



YZF-R1S YZF-R1SC

SERVICE MANUAL

EAS00010

**YZF-R1S/YZF-R1SC
SERVICE MANUAL**

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NOTICE

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

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

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

NOTE:

- This Service Manual contains information regarding periodic maintenance to the emission control system. Please read this material carefully.
- Designs and specifications are subject to change without notice.

IMPORTANT MANUAL INFORMATION

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



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



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

CAUTION:

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

NOTE:

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

HOW TO USE THIS MANUAL

This manual is intended as a handy, easy-to-read reference book for the mechanic. Comprehensive explanations of all installation, removal, disassembly, assembly, repair and check procedures are laid out with the individual steps in sequential order.

- ① The manual is divided into chapters. An abbreviation and symbol in the upper right corner of each page indicate the current chapter. Refer to “SYMBOLS”.
- ② Each chapter is divided into sections. The current section title is shown at the top of each page, except in Chapter 3 (“PERIODIC CHECKS AND ADJUSTMENTS”), where the sub-section title(s) appears.
- ③ Sub-section titles appear in smaller print than the section title.
- ④ To help identify parts and clarify procedure steps, there are exploded diagrams at the start of each removal and disassembly section.
- ⑤ Numbers are given in the order of the jobs in the exploded diagram. A circled number indicates a disassembly step.
- ⑥ Symbols indicate parts to be lubricated or replaced. Refer to “SYMBOLS”.
- ⑦ A job instruction chart accompanies the exploded diagram, providing the order of jobs, names of parts, notes in jobs, etc.
- ⑧ Jobs requiring more information (such as special tools and technical data) are described sequentially.

②
①

CLUTCH
ENG

CLUTCH
CLUTCH COVER

CLUTCH
ENG

REMOVING THE CLUTCH

1. Remove:
• clutch cover ①
• gasket

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:
• compression spring bolts ①
• compression springs
• pressure plate ②
• pull rod ③

3. Remove:
• friction plate 1

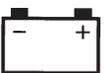
4. Remove:
• clutch plate 1 ①
• friction plate 2

5. Straighten the clutch boss nut rib ①.

Order	Job/Part	Q'ty	Remarks
	Removing the clutch cover		Remove the parts in the order listed.
	Right side cowl		Refer to “COWLINGS” in chapter 3.
	Bottom cowl		Drain.
	Engine oil		Refer to “CHANGING THE ENGINE OIL” in chapter 3.
1	Cover	1	
2	Clutch cable	1	Disconnect.
3	Clutch cover	1	
4	Clutch cover gasket	1	
5	Dowel pin	2	
6	Oil filler cap	1	
			For installation, reverse the removal procedure.

5-46

5-50

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

SYMBOLS

The following symbols are not relevant to every vehicle.

Symbols ① to ⑨ indicate the subject of each chapter.

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

Symbols ⑩ to ⑰ indicate the following.

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

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

- ⑱ Engine oil
- ⑲ Gear oil
- ⑳ Molybdenum-disulfide oil
- ㉑ Wheel-bearing grease
- ㉒ Lithium-soap-based grease
- ㉓ Molybdenum-disulfide grease

Symbols ㉔ to ㉕ in the exploded diagrams indicate the following.

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

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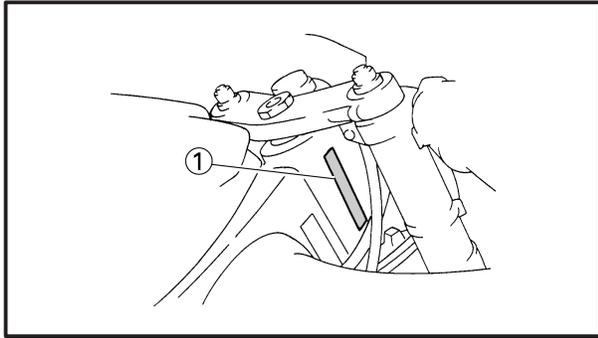
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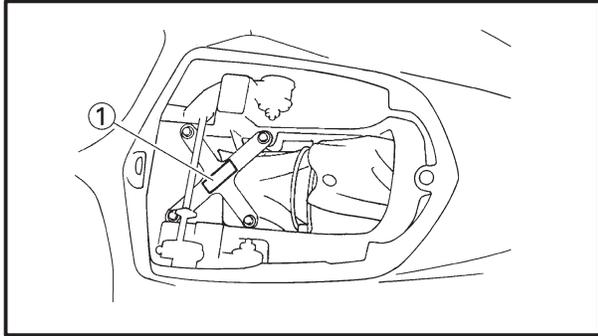
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GENERAL INFORMATION MOTORCYCLE IDENTIFICATION

EAS00017

VEHICLE IDENTIFICATION NUMBER

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

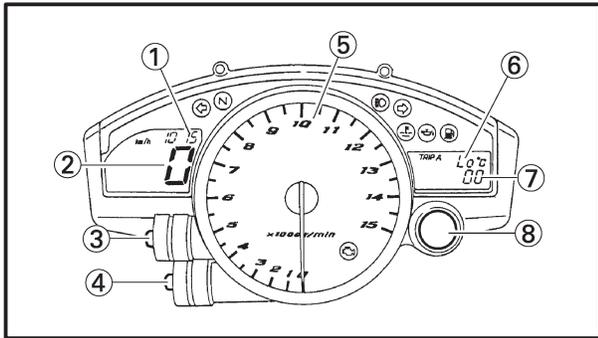


EAS00018

MODEL LABEL

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

EAS00019



- ① Clock
- ② Speedometer
- ③ “SELECT” button
- ④ “RESET” button
- ⑤ Tachometer
- ⑥ Coolant temperature display/air intake temperature display
- ⑦ Odometer/tripmeters/fuel reserve tripmeter/stopwatch
- ⑧ Shift timing indicator light

FEATURES
INSTRUMENT FUNCTIONS

Multi-function display

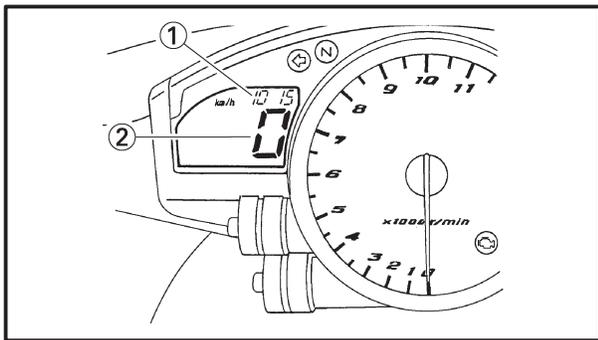
The multi-function meter unit is equipped with the following:

- a speedometer (which shows the riding speed)
- a tachometer (which shows engine speed)
- an odometer (which shows the total distance traveled)
- two tripmeters (which show the distance traveled since they were last set to zero)
- a fuel reserve tripmeter (which shows the distance traveled since the fuel level warning light came on)
- a stopwatch
- a clock
- a coolant temperature display
- an air intake temperature display
- a self-diagnosis device
- a display brightness and shift timing indicator light control mode

1

NOTE:

- Be sure to turn the key to “ON” before using the “SELECT” and “RESET” buttons.



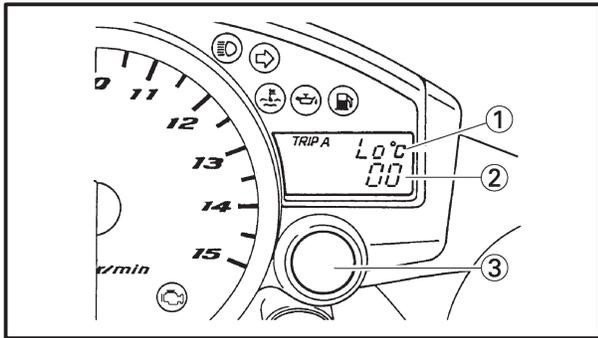
- ① Clock
- ② Speedometer

Clock mode

Turn the key to “ON”.

To set the clock

1. Push the “SELECT” button and “RESET” button together for at least two seconds.
2. When the hour digits start flashing, push the “RESET” button to set the hours.
3. Push the “SELECT” button, and the minute digits will start flashing.
4. Push the “RESET” button to set the minutes.
5. Push the “SELECT” button and then release it to start the clock.



- ① Coolant temperature display/air intake temperature display
- ② Odometer/tripmeters/fuel reserve tripmeter/stopwatch
- ③ Shift timing indicator light

Odometer, tripmeter, and stopwatch modes

Push the “SELECT” button to switch the display between the odometer mode “ODO”, the tripmeter modes “TRIP A” and “TRIP B” and the stopwatch mode in the following order:

TRIP A → TRIP B → ODO → Stopwatch → TRIP A

If the fuel level warning light comes on, the odometer display will automatically change to the fuel reserve tripmeter mode “F-TRIP” and start counting the distance traveled from that point. In that case, push the “SELECT” button to switch the display between the various tripmeter, odometer, and stopwatch modes in the following order:

F-TRIP → Stopwatch → TRIP A → TRIP B → ODO → F-TRIP

To reset a tripmeter, select it by pushing the “SELECT” button, and then push the “RESET” button for at least one second. If you do not reset the fuel reserve tripmeter manually, it will reset itself automatically and the display will return to the prior mode after refueling and traveling 5 km (3 mi).

Stopwatch mode

Standard measurement

1. Push the “RESET” button to start the stopwatch.
2. Push the “SELECT” button to stop the stopwatch.
3. Push the “SELECT” button again to reset the stopwatch.

Split-time measurement

1. Push the “RESET” button to start the stopwatch.
2. Push the “RESET” button to measure split-times. (The colon “:” will start flashing.)
3. Push the “RESET” button to display the final split-time or push the “SELECT” button to stop the stopwatch and display total elapsed time.
4. Push the “SELECT” button to reset the stopwatch.

Coolant temperature display

The coolant temperature display indicates the temperature of the coolant. Push the “RESET” button to switch the coolant temperature display to the air intake temperature display.

NOTE: _____

When the coolant temperature display is selected, “C” is displayed before the coolant temperature.

Air intake temperature display

The air intake temperature display indicates the temperature of the air drawn into the air filter case. Push the “RESET” button to switch the coolant temperature display to the air intake temperature display.

NOTE: _____

- Even if the air intake temperature is set to be displayed, the coolant temperature warning light comes on when the engine overheats.
- When the key is turned to “ON”, the coolant temperature is automatically displayed, even if the air intake temperature was displayed prior to turning the key to “OFF”.
- When the air intake temperature display is selected, “A” is displayed before the temperature.

Self-diagnosis devices

The model is equipped with a self-diagnosis device for various electrical circuits. If any of those circuits are defective, the engine trouble warning light will come on, and then the right display will indicate a two-digit error code (e.g.,11,12,13).

Display brightness and shift timing indicator light control mode

This mode cycles through five control functions, allowing you to make the following settings in the order listed below.

- Display brightness:
This function allows you to adjust the brightness of the displays and tachometer to suit the outside lighting conditions.
- Shift timing indicator light activity:
This function allows you to choose whether or not the indicator light should be activated and whether it should flash or stay on when activated.
- Shift timing indicator light activation:
This function allows you to select the engine speed at which the indicator light will be activated.
- Shift timing indicator light deactivation:
This function allows you to select the engine speed at which the indicator light will be deactivated.
- Shift timing indicator light brightness:
This function allows you to adjust the brightness of the indicator light to suit your preference.

NOTE:

- To make any settings in this mode, you have to cycle through all of its functions. However, if the key is turned to “OFF” or the engine is started before completing the procedure, only the settings made before the “SELECT” button was last pushed will be applied.
- In this mode, the right display shows the current setting for each function (except the shift timing indicator light activity function).

To adjust the brightness of the multifunction meter displays and tachometer

1. Turn the key to “OFF”.
2. Push and hold the “SELECT” button.
3. Turn the key to “ON”, and then release the “SELECT” button after five seconds.
4. Push the “RESET” button to select the desired brightness level.
5. Push the “SELECT” button to confirm the selected brightness level. The control mode changes to the shift timing indicator light activity function.

To set the shift timing indicator light activity function

1. Push the “RESET” button to select one of the following indicator light activity settings:
 - The indicator light will stay on when activated. (This setting is selected when the indicator light stays on.)
 - The indicator light will flash when activated. (This setting is selected when the indicator light flashes four times per second.)
 - The indicator light is deactivated; in other words, it will not come on or flash. (This setting is selected when the indicator light flashes once every two seconds.)
2. Push the “SELECT” button to confirm the selected indicator light activity. The control mode changes to the shift timing indicator light activation function.

To set the shift timing indicator light activation function

NOTE: _____

The shift timing indicator light activation function can be set between 7000 r/min and 15000 r/m. From 7000 r/min to 12000 r/min, the indicator light can be set in increments of 500 r/min. From 12000 r/min to 15000 r/min, the indicator light can be set in increments of 200 r/min.

1. Push the “RESET” button to select the desired engine speed for activating the indicator light.
2. Push the “SELECT” button to confirm the selected engine speed. The control mode changes to the shift timing indicator light deactivation function.

To set the shift timing indicator light deactivation function

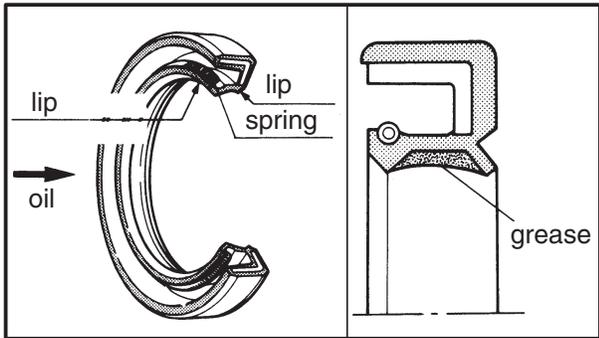
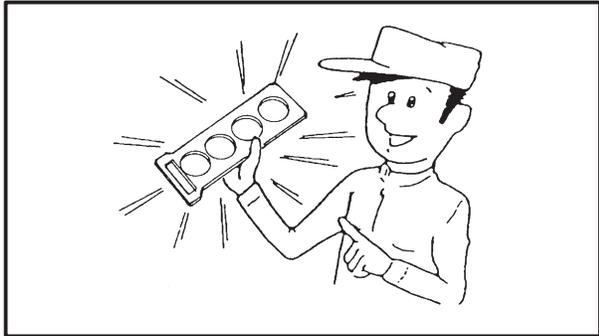
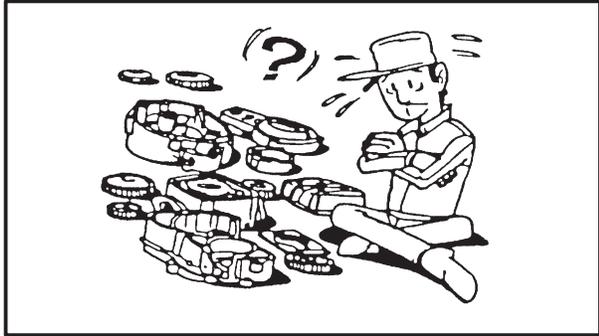
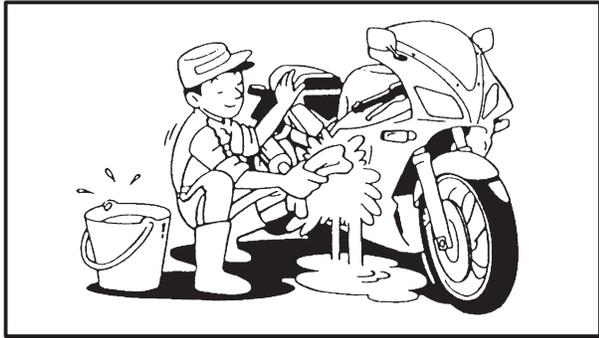
NOTE: _____

- The shift timing indicator light activation function can be set between 7000 r/min and 15000 r/min. From 7000 r/min to 12000 r/min, the indicator light can be set in increments of 500 r/min. From 12000 r/min to 15000 r/min, the indicator light can be set in increments of 200 r/min.
 - Be sure to set the deactivation function to a higher engine speed than for the activation function, otherwise the shift timing indicator light will remain deactivated.
-

1. Push the “RESET” button to select the desired engine speed for deactivating the indicator light.
2. Push the “SELECT” button to confirm the selected engine speed. The control mode changes to the shift timing indicator light brightness function.

To adjust the shift timing indicator light brightness

1. Push the “RESET” button to select the desired indicator light brightness level.
2. Push the “SELECT” button to confirm the selected indicator light brightness level. The right display will return to the odometer or tripmeter mode



EAS00020

**IMPORTANT INFORMATION
PREPARATION FOR REMOVAL AND
DISASSEMBLY**

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

EAS00021

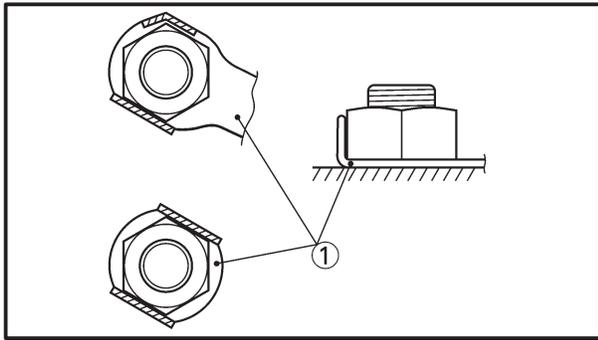
REPLACEMENT PARTS

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

EAS00022

GASKETS, OIL SEALS AND O-RINGS

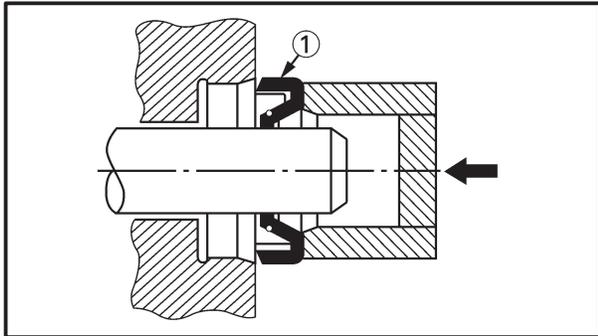
1. When overhauling the engine, replace all gaskets, seals and O-rings. All gasket surfaces, oil seal lips and O-rings must be cleaned.
2. During reassembly, properly oil all mating parts and bearings and lubricate the oil seal lips with grease.



EAS00023

LOCK WASHERS/PLATES AND COTTER PINS

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



EAS00024

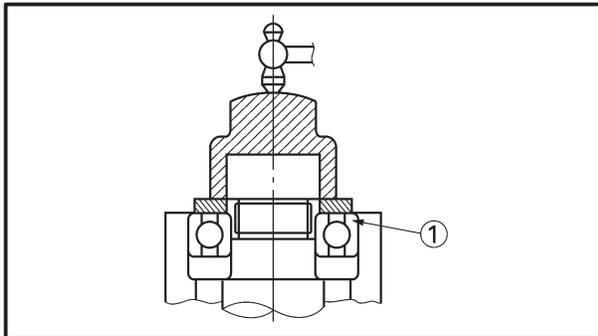
BEARINGS AND OIL SEALS

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.

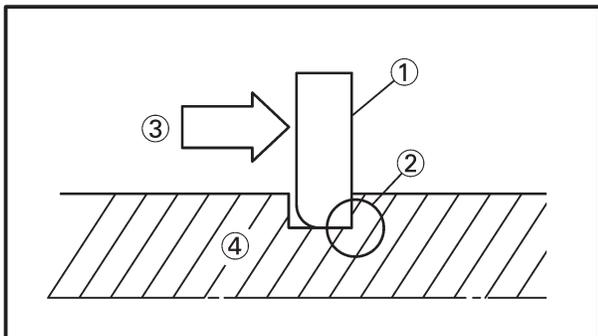
① Oil seal

CAUTION:

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



① Bearing



EAS00025

CIRCLIPS

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

④ Shaft

EAS00026

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.

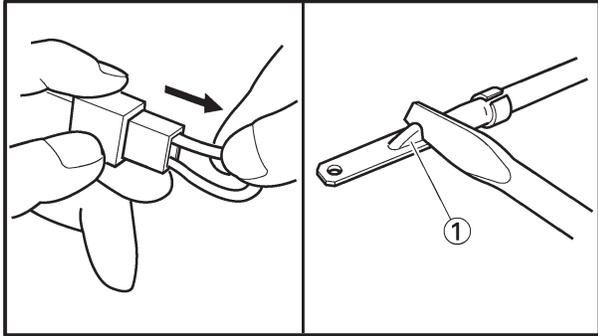
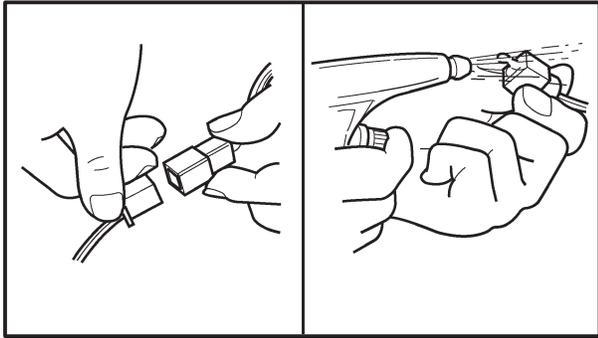
3. Check:

- all connections

Loose connection → Connect properly.

NOTE: _____

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

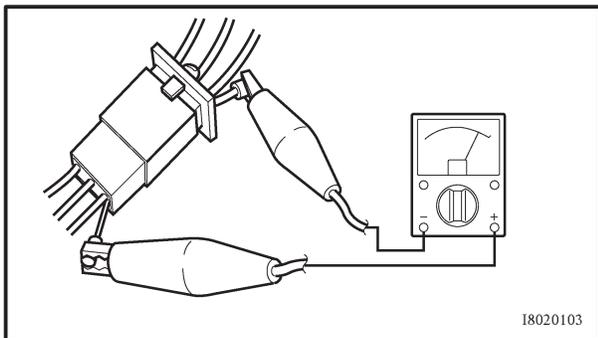


4. Connect:

- lead
- coupler
- connector

NOTE: _____

Make sure all connections are tight.



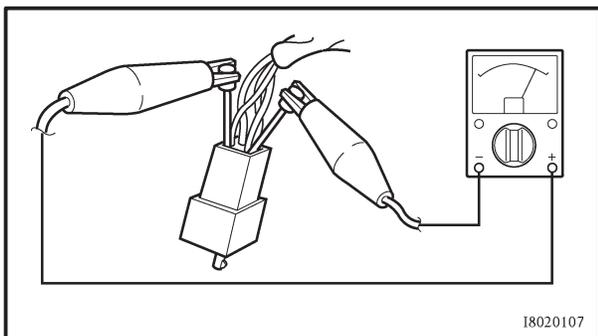
5. Check:

- continuity
(with the pocket tester)

	Pocket tester 90890-03112, YU-3112
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NOTE: _____

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



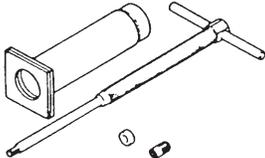
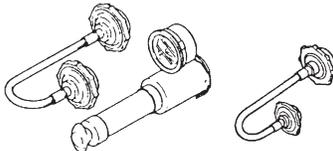
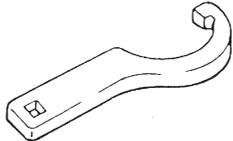
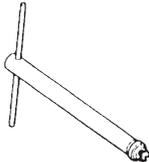
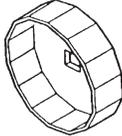
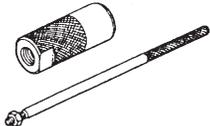
EAS00027

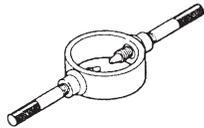
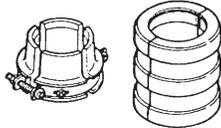
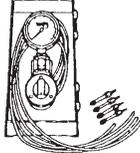
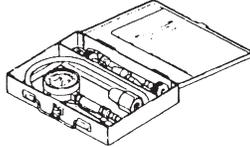
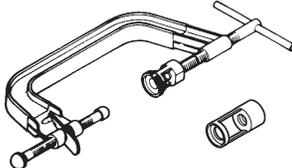
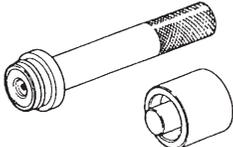
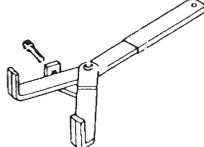
SPECIAL TOOLS

The following special tools are necessary for complete and accurate tune-up and assembly. Use only the appropriate special tools as this will help prevent damage caused by the use of inappropriate tools or improvised techniques. Special tools, part numbers or both may differ depending on the country. When placing an order, refer to the list provided below to avoid any mistakes.

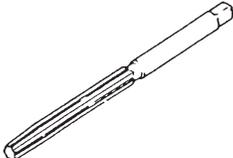
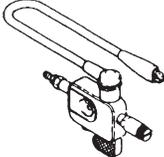
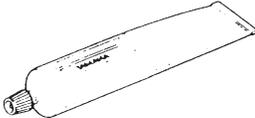
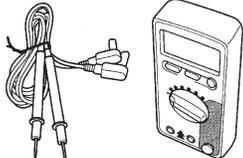
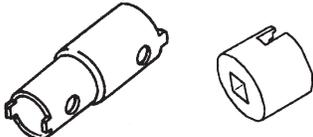
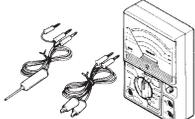
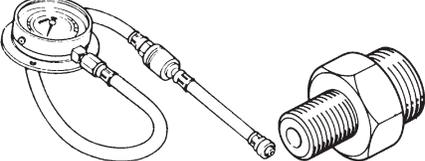
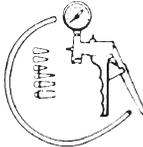
NOTE:

- For U.S.A. and Canada, use part number starting with “YM-”, “YU-”, or “ACC-”.
- For others, use part number starting with “90890-”.

Tool No.	Tool name/Function	Illustration
90890-01304 YU-01304	Piston pin puller This tool is used to remove the piston pins.	
Radiator cap tester 90890-01325 YU-24460-01 Adapter 90890-01352 YU-33984	Radiator cap tester Radiator cap tester adapter These tools are used to check the cooling system.	
90890-01403 YU-33975	Steering nut wrench This tool is used to loosen or tighten the steering stem ring nuts.	
90890-01423 YM-01423	Damper rod holder This tool is used to hold the damper rod assembly when loosening or tightening the damper rod assembly bolt.	
90890-01426 YU-38411	Oil filter wrench This tool is needed to loosen or tighten the oil filter cartridge.	
90890-01434 YM-01434	Rod holder This tool is used to support the damper adjusting rod.	
Rod puller 90890-01437 YM-01437 Rod puller attachment 90890-01436 YM-01436	Rod puller Rod puller attachment These tools are used to pull up the front fork damper rod.	

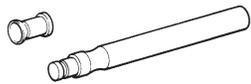
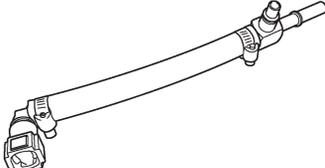
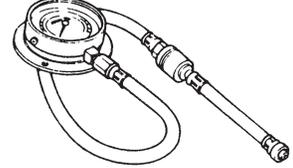
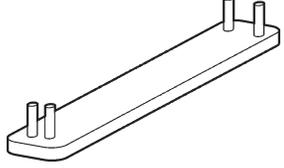
Tool No.	Tool name/Function	Illustration
90890-01441 YM-01441	<p>Fork spring compressor</p> <p>This tool is used to disassemble or assemble the front fork legs.</p>	
90890-01442 YM-01442	<p>Fork seal driver</p> <p>This tool is used to install the front fork's oil seal and dust seal.</p>	
90890-03094 YU-08030	<p>Vacuum gauge</p> <p>This guide is used to synchronize the carburetors.</p>	
Compression gauge 90890-03081 YU-33223 Adapter 90890-04136	<p>Compression gauge Compression gauge adapter</p> <p>These tools are used to measure engine compression.</p>	
Valve spring compressor 90890-04019 YM-04019 Attachment 90890-04108 YM-01253 90890-04114 YM-4114	<p>Valve spring compressor Valve spring compressor attachment</p> <p>These tools are used to remove or install the valve assemblies.</p>	
Middle driven shaft bearing driver 90890-04058 YM-4058 Mechanical seal installer 90890-04078 YM-33221	<p>Middle driven shaft bearing driver Mechanical seal installer</p> <p>These tools are used to install the water pump seal.</p>	
90890-04086 YM-91042	<p>Clutch holding tool</p> <p>This tool is used to hold the clutch boss when removing or installing the clutch boss nut.</p>	
90890-04111 90890-04116 YM-4116	<p>Valve guide remover</p> <p>This tool is used to remove or install the valve guides.</p>	
90890-04112 90890-04117 YM-4117	<p>Valve guide installer</p> <p>This tool is used to install the valve guides.</p>	



Tool No.	Tool name/Function	Illustration
90890-04113 YM-04113 90890-04118 YM-4118	Valve guide reamer This tool is used to rebores the new valve guides.	
90890-06754 YM-34487	Ignition checker This tool is used to check the ignition system components.	
90890-85505 ACC-1109-0501	Yamaha bond No. 1215 This bond is used to seal two mating surfaces (e.g., crankcase mating surfaces).	
90890-03174	Digital circuit tester This tool is used to check the electrical system.	
Pivot shaft wrench 90890-01471 YM-01471 Pivot shaft wrench adapter 90890-01476	Pivot shaft wrench Pivot shaft wrench adapter This tool is needed to loosen or tighten the spacer bolt.	
90890-03132 YU-3112	Pocket tester This instrument is needed for checking the engine oil temperature.	
Oil pressure gauge 90890-03153 YU-03153 Adapter 90890-03139	Oil pressure gauge Adapter These tools are used to measure engine oil pressure.	
90890-06756	Vacuum/pressure pump gauge set This tool used to measure the vacuum pressure.	
90793-80009	Engine tachometer This tool is needed for observing engine rpm.	

SPECIAL TOOLS

GEN INFO	
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Tool No.	Tool name/Function	Illustration
90890-04101	<p>Valve lapper</p> <p>This tool is needed to remove and install the valve lifter.</p>	
90890-03176 YM-03176	<p>Fuel pressure adapter</p> <p>This tool is needed to measure fuel pressure.</p>	
90890-03153 YU-03153	<p>Pressure gauge</p> <p>This tool is used to measure fuel pressure.</p>	
90890-04143 YM-04143	<p>Camshaft wrench</p> <p>This tool is used to hold and rotate the camshaft sprocket.</p>	



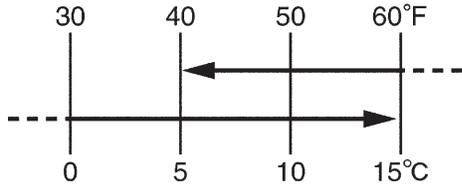
SPECIFICATIONS

GENERAL SPECIFICATIONS

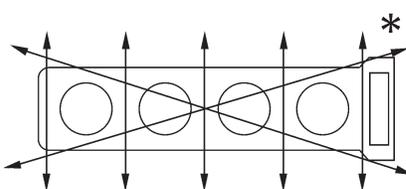
Item	Standard	Limit
Model code	5VY4 (USA), 5VY5 (CAL)	...
Dimensions		
Overall length	2,065 mm (8.13 in)	...
Overall width	720 mm (28.3 in)	...
Overall height	1,105 mm (43.5 in)	...
Seat height	835 mm (32.9 in)	...
Wheelbase	1,395 mm (54.9 in)	...
Minimum ground clearance	135 mm (5.31 in)	...
Minimum turning radius	3,400 mm (133.9 in)	...
Weight		
Wet (with oil and a full fuel tank)	193 kg (425 lb) (USA) 194 kg (428 lb) (CAL)	...
Maximum load (except motorcycle)	202 kg (445 lb) (USA) 201 kg (443 lb) (CAL)	...



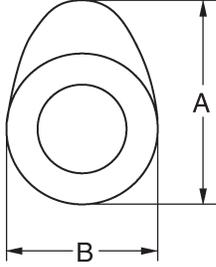
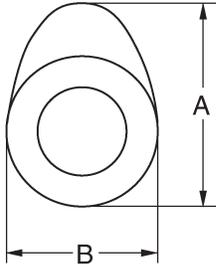
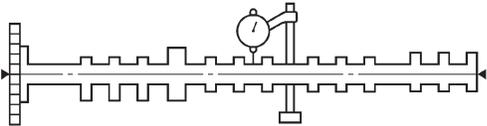
ENGINE SPECIFICATIONS

Item	Standard	Limit
<p>Engine Engine type Displacement Cylinder arrangement Bore × stroke Compression ratio Engine idling speed Vacuum pressure at engine idling speed Standard compression pressure (at sea level)</p>	<p>Liquid-cooled, 4-stroke, DOHC 998 cm³ (60.90 cu.in) Forward-inclined parallel 4-cylinder 77.0 × 53.6 mm (3.03 × 2.11 in) 12.4 : 1 1,150 ~ 1,250 r/min 22 kPa (165 mmHg, 6.5 inHg) 1,480 kPa (14.80 kg/cm², 14.80 bar, 210.5 psi) at 350 r/min</p>	<p>... </p>
<p>Fuel Recommended fuel Fuel tank capacity Total (including reserve) Reserve only</p>	<p>Premium unleaded gasoline only 18 L (3.96 Imp gal, 4.76 US gal) 3.4 L (0.75 Imp gal, 0.90 US gal)</p>	<p>... </p>
<p>Engine oil Lubrication system Recommended oil</p>  <p>Quantity Total amount Without oil filter cartridge replacement With oil filter cartridge replacement Oil pressure</p> <p>Engine oil temperature Relief valve opening pressure</p>	<p>Wet sump</p> <p>At 5°C (40°F) or higher Yamalube 4 (20W40) or SAE 20W40 type SE motor oil At 15°C (60°F) or lower Yamalube 4 (10W30) or SAE 10W30 type SE motor oil</p> <p>3.8 L (3.35 Imp qt, 4.02 US qt) 2.9 L (2.55 Imp qt, 3.07 US qt) 3.1 L (2.73 Imp qt, 3.28 US qt) 230 kPa at 5,000 r/min (2.3 kg/cm² at 5,000 r/min) (2.3 bar at 5,000 r/min) (32.7 psi at 5,000 r/min) 100°C (212°F) 600 ~ 680 kPa (6.0 ~ 6.8 kg/cm², 6.0 ~ 6.8 bar, 87.0 ~ 98.6 psi)</p>	<p>... </p>

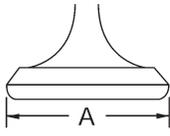
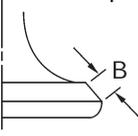
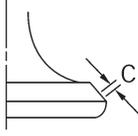
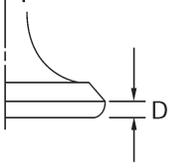
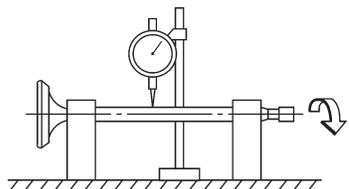


Item	Standard	Limit
Oil filter Oil filter type Bypass valve opening pressure	Paper 80 ~ 120 kPa (0.8 ~ 1.2 kg/cm ² , 0.8 ~ 1.2 bar, 11.6 ~ 17.4 psi)
Oil pump Oil pump type Inner-rotor-to-outer-rotor-tip clearance Outer-rotor-to-oil-pump-housing clearance	Trochoid 0.01 ~ 0.10 mm (0.0004 ~ 0.0039 in) 0.09 ~ 0.15 mm (0.00035 ~ 0.0059 in)	... 0.18 mm (0.0071 in) 0.22 mm (0.0087 in)
Cooling system Radiator capacity Radiator cap opening pressure Radiator core Width Height Depth Coolant reservoir Capacity Water pump Water pump type Reduction ratio Max. impeller shaft tilt	2.51 L (2.21 Imp qt, 2.65 US qt) 108 ~ 137 kPa (1.08 ~ 1.37 kg/cm ² , 1.0 ~ 1.3 bar, 15.6 ~ 19.9 psi) 380 mm (14.96 in) 258 mm (10.2 in) 24 mm (0.94 in) 0.25 L (0.22 Imp qt, 0.26 US qt) Single suction centrifugal pump 65/43 × 25/32 (1.181) 0.15 mm (0.006 in)
Starting system type	Electric starter	
Spark plugs Model (manufacturer) × quantity Spark plug gap	CR9EK (NGK) × 4 0.6 ~ 0.7 mm (0.0236 ~ 0.0276 in)
Cylinder head Volume Max. warpage 	12.5 ~ 13.1 cm ³ (0.76 ~ 0.80 cu.in) 0.10 mm (0.0039 in)

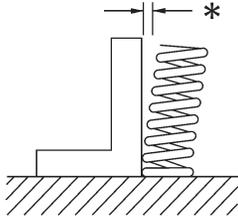


Item	Standard	Limit
<p>Camshafts Drive system Camshaft cap inside diameter Camshaft journal diameter Camshaft-journal-to-camshaft-cap clearance Intake camshaft lobe dimensions</p>	<p>Chain drive (right) 22.500 ~ 22.521 mm (0.8858 ~ 0.8867 in) 22.459 ~ 22.472 mm (0.8842 ~ 0.8847 in) 0.028 ~ 0.062 mm (0.0011 ~ 0.0024 in)</p>	<p>••• ••• •••</p>
		
<p>Measurement A</p>	<p>32.85 ~ 32.95 mm (1.293 ~ 1.297 in)</p>	<p>32.75 mm (1.289 in)</p>
<p>Measurement B</p>	<p>25.14 ~ 25.24 mm (0.990 ~ 0.994 in)</p>	<p>25.04 mm (0.986 in)</p>
<p>Exhaust camshaft lobe dimensions</p>		
		
<p>Measurement A</p>	<p>30.75 ~ 30.85 mm (1.211 ~ 1.215 in)</p>	<p>30.65 mm (1.207 in)</p>
<p>Measurement B</p>	<p>23.09 ~ 23.19 mm (0.909 ~ 0.913 in)</p>	<p>22.99 mm (0.905 in)</p>
<p>Max. camshaft runout</p>	<p>•••</p>	<p>0.03 mm (0.0012 in)</p>
		

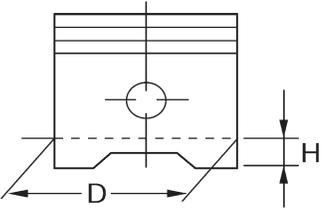
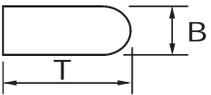
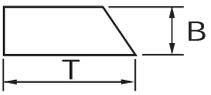
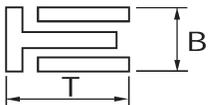


Item	Standard	Limit
Timing chain		
Model/number of links	RH2020/122	•••
Tensioning system	Automatic	•••
Valves, valve seats, valve guides		
Valve clearance (cold)		
Intake	0.11 ~ 0.20 mm (0.0043 ~ 0.0079 in)	•••
Exhaust	0.21 ~ 0.25 mm (0.0083 ~ 0.0098 in)	•••
Valve dimensions		
		
		
Head Diameter	Face Width	Seat Width
		Margin Thickness
Valve head diameter A		
Intake	23.4 ~ 23.6 mm (0.9213 ~ 0.9291 in)	•••
Exhaust	24.9 ~ 25.1 mm (0.9803 ~ 0.9882 in)	•••
Valve face width B		
Intake	1.76 ~ 2.90 mm (0.0693 ~ 0.1142 in)	•••
Exhaust	1.76 ~ 2.90 mm (0.0693 ~ 0.1142 in)	•••
Valve seat width C		
Intake	0.9 ~ 1.1 mm (0.0354 ~ 0.0433 in)	1.6 mm (0.06 in)
Exhaust	0.9 ~ 1.1 mm (0.0354 ~ 0.0433 in)	1.6 mm (0.06 in)
Valve margin thickness D		
Intake	0.5 ~ 0.9 mm (0.0197 ~ 0.0354 in)	0.5 mm (0.02 in)
Exhaust	0.5 ~ 0.9 mm (0.0197 ~ 0.0354 in)	0.5 mm (0.02 in)
Valve stem diameter		
Intake	3.975 ~ 3.990 mm (0.1565 ~ 0.1571 in)	3.945 mm (0.1553 in)
Exhaust	4.460 ~ 4.475 mm (0.1756 ~ 0.1762 in)	4.425 mm (0.1742 in)
Valve guide inside diameter		
Intake	4.000 ~ 4.012 mm (0.1575 ~ 0.1580 in)	4.050 mm (0.1594 in)
Exhaust	4.500 ~ 4.512 mm (0.1772 ~ 0.1776 in)	4.550 mm (0.1791 in)
Valve-stem-to-valve-guide clearance		
Intake	0.010 ~ 0.037 mm (0.0004 ~ 0.0015 in)	0.08 mm (0.0032 in)
Exhaust	0.025 ~ 0.052 mm (0.0010 ~ 0.0020 in)	0.10 mm (0.0039 in)
Valve stem runout	•••	0.01 mm (0.0004 in)
		
Valve seat width		
Intake	0.9 ~ 1.1 mm (0.0354 ~ 0.0433 in)	1.6 mm (0.06 in)
Exhaust	0.9 ~ 1.1 mm (0.0354 ~ 0.0433 in)	1.6 mm (0.06 in)

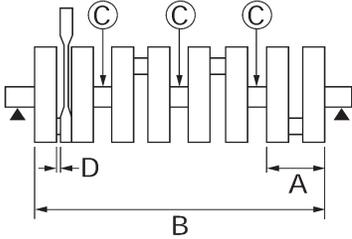


Item	Standard	Limit
Valve springs		
Free length		
Intake	39.3 mm (1.55 in)	37.3 mm (1.47 in)
Exhaust	39.3 mm (1.55 in)	37.3 mm (1.47 in)
Installed length (valve closed)		
Intake	32.7 mm (1.29 in)	•••
Exhaust	32.8 mm (1.29 in)	•••
Compressed spring force (installed)		
Intake	145.9 ~ 167.9 N (14.88 ~ 17.12 kg, 32.80 ~ 37.74 lb)	•••
Exhaust	164.1 ~ 188.9 N (16.73 ~ 19.26 kg, 36.89 ~ 42.46 lb)	•••
Spring tilt		
		
Intake	•••	2.5°/1.7 mm (0.07 in)
Exhaust	•••	2.5°/1.7 mm (0.07 in)
Winding direction (top view)		
Intake	Clockwise	•••
Exhaust	Clockwise	•••
		
Cylinders		
Cylinder arrangement	Forward-inclined, parallel 4-cylinder	•••
Bore × stroke	77.0 mm × 53.6 mm (3.03 × 2.11 in)	•••
Compression ratio	12.4 : 1	•••
Bore	77.00 ~ 77.01 mm (3.0315 ~ 3.0319 in)	•••
Max. out-of-round	•••	0.005 mm (0.0002 in)



Item	Standard	Limit
Piston		
Piston-to-cylinder clearance	0.010 ~ 0.035 mm (0.0004 ~ 0.0014 in)	0.120 mm (0.0047 in)
Diameter D	76.975 ~ 76.990 mm (3.0305 ~ 3.0311 in)	•••
		
Height H	5 mm (0.20 in)	•••
Piston pin bore (in the piston)		
Diameter	17.002 ~ 17.013 mm (0.6694 ~ 0.6698 in)	17.043 mm (0.6710 in)
Offset	0.5 mm (0.0197 in)	•••
Offset direction	Intake side	•••
Piston pins		
Outside diameter	16.991 ~ 17.000 mm (0.6689 ~ 0.6693 in)	16.971 mm (0.6682 in)
Piston-pin-to-piston-pin-bore clearance	0.002 ~ 0.022 mm (0.0001 ~ 0.0009 in)	0.072 mm (0.0028 in)
Piston rings		
Top ring		
Ring type	Barrel	•••
Dimensions (B × T)	0.90 × 2.75 mm (0.04 × 0.11 in)	•••
End gap (installed)	0.15 ~ 0.25 mm (0.0059 ~ 0.0098 in)	0.50 mm (0.0197 in)
Ring side clearance	0.030 ~ 0.065 mm (0.0012 ~ 0.0026 in)	0.115 mm (0.0045 in)
2nd ring		
		
Ring type	Taper	•••
Dimensions (B × T)	0.80 × 2.75 mm (0.03 × 0.11 in)	•••
End gap (installed)	0.30 ~ 0.45 mm (0.0118 ~ 0.0177 in)	0.80 mm (0.0315 in)
Ring side clearance	0.020 ~ 0.055 mm (0.0008 ~ 0.0022 in)	0.115 mm (0.0045 in)
Oil ring		
		
Dimensions (B × T)	1.50 × 2.25 mm (0.06 × 0.09 in)	•••
End gap (installed)	0.10 ~ 0.40 mm (0.0039 ~ 0.0158 in)	•••



Item	Standard	Limit
<p>Connecting rods Crankshaft-pin-to-big-end-bearing clearance Bearing color code</p>	<p>0.034 ~ 0.058 mm (0.0013 ~ 0.0023 in) 1 = Blue 2 = Black 3 = Brown 4 = Green</p>	<p>0.09 mm (0.0035 in) ...</p>
<p>Crankshaft</p>  <p>Width A Width B Max. runout C Big end side clearance D Crankshaft-journal-to-crankshaft-journal-bearing clearance Bearing color code</p>	<p>55.20 ~ 56.60 mm (2.17 ~ 2.23 in) 298.8 ~ 300.7 mm (11.76 ~ 11.84 in) ... 0.160 ~ 0.262 mm (0.0063 ~ 0.0103 in) 0.014 ~ 0.037 mm (0.0006 ~ 0.0015 in) 0 = White 1 = Blue 2 = Black 3 = Brown 4 = Green</p>	<p>... ... 0.03 mm (0.0012 in) ... 0.10 mm (0.0039 in) ...</p>



Item	Standard	Limit
Clutch		
Clutch type	Wet, multiple disc	•••
Clutch release method	Outer pull, rack and pinion pull	•••
Clutch release method operation	Cable operation	•••
Operation	Left-hand operation	•••
Clutch cable free play (at the end of the clutch lever)	10 ~ 15 mm (0.39 ~ 0.59 in)	•••
Friction plates		
Color code	Purple	•••
Thickness	2.9 ~ 3.1 mm (0.114 ~ 0.122 in)	2.8 mm (0.110 in)
Plate quantity	7	•••
Color code	Green	•••
Thickness	2.9 ~ 3.1 mm (0.114 ~ 0.112 in)	2.8 mm (0.110 in)
Plate quantity	1	•••
Color code	—	•••
Thickness	2.9 ~ 3.1 mm (0.114 ~ 0.112 in)	2.8 mm (0.110 in)
Plate quantity	1	•••
Clutch plates		
Thickness	1.9 ~ 2.1 mm (0.07 ~ 0.08 in)	•••
Plate quantity	8	•••
Max. warpage	•••	0.1 mm (0.0039 in)
Clutch springs		
Free length	52.5 mm (2.07 in)	49.9 mm (1.96 in)
Spring quantity	6	•••

ENGINE SPECIFICATIONS

SPEC



Item	Standard	Limit
Transmission		
Transmission type	Constant mesh, 6-speed	•••
Primary reduction system	Spur gear	•••
Primary reduction ratio	65/43 (1.512)	•••
Secondary reduction system	Chain drive	•••
Secondary reduction ratio	45/17 (2.647)	•••
Operation	Left-foot operation	•••
Gear ratios		
1st gear	38/15 (2.533)	•••
2nd gear	33/16 (2.063)	•••
3rd gear	37/21 (1.762)	•••
4nd gear	35/23 (1.522)	•••
5th gear	30/22 (1.364)	•••
6th gear	33/26 (1.269)	•••
Max. main axle runout	•••	0.08 mm (0.0032 in)
Max. drive axle runout	•••	0.08 mm (0.0032 in)
Shifting mechanism		
Shift mechanism type	Shift drum/Guide bar	•••
Max. shift fork guide bar bending	•••	0.10 mm (0.0039 in)
Air filter type		
	Oil coated paper element	•••
Fuel pump		
Pump type	Electrical	•••
Model (manufacturer)	5PW (DENSO)	•••
Output pressure	294 kPa (2.94 kg/cm ² , 2.94 bar, 42.6 psi)	•••
Throttle position sensor		
Resistance	4.9 ~ 5.1 kΩ at 20°C (68°F)	•••
Output voltage (at idle)	0.63 ~ 0.73 V	•••
Throttle bodies		
Model (manufacturer) × quantity	45EIDW (MIKUNI) × 2	•••
Intake vacuum pressure	22 kPa (165 mmHg, 6.4966 inHg)	•••
Throttle cable free play (at the flange of the throttle grip)	3 ~ 5 mm (0.12 ~ 0.20 in)	•••
ID mark	5VY1 00 (USA) 5VY5 10 (CAL)	•••
Throttle valve size	#100	•••



CHASSIS SPECIFICATIONS

Item	Standard	Limit
Frame		
Frame type	Diamond	•••
Caster angle	24°	•••
Trail	97 mm (3.82 in)	•••
Front wheel		
Wheel type	Cast wheel	•••
Rim		
Size	17 M/C × MT3.50	•••
Material	Aluminum	•••
Wheel travel	120 mm (4.72 in)	•••
Wheel runout		
Max. radial wheel runout	•••	1 mm (0.04 in)
Max. lateral wheel runout	•••	0.5 mm (0.02 in)
Rear wheel		
Wheel type	Cast wheel	•••
Rim		
Size	17 M/C × MT6.00	•••
Material	Aluminum	•••
Wheel travel	130 mm (5.12 in)	•••
Wheel runout		
Max. radial wheel runout	•••	1 mm (0.04 in)
Max. lateral wheel runout	•••	0.5 mm (0.02 in)
Front tire		
Tire type	Tubeless	•••
Size	120/70 ZR17 M/C (58W)	•••
Model (manufacturer)	Pilot POWER C (MICHELIN) D218FL (DUNLOP)	•••
Tire pressure (cold)		
0 ~ 90 kg (0 ~ 198 lb)	250 kPa (2.5 kgf/cm ² , 2.5 bar, 35.6 psi)	•••
90 ~ 202 kg (198 ~ 445 lb)	250 kPa (2.5 kgf/cm ² , 2.5 bar, 35.6 psi)	•••
High-speed riding	250 kPa (2.5 kgf/cm ² , 2.5 bar, 35.6 psi)	•••
Min. tire tread depth	•••	1.6 mm (0.06 in)
Rear tire		
Tire type	Tubeless	•••
Size	190/50 ZR17 M/C (73W)	•••
Model (manufacturer)	Pilot POWER G (MICHELIN) D218L (DUNLOP)	•••
Tire pressure (cold)		
0 ~ 90 kg (0 ~ 198 lb)	290 kPa (2.9 kgf/cm ² , 2.9 bar, 41.3 psi)	•••
90 ~ 202 kg (198 ~ 445 lb)	290 kPa (2.9 kgf/cm ² , 2.9 bar, 41.3 psi)	•••
High-speed riding	290 kPa (2.9 kgf/cm ² , 2.9 bar, 41.3 psi)	•••
Min. tire tread depth	•••	1.6 mm (0.06 in)

CHASSIS SPECIFICATIONS

SPEC



Item	Standard	Limit
Front brakes		
Brake type	Dual disc brake	•••
Operation	Right hand operation	•••
Recommended fluid	DOT 4	•••
Brake lever free play	2.3 ~ 11.5 mm (0.09 ~ 0.45 in)	•••
Brake discs		
Diameter × thickness	320 × 4.5 mm (12.60 × 0.18 in)	•••
Min. thickness	•••	4.0 mm (0.16 in)
Max. deflection	•••	0.1 mm (0.004 in)
Brake pad lining thickness (inner)	4.5 mm (0.18 in)	0.5 mm (0.02 in)
Brake pad lining thickness (outer)	4.5 mm (0.18 in)	0.5 mm (0.02 in)
Master cylinder inside diameter	14 mm (0.55 in)	•••
Caliper cylinder inside diameter	30.1 mm and 27 mm (1.19 in and 1.06 in)	•••
Rear brake		
Brake type	Single disc brake	•••
Operation	Right foot operation	•••
Recommended fluid	DOT 4	•••
Brake pedal freeplay	4.3 ~ 9.3 mm (0.17 ~ 0.37 in)	•••
Brake discs		
Diameter × thickness	220 × 5 mm (8.66 × 0.20 in)	•••
Min. thickness	•••	4.5 mm (0.18 in)
Max. deflection	•••	0.15 mm (0.006 in)
Brake pad lining thickness (inner)	6.0 mm (0.24 in)	1.0 mm (0.04 in)
Brake pad lining thickness (outer)	6.0 mm (0.24 in)	1.0 mm (0.04 in)
Master cylinder inside diameter	12.7 mm (0.5 in)	•••
Caliper cylinder inside diameter	31.8 mm (1.25 in)	•••

CHASSIS SPECIFICATIONS

SPEC



Item	Standard	Limit
Front suspension		
Suspension type	Telescopic fork	•••
Front fork type	Coil spring/oil damper	•••
Front fork travel	120 mm (4.72 in)	•••
Spring		
Free length	236.5 mm (9.31 in)	231.8 mm (9.13 in)
Spacer length	100 mm (3.937 in)	•••
Installed length	222.5 mm (8.76 in)	•••
Spring rate (K1)	8.83 N/mm (0.90 kg/mm, 50.42 lb/in)	•••
Spring stroke (K1)	0 ~ 120 mm (0 ~ 4.7244 in)	•••
Inner tube outer diameter	43 mm (1.69 in)	•••
Inner tube bending limit	•••	0.2 mm (0.01 in)
Optional spring available	No	•••
Fork oil		
Recommended oil	Suspension oil "01"	•••
Quantity (each front fork leg)	0.53 L (0.47 Imp qt, 0.56 US qt)	•••
Level (from the top of the outer tube, with the outer tube fully compressed, and without the fork spring)	76 mm (2.99 in)	•••
Spring preload adjusting positions		
Minimum	8	•••
Standard	4.5	•••
Maximum	1	•••
Rebound damping adjusting positions		
Minimum*	26	•••
Standard*	10	•••
Maximum*	1	•••
Compression damping adjusting positions		
Minimum*	25	•••
Standard*	10	•••
Maximum*	1	•••
*from the fully turned-in position		

CHASSIS SPECIFICATIONS

SPEC



Item	Standard	Limit
Steering		
Steering bearing type	Angular bearing	•••
Lock to lock angle (left)	27°	•••
Lock to lock angle (right)	27°	•••
Rear suspension		
Suspension type	Swingarm (link suspension)	•••
Rear shock absorber assembly type	Coil spring/gas-oil damper	•••
Rear shock absorber assembly travel	65 mm (2.56 in)	•••
Spring		
Free length	173.5 mm (6.83 in)	•••
Installed length	163.5 mm (6.44 in)	•••
Spring rate (K1)	83.4 N/mm (8.50 kg/mm, 476.21 lb/in)	•••
Spring stroke (K1)	0 ~ 65 mm (0.00 ~ 2.56 in)	•••
Optional spring available	No	•••
Standard spring preload gas/air pressure	1,200 kPa (12 kg/cm ² , 12 bar, 171 psi)	•••
Spring preload adjusting positions		
Minimum	1	•••
Standard	4	•••
Maximum	9	•••
Rebound damping adjusting positions		
Minimum*	20	•••
Standard*	17	•••
Maximum*	1	•••
Compression damping adjusting positions		
Minimum*	20	•••
Standard*	12	•••
Maximum*	1	•••
*from the fully turned-in position		
Swingarm		
Free play (at the end of the swingarm)		
Radial	•••	1.0 mm (0.04 in)
Axial	•••	1.0 mm (0.04 in)
Drive chain		
Model (manufacturer)	50VA8 (DAIDO)	•••
Link quantity	116	•••
Drive chain slack	25 ~ 35 mm (0.98 ~ 1.38 in)	•••
Maximum ten-link section	•••	150.1 mm (5.91 in)



ELECTRICAL SPECIFICATIONS

Item	Standard	Limit
System voltage	12 V	...
Ignition system		
Ignition system type	DC. T.C.I.	...
Ignition timing	5° BTDC at 1,050 r/min	...
Crankshaft position sensor resistance/color	336 ~ 504 Ω at 20°C (68°F)/Gy-B	...
T.C.I. unit model (manufacturer)	F8T822 (MITSUBISHI) (USA) F8T823 (MITSUBISHI) (CAL)
Ignition coils		
Model (manufacturer)	F6T558 (MITSUBISHI)	...
Minimum ignition spark gap	6 mm (0.24 in)	...
Primary coil resistance	1.19 ~ 1.61 Ω at 20°C (68°F)	...
Secondary coil resistance	8.5 ~ 11.5 kΩ at 20°C (68°F)	...
Charging system		
System type	A.C. magneto	...
Model (manufacturer)	F4T850 (MITSUBISHI)	...
Normal output	14 V/560 W at 5,000 r/min	...
Stator coil resistance/color	0.14 ~ 0.18 Ω at 20°C (68°F)/W-W	...
Rectifier/regulator		
Regulator type	Semi conductor short circuit	...
Model (manufacture)	FH011AA (SHINDENGEN)	...
No-load regulated voltage	14.3 ~ 15.1 V	...
Rectifier capacity	50 A	...
Withstand voltage	100 V	...
Battery		
Battery type	YTZ10S	...
Battery voltage/capacity	12 V/8.6 Ah	...
Specific gravity	1.310	...
Manufacturer	YUASA	...
Ten hour rate amperage	0.8 A	...
Headlight type	Halogen bulb	
Bulbs (voltage/wattage × quantity)		
Headlight	12 V 55 W × 4	...
Auxiliary light	12 V 5 W × 2	...
Tail/brake light	LED × 1	...
Front turn signal light/position light	12 V 21 W/5 W × 2	...
Rear turn signal light	12 V 21 W × 2	...
Licence plate light	12 V 5 W × 1	...
Meter light	LED × 1	...

ELECTRICAL SPECIFICATIONS

SPEC



Item	Standard	Limit
Indicator light (voltage/wattage × quantity)		
Neutral indicator light	LED × 1	...
High beam indicator light	LED × 1	...
Oil level warning light	LED × 1	...
Turn signal indicator light	LED × 2	...
Fuel level warning light	LED × 1	...
Coolant temparture indicator light	LED × 1	...
Engine trouble warning light	LED × 1	...
Shift timing indicator light	LED × 1	...
Electric starting system		
System type	Constant mesh	...
Starter motor		
Model (manufacturer)	5VY (YAMAHA)	...
Power output	0.9 kW	...
Brushes		
Overall length	10.8 mm (0.43 in)	3.6 mm (0.14 in)
Spring force	5.28 ~ 7.92 N (538 ~ 808 g, 18.99 ~ 28.48 oz)	...
Armature coil resistance	0.0090 ~ 0.0110 Ω at 20°C (68°F)	...
Commutator diameter	24.5 mm (0.96 in)	23.5 mm (0.93 in)
Mica undercut	1.5 mm (0.06 in)	...
Starter relay		
Model (manufacturer)	2768079-A (JIDECO)	...
Amperage	180 A	...
Coil resistance	4.18 ~ 4.62 Ω at 20°C (68°F)	...
Horn		
Horn type	Plane	...
Model (manufacturer) × quantity	YF-12 (NIKKO) × 1	...
Max. amperage	3 A	...
Performance	105 ~ 113 db/2 m	...
Coil resistance	1.15 ~ 1.25 Ω at 20°C (68°F)	...
Turn signal relay		
Relay type	Full transistor	...
Model (manufacturer)	FE218BH (DENSO)	...
Self-cancelling device built-in	No	...
Turn signal blinking frequency	75 ~ 95 cycles/min.	...
Wattage	21 W × 2 + 3.4 W	...
Oil level switch		
Model (manufacturer)	5VY (SOMIC ISHIKAWA)	...
EXUP servo motor		
Model (manufacturer)	5VY (YAMAHA)	...

ELECTRICAL SPECIFICATIONS

SPEC



Item	Standard	Limit
Fuses (amperage × quantity)		
Main fuse	50 A × 1	...
Fuel injection system fuse	15 A × 1	...
Headlight fuse	25 A × 1	...
Signaling system fuse	10 A × 1	...
Ignition fuse	15 A × 1	...
Radiator fan motor fuse	15 A × 2	...
Backup fuse (odometer and clock)	10 A × 1	...
Reserve fuse	25 A, 15 A, 10 A × 1	...

CONVERSION TABLE/ GENERAL TIGHTENING TORQUE SPECIFICATIONS



EAS00028

EAS00030

CONVERSION TABLE

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

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

Ex.

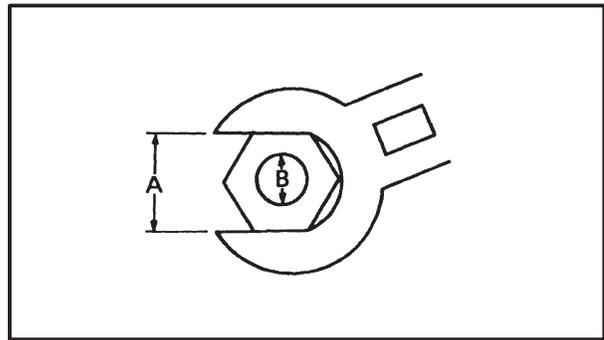
METRIC		MULTIPLIER	=	IMPERIAL
** mm	×	0.03937	=	** in
2 mm	×	0.03937	=	0.08 in

CONVERSION TABLE

METRIC TO IMPERIAL			
	Metric unit	Multiplier	Imperial unit
Tightening torque	m•kg	7.233	ft•lb
	m•kg	86.794	in•lb
	cm•kg	0.0723	ft•lb
	cm•kg	0.8679	in•lb
Weight	kg	2.205	lb
	g	0.03527	oz
Speed	km/hr	0.6214	mph
Distance	km	0.6214	mi
	m	3.281	ft
	m	1.094	yd
	cm	0.3937	in
	mm	0.03937	in
Volume/ Capacity	cc (cm 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)

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



TIGHTENING TORQUES
ENGINE TIGHTENING TORQUES

Item	Fastener	Thread size	Q'ty	Tightening torque			Remarks
				Nm	m•kg	ft•lb	
Spark plugs	—	M10	4	13	1.3	9.4	
Cylinder head	Nut	M10	10	See NOTE 1			
	Bolt	M6	2	12	1.2	8.7	
Camshaft caps	Bolt	M6	28	10	1.0	7.2	
Cylinder head cover	Bolt	M6	6	12	1.2	8.7	
Cylinder head (exhaust pipe)	Stud bolt	M8	8	15	1.5	11	
Air indication system cap	Bolt	M6	4	10	1.0	7.2	
Camshaft sprockets	Bolt	M7	4	24	2.4	17	
Cylinder head and throttle body	Clamp	M5	4	3	0.3	2.2	
Connecting rod caps	Bolt	M8	8	20+150°	2.0+150°	14+150°	
Generator rotor	Bolt	M10	1	60	6.0	43	
Timing chain tensioner	Bolt	M6	2	10	1.0	7.2	
Water pump outlet pipe	Bolt	M6	1	10	1.0	7.2	
Water pump inlet pipe (water pump side)	Bolt	M6	1	10	1.0	7.2	
Water pump inlet pipe (front side)	Bolt	M6	1	10	1.0	7.2	
Oil/water pump assembly sprocket	Bolt	M6	1	15	1.5	11	
Water pump	Bolt	M6	2	12	1.2	8.7	
Thermostat cover	Nut	M6	2	10	1.0	7.2	
Thermostat inlet pipe	Bolt	M6	1	10	1.0	7.2	
Oil cooler	Bolt	M20	1	63	6.3	46	
Engine oil drain bolt	Bolt	M14	1	43	4.3	31	
Oil pipe	Bolt	M6	2	10	1.0	7.2	
Oil strainer	Bolt	M6	3	10	1.0	7.2	
Oil delivery pipe	Bolt	M6	3	10	1.0	7.2	
Oil filter union bolt	Bolt	M20	1	70	7.0	51	
Oil filter	—	M20	1	17	1.7	12	
Oil pan	Bolt	M6	14	12	1.2	8.7	
Oil pan	Bolt	M6	1	12	1.2	8.7	
Air filter case cover	Screw	M5	10	1.7	0.17	1.2	
Throttle body and throttle body joint	Clamp	M5	4	3	0.3	2.2	
Throttle body and funnel	Bolt	M5	6	4.2	0.42	3.0	
Throttle cable	Nut	M6	1	4.5	0.45	3.3	
Throttle cable adjuster	Bolt	M6	1	4.5	0.45	3.3	
Stator coil	Screw	M6	3	14	1.4	10	
Generator rotor cover and bearing housing	Screw	M6	3	10	1.0	7.2	
Pull lever cover	Bolt	M6	2	10	1.0	7.2	
Thermostat assembly stay	Bolt	M6	2	10	1.0	7.2	
Starter clutch idler gear	Bolt	M6	1	10	1.0	7.2	
Clutch boss	Nut	M20	1	95	9.5	69	Stake
Clutch spring	Bolt	M6	6	10	1.0	7.2	
Drive sprocket	Nut	M22	1	85	8.5	61	Use a lock washer

TIGHTENING TORQUES

SPEC



Item	Fastener	Thread size	Q'ty	Tightening torque			Remarks
				Nm	m•kg	ft•lb	
Exhaust pipe and cylinder head	Nut	M8	8	20	2.0	14	
Catalyst pipe assembly and muffler	Bolt	M8	2	20	2.0	14	
Exhaust pipe and exhaust valve pipe assembly	Bolt	M6	5	10	1.0	7.2	
Exhaust valve pipe and housing	Bolt	M6	1	10	1.0	7.2	
Pulley and shaft arm	Nut	M6	1	7	0.7	5.0	
EXUP pulley bracket	Bolt	M6	1	10	1.0	7.2	
EXUP pulley cover	Bolt	M6	2	10	1.0	7.2	
Exhaust valve pipe and bracket	Bolt	M8	1	20	2.0	14	
EXUP cable nut	Nut	M6	2	7	0.7	5.0	
Catalyst pipe bracket and frame	Bolt	M8	1	20	2.0	14	
Catalyst pipe and catalyst pipe bracket	Bolt	M8	1	20	2.0	14	
Exhaust valve pipe and catalyst pipe	Bolt	M8	1	20	2.0	14	
EXUP servo motor	Bolt	M6	2	7	0.7	5.0	
Muffler and rear frame	Bolt	M8	2	23	2.3	17	
Muffler cover	Bolt	M6	2	10	1.0	7.2	
Crankcase	Stud bolt	M10	10	8	0.8	5.8	
Crankcase (main journal)	Bolt	M9	10	See NOTE 2			
Crankcase	Bolt	M6	10	12	1.2	8.7	
Crankcase	Bolt	M8	1	24	2.4	17	
Crankcase	Bolt	M8	5	24	2.4	17	
Generator rotor cover	Bolt	M6	4	12	1.2	8.7	
Generator rotor cover	Bolt	M8	3	22	2.2	16	
Drive sprocket cover	Bolt	M6	2	10	1.0	7.2	
Drive sprocket cover	Bolt	M6	1	10	1.0	7.2	
Crankcase cover (left)	Screw	M6	3	10	1.0	7.2	
Clutch cover	Bolt	M6	7	12	1.2	8.7	
Clutch cover	Bolt	M6	1	12	1.2	8.7	
Pickup rotor cover	Bolt	M6	6	12	1.2	8.7	
Breather cover	Bolt	M6	4	12	1.2	8.7	
Breather plate	Bolt	M6	3	10	1.0	7.2	
Plate	Bolt	M6	2	10	1.0	7.2	
Pickup rotor cover blind bolt	Bolt	M8	1	15	1.5	11	
Generator rotor cover plug	Plug	M20	1	8	0.8	5.8	
Main gallery plug (oil return)	Plug	M16	3	8	0.8	5.8	
Main gallery plug	Plug	M20	1	8	0.8	5.8	
Oil return pipe	Bolt	M6	2	10	1.0	7.2	
Oil return plug	Screw	M12	2	24	2.4	17	
Stator coil lead	Bolt	M6	1	10	1.0	7.2	

TIGHTENING TORQUES

SPEC



Item	Fastener	Thread size	Q'ty	Tightening torque			Remarks
				Nm	m•kg	ft•lb	
Main axle bearing housing	Bolt	M6	3	12	1.2	8.7	
Shift fork shaft stopper	Bolt	M6	2	10	1.0	7.2	
Stopper screw	Screw	M8	1	22	2.2	16	
Shift rod lock nut (rear)	Nut	M6	1	7	0.7	5.0	Left thread
Shift rod lock nut (front)	Nut	M6	1	7	0.7	5.0	
Shift rod joint	Bolt	M6	1	10	1.0	7.2	
Shift arm	Bolt	M6	1	10	1.0	7.2	
E.C.U.	Screw	M6	2	7	0.7	5.0	
Neutral switch	—	M10	1	20	2.0	15	
EXUP servo motor cover	Screw	M5	2	2	0.2	1.5	
Coolant temperature sensor	—	M12	1	18	1.8	13	
Cylinder identification sensor	Bolt	M6	1	8	0.8	5.7	
Atmospheric pressure sensor	Screw	M5	2	7	0.7	5.0	
Crankshaft position sensor	Bolt	M6	1	10	1.0	7.2	
Oil level switch	Bolt	M6	2	10	1.0	7.2	

NOTE 1:

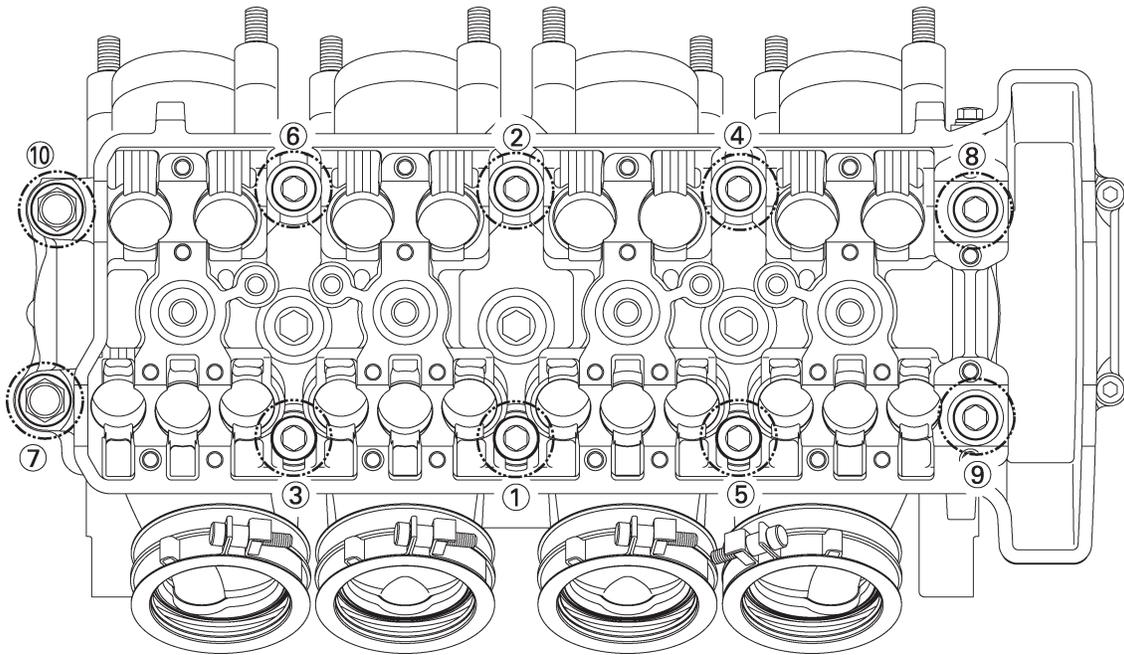
1. First, tighten the bolts to approximately 19 Nm (1.9 m•kg, 14 ft•lb) with a torque wrench following the tightening order.
2. Retighten the bolts 67 Nm (6.7 m•kg, 48 ft•lb) with a torque wrench.

NOTE 2:

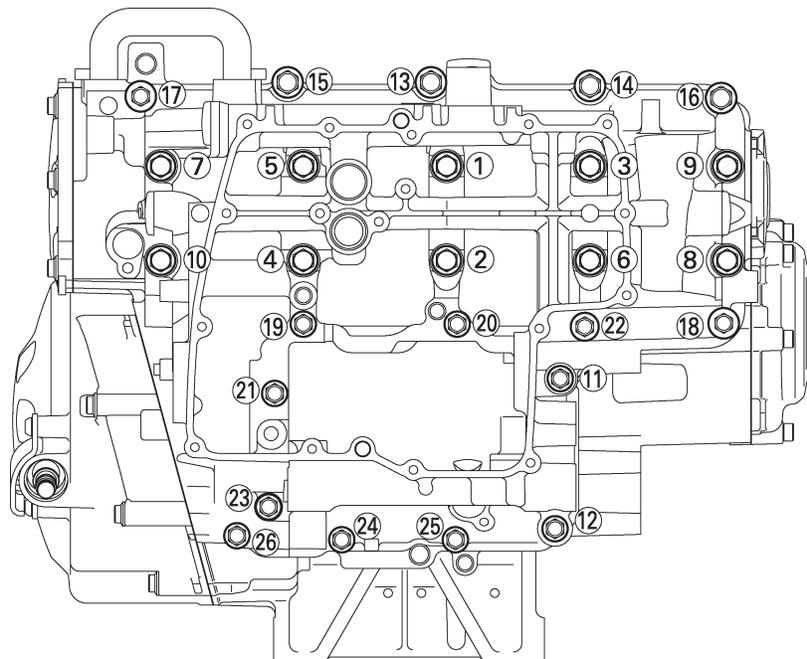
1. First, tighten the bolts to approximately 20 Nm (2.0 m•kg, 15 ft•lb) with a torque wrench following the tightening order.
2. Loosen the all bolts one by one following the tightening order and then tighten them to 20 Nm (2.7 m•kg, 15 ft•lb) again.
3. Retighten the bolts further to reach the specified angle (60°).



Cylinder head tightening sequence:



Crankcase tightening sequence.





CHASSIS TIGHTENING TORQUES

Item	Thread size	Tightening			Remarks	
		Nm	m•kg	ft•lb		
Upper bracket and outer tube	M8	26	2.6	19	See NOTE 1	
Upper bracket and steering stem nut	M28	113	11.3	82		
Handlebar and outer tube	M8	17	1.7	12		
Handlebar and upper bracket	M6	13	1.3	9		
Steering shaft and ring nut	M30	18	1.8	13		
Outer tube and under bracket	M8	23	2.3	17		
Main switch and upper bracket	M8	26	2.6	19		
Front brake master cylinder cap stopper	M4	1.2	0.12	0.9		
Front brake hose union bolts	M10	30	3.0	22		
Front brake master cylinder and bracket	M6	13	1.3	9		
Meter assembly and front cowling stay	—	1.3	0.13	0.9		
Headlight and front cowling stay	—	0.8	0.08	0.6		
Front cowling and headlight assembly	—	1.5	0.15	1.1		
Cover 7, 8 and frame	M6	5	0.5	3.6		
Under cowling and engine	M6	5	0.5	3.6		
Windshield and front cowling	M5	0.4	0.04	0.3		
Duct and console panel	M5	1.3	0.13	0.9		
End grip and handlebar	M6	4	0.4	2.9		
Horn bracket and under bracket	M6	4	0.4	2.9		
Coolant reservoir tank and frame	M6	5	0.5	3.6		
Engine mount front (left and right)	M10	45	4.5	33		See NOTE 2
Engine mount rear upper	M10	51	5.1	37		
Engine mount rear under	M10	51	5.1	37		
Engine mount rear adjust bolt	M16	7	0.7	5.1		
Catalyst pipe stay and frame	M10	44	4.4	32		
Clutch cable lock nut (engine side)	M8	7	0.7	5.1		
Main frame and rear frame	M10	41	4.1	30		
Throttle cable adjust nut (throttle body side)	M6	5	0.5	3.6		
Cover 2 and plate	—	0.8	0.08	0.6		
Pivot shaft and nut	M18	105	10.5	76		
Connecting rod and frame	M10	44	4.4	32		
Relay arm and connecting rod	M10	44	4.4	32		
Relay arm and swingarm	M10	44	4.4	32		
Rear shock absorber and relay arm	M10	44	4.4	32		
Rear shock absorber and upper bracket	M10	44	4.4	32		
Upper bracket and frame	M14	92	9.2	67		
Seal guard	M6	7	0.7	5.1		
Drive chain case	M6	7	0.7	5.1		
Chain puller adjust nut	M8	16	1.6	12		
Fuel tank and fuel pump assembly	M5	4	0.4	2.9		
Fuel tank stay (front side) and frame	M6	7	0.7	5.1		
Fuel tank and fuel tank stay (front side)	M6	7	0.7	5.1		
Fuel tank stay (rear side) and rear frame	M6	7	0.7	5.1		
Side cover and fuel tank	M5	0.4	0.04	0.3		
Rider seat and frame	M6	7	0.7	5.1		
Seat lock plate and rear frame	M6	10	1.0	7		
Side cover (rear side) and frame	M5	4	0.4	2.9		



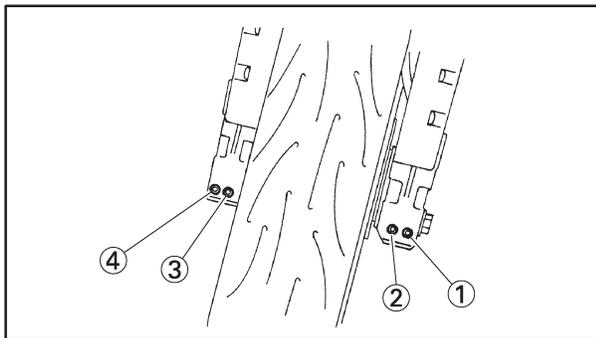
Item	Thread size	Tightening			Remarks
		Nm	m•kg	ft•lb	
Battery box and frame	M6	7	0.7	5.1	 See NOTE 3
Atmospheric pressure sensor and battery box	—	0.7	0.07	0.5	
Lean angle cut-off switch and battery box	—	2	0.2	1.4	
Foot rest bracket (front) and frame	M8	28	2.8	20	
Foot rest bracket (rear) and frame	M8	28	2.8	20	
Rear brake master cylinder and foot rest bracket	M6	18	1.8	13	
Rear brake hose union bolt	M10	30	3.0	22	
Sidestand bracket and frame	M10	63	6.3	46	
Front wheel axle shaft and bolt	M14	91	9.1	66	
Rear wheel axle nut	M24	150	15.0	109	
Front brake caliper and front fork	M10	35	3.5	25	
Front brake disc and front wheel	M6	18	1.8	13	
Rear brake disc and rear wheel	M6	30	3.0	22	
Rear wheel sprocket and drive hub	M10	100	10.0	72	
Brake caliper bleed screw	M8	6	0.6	4.3	
Front wheel axle pinch bolt	M8	20	2.0	14	

NOTE 1:

1. First, tighten the ring nut to approximately 52 Nm (5.2 m•kg, 38 ft•lb) with a torque wrench, then loosen the ring nut completely.
2. Retighten the lower ring nut to specification.

NOTE 2:

Refer to “INSTALLING THE ENGINE” in chapter 5.



NOTE 3:

1. Insert the front wheel axle from the right side and tighten it with the flange bolt from the left side to 91 Nm (9.1 m•kg, 65.8 ft•lb).
2. In the order from the pinch bolt ② → pinch bolt ① → pinch bolt ②, tighten each bolt to 20 Nm (2.0 m•kg, 14 ft•lb) without performing temporary tightening.
3. Check that the end face of the axle head and the end face of the fork side are flush-mounted. If they are out of alignment, make sure to fit them by adding the external force by hand or with a plastic hammer, etc.
If the end face of the axle is not parallel to the end face of the fork, align them so that one point of the axle circumference is positioned on the end face of the fork.
At this stage, it can be accepted if the end face of the axle becomes partially concave to the end face of the fork.
4. In the order from the pinch bolt ④ → pinch bolt ③ → pinch bolt ④, tighten each bolt to 20 Nm (2.0 m•kg, 14 ft•lb) without performing temporary tightening.



EAS00031

**LUBRICATION POINTS AND LUBRICANT TYPES
ENGINE**

Lubrication point	Lubricant
Oil seal lips	
O-rings	
Bearings	
Crankshaft pins	
Piston surfaces	
Piston pins	
Crankshaft journals	
Camshaft lobes	
Camshaft journals	
Valve stems (intake and exhaust)	
Valve stem ends (intake and exhaust)	
Water pump impeller shaft	
Oil pump rotors (inner and outer)	
Oil pump housing	
Oil strainer	
Clutch (pull rod)	
Oil/water pump drive sprocket and washer	
Clutch (thrust plate)	
Starter clutch idle gear inner surface	
Starter clutch assembly	
Primary driven gear	
Transmission gears (wheel and pinion)	
Main axle and drive axle	
Shift drum	
Shift forks and shift fork guide bars	
Shift shaft	
Shift shaft boss	
Cylinder head cover mating surface	Yamaha bond No.1215
Crankcase mating surface	Yamaha bond No.1215
Clutch cover (crankcase mating surface)	Yamaha bond No.1215
Generator rotor cover (crankcase mating surface)	Yamaha bond No.1215
Pickup rotor cover	Yamaha bond No.1215



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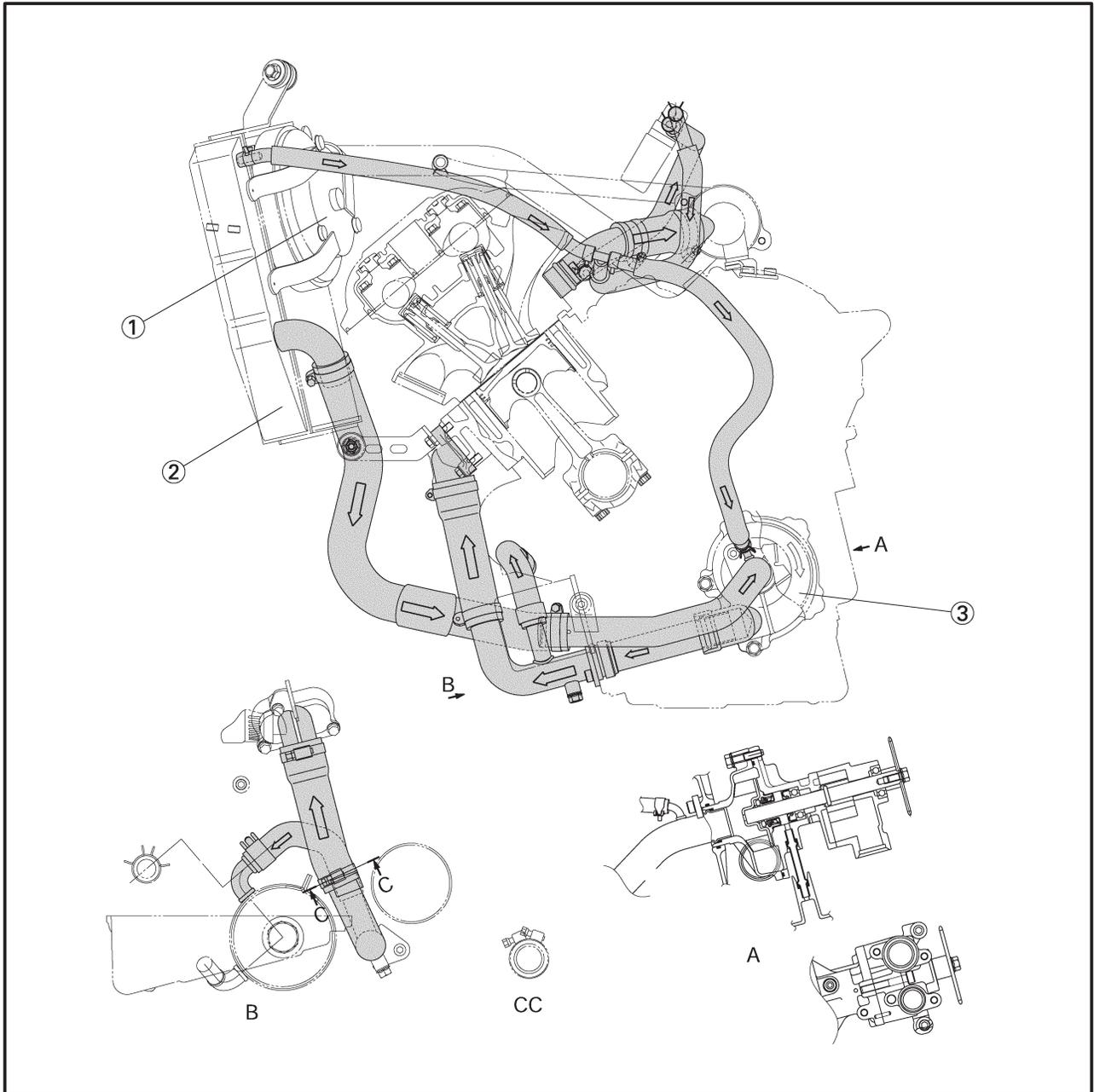
CHASSIS

Lubrication point	Lubricant
Steering bearings and bearing races (upper and lower)	
Throttle grip inner surface	
Brake lever pivoting point and metal-to-metal moving parts	
Clutch lever pivoting point and metal-to-metal moving parts	
Engine mount bolts (rear upper and lower)	
Relay arm, connecting rod and rear shock absorber collar	
Pivot shaft	
Swingarm pivot bearing	
Swingarm head pipe end, oil seal and bush	
Oil seal (relay arm, connecting arm and rear shock absorber)	
Seat lock assembly moving parts	
Sidestand pivoting pint and metal-to-metal moving parts	
Link and sidestand switch contact point	
Sidestand hook and spring	
Shift shaft joint	
Front wheel oil seal (right and left)	
Front axle shaft	
Rear wheel oil seal	
Rear wheel drive hub oil seal	
Rear wheel drive hub mating surface	

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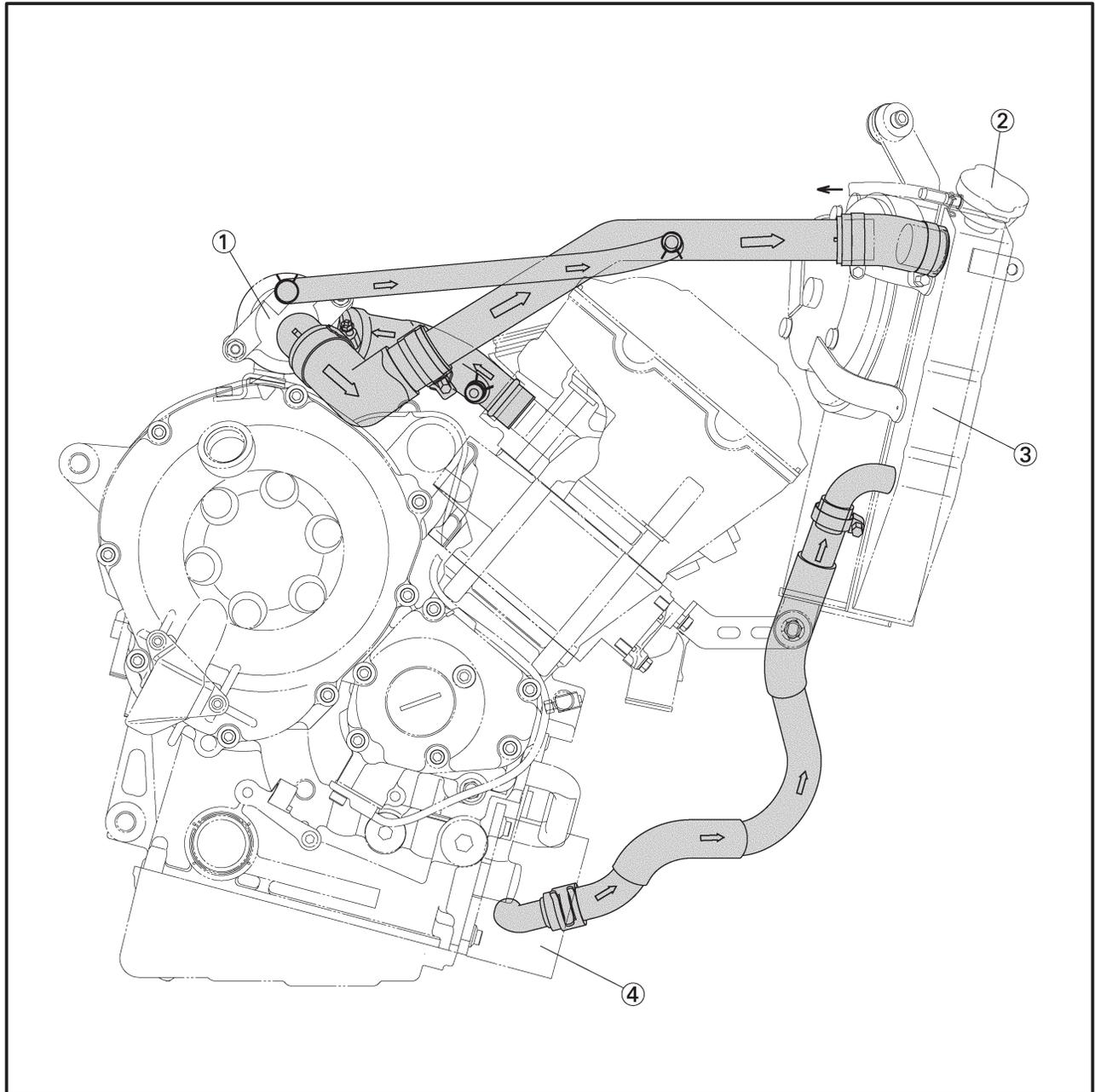
COOLING SYSTEM DIAGRAMS

- ① Radiator fan
- ② Radiator
- ③ Water pump



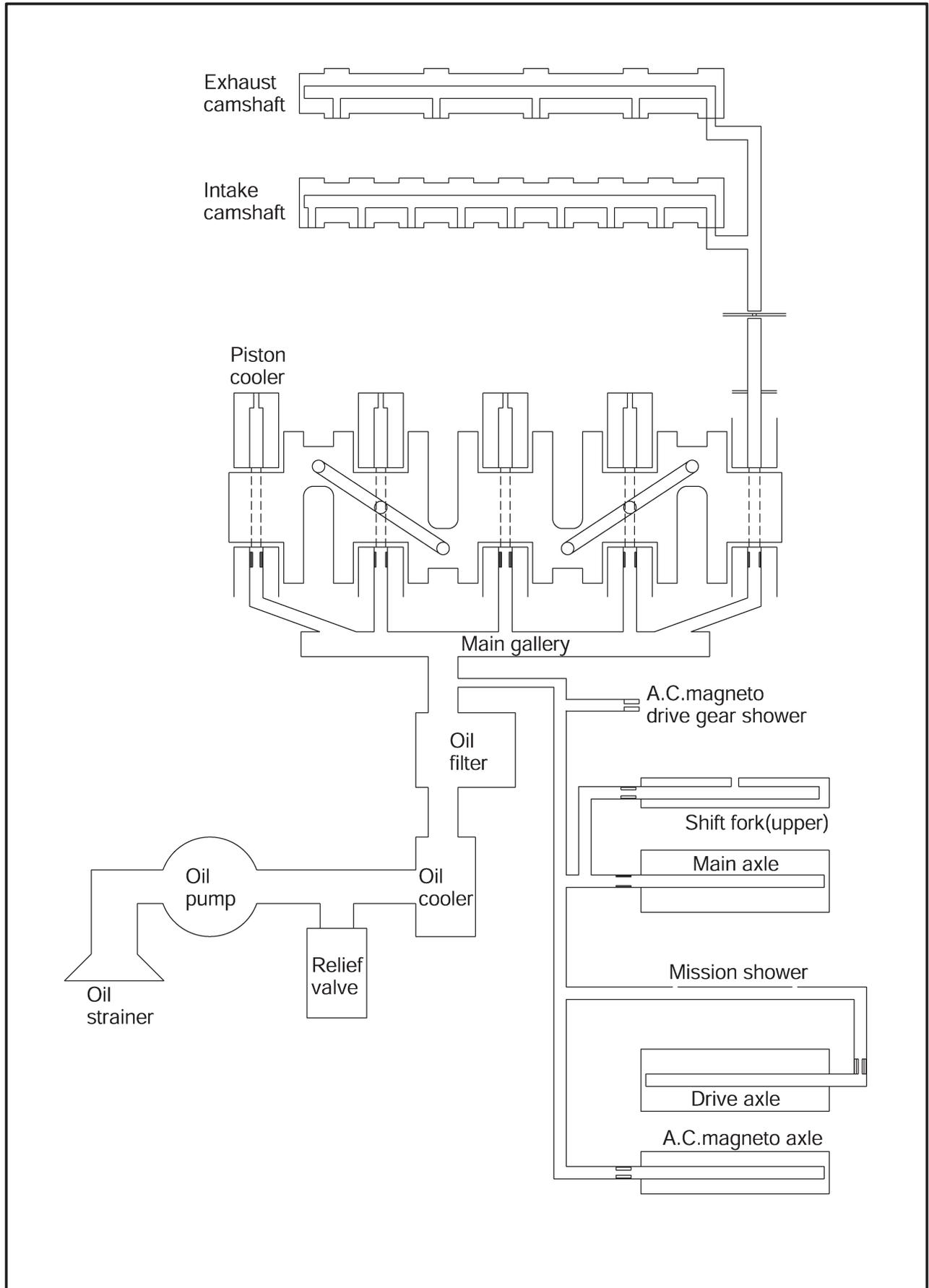


- ① Thermostat
- ② Radiator cap
- ③ Radiator
- ④ Oil cooler





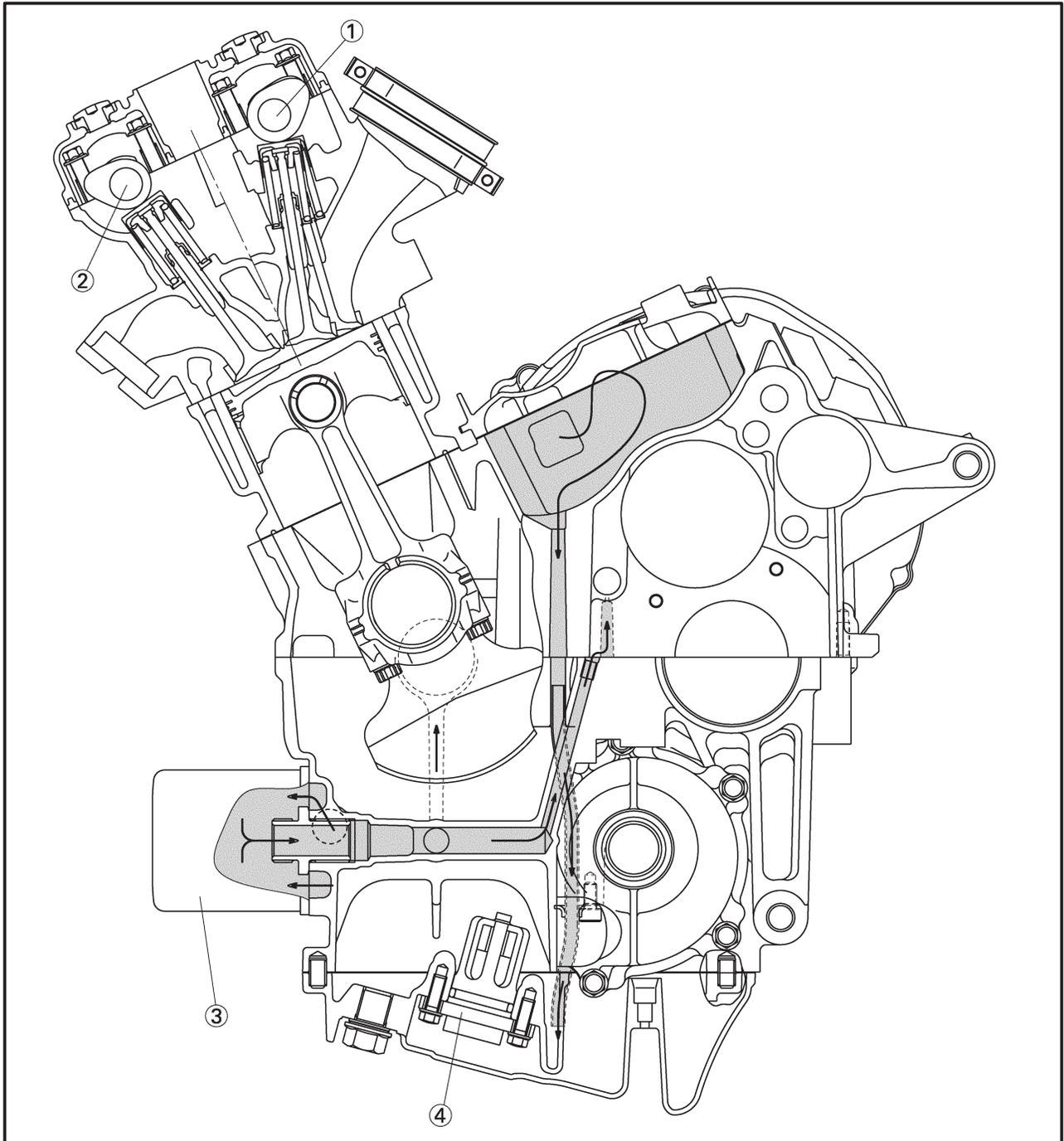
ENGINE OIL LUBRICATION CHART



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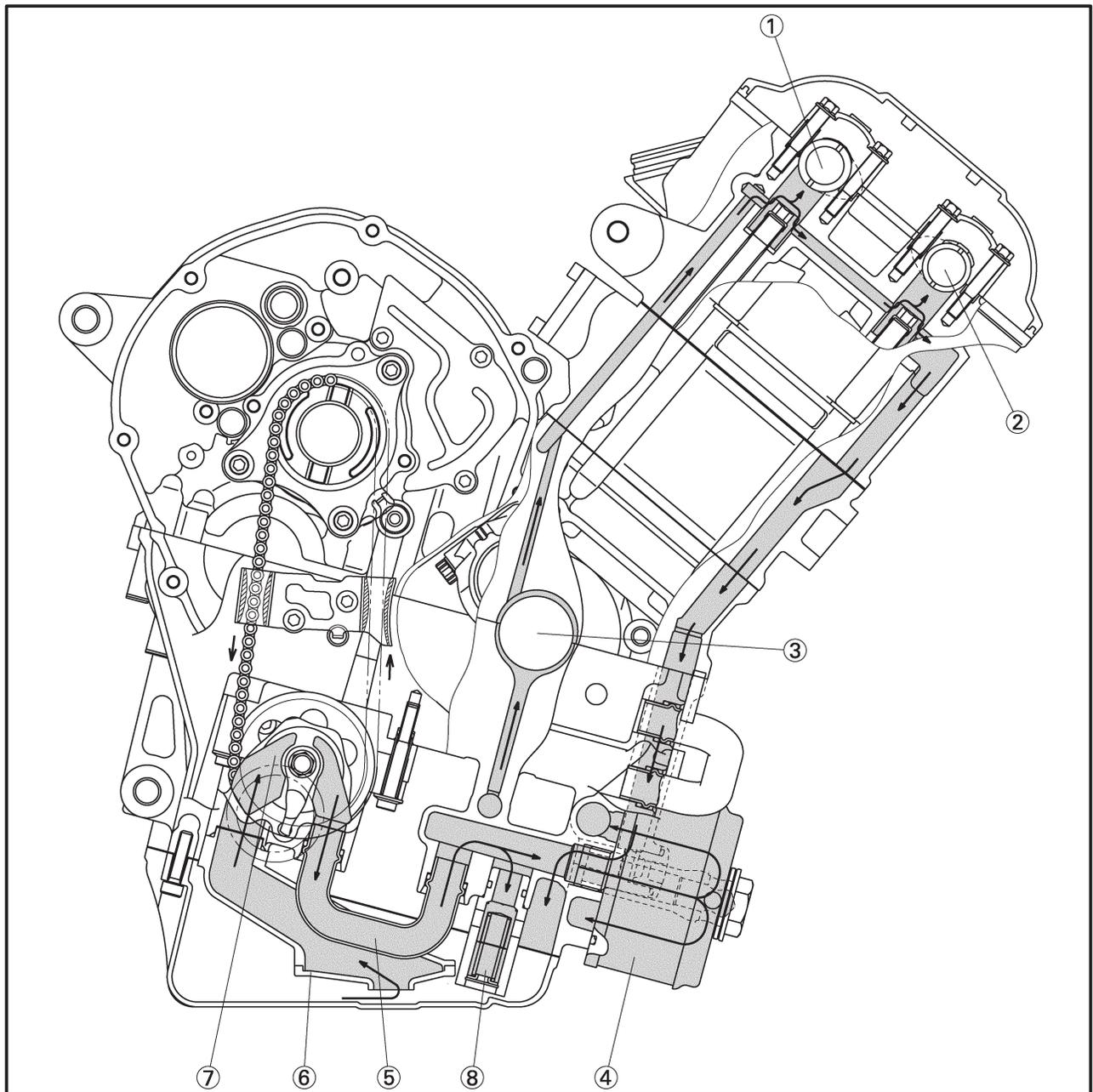
LUBRICATION DIAGRAMS

- ① Intake camshaft
- ② Exhaust camshaft
- ③ Oil filter cartridge
- ④ Oil level switch



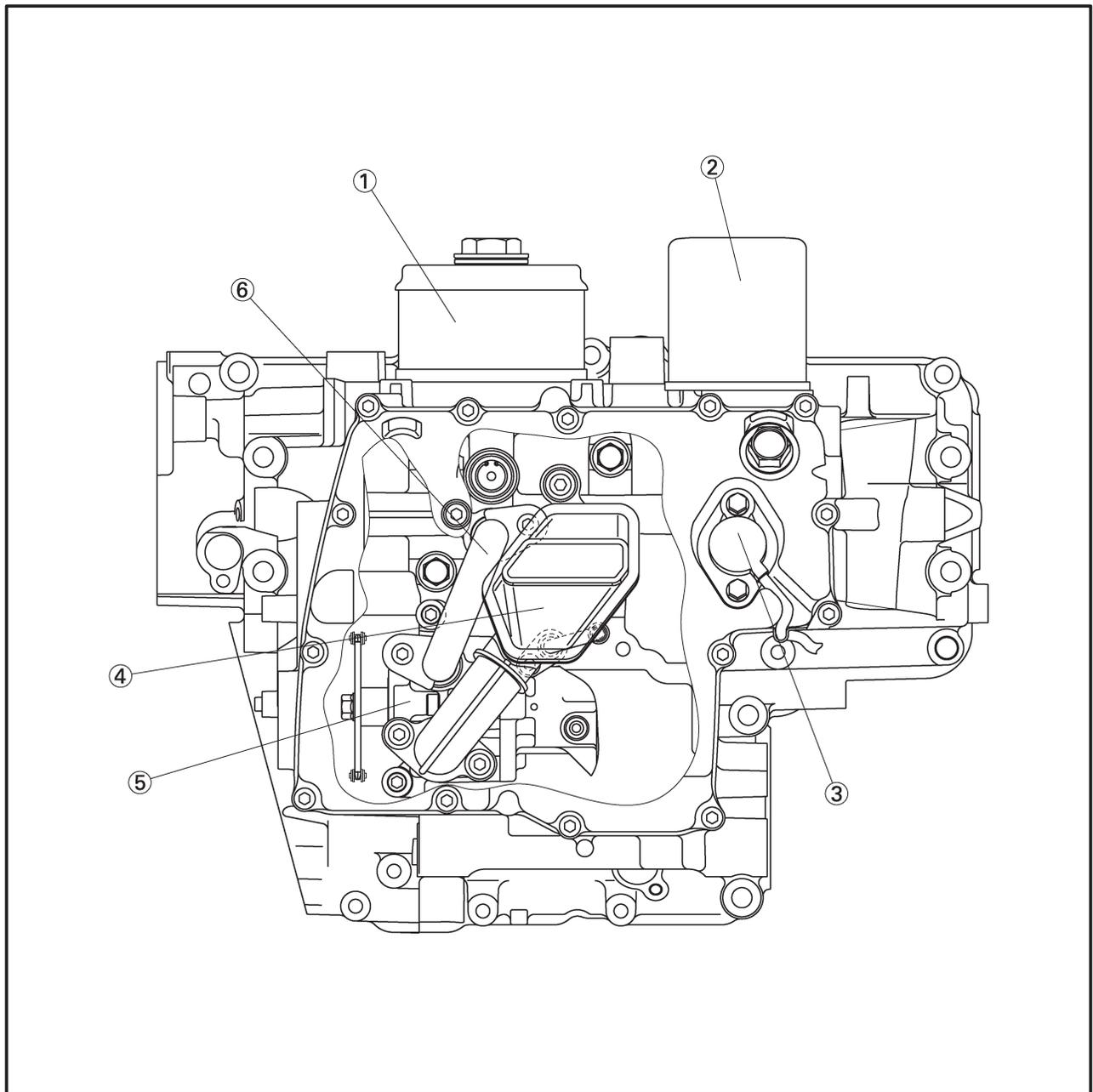


- ① Intake camshaft
- ② Exhaust camshaft
- ③ Crankshaft
- ④ Oil cooler
- ⑤ Oil pipe
- ⑥ Oil strainer
- ⑦ Oil pump
- ⑧ Relief valve



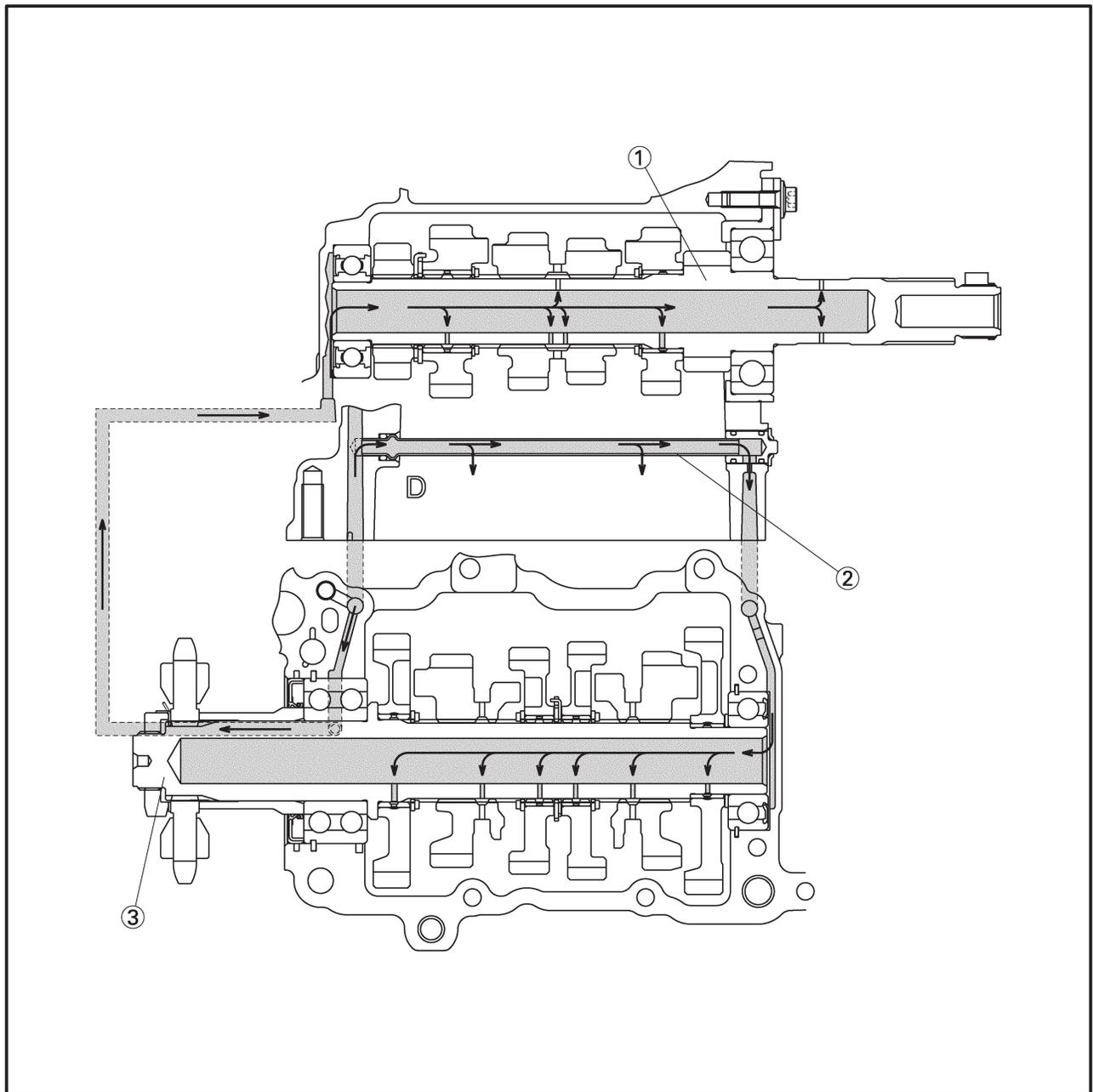


- ① Oil cooler
- ② Oil filter cartridge
- ③ Oil level switch
- ④ Oil strainer
- ⑤ Oil pump
- ⑥ Oil pipe



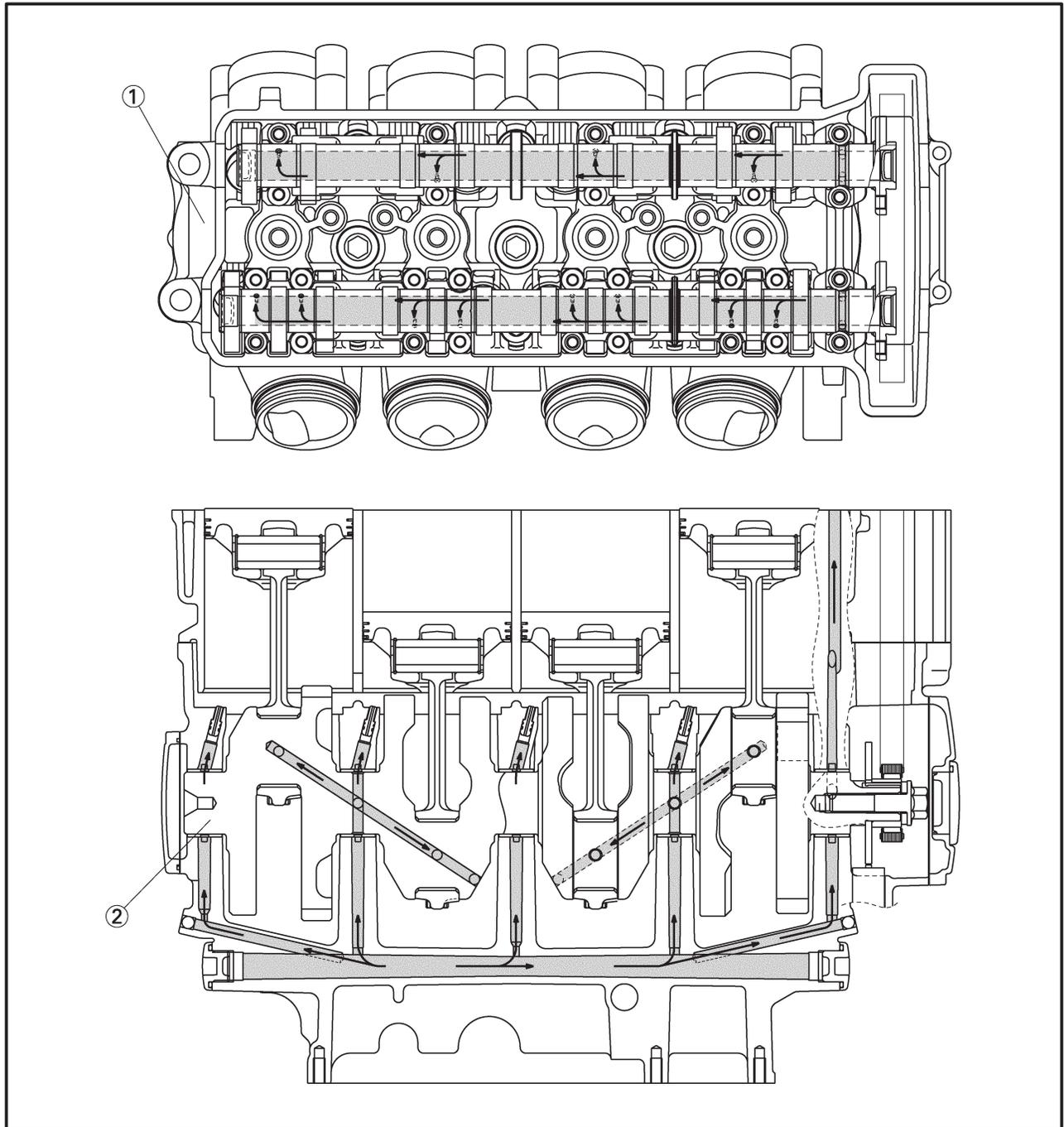


- ① Main axle
- ② Oil delivery pipe
- ③ Drive axle





- ① Cylinder head
- ② Crankshaft



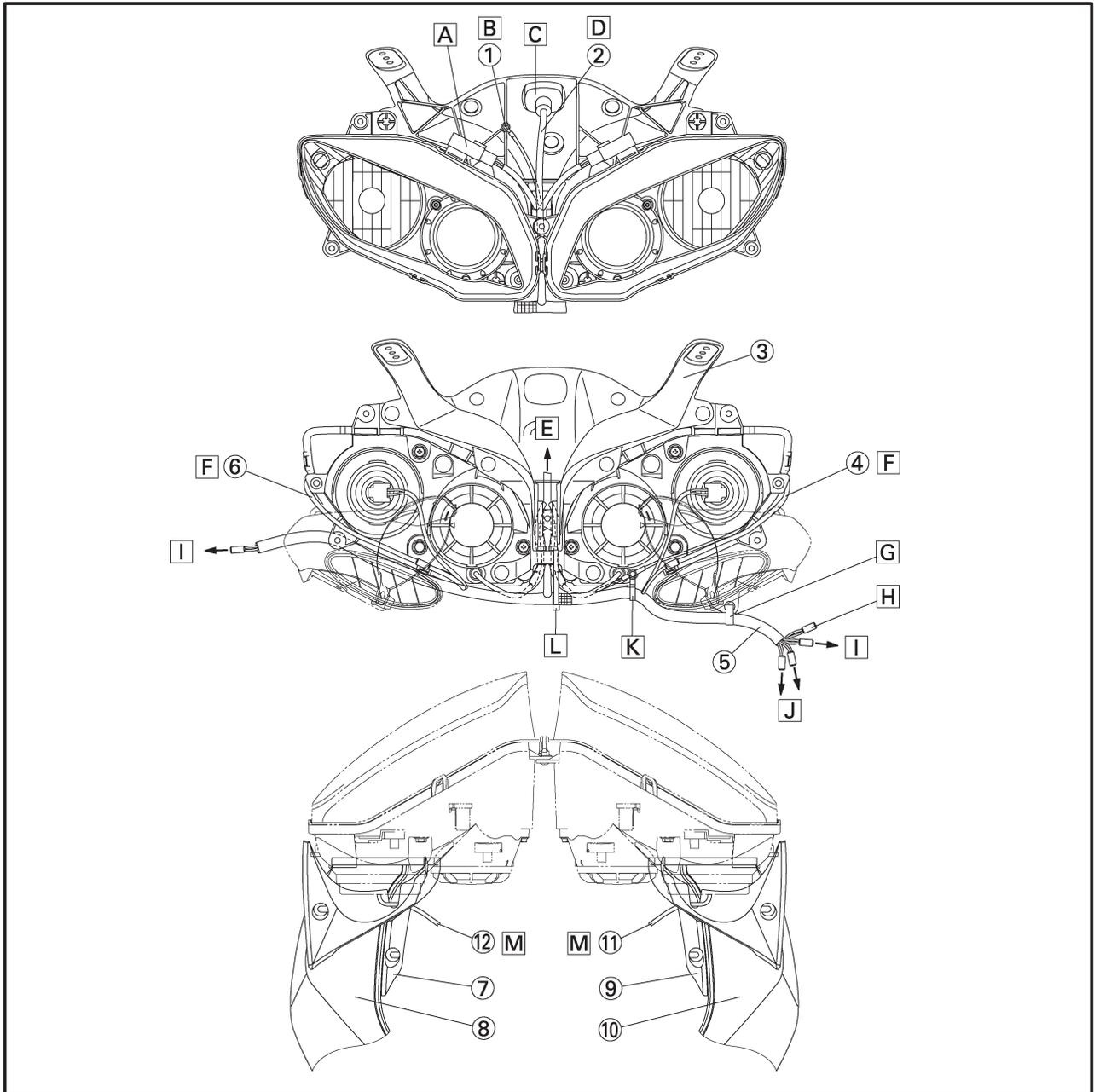


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CABLE ROUTING

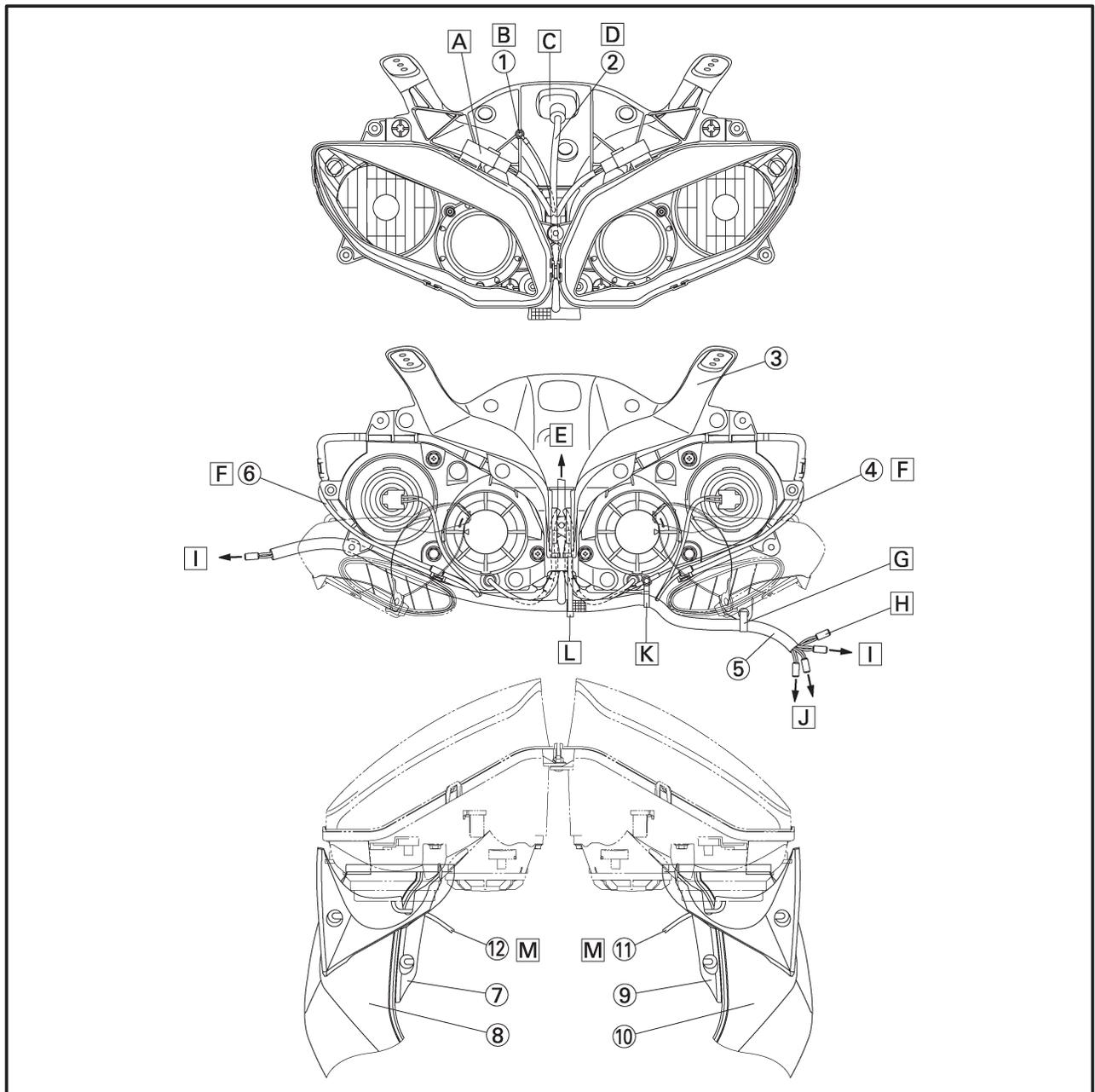
- ① Ground lead
- ② Meter lead
- ③ Stay 1
- ④ Auxiliary light lead (right)
- ⑤ Headlight lead
- ⑥ Auxiliary light lead (left)
- ⑦ Console panel 1
- ⑧ Duct 1
- ⑨ Console panel 2
- ⑩ Duct 2
- ⑪ Headlight lead (right)
- ⑫ Headlight lead (left)

- A Insert to the rib of the head light. (Either location of the right and left relays is acceptable.)
- B The lead should not stretch too much.
- C Make sure to insert the coupler and boot to the stay 1 hole.
- D The speedometer lead should not be strained.
- E To the stay 1 hole
- F Connect after passing over the upper side of the duct.
- G Clamp the head light lead by wrapping and insert it to the intake air grill hole. (only at the right side.)
- H Do not connect the wire to the coupler with the plug for options.
- I To the turn signal light
- J To the wire harness
- K Cut the tip of the clamp.





- L Clamp the head light lead to the stay 1 at the positioning white tape section. There should be no slack when clamping. Point the tip of the clamp (excessive part) to the front side of the vehicle. Fasten the head light lead with a clamp.
- M Feed a lead wire through the U shape cutout of the console panel.

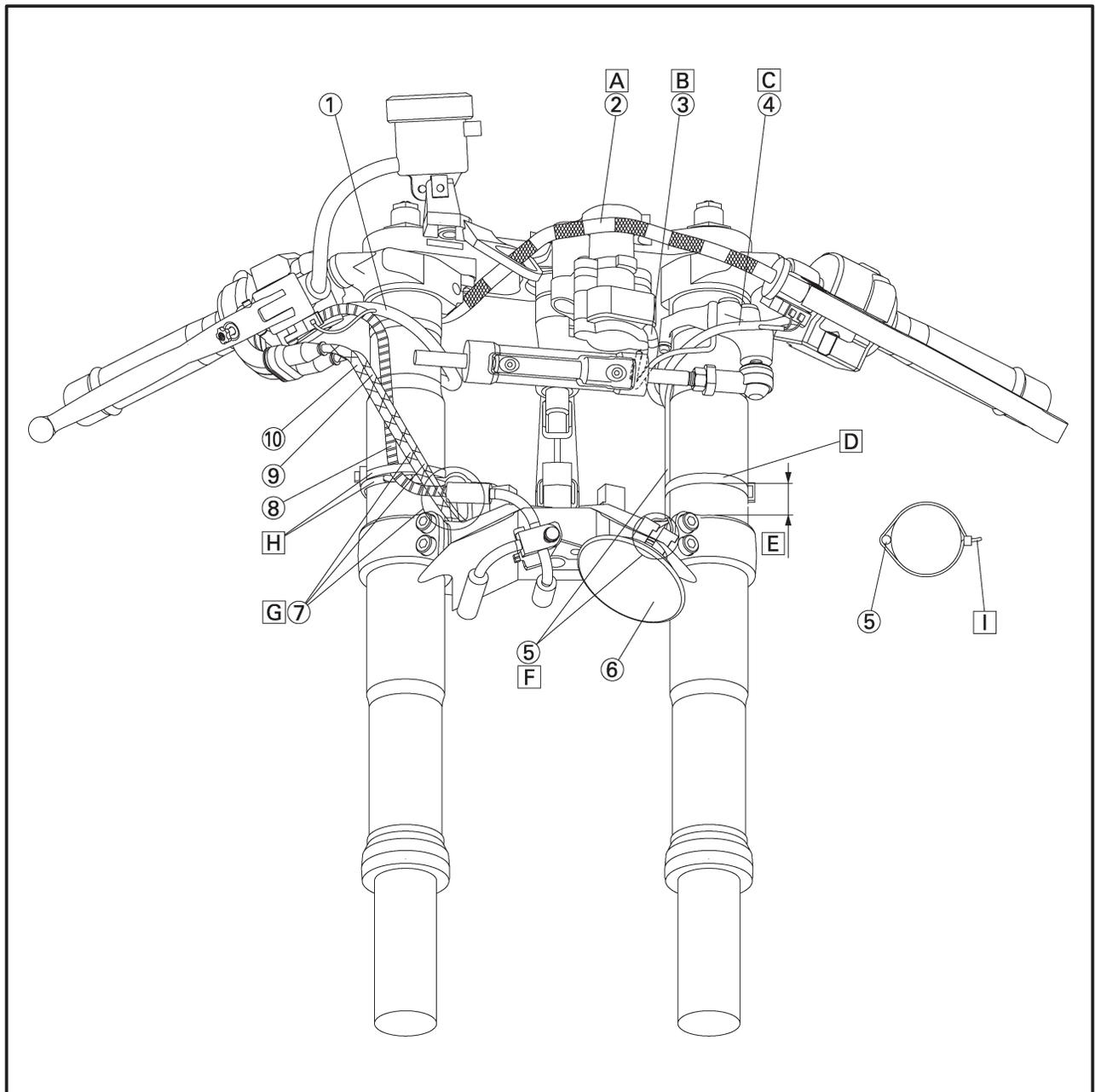




- ① Right handlebar switch lead
- ② Clutch cable
- ③ Main switch lead
- ④ Left handlebar switch lead
- ⑤ Horn lead
- ⑥ Horn
- ⑦ Throttle cables
- ⑧ Brake hose
- ⑨ Throttle cable (return side)
- ⑩ Throttle cable (pull side)

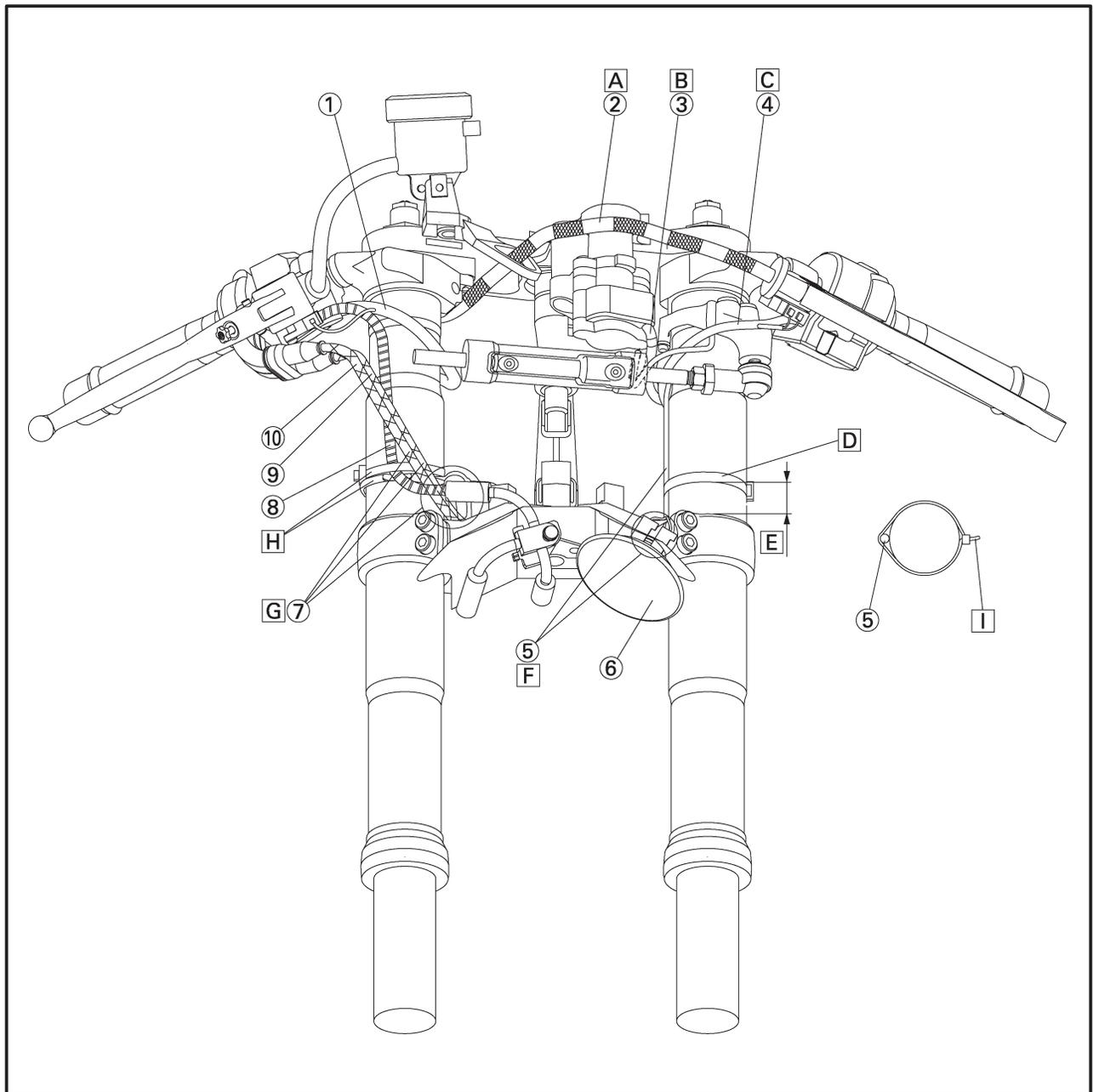
- A Route the clutch cable so as to get along the front side of the main switch after passing it through the guide.
- B Pass the main switch lead through the guide wire.
- C Pass the left handlebar switch lead through the guide wire.
- D Point the tip of the band (excessive part) to the rear side of the vehicle and cut the surplus section. Clamp it to the outer tube.
- E Clamp the section between 0 and 20 mm (0 and 0.79 in) from the split of the under bracket.

- F Clamp the leads inside the front fork of the vehicle. Point the exit of the horn lead to the left front fork side.
- G Two throttle cables should not cross with each other. Route two throttle cables behind the brake hose, pass between the inside of the under bracket's upper side front fork and guide wire assembly, and then pass it through the clamp that is inserted to the cover 3 under the frame.





- H Clamp the assembly of the clamp and guide wire to the front fork outer tube. Cut the tip of the clamp leaving 2 to 4 mm (0.08 ~ 0.16 in). Point the binding part to the external part of the vehicle. Clamp it to the outer tube.
- I Cut the tip leaving 2 to 4mm (0.08 ~ 0.16 in).



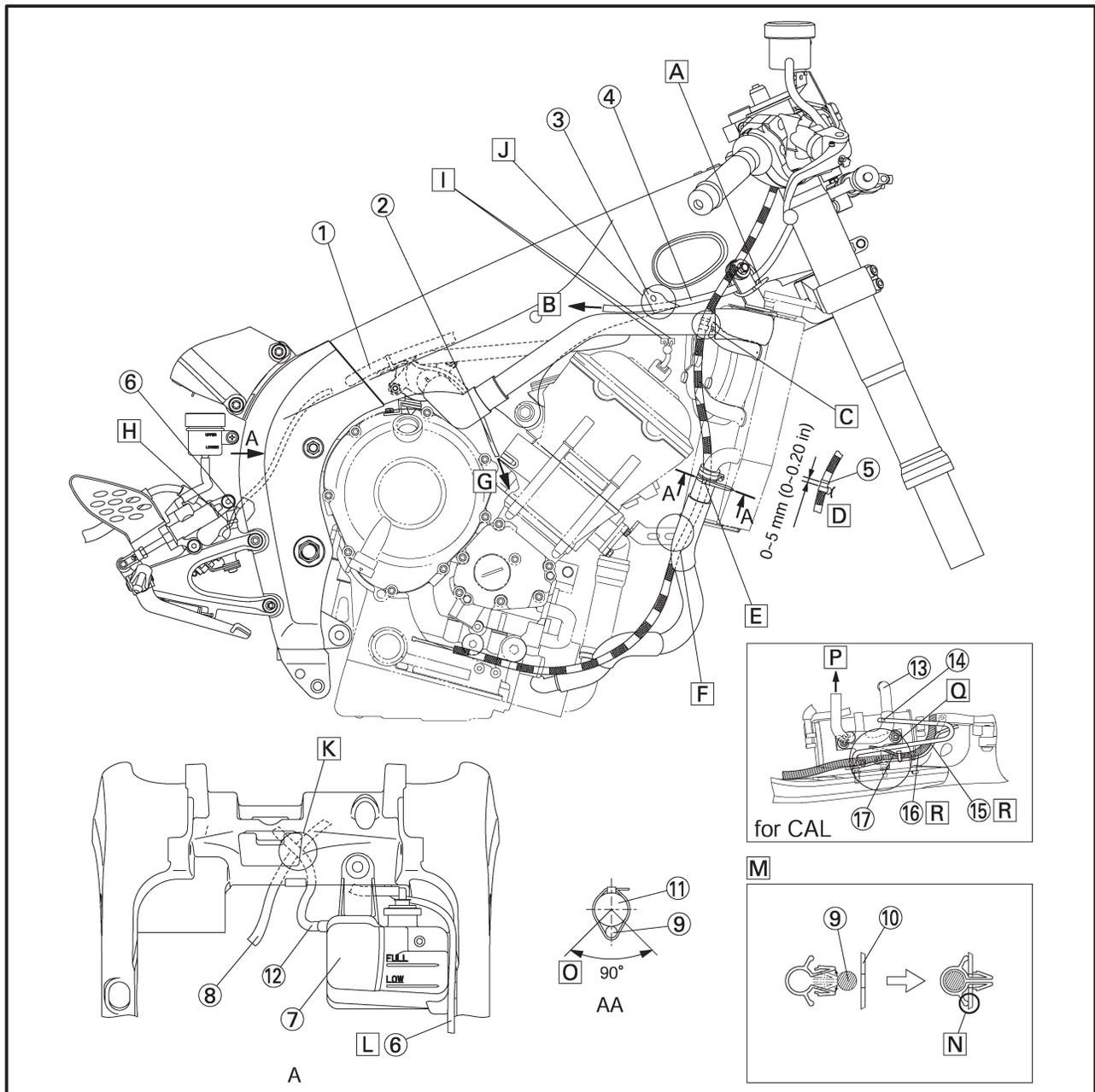


- ① Wire harness
- ② Crankshaft position sensor lead
- ③ Heat protector
- ④ Right handlebar switch lead
- ⑤ Positioning guide
- ⑥ Rear brake light switch lead
- ⑦ Coolant reservoir tank
- ⑧ Speed sensor lead
- ⑨ Clutch cable
- ⑩ Radiator
- ⑪ Oil cooler outlet hose
- ⑫ Coolant reservoir tank drain hose
- ⑬ Breather pipe
- ⑭ Fuel tank drain hose
- ⑮ A.C. magneto lead
- ⑯ Wire harness

- ⑰ Throttle body lead

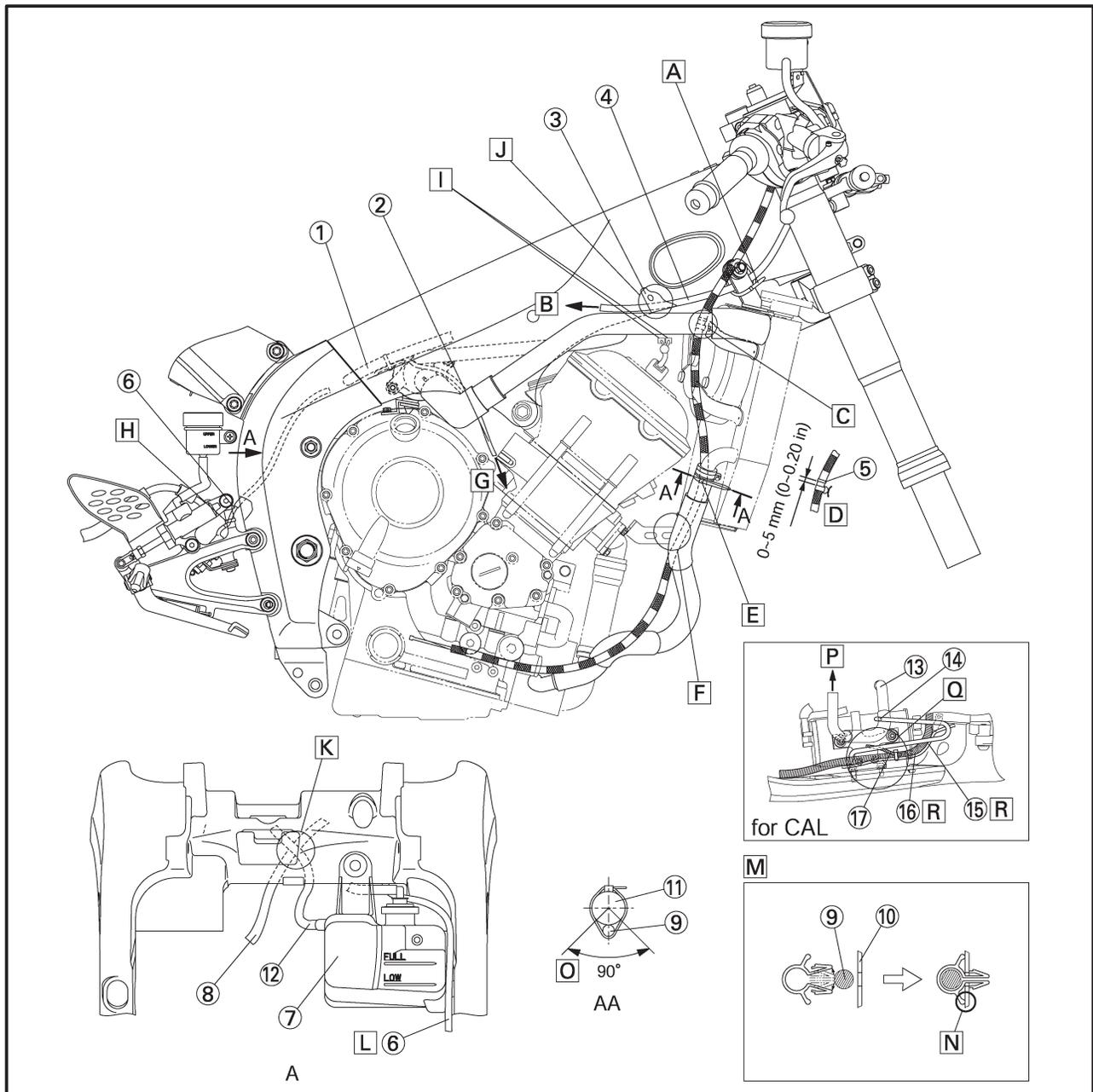
- A** Clamp it after passing between the frame and radiator stay. Point the tip of the clamp (excessive part) to the front side of the vehicle. Fasten the right handlebar switch lead with a clamp.
- B** To the wire harness
- C** The clutch cable positioning guide should be above the upper end of the clamp. Fasten the clutch cable with a clamp. (Refer to **M**)
- D** Position relation between the clamp and guide.

