark (a) and the maximum level mark (b).

Low oil level → Add oil to the proper level.

NOTE:

- Wait a few minutes until the oil settles before checking the oil level.
- Do not screw the dipstick (1) in when checking the oil level.



NOTE:

Recommended oil classification:

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

CAUTION:

- Engine oil also lubricates the clutch and the wrong oil types or additives could cause clutch slippage. Therefore, do not add any chemical additives or use engine oils with a grade of CD (c) or higher and do not use oils labeled "ENERGY CONSERVING II" (d) or higher.
- Do not add any chemical additives. Engine oil also lubricates the clutch and additives could cause clutch slippage.
- Do not allow foreign material to enter the crankcase.

A For CDN

B For Europe, Oceania

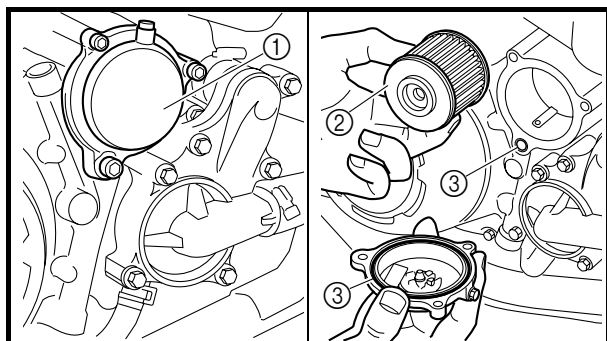
4. Start the engine, warm it up for several minutes, and then turn it off.

5. Check:

- engine oil level

NOTE:

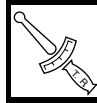
Before checking the engine oil level, wait a few minutes until the oil has settled.



CHANGING THE ENGINE OIL



- c. Install the new oil filter element and the oil filter element cover.



Oil filter element cover bolt
10 Nm (1.0 m · kg, 7.2 ft · lb)



9. Check:

- engine oil drain bolt gasket
Damage → Replace.

10. Install:

- engine oil drain bolt (crankcase)
(along with the gasket)

23 Nm (2.3 m · kg, 17 ft · lb)

- engine oil drain bolt (oil tank)
(along with the washer)

19 Nm (1.9 m · kg, 13 ft · lb)

- oil filter element drain bolt

10 Nm (1.0 m · kg, 7.2 ft · lb)

11. Fill:

- oil tank
(with the specified amount of the recommended engine oil)
- crankcase
(with the specified amount of the recommended engine oil)



Overhaul

Total amount

2.30 L (2.02 Imp qt, 2.43 US qt)

Quantity in oil tank

1.30 L (1.14 Imp qt, 1.37 US qt)

Quantity in crankcase

1.00 L (0.88 Imp qt, 1.06 US qt)

Periodic oil replacement

Total amount

1.75 L (1.54 Imp qt, 1.85 US qt)

Quantity in oil tank

1.30 L (1.14 Imp qt, 1.37 US qt)

Quantity in crankcase

0.45 L (0.40 Imp qt, 0.48 US qt)

With oil filter element replacement

Total amount

1.85 L (1.63 Imp qt, 1.96 US qt)

Quantity in oil tank

1.30 L (1.14 Imp qt, 1.37 US qt)

Quantity in crankcase

0.55 L (0.48 Imp qt, 0.58 US qt)

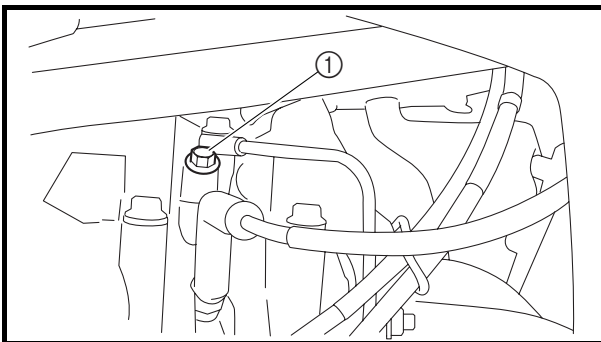
CHK
ADJ

-
- 12 Nm (1.2 m · kg, 8.7 ft · lb)**

15. Check:

- engine oil level

Refer to “CHECKING THE ENGINE OIL LEVEL”.

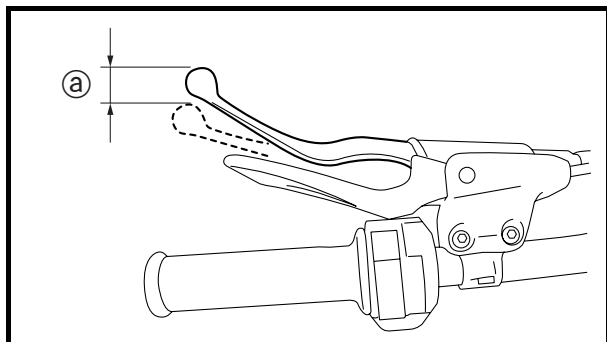


- 
- a. Slightly loosen the oil gallery bolt ①.
 - b. Start the engine and keep it idling until engine oil starts to seep from the oil gallery bolt. If no engine oil comes out after one minute, turn the engine off so that it will not seize.
 - c. Check the engine oil passages, the oil filter element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



Oil gallery bolt
10 Nm (1.0 m · kg, 7.2 ft · lb)

CHK
ADJ



EBS00070

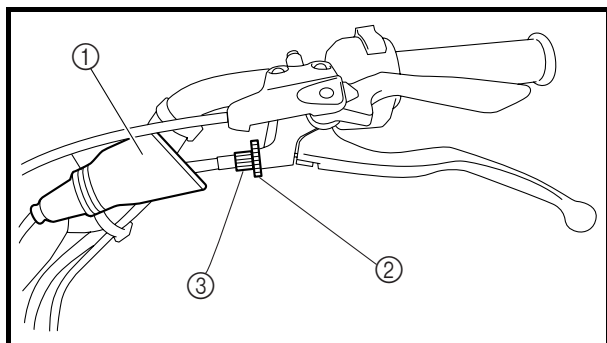
ADJUSTING THE CLUTCH CABLE

1. Check:

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

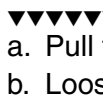


Clutch lever free play (at the clutch lever end)
5 ~ 10 mm (0.20 ~ 0.39 in)



2. Adjust:

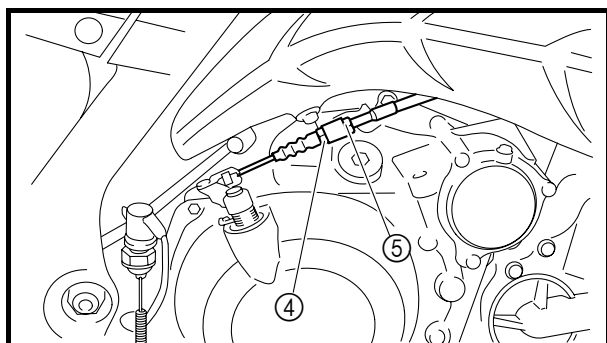
- clutch lever free play



- a. Pull the rubber cover ① off.
- b. Loosen the locknut ② and finger tighten the adjusting bolt ③.
- c. Loosen the locknut ④.
- d. Turn the adjusting nut ⑤ until the clutch lever free play is within the specified limits.



Clutch lever free play (at the clutch lever end)
5 ~ 10 mm (0.20 ~ 0.39 in)

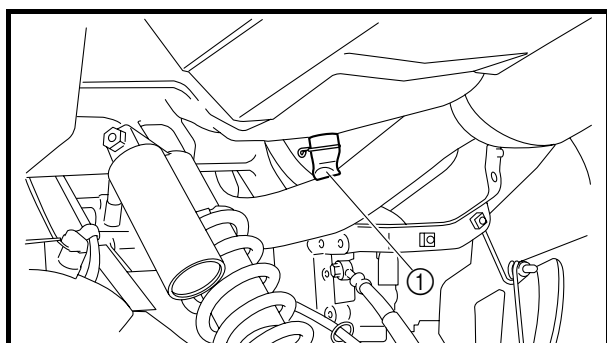


- e. Tighten the locknut ④.

NOTE:

If the specified clutch lever free play cannot be obtained on it, use the adjusting bolt ③.

- f. Turn the adjusting bolt ③ until the clutch lever free play is within the specified limits.
- g. Tighten the locknut ②.
- h. Pull the rubber cover ① in.



EBS00073

CLEANING THE AIR FILTER ELEMENT

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.

CHK
ADJ

-
- A line drawing of the front engine compartment of a vehicle. The diagram shows the engine, various fluid reservoirs, and other components. Numbered callouts are as follows: 1 points to the top of the engine; 2 points to the coolant reservoir; 3 points to the brake fluid reservoir; 4 points to the windshield washer fluid reservoir; 5 points to the battery.

-

-
- This diagram shows the front wheel (2) and the front wheel nut (3) in an exploded view. The front wheel is a solid cylindrical component with a central hub. The front wheel nut is a threaded component with a flange. The diagram illustrates how the nut is used to secure the wheel to the axle.

- 3 - 30**

CHK
ADJ

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.

- CAUTION:**

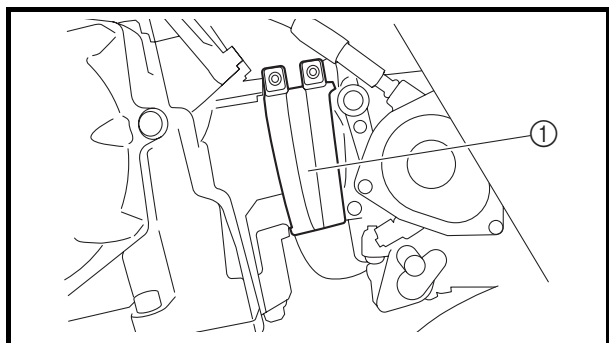
- c. Apply Yamaha foam air filter oil or other quality foam air filter oil to the element.
- d. Squeeze out the excess oil.

The element should be wet but not dripping.

6. Install:
 - air filter element frame
7. Install:
 - air filter element
 - wing bolt

Make sure its sealing surface matches the sealing surface of the case so there is no air leak.

8. Install:
 - air filter case cover
 9. Install:
 - seat
- Refer to “SEAT, FENDERS AND FUEL TANK”.



CHECKING THE THROTTLE BODY JOINT

1. Check:
 - throttle body joint ①
Cracks/damage → Replace.
Refer to “FUEL INJECTION SYSTEM” in chapter 6.

CHECKING THE FUEL HOSE/ CHECKING THE BREATHER HOSES



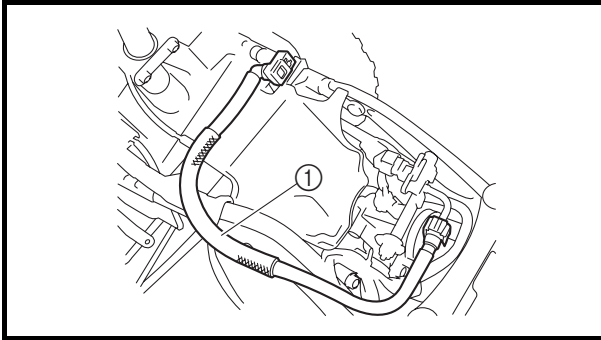
EAS00096

CHECKING THE FUEL HOSE

1. Remove:

- seat
- front fender
- fuel tank

Refer to “SEAT, FENDERS AND FUEL TANK”.



2. Check:

- fuel hose ①

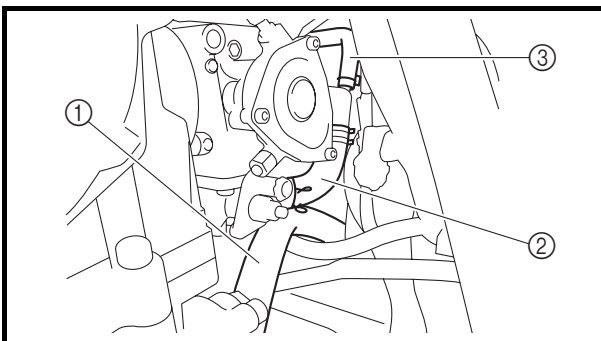
Cracks/damage → Replace.

Loose connection → Connect properly.

3. Install:

- fuel tank
- front fender
- seat

Refer to “SEAT, FENDERS AND FUEL TANK”.



EAS00098

CHECKING THE BREATHER HOSES

1. Check:

- crankcase breather hose ①
- hose (throttle-body-joint-to-throttle-body-left side) ②
- hose (throttle-body-joint-to-throttle-body-right side) ③

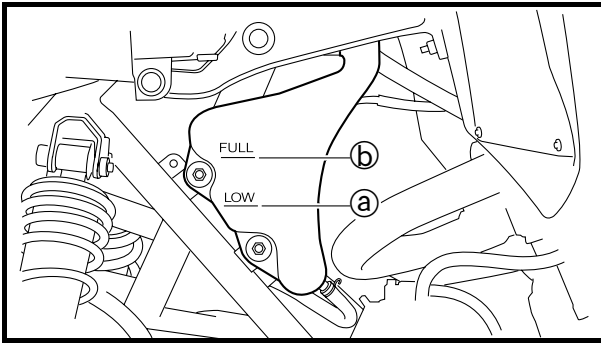
Cracks/damage → Replace.

Loose connection → Connect properly.

CAUTION:

Make sure the breather hoses are routed correctly.

CHECKING THE COOLANT LEVEL/ CHANGING THE COOLANT



EBS00076

CHECKING THE COOLANT LEVEL

1. Place the vehicle on a level surface.
2. Check:
 - coolant levelThe 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.

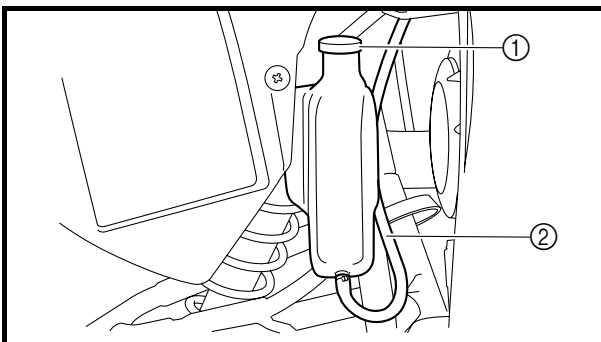
CAUTION:

- 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.

3. Start the engine, warm it up for several minutes, and then turn it off.
4. Check:
 - coolant level

NOTE:

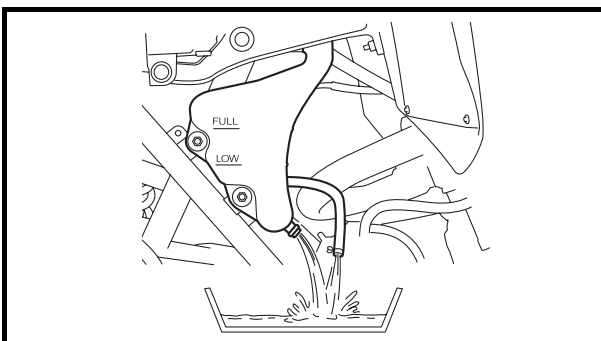
Before checking the coolant level, wait a few minutes until the coolant has settled.

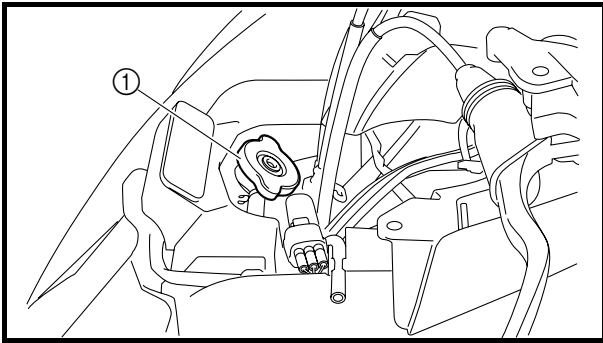


EBS00075

CHANGING THE COOLANT

1. Remove:
 - coolant reservoir cap (1)
2. Disconnect:
 - coolant reservoir hose (2)
3. Drain:
 - coolant (from the coolant reservoir)
4. Connect:
 - coolant reservoir hose



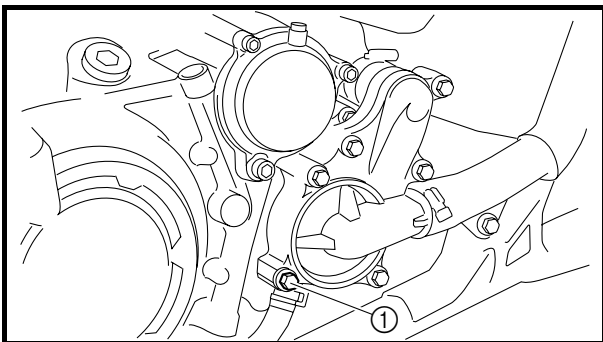


5. Remove:
- radiator cap ①

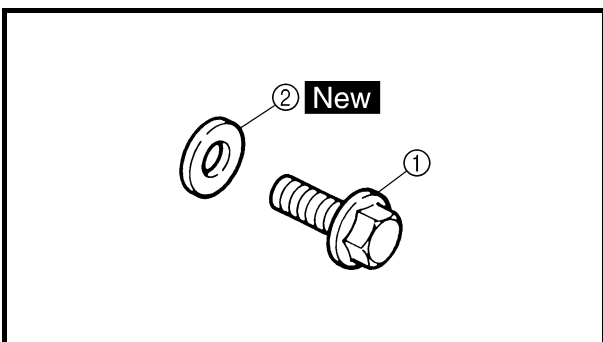
⚠ WARNING

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

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



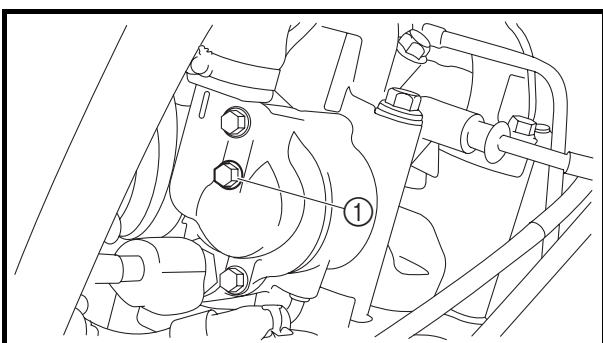
6. Remove:
- coolant drain bolt ①
(along with the copper washer)
7. Drain:
- coolant
(from the engine and radiator)



8. Check:
- coolant drain bolt ①
Damage → Replace.

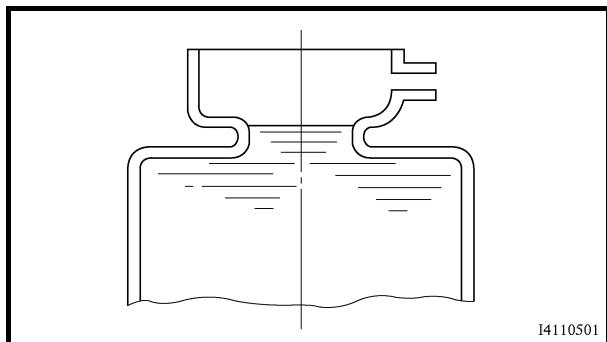
9. Install:
- copper washer ② **New**
 - coolant drain bolt

10 Nm (1.0 m · kg, 7.2 ft · lb)



10. Remove:
- air bleed bolt ①

CHANGING THE COOLANT



11.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

1.61 L (1.42 Imp qt, 1.70 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, if distilled water is not available, soft water may be used.
- If coolant comes into contact with painted surfaces, immediately wash them with water.
- Do not mix different types of antifreeze.

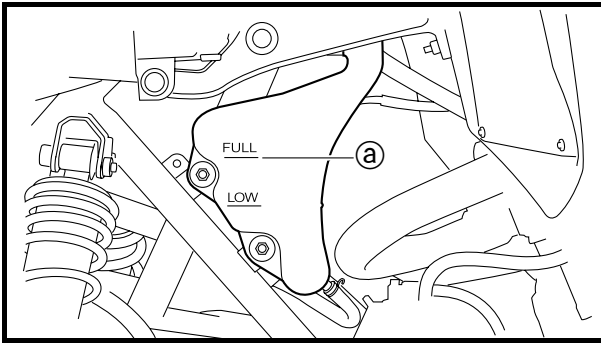
12.Install:

- air bleed bolt  10 Nm (1.0 m · kg, 7.2 ft · lb)

13.Install:

- radiator cap

CHANGING THE COOLANT/ CHECKING THE COOLING SYSTEM



14.Fill:

- coolant reservoir
(with the recommended coolant to the maximum level mark ①)

15.Install:

- coolant reservoir cap

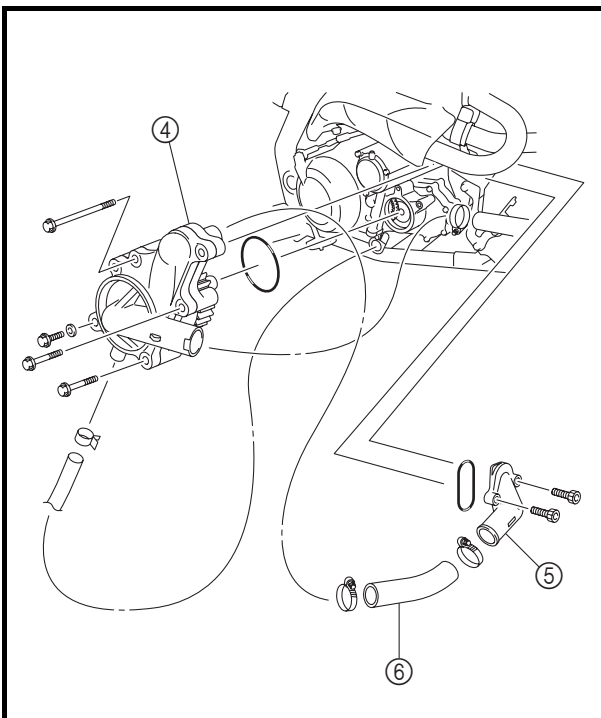
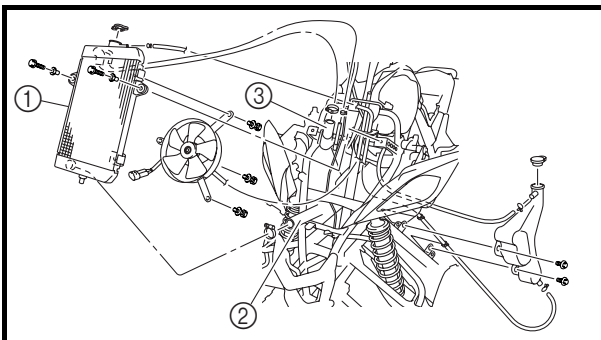
16.Start the engine, warm it up for several minutes, and then stop it.

17.Check:

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

NOTE:

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



EAS00104

CHECKING THE COOLING SYSTEM

1. Remove:

- seat
- front fender

Refer to "SEAT, FENDERS AND FUEL TANK".

2. Check:

- radiator ①
- radiator outlet hose ②
- radiator inlet hose ③
- water pump assembly ④
- water jacket inlet housing ⑤
- water pump outlet hose ⑥

Cracks/damage → Replace.

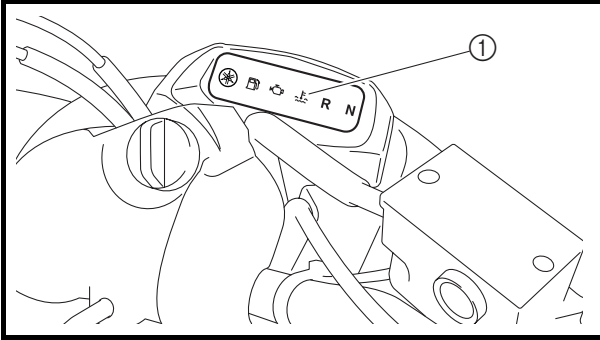
Refer to "COOLING SYSTEM" in chapter 5.

3. Install:

- front fender
- seat

Refer to "SEAT, FENDERS AND FUEL TANK".

CHECKING THE COOLANT TEMPERATURE WARNING LIGHT

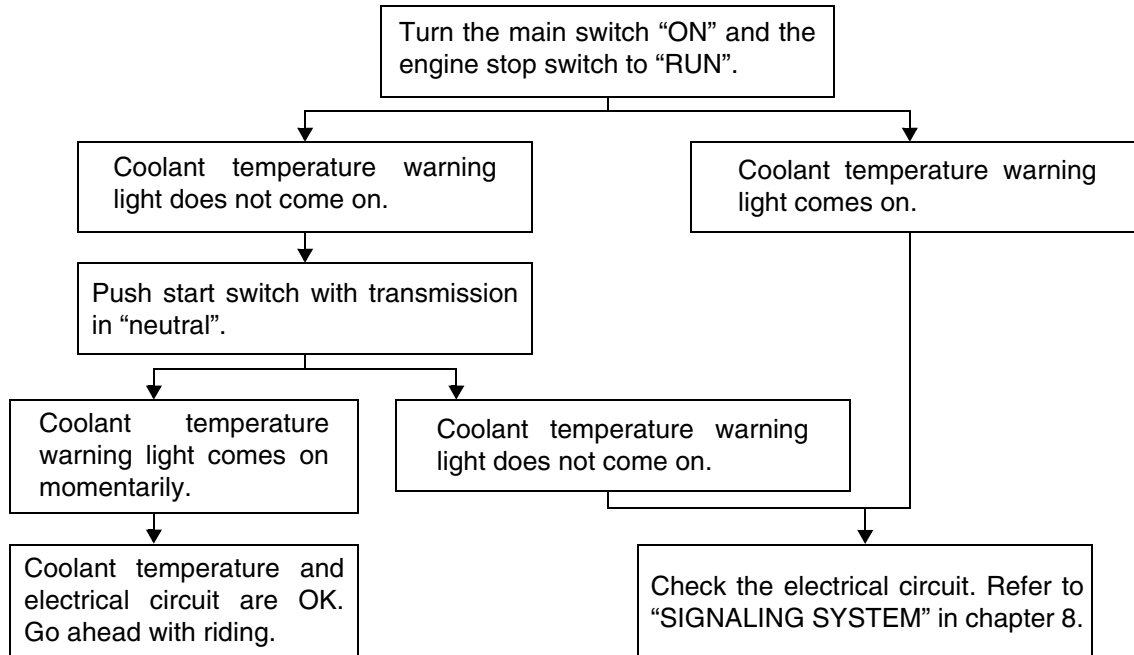


EBS00077

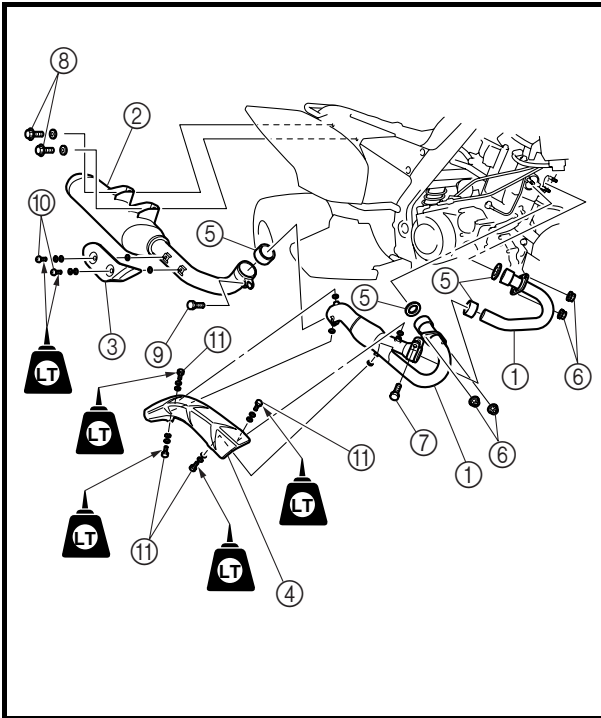
CHECKING THE COOLANT TEMPERATURE WARNING LIGHT

- ① Coolant temperature warning light

Coolant temperature warning light checking method



CHECKING THE EXHAUST SYSTEM/ CLEANING THE SPARK ARRESTER



EAS00099

CHECKING THE EXHAUST SYSTEM

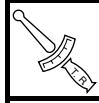
The following procedure applies to all of the exhaust pipe gaskets.

1. Check:

- exhaust pipes ①
- muffler ②
- muffler protector ③
- exhaust pipe protector ④
- Cracks/damage → Replace.
- gaskets ⑤
- Exhaust gas leaks → Replace.

2. Check:

- tightening torques



Exhaust pipe nut ⑥
20 Nm (2.0 m · kg, 14 ft · lb)
Exhaust pipe bolt ⑦
16 Nm (1.6m · kg, 11 ft · lb)
Muffler bolt ⑧
38 Nm (3.8 m · kg, 27 ft · lb)
Exhaust pipe and muffler bolt ⑨
18 Nm (1.8 m · kg, 13 ft · lb)
Muffler protector bolt ⑩
8 Nm (0.8 m · kg, 5.8 ft · lb)
Exhaust pipe protector bolt ⑪
8 Nm (0.8 m · kg, 5.8ft · lb)

CLEANING THE SPARK ARRESTER

1. Clean:

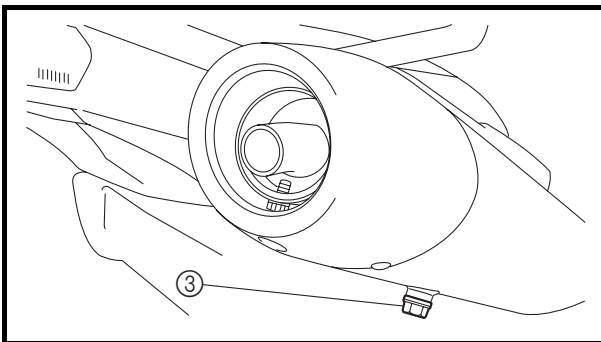
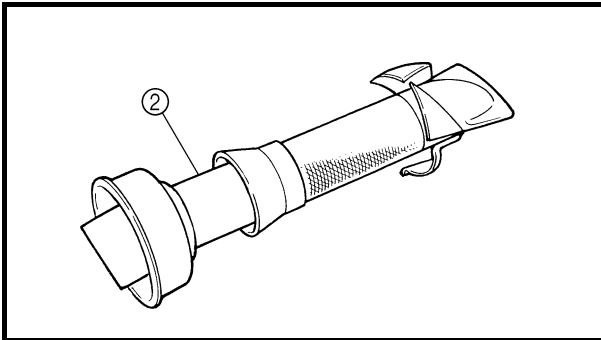
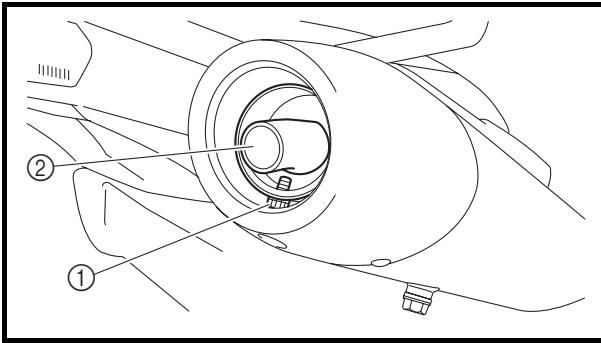
- spark arrester



⚠ WARNING

- Select a well-ventilated area free of combustible materials.
- Always let the exhaust system cool before performing this operation.
- Do not start the engine when removing the tailpipe from the muffler.
- Make sure that the transmission is in neutral.

CLEANING THE SPARK ARRESTER



- Remove the bolt ①.
- Remove the tailpipe ② by pulling it out of the muffler.
- Tap the tailpipe lightly with a soft-face hammer or suitable tool, then use a wire brush to remove any carbon deposits from the spark arrester portion of the tailpipe and inside of the tail pipe housing.
- Insert the tailpipe into the muffler and align the bolt holes.
- Insert the bolt ① and tighten it.



Bolt
8 Nm (0.8 m · kg, 5.8 ft · lb)

- Remove the purging bolt ③.
- Start the engine and rev it up approximately twenty times while momentarily creating exhaust system back pressure by blocking the end of the muffler with a shop towel.
- Stop the engine and allow the exhaust pipe to cool.
- Install the purging bolt ③ and tighten it.

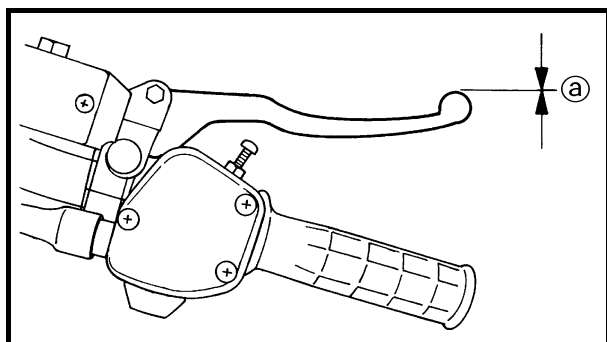


Purging bolt
27 Nm (2.7 m · kg, 19 ft · lb)



ADJUSTING THE FRONT BRAKE/ ADJUSTING THE REAR BRAKE

CHK
ADJ



EBS00080

CHASSIS

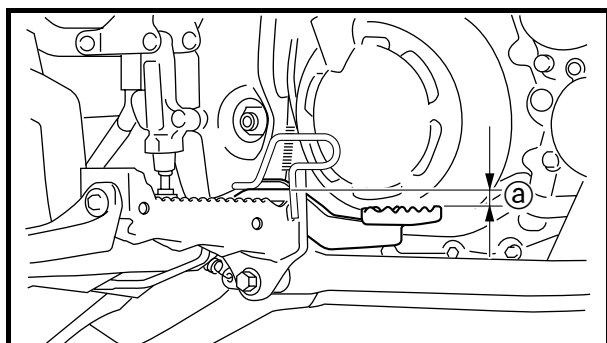
ADJUSTING THE FRONT BRAKE

1. Measure:

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



Brake lever free play (at the end of the brake lever)
0 mm (0 in)



EBS00085

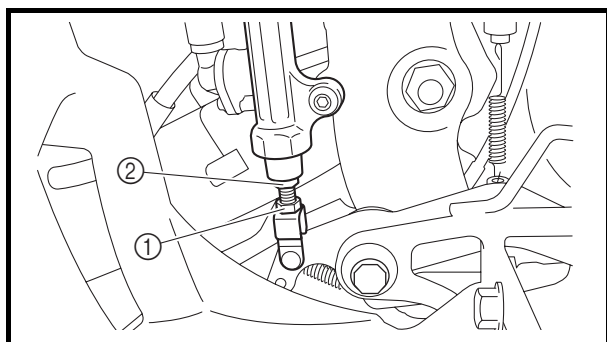
ADJUSTING THE REAR BRAKE

1. Measure:

- brake pedal height ①
Out of specification → Adjust.



Brake pedal height
15.3 mm (0.60 in)



2. Adjust:

- brake pedal height



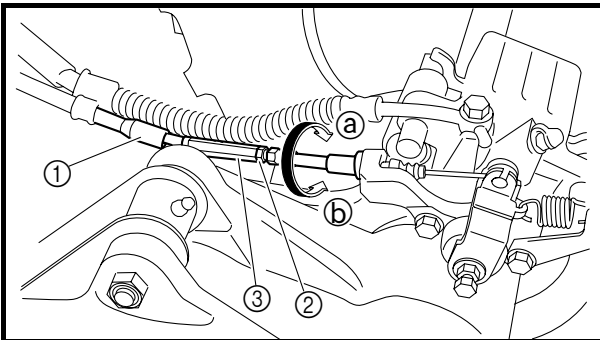
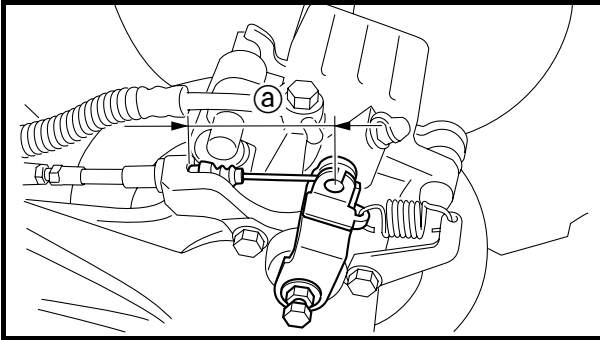
- Loosen the locknut ①.
- Turn the adjusting bolt ② until the brake pedal height is within the specified limits.
- Tighten the locknut.



Locknut
17 Nm (1.7 m · kg, 12 ft · lb)

CHK
ADJ

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.



- parking brake cable end length ①
Out of specification → Adjust.



- parking brake cable end length

- After this adjustment is performed, lift the 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.**

CHECKING THE BRAKE FLUID LEVEL



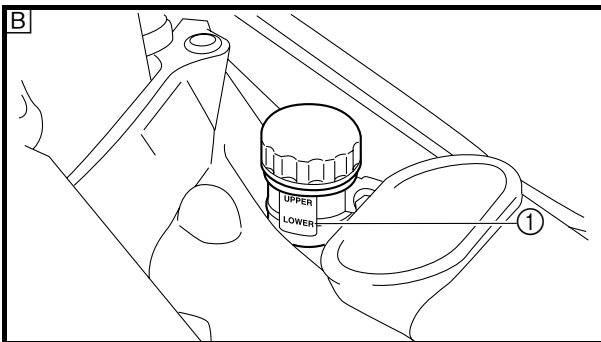
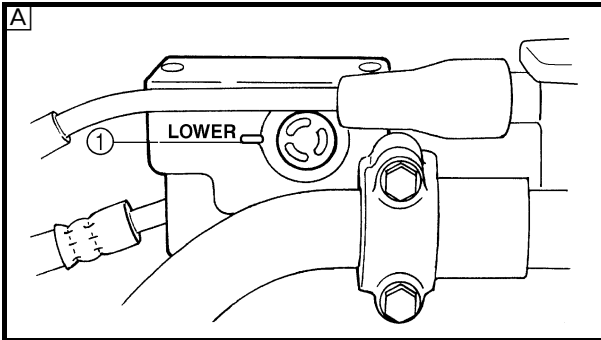
EBS00087

CHECKING THE BRAKE FLUID LEVEL

1. Place the vehicle on a level surface.

NOTE:

When checking the brake fluid level, make sure that the top of the brake master cylinder reservoir top and the brake fluid reservoir top is horizontal.



2. Check:

- brake fluid level

Below the minimum level mark ① → Add the recommended brake fluid to the proper level.



**Recommended brake fluid
DOT 4**

☐ A Front brake

☐ B Rear brake



WARNING

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

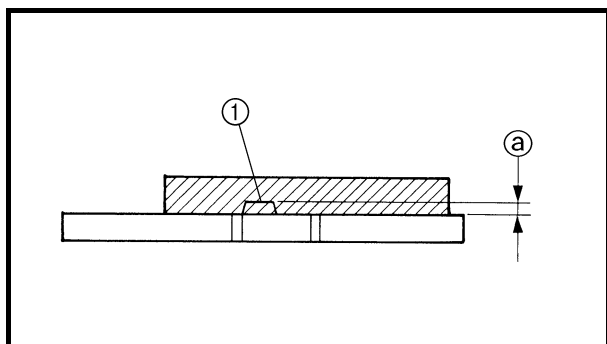
CAUTION:

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

NOTE:

In order to ensure a correct reading of the brake fluid level, make sure that the top of the brake master cylinder reservoir and the brake fluid reservoir is horizontal.

CHECKING THE FRONT BRAKE PADS/ CHECKING THE REAR BRAKE PADS



EBS00088

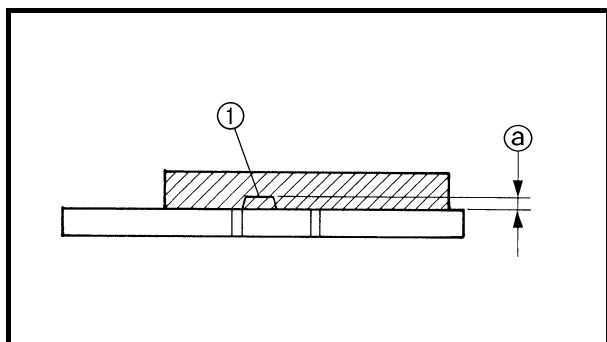
CHECKING THE FRONT BRAKE PADS

1. Remove:
 - front wheels
Refer to “FRONT AND REAR WHEELS” in chapter 7.
2. Check:
 - brake pads
Wear indicators ① almost touch the brake disc → Replace the brake pads as a set.
Refer to “FRONT AND REAR BRAKES” in chapter 7.



Brake pad wear limit ①
1.0 mm (0.04 in)

3. Operate the brake lever.
4. Install:
 - front wheels
Refer to “FRONT AND REAR WHEELS” in chapter 7.



EBS00089

CHECKING THE REAR BRAKE PADS

1. Check:
 - brake pads
Wear indicator ① almost touch the brake disc → Replace the brake pads as a set.
Refer to “FRONT AND REAR BRAKES” in chapter 7.



Brake pad wear limit ①
1.0 mm (0.04 in)

2. Operate the brake pedal.



5. Check:

- brake hoses

Apply the brake lever or brake pedal several times.

Fluid leakage → Replace the hoses.

Refer to “FRONT AND REAR BRAKES” in chapter 7.

6. Install:

- front fender
- fuel tank top panel
- seat

Refer to “SEAT, FENDERS AND FUEL TANK”.

EBS00094

BLEEDING THE HYDRAULIC BRAKE SYSTEM

WARNING

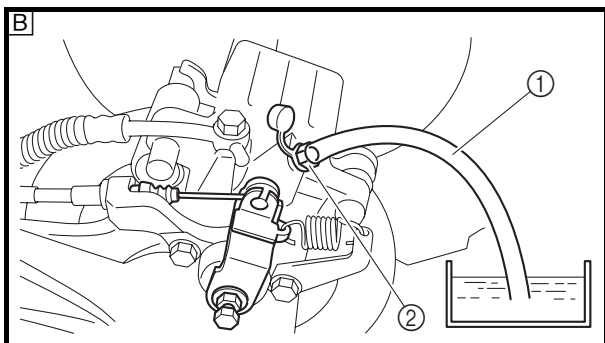
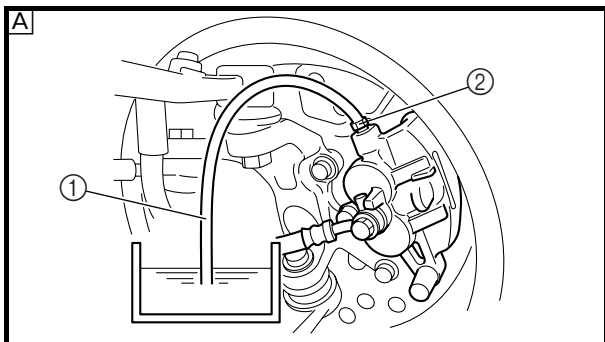
Bleed the hydraulic brake system whenever:

- the system is disassembled,
- a brake hose is loosened, disconnected or replaced,
- the brake fluid level is very low,
- brake operation is faulty.

NOTE:

- Be careful not to spill any brake fluid or allow the brake master cylinder reservoir or brake fluid reservoir to overflow.
- When bleeding the hydraulic brake system, make sure there is always enough brake fluid before applying the brake. Ignoring this precaution could allow air to enter the hydraulic brake system, considerably lengthening the bleeding procedure.
- If bleeding is difficult, it may be necessary to let the brake fluid settle for a few hours. Repeat the bleeding procedure when the tiny bubbles in the hose have disappeared.

BLEEDING THE HYDRAULIC BRAKE SYSTEM



1. Bleed:
 - hydraulic brake system



- a. Fill the brake fluid reservoir to the proper level with the recommended brake fluid.
- b. Install the diaphragm (brake master cylinder reservoir or brake fluid reservoir).
- c. Connect a clear plastic hose ① tightly to the bleed screw ②.

▲ Front

▲ Rear

- d. Place the other end of the hose into a container.
- e. Slowly apply the brake lever or brake pedal several times.
- f. Fully squeeze the brake lever or fully depress the brake pedal and hold it in position.
- g. Loosen the bleed screw.

NOTE:

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

- h. Tighten the bleed screw and then release the brake lever or brake pedal.
- i. Repeat steps (e) to (h) until all of the air bubbles have disappeared from the brake fluid in the plastic hose.
- j. Tighten the bleed screw to specification.



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

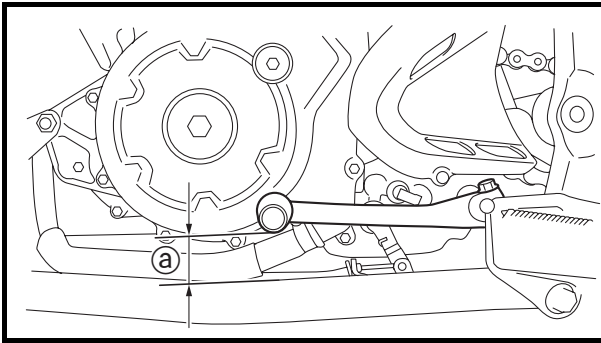
- k. Fill the brake master cylinder reservoir or the brake fluid reservoir to the proper level with the recommended brake fluid.
Refer to "CHECKING THE BRAKE FLUID LEVEL".

⚠ WARNING

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



ADJUSTING THE SHIFT PEDAL/ ADJUSTING THE REVERSE CONTROL CABLE



EBS00098

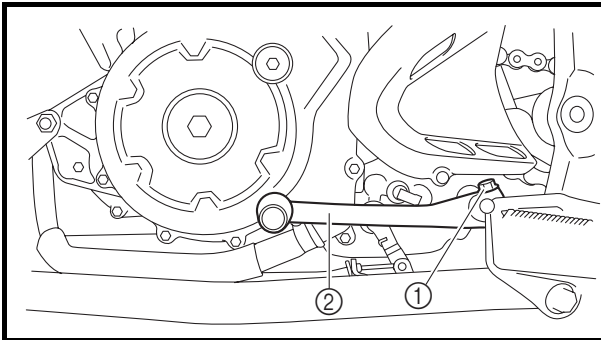
ADJUSTING THE SHIFT PEDAL

1. Measure:

- shift pedal height (a)
Out of specification → Adjust.



Shift pedal height
48 mm (1.89 in)



2. Adjust:

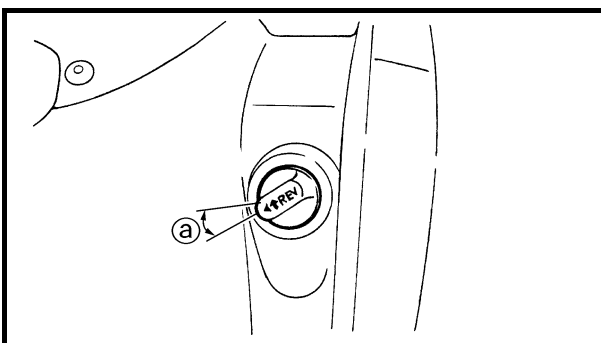
- shift pedal position



- Loosen the bolt (1).
- Remove the shift pedal (2).
- Install the shift pedal at the correct height.
- Tighten the bolt to specification.



Shift pedal bolt
16 Nm (1.6 m · kg, 11 ft · lb)



EBS00096

ADJUSTING THE REVERSE CONTROL CABLE

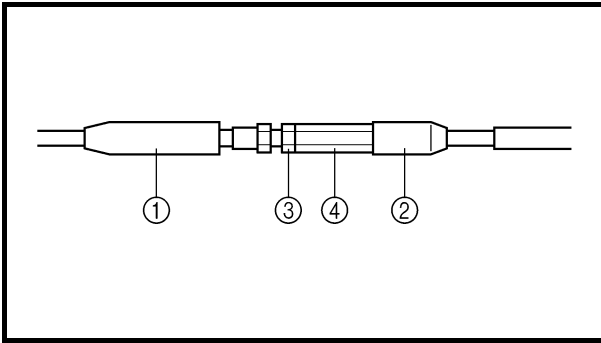
1. Check:

- reverse knob free play (a)
Out of specification → Adjust.



Reverse knob free play
0 mm (0 in)

ADJUSTING THE REVERSE CONTROL CABLE/ ADJUSTING THE DRIVE CHAIN SLACK



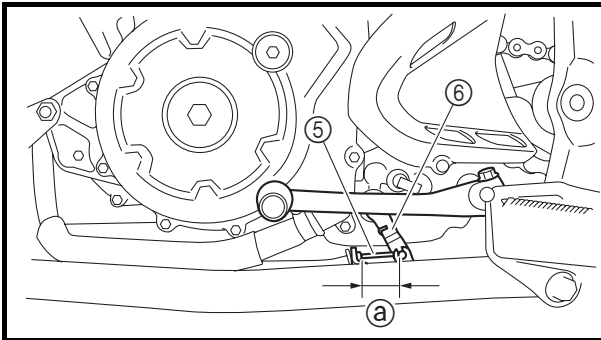
2. Adjust:
- reverse knob free play



- Pull the boots ① and ② off.
- Loosen the locknut ③.
- Turn the adjusting nut ④ until the reverse control cable ⑤ is taut or the length ⑥ is 33 mm (1.30 in).

NOTE:

Be sure to hold the reverse shift lever ⑥ when make this adjustment so that it does not move.



- Tighten the locknut ③.
- Put the boots ① and ② in.



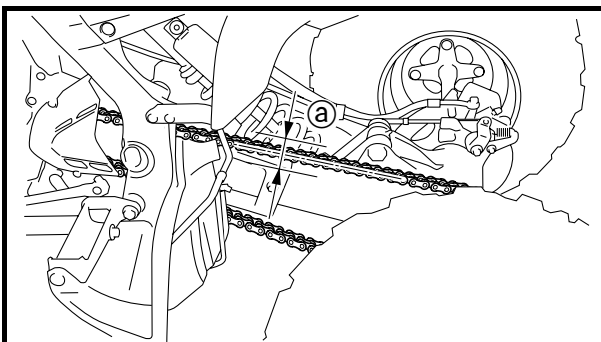
ADJUSTING THE DRIVE CHAIN SLACK

NOTE:

Measure the drive chain slack halfway between the drive axle and the rear axle.

CAUTION:

A drive chain that is too tight will overload the engine and other vital parts, and one that is too loose can skip and damage the swingarm or cause an accident. Therefore, keep the drive chain slack within the specified limits.

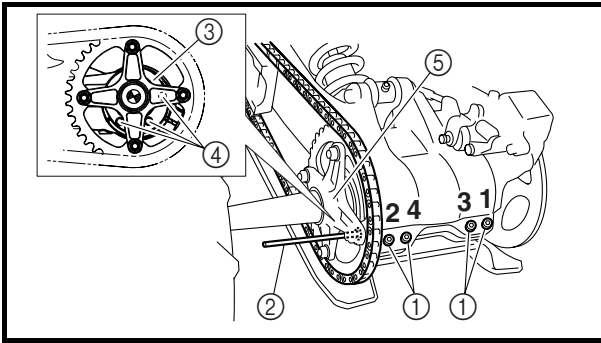


1. Measure:
- drive chain slack ①
- Out of specification → Adjust.



Drive chain slack
25 ~ 35 mm (0.98 ~ 1.38 in)

ADJUSTING THE DRIVE CHAIN SLACK



2. Adjust:
- drive chain slack



NOTE:

The drive chain slack is adjusted by the rotation of the rear axle hub.

- a. Loosen the rear axle pinch bolts ①.

NOTE:

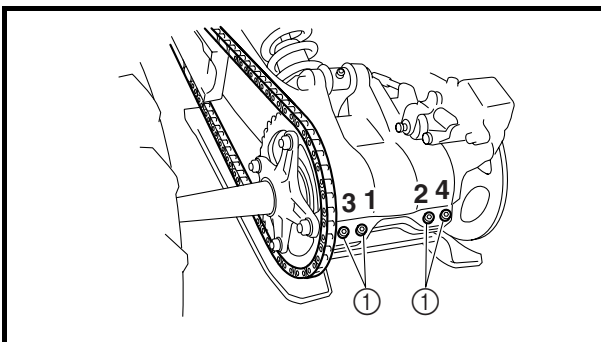
Loosen the rear axle pinch bolts in the proper sequence as shown.

- b. Insert an appropriate shaft ② in the hole ④ of rear axle hub ③ so that the sprocket bracket ⑤ does not move.
- c. Shift the transmission into the neutral position.
- d. To loosen the drive chain, push the vehicle forward, and to tighten the drive chain, pull the vehicle backward.

CAUTION:

Excessive chain slack will overload the engine and other vital parts; keep the slack within the specified limits.

- e. If the chain slack cannot be adjusted, replace the sprockets and drive chain as a set.
- f. Tighten the rear axle pinch bolts ①.



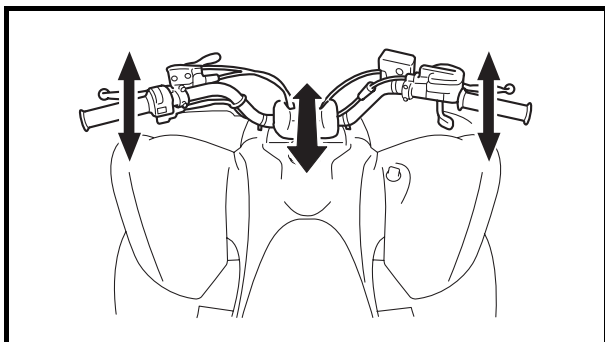
Rear axle pinch bolt
21 Nm (2.1 m · kg, 15 ft · lb)

NOTE:

- Tighten the rear axle pinch bolts ① in the proper sequence as shown.
- The chain should be cleaned and lubricated after every use of the vehicle.



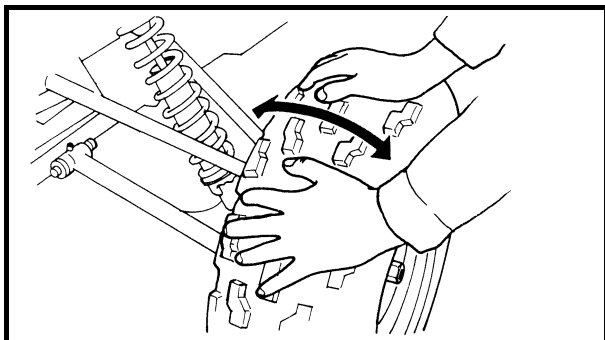
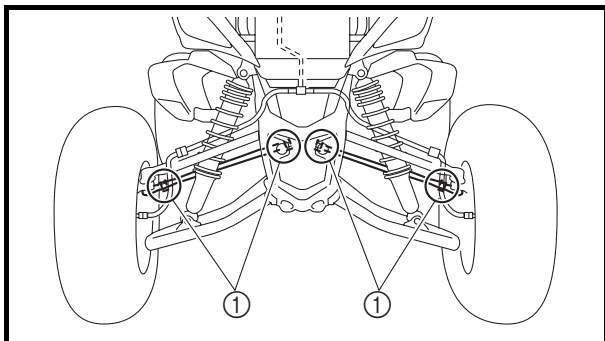
CHECKING THE STEERING SYSTEM/ ADJUSTING THE TOE-IN



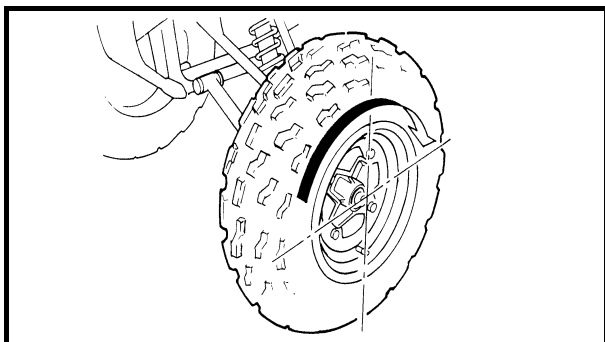
EBS00106

CHECKING THE STEERING SYSTEM

1. Place the vehicle 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.
3. Check:
 - tie-rod ends
Turn the handlebar to the left and right until it stops completely, and then move the handlebar slightly in the opposite direction.
Tie-rod end(s) ① have vertical play → Replace the tie-rod end(s).



4. Raise the front end of the vehicle 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.



EBS00108

ADJUSTING THE TOE-IN

1. Place the vehicle on a level surface.
2. Measure:
 - toe-in
Out of specification → Adjust.



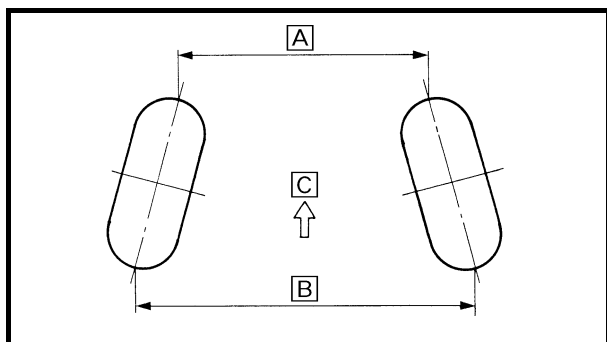
Toe-in
2 ~ 12 mm (0.08 ~ 0.47 in)
(with tires touching the ground)

NOTE:

Before measuring the toe-in, make sure that the tire pressure is correct.

- a. Mark both front tire tread centers.

ADJUSTING THE TOE-IN



- 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.

$$\text{Toe-in} = \mathbf{B} - \mathbf{A}$$

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

C Forward

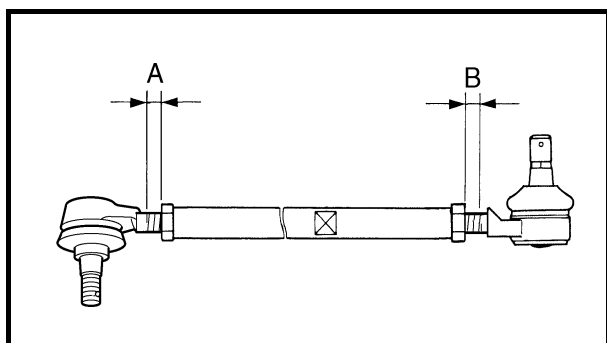
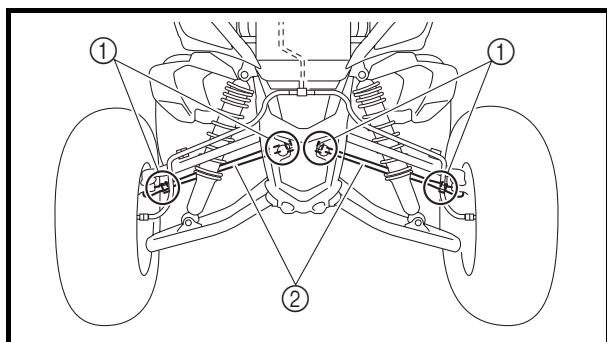


- Adjust:

- toe-in

⚠ WARNING

- Be sure that both tie-rods are turned the same amount. If not, the vehicle will drift right or left even though the handlebar is positioned straight. This may lead to mis-handling and an accident.
- After setting the toe-in to specification, run the vehicle 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.



- 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.

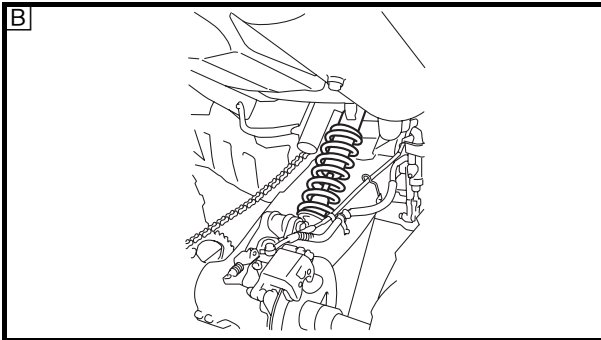
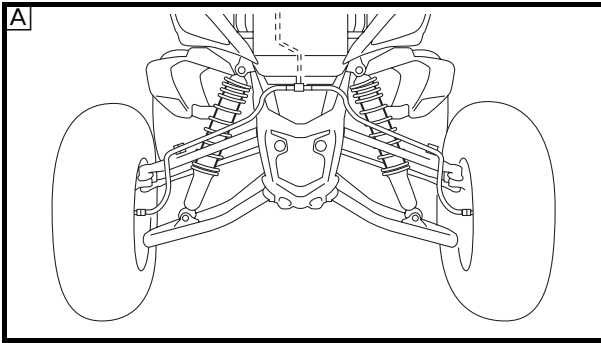


Locknut (rod end)
18 Nm (1.8 m · kg, 13 ft · lb)

NOTE:

Adjust the rod ends so that A and B are equal.





EBS00109

**CHECKING THE FRONT AND REAR SHOCK
ABSORBERS**

1. Place the vehicle on a level surface.
2. Check:
 - damper rod
Bends/damage → Replace the rear shock absorber assembly.
 - oil leakage
Excessive oil leakage → Replace the front/rear shock absorber assembly.
 - gas cylinder
Damage/gas leaks → Replace the rear shock absorber assembly.
 - spring
Fatigue → Replace the front/rear shock absorber assembly.
Refer to “FRONT ARMS AND FRONT SHOCK ABSORBER ASSEMBLIES” and “REAR SHOCK ABSORBER AND RELAY ARM” in chapter 7.
3. Check:
 - operation
Pump the shock absorbers up and down for several times.
Unsmooth operation → Replace the front/rear shock absorber assembly.
Refer to “ADJUSTING THE FRONT SHOCK ABSORBERS” and “ADJUSTING THE REAR SHOCK ABSORBER”.

A Front shock absorber

B Rear shock absorber

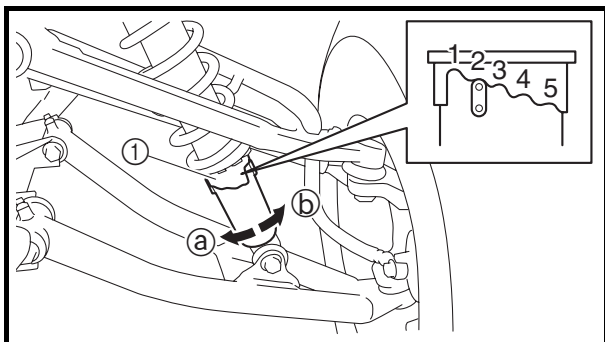
EBS00110

**ADJUSTING THE FRONT SHOCK
ABSORBERS**

⚠ WARNING

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

ADJUSTING THE FRONT SHOCK ABSORBERS/ ADJUSTING THE REAR SHOCK ABSORBER



- Adjust:
 - spring preload
 Turn the adjuster ① in direction ③ or ④.

Direction ③	Spring preload is increased (suspension is harder).
Direction ④	Spring preload is decreased (suspension is softer).

Standard position: 2
Minimum position: 1
Maximum position: 5

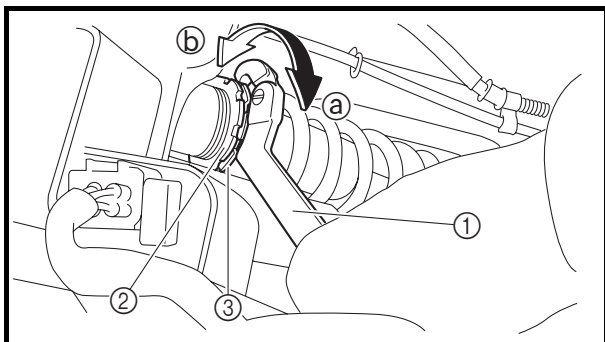
EBS00111

ADJUSTING THE REAR SHOCK ABSORBER

- Remove:
 - seat
 - air filter case
 Refer to "SEAT, FENDERS AND FUEL TANK".
- Adjust:
 - spring preload



- Elevate the rear wheels by placing a suitable stand under the frame.
- Loosen the locknut ② with the ring nut wrench ①.

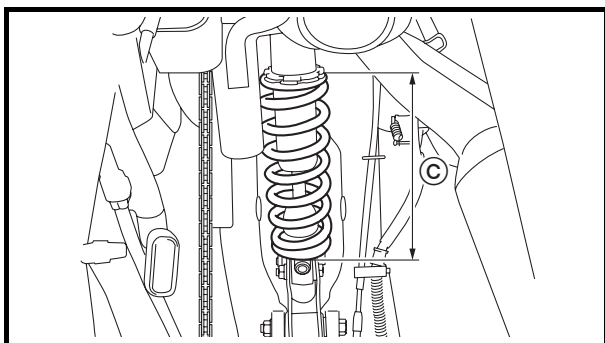


Ring nut wrench
90890-01268
Spanner wrench
YU-01268

- Turn the adjusting ring ③ in direction ③ or ④.

Direction ③	Spring preload is increased (suspension is harder).
Direction ④	Spring preload is decreased (suspension is softer).

Adjusting length ⑤
Standard: 236 mm (9.29 in)
Minimum: 228 mm (8.98 in)
Maximum: 243 mm (9.57 in)

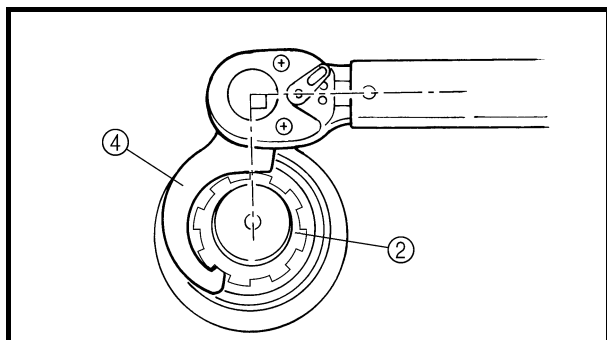


NOTE:

- Be sure to remove all dirt and mud from around the locknut and adjusting ring before adjustment.
- The length of the spring (installed) changes 1.5 mm (0.06 in) per turn of the adjuster.

CAUTION:

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



- d. Tighten the locknut (2) with a steering nut wrench (4).

NOTE:

Set the torque wrench at a right angle to the steering nut wrench.



Steering nut wrench
90890-01443
Spanner wrench
YU-33975



Locknut
42 Nm (4.2 m · kg, 30 ft · lb)

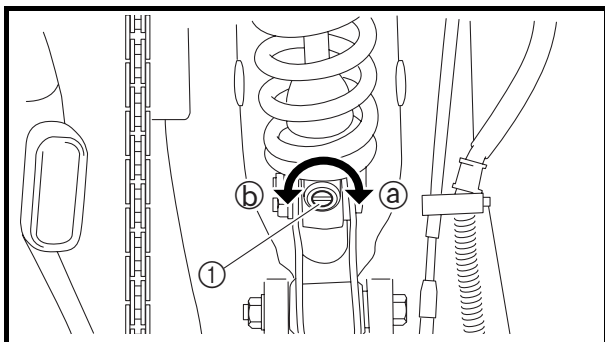
NOTE:

Always tighten the locknut against the adjusting ring, then torque it to specification.

3. Install:

- air filter case with air intake duct

ADJUSTING THE REAR SHOCK ABSORBER



4. Adjust:
- rebound damping force



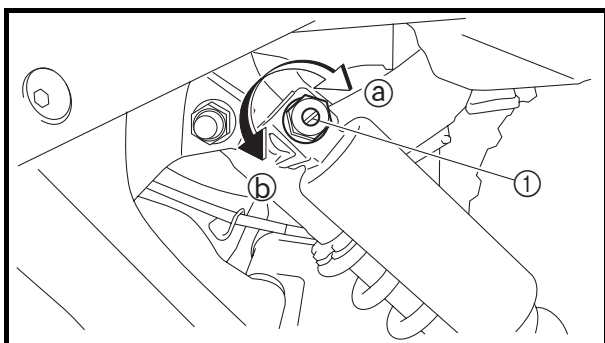
- Turn the adjusting screw ① in direction ① or ②.

Direction ①	Rebound damping force is increased.
Direction ②	Rebound damping force is decreased.

From the fully turned-in position
Standard: 12 clicks out
Minimum: 20 clicks out
Maximum: 3 clicks out

CAUTION:

Do not force the adjuster past the minimum or maximum extent of adjustment. The adjuster may be damaged.



5. Adjust:
- compression damping force



- a. Turn the adjusting screw ① in direction ① or ②.

Direction ①	Compression damping force is increased.
Direction ②	Compression damping force is decreased.

From the fully turned-in position
Standard: 7 clicks out
Minimum: 12 clicks out
Maximum: 2 clicks out

CAUTION:

Do not force the adjuster past the minimum or maximum extent of adjustment. The adjuster may be damaged.



6. Install:
- air filter case
 - seat
- Refer to "SEAT, FENDERS AND FUEL TANK".

EBS00114

CHECKING THE TIRES**⚠ 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 ATVs. 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 vehicle's handling characteristics and are therefore not recommended.

	Manufacturer	Size	Type
Front	DUNLOP	AT21 × 7-10	KT341 Radial
Rear	DUNLOP	AT20 × 10-9	KT345 Radial

• TIRE PRESSURE

- 1) Recommended tire pressure
Front 27.5 kPa (0.275 kg/cm², 4.0 psi)
Rear 27.5 kPa (0.275 kg/cm², 4.0 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 24.5 kPa (0.245 kg/cm², 3.5 psi)

Rear 24.5 kPa (0.245 kg/cm², 3.5 psi)

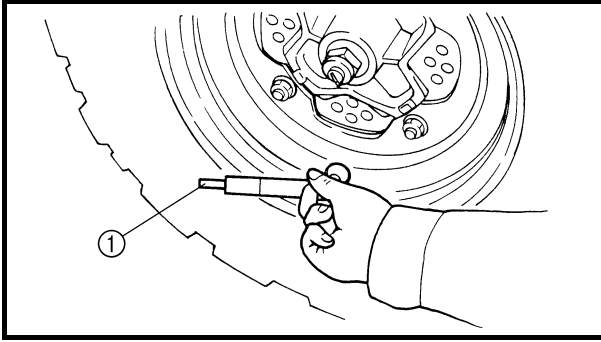
- 3) Use no more than
Front 250 kPa (2.5 kg/cm², 36 psi)
Rear 250 kPa (2.5 kg/cm², 36 psi)
when seating the tire beads. Higher pressures may cause the tire to burst. Inflate the tires slowly and carefully. Fast inflation could cause the tire to burst.

• MAXIMUM LOADING LIMIT

- 1) Vehicle load limits: 100 kg (220 lb)
*Total weight of the cargo, rider, and accessories.

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

CHECKING THE TIRES



1. Measure:

- tire pressure

Out of specification → Adjust.

NOTE:

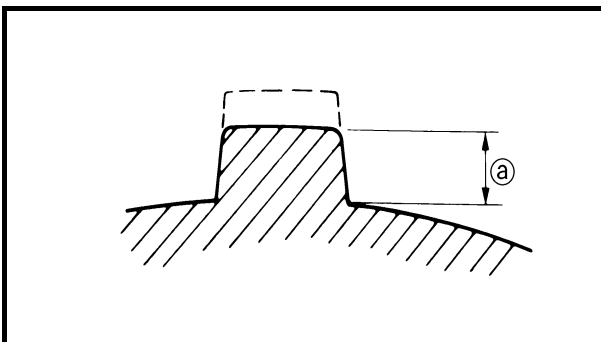
- The low-pressure tire gauge ① is included as standard equipment.
- If dust or the like is stuck to this gauge, it will not provide the correct readings. Therefore, take two measurements of the tire's pressure and use the second reading.

Cold tire pressure	Front	Rear
Standard	27.5 kPa (0.275 kg/cm ² , 4.0 psi)	27.5 kPa (0.275 kg/cm ² , 4.0 psi)
Minimum	24.5 kPa (0.245 kg/cm ² , 3.5 psi)	24.5 kPa (0.245 kg/cm ² , 3.5 psi)
Maximum	30.5 kPa (0.305 kg/cm ² , 4.4 psi)	30.5 kPa (0.305 kg/cm ² , 4.4 psi)

⚠ WARNING

Uneven or improper tire pressure may adversely affect the handling of this vehicle 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. Check:

- tire surfaces

Wear/damage → Replace.

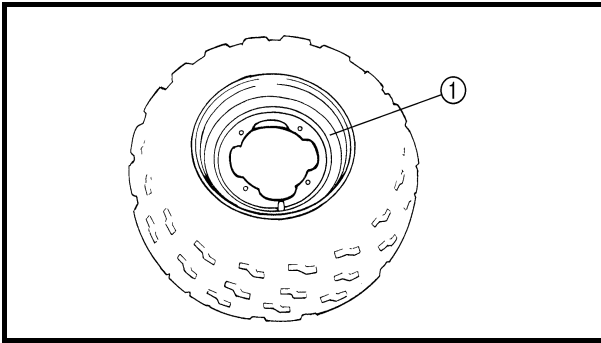


Tire wear limit @
Front and rear: 3.0 mm (0.12 in)

⚠ WARNING

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

CHECKING THE WHEELS/ CHECKING AND LUBRICATING THE CABLES



EBS00116

CHECKING THE WHEELS

1. Check:

- wheel 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.

EBS00117

CHECKING AND LUBRICATING THE CABLES

⚠ 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. Check:

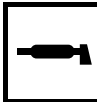
- cable sheath

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-based grease
(onto end of the cable)

LUBRICATING THE LEVERS AND PEDALS

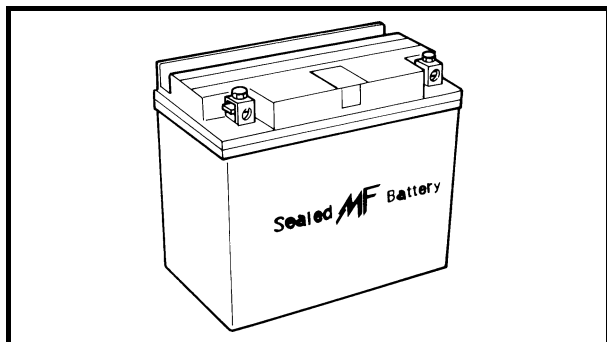


EBS00118

LUBRICATING THE LEVERS AND PEDALS

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

	Recommended lubricant Lithium-soap-based grease
---	--



EBS00120

ELECTRICAL SYSTEM

CHECKING AND CHARGING THE BATTERY

WARNING

Batteries generate explosive hydrogen gas and contain electrolyte which is made of poisonous and highly caustic sulfuric acid. Therefore, always follow these preventive measures:

- Wear protective eye gear when handling or working near batteries.
- Charge batteries in a well-ventilated area.
- Keep batteries away from fire, sparks or open flames (e.g., welding equipment, lighted cigarettes).
- DO NOT SMOKE when charging or handling batteries.
- KEEP BATTERIES AND ELECTROLYTE OUT OF REACH OF CHILDREN.
- Avoid bodily contact with electrolyte as it can cause severe burns or permanent eye injury.

FIRST AID IN CASE OF BODILY CONTACT: EXTERNAL

- Skin — Wash with water.
- Eyes — Flush with water for 15 minutes and get immediate medical attention.

INTERNAL

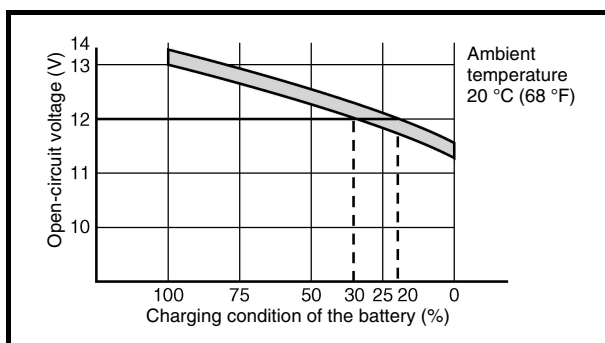
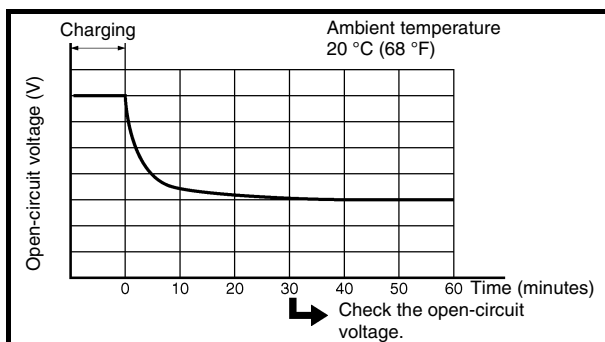
- Drink large quantities of water or milk followed with milk of magnesia, beaten egg or vegetable oil. Get immediate medical attention.

CAUTION:

- This is a sealed battery. Never remove the sealing caps because the balance between cells will not be maintained and battery performance will deteriorate.
 - Charging time, charging amperage and charging voltage for an MF battery are different from those of conventional batteries. The MF battery should be charged as explained in the charging method illustrations. If the battery is overcharged, the electrolyte level will drop considerably. Therefore, take special care when charging the battery.
-

CHK
ADJ

- c. Open-circuit voltage = 12.0 V
- d. Charging time = 6.5 hours
- e. Charge of the battery = 20 ~ 30%

[illegible]

- WARNING**

Do not quick charge a battery.

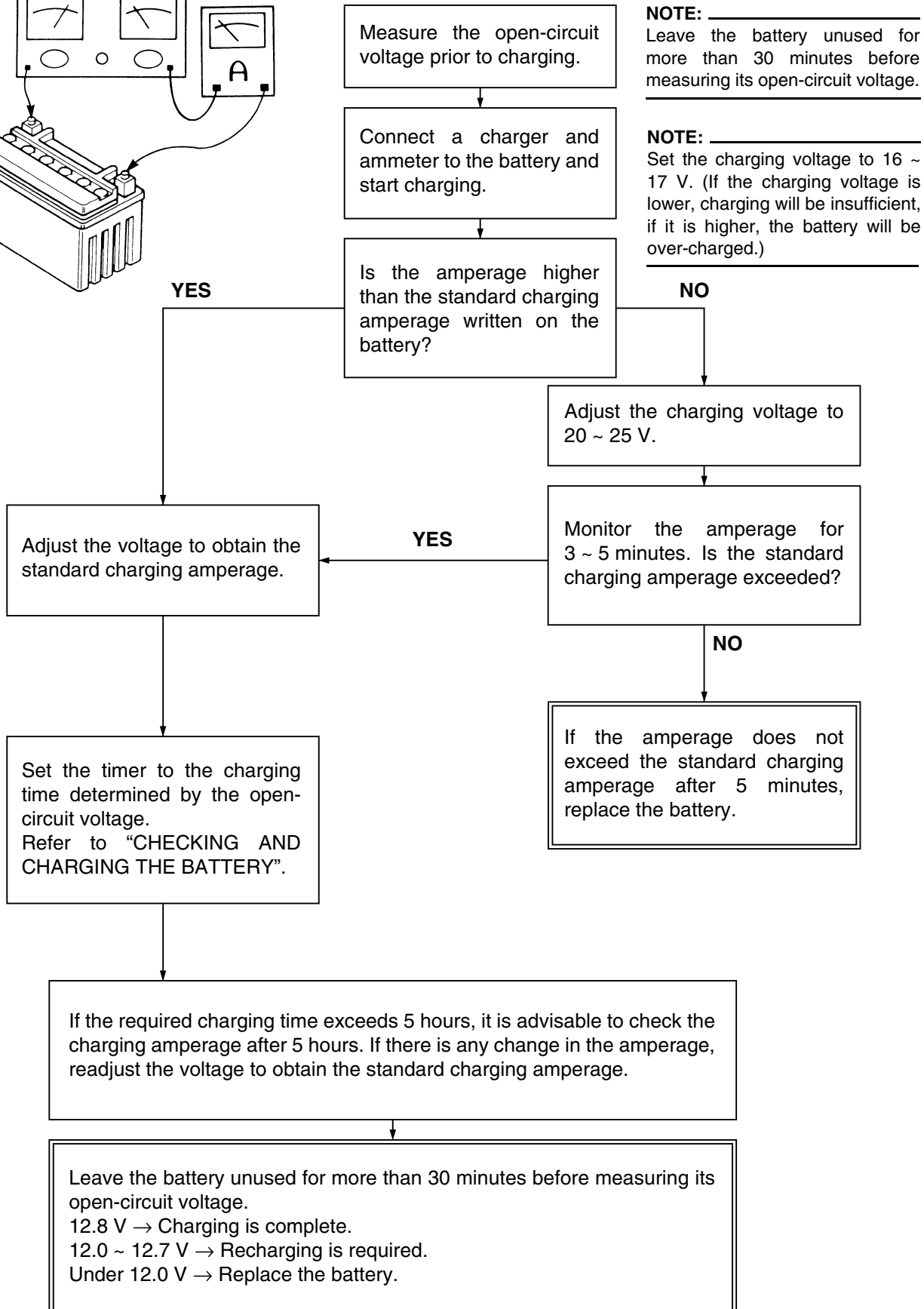
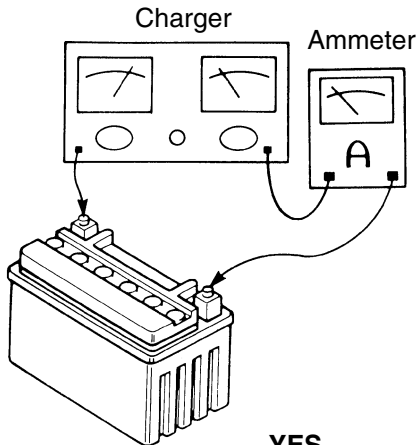
CAUTION:

- 3 - 62**

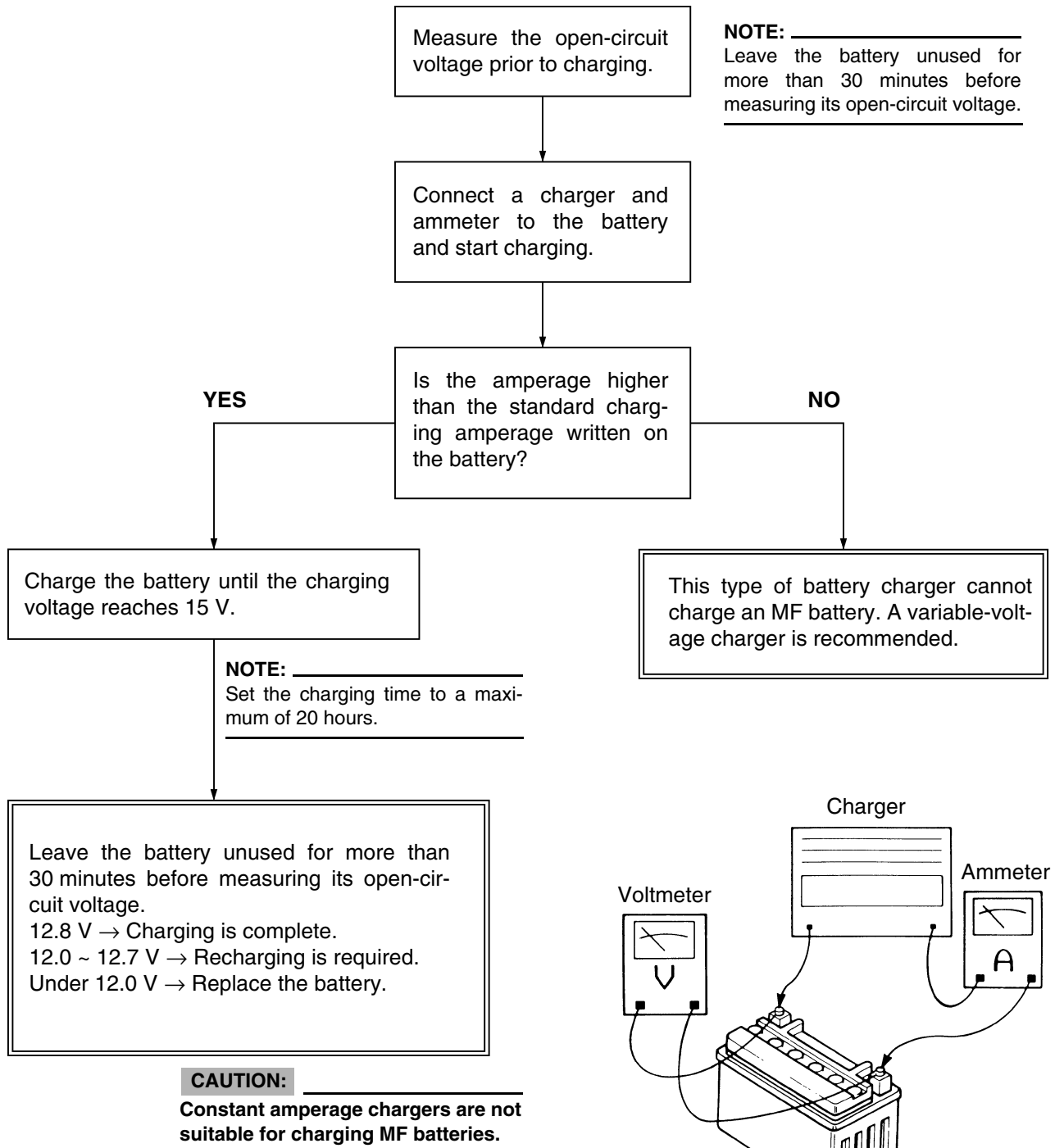


- If the battery becomes hot to the touch at any time during the charging process, disconnect the battery charger and let the battery cool before reconnecting it. Hot batteries can explode!
 - As shown in the following illustration, the open-circuit voltage of an MF battery stabilizes about 30 minutes after charging has been completed. Therefore, wait 30 minutes after charging is completed before measuring the open-circuit voltage.
-

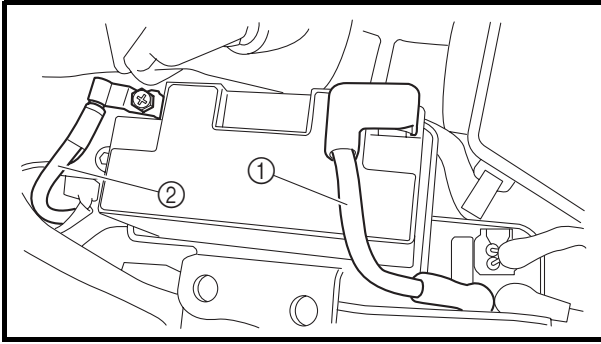
Charging method using a variable-current (voltage) charger



Charging method using a constant voltage charger



CHECKING AND CHARGING THE BATTERY/ CHECKING THE FUSES



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

CAUTION:

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

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

	Recommended lubricant Dielectric grease
---	--

10. Install:
 - battery holding bracket
 - seat
Refer to “SEAT, FENDERS AND FUEL TANK”.

EBS00121

CHECKING THE FUSES

The following procedure applies to all of the fuses.

CAUTION:

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

1. Remove:
 - seat
Refer to “SEAT, FENDERS AND FUEL TANK”.



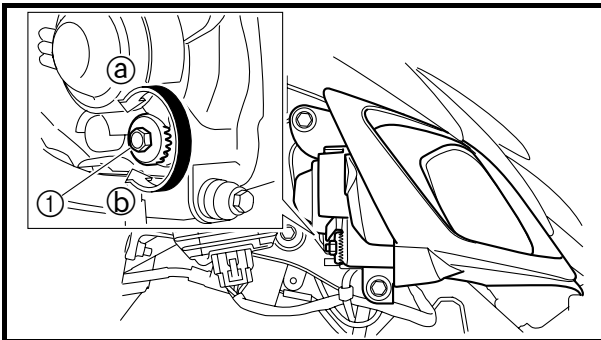
⚠ WARNING

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

4. Install:

- seat

Refer to "SEAT, FENDERS AND FUEL TANK".



EBS00122

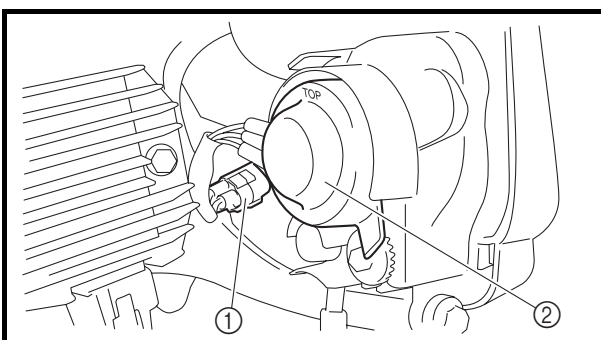
ADJUSTING THE HEADLIGHT BEAMS

1. Adjust:

- headlight beam (vertically)

a. Turn the adjusting bolt ① in direction ① or ②.

Direction ①	Headlight beam is raised.
Direction ②	Headlight beam is lowered.



EBS00124

REPLACING A HEADLIGHT BULB

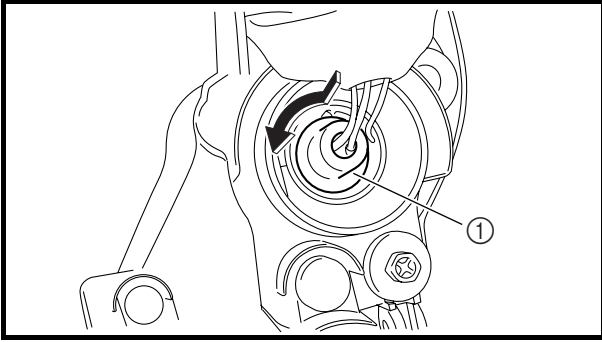
1. Disconnect:

- headlight coupler ①

2. Remove:

- headlight bulb holder cover ②

REPLACING A HEADLIGHT BULB



3. Remove:
- bulb holder ①
 - bulb

NOTE:

Push the headlight bulb holder inward, turn it 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.

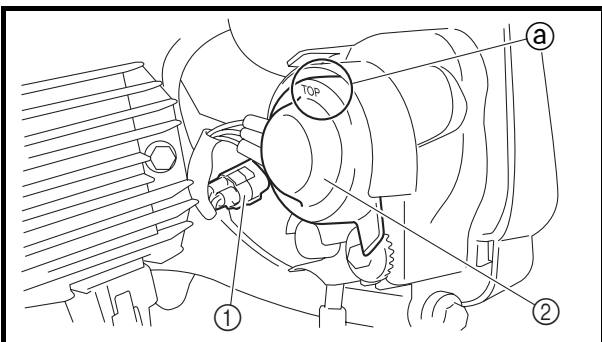
4. Install:

- 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.



5. Install:
- bulb holder
 - headlight bulb holder cover ①

NOTE:

After installing the bulb holder cover, make sure that the "TOP" mark ① is in the position shown.

