YAMAHA 2009-2012

SERVICE MANUAL

XJ6S(Y)
XJ6SA

DIVERSION

36C-28197-E0

EAS20040

XJ6S(Y)
XJ6SA
SERVICE MANUAL
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EAS20071

IMPORTANT

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.

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.

TIP

Designs and specifications are subject to change without notice.

EAS20081

IMPORTANT MANUAL INFORMATION

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

⚠	**This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.**

⚠ WARNING	**A WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.**

NOTICE	**A NOTICE indicates special precautions that must be taken to avoid damage to the vehicle or other property.**

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

EAS20090

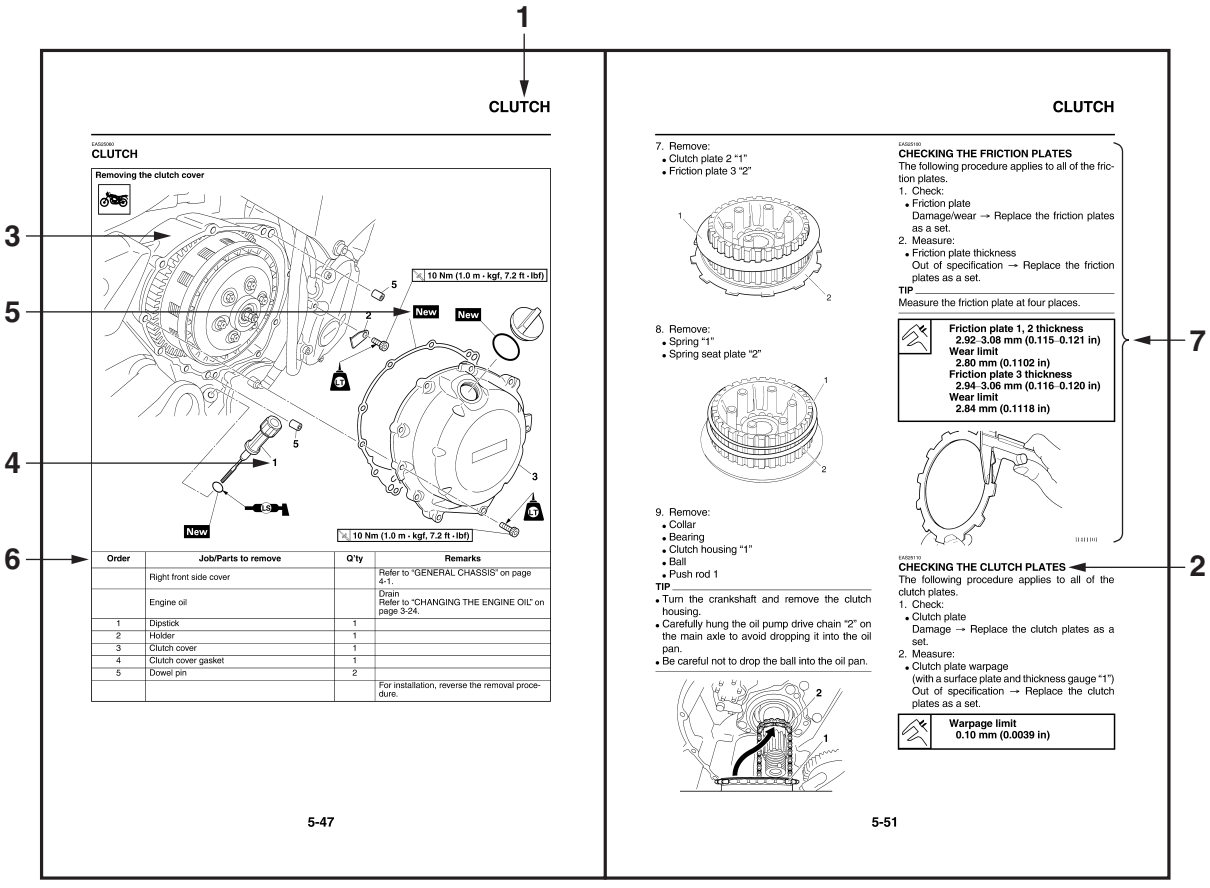
HOW TO USE THIS MANUAL

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.

- The manual is divided into chapters and each chapter is divided into sections. The current section title is shown at the top of each page “1”.
- Sub-section titles appear in smaller print than the section title “2”.
- To help identify parts and clarify procedure steps, there are exploded diagrams at the start of each removal and disassembly section “3”.
- Numbers are given in the order of the jobs in the exploded diagram. A number indicates a disassembly step “4”.
- Symbols indicate parts to be lubricated or replaced “5”.

Refer to “SYMBOLS”.

- A job instruction chart accompanies the exploded diagram, providing the order of jobs, names of parts, notes in jobs, etc “6”.
- Jobs requiring more information (such as special tools and technical data) are described sequentially “7”.



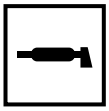
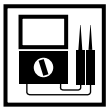
EAS20100

SYMBOLS

The following symbols are used in this manual for easier understanding.

TIP

The following symbols are not relevant to every vehicle.

SYMBOL	DEFINITION	SYMBOL	DEFINITION
	Serviceable with engine mounted		Gear oil
	Filling fluid		Molybdenum disulfide oil
	Lubricant		Brake fluid
	Special tool		Wheel bearing grease
	Tightening torque		Lithium-soap-based grease
	Wear limit, clearance		Molybdenum disulfide grease
	Engine speed		Silicone grease
	Electrical data		Apply locking agent (LOCTITE®).
	Engine oil	New	Replace the part with a new one.

EAS20110

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PERIODIC CHECKS AND ADJUSTMENTS 3

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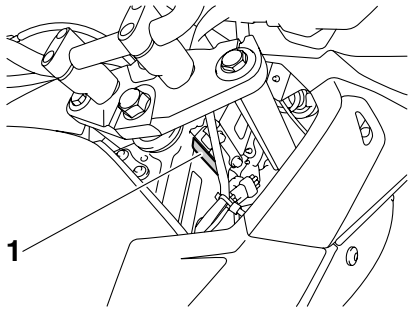
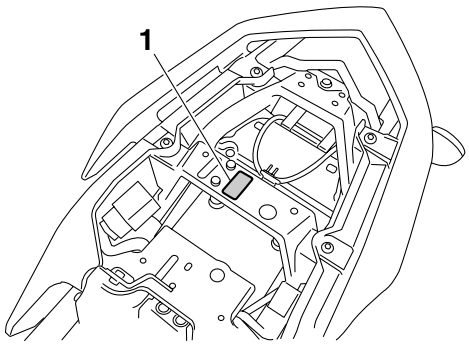
EAS20130
IDENTIFICATION

EAS20140
VEHICLE IDENTIFICATION NUMBER
The vehicle identification number “1” is stamped into the right side of the steering head pipe.



EAS20150
MODEL LABEL
The model label “1” is affixed to the frame. This information will be needed to order spare parts.



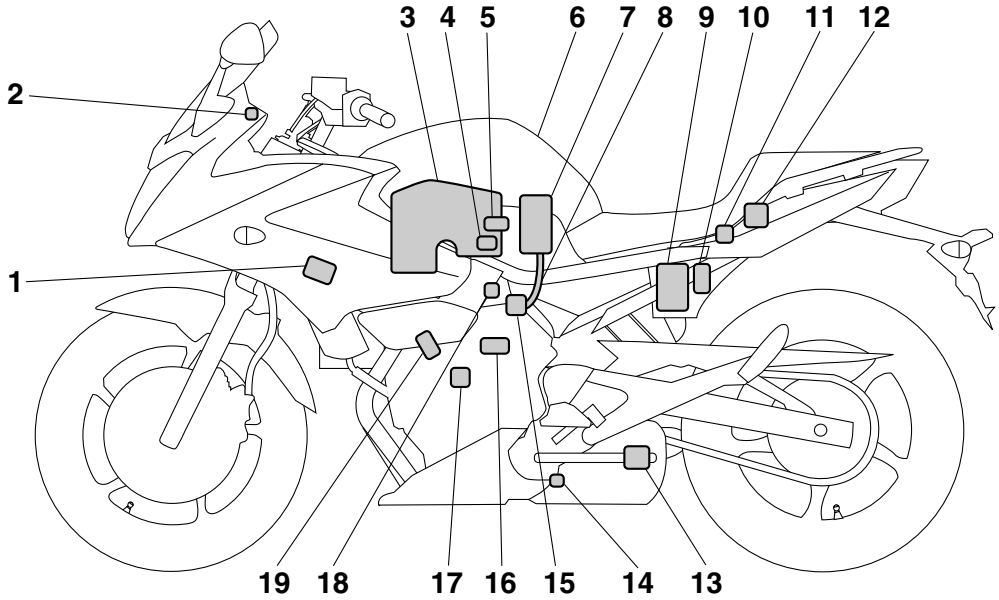
EAS20170
FEATURES

EAS4B51038
OUTLINE OF FI SYSTEM

The main function of a fuel supply system is to provide fuel to the combustion chamber at the optimum air-fuel ratio in accordance with the engine operating conditions. In a conventional carburetor system, the air-fuel ratio of the mixture that is supplied to the combustion chamber is created by the volume of the intake air and the fuel that is metered by the jet used in the respective chamber. Despite the same volume of intake air, the fuel volume requirement varies with the engine operating conditions, such as acceleration, deceleration, or operation under a heavy load. Carburetors that meter the fuel through the use of jets have been provided with various auxiliary devices, so that an optimum air-fuel ratio can be achieved to accommodate the constant changes in the operating conditions of the engine.

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

Adoption of the FI system has resulted in a highly precise fuel supply, improved engine response, better fuel economy, and reduced exhaust emissions. Furthermore, the air induction system (AI system) has been placed under computer control together with the FI system in order to realize cleaner exhaust gases.



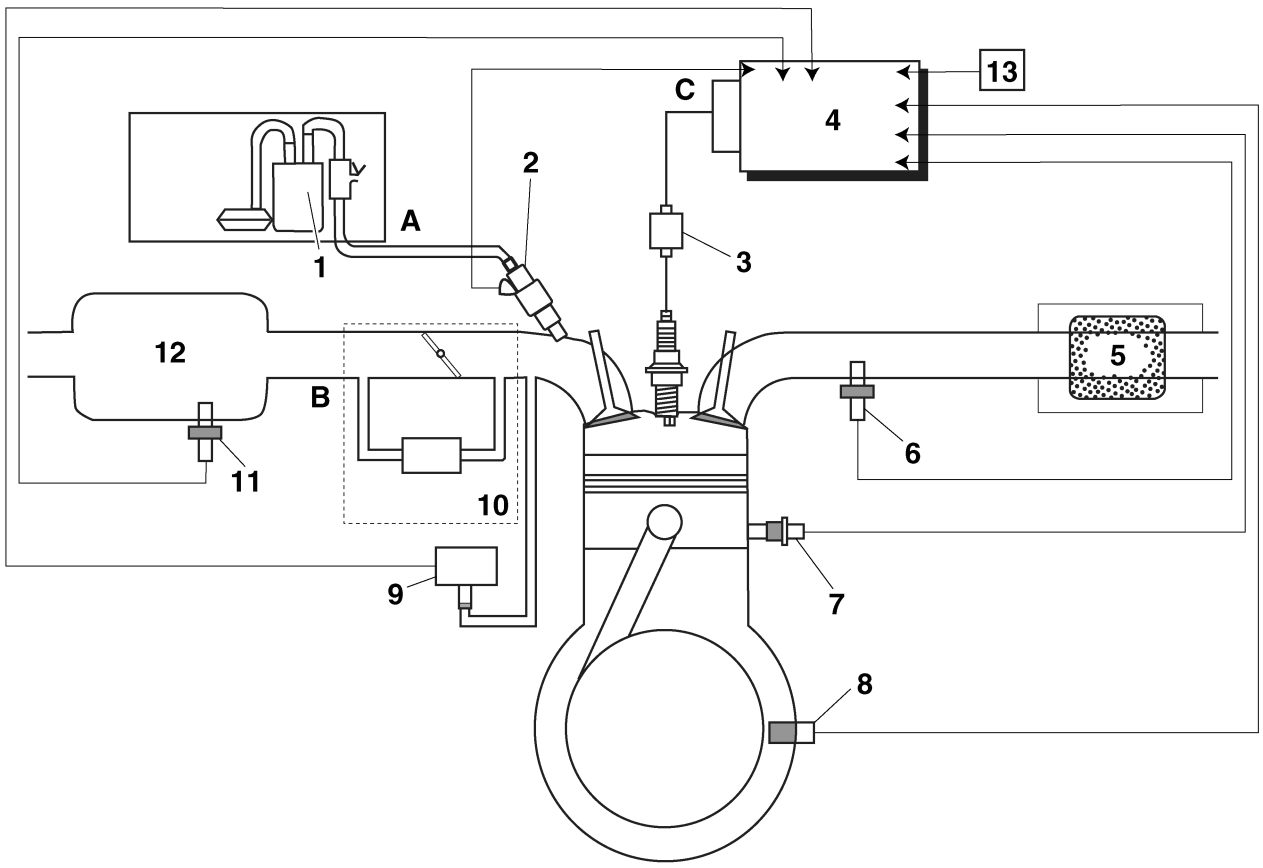
1. Ignition coil
2. Engine trouble warning light
3. Air filter case
4. Intake air pressure sensor
5. Intake air temperature sensor
6. Fuel tank
7. Fuel pump
8. Fuel hose
9. Battery
10. ECU (engine control unit)
11. Lean angle sensor
12. Relay unit
13. Catalyst
14. O_2 sensor
15. Fuel injector
16. Coolant temperature sensor
17. Crankshaft position sensor
18. Throttle position sensor
19. Spark plug

EAS4B51039
FI SYSTEM

The fuel pump delivers fuel to the fuel injector via the fuel filter. The pressure regulator (in the fuel pump) maintains the fuel pressure that is applied to the fuel injector at 245–255 kPa (2.45–2.55 kgf/cm^2, 35.5–37.0 psi) higher than the intake manifold pressure. Accordingly, when the energizing signal from the ECU (engine control unit) energizes the fuel injector, the fuel passage opens, causing the fuel to be injected into the intake manifold only during the time the passage remains open. Therefore, the longer the length of time the fuel injector is energized (injection duration), the greater the volume of fuel that is supplied. Conversely, the shorter the length of time the fuel injector is energized (injection duration), the lesser the volume of fuel that is supplied.

The injection duration and the injection timing are controlled by the ECU (engine control unit). Signals that are input from the throttle position sensor, crankshaft position sensor, intake air pressure sensor, intake air temperature sensor, coolant temperature sensor, and O_2 sensor enable the ECU (engine control unit) to determine the injection duration. The injection timing is determined through the signals from the crankshaft position sensor. As a result, the volume of fuel that is required by the engine can be supplied at all times in accordance with the driving conditions.

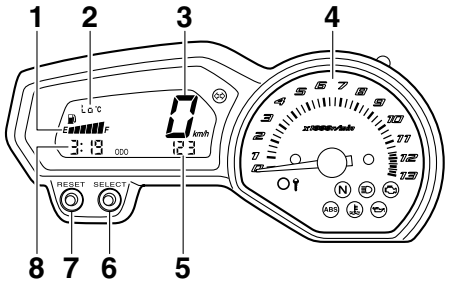
Illustration is for reference only.



1. Fuel pump
2. Fuel injector
3. Ignition coil
4. ECU (engine control unit)
5. Catalyst
6. O_2 sensor
7. Coolant temperature sensor
8. Crankshaft position sensor
9. Intake air pressure sensor
10. Throttle body
11. Intake air temperature sensor
12. Air filter case
13. Throttle position sensor

A. Fuel system
B. Air system
C. Control system

EAS20S1001
INSTRUMENT FUNCTIONS
Multi-function meter unit



1. Fuel meter
2. Coolant temperature display
3. Speedometer
4. Tachometer
5. Odometer/tripmeter/fuel reserve tripmeter
6. “SELECT” button
7. “RESET” button
8. Clock

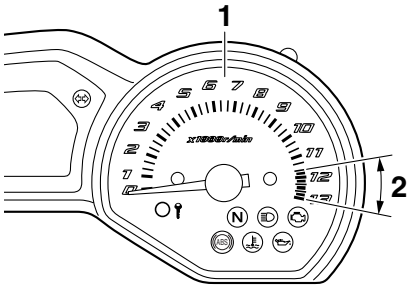
EWA20S1001
⚠ WARNING

Be sure to stop the vehicle before making any setting changes to the multi-function meter unit. Changing settings while riding can distract the operator and increase the risk of an accident.

The multi-function meter unit is equipped with the following:
- a speedometer
- a tachometer
- an odometer
- 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 left segment of the fuel meter started flashing)
- a clock
- a fuel meter
- a coolant temperature display
- a self-diagnosis device

TIP
- Be sure to turn the key to “ON” before using the “SELECT” and “RESET” buttons.
- For the U.K. only: To switch the speedometer and odometer/tripmeter displays between kilometers and miles, press the “SELECT” button for at least one second.

Tachometer



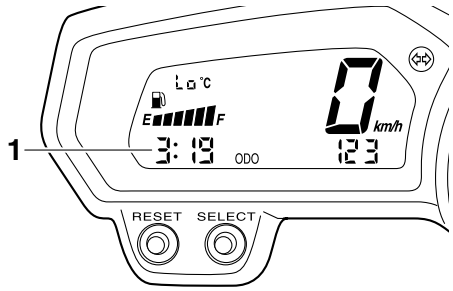
1. Tachometer
2. Tachometer red zone

The electric tachometer allows the rider to monitor the engine speed and keep it within the ideal power range.
When the key is turned to “ON”, the tachometer needle will sweep once across the r/min range and then return to zero r/min in order to test the electrical circuit.

ECA20S1006
NOTICE

Do not operate the engine in the tachometer red zone.
Red zone:11666 r/min and above

Clock

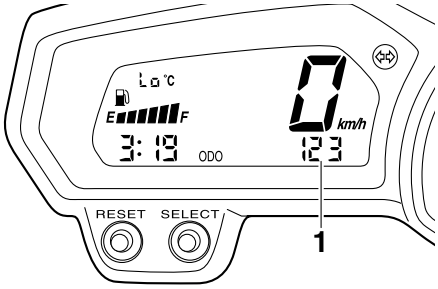


1. Clock

The clock displays when the key is turned to “ON”. In addition, the clock can be displayed for 10 seconds by pushing the “SELECT” button when the main switch is in the “OFF”, “LOCK” or “P≷” position.

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

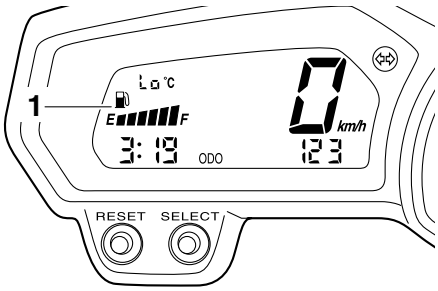
Odometer and tripmeter modes



1. Odometer/tripmeter/fuel reserve tripmeter

Push the "SELECT" button to switch the display between the odometer mode "ODO" and the tripmeter modes "TRIP A" and "TRIP B" in the following order:
TRIP A → TRIP B → ODO → TRIP A
When the fuel amount in the fuel tank decreases to 3.2 L (0.85 US gal, 0.70 Imp.gal), the left segment of the fuel meter will start flashing, and 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 and odometer modes in the following order:
F-TRIP → 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).

Fuel meter



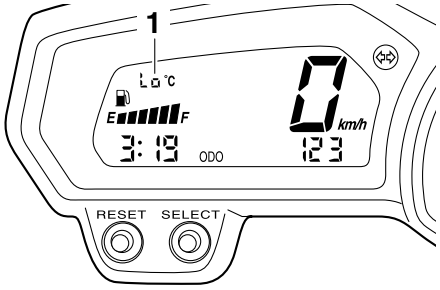
1. Fuel meter

The fuel meter indicates the amount of fuel in the fuel tank. The display segments of the fuel meter disappear towards "E" (Empty) as the fuel level decreases. When the last segment on the left starts flashing, refuel as soon as possible.

TIP

This fuel meter is equipped with a self-diagnosis system. If a problem is detected in the electrical circuit, the following cycle is repeated until the malfunction is corrected: fuel level segments and symbol "⛽" flash eight times, then go off for approximately 3 seconds. If this occurs, check the electrical circuit. Refer to "SIGNALING SYSTEM" on page 8-27.

Coolant temperature mode



1. Coolant temperature display

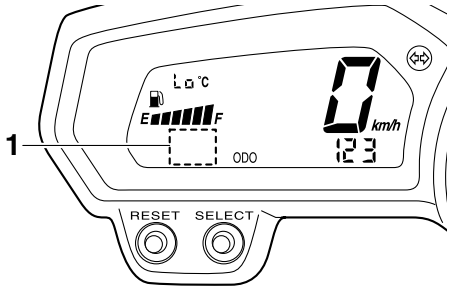
The coolant temperature display indicates the temperature of the coolant.

ECA20S1007

NOTICE

Do not continue to operate the engine if it is overheating.

Self-diagnosis device



1. Error code display

This model is equipped with a self-diagnosis device for various electrical circuits.
If a problem is detected in any of those circuits, the engine trouble warning light will come on and the display will indicate an error code.
The self-diagnosis device also detects problems in the immobilizer system circuits.
If a problem is detected in the immobilizer system circuits, the immobilizer system indicator light will flash and the display will indicate an error code.

TIP

If the display indicates error code 52, this could be caused by transponder interference. If this error code appears, try the following.

1. Use the code re-registering key to start the engine.

TIP

Make sure there are no other immobilizer keys close to the main switch, and do not keep more than one immobilizer key on the same key ring! Immobilizer system keys may cause signal interference, which may prevent the engine from starting.

2. If the engine starts, turn it off and try starting the engine with the standard keys.
3. If one or both of the standard keys do not start the engine, re-register the standard keys.

If the display indicates any error codes, note the code number, and then check the vehicle.

ECA20S1008

NOTICE

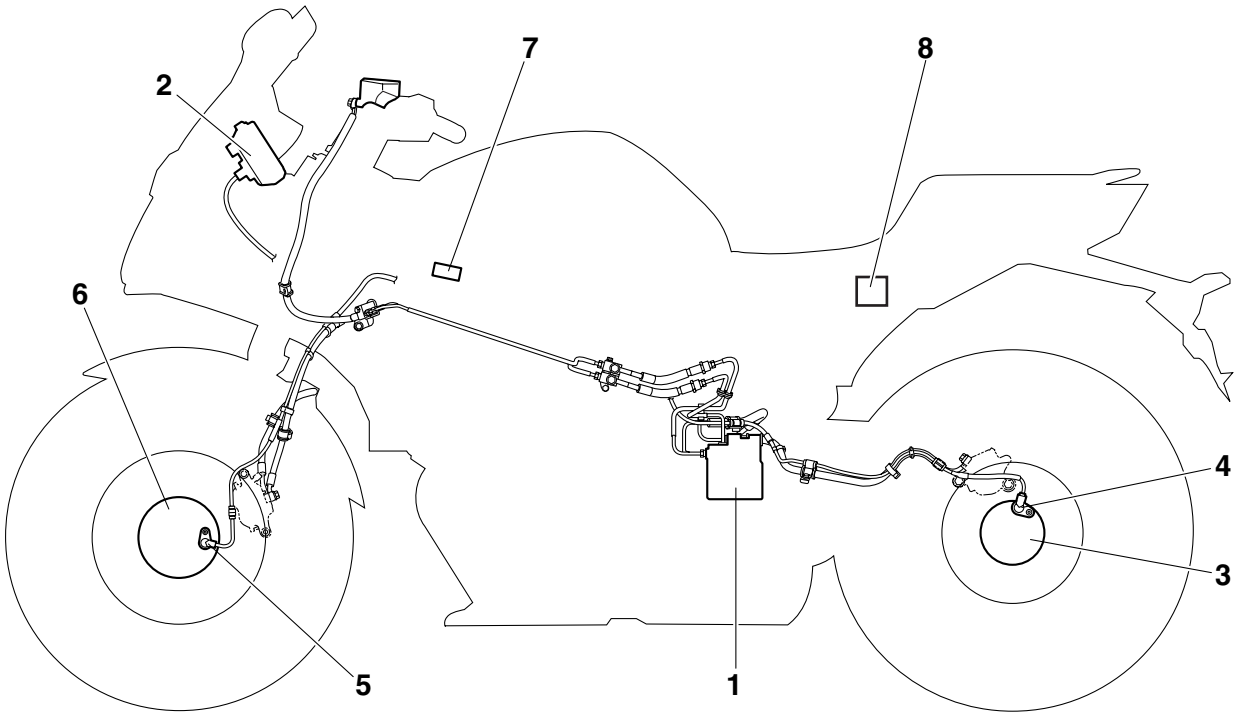
If the display indicates an error code, the vehicle should be checked as soon as possible in order to avoid engine damage.

EAS4B56001

OUTLINE OF THE ABS

1. The Yamaha ABS (anti-lock brake system) features an electronic control system, which acts on the front and rear brakes independently.
2. The ABS features a compact and lightweight design to help maintain the basic maneuverability of the vehicle.
3. The hydraulic unit assembly, which is the main component of the ABS, is centrally located on the vehicle to increase mass centralization.

ABS layout



1. Hydraulic unit assembly (ABS ECU)
2. ABS warning light
3. Rear wheel sensor rotor
4. Rear wheel sensor
5. Front wheel sensor
6. Front wheel sensor rotor
7. ABS test coupler
8. Fuse box

ABS

The operation of the Yamaha ABS brakes is the same as conventional brakes on other vehicles, with a front brake lever for operating the front brake and a rear brake pedal for operating the rear brake. When wheel lock is detected during emergency braking, hydraulic control is performed by the hydraulic system on the front and rear brakes independently.

Useful terms

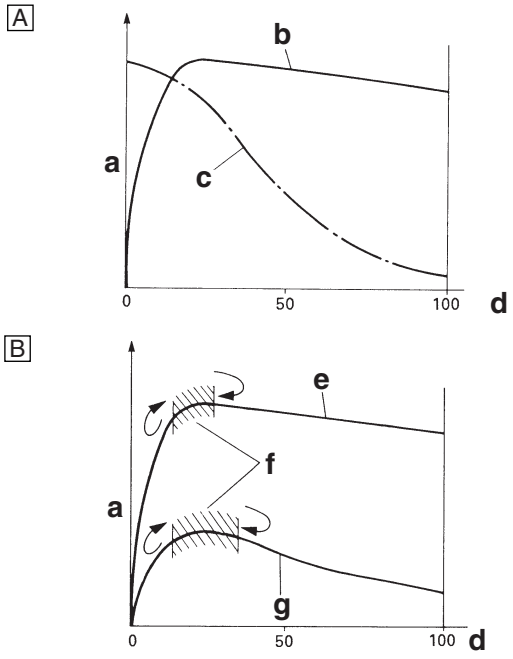
• Wheel speed:
The rotation speed of the front and rear wheels.
• Chassis speed:
The speed of the chassis.
When the brakes are applied, wheel speed and chassis speed are reduced. However, the chassis travels forward by its inertia even though the wheel speed is reduced.
• Brake force:
The force applied by braking to reduce the wheel speed.
• Wheel lock:
A condition that occurs when the rotation of one or both of the wheels has stopped, but the vehicle continues to travel.

• Side force:
The force on the tires which supports the vehicle when cornering.
• Slip ratio:
When the brakes are applied, slipping occurs between the tires and the road surface. This causes a difference between the wheel speed and the chassis speed.
Slip ratio is the value that shows the rate of wheel slippage and is defined by the following formula.

$$\text{Slip ratio} = \frac{\text{Chassis speed} - \text{Wheel speed}}{\text{Chassis speed}} \times 100\ (\%)$$

0%: There is no slipping between the wheel and the road surface. The chassis speed is equal to the wheel speed.
100%: The wheel speed is “0”, but the chassis is moving (i.e., wheel lock).

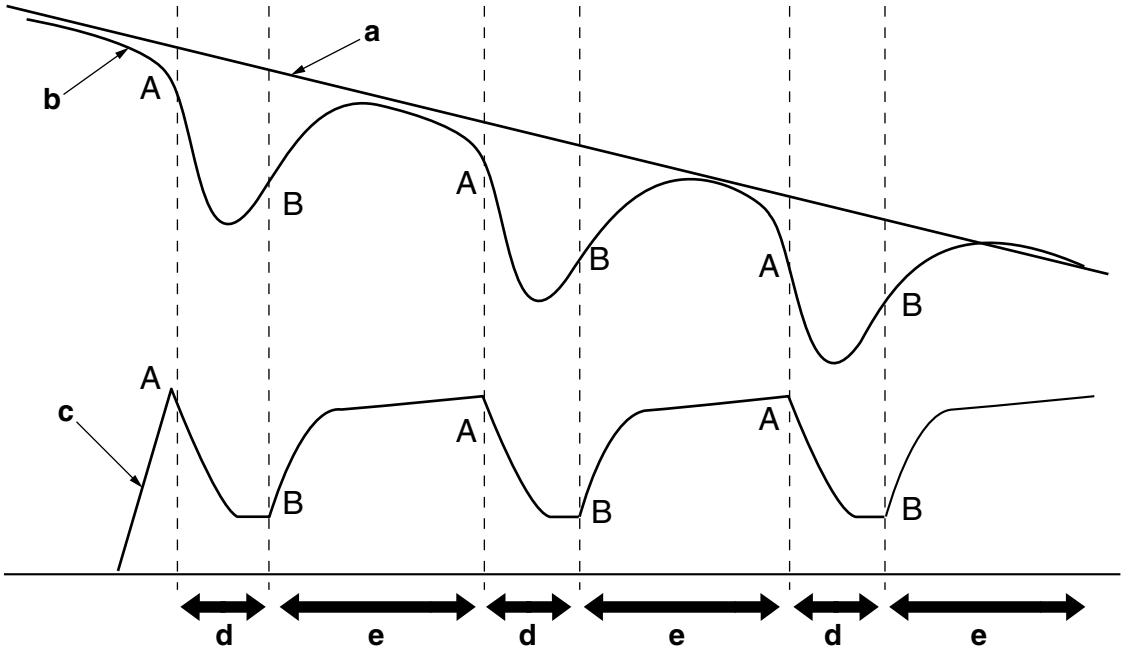
Brake force and vehicle stability
When the brake pressure is increased, wheel speed is reduced. Slipping occurs between the tire and the road surface and brake force is generated. The limit of this brake force is determined by the friction force between the tire and the road surface and is closely related to wheel slippage. Wheel slippage is represented by the slip ratio.
Side force is also closely related to wheel slippage. See figure “A”. If the brakes are applied while keeping the proper slip ratio, it is possible to obtain the maximum brake force without losing much side force. ABS allows full use of the tires’ capabilities even on slippery road surfaces or less slippery road surfaces. See figure “B”.



a. Friction force between the tire and road surface
b. Brake force
c. Side force
d. Slip ratio (%)
e. Less slippery road surface
f. Controlling zone
g. Slippery road surface

Wheel slip and hydraulic control
The ABS ECU calculates the wheel speed of each wheel according to the rotation signal received from the front and rear wheel sensors. In addition, the ABS ECU calculates the vehicle chassis speed and the rate of speed reduction based on the wheel speed values.

The difference between the chassis speed and the wheel speed calculated in the slip ratio formula is equal to the wheel slip. When the wheel speed is suddenly reduced, the wheel has a tendency to lock. When the wheel slip and the wheel speed reduction rate exceed the preset values, the ABS ECU determines that the wheel has a tendency to lock.
If the slip is large and the wheel has a tendency to lock (point A in the following figure), the ABS ECU reduces the brake fluid pressure in the brake caliper. Once the ABS ECU determines that the tendency of the wheel to lock has diminished after the brake fluid pressure is reduced, it increases the hydraulic pressure (point B in the following figure). The hydraulic pressure is initially increased quickly, and then it is increased gradually.



a. Chassis speed
b. Wheel speed
c. Brake force
d. Depressurizing phase
e. Pressurizing phase

ABS operation and vehicle control
If the ABS starts operating, there is a tendency of the wheel to lock, and the vehicle is approaching the limit of control. To make the rider aware of this condition, the ABS has been designed to generate a reaction-force pulsating action in the front brake lever and rear brake pedal independently.

TIP
When the ABS is activated, a pulsating action may be felt at the front brake lever or rear brake pedal, but this does not indicate a malfunction.

The higher the side force on a tire, the less traction there is available for braking. This is true whether the vehicle is equipped with ABS or not. Therefore, sudden braking while cornering is not recommended. Excessive side force, which ABS cannot prevent, could cause the tire to slip sideways.

EWA4B56003

⚠ WARNING

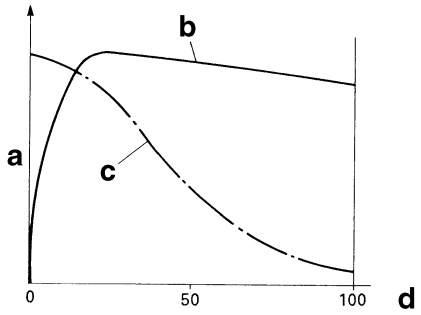
The braking of the vehicle, even in the worst case, is principally executed when the vehicle is advancing straight ahead. During a turn, sudden braking is liable to cause a loss of traction of the tires. Even in vehicles equipped with ABS, overturning of the vehicle cannot be prevented if it is braked suddenly.

The ABS functions to prevent the tendency of the wheel to lock by controlling the brake fluid pressure. However, if there is a tendency of the wheel to lock on a slippery road surface, due to engine braking, the ABS may not be able to prevent the wheel from locking.

EWA13870

⚠ WARNING

The ABS controls only the tendency of the wheel to lock caused by applying the brakes. The ABS cannot prevent wheel lock on slippery surfaces, such as ice, when it is caused by engine braking, even if the ABS is operating.

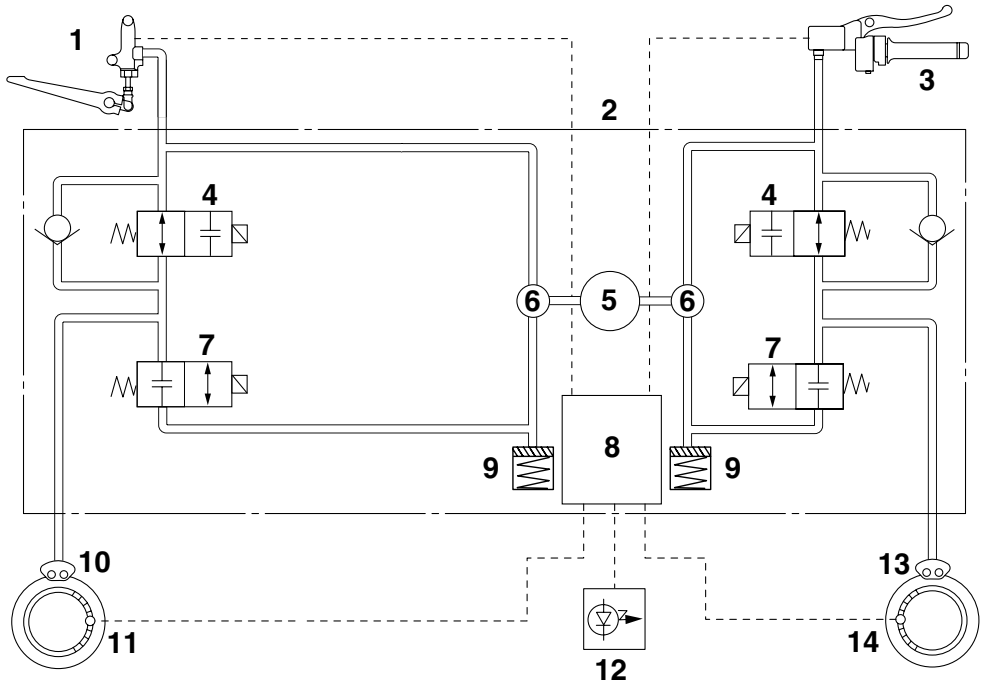


a. Friction force between the tire and road surface
b. Brake force
c. Side force
d. Slip ratio (%)

Electronic ABS features

The Yamaha ABS (anti-lock brake system) has been developed with the most advanced electronic technology.
The ABS control is processed with good response under various vehicle travel conditions.
The ABS also includes a highly developed self-diagnosis function. The ABS detects any problem condition and allows normal braking even if the ABS is not operating properly.
When this occurs, the ABS warning light on the meter assembly comes on.
The ABS stores the fault codes in the memory of the ABS ECU for easy problem identification and troubleshooting.

ABS block diagram

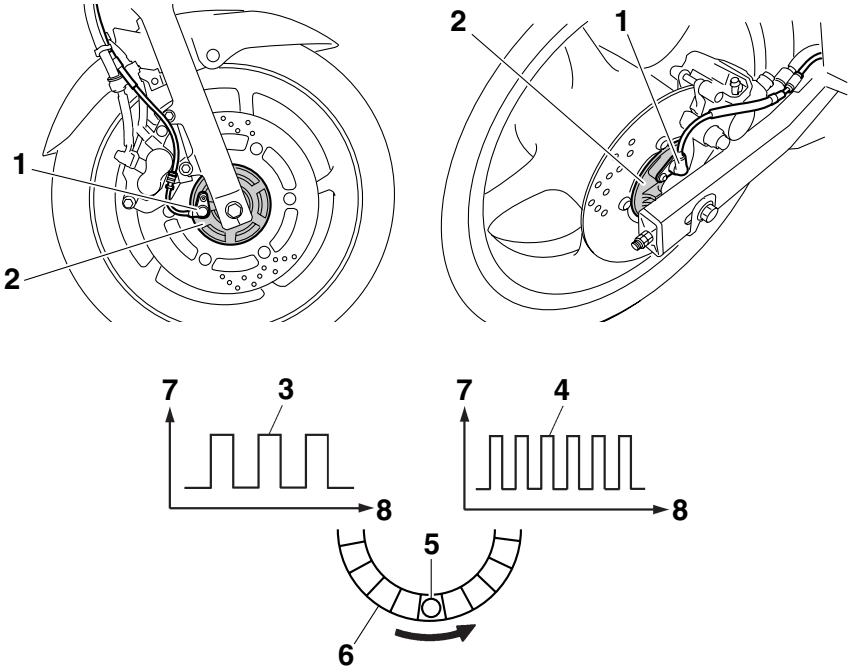


1. Rear brake master cylinder
2. Hydraulic unit assembly
3. Front brake master cylinder
4. Inlet solenoid valve
5. ABS motor
6. Hydraulic pump
7. Outlet solenoid valve
8. ABS ECU
9. Buffer chamber
10. Rear brake caliper
11. Rear wheel sensor
12. ABS warning light
13. Front brake caliper
14. Front wheel sensor

EAS4B56009
ABS COMPONENT FUNCTIONS

Wheel sensors and wheel sensor rotors

Wheel sensors “1” detect the wheel rotation speed and transmit the wheel rotation signal to the ABS ECU.
Each wheel sensor contains a Hall IC. The wheel sensors are installed in the sensor housing for each wheel.
Sensor rotors “2” are installed on the inner side of the front and rear wheel hubs and rotate with the wheels.
The front and rear sensor rotors each have 80 magnetic poles (40 pairs) and are installed close to the wheel sensors. As the sensor rotor rotates, the Hall element in the Hall IC installed in the wheel sensor generates pulses. The pulse frequency, which is proportional to the magnetic flux density, is converted into a wave in the Hall IC so that it can be output.
The ABS ECU calculates the wheel rotation speed by detecting the pulse frequency.



3. At low speed
4. At high speed
5. Wheel sensor
6. Wheel sensor rotor
7. Voltage
8. Time

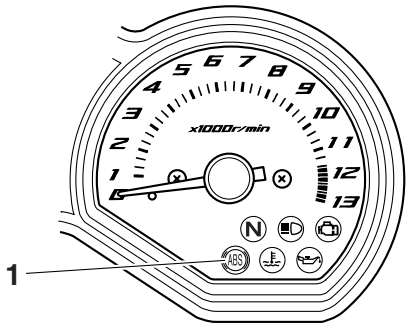
ABS warning light

The ABS warning light "1" comes on to warn the rider if a malfunction in the ABS occurs.
When the main switch is turned to "ON", the ABS warning light comes on for 2 seconds, then goes off, so that the rider can check if the ABS warning light is disconnected and check if the ABS is operating properly.

ECA4B56001

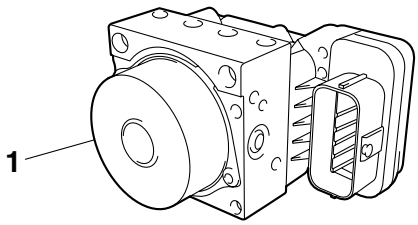
NOTICE

If the rear wheel is raced with the vehicle on the centerstand, the ABS warning light may flash or come on. If this occurs, turn the main switch to "OFF", then back to "ON". The ABS operation is normal if the ABS warning light comes on for 2 seconds, then goes off.



Hydraulic unit assembly

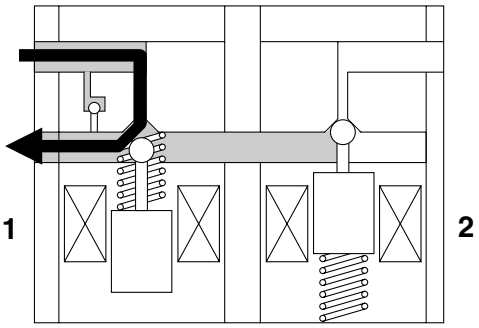
The hydraulic unit assembly "1" is composed of hydraulic control valves (each with a outlet solenoid valve and inlet solenoid valve), buffer chambers, hydraulic pumps, an ABS motor, and ABS ECU. The hydraulic unit adjusts the front and rear wheel brake fluid pressure to control the wheel speed according to signals transmitted from the ABS ECU.



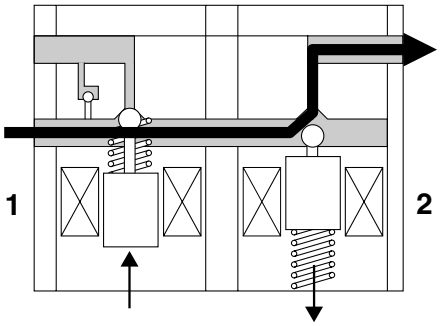
Hydraulic control valve

The hydraulic control valve is composed of a inlet solenoid valve and outlet solenoid valve.
The electromagnetic force generated in the inlet solenoid valve varies proportionally with the duty cycle control voltage that is supplied to it. Since this voltage is continuously variable, the solenoid valve moves smoothly and the hydraulic pressure is adjusted linearly.

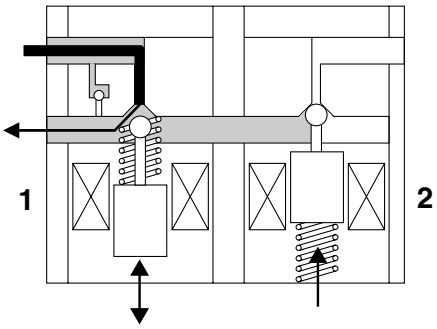
1. When the brakes are operated normally, the inlet solenoid valve "1" is open and the outlet solenoid valve "2" is closed. The brake line between the brake master cylinder and brake caliper is open.



2. When the ABS is activated, the inlet solenoid valve "1" closes and the outlet solenoid valve "2" opens using the power supplied from the ABS ECU signals. This reduces the hydraulic pressure.

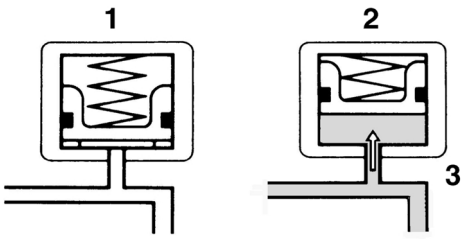


3. When the ABS ECU sends a signal to stop reducing the hydraulic pressure, the outlet solenoid valve "2" closes and the brake fluid is pressurized again. The inlet solenoid valve "1" controls the hydraulic pressure difference between the brake fluid in the upper brake lines (brake master cylinder side) and the brake fluid in the lower brake lines (brake caliper side).



Buffer chamber

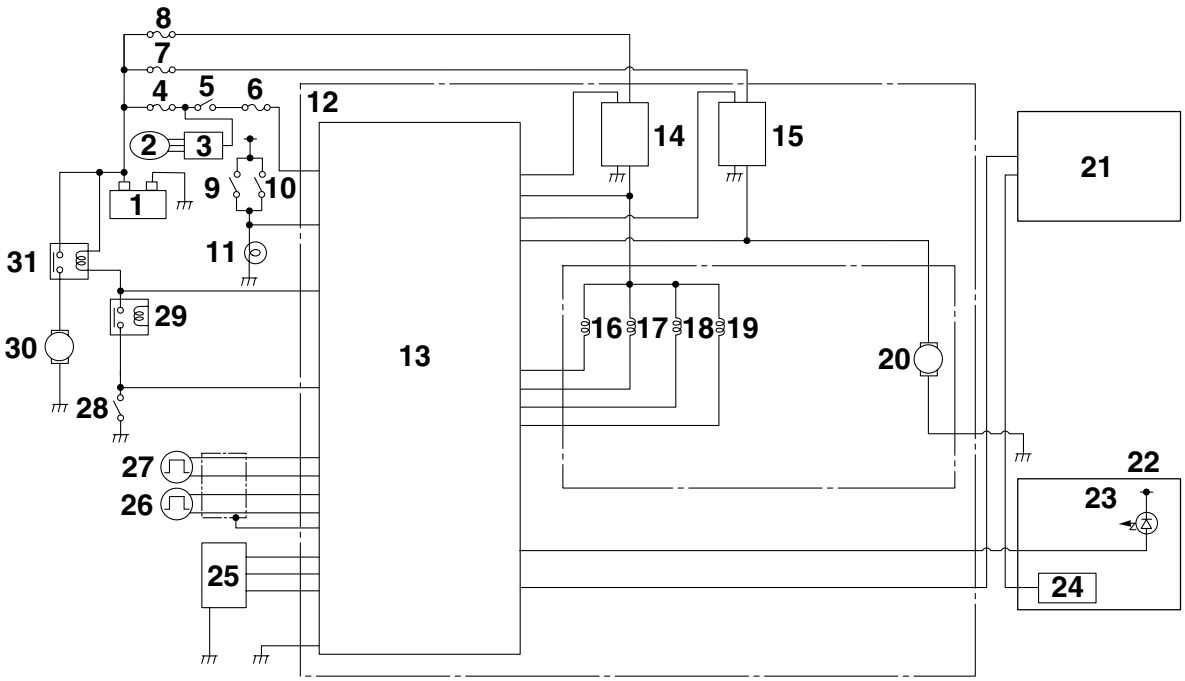
The buffer chamber accumulates the brake fluid that is depressurized while the ABS is operating.



1. Buffer chamber (pressurizing phase)
2. Buffer chamber (depressurizing phase)
3. Raised piston

ABS ECU

The ABS ECU is integrated with the hydraulic unit to achieve a compact and lightweight design.
As shown in the block following diagram, the ABS ECU receives wheel sensor signals from the front and rear wheels and also receives signals from other monitor circuits.



1. Battery
2. AC magneto
3. Rectifier/regulator
4. Main fuse
5. Main switch
6. ABS ECU fuse
7. ABS motor fuse
8. ABS solenoid fuse
9. Front brake light switch
10. Rear brake light switch
11. Tail/brake light
12. Hydraulic unit assembly
13. ABS ECU
14. Solenoid relay
15. ABS motor relay
16. Front brake inlet solenoid
17. Front brake outlet solenoid
18. Rear brake inlet solenoid
19. Rear brake outlet solenoid
20. ABS motor
21. ECU (engine control unit)
22. Meter assembly
23. ABS warning light
24. Speedometer
25. ABS test coupler
26. Rear wheel sensor
27. Front wheel sensor
28. Start switch
29. Starting circuit cut-off relay
30. Starter motor
31. Starter relay

The necessary actions are confirmed using the monitor circuit and control signals are transmitted to the hydraulic unit assembly.

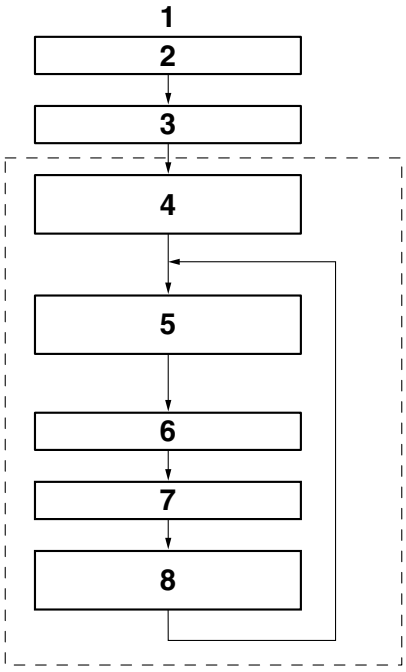
ABS control operation

The ABS control operation performed in the ABS ECU is divided into the following two parts.
- Hydraulic control
- Self-diagnosis

When a malfunction is detected in the ABS, a fault code is stored in the memory of the ABS ECU for easy problem identification and troubleshooting.

TIP

- Some types of malfunctions are not recorded in the memory of the ABS ECU (e.g., a blown ABS ECU fuse).
- The ABS performs a self-diagnosis test for a few seconds each time the vehicle first starts off after the main switch was turned on. During this test, a “clicking” noise can be heard from under the seat and if the front brake lever or rear brake pedal are even slightly applied, a vibration can be felt at the lever or pedal, but these do not indicate a malfunction.



1. Software operation flow
2. Main switch “ON”
3. Initialize
4. Self-diagnosis (when static)
5. Self-diagnosis (when riding)
6. Receive signals
7. Control operation
8. Depressurize/pressurize

EAS4B56010

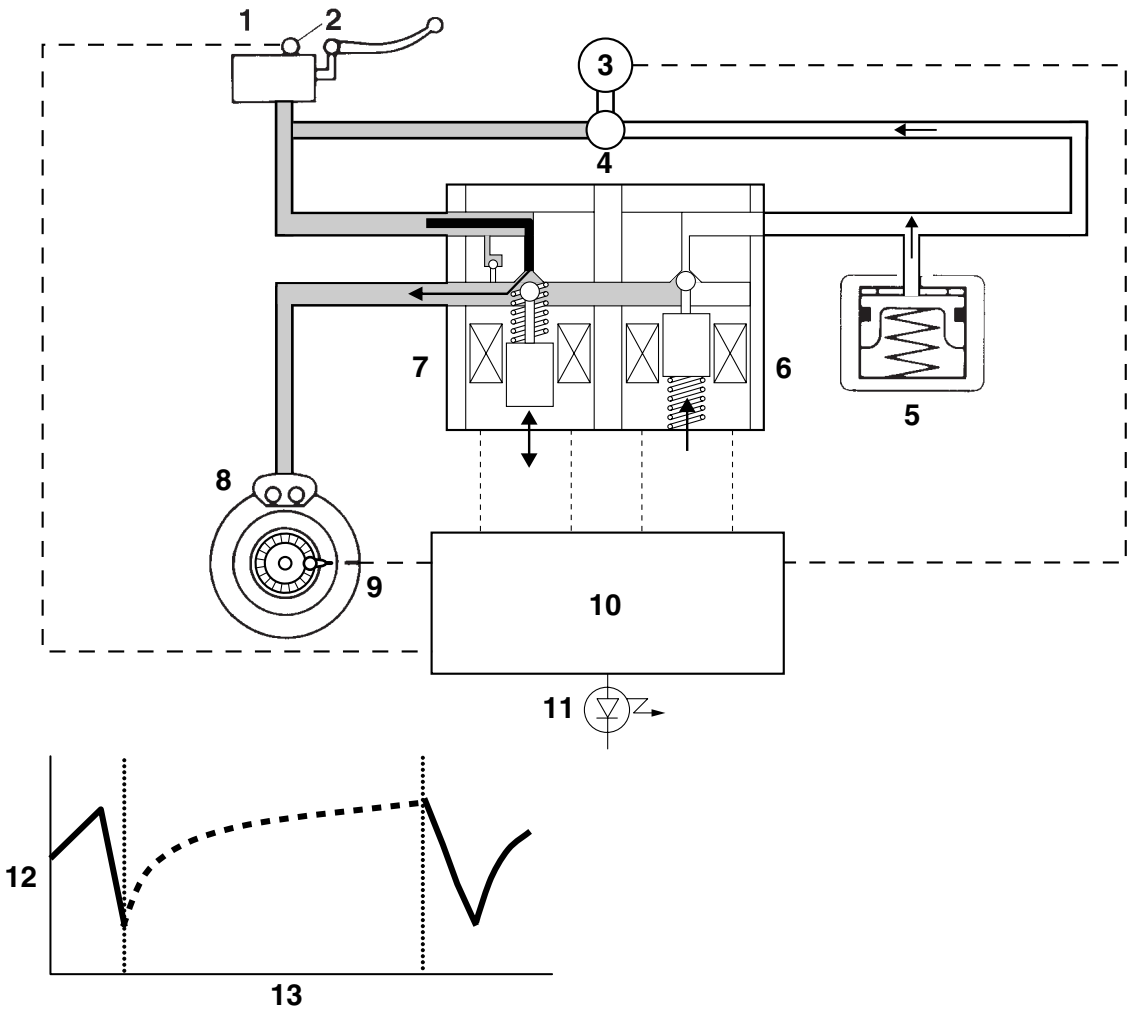
ABS OPERATION

The ABS hydraulic circuit consists of two systems: the front wheel, and rear wheel. The following describes the system for the front wheel only.

Normal braking (ABS not activated)

When the ABS is not activated, the inlet solenoid valve is open and the outlet solenoid valve is closed because a control signal has not been transmitted from the ABS ECU. Therefore, when the brake lever is squeezed, the hydraulic pressure in the brake master cylinder increases and the brake fluid is sent to the brake caliper.

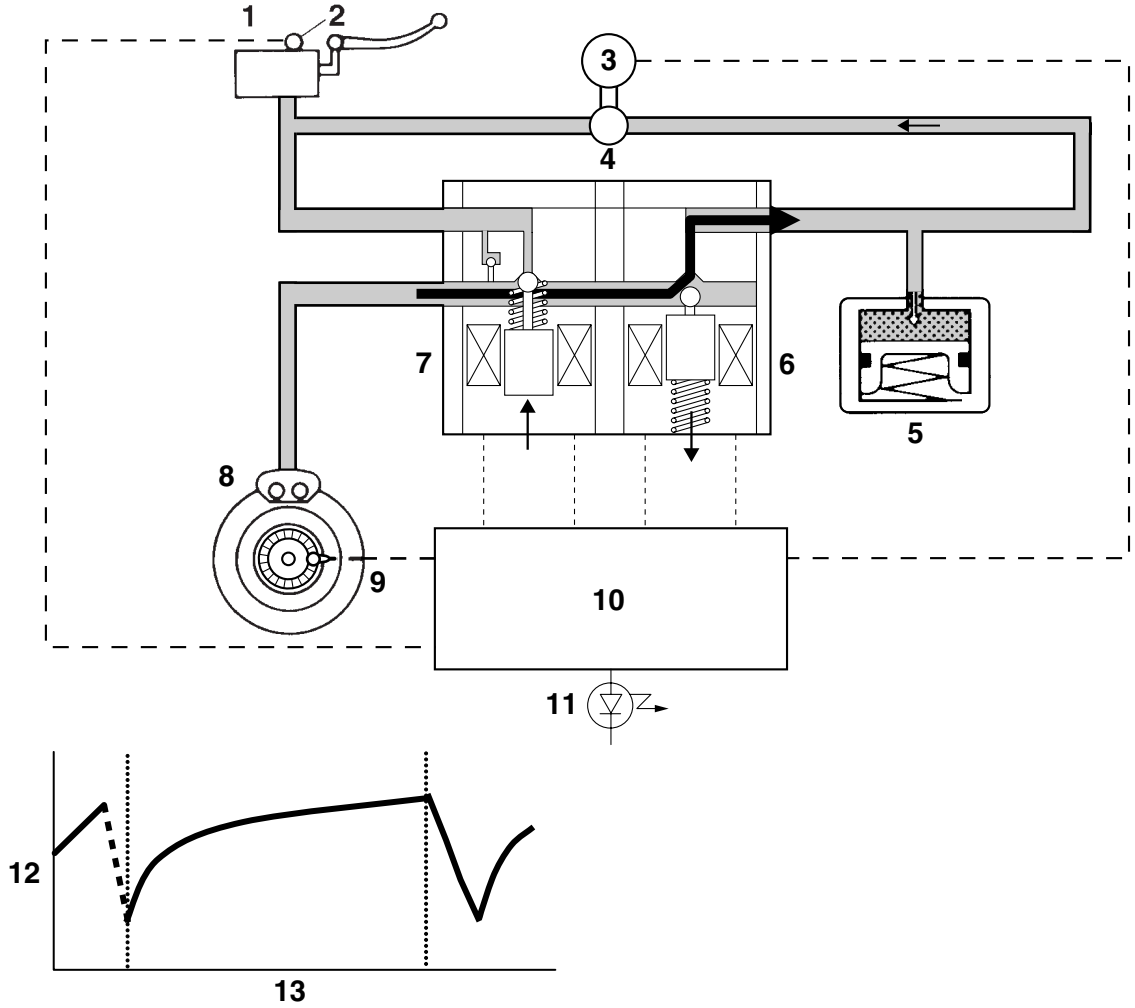
At this time, the inlet and outlet check valves of the hydraulic pump are closed. As a result of eliminating the orifice, the brake master cylinder directly pressurizes the brake caliper during normal braking. When the brake lever is released, the brake fluid in the brake caliper returns to the brake master cylinder.



1. Brake master cylinder
2. Brake light switch
3. ABS motor
4. Hydraulic pump
5. Buffer chamber
6. Outlet solenoid valve
7. Inlet solenoid valve
8. Brake caliper
9. Wheel sensor
10. ABS ECU
11. ABS warning light
12. Brake fluid pressure
13. Time

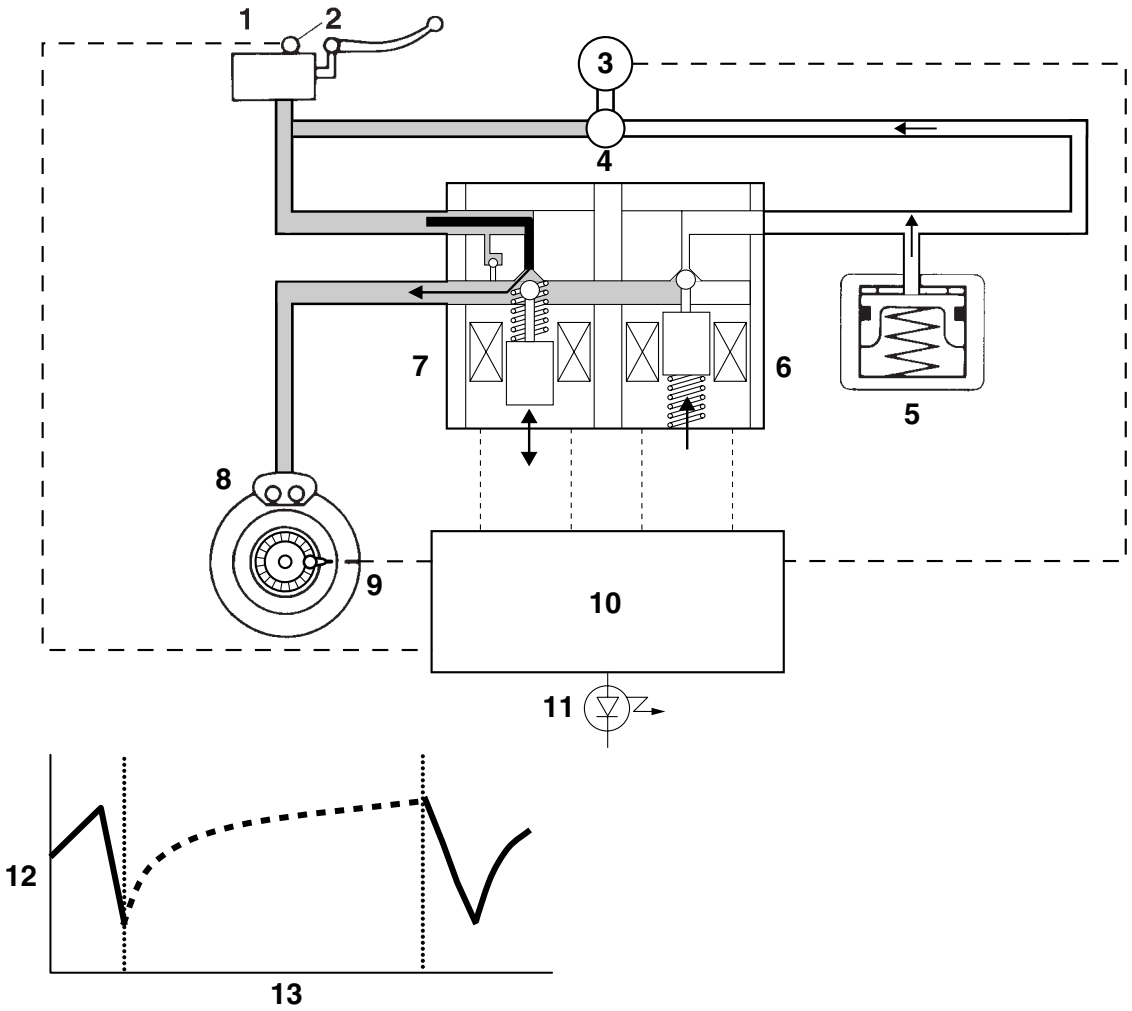
Emergency braking (ABS activated)

1. Depressurizing phase
   When the front wheel is about to lock, the outlet solenoid valve is opened by the “depressurization” signal transmitted from the ABS ECU. When this occurs, the inlet solenoid valve compresses the spring and closes the brake line from the brake master cylinder. Because the outlet solenoid valve is open, the brake fluid is sent to the buffer chamber. As a result, the hydraulic pressure in the brake caliper is reduced.
   The brake fluid stored in the buffer chamber is pumped back to the brake master cylinder by the hydraulic pump linked to the ABS motor.



1. Brake master cylinder
2. Brake light switch
3. ABS motor
4. Hydraulic pump
5. Buffer chamber
6. Outlet solenoid valve
7. Inlet solenoid valve
8. Brake caliper
9. Wheel sensor
10. ABS ECU
11. ABS warning light
12. Brake fluid pressure
13. Time

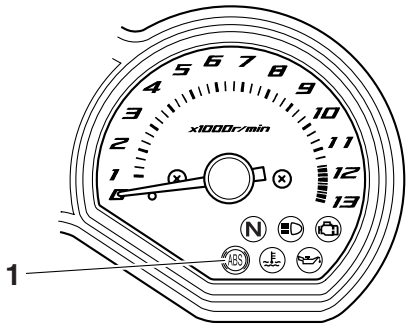
2. Pressurizing phase
   The outlet solenoid valve is closed by the “pressurization” signal transmitted from the ABS ECU. At this time, the ABS ECU controls the opening of the inlet solenoid valve. As the inlet solenoid valve opens, the brake line from the brake master cylinder opens, allowing the brake fluid to be sent to the brake caliper.



1. Brake master cylinder
2. Brake light switch
3. ABS motor
4. Hydraulic pump
5. Buffer chamber
6. Outlet solenoid valve
7. Inlet solenoid valve
8. Brake caliper
9. Wheel sensor
10. ABS ECU
11. ABS warning light
12. Brake fluid pressure
13. Time

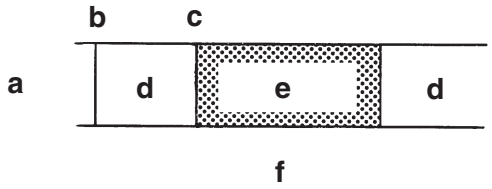
EAS4B56011
ABS SELF-DIAGNOSIS FUNCTION

ABS warning light
The ABS warning light “1” comes on when a malfunction is detected by the ABS self-diagnosis. It is located in the meter assembly.



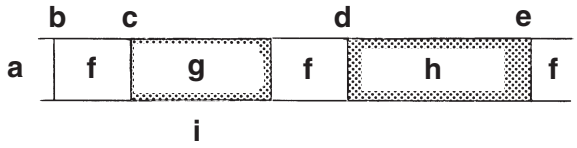
Instances when the ABS warning light comes on

1. The ABS warning light comes on when the main switch is turned to “ON”.
   The ABS warning light comes on for 2 seconds while the ABS is performing a self-diagnosis, then goes off if there are no problems.



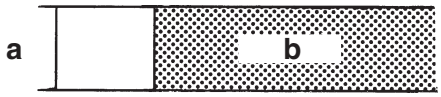
a. ABS warning light
b. Main switch “OFF”
c. Main switch “ON”
d. Goes off
e. Comes on for 2 seconds
f. ABS self-diagnosis

2. The ABS warning light comes on while the start switch is being pushed.
   When the engine is being started, the ABS warning light comes on while the start switch is being pushed. (Refer to “ELECTRIC STARTING SYSTEM” on page 8-7.)



a. ABS warning light
b. Main switch “OFF”
c. Main switch “ON”
d. Start switch “ON”
e. Start switch “OFF”
f. Goes off
g. Comes on for 2 seconds
h. Comes on while the start switch is being pushed
i. ABS self-diagnosis

3. The ABS warning light comes on while riding.
   If the ABS warning light comes on while riding, a malfunction has been detected in the ABS. The ABS hydraulic control will not be performed. The ABS will have recourse to manual braking if this occurs.

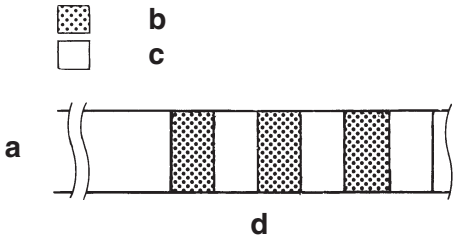


a. ABS warning light
b. Comes on

4. The ABS warning light flashes while riding.
   If the ABS warning light flashes while riding, there is no problem with the function of the ABS. However, the ABS ECU input has unstable factors. (For details, refer to "ABS TROUBLESHOOTING OUTLINE" on page 8-105.)

TIP

The ABS warning light comes on or flashes if the vehicle is ridden with the test coupler adapter connected to the ABS test coupler.



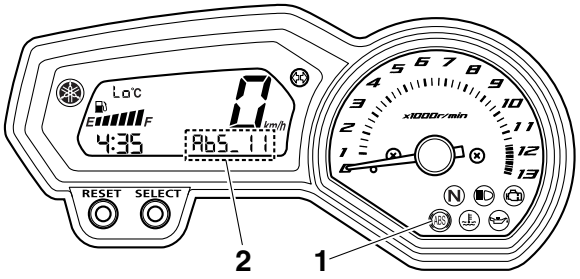
a. ABS warning light
b. Comes on
c. Goes off
d. Unstable ABS ECU input

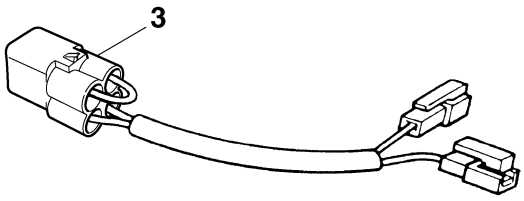
5. The ABS warning light "1" flashes and a fault code "2" is indicated on the multi-function display when the test coupler adapter "3" is connected to the ABS test coupler "4" for troubleshooting the ABS.
   When the test coupler adapter is connected to the ABS test coupler, the ABS warning light starts flashing and the multi-function display indicates all the fault codes recorded in the ABS ECU.

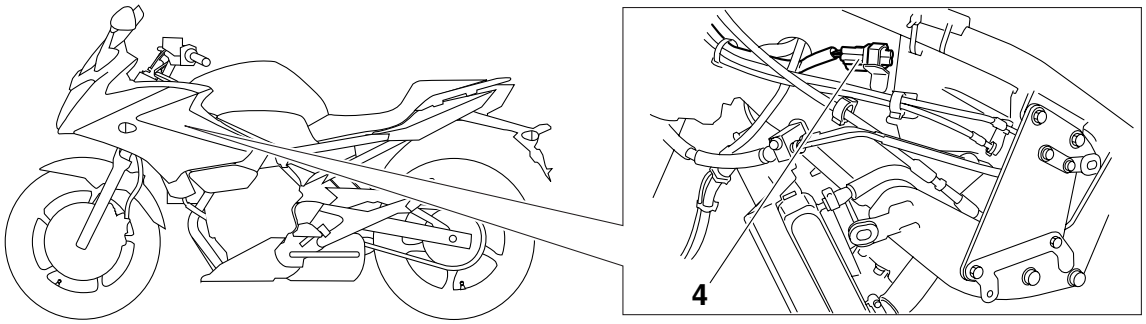
Test coupler adapter
90890-03149

TIP

The ABS warning light comes on or flashes if the vehicle is ridden with the test coupler adapter connected to the ABS test coupler.







EAS4B56012
ABS WARNING LIGHT AND OPERATION

ABS warning light
- When the main switch is turned to “ON”, the ABS warning light comes on for 2 seconds, then goes off.
- The ABS warning light comes on while the start switch is being pushed.
- If the ABS warning light comes on while riding, stop the vehicle, and then turn the main switch to “OFF”, then back to “ON”. The ABS operation is normal if the ABS warning light comes on for 2 seconds, then goes off.
- If the rear wheel is raced with the vehicle on the centerstand, the ABS warning light may flash or come on. If this occurs, turn the main switch to “OFF”, then back to “ON”. The ABS operation is normal if the ABS warning light comes on for 2 seconds, then goes off.
- The ABS operation is normal if the ABS warning light flashes.
- Even if the ABS warning light remains on and does not go off, or if it comes on after riding, conventional braking performance of the vehicle is maintained.

ABS function
EWA20S1003

⚠ WARNING

- **When hydraulic control is performed by the ABS, the brake system alerts the rider that the wheels have a tendency to lock by generating a reaction-force pulsating action in the front brake lever or rear brake pedal. When the ABS is activated, the grip between the road surface**

and tires is close to the limit. The ABS cannot prevent wheel lock* on slippery surfaces, such as ice, when it is caused by engine braking, even if the ABS is activated.

- **The ABS is not designed to shorten the braking distance or improve the cornering performance.**
- **Depending on the road conditions, the braking distance may be longer compared to that of vehicles not equipped with ABS. Therefore, ride at a safe speed and keep a safe distance between yourself and other vehicles.**
- **The braking of the vehicle, even in the worst case, is principally executed when the vehicle is advancing straight ahead. During a turn, sudden braking is liable to cause a loss of traction of the tires. Even vehicles equipped with ABS cannot be prevented from falling over if braked suddenly.**
- **The ABS does not work when the main switch is turned to "OFF". The conventional braking function can be used.**

*** Wheel lock: A condition that occurs when the rotation of one or both of the wheels has stopped, but the vehicle continues to travel.**

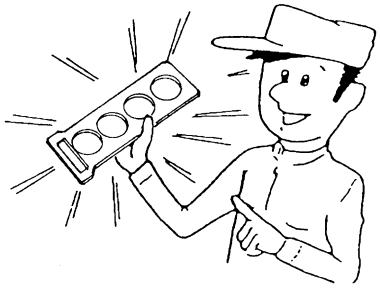
EAS20180
IMPORTANT INFORMATION

EAS20190
PREPARATION FOR REMOVAL AND DISASSEMBLY
1. Before removal and disassembly, remove all dirt, mud, dust and foreign material.

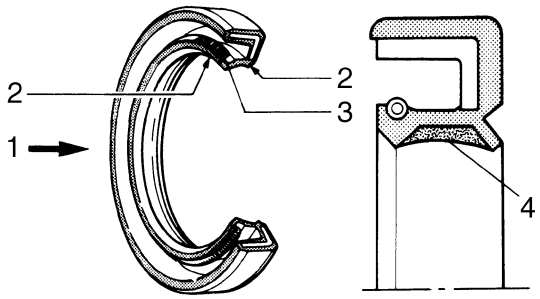
2. Use only the proper tools and cleaning equipment.
   Refer to “SPECIAL TOOLS” on page 1-29.
3. When disassembling, always keep mated parts together. This includes gears, cylinders, pistons and other parts that have been “mated” through normal wear. Mated parts must always be reused or replaced as 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.

EAS20200
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.

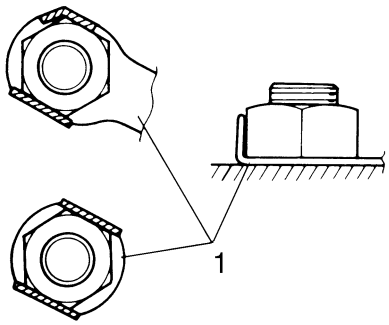


EAS20210
GASKETS, OIL SEALS AND O-RINGS
1. When overhauling the engine, replace all gaskets, seals and O-rings. All gasket surfaces, oil seal lips and O-rings must be cleaned.
2. During reassembly, properly oil all mating parts and bearings and lubricate the oil seal lips with grease.



1. Oil
2. Lip
3. Spring
4. Grease

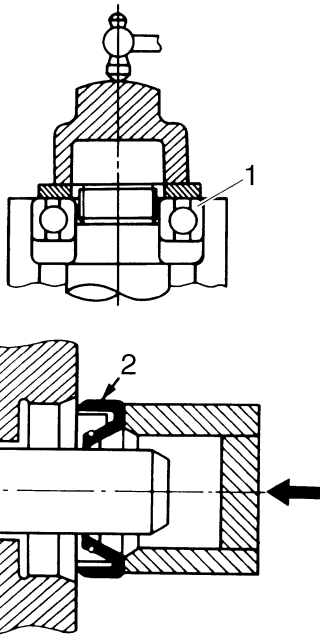
EAS20220
LOCK WASHERS/PLATES AND COTTER PINS
After removal, replace all lock washers/plates “1” and cotter pins. After the bolt or nut has been tightened to specification, bend the lock tabs along a flat of the bolt or nut.



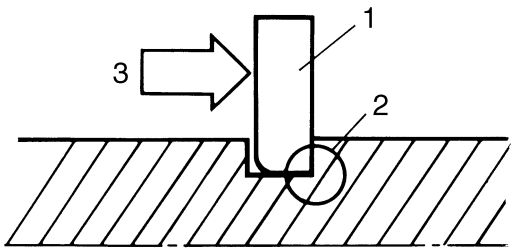
EAS20230
BEARINGS AND OIL SEALS
Install bearings “1” and oil seals “2” so that the manufacturer’s marks or numbers are visible. When installing oil seals, lubricate the oil seal lips with a light coat of lithium-soap-based grease. Oil bearings liberally when installing, if appropriate.

ECA13300
NOTICE

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

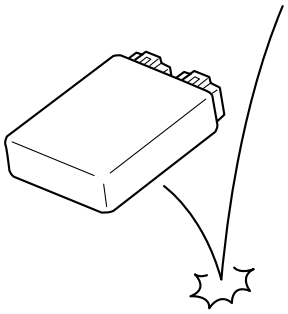


EAS20240
CIRCLIPS
Before reassembly, check all circlips carefully and replace damaged or distorted circlips. Always replace piston pin clips after one use. When installing a circlip “1”, make sure the sharp-edged corner “2” is positioned opposite the thrust “3” that the circlip receives.

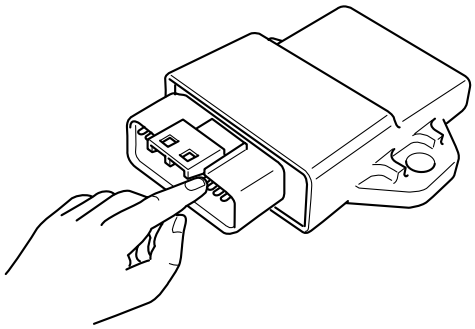


EAS20250
CHECKING THE CONNECTIONS

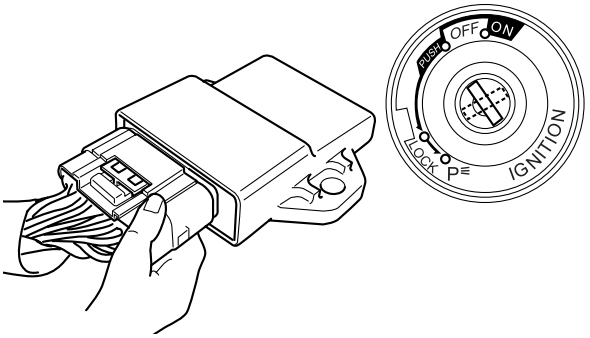
ECA20S1001
NOTICE
Electronic parts are very sensitive. Handle with care and do not give impact.



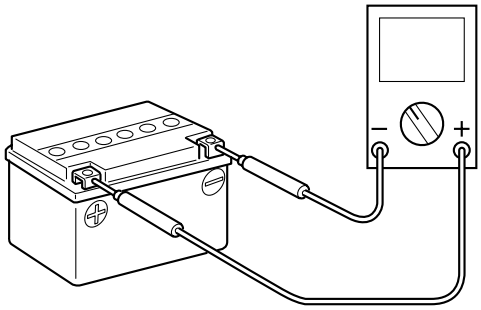
ECA20S1002
NOTICE
- **Mankind has static electricity. It`s voltage is very high and electronic parts are very sensitive.**
- **It is possible that inner small components of electronic parts are destroyed by static electricity.**
- **Do not touch and do not make them dirty.**



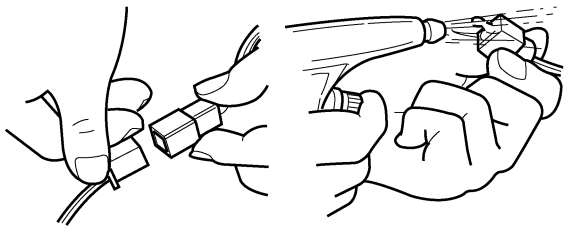
ECA20S1003
NOTICE
- **When you disconnect electronic parts from the wire harness, always turn off the main switch.**
- **If you disconnect above condition, it may damage the electronic parts.**



TIP
When you check the electric system of a motorcycle, check the battery voltage before. Minimum 11V is requested to check each component function.

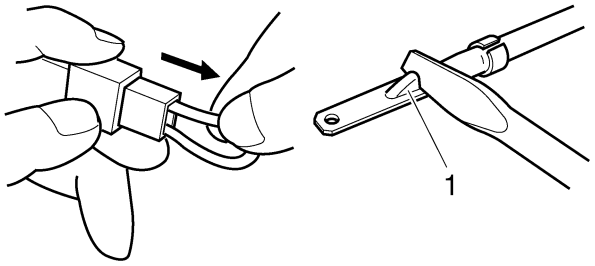


Check the leads, couplers, and connectors for stains, rust, moisture, etc.
1. Disconnect:
   - Lead
   - Coupler
   - Connector
2. Check:
   - Lead
   - Coupler
   - Connector
     Moisture → Dry with an air blower.
     Rust/stains → Connect and disconnect several times.

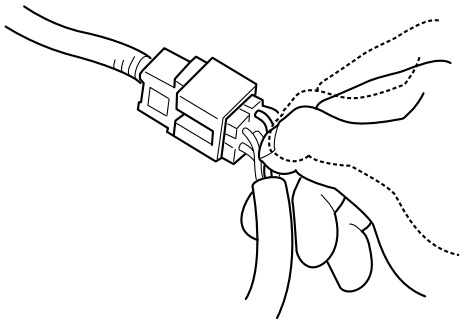


3. Check:
   - All connections
     Loose connection → Connect properly.

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



TIP
If the contact seems not good, pull the terminal by hand and check its condition.



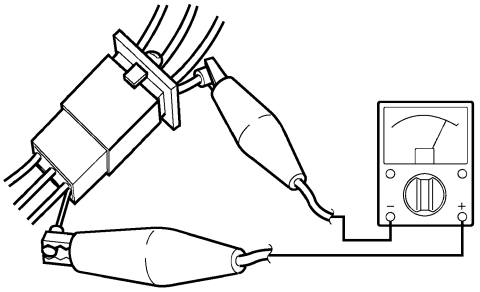
4. Connect:
   - Lead
   - Coupler
   - Connector

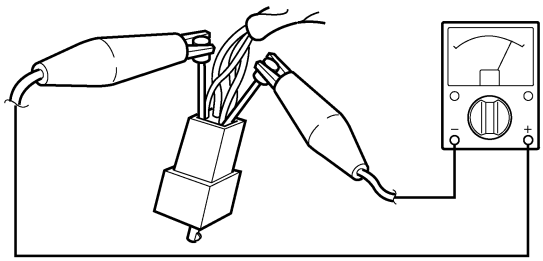
TIP
Make sure all connections are tight.

5. Check:
   - Continuity
     (with the pocket tester)

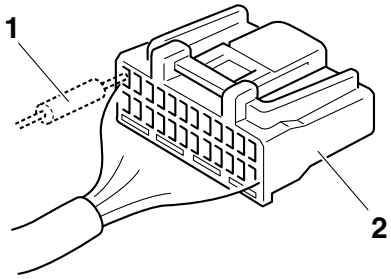
Pocket tester
90890-03112
Analog pocket tester
YU-03112-C

TIP
- 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.





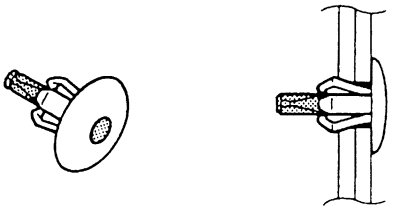
TIP
When you check the voltage or electrical continuity, insert the measuring probe from back side as you can insert from back side.

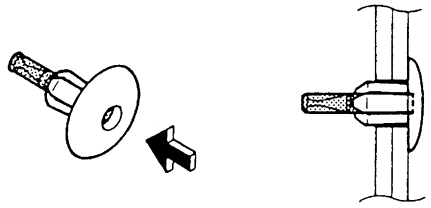


1. Probe
2. Coupler

EAS21840
REMOVING THE QUICK FASTENER

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



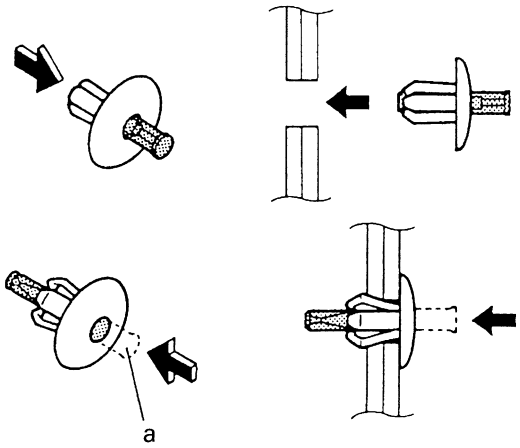


EAS21850

INSTALLING THE QUICK FASTENER

TIP

To install the quick fastener, push its pin so that it protrudes from the fastener head, then insert the fastener into the cover and push the pin “a” in with screwdriver. Make sure that the pin is flush with the fastener’s head.

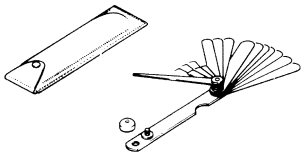
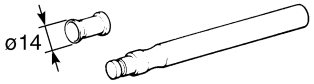
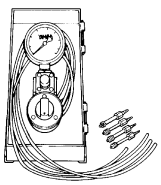
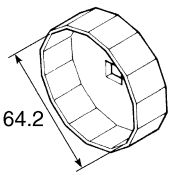


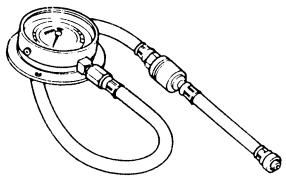
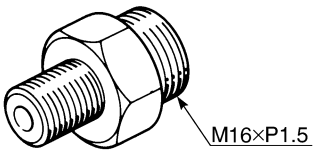
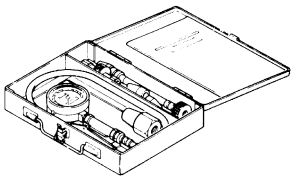
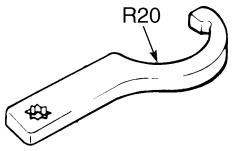
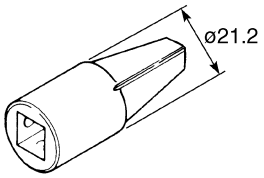
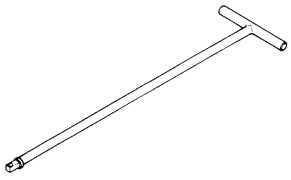
EAS20260
SPECIAL TOOLS

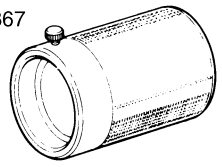
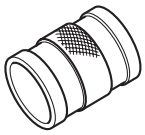
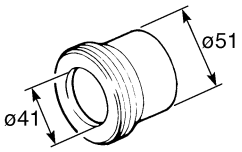
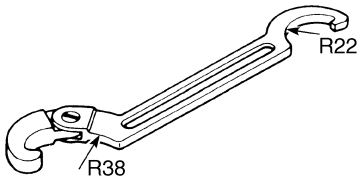
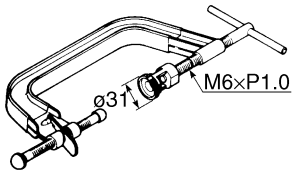
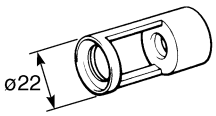
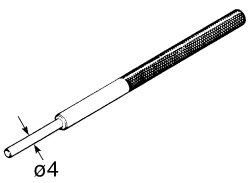
The following special tools are necessary for complete and accurate tune-up and assembly. Use only the appropriate special tools as this will help prevent damage caused by the use of inappropriate tools or improvised techniques. Special tools, part numbers or both may differ depending on the country.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

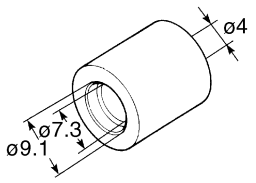
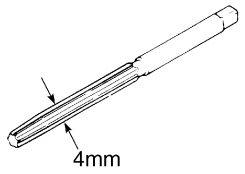
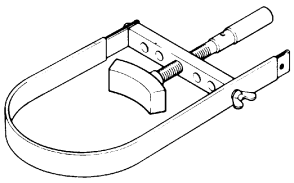
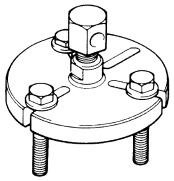
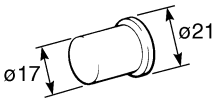
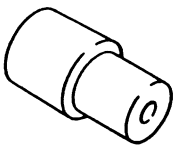
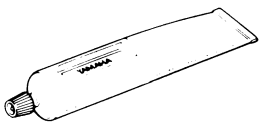
TIP

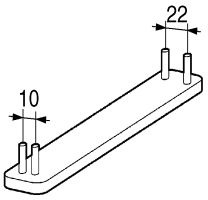
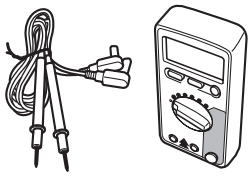
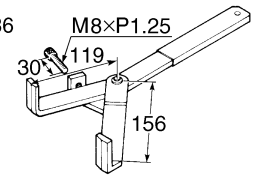
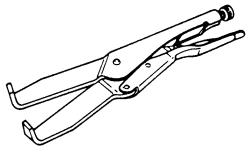
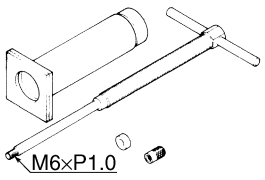
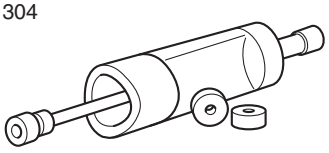
- For U.S.A. and Canada, use part number starting with “YM-”, “YU-”, or “ACC-”.
- For others, use part number starting with “90890-”.