- E** Clamp the clamp upper end along the line of lower end of the hose clamp assembly. Point the tip of the clamp (surplus section) to the front side of the vehicle. Clutch cable is what the clamp fastens.
- F** The clutch cable doesn't project outside the water hose and the cylinder head in the box part in the figure.
- G** To the engine
- H** Clamp behind the bracket 3.





- I** The coupler for the air induction solenoid lead and camshaft sensor lead should be connected above the ignition coil sub wire harness and it should not drop on the cylinder head cover behind the ignition coil.
- J** Pass the right handlebar switch lead between the frame and heat protector.
- K** Coolant reservoir tank drain hose should cross with the speed sensor lead under the swingarm bracket. Route the coolant reservoir tank drain hose over the up side of the vehicle.
- L** Pass the rear brake light switch lead between the swingarm bracket and coolant reservoir tank.
- M** Release the tip of the clamp and install it to the clutch cable. Insert the clamp to the hole located on the right back side of the radiator. Radiator fan motor lead should not be caught while inserting the clamp.
- N** Push the clamp until it hits the radiator side stay. Radiator fan motor lead should not be caught.
- O** Clamp the clutch cable so that it is within this specified clamp.
- P** To the air filter
- Q** Route the fuel tank drain hose over the canister stay and between the breather hose 2 and wire harness. On the front side of the canister stay, let though the bottom of the A.C.magneto lead and the wire harness.
- R** Route by the upside of vehicle away from the canister stay.





- ① Heat protector
- ② Main switch lead
- ③ Left handlebar switch lead
- ④ EXUP servo motor lead
- ⑤ Coolant reservoir tank drain hose
- ⑥ Fuel tank drain hose
- ⑦ Coolant outlet pipe
- ⑧ Sidestand switch lead
- ⑨ Oil level switch lead
- ⑩ A.C.magneto lead
- ⑪ Fuse box stay
- ⑫ Water hose
- ⑬ Stay 1
- ⑭ Chain case cover

A Clamp the leads so that they are positioned inner of the vehicle than the washer position after routing them between the frame and radiator stay. Align the clamp position with the taping sections of leads. Point the tip of the clamp (surplus section) to the down front side of the vehicle.

What the clamp fastens at this stage are the handlebar switch and main switch leads.

B Pass the main switch lead and left handlebar switch lead between the frame and the heat protector.

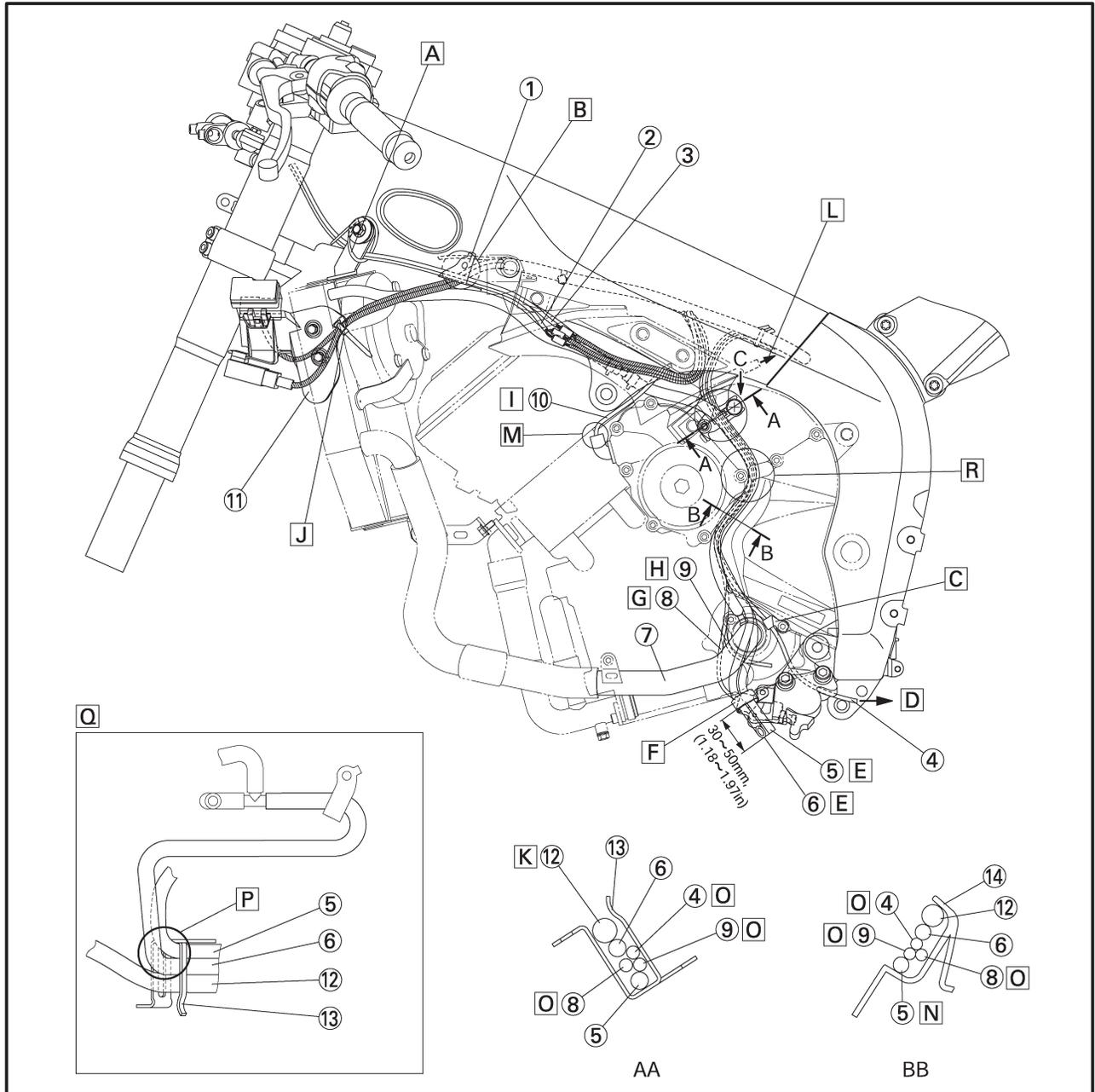
C Fold back the clamp and secure it after passing the lead through the clamp.

D To the EXUP servo motor

E Pass the coolant reservoir tank drain hose and fuel tank drain hose through the clamp from the outer side of the water pump inlet pipe after routing it behind the water pump breather hose.

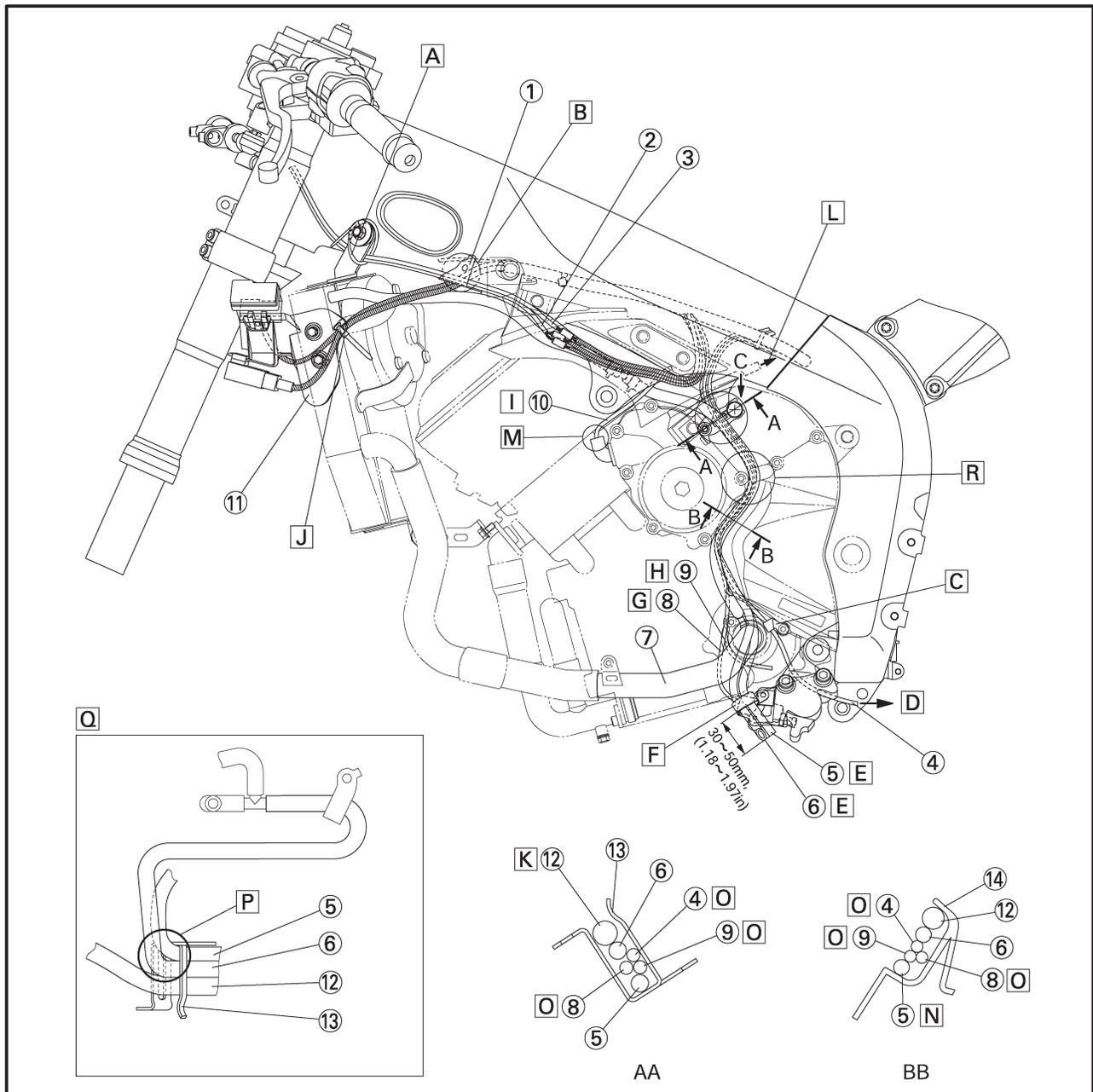
The lengths of two hose ends are allowed to be random. Any direction of cut edges can be accepted. (Only for the fuel tank drain hose)

F Clamp the fuel tank drain hose and fuel tank breather hose.



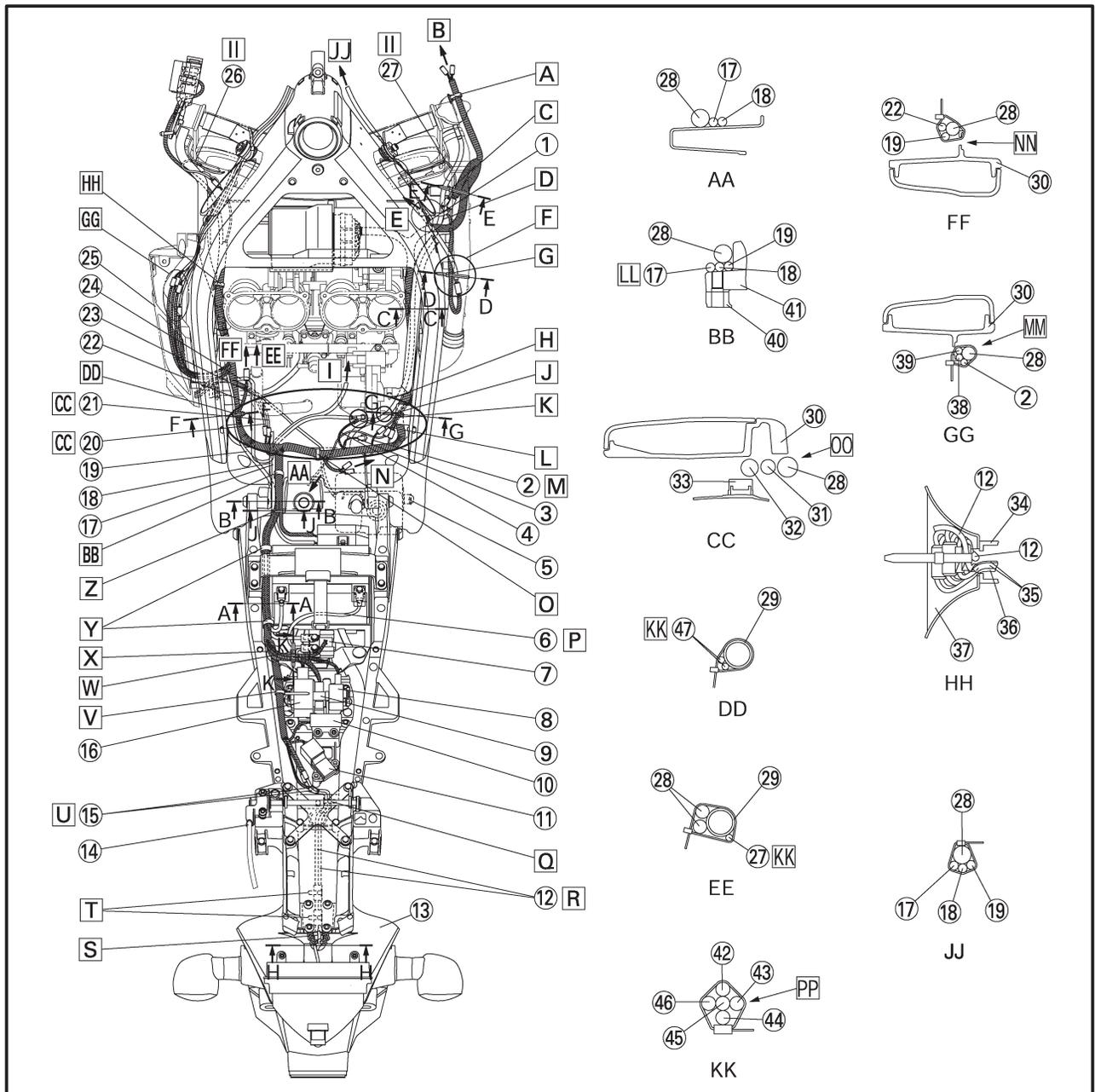


- G** Route the lead by the inside of the water hose and water pipe.
- H** Route the lead by the inside of the water hose and water pipe.
- I** Route by the outside of vehicle away from the water hose.
- J** Point the tip of the clamp (excessive part) to the down rear side of the vehicle. Fasten the wire harness with a clamp.
- K** Route the water hose so that it is placed at the outermost position finally after routing other leads and hoses in the guide.
- L** To the coolant reservoir tank
- M** There should be no exposure of bared conductors due to the displacement of the tube.
- N** Route the coolant reservoir tank drain hose so that it is routed at the innermost position to each hose and lead.
- O** Can be routed in any order.
- P** Align the molded part of the fuel tank drain hose with the stay 1.
- Q** Routing of the fuel tank drain hose. EXUP servo motor, oil level switch and sidestand switch leads are omitted in this drawing.
- R** Arrange so as not for each hose to cross in the part between "BB" from the section "AA" which is in the illustration.



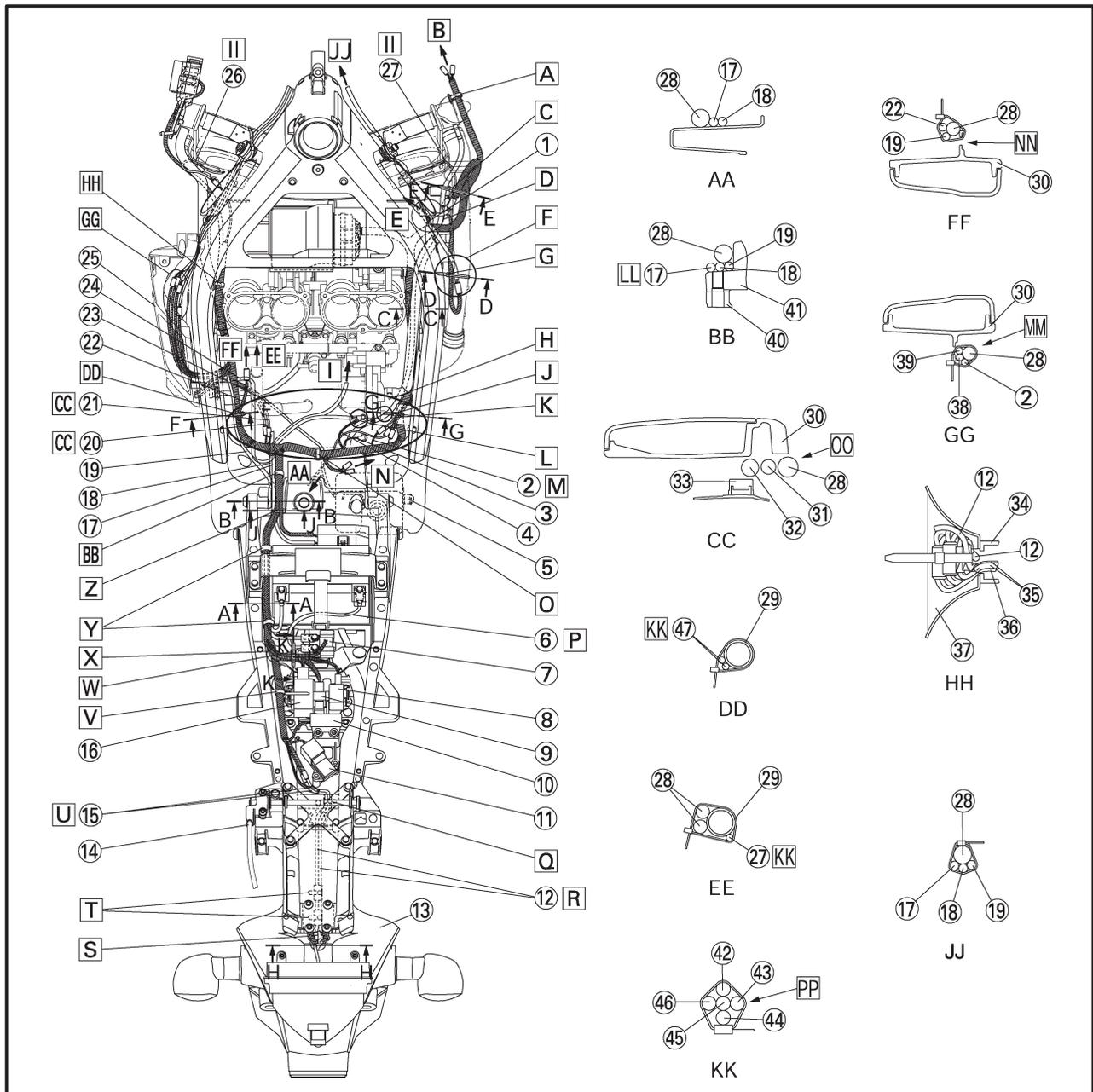


- | | | |
|-----------------------------------|---------------------------------------|--|
| ① Heat protector | ①7 Battery negative lead | ③3 Throttle body side cap |
| ② Crankshaft position sensor lead | ①8 Starter motor lead | ③4 Mud guard |
| ③ Neutral switch lead | ①9 A.C.magneto lead | ③5 Turn signal light lead |
| ④ Ground lead | ②0 Oil level switch lead | ③6 License plate light lead |
| ⑤ Coolant reservoir tank | ②1 Sidestand switch lead | ③7 Rear fender rib |
| ⑥ Battery positive lead | ②2 Throttle body lead | ③8 Speed sensor lead |
| ⑦ Starter relay | ②3 Coolant reservoir tank drain hose | ③9 Rear brake light switch lead |
| ⑧ Turn signal relay | ②4 Fuel tank drain hose | ④0 Rear frame |
| ⑨ Main fuse | ②5 Cover 7 | ④1 Swingarm bracket |
| ⑩ Lean angle cut-off switch | ②6 Radiator fan motor lead (left) | ④2 Main fuse lead |
| ⑪ Atmospheric pressure sensor | ②7 Radiator fan motor lead (right) | ④3 Starting circuit cut-off relay lead |
| ⑫ Tail/brake light lead | ②8 Wire harness | ④4 Turn signal light relay lead |
| ⑬ Rear fender | ②9 Pipe 3 | ④5 Starter relay lead |
| ⑭ Seat lock cable | ③0 Frame | ④6 Main fuse lead (To the battery positive lead) |
| ⑮ Anti safety alarm coupler | ③1 Coolant reservoir tank hose | ④7 Right handlebar switch lead |
| ⑯ Starting circuit cut-off relay | ③2 Thermo stat assembly breather hose | |



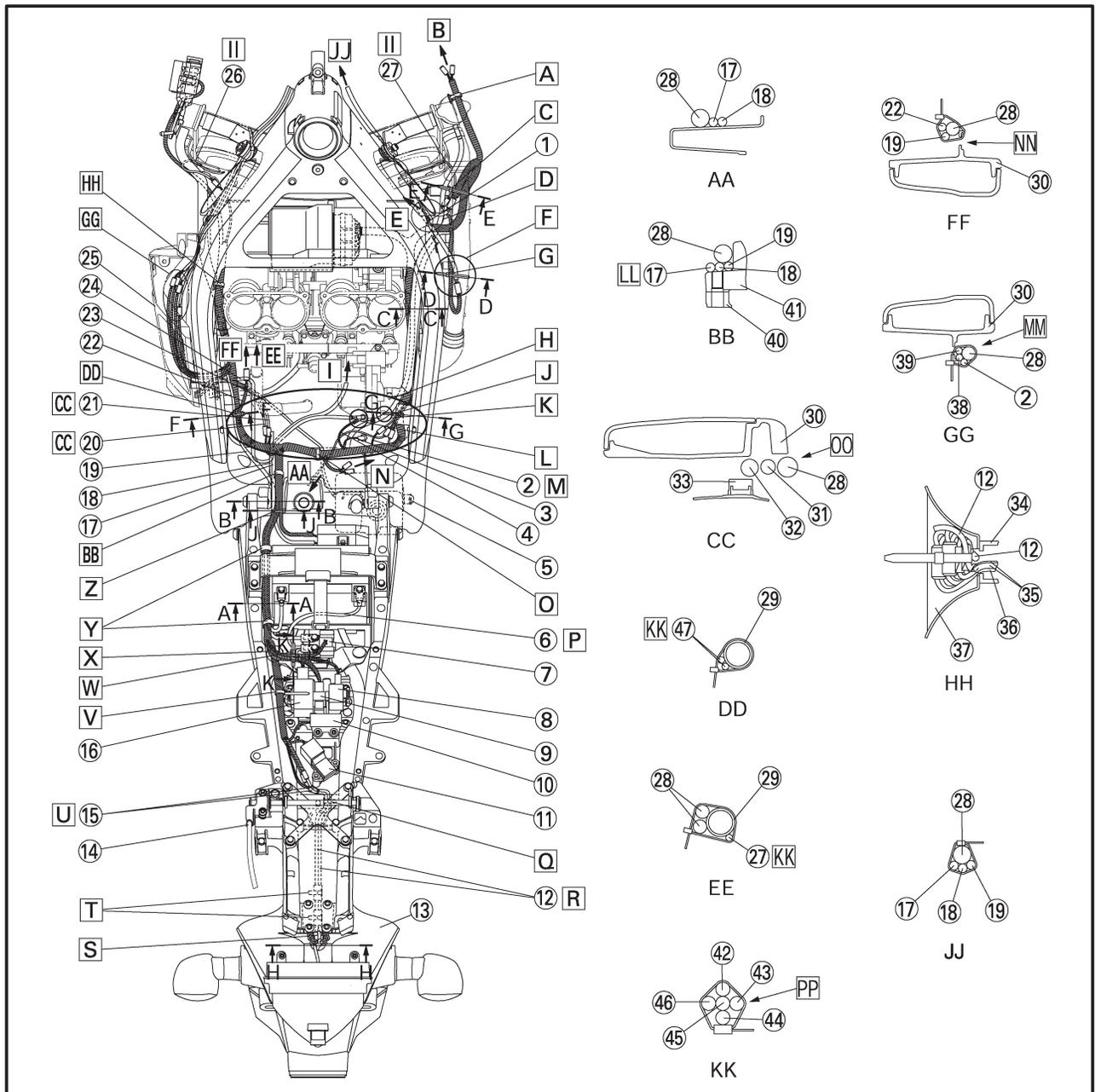


- A** Pass the wire harness through the clamp inserted to the radiator stay.
- B** To the headlight lead
- C** Clamp the lead between three protrusions of the pipe (the first and second parts from the vehicle front). Point the tip of the clamp (excessive part) to the inside of the vehicle.
- D** To the vehicle right side diagram
- E** To the engine
- F** Clamp the lead between three protrusions of the pipe (the inside and outside of the vehicle).
- G** Point the tip of the clamp (excessive part) to the inside of the vehicle.
- H** All hoses and leads should be routed over the vehicle's upper side above the heat protector.
- I** To the starter motor
- J** Fasten the wire harness, crank shaft position sensor lead, rear brake light switch lead and speed sensor lead with a clamp. Then, point the tip of the clamp (cut the tip of the clamp leaving 2 to 4 mm (0.08 to 0.16 in.)) to the inside of the vehicle.
- K** Pass the water hose lower side of the thermostat, and between the ground lead and the neutral switch.
- L** Install the leads so that the engine ground lead is positioned lower and the battery negative lead to be upper. Install the protrusion of each lead to be above the vehicle.
- M** Route the crankshaft position sensor lead under the wire harness.
- N** To the fuel pump
- O** Clamp the wire harness winding in and insert it to the frame hole.





- P** Pass the lead through inside of the battery band.
- Q** Press on the tip of the clamp after passing the leads through it.
- R** Insert the tail/brake light lead to the rear frame hole.
- S** Insert the clamp from the vehicle front to the rear side and fasten each lead, coupler and onion-head to the fender rib, and then point the tip of the clamp (excessive part) to the upper side of the vehicle.
- T** Hold down the clamp tips after passing each lead.
- U** Make sure to position the coupler at the downmost position of leads. However, the coupler should be set in the rear frame so that it is not caught by the seat bottom, cover and other components.
- V** Point the tip of the clamp (excessive part) to the inside of the vehicle. Fasten the wire harness with a clamp.
- W** Point the tip of the clamp (surplus section) to the rear side of the vehicle. Fasten the starter relay lead, turn signal relay lead, main fuse lead, main fuse lead (from the battery positive lead) and starting circuit cut-off relay lead with a clamp.
- X** Route each lead under the wire harness.
- Y** Fasten the wire harness, battery negative lead and starter motor lead with a clamp. Point the tip of the clamp (excessive part) to the inside of the vehicle.





Z Point the tip of the clamp (excessive part) to the down side of the vehicle. Fasten the wire harness, battery negative lead, A.C. magneto lead and starter motor lead with a clamp.

AA To the speed sensor

BB Insert the wire harness wrapping clamp to the hole of the frame.

CC After passing the lead between the wire harness and starter motor leads, fastening by the clamp should be cancelled and route the lead under the idle remote controller.

DD Fasten the wire harness, A.C. magneto lead, and throttle body lead with a clamp. Point the tip of the clamp (cut the tip of the clamp leaving 2 to 4 mm (0.08 to 0.16 in.) to the inside of the vehicle.

EE To the air filter

FF To the throttle body

GG To install the cover 7, install so as to set each coupler in the cover. Make sure that each lead is not caught by the cover 7.

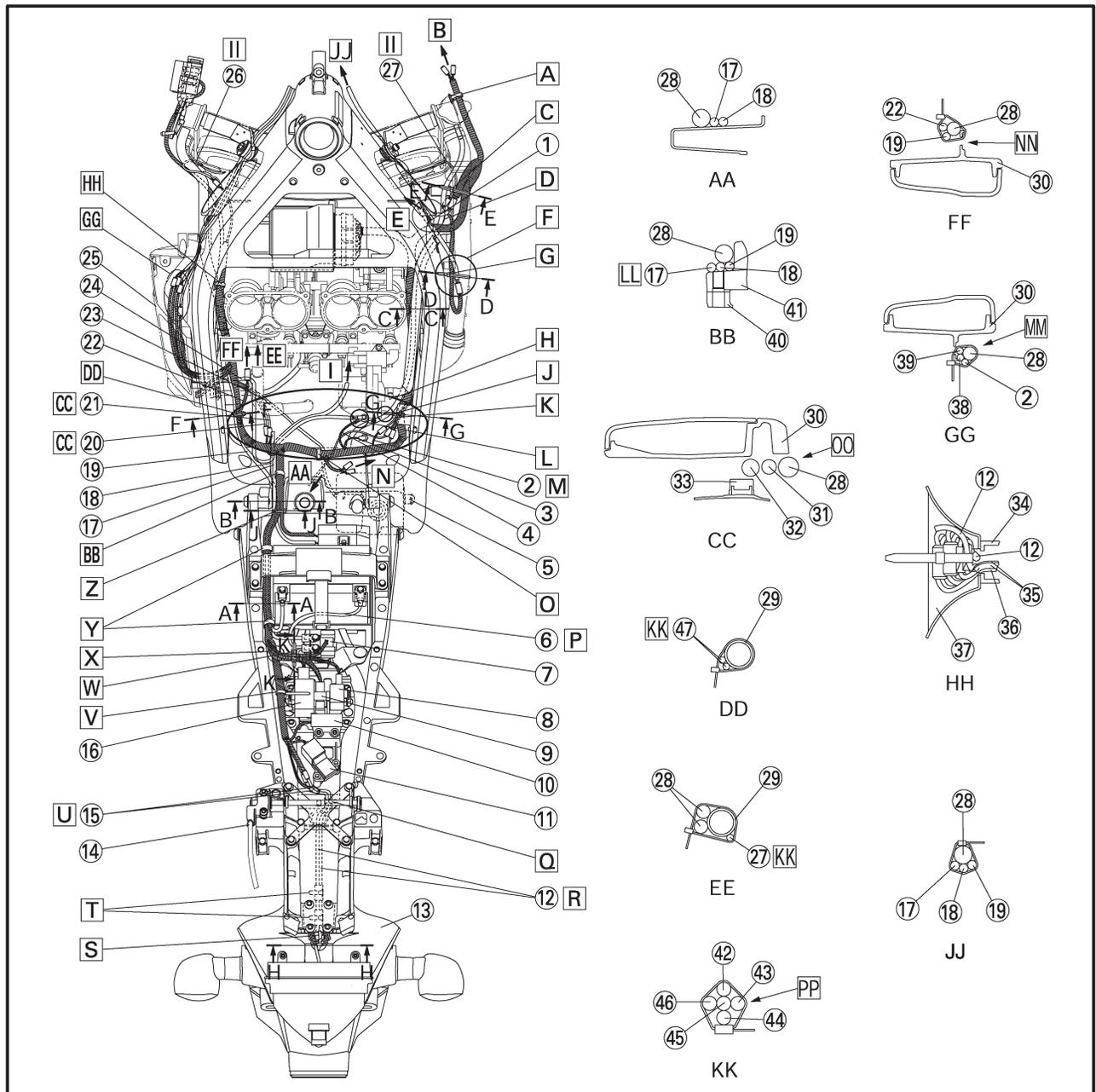
HH Insert the wire harness wrapping clamp to the hole of the frame.

II Make sure that the lead is fastened with the guide of the radiator stay.

JJ To the right handlebar switch

KK Do not place it beyond pipe 3 in the direction to the external part of the vehicle.

LL Battery negative lead should not run on the swingarm bracket.



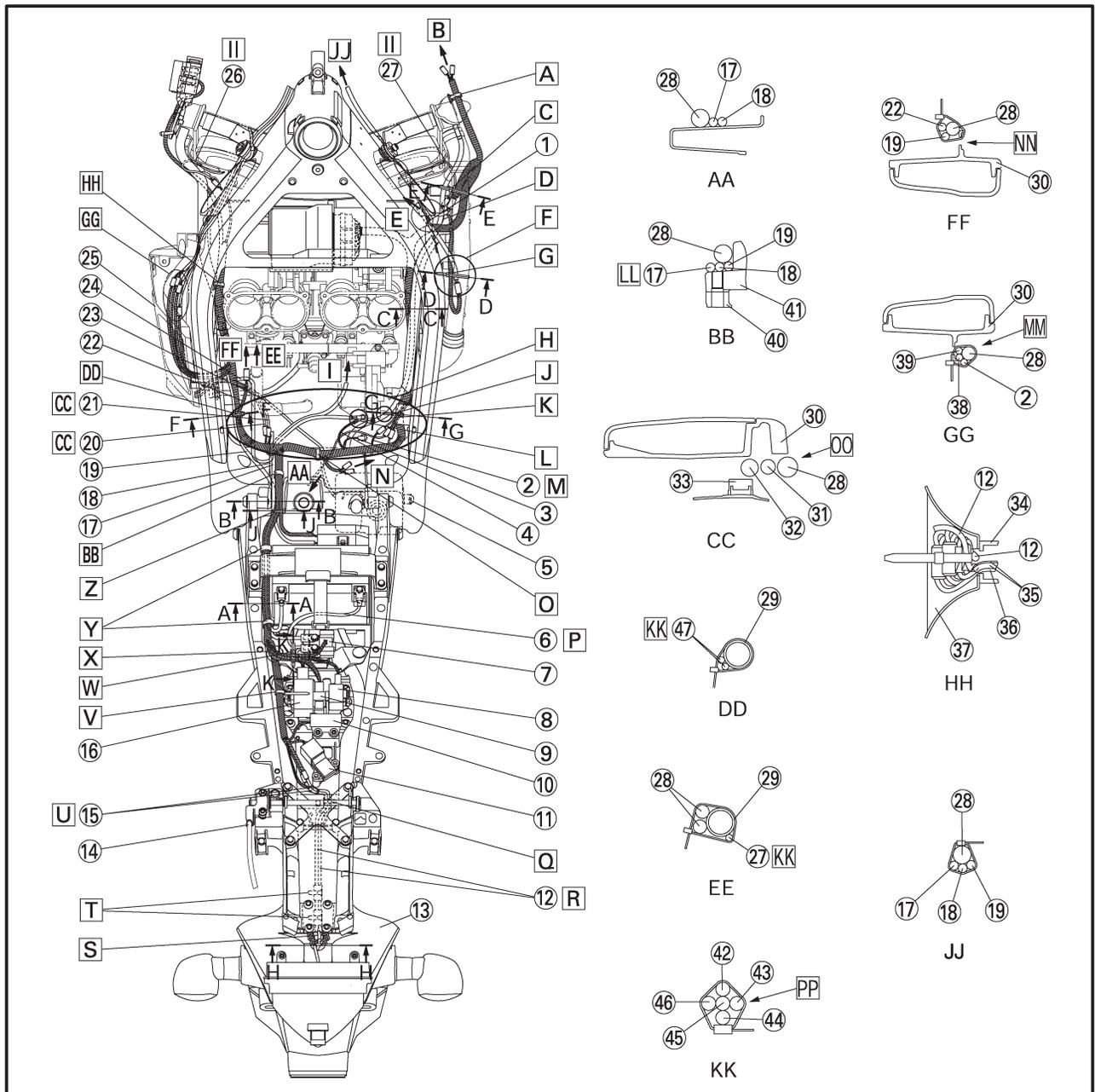


MM Route each lead lower than the frame plate. Leads should be routed in random order. Clamp can be inserted in any direction.

PP Route the leads in random order.

NN Route each lead higher than the frame plate, pass it to the inside of the vehicle from the hole. Leads should be routed in random order. Clamp can be inserted in any direction.

OO The hoses should not be located higher than the throttle body side cap over the up side of the vehicle.

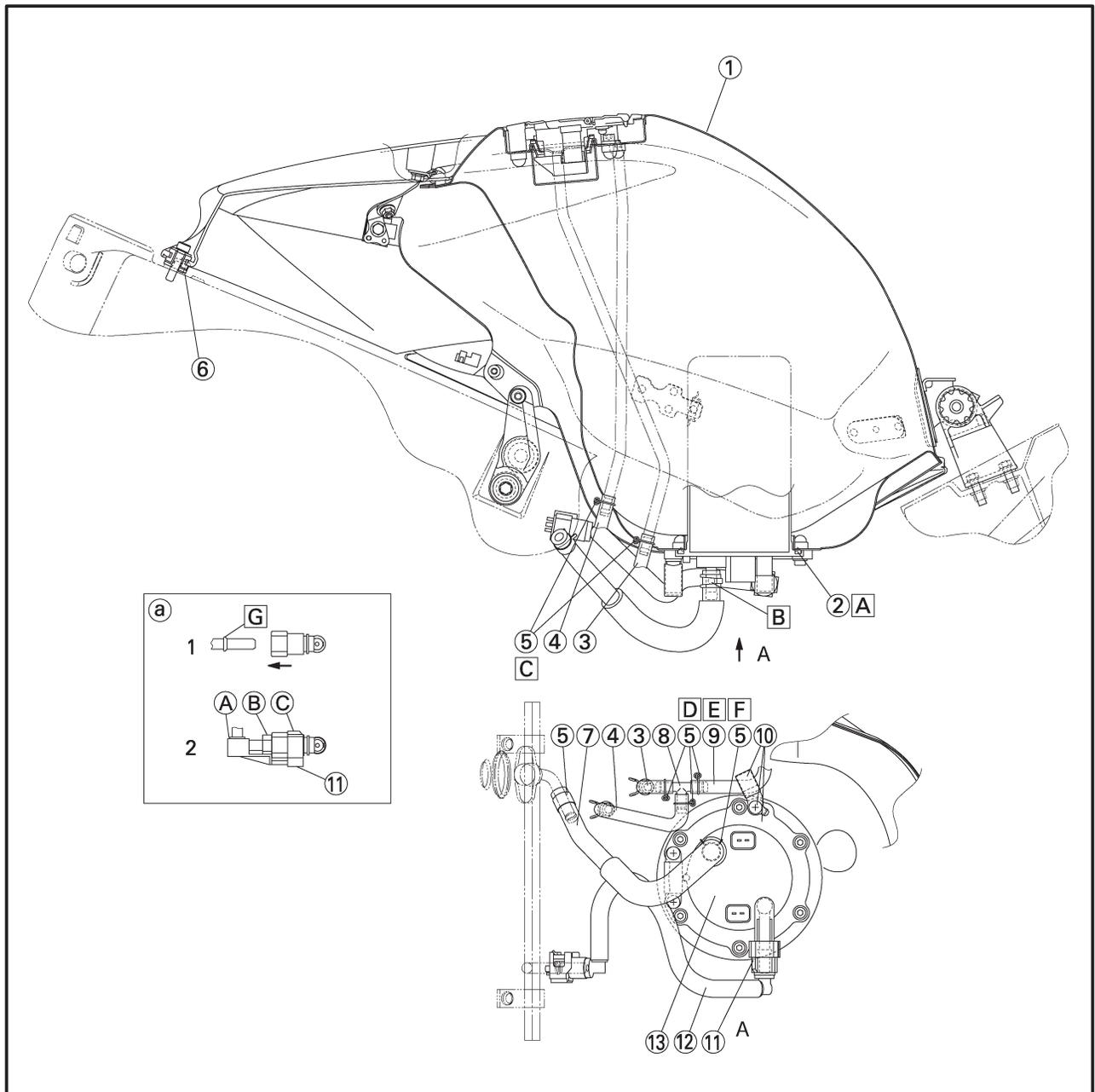




- ① Fuel tank
- ② O-ring
- ③ Fuel tank drain hose
- ④ Fuel tank breather hose
- ⑤ Clip
- ⑥ Air filter stay
- ⑦ Fuel hose 2
- ⑧ 3 way connector
- ⑨ Pipe
- ⑩ Fuel tank bracket
- ⑪ Fuel hose clamp
- ⑫ Fuel hose 1
- ⑬ Fuel pump assembly

- [A] Install the lip of O-ring facing upward.
- [B] Install the part pointing the white paint part of the hose to the left side of the vehicle.
- [C] Any direction of the clip grip can be accepted.
- [D] Install the clip grip as specified in the drawing.
- [E] Install the part pointing the white paint part of the hose to the left side of the vehicle.
- [F] Point the clip grip to the left side of the vehicle.

- ① Fuel piping connector attachment directions. (fuel pump side)
- 1. Insert the connector until the click sound is heard and check that the connector does not come off. Make sure that no foreign matter is caught in the sealing section. (It is prohibited to wear the cotton work gloves or equivalent coverings.)
- [G] This part works as a dropout stopper.
- 2. After Item 1 mentioned above is finished, check that the clamp is inserted from the down side, and [A], [B] and [C]-sections are perfectly equipped.

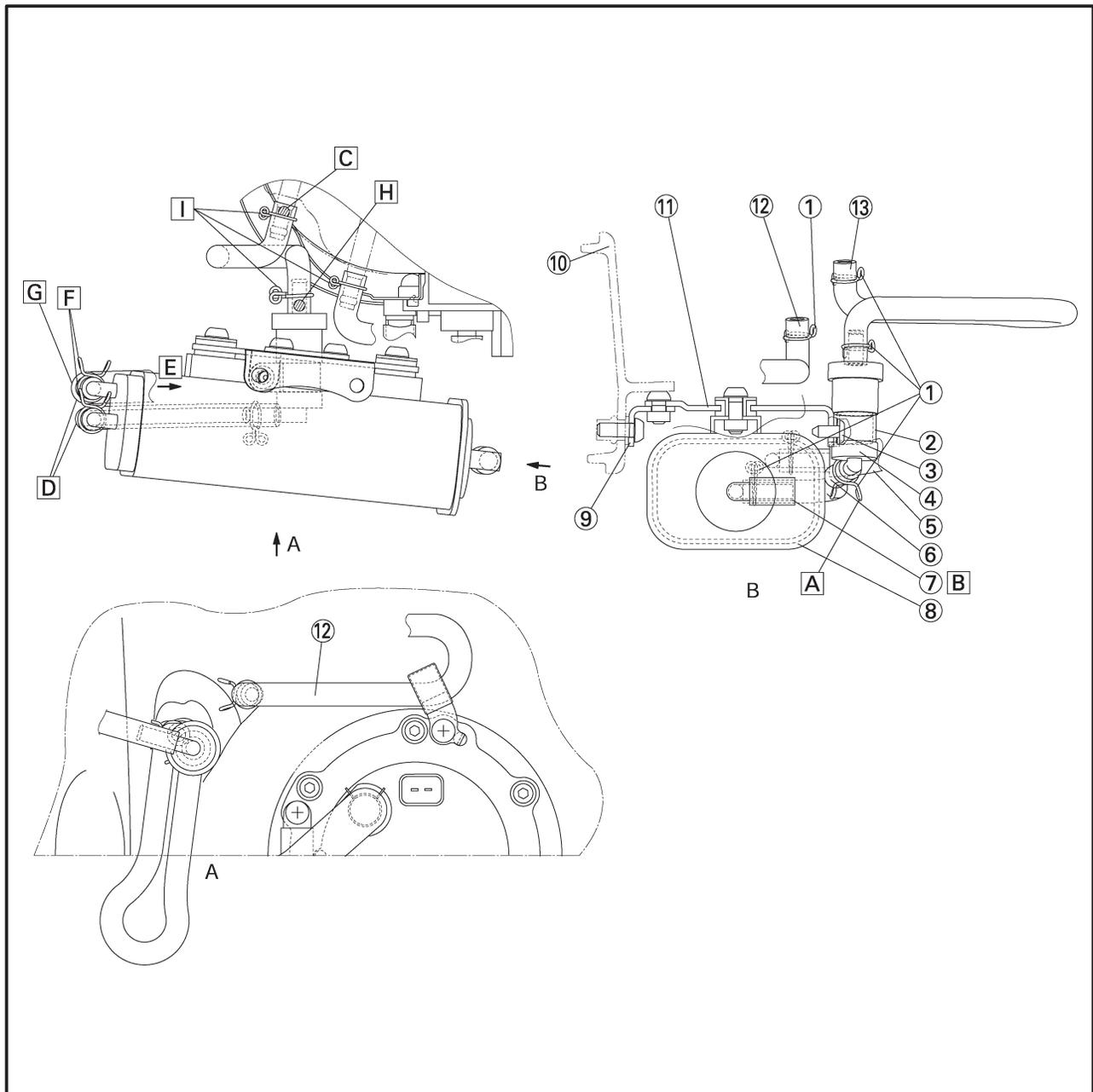




for CAL

- ① Clip
- ② Clamp
- ③ Rivet
- ④ Roll over valve assembly
- ⑤ Balance pipe
- ⑥ Pipe 4
- ⑦ Canister hose
- ⑧ Canister assembly
- ⑨ Canister bracket
- ⑩ Frame
- ⑪ Canister stay
- ⑫ Pipe 2
- ⑬ Pipe 3

- A** Point the clip grip to the down side of the vehicle.
- B** Insert the hose so that its tip of the nipple does not protrude.
- C** Install the part pointing the white paint mark to the left side of the vehicle.
- D** Insert the hose until it reaches the R-bottom of the pipe.
- E** To the throttle body
- F** Point the clip grip to the upper side of the vehicle.
- G** Install the part pointing the yellow paint mark to the front side of the vehicle.
- H** Install the part pointing the yellow paint mark to the left side of the vehicle.



EAS00036

PERIODIC CHECKS AND ADJUSTMENTS

INTRODUCTION

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

PERIODIC MAINTENANCE CHART FOR THE EMISSION CONTROL SYSTEM

No.	ITEM	ROUTINE	INITIAL	ODOMETER READINGS				
			600 mi (1000 km) or 1 month	4000 mi (7000 km) or 6 months	8000 mi (13000 km) or 12 months	12000 mi (19000 km) or 18 months	16000 mi (25000 km) or 24 months	20000 mi (31000 km) or 30 months
1	* Fuel line (See page 3-33)	<ul style="list-style-type: none"> Check fuel hoses for cracks or damage. Replace if necessary. 		✓	✓	✓	✓	✓
2	* Spark plugs (See page 3-23)	<ul style="list-style-type: none"> Check Condition. Adjust gap and clean. Replace every 8000 mi (13000 km) or 12 months. 		✓	Replace.	✓	Replace.	✓
3	* Valve clearance (See page 3-11)	<ul style="list-style-type: none"> Check and adjust valve clearance when engine is cold. 	Every 26600 mi (42000 km)					
4	* Crankcase breather system (See page 3-34)	<ul style="list-style-type: none"> Check breather hose for cracks or damage. Replace if necessary. 		✓	✓	✓	✓	✓
5	* Electronic fuel injection (See page 3-17, 21)	<ul style="list-style-type: none"> Check and adjust engine idle speed and synchronization. 	✓	✓	✓	✓	✓	✓
6	* Exhaust system (See page 3-35)	<ul style="list-style-type: none"> Check for leakage. Tighten if necessary. Replace gasket(s) if necessary. 		✓	✓	✓	✓	✓
7	* Evaporative emission control system (For California only)	<ul style="list-style-type: none"> Check control system for damage. Replace if necessary. 				✓		✓
8	* Air induction system (See page 7-46)	<ul style="list-style-type: none"> Check the air cut-off valve, reed valve, and hose for damage. Replace any damaged parts if necessary. 				✓		✓

3

GENERAL MAINTENANCE AND LUBRICATION CHART

No.	ITEM	ROUTINE	INITIAL	ODOMETER READINGS				
			600 mi (1000 km) or 1 month	4000 mi (7000 km) or 6 months	8000 mi (13000 km) or 12 months	12000 mi (19000 km) or 18 months	16000 mi (25000 km) or 24 months	20000 mi (31000 km) or 30 months
1	* Air filter element (See page 3-32)	<ul style="list-style-type: none"> Check condition and damage. Replace if necessary. 		✓	✓	✓	✓	✓
2	* Clutch (See page 3-31)	<ul style="list-style-type: none"> Check operation. Adjust or replace cable. 	✓	✓	✓	✓	✓	✓
3	* Front brake (See page 3-42, 44, 45)	<ul style="list-style-type: none"> Check operation, fluid level, and for fluid leakage. Replace brake pads if necessary. 	✓	✓	✓	✓	✓	✓
4	* Rear brake (See page 3-43, 44, 45)	<ul style="list-style-type: none"> Check operation, fluid level, and for fluid leakage. Replace brake pads if necessary. 	✓	✓	✓	✓	✓	✓
5	* Brake hoses (See page 3-46)	<ul style="list-style-type: none"> Check for cracks or damage. Replace. 		✓	✓	✓	✓	✓
6	* Wheels (See page 4-3)	<ul style="list-style-type: none"> Check runout and for damage. Replace if necessary. 		✓	✓	✓	✓	✓
7	* Tires (See page 3-58)	<ul style="list-style-type: none"> Check tread depth and for damage. Replace if necessary. Check air pressure. Correct if necessary. 		✓	✓	✓	✓	✓
8	* Wheel bearings (See page 4-3)	<ul style="list-style-type: none"> Check bearings for smooth operation. Replace if necessary. 		✓	✓	✓	✓	✓

GENERAL MAINTENANCE AND LUBRICATION CHART

**CHK
ADJ**



No.	ITEM	ROUTINE	INITIAL	ODOMETER READINGS					
			600 mi (1000 km) or 1 month	4000 mi (7000 km) or 6 months	8000 mi (13000 km) or 12 months	12000 mi (19000 km) or 18 months	16000 mi (25000 km) or 24 months	20000 mi (31000 km) or 30 months	
9	* Swingarm pivot bearings (See page 4-71)	<ul style="list-style-type: none"> Check bearing assemblies for looseness. Moderately repack with lithium-soap-based grease. 			✓			Repack.	
10	Drive chain (See page 3-49, 50)	<ul style="list-style-type: none"> Check chain slack/alignment and condition. Adjust and lubricate chain with a special O-ring chain lubricant thoroughly. 	Every 600 mi (800 km) and after washing the motorcycle or riding in the rain						
11	* Steering bearings (See page 3-51)	<ul style="list-style-type: none"> Check bearing assembly for looseness. Moderately repack with lithium-soap-based grease every 16000 mi (25000 km) or 24 months. 	✓	✓	✓	✓	Repack.	✓	
12	* Steering damper (See page 4-60)	<ul style="list-style-type: none"> Check operation and for oil leakage. 		✓	✓	✓	✓	✓	
13	* Chassis fasteners (See page 2-23)	<ul style="list-style-type: none"> Check all chassis fitting and fasteners. Correct if necessary. 		✓	✓	✓	✓	✓	
14	Brake and clutch lever pivot shafts (See page 3-61)	<ul style="list-style-type: none"> Apply lithium-soap-based grease (all-purpose grease) lightly. 		✓	✓	✓	✓	✓	
15	Sidestand pivot (See page 3-61)	<ul style="list-style-type: none"> Check operation. Apply lithium-soap-based grease (all-purpose grease) lightly. 		✓	✓	✓	✓	✓	
16	* Sidestand switch (See page 3-61, 8-4)	<ul style="list-style-type: none"> Check operation and replace if necessary. 	✓	✓	✓	✓	✓	✓	
17	* Front fork (See page 3-53)	<ul style="list-style-type: none"> Check operation and for oil leakage. Replace if necessary. 		✓	✓	✓	✓	✓	
18	* Shock absorber assembly (See page 3-56, 4-67)	<ul style="list-style-type: none"> Check operation and for oil leakage. Replace if necessary. 		✓	✓	✓	✓	✓	
19	* Rear suspension link pivots (See page 4-71)	<ul style="list-style-type: none"> Check operation. Correct if necessary. 			✓			✓	
20	Engine oil (See page 3-26, 28)	<ul style="list-style-type: none"> Change (warm engine before draining.) 	✓	✓	✓	✓	✓	✓	
21	* Engine oil filter cartridge (See page 3-28)	<ul style="list-style-type: none"> Replace. 	✓		✓			✓	
22	* Cooling system (See page 3-37, 38, 39)	<ul style="list-style-type: none"> Check hoses for cracks or damage. Replace if necessary. 		✓	✓	✓	✓	✓	
		<ul style="list-style-type: none"> Change with ethylene glycol antifreeze coolant every 24 months. 					Change.		
23	* EXUP system (See page 3-36)	<ul style="list-style-type: none"> Check operation, cable free play and pulley position. 	✓	Every 12000 mi (19000 km)					
24	* Control cables (See page 3-61)	<ul style="list-style-type: none"> Apply Yamaha chain and cable lube or engine oil SAE 10W-30 thoroughly. 	✓	✓	✓	✓	✓	✓	
25	* Throttle grip housing and cable (See page 3-22)	<ul style="list-style-type: none"> Check operation and free play. Adjust the throttle cable free play if necessary. Lubricate the throttle grip housing and cable. 		✓	✓	✓	✓	✓	

* Since these items require special tools, data and technical skills, have a Yamaha dealer perform the service.

NOTE:

From 24000 mi (37000 km) or 36 months, repeat the maintenance intervals starting from 8000 mi (13000 km) or 12 months.

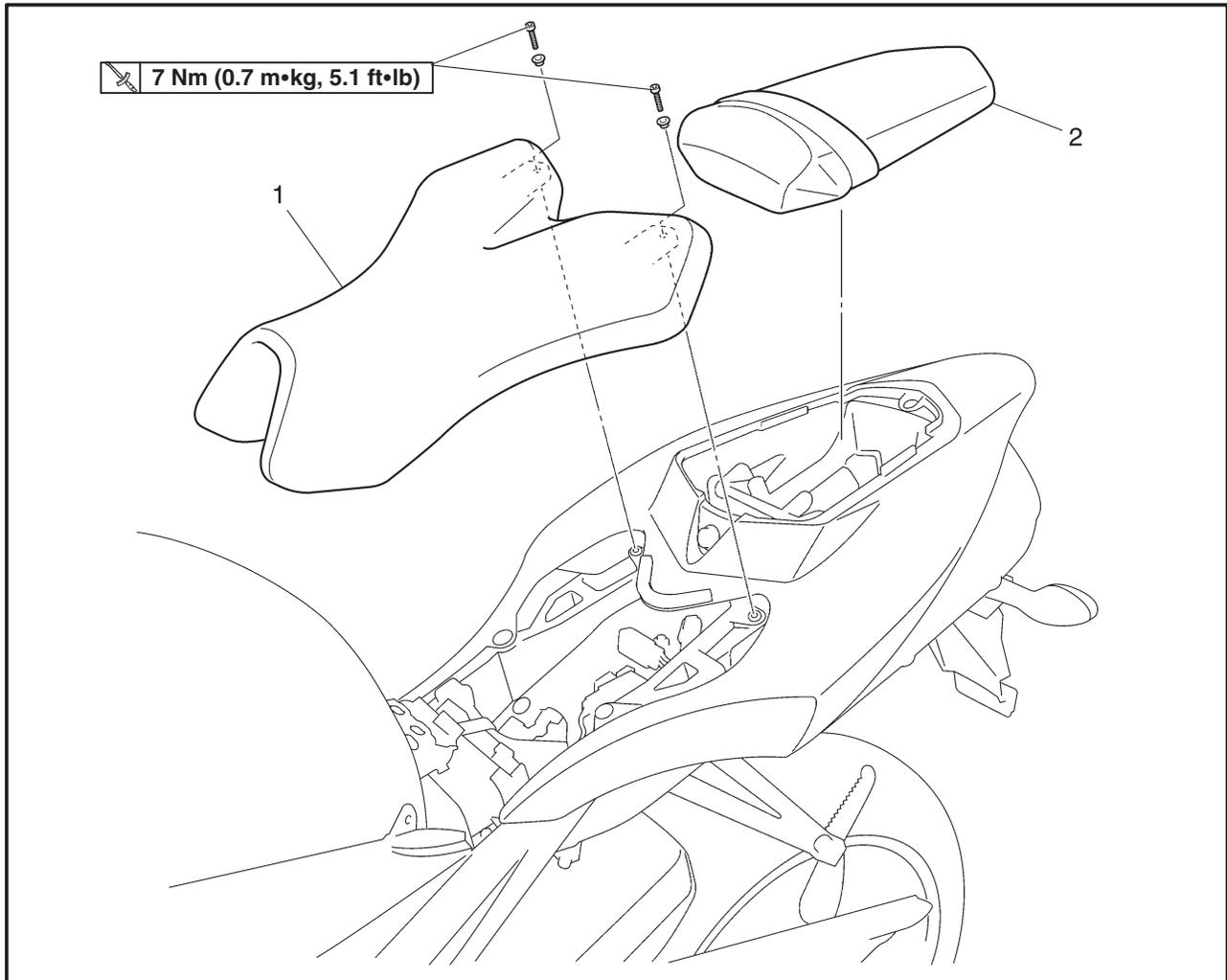
NOTE:

- Air filter
 - This model's air filter is equipped with a disposable oil-coated paper element, which must not be cleaned with compressed air to avoid damaging it.
 - The air filter element needs to be replaced more frequently when riding in unusually wet or dusty areas.
- Hydraulic brake service
 - After disassembling the brake master cylinders and calipers, always change the fluid. Regularly check the brake fluid levels and fill the reservoirs as required.
 - Every two years replace the internal components of the brake master cylinders and calipers, and change the brake fluid.
 - Replace the brake hoses every four years and if cracked or damaged.



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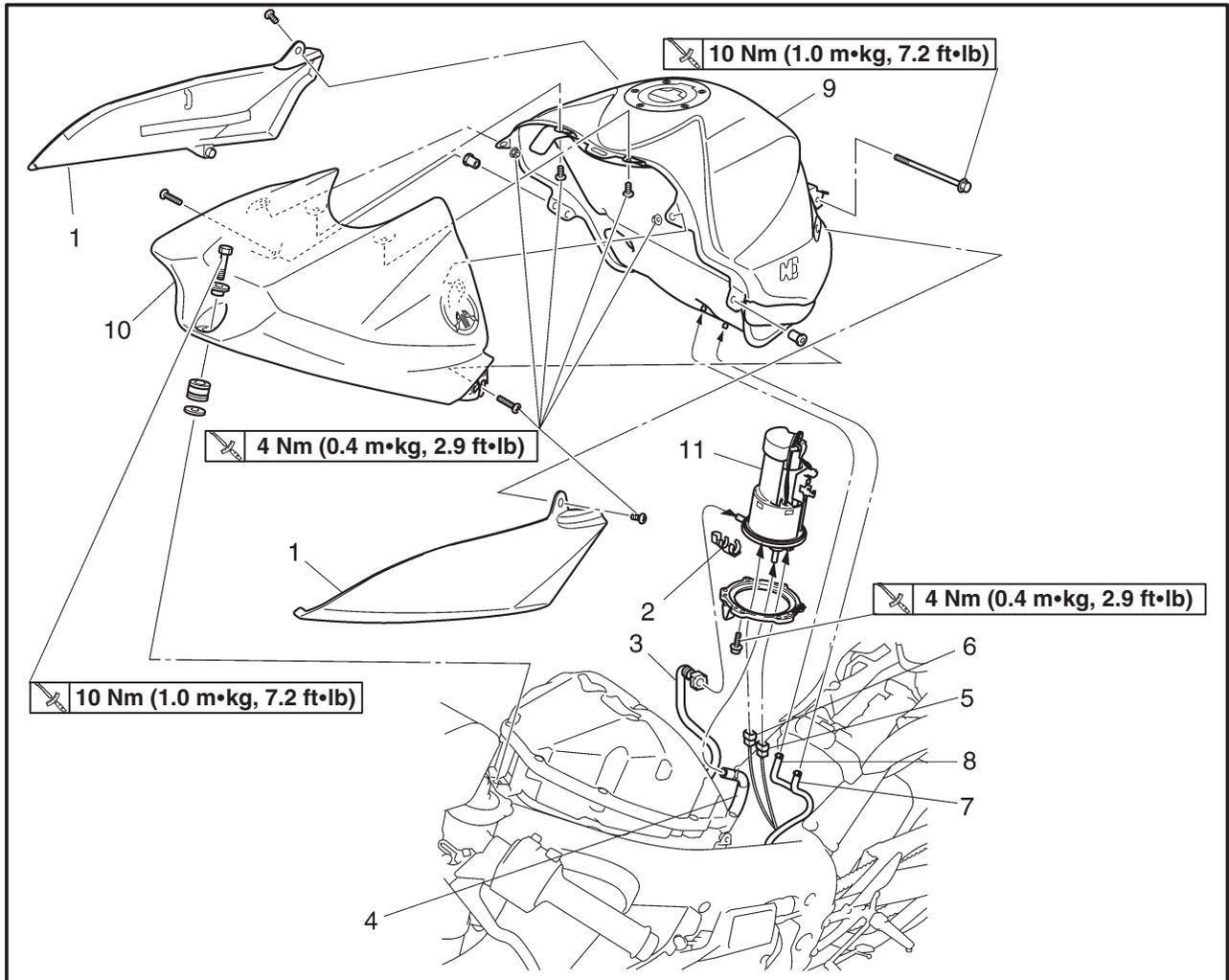
SEATS



Order	Job/Part	Q'ty	Remarks
	Removing the seats		
1	Rider seat	1	Remove the parts in the order listed. For installation, reverse the removal procedure.
2	Passenger seat	1	

EAS00040

FUEL TANK



Order	Job/Part	Q'ty	Remarks
	Removing the fuel tank		
	Rider seat	2	Remove the parts in the order listed. Refer to "SEATS".
1	Fuel tank side cover	2	
2	Fuel hose connector cover	1	
3	Fuel hose	1	Disconnect.
4	Fuel return hose	1	Disconnect.
5	Fuel sender coupler	1	Disconnect.
6	Fuel pump coupler	1	Disconnect.
7	Fuel tank over flow hose	1	Disconnect.
8	Fuel tank breather hose	1	Disconnect.
9	Fuel tank	1	Disconnect.
10	Fuel tank cover	1	
11	Fuel pump	1	
			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 cover
 - fuel return hose
 - fuel hose
 - fuel sender coupler
 - fuel pump coupler
 - fuel tank breather hose
 - fuel tank over flow hose

CAUTION: _____

Although the fuel has been removed from the fuel tank, be careful when removing the fuel hoses, since there may be fuel remaining in it.

NOTE: _____

Before removing the hoses, place a few rags in the area under where it will be removed.

3. Remove:
 - fuel tank

NOTE: _____

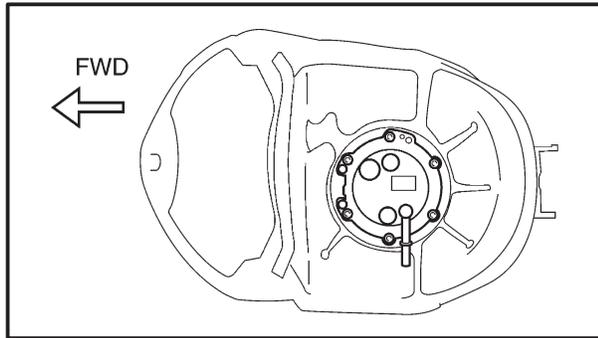
Do not set the fuel tank down so that the installation surface of the fuel pump is directly under the tank. Be sure to lean the fuel tank in an upright position.

REMOVING THE FUEL PUMP

1. Remove:
 - fuel pump

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

 4 Nm (0.4 m•kg, 2.9 ft•lb)

NOTE: _____

- Do not damage the installation surfaces of the fuel tank when installing the fuel pump.
- Always use a new fuel pump gasket.
- Install the fuel pump as shown in the illustration.
- Tighten the fuel pump bolts in stages in a criss-cross pattern and to the specified torque.

INSTALLING THE FUEL TANK

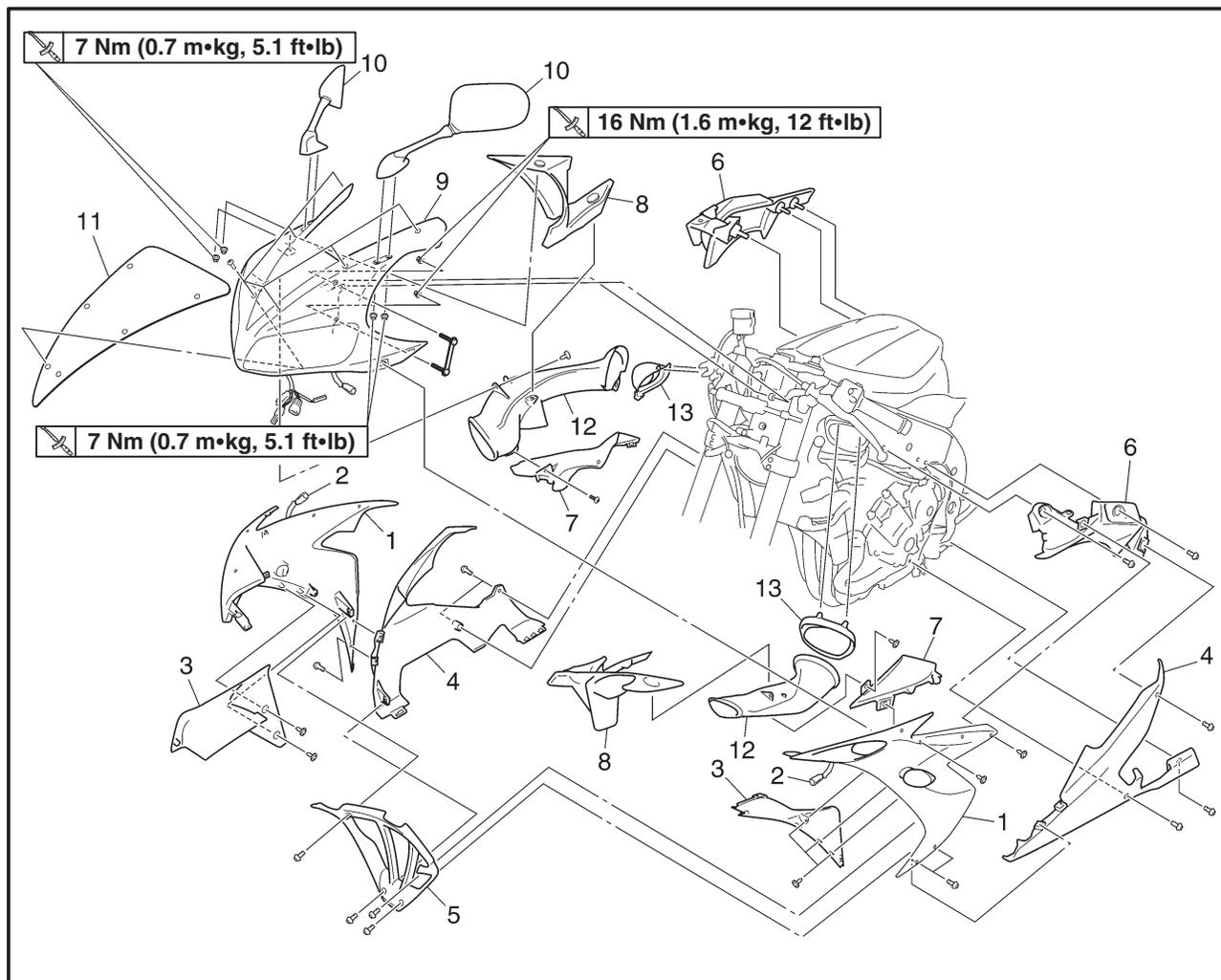
1. Install:

- fuel hose
- fuel return hose
- fuel hose connector cover

CAUTION: _____

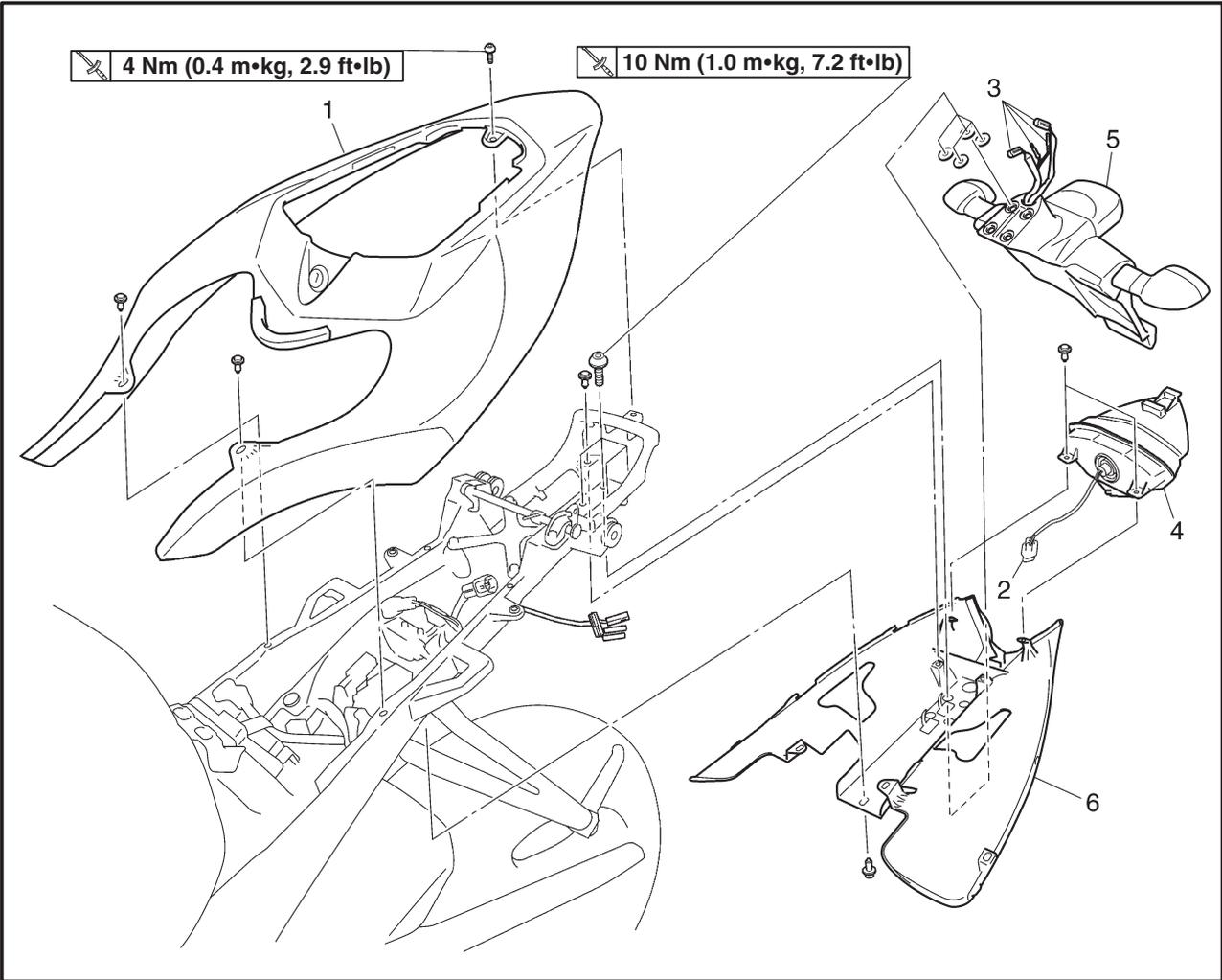
When installing the fuel hose, make sure that it is securely connected, and that the fuel hose holder is in the correct position, otherwise the fuel hose will not be properly installed.

COWLINGS
FRONT COWLING AND SIDE COWLINGS

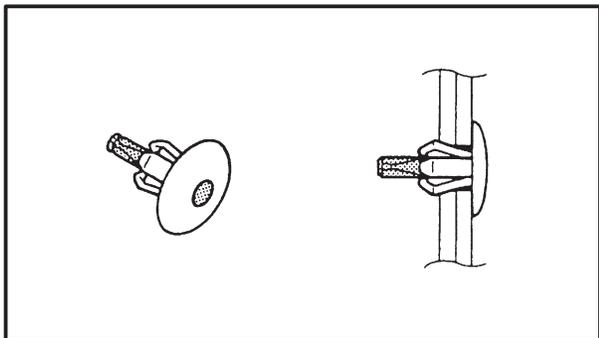


Order	Job/Part	Q'ty	Remarks
	Removing the front cowling and side cowlings		Remove the parts in the order listed.
	Rider seat		Refer to "SEATS".
1	Side cowling	2	
2	Front turn signal light lead coupler	2	Disconnect.
3	Side cowling inner panel	2	
4	Bottom cowling	2	
5	Bottom cowl front cover	1	
6	Frame side cover	2	
7	Frame side panel	2	
8	Headlight panel	2	
9	Front cowling	1	
10	Rear view mirror	2	
11	Windshield	1	
12	Air intake duct	2	
13	Air intake duck mount	2	
			For installation, reverse the removal procedure.

REAR COWLING



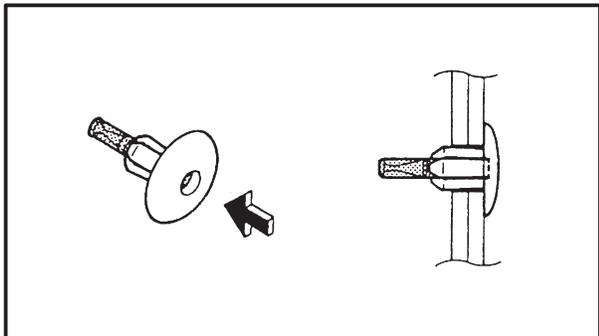
Order	Job/Part	Q'ty	Remarks
	Removing the rear cowling		
	Rider seat and passenger seat		Remove the parts in the order listed. Refer to "SEATS".
	Muffler		Refer to "EXHAUST PIPE" in chapter 5.
1	Rear cowling (upper)	1	
2	Tail/brake light lead coupler	1	Disconnect.
3	Rear turn signal light lead coupler	4	Disconnect.
4	Tail/brake light	1	
5	License plate bracket assembly	1	
6	Rear cowling (lower)	1	
			For installation, reverse the removal procedure.



REMOVAL

1. Remove:
 - rear cowl
 - side cowlings

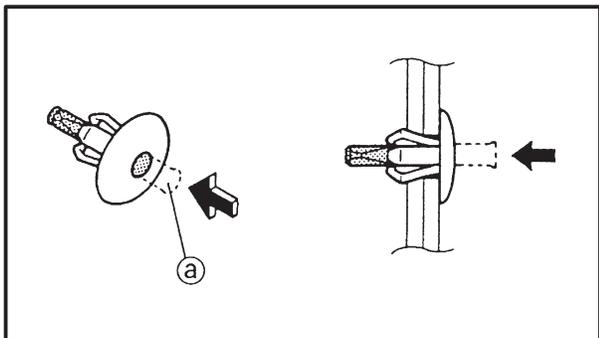
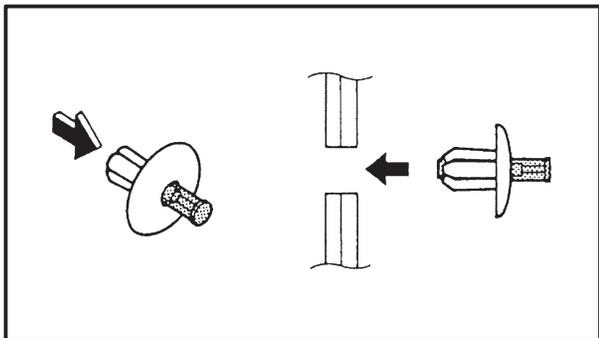
NOTE: _____
To remove the quick fastener, push its center with a screwdriver, then pull the fastener out.



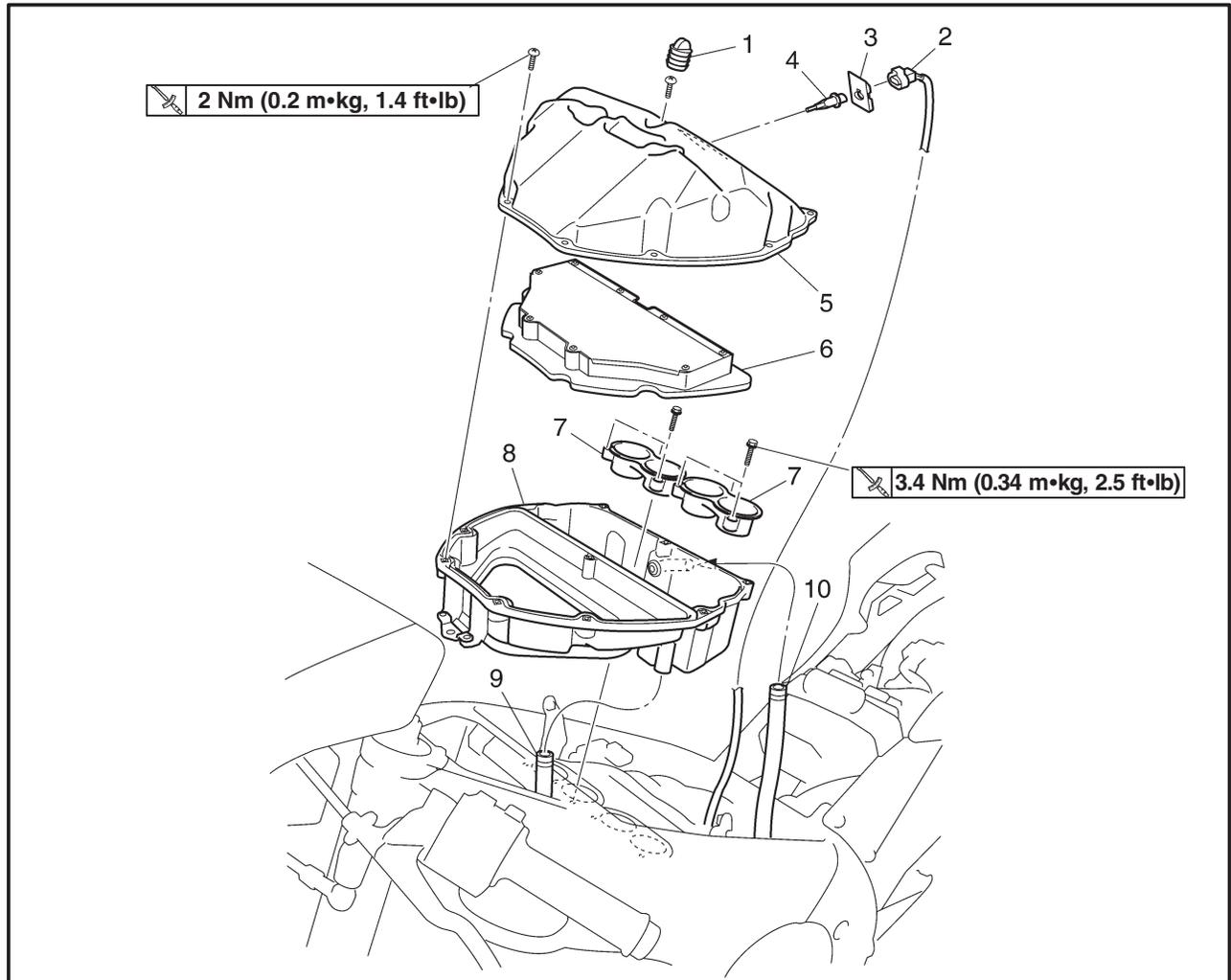
INSTALLATION

1. Install:
 - side cowlings
 - rear cowl

NOTE: _____
To install the quick fastener, push its pin so that it protrudes from the fastener head, then insert the fastener into the cowl and push the pin (a) in with a screwdriver. Make sure that the pin is flush with the fastener's head.



AIR FILTER CASE



Order	Job/Part	Q'ty	Remarks
	Removing the air filter case		Remove the parts in the order listed.
	Rider seat		Refer to "SEATS".
	Fuel tank		Refer to "FUEL TANK".
1	Plug	1	
2	Air temperature sensor lead coupler	1	Disconnect.
3	Spacer	1	
4	Air temperature sensor	1	
5	Air filter case cover	1	
6	Air filter	1	
7	Funnel	2	
8	Air filter case	1	
9	Air induction system hose	1	Disconnect.
10	Crankcase breather hose	1	Disconnect.
			For installation, reverse the removal procedure.

EAS00045

ENGINE

ADJUSTING THE VALVE CLEARANCE

The following procedure applies to all of the valves.

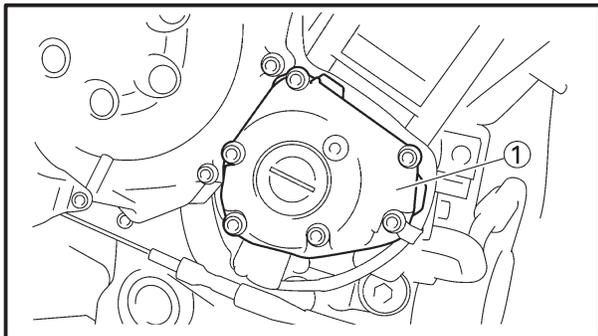
NOTE: _____

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

1. Remove
 - rider seat
Refer to “SEATS”.
 - fuel tank
Refer to “FUEL TANK”.
 - air filter case
Refer to “AIR FILTER CASE”.
 - bottom cowlings
 - side cowlings
Refer to “COWLINGS”.
 - throttle body assembly
Refer to “THROTTLE BODIES” in chapter 7.
 - air cut-off valve
Refer to “AIR INDUCTION SYSTEM” in chapter 7.
 - radiator
 - radiator fan motor
Refer to “RADIATOR” in chapter 6.

2. Remove
 - ignition coils
 - spark plugs
 - cylinder head cover
 - cylinder head cover gasket
Refer to “CAMSHAFT” in chapter 5.

3. Remove
 - pickup rotor cover ①



- c. Round off the original valve pad number according to the following table.

Last digit	Rounded value
0 or 2	0
5	5
8	10

EXAMPLE:

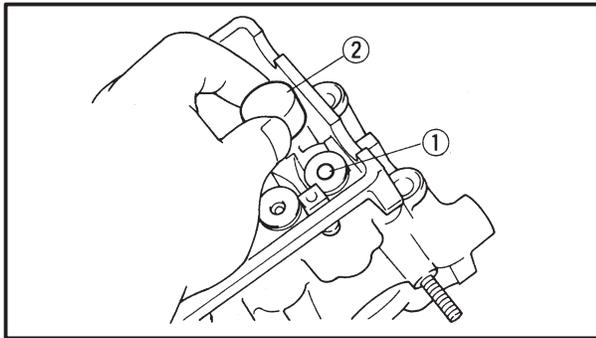
Original valve pad number
= 148 (thickness = 1.48 mm (0.058 in))

Rounded value = 150

- d. Locate the rounded number of the original valve pad and the measured valve clearance in the valve pad selection table. The point where the column and row intersect is the new valve pad number.

NOTE: _____

The new valve pad number is only an approximation. The valve clearance must be measured again and the above steps should be repeated if the measurement is still incorrect.



- e. Install the new valve pad ① and the valve lifter ②.

NOTE: _____

- Lubricate the valve pad with molybdenum disulfide grease.
- Lubricate the valve lifter with molybdenum disulfide oil.
- The valve lifter must turn smoothly when rotated by hand.
- Install the valve lifter and the valve pad in the correct place.

- f. Install the exhaust and intake camshafts, timing chain and camshaft caps.

	<p>Camshaft cap bolt 10 Nm (1.0 m•kg, 7.2 ft•lb)</p>
--	---



NOTE: _____

- Refer to “ASSEMBLING AND ADJUSTING THE ENGINE – CYLINDER HEAD AND CAM-SHAFT” in chapter 5.
- Lubricate the camshaft bearings, camshaft lobes and camshaft journals.
- First, install the exhaust camshaft.
- Align the camshaft marks with the camshaft cap marks.
- Turn the crankshaft counterclockwise several full turns to seat the parts.

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



ADJUSTING THE VALVE CLEARANCE



INTAKE

MEASURED CLEARANCE	INSTALLED PAD NUMBER																								
	120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240
0.00 ~ 0.02				120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225
0.03 ~ 0.07			120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230
0.08 ~ 0.10		120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235
0.11 ~ 0.20	STANDARD CLEARANCE																								
0.21 ~ 0.25	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240	
0.26 ~ 0.30	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240		
0.31 ~ 0.35	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240			
0.36 ~ 0.40	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240				
0.41 ~ 0.45	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240					
0.46 ~ 0.50	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240						
0.51 ~ 0.55	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240							
0.56 ~ 0.60	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240								
0.61 ~ 0.65	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240									
0.66 ~ 0.70	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240										
0.71 ~ 0.75	175	180	185	190	195	200	205	210	215	220	225	230	235	240											
0.76 ~ 0.80	180	185	190	195	200	205	210	215	220	225	230	235	240												
0.81 ~ 0.85	185	190	195	200	205	210	215	220	225	230	235	240													
0.86 ~ 0.90	190	195	200	205	210	215	220	225	230	235	240														
0.91 ~ 0.95	195	200	205	210	215	220	225	230	235	240															
0.96 ~ 1.00	200	205	210	215	220	225	230	235	240																
1.01 ~ 1.05	205	210	215	220	225	230	235	240																	
1.06 ~ 1.10	210	215	220	225	230	235	240																		
1.11 ~ 1.15	215	220	225	230	235	240																			
1.16 ~ 1.20	220	225	230	235	240																				
1.21 ~ 1.25	225	230	235	240																					
1.26 ~ 1.30	230	235	240																						
1.31 ~ 1.35	235	240																							
1.36 ~ 1.40	240																								

VALVE CLEARANCE (cold):
 0.11 ~ 0.20 mm (0.0043 ~ 0.0079 in)
 Example: Installed is 175
 Measured clearance is 0.27 mm (0.0106 in)
 Replace 175 pad with 185 pad
 Pad number: (example)
 Pad No.175 = 1.75 mm (0.0689 in)
 Pad No.185 = 1.85 mm (0.0728 in)

EXHAUST

MEASURED CLEARANCE	INSTALLED PAD NUMBER																								
	120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240
0.00 ~ 0.02						120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215
0.03 ~ 0.07					120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220
0.08 ~ 0.12				120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225
0.13 ~ 0.17			120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230
0.18 ~ 0.20		120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235
0.21 ~ 0.25	STANDARD CLEARANCE																								
0.26 ~ 0.30	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240	
0.31 ~ 0.35	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240		
0.36 ~ 0.40	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240			
0.41 ~ 0.45	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240				
0.46 ~ 0.50	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240					
0.51 ~ 0.55	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240						
0.56 ~ 0.60	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240							
0.61 ~ 0.65	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240								
0.66 ~ 0.70	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240									
0.71 ~ 0.75	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240										
0.76 ~ 0.80	175	180	185	190	195	200	205	210	215	220	225	230	235	240											
0.81 ~ 0.85	180	185	190	195	200	205	210	215	220	225	230	235	240												
0.86 ~ 0.90	185	190	195	200	205	210	215	220	225	230	235	240													
0.91 ~ 0.95	190	195	200	205	210	215	220	225	230	235	240														
0.96 ~ 1.00	195	200	205	210	215	220	225	230	235	240															
1.01 ~ 1.05	200	205	210	215	220	225	230	235	240																
1.06 ~ 1.10	205	210	215	220	225	230	235	240																	
1.11 ~ 1.15	210	215	220	225	230	235	240																		
1.16 ~ 1.20	215	220	225	230	235	240																			
1.21 ~ 1.25	220	225	230	235	240																				
1.26 ~ 1.30	225	230	235	240																					
1.31 ~ 1.35	230	235	240																						
1.36 ~ 1.40	235	240																							
1.41 ~ 1.45	240																								

VALVE CLEARANCE (cold):
 0.21 ~ 0.25 mm (0.0083 ~ 0.0098 in)
 Example: Installed is 175
 Measured clearance is 0.35 mm (0.0138 in)
 Replace 175 pad with 185 pad
 Pad number: (example)
 Pad No.175 = 1.75 mm (0.0689 in)
 Pad No.185 = 1.85 mm (0.0728 in)



7. Install:
- all removed parts

NOTE: _____
For installation, reverse the removal procedure.

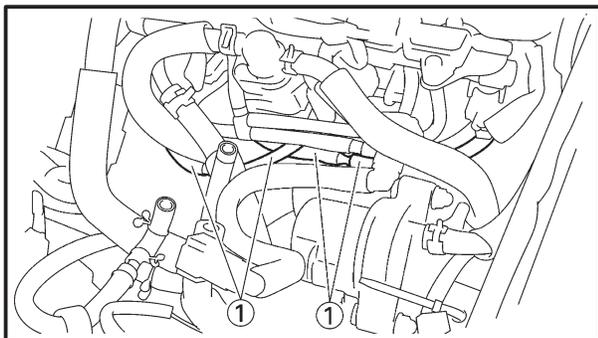
SYNCHRONIZING THE THROTTLE BODIES

NOTE: _____
Prior to synchronizing the throttle bodies, the valve clearance and the engine idling speed should be properly adjusted and the ignition timing should be checked.

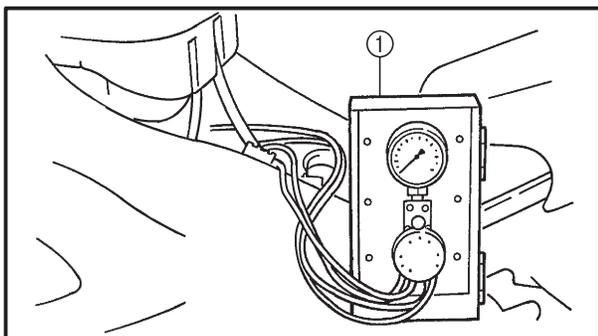
1. Stand the motorcycle on a level surface.

NOTE: _____
Place the motorcycle on a suitable stand.

2. Remove:
- rider seat
Refer to "SEATS".
 - fuel tank
Refer to "FUEL TANK".



3. Remove:
- synchronizing hoses ①



4. Install:
- vacuum gauge ①
(onto the synchronizing hose)
 - digital tachometer
(near the spark plug)



Vacuum gauge
90890-03094, YU-08030

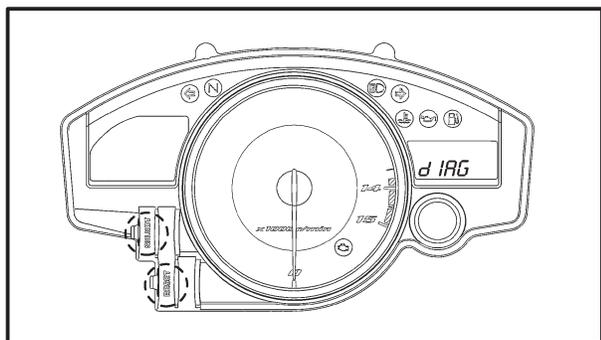


9. Measure:
 - engine idling speed
Out of specification → Adjust.
Make sure that the vacuum pressure is within specification.
10. Stop the engine and remove the measuring equipment.
11. Adjust:
 - throttle cable free play
Refer to “ADJUSTING THE THROTTLE CABLE FREE PLAY”.



**Throttle cable free play
(at the flange of the throttle grip)**
3 ~ 5 mm (0.12 ~ 0.20 in)

13. Install:
 - synchronizing hoses
 - fuel tank
Refer to “FUEL TANK”.
 - rider seat
Refer to “SEATS”.



ADJUSTING THE EXHAUST GAS VOLUME

NOTE:

Be sure to set the carbon monoxide density to standard, and then adjust the exhaust gas.

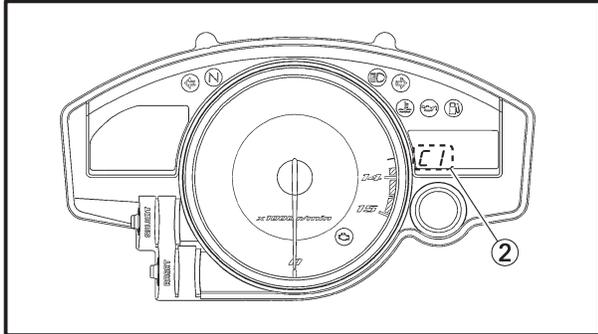
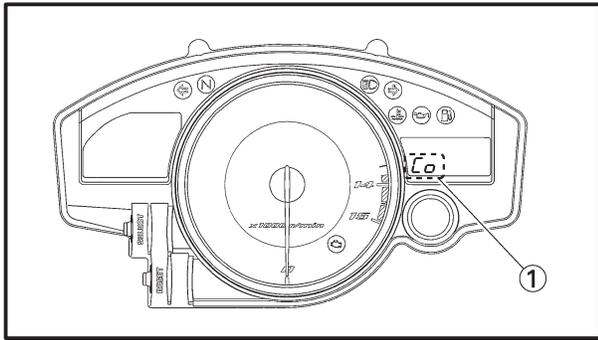
1. Turn the main switch to “OFF” and engine stop switch “ON”.
2. While keeping the “SELECT” and “RESET” buttons pressed simultaneously, turn “ON” the main switch (keep them pressed for 8 seconds or more).

NOTE:

All indications on the meter disappear except the clock and trip indications.
Letters “diag” appear on the clock LCD.

ADJUSTING THE EXHAUST GAS VOLUME

CHK
ADJ



- Using the “SELECT” button, select either the Co adjustment mode ① (which appears as “Co”) or the diagnosis mode (which appears as “diag”).
- After “Co” appears as a result of pressing the “SELECT” button, simultaneously press the “SELECT” and “RESET” buttons for 2 seconds or more to execute the selection.

- Press the “SELECT” and “RESET” buttons to select the cylinder ②.

NOTE: _____

- The adjustment cylinder appears on the clock LCD.
- “RESET” button = decrement
- “SELECT” button = increment

- Execute the selection of the cylinder by simultaneously pressing the “SELECT” and “RESET” buttons for approximately 2 seconds.
- After selecting the adjustment cylinder, change the “Co” adjustment volume by pressing the “SELECT” and “RESET” buttons.

NOTE: _____

- The Co adjustment volume appears on the trip LCD.
- “RESET” button = decrement
 - “SELECT” button = increment

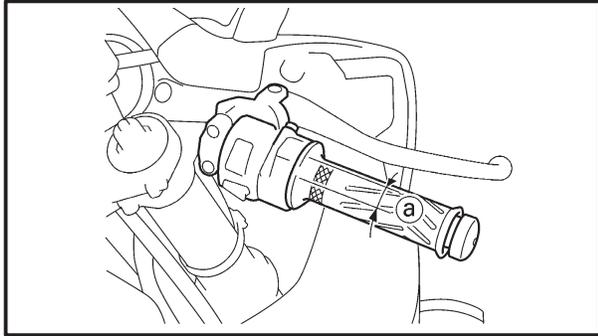
- The selection is executed upon releasing the finger from the switch.
- Simultaneously press the “SELECT” and “RESET” buttons to return to the cylinder selection. (step 5)
- Cancel the mode by turning “OFF” the main switch.

EAS00056

ADJUSTING THE THROTTLE CABLE FREE PLAY

NOTE:

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



1. Check:
 - throttle cable free play (a)
 Out of specification → Adjust.

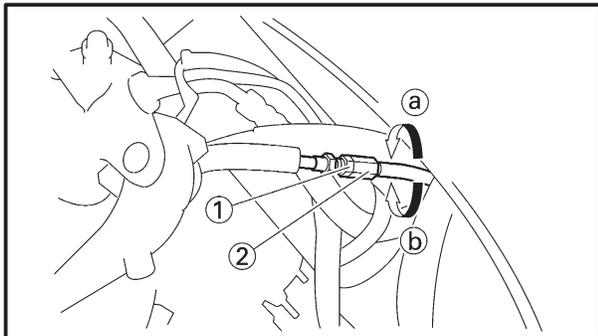
	Throttle cable free play (at the flange of the throttle grip) 3 ~ 5 mm (0.12 ~ 0.20 in)
--	---

2. Adjust:
 - throttle cable free play



Handlebar side

- a. Loosen the locknut (1).
- b. Turn the adjusting nut (2) in direction (a) or (b) until the specified throttle cable free play is obtained.



Direction (a)	Throttle cable free play is increased.
Direction (b)	Throttle cable free play is decreased.

- c. Tighten the locknut.

WARNING

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



EAS00059

CHECKING THE SPARK PLUGS

The following procedure applies to all of the spark plugs.

1. Remove:
 - side cowlings
 - bottom cowlings
 Refer to “COWLINGS”.
2. Remove:
 - radiator upper bolts
 - radiator lower bolt
 Refer to “RADIATOR” in chapter 6.
3. Remove:
 - ignition coils
 - spark plugs

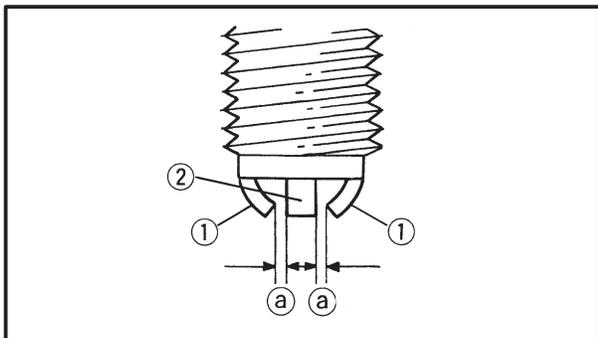
CAUTION:

Before removing the spark plugs, blow away any dirt accumulated in the spark plug wells with compressed air to prevent it from falling into the cylinders.

4. Check:
 - spark plug type
 Incorrect → Change.



Spark plug type (manufacturer)
CR9EK (NGK)



5. Check:
 - electrode ①
Damage/wear → Replace the spark plug.
 - insulator ②
Abnormal color → Replace the spark plug.
Normal color is medium-to-light tan.
6. Clean:
 - spark plug
(with a spark plug cleaner or wire brush)
7. Measure:
 - spark plug gap ③
(with a wire Thickness gauge)
Out of specification → Regap.



Spark plug gap
0.6 ~ 0.7 mm
(0.0236 ~ 0.0276 in)



8. Install:
 - spark plugs
 - ignition coils

 13 Nm (1.3 m•kg, 9.4 ft•lb)

NOTE: _____

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

9. Install:
 - radiator upper bolts
 - radiator lower boltRefer to “RADIATOR” in chapter 6.
10. Install:
 - side cowlings
 - bottom cowlingsRefer to “COWLINGS”.

EAS00065

MEASURING THE COMPRESSION PRESSURE

The following procedure applies to all of the cylinders.

NOTE: _____

Insufficient compression pressure will result in a loss of performance.

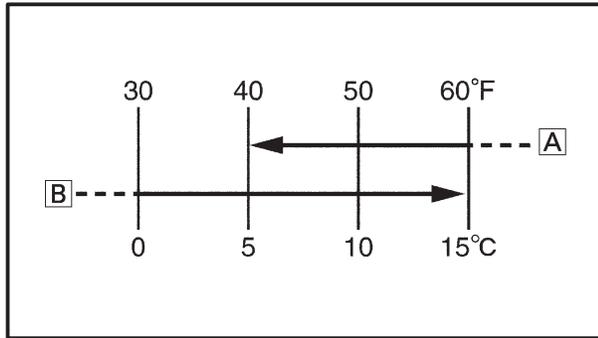
1. Measure:
 - valve clearanceOut of specification → Adjust.
Refer to “ADJUSTING THE VALVE CLEARANCE”.
2. Start the engine, warm it up for several minutes, and then turn it off.
3. Remove:
 - ignition coils
 - spark plugs

CAUTION: _____

Before removing the spark plugs, use compressed air to blow away any dirt accumulated in the spark plug wells to prevent it from falling into the cylinders.

CHECKING THE ENGINE OIL LEVEL

CHK
ADJ



Recommended oil

AT 5°C (40°F) or higher **A**

Yamalube 4 (20W40) or
SAE 20W40 type SE motor
oil

AT 15°C (60°F) or lower **B**

Yamalube 4 (10W30) or
SAE 10W30 type SE motor
oil

NOTE: _____

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

4. Start the engine, warm it up for several minutes, and then turn it off.
5. Check the engine oil level again.

NOTE: _____

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

	Oil filter cartridge 17 Nm (1.7 m•kg, 12 ft•lb)
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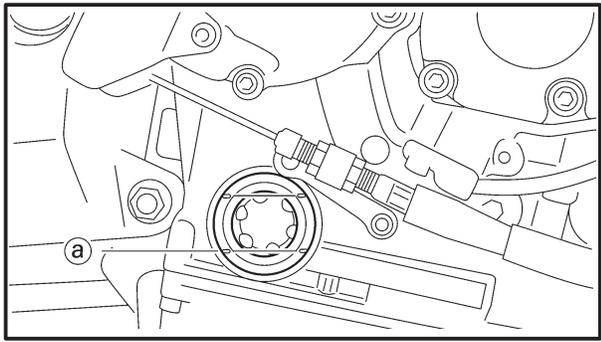
8. Replace:
 - engine oil drain bolt gasket **New**
9. Install:
 - engine oil drain bolt
(along with the new gasket)

 **43 Nm (4.3 m•kg, 31 ft•lb)**

10. Fill:
 - crankcase
(with the specified amount of the recommended engine oil)

	Quantity
	Total amount
	3.8 L (3.35 Imp qt, 4.02 US qt)
	Without oil filter cartridge replacement
	2.9 L (2.55 Imp qt, 3.07 US qt)
	With oil filter cartridge replacement
	3.1 L (2.73 Imp qt, 3.28 US qt)

11. Install:
 - engine oil filler cap
 - bottom cowlings
Refer to “COWLINGS”.
12. Start the engine, warm it up for several minutes, and then turn it off.



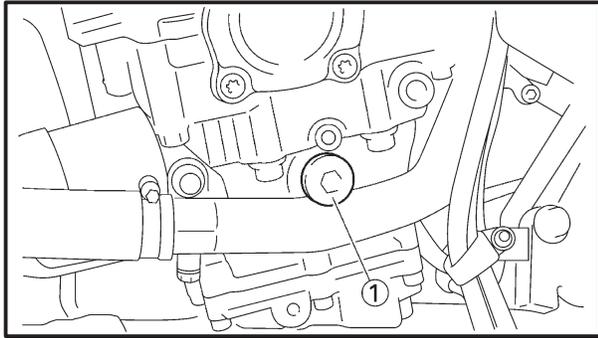
EAS00077
MEASURING THE ENGINE OIL PRESSURE

1. Check:
 - engine oil level
Below the minimum level mark (a) → Add the recommended engine oil to the proper level.
2. Start the engine, warm it up for several minutes, and then turn it off.

CAUTION: _____

When the engine is cold, the engine oil will have a higher viscosity, causing the engine oil pressure to increase. Therefore, be sure to measure the engine oil pressure after warming up the engine.

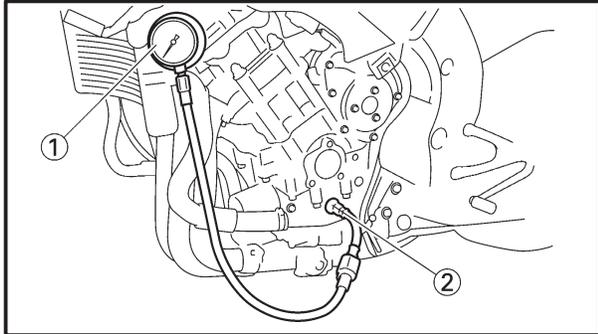
3. Remove:
 - bottom cowlings
Refer to “COWLINGS”.



4. Remove:
- oil gallery bolt ①

⚠ WARNING

The engine, muffler and engine oil are extremely hot.



5. Install:
- oil pressure gauge ①
 - adapter ②



Pressure gauge
90890-03153, YU-03153
Oil pressure adapter
90890-03139

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

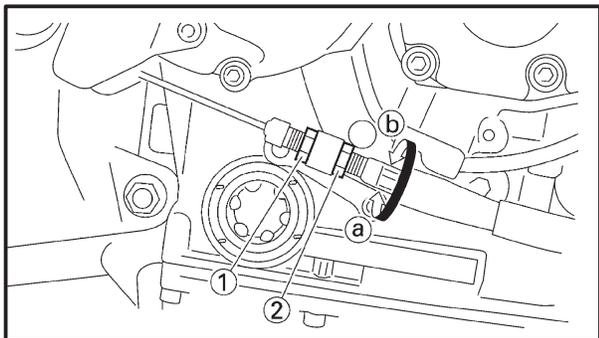


Engine oil pressure
230 kPa
(2.3 kg/cm², 2.3 bar, 32.71 psi)
Engine speed
Approx. 5,000 r/min
Engine oil temperature
100°C (212°F)

NOTE:

Regarding the oil pressure as its own data may fluctuate depending on the oil temperature and viscosity, the oil pressure may fluctuate when measuring. The following data should be used only as a reference when measuring the engine oil pressure.

ADJUSTING THE CLUTCH CABLE FREE PLAY/ REPLACING THE AIR FILTER ELEMENT



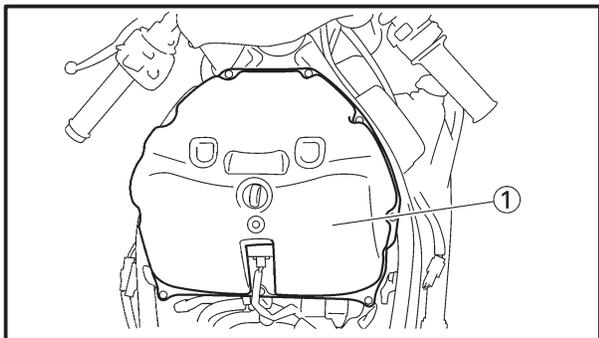
Engine side

- a. Loosen the locknut ①.
- b. Turn the adjusting nut ② in direction (a) or (b) until the specified clutch cable free play is obtained.

Direction (a)	Clutch cable free play is increased.
Direction (b)	Clutch cable free play is decreased.

- c. Tighten the locknuts.

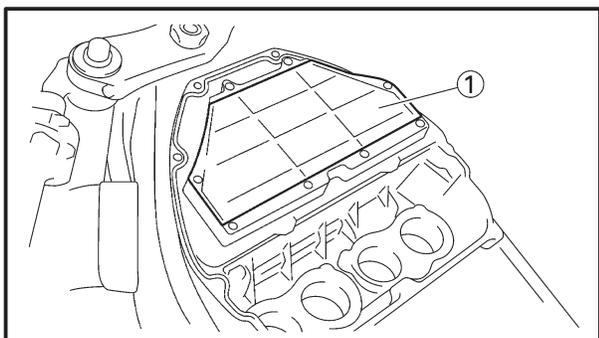
	Lock nut 7Nm (0.7 m•kg, 5.1 ft•lb)
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EAS00086

REPLACING THE AIR FILTER ELEMENT

1. Remove:
 - rider seat
Refer to "SEATS".
 - fuel tank
Refer to "FUEL TANK".
2. Remove:
 - air filter case cover ①



3. Check:
 - air filter element ①
Damage → Replace.

NOTE:

Replace the air filter element at periodic intervals of 40,000 km travel.

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

4. Install:
 - air filter case cover

CAUTION: _____

Never operate the engine without the air filter element installed. Unfiltered air will cause rapid wear of engine parts and may damage the engine. Operating the engine without the air filter element will also affect the throttle bodies tuning, leading to poor engine performance and possible overheating.

NOTE: _____

When installing the air filter element into the air filter case cover, make sure their sealing surfaces are aligned to prevent any air leaks.

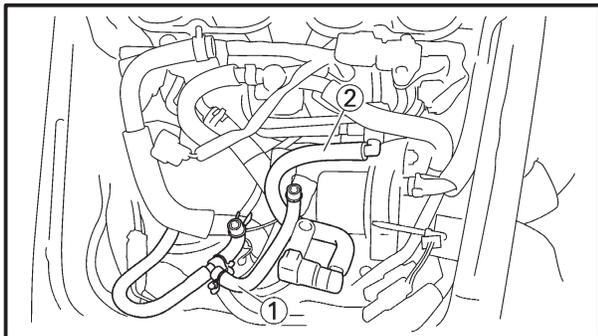
5. Install:
 - fuel tank
Refer to “FUEL TANK”.
 - rider seat
Refer to “SEATS”.

EAS00096

CHECKING THE FUEL AND BREATHER HOSES

The following procedure applies to all of the fuel and breather hoses.

1. Remove:
 - rider seat
Refer to “SEATS”.
 - fuel tank
Refer to “FUEL TANK”.



2. Check:
 - breather hose ①
 - fuel hose ②
Cracks/damage → Replace.
Loose connection → Connect properly.

NOTE: _____

Before removing the fuel hoses, place a few rags in the area under where it will be removed.

3. Install:
 - fuel tank
Refer to “FUEL TANK”.
 - rider seat
Refer to “SEATS”.

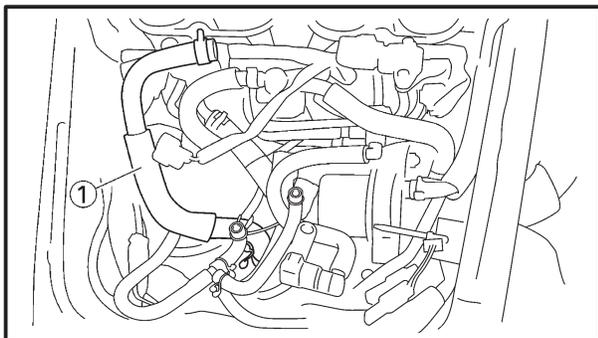
CAUTION: _____

To install the fuel tank, check that the breather hose is not folded or pinched by the fuel tank.

EAS00098

CHECKING THE CRANKCASE BREATHER HOSE

1. Remove:
 - rider seat
Refer to “SEATS”.
 - fuel tank
Refer to “FUEL TANK”.



2. Check:
 - crankcase breather hose ①
Cracks/damage → Replace.
Loose connection → Connect properly.

CAUTION: _____

Make sure the crankcase breather hose is routed correctly.

3. Install:
 - fuel tank
Refer to “FUEL TANK”.
 - rider seat
Refer to “SEATS”.

CAUTION: _____

To install the fuel tank, check that the breather hose is not folded or pinched by the fuel tank.



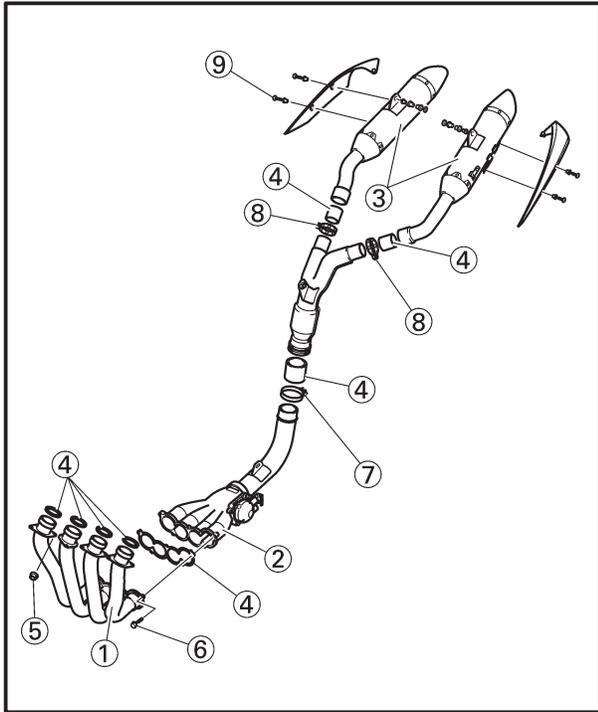
EAS00099

CHECKING THE EXHAUST SYSTEM

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

⚠ WARNING

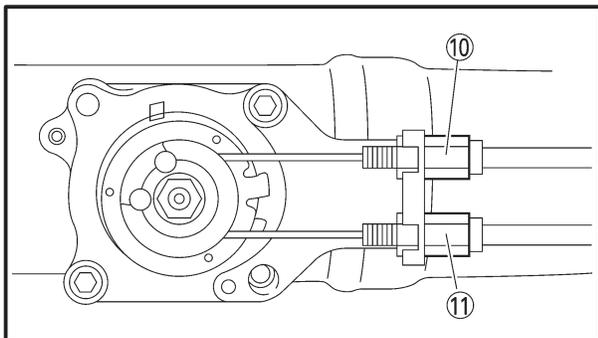
Do not touch the muffler bracket until the exhaust system has cooled.



1. Check:
 - exhaust pipe ①
 - exhaust valve pipe ②
 - muffler ③
 - Cracks/damage → Replace.
 - gaskets ④
 - Exhaust gas leaks → Replace.
2. Check:
 - tightening torque



Exhaust pipe nut ⑤
20 Nm (2.0 m•kg, 14 ft•lb)
Exhaust pipe and exhaust valve pipe bolt ⑥
10 Nm (1.0 m•kg, 7.2 ft•lb)
Catalyst pipe assembly bolt ⑦
20 Nm (2.0m•kg, 14 ft•lb)
Catalyst pipe assembly and muffler bolt ⑧
20 Nm (2.0 m•kg, 14 ft•lb)
Muffler cover ⑨
10 Nm (1.0 m•kg, 7.2 ft•lb)



NOTE:

Install the EXUP cable in parallel without twisting its upper ⑩ and lower sides ⑪.

- black metal ⑩ is upper.
- white metal ⑪ is lower.



7. Install:
 - bottom cowlingsRefer to “COWLINGS”.

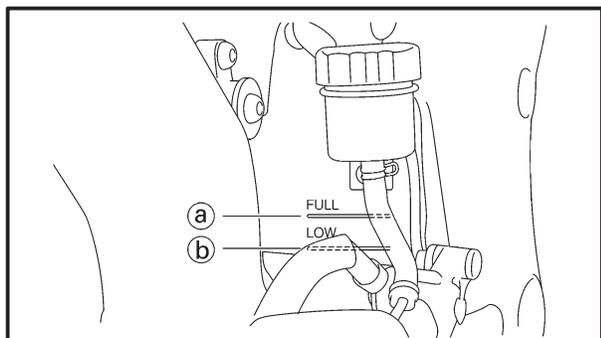
EAS00102

CHECKING THE COOLANT LEVEL

1. Stand the motorcycle on a level surface.

NOTE:

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



2. Check:
 - coolant levelThe coolant level should be between the maximum level mark (a) and minimum 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, if distilled water is not available, soft water may be used.

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

4. Check:
 - coolant level

NOTE:

Before checking the coolant level, wait a few minutes until it settles.

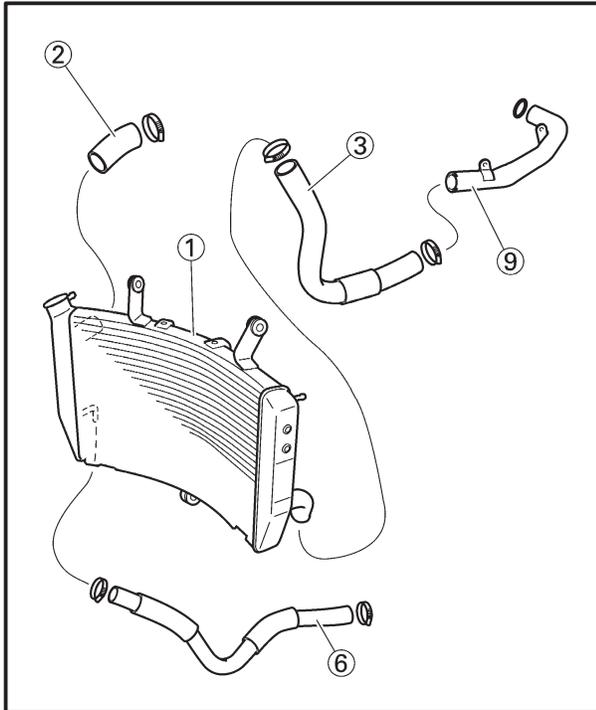


EAS00104

CHECKING THE COOLING SYSTEM

1. Remove:

- bottom cowlings
 - side cowlings
- Refer to "COWLINGS".



2. Check:

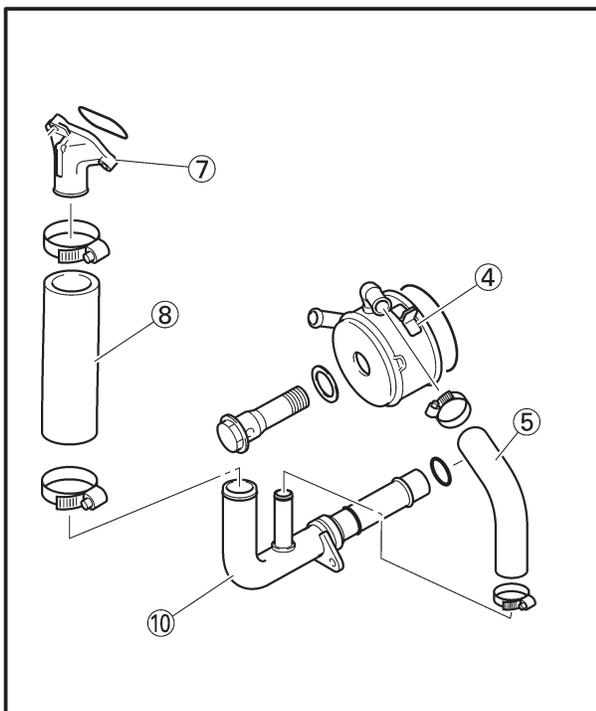
- radiator ①
- radiator inlet hose ②
- radiator outlet hose ③
- oil cooler ④
- oil cooler inlet hose ⑤
- oil cooler outlet hose ⑥
- water jacket joint ⑦
- water jacket joint inlet hose ⑧
- water pump inlet pipe ⑨
- water pump outlet pipe ⑩

Cracks/damage → Replace.

Refer to "COOLING SYSTEM" in chapter 6.

3. Install:

- side cowlings
 - bottom cowling
- Refer to "COWLINGS".

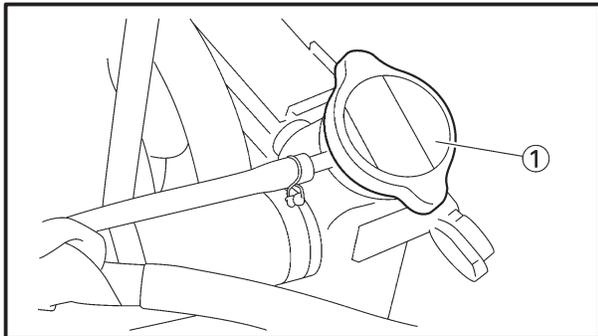
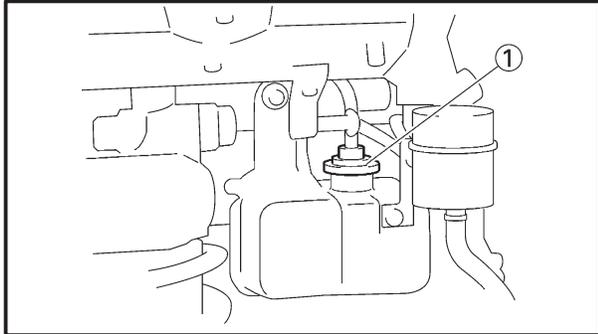




EAS00105

CHANGING THE COOLANT

1. Remove:
 - bottom cowlings
 - side cowlings
Refer to “COWLINGS”.
 - rider seat
Refer to “SEATS”.
2. Remove:
 - coolant reservoir tank
 - coolant reservoir hose
3. Disconnect:
 - coolant reservoir cap ①
4. Drain:
 - coolant
(from the coolant reservoir tank)

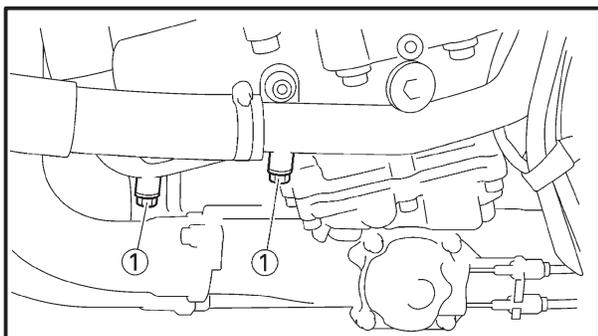


5. Remove:
 - radiator cap ①

CAUTION:

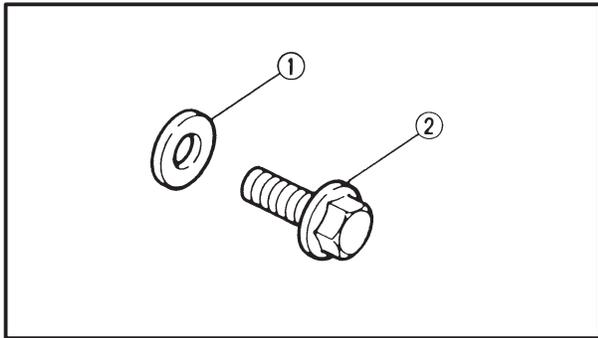
A hot radiator is under pressure. Therefore, do not remove the radiator cap when the engine is hot. Scalding hot fluid and steam may be blown out, which could cause serious injury. When the engine has cooled, open the radiator cap as follows:

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.



The following procedure applies to all of the coolant drain bolts and copper washers.

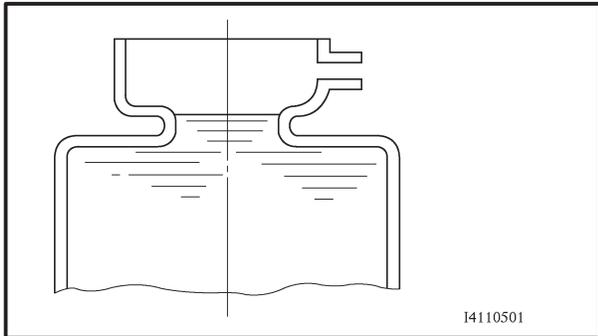
6. Remove:
 - coolant drain bolts ①
(along with the copper washers)



7. Drain:
 - coolant
(water pump inlet pipe and outlet pipe)
8. Check:
 - copper washers ① **New**
9. Install:
 - coolant drain bolts ②
(with copper washers)

10 Nm (1.0 m•kg, 7.2 ft•lb)

10. Install:
 - coolant reservoir tank
11. Connect:
 - coolant reservoir hose



12. Fill:
 - cooling system
(with the specified amount of the recommended coolant)



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

Mixing ratio
1:1 (antifreeze:water)

Quantity
Total amount
2.51 L
(2.21 Imp qt, 2.65 US qt)

Coolant reservoir capacity
0.25 L
(0.22 Imp qt, 0.26 US qt)

Handling notes for coolant

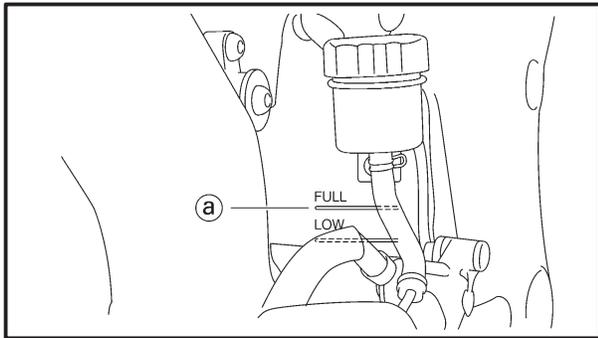
Coolant is potentially harmful and should be handled with special care.

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.
-



13. Install:
 - radiator cap
14. Fill:
 - coolant reservoir tank (with the recommended coolant to the maximum level mark (a))
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.

18. Install:
 - rider seat
Refer to "SEATS".
 - bottom cowlings
 - side cowlings
Refer to "COWLINGS".

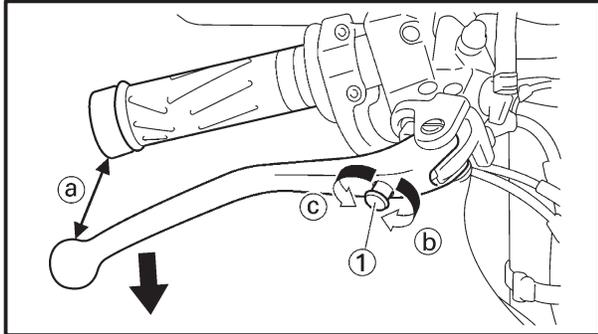
EAS00107

CHASSIS ADJUSTING THE FRONT BRAKE

- Adjust:
 - brake lever position
(distance **(a)** from the throttle grip to the brake lever)

NOTE: _____

While pushing the brake lever forward, turn the adjusting dial **(1)** until the brake lever is in the desired position.



Direction (b)	Distance (a) is the largest.
Direction (c)	Distance (a) is the smallest.

⚠ WARNING _____

- After adjusting the brake lever position, make sure the pin on the brake lever holder is firmly inserted in the hole in the adjusting dial.
- A soft or spongy feeling in the brake lever can indicate the presence of air in the brake system. Before the vehicle is operated, the air must be removed by bleeding the brake system. Air in the brake system will considerably reduce in loss of control and possibly an accident. Therefore, check and if necessary, bleed the brake system.

CAUTION: _____

After adjusting the brake lever position, make sure there is no brake drag.

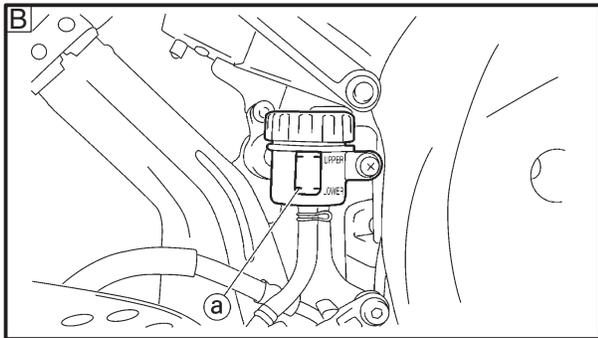
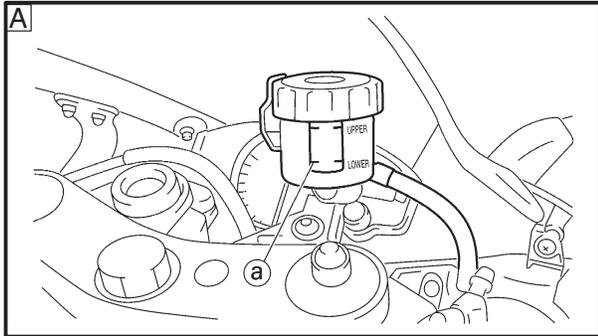
EAS00115

CHECKING THE BRAKE FLUID LEVEL

1. Stand the motorcycle on a level surface.

NOTE:

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



2. Check:

- brake fluid level
Below the minimum level mark (a) → Add the recommended brake fluid to the proper level.

	Recommended brake fluid DOT 4
---	--

- A** Front brake
- B** Rear brake

⚠ WARNING

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

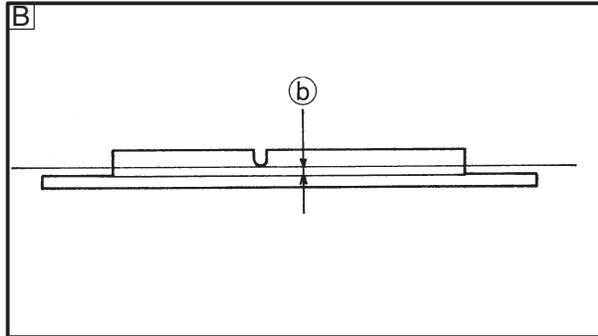
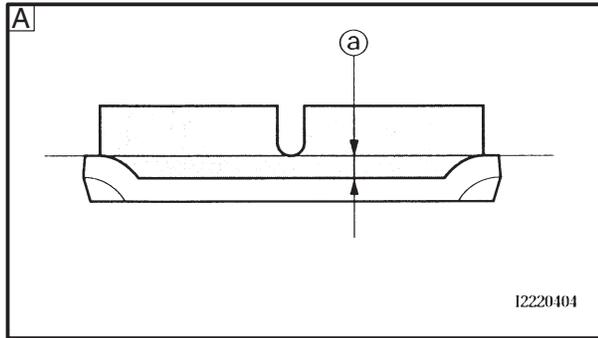
CAUTION:

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

NOTE:

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

CHECKING THE FRONT AND REAR BRAKE PADS/ CHECKING THE FRONT AND REAR BRAKE HOSES



2. Check:

- front brake pad
- rear brake pad

Brake pad wear limit (a), (b)

Wear limit reached → Replace the brake pads as a set.

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



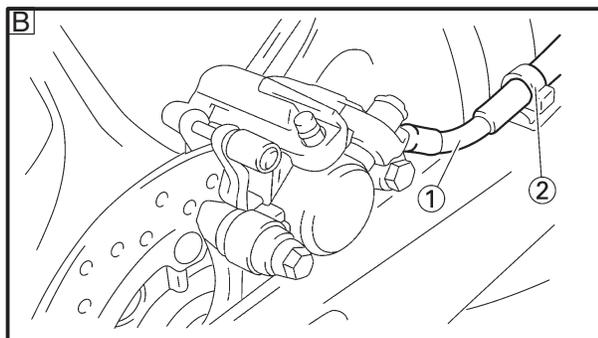
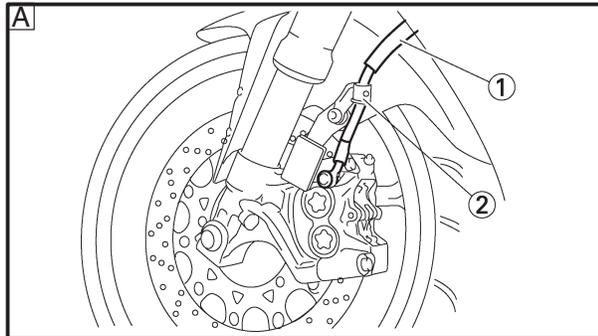
Brake pad wear limit

(a) 0.5 mm (0.02 in)

(b) 1.0 mm (0.04 in)

A Front brake

B Rear brake



EAS00131

CHECKING THE FRONT AND REAR BRAKE HOSES

The following procedure applies to all of the brake hoses and brake hose clamps.

1. Check:

- brake hose (1)

Cracks/damage/wear → Replace.

A Front

B Rear

2. Check:

- brake hose clamp (2)

Loose → Tighten the clamp bolt.

3. Hold the motorcycle upright and apply the brake several times.

4. Check:

- brake hose

Brake fluid leakage → Replace the damaged hose.

Refer to “FRONT AND REAR BRAKES” in chapter 4.

EAS00135

BLEEDING THE HYDRAULIC BRAKE SYSTEM

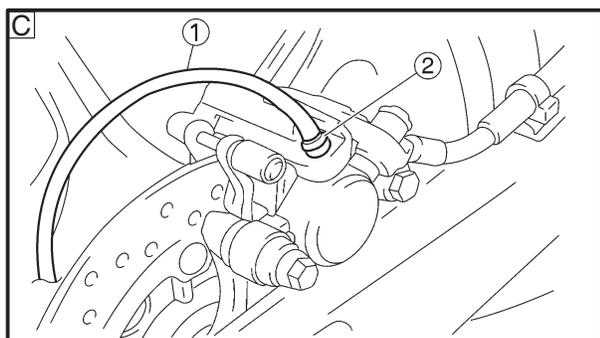
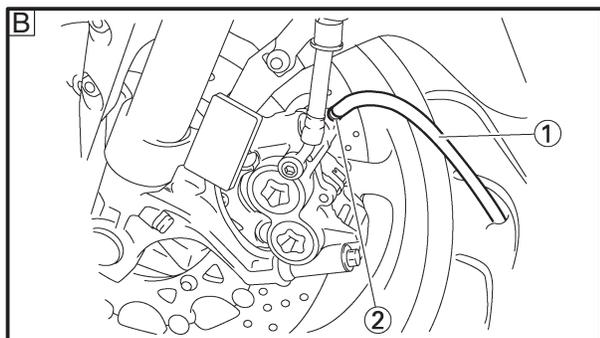
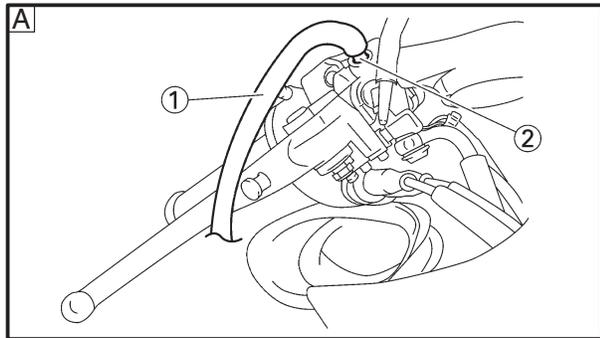
WARNING

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 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.



1. Bleed:
 - hydraulic brake system



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

- A** Front brake master cylinder
- B** Front brake caliper
- C** Rear brake caliper

NOTE:

Bleeding order of the front hydraulic brake system is the following order:

1. front brake master cylinder.
2. front brake calipers.
3. front brake master cylinder.