6. Connect:

- headlight lead coupler ②



CHAPTER 4

ENGINE

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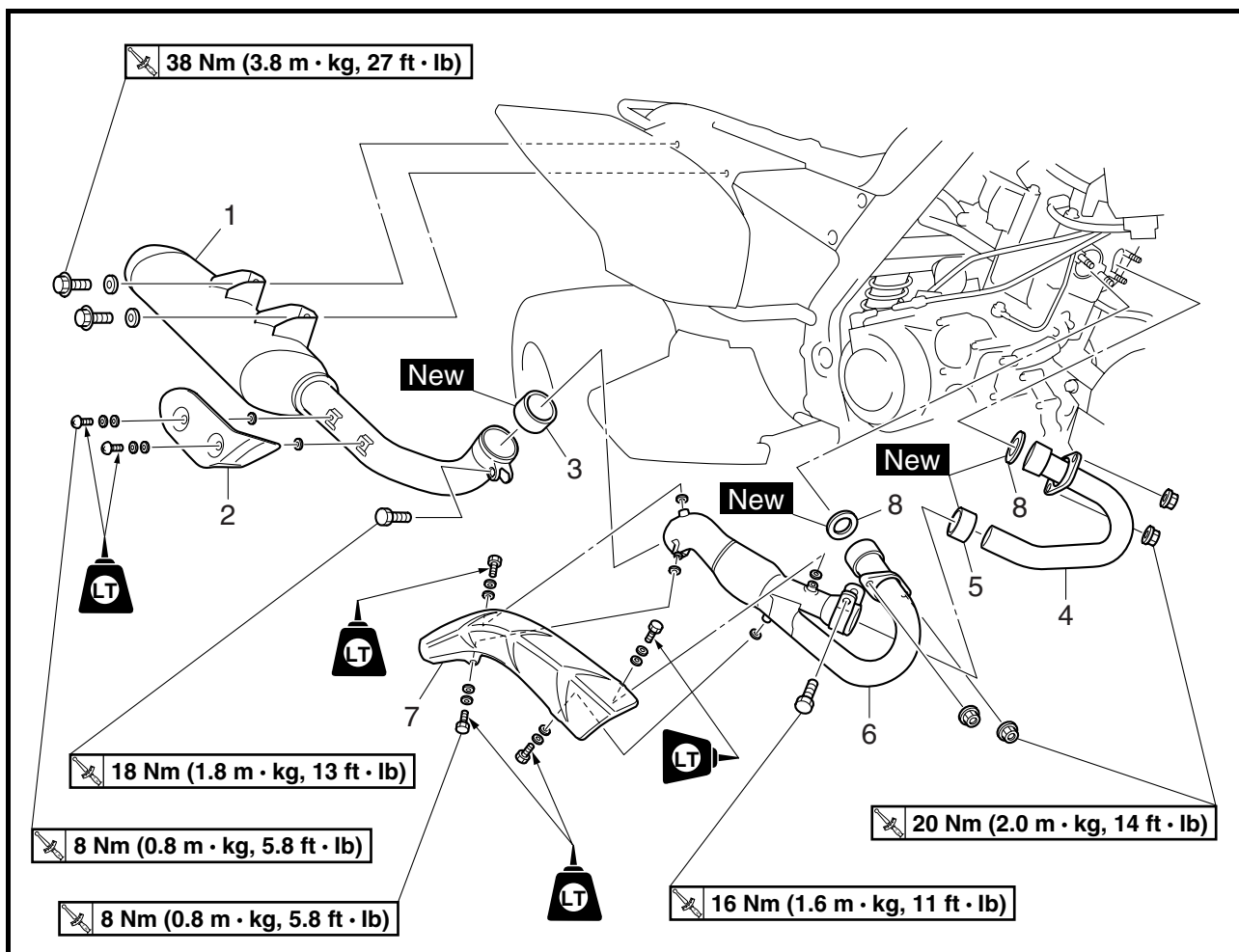


EBS00198

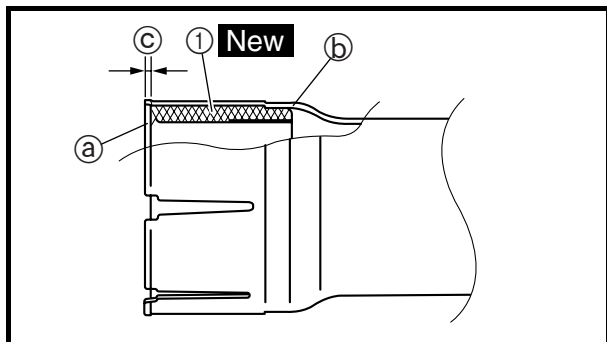
ENGINE

ENGINE REMOVAL

MUFFLER AND EXHAUST PIPES



Order	Job/Part	Q'ty	Remarks
	Removing the muffler and exhaust pipes		Remove the parts in the order listed.
	Seat/fuel tank top panel		Refer to "SEAT, FENDERS AND FUEL TANK" in chapter 3.
1	Muffler	1	Refer to "INSTALLING THE EXHAUST PIPES AND MUFFLER".
2	Muffler protector	1	
3	Gasket	1	
4	Exhaust pipe 1	1	
5	Gasket	1	
6	Exhaust pipe 2	1	
7	Exhaust pipe protector	1	
8	Gasket	2	For installation, reverse the removal procedure.

**INSTALLING THE EXHAUST PIPES AND MUFFLER**

1. Install:

- gasket ① **New**
(to muffler)

NOTE:

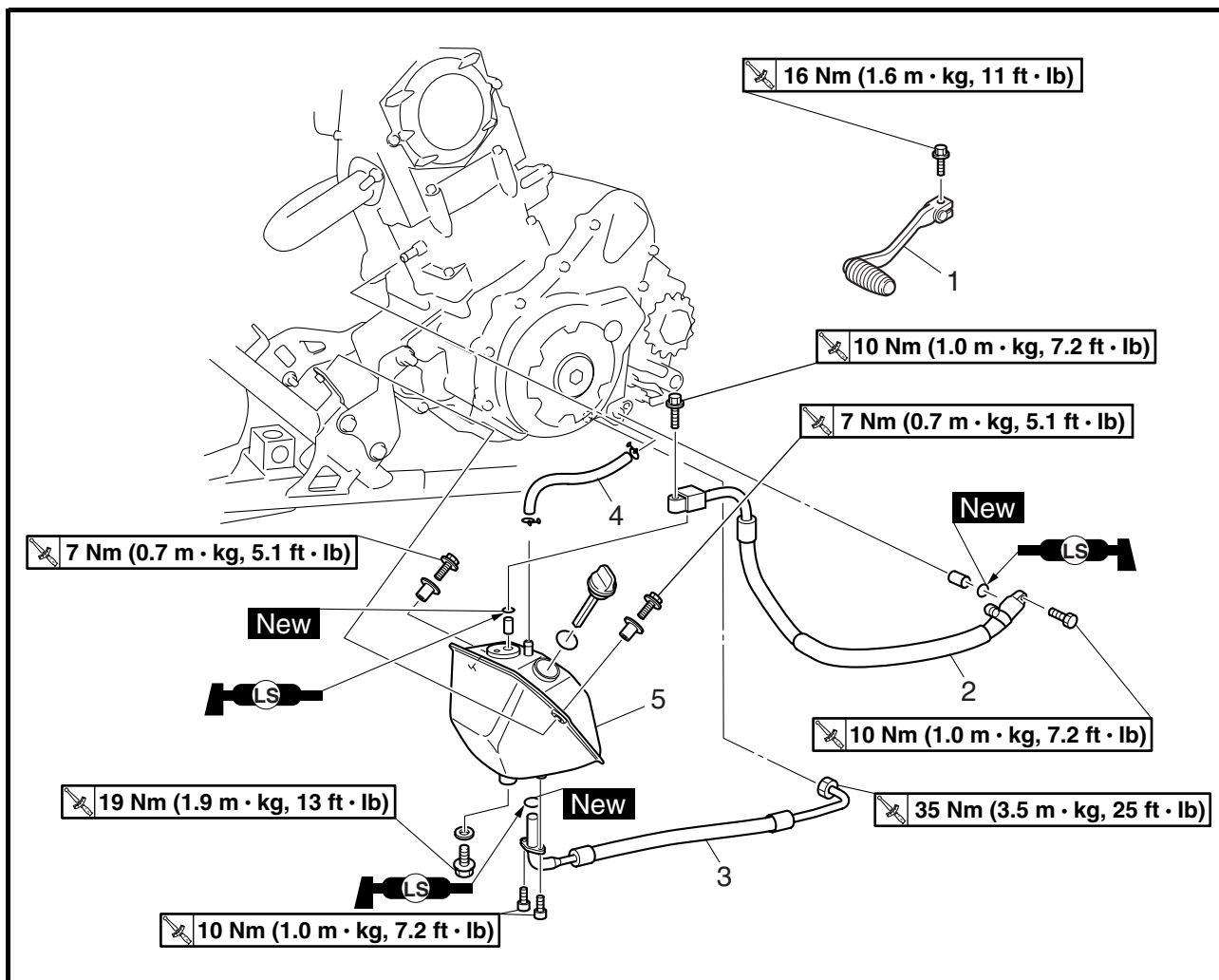
Install the gasket with the chamfer ①, located on an inner rim of the gasket, and the chamfer ②, located on an outer rim of the gasket, as shown.



Installed depth of gasket ③
1.0 ~ 1.5 mm (0.04 ~ 0.06 in)



OIL TANK

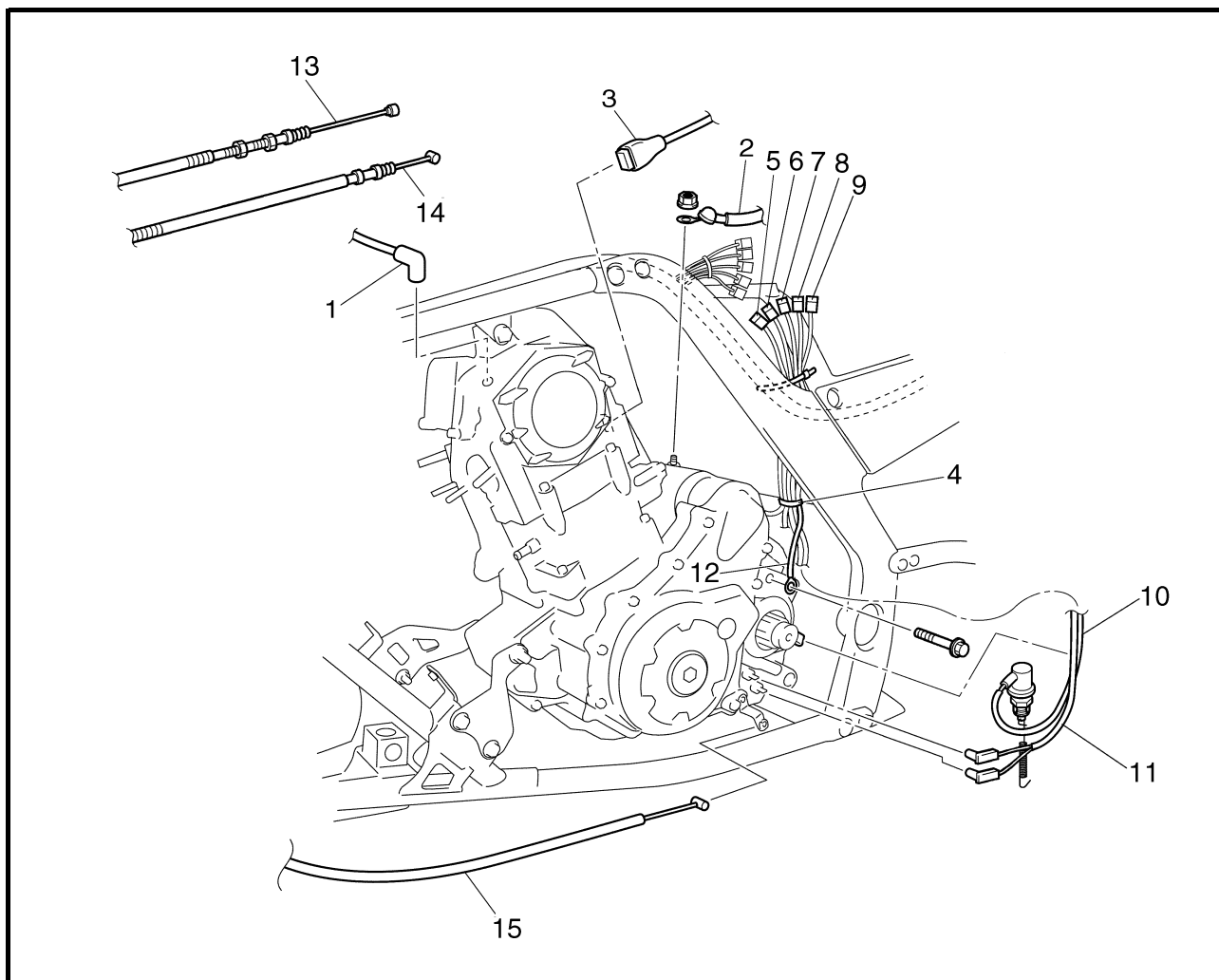


Order	Job/Part	Q'ty	Remarks
	Removing the oil tank		
	Engine oil		Remove the parts in the order listed.
	Engine skid plate		Drain.
			Refer to "SEAT, FENDERS AND FUEL TANK" in chapter 3.
1	Shift pedal	1	
2	Oil tank inlet hose	1	
3	Oil tank outlet hose	1	
4	Oil tank breather hose	1	
5	Oil tank	1	
			For installation, reverse the removal procedure.

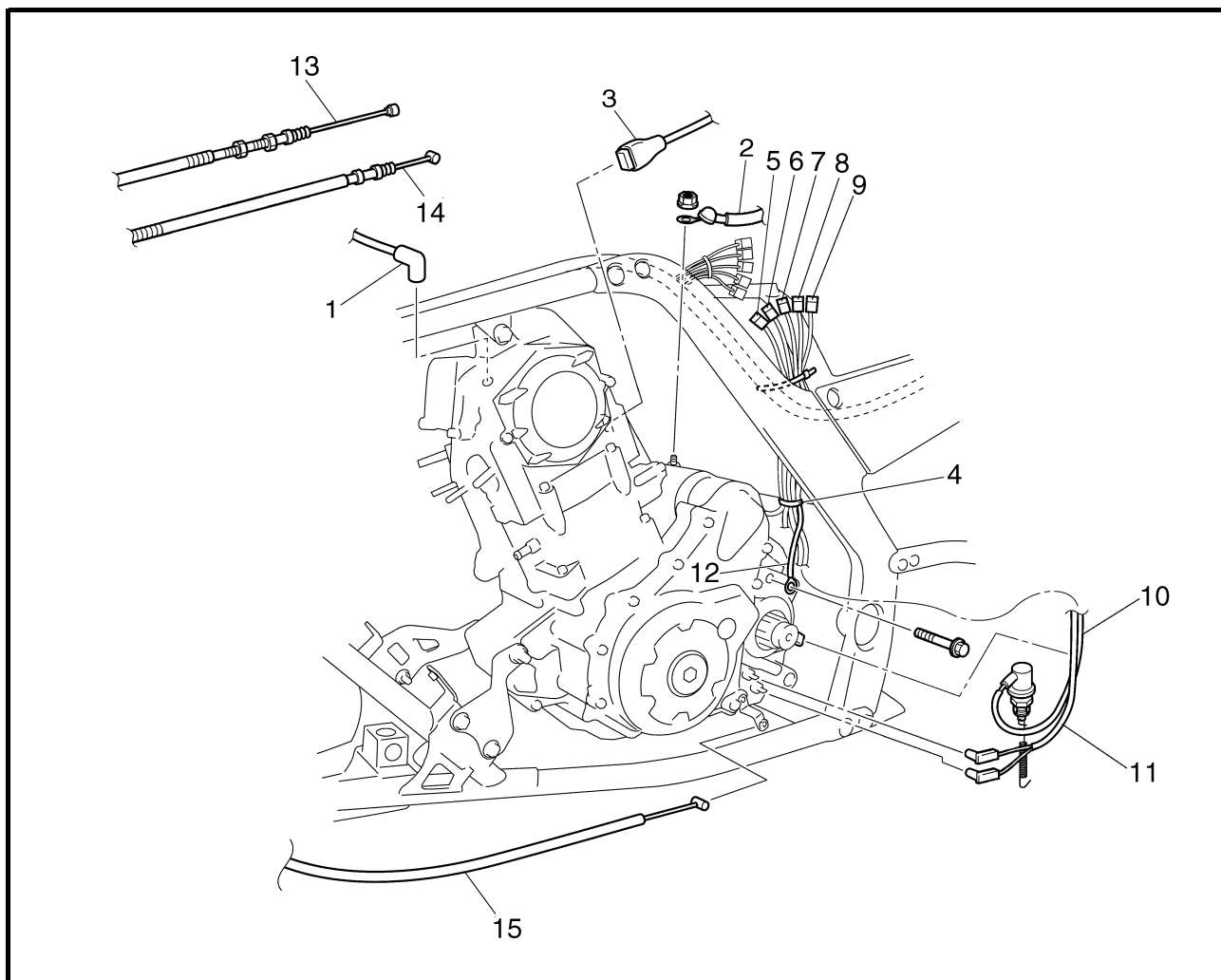


EBS00204

LEADS, CABLES AND HOSES



Order	Job/Part	Q'ty	Remarks
	Removing the leads, cables and hoses		Remove the parts in the order listed.
	Coolant		Drain.
	Right foot protector/air filter case/battery/fuel tank		Refer to "SEAT, FENDERS AND FUEL TANK" in chapter 3.
	Rear brake light switch/right footrest		Refer to "REAR BRAKE MASTER CYLINDER" in chapter 7.
	Radiator inlet hose		Refer to "THERMOSTAT" in chapter 5.
	Radiator outlet hose		Refer to "WATER PUMP" in chapter 5.
	Throttle body		Refer to "THROTTLE BODY" in chapter 6.
	Drive sprocket		Refer to "SWINGARM AND DRIVE CHAIN" in chapter 7.
1	Spark plug cap	1	
2	Starter motor lead	1	

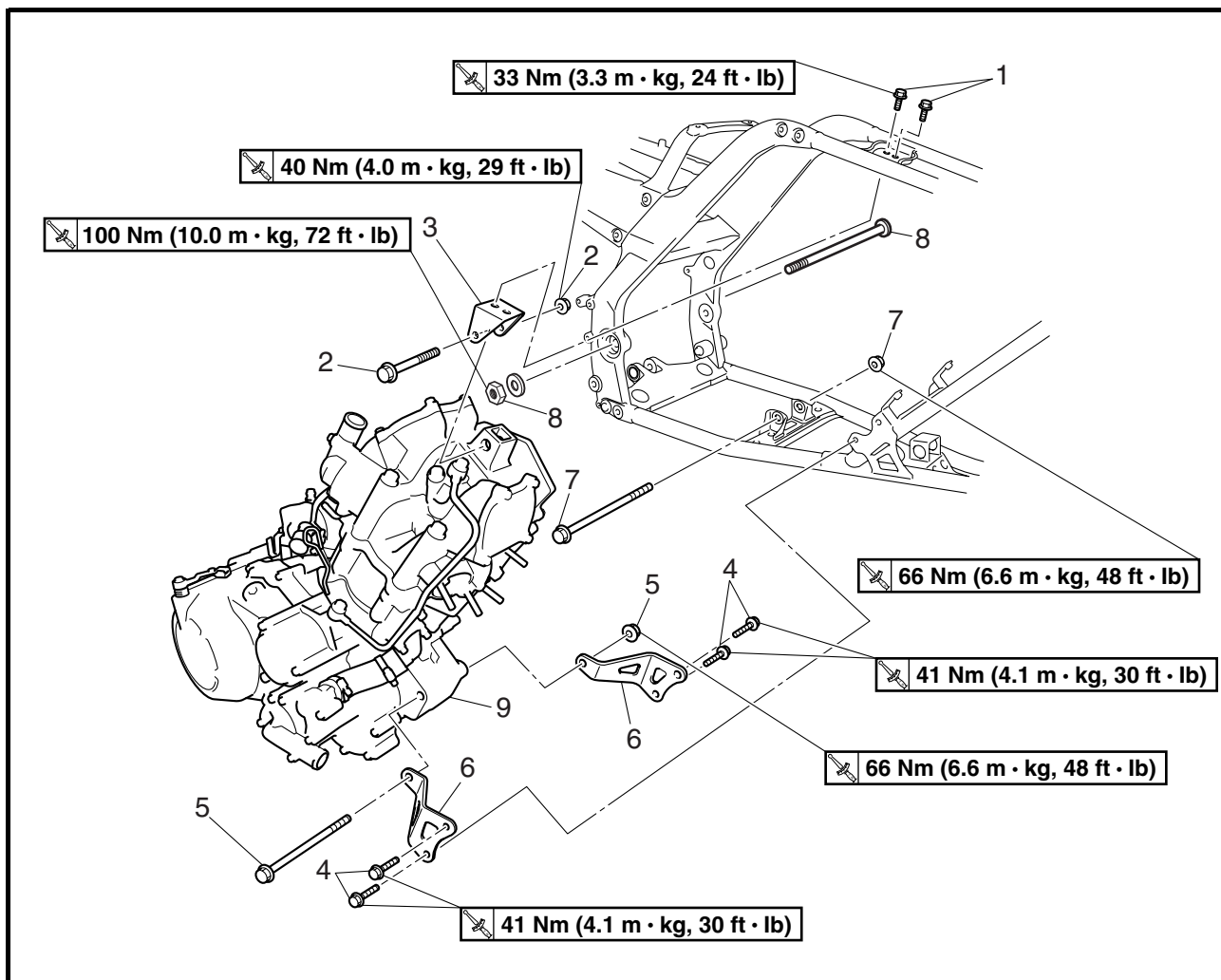


Order	Job/Part	Q'ty	Remarks
3	Coolant temperature sensor coupler	1	Disconnect.
4	Plastic band	1	
5	Wire sub lead coupler	1	
6	Speed sensor coupler	1	
7	A.C. magneto coupler	1	Disconnect.
8	Crankshaft position sensor coupler	1	Disconnect.
9	Rear brake light switch coupler	1	
10	Rear brake light switch lead	1	
11	Wire sub lead	1	
12	Ground lead	1	
13	Clutch cable	1	
14	Parking brake cable	1	
15	Reverse control cable	1	
			For installation, reverse the removal procedure.

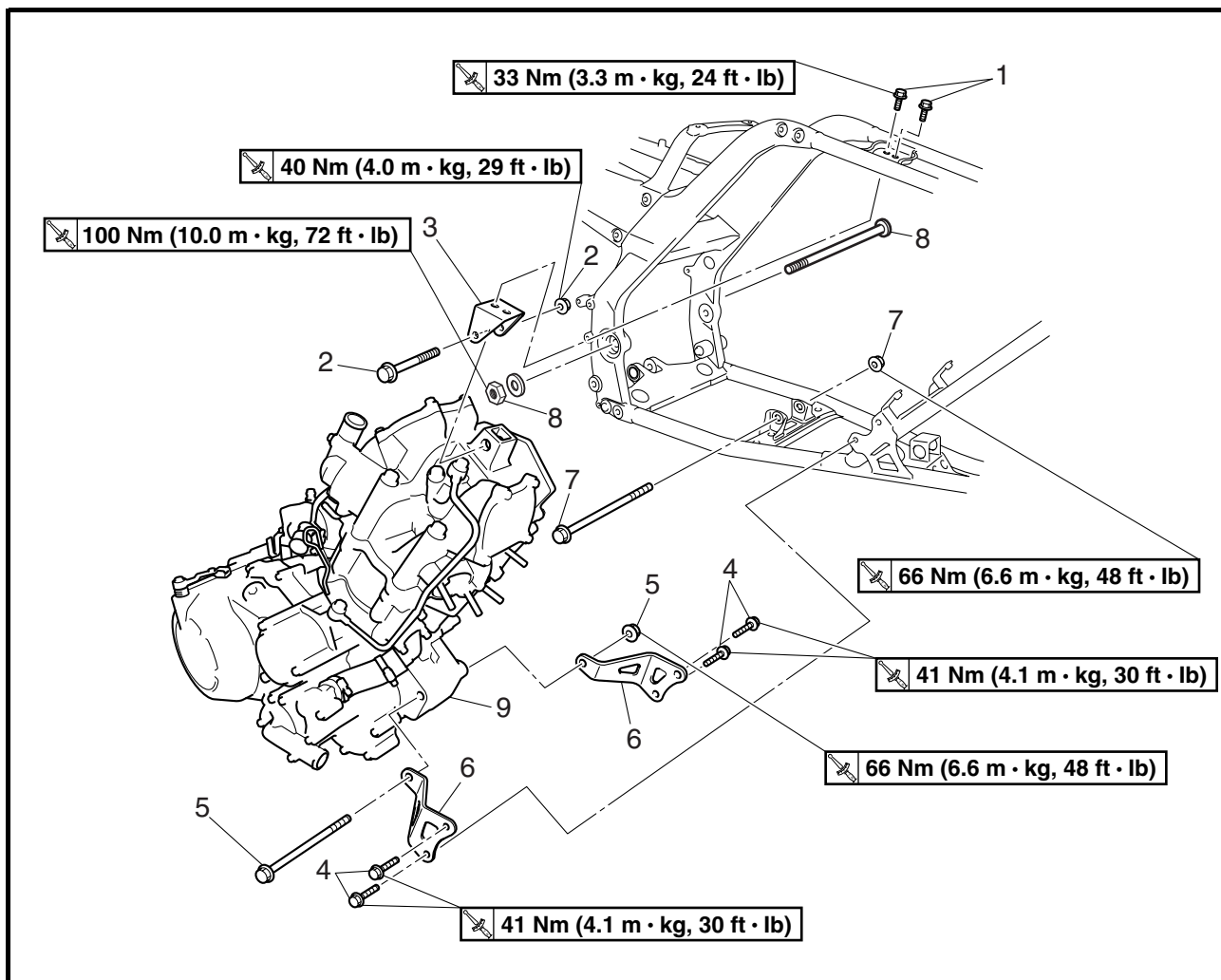


EBS00205

ENGINE MOUNTING BOLTS



Order	Job/Part	Q'ty	Remarks
	Removing the engine mounting bolts		Remove the parts in the order listed.
1	Engine upper bracket bolt	2	CAUTION: _____ Install all of the bolts/nuts and then tighten them to full torque specifications.
2	Engine mounting bolt (upper)/nut	1/1	
3	Engine upper bracket	1	
4	Engine lower bracket bolt	4	
5	Engine mounting bolt (middle)/nut	1/1	
6	Engine lower bracket	2	
7	Engine mounting bolt (lower)/nut	1/1	
8	Pivot shaft/pivot shaft nut	1/1	



Order	Job/Part	Q'ty	Remarks
9	Engine assembly	1	NOTE: _____ Remove the engine assembly from the right side of the vehicle. _____ For installation, reverse the removal procedure.



EBS00206

INSTALLING THE ENGINE

1. Install:

- swingarm
- pivot shaft
- washer
- pivot shaft nut

NOTE:

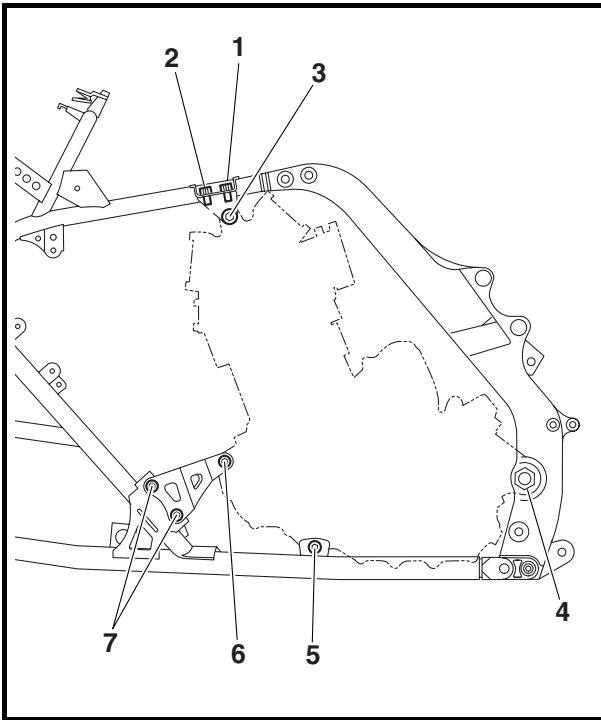
Do not fully tighten the pivot shaft nut.

2. Install:

- engine mounting bolt (lower)/nut
- engine lower bracket (left)
- engine lower bracket (right)
- engine lower bracket bolts
- engine mounting bolt (middle)/nut
- engine upper bracket
- engine upper bracket bolts
- engine mounting bolt (upper)/nut

NOTE:

Do not fully tighten the bolts and nuts.



3. Tighten:

- engine upper bracket bolt "1"

33 Nm (3.3 m · kg, 24 ft · lb)

- engine upper bracket bolt "2"

33 Nm (3.3 m · kg, 24 ft · lb)

- engine mounting bolt (upper)/nut "3"

40 Nm (4.0 m · kg, 29 ft · lb)

- pivot shaft nut "4"

100 Nm (10.0 m · kg, 72 ft · lb)

- engine mounting bolt (lower)/nut "5"

66 Nm (6.6 m · kg, 48 ft · lb)

- engine mounting bolt (middle)/nut "6"

66 Nm (6.6 m · kg, 48 ft · lb)

- engine lower bracket bolts "7"

41 Nm (4.1 m · kg, 30 ft · lb)

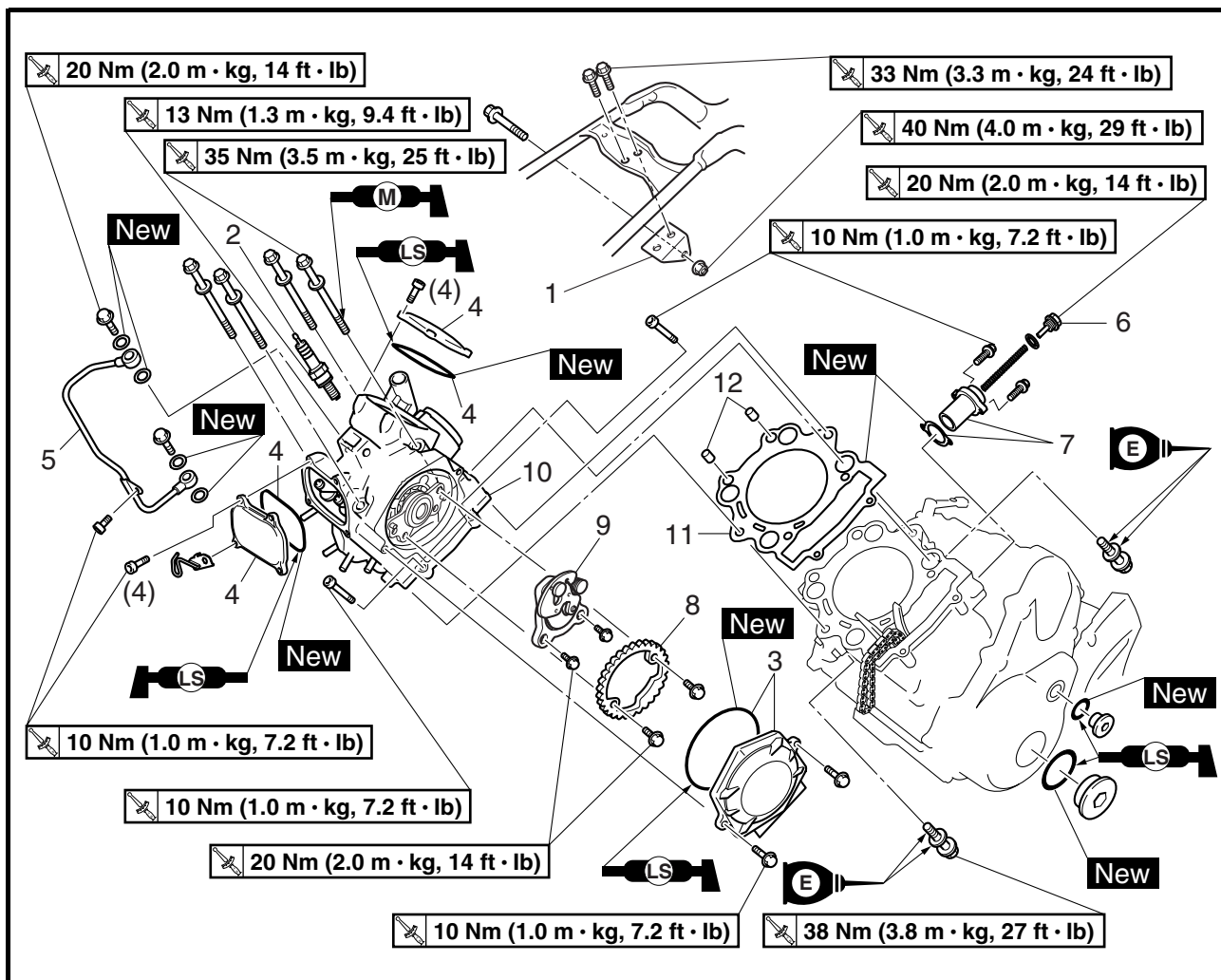
NOTE:

Tighten the bolts and nuts in the proper tightening sequence as shown.

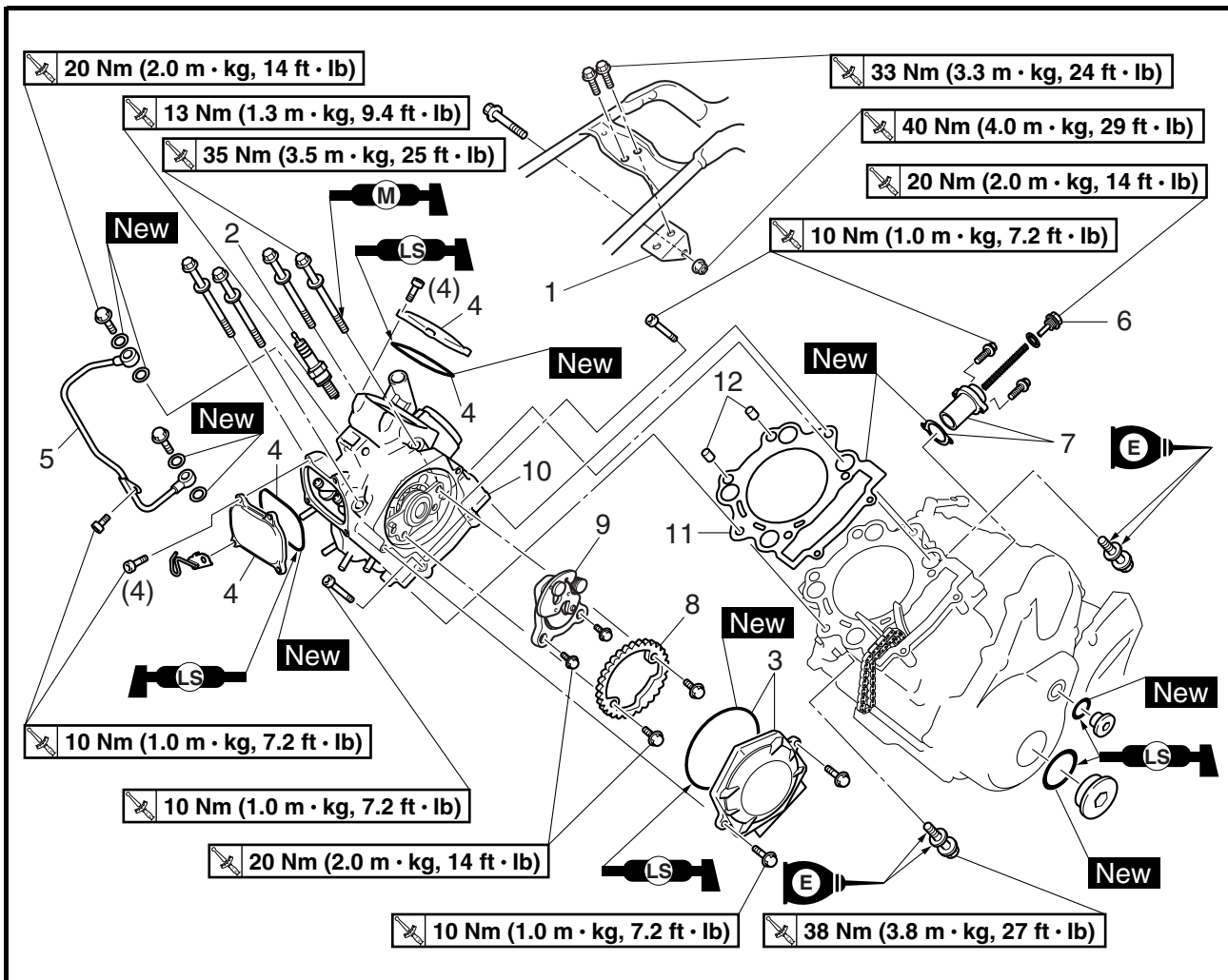


EBS00218

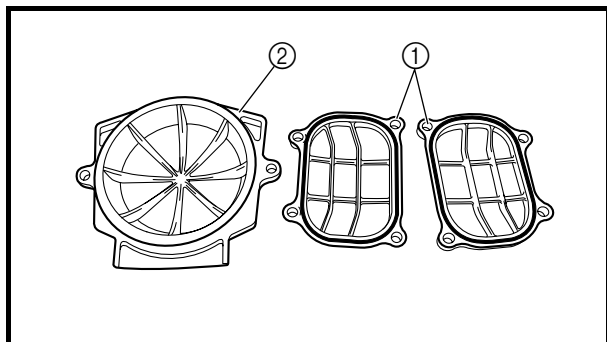
CYLINDER HEAD



Order	Job/Part	Q'ty	Remarks
	Removing the cylinder head		
	Throttle body		Remove the parts in the order listed. Refer to "THROTTLE BODY" in chapter 6.
	Thermostat/coolant temperature sensor		Refer to "THERMOSTAT" in chapter 5.
1	Engine upper bracket	1	Refer to "REMOVING THE CYLINDER HEAD" and "INSTALLING THE CYLINDER HEAD".
2	Spark plug	1	
3	Camshaft sprocket cover/O-ring	1/1	
4	Tappet cover/O-ring	2/2	
5	Oil delivery pipe	1	
6	Timing chain tensioner cap bolt	1	
7	Timing chain tensioner/gasket	1/1	
8	Camshaft sprocket	1	



Order	Job/Part	Q'ty	Remarks
9	Decompressor assembly	1	Refer to "REMOVING THE CYLINDER HEAD" and "INSTALLING THE CYLINDER HEAD".
10	Cylinder head	1	
11	Cylinder head gasket	1	
12	Dowel pin	2	
			For installation, reverse the removal procedure.



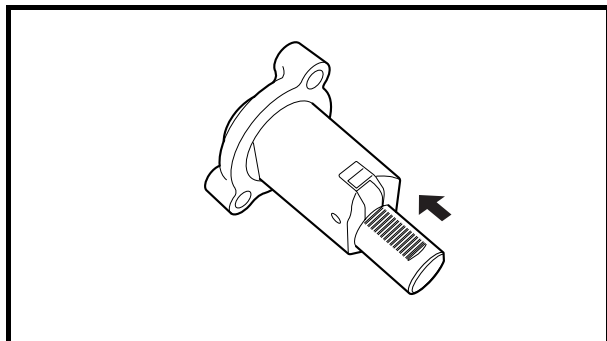
EBS00227

CHECKING THE TAPPET COVERS AND CAMSHAFT SPROCKET COVER

1. Check:

- tappet covers ①
- camshaft sprocket cover ②

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



EBS00229

CHECKING THE TIMING CHAIN TENSIONER

1. Check:

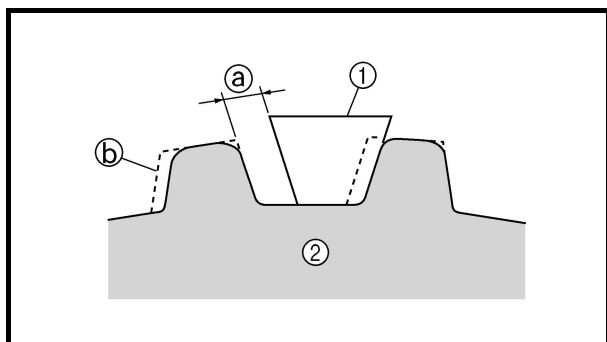
- timing chain tensioner
- Cracks/damage → Replace.

2. Check:

- one-way cam operation
- Rough movement → Replace the timing chain tensioner.

3. Check:

- timing chain tensioner cap bolt
 - copper washer **New**
 - spring
 - one-way cam
 - gasket **New**
 - timing chain tensioner rod
- Damage/wear → Replace the defective part(s).



EBS00224

CHECKING THE CAMSHAFT SPROCKET

1. Check:

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

① 1/4 of a tooth

② Correct

③ Roller

④ Sprocket

EBS00232

INSTALLING THE CYLINDER HEAD

1. Install:

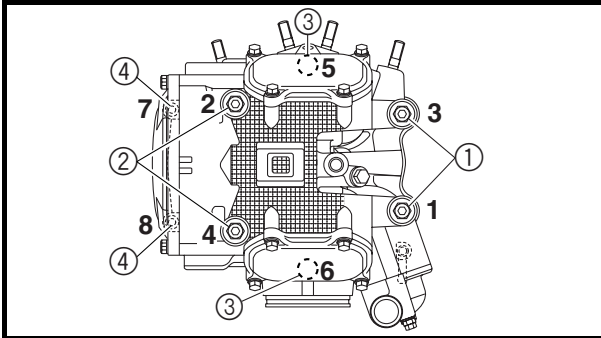
- dowel pins
- cylinder head gasket **New**



2. Install:
- cylinder head
 - cylinder head bolts

NOTE:

- Lubricate the cylinder head bolt ① and ② threads and mating surface with molybdenum disulfide grease.
- Lubricate the cylinder head bolts ③ threads and mating surface with engine oil.
- Install the washers with their blunt surface facing the bolt seat.

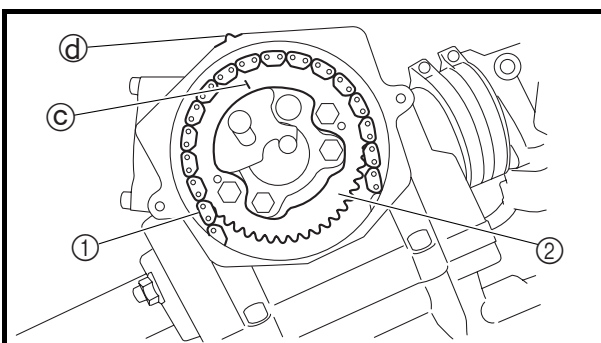
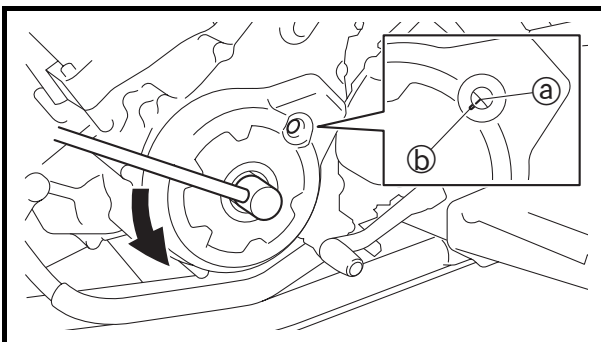


3. Tighten:

- cylinder head bolts ①: $\ell = 135 \text{ mm (5.31 in)}$
35 Nm (3.5 m · kg, 25 ft · lb)
- cylinder head bolts ②: $\ell = 145 \text{ mm (5.71 in)}$
35 Nm (3.5 m · kg, 25 ft · lb)
- cylinder head bolts ③
38 Nm (3.8 m · kg, 27 ft · lb)
- cylinder head bolts ④
10 Nm (1.0 m · kg, 7.2 ft · lb)

NOTE:

Tighten the cylinder head bolts in the proper tightening sequence as shown and torque them in two stages.



4. Install:
- camshaft sprocket
(onto the camshaft)



- Turn the primary pulley counterclockwise.
- Align the "I" mark ① on the A.C. magneto rotor with the stationary pointer ② on the A.C. magneto cover.
- Install the timing chain ① onto the camshaft sprocket ②, then the camshaft sprocket onto the camshaft, and then finger tighten the camshaft sprocket bolts.
- Make sure the "I" mark ③ on the camshaft sprocket with the stationary pointer ④ on the cylinder head.

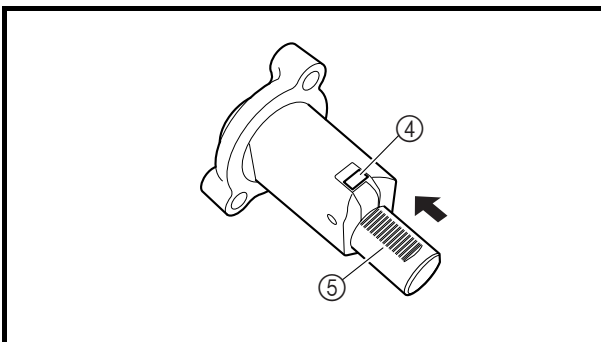
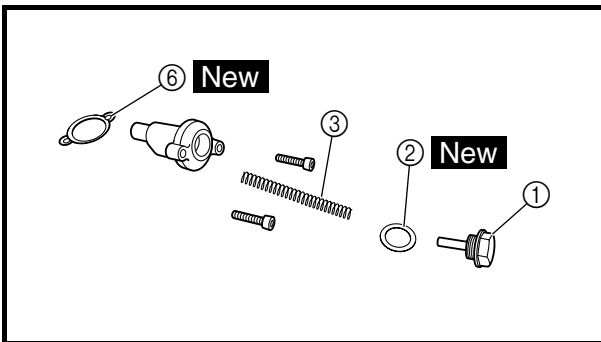
**NOTE:**

- When installing the camshaft sprocket, be sure to keep the timing chain as tight as possible at the exhaust end of the chain.
- Align the projection on the camshaft with the slot in the camshaft sprocket.

CAUTION:

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

- e. Remove the wire from the timing chain.



5. Install:

- timing chain tensioner



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



Timing chain tensioner bolt
10 Nm (1.0 m · kg, 7.2 ft · lb)

NOTE:

Install the gasket with its beaded side facing the timing chain tensioner end.

- Install the spring and timing chain tensioner cap bolt.

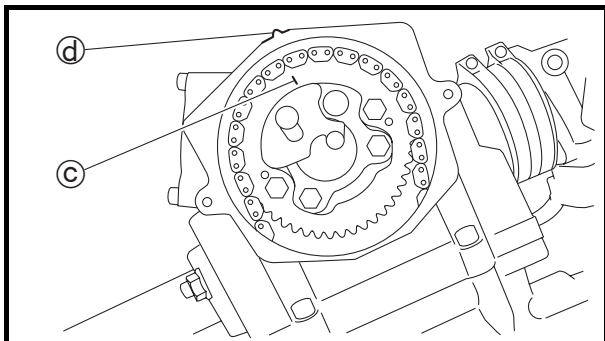
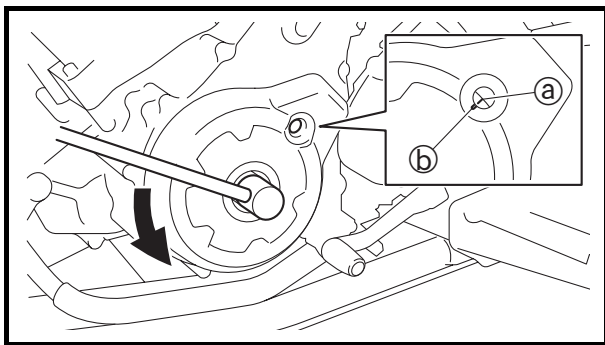


Timing chain tensioner cap bolt
20 Nm (2.0 m · kg, 14 ft · lb)



6. Turn:

- crankshaft
(several turns counterclockwise)



7. Check:

- "I" mark (a)

NOTE:

Check that the "I" mark on the A.C. magneto rotor is aligned with the stationary pointer (b) on the A.C. magneto cover.

- "I" mark (c)

NOTE:

Check that the "I" mark on the camshaft sprocket is aligned with the stationary pointer (d) on the cylinder head.

Out of alignment → Correct.

Repeat steps (4) to (7), if necessary.

8. Tighten:

- camshaft sprocket bolts

20 Nm (2.0 m · kg, 14 ft · lb)

CAUTION:

Be sure to tighten the camshaft sprocket bolts to the specified torque to avoid the possibility of the bolts coming loose and damaging the engine.

9. Measure:

- valve clearance

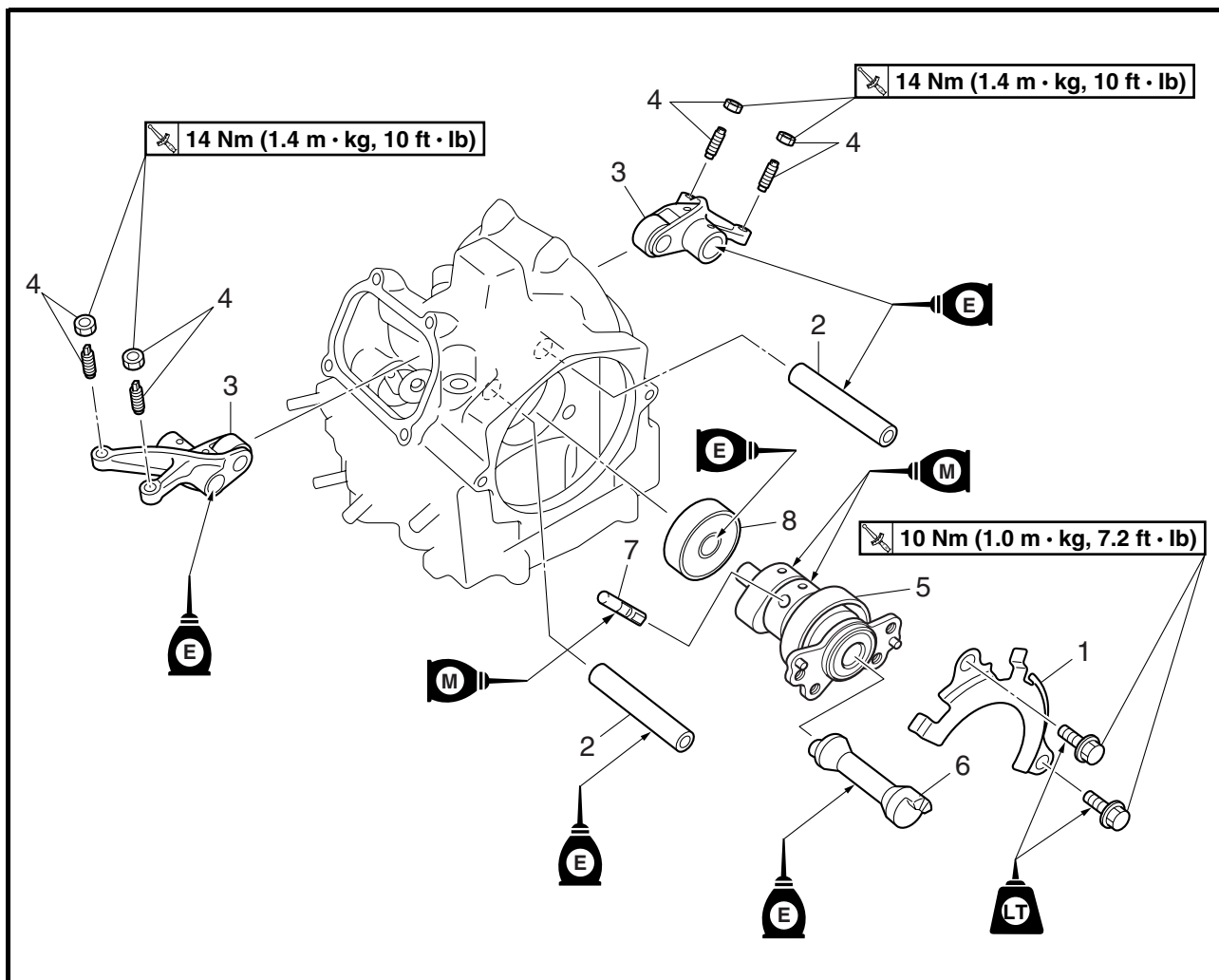
Out of specification → Adjust.

Refer to "ADJUSTING THE VALVE CLEARANCE" in chapter 3.

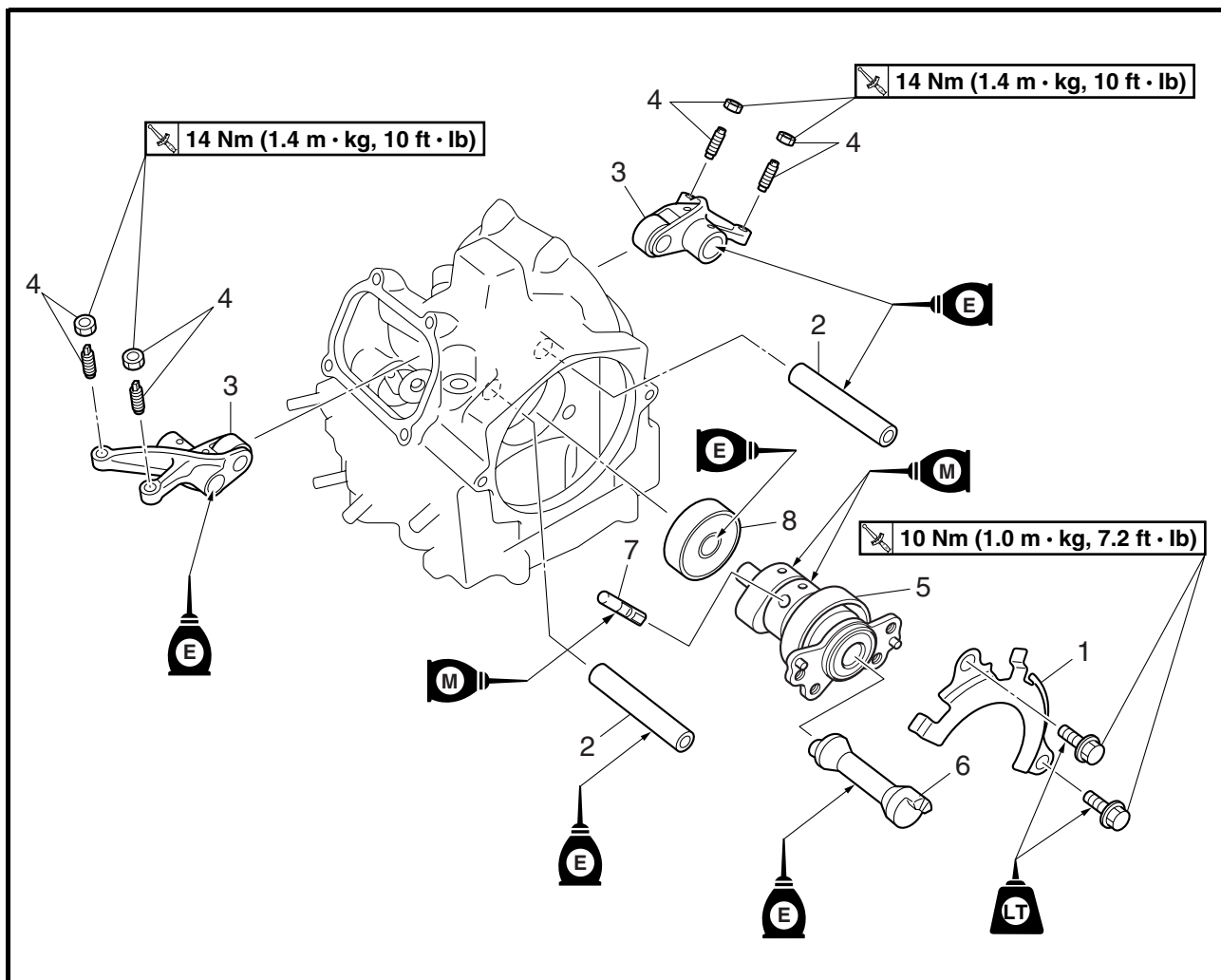


EBS00235

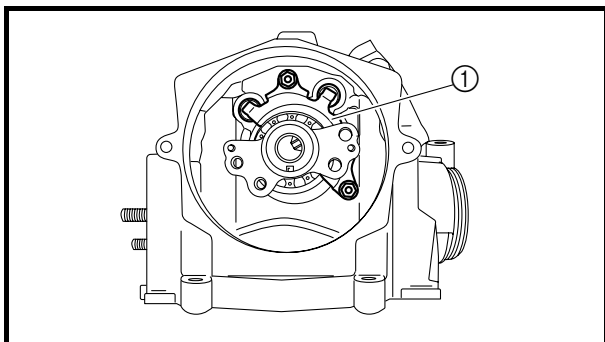
ROCKER ARMS AND CAMSHAFT



Order	Job/Part	Q'ty	Remarks
	Removing the rocker arms and camshaft		Remove the parts in the order listed.
	Cylinder head		Refer to "CYLINDER HEAD".
1	Bearing retainer	1	CAUTION: Do not disassemble the camshaft assembly.
2	Rocker arm shaft	2	
3	Rocker arm	2	
4	Locknut/valve adjuster	4/4	
5	Camshaft	1	
6	Decompressor lever	1	Refer to "REMOVING THE ROCKER ARMS AND CAMSHAFT" and "INSTALLING THE CAMSHAFT AND ROCKER ARMS".



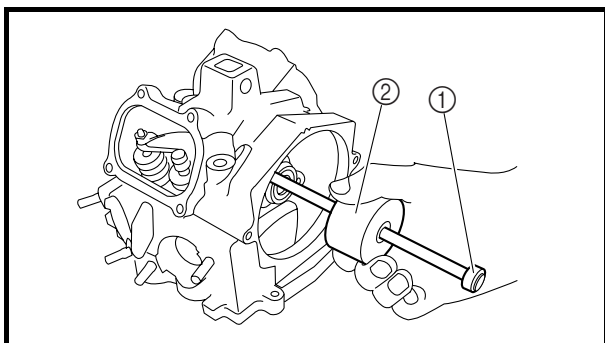
Order	Job/Part	Q'ty	Remarks
7	Decompressor lever pin	1	Refer to "REMOVING THE ROCKER ARMS AND CAMSHAFT" and "INSTALLING THE CAMSHAFT AND ROCKER ARMS". For installation, reverse the removal procedure.
8	Bearing	1	



EBS00238

REMOVING THE ROCKER ARMS AND CAMSHAFT

1. Loosen:
 - locknuts
 - adjusting screws
2. Remove:
 - camshaft retainer ①



3. Remove:
 - intake rocker arm shaft
 - exhaust rocker arm shaft
 - intake rocker arm
 - exhaust rocker arm

NOTE:

Remove the rocker arm shafts with the slide hammer bolt ① and weight ②.



Slide hammer bolt
90890-01083
Slide hammer bolt (6 mm)
YU-01083-1
Weight
90890-01084, YU-01083-3

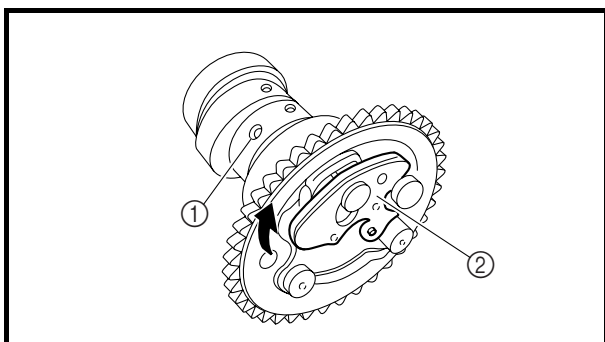
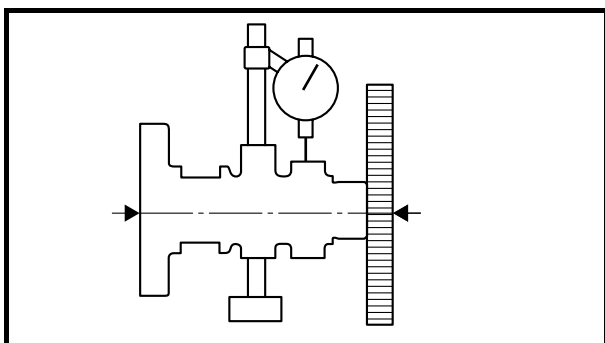
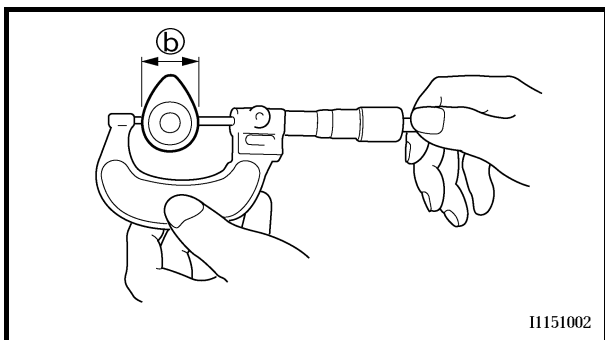
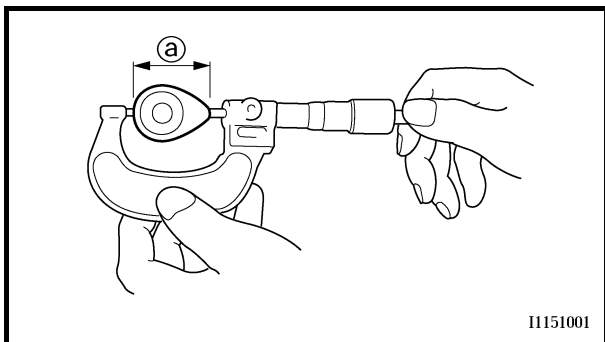
4. Remove:
 - camshaft

EAS00205

CHECKING THE CAMSHAFT

1. Check:
 - camshaft lobes

Blue discoloration/pitting/scratches →
 Replace the camshaft and camshaft sprocket.



2. Measure:

- camshaft lobe dimensions (a) and (b)
Out of specification → Replace the camshaft.



Camshaft lobe dimensions

Intake

- (a) 43.300 ~ 43.400 mm
(1.7047 ~ 1.7087 in)

<Limit>:

43.200 mm (1.7008 in)

- (b) 37.026 ~ 37.126 mm
(1.4577 ~ 1.4617 in)

<Limit>:

36.926 mm (1.4538 in)

Exhaust

- (a) 43.129 ~ 43.229 mm
(1.6980 ~ 1.7019 in)

<Limit>:

43.029 mm (1.6941 in)

- (b) 37.057 ~ 37.157 mm
(1.4589 ~ 1.4629 in)

<Limit>:

36.957 mm (1.4550 in)

3. Measure:

- camshaft runout
Out of specification → Replace.



Camshaft runout limit

0.030 mm (0.0012 in)

EBS00225

CHECKING THE DECOMPRESSION SYSTEM

1. Check:

- decompression system

- Check the decompression system with the camshaft sprocket installed on and the decompressor lever pin installed in the camshaft.
- Check that the decompressor lever pin (1) projects from the camshaft.
- Check that the decompressor cam (2) moves smoothly.



EBS00239

CHECKING THE ROCKER ARMS AND ROCKER ARM SHAFTS

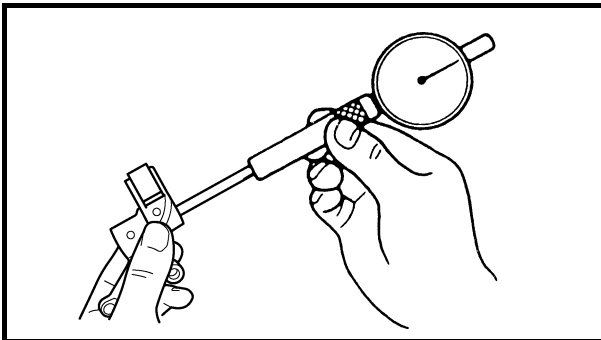
The following procedure applies to both of the rocker arms and rocker arm shafts.

1. Check:

- rocker arm
Damage/wear → Replace.

2. Check:

- rocker arm shaft
Blue discoloration/excessive wear/pitting/scratches → Replace or check the lubrication system.

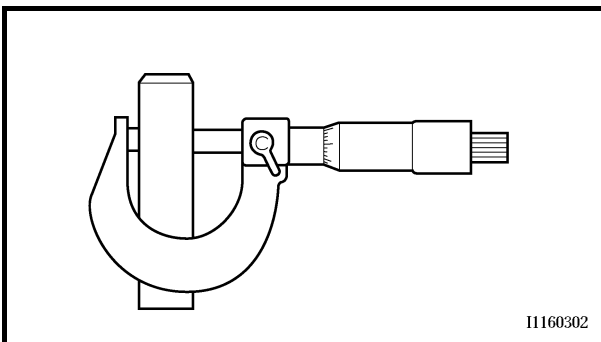


3. Measure:

- rocker arm inside diameter
Out of specification → Replace.



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



11160302

4. Measure:

- rocker arm shaft outside diameter
Out of specification → Replace.



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



5. Calculate:

- rocker-arm-to-rocker-arm-shaft clearance

NOTE:

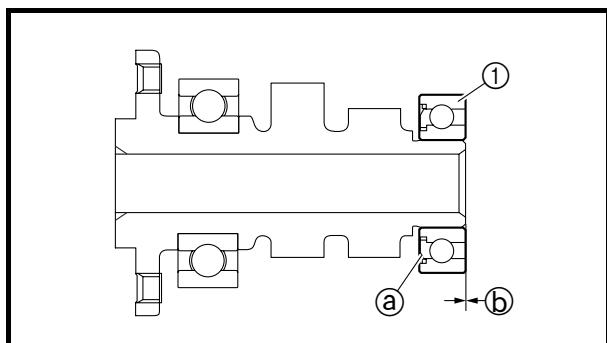
Calculate the clearance by subtracting the rocker arm shaft outside diameter from the rocker arm inside diameter.

Out of specification → Replace the defective part(s).



Rocker-arm-to-rocker-arm-shaft clearance

0.009 ~ 0.037 mm
(0.0004 ~ 0.0015 in)



EAS00243

INSTALLING THE CAMSHAFT AND ROCKER ARMS

1. Install:

- bearing ①
(onto the camshaft)

NOTE:

- Apply engine oil to the bearing.
- Install the bearing so that the seal is facing ② the camshaft.



Installed depth ②
0 mm (0 in)

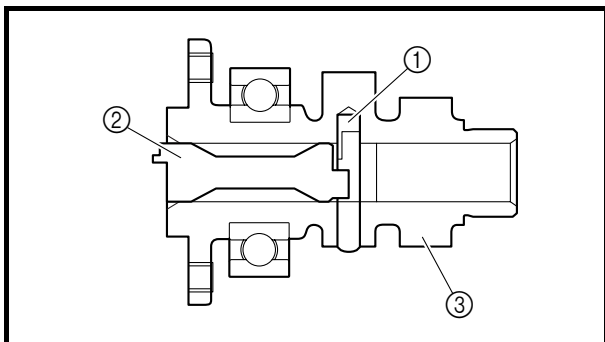
2. Lubricate:

- camshaft
- decompressor lever pin
- decompressor lever



Recommended lubricant

Camshaft
Molybdenum disulfide oil
Camshaft bearing
Engine oil

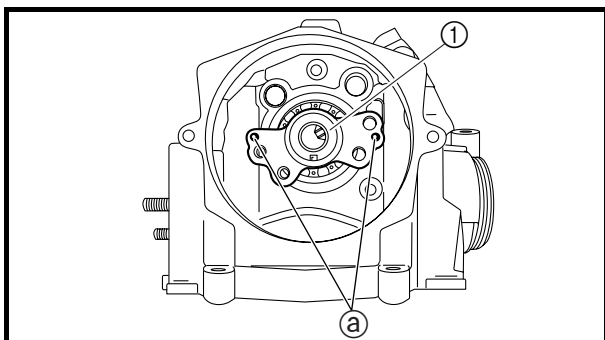


3. Install:

- decompressor lever pin ①
- decompressor lever ②

NOTE:

Install the decompressor lever pin ① and decompressor lever ② in the camshaft ③ as shown in the illustration.



4. Install:

- camshaft ①

NOTE:

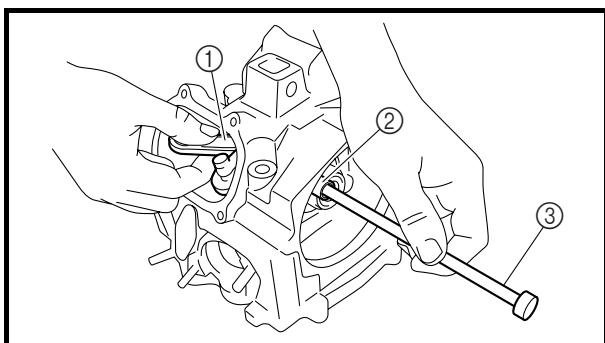
Install the camshaft so that its projection ① becomes horizontal.

5. Lubricate:

- rocker arm shafts



Recommended lubricant
Engine oil



6. Install:

- exhaust rocker arm ①
- exhaust rocker arm shaft ②
- intake rocker arm
- intake rocker arm shaft

NOTE:

- Use a slide hammer bolt ③ to install the rocker arm shaft.
- Make sure the rocker arm shafts (intake and exhaust) are completely pushed into the cylinder head.



Slide hammer bolt
90890-01083
Slide hammer bolt (6 mm)
YU-01083-1

7. Install:

- camshaft retainer
- camshaft retainer bolts

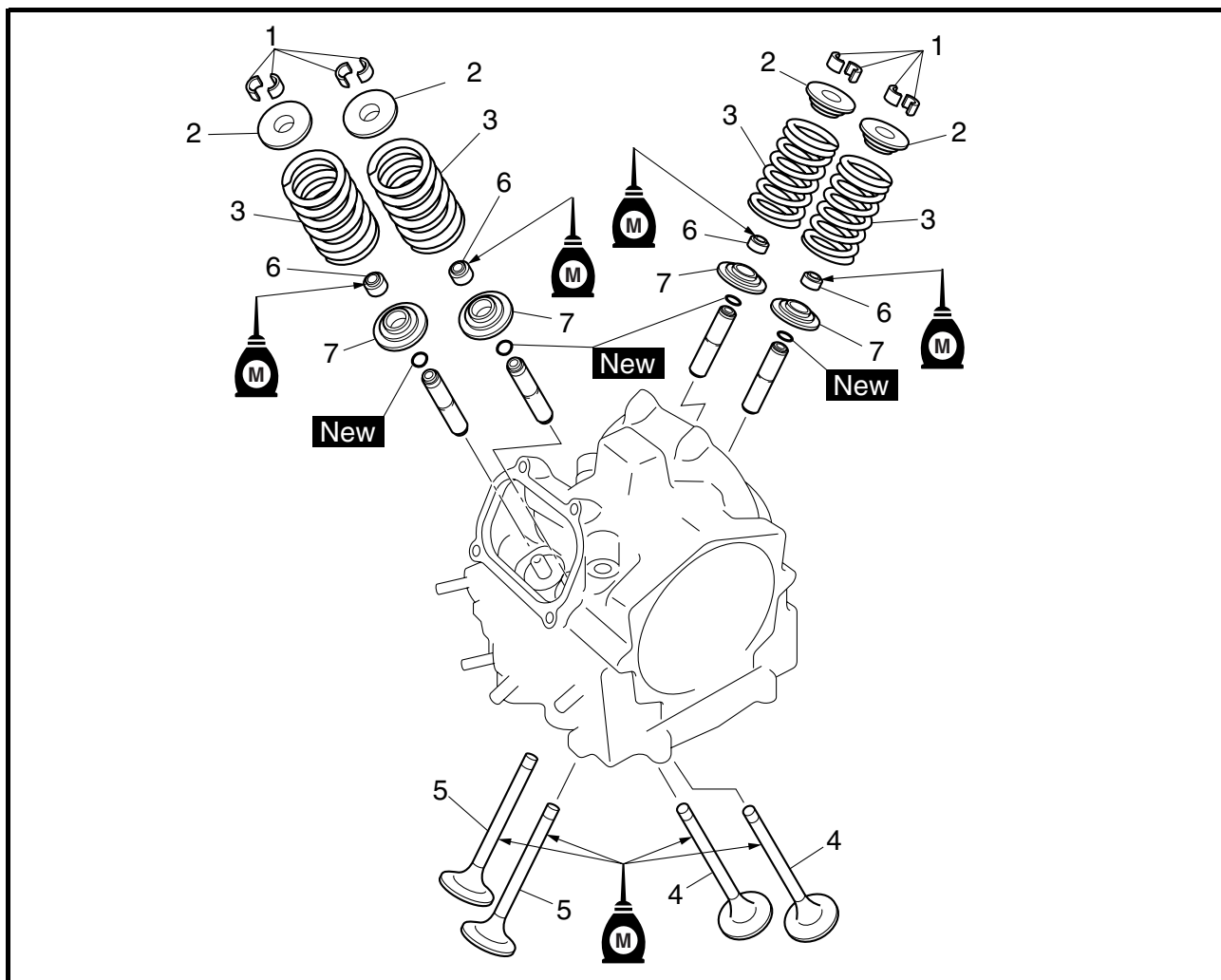


10 Nm (1.0 m · kg, 7.2 ft · lb)

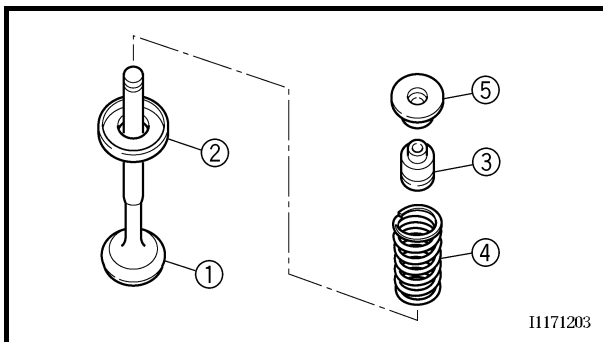


EBS00234

VALVES AND VALVE SPRINGS



Order	Job/Part	Q'ty	Remarks
	Removing the valves and valve springs		Remove the parts in the order listed.
	Cylinder head		Refer to "CYLINDER HEAD".
	Rocker arms/rocker arm shafts/cam-shaft		Refer to "ROCKER ARMS AND CAM-SHAFT".
1	Valve cotter	8	Refer to "REMOVING THE VALVES AND VALVE SPRINGS" and "INSTALLING THE VALVES AND VALVE SPRINGS".
2	Valve spring retainer	4	
3	Valve spring	4	
4	Exhaust valve	2	
5	Intake valve	2	
6	Valve stem seal	4	
7	Valve spring seat	4	
			For installation, reverse the removal procedure.

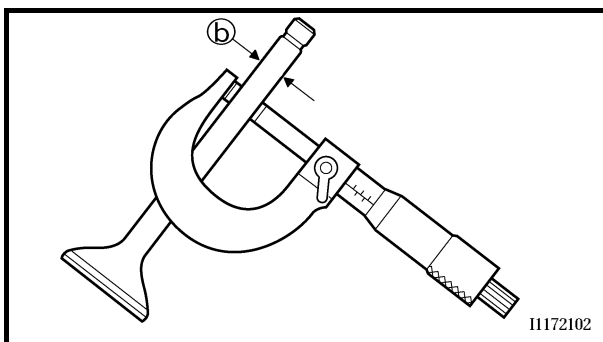
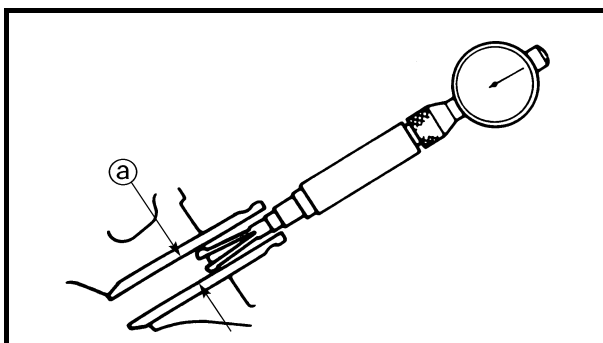


3. Remove:

- valve spring retainer ①
- valve spring ②
- valve stem seal ③
- valve spring seat ④
- valve ⑤

NOTE:

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



EBS00240

CHECKING THE VALVES AND VALVE SPRINGS

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

1. Measure:

- valve-stem-to-valve-guide clearance

Stem-to-guide clearance =
Valve guide inside diameter ① –
Valve stem diameter ②

Out of specification → Replace the valve guide.



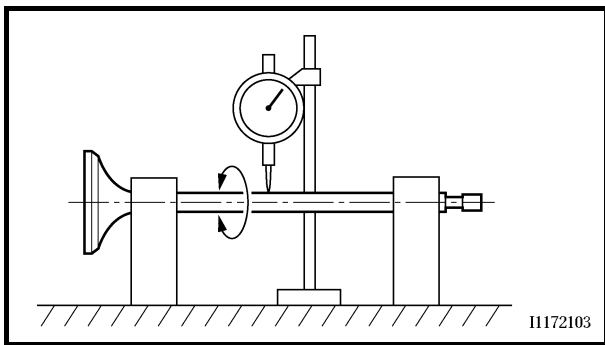
Stem-to-guide clearance

Intake

0.010 ~ 0.037 mm
 (0.0004 ~ 0.0015 in)
 <Limit>: 0.08 mm (0.0031 in)

Exhaust

0.025 ~ 0.052 mm
 (0.0010 ~ 0.0020 in)
 <Limit>: 0.10 mm (0.0039 in)



5. Measure:

- valve stem runout

Out of specification → Replace.



Valve stem runout
0.010 mm (0.0004 in)

NOTE:

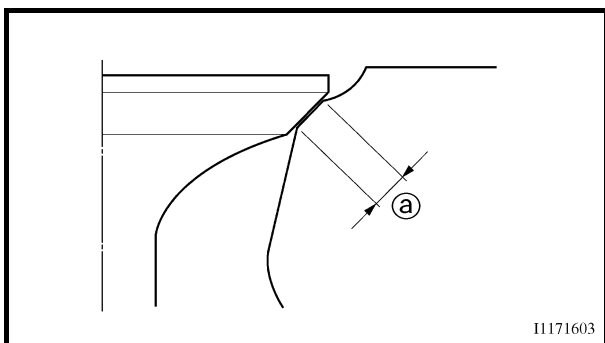
- When installing a new valve, always replace the valve guide.
- If the valve is removed or replaced, always replace the valve stem seal.

6. Eliminate:

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

7. Check:

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



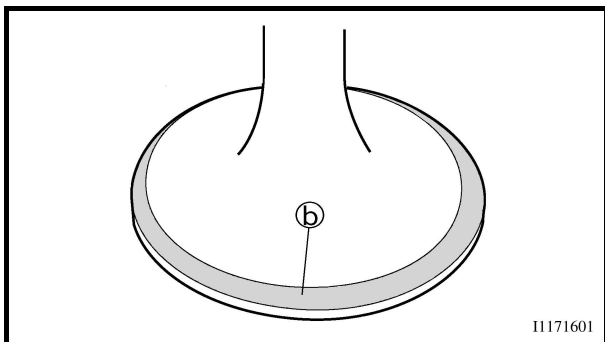
8. Measure:

- valve seat width ①

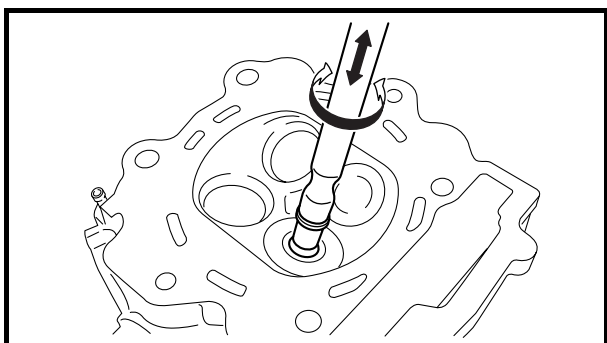
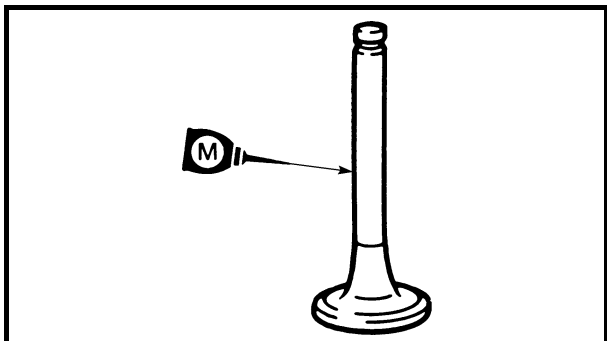
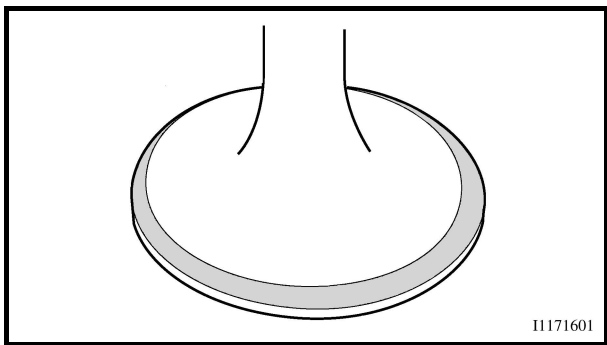
Out of specification → Replace the valve seat.



Valve seat width
Intake
1.00 ~ 1.20 mm
(0.0394 ~ 0.0472 in)
<Limit>: 1.60 mm (0.0630 in)
Exhaust
1.00 ~ 1.20 mm
(0.0394 ~ 0.0472 in)
<Limit>: 1.60 mm (0.0630 in)



- Apply Mechanic's blueing dye (Dykem) ② 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.



- Apply a coarse lapping compound to the valve face.

CAUTION:

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

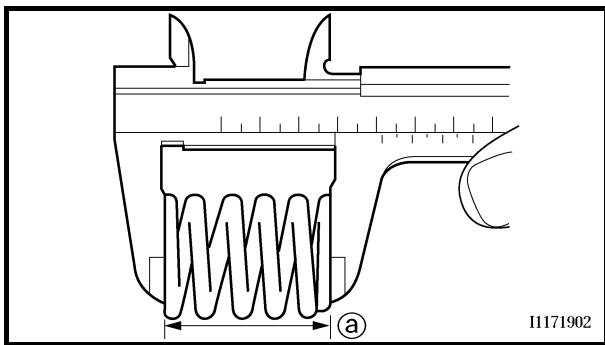
- Apply a fine lapping compound to the valve face and repeat the above steps.

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.





10.Measure:

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



Valve spring free length

Intake

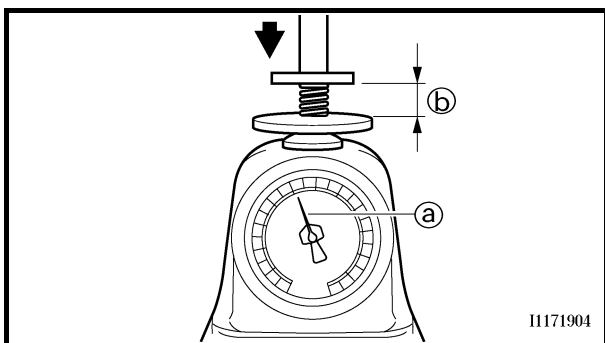
38.79 mm (1.53 in)

<Limit>: 36.85 mm (1.45 in)

Exhaust

38.79 mm (1.53 in)

<Limit>: 36.85 mm (1.45 in)



11.Measure:

- compressed spring force ①
- Out of specification → Replace.

② Installed length



Compressed valve spring force (installed)

Intake

169.0 ~ 199.0 N at 35.00 mm

(17.23 ~ 20.29 kg at 35.00 mm,

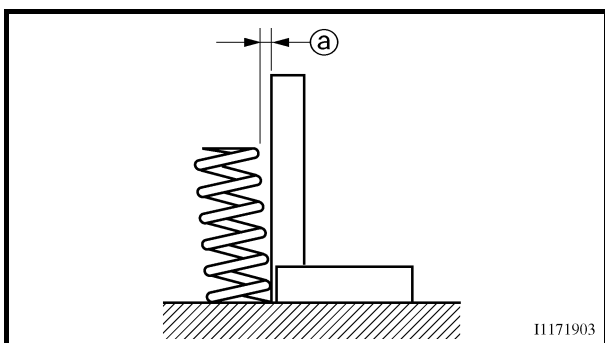
37.99 ~ 44.73 lb at 1.38 in)

Exhaust

169.0 ~ 199.0 N at 35.00 mm

(17.23 ~ 20.29 kg at 35.00 mm,

37.99 ~ 44.73 lb at 1.38 in)



12.Measure:

- valve spring tilt ①
- Out of specification → Replace.



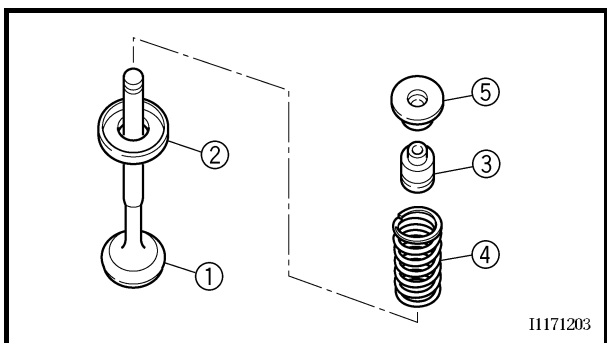
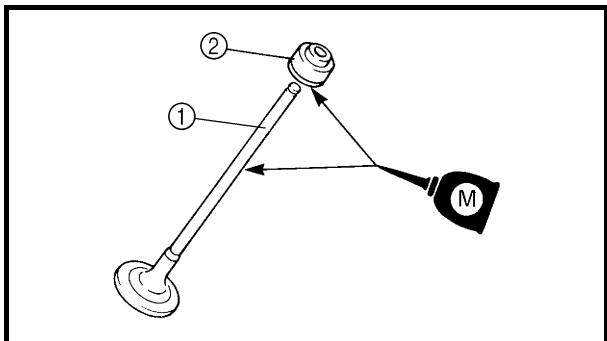
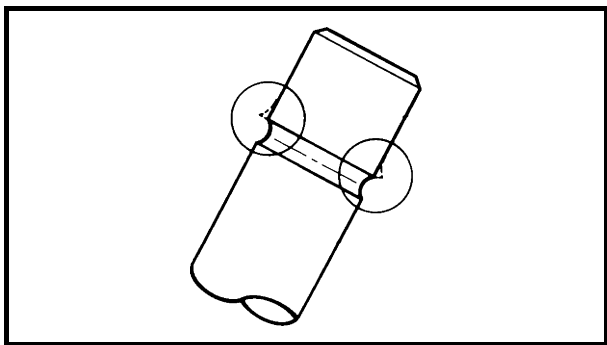
Valve spring tilt limit

Intake

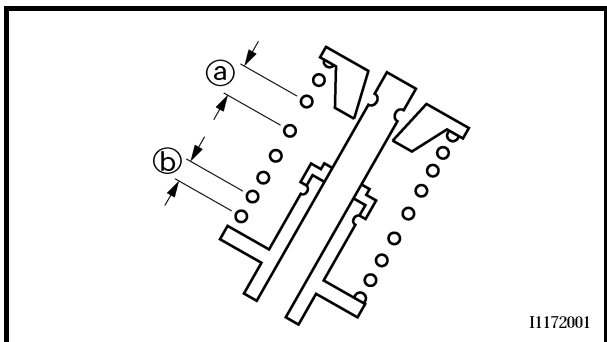
2.5°/1.70 mm (0.067 in)

Exhaust

2.5°/1.70 mm (0.067 in)



11171203



11172001

EBS00241

INSTALLING THE VALVES AND VALVE SPRINGS

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

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

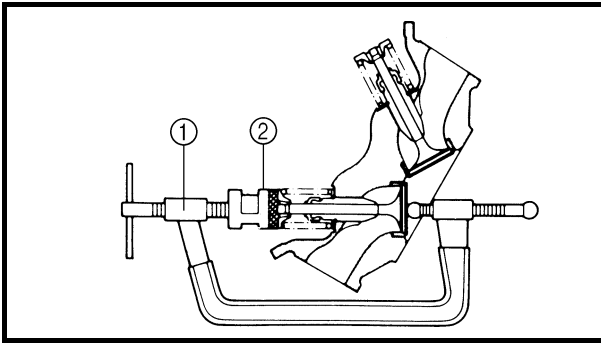
	Recommended lubricant Molybdenum disulfide oil
---	---

3. Install:
 - valve ①
 - valve spring seat ②
 - valve stem seal ③
 - valve spring ④
 - valve spring retainer ⑤
(into the cylinder head)

NOTE:

- Install the valve spring with the larger pitch ① facing up.
- Install the valve spring with its painted end facing up.

② Smaller pitch



4. Install:

- valve cotters

NOTE:

Install the valve cotters while compressing the valve spring with the valve spring compressor ① and attachment ②.



Valve spring compressor
90890-04019, YM-04019

Valve spring compressor attachment

90890-01243

Valve spring compressor adapter
(26 mm)

YM-01253-1

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

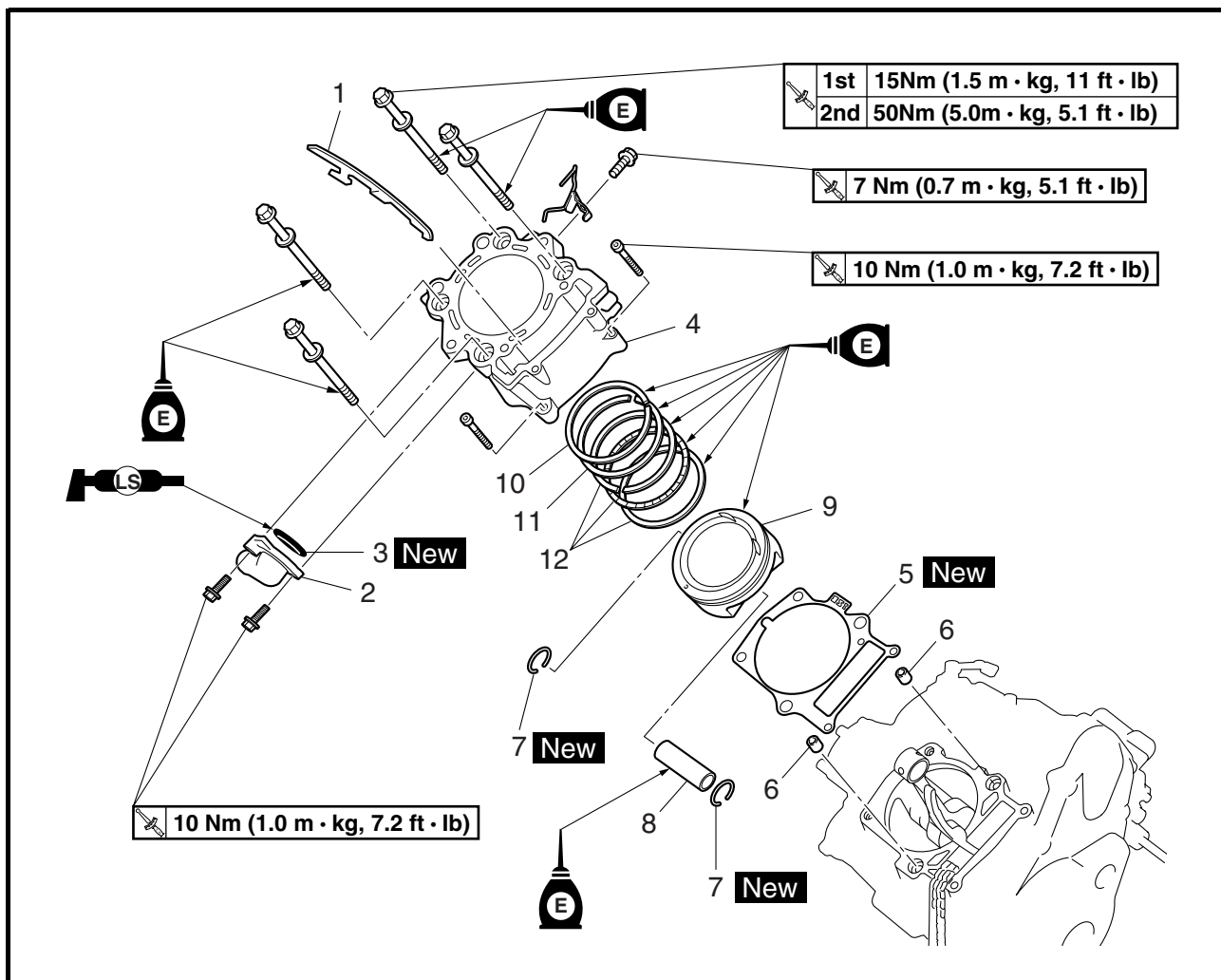
CAUTION:

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

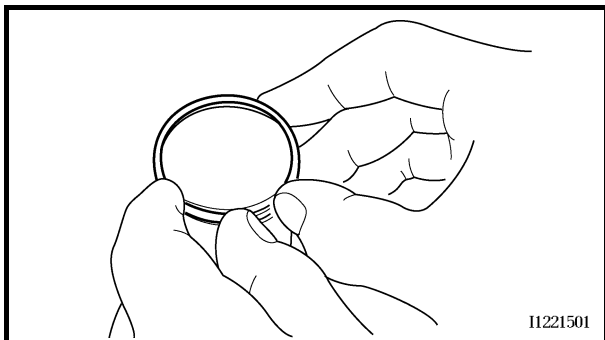
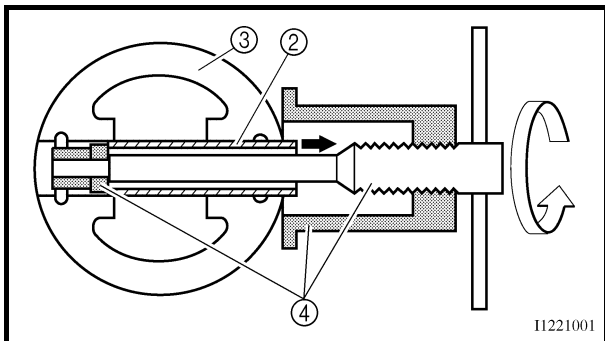
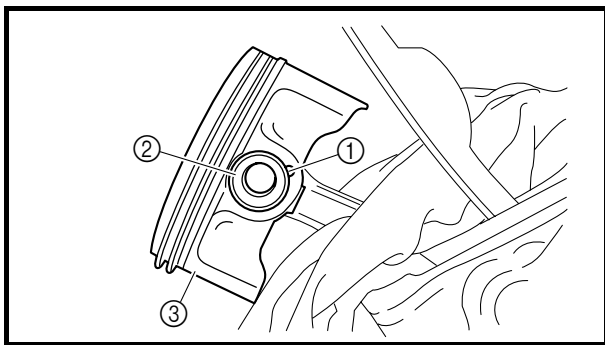


EBS00245

CYLINDER AND PISTON



Order	Job/Part	Q'ty	Remarks
	Removing the cylinder and piston		
	Cylinder head		Remove the parts in the order listed. Refer to "CYLINDER HEAD".
1	Timing chain guide (exhaust)	1	
2	Water jacket joint	1	
3	O-ring	1	
4	Cylinder	1	
5	Cylinder gasket	1	Refer to "INSTALLING THE PISTON AND CYLINDER".
6	Dowel pin	2	
7	Piston pin clip	2	
8	Piston pin	1	
9	Piston	1	Refer to "REMOVING THE PISTON" and "INSTALLING THE PISTON AND CYLINDER".
10	Top ring	1	
11	2nd ring	1	
12	Oil ring	1	
			For installation, reverse the removal procedure.