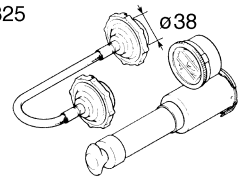
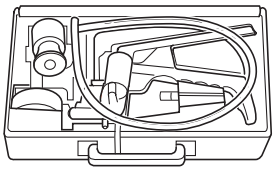
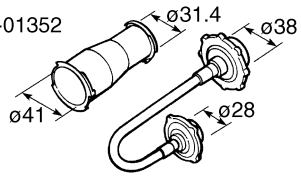
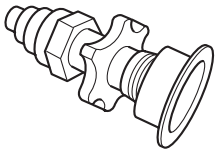
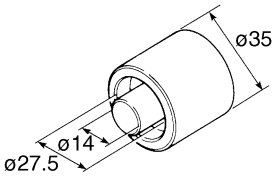
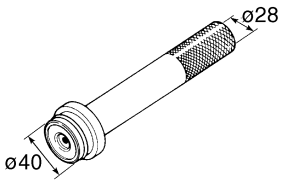
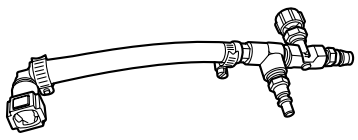
Tool name/Tool No.	Illustration	Reference pages
Test coupler adapter 90890-03149		1-21, 4-54, 4-55
Pocket tester 90890-03112 Analog pocket tester YU-03112-C		1-27, 8-151, 8-159, 8-166
Thickness gauge 90890-03079 Narrow gauge set YM-34483		3-6
Valve lapper 90890-04101 Valve lapping tool YM-A8998		3-6, 5-24
Vacuum gauge 90890-03094 Carburetor synchronizer YU-44456	90890-03094 	3-8, 3-9
Oil filter wrench 90890-01426 YU-38411		3-25

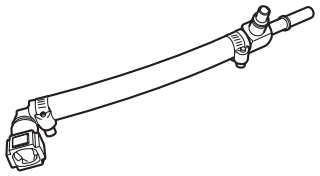
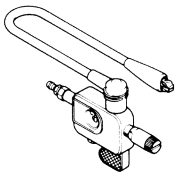
Tool name/Tool No.	Illustration	Reference pages
Pressure gauge 90890-03153 YU-03153		3-26, 7-7, 7-9
Oil pressure adapter H 90890-03139		3-26
Compression gauge 90890-03081 Engine compression tester YU-33223		5-18
Steering nut wrench 90890-01403 Spanner wrench YU-33975		3-19, 4-70
Damper rod holder 90890-01460		4-63, 4-65
T-handle 90890-01326 YM-01326		4-63, 4-65

Tool name/Tool No.	Illustration	Reference pages
Fork seal driver weight 90890-01367 Replacement hammer YM-A9409-7	90890-01367  YM-A9409-7/YM-A5142-4 	4-65, 4-66
Fork seal driver attachment (ø41) 90890-01381 Replacement 41 mm YM-A5142-2		4-65
Ring nut wrench 90890-01268 Spanner wrench YU-1268		4-70
Valve spring compressor 90890-04019 YM-04019		5-21, 5-26
Valve spring compressor attachment 90890-04108 Valve spring compressor adapter 22 mm YM-04108		5-21, 5-26
Valve guide remover (ø4) 90890-04111 Valve guide remover (4.0 mm) YM-04111		5-22

Tool name/Tool No.	Illustration	Reference pages
Valve guide installer (ø4) 90890-04112 Valve guide installer (4.0 mm) YM-04112		5-22
Valve guide reamer (ø4) 90890-04113 Valve guide reamer (4.0 mm) YM-04113		5-22
Sheave holder 90890-01701 Primary clutch holder YS-01880-A		5-30, 5-31, 5-32
Flywheel puller 90890-01362 Heavy duty puller YU-33270-B		5-30
Flywheel puller attachment 90890-04089 Crankshaft protector YM-33282	90890-04089  YM-33282 	5-30
Yamaha bond No. 1215 (Three bond No.1215®) 90890-85505		5-32, 5-34, 5-61, 6-12

Tool name/Tool No.	Illustration	Reference pages
Camshaft wrench 90890-04143 YM-04143		5-34
Digital circuit tester 90890-03174 Model 88 Multimeter with tachometer YU-A1927		5-38, 7-10, 8-143, 8-152, 8-153, 8-157, 8-158, 8-160, 8-161, 8-162, 8-163, 8-164, 8-165, 8-166, 8-167, 8-168
Universal clutch holder 90890-04086 YM-91042	90890-04086  YM-91042 	5-50, 5-54
Piston pin puller set 90890-01304 Piston pin puller YU-01304	90890-01304  YU-01304 	5-66

Tool name/Tool No.	Illustration	Reference pages
Radiator cap tester 90890-01325 Radiator pressure tester YU-24460-01	90890-01325  YU-24460-01 	6-3
Radiator cap tester adapter 90890-01352 Radiator pressure tester adapter YU-33984	90890-01352  YU-33984 	6-3
Mechanical seal installer 90890-04078 Water pump seal installer YM-33221-A		6-12
Middle driven shaft bearing driver 90890-04058 Bearing driver 40 mm YM-04058		6-12
Fuel injector pressure adapter 90890-03210 YU-03210		7-7

Tool name/Tool No.	Illustration	Reference pages
Fuel pressure adapter 90890-03176 YM-03176		7-9
Ignition checker 90890-06754 Opama pet-4000 spark checker YM-34487		8-160

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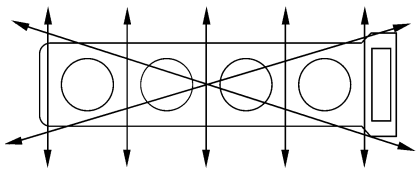
EAS20280
GENERAL SPECIFICATIONS

Model	
Model	XJ6S 36C1 XJ6SA 36D1 XJ6SY 36C2
Dimensions	
Overall length	2120 mm (83.5 in)
Overall width	770 mm (30.3 in)
Overall height	1210 mm (47.6 in)
Seat height	785 mm (30.9 in)
Wheelbase	1440 mm (56.7 in)
Ground clearance	140 mm (5.51 in)
Minimum turning radius	2800 mm (110.2 in)
Weight	
With oil and fuel	XJ6S 211.0 kg (465 lb) XJ6SA 216.0 kg (476 lb) XJ6SY 211.0 kg (465 lb)
Maximum load	XJ6S 189 kg (417 lb) XJ6SA 184 kg (406 lb) XJ6SY 189 kg (417 lb)

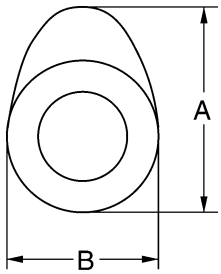
EAS20290
ENGINE SPECIFICATIONS

Engine	
Engine type	Liquid cooled 4-stroke, DOHC
Displacement	599.8 cm^3
Cylinder arrangement	Forward-inclined parallel 4-cylinder
Bore × stroke	65.5 × 44.5 mm (2.58 × 1.75 in)
Compression ratio	12.20 :1
Standard compression pressure (at sea level)	1550 kPa/400 r/min (15.5 kgf/cm^2/400 r/min, 220.5 psi/400 r/min)
Minimum–maximum	1300–1650 kPa (13.0–16.5 kgf/cm^2, 184.9–234.7 psi)
Starting system	Electric starter
Fuel	
Recommended fuel	XJ6S Regular unleaded gasoline only XJ6SA Regular unleaded gasoline only XJ6SY Unleaded gasoline only
Fuel tank capacity	17.3 L (4.57 US gal, 3.81 Imp.gal)
Fuel reserve amount	3.2 L (0.85 US gal, 0.70 Imp.gal)
Engine oil	
Lubrication system	Wet sump
Type	SAE 10W-30, SAE 10W-40, SAE 15W-40, SAE 20W-40 or SAE 20W-50
Recommended engine oil grade	API service SG type or higher, JASO standard MA
Engine oil quantity	
Total amount	3.40 L (3.59 US qt, 2.99 Imp.qt)
Without oil filter cartridge replacement	2.50 L (2.64 US qt, 2.20 Imp.qt)
With oil filter cartridge replacement	2.80 L (2.96 US qt, 2.46 Imp.qt)
Oil filter type	Paper
Oil pump	
Oil pump type	Trochoid
Inner-rotor-to-outer-rotor-tip clearance	Less than 0.12 mm (0.0047 in)
Limit	0.20 mm (0.0079 in)
Outer-rotor-to-oil-pump-housing clearance	0.090–0.150 mm (0.0035–0.0059 in)
Limit	0.220 mm (0.0087 in)
Oil-pump-housing-to-inner-and-outer-rotor clearance	0.050–0.110 mm (0.0020–0.0043 in)
Limit	0.180 mm (0.0071 in)
Bypass valve opening pressure	80.0–120.0 kPa (0.80–1.20 kgf/cm^2, 11.6–17.4 psi)
Relief valve operating pressure	490.0–570.0 kPa (4.90–5.70 kgf/cm^2, 71.1–82.7 psi)
Pressure check location	Main gallery
Cooling system	
Radiator capacity (including all routes)	2.00 L (2.11 US qt, 1.76 Imp.qt)
Radiator capacity	0.56 L (0.59 US qt, 0.49 Imp.qt)
Coolant reservoir capacity (up to the maximum level mark)	0.25 L (0.26 US qt, 0.22 Imp.qt)
Radiator cap opening pressure	93.3–122.7 kPa (0.93–1.23 kgf/cm^2, 13.5–17.8 psi)
Radiator core	
Width	300.0 mm (11.81 in)
Height	197.0 mm (7.76 in)

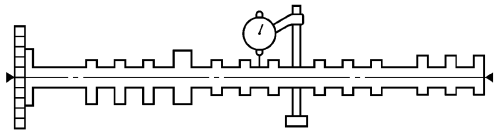
Depth	22.0 mm (0.87 in)
Water pump	
Water pump type	Single suction centrifugal pump
Reduction ratio	86/44 × 31/31 (1.955)
Spark plug (s)	
Manufacturer/model	NGK/CR9E
Spark plug gap	0.7–0.8 mm (0.028–0.031 in)
Cylinder head	
Volume	10.33–10.93 cm^3 (0.63–0.67 cu.in)
Warpage limit	0.05 mm (0.0020 in)



Camshaft	
Drive system	Chain drive (right)
Camshaft cap inside diameter	23.008–23.029 mm (0.9058–0.9067 in)
Camshaft journal diameter	22.967–22.980 mm (0.9042–0.9047 in)
Camshaft-journal-to-camshaft-cap clearance	0.028–0.062 mm (0.0011–0.0024 in)
Limit	0.080 mm (0.0032 in)
Camshaft lobe dimensions	
Intake A	31.850–31.950 mm (1.2539–1.2579 in)
Limit	31.800 mm (1.2520 in)
Intake B	24.950–25.050 mm (0.9823–0.9862 in)
Limit	24.900 mm (0.9803 in)
Exhaust A	31.850–31.950 mm (1.2539–1.2579 in)
Limit	31.800 mm (1.2520 in)
Exhaust B	24.950–25.050 mm (0.9823–0.9862 in)
Limit	24.900 mm (0.9803 in)



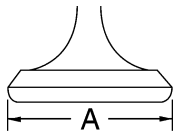
Camshaft runout limit	0.060 mm (0.0024 in)



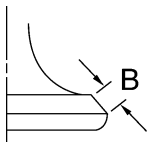
Timing chain	
Tensioning system	Automatic
Valve clearance (cold)	
Intake	0.13–0.20 mm (0.0051–0.0079 in)
Exhaust	0.23–0.30 mm (0.0091–0.0118 in)

Valve dimensions

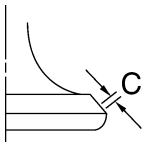
Valve head diameter A (intake)	24.90–25.10 mm (0.9803–0.9882 in)
Valve head diameter A (exhaust)	21.90–22.10 mm (0.8622–0.8701 in)



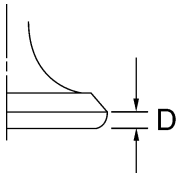
Valve face width B (intake)	1.210–2.490 mm (0.0476–0.0980 in)
Valve face width B (exhaust)	1.210–2.490 mm (0.0476–0.0980 in)



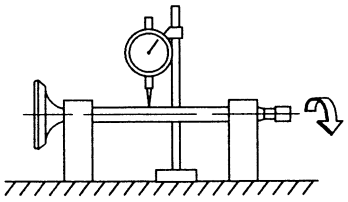
Valve seat width C (intake)	0.90–1.10 mm (0.0354–0.0433 in)
Limit	1.6 mm (0.06 in)
Valve seat width C (exhaust)	0.90–1.10 mm (0.0354–0.0433 in)
Limit	1.6 mm (0.06 in)



Valve margin thickness D (intake)	0.60–0.80 mm (0.0236–0.0315 in)
Limit	0.5 mm (0.02 in)
Valve margin thickness D (exhaust)	0.60–0.80 mm (0.0236–0.0315 in)
Limit	0.5 mm (0.02 in)

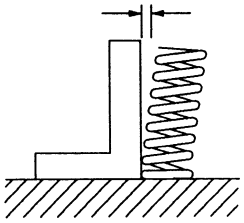


Valve stem diameter (intake)	3.975–3.990 mm (0.1565–0.1571 in)
Limit	3.945 mm (0.1553 in)
Valve stem diameter (exhaust)	3.960–3.975 mm (0.1559–0.1565 in)
Limit	3.930 mm (0.1547 in)
Valve guide inside diameter (intake)	4.000–4.012 mm (0.1575–0.1580 in)
Limit	4.042 mm (0.1591 in)
Valve guide inside diameter (exhaust)	4.000–4.012 mm (0.1575–0.1580 in)
Limit	4.042 mm (0.1591 in)
Valve-stem-to-valve-guide clearance (intake)	0.010–0.037 mm (0.0004–0.0015 in)
Limit	0.080 mm (0.0032 in)
Valve-stem-to-valve-guide clearance (exhaust)	0.025–0.052 mm (0.0010–0.0020 in)
Limit	0.100 mm (0.0039 in)
Valve stem runout	0.040 mm (0.0016 in)



Valve spring

Free length (intake)	39.08 mm (1.54 in)
Free length (exhaust)	39.08 mm (1.54 in)
Installed length (intake)	33.40 mm (1.31 in)
Installed length (exhaust)	33.40 mm (1.31 in)
Spring rate K1 (intake)	25.05 N/mm (2.55 kgf/mm, 143.04 lb/in)
Spring rate K2 (intake)	40.82 N/mm (4.16 kgf/mm, 233.08 lb/in)
Spring rate K1 (exhaust)	25.05 N/mm (2.55 kgf/mm, 143.04 lb/in)
Spring rate K2 (exhaust)	40.82 N/mm (4.16 kgf/mm, 233.08 lb/in)
Installed compression spring force (intake)	132.40–152.40 N (13.50–15.54 kgf, 29.76–34.26 lbf)
Installed compression spring force (exhaust)	132.40–152.40 N (13.50–15.54 kgf, 29.76–34.26 lbf)
Spring tilt (intake)	2.5 °/1.7 mm (0.07 in)
Spring tilt (exhaust)	2.5 °/1.7 mm (0.07 in)



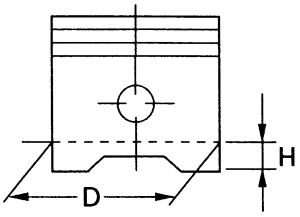
Winding direction (intake)	Clockwise
Winding direction (exhaust)	Clockwise

Cylinder

Bore	65.500–65.510 mm (2.5787–2.5791 in)
Taper limit	0.050 mm (0.0020 in)
Out of round limit	0.050 mm (0.0020 in)

Piston

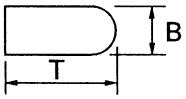
Piston-to-cylinder clearance	0.010–0.035 mm (0.0004–0.0014 in)
Limit	0.05 mm (0.0020 in)
Diameter D	65.475–65.490 mm (2.5778–2.5783 in)
Height H	5.0 mm (0.20 in)



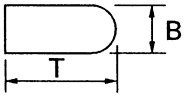
Offset	0.50 mm (0.0197 in)
Offset direction	Intake side
Piston pin bore inside diameter	16.002–16.013 mm (0.6300–0.6304 in)
Piston pin outside diameter	15.990–15.995 mm (0.6295–0.6297 in)

Piston ring

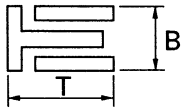
Top ring	
Ring type	Barrel
Dimensions (B × T)	0.90 × 2.45 mm (0.04 × 0.10 in)



End gap (installed)	0.25–0.35 mm (0.0098–0.0138 in)
Ring side clearance	0.030–0.065 mm (0.0012–0.0026 in)
2nd ring	
Ring type	Barrel
Dimensions (B × T)	0.80 × 2.50 mm (0.03 × 0.10 in)



End gap (installed)	0.65–0.80 mm (0.0256–0.0315 in)
Ring side clearance	0.030–0.065 mm (0.0012–0.0026 in)
Oil ring	
Dimensions (B × T)	1.50 × 2.00 mm (0.06 × 0.08 in)



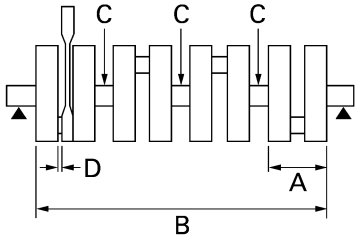
End gap (installed)	0.10–0.35 mm (0.0039–0.0138 in)

Connecting rod

Oil clearance	0.038–0.062 mm (0.0015–0.0024 in)
Limit	0.08 mm (0.0032 in)
Bearing color code	1: Yellow-Blue 2: Yellow-Black 3: Yellow-Brown 4: Yellow-Green

Crankshaft

Width A	51.90–52.50 mm (2.04–2.07 in)
Width B	268.80–270.00 mm (10.58–10.63 in)
Runout limit C	0.030 mm (0.0012 in)
Big end side clearance D	0.160–0.262 mm (0.0063–0.0103 in)



Small end free play	0.32–0.50 mm (0.01–0.02 in)
Journal oil clearance	0.016–0.040 mm (0.0006–0.0016 in)
Bearing color code	0.White 1.Blue 2.Black 3.Brown 4.Green

Clutch

Clutch type	Wet, multiple-disc
Clutch release method	Inner push, cam push
Clutch lever free play	10.0–15.0 mm (0.39–0.59 in)
Friction plate thickness	2.92–3.08 mm (0.115–0.121 in)

Wear limit	2.80 mm (0.1102 in)
Plate quantity	6 pcs
Friction plate thickness	2.92–3.08 mm (0.115–0.121 in)
Wear limit	2.80 mm (0.1102 in)
Plate quantity	1 pcs
Friction plate thickness	2.94–3.06 mm (0.116–0.120 in)
Water limit	2.84 mm (0.1118 in)
Plate quantity	1 pcs
Clutch plate thickness	1.90–2.10 mm (0.075–0.083 in)
Plate quantity	7 pcs
Warpage limit	0.10 mm (0.0039 in)
Clutch spring free length	55.00 mm (2.17 in)
Minimum length	54.00 mm (2.13 in)
Spring quantity	6 pcs
Transmission	
Transmission type	Constant mesh 6-speed
Primary reduction system	Spur gear
Primary reduction ratio	86/44 (1.955)
Secondary reduction system	Chain drive
Secondary reduction ratio	46/16 (2.875)
Operation	Left foot operation
Gear ratio	
1st	37/13 (2.846)
2nd	37/19 (1.947)
3rd	28/18 (1.556)
4th	32/24 (1.333)
5th	25/21 (1.190)
6th	26/24 (1.083)
Main axle runout limit	0.02 mm (0.0008 in)
Drive axle runout limit	0.02 mm (0.0008 in)
Shifting mechanism	
Shift mechanism type	Shift drum
Shift fork guide bar bending limit	0.050 mm (0.0020 in)
Shift fork thickness	5.76–5.89 mm (0.2268–0.2319 in)
Limit	5.50 mm (0.22 in)
Air filter	
Air filter element	Oil-coated paper element
Fuel pump	
Pump type	Electrical
Maximum consumption amperage	5.5 A
Output pressure	250.0 kPa (2.50 kgf/cm^2, 36.3 psi)
Fuel injector	
Model/quantity	0290 x 4
Throttle body	
Type/quantity	32EIDW-B1/1
ID mark	20S1 00
Throttle valve size	#50
Throttle position sensor	
Resistance	1.75–3.25 kΩ
Output voltage (at idle)	0.63–0.73 V

Idling condition	
Engine idling speed	1250–1350 r/min
CO%	4.5–5.5 %
Intake vacuum	32.0 kPa (238 mmHg, 9.37 inHg)
Water temperature	95.0–105.0 °C (203.00–221.00 °F)
Oil temperature	75.0–85.0 °C (167.00–185.00 °F)
Throttle cable free play	3.0–5.0 mm (0.12–0.20 in)

EAS20300
CHASSIS SPECIFICATIONS

Chassis	
Frame type	Diamond
Caster angle	26.00 °
Trail	103.5 mm (4.08 in)
Front wheel	
Wheel type	Cast wheel
Rim size	17M/C x MT3.50
Rim material	Aluminum
Wheel travel	130.0 mm (5.12 in)
Radial wheel runout limit	1.0 mm (0.04 in)
Lateral wheel runout limit	0.5 mm (0.02 in)
Rear wheel	
Wheel type	Cast wheel
Rim size	17M/C x MT4.50
Rim material	Aluminum
Wheel travel	130.0 mm (5.12 in)
Radial wheel runout limit	1.0 mm (0.04 in)
Lateral wheel runout limit	0.5 mm (0.02 in)
Front tire	
Type	Tubeless
Size	120/70 ZR17M/C (58W)
Manufacturer/model	BRIDGESTONE/BT021
Manufacturer/model	DUNLOP/ROADSMART
Wear limit (front)	XJ6S/XJ6SA 1.6 mm (0.06 in) XJ6SY 1.0 mm (0.04 in)
Rear tire	
Type	Tubeless
Size	160/60 ZR17M/C (69W)
Manufacturer/model	BRIDGESTONE/BT021
Manufacturer/model	DUNLOP/ROADSMART
Wear limit (rear)	XJ6S/XJ6SA 1.6 mm (0.06 in) XJ6SY 1.0 mm (0.04 in)
Tire air pressure (measured on cold tires)	
Loading condition	0–90 kg (0–198 lb)
Front	225 kPa (2.25 kgf/cm^2, 33 psi, 2.25 bar)
Rear	250 kPa (2.50 kgf/cm^2, 36 psi, 2.50 bar)
Loading condition	XJ6S/XJ6SY 90–189 kg (198–417 lb) XJ6SA 90–184 kg (198–406 lb)
Front	250 kPa (2.50 kgf/cm^2, 36 psi, 2.50 bar)
Rear	290 kPa (2.90 kgf/cm^2, 42 psi, 2.90 bar)
High-speed riding	
Front	225 kPa (2.25 kgf/cm^2, 33 psi, 2.25 bar)
Rear	250 kPa (2.50 kgf/cm^2, 36 psi, 2.50 bar)
Front brake	
Type	Dual disc brake
Operation	Right hand operation
Front disc brake	
Disc outside diameter × thickness	298.0 × 4.5 mm (11.73 × 0.18 in)

Brake disc thickness limit	4.0 mm (0.16 in)
Brake disc deflection limit	0.10 mm (0.0039 in)
Brake pad lining thickness (inner)	6.0 mm (0.24 in)
Limit	0.8 mm (0.03 in)
Brake pad lining thickness (outer)	6.0 mm (0.24 in)
Limit	0.8 mm (0.03 in)
Master cylinder inside diameter	16.00 mm (0.63 in)
Caliper cylinder inside diameter	30.16 mm (1.19 in)
Caliper cylinder inside diameter	25.40 mm (1.00 in)
Recommended fluid	DOT 4
Rear brake	
Type	Single disc brake
Operation	Right foot operation
Rear disc brake	
Disc outside diameter × thickness	245.0 × 5.0 mm (9.65 × 0.20 in)
Brake disc thickness limit	4.5 mm (0.18 in)
Brake disc deflection limit	0.15 mm (0.0059 in)
Brake pad lining thickness (inner)	7.0 mm (0.28 in)
Limit	1.5 mm (0.06 in)
Brake pad lining thickness (outer)	7.0 mm (0.28 in)
Limit	1.5 mm (0.06 in)
Master cylinder inside diameter	12.7 mm (0.50 in)
Caliper cylinder inside diameter	38.10 mm (1.50 in)
Recommended fluid	DOT 4
Steering	
Steering bearing type	Angular bearing
Center to lock angle (left)	35.0 °
Center to lock angle (right)	35.0 °
Front suspension	
Type	Telescopic fork
Spring/shock absorber type	Coil spring/oil damper
Front fork travel	130.0 mm (5.12 in)
Fork spring free length	365.1 mm (14.37 in)
Collar length	145.0 mm (5.71 in)
Installed length	358.1 mm (14.10 in)
Spring rate K1	7.40 N/mm (0.75 kgf/mm, 42.25 lb/in)
Spring rate K2	11.80 N/mm (1.20 kgf/mm, 67.38 lb/in)
Spring stroke K1	0.0–70.0 mm (0.00–2.76 in)
Spring stroke K2	70.0–130.0 mm (2.76–5.12 in)
Inner tube outer diameter	41.0 mm (1.61 in)
Inner tube bending limit	0.2 mm (0.01 in)
Optional spring available	No
Recommended oil	Suspension oil 01 or equivalent
Quantity	473.0 cm^3 (15.99 US oz, 16.68 Imp.oz)
Front fork leg oil level (from the top of the inner tube, with the inner tube fully compressed and without the fork spring)	115.0 mm (4.53 in)
Rear suspension	
Type	Swingarm (monocross)
Spring/shock absorber type	Coil spring/gas-oil damper
Rear shock absorber assembly travel	42.0 mm (1.65 in)

Spring free length	177.5 mm (6.99 in)
Installed length	165.5 mm (6.52 in)
Spring rate K1	176.50 N/mm (18.00 kgf/mm, 1007.82 lb/in)
Spring stroke K1	0.0–42.0 mm (0.00–1.65 in)
Optional spring available	No
Enclosed gas/air pressure (STD)	1500 kPa (15.0 kgf/cm^2, 213.3 psi)
Spring preload adjusting positions	
Minimum	1
Standard	3
Maximum	7
Drive chain	
Type/manufacturer	520 VP2/DAIDO
Number of links	118
Drive chain slack	45.0–55.0 mm (1.77–2.17 in)
15-link length limit	239.3 mm (9.42 in)

EAS20310
ELECTRICAL SPECIFICATIONS

Voltage	
System voltage	12 V
Ignition system	
Ignition system	TCI (digital)
Advancer type	Digital
Ignition timing (B.T.D.C.)	6.5 °/1300 r/min
Engine control unit	
Model/manufacturer	XJ6S/XJ6SY FUA0030/MITSUBISHI XJ6SA FUA0031/MITSUBISHI
Crankshaft position sensor	
Crankshaft position sensor resistance	248–372 Ω (Gy-B)
Ignition coil	
Minimum ignition spark gap	6.0 mm (0.24 in)
Primary coil resistance	1.53–2.07 Ω
Secondary coil resistance	12.00–18.00 kΩ
Spark plug cap	
Material	Resin
Resistance	10.0 kΩ
AC magneto	
Standard output	14.0 V, 330 W@5000 r/min
Stator coil resistance	0.240–0.360 Ω (W-W)
Rectifier/regulator	
Regulator type	Semi conductor-short circuit
No load regulated voltage	14.1–14.9 V
Rectifier capacity	35.0 A
Battery	
Model	GT12B-4
Voltage, capacity	12 V, 10.0 Ah
Specific gravity	1.330
Manufacturer	GS YUASA
Ten hour rate amperage	1.00 A
Headlight	
Bulb type	Halogen bulb
Bulb voltage, wattage × quantity	
Headlight	12 V, 60 W/55.0 W × 1
Auxiliary light	12 V, 5.0 W × 1
Tail/brake light	12 V, 5.0 W/21.0 W × 1
Front turn signal light	12 V, 10.0 W × 2
Rear turn signal light	12 V, 10.0 W × 2
License plate light	12 V, 5.0 W × 1
Indicator light	
Neutral indicator light	LED
Turn signal indicator light	LED
Oil level warning light	LED
High beam indicator light	LED

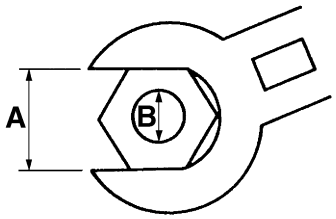
Coolant temperature warning light	LED
Engine trouble warning light	LED
ABS warning light	XJ6SA LED
Immobilizer system indicator light	LED
Electric starting system	
System type	Constant mesh
Starter motor	
Power output	0.60 kW
Armature coil resistance	0.0012–0.0022 Ω
Brush overall length	10.0 mm (0.39 in)
Limit	3.50 mm (0.14 in)
Brush spring force	7.16–9.52 N (730–971 gf, 25.77–34.27 oz)
Commutator diameter	28.0 mm (1.10 in)
Limit	27.0 mm (1.06 in)
Mica undercut (depth)	0.70 mm (0.03 in)
Starter relay	
Amperage	180.0 A
Coil resistance	4.18–4.62 Ω
Horn	
Horn type	Plane
Quantity	1 pcs
Maximum amperage	3.0 A
Coil resistance	1.07–1.11 Ω
Turn signal/hazard relay	
Relay type	Full transistor
Built-in, self-canceling device	No
Turn signal blinking frequency	75–95 cycles/min
Fuel sender unit	
Sender unit resistance (full)	19.0–21.0 Ω
Sender unit resistance (empty)	139.0–141.0 Ω
Starting circuit cut-off relay	
Coil resistance	162.0–198.0 Ω
Headlight relay	
Coil resistance	86.40–105.60 Ω
Thermo unit	
Resistance at 80°C	290.0–354.0 Ω
Fuses	
Main fuse	30.0 A
Headlight fuse	20.0 A
Taillight fuse	10.0 A
Signaling system fuse	7.5 A
Ignition fuse	10.0 A
Radiator fan fuse	20.0 A
Fuel injection system fuse	10.0 A
Backup fuse	7.5 A
ABS motor fuse	XJ6SA 30.0 A
ABS ECU fuse	XJ6SA 7.5 A
ABS solenoid fuse	XJ6SA 20.0 A

Spare fuse	XJ6S/XJ6SY 30.0 A XJ6SA 30.0 A×2
Spare fuse	20.0 A
Spare fuse	10.0 A 7.5 A

EAS20320
TIGHTENING TORQUES

EAS20330
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·kgf	ft·lbf
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

EAS20340
ENGINE TIGHTENING TORQUES

Item	Thread size	Q'ty	Tightening torque	Remarks
Spark plugs	M10	4	13 Nm (1.3 m·kgf, 9.4 ft·lbf)	
Cylinder head stud bolt	M8	8	15 Nm (1.5 m·kgf, 10 ft·lbf)	
Cylinder head plug	M20	3	42 Nm (4.2 m·kgf, 30 ft·lbf)	LT
Cylinder head bolt	M10	10	See TIP	E
Cylinder head bolt	M6	2	12 Nm (1.2 m·kgf, 8.7 ft·lbf)	
Camshaft caps bolt	M6	20	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Cylinder head cover bolt	M6	6	12 Nm (1.2 m·kgf, 8.7 ft·lbf)	
Camshaft cap oil check bolt	M8	1	15 Nm (1.5 m·kgf, 10 ft·lbf)	
Air induction system reed valve cap bolt	M6	4	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Air cut-off valve bracket bolt	M6	1	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Camshaft sprocket bolt	M7	4	20 Nm (2.0 m·kgf, 14 ft·lbf)	
Connecting rod cap bolt	M7	8	15 Nm (1.5 m·kgf, 11 ft·lbf) + 120°	M
Generator rotor bolt	M12	1	75 Nm (7.5 m·kgf, 54 ft·lbf)	E
Timing chain tensioner bolt	M6	2	12 Nm (1.2 m·kgf, 8.7 ft·lbf)	

Item	Thread size	Q'ty	Tightening torque	Remarks
Thermostat cover bolt	M6	2	12 Nm (1.2 m·kgf, 8.7 ft·lbf)	
Water jacket joint bolt	M6	2	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Water pump cover bolt	M6	1	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Coolant drain bolt	M6	1	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Water pump bolt	M6	2	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Coolant temperature	M12	1	18 Nm (1.8 m·kgf, 12 ft·lbf)	
Radiator bolt	M6	2	7 Nm (0.7 m·kgf, 5.0 ft·lbf)	
Radiator stay and crankcase	M6	1	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Radiator cap stopper bolt	M5	1	5 Nm (0.5 m·kgf, 3.6 ft·lbf)	
Oil pump cover bolt	M6	3	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Oil pump bolt	M6	3	12 Nm (1.2 m·kgf, 8.7 ft·lbf)	
Oil pan bolt	M6	12	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Oil cooler union bolt	M20	1	63 Nm (6.3 m·kgf, 46 ft·lbf)	Apply oil to threads and surface
Engine oil drain bolt	M14	1	43 Nm (4.3 m·kgf, 31 ft·lbf)	
Oil filter union bolt	M20	1	70 Nm (7.0 m·kgf, 51 ft·lbf)	
Oil filter	M20	1	17 Nm (1.7 m·kgf, 12 ft·lbf)	Apply grease to O-ring
Oil pump chain guide bolt	M6	2	12 Nm (1.2 m·kgf, 8.7 ft·lbf)	
Oil pipe bolt	M6	2	12 Nm (1.2 m·kgf, 8.7 ft·lbf)	
Intake air temperature sensor	M5	1	2.5 Nm (0.3 m·kgf, 1.8 ft·lbf)	
Throttle body joint bolt	M6	6	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Air filter case cover	M5	9	2.5 Nm (0.3 m·kgf, 1.8 ft·lbf)	
Air filter case	M6	1	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Throttle body and throttle body joint	M4	4	2.8 Nm (0.28 m·kgf, 2.0 ft·lbf)	
Throttle body and air filter case	M5	4	2.8 Nm (0.28 m·kgf, 2.0 ft·lbf)	
Intake air pressure sensor	M5	1	3.5 Nm (0.4 m·kgf, 2.5 ft·lbf)	
Fast idle plunger assembly	M5	2	3.5 Nm (0.4 m·kgf, 2.5 ft·lbf)	
Exhaust pipe nut	M8	8	20 Nm (2.0 m·kgf, 14 ft·lbf)	
Muffler bolt	M8	2	20 Nm (2.0 m·kgf, 14 ft·lbf)	
Muffler bracket and frame	M6	4	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	

Item	Thread size	Q'ty	Tightening torque	Remarks
Muffler cap	M6	3	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Clutch cover bolt	M6	10	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Generator cover bolt	M6	7	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Crankcase bolt (main journal)	M8	10	See TIP	Apply oil to threads and surface
Crankcase bolt (bolt number "13","14")	M6	2	12 Nm (1.2 m·kgf, 8.7 ft·lbf)	Apply oil to threads and surface
Crankcase bolt (bolt number "15"–"17", "19"–"27")	M6	12	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	Apply oil to threads and surface
Crankcase bolt (bolt number "18")	M6	1	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	Apply oil to surface
Crankcase bolt	M8	2	24 Nm (2.4 m·kgf, 17 ft·lbf)	Apply oil to threads and surface
Clutch cable holder bolt	M6	2	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Push lever assembly shaft stopper	M6	1	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Push lever assembly	M6	2	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Pickup coil rotor cover bolt	M6	7	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Timing mark accessing bolt	M8	1	15 Nm (1.5 m·kgf, 11 ft·lbf)	
Breather plate screw	M6	3	12 Nm (1.2 m·kgf, 8.7 ft·lbf)	
Stator coil bolt	M6	3	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Stator coil lead clamp screw	M6	1	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Drive sprocket cover bolt	M6	3	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Main gallery bolt	M16	2	8 Nm (0.8 m·kgf, 5.8 ft·lbf)	Do not over tighten
Ventilation chamber cover bolt	M6	6	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Stay 1 (XJ6S)	M6	2	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	

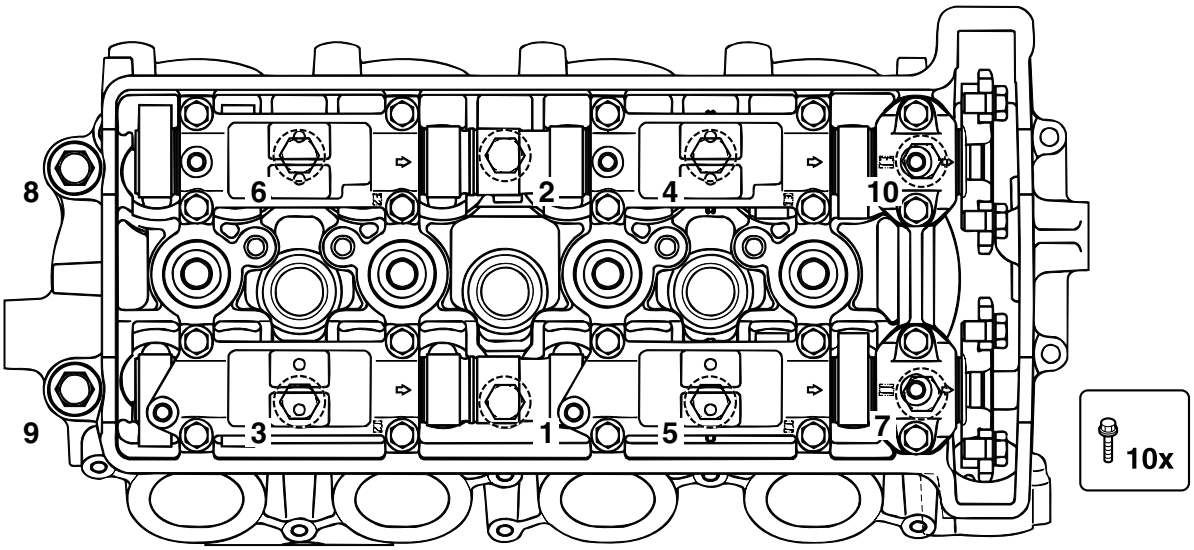
Item	Thread size	Q'ty	Tightening torque	Remarks
Crankshaft position sensor bolt	M6	2	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Starter clutch screw	M8	3	32 Nm (3.2 m·kgf, 23 ft·lbf)	
Starter motor assembly bolt	M6	2	3.4 Nm (0.34 m·kgf, 2.3 ft·lbf)	
Clutch compression spring bolt	M6	6	8 Nm (0.8 m·kgf, 5.8 ft·lbf)	
Clutch boss nut	M20	1	95 Nm (9.5 m·kgf, 68 ft·lbf)	Stake the nut on slot of shaft
Push rod 2 lock nut	M6	1	8 Nm (0.8 m·kgf, 5.8 ft·lbf)	
Drive sprocket nut	M20	1	85 Nm (8.5 m·kgf, 61 ft·lbf)	Stake the nut on slot of shaft
Transmission bearing housing screw	M6	3	12 Nm (1.2 m·kgf, 8.7 ft·lbf)	
Shift fork guide bar retainer bolt	M6	2	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
O_2 sensor	M10	1	15 Nm (1.5 m·kgf, 10 ft·lbf)	
Shift shaft spring stopper screw	M8	1	22 Nm (2.2 m·kgf, 16 ft·lbf)	
Shift rod lock nut	M6	1	9 Nm (0.9 m·kgf, 6.5 ft·lbf)	Left thread
Shift rod lock nut	M6	1	9 Nm (0.9 m·kgf, 6.5 ft·lbf)	
Shift rod joint	M6	1	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Shift arm bolt	M6	1	16 Nm (1.6 m·kgf, 11 ft·lbf)	
Pickup rotor bolt	M8	1	35 Nm (3.5 m·kgf, 25 ft·lbf)	
Starter motor bolt	M6	2	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Neutral switch	M10	1	20 Nm (2.0 m·kgf, 14 ft·lbf)	
Oil level switch bolt	M6	2	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Speed sensor bolt (XJ6S)	M6	1	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Throttle position sensor bolt	M5	2	3.5 Nm (0.35 m·kgf, 2.5 ft·lbf)	

TIP

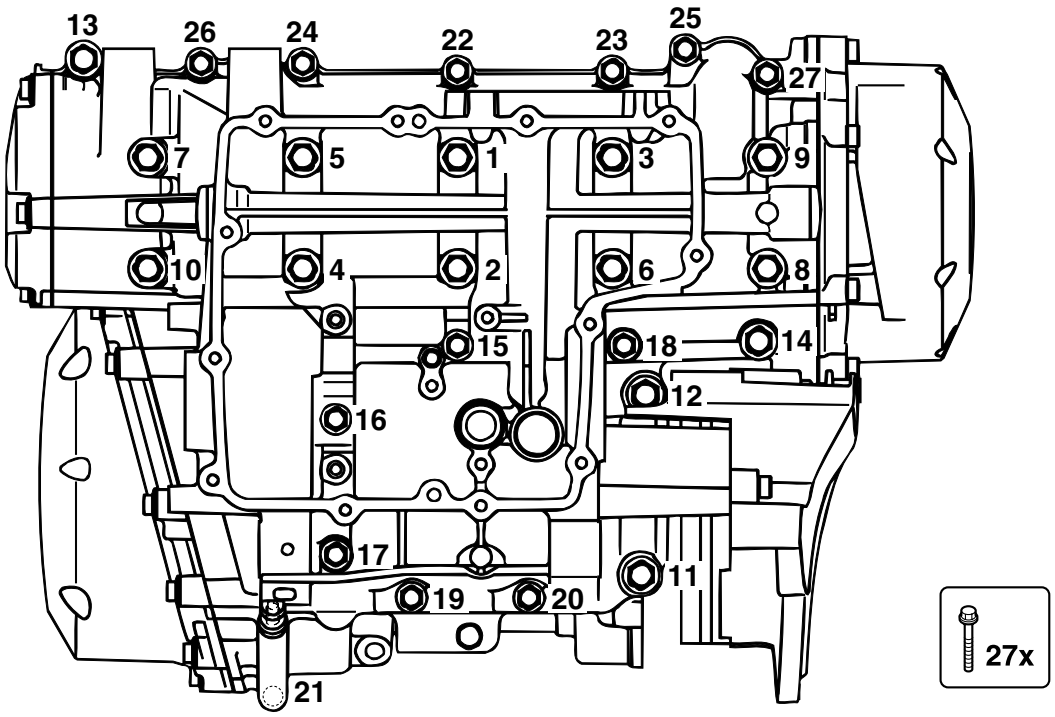
- Cylinder head bolt
  1. Tighten the bolts to 19 Nm (1.9 m·kgf, 14 ft·lbf) "1"–"10" following the tightening order.
  2. Retighten the bolts 50 Nm (5.0 m·kgf, 36 ft·lbf) "1"–"10" following the tightening order.
  3. Loosen the bolt "1" and retighten it 12 Nm (1.2 m·kgf, 8.8 ft·lb) and then to the 120° angle.
  4. Repeat the step 3 to the bolt "2"–"10" following the tightening order.
- Crankcase bolt (main journal)
  1. Tighten the bolts to 20 Nm (2.0 m·kgf, 14 ft·lbf) "1"–"10" following the tightening order.
  2. Loosen the bolt "1" and retighten it 12 Nm (1.2 m·kgf, 8.8 ft·lb).
  3. Repeat the step 2 to the bolts "2"–"10" following the tightening order.
  4. Tighten at 50°–60° angle according to the tightening order ("1"–"7", "10").

Tighten at 75°–85° angle according to the tightening order (“8”, “9”).

Cylinder head tightening sequence.



Crankcase tightening sequence.



EAS20350

CHASSIS TIGHTENING TORQUES

Item	Thread size	Q’ty	Tightening torque	Remarks
Upper bracket pinch bolt	M8	2	20 Nm (2.0 m·kgf, 14 ft·lbf)	
Grip end	M16	2	26 Nm (2.6 m·kgf, 18 ft·lbf)	
Left handlebar switch screw	M5	2	4 Nm (0.4 m·kgf, 2.9 ft·lbf)	

Item	Thread size	Q'ty	Tightening torque	Remarks
Right handlebar switch screw	M5	3	4 Nm (0.4 m·kgf, 2.9 ft·lbf)	
Steering stem nut	M22	1	110 Nm (11 m·kgf, 80 ft·lbf)	
Upper handlebar holder bolt	M8	4	24 Nm (2.4 m·kgf, 17 ft·lbf)	
Lower bracket pinch bolt	–	2	30 Nm (3.0 m·kgf, 22 ft·lbf)	
Lower ring nut	M25	1	See TIP	See TIP
Front fork cap bolt	M37	2	24 Nm (2.4 m·kgf, 17 ft·lbf)	
Damper rod assembly bolt	M10	2	23 Nm (2.3 m·kgf, 17 ft·lbf)	
Front wheel axle pinch bolt	M8	1	19 Nm (1.9 m·kgf, 13 ft·lbf)	
Front brake master cylinder holder bolt	M6	2	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Front brake master cylinder cap screw	M4	2	1.5 Nm (0.15 m·kgf, 1.1 ft·lbf)	
Front brake hose union blot	M10	2	32 Nm (3.2 m·kgf, 23 ft·lbf)	
Front fender and front fork	M6	4	6 Nm (0.6 m·kgf, 4.3 ft·lbf)	
Rear side cover	M6	2	7 Nm (0.7 m·kgf, 5.0 ft·lbf)	
Clutch lever holder bolt	M6	1	11 Nm (1.1 m·kgf, 8.0 ft·lbf)	
Engine mount bolts (left of front side)	M10	2	55 Nm (5.5 m·kgf, 40 ft·lbf)	See TIP
Engine mount bolts (right of front side)	M10	2	55 Nm (5.5 m·kgf, 40 ft·lbf)	See TIP
Engine mount self locking nut (upper)	M10	1	55 Nm (5.5 m·kgf, 40 ft·lbf)	See TIP
Engine mount self locking nut (lower)	M10	1	55 Nm (5.5 m·kgf, 40 ft·lbf)	See TIP
Throttle cable adjust nut	M6	1	4 Nm (0.4 m·kgf, 2.9 ft·lbf)	
Clutch cable locknut	M8	1	7 Nm (0.7 m·kgf, 5.0 ft·lbf)	
Pivot shaft nut	M14	1	110 Nm (11.0 m·kgf, 79 ft·lbf)	
Rear shock absorber and frame	M12	1	51 Nm (5.1 m·kgf, 36 ft·lbf)	
Rear shock absorber and swing arm	M12	1	55 Nm (5.5 m·kgf, 39 ft·lbf)	
Drive chain guide bolt	M6	1	7 Nm (0.7 m·kgf, 5.0 ft·lbf)	
Rear brake hose holder and swing arm	M6	1	7 Nm (0.7 m·kgf, 5.0 ft·lbf)	
Chain cover bolt	M6	2	7 Nm (0.7 m·kgf, 5.0 ft·lbf)	
Fuel tank bracket and frame	M6	2	7 Nm (0.7 m·kgf, 5.0 ft·lbf)	
Fuel tank bracket and fuel tank	M6	2	7 Nm (0.7 m·kgf, 5.0 ft·lbf)	
Fuel tank and frame	M6	1	7 Nm (0.7 m·kgf, 5.0 ft·lbf)	

Item	Thread size	Q'ty	Tightening torque	Remarks
Fuel tank and fuel tank cap	M5	4	6 Nm (0.6 m·kgf, 4.3 ft·lbf)	
Fuel pump and fuel tank	M5	6	4 Nm (0.4 m·kgf, 2.9 ft·lbf)	
Ignition coil screw	M6	2	1.5 Nm (0.15 m·kgf, 1.1 ft·lbf)	
Seat lock and frame	M6	2	7 Nm (0.7 m·kgf, 5.0 ft·lbf)	
Seat key cylinder and mud guard	M6	2	3 Nm (0.3 m·kgf, 2.2 ft·lbf)	
Battery terminal	M6	2	2.5 Nm (0.25 m·kgf, 1.8 ft·lbf)	
Licence plate light screw	M5	2	2.5 Nm (0.25 m·kgf, 1.8 ft·lbf)	
Mud guard and frame	M6	4	23 Nm (2.3 m·kgf, 17 ft·lbf)	
Tail/brake right	M5	3	3 Nm (0.3 m·kgf, 2.2 ft·lbf)	
Grab bar bolt	M8	4	16 Nm (1.6 m·kgf, 11 ft·lbf)	
Lean angle sensor bolt	M4	2	2 Nm (0.2 m·kgf, 1.4 ft·lbf)	
Coolant reservoir tank cover bolt	M6	2	4 Nm (0.4 m·kgf, 2.9 ft·lbf)	
Front wheel axle	M16	1	65 Nm (6.5 m·kgf, 46 ft·lbf)	
Front wheel axle pinch bolt	M8	1	19 Nm (1.9 m·kgf, 13 ft·lbf)	
Front brake caliper bolt	M10	4	27 Nm (2.7 m·kgf, 19 ft·lbf)	
Front brake disc bolt	M6	10	18 Nm (1.8 m·kgf, 13 ft·lbf)	
Front brake caliper bleed screw	M7	2	6 Nm (0.6 m·kgf, 4.3 ft·lbf)	
Rear brake caliper bleed screw	M7	1	5 Nm (0.5 m·kgf, 3.6 ft·lbf)	
Rear wheel axle nut	M16	1	90 Nm (9.0 m·kgf, 64 ft·lbf)	
Rear brake disc and rear wheel	M8	5	20 Nm (2.0 m·kgf, 14 ft·lbf)	
Rear brake caliper bolt front and rear brake caliper bracket	M12	1	27 Nm (2.7 m·kgf, 20 ft·lbf)	
Rear brake caliper bolt rear and rear brake caliper bracket	M8	1	22 Nm (2.2 m·kgf, 16 ft·lbf)	
Rear brake caliper pad pin screw plug	M10	1	2.5 Nm (0.3 m·kgf, 1.8 ft·lbf)	
Rear brake caliper pad pin	M10	1	17 Nm (1.7 m·kgf, 12 ft·lbf)	
Rear wheel sprocket and rear wheel drive hub	M10	6	80 Nm (8.0 m·kgf, 57 ft·lbf)	
Chain adjusting bolt lock nut	M8	2	16 Nm (1.6 m·kgf, 12 ft·lbf)	
Rear brake hose union bolt	M10	1	30 Nm (3.0 m·kgf, 22 ft·lbf)	
Sidestand nut	M10	1	54 Nm (5.4 m·kgf, 38 ft·lbf)	
Sidestand bracket and frame	M10	3	63 Nm (6.3 m·kgf, 46 ft·lbf)	
Sidestand switch nut	M5	2	4 Nm (0.4 m·kgf, 2.9 ft·lbf)	
Centerstand bolt	M10	2	73 Nm (7.3 m·kgf, 52 ft·lbf)	

Item	Thread size	Q'ty	Tightening torque	Remarks
Brake pedal and footrest bracket	M6	1	7 Nm (0.7 m·kgf, 5.0 ft·lbf)	
Footrest bolt	M8	2	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Footrest bracket and frame	M8	6	30 Nm (3.0 m·kgf, 22 ft·lbf)	
Rear brake fluid reservoir and bracket	M6	1	3 Nm (0.3 m·kgf, 2.2 ft·lbf)	
Rear master cylinder and footrest bracket	M8	2	23 Nm (2.3 m·kgf, 17 ft·lbf)	
Shift pedal bolt	M8	1	22 Nm (2.2 m·kgf, 15 ft·lbf)	
Shift rod lock nut	M6	2	9 Nm (0.9 m·kgf, 6.5 ft·lbf)	
Footrest cover screw	M5	4	4 Nm (0.4 m·kgf, 2.9 ft·lbf)	
Passenger footrest cover screw	M5	2/2	4 Nm (0.4 m·kgf, 2.9 ft·lbf)	
Rear side reflector nut (for AUS)	M5	2	2 Nm (0.2 m·kgf, 1.4 ft·lbf)	
Rear side reflector stay nut (for AUS)	M4	4	3 Nm (0.3 m·kgf, 2.2 ft·lbf)	
Rear reflector nut	M5	1	2 Nm (0.2 m·kgf, 1.4 ft·lbf)	
License plate bracket nut	M6	2	4 Nm (0.4 m·kgf, 2.9 ft·lbf)	
Rear fender screw	M5	4	2.5 Nm (0.3 m·kgf, 1.8 ft·lbf)	
Front cowling assembly bolt	M8	2	33 Nm (3.3 m·kgf, 23 ft·lbf)	
Cowling stay and headlight assembly	M6	4	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Side panel bolt	M6	6	7 Nm (0.7 m·kgf, 5.0 ft·lbf)	
Front wheel sensor bolt (with ABS)	M6	1	7 Nm (0.7 m·kgf, 5.0 ft·lbf)	
Rear wheel sensor bolt (with ABS)	M6	1	7 Nm (0.7 m·kgf, 5.0 ft·lbf)	
Front sensor rotor and front wheel (with ABS)	M5	5	8 Nm (0.8 m·kgf, 5.8 ft·lbf)	
Rear sensor rotor and rear wheel (with ABS)	M5	5	8 Nm (0.8 m·kgf, 5.8 ft·lbf)	
Hydraulic unit and bracket (with ABS)	M6	3	7 Nm (0.7 m·kgf, 5.0 ft·lbf)	
Hydraulic unit and brake hose holder (with ABS)	M6	2	7 Nm (0.7 m·kgf, 5.0 ft·lbf)	
Front brake hose and brake hose holder (with ABS)	M6	1	7 Nm (0.7 m·kgf, 5.0 ft·lbf)	
Front brake pipe bracket and crank case (with ABS)	M6	2	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Hydraulic unit bracket and cap damper (with ABS)	M6	2	7 Nm (0.7 m·kgf, 5.0 ft·lbf)	
Hydraulic unit bracket and cap damper bolt (with ABS)	M8	3	16 Nm (1.6 m·kgf, 11 ft·lbf)	
Frame and member (with ABS)	M8	4	23 Nm (2.3 m·kgf, 16 ft·lbf)	

Item	Thread size	Q'ty	Tightening torque	Remarks
Brake hose union bolt (with ABS)	M10	2	30 Nm (3.0 m·kgf, 22 ft·lbf)	
Brake pipe/joint assembly flare nut (with ABS)	M10	4	16 Nm (1.6 m·kgf, 11 ft·lbf)	

TIP

- Lower ring nut
  1. First, tighten the ring nut to approximately 52 Nm (5.2 m·kgf, 38 ft·lbf) with a torque wrench, then loosen the ring nut completely.
  2. Retighten the lower ring nut to 18 Nm (1.8 m·kgf, 13 ft·lbf) with a torque wrench.
- Engine mount bolts and engine mount self locking nut
  Refer to "INSTALLING THE ENGINE" on page 5-6.

EAS20360
LUBRICATION POINTS AND LUBRICANT TYPES

EAS20370
ENGINE

Lubrication point	Lubricant
Oil seal lips	LS
O-rings	LS
Bearings and bushes	E
Crankshaft pins	E
Piston surfaces	E
Piston pins	E
Connecting rod bolts	M
Crankshaft journals	E
Camshaft profile journals	M
Valve stems (intake and exhaust)	M
Valve stem ends (intake and exhaust)	M
Valve lifter surface	E
Piston cooler (O-ring)	LS or E
Oil pump rotors (inner and outer)	LS
Oil strainer	LS or E
Clutch (push rod)	LS
Starter clutch assembly inner surface	E
Idler gear	E
Primary driven gear	E
Transmission gears (wheel and pinion)	M
Main axle and drive axle	M
Shift forks and shift fork guide bars	E
Shift shaft	E
Push lever axle and cover 2	LS
Shift fork pin	E
Cylinder head cover mating surface	Three bond No.1541®

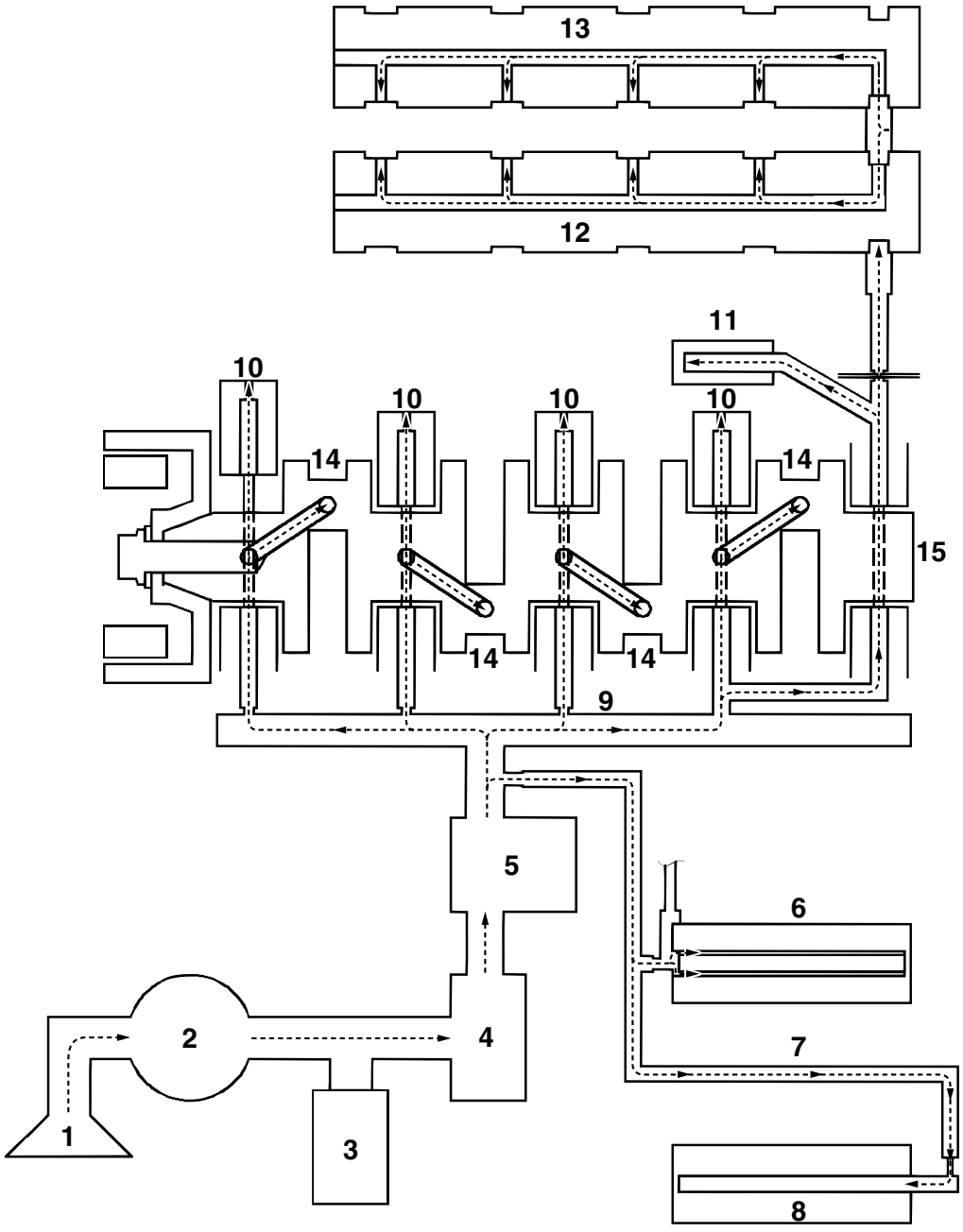
Lubrication point	Lubricant
Cylinder head cover semicircular	Three bond No.1215B®
Crankcase mating surface	Three bond No.1215®
Generator rotor cover (stator coil assembly lead grommet)	Three bond No.1215®
Pickup rotor cover (crankshaft position sensor lead grommet)	Three bond No.1215®

EAS20380
CHASSIS

Lubrication point	Lubricant
Steering bearings and bearing races (upper and lower)	LS
Rear arm pivot, bush outer surface, oil seal lip	M
Front wheel oil seal (right and left)	LS
Rear wheel oil seal	LS
Rear wheel drive hub oil seal	LS
Rear wheel drive hub mating surface	LS
Rear brake pedal shaft	LS
Sidestand pivoting point and metal-to-metal moving parts	LS
Link and sidestand switch contact point	LS
Throttle grip inner surface	LS
Brake lever pivoting point and metal-to-metal moving parts	S
Clutch lever pivoting point and metal-to-metal moving parts	LS
Rear shock absorber collar	M
Pivot shaft	LS
Swingarm pivot bearing	LS
Swingarm head pipe end, oil seal and bush	M
Shift pedal shaft	M
Shift shaft joint	LS
Rear footrest ball and metal-to-metal moving parts	LS
Centerstand metal-to-metal moving parts	LS
Rear wheel axle nut	LS
Clutch cable end	LS
Sidestand bracket and link mating surface	LS

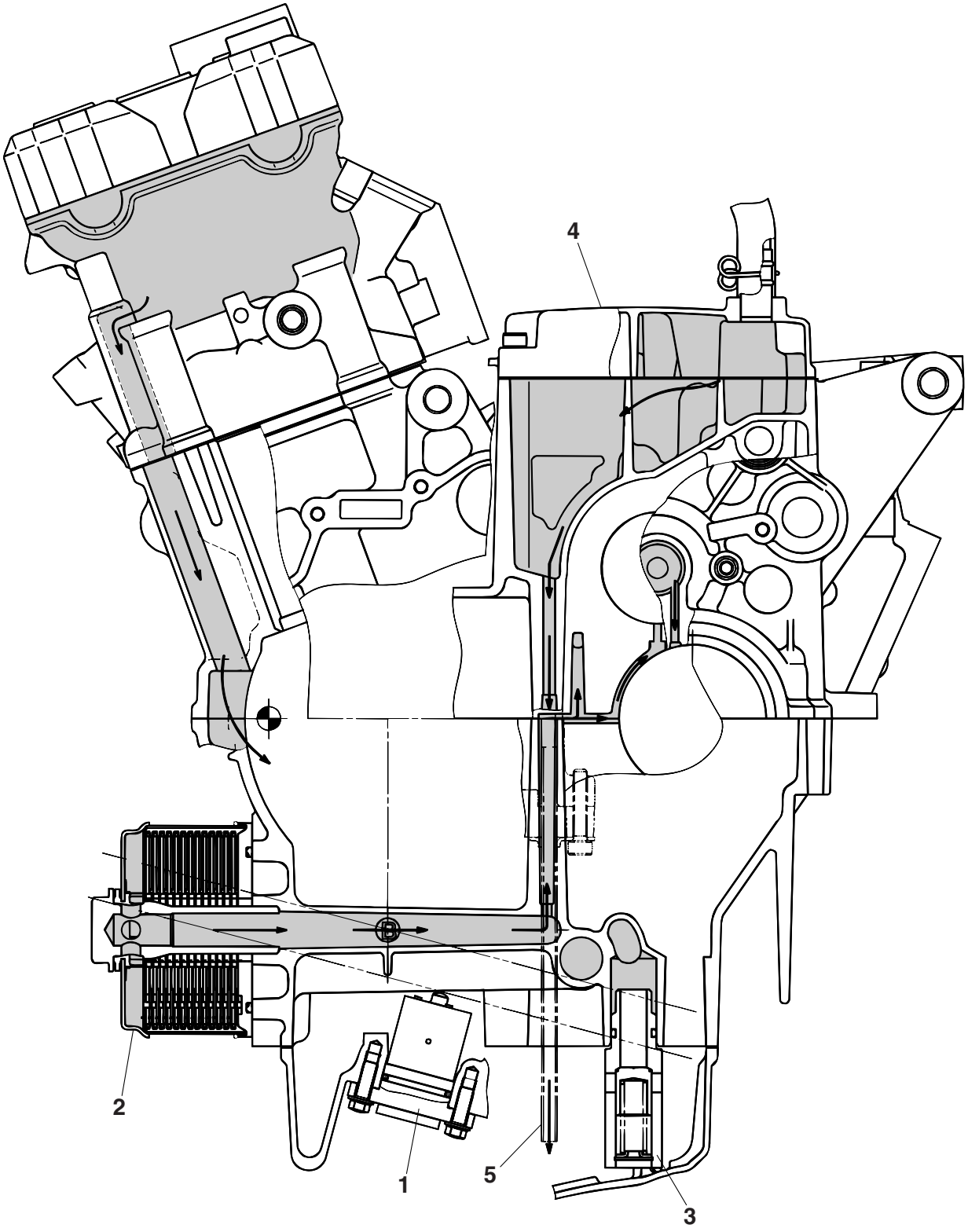
EAS20390
LUBRICATION SYSTEM CHART AND DIAGRAMS

EAS20400
ENGINE OIL LUBRICATION CHART

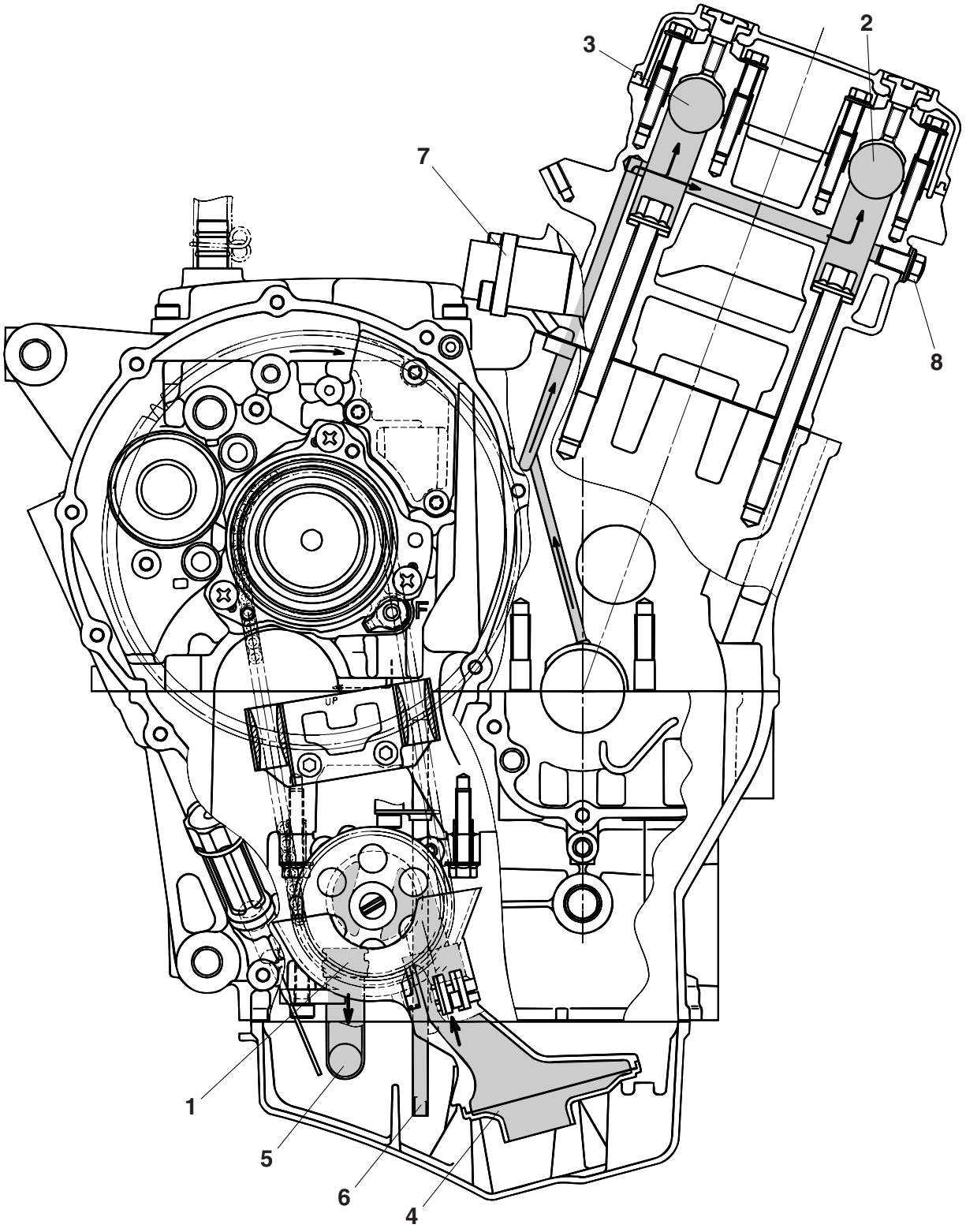


1. Oil strainer
2. Oil pump
3. Relief valve
4. Oil filter
5. Oil cooler
6. Main axle
7. Oil pipe
8. Drive axle
9. Main gallery
10. Oil nozzle
11. Timing chain tensioner
12. Intake camshaft
13. Exhaust camshaft
14. Big end
15. Crankshaft

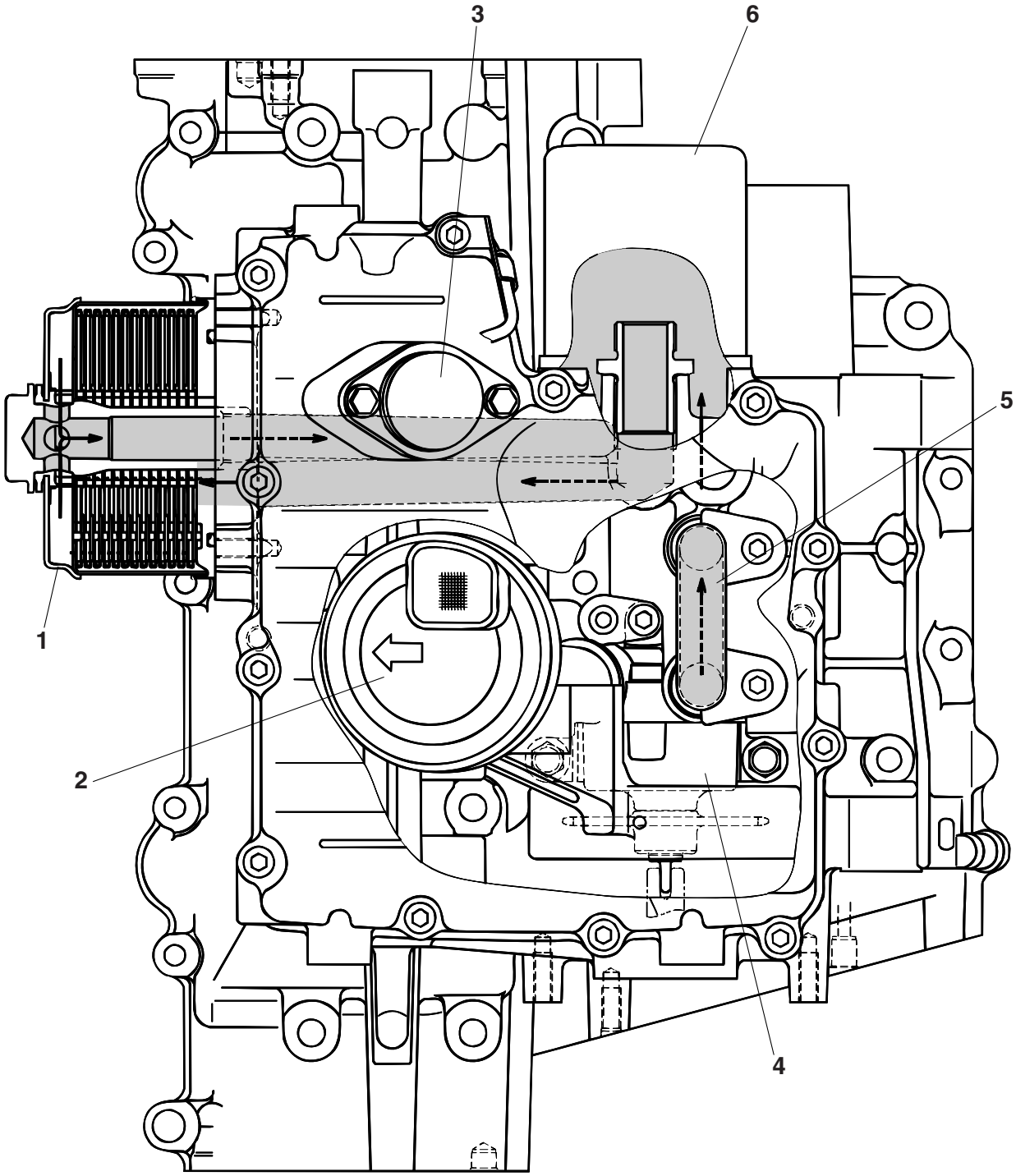
EAS20410
LUBRICATION DIAGRAMS



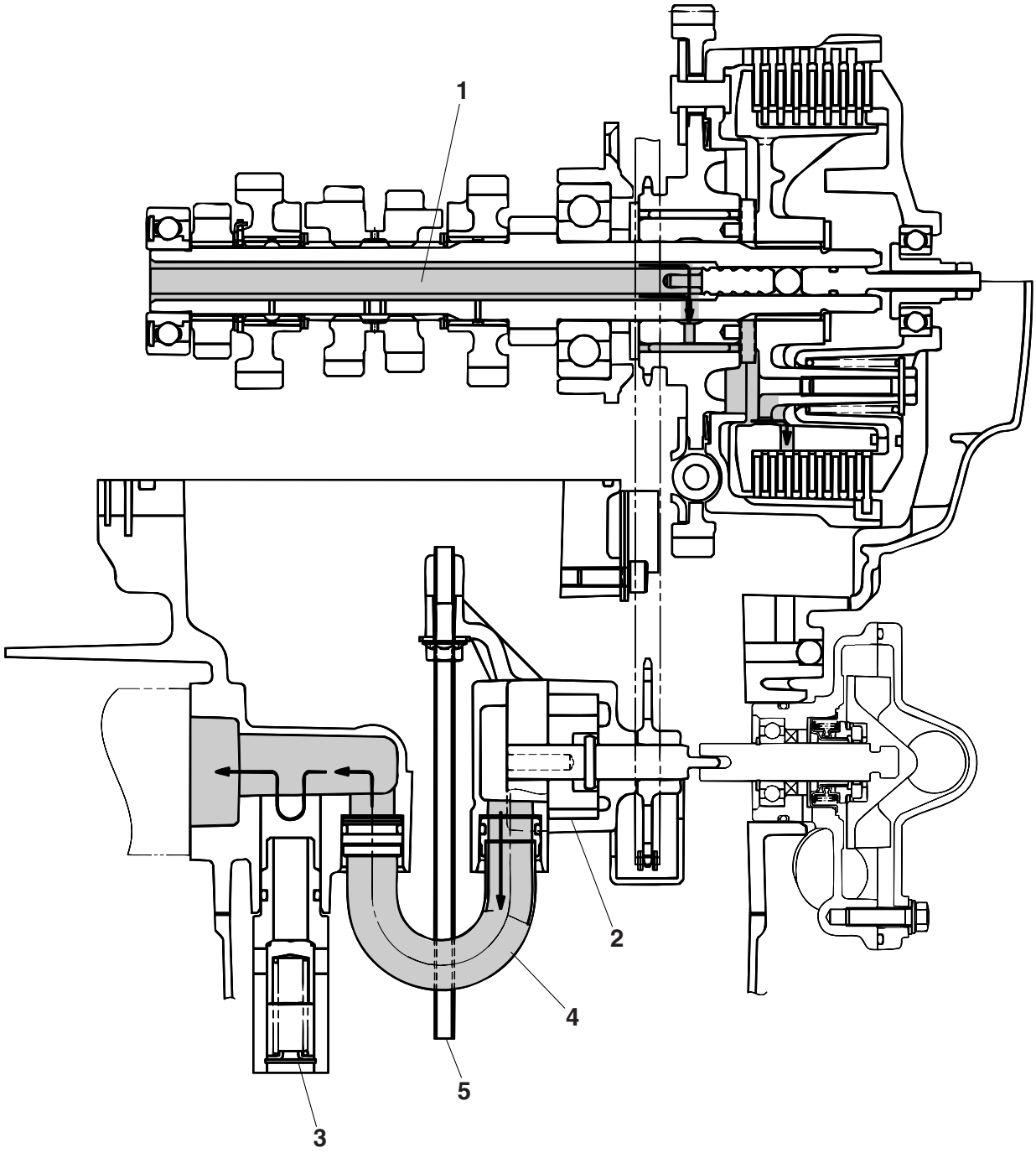
1. Oil level switch
2. Oil cooler
3. Relief valve
4. Ventilation chamber cover
5. Oil delivery pipe


3
2
7
8
F
UP
1
5
6
4

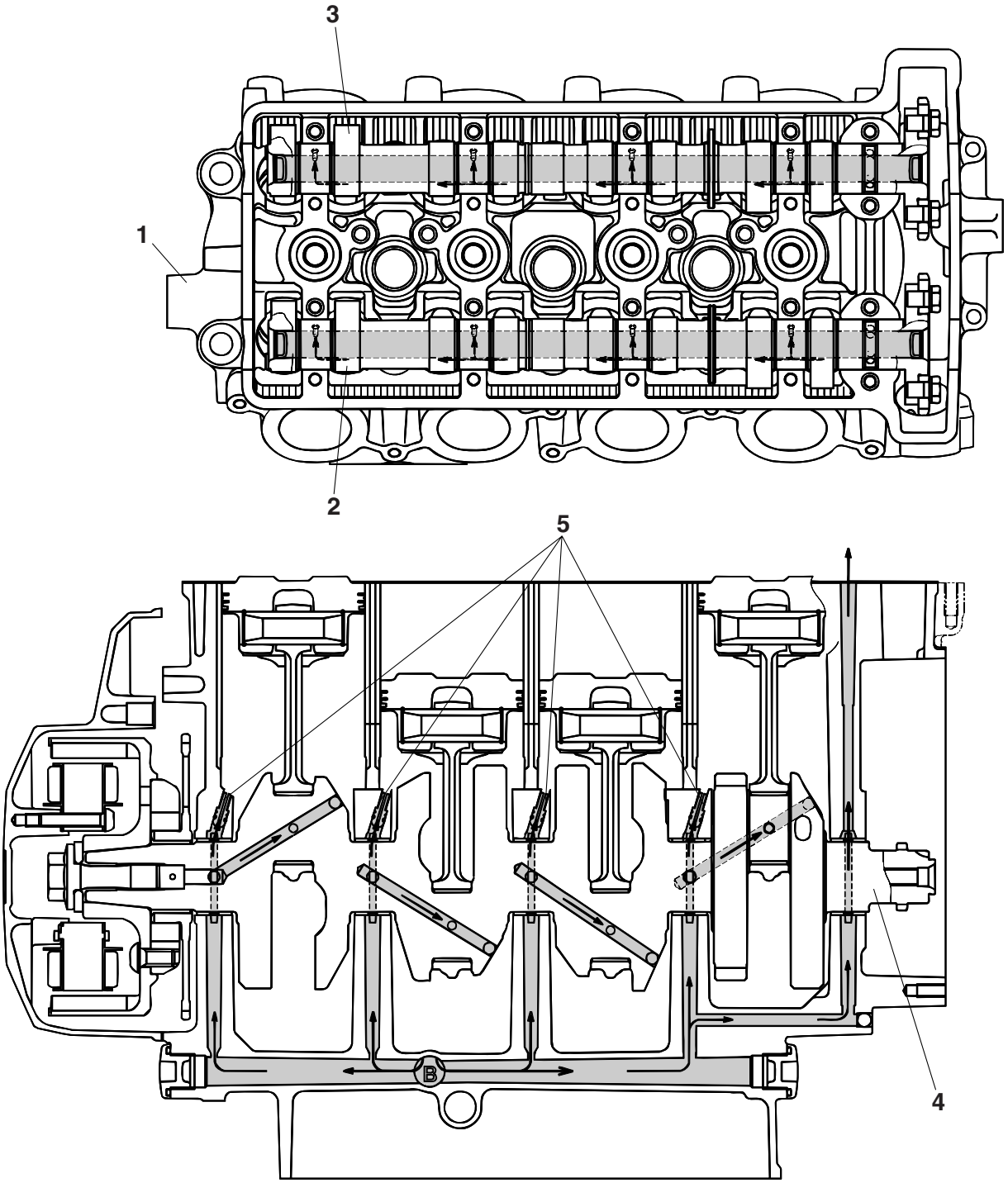
1. Oil pump
2. Exhaust camshaft
3. Intake camshaft
4. Oil strainer
5. Oil pipe
6. Oil delivery pipe
7. Timing chain tensioner
8. Oil check bolt


3
6
5
1
2
4

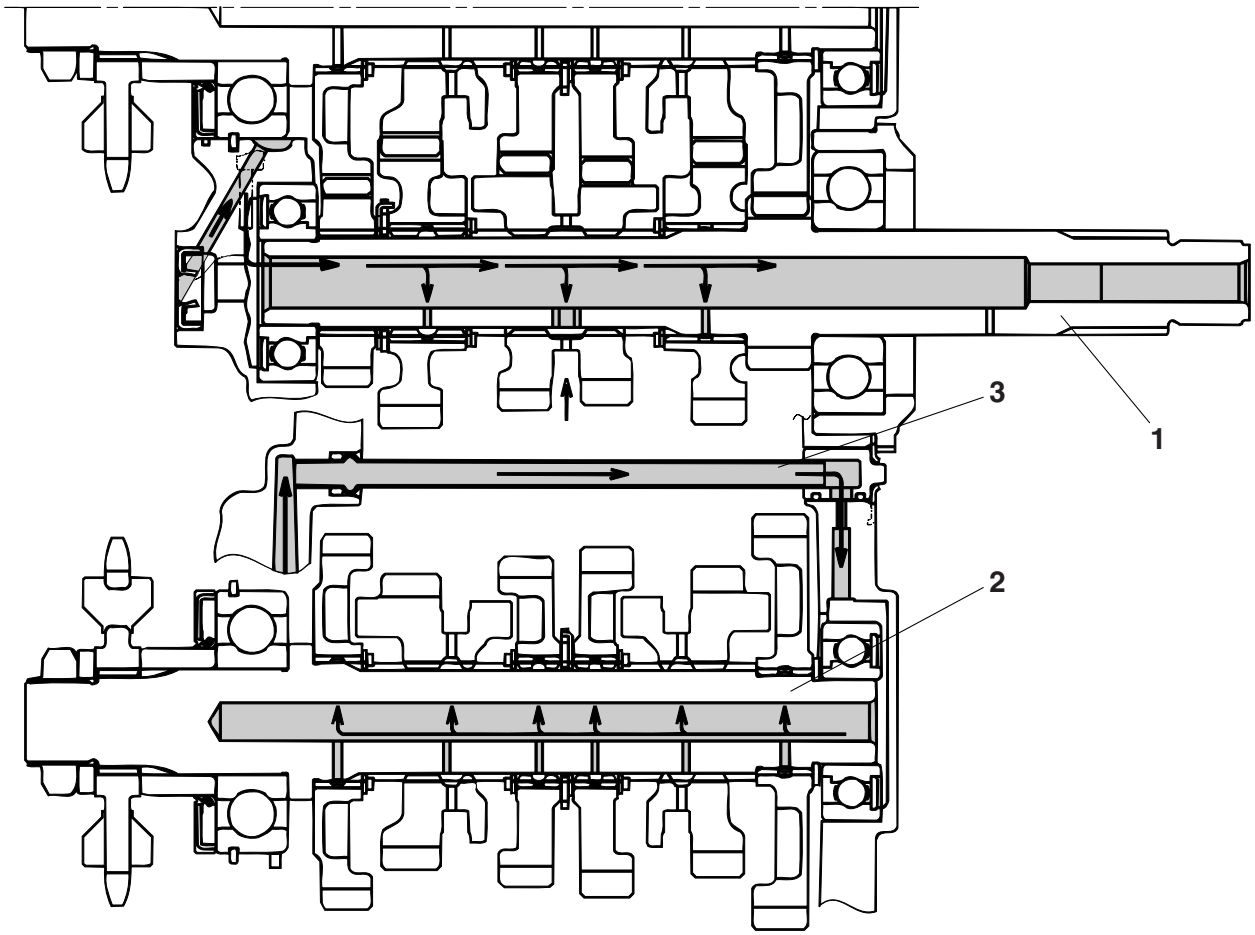
1. Oil cooler
2. Oil strainer
3. Oil level switch
4. Oil pump
5. Oil pipe
6. Oil filter


1
2
3
4
5

1. Main axle
2. Oil pump
3. Relief valve
4. Oil pipe
5. Oil delivery pipe

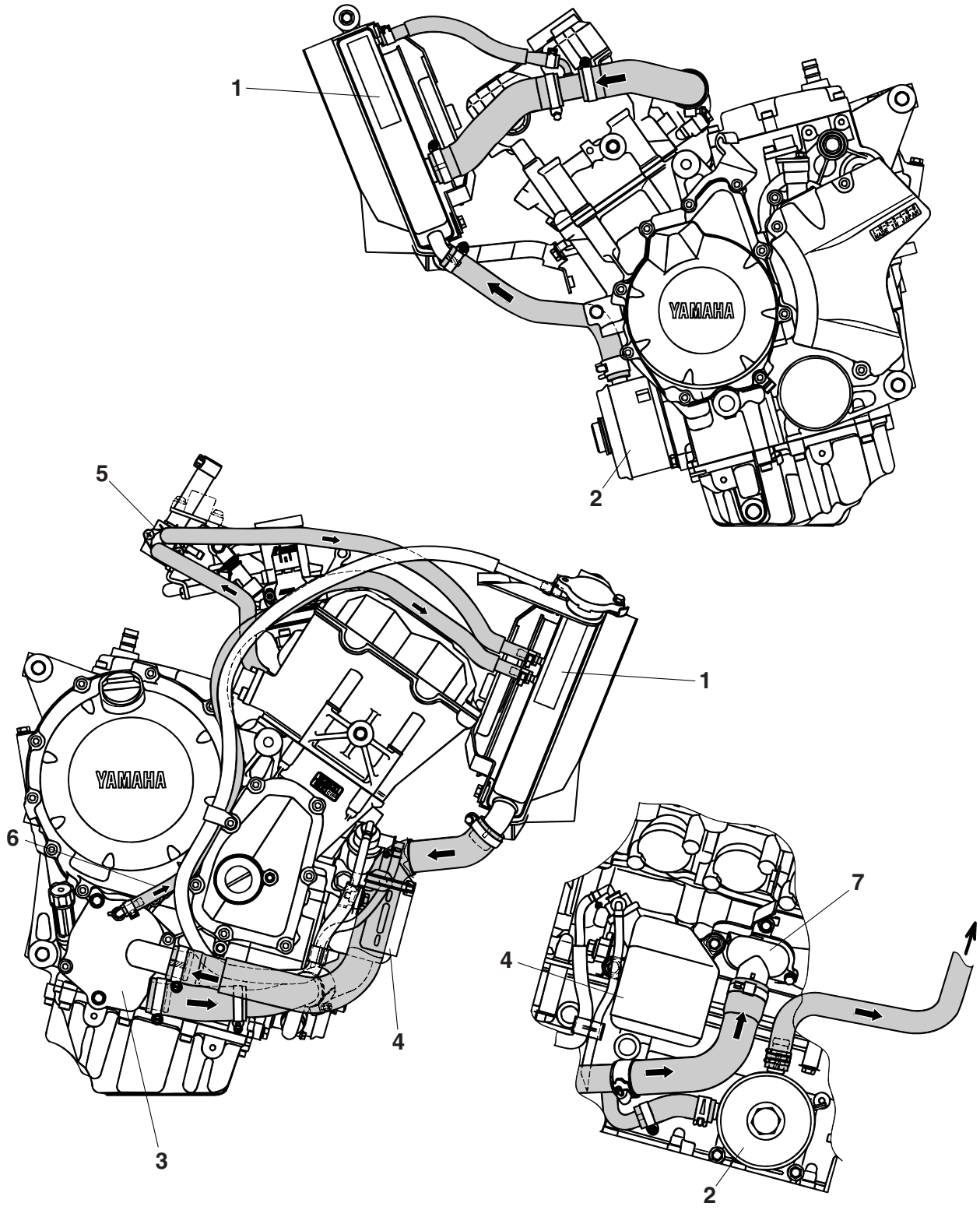

3
1
2
5
B
4

1. Cylinder head
2. Intake camshaft
3. Exhaust camshaft
4. Crankshaft
5. Oil nozzle


3
1
2

1. Main axle
2. Drive axle
3. Oil pipe

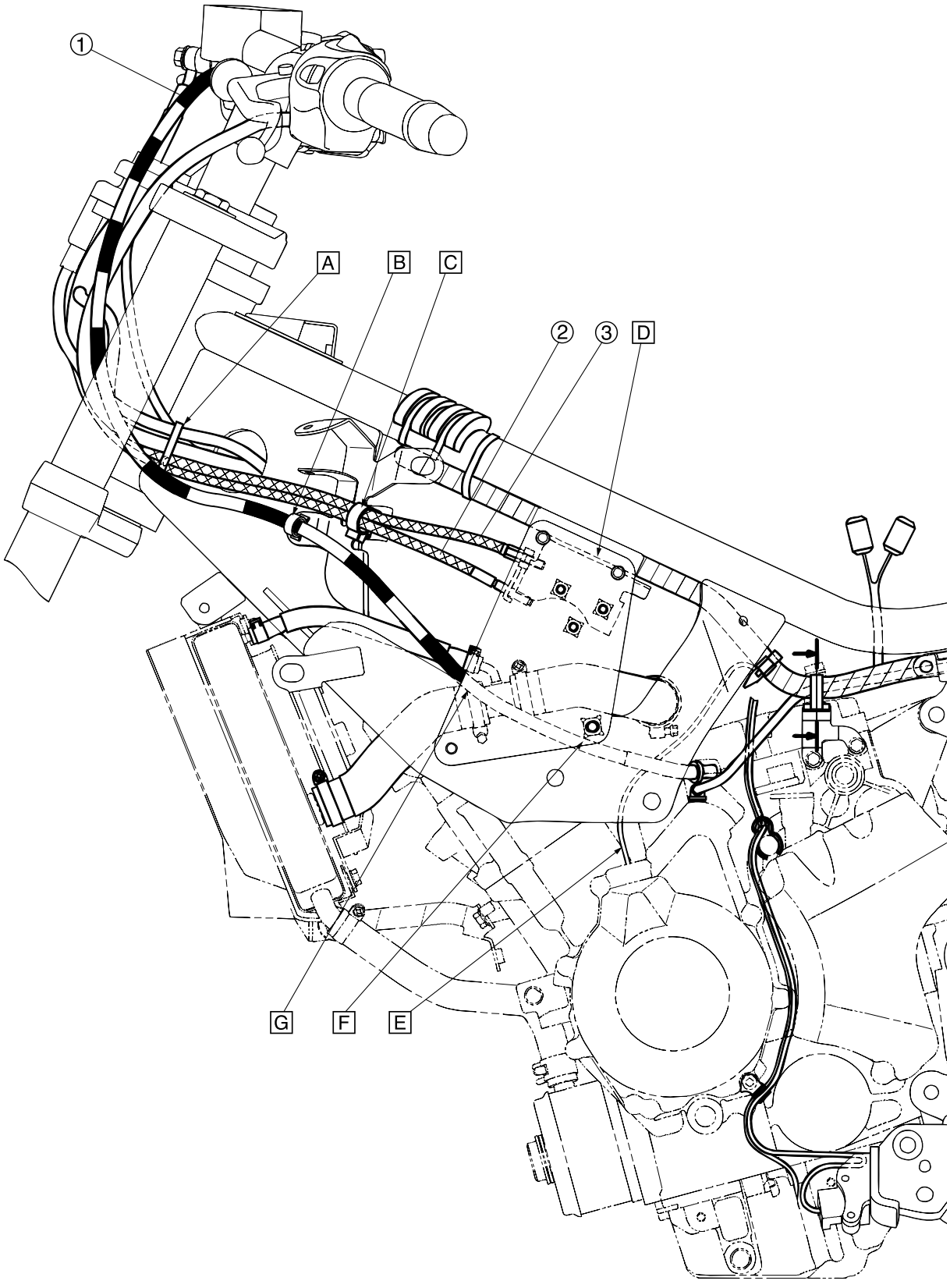
EAS20420
COOLING SYSTEM DIAGRAMS



1. Radiator
2. Oil cooler
3. Water pump
4. Coolant reservoir
5. Fast idle plunger
6. Water pump breather hose
7. Water jacket joint

EAS20430
CABLE ROUTING

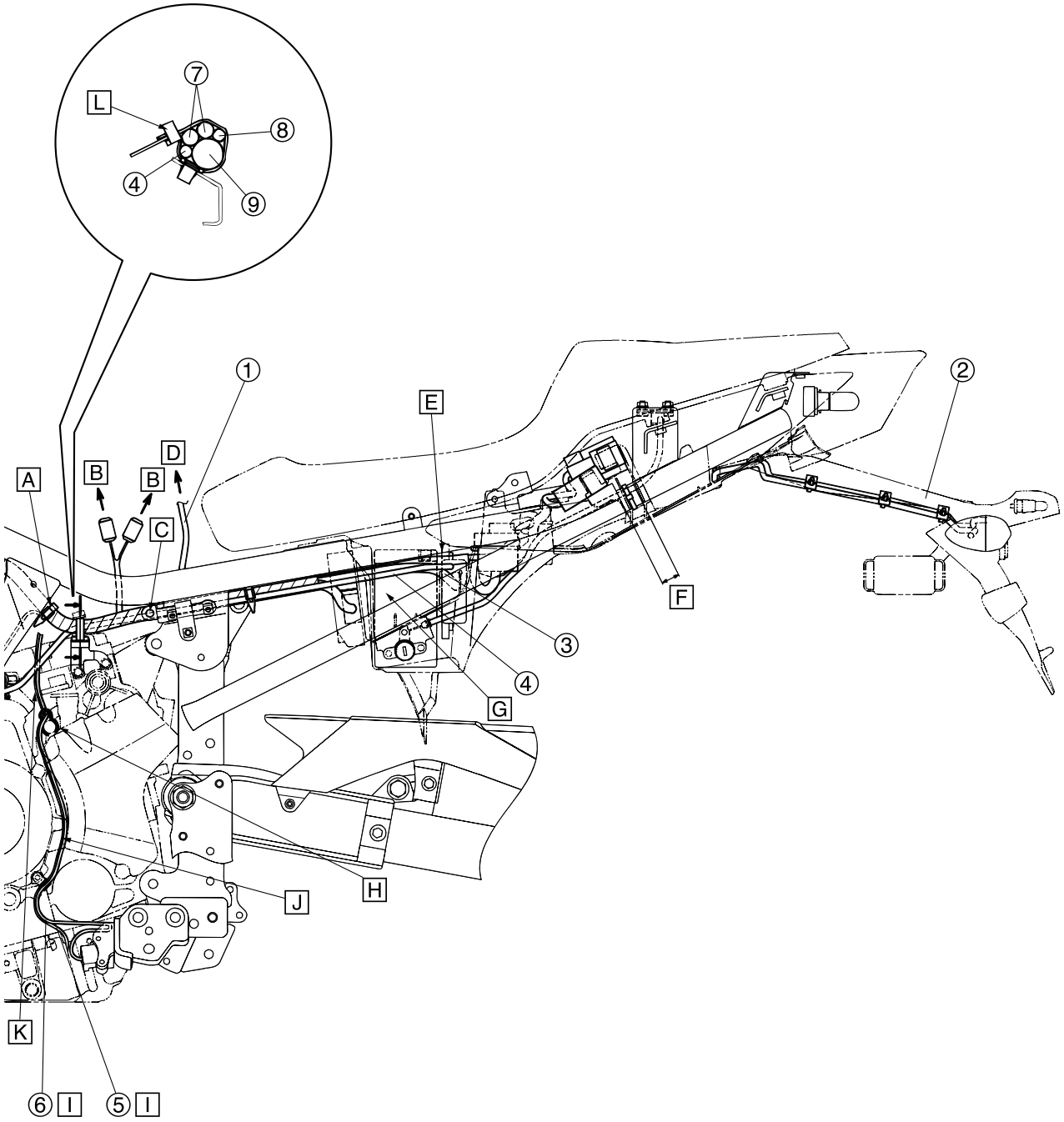
(XJ6S)



1. Clutch cable
2. Throttle cable (accelerator side)
3. Throttle cable (decelerator side)

A. Clamp the left handlebar switch lead, main switch lead, immobilizer lead, and throttle cables. Clamp the leads at the white tape position. Direct the end of clamp down and outward.No need to cut off its end.
B. Clamp the clutch cable.
C. Clamp the throttle cables.
D. Pass the wire harness above the bracket mounted at the rear side of the gusset.
E. Pass the AC magneto lead under the clutch cable.
F. Pass the clutch cable under the nut projection.
G. Pass the clutch cable outside the radiator inlet hose.

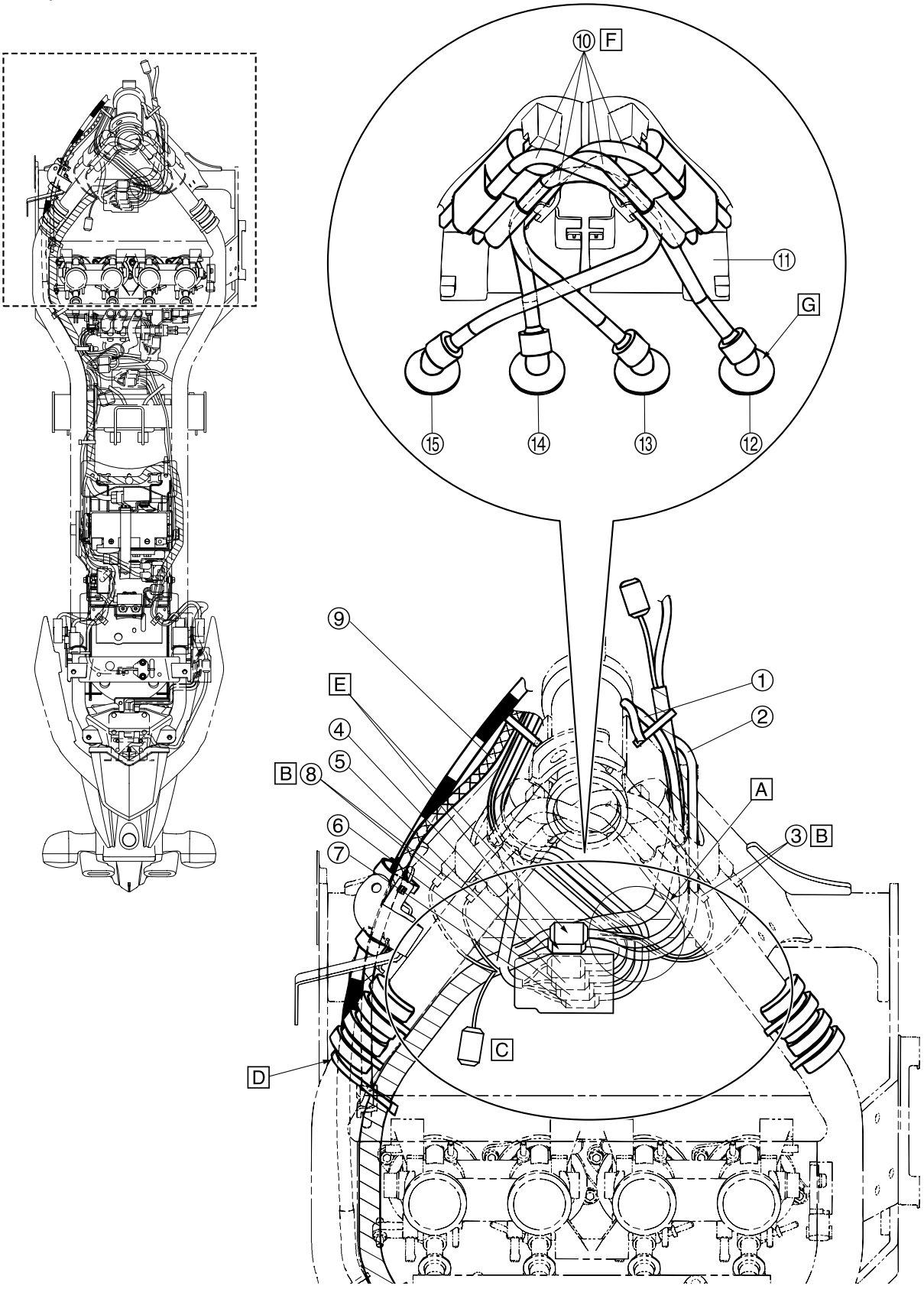
(XJ6S)



1. Fuel tank drain hose
2. Rear mudguard assembly
3. ECU lead
4. Starter motor lead
5. Oil level switch lead
6. Sidestand switch lead
7. Sub-wire harness (throttle body)
8. Throttle body joint coupler
9. Wire harness

A. Clamp the wire harness and AC magneto lead. Direct the end of clamp out and downward. No need to cut off its end.
B. To fuel pump
C. Insert the wire harness clamp into the side cover bracket.
D. To fuel tank
E. Insert the wire harness inside of the frame from behind the battery.
F. Clamp the seat lock cable to the inside of frame in this area. Direct the end of clamp out and upward. No need to cut off its end.
G. Take care not pinch the wire harness between battery and frame on the battery installation.
H. Clamp the sidestand switch lead and oil level switch lead.
I. The leads may be crossed.
J. Pass the sidestand switch lead and oil level switch lead inside the chain drive case cover.
K. Pass the sidestand lead and oil level switch lead under the starter motor lead.
L. Clamp the leads. Direct the end of clamp inside of the vehicle.

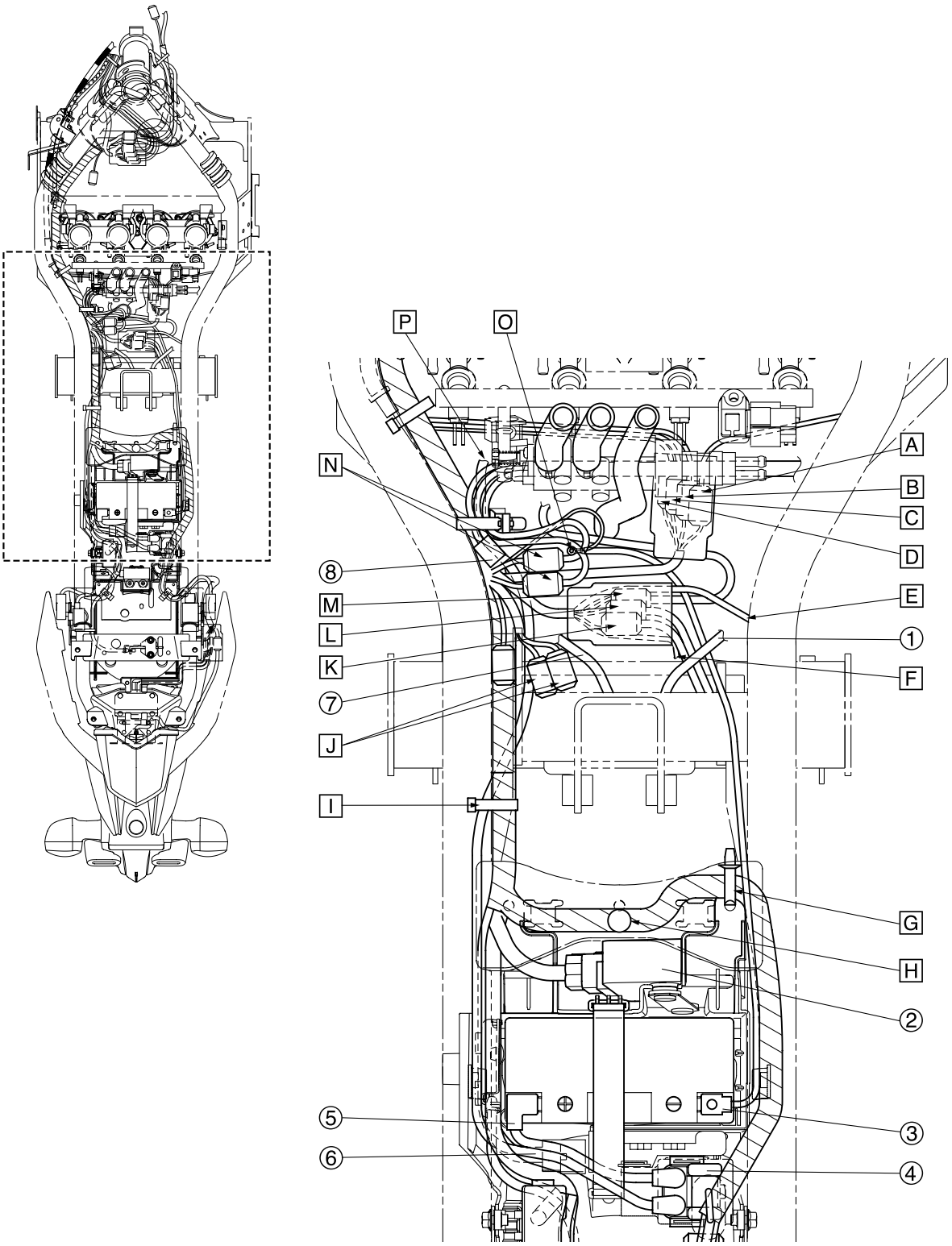
(XJ6S)



1. Right handlebar switch lead
2. Radiator fan motor lead
3. Ignition coil #2, #3 connector
4. Main switch lead 2
5. Main switch lead 1
6. Immobilizer lead
7. Left handlebar switch lead
8. Ignition coil #1, #4 connector
9. Throttle cables
10. High tension code
11. Cover
12. Spark plug cap #4
13. Spark plug cap #3
14. Spark plug cap #2
15. Spark plug cap #1

A. There is no order in overlapping the wire harness in this area.
B. The either positive and negative ignition coil connectors can be connected to the each terminal.
C. To air cut-off valve
D. Clamp the wire harness. Direct the end of clamp in and downward. No need to cut off its end.
E. Place the right handlebar switch lead coupler and the radiator fan motor lead coupler underneath of the air cut-off valve.
F. There is no order in overlapping the high tension codes.
G. Install spark plug caps #1 to #4 in the directions as shown.