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

EAS00146

CHECKING AND ADJUSTING THE STEERING HEAD

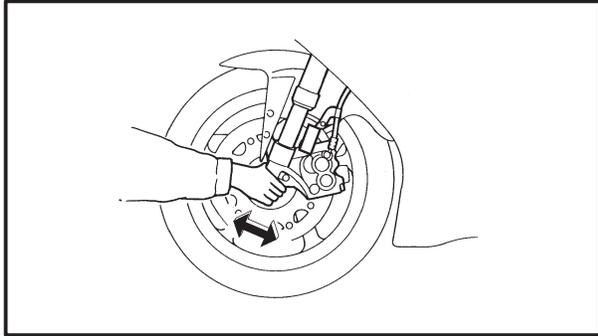
1. Stand the motorcycle on a level surface.

WARNING

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

NOTE:

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



2. Check:

- steering head

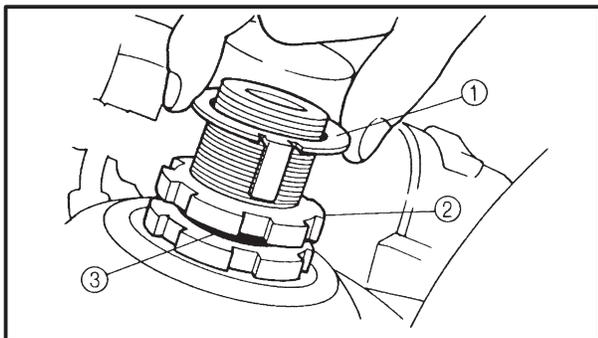
Grasp the bottom of the front fork legs and gently rock the front fork.

Binding/looseness → Adjust the steering head.

3. Remove:

- upper bracket

Refer to “HANDLEBAR” and “STEERING HEAD” in chapter 4.



4. Adjust:

- steering head

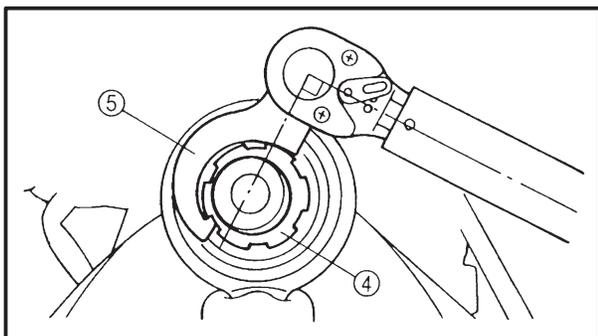


a. Remove the lock washer (1), the upper ring nut (2), and the rubber washer (3).

b. Loosen the lower ring nut (4) and then tighten it to specification with a steering nut wrench (5).

NOTE:

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



	Steering nut wrench 90890-01403, YU-33975
---	---

	Lower ring nut (initial tightening torque) 52 Nm (5.2 m•kg, 38 ft•lb)
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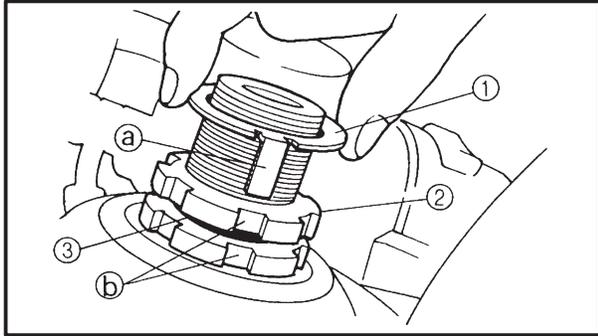
- c. Loosen the lower ring nut ④ completely, then tighten it to specification.

⚠ WARNING

Do not overtighten the lower ring nut.



**Lower ring nut
(final tightening torque)
18 Nm (1.8 m•kg, 13 ft•lb)**



- d. Check the steering head for looseness or binding by turning the front fork all the way in both directions. If any binding is felt, remove the under bracket and check the upper and lower bearings. Refer to “STEERING HEAD” in chapter 4.
- e. Install the rubber washer ③.
- f. Install the upper ring nut ②.
- g. Finger tighten the upper ring nut ②, then align the slots of both ring nuts. If necessary, hold the lower ring nut and tighten the upper ring nut until their slots are aligned.
- h. Install the lock washer ①.

NOTE:

Make sure the lock washer tabs ① sit correctly in the ring nut slots ②.

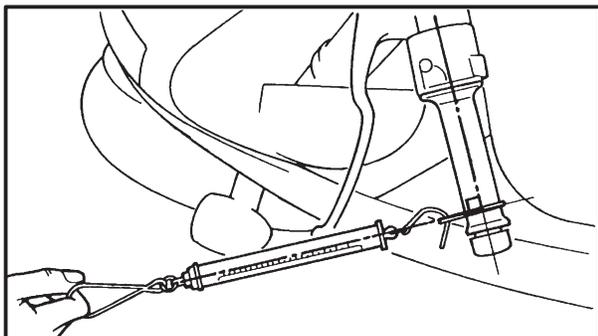
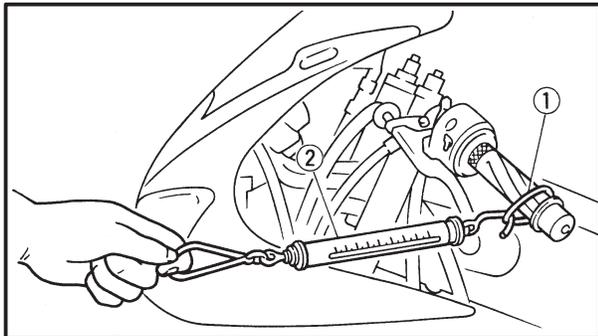


5. Install:
- upper bracket
Refer to “HANDLEBAR” and “STEERING HEAD” in chapter 4.
6. Measure:
- steering head tension



NOTE:

Make sure all of the cables and wires are properly routed.



- a. Point the front wheel straight ahead.
- b. Install a plastic locking tie ① loosely around the end of the handlebar as shown.
- c. Hook a spring gauge ② onto the plastic locking tie.
- d. Hold the spring gauge at a 90° angle from the handlebar, pull the spring gauge, and then record the measurement when the handlebar starts to run.



Steering head tension
200 ~ 500 g

- e. Repeat the above procedure on the opposite handlebar.
- f. If the steering head tension is out of specification (both handlebars should be within specification), remove the upper bracket and loosen or tighten the upper ring nut.
- g. Reinstall the upper bracket and measure the steering head tension again as described above.
- h. Repeat the above procedure until the steering head tension is within specification.
- i. Grasp the bottom of the front fork legs and gently rock the front fork.
Binding/looseness → Adjust the steering head.



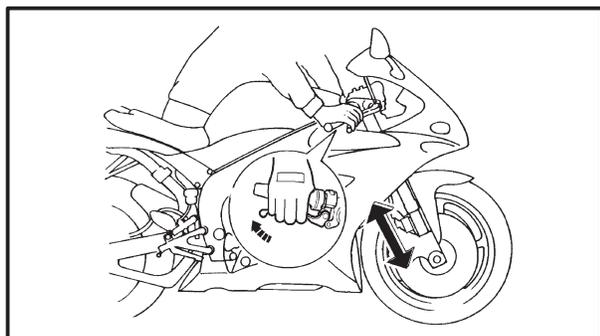
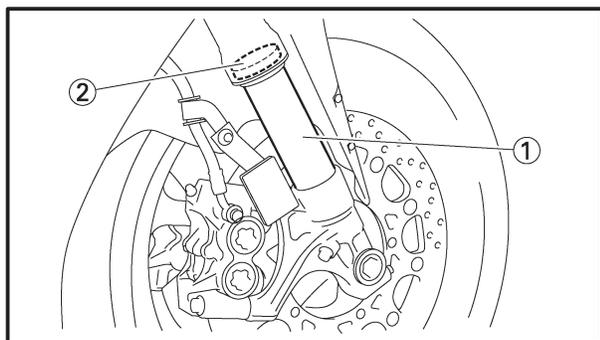
EAS00150

CHECKING THE FRONT FORK

1. Stand the motorcycle on a level surface.

WARNING

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



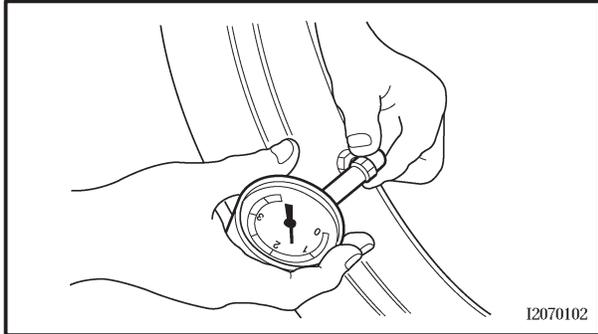
2. Check:
 - inner tube ①
Damage/scratches → Replace.
 - oil seal ②
Oil leakage → Replace.
3. Hold the motorcycle upright and apply the front brake.
4. Check:
 - front fork operation
Push down hard on the handlebars several times and check if the front fork rebounds smoothly.
Rough movement → Repair.
Refer to “FRONT FORK” in chapter 4.

EAS00162

CHECKING THE TIRES

The following procedure applies to both of the tires.

1. Check:
 - tire pressure
Out of specification → Regulate.



⚠ WARNING

- The tire pressure should only be checked and regulated when the tire temperature equals the ambient air temperature.
- The tire pressure and the suspension must be adjusted according to the total weight (including cargo, rider, passenger and accessories) and the anticipated riding speed.
- Operation of an overloaded motorcycle could cause tire damage, an accident or an injury.

NEVER OVERLOAD THE MOTORCYCLE.

Basic weight (with oil and a full fuel tank)	193 kg (425 lb) 194 kg (428 lb) for CAL	
Maximum load*	202 kg (445 lb) 201 kg (443 lb) for CAL	
Cold tire pressure	Front	Rear
Up to 90 kg load*	250 kPa (2.5 kgf/cm ² , 2.5 bar, 35.6 psi)	290 kPa (2.9 kgf/cm ² , 2.9 bar, 41.3 psi)
90 kg ~ maximum load*	250 kPa (2.5 kgf/cm ² , 2.5 bar, 35.6 psi)	290 kPa (2.9 kgf/cm ² , 2.9 bar, 41.3 psi)
High- speed riding	250 kPa (2.5 kgf/cm ² , 2.5 bar, 35.6 psi)	290 kPa (2.9 kgf/cm ² , 2.9 bar, 41.3 psi)

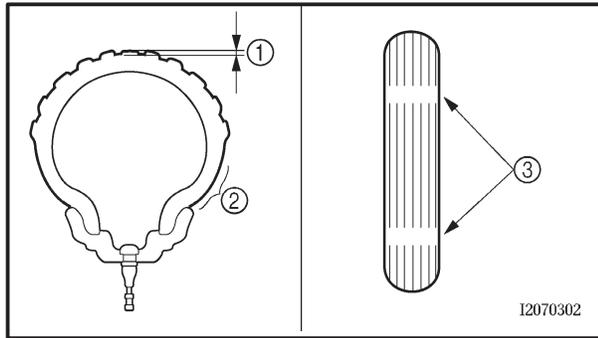
* Total weight of rider, passenger, cargo and accessories

⚠ WARNING

It is dangerous to ride with a worn-out tire. When the tire tread reaches the wear limit, replace the tire immediately.

CHECKING THE TIRES

CHK
ADJ



2. Check:
- tire surfaces
- Damage/wear → Replace the tire.

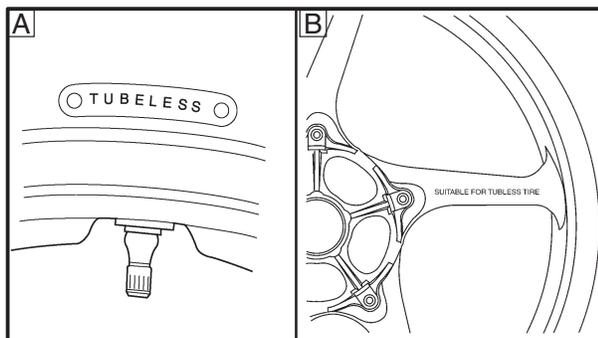


Minimum tire tread depth
1.6 mm (0.06 in)

- ① Tire tread depth
- ② Sidewall
- ③ Wear indicator

⚠ WARNING

- Do not use a tubeless tire on a wheel designed only for tube tires to avoid tire failure and personal injury from sudden deflation.
- When using a tube tire, be sure to install the correct tube.
- Always replace a new tube tire and a new tube as a set.
- To avoid pinching the tube, make sure the wheel rim band and tube are centered in the wheel groove.
- Patching a punctured tube is not recommended. If it is absolutely necessary to do so, use great care and replace the tube as soon as possible with a good quality replacement.



- A Tire
- B Wheel

Tube wheel	Tube tire only
Tubeless wheel	Tube or tubeless tire

⚠ WARNING

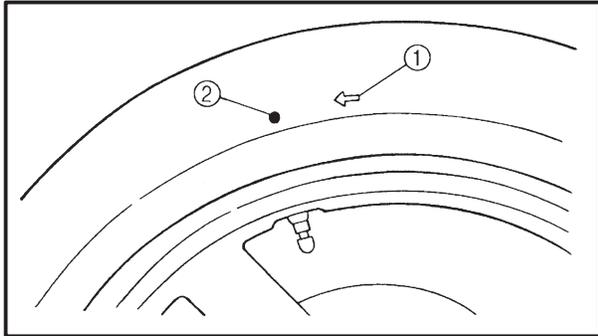
After extensive tests, the tires listed below have been approved by Yamaha Motor Co., Ltd. for this model. The front and rear tires should always be by the same manufacturer and of the same design. No guarantee concerning handling characteristics can be given if a tire combination other than one approved by Yamaha is used on this motorcycle.

Front tire

Manufacturer	Size	Model
DUNLOP	120/70ZR 17 M/C (58W)	D218FL
MICHELIN	120/70ZR 17 M/C (58W)	Pilot POWER C

Rear tire

Manufacturer	Size	Model
DUNLOP	190/50ZR 17 M/C (73W)	D218L
MICHELIN	190/50ZR 17 M/C (73W)	Pilot POWER G



⚠ WARNING

New tires have a relatively low grip on the road surface until they have been slightly worn. Therefore, approximately 100 km should be traveled at normal speed before any high-speed riding is done.

NOTE:

- For tires with a direction of rotation mark ①:
- Install the tire with the mark pointing in the direction of wheel rotation.
 - Align the mark ② with the valve installation point.

EAS00168

CHECKING THE WHEELS

The following procedure applies to both of the wheels.

1. Check:
 - wheel
Damage/out-of-round → Replace.

⚠ WARNING

Never attempt to make any repairs to the wheel.

NOTE:

After a tire or wheel has been changed or replaced, always balance the wheel.

EAS00170

CHECKING AND LUBRICATING THE CABLES

The following procedure applies to all of the inner and outer cables.

WARNING

Damaged outer cable may cause the cable to corrode and interfere with its movement. Replace damaged outer cable and inner cables as soon as possible.

1. Check:
 - outer cable
Damage → Replace.
2. Check:
 - cable operation
Rough movement → Lubricate.



Recommended lubricant
Engine oil or a suitable cable lubricant

NOTE:

Hold the cable end upright and pour a few drops of lubricant into the cable sheath or use a suitable lubricating device.

EAS00171

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

EAS00172

LUBRICATING THE SIDESTAND

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



Recommended lubricant
Lithium-soap-based grease

EAS00174

LUBRICATING THE REAR SUSPENSION

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



Recommended lubricant
Molybdenum-disulfide grease



EAS00178

ELECTRICAL SYSTEM

CHECKING AND CHARGING THE BATTERY

⚠ WARNING

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

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

FIRST AID IN CASE OF BODILY CONTACT: EXTERNAL

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

INTERNAL

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

CAUTION:

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

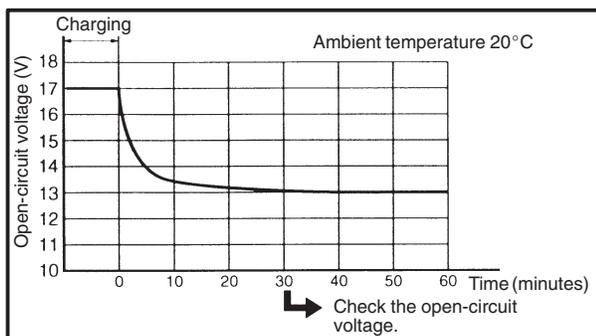
5. Charge:
- battery
(refer to the appropriate charging method illustration)

⚠ WARNING

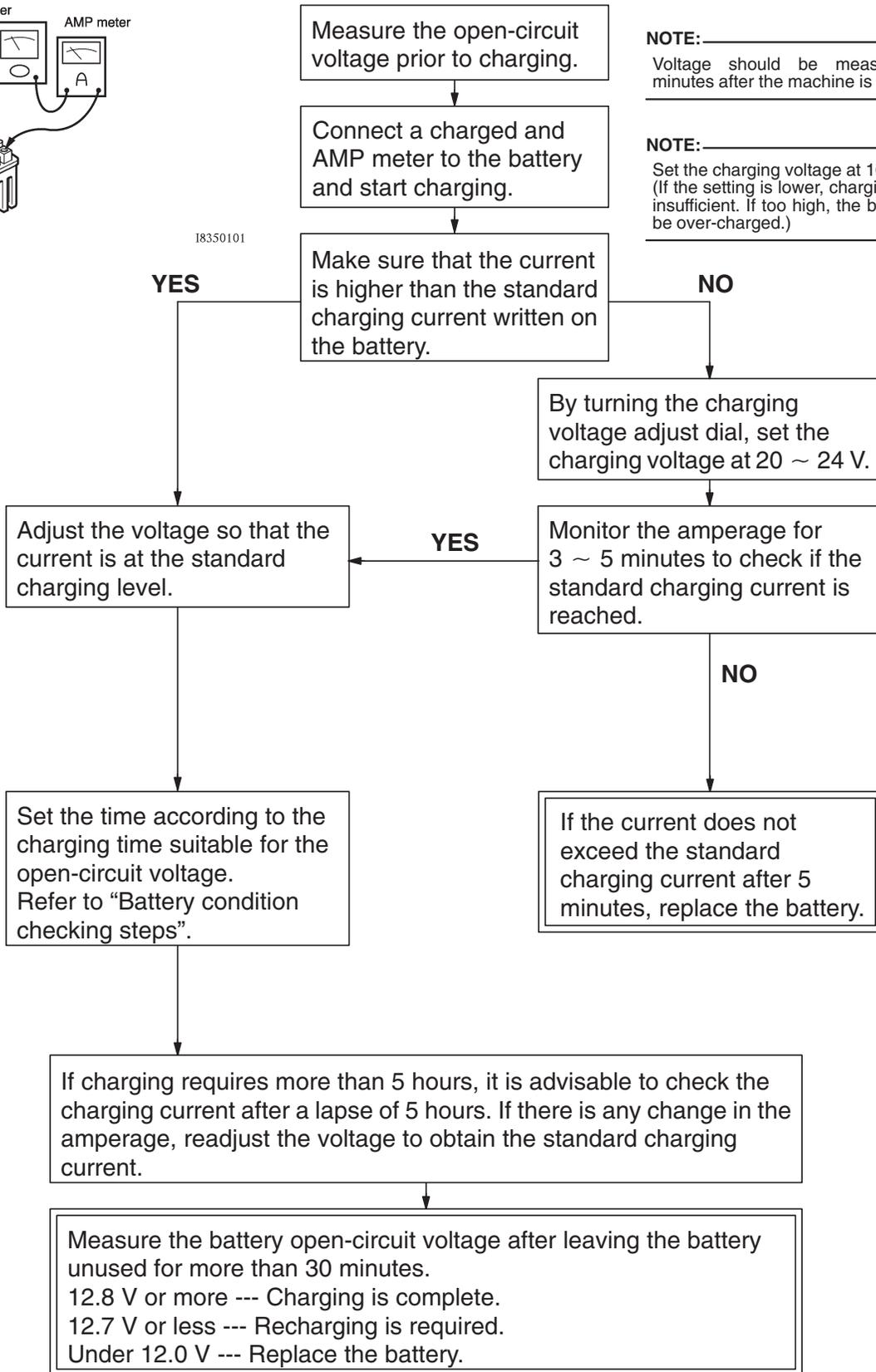
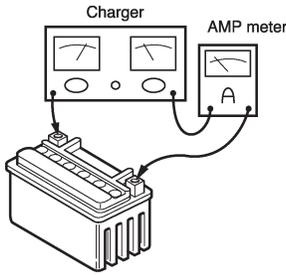
Do not quick charge a battery.

CAUTION:

- Never remove the MF battery sealing caps.
- Do not use a high-rate battery charger since it forces a high-amperage current into the battery quickly and can cause battery overheating and battery plate damage.
- If it is impossible to regulate the charging current on the battery charger, be careful not to overcharge the battery.
- When charging a battery, be sure to remove it from the motorcycle. (If charging has to be done with the battery mounted on the motorcycle, disconnect the negative battery lead from the battery terminal.)
- To reduce the chance of sparks, do not plug in the battery charger until the battery charger leads are connected to the battery.
- Before removing the battery charger lead clips from the battery terminals, be sure to turn off the battery charger.
- Make sure the battery charger lead clips are in full contact with the battery terminal and that they are not shorted. A corroded battery charger lead clip may generate heat in the contact area and a weak clip spring may cause sparks.
- If the battery becomes hot to the touch at any time during the charging process, disconnect the battery charger and let the battery cool before reconnecting it. Hot batteries can explode!
- As shown in the following illustration, the open-circuit voltage of an MF battery stabilizes about 30 minutes after charging has been completed. Therefore, wait 30 minutes after charging is completed before measuring the open-circuit voltage.



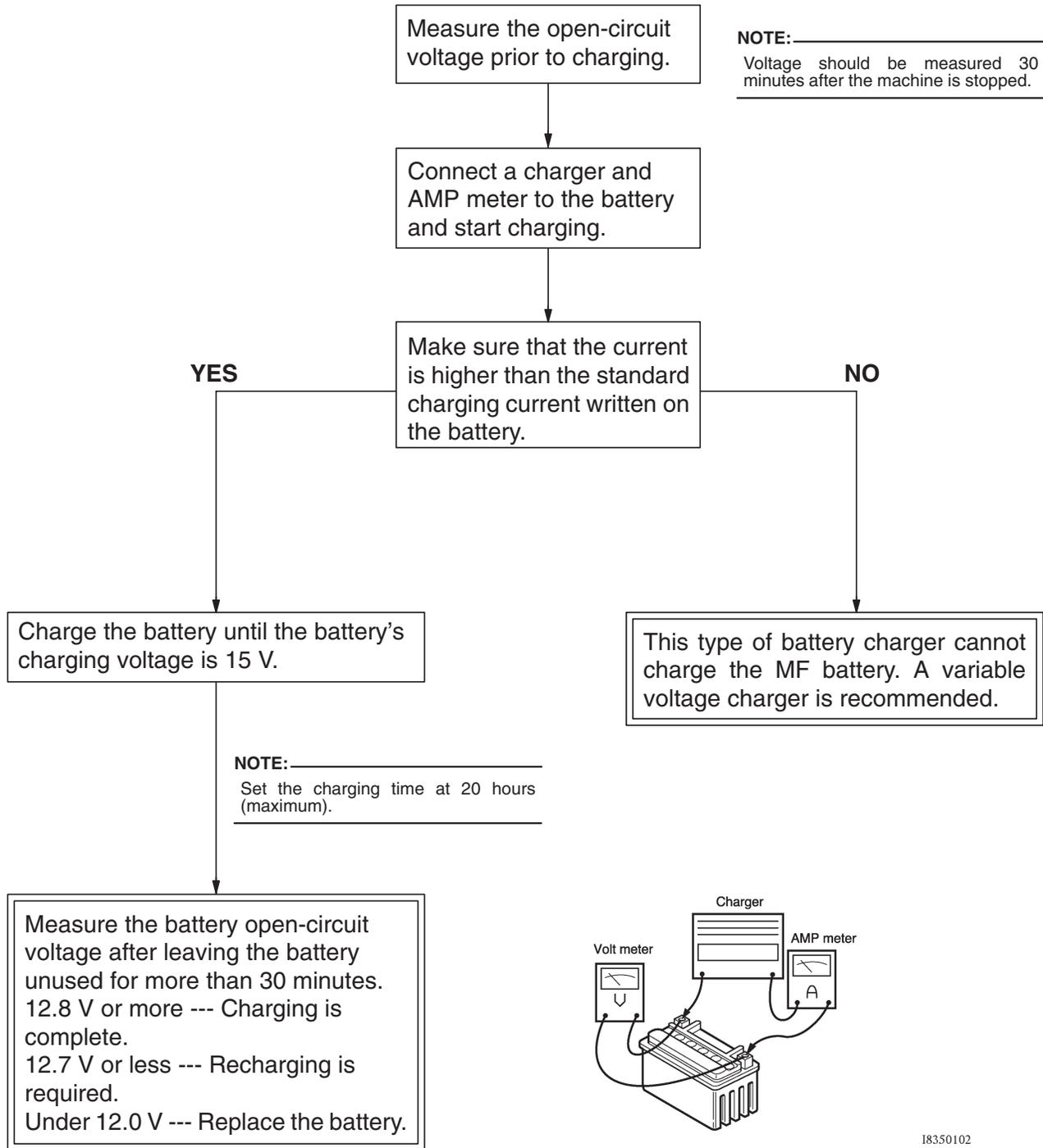
Charging method using a variable-current (voltage) charger



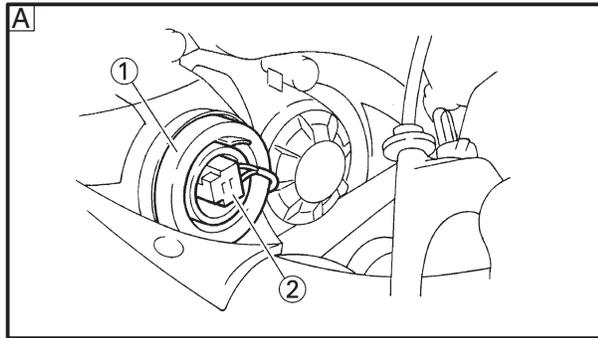
NOTE: _____
Voltage should be measured 30 minutes after the machine is stopped.

NOTE: _____
Set the charging voltage at 16 ~ 17 V. (If the setting is lower, charging will be insufficient. If too high, the battery will be over-charged.)

Charging method using a constant voltage charger



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EAS00183

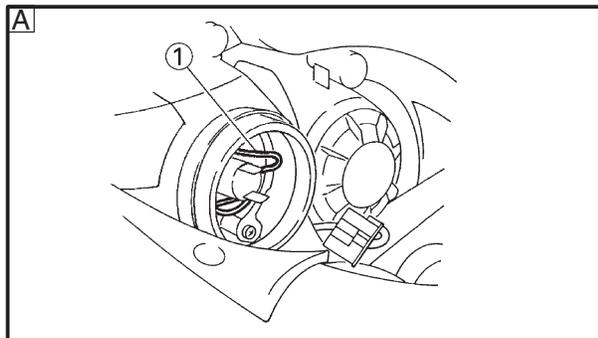
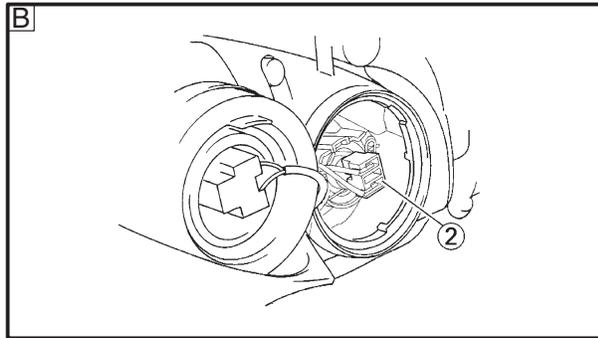
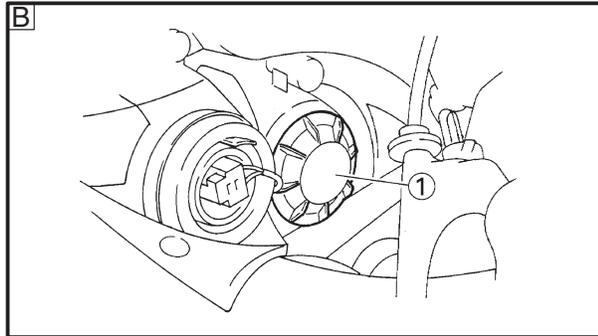
REPLACING THE HEADLIGHT BULBS

The following procedure applies to both of the headlight bulbs.

1. Disconnect:
 - headlight bulb cover ①
 - headlight coupler ②

A high beam

B low beam



2. Remove:
 - headlight bulb holder ①

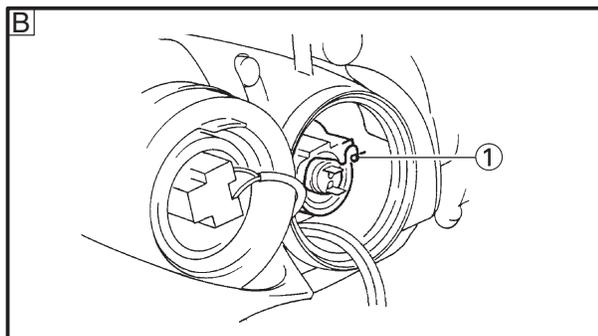
A high beam

B low beam

3. Remove:
 - headlight bulb

⚠ WARNING

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



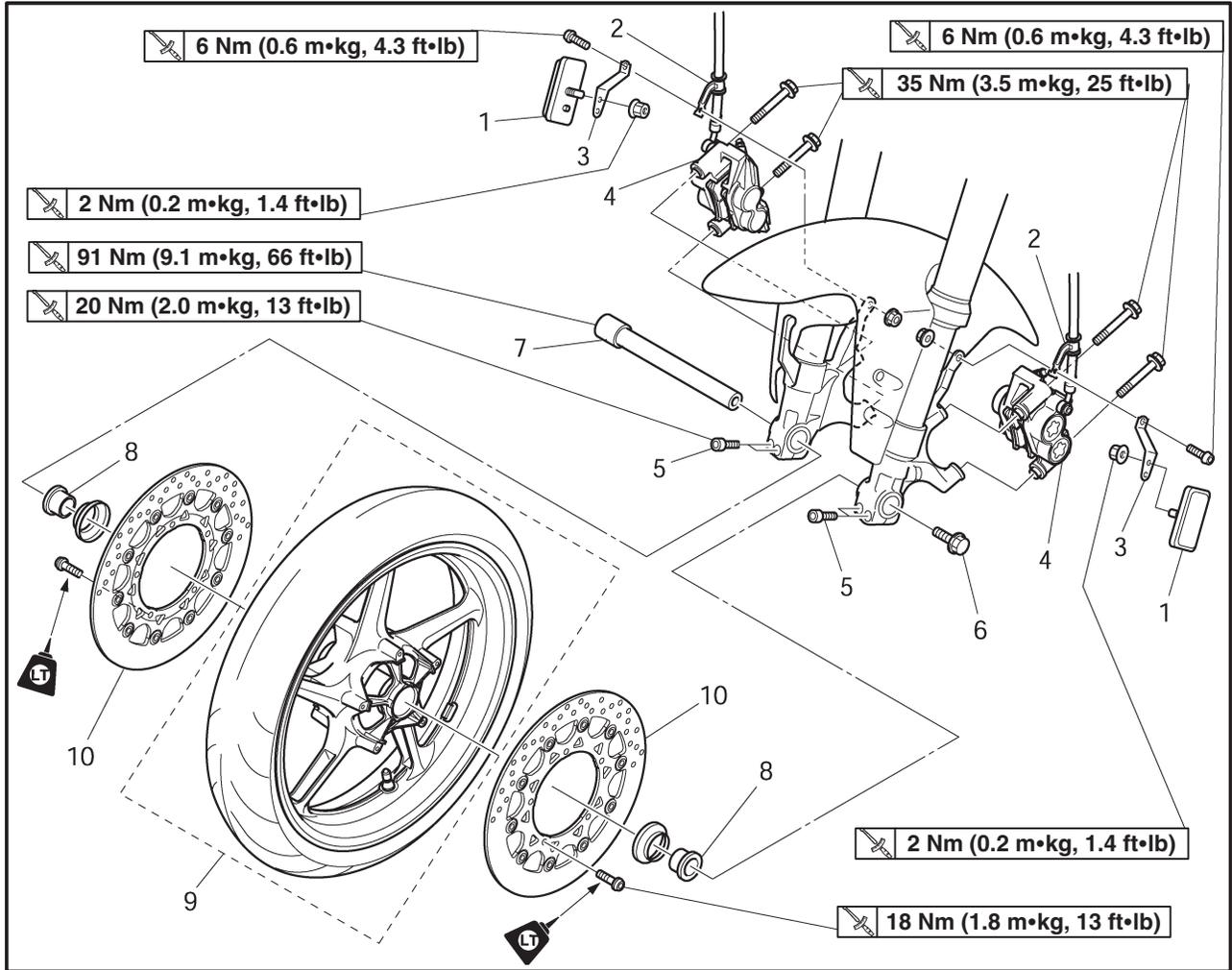
4. Install:
 - headlight bulb **New**

Secure the new headlight bulb with the headlight bulb holder.

EAS00514

CHASSIS

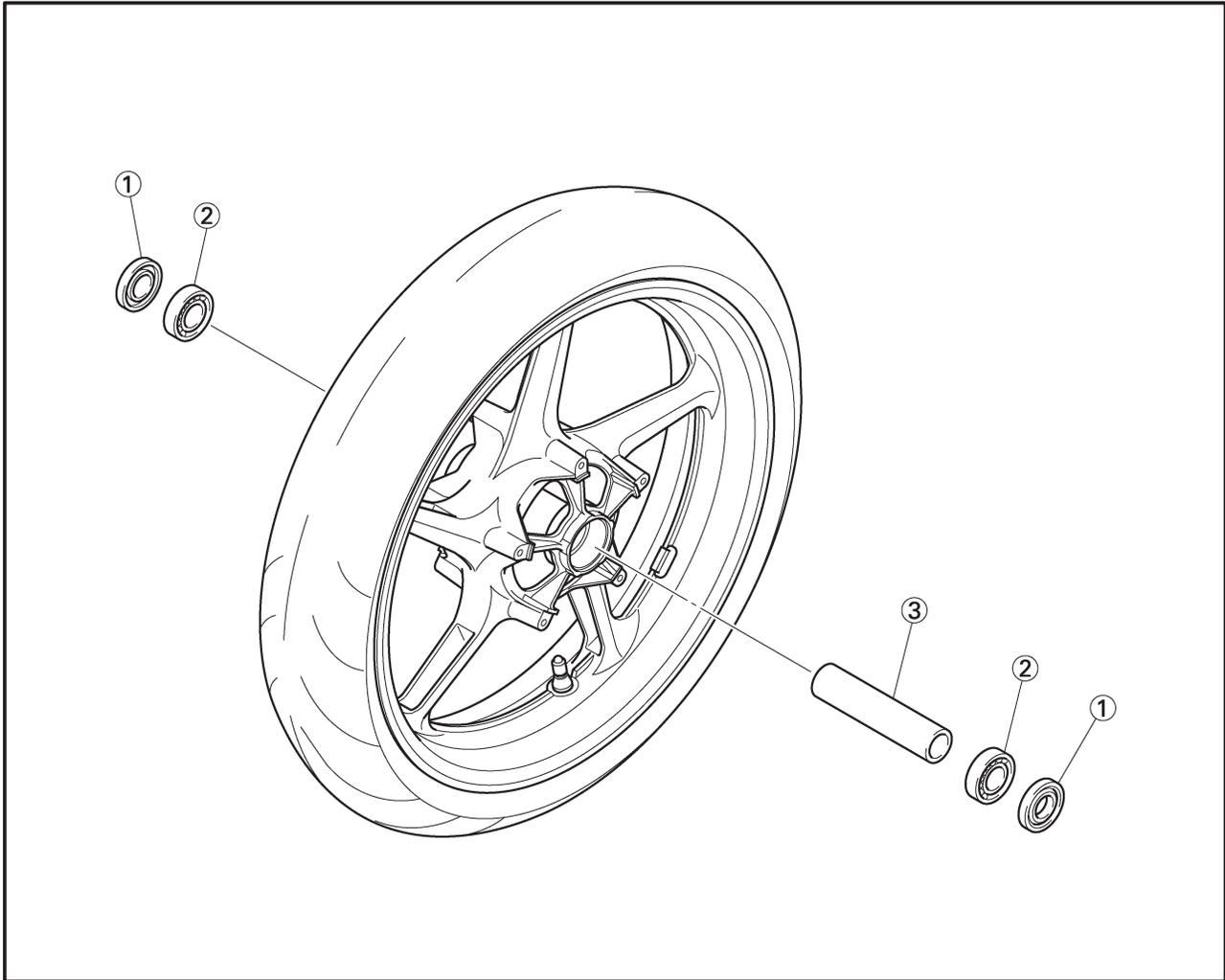
FRONT WHEEL AND BRAKE DISCS



4

Order	Job/Part	Q'ty	Remarks
	Removing the front wheel and brake discs		Remove the parts in the order listed. NOTE: _____ Place the motorcycle on a suitable stand so that the front wheel is elevated.
1	Side reflector (left and right)	2	
2	Brake hose holder (left and right)	2	
3	Side reflector bracket	2	
4	Front brake caliper (left and right)	2	
5	Front wheel axle pinch bolt	4	
6	Front wheel axle bolt	1	
7	Front wheel axle	1	
8	Collar (left and right)	2	
9	Front wheel	1	
10	Front brake disc (left and right)	2	
			For installation, reverse the removal procedure.

EAS00518



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

EAS00521

REMOVING THE FRONT WHEEL

1. Stand the motorcycle on a level surface.

⚠ WARNING

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

NOTE:

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

2. Remove:

- left brake caliper
- right brake caliper

Refer to “FRONT BRAKE CALIPERS”.

NOTE:

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

3. Elevate:

- front wheel

NOTE:

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

4. Loosen :

- front wheel axle pinch bolt

5. Remove :

- front wheel axle bolt
- front wheel axle
- front wheel

EAS00525

CHECKING THE FRONT WHEEL

1. Check:

- wheel axle

Roll the wheel axle on a flat surface.

Bends → Replace.

⚠ WARNING

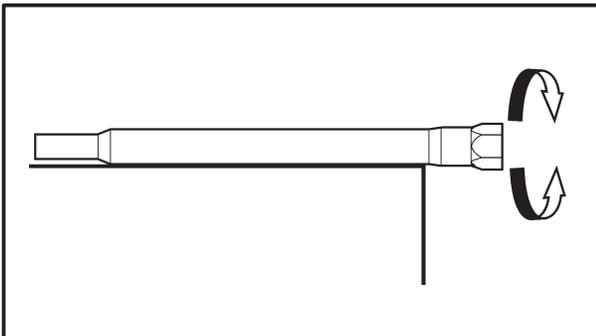
Do not attempt to straighten a bent wheel axle.

2. Check:

- tire
- front wheel

Damage/wear → Replace.

Refer to “CHECKING THE TIRES” and “CHECKING THE WHEELS” in chapter 3.





Brake disc bolt

Front : 18 Nm (1.8 m•kg, 13 ft•lb)

Rear : 30 Nm (3.0 m•kg, 22 ft•lb)

LOCTITE®

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



EAS00545

INSTALLING THE FRONT WHEEL

The following procedure applies to both brake discs.

1. Lubricate:
 - wheel axle
 - oil seal lips



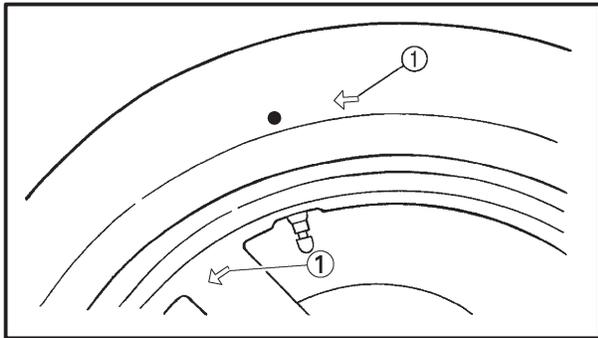
Recommended lubricant

Lithium-soap-based grease

2. Lift the wheel up between the fork legs.
3. Insert the wheel axle.

NOTE:

Install the tire and wheel with the mark ① pointing in the direction of wheel rotation.



4. Lower the front wheel so that it is on the ground.
5. Tighten:
 - wheel axle
 - wheel axle pinch bolt

 **91 Nm (9.1 m•kg, 66 ft•lb)**

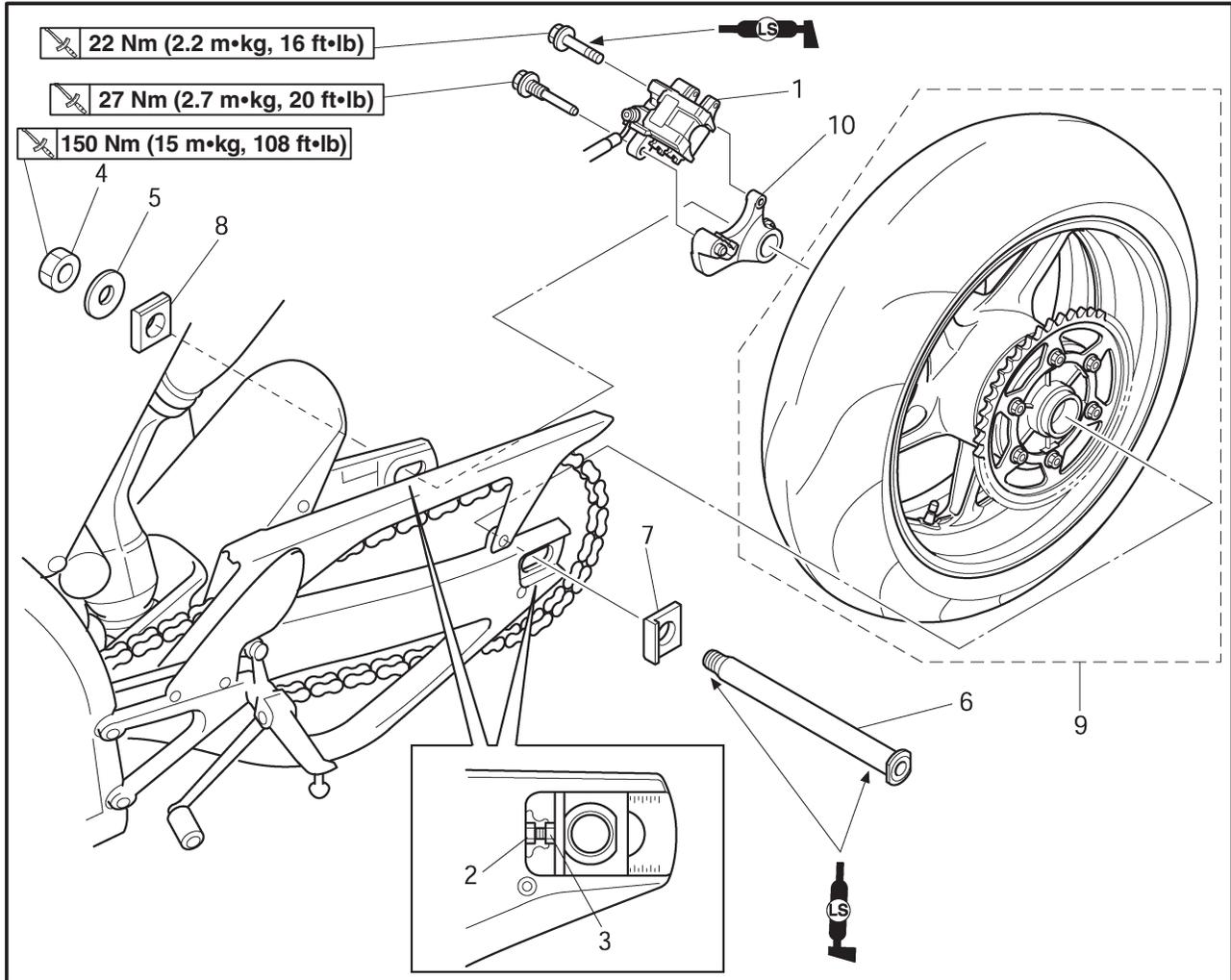
 **20 Nm (2.0 m•kg, 14 ft•lb)**

CAUTION:

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

EAS00551

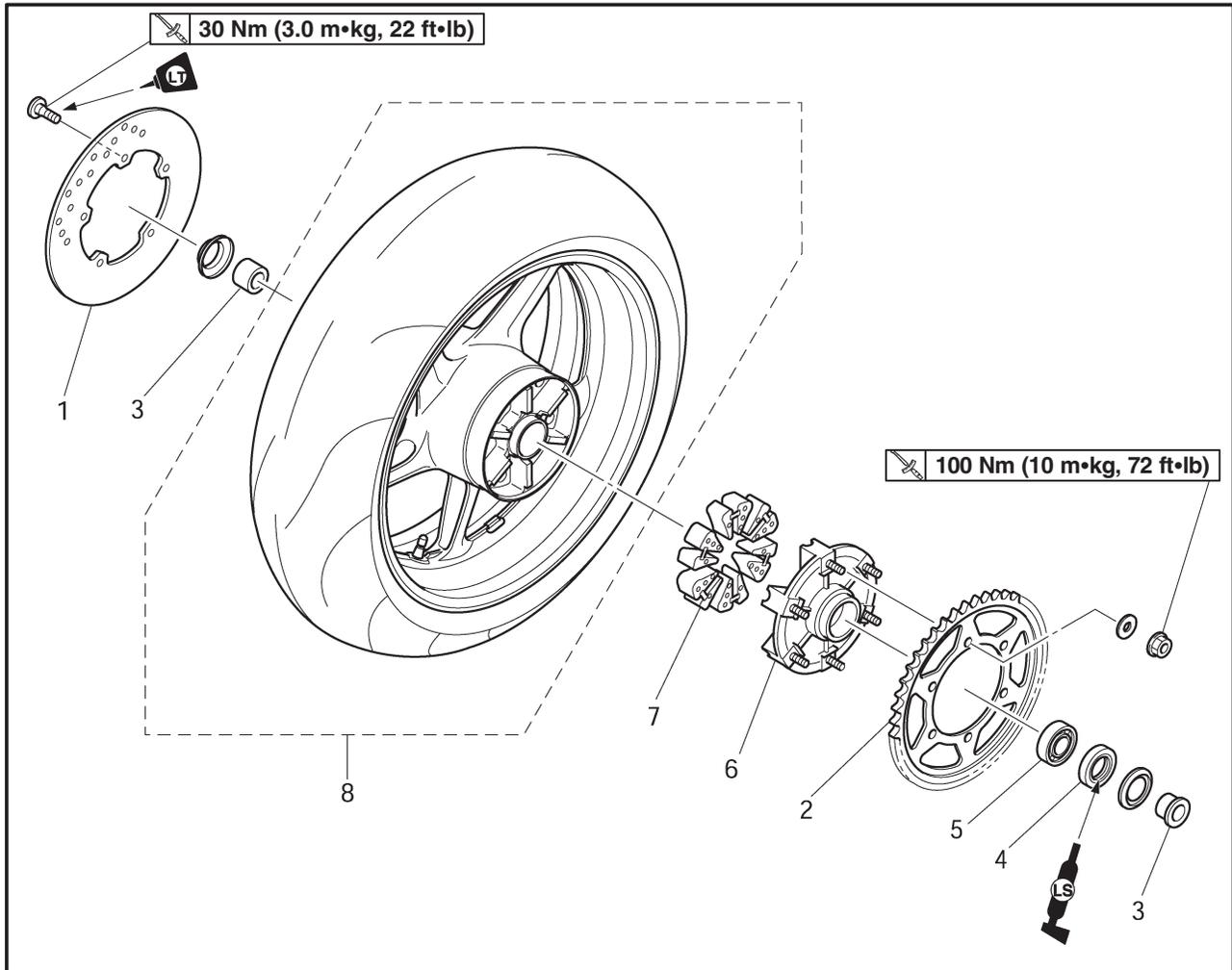
REAR WHEEL AND BRAKE DISC
REAR WHEEL



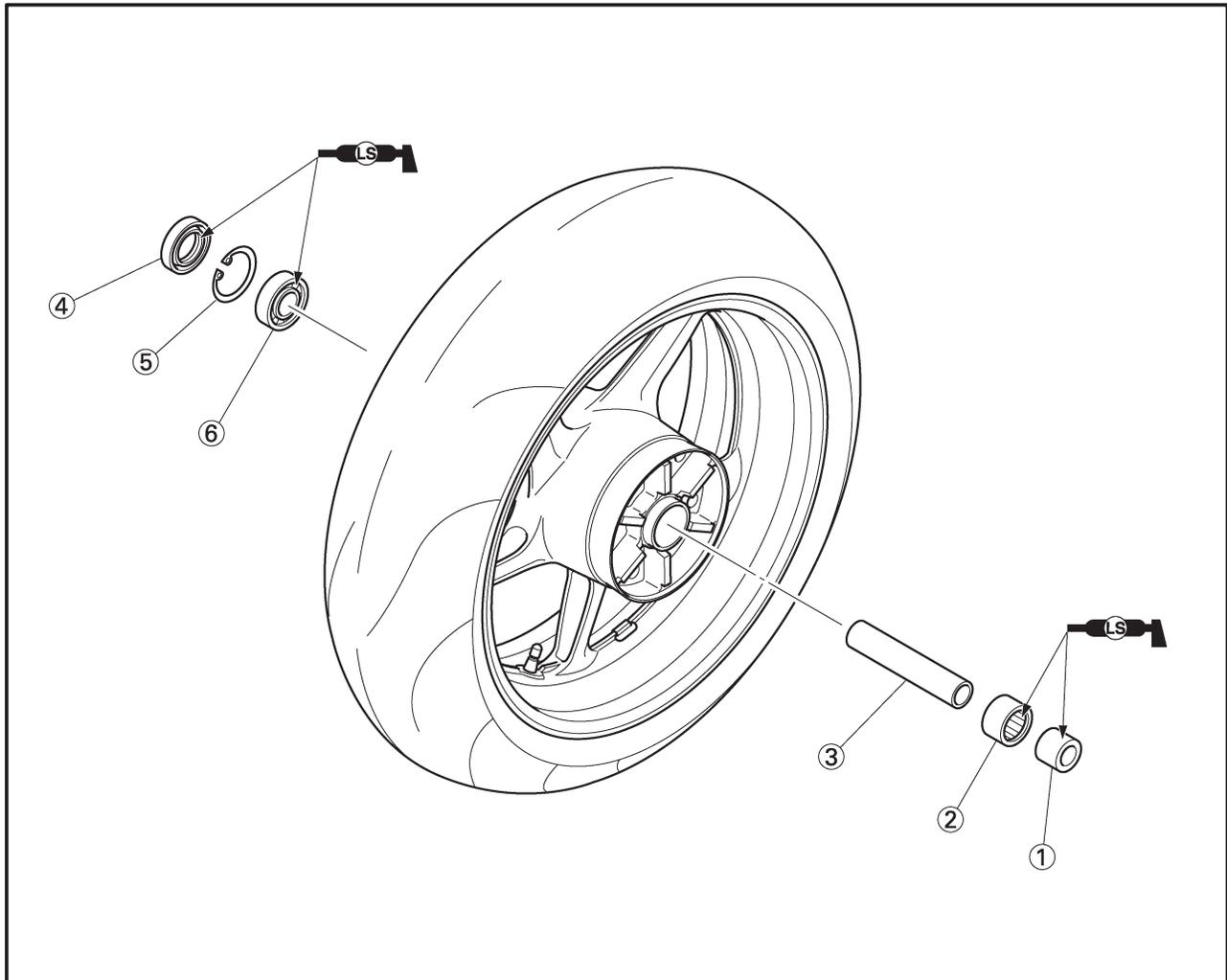
Order	Job/Part	Q'ty	Remarks
	Removing the rear wheel		Remove the parts in the order listed. NOTE: _____ Place the motorcycle on a suitable stand so that the rear wheel is elevated.
1	Rear brake caliper	1	
2	Lock nut (left and right)	2	Loosen.
3	Adjusting bolt (left and right)	2	Loosen.
4	Wheel axle nut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

EAS00560

REAR BRAKE DISC AND REAR WHEEL SPROCKET



Order	Job/Part	Q'ty	Remarks
	Removing the rear brake disc and rear wheel sprocket		Remove the parts in the order listed.
1	Rear brake disc	1	
2	Rear wheel sprocket	1	
3	Collar	2	
4	Oil seal	1	
5	Bearing	1	
6	Rear wheel drive hub	1	
7	Rear wheel drive hub damper	6	
8	Rear wheel	1	
			For installation, reverse the disassembly procedure.



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

EAS00561

REMOVING THE REAR WHEEL

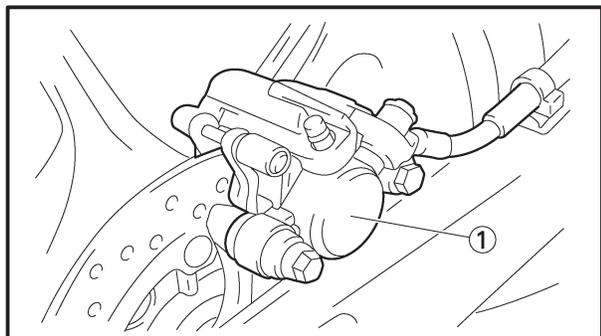
1. Stand the motorcycle on a level surface.

⚠ WARNING

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

NOTE:

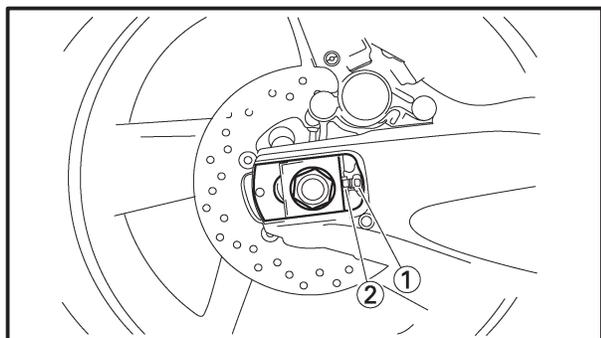
Place the motorcycle on a suitable stand so that the rear wheel is elevated.



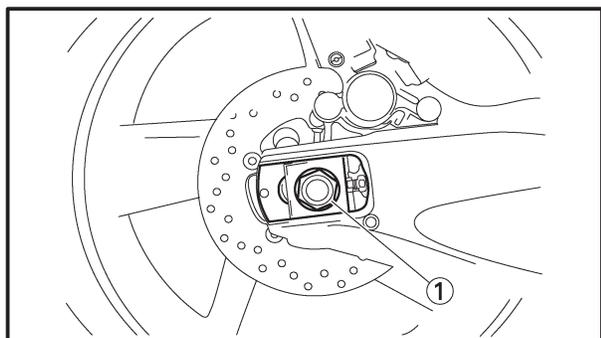
2. Remove:
• brake caliper ①

NOTE:

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



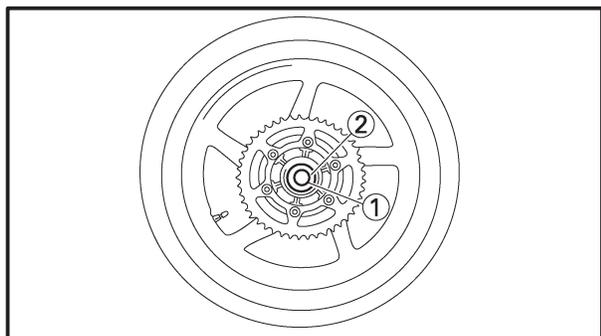
3. Loosen:
• locknut ①
• adjusting bolt ②



4. Remove:
• wheel axle nut ①
• wheel axle
• rear wheel

NOTE:

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

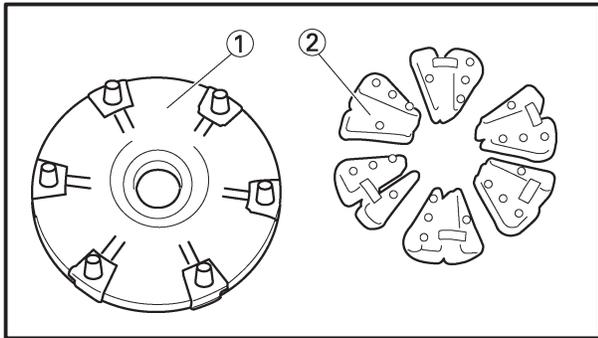


5. Remove:
• left collar ①
• rear wheel drive hub ②
• rear wheel drive hub damper
• right collar

EAS00565

CHECKING THE REAR WHEEL

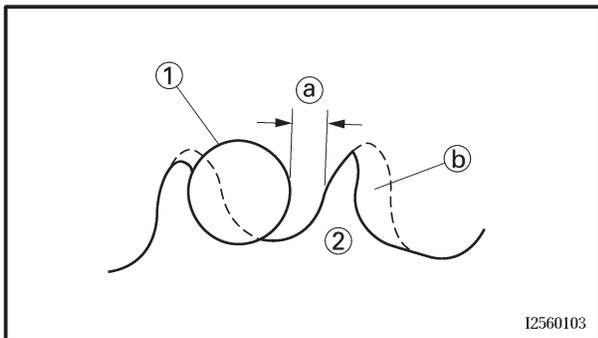
1. Check:
 - wheel axle
 - rear wheel
 - wheel bearings
 - oil seals
 Refer to “CHECKING THE FRONT WHEEL”.
2. Check:
 - tire
 - rear wheel
 Damage/wear → Replace.
 Refer to “CHECKING THE TIRES” and “CHECKING THE WHEELS” in chapter 3.
3. Measure:
 - radial wheel runout
 - lateral wheel runout
 Refer to “CHECKING THE FRONT WHEEL”.



EAS00567

CHECKING THE REAR WHEEL DRIVE HUB

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



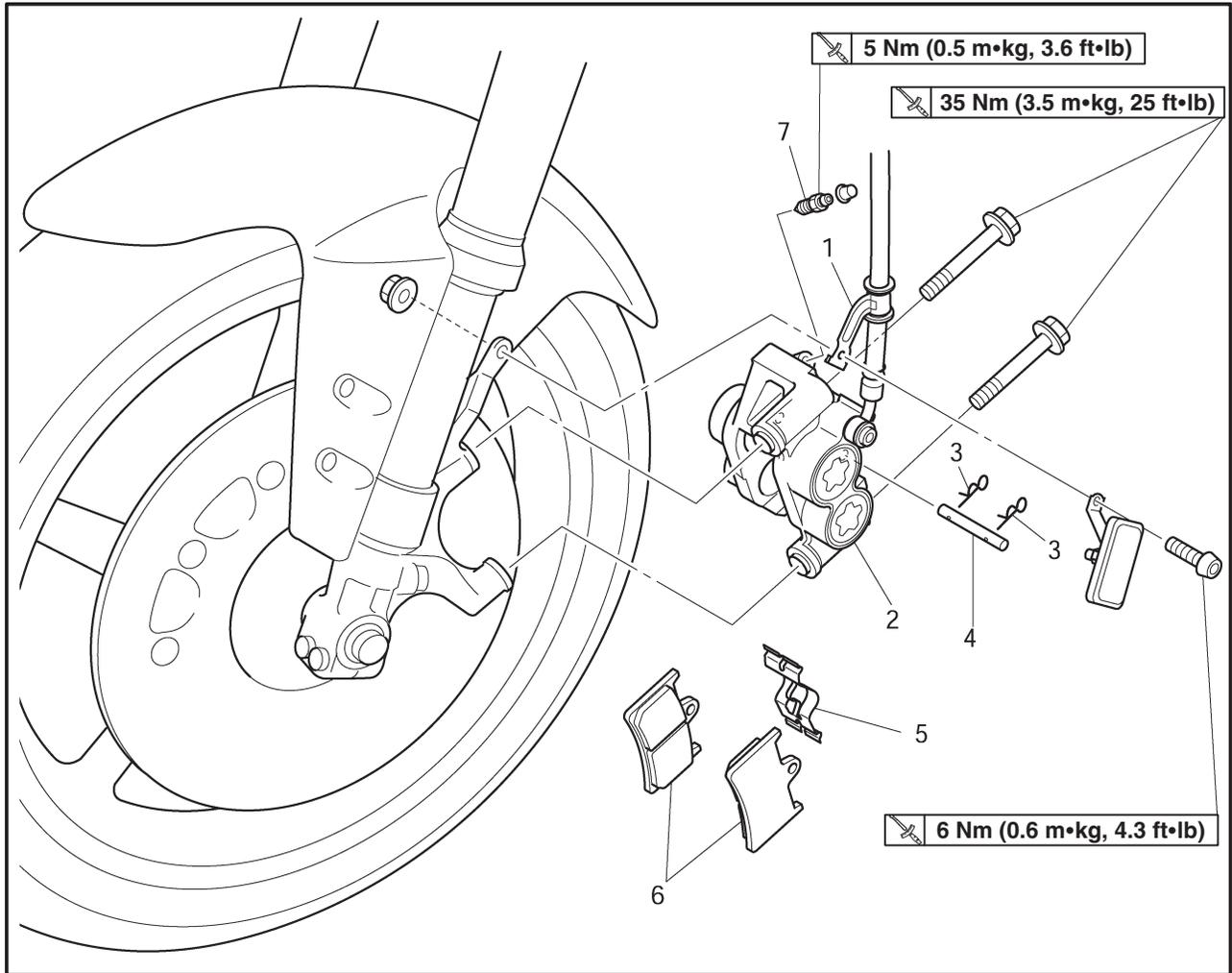
EAS00568

CHECKING AND REPLACING THE REAR WHEEL SPROCKET

1. Check:
 - rear wheel sprocket
 More than 1/4 tooth (a) wear → Replace the rear wheel sprocket.
 Bent teeth → Replace the rear wheel sprocket.
- (b) Correct
 (1) Drive chain roller
 (2) Rear wheel sprocket

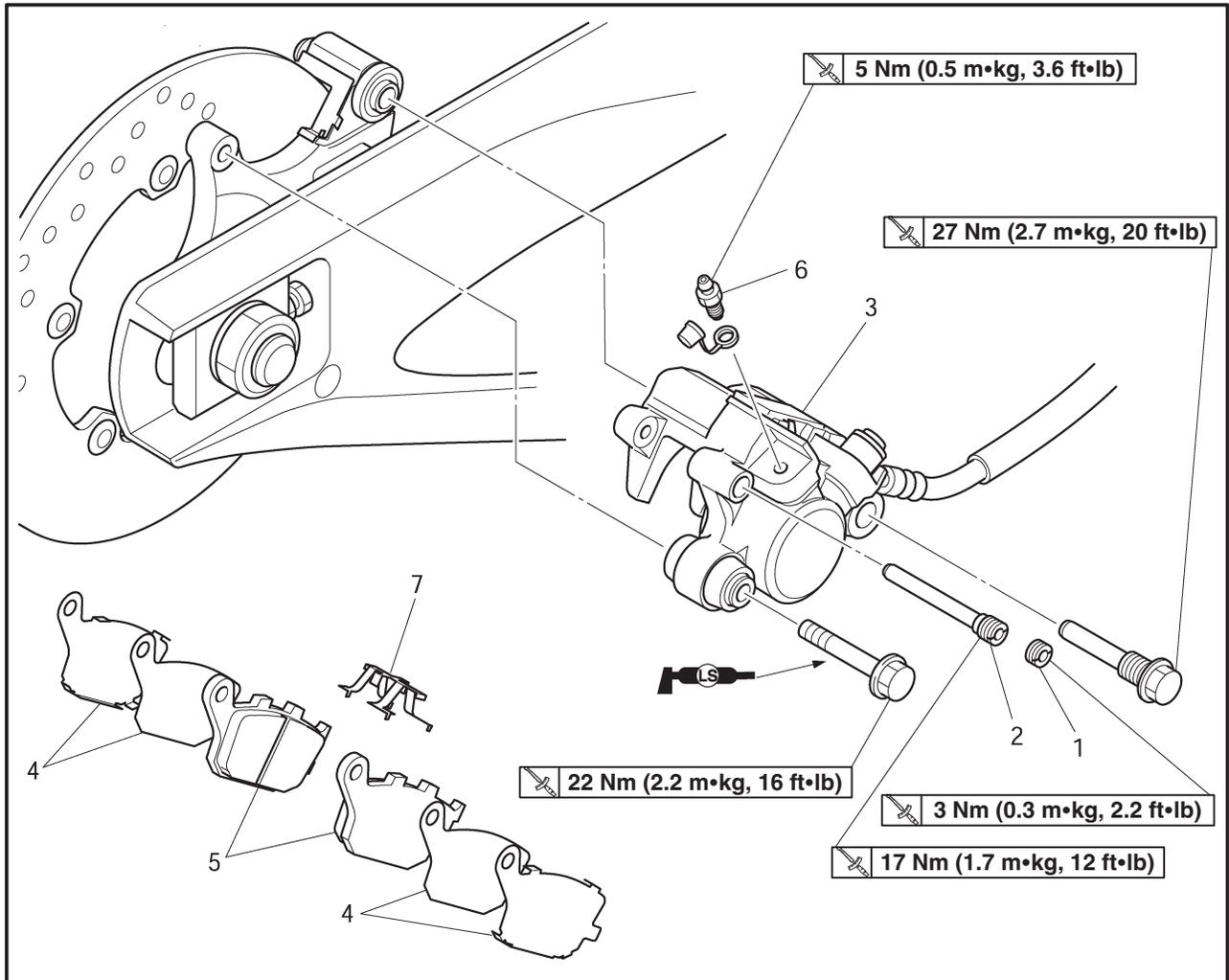
EAS00577

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. NOTE: _____ The following procedure applies to both of the front brake calipers.
1	Brake hose holder	1	
2	Front brake caliper	1	
3	Brake pad clip	2	
4	Brake pad pin	1	
5	Brake pad spring	1	
6	Brake pad	2	
7	Bleed screw	1	
			For installation, reverse the removal procedure.

REAR BRAKE PADS



Order	Job/Part	Q'ty	Remarks
	Removing the rear brake pads		Remove the parts in the order listed.
1	Screw plug	1	
2	Brake pad pin	1	
3	Rear brake caliper	1	
4	Brake pad shim	4	
5	Brake pad	2	
6	Bleed screw	1	
7	Brake pad spring	1	
			For installation, reverse the removal procedure.



EAS00579

CAUTION: _____

Disc brake components rarely require disassembly.

Therefore, always follow these preventive measures:

⚠ WARNING _____

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

FIRST AID FOR BRAKE FLUID ENTERING THE EYES:

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

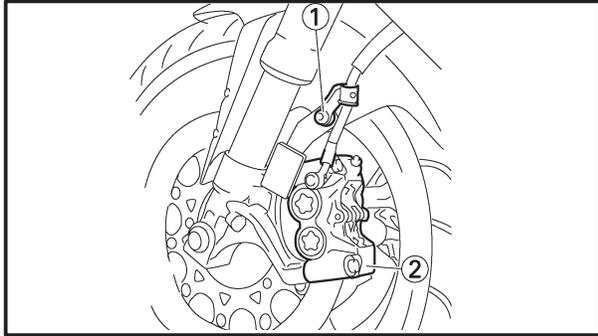
EAS00582

REPLACING THE FRONT BRAKE PADS

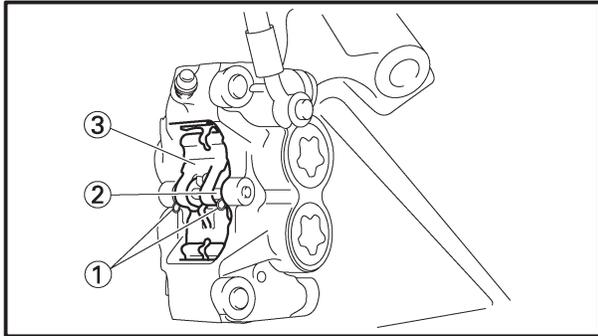
The following procedure applies to both brake calipers.

NOTE: _____

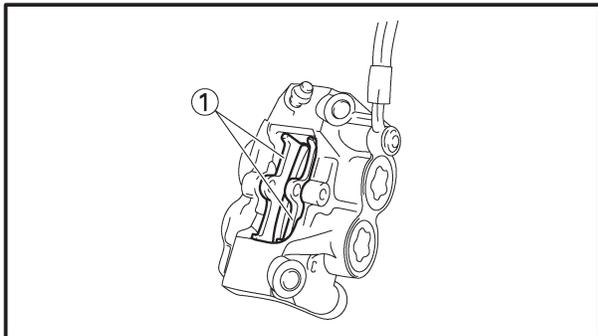
When replacing the brake pads, it is not necessary to disconnect the brake hose or disassemble the brake caliper.



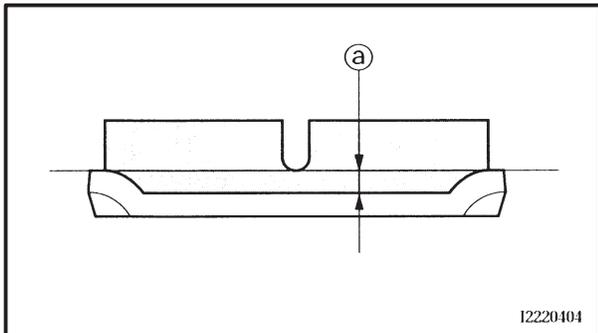
1. Remove:
 - brake hose holder ①
 - brake caliper ②



2. Remove:
 - brake pad clips ①
 - brake pad pin ②
 - brake pad spring ③



3. Remove:
 - brake pads ①
(along with the brake pad shims)



4. Measure:
 - brake pad wear limit ①
 Out of specification → Replace the brake pads as a set.

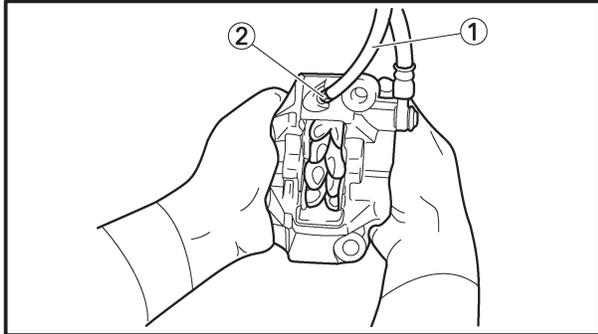
	Brake pad wear limit 0.5 mm (0.02 in)
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I2220404

5. Install:
 - brake pad shims (onto the brake pads)
 - brake pads
 - brake pad spring

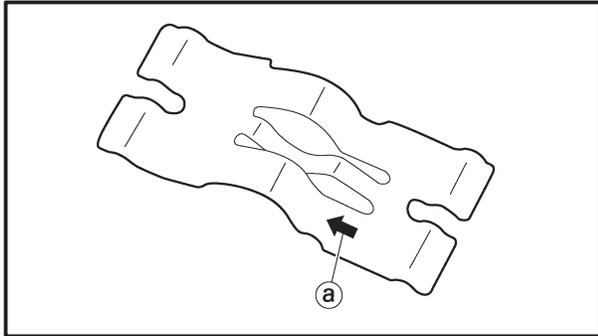
NOTE:

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



- a. Connect a clear plastic hose (1) tightly to the bleed screw (2). Put the other end of the hose into an open container.
- b. Loosen the bleed screw and push the brake caliper pistons into the brake caliper with your finger.
- c. Tighten the bleed screw.

	<p>Bleed screw 5 Nm (0.5 m•kg, 3.6 ft•lb)</p>
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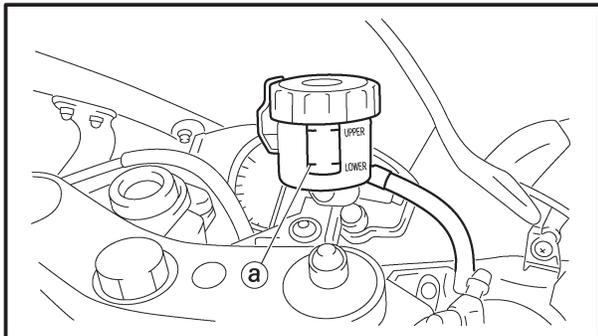


- d. Install a new brake pad shim onto each new brake pad.

NOTE:

Install the brake pad spring pointing (a) toward the bleed screw.

- e. Install new brake pads and a new brake pad spring.



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

	<p>35 Nm (3.5 m•kg, 25 ft•lb)</p>
---	--

7. Check:

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

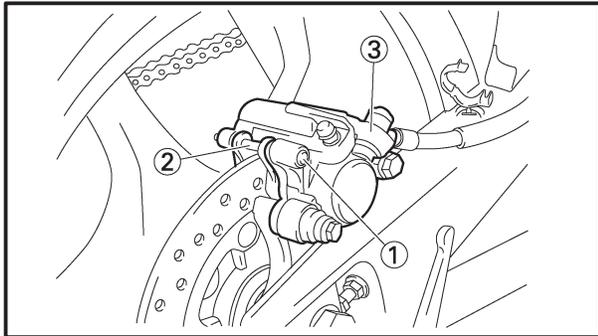
8. Check:

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

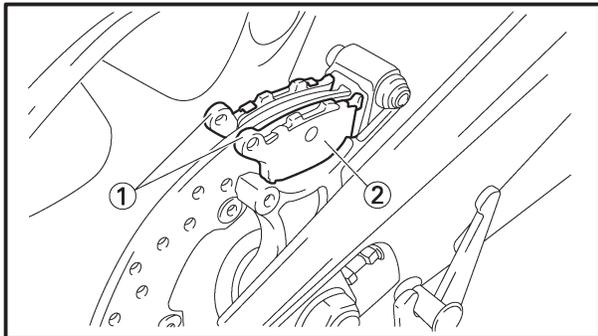
REPLACING THE REAR BRAKE PADS

NOTE: _____

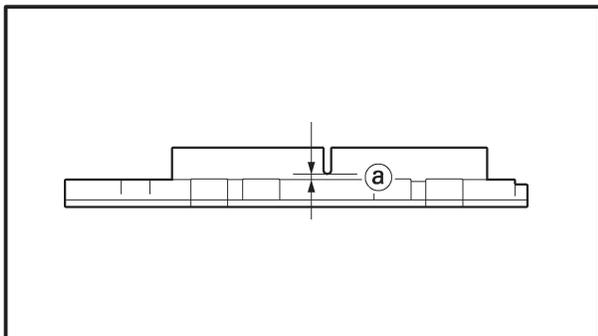
When replacing the brake pads, it is not necessary to disconnect the brake hose or disassemble the brake caliper.



1. Remove :
- screw plug ①
 - brake pad pin ②
 - brake caliper ③
 - brake pad spring



2. Remove :
- brake pads ①
 - (along with the brake pad shims ②)



3. Measure :
- brake pad wear limit ①
 - Out of specification → Replace the brake pads as a set.

	Brake pad wear limit 1.0 mm (0.04 in)
---	--

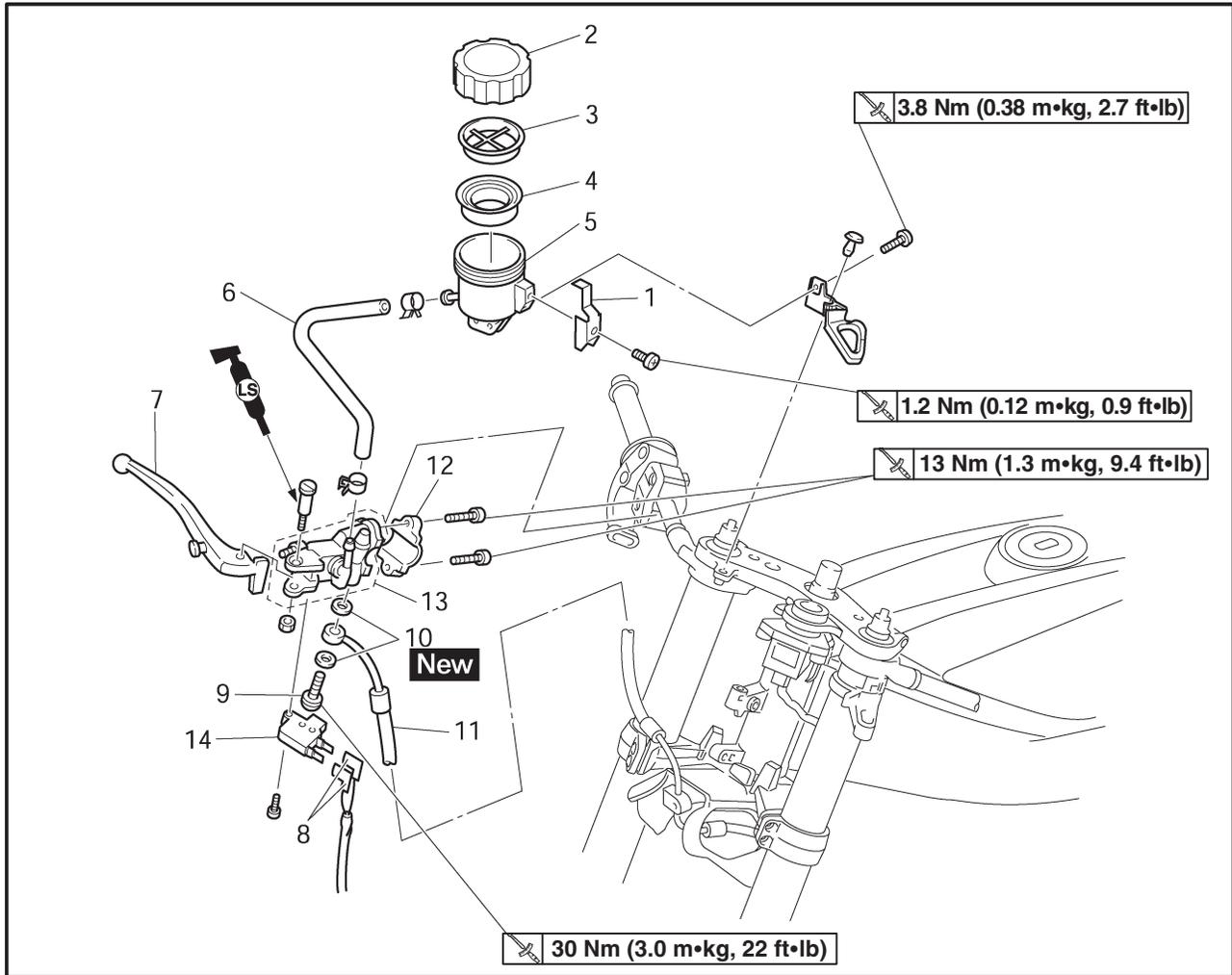
4. Install :
- brake pad shims
 - (onto the brake pads)
 - brake pads
 - brake pad spring

NOTE: _____

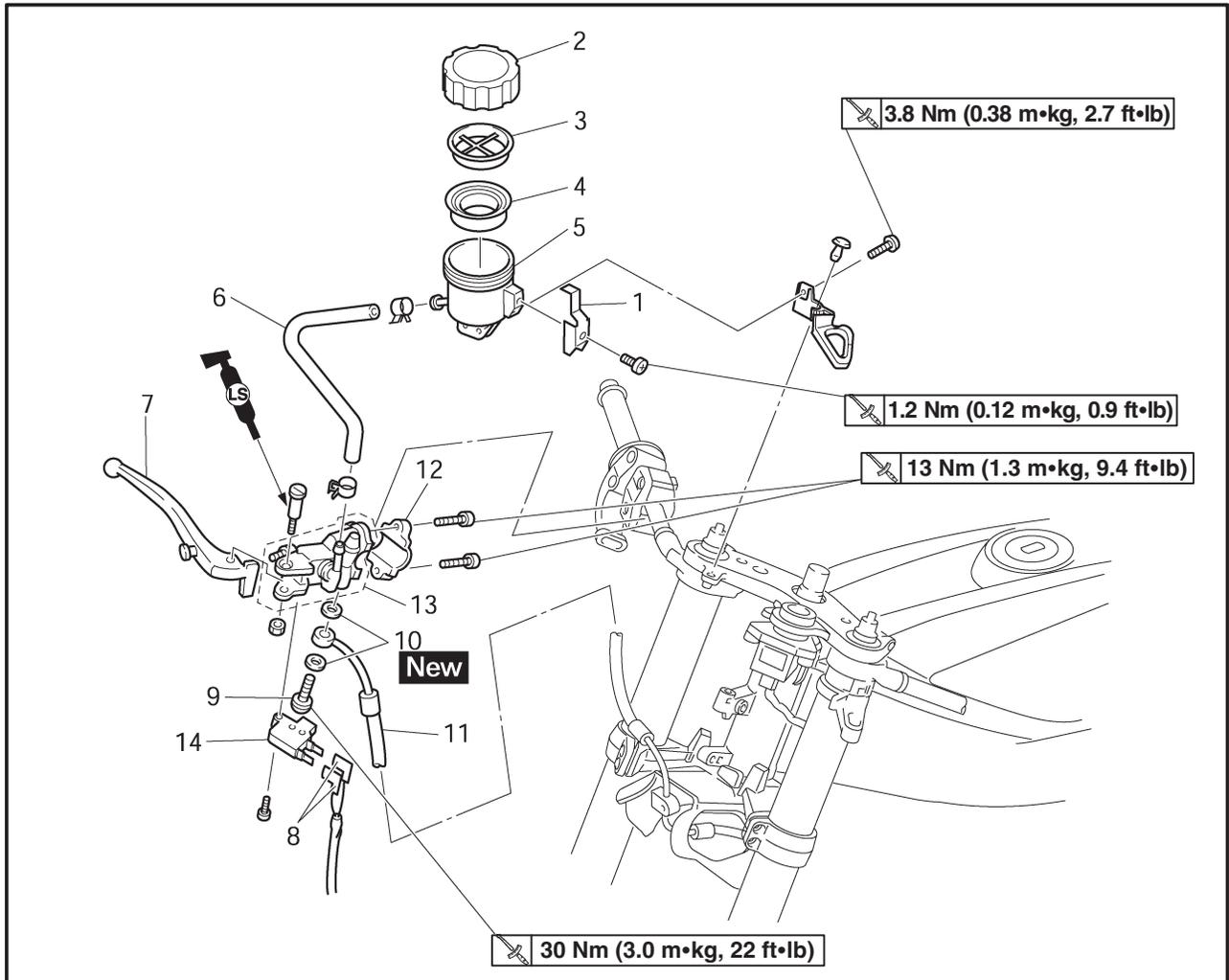
Always install new brake pads, brake pad shims, and a brake pad spring as a set.

EAS00584

FRONT BRAKE MASTER CYLINDER

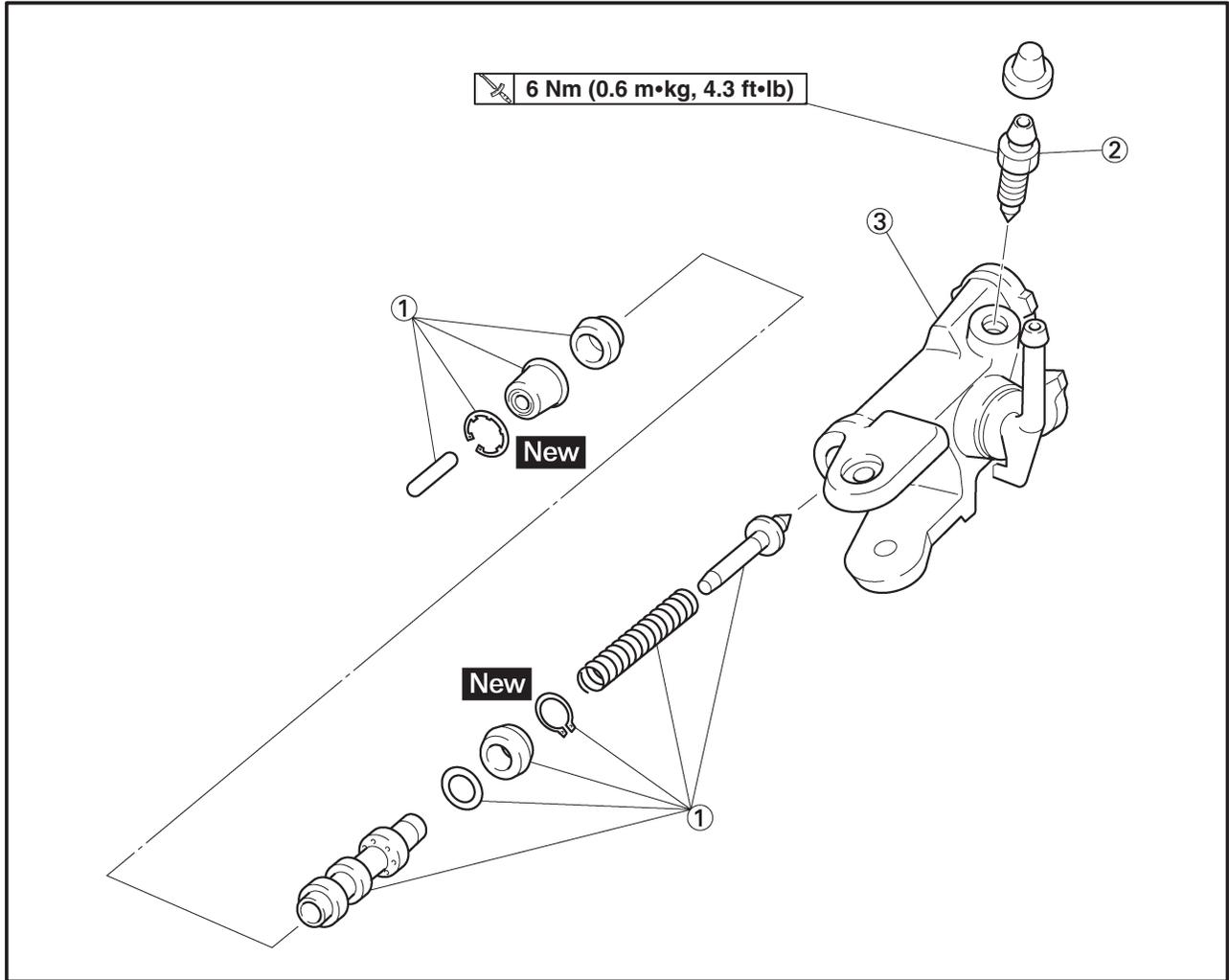


Order	Job/Part	Q'ty	Remarks
	Removing the front brake master cylinder		Remove the parts in the order listed.
	Brake fluid		Drain. Refer to "CHANGING THE BRAKE FLUID" in chapter 3.
1	Stopper	1	
2	Brake fluid reservoir cap	1	
3	Brake fluid reservoir diaphragm holder	1	
4	Brake fluid reservoir diaphragm	1	
5	Brake fluid reservoir tank	1	
6	Brake fluid reservoir hose	1	
7	Brake lever	1	
8	Front brake switch connector	2	Disconnect.
9	Union bolt	1	



Order	Job/Part	Q'ty	Remarks
10	Copper washer	2	For installation, reverse the removal procedure.
11	Brake hose	1	
12	Brake master cylinder bracket	1	
13	Brake master cylinder	1	
14	Front brake light switch	1	

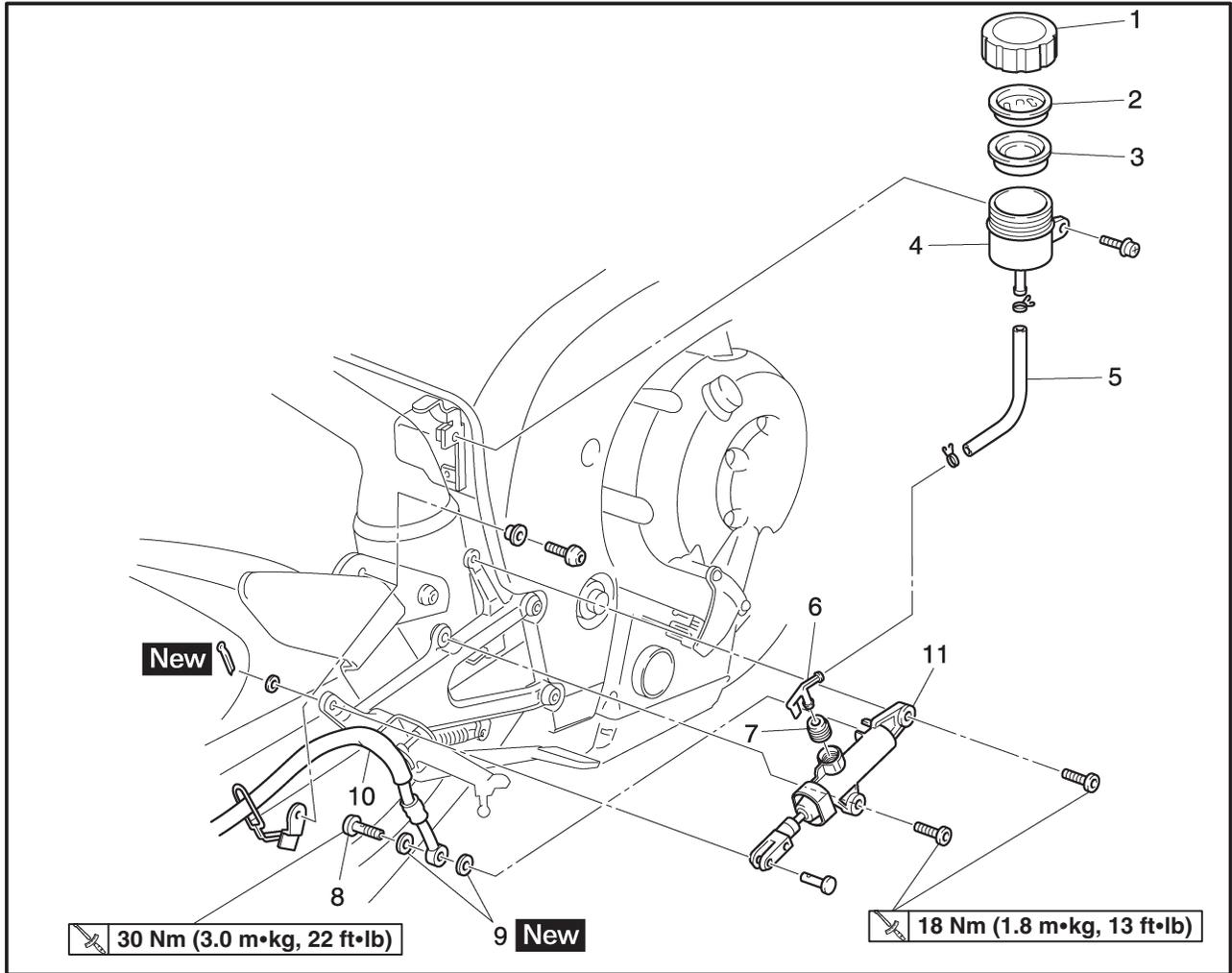
EAS00585



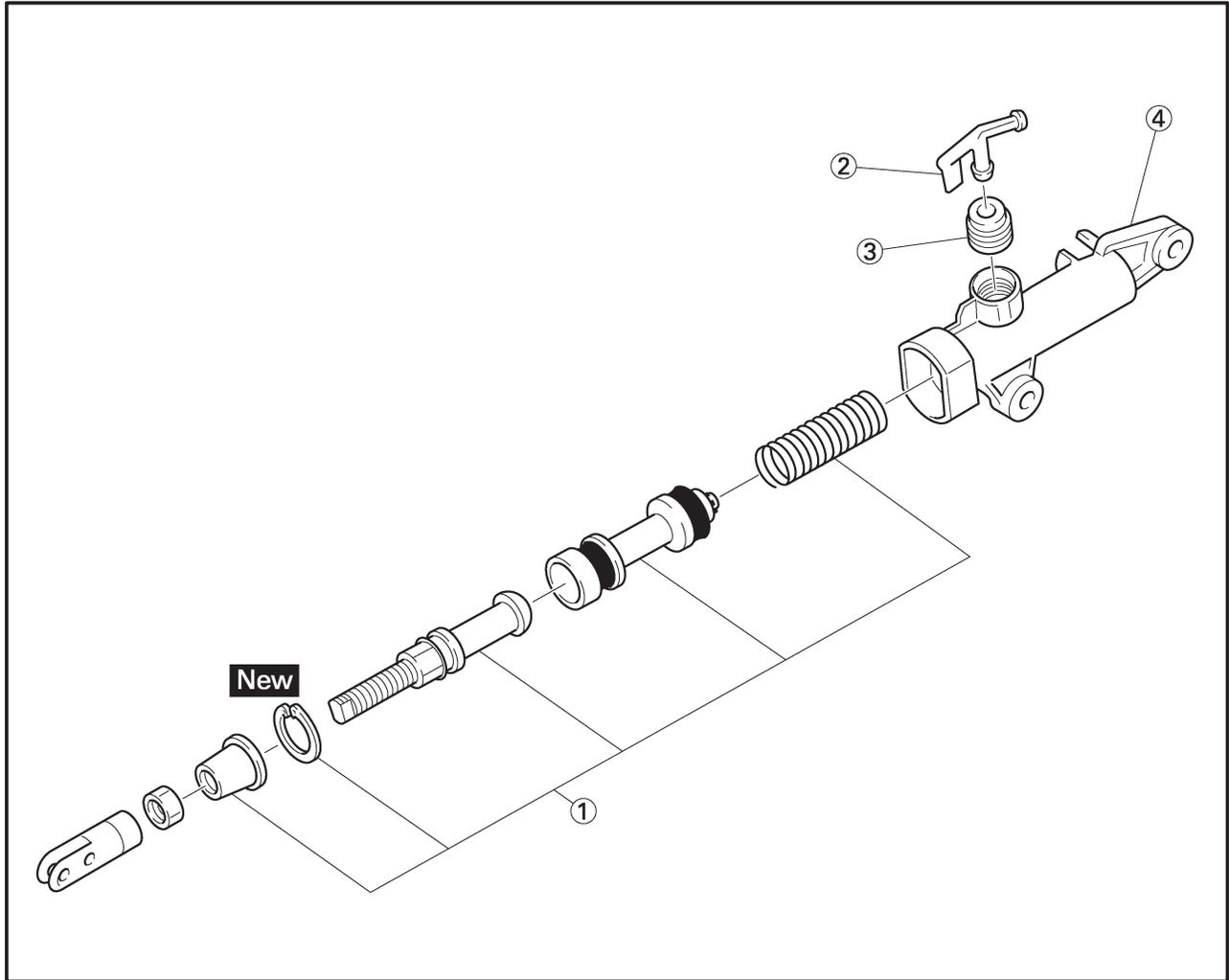
Order	Job/Part	Q'ty	Remarks
	Disassembling the front brake master cylinder		Disassemble the parts in the order listed.
①	Brake master cylinder kit	1	
②	Bleed screw	1	
③	Brake master cylinder body	1	
			For assembly, reverse the disassembly procedure.

EAS00586

REAR BRAKE MASTER CYLINDER



Order	Job/Part	Q'ty	Remarks
	Removing the rear brake master cylinder		Remove the parts in the order listed.
	Brake fluid		Drain. Refer to "CHANGING THE BRAKE FLUID" in chapter 3.
1	Brake fluid reservoir cap	1	
2	Brake fluid reservoir diaphragm holder	1	
3	Brake fluid reservoir diaphragm	1	
4	Brake fluid reservoir tank	1	
5	Brake fluid reservoir hose	1	
6	Hose joint	1	
7	Bush	1	
8	Union bolt	1	
9	Copper washer	2	
10	Brake hose	1	
11	Brake master cylinder	1	
			For installation, reverse the removal procedure.



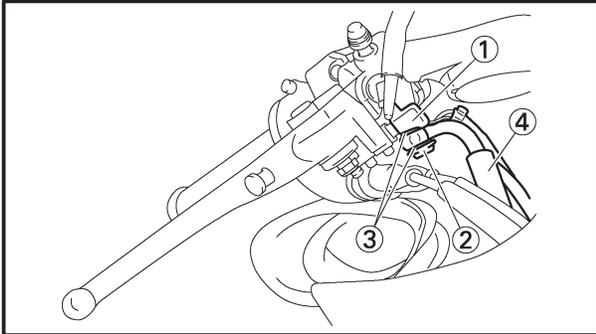
Order	Job/Part	Q'ty	Remarks
	Disassembling the rear brake master cylinder		Disassemble the parts in the order listed.
①	Brake master cylinder kit	1	
②	Hose joint	1	
③	Bush	1	
④	Brake master cylinder body	1	
			For assembly, reverse the disassembly procedure.

EAS00588

DISASSEMBLING THE FRONT BRAKE MASTER CYLINDER

NOTE: _____

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

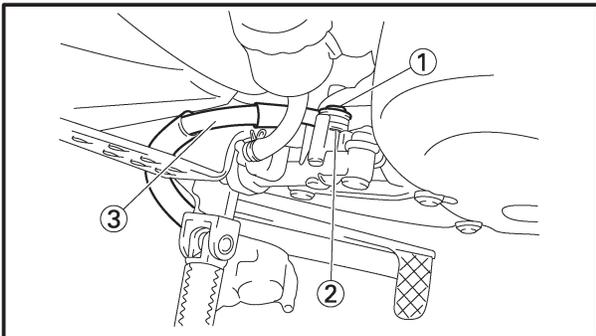


1. Disconnect:
 - brake light switch connector ① (from the brake light switch)
2. Remove:
 - union bolt ②
 - copper washers ③
 - brake hose ④

NOTE: _____

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

3. Remove :
 - brake master cylinder bracket
 - brake master cylinder assembly
4. Remove :
 - dust boot
 - circlip



EAS00589

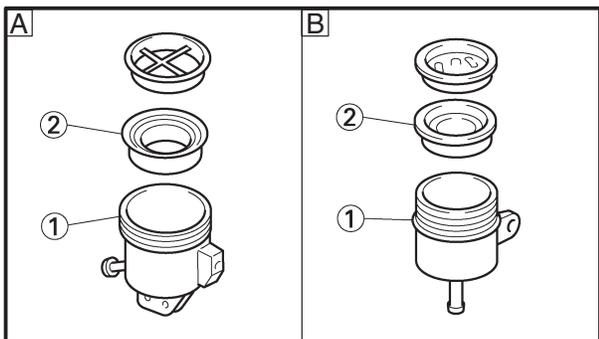
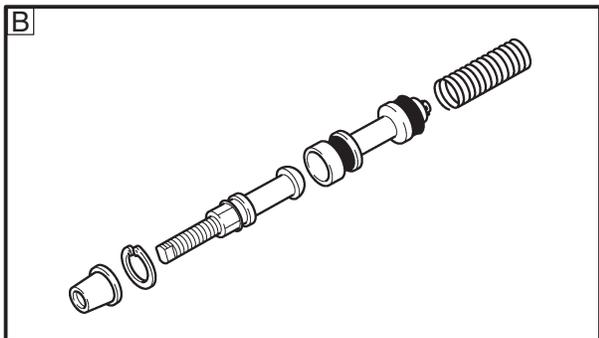
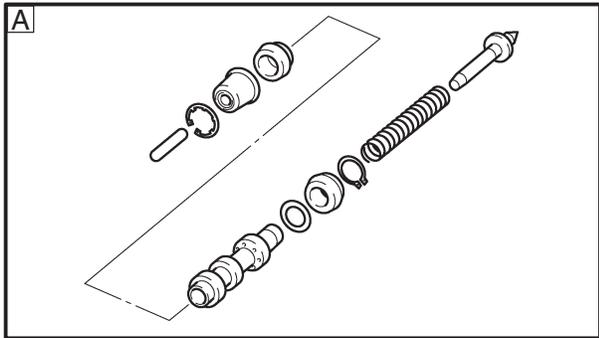
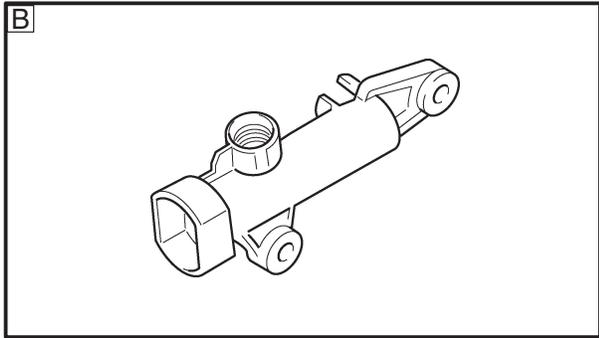
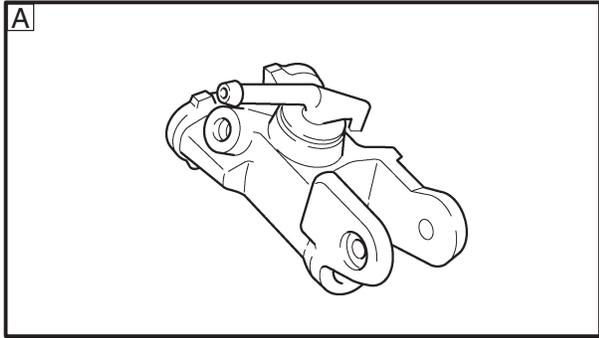
DISASSEMBLING THE REAR BRAKE MASTER CYLINDER

1. Remove:
 - union bolt ①
 - copper washers ②
 - brake hose ③

NOTE: _____

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

2. Remove :
- brake master cylinder assembly
3. Remove :
- dust boot
- circlip



EAS00593

CHECKING THE FRONT AND REAR BRAKE MASTER CYLINDERS

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

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

- A** Front
- B** Rear

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

- A** Front
- B** Rear

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

- A** Front
- B** Rear

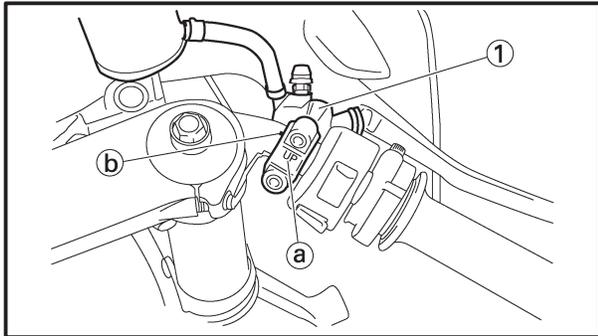
4. Check:
 - brake hoses
Cracks/damage/wear → Replace.

EAS00607

ASSEMBLING AND INSTALLING THE FRONT BRAKE MASTER CYLINDER

⚠ WARNING

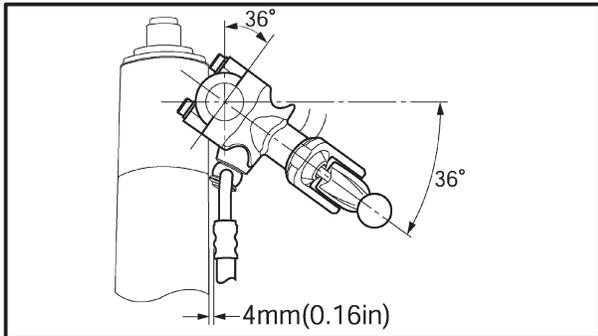
- Before installation, all internal brake components should be cleaned and lubricated with clean or new brake fluid.
- Never use solvents on internal brake components.



	Recommended brake fluid DOT 4
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1. Install :
 - brake master cylinder kit
 - circlip **New**
 - dust boot
2. Install:
 - brake master cylinder ①

 **13 Nm (1.3 m•kg, 9.4 ft•lb)**



NOTE:

- Install the brake master cylinder holder with the “UP” mark (a) facing up.
- Align the end of the brake master cylinder holder with the punch mark (b) on the right handlebar.
- First, tighten the upper bolt, then the lower bolt. There should be 2 ~ 2.5 mm (0.08 ~ 0.10 in) for clearance between the right handlebar switch and the brake master cylinder holder.

3. Install:
 - copper washers **New**
 - brake hose
 - union bolt
 - brake light switch coupler

 **30 Nm (3.0 m•kg, 22 ft•lb)**

⚠ WARNING

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

**NOTE:** _____

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

4. Fill:

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



Recommended brake fluid
DOT 4

⚠ WARNING _____

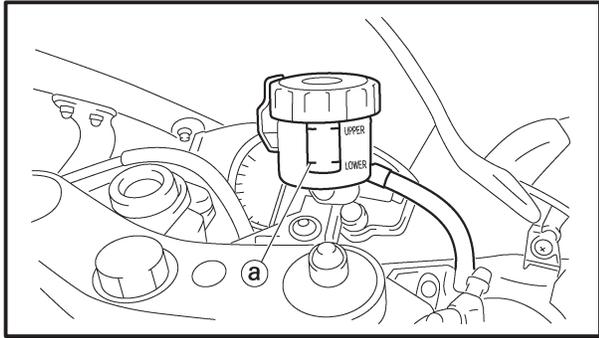
- **Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.**
- **Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor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

CAUTION: _____

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

5. Bleed:

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



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

EAS00608

ASSEMBLING THE REAR BRAKE MASTER CYLINDER

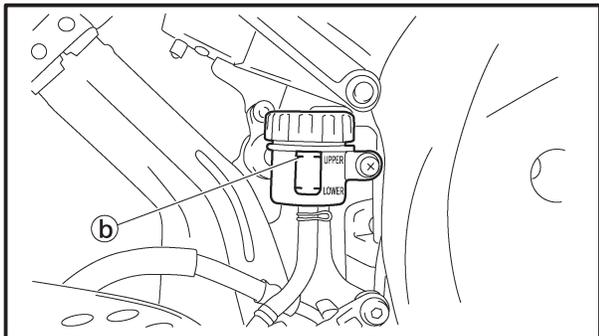
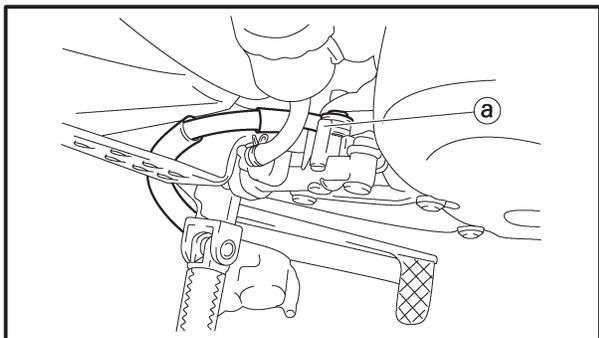
1. Install:
 - brake master cylinder kit
 - circlip
 - dust boot
2. Install:
 - copper washers **New**
 - brake hoses
 - union bolt  **30 Nm (3.0 m•kg, 22 ft•lb)**

⚠ WARNING

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

CAUTION:

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



3. Fill:
 - brake fluid reservoir
(to the maximum level mark (b))

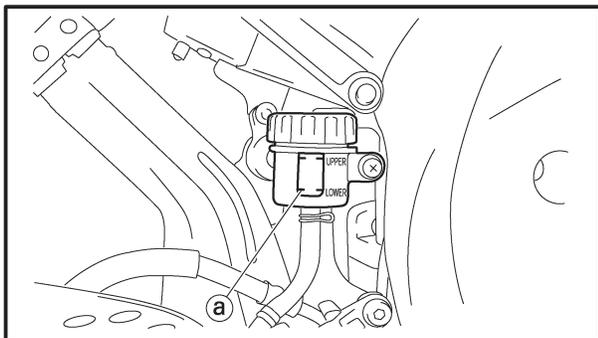
	Recommended brake fluid DOT 4
---	--

**⚠ WARNING**

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

CAUTION:

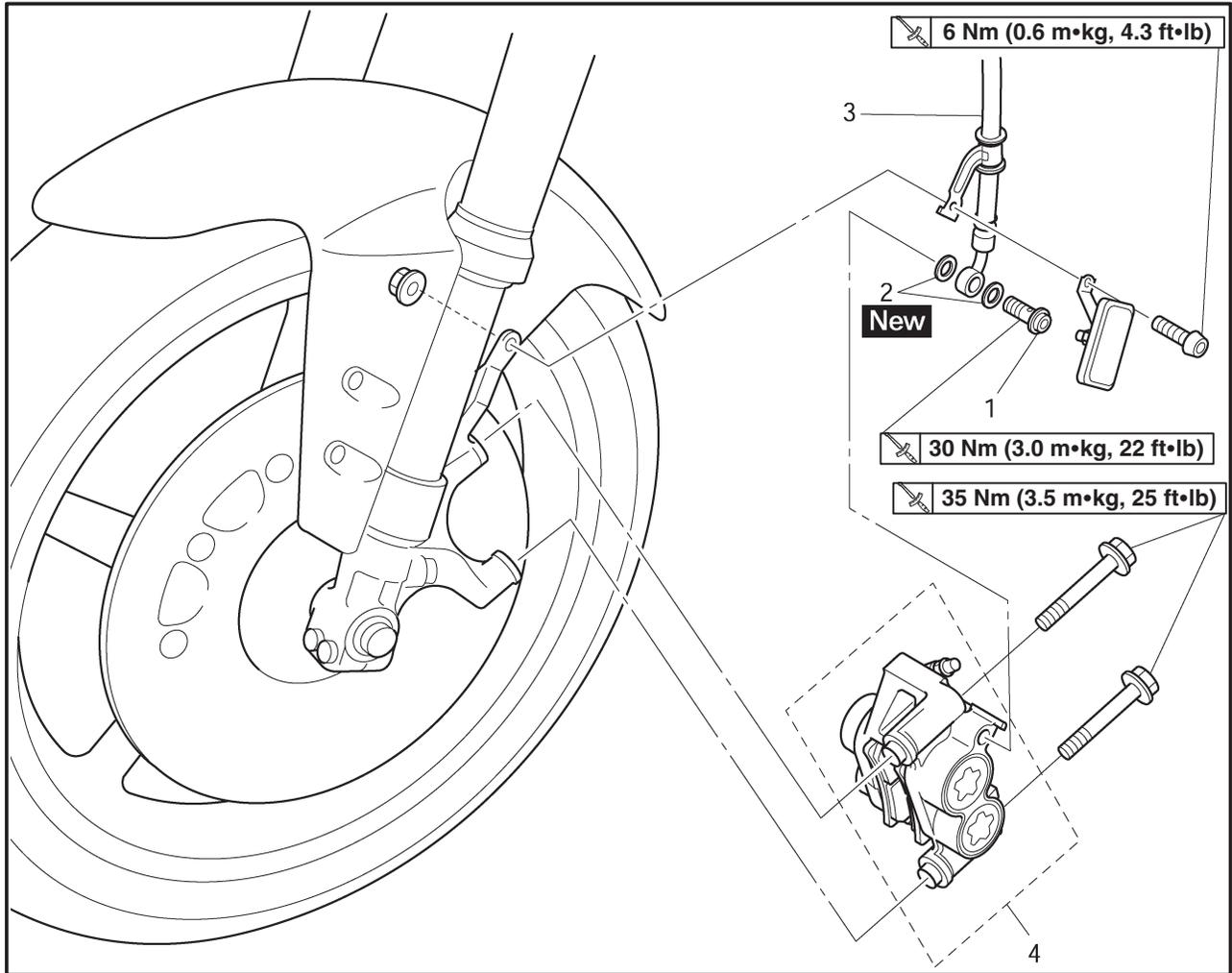
Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.



4. Bleed:
 - brake system
Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” in chapter 3.
5. Check:
 - brake fluid level
Below the minimum level mark (a) → Add the recommended brake fluid to the proper level.
Refer to “CHECKING THE BRAKE FLUID LEVEL” in chapter 3.
6. Adjust:
 - rear brake light operation timing
Refer to “ADJUSTING THE REAR BRAKE LIGHT SWITCH” in chapter 3.

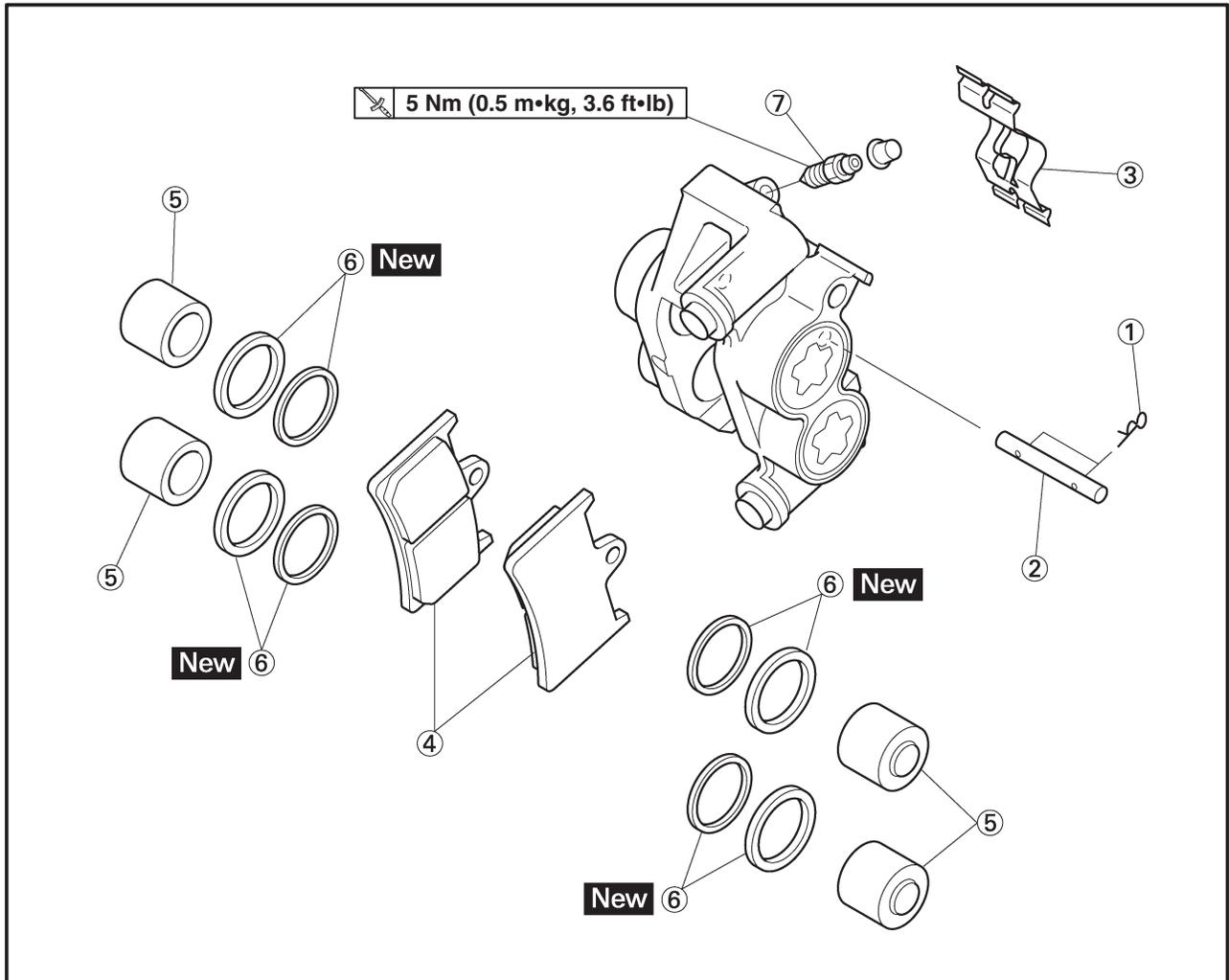
EAS00613

FRONT BRAKE CALIPERS



Order	Job/Part	Q'ty	Remarks
	Removing the front brake calipers		Remove the parts in the order listed. NOTE: _____ The following procedure applies to both of the front brake calipers.
	Brake fluid		Drain. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" in chapter 3.
1	Union bolt	1	
2	Copper washer	2	
3	brake hose	1	
4	brake caliper	1	
			For installation, reverse the removal procedure.

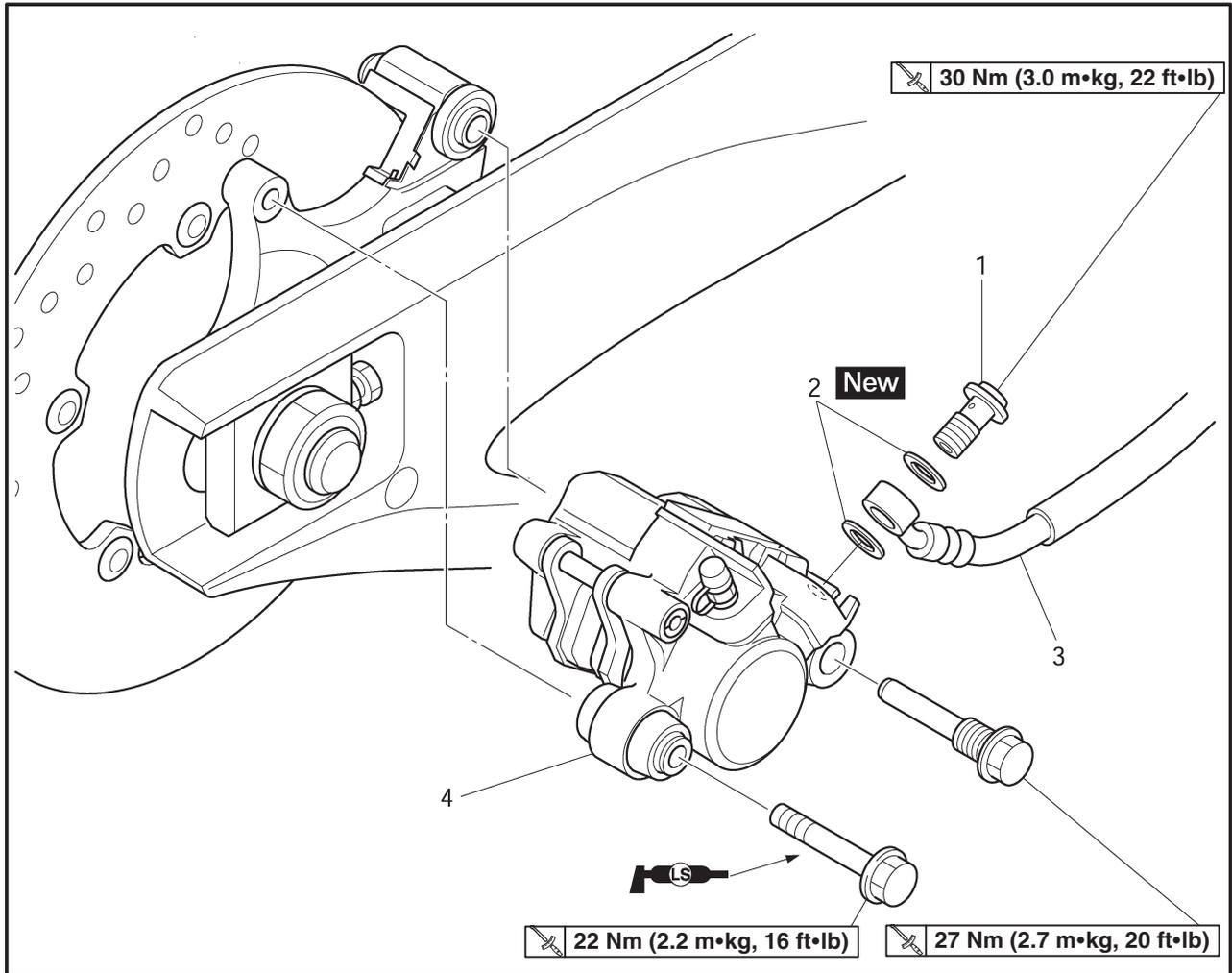
EAS00615



Order	Job/Part	Q'ty	Remarks
	Disassembling the front brake calipers		Disassemble the parts in the order listed. NOTE: _____ The following procedure applies to both of the front brake calipers. _____
①	Brake pad clip	2	
②	Brake pad pin	1	
③	Brake pad spring	1	
④	Brake pad	2	
⑤	Brake caliper piston	4	
⑥	Brake caliper piston seal	8	
⑦	Bleed screw	1	
			For assembly, reverse the disassembly procedure.

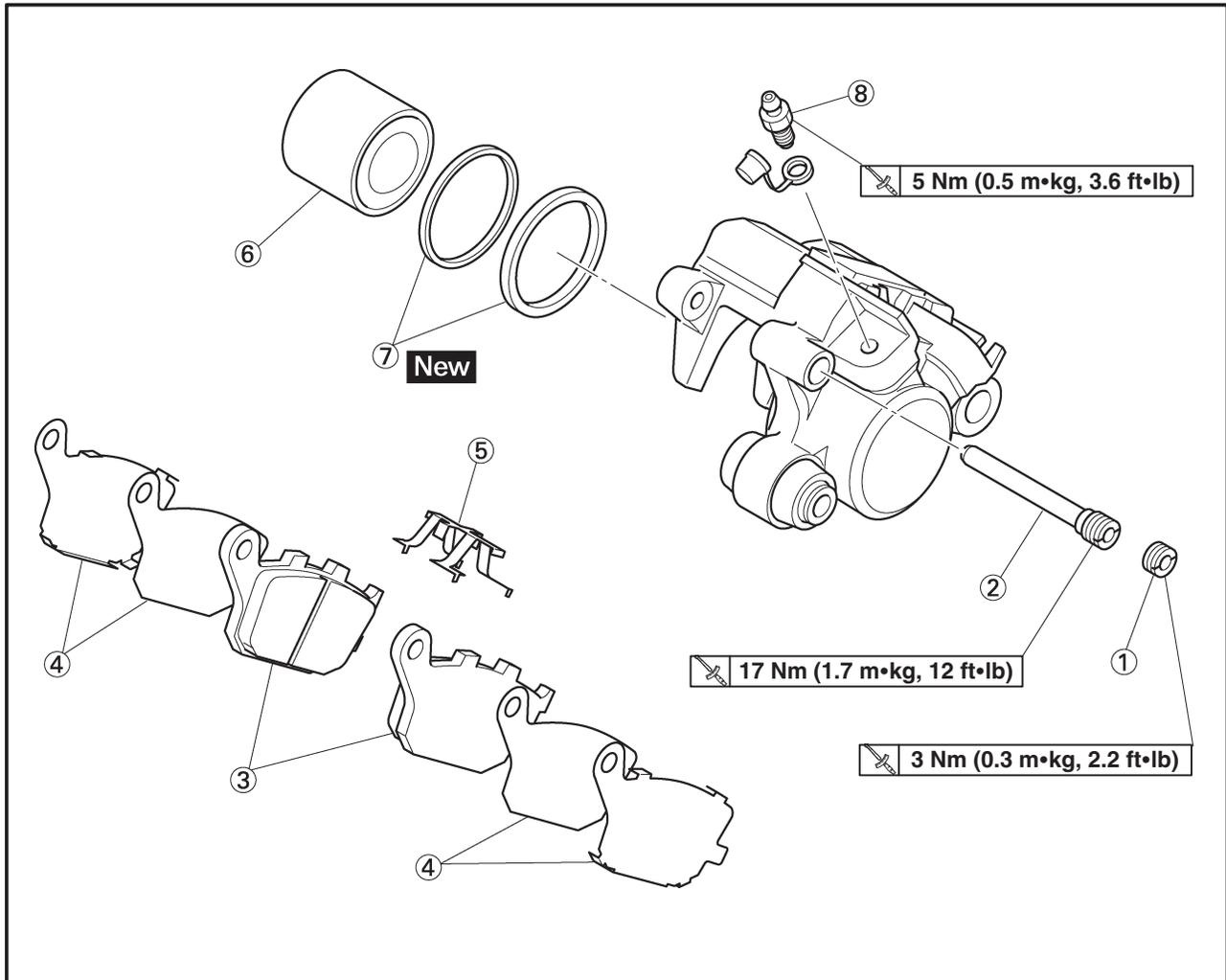
EAS00616

REAR BRAKE CALIPER



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

EAS00617

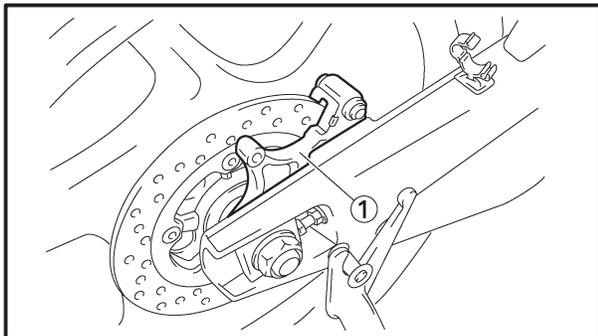
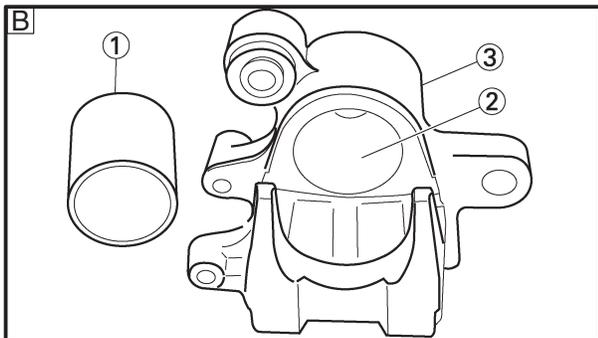
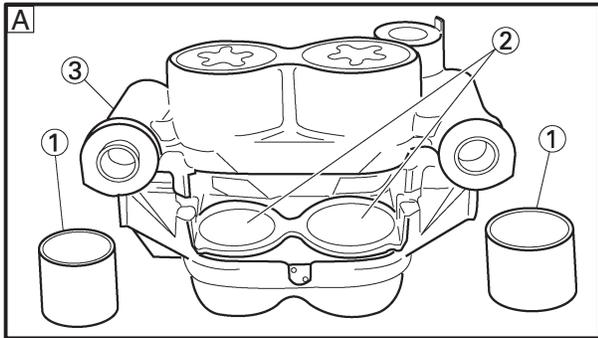


Order	Job/Part	Q'ty	Remarks
	Disassembling the rear brake caliper		Disassemble the parts in the order listed.
①	Screw plug	1	
②	Brake pad pin	1	
③	Brake pad	2	
④	Brake pad shim	4	
⑤	Brake pad spring	1	
⑥	Brake caliper piston	1	
⑦	Brake caliper piston seal	2	
⑧	Bleed screw	1	
			For assembly, reverse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

EAS00633

CHECKING THE FRONT AND REAR BRAKE CALIPERS

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



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

⚠ WARNING

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

- A** Front
- B** Rear

2. Check:
 - brake caliper bracket ①
Cracks/damage → Replace.

EAS00640

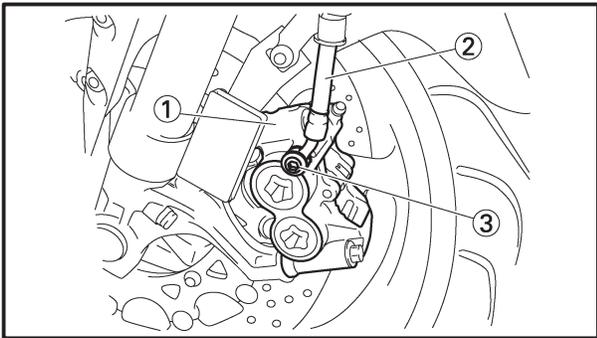
ASSEMBLING AND INSTALLING THE FRONT BRAKE CALIPERS

The following procedure applies to both of the brake calipers.

⚠ WARNING

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

	Recommended brake fluid DOT 4
---	--



1. Install :
 - brake pads
 - brake pad spring
 - brake pad pin
2. Install:

- brake caliper ①

 **35 Nm (3.5 m•kg, 25 ft•lb)**

- copper washers **New**

- brake hose ②

- union bolt ③

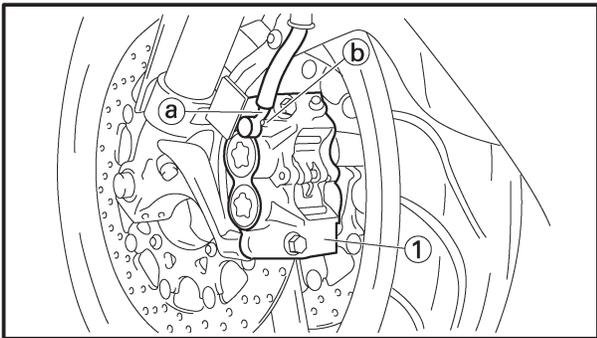
 **30 Nm (3.0 m•kg, 22 ft•lb)**

- brake hose holder

 **6 Nm (0.6 m•kg, 4.3 ft•lb)**

⚠ WARNING

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



CAUTION:

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



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



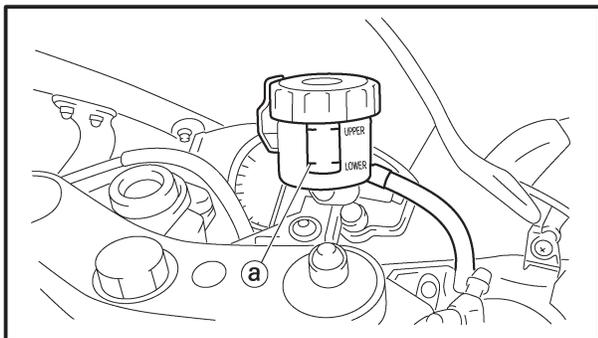
**Recommended brake fluid
DOT 4**

⚠ WARNING

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

CAUTION:

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



4. Bleed:
 - brake system
Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" in chapter 3.
5. Check:
 - brake fluid level
Below the minimum level mark (a) → Add the recommended brake fluid to the proper level. Refer to "CHECKING THE BRAKE FLUID LEVEL" in chapter 3.
6. Check:
 - brake lever operation
Soft or spongy feeling → Bleed the brake system.
Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" in chapter 3.

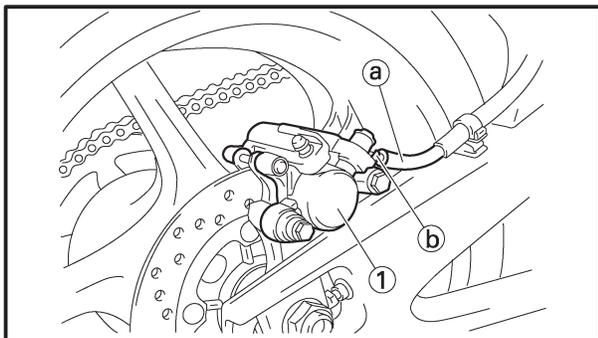
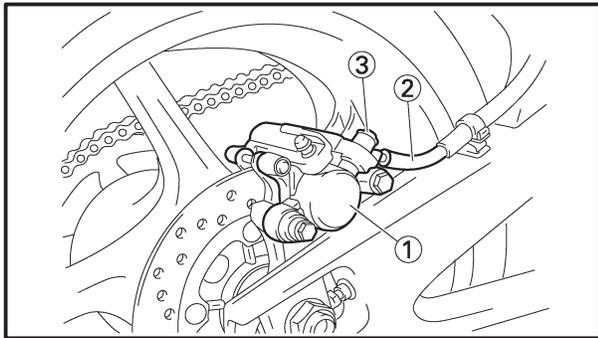
EAS00642

ASSEMBLING AND INSTALLING THE REAR BRAKE CALIPER

⚠ WARNING

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

	Recommended brake fluid DOT 4
---	--



1. Install:

- brake caliper ①

(front)

 **27 Nm (2.7 m•kg, 20 ft•lb)**

(rear)

 **22 Nm (2.2 m•kg, 16 ft•lb)**

- brake pad pin
- screw plug
- copper washers **New**
- brake hose ②
- union bolt ③

 **30 Nm (3.0 m•kg, 22 ft•lb)**

⚠ WARNING

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

CAUTION:

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



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



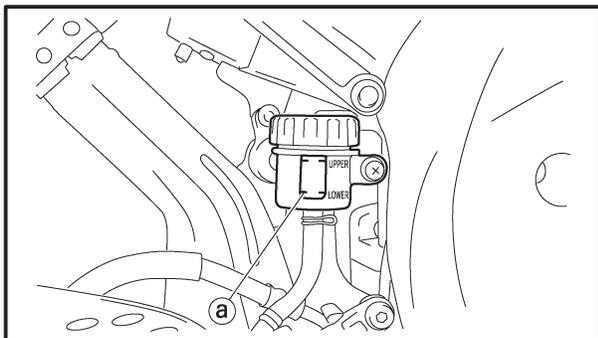
**Recommended brake fluid
DOT 4**

⚠ WARNING

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

CAUTION:

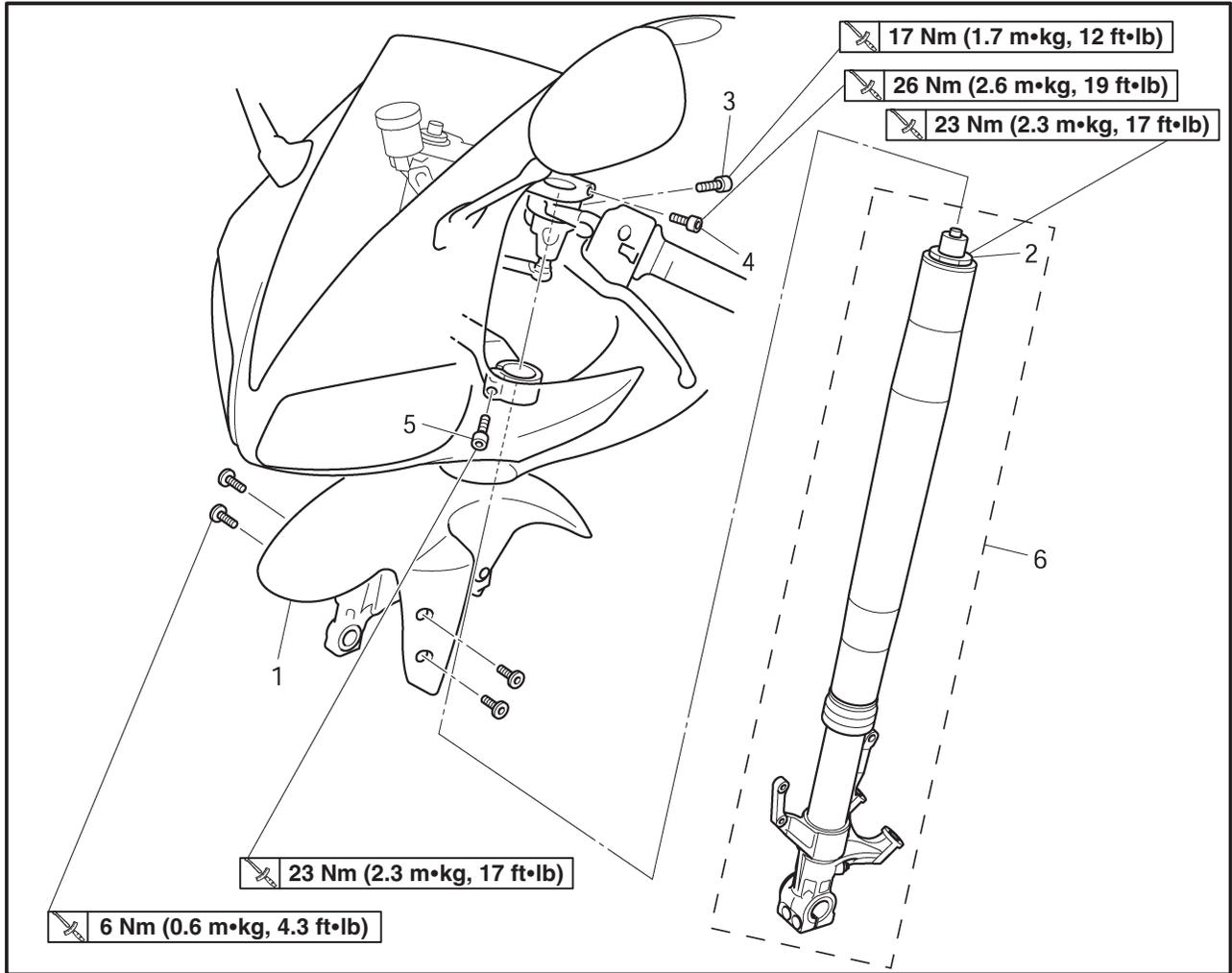
Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.