EBS00247

REMOVING THE PISTON

1. Remove:

- piston pin clips ①
- piston pin ②
- piston ③

NOTE:

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



Piston pin puller set
90890-01304
Piston pin puller
YU-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, as shown in the illustration.

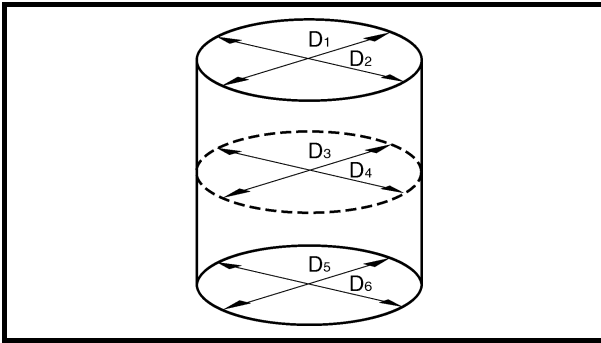
EBS00249

CHECKING THE CYLINDER AND PISTON

1. Check:

- piston wall
- cylinder wall

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



2. Measure:

- piston-to-cylinder clearance



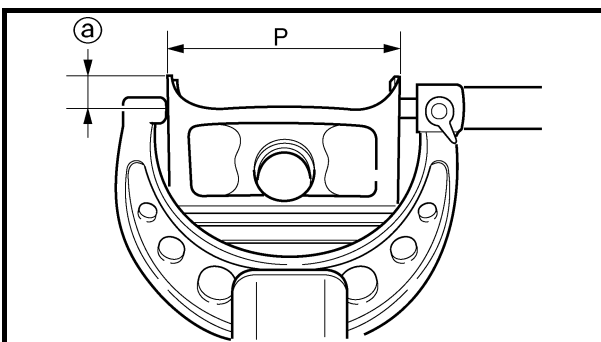
- a. Measure the cylinder bore “C” with a cylinder bore gauge.

NOTE:

Measure the cylinder bore “C” in parallel to and at right angles to the crankshaft. Then, find the average of the measurements.

Cylinder bore “C”	102.000 ~ 102.010 mm (4.0157 ~ 4.0161 in)
Taper limit “T”	0.05 mm (0.002 in)
Out of round “R”	0.05 mm (0.002 in)
“C” = Maximum D	
“T” = (Maximum D ₁ or D ₂) – (Maximum D ₅ or D ₆)	
“R” = (Maximum D ₁ , D ₃ or D ₅) – (Minimum D ₂ , D ₄ or D ₆)	

- b. If out of specification, replace the cylinder, and the piston and piston rings as a set.
- c. Measure piston skirt diameter “P” with the micrometer.
- ① 10 mm (0.39 in) from the bottom edge of the piston



 Piston size “P”	
Standard	101.955 ~ 101.970 mm (4.0140 ~ 4.0146 in)

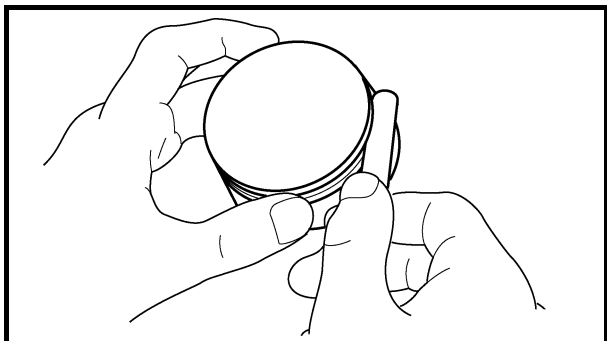
- d. If out of specification, replace the piston and piston rings as a set.
- e. Calculate the piston-to-cylinder clearance with the following formula.

Piston-to-cylinder clearance =
Cylinder bore “C” –
Piston skirt diameter “P”

 Piston-to-cylinder clearance 0.03 ~ 0.055 mm (0.0012 ~ 0.0022 in) <Limit>: 0.13 mm (0.051 in)
--



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



EBS00250

CHECKING THE PISTON RINGS

1. Measure:

- piston ring side clearance

Out of specification → Replace the piston and piston rings as a set.

NOTE:

Before measuring the piston ring side clearance, eliminate any carbon deposits from the piston ring grooves and piston rings.



Piston ring side clearance

Top ring

0.030 ~ 0.070 mm

(0.0012 ~ 0.0028 in)

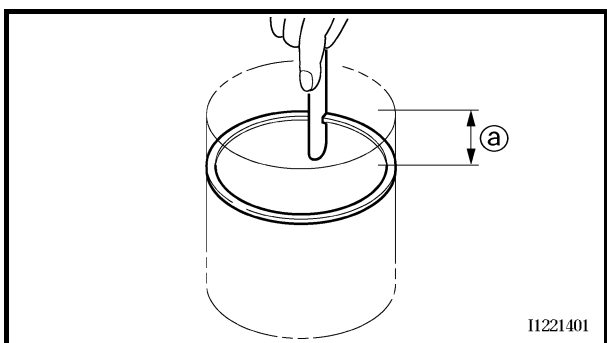
<Limit>: 0.12 mm (0.0047 in)

2nd ring

0.030 ~ 0.070 mm

(0.0012 ~ 0.0028 in)

<Limit>: 0.13 mm (0.0051 in)



- ## 2. Install:

- piston ring
(into the cylinder)

NOTE:

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

① 50.0 mm (1.97 in)



3. Measure:

- piston ring end gap
Out of specification → Replace the piston ring.

NOTE:

The oil ring expander spacer's end gap cannot be measured. If the oil ring rail's gap is excessive, replace all three piston rings.

**Piston ring end gap****Top ring**

0.20 ~ 0.35 mm

(0.008 ~ 0.014 in)

<Limit>: 0.60 mm (0.024 in)

2nd ring

0.35 ~ 0.50 mm

(0.014 ~ 0.020 in)

<Limit>: 0.85 mm (0.033 in)

Oil ring

0.20 ~ 0.70 mm

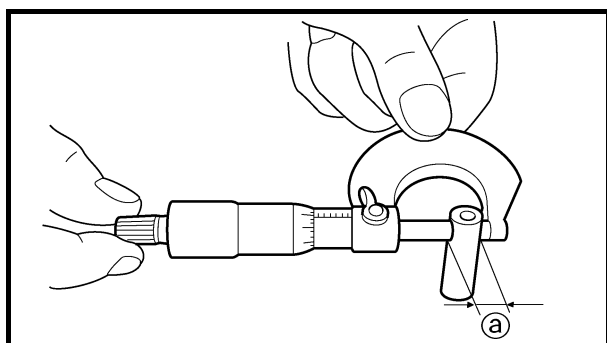
(0.008 ~ 0.028 in)

EBS00251

CHECKING THE PISTON PIN

1. Check:

- piston pin
Blue discoloration/grooves → Replace the piston pin and then check the lubrication system.



2. Measure:

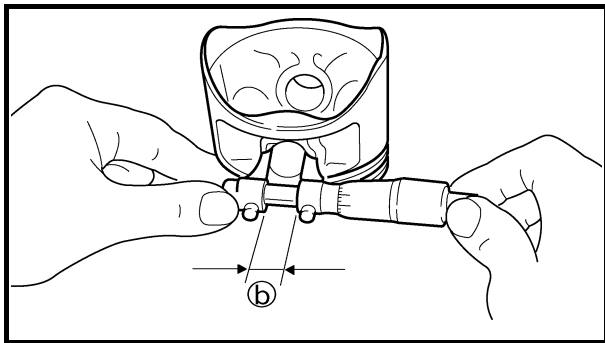
- piston pin outside diameter ①
Out of specification → Replace the piston pin.

**Piston pin outside diameter**

22.991 ~ 23.000 mm

(0.9052 ~ 0.9055 in)

<Limit>: 22.971 mm (0.9044 in)



3. Measure:

- piston pin bore inside diameter ⑥
Out of specification → Replace the piston.



Piston pin bore inside diameter
23.004 ~ 23.015 mm
(0.9057 ~ 0.9061 in)
<Limit>: 23.045 mm (0.9073 in)

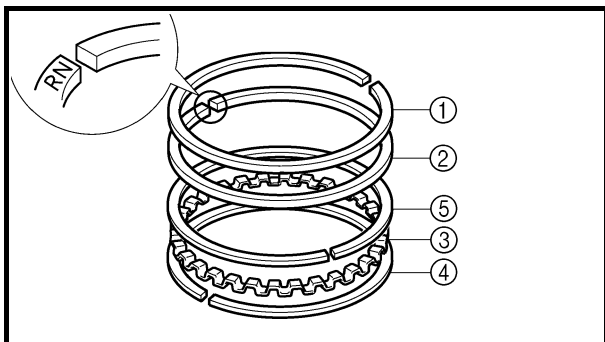
4. Calculate:

- piston-pin-to-piston-pin-bore clearance
Out of specification → Replace the piston pin and piston as a set.

Piston-pin-to-piston-pin-bore clearance =
Piston pin bore inside diameter ⑥ –
Piston pin outside diameter ①



Piston-pin-to-piston-pin-bore clearance
0.004 ~ 0.024 mm
(0.0002 ~ 0.0009 in)
<Limit>: 0.074 mm (0.0029 in)



EBS00252

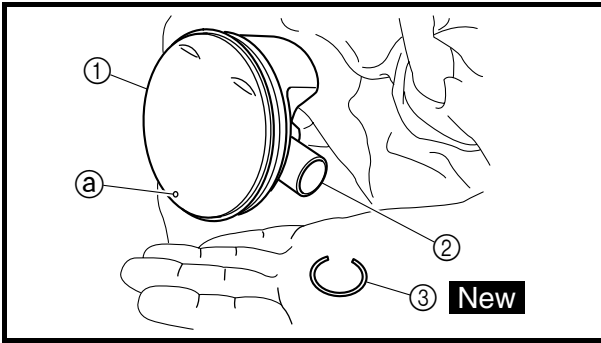
INSTALLING THE PISTON AND CYLINDER

1. Install:

- top ring ①
- 2nd ring ②
- oil ring expander ③
- lower oil ring rail ④
- upper oil ring rail ⑤

NOTE:

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



2. Install:

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

NOTE:

- Apply engine oil to the piston pin.
- Make sure the punch mark (a) on the piston points towards the exhaust side of the cylinder.
- Before installing the piston pin clips, cover the crankcase opening with a clean rag to prevent the clips from falling into the crankcase.

3. Install:

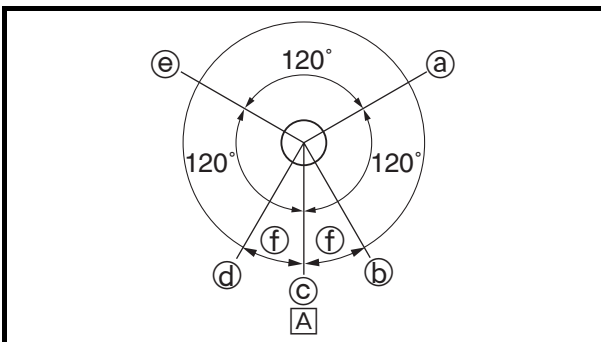
- cylinder gasket **New**
- dowel pins

4. Lubricate:

- piston
- piston rings
- cylinder
(with the recommended lubricant)



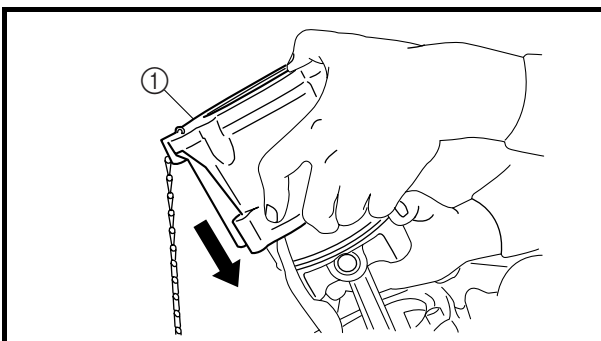
Recommended lubricant
Engine oil



5. Offset:

- piston ring end gaps

- ① Top ring
- ② Upper oil ring rail
- ③ Oil ring expander
- ④ Lower oil ring rail
- ⑤ 2nd ring
- ⑥ 20 mm (0.79 in)
- Ⓐ Exhaust side

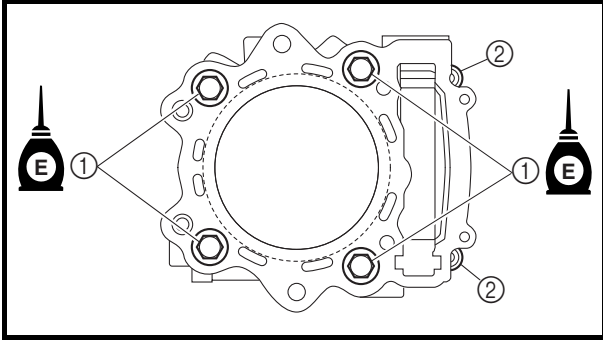


6. Install:

- cylinder ①
- timing chain guide (exhaust)

NOTE:

- While compressing the piston rings with one hand, install the cylinder with the other hand.
- Pass the timing chain and timing chain guide (exhaust side) through the timing chain cavity.



7. Install:

- cylinder bolts

NOTE:

Lubricate the cylinder bolt ① threads and mating surface with engine oil.

8. Tighten:

- cylinder bolts ① (1st)

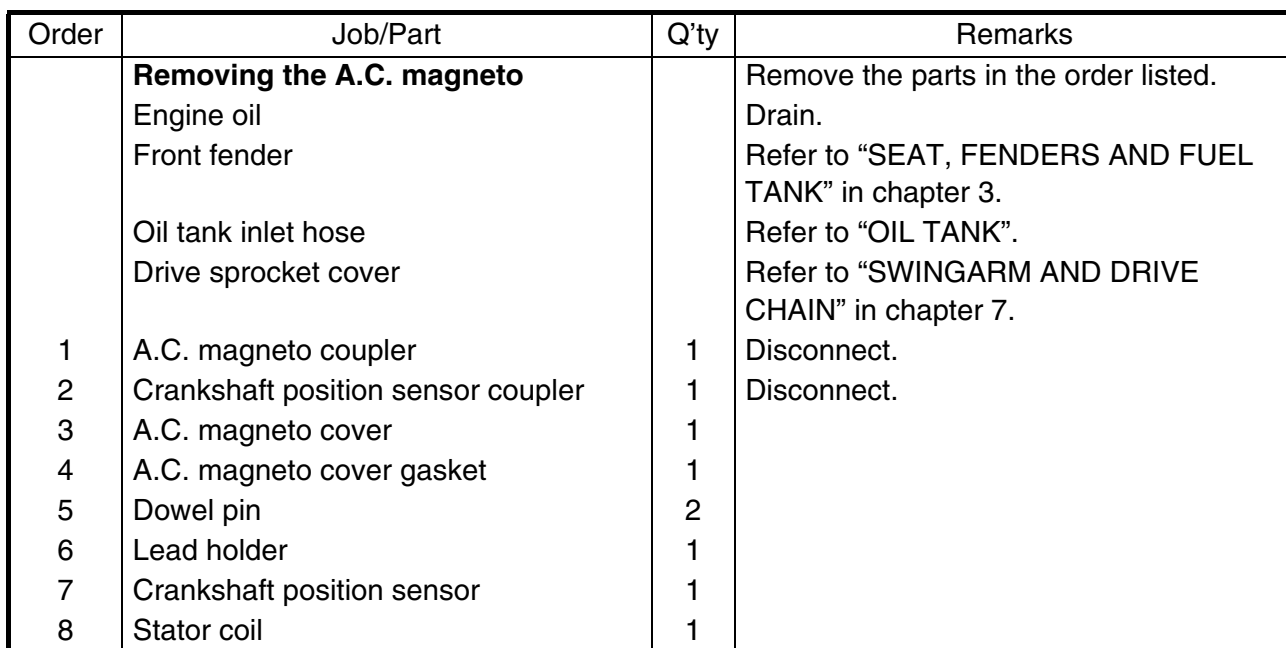
15 Nm (1.5 m · kg, 11 ft · lb)

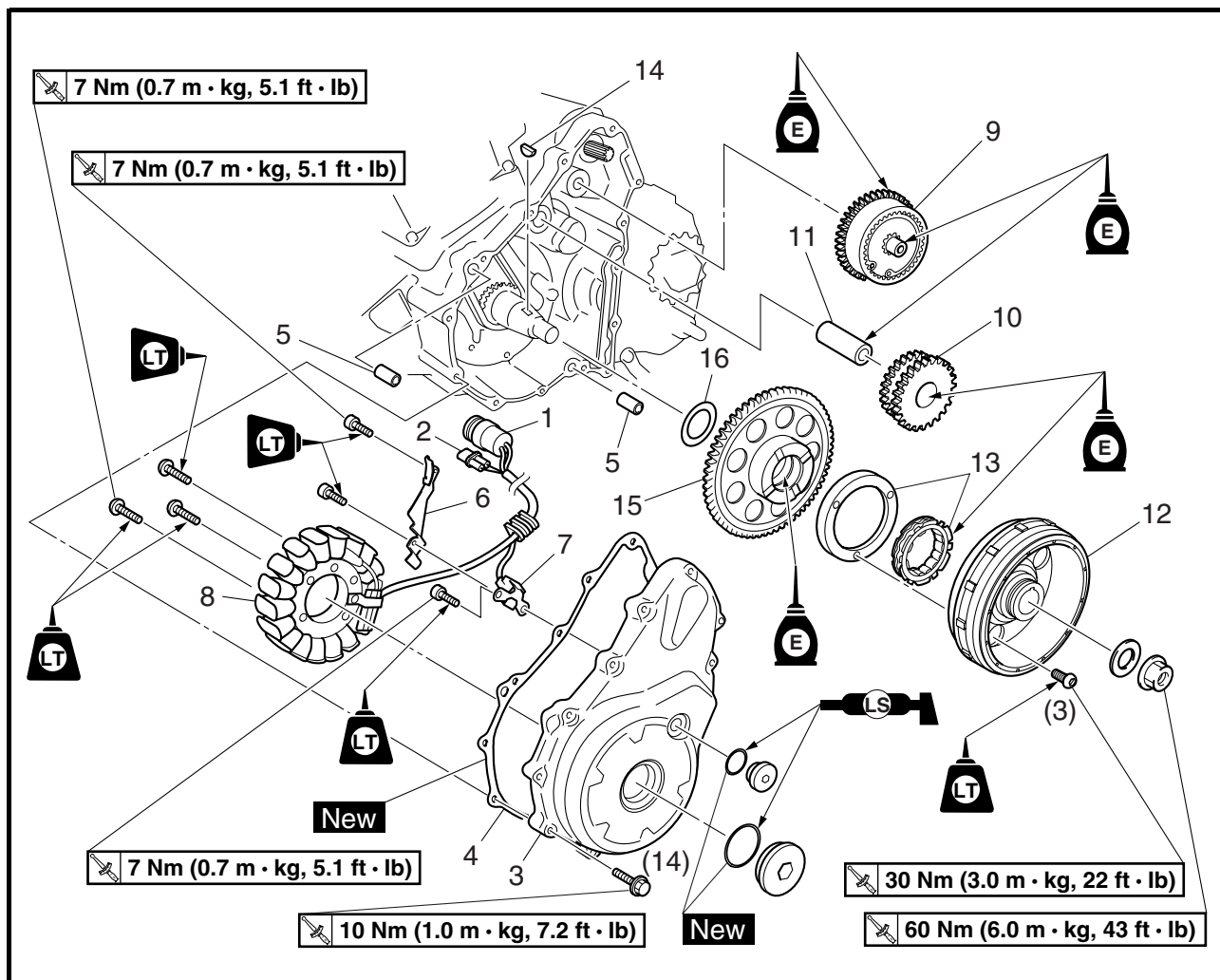
- cylinder bolts ① (2nd)

50 Nm (5.0 m · kg, 36 ft · lb)

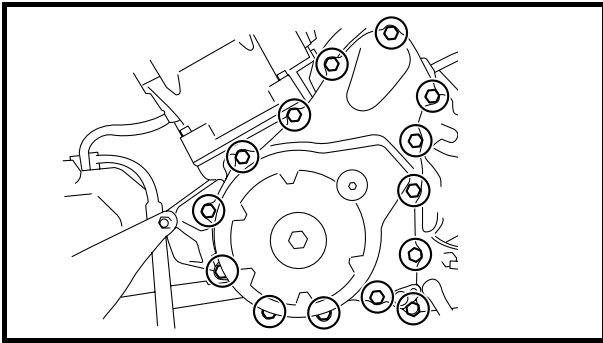
- cylinder bolts (timing chain side) ②

10 Nm (1.0 m · kg, 7.2 ft · lb)





Order	Job/Part	Q'ty	Remarks
9	Torque limiter	1	Refer to "REMOVING THE A.C. MAGNETO ROTOR" and "INSTALLING THE A.C. MAGNETO ROTOR".
10	Starter idle gear	1	
11	Starter idle gear shaft	1	
12	A.C. magneto rotor	1	
13	Starter clutch	1	
14	Woodruff key	1	For installation, reverse the removal procedure.
15	Starter wheel gear	1	
16	Washer	1	



EBS00259

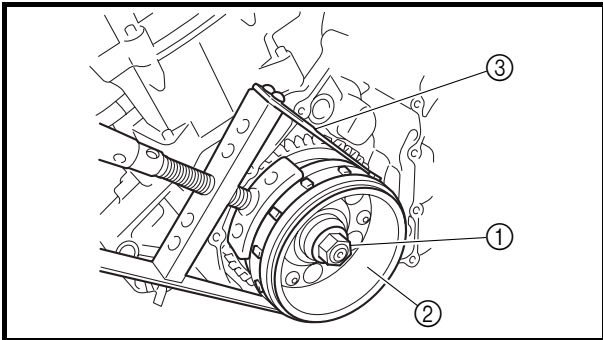
REMOVING THE A.C. MAGNETO ROTOR

1. Remove:

- A.C. magneto cover

NOTE:

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



2. Remove:

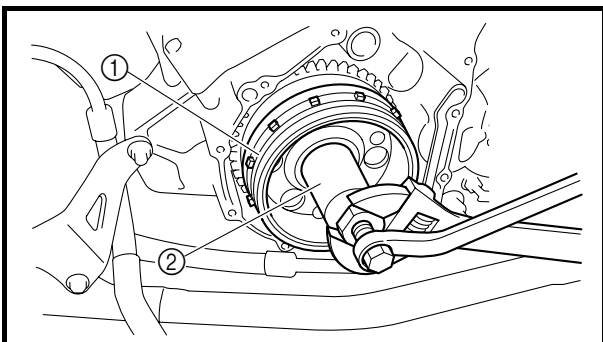
- A.C. magneto rotor nut ①
- washer

NOTE:

While holding the A.C. magneto rotor ② with the sheave holder ③, loosen the A.C. magneto rotor nut.



Sheave holder
90890-01701
Primary clutch holder
YS-01880-A



3. Remove:

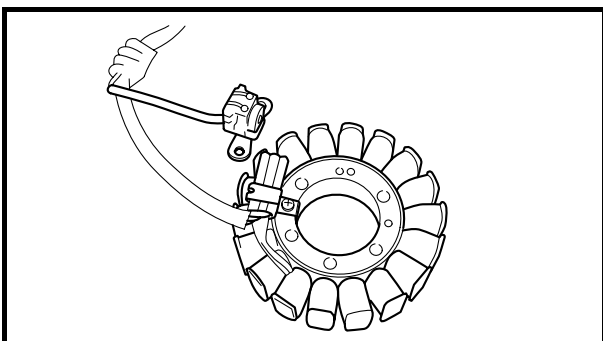
- A.C. magneto rotor ①

NOTE:

Use the flywheel puller ②.



Flywheel puller
90890-01404
YM-01404

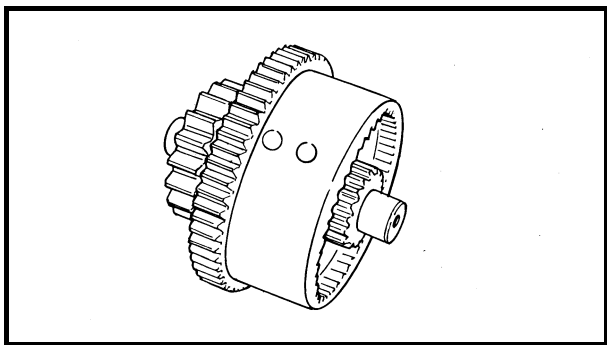


EBS00262

CHECKING THE STATOR COIL AND CRANKSHAFT POSITION SENSOR

1. Check:

- stator coil
 - crankshaft position sensor
- Damage → Replace the crankshaft position sensor/stator assembly.

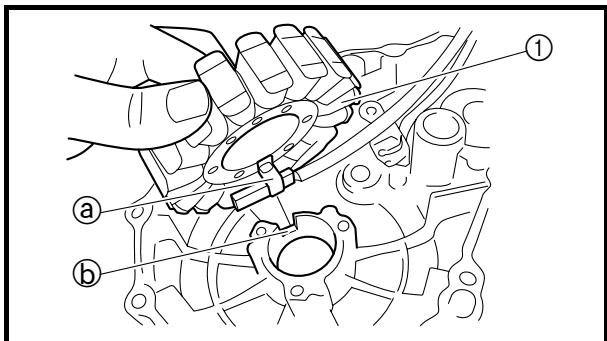
**CHECKING THE TORQUE LIMITER**

1. Check:

- torque limiter
- Damage/wear → Replace.

NOTE:

Do not disassemble the torque limiter.



EBS00268

INSTALLING THE A.C. MAGNETO ROTOR

1. Install:

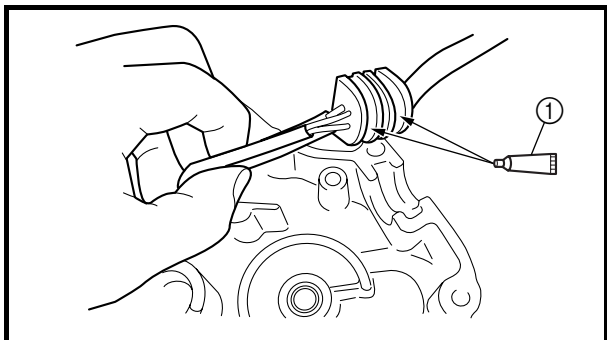
- stator coil ①



7 Nm (0.7 m · kg, 5.1 ft · lb)

NOTE:

Align the projection (a) on the stator coil with the slot (b) in the A.C. magneto cover.



2. Apply:

- Yamaha bond No. 1215 (Three bond No. 1215) ①
- (into the slit)



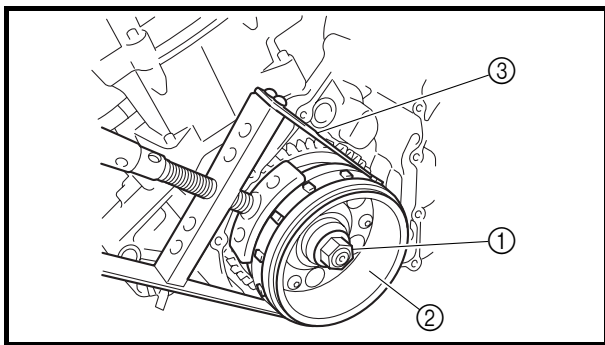
**Yamaha bond No. 1215
(Three bond No. 1215)
90890-85505**

3. Install:

- woodruff key
- A.C. magneto 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.



4. Tighten:

- A.C. magneto rotor nut ①

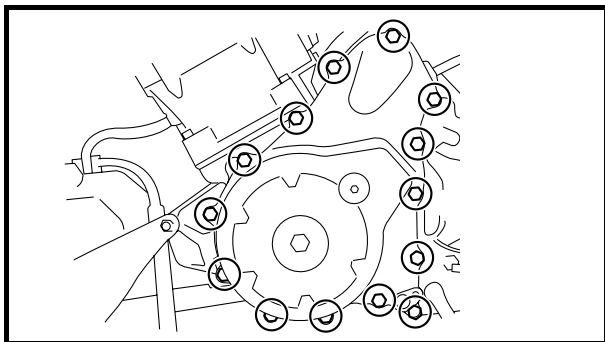
60 Nm (6.0 m · kg, 43 ft · lb)

NOTE:

While holding the A.C. magneto rotor ② with the sheave holder ③, tighten the A.C. magneto rotor nut.



Sheave holder
90890-01701
Primary clutch holder
YS-01880-A



5. Install:

- gasket **New**
- A.C. magneto cover
- bolts

10 Nm (1.0 m · kg, 7.2 ft · lb)

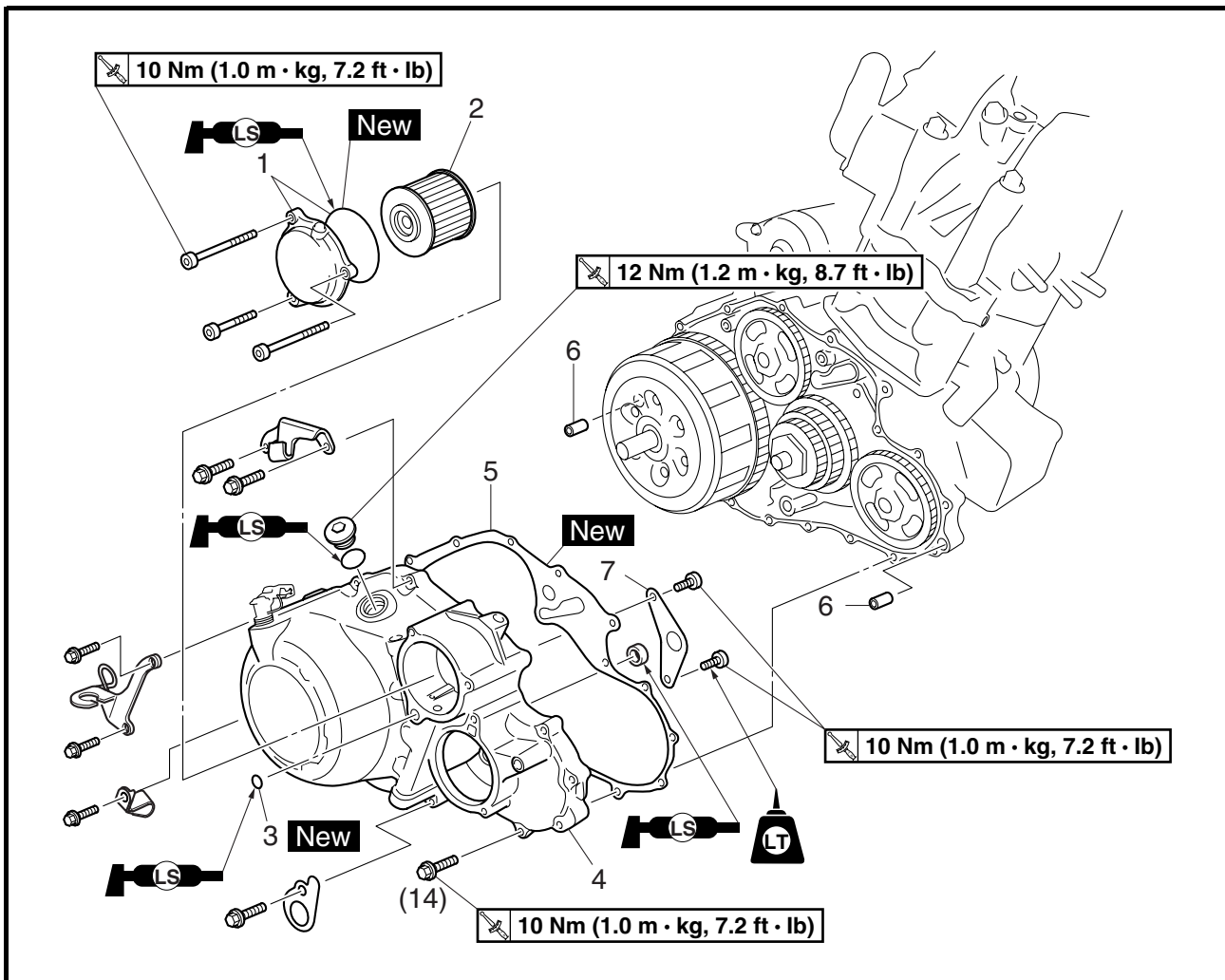
NOTE:

Tighten the A.C. magneto cover bolts in stages, using a crisscross pattern.



EBS00293

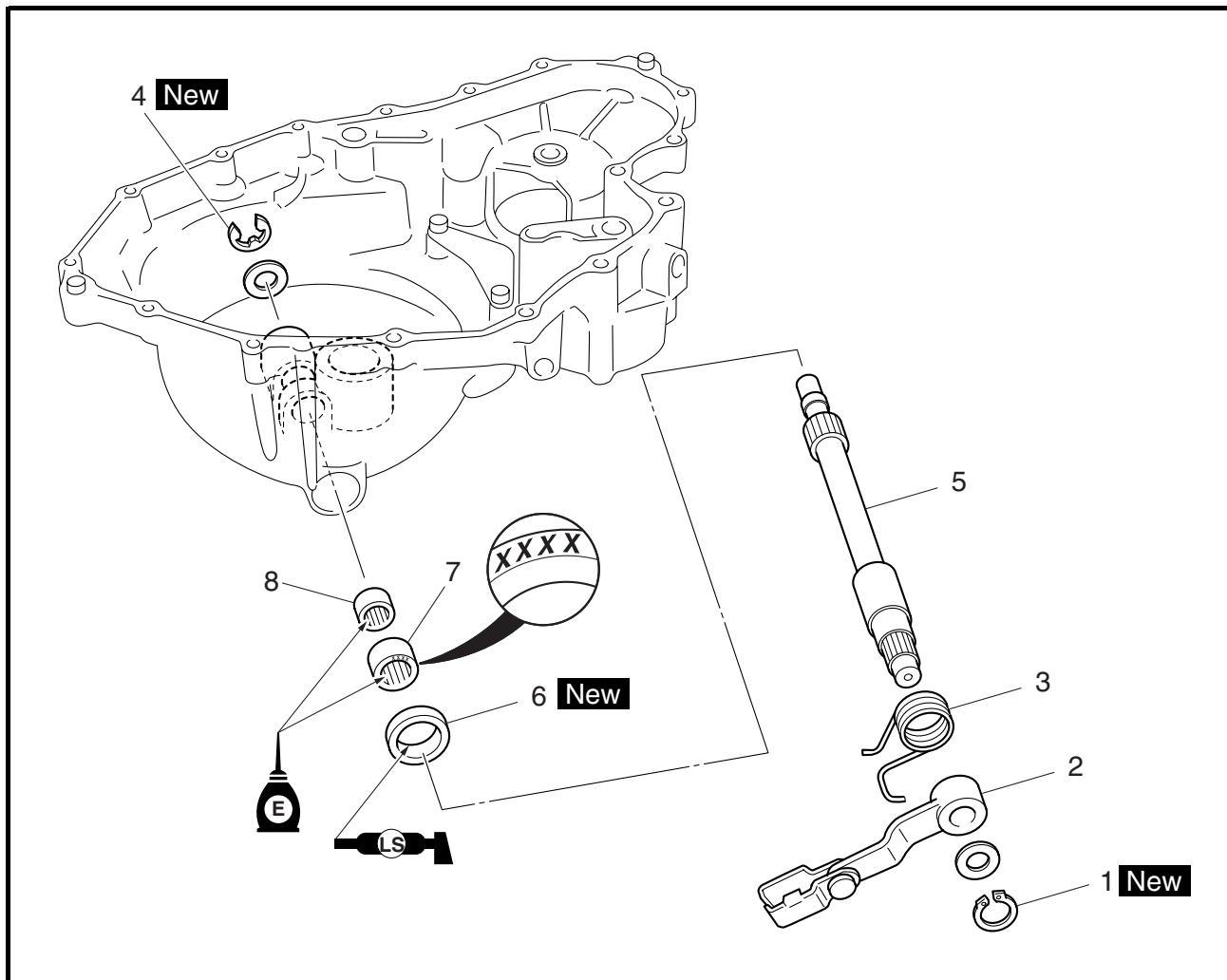
CLUTCH



Order	Job/Part	Q'ty	Remarks
	Removing the clutch cover		
	Engine oil		Remove the parts in the order listed.
	Front fender		Drain.
	Rear brake light switch/right foot rest/ brake pedal/spring		Refer to "SEAT, FENDERS AND FUEL TANK" in chapter 3.
	Oil delivery pipe		Refer to "FRONT AND REAR BRAKES" in chapter 7.
1	Oil filter cover/O-ring	1/1	Refer to "CYLINDER HEAD".
2	Oil filter	1	
3	O-ring	1	
4	Clutch cover	1	
5	Clutch cover gasket	1	
6	Dowel pin	2	Refer to "REMOVING THE CLUTCH" and "INSTALLING THE CLUTCH".
7	Oil seal retainer	1	
			For installation, reverse the removal pro- cedure.



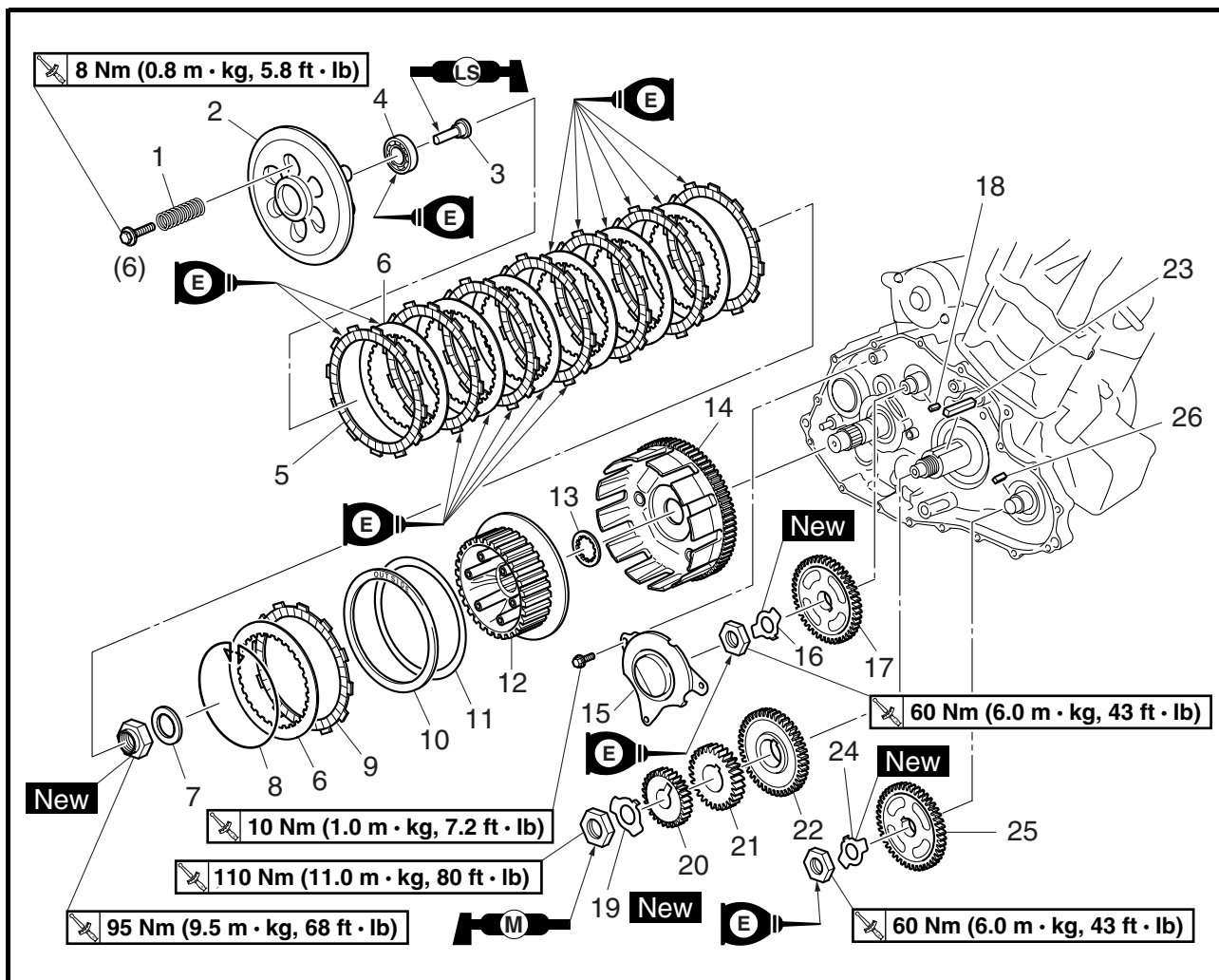
EBS00294



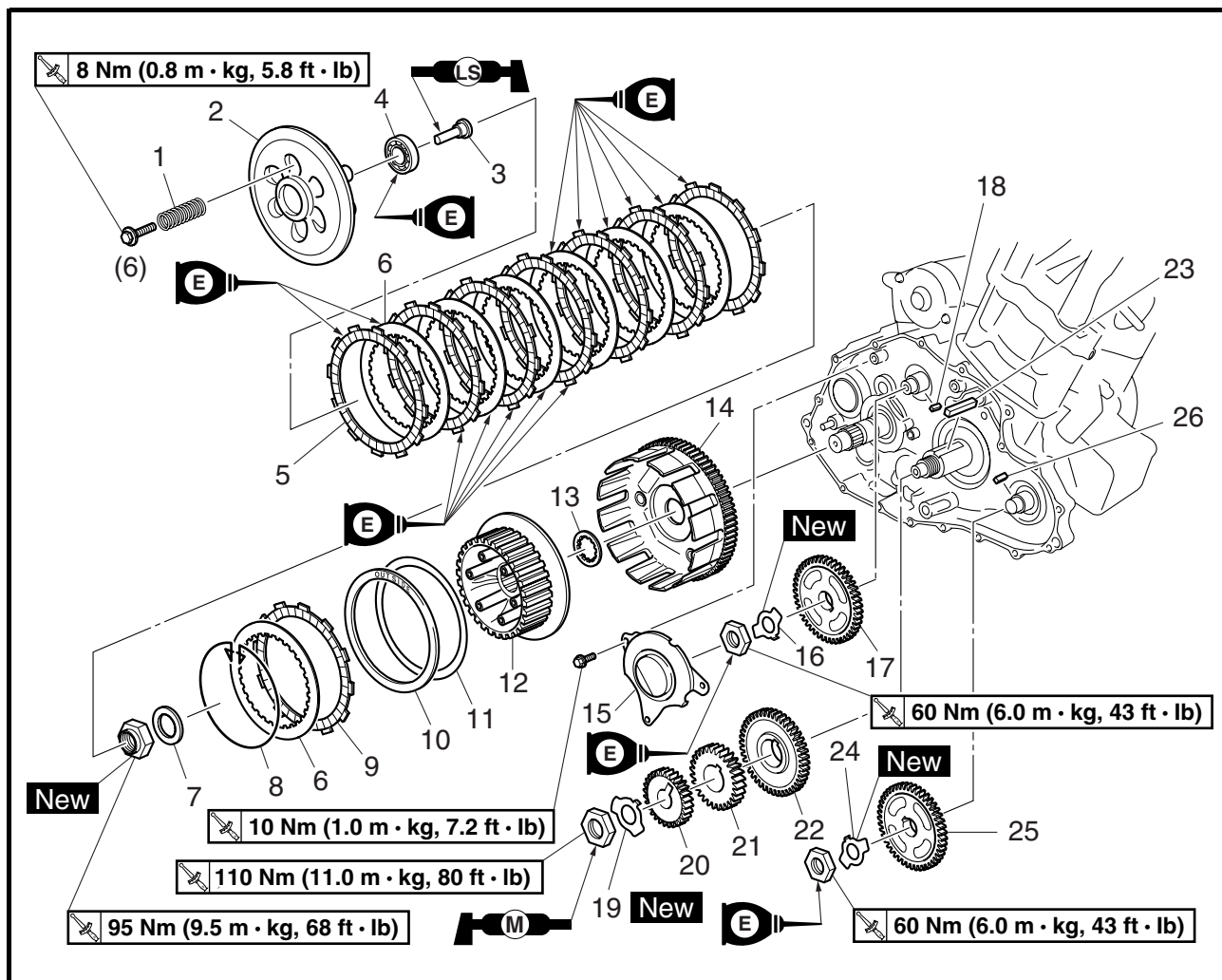
Order	Job/Part	Q'ty	Remarks
	Removing the pull lever shaft		Remove the parts in the order listed.
1	Circlip	1	
2	Pull lever	1	
3	Pull lever spring	1	
4	Circlip	1	
5	Pull lever shaft	1	
6	Oil seal	1	
7	Bearing	1	
8	Bearing	1	
			For installation, reverse the removal procedure.



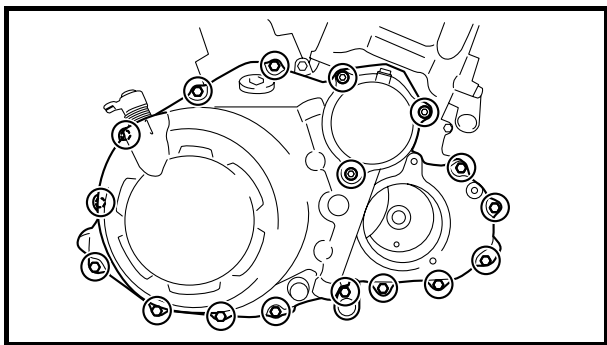
EBS00291



Order	Job/Part	Q'ty	Remarks
	Removing the clutch		Remove the parts in the order listed.
1	Clutch spring	6	} Refer to "INSTALLING THE CLUTCH".
2	Pressure plate	1	
3	Pull rod	1	
4	Bearing	1	
5	Friction plate 1	7	} Refer to "INSTALLING THE CLUTCH".
6	Clutch plate	7	
7	Conical spring washer	1	
8	Wire circlip	1	
9	Friction plate 2	1	} Refer to "REMOVING THE CLUTCH" and "INSTALLING THE CLUTCH".
10	Clutch damper spring	1	
11	Clutch damper spring seat	1	
12	Clutch boss	1	
13	Thrust washer	1	} Refer to "INSTALLING THE CLUTCH".
14	Clutch housing	1	



Order	Job/Part	Q'ty	Remarks
15	Breather plate	1	Refer to "REMOVING THE PRIMARY DRIVE GEAR AND BALANCER DRIVEN GEAR" and "INSTALLING THE PRIMARY DRIVE GEAR AND BALANCER DRIVEN GEARS".
16	Lock washer	1	
17	Balancer driven gear 1	1	
18	Straight key	1	
19	Lock washer	1	
20	Water pump drive gear	1	
21	Primary drive gear	1	
22	Balancer drive gear	1	
23	Straight key	1	
24	Lock washer	1	
25	Balancer driven gear 2	1	
26	Straight key	1	
			For installation, reverse the removal procedure.



EBS00297

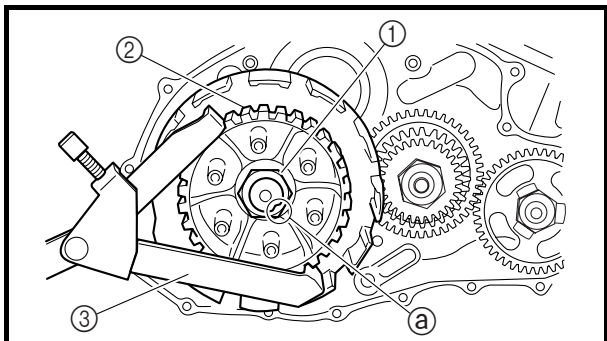
REMOVING THE CLUTCH

1. Remove:

- clutch cover

NOTE:

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

2. Straighten the clutch boss nut staked point **a**.

3. Loosen:

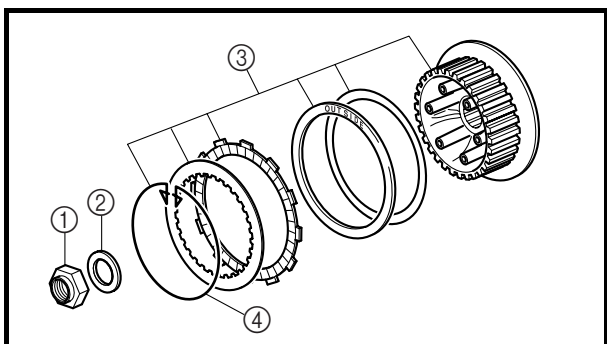
- clutch boss nut ①

NOTE:

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



Universal clutch holder
90890-04086, YM-91042

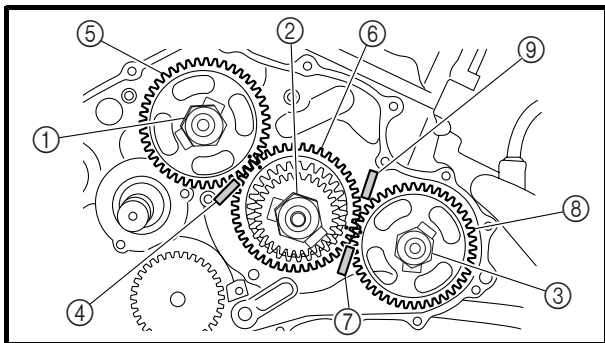


4. Remove:

- clutch boss nut ①
- conical spring washer ②
- clutch boss assembly ③

NOTE:

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



EBS00298

REMOVING THE PRIMARY DRIVE GEAR AND BALANCER DRIVEN GEAR

1. Straighten the lock washer tabs.
2. Loosen:
 - balancer driven gear 1 nut ①
 - primary drive gear nut ②
 - balancer driven gear 2 nut ③

NOTE:

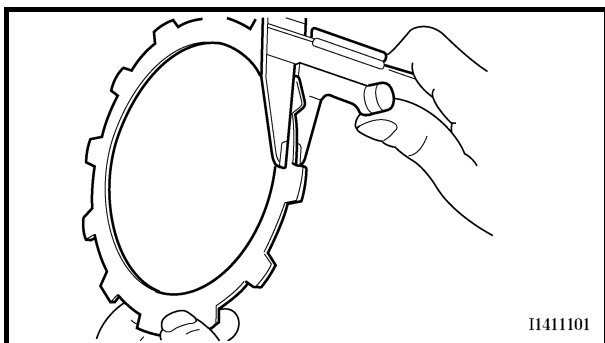
- Place an aluminum plate ④ between the teeth of the balancer driven gear 1 ⑤ and balancer drive gear ⑥, then loosen the nut ①.
- Place an aluminum plate ⑨ between the teeth of the balancer driven gear 2 ⑧ and balancer drive gear ⑥, then loosen the nut ③.
- Place an aluminum plate ⑦ between the teeth of the balancer drive gear ⑥ and balancer driven gear 2 ⑧, then loosen the nut ②.

EBS00300

CHECKING THE FRICTION PLATES

The following procedure applies to all of the friction plates.

1. Check:
 - friction plate
Damage/wear → Replace the friction plates as a set.



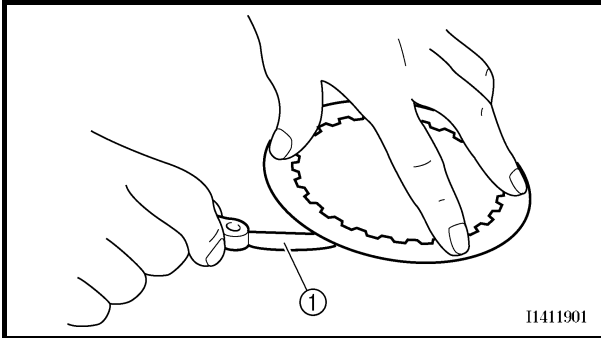
2. Measure:
 - friction plate thickness
Out of specification → Replace the friction plates as a set.

NOTE:

Measure the friction plate at four places.



Friction plate 1 thickness
 2.92 ~ 3.08 mm (0.115 ~ 0.121 in)
 <Limit>: 2.82 mm (0.111 in)
Friction plate 2 thickness
 2.90 ~ 3.10 mm (0.114 ~ 0.122 in)
 <Limit>: 2.8 mm (0.110 in)



EBS00301

CHECKING THE CLUTCH PLATES

The following procedure applies to all of the clutch plates.

1. Check:

- clutch plate

Damage → Replace the clutch plates as a set.

2. Measure:

- clutch plate warpage
 (with a surface plate and thickness gauge ①)

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



Maximum clutch plate warpage
 0.2 mm (0.0079 in)

EBS00302

CHECKING THE CLUTCH SPRINGS

The following procedure applies to all of the clutch springs.

1. Check:

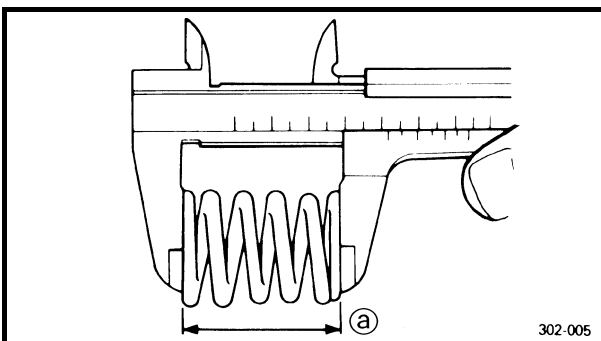
- clutch spring

Damage → Replace the clutch springs as a set.

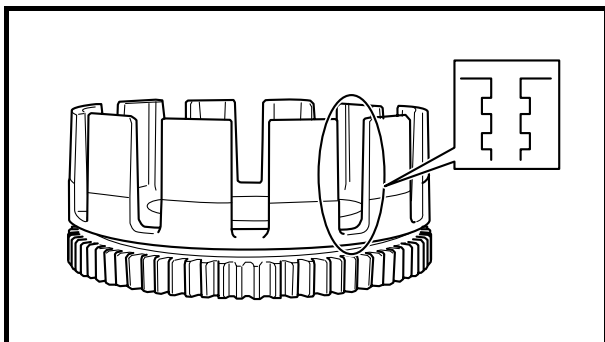
2. Measure:

- clutch spring free length ②

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



Clutch spring free length
 50.0 mm (1.97 in)
 <Limit>: 48 mm (1.89 in)



EBS00303

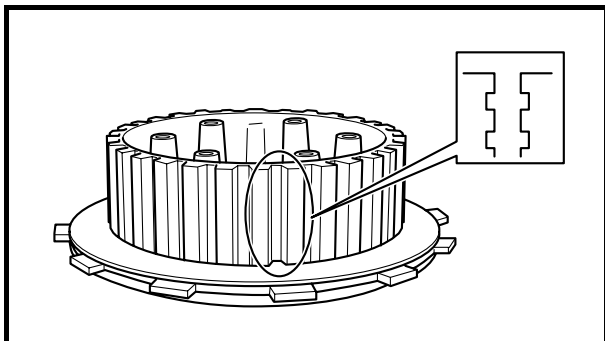
CHECKING THE CLUTCH HOUSING

1. Check:

- clutch housing dogs
Damage/pitting/wear → Deburr the clutch housing dogs or replace the clutch housing.

NOTE:

Pitting on the clutch housing dogs will cause erratic clutch operation.



EBS00304

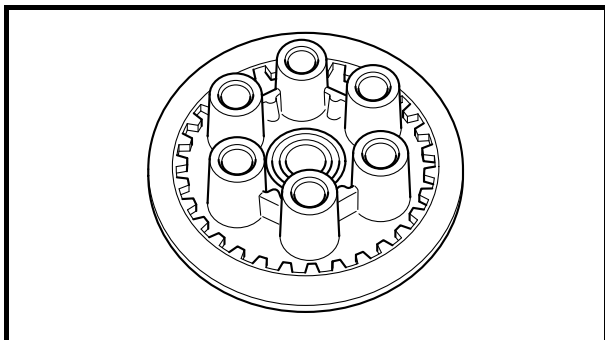
CHECKING THE CLUTCH BOSS

1. Check:

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

NOTE:

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

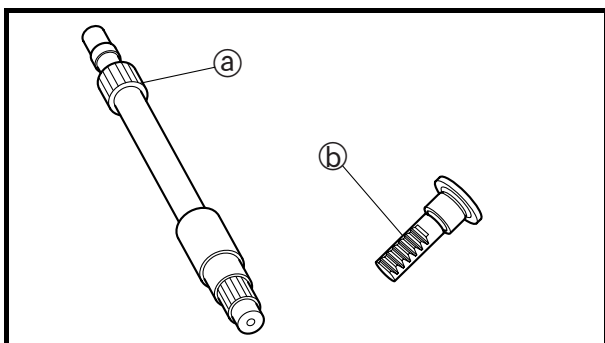


EBS00305

CHECKING THE PRESSURE PLATE

1. Check:

- pressure plate
Cracks/damage → Replace.



EBS00306

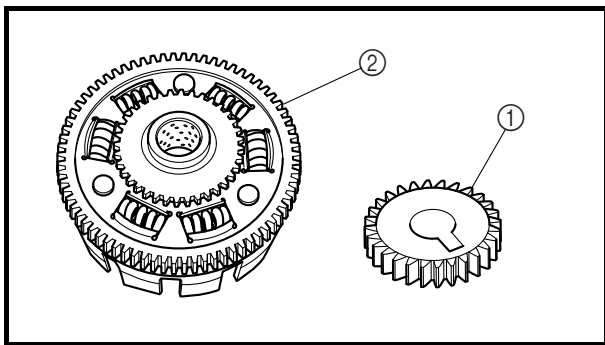
CHECKING THE PULL LEVER SHAFT AND PULL ROD

1. Check:

- pull lever shaft pinion gear teeth (a)
- pull rod teeth (b)
Damage/wear → Replace the pull lever shaft and pull rod as a set.

2. Check:

- pull rod bearing
Damage/wear → Replace.



EBS00307

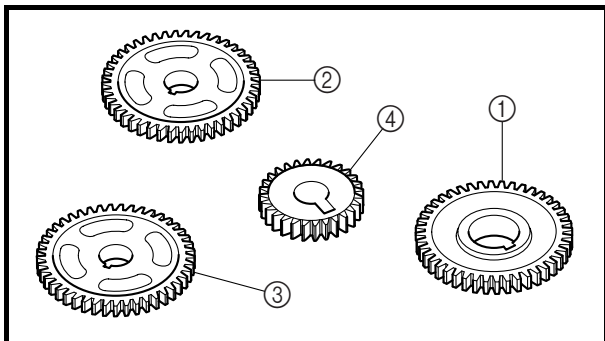
CHECKING THE PRIMARY DRIVE GEARS

1. Check:

- primary drive gear ①
- primary driven gear ②

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

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



EBS00308

CHECKING THE BALANCER DRIVE GEARS

1. Check:

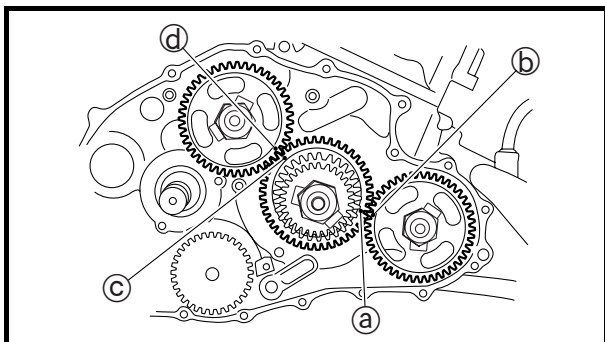
- balancer drive gear ①
- balancer driven gear 1 ②
- balancer driven gear 2 ③
- water pump drive gear ④

Damage/wear → Replace the balancer drive gear and balancer driven gear as a set.

Replace the water pump drive gear and water pump driven gear as a set.

Excessive noise during operation → Replace the balancer drive gear and balancer driven gear as a set.

Replace the water pump drive gear and water pump driven gear as a set.



EBS00310

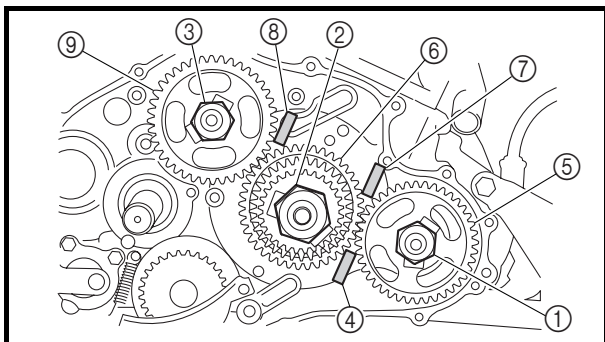
INSTALLING THE PRIMARY DRIVE GEAR AND BALANCER DRIVEN GEARS

1. Install:

- balancer drive gear
- primary drive gear
- water pump drive gear
- balancer driven gear 1
- balancer driven gear 2

NOTE:

- Align the punch mark ① on the balancer drive gear with the punch mark ② on the balancer driven gear 2.
- Align the punch mark ③ on the balancer drive gear with the punch mark ④ on the balancer driven gear 1.



2. Tighten:

- balancer driven gear 2 nut ①

60 Nm (6.0 m · kg, 43 ft · lb)

- primary drive gear nut ②

110 Nm (11.0 m · kg, 80 ft · lb)

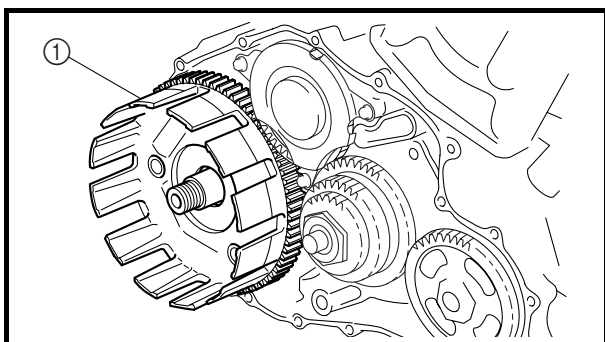
- balancer driven gear 1 nut ③

60 Nm (6.0 m · kg, 43 ft · lb)

NOTE:

- Apply the engine oil to the balancer threads.
- Apply the molybdenum disulfide grease to the crankshaft and nut ② threads.
- Place an aluminum plate ④ between the teeth of the balancer driven gear 2 ⑤ and balancer drive gear ⑥, then tighten the nut ①.
- Place an aluminum plate ⑦ between the teeth of the balancer driven gear 2 ⑤ and balancer drive gear ⑥, then tighten the nut ②.
- Place an aluminum plate ⑧ between the teeth of the balancer drive gear ⑥ and balancer driven gear 1 ⑨, then tighten the nut ③.

3. Bend the lock washer tabs along a flat side of the nut.



EBS00311

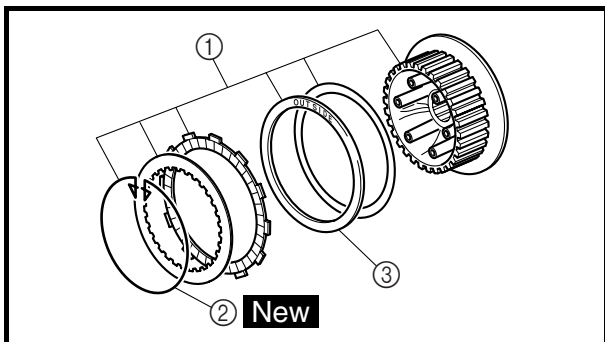
INSTALLING THE CLUTCH

1. Install:

- clutch housing ①

NOTE:

- Make sure that the primary driven gear teeth and primary drive gear teeth mesh correctly.
- Make sure that the oil pump drive gear teeth and oil pump driven gear teeth mesh correctly.

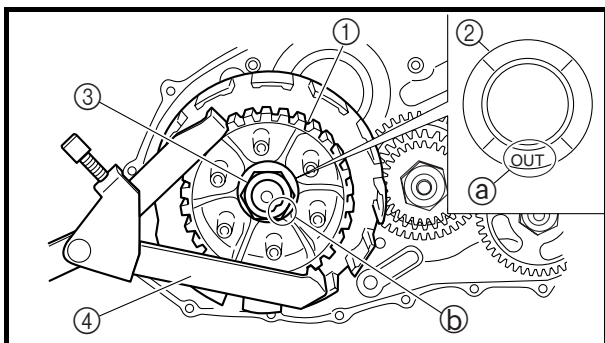


2. Install:

- clutch boss assembly ①

NOTE:

- If the wire circlip ② has been removed, carefully install a new one.
- Install the clutch damper spring ③ with the “OUTSIDE” mark facing out.



3. Install:

- clutch boss ①
- conical spring washer ②
- clutch boss nut ③ **New**

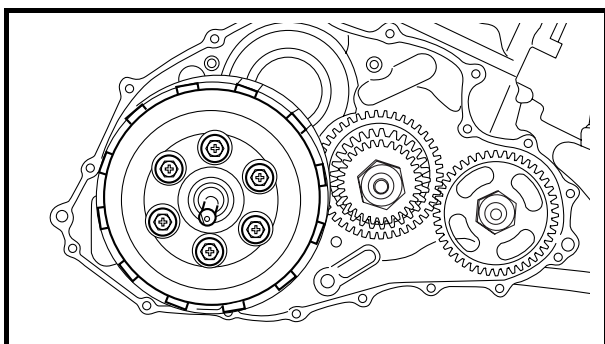
95 Nm (9.5 m · kg, 68 ft · lb)

NOTE:

- Install the washer ② with the “OUT” mark a facing out.
- While holding the clutch boss ① with the clutch holding tool ④, tighten the clutch boss nut.
- Stake the clutch boss nut ③ at a cutout b in the main axle.



Universal clutch holder
90890-04086, YM-91042



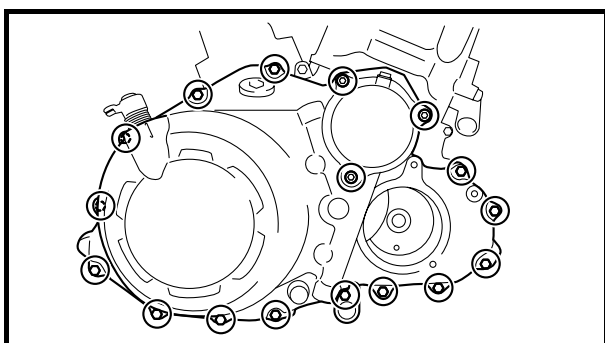
4. Install:

- clutch springs

8 Nm (0.8 m · kg, 5.8 ft · lb)

NOTE:

Tighten the bolts in stages, using a crisscross pattern.



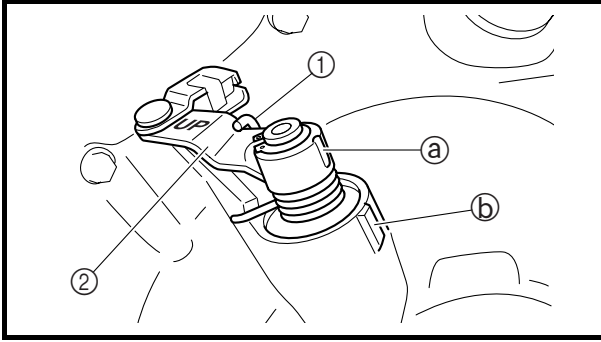
5. Install:

- clutch cover

10 Nm (1.0 m · kg, 7.2 ft · lb)

NOTE:

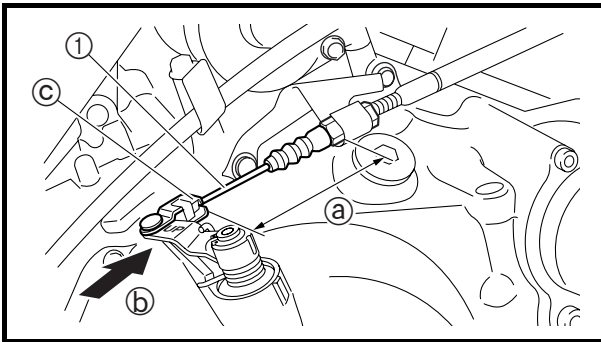
- To install the clutch cover, position the pull rod so that the teeth face towards the rear of the vehicle.
- Tighten the clutch cover bolts in stages and in a crisscross pattern.



6. Install:
- pull lever spring ①
 - pull lever ②
 - washer
 - circlip **New**

NOTE:

- Install the pull lever with the “UP” mark facing up.
- Align the mark ① on the pull lever with the stationary pointer ② on the clutch cover.
- Install the pull lever spring ① as shown.



7. Install:
- clutch cable ①
8. Check:
- clutch cable length ①
- Out of specification → Adjust.

NOTE:

- Push the pull lever in direction ② and check the cable length ①.
- Bend the tab ③ on the pull lever to secure the clutch cable.



Clutch cable length
67 ~ 76 mm (2.64 ~ 2.99 in)

9. Adjust:
- clutch cable length

NOTE:

Move the pull lever a notch until the cable length is within specification.

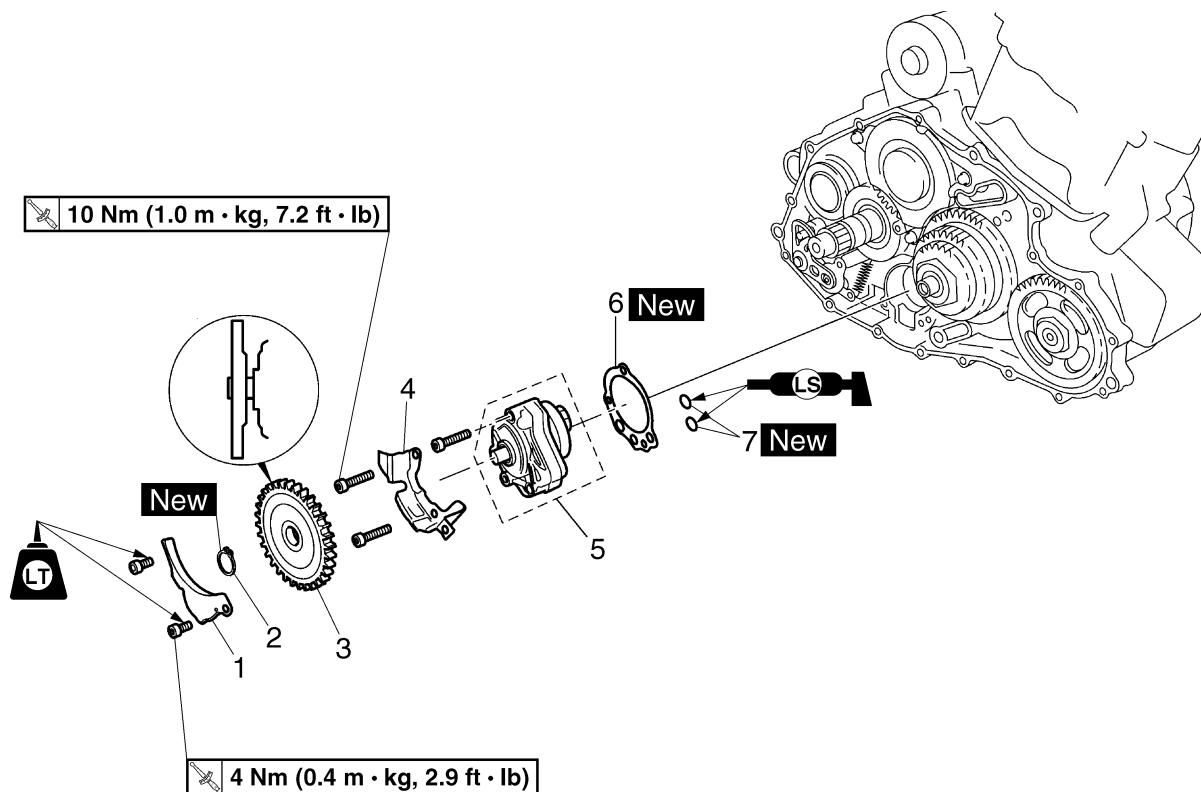
10. Adjust:

- clutch cable free play
- Refer to “ADJUSTING THE CLUTCH CABLE” in chapter 3.

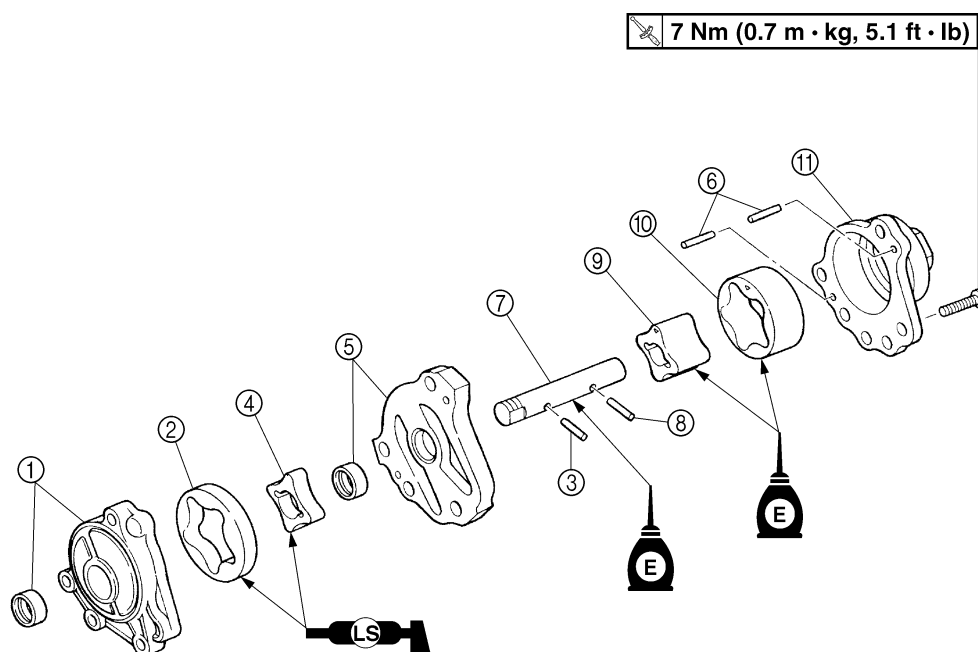


EBS00315

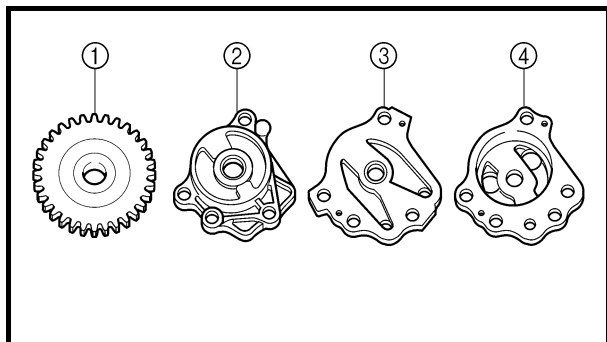
OIL PUMP



Order	Job/Part	Q'ty	Remarks
	Removing the oil pump		Remove the parts in the order listed.
	Clutch housing		Refer to "CLUTCH".
1	Oil baffle plate 1	1	
2	Circlip	1	
3	Oil pump driven gear	1	
4	Oil baffle plate 2	1	
5	Oil pump	1	
6	Oil pump gasket	1	
7	O-ring	2	
			For installation, reverse the removal procedure.



Order	Job/Part	Q'ty	Remarks
	Disassembling the oil pump		Remove the parts in the order listed.
①	Oil pump housing 1/oil seal	1/1	
②	Oil pump outer rotor 1	1	
③	Dowel pin	1	
④	Oil pump inner rotor 1	1	
⑤	Oil pump housing cover/oil seal	1/1	
⑥	Dowel pin	2	
⑦	Oil pump shaft	1	
⑧	Dowel pin	1	
⑨	Oil pump inner rotor 2	1	Refer to "ASSEMBLING THE OIL PUMP".
⑩	Oil pump outer rotor 2	1	
⑪	Oil pump housing 2	1	
			For assembly, reverse the disassembly procedure.

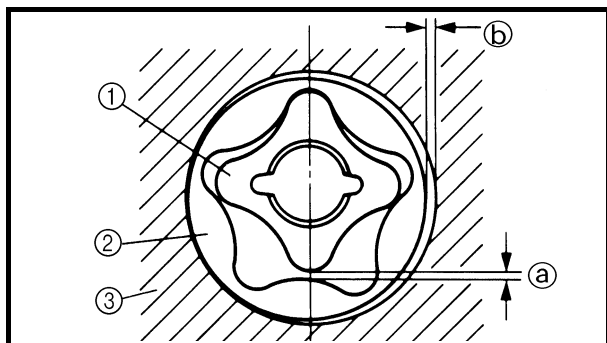


EBS00317

CHECKING THE OIL PUMP**1. Check:**

- oil pump driven gear ①
- oil pump housing 1 ②
- oil pump housing cover ③
- oil pump housing 2 ④

Cracks/damage/wear → Replace.

**2. Measure:**

- inner-rotor-to-outer-rotor-tip clearance ①
- outer-rotor-to-oil-pump-housing clearance ②

Out of specification → Replace the oil pump.

- ① inner rotor
- ② outer rotor
- ③ oil pump housing

**Inner-rotor-to-outer-rotor-tip clearance**

Less than 0.12 mm (0.0047 in)

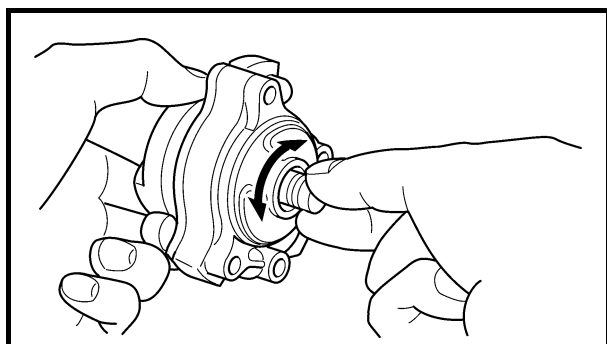
<Limit>: 0.20 mm (0.0079 in)

Outer-rotor-to-oil-pump-housing clearance

0.09 ~ 0.15 mm

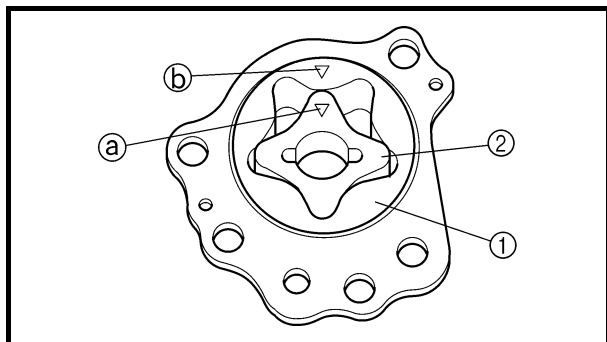
(0.0035 ~ 0.0059 in)

<Limit>: 0.22 mm (0.0087 in)

**3. Check:**

- oil pump operation

Rough movement → Repeat steps (1) and (2) or replace the defective parts.



EBS00318

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

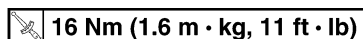
- oil pump outer rotor 2 ①
- oil pump inner rotor 2 ②
(to the oil pump housing 2)
- oil pump housing

7 Nm (0.7 m · kg, 5.1 ft · lb)**NOTE:**

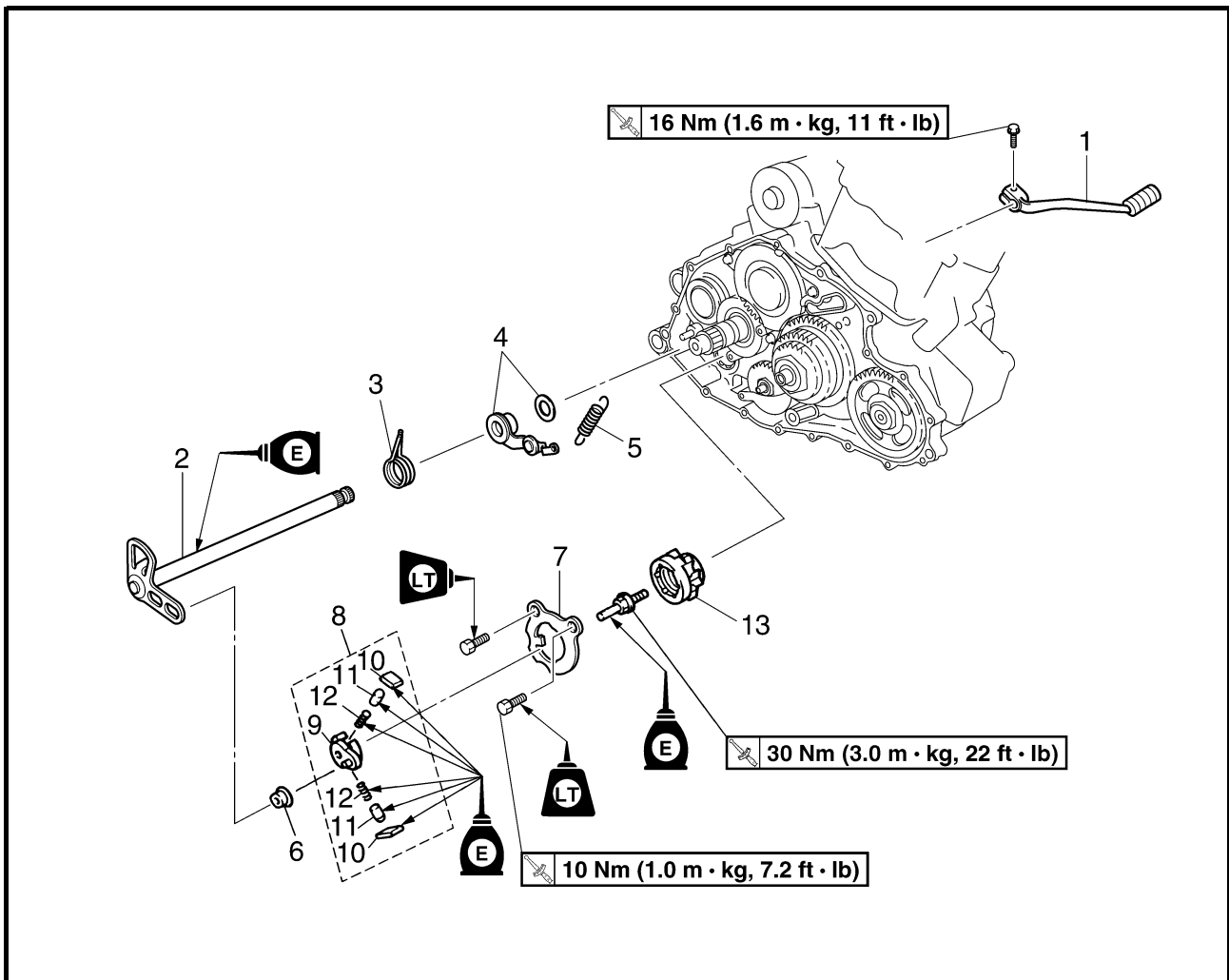
Align the match mark (a) on the inner rotor 2 with the match mark (b) on the outer rotor 2.

2. Check:

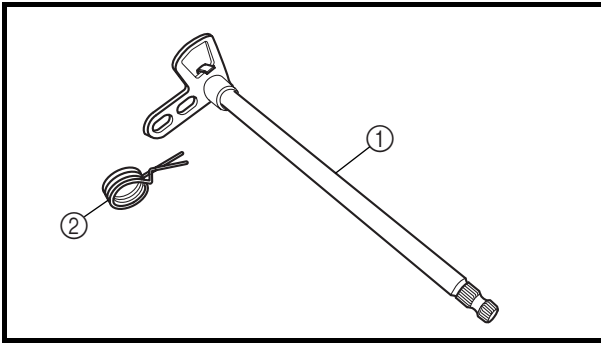
- oil pump operation
Refer to "CHECKING THE OIL PUMP".



Removing the shift shaft



Order	Job/Part	Q'ty	Remarks
13	Shift drum segment	1	Refer to "INSTALLING THE SHIFT LEVER". For installation, reverse the removal procedure.

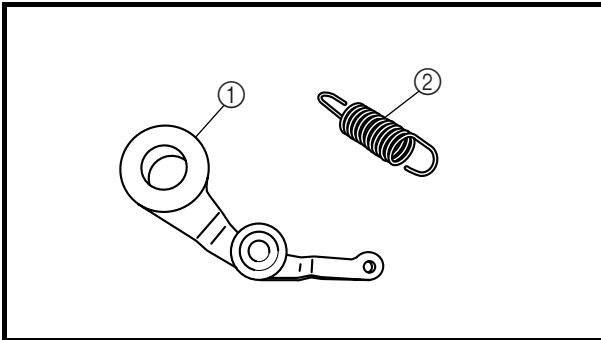


EBS01018

CHECKING THE SHIFT SHAFT

1. Check:

- shift shaft ①
Bends/damage/wear → Replace.
- shift shaft spring ②
Damage/wear → Replace.

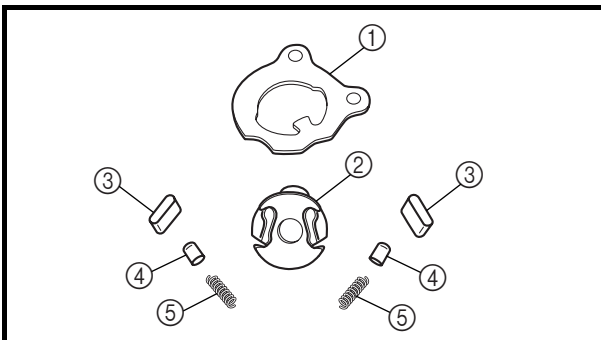


EBS01019

CHECKING THE STOPPER LEVER

1. Check:

- stopper lever ①
Bends/damage → Replace.
Roller turns roughly → Replace the stopper lever.
- stopper lever spring ②
Damage/wear → Replace.

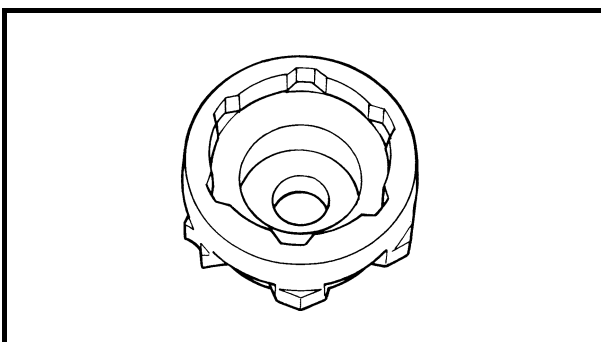


EBS00359

CHECKING THE SHIFT GUIDE

1. Check:

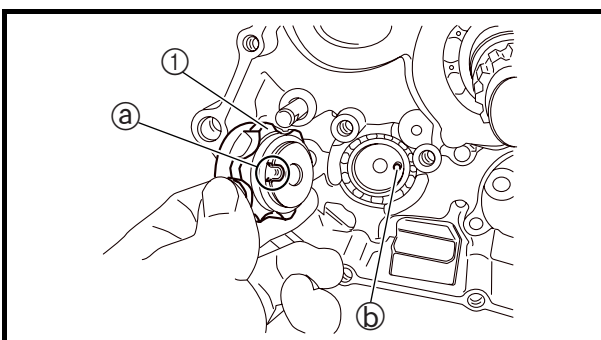
- shift guide ①
- pawl holder ②
- pawls ③
- pawl pins ④
- springs ⑤
Wear/cracks/damage → Replace.



CHECKING THE SHIFT DRUM SEGMENT

1. Check:

- shift drum segment
Damage/wear → Replace.



INSTALLING THE SHIFT LEVER

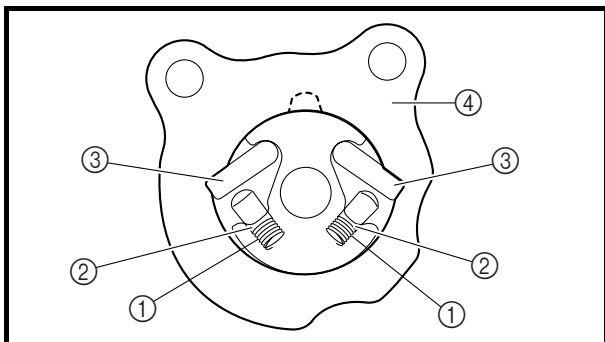
1. Install:

- shift drum segment ①
- shift drum segment bolt

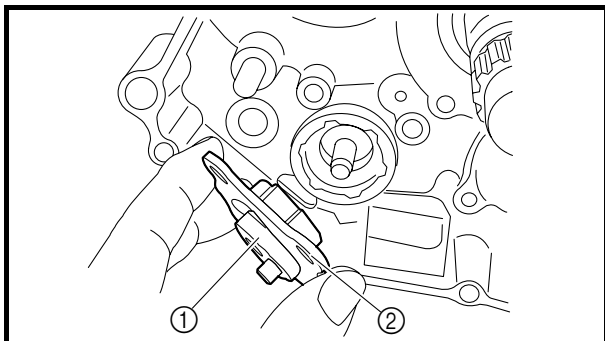
30 Nm (3.0 m · kg, 22 ft · lb)

NOTE:

Align the notch (a) on the shift drum segment with the pin (b) on the shift drum.