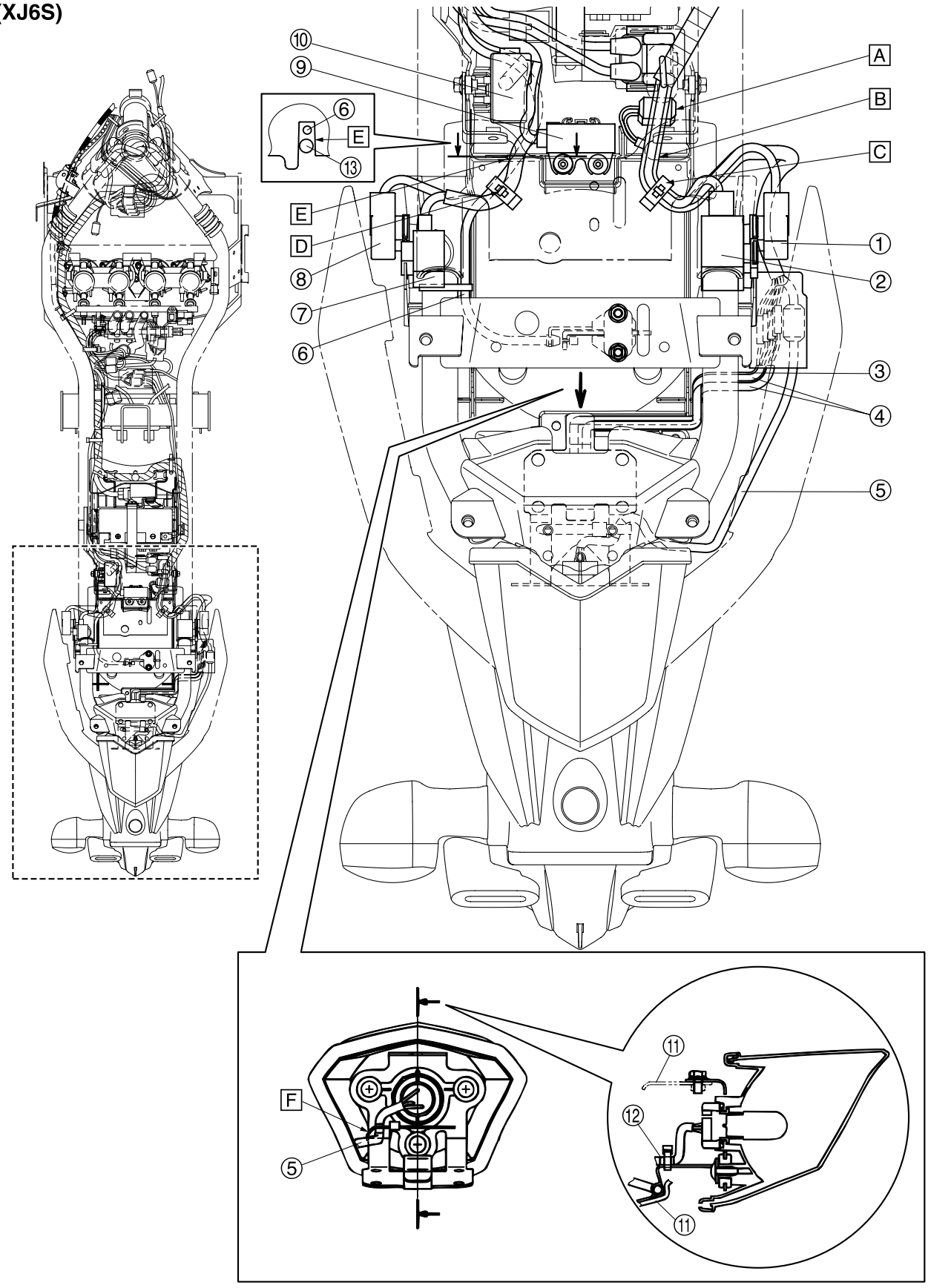
(XJ6S)



1. Fuel tank breather hose
2. Rectifier/regulator
3. Battery negative lead
4. Starter relay
5. Battery positive lead
6. Starter motor lead
7. Fuel tank drain hose
8. Throttle body joint coupler

A. To crankshaft position sensor
B. To AC magneto
C. To oil level switch
D. To sidestand switch
E. To ground lead
F. To neutral switch
G. Clamp the wire harness.
H. Insert the wire harness into the plate nut.
I. Clamp the wire harness and starter motor lead. Direct the end of clamp out and downwards. No need to cut off its end.
J. To fuel pump
K. To rear brake light switch
L. To O_2 sensor
M. To speed sensor
N. To sub-wire harness
O. Install the terminal to touch the projection of the crank case.
P. To starter motor

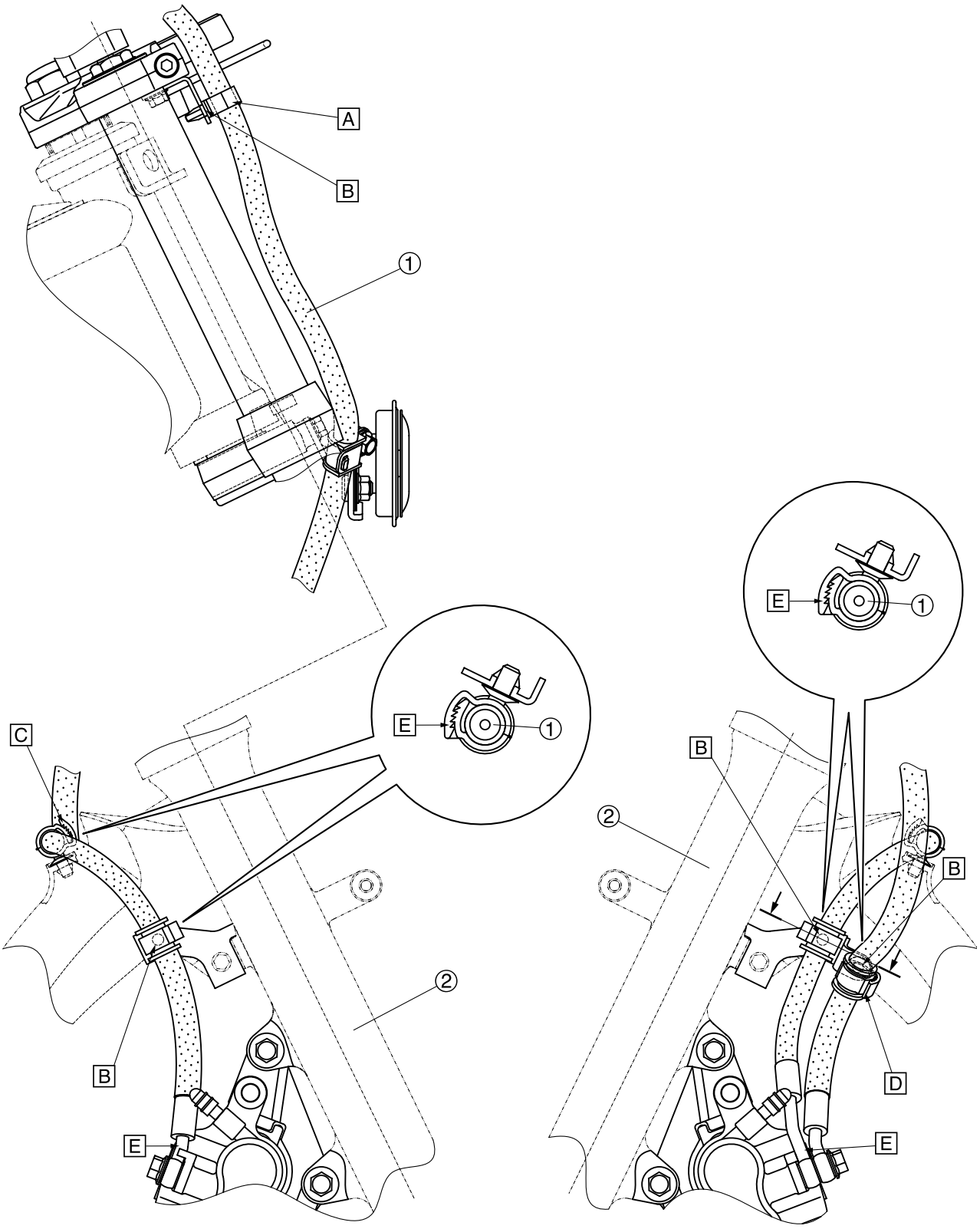
(XJ6S)



1. Radiator fan motor relay
2. Relay unit
3. License plate light lead
4. Rear turn signal light leads (left/right)
5. Tail/brake light lead
6. Seat lock cable
7. Turn signal relay
8. Headlight relay
9. Lean angle sensor
10. Fuse box
11. Frame COMP.
12. White tape
13. Wire harness

A. Insert the alarm coupler under the wire harness.
B. Pass the wire harness through the rear fender notch.
C. Clamp the radiator fan motor relay lead, relay unit lead and tail lead (wire harness). They may be clamped in any direction.
D. Clamp the turn signal relay lead, relay unit lead and seat lock cable. They may be clamped in any direction.
E. Pass the wire harness and seat lock cable through the rear fender notch.
F. Fasten the tail/brake light lead tightly with a plastic tie on the white taped area.

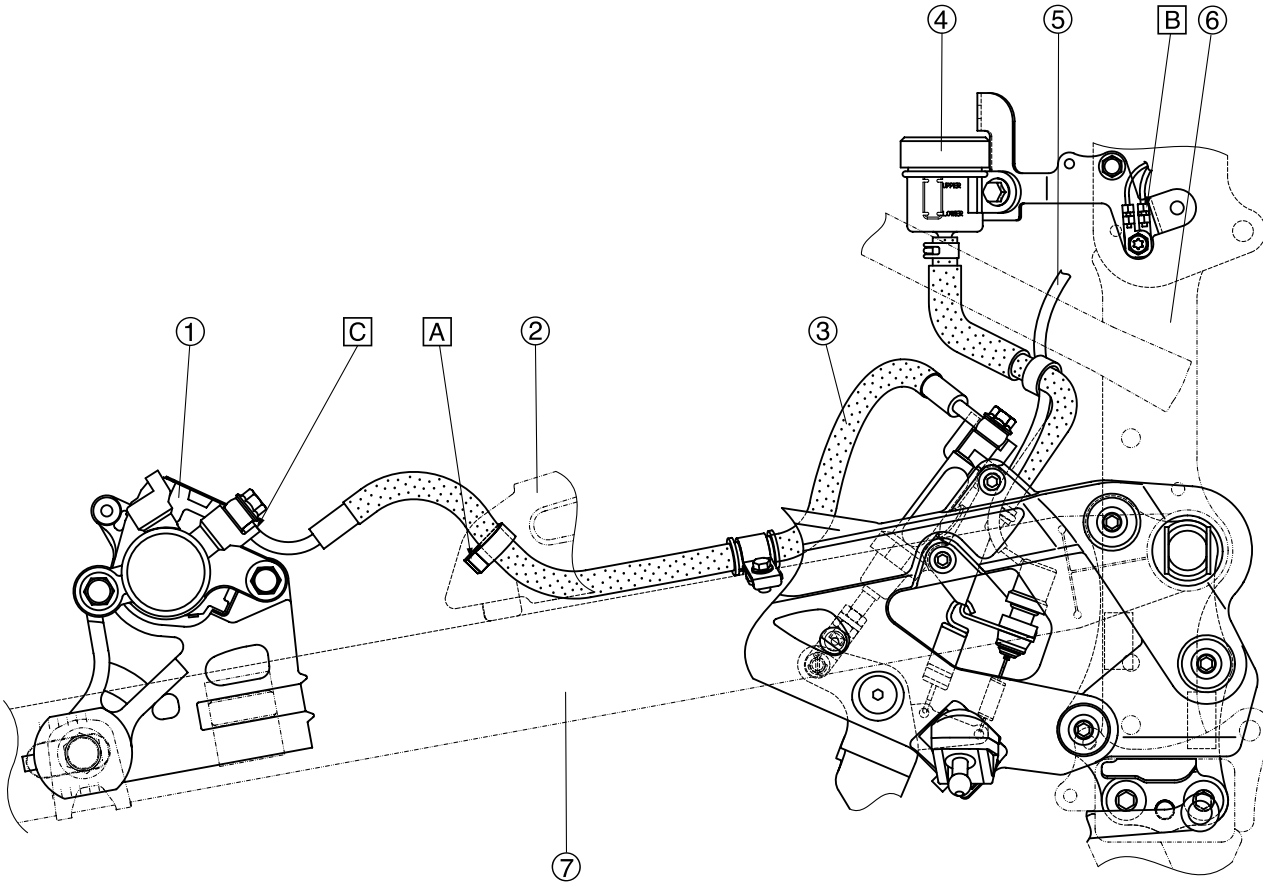
(XJ6S)



1. Front brake hose
2. Front fork assembly

A. Clamp it securely. The pawl must be directed toward the right side of the vehicle.
B. Insert it securely until it reaches its end position.
C. Secure for 3 or more notches. The pawl must be directed toward the front of the vehicle.
D. Secure for 3 or more notches. The pawl must be directed toward the rear of the vehicle.
E. Install the brake pipe to touch the projection on the brake caliper.

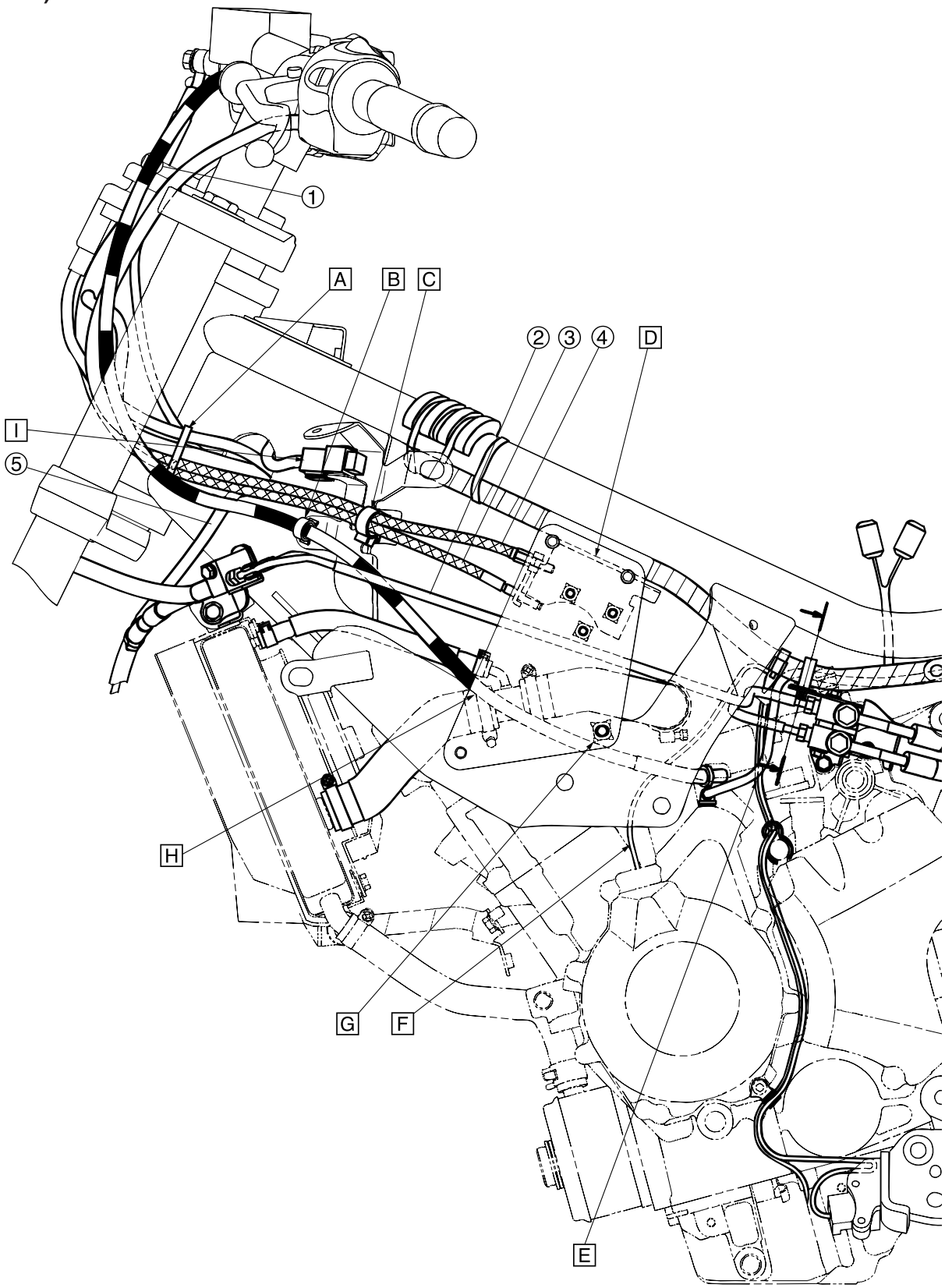
(XJ6S)



1. Rear brake caliper
2. Dust cover
3. Rear brake hose
4. Rear brake reservoir
5. Rear brake light switch lead
6. Frame complete
7. Swingarm

A. Clamp it securely. The pawl must be directed toward the rear of the vehicle.
B. Install the terminal against the bracket with crimp barrel side facing outwards.
C. Install the brake pipe to touch the projection on the brake caliper.

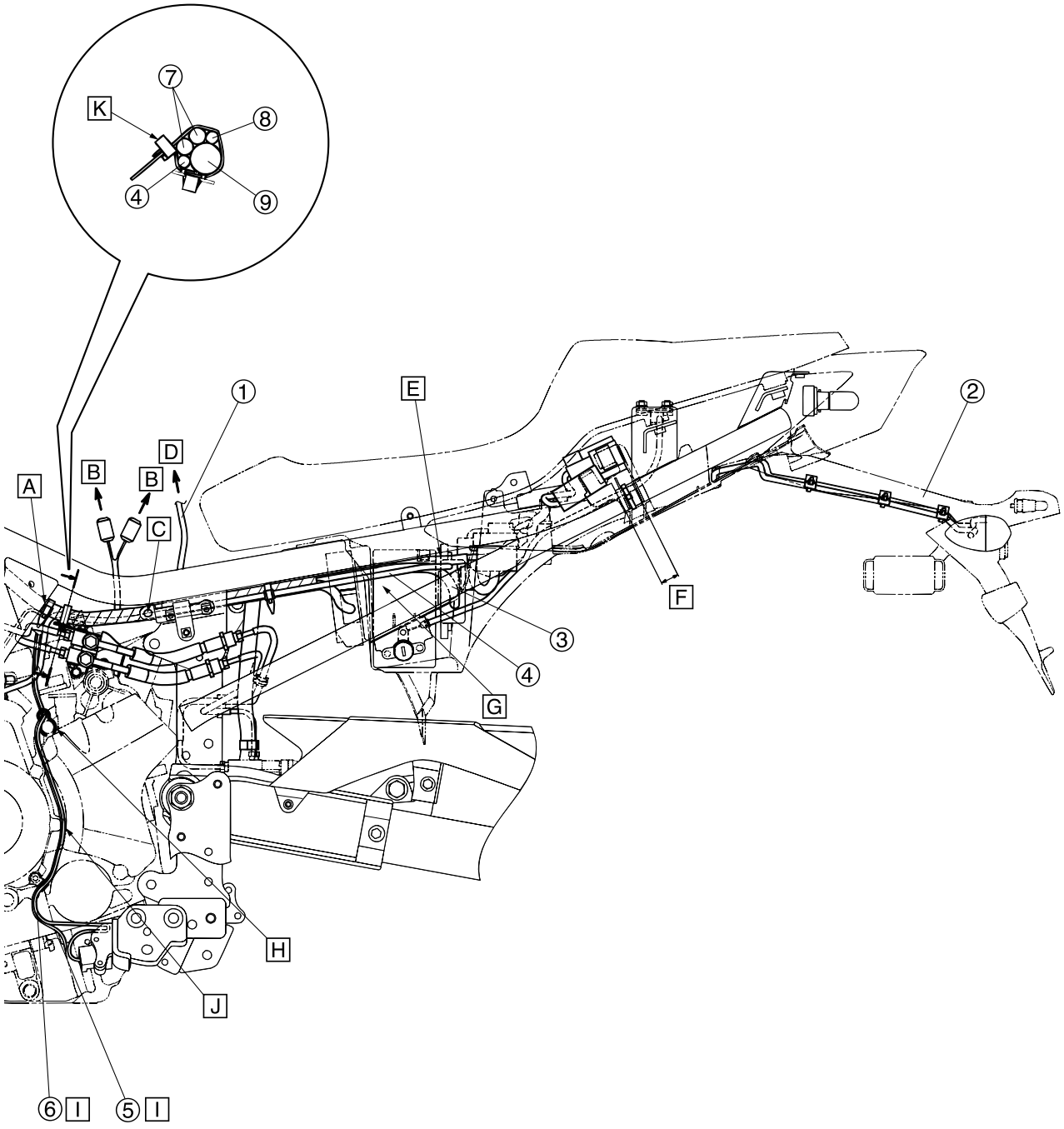
(XJ6SA)



1. Clutch cable
2. Front brake pipe
3. Throttle cable (accelerator side)
4. Throttle cable (decelerator side)
5. Front wheel sensor lead

A. Clamp the left handlebar switch lead, main switch lead, immobilizer lead, and throttle cables. Clamp the leads at the white tape position. Direct the end of clamp down and outward.No need to cut off its end.
B. Clamp the clutch cable.
C. Clamp the throttle cables.
D. Pass the wire harness above the bracket mounted at the rear side of the gusset.
E. Pass the sidestand lead and oil level switch lead under the starter motor lead.
F. Pass the AC magneto lead under the clutch cable.
G. Pass the clutch cable under the nut projection.
H. Pass the clutch cable outside the radiator inlet hose.
I. Insert the ABS test coupler into the connector.

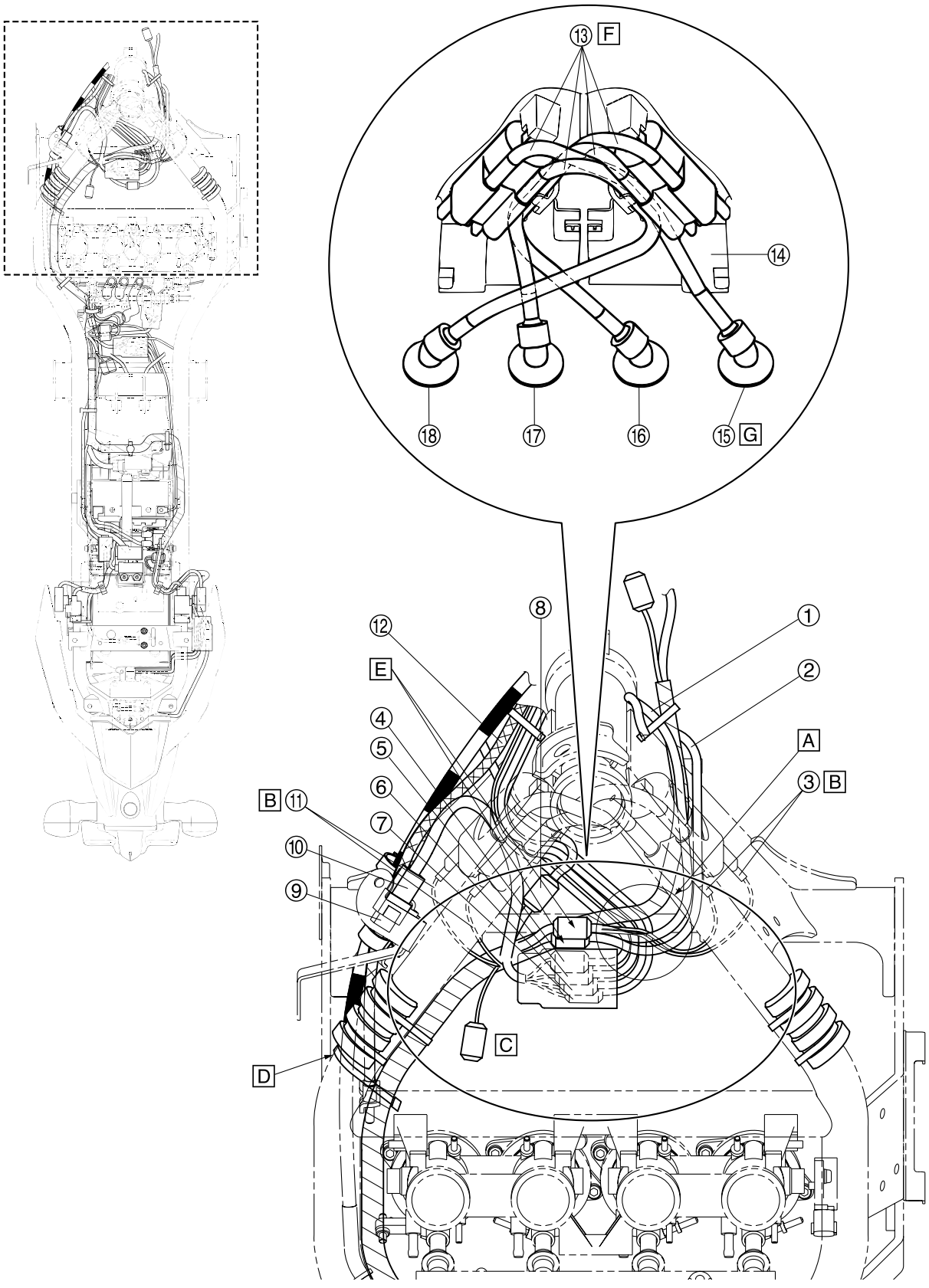
(XJ6SA)



1. Fuel tank drain hose
2. Rear mudguard assembly
3. ECU lead
4. Starter motor lead
5. Oil level switch lead
6. Sidestand switch lead
7. Sub-wire harness (throttle body)
8. Throttle body joint connector
9. Wire harness

A. Clamp the wire harness and AC magneto lead. Direct the end of clamp out and downward. No need to cut off its end.
B. To fuel pump
C. Insert the wire harness clamp into the side cover bracket.
D. To fuel tank
E. Insert the wire harness inside of the frame from behind the battery.
F. Clamp the seat lock cable to the inside of frame in this area.
G. Take care not pinch the wire harness between battery and frame on the battery installation.
H. Clamp the sidestand switch lead and oil level switch lead.
I. The leads may be crossed.
J. Pass the sidestand switch lead and oil level switch lead inside the chain drive case cover.
K. Clamp the leads. Direct the end of clamp inside of the vehicle.

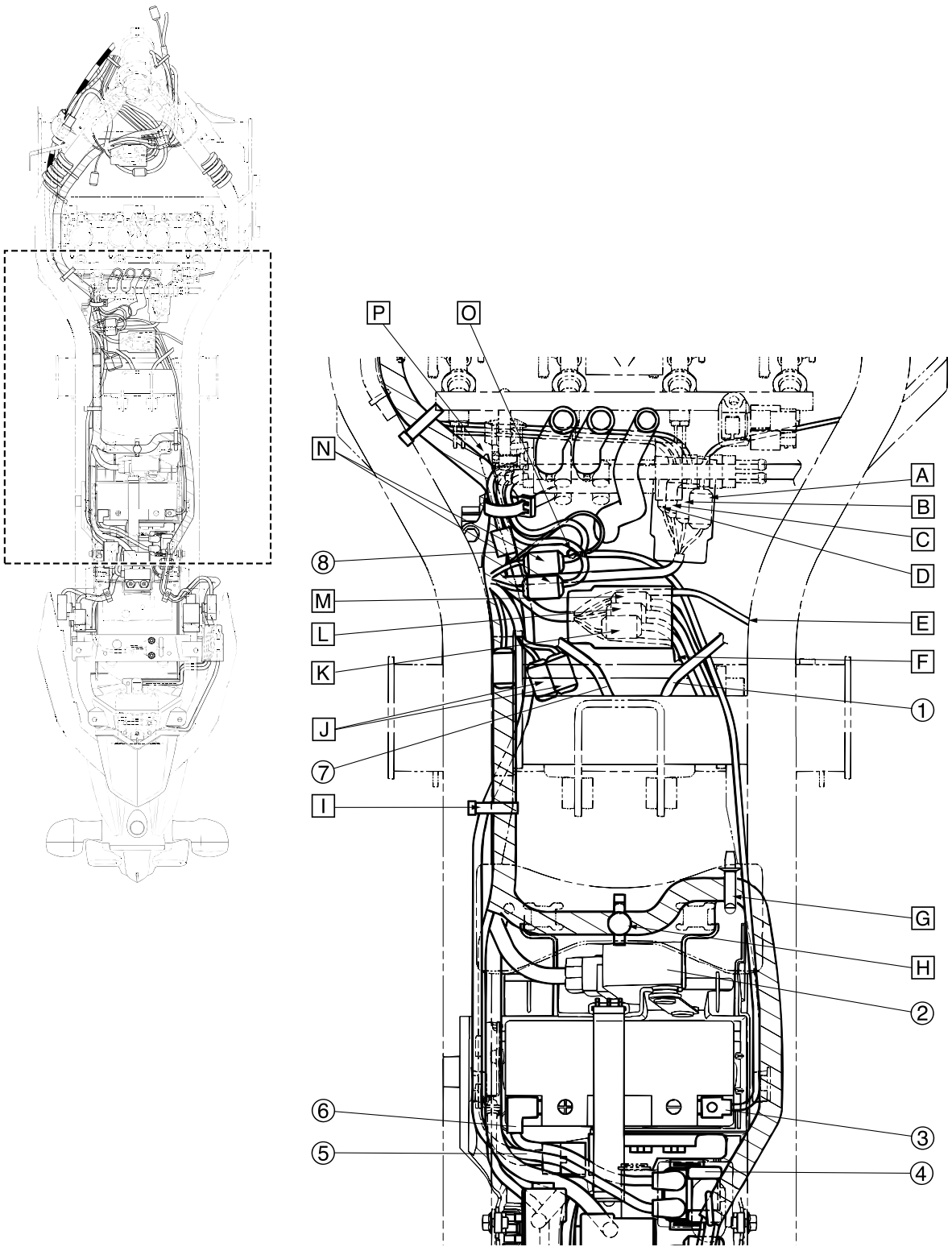
(XJ6SA)



1. Right handlebar switch lead
2. Radiator fan motor lead
3. Ignition coil #2, #3 connector
4. Main switch lead 2
5. Main switch lead 1
6. Immobilizer lead
7. Left handlebar switch lead
8. Front wheel sensor lead
9. Connector
10. ABS test coupler
11. Ignition coil #1, #4 connector
12. Throttle cables
13. High tension code
14. Cover
15. Spark plug cap #4
16. Spark plug cap #3
17. Spark plug cap #2
18. Spark plug cap #1

A. There is no order in overlapping the wire harness in this area.
B. The either positive and negative ignition coil connectors can be connected to the each terminal.
C. To air cut-off valve
D. Clamp the wire harness. Direct the end of clamp in and downward. No need to cut off its end.
E. Place the right handlebar switch lead coupler and the radiator fan motor lead coupler underneath of the air cut-off valve.
F. There is no order in overlapping the high tension codes.
G. Install spark plug caps #1 to #4 in the directions as shown.

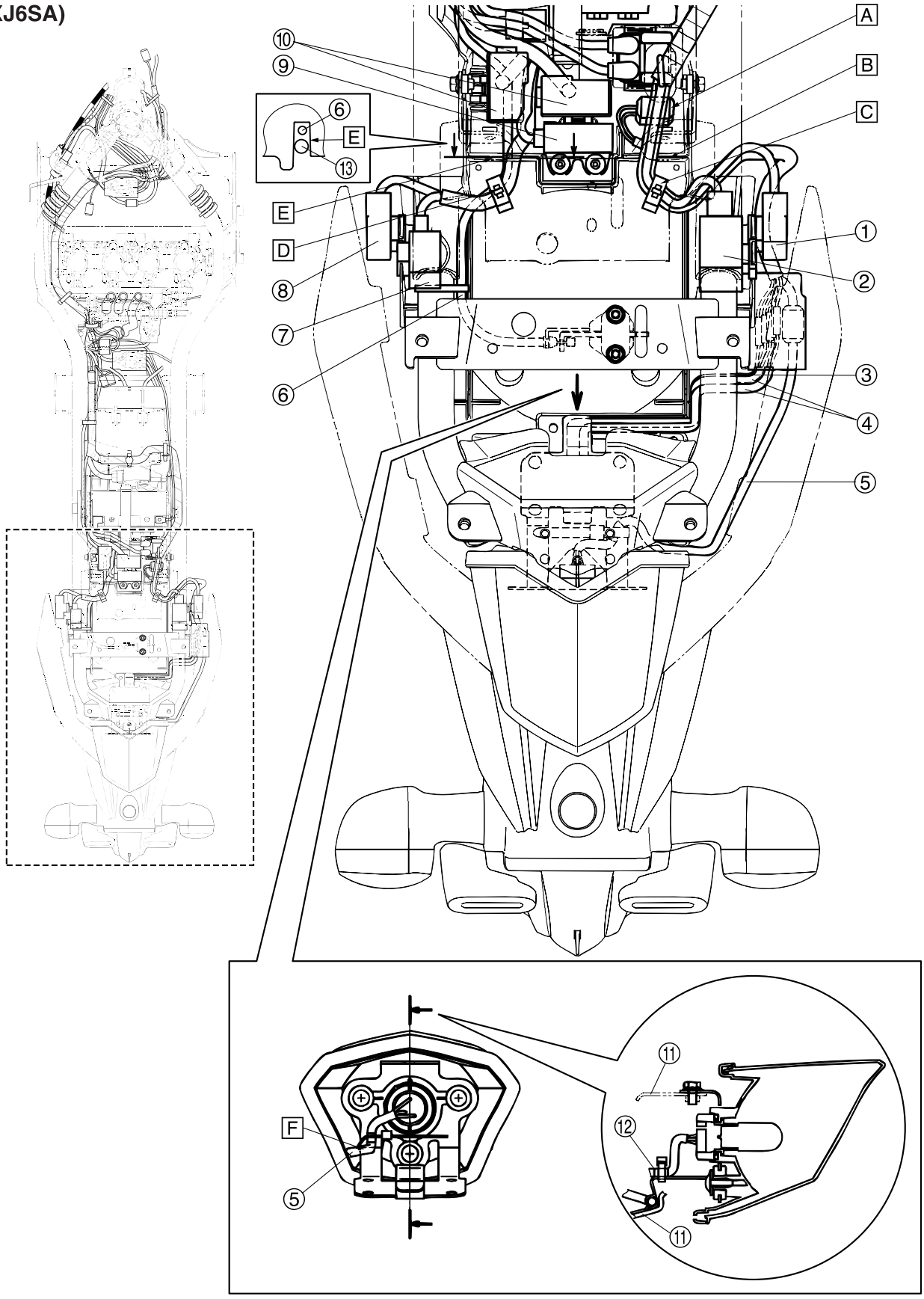
(XJ6SA)



1. Fuel tank breather hose
2. Rectifier/regulator
3. Battery negative lead
4. Starter relay
5. Starter motor lead
6. Battery positive lead
7. Fuel tank drain hose
8. Throttle body joint coupler

A. To crankshaft position sensor
B. To AC magneto
C. To oil level switch
D. To sidestand switch
E. To ground lead
F. To neutral switch
G. Clamp the wire harness.
H. Insert the wire harness into the plate nut.
I. Clamp the wire harness and starter motor lead. Direct the end of clamp out and downward. No need to cut off its end.
J. To fuel pump
K. To rear brake light switch
L. To O_2 sensor
M. To rear wheel sensor
N. To sub-wire harness
O. Install the terminal to touch the projection of the crank case.
P. To starter motor

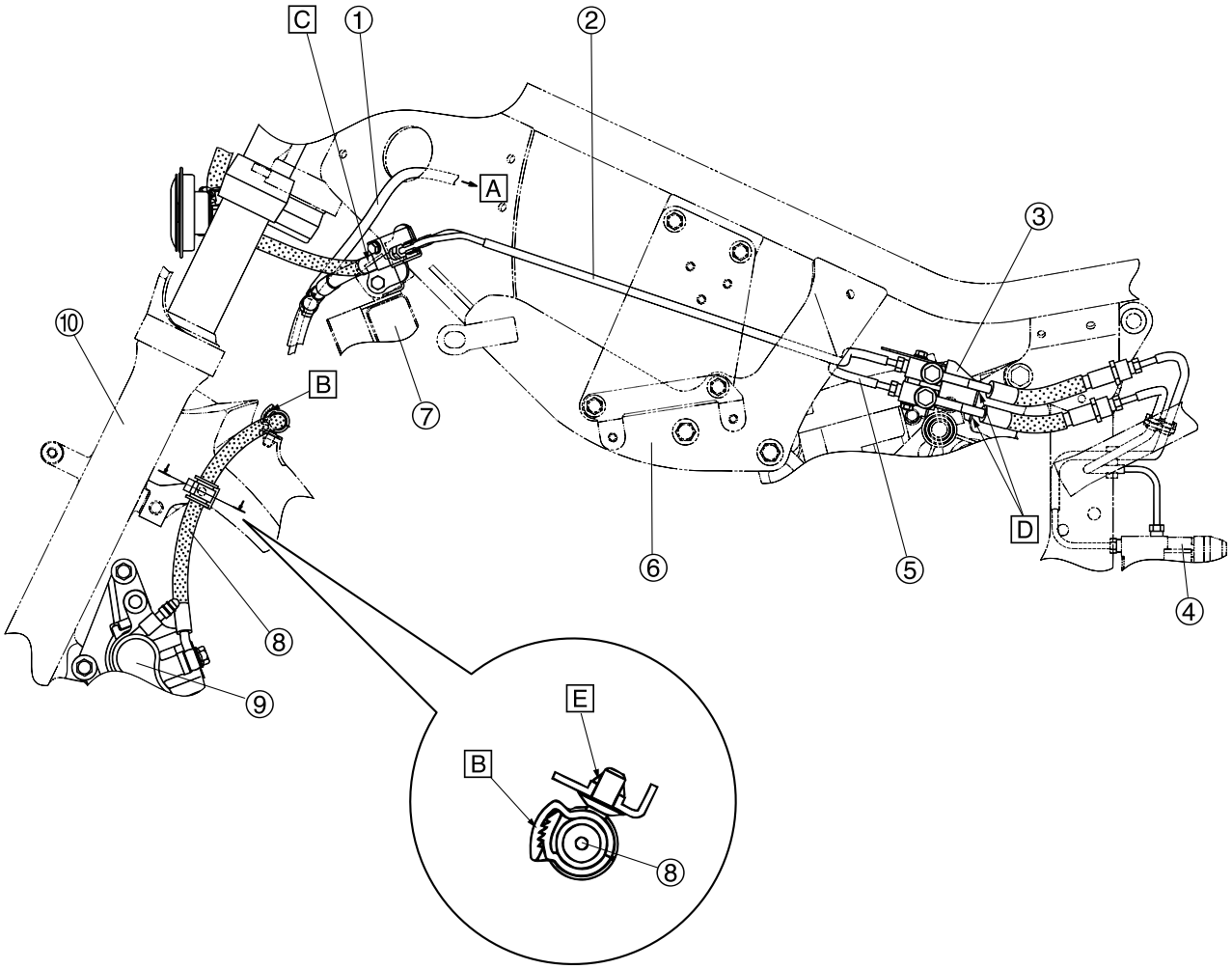
(XJ6SA)



1. Radiator fan motor relay
2. Relay unit
3. License plate light lead
4. Rear turn signal light leads (left/right)
5. Tail/brake light lead
6. Seat lock cable
7. Turn signal relay
8. Headlight relay
9. Lean angle sensor
10. Fuse box
11. Frame COMP.
12. White tape
13. Wire harness

A. Insert the alarm coupler under the wire harness.
B. Pass the wire harness through the rear fender notch.
C. Clamp the radiator fan motor relay lead, relay unit lead and tail lead (wire harness). They may be clamped in any direction.
D. Clamp the turn signal relay lead, relay unit lead and seat lock cable. They may be clamped in any direction.
E. Pass the wire harness and seat lock cable through the rear fender notch.
F. Fasten the tail/brake light lead tightly with a plastic tie on the white taped.

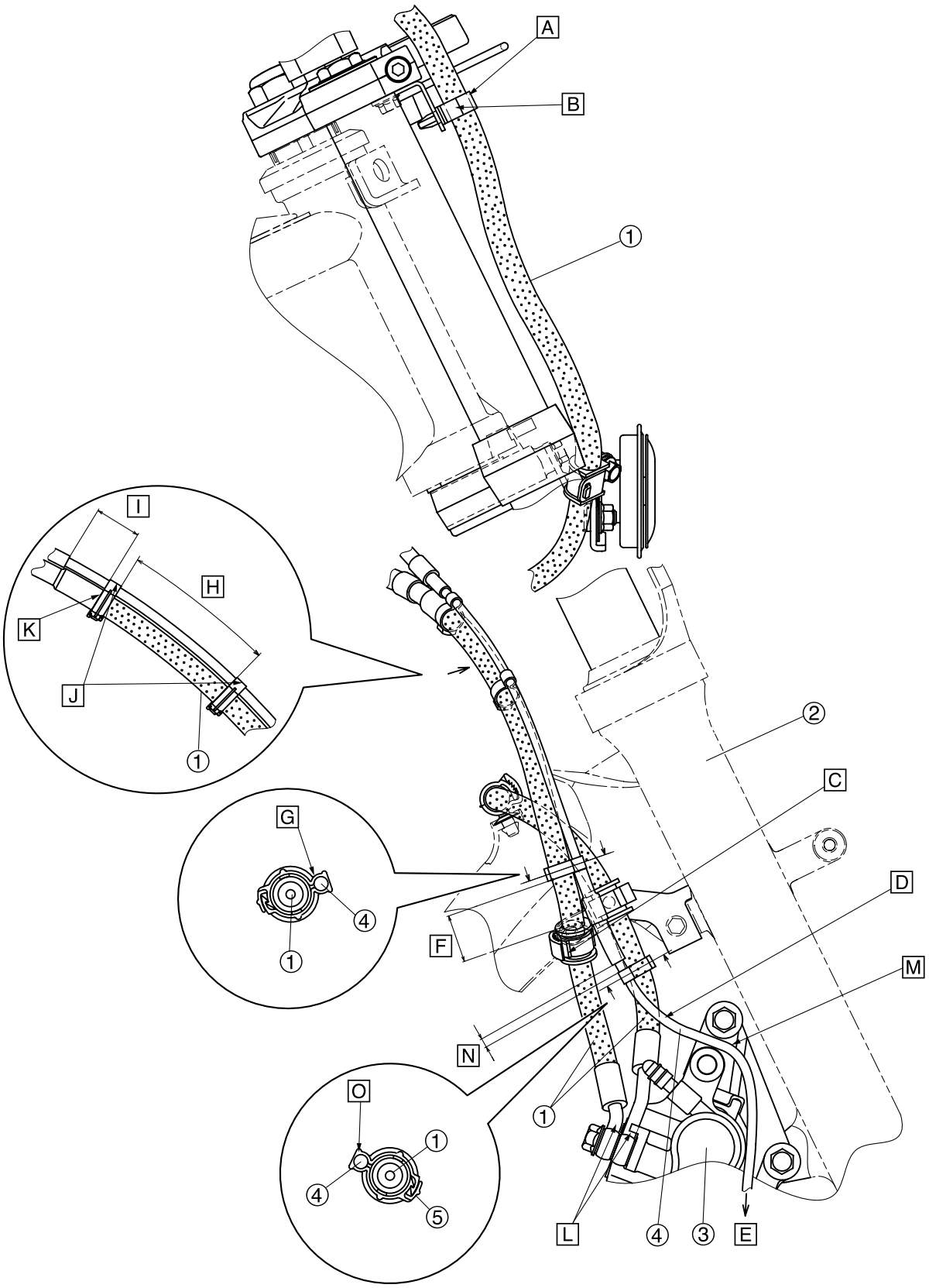
(XJ6SA)



1. Front wheel sensor lead
2. Front brake pipe (front brake master cylinder–hydraulic unit)
3. Brake pipe holder
4. Hydraulic unit
5. Front brake pipe (front brake caliper–hydraulic unit)
6. Frame
7. Radiator assembly
8. Front brake hose
9. Front brake caliper
10. Front fork assembly

A. To wire harness
B. Secure for 3 or more notches. The pawl must be directed toward the front of the vehicle.
C. Install the bracket to touch the frame.
D. Install the brake pipe to touch the front brake pipe bracket stopper.
E. Insert it securely until it reaches its end position.

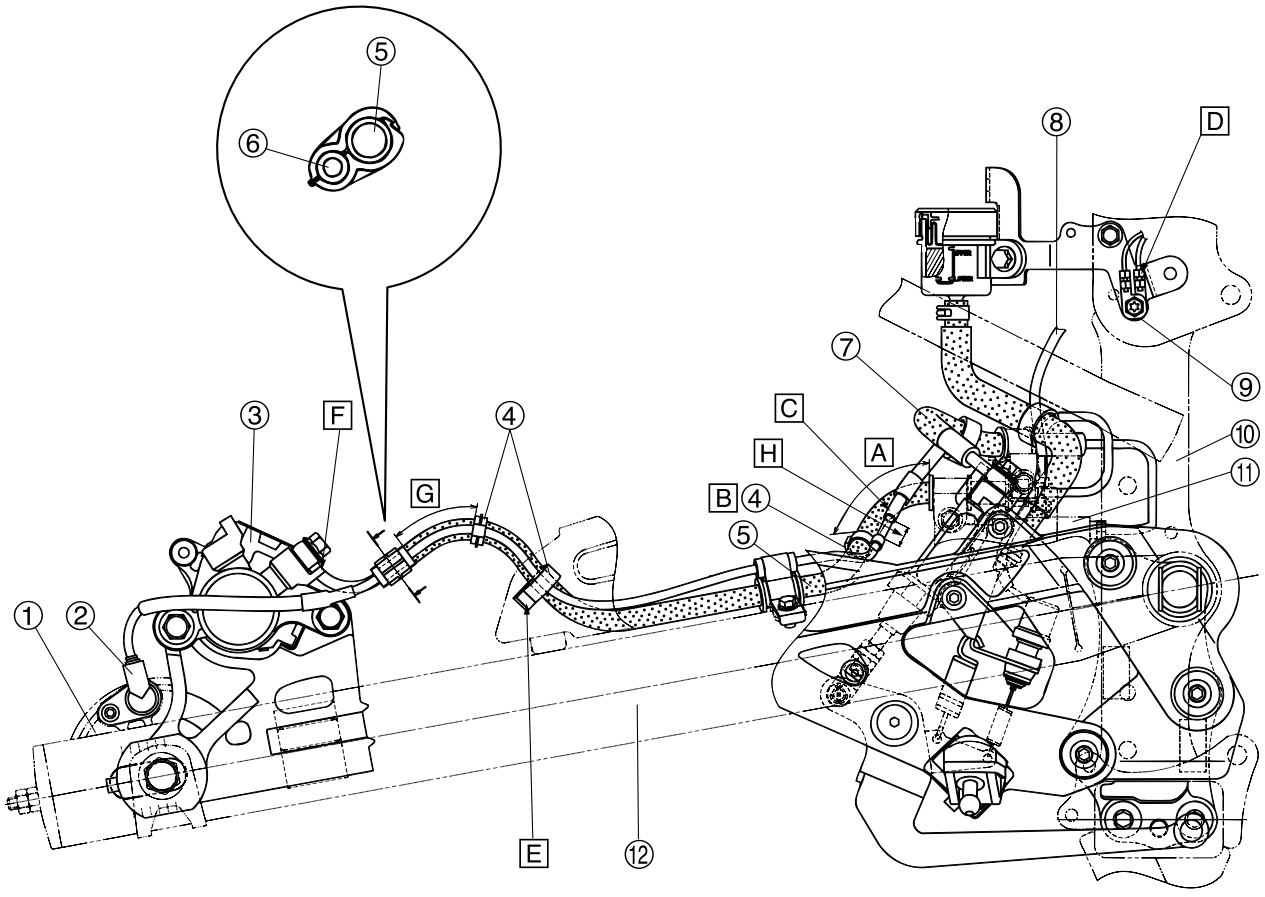
(XJ6SA)



1. Front brake hose
2. Front fork assembly
3. Front brake caliper
4. Front wheel sensor lead
5. Clamp

A. Clamp securely. The pawl must be directed toward the right side of the vehicle.
B. Insert it securely until it reaches its end position.
C. Secure for 3 or more notches. The pawl must be directed toward the rear of the vehicle.
D. Pass the front wheel sensor lead outside the front brake hose.
E. To front wheel sensor
F. 25–35 mm from the grommet end
G. Install the front wheel sensor lead at the front of the vehicle.
H. 80–90 mm
I. 20–30 mm from the protector end
J. Clamp the front wheel sensor lead to the top of the vehicle.
K. End of the front brake hose tube
L. Install the underneath brake pipe to touch the projection of the brake caliper. The above brake pipe must be installed in the same direction.
M. Pass the front wheel sensor lead between the bosses.
N. 0–10mm from the bottom end of the front wheel sensor lead protector.
O. Clamp the front wheel sensor lead on to the outer behind side of the front break hose.

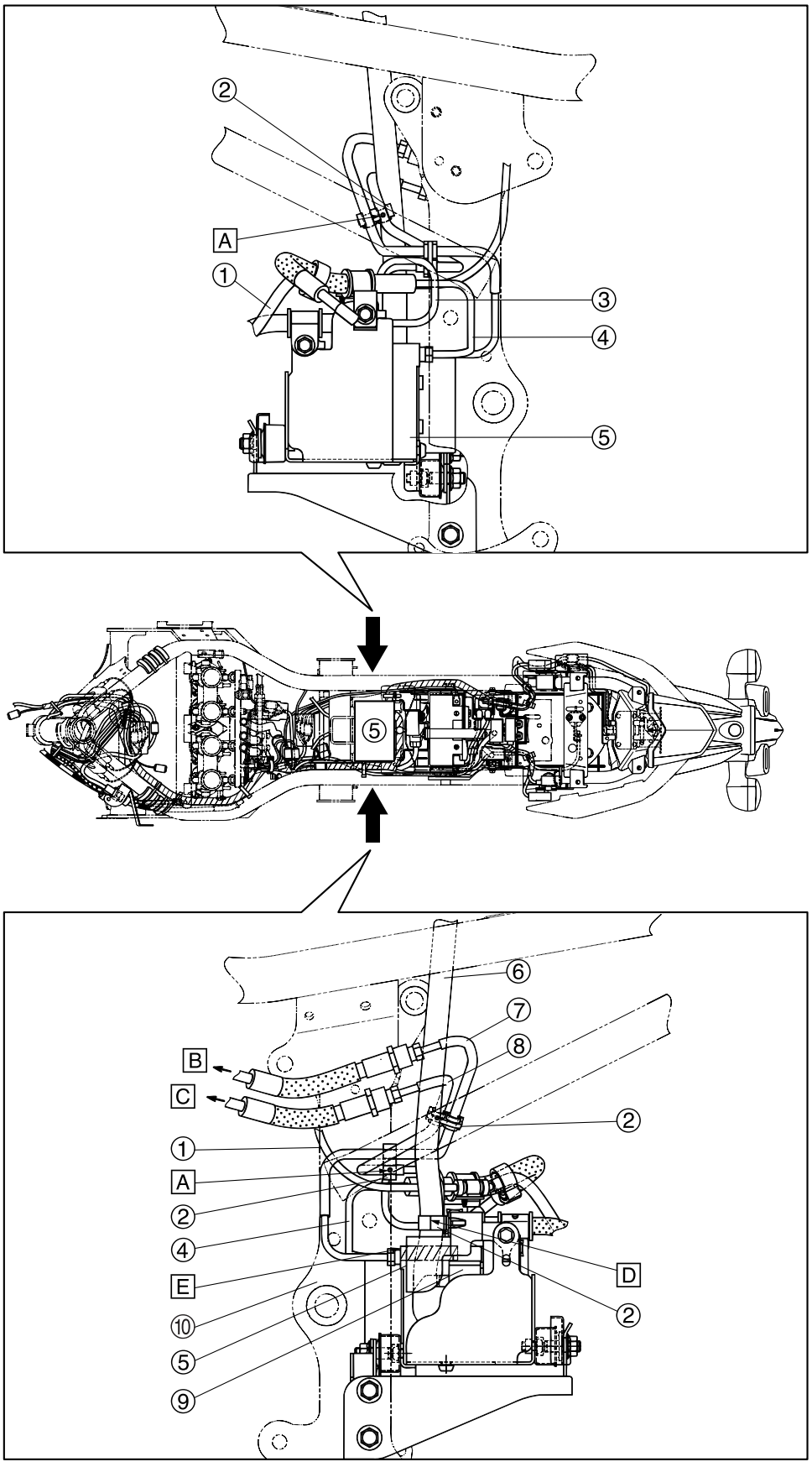
(XJ6SA)



1. Rear wheel sensor housing
2. Rear wheel sensor
3. Rear brake caliper
4. Clamp
5. Rear brake hose (rear brake caliper–hydraulic unit)
6. Rear wheel sensor lead
7. Rear brake hose (rear brake master cylinder–hydraulic unit)
8. Rear brake light switch lead
9. Wire harness
10. Frame complete
11. Hydraulic unit
12. Swingarm

A. 60–70 mm
B. Install the rear wheel sensor lead at the right side of the vehicle.
C. Align it to the rear wheel sensor lead tube.
D. Install the terminal against the bracket with crimp barrel side facing outwards.
E. Secure with clamp. The opening must be directed toward the rear of the vehicle.
F. Install the brake pipe to touch the projection of the brake caliper.
G. 40–50 mm
H. 20–30 mm

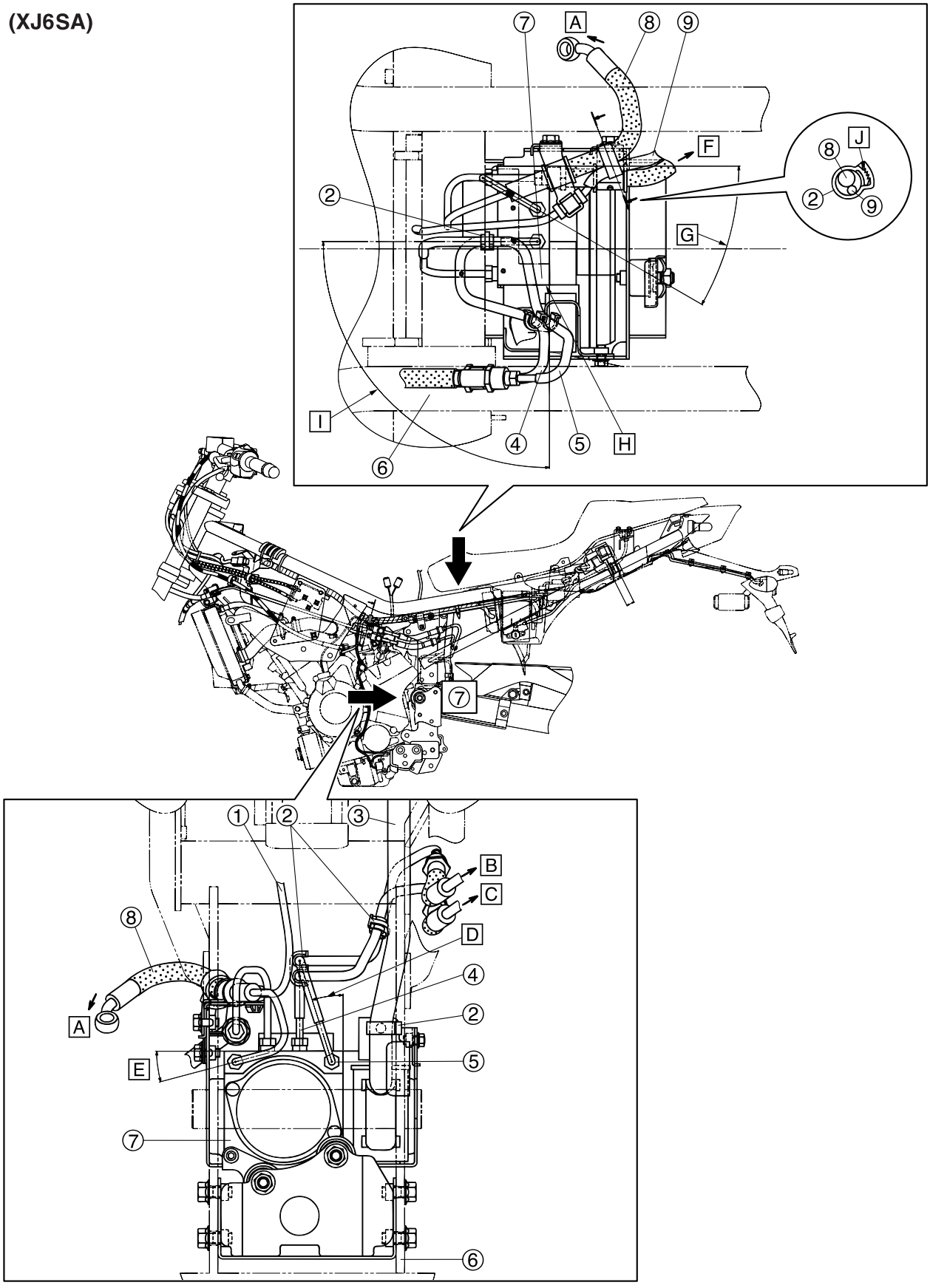
(XJ6SA)



1. Rear wheel sensor
2. Clamp
3. Rear brake pipe (hydraulic unit–rear brake caliper)
4. Rear brake pipe (rear brake master cylinder–hydraulic unit)
5. Hydraulic unit
6. Wire harness
7. Front brake pipe (front brake master cylinder–hydraulic unit)
8. Front brake pipe (hydraulic unit–front brake caliper)
9. Hydraulic unit coupler
10. Frame

A. Align to the paint mark of the brake pipe, and install the clamp.
B. To front brake master cylinder
C. To front brake caliper
D. Install the clamp with its pawl facing the left side of the vehicle.
E. Align to the protector and hydraulic unit end.

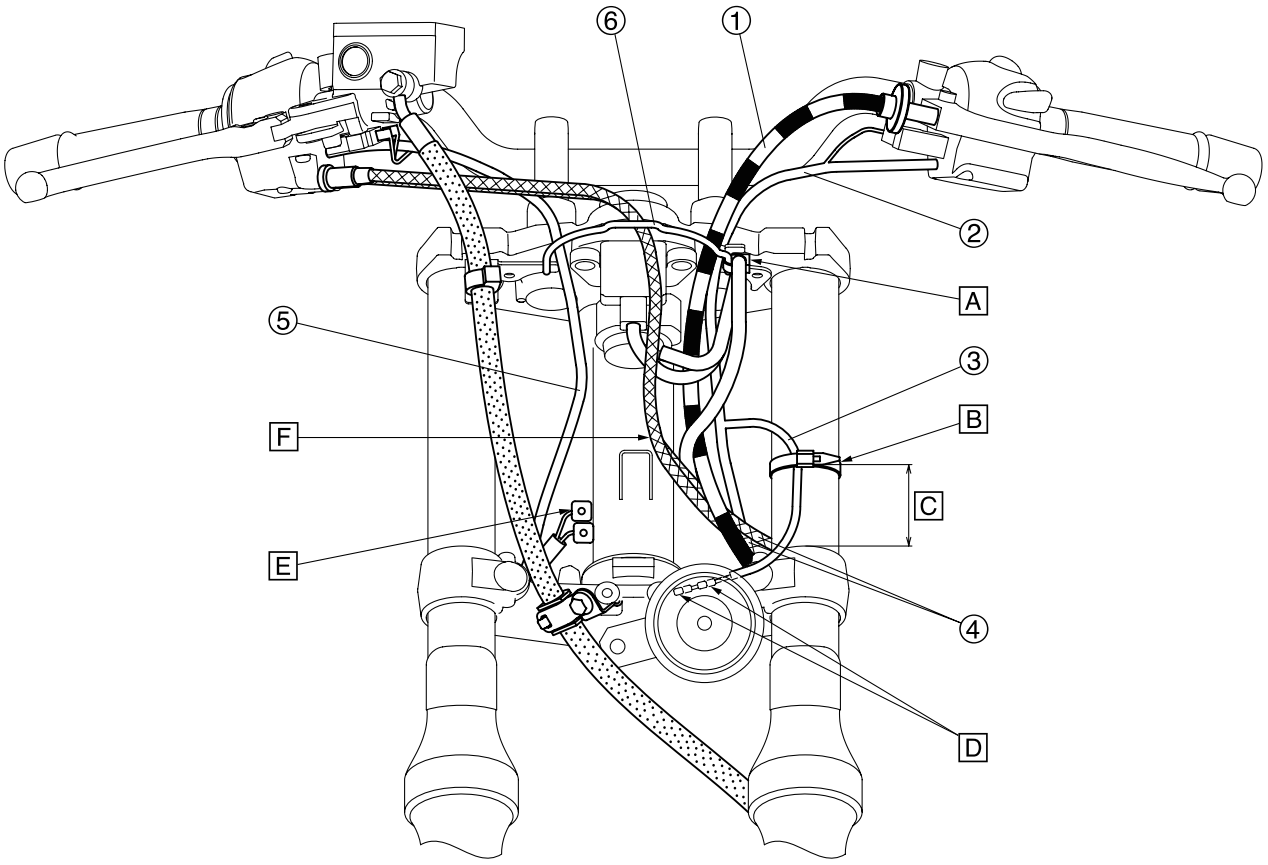
(XJ6SA)



1. Rear wheel sensor
2. Clamp
3. Wire harness
4. Front brake pipe (hydraulic unit–front brake caliper)
5. Front brake pipe (front brake master cylinder–hydraulic unit)
6. Frame
7. Hydraulic unit
8. Rear brake hose (rear brake master cylinder–hydraulic unit)
9. Rear wheel sensor lead

A. To rear brake master cylinder
B. To front brake master cylinder
C. To front brake caliper
D. Install it in the 16–20° range.
E. Install it in the 13–17° range.
F. To rear brake caliper
G. Install it in the 28–32° range.
H. Align the paper liner slit of the protector to the hydraulic unit end.
I. Install it in the 88-92° range.
J. Install the clamp with its pawl facing the lower side of the vehicle.

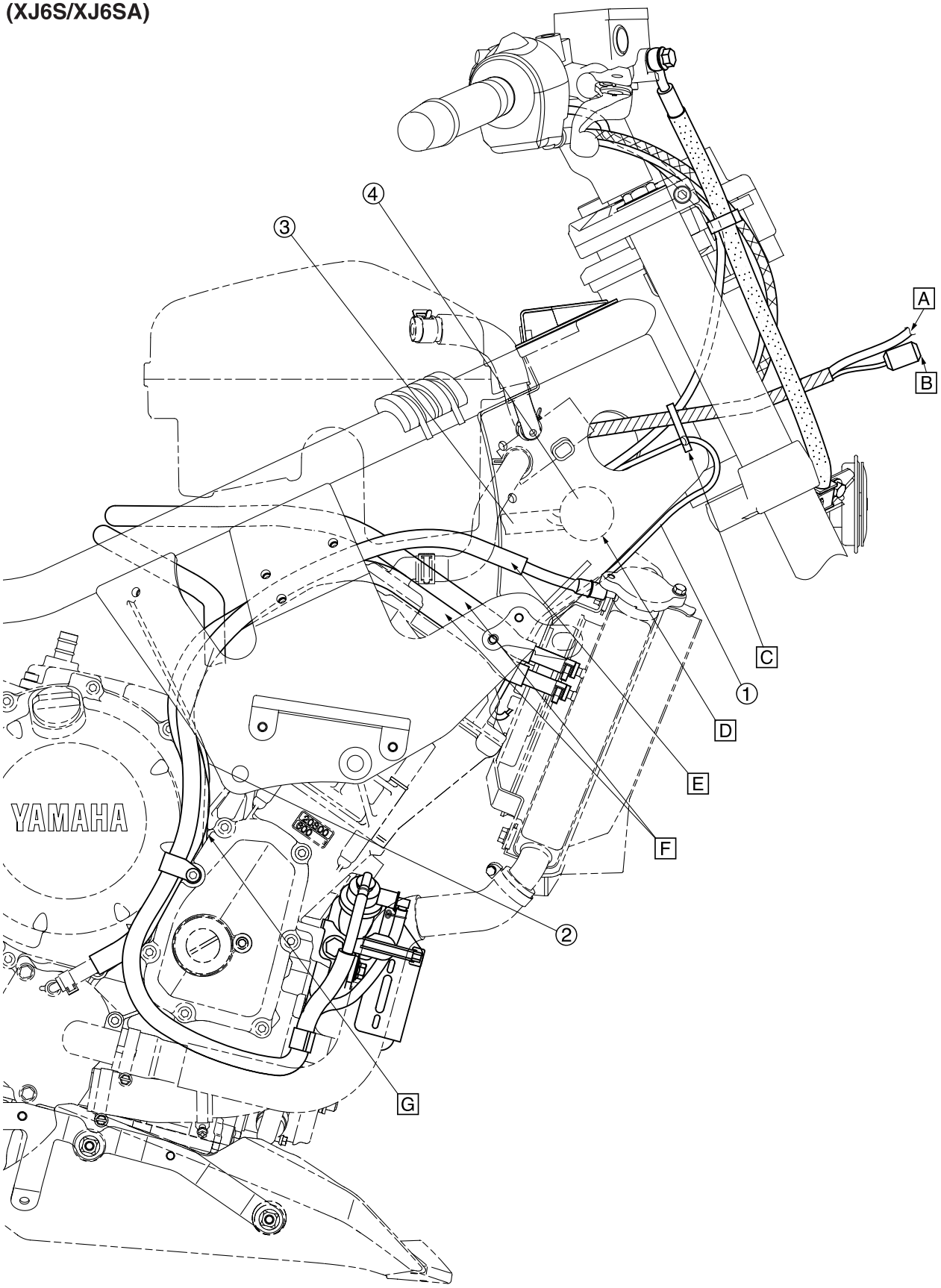
(XJ6S/XJ6SA)



1. Clutch cable
2. Left handlebar switch lead
3. Horn lead
4. Throttle cables
5. Right handlebar switch lead
6. Cable guide

A. Clamp the main switch lead and immobilizer lead on to the left side of the cable guide where it is not curved.
   Clamp the leads at the white tape position.
B. Pass the horn lead front of the inner tube and clamp it on.
   Direct the end of clamp toward front side of the vehicle with its end pointing outside.
   No need to cut off its end.
C. 40–60mm.
D. The terminal must direct toward the out of the vehicle.
E. To headlight.
F. Pass the throttle cable above the cowling stay.

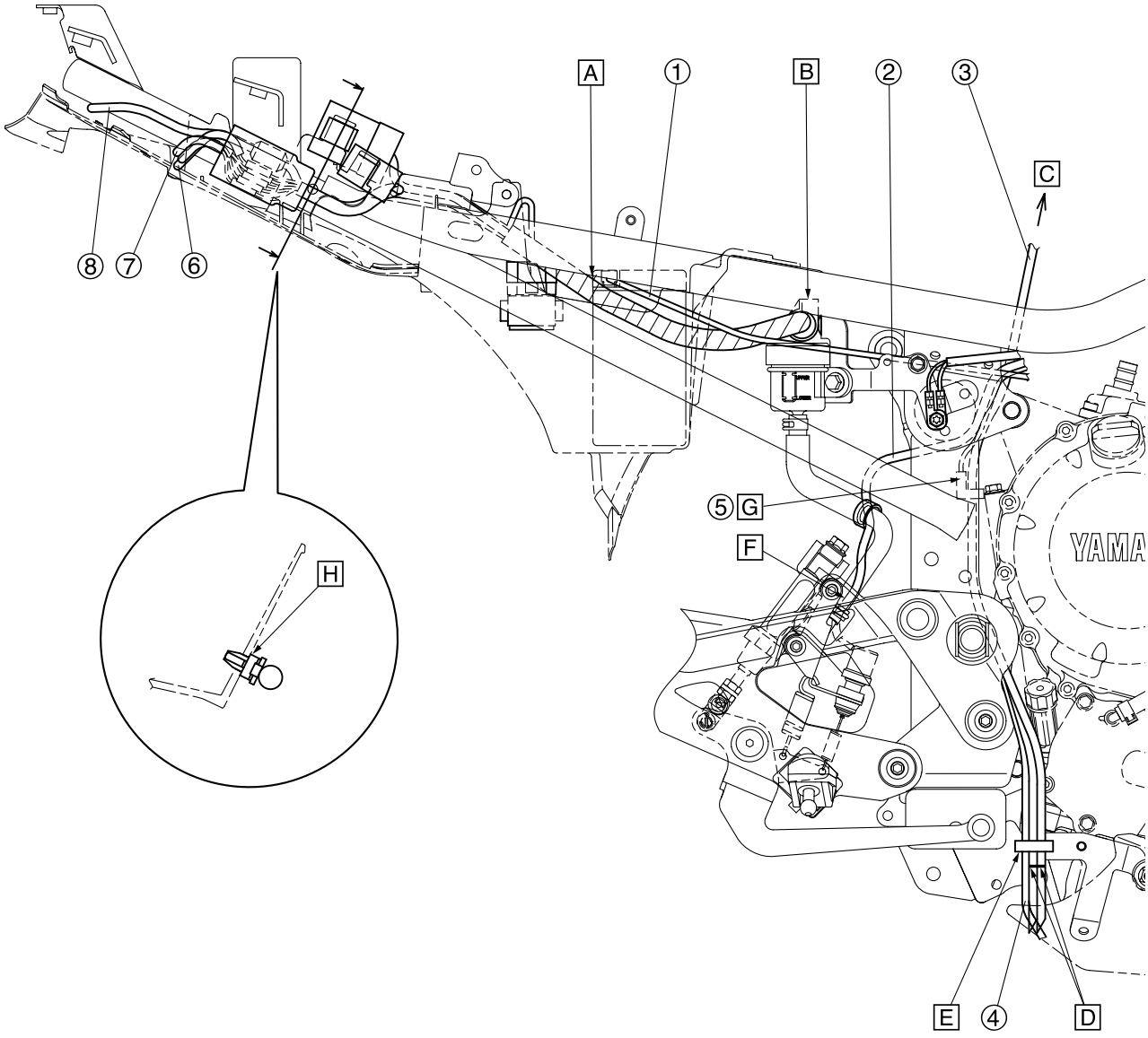
(XJ6S/XJ6SA)



1. Radiator fan motor lead
2. Crankshaft position sensor lead
3. Wire harness
4. Connector cover

A. To meter
B. To headlight
C. Clamp the wire harness, right handlebar switch lead, and radiator fan motor lead. Clamp the right handlebar switch lead so that there is no slack when the handle is all the way turned to the left. Clamp the other leads at the white tape position. Direct the end of clamp down and outward. No need to cut off its end.
D. Install the connector cover where underneath of the air cut-off valve and front of the air filter with its opening facing on the right.
E. Pass the coolant reservoir hose outside the fast idle plunger outlet hose and water pump breather hose (outer side).
F. Pass the fast idle plunger outlet hose and water pump breather hose under the cover.
G. Pass the crankshaft position sensor lead inside of radiator hose.

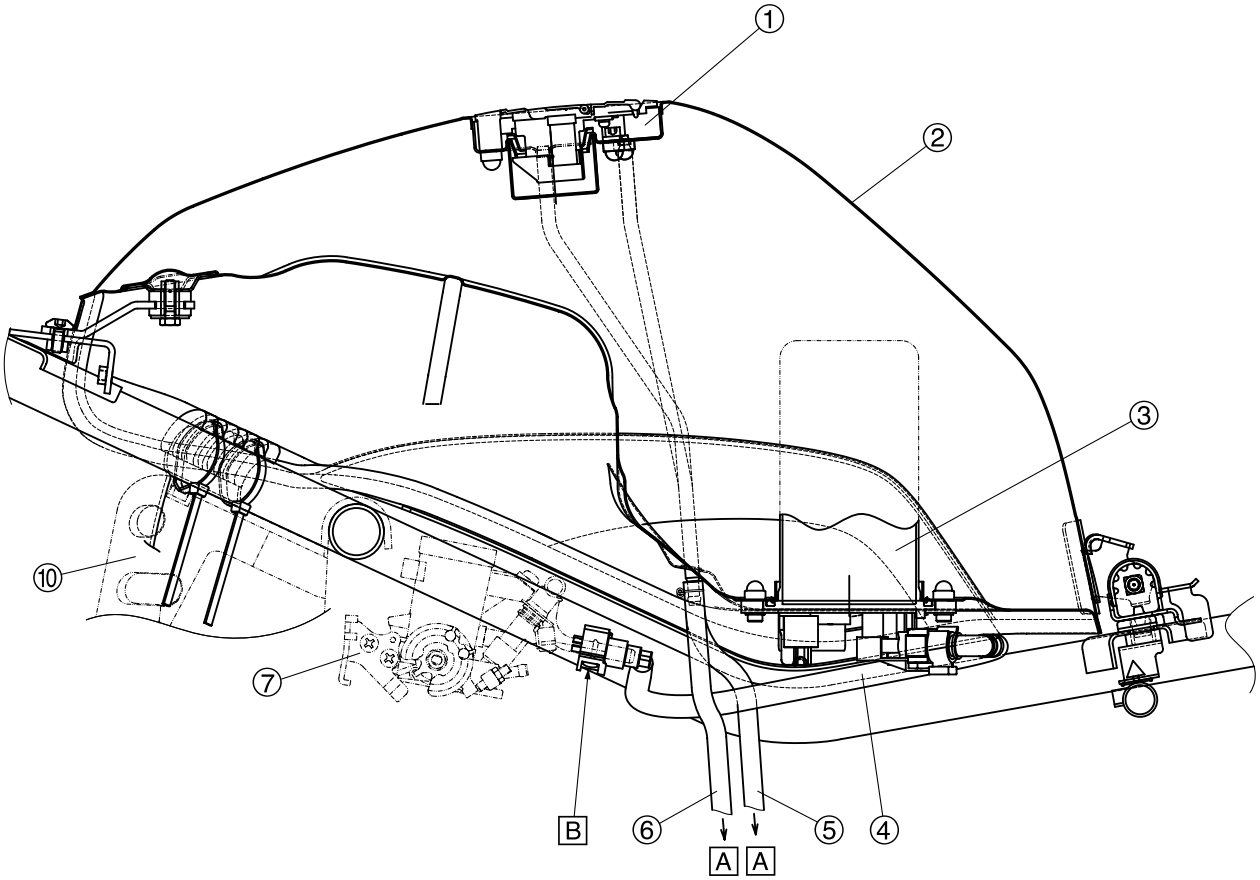
(XJ6S/XJ6SA)

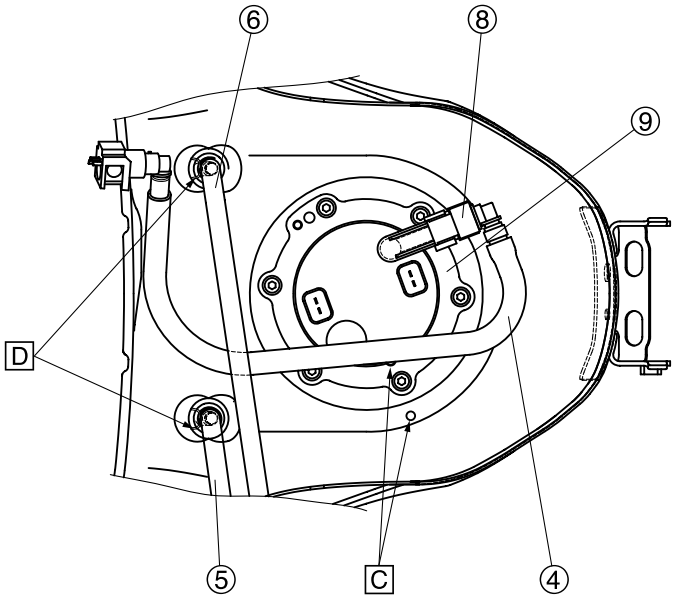


1. Battery negative lead
2. Rear brake light switch lead
3. Fuel tank breather hose
4. O_2 sensor lead
5. Neutral switch lead
6. Rear turn signal light lead (right/left)
7. License plate light lead
8. Tail/brake light lead

A. Install the wire harness inside frame from behind of the battery.
B. Clamp the wire harness. The opening must be directed upward.
C. To fuel tank
D. The paint mark of both the fuel tank breather hose and the fuel tank drain hose must be positioned under the clamp.
E. Clamp the O_2 sensor lead, fuel tank breather hose, and fuel tank drain hose.
F. Take care not pinch the rear brake light switch lead between the reservoir hose and master cylinder.
G. The terminal of the neutral switch must be directed upward.
H. Insert the wire harness clamp into the rear fender.

(XJ6S/XJ6SA)

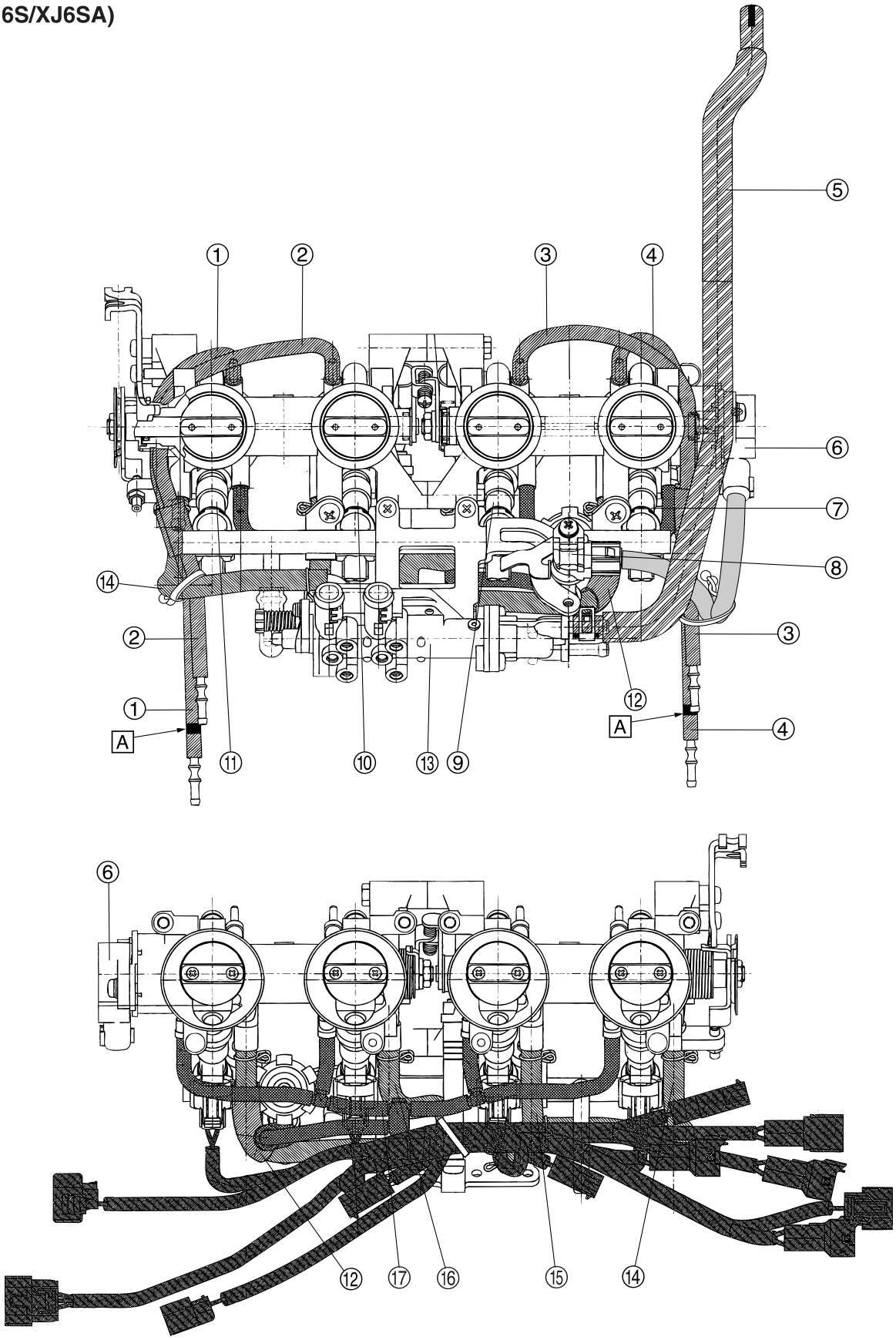




1. Fuel tank cap
2. Fuel tank
3. Fuel pump
4. Fuel hose
5. Fuel tank breather hose (right side)
6. Fuel tank drain hose (left side)
7. Throttle body
8. Fuel hose connector
9. Fuel pump bracket
10. Rubber cover

A. Release to atmospheric pressure
B. Make sure that the connector is connected securely.
C. The protrusion of the fuel pump must be aligned with the fuel tank mark.
D. Direct the clip end toward front of the vehicle.

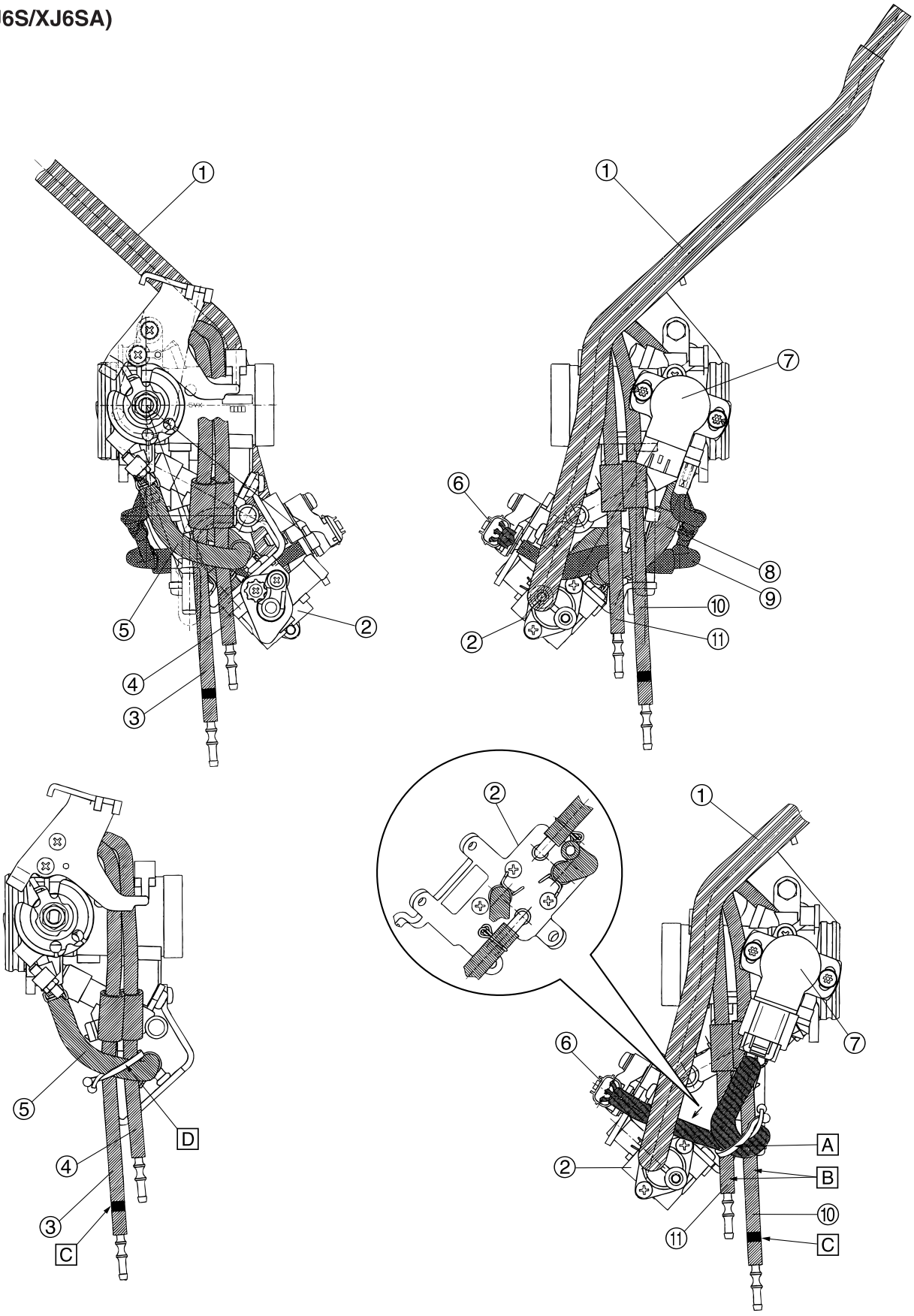
(XJ6S/XJ6SA)



1. Synchronizing hose #1
2. Synchronizing hose #2
3. Synchronizing hose #3
4. Synchronizing hose #4
5. Fast idle plunger coolant hose
6. Throttle position sensor
7. Fuel injector #4
8. Intake air pressure sensor
9. Fuel injector #3
10. Fuel injector #2
11. Fuel injector #1
12. Fast idle plunger hose (fast idle plunger-throttle body #4)
13. Fast idle plunger
14. Fast idle plunger hose (fast idle plunger-throttle body #1)
15. Fast idle plunger hose (fast idle plunger-throttle body #2)
16. Fast idle plunger hose (fast idle plunger-throttle body #3)
17. Negative pressure hose (throttle body-intake air pressure sensor)

A. Red paint mark

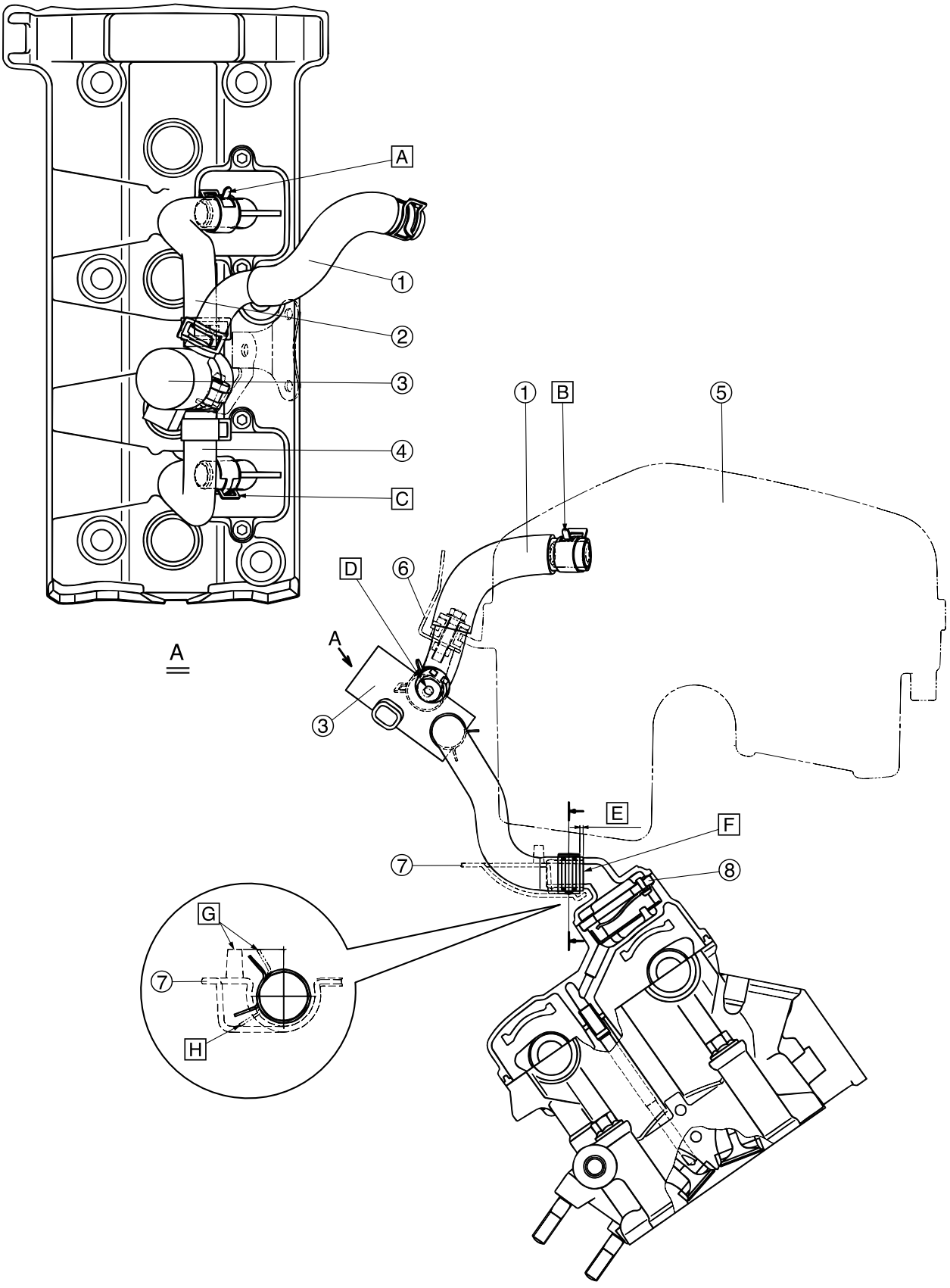
(XJ6S/XJ6SA)



1. Fast idle plunger coolant hose
2. Fast idle plunger
3. Synchronizing hose #1
4. Synchronizing hose #2
5. Fast idle plunger hose (fast idle plunger-throttle body #1)
6. Intake air pressure sensor
7. Throttle position sensor
8. Fast idle plunger hose (fast idle plunger-throttle body #4)
9. Negative pressure hose (throttle body-intake air pressure sensor)
10. Synchronizing hose #4
11. Synchronizing hose #3

A. Secure the intake air pressure sensor lead, throttle position sensor lead, and synchronizing hoses #3 and #4 using clamp. The top end of the clamp must be positioned close to throttle body #3.
B. Pass the synchronizing hoses #3 and #4 between the intake air pressure sensor lead and the throttle position sensor lead.
C. Red paint mark
D. Secure the fast idle plunger hose (fast idle plunger-throttle body #1) and synchronizing hoses #1 and #2 using clamp. The top end of the clamp must be positioned close to throttle body #2.

(XJ6S/XJ6SA)



1. Air cut-off valve hose 1
2. Air cut-off valve hose 2
3. Air cut-off valve
4. Air cut-off valve hose 3
5. Air filter case
6. Bracket
7. Rubber cover
8. Reed valve

A. Install the clamp with its end facing the right side of the vehicle.
B. Install the clamp with its end facing the top of the vehicle. Install the clamp with its end facing upwards without touching the air filter case.
C. Install the clamp with its end facing the left side of the vehicle.
D. Insert the grommet of the air cut-off valve into the frame bracket. A silicon hydrate or a neutral detergent (soap solution) can be coated slightly on it.
E. 1–3 mm
F. Insert the air cut-off valve hose until it reaches its end position.
G. Install the clamp so that its end is positioned below the protrusion of the rubber cover (at the right and left sides).
H. Install the clamp so that its end does not come in contact with the rubber cover (at the right and left sides).

PERIODIC CHECKS AND ADJUSTMENTS

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EAS20450
PERIODIC MAINTENANCE

EAS20460
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.

TIP

- **The annual checks must be performed every year, except if a kilometer-based maintenance, or for the UK, a mileage-based maintenance, is performed instead.**
- From 50000 km (30000 mi), repeat the maintenance intervals starting from 10000 km (6000 mi).
- Items marked with an asterisk should be performed by a Yamaha dealer as they require special tools, data and technical skills.

EAU46910
PERIODIC MAINTENANCE CHART FOR THE EMISSION CONTROL SYSTEM

NO.		ITEM	CHECK OR MAINTENANCE JOB	ODOMETER READING					ANNUAL CHECK
				1000 km (600 mi)	10000 km (6000 mi)	20000 km (12000 mi)	30000 km (18000 mi)	40000 km (24000 mi)	
1	*	**Fuel line**	• Check fuel hoses for cracks or damage.		√	√	√	√	√
2	*	**Spark plugs**	• Check condition. • Clean and regap.		√		√		
			• Replace.			√		√	
3	*	**Valves**	• Check valve clearance. • Adjust.	Every 40000 km (24000 mi)					
4	*	**Fuel injection**	• Adjust engine idling speed and synchronization.	√	√	√	√	√	√
5	*	**Air induction system**	• Check the air cut-off valve, reed valve, and hose for damage. • Replace the entire air induction system if necessary.		√	√	√	√	√

EAU1770B

GENERAL MAINTENANCE AND LUBRICATION CHART

NO.		ITEM	CHECK OR MAINTENANCE JOB	ODOMETER READING					ANNUAL CHECK
				1000 km (600 mi)	10000 km (6000 mi)	20000 km (12000 mi)	30000 km (18000 mi)	40000 km (24000 mi)	
1		Air filter element	• Replace.					√	
2		Clutch	• Check operation. • Adjust.	√	√	√	√	√	
3	*	Front brake	• Check operation, fluid level and vehicle for fluid leakage.	√	√	√	√	√	√
			• Replace brake pads.	Whenever worn to the limit					
4	*	Rear brake	• Check operation, fluid level and vehicle for fluid leakage.	√	√	√	√	√	√
			• Replace brake pads.	Whenever worn to the limit					
5	*	Brake hoses	• Check for cracks or damage.		√	√	√	√	√
			• Replace.	Every 4 years					
6	*	Wheels	• Check runout and for damage.		√	√	√	√	
7	*	Tires	• Check tread depth and for damage. • Replace if necessary. • Check air pressure. • Correct if necessary.		√	√	√	√	√
8	*	Wheel bearings	• Check bearing for looseness or damage.		√	√	√	√	
9	*	Swingarm	• Check operation and for excessive play.		√	√	√	√	
			• Lubricate with lithium-soap-based grease.	Every 50000 km (30000 mi)					
10		Drive chain	• Check chain slack, alignment and condition. • Adjust and lubricate chain with a special O-ring chain lubricant thoroughly.	Every 1000 km (600 mi) and after washing the motorcycle or riding in the rain					
11	*	Steering bearings	• Check bearing play and steering for roughness.	√	√	√	√	√	
			• Lubricate with lithium-soap-based grease.	Every 20000 km (12000 mi)					
12	*	Chassis fasteners	• Make sure that all nuts, bolts and screws are properly tightened.		√	√	√	√	√
13		Brake lever pivot shaft	• Lubricate with silicone grease.		√	√	√	√	√
14		Brake pedal pivot shaft	• Lubricate with lithium-soap-based grease.		√	√	√	√	√
15		Clutch lever pivot shaft	• Lubricate with lithium-soap-based grease.		√	√	√	√	√
16		Shift pedal pivot shaft	• Lubricate with lithium-soap-based grease.		√	√	√	√	√
17		Sidestand, centerstand	• Check operation. • Lubricate.		√	√	√	√	√
18	*	Sidestand switch	• Check operation.	√	√	√	√	√	√

NO.		ITEM	CHECK OR MAINTENANCE JOB	ODOMETER READING					ANNUAL CHECK
				1000 km (600 mi)	10000 km (6000 mi)	20000 km (12000 mi)	30000 km (18000 mi)	40000 km (24000 mi)	
19	*	**Front fork**	• Check operation and for oil leakage.		√	√	√	√	
20	*	**Shock absorber assembly**	• Check operation and shock absorber for oil leakage.		√	√	√	√	
21		**Engine oil**	• Change. • Check oil level and vehicle for oil leakage.	√	√	√	√	√	√
22		**Engine oil filter cartridge**	• Replace.	√		√		√	
23	*	**Cooling system**	• Check coolant level and vehicle for coolant leakage.		√	√	√	√	√
			• Change.	Every 3 years					
24	*	**Front and rear brake switches**	• Check operation.	√	√	√	√	√	√
25		**Moving parts and cables**	• Lubricate.		√	√	√	√	√
26	*	**Throttle grip housing and cable**	• Check operation and free play. • Adjust the throttle cable free play if necessary. • Lubricate the throttle grip housing and cable.		√	√	√	√	√
27	*	**Lights, signals and switches**	• Check operation. • Adjust headlight beam.	√	√	√	√	√	√

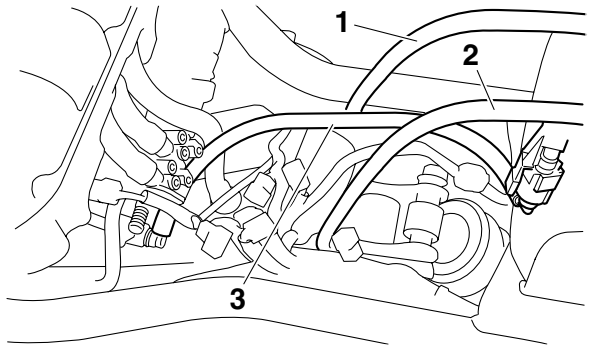
TIP

- 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
  - Regularly check and, if necessary, correct the brake fluid level.
  - 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.