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

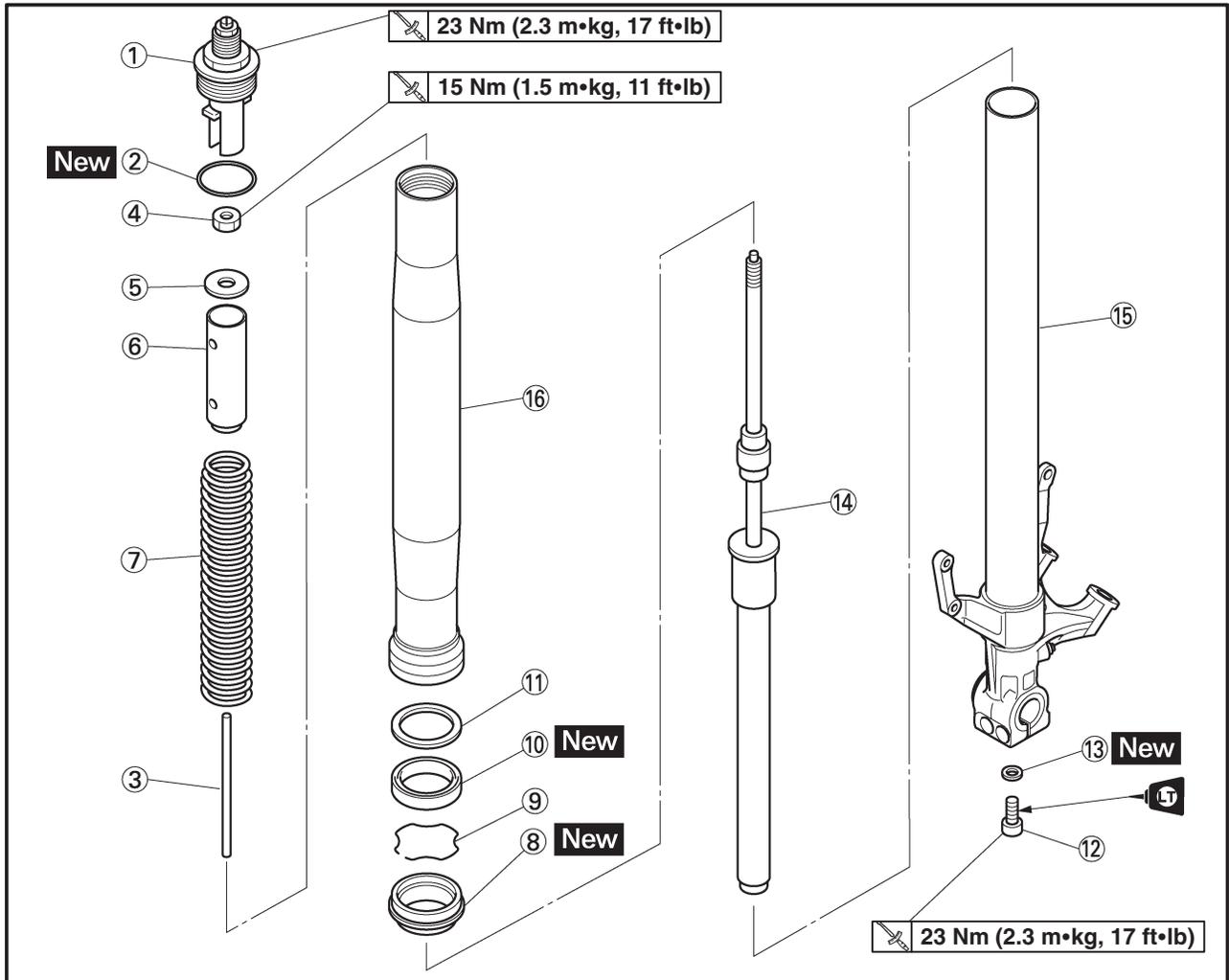
EAS00647

FRONT FORK
FRONT FORK LEGS

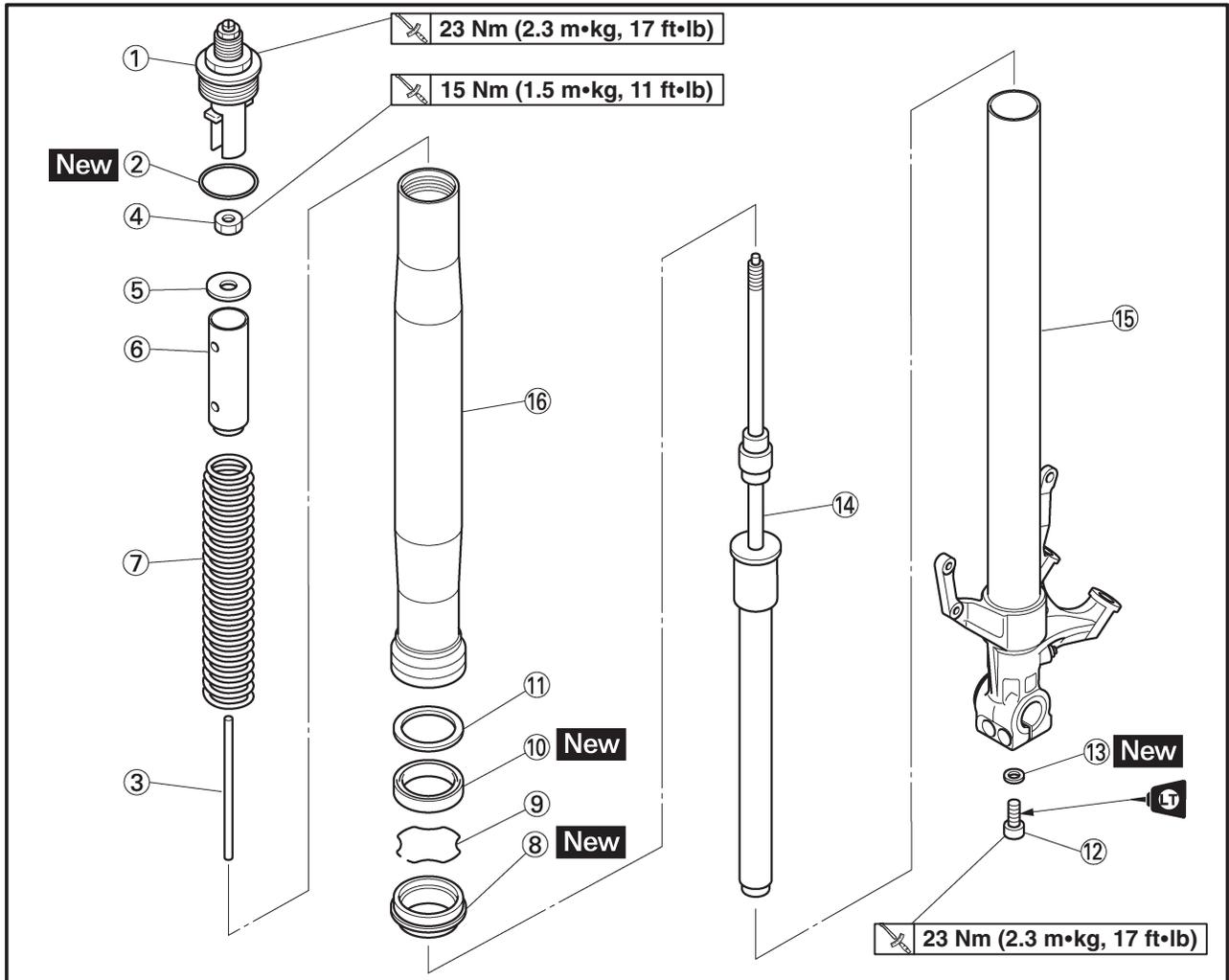


Order	Job/Part	Q'ty	Remarks
	Removing the front fork legs		Remove the parts in the order listed.
	Front wheel		Refer to "FRONT WHEEL AND BRAKE DISCS".
	Front brake calipers		Refer to "FRONT AND REAR BRAKES".
	Side cowlings		Refer to "COWLINGS" in chapter3.
1	Front fender	1	
2	Cap bolt	1	Loosen.
3	Handlebar pinch bolt	1	Loosen.
4	Upper bracket pinch bolt	1	Loosen.
5	Under bracket pinch bolt	2	Loosen.
6	Front fork leg	1	
			For installation, reverse the removal procedure.

EAS00648



Order	Job/Part	Q'ty	Remarks
	Disassembling the front fork legs		Disassemble the parts in the order listed. NOTE: _____ The following the procedure applies to both of the front fork legs.
①	Cap bolt	1	
②	O-ring	1	
③	Damper adjusting rod	1	
④	Nut	1	
⑤	Washer	1	
⑥	Spacer	1	
⑦	Fork spring	1	
⑧	Dust seal	1	
⑨	Oil seal clip	1	
⑩	Oil seal	1	



Order	Job/Part	Q'ty	Remarks
①	Washer	1	
②	Damper rod assembly bolt	1	
③	Copper washer	1	
④	Damper rod assembly	1	
⑤	Inner tube	1	
⑥	Outer tube	1	
			For assembly, reverse the disassembly procedure.



EAS00649

REMOVING THE FRONT FORK LEGS

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

1. Stand the motorcycle on a level surface.

⚠ WARNING

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

NOTE:

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

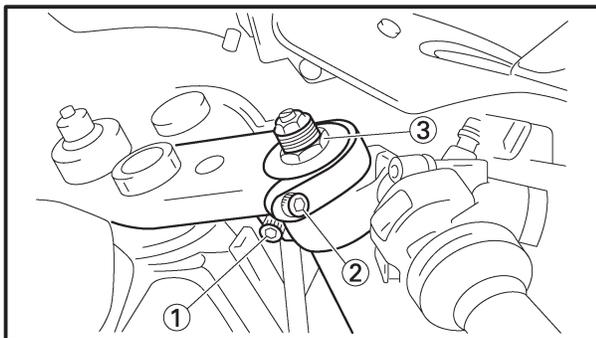
2. Remove

- front wheel
- front brake caliper

Refer to "FRONT WHEEL AND BRAKE DISCS".

3. Remove:

- Side Cowlings
Refer to "COWLINGS" in chapter 3.
- handlebar

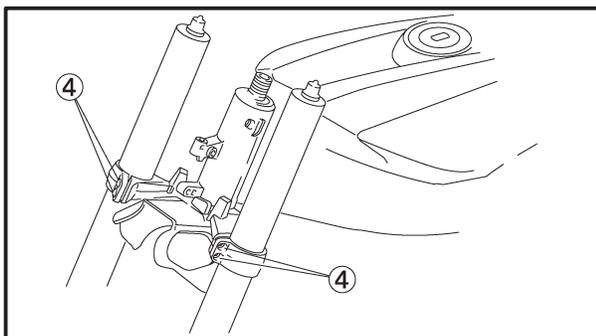


4. Loosen:

- handlebar pinch bolt ①
- upper bracket pinch bolt ②
- cap bolt ③
- under bracket pinch bolt ④

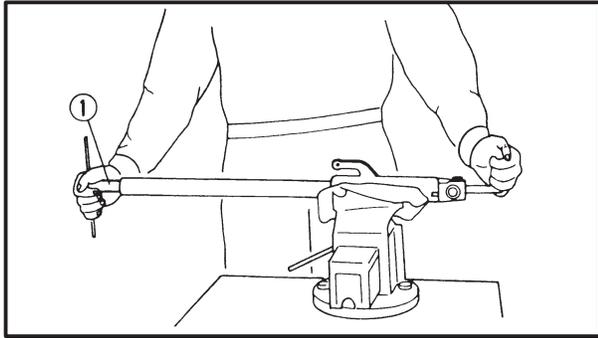
⚠ WARNING

Before loosening the upper and under bracket pinch bolts, support the front fork leg.



5. Remove:

- front fork leg



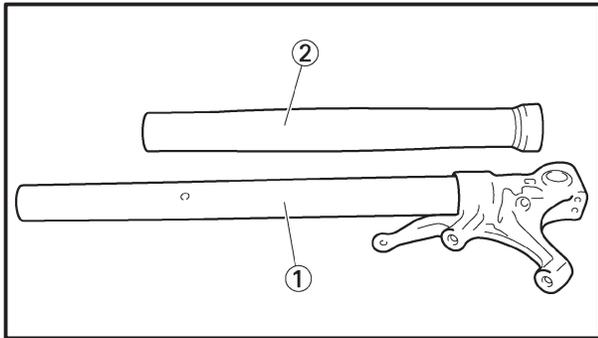
4. Remove:
- damper rod assembly bolt
 - damper rod assembly

NOTE:

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



Damper rod holder
90890-01423, YM-01423



EAS00656

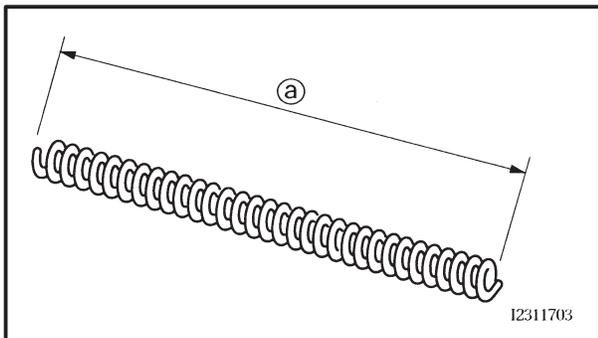
CHECKING THE FRONT FORK LEGS

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

1. Check:
- inner tube ①
 - outer tube ②
- Bends/damage/scratches → Replace.

⚠ WARNING

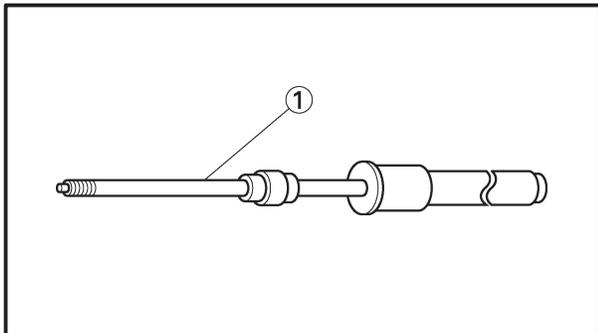
Do not attempt to straighten a bent inner tube as this may dangerously weaken it.



2. Measure:
- spring free length ①
- Out of specification → Replace.



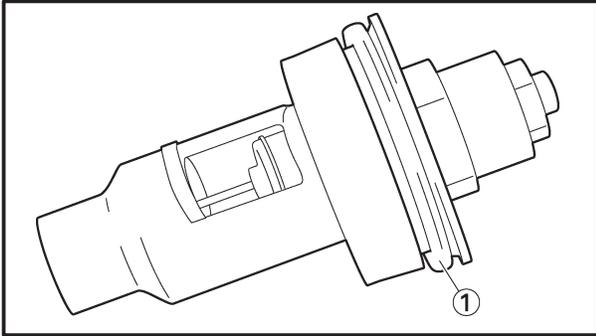
Spring free length
236.5 mm (9.31 in)
<Limit> : 231.8 mm (9.13 in)



3. Check:
- damper rod ①
- Damage/wear → Replace.
Obstruction → Blow out all of the oil passages with compressed air.
- damper rod adjusting rod
- Bends/damage → Replace.

**CAUTION:**

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



4. Check:
 - cap bolt O-ring ①
 - Damage/wear → Replace.

EAS00659

ASSEMBLING THE FRONT FORK LEGS

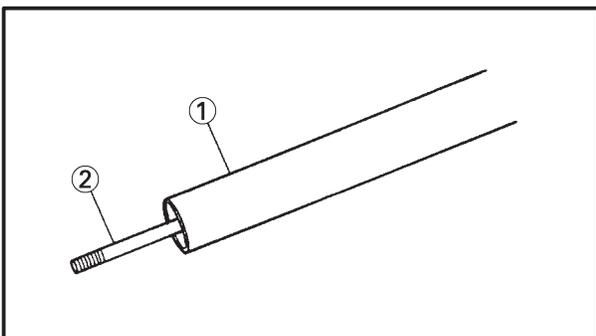
The following procedure applies to both of the front fork legs.

⚠ WARNING

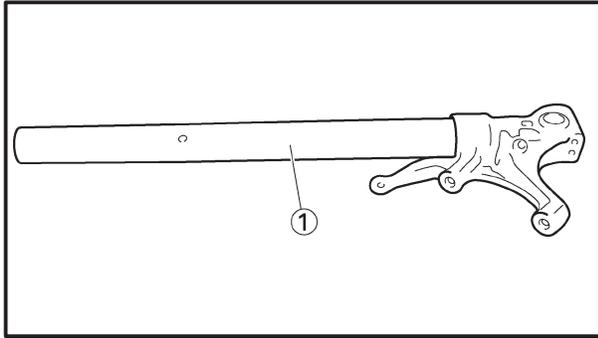
- Make sure the oil levels in both front fork legs are equal.
- Uneven oil levels can result in poor handling and a loss of stability.

NOTE:

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



1. Install:
 - inner tube ①
 - damper rod assembly ②
 - damper rod assembly bolt
 - copper washer **New**

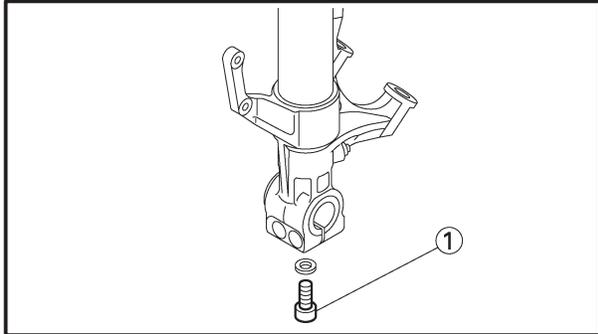


⚠ WARNING

Always use new copper washer.

CAUTION:

Allow the damper rod assembly (1) to slide slowly down the inner tube (1) until it protrudes from the bottom of the inner tube. Be careful not to damage the inner tube.



2. Lubricate:
- inner tube's outer surface

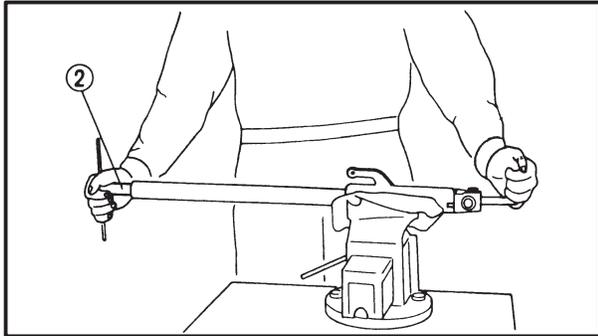
	Recommended lubricant Suspension oil "01" or equivalent
--	---

3. Tighten:
- damper rod assembly bolt (1)

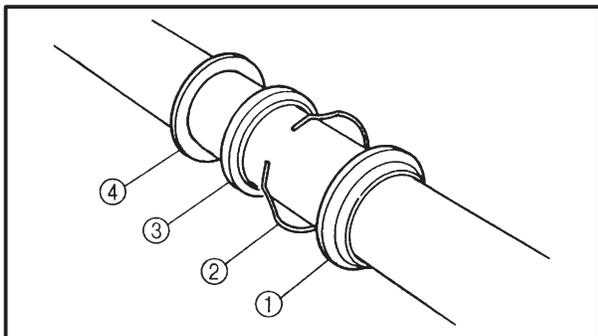
23 Nm (2.3 m•kg, 17 ft•lb)
LOCTITE®

NOTE:

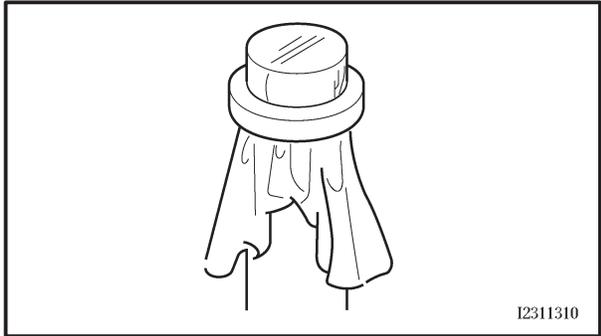
While holding the damper rod assembly with the damper rod holder (2), tighten the damper rod assembly bolt.



	Damper rod holder 90890-01423, YM-01423
--	---



4. Install:
- dust seal (1)
 - oil seal clip (2)
 - oil seal (3)
 - washer (4)

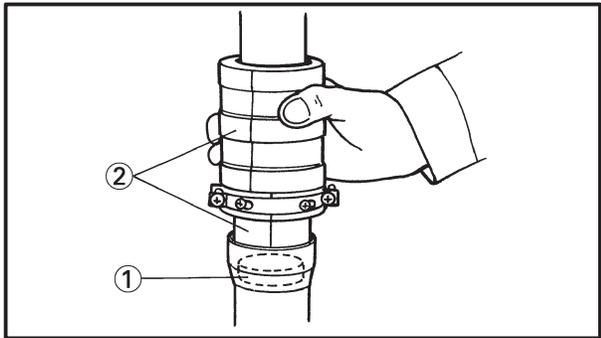


CAUTION: _____

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

NOTE: _____

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

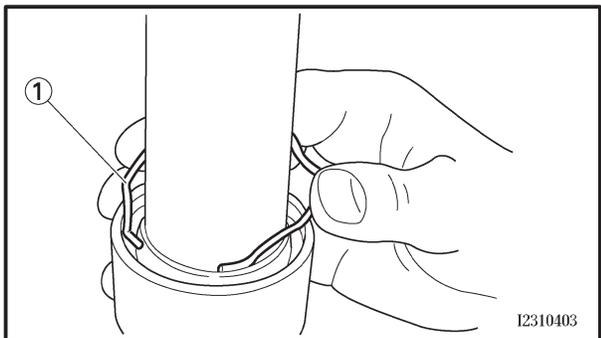


5. Install :

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



Fork seal driver
90890-01442, YM-01442

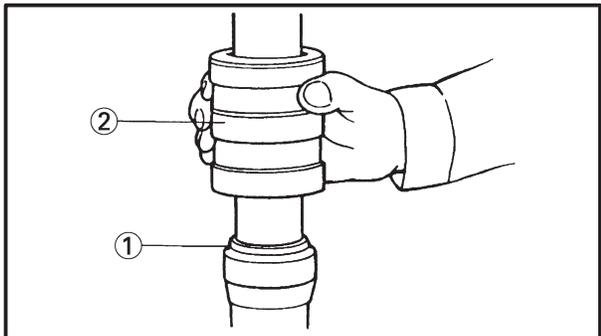


6. Install:

- oil seal clip ①

NOTE: _____

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

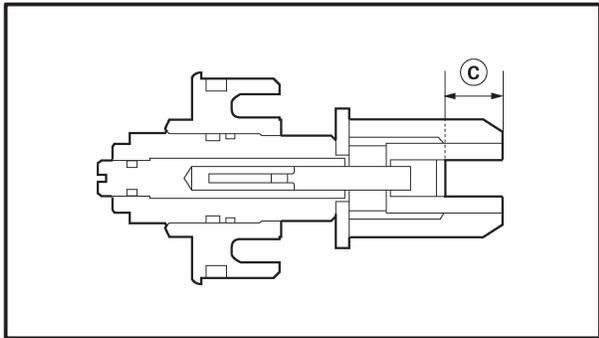
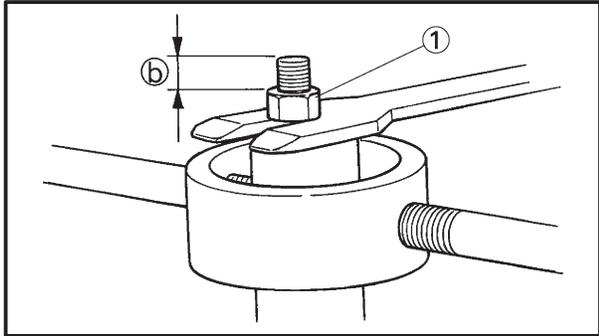
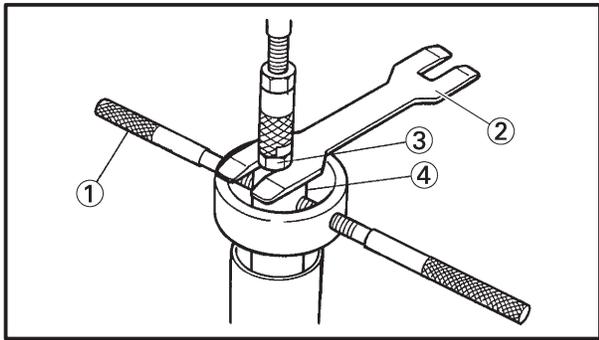


7. Install:

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



Fork seal driver
90890-01442m YM-01442



- d. Press down on the spacer with the fork spring compressor (1).
- e. Pull up the rod puller and install the rod holder (2) between the nut (3) and the spacer (4).

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

	Fork spring compressor 90890-01441, YM-01441
	Rod holder 90890-01434, YM-01434

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

	Distance (b) 11 mm (0.43 in)
---	--

- h. Set the cap bolt distance (c) to specification.

	Distance (c) 13 mm (0.51 in)
---	--

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

	Nut 15 Nm (1.5 m•kg, 11 ft•lb)
---	--

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

⚠ WARNING _____

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



EAS00662

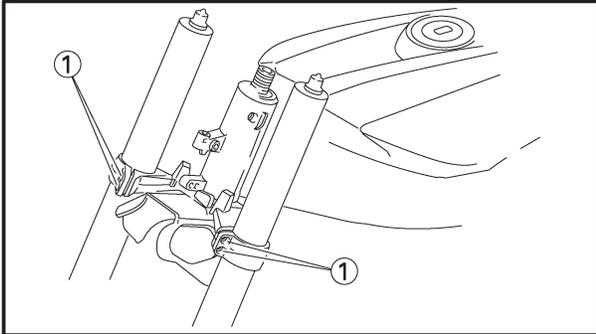
INSTALLING THE FRONT FORK LEGS

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

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

NOTE: _____

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



2. Tighten:

- under bracket pinch bolt ①

	23 Nm (2.3 m•kg, 17 ft•lb)
---	----------------------------
- cap bolt ②

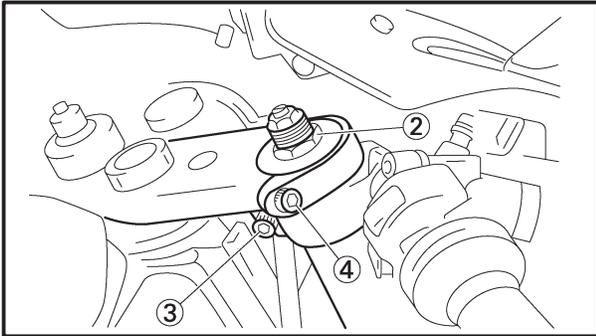
	23 Nm (2.3 m•kg, 17 ft•lb)
---	----------------------------
- handlebar pinch bolt ③

	17 Nm (1.7 m•kg, 12 ft•lb)
---	----------------------------
- upper bracket pinch bolt ④

	26 Nm (2.6 m•kg, 19 ft•lb)
---	----------------------------

⚠ WARNING _____

Make sure the brake hoses are routed properly.

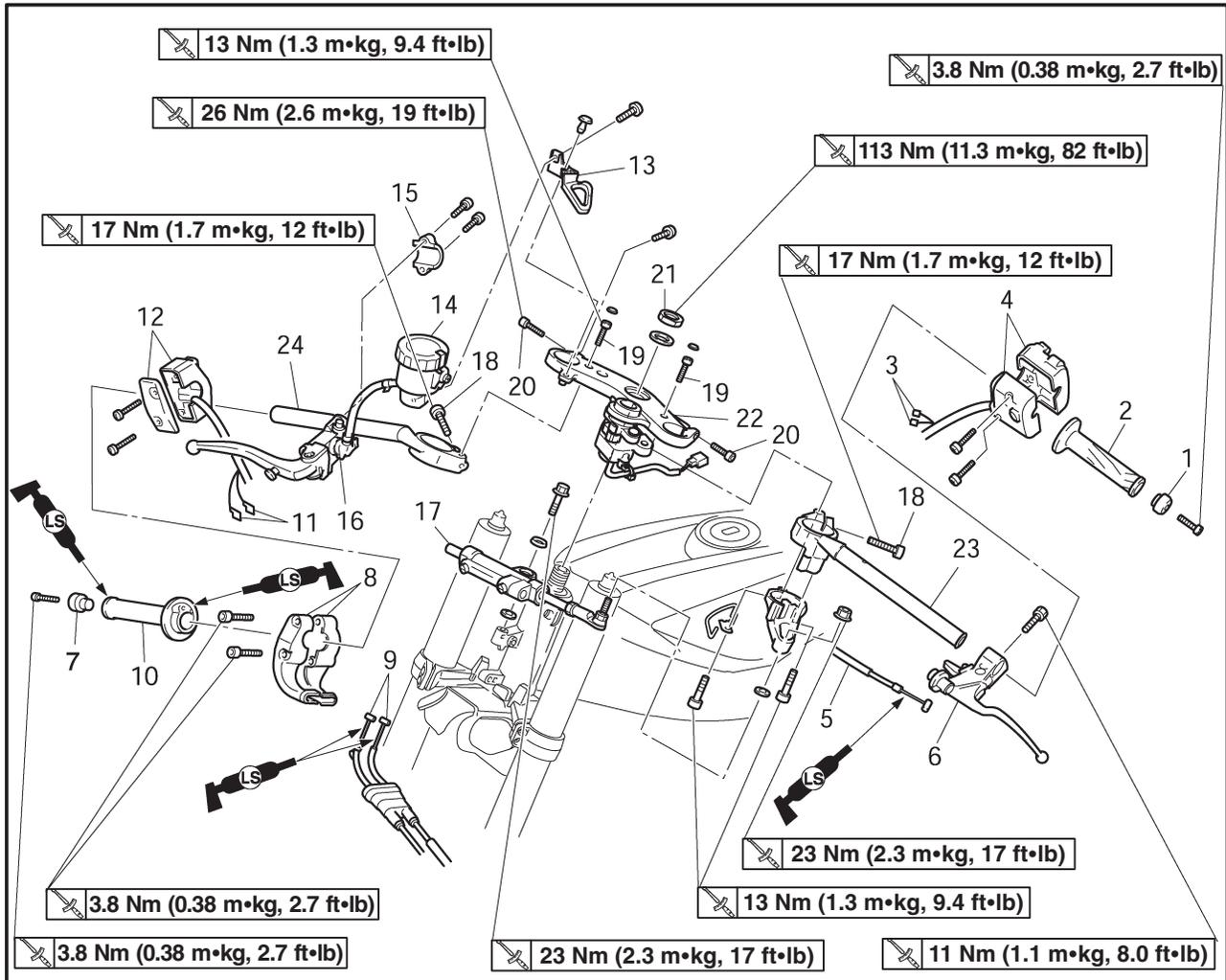


3. Adjust:

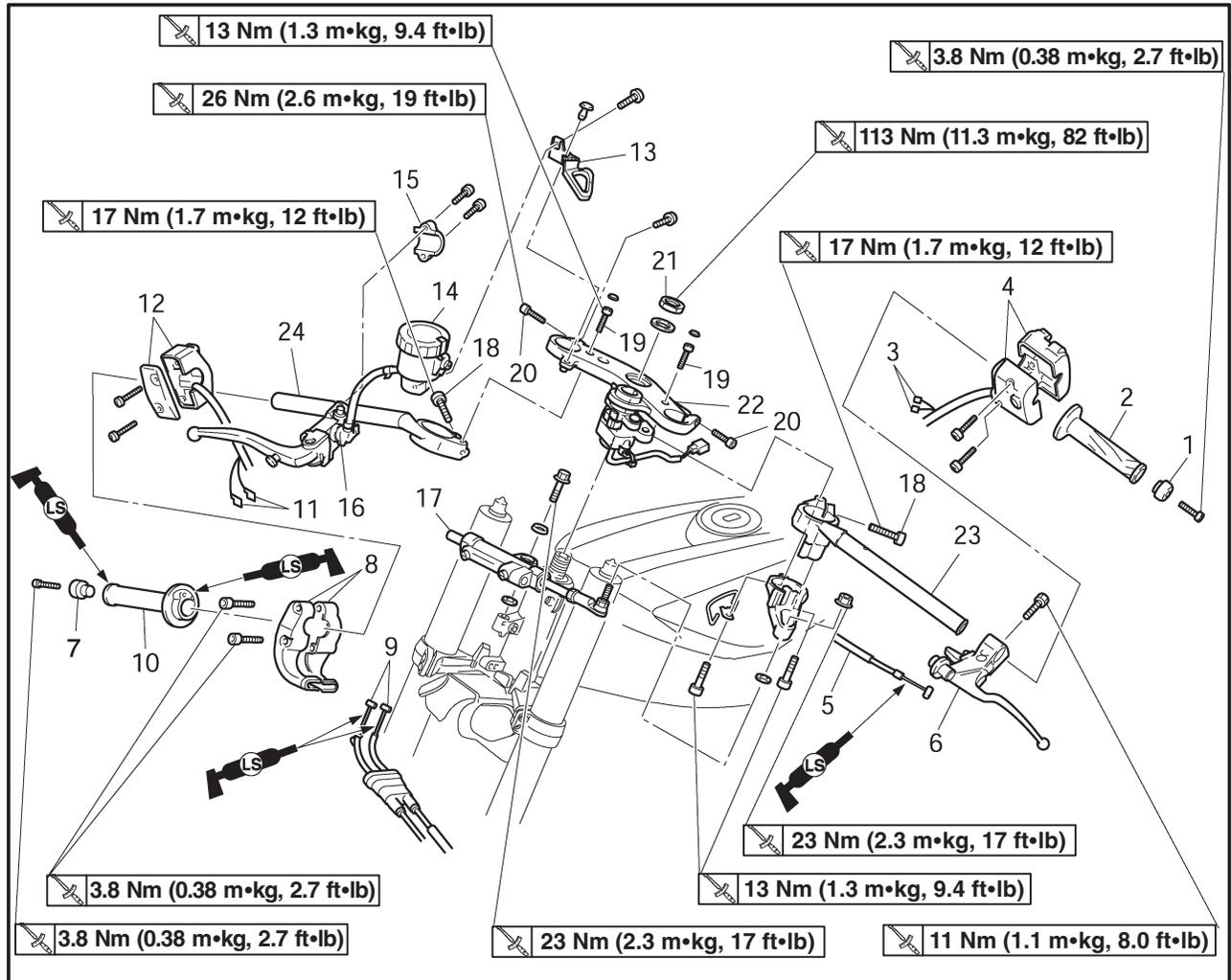
- spring preload
 - rebound damping
 - compression damping
- Refer to “ADJUSTING THE FRONT FORK LEGS” in chapter 3.

EAS00665

HANDLEBARS



Order	Job/Part	Q'ty	Remarks
	Removing the handlebars		Remove the parts in the order listed. Refer to "COWLINGS" in chapter 3.
1	Front cowling and side cowling		
1	Left grip end	1	
1	Handlebar grip	1	
2	Clutch switch connector	2	Disconnect.
1	Left handlebar switch	1	
1	Clutch cable	1	
1	Clutch lever	1	
1	Right grip end	1	
1	Throttle cable housing	1	
2	Throttle cable	2	
1	Throttle grip	1	
2	Front brake light switch connector	2	Disconnect.
1	Right handlebar switch	1	
1	Clutch cable holder	1	
1	Brake fluid reservoir tank	1	
1	Brake master cylinder bracket	1	



Order	Job/Part	Q'ty	Remarks
16	Brake master cylinder	1	For assembly, reverse the disassembly procedure.
17	Steering damper	1	
18	Handlebar pinch bolt	2	
19	Upper bracket bolt	2	
20	Upper bracket pinch bolt	2	
21	Steering stem nut	1	
22	Upper bracket	1	
23	Left handlebar	1	
24	Right handlebar	1	



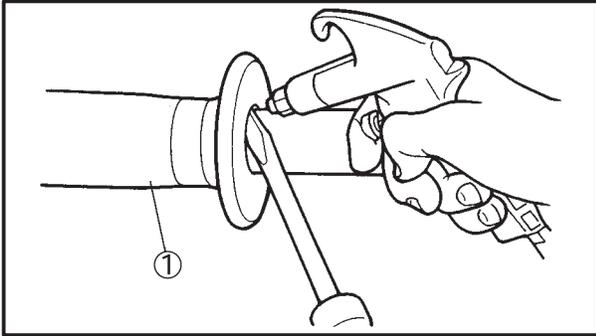
EAS00667

REMOVING THE HANDLEBARS

1. Stand the motorcycle on a level surface.

⚠ WARNING

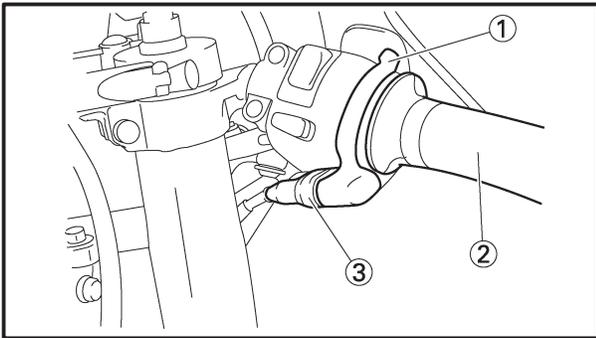
Securely support the motorcycle so that there is no danger of it falling over.



2. Remove:
• handlebar grip ①

NOTE:

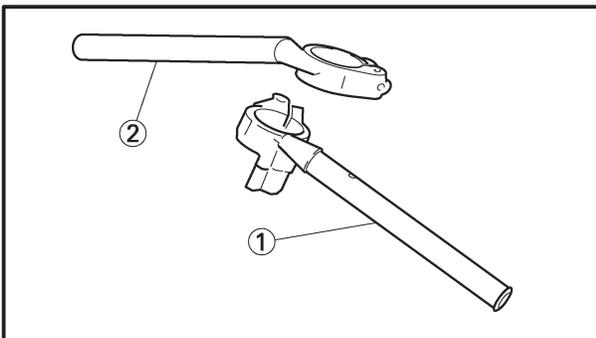
Blow compressed air between the left handlebar and the handlebar grip, and gradually push the grip off the handlebar.



3. Remove:
• throttle cable housing ①
• throttle grip ②

NOTE:

While removing the throttle cable housing, pull back the rubber cover ③.



EAS00669

CHECKING THE HANDLEBARS

1. Check:
• left handlebar ①
• right handlebar ②
Bends/cracks/damage → Replace.

⚠ WARNING

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

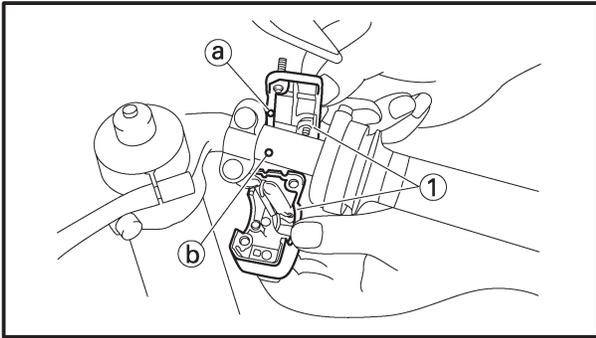
EAS00674

INSTALLING THE HANDLEBARS

1. Stand the motorcycle on a level surface.

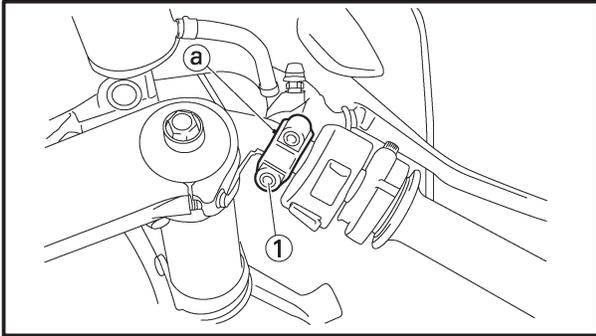
⚠ WARNING

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



2. Install:
- right handlebar switch ①

NOTE: _____
Align the projection (a) on the right handlebar switch with the hole (b) in the right handlebar.

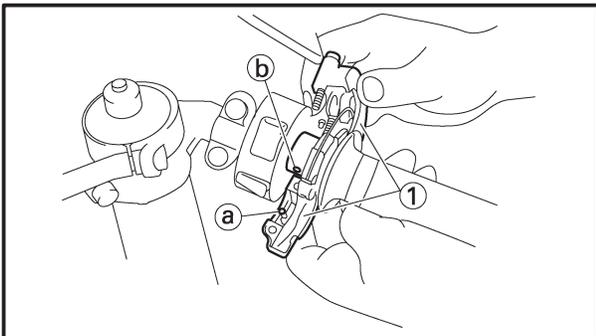


3. Install:
- brake master cylinder holder ①

CAUTION: _____

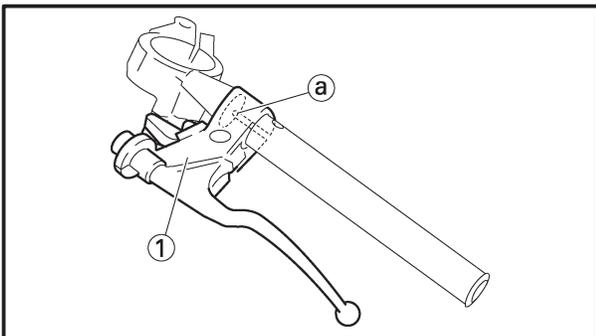
- Install the brake master cylinder holder with the “UP” mark facing up.
 - First, tighten the upper bolt, then the lower bolt.
-

NOTE: _____
• Align the mating surfaces of the brake master cylinder holder with the punch mark (a) in the right handlebar.
• There should be 2 mm (0.08 in) of clearance between the right handlebar switch and the brake master cylinder holder.



4. Install:
- throttle grip
 - throttle cable housing ①
 - throttle cables

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

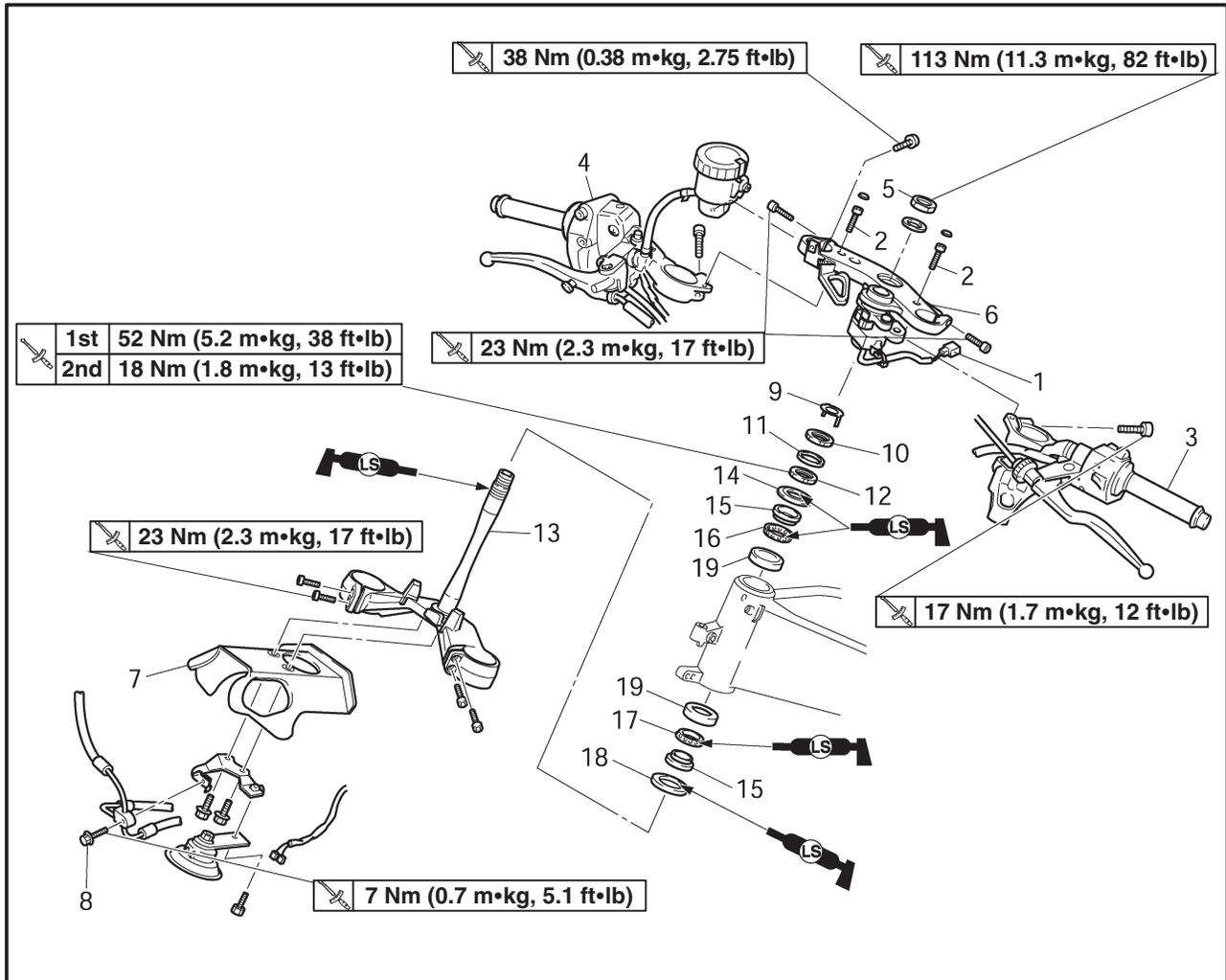


5. Install:
- clutch lever holder ①

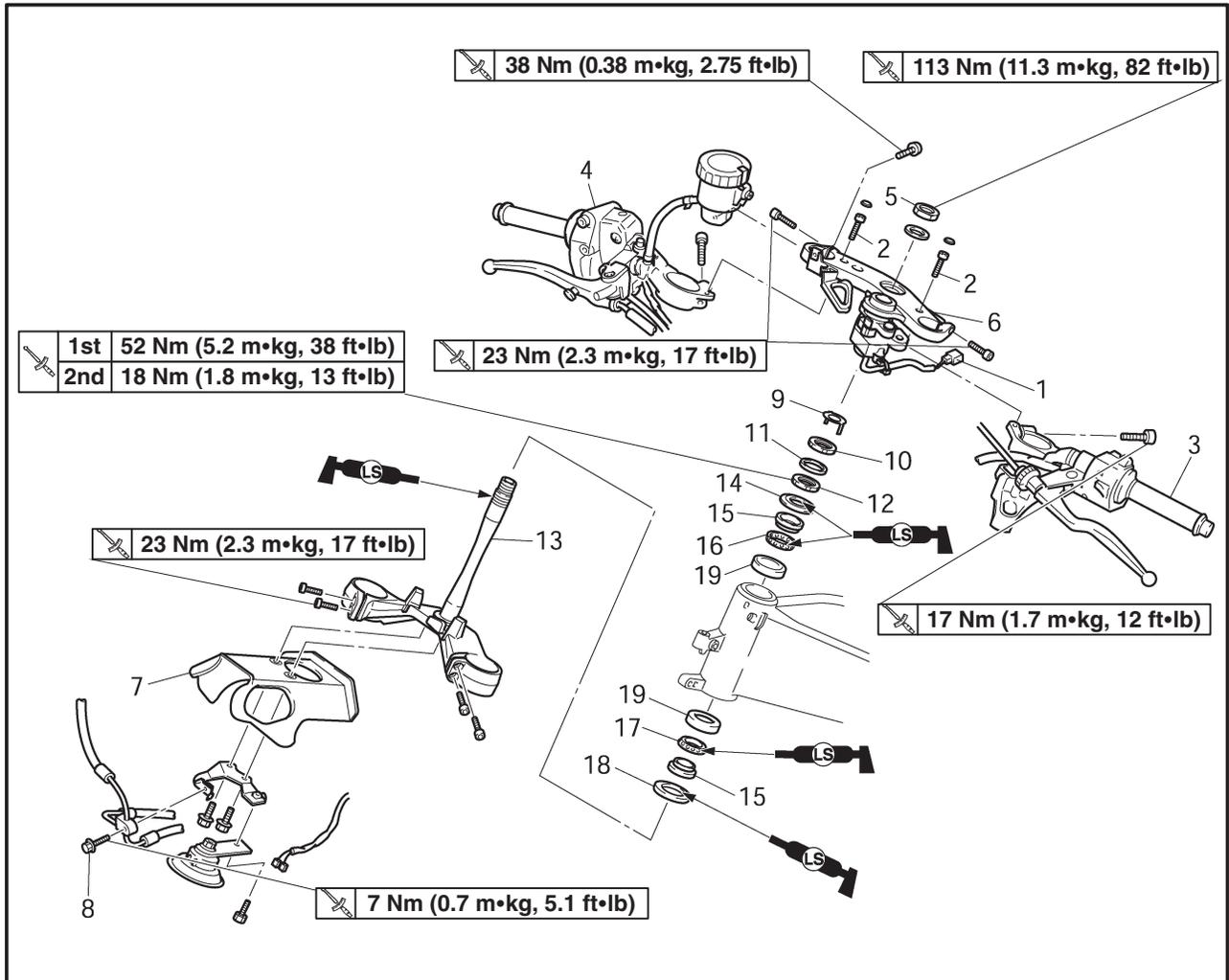
NOTE: _____
Align the slit in the clutch lever holder with the punch mark (a) in the left handlebar.

EAS00676

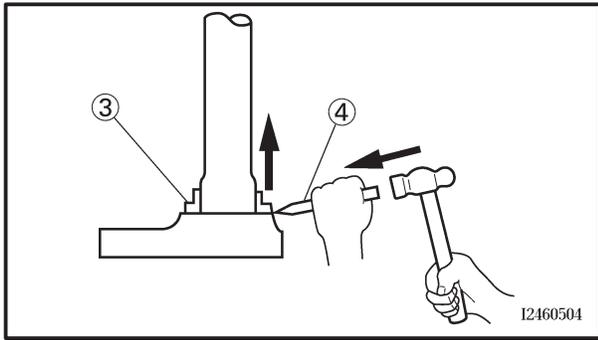
**STEERING HEAD
UNDER BRACKET**



Order	Job/Part	Q'ty	Remarks
	Removing the under bracket		
	Front wheel		Remove the parts in the order listed. Refer to "FRONT WHEEL AND BRAKE DISCS".
	Front cowling and side cowling		Refer to "COWLINGS" in chapter 3.
	Front fork legs		Refer to "FRONT FORK".
1	Main switch connector	2	Disconnect.
2	Upper bracket bolt	2	
3	Left handlebar assembly	1	
4	Right handlebar assembly	1	
5	Steering stem nut	1	
6	Upper bracket	1	
7	Under bracket panel	1	
8	Brake hose holder bolt	1	
9	Lock washer	1	
10	Upper ring nut	1	
			For installation, reverse the removal procedure.



Order	Job/Part	Q'ty	Remarks
11	Rubber washer	1	
12	Lower ring nut	1	
13	Under bracket	1	
14	Bearing cover	1	
15	Bearing inner race	2	
16	Upper bearing	1	
17	Lower bearing	1	
18	Dust seal	1	
19	Bearing outer race	2	
			For assembly, reverse the disassembly procedure.



- b. Remove the bearing race (3) from the lower bracket with a floor chisel (4) and hammer.
- c. Install a new rubber seal and new bearing races.

CAUTION: _____

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

NOTE: _____

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



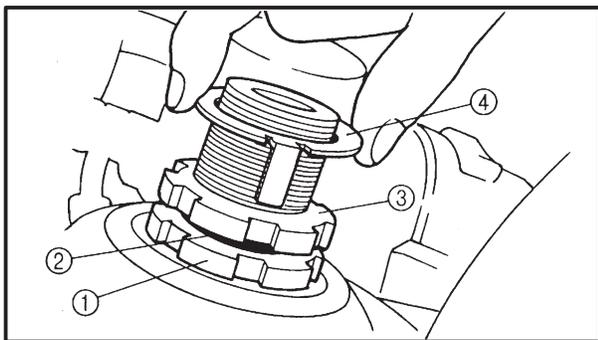
- 4. Check:
 - upper bracket
 - lower bracket (along with the steering stem)
 - Bends/cracks/damage → Replace.

EAS00683

INSTALLING THE STEERING HEAD

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

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



- 2. Install:
 - lower ring nut (1)
 - rubber washer (2)
 - upper ring nut (3)
 - lock washer (4)

Refer to “CHECKING THE STEERING HEAD” in chapter 3.
- 3. Install:
 - upper bracket
 - steering stem nut

NOTE: _____

Temporarily tighten the steering stem nut.

- 4. Install:
 - front fork legs

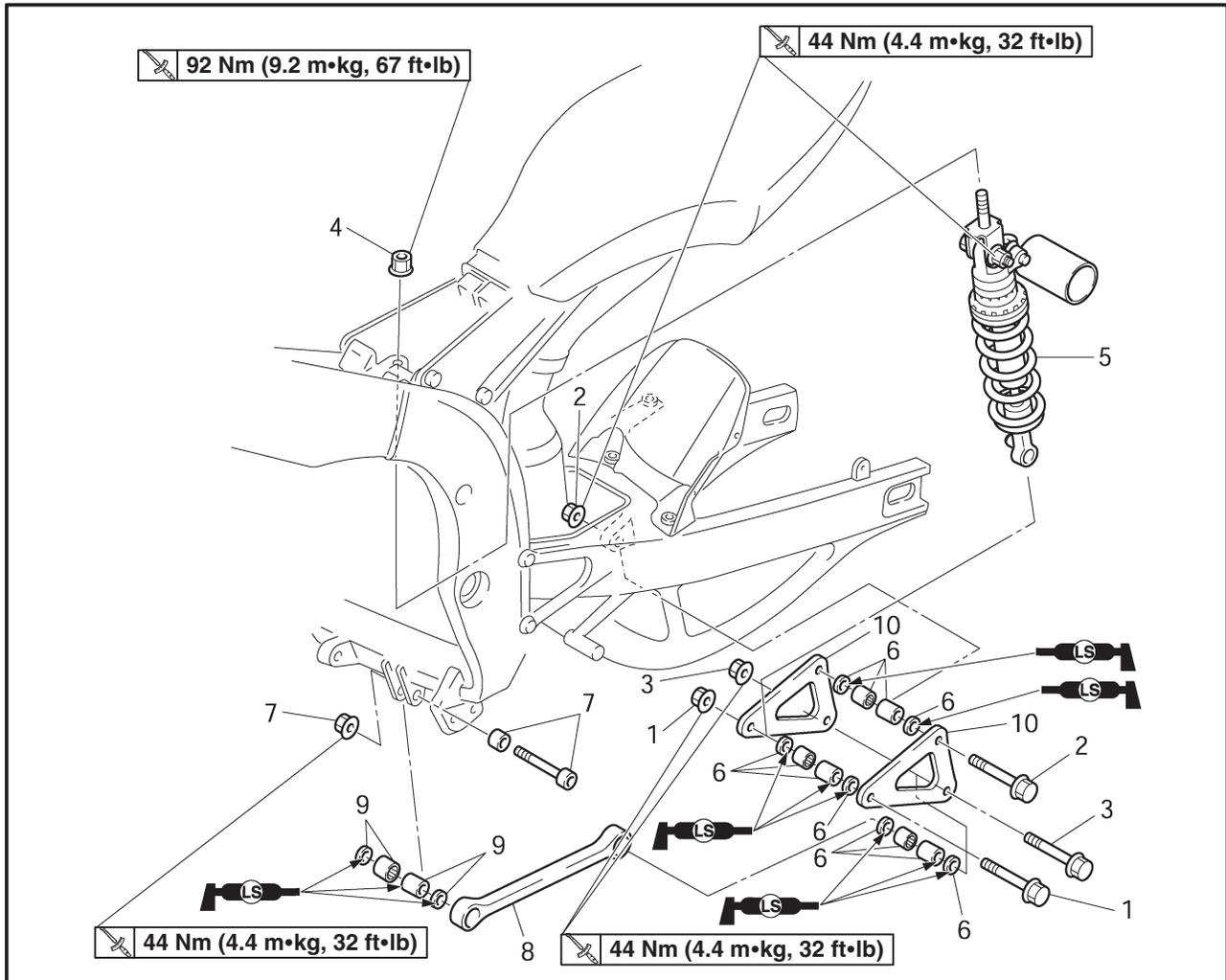
Refer to “INSTALLING THE FRONT FORK LEGS”.

NOTE: _____

Temporarily tighten the upper and lower bracket pinch bolts.

EAS00685

REAR SHOCK ABSORBER ASSEMBLY



Order	Job/Part	Q'ty	Remarks
	Removing the rear shock absorber assembly		Remove the parts in the order listed.
	EXUP servo motor		Refer to "EXHAUST PIPE" in chapter 5.
1	Self-locking nut/bolt	1/1	
2	Self-locking nut/bolt	1/1	
3	Self-locking nut/bolt	1/1	
4	Self-locking nut	1	
5	Rear shock absorber assembly	1	
6	Oil seal/bearing/collar	6/3/3	
7	Collar/self-locking nut/bolt	1/1/1	
8	Connecting arm	2	
9	Oil seal/bearing/collar	2/1/1	
10	Relay arm	1	
			For installation, reverse the removal procedure.

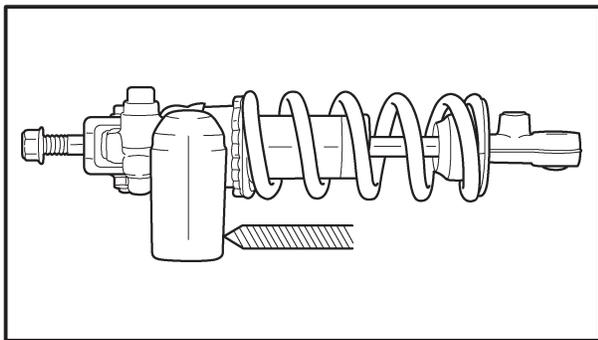
EAS00687

HANDLING THE REAR SHOCK ABSORBER AND GAS CYLINDER

⚠ WARNING

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

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



EAS00689

DISPOSING OF A REAR SHOCK ABSORBER AND GAS CYLINDER

Gas pressure must be released before disposing of a rear shock absorber and gas cylinder. To release the gas pressure, drill a 2 ~ 3 mm (0.08 ~ 0.12 in) hole through the gas cylinder at a point 15 ~ 20 mm (0.59 ~ 0.79 in) from its end as shown.

⚠ WARNING

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

EAS00690

REMOVING THE REAR SHOCK ABSORBER ASSEMBLY

1. Stand the motorcycle on a level surface.

⚠ WARNING

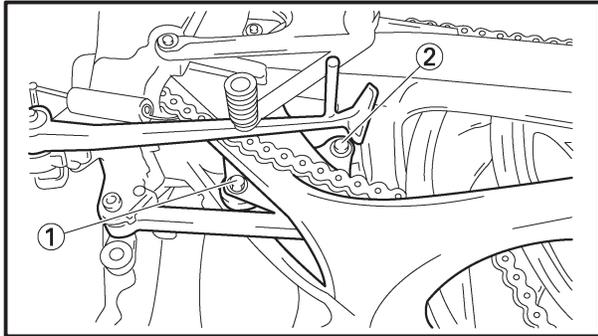
Securely support the motorcycle so that there is no danger of it falling over.

NOTE:

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

2. Remove:

- bottom cowling
Refer to "COWLINGS" in chapter 3.
- servo motor
Refer to "EXHAUST PIPE" in chapter 5.

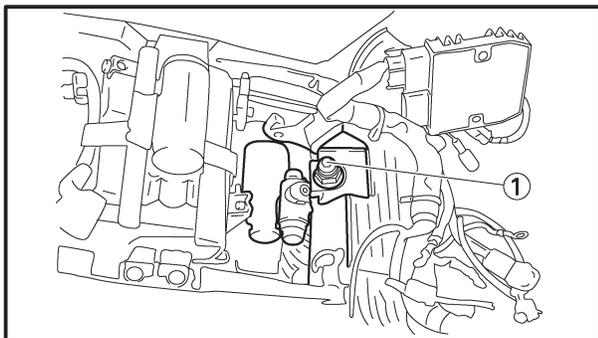


3. Remove:

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

NOTE:

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

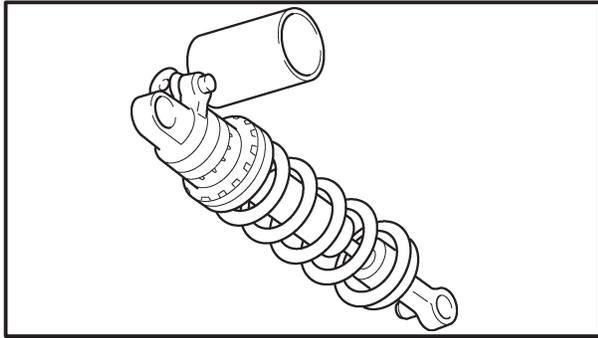


4. Remove:

- rear shock absorber assembly upper bolt ①
- rear shock absorber assembly

NOTE:

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



EAS00695

CHECKING THE REAR SHOCK ABSORBER ASSEMBLY

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

EAS00698

INSTALLING THE REAR SHOCK ABSORBER ASSEMBLY

1. Lubricate:
 - spacers
 - bearings

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

2. Install:
 - rear shock absorber assembly

NOTE:

- When installing the rear shock absorber assembly, lift up the swingarm.
- Install the connecting arm front bolt from the right.

3. Tighten:

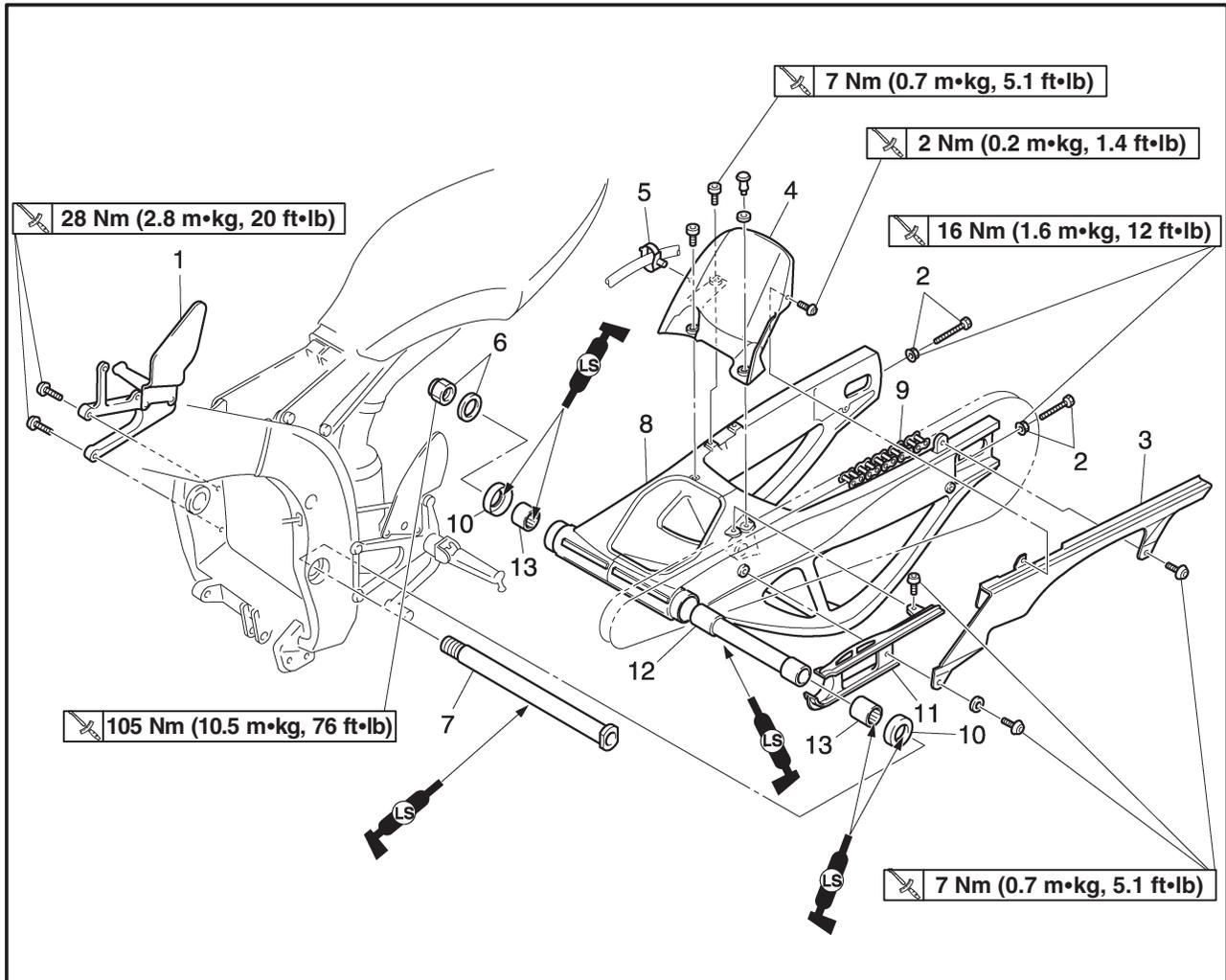
- rear shock absorber assembly upper nut
 **44 Nm (4.4 m•kg, 32 ft•lb)**
- rear shock absorber assembly lower nut
 **44 Nm (4.4 m•kg, 32 ft•lb)**
- relay arm-to swingarm nut
 **44 Nm (4.4 m•kg, 32 ft•lb)**

4. Install :

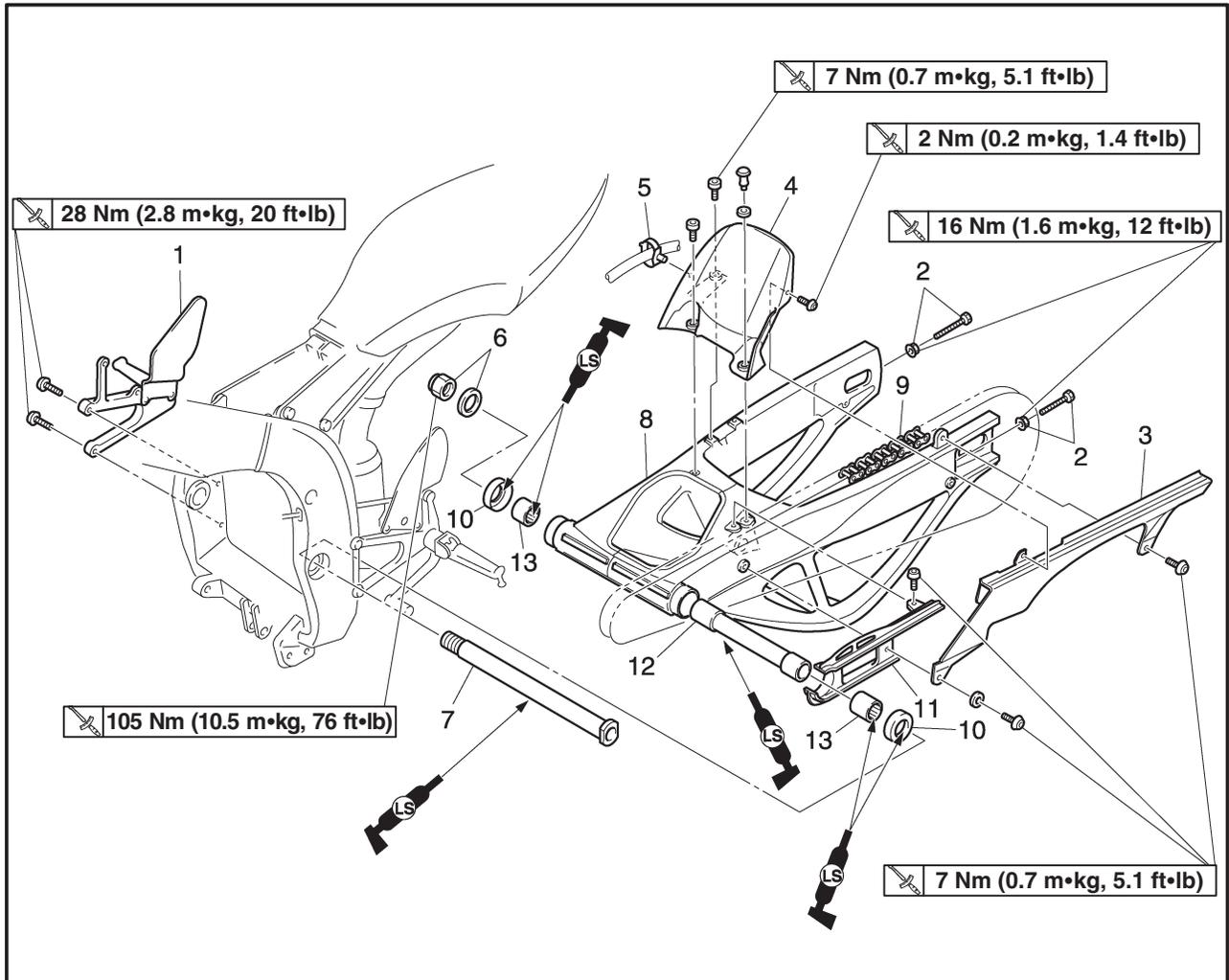
- EXUP servo motor
Refer to “EXHAUST PIPE” in chapter 5.
- bottom cowling
Refer to “COWLINGS” in chapter 3.

EAS00700

SWINGARM AND DRIVE CHAIN



Order	Job/Part	Q'ty	Remarks
	Removing the swingarm and drive chain		Remove the parts in the order listed.
	Rear wheel		Refer to "REAR WHEEL AND BRAKE DISC".
	Rear shock absorber		Refer to "REAR SHOCK ABSORBER ASSEMBLY".
	Drive sprocket		Refer to "ENGINE REMOVAL" in chapter 5.
	Muffler		Refer to "EXHAUST PIPE" in chapter 5.
	Catalyst pipe assembly		Refer to "EXHAUST PIPE" in chapter 5.
1	Right footrest bracket	1	
2	Adjusting bolt/locknut	2/2	
3	Drive chain guard	1	
4	Rear fender	1	
5	Brake hose holder	1	
6	Pivot shaft nut/washer	1/1	
7	Pivot shaft	1	



Order	Job/Part	Q'ty	Remarks
8	Swingarm	1	For installation, reverse the removal procedure.
9	Drive chain	1	
10	Dust cover	2	
11	Drive chain guide	1	
12	Spacer	1	
13	Bearing	2	

EAS00704

REMOVING THE DRIVE CHAIN

1. Stand the motorcycle on a level surface.

⚠ WARNING _____

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

NOTE: _____

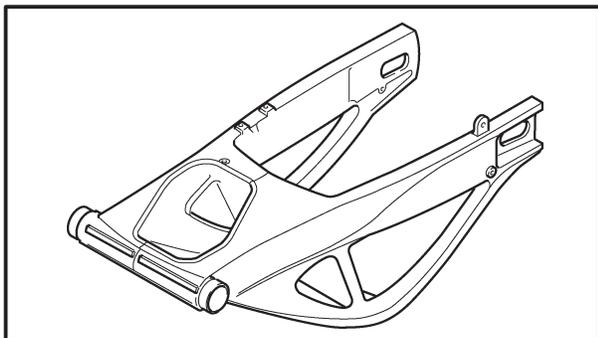
Place the motorcycle on a suitable stand so that the rear wheel is elevated.

2. Remove:

- drive chain
(with the drive chain cutter)

NOTE: _____

Only cut the drive chain if it or the swingarm is to be replaced.



EAS00707

CHECKING THE SWINGARM

1. Check:

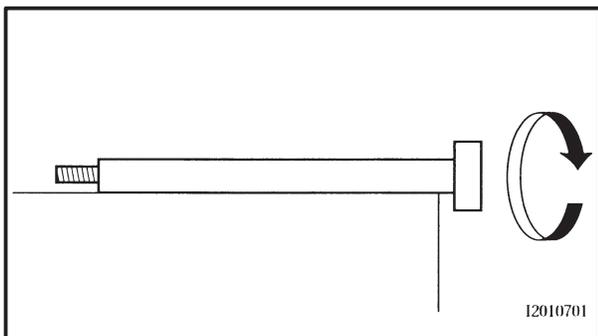
- swingarm
Bends/cracks/damage → Replace.

2. Check:

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

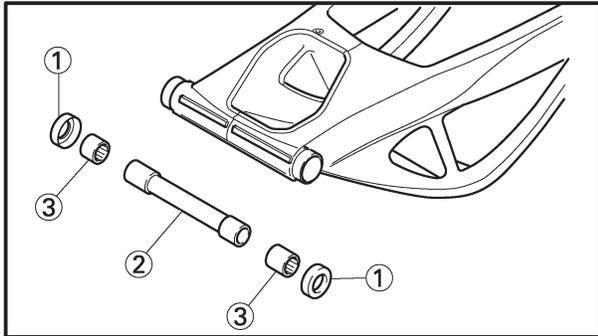
⚠ WARNING _____

Do not attempt to straighten a bent pivot shaft.

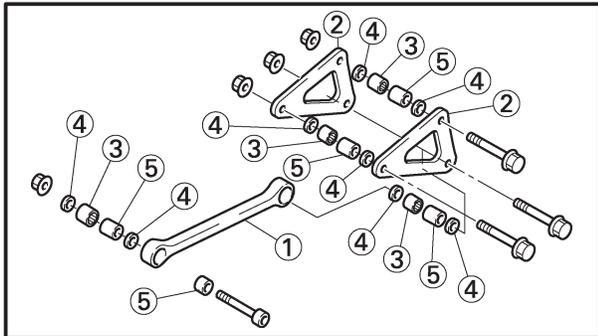


3. Wash:
- pivot shaft
 - dust covers
 - spacer
 - washers
 - bearings

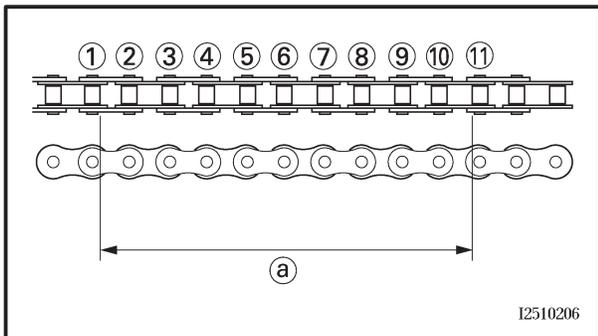
	Recommended cleaning solvent Kerosene
---	--



4. Check:
- dust covers ①
 - spacer ②
 - Damage/wear → Replace.
 - bearings ③
 - Damage/pitting → Replace.



5. Check:
- connecting arms ①
 - relay arm ②
 - Damage/wear → Replace.
6. Check:
- bearings ③
 - oil seals ④
 - Damage/pitting → Replace.
7. Check:
- collars ⑤
 - Damage/scratches → Replace.



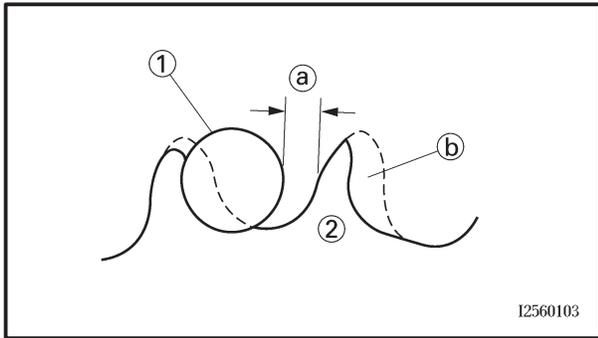
EAS00709

CHECKING THE DRIVE CHAIN

1. Measure:
- ten-link section (a) of the drive chain
 - Out of specification → Replace the drive chain.

	Ten-link drive chain section limit (maximum) 150.1 mm (5.91 in)
---	--

- NOTE:** _____
- While measuring the ten-link section, push down on the drive chain to increase its tension.
 - Measure the length between drive chain roller ① and ⑪ as shown.
 - Perform this measurement at two or three different places.



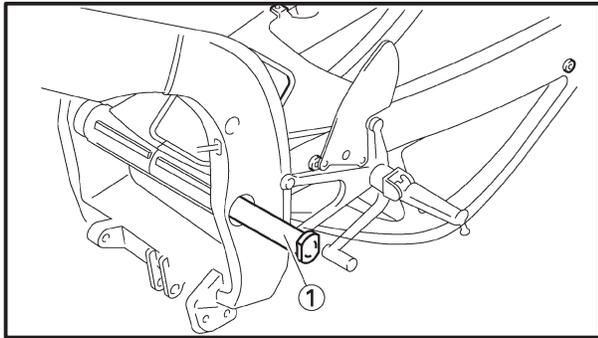
6. Check:
- drive sprocket
 - rear wheel sprocket
- More than 1/4 tooth (a) wear → Replace the drive chain sprockets as a set.
 Bent teeth → Replace the drive chain sprockets as a set.
- (b) Correct
 - (1) Drive chain roller
 - (2) Drive chain sprocket

EAS00711

INSTALLING THE SWINGARM

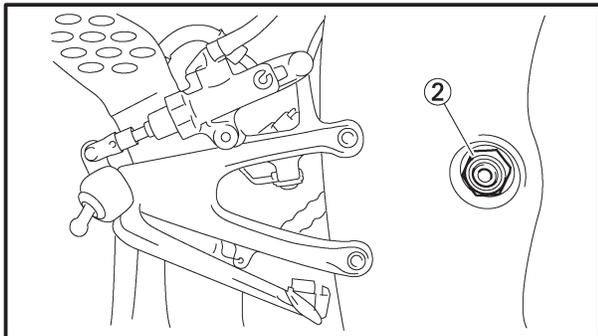
1. Lubricate:
- bearings
 - spacers
 - dust covers
 - pivot shaft

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



2. Install:
- swingarm
 - pivot shaft (1)
 - pivot shaft nut (2)

3. Install:
- rear shock absorber assembly
 - rear wheel
- Refer to “INSTALLING THE REAR SHOCK ABSORBER ASSEMBLY” and “INSTALLING THE REAR WHEEL”.

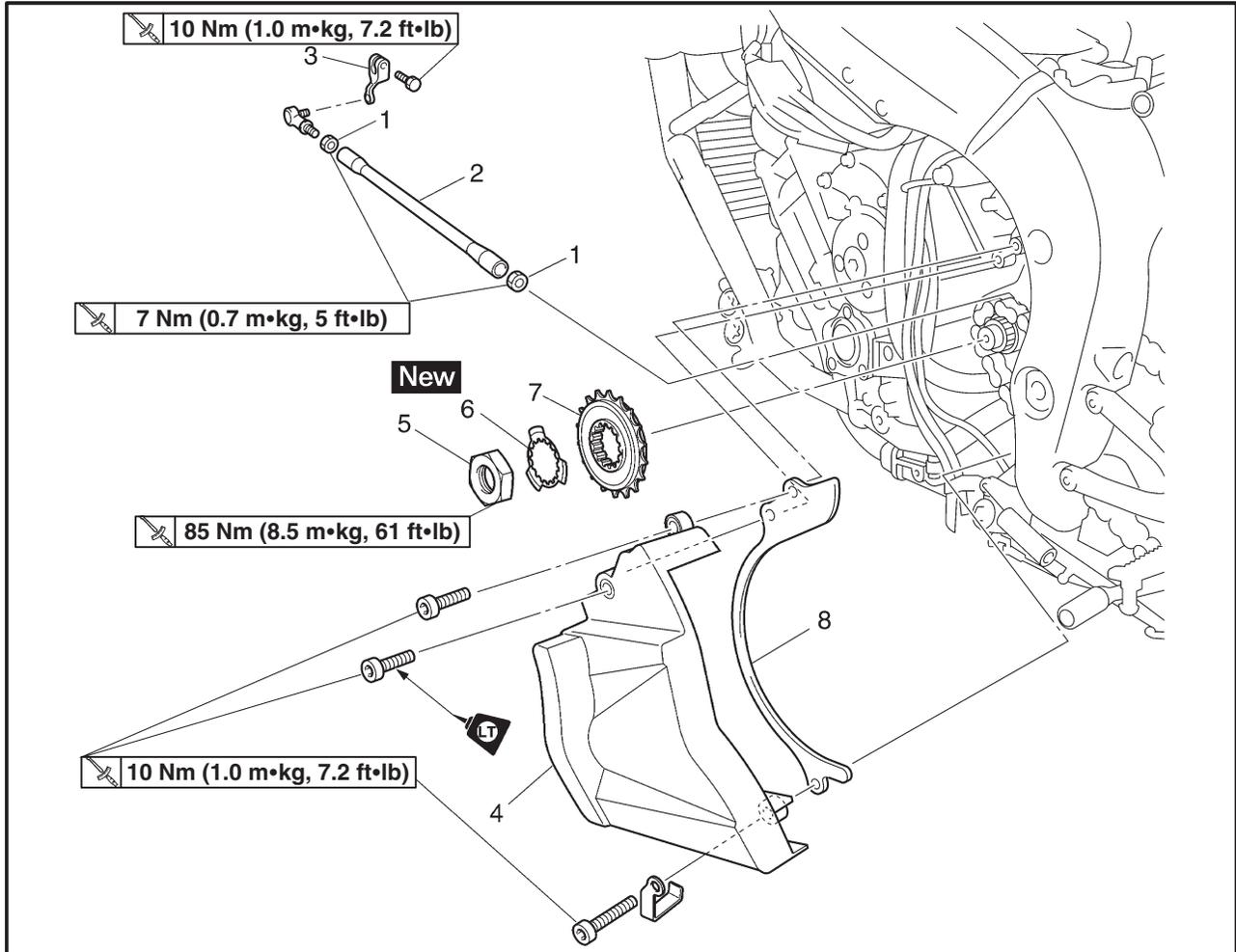


4. Adjust:
- drive chain slack
- Refer to “ADJUSTING THE DRIVE CHAIN SLACK” in chapter 3.

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

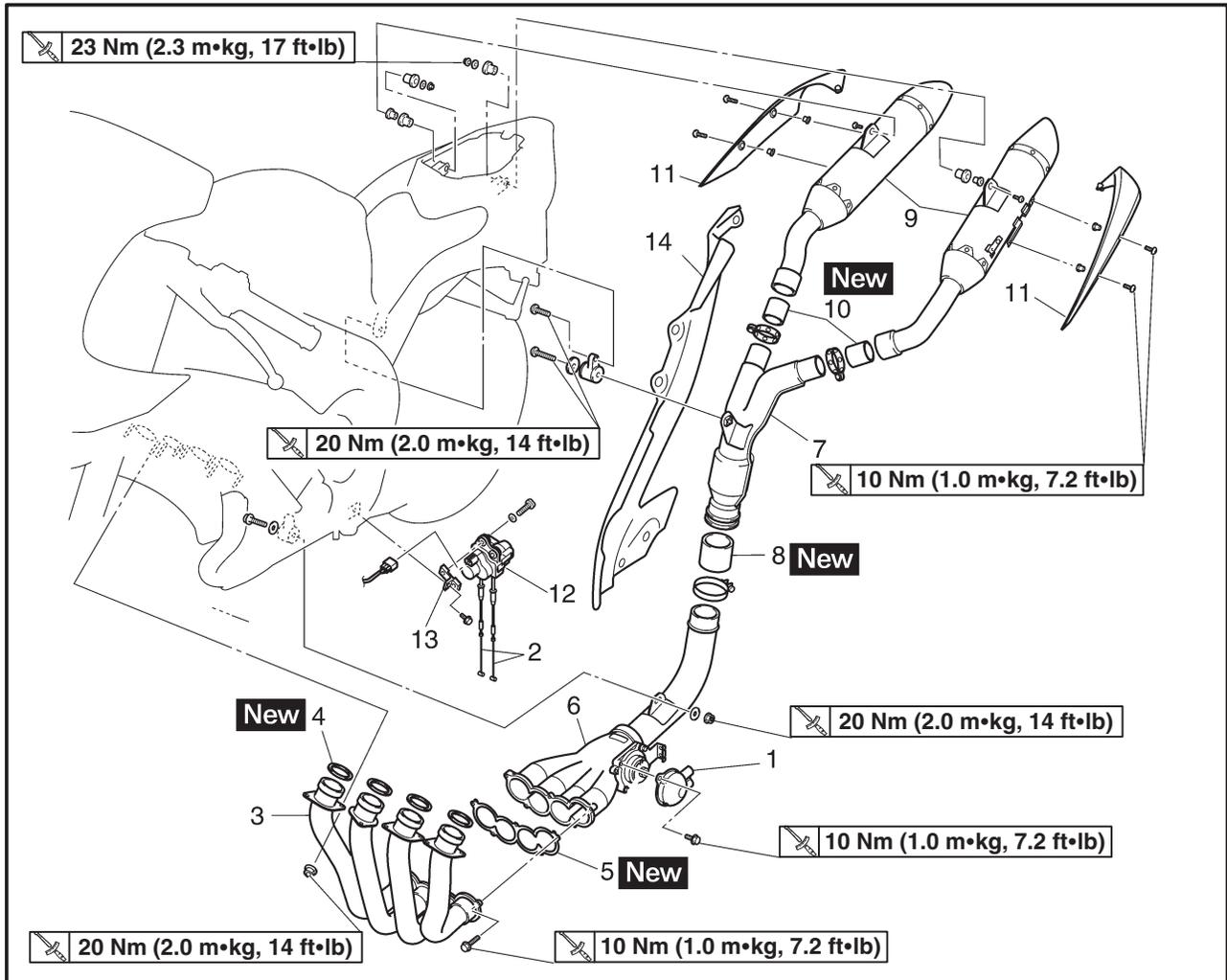
ENGINE

ENGINE
DRIVE SPROCKET



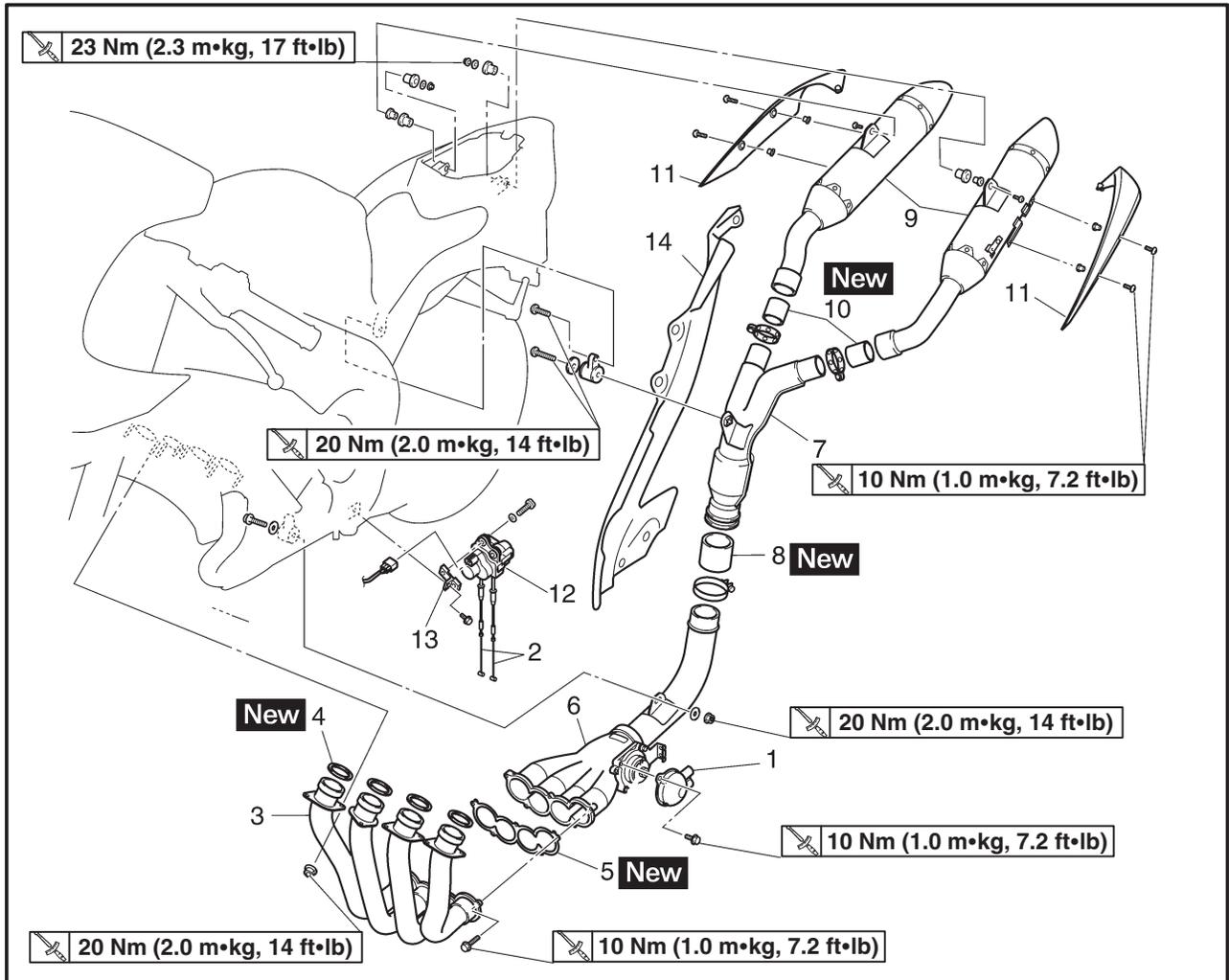
Order	Job/Part	Q'ty	Remarks
	Removing the drive sprocket		
	Bottom cowlings		Remove the parts in the order listed. Refer to "COWLINGS" in chapter 3.
1	Lock nut	2	Loosen.
2	Shift rod	1	
3	Sift arm	1	
4	Drive sprocket cover	1	
5	Drive sprocket nut	1	
6	Lock washer	1	
7	Drive sprocket	1	
8	Plate	1	
			For installation, reverse the removal procedure.

EXHAUST PIPE 

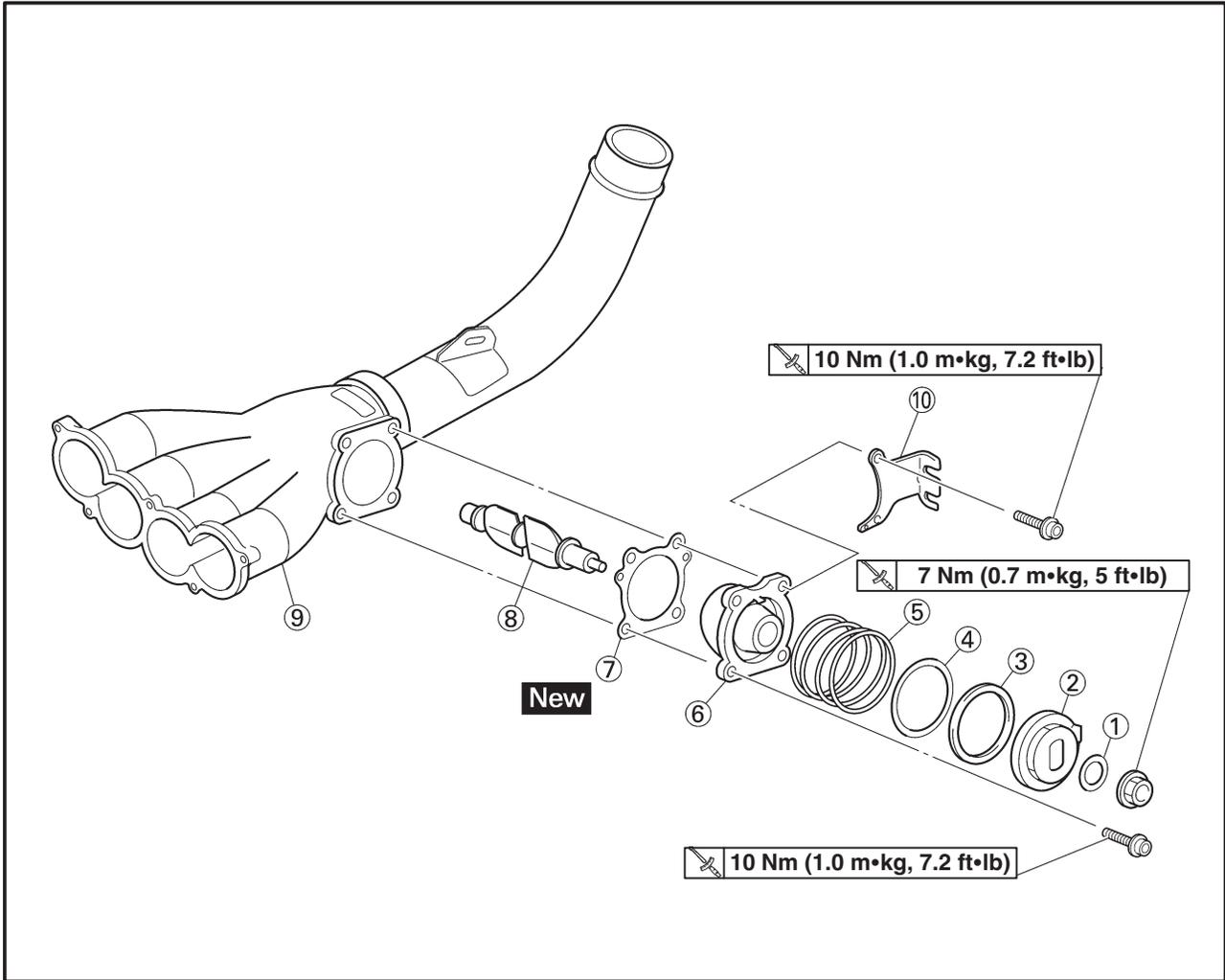


5

Order	Job/Part	Q'ty	Remarks
	Removing the exhaust pipe		Remove the parts in the order listed.
	Rider seat and passenger seat		Refer to "SEATS" in chapter 3.
	Fuel tank		Refer to "FUEL TANK" in chapter 3.
	Side cowlings and bottom cowlings		Refer to "COWLINGS" in chapter 3.
1	EXUP pulley cover	1	
2	EXUP cable	2	
3	Exhaust pipe assembly	1	
4	Exhaust pipe gasket	4	
5	Exhaust valve pipe gasket	1	
6	Exhaust valve pipe assembly	1	
7	Catalyst pipe assembly	1	
8	Gasket	1	
9	Muffler	2	
10	Gasket	2	

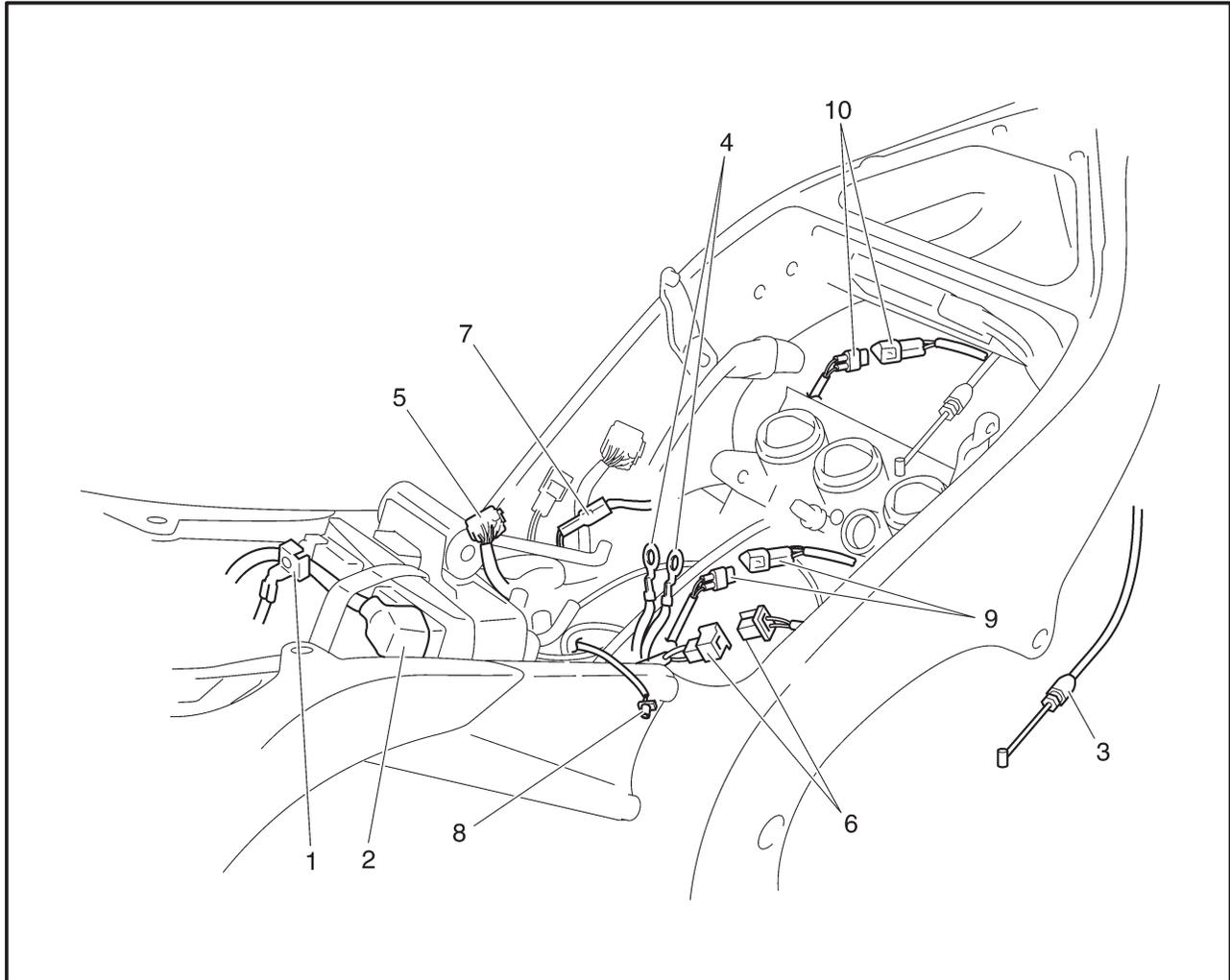


Order	Job/Part	Q'ty	Remarks
11	Muffler cover	2	For installation, reverse the removal procedure.
12	EXUP servo motor	1	
13	EXUP servo motor bracket	1	
14	Protector	1	

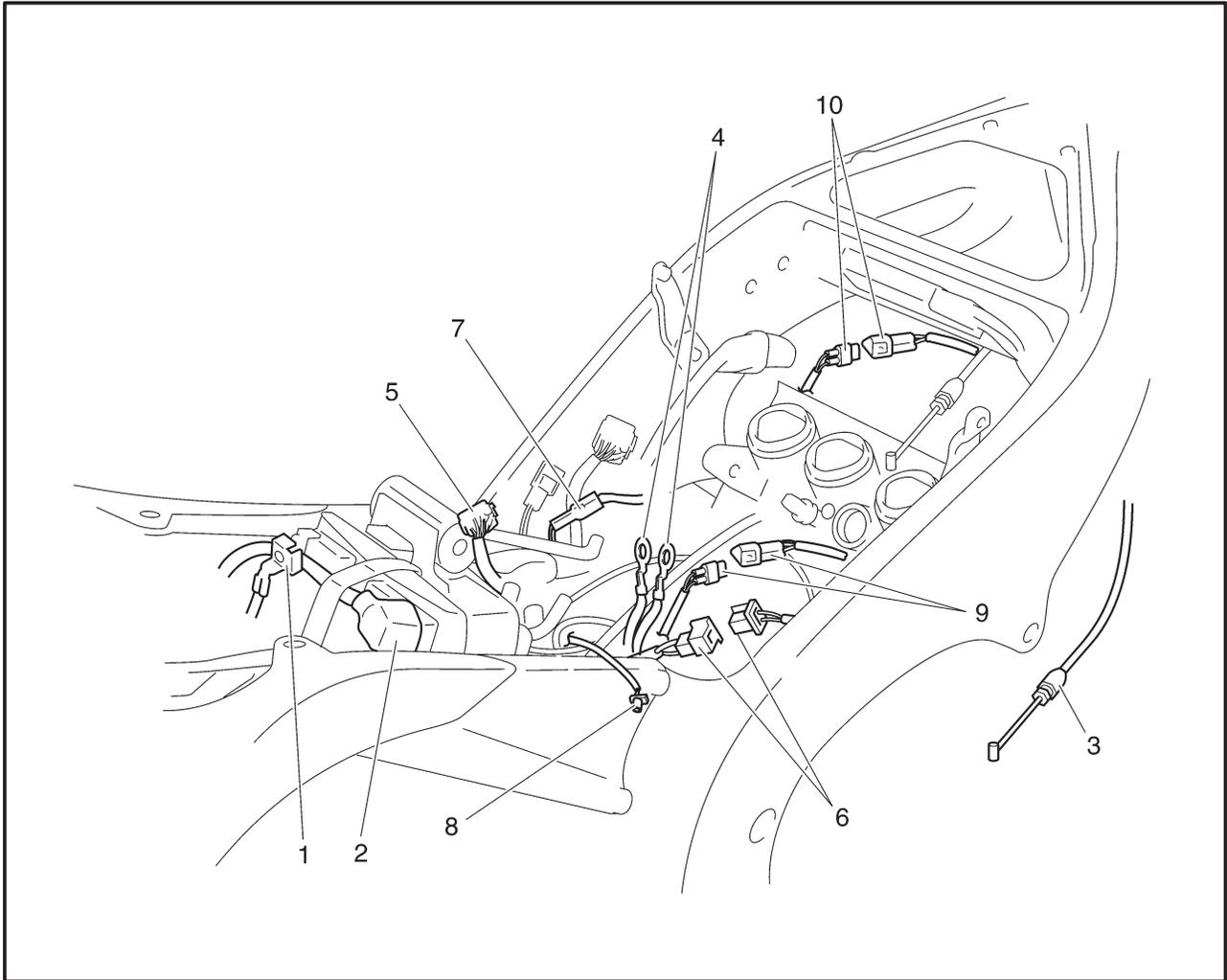


Order	Job/Part	Q'ty	Remarks
	Disassembling the exhaust valve pipe		Disassemble the parts in the order listed.
①	Washer	1	
②	Pulley	1	
③	Collar	1	
④	Plate	1	
⑤	Spring	1	
⑥	Housing	1	
⑦	Gasket	1	
⑧	Shaft arm	1	
⑨	Exhaust valve pipe	1	
⑩	EXUP pulley bracket	1	
			For assembly, reverse the disassembly procedure.

LEADS AND HOSES

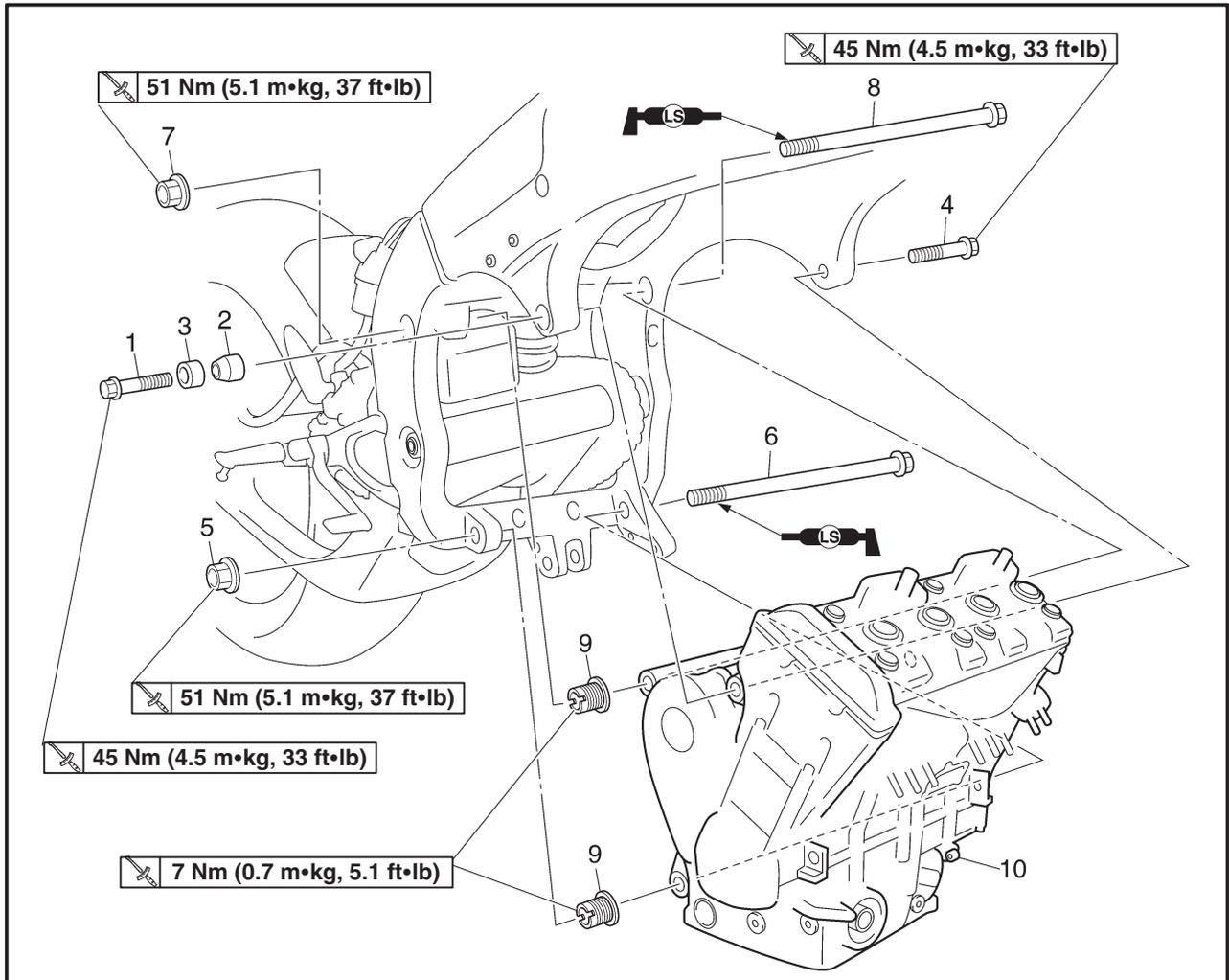


Order	Job/Part	Q'ty	Remarks
	Disconnecting the leads and hoses		Disconnect the parts in the order listed.
	Fuel tank		Refer to "FUEL TANK" in chapter 3.
	Air filter case		Refer to "AIR FILTER CASE" in chapter 3.
	Throttle body assembly		Refer to "THROTTLE BODIES" in chapter 7.
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" in chapter 3.
	Oil cooler		Refer to "OIL COOLER" in chapter 6.
	Air cut-off valve		Refer to "AIR INDUCTION SYSTEM" in chapter 7.
	Starter motor		Refer to "STARTING SYSTEM" in chapter 7.
1	Battery negative lead	1	
2	Battery positive lead	1	

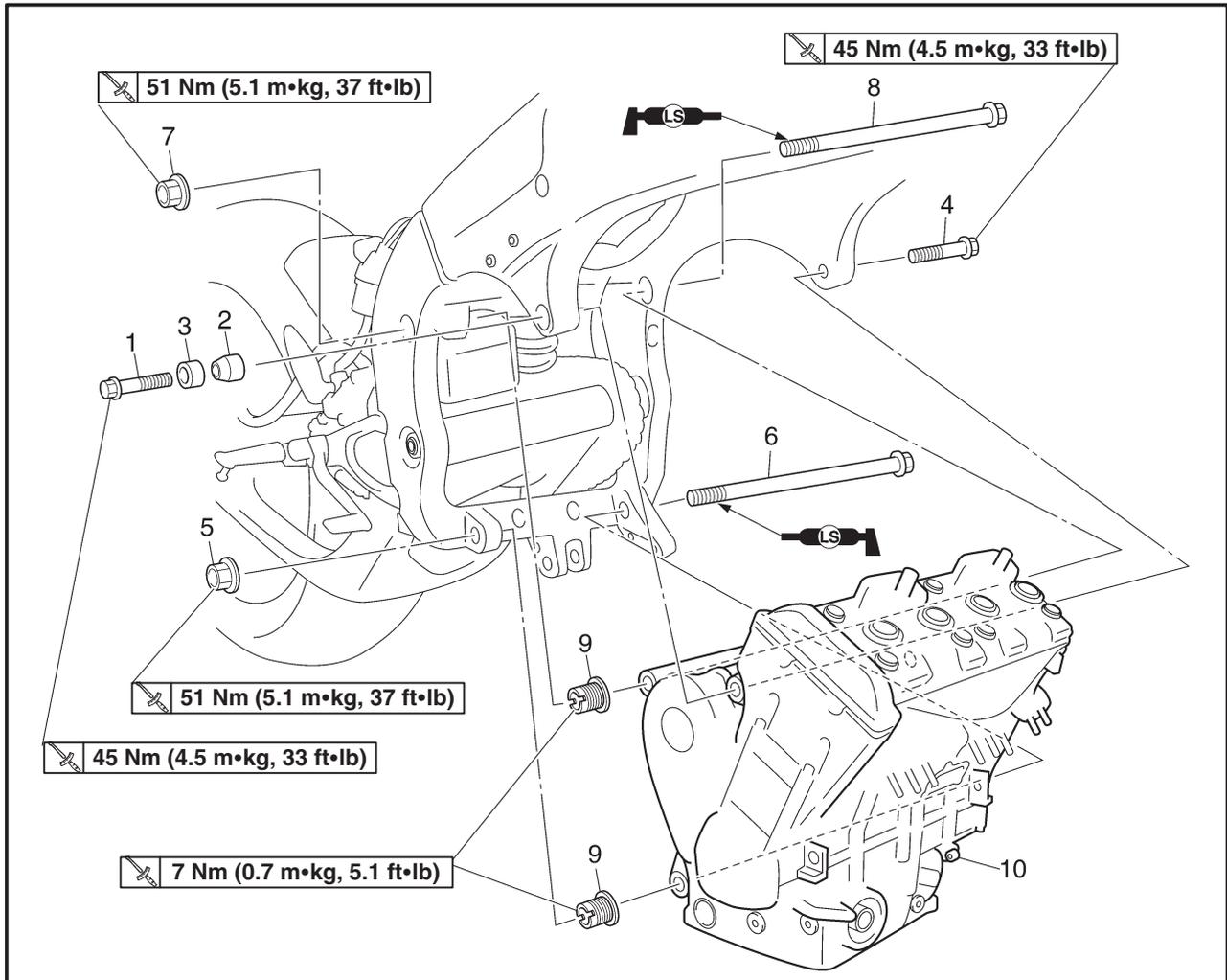


Order	Job/Part	Q'ty	Remarks
			<p>CAUTION: _____</p> <p>First, disconnect the negative battery lead, and then the positive battery lead. For connecting, reverse the disconnection procedure.</p> <hr/>
3	Clutch cable	1	
4	Ground lead	2	
5	Stator coil assembly coupler	1	Disconnect.
6	Crankshaft position sensor lead coupler	1	Disconnect.
7	Oil level switch connector	1	Disconnect.
8	Neutral switch connector	1	Disconnect.
9	Speed sensor coupler	1	Disconnect.
10	Cylinder identification sensor coupler	1	Disconnect.
			For installation, reverse the removal procedure.

ENGINE



Order	Job/Part	Q'ty	Remarks
	Removing the engine		Remove the parts in the order listed. NOTE: _____ Place a suitable stand under the frame and engine.
1	Right front engine mounting bolt	1	
2	Engine mount collar (inside)	1	
3	Engine mount collar (outside)	1	
4	Left front engine mounting bolt	1	
5	Lower self locking nut	1	
6	Lower engine mounting bolt	1	
7	Upper self locking nut	1	
8	Upper engine mounting bolt	1	

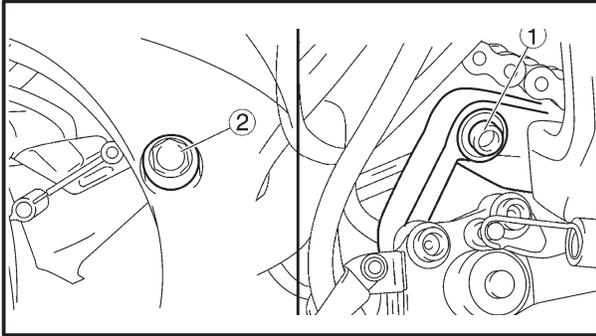


Order	Job/Part	Q'ty	Remarks
9	Engine mounting adjust bolt	2	NOTE: _____ Use the pivot shaft wrench and adapter to loosen the engine mounting adjust bolts. _____ For installation, reverse the removal procedure.
10	Engine	1	



INSTALLING THE ENGINE

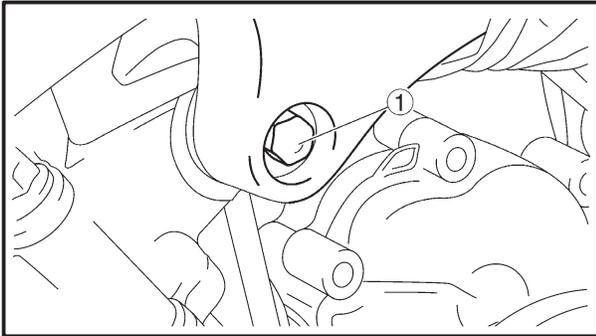
1. Install:
 - engine mounting adjust bolts (temporary tighten)
2. Install:
 - engine



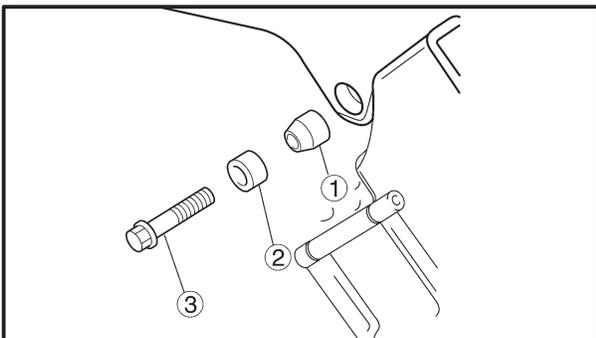
3. Install:
 - lower engine mounting bolt ①
 - upper engine mounting bolt ②
 - self locking nuts

NOTE: _____

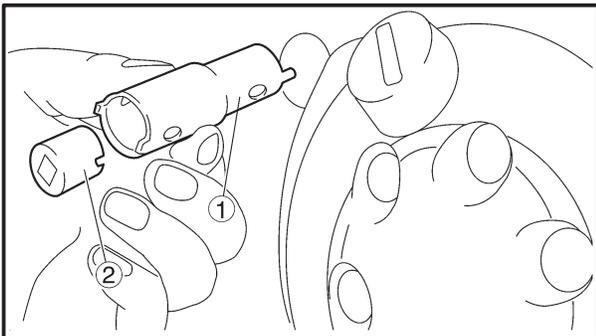
Lubricate the lower and upper engine mounting bolts threads with lithium-soap-based grease.



4. Install:
 - left front engine mount bolt ① (temporary tighten)



5. Install:
 - engine mount collar (inside) ①
 - engine mount collar (outside) ②
 - right front engine mount bolt ③ (temporary tighten)

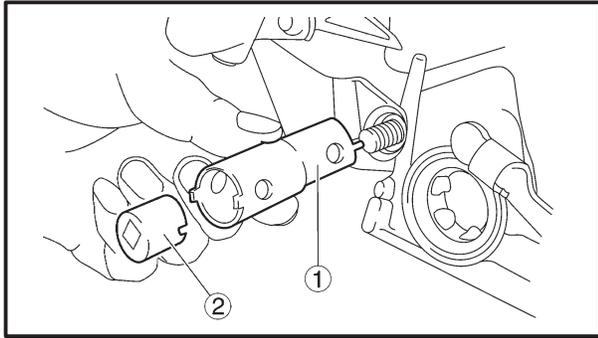


6. Tighten:
 - engine mounting adjust bolts

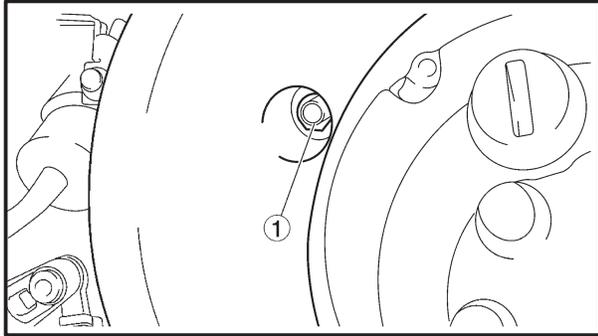
 **7 Nm (0.7 m•kg, 5.1 ft•lb)**

NOTE: _____

Use the pivot shaft wrench ① and pivot shaft wrench adapter ② to tighten the engine mounting adjust bolts.



Pivot shaft wrench
90890-01471, YM-01471
Pivot shaft wrench adapter
90890-01476



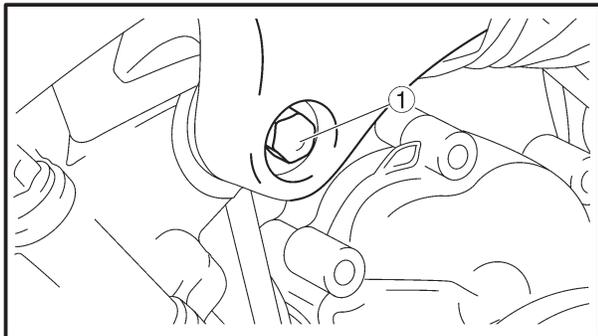
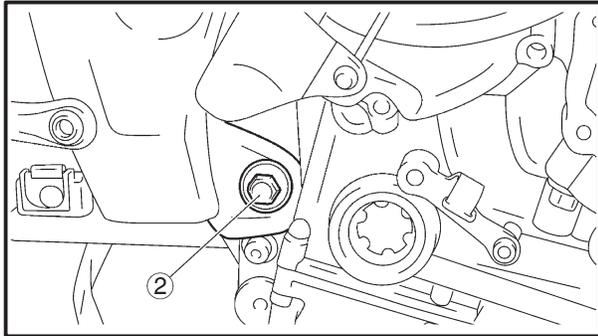
7. Tighten:

- upper self-locking nut ①
- lower self-locking nut ②

 **51 Nm (5.1 m•kg, 37 ft•lb)**

NOTE: _____

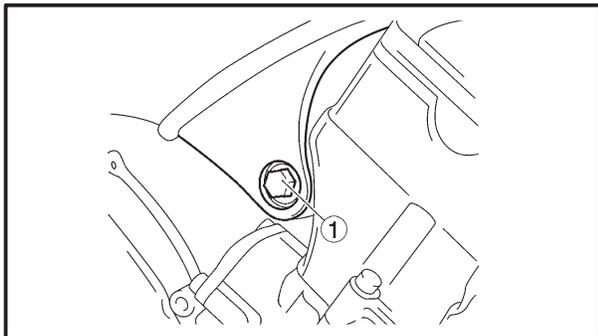
First tighten the lower self-locking nut, and then tighten the upper self-locking nut.



8. Tighten:

- left front engine mounting bolt ①

 **45 Nm (4.5 m•kg, 33 ft•lb)**



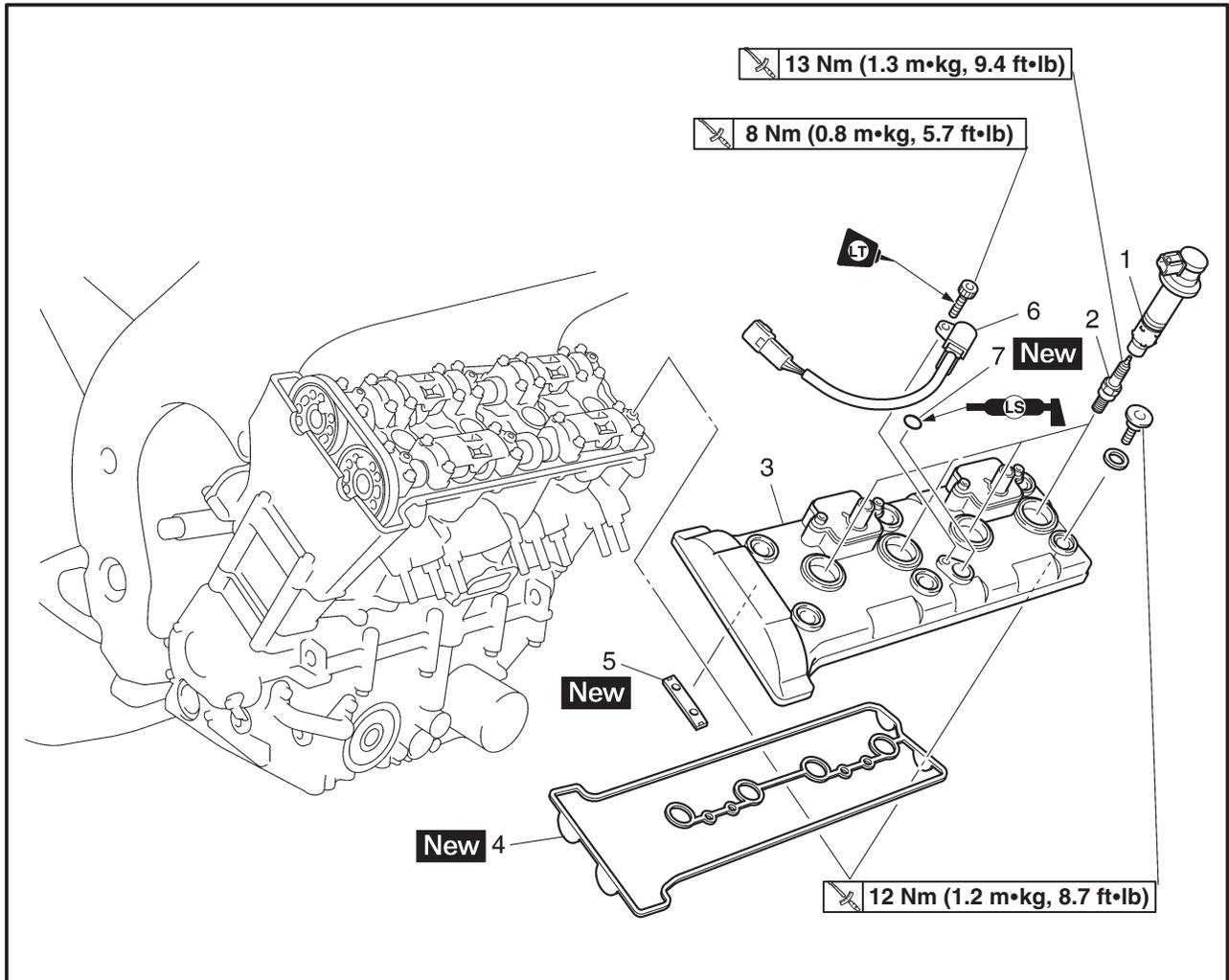
9. Tighten:

- right front engine mounting bolt ①

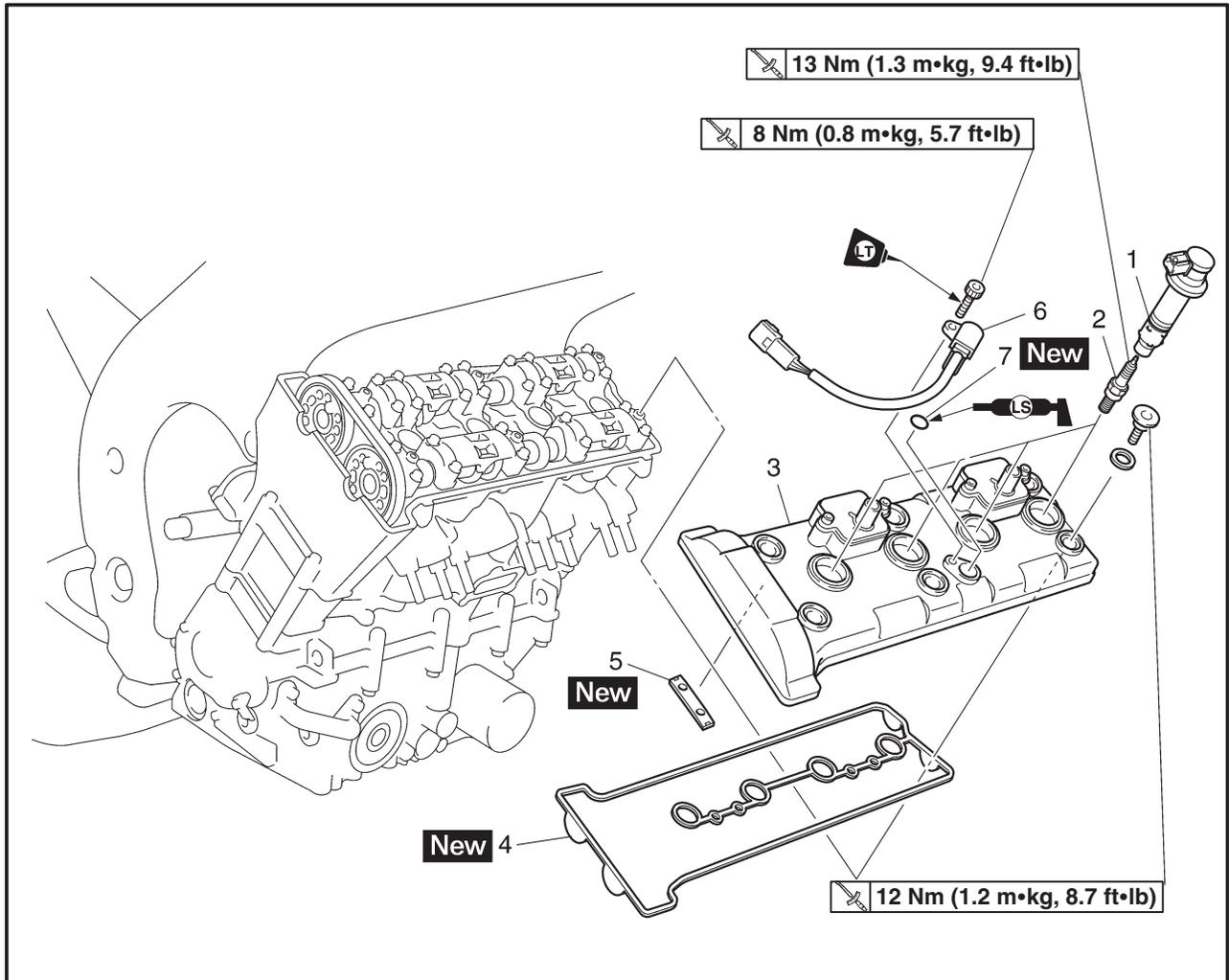
 **45 Nm (4.5 m•kg, 33 ft•lb)**

EAS00194

**CAMSHAFT
CYLINDER HEAD COVER**



Order	Job/Part	Q'ty	Remarks
	Removing the cylinder head cover		Remove the parts in the order listed. Refer to "FUEL TANK" in chapter 3. Refer to "COWLINGS" in chapter 3. Refer to "THROTTLE BODIES" in chapter 7. Refer to "RADIATOR" in chapter 3. Refer to "AIR INDUCTION SYSTEM" in chapter 7.
	Fuel tank		
	Side and bottom cowlings		
	Throttle body assembly		
	Radiator assembly		
	Air cut-off valve		
1	Ignition coil	4	
2	Spark plug	4	
3	Cylinder head cover	1	
4	Cylinder head cover gasket	1	

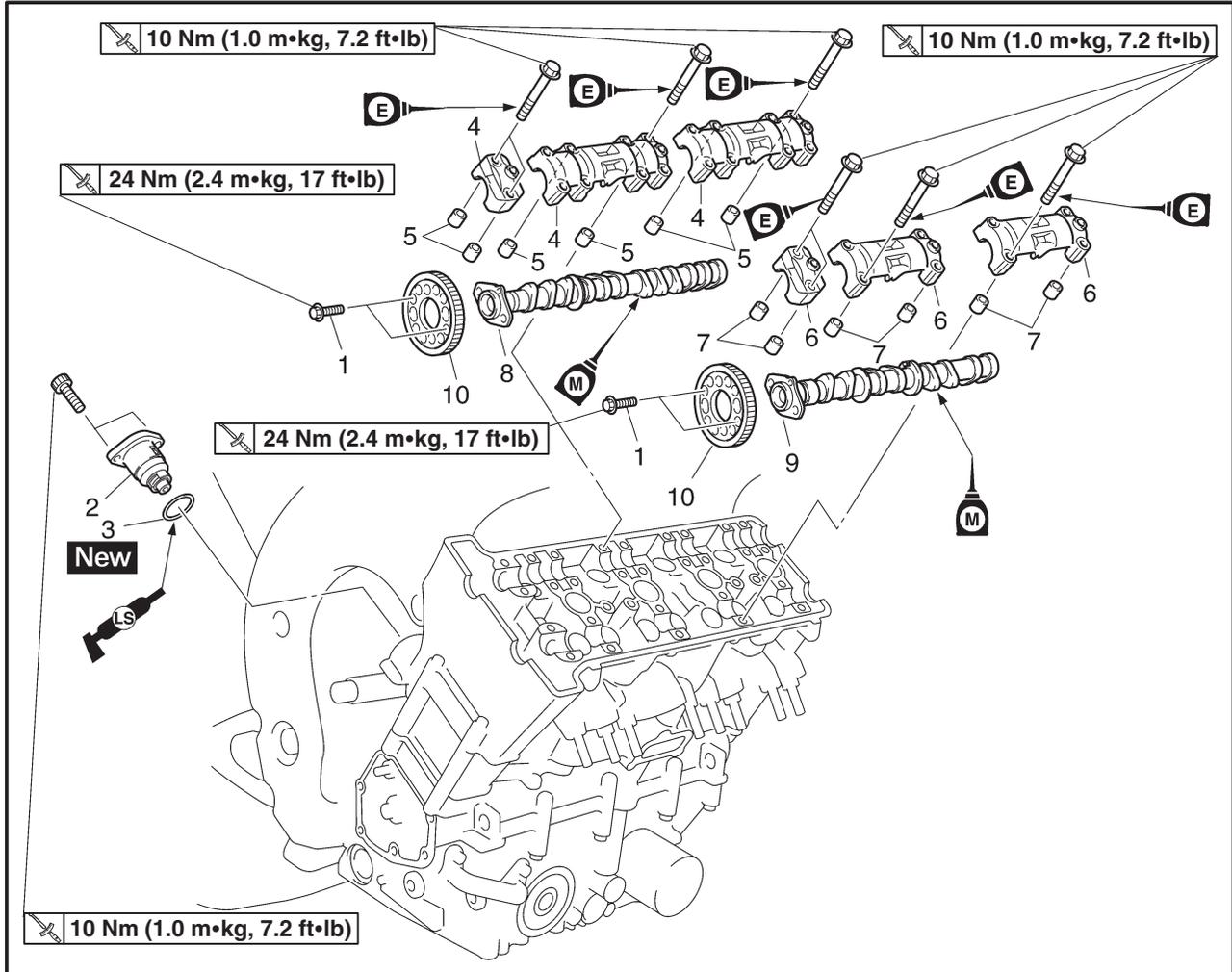


Order	Job/Part	Q'ty	Remarks
5	Timing chain guide (top side)	1	For installation, reverse the removal procedure.
6	Cylinder identification sensor	1	
7	O-ring	1	

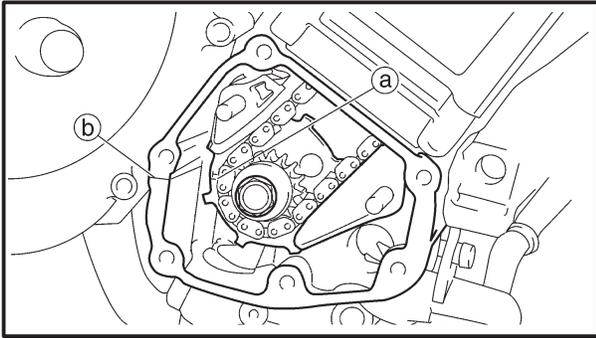


EAS00196

CAMSHAFTS



Order	Job/Part	Q'ty	Remarks
	Removing the camshafts		
	Pickup rotor cover		Remove the parts in the order listed. Refer to "CRANKSHAFT POSITION SENSOR AND PICKUP ROTOR".
1	Camshaft sprocket bolt	4	Loosen.
2	Timing chain tensioner	1	
3	Timing chain tensioner O-ring	1	
4	Intake camshaft cap	3	NOTE: _____
5	Dowel pin	6	
6	Exhaust camshaft cap	3	
7	Dowel pin	6	
8	Intake camshaft	1	Refer to "REMOVING THE CAMSHAFTS".
9	Exhaust camshaft	1	
10	Camshaft sprocket	2	
			For installation, reverse the removal procedure.



EAS00198

REMOVING THE CAMSHAFTS

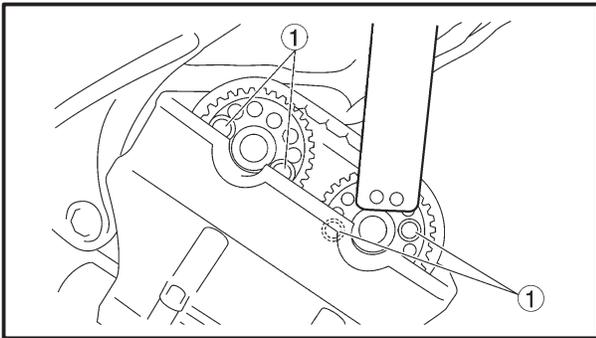
1. Remove:
 - pickup rotor cover
 Refer to "CRANKSHAFT POSITION SENSOR AND PICKUP ROTOR".
2. Align:
 - "T" mark (a) on the pickup rotor (with the crankcase mating surface (b))



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

NOTE: _____

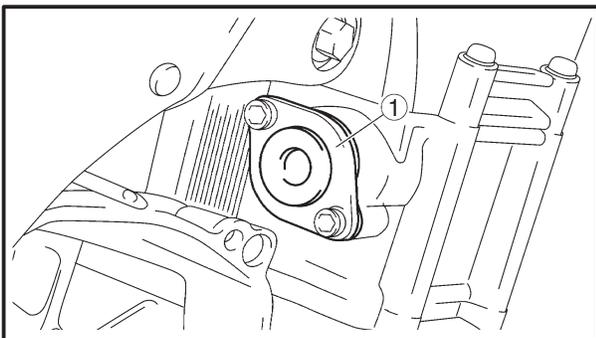
TDC on the compression stroke can be found when the camshaft lobes are turned away from each other.