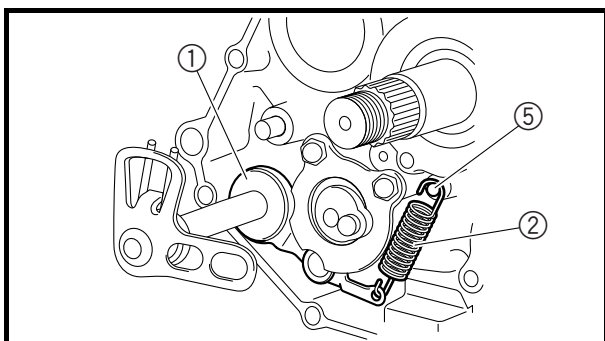
2. Install:
- springs ①
 - pawl pins ②
 - pawls ③
 - shift guide ④
(to the pawl holder)



3. Install:
- shift lever assembly ①
 - shift guide ② **10 Nm (1.0 m · kg, 7.2 ft · lb)**

NOTE:

The shift lever assembly is installed at the same time as the shift guide.



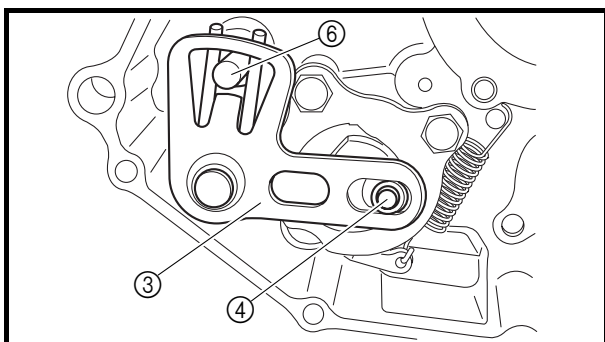
EBS00343

INSTALLING THE SHIFT SHAFT

1. Install:
- stopper lever ①
 - stopper lever spring ②
 - shift shaft ③
 - roller ④
 - shift shaft spring

NOTE:

- Hook the ends of the stopper lever spring onto the stopper lever and the crankcase boss ⑤.
- Install the end of the shift shaft spring onto the shift shaft spring stopper ⑥.
- Install the end of the shift shaft lever onto the roller ④.

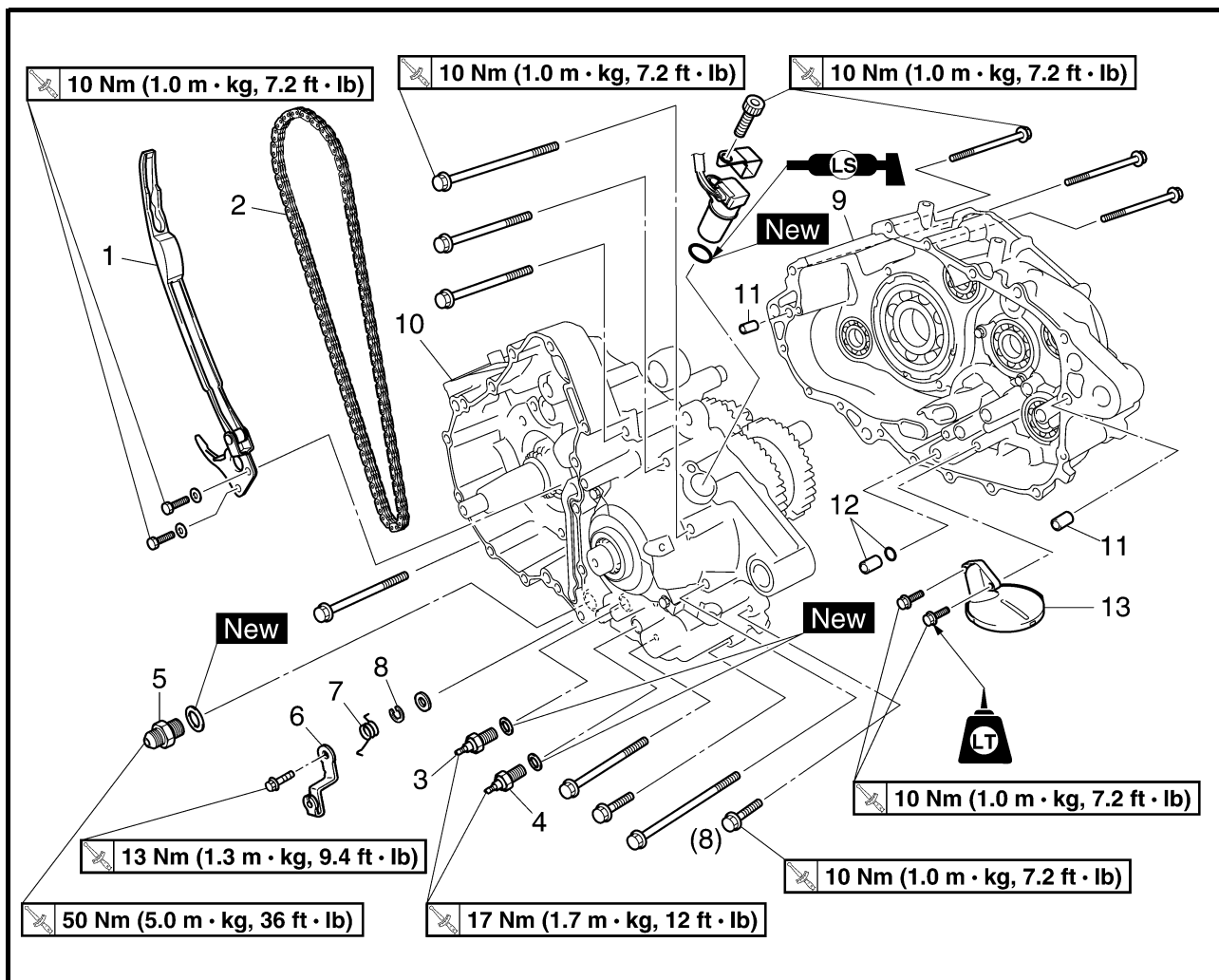


2. Install:
- shift pedal **16 Nm (1.6 m · kg, 11 ft · lb)**
- Refer to "ADJUSTING THE SHIFT PEDAL" in chapter 3.

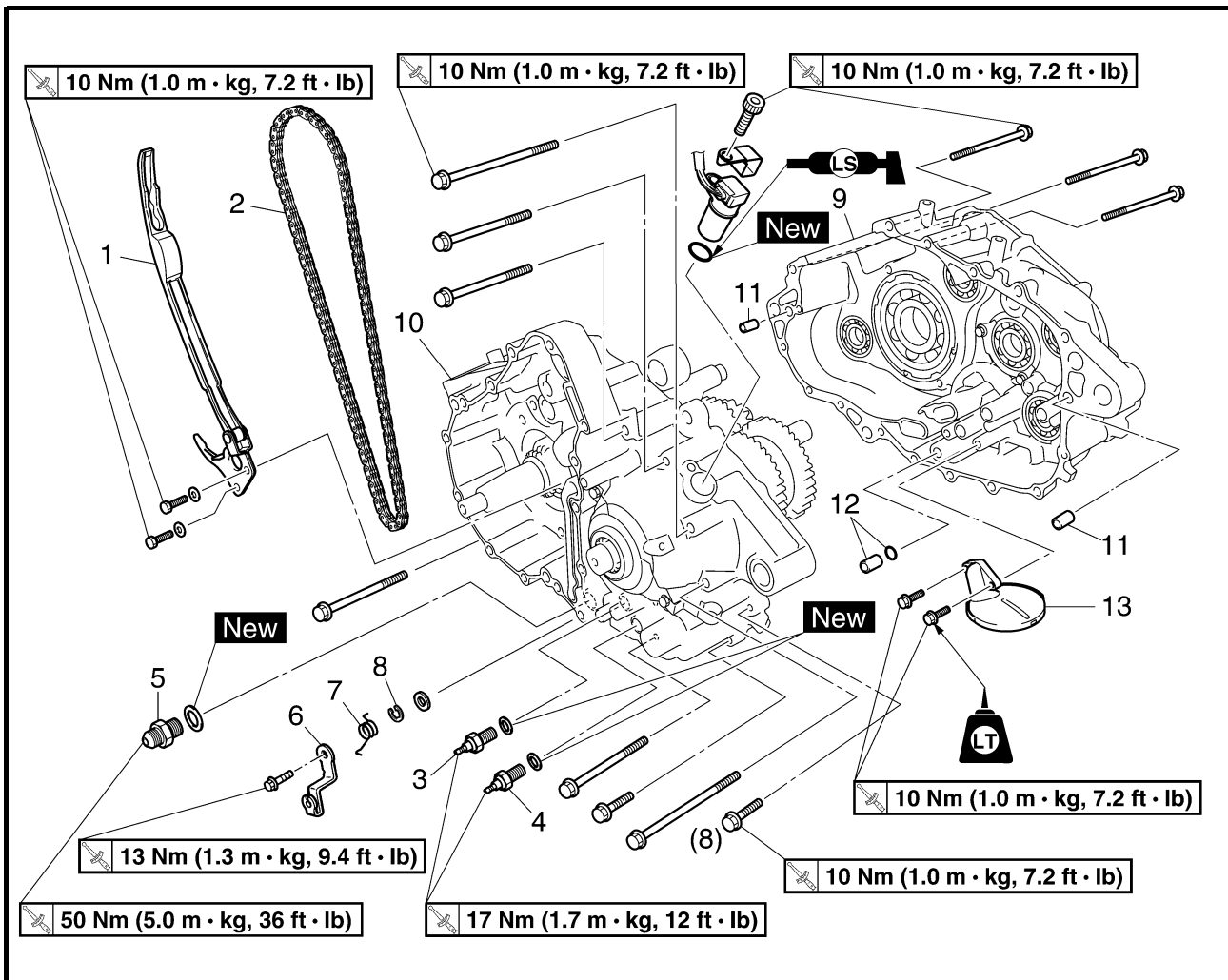


EBS00320

CRANKCASE



Order	Job/Part	Q'ty	Remarks
	Separating the crankcase		
	Engine assembly		Remove the parts in the order listed.
	Piston		Refer to "ENGINE REMOVAL".
	A.C. magneto		Refer to "CYLINDER AND PISTON".
	Balancer driven gears		Refer to "A.C. MAGNETO".
	Oil pump		Refer to "CLUTCH".
	Shift drum segment		Refer to "OIL PUMP".
	Starter motor		Refer to "SHIFT SHAFT".
			Refer to "STARTER MOTOR" in chapter 8.
1	Timing chain guide (intake side)	1	
2	Timing chain	1	
3	Neutral switch	1	
4	Reverse switch	1	
5	Oil pipe joint	1	

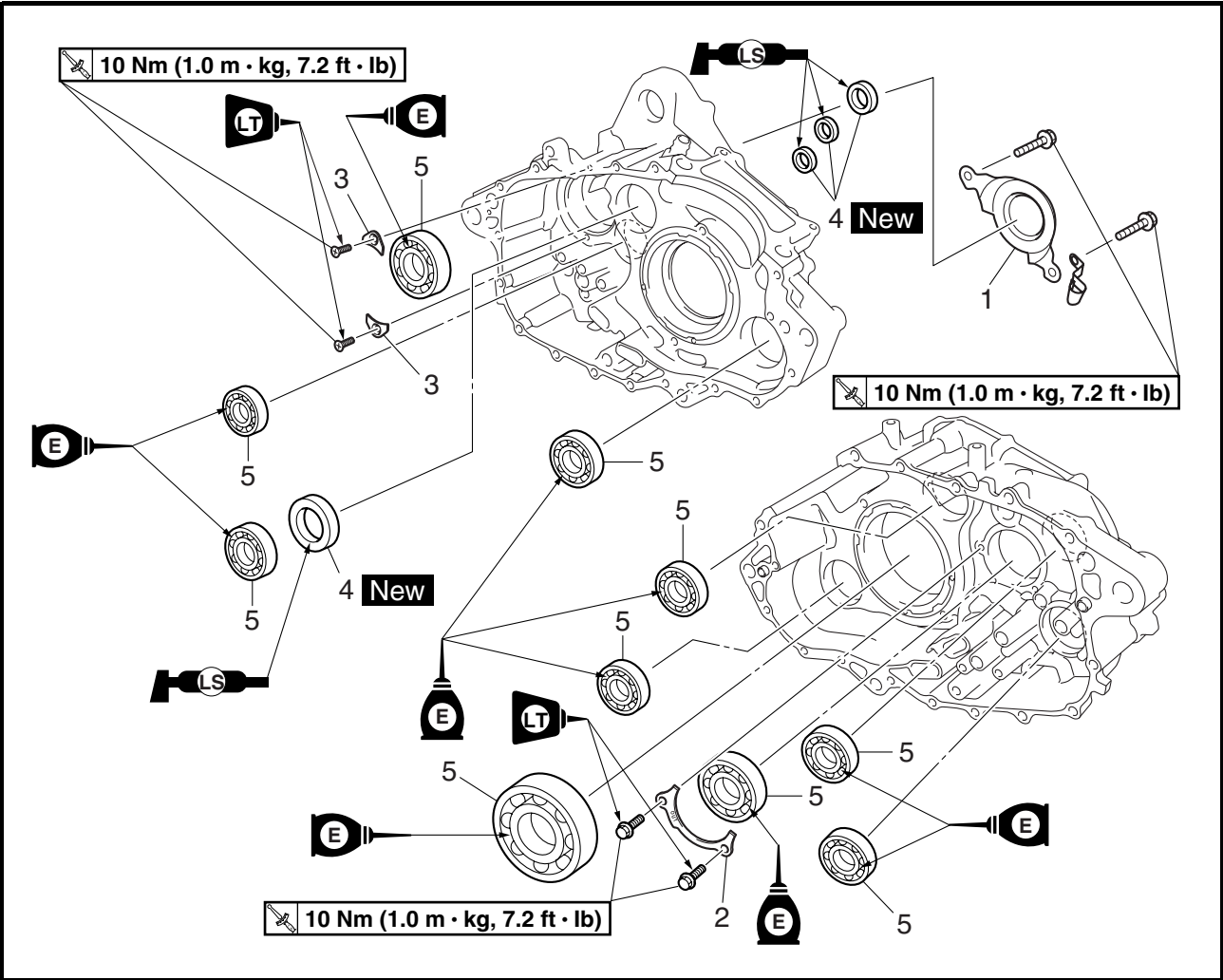


Order	Job/Part	Q'ty	Remarks
6	Reverse shift lever	1	Refer to "SEPARATING THE CRANK-CASE".
7	Reverse shift lever spring	1	
8	Circlip	1	
9	Right crankcase	1	
10	Left crankcase	1	
11	Dowel pin	2	For installation, reverse the removal procedure.
12	Dowel pin/O-ring	1/1	
13	Oil strainer	1	

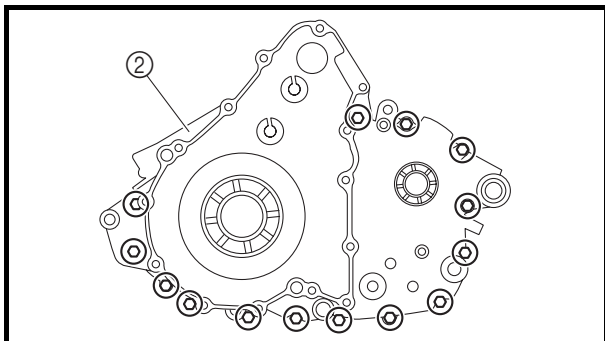
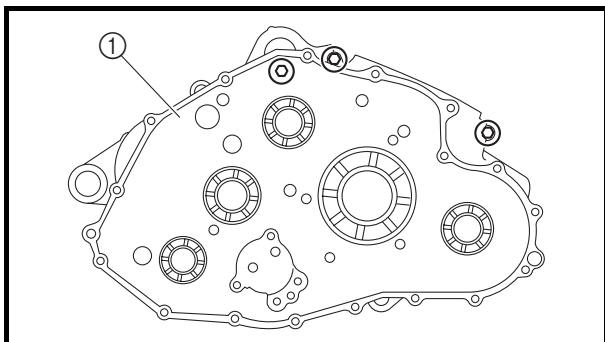


EBS00321

CRANKCASE BEARINGS



Order	Job/Part	Q'ty	Remarks
	Removing the crankcase bearings		
	Crankshaft		Remove the parts in the order listed.
	Transmission		Refer to "CRANKSHAFT".
1	Oil seal retainer	1	Refer to "TRANSMISSION".
2	Bearing retainer	1	
3	Bearing retainer	1	
4	Oil seal	4	
5	Bearing	10	
			For installation, reverse the removal procedure.



EBS00332

SEPARATING THE CRANKCASE

1. Separate:

- right crankcase ①
- left crankcase ②



a. 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.

b. Remove the right crankcase.

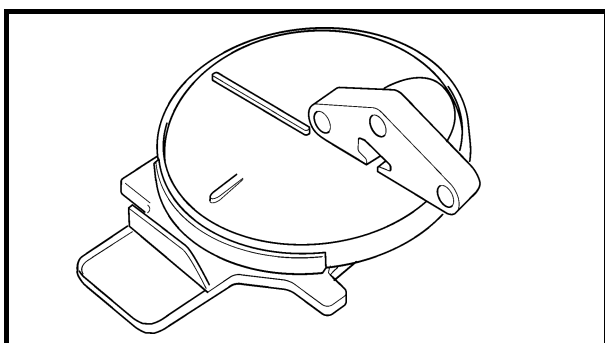
NOTE:

Insert a screwdriver or pry bar into the pry points in the crankcase and then carefully pry apart the crankcase halves.

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.

c. Remove the dowel pins and O-ring.

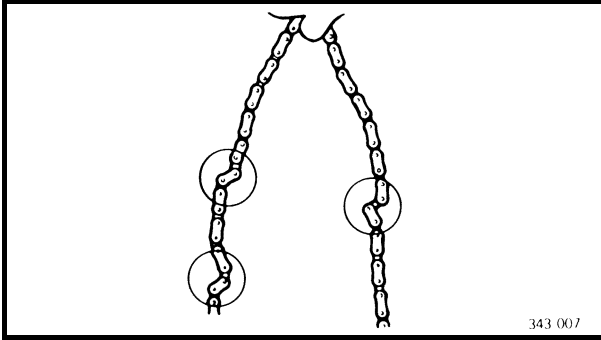


EBS00325

CHECKING THE OIL STRAINER

1. Check:

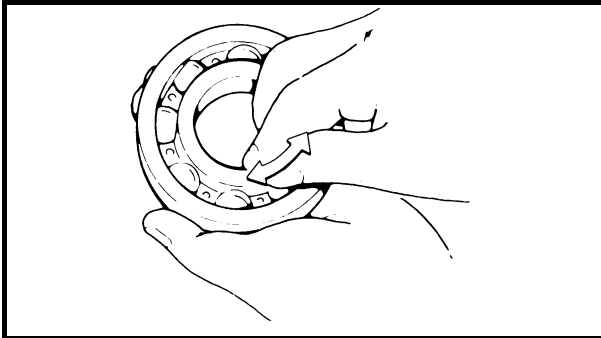
- oil strainer
Damage → Replace.
Contaminants → Clean with engine oil.



EBS00335

CHECKING THE TIMING CHAIN AND GUIDE

1. Check:
 - timing chain
Cracks/stiffness → Replace the timing chain and camshaft as a set.
2. Check:
 - timing chain guide (intake side)
Wear/damage → Replace.



EBS00339

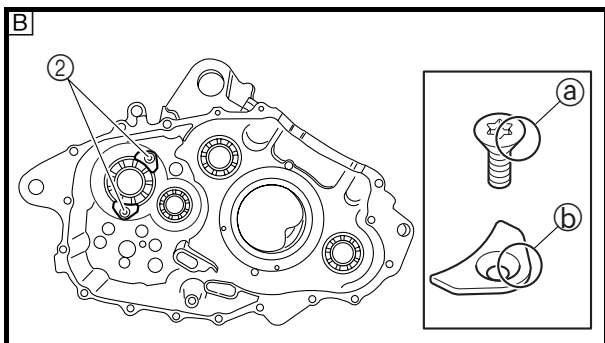
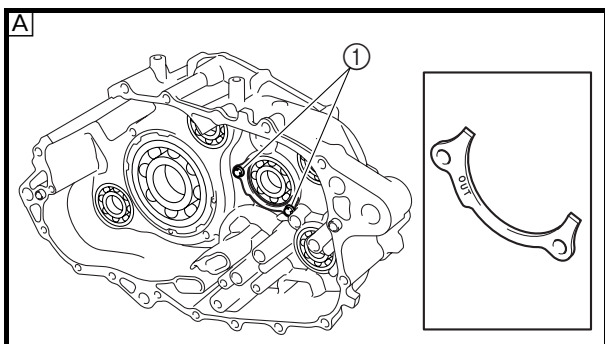
CHECKING THE BEARINGS AND OIL SEALS

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

EBS00338

CHECKING THE CRANKCASE

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



EBS00342

ASSEMBLING THE CRANKCASE**1. Install:**

- bearings **New**
- bearing retainers
- bearing retainer bolts ①

10 Nm (1.0 m · kg, 7.2 ft · lb)

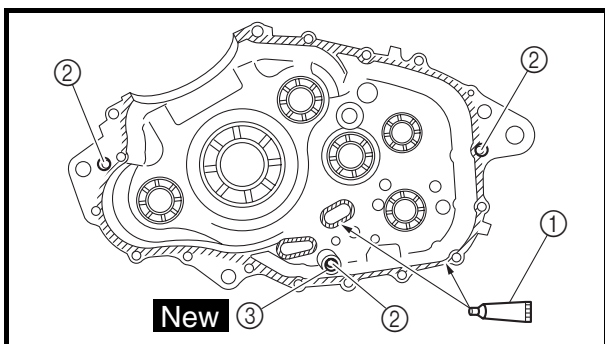
- bearing retainer screws ②

10 Nm (1.0 m · kg, 7.2 ft · lb)
NOTE:

- Install the bearing by pressing its outer race evenly.
- To prevent the bearing retainer screws ② from becoming loose, flatten the edge ① of each screw into the depression ② using a punch, etc. Be careful not to damage the hole for the screwdriver in the screw heads.

Right crankcase

Left crankcase

**2. Apply:**

- Yamaha bond No. 1215 (Three bond No. 1215) ①
(to the mating surfaces of both case halves)


**Yamaha bond No. 1215
(Three bond No. 1215)
90890-85505**
3. Install:

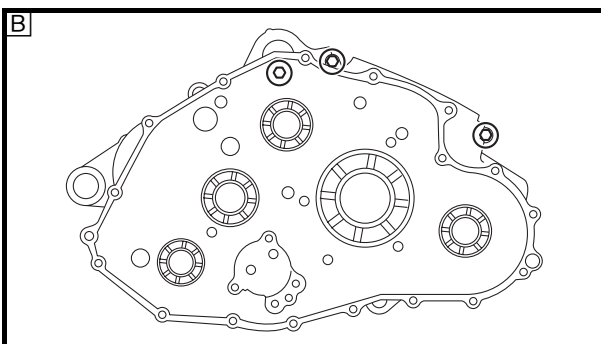
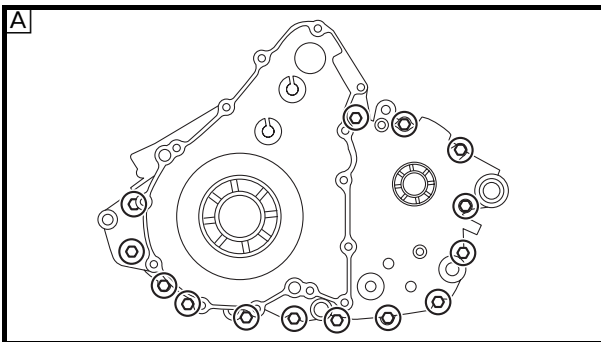
- dowel pins ②
- O-ring ③ **New**



4. Fit the right crankcase onto the left crankcase. 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 drum in both directions.



5. Install:

- crankcase bolts

A Left crankcase

B Right crankcase

6. Tighten:

- crankcase bolts
(follow the proper tightening sequence)

 **10 Nm (1.0m · kg, 7.2 ft · lb)**

NOTE:

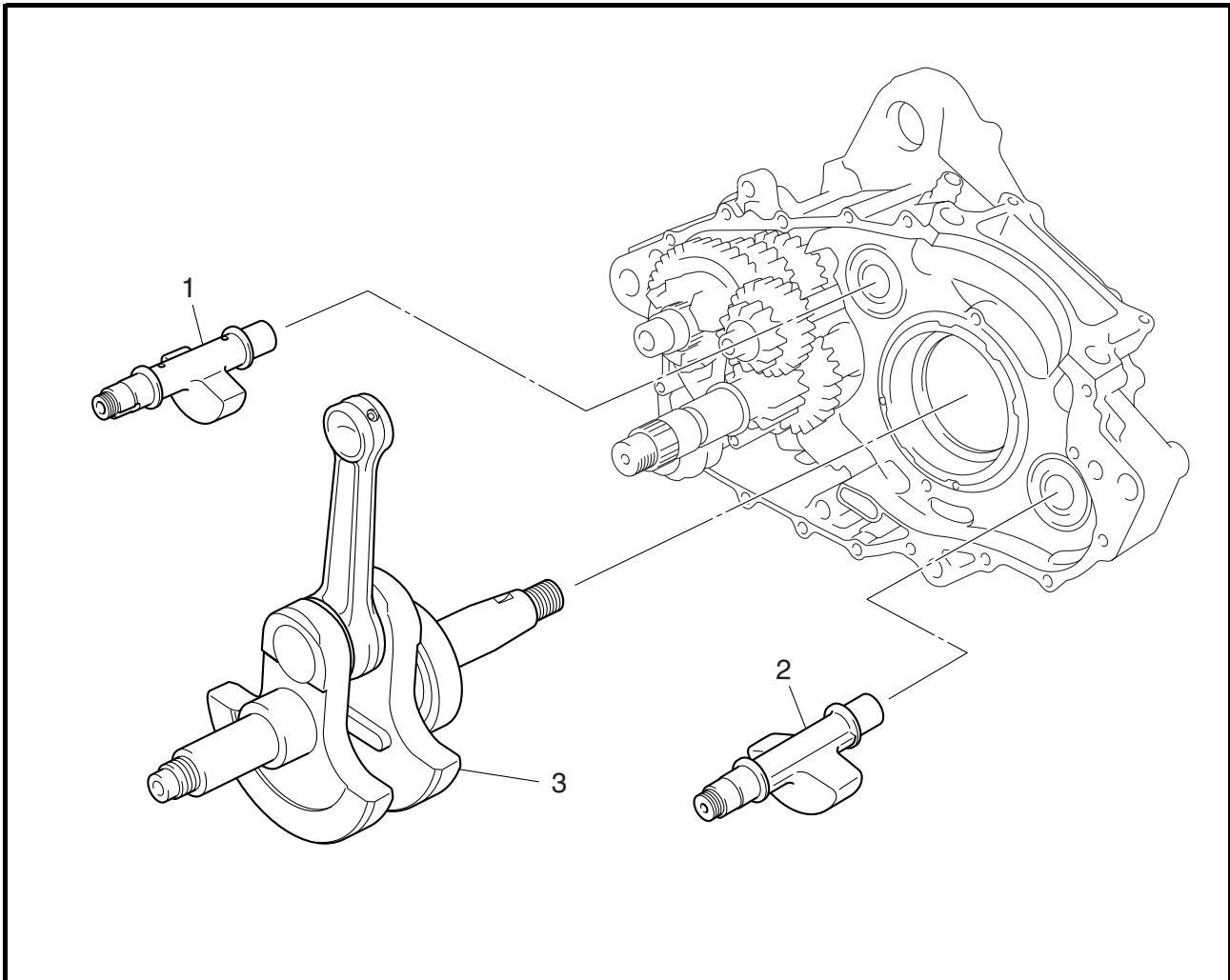
Tighten the bolts in stages, using a crisscross pattern.

7. Apply:

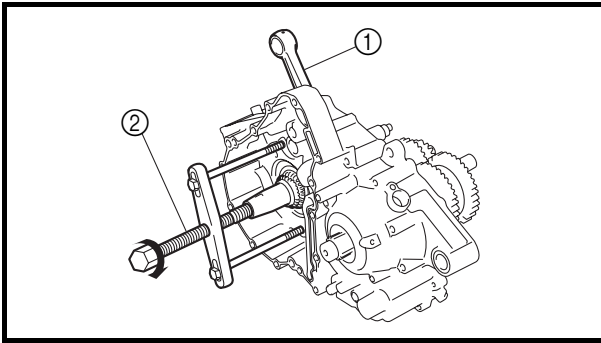
- 4-stroke engine oil
(to the crankshaft pin, bearing and oil delivery hole)

8. Check:

- crankshaft and transmission operation
Unsmooth operation → Repair.

**CRANKSHAFT****CRANKSHAFT AND BALANCER**

Order	Job/Part	Q'ty	Remarks
	Removing the crankshaft and balancer		Remove the parts in the order listed.
	Crankcase		Separate. Refer to "CRANKCASE".
1	Balancer 1	1	
2	Balancer 2	1	
3	Crankshaft	1	Refer to "REMOVING THE CRANK-SHAFT" and "INSTALLING THE CRANK-SHAFT". For installation, reverse the removal procedure.



EBS00336

REMOVING THE CRANKSHAFT

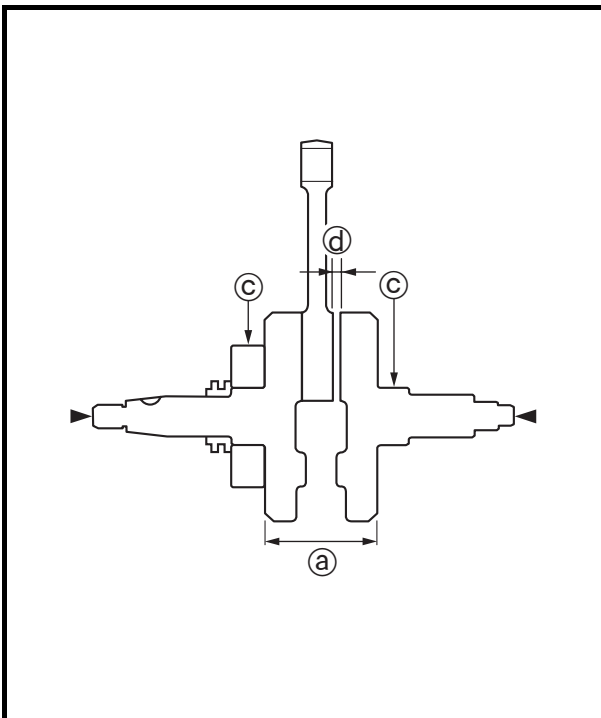
1. Remove:

- crankshaft ①

Use a crankcase separating tool ②.



Crankcase separating tool
90890-01135
Crankcase separator
YU-01135-B



EBS00360

CHECKING THE CRANKSHAFT

1. Measure:

- crank width ①

Out of specification → Replace the crankshaft.



Crank width
74.95 ~ 75.00 mm
(29.51 ~ 29.53 in)

2. Measure:

- side clearance ②

Out of specification → Replace the crankshaft.



Big end side clearance
0.35 ~ 0.65 mm
(0.0138 ~ 0.0256 in)
<Limit>: 1.00 mm (0.040 in)

3. Measure:

- runout ③

Out of specification → Replace the crankshaft.

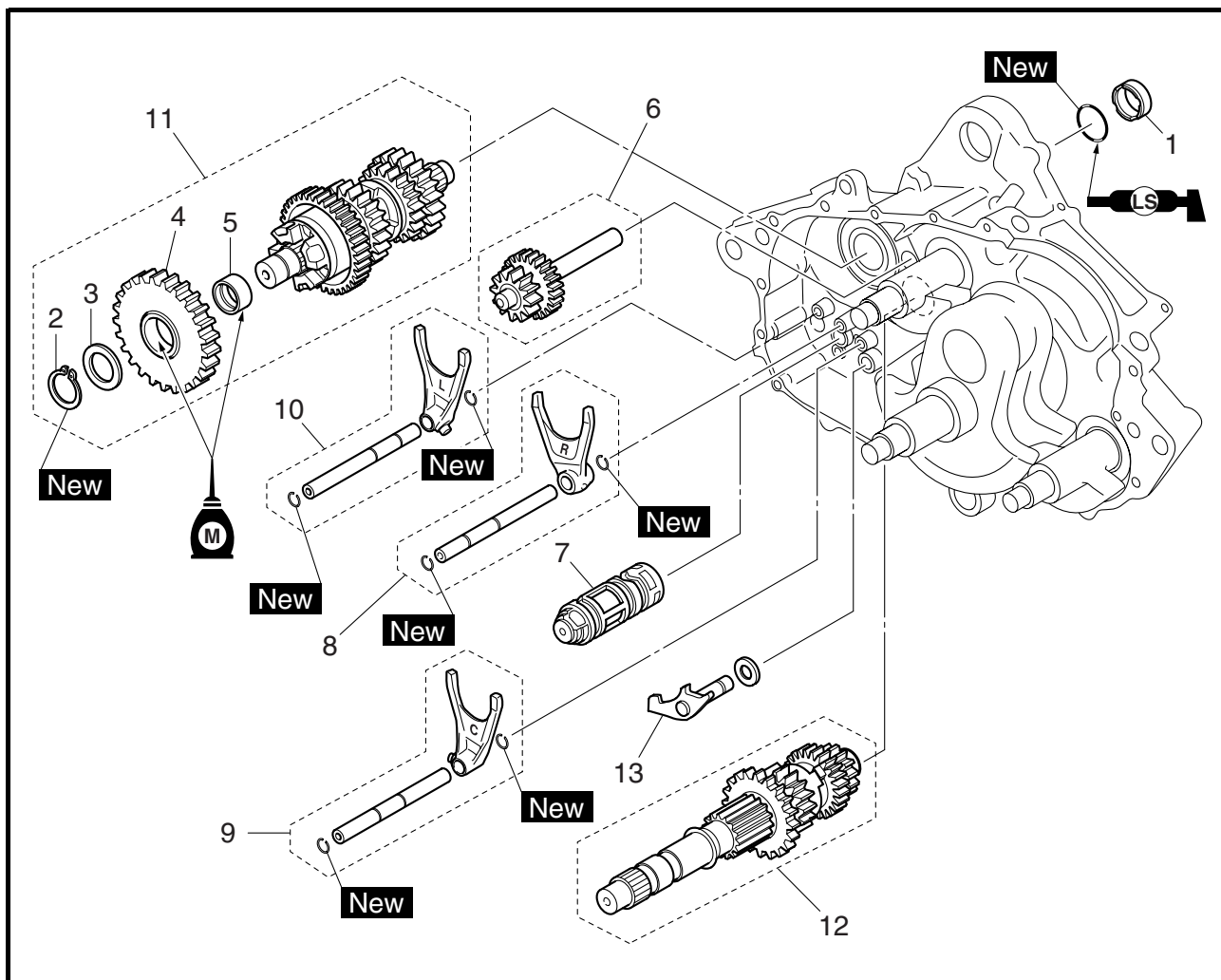


Runout limit
0.03 mm (0.0012 in)

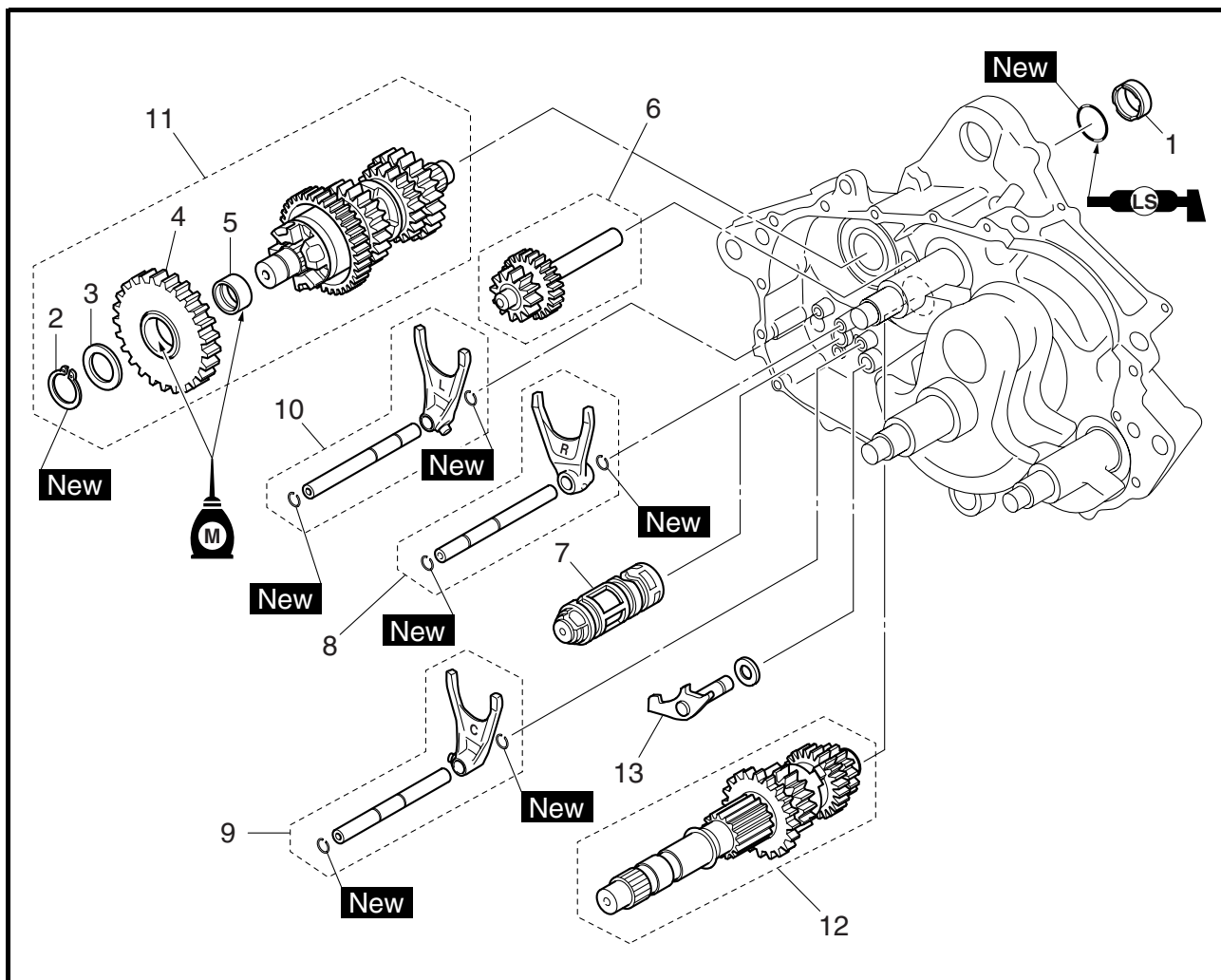


EAS00345

TRANSMISSION



Order	Job/Part	Q'ty	Remarks
	Removing the transmission, shift drum, and shift forks		Remove the parts in the order listed.
	Crankcase		Separate. Refer to "CRANKCASE".
1	Spacer	1	
2	Circlip	1	
3	Washer	1	
4	Reverse wheel gear 2	1	
5	Spacer	1	

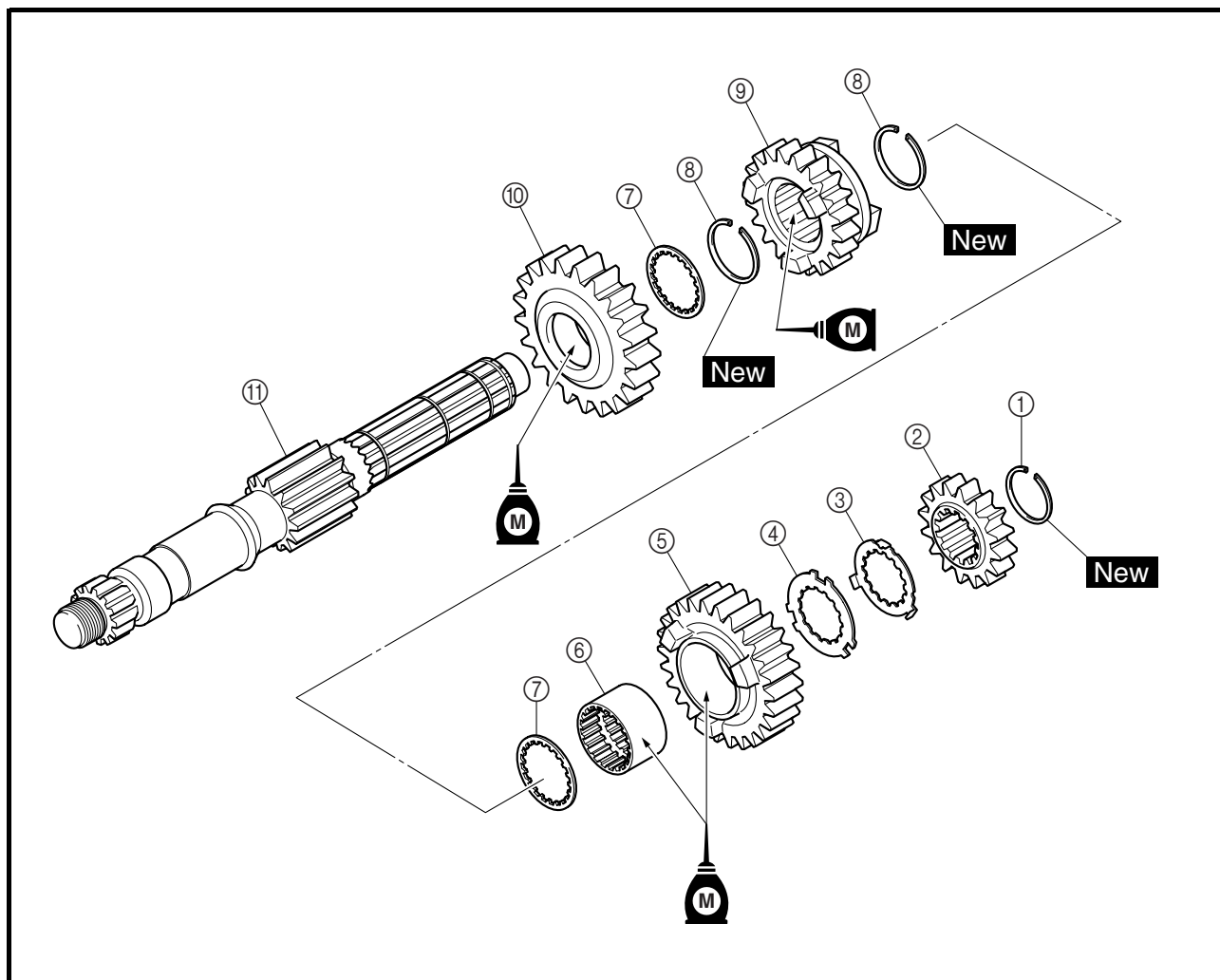


Order	Job/Part	Q'ty	Remarks
6	Counter axle assembly	1	Refer to "INSTALLING THE TRANSMISSION".
7	Shift drum	1	
8	Shift fork "R"	1	
9	Shift fork "C"	1	
10	Shift fork "L"	1	
11	Drive axle assembly	1	
12	Main axle assembly	1	
13	Reverse shift shaft	1	For installation, reverse the removal procedure.



EBS00347

MAIN AXLE

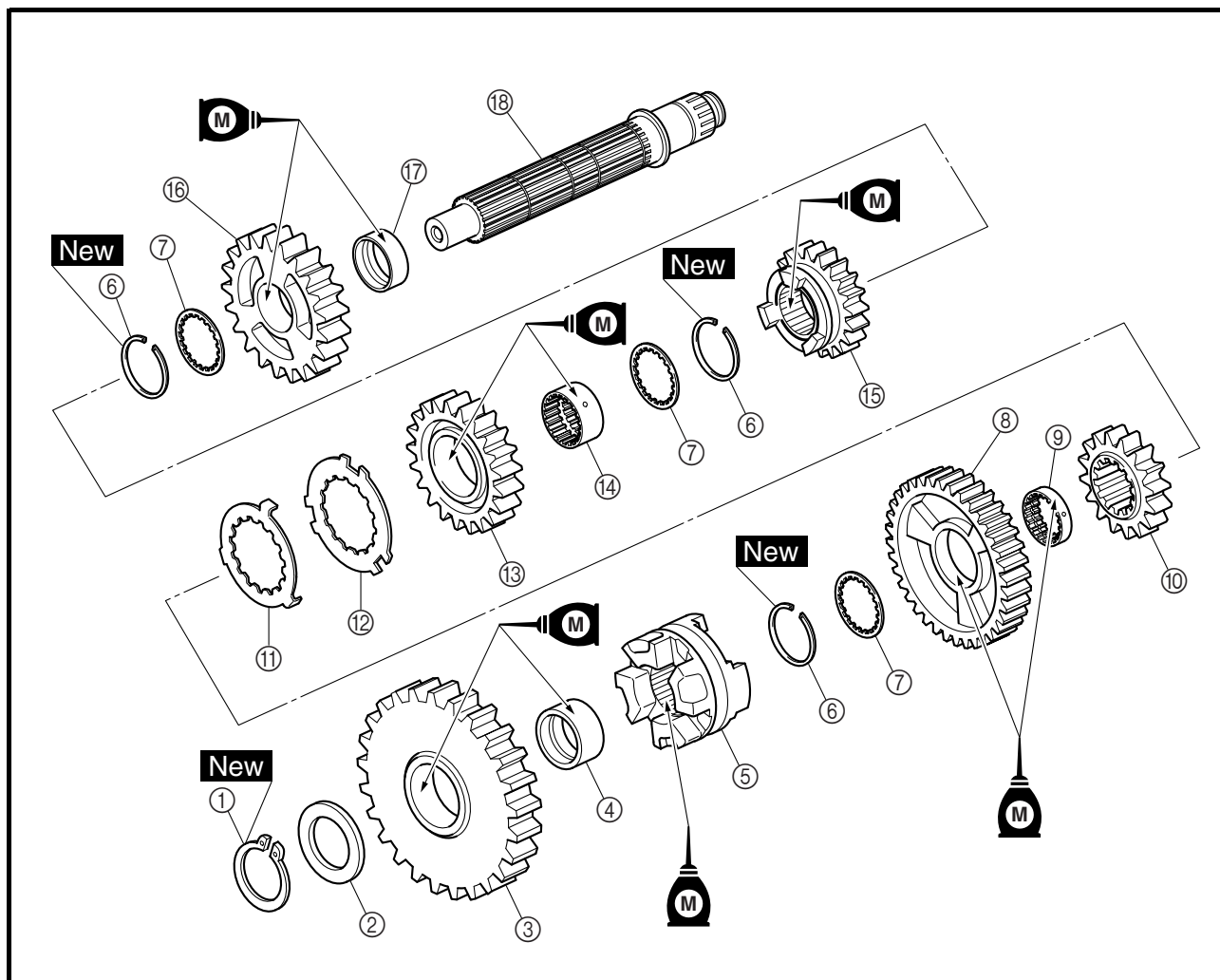


Order	Job/Part	Q'ty	Remarks
	Disassembling the main axle		Remove the parts in the order listed.
①	Circlip	1	Refer to "ASSEMBLING THE MAIN AXLE AND DRIVE AXLE".
②	2nd pinion gear	1	
③	Toothed lock washer	1	
④	Toothed washer retainer	1	
⑤	4th pinion gear	1	
⑥	Toothed spacer	1	
⑦	Toothed washer	2	
⑧	Circlip	2	
⑨	3rd pinion gear	1	
⑩	5th pinion gear	1	
⑪	Main axle/1st pinion gear	1	
			For assembly, reverse the disassembly procedure.

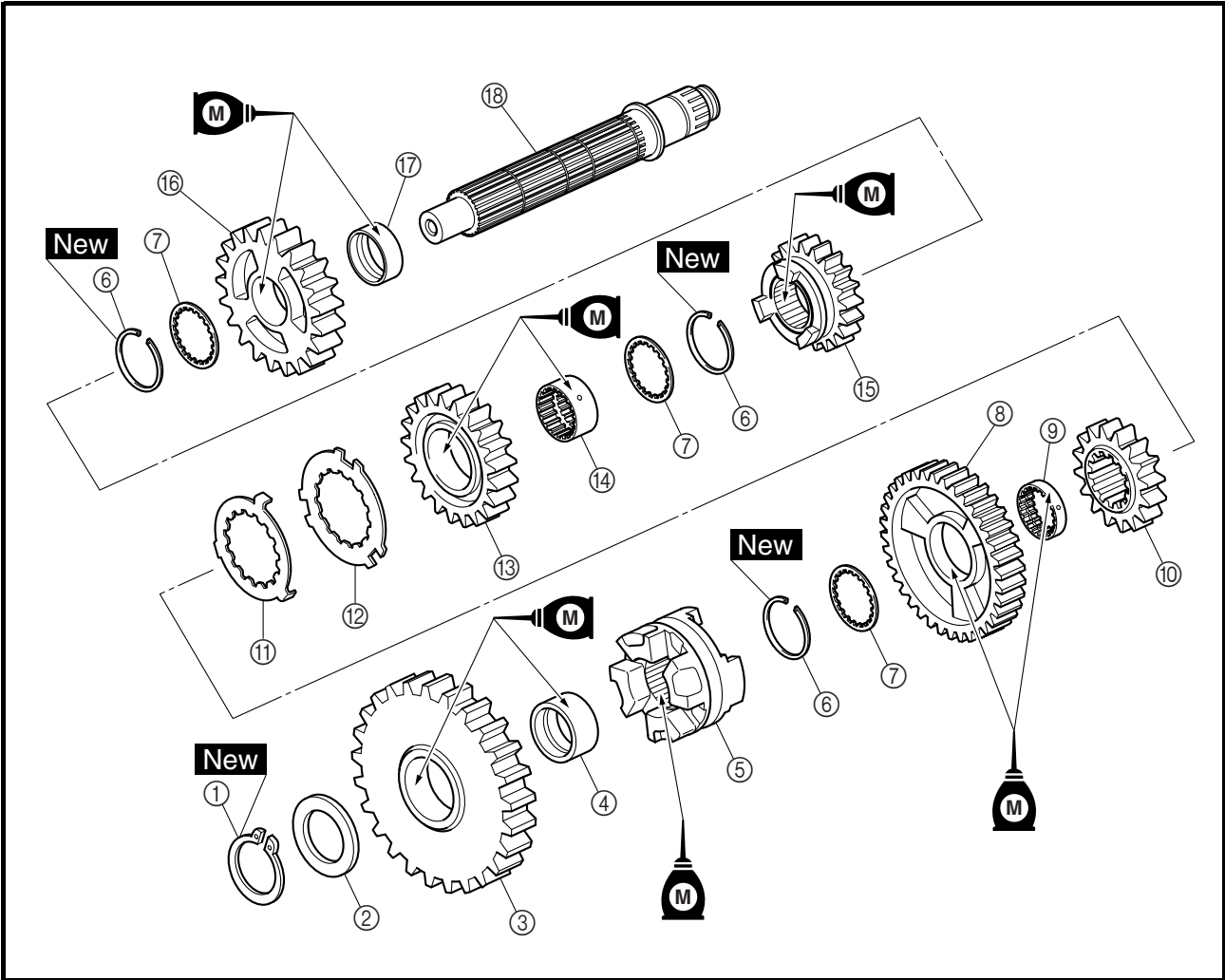


EBS00348

DRIVE AXLE



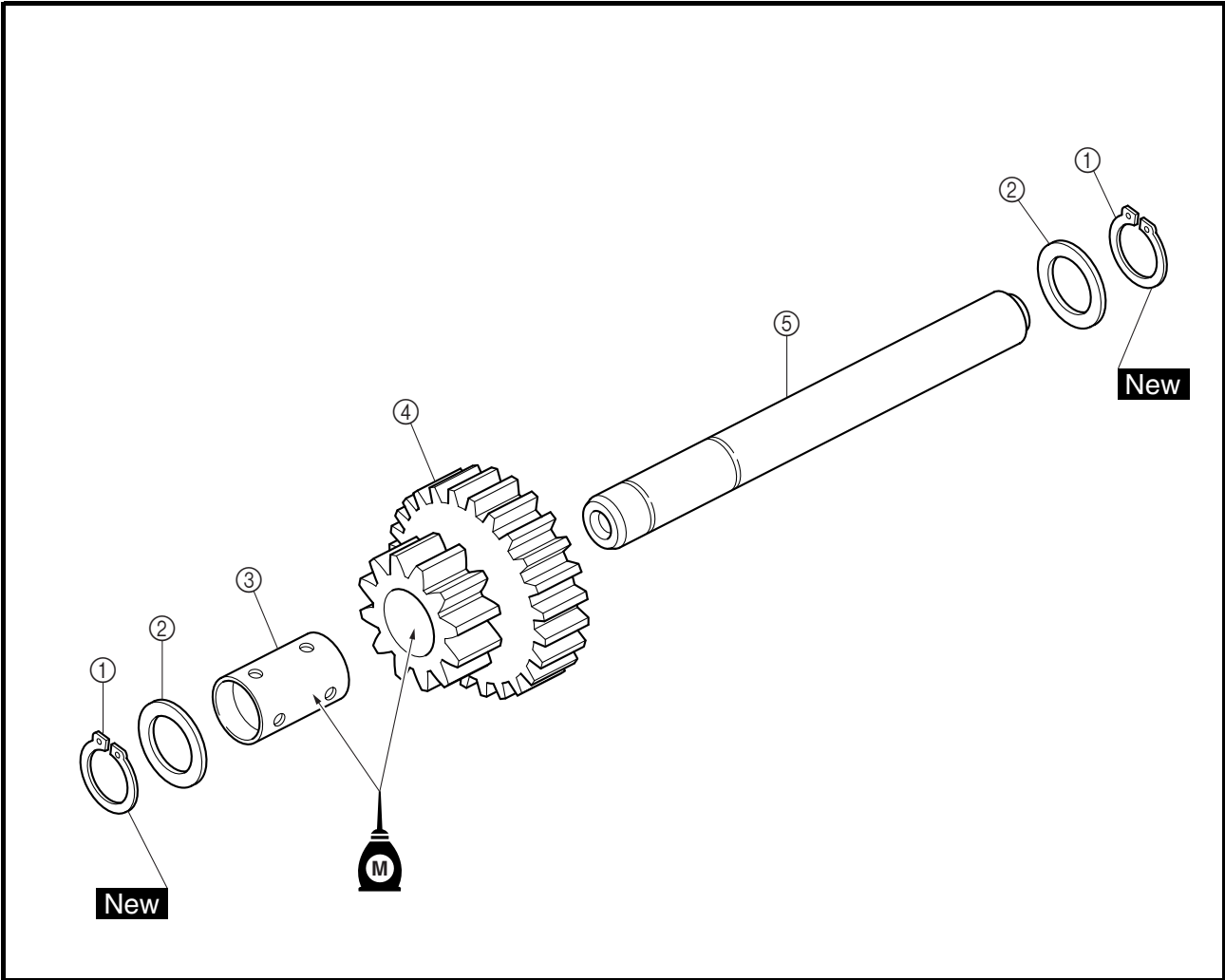
Order	Job/Part	Q'ty	Remarks
	Disassembling the drive axle		
①	Circlip	1	Remove the parts in the order listed.
②	Washer	1	Refer to "ASSEMBLING THE MAIN AXLE AND DRIVE AXLE".
③	Reverse wheel gear 2	1	
④	Spacer	1	
⑤	Dog clutch	1	Refer to "ASSEMBLING THE MAIN AXLE AND DRIVE AXLE".
⑥	Circlip	3	
⑦	Toothed washer	3	
⑧	1st wheel gear	1	
⑨	Toothed spacer	1	
⑩	5th wheel gear	1	
⑪	Toothed lock washer	1	
⑫	Toothed washer retainer	1	
⑬	3rd wheel gear	1	
⑭	Toothed spacer	1	



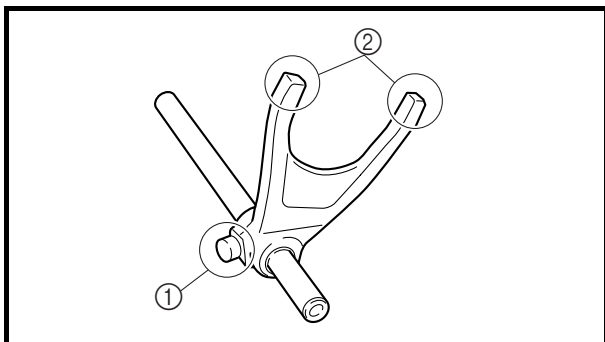
Order	Job/Part	Q'ty	Remarks
⑮	4th wheel gear	1	For assembly, reverse the disassembly procedure.
⑯	2nd wheel gear	1	
⑰	Spacer	1	
⑱	Drive axle	1	



COUNTER AXLE



Order	Job/Part	Q'ty	Remarks
	Disassembling the counter axle		
①	Circlip	2	Remove the parts in the order listed.
②	Washer	2	
③	Spacer	1	
④	Reverse wheel gear 1	1	
⑤	Counter axle	1	
			For assembly, reverse the disassembly procedure.



EBS00350

CHECKING THE SHIFT FORKS

The following procedure applies to all of the shift forks.

1. Check:

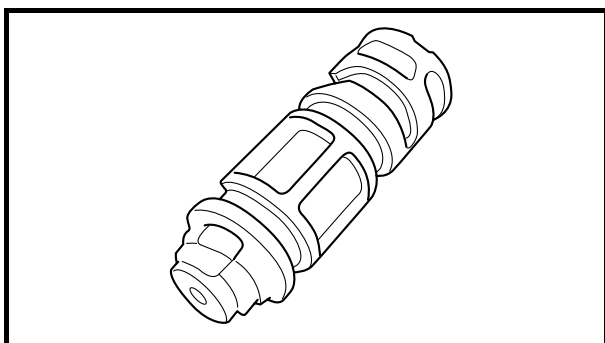
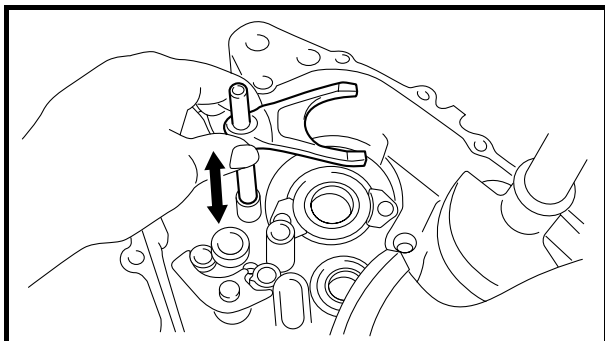
- shift fork cam follower ①
- shift fork pawl ②

Bends/damage/scoring/wear → Replace the shift fork.

2. Check:

- shift fork movement

Rough movement → Replace the shift forks.



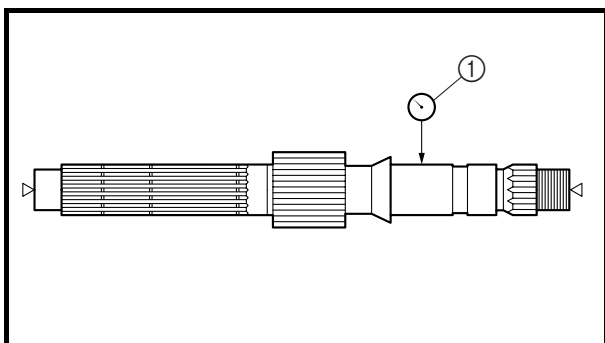
EBS00351

CHECKING THE SHIFT DRUM ASSEMBLY

1. Check:

- shift drum grooves

Scratches/wear/damage → Replace.



EBS00354

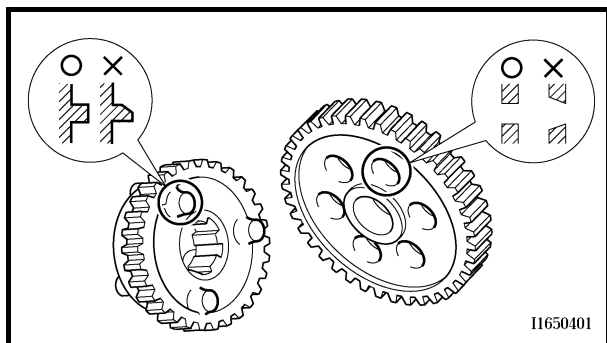
CHECKING THE TRANSMISSION

1. Measure:

- main axle runout
(with a centering device and dial gauge ①)
Out of specification → Replace the main axle.



Main axle runout limit
0.08 mm (0.0031 in)



2. Check:

- transmission gears
Blue discoloration/pitting/wear → Replace the defective gear(s).
- transmission gear dogs
Cracks/damage/rounded edges → Replace the defective gear(s).

3. Check:

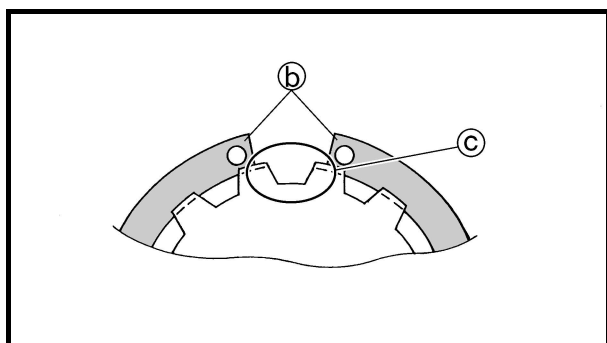
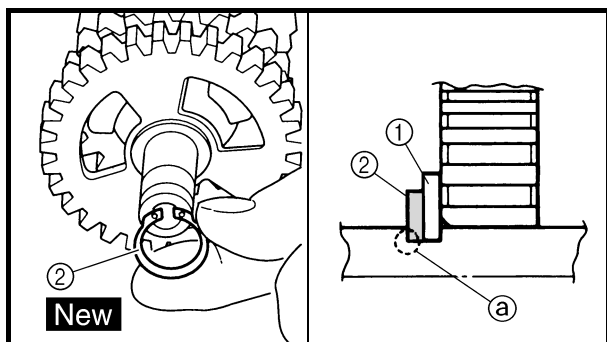
- transmission gear engagement
(each pinion gear to its respective wheel gear)
Incorrect → Reassemble the transmission axle assemblies.

4. Check:

- transmission gear movement
Rough movement → Replace the defective part(s).

5. Check:

- circlips
Bends/damage/looseness → Replace.



EBS00355

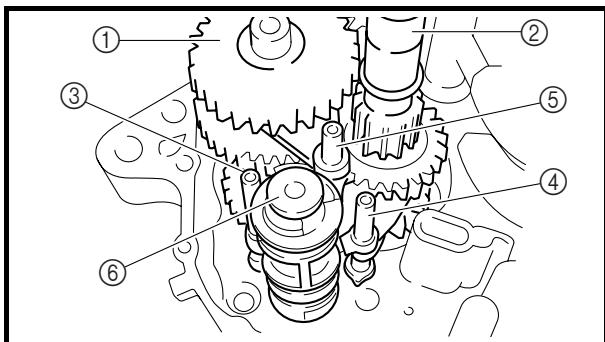
ASSEMBLING THE MAIN AXLE AND DRIVE AXLE

1. Install:

- toothed washer ①
- circlip ② **New**

NOTE:

- Be sure the circlip shape-edged corner (a) is positioned on the opposite side to the toothed washer and gear.
- Install the circlip so that both ends (b) are positioned in the center of two axle spline (c).



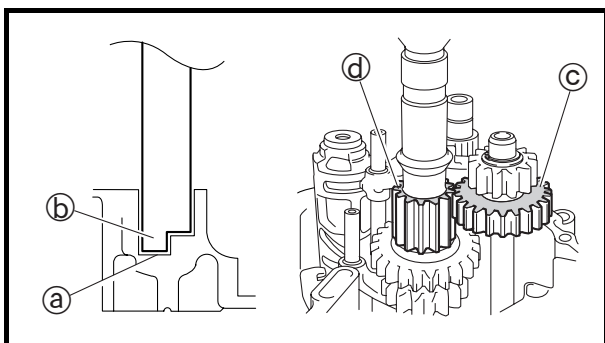
EBS00356

INSTALLING THE TRANSMISSION**1. Install:**

- drive axle assembly ①
- main axle assembly ②
- shift fork "L" ③ (to drive axle)
- shift fork "C" ④ (to main axle)
- shift fork "R" ⑤ (to drive axle)
- shift drum ⑥

NOTE:

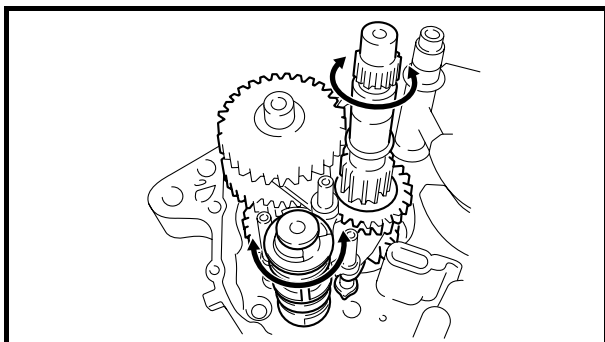
The embossed marks on the shift forks should face towards the right side of the engine and be in the following sequence: "R", "C", "L". Be sure that the shift fork cam follower is properly seated in the shift drum groove.

**2. Install:**

- counter axle assembly

NOTE:

- Engage the concave part ① of the left crankcase and convex part ② of the counter axle.
- Align the edge height of reverse wheel gear 1 ③ and main axle/1st pinion gear ④.

**3. Check:**

- shift operation
- Unsmooth operation → Repair.

NOTE:

- Apply engine oil to each gear and bearing thoroughly.
- Before assembling the crankcase, make sure that the transmission is in neutral and that the gears turn freely.

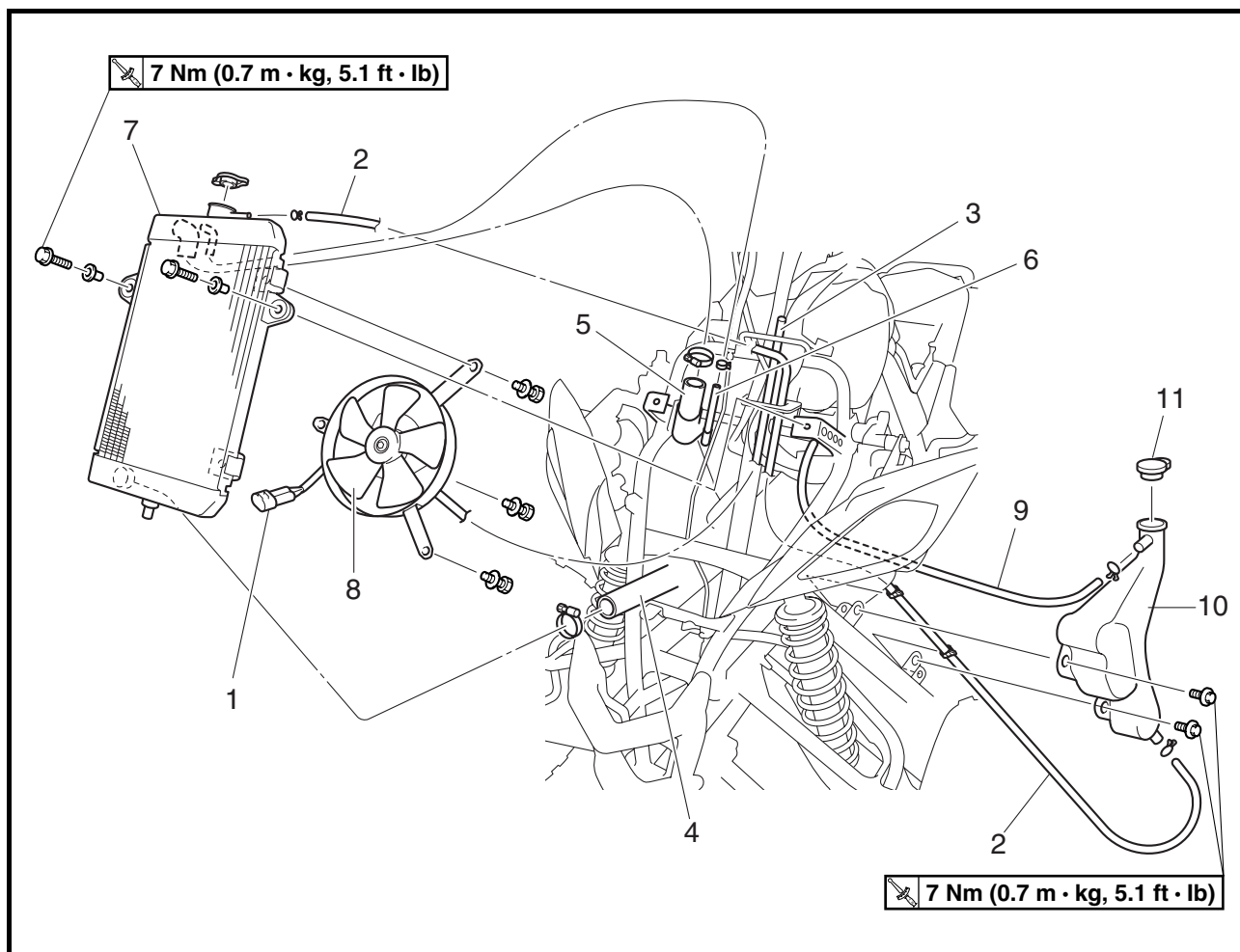
CHAPTER 5

COOLING SYSTEM

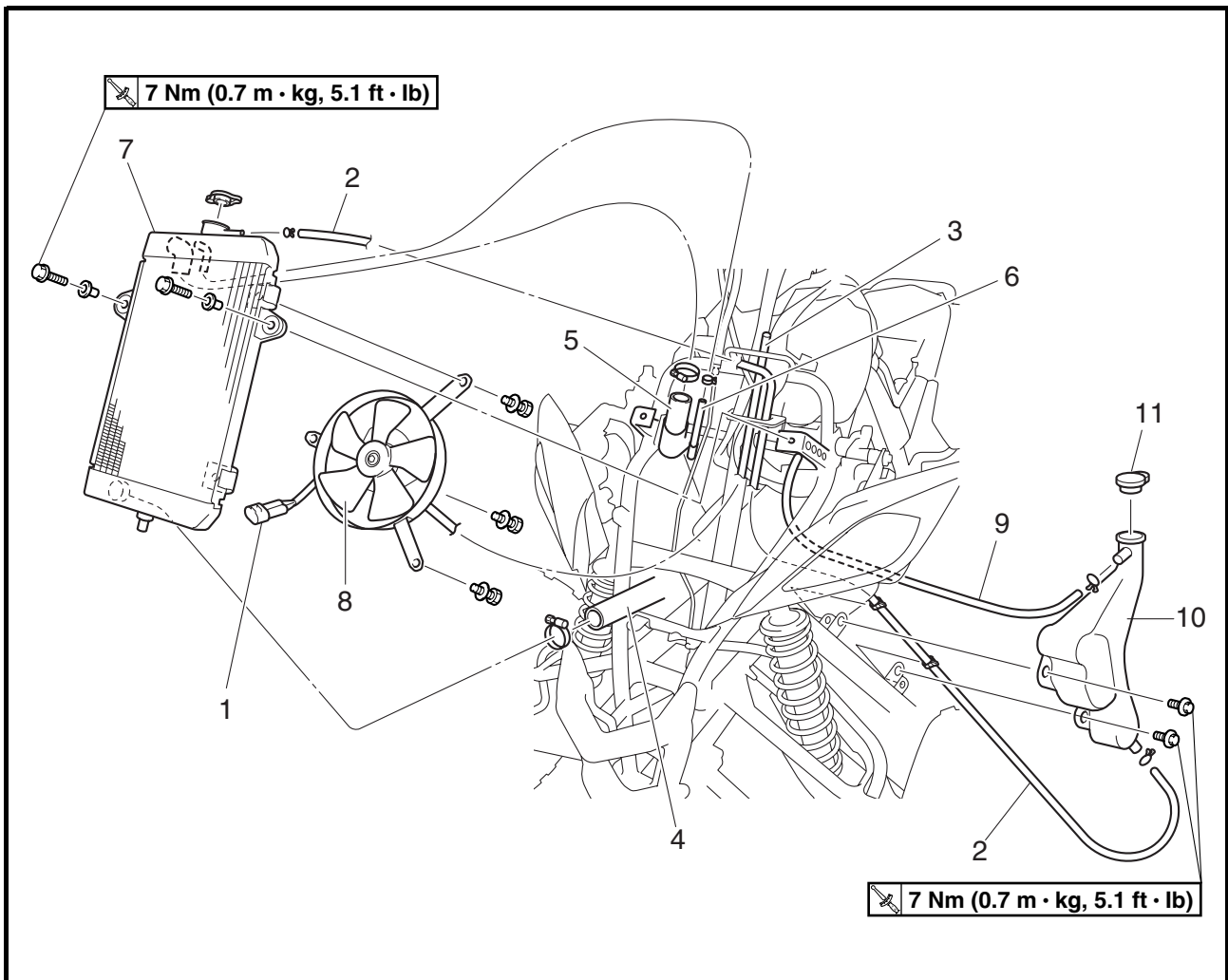
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INSTALLING THE RADIATOR.....	5-4
 THERMOSTAT	5-5
CHECKING THE THERMOSTAT.....	5-6
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 WATER PUMP	5-7
DISASSEMBLING THE WATER PUMP.....	5-9
CHECKING THE WATER PUMP	5-9
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COOLING SYSTEM

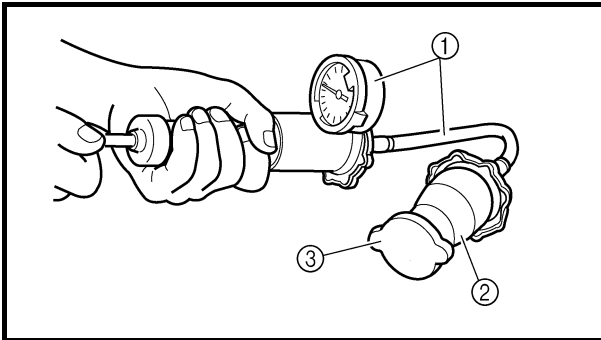
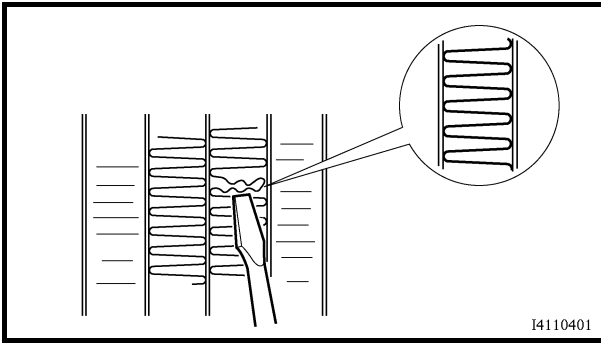
RADIATOR



Order	Job/Part	Q'ty	Remarks
	Removing the radiator		Remove the parts in the order listed.
	Front fender		Refer to "SEAT, FENDERS AND FUEL TANK" in chapter 3.
	Coolant		Drain.
1	Radiator fan motor coupler	1	Disconnect.
2	Coolant reservoir hose	1	
3	Radiator fan breather hose	1	Disconnect.
4	Radiator outlet hose	1	Disconnect.
5	Radiator inlet hose	1	Disconnect.
6	Fast idle plunger outlet hose	1	Disconnect.
7	Radiator	1	
8	Radiator fan	1	
9	Coolant reservoir breather hose	1	



Order	Job/Part	Q'ty	Remarks
10	Coolant reservoir	1	For installation, reverse the removal procedure.
11	Coolant reservoir cap	1	



EBS00127

CHECKING THE RADIATOR

1. Check:
 - 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. Check:
 - 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/cm²,
13.27 ~ 17.45 psi)

- a. Install the radiator cap tester ① and radiator cap tester adapter ② to the radiator cap ③.



Radiator cap tester

90890-01325

Radiator pressure tester

YU-24460-01

Radiator cap tester adapter

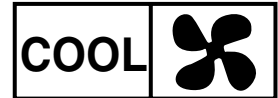
90890-01352

Radiator pressure tester adapter

YU-33984

- b. Apply the specified pressure for ten seconds and make sure there is no drop in pressure.

4. Check:
- radiator fan
- Damage → Replace.
Malfunction → Check and repair.
Refer to “COOLING SYSTEM” in chapter 8.



EBS00128

INSTALLING THE RADIATOR

1. Fill:

- cooling system
(with the specified amount of the recommended coolant)
Refer to "CHANGING THE COOLANT" in chapter 3.

2. Check:

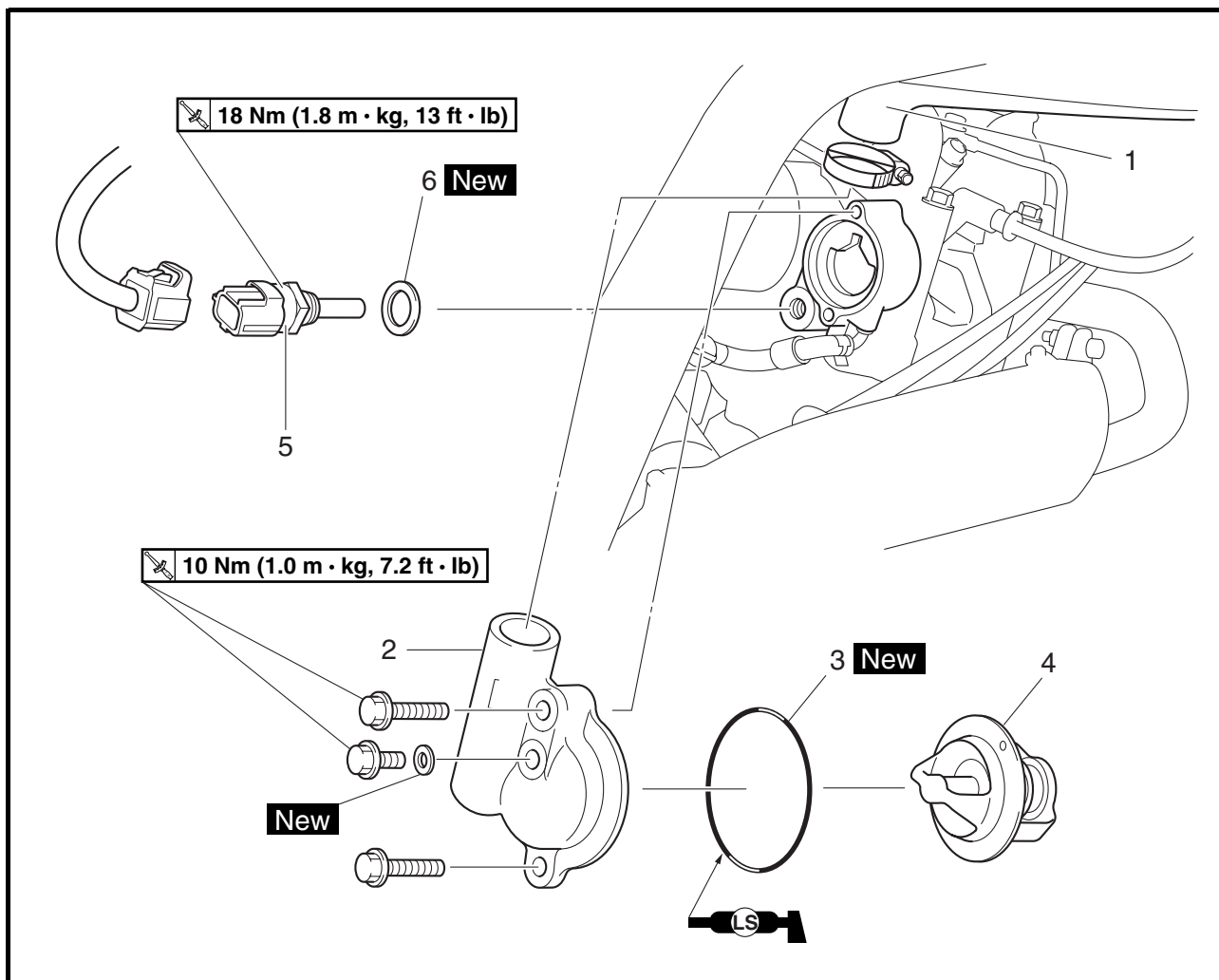
- cooling system
Leaks → Repair or replace any faulty part.

3. Measure:

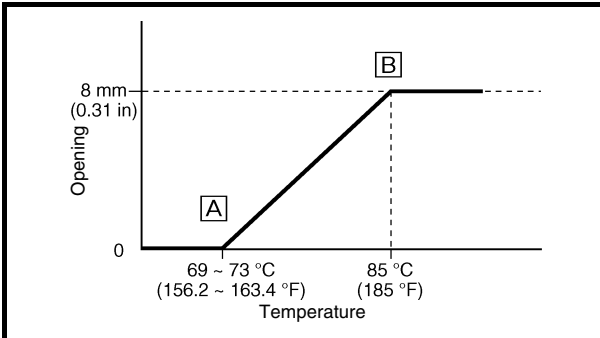
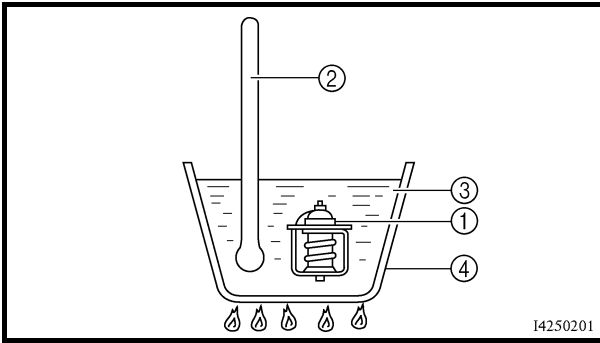
- radiator cap opening pressure
Below the specified pressure → Replace the radiator cap.
Refer to "CHECKING THE RADIATOR".

EBS00129

THERMOSTAT



Order	Job/Part	Q'ty	Remarks
	Removing the thermostat		
	Front fender		Remove the parts in the order listed. Refer to "SEAT, FENDERS AND FUEL TANK" in chapter 3.
	Coolant		Drain.
1	Radiator inlet hose	1	
2	Thermostat cover	1	
3	O-ring	1	
4	Thermostat	1	
5	Coolant temperature sensor	1	
6	Copper washer	1	
			For installation, reverse the removal procedure.



EBS00132

CHECKING THE THERMOSTAT

1. Check:

- thermostat ①
- Does not open at 69 ~ 73 °C (156.2 ~ 163.4 °F) → Replace.

- 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
- A Fully closed
- B Fully open

NOTE:

If the accuracy of the thermostat is in doubt, replace it. A faulty thermostat could cause serious overheating or overcooling.

2. Check:

- thermostat cover
- thermostat housing (cylinder head)
- Cracks/damage → Replace.

EBS00133

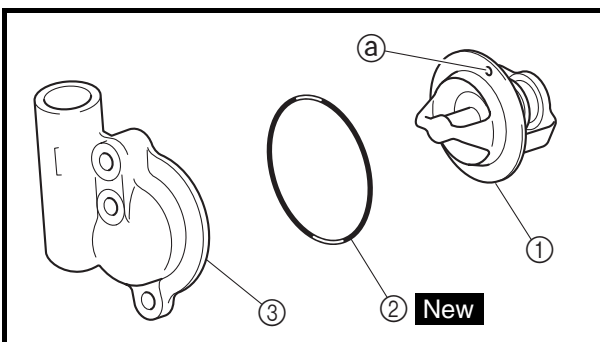
INSTALLING THE THERMOSTAT

1. Install:

- thermostat ①
- O-ring ② **New**
- thermostat cover ③

NOTE:

Install the thermostat with its breather hole ② facing up.



2. Fill:

- cooling system
- (with the specified amount of the recommended coolant)
- Refer to "CHANGING THE COOLANT" in chapter 3.

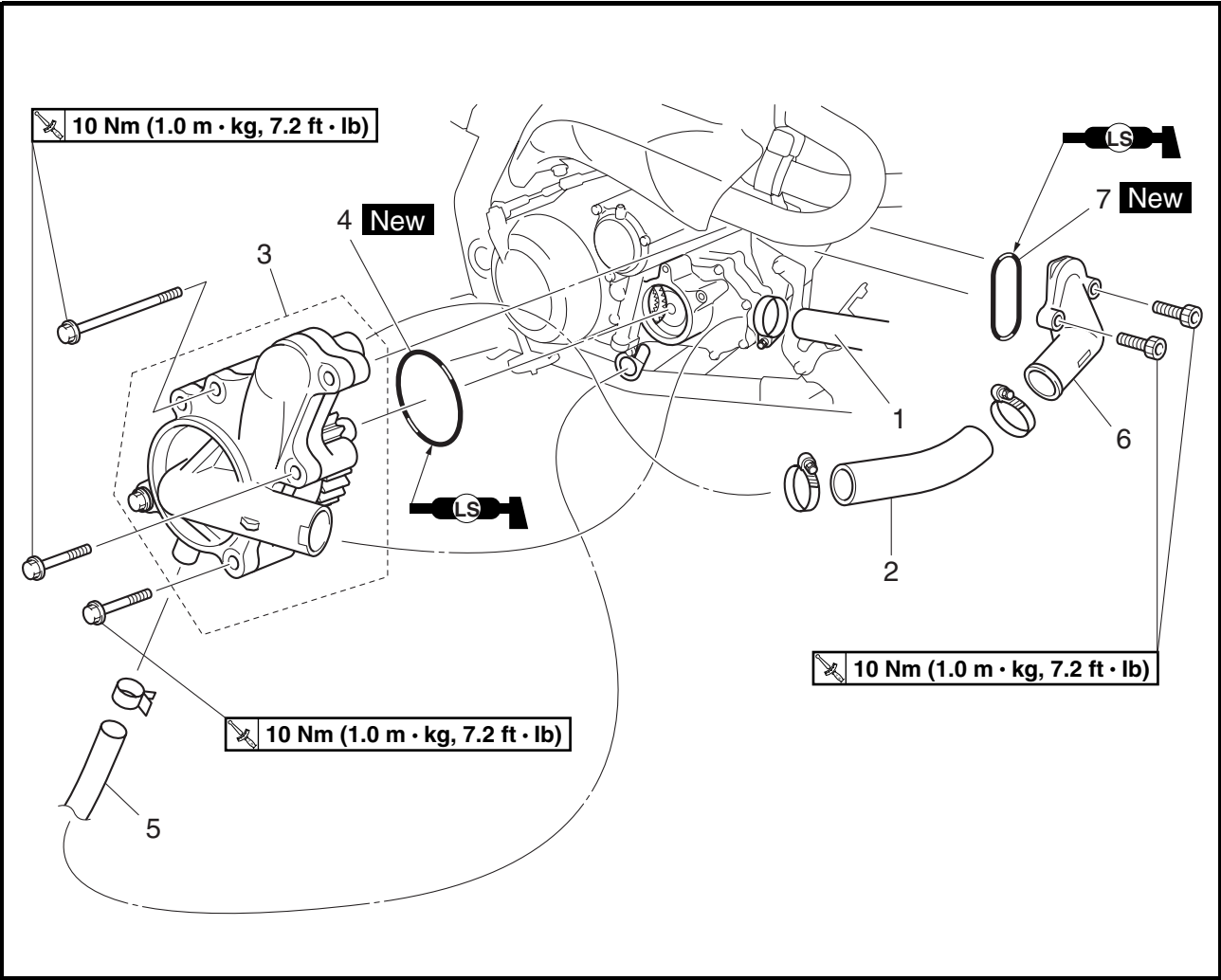
3. Check:

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



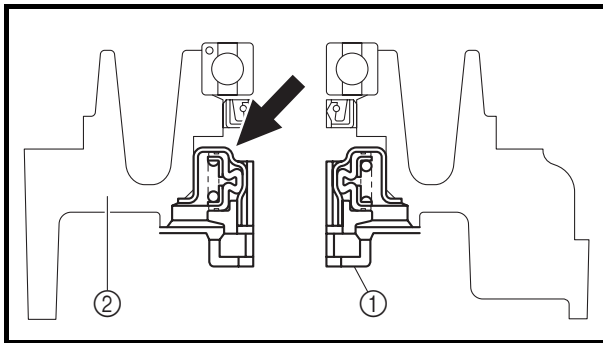
EBS00134

WATER PUMP



Order	Job/Part	Q'ty	Remarks
	Removing the water pump		
	Coolant		Remove the parts in the order listed.
			Drain.
1	Radiator outlet hose	1	Disconnect.
2	Water pump outlet hose	1	
3	Water pump	1	
4	O-ring	1	
5	Water pump breather hose	1	
6	Water jacket inlet housing	1	
7	O-ring	1	
			For installation, reverse the removal procedure.

Order	Job/Part	Q'ty	Remarks
	Disassembling the water pump		Remove the parts in the order listed.
①	Water pump housing cover	1	
②	Gasket	1	
③	Circlip	1	
④	Impeller shaft gear	1	Refer to “ASSEMBLING THE WATER PUMP”.
⑤	Pin	1	
⑥	Washer	1	
⑦	Impeller shaft assembly	1	
⑧	Water pump seal	1	Refer to “DISASSEMBLING THE WATER PUMP” and “ASSEMBLING THE WATER PUMP”.
⑨	Oil seal	1	
⑩	Bearing	1	
⑪	Water pump housing	1	
			For assembly, reverse the disassembly procedure.



EBS00138

DISASSEMBLING THE WATER PUMP

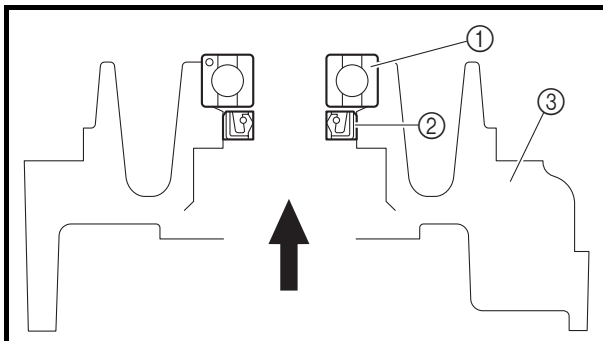
1. Remove:

- water pump seal ①

NOTE:

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

- ② Water pump housing



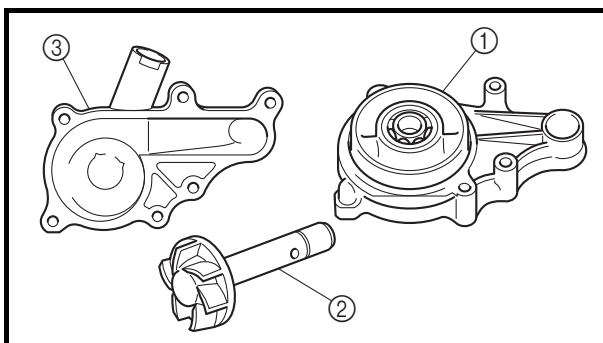
2. Remove:

- bearing ①
- oil seal ②

NOTE:

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

- ③ Water pump housing



EBS00139

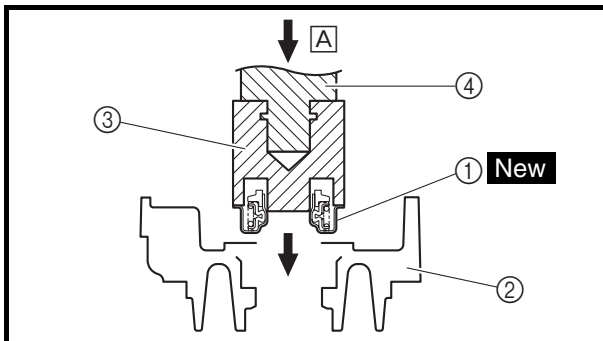
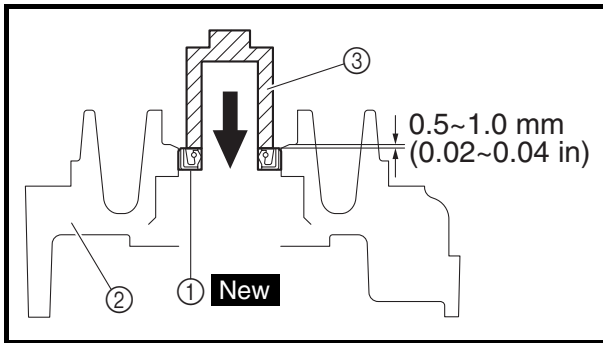
CHECKING THE WATER PUMP

1. Check:

- water pump housing ①
 - impeller ②
 - water pump housing cover ③
- Cracks/damage/wear → Replace.