EAS21030
CHECKING THE FUEL LINE
The following procedure applies to all of the fuel, vacuum and breather hoses.
1. Remove:
   - Seat
     Refer to "GENERAL CHASSIS" on page 4-1.
   - Fuel tank
     Refer to "FUEL TANK" on page 7-1.
2. Check:
   - Fuel tank breather hose "1"
   - Fuel tank drain hose "2"
   - Fuel hose "3"
     Cracks/damage → Replace.
     Loose connection → Connect properly.

ECA14940
NOTICE
Make sure the fuel tank breather hose is routed correctly.

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



3. Install:
   - Fuel tank
     Refer to "FUEL TANK" on page 7-1.
   - Seat
     Refer to "GENERAL CHASSIS" on page 4-1.

EAS20680
CHECKING THE SPARK PLUGS
The following procedure applies to all of the spark plugs.
1. Remove:
   - Seat
     Refer to "GENERAL CHASSIS" on page 4-1.
   - Fuel tank
     Refer to "FUEL TANK" on page 7-1.
   - Air filter case
     Refer to "GENERAL CHASSIS" on page 4-1.
   - Rubber cover
     Refer to "AIR INDUCTION SYSTEM" on page 7-11.
2. Disconnect:
   - Spark plug caps
3. Remove:
   - Spark plugs

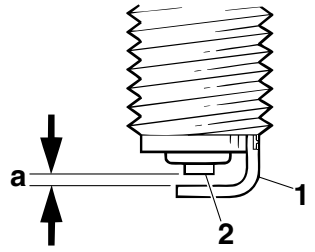
ECA13320
NOTICE
Before removing the spark plugs, blow away any dirt accumulated in the spark plug wells with compressed air to prevent it from falling into the cylinders.

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

	Manufacturer/model **NGK/CR9E**

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

	Spark plug gap **0.7–0.8 mm (0.028–0.031 in)**



8. Install:
   - Spark plugs

	Spark plug **13 Nm (1.3 m·kgf, 9.4 ft·lbf)**

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

9. Connect:
   • Spark plug caps
10. Install:
   • Rubber cover
     Refer to “AIR INDUCTION SYSTEM” on page 7-11.
   • Air filter case
     Refer to “GENERAL CHASSIS” on page 4-1.
   • Fuel tank
     Refer to “FUEL TANK” on page 7-1.
   • Seat
     Refer to “GENERAL CHASSIS” on page 4-1.

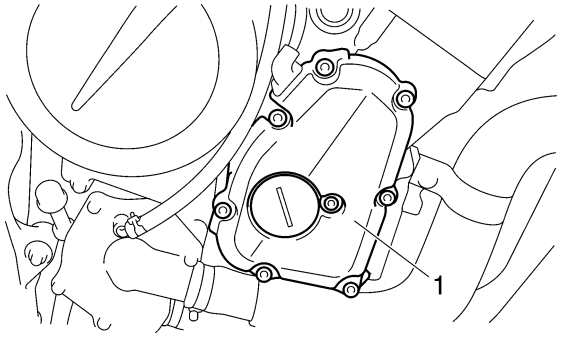
EAS20490
ADJUSTING THE VALVE CLEARANCE

The following procedure applies to all of the valves.

TIP

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

1. Remove:
   • Seat
     Refer to “GENERAL CHASSIS” on page 4-1.
   • Fuel tank
     Refer to “FUEL TANK” on page 7-1.
   • Air filter case
     Refer to “GENERAL CHASSIS” on page 4-1.
   • Throttle bodies
     Refer to “THROTTLE BODIES” on page 7-4.
   • Air cut-off valve
   • Rubber cover
     Refer to “AIR INDUCTION SYSTEM” on page 7-11.
2. Remove:
   • Spark plug caps
   • Spark plugs
   • Throttle body
     Refer to “THROTTLE BODIES” on page 7-4.
   • Cylinder head cover
   • Cylinder head cover gasket
     Refer to “CAMSHAFTS” on page 5-8.
3. Remove:
   • Pickup rotor cover “1”
   • Gasket



4. Measure:
   • Valve clearance
     Out of specification → Adjust.

Valve clearance (cold)
Intake
0.13–0.20 mm (0.0051–0.0079 in)
Exhaust
0.23–0.30 mm (0.0091–0.0118 in)

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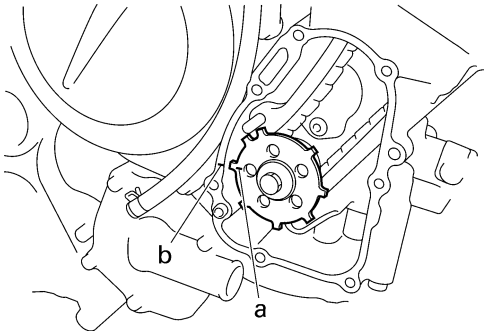
a. Turn the crankshaft counterclockwise.
b. When piston #1 is at TDC on the compression stroke, align the TDC mark “a” on the pickup rotor with the crankcase mating surface “b”.

TIP

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



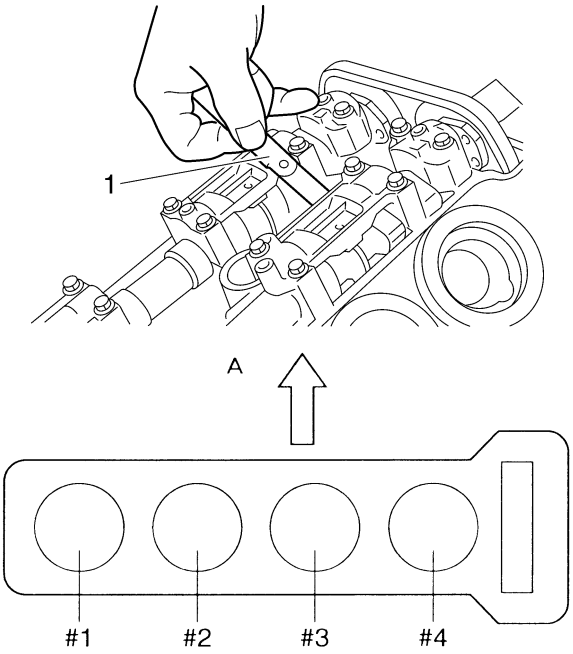
c. Measure the valve clearance with a thickness gauge “1”.

TIP

- If the valve clearance is incorrect, record the measured reading.
- Measure the valve clearance in the following sequence.

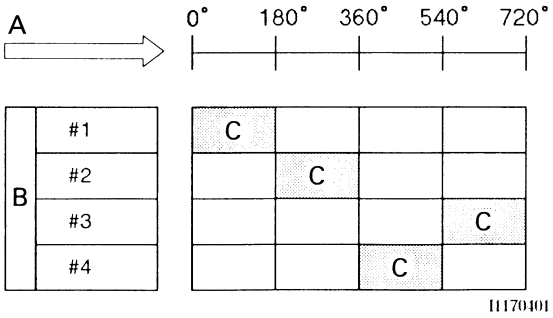
Valve clearance measuring sequence
Cylinder #1 → #2 → #4 → #3

Thickness gauge
90890-03079
Narrow gauge set
YM-34483



A. Front

d. To measure the valve clearances of the other cylinders, starting with cylinder #1 at TDC, turn the crankshaft counterclockwise as specified in the following table.



A. Degrees that the crankshaft is turned counterclockwise
B. Cylinder
C. Combustion cycle

Cylinder #2	180°
Cylinder #4	360°
Cylinder #3	540°

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5. Remove:
   • Camshafts

TIP

- Refer to “CAMSHAFTS” on page 5-8.
- When removing the timing chain and camshafts, fasten the timing chain with a wire to retrieve it if it falls into the crankcase.

6. Adjust:
   • Valve clearance

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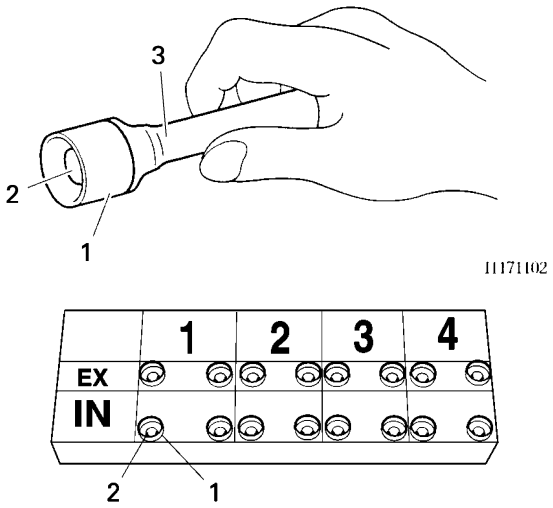
a. Remove the valve lifter “1” and the valve pad “2” with a valve lapper “3”.

Valve lapper
90890-04101
Valve lapping tool
YM-A8998

TIP

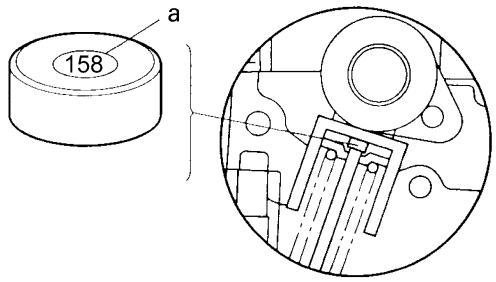
- Cover the timing chain opening with a rag to prevent the valve pad from falling into the crankcase.
- Make a note of the position of each valve lifter “1” and valve pad “2” so that they can be installed in the correct place.



b. Calculate the difference between the specified valve clearance and the measured valve clearance.
   Example:
   Specified valve clearance = 0.13–0.20 mm (0.005–0.008 in)
   Measure valve clearance = 0.25 mm (0.010 in)
   0.25 mm (0.010 in)–0.20 mm (0.008 in) = 0.05 mm (0.002 in)
c. Check the thickness of the current valve pad.

TIP
The thickness “a” of each valve pad is marked in hundredths of millimeters on the side that touches the valve lifter.

Example:
If the valve pad is marked “158”, the pad thickness is 1.58 mm (0.062 in)



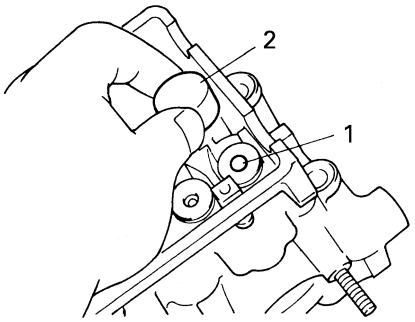
d. Calculate the sum of the values obtained in steps (b) and (c) to determine the required valve pad thickness and the valve pad number.
Example:
1.58 mm (0.062 in) + 0.05 mm (0.002 in) = 1.63 mm (0.064 in)
The valve pad number is 163.
e. Round off the valve pad number according to the following table, and then select the suitable valve pad.

Last digit	Rounded value
0,1,2	0
3,4,5,6	5
7,8,9	10

TIP
Refer to the following table for the available valve pads.

Valve pad range	Nos. 120–240
Valve pad thickness	1.20–2.40 mm (0.0591–0.0945 in)
Available valve pads	25 thicknesses in 0.05 mm (0.002 in) increments

Example:
Valve pad number = 163
Rounded value = 165
New valve pad number = 165
f. Install the new valve pad “1” and the valve lifter “2”.



TIP
- 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.

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

	Camshaft cap bolt **10 Nm (1.0 m·kgf, 7.2 ft·lbf)**

TIP
- Refer to “CAMSHAFTS” on page 5-8.
- 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.

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

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7. Install:
- All removed parts

TIP
For installation, reverse the removal procedure.

EAS20610
ADJUSTING THE ENGINE IDLING SPEED

TIP
Before synchronizing the throttle bodies, check the following items:
- Valve clearance

- Spark plugs
- Air filter element
- Throttle body joints
- Fuel hoses
- Air induction system
- Exhaust system
- Breather hoses
- Throttle body hoses
- Fast idle plunger outlet hose
- Fast idle plunger inlet hose

1. Start the engine and let it warm up for several minutes.
2. Check:
   - Engine idling speed
     Out of specification → Adjust.

Engine idling speed
1250–1350 r/min

3. Adjust:
   - Engine idling speed

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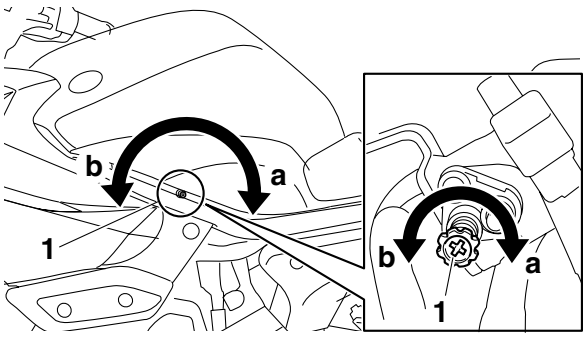
a. Turn the idle adjusting screw "1" in direction "a" or "b" until the specified engine idling speed is obtained.

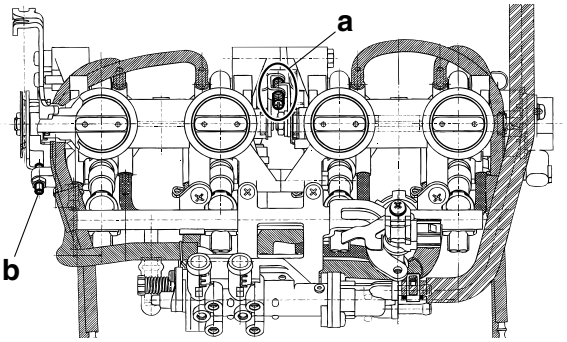
Direction "a"
Engine idling speed is increased.
Direction "b"
Engine idling speed is decreased.



ECA20S1010

NOTICE

- **Do not touch synchronizing screw "a". Could affect the engine idling speed or cause malfunction in other related parts.**
- **Do not touch the throttle adjust screw "b". Could affect the engine idling speed or cause malfunction in order related parts.**
- **Clean the throttle bodies only if they cannot be synchronized using the air screw. Refer to "CHECKING AND CLEANING THE THROTTLE BODIES" on page 7-8.**
- **If they cannot synchronized, replace the throttle body assembly.**



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4. Adjust:
   - Throttle cable free play
     Refer to "ADJUSTING THE THROTTLE CABLE FREE PLAY" on page 3-30.

Throttle cable free play
3.0–5.0 mm (0.12–0.20 in)

EAS20570

SYNCHRONIZING THE THROTTLE BODIES

TIP

Before synchronizing the throttle bodies, check the following items:

- Valve clearance
- Spark plugs
- Air filter element
- Throttle body joints
- Fuel hoses
- Air induction system
- Exhaust system
- Breather hoses
- Throttle body hoses
- Fast idle plunger outlet hose
- Fast idle plunger inlet hose

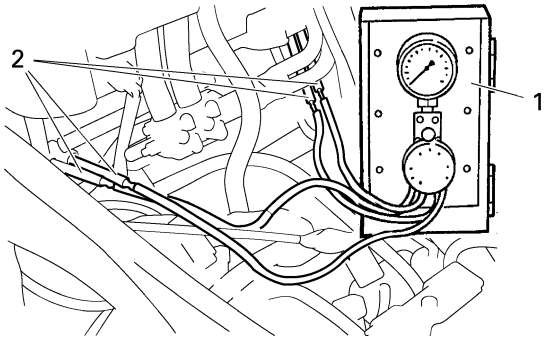
1. Stand the vehicle on a level surface.

TIP

Place the vehicle on the centerstand.

2. Remove:
   - Seat
     Refer to "GENERAL CHASSIS" on page 4-1.
   - Fuel tank
     Refer to "FUEL TANK" on page 7-1.
3. Install:
   - Vacuum gauge "1"
     (onto the synchronizing hose "2")

Vacuum gauge
90890-03094
Carburetor synchronizer
YU-44456



4. Install:
   - Fuel tank
     Refer to “FUEL TANK” on page 7-1.
5. Start the engine and let it warm up for several minutes.
6. Check:
   - Engine idling speed
     Out of specification → Adjust.
     Refer to “ADJUSTING THE ENGINE IDLING SPEED” on page 3-7.

Engine idling speed
1250–1350 r/min

- Check the vacuum pressure.

The difference in vacuum pressure between the throttle bodies should not exceed 1.33 kPa (10 mmHg).

If out of specification → Adjust the throttle body synchronization.

7. Adjust:
   - Throttle body synchronization

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a. With throttle body #1 “2” as standard, adjust throttle bodies #2 “3”, #3 “4”, and #4 “5” using the air screw “1”.

ECA14900

NOTICE

Do not use the throttle valve adjusting screws to adjust the throttle body syncronization.

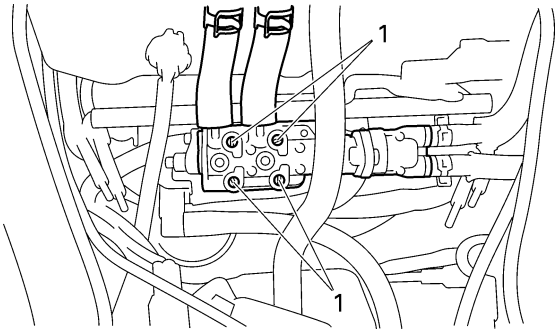
TIP

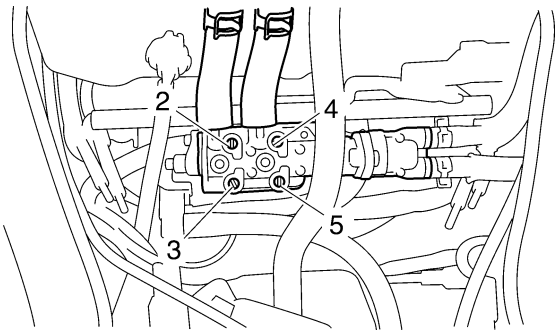
- After each step, rev the engine two or three times, each time for less than a second, and check the synchronization again.
- If a air screw was removed, clean or replace the throttle bodies.

Vacuum gauge
90890-03094
Carburetor synchronizer
YU-44456

TIP

The difference in vacuum pressure between two throttle bodies should not exceed 1.33 kPa (10 mmHg).





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8. Measure:
   - Engine idling speed
     Out of specification → Adjust.
     Make sure that the vacuum pressure is within specification.
9. Stop the engine and remove the measuring equipment.
10. Adjust:
    - Throttle cable free play
      Refer to “ADJUSTING THE THROTTLE CABLE FREE PLAY” on page 3-30.

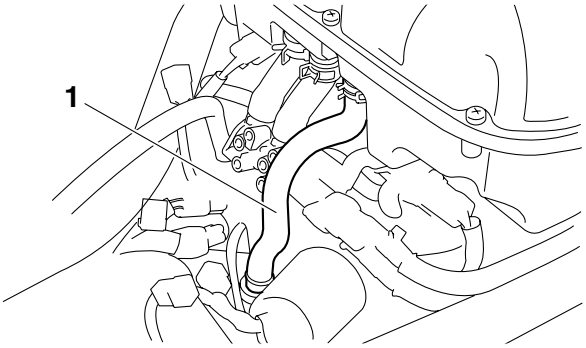
Throttle cable free play
3.0–5.0 mm (0.12–0.20 in)

11. Install:
    - Fuel tank
      Refer to “FUEL TANK” on page 7-1.
    - Seat
      Refer to “GENERAL CHASSIS” on page 4-1.

EAS20S13005
CHECKING THE AIR INDUCTION SYSTEM
Refer to “AIR INDUCTION SYSTEM” on page 7-11.

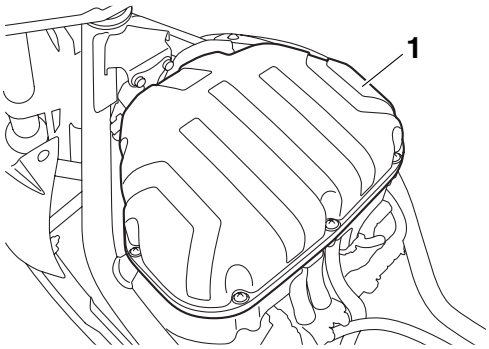
EAS21070
CHECKING THE CRANKCASE BREATHER HOSE
1. Remove:
   - Seat
     Refer to “GENERAL CHASSIS” on page 4-1.
   - Fuel tank
     Refer to “FUEL TANK” on page 7-1.
2. Check:
   - Crankcase breather hose “1”
     Cracks/damage → Replace.
     Loose connection → Connect properly.

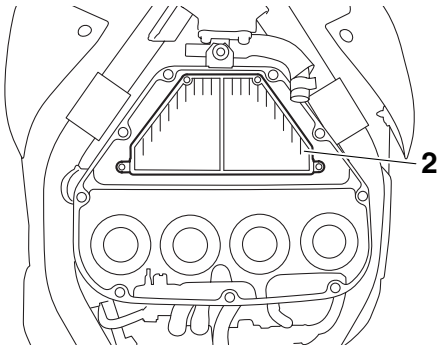
ECA13450
NOTICE
Make sure the crankcase breather hose is routed correctly.



3. Install:
   - Fuel tank
     Refer to “FUEL TANK” on page 7-1.
   - Seat
     Refer to “GENERAL CHASSIS” on page 4-1.

EAS20960
REPLACING THE AIR FILTER ELEMENT
1. Remove:
   - Seat
     Refer to “GENERAL CHASSIS” on page 4-1.
   - Fuel tank
     Refer to “FUEL TANK” on page 7-1.
2. Remove:
   - Air filter case cover screw “1”
   - Air filter element “2”





3. Check:
   - Air filter element
     Damage → Replace.

TIP
- Replace the air filter element every 40000 km of operation.
- The air filter needs more frequent service if you are riding in unusually wet or dusty areas.

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

	Air filter case cover screw 2.5 Nm (0.3 m·kgf, 1.8 ft·lbf)

ECA4S81008
NOTICE
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 throttle bodies synchronization, leading to poor engine performance and possible overheating.

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

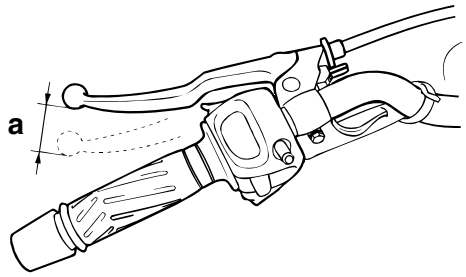
5. Install:
   - Fuel tank
     Refer to “FUEL TANK” on page 7-1.

• Seat
Refer to “GENERAL CHASSIS” on page 4-1.

EAS20870
ADJUSTING THE CLUTCH CABLE FREE PLAY

1. Check:
• Clutch cable free play “a”
Out of specification → Adjust.

	Clutch lever free play **10.0–15.0 mm (0.39–0.59 in)**



2. Adjust:
• Clutch cable free play

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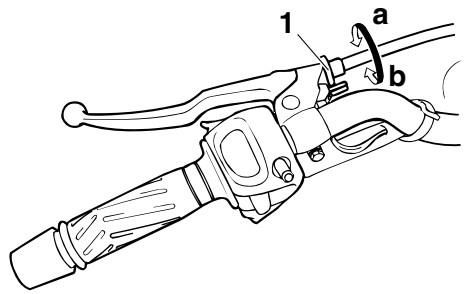
Handlebar side

a. Turn the adjusting bolt “1” in direction “a” or “b” until the specified clutch cable free play is obtained.

Direction “a”
Clutch cable free play is increased.
Direction “b”
Clutch cable free play is decreased.

TIP
If the specified clutch cable free play cannot be obtained on the handlebar side of the cable, use the adjusting nut on the engine side.



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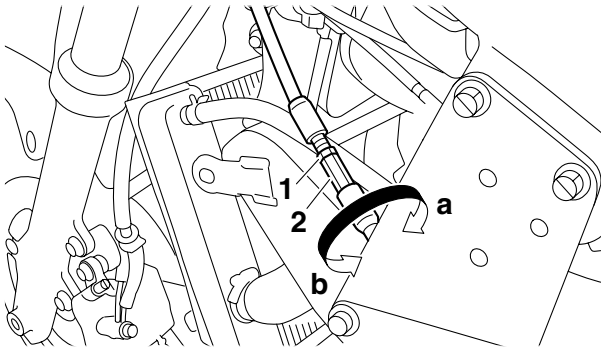
Engine side

a. Remove the left side cowling and left side panel.
Refer to “GENERAL CHASSIS” on page 4-1.
b. Loosen the locknut “1”.
c. 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.

d. Tighten the locknut.

	Clutch cable locknut **7 Nm (0.7 m·kgf, 5.0 ft·lbf)**



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EAS21240
CHECKING THE BRAKE FLUID LEVEL

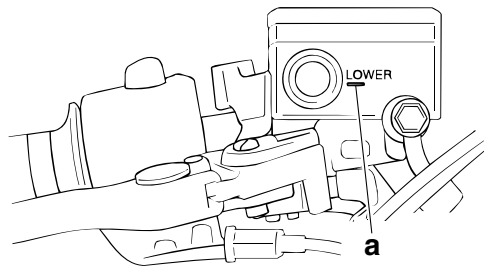
1. Stand the vehicle on a level surface.

TIP
• Place the vehicle on the centerstand.
• Make sure the vehicle is upright.

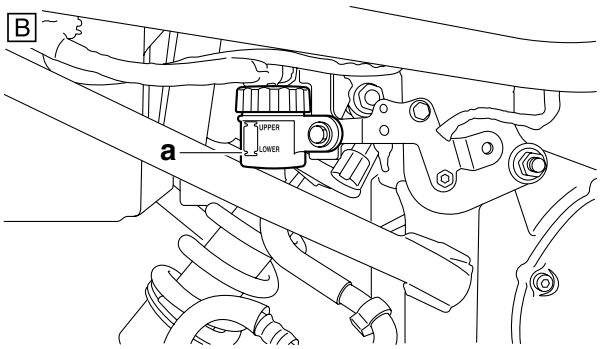
2. Check:
• Brake fluid level
Below the minimum level mark “a” → Add the recommended brake fluid to the proper level.

	Recommended fluid **DOT 4**

A



B



A. Front brake
B. Rear brake

EWA13090

⚠ 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.**

ECA13540

NOTICE

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

TIP

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

EAS21160

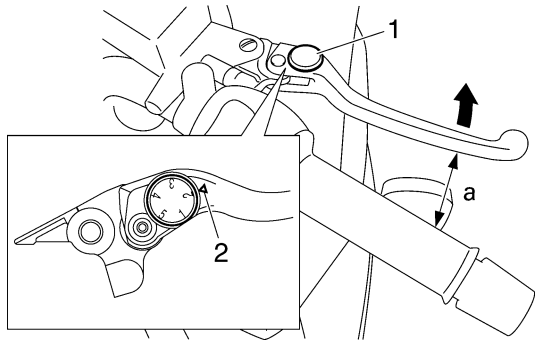
ADJUSTING THE FRONT DISC BRAKE

1. Adjust:
   - Brake lever position
     (distance “a” from the throttle grip to the brake lever)

TIP

- While pushing the brake lever forward, turn the adjusting dial “1” until the brake lever is in the desired position.
- Be sure to align the setting on the adjusting dial with the arrow mark “2” on the brake lever holder.

Position #1
Distance “a” is the largest.
Position #5
Distance “a” is the smallest.



EWA13060

⚠ 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.**

ECA13490

NOTICE

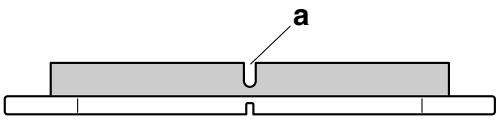
After adjusting the brake lever position, make sure there is no brake drag.

EAS21250

CHECKING THE FRONT BRAKE PADS

The following procedure applies to all of the brake pads.

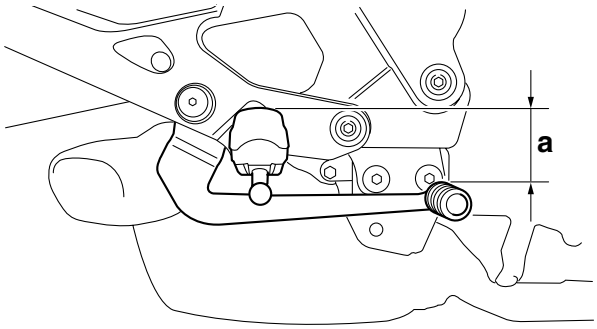
1. Operate the brake.
2. Check:
   - Front brake pad
     Wear indicator groove “a” has almost disappeared → Replace the brake pads as a set.
     Refer to “FRONT BRAKE” on page 4-23.



EAS21190
ADJUSTING THE REAR DISC BRAKE

1. Check:
   - Brake pedal position
     (distance "a" from the top of the rider footrest to the top of the brake pedal)
     Out of specification → Adjust.

	Brake pedal position (below the top of the rider footrest) **46.5 mm (1.83 in)**



2. Adjust:
   - Brake pedal position

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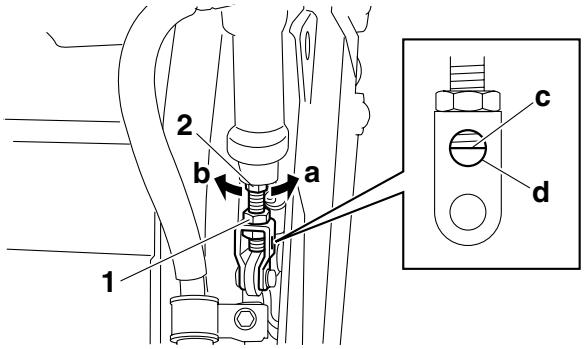
a. Loosen the locknut "1".
b. Turn the adjusting bolt "2" in direction "a" or "b" until the specified brake pedal position is obtained.

Direction "a" **Brake pedal is raised.** **Direction "b"** **Brake pedal is lowered.**

EWA13070
⚠ WARNING

After adjusting the brake pedal position, check that the end of the adjusting bolt "c" is visible through the hole "d".



c. Tighten the locknut "1" to specification.

	Locknut **18 Nm (1.8 m·kgf, 13 ft·lbf)**

EWA4S81005
⚠ WARNING

A soft or spongy feeling in the brake pedal 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 braking performance.

ECA13510
NOTICE

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

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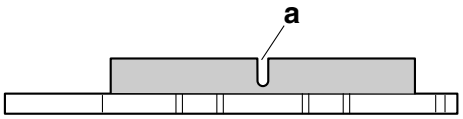
3. Adjust:
   - Rear brake light switch
     Refer to "ADJUSTING THE REAR BRAKE LIGHT SWITCH" on page 3-29.

EAS21260
CHECKING THE REAR BRAKE PADS

The following procedure applies to all of the brake pads.

1. Operate the brake.
2. Check:
   - Rear brake pad
     Wear indicator groove "a" has almost disappeared → Replace the brake pads as a set.
     Refer to "REAR BRAKE" on page 4-37.



EAS21340
BLEEDING THE HYDRAULIC BRAKE SYSTEM

EWA13100
⚠ 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.**

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

1. Bleed:
   - Hydraulic brake system

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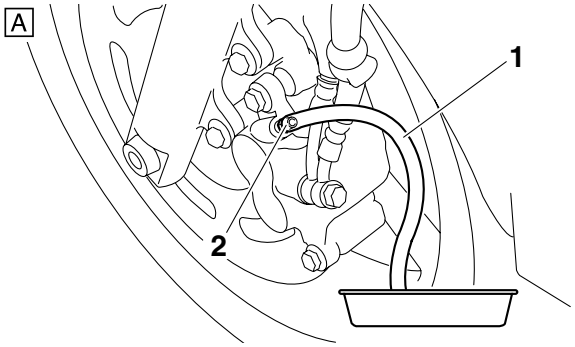
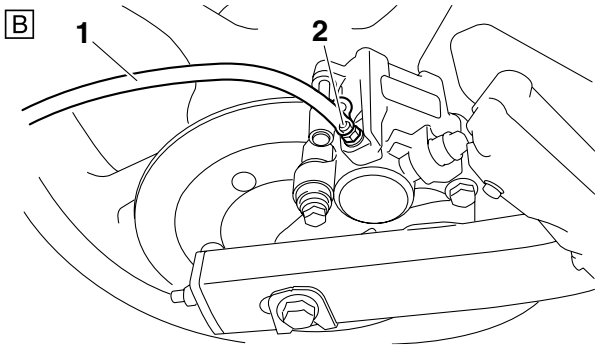
a. Fill the brake fluid reservoir to the proper level with the recommended brake fluid.
b. Install the brake master cylinder reservoir diaphragm.
c. Connect a clear plastic hose “1” tightly to the bleed screw “2”.





A. Front brake
B. Rear brake

d. Place the other end of the hose into a container.
e. Slowly apply the brake lever 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.

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

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

Front brake caliper bleed screw
6 Nm (0.6 m·kgf, 4.3 ft·lbf)
Rear brake caliper bleed screw
5 Nm (0.5 m·kgf, 3.6 ft·lbf)

k. Fill the brake fluid reservoir to the proper level with the recommended brake fluid.
Refer to “CHECKING THE BRAKE FLUID LEVEL” on page 3-11.

EWA13110

⚠ WARNING

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

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Bleeding the ABS brake

EWA36C1001

⚠ WARNING

Bleed the ABS whenever:

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

TIP

- Be careful not to spill any brake fluid or allow the brake master cylinder reservoir or brake fluid reservoir to overflow.
- When bleeding the ABS, make sure there is always enough brake fluid before applying the brake. Ignoring this precaution could allow air to enter the ABS, 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:
   - ABS

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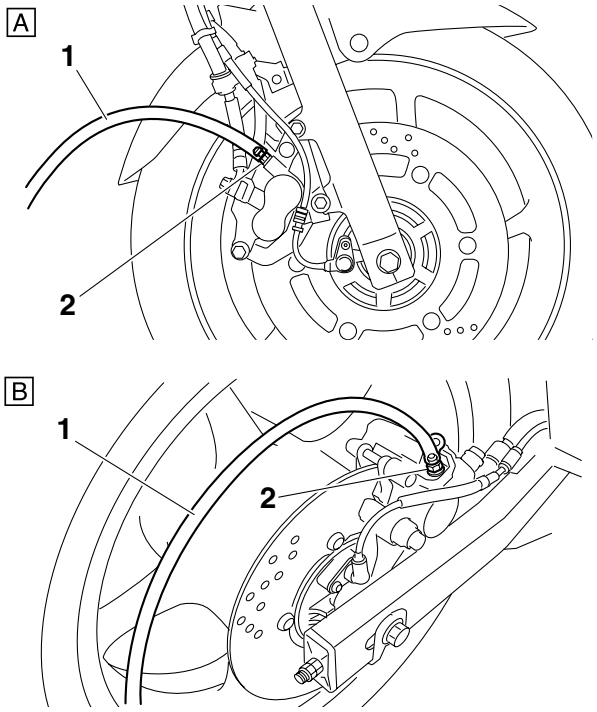
a. Fill the brake fluid reservoir to the proper level with the recommended brake fluid.
b. Install the brake master cylinder reservoir diaphragm.
c. Connect a clear plastic hose “1” tightly to the bleed screw “2”.



A. Front brake
B. Rear brake

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

TIP

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

h. Tighten the bleed screw, and then release the brake lever or brake pedal.
i. Repeat steps (e) to (h) until all of the air bubbles have disappeared from the brake fluid in the plastic hose.
j. Check the operation of the hydraulic unit.
   Refer to “HYDRAULIC UNIT OPERATION TESTS” on page 4-53.

ECA14780

NOTICE

Make sure that the main switch is set to “OFF” before checking the operation of the hydraulic unit.

k. After operating the ABS, repeat steps (e) to (i), and then fill the primary circuit with the recommended brake fluid.
l. Tighten the bleed screw to the specified torque.

Front brake caliper bleed screw
6 Nm (0.6 m·kgf, 4.3 ft·lbf)
Rear brake caliper bleed screw
5 Nm (0.5 m·kgf, 3.6 ft·lbf)

m. Fill the brake master cylinder reservoir or brake fluid reservoir to the proper level with the recommended brake fluid.
Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-11.

EWA14020

⚠ WARNING

After bleeding the ABS, check the brake operation.

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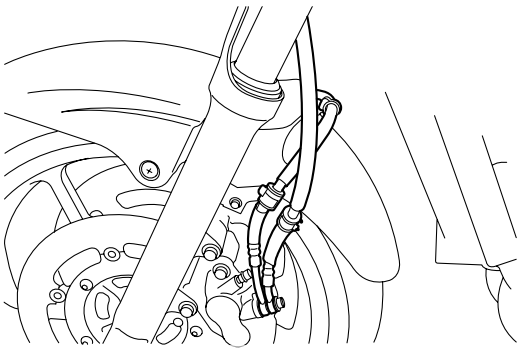
EAS21280

CHECKING THE FRONT BRAKE HOSES

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

1. Check:
   - Brake hose
     Cracks/damage/wear → Replace.

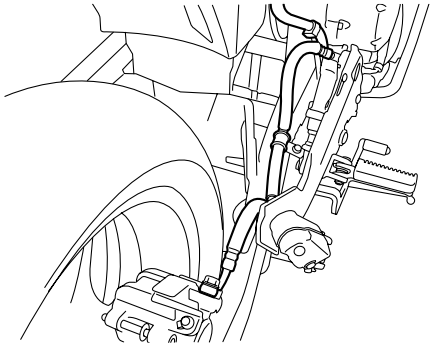


2. Check:
   - Brake hose clamp
     Loose → Tighten the clamp bolt.
3. Hold the vehicle upright and apply the brake several times.
4. Check:
   - Brake hose
     Brake fluid leakage → Replace the damaged hose.
     Refer to "FRONT BRAKE" on page 4-23.

EAS21290

CHECKING THE REAR BRAKE HOSE

1. Check:
   - Brake hose
     Cracks/damage/wear → Replace.



2. Check:
   - Brake hose clamp
     Loose Connection → Tighten the clamp bolt.
3. Hold the vehicle upright and apply the rear brake several times.
4. Check:
   - Brake hose
     Brake fluid leakage → Replace the damaged hose.
     Refer to "REAR BRAKE" on page 4-37.

EAS21670

CHECKING THE WHEELS

The following procedure applies to both of the wheels.

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

EWA13260

⚠ WARNING

Never attempt to make any repairs to the wheel.

TIP

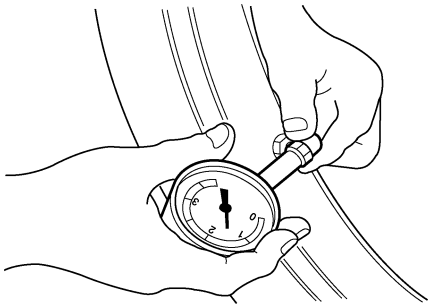
After a tire or wheel has been changed or replaced, always balance the wheel.

EAS21650

CHECKING THE TIRES

The following procedure applies to both of the tires.

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



EWA13180

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 vehicle could cause tire damage, an accident or an injury.**

NEVER OVERLOAD THE VEHICLE.

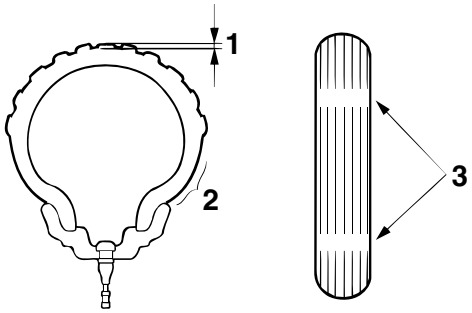
Tire air pressure (measured on cold tires)
Loading condition*
0–90 kg (0–198 lb)
Front
225 kPa (2.25 kgf/cm^2, 33 psi)
Rear
250 kPa (2.50 kgf/cm^2, 36 psi)
Loading condition*
90–189 kg (198–417 lb) (XJ6S/XJ6SY)
90–184 kg (198–406 lb) (XJ6SA)
Front
250 kPa (2.50 kgf/cm^2, 36 psi)
Rear
290 kPa (2.90 kgf/cm^2, 42 psi)
High-speed riding
Front
225 kPa (2.25 kgf/cm^2, 33 psi)
Rear
250 kPa (2.50 kgf/cm^2, 36 psi)
Maximum load*
189 kg (417 lb) (XJ6S/XJ6SY)
184 kg (406 lb) (XJ6SA)
*** Total weight of rider, passenger, cargo and accessories**

EWA13190

WARNING

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

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



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

Wear limit (front)
XJ6SY 1.0 mm (0.04 in)
XJ6S 1.6 mm (0.06 in)
XJ6SA 1.6 mm (0.06 in)
Wear limit (rear)
XJ6SY 1.0 mm (0.04 in)
XJ6S 1.6 mm (0.06 in)
XJ6SA 1.6 mm (0.06 in)

EWA14090

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 vehicle.

Front tire
Size
120/70 ZR17M/C (58W)
Manufacturer/model
BRIDGESTONE/BT021
Manufacturer/model
DUNLOP/ROADSMART

Rear tire
Size
160/60 ZR17M/C (69W)
Manufacturer/model
BRIDGESTONE/BT021
Manufacturer/model
DUNLOP/ROADSMART

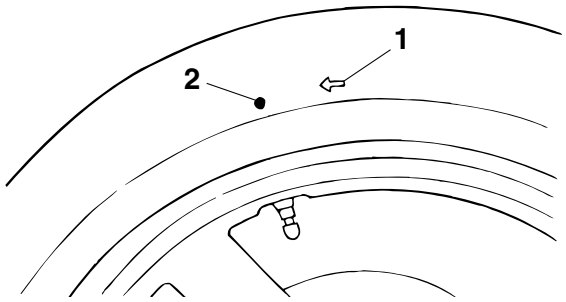
EWA13210

⚠ 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.

TIP

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.



EAS20S13001

CHECKING THE WHEEL BEARING

Refer to "CHECKING THE FRONT WHEEL" on page 4-8 and "CHECKING THE REAR WHEEL" on page 4-18.

EAS20S13004

CHECKING THE SWINGARM

Refer to "CHECKING THE SWINGARM" on page 4-76.

EAS21390

ADJUSTING THE DRIVE CHAIN SLACK

TIP

The drive chain slack must be checked at the tightest point on the chain.

ECA13550

NOTICE

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

1. Stand the vehicle on a level surface.

EWA13120

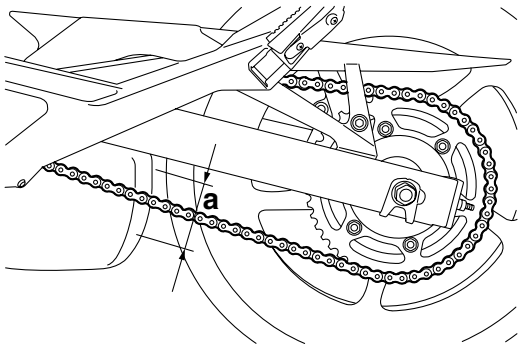
⚠ WARNING

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

TIP

Place the vehicle on the centerstand so that the rear wheel is elevated.

2. Spin the rear wheel several times and find the tightest position of drive chain.
3. Check:
   - Drive chain slack "a"
     Out of specification → Adjust.



Drive chain slack
45.0–55.0 mm (1.77–2.17 in)

4. Adjust:
   - Drive chain slack

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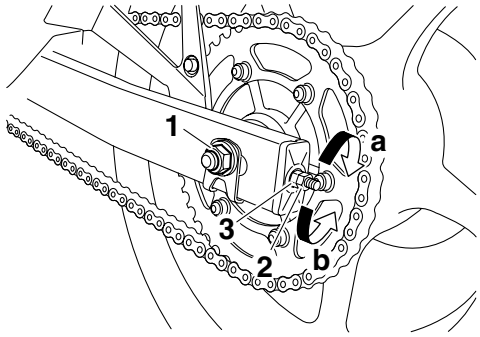
a. Loosen the wheel axle nut "1".
b. Loosen both locknuts "2".
c. Turn both adjusting nuts "3" in direction "a" or "b" until the specified drive chain slack is obtained.

Direction "a"
Drive chain is tightened.
Direction "b"
Drive chain is loosened.

TIP

To maintain the proper wheel alignment, adjust both sides evenly.



d. Tighten both locknuts to specification.

	Locknut **16 Nm (1.6 m·kgf, 12 ft·lbf)**

e. Tighten the wheel axle nut to specification.

	Wheel axle nut **90 Nm (9.0 m·kgf, 64 ft·lbf)**

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EAS21440

LUBRICATING THE DRIVE CHAIN

The drive chain consists of many interacting parts. If the drive chain is not maintained properly, it will wear out quickly. Therefore, the drive chain should be serviced, especially when the vehicle is used in dusty areas.

This vehicle has a drive chain with small rubber O-rings between each side plate. Steam cleaning, high-pressure washing, certain solvents, and the use of a coarse brush can damage these O-rings. Therefore, use only kerosene to clean the drive chain. Wipe the drive chain dry and thoroughly lubricate it with engine oil or chain lubricant that is suitable for O-ring chains. Do not use any other lubricants on the drive chain since they may contain solvents that could damage the O-rings.

	Recommended lubricant **Engine oil or chain lubricant suitable for O-ring chains**

EAS21500

CHECKING AND ADJUSTING THE STEERING HEAD

1. Stand the vehicle on a level surface.

EWA13120

⚠ WARNING

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

TIP

Place the vehicle 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 “STEERING HEAD” on page 4-68.
4. Adjust:
   - Steering head

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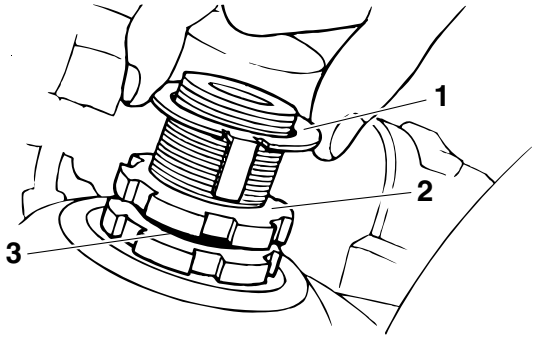
a. Remove the lock washer “1”, the upper ring nut “2”, and the rubber washer “3”.



b. Tighten the lower ring nut “4” with a steering nut wrench “5”.

TIP

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

	Steering nut wrench **90890-01403** **Spanner wrench** **YU-33975**

	Lower ring nut (initial tightening torque) **52 Nm (5.2 m·kgf, 38 ft·lbf)**

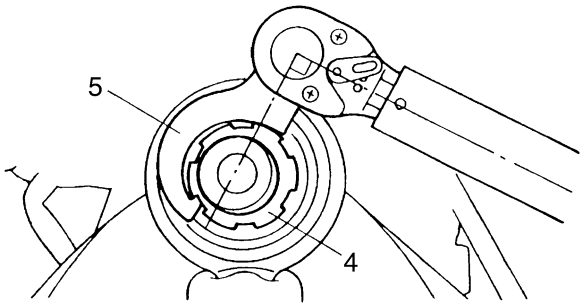
c. Loosen the lower ring nut “4” completely and then tighten it to specification with a steering nut wrench.

EWA13140

⚠ WARNING

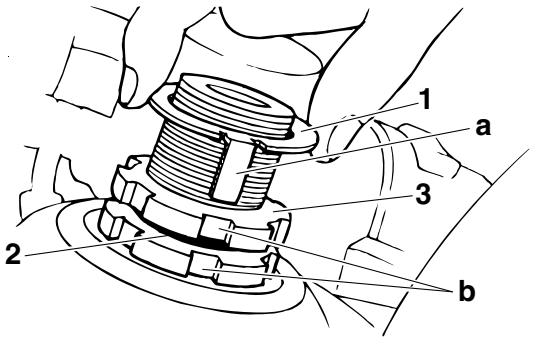
Do not overtighten the lower ring nut.

Lower ring nut (final tightening torque)
18 Nm (1.8 m·kgf, 13 ft·lbf)



d. Check the steering head for looseness or binding by turning the front fork all the way in both directions. If any binding is felt, remove the lower bracket and check the upper and lower bearings.
   Refer to "STEERING HEAD" on page 4-68.
e. Install the rubber washer "2".
f. Install the upper ring nut "3".
g. Finger tighten the upper ring nut "3", 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".

TIP
Make sure the lock washer tabs "a" sit correctly in the ring nut slots "b".



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5. Install:
   • Upper bracket
   Refer to "STEERING HEAD" on page 4-68.
6. Measure:
   • Steering head tension

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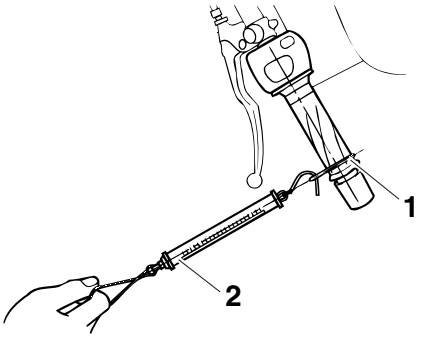
TIP
Make sure all of the cables and wires are properly routed.

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.

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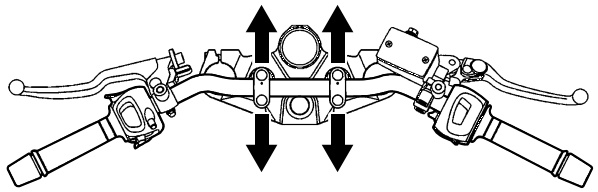
EAS20S13006
ADJUSTING THE HANDLEBAR POSITION

1. Check:
   • Handlebar position

TIP
The handlebar position can be adjusted in two positions to suit the rider's preference.



2. Adjust:
   - Handlebar position

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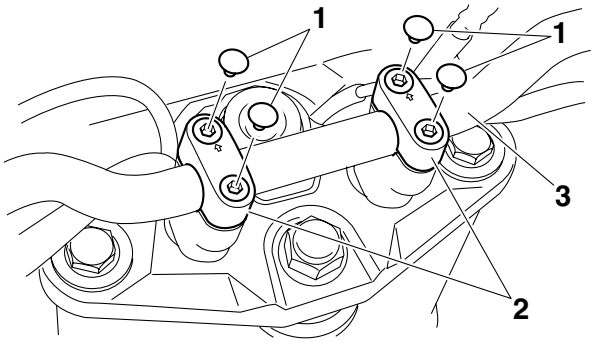
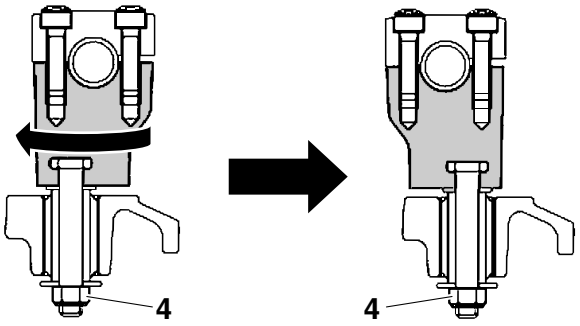
a. Remove the handlebar holder caps “1”, upper handlebar holders “2” and handlebar “3”.

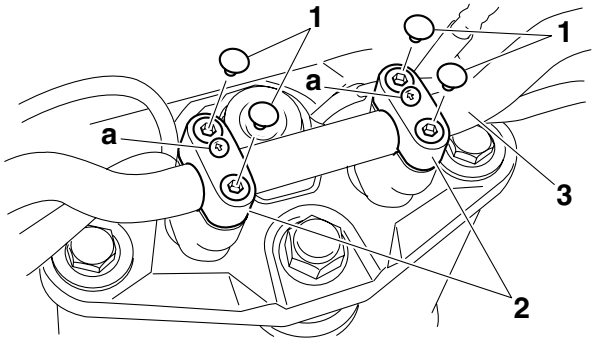


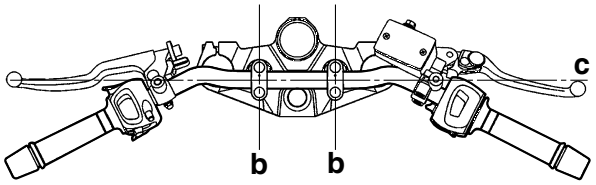
b. Loosen the lower handlebar holder nuts “4”.
c. Adjust the handlebar position by rotating both of the lower handlebar holders in 180° degrees.
d. Tighten the lower handlebar holder nuts “4”.

	Lower handlebar holder nut 32 Nm (3.2 m·kgf, 23 ft·lbf)



e. Install the handlebar “3”, upper handlebar holders “2” and handlebar holder caps “1”.





	Upper handlebar holder bolt 24 Nm (2.4 m·kgf, 17 ft·lbf)

ECA14250

NOTICE

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

TIP

- The upper handlebar holders should be installed with the allow marks “a” facing forward.
- Make sure the lower handlebar holders are placed in the parallel position to the vehicle “b” when installing.
- Once the handlebar is installed, check the position to make sure it is in the straight line “c”.

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EAS21700

LUBRICATING THE LEVERS

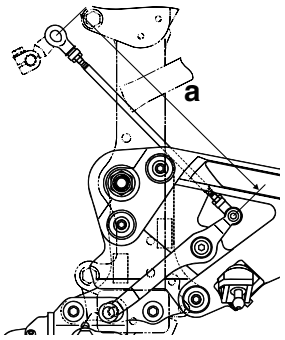
Lubricate the pivoting point and metal-to-metal moving parts of the levers.

Recommended lubricant
Clutch lever
Lithium-soap-based grease
Brake lever
Silicone grease

EAS21710
LUBRICATING THE PEDAL
Lubricate the pivoting point and metal-to-metal moving parts of the pedal.

Recommended lubricant
Lithium-soap-based grease

EAS21370
ADJUSTING THE SHIFT PEDAL
1. Check:
   - Shift pedal position
     Check the shift rod length “a”.
     Out of specification → Adjust.



Shift rod length
260.4–262.4 mm (10.25–10.33 in)

2. Adjust:
   - Shift pedal position

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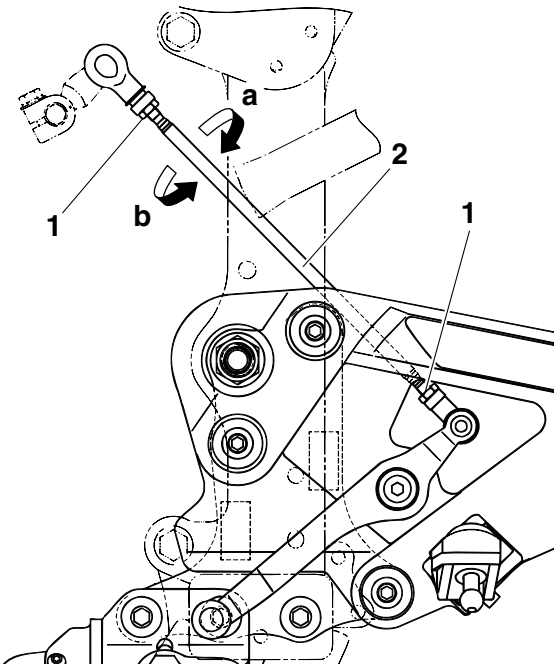
a. Loosen both locknuts “1”.
b. Turn the shift rod “2” in direction “a” or “b” until the specified shift rod length is obtained.



c. Tighten both locknuts.

Shift rod locknut
9 Nm (0.9 m·kgf, 6.5 ft·lbf)

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EAS21720
LUBRICATING THE SIDESTAND
Lubricate the pivoting point and metal-to-metal moving parts of the sidestand.

Recommended lubricant
Lithium-soap-based grease

EAS21730
LUBRICATING THE CENTERSTAND
Lubricate the pivoting point and metal-to-metal moving parts of the centerstand.

Recommended lubricant
Lithium-soap-based grease

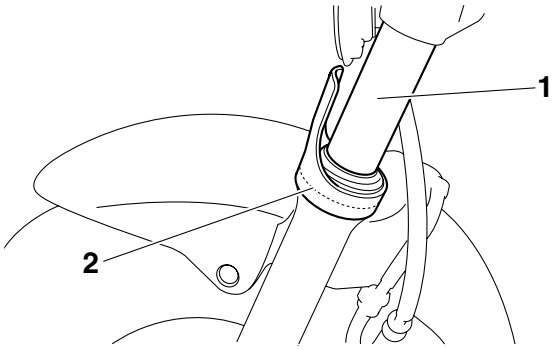
EAS20S13002
CHECKING THE SIDESTAND SWITCH
Refer to “CHECKING THE SWITCHES” on page 8-149.

EAS21530
CHECKING THE FRONT FORK
1. Stand the vehicle on a level surface.

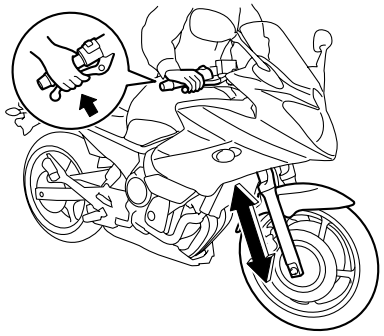
EWA13120
WARNING
Securely support the vehicle so that there is

no danger of it falling over.

2. Check:
   - Inner tube "1"
     Damage/scratches → Replace.
   - Oil seal "2"
     Oil leakage → Replace.



3. Hold the vehicle upright and apply the front brake.
4. Check:
   - Front fork operation
     Push down hard on the handlebar several times and check if the front fork rebounds smoothly.
     Rough movement → Repair.
     Refer to "FRONT FORK" on page 4-61.



EAS21740
LUBRICATING THE REAR SUSPENSION

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

	Recommended lubricant **Molybdenum disulfide grease**

EAS21590
ADJUSTING THE REAR SHOCK ABSORBER ASSEMBLY

EWA13120
⚠ WARNING

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

Spring preload

ECA13590
NOTICE

Never go beyond the maximum or minimum adjustment positions.

1. Adjust:
   - Spring preload

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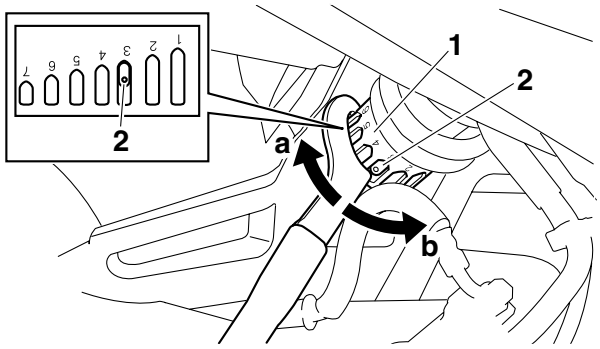
a. Adjust the spring preload with the special wrench and extension bar included in the owner's tool kit.
b. Turn the adjusting ring "1" in direction "a" or "b".
c. Align the desired position on the adjusting ring with the stopper "2".

Direction "a"
Spring preload is increased (suspension is harder).
Direction "b"
Spring preload is decreased (suspension is softer).

Spring preload adjusting positions
Minimum
1
Standard
3
Maximum
7



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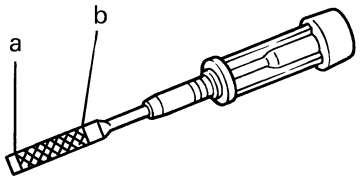
EAS20730
CHECKING THE ENGINE OIL LEVEL

1. Stand the vehicle on a level surface.

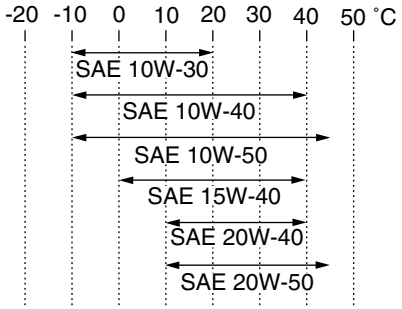
TIP
- Place the vehicle on the centerstand.
- Make sure the vehicle is upright.

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

3. Check:
   • Engine oil level
   The engine oil level should be between the minimum level mark “a” and maximum level mark “b”.
   Below the minimum level mark → Add the recommended engine oil to the proper level.



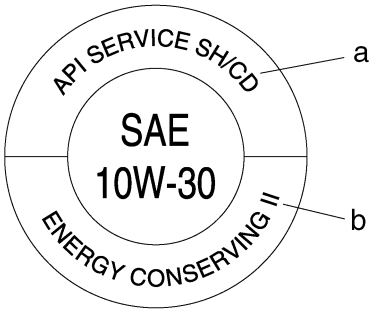
Type
SAE 10W-30, SAE 10W-40, SAE 15W-40, SAE 20W-40 or SAE 20W-50
Recommended engine oil grade
API service SG type or higher, JASO standard MA



ECA4S81007

NOTICE

- **Engine oil also lubricates the clutch and the wrong oil types or additives could cause clutch slippage. Therefore, do not add any chemical additives or use engine oils with a grade of CD “a” or higher and do not use oils labeled “ENERGY CONSERVING II” “b” or higher.**
- **Do not allow foreign materials to enter the crankcase.**



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

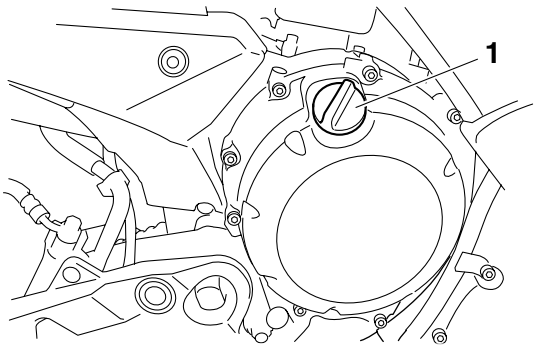
4. Start the engine, warm it up for several minutes, and then turn it off.
5. Check the engine oil level again.

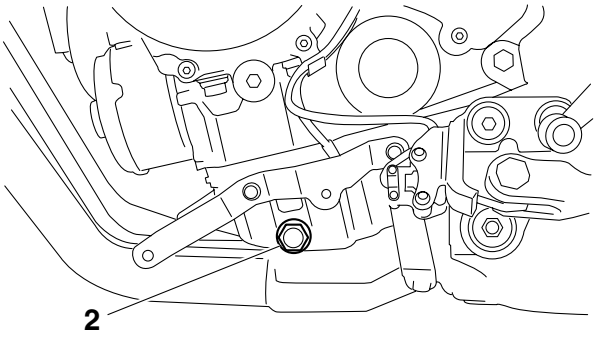
TIP
Before checking the engine oil level, wait a few minutes until the oil has settled.

EAS20790

CHANGING THE ENGINE OIL

1. Start the engine, warm it up for several minutes, and then turn it off.
2. Place a container under the engine oil drain bolt.
3. Remove:
   • Bottom cowling
   Refer to “GENERAL CHASSIS” on page 4-1.
   • Engine oil filler cap “1”
   • Engine oil drain bolt “2”
   (along with the gasket)





4. Drain:
   • Engine oil
   (completely from the crankcase)
5. If the oil filter cartridge is also to be replaced, perform the following procedure.

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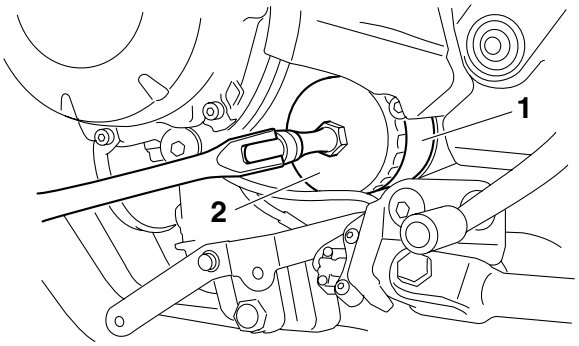
a. Remove the oil filter cartridge "1" with an oil filter wrench "2".

Oil filter wrench
90890-01426
YU-38411

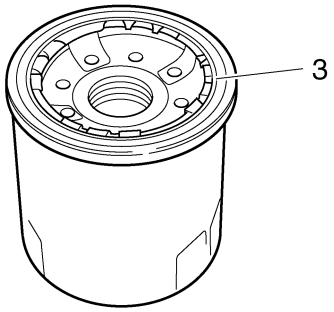


b. Lubricate the O-ring "3" of the new oil filter cartridge with a thin coat of engine oil.

ECA13390

NOTICE

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



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

Oil filter cartridge
17 Nm (1.7 m·kgf, 12 ft·lbf)

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6. Check:
   • Engine oil drain bolt gasket New
7. Install:
   • Engine oil drain bolt
   (along with the new gasket)

Engine oil drain bolt
43 Nm (4.3 m·kgf, 31 ft·lbf)

8. Fill:
   • Crankcase
   (with the specified amount of the recommended engine oil)

Engine oil quantity
Total amount
3.40 L (3.59 US qt, 2.99 Imp.qt)
Without oil filter cartridge replacement
2.50 L (2.64 US qt, 2.20 Imp.qt)
With oil filter cartridge replacement
2.80 L (2.96 US qt, 2.46 Imp.qt)

9. Install:
   • Engine oil filler cap
   • Bottom cowling
   Refer to "GENERAL CHASSIS" on page 4-1.
10. Start the engine, warm it up for several minutes, and then turn it off.
11. Check:
   • Engine
   (for engine oil leaks)
12. Check:
   • Engine oil level
   Refer to "CHECKING THE ENGINE OIL LEVEL" on page 3-23.

EAS20820

MEASURING THE ENGINE OIL PRESSURE

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

ECA13410

NOTICE

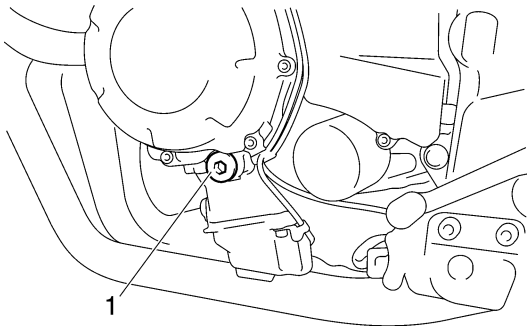
When the engine is cold, the engine oil will have a higher viscosity, causing the engine oil pressure to increase. Therefore, be sure to measure the engine oil pressure after warming up the engine.

3. Remove:
   • Main gallery bolt "1"

EWA12980

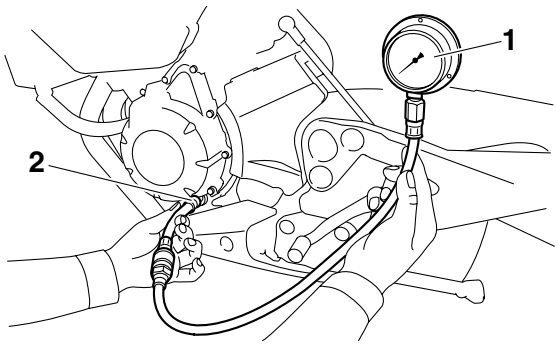
⚠ WARNING

The engine, muffler and engine oil are extremely hot.



4. Install:
   - Oil pressure gauge “1”
   - Adapter “2”

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



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

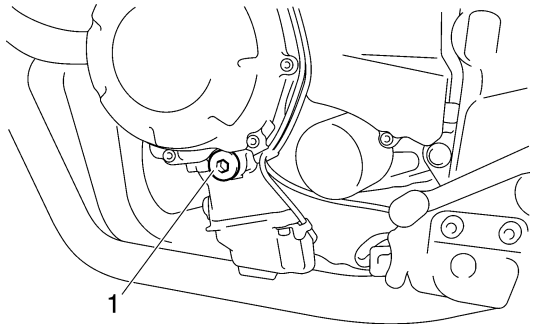
Engine oil pressure
240 kPa (2.4 kgf/cm^2, 34.1 psi)
Engine speed
Approx 6,600 r/min
Oil temperature
75.0–85.0 °C (167.00–185.00 °F)

Out of specification → Adjust.

Engine oil pressure	Possible causes
Below specification	• Faulty oil pump • Clogged oil filter • Leaking oil passage • Broken or damaged oil seal
Above specification	• Leaking oil passage • Faulty oil filter • Oil viscosity too high

6. Install:
   - Main gallery bolt “1”

Main gallery bolt
8 Nm (0.8 m·kgf, 5.8 ft·lbf)



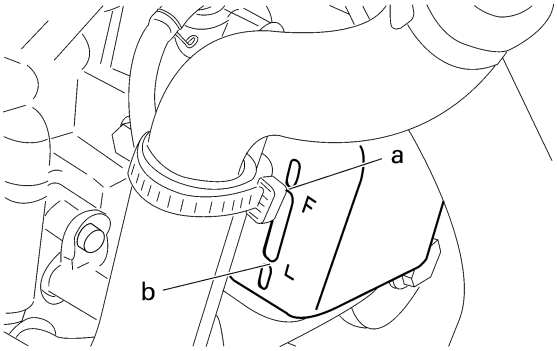
EAS21110
CHECKING THE COOLANT LEVEL

1. Stand the vehicle on a level surface.

TIP
- Place the vehicle on the centerstand.
- Make sure the vehicle is upright.

2. Check:
   - Coolant level
     The 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.

ECA13470
NOTICE
- **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

TIP

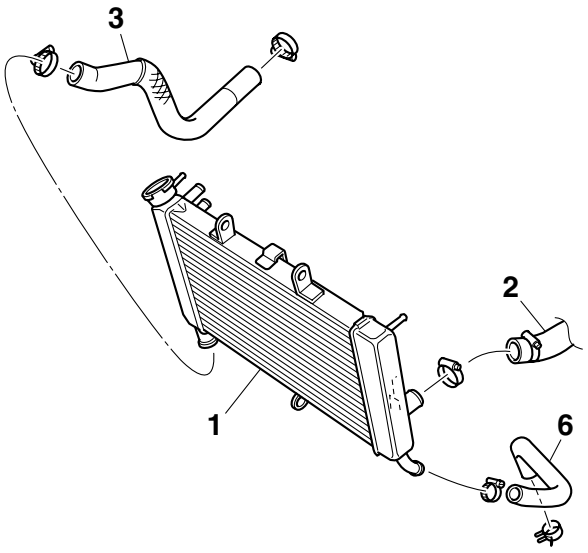
Before checking the coolant level, wait a few minutes until it settles.

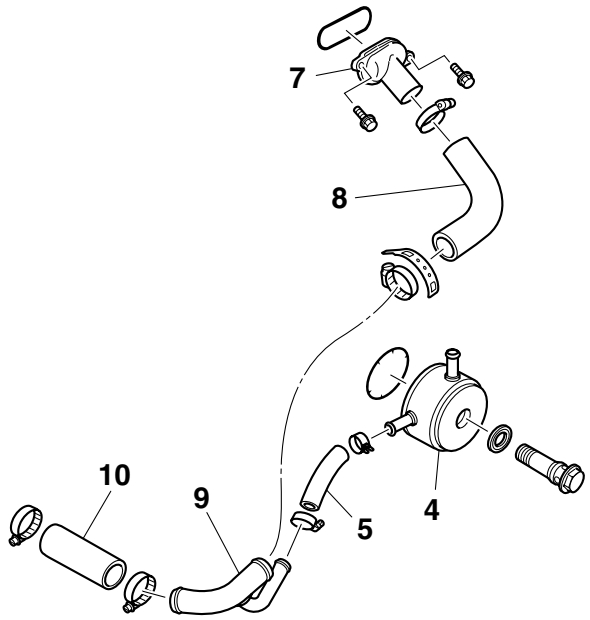
EAS21120

CHECKING THE COOLING SYSTEM

1. 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 hose "8"
   - Oil cooler inlet pipe "9"
   - Water pump outlet hose "10"

   Cracks/damage → Replace.
   Refer to "RADIATOR" on page 6-1.

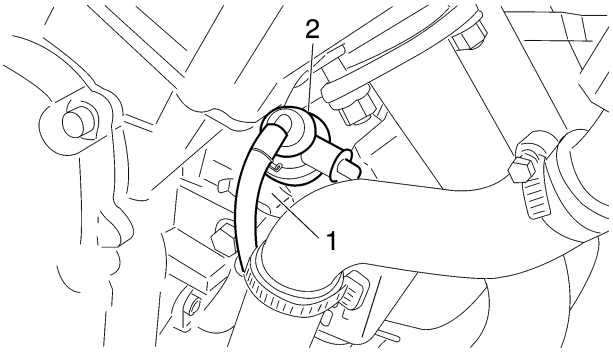




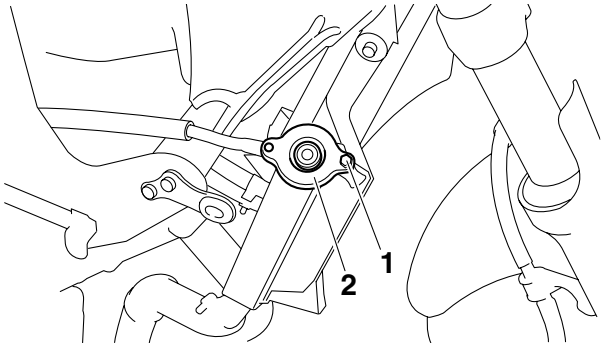
EAS21130

CHANGING THE COOLANT

1. Remove:
   - Coolant reservoir "1"
   - Coolant reservoir cap "2"



2. Drain:
   - Coolant
     (from the coolant reservoir)
3. Remove:
   - Right side cowling
     Refer to "GENERAL CHASSIS" on page 4-1.
   - Radiator cap lock bolt "1"
   - Radiator cap "2"



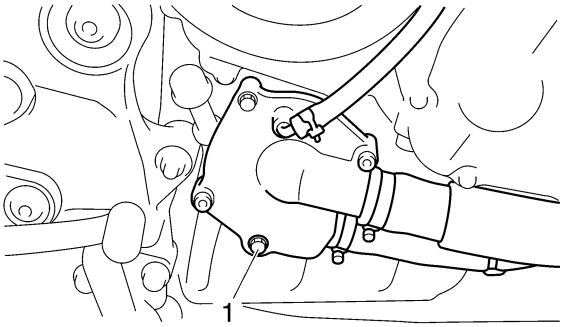
EWA13030

⚠ WARNING

A hot radiator is under pressure. Therefore, do not remove the radiator cap when the engine is hot. Scalding hot fluid and steam may be blown out, which could cause serious injury. When the engine has cooled, open the radiator cap as follows:
Place a thick rag or a towel over the radiator cap and slowly turn the radiator cap counterclockwise toward the detent to allow any residual pressure to escape. When the hissing sound has stopped, press down on the radiator cap and turn it counterclockwise to remove.

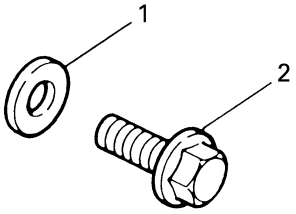
The following procedure applies to all of the coolant drain bolts and copper washers.

4. Remove:
   - Coolant drain bolt (water pump) "1" (along with the copper washer)



5. Drain:
   - Coolant (from the engine and radiator)
6. Check:
   - Copper washer "1" New
7. Install:
   - Coolant drain bolt (water pump) "2"

	Coolant drain bolt (water pump) **10 Nm (1.0 m·kgf, 7.2 ft·lbf)**



8. Install:
   - Coolant reservoir
9. 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)** **Radiator capacity (including all routes)** **2.00 L (2.11 US qt, 1.76 Imp.qt)** **Coolant reservoir capacity (up to the maximum level mark)** **0.25 L (0.26 US qt, 0.22 Imp.qt)**

Handling notes for coolant
Coolant is potentially harmful and should be handled with special care.

EWA13040

⚠ 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.**

ECA13480

NOTICE

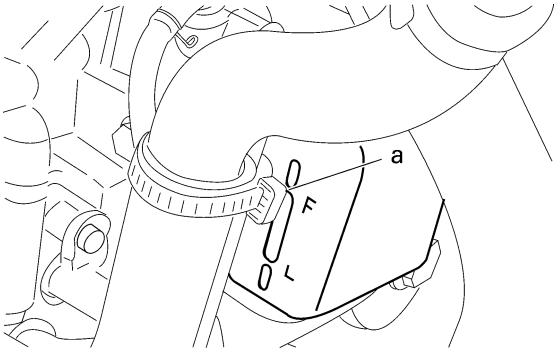
- **Adding water instead of coolant lowers the antifreeze content of the coolant. If water is used instead of coolant check, and if necessary, correct the antifreeze concentration of the coolant.**
- **Use only distilled water. However, if distilled water is not available, soft water may be used.**
-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

10. Install:
- Radiator cap
- Radiator cap lock bolt

	Radiator cap lock bolt **5 Nm (0.5 m·kgf, 7.2 ft·lbf)**

- Right side cowling
  Refer to "GENERAL CHASSIS" on page 4-1.

11. Fill:
- Coolant reservoir
  (with the recommended coolant to the maximum level mark "a")



12. Install:
- Coolant reservoir cap

13. Start the engine, warm it up for several minutes, and then stop it.
14. Check:
- Coolant level
  Refer to "CHECKING THE COOLANT LEVEL" on page 3-26.

TIP

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

EAS20S13003

CHECKING THE FRONT AND REAR BRAKE SWITCH

Refer to "CHECKING THE SWITCHES" on page 8-149.

EAS21330

ADJUSTING THE REAR BRAKE LIGHT SWITCH

TIP

The rear brake light switch is operated by movement of the brake pedal. The rear brake light switch is properly adjusted when the brake light comes on just before the braking effect starts.

1. Check:
- Rear brake light operation timing
  Incorrect → Adjust.

2. Adjust:
- Rear brake light operation timing

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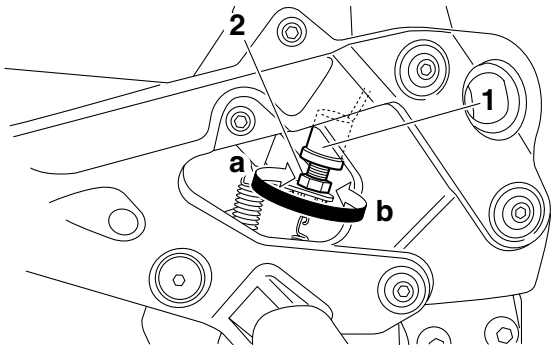
a. Hold the main body "1" of the rear brake light switch so that it does not rotate and turn the adjusting nut "2" in direction "a" or "b" until the rear brake light comes on at the proper time.

Direction "a"
Brake light comes on sooner.
Direction "b"
Brake light comes on later.



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EAS21690

CHECKING AND LUBRICATING THE CABLES

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

EWA13270

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**

TIP

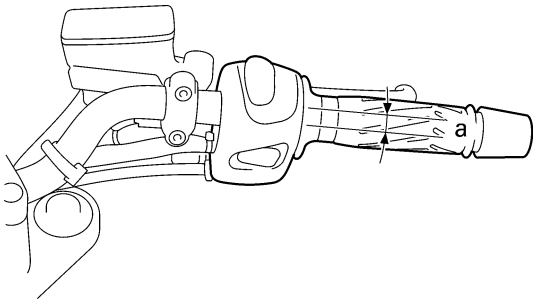
Hold the cable end upright and pour a few drops of lubricant into the cable sheath or use a suitable lubricating device.

EAS20630
ADJUSTING THE THROTTLE CABLE FREE PLAY

TIP

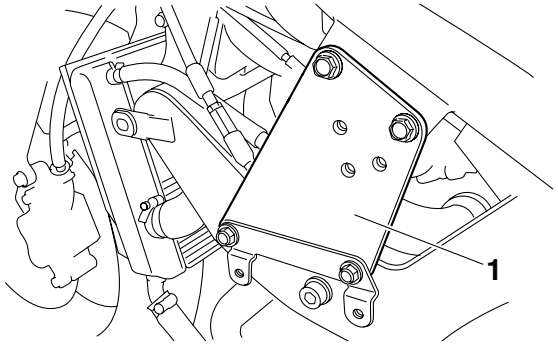
Prior to adjusting the throttle cable free play, the engine idling speed and throttle bodies synchronization should be adjusted properly.

1. Check:
   - Throttle cable free play "a"
     Out of specification → Adjust.



Throttle cable free play
3.0–5.0 mm (0.12–0.20 in)

2. Remove:
   - Left side panel
     Refer to "GENERAL CHASSIS" on page 4-1.
   - Gusset "1"



3. Adjust:
   - Throttle cable free play

TIP

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

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Throttle body side

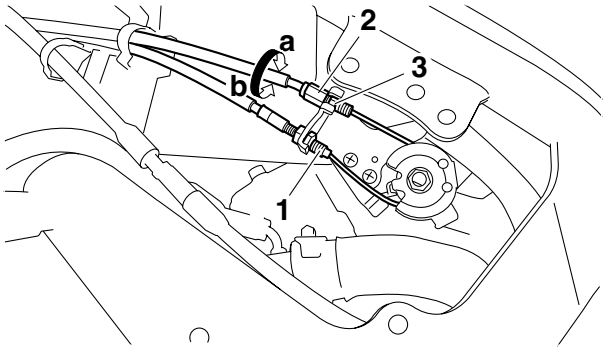
a. Loosen the adjusting nut "2" on the decelerator cable.
b. Turn the locknut "3" in direction "a" or "b" to take up any slack on the decelerator cable.

Direction "a"
Throttle cable free play is increased.
Direction "b"
Throttle cable free play is decreased.

c. Tighten the adjusting nut.

TIP

If the specified throttle cable free play cannot be obtained on the throttle body side of the cable, use the adjusting nut on the handlebar side.



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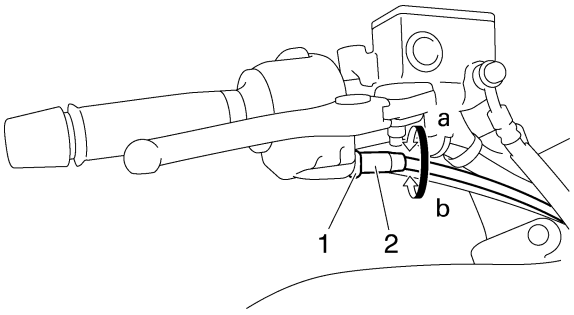
Handlebar side

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.



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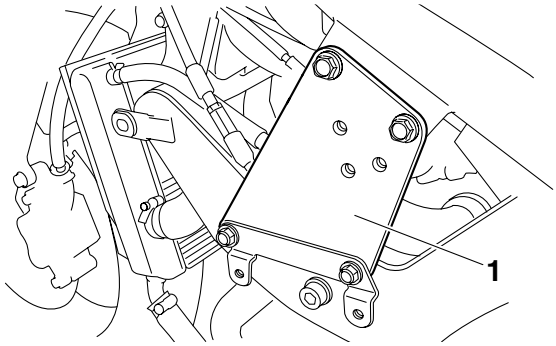
4. Install:
   - Gusset "1"



	Gusset bolt **30 Nm (3.0 m·kgf, 22 ft·lbf)**

- Left side panel
  Refer to "GENERAL CHASSIS" on page 4-1.

EWA4S81001

⚠ WARNING

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

EAS21760

CHECKING AND CHARGING THE BATTERY

Refer to "ELECTRICAL COMPONENTS" on page 8-145.

EAS21770

CHECKING THE FUSES

Refer to "ELECTRICAL COMPONENTS" on page 8-145.

EAS21810

ADJUSTING THE HEADLIGHT BEAMS

The following procedure applies to both of the headlights.

1. Adjust:
   - Headlight beam (vertically)

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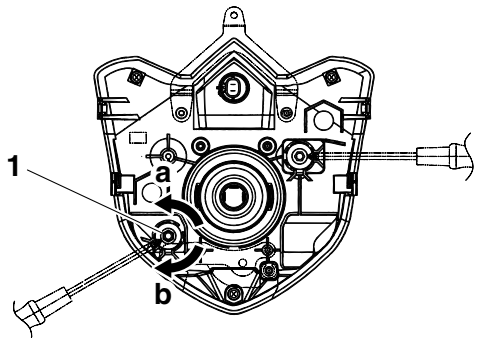
a. Turn the adjusting screw "1" in direction "a" or "b".

Direction "a"
Headlight beam is raised.
Direction "b"
Headlight beam is lowered.



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2. Adjust:
   - Headlight beam (horizontally)

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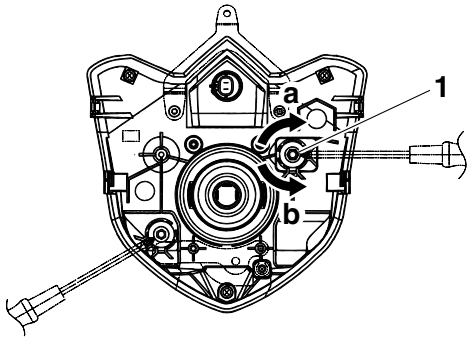
a. Turn the adjusting screw "1" in direction "a" or "b".

Direction "a"
Headlight beam moves to the right.
Direction "b"
Headlight beam moves to the left.



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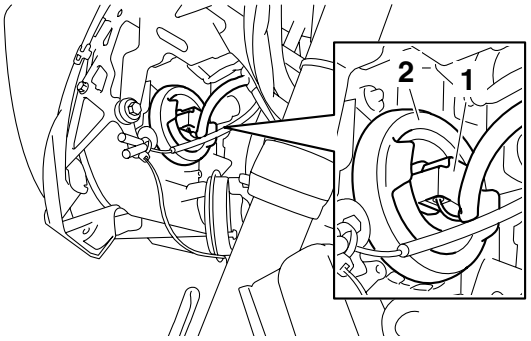
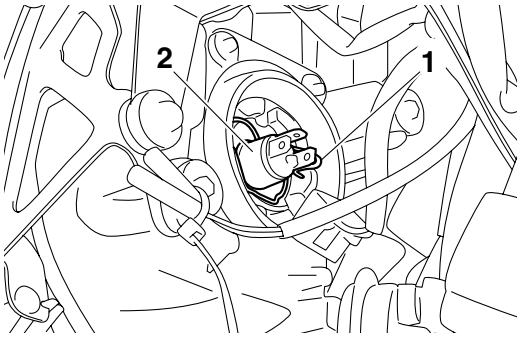
EAS21790

REPLACING THE HEADLIGHT BULBS

1. Disconnect:
   - Headlight coupler "1"
2. Remove:
   - Headlight bulb cover "2"



3. Remove:
   - Headlight bulb holder “1”
4. Remove:
   - Headlight bulb “2”



EWA13320

WARNING

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

5. Install:
   - Headlight bulb New
     Secure the new headlight bulb with the headlight bulb holder.

ECA13690

NOTICE

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

6. Install:
   - Headlight bulb holder
7. Install:
   - Headlight bulb cover
8. Connect:
   - Headlight coupler

CHASSIS

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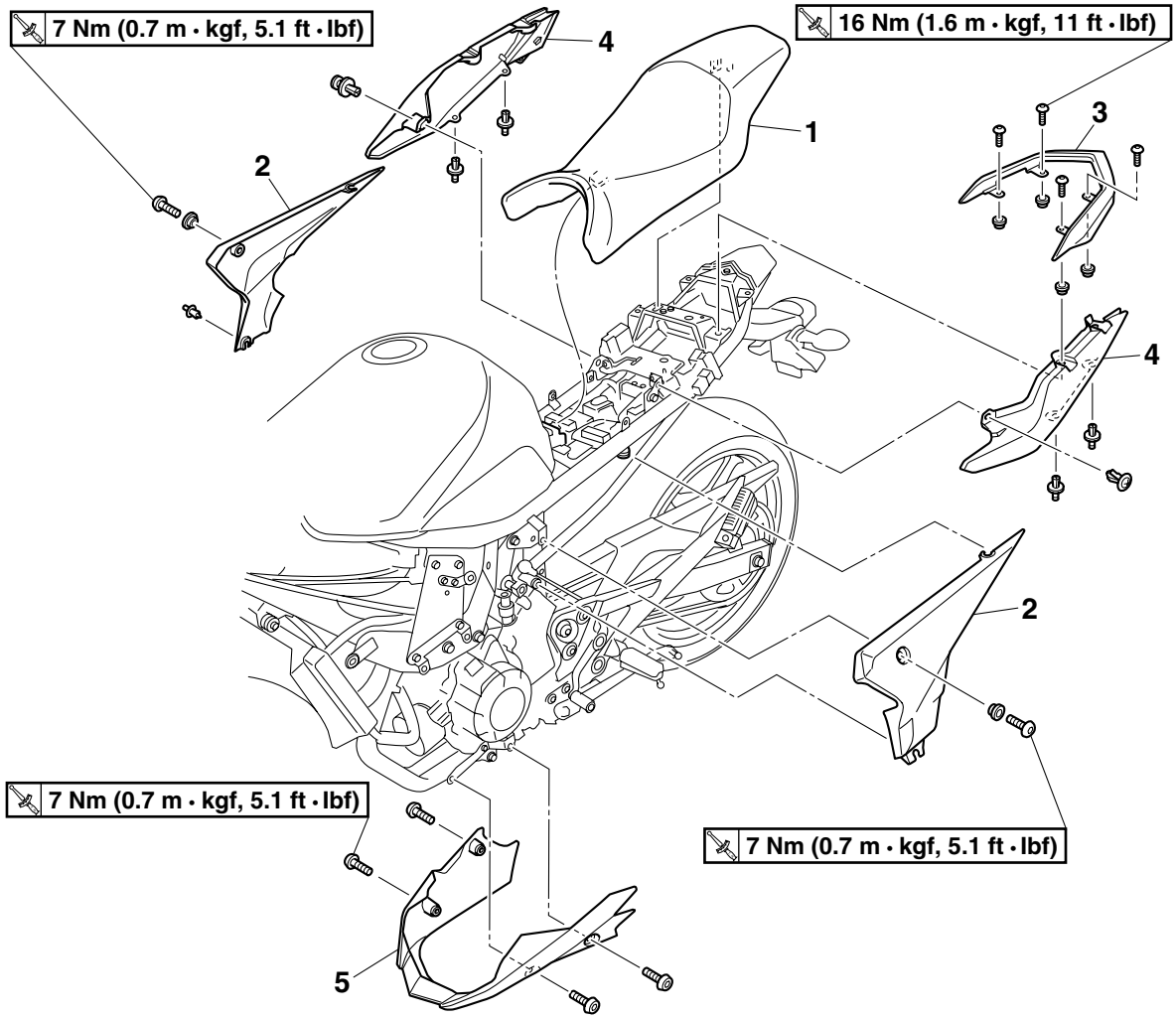
EAS21830

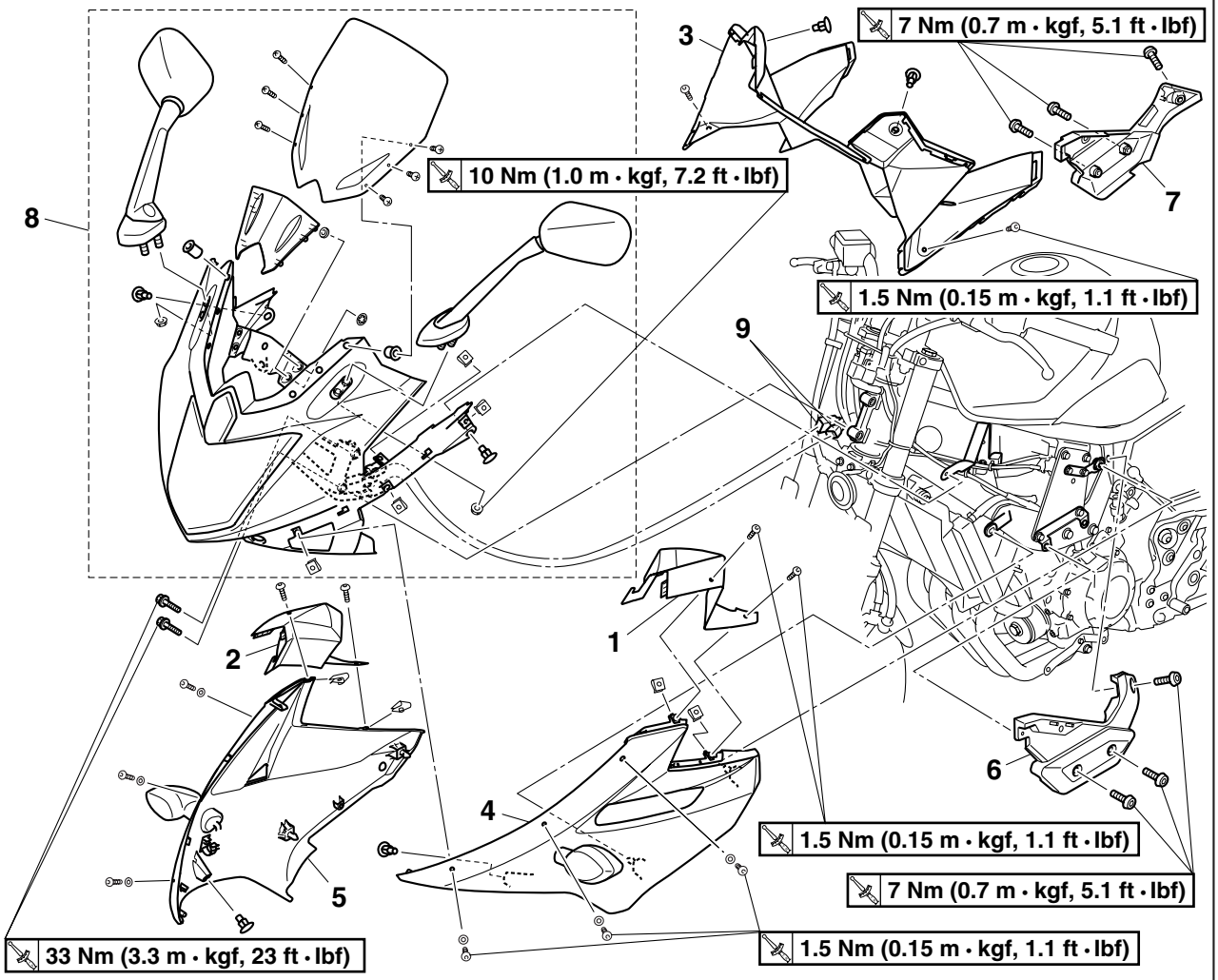
GENERAL CHASSIS

Removing the cowlings



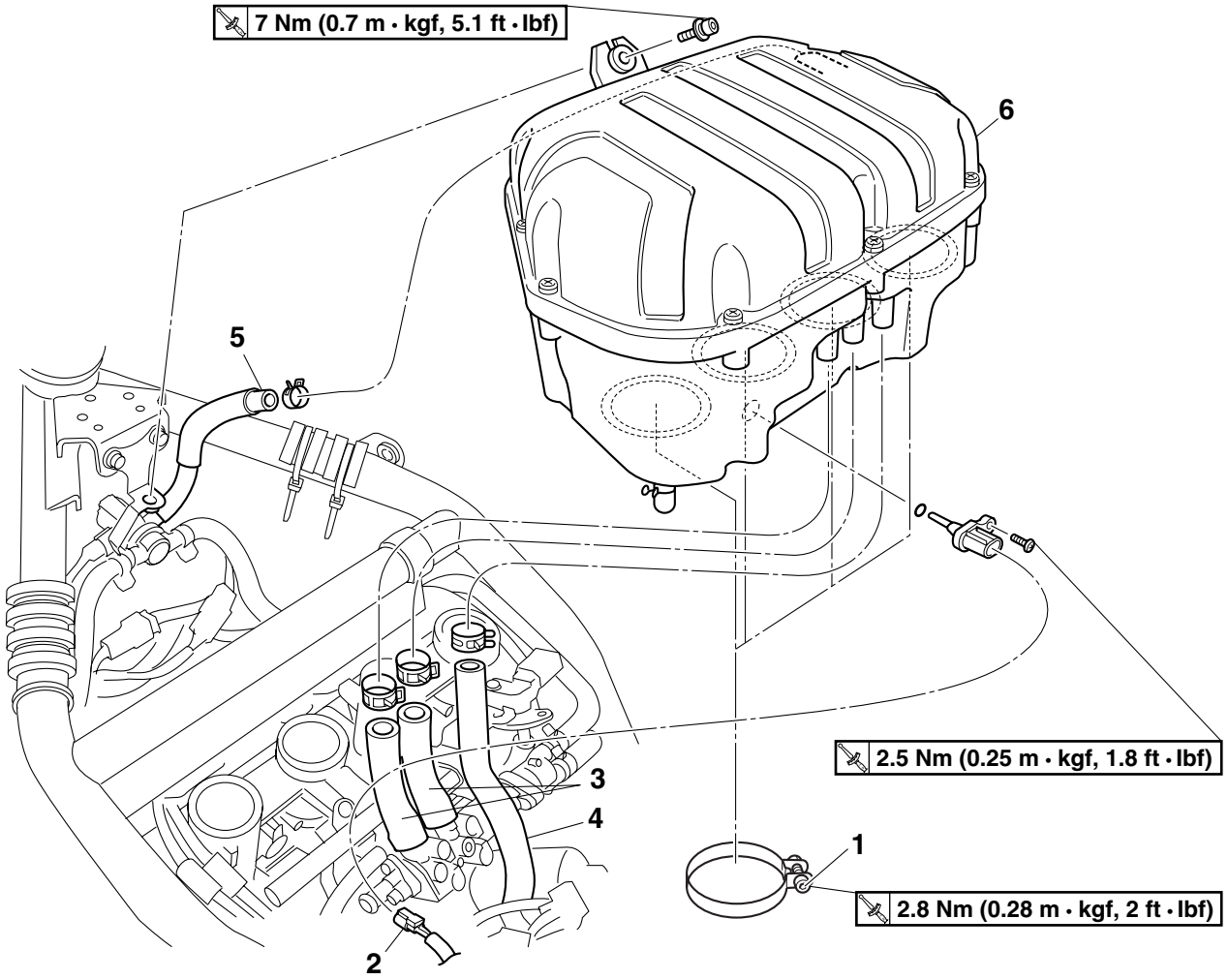
Order	Job/Parts to remove	Q'ty	Remarks
1	Seat	1	
2	Rear side cover	2	
3	Grab bar	1	
4	Rear cowling	2	
5	Bottom cowling	1	
			For installation, reverse the removal procedure.