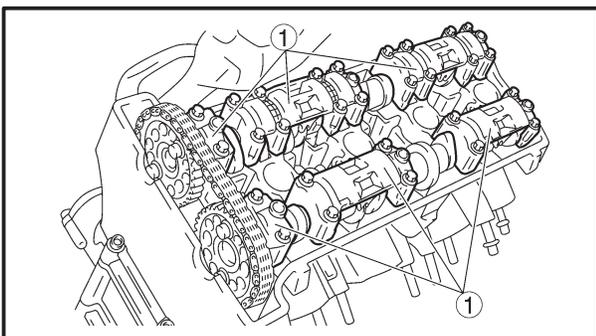
3. Loosen:
 - camshaft sprocket bolts (1)



Camshaft wrench
90890-04143



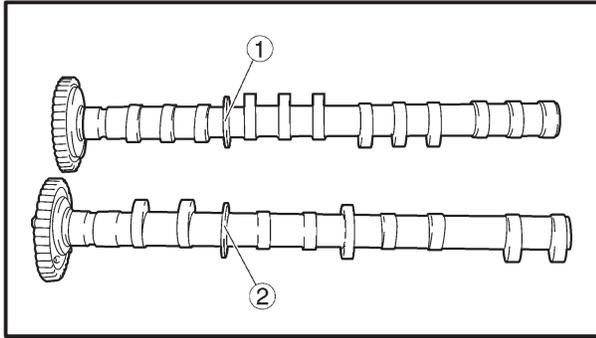
4. Remove:
 - timing chain tensioner (1)
 - O-ring



5. Remove:
 - camshaft caps (1)
 - dowel pins

CAUTION: _____

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

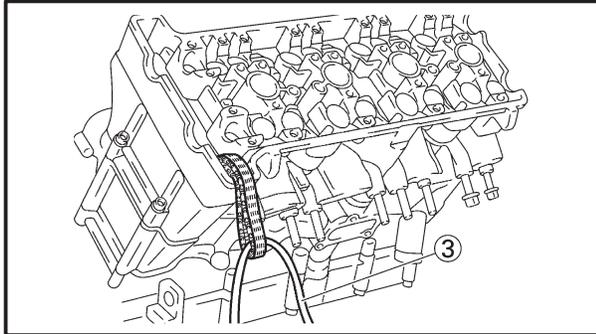


6. Remove:

- intake camshaft ①
- exhaust camshaft ②

NOTE: _____

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



7. Remove:

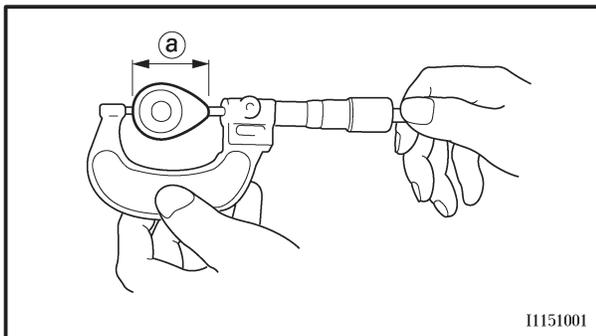
- camshaft sprockets

EAS00204

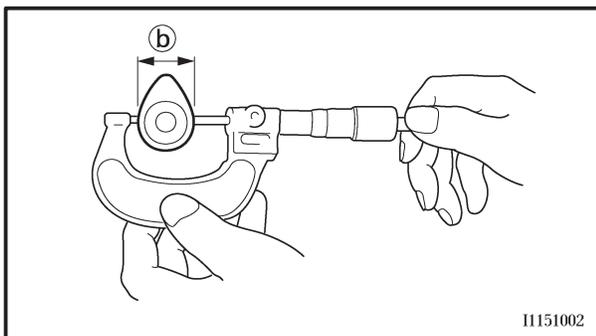
CHECKING THE CAMSHAFTS

1. Check:

- camshaft lobes
Blue discoloration/pitting/scratches → Replace the camshaft.



11151001



11151002

2. Measure:

- camshaft lobe dimensions ① and ②
Out of specification → Replace the camshaft.



Camshaft lobe dimension limit

Intake camshaft

① 32.85 ~ 32.95 mm

(1.293 ~ 1.297 in)

<Limit>: 32.75 mm (1.289 in)

② 25.14 ~ 25.24 mm

(0.990 ~ 0.994 in)

<Limit>: 25.04 mm (0.986 in)

Exhaust camshaft

① 30.75 ~ 30.85 mm

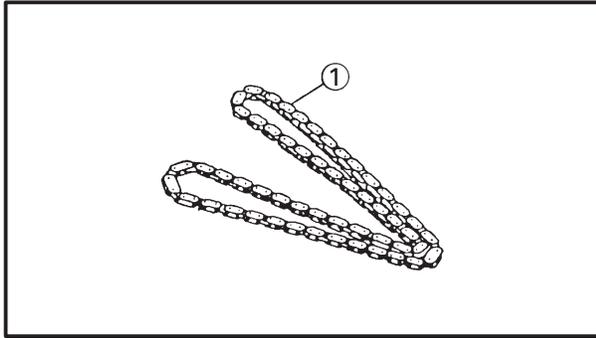
(1.211 ~ 1.215 in)

<Limit>: 30.65 mm (1.207 in)

② 23.09 ~ 23.19 mm

(0.909 ~ 0.913 in)

<Limit>: 22.99 mm (0.905 in)



EAS00208

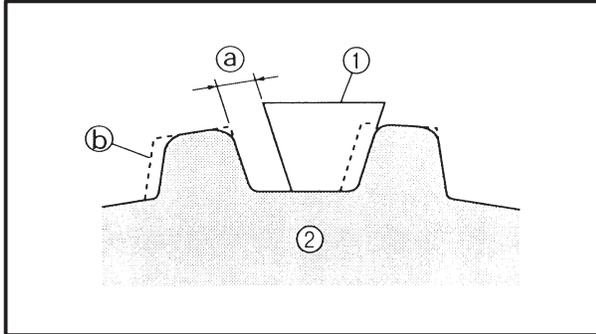
CHECKING THE TIMING CHAIN, CAMSHAFT SPROCKETS, AND TIMING CHAIN GUIDES

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

1. Check:

- timing chain ①

Damage/stiffness → Replace the timing chain and camshaft sprockets as a set.



2. Check:

- camshaft sprocket

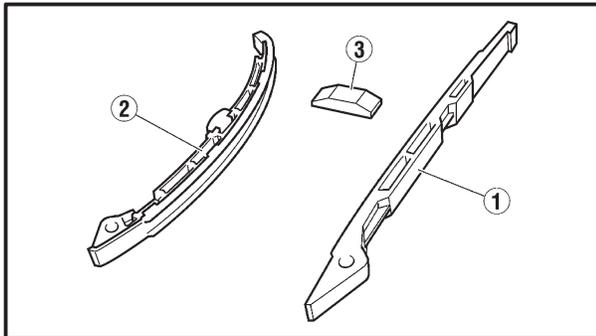
More than 1/4 tooth wear (a) → Replace the camshaft sprockets and the timing chain as a set.

(a) 1/4 tooth

(b) Correct

① Timing chain roller

② Camshaft sprocket



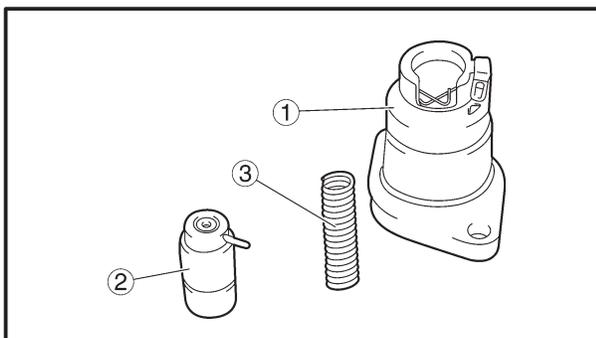
3. Check:

- timing chain guide (exhaust side) ①

- timing chain guide (intake side) ②

- timing chain guide (top side) ③

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



CHECKING THE TIMING CHAIN TENSIONER

1. Remove:

- timing chain tensioner housing ①

- timing chain tensioner rod ②

- timing chain tensioner spring ③

NOTE:

Squeeze the timing chain tensioner clip, and then remove the timing chain tensioner spring and timing chain tensioner rod.

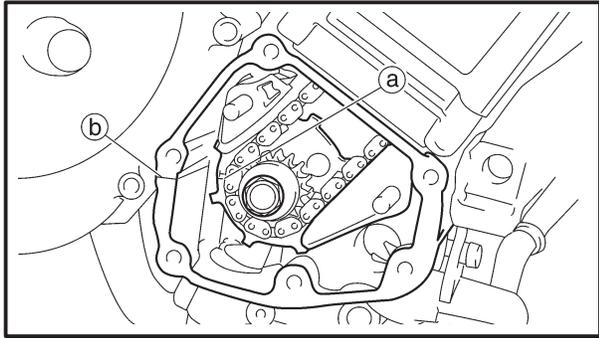
2. Check:

- timing chain tensioner housing

- timing chain tensioner rod

- timing chain tensioner spring

Damage/wear → Replace.



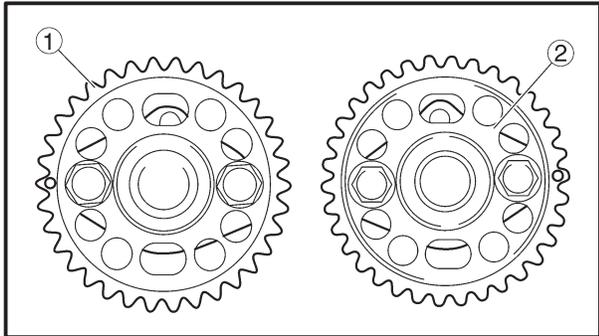
EAS00215

INSTALLING THE CAMSHAFTS

1. Align:
 - “T” mark (a) on the pickup rotor
(with the crankcase mating surface (b))



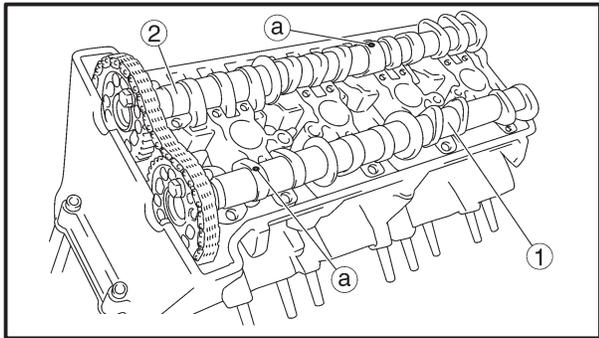
- a. Turn the crankshaft clockwise.
- b. When piston #1 is at TDC, align the “T” mark (a) with the crankcase mating surface (b).



2. Install:
 - intake camshaft sprocket (1)
 - exhaust camshaft sprocket (2)
(with the camshaft sprockets temporarily tightened)

NOTE: _____

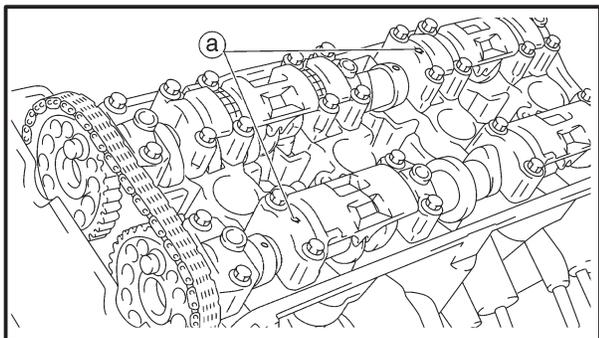
Install the camshaft sprockets as a illustration.



3. Install:
 - exhaust camshaft (1)
 - intake camshaft (2)
(with the camshaft sprockets temporarily tightened)

NOTE: _____

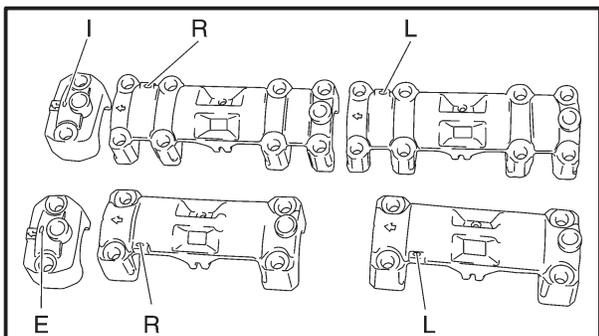
Make sure the punch mark (a) faces up.



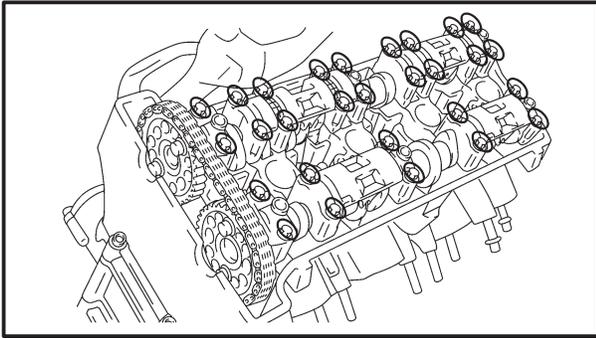
4. Install:
 - dowel pins
 - exhaust camshaft caps
 - intake camshaft caps

NOTE: _____

- Make sure each camshaft cap is installed in its original place.
- Make sure the arrow mark (a) on each camshaft cap points towards the right side of the engine.



- L: Left side camshaft cap mark
- R: Right side camshaft cap mark
- I: Intake side camshaft cap mark
- E: Exhaust side camshaft cap mark



5. Install:

- camshaft cap bolts

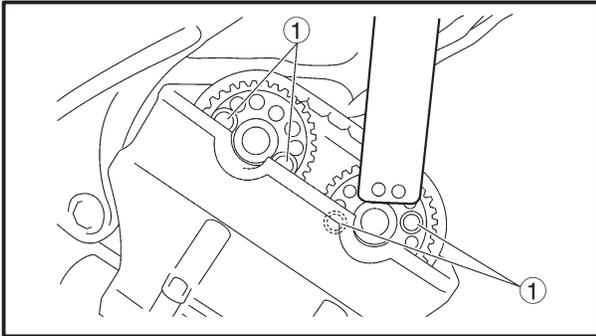
 10 Nm (1.0 m•kg, 7.2 ft•lb)

NOTE: _____

Tighten the camshaft cap bolts in stages and in a crisscross pattern, working from the inner caps out.

CAUTION: _____

- Lubricate the camshaft cap bolts with the engine oil.
- The camshaft cap bolts must be tightened evenly or damage to the cylinder head, camshaft caps, and camshafts will result.
- Do not turn the crankshaft when installing the camshaft to avoid damage or improper valve timing.



6. Tighten:

- camshaft sprocket bolts ①

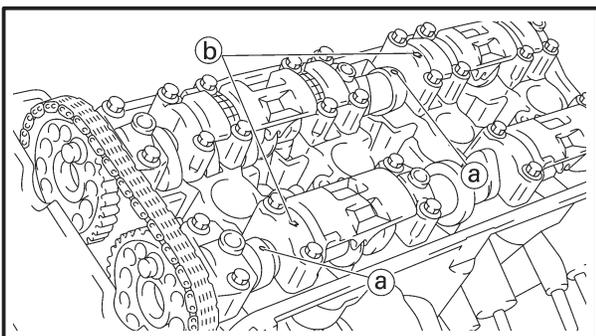
 24 Nm (2.4 m•kg, 17 ft•lb)



Camshaft wrench
90890-04143

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.



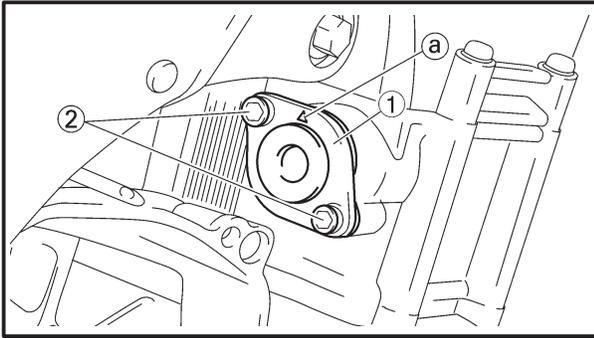
7. Align:

- camshaft punch mark (a)

Align the camshaft punch mark (a) and the camshaft cap arrow mark (b).



Camshaft wrench
90890-04143



8. Install:
- O-ring **New**
 - timing chain tensioner ①
 - timing chain tensioner bolts ②

10 Nm (1.0 m•kg, 7.2 ft•lb)

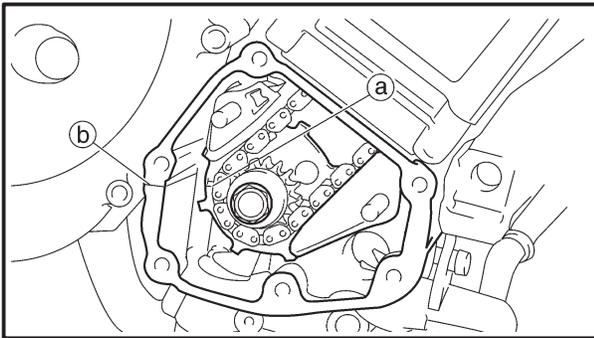
CAUTION:

The “arrow” mark ① on the timing chain tensioner should face up.

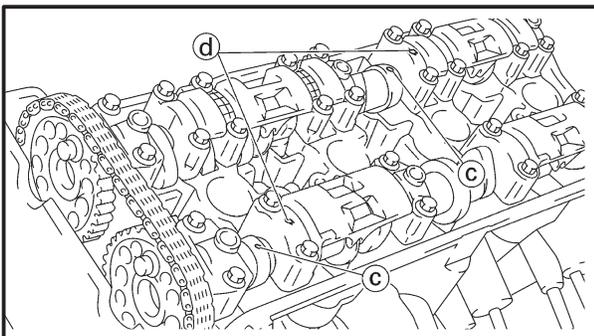
WARNING

Always use a new O-ring.

9. Turn:
- crankshaft
(several full turns clockwise)



10. Check:
- “T” mark ①
Make sure the “T” mark on the pickup rotor is aligned with the crankcase mating surface ②.



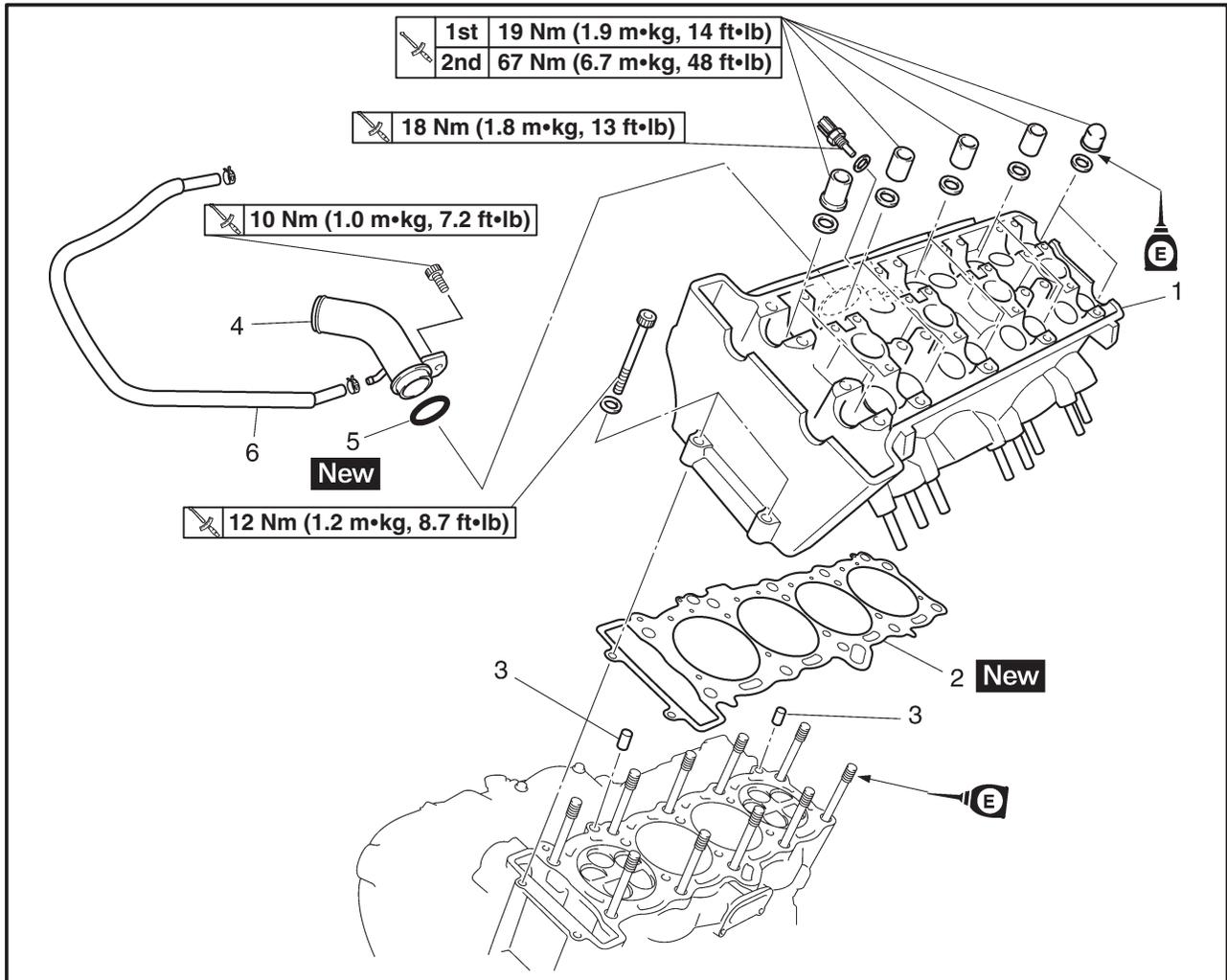
- camshaft punch mark ③
Make sure the punch mark ③ on the camshaft is aligned with the camshaft cap arrow mark ④.
Out of alignment → Adjust.
Refer to the installation steps above.

11. Measure:
- valve clearance
Out of specification → Adjust.
Refer to “ADJUSTING THE VALVE CLEARANCE” in chapter 3.

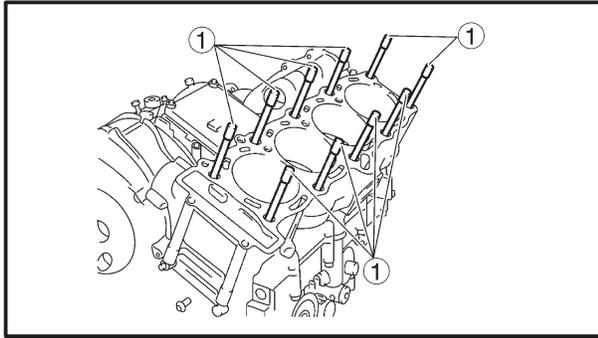
12. Install:
- pickup coil rotor cover
Refer to “CRANKSHAFT POSITION SENSOR”.

EAS00221

CYLINDER HEAD



Order	Job/Part	Q'ty	Remarks
	Removing the cylinder head		
	Engine		Remove the parts in the order listed. Refer to "ENGINE".
	Intake camshaft		Refer to "CAMSHAFTS".
	Exhaust camshaft		
1	Cylinder head	1	
2	Cylinder head gasket	1	
3	Dowel pin	2	
4	Coolant pipe	1	
5	O-ring	1	
6	Thermo wax out let hose	1	
			For installation, reverse the removal procedure.



EAS00233

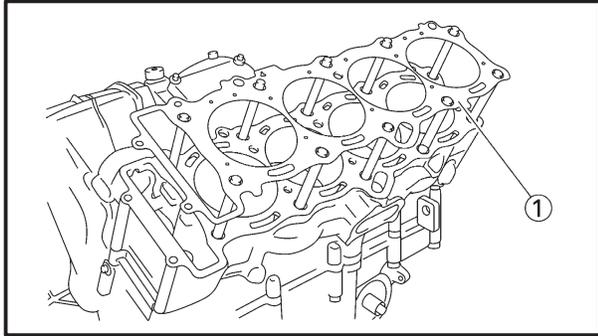
INSTALLING THE CYLINDER HEAD

1. Check:
 - cylinder head bolts (1)

 **8 Nm (0.8 m•kg, 5.8 ft•lb)**

NOTE: _____

Retighten the cylinder head bolts to specification, before installing the cylinder head.

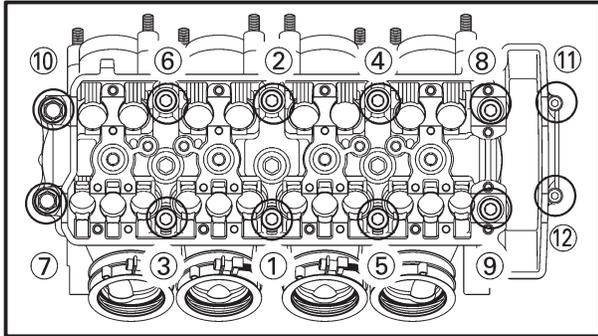


2. Install:
 - gasket **New** (1)
 - dowel pins

3. Install:
 - cylinder head

NOTE: _____

Pass the timing chain through the timing chain cavity.



4. Tighten:
 - cylinder head nuts (1) ~ (10)

1st  **19 Nm (1.9 m•kg, 14 ft•lb)**

2nd  **67 Nm (6.7 m•kg, 48 ft•lb)**

- cylinder head bolts (11) (12)

 **12 Nm (1.2 m•kg, 8.7 ft•lb)**

NOTE: _____

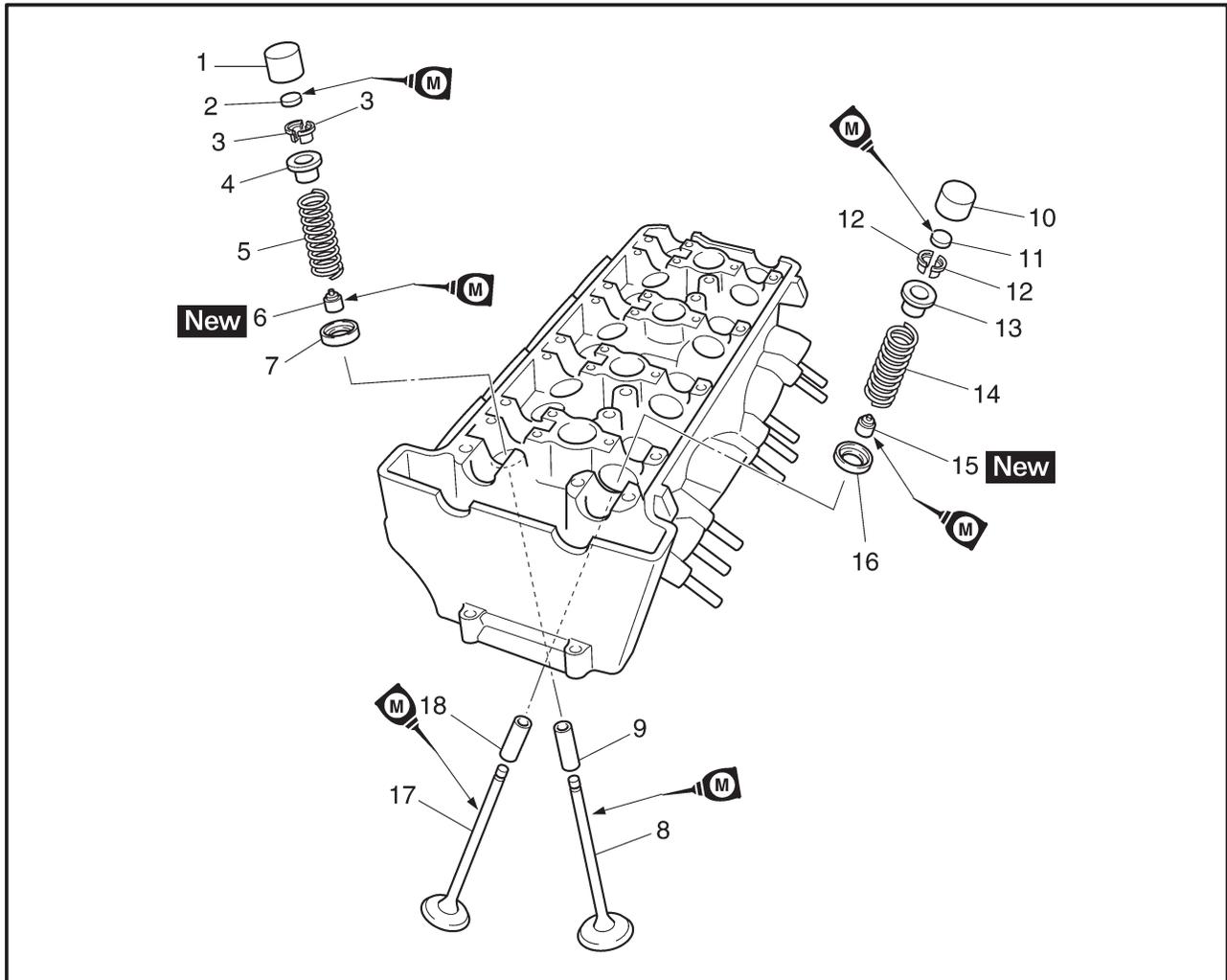
- First, tighten the nuts (1) ~ (10) to approximately 19 Nm (1.9 m•kg, 14 ft•lb) with a torque wrench, and then tighten the 67 Nm (6.7 m•kg, 48 ft•lb).
- Lubricate the cylinder head nuts with engine oil.
- Tighten the cylinder head nuts in the proper tightening sequence as shown and torque them in two stages.

5. Install:
 - exhaust camshaft
 - intake camshaft

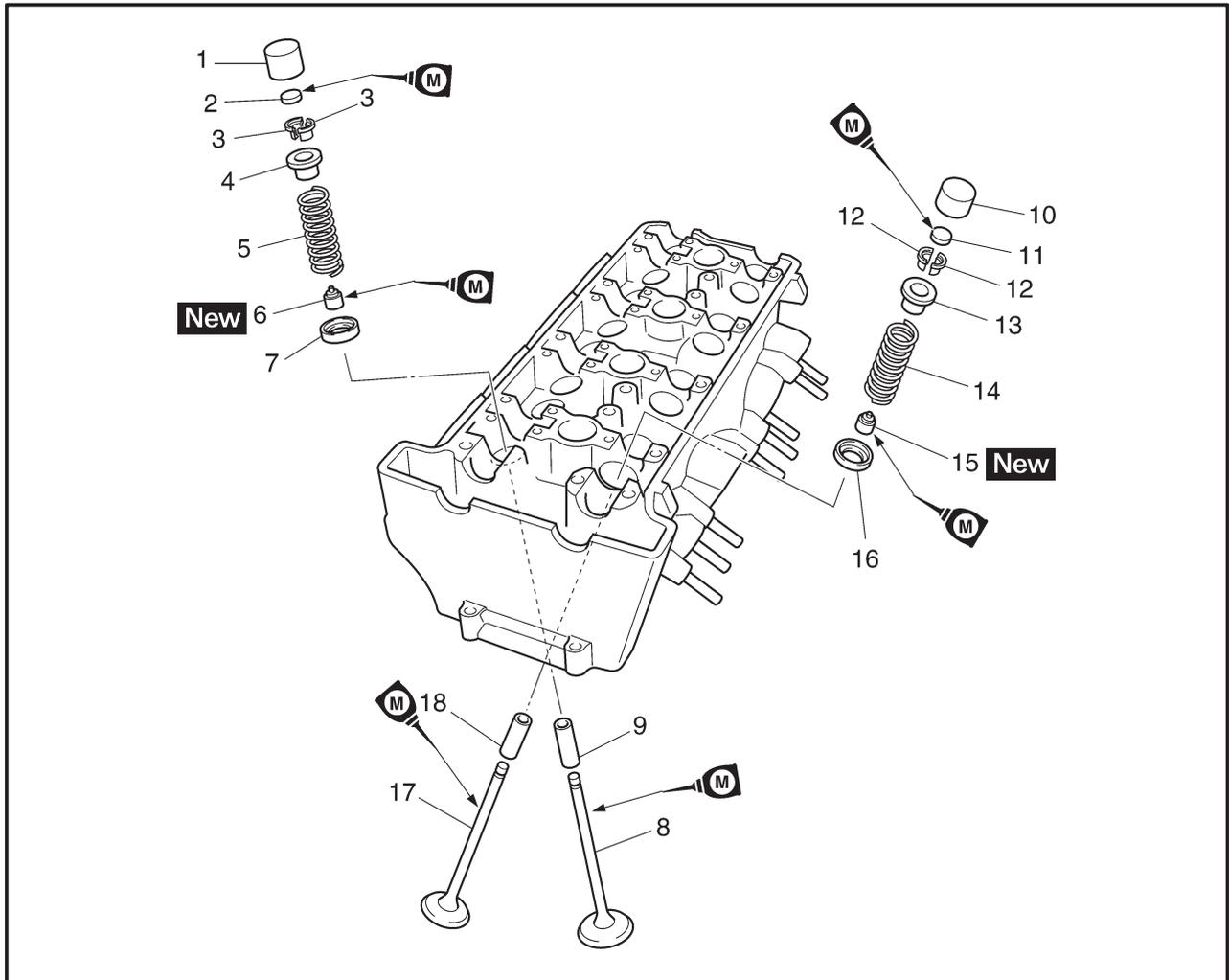
Refer to “INSTALLING THE CAMSHAFTS”.

EAS00236

VALVES AND VALVE SPRINGS



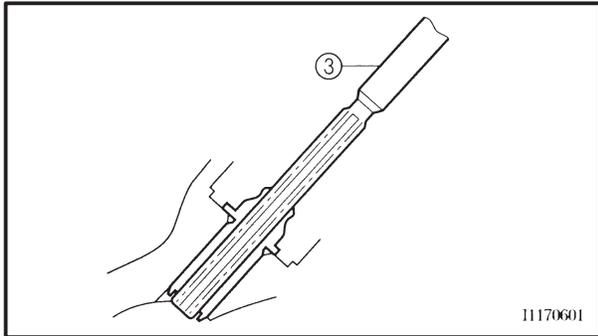
Order	Job/Part	Q'ty	Remarks
	Removing the valves and valve springs		Remove the parts in the order listed.
	Cylinder head		Refer to "CYLINDER HEAD".
1	Intake valve lifter	12	
2	Intake valve pad	12	
3	Intake valve cotter	24	
4	Intake valve upper spring seat	12	
5	Intake valve spring	12	
6	Intake valve oil seal	12	
7	Intake valve lower spring seat	12	
8	Intake valve	12	
9	Intake valve guide	12	



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

NOTE: _____

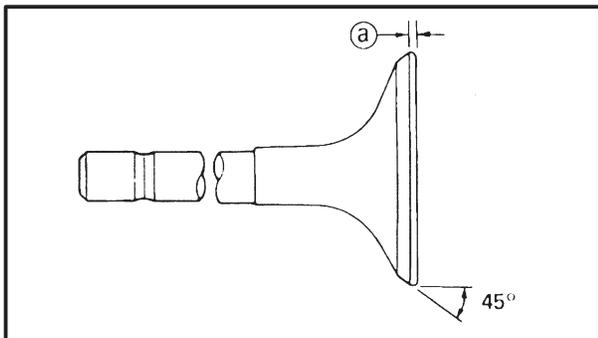
After replacing the valve guide, reface the valve seat.



	Valve guide remover
	Intake (4.0 mm, 0.16 in)
	90890-04111
	Exhaust (4.5 mm, 0.18 in)
	90890-04116, YM-4116
	Valve guide installer
	Intake (4.0 mm, 0.16 in)
	90890-04112
	Exhaust (4.5 mm, 0.18 in)
	90890-04117, YM-4117
	Valve guide reamer
	Intake (4.0 mm, 0.16 in)
90890-04113	
Exhaust (4.5 mm, 0.18 in)	
90890-04118, YM-4118	

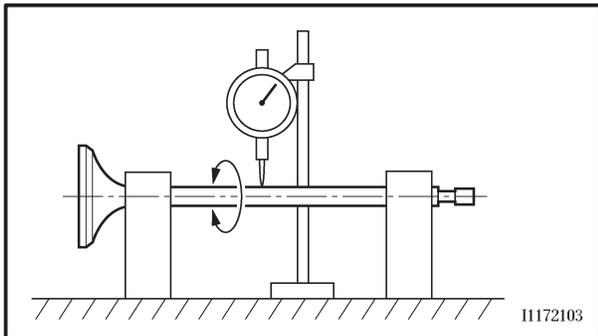


3. Eliminate:
 - carbon deposits
(from the valve face and valve seat)
4. Check:
 - valve face
Pitting/wear → Grind the valve face.
 - valve stem end
Mushroom shape or diameter larger than the body of the valve stem → Replace the valve.



5. Measure:
 - valve margin thickness (a)
Out of specification → Replace the valve.

	Valve margin thickness
	0.5 ~ 0.9 mm
	(0.0197 ~ 0.0354 in)
	<Limit>: 0.5 mm (0.02 in)

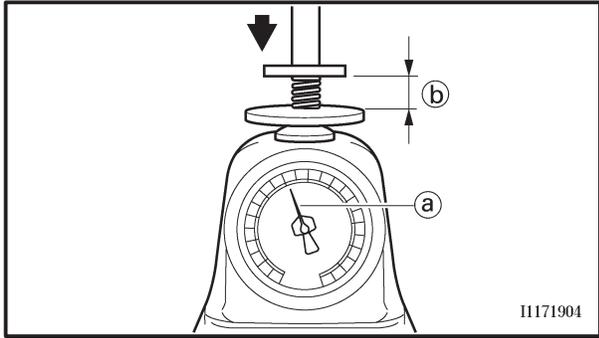


6. Measure:
 - valve stem runout
Out of specification → Replace the valve.

NOTE: _____

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

	Valve stem runout
	0.01 mm (0.0004 in)



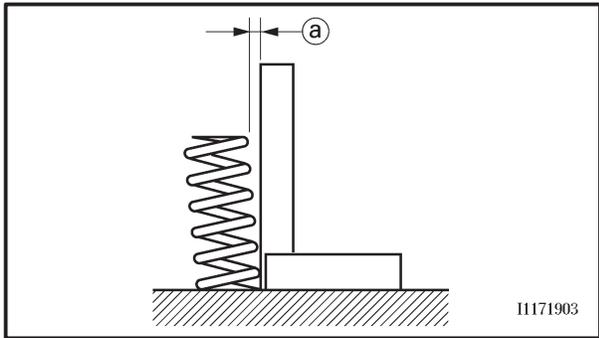
I1171904

2. Measure:
- compressed valve spring force (a)
Out of specification → Replace the valve spring.
 - (b) Installed length

 **Compressed valve spring force (installed)**

Intake valve spring
145.9 ~ 167.9 N
(14.88 ~ 17.12 kg,
32.80 ~ 37.74 lb) at
32.65 mm (1.285 in)

Exhaust valve spring
164.1 ~ 188.9 N
(16.73 ~ 19.26 kg,
36.89 ~ 42.46 lb) at
32.82 mm (12.92 in)



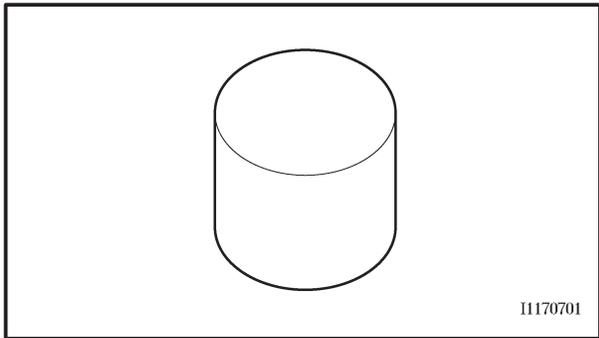
I1171903

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

 **Spring tilt limit**

Intake valve spring
1.7 mm (0.07 in)

Exhaust valve spring
1.7 mm (0.07 in)



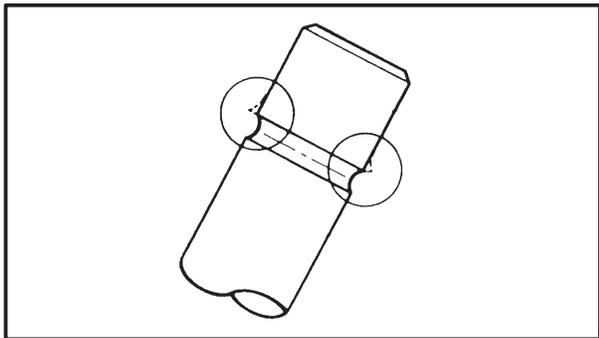
I1170701

EAS00242

CHECKING THE VALVE LIFTERS

The following procedure applies to all of the valve lifters.

1. Check:
- valve lifter
Damage/scratches → Replace the valve lifters and cylinder head.

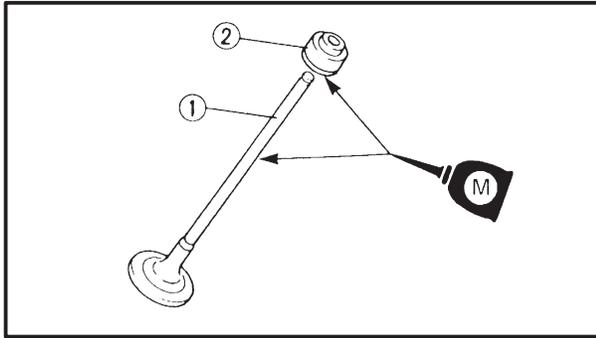


EAS00245

INSTALLING THE VALVES

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

1. Deburr:
- valve stem end
(with an oil stone)

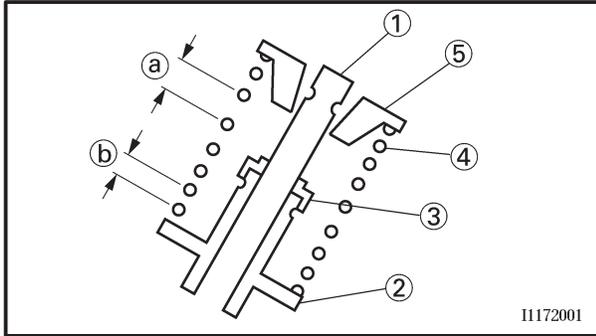


2. Lubricate:

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



Recommended lubricant
Molybdenum disulfide oil



3. Install:

- valve ①
- lower spring seat ②
- valve stem seal ③
- valve spring ④
- upper spring seat ⑤
(into the cylinder head)

NOTE:

Install the valve spring with the larger pitch (a) facing up.

(b) Smaller pitch

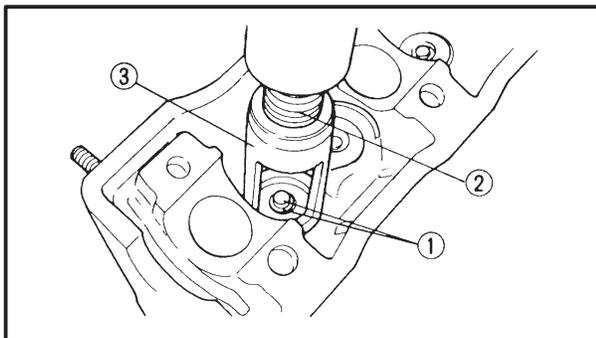
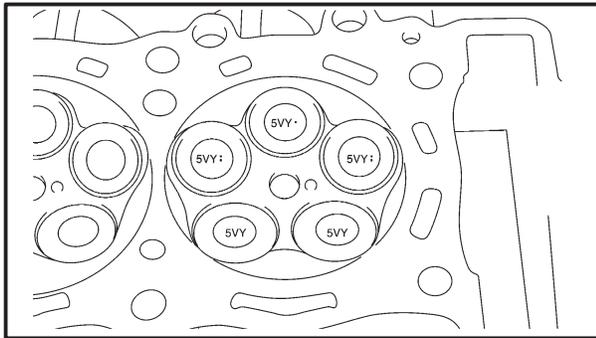
NOTE:

Make sure that each valve is installed in its original place. Refer to the following embossed marks.

Right and left intake valve(-s): "5VY :"

Middle intake valve(-s): "5VY ."

Exhaust valve(-s): "5VY"



4. Install:

- valve cotteners ①

NOTE:

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



Valve spring compressor
90890-04019, YM-04019

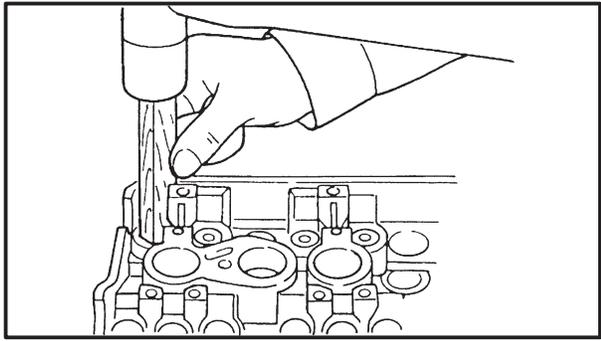
Valve spring compressor attachment

Intake valve

90890-04114, YM-4114

Exhaust valve

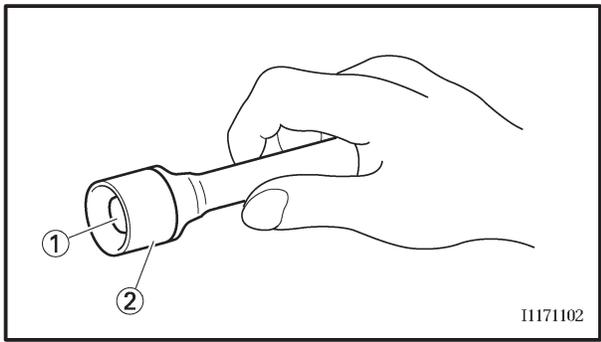
90890-04108, YM-4108



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

CAUTION: _____

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



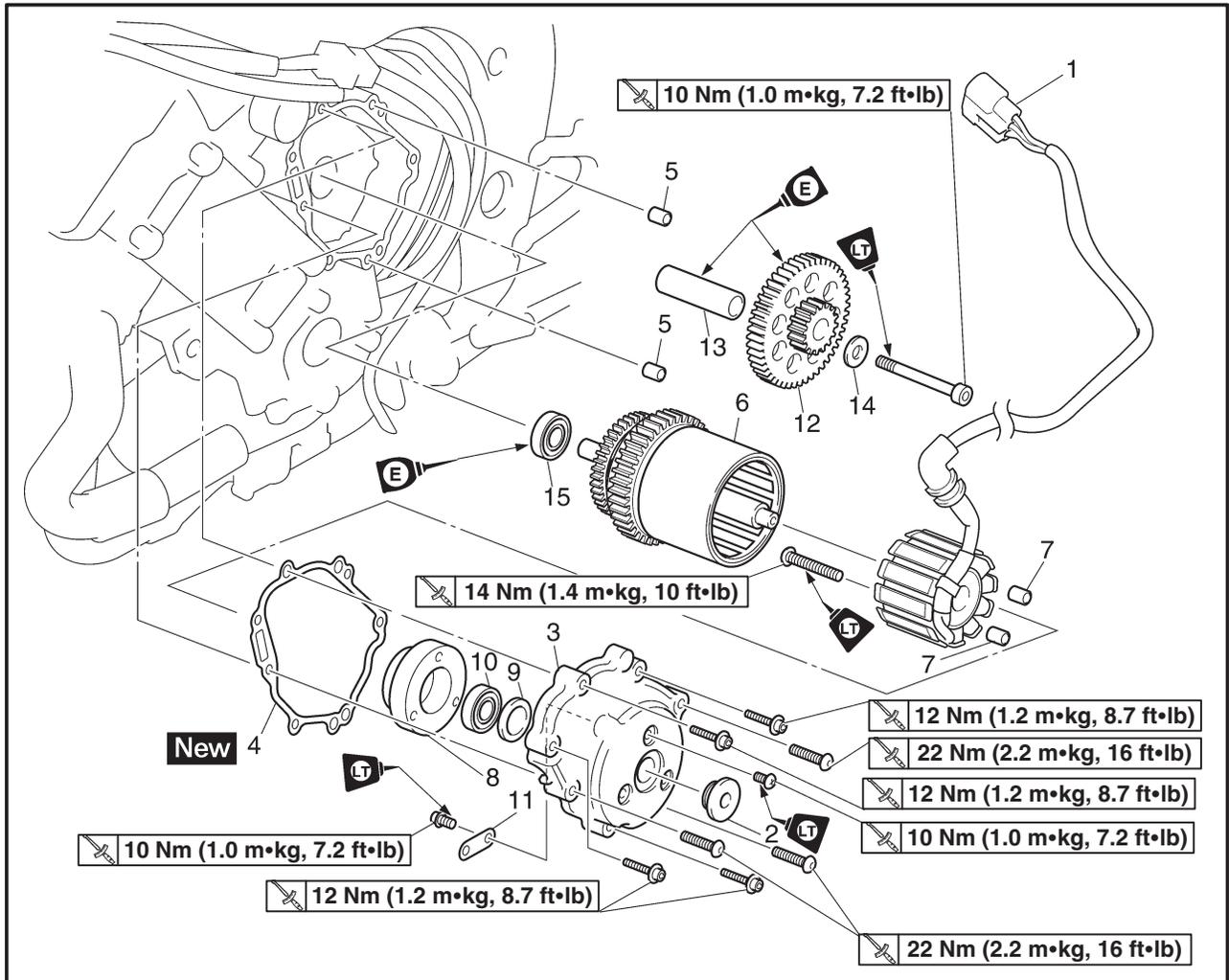
6. Install:

- valve pad ①
- valve lifter ②

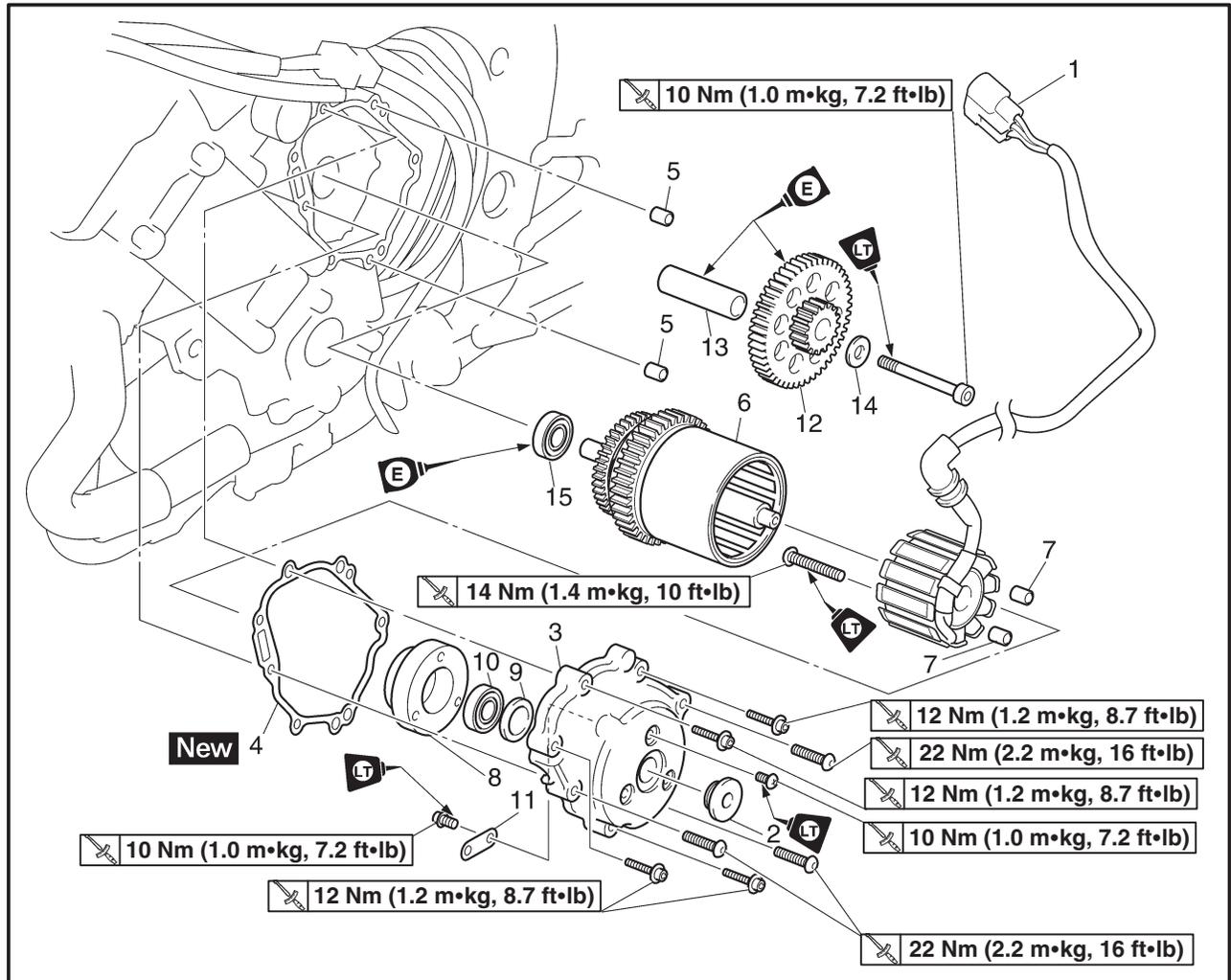
NOTE: _____

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

STARTER CLUTCH AND GENERATOR
STATOR COIL ASSEMBLY

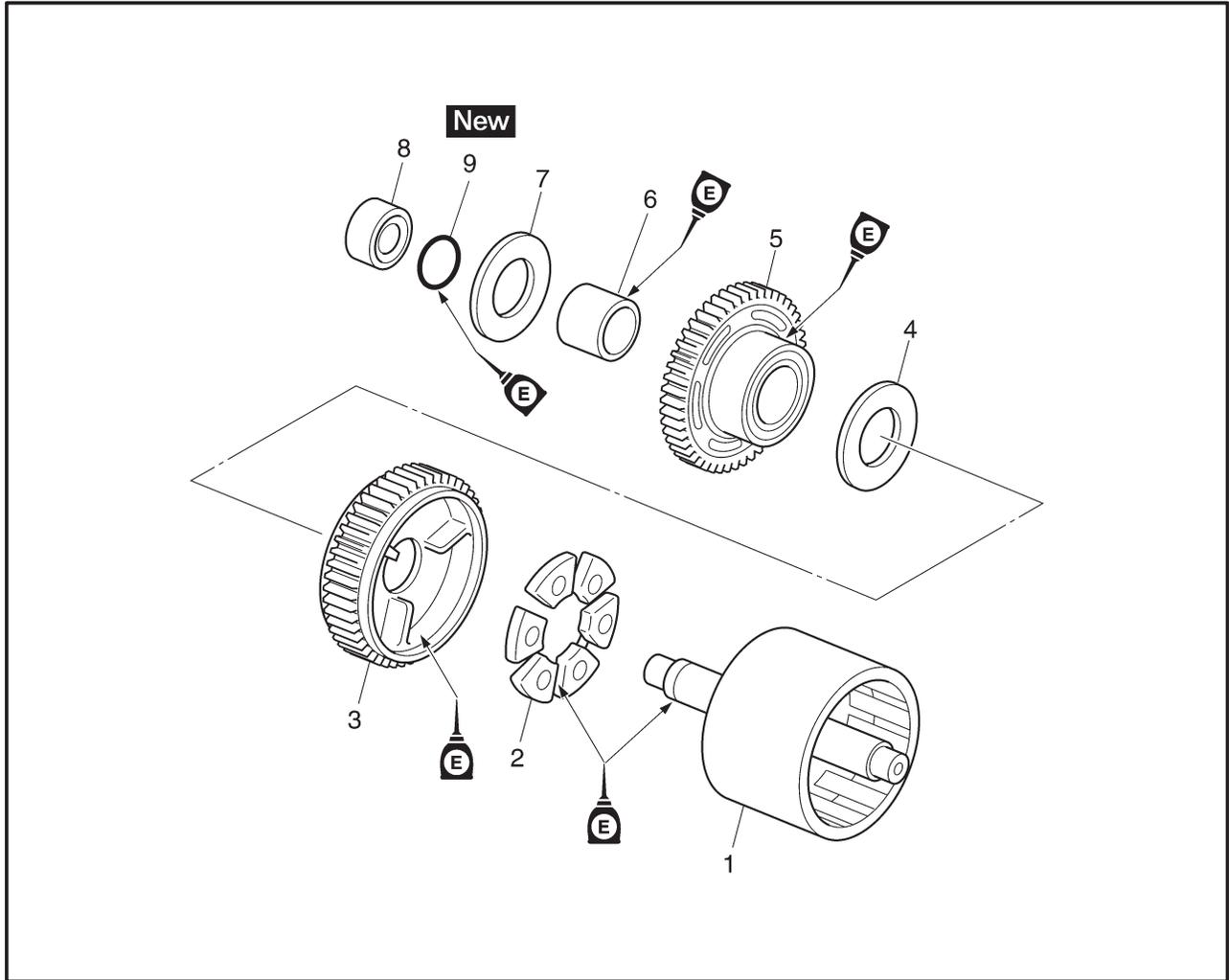


Order	Job/Part	Q'ty	Remarks
	Removing the stator coil assembly		Remove the parts in the order listed.
	Rider seat		Refer to "SEATS" in chapter 3.
	Fuel tank		Refer to "FUEL TANK" in chapter 3.
	Left side cowling		Refer to "COWLINGS" in chapter 3.
	Bottom cowlings		
	Engine oil		Drain.
			Refer to "CHANGING THE ENGINE OIL" in chapter 3.
1	Stator coil assembly lead coupler	1	Disconnect.
2	Plug	1	
3	Generator rotor cover	1	
4	Gasket	1	
5	Dowel pin	2	
6	Generator rotor assembly	1	
7	Dowel pin	2	
8	Bearing housing	1	
9	Collar	1	



Order	Job/Part	Q'ty	Remarks
10	Bearing	1	For installation, reverse the removal procedure.
11	Stator coil assembly lead holder	1	
12	Idler gear	1	
13	Idler gear shaft	1	
14	Washer	1	
15	Bearing	1	

STARTER CLUTCH



Order	Job/Part	Q'ty	Remarks
	Removing the starter clutch		Remove the parts in the order listed.
1	Generator rotor	1	
2	Damper	3	
3	Driven gear	1	
4	Washer	1	
5	Starter clutch drive gear	1	
6	Collar	1	
7	Washer	1	
8	Spacer	1	
9	O-ring	1	
			For installation, reverse the removal procedure.

REMOVING THE GENERATOR

1. Remove:
 - rider seat
 - fuel tank

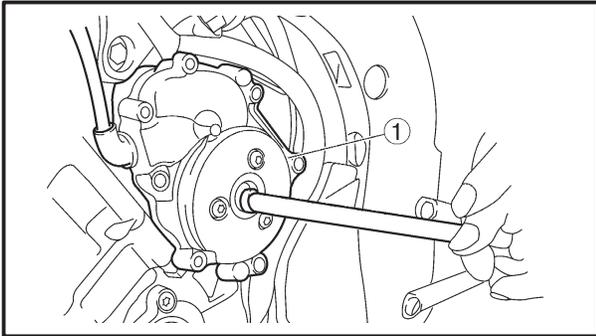
Refer to “SEATS” and “FUEL TANK” in chapter 3.

2. Remove:
 - left side cowling
 - bottom cowlings

Refer to “COWLINGS” in chapter 3.

3. Drain:
 - engine oil

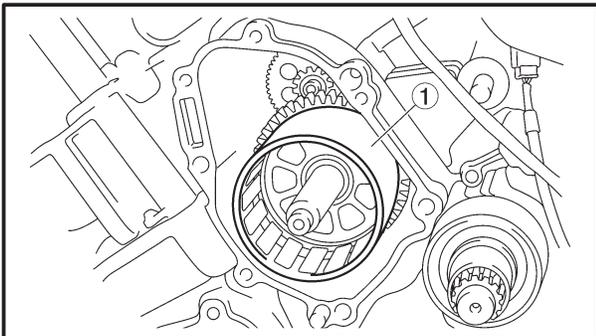
Refer to “CHANGING THE ENGINE OIL” in chapter 3.



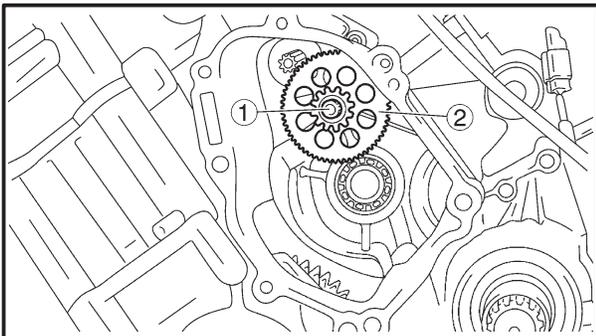
4. Remove:
 - plug
 - generator rotor cover ①

NOTE:

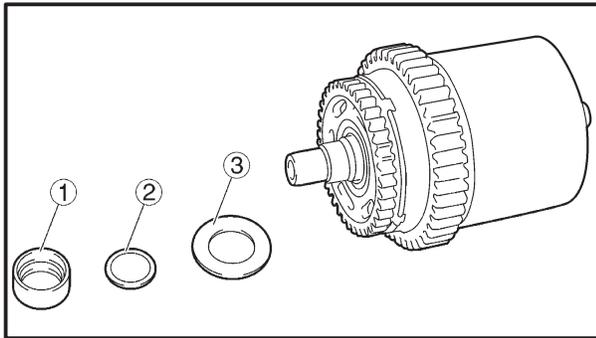
- While pushing generator rotor, remove the generator rotor cover.
- Loosen each bolt 1/4 of a turn a time, in stages and in a crisscross pattern.
- After all of the bolts are fully loosened, remove them.



5. Remove:
 - generator rotor and starter clutch assembly ①.

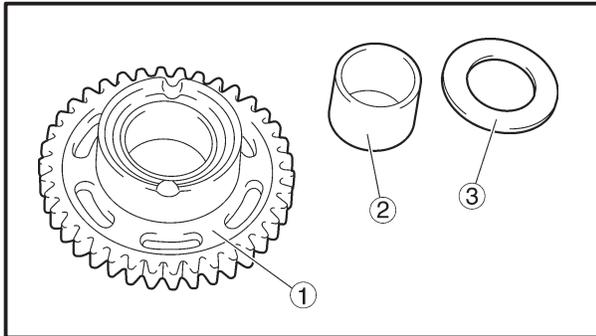


6. Remove:
 - idler gear shaft bolt ①
 - idler shaft
 - idler gear ②

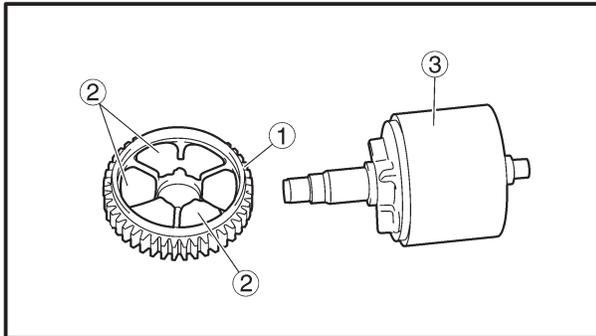


REMOVING THE STARTER CLUTCH

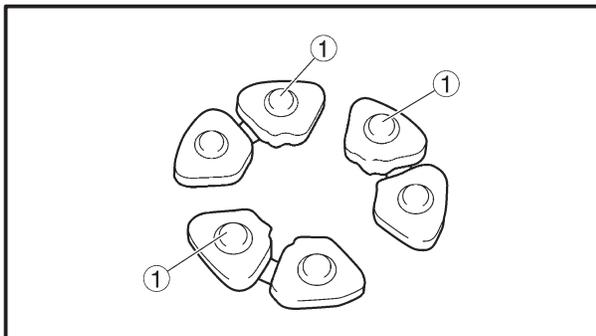
1. Remove:
 - spacer ①
 - O-ring ②
 - washer ③



2. Remove:
 - Starter clutch drive gear ①
 - collar ②
 - washer ③

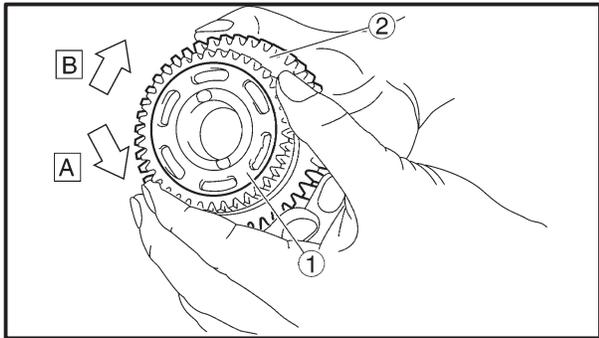
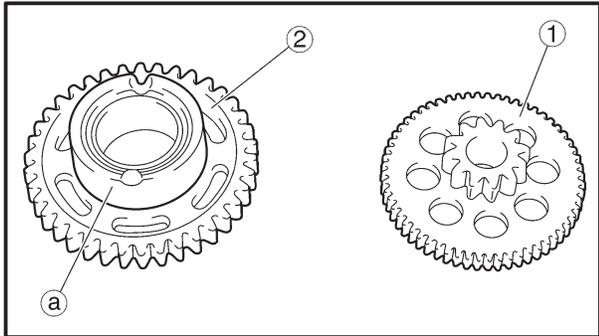
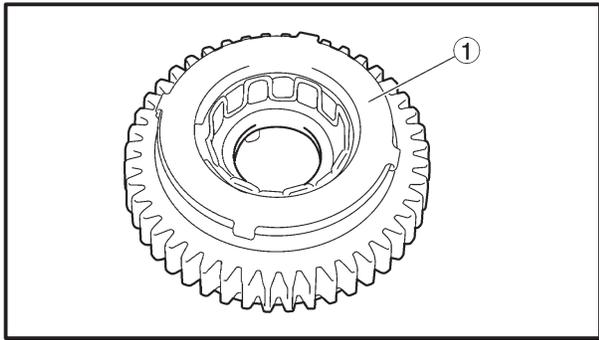


3. Remove:
 - driven gear ①
 - dampers ②
 - generator rotor ③



CHECKING THE DAMPER

1. Check:
 - dampers ①Damage/wear → Replace.



EAS00351

CHECKING THE STARTER CLUTCH

1. Check:

- starter clutch rollers ①
Damage/wear → Replace.

2. Check:

- starter clutch idle gear ①
- starter clutch drive gear ②
Burrs/chips/roughness/wear → Replace the defective part(s).

3. Check:

- starter clutch gear's contacting surfaces ①
Damage/pitting/wear → Replace the starter clutch gear.

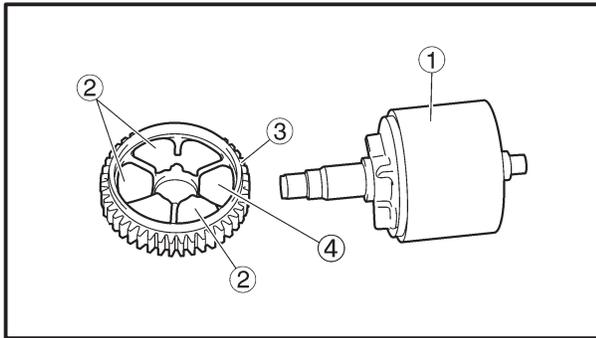
4. Check:

- starter clutch operation



- Install the starter clutch drive gear ① onto the starter clutch ② and hold the starter clutch.
- When turning the starter clutch drive gear counterclockwise [A], the starter clutch and the starter clutch drive gear should engage, otherwise the starter clutch is faulty and must be replaced.
- When turning the starter clutch drive gear clockwise [B], it should turn freely, otherwise the starter clutch is faulty and must be replaced.



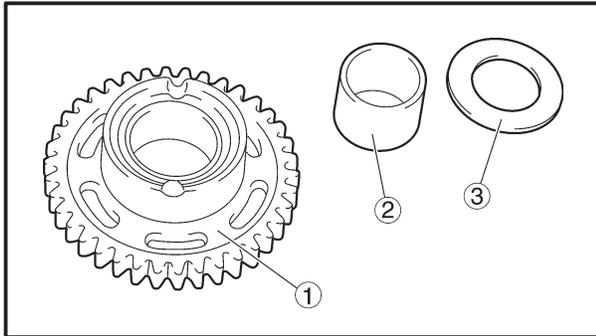


INSTALLING THE STARTER CLUTCH

1. Install:
 - generator rotor ①
 - damper ②
 - driven gear ③

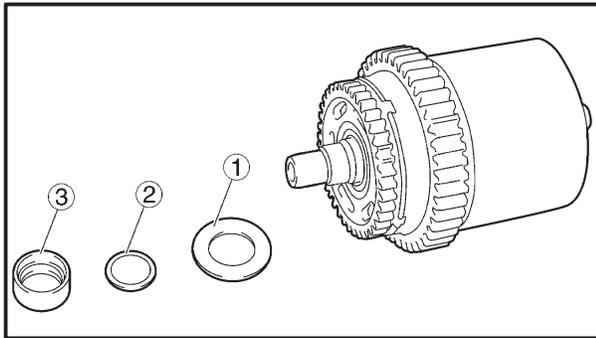
NOTE:

- The hole side of the damper is installed to the generator side.
- Lubricate the engine oil ④.



2. Install:
 - starter clutch drive gear ①
 - collar ②
 - washer ③

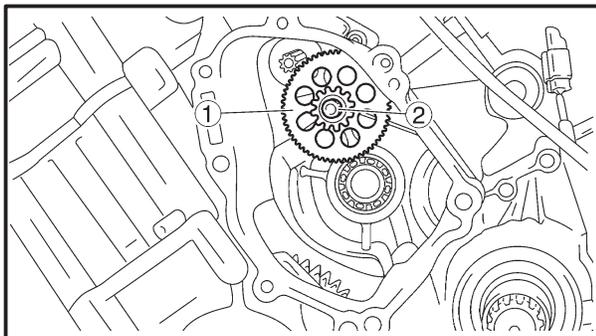
Refer to "CHECKING THE STARTER CLUTCH".



3. Install:
 - washer ①
 - O-ring ② **New**
 - spacer ③

NOTE:

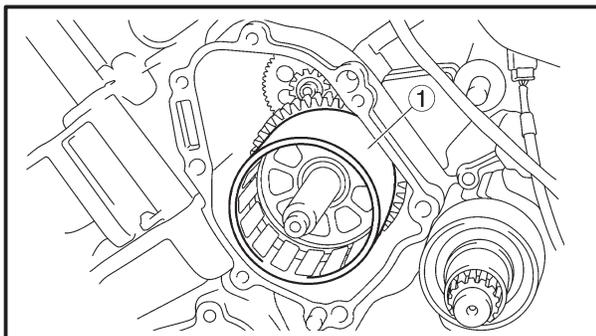
Lubricate the engine oil to O-ring.



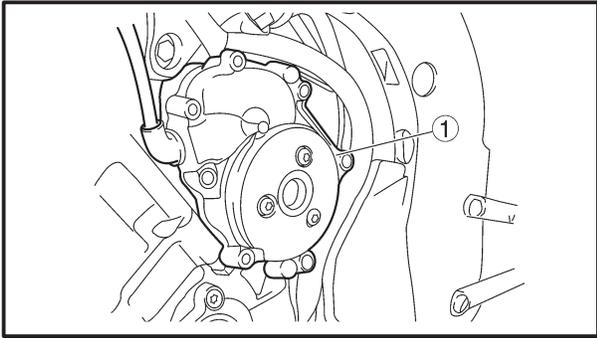
INSTALLING THE GENERATOR

1. Install:
 - idle gear shaft
 - idle gear ①
 - washer
 - idle gear shaft bolt ②

10 Nm (1.0 m•kg, 7.2 ft•lb)
LOCTITE®



2. Install:
 - generator rotor and starter clutch assembly ①



3. Install:
- generator cover gasket
 - generator cover ①

(M6 bolts)	12 Nm (1.2 m•kg, 8.7 ft•lb)
(M8 bolts)	22 Nm (2.2 m•kg, 16 ft•lb)

NOTE:

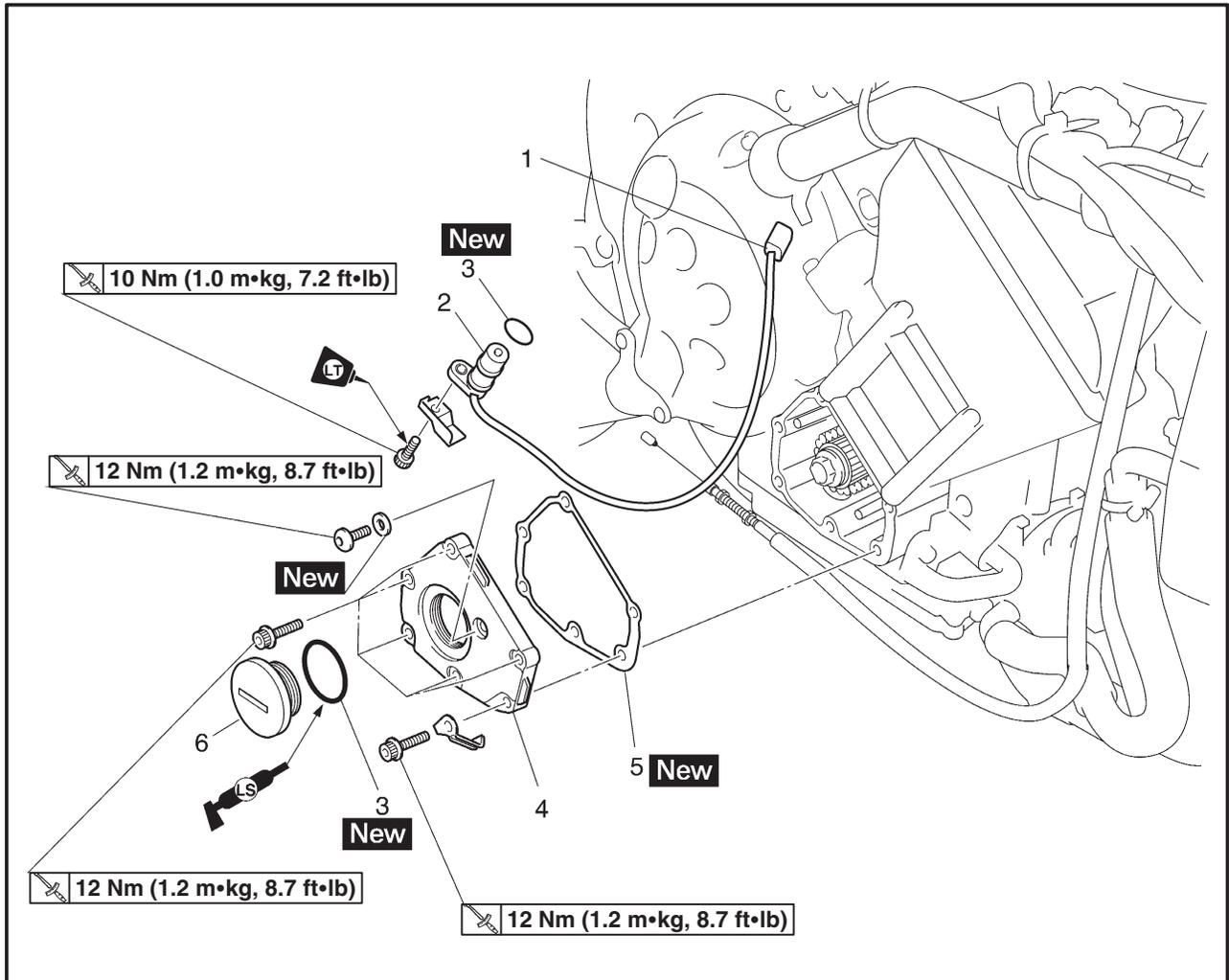
- First tighten the M8 bolts and then tighten the M6 bolts.
- Tighten the generator rotor cover bolts in stages and in a crisscross pattern.

4. Fill:
- engine oil
Refer to “CHANGING THE ENGINE OIL” in chapter 3.

5. Install:
- bottom cowling
 - left side cowling
Refer to “COWLINGS” in chapter 3.

6. Install:
- fuel tank
 - rider seat
Refer to “SEATS” and “FUEL TANK” in chapter 3.

CRANKSHAFT POSITION SENSOR

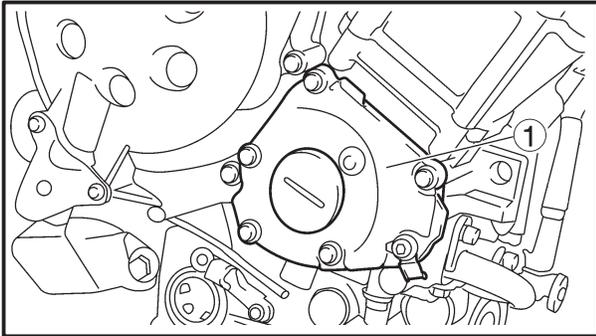


Order	Job/Part	Q'ty	Remarks
	Removing the crankshaft position sensor		Remove the parts in the order listed.
	Rider seat		Refer to "SEATS" in chapter 3.
	Fuel tank		Refer to "FUEL TANK" in chapter 3.
	Side cowlings		Refer to "COWLINGS" in chapter 3.
	Bottom cowlings		
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" in chapter 3.
1	Crankshaft position sensor lead coupler	1	Disconnect.
2	Crankshaft position sensor	1	
3	O-ring	1	
4	Pickup rotor cover	1	
5	Gasket	1	
6	Cover	1	
			For installation, reverse the removal procedure.



REMOVING THE CRANKSHAFT POSITION SENSOR

1. Remove:
 - rider seat
 - fuel tank
 Refer to “SEATS” and “FUEL TANK” in chapter 3.
2. Remove:
 - right side cowling
 - bottom cowlings
 Refer to “COWLINGS” in chapter 3.
3. Drain:
 - engine oil
 Refer to “CHANGING THE ENGINE OIL” in chapter 3.
4. Disconnect:
 - crankshaft position sensor lead coupler



5. Remove:
 - crankshaft position sensor
 - O-ring
 - pickup rotor cover ①

NOTE:

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

INSTALLING THE CRANKSHAFT POSITION SENSOR

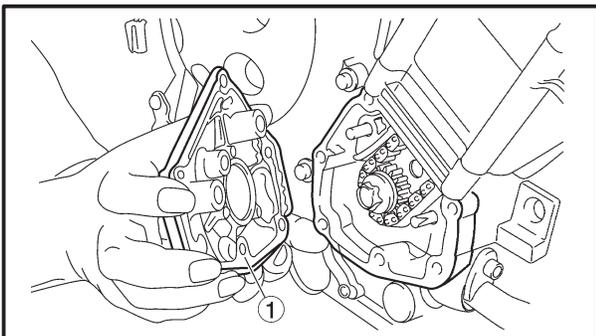
1. Install:
 - gasket **New**
 - pickup rotor cover ①

12 Nm (1.2 m•kg, 8.7 ft•lb)

 - O-ring **New**
 - crankshaft position sensor

10 Nm (1.0 m•kg, 7.2 ft•lb)
LOCTITE®

2. Connect:
 - crankshaft position sensor lead coupler
3. Fill:
 - engine oil
 Refer to “CHANGING THE ENGINE OIL” in chapter 3.
4. Install:
 - right side cowling
 - bottom cowlings
 Refer to “COWLINGS” in chapter 3.



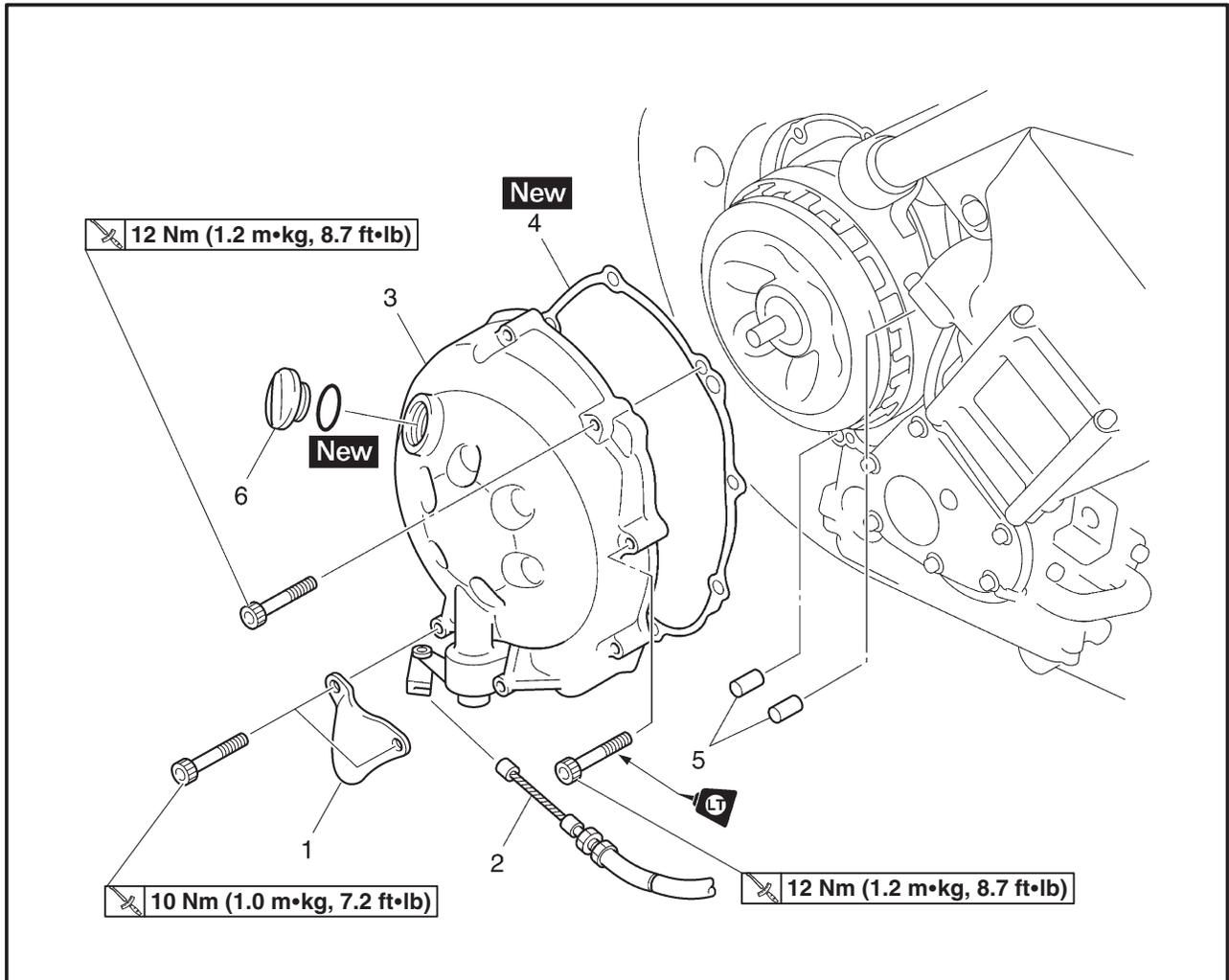


5. Install:

- rider seat
- fuel tank

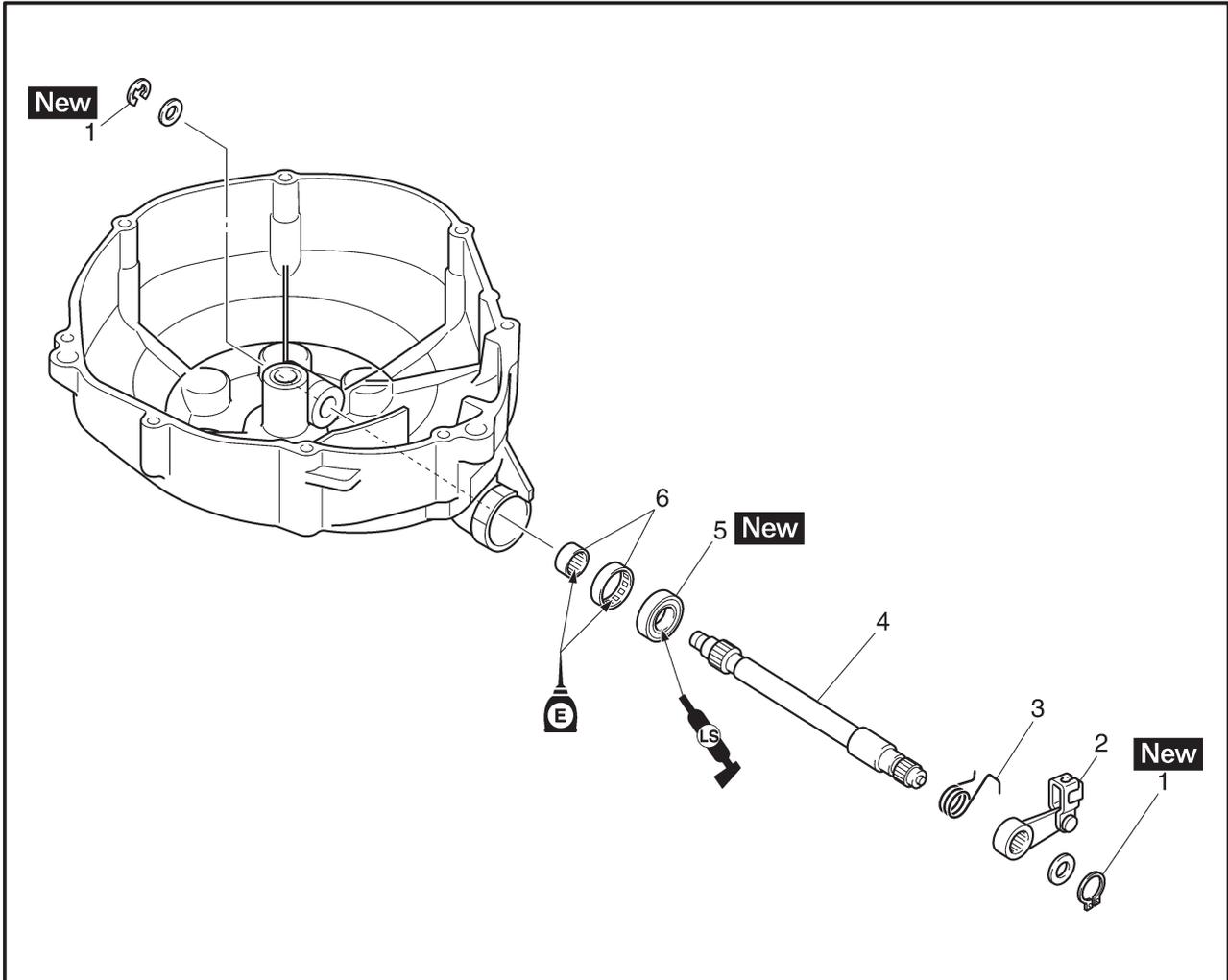
Refer to “SEATS” and “FUEL TANK” in chapter 3.

CLUTCH
CLUTCH COVER



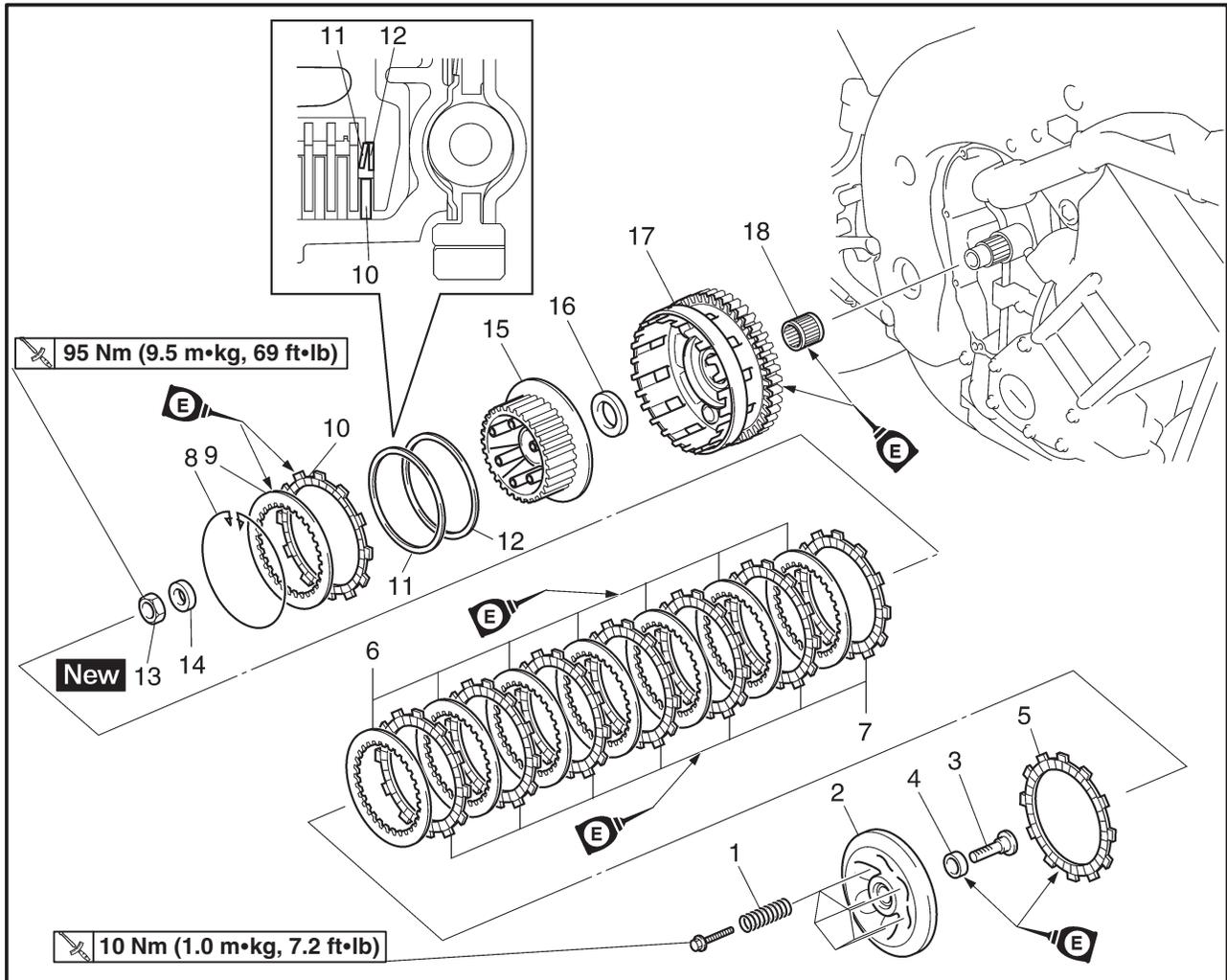
Order	Job/Part	Q'ty	Remarks
	Removing the clutch cover		Remove the parts in the order listed.
	Right side cowling		Refer to "COWLINGS" in chapter 3.
	Bottom cowling		
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" in chapter 3.
1	Cover	1	
2	Clutch cable	1	Disconnect.
3	Clutch cover	1	
4	Clutch cover gasket	1	
5	Dowel pin	2	
6	Oil filler cap	1	
			For installation, reverse the removal procedure.

PULL LEVER SHAFT

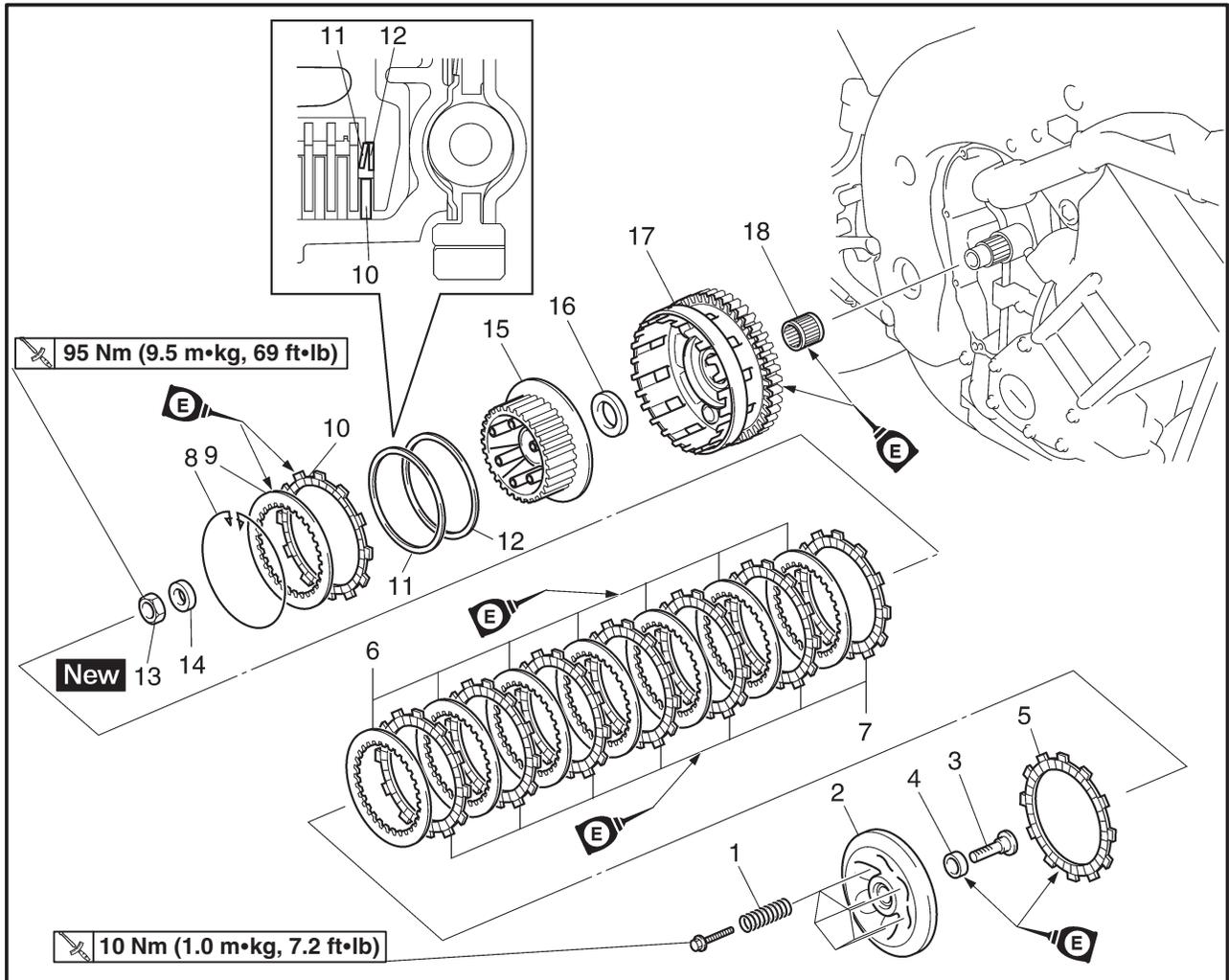


Order	Job/Part	Q'ty	Remarks
	Removing the pull lever shaft		Remove the parts in the order listed.
1	Circlip	2	
2	Pull lever	1	
3	Pull lever spring	1	
4	Pull lever shaft	1	
5	Oil seal	1	
6	Bearing	2	
			For installation, reverse the removal procedure.

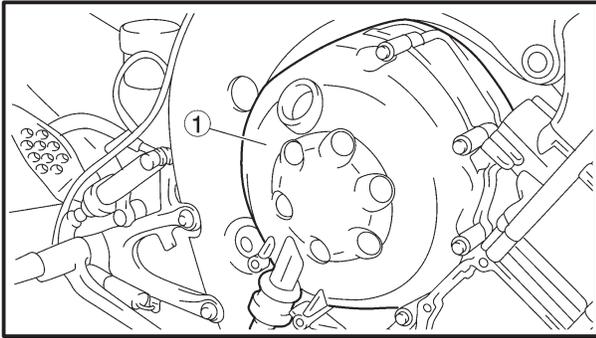
CLUTCH 



Order	Job/Part	Q'ty	Remarks
	Removing the clutch		Remove the parts in the order listed.
1	Compression spring	6	
2	Pressure plate	1	
3	Pull rod	1	
4	Bearing	1	
5	Friction plate 1	1	
6	Clutch plate 1	7	
7	Friction plate 2	7	
8	Wire clip	1	
9	Clutch plate 2	1	
10	Friction plate 3	1	
11	Clutch damper spring	1	
12	Clutch damper spring seat	1	



Order	Job/Part	Q'ty	Remarks
13	Clutch boss nut	1	For installation, reverse the removal procedure.
14	Washer	1	
15	Clutch boss	1	
16	Thrust plate	1	
17	Clutch housing	1	
18	Bearing	1	



EAS00276

REMOVING THE CLUTCH

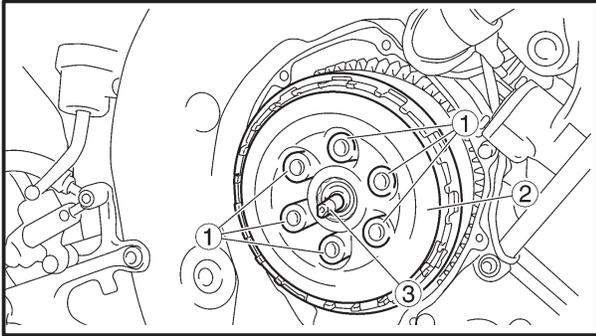
1. Remove:

- clutch cover ①
- gasket

NOTE: _____

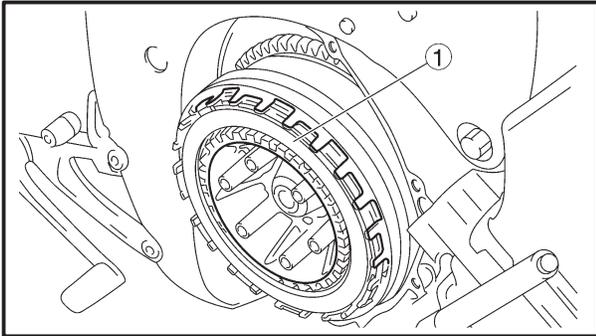
Loosen each bolt 1/4 of a turn at a time, in stages and in a crisscross pattern.

After all of the bolts are fully loosened, remove them.



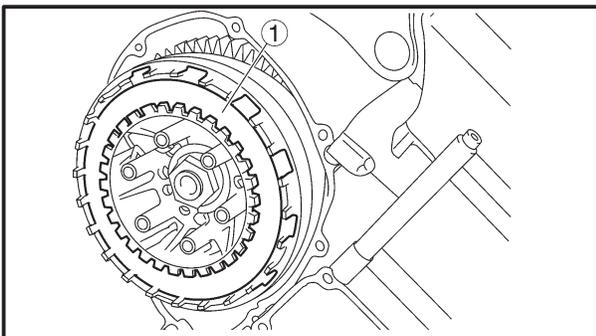
2. Remove:

- compression spring bolts ①
- compression springs
- pressure plate ②
- pull rod ③



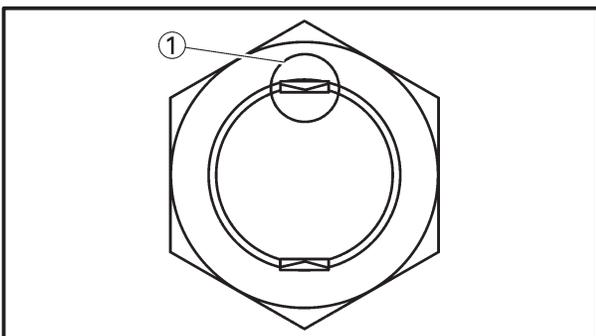
3. Remove:

- friction plate 1

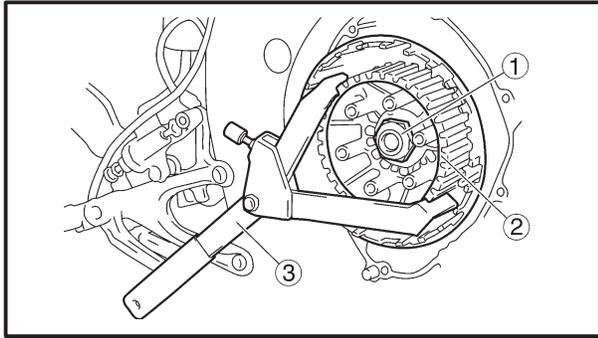


4. Remove:

- clutch plate 1 ①
- friction plate 2



5. Straighten the clutch boss nut rib ①.



6. Loosen:
- clutch boss nut ①

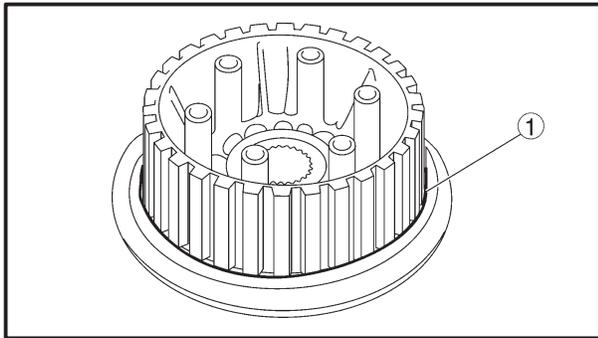
NOTE: _____

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



Universal clutch holder
90890-04086, YM-91042

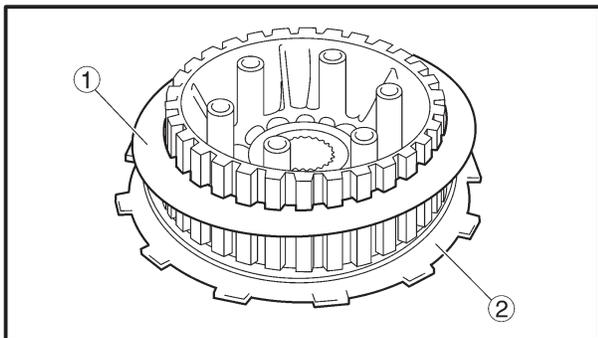
7. Remove:
- clutch boss nut
 - washer
 - clutch boss assembly
 - thrust plate



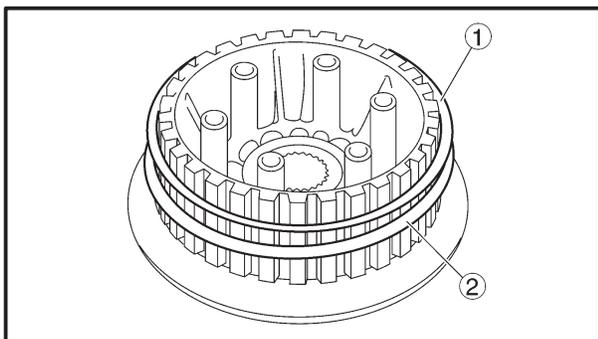
8. Remove:
- wire clip ①

NOTE: _____

There is a built-in damper between the clutch boss and the clutch plate. It is not necessary to remove the wire circlip ① and disassemble the built-in damper unless there is serious clutch chattering.



9. Remove:
- clutch plate 2 ①
 - friction plate 3 ②



10. Remove:
- clutch damper spring ①
 - clutch damper spring seat ②



EAS00280

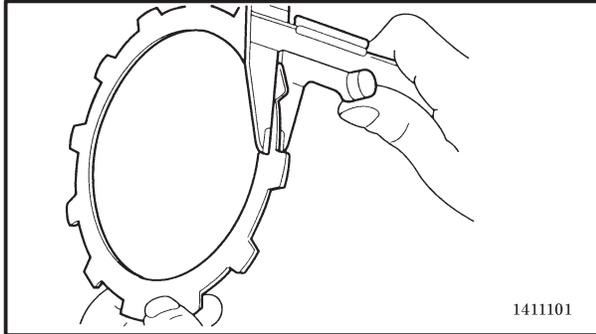
CHECKING THE FRICTION PLATES

The following procedure applies to all of the friction plates.

1. Check:

- friction plate

Damage/wear → Replace the friction plates as a set.



2. Measure:

- friction plate thickness

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

NOTE:

Measure the friction plate at four places.

**Friction plate thickness**

2.9 ~ 3.1 mm (0.114 ~ 0.122 in)

<Limit>: 2.8 mm (0.110 in)

EAS00281

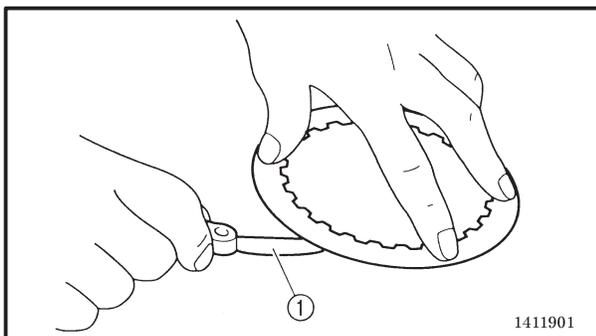
CHECKING THE CLUTCH PLATES

The following procedure applies to all of the clutch plates.

1. Check:

- clutch plate

Damage → Replace the clutch plates as a set.



2. Measure:

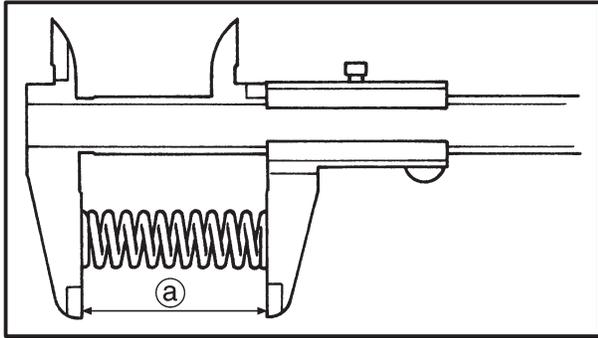
- clutch plate warpage

(with a surface plate and thickness gauge ①)

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

**Clutch plate warpage limit**

0.1 mm (0.0039 in)



EAS00282

CHECKING THE CLUTCH SPRINGS

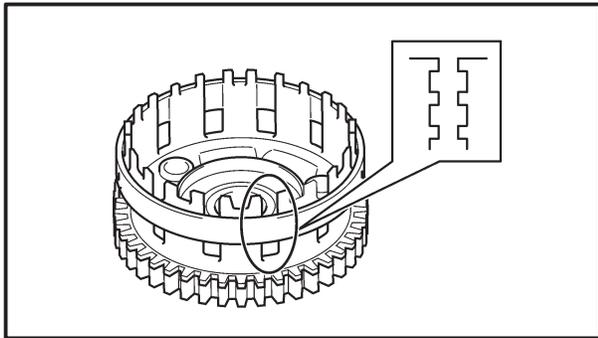
The following procedure applies to all of the clutch springs.

1. Check:
 - clutch spring
Damage → Replace the clutch springs as a set.
2. Measure:
 - clutch spring free length (a)
Out of specification → Replace the clutch springs as a set.

**Clutch spring free length**

52.5 mm (2.07 in)

<Limit>: 49.9 mm (1.96 in)



EAS00284

CHECKING THE CLUTCH HOUSING

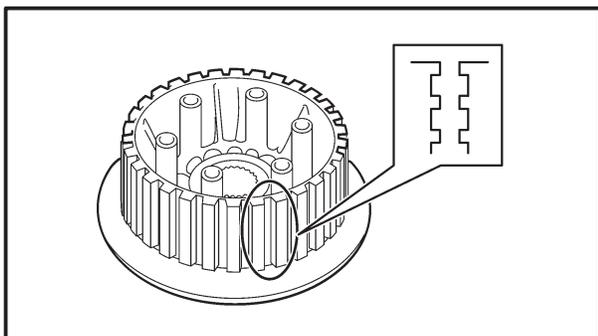
1. Check:
 - clutch housing dogs
Damage/pitting/wear → Deburr the clutch housing dogs or replace the clutch housing.

NOTE: _____

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

2. Check:

- bearing
Damage/wear → Replace the bearing and clutch housing.



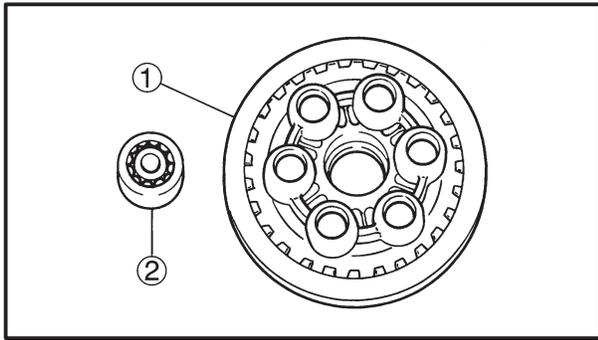
EAS00285

CHECKING THE CLUTCH BOSS

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

NOTE: _____

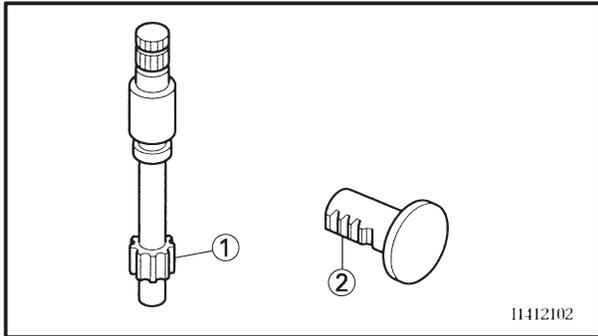
Pitting on the clutch boss splines will cause erratic clutch operation.



EAS00286

CHECKING THE PRESSURE PLATE

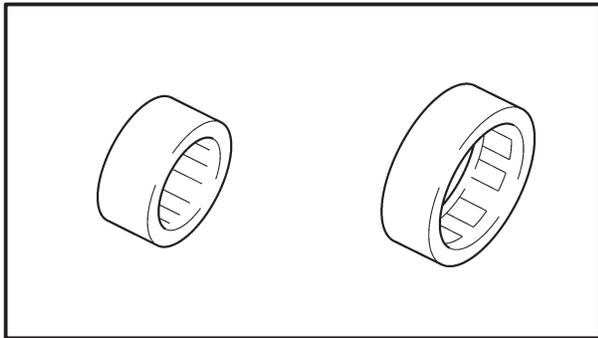
1. Check:
- pressure plate ①
Cracks/damage → Replace.
 - bearing ②
Damage/wear → Replace.



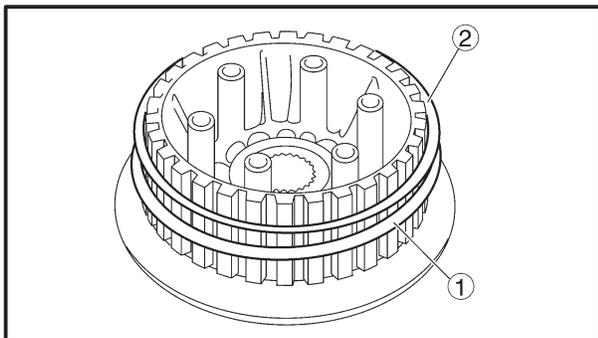
EAS00287

CHECKING THE PULL LEVER SHAFT AND PULL ROD

1. Check:
- pull lever shaft pinion gear teeth ①
 - pull rod teeth ②
Damage/wear → Replace the pull rod and pull lever shaft pinion gear as a set.

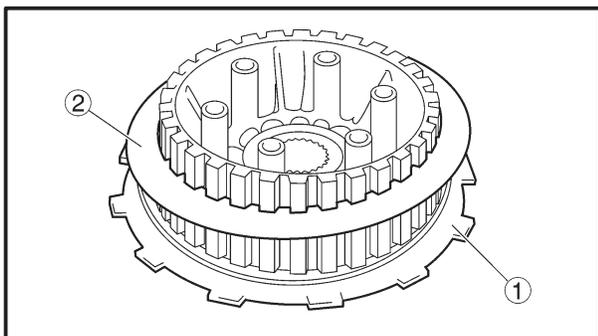


2. Check:
- pull rod bearing
Damage/wear → Replace.



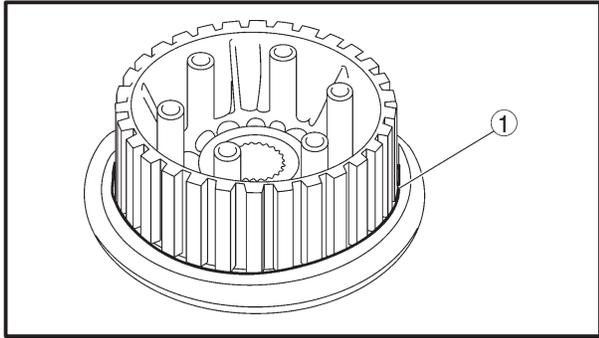
INSTALLING THE CLUTCH

1. Install:
- clutch damper spring seat ①
 - clutch damper spring ②

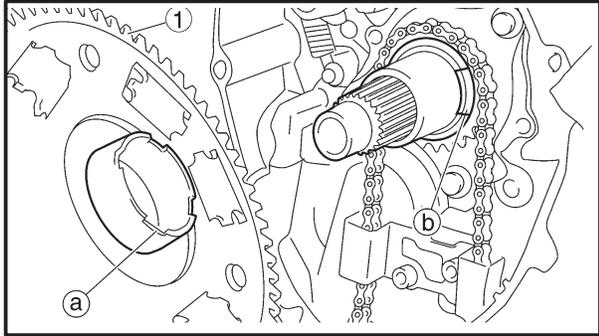


2. Install:
- friction plate 3 ①
 - clutch plate 2 ②

NOTE: _____
Lubricate the engine oil.

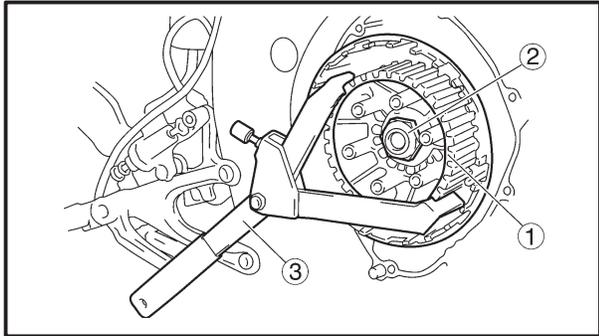


3. Install:
 • wire clip ①



4. Install:
 • clutch housing ①

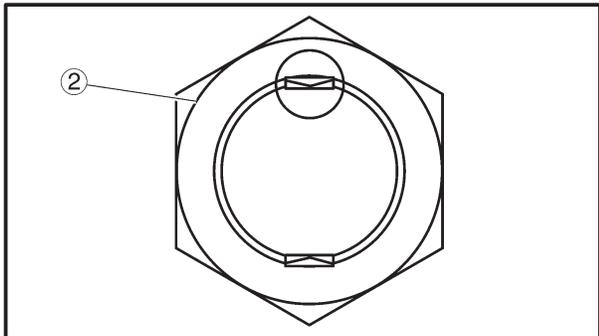
NOTE: _____
 Align the projection of clutch housing (a) and hollow of the oil pump drive gear (b).



5. Install:
 • thrust plate
 • clutch boss assembly ①
 • washer
 • clutch boss nut ② **New**

 **95 Nm(9.5 m•kg, 69 ft•lb)**

NOTE: _____
 • Install the washer on the main axle with the “OUT” mark facing away from the motorcycle.
 • Lock the threads on the clutch boss nut by staking them with a drift punch at the point aligned with the groove in the axle.
 • While holding the clutch boss assembly ① with the clutch holding tool ③, tighten the clutch boss nut.



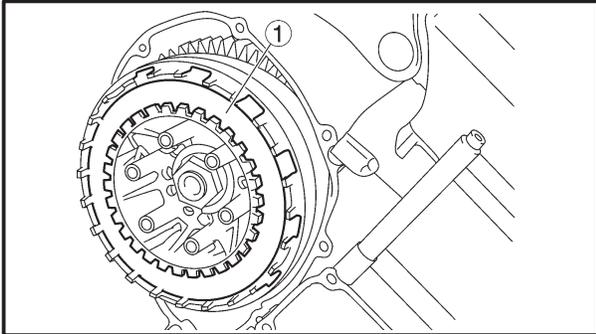
 **Universal clutch holder**
 90890-04089, YM-91042



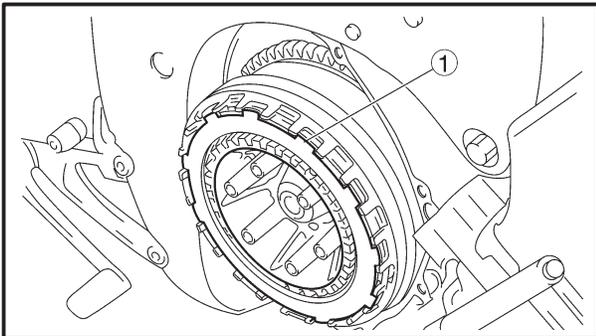
6. Lubricate:
- friction plates
 - clutch plates
(with the recommended lubricant)



Recommended lubricant
Engine oil



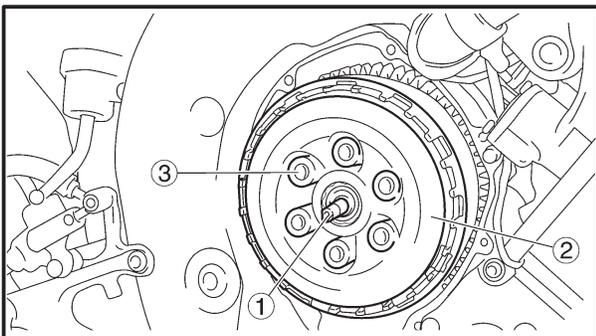
7. Install:
- friction plate 2
 - clutch plate 1 (1)



8. Install:
- friction plate 1 (1)

NOTE: _____

Install the last friction plate shifting half phase.

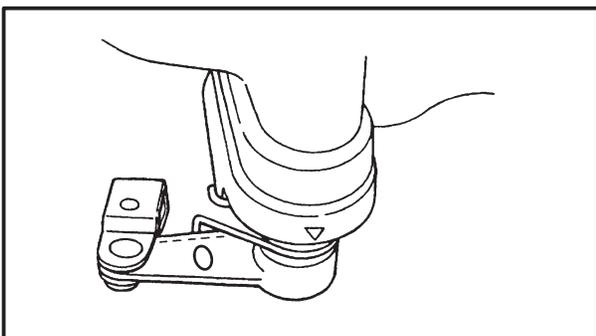


9. Install:
- bearing
 - pull rod (1)
 - pressure plate (2)
 - clutch springs
 - clutch spring bolts (3)

10 Nm (1.0 m•kg, 7.2 ft•lb)

NOTE: _____

Tighten the clutch spring bolts in stages and in a crisscross pattern.



10. Install:
- pull lever

NOTE: _____

Install the pull lever with the “○” mark facing toward upper side.

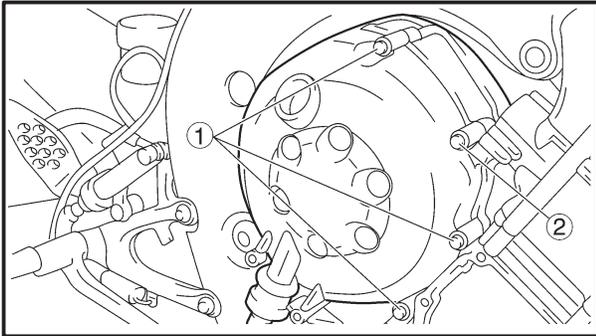
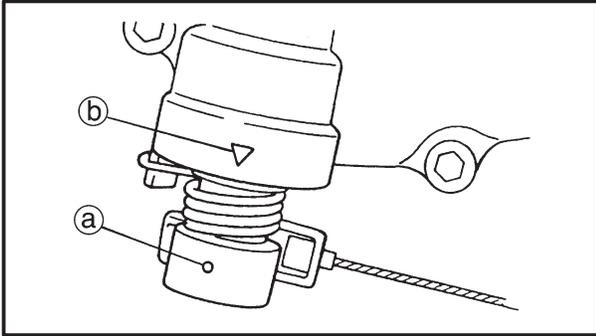


11. Install:

- clutch cover
- clutch cover gasket **New**

NOTE:

- Install the pull rod so that the teeth face towards the rear of the motorcycle. Then, install the clutch cover.
- Apply oil onto the bearing.
- Apply molybdenum disulfide grease onto the pull rod.
- When installing the clutch cover, push the pull lever and check that the punch mark (a) on the pull lever aligns with the mark (b) on the clutch cover. Make sure that the pull rod teeth and pull lever shaft pinion gear are engaged.
- Tighten the clutch cover bolts in stages and in a crisscross pattern.



12. Tighten:

- clutch cover bolts ①

 12 Nm (1.2 m•kg, 8.7 ft•lb)

- clutch cover bolt ②

 12 Nm (1.2 m•kg, 8.7 ft•lb)

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NOTE:

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

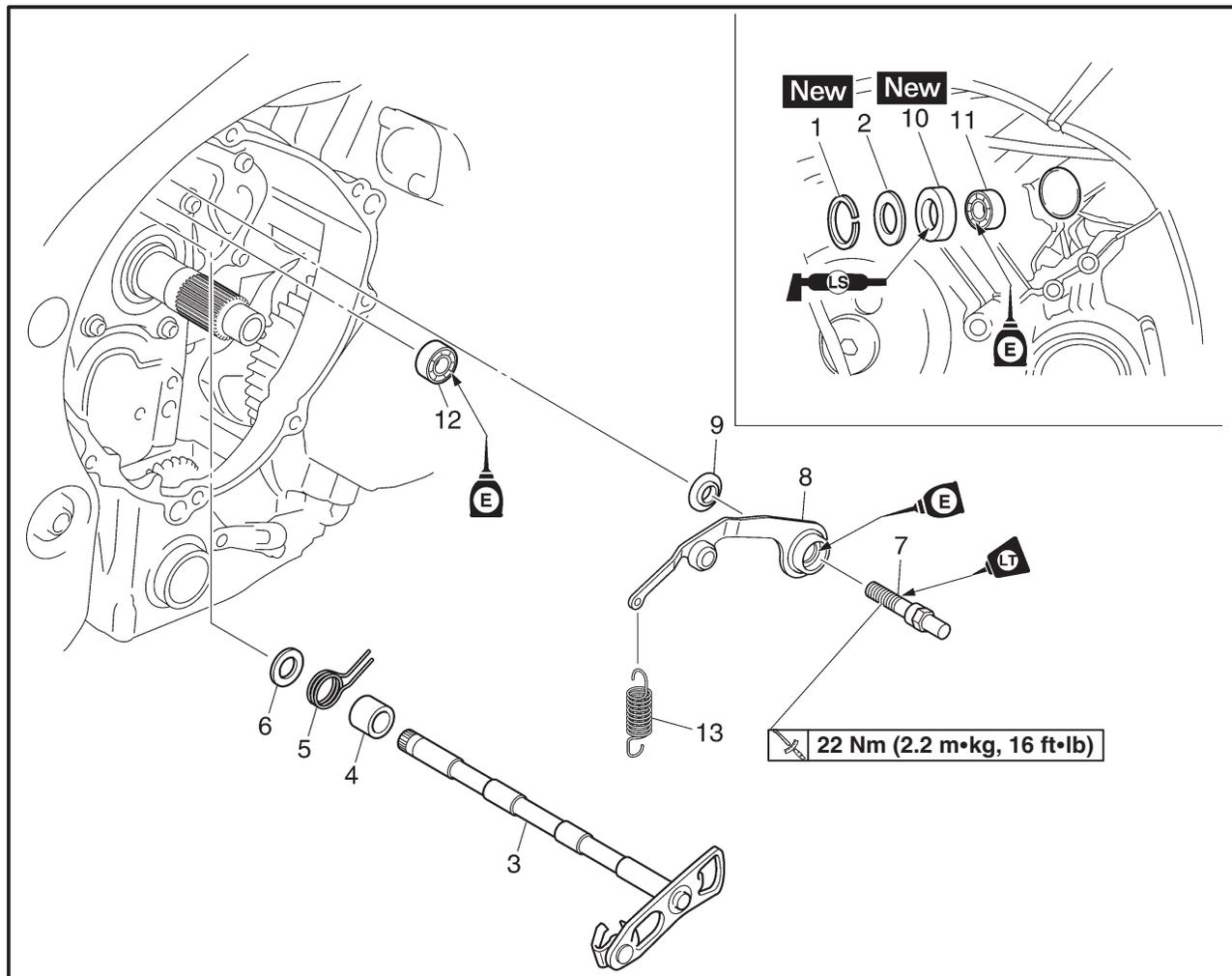
13. Adjust:

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

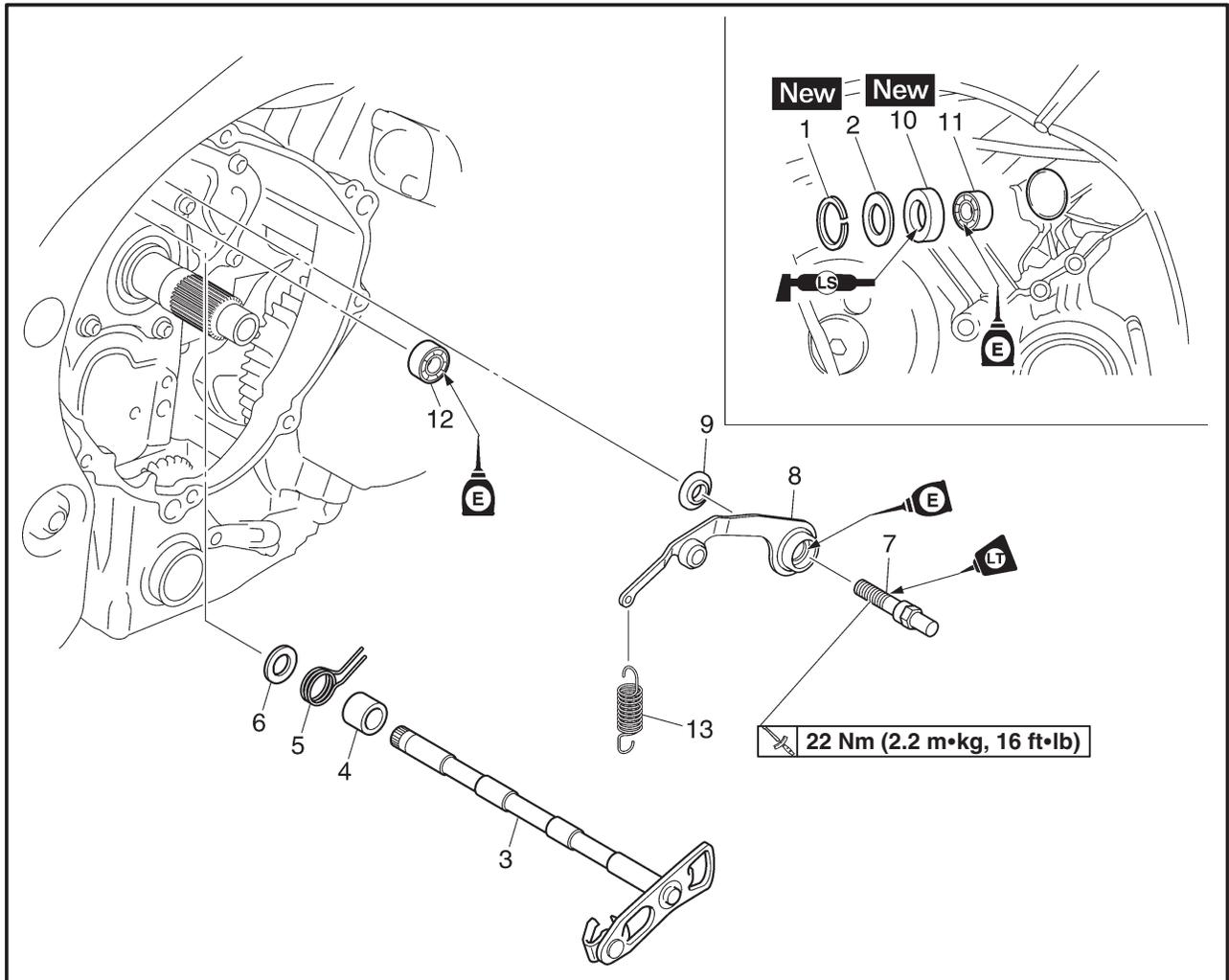


EAS00327

SHIFT SHAFT
SHIFT SHAFT AND STOPPER LEVER



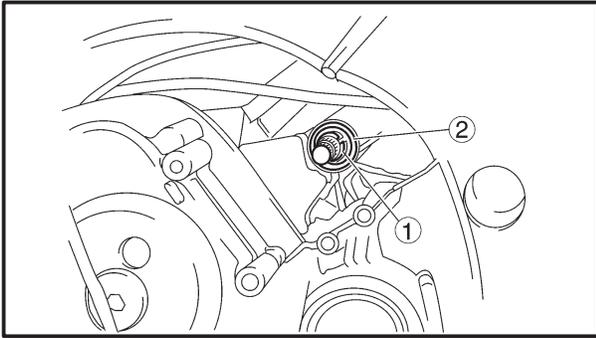
Order	Job/Part	Q'ty	Remarks
	Removing the shift shaft and stopper lever		Remove the parts in the order listed.
	Side cowlings		Refer to "COWLINGS" in chapter 3.
	Bottom cowlings		
	Clutch assembly		
	Sift arm and shift rod		
1	Circlip	1	Refer to "CLUTCH".
2	Washer	1	
3	Shift shaft	1	Refer to "ENGINE".
4	Collar	1	
5	Shift shaft spring	1	
6	Washer	1	
7	Stopper screw	1	
8	Stopper lever	1	
9	Washer	1	



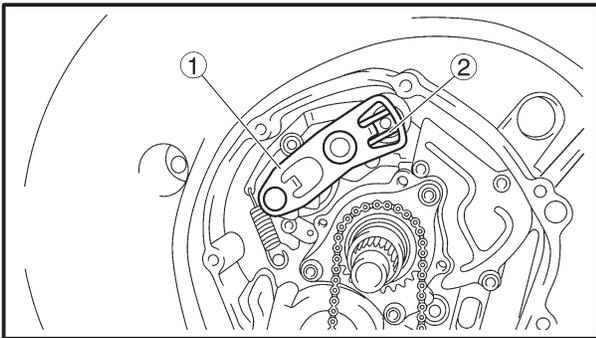
Order	Job/Part	Q'ty	Remarks
10	Oil seal	1	For installation, reverse the removal procedure.
11	Bearing	1	
12	Bearing	1	
13	Stopper lever spring	1	

REMOVING THE SHIFT SHAFT

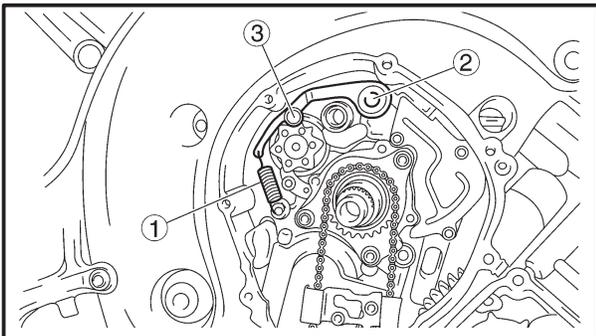
1. Remove:
 - left and right side cowlings
 - bottom cowlings
 Refer to “COWLINGS” in chapter 3.
2. Remove:
 - clutch assembly
 Refer to “CLUTCH”.
3. Remove:
 - shift arm
 - shift rod
 Refer to “ENGINE”.



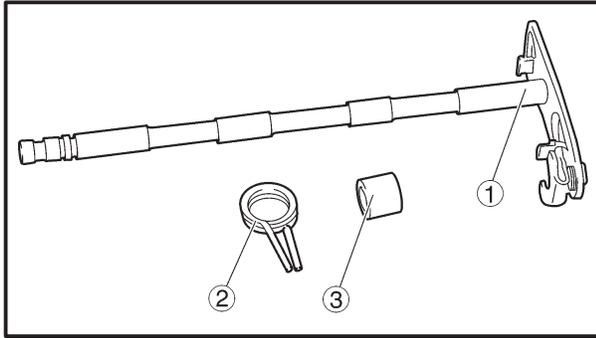
4. Remove:
 - circlip ①
 - Washer ②
 (left side of the engine)



5. Remove:
 - shift shaft ①
 - shift shaft spring ②
 - collar
 - washer

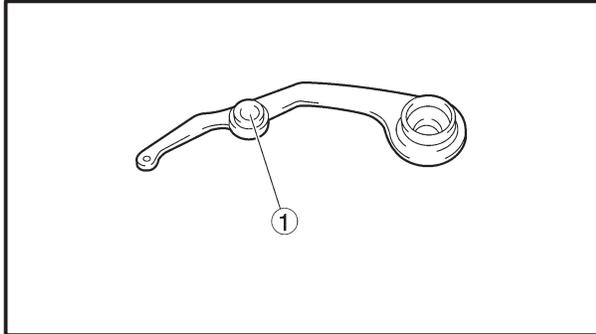


6. Remove:
 - stopper lever spring ①
 - stopper screw ②
 - stopper lever ③
 - washer



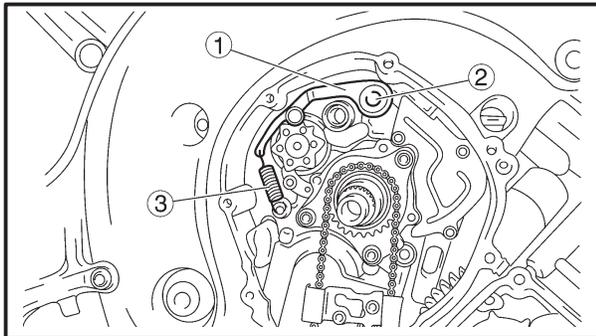
CHECKING THE SHIFT SHAFT

1. Check:
 - shift shaft ①
Bends/damage/wear → replace.
 - shift shaft spring ②
 - collar ③
Damage/wear → Replace.



CHECKING THE STOPPER LEVER

1. Check:
 - stopper lever ①
Bends/damage → Replace.
 - Roller turns roughly → Replace the stopper lever.

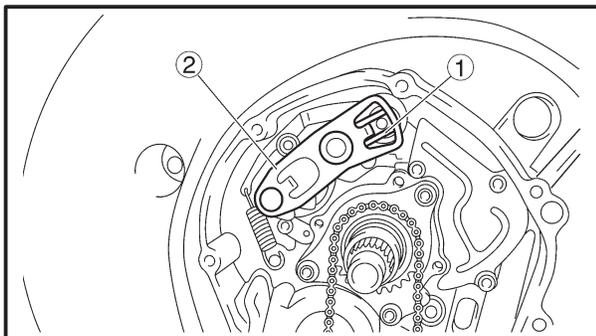


INSTALLING THE SHIFT SHAFT

1. Install:
 - washer
 - stopper lever ①
 - stopper screw ②

22 Nm (2.2 m•kg, 16 ft•lb)
LOCTITE®

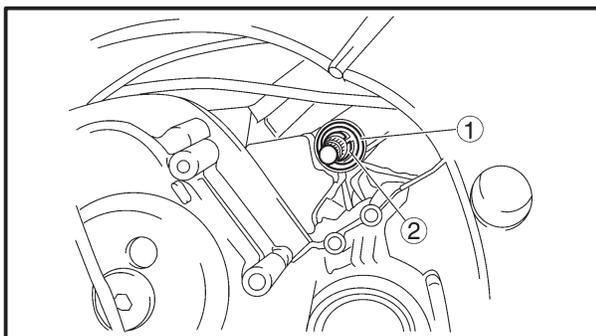
- stopper lever spring ③



2. Install:
 - washer
 - collar
 - shift shaft spring ①
 - shift shaft ②

NOTE:

- Mesh the stopper lever with the shift drum segment assembly.
- Lubricate the oil seal lips with lithium soap base grease.
- Install the end of the shift shaft spring onto the shift shaft spring stopper.