2. Check:

- bearing
 - impeller shaft gear
- Rough movement → Replace.
- Pitting/wear → Replace.



EBS00140

ASSEMBLING THE WATER PUMP

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 out 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
90890-04132

Water pump seal installer
YM-33221-A

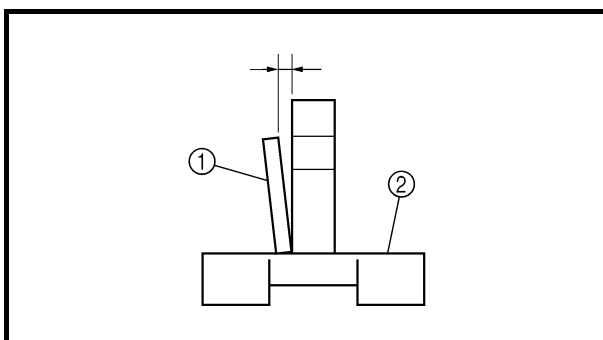
Middle driven shaft bearing driver

④

90890-04058

Bearing driver (40 mm)
YM-04058

A Push down.



3. Measure:

- impeller shaft tilt

CAUTION:

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



Max. impeller shaft tilt
0.15 mm (0.006 in)

- ① Straightedge
- ② Impeller



CHAPTER 6

FUEL INJECTION SYSTEM

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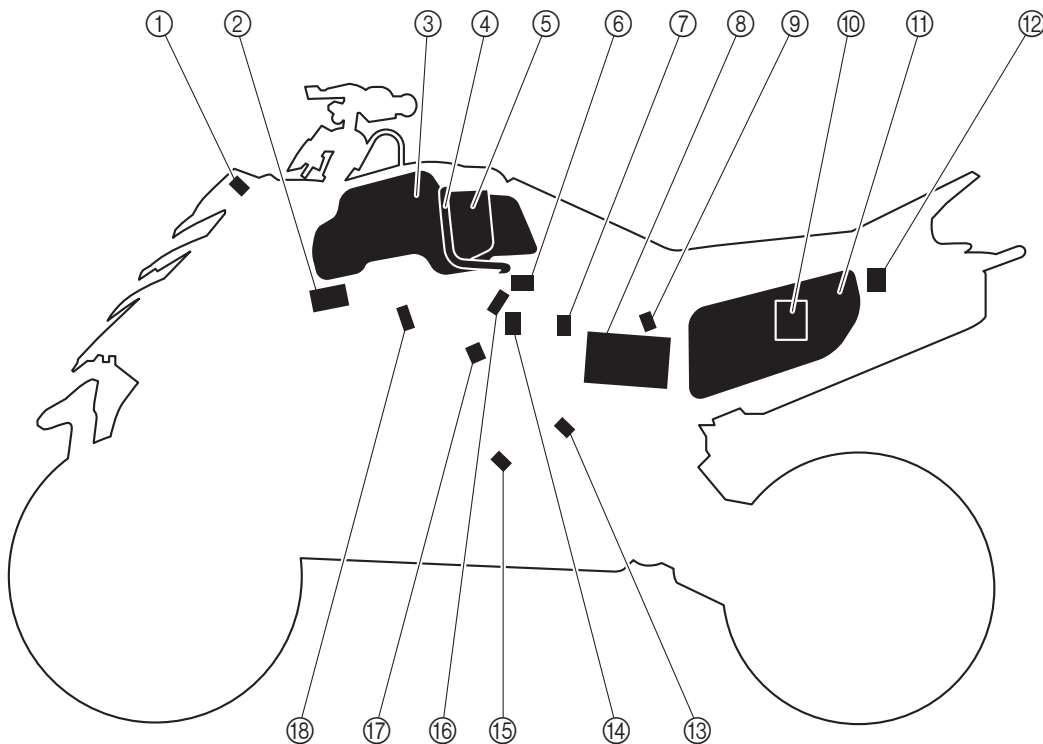


EAS00894

FUEL INJECTION SYSTEM

FUEL INJECTION SYSTEM

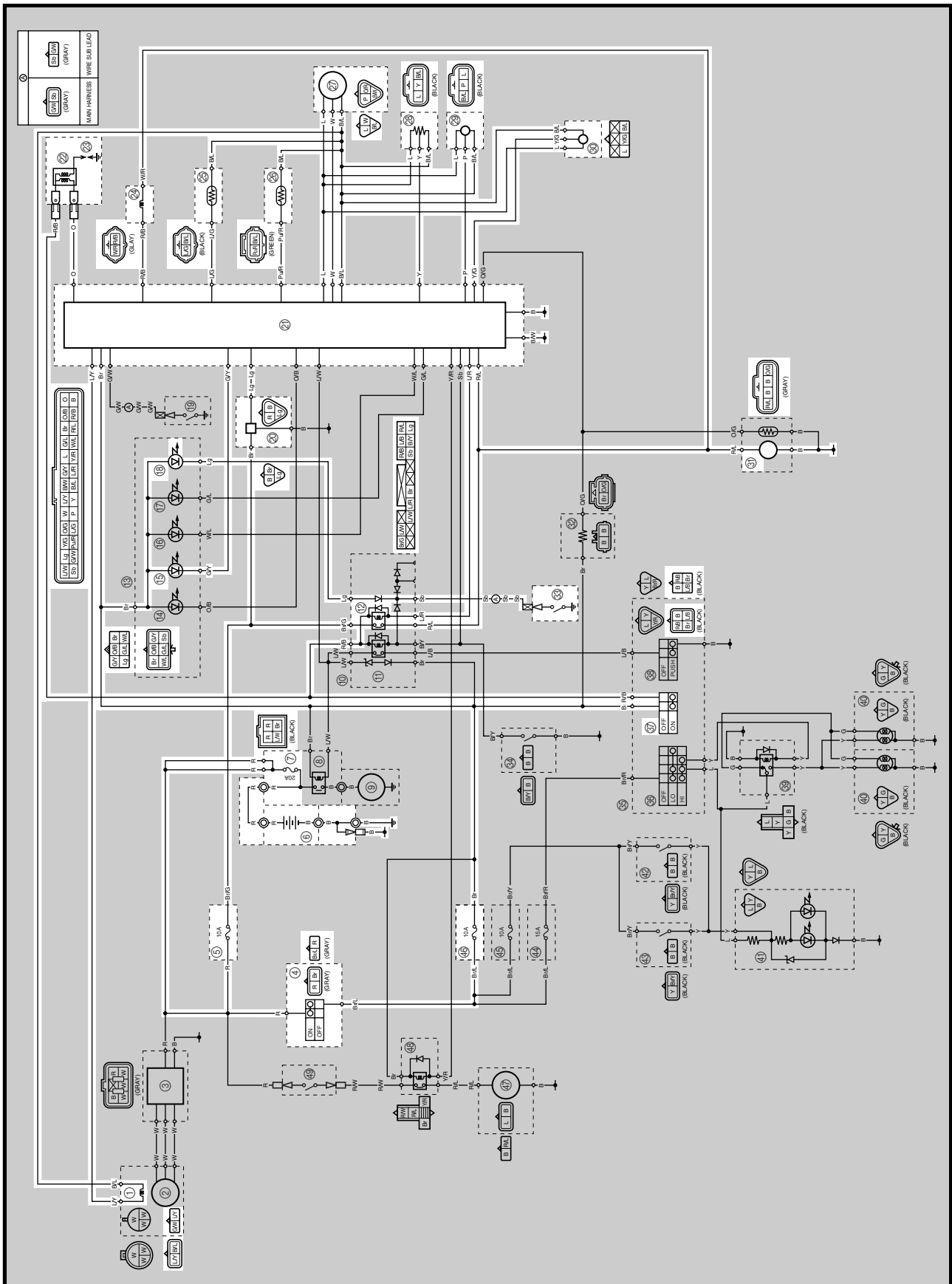
- | | | |
|--------------------------------|---------------------------------|------------------------------|
| ① Engine trouble warning light | ⑧ Battery | ⑮ Crankshaft position sensor |
| ② Ignition coil | ⑨ Intake air temperature sensor | ⑯ Fuel injector |
| ③ Fuel tank | ⑩ ECU | ⑰ Coolant temperature sensor |
| ④ Fuel hose | ⑪ Air filter case | ⑱ Spark plug |
| ⑤ Fuel pump | ⑫ Relay unit (fuel pump relay) | |
| ⑥ Intake air pressure sensor | ⑬ Speed sensor | |
| ⑦ Lean angle sensor | ⑭ Throttle position sensor | |





EAS27340

CIRCUIT DIAGRAM



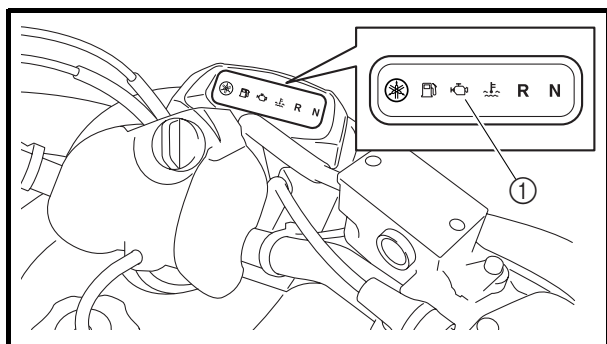


- ① Crankshaft position sensor
- ④ Main switch
- ⑤ Fuel injector system fuse
- ⑥ Battery
- ⑦ Main fuse
- ⑫ Fuel pump relay
- ⑮ Engine trouble warning light
- ⑱ Neutral indicator light
- ⑳ Self-diagnosis signal coupler
- ㉑ ECU
- ㉒ Ignition coil
- ㉓ Spark plug
- ㉔ Fuel injector
- ㉕ Intake air temperature sensor
- ㉖ Coolant temperature sensor
- ㉗ Speed sensor
- ㉘ Throttle position sensor
- ㉙ Intake air pressure sensor
- ㉚ Lean angle sensor
- ㉛ Fuel pump
- ㉜ Neutral switch
- ㉝ Engine stop switch
- ㉞ Ignition fuse



ECU'S SELF-DIAGNOSTIC FUNCTION

The ECU is equipped with a self-diagnostic function in order to ensure that the engine control system is operating normally. If this function detects a malfunction in the system, it immediately operates the engine under substitute characteristics and illuminates the engine trouble warning light to alert the rider that a malfunction has occurred in the system. Once a malfunction has been detected, a fault code is stored in the memory of the ECU.



① Engine trouble warning light

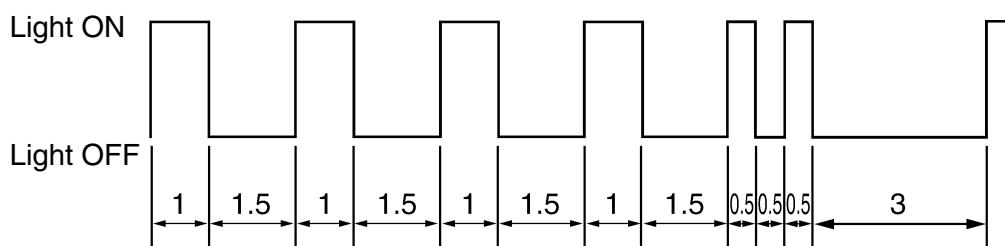
- To inform the rider that the fuel injection system is not functioning correctly, the engine trouble warning light flashes when the start switch is being pushed to start the engine.
- If a malfunction is detected in the system by the self-diagnostic function, this mode provides an appropriate substitute characteristic operation, and alerts the rider of the detected malfunction by illuminating the engine trouble warning light.
- After the engine has been stopped, the lowest fault code number displays on the FI diagnostic tool. This fault code remains stored in the memory of the ECU until it is deleted.

Engine trouble warning light fault code indication

Digit of 10: Cycles of 1 sec. ON and 1.5 sec. OFF.

Digit of 1: Cycles of 0.5 sec. ON and 0.5 sec. OFF.

<Example> 42



EAS00900

Engine trouble warning light indication and FI system operating condition

Engine condition	Warning light indication	FI operation	Vehicle operation
Operates (cranking with electric starter)	Flashing	Operation stopped.	Unable
	Remains ON	Operated with substitute characteristics in accordance with the description of the malfunction.	Able
Stopped	Flashing (indicate the fault code)	—	—



EAS27380

SELF-DIAGNOSTIC FUNCTION TABLE

If the ECU detects an abnormal signal from a sensor while the vehicle is being driven, the ECU illuminates the engine trouble warning light and provides the engine with alternate operating instructions that are appropriate for the type of malfunction.

When an abnormal signal is received from a sensor, the ECU processes the specified values that are programmed for each sensor in order to provide the engine with alternate operating instructions that enable the engine to continue to operate or stop operating, depending on the conditions.

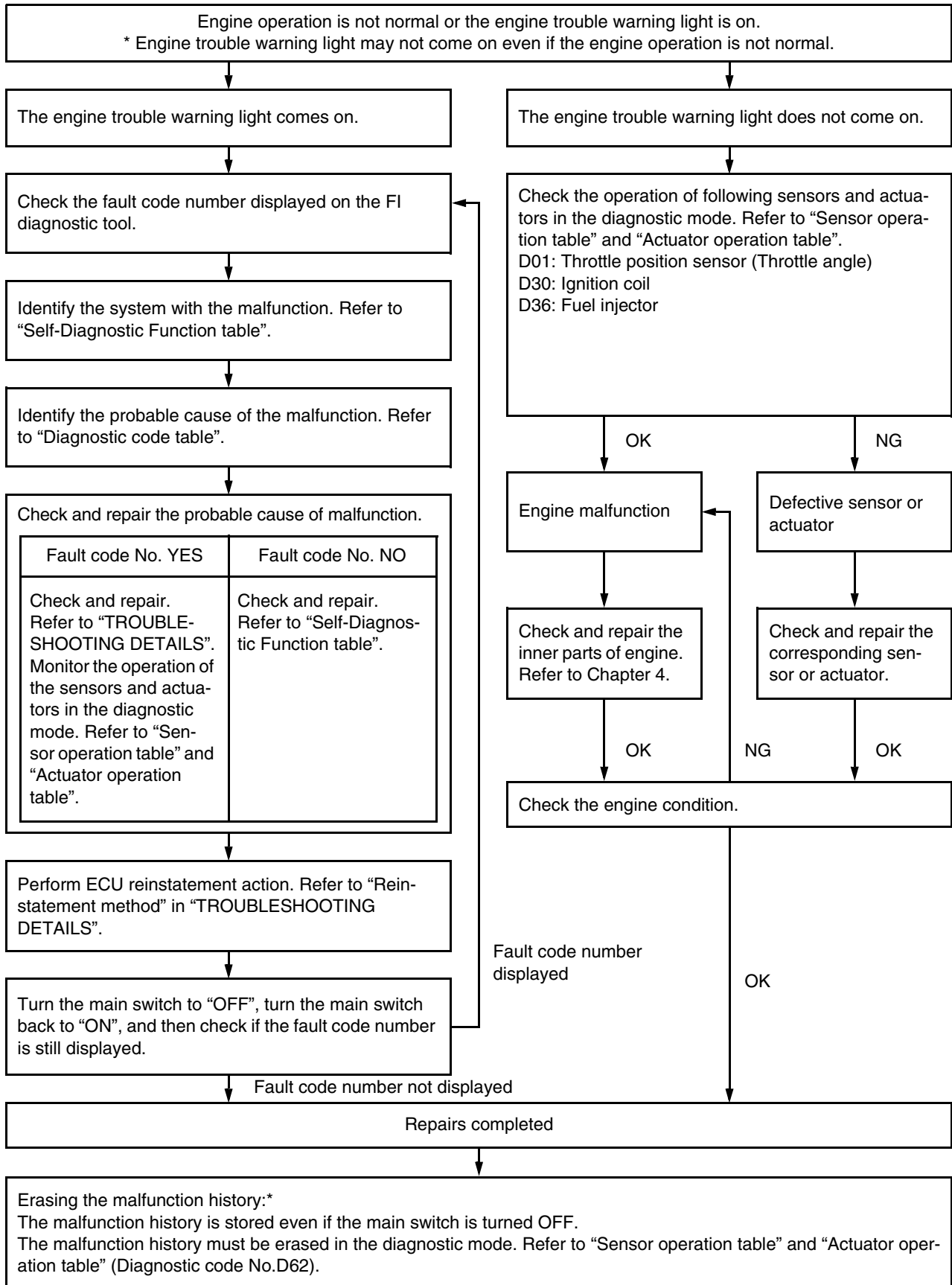
Self-Diagnostic Function table

Fault code No.	Item	Symptom	Able / unable to start	Able / unable to drive
12	Crankshaft position sensor	No normal signals are received from the crankshaft position sensor.	Unable	Unable
13	Intake air pressure sensor (open or short circuit)	Intake air pressure sensor: open or short circuit detected.	Able	Able
14	Intake air pressure sensor (hose line)	Intake air pressure sensor: hose system malfunction (clogged or detached hose).	Able	Able
15	Throttle position sensor (open or short circuit)	Throttle position sensor: open or short circuit detected.	Able	Able
16	Throttle position sensor	Stuck throttle position sensor detected.	Able	Able
21	Coolant temperature sensor	Coolant temperature sensor: open or short circuit detected.	Able	Able
22	Intake air temperature sensor (open or short circuit)	Intake air temperature sensor: open or short circuit detected.	Able	Able
30	Lean angle sensor (latch up detected)	The vehicle has overturned.	Unable	Unable
33	Ignition coil (faulty ignition)	Malfunction detected in the primary wire of ignition coil.	Unable	Unable
41	Lean angle sensor (open or short circuit)	Lean angle sensor: open or short circuit detected.	Unable	Unable
42	Speed sensor	No normal signals are received from the speed sensor.	Able	Able
	Neutral switch	Open or short circuit is detected in the neutral switch.		
43	Fuel system voltage (monitoring voltage)	The ECU is unable to monitor the battery voltage (an open or short circuit in the line to the ECU).	Able	Able
44	Error in writing the amount of CO adjustment on EEPROM	Error is detected while reading or writing on EEPROM (CO adjustment value).	Able	Able
46	Vehicle system power supply (Monitoring voltage)	Power supply to the fuel injection system is not normal.	Able	Able
50	ECU internal malfunction (memory check error)	Faulty ECU memory. (When this malfunction is detected in the ECU, the fault code number might not appear on the meter).	Unable	Unable



EAS00904

TROUBLESHOOTING CHART



* Operated when the engine trouble warning light is on.



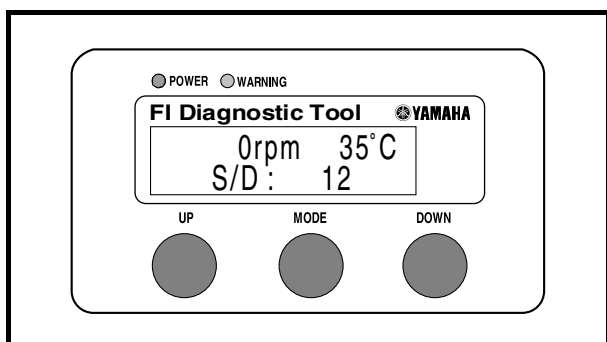
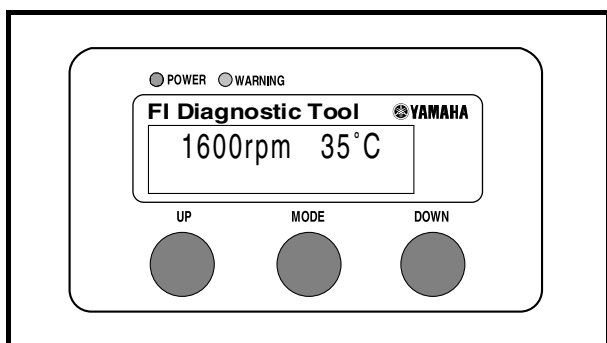
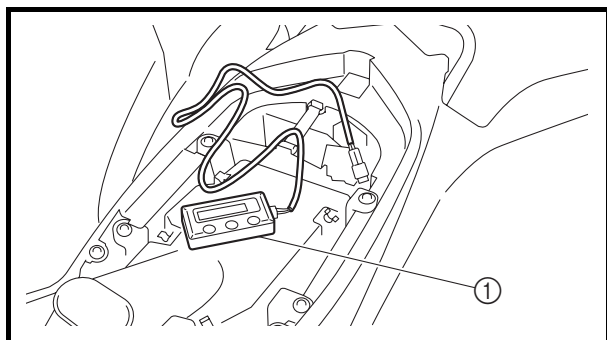
EAS00905

DIAGNOSTIC MODE

It is possible to monitor the sensor output data or check the activation of actuators with the FI diagnostic tool connected to the vehicle and set to the normal mode or the diagnostic monitoring mode.



FI diagnostic tool
90890-03182, YU-03182



Setting the normal mode

NOTE:

The engine speed, engine temperature, and fault code, if detected, can be displayed on the LCD of the FI diagnostic tool when the tool is connected to the vehicle and is set to the normal mode.

1. Turn the main switch to "OFF" and set the engine stop switch to "RUN".
2. Remove the self-diagnosis signal coupler cap, and then connect the FI diagnostic tool ① as shown.
3. Turn the main switch to "ON" and start the engine.

NOTE:

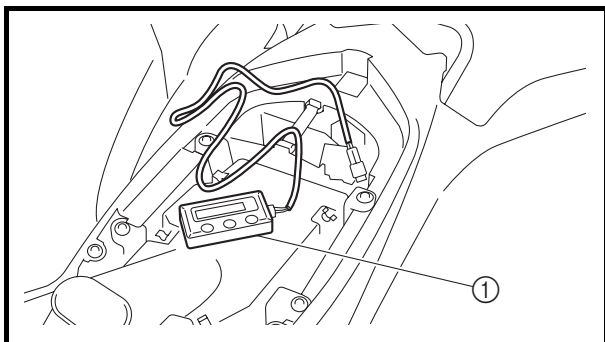
- Coolant temperature and engine revolution appear on the LCD of the FI diagnostic tool.
- "POWER" LED (Green) comes on.
- If a malfunction is detected in the system, "WARNING" LED (Orange) comes on.

4. Stop the engine.

NOTE:

If a malfunction is detected in the system, the fault code appears on the LCD of the FI diagnostic tool. And also, "WARNING" LED (Orange) comes on.

5. Turn the main switch to "OFF" to cancel the normal mode.
6. Disconnect the FI diagnostic tool and connect the self-diagnosis signal connector.

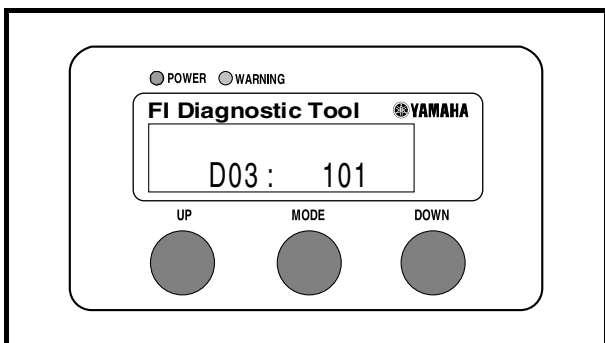


Setting the diagnostic mode

1. Turn the main switch to “OFF” and set the engine stop switch to “RUN”.
2. Remove the self-diagnosis signal coupler cap, and then connect the FI diagnostic tool ① as shown.
3. While press the “MODE” button, turn the main switch to “ON”.

NOTE:

- “DIAG” appears on the LCD of the FI diagnostic tool.
- “POWER” LED (Green) comes on.



4. Press the “UP” button to select the CO adjustment mode “CO” or the diagnostic mode “DIAG”.
5. After selecting “DIAG”, press the “MODE” button.
6. Select the diagnostic code number corresponding to the fault code number by pressing the “UP” and “DOWN” buttons.

NOTE:

- The diagnostic code number appears on the LCD (D01-D70).
- To decrease the selected diagnostic code number, press the “DOWN” button. Press the “DOWN” button for 1 second or longer to automatically decrease the diagnostic code numbers.
- To increase the selected diagnostic code number, press the “UP” button. Press the “UP” button for 1 second or longer to automatically increase the diagnostic code numbers.

7. Verify the operation of the sensor or actuator.
 - Sensor operation
The data representing the operating conditions of the sensor appear on the LCD.
 - Actuator operation
Set the engine stop switch to “OFF” and then to “RUN”.
8. Turn the main switch to “OFF” to cancel the diagnostic mode.
9. Disconnect the FI diagnostic tool and connect the self-diagnosis signal connector.



Diagnostic code table

Fault code No.	Symptom	Probable cause of malfunction	Diagnostic code No.
12	No normal signals are received from the crankshaft position sensor.	• Open or short circuit in wire harness. • Defective crankshaft position sensor. • Malfunction in pickup rotor. • Malfunction in ECU. • Improperly installed sensor.	—
13	Intake air pressure sensor: open or short circuit detected.	• Open or short circuit in wire harness. • Defective intake air pressure sensor. • Malfunction in ECU.	D03
14	Intake air pressure sensor: hose system malfunction (clogged or detached hose).	• Intake air pressure sensor hose is detached, clogged, kinked, or pinched. • Malfunction in ECU.	D03
15	Throttle position sensor: open or short circuit detected.	• Open or short circuit in wire sub lead. • Open or short circuit in wire harness. • Defective throttle position sensor. • Malfunction in ECU. • Improperly installed throttle position sensor.	D01
16	Stuck throttle position sensor detected.	• Stuck throttle position sensor. • Malfunction in ECU.	D01
21	Coolant temperature sensor: open or short circuit detected.	• Open or short circuit in wire harness. • Defective coolant temperature sensor. • Malfunction in ECU. • Improperly installed coolant temperature sensor.	D06
22	Intake air temperature sensor: open or short circuit detected.	• Open or short circuit in wire harness. • Defective intake air temperature sensor. • Malfunction in ECU. • Improperly installed intake air temperature sensor.	D05
30	The vehicle has overturned.	• Overturned. • Malfunction in ECU.	D08
33	Malfunction detected in the primary lead of the ignition coil.	• Open or short circuit in wire harness. • Malfunction in ignition coil. • Malfunction in ECU. • Malfunction in a component of ignition cut-off circuit system.	D30 D32
41	Lean angle sensor: open or short circuit detected.	• Open or short circuit in wire harness. • Defective lean angle sensor. • Malfunction in ECU.	D08
42	No normal signals are received from the speed sensor. Open circuit is detected in the neutral switch.	• Open circuit in wire harness. • Defective speed sensor. • Malfunction in vehicle speed sensor detected. • Defective neutral switch. • Malfunction in the engine side of the neutral switch. • Malfunction in ECU.	D07 D21
43	The ECU is unable to monitor the battery voltage (an open or short circuit in the line to the ECU).	• Open or short circuit in wire harness. • Malfunction in ECU.	D09
44	Error is detected while reading or writing on EEPROM (CO adjustment value).	• Malfunction in ECU. (The CO adjustment value is not properly written on or read from the internal memory).	D60
46	Power supply to the fuel injection system is not normal.	• Malfunction in the charging system. Refer to "CHARGING SYSTEM" in chapter 8.	—
50	Faulty ECU memory. (When this malfunction is detected in the ECU, the fault code number might not appear on the LCD of the FI diagnostic tool.)	• Malfunction in ECU. (The program and data are not properly written on or read from the internal memory.)	—



Sensor operation table

Diagnostic code No.	Item	FI diagnostic tool display	Checking method
D01	Throttle angle • Fully closed position • Fully opened position	15 ~ 20 95 ~ 100	Check with throttle fully closed. Check with throttle fully open.
D03	Pressure difference (atmospheric pressure and intake air pressure)	Displays the intake air pressure.	Set the engine stop switch to "RUN", then operate the throttle while pushing the start switch. (If the display value changes, the performance is OK.)
D05	Intake air temperature	Displays the intake air temperature.	Compare the actually measured intake air temperature with the FI diagnostic tool.
D06	Coolant temperature	Displays the coolant temperature.	Compare the actually measured coolant temperature with the FI diagnostic tool.
D07	Vehicle speed pulse	0 ~ 999	Check that the number increases when the rear wheel is rotated. The number is cumulative and does not reset each time the wheel is stopped.
D08	Lean angle sensor • Upright • Overturned	0.4 ~ 1.4 3.7 ~ 4.4	Remove the lean angle sensor and incline it more than 65 degrees.
D09	Fuel system voltage (battery voltage)	Approximately 12.0	Set the engine stop switch to "RUN", and then compare with the actually measured battery voltage. (If the battery voltage is lower, perform recharging.)
D21	Neutral switch • Neutral • In gear	ON OFF	Shift the transmission.
D60	EEPROM fault code display • No history • History exists	00 01	—
D61	Malfunction history code display • No history • History exists	00 Fault codes 12-63 • (If more than one code number is detected, the display alternates every two seconds to show all the detected code numbers. When all code numbers are shown, the display repeats the same process.)	—
D62	Malfunction history code erasure • No history • History exists	0 Up to 15 fault codes	— To erase the history, set the engine stop switch to "RUN".
D70	Control number	00 ~ 255	—



Actuator operation table

Diagnostic code No.	Item	Actuation	Checking method
D30	Ignition coil	Actuates the ignition coil for five times every second. Illuminates the "WARNING" on the FI diagnostic tool and engine trouble warning light.	Check the spark five times. • Connect an ignition checker.
D36	Injector	Actuates the injector for five times every second. Illuminates the "WARNING" on the FI diagnostic tool and engine trouble warning light.	Check the operating sound of the injector five times.
D50	Fuel pump relay	Actuates the fuel pump relay for five times every second. Illuminates the "WARNING" on the FI diagnostic tool and engine trouble warning light. (The engine trouble warning light is OFF when the relay is ON, and the engine trouble warning light is ON when the relay is OFF).	Check the operating sound of the fuel pump relay five times.
D51	Radiator fan motor relay	Actuates the radiator fan motor relay for five cycles of five seconds. (ON 2 seconds, OFF 3 seconds) Illuminates the engine trouble warning light.	Check the operating sound of the radiator fan motor relay five times.

Communication error with the FI diagnostic tool

LCD Display	Symptom	Probable cause of malfunction
Waiting for connection....	No signals are received from the ECU.	• Improper connection in connecting lead. • The main switch is OFF position. • Malfunction in FI diagnostic tool. • Malfunction in ECU.
ERROR 4	Commands from the FI diagnostic tool are not accepted by the ECU.	• Turn the main switch to "OFF" once, and then set the FI diagnostic tool to CO adjustment mode or diagnostic mode. • Vehicle battery is insufficiently charged. • Malfunction in FI diagnostic tool. • Malfunction in ECU.

EAS00908

TROUBLESHOOTING DETAILS

This section describes the countermeasures per fault code number displayed on the FI diagnostic tool. Check and service the items or components that are the probable cause of the malfunction following the order given.

After the check and service of the malfunctioning part has been completed, reset the FI diagnostic tool display according to the "Reinstatement method".

Fault code No.:

Fault code number displayed on the FI diagnostic tool when the engine failed to work normally.

Refer to "Diagnostic code table".

Diagnostic code No.:

Diagnostic code number to be used when the diagnostic mode is operated. Refer to "DIAGNOSTIC MODE".

FUEL INJECTION SYSTEM

FI


Fault code No.	12	Symptom	No normal signals are received from the crankshaft position sensor.	
Diagnostic code No.	—	—	—	
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
1	Installed condition of crankshaft position sensor.		Check for looseness or pinching.	Cranking the engine.
2	Connections • Crankshaft position sensor coupler • Main wire harness ECU coupler		• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.	
3	Open or short circuit in wire harness.		• Repair or replace if there is an open or short circuit. • Between the crankshaft position sensor coupler and ECU coupler. (blue/yellow–blue/yellow) (black/blue–black/blue)	
4	Defective crankshaft position sensor.		• Replace if defective. Refer to “IGNITION SYSTEM” in chapter 8.	

FUEL INJECTION SYSTEM

FI


Fault code No.		13	Symptom	Intake air pressure sensor: open or short circuit detected.	
Diagnostic code No.		D03		Intake air pressure sensor	
Order	Item/components and probable cause			Check or maintenance job	Reinstatement method
1	Connections • Intake air pressure sensor coupler • Main wire harness ECU coupler			• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.	Turning the main switch to “ON”.
2	Open or short circuit in wire harness.			• Repair or replace if there is an open or short circuit. • Between intake air pressure sensor coupler and ECU coupler (black/blue–black/blue) (pink–pink) (blue–blue)	
3	Defective intake air pressure sensor.			• Execute the diagnostic mode. (Code No.D03) • Replace if defective. Refer to “CHECKING THE INTAKE AIR PRESSURE SENSOR”.	

FUEL INJECTION SYSTEM

FI


Fault code No.	14	Symptom	Intake air pressure sensor: hose system malfunction (clogged or detached hose).	
Diagnostic code No.		D03	Intake air pressure sensor	
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
1	Intake air pressure sensor hose		• Check the intake air pressure sensor hose condition. • Repair or replace the sensor hose.	Starting the engine and operating it at idle.
2	Intake air pressure sensor malfunction at intermediate electrical potential.		• Check and repair the connection. • Replace it if there is a malfunction.	
3	Connections • Intake air pressure sensor coupler • Main wire harness ECU coupler		• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.	
4	Defective intake air pressure sensor.		• Execute the diagnostic mode. (Code No.D03) • Replace if defective. Refer to “CHECKING THE INTAKE AIR PRESSURE SENSOR”.	

FUEL INJECTION SYSTEM

FI



Fault code No.		15	Symptom	Throttle position sensor: open or short circuit detected.	
Diagnostic code No.		D01		Throttle position sensor	
Order	Item/components and probable cause			Check or maintenance job	Reinstatement method
1	Installed condition of throttle position sensor.			• Check for looseness or pinching. • Check that the sensor is installed in the specified position.	Turning the main switch to “ON”.
2	Connections • Throttle position sensor coupler • Main wire harness ECU coupler			• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.	
3	Open or short circuit in wire harness.			• Repair or replace if there is an open or short circuit. • Between throttle position sensor coupler and ECU coupler (blue–blue) (yellow–yellow) (black/blue–black/blue)	
4	Throttle position sensor lead wire open circuit output voltage check.			• Check for open circuit and replace the throttle position sensor. (yellow–black/blue)	
5	Defective throttle position sensor.			• Execute the diagnostic mode. (Code No.D01) • Replace if defective. Refer to “CHECKING AND ADJUSTING THE THROTTLE POSITION SENSOR”.	

FUEL INJECTION SYSTEM

FI


Fault code No.		16	Symptom	Stuck throttle position sensor detected.		
Diagnostic code No.		D01	Throttle position sensor			
Order	Item/components and probable cause			Check or maintenance job	Reinstatement method	
1	Installed condition of throttle position sensor.			• Check the installed area for looseness or pinching. • Check that the throttle position sensor is installed in the specified position. Refer to “THROTTLE BODY”.	Reinstated by starting the engine, operating it at idle, and then racing it.	
2	Defective throttle position sensor.			• Execute the diagnostic monitoring mode. (Code No.D01) • Replace if defective. Refer to “CHECKING AND ADJUSTING THE THROTTLE POSITION SENSOR”.		

Fault code No.	21	Symptom	Coolant temperature sensor: open or short circuit detected.	
Diagnostic code No.		D06	Coolant temperature sensor	
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
1	Installed condition of coolant temperature sensor.		Check the installed area for looseness or pinching.	Turning the main switch to “ON”.
2	Connections • Coolant temperature sensor coupler • Main wire harness ECU coupler		• Check the coupler for any pins that may have pulled out. • Check the locking condition of the coupler. If there is a malfunction, repair it and connect the coupler securely.	
3	Open or short circuit in wire harness.		• Repair or replace if there is an open or short circuit. • Between coolant temperature sensor coupler and ECU coupler. (black/blue–black/blue) (black/yellow–black/yellow)	
4	Defective coolant temperature sensor.		• Execute the diagnostic mode. (Code No.D06) • Replace if defective. Refer to “SIGNALING SYSTEM” in chapter 8.	

FUEL INJECTION SYSTEM

FI


Fault code No.	22	Symptom	Intake air temperature sensor: open or short circuit detected.	
Diagnostic code No.		D05	Intake air temperature sensor	
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
1	Installed condition of air temperature sensor.		Check for looseness or pinching.	Turning the main switch to “ON”.
2	Connections • Intake air temperature sensor coupler • Main wire harness ECU coupler		• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.	
3	Open or short circuit in wire harness.		• Repair or replace if there is an open or short circuit. • Between air temperature sensor coupler and ECU coupler (brown/white–brown/white) (black/white–black/blue)	
4	Defective air temperature sensor.		• Execute the diagnostic mode. (Code No.D05) • Replace if defective. Refer to “CHECKING THE INTAKE AIR TEMPERATURE SENSOR”.	

FUEL INJECTION SYSTEM

FI


Fault code No.		30	Symptom	The vehicle has overturned.	
Diagnostic code No.		D08		Lean angle sensor	
Order	Item/components and probable cause			Check or maintenance job	Reinstatement method
1	The vehicle has overturned.			Raise the vehicle upright.	Turning the main switch to “ON” (however, the engine cannot be restarted unless the main switch is first turned “OFF”).
2	Installed condition of the lean angle sensor.			Check for looseness or pinching.	
3	Connections • Lean angle sensor coupler • Main wire harness ECU coupler			• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.	
4	Defective lean angle sensor.			• Execute the diagnostic mode. (Code No.D08) • Replace if defective. Refer to “IGNITION SYSTEM” in chapter 8.	

FUEL INJECTION SYSTEM

FI


Fault code No.	33	Symptom	Malfunction detected in the primary lead of the ignition coil.	
Diagnostic code No.		D30	Ignition coil	
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
1	Connections • Ignition coil connector (primary coil side) • Main wire harness ECU coupler		• Check the connector and coupler for any pins that may be pulled out. • Check the locking condition of the connector and coupler. • If there is a malfunction, repair it and connect the coupler or connector securely.	Starting the engine and operating it at idle.
2	Open or short circuit in wire harness.		• Repair or replace if there is an open or short circuit. • Between ignition coil connector and ECU coupler/main wire harness. (red/black–red/black) (orange–orange)	
3	Defective ignition coil.		• Execute the diagnostic mode. (Code No.D30) • Test the primary and secondary coils for continuity. • Replace if defective. Refer to “IGNITION SYSTEM” in chapter 8.	

FUEL INJECTION SYSTEM

FI


Fault code No.	41	Symptom	Lean angle sensor: open or short circuit detected.	
Diagnostic code No.	D08	Lean angle sensor		
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
1	Connections • Lean angle sensor coupler • Main wire harness ECU coupler		• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.	Turning the main switch to “ON”.
2	Open or short circuit in lead wire.		• Repair or replace if there is an open or short circuit. • Between lean angle sensor coupler and ECU coupler. (blue–blue) (yellow/green–yellow/green) (black/blue–black/blue)	
3	Defective lean angle switch.		• Execute the diagnostic mode. (Code No.D08) • Replace if defective. Refer to “IGNITION SYSTEM” in chapter 8.	

FUEL INJECTION SYSTEM

FI



Fault code No.	42	Symptom	A. No normal signals are received from the speed sensor. B. Open circuit is detected in the neutral switch.	
Diagnostic code No.		A	D07	Speed sensor
		B	D21	Neutral switch
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
A-1	Connections • Speed sensor coupler • Main wire harness ECU coupler		• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.	Starting the engine, and activating the vehicle speed sensor by operating the vehicle at 20 to 30 km/h.
A-2	Open or short circuit in speed sensor lead.		• Repair or replace if there is an open or short circuit. • Between speed sensor coupler and ECU coupler. (blue–blue) (white–white) (black/blue–black/blue)	
A-3	Gear for detecting vehicle speed has broken.		• Replace if defective. Refer to “TRANSMISSION” in chapter 4.	
A-4	Defective speed sensor.		• Execute the diagnostic mode. (Code No.D07) • Replace if defective. Refer to “CHECKING THE SPEED SENSOR”.	

FUEL INJECTION SYSTEM

FI



Fault code No.	42	Symptom	A. No normal signals are received from the speed sensor. B. Open circuit is detected in the neutral switch.	
Diagnostic code No.		A	D07	Speed sensor
		B	D21	Neutral switch
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
B-1	Connections • Neutral switch coupler • Main wire harness ECU coupler		• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.	Starting the engine, and activating the vehicle speed sensor by operating the vehicle at 20 to 30 km/h.
B-2	Open circuit in neutral switch lead.		• Repair or replace if there is an open circuit. • Between neutral switch connector and relay unit coupler. (sky blue–sky blue) • Between relay unit coupler and ECU coupler. (light green–brown) (black/yellow–sky blue)	
B-3	Faulty shift drum (neutral detection area).		• Replace if defective. Refer to “TRANSMISSION” in chapter 4.	
B-4	Defective neutral switch.		• Execute the diagnostic mode. (Code No.D21) • Replace if defective. Refer to “CHECKING THE SWITCHES” in chapter 8.	

FUEL INJECTION SYSTEM

FI


Fault code No.	43	Symptom	The ECU is unable to monitor the battery voltage (an open or short circuit in the line to the ECU).	
Diagnostic code No.		D09	Fuel system voltage	
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
1	Connections • Relay unit coupler (fuel pump relay) • Main wire harness ECU coupler		• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.	Starting the engine and operating it at idle.
2	Open or short circuit in the wire harness.		• Repair or replace if there is an open or short circuit. • Between relay unit coupler and ECU coupler. (blue/red–blue/red) (red/blue–red/blue) • Between relay unit coupler and battery terminal. (brown/green–red) • Between relay unit coupler and handlebar switch coupler. (red/black–red/black)	
3	Malfunction or open circuit in fuel pump relay.		• Execute the diagnostic mode. (Code No.D09) • Replace if defective. • If there is no malfunction with the relay unit, replace the ECU.	

Fault code No.		44	Symptom	Error is detected while reading or writing on EEPROM (CO adjustment value).	
Diagnostic code No.			D60	EEPROM improper cylinder indication	
Order	Item/components and probable cause			Check or maintenance job	Reinstatement method
1	Malfunction in ECU.			• Execute the diagnostic mode. (Code No.D60) 1. Check the faulty cylinder. • Replace ECU if defective.	Turning the main switch to “ON”.

FUEL INJECTION SYSTEM

FI



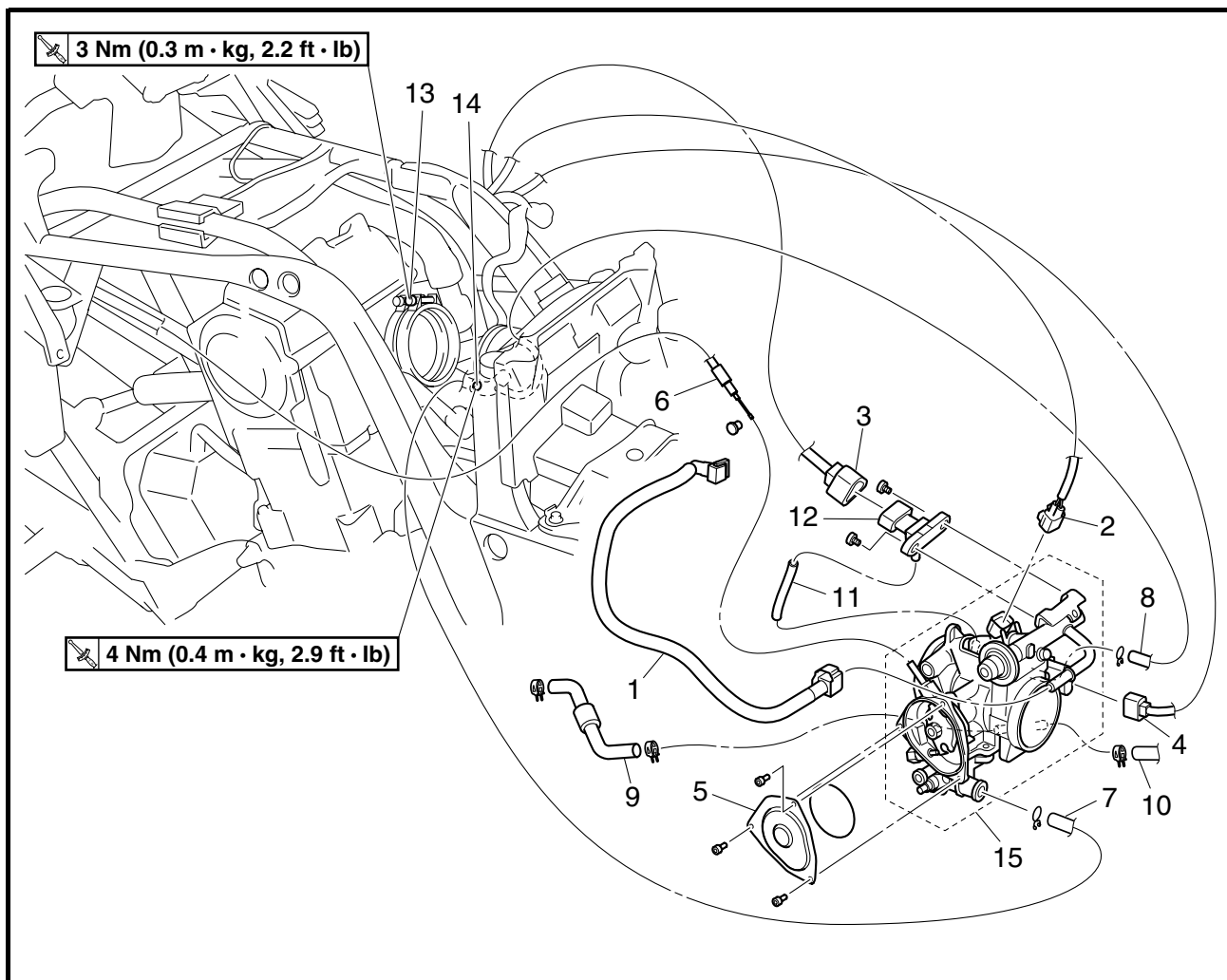
Fault code No.	46	Symptom	Power supply to the fuel injection system is not normal.	
Diagnostic code No.	—	—		
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
1	Connections • Main wire harness ECU coupler		• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.	Starting the engine and operating it at idle.
2	Faulty battery.		• Replace or charge the battery. Refer to “CHECKING AND CHARGING THE BATTERY” in chapter 3.	
3	Malfunction in rectifier/regulator		• Replace if defective. Refer to “CHARGING SYSTEM” in chapter 8.	
4	Open or short circuit in wire harness.		• Repair or replace if there is an open or short circuit. • Between battery and main switch (red–red) • Between main switch and ignition fuse (brown/blue–brown/blue) • Between ignition fuse and ECU (brown–brown)	

Fault code No.	50	Symptom	Faulty ECU memory. (When this malfunction is detected in the ECU, the fault code number might not appear on the meter.)	
Diagnostic code No.	—	—		
Order	Item/components and probable cause		Check or maintenance job	Reinstatement method
1	Malfunction in ECU.		Replace the ECU. NOTE: _____ Do not perform this procedure with the main switch turned to “ON”. _____	Turning the main switch to “ON”.

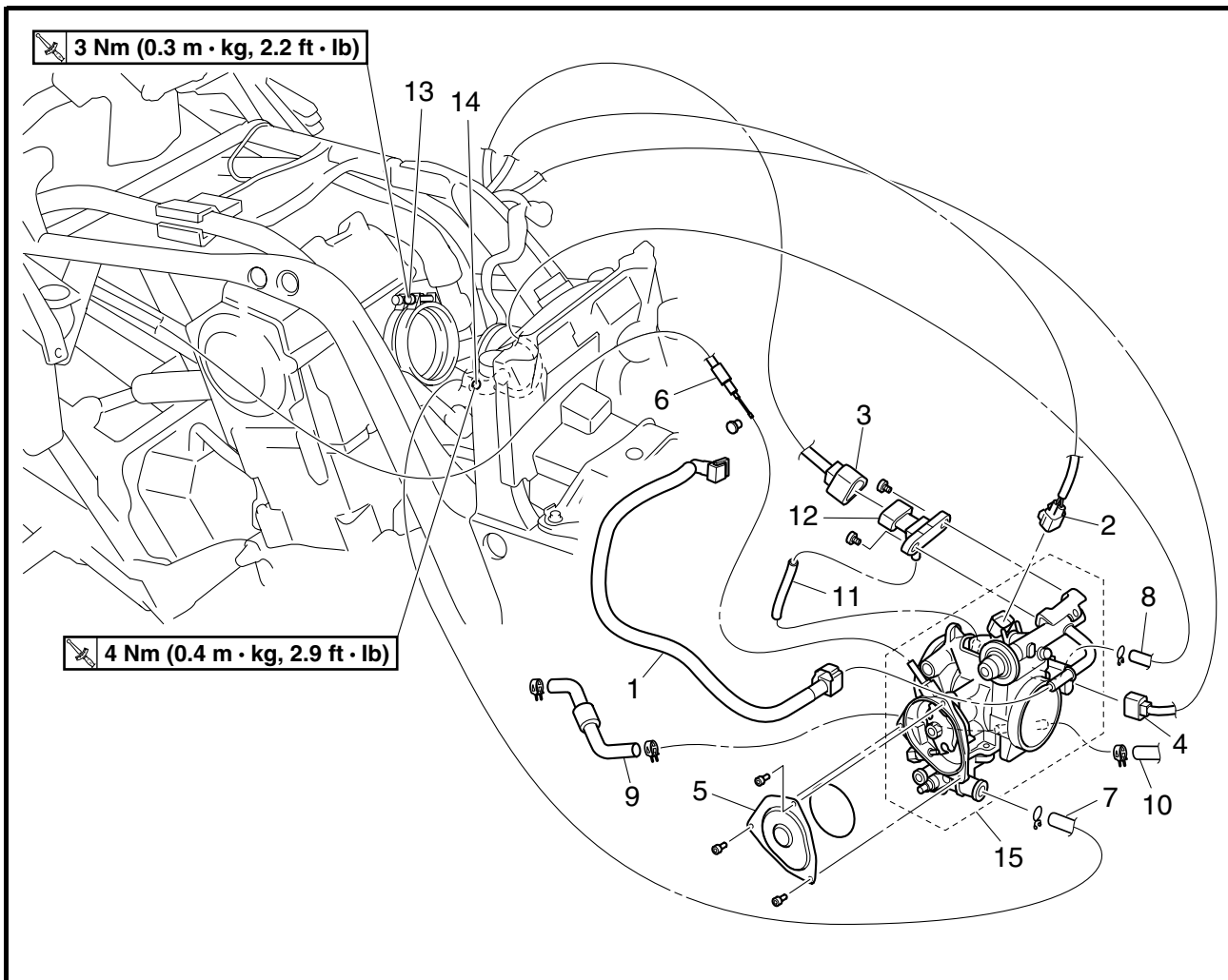


EAS00909

THROTTLE BODY



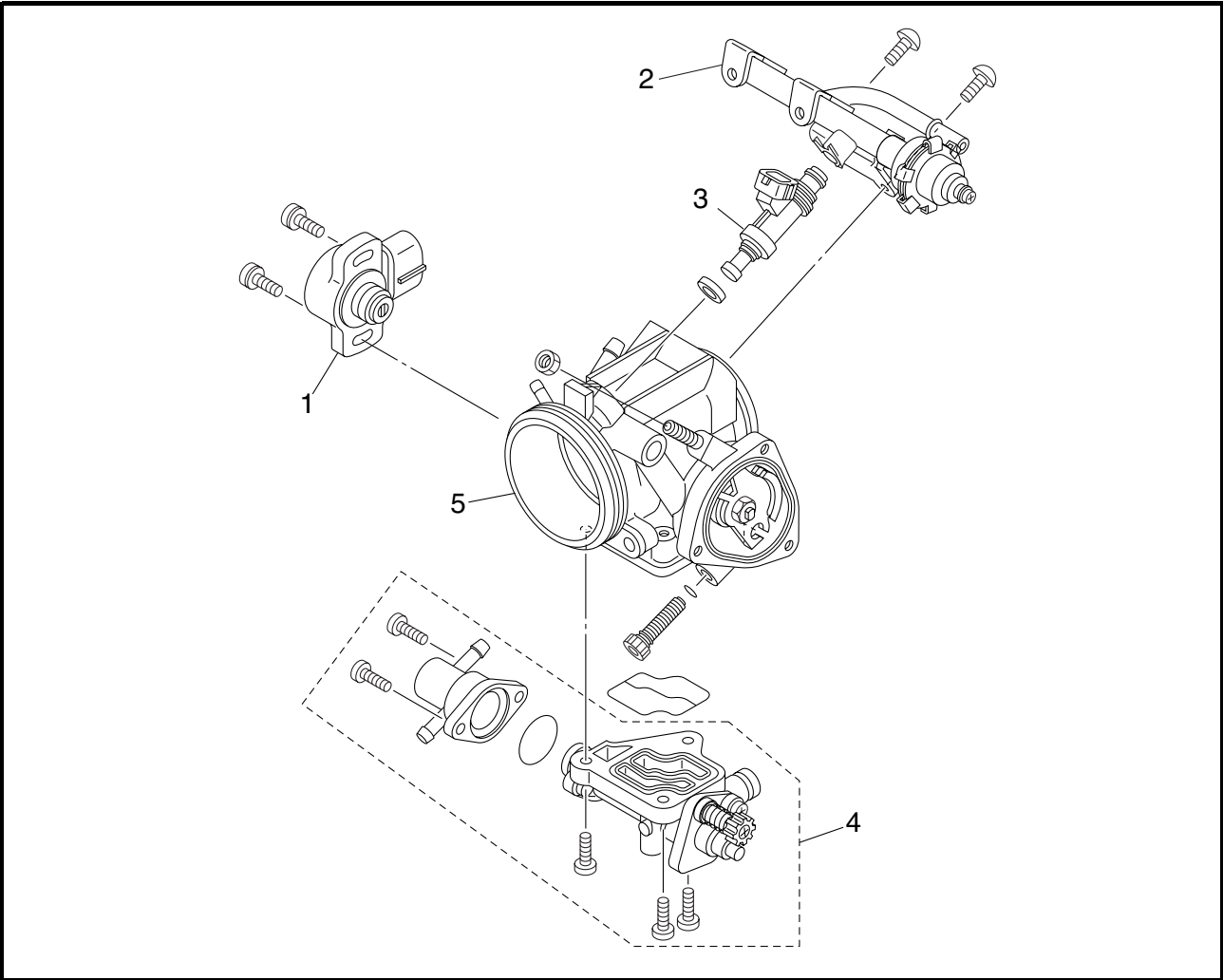
Order	Job/Part	Q'ty	Remarks
	Removing the throttle body		
	Fuel tank shield		Remove the parts in the order listed. Refer to "SEAT, FENDERS AND FUEL TANK" in chapter 3.
	Coolant		Drain. Refer to "CHANGING THE COOLANT" in chapter 3.
1	Fuel hose	1	Disconnect.
2	Fuel injector coupler	1	Disconnect.
3	Intake air pressure sensor coupler	1	Disconnect.
4	Throttle position sensor coupler	1	Disconnect.
5	Throttle cable housing cover	1	
6	Throttle cable	1	
7	Hose (air-filter-joint-to-throttle-body-left-side)	1	Disconnect.
8	Hose (air-filter-joint-to-throttle-body-right-side)	1	Disconnect.



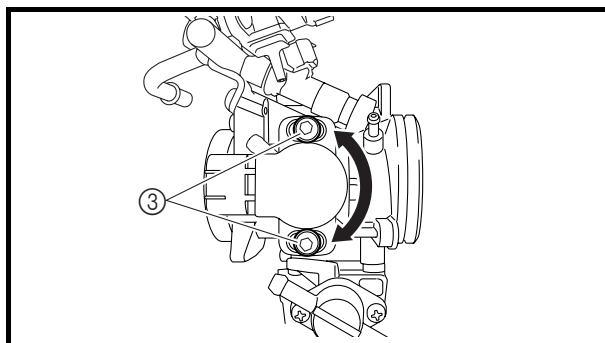
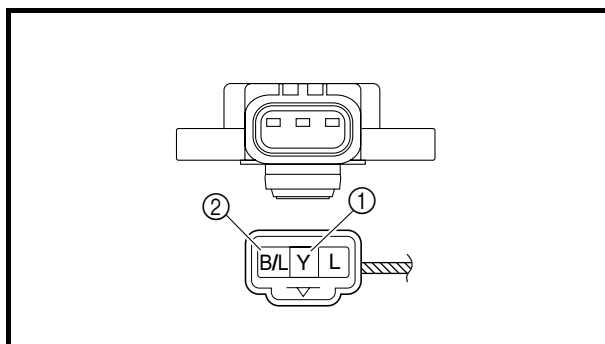
Order	Job/Part	Q'ty	Remarks
9	Fast idle plunger inlet hose	1	Disconnect.
10	Fast idle plunger outlet hose	1	
11	Intake air pressure sensor hose	1	
12	Intake air pressure sensor	1	
13	Intake manifold clamp screw	1	Loosen.
14	Air filter case joint clamp screw	1	Loosen.
15	Throttle body assembly	1	For installation, reverse the removal procedure.



EAS00910



Order	Job/Part	Q'ty	Remarks
	Removing the injector		
1	Throttle position sensor	1	Remove the parts in the order listed. CAUTION: _____ The throttle body should not be disassembled. _____ For installation, reverse the removal procedure.
2	Fuel injection pipe	1	
3	Fuel injector	1	
4	Fast idle plunger unit	1	
5	Throttle body	1	



Slot is worn or broken → Replace the throttle position sensor.

NOTE:

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



Throttle position sensor resistance

0 ~ 5 ± 1 kΩ at 20 °C (68 °F)
(yellow-black/blue)



2. Adjust:

- throttle position sensor angle



- Connect the throttle position sensor coupler to the wire harness.
- Connect the digital circuit tester to the throttle position sensor.

Positive digital circuit tester probe → yellow ①

Negative digital circuit tester probe → black/blue ②



Digital circuit tester 90890-03174

Model 88 Multimeter with tachometer
YU-A1927

- Measure the throttle position sensor voltage.
- Adjust the throttle position sensor angle so that the voltage is within the specified range.



Throttle position sensor voltage 0.63 ~ 0.73 V (yellow-black/blue)

- After adjusting the throttle position sensor angle, tighten the throttle position sensor screws ③.



CHAPTER 7

CHASSIS

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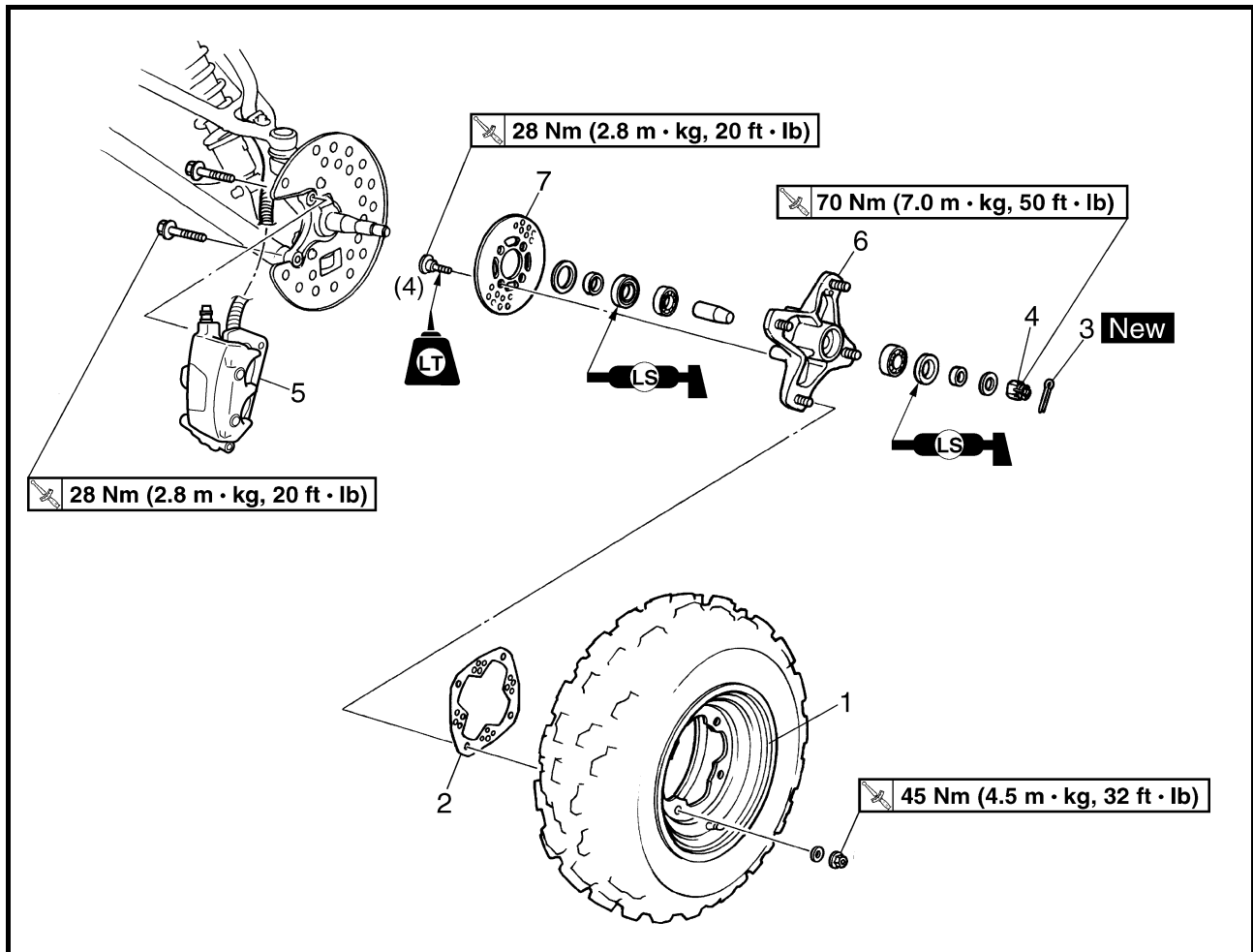


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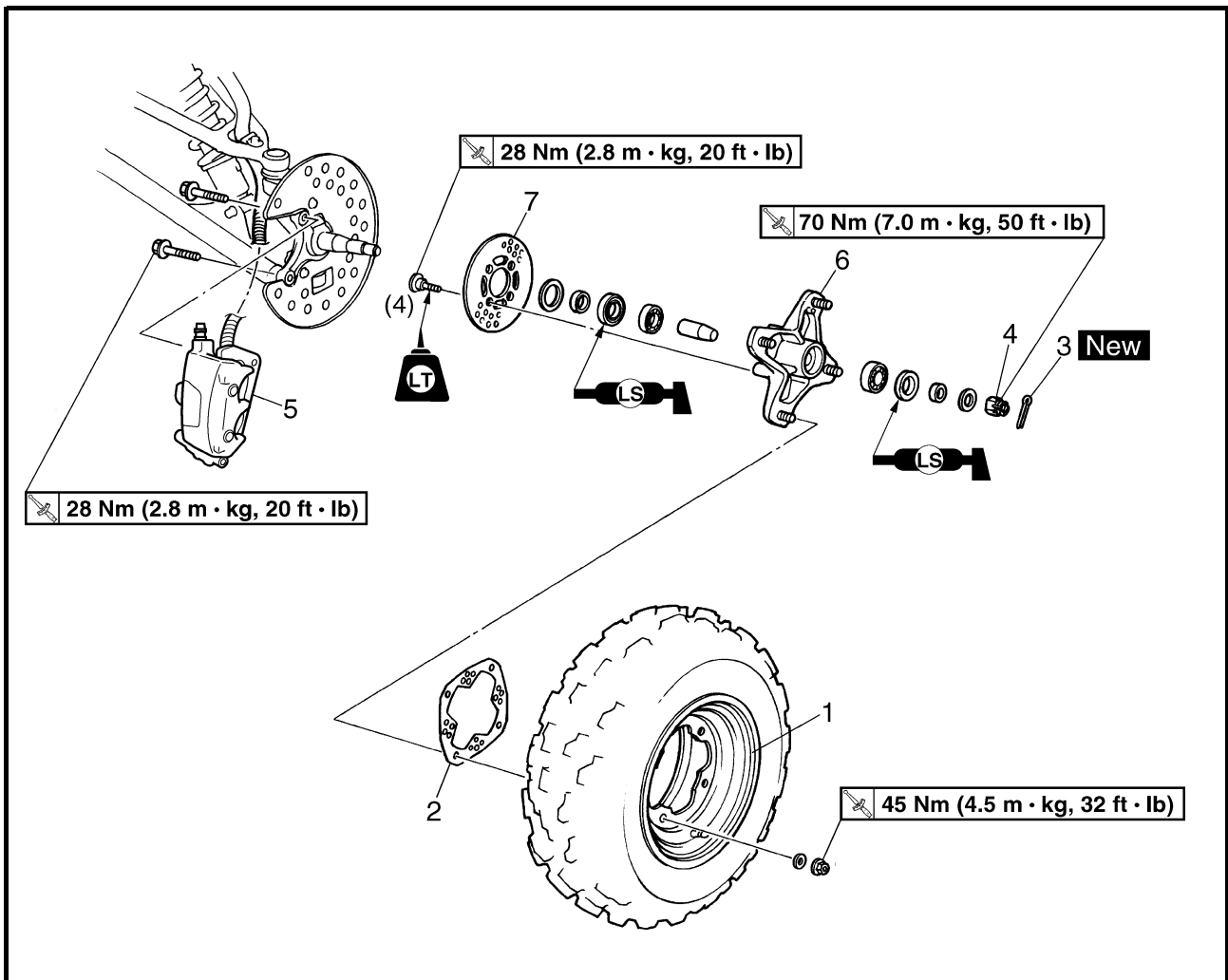
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FRONT AND REAR WHEELS

FRONT WHEELS

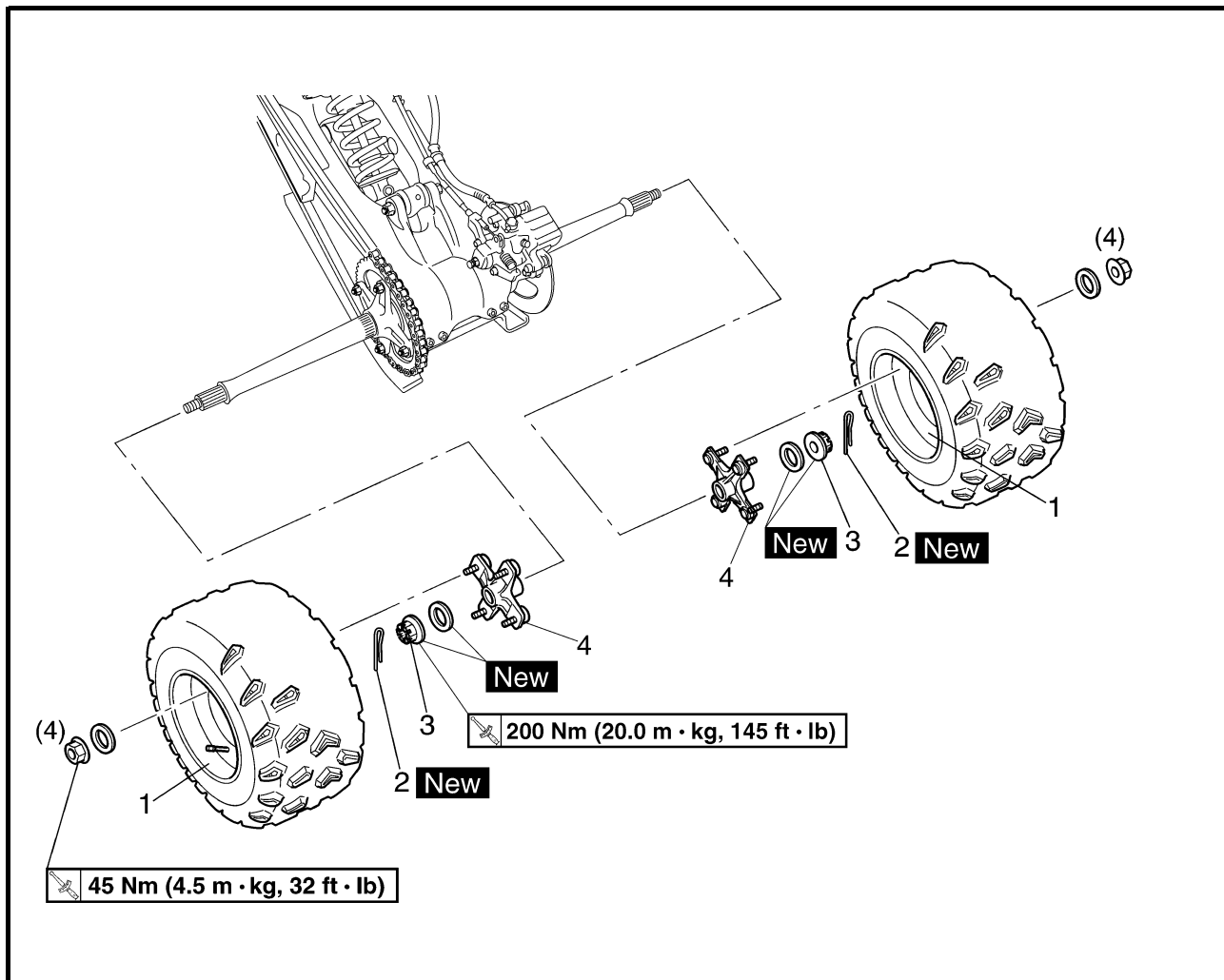


Order	Job/Part	Q'ty	Remarks
	Removing the front wheels		Remove the parts in the order listed. The following procedure applies to both of the front wheels. Place the vehicle on a level surface.
			⚠ WARNING Securely support the vehicle so there is no danger of it falling over.
1	Front wheel	1	Refer to "INSTALLING THE FRONT WHEELS".
2	Brake disc guard (outer)	1	
3	Cotter pin	1	Refer to "INSTALLING THE FRONT WHEEL HUBS".
4	Axle nut	1	

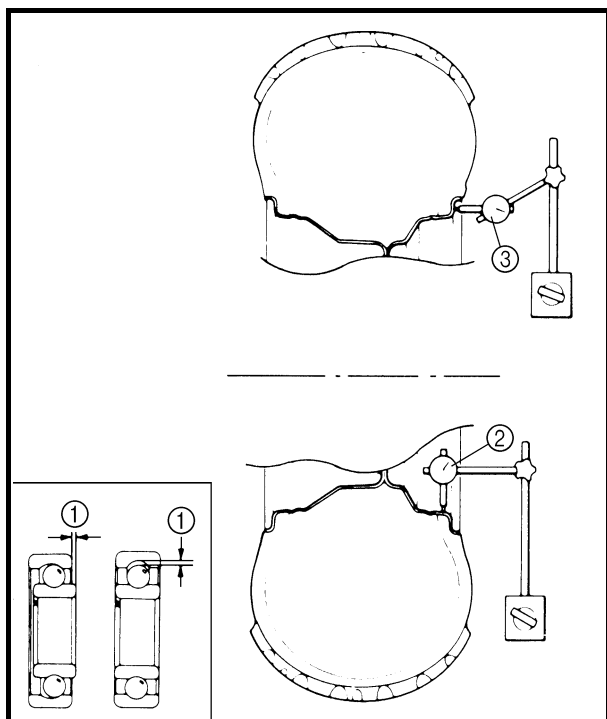


Order	Job/Part	Q'ty	Remarks
5	Brake caliper assembly	1	NOTE: _____ Do not squeeze the brake lever when the brake caliper is off of the brake discs as the brake pads will be forced shut. _____ For installation, reverse the removal procedure.
6	Wheel hub	1	
7	Brake disc	1	

REAR WHEELS



Order	Job/Part	Q'ty	Remarks
	Removing the rear wheels		Remove the parts in the order listed. Place the vehicle on a level surface.
			⚠ WARNING Securely support the vehicle so there is no danger of it falling over.
1	Rear wheel	2	Refer to "INSTALLING THE REAR WHEEL HUBS".
2	Cotter pin	2	
3	Axle nut	2	
4	Wheel hub	2	
			For installation, reverse the removal procedure.



EBS00383

CHECKING THE WHEELS

1. Check:
 - wheels
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)

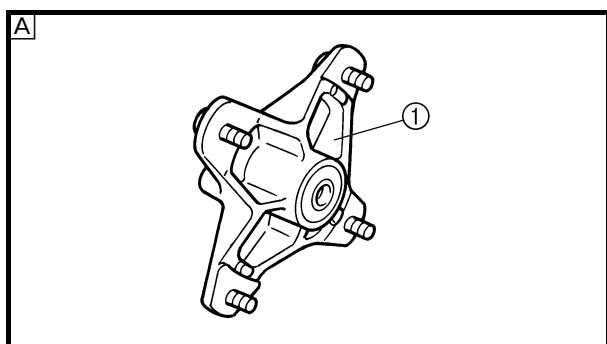
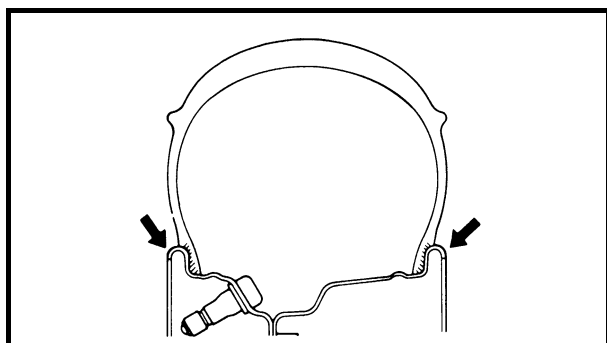
3. Check:
 - wheel balance

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 vehicle damage and possible operator injury.



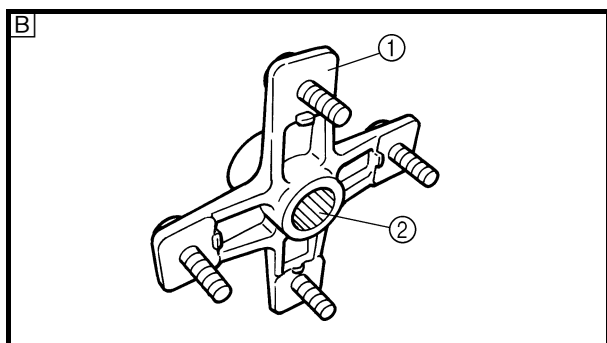
EBS00385

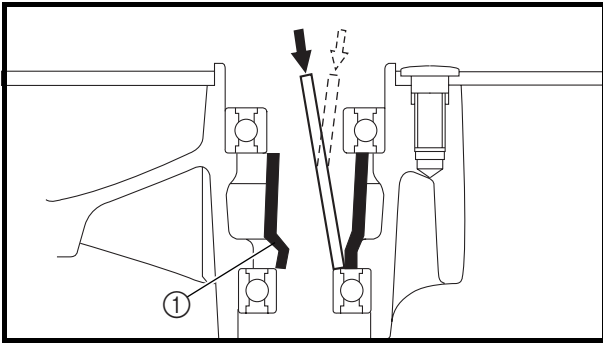
CHECKING THE WHEEL HUBS

1. Check:
 - wheel hubs ①
 - Cracks/damage → Replace.
 - splines (wheel hub) ②
 - Wear/damage → Replace the wheel hub.

A Front

B Rear





2. Check:

- wheel bearings

Wheel hub play/wheel turns roughly → Replace.



a. Clean wheel hub exterior.

b. Drive bearing out by pushing spacer aside and tapping around perimeter of bearing inner race. Use a soft metal drift punch and a hammer. The spacer ① “floats” between bearings. Remove both bearings as described.

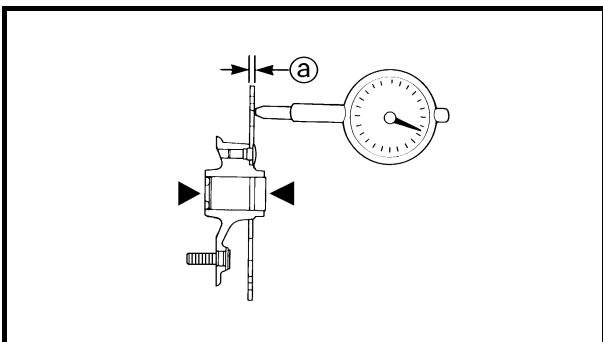
⚠ WARNING

Eye protection is recommended when using striking tools.

c. To install the wheel bearings, reverse the above sequence. Use a socket that matches outside diameter of bearing outer race to drive in bearing.

CAUTION:

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



EBS00389

CHECKING THE BRAKE DISCS

1. Check:

- brake discs

Galling/damage → Replace.

2. Measure:

- brake disc deflection

Out of specification → Check the wheel runout.



Brake disc maximum deflection

Front: 0.15 mm (0.006 in)

Rear: 0.15 mm (0.006 in)

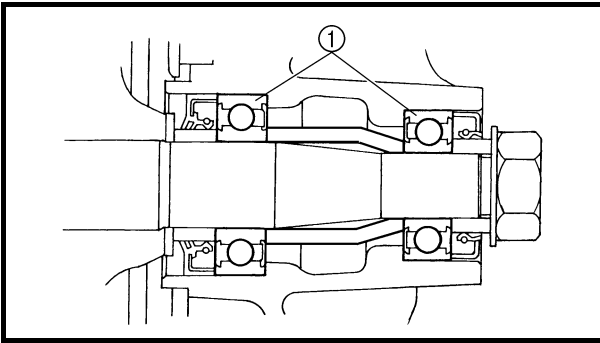
- brake disc thickness ②

Out of specification → Replace.



Brake disc minimum thickness

3 mm (0.12 in)

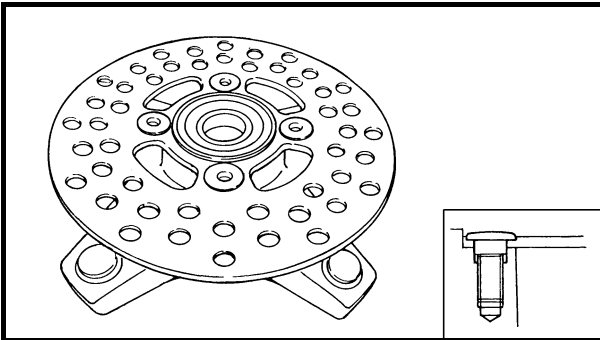


INSTALLING THE FRONT WHEEL HUB BEARINGS

1. Install:
 - bearings ①

NOTE:

Face the oil seal side of the bearing inward.

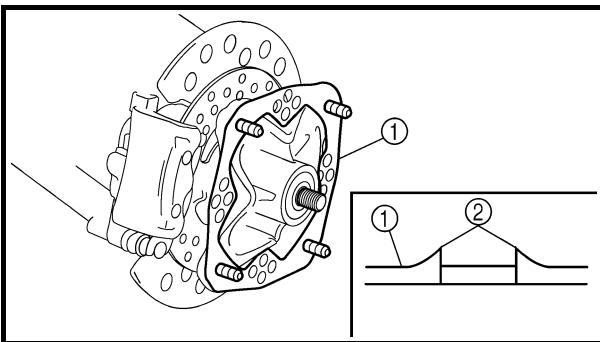


INSTALLING THE FRONT BRAKE DISCS

1. Install:
 - brake discs

NOTE:

Install the brake discs with their spot-faced side facing the bolt heads.



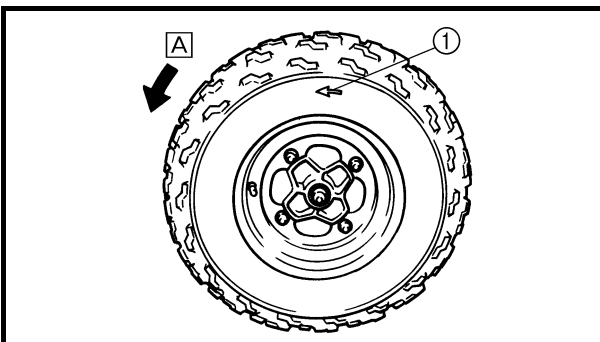
EBS00392

INSTALLING THE FRONT WHEELS

1. Install:
 - brake disc guards (outer) ①

NOTE:

Install the brake disc guard (outer) with the punched burrs ② on the wheel hub side.



2. Install:
 - wheels

NOTE:

The arrow mark ① on the tire must point in the direction of rotation A of the wheel.



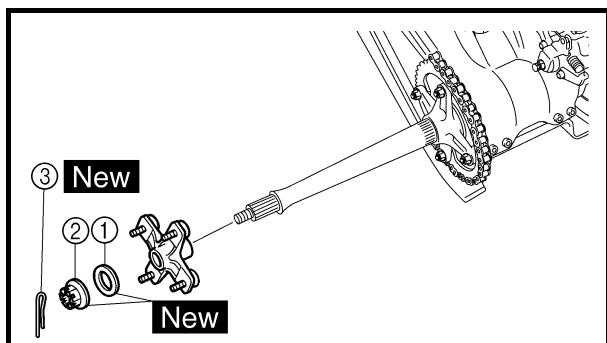
INSTALLING THE FRONT WHEEL HUBS

- front axle nuts ①

 70 Nm (7.0 m · kg, 50 ft · lb)

- cotter pins ②

Do not loosen the axle nut after torquing it. If an axle nut slot is not aligned with the cotter pin hole on either side of the axle, further tighten the axle nut until a slot is aligned with the hole.



- cotter pins ③ **New**

b. Tighten the rear axle nuts to specification.

Rear axle nut
200 Nm (20.0 m · kg, 145 ft · lb)

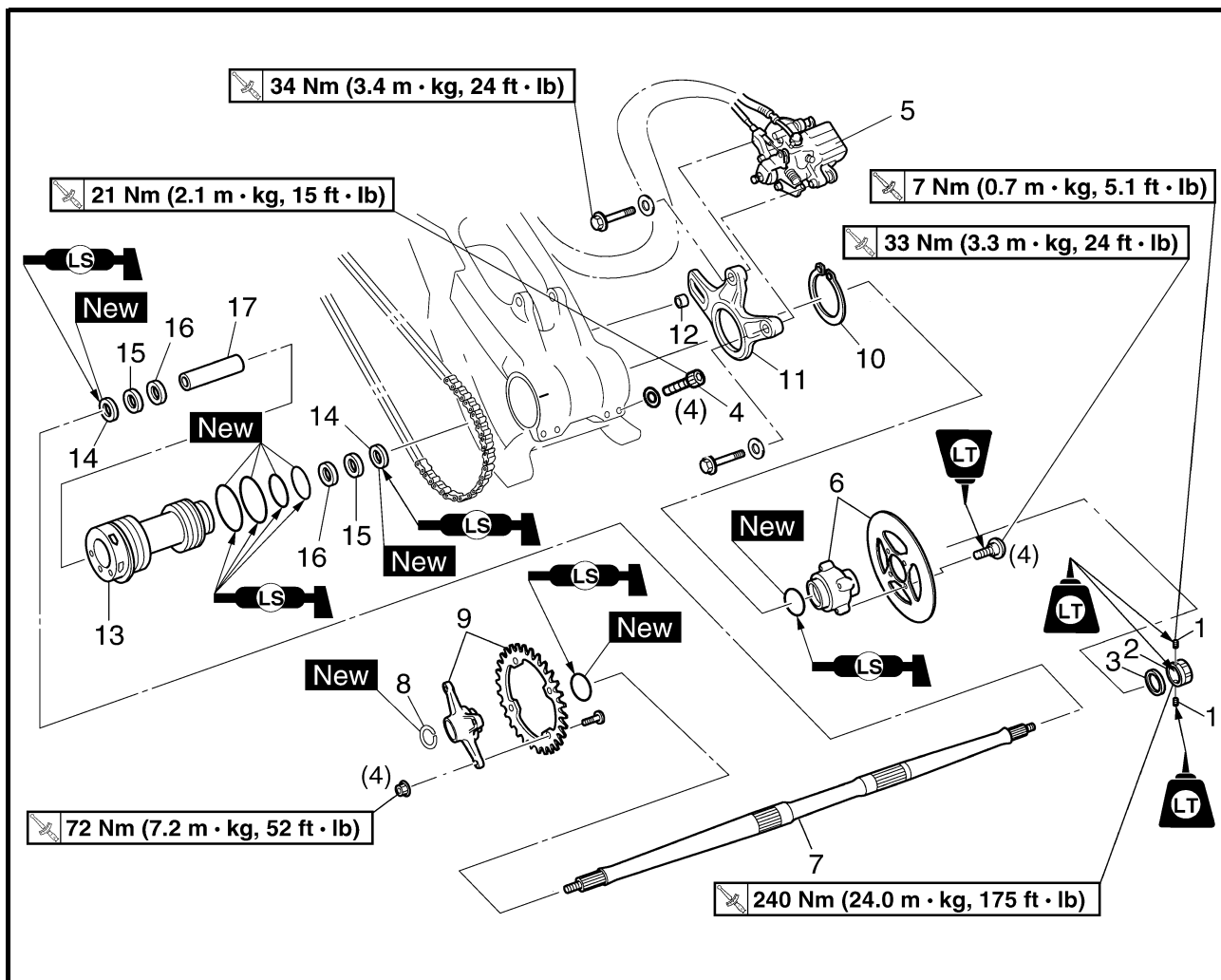
d. Retighten the rear axle nuts to specification.

Rear axle nut
200 Nm (20.0 m · kg, 145 ft · lb)

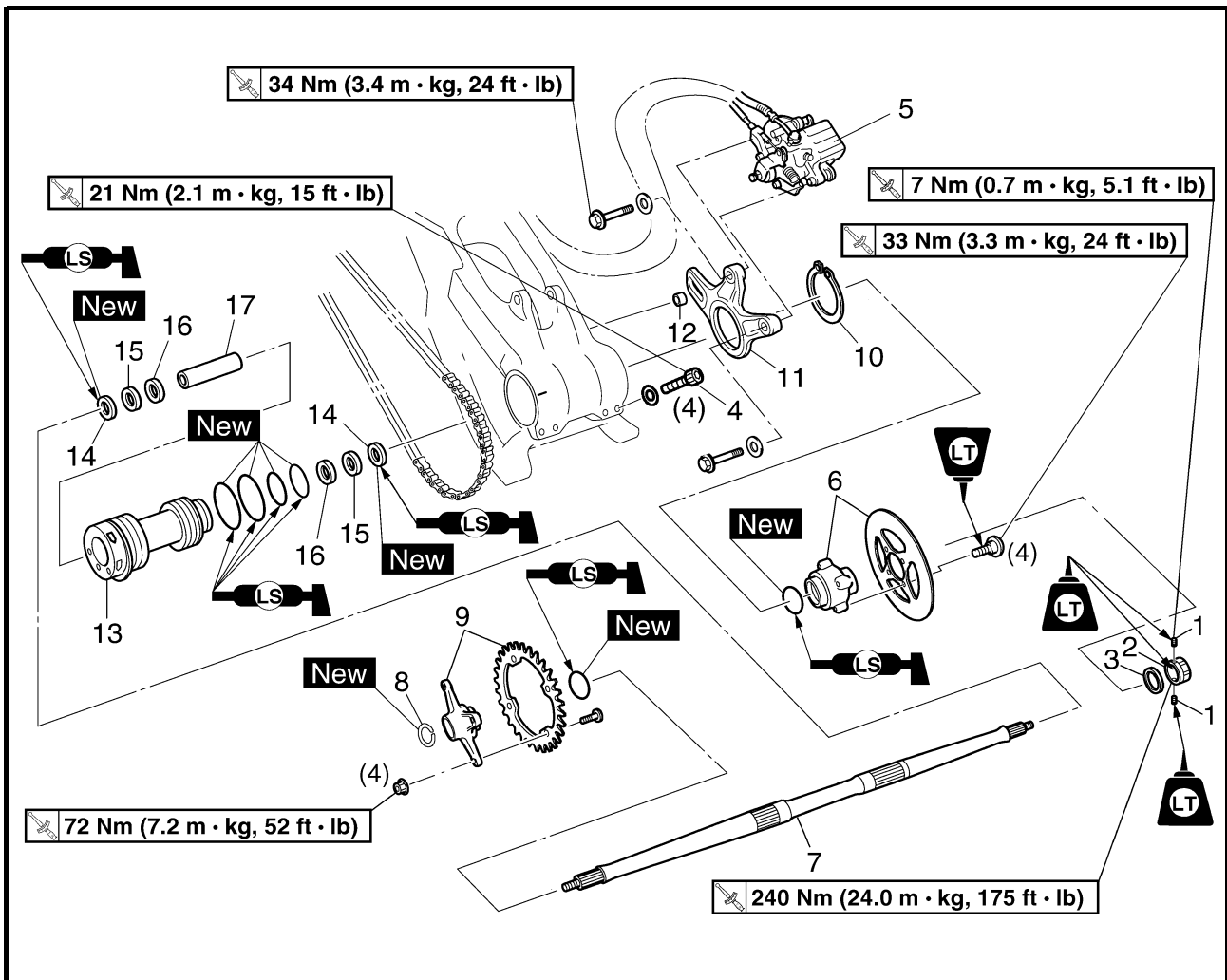
Do not loosen the axle nut after torquing it. If an axle nut slot is not aligned with the cotter pin hole on either side of the axle, further tighten the axle nut until a slot is aligned with the hole.

EBS00382

REAR AXLE AND REAR AXLE HUB



Order	Job/Part	Q'ty	Remarks
	Removing the rear axle and rear axle hub		Remove the parts in the order listed.
1	Rear wheels/rear wheel hubs	2	Refer to "FRONT AND REAR WHEELS".
2	Bolt	1	Refer to "REMOVING THE REAR AXLE" and "INSTALLING THE REAR AXLE".
3	Nut	1	
4	Conical spring washer	1	
5	Rear axle pinch bolt	4	
6	Brake caliper	1	NOTE: Do not apply the brake pedal and do not use the parking brake when the brake caliper is off of the brake disc as the brake pad will be force shut.



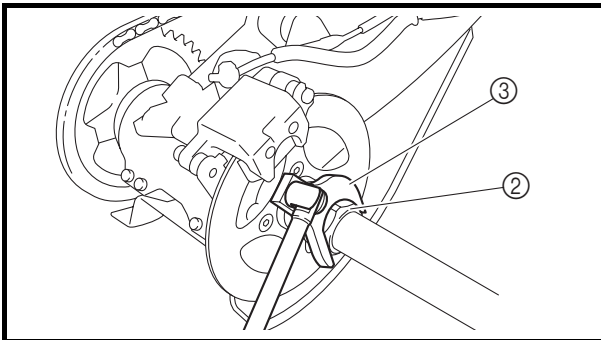
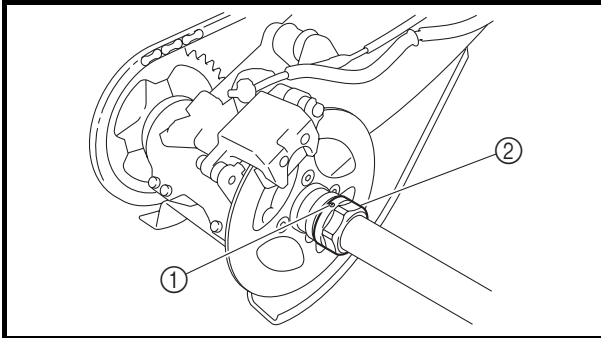
Order	Job/Part	Q'ty	Remarks
6	Brake disc/brake disc bracket	1/1	Refer to "REMOVING THE REAR AXLE".
7	Rear axle	1	
8	Circlip	1	
9	Driven sprocket/sprocket bracket	1/1	
10	Circlip	1	Refer to "INSTALLING THE DRIVEN SPROCKET".
11	Brake caliper bracket	1	
12	Spacer	1	
13	Rear axle hub	1	
14	Oil seal	2	
15	Bearing	2	
16	Bearing	2	
17	Spacer	1	
			For installation, reverse the removal procedure.