Removing the front cowling assembly



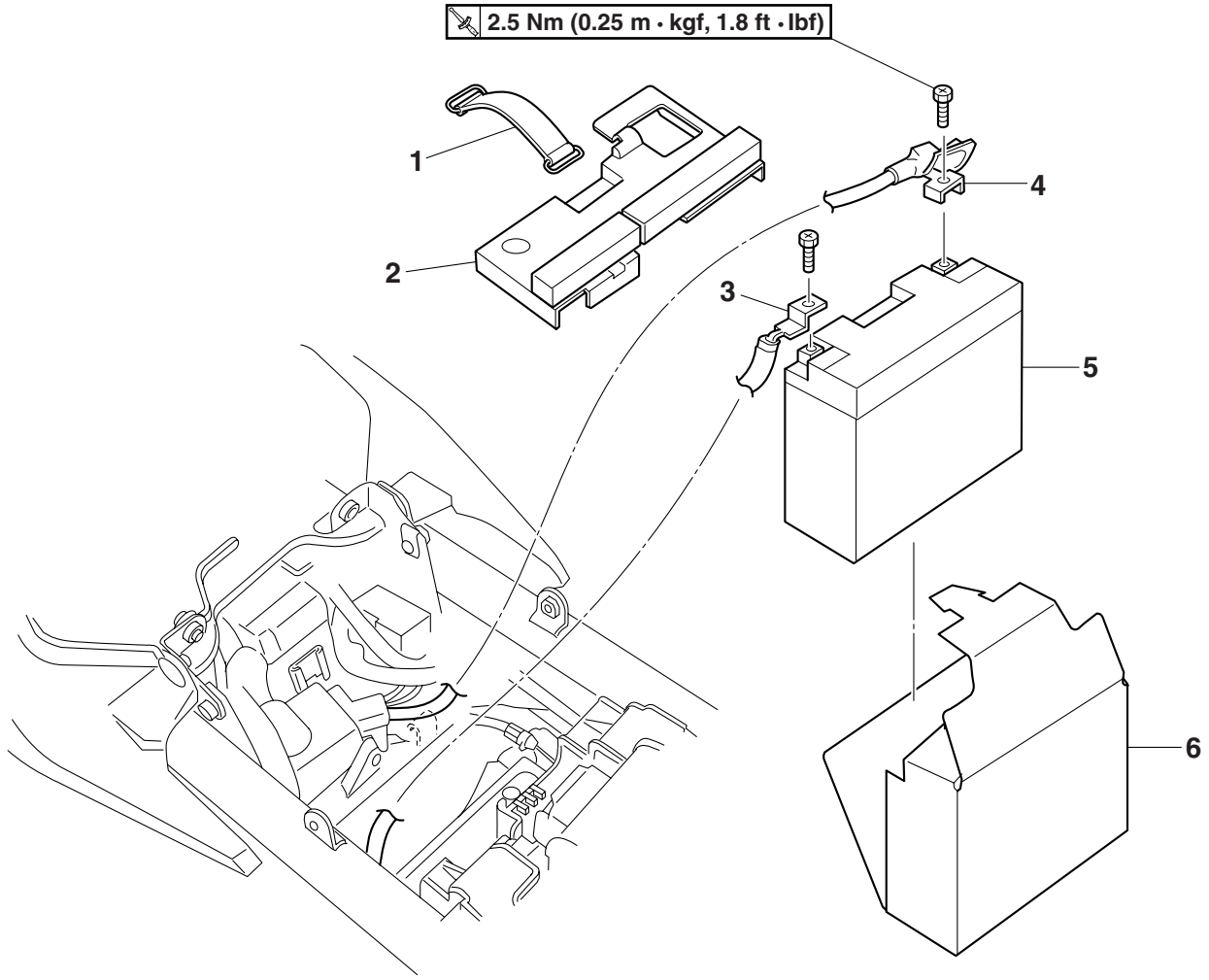
Order	Job/Parts to remove	Q'ty	Remarks
1	Front cowling left inner panel	1	
2	Front cowling right inner panel	1	
3	Front cowling center inner panel	1	
4	Left side cowling	1	
5	Right side cowling	1	
6	Left side panel	1	
7	Right side panel	1	
8	Front cowling assembly	1	
9	Sub-wire harness coupler	2	
			For installation, reverse the removal procedure.

Removing the air filter case



Order	Job/Parts to remove	Q'ty	Remarks
	Seat		Refer to "GENERAL CHASSIS" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
1	Clamp screw	4	Loosen.
2	Intake air temperature sensor coupler	1	Disconnect.
3	Throttle body hose	2	Disconnect.
4	Crankcase breather hose	1	Disconnect.
5	Air cut-off valve hose	1	Disconnect.
6	Air filter case	1	
			For installation, reverse the removal procedure.

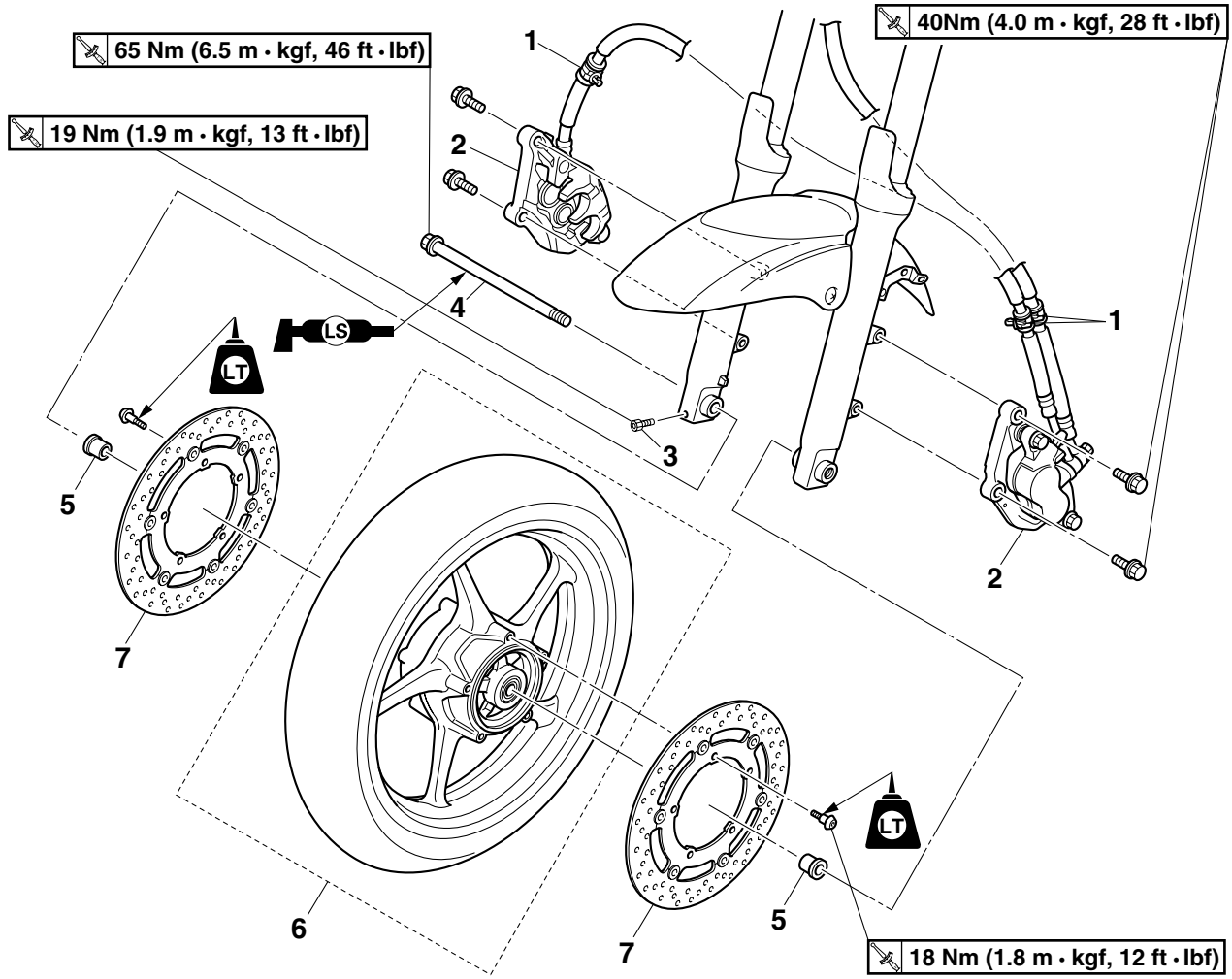
Removing the battery



Order	Job/Parts to remove	Q'ty	Remarks
	Seat		Refer to "GENERAL CHASSIS" on page 4-1.
1	Battery band	1	
2	Battery cover	1	
3	Negative battery lead	1	
4	Positive battery lead	1	
5	Battery	1	
6	Battery seat	1	
			For installation, reverse the removal procedure.

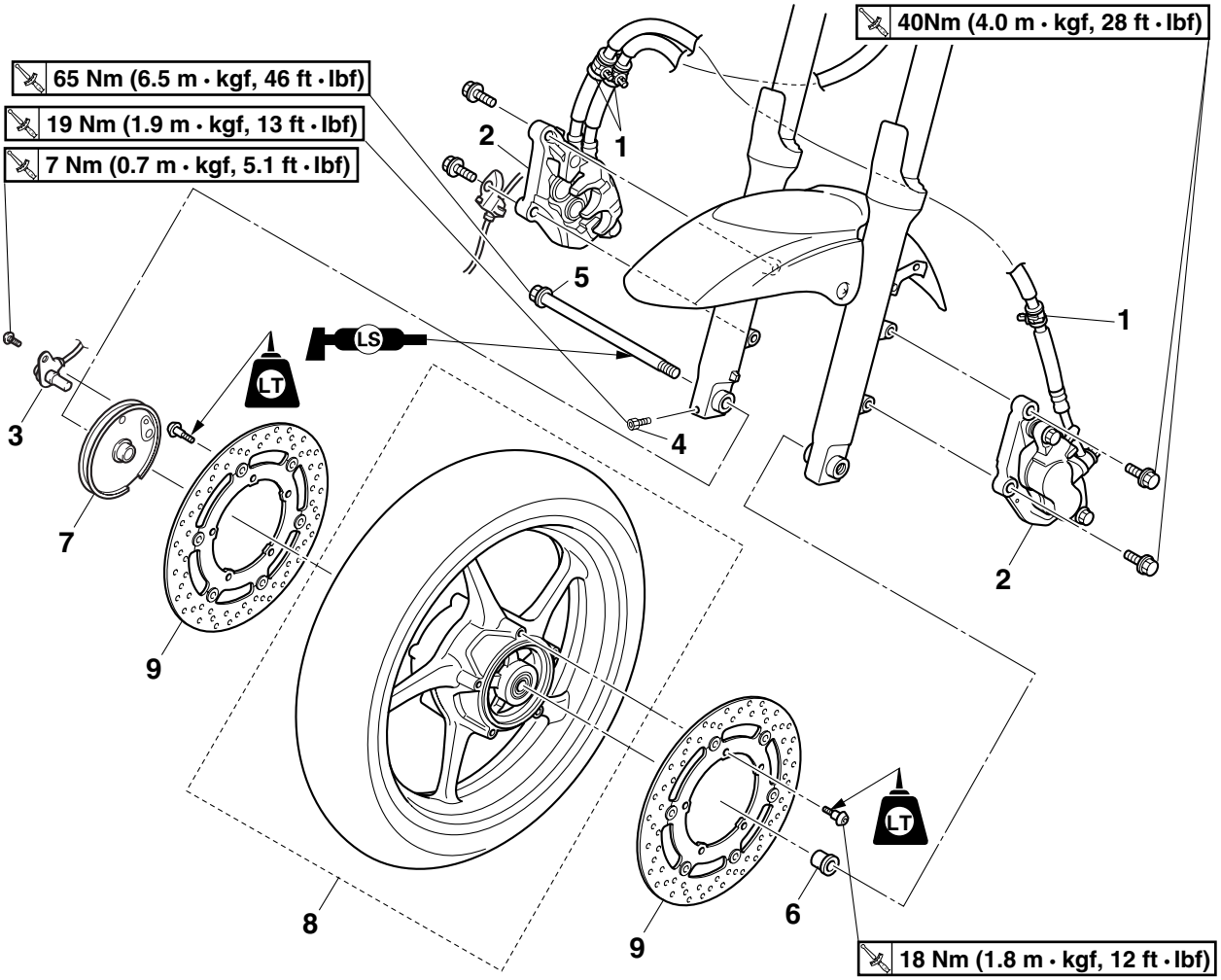
EAS21880
FRONT WHEEL

Removing the front wheel and brake discs (XJ6S)



Order	Job/Parts to remove	Q'ty	Remarks
1	Brake hose holder	3	
2	Front brake caliper	2	
3	Front wheel axle pinch bolt	1	Loosen.
4	Front wheel axle	1	
5	Collar	2	
6	Front wheel	1	
7	Front brake disc	2	
			For installation, reverse the removal procedure.

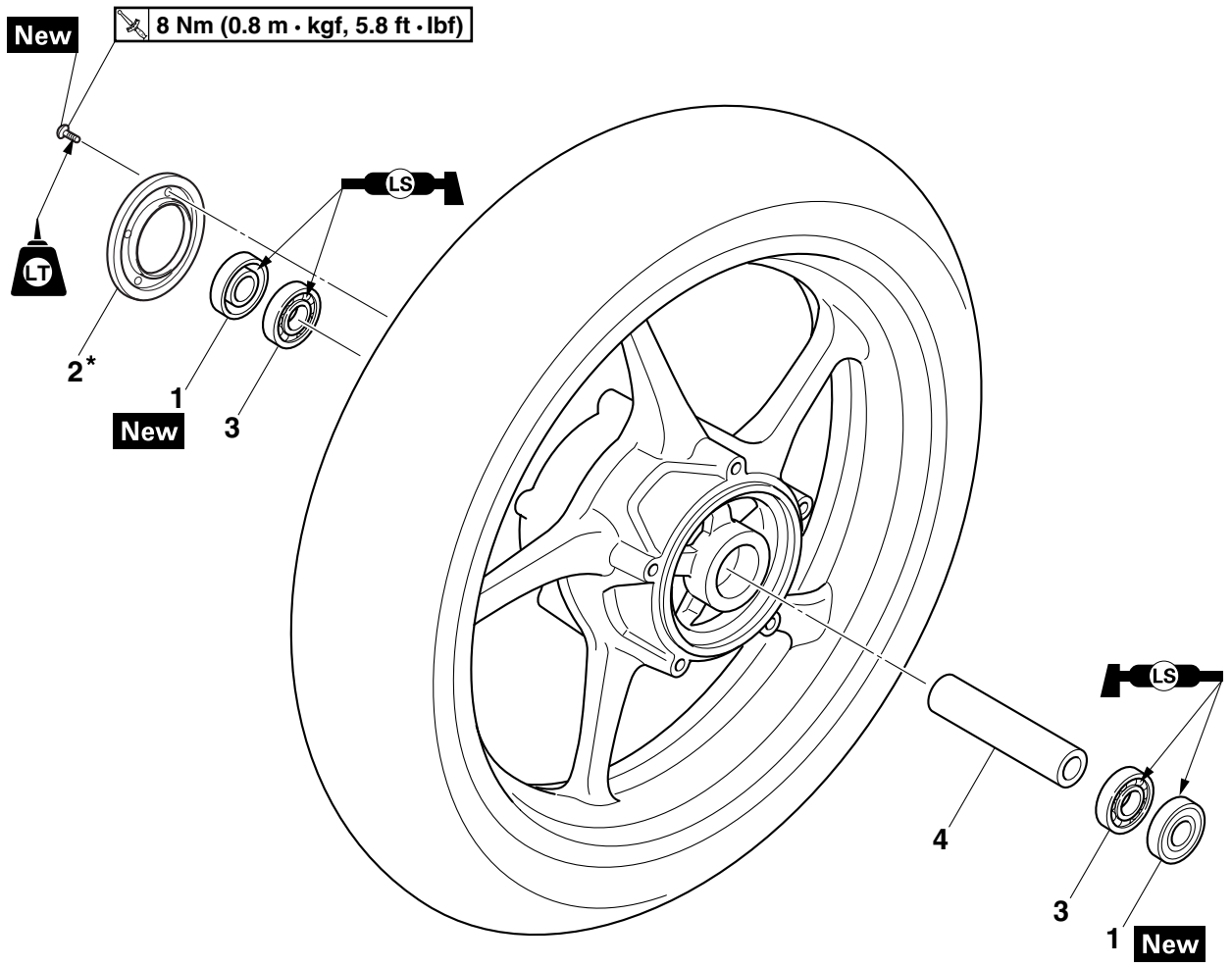
Removing the front wheel and brake discs (XJ6SA)



Order	Job/Parts to remove	Q'ty	Remarks
1	Brake hose holder	3	
2	Front brake caliper	2	
3	Front wheel sensor	1	
4	Front wheel axle pinch bolt	1	Loosen.
5	Front wheel axle	1	
6	Collar	1	
7	Sensor housing	1	
8	Front wheel	1	
9	Front brake disc	2	
			For installation, reverse the removal procedure.

*XJ6SA

Disassembling the front wheel



Order	Job/Parts to remove	Q'ty	Remarks
1	Oil seal	2	
2	Front wheel sensor rotor (XJ6SA)	1	
3	Wheel bearing	2	
4	Spacer	1	
			For assembly, reverse the disassembly procedure.

*XJ6SA

EAS21900
REMOVING THE FRONT WHEEL

1. Stand the vehicle on a level surface.

EWA13120
⚠ WARNING

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

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

2. Remove:
   - Left brake caliper
   - Right brake caliper

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

3. Loosen:
   - Front wheel pinch bolt
   - Front wheel axle
4. Elevate:
   - Front wheel

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

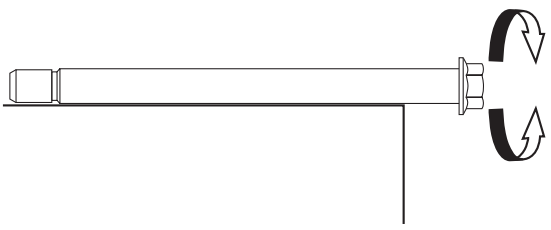
5. Remove:
   - Front wheel axle
   - Front wheel
6. Remove:
   - Collar

EAS21920
CHECKING THE FRONT WHEEL

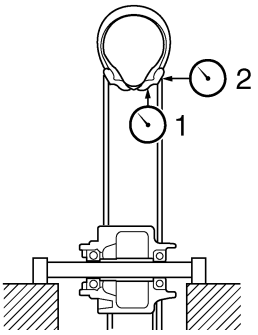
1. Check:
   - Wheel axle
     Roll the wheel axle on a flat surface.
     Bends → Replace.

EWA13460
⚠ WARNING

Do not attempt to straighten a bent wheel axle.

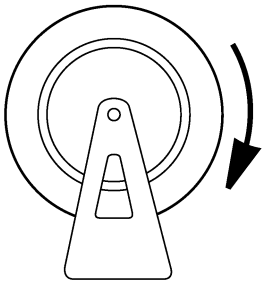


2. Check:
   - Tire
   - Front wheel
     Damage/wear → Replace.
     Refer to “CHECKING THE TIRES” on page 3-16 and “CHECKING THE WHEELS” on page 3-16.
3. Measure:
   - Radial wheel runout “1”
   - Lateral wheel runout “2”
     Over the specified limits → Replace.



Radial wheel runout limit
1.0 mm (0.04 in)
Lateral wheel runout limit
0.5 mm (0.02 in)

4. Check:
   - Wheel bearings
     Front wheel turns roughly or is loose → Replace the wheel bearings.
   - Oil seals
     Damage/wear → Replace.



5. Replace:
   - Wheel bearings New
   - Oil seals New

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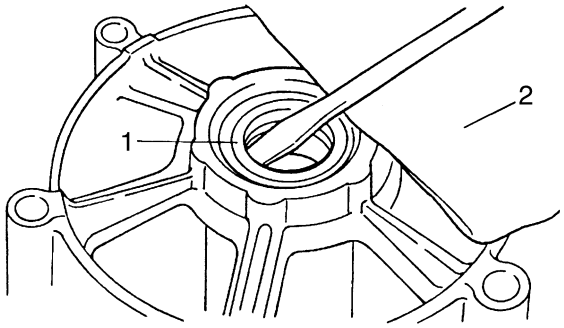
a. Clean the outside of the front wheel hub.
b. Remove the oil seals “1” with a flat-head screwdriver.

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

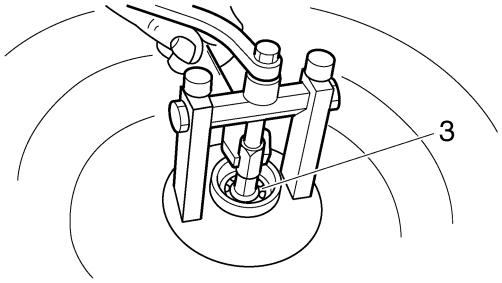


c. Remove the wheel bearings “3” with a general bearing puller.

ECA20S1009

NOTICE

Do not damage the front wheel sensor rotor.



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

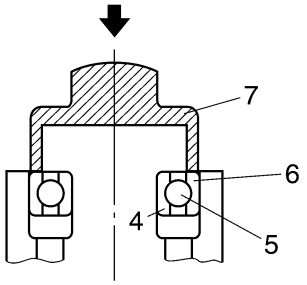
ECA14130

NOTICE

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

TIP

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



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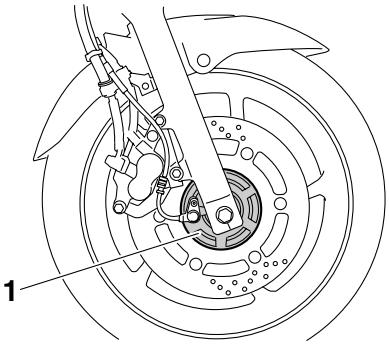
EAS22010

MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR

ECA4B56004

NOTICE

Keep magnets (including magnetic pick-up tools, magnetic screwdrivers, etc.) away from the front wheel hub “1”, otherwise the wheel sensor rotor equipped in the wheel hub may be damaged, resulting in improper performance of the ABS system.



- ABS wheel speed sensor and sensor rotor

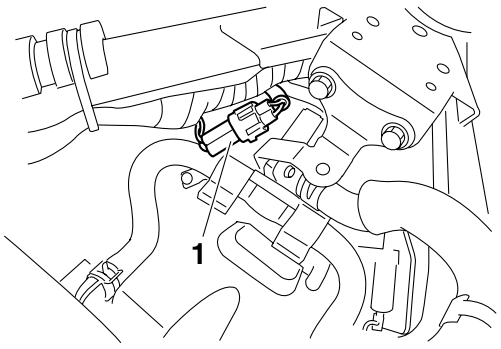
ECA14450

NOTICE

- **Handle the ABS components with care since they have been accurately adjusted. Keep them away from dirt and do not subject them to shocks.**
- **The ABS wheel sensor cannot be disassembled. Do not attempt to disassemble it. If faulty, replace with a new one.**

Removing the front wheel sensor

1. Disconnect:
   - Front wheel sensor coupler “1”



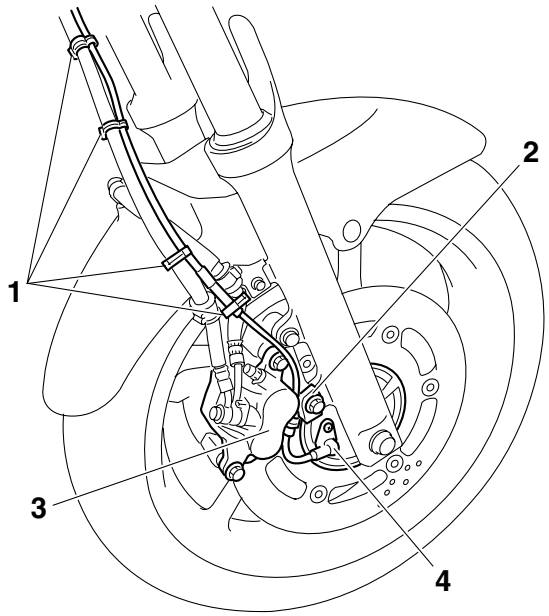
2. Remove:
   - Clamp “1”
   - Front wheel sensor lead holder “2”
   - Brake caliper “3”
   - Front wheel sensor “4”

ECA4S81011

NOTICE

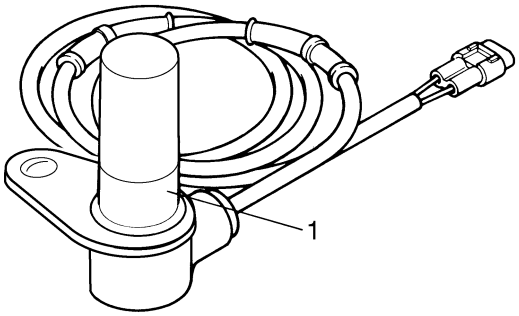
- **Be sure not to contact the sensor electrode**

to any metal part when removing the front wheel sensor from the sensor housing.
- **Do not operate the brake lever when removing the brake caliper.**



Checking the front wheel sensor and sensor rotor

1. Check:
   - Front wheel sensor "1"
     Cracks/bends/distortion → Replace.
     Iron powder/dust → Clean.



2. Check:
   - Front wheel sensor rotor
     Cracks/damage → Replace the front wheel sensor rotor.
3. Measure:
   - Wheel sensor rotor deflection
     Out of specification → Clean the installation surface of the wheel sensor rotor and correct the wheel sensor rotor deflection, or replace the wheel sensor rotor.

Wheel sensor rotor deflection limit
0.15 mm (0.0059 in)

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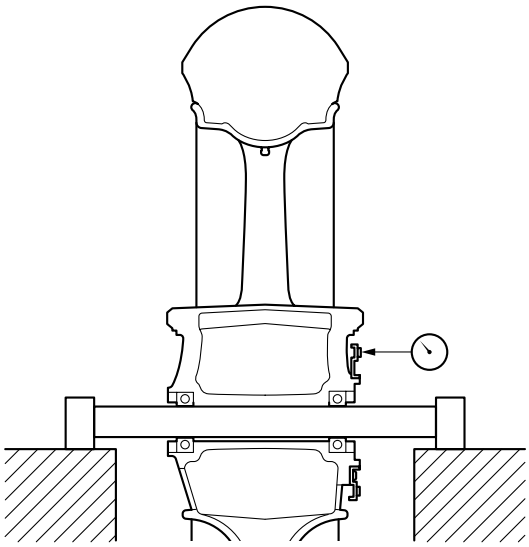
a. Hold the dial gauge at a right angle against the wheel sensor rotor surface.
b. Measure the wheel sensor rotor deflection.

TIP

Do not touch the surface of the rotor magnet with a sharp object.



c. If the deflection is above specification, remove the sensor rotor from the wheel, rotate it by one or two bolt holes, and then install it.

Wheel sensor rotor bolt
8 Nm (0.8 m·kgf, 5.8 ft·lbf)
LOCTITE®

ECA4B56023

NOTICE

Replace the wheel sensor rotor bolts with new ones.

d. If the deflection is still above specification, replace the wheel sensor rotor.

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Installing the front wheel sensor

1. Install:
   - Front wheel

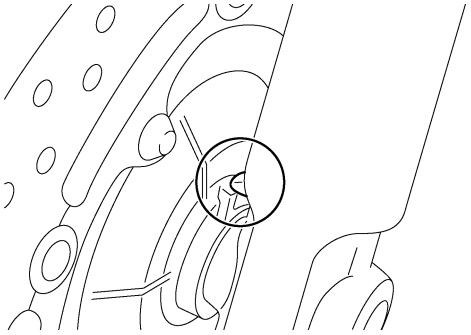
ECA14470

NOTICE

Make sure there are no foreign materials in the wheel hub. Foreign materials cause damage to the inner sensor rotor and wheel sensor.

TIP

Align the slot in the sensor housing with the projection of the front fork before assembly.



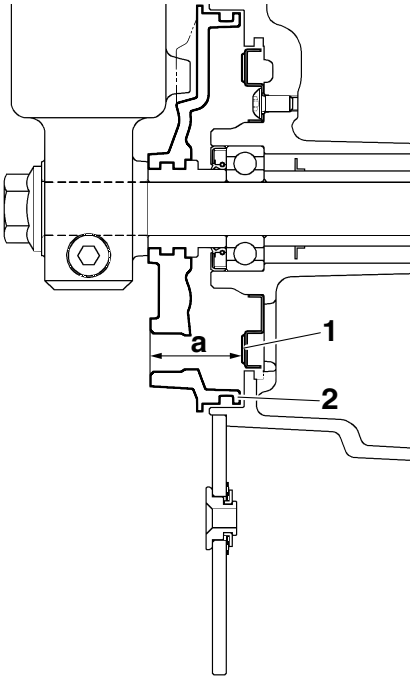
2. Measure:

TIP

Measure the distance "a" only if the wheel bearings, wheel sensor rotor, or both were replaced.

   - Distance "a"
     (between the wheel sensor rotor "1" and wheel sensor housing "2")
     Out of specification → Reinstall the bearing or replace the wheel sensor rotor.

	Distance "a" (between the wheel sensor rotor and wheel sensor housing) **29.13–29.55 mm (1.15–1.16 in)**



3. Install:
   - Front wheel sensor "1"

	Front wheel sensor bolt **7 Nm (0.7 m·kgf, 5.1 ft·lbf)**

   - Brake caliper "2"
   - Front wheel sensor lead holder "3"

	Front brake caliper bracket bolt **40 Nm (4.0 m·kgf, 29 ft·lbf)**

   - Clamp "4"

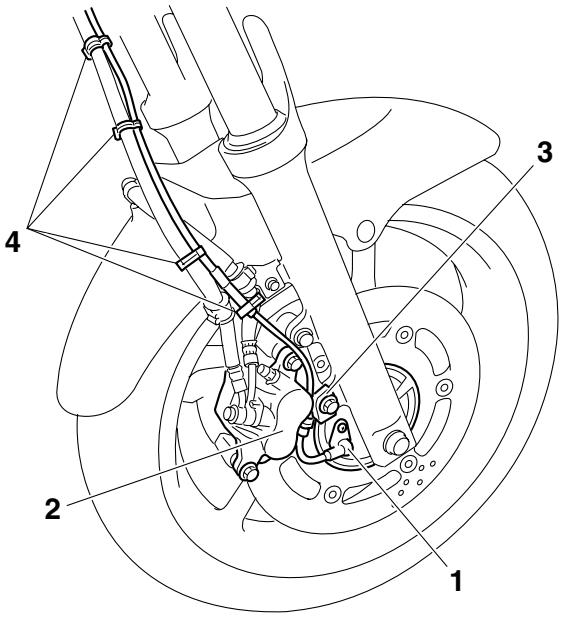
ECA14480

NOTICE

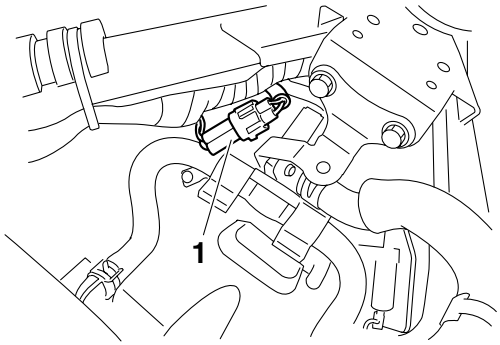
To route the front wheel sensor lead, refer to "CABLE ROUTING" on page 2-43.

TIP

When installing the front wheel sensor, check the wheel sensor lead for twists and the sensor electrode for foreign materials.



4. Connect:
   • Front wheel sensor coupler “1”



5. Check:
   • Front wheel sensor installation
   Check if the wheel sensor housing is installed properly.
   Refer to “MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR” on page 4-9.

EAS21970
ADJUSTING THE FRONT WHEEL STATIC BALANCE

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

1. Remove:
   • Balancing weight(s)
2. Find:
   • Front wheel’s heavy spot

TIP
Place the front wheel on a suitable balancing stand.

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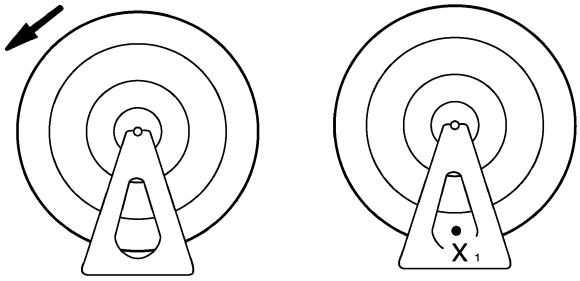
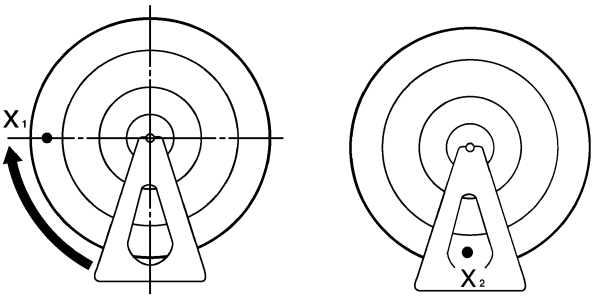
a. Spin the front wheel.
b. When the front wheel stops, put an “X_1” mark at the bottom of the wheel.



c. Turn the front wheel 90° so that the “X_1” mark is positioned as shown.
d. Release the front wheel.
e. When the wheel stops, put an “X_2” mark at the bottom of the wheel.



f. Repeat steps (d) through (f) several times until all the marks come to rest at the same spot.
g. The spot where all the marks come to rest is the front wheel’s heavy spot “X”.

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3. Adjust:
   • Front wheel static balance

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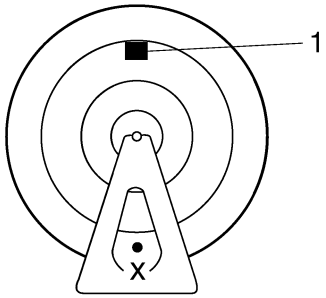
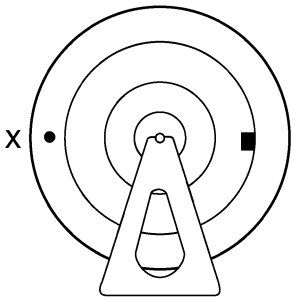
a. Install a balancing weight “1” onto the rim exactly opposite the heavy spot “X”.



TIP
Start with the lightest weight.

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



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

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4. Check:
   • Front wheel static balance

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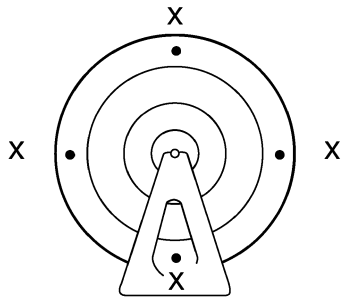
a. Turn the front wheel and make sure it stays at each position shown.



b. If the front wheel does not remain stationary at all of the positions, rebalance it.

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EAS22000
INSTALLING THE FRONT WHEEL

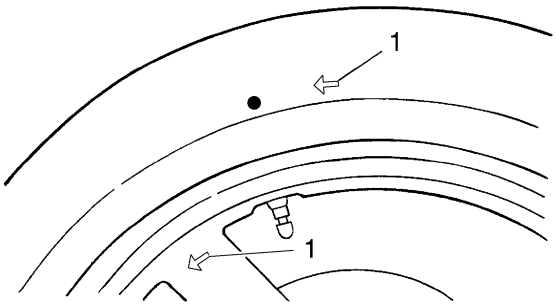
The following procedure applies to both of the brake discs.

1. Lubricate:
   • Wheel axle
   • Oil seal lips

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

2. Install:
   • Collar
   • Wheel axle

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



3. Tighten:
   • Wheel axle

	Wheel axle **65 Nm (6.5 m·kgf, 46 ft·lbf)**

   • Wheel axle pinch bolt

	Wheel axle pinch bolt **19 Nm (1.9 m·kgf, 14 ft·lbf)**

ECA20S1004
NOTICE
Before tightening the wheel axle, push down hard on the handlebar(s) several times and check if the front fork rebounds smoothly.

4. Install:
   • Brake calipers

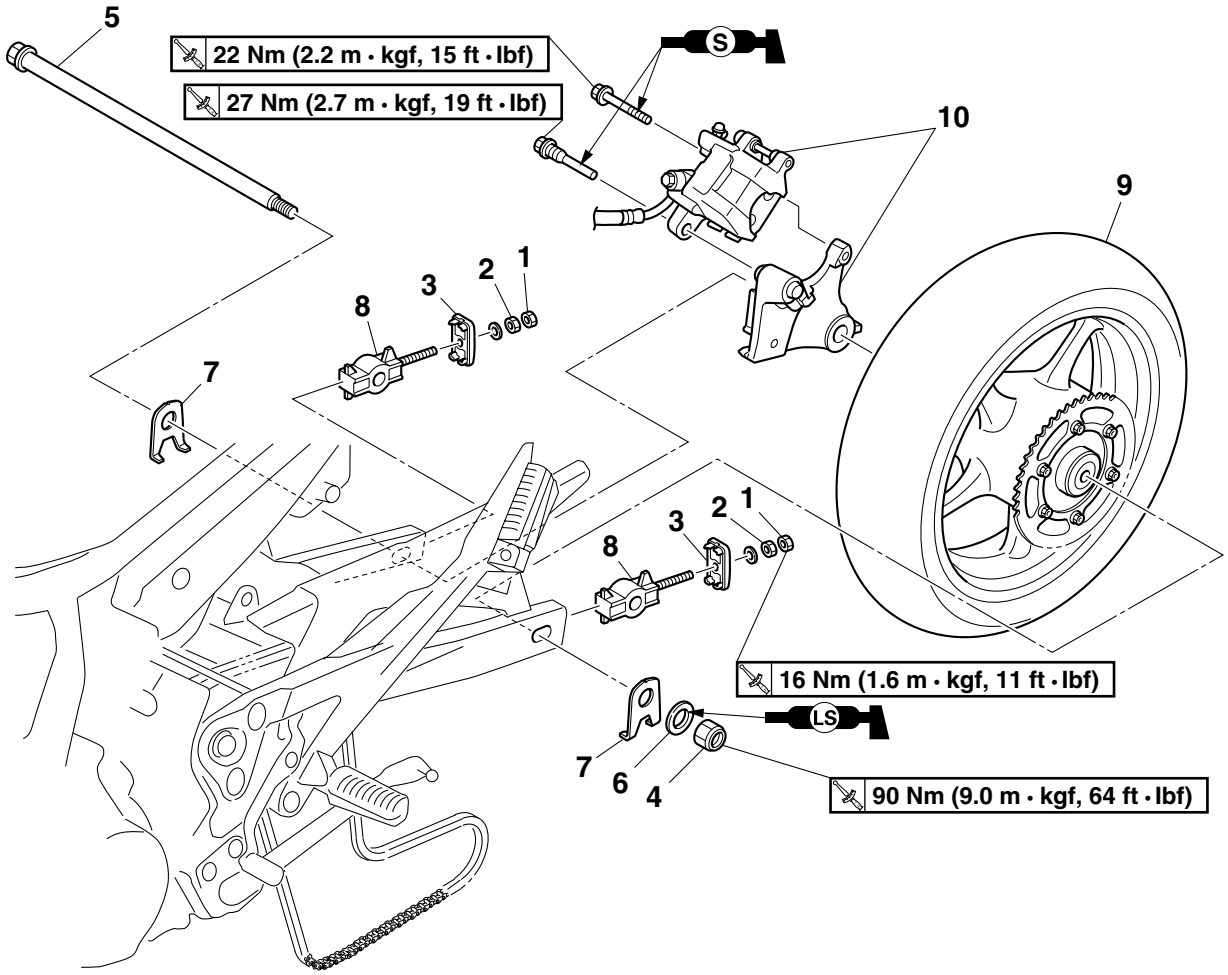
	Front brake caliper bolt **40 Nm (4.0 m·kgf, 29 ft·lbf)**

EWA13490
⚠ WARNING
Make sure the brake cable is routed properly.

EAS22030

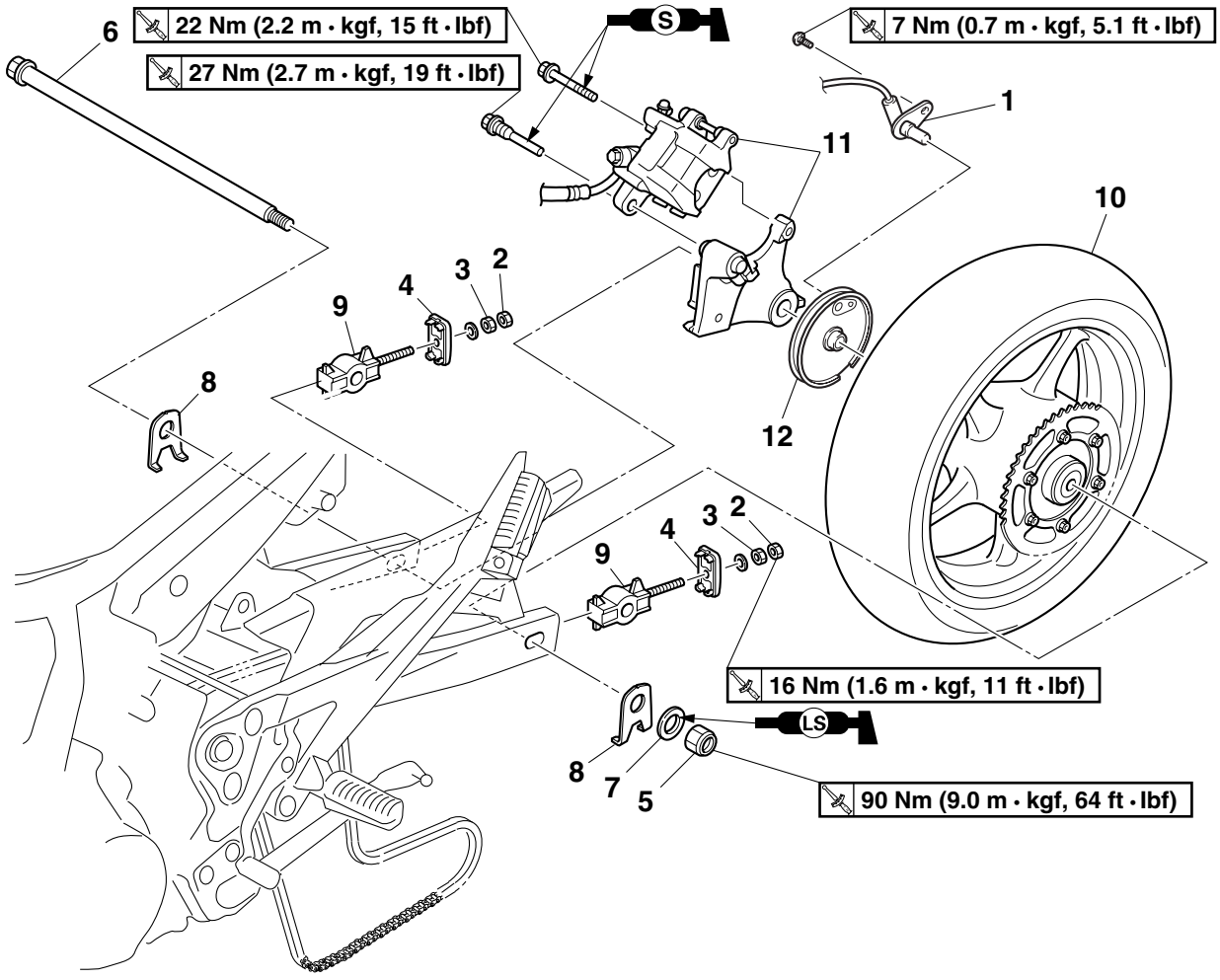
REAR WHEEL

Removing the rear wheel (XJ6S)



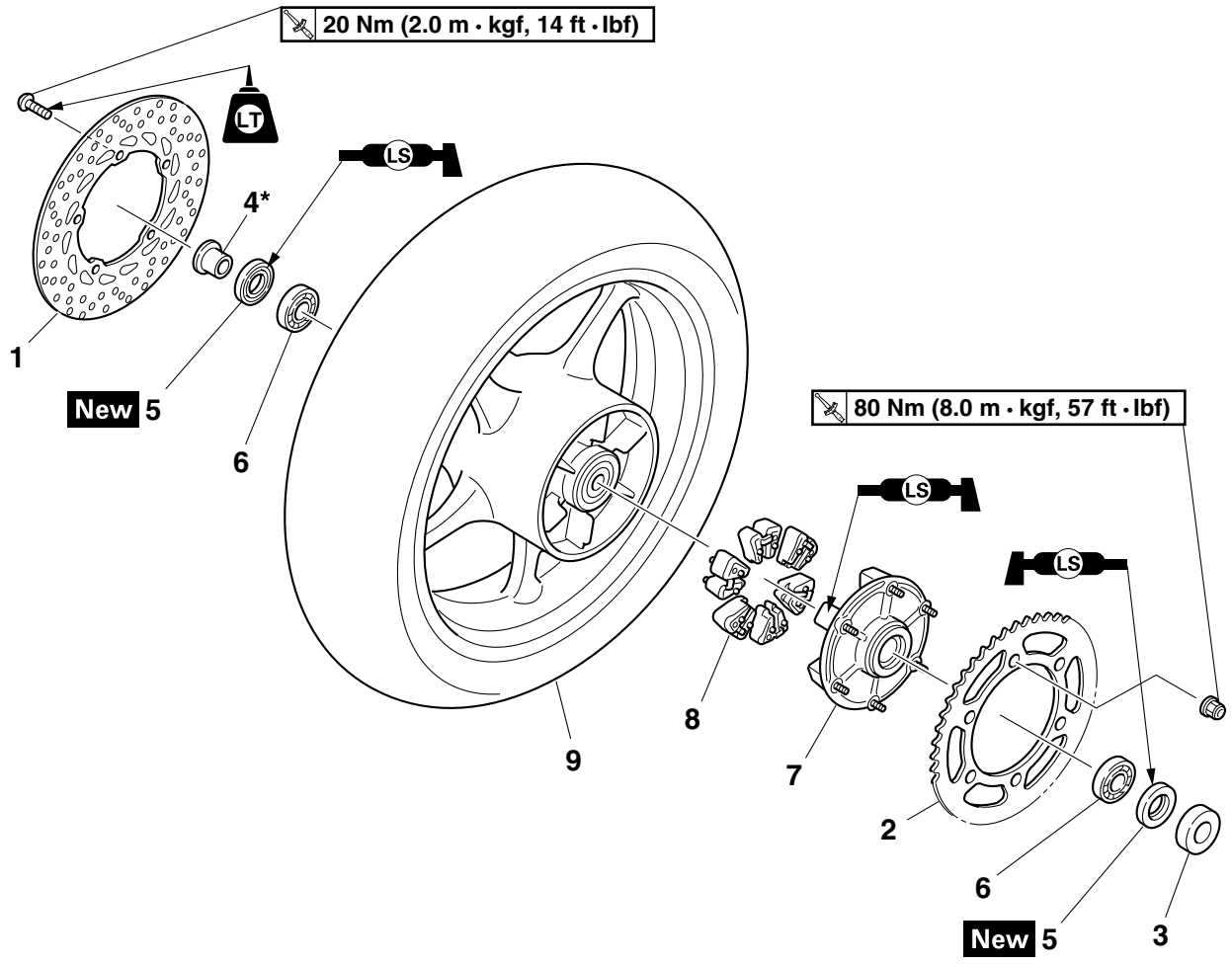
Order	Job/Parts to remove	Q'ty	Remarks
1	Locknut	2	Loosen.
2	Adjusting nut	2	Loosen.
3	Cap	2	
4	Rear wheel axle nut	1	
5	Rear wheel axle	1	
6	Washer	1	
7	Indicator plate	2	
8	Drive chain puller	2	
9	Rear wheel	1	
10	Rear brake caliper assembly	1	
			For installation, reverse the removal procedure.

Removing the rear wheel (XJ6SA)



Order	Job/Parts to remove	Q'ty	Remarks
1	Rear wheel sensor	1	
2	Lock nut	2	Loosen.
3	Adjusting nut	2	Loosen.
4	Cap	2	
5	Wheel axle nut	1	
6	Rear wheel axle	1	
7	Washer	1	
8	Indicator plate	2	
9	Drive chain puller	2	
10	Rear wheel	1	
11	Rear brake caliper assembly	1	
12	Sensor housing	1	
			For installation, reverse the removal procedure.

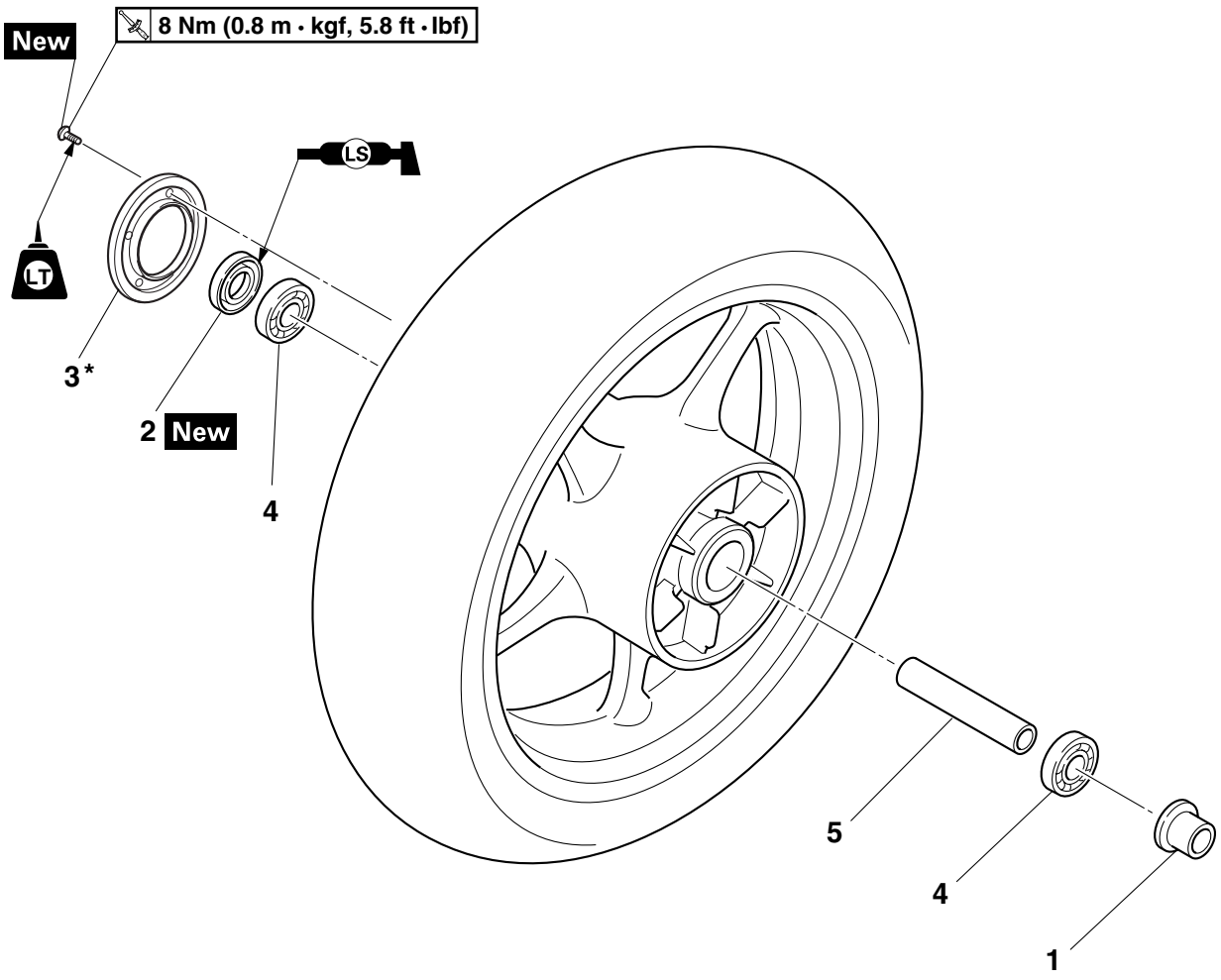
Removing the rear brake disc and rear wheel sprocket



Order	Job/Parts to remove	Q'ty	Remarks
1	Rear brake disc	1	
2	Rear wheel sprocket	1	
3	Collar	1	
4	Collar (XJ6S)	1	
5	Oil seal	2	
6	Bearing	2	
7	Rear wheel drive hub	1	
8	Rear wheel drive hub damper	6	
9	Rear wheel	1	
			For installation, reverse the removal procedure.

*XJ6S

Disassembling the rear wheel



Order	Job/Parts to remove	Q'ty	Remarks
1	Collar	1	
2	Oil seal	1	
3	Rear wheel sensor rotor (XJ6SA)	1	
4	Bearing	2	
5	Spacer	1	
			For assembly, reverse the disassembly procedure.

*XJ6SA

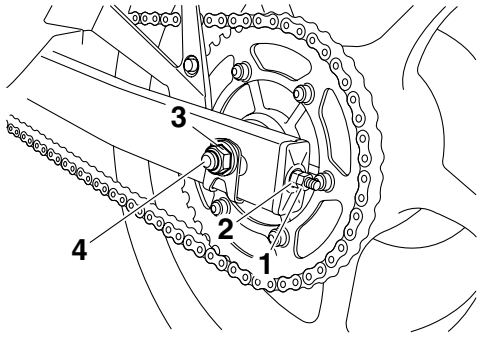
EAS22040
REMOVING THE REAR WHEEL
1. Stand the vehicle on a level surface.

EWA13120
⚠ WARNING

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

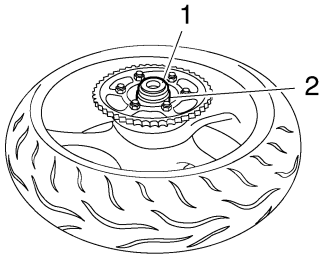
TIP
Place the vehicle on the centerstand so that the rear wheel is elevated.

2. Loosen:
   - Locknut “1”
   - Adjusting nut “2”
3. Remove:
   - Wheel axle nut “3”
   - Rear wheel axle “4”
   - Indicator plate
   - Washer
   - Rear wheel
   - Rear brake caliper assembly



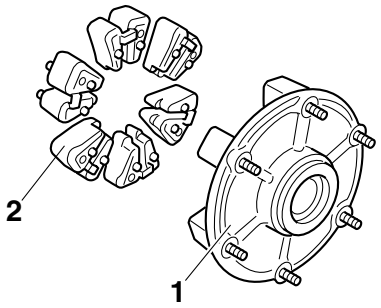
TIP
Push the rear wheel forward and remove the drive chain from the rear wheel sprocket.

4. Remove:
   - Left collar “1”
   - Rear wheel drive hub “2”
   - Rear wheel drive hub damper
   - Right collar (XJ6S)

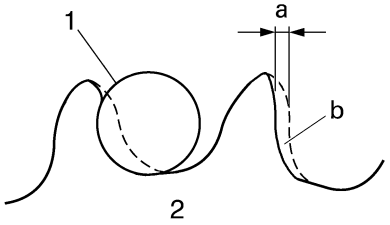


EAS22090
CHECKING THE REAR WHEEL
1. Check:
   - Wheel axle
   - Rear wheel
   - Wheel bearings
   - Oil seals
   Refer to “CHECKING THE FRONT WHEEL” on page 4-8.
2. Check:
   - Tire
   - Rear wheel
   Damage/wear → Replace.
   Refer to “CHECKING THE TIRES” on page 3-16 and “CHECKING THE WHEELS” on page 3-16.
3. Measure:
   - Radial wheel runout
   - Lateral wheel runout
   Refer to “CHECKING THE FRONT WHEEL” on page 4-8.

EAS22110
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.



EAS22120
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

2. Replace:
   • Rear wheel sprocket

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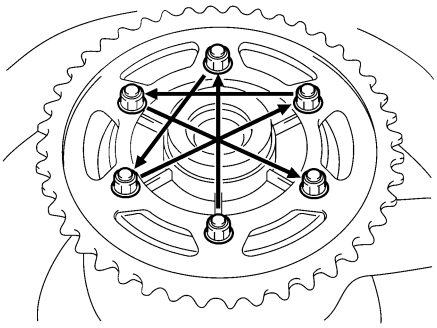
a. Remove the self-locking nuts and the rear wheel sprocket.
b. Clean the rear wheel drive hub with a clean cloth, especially the surfaces that contact the sprocket.
c. Install the new rear wheel sprocket.

	Rear wheel sprocket self-locking nut **80 Nm (8.0 m·kgf, 57 ft·lbf)**

TIP

Tighten the self-locking nuts in stages and in a crisscross pattern.



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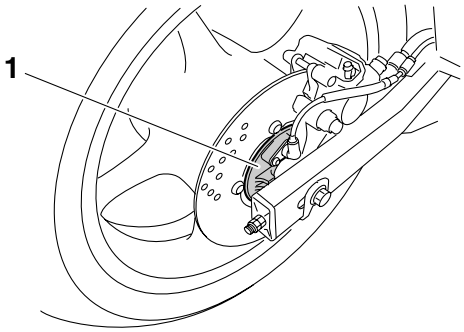
EAS22200

MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR

ECA4B56008

NOTICE

Keep magnets (including magnetic pick-up tools, magnetic screwdrivers, etc.) away from the rear wheel hub "1", otherwise the wheel sensor rotor equipped in the wheel hub may be damaged, resulting in improper performance of the ABS system.



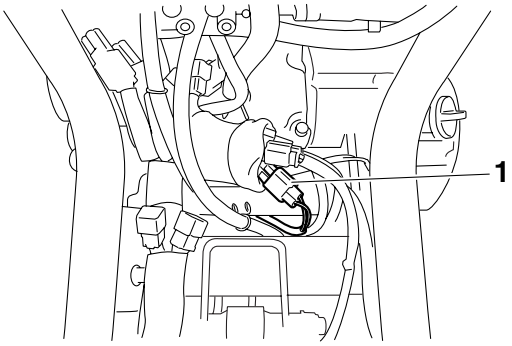
ECA4S81012

NOTICE

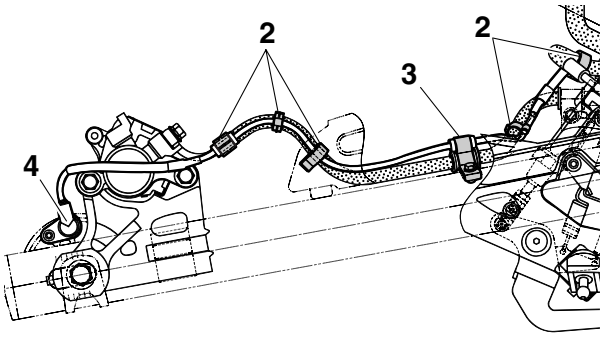
- **Be sure not to contact the sensor electrode to any metal part when removing the rear wheel sensor from the sensor housing.**
- **Do not operate the brake lever when removing the brake caliper.**

Removing the rear wheel sensor

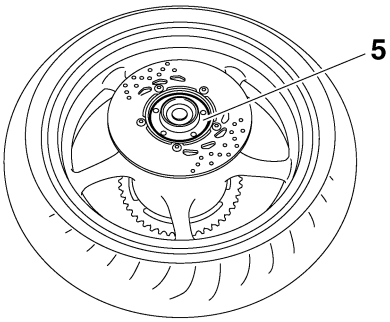
1. Disconnect:
   • Rear wheel sensor coupler "1"



2. Remove:
   • Clamp "2"
   • Rear wheel sensor lead holder "3"
3. Remove:
   • Rear wheel sensor "4"



4. Remove:
   • Rear wheel
   Refer to "REMOVING THE REAR WHEEL" on page 4-18.
5. Remove:
   • Sensor rotor "5"



Checking the rear wheel sensor and sensor rotor

1. Check:
   - Rear wheel sensor
     Cracks/bends/distortion → Replace.
     Iron powder/dust → Clean.
2. Check:
   - Rear wheel sensor rotor
     Cracks/damage → Replace.

Installing the rear wheel sensor

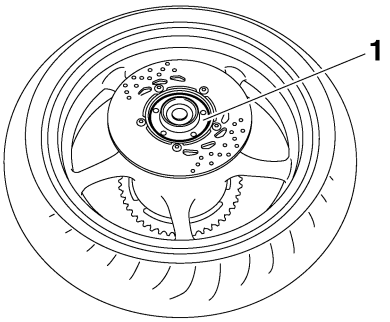
1. Install:
   - Sensor rotor "1"

	Sensor rotor bolt **8 Nm (0.8 m·kgf, 5.8 ft·lbf)** **LOCTITE®**

ECA4B56012

NOTICE

Replace the wheel sensor bolts with new ones.



2. Measure:
   - Wheel sensor rotor deflection
     Out of specification → Correct the wheel sensor rotor deflection or replace the wheel sensor rotor.
     Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-9.

	Wheel sensor rotor deflection limit **0.15 mm (0.0059 in)**

3. Install:
   - Rear wheel
     Refer to "INSTALLING THE REAR WHEEL" on page 4-21.

ECA14470

NOTICE

Make sure there are no foreign materials in the wheel hub. Foreign materials cause damage to the inner sensor rotor and wheel sensor.

4. Install:
   - Rear wheel sensor "2"

	Rear wheel sensor bolt **7 Nm (0.7 m·kgf, 5.1 ft·lbf)**

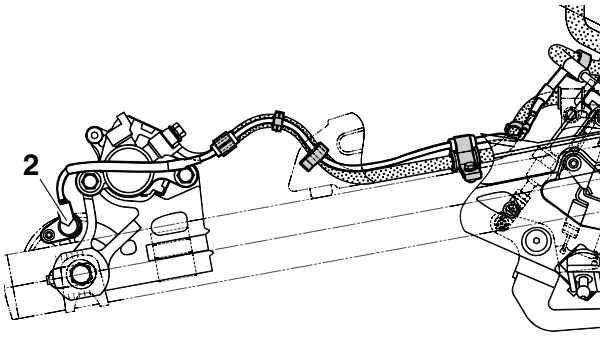
TIP

When installing the rear wheel sensor, check the rear wheel sensor lead for twists and the sensor electrode for foreign materials.

ECA14500

NOTICE

To route the rear wheel sensor lead, refer to "CABLE ROUTING" on page 2-43.



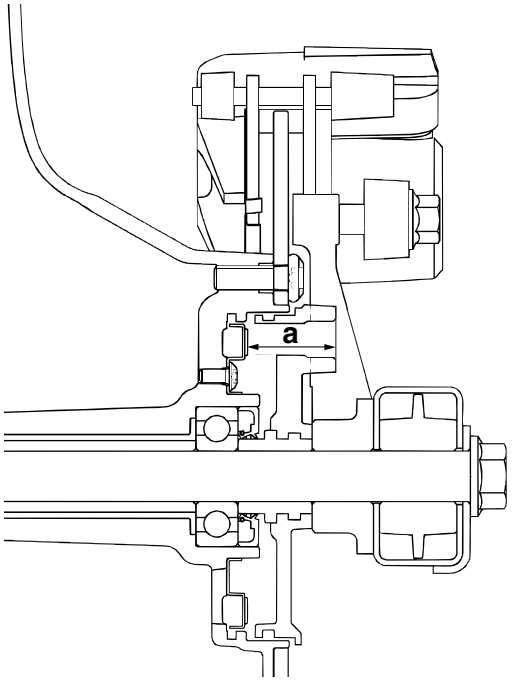
5. Measure:

TIP

Measure the distance "a" only if the wheel bearings, wheel sensor rotor, or both were replaced.

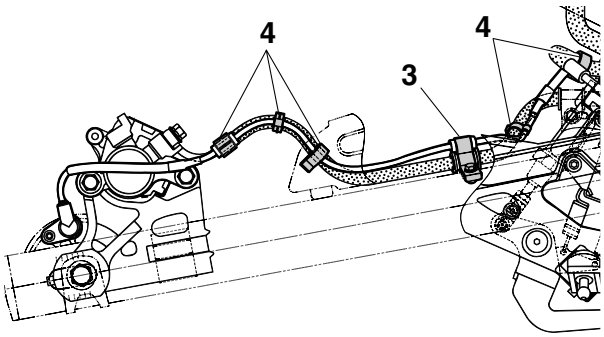
   - Distance "a"
     (between the wheel sensor rotor "1" and wheel sensor housing "2")
     Out of specification → Reinstall the bearing or replace the wheel sensor rotor.

	Distance "a" (between the wheel sensor rotor and wheel sensor housing) **29.43–29.85 mm (1.16–1.18 in)**

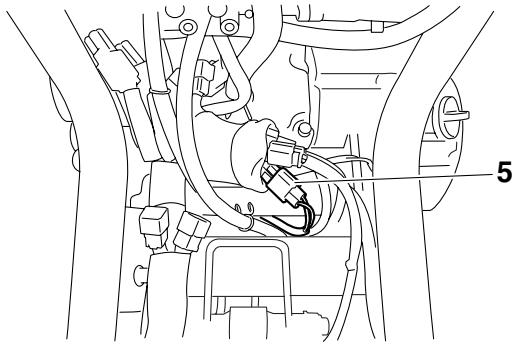


6. Install:
   - Rear wheel sensor lead holder “3”
   - Clamp “4”

	Rear wheel sensor lead holder bolt **7 Nm (0.7 m·kgf, 5.1 ft·lbf)**



7. Connect:
   - Rear wheel sensor coupler “5”



ECA14500

NOTICE

To route the rear wheel sensor lead, refer to “CABLE ROUTING” on page 2-43.

8. Check:
   - Rear wheel sensor installation
     Check if the wheel sensor housing is installed properly.

EAS22150

ADJUSTING THE REAR WHEEL STATIC BALANCE

TIP

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

1. Adjust:
   - Rear wheel static balance
     Refer to “ADJUSTING THE FRONT WHEEL STATIC BALANCE” on page 4-12.

EAS22160

INSTALLING THE REAR WHEEL

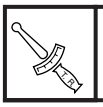
1. Lubricate:
   - Wheel axle
   - Wheel bearings
   - Oil seal lips

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

2. Install:
   - Collar
   - Rear brake caliper assembly
   - Rear wheel
   - Indicator plate
   - Washer
   - Rear wheel axle
3. Adjust:
   - Drive chain slack
     Refer to “ADJUSTING THE DRIVE CHAIN SLACK” on page 3-18.

Drive chain slack
45.0–55.0 mm (1.77–2.17 in)

4. Tighten:
   - Wheel axle nut

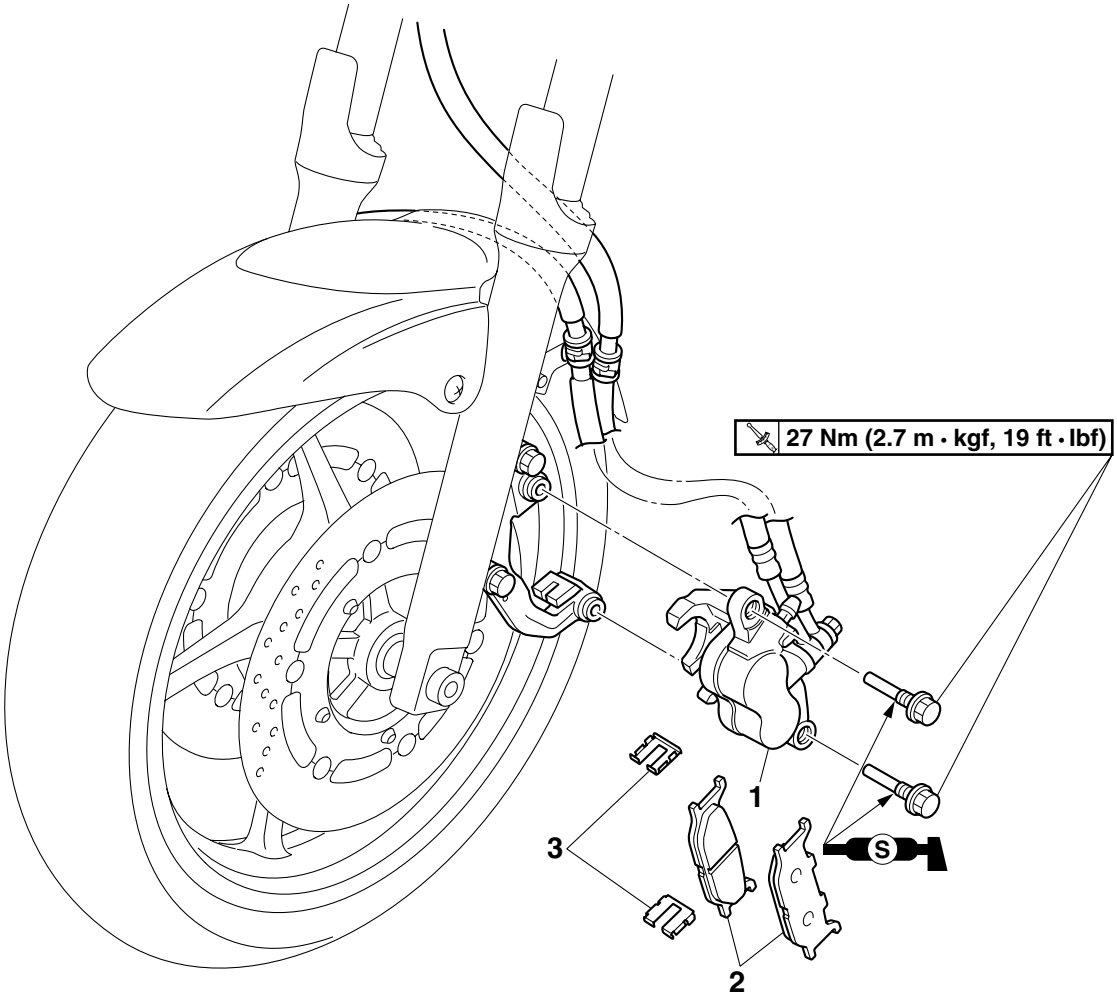


Wheel axle nut
90 Nm (9.0 m·kgf, 64 ft·lbf)

EAS22210

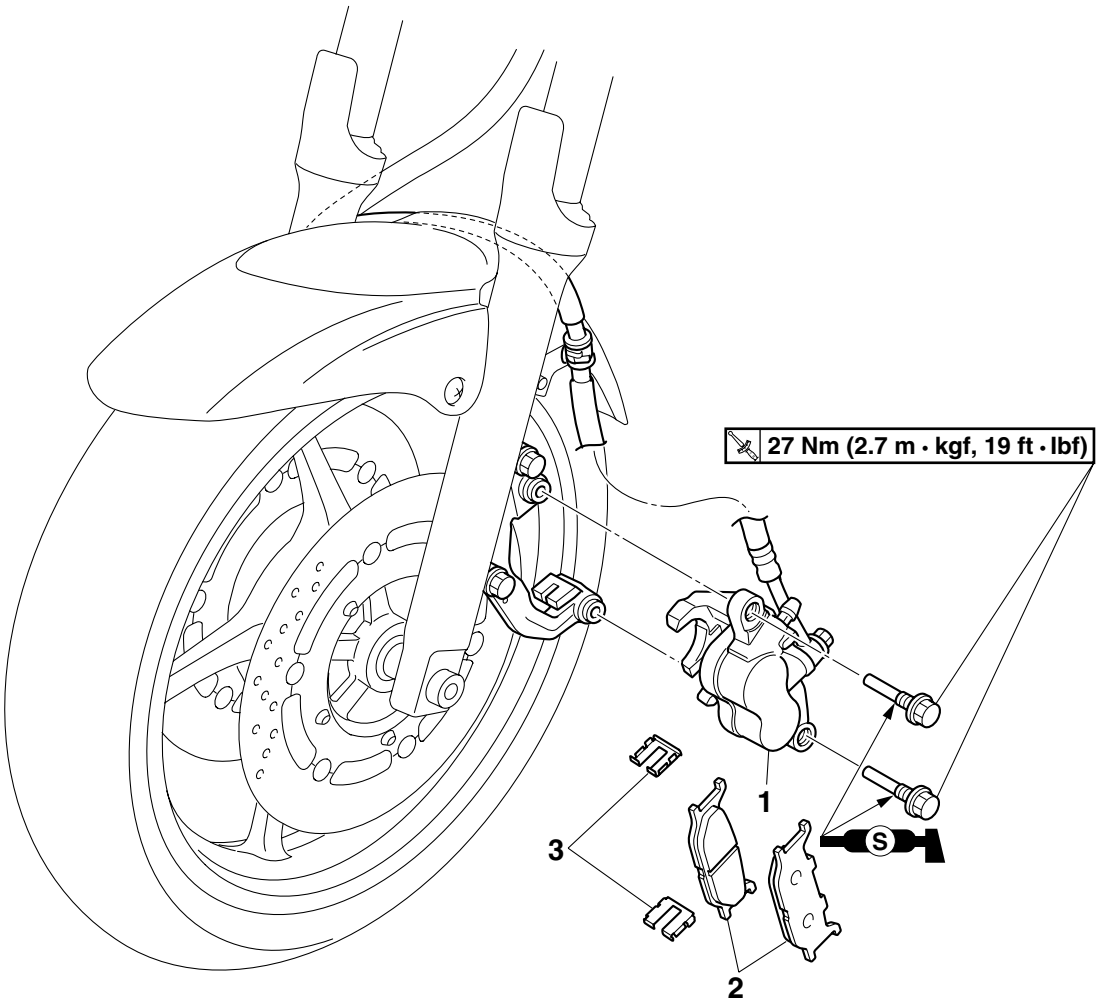
FRONT BRAKE

Removing the front brake pads (XJ6S)



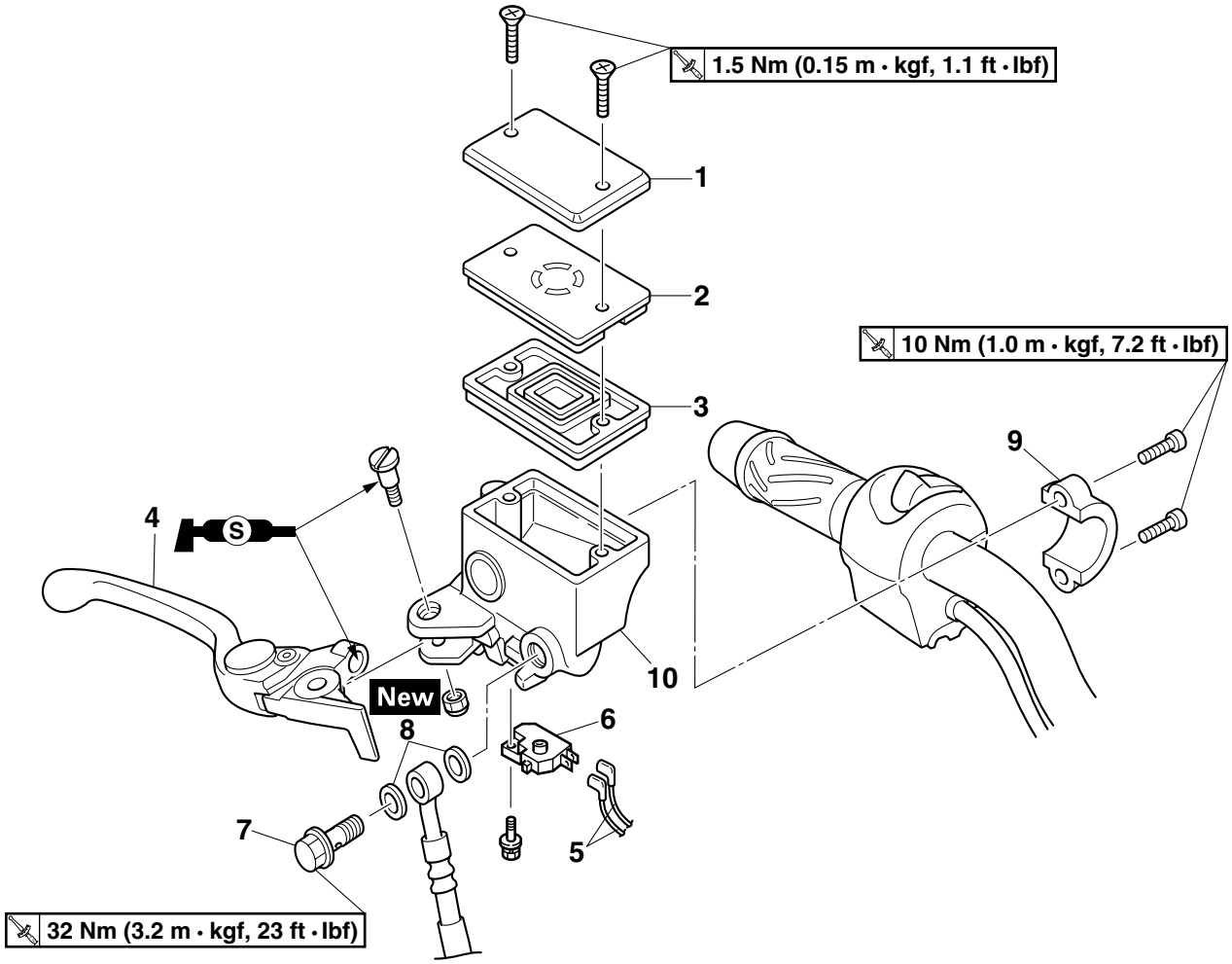
Order	Job/Parts to remove	Q'ty	Remarks
1	Front brake caliper	1	
2	Brake pad	2	
3	Brake pad spring	2	
			For installation, reverse the removal procedure.

Removing the front brake pads (XJ6SA)



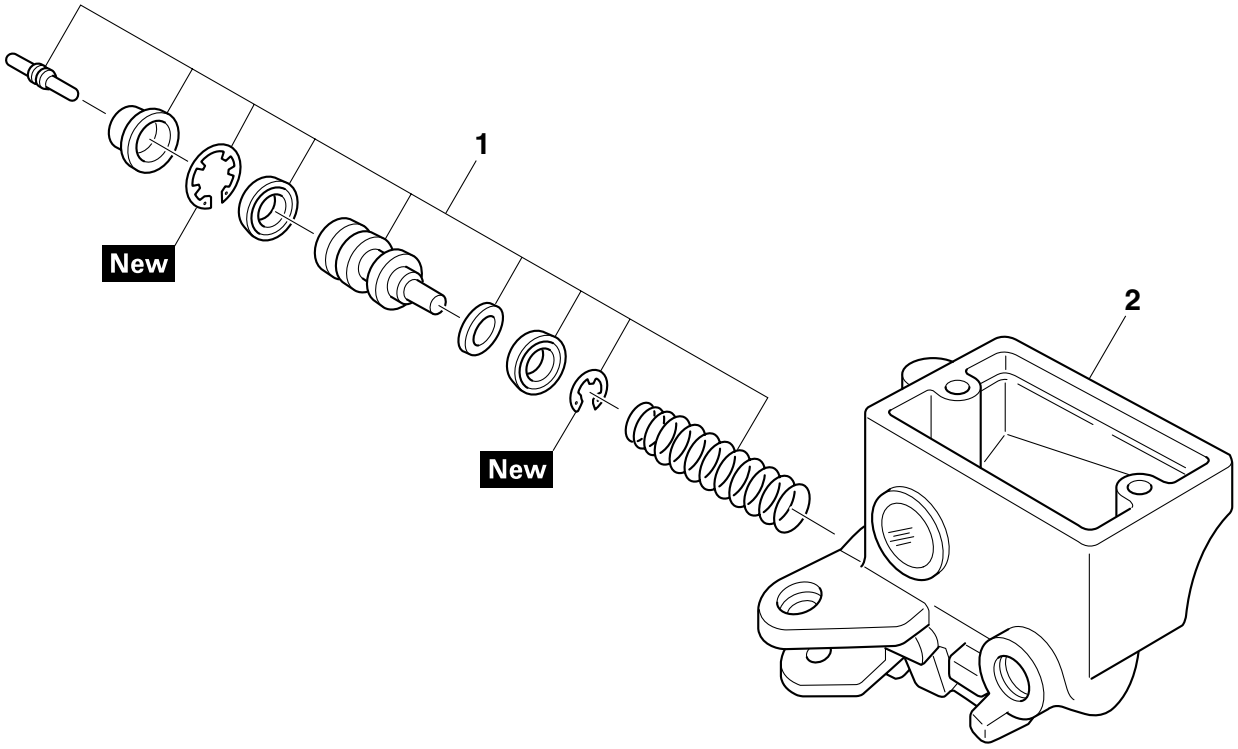
Order	Job/Parts to remove	Q'ty	Remarks
1	Front brake caliper	1	
2	Brake pad	2	
3	Brake pad spring	2	
			For installation, reverse the removal procedure.

Removing the front brake master cylinder



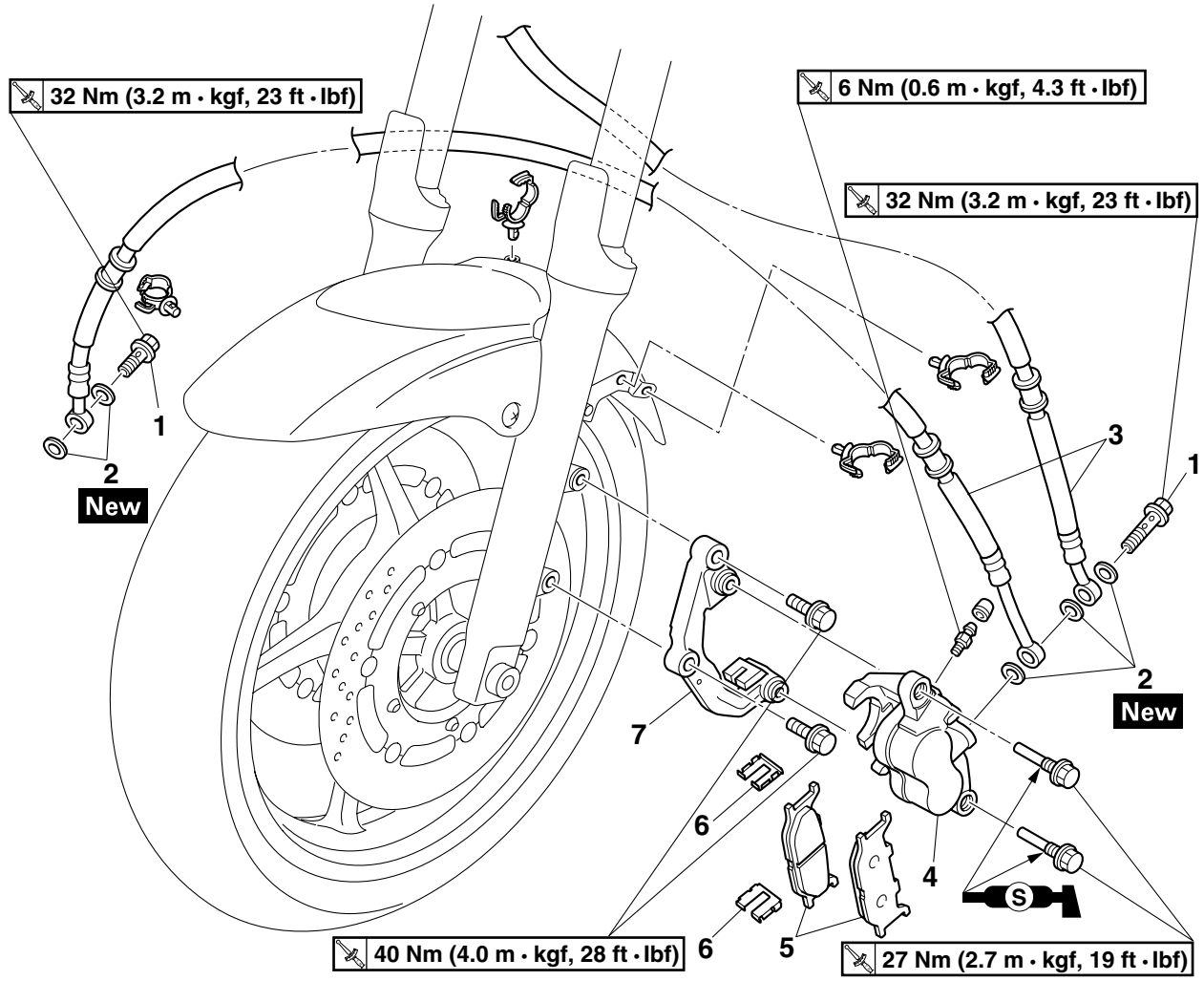
Order	Job/Parts to remove	Q'ty	Remarks
	Brake fluid		Drain. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-14.
1	Brake master cylinder reservoir cap	1	
2	Brake master cylinder reservoir diaphragm holder	1	
3	Brake master cylinder reservoir diaphragm	1	
4	Brake lever	1	
5	Front brake light switch connector	2	Disconnect.
6	Front brake light switch	1	
7	Union bolt	1	
8	Copper washer	2	
9	Front brake master cylinder holder	1	
10	Front brake master cylinder reservoir	1	
			For installation, reverse the removal procedure.

Disassembling the front brake master cylinder



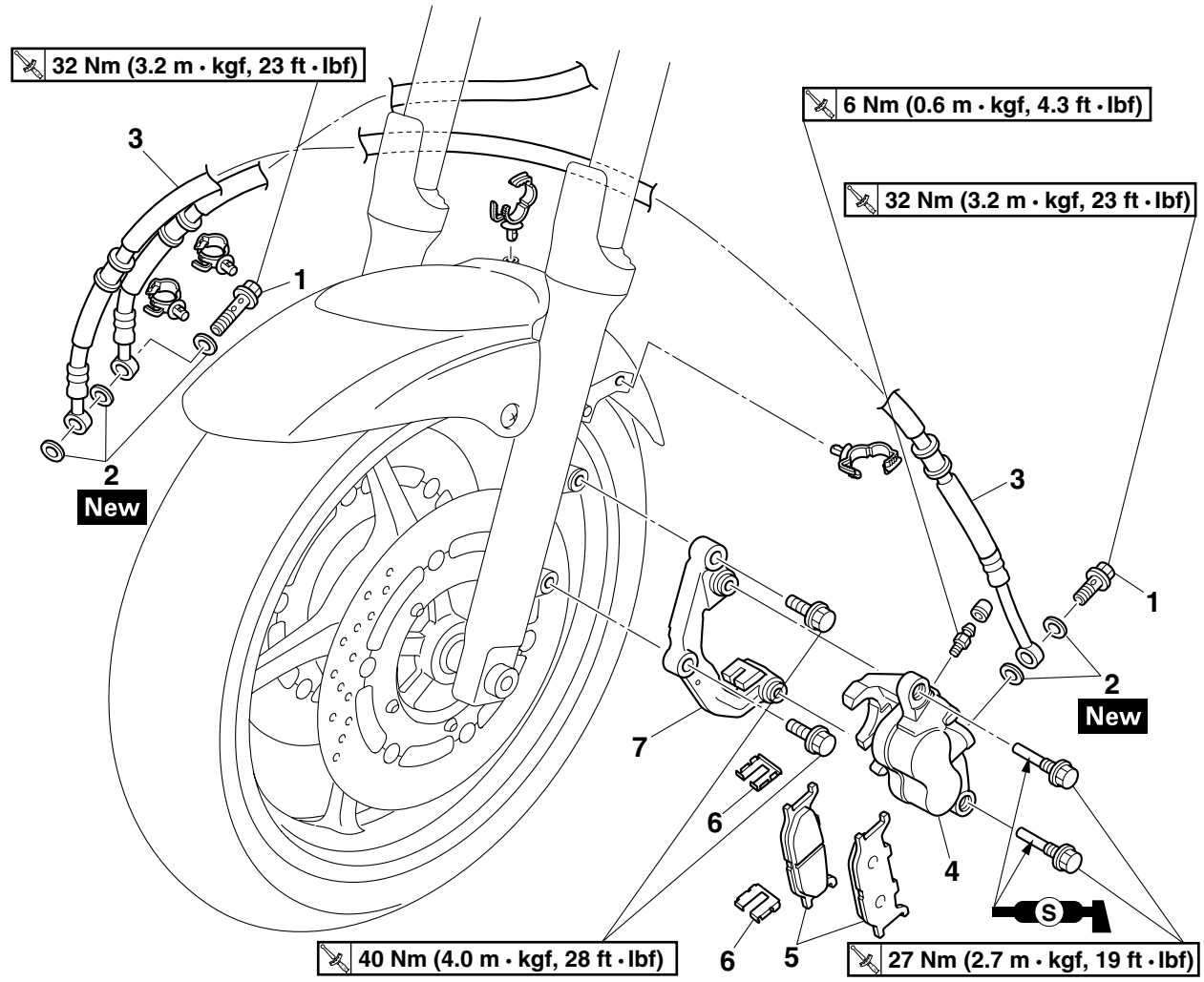
Order	Job/Parts to remove	Q'ty	Remarks
1	Master cylinder kit	1	
2	Master cylinder	1	
			For assembly, reverse the disassembly procedure.

Removing the front brake calipers (XJ6S)



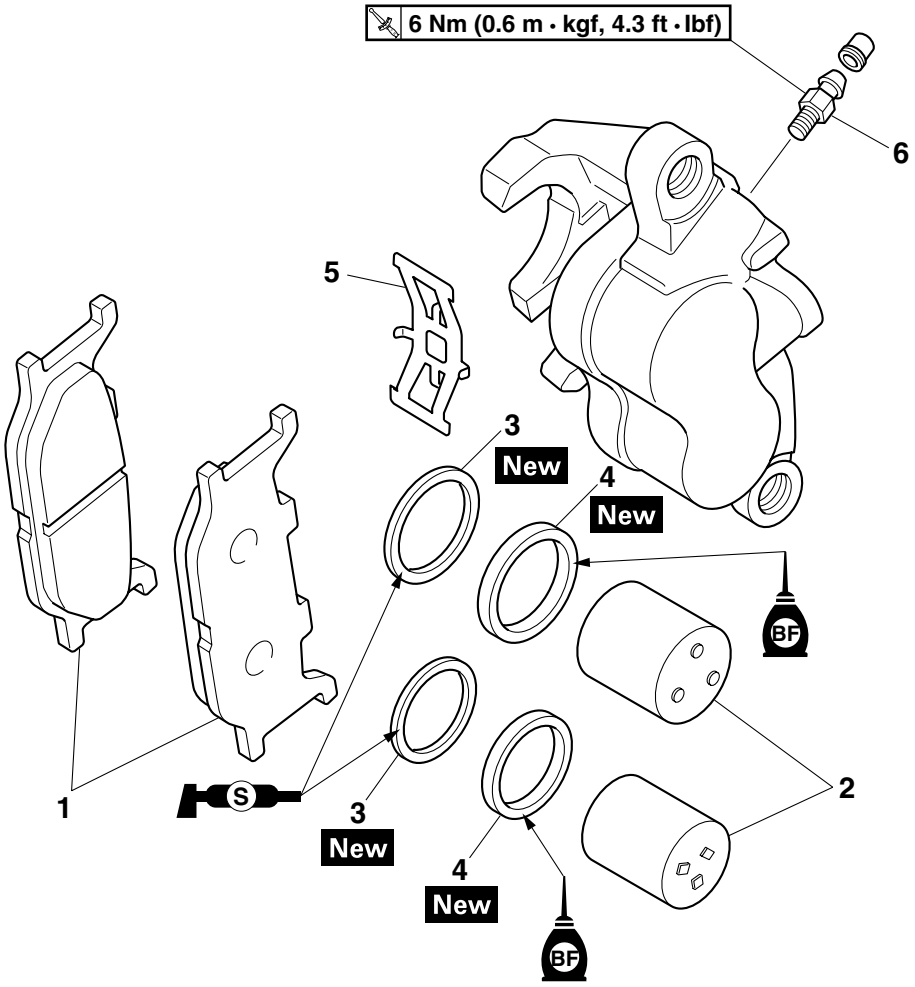
Order	Job/Parts to remove	Q'ty	Remarks
	Brake fluid		Drain. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-14.
1	Union bolt	2	
2	Copper washer	5	
3	Brake hose	2	
4	Brake caliper	1	
5	Brake pad	2	
6	Brake pad spring	2	
7	Brake caliper bracket	1	
			For installation, reverse the removal procedure.

Removing the front brake calipers (XJ6SA)



Order	Job/Parts to remove	Q'ty	Remarks
	Brake fluid		Drain. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-14.
1	Union bolt	2	
2	Copper washer	5	
3	Brake hose	2	
4	Brake caliper	1	
5	Brake pad	2	
6	Brake pad spring	2	
7	Brake caliper bracket	1	
			For installation, reverse the removal procedure.

Disassembling the front brake calipers

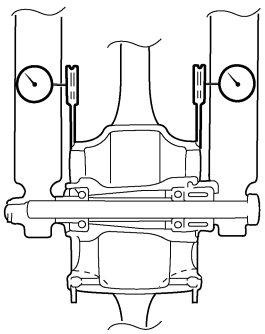


Order	Job/Parts to remove	Q'ty	Remarks
1	Brake pad	2	
2	Brake caliper piston	2	
3	Brake caliper piston dust seal	2	
4	Brake caliper piston seal	2	
5	Brake pad spring	1	
6	Bleed screw	1	
			For assembly, reverse the disassembly procedure.

EAS22220
INTRODUCTION
EWA14100
⚠ WARNING

Disc brake components rarely require disassembly. Therefore, always follow these preventive measures:
- **Never disassemble brake components unless absolutely necessary.**
- **If any connection on the hydraulic brake system is disconnected, the entire brake system must be disassembled, drained, cleaned, properly filled, and bled after reassembly.**
- **Never use solvents on internal brake components.**
- **Use only clean or new brake fluid for cleaning brake components.**
- **Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.**
- **Avoid brake fluid coming into contact with the eyes as it can cause serious injury.**
- **FIRST AID FOR BRAKE FLUID ENTERING THE EYES:**
- **Flush with water for 15 minutes and get immediate medical attention.**

EAS22240
CHECKING THE FRONT BRAKE DISCS
The following procedure applies to both brake discs.
1. Check:
   - Brake disc
     Damage/galling → Replace.
2. Measure:
   - Brake disc deflection
     Out of specification → Correct the brake disc deflection or replace the brake disc.