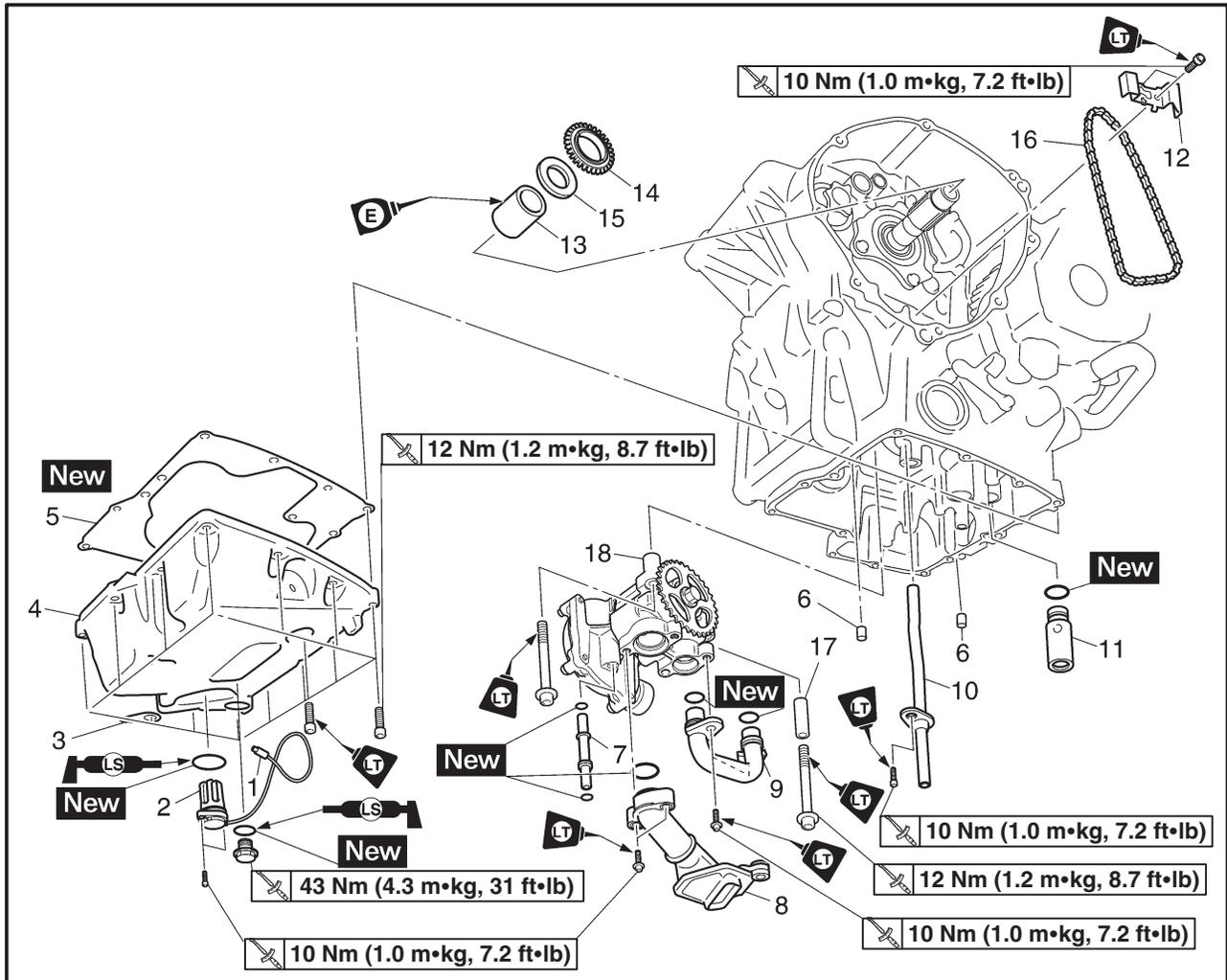
3. Install:
 - Washer ①
 - circlip ② **New**



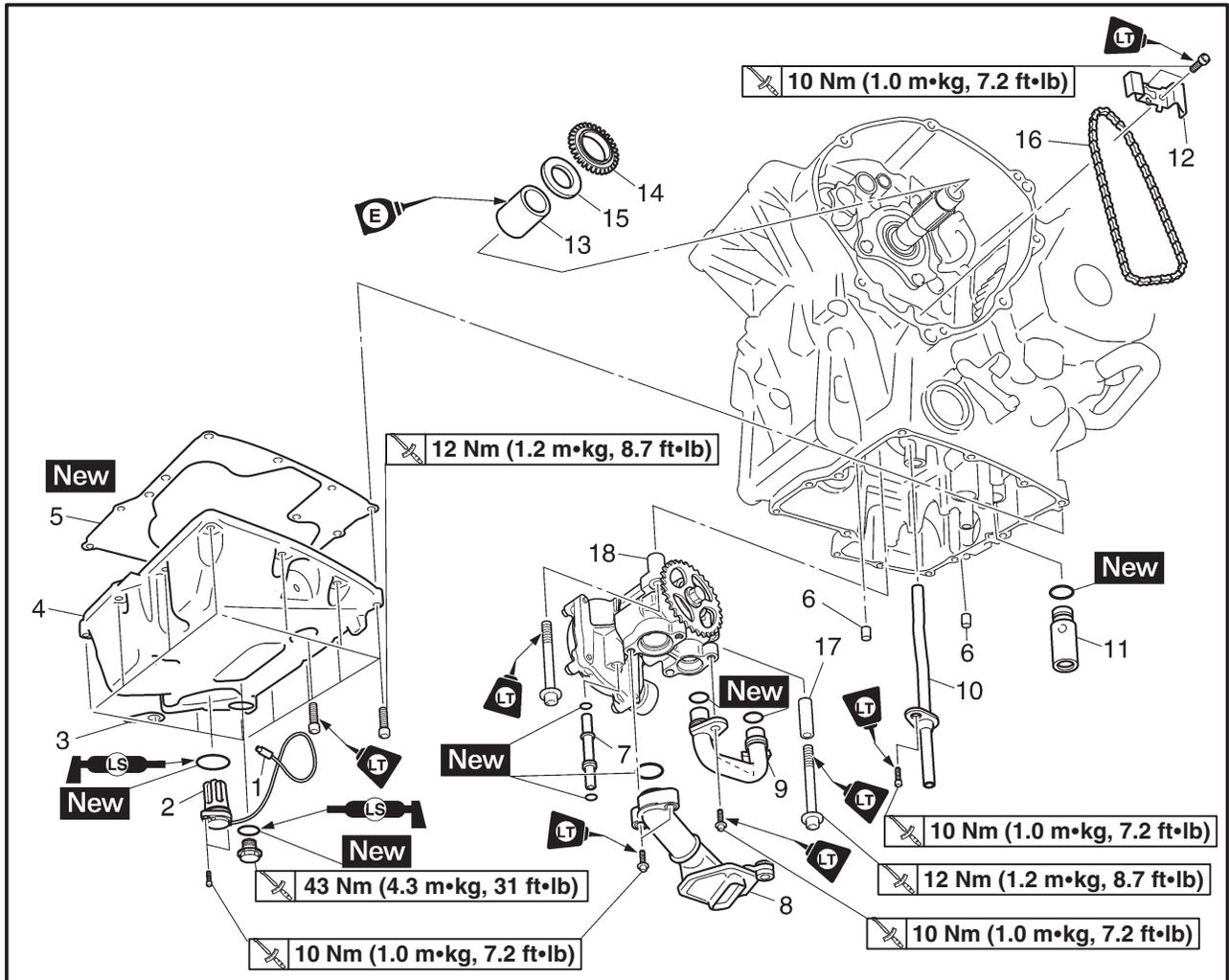
4. Install:
 - shift rod
 - shift armRefer to “ENGINE”.
5. Install:
 - clutch assemblyRefer to “CLUTCH”.
6. Install:
 - left and side cowling
 - bottom cowlingsRefer to “COWLING” in chapter 3.

EAS00356

OIL PAN AND OIL PUMP

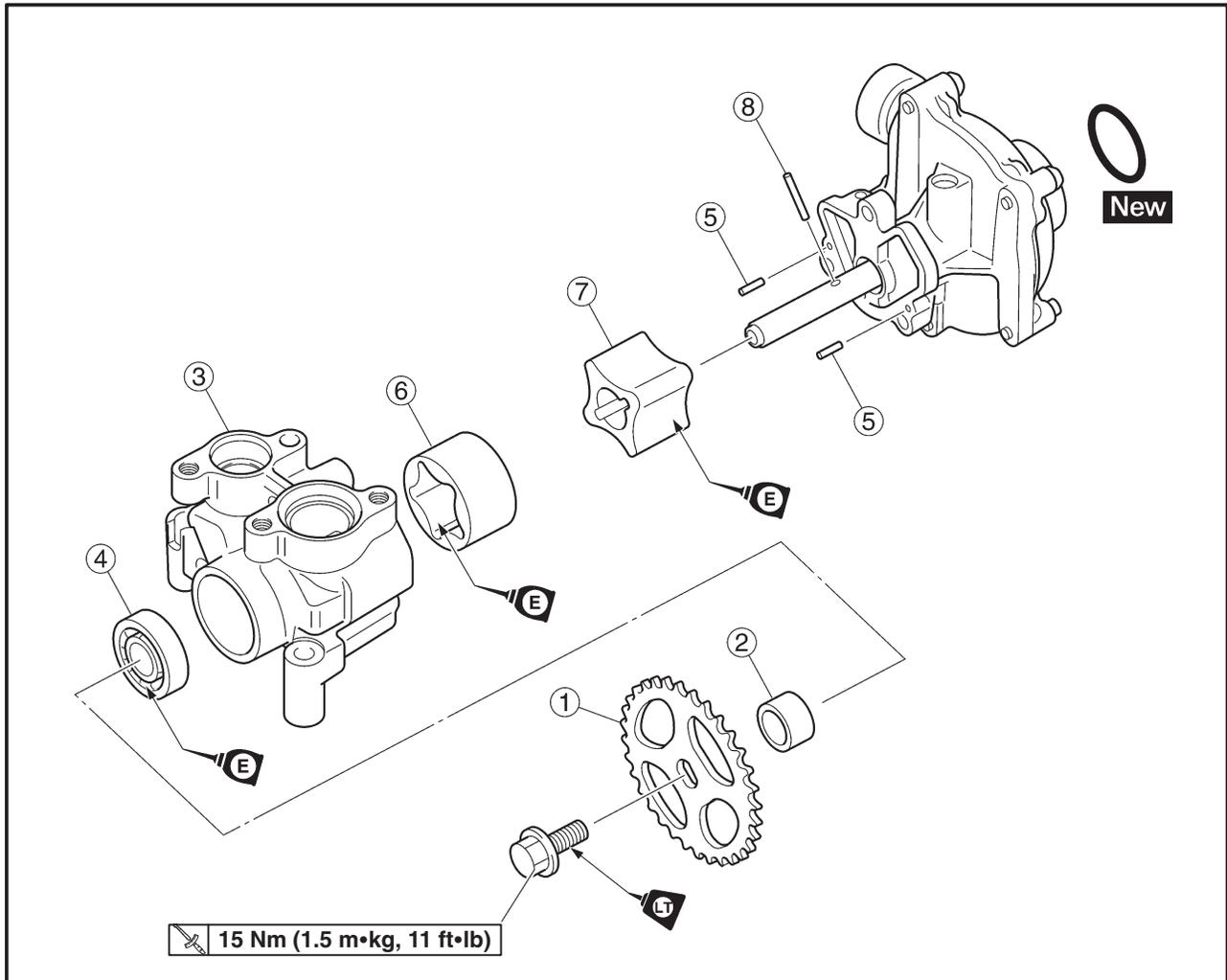


Order	Job/Part	Q'ty	Remarks
	Removing the oil pan and oil pump		Remove the parts in the order listed.
	Side cowlings		Refer to "COWLINGS" in chapter 3.
	Bottom cowlings		
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" in chapter 3.
	Exhaust pipe and exhaust valve pipe		Refer to "EXHAUST PIPE".
	Clutch assembly		Refer to "CLUTCH".
	Water pump inlet pipe		Refer to "OIL COOLER" in chapter 6.
	Water pump outlet pipe		
1	Oil level switch lead coupler	1	Disconnect.
2	Oil level switch	1	
3	Oil level switch lead holder	1	
4	Oil pan	1	
5	Oil pan gasket	1	
6	Dowel pin	2	
7	Drain pipe	1	
8	Oil strainer	1	

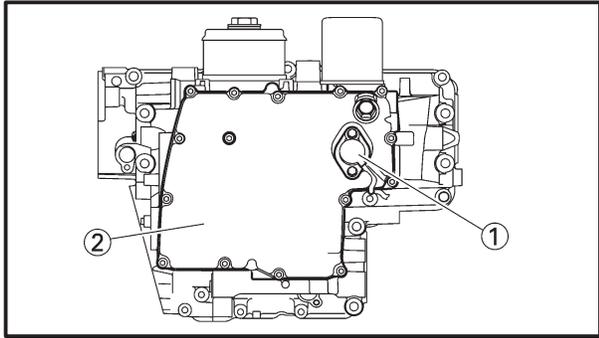


Order	Job/Part	Q'ty	Remarks
9	Oil pipe	1	For installation, reverse the removal procedure.
10	Oil delivery pipe	1	
11	Relief valve assembly	1	
12	Oil/water pump assembly drive chain guide	1	
13	Collar	1	
14	Oil/water pump assembly drive sprocket	1	
15	Washer	1	
16	Oil/water pump assembly drive chain	1	
17	Dowel pin	1	
18	Oil/water pump assembly	1	

EAS00360



Order	Job/Part	Q'ty	Remarks
	Disassembling the oil pump		Disassemble the parts in the order listed.
①	Oil/water pump driven sprocket	1	
②	Collar	1	
③	Oil pump housing	1	
④	Bearing	1	
⑤	Pin	2	
⑥	Oil pump outer rotor	1	
⑦	Oil pump inner rotor	1	
⑧	Pin	1	
			For assembly, reverse the disassembly procedure.



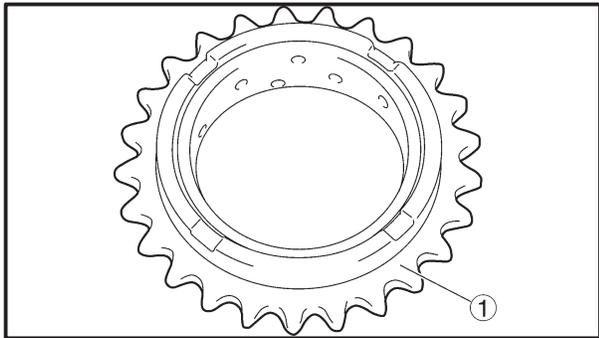
EAS00362

REMOVING THE OIL PAN

1. Remove:
 - oil level switch ①
 - oil pan ②
 - oil pan gasket
 - dowel pins

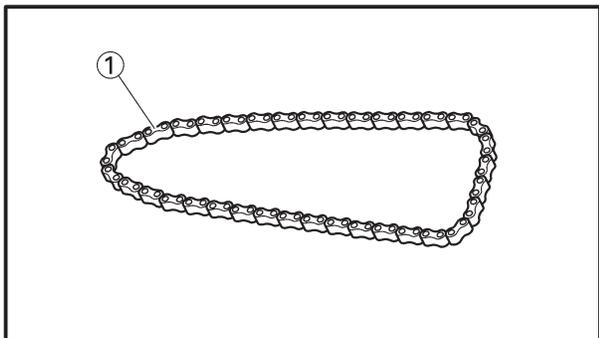
NOTE: _____

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

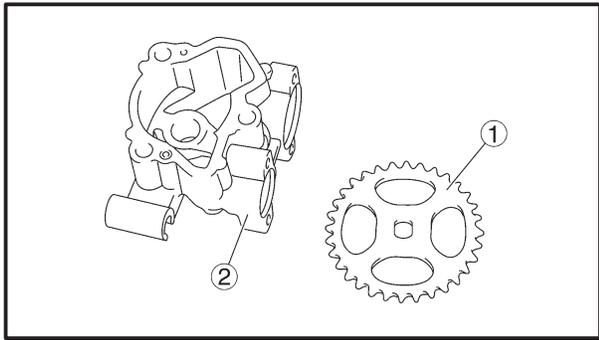


CHECKING THE SPROCKET AND CHAIN

1. Check:
 - oil/water pump assembly drive sprocket ①
Cracks/damage/wear → Replace the defective part(-s).



2. Check:
 - oil/water pump assembly drive chain ①
Damage/stiffness → Replace the oil/water pump assembly drive chain and oil/water pump assembly drive sprocket as a set.

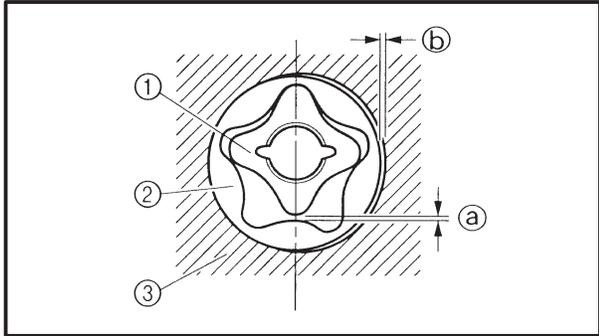


EAS00364

CHECKING THE OIL PUMP

1. Check:

- oil pump driven gear ①
 - oil pump rotor housing ②
 - oil pump cover
- Cracks/damage/wear → Replace the defective part(s).

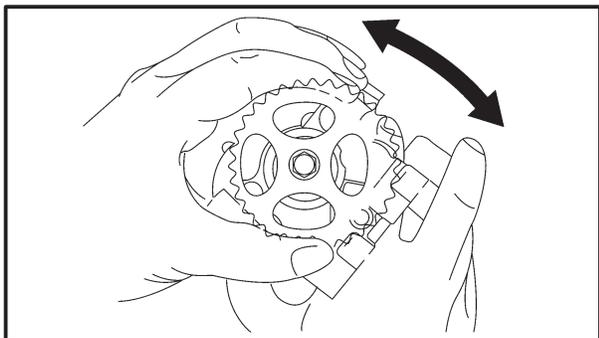


2. Measure:

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

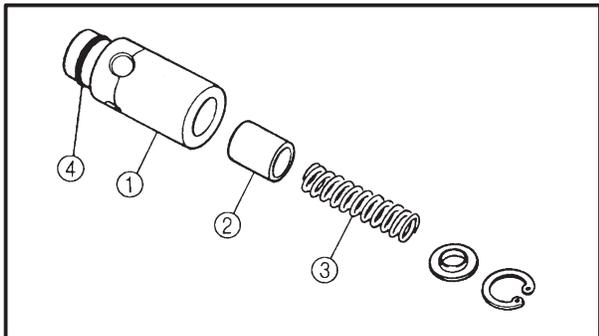
- ① Inner rotor
- ② Outer rotor
- ③ Oil pump housing

	Inner-rotor-to-outer-rotor-tip clearance
	0.01 ~ 0.10 mm (0.0004 ~ 0.0039 in)
	<Limit>: 0.18 mm (0.0071 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 part(s).

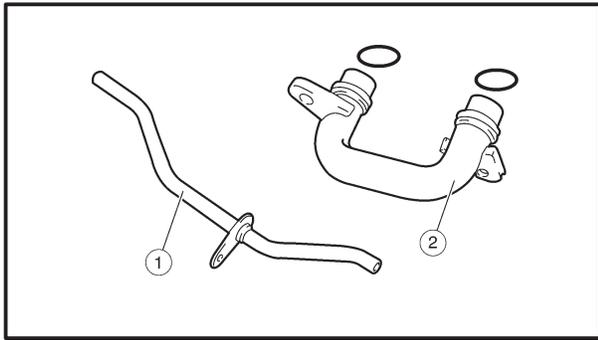


EAS00365

CHECKING THE RELIEF VALVE

1. Check:

- relief valve body ①
 - relief valve ②
 - spring ③
 - O-ring ④
- Damage/wear → Replace the defective part(s).



EAS00367

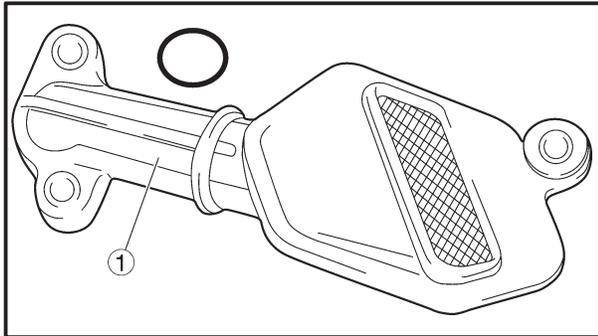
CHECKING THE OIL DELIVERY PIPE AND OIL PIPE

1. Check:

- oil delivery pipe ①
- oil pipe ②

Damage → Replace.

Obstruction → Wash and blow out with compressed air.



EAS00368

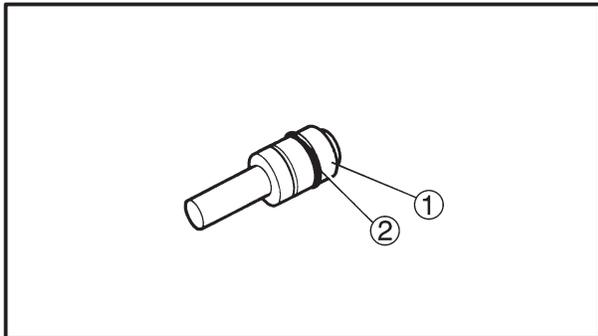
CHECKING THE OIL STRAINER

1. Check:

- oil strainer ①

Damage → Replace.

Contaminants → Clean with solvent.



EAS00373

CHECKING THE OIL NOZZLES

The following procedure applies to all of the oil nozzles.

1. Check:

- oil nozzle ①

Damage/wear → Replace the oil nozzle.

- O-ring ②

Damage/wear → Replace.

- oil nozzle passage

Obstruction → Blow out with compressed air.

EAS00374

ASSEMBLING THE OIL PUMP

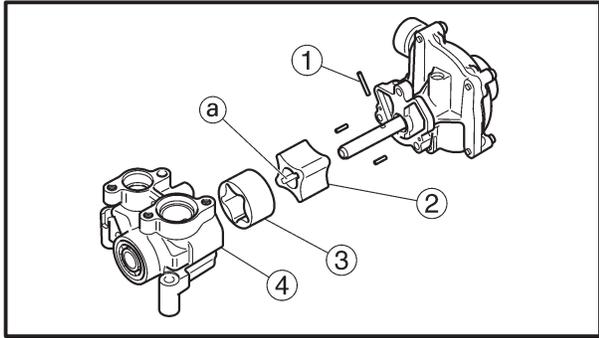
1. Lubricate:

- inner rotor
- outer rotor
- oil pump shaft

(with the recommended lubricant)



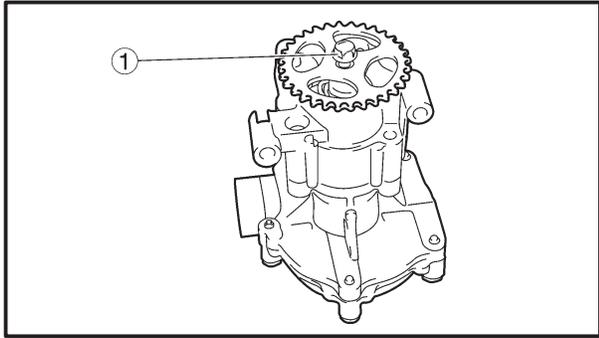
Recommended lubricant
Engine oil



2. Install:
- pin ①
 - inner rotor ②
 - outer rotor ③
 - oil pump housing ④

NOTE:

When installing the inner rotor, align the pin ① in the oil pump shaft with the groove ② in the inner rotor ②.



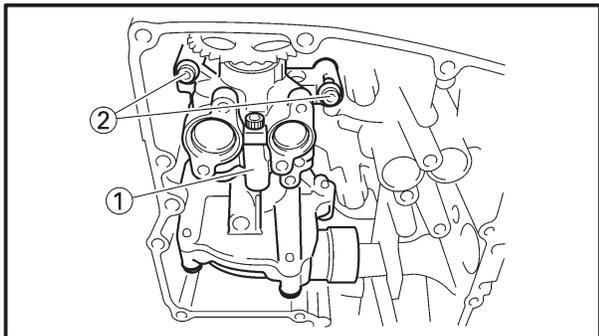
3. Install:
- oil/water pump driven sprocket ①

 **15 Nm (1.5 m•kg, 11 ft•lb)**
LOCTITE®

NOTE:

5VY mark of the oil/water pump driven gear is installed at oil pump side.

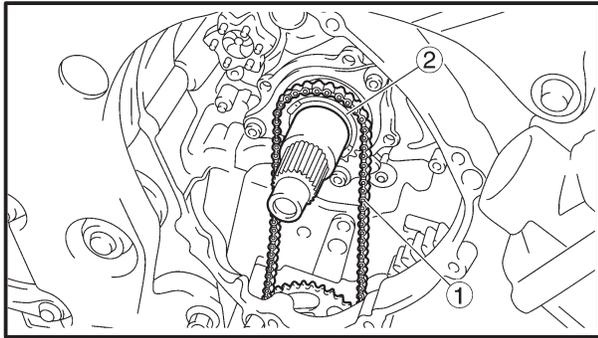
4. Check:
- oil pump operation
- Refer to “CHECKING THE OIL PUMP”.



INSTALLING THE OIL/WATER PUMP ASSEMBLY

1. Install:
- O-ring **New**
 - oil/water pump assembly ①
 - dowel pin
 - bolts ②

 **12 Nm (1.2 m•kg, 8.7 ft•lb)**
LOCTITE®

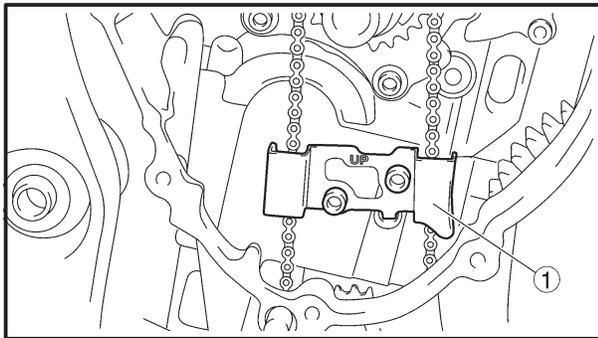


2. Install:
- washer
 - oil/water pump assembly drive chain ①
 - oil/water pump assembly drive sprocket ②
 - collar

NOTE: _____
 Install the oil/water pump assembly drive chain ① onto the oil/water pump assembly drive sprocket ②.

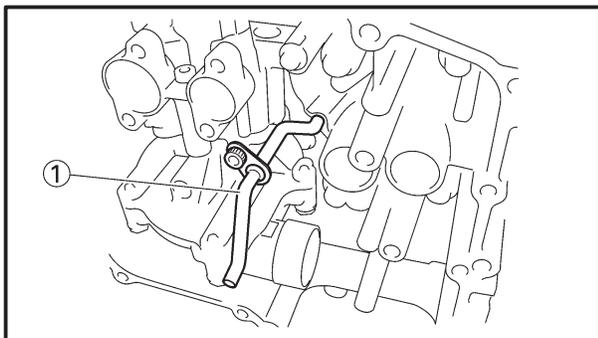
CAUTION: _____

After installing the oil/water pump assembly drive chain and drive sprocket, make sure the oil/water pump turns smoothly.

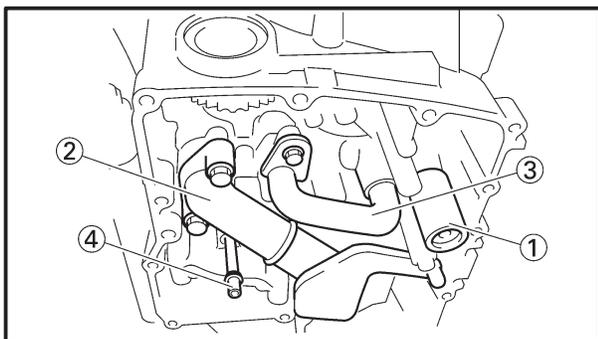


3. Install:
- oil/water pump assembly drive chain guide ①
-  10 Nm (1.0 m•kg, 7.2 ft•lb)
 LOCTITE®

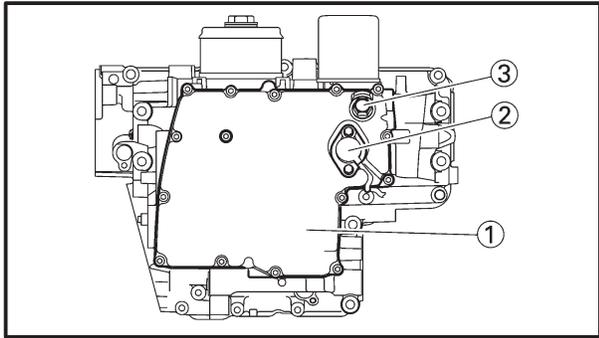
NOTE: _____
 “UP” mark of the oil/water pump assembly drive chain guide is upward.



4. Install:
- oil delivery pipe ①
-  10 Nm (1.0 m•kg, 7.2 ft•lb)
 LOCTITE®



5. Install:
- relief valve ①
 - O-ring **New**
 - oil strainer ②
 - O-ring **New**
 - oil pipe ③
 - O-ring **New**
 - drain pipe ④
 - O-ring **New**
-  10 Nm (1.0 m•kg, 7.2 ft•lb)
 LOCTITE®



EAS00380

INSTALLING THE OIL PAN

1. Install:

- dowel pins
- gasket **New**
- oil pan ①  **12 Nm (1.2 m•kg, 8.7 ft•lb)**
- oil level switch ②  **10 Nm (1.0 m•kg, 7.2 ft•lb)**
- engine oil drain bolt ③  **43Nm (4.3 m•kg, 31 ft•lb)**

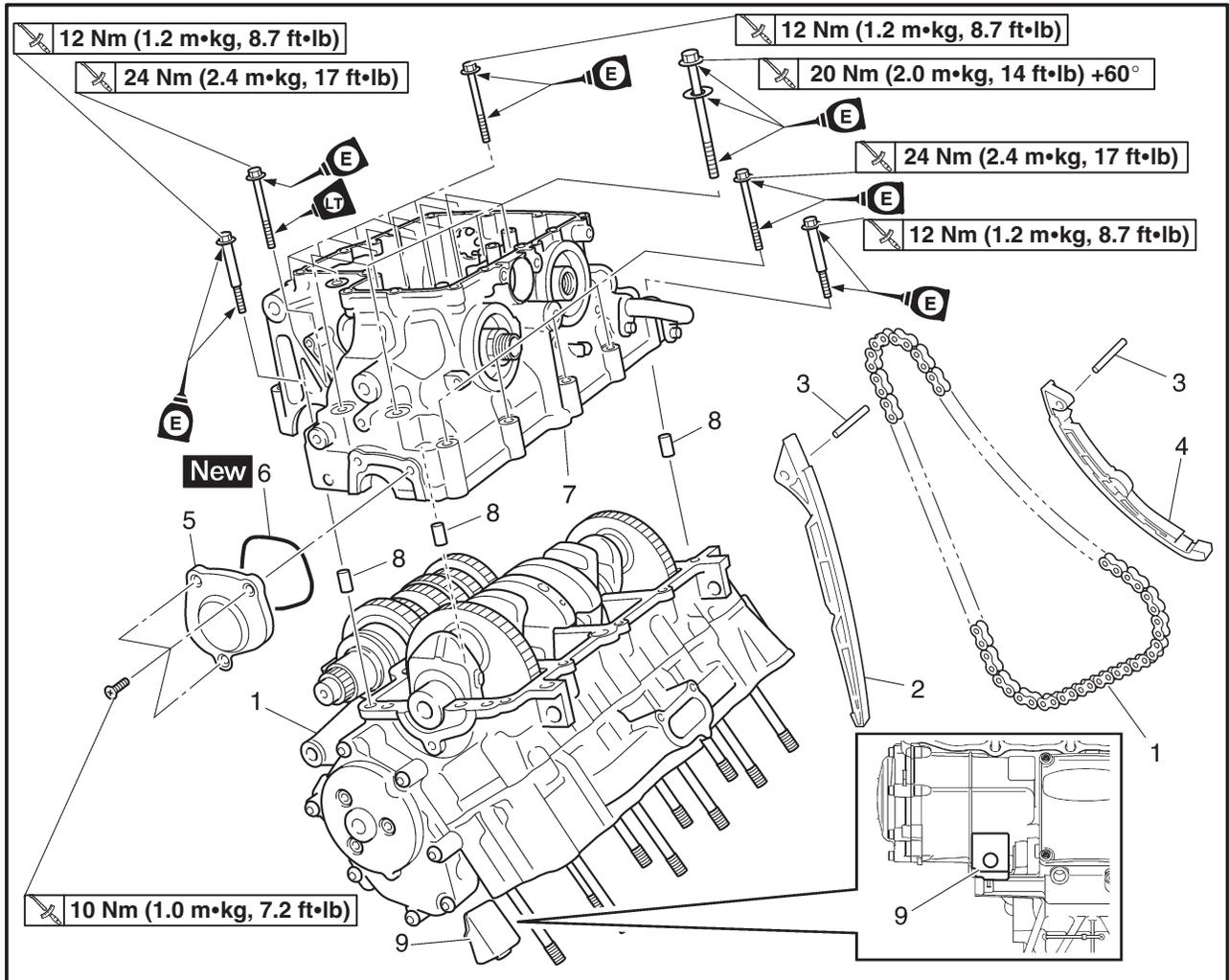
⚠ WARNING

Always use new copper washers.

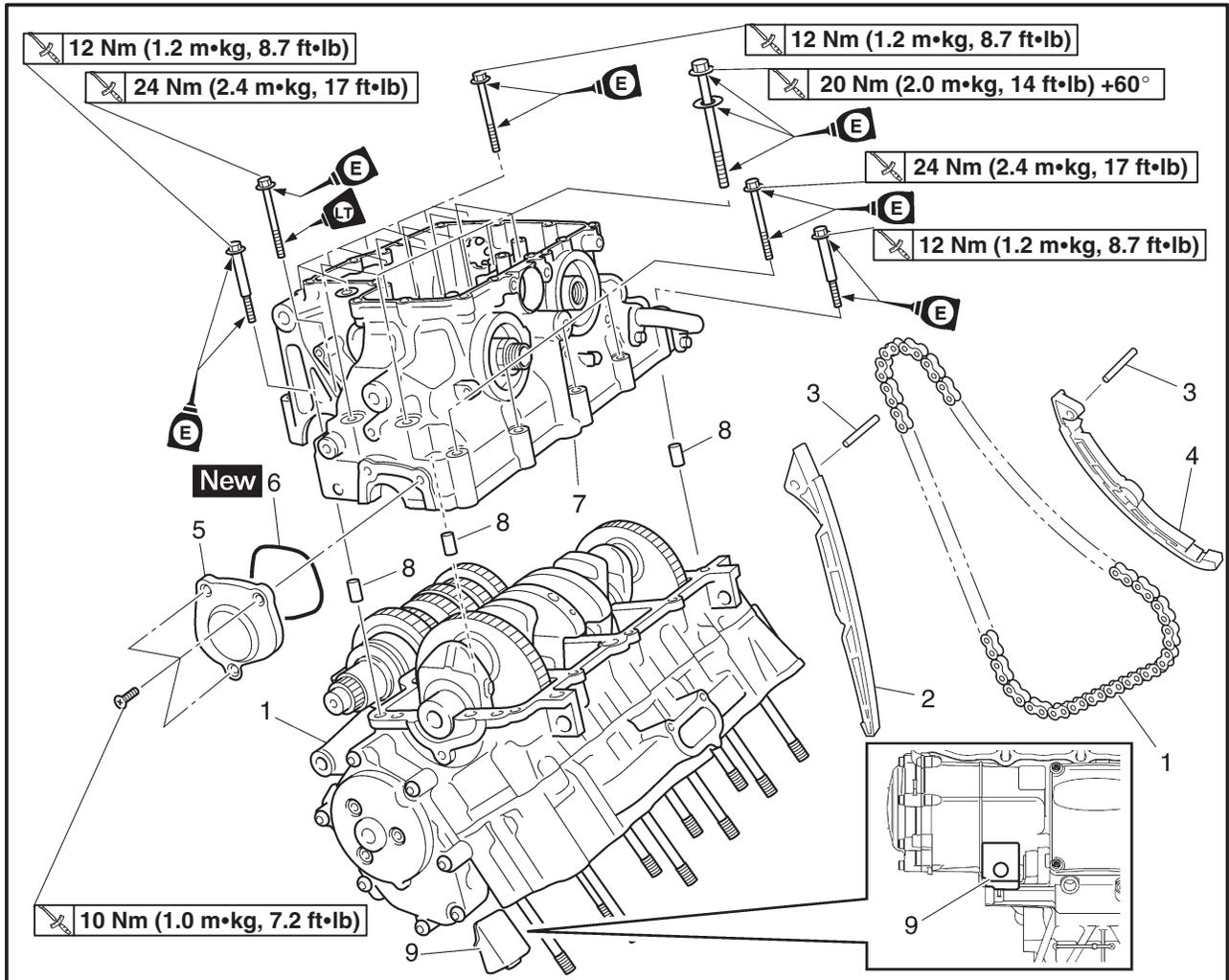
NOTE:

- Tighten the oil pan bolts in stages and in a crisscross pattern.
- Lubricate the oil level switch O-ring with engine oil.

CRANKCASE



Order	Job/Part	Q'ty	Remarks
	<p>Removing the crankcase</p> <p>Air filter case</p> <p>Throttle body assembly</p> <p>Engine</p> <p>Cylinder head</p> <p>Starter clutch and generator</p> <p>Shift shaft</p> <p>Crankshaft position sensor</p> <p>Clutch</p> <p>Oil pan and oil pump</p> <p>Starter motor</p>		<p>Remove the parts in the order listed.</p> <p>Refer to "AIR FILTER CASE" in chapter 3.</p> <p>Refer to "THROTTLE BODIES" in chapter 7.</p> <p>Refer to "ENGINE".</p> <p>Refer to "CYLINDER HEAD".</p> <p>Refer to "STARTER CLUTCH AND GENERATOR".</p> <p>Refer to "SHIFT SHAFT".</p> <p>Refer to "CRANKSHAFT POSITION SENSOR".</p> <p>Refer to "CLUTCH".</p> <p>Refer to "OIL PAN AND OIL PUMP".</p> <p>Refer to "STARTING SYSTEM" in chapter 8.</p>



Order	Job/Part	Q'ty	Remarks
1	Timing chain	1	For installation, reverse the removal procedure.
2	Timing chain guide (intake side)	1	
3	Pin	2	
4	Timing chain guide (exhaust side)	1	
5	Left side cover	1	
6	O-ring	1	
7	Lower crankcase	1	
8	Dowel pin	3	
9	Damper	1	



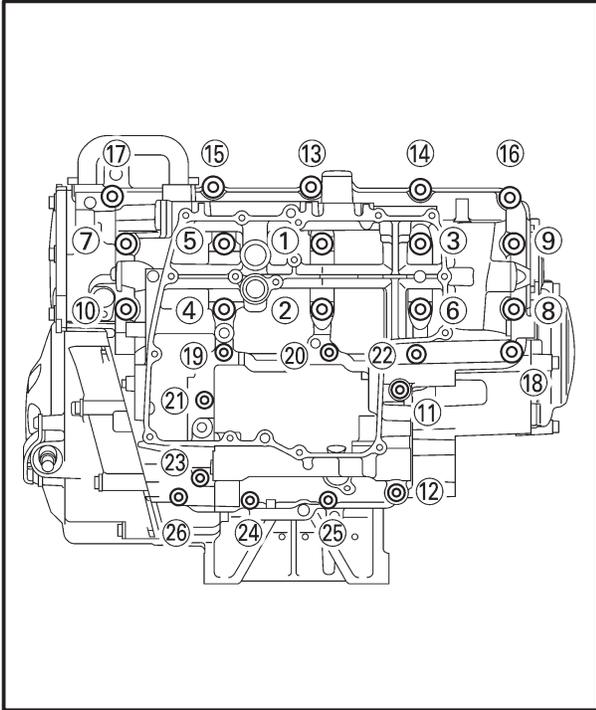
EAS00384

DISASSEMBLING THE CRANKCASE

1. Place the engine upside down.
2. Remove:
 - crankcase bolts

NOTE:

- Loosen each bolt 1/4 of a turn at a time, in stages and in a crisscross pattern. After all of the bolts are fully loosened, remove them.
- Loosen the bolts in decreasing numerical order (refer to the numbers in the illustration).
- The numbers embossed on the crankcase indicate the crankcase tightening sequence.



- M9 × 105 mm (4.1 in) bolts: ① ~ ⑩
- M8 × 60 mm (2.4 in) bolt: ⑪ LOCTITE®
- M8 × 60 mm (2.4 in) bolts: ⑫, ⑯
- M6 × 70 mm (2.8 in) bolts: ⑰, ⑳, ㉓
- M6 × 65 mm (2.5 in) bolts: ⑱, ⑲
- M6 × 60 mm (2.4 in) bolts: ㉒, ㉔, ㉕
- M6 × 50 mm (2.0 in) bolts: ㉖, ㉖
- M8 × 50 mm (2.0 in) bolts: ㉓ ~ ㉕

3. Remove:
 - lower crankcase

CAUTION:

Tap on one side of the crankcase with a soft-face hammer. Tap only on reinforced portions of the crankcase, not on the crankcase mating surfaces. Work slowly and carefully and make sure the crankcase halves separate evenly.

4. Remove:
 - dowel pins
5. Remove:
 - crankshaft journal lower bearing (from the lower crankcase)

NOTE:

Identify the position of each crankshaft journal lower bearing so that it can be reinstalled in its original place.

EAS00399

CHECKING THE CRANKCASE

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

EAS00401

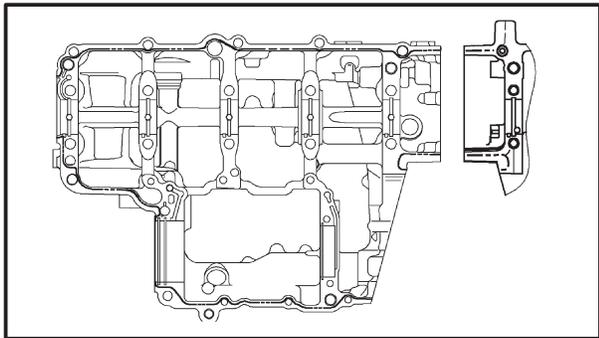
CHECKING THE BEARINGS AND OIL SEALS

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

ASSEMBLING THE CRANKCASE

1. Lubricate:
 - crankshaft journal bearings
(with the recommended lubricant)

	Recommended lubricant Engine oil
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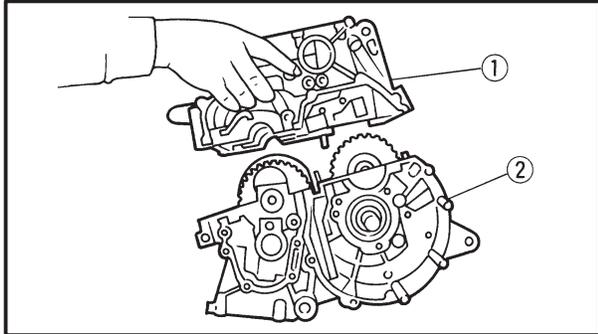
2. Apply:
 - sealant

	Yamaha bond No. 1215 90890-85505, ACC-1109-05-01
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NOTE: _____

Do not allow any sealant to come into contact with the oil gallery or crankshaft journal bearings. Do not apply sealant to within 2 ~ 3 mm (0.08 ~ 0.12 in) of the crankshaft journal bearings.

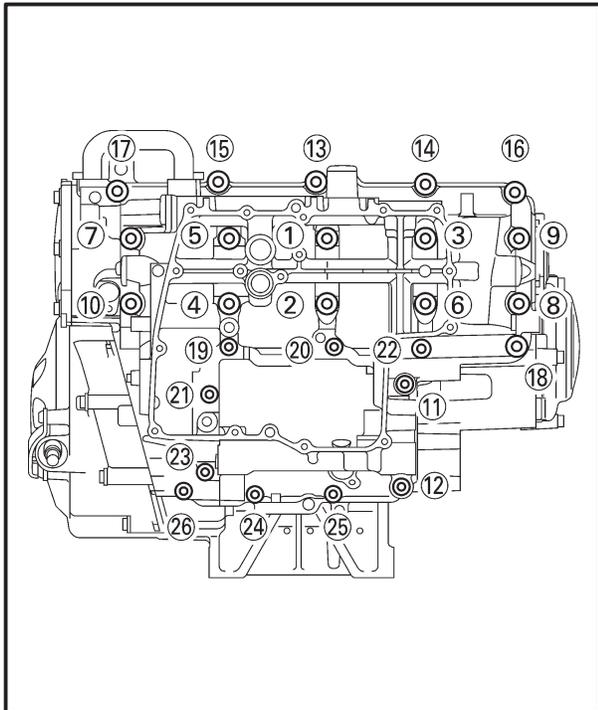
3. Install:
 - dowel pin
4. Set the shift drum assembly and transmission gears in the neutral position.



5. Install:
 - lower crankcase (1)
(onto the upper crankcase (2))

CAUTION: _____

Before tightening the crankcase bolts, make sure that the transmission gears shift correctly when the shift drum assembly is turned by hand.



6. Install:
 - crankcase bolts

NOTE: _____

- Lubricate the bolt threads with engine oil.
- Install a washer on bolts (1) ~ (10) and (22).
- Seal bolt (18)
- Tighten the bolts in the tightening sequence cast on the crankcase.

- M9 × 105 mm (4.1 in) bolts: (1) ~ (10)
- M8 × 60 mm (2.4 in) bolt: (11) LOCTITE®
- M8 × 60 mm (2.4 in) bolts: (12), (16)
- M6 × 70 mm (2.8 in) bolts: (19), (21), (23)
- M6 × 65 mm (2.5 in) bolts: (17), (18)
- M6 × 60 mm (2.4 in) bolts: (22), (24), (25)
- M6 × 50 mm (2.0 in) bolts: (20), (26)
- M8 × 50 mm (2.0 in) bolts: (13) ~ (15)



Crankcase bolt

Bolt (1) ~ (10)

1st: 20 Nm (2.0 m•kg, 14 ft•lb)

2nd*: 20 Nm (2.0 m•kg, 14 ft•lb)

3rd: +60°

Bolt (11) ~ (16)

24 Nm (2.4 m•kg, 17 ft•lb)

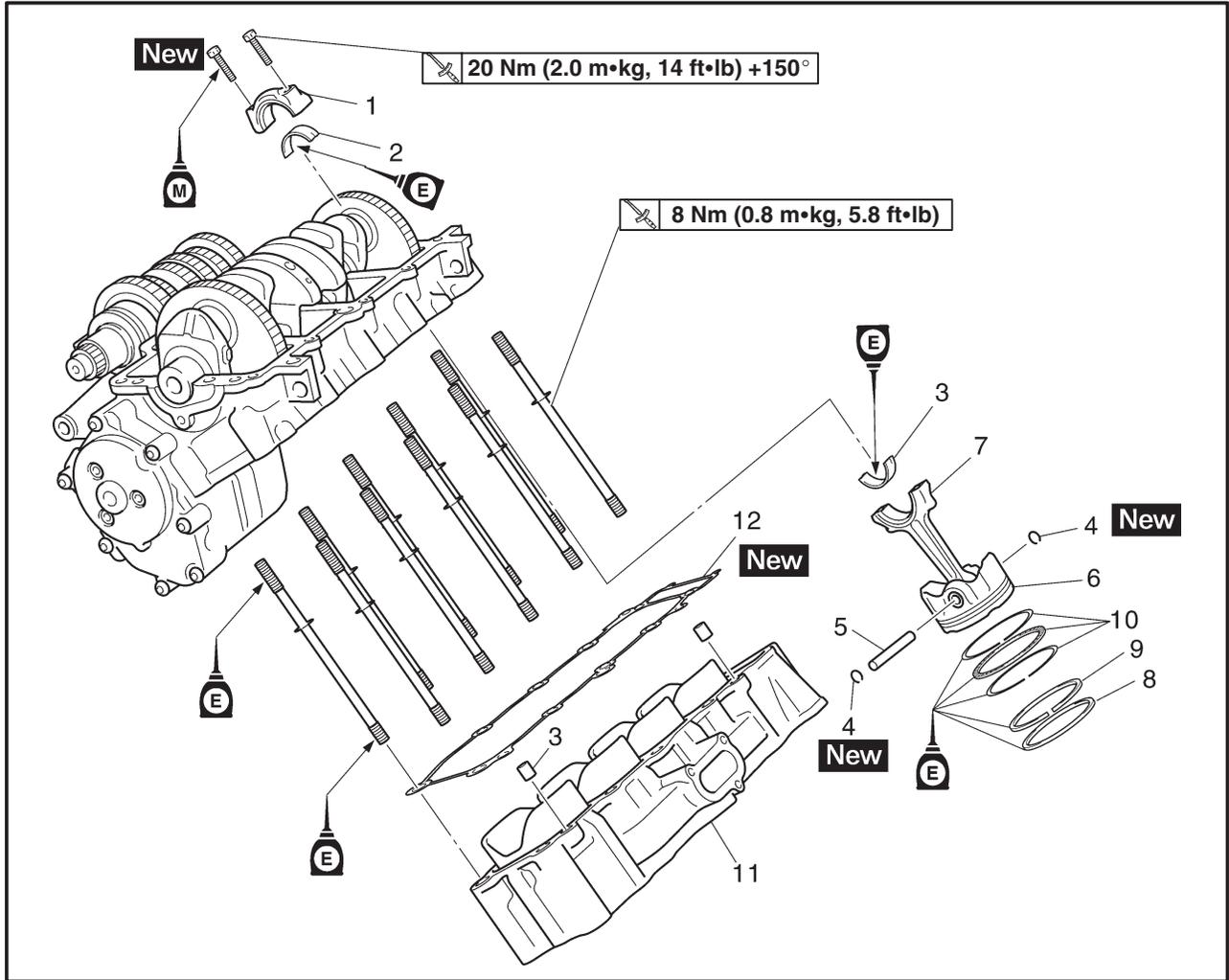
Bolt (17) ~ (26)

12 Nm (1.2 m•kg, 8.7 ft•lb)

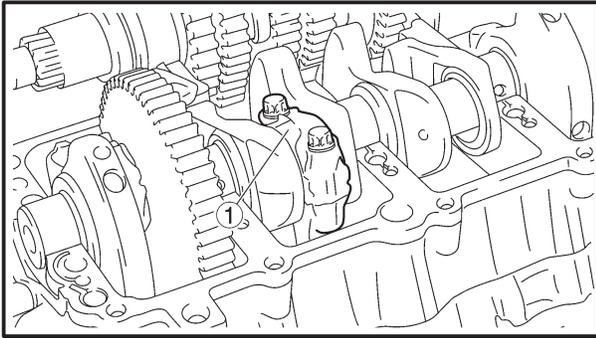
* Following the tightening order, loosen the bolt one by one and then retighten it to the specific torque.

EAS00252

CONNECTING RODS AND PISTONS



Order	Job/Part	Q'ty	Remarks
	Removing the connecting rods and pistons		Remove the parts in the order listed.
	Lower crankcase		Refer to "CRANKCASE".
1	Connecting rod cap	4	
2	Big end lower bearing	4	
3	Big end upper bearing	4	
4	Piston pin clip	8	
5	Piston pin	4	
6	Piston	4	
7	Connecting rod	4	
8	Top ring	4	
9	2nd ring	4	
10	Oil ring	4	
11	Cylinder	1	
12	Cylinder gasket	1	
			For installation, reverse the removal procedure.



EAS00393

REMOVING THE CONNECTING RODS AND PISTONS

The following procedure applies to all of the connecting rods and pistons.

1. Remove:
 - connecting rod cap ①
 - big end bearings

NOTE: _____

- Identify the position of each big end bearing so that it can be reinstalled in its original place.
- After removing the connecting rods and connecting rod caps, care should be taken not to damage the mating surfaces of the connecting rods and connecting rod caps.

2. Remove:
 - Cylinder
 - Cylinder gasket
 - Cylinder stud bolts

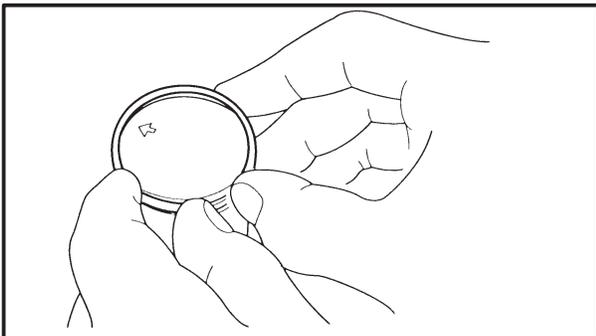
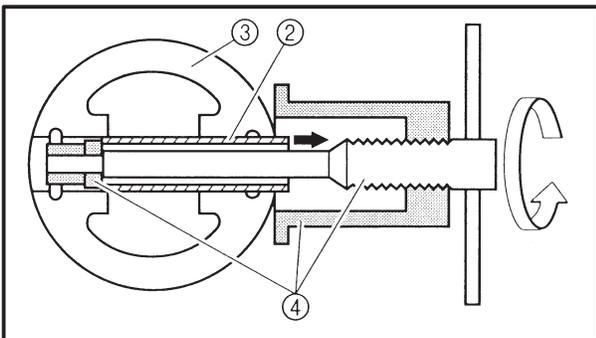
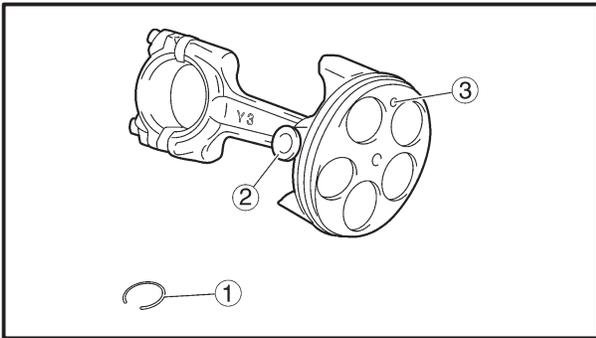
3. Remove:
 - piston pin clips ①
 - piston pin ②
 - piston ③

CAUTION: _____

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

NOTE: _____

- For reference during installation, put identification marks on the piston crown.
- Before removing the piston pin, deburr the piston pin clip groove and the piston pin bore area. If both areas are deburred and the piston pin is still difficult to remove, remove it with the piston pin puller set ④.

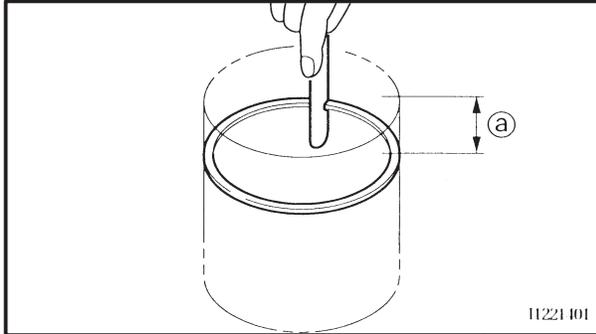


Piston pin puller set
90890-01304, YU-01304

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

NOTE: _____

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

**Piston ring side clearance****Top ring**

0.030 ~ 0.065 mm

(0.0012 ~ 0.0026 in)

<Limit>: 0.115 mm (0.0045 in)

2nd ring

0.020 ~ 0.055 mm

(0.0008 ~ 0.002 in)

<Limit>: 0.115 mm (0.0045 in)

2. Install:

- piston ring
(into the cylinder)

NOTE:

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

Ⓐ 5 mm (0.20 in)

3. Measure:

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

NOTE:

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

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

0.15 ~ 0.25 mm

(0.0059 ~ 0.0098 in)

<Limit>: 0.50 mm (0.0197 in)

2nd ring

0.30 ~ 0.45 mm

(0.0118 ~ 0.0177 in)

<Limit>: 0.80 mm (0.0315 in)

Oil ring

0.10 ~ 0.40 mm

(0.0039 ~ 0.0158 in)

CHECKING THE PISTON PINS

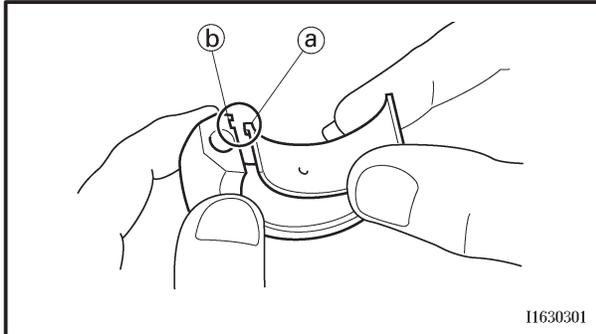
The following procedure applies to all of the piston pins.

1. Check:

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

**CAUTION:**

Do not interchange the big end bearings and connecting rods. To obtain the correct crankshaft-pin-to-big-end-bearing clearance and prevent engine damage, the big end bearings must be installed in their original positions.

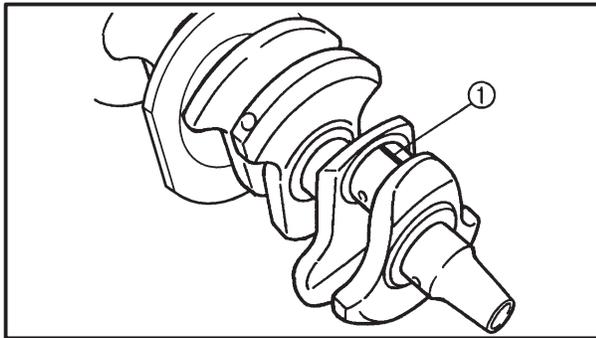


I1630301

- a. Clean the big end bearings, crankshaft pins, and the inside of the connecting rods halves.
- b. Install the big end upper bearing into the connecting rod and the big end lower bearing into the connecting rod cap.

NOTE:

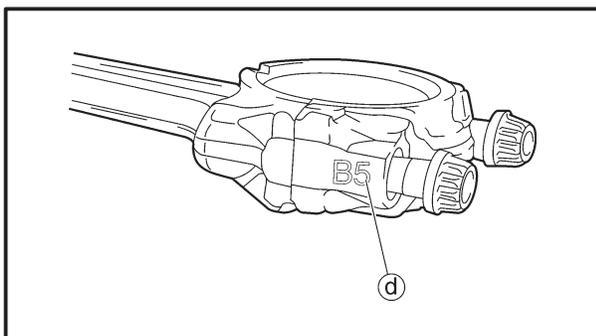
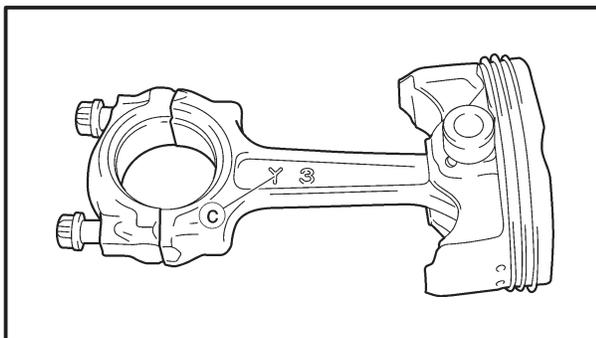
Align the projections (a) on the big end bearings with the notches (b) in the connecting rod and connecting rod cap.



- c. Put a piece of Plastigauge[®] (1) on the crankshaft pin.
- d. Assemble the connecting rod halves.

NOTE:

- Do not move the connecting rod or crankshaft until the clearance measurement has been completed.
- Lubricate the bolt threads with molybdenum disulfide grease.
- Make sure that the "Y" mark (c) on the connecting rod faces towards the left side of the crankshaft.
- Make sure that the characters (d) on both the connecting rod and connecting rod cap are aligned.





e. Tighten the connecting rod bolts.

NOTE:

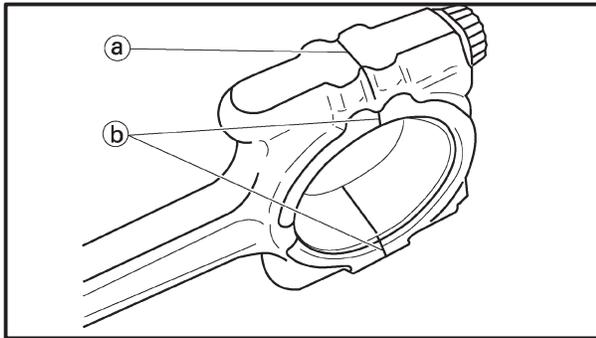
Install by carrying out the following procedures in order to assemble in the most suitable condition.



Connecting rod bolt
29.4 Nm (3.0 m•kg, 21 ft•lb)

NOTE:

- First, tighten the bolts to 15 Nm (1.5 m•kg, 11 ft•lb).
- Retighten the bolts to 29.4 Nm (3.0 m•kg, 21 ft•lb).



- f. Replace the connecting rod bolts with new ones.
- g. Clean the connecting rod bolts.
- h. After installing the big end bearing, assemble the connecting rod and connecting rod cap once using a single unit of the connecting rod.
- i. Tighten the connecting rod bolt while checking that the sections shown (a) and (b) are flush with each other by touching the surface.
- Side machined face (a)
 - Thrusting faces (4 places at front and rear) (b)

NOTE:

To install the big end bearing, care should be taken not to install it at an angle and the position should not be out of alignment.

- j. Loosen the connecting rod bolt, remove the connecting rod and connecting rod cap and install these parts to the crankshaft with the big end bearing kept in the current condition.

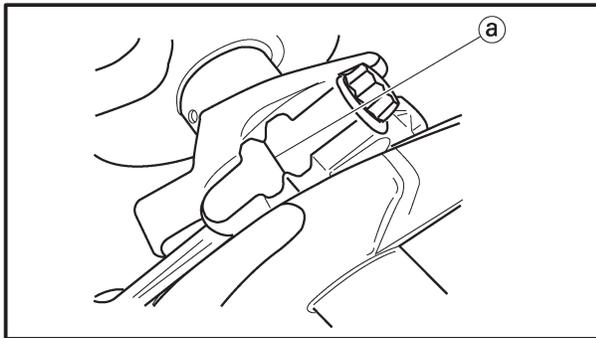
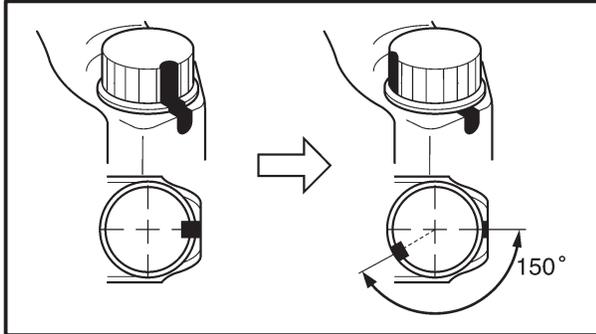
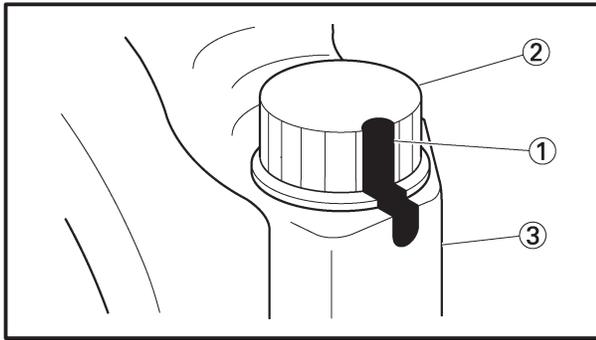
k. Tighten the connecting rod bolts.



Connecting rod bolt
20 Nm (2.0 m•kg, 14 ft•lb) + 150°

CAUTION:

Tighten the connecting rod bolts using the plastic-region tightening angle method.



- l. Clean the connecting rod bolts.
- m. Tighten the connecting rod bolts.
- n. Put a mark (1) on the corner of the connecting rod bolt (2) and the connecting rod (3).
- o. Tighten the bolt further to reach the specified angle (150°).

- p. After the installation, check that the section shown (a) is flush with each other by touching the surface.

- Side machined face (a)

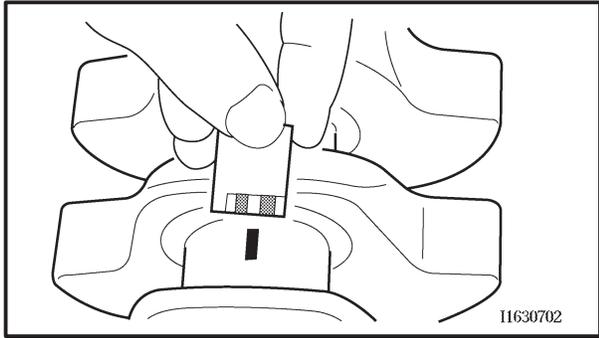
⚠ WARNING

- When the bolt is tightened more than the specified angle, do not loosen the bolt and then retighten it. Replace the bolt with a new one and perform the procedure again.
- If they are not flush with each other, remove the connecting rod bolt and big end bearing and restart from step "e". In this case, make sure to replace the connecting rod bolt.

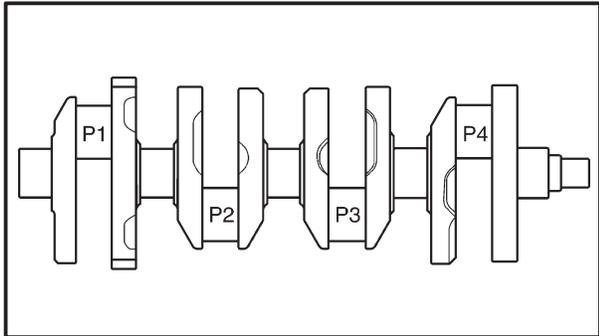
CAUTION:

- Do not use a torque wrench to tighten the nut to the specified angle.
- Tighten the bolt until it is at the specified angles.

- q. Remove the connecting rod and big end bearings.
Refer to "REMOVING THE CONNECTING RODS".



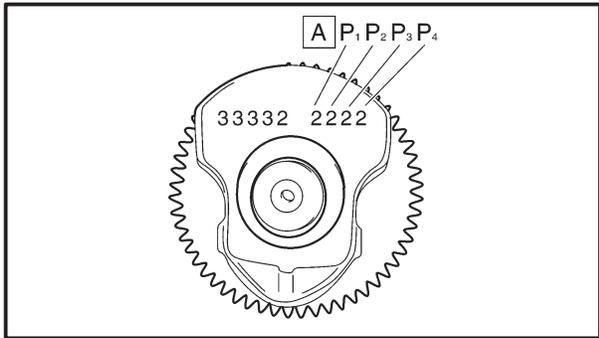
r. Measure the compressed Plastigauge® width on the crankshaft pin.
If the crankshaft-pin-to-big-end-bearing clearance is out of specification, select replacement big end bearings.



2. Select:
• big end bearings (P1 ~ P4)

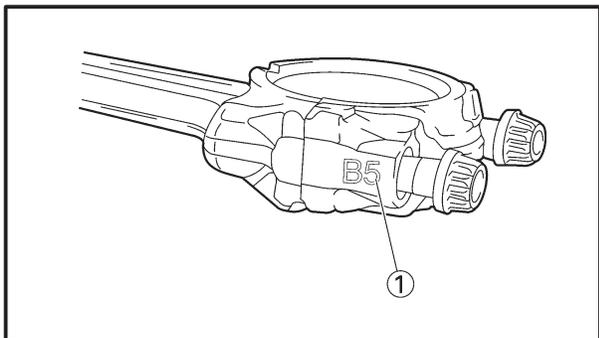
NOTE: _____

- The numbers **A** stamped into the crankshaft web and the numbers **①** on the connecting rods are used to determine the replacement big end bearing sizes.
- “P1” ~ “P4” refer to the bearings shown in the crankshaft illustration.

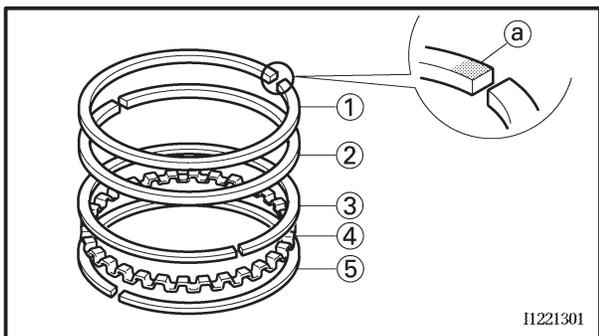


For example, if the connecting rod “P₁” and the crankshaft web “P₁” numbers are “5” and “2” respectively, then the bearing size for “P₁” is:

<p>“P₁” (connecting rod) – “P₁” (crankshaft) = 5 – 2 = 3 (brown)</p>
--



BIG END BEARING COLOR CODE	
1	Blue
2	Black
3	Brown
4	Green



INSTALLING THE CONNECTING ROD AND PISTON

The following procedure applies to all of the connecting rods and pistons.

1. Install:
- top ring **①**
 - 2nd ring **②**
 - upper oil ring rail **③**
 - oil ring expander **④**
 - lower oil ring rail **⑤**



NOTE:

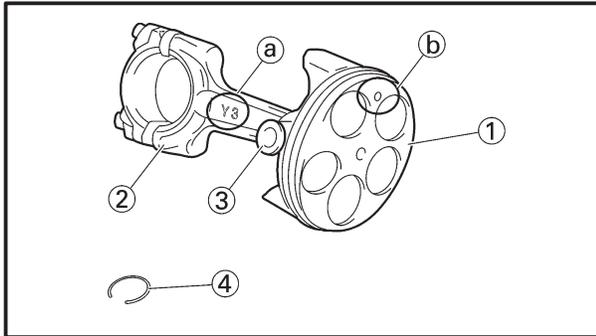
Be sure to install the piston rings so that the manufacturer's marks or numbers (a) face up.

2. Install:

- piston ①
- (onto the respective connecting rod ②)
- piston pin ③
- piston pin clip **New** ④

NOTE:

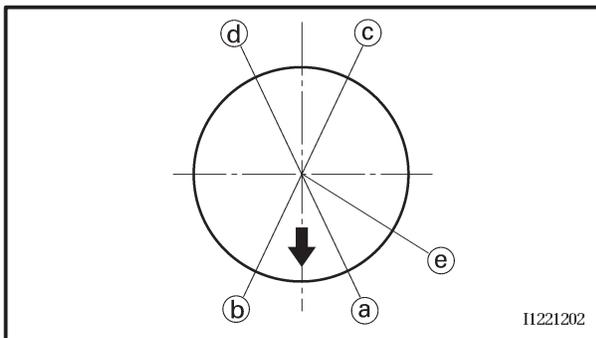
- Apply engine oil onto the piston pin.
- Make sure that the "Y" mark (a) on the connecting rod faces left when the arrow mark (b) on the piston is pointing up. Refer to the illustration.
- Reinstall each piston into its original cylinder (numbering order starting from the left: #1 to #4).



3. Lubricate:

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

	Recommended lubricant Engine oil
--	---



4. Offset:

- piston ring end gaps

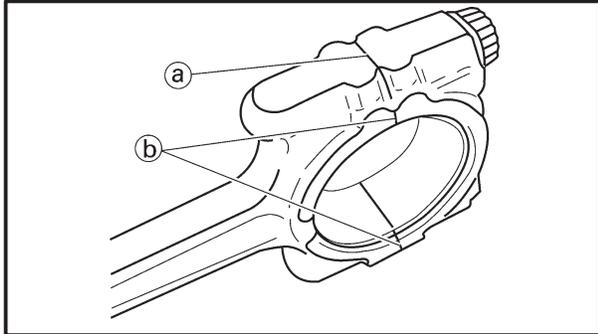
- ① Top ring
- ② Lower oil ring rail
- ③ Upper oil ring rail
- ④ 2nd ring
- ⑤ Oil ring expander

5. Lubricate:

- crankshaft pins
- big end bearings
- connecting rod big end inner surface
- (with the recommended lubricant)

	Recommended lubricant Engine oil
--	---

- b. Clean the connecting rod bolts.
- c. After installing the big end bearing, assemble the connecting rod and connecting rod cap once using a single unit of the connecting rod.

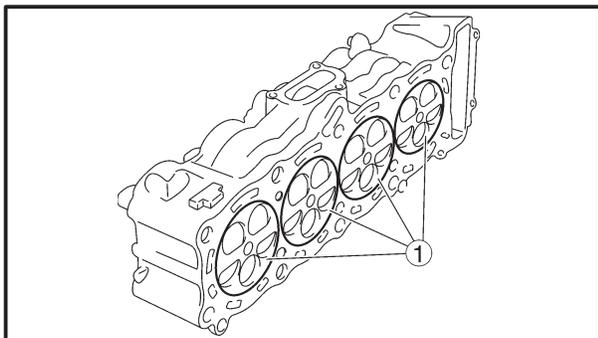


- d. Tighten the connecting rod bolt while checking that the sections shown (a) and (b) are flush with each other by touching the surface.
 - Side machined face (a)
 - Thrusting faces (4 places at front and rear) (b)

NOTE: _____

To install the big end bearing, care should be taken not to install it at an angle and the position should not be out of alignment.

- e. Loosen the connecting rod bolt, remove the connecting rod and connecting rod cap and install these parts to the crankshaft with the big end bearing kept in the current condition.



- 10. Install:
 - piston assemblies (1) (into the cylinder)

NOTE: _____

While compressing the piston rings with one hand, install the connecting rod assembly into the cylinder with the other hand.

**⚠ WARNING**

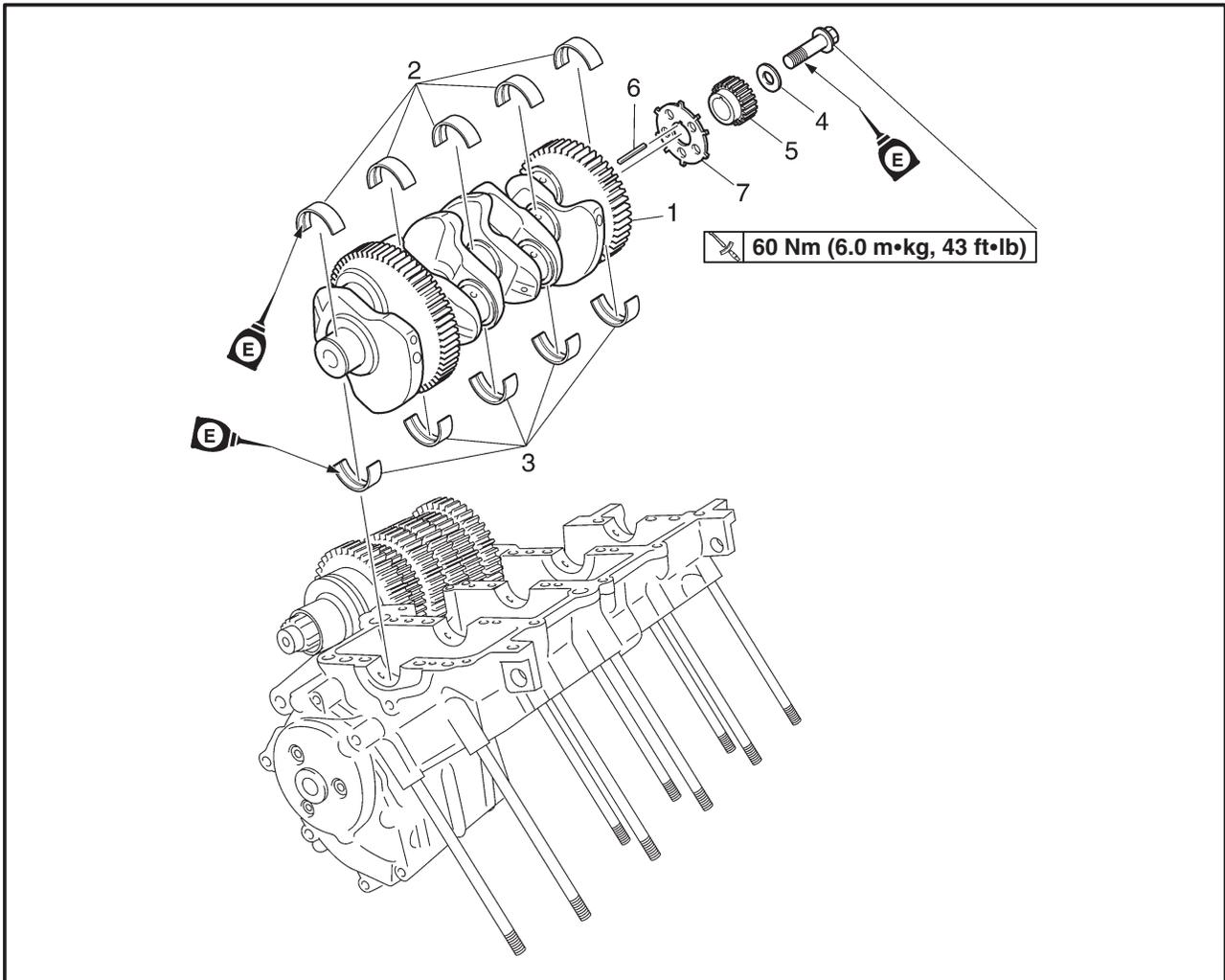
- When the bolt is tightened more than the specified angle, do not loosen the bolt and then retighten it.
Replace the bolt with a new one and perform the procedure again.
 - If they are not flush with each other, remove the connecting rod bolt and big end bearing and restart from step “9”.
In this case, make sure to replace the connecting rod bolt.
-

CAUTION:

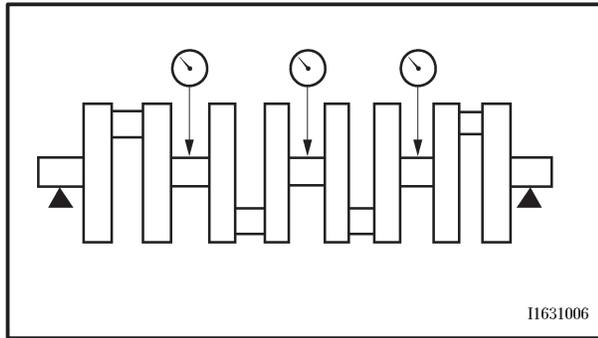
- Do not use a torque wrench to tighten the bolt to the specified angle.
 - Tighten the bolt until it is at the specified angles.
-

EAS00381

CRANKSHAFT



Order	Job/Part	Q'ty	Remarks
	Removing the crankshaft		Remove the parts in the order listed. Separate.
	Crankcase		Refer to "CRANKCASE".
	Connecting rod and connecting rod caps		Refer to "CONNECTING RODS AND PISTONS".
1	Crankshaft	1	
2	Crankshaft journal lower bearing	5	
3	Crankshaft journal upper bearing	5	
4	Washer	1	
5	Crankshaft drive gear	1	
6	Pin	1	
7	Pickup rotor	1	
			For installation, reverse the removal procedure.



EAS00395

CHECKING THE CRANKSHAFT

1. Measure:

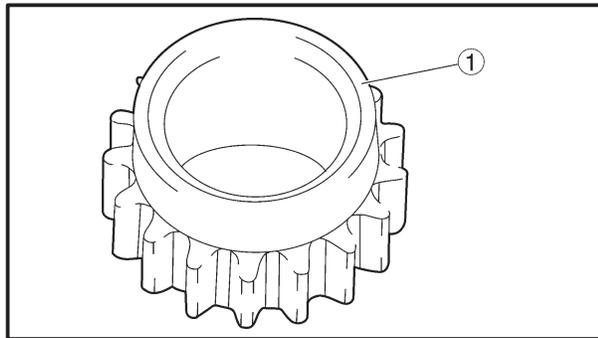
- crankshaft runout
Out of specification → Replace the crankshaft.



Crankshaft runout
Less than 0.03 mm (0.0012 in)

2. Check:

- crankshaft journal surfaces
- crankshaft pin surfaces
- bearing surfaces
Scratches/wear → Replace the crankshaft.

**CHECKING THE CRANKSHAFT DRIVE SPROCKET**

1. Check:

- crankshaft drive sprocket ①
Cracks/damage/wear → Replace the defective part(s).

CHECKING THE CRANKSHAFT JOURNAL BEARINGS

1. Measure:

- crankshaft-journal-to-crankshaft-journal-bearing clearance
Out of specification → Replace the crankshaft journal bearings.



Crankshaft-journal-to-crankshaft-journal-bearing clearance
0.014 ~ 0.037 mm
(0.0006 ~ 0.0015 in)
<Limit>: 0.10 mm (0.0039 in)

CAUTION:

Do not interchange the crankshaft journal bearings. To obtain the correct crankshaft-journal-to-crankshaft-journal-bearing clearance and prevent engine damage, the crankshaft journal bearings must be installed in their original positions.

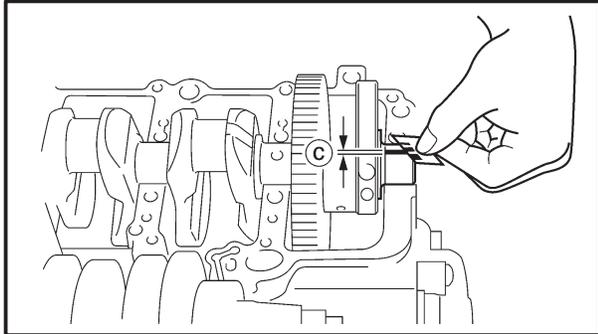


* Following the tightening order, loosen the bolt one by one and then retighten it to the specific torque.

NOTE: _____

Lubricate the crankcase bolt threads with engine oil.

Refer to "CRANKCASE".



g. Remove the lower crankcase and the crankshaft journal lower bearings.

h. Measure the compressed Plastigauge® width (C) on each crankshaft journal.

If the crankshaft-journal-to-crankshaft-journal-bearing clearance is out of specification, select replacement crankshaft journal bearings.



2. Select:

- crankshaft journal bearings (J1 ~ J5)

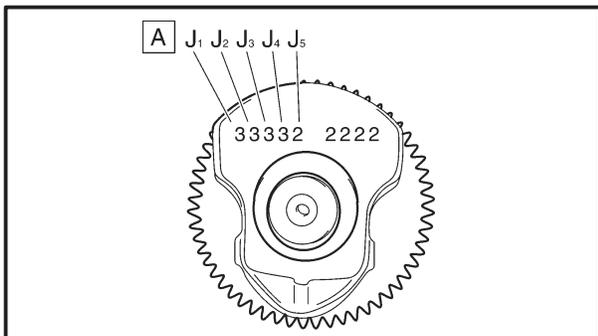
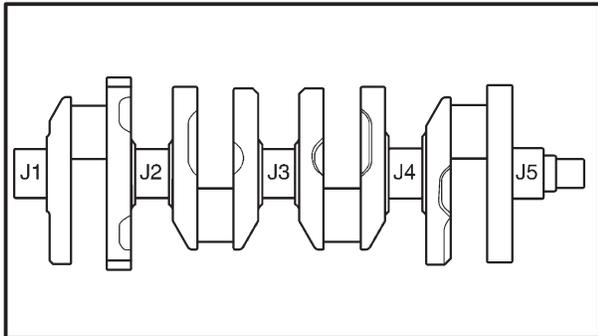
NOTE: _____

- The numbers [A] stamped into the crankshaft web and the numbers ① stamped into the lower crankcase are used to determine the replacement crankshaft journal bearing sizes.

- "J1 ~ J5" refer to the bearings shown in the crankshaft illustration.

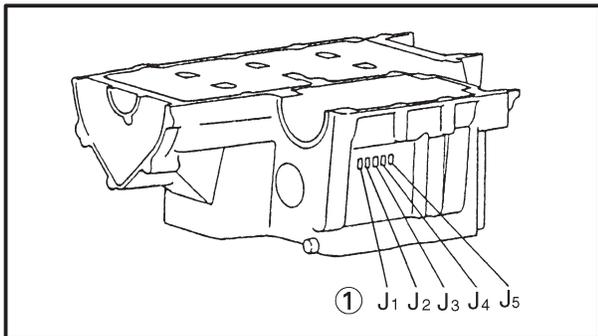
- If "J1 ~ J5" are the same, use the same size for all of the bearings.

- If the size is the same for all "J₁ to J₅" one digit for that size is indicated. (Crankcase side only)

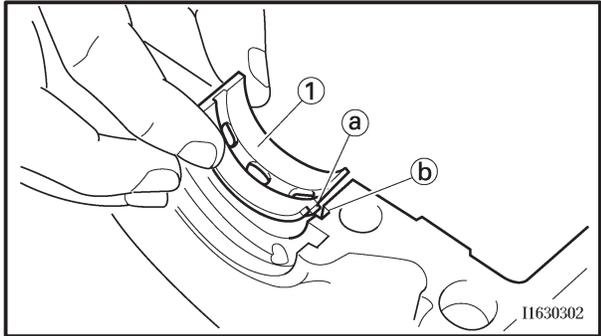


For example, if the crankcase "J₁" and crankshaft web "J₁" numbers are "6" and "2" respectively, then the bearing size for "J₁" is:

"J₁" (crankcase) – "J₁"
 (crankshaft web) – 1 =
 6 – 2 – 1 = 3 (brown)



CRANKSHAFT JOURNAL BEARING COLOR CODE	
0	White
1	Blue
2	Black
3	Brown
4	Green



EAS00407

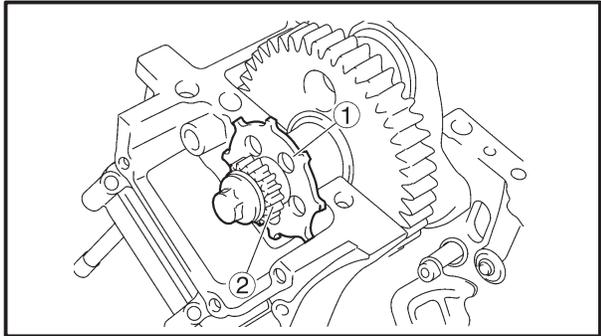
INSTALLING THE CRANKSHAFT

1. Install:
 - crankshaft journal upper bearings ① (into the upper crankcase)
2. Lubricate:
 - crankshaft journal upper bearings (with the recommended lubricant)

	Recommended lubricant Engine oil
---	---

NOTE:

- Align the projections (a) on the crankshaft journal upper bearings with the notches (b) in the upper crankcase.
- Be sure to install each crankshaft journal upper bearing in its original place.



3. Install:
 - crankshaft
4. Install:
 - crankcase (lower)
Refer to "CRANKCASE".
5. Install:
 - pin
 - pickup rotor ①
 - drive sprocket ②

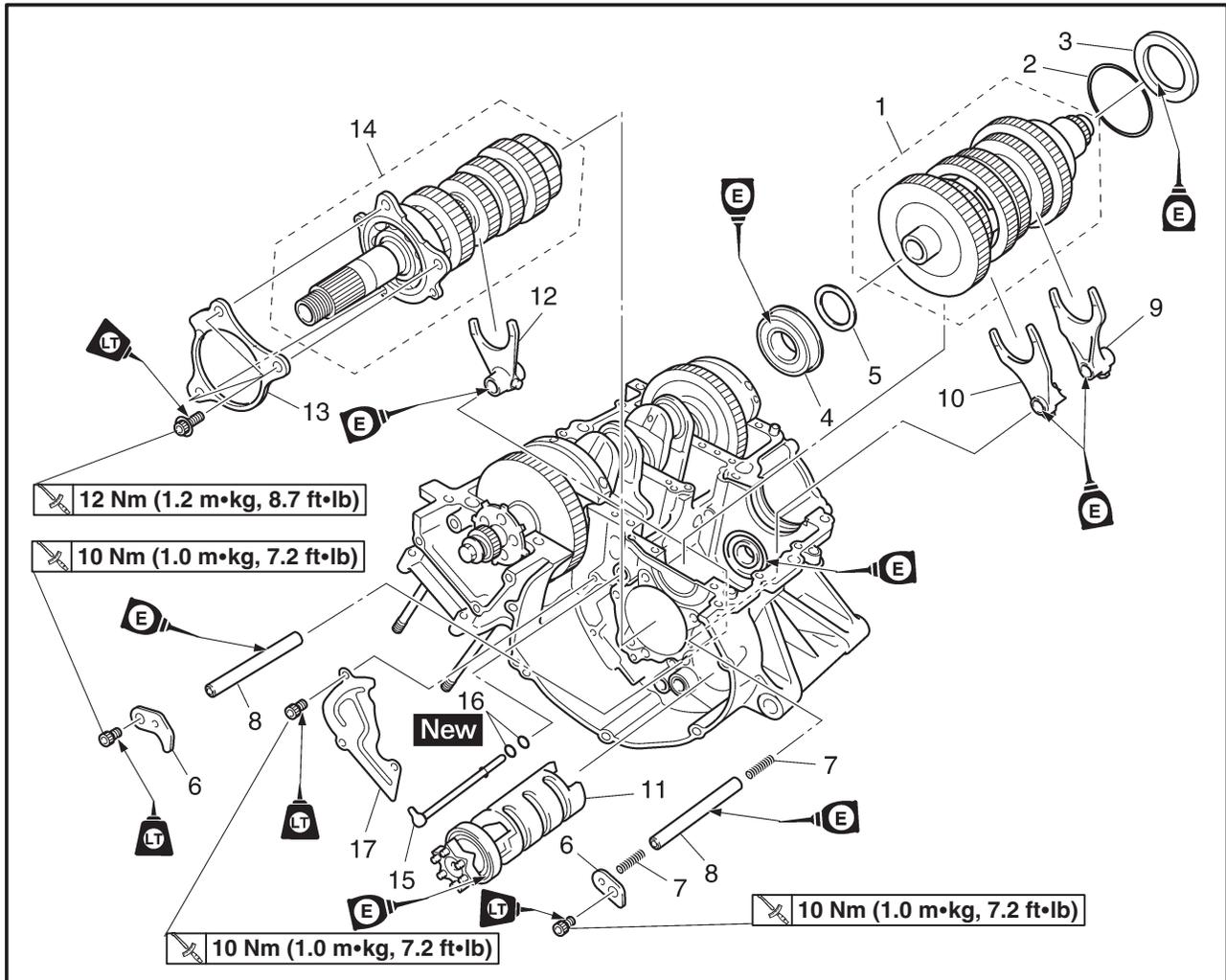
 **60 Nm (6.0 m•kg, 43 ft•lb)**



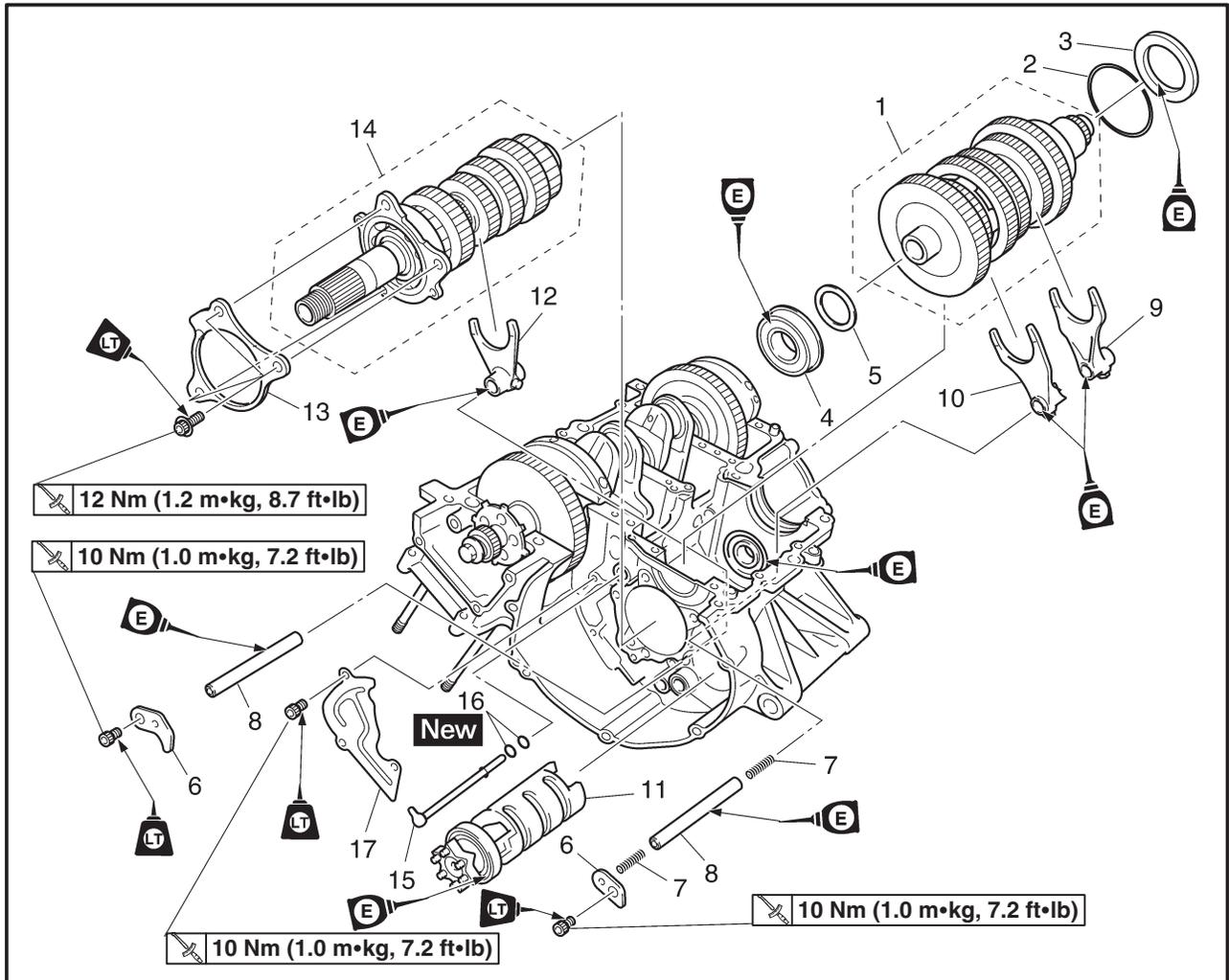
EAS00419

TRANSMISSION

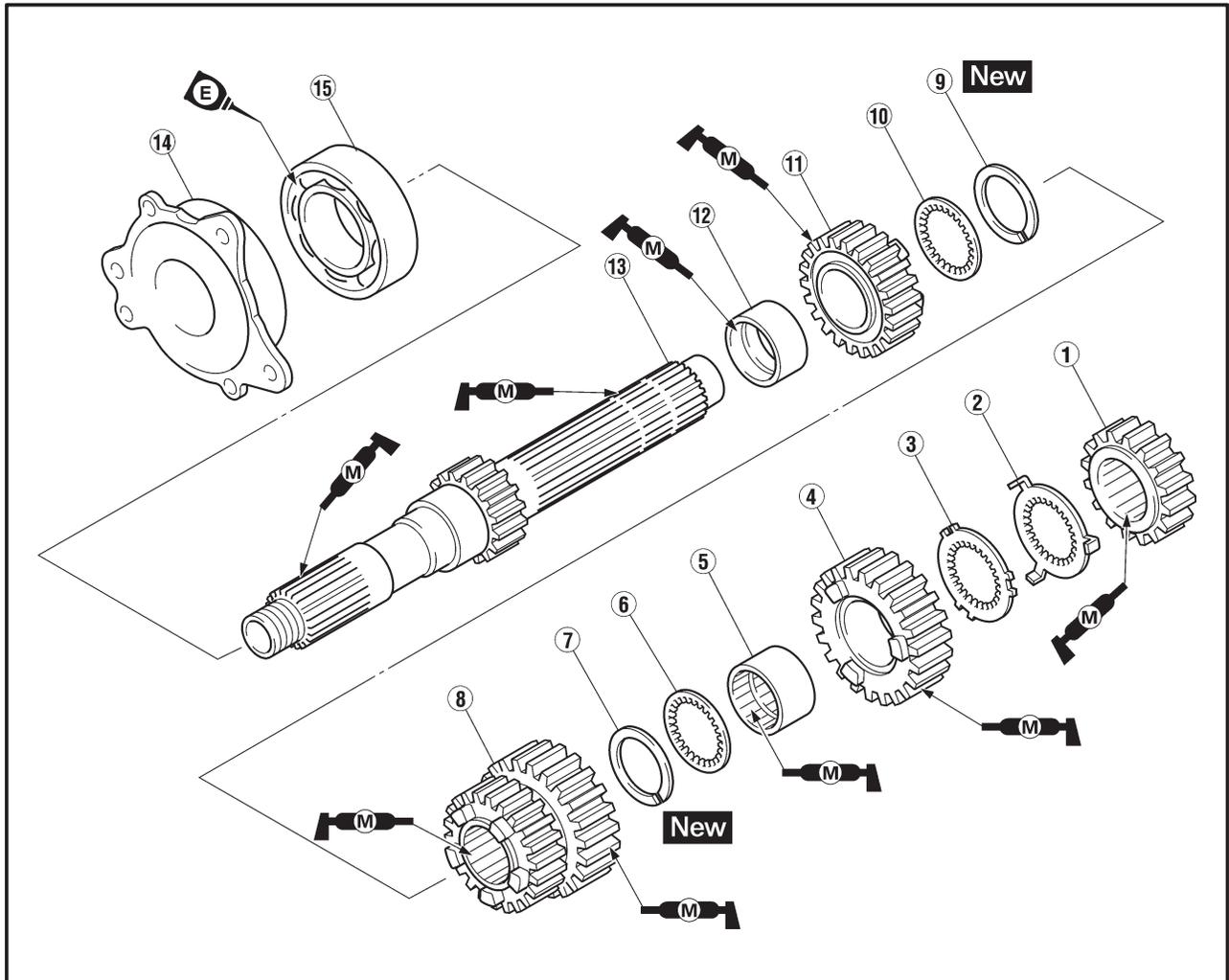
TRANSMISSION, SHIFT DRUM ASSEMBLY AND SHIFT FORKS



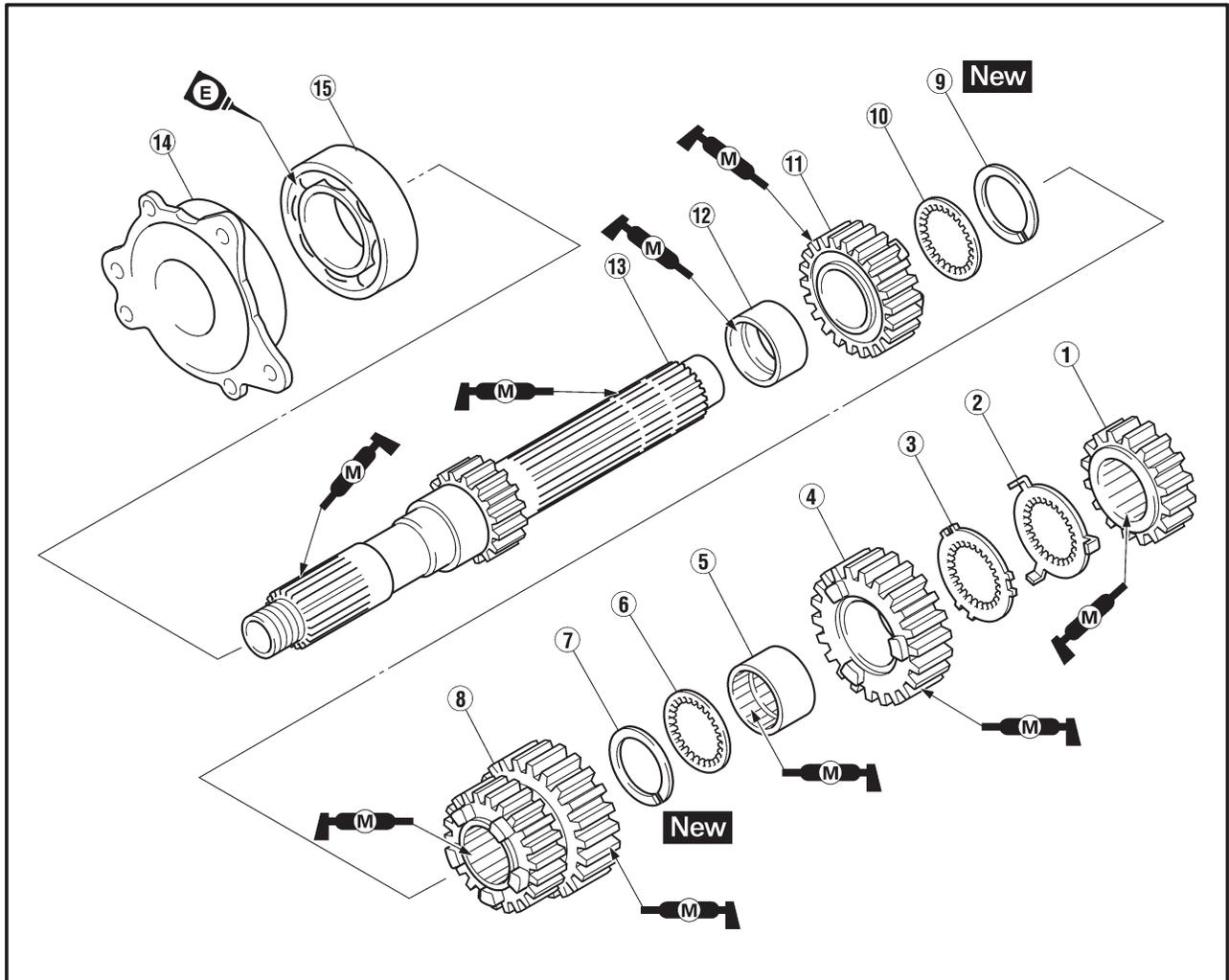
Order	Job/Part	Q'ty	Remarks
	Removing the transmission, shift drum assembly, and shift forks		Remove the part in the order listed.
	Crankcase lower		Separate. Refer to "CRANKCASE".
1	Drive axle assembly	1	
2	Circlip	1	
3	Oil seal	1	
4	Bearing	1	
5	Washer	1	
6	Shift drum retainer	2	
7	Spring	2	
8	Shift fork guide bar	2	
9	Shift fork "L"	1	
10	Shift fork "R"	1	
11	Shift drum assembly	1	
12	Shift fork "C"	1	



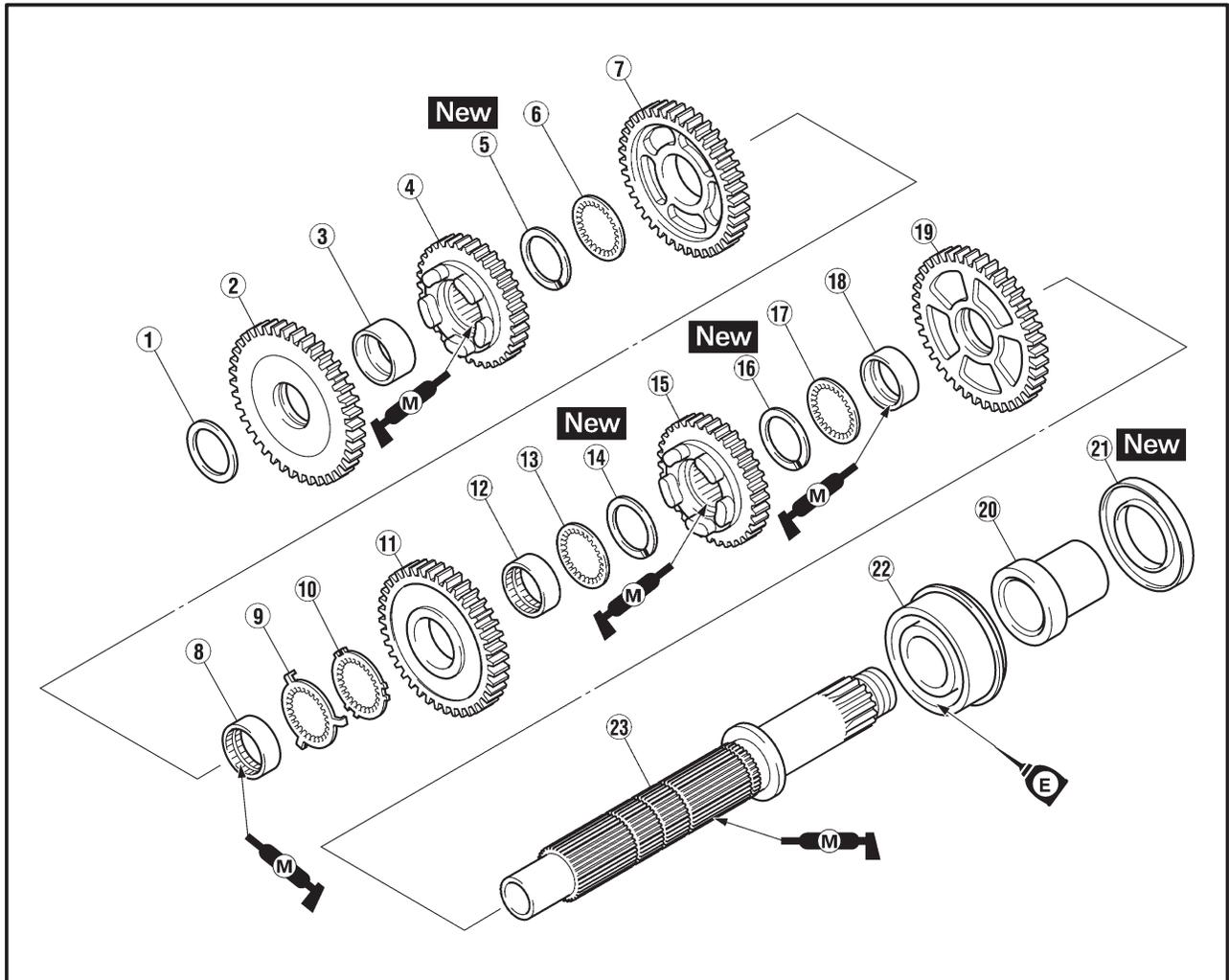
Order	Job/Part	Q'ty	Remarks
13	Main axle retainer	1	For installation, reverse the removal procedure.
14	Main axle assembly	1	
15	Oil pipe	1	
16	O-ring	2	
17	Oil baffle plate	1	



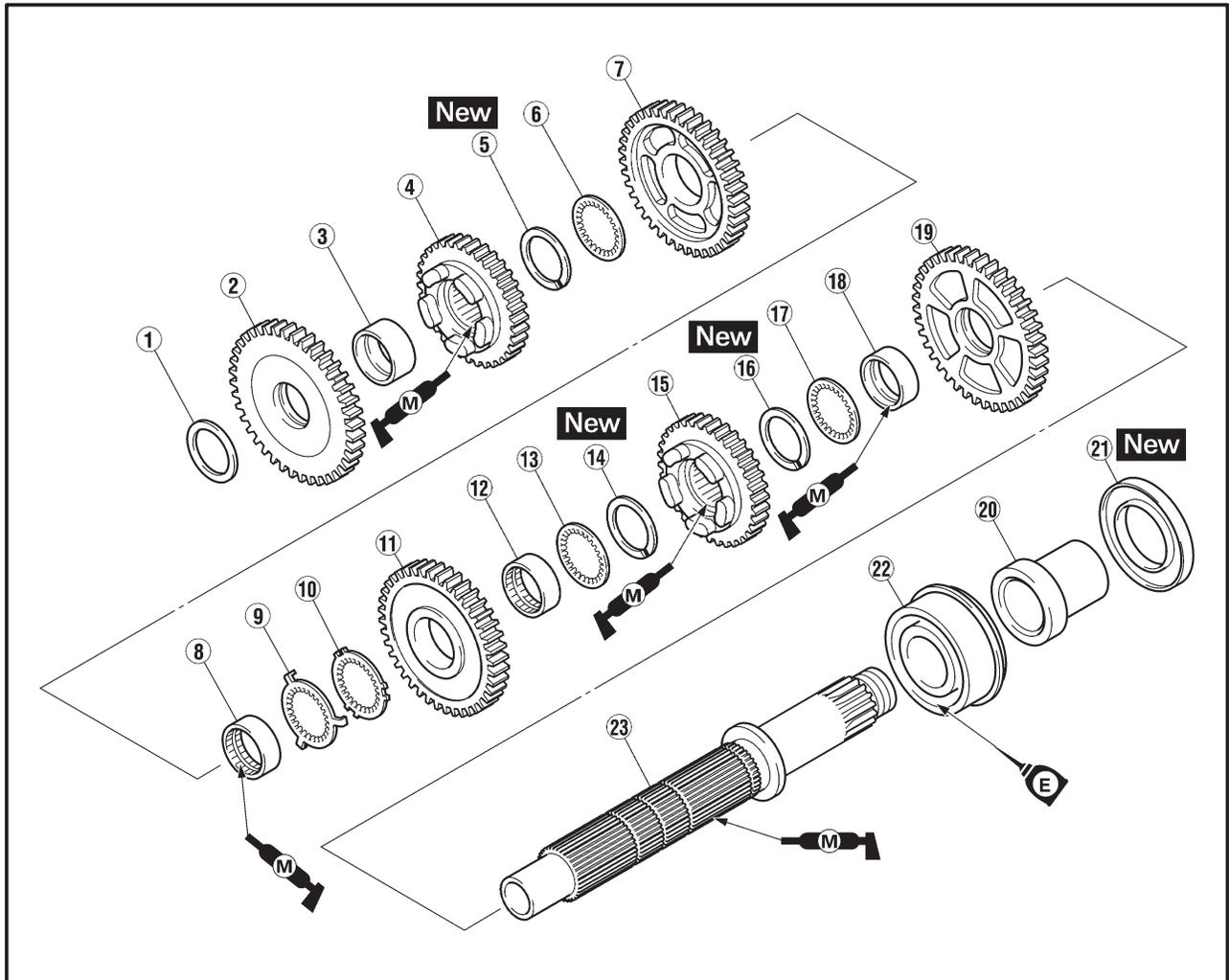
Order	Job/Part	Q'ty	Remarks
	Disassembling the main axle assembly		Disassemble the parts in the order listed.
①	2nd pinion gear	1	
②	Toothed lock washer	1	
③	Toothed lock washer retainer	1	
④	6th pinion gear	1	
⑤	Collar	1	
⑥	Washer	1	
⑦	Circlip	1	
⑧	3rd pinion gear	1	
⑨	Circlip	1	
⑩	Washer	1	
⑪	5th pinion gear	1	
⑫	Collar	1	
⑬	Main axle	1	



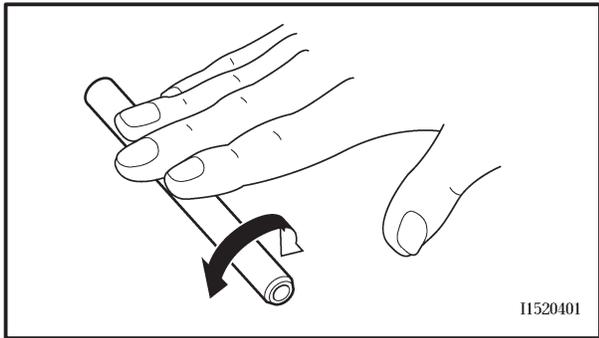
Order	Job/Part	Q'ty	Remarks
⑭	Bearing housing	1	For installation, reverse the removal procedure.
⑮	Bearing	1	



Order	Job/Part	Q'ty	Remarks
	Disassembling the drive axle assembly		Disassemble the parts in the order listed.
①	Washer	1	
②	1st wheel gear	1	
③	Collar	1	
④	5th wheel gear	1	
⑤	Circlip	1	
⑥	Washer	1	
⑦	3rd wheel gear	1	
⑧	Collar	1	
⑨	Toothed lock washer	1	
⑩	Toothed lock washer retainer	1	
⑪	4th wheel gear	1	
⑫	Collar	1	
⑬	Washer	1	
⑭	Circlip	1	



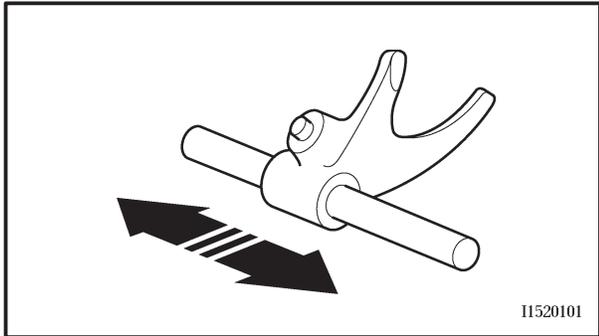
Order	Job/Part	Q'ty	Remarks
⑮	6th wheel gear	1	For installation, reverse the removal procedure.
⑯	Circlip	1	
⑰	Washer	1	
⑱	Collar	1	
⑲	2nd wheel gear	1	
⑳	Collar	1	
㉑	Oil seal	1	
㉒	Bearing	1	
㉓	Drive axle	1	



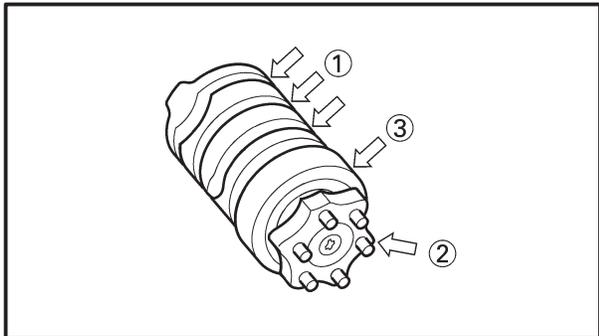
2. Check:
- shift fork guide bar
Roll the shift fork guide bar on a flat surface.
Bends → Replace.

⚠ WARNING

Do not attempt to straighten a bent shift fork guide bar.



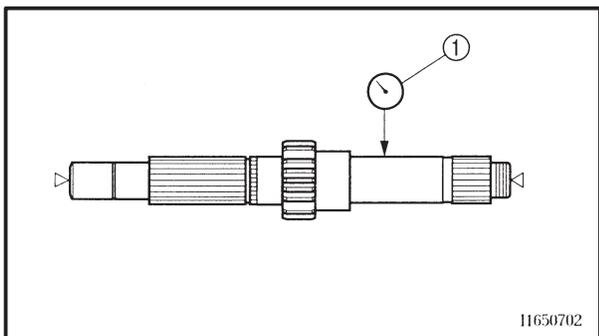
3. Check:
- shift fork movement
(along the shift fork guide bar)
Rough movement → Replace the shift forks and shift fork guide bar as a set.



EAS00422

CHECKING THE SHIFT DRUM ASSEMBLY

1. Check:
- shift drum grooves ①
Damage/scratches/wear → Replace the shift drum assembly.
 - shift drum segment ②
Damage/wear → Replace the shift drum assembly.
 - shift drum bearing ③
Damage/pitting → Replace the shift drum assembly.



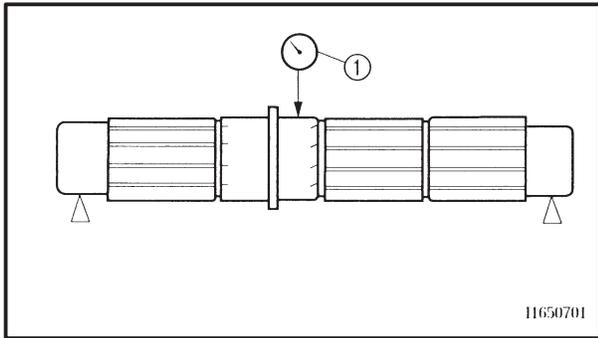
EAS00425

CHECKING THE TRANSMISSION

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



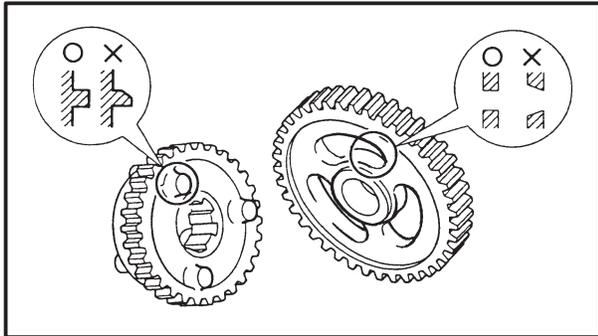
**Main axle runout limit
0.08 mm (0.0032 in)**



2. Measure:

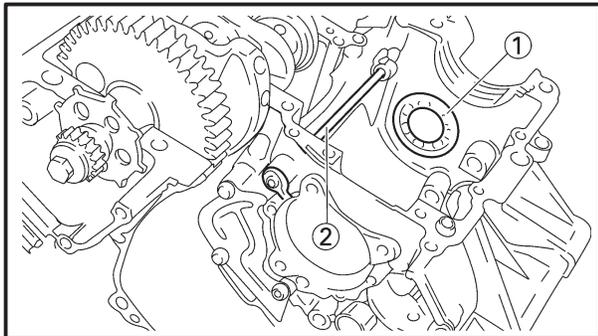
- drive axle runout
(with a centering device and dial gauge ①)
Out of specification → Replace the drive axle.

 **Drive axle runout limit**
0.08 mm (0.0032 in)



3. Check:

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



INSTALLING THE TRANSMISSION

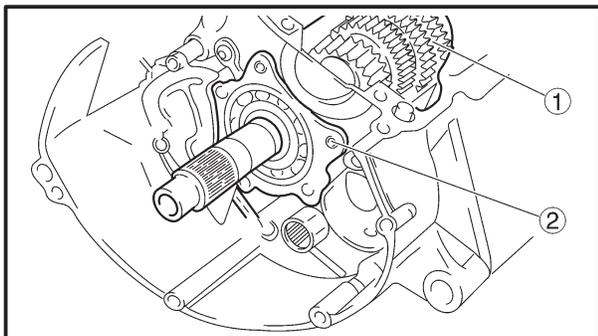
1. Install:

- bearing ①

NOTE: _____

Make the seal side of bearing face to the outside and install it close to the right end face of the crankcase.

- oil pipe ②



2. Install:

- main axle assembly ①
- bearing housing ②

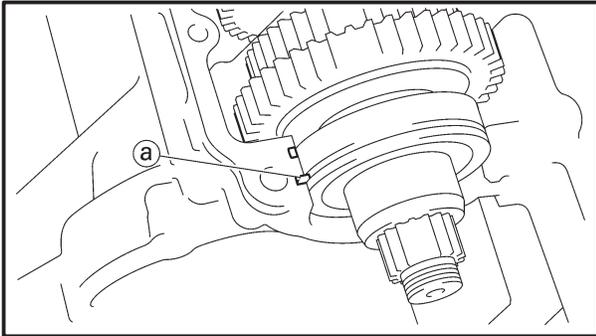
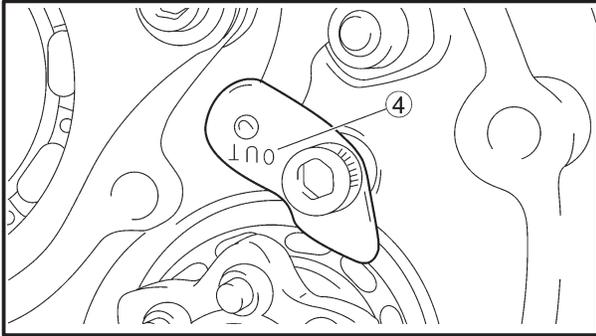
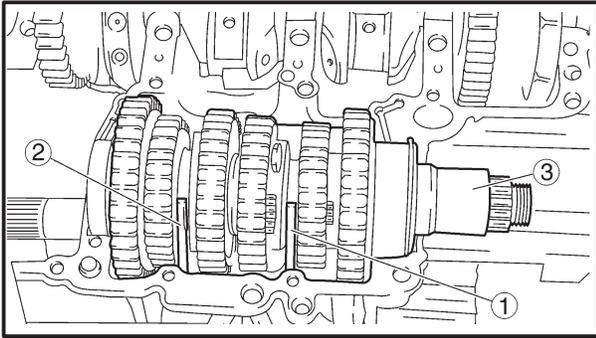
 **12 Nm (1.2 m•kg, 8.7 ft•lb)**
LOCTITE®

- shift fork “C”
- shift drum assembly
- shift fork guide bar
- shift fork guide bar retainer

 **10 Nm (1.0 m•kg, 7.2 ft•lb)**
LOCTITE®

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”.
- Carefully position the shift forks so that they are installed correctly into the transmission gears.
- Install shift fork “C” into the groove in the 3rd and 4th pinion gear on the main axle.



3. Install:

- shift fork "L" ① and "R" ②
- drive axle assembly ③
- shift fork guide bar
- shift fork guide bar retainer ④

 10 Nm (1.0 m•kg, 7.2 ft•lb)
LOCTITE®

NOTE: _____

- Install shift fork "L" into the groove in the 6th wheel gear and shift fork "R" into the groove in the 5th wheel gear on the drive axle.
- Make sure that the drive axle bearing circlip ④ is inserted into the grooves in the upper crank-case.

4. Check:

- transmission
Rough movement → Repair.

NOTE: _____

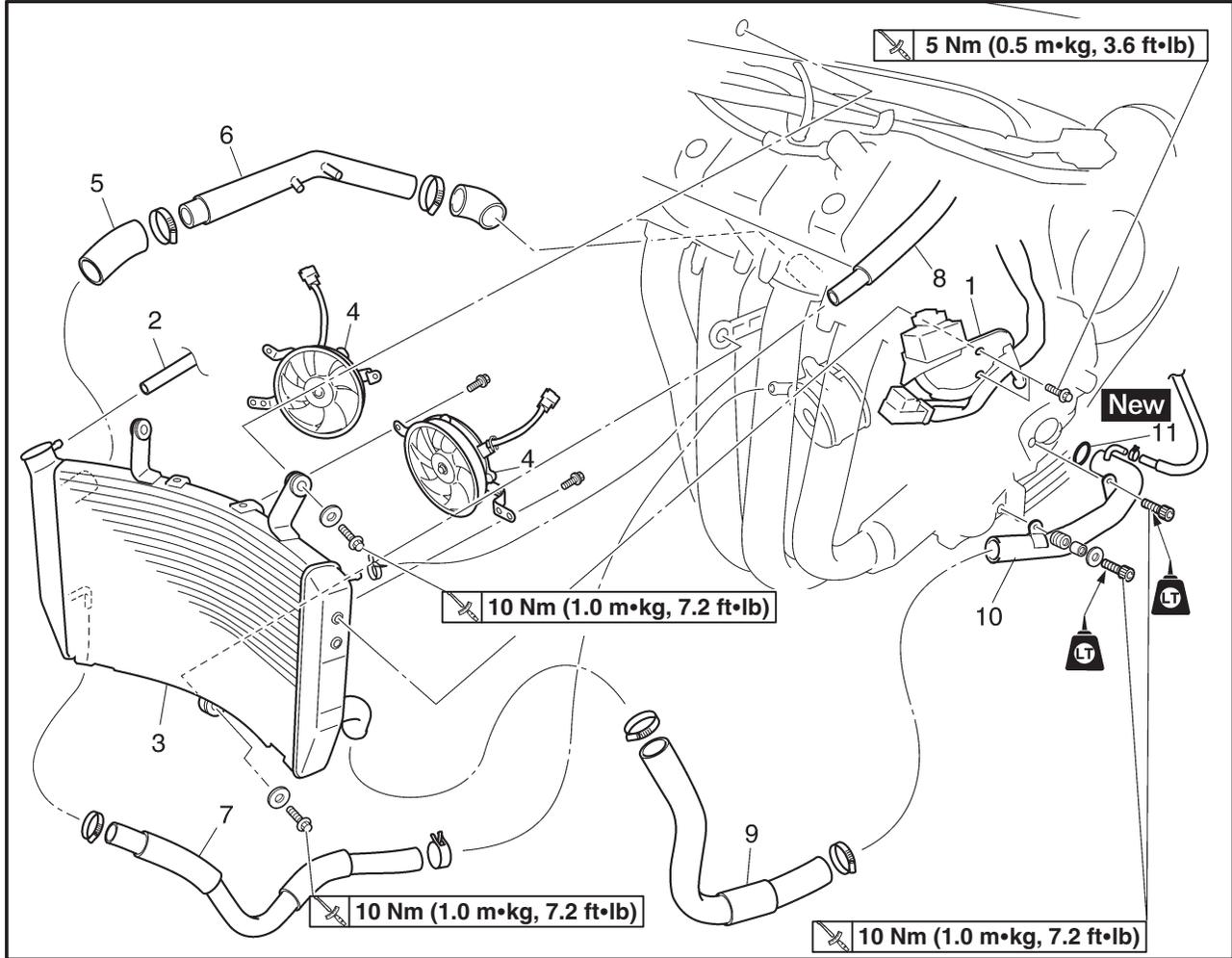
Oil each gear, shaft, and bearing thoroughly.



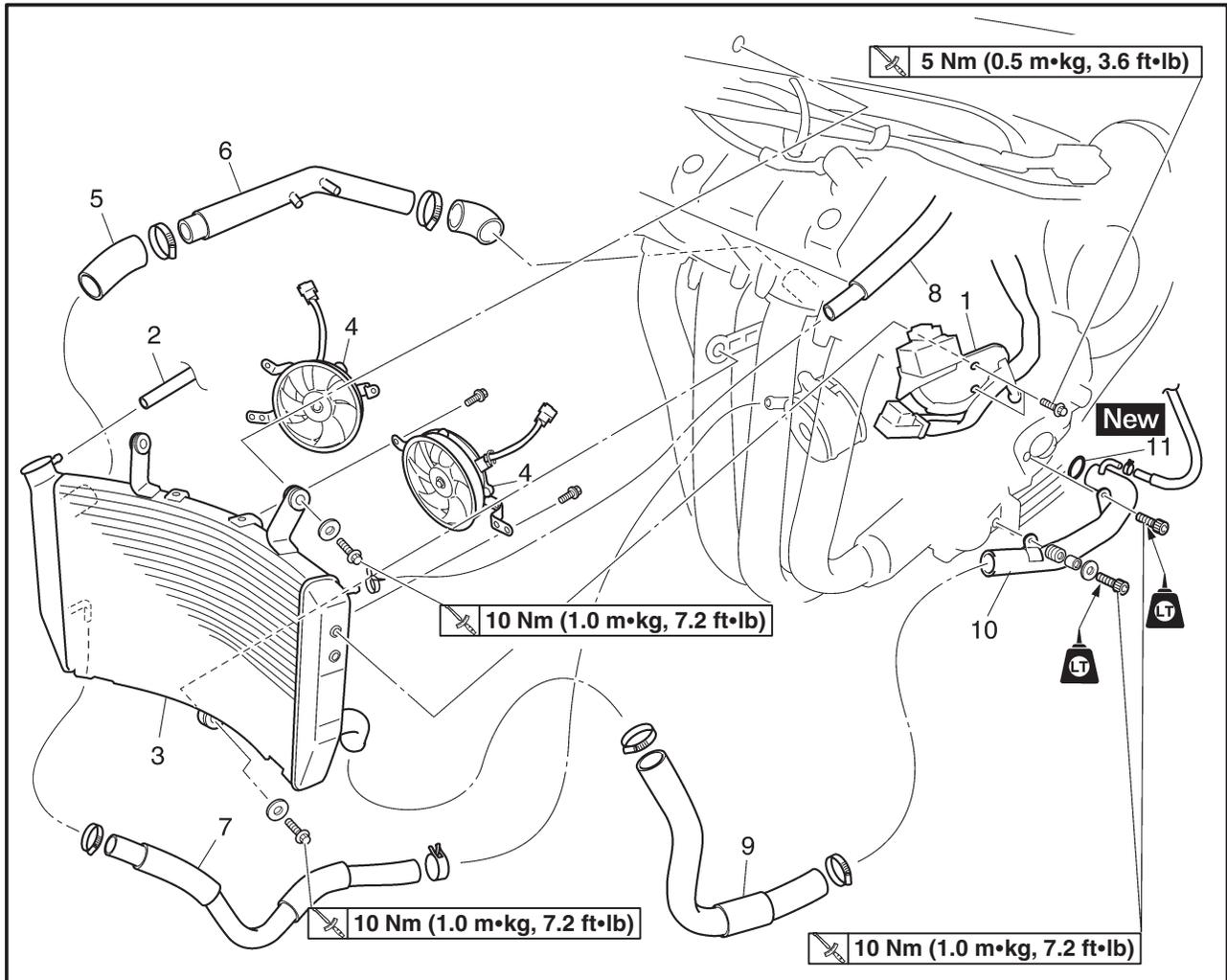
EAS00454

COOLING SYSTEM

RADIATOR



Order	Job/Part	Q'ty	Remarks
	Removing the radiator		Remove the parts in the order listed.
	Rider seat		Refer to "SEATS" in chapter 3.
	Fuel tank		
	Air filter case		Refer to "AIR FILTER CASE" in chapter 3.
	Side cowlings		
	Bottom cowling		Refer to "COWLINGS" in chapter 3.
	Coolant		Drain. Refer to "CHANGING THE COOLANT" in chapter 3.
1	Fuse box stay	1	Disconnect.
2	Coolant reservoir hose	1	
3	Radiator	1	
4	Radiator fan motor	2	
5	Radiator inlet hose	1	



Order	Job/Part	Q'ty	Remarks
6	Radiator inlet pipe	1	For installation, reverse the removal procedure.
7	Oil cooler outlet hose	1	
8	Water pump breather hose	1	
9	Radiator outlet hose	1	
10	Water pump inlet pipe	1	
11	O-ring	1	



EAS00456

INSTALLING THE RADIATOR**1. Fill:**

- cooling system

(with the specified amount of the recommended coolant)

Refer to “CHANGING THE COOLANT” in chapter 3.

2. Check:

- cooling system

Leaks → Repair or replace any faulty part.

3. Measure:

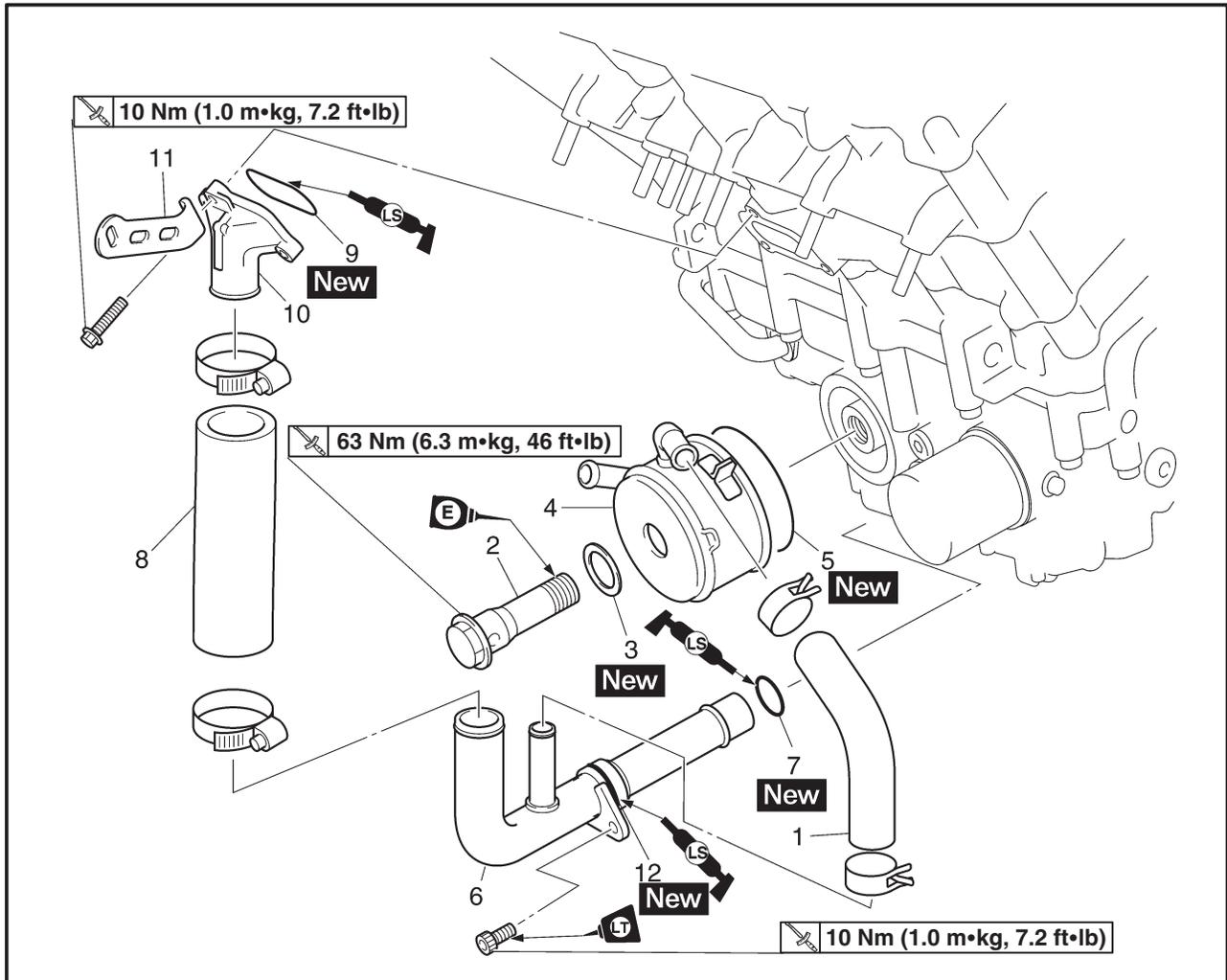
- radiator cap opening pressure

Below the specified pressure → Replace the radiator cap.

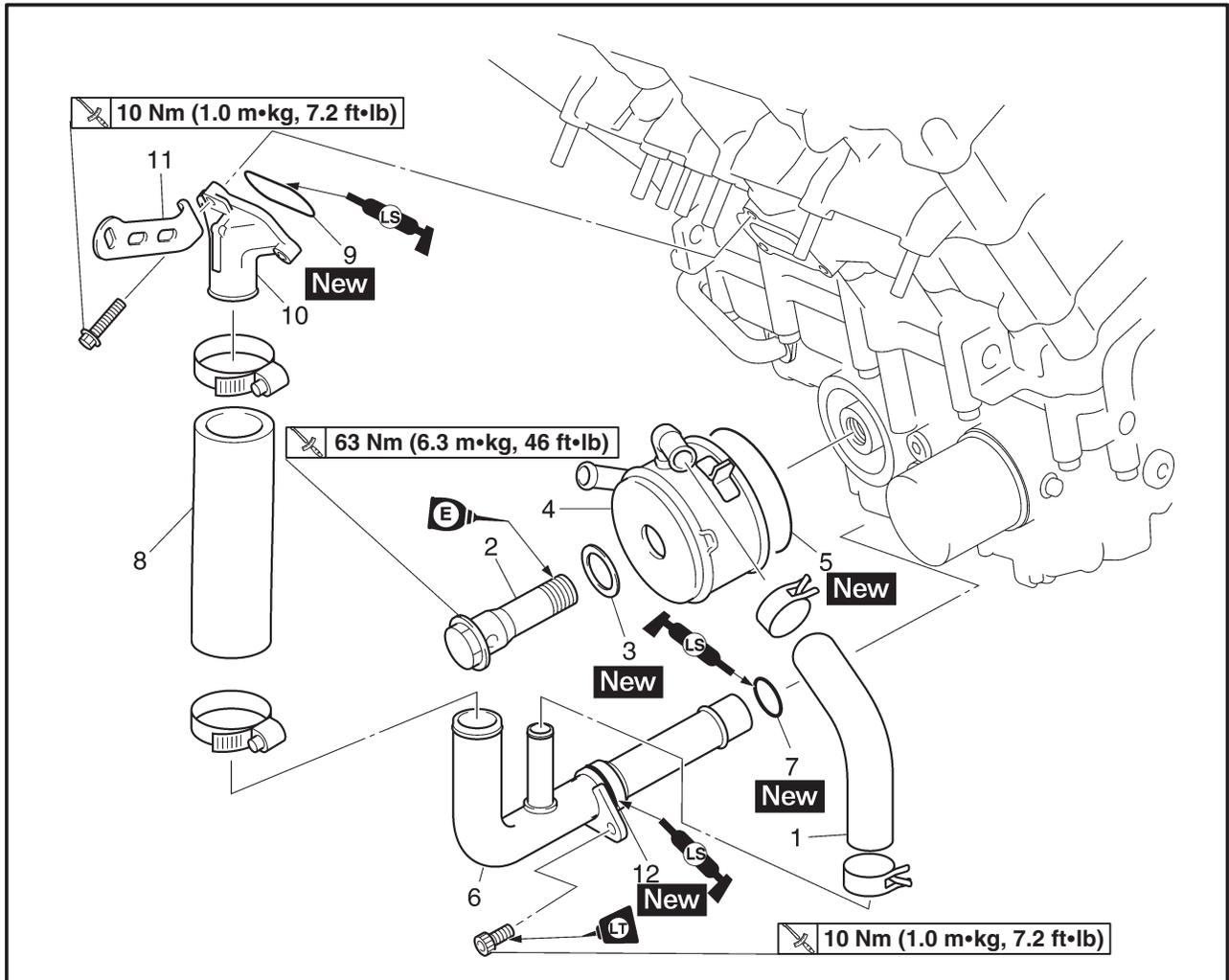
Refer to “CHECKING THE RADIATOR”.