REMOVING THE REAR BRAKE CALIPER

NOTE:

If the rear brake caliper cannot be removed easily, first remove the brake pad, next remove the caliper.



EBS00393

REMOVING THE REAR AXLE

1. Place the vehicle on a level surface.
2. Remove:
 - bolts ①
3. Loosen:
 - nut ②

NOTE:

- Apply the brake pedal so that the rear axle does not turn, when loosening the nut.
- Use the rear axle nut wrench 46 mm ③.

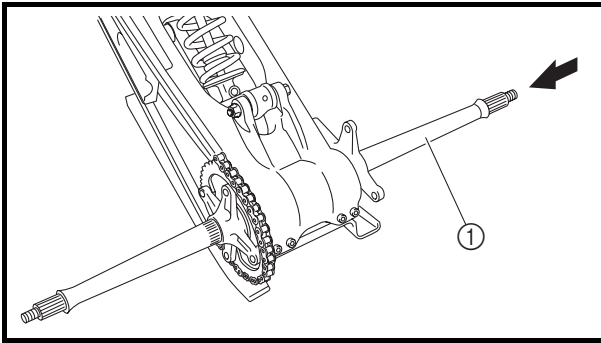


Rear axle nut wrench (46 mm)
90890-01498
Axle nut wrench (46 mm)
YM-37134

4. Loosen:
 - drive chain
 Refer to “ADJUSTING THE DRIVE CHAIN SLACK” in chapter 3.
5. Elevate the rear wheels by placing the suitable stand under the frame.
6. Remove:
 - rear wheels
 - wheel hubs
 - nut ②
 - conical spring washer

REAR AXLE AND REAR AXLE HUB

CHAS

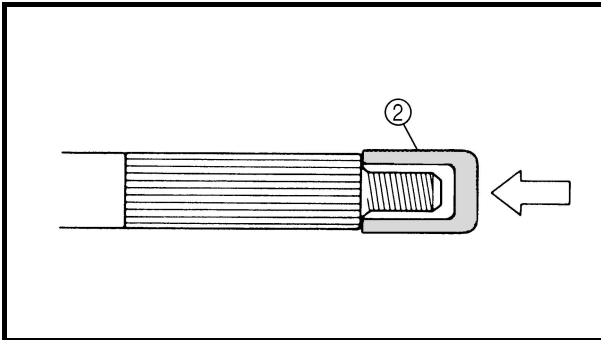


7. Remove:

- rear axle ①
(with driven sprocket)

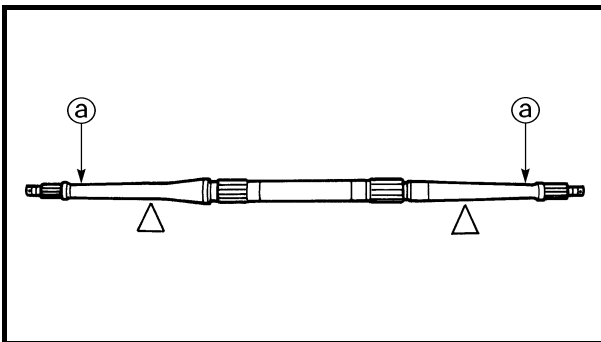
CAUTION:

- **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, then pull out the rear axle to the left.**



8. Remove:

- circlip
- driven sprocket bracket



EBS00395

CHECKING THE REAR AXLE

1. Check:

- rear axle runout ①
Out of specification → Replace.

⚠ WARNING

Do not attempt to straighten a bent axle.



**Rear axle runout limit
1.5 mm (0.06 in)**

CHECKING THE DRIVEN SPROCKET

1. Check:

- driven sprocket
Refer to “SWINGARM AND DRIVE CHAIN”.

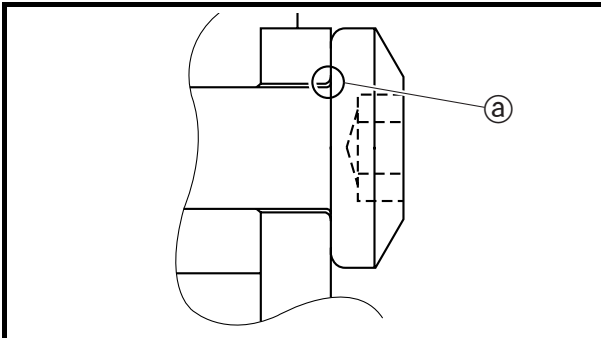


CHECKING THE BRAKE DISC

1. Check:

- brake disc

Refer to "FRONT AND REAR WHEELS".



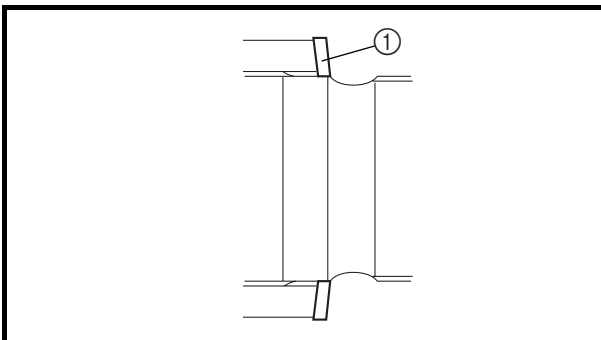
INSTALLING THE DRIVEN SPROCKET

1. Install:

- driven sprocket

NOTE:

Make sure that the blunt-edged corner ① of the driven sprocket is facing outward.



EBS00397

INSTALLING THE REAR AXLE

1. Install:

- conical spring washer ①
- nut

NOTE:

Install the conical spring washer with the convex side of the washer facing outward as shown.

2. Install:

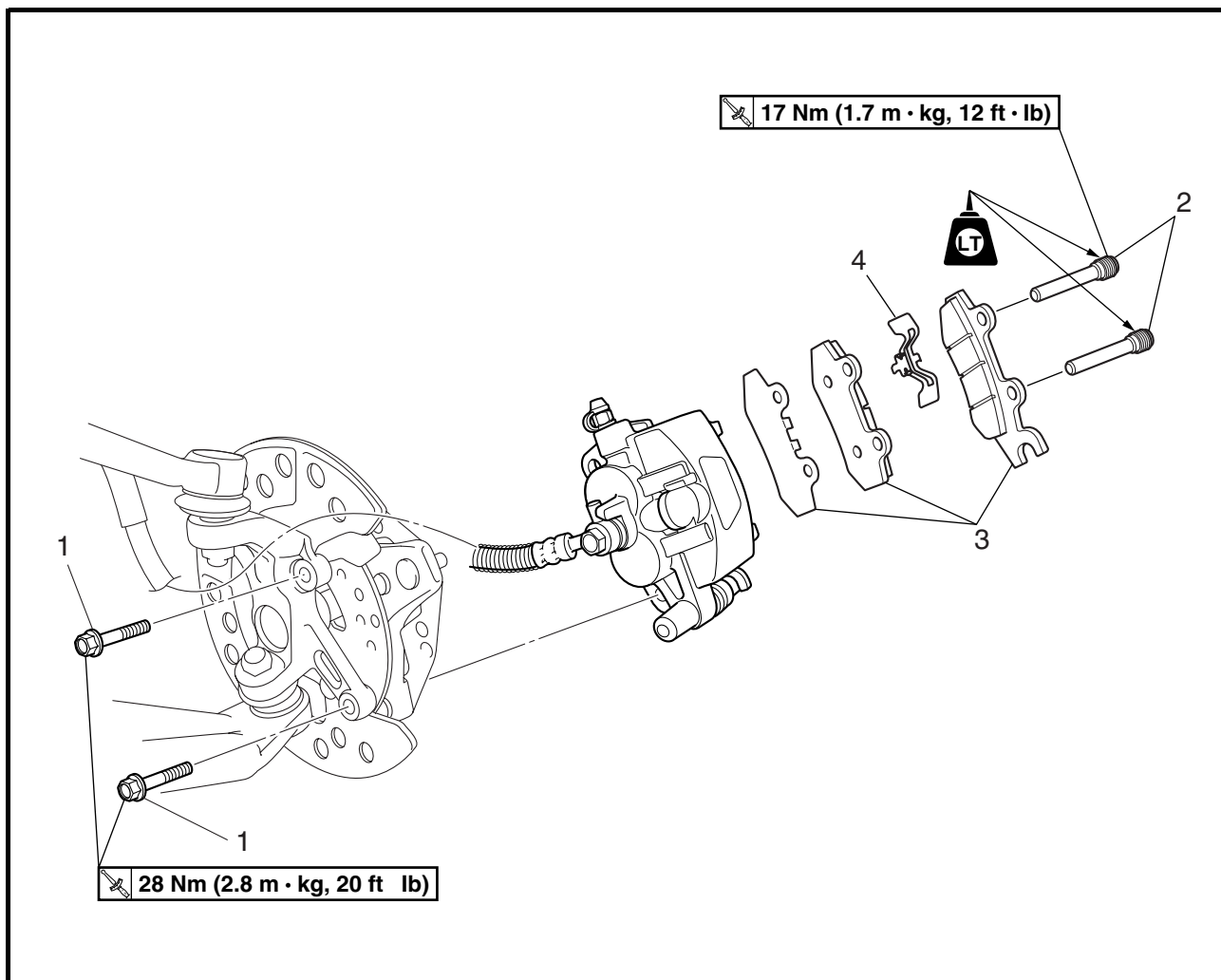
- rear wheels

Refer to "FRONT AND REAR WHEELS".

EBS00400

FRONT AND REAR BRAKES

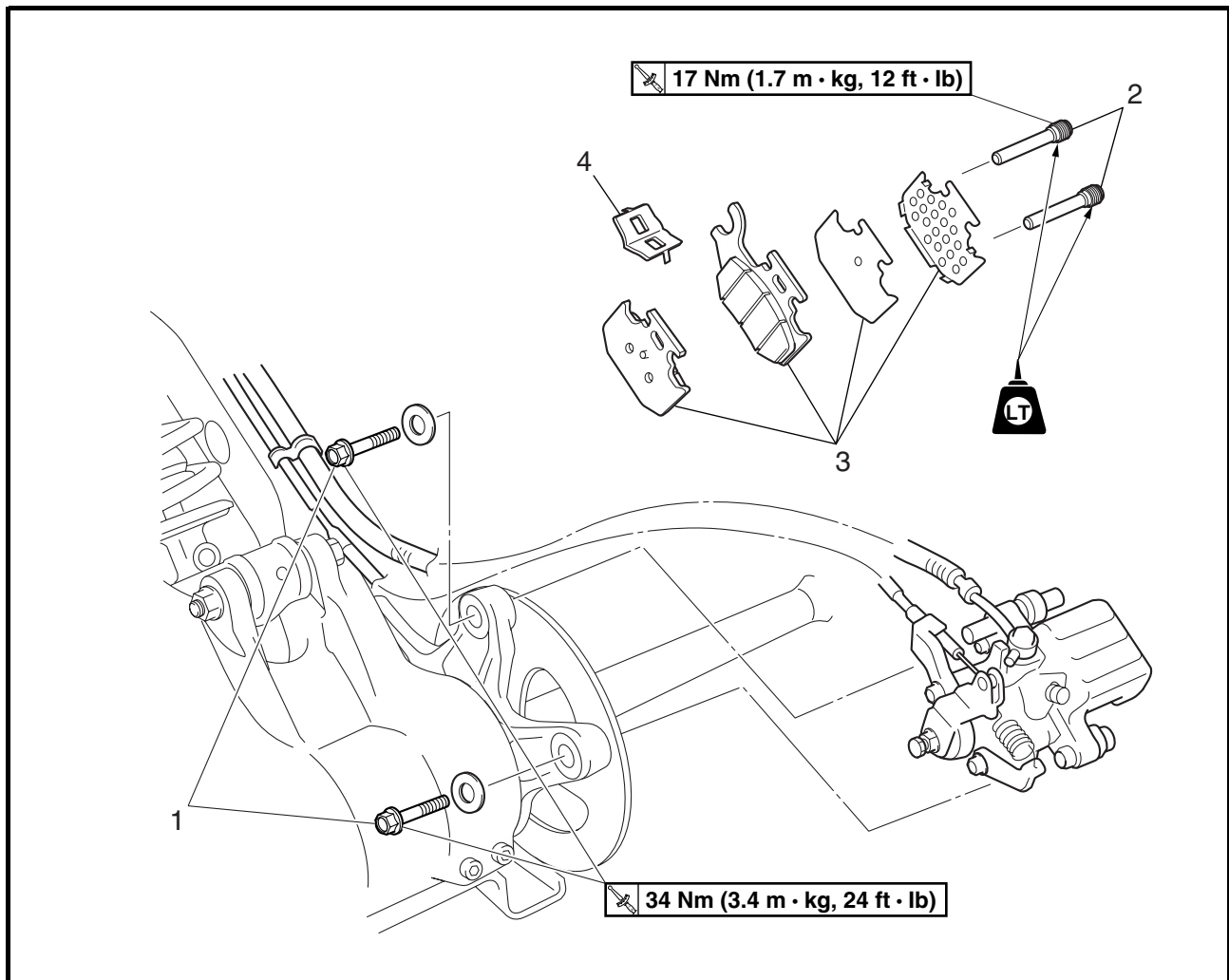
FRONT BRAKE PADS



Order	Job/Part	Q'ty	Remarks
	Removing the front brake pads		Remove the parts in the order listed. The following procedure applies to both of the front brake calipers. Refer to "FRONT AND REAR WHEELS".
1	Front wheel	2	Refer to "REPLACING THE FRONT BRAKE PADS".
1	Brake caliper mounting bolt	2	
2	Brake pad retaining bolt	2/1	
3	Brake pad/pad shim	1	
4	Brake pad spring		For installation, reverse the removal procedure.

EBS00401

REAR BRAKE PADS



Order	Job/Part	Q'ty	Remarks
	Removing the rear brake pads		Remove the parts in the order listed.
1	Brake caliper mounting bolt	2	Refer to "REPLACING THE REAR BRAKE PADS".
2	Brake pad retaining bolt	2	
3	Brake pad/insulator/pad shim	2/1/1	
4	Brake pad spring	1	For installation, reverse the removal procedure.

EBS00402

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.

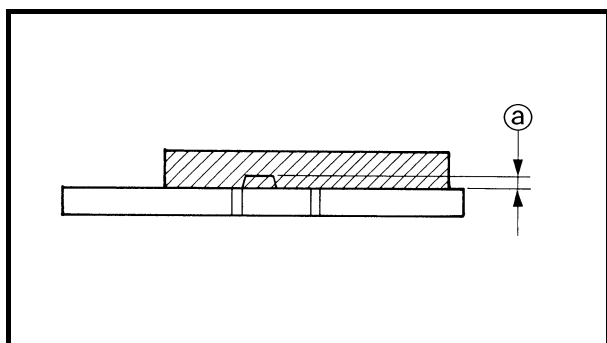
EBS00404

REPLACING THE FRONT BRAKE PADS

The following procedure applies to both of the front brake calipers.

NOTE:

It is not necessary to disassemble the brake calipers and brake hoses to replace the brake pads.



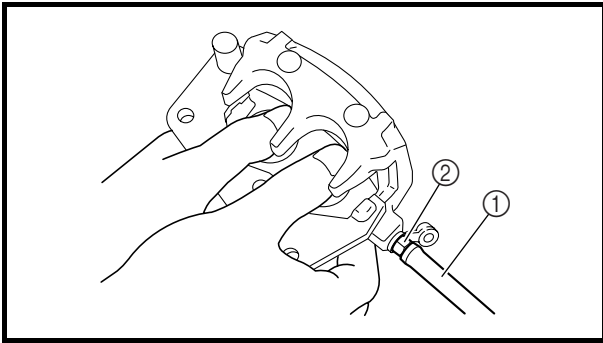
1. Remove:

- brake pads

@ Wear limit

NOTE:

Replace the brake pads as a set if either is found to be worn to the wear limit.



- Always install new brake pads and brake pad spring as a set.

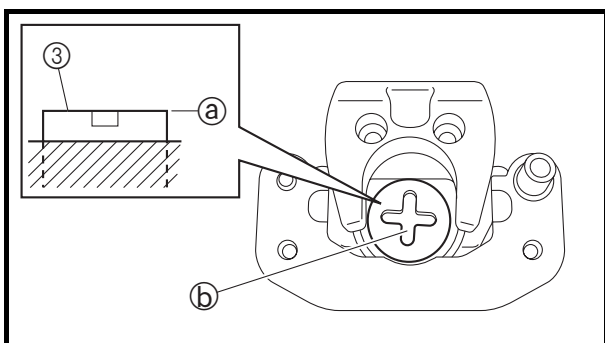
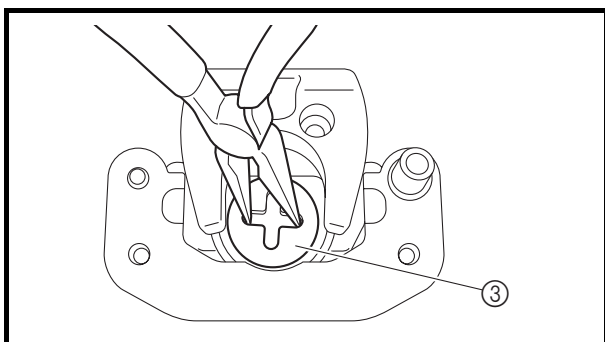
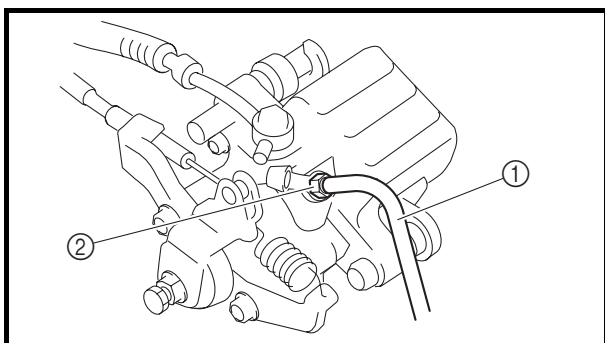
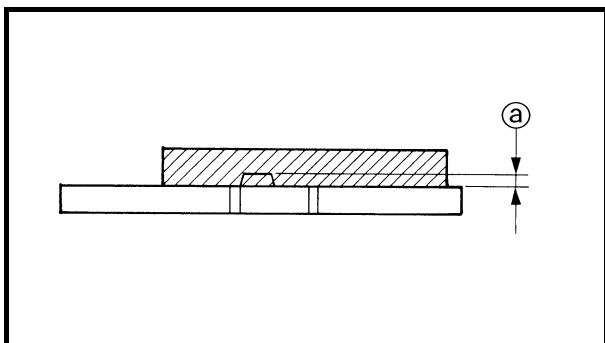
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EBS00405

REPLACING THE REAR BRAKE PADS

NOTE:

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



1. Remove:
 - brake pads

① wear limit

NOTE:

Replace the brake pads as a set if either is found to be worn to the wear limit.

- brake pads
- brake pad spring

NOTE:

Always install new brake pads, brake pad shim and brake pad spring as a set.

- a. Connect a suitable hose ① tightly to the brake caliper bleed screw ②. Put the other end of this hose into an open container.
- b. Loosen the brake caliper bleed screw, and then turn the brake caliper piston ③ clockwise until section ④ of the brake caliper piston is level with the surface of the brake caliper body.

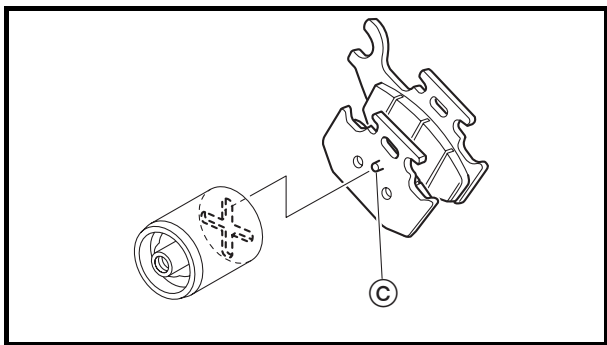
NOTE:

Align the recesses ⑥ in the brake caliper piston with the brake caliper body as shown in the illustration.

- c. Tighten the brake caliper bleed screw.



Brake caliper bleed screw
6 Nm (0.6 m · kg, 4.3 ft · lb)



- d. Install new brake pads, a new insulator, a new pad shim, a new pad spring, and the rear brake caliper.

NOTE:

Align the projection © on the piston side of the brake pad with the lower recess in the brake caliper piston.

- e. Install the retaining bolts and brake caliper.



Brake pad retaining bolt
17 Nm (1.7 m · kg, 12 ft · lb)
Brake caliper mounting bolt
34 Nm (3.4 m · kg, 24 ft · lb)

3. Check:

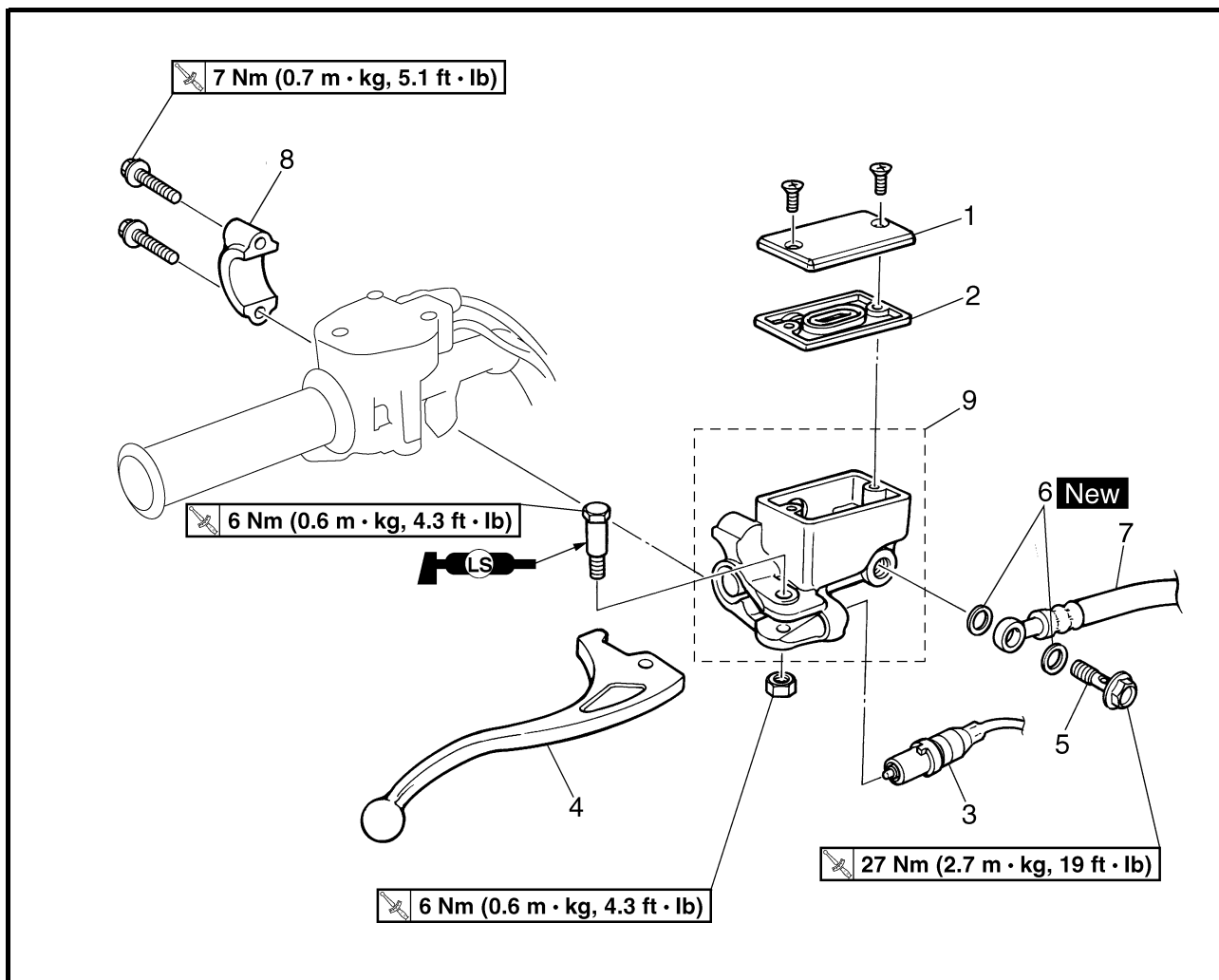
- brake fluid level
Refer to “CHECKING THE BRAKE FLUID LEVEL” in chapter 3.

4. Check:

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

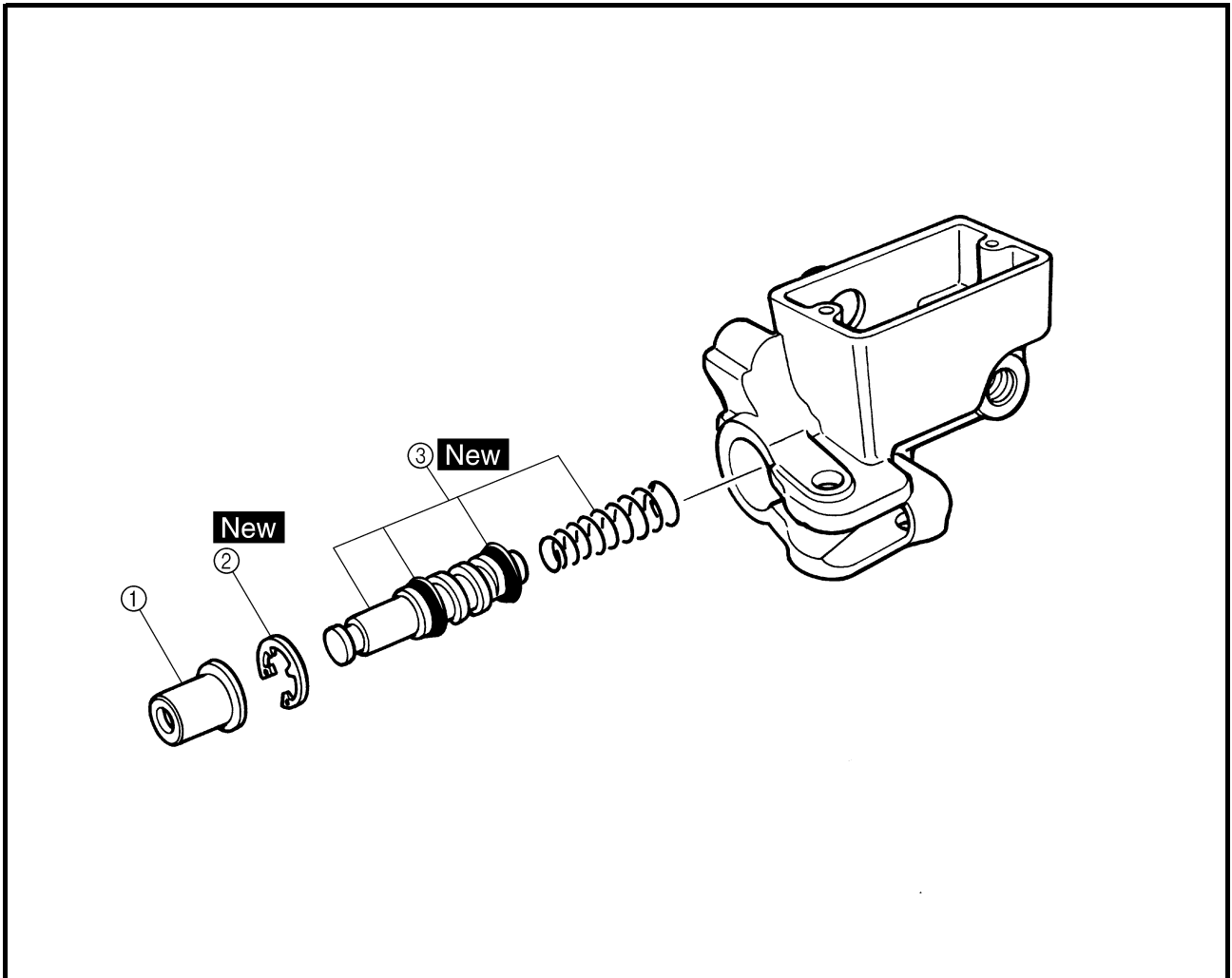
EBS00407

FRONT BRAKE MASTER CYLINDER



Order	Job/Part	Q'ty	Remarks
	Removing the front brake master cylinder		Remove the parts in the order listed.
	Brake fluid		Drain.
1	Brake fluid reservoir cap	1	
2	Brake fluid reservoir diaphragm	1	
3	Front brake light switch	1	
4	Brake lever	1	
5	Union bolt	1	
6	Copper washer	2	Disconnect. Refer to "INSTALLING THE FRONT BRAKE MASTER CYLINDER".
7	Brake hose	1	
8	Brake master cylinder bracket	1	
9	Brake master cylinder	1	For installation, reverse the removal procedure.

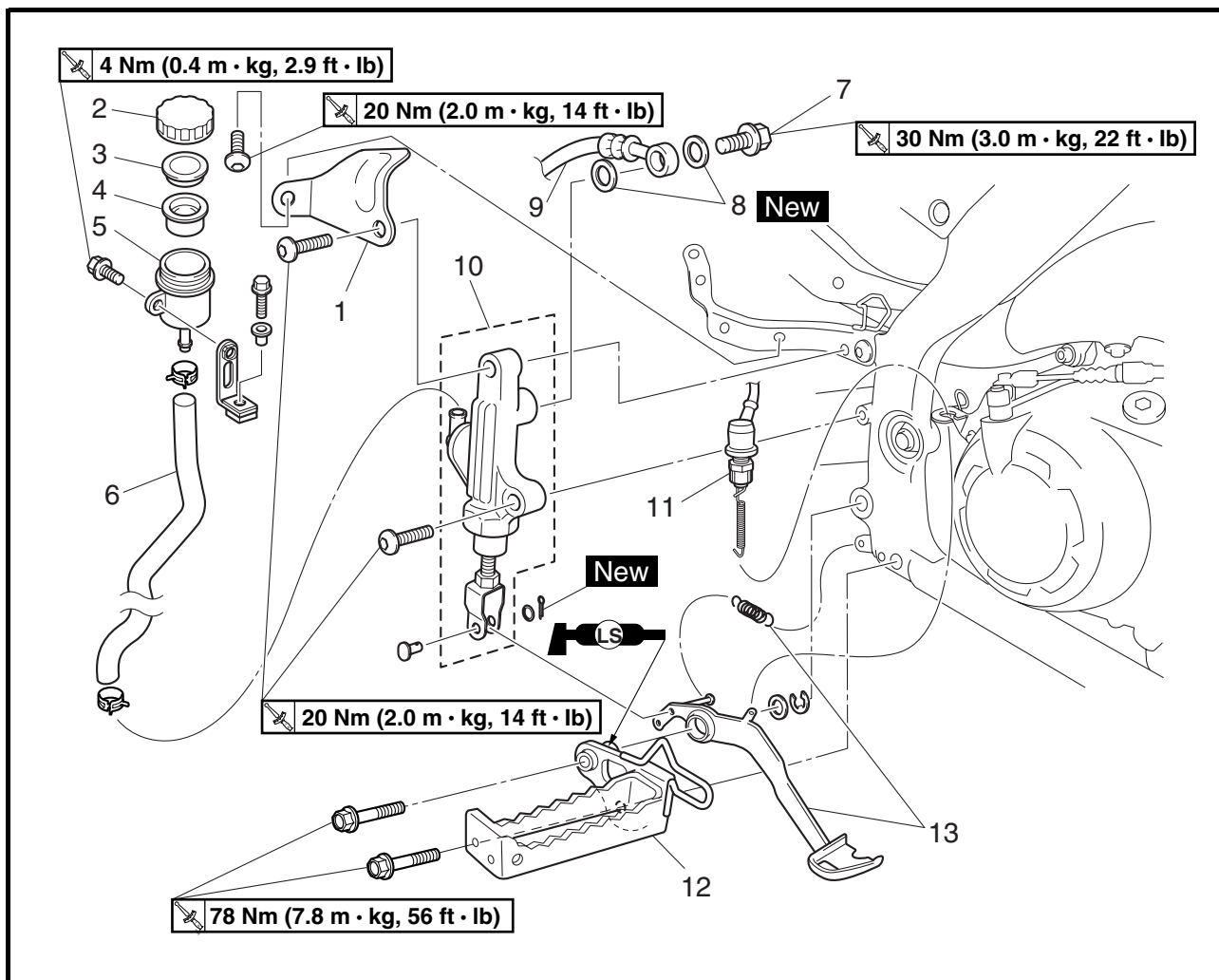
EBS00409



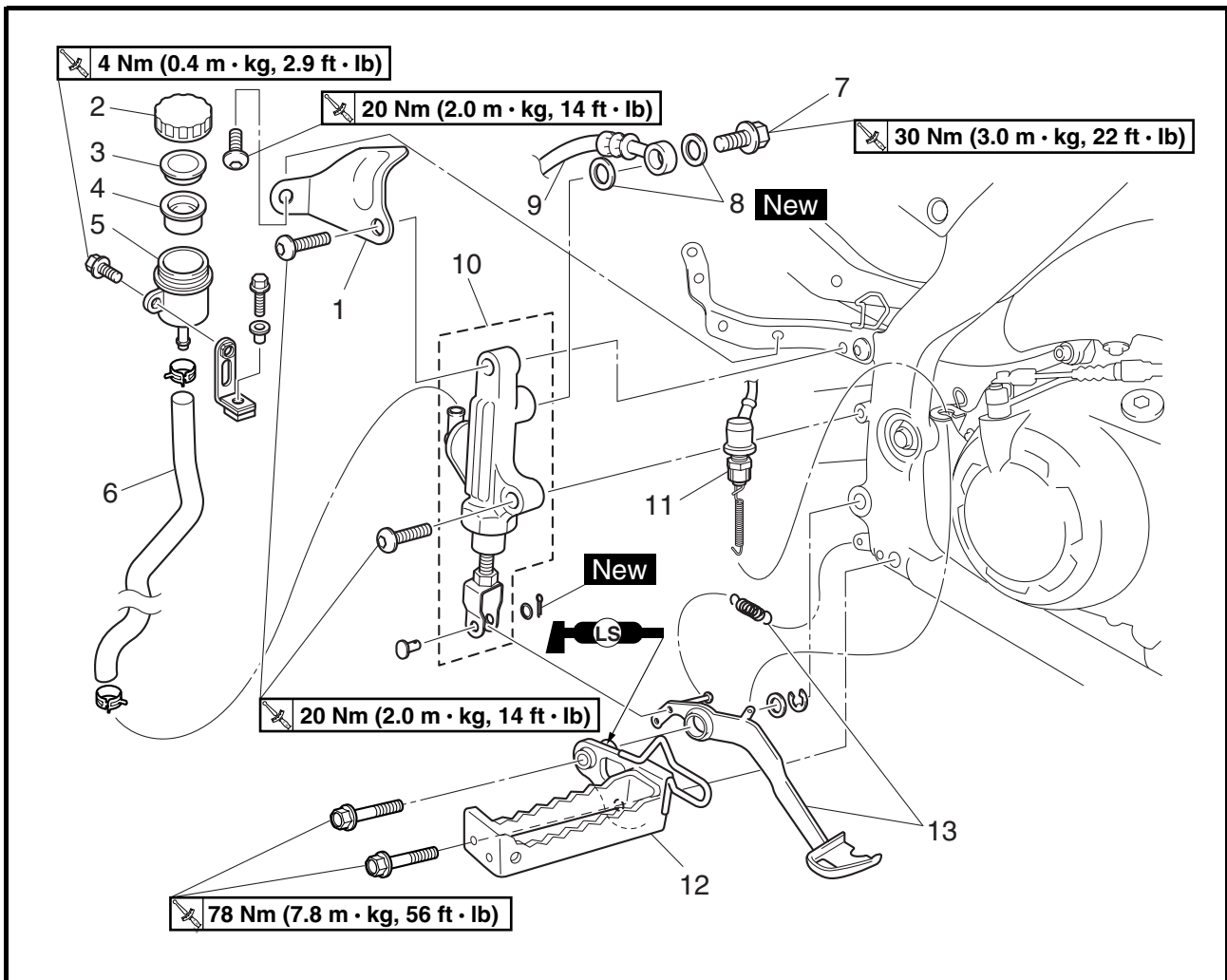
Order	Job/Part	Q'ty	Remarks
	Disassembling the front brake master cylinder		Remove the parts in the order listed.
①	Dust boot	1	Refer to "ASSEMBLING THE FRONT BRAKE MASTER CYLINDER".
②	Circlip	1	
③	Brake master cylinder kit	1	
			For assembly, reverse the disassembly procedure.

EBS00410

REAR BRAKE MASTER CYLINDER

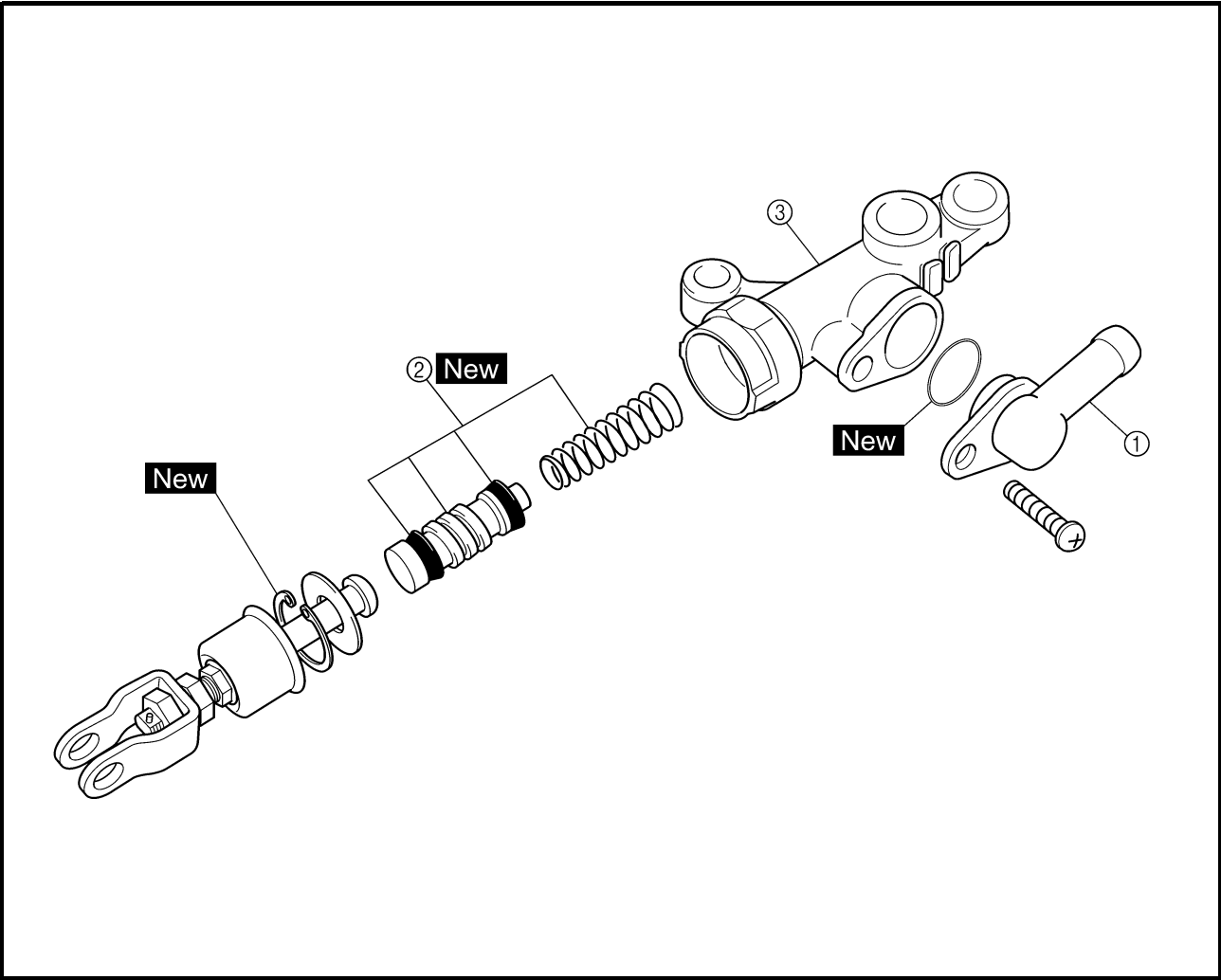


Order	Job/Part	Q'ty	Remarks
	Removing the rear brake master cylinder		Remove the parts in the order listed.
	Right foot protector		Refer to "SEAT, FENDERS AND FUEL TANK" in chapter 3.
	Brake fluid		Drain.
1	Brake fluid reservoir hose cover	1	
2	Brake fluid reservoir cap	1	
3	Brake fluid reservoir diaphragm holder	1	
4	Brake fluid reservoir diaphragm	1	
5	Brake fluid reservoir	1	
6	Brake fluid reservoir hose	1	

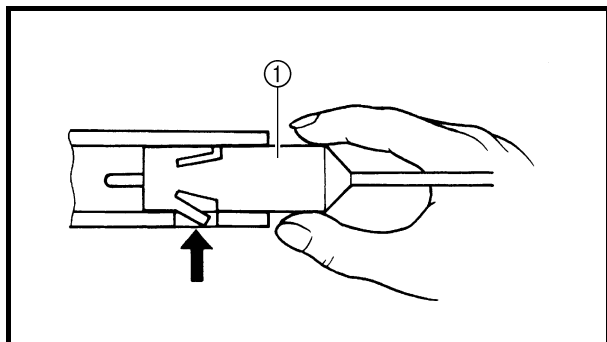


Order	Job/Part	Q'ty	Remarks
7	Union bolt	1	Disconnect. } Refer to "INSTALLING THE REAR BRAKE MASTER CYLINDER".
8	Copper washer	2	
9	Brake hose	1	
10	Brake master cylinder	1	
11	Rear brake light switch	1	
12	Right footrest	1	For installation, reverse the removal procedure.
13	Brake pedal/spring	1/1	

EBS00411



Order	Job/Part	Q'ty	Remarks
	Disassembling the rear brake master cylinder		Remove the parts in the order listed.
①	Hose joint	1	Refer to "ASSEMBLING THE REAR BRAKE MASTER CYLINDER". For assembly, reverse the disassembly procedure.
②	Brake master cylinder kit	1	
③	Brake master cylinder	1	



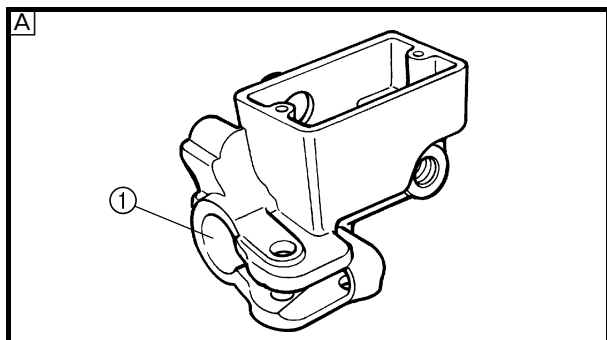
EBS00446

REMOVING THE FRONT BRAKE LIGHT SWITCH

1. Remove:
 - front brake light switch ①

NOTE:

Push the fastener when removing the front brake light switch out of the brake master cylinder.



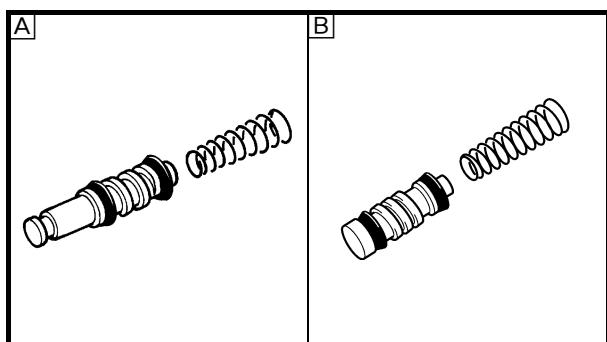
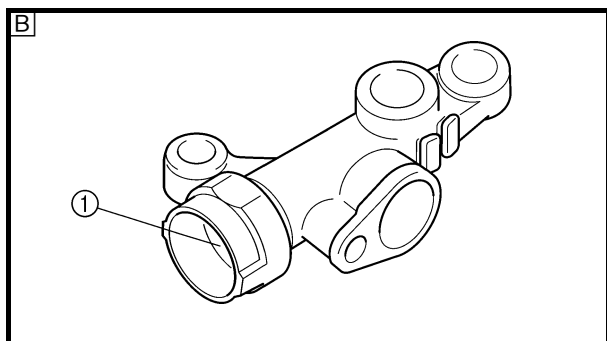
EBS00413

CHECKING THE MASTER CYLINDERS

1. Check:
 - 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

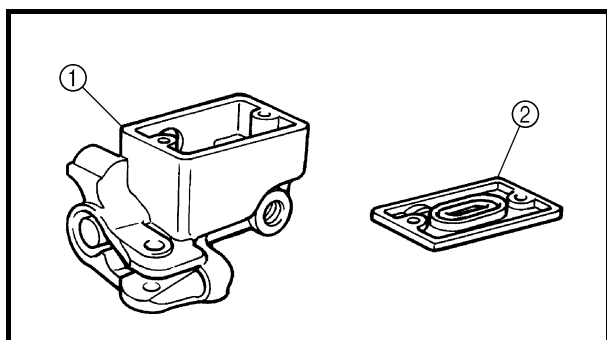


2. Check:

- brake master cylinder kit
Scratches/wear/damage → Replace as a set.

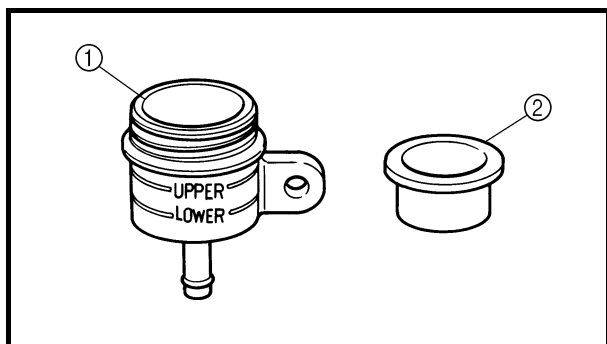
☐ A Front

☐ B Rear



3. Check:

- front brake master cylinder reservoir ①
- front brake master cylinder reservoir diaphragm ②
Cracks/damage → Replace.



4. Check:

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

EBS00415

ASSEMBLING THE FRONT BRAKE MASTER CYLINDER

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.

EBS00416

ASSEMBLING THE REAR BRAKE MASTER CYLINDER

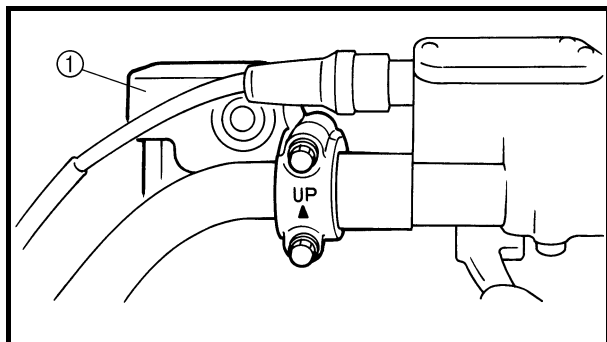
WARNING

- 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.



EBS00418

INSTALLING THE FRONT BRAKE MASTER CYLINDER

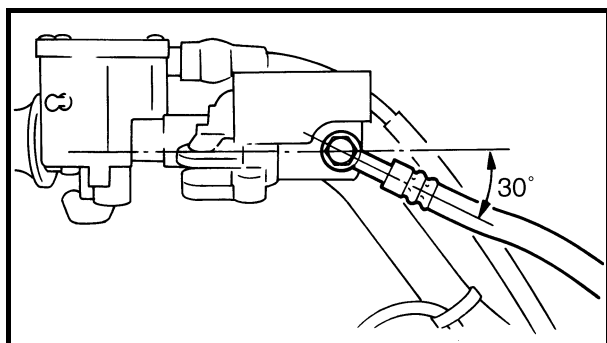
1. Install:

- 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.
- Install the brake master cylinder so that the gaps between the brake master cylinder and the brake master cylinder bracket are equal.



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 vehicle operation. Refer to “CABLE ROUTING” in chapter 2.

3. Fill:

- brake master cylinder 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 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

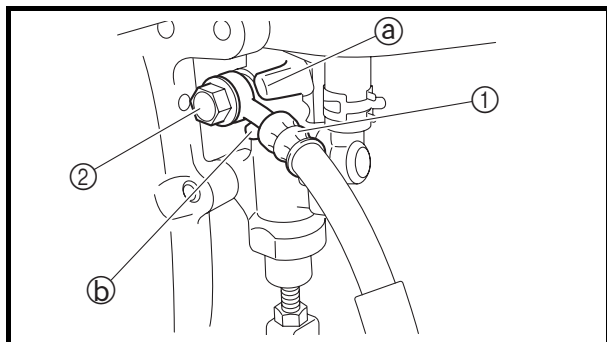
Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” in chapter 3.

5. Check:

- brake fluid level

Brake fluid level is under the “LOWER” level line → Add the recommended brake fluid to the proper level.

Refer to “CHECKING THE BRAKE FLUID LEVEL” in chapter 3.



EBS00419

INSTALLING THE REAR BRAKE MASTER CYLINDER

1. Install:

- copper washers **New**
- brake hose ①
- union bolt ②  30 Nm (3.0 m · kg, 22 ft · lb)

CAUTION:

When installing the brake hose onto the brake master cylinder, make sure the brake hose is installed between the stoppers ① and ② on brake master cylinder as shown.

WARNING

Proper brake hose routing is essential to insure safe vehicle operation. Refer to “CABLE ROUTING” in chapter 2.

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 “BLEEDING THE HYDRAULIC BRAKE SYSTEM” in chapter 3.

4. Check:

- brake fluid level

Brake fluid level is under the “LOWER” level line → Add the recommended brake fluid to the proper level.

Refer to “CHECKING THE BRAKE FLUID LEVEL” in chapter 3.

- brake pedal height

Out of specification → Adjust.

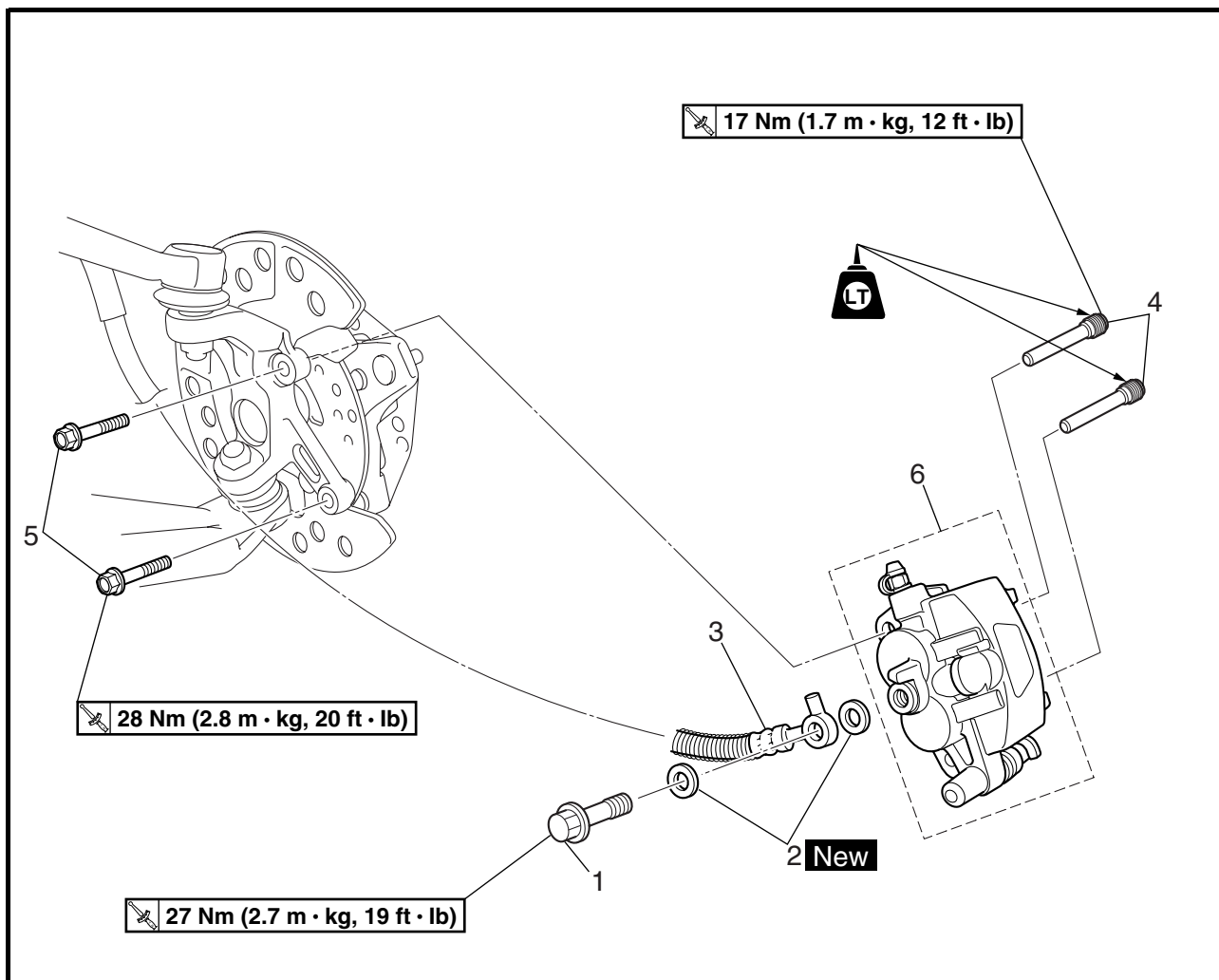


Brake pedal height
15.3 mm (0.60 in)

Refer to “ADJUSTING THE REAR BRAKE” in chapter 3.

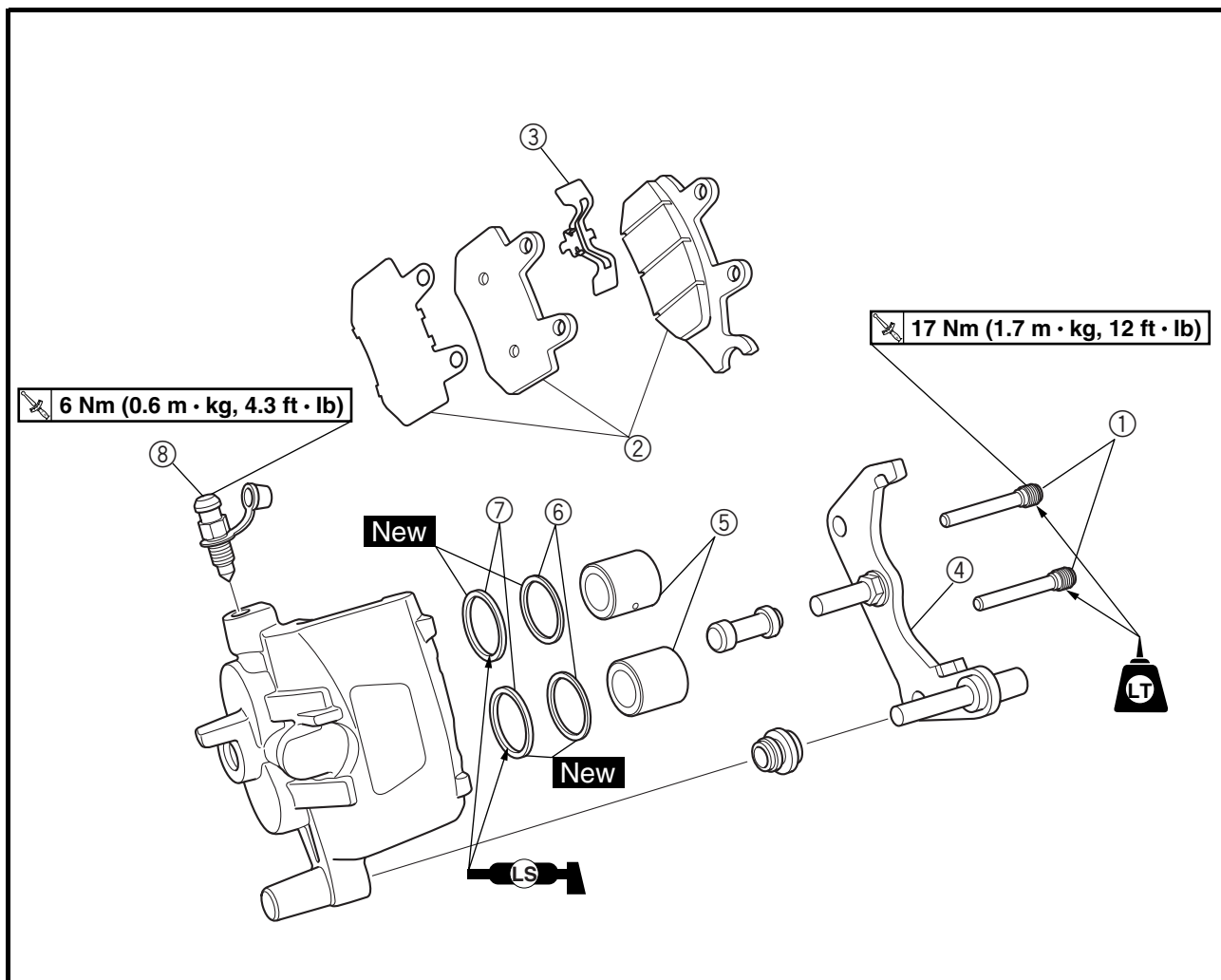
EBS00421

FRONT BRAKE CALIPERS



Order	Job/Part	Q'ty	Remarks
	Removing the front brake calipers		Remove the parts in the order listed. The following procedure applies to both of the front brake calipers.
	Brake fluid		Drain.
	Front wheel		Refer to "FRONT AND REAR WHEELS".
1	Union bolt	1	Disconnect. } Loosen. } Refer to "INSTALLING THE FRONT BRAKE CALIPERS".
2	Copper washer	2	
3	Brake hose	1	
4	Brake pad retaining bolt	2	
5	Brake caliper mounting bolt	2	
6	Brake caliper assembly	1	For installation, reverse the removal procedure.

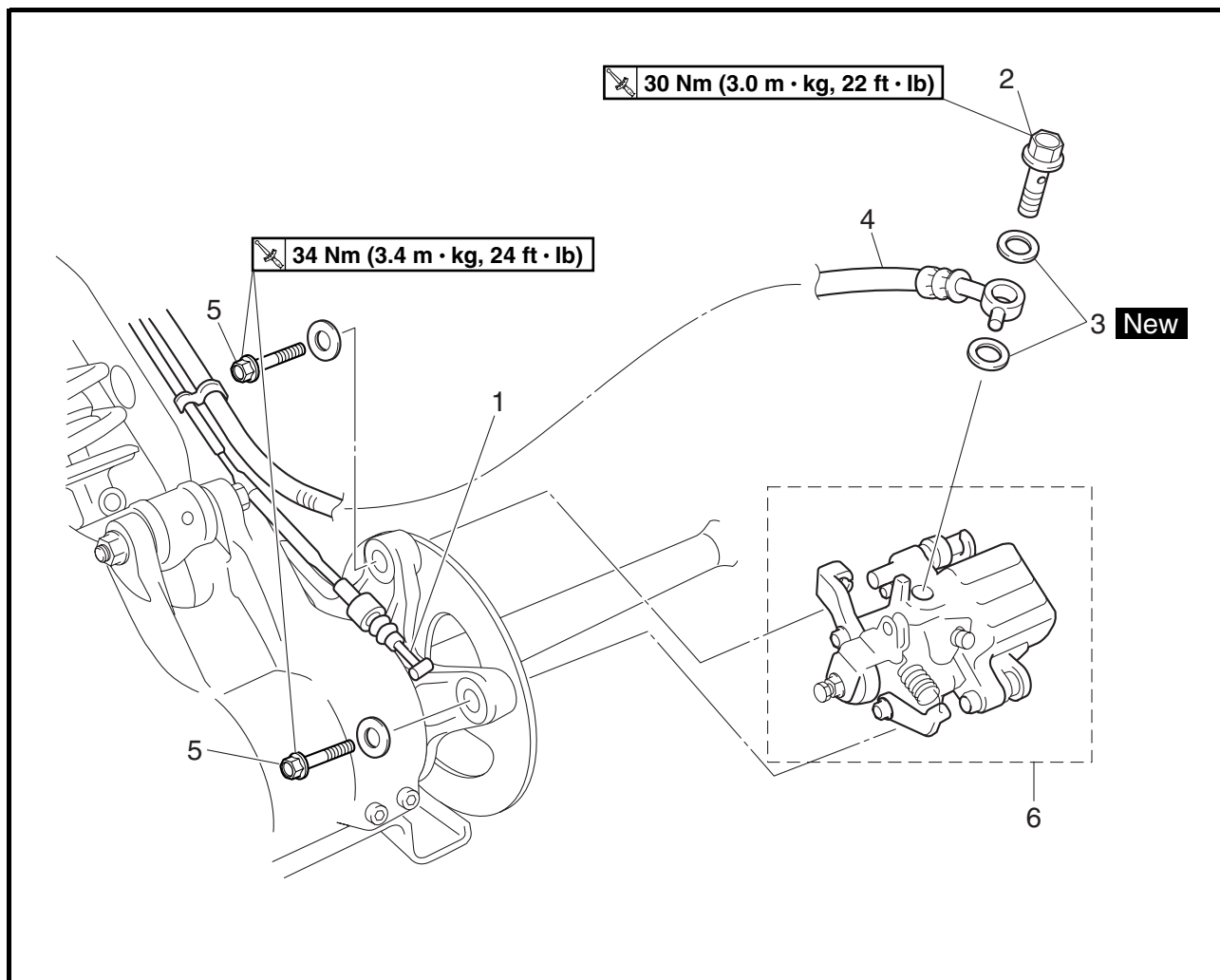
EBS00423



Order	Job/Part	Q'ty	Remarks
	Disassembling the front brake calipers		Remove the parts in the order listed. The following procedure applies to both of the front brake calipers.
①	Brake pad retaining bolt	2	Refer to "DISASSEMBLING THE FRONT BRAKE CALIPERS" and "ASSEMBLING THE FRONT BRAKE CALIPERS".
②	Brake pad/pad shim	2/1	
③	Brake pad spring	1	
④	Caliper bracket	1	
⑤	Caliper piston	2	
⑥	Dust seal	2	
⑦	Caliper piston seal	2	For assembly, reverse the disassembly procedure.
⑧	Bleed screw	1	

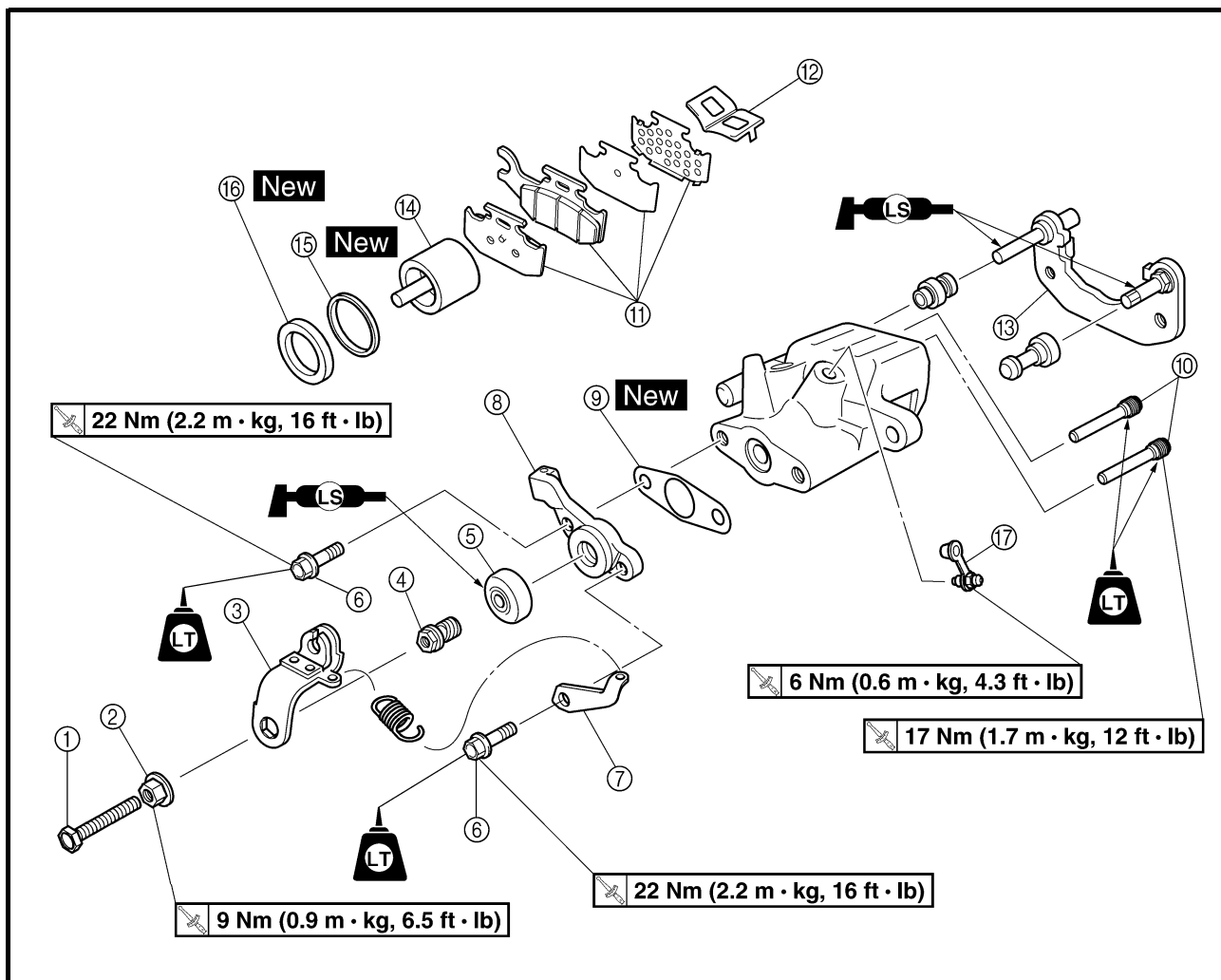
EBS00424

REAR BRAKE CALIPER

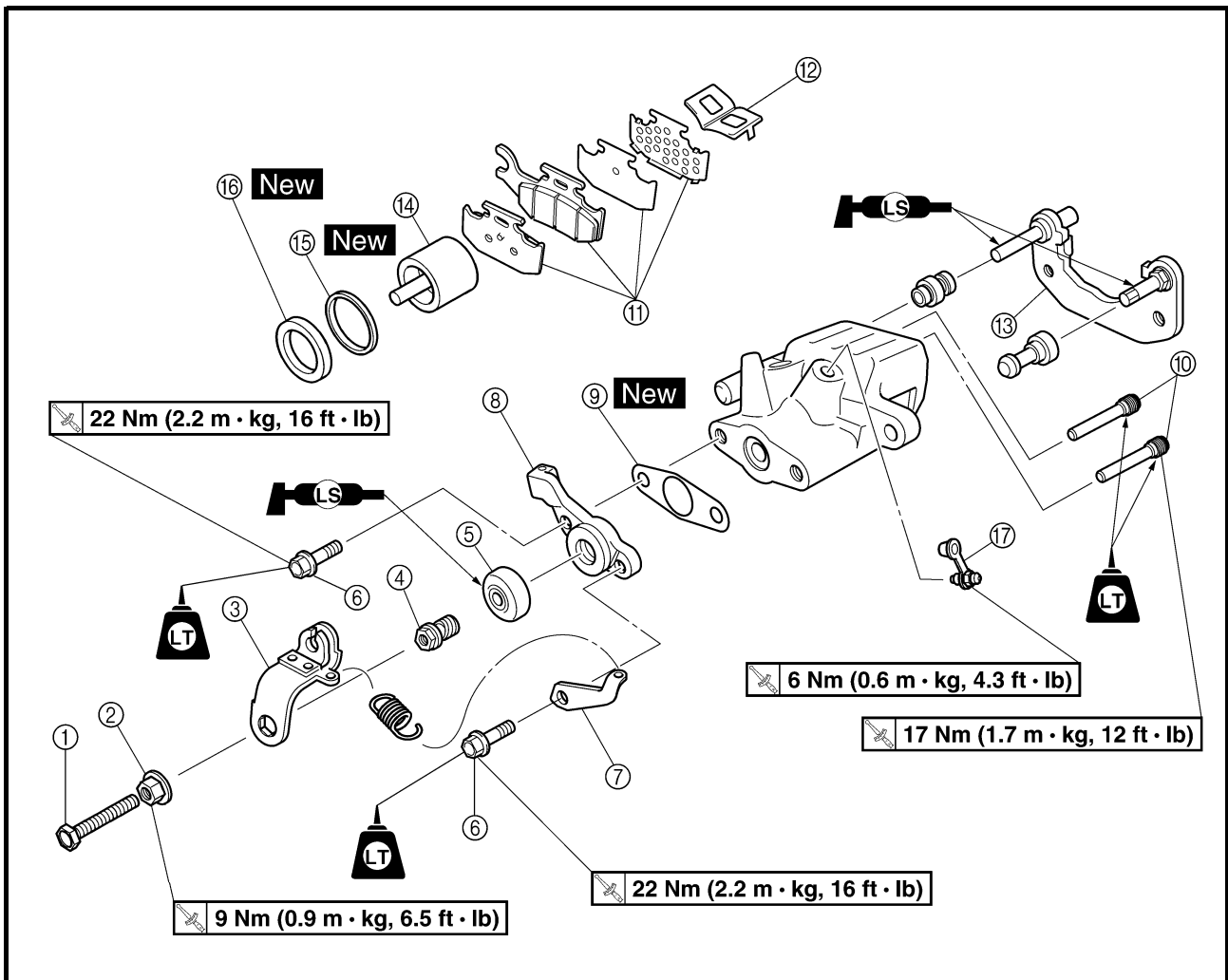


Order	Job/Part	Q'ty	Remarks
	Removing the rear brake caliper		Remove the parts in the order listed.
	Brake fluid		Drain.
1	Parking brake cable	1	Disconnect.
2	Union bolt	1	Disconnect. } Refer to "INSTALLING THE REAR BRAKE CALI- PER".
3	Copper washer	2	
4	Brake hose	1	
5	Brake caliper mounting bolt	2	
6	Brake caliper assembly	1	For installation, reverse the removal procedure.

EBS00425



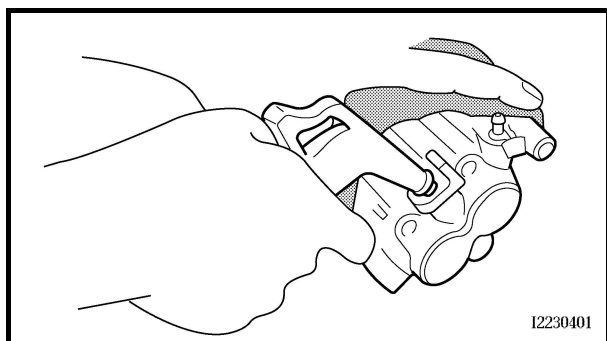
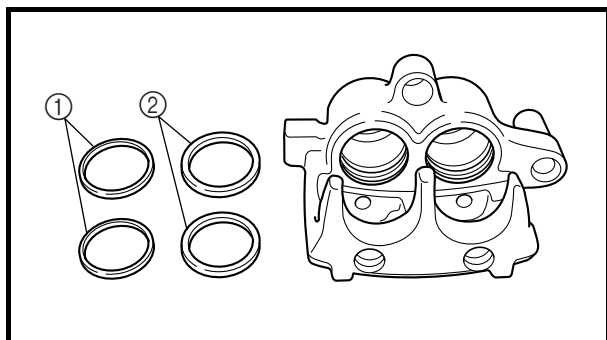
Order	Job/Part	Q'ty	Remarks
	Disassembling the rear brake caliper		Remove the parts in the order listed.
①	Adjusting bolt	1	Refer to "ASSEMBLING THE REAR BRAKE CALIPER".
②	Locknut	1	
③	Parking brake arm	1	
④	Parking brake shaft	1	
⑤	Rubber boot	1	
⑥	Parking brake bracket mounting bolt	1	
⑦	Parking brake case bracket	1	
⑧	Parking brake case	1	
⑨	Gasket	1	
⑩	Brake pad retaining bolt	2	
⑪	Brake pad/insulator/pad shim	2/1/1	
⑫	Brake pad spring	1	
⑬	Caliper bracket	1	



Order	Job/Part	Q'ty	Remarks
⑭	Brake caliper piston	1	Refer to "DISASSEMBLING THE REAR BRAKE CALIPER" and "ASSEMBLING THE REAR BRAKE CALIPER".
⑮	Dust seal	1	
⑯	Caliper piston seal	1	
⑰	Bleed screw	1	
			For assembly, reverse the disassembly procedure.

NOTE:

If the rear brake caliper cannot be removed easily, first remove the brake pad, next remove the caliper.



DISASSEMBLING THE FRONT BRAKE CALIPERS

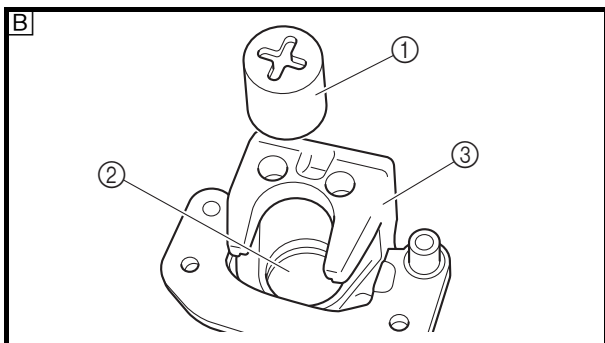
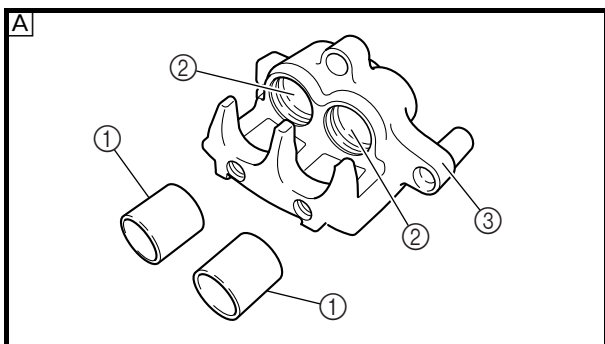
1. Remove:
 - brake caliper pistons
 - dust seals ①
 - caliper piston seals ②

- a. 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 caliper cylinder.**

- b. Remove the dust seals and the caliper piston seals.



1. Check:

- brake caliper pistons ①
Scratches/rust/wear → Replace the brake caliper assembly.
- brake caliper cylinders 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 seals and dust seals whenever the brake caliper is disassembled.

A Front

B Rear

EBS00431

ASSEMBLING THE FRONT BRAKE CALIPERS

The following procedure applies to both of the front brake calipers.

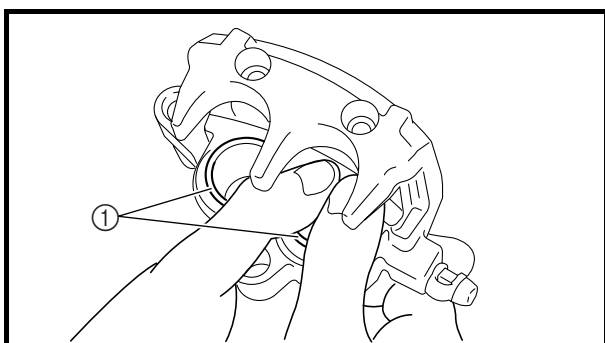
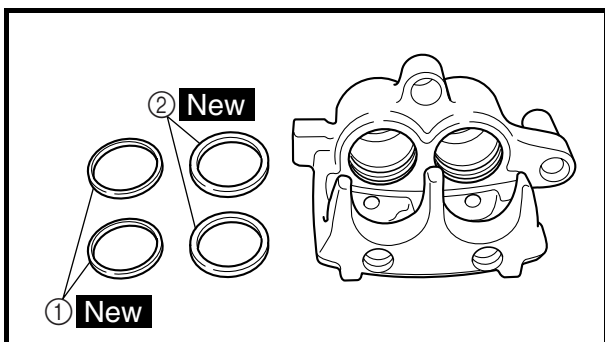
⚠ WARNING

- 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 seals whenever a brake caliper is disassembled.



1. Install:

- caliper piston seals ① **New**
- dust seals ② **New**

2. Install:

- brake caliper pistons ①

EBS00432

ASSEMBLING THE REAR BRAKE CALIPER

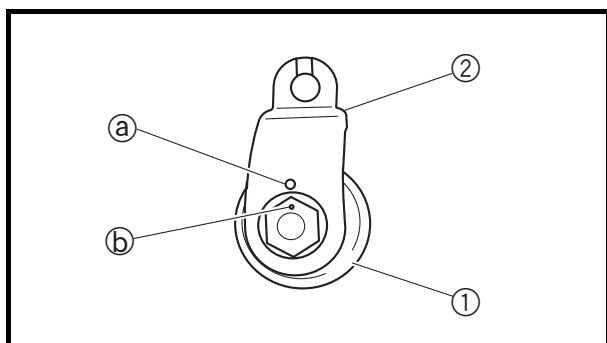
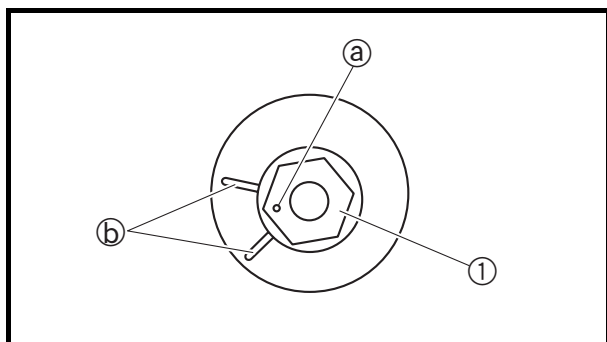
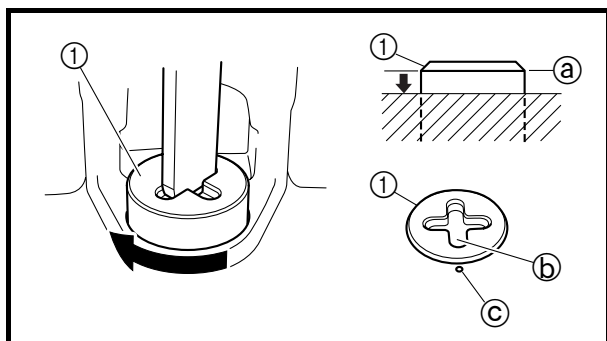
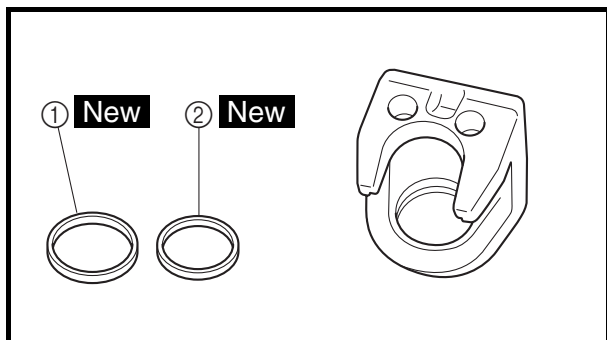
WARNING

- 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 and dust seal whenever a brake caliper is disassembled.



1. Install:

- caliper piston seal ① **New**
- dust seal ② **New**

2. Install:

- brake caliper piston ①
Turn the brake caliper piston clockwise until section (a) of the brake caliper piston is level with the surface of the brake caliper body.

NOTE:

Align an end (b) of the groove in the brake caliper piston with the punch mark (c) on the brake caliper body.

3. Install:

- parking brake shaft ①

NOTE:

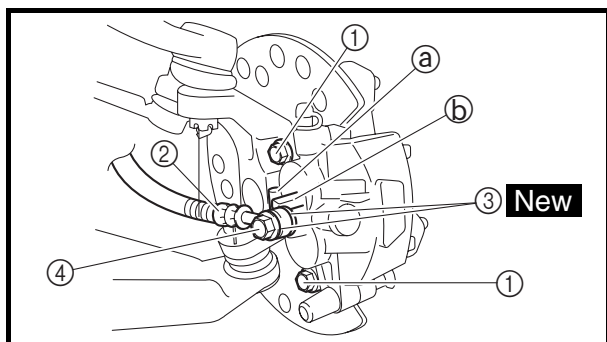
When installing the parking brake shaft, the punch mark (a) should be between the marks (b) with the parking brake shaft fully turned in.

4. Install:

- rubber boot ①
- parking brake arm ②

NOTE:

When installing the parking brake arm, turn the parking brake shaft clockwise and align the punch mark (a) on the parking brake arm with the punch mark (b) on the parking brake shaft.



EBS00434

INSTALLING THE FRONT BRAKE CALIPERS

The following procedure applies to both of the front brake calipers.

1. Install:

- brake caliper assembly
- brake caliper mounting bolts ①

 **28 Nm (2.8 m · kg, 20 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 ① touches the projection ② on the brake caliper.

WARNING

Proper brake hose routing is essential to insure safe vehicle operation. Refer to “CABLE ROUTING” in chapter 2.

2. Fill:

- brake master cylinder reservoir



**Recommended brake fluid
DOT 4**

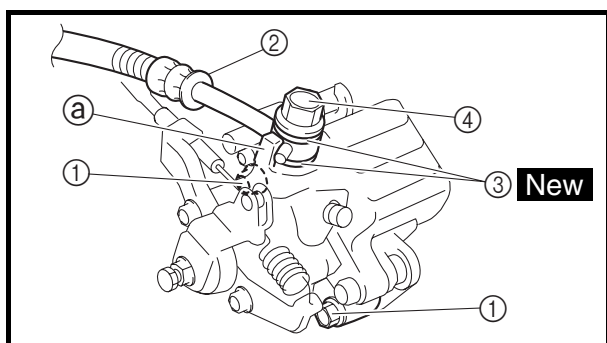
CAUTION:

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 “BLEEDING THE HYDRAULIC BRAKE SYSTEM” in chapter 3.
4. Check:
 - brake fluid level
Brake fluid level is below the “LOWER” level line → Add the recommended brake fluid to the proper level.
Refer to “CHECKING THE BRAKE FLUID LEVEL” in chapter 3.



EBS00436

INSTALLING THE REAR BRAKE CALIPER

1. Install:
 - brake caliper assembly
 - brake caliper mounting bolts ①
 - brake hose ②
 - copper washers ③ **New**
 - union bolt ④

 **34 Nm (3.4 m · kg, 24 ft · lb)**

 **30 Nm (3.0 m · kg, 22 ft · lb)**

CAUTION:

When installing the brake hose on the brake caliper, make sure that the brake pipe touches the projection ③ on the brake caliper.

⚠ WARNING

Proper brake hose routing is essential to insure safe vehicle operation. Refer to “CABLE ROUTING” in chapter 2.

2. Fill:
 - brake fluid reservoir



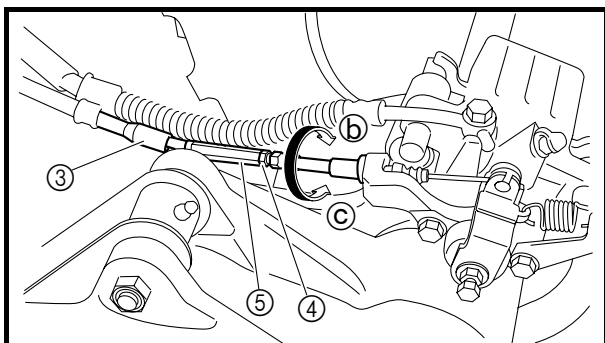
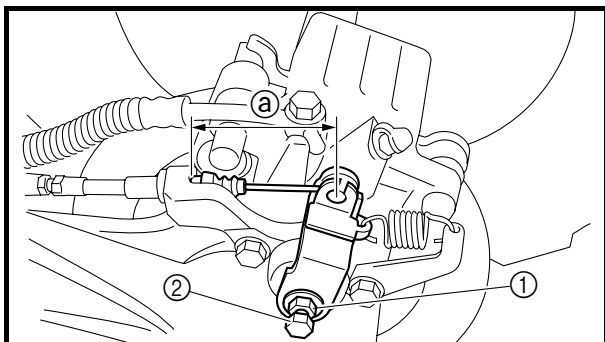
CAUTION:

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 “BLEEDING THE HYDRAULIC BRAKE SYSTEM” in chapter 3.
4. Check:
 - brake fluid level
Brake fluid level is below the “LOWER” level line → Add the recommended brake fluid to the proper level.
Refer to “CHECKING THE BRAKE FLUID LEVEL” in chapter 3.



5. Adjust:
- parking brake cable end length (a)



- Loosen the locknut (1) and adjusting bolt (2).
- Slide back the rubber cover (3).
- Loosen the locknut (4).
- Turn the adjusting nut (5) in direction (b) or (c) until the specified brake cable end length (a) is obtained.



Parking brake cable end length
58 ~ 60 mm (2.28 ~ 2.36 in)

- Tighten the locknut (4).
- Slowly turn the adjusting bolt (2) clockwise until resistance is felt.
- Tighten the locknut (1).



Locknut
9 Nm (0.9 m · kg, 6.5 ft · lb)

- Set the parking brake lever and wait more than 5 minutes.
- Release the parking brake lever.
- Repeat step (a) to (g).
- Slide the rubber cover to its original position.



WARNING

After this adjustment is performed, lift the 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.

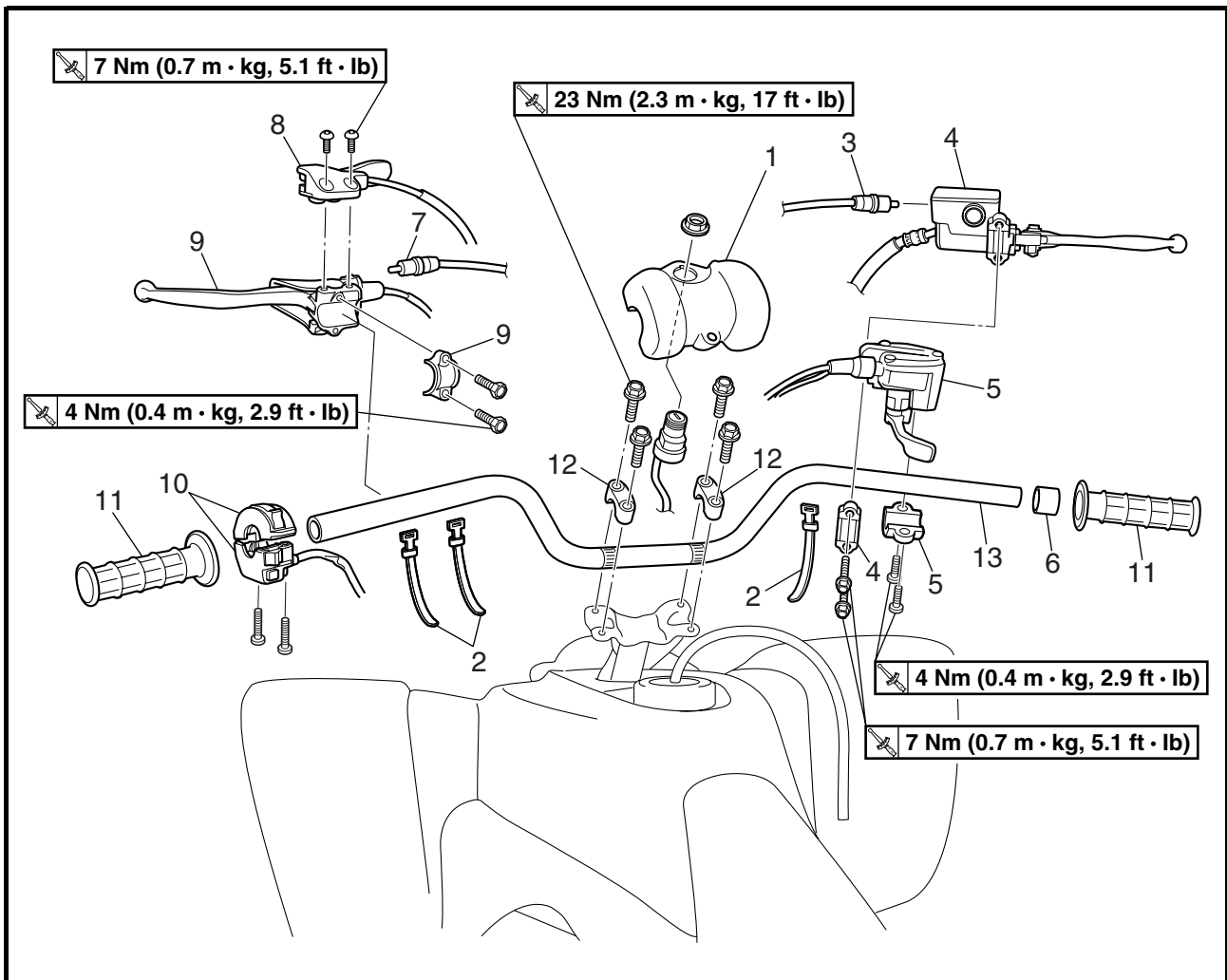




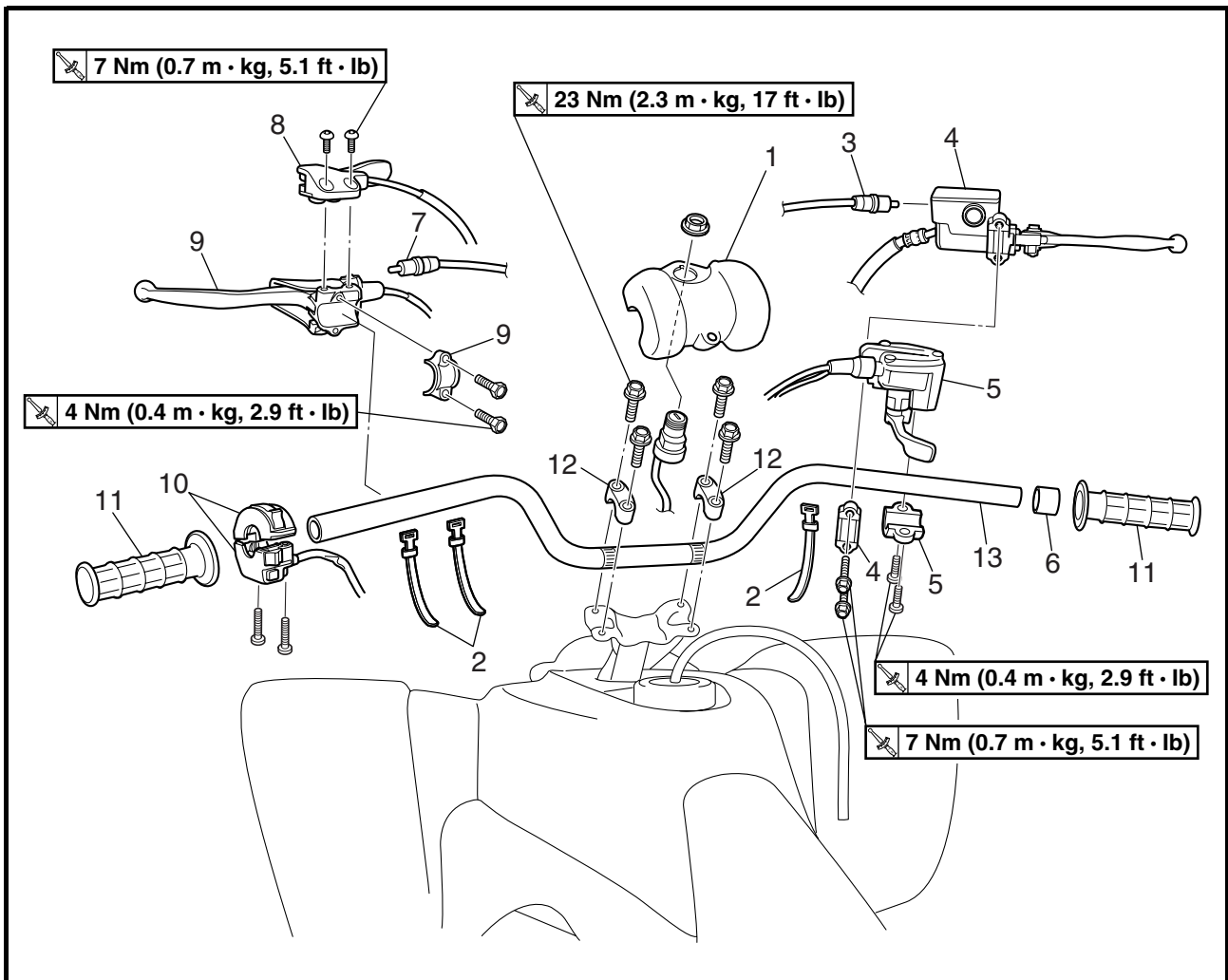
EBS00444

STEERING SYSTEM

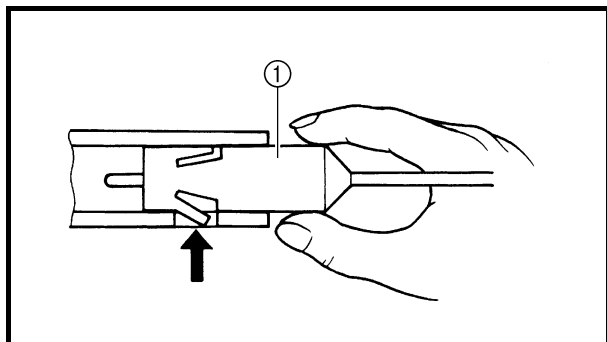
HANDLEBAR



Order	Job/Part	Q'ty	Remarks
	Removing the handlebar		Remove the parts in the order listed.
1	Handlebar cover	1	
2	Plastic band	3	
3	Front brake light switch	1	Refer to "REMOVING THE FRONT BRAKE LIGHT SWITCH AND CLUTCH SWITCH".
4	Brake master cylinder/holder	1/1	Refer to "INSTALLING THE BRAKE MASTER CYLINDER".
5	Throttle lever assembly/holder	1/1	
6	Spacer	1	
7	Clutch switch	1	Refer to "REMOVING THE FRONT BRAKE LIGHT SWITCH AND CLUTCH SWITCH".
8	Parking brake lever	1	
9	Clutch lever/bracket	1/1	Refer to "INSTALLING THE CLUTCH LEVER".
10	Handlebar switch	1	



Order	Job/Part	Q'ty	Remarks
11	Handlebar grip	2	Refer to "REMOVING THE HANDLEBAR GRIPS" and "INSTALLING THE HANDLEBAR GRIPS".
12	Handlebar holder	2	
13	Handlebar	1	
			For installation, reverse the removal procedure.