	Brake disc deflection limit 0.10 mm (0.0039 in)

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a. Place the vehicle on a suitable stand so that the front wheel is elevated.
b. Before measuring the front brake disc deflection, turn the handlebar to the left or right to ensure that the front wheel is stationary.
c. Remove the brake caliper.
d. Hold the dial gauge at a right angle against the brake disc surface.
e. Measure the deflection 2–3 mm (0.0787–0.1181 in) below the edge of the brake disc.

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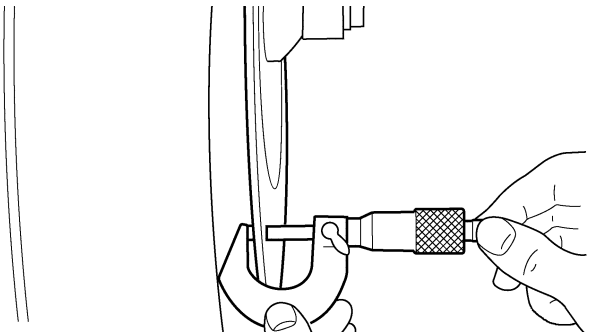
3. Measure:
   - Brake disc thickness
     Measure the brake disc thickness at a few different locations.
     Out of specification → Replace.



	Brake disc thickness limit 4.0 mm (0.16 in)

4. Adjust:
   - Brake disc deflection

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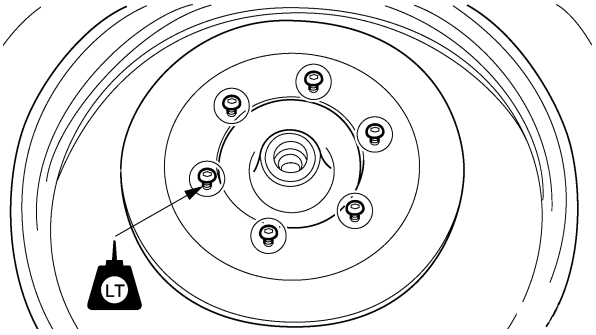
a. Remove the brake disc.
b. Rotate the brake disc by one bolt hole.
c. Install the brake disc.

TIP

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



Brake disc bolt
18 Nm (1.8 m·kgf, 13 ft·lbf)
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.

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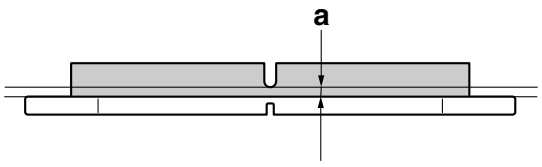
EAS22270
REPLACING THE FRONT BRAKE PADS

The following procedure applies to both brake calipers.

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

1. Measure:
   • Brake pad wear limit "a"
   Out of specification → Replace the brake pads as a set.

Brake pad lining thickness (inner)
6.0 mm (0.24 in)
Limit
0.8 mm (0.03 in)
Brake pad lining thickness (outer)
6.0 mm (0.24 in)
Limit
0.8 mm (0.03 in)



2. Install:
   • Brake pad spring
   • Brake pads

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

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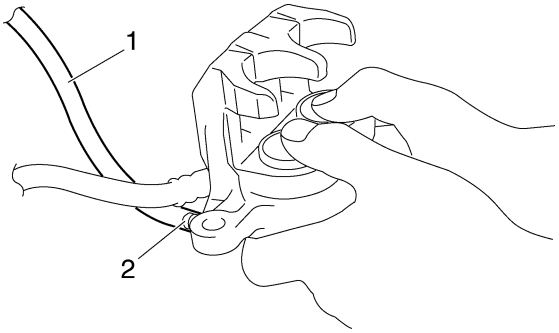
a. Connect a clear plastic hose "1" tightly to the bleed screw "2". Put the other end of the hose into an open container.
b. Loosen the bleed screw and push the brake caliper pistons into the brake caliper with your finger.
c. Tighten the bleed screw.

Bleed screw
6 Nm (0.6 m·kgf, 4.3 ft·lbf)

d. Install new brake pads and a new brake pad spring.



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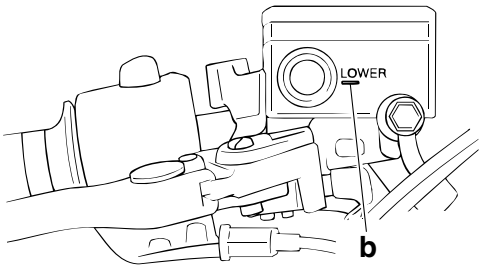
3. Install:
   • Brake caliper

Brake caliper bolt
27 Nm (2.7 m·kgf, 19 ft·lbf)

4. Check:
   • Brake fluid level
   Below the minimum level mark "b" → Add the recommended brake fluid to the proper level. Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-11.



5. Check:
   • Brake lever operation
   Soft or spongy feeling → Bleed the brake system.
   Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-14.

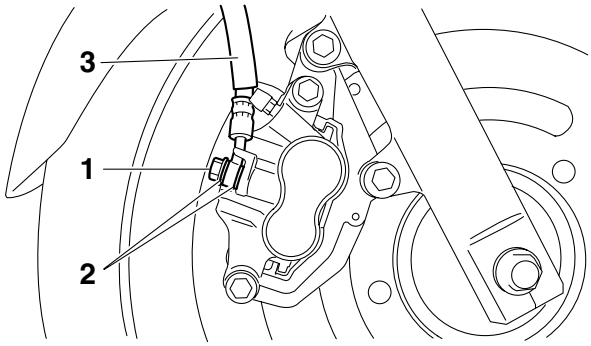
EAS22300
REMOVING THE FRONT BRAKE CALIPERS

The following procedure applies to both of the brake calipers.

TIP

Before removing the brake caliper, drain the brake fluid from the entire brake system.

1. Remove:
   - Union bolt “1”
   - Copper washers “2”
   - Brake hose “3”
   - Brake caliper



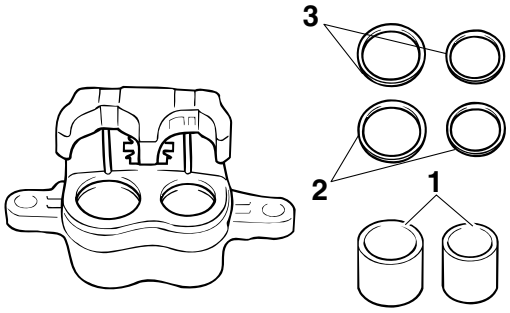
TIP

Put the end of the brake hose into a container and pump out the brake fluid carefully.

EAS22360
DISASSEMBLING THE FRONT BRAKE CALIPERS

The following procedure applies to both of the brake calipers.

1. Remove:
   - Brake caliper pistons “1”
   - Brake caliper piston dust seals “2”
   - Brake caliper piston seals “3”



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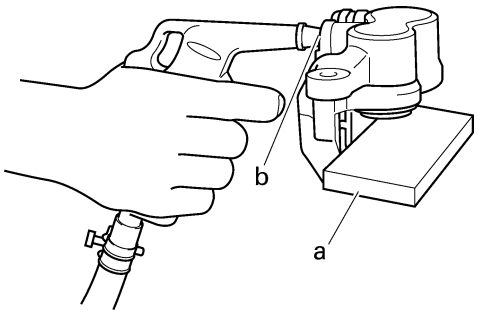
a. Secure the brake caliper pistons with a piece of wood “a”.
b. Blow compressed air into the brake hose joint opening “b” to force out the pistons from the brake caliper.



EWA4S81006

⚠ WARNING

- **Cover the brake caliper piston with a rag. Be careful not the get injured when the pistons are expelled from the brake caliper.**
- **Never try to pry out the brake caliper pistons.**

c. Remove the brake caliper piston dust seals and brake caliper piston seals.

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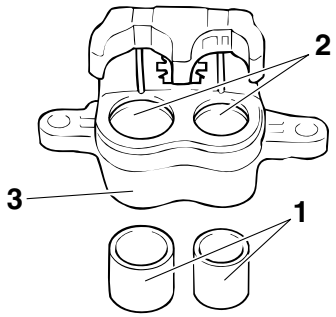
EAS22390
CHECKING THE FRONT BRAKE CALIPERS

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.



EWA13600
⚠ WARNING

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

EAS22410
ASSEMBLING THE FRONT BRAKE CALIPERS

EWA13620
⚠ 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.**

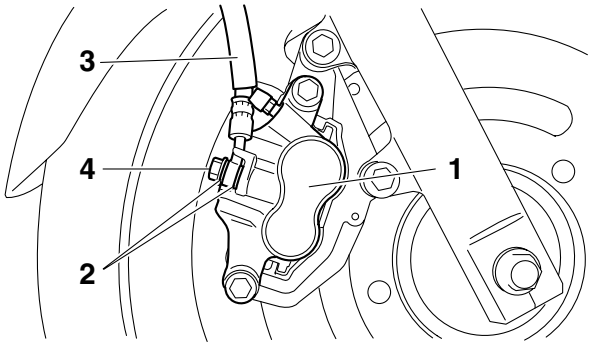
Recommended fluid
DOT 4

1. Install:
   - Brake caliper piston seals New
   - Brake caliper piston dust seals New
   - Brake caliper pistons

EAS22440
INSTALLING THE FRONT BRAKE CALIPERS

The following procedure applies to both of the brake calipers.

1. Install:
   - Brake caliper “1”
   - Copper washers “2” New
   - Brake hose “3”
   - Union bolt “4”



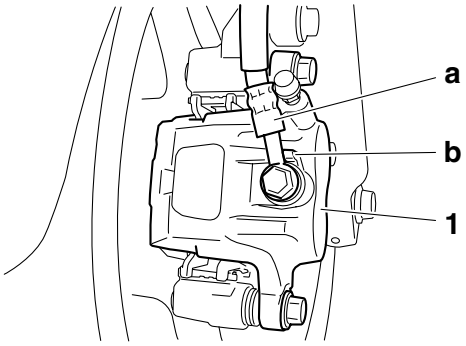
Brake caliper bolt
27 Nm (2.7 m·kgf, 19 ft·lbf)
Brake hose union bolt
32 Nm (3.2 m·kgf, 23 ft·lbf)

EWA13530
⚠ WARNING

Proper brake hose routing is essential to insure safe vehicle operation. Refer to “CABLE ROUTING” on page 2-43.

ECA14170
NOTICE

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



2. Check that the brake caliper slide smoothly on the side way.
   Difficult → Apply the silicone grease to the brake caliper bolt.
3. Fill:
   - Brake master cylinder reservoir
     (with the specified amount of the recommended brake fluid)

Recommended fluid
DOT 4

EWA13090
⚠ WARNING

- **Use only the designated brake fluid. Other brake fluids may cause the rubber seals to**

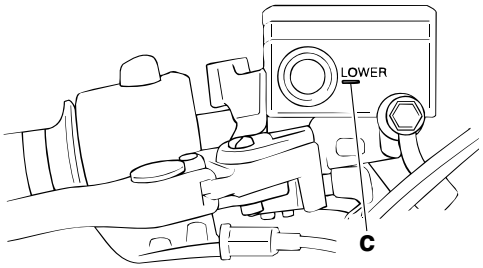
deteriorate, causing leakage and poor brake performance.
- **Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor brake performance.**
- **When refilling, be careful that water does not enter the brake fluid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

ECA13540

NOTICE

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" on page 3-14.
5. Check:
   - Brake fluid level
     Below the minimum level mark "c" → Add the recommended brake fluid to the proper level.
     Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-11.



6. Check:
   - Brake lever operation
     Soft or spongy feeling → Bleed the brake system.
     Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-14.

EAS22490

REMOVING THE FRONT BRAKE MASTER CYLINDER

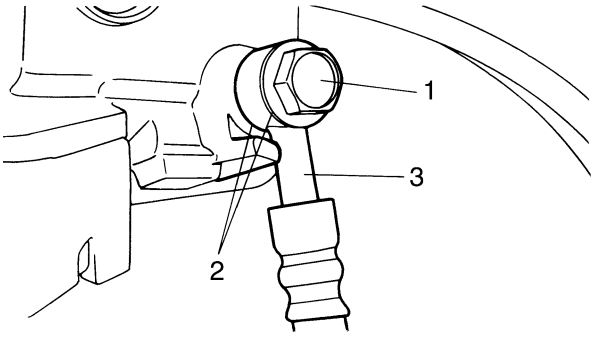
TIP

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

1. Disconnect:
   - Front brake light switch connector
     (from the front brake light switch)
2. Remove:
   - Union bolt "1"
   - Copper washers "2"
   - Brake hoses "3"

TIP

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

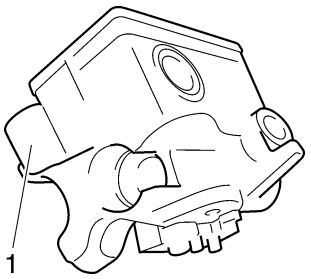


3. Remove:
   - Brake lever
   - Brake master cylinder holder
   - Brake master cylinder

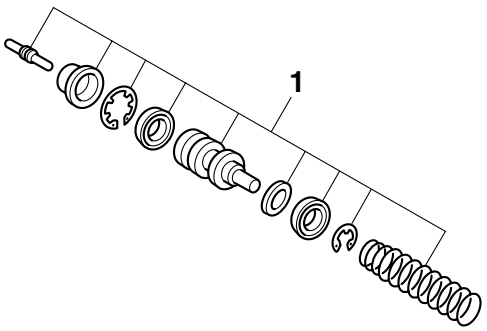
EAS22500

CHECKING THE FRONT BRAKE MASTER CYLINDER

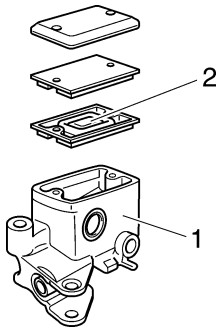
1. Check:
   - Brake master cylinder "1"
     Damage/scratches/wear → Replace.
   - Brake fluid delivery passages
     (brake master cylinder body)
     Obstruction → Blow out with compressed air.



2. Check:
   - Brake master cylinder kit "1"
     Damage/scratches/wear → Replace.



3. Check:
   - Brake master cylinder reservoir “1”
     Cracks/damage → Replace.
   - Brake master cylinder reservoir diaphragm “2”
     Damage/wear → Replace.



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

EAS22520
ASSEMBLING THE FRONT BRAKE MASTER CYLINDER

EWA13520
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 fluid **DOT 4**

1. Install:
   - Master cylinder kit
   - Circlip New

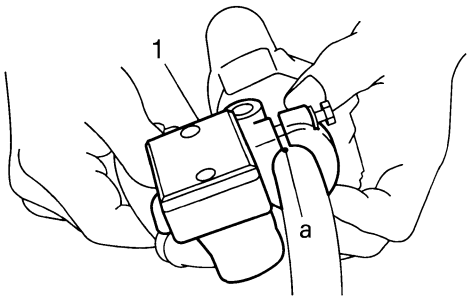
EAS22530
INSTALLING THE FRONT BRAKE MASTER CYLINDER

1. Install:
   - Brake master cylinder “1”

	Brake master cylinder holder bolt **10 Nm (1.0 m·kgf, 7.2 ft·lbf)**

TIP

- Install the brake master cylinder holder with the “UP” mark facing up.
- Align the end of the brake master cylinder holder with the punch mark “a” on the handlebar.
- First, tighten the upper bolt, then the lower bolt.



2. Install:
   - Copper washers“1” New
   - Brake hose “2”
   - Union bolt “3”

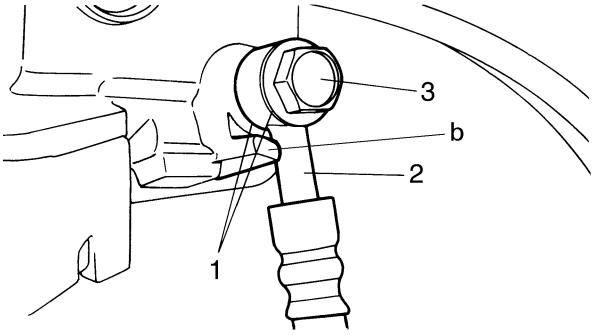
	Brake hose union bolt **32 Nm (3.2 m·kgf, 23 ft·lbf)**

EWA13530
WARNING

Proper brake hose routing is essential to insure safe vehicle operation. Refer to “CABLE ROUTING” on page 2-43.

ECA4S81013
NOTICE

When installing the brake hose onto the brake master cylinder, make sure that the brake pipe touches the projection “b” on the brake master cylinder.



TIP

- While holding the brake hose, tighten the union bolt as shown.
- Turn the handlebar 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.

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

Recommended fluid
DOT 4

EWA13540

WARNING

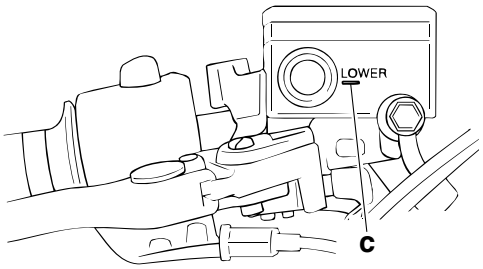
- **Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.**
- **Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor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

ECA13540

NOTICE

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" on page 3-14.
5. Check:
   - Brake fluid level
     Below the minimum level mark "c" → Add the recommended brake fluid to the proper level.
     Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-11.

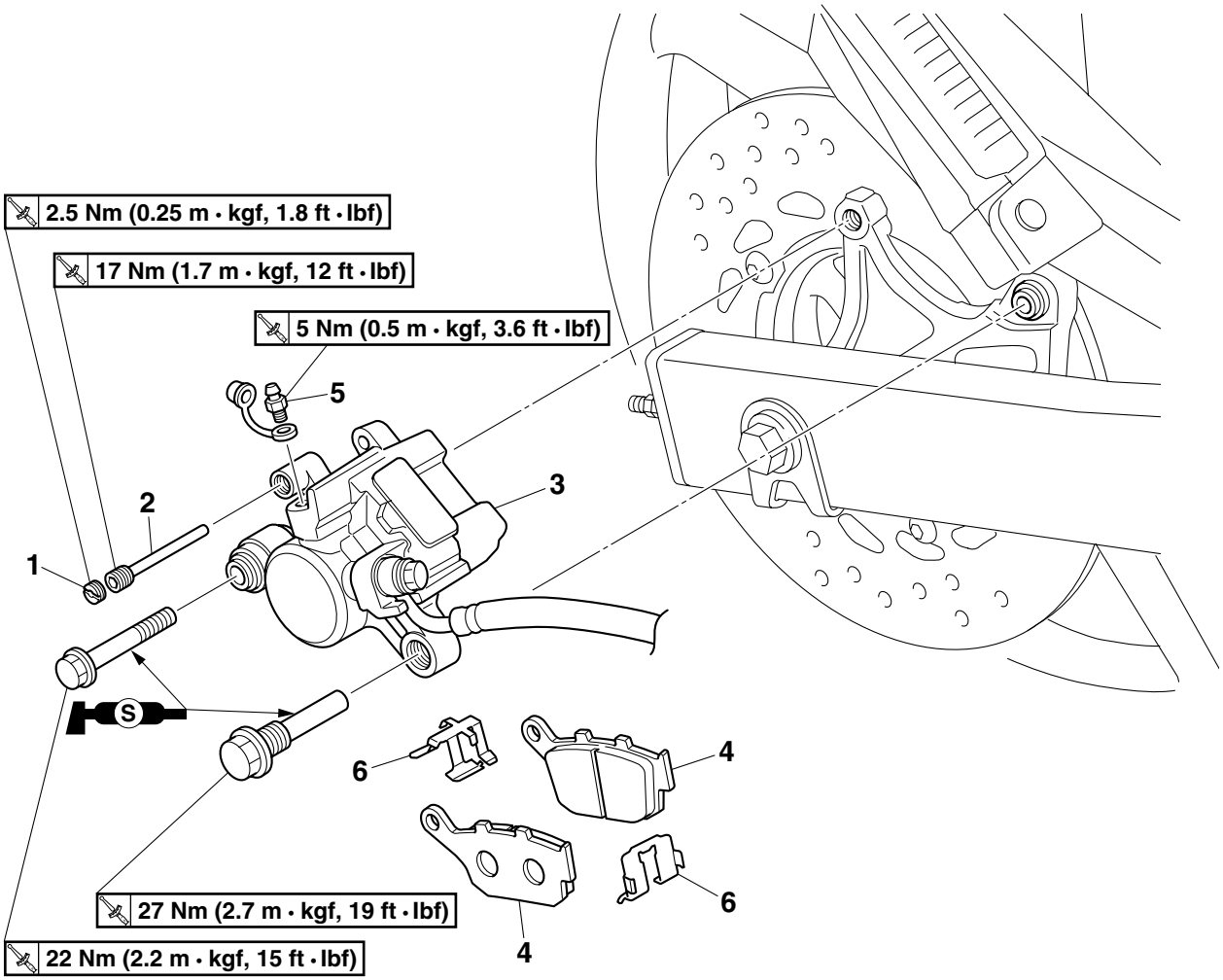


6. Check:
   - Brake lever operation
     Soft or spongy feeling → Bleed the brake system.
     Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-14.

EAS22550

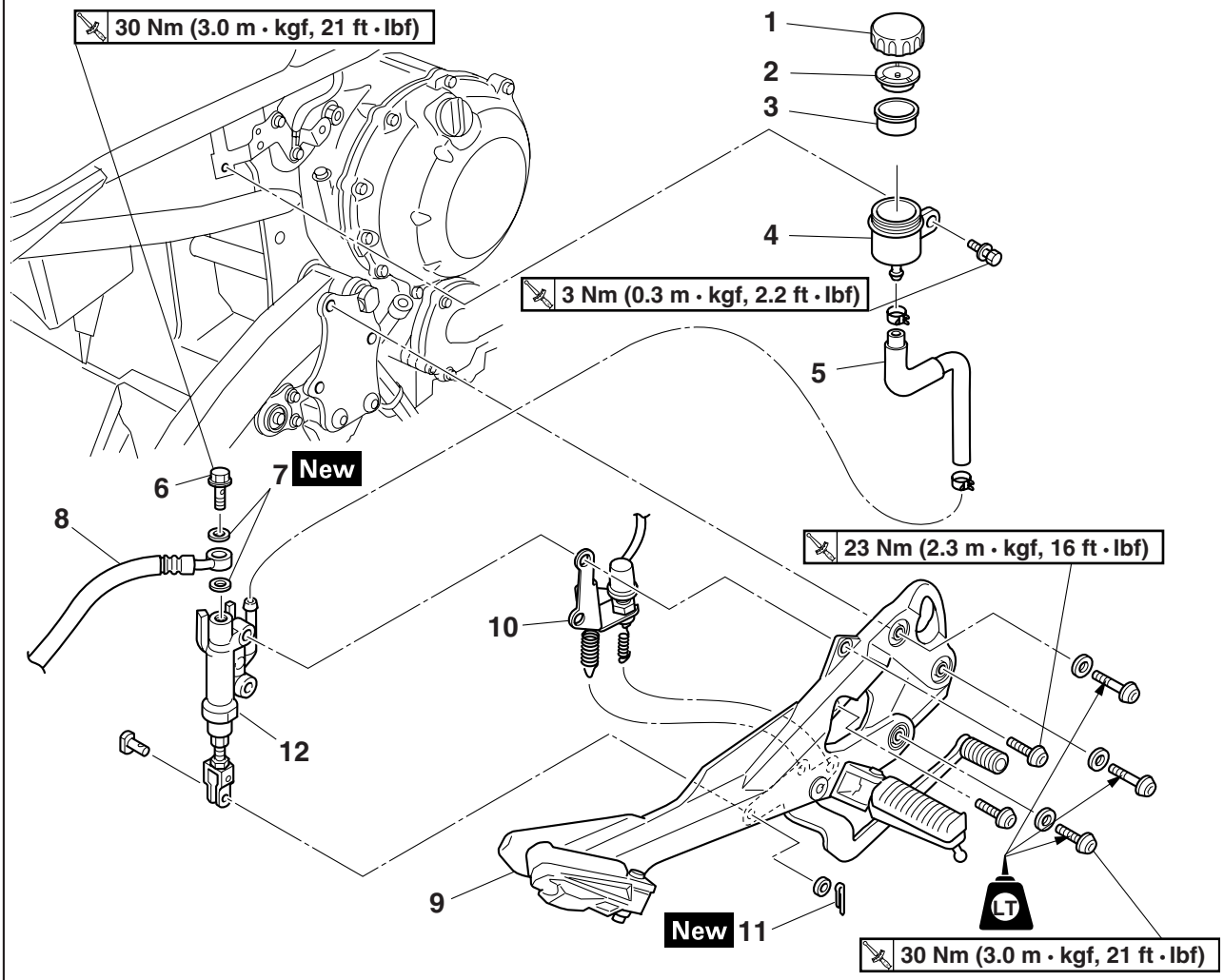
REAR BRAKE

Removing the rear brake pads



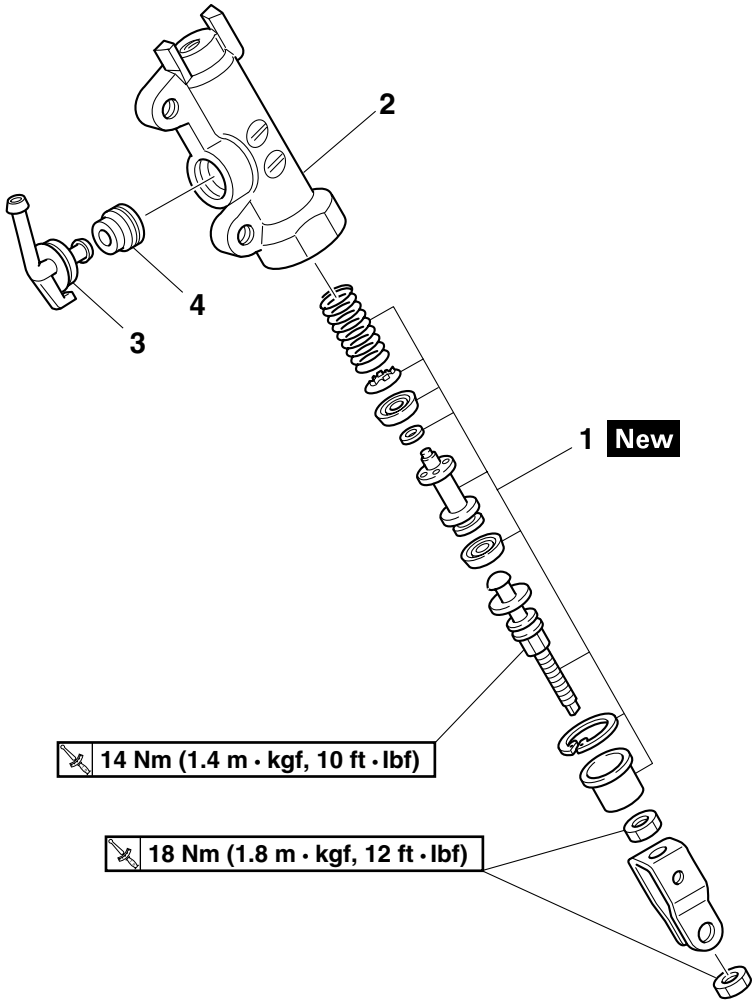
Order	Job/Parts to remove	Q'ty	Remarks
1	Screw plug	1	
2	Brake pad pin	1	
3	Rear brake caliper	1	
4	Brake pad	2	
5	Bleed screw	1	
6	Brake pad spring	2	
			For installation, reverse the removal procedure.

Removing the rear brake master cylinder



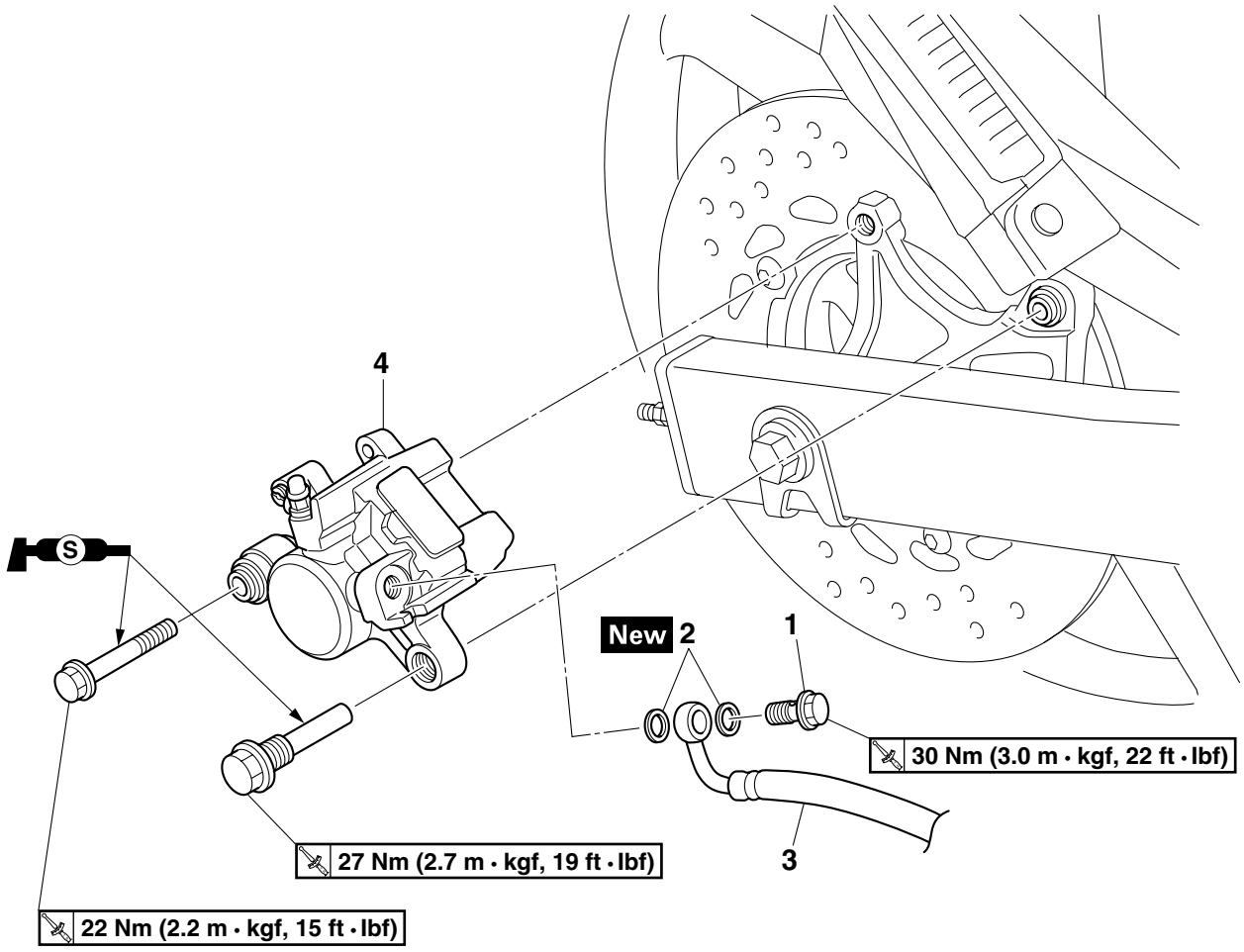
Order	Job/Parts to remove	Q'ty	Remarks
	Brake fluid		Drain. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-14.
	Right rear side cover		Refer to "GENERAL CHASSIS" on page 4-1.
1	Brake fluid reservoir cap	1	
2	Rear brake fluid reservoir diaphragm holder	1	
3	Rear brake fluid reservoir diaphragm	1	
4	Brake fluid reservoir	1	
5	Brake fluid reservoir hose	1	
6	Union bolt	1	
7	Copper washer	2	
8	Brake hose	1	
9	Right footrest assembly	1	
10	Rear brake light switch assembly	1	
11	Cotter pin	1	
12	Rear brake master cylinder	1	
			For installation, reverse the removal procedure.

Disassembling the rear brake master cylinder



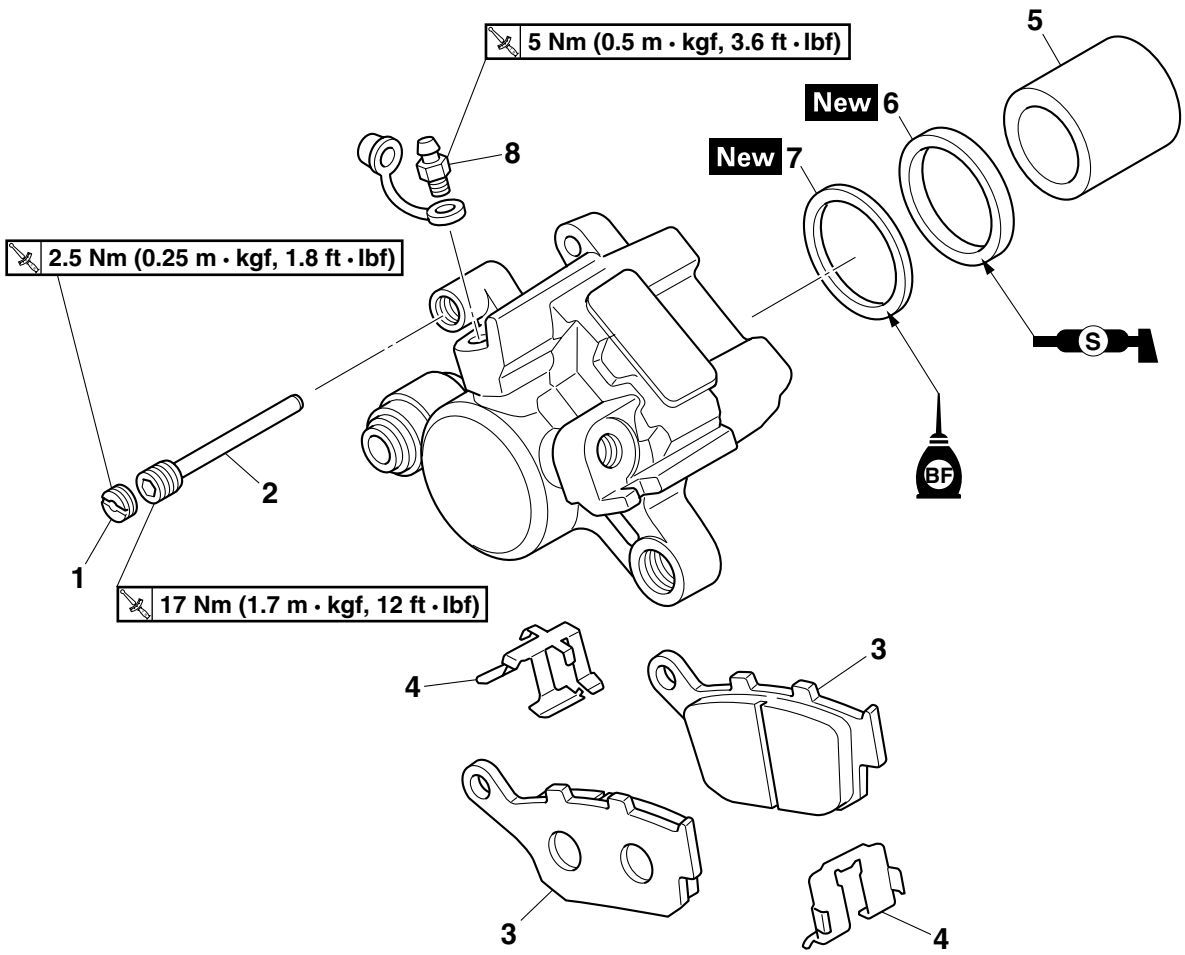
Order	Job/Parts to remove	Q'ty	Remarks
1	Brake master cylinder kit	1	
2	Brake master cylinder body	1	
3	Connector	1	
4	Bushing	1	
			For installation, reverse the removal procedure.

Removing the rear brake caliper



Order	Job/Parts to remove	Q'ty	Remarks
	Brake fluid		Drain. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-14.
1	Union bolt	1	
2	Copper washer	2	
3	Brake hose	1	
4	Rear brake caliper	1	
			For installation, reverse the removal procedure.

Disassembling the rear brake caliper



Order	Job/Parts to remove	Q'ty	Remarks
1	Screw plug	1	
2	Brake pad pin	1	
3	Brake pad	2	
4	Brake pad spring	2	
5	Brake caliper piston	1	
6	Brake caliper piston dust seal	1	
7	Brake caliper piston seal	1	
8	Bleed screw	1	
			For assembly, reverse the disassembly procedure.

EAS22560
INTRODUCTION
EWA14100
⚠ WARNING

Disc brake components rarely require disassembly. Therefore, always follow these preventive measures:
- **Never disassemble brake components unless absolutely necessary.**
- **If any connection on the hydraulic brake system is disconnected, the entire brake system must be disassembled, drained, cleaned, properly filled, and bled after reassembly.**
- **Never use solvents on internal brake components.**
- **Use only clean or new brake fluid for cleaning brake components.**
- **Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.**
- **Avoid brake fluid coming into contact with the eyes as it can cause serious injury.**
- **FIRST AID FOR BRAKE FLUID ENTERING THE EYES:**
- **Flush with water for 15 minutes and get immediate medical attention.**

EAS22570
CHECKING THE REAR BRAKE DISC
1. Check:
   - Brake disc
     Damage/galling → Replace.
2. Measure:
   - Brake disc deflection
     Out of specification → Correct the brake disc deflection or replace the brake disc.
     Refer to "CHECKING THE FRONT BRAKE DISCS" on page 4-30.

Brake disc deflection limit
0.15 mm (0.0059 in)

3. Measure:
   - Brake disc thickness
     Measure the brake disc thickness at a few different locations.
     Out of specification → Replace.
     Refer to "CHECKING THE FRONT BRAKE DISCS" on page 4-30.

Brake disc thickness limit
4.5 mm (0.18 in)

4. Adjust:
   - Brake disc deflection
     Refer to "CHECKING THE FRONT BRAKE DISCS" on page 4-30.

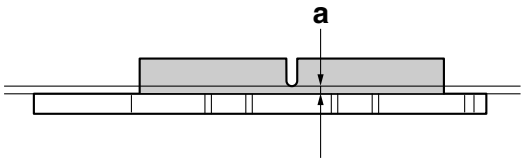
Brake disc bolt
20 Nm (2.0 m·kgf, 14 ft·lbf)
LOCTITE®

EAS22580
REPLACING THE REAR BRAKE PADS
TIP

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

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

Brake pad lining thickness (inner)
7.0 mm (0.28 in)
Limit
1.5 mm (0.06 in)
Brake pad lining thickness (outer)
7.0 mm (0.28 in)
Limit
1.5 mm (0.06 in)



2. Install:
   - Brake pad spring
   - Brake pads

TIP

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

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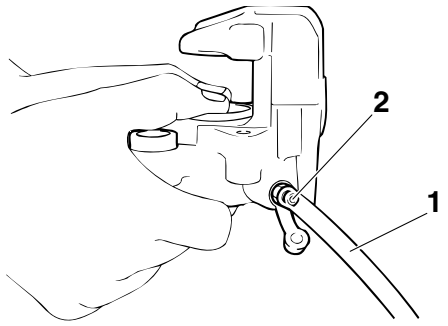
a. Connect a clear plastic hose "1" tightly to the bleed screw "2". Put the other end of the hose into an open container.



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

	Bleed screw **5 Nm (0.5 m·kgf, 3.6 ft·lbf)**

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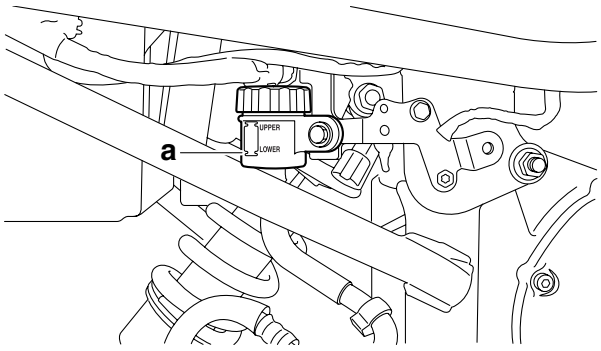
3. Install:
   - Brake caliper
   - Brake pad pin
   - Screw plug

	Brake caliper bolt (front side) **27 Nm (2.7 m·kgf, 20 ft·lbf)** **Brake caliper bolt (rear side)** **22 Nm (2.2 m·kgf, 16 ft·lbf)** **Brake pad pin** **17 Nm (1.7 m·kgf, 12 ft·lbf)** **Screw plug** **2.5 Nm (0.25 m·kgf, 1.8 ft·lbf)**

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" on page 3-11.



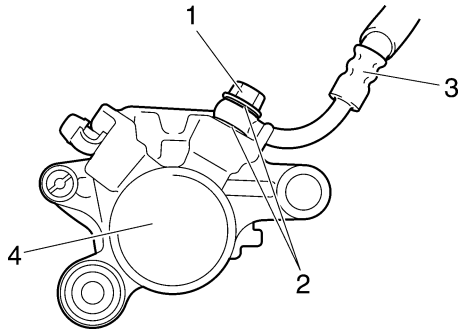
5. Check:
   - Brake pedal operation
     Soft or spongy feeling → Bleed the brake system.
     Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-14.

EAS22590
REMOVING THE REAR BRAKE CALIPER

TIP

Before disassembling the brake caliper, drain the brake fluid from the entire brake system.

1. Remove:
   - Union bolt "1"
   - Copper washers "2"
   - Brake hose "3"
   - Brake caliper "4"

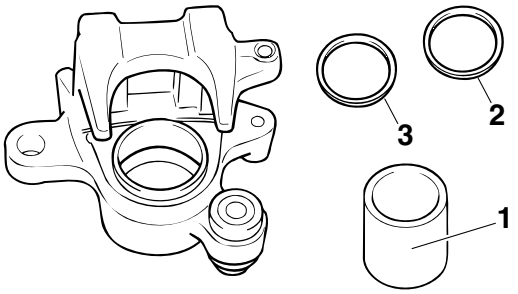


TIP

Put the end of the brake hose into a container and pump out the brake fluid carefully.

EAS22600
DISASSEMBLING THE REAR BRAKE CALIPER

1. Remove:
   - Brake caliper piston "1"
   - Brake caliper piston dust seal "2"
   - Brake caliper piston seal "3"



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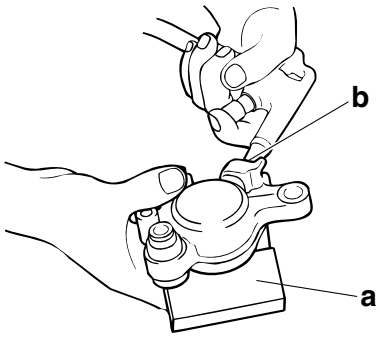
a. Secure the brake caliper piston with a piece of wood "a".
b. Blow compressed air into the brake hose joint opening "b" to force out the piston from the brake caliper.

EWA13550

WARNING

- **Cover the brake caliper piston with a rag.**

Be careful not to get injured when the piston is expelled from the brake caliper.
- **Never try to pry out the brake caliper piston.**



c. Remove the brake caliper piston dust seal and brake caliper piston seal.

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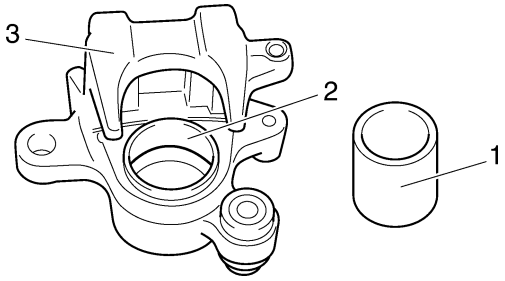
EAS22640
CHECKING THE REAR BRAKE CALIPER

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

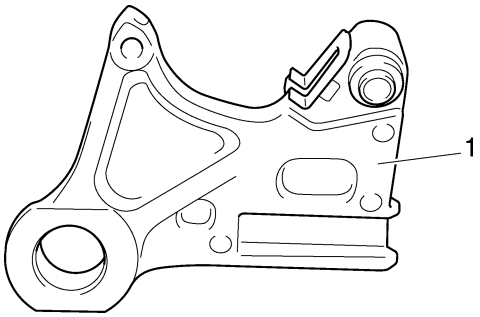
1. Check:
   - Brake caliper piston “1”
     Rust/scratches/wear → Replace the brake caliper pistons.
   - Brake caliper cylinder “2”
     Scratches/wear → Replace the brake caliper assembly.
   - Brake caliper body “3”
     Cracks/damage → Replace the brake caliper assembly.
   - Brake fluid delivery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



EWA13610
WARNING

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

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



EAS22650
ASSEMBLING THE REAR BRAKE CALIPER

EWA13620
WARNING

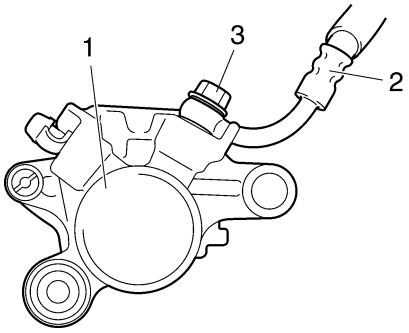
- **Before installation, all internal brake components should be cleaned and lubricated with clean or new brake fluid.**
- **Never use solvents on internal brake components as they will cause the piston seals to swell and distort.**
- **Whenever a brake caliper is disassembled, replace the brake caliper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

Recommended fluid
DOT 4

1. Install:
   - Brake caliper piston seal New
   - Brake caliper piston dust seal New
   - Brake caliper piston

EAS22670
INSTALLING THE REAR BRAKE CALIPER

1. Install:
   - Brake caliper “1”
     (temporarily)
   - Copper washers New
   - Brake hose “2”
   - Union bolt “3”



Brake hose union bolt
30 Nm (3.0 m·kgf, 22 ft·lbf)

EWA13530

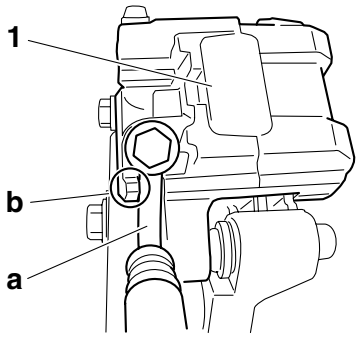
⚠ WARNING

Proper brake hose routing is essential to insure safe vehicle operation. Refer to "CABLE ROUTING" on page 2-43.

ECA14170

NOTICE

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



2. Remove:
   - Brake caliper
3. Install:
   - Brake pad spring
   - Brake pads
   - Brake pad pin
   - Screw plug
   - Brake caliper

Brake caliper bolt (front side)
27 Nm (2.7 m·kgf, 20 ft·lbf)
Brake caliper bolt (rear side)
22 Nm (2.2 m·kgf, 16 ft·lbf)
Brake pad pin
17 Nm (1.7 m·kgf, 12 ft·lbf)
Screw plug
2.5 Nm (0.25 m·kgf, 1.8 ft·lbf)

4. Check that the brake caliper slide smoothly on the side way.
   Difficult → Apply the silicone grease to the brake caliper bolt.
5. Fill:
   - Brake fluid reservoir
     (with the specified amount of the recommended brake fluid)

Recommended fluid
DOT 4

EWA13090

⚠ WARNING

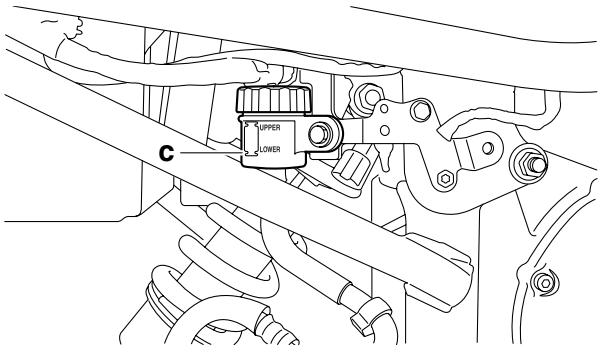
- **Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.**
- **Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor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

ECA13540

NOTICE

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

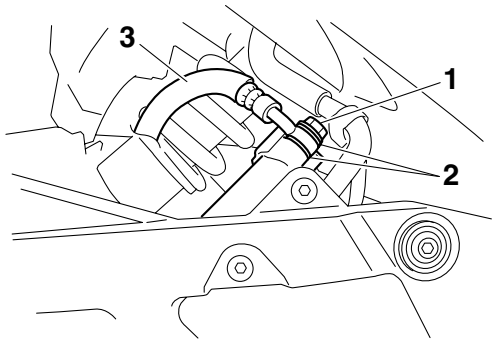
6. Bleed:
   - Brake system
     Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-14.
7. Check:
   - Brake fluid level
     Below the minimum level mark "c" → Add the recommended brake fluid to the proper level.
     Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-11.



8. Check:
   • Brake pedal operation
   Soft or spongy feeling → Bleed the brake system.
   Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-14.

EAS22700
REMOVING THE REAR BRAKE MASTER CYLINDER

1. Remove:
   • Union bolt "1"
   • Copper washers "2"
   • Brake hose "3"

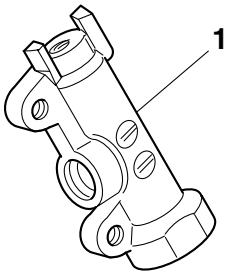


TIP
To collect any remaining brake fluid, place a container under the master cylinder and the end of the brake hose.

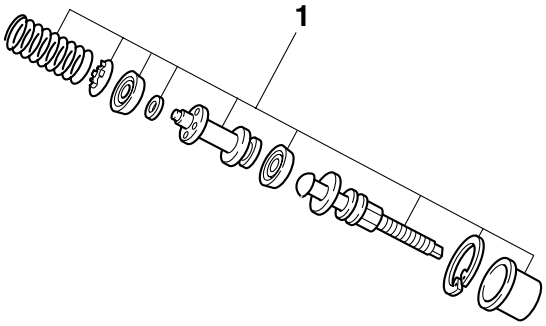
2. Disconnect:
   • Brake fluid reservoir hose
3. Remove:
   • Right footrest assembly
4. Remove:
   • Cotter pin (from the brake pedal link)
5. Remove:
   • Rear brake master cylinder
6. Remove:
   • Circlip (from the rear brake master cylinder)
   • Master cylinder kit

EAS22720
CHECKING THE REAR BRAKE MASTER CYLINDER

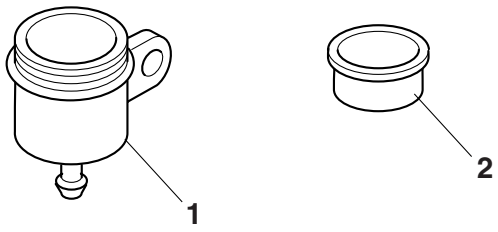
1. Check:
   • Brake master cylinder "1"
   Damage/scratches/wear → Replace.
   • Brake fluid delivery passages (brake master cylinder body)
   Obstruction → Blow out with compressed air.



2. Check:
   • Brake master cylinder kit "1"
   Damage/scratches/wear → Replace.



3. Check:
   • Brake fluid reservoir "1"
   Cracks/damage → Replace.
   • Brake fluid reservoir diaphragm "2"
   Cracks/damage → Replace.



4. Check:
   • Brake hoses
   Cracks/damage/wear → Replace.

EAS22730
ASSEMBLING THE REAR BRAKE MASTER CYLINDER

EWA13520
⚠ WARNING

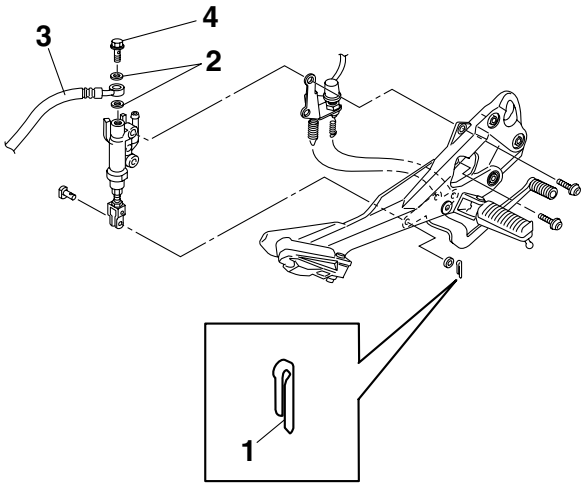
- **Before installation, all internal brake components should be cleaned and lubricated with clean or new brake fluid.**
- **Never use solvents on internal brake components.**

Recommended fluid
DOT 4

1. Install:
   - Master cylinder kit New
   - Circlip New

EAS22740
INSTALLING THE REAR BRAKE MASTER CYLINDER

1. Install:
   - Cotter pin "1" New
   - Copper washers "2" New
   - Brake hose "3"
   - Union bolt "4"



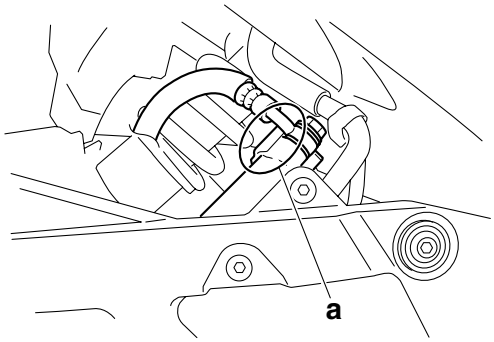
Brake hose union bolt
30 Nm (3.0 m·kgf, 22 ft·lbf)

EWA13530
WARNING

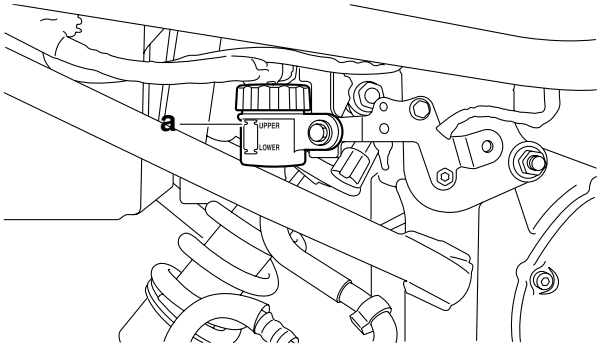
Proper brake hose routing is essential to insure safe vehicle operation. Refer to "CABLE ROUTING" on page 2-43.

ECA14160
NOTICE

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



2. Fill:
   - Brake fluid reservoir
     (to the maximum level mark "a")



Recommended fluid
DOT 4

EWA13090
WARNING

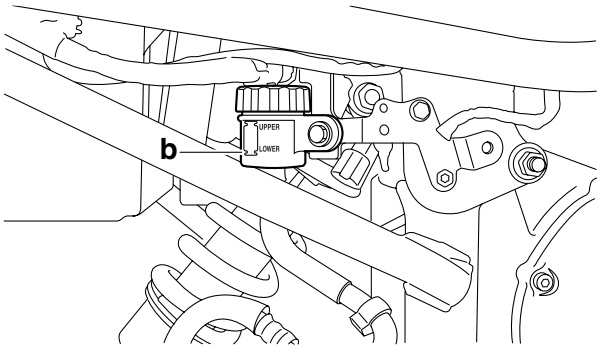
- **Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.**
- **Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor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

ECA13540
NOTICE

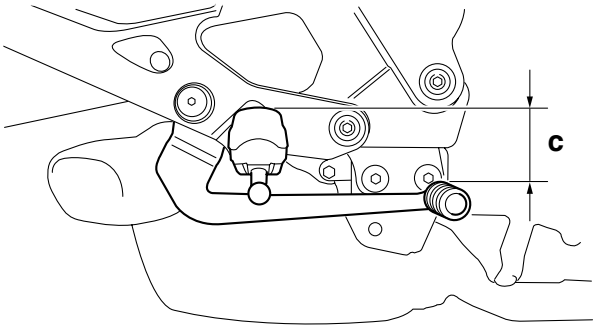
Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.

3. Bleed:
   - Brake system
     Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-14.
4. Check:
   - Brake fluid level

Below the minimum level mark “b” → Add the recommended brake fluid to the proper level. Refer to “CHECKING THE BRAKE FLUID LEVEL” on page 3-11.



5. Adjust:
   - Brake pedal position “c”
     Refer to “ADJUSTING THE REAR DISC BRAKE” on page 3-13.

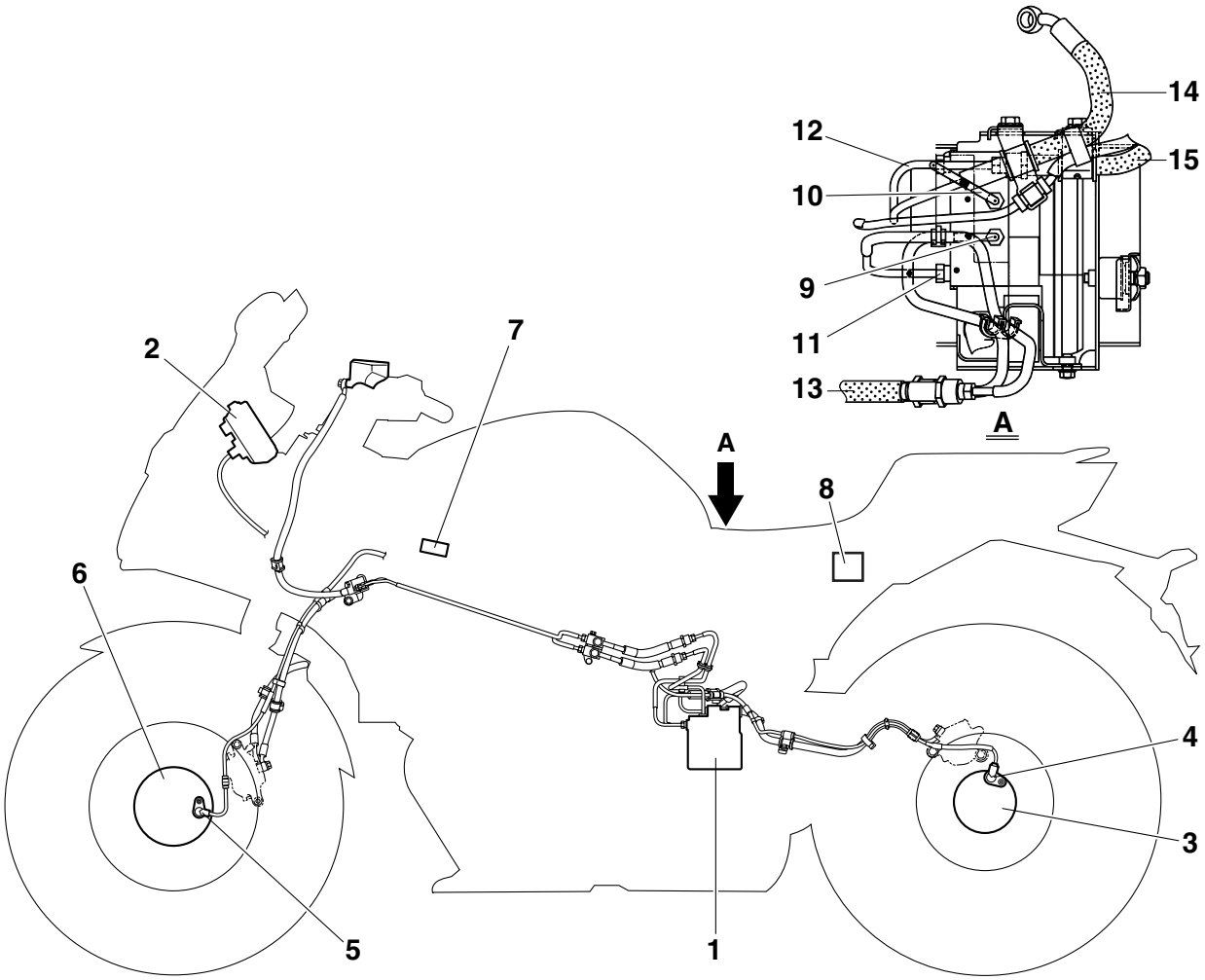


	Brake pedal position **46.5 mm (1.83 in)**

6. Adjust:
   - Rear brake light operation timing
     Refer to “ADJUSTING THE REAR BRAKE LIGHT SWITCH” on page 3-29.

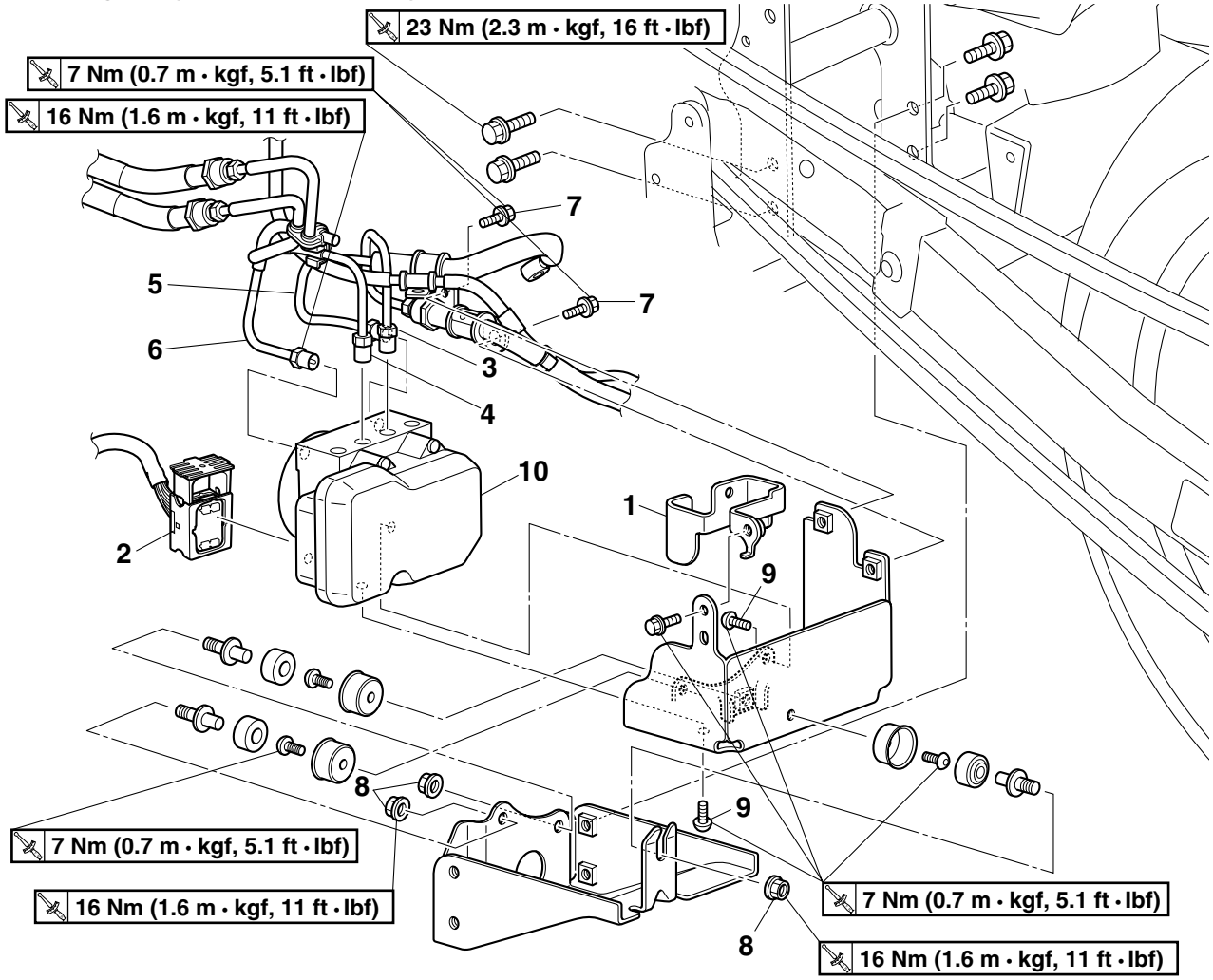
EAS22760
ABS (ANTI-LOCK BRAKE SYSTEM)

EAS4B56003
ABS COMPONENTS CHART



1. Hydraulic unit assembly
2. ABS warning light
3. Rear wheel sensor rotor
4. Rear wheel sensor
5. Front wheel sensor
6. Front wheel sensor rotor
7. ABS test coupler
8. Fuse box
9. Brake pipe/joint assembly (hydraulic unit to front brake calipers)
10. Brake pipe/joint assembly (hydraulic unit to rear brake caliper)
11. Brake pipe/joint assembly (front brake master cylinder to hydraulic unit)
12. Brake pipe/joint assembly (rear brake master cylinder to hydraulic unit)
13. Front brake hose (front brake master cylinder to hydraulic unit)
14. Rear brake hose (rear brake master cylinder to hydraulic unit)
15. Rear brake hose (hydraulic unit to rear brake caliper)

Removing the hydraulic unit assembly



Order	Job/Parts to remove	Q'ty	Remarks
	Brake fluid		Drain. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-14.
1	ABS ECU coupler bracket	1	
2	ABS ECU coupler	1	Disconnect.
3	Brake pipe/joint assembly (hydraulic unit to rear brake caliper)	1	
4	Brake pipe/joint assembly (hydraulic unit to front brake calipers)	1	
5	Brake pipe/joint assembly (rear brake master cylinder to hydraulic unit)	1	
6	Brake pipe/joint assembly (front brake master cylinder to hydraulic unit)	1	
7	Rear brake hose holder bolt	2	
8	Nut	3	
9	Screw	2	
10	Hydraulic unit assembly	1	
			For installation, reverse the removal procedure.

EAS4B56004
REMOVING THE HYDRAULIC UNIT ASSEMBLY

ECA4B56013
NOTICE

Unless necessary, avoid removing and installing the brake pipes of the hydraulic unit assembly.

EWA13930
⚠ WARNING

Refill with the same type of brake fluid that is already in the system. Mixing fluids may result in a harmful chemical reaction, leading to poor braking performance.

ECA4B56014
NOTICE

- **Handle the ABS components with care, since they have been accurately adjusted. Keep them away from dirt and do not subject them to shocks.**
- **Do not turn the main switch to "ON" when removing the hydraulic unit assembly.**
- **Do not clean with compressed air.**
- **Do not reuse the brake fluid.**
- **Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.**
- **Do not allow any brake fluid to contact the couplers. Brake fluid may damage the couplers and cause bad contacts.**
- **If the union bolts for the hydraulic unit assembly have been removed, be sure to tighten them to the specified torque and bleed the brake system.**

1. Remove:
   - Brake pipes
   - Brake hoses

TIP

Do not operate the brake lever and brake pedal while removing the brake hoses and brake pipes.

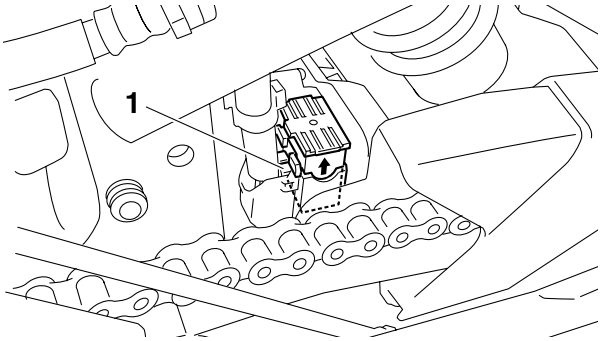
ECA4B56015
NOTICE

When removing the brake hoses and brake pipes, cover the area around the hydraulic unit assembly to catch any spilt brake fluid. Do not allow the brake fluid to contact other parts.

2. Disconnect:
   - ABS ECU coupler "1"

TIP

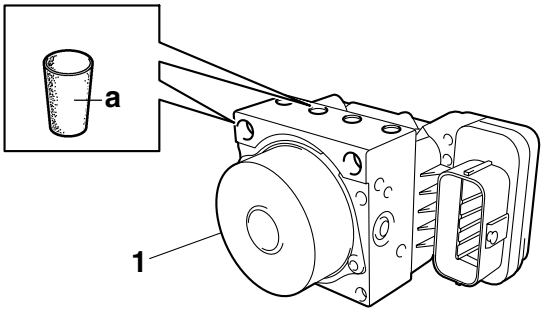
Pull up the coupler ejection slider to disconnect the ABS ECU coupler.



3. Remove:
   - Hydraulic unit assembly "1"

TIP

- To avoid brake fluid leakage and to prevent foreign materials from entering the hydraulic unit assembly, insert a rubber plug "a" or a bolt (M10 × 1.0) into each flare nut hole.
- When using a bolt, do not tighten the bolt until the bolt head touches the hydraulic unit. Otherwise, the brake pipe seating surface could be deformed.



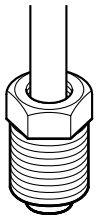
EAS4B56005
CHECKING THE HYDRAULIC UNIT ASSEMBLY

1. Check:
   - Hydraulic unit assembly
     Cracks/damage → Replace the hydraulic unit assembly and the brake pipes that are connected to the assembly as a set.

EAS4B56006
CHECKING THE BRAKE PIPES

The following procedure applies to all of the brake pipes.

1. Check:
   - Brake pipe end (flare nut)
     Damage → Replace the hydraulic unit, brake pipes, and related parts as a set.



EAS4B56007

INSTALLING THE HYDRAULIC UNIT ASSEMBLY

1. Install:
   - Hydraulic unit assembly

ECA4B56016

NOTICE

Do not remove the rubber plugs or bolts (M10 × 1.0) installed in the flare nut holes before installing the hydraulic unit assembly.

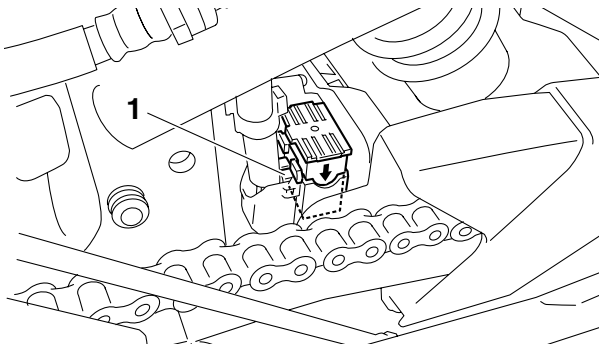
TIP

Do not allow any foreign materials to enter the hydraulic unit assembly or the brake hoses or brake pipes when installing the hydraulic unit assembly.

2. Remove:
   - Rubber plugs or bolts (M10 × 1.0)
3. Connect:
   - ABS ECU coupler “1”

TIP

Push down the coupler ejection slider until a click is heard, making sure that is installed securely.



4. Install:
   - Brake pipe/joint assemblies “1”
   - Brake pipe/joint assembly flare nuts “2”
   - Brake pipe/joint assembly bolts “3”

Brake pipe/joint assembly flare nut
16 Nm (1.6 m·kgf, 11 ft·lbf)
Brake pipe/joint assembly bolt
7 Nm (0.7 m·kgf, 5.1 ft·lbf)

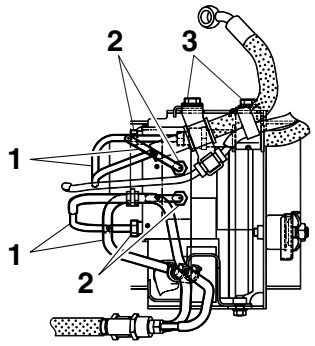
ECA4B56017

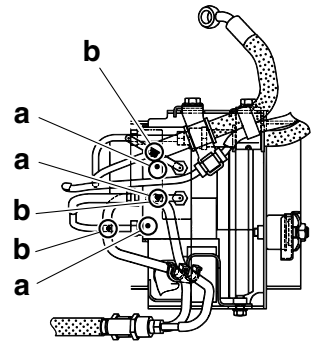
NOTICE

If the brake pipe flare nut does not turn easily, replace the hydraulic unit, brake pipes, and related parts as a set.

TIP

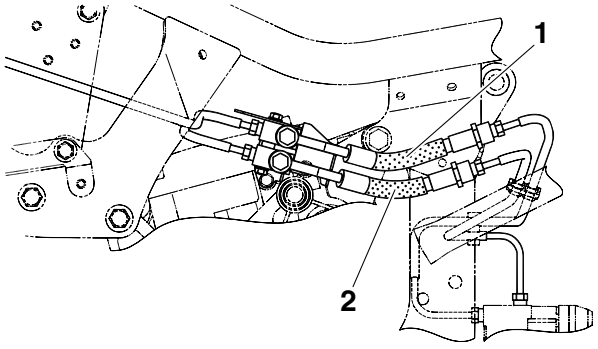
- Each brake pipe/joint assembly is color-coded to its corresponding flare nut hole; therefore, be sure to match the paint colors “a” and “b”.
- Tighten the brake pipe/joint assembly flare nut and bolt on each brake pipe/joint assembly before installing the next assembly. First tighten the brake pipe/joint assembly flare nut, then the brake pipe/joint assembly bolt.





5. Install:
   - Front brake hose (front brake master cylinder to hydraulic unit) “1”
   - Front brake hose (hydraulic unit to front brake calipers) “2”
   - Brake hose gaskets New
   - Brake hose union bolts

Brake hose union bolt
30 Nm (3.0 m·kgf, 22 ft·lbf)



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

	Recommended fluid **DOT 4**

EWA13090

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.**

ECA13540

NOTICE

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

7. Bleed:
   - Brake system
     Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-14.
8. Check the operation of the hydraulic unit according to the brake lever and the brake pedal response. (Refer to "HYDRAULIC UNIT OPERATION TESTS" on page 4-53.)

ECA14770

NOTICE

Always check the operation of the hydraulic unit according to the brake lever and the brake pedal response.

9. Delete the fault codes. (Refer to "[D-1] DELETING THE FAULT CODES" on page 8-142.)
10. Perform a trial run. (Refer to "TRIAL RUN" on page 4-56.)

EAS22800

HYDRAULIC UNIT OPERATION TESTS

The reaction-force pulsating action generated in the brake lever and brake pedal when the ABS is activated can be tested when the vehicle is stopped.
The hydraulic unit operation can be tested using the following two methods.

- Hydraulic unit operation test 1: this test checks the function of the ABS after the system was disassembled, adjusted, or serviced.
- Hydraulic unit operation test 2: this test generates the same reaction-force pulsating action that is generated in the brake lever and brake pedal when the ABS is activated.

Hydraulic unit operation test 1

EWA13120

WARNING

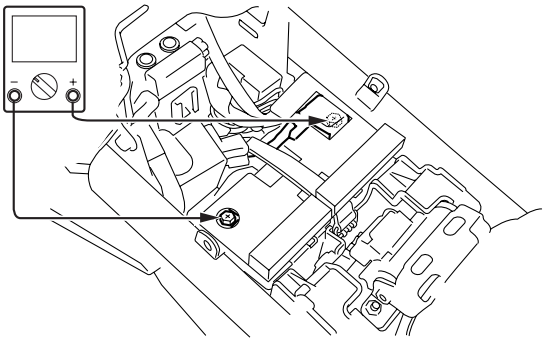
Securely support the vehicle so that there is no danger of it falling over.

1. Place the vehicle on the centerstand.
2. Turn the main switch to "OFF".
3. Remove:
   - Seat
     Refer to "GENERAL CHASSIS" on page 4-1.
4. Check:
   - Battery voltage
     Lower than 12.8 V → Charge or replace the battery.

	Battery voltage **Higher than 12.8 V**

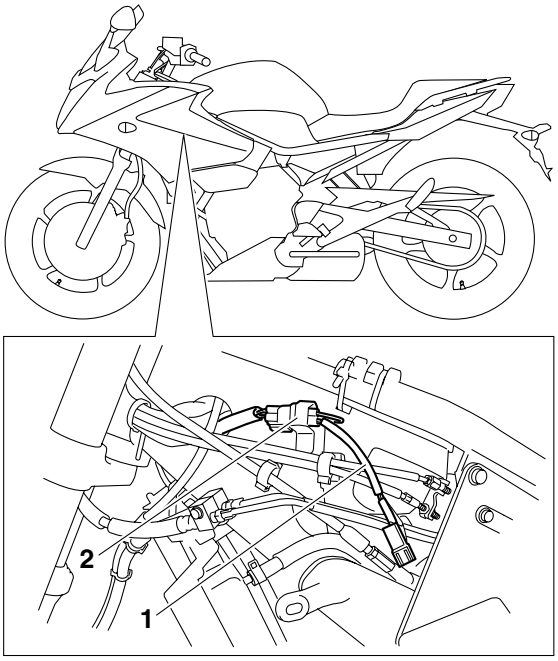
TIP

- If the battery voltage is lower than 12.8 V, charge the battery, and then perform hydraulic unit operation test 1.
- If the battery voltage is lower than 10 V, the ABS warning light comes on and the ABS does not operate.



5. Connect the test coupler adapter “1” to the ABS test coupler “2”.

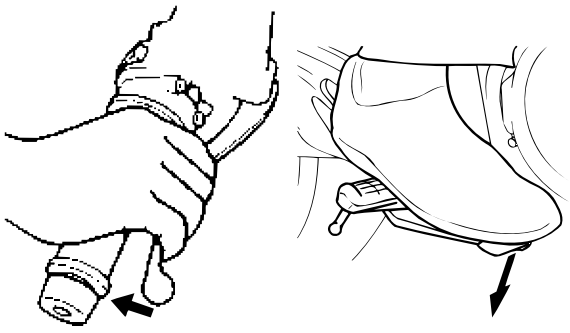
	Test coupler adapter **90890-03149**



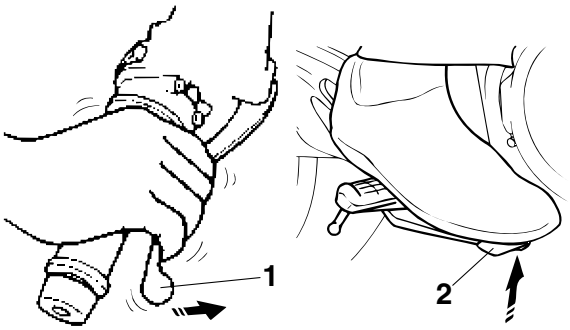
6. Turn the main switch to “ON” while operating the brake lever and then brake pedal simultaneously.

TIP

Do not push the start switch when turning the main switch to “ON”, otherwise the operation test will not begin.



7. Check:
   - Hydraulic unit operation
     When the main switch is turned to “ON”, a single pulse will be generated in the front brake lever “1”, rear brake pedal “2”, and again in the front brake lever, in this order.



ECA4B56019

NOTICE

- **Check that the pulse is felt in the front brake lever, rear brake pedal, and again in the front brake lever, in this order.**
- **If the pulse is felt in the rear brake pedal before it is felt in the front brake lever, check that the brake hoses and brake pipes are connected correctly to the hydraulic unit assembly.**
- **If the pulse is hardly felt in either the brake lever or brake pedal, check that the brake hoses and brake pipes are connected correctly to the hydraulic unit assembly.**

   - If the operation of the hydraulic unit is normal, delete all of the fault codes.

Hydraulic unit operation test 2

EWA13120

⚠ WARNING

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

1. Place the vehicle on the centerstand.
2. Turn the main switch to “OFF”.
3. Remove:
   - Seat

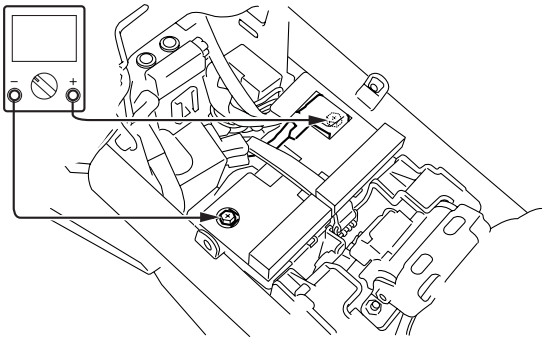
Refer to “GENERAL CHASSIS” on page 4-1.

4. Check:
   - Battery voltage
     Lower than 12.8 V → Charge or replace the battery.

	Battery voltage **Higher than 12.8 V**

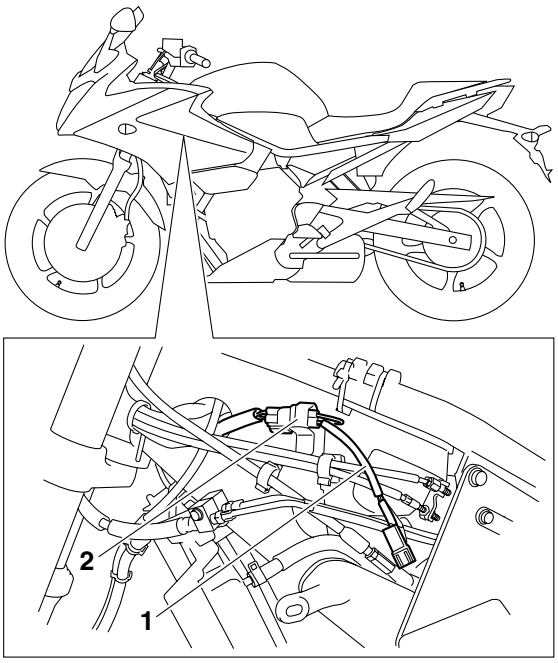
TIP

- If the battery voltage is lower than 12.8 V, charge the battery, and then perform hydraulic unit operation test 2.
- If the battery voltage is lower than 10 V, the ABS warning light comes on and the ABS does not operate.



5. Connect the test coupler adapter “1” to the ABS test coupler “2”.

	Test coupler adapter **90890-03149**

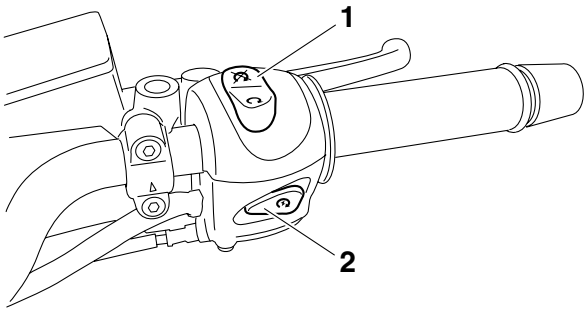


6. Set the engine stop switch “1” to “⊗”.
7. Turn the main switch to “ON”.
8. Push the start switch “2” for at least 4 seconds.

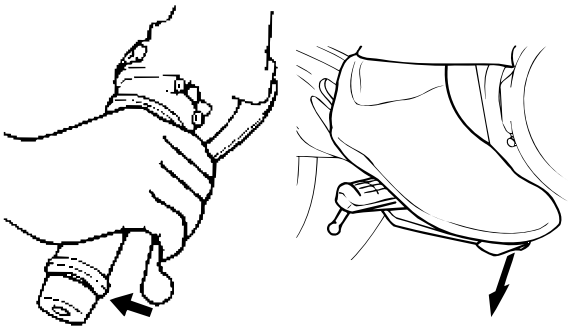
ECA14790

NOTICE

Do not operate the brake lever or the brake pedal.



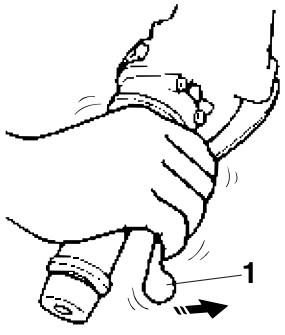
9. After releasing the start switch, operate the front brake lever and the rear brake pedal simultaneously.



10. A reaction-force pulsating action is generated in the front brake lever “1” 0.5 second after the brake lever and brake pedal are operated simultaneously and continues for approximately 1.5 seconds.

TIP

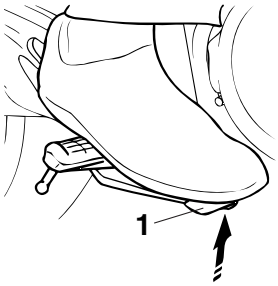
- The reaction-force pulsating action consists of quick pulses.
- Be sure to continue operating the brake lever and brake pedal even after the pulsating action has stopped.



11. After the pulsating action has stopped in the front brake pedal, it is generated in the rear brake pedal “1” 0.5 second later and continues for approximately 2 seconds.

TIP

- The reaction-force pulsating action consists of quick pulses.
- Be sure to continue operating the brake lever and brake pedal even after the pulsating action has stopped.



12. After the pulsating action has stopped in the rear brake pedal, it is generated in the front brake lever 0.5 second later and continues for approximately 1.5 seconds.

TIP

The reaction-force pulsating action consists of quick pulses.

ECA4B56021

NOTICE

- **Check that the pulse is felt in the front brake lever, rear brake pedal, and again in the front brake lever, in this order.**
- **If the pulse is felt in the rear brake pedal before it is felt in the front brake lever, check that the brake hoses and brake pipes are connected correctly to the hydraulic unit assembly.**
- **If the pulse is hardly felt in either the brake lever or brake pedal, check that the brake hoses and brake pipes are connected correctly to the hydraulic unit assembly.**

13. Turn the main switch to “OFF”.
14. Remove the test coupler adapter from the ABS test coupler.
15. Turn the main switch to “ON”.
16. Set the engine stop switch to “ ”.
17. Check for brake fluid leakage around the hydraulic unit.
    Brake fluid leakage → Replace the hydraulic unit, brake pipes, and related parts as a set.

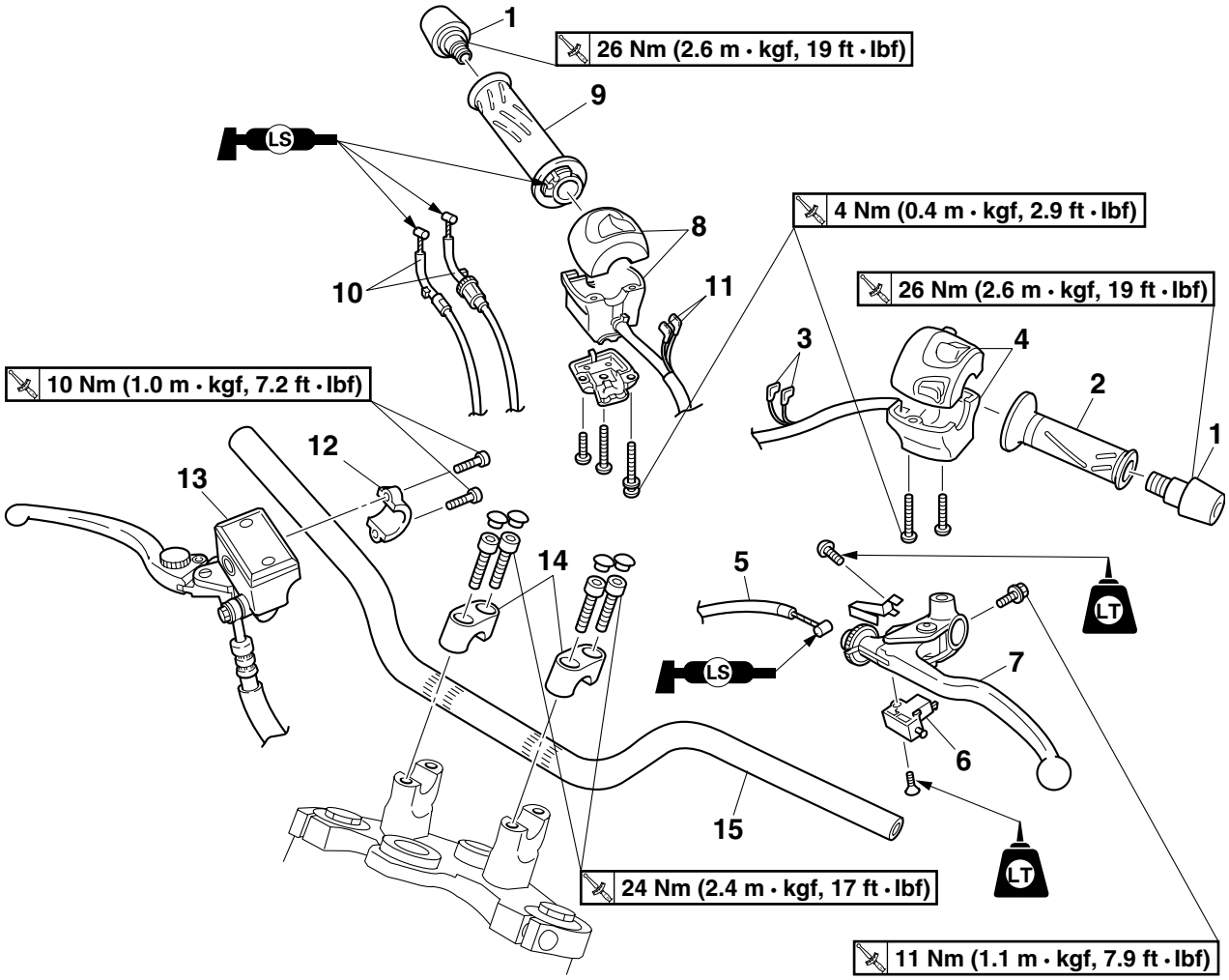
EAS22820

TRIAL RUN

After all checks and servicing are completed, always ensure the vehicle has no problems by performing a trial run at a speed of faster than 30 km/h.

EAS22840
HANDLEBAR

Removing the handlebar



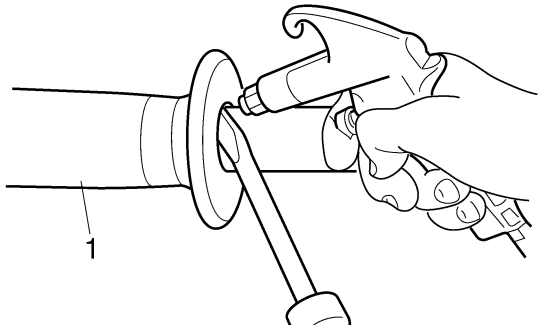
Order	Job/Parts to remove	Q'ty	Remarks
1	Grip end	2	
2	Handlebar grip	1	
3	Clutch switch connector	2	Disconnect.
4	Left handlebar switch	1	
5	Clutch cable	1	
6	Clutch switch	1	
7	Clutch lever	1	
8	Right handlebar switch	1	
9	Throttle grip	1	
10	Throttle cable	2	
11	Front brake light switch connector	2	Disconnect.
12	Front brake master cylinder holder	1	
13	Front brake master cylinder	1	
14	Upper handlebar holder	2	
15	Handlebar	1	
			For installation, reverse the removal procedure.

EAS22860
REMOVING THE HANDLEBARS
1. Stand the vehicle on a level surface.

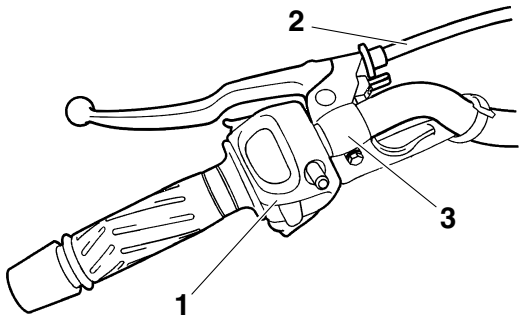
EWA13120
WARNING
Securely support the vehicle so that there is no danger of it falling over.

2. Remove:
   - Handlebar grip “1”

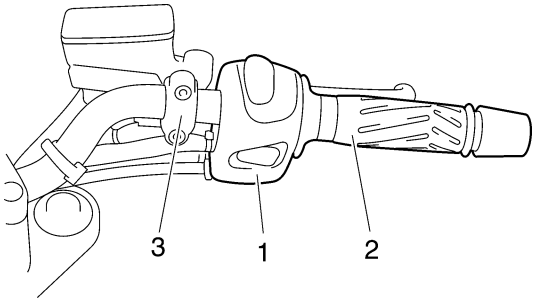
TIP
Blow compressed air between the left handlebar and the handlebar grip, and gradually push the grip off the handlebar.



3. Disconnect:
   - Clutch switch connector
4. Remove:
   - Left handlebar switch “1”
   - Clutch cable “2”
   - Clutch lever holder “3”

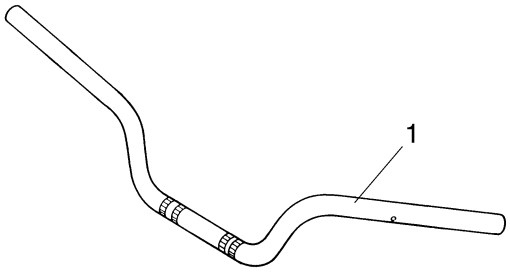


5. Remove:
   - Right handlebar switch “1”
   - Throttle grip “2”
   - Throttle cable
6. Disconnect:
   - Front brake light switch connector
7. Remove:
   - Front brake master cylinder holder “3”
   - Front brake master cylinder
   - Upper handlebar holder
   - Handlebar



EAS22880
CHECKING THE HANDLEBAR
1. Check:
   - Handlebar “1”
     Bends/cracks/damage → Replace.

EWA13690
WARNING
Do not attempt to straighten a bent handlebar as this may dangerously weaken it.



EAS22930
INSTALLING THE HANDLEBAR
1. Stand the vehicle on a level surface.

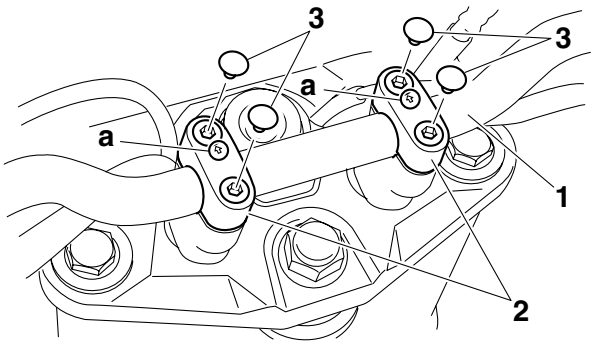
EWA13120
WARNING
Securely support the vehicle so that there is no danger of it falling over.

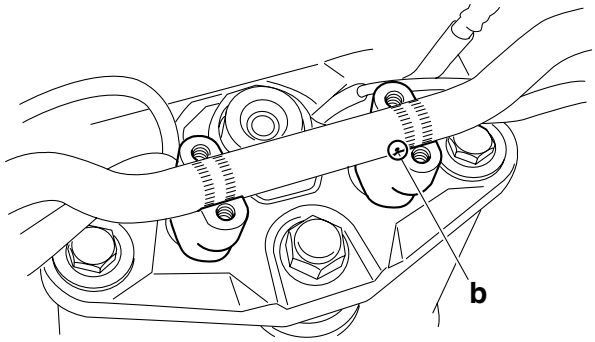
2. Install:
   - Lower handlebar holders

TIP
Temporarily tighten the lower handle bar holder nuts

3. Install:
   - Handlebar “1”
   - Upper handlebar holders “2”
   - Upper handlebar holder caps “3”

	Upper handlebar holder bolt 24 Nm (2.4 m·kgf, 17 ft·lbf)





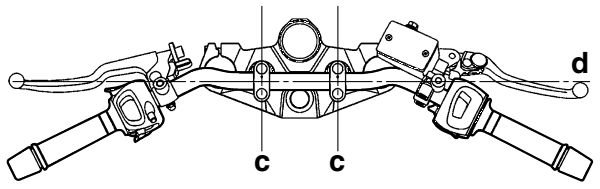
ECA14250

NOTICE

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

TIP

- The upper handlebar holders should be installed with the allow marks "a" facing forward.
- Align the match marks "b" on the handlebar with the upper surface of the lower handlebar holder.



TIP

- Make sure the lower handlebar holders are placed in the parallel position to the vehicle "c" when installing the handle bar.
- Once the handlebar is installed, check the position to make sure it is in the straight line "d".

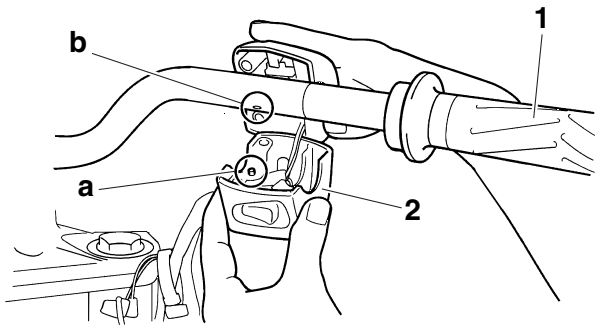
4. Tighten:
   - Lower handlebar holder nuts

	Lower handlebar holder nut 32 Nm (3.2 m·kgf, 23 ft·lbf)

5. Install:
   - Throttle grip "1"
   - Throttle cables
   - Right handlebar switch "2"

TIP

Align the projections "a" on the handlebar switch with the holes "b" in the handlebar.