EAS00457

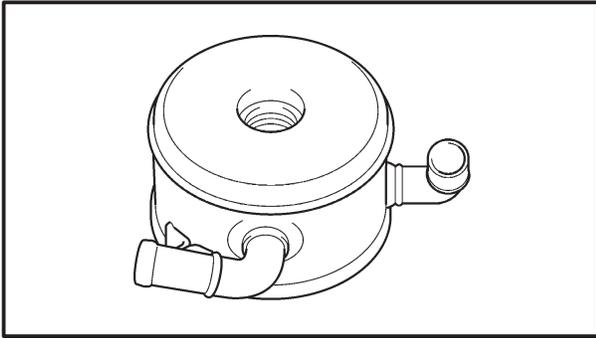
OIL COOLER



Order	Job/Part	Q'ty	Remarks
	Removing the oil cooler Engine oil		Remove the parts in the order listed. Drain. Refer to "CHANGING THE ENGINE OIL" in chapter 3.
1	Oil cooler inlet hose	1	
2	Bolt	1	
3	Washer	1	
4	Oil cooler	1	
5	O-ring	1	
6	Water pump outlet pipe	1	
7	O-ring	1	
8	Water jacket joint inlet hose	1	
9	O-ring	1	



Order	Job/Part	Q'ty	Remarks
10	Water jacket joint	1	For installation, reverse the removal procedure.
11	Stay	1	
12	O-ring	1	



EAS00458

CHECKING THE OIL COOLER

1. Check:
 - oil cooler
Cracks/damage → Replace.
2. Check:
 - oil cooler inlet hose
 - oil cooler outlet hose
Cracks/damage/wear → Replace.

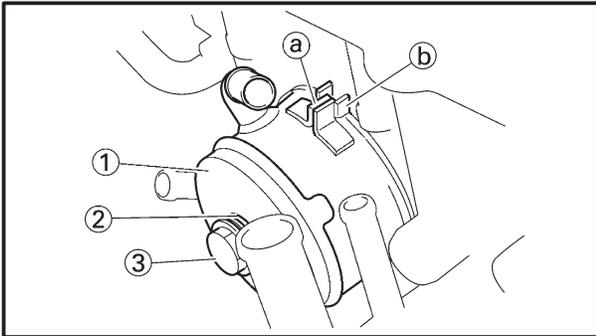
EAS00459

INSTALLING THE OIL COOLER

1. Clean:
 - mating surfaces of the oil cooler and the crankcase
(with a cloth dampened with lacquer thinner)
2. Install:
 - O-ring **New**
 - oil cooler ①
 - washer ② **New**
 - bolt ③  **63 Nm (6.3 m•kg, 46 ft•lb)**

NOTE:

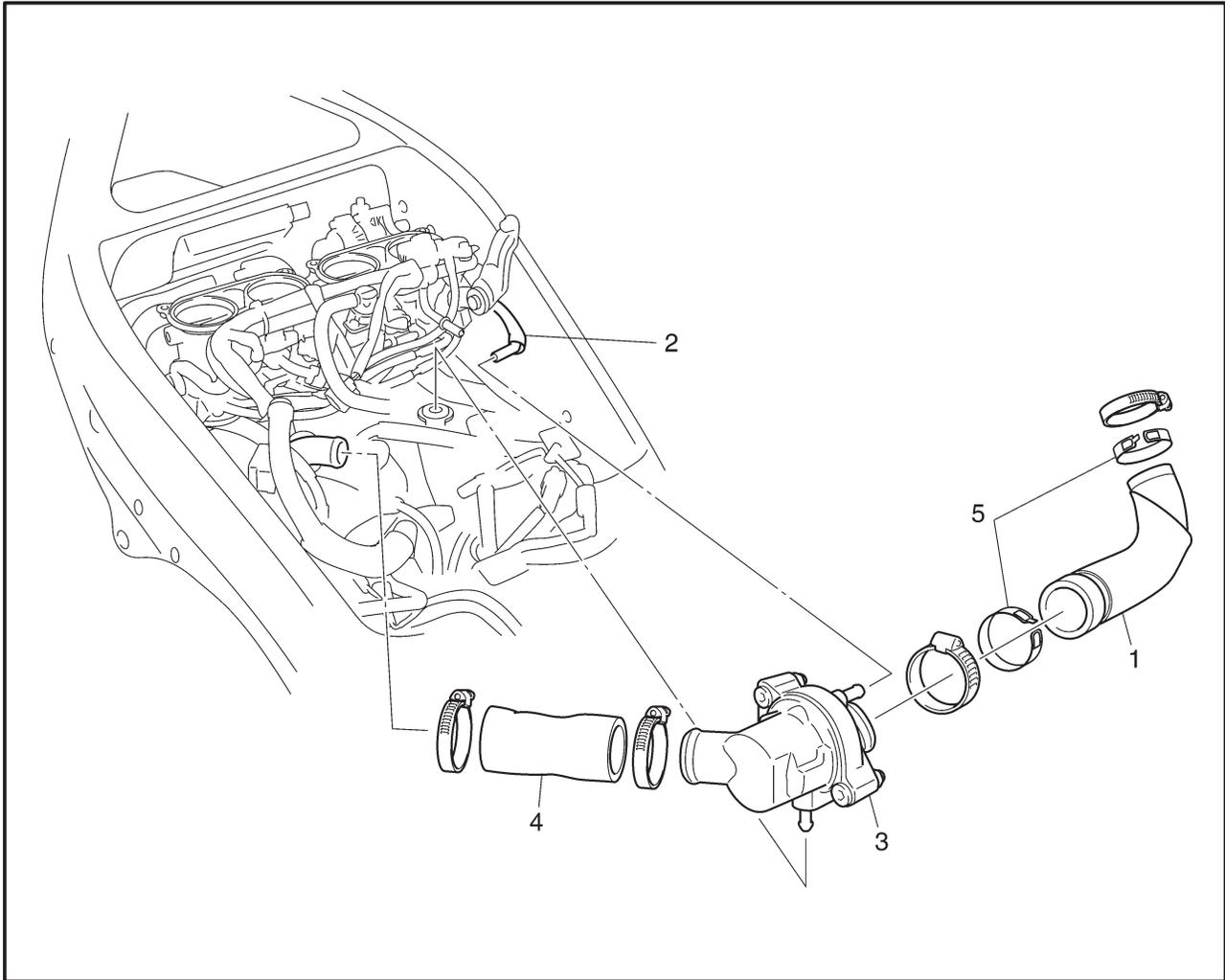
- Before installing the oil cooler, lubricate the oil cooler bolt and O-ring with a thin coat of engine oil.
- Make sure that the O-ring is positioned properly.
- Align the projection (a) on the oil cooler with the slot (b) in the crankcase.



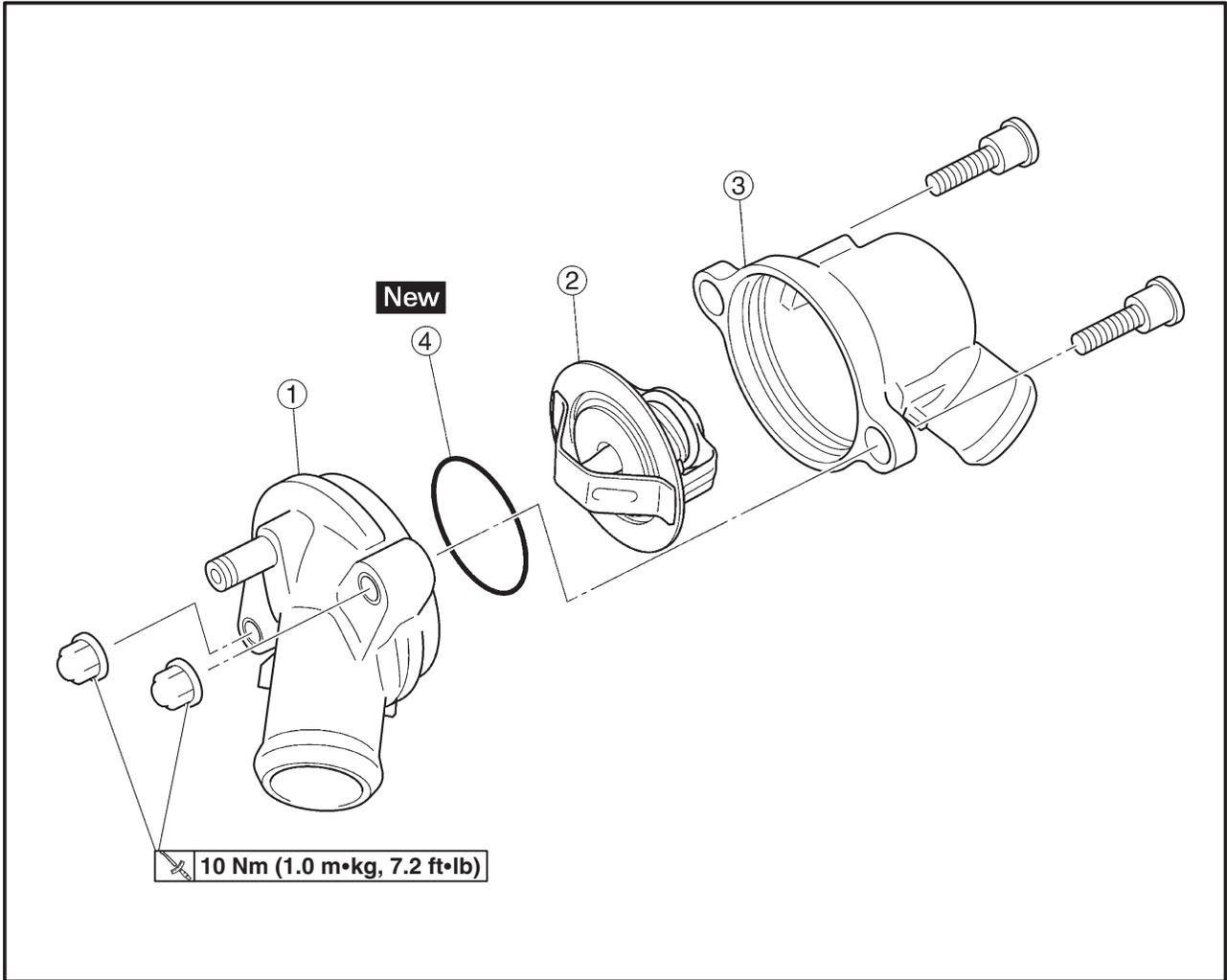
3. Fill:
 - cooling system
(with the specified amount of the recommended coolant)
Refer to “CHANGING THE COOLANT” in chapter 3.
 - crankcase
(with the specified amount of the recommended engine oil)
Refer to “CHANGING THE ENGINE OIL” in chapter 3.
4. Check:
 - cooling system
Leaks → Repair or replace any faulty part.
5. Measure:
 - radiator cap opening pressure
Below the specified pressure → Replace the radiator cap.
Refer to “CHECKING THE RADIATOR”.

EAS00460

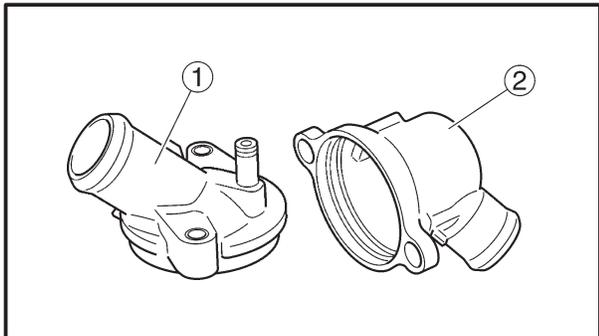
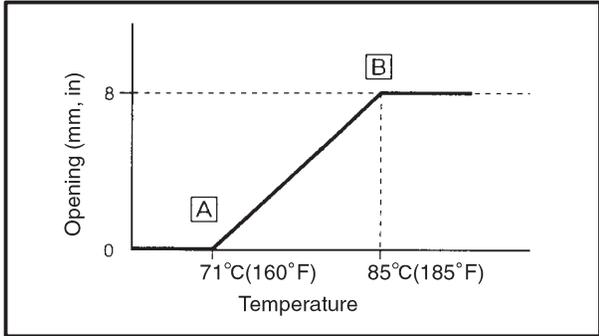
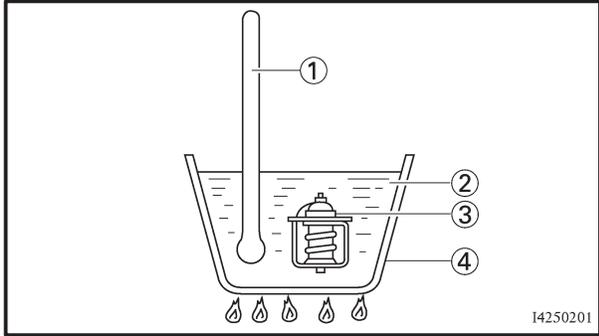
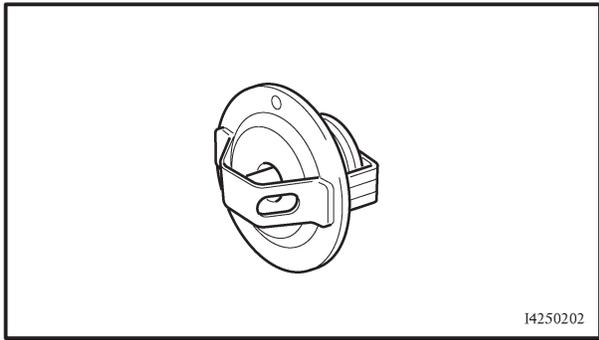
THERMOSTAT



Order	Job/Part	Q'ty	Remarks
	Removing the thermostat assembly		Remove the parts in the order listed.
	Rider seat		Refer to "SEATS" in chapter 3.
	Fuel tank		Refer to "FUEL TANK" in chapter 3.
	Air filter case		Refer to "AIR FILTER CASE" in chapter 3.
	Coolant		Drain. Refer to "CHANGING THE COOLANT" in chapter 3.
1	Thermostat assembly outlet hose	1	
2	Thermostat assembly breather hose	1	
3	Thermostat assembly	1	
4	Thermostat assembly inlet hose	1	
5	Band	2	
			For installation, reverse the removal procedure.



Order	Job/Part	Q'ty	Remarks
	Disassembling the thermostat housing		Disassemble the parts in the order listed.
①	Thermostat housing cover	1	
②	Thermostat	1	
③	Thermostat housing	1	
④	O-ring	1	
			For assembly, reverse the disassembly procedure.



EAS00462

CHECKING THE THERMOSTAT

1. Check:

- thermostat

Does not open at 71 ~ 85°C (160 ~ 185°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 Thermometer
- ② Water
- ③ Thermostat
- ④ Container
- A Fully closed
- B Fully open

NOTE:

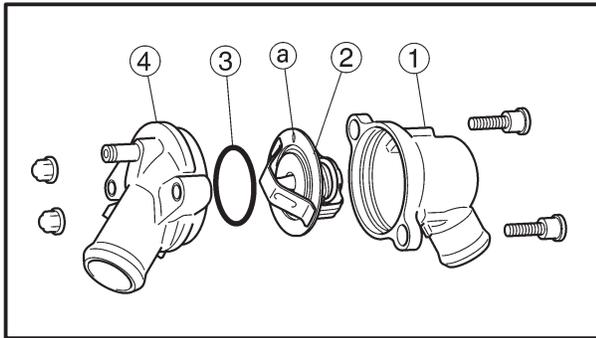
If the accuracy of the thermostat is in doubt, replace it. A faulty thermostat could cause serious overheating or overcooling.

2. Check:

- thermostat housing cover ①

- thermostat housing ②

Cracks/damage → Replace.



EAS00464

ASSEMBLING THE THERMOSTAT ASSEMBLY

1. Install:

- thermostat housing ①
- thermostat ②
- O-ring **New** ③
- thermostat housing cover ④

 **10 Nm (1.0 m•kg, 7.2 ft•lb)**

NOTE:

Install the thermostat with its breather hole (a) facing up.

EAS00466

INSTALLING THE THERMOSTAT ASSEMBLY

1. Fill:

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

2. Check:

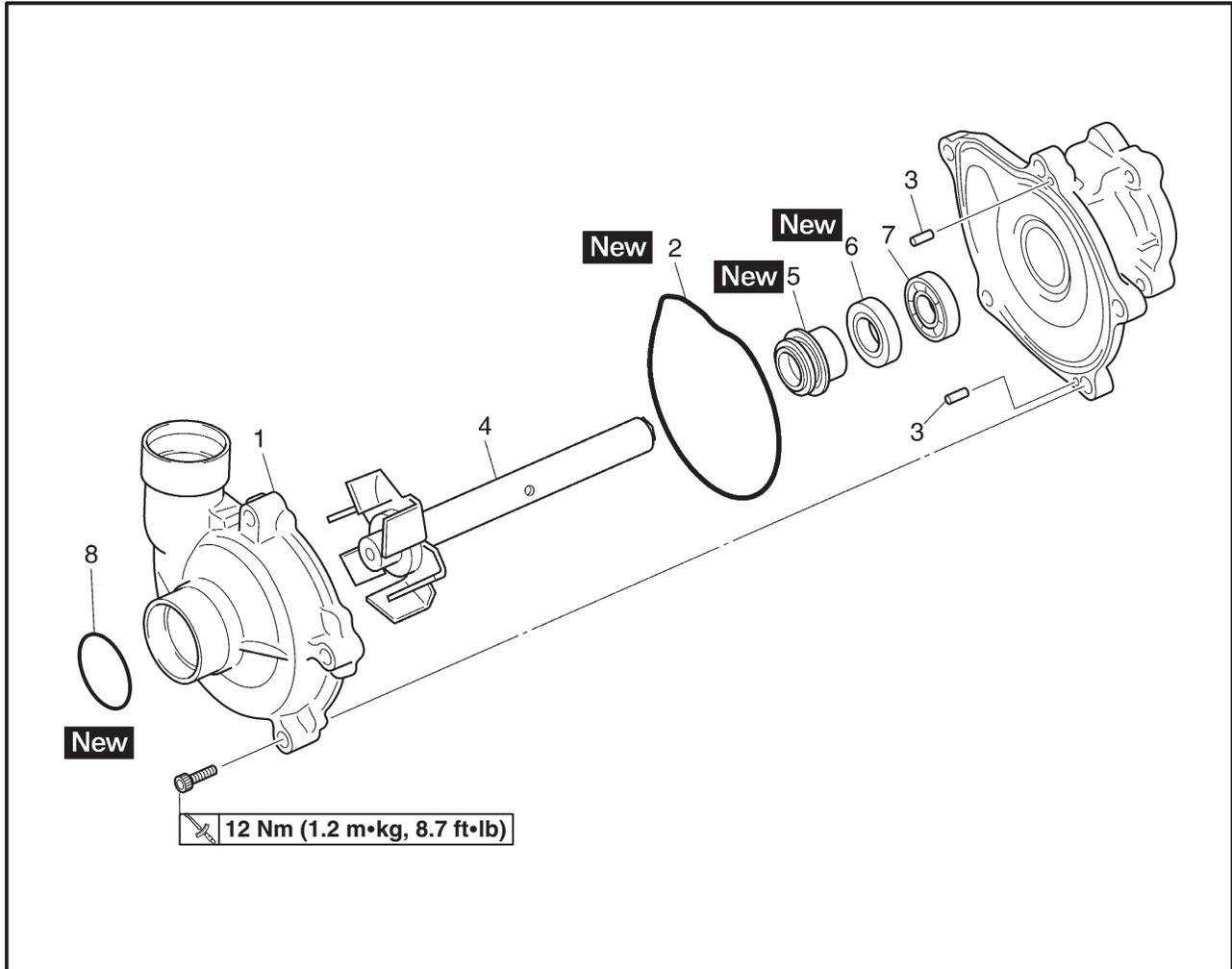
- cooling system
Leaks → Repair or replace any faulty part.

3. Measure:

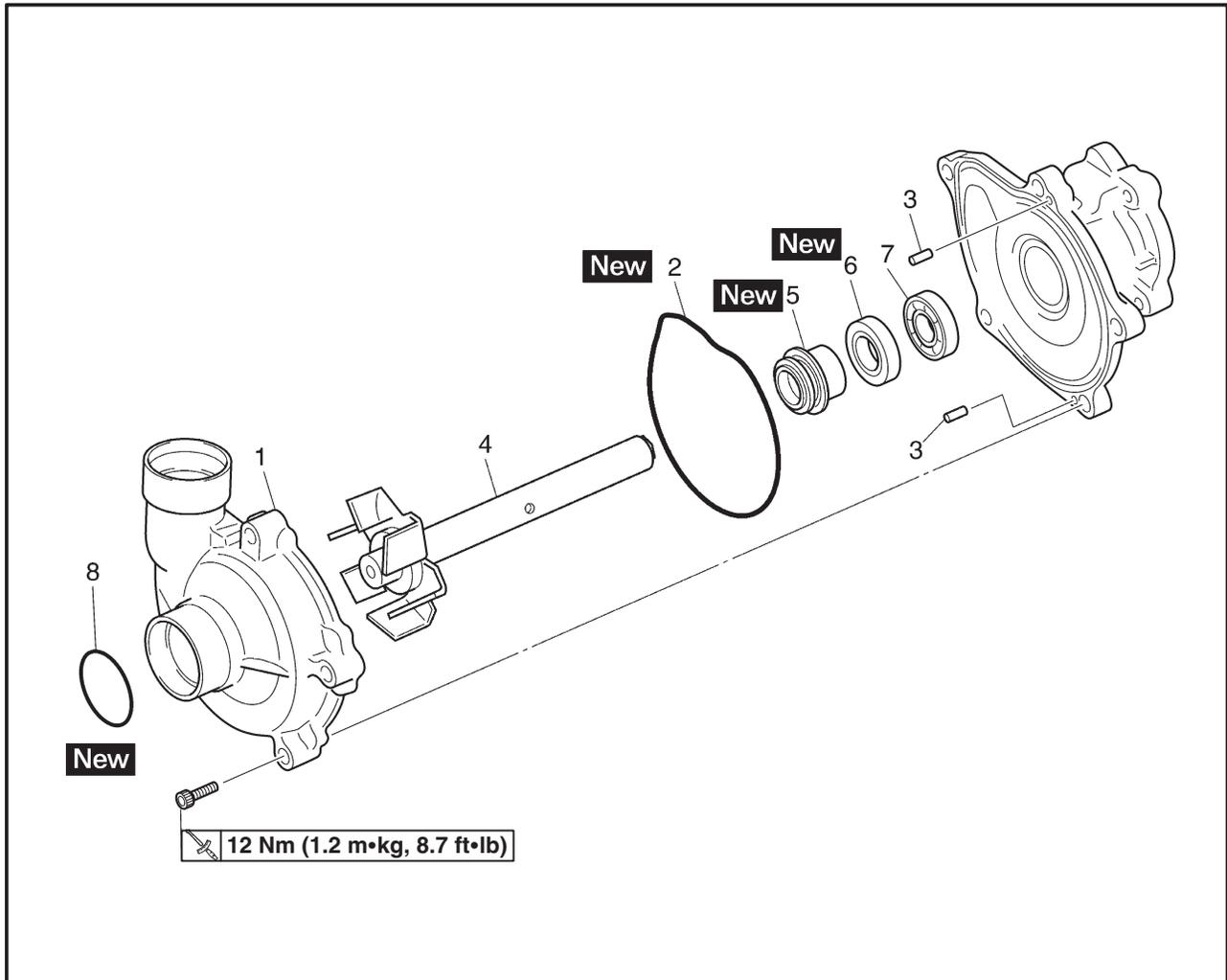
- radiator cap opening pressure
Below the specified pressure → Replace the radiator cap.
Refer to "CHECKING THE RADIATOR".

EAS00468

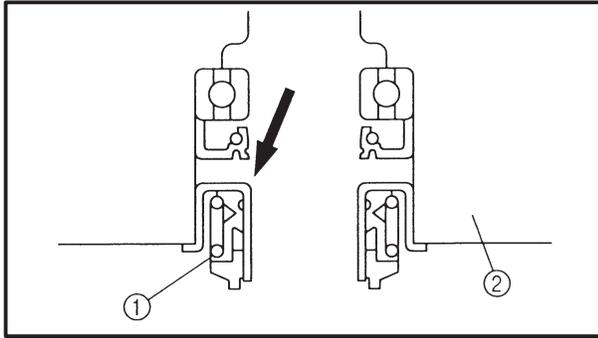
**WATER PUMP
IMPELLER SHAFT**



Order	Job/Part	Q'ty	Remarks
	Removing the impeller shaft		Remove the parts in the order listed. NOTE: _____ <ul style="list-style-type: none"> •The water pump and oil pump are combined into one unit (oil/water pump assembly). •It is not necessary to remove the impeller shaft unless the coolant level is extremely low or coolant leaks from the oil pan.
	Oil/water pump assembly and oil pump rotor		Refer to "OIL PAN AND OIL PUMP" in chapter 5.
1	Water pump cover	1	
2	O-ring	1	
3	Pin	2	
4	Impeller shaft (along with the impeller)	1	



Order	Job/Part	Q'ty	Remarks
5	Water pump seal	1	For installation, reverse the removal procedure.
6	Oil seal	1	
7	Bearing	1	
8	O-ring	1	



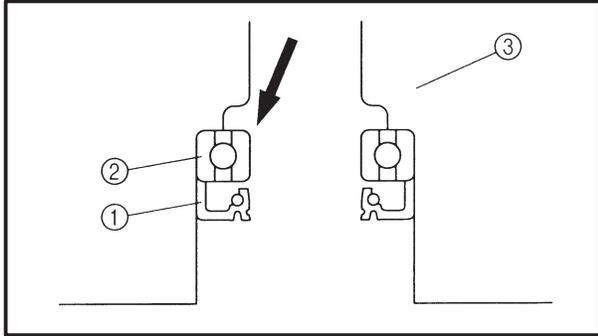
EAS00471

DISASSEMBLING THE WATER PUMP

1. Remove:
- water pump seal ①

NOTE: _____
 Tap out the water pump seal from the inside of the water pump housing.

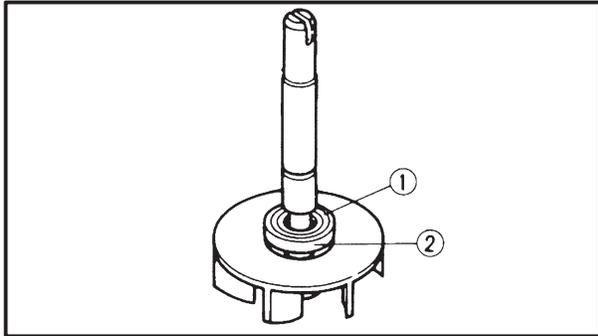
② Water pump housing



2. Remove:
- oil seal ①
 - bearing ②

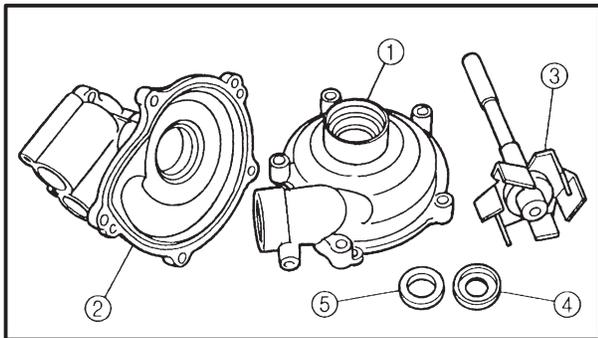
NOTE: _____
 Tap out the bearing and oil seal from the outside of the water pump housing.

③ Water pump housing



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

NOTE: _____
 Do not scratch the impeller shaft.



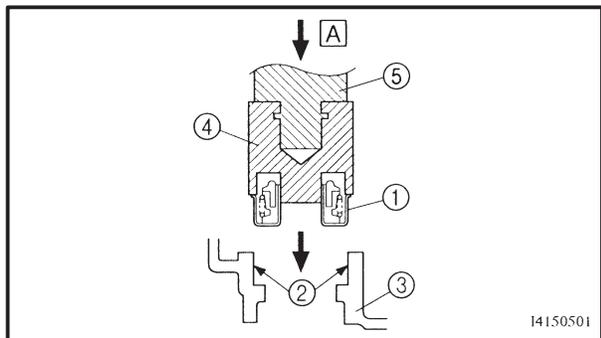
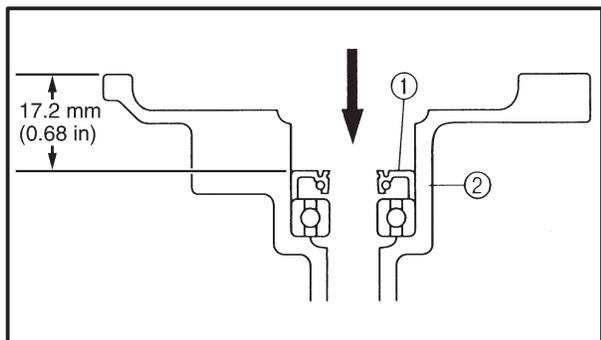
EAS00473

CHECKING THE WATER PUMP

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

2. Check:
- bearing
- Rough movement → Replace.

3. Check:
- water pump outlet pipe
- Cracks/damage/wear → Replace.



EAS00475

ASSEMBLING THE WATER PUMP

1. Install:
- oil seal **New** ①
(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 that matches its outside diameter.

2. Install:
- water pump seal **New** ①

CAUTION: _____

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

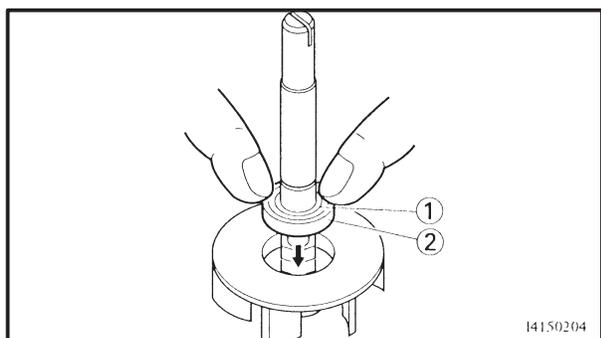
NOTE: _____

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



Mechanical seal installer ④
 90890-04078, YM-33221
Middle driven shaft bearing driver ⑤
 90890-04058, YM-04058
Yamaha bond #1215
 90890-85505
Quick gasket
 ACC-11001-05-01

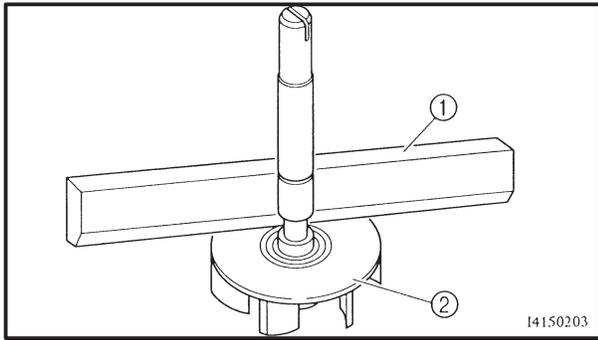
A Push down.



3. Install:
- rubber damper **New** ②
 - rubber damper holder **New** ①

NOTE: _____

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



4. Measure:
- impeller shaft tilt
Out of specification → Repeat steps (3) and (4).

CAUTION: _____

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



**Impeller shaft tilt limit
0.15 mm (0.006 in)**

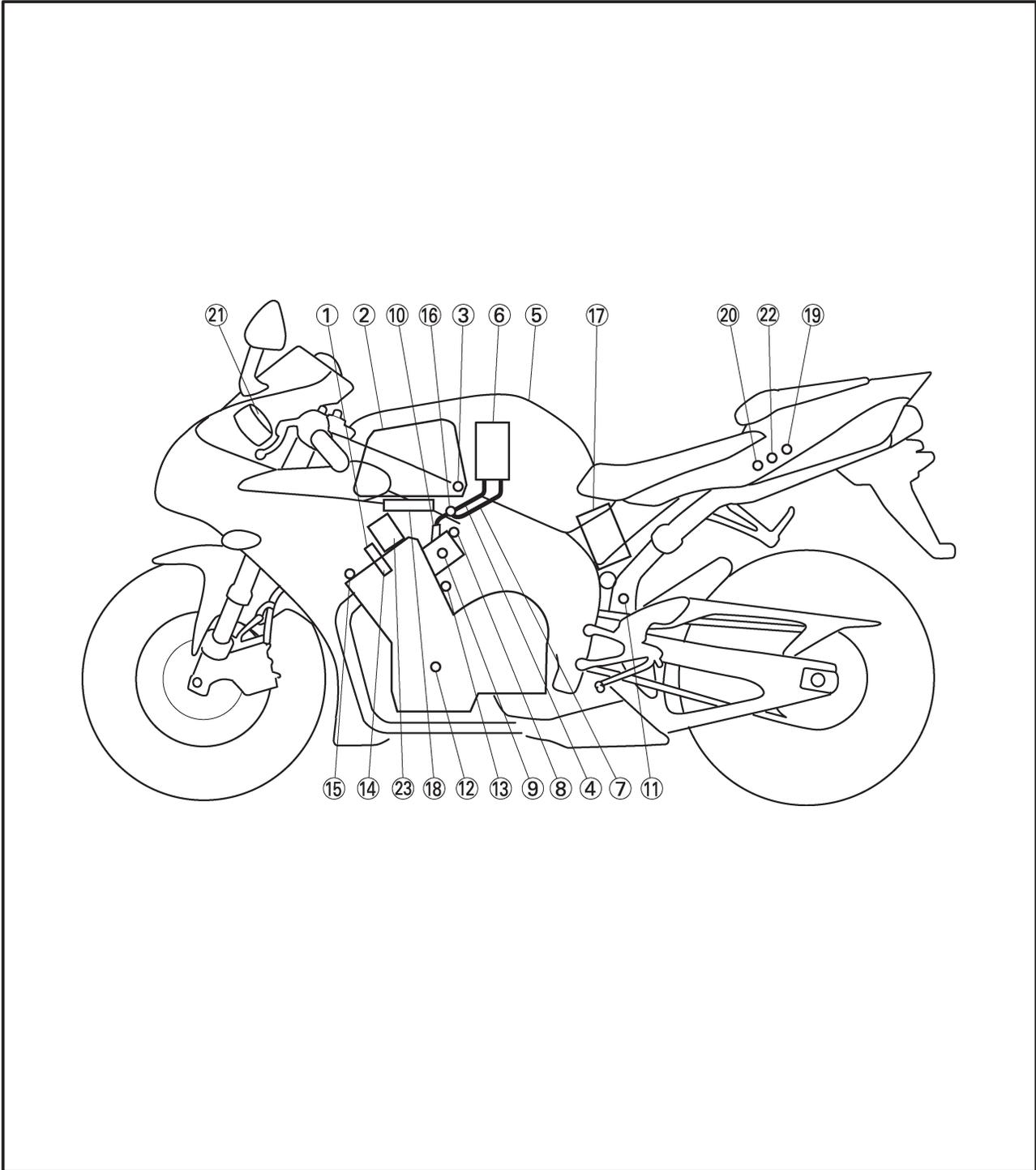
- ① Straightedge
- ② Impeller



FUEL INJECTION SYSTEM

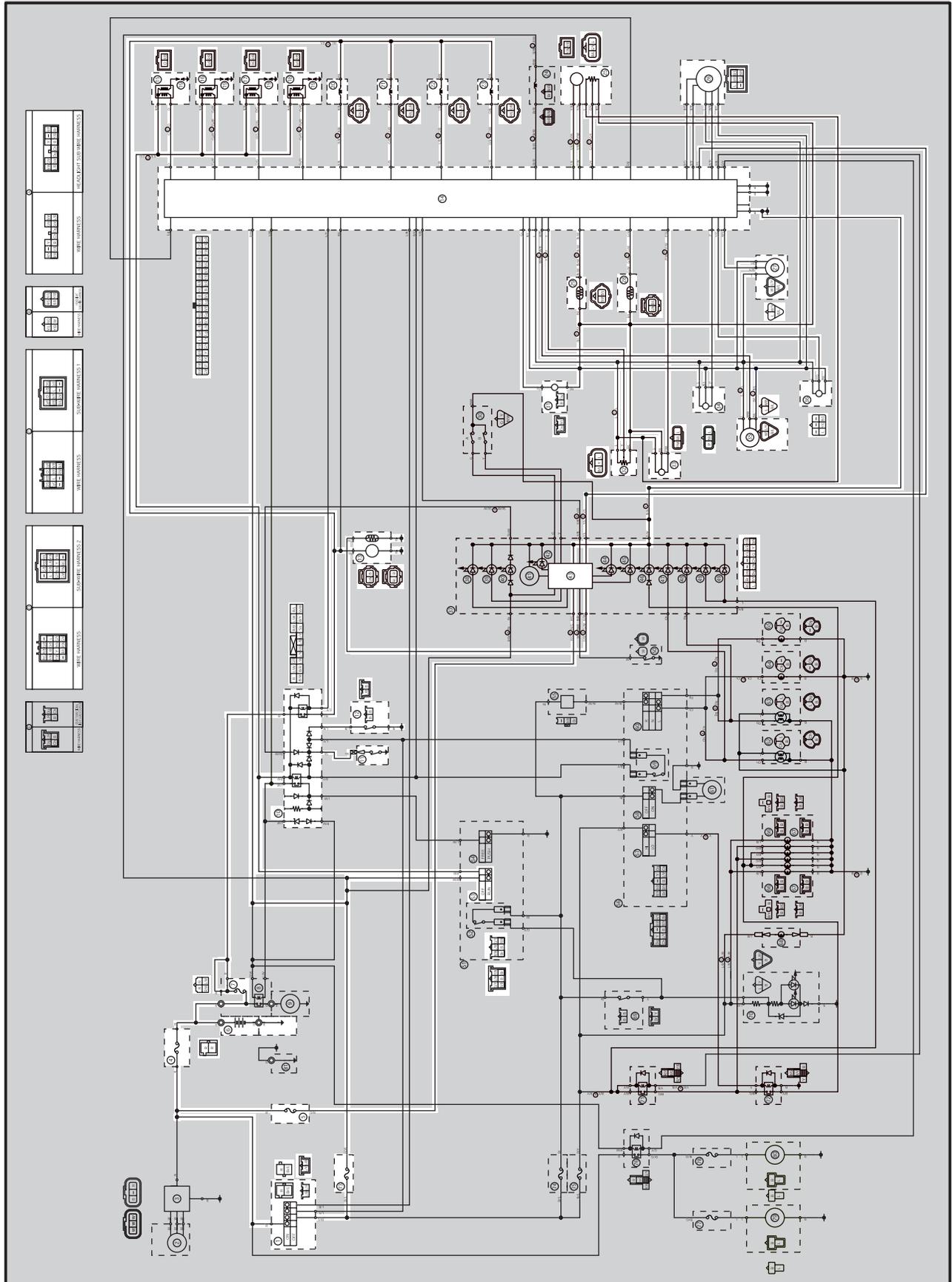
FUEL INJECTION SYSTEM

- | | | | |
|-----------------------------|------------------------------|----------------------------------|--------------------------------|
| ① Ignition coil | ⑧ Intake air pressure sensor | ⑬ Coolant temperature sensor | ⑰ Atmospheric pressure sensor |
| ② Air filter case | ⑨ Throttle position sensor | ⑭ Spark plug | ⑱ Fuel injection system relay |
| ③ Intake temperature sensor | ⑩ Fuel injector | ⑮ Cylinder identification sensor | ⑳ Engine trouble warning light |
| ④ Fuel delivery hose | ⑪ Catalytic converter | ⑯ Pressure regulator | ㉑ Lean angle cut-off switch |
| ⑤ Fuel tank | ⑫ Crankshaft position sensor | ⑰ Battery | ㉒ Air cut-off valve |
| ⑥ Fuel pump | | ⑱ ECU | |
| ⑦ Fuel return hose | | | |





WIRING DIAGRAM





- ① Main switch
- ④ Fuse (main)
- ⑤ Fuse (backup)
- ⑥ Battery
- ⑦ Fuse (fuel injection)
- ⑩ Starting circuit cut-off relay
- ⑪ Neutral switch
- ⑫ Sidestand switch
- ⑬ Fuel pump
- ⑭ E.C.U.
- ⑮ Ignition coil #1
- ⑯ Ignition coil #2
- ⑰ Ignition coil #3
- ⑱ Ignition coil #4
- ⑲ Spark plug
- ⑳ Injector #1
- ㉑ Injector #2
- ㉒ Injector #3
- ㉓ Injector #4
- ㉕ Sub-throttle position sensor
- ㉖ EXUP servo motor
- ㉗ Speed sensor
- ㉘ Coolant temperature sensor
- ㉙ Intake air temperature sensor
- ㉚ Crankshaft position sensor
- ㉛ Throttle position sensor
- ㉜ Intake air pressure sensor
- ㉝ Atmospheric pressure sensor
- ㉞ Cylinder identification sensor
- ㉟ Lean angle cut-off switch
- ④③ Multi function meter
- ⑤③ Engine stop switch
- ⑦③ Fuse (ignition)



EAS00899

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.

- To inform the rider that the fuel injection system is not functioning, 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 an engine trouble warning light.
- After the engine has been stopped, the fault code number appears from the lowest value in order of precedence on the LCD meter. Once a fault code has been displayed, it remains stored in the memory of the ECU until it is deleted.

EAS00900

Engine trouble warning light indication and FI system operating condition

Warning light indication	ECU's operation	FI operation	Vehicle operation
Flashing*	Warning provided when unable to start engine	Operation stopped	Unable
Remains ON	Malfunction detected	Operated with substitute characteristics in accordance with the description of the malfunction	Able/Unable depending on the self-diagnostic fault code

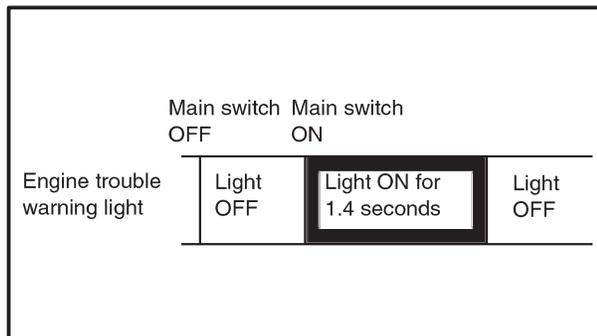
* The warning light flashes when any one of the conditions listed below is present and the start switch is pushed.

- | | |
|--|---|
| 11: Cylinder identification sensor | 30: Lean angle cut-off switch (latch up detected) |
| 12: Crankshaft position sensor | 41: Lean angle cut-off switch (open or short circuit) |
| 19: Sidestand switch (open circuit in wire to ECU) | 50: ECU internal malfunction (memory check error) |

EAS00901

Checking for a defective engine trouble warning light bulb

The engine trouble warning light comes on for 1.4 seconds after the main switch has been turned "ON" and when the start switch is being pushed. If the warning light does not come on under these conditions, the warning light bulb may be defective.





SUBSTITUTE CHARACTERISTICS OPERATION CONTROL (FAIL-SAFE ACTION)

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.

The ECU takes fail-safe actions in two ways: one in which the sensor output is set to a prescribed value, and the other in which the ECU directly operates an actuator. Details on the fail-safe actions are given in the table below.

FAIL-SAFE ACTIONS TABLE

Fault Code No.	Item	Symptom	Fail-safe action	Able/unable to start	Able/unable to drive
11	Cylinder identification sensor	No normal signals are received from the cylinder identification sensor.	Continues to operate the engine based on the results of the cylinder identification that existed up to that point.	Unable	Able
12	Crankshaft position sensor	No normal signals are received from the crankshaft position sensor.	• Stops the engine (by stopping the injection and ignition).	Unable	Unable
13 14	Intake air pressure sensor (open or short circuit) (pipe system)	Intake air pressure sensor-open or short circuit detected. Faulty intake air pressure sensor system.	• Fixes the intake air pressure to 101.3 kpa.	Able	Able
15 16	Throttle position sensor (open or short circuit) (stuck)	Throttle position sensor-open or short circuit detected.	• Fixes the throttle position sensor to fully open.	Able	Able
17	EXUP servo motor potention (open or short circuit)	EXUP servo motor potention-open or short circuit detected.	• Turn the EXUP servo motor toward the open side for 3 seconds and then stop it.	Able	Able
18	EXUP servo motor (lock)	A lock of the EXUP servo motor is detected.	• Perform the preventive control against motor locking. (Perform the lock release operation) twice every 100 seconds.	Able	Able
19	Sidestand switch (open circuit in wire to ECU)	Open circuit in the input line of ECU No.15 terminal is detected when the start switch is pressed.	-- (No start)	Unable	Unable
20	Intake air pressure Atmospheric pressure	Defective values are detected due to the internal malfunction	• Fixes the intake air pressure and atmospheric pressure to 101.3 kpa.	Able	Able
21	Coolant temperature sensor	Coolant temperature sensor-open or short circuit detected.	• Fixes the coolant temperature to 60°C.	Able	Able
22	Intake temperature sensor	Intake temperature sensor-open or short circuit detected.	• Fixes the intake temperature to 20°C.	Able	Able
23	Atmospheric pressure sensor	Atmospheric pressure sensor-open or short circuit detected.	• Fixes the atmospheric pressure to 101.3 kpa.	Able	Able
33 34 35 36	Faulty ignition	Open circuit detected in the primary lead of the ignition coil.	• Cut the injection of other cylinder in the same group with the cylinder that the error is detected. (Example: when the #1 cylinder is detective, cut the injection of #1 and #4 cylinders, when the #2 cylinder is detective, cut the injection of #2 and #3 cylinders). Turn on the power to the air induction solenoid to always cut-off the air.	Able (depending on the number of faulty cylinders)	Able (depending on the number of faulty cylinders)
30 41	Lean angle cut-off switch (latch up detected) (open or short circuit)	Lean angle cut-off switch-open or short circuit detected.	• Turns OFF the fuel injection system relay of the fuel system.	Unable	Unable
42	Speed sensor, neutral switch	No normal signals are received from the speed sensor; or, an open or short circuit is detected in the neutral switch.	• Fixes the gear to the top gear.	Able	Able
43	Fuel system voltage (monitor voltage)	The ECU is unable to monitor the battery voltage (an open circuit in the line to the ECU).	• Fixes the battery voltage to 12 V.	Able	Able
44	Error in writing the amount of CO adjustment on EEPROM	An error is detected while reading or writing on EEPROM (CO adjustment value).	--	Able	Able

FUEL INJECTION SYSTEM

FI



Fault Code No.	Item	Symptom	Fail-safe action	Able/unable to start	Able/unable to drive
46	Vehicle system power supply (Monitor voltage)	Power supply to the FI system is not normal.	--	Able	Able
47	Sub-throttle servo motor potention (open or short circuit)	sub-throttle servo motor potention-open or short circuit detected.	<ul style="list-style-type: none"> Turn the sub-throttle servo motor toward the close side for 4 seconds and then stop it. 	Able	Able
48	Sub-throttle servo motor (lock)	A lock of the sub-throttle servo motor is detected.	<ul style="list-style-type: none"> Perform the preventative control against motor locking. (Perform the lock release operation twice every 100 seconds.) 	Able	Able
50	ECU internal malfunction (memory check error)	Faulty ECU memory. When this malfunction is detected, the code number might not appear on the meter.	--	Unable	Unable
—	Start unable warning	Relay is not turned ON even if the crank signal is input while the start switch is turned ON. When the start switch is turned ON while an error is detected with the fault code of No.11, 12, 19, 30, 41 or 50.	Engine trouble warning light flashes when the start switch is turned ON.	Unable	Unable

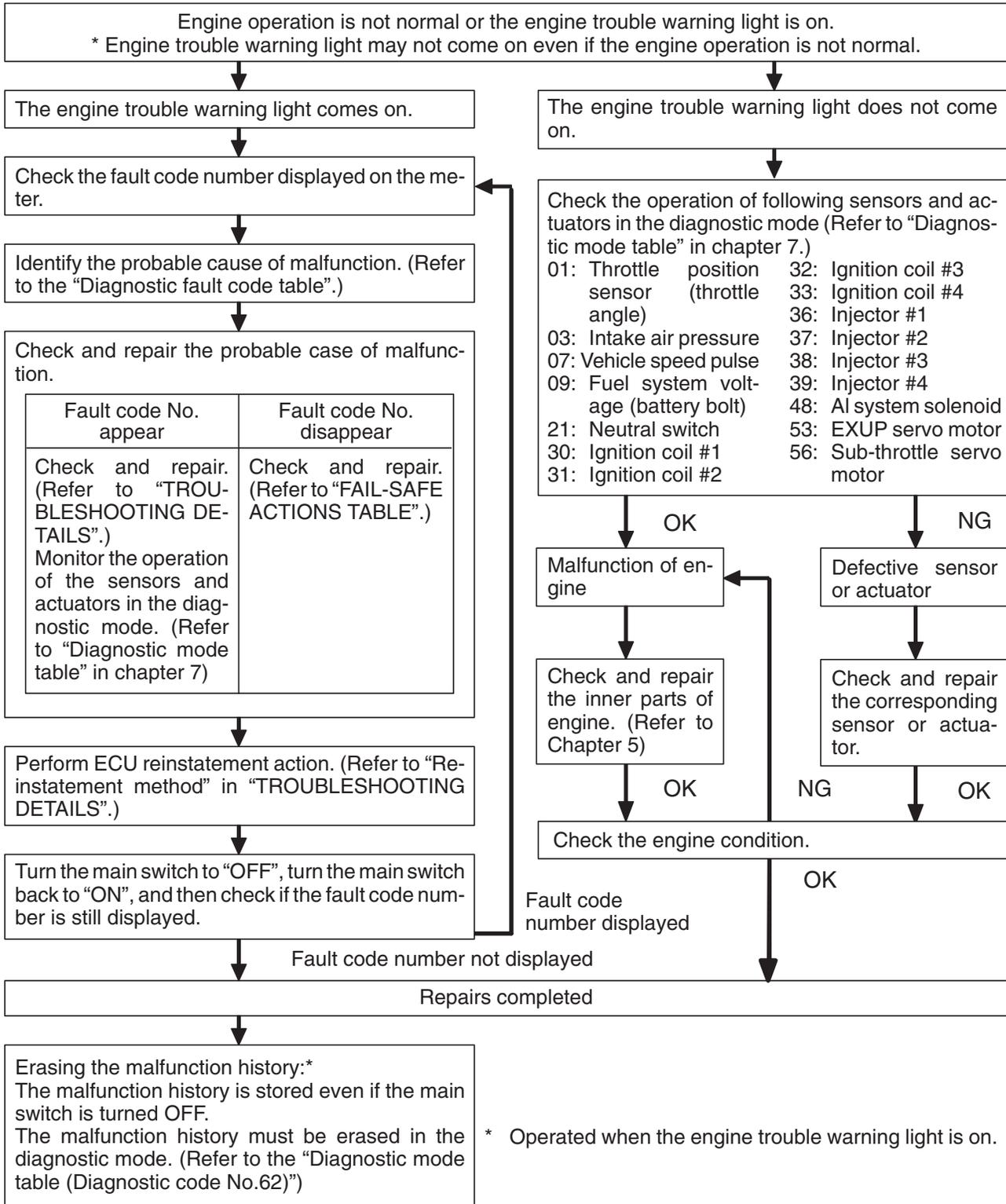
Communication error with the meter

Fault Code No.	Item	Symptom	Fail-safe action	Able/unable to start	Able/unable to drive
Er-1	ECU internal malfunction (output signal error)	No signals are received from the ECU.	—	Unable	Unable
Er-2	ECU internal malfunction (output signal error)	No signals are received from the ECU within the specified duration.	—	Unable	Unable
Er-3	ECU internal malfunction (output signal error)	Data from the ECU cannot be received correctly.	—	Unable	Unable
Er-4	ECU internal malfunction (input signal error)	Non-registered data has been received from the meter.	—	Unable	Unable



EAS00904

TROUBLESHOOTING CHART

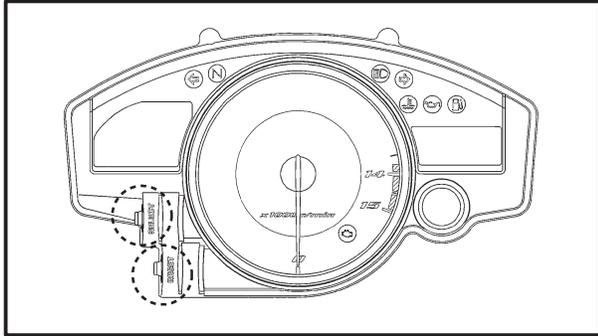




EAS00905

DIAGNOSTIC MODE

It is possible to monitor the sensor output data or check the activation of actuators without connecting the measurement equipment by simply switching the meter indication from the normal mode to the diagnostic monitoring mode.

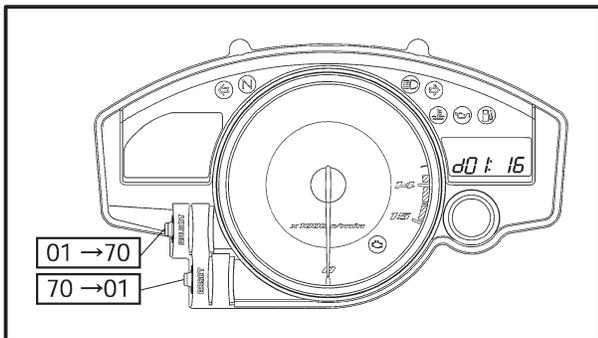


Setting the diagnostic mode

1. Turn the main switch to "OFF" and set the engine stop switch to "OFF".
2. Disconnect the wire harness coupler from the fuel pump.
3. Simultaneously press and hold the "SELECT" and "RESET" buttons, turn the main switch to "ON", and continue to press the buttons for 8 seconds or more.

NOTE:

- All displays on the meter disappear except the clock and tripmeter displays.
- "dIAG" appears on the LCD meter.



4. Press the "SELECT" button to select the CO adjustment mode "Co" or the diagnostic mode "dIAG".
5. After selecting "dIAG", simultaneously press the "SELECT" and "RESET" buttons for 2 seconds or more to execute the selection.
6. Select the diagnostic code number that applies to the item that was verified with the fault code number by pressing the "SELECT" and "RESET" buttons.

NOTE:

- The diagnostic code number appears on the LCD meter (01-70).
- To decrease the selected diagnostic code number, press the "RESET" button. Press the "RESET" button for 1 second or longer to automatically decrease the diagnostic code numbers.
- To increase the selected diagnostic code number, press the "SELECT" button. Press the "SELECT" 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 appears on the trip LCD.
 - Actuator operation
Set the engine stop switch to “ON” to operate the actuator.
* If the engine stop switch is set to “ON”, set it to “OFF”, and then set it to “ON” again.
8. Turn the main switch to “OFF” to cancel the the diagnostic mode.

NOTE: _____

To perform a reliable diagnosis, make sure to turn “OFF” the power supply before every check and then start right from the beginning.



Diagnostic fault code table

Fault code No.	Symptom	Probable cause of malfunction	Diagnostic code
11	No normal signals are received from the cylinder identification sensor.	<ul style="list-style-type: none"> • Open or short circuit in wiring sub lead. • Open or short circuit in wiring harness. • Defective cylinder identification sensor. • Malfunction in ECU. • Improperly installed sensor. 	—
12	No normal signals are received from the crankshaft position sensor.	<ul style="list-style-type: none"> • Open or short circuit in wiring 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.	<ul style="list-style-type: none"> • Open or short circuit in wiring sub lead. • Open or short circuit in wiring harness. • Defective intake air pressure sensor. • Malfunction in ECU. 	03
14	Faulty intake air pressure sensor hose system; a hose is detached, causing constant application of the atmospheric pressure to the sensor; or, the hose is clogged.	<ul style="list-style-type: none"> • Intake air pressure sensor hose is detached, clogged, kinked, or pinched. • Malfunction in ECU. 	03
15	Throttle position sensor-open or short circuit detected.	<ul style="list-style-type: none"> • Open or short circuit in wiring sub lead. • Open or short circuit in wiring harness. • Defective throttle position sensor. • Malfunction in ECU. • Improperly installed throttle position sensor. 	01
16	A stuck throttle position sensor is detected.	<ul style="list-style-type: none"> • Stuck throttle position sensor. • Malfunction in ECU. 	01
17	EXUP servo motor potention circuit-open or short circuit detected.	<ul style="list-style-type: none"> • Open or short circuit in wiring sub lead. • Detective EXUP servo motor (potention circuit). 	53
18	EXUP servo motor is stuck.	<ul style="list-style-type: none"> • Open or short circuit in wiring sub lead. • Stuck EXUP servo motor (mechanism). • Stuck EXUP servo motor (motor). 	53
19	Open circuit in the input line of ECU No.15 terminal is detected when the start switch is pressed.	<ul style="list-style-type: none"> • Open circuit in wiring harness (ECU Coupler). • Malfunction in ECU. 	20
20	When the main switch is turned to ON, the atmospheric sensor voltage and intake air pressure sensor voltage differ greatly.	<ul style="list-style-type: none"> • Atmospheric pressure sensor hose is clogged. • Intake air pressure sensor hose is clogged, kinked, or pinched. • Malfunction of the atmospheric pressure sensor in the intermediate electrical potential. • Malfunction of the intake air pressure sensor in the intermediate electrical potential. • Malfunction in ECU. 	03 02
21	Coolant temperature sensor-open or short circuit detected.	<ul style="list-style-type: none"> • Open or short circuit in wiring harness. • Defective coolant temperature sensor. • Malfunction in ECU. 	06
22	Intake temperature sensor-open or short circuit detected.	<ul style="list-style-type: none"> • Open or short circuit in wiring harness. • Defective intake temperature sensor. • Malfunction in ECU. 	05
23	Atmospheric pressure sensor-open or short circuit detected.	<ul style="list-style-type: none"> • Open or short circuit in wiring sub lead. • Defective atmospheric pressure sensor. • Malfunction in ECU. 	02
30	The motorcycle has overturned.	<ul style="list-style-type: none"> • Overturned. • Malfunction in ECU. 	08
33	Open circuit is detected in the primary lead of the ignition coil (#1).	<ul style="list-style-type: none"> • Open or short circuit in wiring harness. • Malfunction in ignition coil. • Malfunction in ECU. • Malfunction in a component of ignition cut-off circuit system. 	30

FUEL INJECTION SYSTEM

FI



Fault code No.	Symptom	Probable cause of malfunction	Diagnostic code
34	Open circuit is detected in the primary lead of the ignition coil (#2).	<ul style="list-style-type: none"> • Open or short circuit in wiring harness. • Malfunction in ignition coil. • Malfunction in ECU. • Malfunction in a component of ignition cut-off circuit system. 	31
35	Open circuit is detected in the primary lead of the ignition coil (#3).	<ul style="list-style-type: none"> • Open or short circuit in wiring harness. • Malfunction in ignition coil. • Malfunction in ECU. • Malfunction in a component of ignition cut-off circuit system. 	32
36	Open circuit is detected in the primary lead of the ignition coil (#4).	<ul style="list-style-type: none"> • Open or short circuit in wiring harness. • Malfunction in ignition coil. • Malfunction in ECU. • Malfunction in a component of ignition cut-off circuit system. 	33
41	Lean angle cut-off switch-open or short circuit detected.	<ul style="list-style-type: none"> • Open or short circuit in wiring harness. • Defective lean angle cut-off switch. • Malfunction in ECU. 	08
42	No normal signals are received from the speed sensor; or, an open or short circuit is detected in the neutral switch.	<ul style="list-style-type: none"> • Open or short circuit in wiring harness. • Defective speed sensor. • Malfunction in vehicle speed sensor detected unit. • Defective neutral switch. • Malfunction in the engine side of the neutral switch. • Malfunction in ECU. 	07 21
43	The ECU is unable to monitor the battery voltage (an open circuit in the monitor line to the ECU).	<ul style="list-style-type: none"> • Open circuit in wiring harness. • Malfunction in ECU. 	09
44	An error is detected while reading or writing on EEPROM.	<ul style="list-style-type: none"> • Malfunction in ECU. (The CO adjustment value is not properly written on or read from the internal memory). 	60
46	Power supply to the FI system is not normal.	<ul style="list-style-type: none"> • Malfunction in "CHARGING SYSTEM". 	—
47	Sub-throttle servo motor potention circuit-open or short circuit detected.	<ul style="list-style-type: none"> • Open or short circuit in wiring harness. • Detective Sub-throttle servo motor (potention circuit). 	56
48	Sub-throttle servo motor is stuck.	<ul style="list-style-type: none"> • Open or short circuit in wiring harness. • Stuck Sub-throttle servo motor (mechanism). • Stuck Sub-throttle servo motor (motor). 	56
50	Faulty ECU memory. When this malfunction is detected, the code number might not appear on the meter.	<ul style="list-style-type: none"> • Malfunction in ECU. (The program and data are not properly written on or read from the internal memory.) 	—
Er-1	No signal are received from the ECU.	<ul style="list-style-type: none"> • Open or short circuit in wiring harness. • Malfunction in meter. • Malfunction in ECU. • Defective wire connection of the ECU coupler. 	—
Er-2	No signal are received from the ECU within the specified duration.	<ul style="list-style-type: none"> • Improper connection in wiring harness. • Malfunction in meter. • Malfunction in ECU. 	—
Er-3	Data from the ECU can not be received correctly.	<ul style="list-style-type: none"> • Improper connection in wiring harness. • Malfunction in meter. • Malfunction in ECU. 	—
Er-4	Non-registered data has been received from the meter.	<ul style="list-style-type: none"> • Improper connection in wiring harness. • Malfunction in meter. • Malfunction in ECU. 	—



Diagnostic mode table

Switch the meter display from the regular mode to the diagnosis mode. To switch the display, refer to "DIAGNOSTIC MODE".

NOTE:

- Check the intake air temperature and coolant temperature as close as possible to the intake air temperature sensor and the coolant temperature sensor respectively.
- If it is not possible to check it with an atmospheric pressure gauge, judge it by using 101.3 kPa as the standard.
- If it is not possible to check the intake air temperature, use the ambient temperature as reference.

Diagnostic code	Item	Description of action	Data displayed on meter (reference value)
01	Throttle angle	Displays the throttle angle. • Check with throttle fully closed. • Check with throttle fully open.	0 ~ 125 degrees • Fully closed position (15 ~ 18) • Fully open position (95 ~ 100)
02	Atmospheric pressure	Displays the atmospheric pressure. * Use an atmospheric pressure gauge to check the atmospheric pressure.	Compare it to the value displayed on the meter.
03	Intake air pressure	Displays the intake air pressure. Engine stop switch is on. * Generate the pressure difference by cranking the engine with the starter, without actually starting the engine.	• Not cranking-atmospheric pressure • Cranking-intake air pressure It changes at the value which is smaller than in the atmospheric pressure.
05	Intake temperature	Displays the intake air temperature. * Check the temperature in the air cleaner case.	Compare it to the value displayed on the meter.
06	Coolant temperature	Displays the coolant temperature. * Check the temperature of the coolant.	Compare it to the value displayed on the meter.
07	Vehicle speed pulse	Displays the accumulation of the vehicle pulses that are generated when the tire is spun.	(0 ~ 999; resets to 0 after 999) OK if the numbers appear on the meter.
08	Lean angle cut-off switch	Displays the lean angle cut-off switch values.	Upright: 0.4 ~ 1.4 V Overturned: 3.7 ~ 4.4 V
09	Fuel system voltage (battery voltage)	Displays the fuel system voltage (battery voltage). Engine stop switch is on.	0 ~ 18.7 V Normally, approximately 12.0 V
20	Sidestand switch	Displays that the switch is ON or OFF. (When the gear is in a position other than neutral.)	Stand retracted: ON Stand extended: OFF
21	Neutral switch	Displays that the switch is ON or OFF.	Neutral: ON In gear: OFF
30	Ignition coil #1	After the engine stop switch has been turned from OFF to ON, it actuates ignition coil #1 for five times every second and illuminates the engine trouble warning light. * Connect an ignition checker. * If the engine stop switch is ON, turn it OFF once, and then turn it back ON.	Check that spark is generated, 5 times with the engine stop switch ON.
31	Ignition coils #2	After the engine stop switch has been turned from OFF to ON, it actuates ignition coil #2 for five times every second and illuminates the engine trouble warning light. * Connect an ignition checker. * If the engine stop switch is ON, turn it OFF once, and then turn it back ON.	Check that spark is generated, 5 times with the engine stop switch ON.

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Diagnostic code	Item	Description of action	Data displayed on meter (reference value)
32	Ignition coil #3	After the engine stop switch has been turned from OFF to ON, it actuates ignition coil #3 for five times every second and illuminates the engine trouble warning light. * Connect an ignition checker. * If the engine stop switch is ON, turn it OFF once, and then turn it back ON.	Check that spark is generated, 5 times with the engine stop switch ON.
33	Ignition coil #4	After the engine stop switch has been turned from OFF to ON, it actuates ignition coil #4 for five times every second and illuminates the engine trouble warning light. * Connect an ignition checker. * If the engine stop switch is ON, turn it OFF once, and then turn it back ON.	Check that spark is generated, 5 times with the engine stop switch ON.
36	Injector #1	After the engine stop switch has been turned from OFF to ON, it actuates the injector #1 five times every second and illuminates the engine trouble warning light. * If the engine stop switch is ON, turn it OFF once, and then turn it back ON.	Check the operating sound of the injector five times with engine stop switch ON.
37	Injector #2	After the engine stop switch has been turned from OFF to ON, it actuates the injector #2 five times every second and illuminates the engine trouble warning light. * If the engine stop switch is ON, turn it OFF once, and then turn it back ON.	Check the operating sound of the injector five times with engine stop switch ON.
38	Injector #3	After the engine stop switch has been turned from OFF to ON, it actuates the injector #3 five times every second and illuminates the engine trouble warning light. * If the engine stop switch is ON, turn it OFF once, and then turn it back ON.	Check the operating sound of the injector five times with engine stop switch ON.
39	Injector #4	After the engine stop switch has been turned from OFF to ON, it actuates the injector #4 five times every second and illuminates the engine trouble warning light. * If the engine stop switch is ON, turn it OFF once, and then turn it back ON.	Check the operating sound of the injector five times with engine stop switch ON.
48	AI system solenoid	After the engine stop switch has been turned from OFF to ON, it actuates the AI system solenoid five times every second and illuminates the engine trouble warning light. * If the engine stop switch is ON, turn it OFF once, and then turn it back ON.	Check the operating sound of the AI system solenoid 5 times with the engine stop switch ON.
50	Fuel injection system relay	After the engine stop switch has been turned from OFF to ON, it actuates the fuel injection system relay five times every second and illuminates the engine trouble warning light (the light is OFF when the relay is ON, and the light is ON when the relay is OFF). * If the engine stop switch is ON, turn it OFF once, and then turn it back ON.	Check the fuel injection system relay operating sound 5 times with the engine stop switch ON.
51	Radiator fan motor relay	After the engine stop switch has been turned from OFF to ON, it actuates the radiator fan motor relay five times every 5 seconds and illuminates the engine trouble warning light. (ON 2 seconds, OFF 3 seconds) * If the engine stop switch is ON, turn it OFF once, and then turn it back ON.	Check the radiator fan motor relay operating sound 5 times with the engine stop switch ON. (At that time, the fan motor rotates.)

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Diagnostic code	Item	Description of action	Data displayed on meter (reference value)
52	Headlight relay 1	After the engine stop switch has been turned from OFF to ON, it actuates the headlight relay five times every 5 seconds and illuminates the engine trouble warning light. (ON 2 seconds, OFF 3 seconds) * If the engine stop switch is ON, turn it OFF once, and then turn it back ON.	Check the headlight relay operating sound 5 times with the engine stop switch ON. (At that time, the headlight turns ON.)
53	EXUP servo motor	After the engine stop switch has been turned from OFF to ON, it actuates the servo motor turns to open side and to close side. * If the engine stop switch is ON, turn it OFF once, and then turn it back ON.	Turn on the engine trouble warning light while servo motor is operated. (Operating angle is displayed on the LCD meter)
56	Sub-throttle servo motor	After the engine stop switch has been turned from OFF to ON, it actuates the servo motor turns to open side and to close side. * If the engine stop switch is ON, turn it OFF once, and then turn it back on.	Turn on the engine trouble warning light while servo motor is operated (Operating angle is displayed on the LCD meter).
60	EEPROM fault code display	<ul style="list-style-type: none"> Transmits the abnormal portion of the data in the E2PROM that has been detected as a self-diagnostic fault code 44. If multiple malfunctions have been detected, different codes are displayed at 2-second intervals, and this process is repeated. 	(01 ~ 04) Displays the cylinder number. (00) Displays when there is no malfunction.
61	Malfunction history code display	<ul style="list-style-type: none"> Displays the codes of the history of the self-diagnosis malfunctions (i.e., a code of a malfunction that occurred once and which has been corrected). If multiple malfunctions have been detected, different codes are displayed at 2-second intervals, and this process is repeated. 	11 ~ 50 (00) Displays when there is no malfunction.
62	Malfunction history code erasure	<ul style="list-style-type: none"> Displays the total number of codes that are being detected through self diagnosis and the fault codes in the past history. Erases only the history codes when the engine stop switch is turned from OFF to ON. If the engine stop switch is ON, turn it OFF once, and then turn it back ON. 	00 ~ 25 (00) Displays when there is no malfunction.
70	Control number	<ul style="list-style-type: none"> Displays the program control number. 	00 ~ 255



TROUBLESHOOTING DETAILS

This section describes the measures per fault code number displayed on the meter. Carry out check and maintenance on items or components that could be a cause of malfunction in accordance with the order.

When the check and maintenance of malfunctioned part is completed, restore the meter display according to the "Restore method".

Fault code No.:

Fault code number displayed on the meter when the engine failed to work normally. (Refer to "Diagnostic fault code table".)

Diagnostic code No.:

Code number to be used when the diagnostic monitoring mode is operated. (Refer to "DIAGNOSTIC MODE".)

Fault code No.	11	Symptom	No normal signals are received from the cylinder identification sensor.
Used diagnostic code No. --			
Order	Inspection operation item and probable cause	Operation item and countermeasure	Reinstatement method
1	Installed condition of sensor	Check the installed area for looseness or pinching.	Reinstated by starting the engine and operating it at idle.
2	Connected condition of connector Inspect 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 it securely. Cylinder identification sensor coupler Main wiring harness ECU coupler Sub-wire harness coupler	
3	Open or short circuit in wiring harness and/or sub lead.	Repair or replace if there is an open or short circuit. Between sensor coupler and ECU coupler Blue – Blue White/Black – White/Black Black/Blue – Black/Blue	
4	Defective cylinder identification sensor.	Replace if defective. 1. Connect the pocket tester (DC 20 V) to the cylinder identification sensor coupler terminal as shown. <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> <p>Tester positive probe → white/black ①</p> <p>Tester negative probe → black/blue ②</p> </div> <div style="text-align: center; margin: 5px 0;"> </div> 2. Set the main switch to "ON". 3. Measure the cylinder identification sensor output voltage. <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> <p>Cylinder identification sensor output voltage</p> <p style="text-align: center;">When sensor is on 4.8 V or more</p> <p style="text-align: center;">When sensor is off 0.8 V or less</p> </div> 4. Is the cylinder identification sensor OK?	



Fault code No.	12	Symptom	No normal signals are received from the crankshaft position sensor.	
Used diagnostic code No. --				
Order	Inspection operation item and probable cause	Operation item and countermeasure	Reinstatement method	
1	Installed condition of sensor	Check the installed area for looseness or pinching.	Reinstated by cranking the engine.	
2	Connected condition of connector Inspect 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 it securely. Crankshaft position sensor coupler Main wiring harness ECU coupler		
3	Open or short circuit in wiring harness.	Repair or replace if there is an open or short circuit between the main wiring harnesses. Between sensor coupler and ECU coupler Gray – Gray Black/Blue – Black/Blue		
4	Defective crankshaft position sensor.	Replace if defective. <ol style="list-style-type: none"> 1. Disconnect the crankshaft position sensor coupler from the wire harness. 2. Connect the pocket tester ($\Omega \times 100$) to the crankshaft position sensor coupler as shown. <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> <p>Tester positive probe → gray ①</p> <p>Tester negative probe → black ②</p> </div> <div style="text-align: center; margin: 5px 0;"> </div> <ol style="list-style-type: none"> 3. Measure the crankshaft position sensor resistance. <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> <div style="display: flex; align-items: center;"> <p>Crankshaft position sensor resistance 336 ~ 504 Ω at 20°C (68°F) (between gray and black)</p> </div> </div> <ol style="list-style-type: none"> 4. Is the crankshaft position sensor OK? 		



Fault code No.	13	Symptom	Intake air pressure sensor – open or short circuit detected.
Used diagnostic code No. 03 (intake air pressure sensor)			
Order	Inspection operation item and probable cause	Operation item and countermeasure	Reinstatement method
1	Connected condition of connector Inspect 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 it securely. Intake air pressure sensor coupler Main wiring harness ECU coupler Sub-wire harness coupler	Reinstated by turning the main switch ON.
2	Open or short circuit in wiring harness and/or sub lead.	Repair or replace if there is an open or short circuit. Between sensor coupler and ECU coupler Black/Blue – Black/Blue Pink/White – Pink/White Blue – Blue	
3	Defective intake air pressure sensor	Execute the diagnostic monitoring mode (Code No.03). Replace if defective. 1. Connect the pocket tester (DC 20 V) to the intake air pressure sensor coupler terminal as shown.	
		<p>Tester positive probe → pink/white ① Tester negative probe → black/blue ②</p> <div style="text-align: center;"> </div>	
		2. Set the main switch to “ON”. 3. Measure the intake air pressure sensor output voltage.	
		<div style="display: flex; align-items: center;"> <div> <p>Intake air pressure sensor output voltage 3.75 ~ 4.25 V</p> </div> </div>	
		4. Is the intake air pressure sensor OK?	

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Fault code No.	14	Symptom	Intake air pressure sensor – hose system malfunction (clogged or detached hose).
Used diagnostic code No. 03 (intake air pressure sensor)			
Order	Inspection operation item and probable cause	Operation item and countermeasuer	Reinstatement method
1	Intake air pressure sensor hose detached, clogged, kinked, or pinched. Intake air pressure sensor malfunction at intermediate electrical potential.	Repair or replace the sensor hose. Inspect and repair the connection.	Reinstated by starting the engine and operating it at idle.
2	Connected condition of connector Intake air pressure sensor coupler Main wiring harness ECU coupler	Check the coupler for any pins that may have pulled out. Check the looking condition of the coupler. If there is a malfunction, repair it and connect it securely.	
3	Defective intake air pressure sensor.	Execute the diagnostic mode (Code No.03). Replace if defective. Refer to “Fault code No. 13”.	

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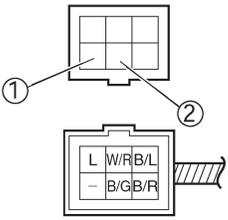
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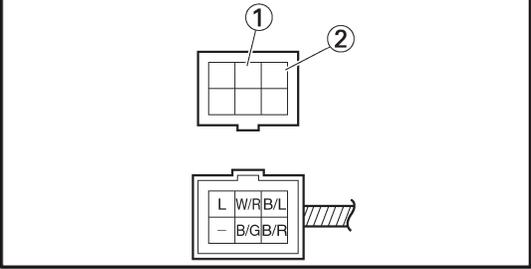
Fault code No.	15	Symptom	Throttle position sensor – open or shrt circuit detected.	
Used diagnostic code No. 01 (throttle position sensor)				
Order	Inspection operation item and probable cause	Operation item and countermeasure		Reinstatement method
1	Installed condition of throttle position sensor.	Check the installed area for looseness or pinching. Check that it is installed in the specified position. Refer to “THROTTLE BODIES” section.		Reinstated by turning the main switch ON.
2	Connected condition of connector Inspect 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 it securely. Throttle position sensor coupler Main wiring harness ECU coupler Sub-wire harness coupler		
3	Open or short circuit in wiring harness and/or sub lead.	Repair or replace if there is an open or short circuit. Between sensor coupler and ECU coupler Black/Blue – Black/Blue Yellow – Yellow Blue – Blue		
4	Throttle position sensor lead wire open circuit output voltage check.	Check for open circuit and replace the throttle position sensor. Black/Blue – Yellow		
		Open circuit item	Output voltage	
		Ground wire open circuit	5 V	
		Output wire open circuit	0V	
5	Defective throttle position sensor.	Execute the diagnostic mode (Code No.01). Replace if defective. Refer to “THROTTLE BODIES” section.		

Fault code No.	16	Symptom	Stuck throttle position sensor detected.	
Used diagnostic code No.01 (throttle position sensor)				
Order	Inspection operation item and probable cause	Operation item and countermeasure		Reinstatement method
1	When detecting fault code No.15.	Refer to “Fault code No.15”.		Reinstated by starting the engine, operating it at idle, and then racing it.
2	Installed condition of throttle position sensor.	Check the installed area for looseness or pinching. Check that it is installed in the specified position. Refer to “THROTTLE BODIES” section.		
3	Defective throttle position sensor	Execute the diagnostic mode (Code No.01). Replace if defective. Refer to “THROTTLE BODIES” section.		



Fault code No.	17	Symptom	EXUP servo motor potention circuit – open or short circuit detected.	
Used diagnostic code 53				
Order	Inspection operation item and probable cause	Operation item and countermeasure	Reinstatement method	
1	Connected condition of connector Inspect 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 it securely. EXUP servo motor coupler Main wireharness ECU coupler	Reinstated by turning the main switch ON.	
2	Open or short circuit in wire harness.	Repair or replace if there is an open or short circuit. Between motor coupler and ECU coupler Blue – Blue White/Red – White/Red Black/Blue – Black/Blue		
3	Defective EXUP servo motor potention circuit.	<p>Execute the diagnostic mode (Code No.53). Replace if defective.</p> <ol style="list-style-type: none"> 1. Disconnect the EXUP servomotor coupler from the wire harness. 2. Connect the pocket tester ($\Omega \times 1k$) to the EXUP servomotor coupler. <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> <p>Positive tester terminal → blue ① Negative tester probe → white/red ②</p>  </div> <ol style="list-style-type: none"> 3. While slowly turning the EXUP servomotor pulley, measure the EXUP servomotor resistance. <div style="border: 1px solid black; padding: 5px; margin: 5px 0;">  <p>EXUP servomotor resistance (when the pulley is turned once) 5.25 ~ 9.75 kΩ at 20°C (68°F)</p> </div> <ol style="list-style-type: none"> 4. Is the EXUP servomotor OK? 		



Fault code No.	18	Symptom	EXUP servo motor is stuck.
Used diagnostic code 53			
Order	Inspection operation item and probable cause	Operation item and countermeasure	Reinstatement method
1	Connected condition of connector Inspect 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 it securely. EXUP servo motor coupler Main wire harness ECU coupler.	Reinstated by turning the main switch ON. It takes 120 seconds at the maximum before the original state returns.
2	Open or short circuit in wire harness.	Repair or replace if there is an open or short circuit. Between motor coupler and ECU coupler. Black/Green – Black/Green Black/Red – Black/Red	
3	Defective EXUP servo motor.	<p>Execute the diagnostic mode (Code No.53). Replace if defective.</p> <ol style="list-style-type: none"> 1. Disconnect the EXUP cables from the EXUP servomotor pulley. 2. Disconnect the EXUP servomotor coupler from the wire harness. 3. Connect the battery leads to the EXUP servomotor coupler as shown. <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <p>Positive battery terminal → black/green ①</p> <p>Negative battery lead → black/red ②</p> </div>  <ol style="list-style-type: none"> 4. Check that the EXUP servomotor pulley rotates several times. <p style="background-color: #ccc; padding: 2px;">CAUTION: _____</p> <p style="text-align: center;">To prevent damaging the EXUP servomotor, perform this test within a few seconds of connecting the battery.</p> <p>_____</p> <ol style="list-style-type: none"> 5. Does the EXUP servomotor pulley turn? 	
4	Defective EXUP valve, pulley, cable.	Replace if defective	



Fault code No.	19	Symptom	Open circuit in the input line of ECU No.15 terminal is detected.	
Used diagnostic code No. 20 (sidestand switch)				
Order	Inspection operation item and probable cause	Operation item and countermeasure	Reinstatement method	
1	Connected condition of connector Main wiring harness ECU coupler (No.15 pin) <pin location> 	Execute the diagnostic mode (Code No.20). 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 connected it securely.	If the transmission is in gear, it is reinstated by retracting the sidestand. If the transmission is in neutral, it is reinstated by reconnecting the wiring.	
2	Open or short circuit in wiring harness and/or sub lead.	Repair or replace if there is an open or short circuit. Between sidestand switch coupler and ECU coupler Blue/Black – Black		
3	The malfunction of the sidestand switch.	Replace if defective. Refer to “CHECKING THE SWITCHES” in chapter 8.		

Fault code No.	20	Symptom	Defective values are detected due to the internal malfunction of the intake air pressure sensor or the atmospheric pressure sensor.	
Used diagnostic code No. 02 (atmospheric pressure sensor) → 1 03 (intake air pressure sensor) → 2				
Order	Inspection operation item and probable cause	Operation item and countermeasure	Reinstatement method	
1	Defective atmospheric pressure sensor	Execute the diagnostic mode (Code No.02). Replace if defective. Refer to “Fault code No.23”.	Reinstated by turning the main switch ON.	
2	Defective intake air pressure sensor	Execute the diagnostic mode (Code No.03). Replace if defective. Refer to “Fault code No.13”.		

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Order	Inspection operation item and probable cause	Operation item and countermeasure	Reinstatement method
Fault code No. 21 Symptom Open or short circuit is detected from the coolant temperature sensor. Used diagnostic code No. 06 (coolant temperature sensor)			
1	Connected condition of connector Inspect 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 it securely. Coolant temperature sensor coupler Main wiring harness ECU coupler Sub-wire harness coupler	Reinstated by turning the main switch ON.
2	Open or short circuit in wiring harness and/or sub lead.	Repair or replace if there is an open or short circuit. Between sensor coupler and ECU coupler Black/Blue – Black/Blue Green/White – Green/White	
3	Defective coolant temperature sensor.	Execute the diagnostic mode (Code No.06). Replace if defective. Refer to “COOLING SYSTEM” in chapter 8.	

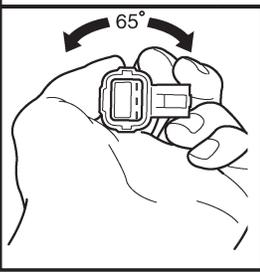
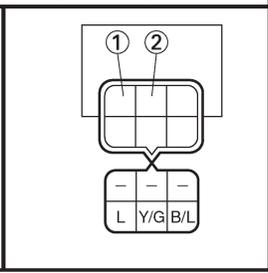


Fault code No.	22	Symptom	Open or short circuit detected from the intake temperature sensor.	
Used diagnostic code No. 05 (intake temperature sensor)				
Order	Inspection operation item and probable cause	Operation item and countermeasure	Reinstatement method	
1	Connected condition of connector Inspect 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 it securely. Intake temperature sensor coupler Main wiring harness ECU coupler Sub-wire harness coupler	Reinstated by turning the main switch ON.	
2	Open or short circuit in wiring harness and/or sub lead.	Repair or replace if there is an open or short circuit. Between sensor coupler and ECU coupler Black/Blue – Black/Blue Brown/White – Brown/White		
3	Defective intake temperature sensor.	Execute the diagnostic mode (Code No.05). Replace if defective. <ol style="list-style-type: none"> 1. Remove the intake air temperature sensor from the air filter case. 2. Connect the pocket tester ($\Omega \times 100$) to the intake air temperature sensor terminal as shown. <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> <p>Tester positive probe → brown/white ① Tester negative probe → black/blue ②</p> </div> <div style="text-align: center; margin: 5px 0;"> </div> <ol style="list-style-type: none"> 3. Measure the intake air temperature sensor resistance. <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> <div style="display: flex; align-items: center;"> <p>Intake air temperature sensor resistance 2.21 ~ 2.69 kΩ at 20°C (68°F)</p> </div> </div> <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> <p>⚠ WARNING</p> <ul style="list-style-type: none"> Handle the intake air temperature sensor with special care. Never subject the intake air temperature sensor to strong shocks. If the intake air temperature sensor is dropped, replace it. </div> <ol style="list-style-type: none"> 4. Is the intake air temperature sensor OK? 		



Fault code No. 23 Symptom Open or short circuit detected from the atmospheric pressure sensor.			
Used diagnostic code No. 02 (atmospheric pressure sensor)			
Order	Inspection operation item and probable cause	Operation item and countermeasure	Reinstatement method
1	Connected condition of connector Inspect 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 it securely. Atmospheric pressure sensor coupler Main wiring harness ECU coupler	Reinstated by turning the main switch ON.
2	Open or short circuit in wiring harness.	Repair or replace if there is an open or short circuit. Between sensor coupler and ECU coupler Blue – Blue Black/Blue – Black/Blue Pink – Pink	
3	Defective atmospheric pressure sensor.	<p>Execute the diagnostic mode (Code No.02). Replace if defective.</p> <ol style="list-style-type: none"> 1. Connect the pocket tester (DC 20 V) to the atmospheric pressure sensor coupler terminal as shown. <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> <p>Tester positive probe → pink ① Tester negative probe → black/blue ②</p> </div> <div style="text-align: center; margin: 5px 0;"> </div> <ol style="list-style-type: none"> 2. Set the main switch to “ON”. 3. Measure the atmospheric pressure sensor output voltage. <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> <div style="display: flex; align-items: center;"> <p>Atmospheric pressure sensor output voltage 3.75 ~ 4.25 V</p> </div> </div> <ol style="list-style-type: none"> 4. Is the atmospheric pressure sensor OK? 	



Fault code No.	30	Symptom	The motorcycle has overturned.
Used diagnostic code No. 08 (lean angle cut-off switch)			
Order	Inspection operation item and probable cause	Operation item and countermeasure	Reinstatement method
1	The motorcycle has overturned.	Raise the motorcycle upright.	Reinstated by turning the main switch ON (however, the engine cannot be restarted unless the main switch is first turned OFF).
2	Installed condition of the lean angle cut-off switch	Check the installed area for looseness or pinching.	
3	Connected condition of connector Inspect 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 it securely. Lean angle cut-off switch coupler Main wiring harness ECU coupler	
4	Defective lean angle cut-off switch	Execute the diagnostic mode (Code No.08). Replace if defective. <ol style="list-style-type: none"> 1. Remove the lean angle cut-off switch from the motorcycle. 2. Connect the lean angle cut-off switch coupler to the wireharness. 3. Connect the pocket tester (DC 20 V) to the emergency stop switch coupler as shown. <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> <p>Tester positive prove → blue ①</p> <p>Tester negative prove → yellow/green ②</p> </div> <div style="display: flex; justify-content: space-around; align-items: center;">   </div> <ol style="list-style-type: none"> 4. When turn the lean angle cut-off switch approx. 65°, the voltage reading is 0.4 V to 4.4 V. 5. Is the emergency stop switch OK? 	

FUEL INJECTION SYSTEM

FI



Fault code No. 33 Symptom Malfunction detected in the primary lead of the ignition coil (#1).			
Used diagnostic code No. 30 (ignition coil #1)			
Order	Inspection operation item and probable cause	Operation item and countermeasure	Reinstatement method
1	Connected condition of connector Inspect 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 it securely. Ignition coil primary side coupler – Orange Main wiring harness ECU coupler	Reinstated by starting the engine and operating it at idle.
2	Open or short circuit in lead.	Repair or replace if there is an open or short circuit. Between ignition coil coupler (#1) and ECU coupler/main harness Orange – Orange Red/Black – Red/Black	
3	Defective ignition coil (test the primary and secondary coils for continuity).	Execute the diagnostic mode (Code No.30). Replace if defective. Refer to "IGNITION SYSTEM" in chapter 8.	

Fault code No. 34 Symptom Malfunction detected in the primary lead of the ignition coil (#2).			
Used diagnostic code No. 31 (ignition coil #2)			
Order	Inspection operation item and probable cause	Operation item and countermeasure	Reinstatement method
1	Connected condition of connector Inspect 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 it securely. Ignition coil primary side coupler – Gray/Red Main wiring harness ECU coupler	Reinstated by starting the engine and operating it at idle.
2	Open or short circuit in lead wire.	Repair or replace if there is an open or short circuit. Between ignition coil coupler (#2) and ECU coupler/main harness Gray/Red – Gray/Red Red/Black – Red/Black	
3	Defective ignition coil (test the primary and secondary coils for continuity).	Execute the diagnostic mode (Code No.31). Replace if defective. Refer to "IGNITION SYSTEM" in chapter 8.	

Fault code No. 35 Symptom Malfunction detected in the primary lead of the ignition coil (#3).			
Used diagnostic code No. 32 (ignition coil #3)			
Order	Inspection operation item and probable cause	Operation item and countermeasure	Reinstatement method
1	Connected condition of connector Inspect 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 it securely. Ignition coil primary side coupler – Orange/ Green Main wiring harness ECU coupler	Reinstated by starting the engine and operating it at idle.
2	Open or short circuit in lead wire.	Repair or replace if there is an open or short circuit. Between ignition coil coupler (#3) and ECU coupler/main harness Orange/Green – Orange/Green Red/Black – Red/Black	
3	Defective ignition coil (test the primary and secondary coils for continuity).	Execute the diagnostic mode (Code No.32). Replace if defective. Refer to "IGNITION SYSTEM" in chapter 8.	

FUEL INJECTION SYSTEM

FI



Fault code No. 36 Symptom Malfunction detected in the primary lead of the ignition coil (#4).			
Used diagnostic code No. 33 (ignition coil #4)			
Order	Inspection operation item and probable cause	Operation item and countermeasure	Reinstatement method
1	Connected state of connector Inspect 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 it securely. Ignition coil primary side coupler – Gray/Green Main wiring harness ECU coupler	Reinstated by starting the engine and operating it at idle.
2	Open or short circuit in lead wire.	Repair or replace if there is an open or short circuit. Between ignition coil coupler (#4) and ECU coupler/main harness Gray/Green – Gray/Green Red/Black – Red/Black	
3	Defective ignition coil (test the primary and secondary coils for continuity).	Execute the diagnostic mode (Code No.33). Replace if defective. Refer to "IGNITION SYSTEM" in chapter 8.	

Fault code No. 41 Symptom Open or short circuit detected in the lean angle cut-off switch.			
Used diagnostic code No. 08 (lean angle cut-off switch)			
Order	Inspection operation item and probable cause	Operation item and countermeasure	Reinstatement method
1	Connected condition of connector Inspect 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 it securely. Lean angle cut-off switch coupler Main wiring harness ECU coupler	Reinstated by turning the main switch ON.
2	Open or short circuit in wiring harness.	Repair or replace if there is an open or short circuit. Between switch coupler and ECU coupler Black/Blue – Black/Blue Yellow/Green – Yellow/Green Blue – Blue	
3	Defective lean angle cut-off switch	Execute the diagnostic mode (Code No.08). Replace if defective. Refer to Fault code No. 30.	



Fault code No.	42	Symptom	1 No normal signals are received from the speed sensor. 2 Open or short circuit is detected in the neutral switch.
Used diagnostic code		No. 07 (speed sensor) → A1 ~ A4 No. 21 (neutral switch) → B1 ~ B4	
Order	Inspection operation item and probable cause	Operation item and countermeasure	Reinstatement method
A1	Connected condition of speed sensor connector Inspect 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 it securely. Speed sensor coupler Main wiring harness ECU coupler	Reinstated by starting the engine, and inputting the vehicle speed signals by operating the motorcycle at a low speed of 20 to 30 km/h.
A2	Open or short circuit in speed sensor lead.	Repair or replace if there is an open or short circuit. Between sensor coupler and ECU coupler. Blue – Blue White/Yellow – White/Yellow Black/Blue – Black/Blue	
A3	Defective speed sensor	Execute the diagnostic mode (Code No.07). Replace if defective. 1. Measure the speed sensor output voltage. 2. Connect the pocket tester (DC 20 V) to the speed sensor coupler terminal as shown.	
A4	Gear for detecting vehicle speed has broken.	Replace if defective. Refer to “TRANSMISSION” in chapter 5.	
Tester positive probe → white ① Tester negative probe → black/blue ②			
		Speed sensor output voltage When sensor is on DC 4.8 V or more When sensor is off DC 0.6 V or less	
A3	Defective speed sensor	3. Measure the speed sensor output voltage. 4. Is the speed sensor OK?	
Order	Inspection operation item and probable cause	Operation item and countermeasure	Reinstatement method.
B1	Connected condition of connector Inspect 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 it securely. Neutral switch connector Main wiring harness ECU coupler	Reinstated by starting the engine, and inputting the vehicle speed signals by operating the motorcycle at a low speed of 20 to 30 km/h.
B2	Open or short circuit in neutral switch lead.	Repair or replace if there is an open or short circuit. Between switch connector and ECU coupler Sky blue – Black/Yellow	
B3	Defective neutral switch	Execute the diagnostic mode (Code No.21). Replace if defective. Refer to “CHECKING THE SWITCHES” in chapter 8.	
B4	Faulty shift drum (neutral detection area)	Replace if defective. Refer to “TRANSMISSION” in chapter 5.	

FUEL INJECTION SYSTEM

FI



Fault code No.	43	Symptom	The ECU is unable to monitor the battery voltage.
Used diagnostic code No. 09 (fuel system voltage)			
Order	Inspection operation item and probable cause	Operation item and countermeasure	Reinstatement method
1	Connected condition of connector Inspect 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 it securely. Starting circuit cut-off relay coupler (fuel injection system relay) ECU coupler	Reinstated by starting the engine and operating it at idle.
2	Malfunction in ECU	Fuel injection system relay is on.	
3	Open or short circuit in the wiring harness.	Repair or replace if there is an open or short circuit. Between battery terminal and ECU coupler Red/white – Red/white Red – Blue/Yellow (Main switch and engine stop switch are on.) Red – Red/Blue (Fuel injection system relay is on.)	
4	Malfunction or open circuit in fuel injection system relay	Execute the diagnostic mode (Code No.09). Replace if defective. NOTE: _____ When the leads are disconnected, the voltage check by the code No.09 is impossible. 1. Disconnect the starting circuit cut-off relay from the wire harness. 2. Connect the pocket tester ($\Omega \times 1$) and battery (12 V) to the starting circuit cut-off relay terminals as shown. <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> Battery positive terminal → red/black ① Battery positive terminal → blue/yellow ② </div> <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> Tester positive probe → red ③ Tester negative probe → red/blue ④ </div> <div style="text-align: center; margin: 5px 0;"> </div> 3. Does the starting circuit cut-off relay have continuity between blue/white and black?	

FUEL INJECTION SYSTEM

FI



Fault code No.	44	Symptom	Error is detected while reading or writing on EEP-ROM (CO adjustment value).
Used diagnostic No. 60 (EEP-ROM improper cylinder indication)			
Order	Inspection operation item and probable cause	Operation item and countermeasure	Reinstatement method
1	Malfunction in ECU	Execute diagnostic code 60 1. Check the faulty cylinder. (If there are multiple cylinders, the number of the faulty cylinders appear alternately at 2-second intervals.) 2. Readjust the CO of the displayed cylinder. Refer to "ADJUSTING THE EXHAUST GAS VALUME" in chapter 3. Replace ECU if defective.	Reinstated by turning the main switch ON.

Fault code No.	46	Symptom	Power supply to the FI system relay is not normal.
Used diagnostic code No. --			
Order	Inspection operation item and probable cause	Operation item and countermeasure	Reinstatement method
1	Connected condition of connector Inspect 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 it securely. ECU coupler.	Reinstated by starting the engine and operating it at idle.
2	Faulty battery	Replace or change the battery Refer to "CHECKING AND CHARGING THE BATTERY" in chapter 3.	
3	The malfunction of the rectifier/regulator.	Replace if defective. Refer to "CHARGING SYSTEM" in chapter 8.	
4	Open or short circuit in wiring harness.	Repair or replace if there is an open or short circuit. <ul style="list-style-type: none"> • Between battery and main switch red – red • Between main switch and fuse (ignition) brown/blue – brown/blue • Between fuse (ignition) and ECU red/white – red/white 	

FUEL INJECTION SYSTEM

FI



Fault code No. 47 Symptom Sub-throttle position sensor – open or short circuit detected.			
Used diagnostic code 56			
Order	Inspection operation item and probable cause	Operation item and countermeasure	Reinstatement method
1	Installed condition of sub-throttle position sensor.	Check the installed area for looseness or pinching. Check that it is installed in the specified position. Refer to “THROTTLE BODIES” section.	Reinstated by turning the main switch ON.
2	Connected condition of connector Inspect 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 it securely. Throttle position sensor coupler Main wiring harness ECU coupler Sub-wire harness coupler	
3	Open or short circuit in wiring harness and/or sub lead.	Repair or replace if there is an open or short circuit. Between sensor coupler and ECU coupler Black/Blue – Black/Blue Green/yellow – Green/yellow Blue – Blue	
4	Defective sub-throttle position sensor.	Replace if defective. Refer to “THROTTLE BODIES” section.	



Fault code No.	48	Symptom	Sub-throttle servo motor is stuck.
Used diagnostic code 56			
Order	Inspection operation item and probable cause	Operation item and countermeasure	Reinstatement method
1	Connected condition of connector Inspect 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 it securely. Sub-throttle servo motor coupler Main wire harness ECU coupler.	Reinstated by turning the main switch ON. It takes 120 seconds at the maximum before the original state returns.
2	Open or short circuit in wire harness.	Repair or replace if there is an open or short circuit. Between motor coupler and ECU coupler. Yellow/Red – Yellow/Red Yellow/White – Yellow/White	
3	Defective sub-throttle servo motor.	<p>Execute the diagnostic mode (Code No.56). Replace if defective.</p> <ol style="list-style-type: none"> 1. Disconnect the sub-throttle cables from the Sub-throttle servomotor pulley. 2. Disconnect the sub-throttle servomotor coupler from the wire harness. 3. Connect the battery leads to the sub-throttle servomotor coupler as shown. <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <p>Positive battery terminal → yellow/red ① Negative battery terminal → yellow/white ②</p> </div> <ol style="list-style-type: none"> 4. Check that the sub-throttle servomotor pulley rotates several times. <p>CAUTION: _____ To prevent damaging the sub-throttle servomotor, perform this test within a few seconds of connecting the battery.</p> <ol style="list-style-type: none"> 5. Does the sub-throttle servomotor pulley turn? 	

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.)
Used diagnostic code No. --			
Order	Inspection operation item and probable cause	Operation item and countermeasure	Reinstatement method
1	Malfunction in ECU	Replace the ECU.	Reinstated by turning the main switch ON.

FUEL INJECTION SYSTEM

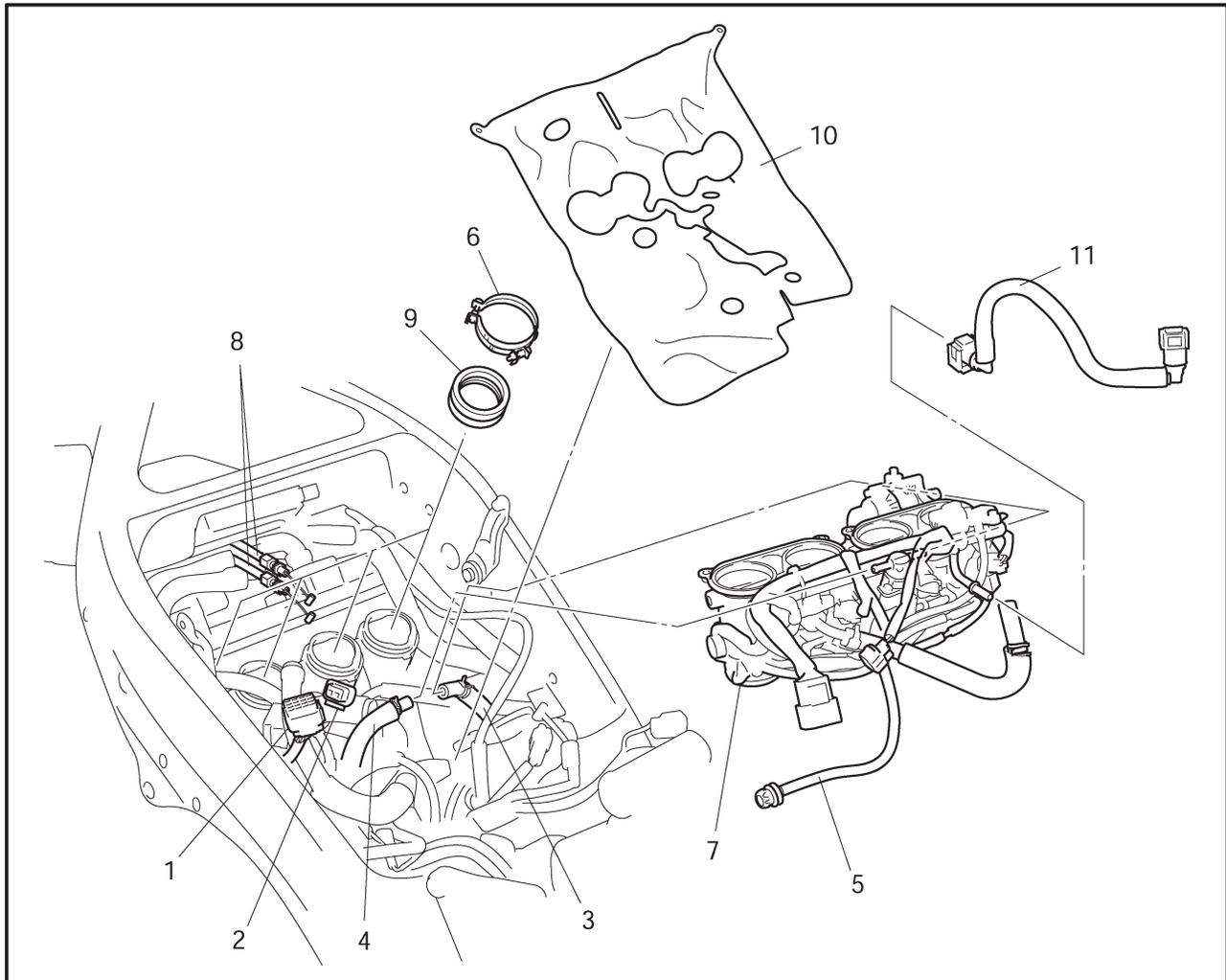
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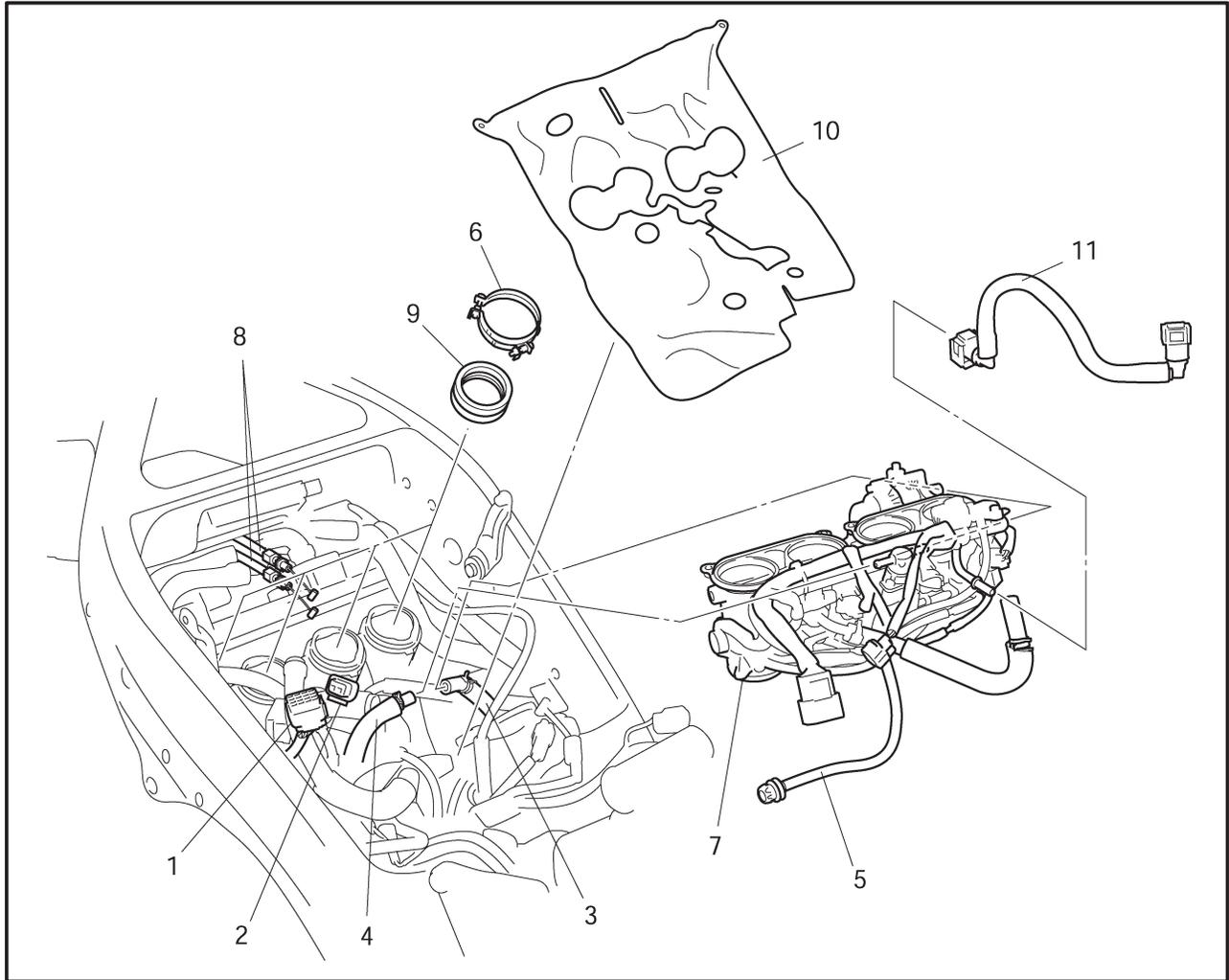
Fault code No.	Er-1	Symptom	No signal are received from the ECU.	
	Er-2	Symptom	No signal are received from the ECU within the specified duration.	
	Er-3	Symptom	Data from the ECU cannot be received correctly.	
	Er-4	Symptom	Non-registered data has been received from the meter.	
Used diagnostic code No. --				
Order	Inspection operation item and probable cause		Operation item and countermeasure	Reinstatement method
1	Connected condition of connector Inspect 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 it securely. Cylinder identification sensor coupler Main wiring harness ECU coupler Sub-wire harness coupler	Reinstated by turning the main switch ON.
2	Open or short circuit in wiring harness and/or sub lead.		Repair or replace if there is an open or short circuit. Between sensor coupler and ECU coupler Yellow/Blue – Yellow/Blue Black/White – Black/White	
3	Malfunction in meter		Replace the meter.	
4	Malfunction in ECU		Replace the ECU.	



THROTTLE BODIES



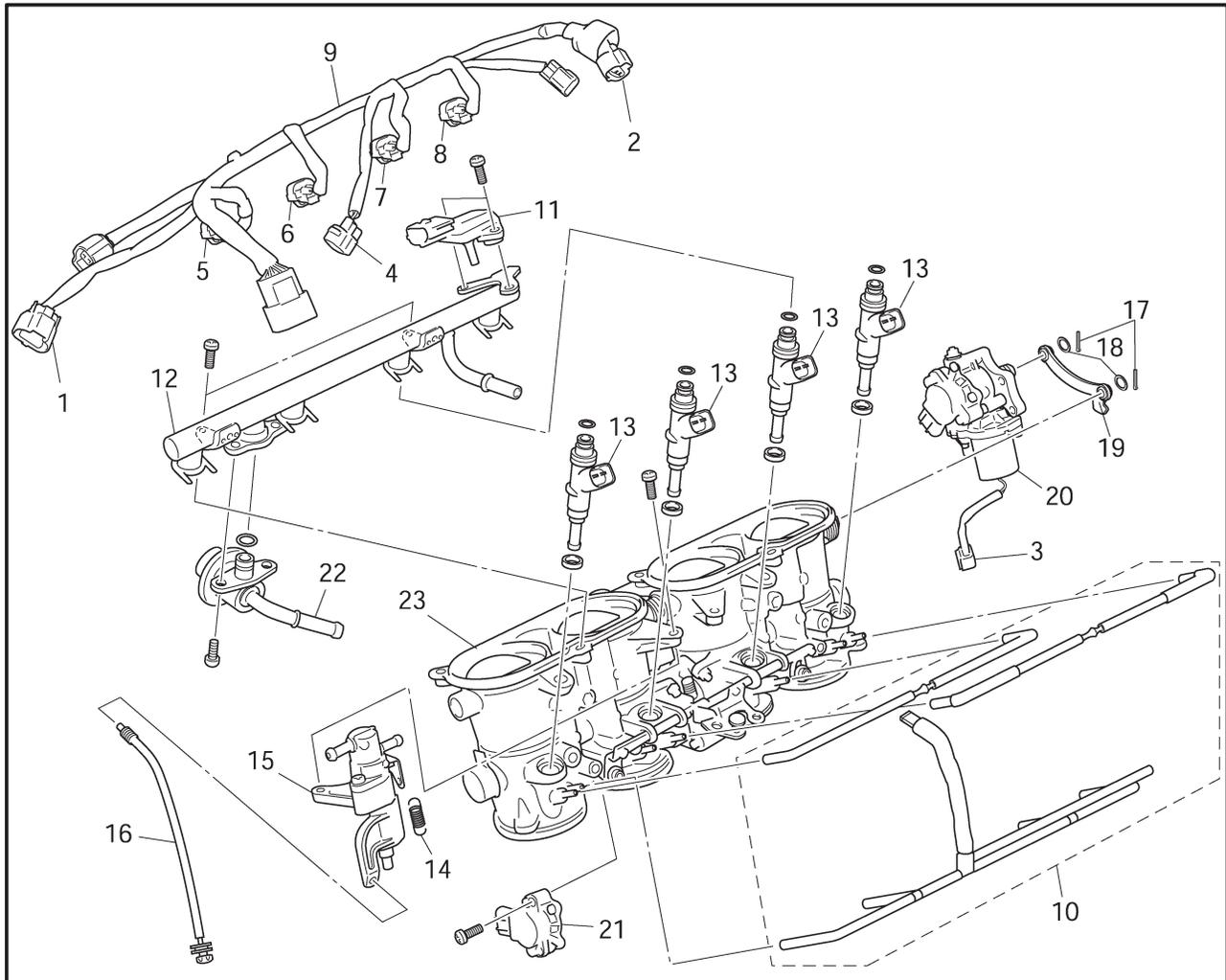
Order	Job/Part	Q'ty	Remarks
	Removing the throttle bodies		Remove the parts in the order listed.
	Seat		Refer to "SEAT" in chapter 3.
	Fuel tank		Refer to "FUEL TANK" in chapter 3.
	Air filter case		Refer to "AIR FILTER CASE" in chapter 3.
1	Sub-wire harness coupler	2	Disconnect.
2	Coolant temperature sensor coupler	1	Disconnect.
3	Thermo wax inlet hose	1	
4	Thermo wax outlet hose	1	
5	Idle adjust screw wire	1	
6	Throttle body joint clamp	4	Loosen. NOTE: _____ If it loosens too much, the nut will separate.
7	Throttle bodies	1	
8	Throttle cables	2	Disconnect.



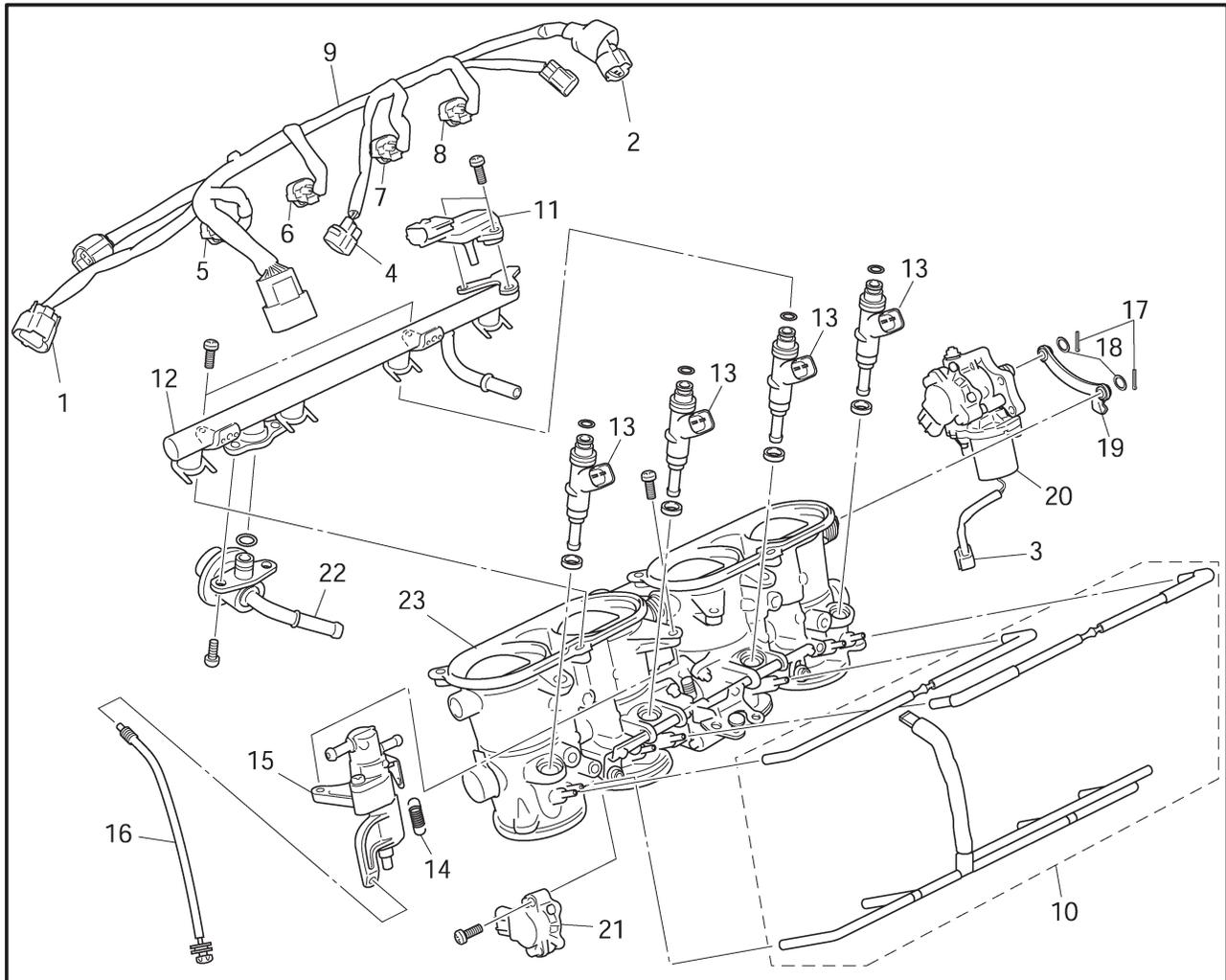
Order	Job/Part	Q'ty	Remarks
9	Throttle body joint	4	<p>NOTE: _____</p> <p>To install the throttle body joint, make sure to install it to the cylinder with the same figures corresponding to the figures stated on the throttle body joint.</p> <p>_____</p> <p>For installation, reverse the removal procedure.</p>
10	Heat protector	1	
11	Fuel hose	1	



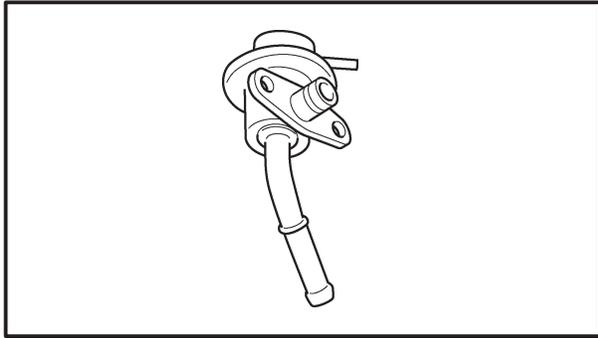
INJECTORS



Order	Job/Part	Q'ty	Remarks
	Removing the injectors		Remove the parts in the order listed.
1	Throttle position sensor coupler	1	Disconnect.
2	Sub-throttle position sensor coupler	1	Disconnect.
3	Sub-throttle motor assembly coupler	1	Disconnect.
4	Intake air pressure sensor coupler	1	Disconnect.
5	Cylinder #1-injector coupler	1	Disconnect.
6	Cylinder #2-injector coupler	1	Disconnect.
7	Cylinder #3-injector coupler	1	Disconnect.
8	Cylinder #4-injector coupler	1	Disconnect.
9	Sub wire harness	1	
10	Negative pressure hose	1	
11	Intake air pressure sensor	1	
12	Fuel distributor	1	
13	Injector	4	
14	Spring	1	
15	Thermo wax assembly	1	



Order	Job/Part	Q'ty	Remarks
16	Idle adjust screw wire	1	For installation, reverse the removal procedure.
17	Cotter pin	2	
18	Washer	2	
19	Link	1	
20	Sub-throttle servo motor assembly	1	
21	Throttle position sensor	1	
22	Fuel pressure regulator	1	
23	Throttle body assembly	1	



CHECKING THE PRESSURE REGULATOR

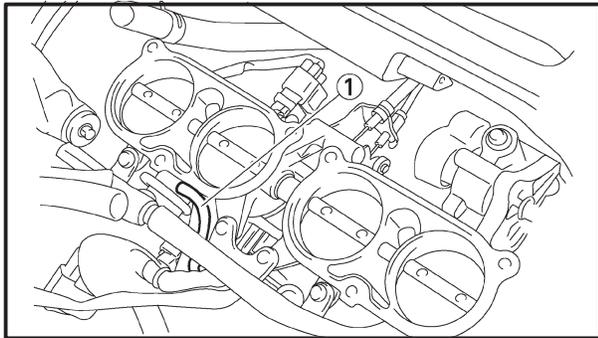
1. Check:
 - pressure regulator
 Damage → Replace.

CHECKING THE FUEL PUMP AND PRESSURE REGULATOR OPERATION

1. Check:
 - pressure regulator operation

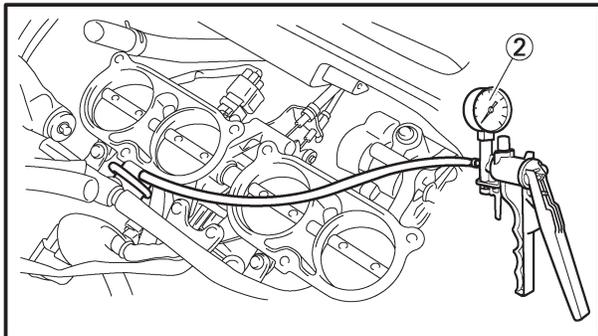


- a. Remove the fuel tank.
Refer to “FUEL TANK” in chapter 3.
- b. Disconnect the negative pressure hose ① from the pressure regulator at the joint.
- c. Connect the vacuum/pressure pump gauge set ② onto the negative pressure hose from the pressure regulator.
- d. Connect the pressure gauge ③ and adapter ④ onto the fuel injection pipe.



Vacuum/pressure pump gauge set
 90890-06756, YB-35956
Pressure gauge
 90890-03153, YU-03153
Adapter
 90890-03176, YM-03176

- e. Install the fuel tank.
Refer to “FUEL TANK” in chapter 3.
- f. Start the engine.
- g. Measure the fuel pressure.

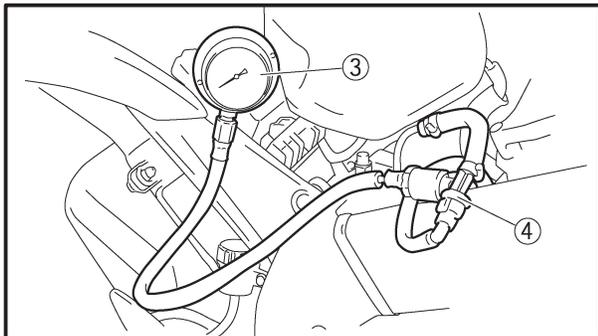


Fuel pressure
 294 kPa (2.94 kg/cm², 42.6 psi)

- h. Use the vacuum pressure pump gauge set to adjust the fuel pressure in relation to the vacuum pressure as described below.

NOTE: _____

The vacuum pressure should not exceed 100 kPa (760 mmHg, 29.9 inHg).





**Increase the vacuum pressure →
Fuel pressure is decreased**

**Decrease the vacuum pressure →
Fuel pressure is increased**

Faulty → Replace the pressure regulator.



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**CHECKING AND ADJUSTING THE
THROTTLE POSITION SENSOR**

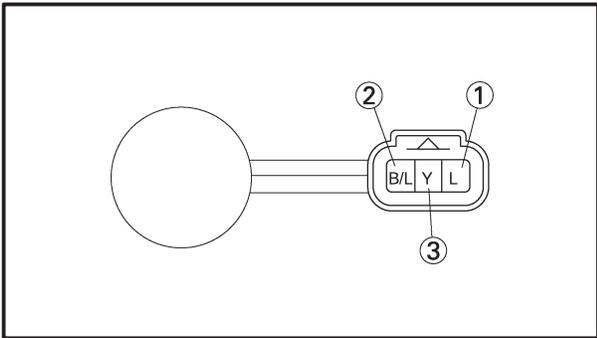
NOTE: _____

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

1. Check:
 - throttle position sensor



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



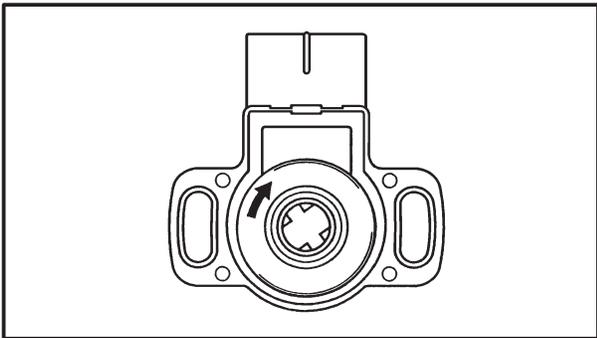
Positive tester probe → blue terminal ①
Negative tester probe → black/blue terminal ②

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

 **Maximum throttle position sensor resistance**
4 ~ 6 k Ω at 20°C (68°F)
(blue – black/blue)

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

Positive tester probe → yellow terminal ③
Negative tester probe → black/blue terminal ②



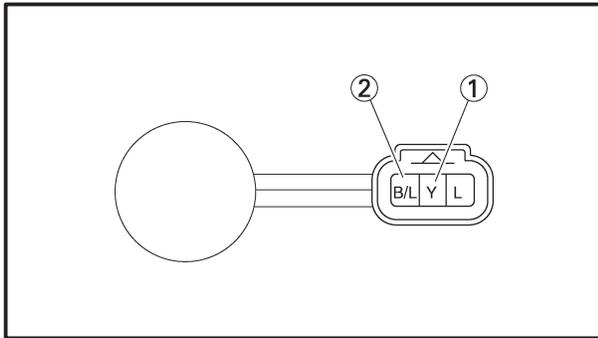


- f. While slowly opening the throttle, check that the throttle position sensor resistance is within the specified range.
 The resistance does not change or it changes abruptly → Replace the throttle position sensor.
 The slot is worn or broken → Replace the throttle position sensor.

NOTE: _____

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

	Throttle position sensor resistance
	0 ~ 6 kΩ at 20°C (68°F)
	(yellow – black)

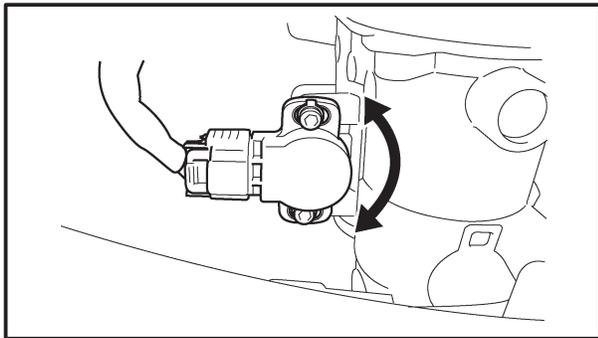


- 2. Adjust:
 - throttle position sensor angle



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

Tester positive probe →	yellow terminal ①
Tester negative probe →	black/blue terminal ②



	Digital circuit tester
	90890-03174

- c. Measure the throttle position sensor voltage.
- d. Adjust the throttle position sensor angle so the measured voltage is within the specified range.

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

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





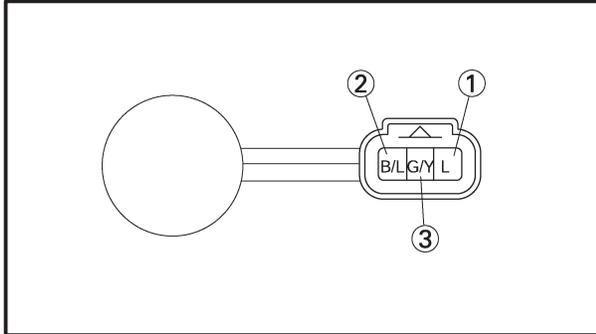
CHECKING AND ADJUSTING THE SUB-THROTTLE POSITION SENSOR

1. Check:

- sub-throttle position sensor



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



Positive tester probe → blue terminal ①
Negative tester probe → black/blue terminal ②

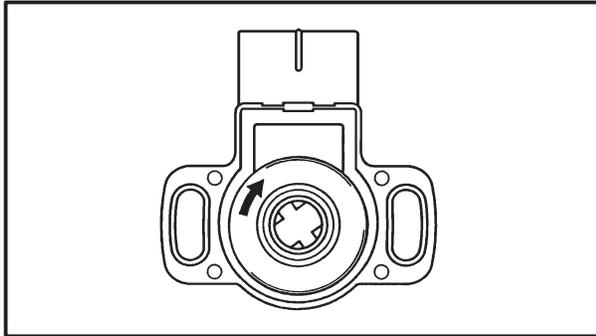
- Measure the maximum sub-throttle position sensor resistance.
 Out of specification → Replace the sub-throttle position sensor.



Maximum sub-throttle position sensor resistance
 4 ~ 6 k Ω at 20°C (68°F)
 (blue – black/blue)

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

Positive tester probe → green/yellow terminal ③
Negative tester probe → black/blue terminal ②



- While slowly opening the sub-throttle worm nut, check that the sub-throttle position sensor resistance is within the specified range.
 The resistance does not change or it changes abruptly → Replace the sub-throttle position sensor.

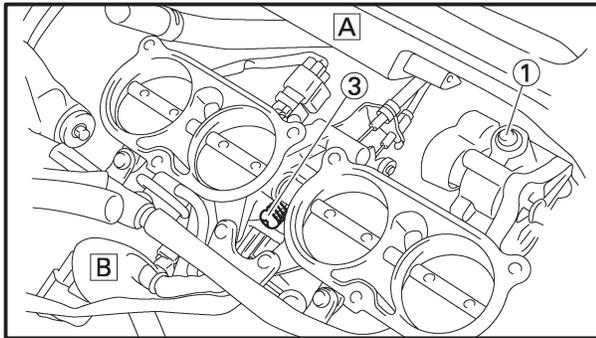
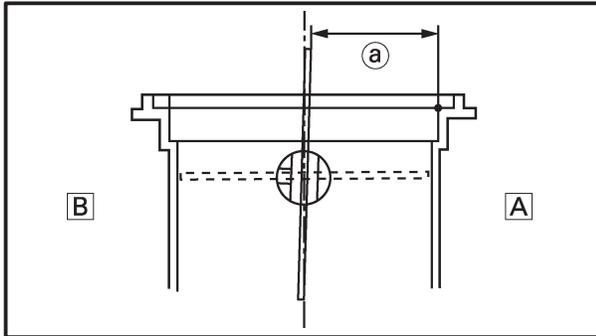
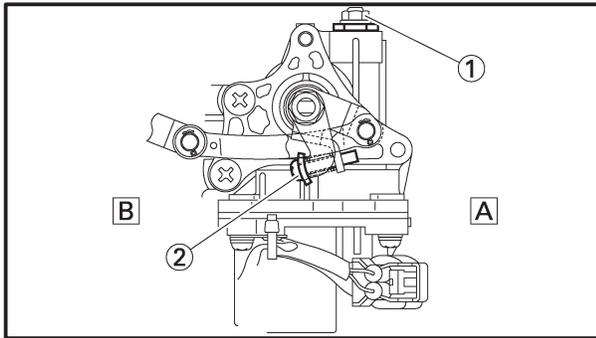
NOTE: _____

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



Sub-throttle position sensor resistance
 0 ~ 6 k Ω at 20°C (68°F)
 (black/blue – green/yellow)





2. Adjust:

- sub-throttle position sensor full open angle



- Turn the nut ① of the worm shaft of the sub-throttle counterclockwise until it contacts with the full open stopper.
- When the dimension of ② sections of the throttle bodies #3 and #4 is measured with a micrometer caliper, adjust with the adjuster ② of the output shaft section of the sub-throttle servo motor so that the dimension is in a range from 24.2 to 24.6 mm (0.95 to 0.97 in).

A Front side

B Rear side



Sub-throttle dimension ②
24.2 ~ 24.6 mm (0.95 ~ 0.97 in)

- After adjusting the dimension of ② sections of the throttle bodies #3 and #4, measure the dimension of ② sections of #1 and #2.
- If the dimension of ② sections of the throttle bodies #1 and #2 is different from the dimension of ② sections of the throttle bodies #3 and #4, adjust it to the same dimension as the measurement value adjusted for the throttle bodies #3 and #4, using the tuning screw ③ located between the throttle bodies #2 and #3.



3. Adjust:

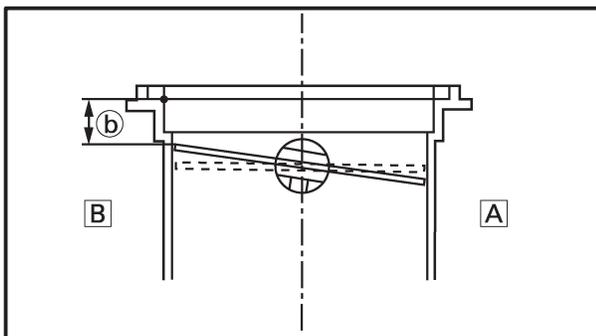
- primary opening



- After performing the full open angle of the sub-throttle position sensor, turn the nut of the worm shaft clockwise, measure the dimension of ③ section with a micrometer caliper or other device and adjust so that the dimension is in a range from 8.1 to 8.5 mm (0.32 to 0.33 in).

A Front side

B Rear side



Sub-throttle dimension ③
8.1 ~ 8.5 mm (0.32 ~ 0.33 in)



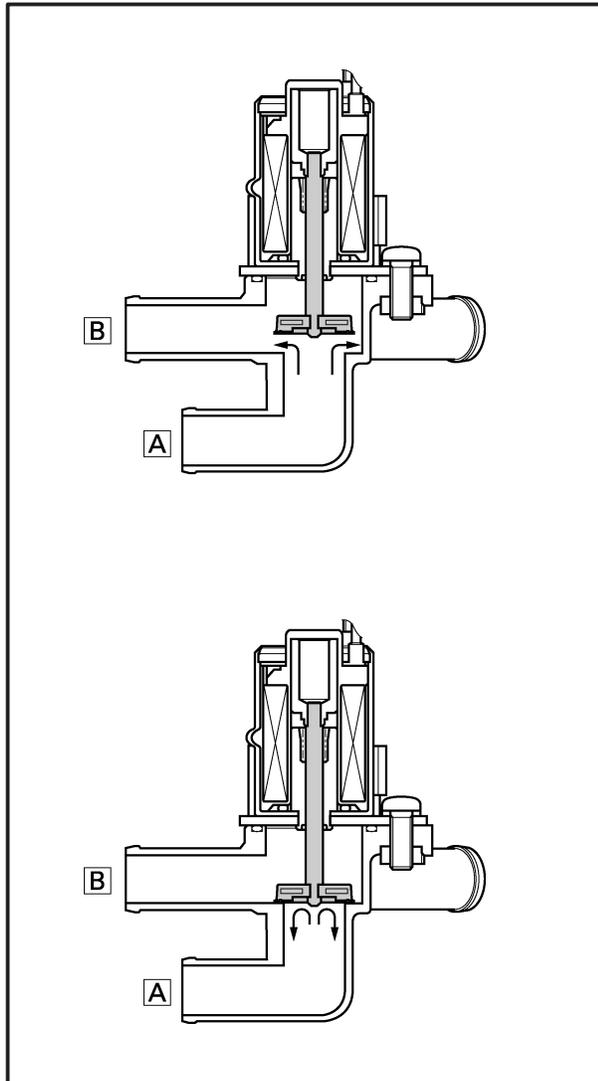
EAS00507

AIR INDUCTION SYSTEM

AIR INJECTION

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

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



EAS0097

AIR CUT-OFF VALVE

The air cut-off valve is controlled by the signals from the ECU in accordance with the combustion conditions. Ordinarily, the air cut-off valve opens to allow the air to flow during idle and closes to cut-off the flow when the motorcycle is being driven. However, if the coolant temperature is below the specified value, the air cut-off valve remains open and allows the air to flow into the exhaust pipe until the temperature becomes higher than the specified value.