EBS00446

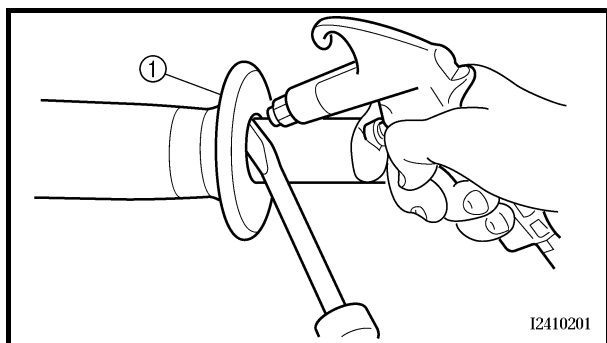
REMOVING THE FRONT BRAKE LIGHT SWITCH AND CLUTCH SWITCH

1. Remove:

- front brake light switch ①
- clutch switch

NOTE:

- Push the fastener when removing the front brake light switch out of the brake master cylinder.
- Push the fastener when removing the clutch switch out of the clutch lever holder.



EBS00447

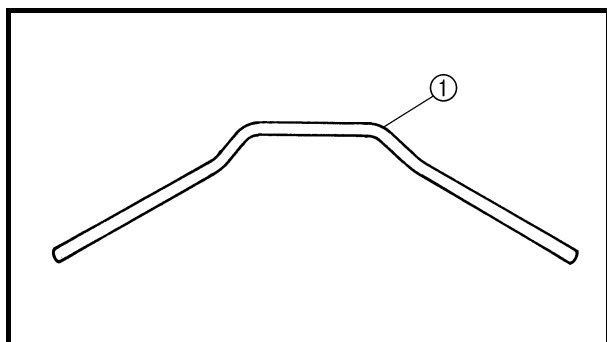
REMOVING THE HANDLEBAR GRIPS

1. Remove:

- handlebar grips ①

NOTE:

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



EBS00448

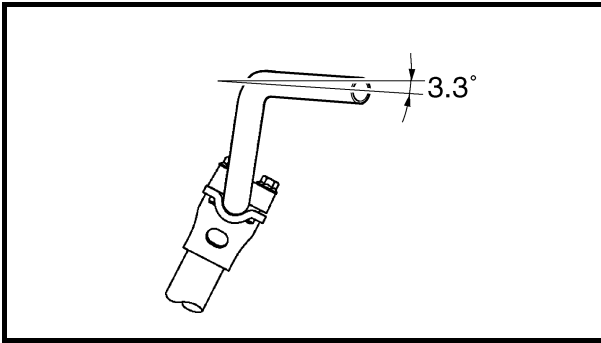
CHECKING THE HANDLEBAR

1. Check:

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

⚠ WARNING

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



EBS00449

INSTALLING THE HANDLEBAR

1. Install:

- handlebar
- handlebar holders

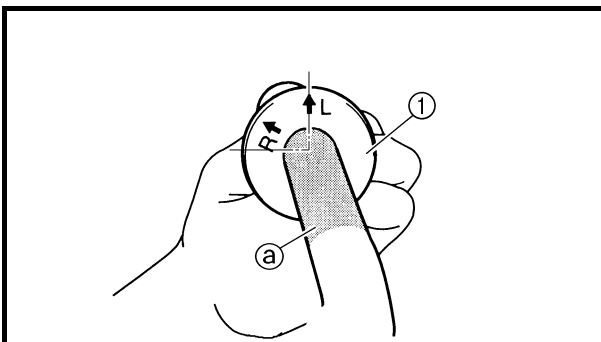
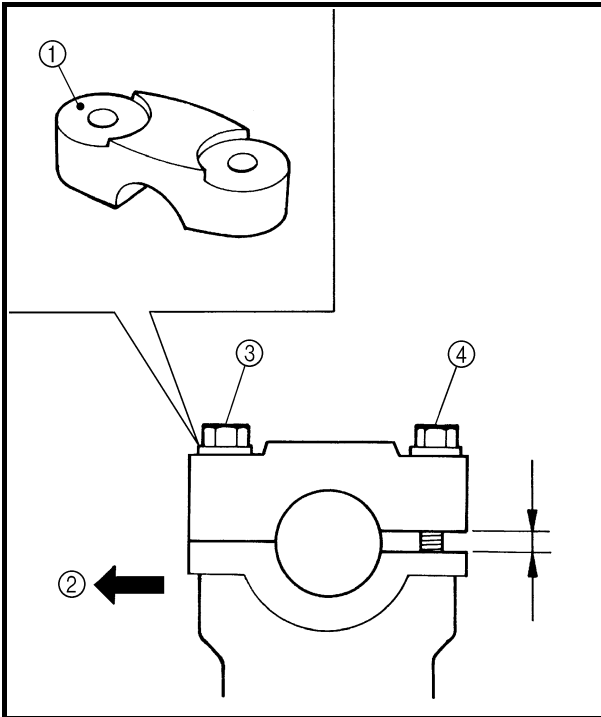
23 Nm (2.3 m · kg, 17 ft · lb)

NOTE:

- Install the handlebar within 3.3° from the horizontal line shown in the illustration.
- The upper handlebar holders should be installed with the punched mark ① forward ②.

CAUTION:

First tighten the bolt ③ on the front side of the handlebar holder, and then tighten the bolt ④ on the rear side.



EBS00450

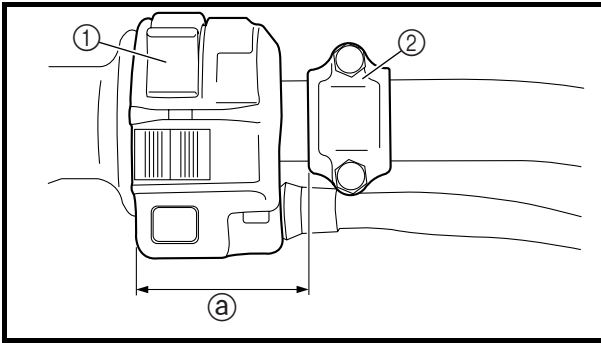
INSTALLING THE HANDLEBAR GRIPS

1. Install:

- handlebar grips ①

NOTE:

- Before applying the adhesive, wipe off grease or oil on the handlebar surface ① with a lacquer thinner.
- Install the handlebar grips to the handlebar so that the arrow marks faces straight upward.



EBS00452

INSTALLING THE CLUTCH LEVER

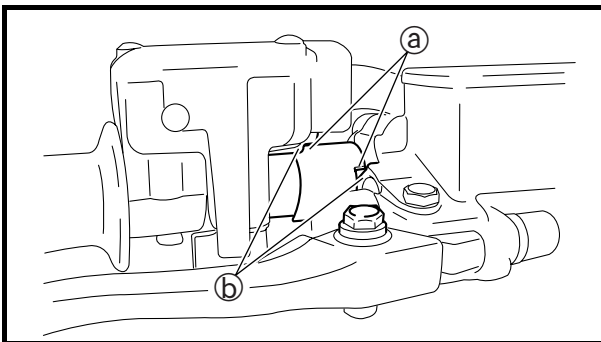
1. Install:

- handlebar switch ①
- clutch lever
- clutch lever bracket ②

NOTE:

Install the clutch lever bracket as shown.

② 53 ~ 54 mm (2.09 ~ 2.13 in)



EBS00453

INSTALLING THE BRAKE MASTER CYLINDER

1. Install:

- brake master cylinder

7 Nm (0.7 m · kg, 5.1 ft · lb)

- spacer
- throttle lever assembly

4 Nm (0.4 m · kg, 2.9 ft · lb)

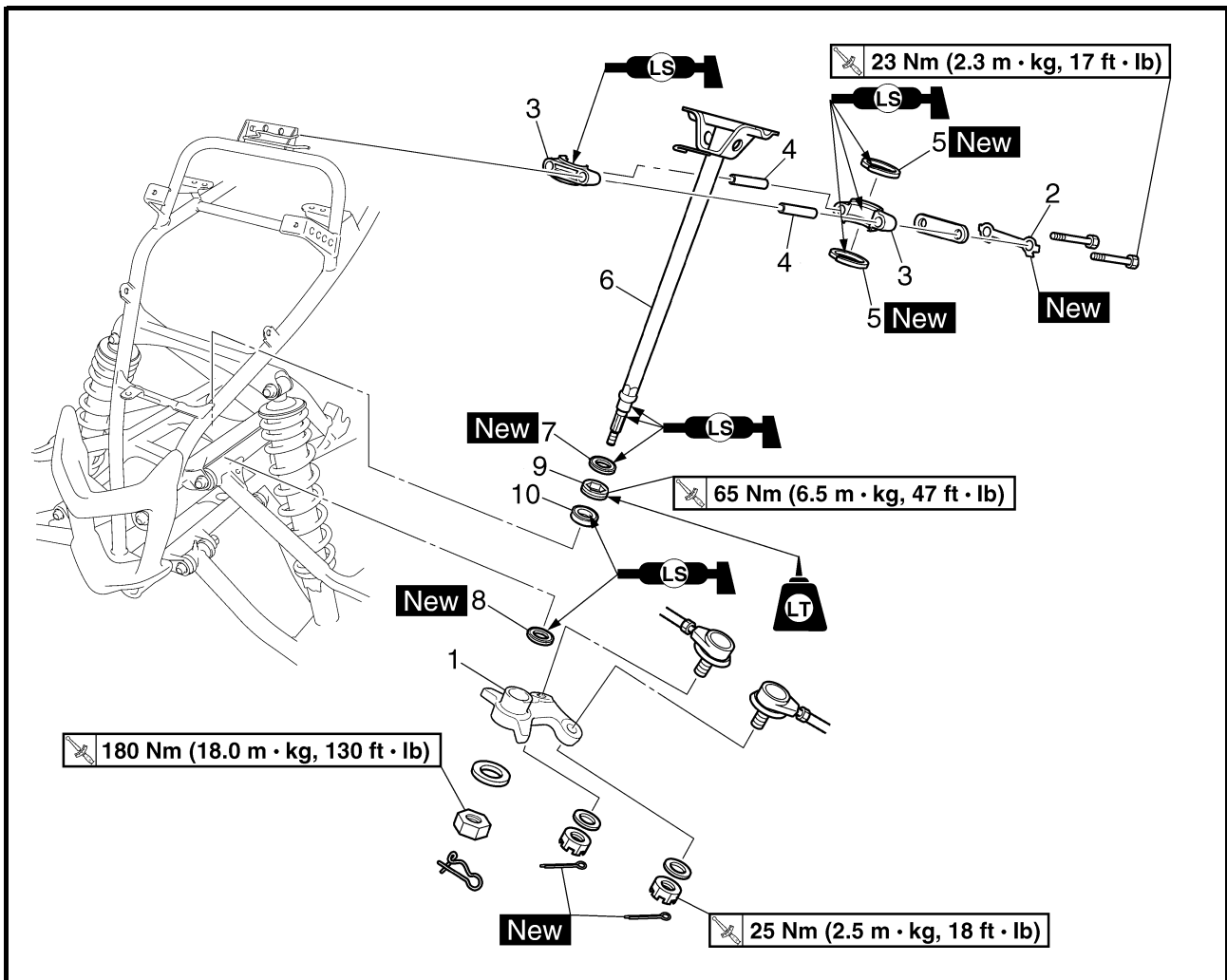
NOTE:

- The “UP” mark on the brake master cylinder bracket should face up.
- Engage the indentations ② in the spacer with the lobes ③ on the throttle lever assembly and brake master cylinder.

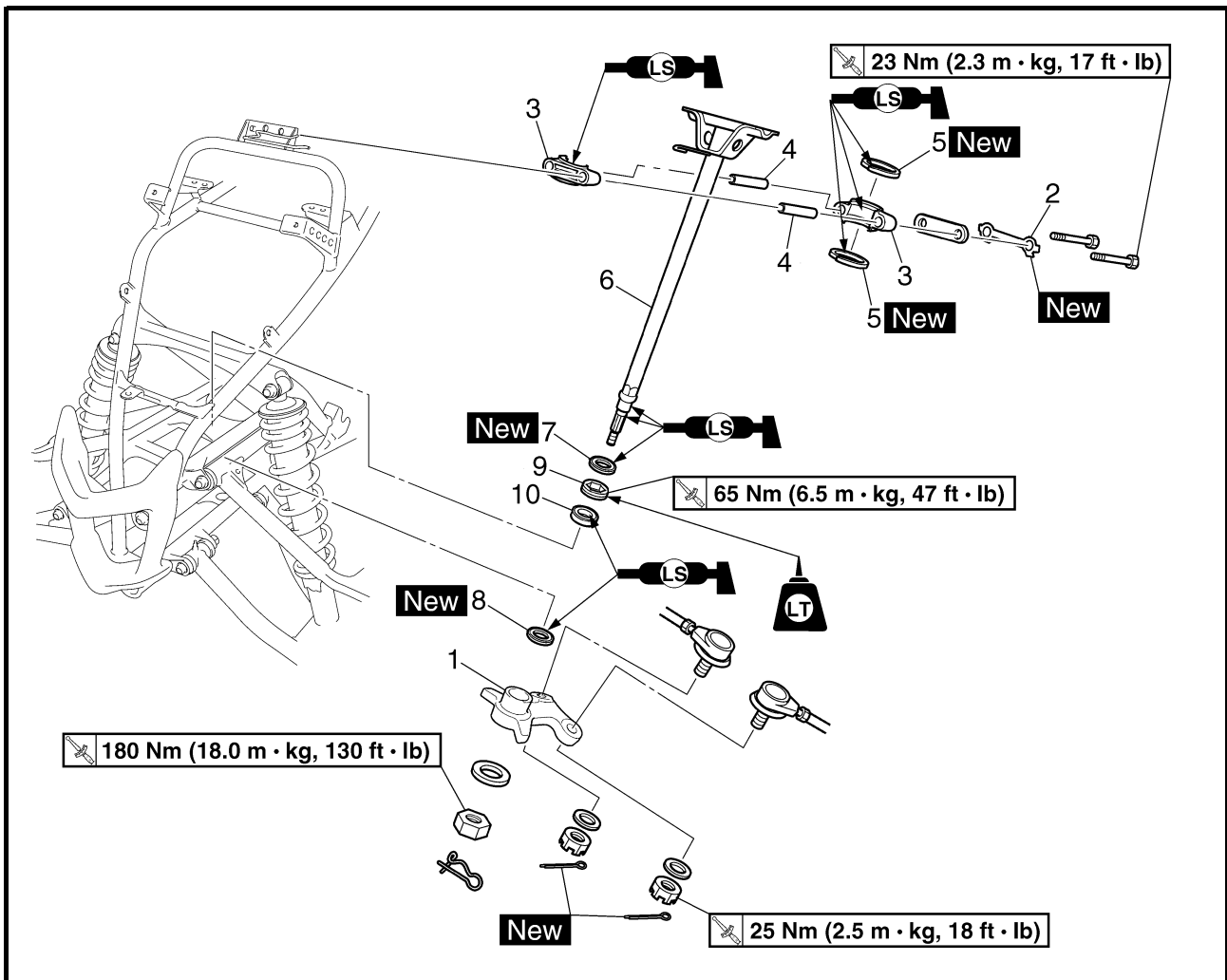


EBS00454

STEERING STEM



Order	Job/Part	Q'ty	Remarks
	Removing the steering stem		
	Front fender/fuel tank		Remove the parts in the order listed. Refer to "SEAT, FENDERS AND FUEL TANK" in chapter 3.
1	Pitman arm	1	Refer to "INSTALLING THE PITMAN ARM".
2	Lock washer	1	Refer to "INSTALLING THE LOCK WASHER".
3	Steering stem bushing	2	
4	Spacer	2	
5	Oil seal	2	
6	Steering stem	1	
7	Oil seal	1	
8	Oil seal	1	



Order	Job/Part	Q'ty	Remarks
9	Bearing retainer	1	Refer to "REMOVING THE BEARING RETAINER" and "INSTALLING THE BEARING RETAINER".
10	Bearing	1	For installation, reverse the removal procedure.



EBS00455

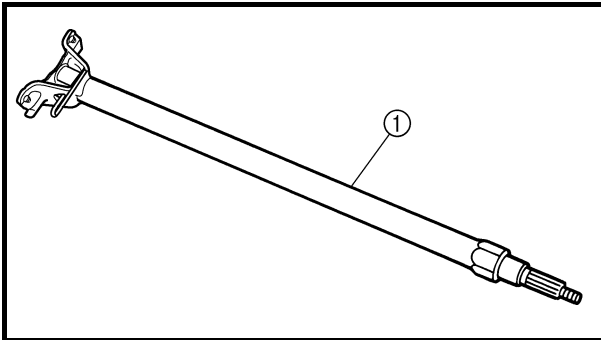
REMOVING THE BEARING RETAINER

1. Remove:

- bearing retainer



Damper rod holder (30 mm)
90890-01327, YM-01327



EBS00456

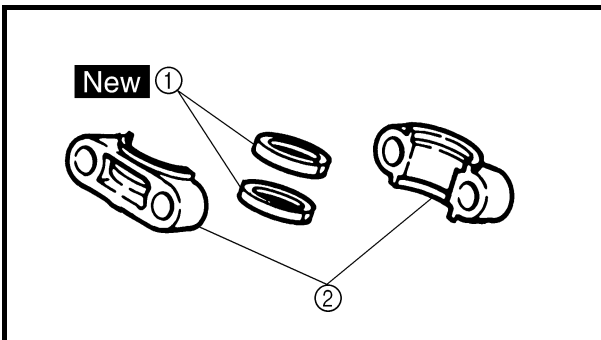
CHECKING THE STEERING STEM

1. Check:

- steering stem ①
Bends → Replace.

⚠ WARNING

Do not attempt to straighten a bent stem; this may dangerously weaken the stem.



2. Check:

- oil seals ① **New**
- steering stem bushings ②
Wear/damage → Replace.

EBS00457

INSTALLING THE BEARING RETAINER

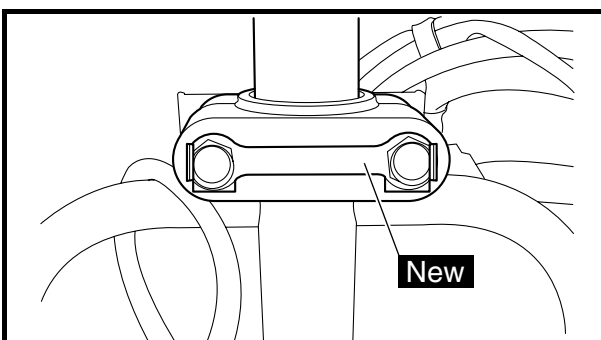
1. Install:

- bearing retainer

65 Nm (6.5 m · kg, 47 ft · lb)



Damper rod holder (30 mm)
90890-01327, YM-01327



EBS00459

INSTALLING THE LOCK WASHER

1. Install:

- lock washer **New**
- bolts

23 Nm (2.3 m · kg, 17 ft · lb)

2. Bend the lock washer tab along a flat side of the bolts.



INSTALLING THE PITMAN ARM

1. Install:

- pitman arm
- washer
- nut
- clip

 **180 Nm (18.0 m · kg, 130 ft · lb)**

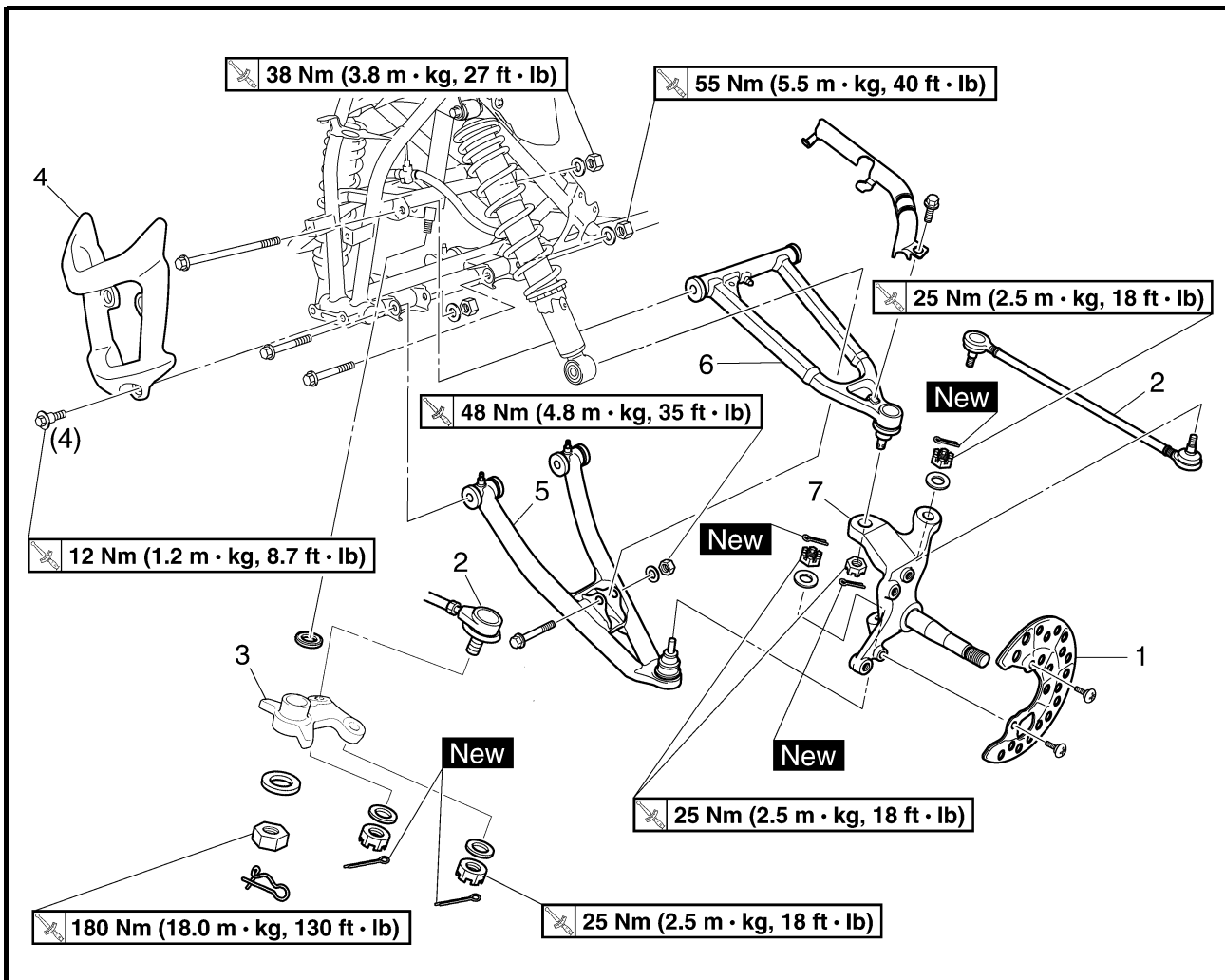
NOTE:

Make sure that the threads of the steering stem, washers, nuts, and the installation surfaces of the pitman arm are free of grease and oil.

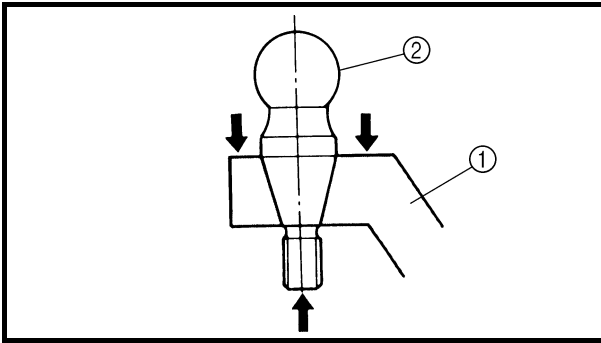


EBS00460

TIE-RODS AND STEERING KNUCKLES



Order	Job/Part	Q'ty	Remarks
	Removing the tie-rods and steering knuckles		Remove the parts in the order listed. The following procedure applies to both of the tie-rods and steering knuckles. Refer to "FRONT AND REAR WHEELS". Refer to "FRONT AND REAR BRAKES".
1	Front wheel/brake disc	1	
	Front brake caliper		
1	Brake disc guard (inner)	1	
2	Tie-rod	2	Refer to "INSTALLING THE TIE-RODS".
3	Pitman arm	1	
4	Front guard	1	
5	Lower front arm	1	
6	Upper front arm	1	
7	Steering knuckle	1	Refer to "REMOVING THE STEERING KNUCKLES". For installation, reverse the removal procedure.



EBS00461

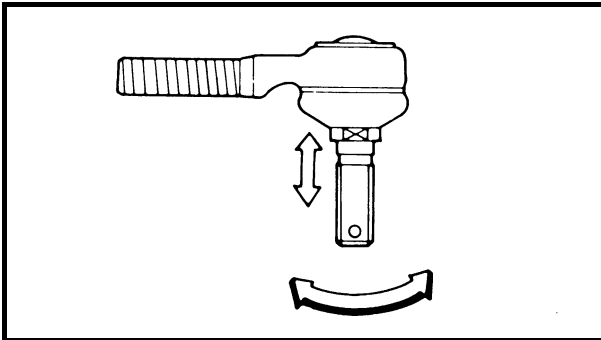
REMOVING THE STEERING KNUCKLES

1. Remove:

- steering knuckles ①

NOTE:

Use a general puller to separate the ball joint ② and steering knuckle.



EBS00462

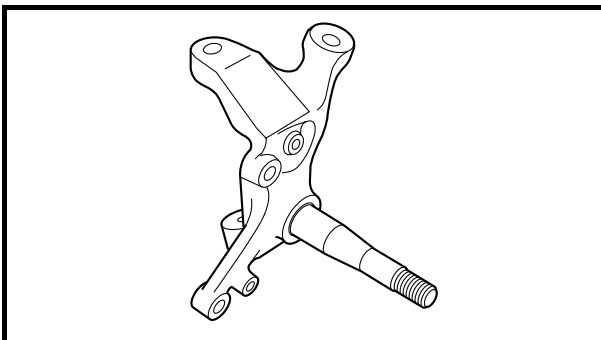
CHECKING THE TIE-RODS

1. Check:

- tie-rod free play and movement
Free play → Replace the tie-rod end.
Turns roughly → Replace the tie-rod end.

2. Check:

- tie-rods
Bends/damage → Replace.

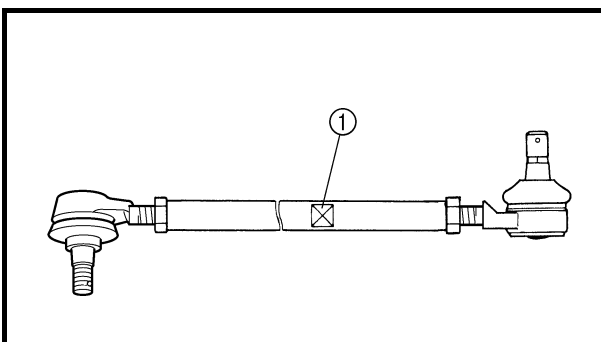


EBS00464

CHECKING THE STEERING KNUCKLES

1. Check:

- steering knuckles
Damage/pitting → Replace.



EBS00465

INSTALLING THE TIE-RODS

1. Install:

- tie-rods (left and right)

25 Nm (2.5 m · kg, 18 ft · lb)

NOTE:

The tie-rod side which must be installed on the outside has grooves ①.

2. Adjust:

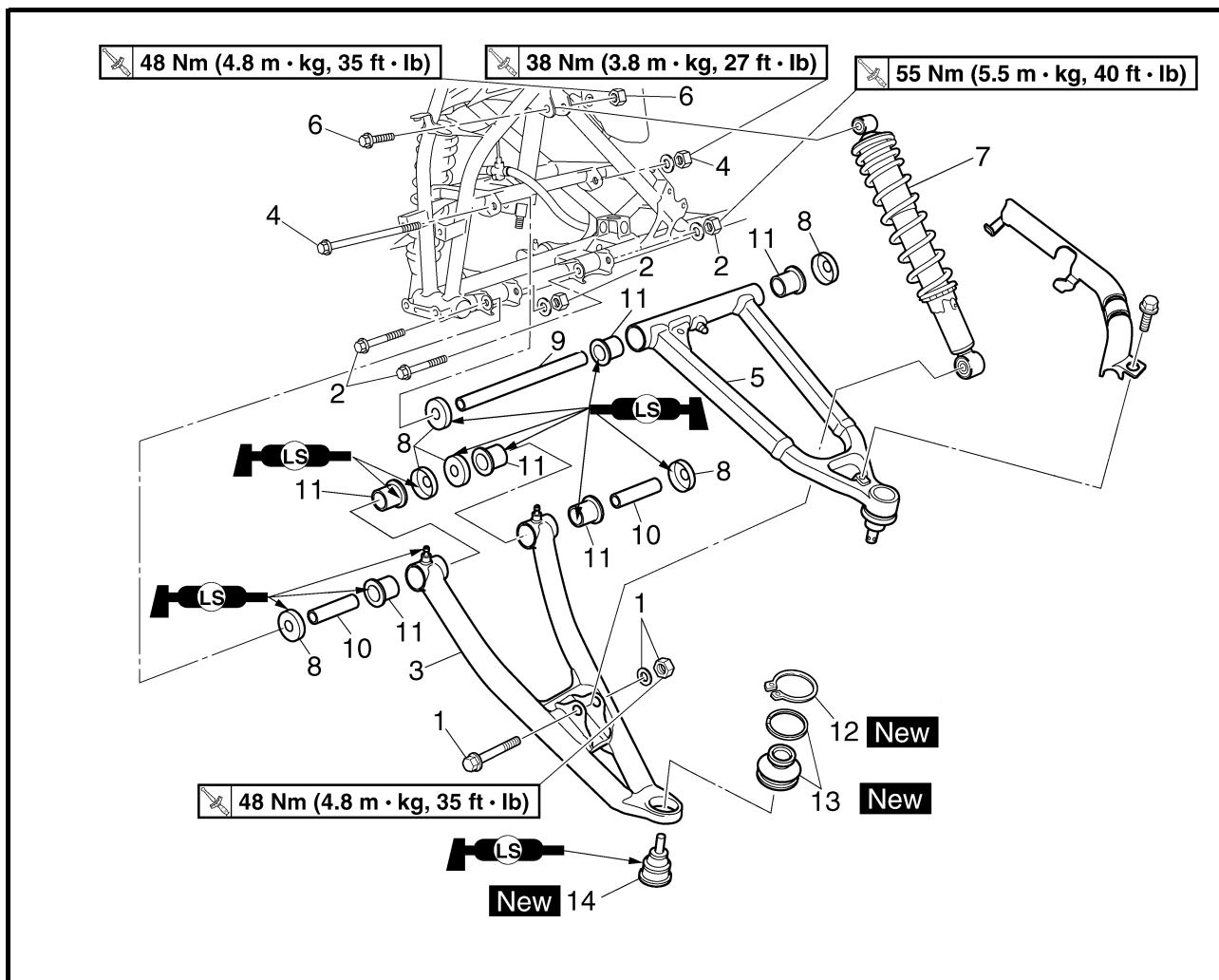
- toe-in
Refer to “ADJUSTING THE TOE-IN” in chapter 3.

FRONT ARMS AND FRONT SHOCK ABSORBER ASSEMBLIES



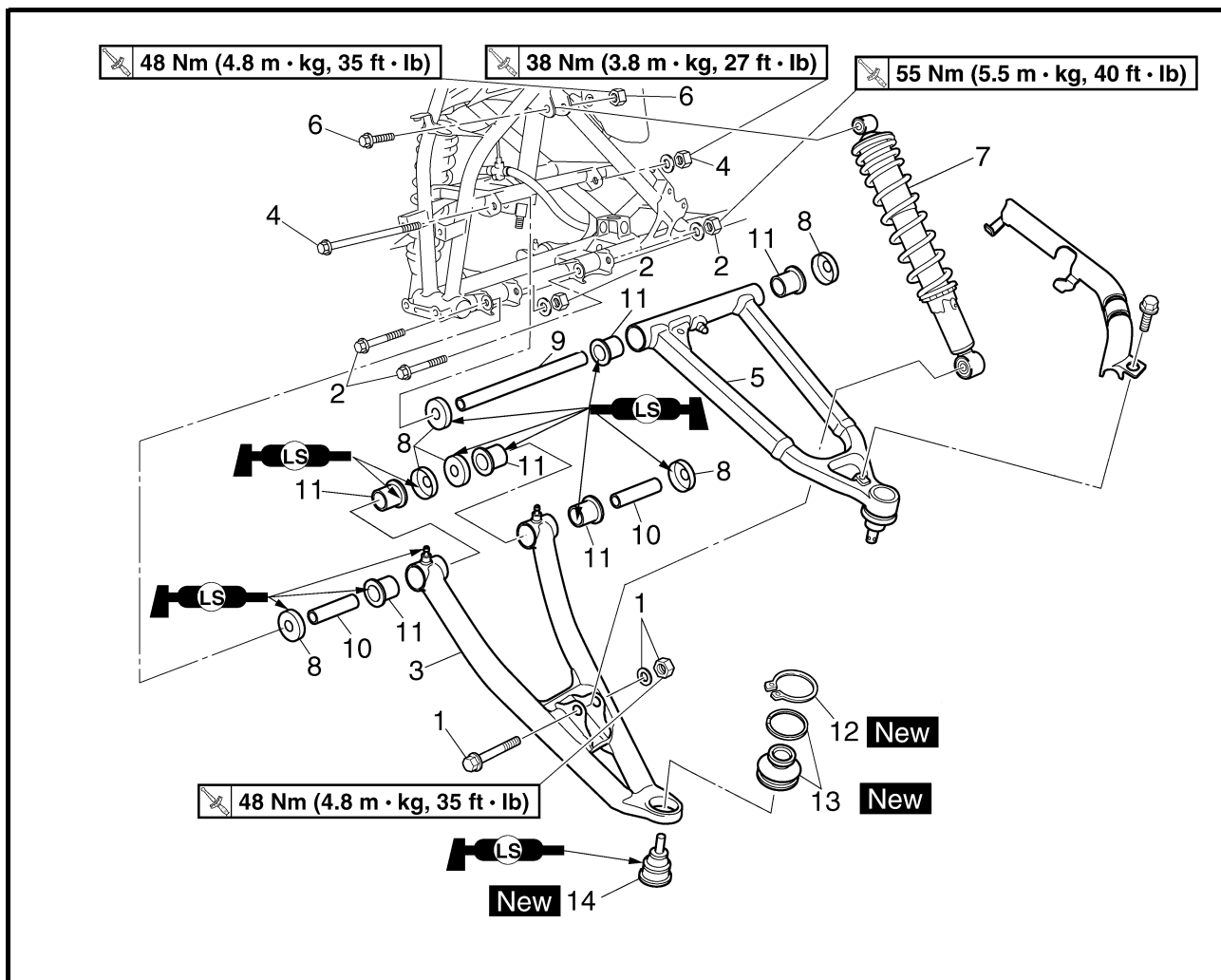
EBS00468

FRONT ARMS AND FRONT SHOCK ABSORBER ASSEMBLIES

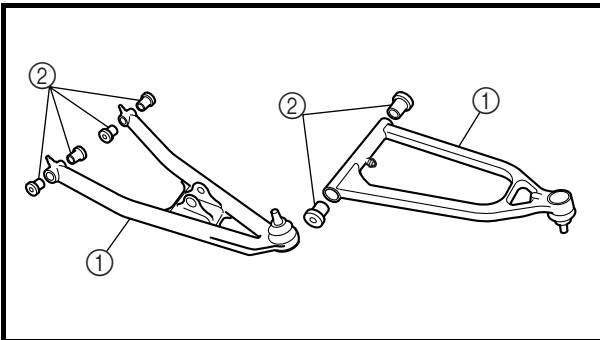
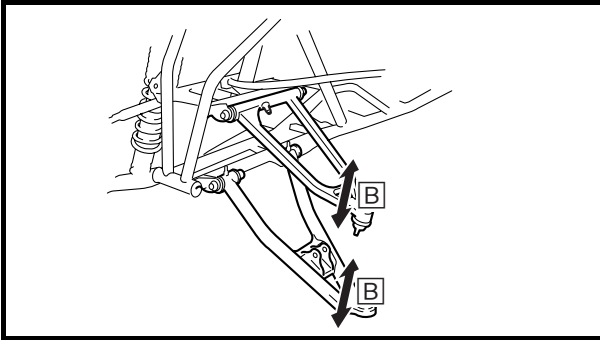
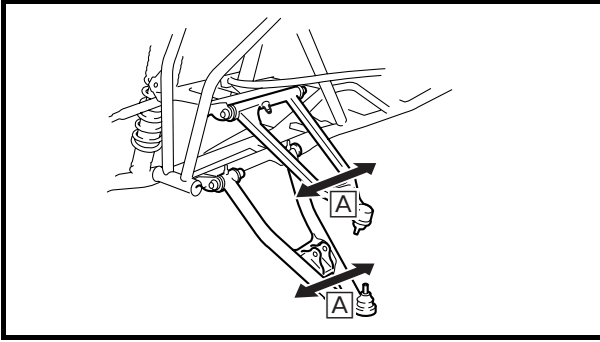


Order	Job/Part	Q'ty	Remarks
	Removing the front arms and front shock absorber assemblies		Remove the parts in the order listed. The following procedure applies to both of the front arms and front shock absorber assemblies. Refer to "FRONT AND REAR WHEELS". Refer to "FRONT AND REAR BRAKES". Refer to "STEERING SYSTEM".
1	Nut/washer/bolt	1/1/1	Refer to "REMOVING THE FRONT ARMS" and "INSTALLING THE FRONT ARMS".
2	Nut/bolt	2/2	
3	Lower front arm	1	
4	Nut/bolt	1/1	
5	Upper front arm	1	
6	Nut/bolt	1/1	
7	Front shock absorber	1	
8	Dust cover	6	

FRONT ARMS AND FRONT SHOCK ABSORBER ASSEMBLIES



Order	Job/Part	Q'ty	Remarks
9	Spacer	1	For installation, reverse the removal procedure.
10	Spacer	2	
11	Bushing	6	
12	Circlip	1	
13	Rubber boot/boot retaining ring	1/1	
14	Ball joint	1	



EBS00469

REMOVING THE FRONT ARMS

1. Check:

- front arm free play

- a. Check the front arm side play by moving it from side to side.

If side play is noticeable, check the bushings.

- b. 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 arm

EBS00470

CHECKING THE FRONT ARMS

1. Check:

- front arms ①
Bends/damage → Replace.

2. Check:

- bushings ②
Wear/damage → Replace.

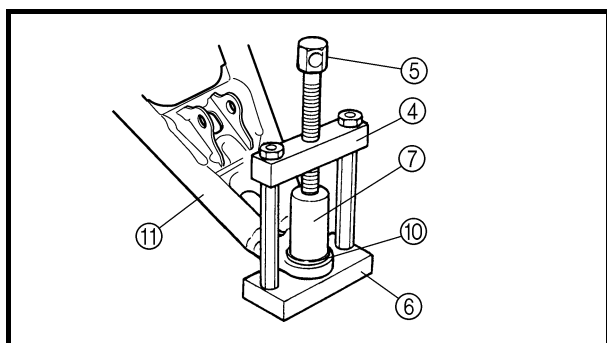
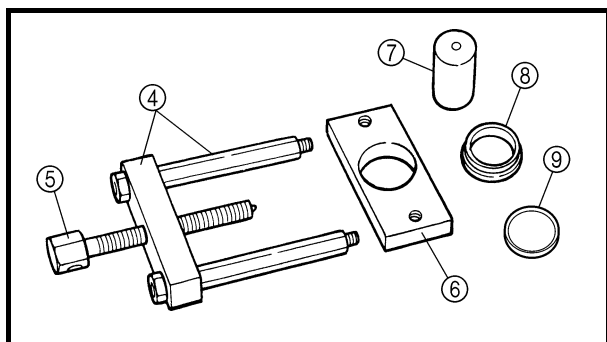
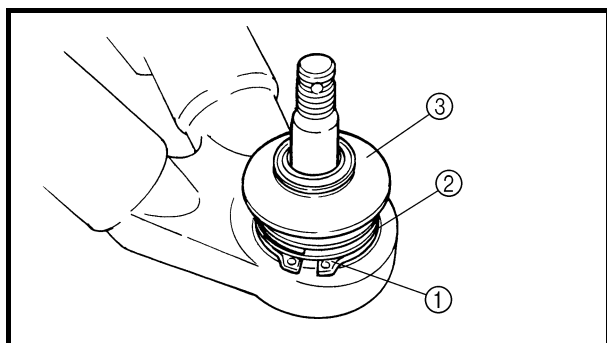
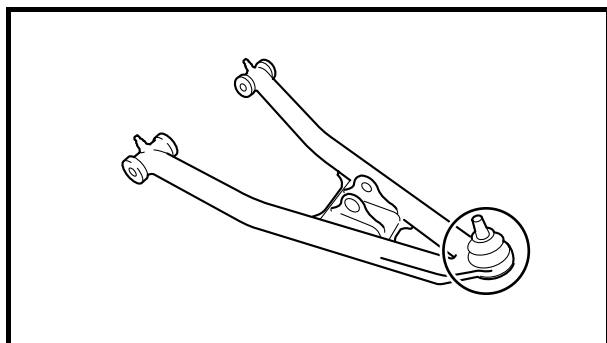
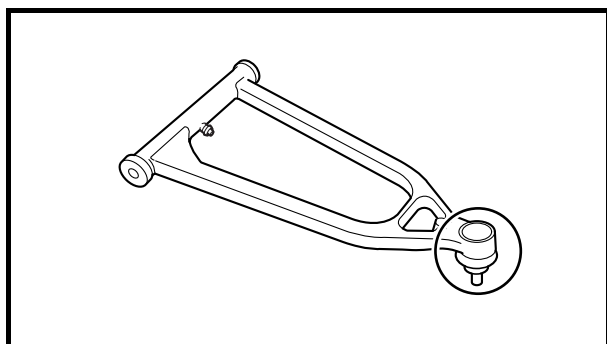
EBS00488

CHECKING THE FRONT SHOCK ABSORBER ASSEMBLIES

The following procedure applies to both of the front shock absorber assemblies.

1. Check:

- shock absorber
Oil leaks → Replace the front shock absorber assembly.
- spring
Fatigue → Replace the front shock absorber assembly.
Move the spring up and down.



EBS00472

CHECKING THE BALL JOINTS

The following procedure applies to both of the front arm ball joints.

1. Check:
 - ball joint (upper front arm)
 - Damage/pitting → Replace the upper front arm.
 - Free play → Replace the front arm.
 - Turns roughly → Replace the upper front arm.
2. Check:
 - ball joint (lower front arm)
 - Damage/pitting → Replace the ball joint.
 - Free play → Replace the ball joint.
 - Turns roughly → Replace the ball joint.



- a. Clean the outside of the lower front arm.
 - b. Remove the circlip ①, boot retaining ring ② and rubber boot ③.
- Use the ball joint remover and installer set.

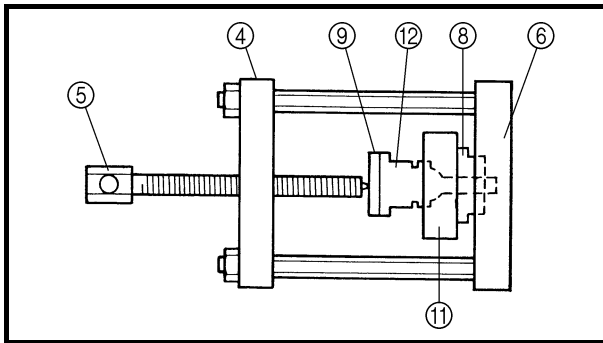
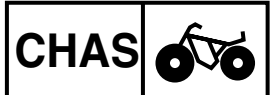


Ball joint remover
90890-01474, YM-01474
Ball joint remover attachment set
90890-01480
Ball joint adapter set
YM-01480

④	Body	90890-01474 YM-01474
⑤	Long bolt	
⑥	Base	90890-01480 YM-01480
⑦	Remover attachment	90890-01474 YM-01474
⑧	Installer spacer	90890-01480 YM-01480
⑨	Installer washer	90890-01474 YM-01474

- c. Install the body ④, long bolt ⑤, base ⑥ and attachment ⑦ onto ball joint.
- d. Hold the body ④ in place while turning in the long bolt ⑤ to remove the ball joint ⑩ from the lower front arm ⑪.
- e. Remove the ball joint remover.

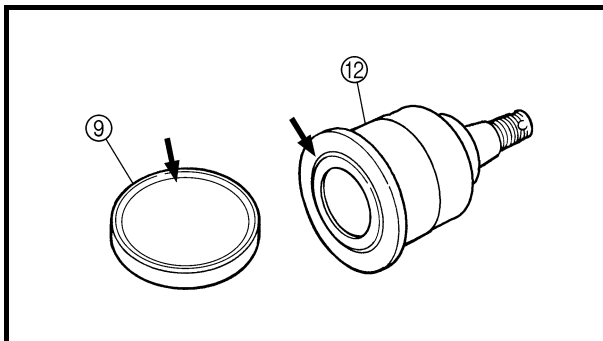
FRONT ARMS AND FRONT SHOCK ABSORBER ASSEMBLIES



- f. Attach the assembled ball joint remover/installer, new ball joint (with rubber boot and retaining ring) ⑫, installer spacer ⑧ and installer washer ⑨ to the lower front arm ⑪.

NOTE:

- Do not tap or damage the top of the ball joint.
- Installer spacer ⑧ must be aligned with the projection on the head of the ball joint ⑫.

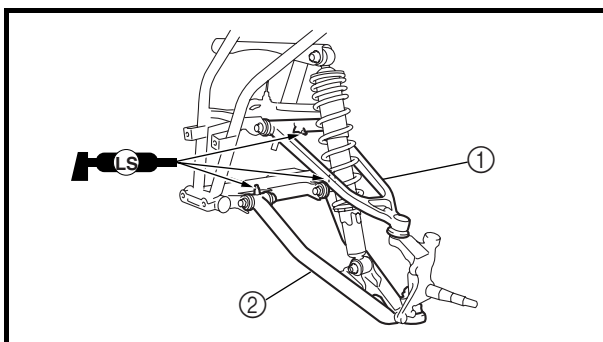
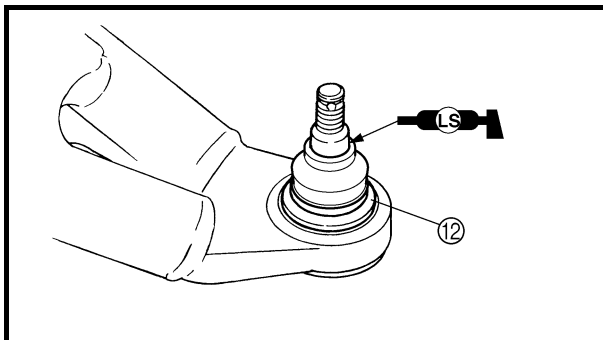


- g. Remove the ball joint remover.

- h. Install a new circlip.

NOTE:

Always use a new ball joint set.



EBS00473

INSTALLING THE FRONT ARMS

The following procedure applies to both of the front arms.

1. Install:

- upper front arm ①

38 Nm (3.8 m · kg, 27 ft · lb)

- lower front arm ②

55 Nm (5.5 m · kg, 40 ft · lb)

NOTE:

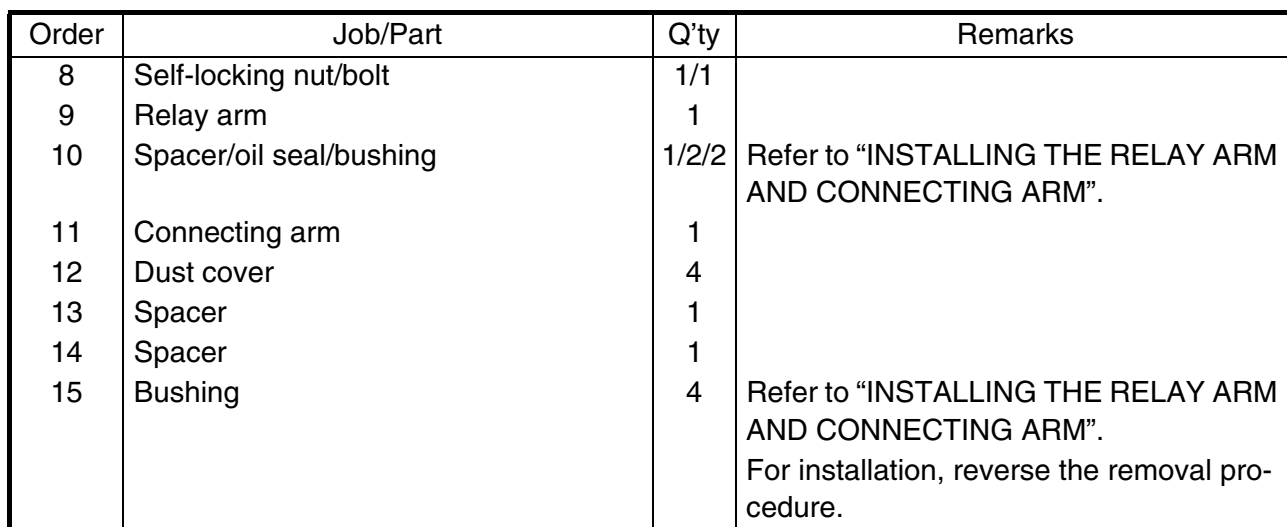
- Be sure to position the bolts (upper and lower) so that the bolt head faces forward.
- Apply lithium-soap-based grease to the grease nipple.

EBS00484

[illegible]

Order	Job/Part	Q'ty	Remarks
	Removing the rear shock absorber and relay arm		Remove the parts in the order below.
	Rear wheels		Refer to "REAR WHEELS".
1	Self-locking nut/bolt/spacer	1/1/1	Refer to "REMOVING THE REAR SHOCK ABSORBER".
2	Self-locking nut/bolt/spacer	1/1/1	
3	Self-locking nut/bolt	1/1	
4	Self-locking nut/bolt	1/1	
5	Rear shock absorber	1	
6	Spacer/oil seal/bearing	1/2/1	
7	Spacer/oil seal/bearing	1/2/1	

CHAS



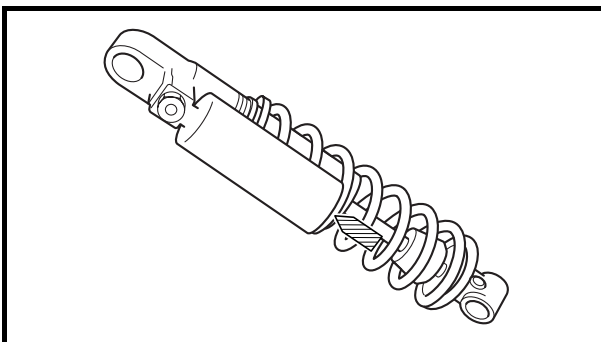
EBS00485

HANDLING THE REAR SHOCK ABSORBER AND GAS CYLINDER

WARNING

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

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



EBS00486

DISPOSING OF A REAR SHOCK ABSORBER AND GAS CYLINDER

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

WARNING

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

EBS00487

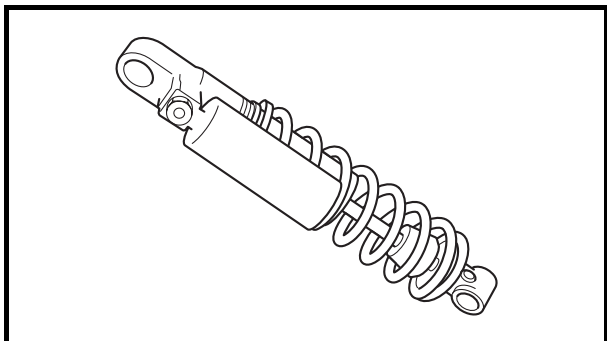
REMOVING THE REAR SHOCK ABSORBER

1. Remove:

- relay arm-to-rear shock absorber lower bolt
- rear shock absorber upper bolt

NOTE:

While removing the relay arm-to-rear shock absorber lower bolt, hold the swingarm so that it does not drop down.

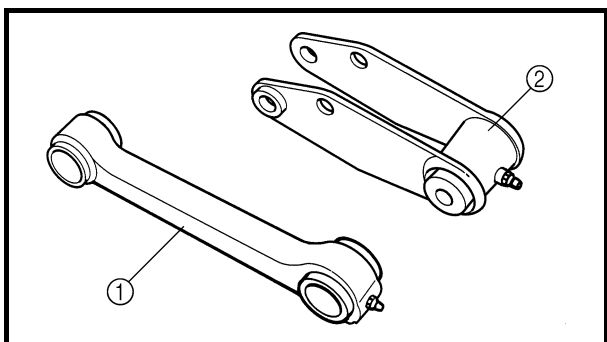


EBS00488

CHECKING THE REAR SHOCK ABSORBER

1. Check:

- shock absorber
Oil leaks → Replace the rear shock absorber assembly.
- shock absorber rod
Bends/damage → Replace the rear shock absorber assembly.
- spring
Fatigue → Replace the rear shock absorber assembly.
Move the spring up and down.
- gas cylinder
Damage/gas leaks → Replace the rear shock absorber assembly.

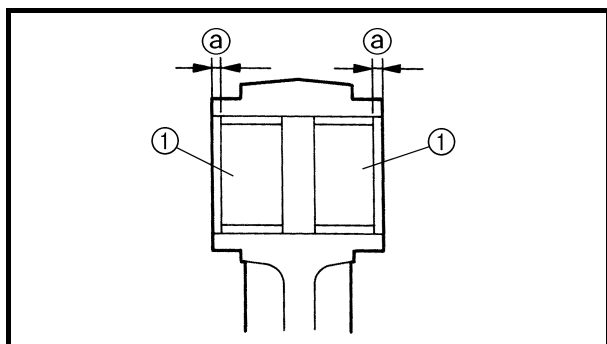


EBS00489

CHECKING THE RELAY ARM AND CONNECTING ARM

1. Check:

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



INSTALLING THE RELAY ARM AND CONNECTING ARM

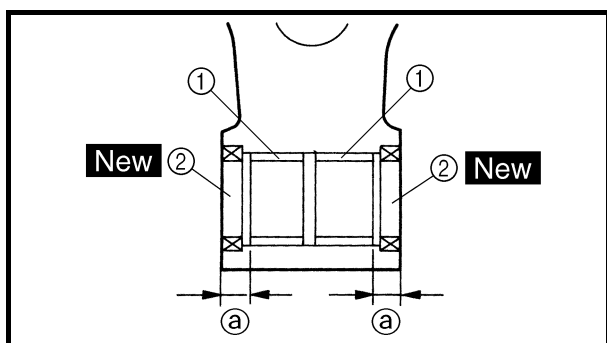
1. Install:
 - bushings ①
(to connecting arm)

NOTE:

Apply lithium-soap-based grease on the bushings when installing.



Installed depth of bushing ①
1.0 mm (0.04 in)



2. Install:
 - bushings ①
 - oil seals ② **New**
(to relay arm)

NOTE:

Apply lithium-soap-based grease on the bushings when installing.



Installed depth of bushing ①
6.5 mm (0.26 in)

INSTALLING THE REAR SHOCK ABSORBER

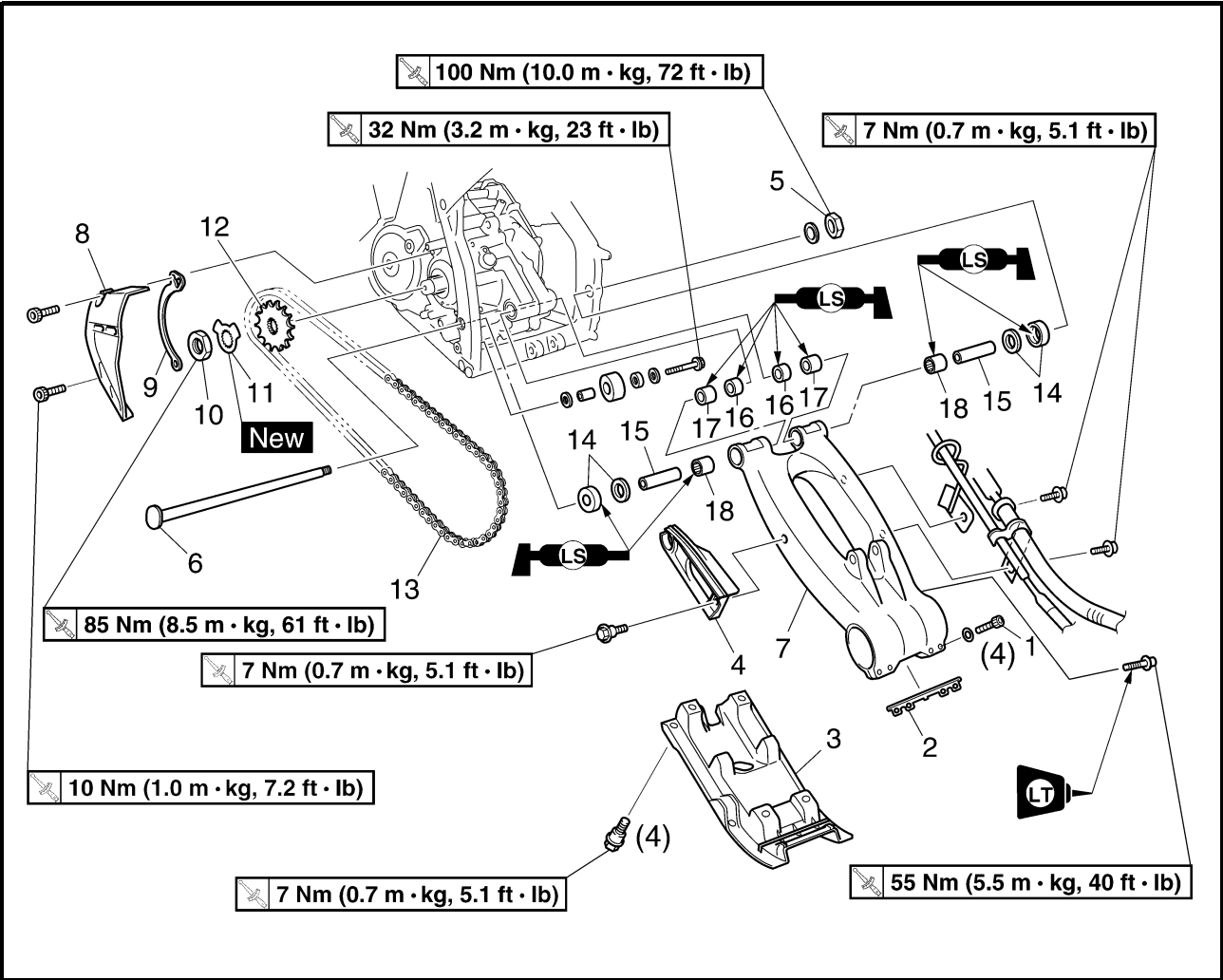
1. Install:
 - connecting arm
 - relay arm
 - rear shock absorber

NOTE:

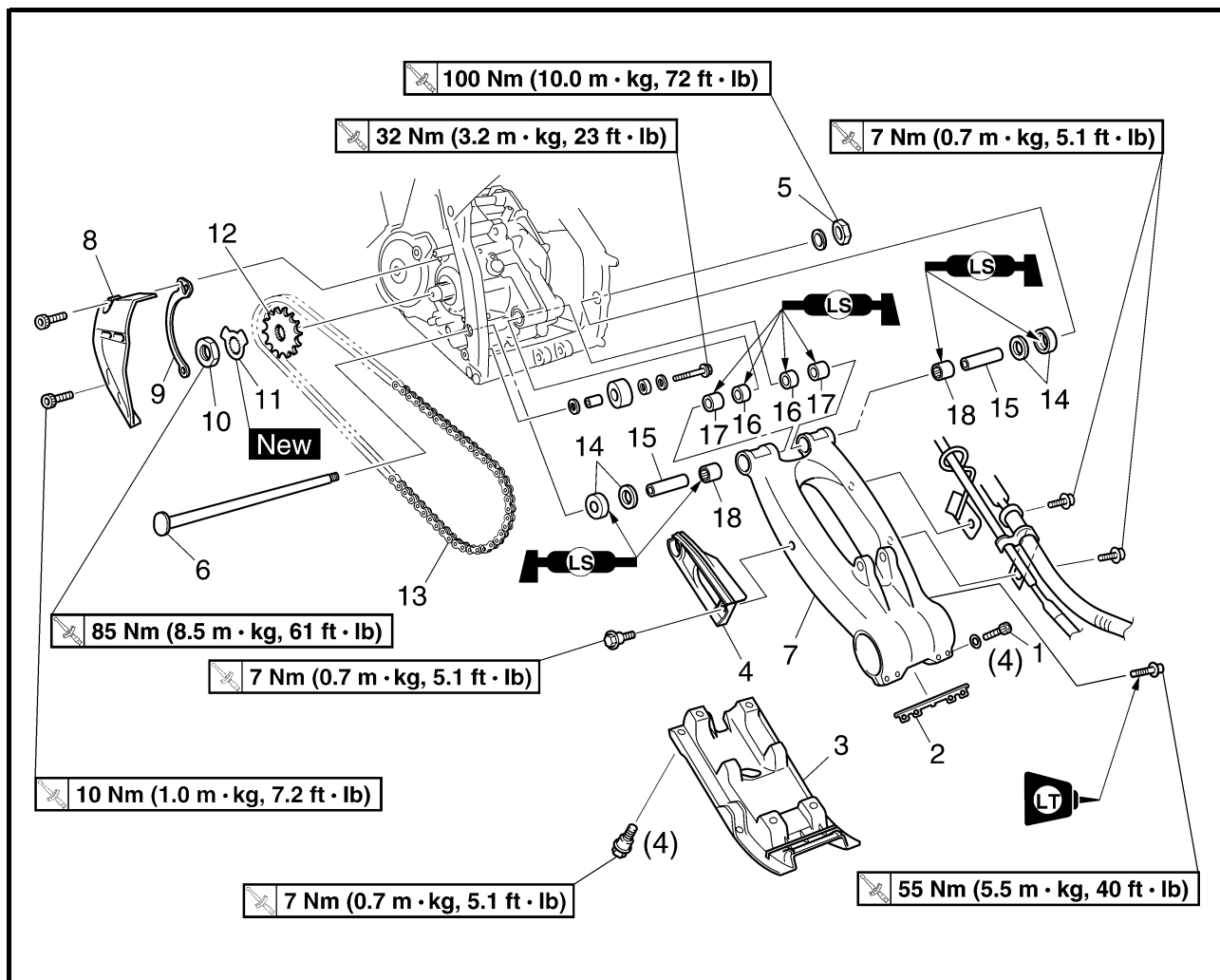
When installing the rear shock absorber, lift up the swingarm.

EBS00492

SWINGARM AND DRIVE CHAIN



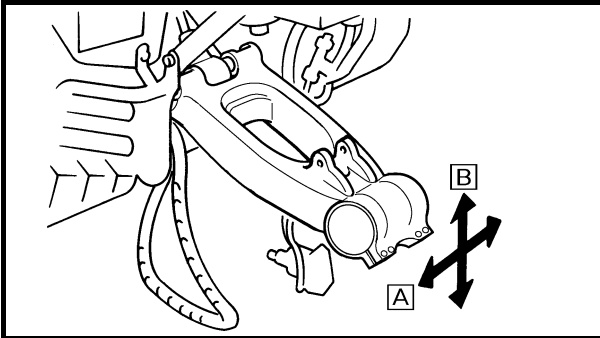
Order	Job/Part	Q'ty	Remarks
	Removing the swingarm and drive chain		Remove the parts in the order below.
	Rear axle hub		Refer to "REAR AXLE AND REAR AXLE HUB".
	Rear shock absorber		Refer to "REAR SHOCK ABSORBER AND RELAY ARM".
1	Rear axle pinch bolt	4	
2	Dust seal	1	
3	Swingarm skid plate	1	
4	Drive chain guide 1	1	
5	Pivot shaft nut	1	
6	Pivot shaft	1	
7	Swingarm	1	Refer to "REMOVING THE SWINGARM".
8	Drive sprocket cover	1	
9	Drive chain guide 2	1	



Order	Job/Part	Q'ty	Remarks
10	Drive sprocket nut	1	Refer to "INSTALLING THE DRIVE SPROCKET".
11	Lock washer	1	
12	Drive sprocket	1	
13	Drive chain	1	
14	Dust cover/washer	2/2	Refer to "INSTALLING THE SWING-ARM". For installation, reverse the removal procedure.
15	Spacer	2	
16	Oil seal	2	
17	Bushing	2	
18	Bearing	2	

NOTE:

Before removing the drive chain and the sprockets, measure the drive chain slack and a 15-link section of the drive chain.



REMOVING THE SWINGARM

- swingarm free play

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



Pivot shaft nut
100 Nm (10.0 m · kg, 72 ft · lb)

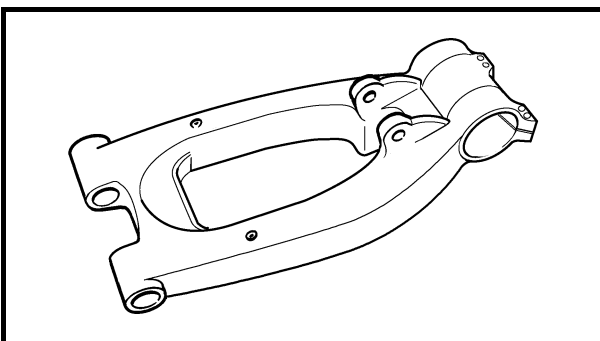
b. Check the swingarm side play by moving it from side to side.

If side play is noticeable, check the spacers, bearings, bushings and frame pivot.

c. Check the swingarm vertical movement ☐ by moving it up and down.

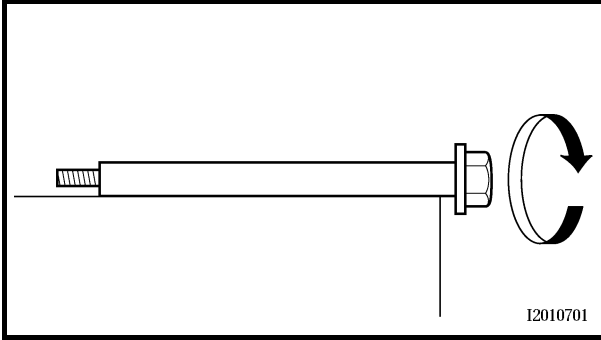
If vertical movement is tight or rough, or if there is binding, check the spacers, bearings, bushings and frame pivot.

- pivot shaft nut
- washer
- pivot shaft
- swingarm



CHECKING THE SWINGARM

- swingarm
Bends/cracks/damage → Replace.



2. Check:

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

WARNING

Do not attempt to straighten a bent pivot shaft.

3. Clean:

- pivot shaft
- spacers
- bearings
- bushings



Recommended cleaning solvent
Kerosene

4. Check:

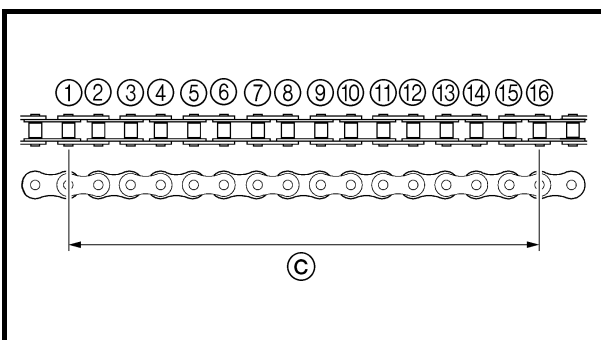
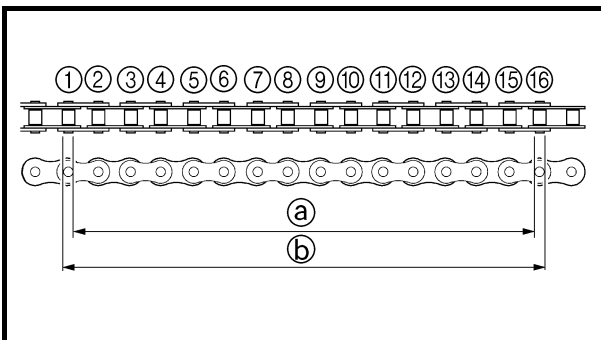
- spacers
Damage/wear → Replace.
- bearings
- bushings
Damage/pitting → Replace.

EBS00496

CHECKING THE DRIVE CHAIN

1. Measure:

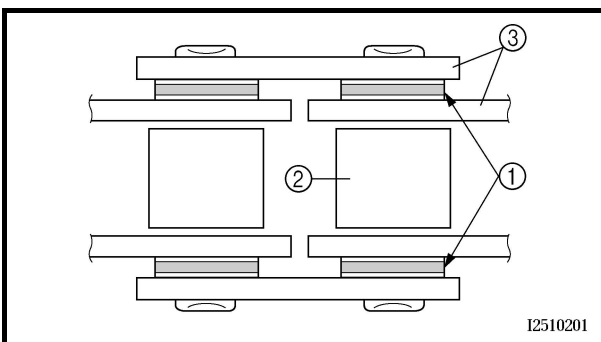
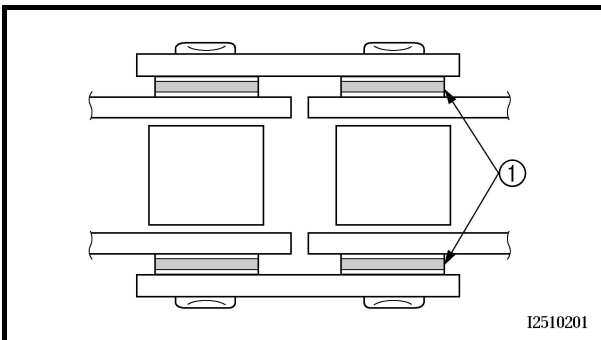
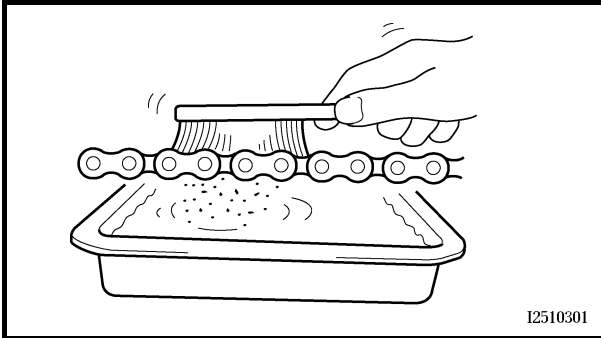
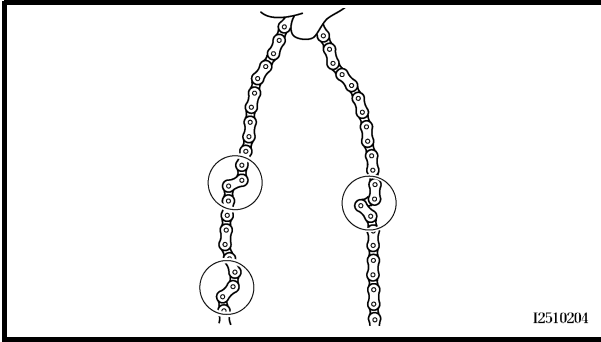
- Measure the length of 15 links on the inner side (a) and outer side (b) of the pin and calculate the length between pin centers.
- Length (c) between pin centers = (inner dimension (a) + outer dimension (b))/2
- 15-link section (c) of the drive chain
Out of specification → Replace the drive chain, drive sprocket and rear wheel sprocket as a set.



15-link drive chain section limit
(maximum)
239.3 mm (9.42 in)

NOTE:

- While measuring the 15-link section, push down on the drive chain to increase its tension.
- Perform this measurement at two or three different places.



2. Check:

- drive chain

Stiffness → Clean and lubricate or replace.

3. Clean:

- drive chain



a. Wipe the drive chain with a clean cloth.

b. Put the drive chain in kerosene and remove any remaining dirt.

c. Remove the drive chain from the kerosene and completely dry it.

CAUTION:

This vehicle has a drive chain with small rubber O-rings ① between the drive chain side plates. Never use high-pressure water or air, steam, gasoline, certain solvents (e.g., benzene), or a coarse brush to clean the drive chain. High-pressure methods could force dirt or water into the drive chain's internal parts, and solvents will deteriorate the O-rings. A coarse brush can also damage the O-rings. Therefore, use only kerosene to clean the drive chain. Don't soak the drive chain in kerosene for more than ten minutes. Kerosene will damage the O-rings.



4. Check:

- O-rings ①

Damage → Replace the drive chain.

- drive chain rollers ②

Damage/wear → Replace the drive chain.

- drive chain side plates ③

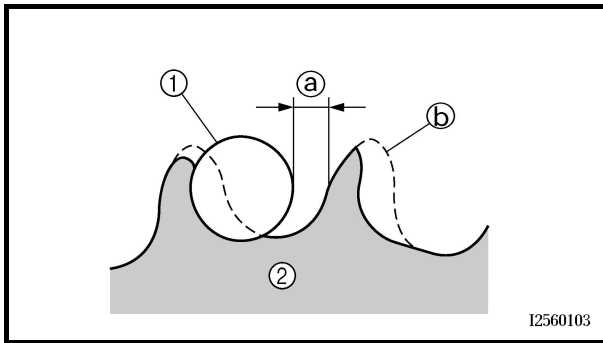
Cracks/damage/wear → Replace the drive chain.

5. Lubricate:

- drive chain



Recommended lubricant
Engine oil or chain lubricant
suitable for O-ring chains



6. Check:

- drive sprocket
- driven sprocket

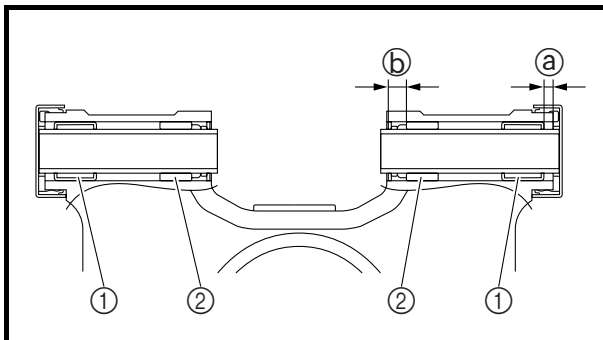
More than 1/4 tooth (a) wear → Replace the drive chain sprockets as a set.

Bent teeth → Replace the drive chain sprockets as a set.

(b) Correct

(1) Drive chain roller

(2) Drive chain sprocket



EBS00497

INSTALLING THE SWINGARM

1. Install:

- bearings (1)
- bushings (2)
(to swingarm)

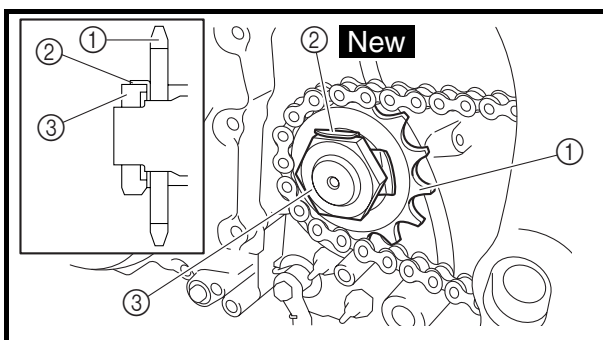
NOTE:

Apply the lithium-soap-based grease on the bushings when installing.



Installed depth of bearing (a)
5 mm (0.20 in)

Installed depth of bushing (b)
9 mm (0.35 in)



EBS00498

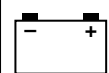
INSTALLING THE DRIVE SPROCKET

1. Install:

- drive sprocket (1)
- lock washer (2) **New**
- drive sprocket nut (3)

85 Nm (8.5 m · kg, 61 ft · lb)

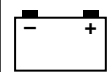
2. Bend the lock washer tab along a flat side of the nut.



CHAPTER 8

ELECTRICAL

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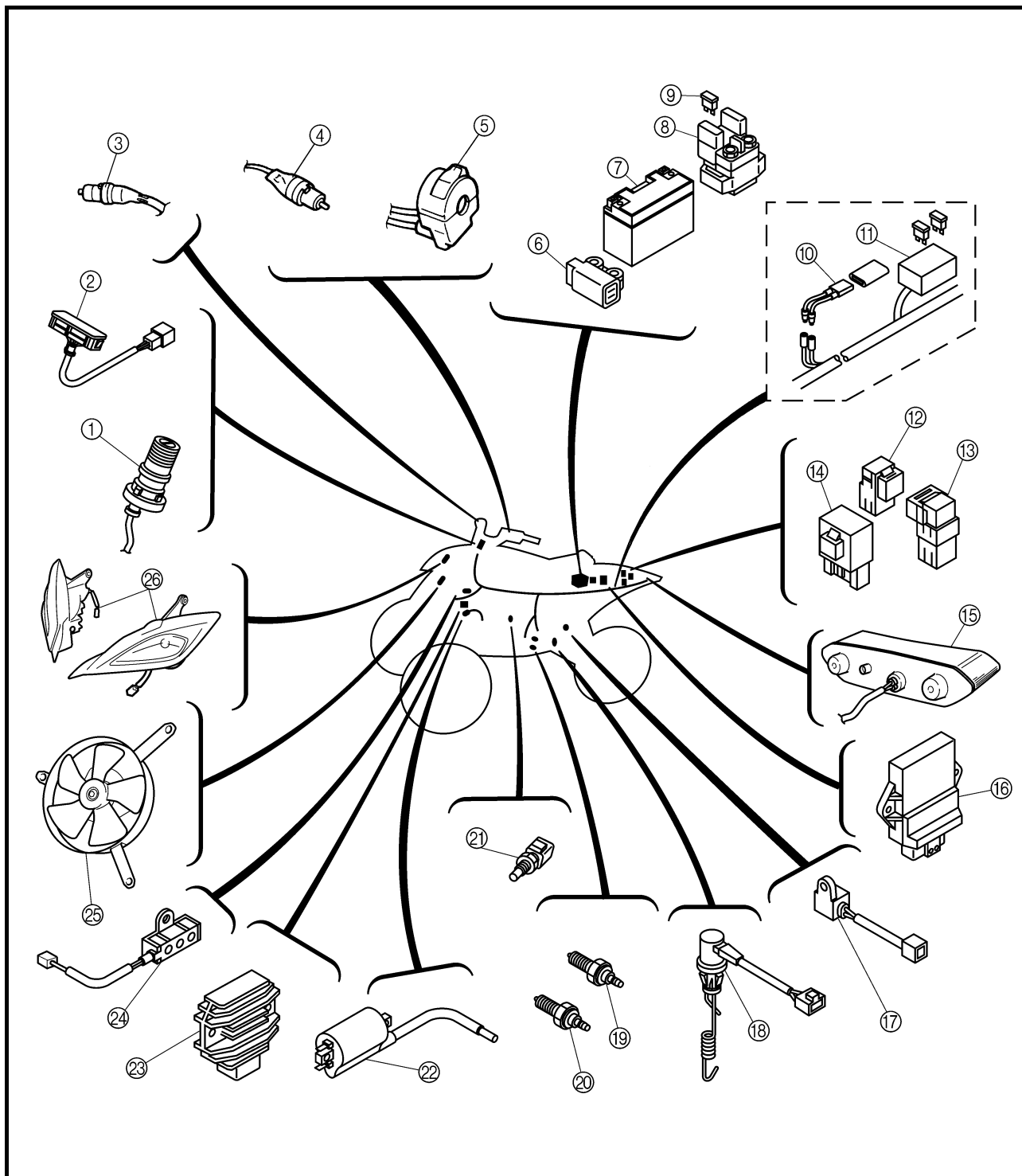


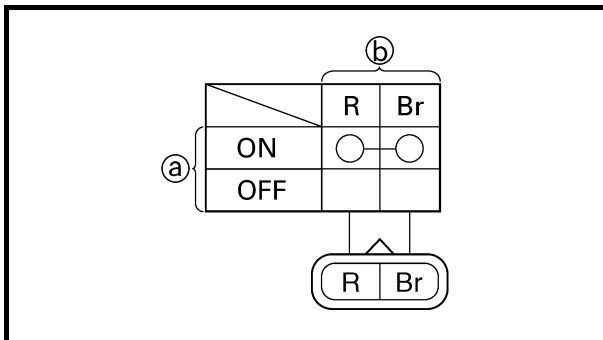
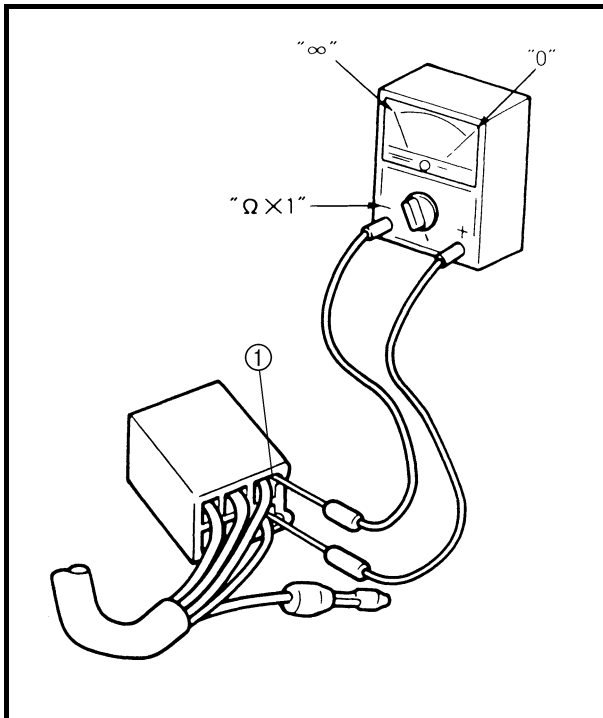
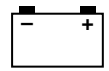
EBS00500

ELECTRICAL

ELECTRICAL COMPONENTS

- | | | | |
|----------------------------|----------------------------|---------------------------|------------------------------|
| ① Main switch | ⑦ Battery | ⑭ Relay unit | ⑳ Coolant temperature sensor |
| ② Indicator light assembly | ⑧ Starter relay | ⑮ Tail/brake light | ㉑ Ignition coil |
| ③ Front brake light switch | ⑨ Main fuse | ⑯ ECU | ㉒ Rectifier/regulator |
| ④ Clutch switch | ⑩ Circuit breaker (fan) | ⑰ Speed sensor | ㉓ Resistor |
| ⑤ Handlebar switch | ⑪ Fuse box | ⑱ Rear brake light switch | ㉔ Radiator fan |
| ⑥ Lean angle sensor | ⑫ Radiator fan motor relay | ㉒ Neutral switch | ㉕ Headlight |
| | ⑬ Headlight relay | ㉓ Reverse switch | |





EBS01028

CHECKING SWITCH CONTINUITY

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

CAUTION:

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



Pocket tester
90890-03112
Analog pocket tester
YU-03112-C

NOTE:

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

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

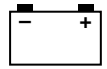
The switch positions ① are shown in the far left column and the switch lead colors ② are shown in the top row in the switch illustration.

NOTE:

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

The example illustration on the left shows that:

There is continuity between the switch terminals for the red and brown switch leads when the switch is set to "ON".



EBS01029

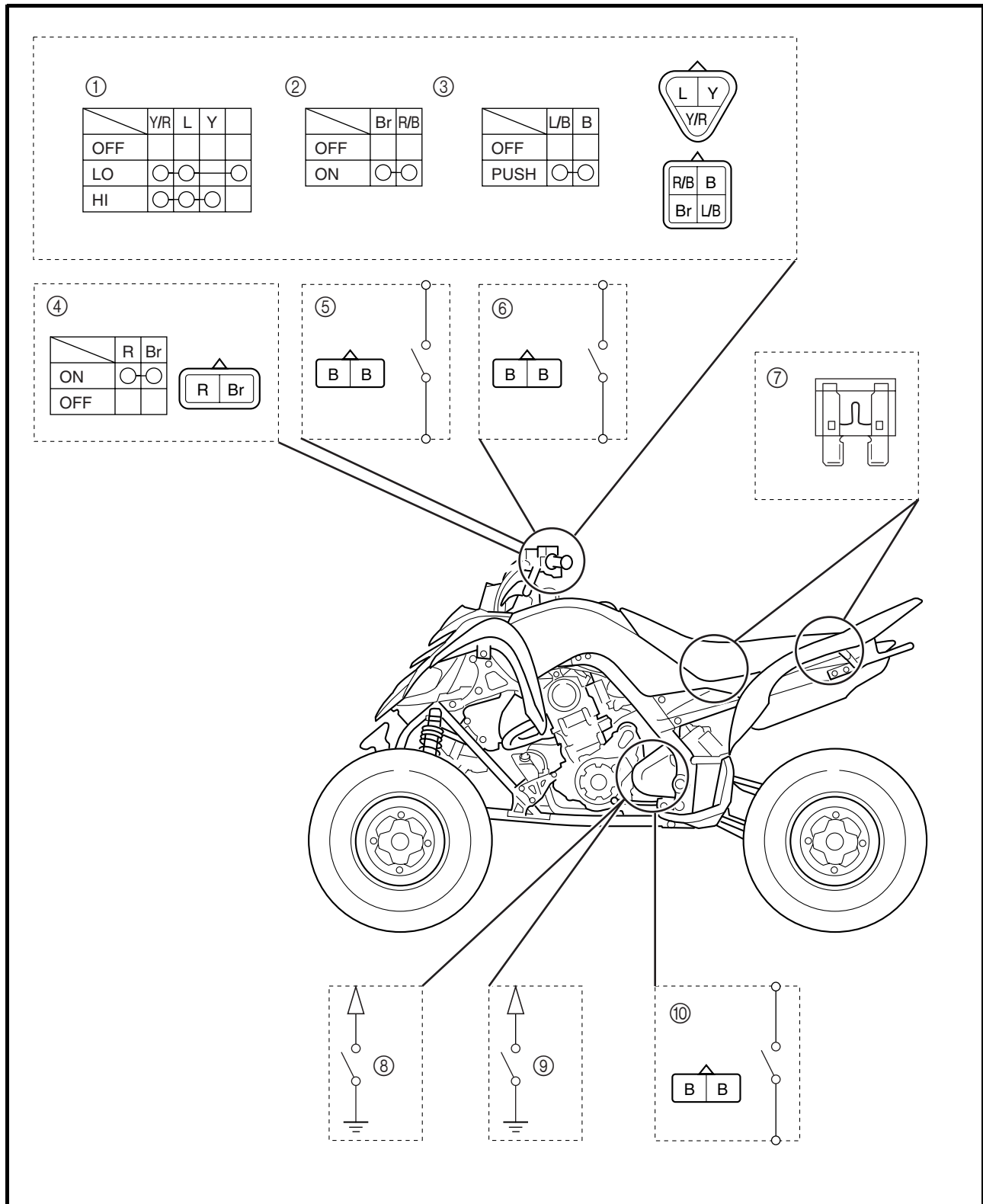
CHECKING THE SWITCHES

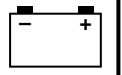
Check each switch for damage or wear, proper connections, and also for continuity between the terminals. Refer to "CHECKING SWITCH CONTINUITY".

Damage/wear → Repair or replace.

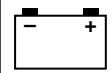
Improperly connected → Properly connect.

Incorrect continuity reading → Replace the switch.





- ① Light switch
- ② Engine stop switch
- ③ Start switch
- ④ Main switch
- ⑤ Front brake light switch
- ⑥ Clutch switch
- ⑦ Fuses
- ⑧ Reverse switch
- ⑨ Neutral switch
- ⑩ Rear brake light switch



EBS01030

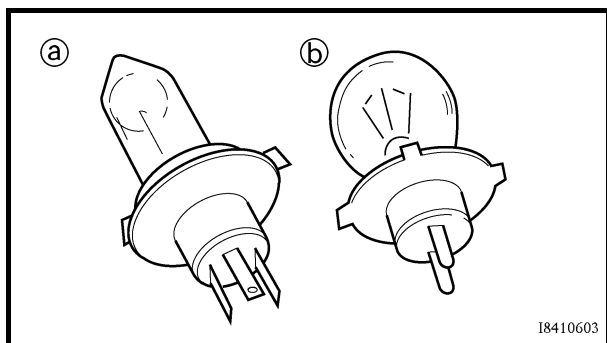
CHECKING THE BULBS AND BULB SOCKETS

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

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

Improperly connected → Properly connect.