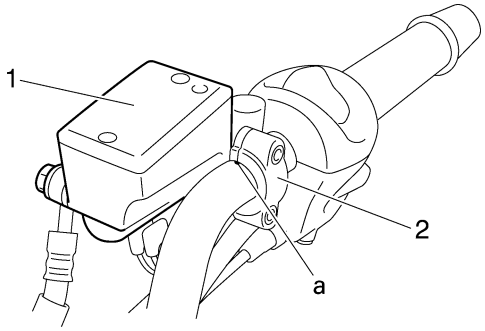


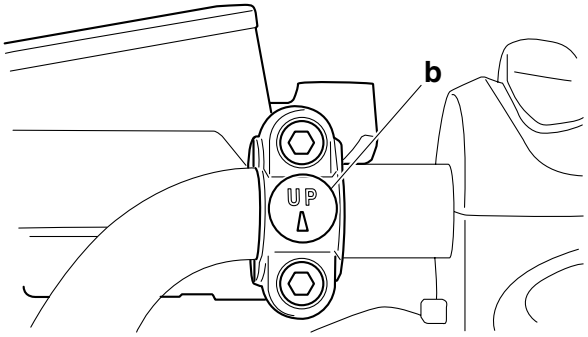
6. Install:
   - Front brake master cylinder "1"
   - Front brake master cylinder holder "2"
     Refer to "INSTALLING THE FRONT BRAKE MASTER CYLINDER" on page 4-35.

	Front brake master cylinder holder bolt 10 Nm (1.0 m·kgf, 7.2 ft·lbf)

TIP

- Align the mating surfaces of the brake master cylinder bracket with the punch mark (right handlebar switch side) "a" on the handlebar.
- Install the brake master cylinder holder with the "UP" mark "b" facing up.



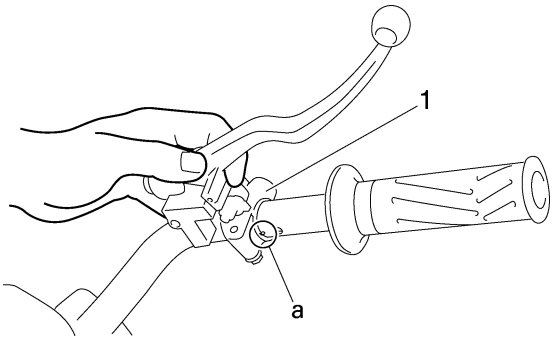


7. Install:
   - Clutch lever holder “1”
   - Clutch cable

	Clutch lever holder bolt **11 Nm (1.1 m·kgf, 7.9 ft·lbf)**

TIP

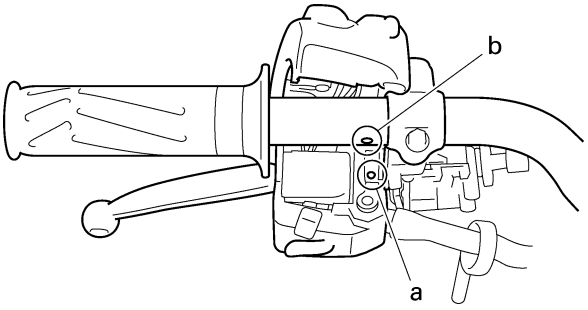
Align the slit on the clutch lever holder with the punch mark “a” on the handlebar.



8. Install:
   - Left handlebar switch

TIP

Align the projection “a” on the left handlebar switch with the hole “b” on the handlebar.



9. Install:
   - Handlebar grip
   - Grip end

	Grip end **26 Nm (2.6 m·kgf, 19 ft·lbf)**

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a. Apply a thin coat of rubber adhesive onto the left end of the handlebar.
b. Slide the handlebar grip over the left end of the handlebar.
c. Wipe off any excess rubber adhesive with a clean rag.

EWA13700

⚠ WARNING

Do not touch the handlebar grip until the rubber adhesive has fully dried.

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10. Adjust:
    - Throttle cable free play
      Refer to “ADJUSTING THE THROTTLE CABLE FREE PLAY” on page 3-30.

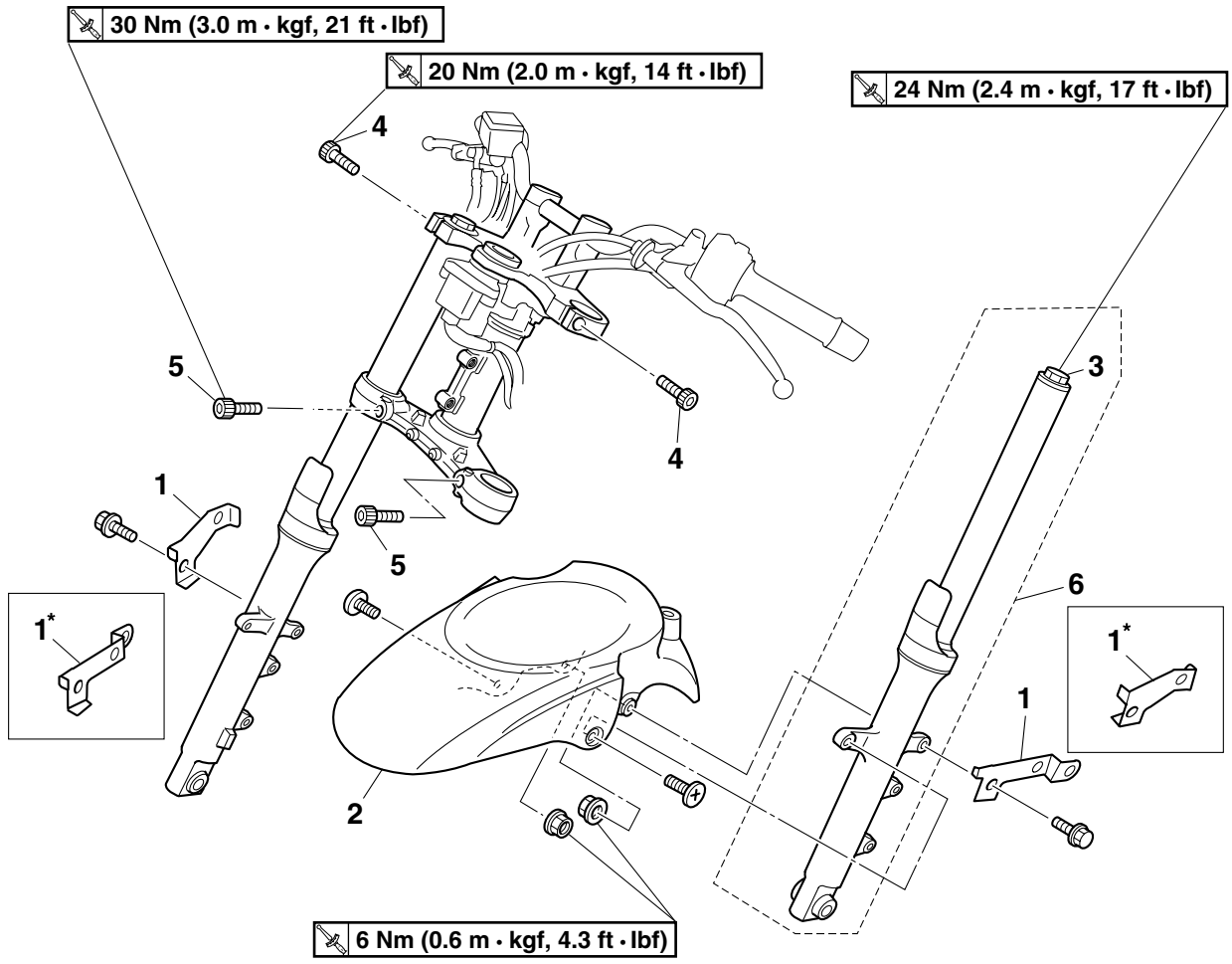
	Throttle cable free play **3.0–5.0 mm (0.12–0.20 in)**

11. Adjust:
    - Clutch cable free play
      Refer to “ADJUSTING THE CLUTCH CABLE FREE PLAY” on page 3-11.

EAS22950

FRONT FORK

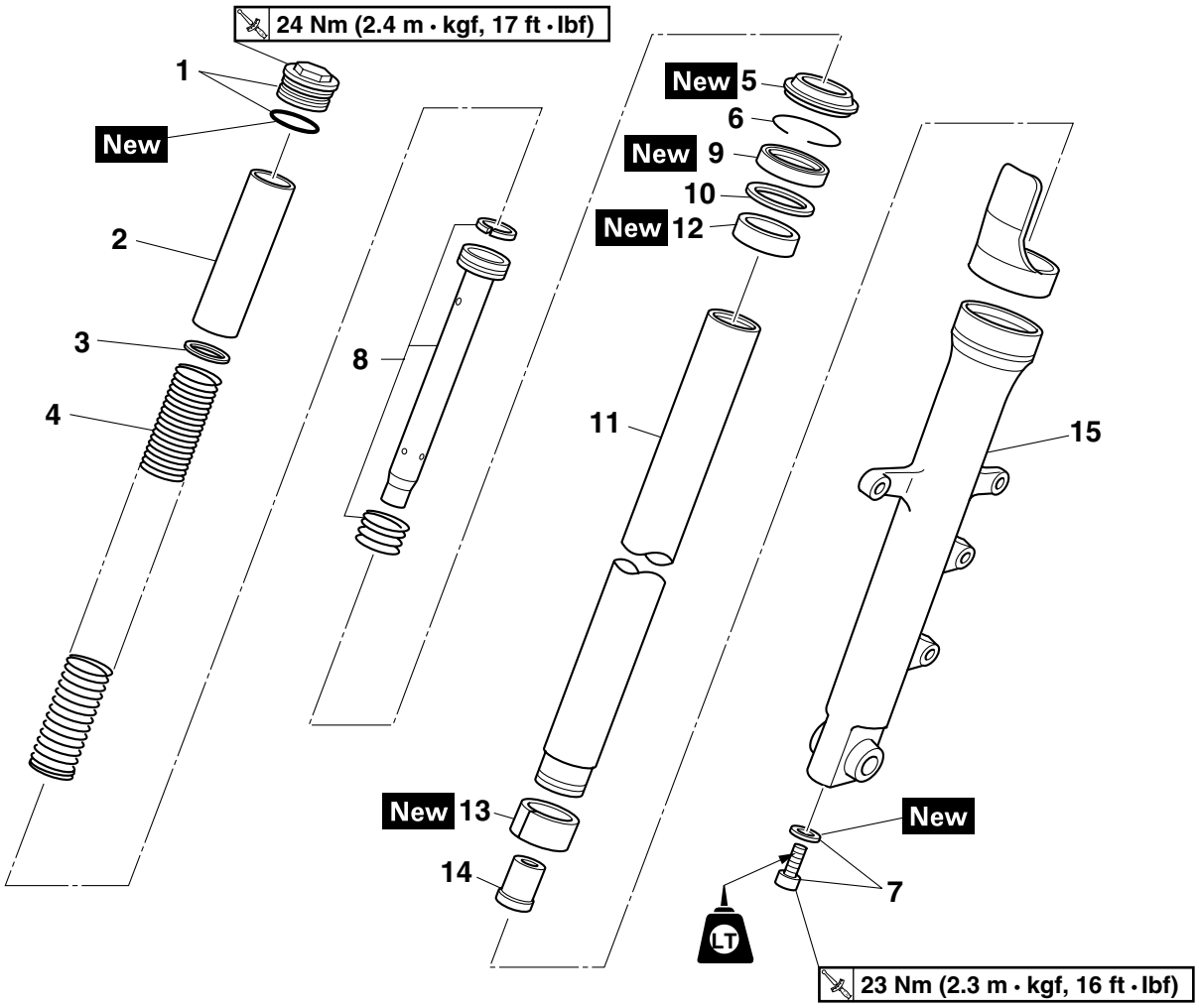
Removing the front fork legs



Order	Job/Parts to remove	Q'ty	Remarks
	Front wheel		Refer to "FRONT WHEEL" on page 4-5.
	Front brake calipers		Refer to "FRONT BRAKE" on page 4-23.
1	Brake hose holder	2	
2	Front fender	1	
3	Cap bolt	1	Loosen.
4	Upper bracket pinch bolt	1	Loosen.
5	Under bracket pinch bolt	1	Loosen.
6	Front fork leg	1	
			For installation, reverse the removal procedure.

*XJ6SA

Disassembling the front fork legs



Order	Job/Parts to remove	Q'ty	Remarks
1	Cap bolt/O-ring	1/1	
2	Spacer	1	
3	Spring seat	1	
4	Front fork spring	1	
5	Dust seal	1	
6	Oil seal clip	1	
7	Damper rod assembly bolt/Copper washer	1/1	
8	Damper rod assembly	1	
9	Oil seal	1	
10	Washer	1	
11	Inner tube	1	
12	Outer tube bushing	1	
13	Inner tube bushing	1	
14	Oil flow stopper	1	
15	Outer tube	1	
			For assembly, reverse the disassembly procedure.

EAS22970
REMOVING THE FRONT FORK LEGS
The following procedure applies to both of the front fork legs.
1. Stand the vehicle on a level surface.

EWA13120
⚠ WARNING

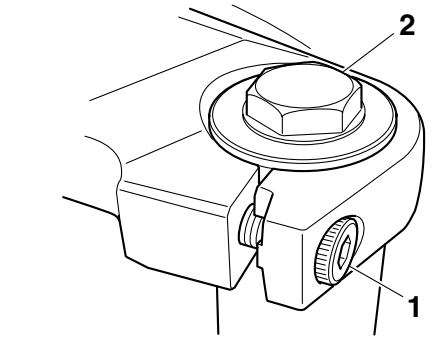
Securely support the vehicle so that there is no danger of it falling over.

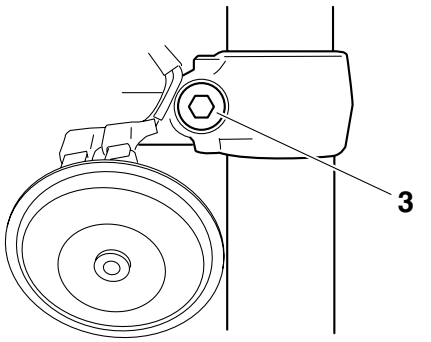
TIP
Place the vehicle on a suitable stand so that the front wheel is elevated.

2. Loosen:
   - Upper bracket pinch bolts “1”
   - Cap bolt “2”
   - Lower bracket pinch bolts “3”

EWA13640
⚠ WARNING

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





3. Remove:
   - Front fork leg

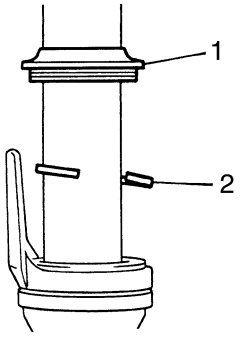
EAS22990
DISASSEMBLING THE FRONT FORK LEGS
The following procedure applies to both of the front fork legs.
1. Remove:
   - Cap bolt
   - Spacer
   - Spring seat
   - Fork spring
2. Drain:
   - Fork oil

TIP
Stroke the inner tube several times while draining the fork oil.

3. Remove:
   - Dust seal “1”
   - Oil seal clip “2” (with a flat-head screwdriver)

ECA14180
NOTICE

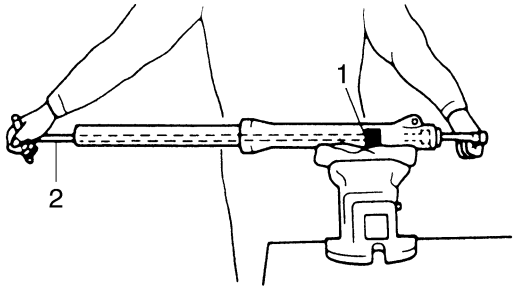
Do not scratch the inner tube.



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

TIP
While holding the damper rod with the damper rod holder “1” and T-handle “2”, loosen the damper rod assembly bolt.

Damper rod holder
90890-01460
T-handle
90890-01326
T-handle 3/8" drive 60 cm long
YM-01326



5. Remove:
   - Inner tube

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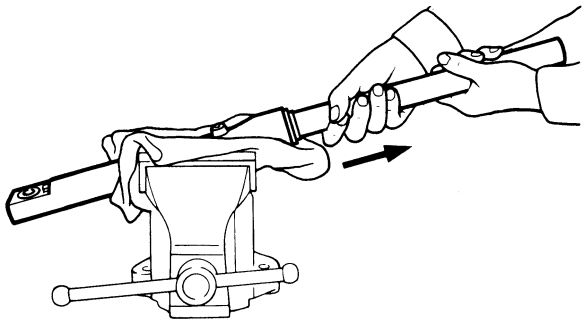
a. Hold the front fork leg horizontally.
b. Securely clamp the brake caliper bracket in a

vise with soft jaws.
c. Separate the inner tube from the outer tube by pulling the inner tube forcefully but carefully.

ECA14190

NOTICE

- **Excessive force will damage the oil seal and bushing. A damaged oil seal or bushing must be replaced.**
- **Avoid bottoming the inner tube into the outer tube during the above procedure, as the oil flow stopper will be damaged.**



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EAS23010

CHECKING THE FRONT FORK LEGS

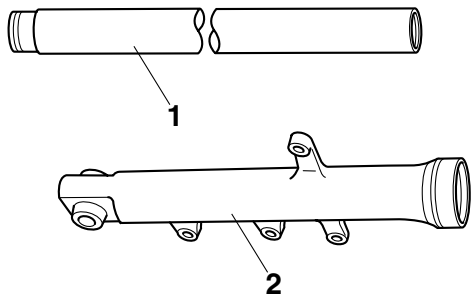
The following procedure applies to both of the front fork legs.

1. Check:
   - Inner tube “1”
   - Outer tube “2”
   Bends/damage/scratches → Replace.

EWA13650

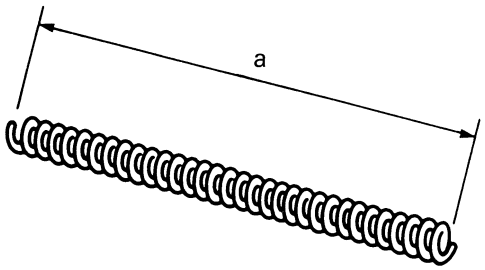
⚠ WARNING

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



2. Measure:
   - Spring free length “a”
   Out of specification → Replace.

Fork spring free length
365.1 mm (14.37 in)
Limit
357.8 mm (14.09 in)

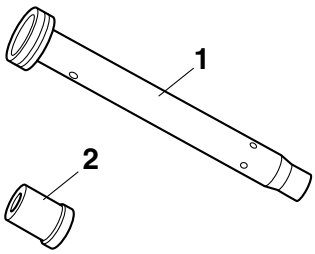


3. Check:
   - Damper rod “1”
   Damage/wear → Replace.
   Obstruction → Blow out all of the oil passages with compressed air.
   - Oil flow stopper “2”
   Damage → Replace.

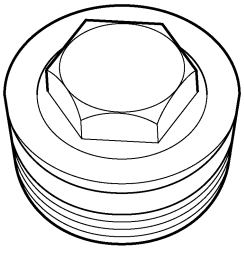
ECA14200

NOTICE

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



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



I2310302

EAS23020
ASSEMBLING THE FRONT FORK LEGS

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

EWA13660
⚠ 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.**

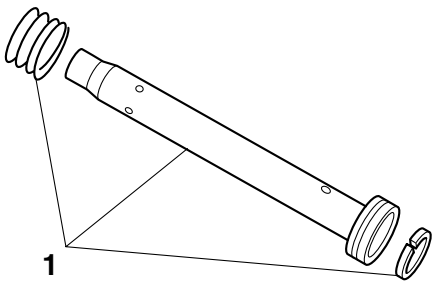
TIP

- When assembling the front fork leg, be sure to replace the following parts:
  –Inner tube bushing
  –Oil seal
  –Dust seal
- Before assembling the front fork leg, make sure all of the components are clean.

1. Install:
   - Inner tube bushing **New**
   - Oil flow stopper
   - Damper rod assembly “1”
   - Copper washer **New**

ECA14210
NOTICE

Allow the damper rod assembly to slide slowly down the inner tube 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

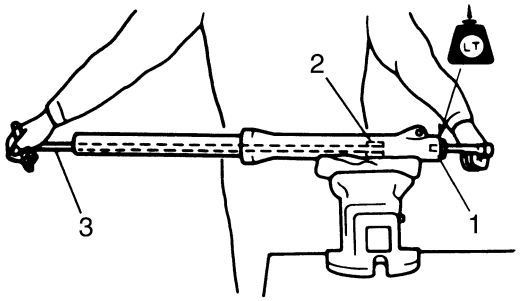
3. Tighten:
   - Damper rod assembly bolt “1”

Damper rod assembly bolt
23 Nm (2.3 m·kgf, 17 ft·lbf)
LOCTITE®

TIP

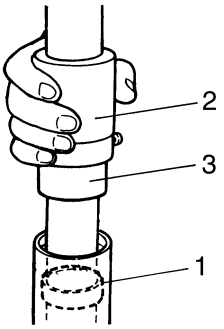
While holding the damper rod assembly with the damper rod holder “2” and T-handle “3”, tighten the damper rod assembly bolt.

Damper rod holder
90890-01460
T-handle
90890-01326
T-handle 3/8" drive 60 cm long
YM-01326



4. Install:
   - Outer tube bushing “1” **New**
   (with the fork seal driver “2” and fork seal attachment “3”)

Fork seal driver weight
90890-01367
Replacement hammer
YM-A9409-7
Fork seal driver attachment (ø41)
90890-01381
Replacement 41 mm
YM-A5142-2

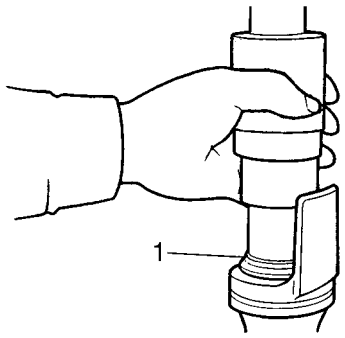


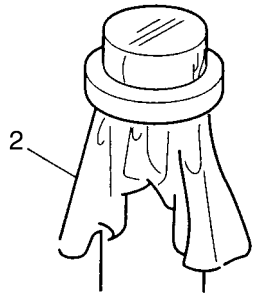
5. Install:
   - Washer
   - Oil seal “1”
   (with the fork seal driver and fork seal attachment)

ECA14220
NOTICE

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

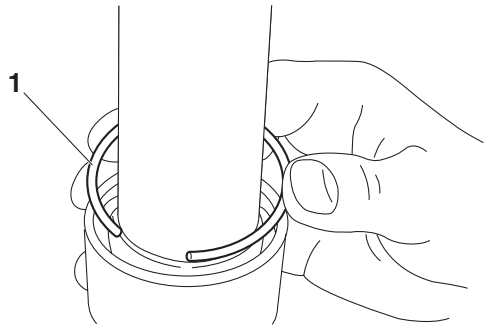
TIP
- Before installing the oil seal, lubricate its lips with lithium soap base grease.
- Lubricate the outer surface of the inner tube with fork oil.
- Before installing the oil seal, cover the top of the front fork leg with a plastic bag "2" to protect the oil seal during installation.





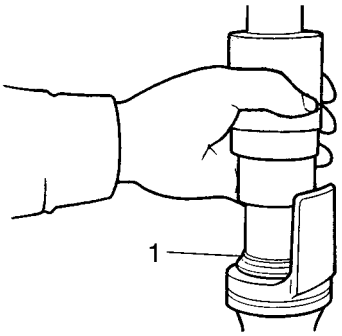
6. Install:
   - Oil seal clip "1"

TIP
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)

	Fork seal driver weight **90890-01367** **Replacement hammer** **YM-A9409-7**



8. Fill:
   - Front fork leg
     (with the specified amount of the recommended fork oil)

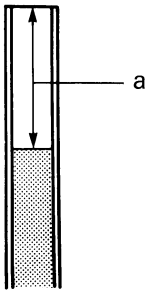
	Quantity **473.0 cm^3 (15.99 US oz, 16.68 Imp.oz)** **Recommended oil** **Suspension oil 01 or equivalent**

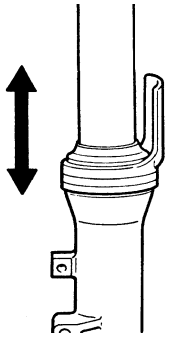
ECA4S81015
NOTICE
- **Be sure to use the recommended fork oil. Other oils may have an adverse effect on front fork performance.**
- **When disassembling and assembling the front fork leg, do not allow any foreign material to enter the front fork.**

9. Measure:
   - Front fork leg oil level "a"
     Out of specification → Correct.

	Front fork leg oil level (from the top of the inner tube, with the inner tube fully compressed and without the fork spring) **115.0 mm (4.53 in)**

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

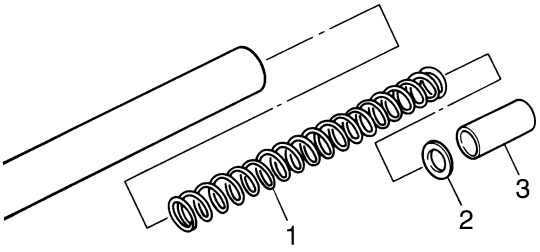


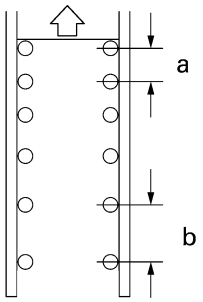


10. Install:
- Spring “1”
- Spring seat “2”
- Spacer “3”
- Cap bolt

TIP

- Install the spring with the smaller pitch “a” facing up.
- Before installing the cap bolt, lubricate its O-ring with grease.
- Temporarily tighten the cap bolt.





a. Smaller pitch
b. Lager pitch

EAS23050

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.

TIP

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

2. Tighten:
- Lower bracket pinch bolt “1”

	Lower bracket pinch bolt 30 Nm (3.0 m·kgf, 22 ft·lbf)

- Cap bolt “2”

	Cap bolt 24 Nm (2.4 m·kgf, 17 ft·lbf)

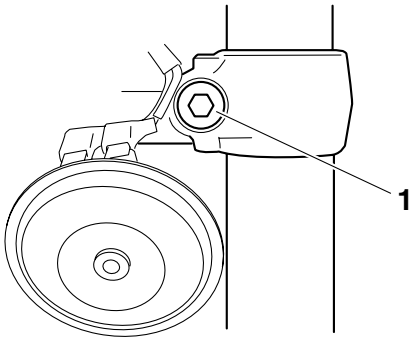
- Upper bracket pinch bolt “3”

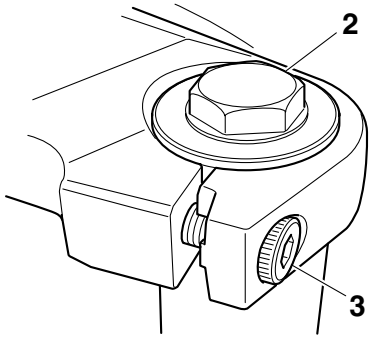
	Upper bracket pinch bolt 20 Nm (2.0 m·kgf, 14 ft·lbf)

EWA13680

WARNING

Make sure the brake hoses are routed properly.

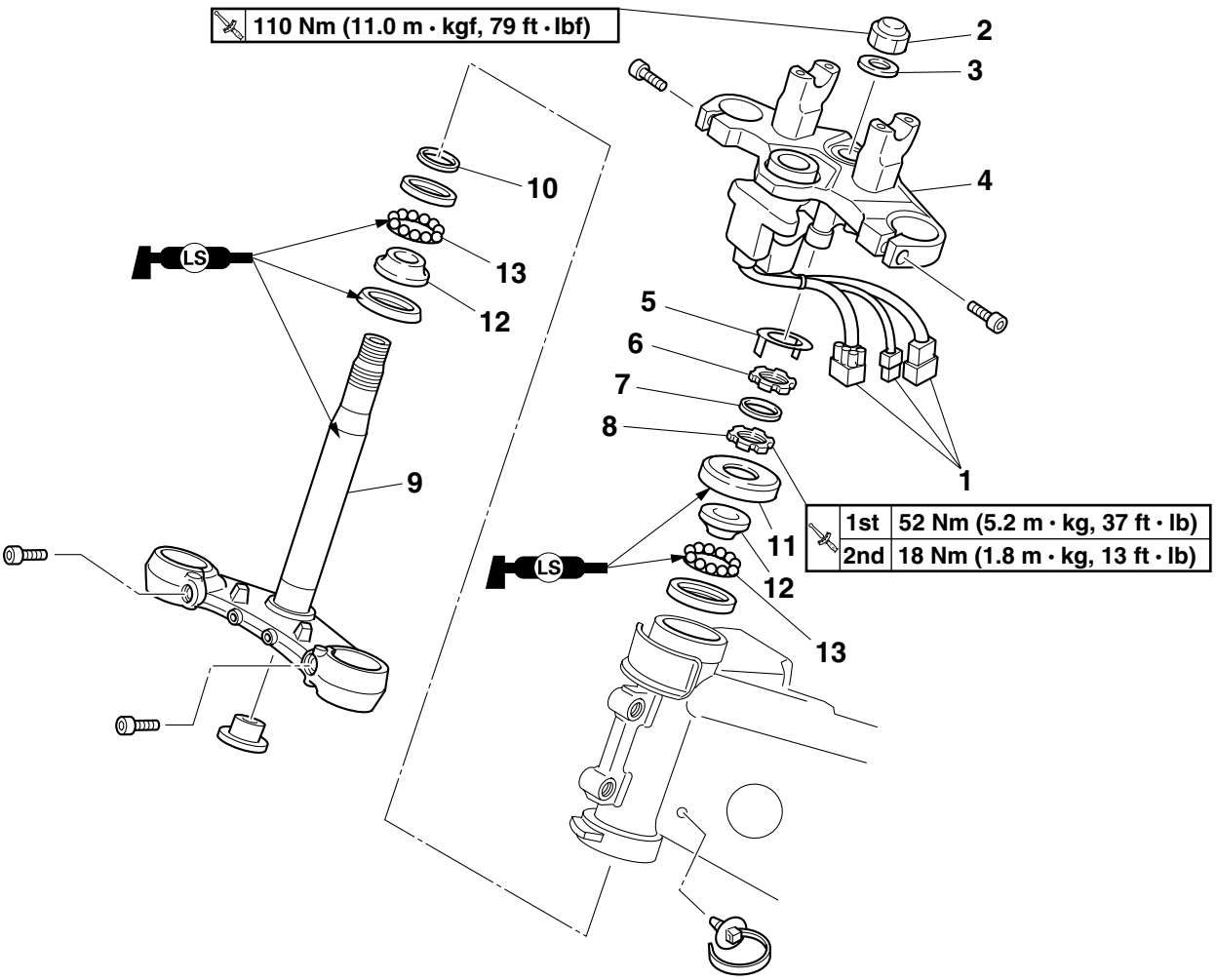




EAS23090

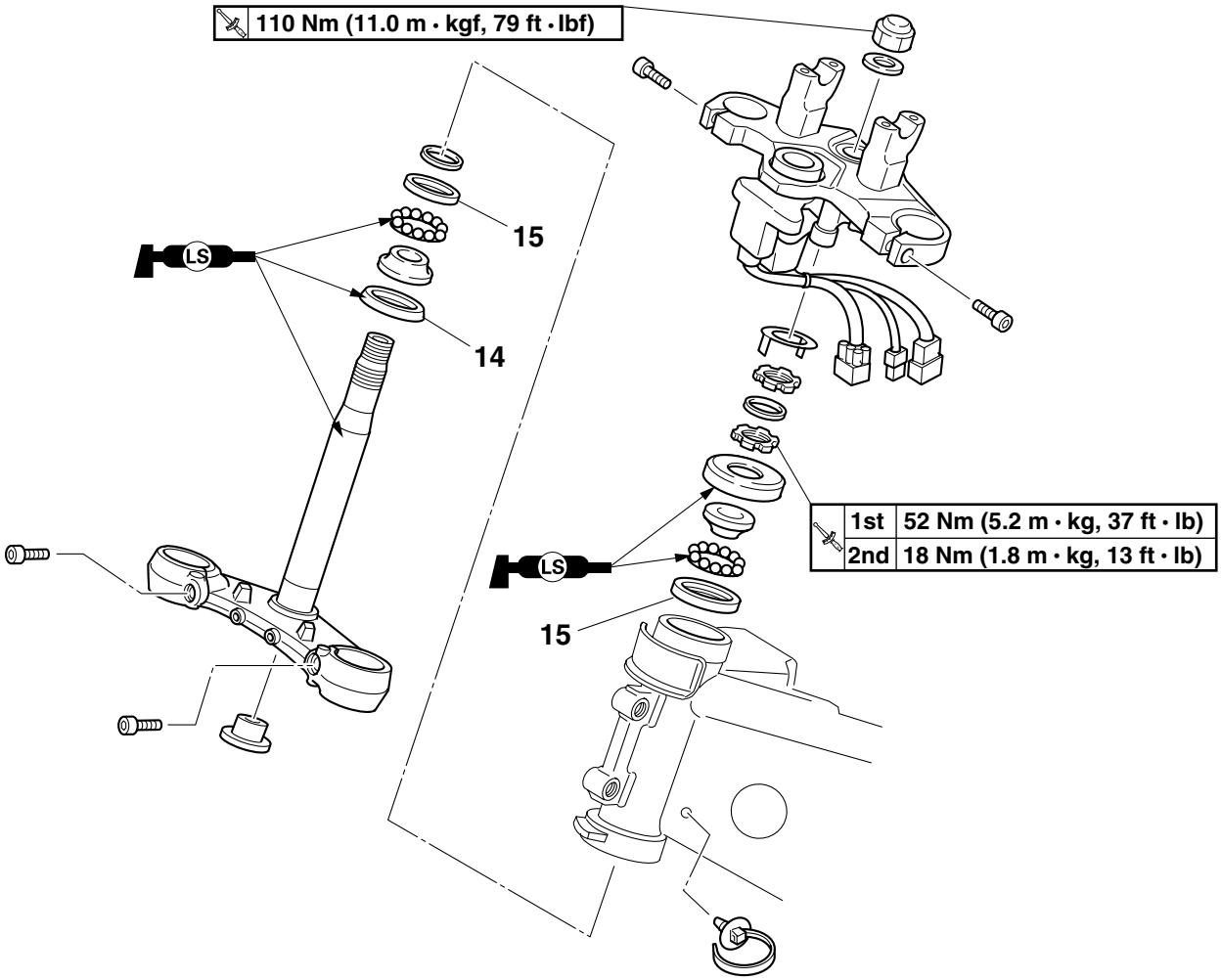
STEERING HEAD

Removing the lower bracket



Order	Job/Parts to remove	Q'ty	Remarks
	Front wheel		Refer to "FRONT WHEEL" on page 4-5.
	Front fender		Refer to "FRONT FORK" on page 4-61.
	Front fork		Refer to "FRONT FORK" on page 4-61.
	Handlebar		Refer to "HANDLEBAR" on page 4-57.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Air cut-off valve assembly		Refer to "AIR INDUCTION SYSTEM" on page 7-11.
1	Main switch coupler/Immobilizer coupler	2/1	Disconnect.
2	Steering stem nut	1	
3	Washer	1	
4	Upper bracket	1	
5	Lock washer	1	
6	Upper ring nut	1	
7	Rubber washer	1	
8	Lower ring nut	1	
9	Lower bracket	1	
10	Rubber washer	1	
11	Bearing cover	1	
12	Bearing inner race	2	
13	Upper bearing/Lower bearing	1/1	

Removing the lower bracket



Order	Job/Parts to remove	Q'ty	Remarks
14	Dust seal	1	
15	Bearing outer race	2	
			For installation, reverse the removal procedure.

EAS23110
REMOVING THE LOWER BRACKET
1. Stand the vehicle on a level surface.

EWA13120
⚠ WARNING

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

2. Remove:
   - Steering stem nut
   - Washer
   - Lock washer
   - Upper ring nut “1”
   - Rubber washer
   - Lower ring nut “2”
   - Lower bracket

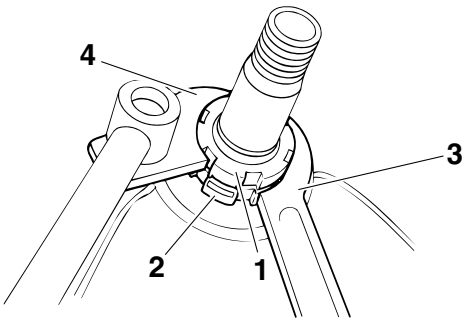
EWA13730
⚠ WARNING

Securely support the lower bracket so that there is no danger of it falling.

TIP

Hold the lower ring nut with the ring nut wrench “3”, and then remove the upper ring nut with the steering nut wrench “4”.

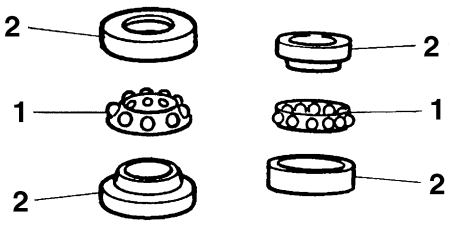
Ring nut wrench
90890-01268
Spanner wrench
YU-01268
Steering nut wrench
90890-01403
Spanner wrench
YU-33975



EAS23130
CHECKING THE STEERING HEAD
1. Wash:
   - Bearing balls
   - Bearing races

Recommended cleaning solvent
Kerosene

2. Check:
   - Bearings “1”
   - Bearing races “2”
     Damage/pitting → Replace.



3. Replace:
   - Bearings
   - Bearing races

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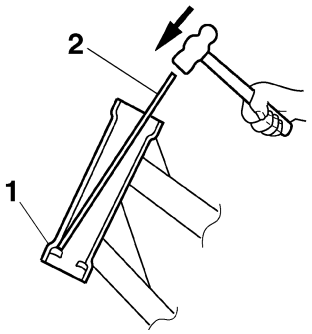
a. Remove the bearing races “1” from the steering head pipe with a long rod “2” and hammer.
b. Remove the bearing race “3” from the lower bracket with a floor chisel “4” and hammer.
c. Install a new dust seal and new bearing races.

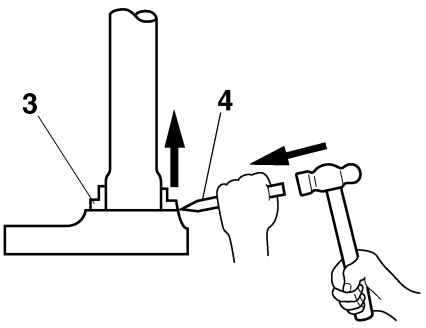
ECA14270
NOTICE

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

TIP

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





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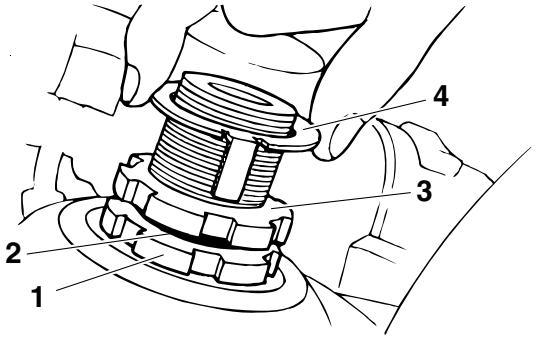
4. Check:
   - Upper bracket
   - Lower bracket
   (along with the steering stem)
   Bends/cracks/damage → Replace.

EAS23140
INSTALLING THE STEERING HEAD

1. Lubricate:
   - Upper bearing
   - Lower bearing
   - Bearing races

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

2. Install:
   - Lower bracket
   - Lower ring nut “1”
   - Rubber washer “2”
   - Upper ring nut “3”
   - Lock washer “4”
   Refer to “CHECKING THE STEERING HEAD” on page 4-70.



3. Install:
   - Upper bracket
   - Washer
   - Steering stem nut

TIP

Temporarily tighten the steering stem nut.

4. Install:
   - Front fork legs
   Refer to “INSTALLING THE FRONT FORK LEGS” on page 4-67.

TIP

Temporarily tighten the upper and lower bracket pinch bolts.

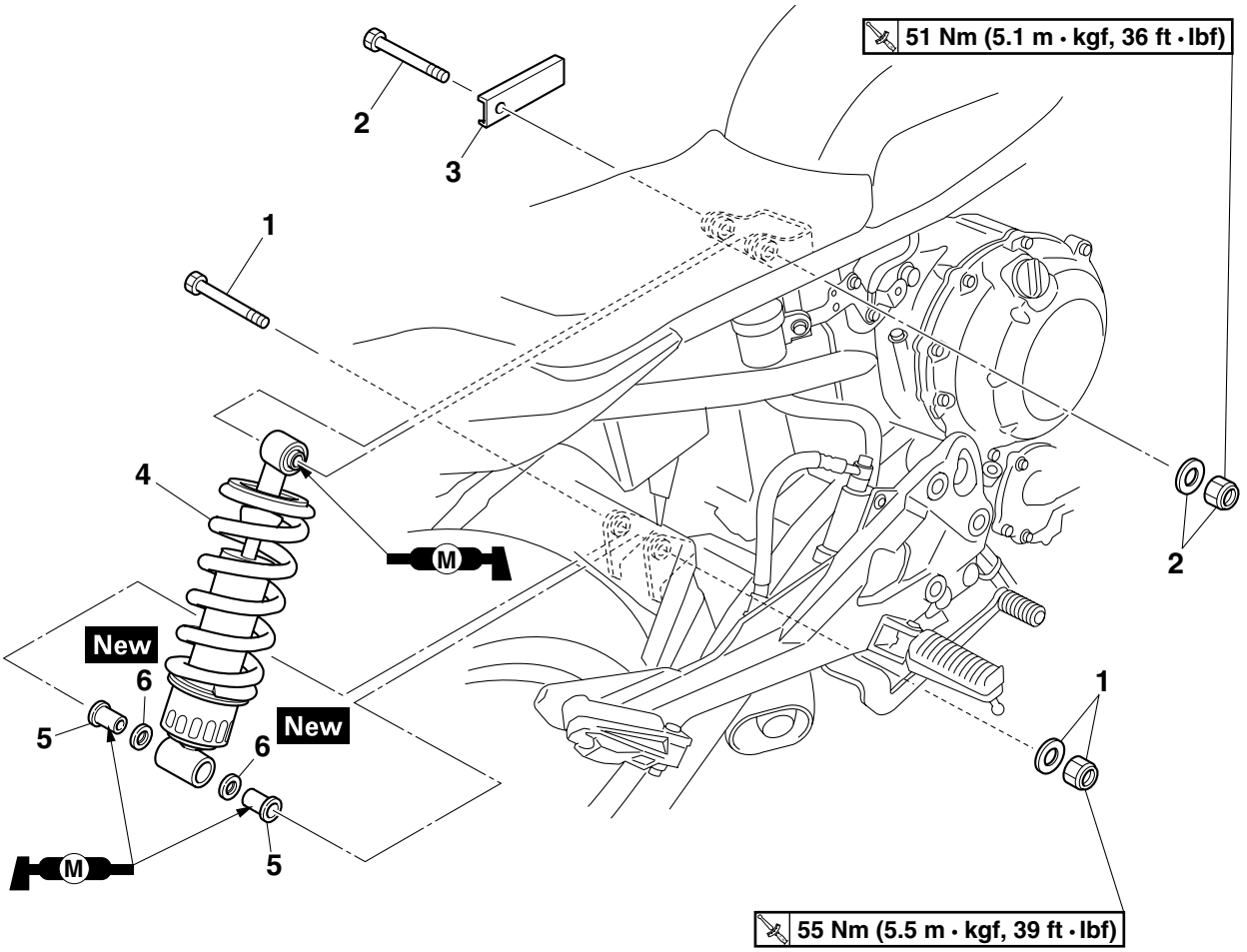
5. Tighten:
   - Steering stem nut

	Steering stem nut **110 Nm (11.0 m·kgf, 79 ft·lbf)**

EAS23160

REAR SHOCK ABSORBER ASSEMBLY

Removing the rear shock absorber assembly



Order	Job/Parts to remove	Q'ty	Remarks
	Rear side cover		Refer to "GENERAL CHASSIS" on page 4-1.
1	Self-locking nut/washer/bolt	1/1/1	
2	Self-locking nut/washer/bolt	1/1/1	
3	Plate	1	
4	Rear shock absorber assembly	1	
5	Collar	2	
6	Oil seal	2	
			For installation, reverse the removal procedure.

EAS23180
HANDLING THE REAR SHOCK ABSORBER

EWA13740
⚠ WARNING

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

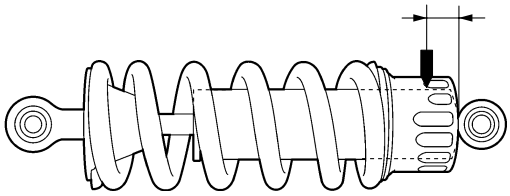
- **Do not tamper or attempt to open the rear shock absorber.**
- **Do not subject the rear shock absorber to an open flame or any other source of high heat. High heat can cause an explosion due to excessive gas pressure.**
- **Do not deform or damage the rear shock absorber in any way. Rear shock absorber damage will result in poor damping performance.**

EAS23190
DISPOSING OF A REAR SHOCK ABSORBER

1. Gas pressure must be released before disposing of a rear shock absorber. To release the gas pressure, drill a 2–3-mm (0.08–0.12 in) hole through the rear shock absorber at a point 20–25 mm (0.79–0.98 in) from its end as shown.

EWA13760
⚠ WARNING

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



EAS23210
REMOVING THE REAR SHOCK ABSORBER ASSEMBLY

1. Stand the vehicle on a level surface.

EWA13120
⚠ WARNING

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

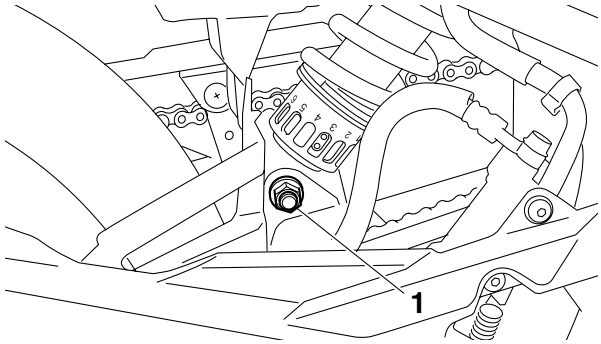
TIP

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

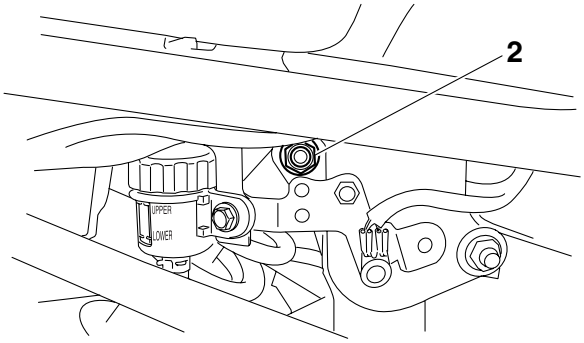
2. Remove:
   - Rear side cover
     Refer to “GENERAL CHASSIS” on page 4-1.
3. Remove:
   - Rear shock absorber assembly lower nut “1”

TIP

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



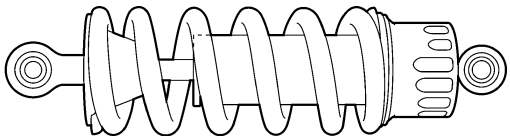
4. Remove:
   - Rear shock absorber assembly upper nut “2”
   - Rear shock absorber assembly



EAS23240
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.
- Oil seals
  Damage/wear → Replace.
- Bolts
  Bends/damage/wear → Replace.



EAS23300
INSTALLING THE REAR SHOCK ABSORBER ASSEMBLY

1. Lubricate:
   - Collar
   - Oil seals

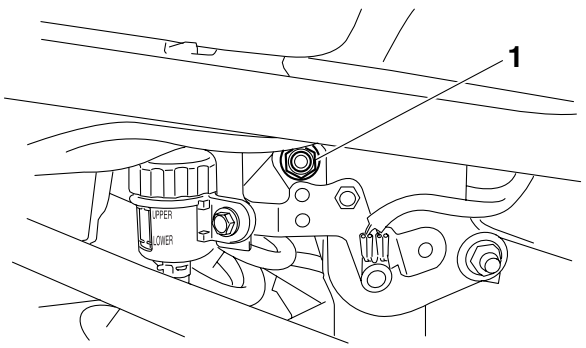
	Recommended lubricant **Molybdenum disulfide grease**

2. Install:
   - Rear shock absorber assembly

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

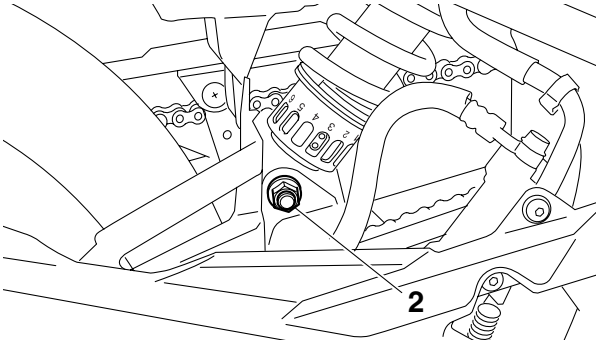
3. Tighten:
   - Rear shock absorber assembly upper nut "1"

	Rear shock absorber assembly upper nut **51 Nm (5.1 m·kgf, 36 ft·lbf)**



- Rear shock absorber assembly lower nut "2"

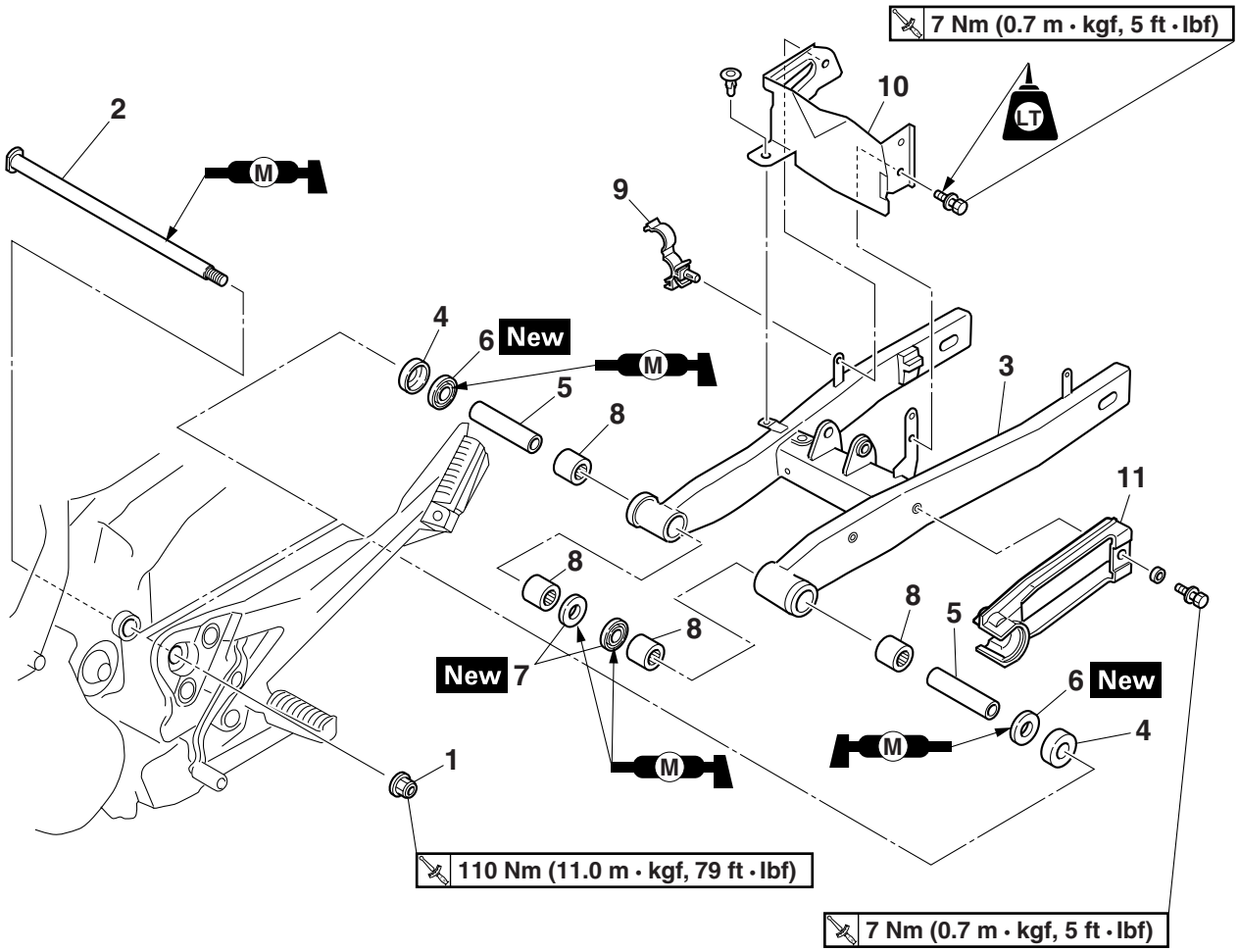
	Rear shock absorber assembly lower nut **55 Nm (5.5 m·kgf, 39 ft·lbf)**



4. Install:
   - Rear side cover
     Refer to "GENERAL CHASSIS" on page 4-1.

EAS23330
SWINGARM

Removing the swingarm



Order	Job/Parts to remove	Q'ty	Remarks
	Rear brake caliper		Refer to "REAR BRAKE" on page 4-37.
	Rear wheel		Refer to "REAR WHEEL" on page 4-14.
	Rear shock absorber assembly		Refer to "REAR SHOCK ABSORBER ASSEMBLY" on page 4-72.
	Drive sprocket		Refer to "ENGINE REMOVAL" on page 5-1.
	Shift rod		Refer to "ENGINE REMOVAL" on page 5-1.
1	Pivot shaft nut	1	
2	Pivot shaft	1	
3	Swingarm	1	
4	Dust cover	2	
5	Spacer	2	
6	Oil seal	2	
7	Oil seal	2	
8	Bearing	4	
9	Clamp	1	
10	Dust cover	1	
11	Drive chain guide	1	
			For installation, reverse the removal procedure.

EAS23340
REMOVING THE SWINGARM
1. Stand the vehicle on a level surface.

EWA13120
⚠ WARNING

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

TIP

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

2. Remove:
   - Rear shock absorber
     Refer to "REAR SHOCK ABSORBER ASSEMBLY" on page 4-72.
3. Measure:
   - Swingarm side play
   - Swingarm vertical movement

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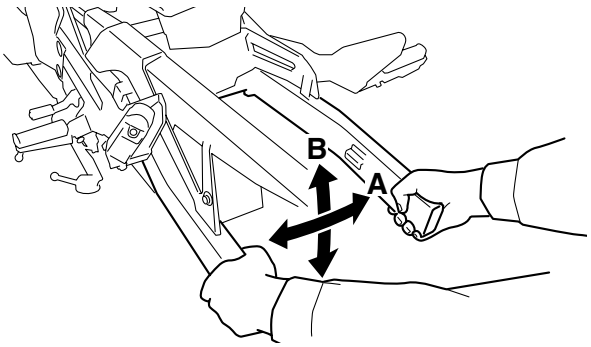
a. Measure the tightening torque of the swingarm pivot shaft bolt and nut.

	Pivot shaft nut **110 Nm (11.0 m·kgf, 79 ft·lbf)**

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

	Swingarm side play (at the end of the swingarm) **1.0 mm (0.039 in)**

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



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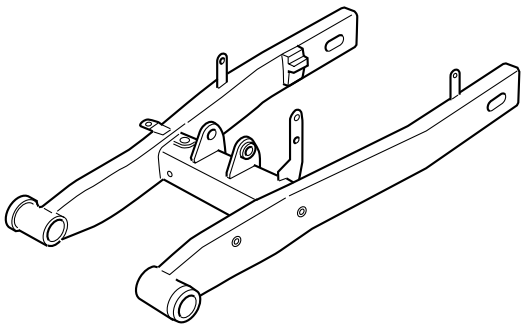
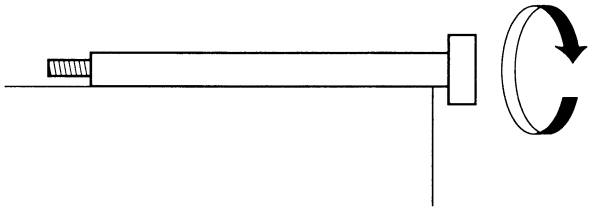
EAS23370
CHECKING THE SWINGARM
1. Check:
   - Swingarm
     Bends/cracks/damage → Replace.



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

EWA4S81007
⚠ WARNING

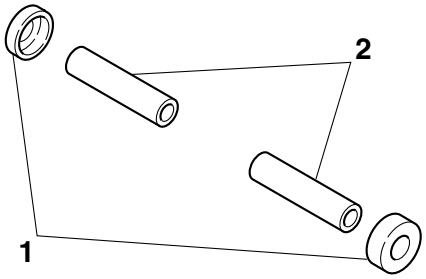
Do not attempt to straighten a bent pivot shaft.



3. Wash:
   - Pivot shaft
   - Dust covers
   - Spacer
   - Bearings

	Recommended cleaning solvent **Kerosene**

4. Check:
   - Dust covers "1"
   - Spacers "2"
     Damage/wear → Replace.
   - Bearings
     Damage/pitting → Replace.



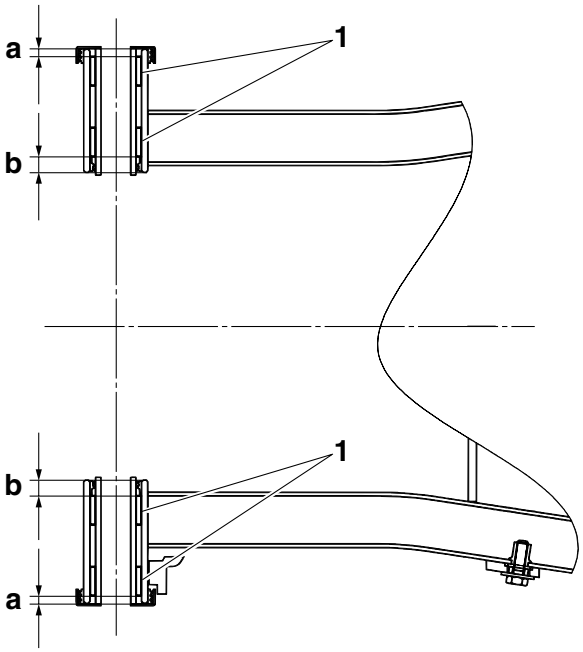
EAS23380
INSTALLING THE SWINGARM

1. Lubricate:
   - Bearings
   - Spacers
   - Oil seals
   - Dust covers
   - Pivot shaft

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

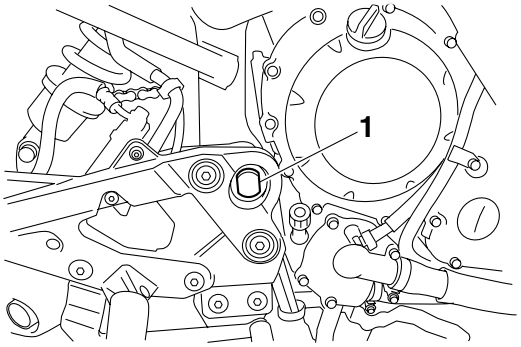
2. Install:
   - Bearing “1”
   - Spacer
   - Oil seal
   - Dust cover

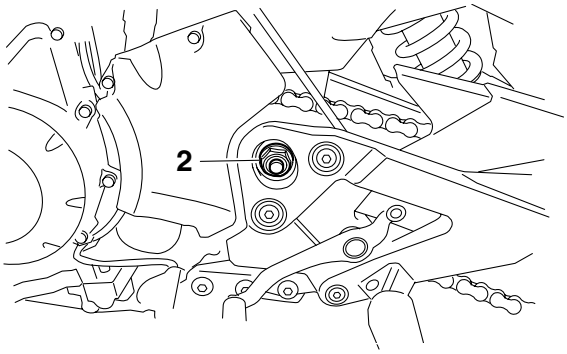
	Bearing installation depth **Out side “a” 4.0 mm (0.16 in)** **In side “b” 8.5 mm (0.33 in)**



3. Install:
   - Swingarm
   - Pivot shaft “1”
   - Pivot shaft nut “2”

	Pivot shaft nut **110 Nm (11.0 m·kgf, 79 ft·lbf)**





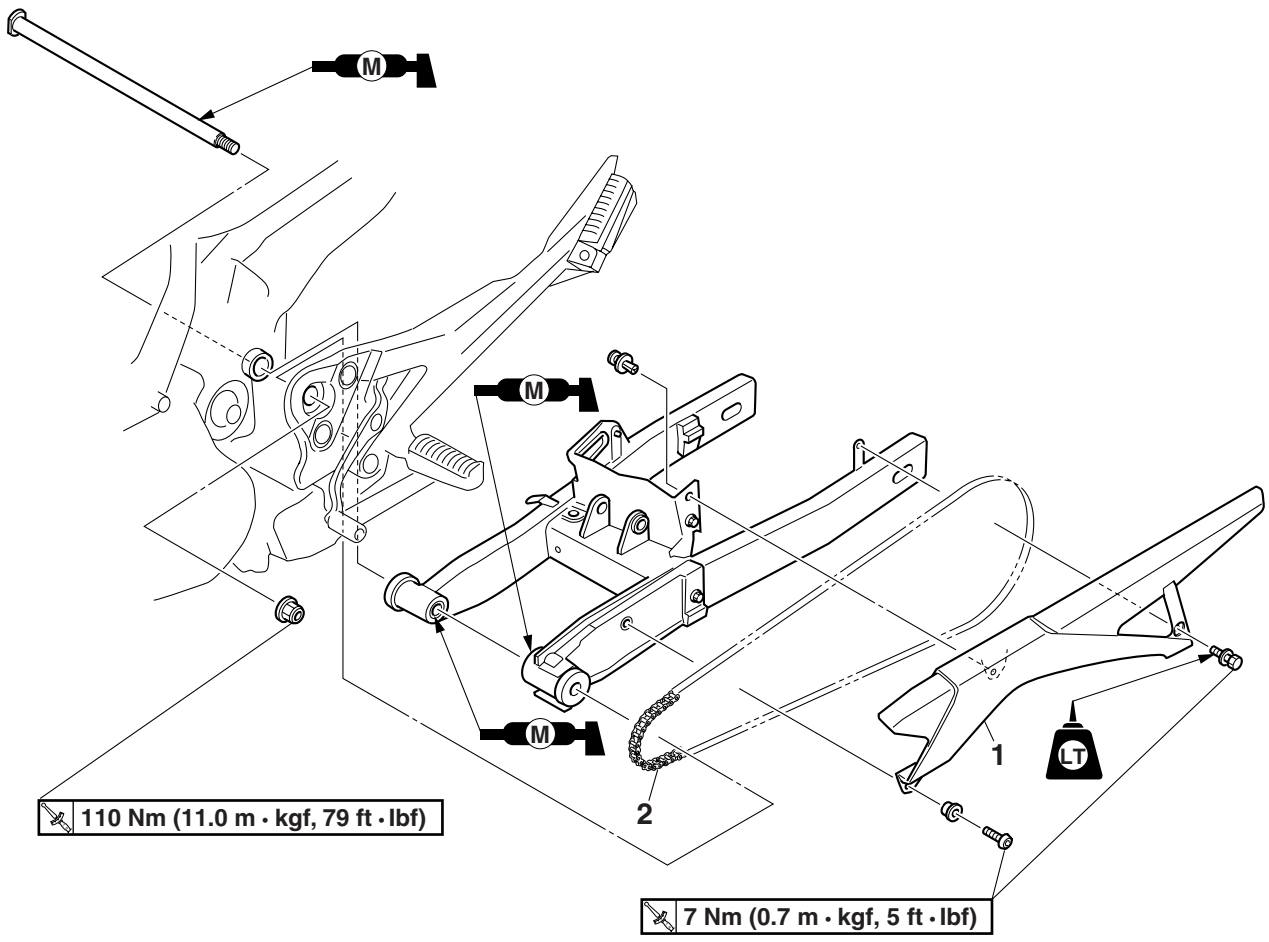
4. Install:
   - Rear shock absorber assembly
     Refer to “INSTALLING THE REAR SHOCK ABSORBER ASSEMBLY” on page 4-74.
   - Rear wheel
     Refer to “INSTALLING THE REAR WHEEL” on page 4-21.
5. Adjust:
   - Drive chain slack
     Refer to “ADJUSTING THE DRIVE CHAIN SLACK” on page 3-18.

	Drive chain slack **45.0–55.0 mm (1.77–2.17 in)**

EAS23400

CHAIN DRIVE

Removing the drive chain



Order	Job/Parts to remove	Q'ty	Remarks
	Drive sprocket		Refer to "ENGINE REMOVAL" on page 5-1.
	Shift rod		Refer to "ENGINE REMOVAL" on page 5-1.
	Swingarm		Refer to "REMOVING THE SWINGARM" on page 4-76.
1	Chain cover	1	
2	Drive chain	1	
			For installation, reverse the removal procedure.

EAS23410
REMOVING THE DRIVE CHAIN
1. Stand the vehicle on a level surface.

EWA13120
⚠ WARNING

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

TIP

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

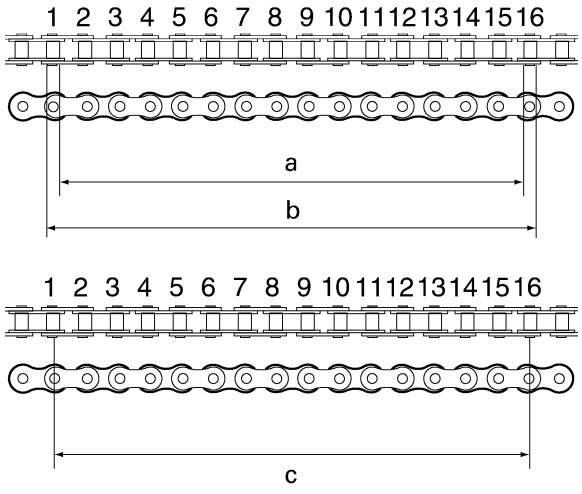
2. Remove:
   - Swingarm
     Refer to "REMOVING THE SWINGARM" on page 4-76.
   - Drive chain

EAS23440
CHECKING THE DRIVE CHAIN
1. Measure:
   - Measure the dimension between 15-links on the inner side "a" and outer side "b" of the roller and calculate the dimension between pin centers.
   - Dimension "c" between pin centers = (Inner dimension "a" + Outer dimension "b")/2
   - 15-link section "c" of the drive chain
     Out of specification → Replace the drive chain, front drive sprocket and rear drive sprocket as a set.

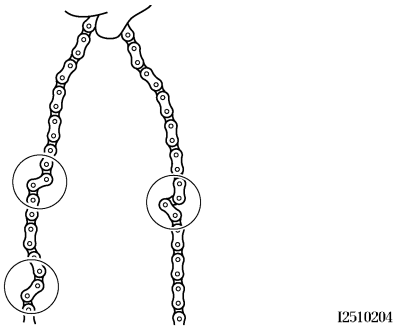
	15-link length limit **239.3 mm (9.42 in)**

TIP

- While measuring the 15-link section, push down on the drive chain to increase its tension.
- Perform this measurement at two or three different places.



2. Check:
   - Drive chain
     Stiffness → Clean and lubricate or replace.



3. Clean:
   - Drive chain

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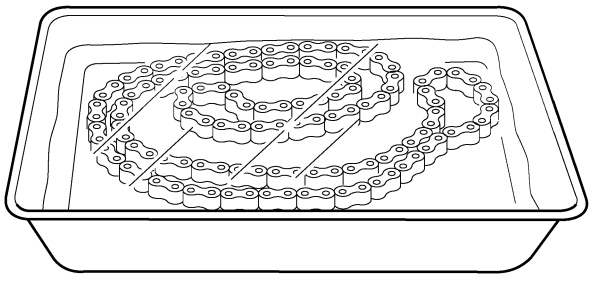
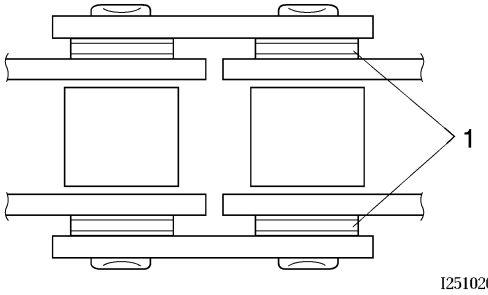
a. Wipe the drive chain with a clean cloth.
b. Put the drive chain in kerosene and remove any remaining dirt.
c. Remove the drive chain from the kerosene and completely dry it.

ECA14290
NOTICE

- **This vehicle has a drive chain with small rubber O-rings "1" between the drive chain side plates. Never use high-pressure water or air, steam, gasoline, certain solvents (e.g., benzine), or a coarse brush to clean the drive chain. High-pressure methods could force dirt or water into the drive chain's internals, and solvents will deteriorate the O-rings. A coarse brush can also damage the O-rings. Therefore, use only kerosene to clean the drive chain.**
- **Do not soak the drive chain in kerosene for more than ten minutes, otherwise the O-rings can be damaged.**





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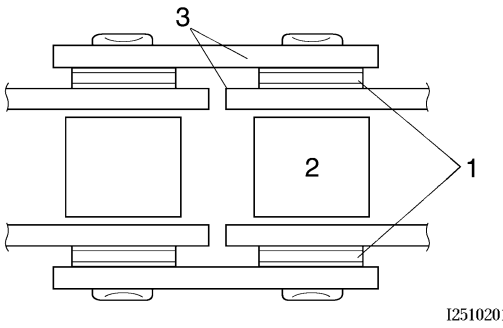
4. Check:
   - O-rings “1”
     Damage → Replace the drive chain.
   - Drive chain rollers “2”
     Damage/wear → Replace the drive chain.
   - Drive chain side plates “3”
     Damage/wear → Replace the drive chain.
     Cracks → Replace the drive chain and make sure the battery breather hose is properly routed away from the drive chain and below the swingarm.

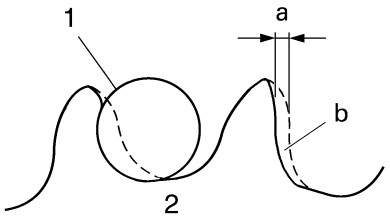


5. Lubricate:
   - Drive chain

Recommended lubricant
Engine oil or chain lubricant suitable for O-ring chains

EAS23460
CHECKING THE DRIVE SPROCKET

1. Check:
   - Drive 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

EAS23470
CHECKING THE REAR WHEEL SPROCKET

Refer to “CHECKING AND REPLACING THE REAR WHEEL SPROCKET” on page 4-18.

EAS23480
CHECKING THE REAR WHEEL DRIVE HUB

Refer to “CHECKING THE REAR WHEEL DRIVE HUB” on page 4-18.

EAS28800
INSTALLING THE DRIVE CHAIN

1. Lubricate:
   - Drive chain

Recommended lubricant
Engine oil or chain lubricant suitable for O-ring chains

2. Install:
   - Drive chain
3. Install:
   - Swingarm
     Refer to “INSTALLING THE SWINGARM” on page 4-77.

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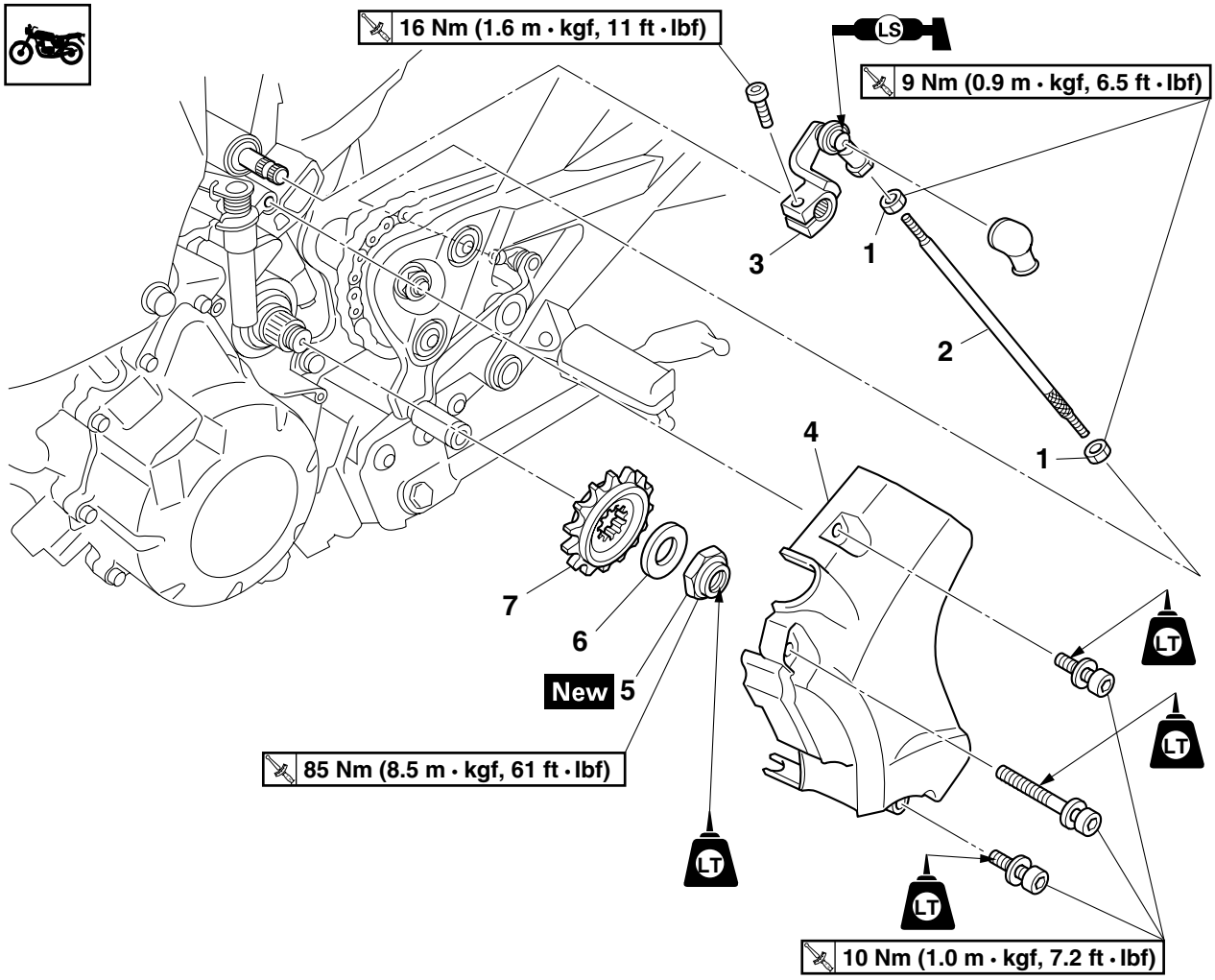
EAS23710

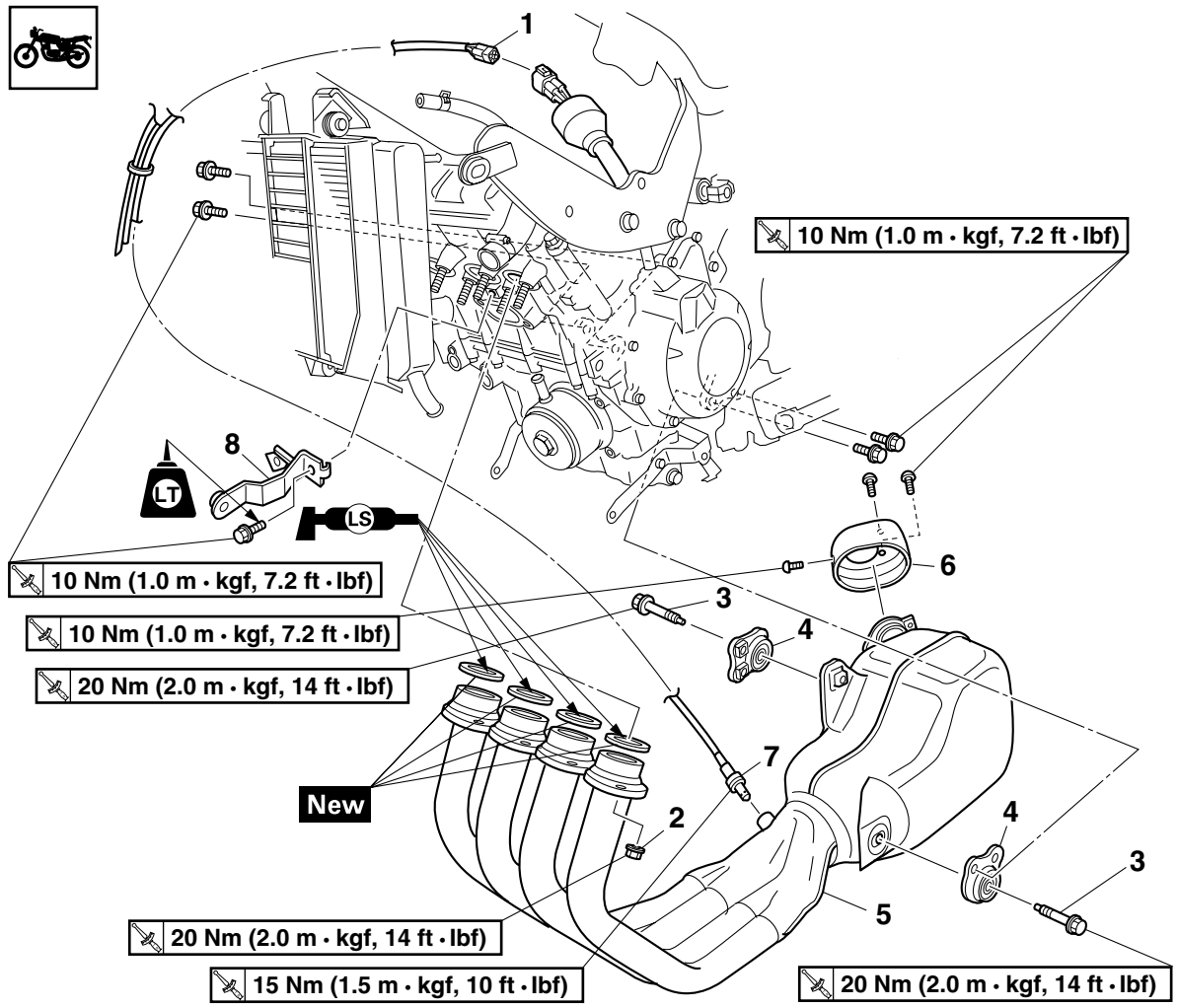
ENGINE REMOVAL

Removing the drive sprocket



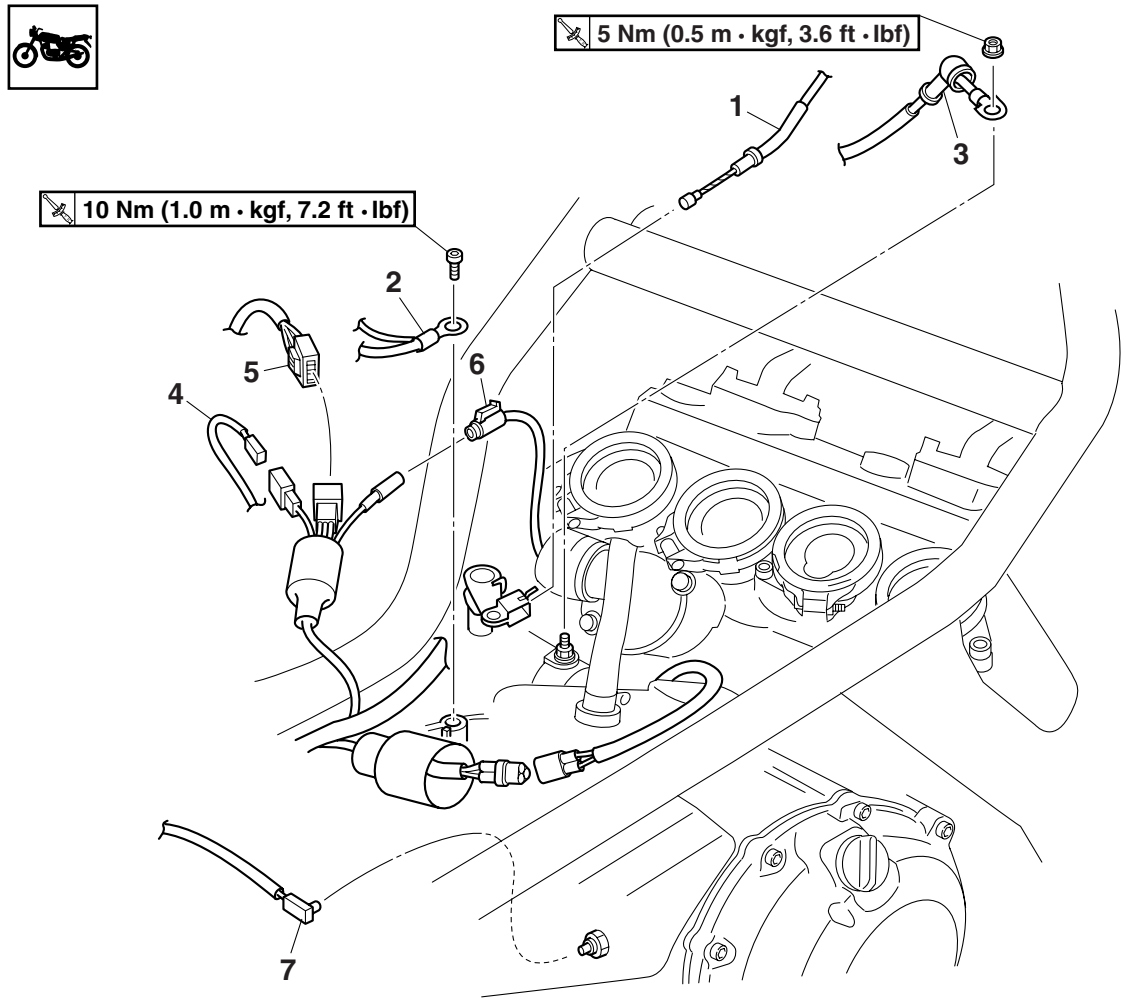
Order	Job/Parts to remove	Q'ty	Remarks
	Drive chain		Loosen
	Push lever assembly		Refer to "CLUTCH" on page 5-47.
1	Locknut	2	
2	Shift rod	1	
3	Shift arm	1	
4	Drive sprocket cover	1	
5	Drive sprocket nut	1	
6	Washer	1	
7	Drive sprocket	1	
			For installation, reverse the removal procedure.

Removing the exhaust pipe



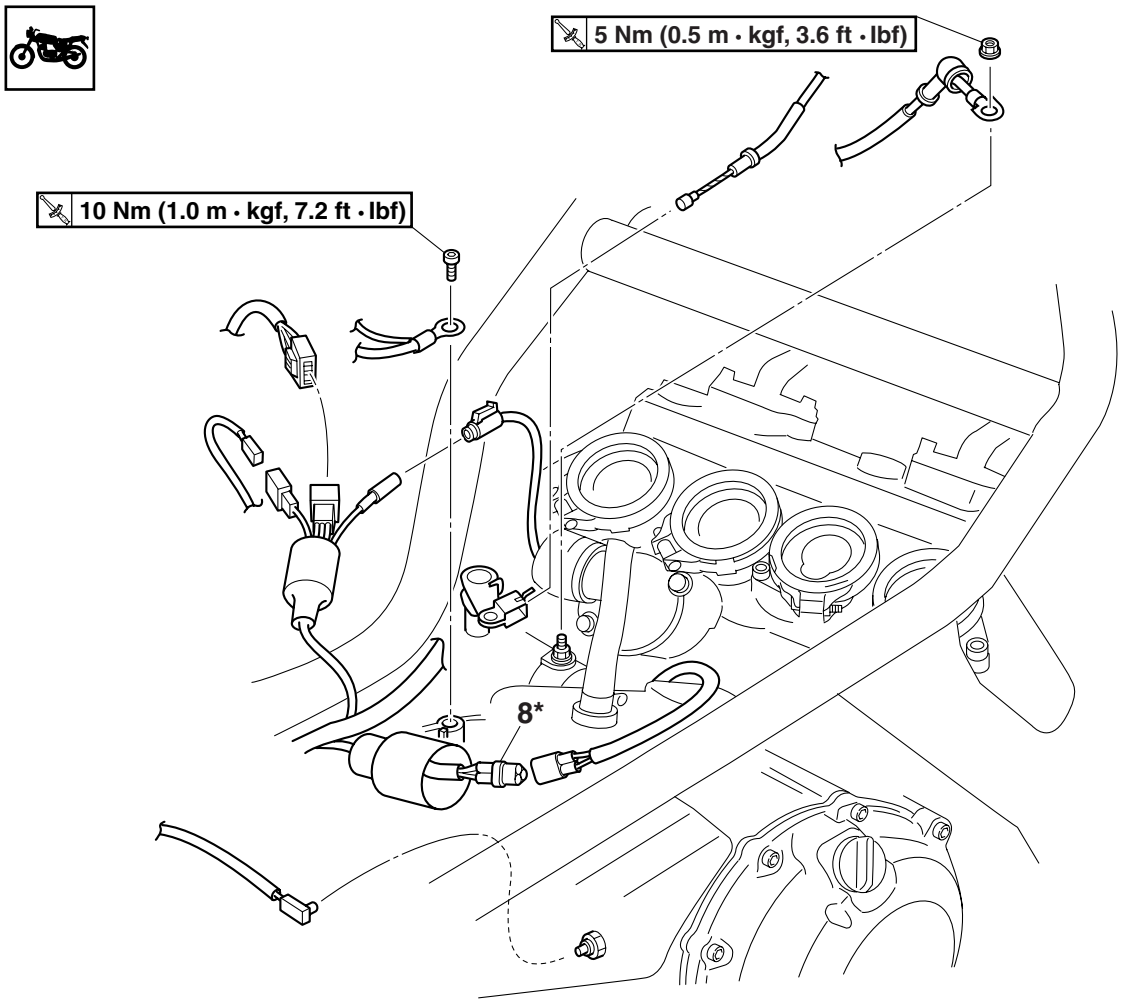
Order	Job/Parts to remove	Q'ty	Remarks
	Seat		Refer to "GENERAL CHASSIS" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Bottom cowling		Refer to "GENERAL CHASSIS" on page 4-1.
	Radiator lower mount bolt		Refer to "RADIATOR" on page 6-1.
1	O_2 sensor lead coupler	1	Disconnect.
2	Nut	8	
3	Bolt	2	
4	Bracket	2	
5	Muffler COMP.	1	
6	Cap	1	
7	O_2 sensor	1	
8	Radiator stay	1	
			For installation, reverse the removal procedure.

Disconnecting the leads and hoses



Order	Job/Parts to remove	Q'ty	Remarks
	Seat		Refer to "GENERAL CHASSIS" on page 4-1.
	Side cowling		Refer to "GENERAL CHASSIS" on page 4-1.
	Rear side cover		Refer to "GENERAL CHASSIS" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Air filter case		Refer to "GENERAL CHASSIS" on page 4-1.
	Air cut-off valve		Refer to "AIR INDUCTION SYSTEM" on page 7-11.
	Throttle body		Refer to "THROTTLE BODIES" on page 7-4.
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-24.
	Radiator		Refer to "RADIATOR" on page 6-1.
1	Clutch cable	1	
2	Ground lead	1	
3	Starter motor lead	1	Disconnect.
4	Sidestand switch coupler	1	Disconnect.
5	Stator coil assembly coupler	1	Disconnect.
6	Oil level switch coupler	1	Disconnect.
7	Neutral switch coupler	1	Disconnect.

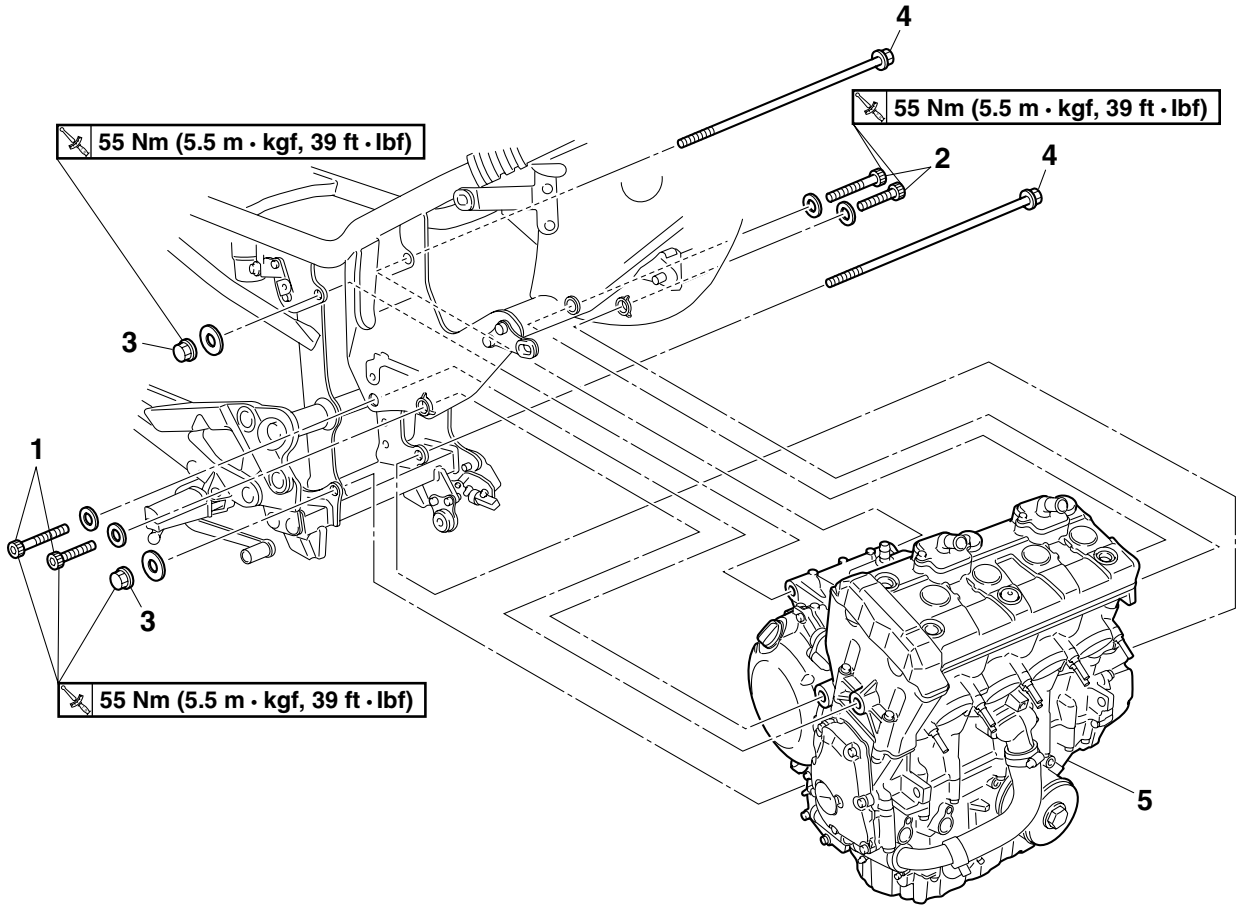
Disconnecting the leads and hoses



Order	Job/Parts to remove	Q'ty	Remarks
8	Speed sensor coupler (XJ6S)	1	Disconnect.
			For assembly, reverse the removal procedure.

*XJ6S

Removing the engine

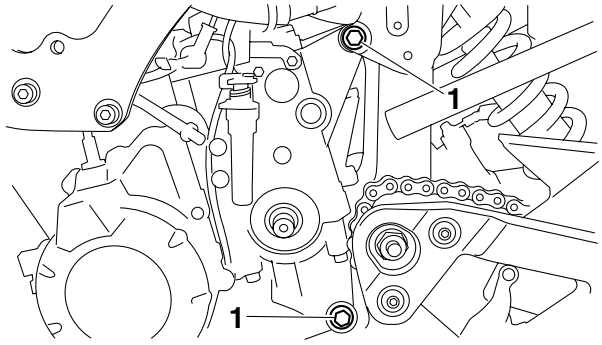


Order	Job/Parts to remove	Q'ty	Remarks
	Left footrest bracket assembly		
1	Right front engine mounting bolt	2	
2	Left front engine mounting bolt	2	
3	Self-locking nut	2	
4	Rear engine mounting bolt	2	
5	Engine	1	
			For installation, reverse the removal procedure.

EAS23720
INSTALLING THE ENGINE

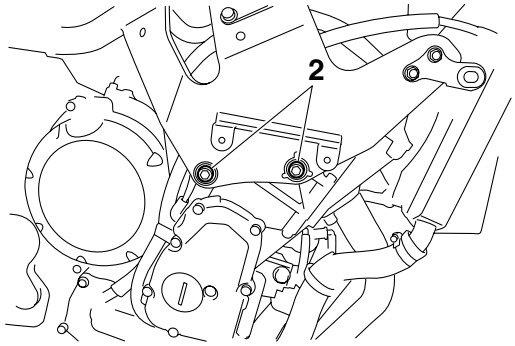
1. Install:
   - Rear engine mounting bolts “1”

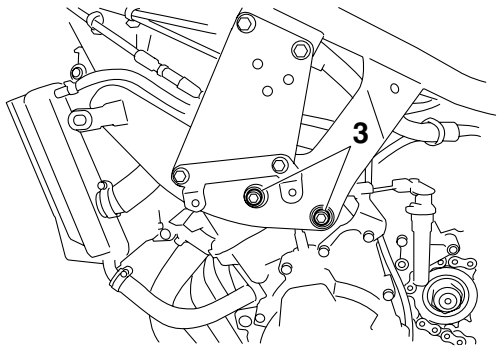
TIP
Lubricate the rear engine mounting bolt threads with engine oil.



2. Install:
   - Right front engine mounting bolt “2”
   - Left front engine mounting bolts “3”

TIP
Do not fully tighten the bolts.

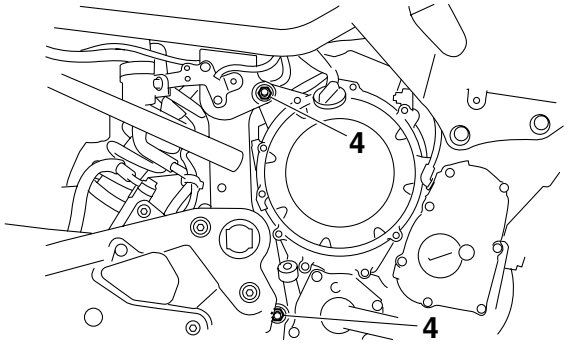




3. Tighten:
   - Self-locking nut “4”

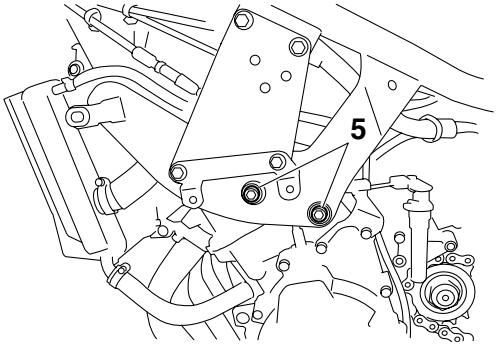
	Self-locking nut **55 Nm (5.5 m·kgf, 40 ft·lbf)**

TIP
First tighten the lower self-locking nut.