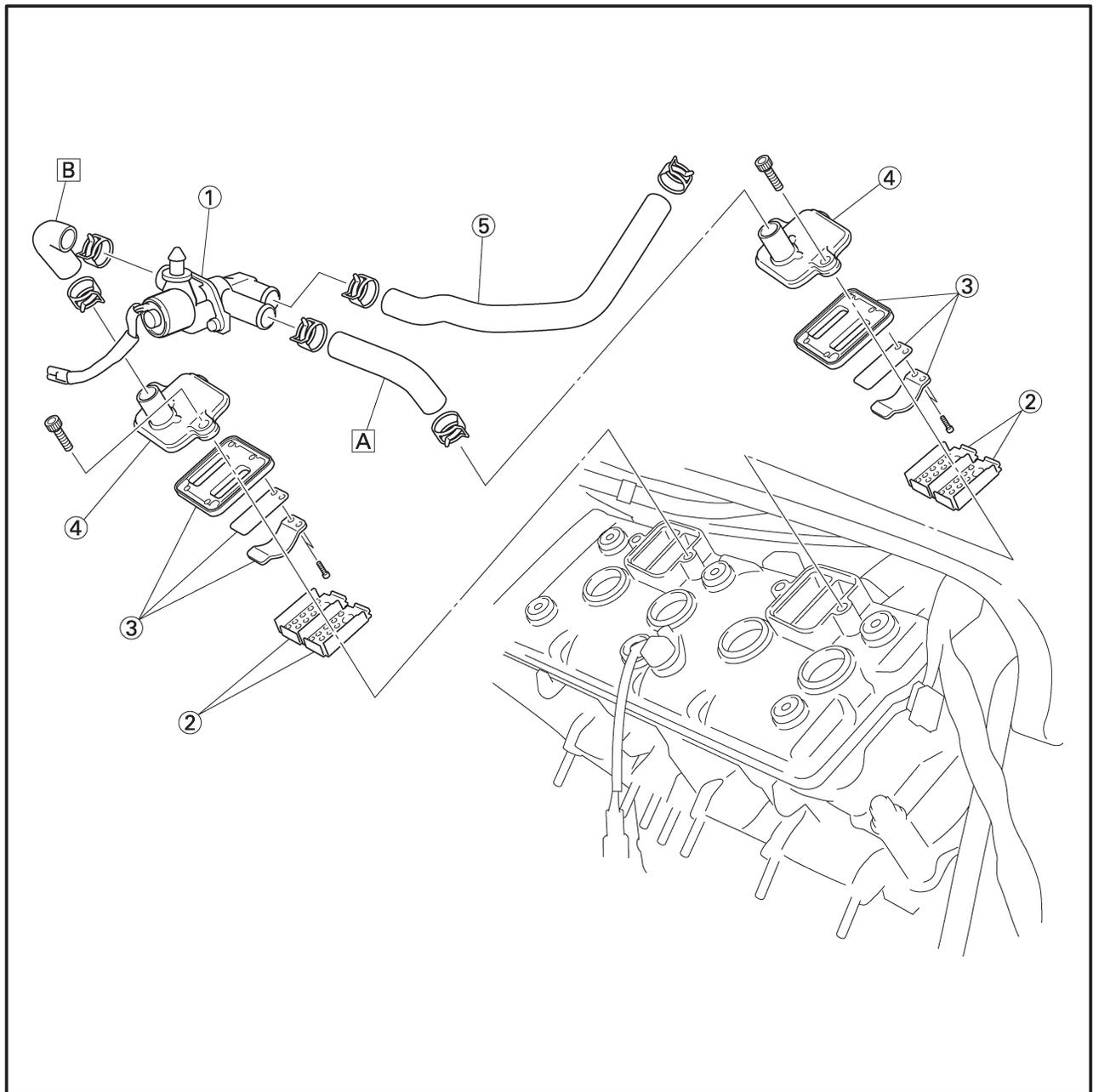
- A** From the air cleaner
- B** To the cylinder head



EAS00509

AIR INDUCTION SYSTEM DIAGRAMS

- ① Air cut-off valve
 - ② Plate
 - ③ Reed valve assembly
 - ④ Reed valve cap
 - ⑤ To air filter case
- A** To cylinder #1 and #2
 - B** To cylinder #3 and #4



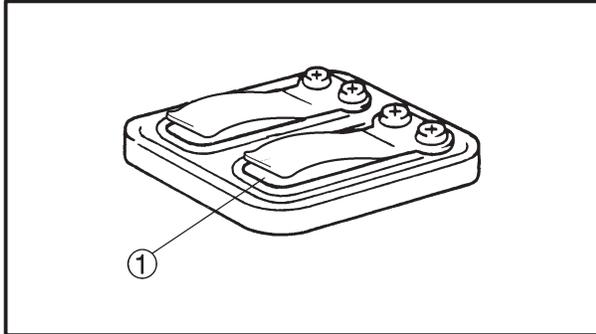


EAS00510

CHECKING THE AIR INDUCTION SYSTEM

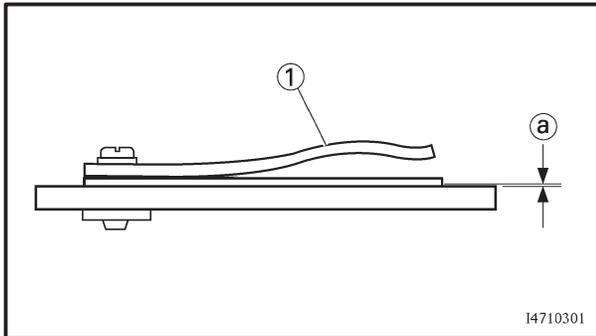
1. Check:

- hoses
Loose connection → Connect properly.
Cracks/damage → Replace.
- pipes
Cracks/damage → Replace.



2. Check:

- reed valve ①
- reed valve stopper
- reed valve seat
Cracks/damage → Replace the reed valve.



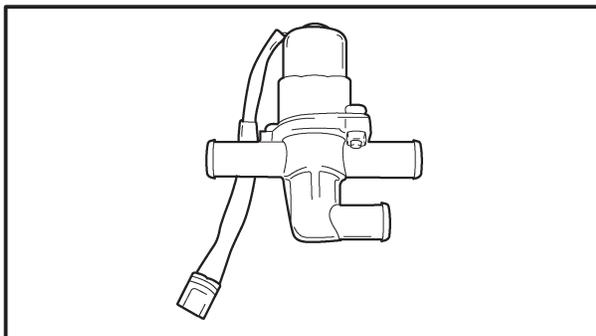
3. Measure:

- reed valve bending limit (a)
Out of specification → Replace the reed valve.



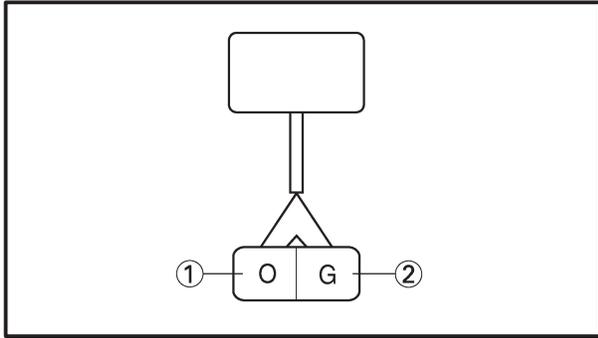
**Reed valve bending limit
0.4 mm (0.016 in)**

- ① Surface plate



4. Check:

- air cut-off valve
Cracks/damage → Replace.



5. Check:

- Air induction system solenoid



- Remove the Air induction system solenoid coupler from the wire harness.
- Connect the pocket tester ($\Omega \times 1$) to the Air induction system solenoid terminal as shown.

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

- Measure the Air induction system solenoid resistance.



Air induction system solenoid resistance

18 ~ 22 Ω at 20°C (68°F)

- Out of specification → Replace.

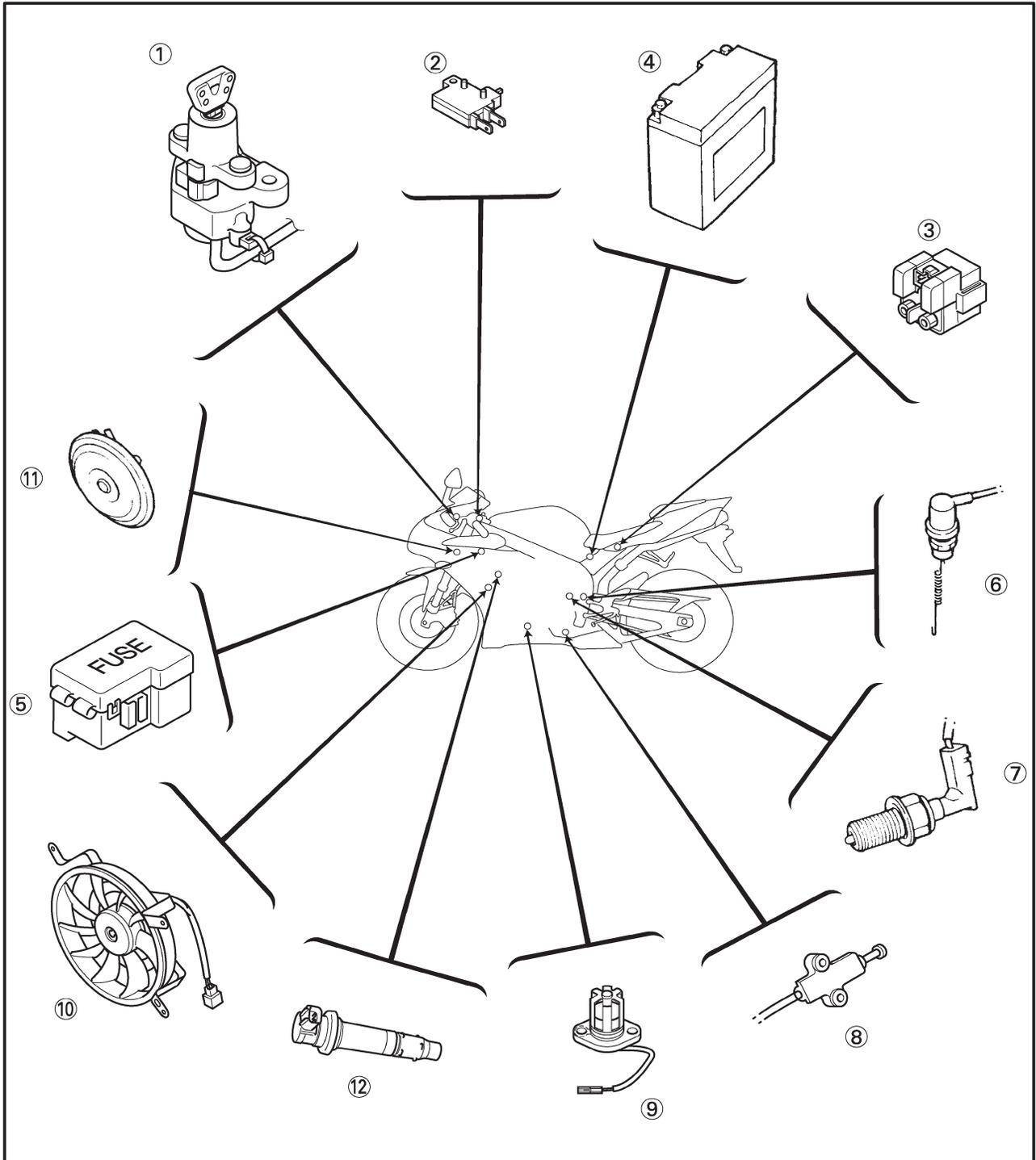


EAS00729

ELECTRICAL SYSTEM

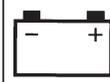
ELECTRICAL COMPONENTS

- ① Main switch
- ② Front brake light switch
- ③ Starter relay
- ④ Battery
- ⑤ Fuse box
- ⑥ Rear brake light switch
- ⑦ Neutral switch
- ⑧ Sidestand switch
- ⑨ Oil level switch
- ⑩ Radiator fan motor
- ⑪ Horn
- ⑫ Ignition coil

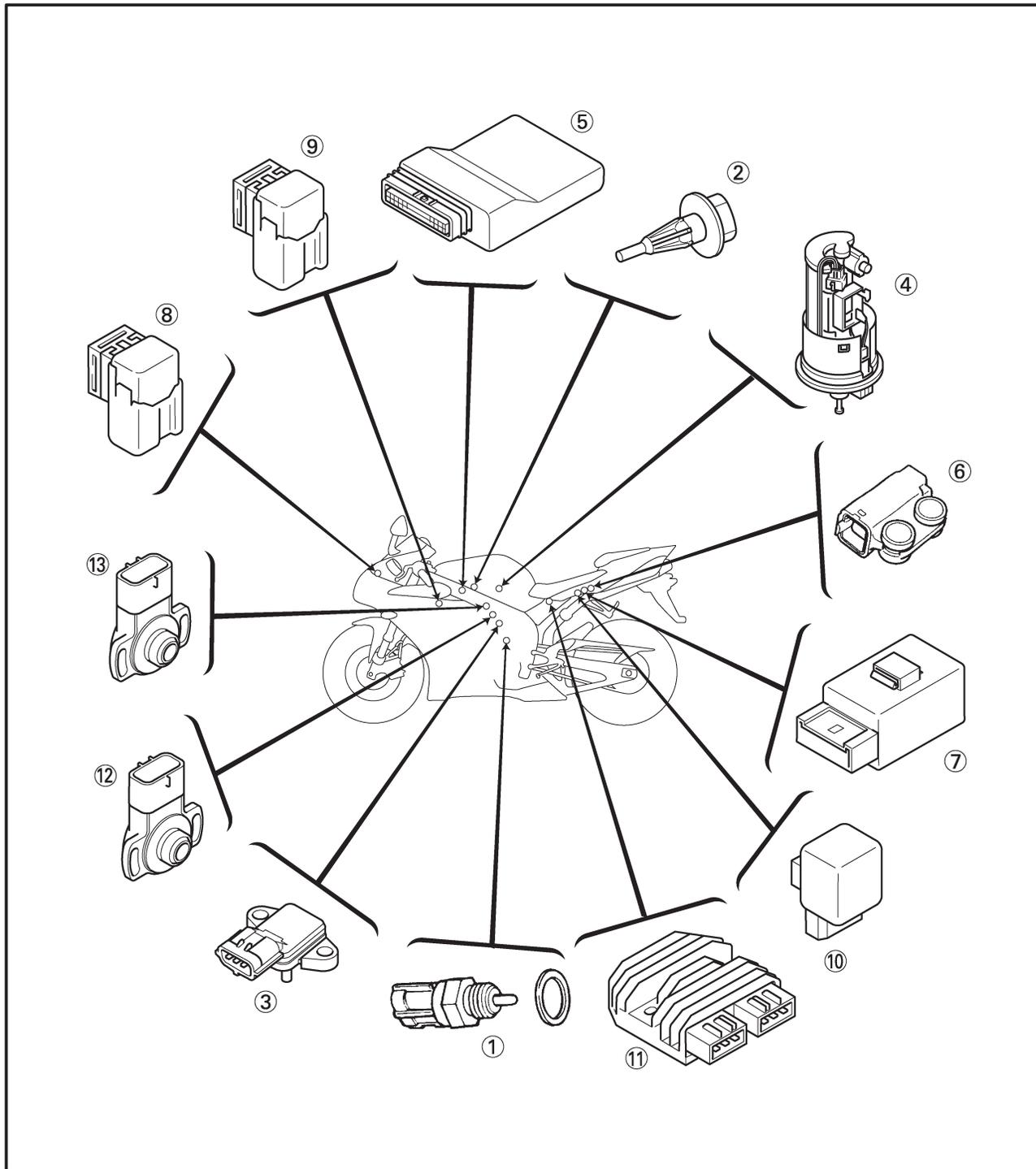


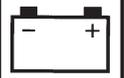
ELECTRICAL COMPONENTS

ELEC



- ① Coolant temperature sensor
- ② Intake air temperature sensor
- ③ Intake air pressure sensor
- ④ Fuel pump
- ⑤ ECU
- ⑥ Lean angle cut-off switch
- ⑦ Starting circuit cut-off relay
- ⑧ Headlight relay (dimmer)
- ⑨ Radiator fan motor relay
- ⑩ Turn signal relay
- ⑪ Rectifier/regulator
- ⑫ Throttle position sensor
- ⑬ Sub-throttle position sensor





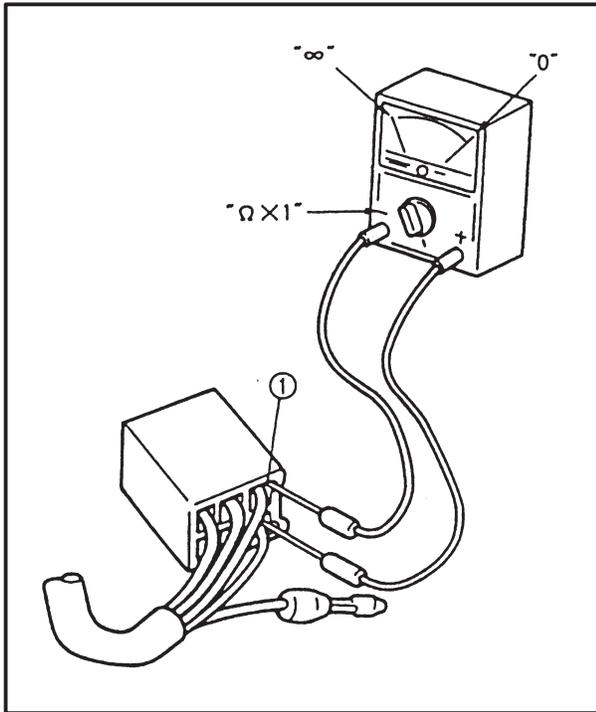
EAS00730

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:

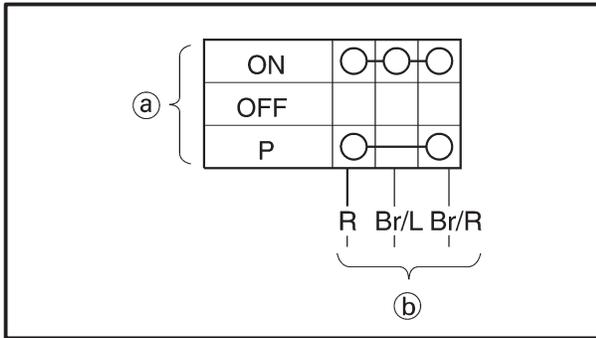
Never insert the tester probes into the coupler terminal slots. Always insert the probes from the opposite end of the coupler ① taking care not to loosen or damage the leads.



Pocket tester
90890-03112, YU-3112

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.

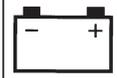
NOTE:

“○—○” 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 red and brown/red when the switch is set to “P”.

There is continuity between red, brown/blue and brown/red when the switch is set to “ON”.



EAS00731

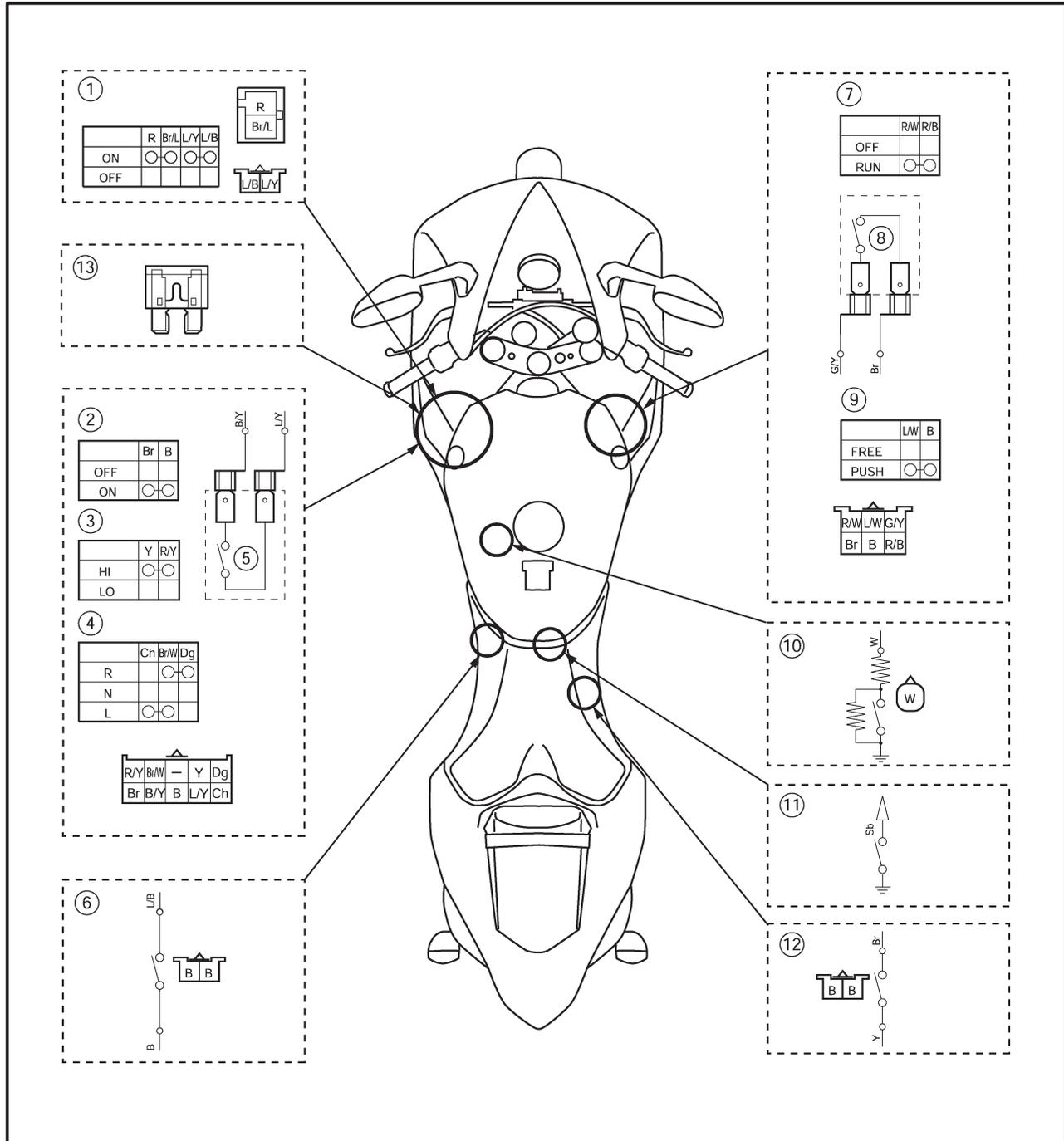
CHECKING THE SWITCHES

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

Damage/wear → Repair or replace.

Improperly connected → Properly connect.

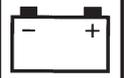
Incorrect continuity reading → Replace the switch.



- ① Main switch
- ② Horn switch
- ③ Dimmer switch
- ④ Turn signal switch
- ⑤ Clutch switch

- ⑥ Sidestand switch
- ⑦ Engine stop switch
- ⑧ Front brake light switch
- ⑨ Start switch
- ⑩ Oil level switch

- ⑪ Neutral switch
- ⑫ Rear brake light switch
- ⑬ Fuse box



EAS00732

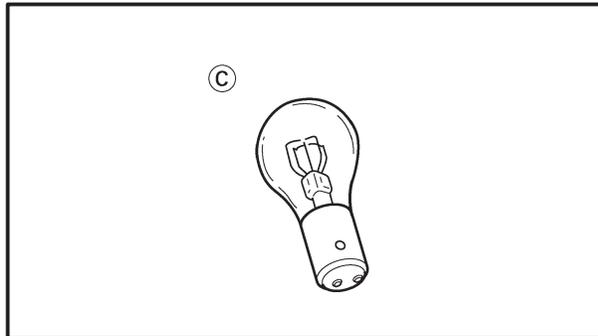
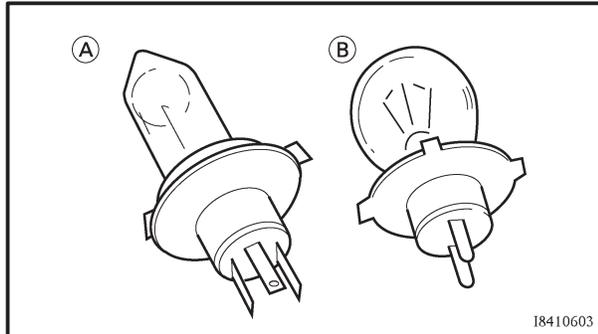
CHECKING THE BULBS AND BULB SOCKETS

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

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

Improperly connected → Properly connect.

No continuity → Repair or replace the bulb, bulb socket or both.



TYPES OF BULBS

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

- Bulbs (A) and (B) are used for 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.
- Bulbs (C) are used for turn signal and tail/brake lights and can be removed from the socket by pushing and turning the bulb counterclockwise.

CHECKING THE CONDITION OF THE BULBS

The following procedure applies to all of the bulbs.

1. Remove:

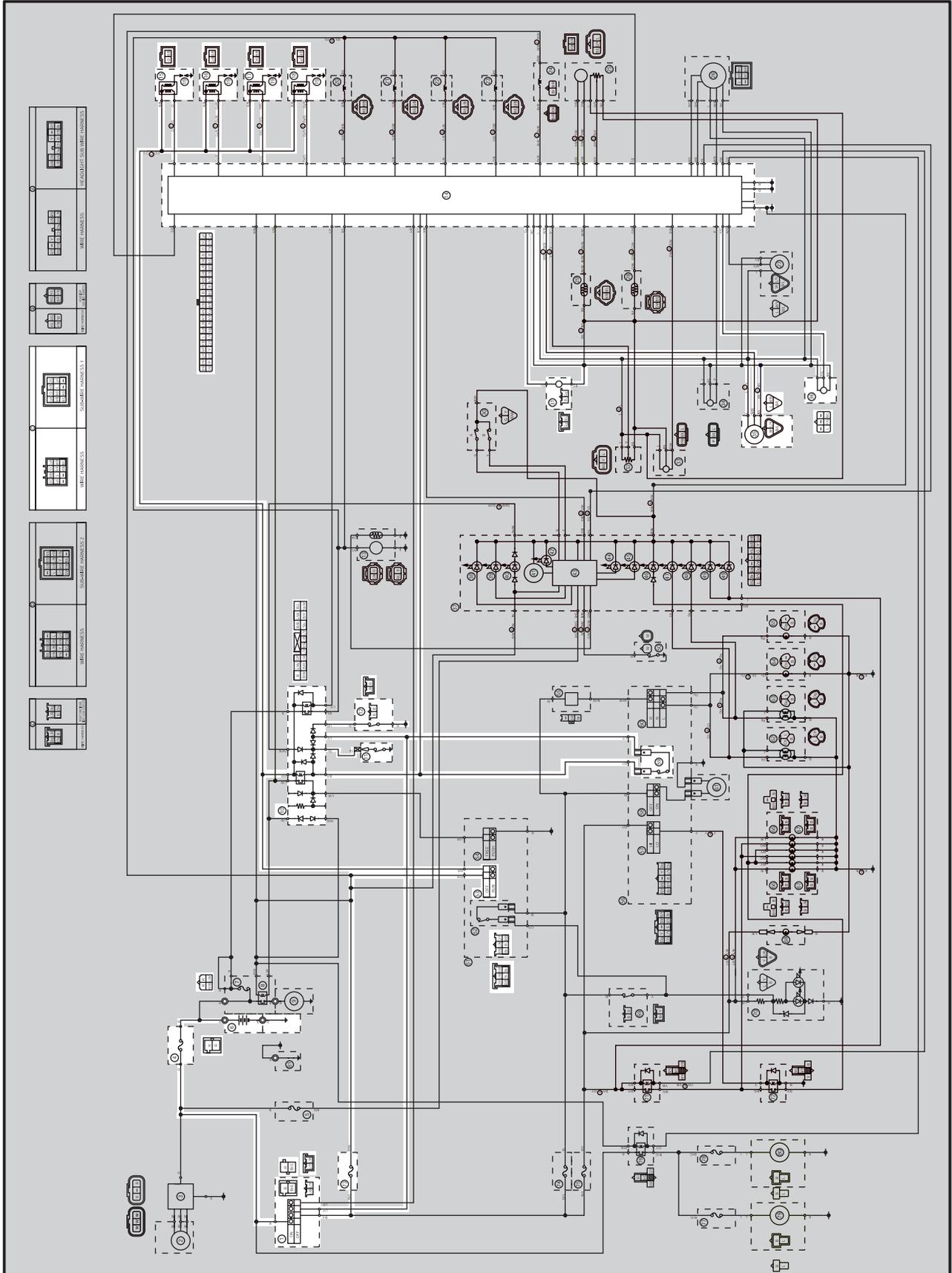
- bulb

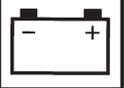
⚠ WARNING

- Since the headlight bulb gets extremely hot, keep flammable products and your hands away from the bulb until it has cooled down.
- When changing the tail/brake light bulb, confirm that the frame has cooled according to the warning label and change the tail/brake light bulb.

EAS00735

IGNITION SYSTEM CIRCUIT DIAGRAM





- ① Main switch
- ④ Fuse (main)
- ⑥ Battery
- ⑩ Starting circuit cut-off relay
- ⑪ Neutral switch
- ⑫ Sidestand switch
- ⑭ E.C.U.
- ⑮ Ignition coil #1
- ⑯ Ignition coil #2
- ⑰ Ignition coil #3
- ⑱ Ignition coil #4
- ⑲ Spark plug
- ⑳ Crankshaft position sensor
- ㉓ Cylinder identification sensor
- ㉔ Lean angle cut-off switch
- ㉕ Engine stop switch
- ㉖ Clutch switch
- ㉗ Fuse (ignition)



EAS00737

TROUBLESHOOTING

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

Check:

1. main and ignition fuses
2. battery
3. spark plugs
4. ignition spark gap
5. ignition coil resistance
6. crankshaft position sensor
7. main switch
8. engine stop switch
9. neutral switch
10. sidestand switch
11. clutch switch
12. starting circuit cut-off relay (diode)
13. lean angle cut-off switch
14. wiring connections
(of the entire ignition system)

NOTE:

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

	<p>Ignition checker 90890-06754</p> <p>Dynamic spark tester YM-34487</p> <p>Pocket tester 90890-03112, YU-3112</p>
---	---

EAS00738

<p>1. Main and ignition fuses</p> <ul style="list-style-type: none"> • 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).

EAS00739

2. Battery	
<ul style="list-style-type: none"> • Check the condition of the battery. Refer to “CHECKING AND CHARGING THE BATTERY” in chapter 3. 	
	<p>Minimum open-circuit voltage 12.8 V or more at 20°C (68°F)</p>
<ul style="list-style-type: none"> • Is the battery OK? 	

↓ YES

↓ NO

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

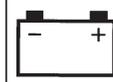
EAS00741

3. Spark plugs	
<p>The following procedure applies to all of the spark plugs.</p> <ul style="list-style-type: none"> • Check the condition of the spark plug. • Check the spark plug type. • Measure the spark plug gap. Refer to “CHECKING THE SPARK PLUGS” in chapter 3. 	
	<p>Standard spark plug CR9EK (NGK)</p> <p>Spark plug gap 0.6 ~ 0.7 mm (0.0236 ~ 0.0276 in)</p>
<ul style="list-style-type: none"> • 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.

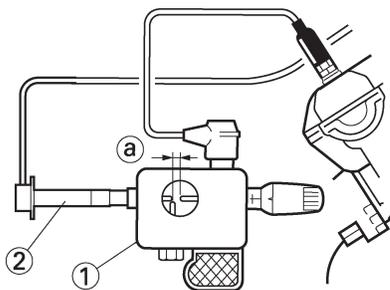


EAS00743

4. Ignition spark gap

The following procedure applies to all of the spark plugs.

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



18110202



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.

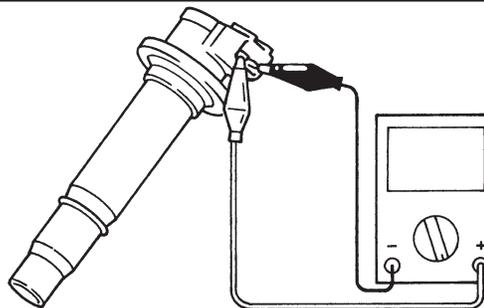
EAS00747

5. Ignition coil resistance

The following procedure applies to all of the ignition coils.

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

Positive tester probe → ignition coil terminal
Negative tester probe → ignition coil terminal



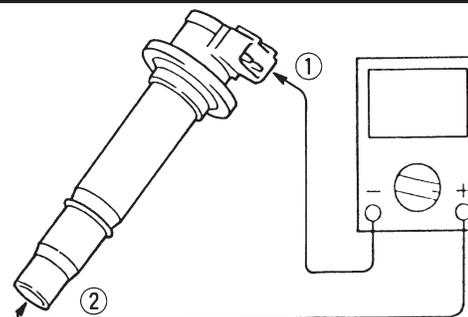
- Measure the primary coil resistance.



Primary coil resistance
1.19 ~ 1.61 Ω at 20°C

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

Negative tester probe → ignition coil terminal ①
Positive tester probe → spark plug terminal ②



- Measure the secondary coil resistance.



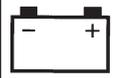
Secondary coil resistance
8.5 ~ 11.5 k Ω at 20°C

- Is the ignition coil OK?

YES

NO

Replace the ignition coil.

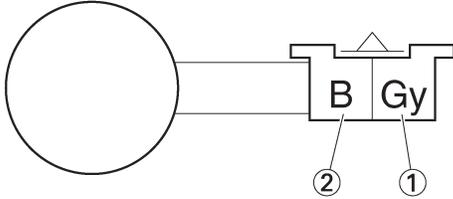


EAS00748

6. 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 → gray ①
 Negative tester probe → black ②



- Measure the crankshaft position sensor resistance.



Crankshaft position sensor resistance
 336 ~ 504 Ω at 20°C
 (between gray and black)

- Is the crankshaft position sensor OK?

↓ YES

↓ NO

Replace the crankshaft position sensor.

EAS00749

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.

EAS00750

8. Engine stop switch

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

↓ YES

↓ NO

Replace the right handlebar switch.

EAS00751

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.

EAS00752

10. Sidestand switch

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

↓ YES

↓ NO

Replace the sidestand switch.

EAS00763

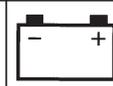
11. Clutch switch

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

↓ YES

↓ NO

Replace the clutch switch.



EAS00753

12. Starting circuit cut-off relay (diode)

- Disconnect the starting circuit cut-off relay coupler from the wire harness.
- Connect the pocket tester ($\Omega \times 1$) to the starting circuit cut-off relay coupler as shown.
- Check the starting circuit cut-off relay for continuity.

Positive tester probe → blue/yellow ① Negative tester probe → sky blue ②	Continuity
Positive tester probe → blue/yellow ① Negative tester probe → blue/black ③	
Positive tester probe → sky blue ② Negative tester probe → blue/yellow ①	No continuity
Positive tester probe → blue/black ③ Negative tester probe → blue/yellow ①	

R	L/W	G/R		R/B	L/W	R/L
B/W	B/R	L/W	L/Y	R/M	L/B	L/Y
				Sb	B/Y	Sb/W

NOTE: _____
 When you switch the positive and negative tester probes, the readings in the above chart will be reversed.

• Are the tester readings correct?

↓ YES

↓ NO

Replace the starting circuit cut-off relay.

13. Lean angle cut-off switch

- Check the lean angle cut-off switch. Refer to “FUEL INJECTION SYSTEM” in chapter 7.
- Is the lean angle cut-off switch OK?

↓ YES

↓ NO

Replace the lean angle cut-off switch.

EAS00754

14. Wiring

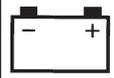
- Check the entire ignition system’s wiring. Refer to “CIRCUIT DIAGRAM”.
- Is the ignition system’s wiring properly connected and without defects?

↓ YES

↓ NO

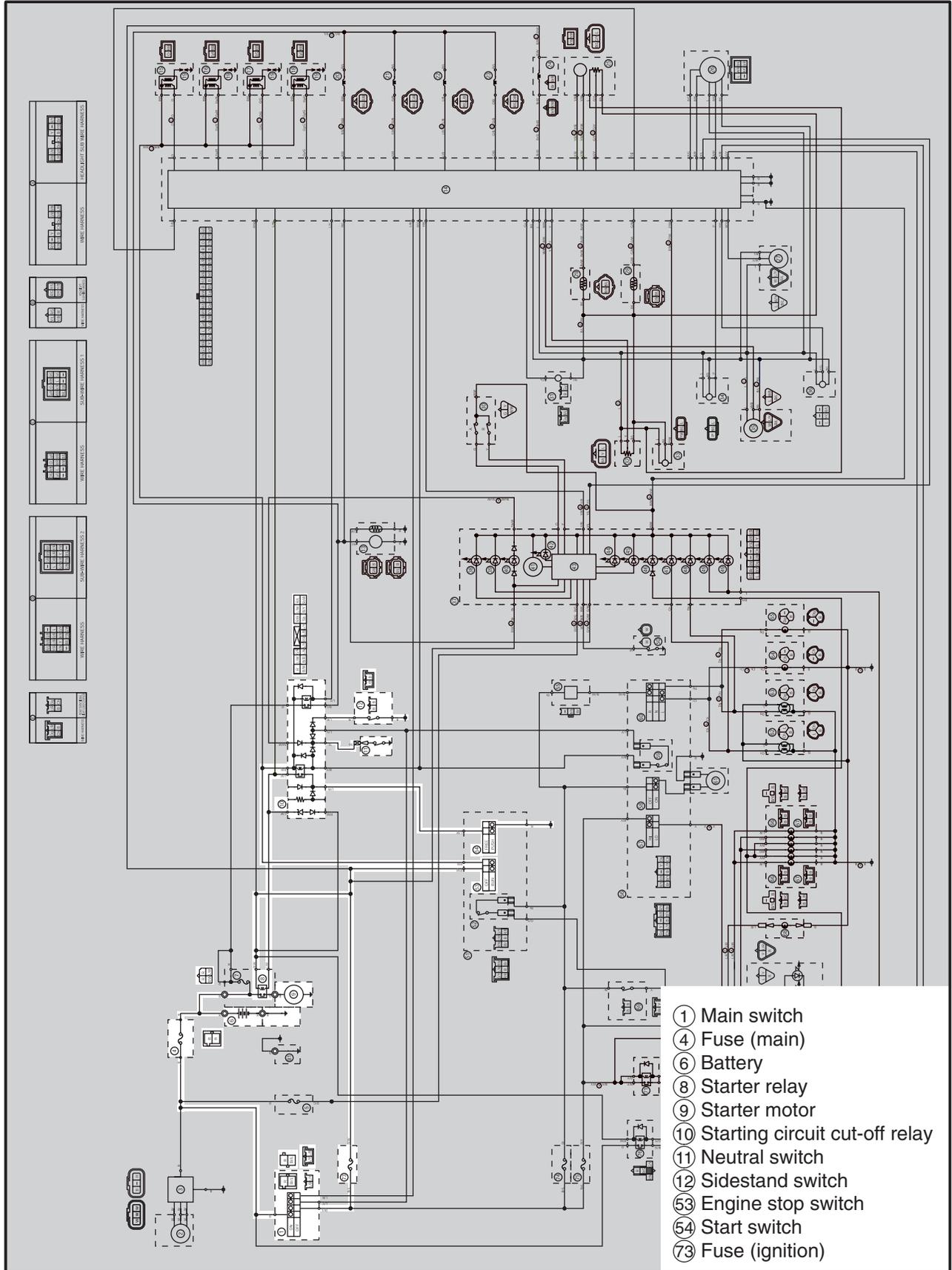
Replace the ECU.

Properly connect or repair the ignition system’s wiring.

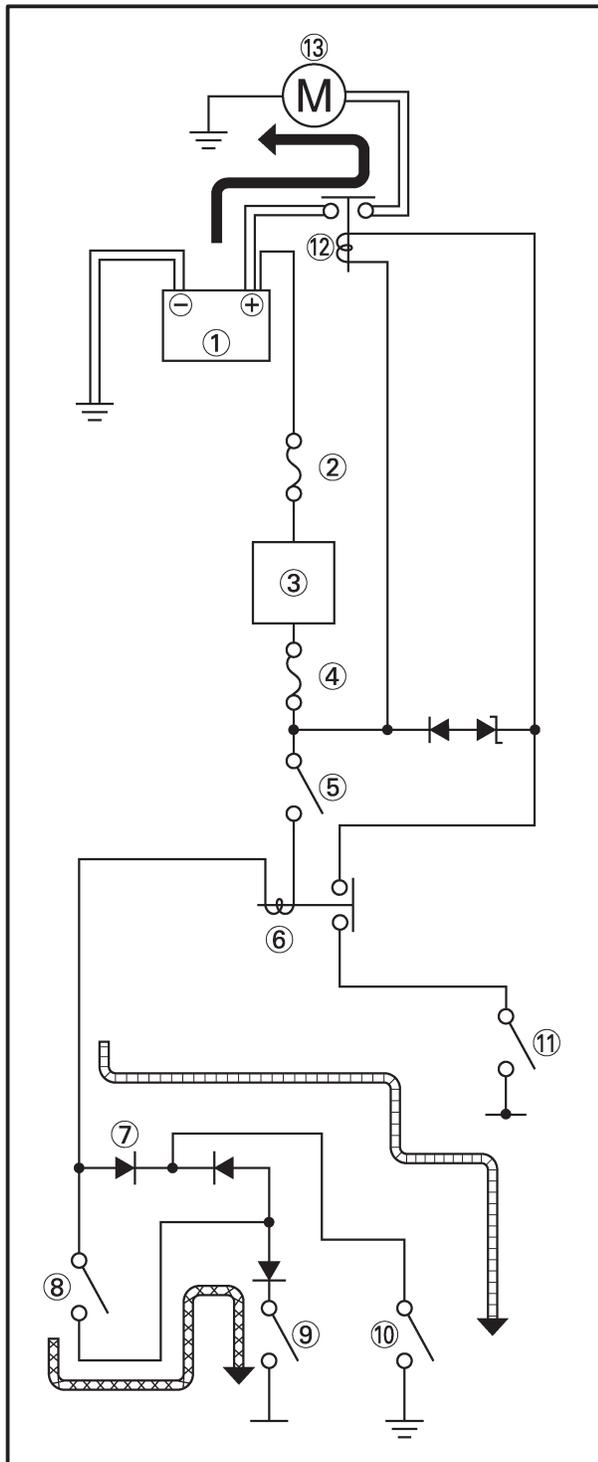
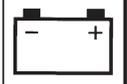


EAS00755

**ELECTRIC STARTING SYSTEM
CIRCUIT DIAGRAM**



- ① Main switch
- ④ Fuse (main)
- ⑥ Battery
- ⑧ Starter relay
- ⑨ Starter motor
- ⑩ Starting circuit cut-off relay
- ⑪ Neutral switch
- ⑫ Sidestand switch
- ⑤③ Engine stop switch
- ⑤④ Start switch
- ⑦③ Fuse (ignition)



EAS00756

STARTING CIRCUIT CUT-OFF SYSTEM OPERATION

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

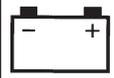
- The transmission is in neutral (the neutral switch is closed).
- The clutch lever is pulled to the handlebar (the clutch switch is closed) and the sidestand is up (the sidestand switch is closed).

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

← WHEN THE TRANSMISSION IS IN NEUTRAL

← WHEN THE SIDESTAND IS UP AND THE CLUTCH LEVER IS PULLED TO THE HANDLEBAR

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



EAS00757

TROUBLESHOOTING

The starter motor fails to turn.

Check:

1. main and ignition fuses
2. battery
3. starter motor
4. starting circuit cut-off relay
5. starter relay
6. main switch
7. engine stop switch
8. neutral switch
9. sidestand 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
 3. side cowlings
 4. throttle body assembly
- Troubleshoot with the following special tool(s).



Pocket tester
90890-03112, YU-3112

EAS00738

1. Main and ignition fuses

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

↓ YES

↓ NO

Replace the fuse(s).

EAS00739

2. Battery

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



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

- Is the battery OK?

↓ YES

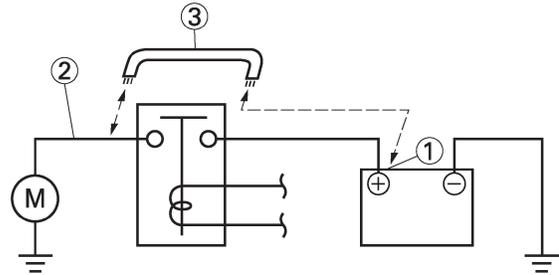
↓ NO

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

EAS00758

3. Starter motor

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



18210801

WARNING

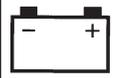
- A wire that is used as a jumper lead must have at least the same capacity or more as that of the battery lead, otherwise the jumper lead may burn.
- This check is likely to produce sparks, therefore make sure nothing flammable is in the vicinity.

- Does the starter motor turn?

↓ YES

↓ NO

Repair or replace the starter motor.



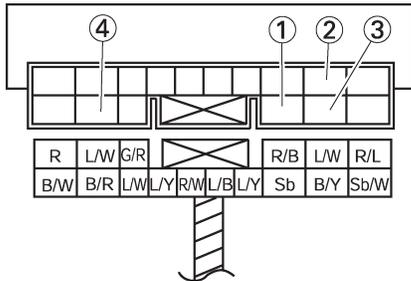
EAS00759

4. Starting circuit cut-off relay

- Disconnect the starting circuit cut-off relay coupler from the wire harness.
- Connect the pocket tester ($\Omega \times 1$) and battery (12 V) to the starting circuit cut-off relay coupler as shown.

Positive battery terminal → red/black ①
Negative battery terminal → black/yellow ②

Positive tester probe → blue/white ③
Negative tester probe → blue/white ④



- Does the starting circuit cut-off relay have continuity between blue/white ③ and blue/white ④?

YES ↓ NO ↓

Replace the starting circuit cut-off relay.

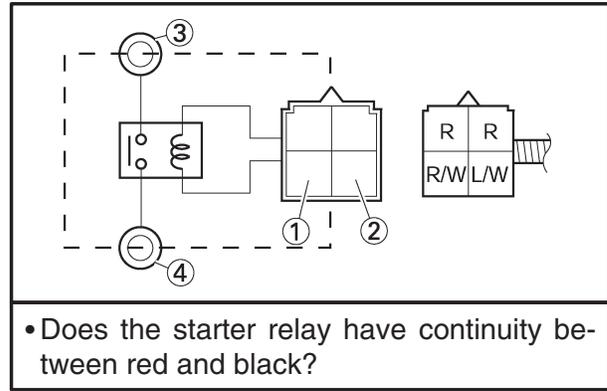
EAS00761

5. Starter relay

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

Positive battery terminal → blue/white ①
Negative battery terminal → red/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.

EAS00749

6. Main switch

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

YES ↓ NO ↓

Replace the main switch.

EAS00750

7. Engine stop switch

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

YES ↓ NO ↓

Replace the right handlebar switch.

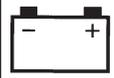
EAS00751

8. Neutral switch

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

YES ↓ NO ↓

Replace the neutral switch.



EAS00752

9. Sidestand switch

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

↓ YES

↓ NO

Replace the sidestand switch.

EAS00766

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.

EAS00763

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.

EAS00764

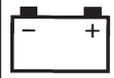
11. Start switch

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

↓ YES

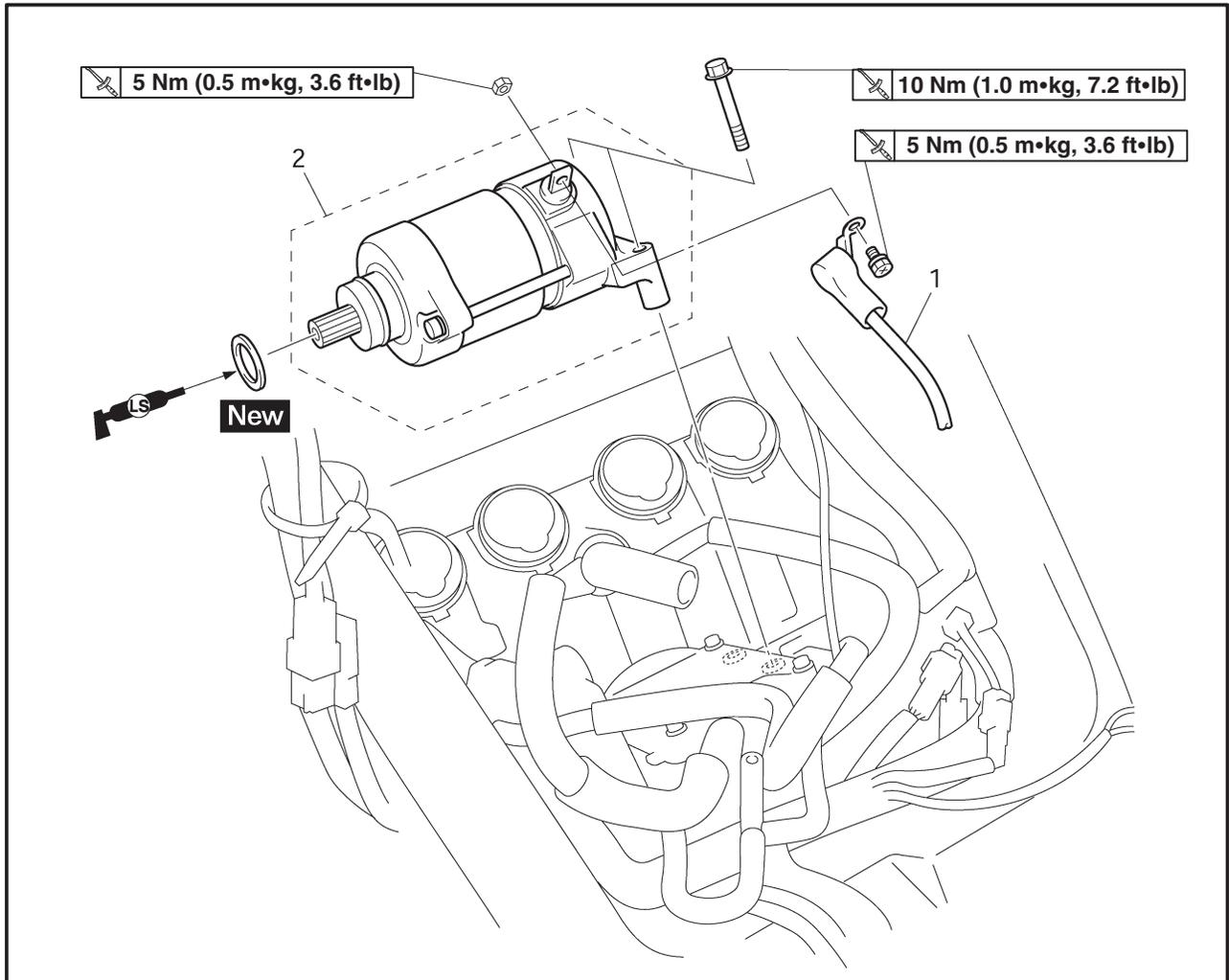
↓ NO

Replace the right handlebar switch.

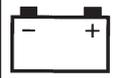


EAS00767

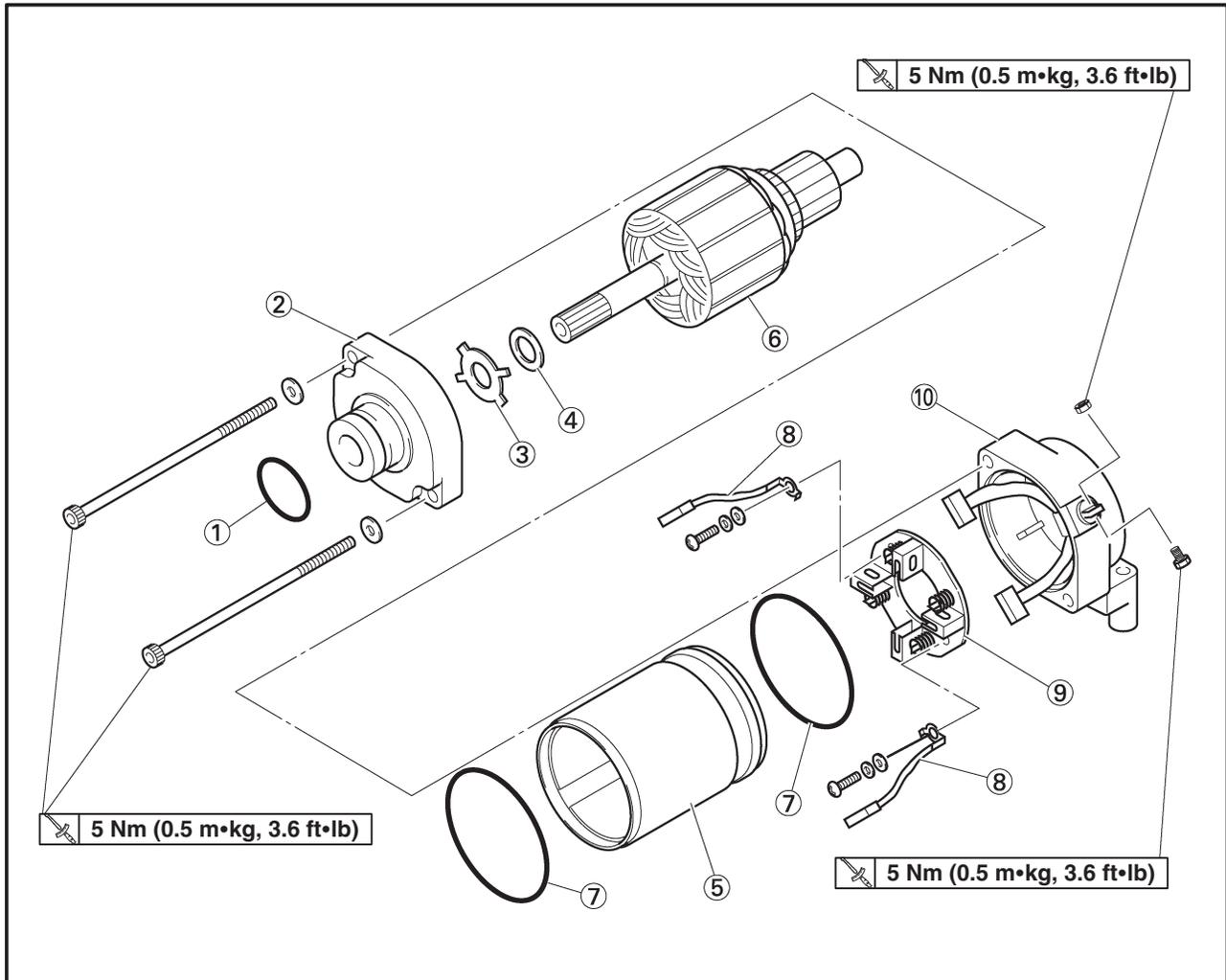
STARTER MOTOR



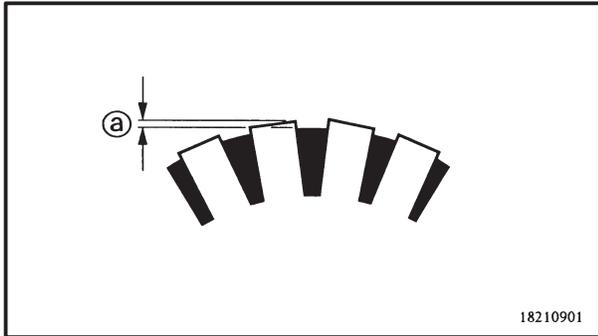
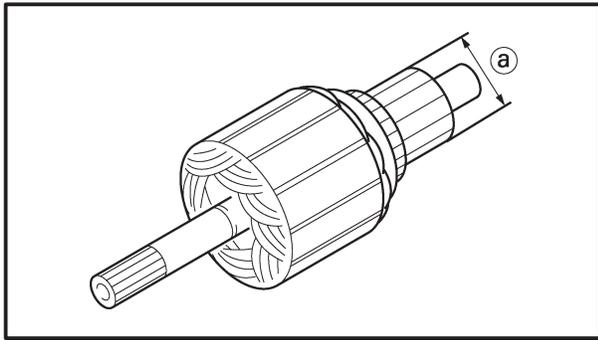
Order	Job/Part	Q'ty	Remarks
	Removing the starter motor Seat Fuel tank Throttle body assembly		Remove the parts in the order listed. Refer to "SEAT" in chapter 3. Refer to "FUEL TANK" in chapter 3. Refer to "THROTTLE BODIES" in chapter 7.
1	Starter motor lead	1	
2	Starter motor	1	
			For installation, reverse the removal procedure.



EAS00768



Order	Job/Part	Q'ty	Remarks
	Disassembling the starter motor		Disassemble the parts in the order listed.
①	O-ring	1	
②	Front cover	1	
③	Lock washer	1	
④	Washer	1	
⑤	Starter motor yoke	1	
⑥	Armature assembly	1	
⑦	O-ring	2	
⑧	Starter motor lead	2	
⑨	Brush holder	1	
⑩	Rear cover	1	
			For assembly, reverse the disassembly procedure.



18210901

EAS00770

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
24.5 mm (0.96 in)

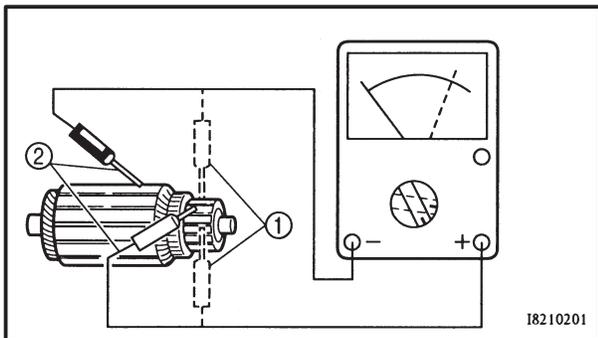
3. Measure:
 - mica undercut (a)
Out of specification → Scrape the mica to the proper measurement with a hacksaw blade that has been grounded to fit the commutator.



Mica undercut
1.5 mm (0.06 in)

NOTE:

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



18210201

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.



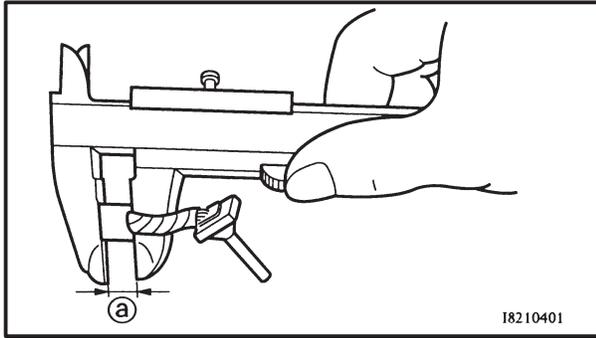
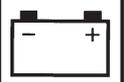
Pocket tester
90890-03112, YU-3112



Armature coil
Commutator resistance ①
0.0090 ~ 0.0110 Ω
at 20°C (68°F)
Insulation resistance ②
Above 1 MΩ at 20°C (68°F)

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





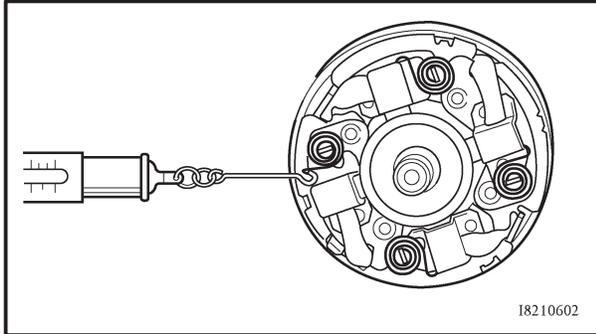
5. Measure:

- brush length (a).

Out of specification → Replace the brushes as a set.



Brush length wear limit
3.6 mm (0.14 in)



6. Measure:

- brush spring force

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

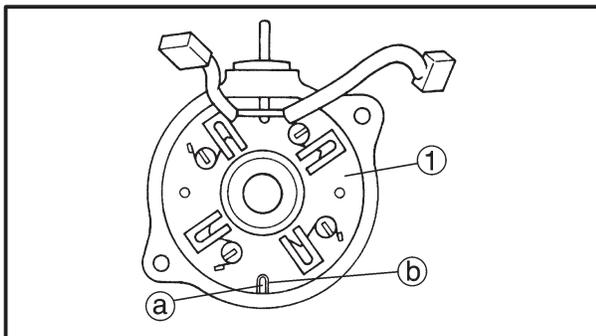


Brush spring force
5.28 ~ 7.92 N
(538 ~ 808 gf, 18.99 ~ 28.48 oz)

7. Check:

- gear teeth

Damage/wear → Replace the gear.



EAS00772

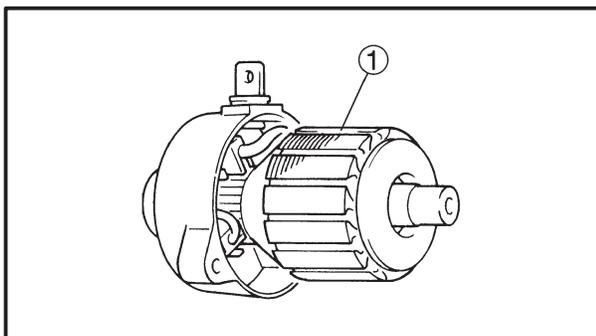
ASSEMBLING THE STARTER MOTOR

1. Install:

- brush seat (1)

NOTE:

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

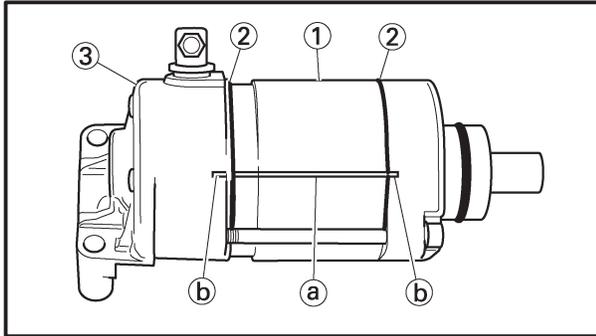
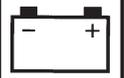


2. Install:

- armature (1)

STARTER MOTOR

ELEC



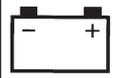
3. Install:

- starter motor yoke ①
- O-rings ② **New**
- starter motor rear cover ③
- bolts

 **5 Nm (0.5 m•kg, 3.6 ft•lb)**

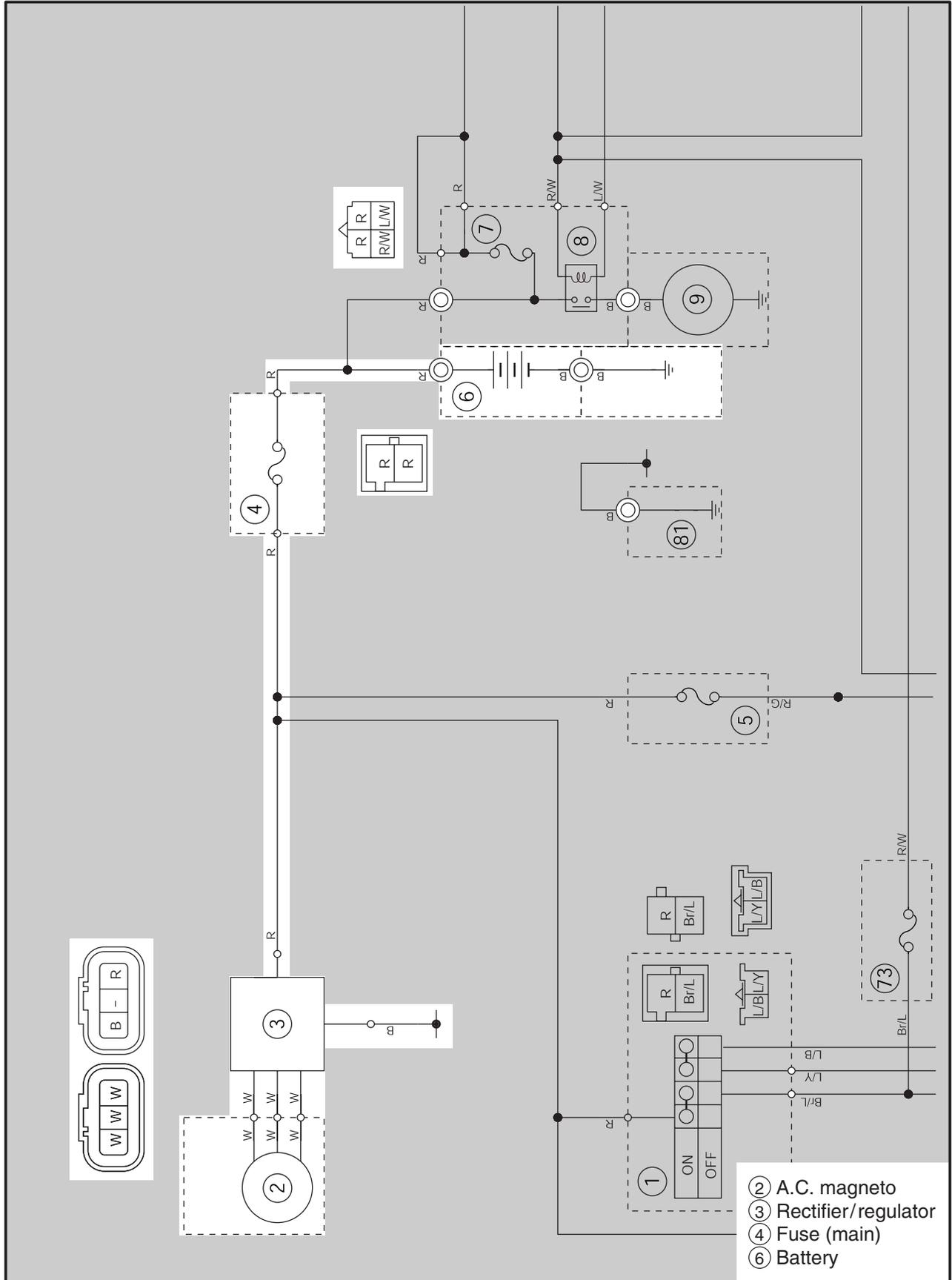
NOTE:

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



EAS00773

**CHARGING SYSTEM
CIRCUIT DIAGRAM**



- ② A.C. magneto
- ③ Rectifier/regulator
- ④ Fuse (main)
- ⑥ Battery



EAS00774

TROUBLESHOOTING

The battery is not being charged.

Check:

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

NOTE:

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

	Pocket tester 90890-03112, YU-3112
--	--

EAS00738

1. Main fuse • Check the main fuse for continuity. Refer to “CHECKING THE FUSES” in chapter 3. • Is the main fuse OK?



Replace the fuse.

EAS00739

2. Battery • Check the condition of the battery. Refer to “CHECKING AND CHARGING THE BATTERY” in chapter 3.
--

	Minimum open-circuit voltage 12.8 V or more at 20°C (68°F)
• Is the battery OK?	

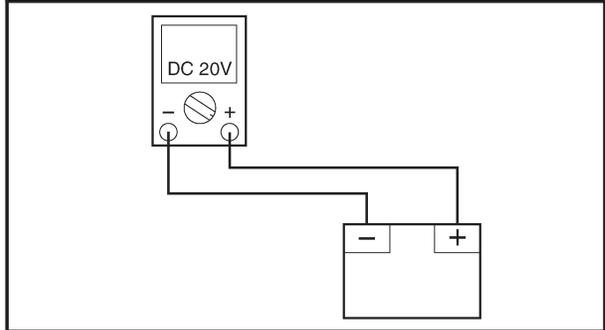


• Clean the battery terminals.
• Recharge or replace the battery.

EAS00775

3. Charging voltage • Set the engine tachometer to the ignition coil of cylinder #1. • Connect the pocket tester (DC 20 V) to the battery as shown.

Positive tester probe → positive battery terminal
Negative tester probe → negative battery terminal



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

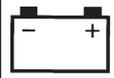
	Charging voltage 14 V at 5,000 r/min
--	--

NOTE:
Make sure the battery is fully charged.

• Is the charging voltage within specification?



The charging circuit is OK.



4. Stator coil lead

- Disconnect stator coil lead coupler.
- Connect the pocket tester ($\Omega \times 1$) to the stator coil lead coupler as shown.

Positive tester probe → white ① Negative tester probe → ground	No continuity
Positive tester probe → white ② Negative tester probe → ground	
Positive tester probe → white ③ Negative tester probe → ground	

• Are the tester readings correct?

↓ YES

↓ NO

Replace the stator coil lead.

EAS00776

5. Stator coil resistance

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

Positive tester probe → white ①
 Negative tester probe → white ②

Positive tester probe → white ①
 Negative tester probe → white ③

- Measure the stator coil resistances.

Stator coil resistance
 0.14 ~ 0.18 Ω at 20°C (68°F)

• Is the stator coil OK?

↓ YES

↓ NO

Replace the stator coil assembly.

EAS00779

6. Wiring

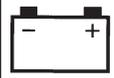
- Check the wiring connections of the entire charging system. Refer to "CIRCUIT DIAGRAM".
- Is the charging system's wiring properly connected and without defects?

↓ YES

↓ NO

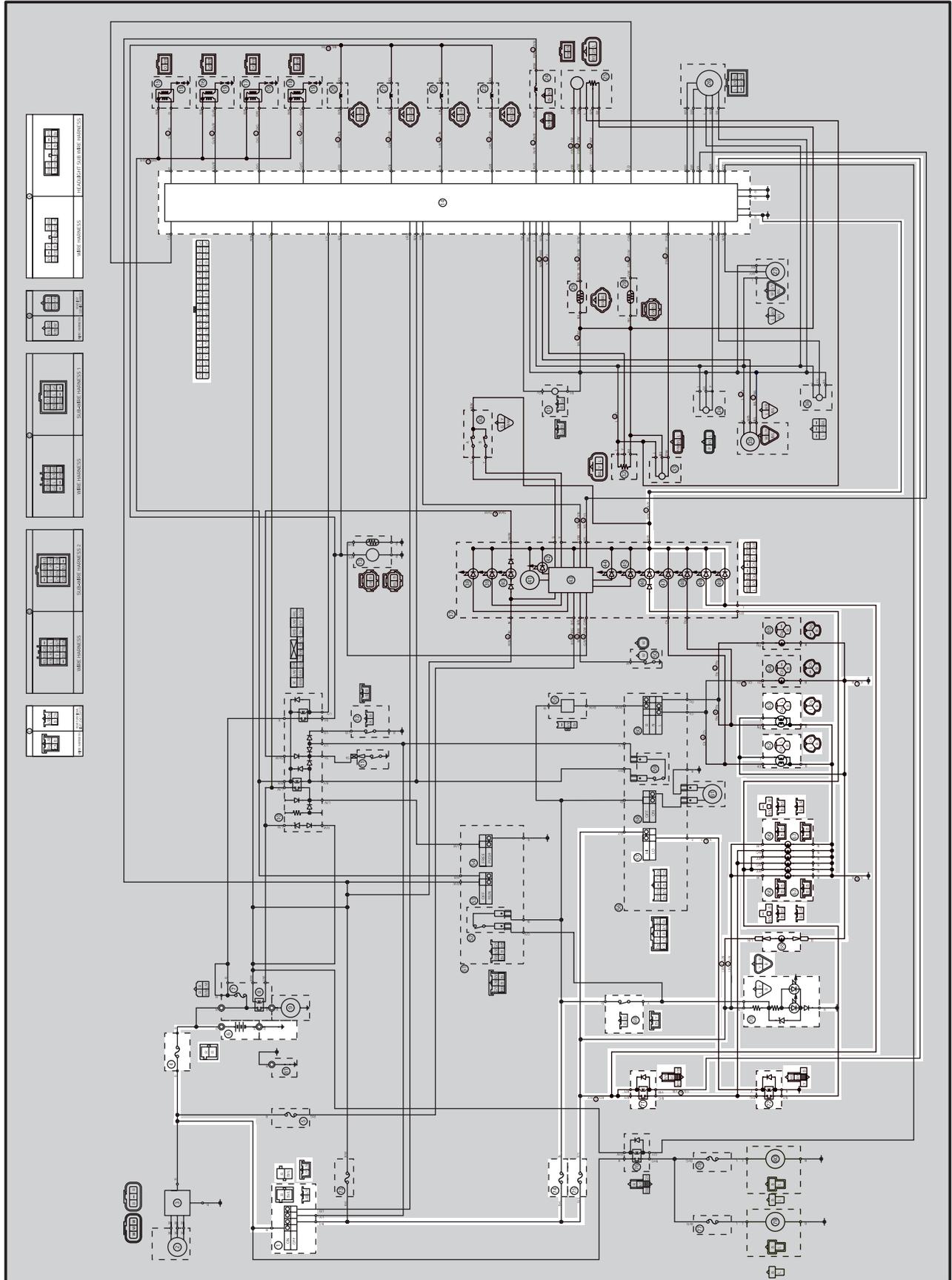
Replace the rectifier/regulator.

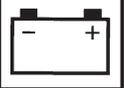
Properly connect or repair the charging system's wiring.



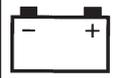
EAS00780

LIGHTING SYSTEM CIRCUIT DIAGRAM





- ① Main switch
- ④ Fuse (main)
- ⑥ Battery
- ⑭ E.C.U.
- ④⑥ Hi beam indicator light
- ④⑨ Meter light
- ⑤⑦ Dimmer switch
- ⑥② Front turn signal/position light (left)
- ⑥③ Front turn signal/position light (right)
- ⑥⑥ Headlight
- ⑥⑦ Auxiliary light
- ⑥⑧ License plate light
- ⑥⑨ Rear brake light switch
- ⑦⑩ Tail/brake light
- ⑦① Headlight relay (on/off)
- ⑦② Headlight relay (dimmer)
- ⑦④ Fuse (signal)
- ⑦⑤ Fuse (headlight)



EAS00781

TROUBLESHOOTING

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

Check:

1. main, turn and headlight fuses
2. battery
3. main switch
4. dimmer switch
5. pass switch
6. headlight relay (on/off)
7. headlight relay (dimmer)
8. wiring connections
(of the entire lighting system)

NOTE:

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



Pocket tester
90890-03112, YU-3112

EAS00738

1. Main, turn and headlight fuses

- Check the main, turn and headlight fuses for continuity. Refer to “CHECKING THE FUSES” in chapter 3.
- Are the main, turn and headlight fuses OK?

↓ YES

↓ NO

Replace the fuse(s).

EAS00739

2. Battery

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

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

• Is the battery OK?

↓ YES

↓ NO

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

EAS00749

3. Main switch

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

↓ YES

↓ NO

Replace the main switch.

EAS00784

4. Dimmer switch

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

↓ YES

↓ NO

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

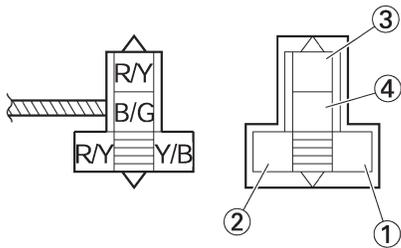


5. Headlight relay (on/off)

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

Positive battery lead → red/yellow ①
Negative battery lead → yellow/black ②

Positive tester probe → red/yellow ③
Negative tester probe → black/green ④



• Does the Headlight relay (dimmer) have continuity between red/yellow ③ and black/green ④?

↓ YES ↓ NO

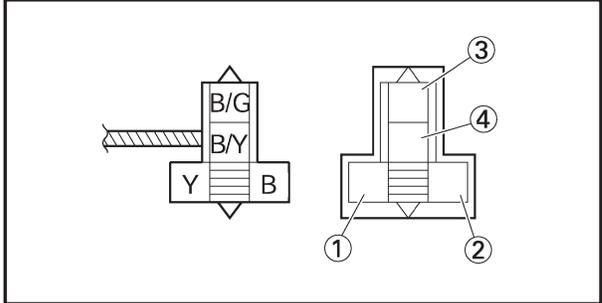
Replace the dimmer relay.

6. Headlight relay (dimmer)

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

Positive battery lead → black ①
Negative battery lead → yellow ②

Positive tester probe → black/green ③
Negative tester probe → black/yellow ④



• Does the headlight relay (dimmer) have continuity between black/green ③ and black/yellow ④?

↓ YES ↓ NO

Replace the headlight relay (dimmer).

EAS00787

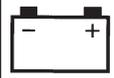
7. Wiring

- 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.



EAS00788

CHECKING THE LIGHTING SYSTEM

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

1. Headlight bulb and socket

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



Replace the headlight bulb, socket or both.

2. Voltage

- Connect the pocket tester (DC 20 V) to the headlight and meter assembly couplers as shown.

A When the dimmer switch is set to “ ”

B When the dimmer switch is set to “ ”

Headlight
Positive tester probe → black ①
Negative tester probe → black/green ②

Headlight coupler (wire harness side)
A Low beam

Headlight
Positive tester probe → black ③
Negative tester probe → black/yellow ④

Headlight coupler (wire harness side)
B High beam

High beam indicator light (LEDs)
Positive tester probe → black/ yellow ⑥
Negative tester probe → black/white ⑤

Meter assembly coupler (wire harness side)

- Turn the main switch to “ON”.
- Start the engine.
- Set the dimmer switch to “ ” or “ ”.
- Measure the voltage (DC 12 V) of black/green ② or black/yellow ④ on the headlight coupler (wire harness side).
- Is the voltage within specification?



This circuit is OK.

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



EAS00792

2. The license plate light fails to come on.

1. License plate light bulb and socket

- Check the license plate light bulb and socket for continuity. Refer to “CHECKING THE BULBS AND BULB SOCKETS”.
- Are the license plate light bulb and socket OK?

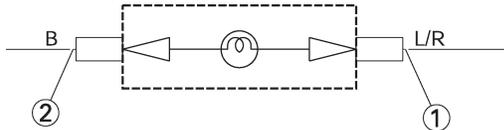


Replace the license plate light bulb, socket or both.

2. Voltage

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

Positive tester probe → blue/red ①
Negative tester probe → black ②



- Turn the main switch to “ON”.
- Measure the voltage (DC 12 V) of blue/red ① on the license plate light coupler (wire harness side).
- Is the voltage within specification?



This circuit is OK.

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

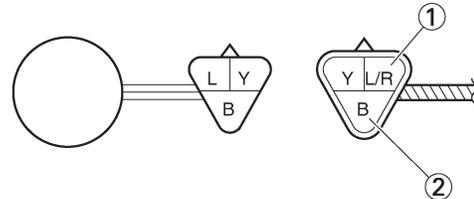
EAS00790

3. The tail/brake light fails to come on.

1. Voltage

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

Positive tester probe → blue/red ①
Negative tester probe → black ②

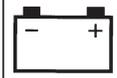


- Turn the main switch to “ON”.
- Measure the voltage (DC 12 V) of blue/red ① on the tail/brake light coupler (wire harness side).
- Is the voltage within specification?



This circuit is OK.

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



EAS00791

4. The auxiliary light fails to come on.

1. Auxiliary light and socket

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



Replace the auxiliary light bulb, socket or both.

5. The turn signal/position light fails to come on.

1. Turn signal/position light and socket

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



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

2. Voltage

- Connect the pocket tester (DC 20 V) to the auxiliary light coupler (auxiliary light side) as shown.

Positive tester probe → blue/red ②
Negative tester probe → black ①

- Turn the main switch to “ON”.
- Measure the voltage (DC 12 V) of blue/red ② on the auxiliary light coupler (auxiliary light side).
- Is the voltage within specification?



This circuit is OK.

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

2. Voltage

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

A Left turn signal/position light
B Right turn signal/position light

Left turn signal/position light
Positive tester probe → blue ①
Negative tester probe → black ②

Right turn signal/position light
Positive tester probe → blue ③
Negative tester probe → black ④

- Turn the main switch to “ON”.
- Measure the voltage (DC 12 V) of blue ① or blue ③ on the turn signal/position light coupler (wire harness side).
- Is the voltage within specification?

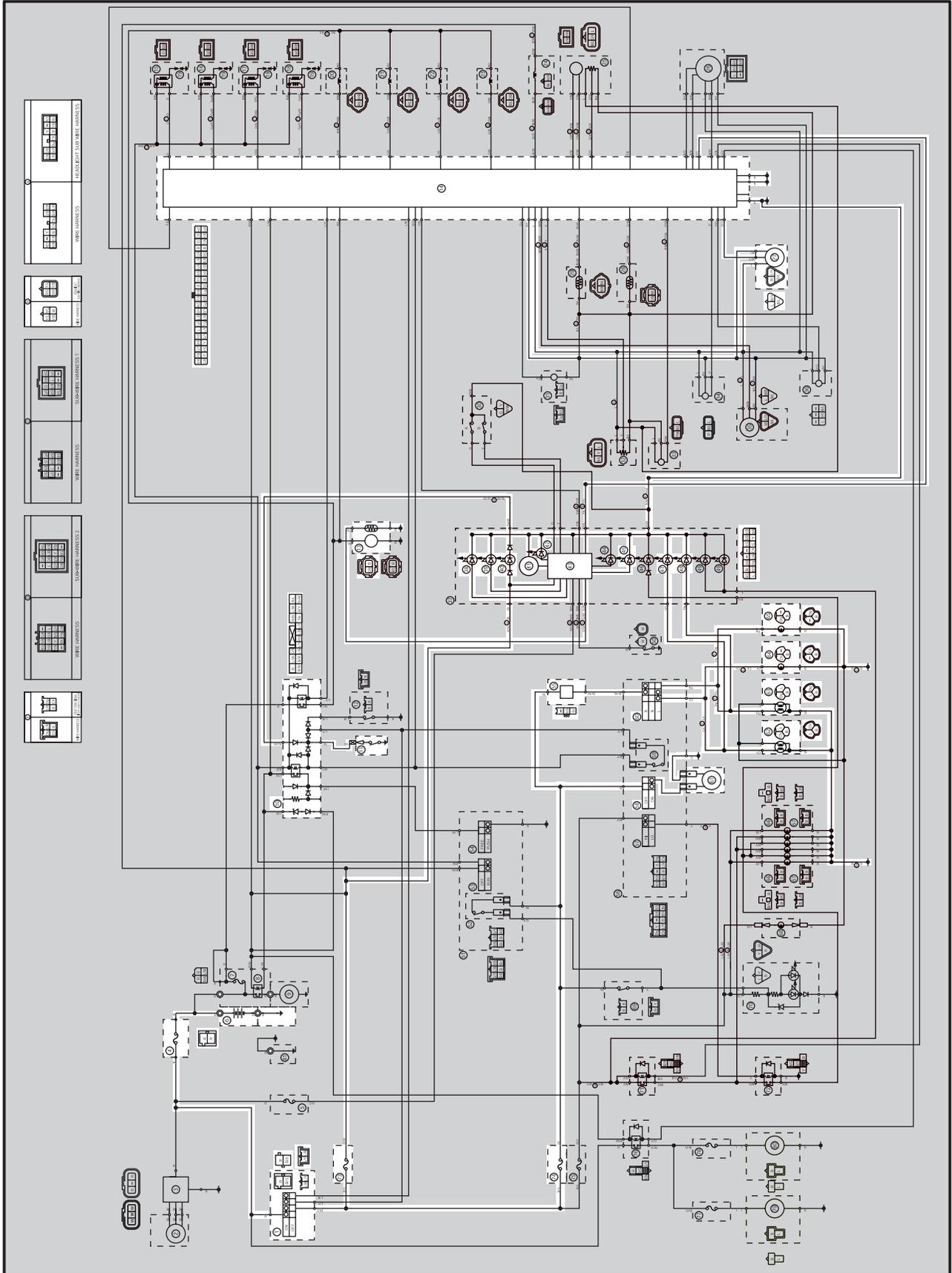


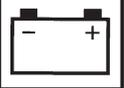
This circuit is OK.

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

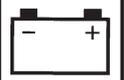
EAS00793

SIGNALING SYSTEM CIRCUIT DIAGRAM





- ① Main switch
- ④ Fuse (main)
- ⑥ Battery
- ⑩ Starting circuit cut-off relay
- ⑪ Neutral switch
- ⑬ Fuel pump
- ⑭ E.C.U.
- ⑳ Speed sensor
- ⑳ Fuel level warning light
- ㉑ Oil level warning light
- ㉒ Neutral indicator light
- ㉓ Tachometer
- ㉔ Shift timing indicator light
- ㉕ Multi function meter
- ㉖ Coolant temperature indicator light
- ㉗ Turn signal indicator light (left)
- ㉘ Turn signal indicator light (right)
- ㉙ Turn signal relay
- ㉚ Horn switch
- ㉛ Turn signal switch
- ㉜ Horn
- ㉝ Front turn signal/position light (left)
- ㉞ Front turn signal/position light (right)
- ㉟ Rear turn signal light (left)
- ㊱ Rear turn signal light (right)
- ㊲ Fuse (ignition)
- ㊳ Fuse (signal)



EAS00794

TROUBLESHOOTING

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

Check:

1. backup, main, ignition, signal, and park 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
 3. side cowlings
- Troubleshoot with the following special tool(s).



Pocket tester
90890-03112, YU-3112

EAS00738

1. Backup, main, ignition, signal and park fuses
- Check the backup, main, ignition, signal and park fuses for continuity. Refer to "CHECKING THE FUSES" in chapter 3.
 - Are the backup, main, ignition, signal and park fuses OK?

↓ YES

↓ NO

Replace the fuse(s).

EAS00739

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



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

- Is the battery OK?

↓ YES

↓ NO

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

EAS00749

3. Main switch

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

↓ YES

↓ NO

Replace the main switch.

EAS00795

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 LIGHTING SYSTEM".

Properly connect or repair the signaling system's wiring.

EAS00796

CHECKING THE SIGNALING SYSTEM

1. The horn fails to sound.

1. Horn switch

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

↓ YES

↓ NO

Replace the left handlebar switch.



2. Voltage

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

Positive tester probe → black/white ①
Negative tester probe → ground

- Turn the main switch to "ON".
- Push the horn switch.
- Measure the voltage (DC 12 V) of black/white at the horn terminal.
- Is the voltage within specification?

↓ YES ↓ NO

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

3. Horn

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

↓ YES ↓ NO

The horn is OK.

Replace the horn.

EAS00797
2. The tail/brake light fails to come on.

1. Tail/brake light bulb and socket

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

↓ YES ↓ NO

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

2. Brake light switches

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

↓ YES ↓ NO

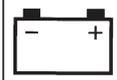
Replace the brake light switch.

3. Voltage

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

Positive tester probe → yellow ①
Negative tester probe → black ②

- Turn 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

This circuit is OK.

↓ NO

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

- Turn the main switch to “ON”.
- Measure the voltage (DC 12 V) on brown ① at the turn signal relay coupler (wire harness side).
- Is the voltage within specification?

↓ YES

↓ NO

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

EAS00799

3. The turn signal/position light, turn signal indicator light or both fail to blink.

1. Turn signal indicator light (LEDs)

- Check the turn signal indicator light for continuity. Refer to “CHECKING THE LEDs”.
- Are the turn signal indicator light OK?

↓ YES

↓ NO

Replace the meter assembly.

2. Turn signal switch

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

↓ YES

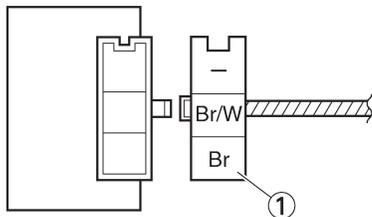
↓ NO

Replace the left handlebar switch.

3. Voltage

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

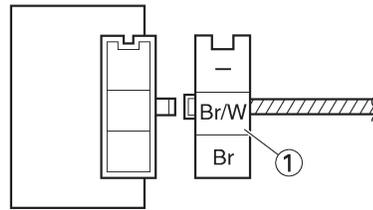
Positive tester probe → brown ①
Negative tester probe → ground



4. Voltage

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

Positive tester probe → brown/white ①
Negative tester probe → ground



- Turn the main switch to “ON”.
- Measure the voltage (DC 12 V) on brown/white ① at the turn signal relay coupler (wire harness side).
- Is the voltage within specification?

↓ YES

↓ NO

The turn signal relay is faulty and must be replaced.



5. Voltage

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

- A Left turn signal light
- B Right turn signal light
- C Turn signal indicator light

Left turn signal/position light

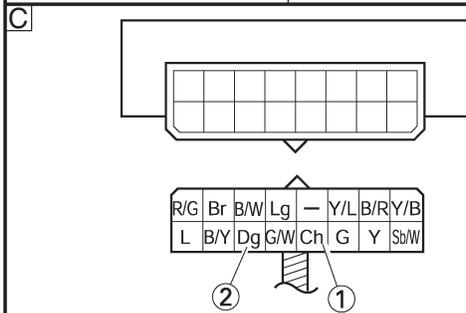
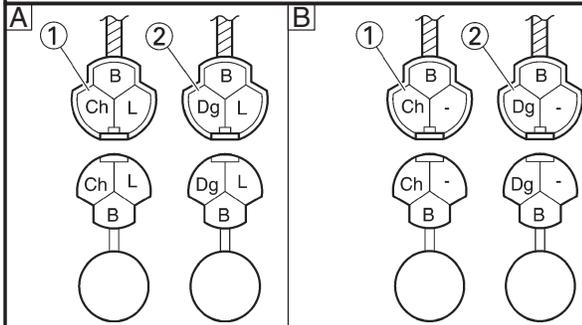
Positive tester probe → chocolate ①

Negative tester probe → ground

Right turn signal/position light

Positive tester probe → dark green ②

Negative tester probe → ground



- Turn the main switch to “ON”.
- Set the turn signal switch to “←” or “→”.
- Measure the voltage (DC 12 V) of the chocolate ① or dark green ② at the turn signal light connector (wire harness side).
- Is the voltage within specification?



This circuit is OK.



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

EAS00801

4. The neutral indicator light fails to come on.

1. Neutral indicator light (LEDs)

- Check the neutral indicator light for continuity. Refer to “CHECKING THE LEDs”.
- Are the neutral indicator light OK?



Replace the meter assembly.

2. Neutral switch

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



Replace the neutral switch.

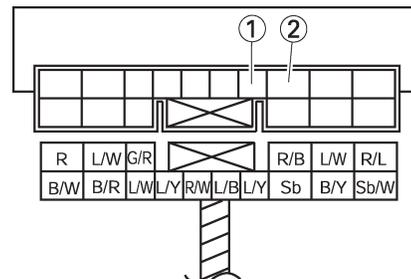
EAS00753

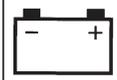
3. Starting circuit cut-off relay (diode)

- Disconnect the starting circuit cut-off relay coupler from the wire harness.
- Connect the pocket tester ($\Omega \times 1$) to the starting circuit cut-off relay coupler as shown.
- Check the starting circuit cut-off relay for continuity.

Positive tester probe → blue/yellow ①
 Negative tester probe → sky blue ②
Continuity

Positive tester probe → sky blue ②
 Negative tester probe → blue/yellow ①
No continuity





NOTE:

When you switch the positive and negative tester probes, the readings in the above chart will be reversed.

• Are the tester readings correct?

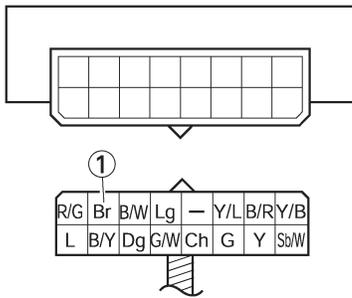


Replace the starting circuit cut-off relay.

4. Voltage

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

Positive tester probe → brown ①
Negative tester probe → ground



• Turn the main switch to “ON”.
 • Measure the voltage (DC 12 V) of brown ① at the meter assembly coupler (wire harness side).
 • Is the voltage within specification?



This circuit is OK.

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

EAS00802

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

1. Oil level warning light (LEDs)

• Check the oil level warning light for continuity.
 When the main switch is turned to “ON”, the oil level warning light is come on.
 • Are the oil level warning light OK?

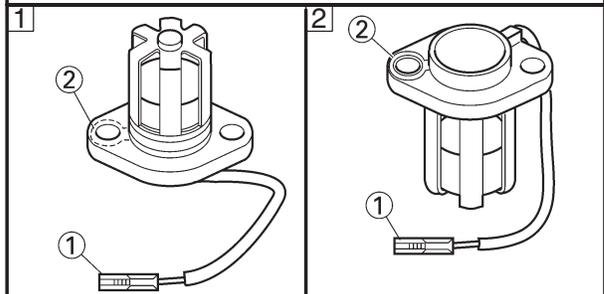


Replace the meter assembly.

2. Oil level switch

• Drain the engine oil and remove the oil level switch from the oil pan.
 • Connect the pocket tester ($\Omega \times 100$) to the oil level switch as shown.

Positive tester probe → Connector ① (white)
Negative tester probe → Body ground ②



• Measure the oil level switch resistance.



Oil level switch resistance

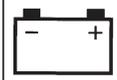
① 114 ~ 126 Ω at 20°C (68°F)

② 484 ~ 536 Ω at 20°C (68°F)

• Is the oil level switch OK?



Replace the oil level switch.



3. Voltage

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

Positive tester probe → black/red ①
Negative tester probe → black/white ②

• Turn the main switch to "ON".
 • Measure the voltage (DC 12V) of black/red ① and black/white ② at the meter assembly coupler.
 • Is the voltage within specification?

↓ YES ↓ NO

This circuit is OK.

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

EAS00803
 6. The fuel level warning light fails to come on.

1. Fuel sender

- Drain the fuel from the fuel tank and remove the fuel pump from the fuel tank.
- Disconnect the fuel sender coupler from the wire harness.
- Connect the pocket tester ($\Omega \times 10$) to the fuel sender terminals as shown.

Positive tester probe → green/white ①
Negative tester probe → black ②

- Measure the fuel sender resistances.

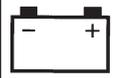
NOTE: _____
 Measure the resistances when the float arm is in contact with the full position and empty position of the stopper.

Fuel sender resistance
Full position of the float
 20 ~ 26 Ω at 20°C (68°F)
Empty position of the float
 134 ~ 140 Ω at 20°C (68°F)

- Is the fuel sender OK?

↓ YES ↓ NO

Replace the fuel pump.



2. Voltage

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

Positive tester probe → green/white ①
Negative tester probe → black/white ②

- Turn the main switch to “ON”.
- Measure the voltage (DC 12 V) of green/white ① and black/white ② at the meter assembly coupler.
- Is the voltage within specification?

↓ YES ↓ NO

This circuit is OK.

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

2. Speed sensor

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

Positive tester probe → white/yellow ①
Negative tester probe → black/blue ②

- Set the main switch to “ON”.
- Elevate the rear wheel and slowly rotate it.
- Measure the voltage (DC 5 V) of white/yellow and blue. With each full rotation of the rear wheel, the voltage reading should cycle from 0.6 V to 4.8 V to 0.6 V to 4.8 V.
- Does the voltage reading cycle correctly?

↓ YES ↓ NO

This circuit is OK.

Replace the speed sensor.

EAS00806
 7. The speedometer fails to come on.

1. Multi-function meter bulb socket

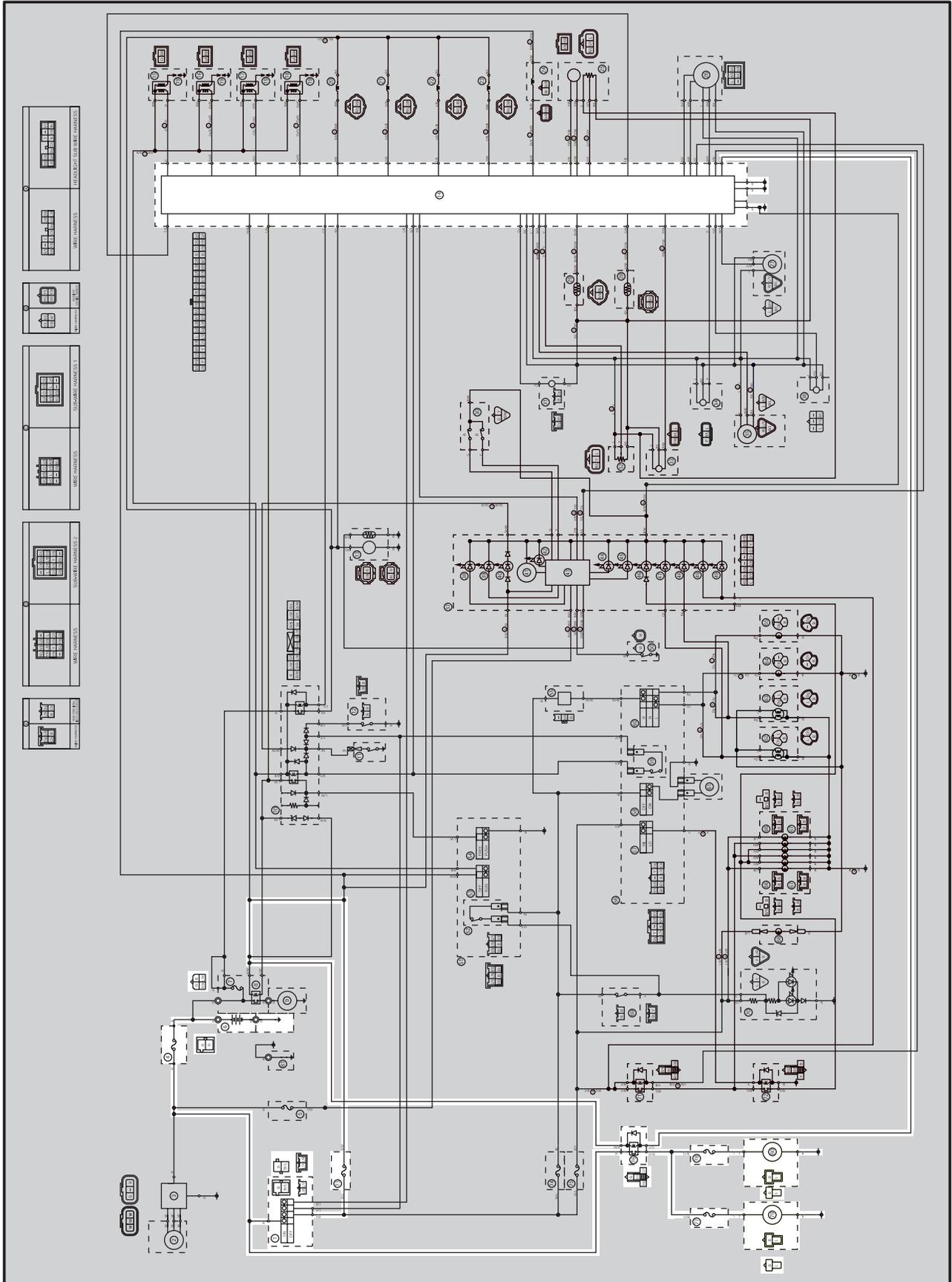
- Check the multi-function meter bulb socket for continuity. Refer to “CHECKING THE BULBS AND BULB SOCKETS”.
- Is the multi-function meter bulb socket OK?

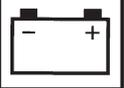
↓ YES ↓ NO

Replace the multi-function meter.

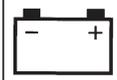
EAS00807

COOLING SYSTEM CIRCUIT DIAGRAM





- ① Main switch
- ④ Fuse (main)
- ⑥ Battery
- ⑭ E.C.U.
- ⑳ Coolant temperature sensor
- ㉓ Fuse (ignition)
- ㉖ Radiator fan motor relay
- ㉗ Fuse (radiator fan motor left)
- ㉘ Fuse (radiator fan motor right)
- ㉙ Radiator fan motor 2
- ㉚ Radiator fan motor 1



EAS00808

TROUBLESHOOTING

- The radiator fan motor fails to turn.
- The coolant temperature indicator light fails to light when the engine is warm.

Check:

1. main, ignition, and radiator fan motor fuses
2. battery
3. main switch
4. radiator fan motor
5. radiator fan motor relay
6. coolant temperature sensor
7. wiring connections
(the entire cooling system)

NOTE:

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



Pocket tester
90890-03112, YU-3112

EAS00738

1. Main, ignition and radiator fan motor fuses
 - Check the main, ignition and radiator fan motor fuses for continuity. Refer to “CHECKING THE FUSES” in chapter 3.
 - Are the main, ignition and radiator fan motor fuses OK?

↓ YES

↓ NO

Replace the fuse(s).

EAS00739

2. Battery

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



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

- Is the battery OK?

↓ YES

↓ NO

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

EAS00749

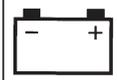
3. Main switch

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

↓ YES

↓ NO

Replace the main switch.



EAS00809

4. Radiator fan motor

- Disconnect the radiator fan motor coupler from the wire harness.
- Connect the battery (DC 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

- Disconnect 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 terminal as shown.
- Check the radiator fan motor for continuity.

Battery positive terminal → red/white ①
Battery negative terminal → green/yellow ②

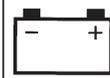
Tester positive probe → red ③
Tester negative probe → brown/green ④

- Does the radiator fan motor relay have continuity between red and brown/green?

↓ YES

↓ NO

Replace the radiator fan motor relay.



EAS00812

6. Coolant temperature sensor

- Remove the coolant temperature sensor.
- Connect the pocket tester ($\Omega \times 1k$) 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.



Coolant temperature sensor resistance

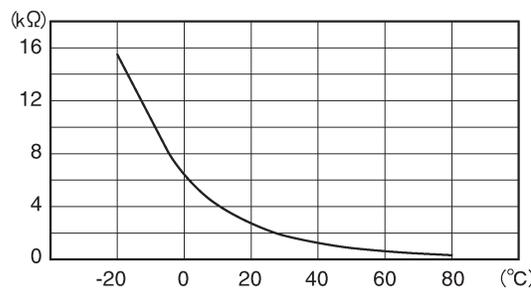
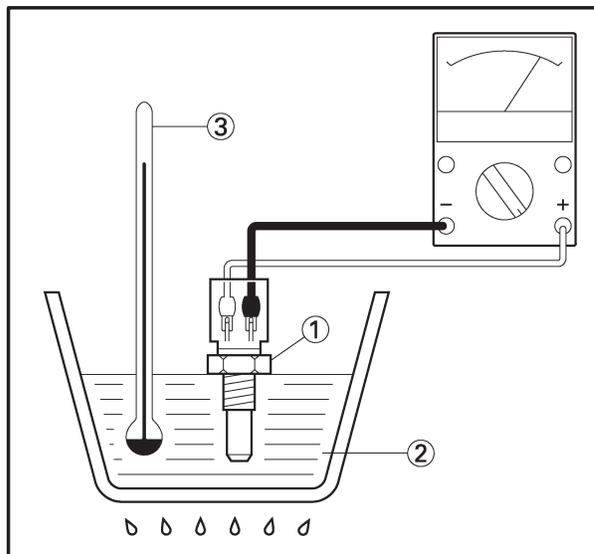
0°C (32°F): 5.21 ~ 6.37 k Ω
 80°C (176°F): 0.29 ~ 0.35 k Ω

⚠ 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
 20 Nm (2.0 m•kg, 14 ft•lb)
 Three bond sealock®10



• Does the coolant temperature sensor operate properly?

↓ YES

↓ NO

Replace the coolant temperature sensor.

EAS00813

7. Wiring

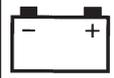
- Check the entire cooling system's wiring. Refer to "CIRCUIT DIAGRAM".
- Is the cooling system's wiring properly connected and without defects?

↓ YES

↓ NO

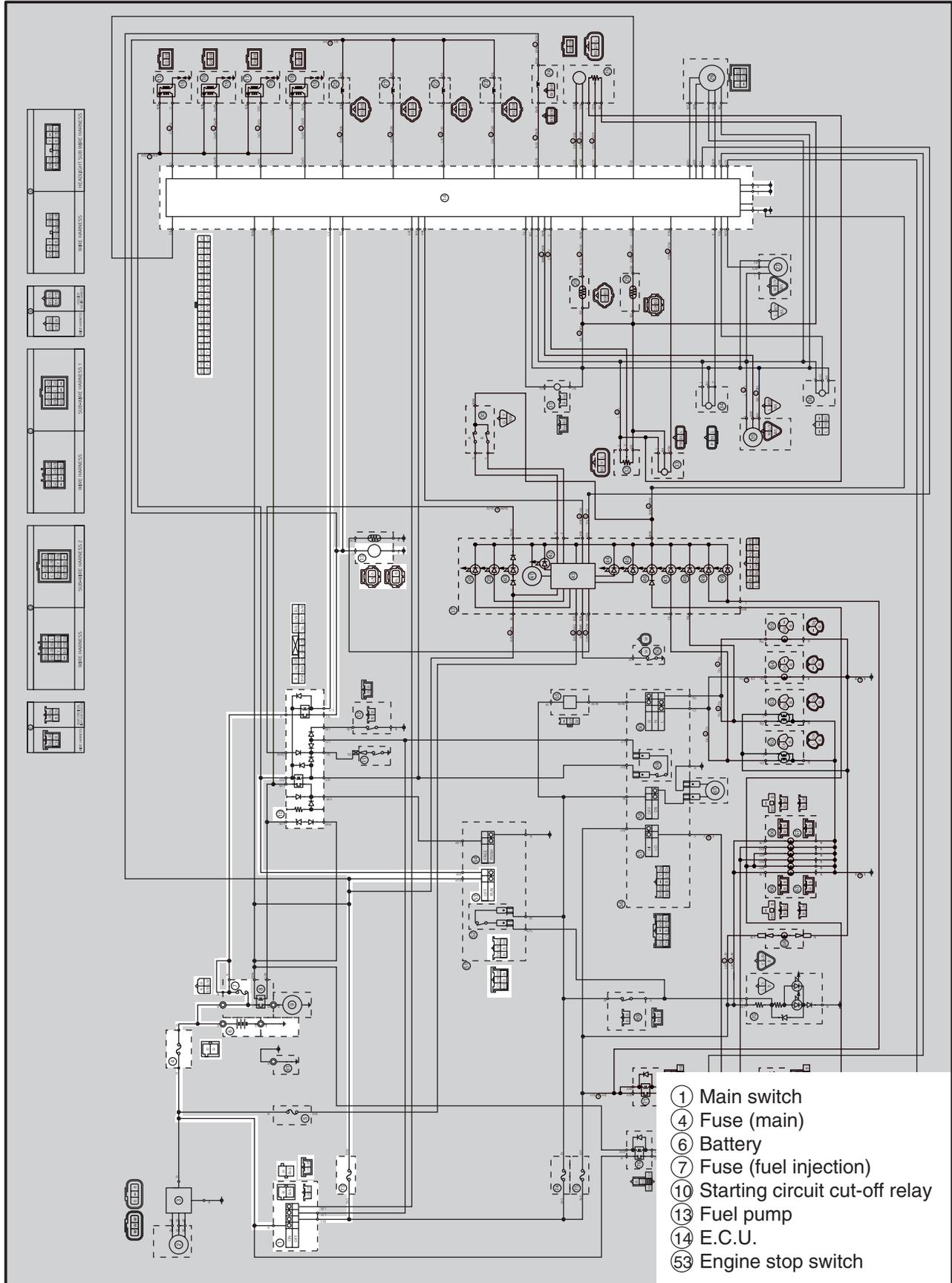
This circuit is OK.

Properly connect or repair the cooling system's wiring.

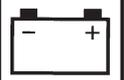


EAS00814

**FUEL PUMP SYSTEM
CIRCUIT DIAGRAM**



- ① Main switch
- ④ Fuse (main)
- ⑥ Battery
- ⑦ Fuse (fuel injection)
- ⑩ Starting circuit cut-off relay
- ⑬ Fuel pump
- ⑭ E.C.U.
- ⑤③ Engine stop switch

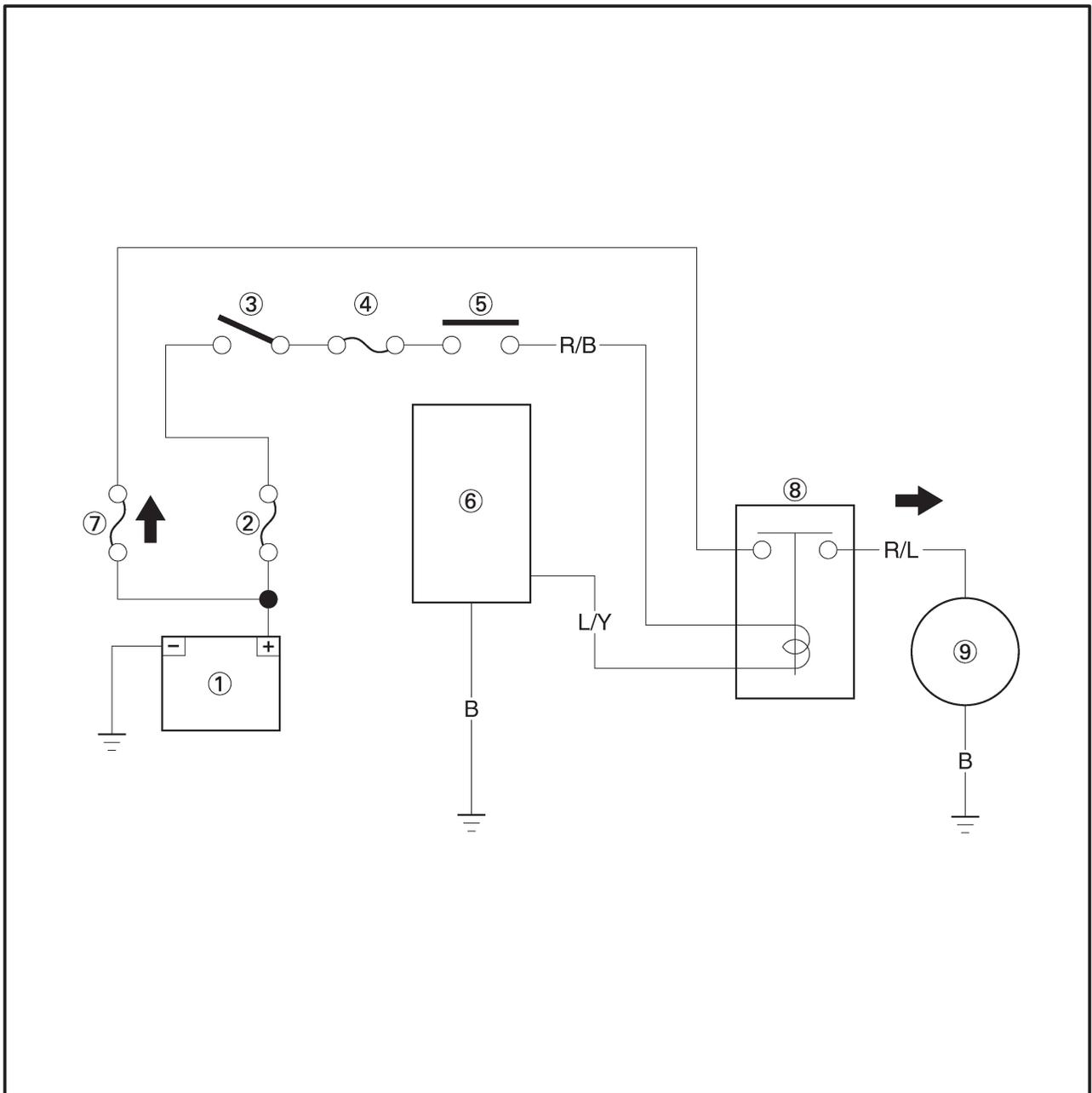


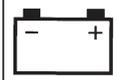
EAS00815

FUEL PUMP SYSTEM

The ECU includes the control unit for the fuel pump.

- ① Battery
- ② Fuse (main)
- ③ Main switch
- ④ Fuse (ignition)
- ⑤ Engine stop switch
- ⑥ ECU
- ⑦ Fuse (fuel injection)
- ⑧ Starting circuit cut-off relay (fuel injection system relay)
- ⑨ Fuel pump





EAS00816

TROUBLESHOOTING

If the fuel pump fails to operate.

Check:

1. main, ignition and fuel injection fuses
2. battery
3. main switch
4. engine stop switch
5. starting circuit cut-off relay
(the fuel injection system relay)
6. fuel pump
7. wiring connections
(the entire fuel system)

NOTE:

- Before troubleshooting, remove the following part(s):

1. seat
2. fuel tank
3. side cowlings

Troubleshoot with the following special tool(s).



Pocket tester
90890-03112, YU-3112

EAS00738

1. Main, ignition and fuel injection system fuses

- Check the main, ignition and fuel system fuses for continuity. Refer to "CHECKING THE FUSES" in chapter 3.

- Are the main, ignition and fuel injection system fuses OK?

↓ YES

↓ NO

Replace the fuse(s).

EAS00739

2. Battery

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



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

- Is the battery OK?

↓ YES

↓ NO

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

EAS00749

3. Main switch

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

- Is the main switch OK?

↓ YES

↓ NO

Replace the main switch.

EAS00750

4. Engine stop switch

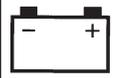
- Check the engine stop switch for continuity. Refer to "CHECKING THE SWITCHES".

- Is the engine stop switch OK?

↓ YES

↓ NO

Replace the right handlebar switch.



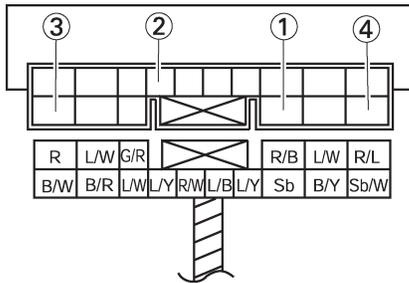
EAS00759

5. Starting circuit cut-off relay (fuel injection system relay)

- Disconnect the starting circuit cut-off relay coupler from the wire harness.
- Connect the pocket tester ($\Omega \times 1$) and battery (12 V) to the starting circuit cut-off relay coupler as shown.

Positive battery lead → red/black ①
Negative battery lead → blue/yellow ②

Positive tester probe → red ③
Negative tester probe → red/blue ④



- Does the starting circuit cut-off relay have continuity between red and red/blue?

↓ YES

↓ NO

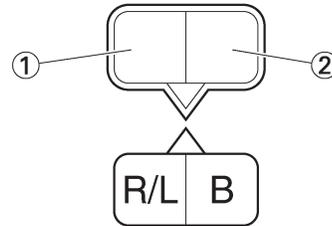
Replace the starting circuit cut-off relay.

EAS00817

6. Fuel pump resistance

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

Positive tester probe → red/blue ①
Negative tester probe → black ②



- Measure the fuel pump resistance.



Fuel pump resistance
 0.2 ~ 3.0 Ω at 20°C (68°F)

- Is the fuel pump OK?

↓ YES

↓ NO

Replace the fuel pump.

EAS00818

7. Wiring

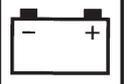
- Check the entire fuel pump system's wiring. Refer to "CIRCUIT DIAGRAM".
- Is the fuel system's wiring properly connected and without defects?

↓ YES

↓ NO

Replace the ECU.

Properly connect or repair the fuel system's wiring.



SELF-DIAGNOSIS

The YZF-R1(S) features a self-diagnosing system for the following circuit(-s):

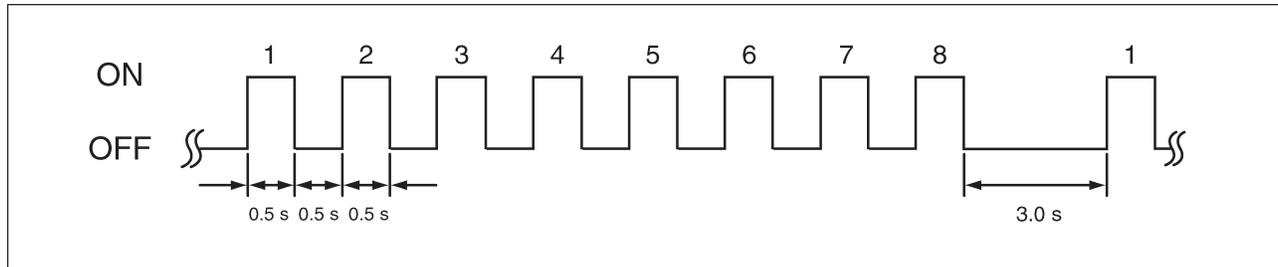
- Fuel pump thermistor
- Oil level switch

If any of these circuits are defective, their respective condition codes will be displayed on the warning light when the main switch is turned “ON” (irrespective of whether the engine is running or not).

Circuit	Defect(-s)	System response	Condition code
Fuel pump thermistor	<ul style="list-style-type: none"> • Open-circuit • Short-circuit 	• The fuel level warning light indicate the condition code.	Refer to *1
Oil level switch	<ul style="list-style-type: none"> • Open-circuit • Short-circuit 	• The oil level warning light indicate the condition code.	Refer to *2

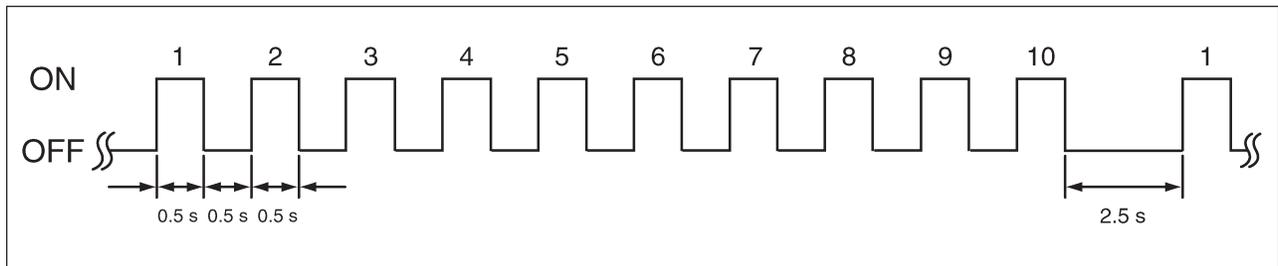
*1 Condition code

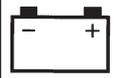
Fuel level warning light



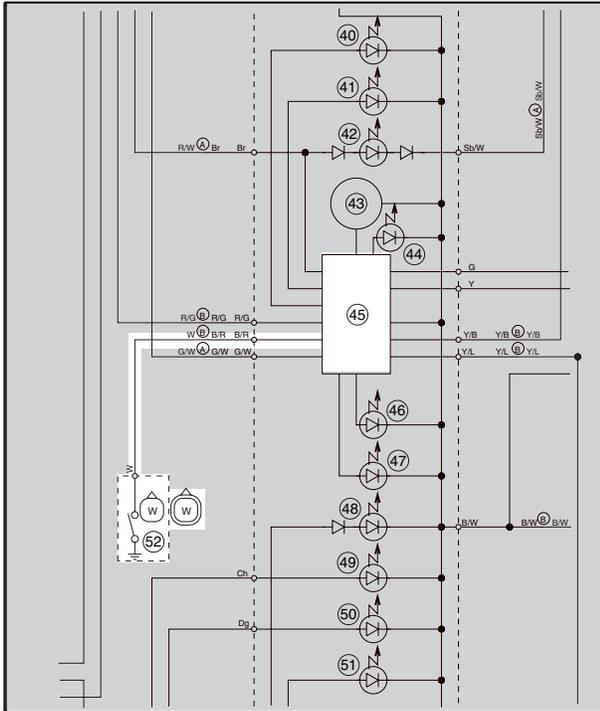
*2 Condition code

Oil level warning light





2. Oil level switch
CIRCUIT DIAGRAM



- ④⑤ Multi-function meter
- ⑤② Oil level switch

2. Oil level switch

- Check the oil level switch for continuity. Refer to “The oil level warning light fails to come on”.
- Is the oil level switch OK?



Replace the multi-function meter.

Replace the oil level switch.

1. Wire harness

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



Repair or replace the wire harness.

TROUBLESHOOTING

NOTE:

The following guide for troubleshooting does not cover all the possible causes of trouble. It should be helpful, however, as a guide to basic troubleshooting. Refer to the relative procedure in this manual for checks, adjustments, and replacement of parts.

STARTING FAILURES

ENGINE

Cylinder(s) and cylinder head(s)

- Loose spark plug
- Loose cylinder head or cylinder
- Damaged cylinder head gasket
- Damaged cylinder gasket
- Worn or damaged cylinder
- Incorrect valve clearance
- Improperly sealed valve
- Incorrect valve-to-valve-seat contact
- Incorrect valve timing
- Faulty valve spring
- Seized valve

Piston(s) and piston ring(s)

- Improperly installed piston ring
- Damaged, worn or fatigued piston ring
- Seized piston ring
- Seized or damaged piston

Air filter

- Improperly installed air filter
- Clogged air filter element

Crankcase and crankshaft

- Improperly assembled crankcase
- Seized crankshaft

ELECTRICAL SYSTEMS

Battery

- Discharged battery
- Faulty battery

Fuse(s)

- Blown, damaged or incorrect fuse
- Improperly installed fuse

Spark plug(s)

- Incorrect spark plug gap
- Incorrect spark plug heat range
- Fouled spark plug
- Worn or damaged electrode
- Worn or damaged insulator

FUEL SYSTEM

Fuel tank

- Empty fuel tank
- Clogged fuel filter
- Clogged fuel strainer
- Clogged fuel tank drain hose
- Deteriorated or contaminated fuel

Fuel pump

- Faulty fuel pump
- Faulty fuel pump relay

Throttle body (-ies)

- Deteriorated or contaminated fuel
- Sucked-in air

Ignition coil(s)

- Cracked or broken ignition coil body
- Broken or shorted primary or secondary coils

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 sidestand switch
- Faulty clutch switch
- Improperly grounded circuit
- Loose connections

Starting system

- Faulty starter motor
- Faulty starter relay
- Faulty starting circuit cut-off relay
- Faulty starter clutch

EAS00846

**INCORRECT ENGINE IDLING SPEED
ENGINE**

Cylinder(s) and cylinder head(s)

- Incorrect valve clearance
- Damaged valve train components

Air filter

- Clogged air filter element

FUEL SYSTEM

Throttle body (-ies)

- Damaged or loose throttle body joint
- Improperly synchronized throttle bodies
- Improperly adjusted engine idling speed (idle adjusting screw)
- Improper throttle cable free play
- Flooded throttle body
- Faulty air induction system

ELECTRICAL SYSTEMS

Battery

- Discharged battery
- Faulty battery

Spark plug(s)

- Incorrect spark plug gap
- Incorrect spark plug heat range
- Fouled spark plug
- Worn or damaged electrode
- Worn or damaged insulator

Ignition coil(s)

- Broken or shorted primary or secondary coils
- Cracked or broken ignition coil

Ignition system

- Faulty ECU
- Faulty crankshaft position sensor

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POOR MEDIUM-AND-HIGH-SPEED PERFORMANCE

Refer to "STARTING FAILURES".

ENGINE

Air filter

- Clogged air filter element

FUEL SYSTEM

Fuel pump

- Faulty fuel pump

EAS00850

FAULTY GEAR SHIFTING

SHIFTING IS DIFFICULT

Refer to "CLUTCH DRAGS".

SHIFT PEDAL DOES NOT MOVE

Shift shaft

- Improperly adjusted shift rod
- Bent shift shaft.

Shift drum and shift forks

- Foreign object in a shift drum groove
- Seized shift fork
- Bent shift fork guide bar

Transmission

- Seized transmission gear
- Foreign object between transmission gears
- Improperly assembled transmission

JUMPS OUT OF GEAR

Shift shaft

- Incorrect shift pedal position
- Improperly returned stopper lever

Shift forks

- Worn shift fork

Shift drum

- Incorrect axial play
- Worn shift drum groove

Transmission

- Worn gear dog

EAS00851

FAULTY CLUTCH

CLUTCH SLIPS

Clutch

- Improperly assembled clutch
- Improperly adjusted clutch cable
- Loose or fatigued clutch spring
- Worn friction plate
- Worn clutch plate

Engine oil

- Incorrect oil level
- Incorrect oil viscosity (low)
- Deteriorated oil

CLUTCH DRAGS

Clutch

- Unevenly tensioned clutch springs
- Warped pressure plate
- Bent clutch plate
- Swollen friction plate
- Bent clutch pull rod
- Broken clutch boss
- Burnt primary driven gear bushing
- Match marks not aligned

Engine oil

- Incorrect oil level
- Incorrect oil viscosity (high)
- Deteriorated oil

EAS00855

OVERHEATING

ENGINE

Clogged coolant passages

- Cylinder head(s) and piston(s)
- Heavy carbon buildup

Engine oil

- Incorrect oil level
- Incorrect oil viscosity
- Inferior oil quality

COOLING SYSTEM

Coolant

- Low coolant level

Radiator

- Damaged or leaking radiator
- Faulty radiator cap
- Bent or damaged radiator fin

Water pump

- Damaged or faulty water pump
- Thermostat
- Thermostat stays closed
- Oil cooler
- Clogged or damaged oil cooler
- Hose(s) and pipe(s)
- Damaged hose
- Improperly connected hose
- Damaged pipe
- Improperly connected pipe

FUEL SYSTEM

Throttle body (-ies)

- Damaged or loose throttle body joint

Air filter

- Clogged air filter element

CHASSIS

Brake(s)

- Dragging brake

ELECTRICAL SYSTEMS

Spark plug(s)

- Incorrect spark plug gap
- Incorrect spark plug heat range

Ignition system

- Faulty E.C.U.

EAS00856

OVERCOOLING

COOLING SYSTEM

Thermostat

- Thermostat stays open

EAS00857

POOR BRAKING PERFORMANCE

- Worn brake pad
- Worn brake disc
- Air in hydraulic brake system
- Leaking brake fluid
- Faulty brake caliper kit
- Faulty brake caliper seal

- Loose union bolt
- Damaged brake hose
- Oil or grease on the brake disc
- Oil or grease on the brake pad
- Incorrect brake fluid level

EAS00861

FAULTY FRONT FORK LEGS

LEAKING OIL

- Bent, damaged or rusty inner tube
- Cracked or damaged outer tube
- Improperly installed oil seal
- Damaged oil seal lip
- Incorrect oil level (high)
- Loose damper rod assembly bolt
- Damaged damper rod assembly bolt copper washer
- Cracked or damaged cap bolt O-ring

MALFUNCTION

- Bent or damaged inner tube
- Bent or damaged outer tube
- Damaged fork spring
- Worn or damaged outer tube bushing
- Bent or damaged damper rod
- Incorrect oil viscosity
- Incorrect oil level

EAS00863

UNSTABLE HANDLING

Handlebars

- Bent or improperly installed right handlebar
- Bent or improperly installed left handlebar

Steering head components

- Improperly installed upper bracket
- Improperly installed under bracket (improperly tightened ring nut)
- Bent steering stem
- Damaged ball bearing or bearing race

Front fork leg(s)

- Uneven oil levels (both front fork legs)
- Unevenly tensioned fork spring (both front fork legs)
- Broken fork spring
- Bent or damaged inner tube
- Bent or damaged outer tube

Swingarm

- Worn bearing or bushing
- Bent or damaged swingarm

Rear shock absorber assembly(-ies)

- Faulty rear shock absorber spring
- Leaking oil or gas

Tire(s)

- Uneven tire pressures (front and rear)
- Incorrect tire pressure
- Uneven tire wear

Wheel(s)

- Incorrect wheel balance
- Deformed cast wheel
- Damaged wheel bearing
- Bent or loose wheel axle
- Excessive wheel runout

Frame

- Bent frame
- Damaged steering head pipe
- Improperly installed bearing race

EAS00866

FAULTY LIGHTING OR SIGNALING SYSTEM

HEADLIGHT DOES NOT COME ON

- Wrong headlight bulb
- Too many electrical accessories
- Hard charging
- Incorrect connection
- Improperly grounded circuit
- Poor contacts (main or light switch)
- Burnt-out headlight bulb

HEADLIGHT BULB BURNT OUT

- Wrong headlight bulb
- Faulty battery
- Faulty rectifier/regulator
- Improperly grounded circuit
- Faulty main switch
- Faulty light switch
- Headlight bulb life expired

TAIL/BRAKE LIGHT DOES NOT COME ON

- Too many electrical accessories
- Incorrect connection

TAIL/BRAKE LIGHT BULB BURNT OUT

- Faulty battery
- Incorrectly adjusted rear brake light switch

TURN SIGNAL DOES NOT COME ON

- Faulty turn signal switch
- Faulty turn signal relay
- Burnt-out turn signal bulb
- Incorrect connection
- Damaged or faulty wire harness
- Improperly grounded circuit
- Faulty battery
- Blown, damaged or incorrect fuse

TURN SIGNAL BLINKS SLOWLY

- Faulty turn signal relay
- Faulty main switch
- Faulty turn signal switch
- Incorrect turn signal bulb

TURN SIGNAL REMAINS LIT

- Faulty turn signal relay
- Burnt-out turn signal bulb

TURN SIGNAL BLINKS QUICKLY

- Incorrect turn signal bulb
- Faulty turn signal relay
- Burnt-out turn signal bulb

HORN DOES NOT SOUND

- Improperly adjusted horn
- Damaged or faulty horn
- Faulty main switch
- Faulty horn switch
- Faulty battery
- Blown, damaged or incorrect fuse
- Faulty wire harness

YZF-R1S/YZF-R1SC WIRING DIAGRAM

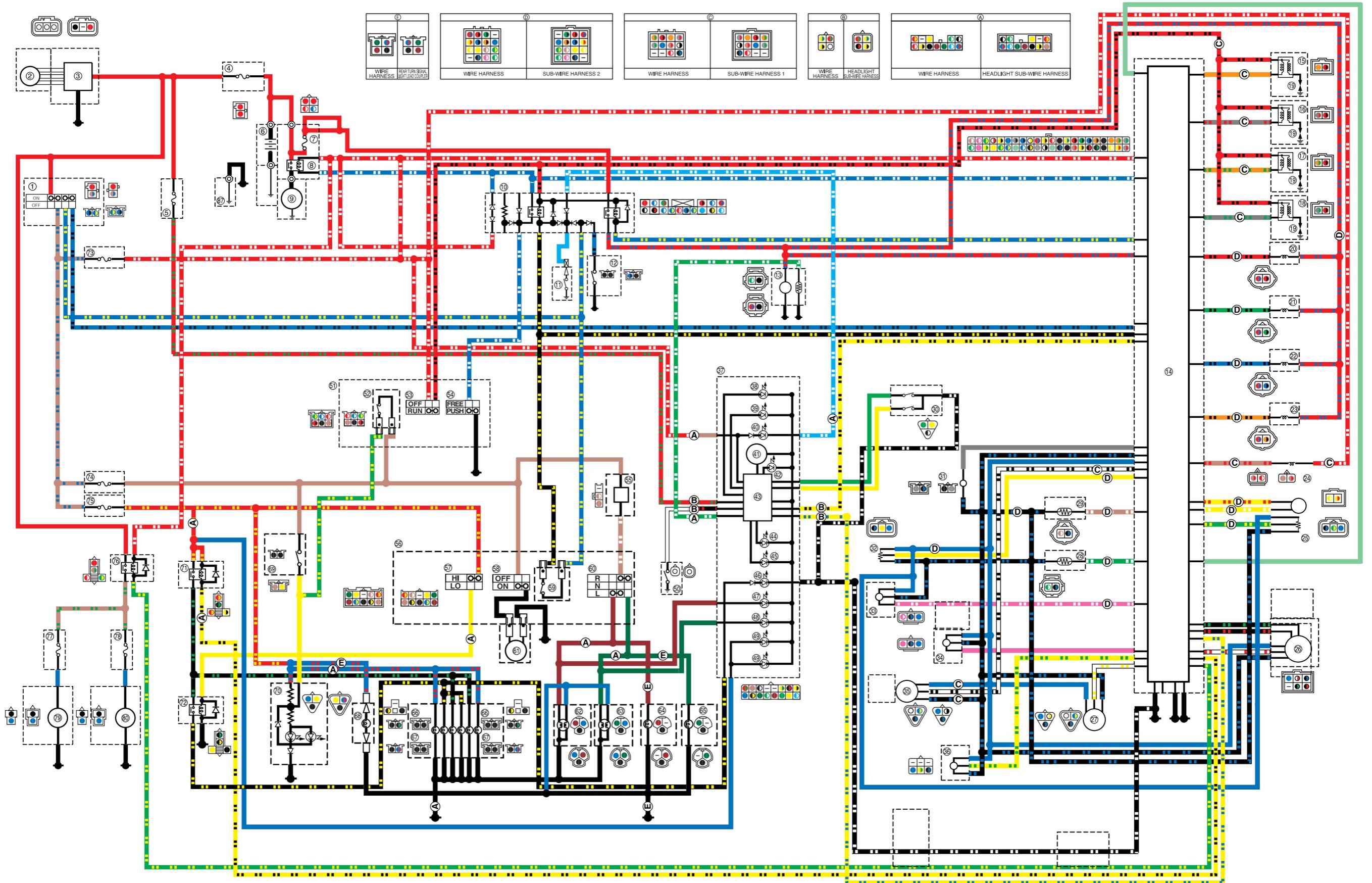
- ① Main switch
- ② A.C. magneto
- ③ Rectifier/regulator
- ④ Fuse (main)
- ⑤ Fuse (backup)
- ⑥ Battery
- ⑦ Fuse (fuel injection)
- ⑧ Starter relay
- ⑨ Starter motor
- ⑩ Starting circuit cut-off relay
- ⑪ Neutral switch
- ⑫ Sidestand switch
- ⑬ Fuel pump
- ⑭ E.C.U
- ⑮ Ignition coil #1
- ⑯ Ignition coil #2
- ⑰ Ignition coil #3
- ⑱ Ignition coil #4
- ⑲ Spark plug
- ⑳ Injector #1
- ㉑ Injector #2
- ㉒ Injector #3
- ㉓ Injector #4
- ㉔ Air induction system solenoid
- ㉕ Sub-throttle position sensor
- ㉖ EXUP servo motor
- ㉗ Speed sensor
- ㉘ Coolant temperature sensor
- ㉙ Intake air temperature sensor
- ㉚ Option switch
- ㉛ Crankshaft position sensor
- ㉜ Throttle position sensor
- ㉝ Intake air pressure sensor
- ㉞ Atmospheric pressure sensor
- ㉟ Cylinder identification sensor
- ⓪ Lean angle cut-off switch
- ⓫ Meter assembly
- ⓬ Fuel level warning light
- ⓭ Oil level warning light
- ⓮ Neutral indicator light
- ⓯ Tacho meter
- ⓰ Shift timing indicator light
- ⓱ Multi function meter
- ⓲ Engine trouble warning light
- ⓳ Coolant temperature indicator light
- ⓴ Hi beam indicator light
- ⓵ Turn signal indicator light (left)
- ⓶ Turn signal indicator light (light)
- ⓷ Meter light
- ⓸ Oil level switch
- ⓹ Right handlebar switch
- ⓺ Front brake light switch
- ⓻ Engine stop switch
- ⓼ Start switch
- ⓽ Turn signal relay
- ⓾ Left handlebar switch
- ⓿ Dimmer switch
- ⓿ Horn switch

- ⑤⑨ Clutch switch
- ⑥⑩ Turn signal switch
- ⑥① Horn
- ⑥② Front turn signal/position light (left)
- ⑥③ Front turn signal/position light (right)
- ⑥④ Rear turn signal light (left)
- ⑥⑤ Rear turn signal light (right)
- ⑥⑥ Headlight
- ⑥⑦ Auxiliary light
- ⑥⑧ License plate light
- ⑥⑨ Rear brake light switch
- ⑦⑩ Tail/brake light
- ⑦① Headlight relay (on/off)
- ⑦② Headlight relay (dimmer)
- ⑦③ Fuse (ignition)
- ⑦④ Fuse (signal)
- ⑦⑤ Fuse (headlight)
- ⑦⑥ Radiator fan motor relay
- ⑦⑦ Fuse (radiator fan motor left)
- ⑦⑧ Fuse (radiator fan motor light)
- ⑦⑨ Radiator fan motor 2
- ⑧⑩ Radiator fan motor 1
- ⑧① Ground

COLOR CODE

B	Black	G/Y ..	Green/Yellow
Br	Brown	Gy/B .	Gray/Black
Ch . . .	Chocolate	Gy/G .	Gray/Green
Dg . . .	Dark green	Gy/R .	Gray/Red
G	Green	L/B ...	Blue/Black
Gy . . .	Gray	L/R ..	Blue/Red
L	Blue	L/W ..	Blue/White
Lg	Light green	L/Y ...	Blue/Yellow
O	Orange	O/B ..	Orange/Black
P	Pink	O/G ..	Orange/Green
R	Red	P/W ..	Pink/White
Sb	Sky blue	R/B ..	Red/Black
W	White	R/G ..	Red/Green
Y	Yellow	R/L ..	Red/Blue
B/G ..	Black/Green	R/W ..	Red/White
B/L ...	Black/Blue	R/Y ..	Red/Yellow
B/R ..	Black/Red	Sb/W .	Sky blue/White
B/W ..	Black/White	W/B ..	White/Black
B/Y ..	Black/Yellow	W/R ..	White/Red
Br/G .	Brown/Green	W/Y ..	White/Yellow
Br/L ..	Brown/Blue	Y/B ..	Yellow/Black
Br/R ..	Brown/Red	Y/G ..	Yellow/Green
Br/W .	Brown/White	Y/L ...	Yellow/Blue
G/B ..	Green/Black	Y/R ..	Yellow/Red
G/R ..	Green/Red	Y/W ..	Yellow/White
G/W ..	Green/White		

YZF-R1S/ YZF-R1SC WIRING DIAGRAM



COLOR CODE

● Black	● Gray	● Red	● Black/Blue	● Brown/Blue	● Green/Yellow	● Blue/White	● Red/Black	● Sky blue/White	● Yellow/Green
● Brown	● Blue	● Sky blue	● Black/Red	● Brown/Red	● Gray/Green	● Blue/Yellow	● Red/Green	● White/Black	● Yellow/Blue
● Chocolate	● Light green	● White	● Black/White	● Brown/White	● Gray/Red	● Orange/Black	● Red/Blue	● White/Red	● Yellow/Red
● Dark green	● Orange	● Yellow	● Black/Yellow	● Green/Black	● Blue/Black	● Orange/Green	● Red/White	● White/Yellow	● Yellow/White
● Green	● Pink	● Black/Green	● Brown/Green	● Green/White	● Blue/Red	● Pink/White	● Red/Yellow	● Yellow/Black	



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