No continuity → Repair or replace the bulb, bulb socket or both.



TYPES OF BULBS

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

- Bulbs ① and ② are used for the headlights and usually use a bulb holder that must be detached before removing the bulb. The majority of these types of bulbs can be removed from their respective socket by turning them counterclockwise.

CHECKING THE CONDITION OF THE BULBS

The following procedure applies to all of the bulbs.

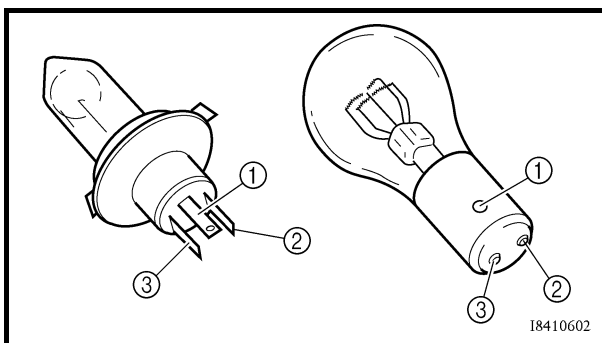
1. Remove:
 - bulb

WARNING

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

ELEC

- Be sure to hold the socket firmly when removing the bulb. Never pull the lead, otherwise it may be pulled out of the terminal in the coupler.
- Avoid touching the glass part of the headlight bulb to keep it free from oil, otherwise the transparency of the glass, the life of the bulb, and the luminous flux will be adversely affected. If the headlight bulb gets soiled, thoroughly clean it with a cloth moistened with alcohol or lacquer thinner.



2. Check:
- bulb (for continuity)
(with the pocket tester)
No continuity → Replace.



Pocket tester
90890-03112
Analog pocket tester
YU-03112-C

Before checking for continuity, set the pocket tester to “0” and to the “ $\Omega \times 1$ ” range.

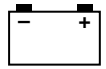
- Connect the positive tester probe to terminal ① and the negative tester probe to terminal ②, and check the continuity.
- Connect the positive tester probe to terminal ① and the negative tester probe to terminal ③, and check the continuity.
- If either of the readings indicate no continuity, replace the bulb.

The following procedure applies to all of the bulb sockets.

- | | |
|---|---|
|  | <p>Pocket tester
 90890-03112
 Analog pocket tester
 YU-03112-C</p> |
|---|---|

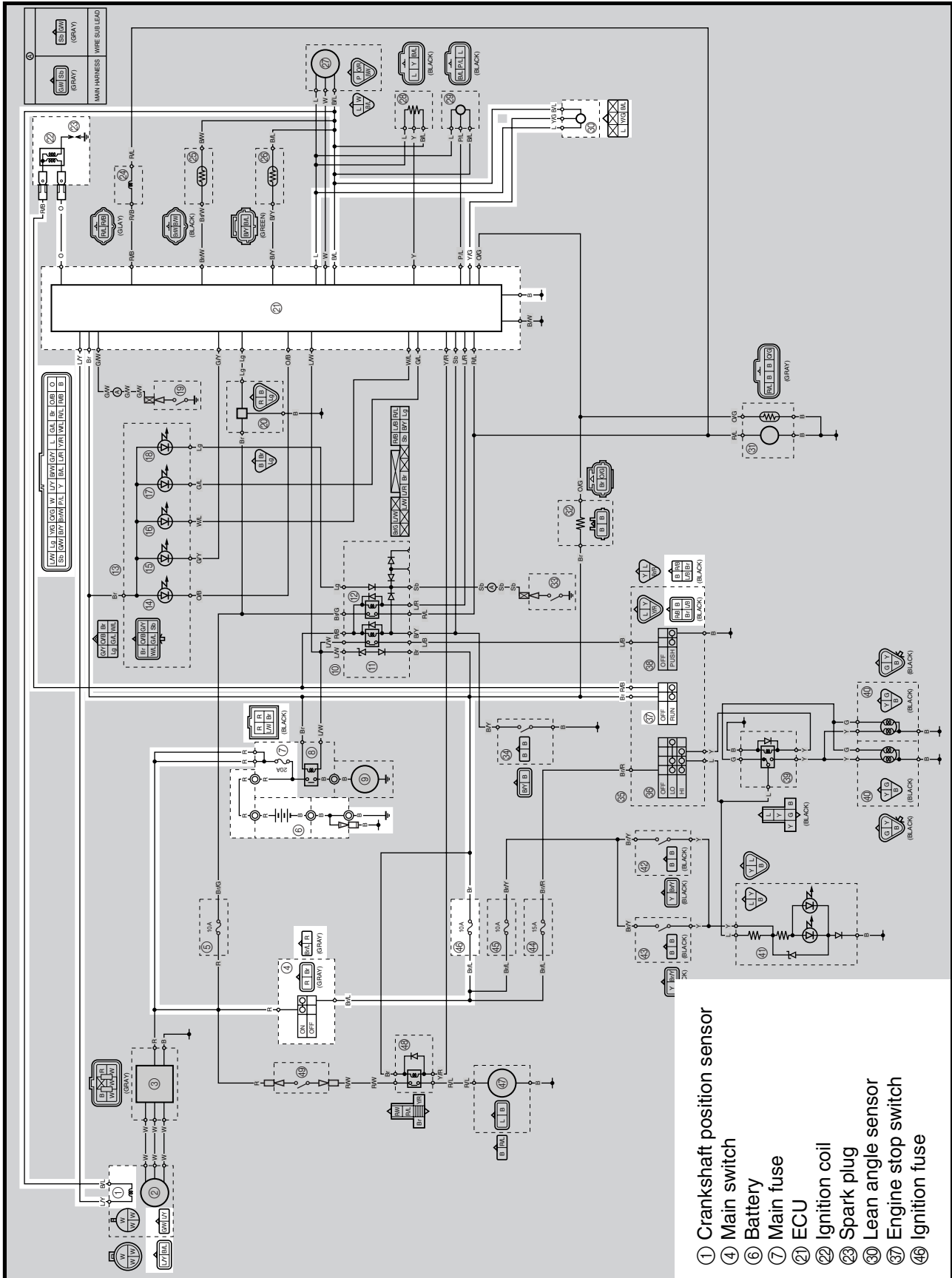
Check each bulb socket for continuity in the same manner as described in the bulb section; however, note the following.

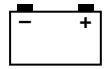
-



EBS00503

IGNITION SYSTEM CIRCUIT DIAGRAM





EBS01045

TROUBLESHOOTING

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

Check:

1. main and ignition fuses
2. battery
3. spark plug
4. ignition spark gap
5. spark plug cap resistance
6. ignition coil resistance
7. main switch
8. engine stop switch
9. crankshaft position sensor resistance
10. lean angle sensor
11. wiring connections (of the entire ignition system)

NOTE:

- Before troubleshooting, remove the following part(s):
 1. seat
 2. fuel tank cover
 3. side covers (left and light)
 4. fuel tank
 5. front fender
- Troubleshoot with the following special tool(s).



Ignition checker
 90890-06754
Opama pet-4000 spark checker
 YM-34487
Pocket tester
 90890-03112
Analog pocket tester
 YU-03112-C

EBS01043

1. Main and ignition fuses

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



YES



NO

Replace the fuse(s).

EBS01044

2. Battery

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



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

- Is the battery OK?

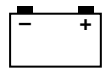


YES



NO

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



EBS01032

3. Spark plug

- Check the condition of the spark plug.
- Check the spark plug type.
- Measure the spark plug gap.

Refer to “CHECKING THE SPARK PLUG” in chapter 3.

Standard spark plug
CR8E (NGK)
Spark plug gap
0.7 ~ 0.8 mm (0.028 ~ 0.031 in)

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



YES



NO

Re-gap or replace the spark plug.

EBS01034

4. Ignition spark gap

- Disconnect the ignition coil from the spark plug.
- Connect the ignition checker ① as shown.

② Ignition coil

- Set the main switch to “ON”.
- Measure the ignition spark gap ③.
- Crank the engine by pushing the start switch and gradually increase the spark gap until a misfire occurs.

Minimum ignition spark gap
6 mm (0.24 in)

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

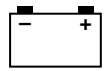


NO



YES

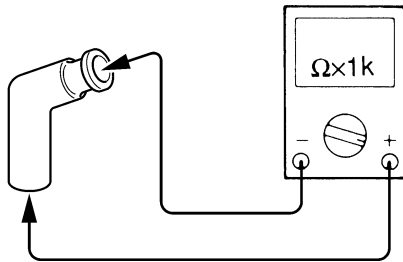
The ignition system is OK.



EBS01036

5. Spark plug cap resistance

- Remove the spark plug cap from the spark plug lead.
- Connect the pocket tester ($\Omega \times 1k$ range) to the spark plug cap as shown.
- Measure the spark plug cap resistance.



Spark plug cap resistance
10 k Ω at 20 °C (68 °F)

- Is the spark plug cap OK?



YES



NO

Replace the spark plug cap.

EBS01038

6. Ignition coil resistance

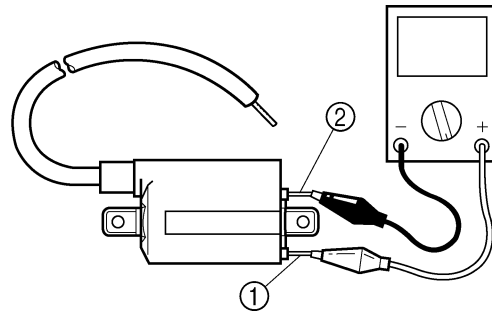
- Disconnect the ignition coil connectors from the ignition coil terminals.
- Connect the pocket tester ($\Omega \times 1$) to the ignition coil as shown.

Positive tester probe →

red/black lead terminal ①

Negative tester probe →

orange lead terminal ②



- Measure the primary coil resistance.



Primary coil resistance
3.4 ~ 4.6 Ω at 20 °C (68 °F)

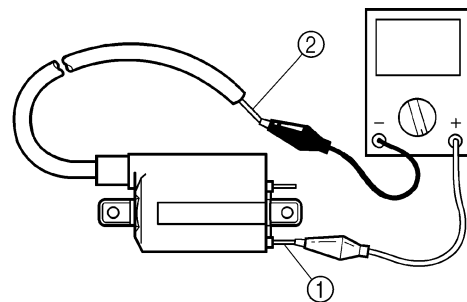
- Connect the pocket tester ($\Omega \times 1k$) to the ignition coil as shown.

Positive tester probe →

red/black lead terminal ①

Negative tester probe →

spark plug lead ②



- Measure the secondary coil resistance.



Secondary coil resistance
10.4 ~ 15.6 k Ω at 20 °C (68 °F)

- Is the ignition coil OK?

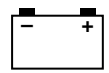


YES



NO

Replace the ignition coil.



EBS01041

7. Main switch

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



YES



NO

Replace the main switch.

EBS01042

8. Engine stop switch

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



YES



NO

Replace the handle-bar switch.

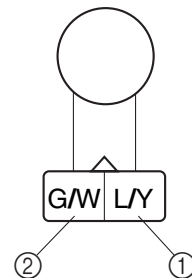
EBS01040

9. Crankshaft position sensor resistance

- Disconnect the crankshaft position sensor coupler from the wire harness.
- Connect the pocket tester ($\Omega \times 100$) to the crankshaft position sensor coupler as shown.

Positive tester probe → blue/yellow ①

Negative tester probe → green/white ②



- Measure the crankshaft position sensor resistance.



Crankshaft position sensor resistance

192 ~ 288 Ω at 20 °C (68 °F)

- Is the crankshaft position sensor OK?

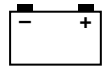


YES



NO

Replace the crankshaft position sensor/stator assembly.



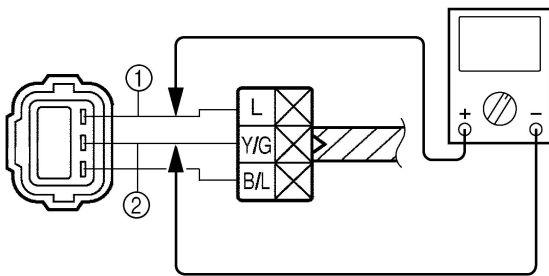
EBS01047

10. Lean angle sensor

- Remove the lean angle sensor.
- Connect the lean angle sensor terminals and lean angle sensor coupler terminals with jumper leads as shown.
- Connect the pocket tester ($\Omega \times 100$) to the lean angle sensor terminals as shown.

Positive tester probe → blue ①

Negative tester probe → yellow/green ②



- Set the main switch to "ON".
- Measure the lean angle sensor voltage.



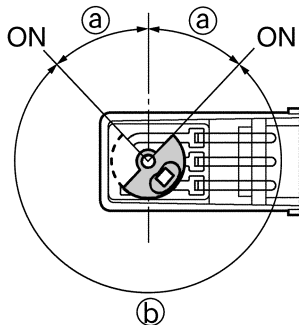
Lean angle sensor voltage

Less than $65^\circ \pm 10^\circ$ (a) →

Approximately 1 V

More than $65^\circ \pm 10^\circ$ (b) →

Approximately 4 V



- Is the lean angle sensor OK?

YES

NO

Replace the lean angle sensor.

11. Wiring

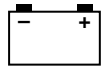
- Check the entire ignition system's wiring. Refer to "CIRCUIT DIAGRAM".
- Is the ignition system's wiring properly connected and without defects?

YES

Replace the ECU.

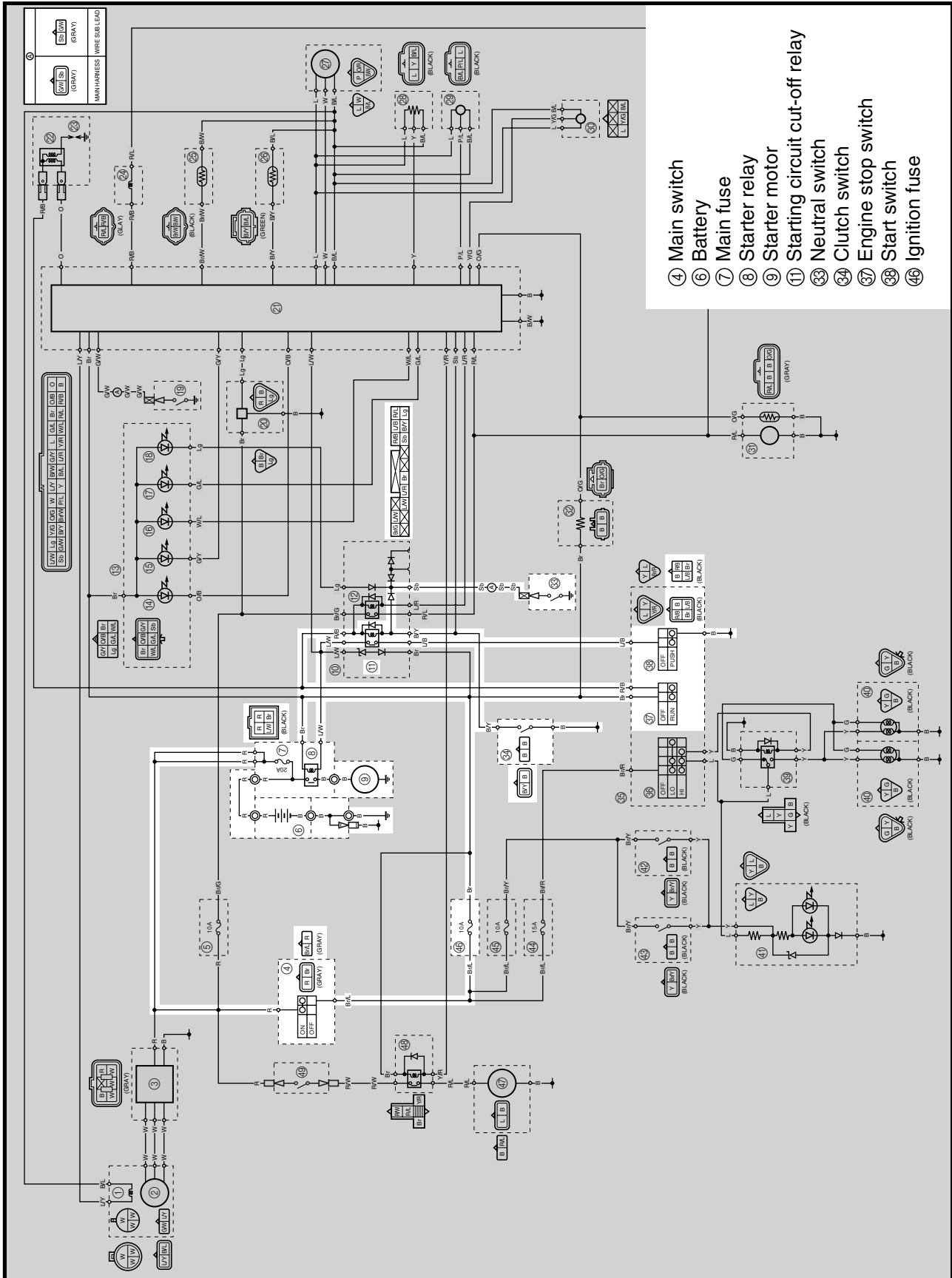
NO

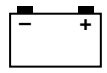
Properly connect or repair the ignition system's wiring.



EBS00506

ELECTRIC STARTING SYSTEM CIRCUIT DIAGRAM





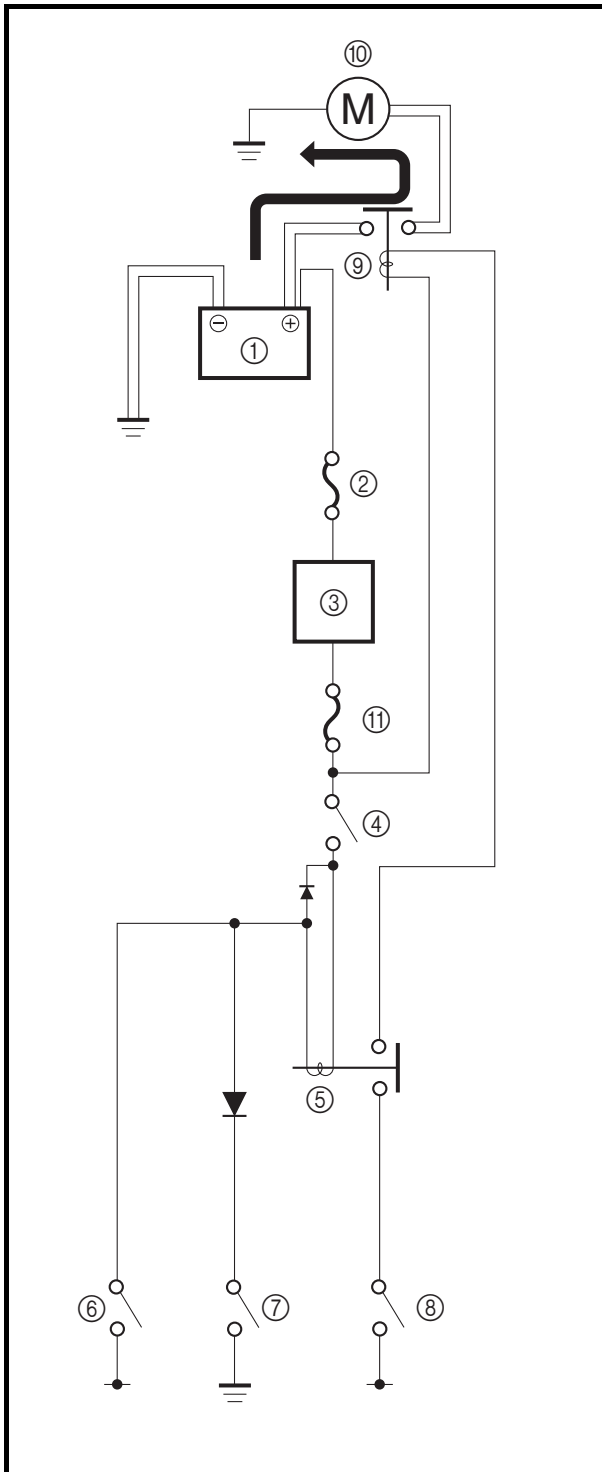
EBS00508

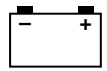
STARTING CIRCUIT CUT-OFF SYSTEM OPERATION

The starting circuit on this model consists of the starter motor, starter relay, clutch switch, 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**
- You pull in the clutch lever (the clutch switch is closed).

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





EBS01050

TROUBLESHOOTING**The starter motor fails to turn.**

Check:

1. main and ignition fuses
2. battery
3. starter motor
4. relay unit (starting circuit cut-off relay)
5. relay unit (diode)
6. starter relay
7. main switch
8. engine stop switch
9. neutral switch
10. clutch switch
11. start switch
12. wiring connections
(of the entire starting system)

NOTE:

- Before troubleshooting, remove the following part(s):
 1. seat
 2. fuel tank cover
 3. side covers (left and right)
 4. front fender
- Troubleshoot with the following special tool(s).



Pocket tester
90890-03112
Analog pocket tester
YU-03112-C

EBS01043

1. Main and ignition fuses

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



YES



NO

Replace the fuse(s).

EBS01044

2. Battery

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



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

- Is the battery OK?



YES



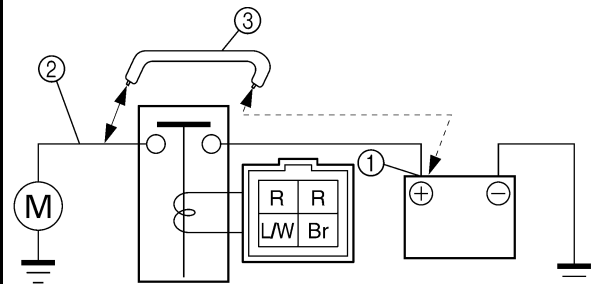
NO

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

EBS01051

3. Starter motor

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

**⚠ WARNING**

- A wire that is used as a jumper lead must have at least the same capacity or more as that of the battery lead, otherwise the jumper lead may burn.
- This check is likely to produce sparks, therefore make sure nothing flammable is in the vicinity.

- Does the starter motor turn?

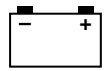


YES



NO

Repair or replace the starter motor.



EBS01052

4. Relay unit (starting circuit cut-off relay)

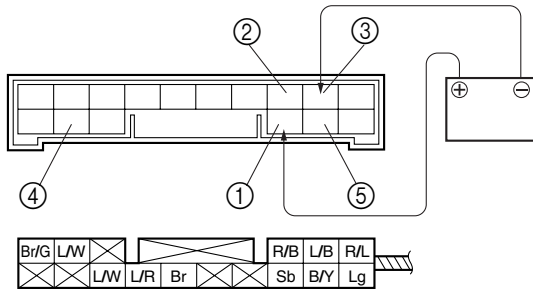
- Remove the relay unit from the wire harness.
- Connect the pocket tester ($\Omega \times 1$) and battery (12 V) to the relay unit as shown.

Positive battery terminal → red/black ①

Negative battery terminal →
sky blue ② or black/yellow ③

Positive tester probe → blue/white ④

Negative tester probe → blue/black ⑤



- Does the relay unit have continuity between blue/white and blue/black?



YES



NO

Replace the relay unit.

EBS01053

5. Relay unit (diode)

- Remove the relay unit from the wire harness.
- Connect the pocket tester ($\Omega \times 1$) to the relay unit as shown.
- Measure the relay unit for continuity as follows.

NOTE:

The pocket tester 90890-03112 and the analog pocket tester YU-03112-C readings are shown in the following table.

Positive tester probe →

sky blue ①

Negative tester probe →

red/black ②

Continuity

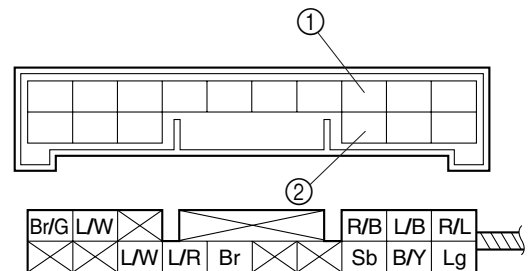
Positive tester probe →

red/black ②

Negative tester probe →

sky blue ①

No continuity



- Are the testing readings correct?

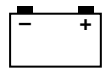


YES



NO

Replace the relay unit.



EBS01054

6. Starter relay

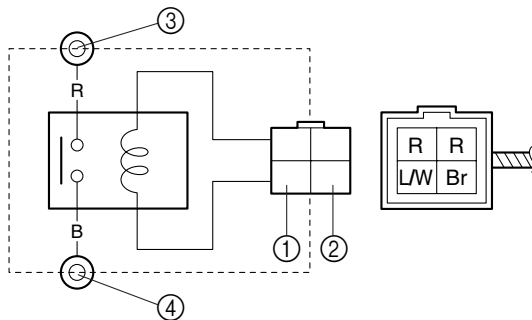
- Remove the starter relay.
- Connect the pocket tester ($\Omega \times 1$) and battery (12 V) to the starter relay as shown.

Positive battery terminal → brown ①

Negative battery terminal → blue/white ②

Positive tester probe → red ③

Negative tester probe → black ④



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

YES

NO

Replace the starter relay.

EBS01041

7. Main switch

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

YES

NO

Replace the main switch.

EBS01042

8. Engine stop switch

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

YES

NO

Replace the handle-bar switch.

EBS01046

9. Neutral switch

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

YES

NO

Replace the neutral switch.

EBS01056

10. Clutch switch

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

YES

NO

Replace the clutch switch.

EBS01057

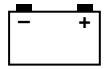
11. Start switch

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

YES

NO

Replace the handle-bar switch.



EBS01059

12.Wiring

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



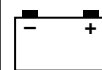
YES



NO

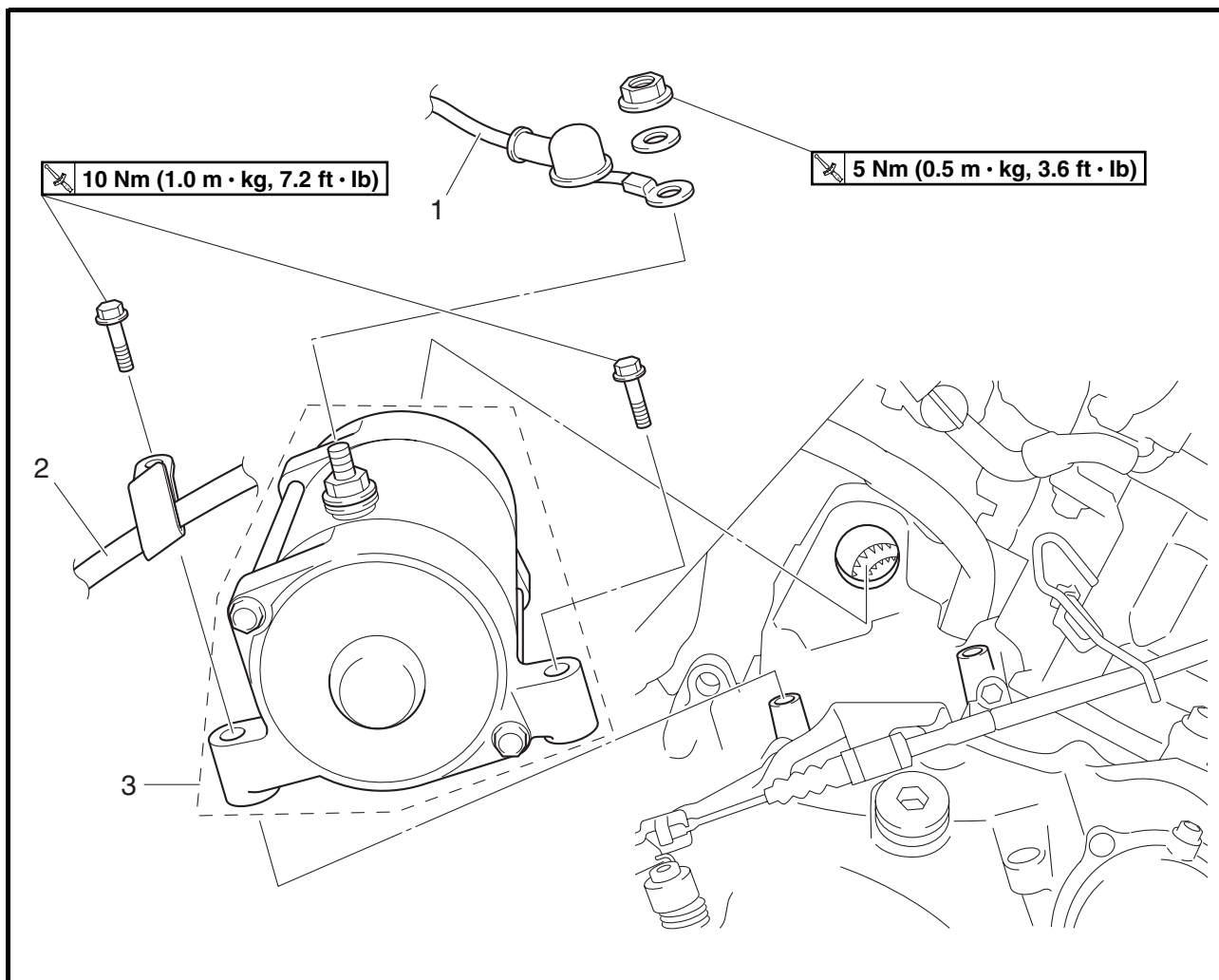
The starting system circuit is OK.

Properly connect or repair the starting system's wiring.



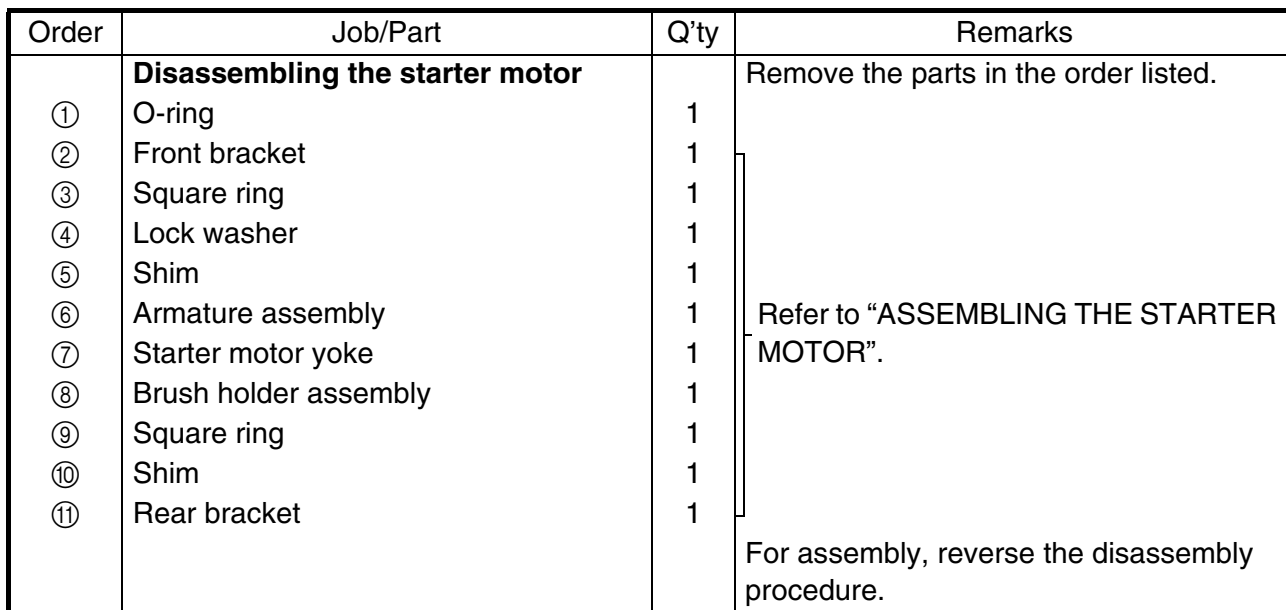
EBS01061

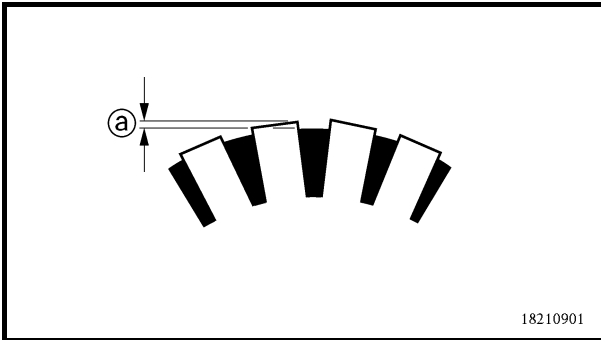
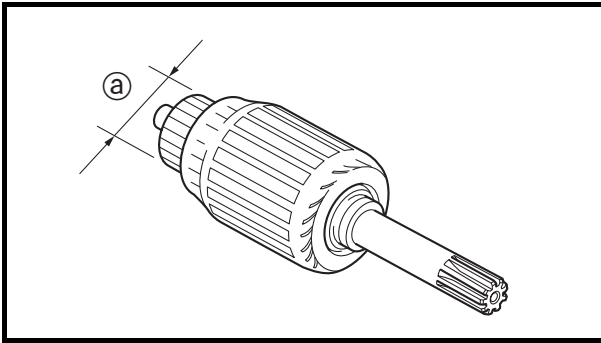
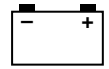
STARTER MOTOR



Order	Job/Part	Q'ty	Remarks
	Removing the starter motor		
	Exhaust pipe		Remove the parts in the order listed. Refer to "ENGINE REMOVAL" in chapter 4.
1	Starter motor lead	1	Disconnect.
2	Parking brake cable	1	
3	Starter motor	1	
			For installation, reverse the removal procedure.

EBS01062





18210901

EBS01064

CHECKING THE STARTER MOTOR

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



Commutator wear limit
27 mm (1.06 in)

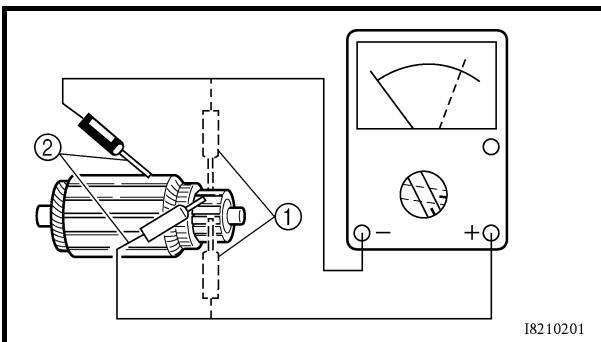
- ### 3. Measure:
- mica undercut (a)
Out of specification → Scrape the mica to the proper measurement with a hacksaw blade that has been grounded to fit the commutator.



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

NOTE:

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



I8210201

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

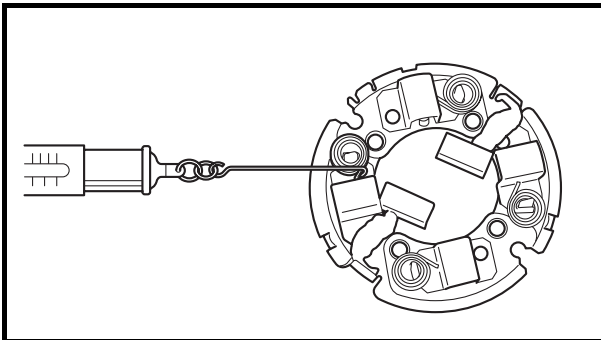
- a. Measure the armature assembly resistances with the pocket tester.



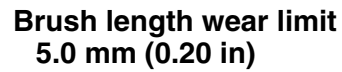
Pocket tester
90890-03112
Analog pocket tester
YU-03112-C



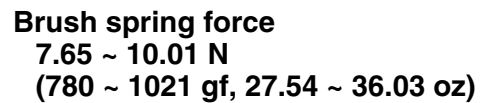
Armature coil
Commutator resistance ①
 0.025 ~ 0.035 Ω at 20 °C (68 °F)
Insulation resistance ②
 Above 1 MΩ at 20 °C (68 °F)



Out of specification → Replace the brushes as a set.

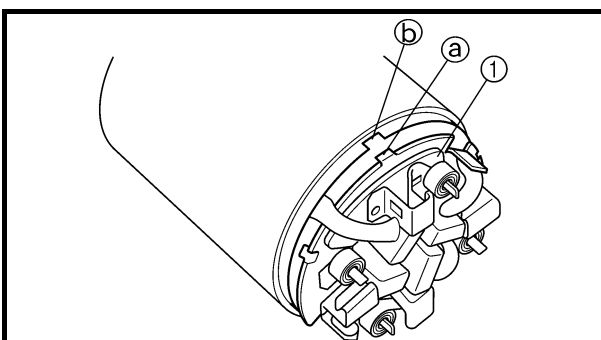


Out of specification → Replace the brush springs as a set.



Damage/wear → Replace the gear.

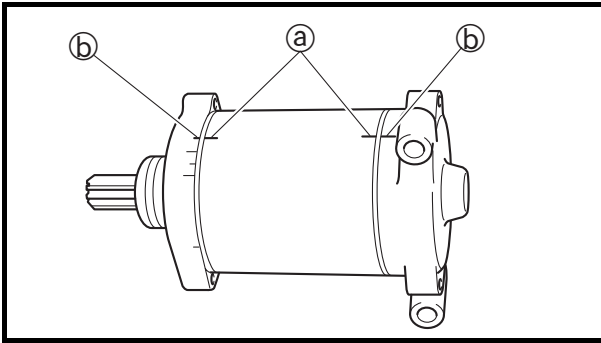
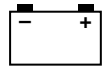
Damage/wear → Replace the defective part(s).



Align the projection **Ⓐ** on the rear bracket with the slot **Ⓑ** in the yoke.

STARTER MOTOR

ELEC

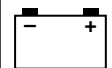


2. Install:

- yoke
- bracket

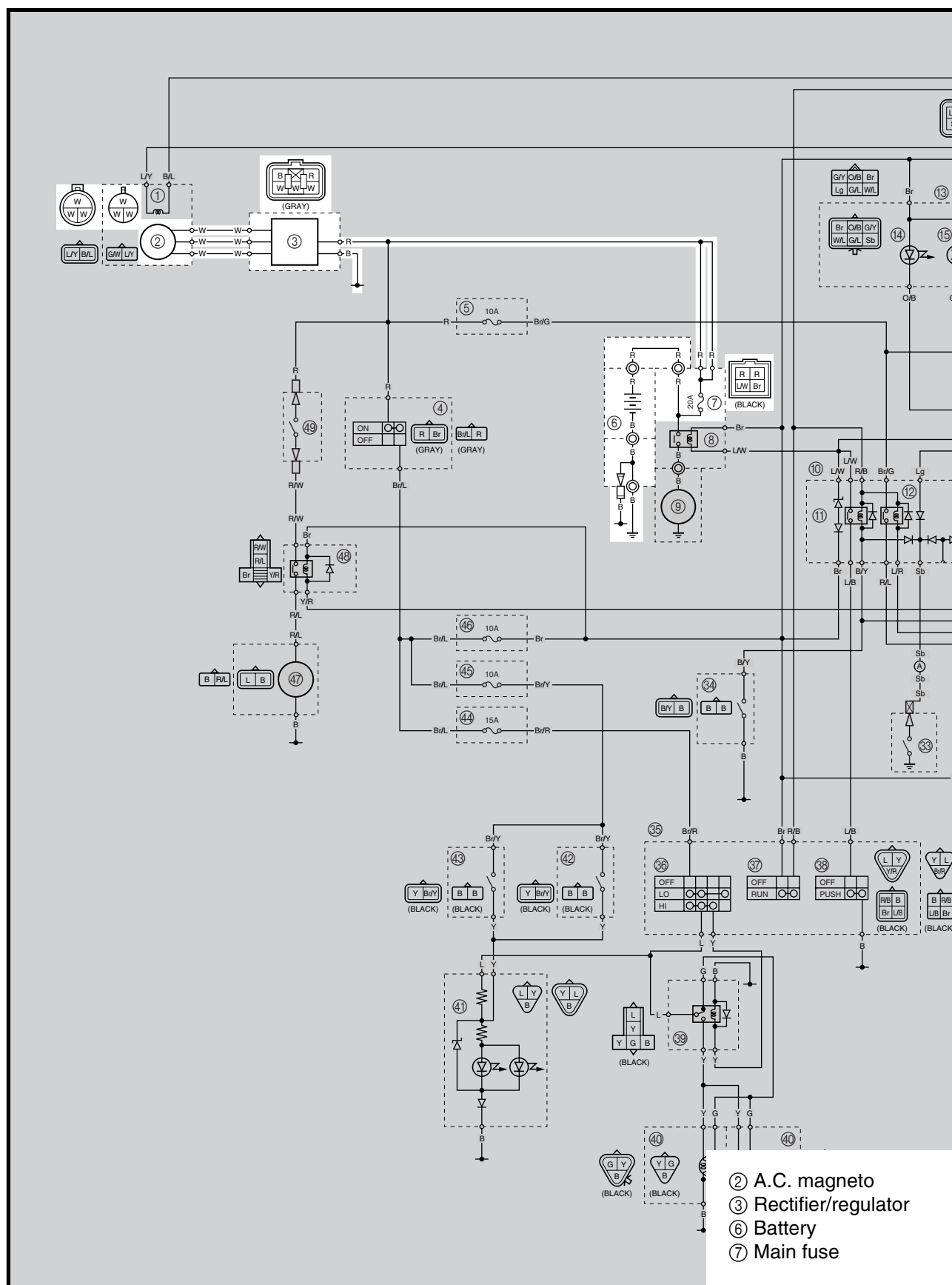
NOTE:

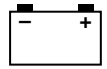
Align the match marks ① on the yoke with the match mark ② on the front bracket and the rear bracket.



EBS00516

CHARGING SYSTEM CIRCUIT DIAGRAM





EBS01065

TROUBLESHOOTING**The battery is not being charged.**

Check:

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

NOTE:

- Before troubleshooting, remove the following part(s):
 1. seat
 2. front tank cover
 3. side covers (left and right)
 4. front fender
- Troubleshoot with the following special tool(s).



Pocket tester
90890-03112
Analog pocket tester
YU-03112-C

EBS01043

1. Main fuse

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



YES



NO

Replace the main
fuse.

EBS01044

2. Battery

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



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

- Is the battery OK?

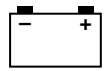


YES



NO

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

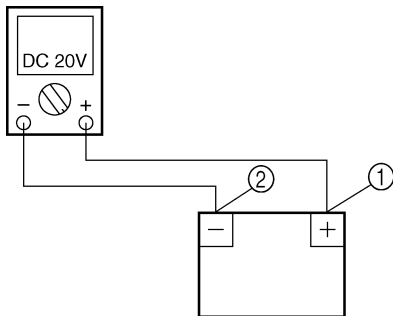


EBS01066

3. Charging voltage

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

Positive tester probe →
positive battery terminal ①
Negative tester probe →
negative battery terminal ②



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



Charging voltage
14 V at 5,000 r/min

NOTE: _____
Make sure the battery is fully charged.

- Is the charging voltage within specification?

NO

YES

The charging circuit is OK.

EBS0110

4. Stator coil resistance

- Disconnect the A.C. magneto coupler from the wire harness.
- Connect the pocket tester ($\Omega \times 1$) to the stator coils.

Tester (+) lead → White terminal ①

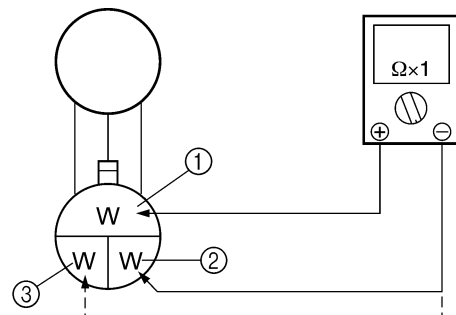
Tester (-) lead → White terminal ②

Tester (+) lead → White terminal ①

Tester (-) lead → White terminal ③

Tester (+) lead → White terminal ②

Tester (-) lead → White terminal ③



- Measure the stator coil resistance.



Stator coil resistance
0.248 ~ 0.372 Ω at 20 °C (68 °F)

YES

NO

Replace the crankshaft position sensor/stator assembly.

5. Wiring

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

YES

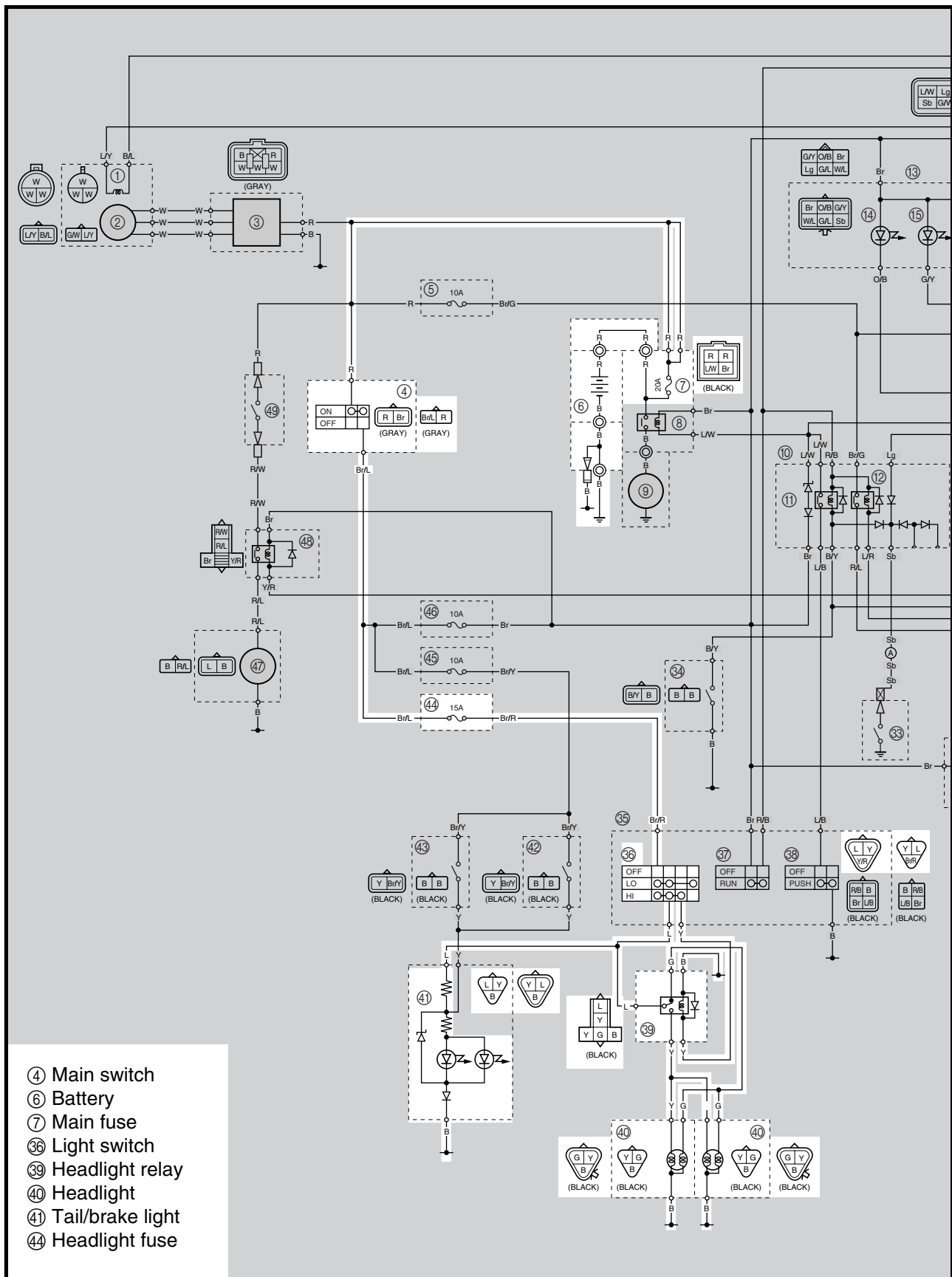
NO

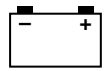
Replace the rectifier/regulator.

Properly connect or repair the charging system's wiring.

EBS00518

LIGHTING SYSTEM CIRCUIT DIAGRAM





EBS01067

TROUBLESHOOTING

Any of the following fail to light: head-light, tail/brake light.

Check:

1. main and headlight fuses
2. battery
3. main switch
4. light switch
5. wiring connections
(of the entire lighting system)

NOTE:

- Before troubleshooting, remove the following part(s):
 1. seat
 2. fuel tank cover
 3. side covers (left and right)
 4. front fender
- Troubleshoot with the following special tool(s).



Pocket tester
90890-03112
Analog pocket tester
YU-03112-C

EBS01043

1. Main and headlight fuses

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



YES



NO

Replace the fuse(s).

EBS01044

2. Battery

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



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

- Is the battery OK?



YES



NO

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

EBS01041

3. Main switch

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



YES



NO

Replace the main switch.

EAS00783

4. Light switch

- Check the light switch for continuity.
Refer to “CHECKING THE SWITCHES”.
- Is the light switch OK?

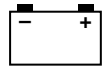


YES



NO

Replace the handle-bar switch.



EBS01069

5. Wiring

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



YES



NO

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

Properly connect or repair the lighting system's wiring.

EBS01070

CHECKING THE LIGHTING SYSTEM

1. The headlights fail to come on.

1. Headlight bulb and socket

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



YES



NO

Replace the headlight bulb, socket or both.

2. Headlight relay

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

A high beam

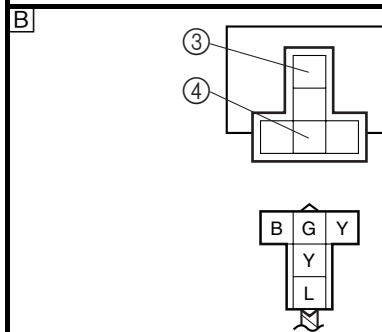
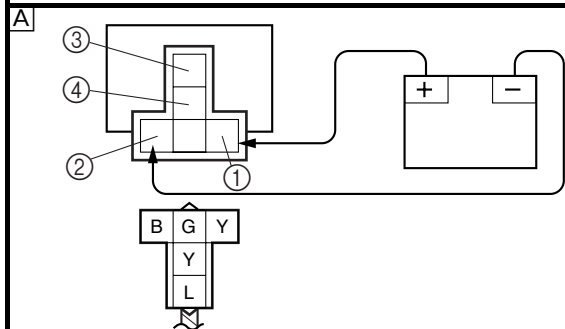
B low beam

Positive battery terminal → yellow ①

Negative battery terminal → black ②

Positive tester probe → blue ③

Negative tester probe → yellow ④



- Does the headlight relay have continuity between blue and yellow? **A**
- Does the headlight relay have continuity between blue and green? **B**

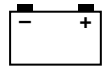


YES



NO

Replace the headlight relay.



3. Voltage

- Connect the pocket tester (DC 20 V) to the headlight couplers as shown.

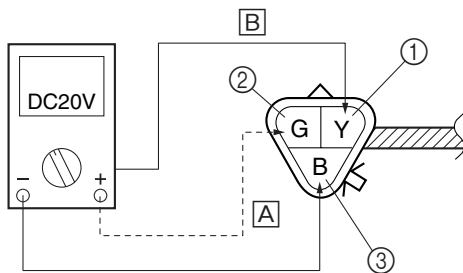
- [A] When the light switch is set to “LO”
[B] When the light switch is set to “HI”

Headlight coupler (wire harness side)

Headlight

Positive tester probe → yellow ① or green ②

Negative tester probe → black ③



- Set the main switch to “ON”.
- Set the light switch to “LO” or “HI”.
- Measure the voltage (DC 12 V) of yellow ① or green ② on the headlight coupler (wire harness side).
- Is the voltage within specification?

YES

NO

This circuit is OK.

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

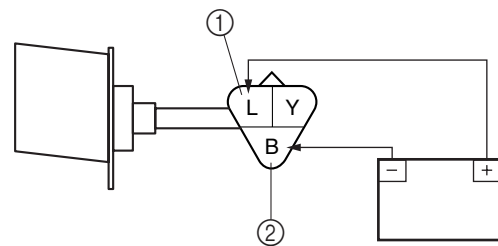
2. The tail light fails to come on.

1. Tail/brake light

- Disconnect the tail/brake light coupler (tail/brake light assembly side).
- Connect the battery (12 V) to the corresponding coupler terminals as shown.
- When the jumper leads are connected to the terminals the tail/brake light should illuminate.

Positive battery terminal → blue ①

Negative battery terminal → black ②

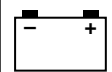


- Is the tail/brake light OK?

YES

NO

Replace the tail/brake light.



2. Voltage

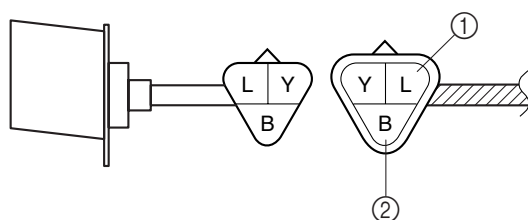
- Connect the pocket tester (DC 20 V) to the tail/brake light coupler as shown.

Tail/brake light coupler (wire harness side)

Tail/brake light

Positive tester probe → **blue** ①

Negative tester probe → **black** ②



- Set the main switch to “ON”.
- Set the light switch to “LO” or “HI”.
- Measure the voltage (DC 12 V) of blue ① on the tail/brake light coupler (wire harness side).
- Is the voltage within specification?



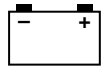
YES

This circuit is OK.



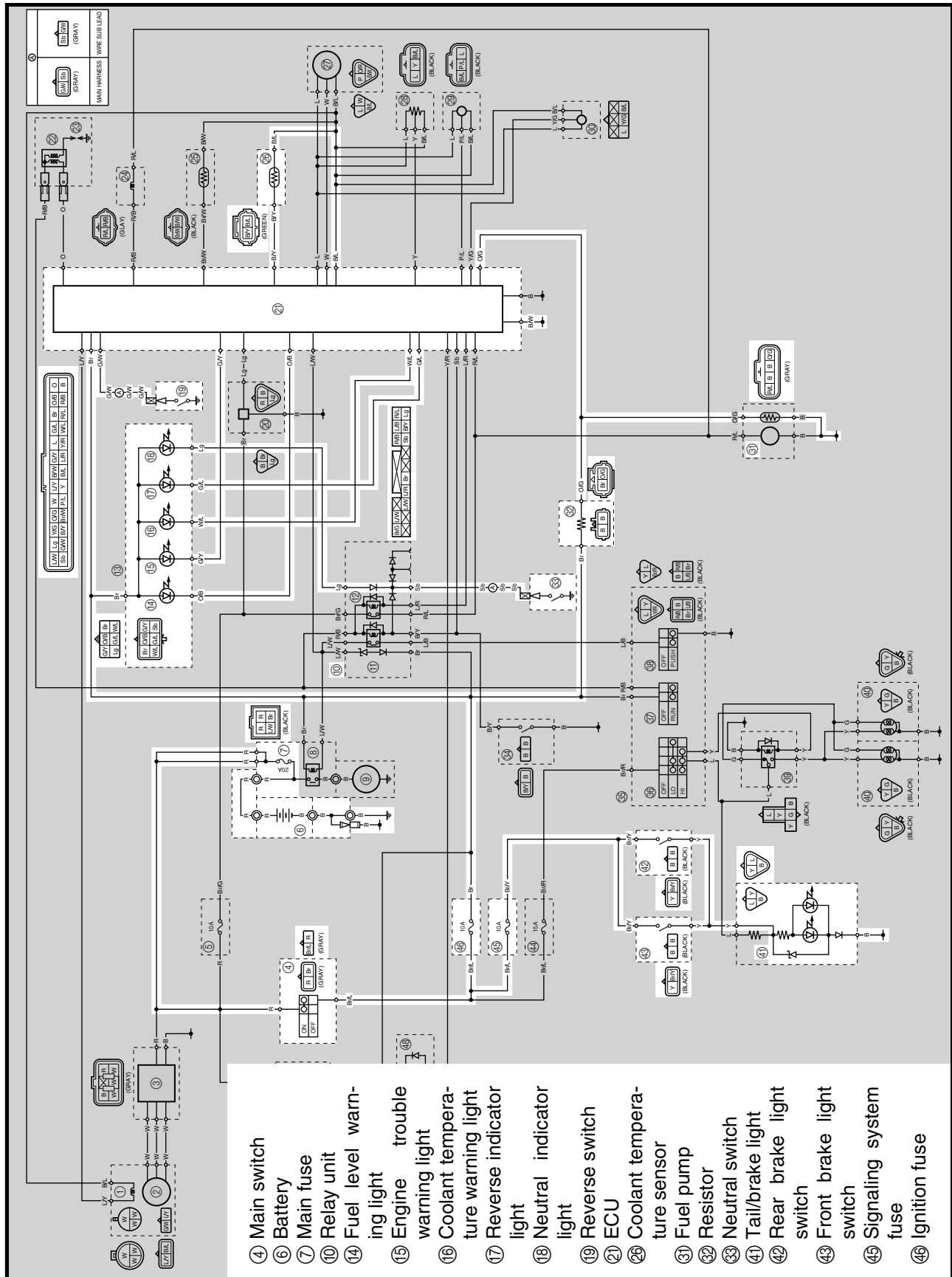
NO

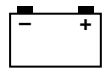
The wiring circuit from the main switch to the tail/brake light coupler is faulty and must be repaired.



EBS00521

SIGNALING SYSTEM CIRCUIT DIAGRAM





EBS01073

TROUBLESHOOTING

Any of the following fail to light: brake light or an indicator light.

Check:

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

NOTE:

- Before troubleshooting, remove the following part(s):
 1. seat
 2. fuel tank cover
 3. side covers (left and right)
 4. front fender
- Troubleshoot with the following special tool(s).



Pocket tester
90890-03112
Analog pocket tester
YU-03112-C

EBS01043

1. Main, ignition and signaling system fuses

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

YES

NO

Replace the fuse(s).

EBS01044

2. Battery

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



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

- Is the battery OK?

YES

NO

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

EBS01041

3. Main switch

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

YES

NO

Replace the main switch.

EBS01074

4. Wiring

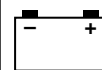
- Check the entire signaling system's wiring. Refer to “CIRCUIT DIAGRAM”.
- Is the signaling system's wiring properly connected and without defects?

YES

NO

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

Properly connect or repair the signaling system's wiring.



EBS01075

CHECKING THE SIGNALING SYSTEM

EBS01076

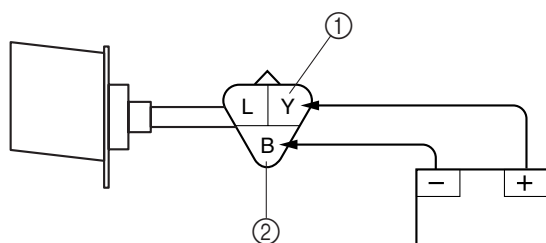
1. The brake light fails to come on.

1. Tail/brake light

- Disconnect the tail/brake light coupler from the wire harness.
- Connect the battery (12V) to the tail/brake light coupler as shown.
- When the jumper leads are connected to the terminals the tail/brake light should illuminate.

Positive battery terminal → yellow ①

Negative battery terminal → black ②



- Is the tail/brake light OK?

YES

NO

Replace the tail/brake light.

2. Brake light switches

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

YES

NO

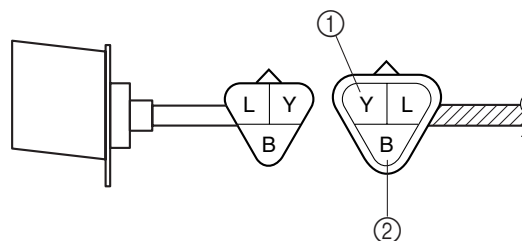
Replace the brake light switch.

3. Voltage

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

Positive tester probe → yellow ①

Negative tester probe → black ②



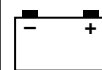
- Set the main switch to "ON".
- Pull in the brake lever or push down on the brake pedal.
- Measure the voltage (DC 12 V) of yellow ① on the tail/brake light coupler (wire harness side).
- Is the voltage within specification?

YES

NO

This circuit is OK.

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



EBS01077

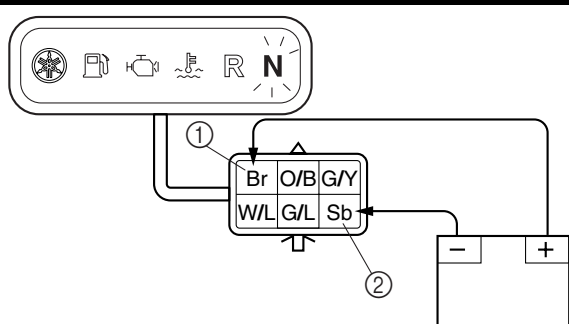
2. The neutral indicator light fails to come on.

1. Indicator light assembly

- Disconnect the indicator light assembly coupler from the wire harness.
- Connect the battery (12V) to the indicator light assembly coupler as shown.
- When the jumper leads are connected to the terminals the neutral indicator light should illuminate.

Positive battery terminal → **brown** ①

Negative battery terminal → **sky blue** ②



- Is the indicator light assembly OK?

YES

NO

Replace the indicator light assembly.

2. Neutral switch

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

YES

NO

Replace the neutral switch.

EBS01053

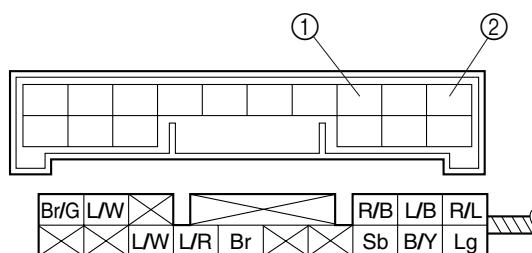
3. Relay unit (diode)

- Remove the relay unit from the wire harness.
- Connect the pocket tester ($\Omega \times 1$) to the relay unit as shown.
- Measure the relay unit for continuity as follows.

NOTE:

The pocket tester 90890-03112 and the analog pocket tester YU-03112-C readings are shown in the following table.

Positive tester probe → sky blue ①	Continuity
Negative tester probe → light green ②	
Positive tester probe → light green ②	No continuity
Negative tester probe → sky blue ①	

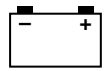


- Are the testing readings correct?

YES

NO

Replace the relay unit.

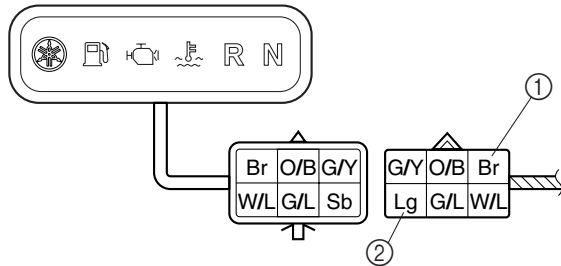


4. Voltage

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

Positive tester probe → brown ①

Negative tester probe → light green ②



- Set the main switch to “ON”.
- Shift the transmission into the neutral position.
- Measure the voltage (DC 12 V) of brown ① and light green ② at the indicator light assembly coupler (wire harness side).
- Is the voltage within specification?

YES

NO

This circuit is OK.

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

EBS01083

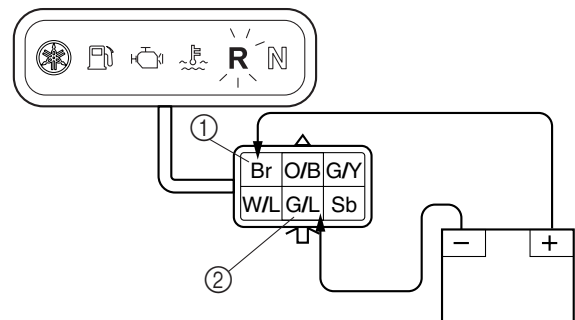
3. The reverse indicator light fails to come on.

1. Indicator light assembly

- Disconnect the indicator light assembly coupler from the wire harness.
- Connect the battery (12V) to the indicator light assembly coupler as shown.
- When the jumper leads are connected to the terminals the reverse indicator light should illuminate.

Positive battery terminal → brown ①

Negative battery terminal → green/blue ②



- Is the indicator light assembly OK?

YES

NO

Replace the indicator light assembly.

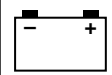
2. Reverse switch

- Check the reverse switch for continuity. Refer to “CHECKING THE SWITCHES”.
- Is the reverse switch OK?

YES

NO

Replace the reverse switch.

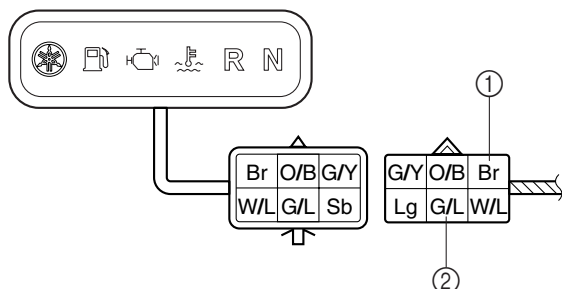


3. Voltage

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

Positive tester probe → brown ①

Negative tester probe → green/blue ②



- Set the main switch to "ON".
- Shift the transmission into the reverse position.
- Measure the voltage (DC 12 V) of brown ① and green/blue ② at the indicator light assembly coupler (wire harness side).
- Is the voltage within specification?

YES

NO

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

EBS01083

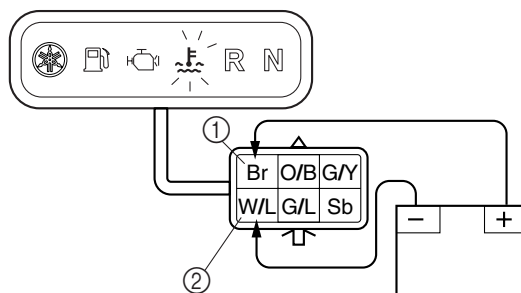
- The coolant temperature warning light does not come on when the main switch is set to "ON", or if the coolant temperature warning light does not come on when the temperature is high (more than 110 ~ 115 °C (230 ~ 239 °F)).

1. Indicator light assembly

- Disconnect the indicator light assembly coupler (from the wire harness).
- Connect the battery (12V) to the indicator light assembly coupler as shown.
- When the jumper leads are connected to the terminals the coolant temperature warning light should illuminate.

Positive battery terminal → brown ①

Negative battery terminal → white/blue ②

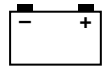


- Is the indicator light assembly OK?

YES

NO

Replace the indicator light assembly.



EBS00812

2. Coolant temperature sensor

- Remove the coolant temperature sensor from the cylinder head.
- Connect the pocket tester ($\Omega \times 10$) to the coolant temperature sensor ① as shown.
- Immerse the coolant temperature sensor in a container filled with coolant ②.

NOTE:

Make sure the coolant temperature sensor terminals do not get wet.

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

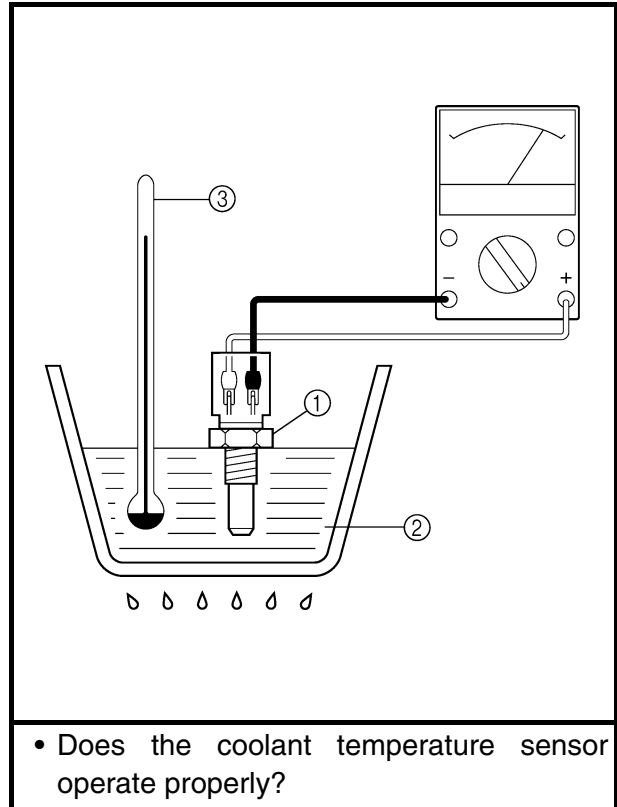
Test step	Coolant temperature	Resistance
1	20 °C (68 °F)	2.32 ~ 2.59 k Ω
2	80 °C (176 °F)	0.310 ~ 0.326 k Ω
3	110 °C (230 °F)	0.140 ~ 0.144 k Ω

⚠ WARNING

- Handle the coolant temperature sensor with special care.
- Never subject the coolant temperature sensor to strong shocks. If the coolant temperature sensor is dropped, replace it.



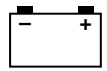
Coolant temperature sensor
18 Nm (1.8 m · kg, 13 ft · lb)



YES

NO

Replace the coolant temperature sensor.

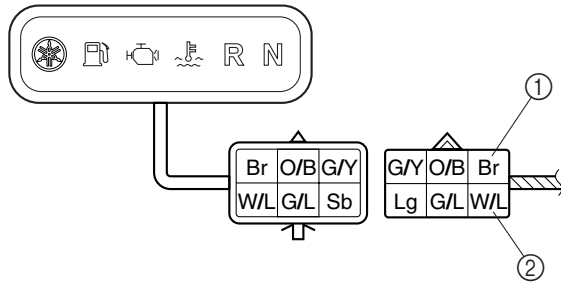


3. Voltage

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

Positive tester probe → brown ①

Negative tester probe → white/blue ②



- Set the main switch to "ON".
- Measure the voltage (DC 12 V) of brown ① and white/blue ② at the indicator light assembly coupler (wire harness side).

NOTE:

The voltage can only be measured during the initial test of the indicator light assembly after the main switch is set to "ON".

- Is the voltage within specification?

YES

NO

This circuit is OK.

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

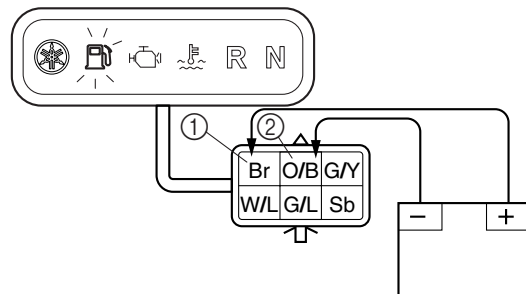
5. The fuel level warning light fails to come on.

1. Indicator light assembly

- Disconnect the indicator light assembly coupler from the wire harness.
- Connect the battery (12V) to the indicator light assembly coupler as shown.
- When the jumper leads are connected to the terminals the fuel level warning light should illuminate.

Positive battery terminal → brown ①

Negative battery terminal → orange/black ②

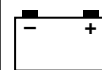


- Is the indicator light assembly OK?

YES

NO

Replace the indicator light assembly.



2. Fuel sender

- Drain the fuel from the fuel tank and then remove the fuel pump (fuel sender) from the fuel tank.
- Connect the pocket tester (DC 5 A) and battery (12 V) to the fuel pump terminals as shown.
- Immerse the fuel sender in a container filled with fuel.

Positive tester probe → orange/green ①

Negative tester probe → positive battery terminal

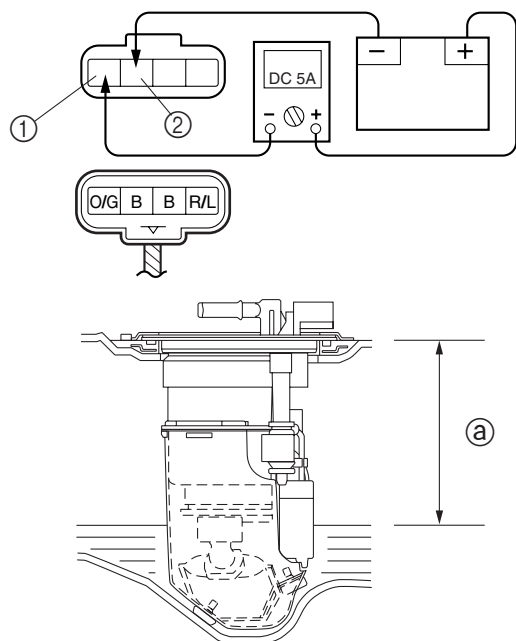
Negative battery terminal → black ②

- Measure the fuel sender current.

① Fuel level



Fuel sender current
Less than 109.85 (4.32 in) mm ①
→ Less than 60 mA
More than 109.85 (4.32 in) mm
① → More than 135 mA



- Is the fuel sender OK?

↓ YES

↓ NO

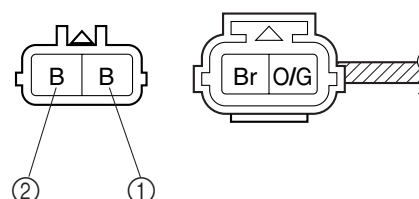
Replace the fuel pump.

3. Resistor

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

Positive tester probe → black ①

Negative tester probe → black ②



- Measure the resistor resistance.



Resistor resistance
68 Ω at 20 °C (68 °F)

- Is the resistor OK?

↓ YES

↓ NO

Replace the resistor assembly.

4. Wiring

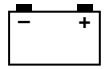
- Check the entire signaling system's wiring. Refer to "CIRCUIT DIAGRAM".
- Is the signaling system's wiring properly connected and without defects?

↓ YES

↓ NO

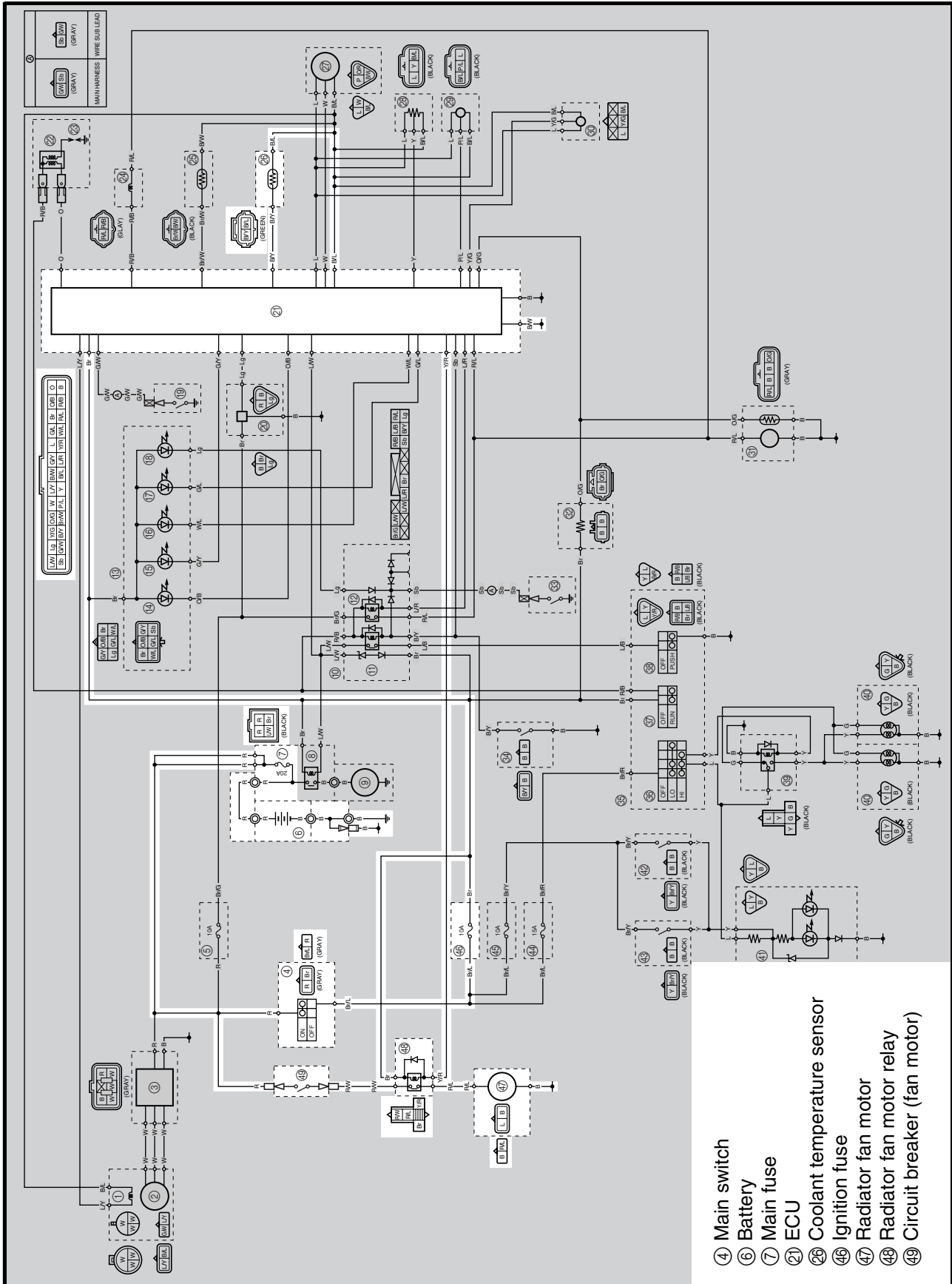
Replace the ECU.

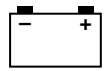
Properly connect or repair the signaling system's wiring.



EBS00532

COOLING SYSTEM CIRCUIT DIAGRAM





EBS01085

TROUBLESHOOTING

The radiator fan motor fails to turn.

Check:

1. main and ignition fuses
2. battery
3. main switch
4. radiator fan motor
5. radiator fan motor relay
6. circuit breaker (fan motor)
7. coolant temperature sensor
8. wiring connections
(the entire cooling system)

NOTE:

- Before troubleshooting, remove the following part(s):
 1. seat
 2. fuel tank cover
 3. side covers (left and right)
 4. front fender
- Troubleshoot with the following special tool(s).



Pocket tester
90890-03112
Analog pocket tester
YU-03112-C

EBS01043

1. Main and ignition fuses

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

↓ YES

↓ NO

Replace the fuse(s).

EBS01044

2. Battery

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



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

- Is the battery OK?

↓ YES

↓ NO

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

EBS01041

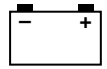
3. Main switch

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

↓ YES

↓ NO

Replace the main switch.



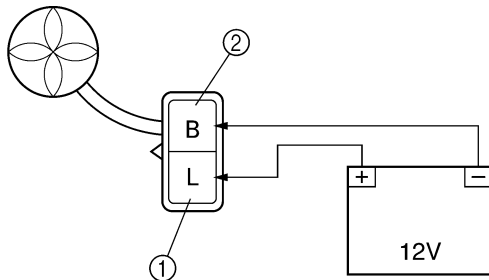
EBS01086

4. Radiator fan motor

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

Positive battery lead → blue ①

Negative battery lead → black ②



- Does the radiator fan motor turn?



YES



NO

The radiator fan motor is faulty and must be replaced.

5. Radiator fan motor relay

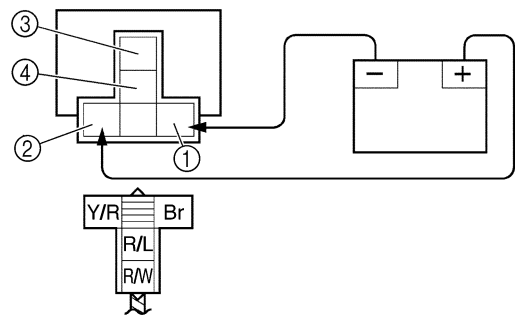
- Remove the radiator fan motor relay from the wire harness.
- Connect the pocket tester ($\Omega \times 1$) and battery (12 V) to the radiator fan motor relay terminal as shown.
- Check the radiator fan motor relay of continuity.

Positive battery lead → brown ①

Negative battery lead → yellow/red ②

Positive tester probe → red/white ③

Negative tester probe → red/blue ④



- Does the radiator fan motor relay have continuity between red/white and red/blue?

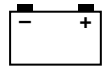


YES



NO

The radiator fan motor relay is faulty and must be replaced.



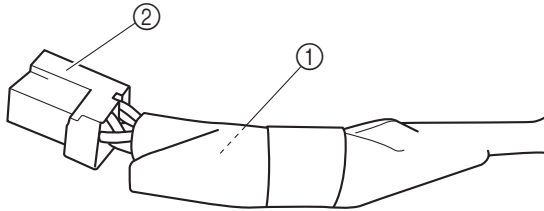
EBS01089

6. Circuit breaker (fan motor)

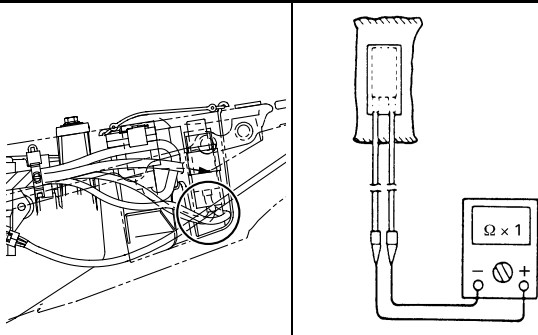
- Remove the circuit breaker from the wire harness.

NOTE:

The circuit breaker ① is attached to the wire harness with white tape near the headlight relay ②.



- Connect the pocket tester ($\Omega \times 1$) to the circuit breaker.



Circuit breaker resistance
Zero Ω at 20 °C (68 °F)



YES



NO

Replace the circuit breaker.

7. Coolant temperature sensor

- Remove the coolant temperature sensor from the cylinder head.
- Connect the pocket tester ($\Omega \times 10$) to the coolant temperature sensor ① as shown.
- Immerse the coolant temperature sensor in a container filled with coolant ②.

NOTE:

Make sure the coolant temperature sensor terminals do not get wet.

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

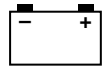
Test step	Coolant temperature	Resistance
1	20 °C (68 °F)	2.32 ~ 2.59 k Ω
2	80 °C (176 °F)	0.310 ~ 0.326 k Ω
3	110 °C (230 °F)	0.140 ~ 0.144 k Ω

⚠ WARNING

- Handle the coolant temperature sensor with special care.
- Never subject the coolant temperature sensor to strong shocks. If the coolant temperature sensor is dropped, replace it.



Coolant temperature sensor
18 Nm (1.8 m · kg, 13 ft · lb)



EBS01090

8. Wiring

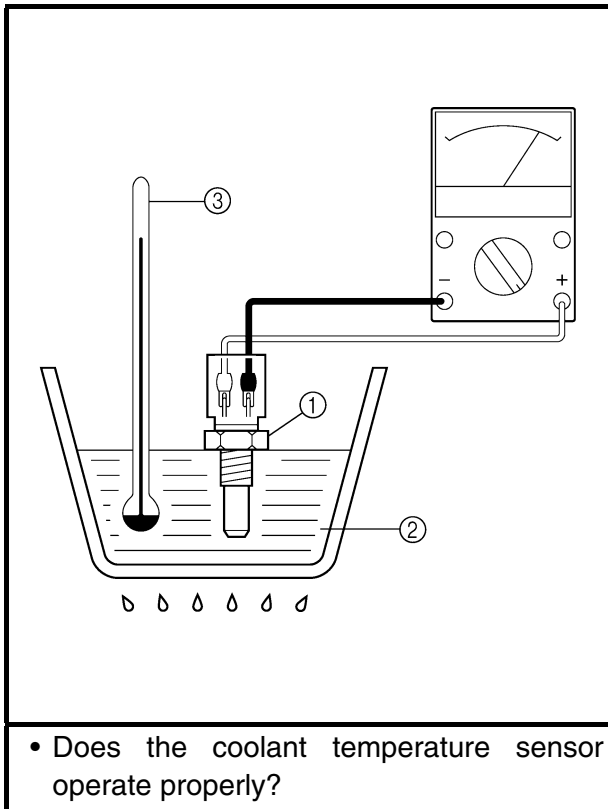
- Check the entire cooling system's wiring. Refer to "CIRCUIT DIAGRAM".
- Is the cooling system's wiring properly connected and without defects?



Replace the ECU.



Properly connect or repair the cooling system's wiring.



Replace the coolant temperature sensor.

CHAPTER 9

TROUBLESHOOTING

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TROUBLESHOOTING**NOTE:**

The following troubleshooting does not cover all the possible causes of trouble. It should be helpful, however, as a guide to troubleshooting. Refer to the relative procedure in this manual for check, adjustment and replacement of parts.

STARTING FAILURE/HARD STARTING**FUEL SYSTEM****Fuel tank**

- Empty fuel tank
- Clogged fuel strainer
- Clogged fuel tank breather hose
- Deteriorated or contaminated fuel

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

Ignition system

- Faulty ECU
- Faulty crankshaft position sensor

Switches and wiring

- Faulty main switch
- Faulty engine stop switch
- Broken or shorted wiring
- Faulty neutral switch
- Faulty start switch
- Faulty clutch switch
- Loose connections

Starter motor

- Faulty starter motor
- Faulty starter relay
- Faulty relay unit
- Faulty starter clutch

Battery

- Faulty battery

COMPRESSION SYSTEM**Cylinder and cylinder head**

- Loose spark plug
- Loose cylinder head or cylinder
- Broken cylinder head gasket
- Broken cylinder gasket
- Worn, damaged or seized cylinder

Valves, camshaft and crankshaft

- Improperly sealed valve
- Improperly contacted valve and valve seat
- Improper valve timing
- Broken valve spring
- Seized camshaft
- Seized crankshaft

Piston and piston rings

- Improperly installed piston ring
- Worn, fatigued or broken piston ring
- Seized piston ring
- Seized or damaged piston

Crankcase and crankshaft

- Improperly seated crankcase
- Seized crankshaft

Valve train

- Improperly adjusted valve clearance
- Improperly adjusted valve timing

EBS00538

POOR IDLE SPEED PERFORMANCE

POOR IDLE SPEED PERFORMANCE

Electrical system

- Faulty spark plug
- Faulty ECU
- Faulty crankshaft position sensor
- Faulty ignition coil

Valve train

- Improperly adjusted valve clearance

Air filter

- Clogged air filter element

EBS00539

POOR MEDIUM AND HIGH-SPEED PERFORMANCE

POOR MEDIUM AND HIGH-SPEED PERFORMANCE

ENGINE

Air filter

- Clogged air filter element

Air intake system

- Clogged or leaking air duct

FUEL SYSTEM

Fuel pump

- Faulty fuel pump

EBS00541

FAULTY GEAR SHIFTING

HARD SHIFTING

Refer to "CLUTCH DRAGGING".

SHIFT PEDAL DOES NOT MOVE

Shift shaft

- Bent shift shaft

Shift cam, shift forks

- 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 GEAR

Shift shaft

- Improperly adjusted shift lever position
- Improperly returned stopper lever

Shift forks

- Worn shift fork

Shift drum

- Improper thrust play
- Worn shift cam groove

Transmission

- Worn gear dog

EBS00545

CLUTCH SLIPPING/DRAGGING

CLUTCH SLIPPING

Clutch

- Loose clutch spring
- Fatigued clutch spring
- Worn friction plate
- Worn clutch plate
- Incorrectly assembled clutch

Engine oil

- Low oil level
- Improper quality (low viscosity)
- Deteriorated oil

CLUTCH DRAGGING

Clutch

- Warped pressure plate
- Unevenly tensioned clutch springs
- Match marks not aligned
- Loose clutch boss nut
- Burnt primary driven gear bushing
- Bent clutch plate
- Swollen friction plate
- Broken clutch boss

Engine oil

- Improper quality (high viscosity)
- Deteriorated oil

EBS00546

OVERHEATING

OVERHEATING

Ignition system

- Improper spark plug gap
- Improper spark plug heat range
- Faulty ECU

Fuel system

- 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
- Faulty fan motor
- Faulty coolant temperature sensor
- Thermostat stays closed

EBS00548

OVERCOOLING

COOLING SYSTEM

Thermostat

- Thermostat stays open

EBS00550

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

EBS00551

SHOCK ABSORBER MALFUNCTION

MALFUNCTION

- Bent or damaged damper rod
- Damaged oil seal lip
- Fatigued shock absorber spring
- Leaking oil or gas

EBS00552

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

EBS00553

LIGHTING SYSTEM

HEADLIGHT DOES NOT COME ON

- Improper bulb
- Too many electrical accessories
- Hard charging (broken stator coil and/or faulty rectifier/regulator)
- Incorrect connection
- Improperly grounded
- Poor contacts (main or light switch)
- Bulb life expired
- Faulty headlight relay

TAIL/BRAKE LIGHT DOES NOT COME ON

- Too many electrical accessories
- Incorrect connection
- Wrong tail/brake light LED

HEADLIGHT BULB BURNT OUT

- Improper bulb
- Faulty battery
- Faulty rectifier/regulator
- Improperly grounded
- Faulty main switch
- Faulty light switch
- Bulb life expired

YFM700RV 2006 WIRING DIAGRAM

	COLOR CODE
① Crankshaft position sensor	BBlack
② A.C. magneto	BrBrown
③ Rectifier/regulator	GGreen
④ Main switch	LBlue
⑤ Fuel injection system fuse	LgLight green
⑥ Battery	OOrange
⑦ Main fuse	PPink
⑧ Starter relay	RRed
⑨ Starter motor	SbSky blue
⑩ Relay unit	WWhite
⑪ Starting circuit cut-off relay	YYellow
⑫ Fuel pump relay	B/LBlack/Blue
⑬ Indicator light assembly	B/WBlack/White
⑭ Fuel level warning light	B/YBlack/Yellow
⑮ Engine trouble warning light	Br/GBrown/Green
⑯ Coolant temperature warning light	Br/LBrown/Blue
⑰ Reverse indicator light	Br/RBrown/Red
⑱ Neutral indicator light	Br/WBrown/White
⑲ Reverse switch	Br/YBrown/Yellow
⑳ Self-diagnosis signal coupler	G/LGreen/Blue
㉑ ECU	G/WGreen/White
㉒ Ignition coil	G/YGreen/Yellow
㉓ Spark plug	L/BBlue/Black
㉔ Fuel injector	L/RBlue/Red
㉕ Intake air temperature sensor	L/WBlue/White
㉖ Coolant temperature sensor	L/YBlue/Yellow
㉗ Speed sensor	O/BOrange/Black
㉘ Throttle position sensor	O/GOrange/Green
㉙ Intake air pressure sensor	O/ROrange/Red
㉚ Lean angle sensor	P/LPink/Blue
㉛ Fuel pump	R/BRed/Black
㉜ Resistor	R/LRed/Blue
㉝ Neutral switch	R/WRed/White
㉞ Clutch switch	W/LWhite/Blue
㉟ Handlebar switch	Y/GYellow/Green
㊱ Light switch	Y/RYellow/Red
㊲ Engine stop switch	
㊳ Start switch	
㊴ Headlight relay	
㊵ Headlight	
㊶ Tail/brake light	
㊷ Rear brake light switch	
㊸ Front brake light switch	
㊹ Headlight fuse	
㊺ Signaling system fuse	
㊻ Ignition fuse	
㊼ Radiator fan motor	
㊽ Radiator fan motor relay	
㊾ Circuit breaker (fan motor)	



YAMAHA MOTOR CO., LTD.
2500 SHINGAI IWATA SHIZUOKA JAPAN

YFM700RV 2006
WIRING DIAGRAM

YFM700RV 2006
SCHÉMA DE CÂBLAGE