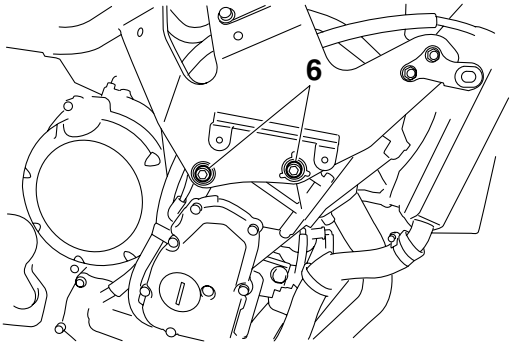
4. Tighten:
   - Left front engine mounting bolts “5”

	Left front mounting bolt **55 Nm (5.5 m·kgf, 40 ft·lbf)**



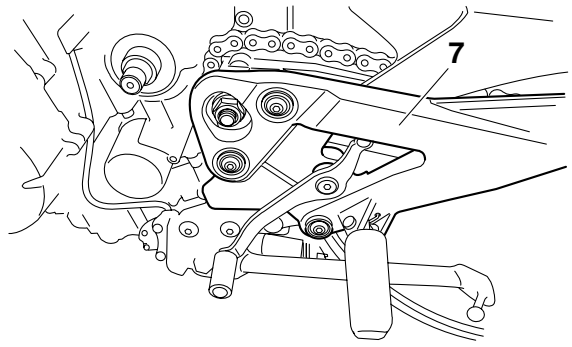
5. Tighten:
   - Right front engine mounting bolt “6”

	Right front engine mounting bolt **55 Nm (5.5 m·kgf, 40 ft·lbf)**



6. Install:
   - Left footrest bracket assembly “7”

	Footrest assembly bolt **30 Nm (3.0 m·kgf, 22 ft·lbf)** **LOCTITE®**

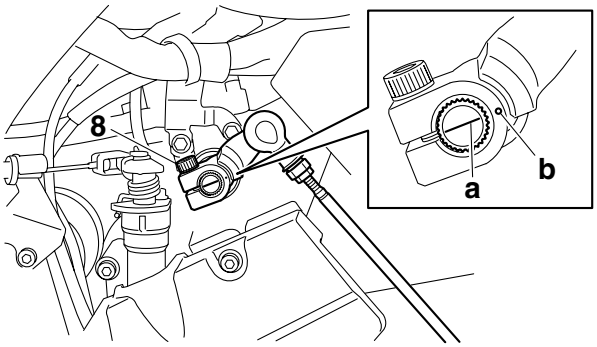


7. Install:
   - Shift arm bolt “8”

	Shift arm bolt **16 Nm (1.6 m·kgf, 11 ft·lbf)**

TIP

Before installing, make sure to align the mark “a” of the shift shaft with the punch mark “b” of the shift arm.



EAS20S15001

INSTALLING THE DRIVE CHAIN

1. Lubricate:
   - Drive chain

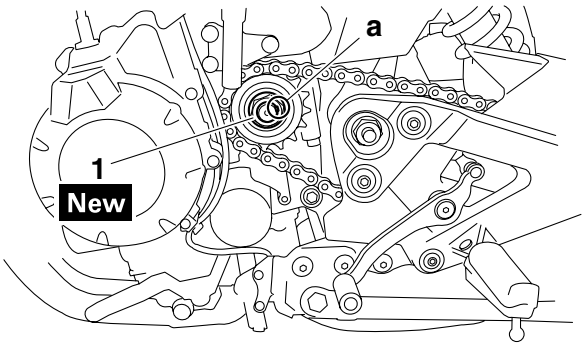
	Recommended lubricant **Engine oil or chain lubricant suitable for O-ring chains**

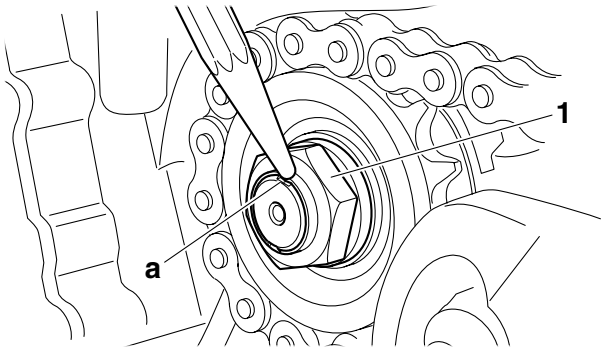
2. Install:
   - Drive sprocket
   - Washer
   - Drive sprocket nut “1” New

	Drive sprocket nut **85 Nm (8.5 m·kgf, 61 ft·lbf)** **LOCTITE®**

TIP

- While applying the rear brake, tighten the drive sprocket nut.
- Stake the drive sprocket nut “1” at a cutout “a” in the drive axle.



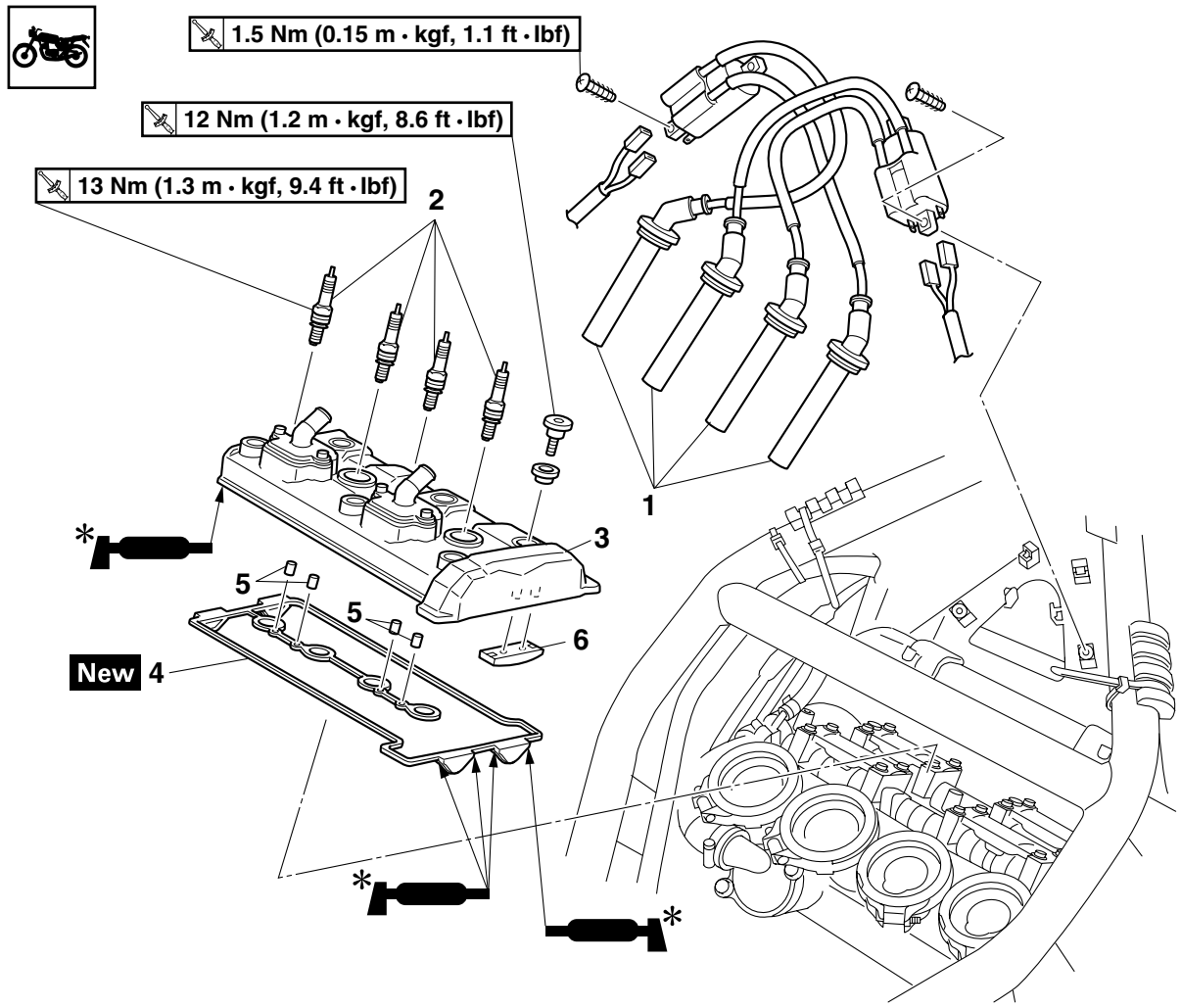


3. Install:
   - Clutch push lever assembly
     Refer to “CLUTCH” on page 5-47.

EAS23760

CAMSHAFTS

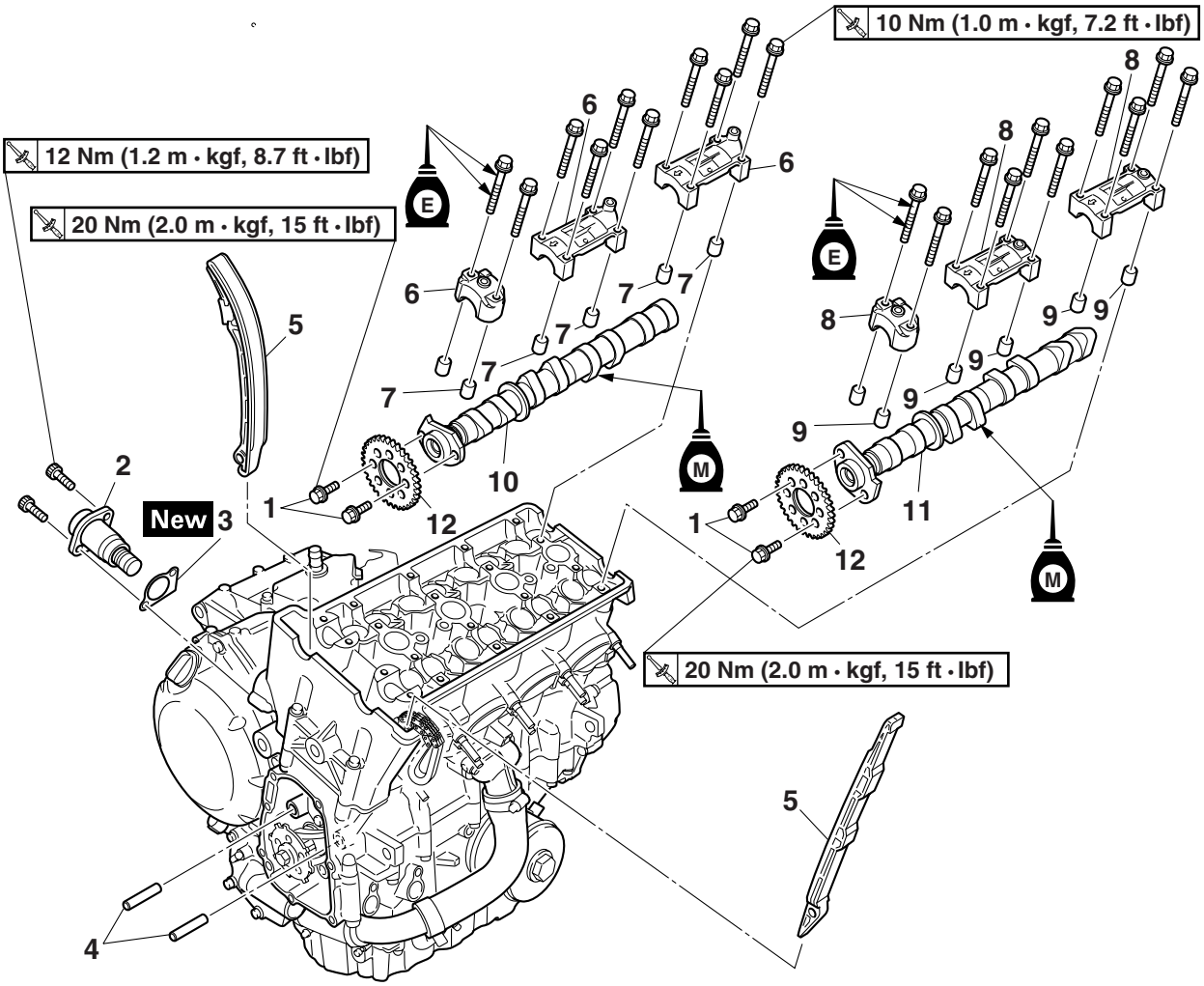
Removing the cylinder head cover



Order	Job/Parts to remove	Q'ty	Remarks
	Side cowling		Refer to "GENERAL CHASSIS" on page 4-1.
	Seat		Refer to "GENERAL CHASSIS" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Air filter case		Refer to "GENERAL CHASSIS" on page 4-1.
	Air cut-off valve		Refer to "AIR INDUCTION SYSTEM" on page 7-11.
	Throttle body		Refer to "THROTTLE BODIES" on page 7-4.
1	Spark plug cap	4	
2	Spark plug	4	
3	Cylinder head cover	1	
4	Cylinder head cover gasket	1	
5	Dowel pin	4	
6	Timing chain guide (top side)	1	
			For installation, reverse the removal procedure.

*Yamaha bond No.1215 (Three Bond No.1215®)

Removing the camshafts



Order	Job/Parts to remove	Q'ty	Remarks
	Pickup rotor cover		Refer to "PICKUP ROTOR" on page 5-33.
1	Camshaft sprocket bolt	4	
2	Timing chain tensioner	1	
3	Timing chain tensioner gasket	1	
4	Pin	2	
5	Timing chain guide (exhaust side)/Timing chain guide (intake side)	1/1	
6	Intake camshaft cap	3	
7	Dowel pin	6	
8	Exhaust camshaft cap	3	
9	Dowel pin	6	
10	Intake camshaft	1	
11	Exhaust camshaft	1	
12	Camshaft sprocket	2	
			For installation, reverse the removal procedure.

EAS23810
REMOVING THE CAMSHAFTS

1. Remove:
   - Pickup rotor cover
     Refer to "PICKUP ROTOR" on page 5-33.
2. Align:
   - "T" mark "a" on the pickup rotor
     (with the crankcase mating surface "b")

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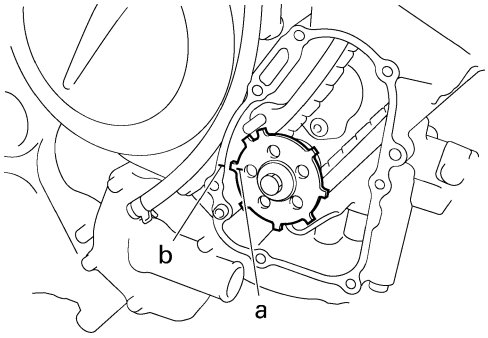
a. Turn the crankshaft clockwise.
b. When piston #1 is at TDC on the compression stroke, align the "T" mark "a" on the pickup rotor with the crankcase mating surface "b".

TIP

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



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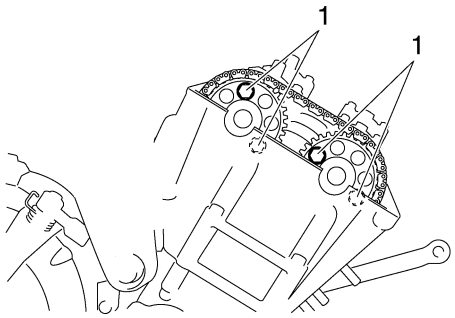
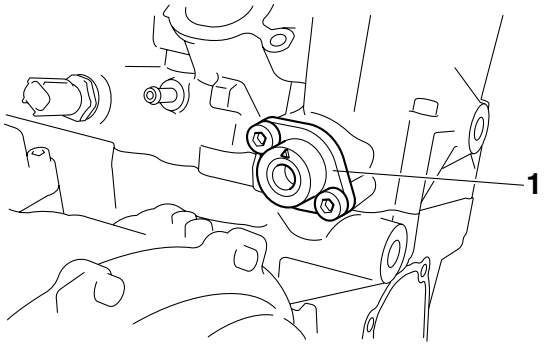
3. Loosen:
   - Camshaft sprocket bolts "1"



4. Remove:
   - Timing chain tensioner "1"
   - Gasket

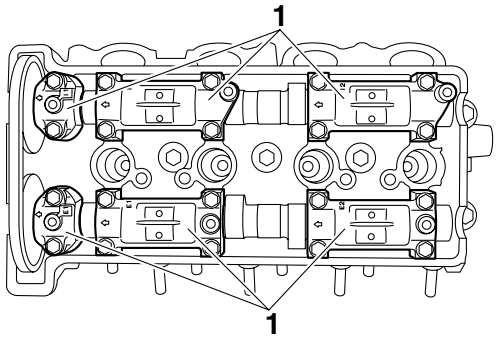


5. Remove:
   - Timing chain guide
   - Camshaft caps "1"
   - Dowel pins

ECA13720

NOTICE

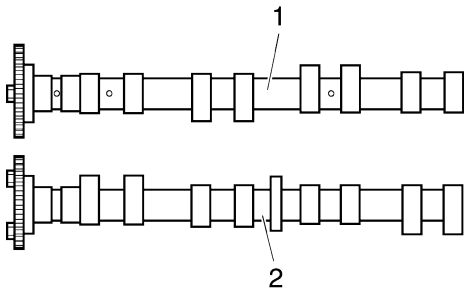
To prevent damage to the cylinder head, camshafts or camshaft caps, loosen the camshaft cap bolts in stages and in a criss-cross pattern, working from the outside in.

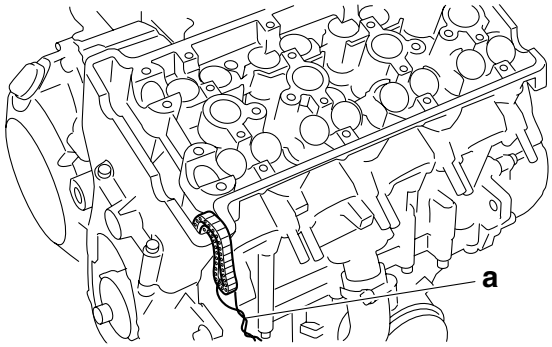


6. Remove:
   - Intake camshaft "1"
   - Exhaust camshaft "2"

TIP

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



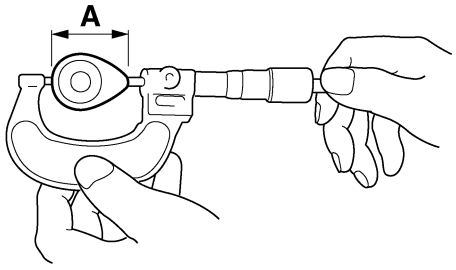


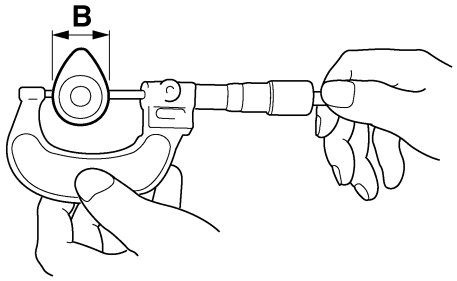
7. Remove:
   • Camshaft sprockets

EAS23850
CHECKING THE CAMSHAFTS

1. Check:
   • Camshaft lobes
   Blue discoloration/pitting/scratches → Replace the camshaft.
2. Measure:
   • Camshaft lobe dimensions “A” and “B”
   Out of specification → Replace the camshaft.

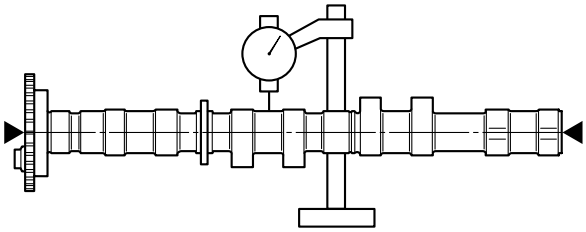
Intake A
31.850–31.950 mm (1.2539–1.2579 in)
Limit
31.800 mm (1.2520 in)
Intake B
24.950–25.050 mm (0.9823–0.9862 in)
Limit
24.900 mm (0.9803 in)
Exhaust A
31.850–31.950 mm (1.2539–1.2579 in)
Limit
31.800 mm (1.2520 in)
Exhaust B
24.950–25.050 mm (0.9823–0.9862 in)
Limit
24.900 mm (0.9803 in)





3. Measure:
   • Camshaft runout
   Out of specification → Replace.

Camshaft runout limit
0.060 mm (0.0024 in)



4. Measure:
   • Camshaft-journal-to-camshaft-cap clearance
   Out of specification → Measure the camshaft journal diameter.

Camshaft-journal-to-camshaft-cap clearance
0.028–0.062 mm (0.0011–0.0024 in)
Limit
0.080 mm (0.0032 in)

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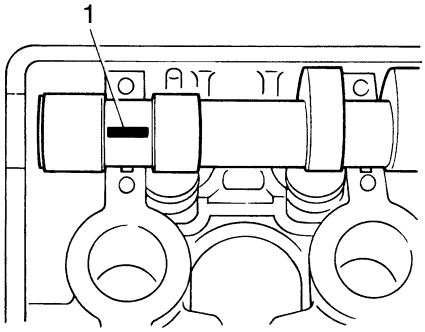
a. Install the camshaft into the cylinder head (without the dowel pins and camshaft caps).
b. Position strip of Plastigauge® “1” onto the camshaft journal as shown.
c. Install the dowel pins and camshaft caps.

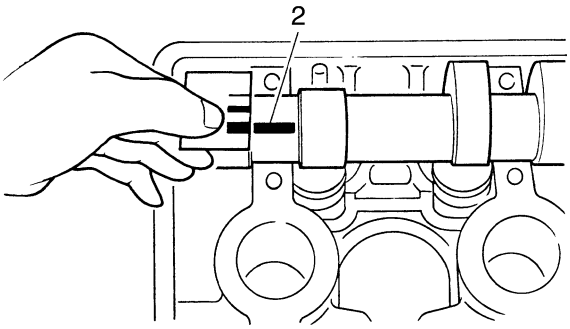
TIP

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

Camshaft cap bolt
10 Nm (1.0 m·kgf, 7.2 ft·lbf)

d. Remove the camshaft caps and then measure the width of the Plastigauge® “2”.





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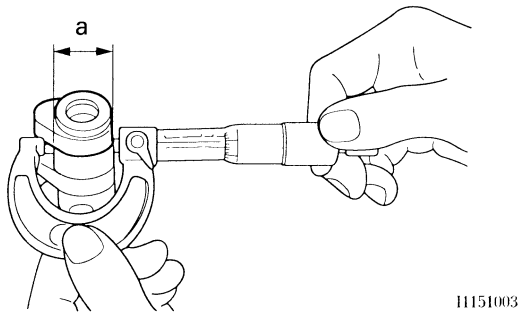
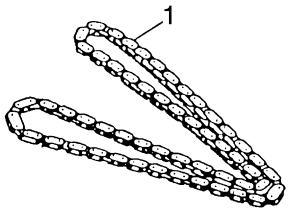
5. Measure:
- Camshaft journal diameter “a”
  Out of specification → Replace the camshaft.
  Within specification → Replace the cylinder head and the camshaft caps as a set.

Camshaft journal diameter
22.967–22.980 mm
(0.9042–0.9047 in)

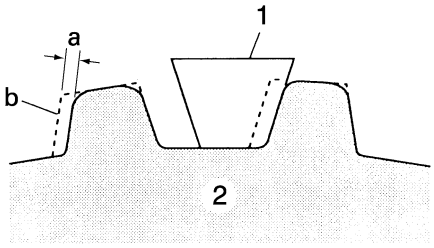


EAS23870
CHECKING THE TIMING CHAIN AND CAMSHAFT SPROCKET

1. Check:
- Timing chain “1”
  Damage/stiffness → Replace the timing chain and camshaft sprocket as a set.



2. Check:
- Camshaft sprocket
  More than 1/4 tooth wear “a” → Replace the camshaft sprocket and the timing chain as a set.

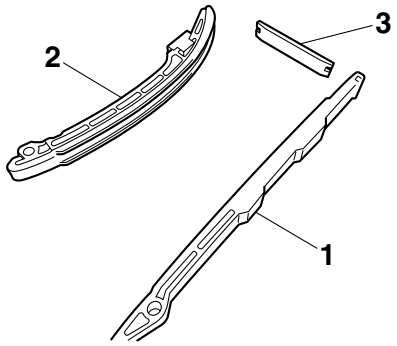


a. 1/4 tooth
b. Correct

1. Timing chain roller
2. Camshaft sprocket

EAS23950
CHECKING THE TIMING CHAIN GUIDES

1. 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).



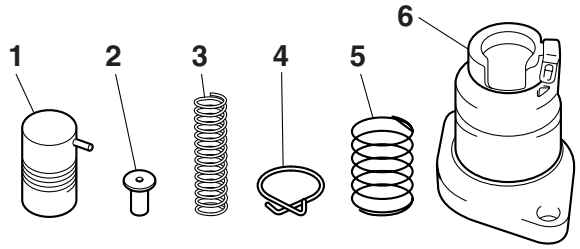
EAS23970
CHECKING THE TIMING CHAIN TENSIONER

1. Remove:
- Timing chain tensioner rod “1”
- Timing chain tensioner spring seat “2”
- Timing chain tensioner inner spring “3”

- Timing chain tensioner outer spring “5”
- Timing chain tensioner housing “6”

TIP

Squeeze the timing chain tensioner clip “4”, and then remove the timing chain tensioner springs and timing chain tensioner rod.



2. Check:
   - Timing chain tensioner housing
   - Timing chain tensioner rod
   - Timing chain tensioner spring seat
   - Timing chain tensioner springs

   Damage/wear → Replace the as a set.
3. Assemble:
   - Timing chain tensioner springs
   - Timing chain tensioner spring seat
   - Timing chain tensioner rod

TIP

Prior to installing the timing chain tensioner rod, drain the engine oil from the timing chain tensioner housing.

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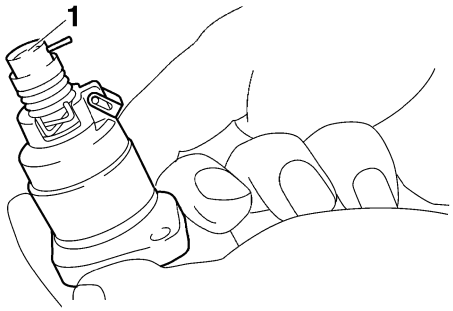
a. Install the timing chain tensioner springs, timing chain tensioner spring seat, and timing chain tensioner rod “1”.



b. Squeeze the timing chain tensioner clip “2”, and then push the timing chain tensioner rod “3” into the timing chain tensioner housing.

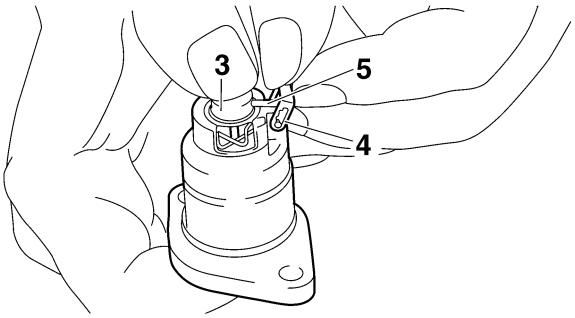
TIP

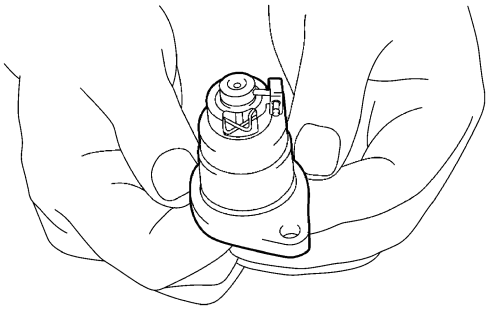
Do not release the timing chain tensioner clip while pushing the rod into the housing, otherwise the rod may be ejected.

c. Hook the clip “4” to the timing chain tensioner rod “3”.

TIP

Hook the timing chain tensioner rod pin “5” to the center of the clip “4”. After the installation, check that the clip “4” can come off by its own weight by pushing the timing chain tensioner rod “3” at the position of installation.





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EAS24010

INSTALLING THE CAMSHAFTS

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

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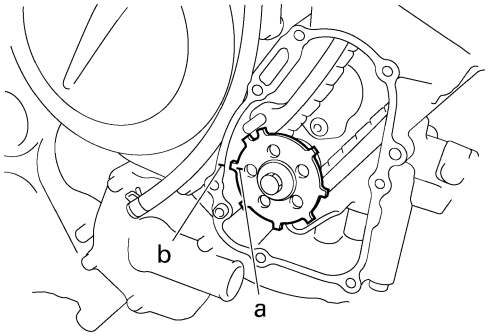
a. Turn the crankshaft clockwise.
b. When piston #1 is at TDC, align the “T” mark

"a" with the crankcase mating surface "b".



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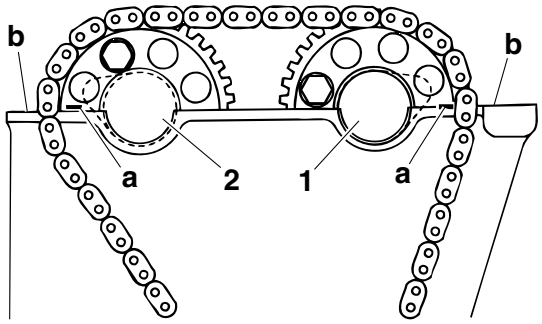
2. Install:
   - Exhaust camshaft "1"
   - Intake camshaft "2"
     (with the camshaft sprockets temporarily tightened)

TIP

Make sure the match mark "a" on the camshaft sprockets is aligned with the cylinder head edge "b".



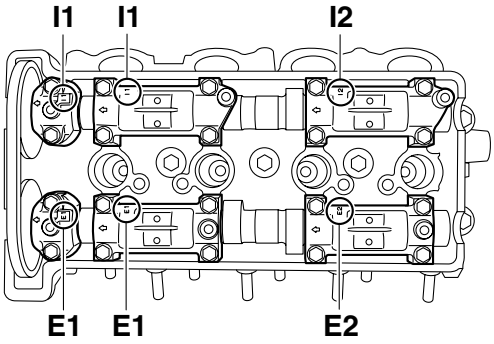
3. Install:
   - Dowel pins
   - Intake camshaft caps
   - Exhaust camshaft caps

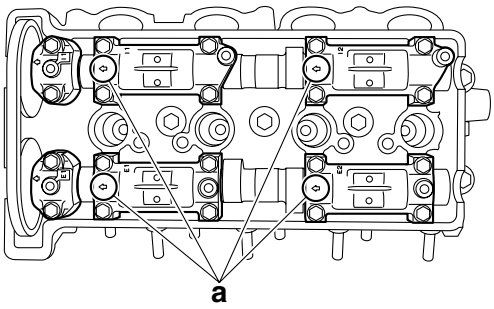
TIP

- Make sure each camshaft cap is installed in its original place. Refer to the identification marks as follows:

"I1", "I2": Intake side camshaft cap mark
"E1", "E2": Exhaust side camshaft cap mark

- Make sure the arrow mark "a" on each camshaft points towards the right side of the engine.





4. Install:
   - Camshaft cap bolts

	Camshaft cap bolt **10 Nm (1.0 m·kgf, 7.2 ft·lbf)**

TIP

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

ECA4S81016

NOTICE

- **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.**

5. Install:
   - Timing chain guide

TIP

When installing the timing chain guide, be sure to keep the timing chain as tight as possible on the exhaust side.

6. Install:
   - Gasket New
   - Timing chain tensioner "1"
   - Timing chain tensioner bolts "2"

	Timing chain tensioner bolt 12 Nm (1.2 m·kgf, 8.6 ft·lbf)

EWA5D01008

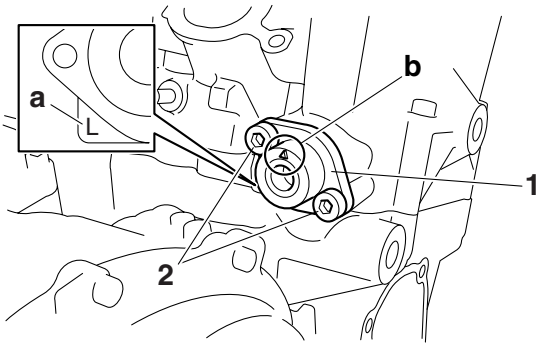
⚠ WARNING

Always use a new gasket.

ECA5D01011

NOTICE

- **Be sure to install the timing chain tensioner gasket so that its section with the "L" mark "a" is protruding from the lower left side of the timing chain tensioner.**
- **The arrow mark "b" on the timing chain tensioner should face up.**



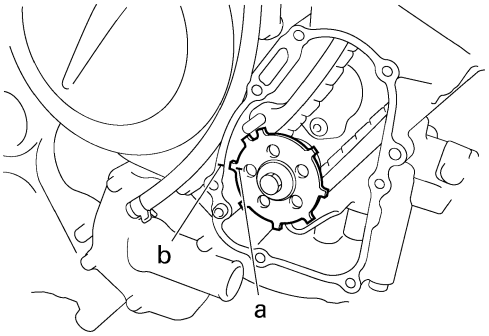
7. Turn:
   - Crankshaft
     (several full turns clockwise)
8. Check:
   - "T" mark "a"
     Make sure the "T" mark on the pickup rotor is aligned with the crankcase mating sure face "b".
   - Camshaft sprocket match mark "c"
     Make sure the match marks on the camshaft sprockets are aligned with the edge of the cylinder head "d".
     Out of alignment → Adjust.
     Refer to the installation steps above.
9. Tighten:
   - Camshaft sprocket bolts "1"

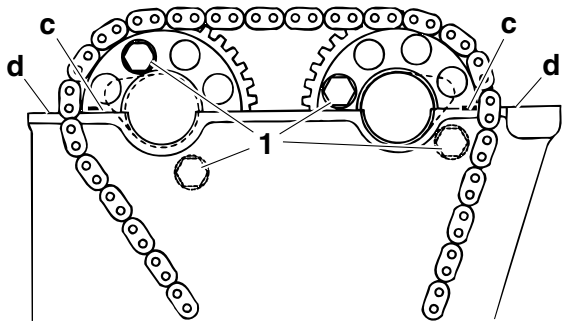
	Camshaft sprocket bolts 20 Nm (2.0 m·kgf, 1.5 ft·lbf)

ECA4S81017

NOTICE

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.

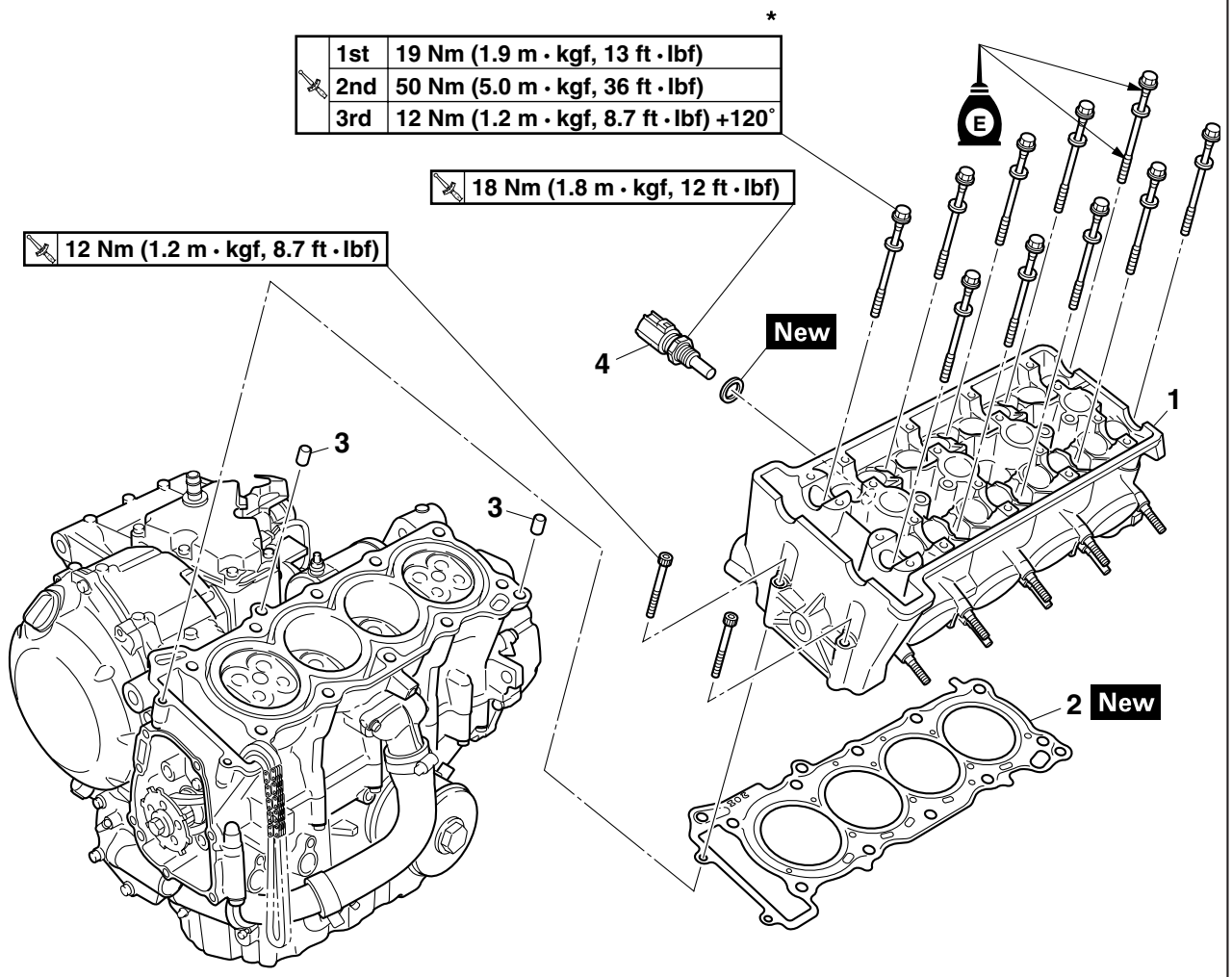




10. Measure:
    - Valve clearance
      Out of specification → Adjust.
      Refer to "ADJUSTING THE VALVE CLEARANCE" on page 3-5.

EAS24100
CYLINDER HEAD

Removing the cylinder head



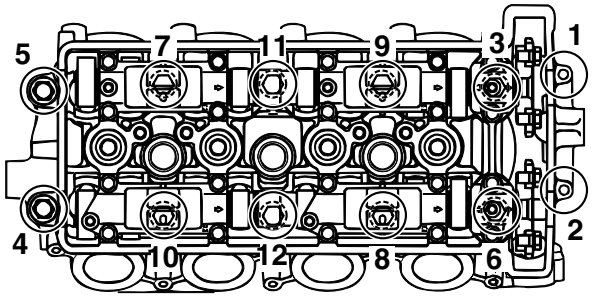
Order	Job/Parts to remove	Q'ty	Remarks
	Thermostat		Refer to "THERMOSTAT" on page 6-6.
	Intake camshaft		Refer to "CAMSHAFTS" on page 5-8.
	Exhaust camshaft		Refer to "CAMSHAFTS" on page 5-8.
1	Cylinder head	1	
2	Cylinder head gasket	1	
3	Dowel pin	2	
4	Coolant temperature sensor	1	
			For installation, reverse the removal procedure.

*Refer to "ENGINE TIGHTENING TORQUES" on page 2-15.

EAS24120
REMOVING THE CYLINDER HEAD
1. Remove:
   - Cylinder head bolts

TIP

- Loosen the bolts in the proper sequence as shown.
- Loosen each bolts 1/2 of a turn at a time. After all of the bolts are fully loosened, remove them.

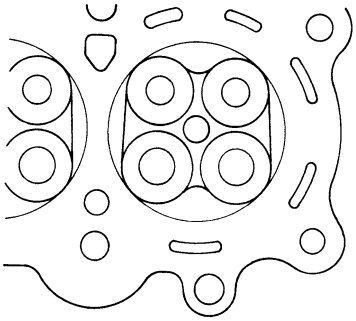


EAS24160
CHECKING THE CYLINDER HEAD
1. Eliminate:
   - Combustion chamber carbon deposits (with a rounded scraper)

TIP

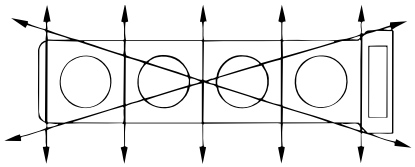
Do not use a sharp instrument to avoid damaging or scratching:

- Spark plug bore threads
- Valve seats



2. Check:
   - Cylinder head
     Damage/scratches → Replace.
   - Cylinder head water jacket
     Mineral deposits/rust → Eliminate.
3. Measure:
   - Cylinder head warpage
     Out of specification → Resurface the cylinder head.

	Warpage limit **0.05 mm (0.0020 in)**



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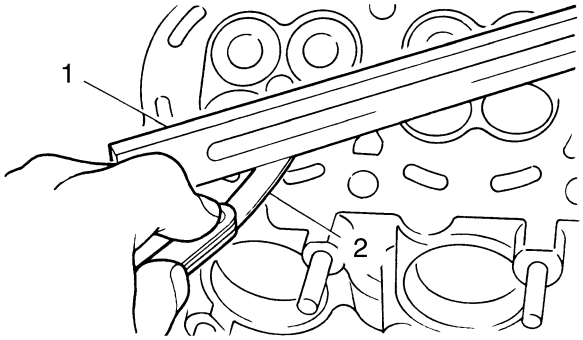
a. Place a straightedge “1” and a thickness gauge “2” across the cylinder head.



b. Measure the warpage.
c. If the limit is exceeded, resurface the cylinder head as follows.
d. Place a 400–600 grit wet sandpaper on the surface plate and resurface the cylinder head using a figure-eight sanding pattern.

TIP

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

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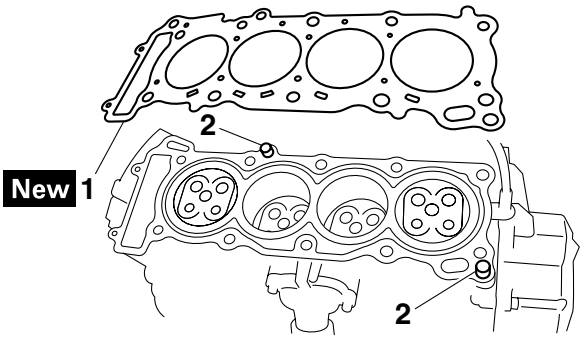
EAS24240
INSTALLING THE CYLINDER HEAD
1. Install:
   - Cylinder head gasket “1” New
   - Dowel pins “2”



2. Install:
   - Cylinder head

TIP

Pass the timing chain through the timing chain cavity.

3. Tighten:
   - Cylinder head bolts "1" – "10"
     Refer to "ENGINE TIGHTENING TORQUES" on page 2-15

Cylinder head bolt
1st: 19 Nm (1.9 m·kgf, 14 ft·lbf)
2nd: 50 Nm (5.0 m·kgf, 36 ft·lbf)
***3rd: 12 Nm (1.2 m·kgf, 8.6 ft·lbf)**
+120°

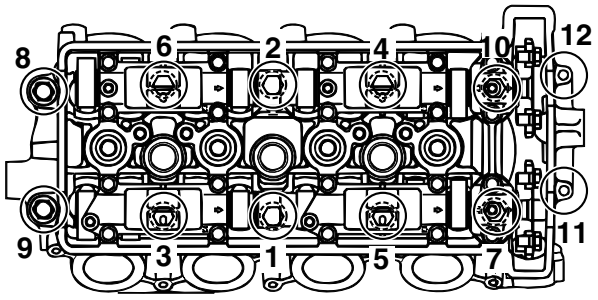
*Loosen the bolt and retighten to specification torque.

   - Cylinder head bolts "11" "12"

Cylinder head bolt
12 Nm (1.2 m·kgf, 8.7 ft·lbf)

TIP

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



4. Install:
   - Exhaust camshaft
   - Intake camshaft
     Refer to "INSTALLING THE CAMSHAFTS" on page 5-13.

EAS20710

MEASURING THE COMPRESSION PRESSURE

The following procedure applies to all of the cylinders.

TIP

Insufficient compression pressure will result in a loss of performance.

1. Measure:
   - Valve clearance
     Out of specification → Adjust.
     Refer to "ADJUSTING THE VALVE CLEARANCE" on page 3-5.
2. Start the engine, warm it up for several minutes, and then turn it off.
3. Remove:
   - Seat
     Refer to "GENERAL CHASSIS" on page 4-1.
   - Fuel tank
     Refer to "FUEL TANK" on page 7-1.
   - Air filter case
     Refer to "GENERAL CHASSIS" on page 4-1.
   - Rubber cover
     Refer to "AIR INDUCTION SYSTEM" on page 7-11.
4. Disconnect:
   - Spark plug caps
5. Remove:
   - Spark plugs

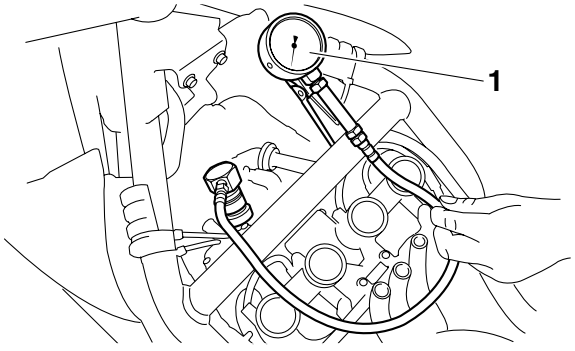
ECA13340

NOTICE

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.

6. Install:
   - Compression gauge "1"

Compression gauge
90890-03081
Engine compression tester
YU-33223



7. Measure:
   • Compression pressure
   Out of specification → Refer to steps (c) and (d).

Standard compression pressure (at sea level)
1550 kPa/400 r/min (15.5 kgf/cm^2/400 r/min, 220.5 psi/400 r/min)
Minimum–maximum
1300–1650 kPa (13.0–16.5 kgf/cm^2, 184.9–234.7 psi)

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

EWA4S81003

⚠ WARNING

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

TIP

The difference in compression pressure between cylinders should not exceed 100 kPa (1 kg/cm^2, 14 psi).

c. If the compression pressure is above the maximum specification, check the cylinder head, valve surfaces and piston crown for carbon deposits.
   Carbon deposits → Eliminate.
d. If the compression pressure is below the minimum specification, pour a teaspoonful of engine oil into the spark plug bore and measure again.
   Refer to the following table.

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

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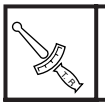
8. Install:
   • Spark plugs



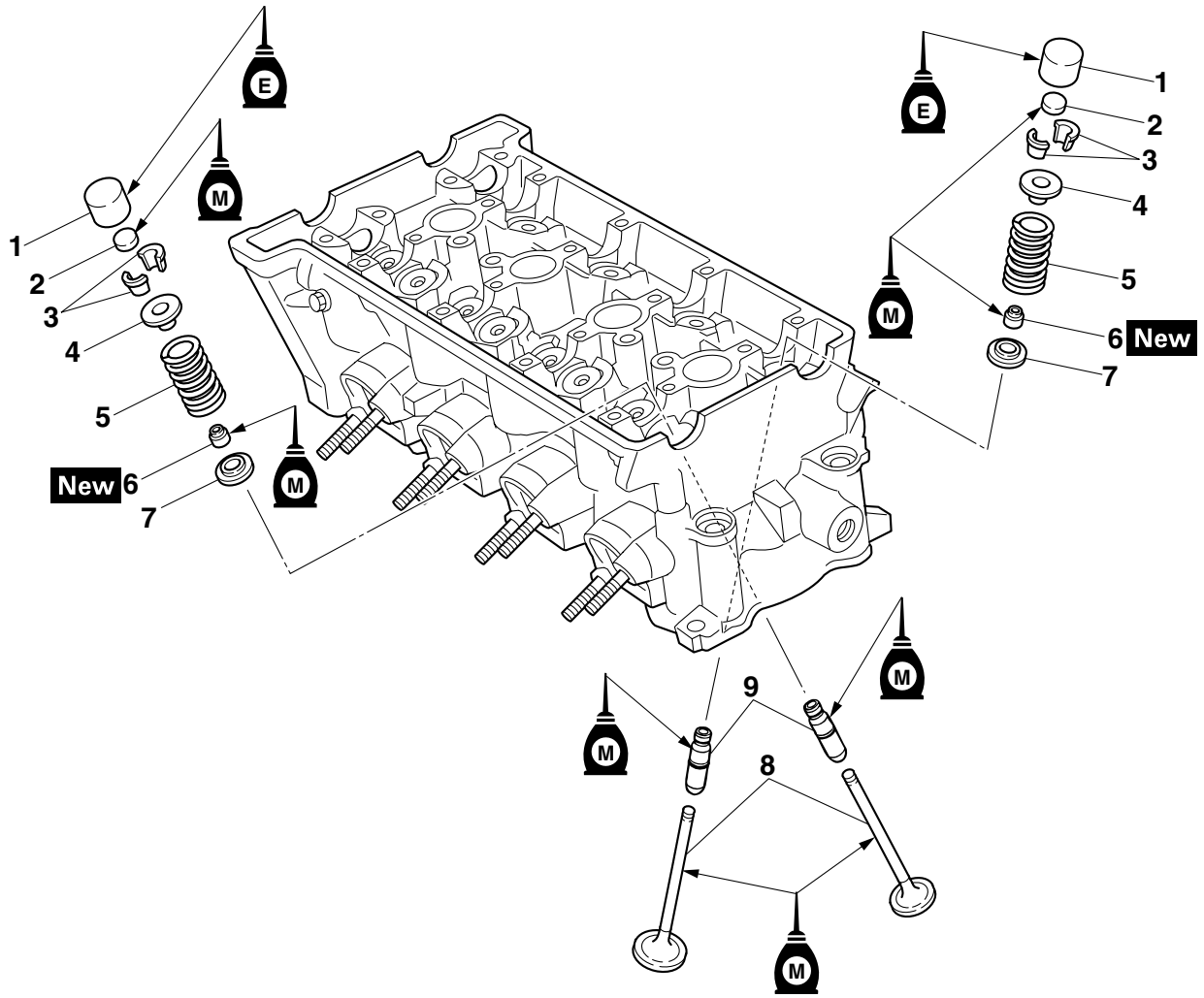
Spark plug
13 Nm (1.3 m·kgf, 9.4 ft·lbf)

9. Connect:
   • Spark plug caps
10. Install:
   • Rubber cover
   Refer to "AIR INDUCTION SYSTEM" on page 7-11.
   • Air filter case
   Refer to "GENERAL CHASSIS" on page 4-1.
   • Fuel tank
   Refer to "FUEL TANK" on page 7-1.
   • Seat
   Refer to "GENERAL CHASSIS" on page 4-1.

EAS24270

VALVES AND VALVE SPRINGS

Removing the valves and valve springs



Order	Job/Parts to remove	Q'ty	Remarks
	Cylinder head		Refer to "CYLINDER HEAD" on page 5-16.
1	Intake valve lifter/Exhaust valve lifter	8/8	
2	Intake valve pad/Exhaust valve pad	8/8	
3	Intake valve cotter/Exhaust valve cotter	16/16	
4	Intake valve upper spring seat/Exhaust valve upper spring seat	8/8	
5	Intake valve spring/Exhaust valve spring	8/8	
6	Intake valve stem seal/Exhaust valve stem seal	8/8	
7	Intake valve lower spring seat/Exhaust valve lower spring seat	8/8	
8	Intake valve/Exhaust valve	8/8	
9	Intake valve guide/Exhaust valve guide	8/8	
			For installation, reverse the removal procedure.

EAS24280
REMOVING THE VALVES

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

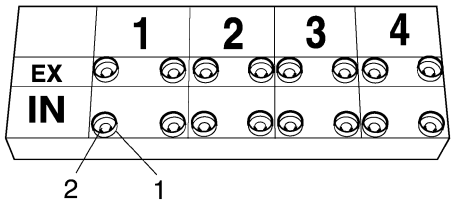
TIP

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

1. Remove:
   - Valve lifter "1"
   - Valve pad "2"

TIP

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



I1172201

2. Check:
   - Valve sealing
     Leakage at the valve seat → Check the valve face, valve seat, and valve seat width.
     Refer to "CHECKING THE VALVE SEATS" on page 5-23.

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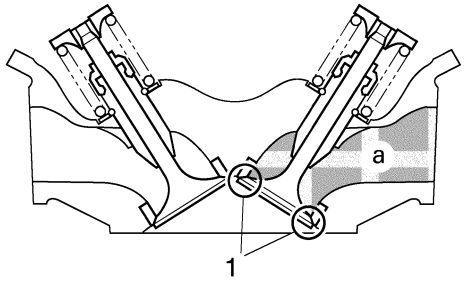
a. Pour a clean solvent "a" into the intake and exhaust ports.
b. Check that the valves properly seal.

TIP

There should be no leakage at the valve seat "1".



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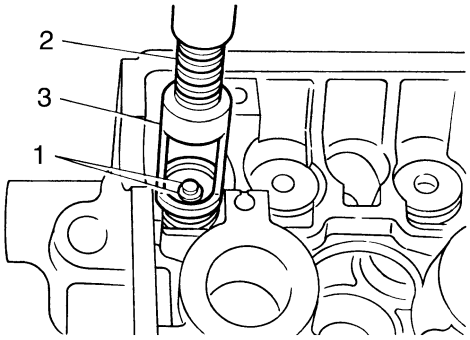
3. Remove:
   - Valve cotters "1"

TIP

Remove the valve cotters by compressing the valve springs with the valve spring compressor "2" and the valve spring compressor attachment "3".

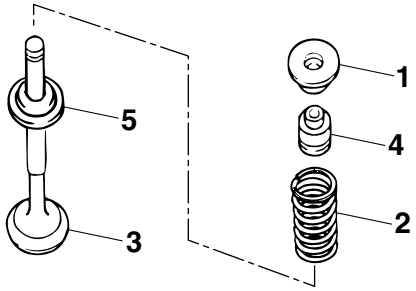
Valve spring compressor
90890-04019
YM-04019
Valve spring compressor attachment
90890-04108
Valve spring compressor adapter 22 mm
YM-04108



4. Remove:
   - Upper spring seat "1"
   - Valve spring "2"
   - Valve "3"
   - Valve stem seal "4"
   - Lower spring seat "5"

TIP

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



EAS24290
CHECKING THE VALVES AND VALVE GUIDES

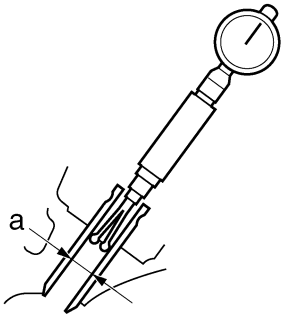
The following procedure applies to all of the valves and valve guides.

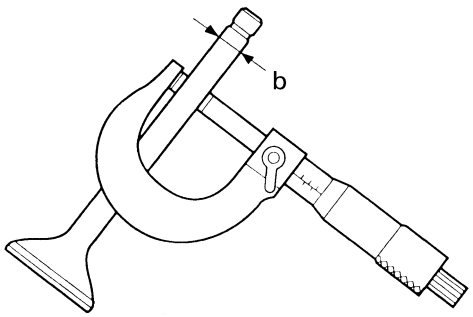
1. Measure:
   - Valve-stem-to-valve-guide clearance
     Out of specification → Replace the valve

guide.

Valve-stem-to-valve-guide clearance = Valve guide inside diameter "a" - Valve stem diameter "b"

Valve-stem-to-valve-guide clearance (intake)
0.010–0.037 mm (0.0004–0.0015 in)
Limit
0.080 mm (0.0032 in)
Valve-stem-to-valve-guide clearance (exhaust)
0.025–0.052 mm (0.0010–0.0020 in)
Limit
0.100 mm (0.0039 in)





2. Replace:
- Valve guide

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

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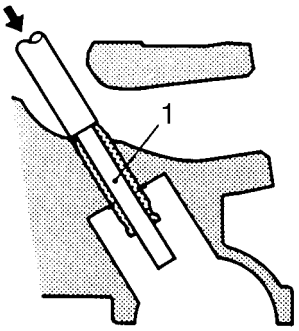
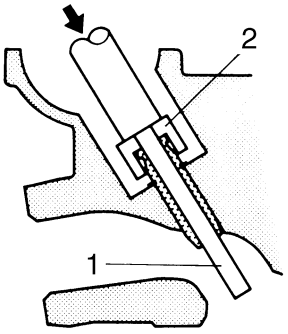
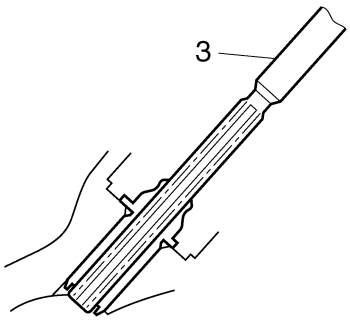
a. Remove the valve guide with the valve guide remover "1".



b. Install the new valve guide with the valve guide installer "2" and valve guide remover "1".



c. After installing the valve guide, bore the valve guide with the valve guide reamer "3" to obtain the proper valve-stem-to-valve-guide clearance.



TIP
After replacing the valve guide, reface the valve seat.

Valve guide remover (ø4)
90890-04111
Valve guide remover (4.0 mm)
YM-04111
Valve guide installer (ø4)
90890-04112
Valve guide installer (4.0 mm)
YM-04112
Valve guide reamer (ø4)
90890-04113
Valve guide reamer (4.0 mm)
YM-04113

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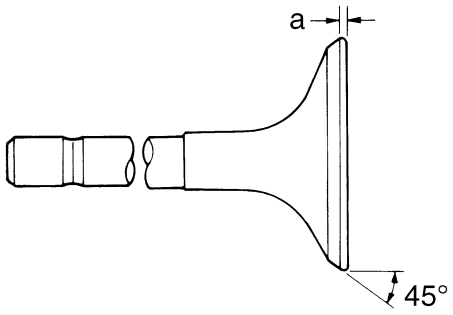
3. Eliminate:
   • Carbon deposits
   (from the valve face and valve seat)
4. Check:
   • Valve face
   Pitting/wear → Grind the valve face.
   • Valve stem end
   Mushroom shape or diameter larger than the body of the valve stem → Replace the valve.
5. Measure:
   • Valve margin thickness "a"
   Out of specification → Replace the valve.

Valve margin thickness D (intake)
0.60–0.80 mm (0.0236–0.0315 in)
Limit
0.5 mm (0.02 in)
Valve margin thickness D (exhaust)
0.60–0.80 mm (0.0236–0.0315 in)
Limit
0.5 mm (0.02 in)

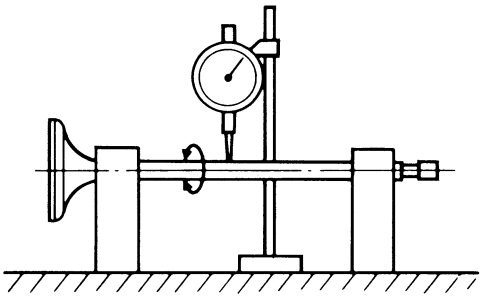


6. Measure:
   • Valve stem runout
   Out of specification → Replace the valve.

TIP

- 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
0.040 mm (0.0016 in)



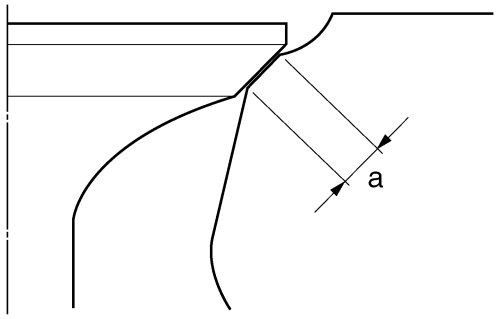
EAS24300

CHECKING THE VALVE SEATS

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

1. Eliminate:
   • Carbon deposits
   (from the valve face and valve seat)
2. Check:
   • Valve seat
   Pitting/wear → Replace the cylinder head.
3. Measure:
   • Valve seat width "a"
   Out of specification → Replace the cylinder head.

Valve seat width C (intake)
0.90–1.10 mm (0.0354–0.0433 in)
Limit
1.6 mm (0.06 in)
Valve seat width C (exhaust)
0.90–1.10 mm (0.0354–0.0433 in)
Limit
1.6 mm (0.06 in)



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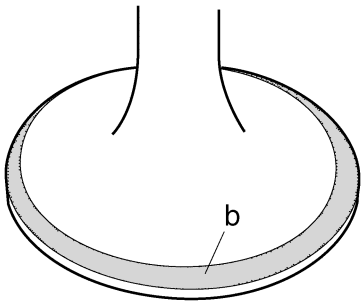
a. Apply Mechanic's blueing dye (Dykem) "b" onto the valve face.



b. Install the valve into the cylinder head.
c. Press the valve through the valve guide and onto the valve seat to make a clear impression.
d. Measure the valve seat width.

TIP

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

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4. Lap:
   - Valve face
   - Valve seat

TIP

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

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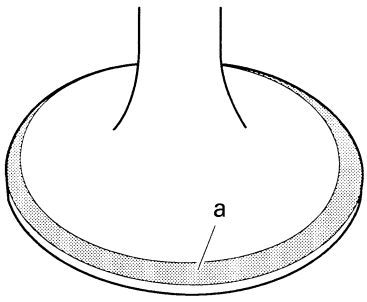
a. Apply a coarse lapping compound “a” to the valve face.

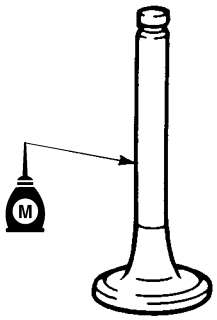
ECA13790

NOTICE

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



b. Apply molybdenum disulfide oil onto the valve stem.

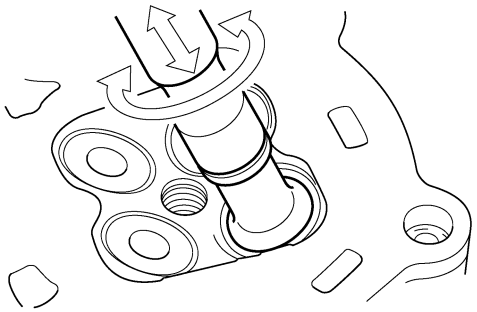


c. Install the valve into the cylinder head.
d. Turn the valve until the valve face and valve seat are evenly polished, then clean off all of the lapping compound.

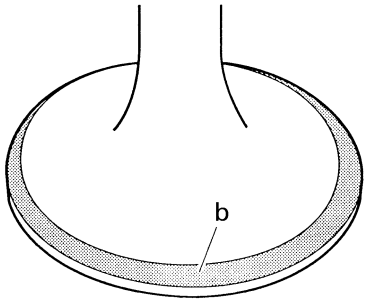
TIP

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

Valve lapper
90890-04101
Valve lapping tool
YM-A8998



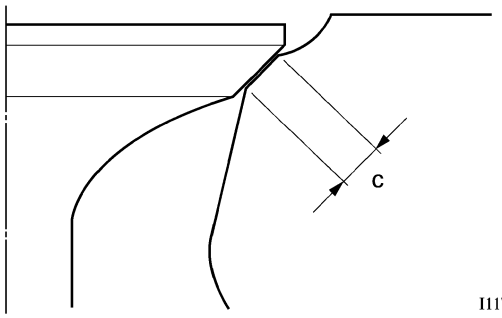
e. Apply a fine lapping compound to the valve face and repeat the above steps.
f. After every lapping procedure, be sure to clean off all of the lapping compound from the valve face and valve seat.
g. Apply Mechanic’s blueing dye (Dykem) “b” onto the valve face.



h. Install the valve into the cylinder head.
i. Press the valve through the valve guide and onto the valve seat to make a clear impres-

sion.

j. Measure the valve seat width “c” again. If the valve seat width is out of specification, reface and lap the valve seat.



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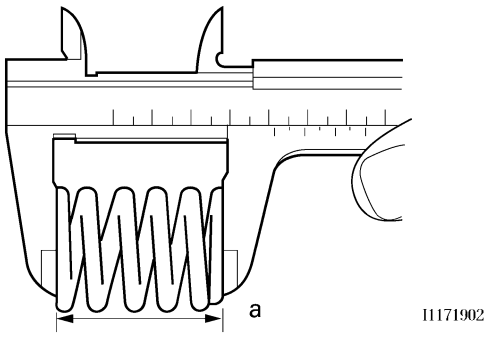
EAS24310

CHECKING THE VALVE SPRINGS

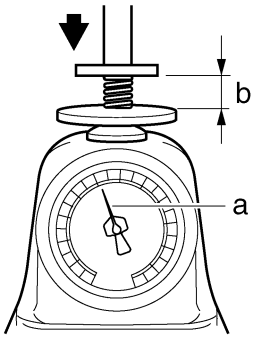
The following procedure applies to all of the valve springs.

1. Measure:
   - Valve spring free length “a”
     Out of specification → Replace the valve spring.

Free length (intake)
39.08 mm (1.54 in)
Limit
37.13 mm (1.46 in)
Free length (exhaust)
39.08 mm (1.54 in)
Limit
37.13 mm (1.46 in)



2. Measure:
   - Compressed valve spring force “a”
     Out of specification → Replace the valve spring.

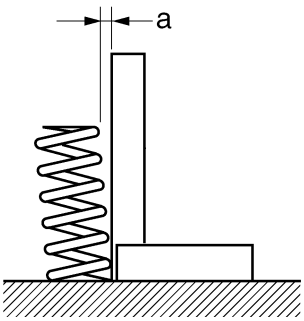


b. Installed length

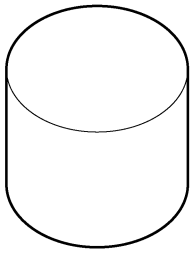
Installed compression spring force (intake)
132.40–152.40 N (13.50–15.54 kgf, 29.76–34.26 lbf)
Installed compression spring force (exhaust)
132.40–152.40 N (13.50–15.54 kgf, 29.76–34.26 lbf)
Installed length (intake)
33.40 mm (1.31 in)
Installed length (exhaust)
33.40 mm (1.31 in)

3. Measure:
   - Valve spring tilt “a”
     Out of specification → Replace the valve spring.

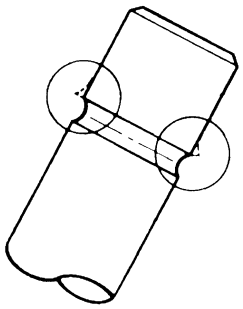
Spring tilt (intake)
2.5 °/1.7 mm (0.07 in)
Spring tilt (exhaust)
2.5 °/1.7 mm (0.07 in)



EAS24320
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.

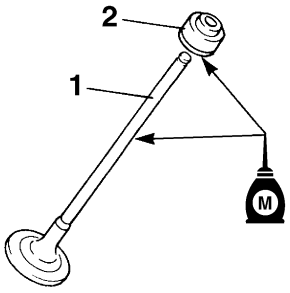


EAS24340
INSTALLING THE VALVES
The following procedure applies to all of the valves and related components.
1. Deburr:
   - Valve stem end
     (with an oil stone)



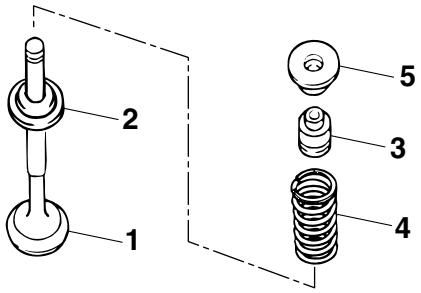
2. Lubricate:
   - Valve stem "1"
   - Valve stem seal "2"
     (with the recommended lubricant)

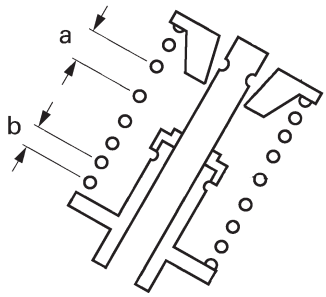
	Recommended lubricant **Molybdenum disulfide oil**



3. Install:
   - Valve "1"
   - Lower spring seat "2"
   - Valve stem seal "3" New
   - Valve spring "4"
   - Upper spring seat "5"
     (into the cylinder head)

TIP
- Make sure each valve is installed in its original place.
- Install the valve spring with the larger pitch "a" facing up.





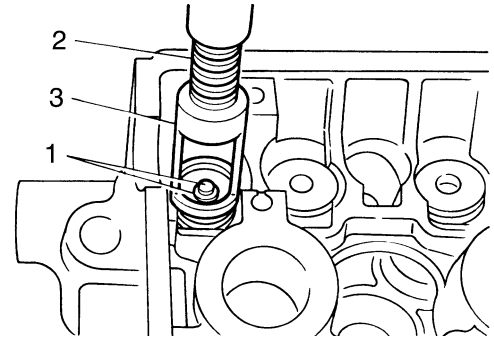
I1172001

a. Larger pitch
b. Smaller pitch

4. Install:
   - Valve cotters "1"

TIP
Install the valve cotters 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** **90890-04108** **Valve spring compressor adapter 22 mm** **YM-04108**

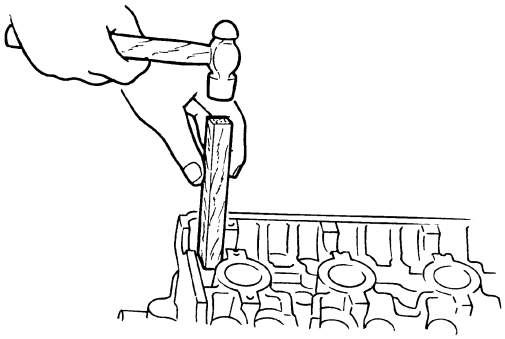


5. To secure the valve cotters onto the valve stem, lightly tap the valve tip with a soft-face hammer.

ECA13800

NOTICE

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

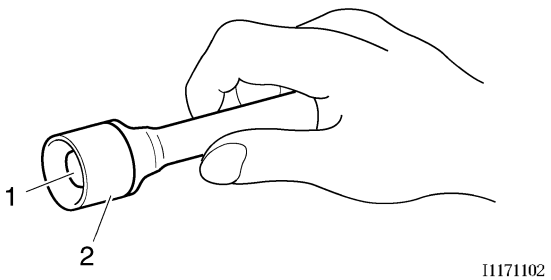


6. Lubricate:
   - Valve pad “1”
   - Valve lifter “2”

   (with the recommended lubricant)

TIP

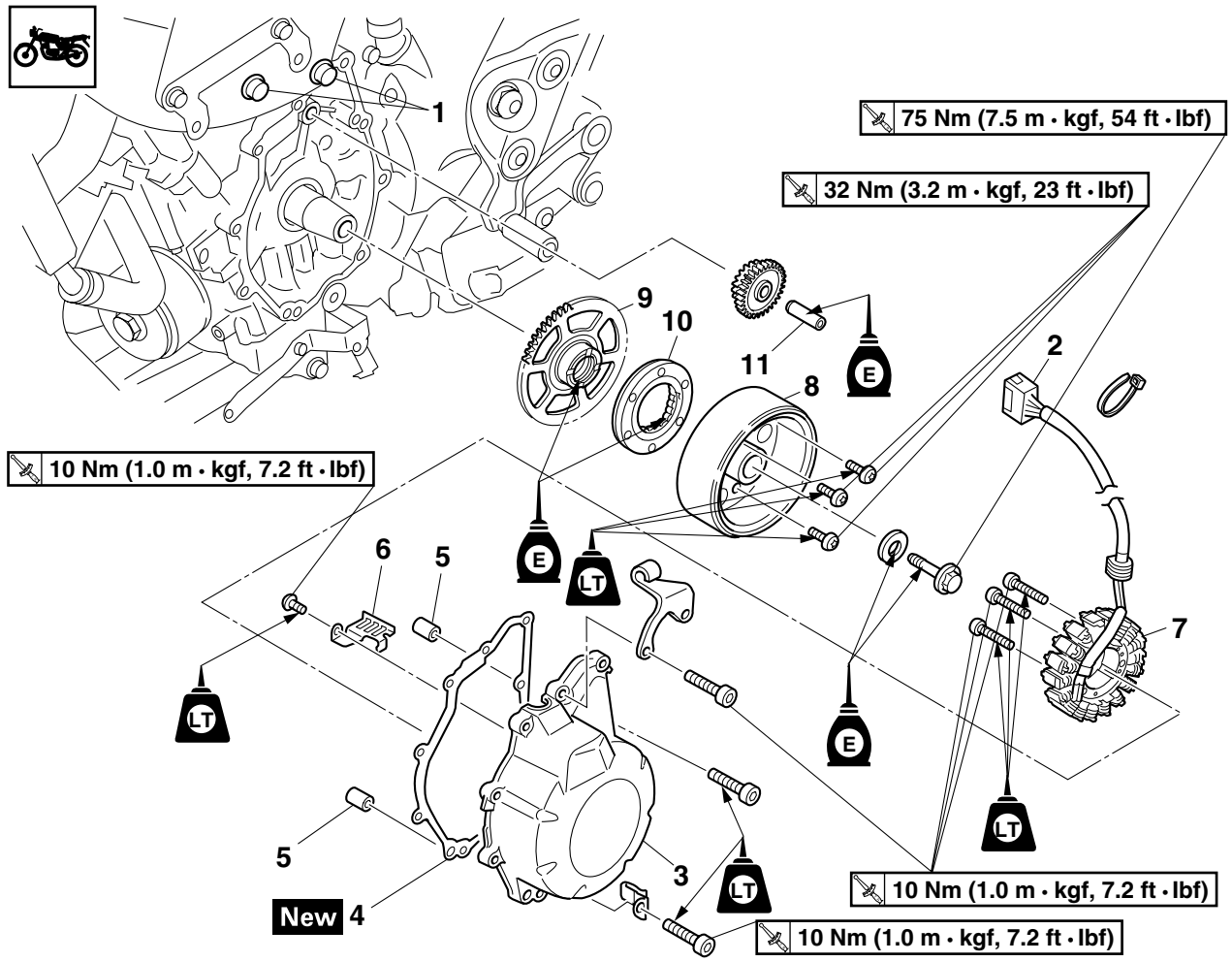
- Lubricate the valve lifter and valve pad with molybdenum disulfide oil.
- The valve lifter must move smoothly when rotated with a finger.
- Each valve lifter and valve pad must be reinstalled in its original position.



EAS4S81014

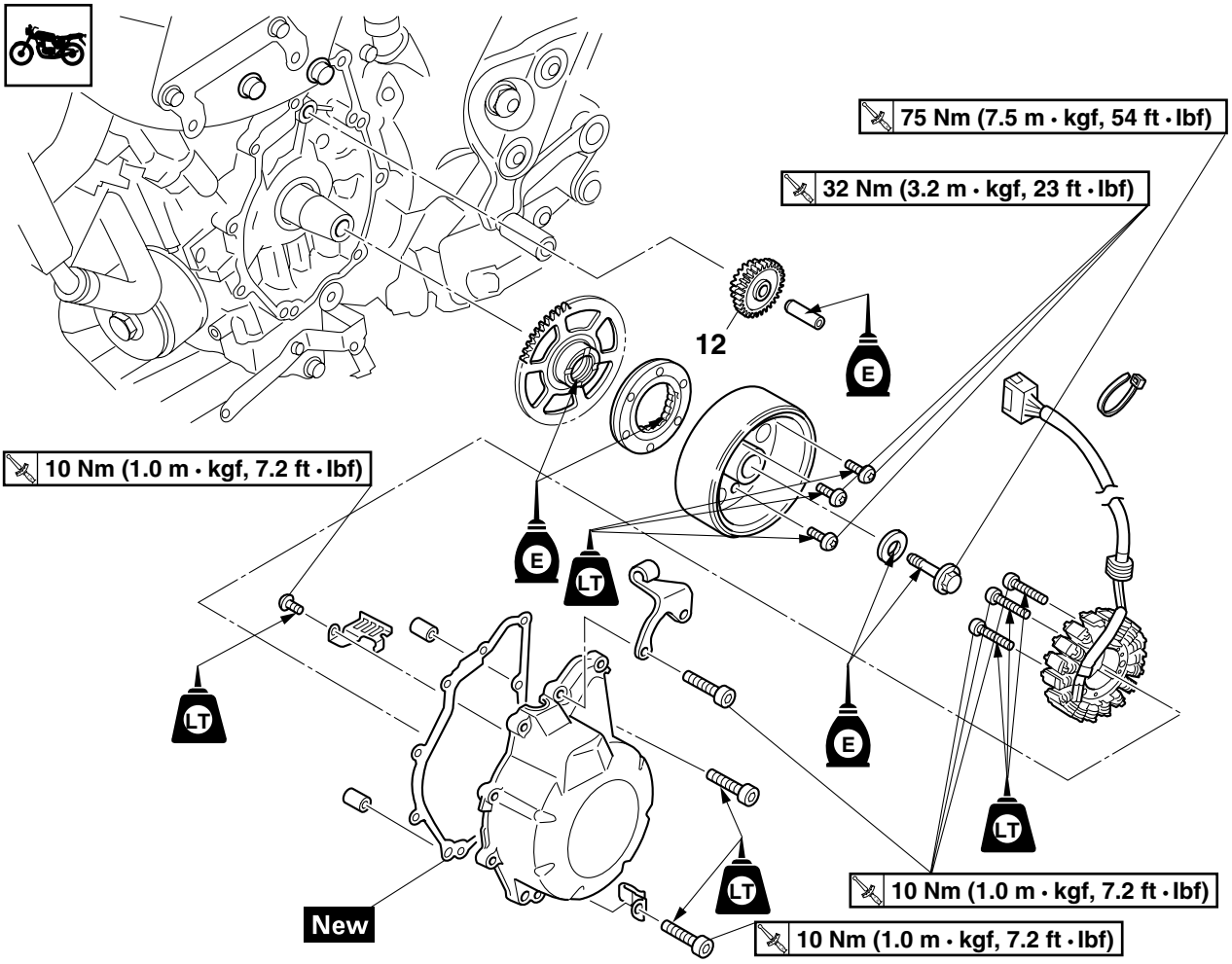
GENERATOR AND STARTER CLUTCH

Removing the generator and starter clutch



Order	Job/Parts to remove	Q'ty	Remarks
	Seat		Refer to "GENERAL CHASSIS" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Left side panel		Refer to "GENERAL CHASSIS" on page 4-1.
	Engine oil		Drain Refer to "CHANGING THE ENGINE OIL" on page 3-24.
1	Left front engine mounting bolt	2	Loosen.
2	Stator coil assembly lead coupler	1	Disconnect.
3	Generator rotor cover	1	
4	Generator rotor cover gasket	1	
5	Dowel pin	2	
6	Stator coil assembly lead holder	1	
7	Stator coil assembly	1	
8	Generator rotor	1	
9	Starter clutch drive gear	1	
10	Starter clutch assembly	1	
11	Idler gear shaft	1	

Removing the generator and starter clutch



Order	Job/Parts to remove	Q'ty	Remarks
12	Idler gear	1	
			For installation, reverse the removal procedure.

EAS24490
REMOVING THE GENERATOR
1. Remove:
   - Seat
     Refer to “GENERAL CHASSIS” on page 4-1.
   - Fuel tank
     Refer to “FUEL TANK” on page 7-1.
2. Drain:
   - Engine oil
     Refer to “CHANGING THE ENGINE OIL” on page 3-24.
3. Remove:
   - Generator rotor cover

TIP

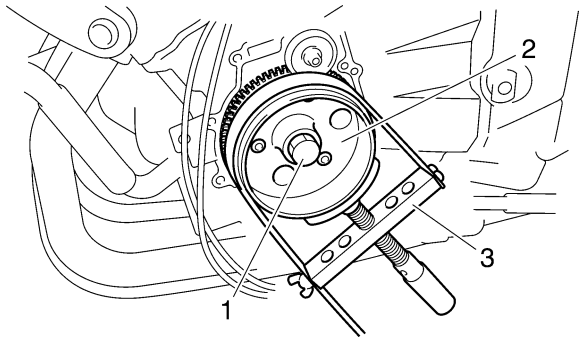
Loosen each bolt 1/4 of a turn at a time, in stages and in a crisscross pattern. After all of the bolts are fully loosened, remove them.

4. Remove:
   - Generator rotor bolt “1”
   - Washer

TIP

- While holding the generator rotor “2” with the sheave holder “3”, loosen the generator rotor bolt.
- Do not allow the sheave holder to touch the projection on the generator rotor.

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



5. Remove:
   - Generator rotor “1”
     (with the flywheel puller “2” and flywheel puller attachment)

ECA13880

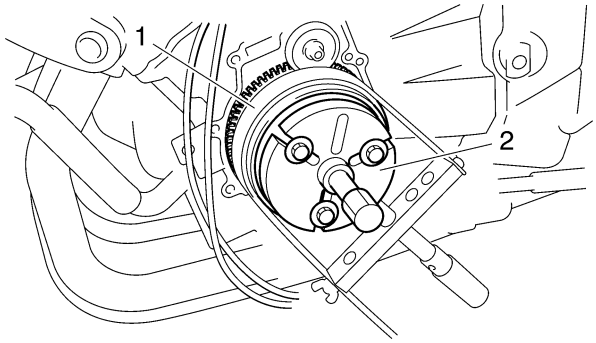
NOTICE

To protect the end of the crankshaft, place an appropriate sized socket between the flywheel puller set’s center bolt and the crankshaft.

TIP

Make sure the flywheel puller is centered over the generator rotor.

Flywheel puller
90890-01362
Heavy duty puller
YU-33270-B
Flywheel puller attachment
90890-04089
Crankshaft protector
YM-33282

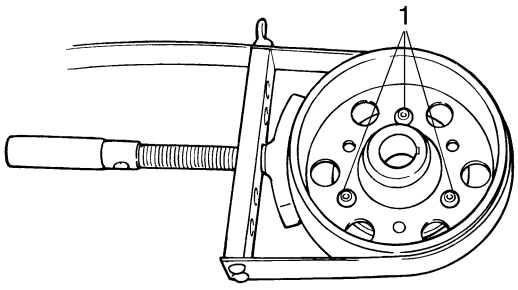


EAS24560
REMOVING THE STARTER CLUTCH
1. Remove:
   - Starter clutch bolt “1”

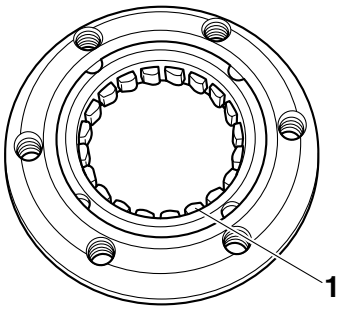
TIP

- While holding the generator rotor with the sheave holder, remove the starter clutch bolt.
- Do not allow the sheave holder to touch the projection on the generator rotor.

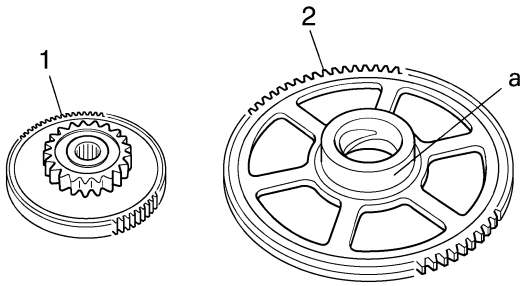
Sheave holder
90890-01701
Primary clutch holder
YS-01880-A



EAS24570
CHECKING THE STARTER CLUTCH
1. Check:
   - Starter clutch rollers “1”
     Damage/wear → Replace.



2. Check:
   - Starter clutch idler gear “1”
   - Starter clutch drive gear “2”
   Burrs/chips/roughness/wear → Replace the defective part(s).
3. Check:
   - Starter clutch gear’s contacting surfaces “a”
   Damage/pitting/wear → Replace the starter clutch gear.



4. Check:
   - Starter clutch operation

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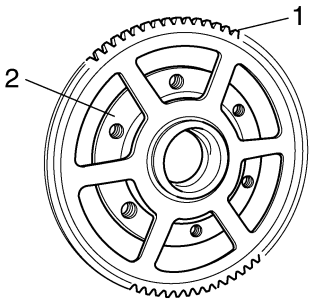
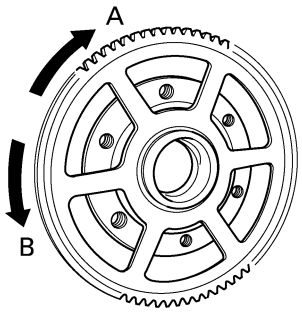
a. Install the starter clutch drive gear “1” onto the starter clutch “2” and hold the starter clutch.
b. When turning the starter clutch drive gear clockwise “A”, the starter clutch and the starter clutch drive gear should engage, otherwise the starter clutch is faulty and must be replaced.
c. When turning the starter clutch drive gear counterclockwise “B”, it should turn freely, otherwise the starter clutch is faulty and must be replaced.





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EAS24600
INSTALLING THE STARTER CLUTCH

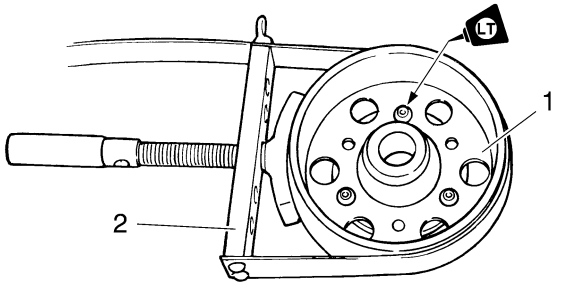
1. Install:
   - Starter clutch

Starter clutch bolt
32 Nm (3.2 m·kgf, 23 ft·lbf)
LOCTITE®

TIP

- While holding the generator rotor “1” with the sheave holder “2”, tighten the starter clutch bolt.
- Do not allow the sheave holder to touch the projection on the generator rotor.

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



EAS24500
INSTALLING THE GENERATOR

1. Install:
   - Generator rotor
   - Washer New
   - Generator rotor bolt

TIP

- Clean the tapered portion of the crankshaft and the generator rotor hub.
- Replace the washer with a new one.

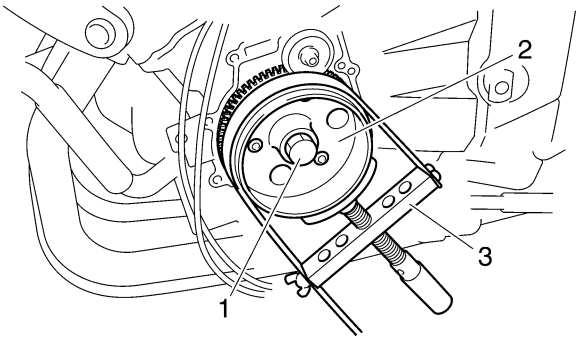
2. Tighten:
   • Generator rotor bolt “1”

	Generator rotor bolt **75 Nm (7.5 m·kgf, 54 ft·lbf)**

TIP

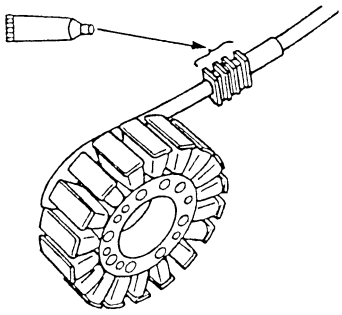
- While holding the generator rotor “2” with the sheave holder “3”, tighten the generator rotor bolt.
- Do not allow the sheave holder to touch the projection on the generator rotor.

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



3. Apply:
   • Sealant
   (onto the stator coil assembly lead grommet)

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



4. Install:
   • Stator coil

	Stator coil bolt **10 Nm (1.0 m·kgf, 7.2 ft·lbf)** **LOCTITE®**

5. Install:
   • Generator rotor cover

	Generator rotor cover bolt **10 Nm (1.0 m·kgf, 7.2 ft·lbf)** **LOCTITE®**

TIP

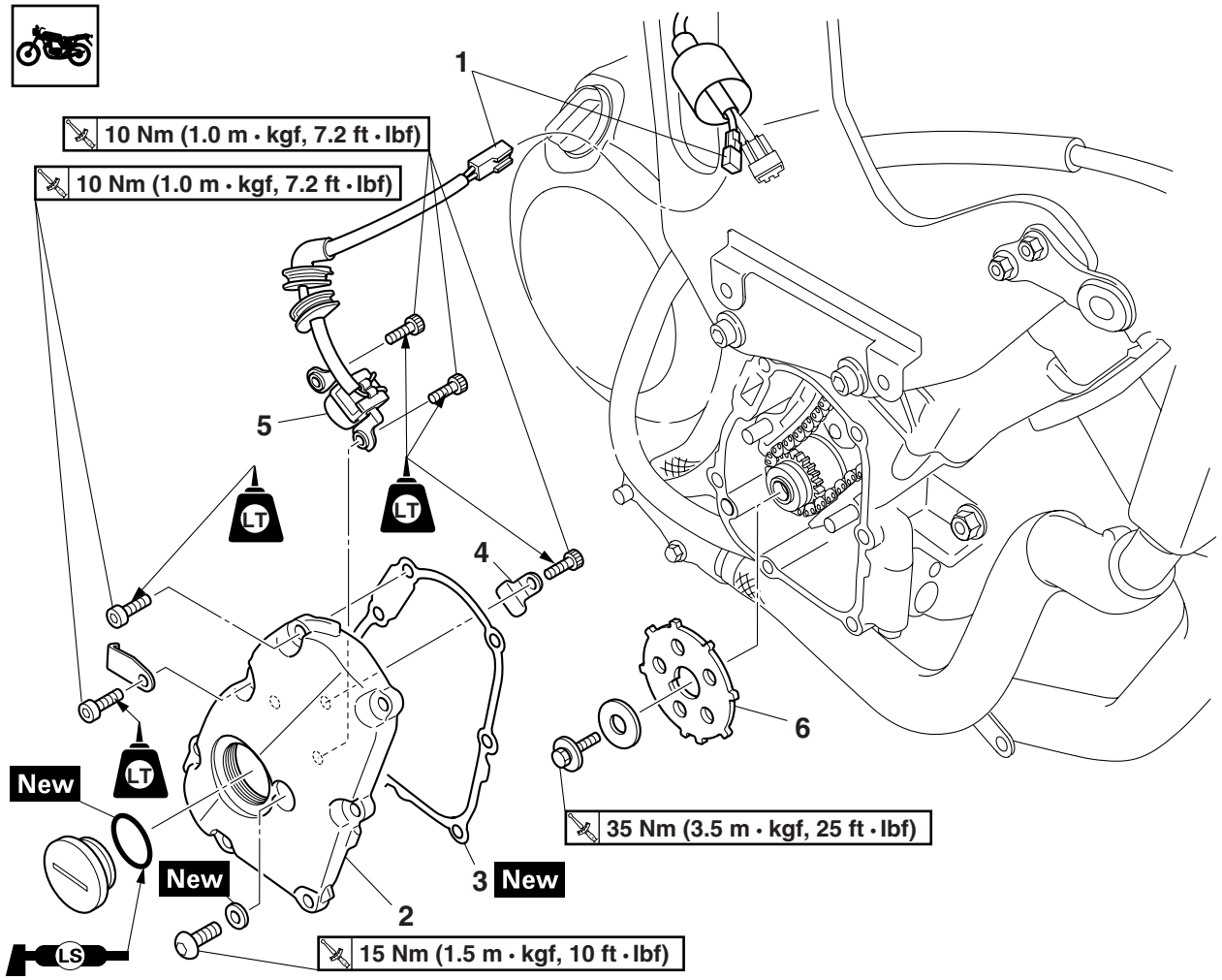
Tighten the generator rotor cover bolts in stages and in a crisscross pattern.

6. Fill:
   • Engine oil
   Refer to “CHANGING THE ENGINE OIL” on page 3-24.
7. Install:
   • Fuel tank
   Refer to “FUEL TANK” on page 7-1.
   • Seat
   Refer to “GENERAL CHASSIS” on page 4-1.

EAS4S81015

PICKUP ROTOR

Removing the pickup rotor



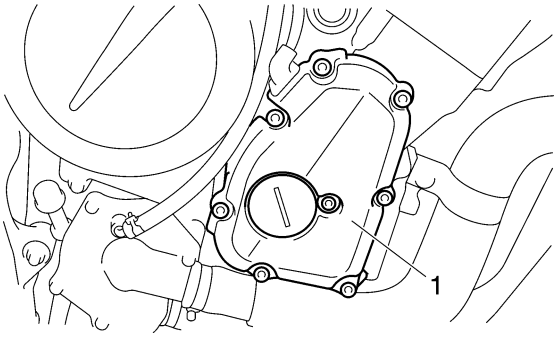
Order	Job/Parts to remove	Q'ty	Remarks
	Seat		Refer to "GENERAL CHASSIS" on page 4-1.
	Right side panel		Refer to "GENERAL CHASSIS" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Engine oil		Drain Refer to "CHANGING THE ENGINE OIL" on page 3-24.
1	Crankshaft position sensor lead coupler	1	Disconnect.
2	Pickup rotor cover	1	
3	Pickup rotor cover gasket	1	
4	Crankshaft position sensor lead holder	1	
5	Crankshaft position sensor	1	
6	Pickup rotor	1	
			For assembly, reverse the removal procedure.

EAS4S81041
REMOVING THE PICKUP ROTOR

1. Remove:
   - Pickup rotor cover “1”
   - Pickup rotor cover gasket

TIP

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

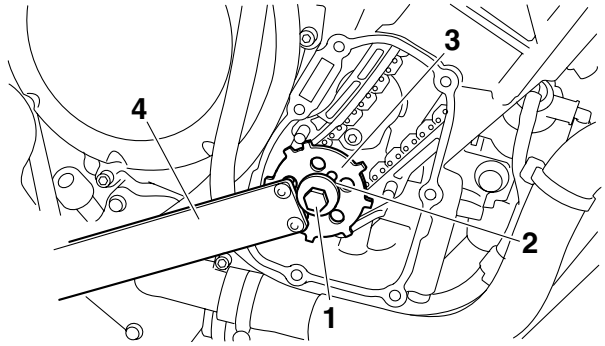


2. Remove:
   - Pickup rotor bolt “1”
   - Washer “2”
   - Pickup rotor “3”

TIP

While holding the pickup rotor “3” with the camshaft wrench “4”, loosen the pickup rotor bolt.

	Camshaft wrench **90890-04143** **YM-04143**

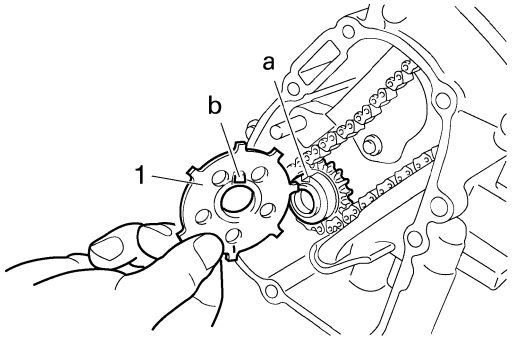


EAS4S81042
INSTALLING THE PICKUP ROTOR

1. Install:
   - Pickup rotor “1”
   - Washer
   - Pickup rotor bolt

TIP

When installing the pickup rotor, align the groove “a” in the crankshaft sprocket with the projection “b” in the pickup rotor.



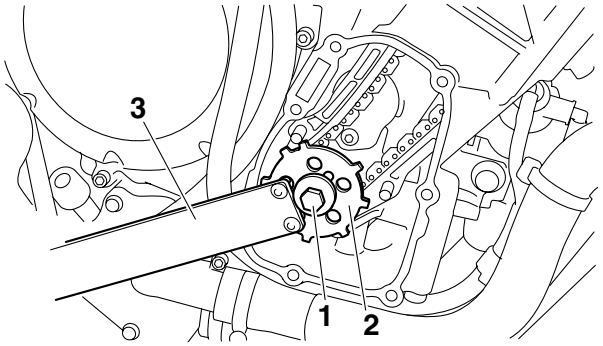
2. Tighten:
   - Pickup rotor bolt “1”

	Pickup rotor bolt **35 Nm (3.5 m·kgf, 25 ft·lbf)**

TIP

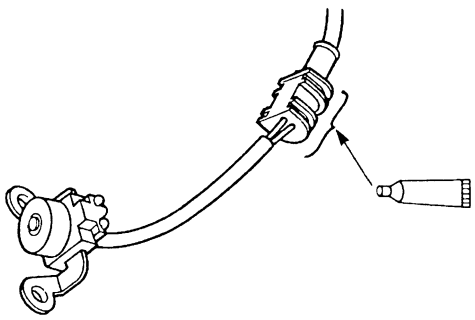
While holding the pickup rotor “2” with the camshaft wrench “3”, tighten the pickup rotor bolt.

	Camshaft wrench **90890-04143** **YM-04143**



3. Apply:
   - Sealant
     (onto the crankshaft position sensor lead grommet)

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

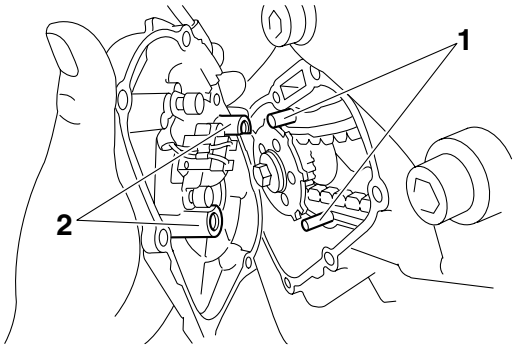


4. Install:
   - Pickup rotor cover gasket New
   - Pickup rotor cover

Pickup rotor cover bolt
10 Nm (1.0 m·kgf, 7.2 ft·lbf)
LOCTITE®

TIP

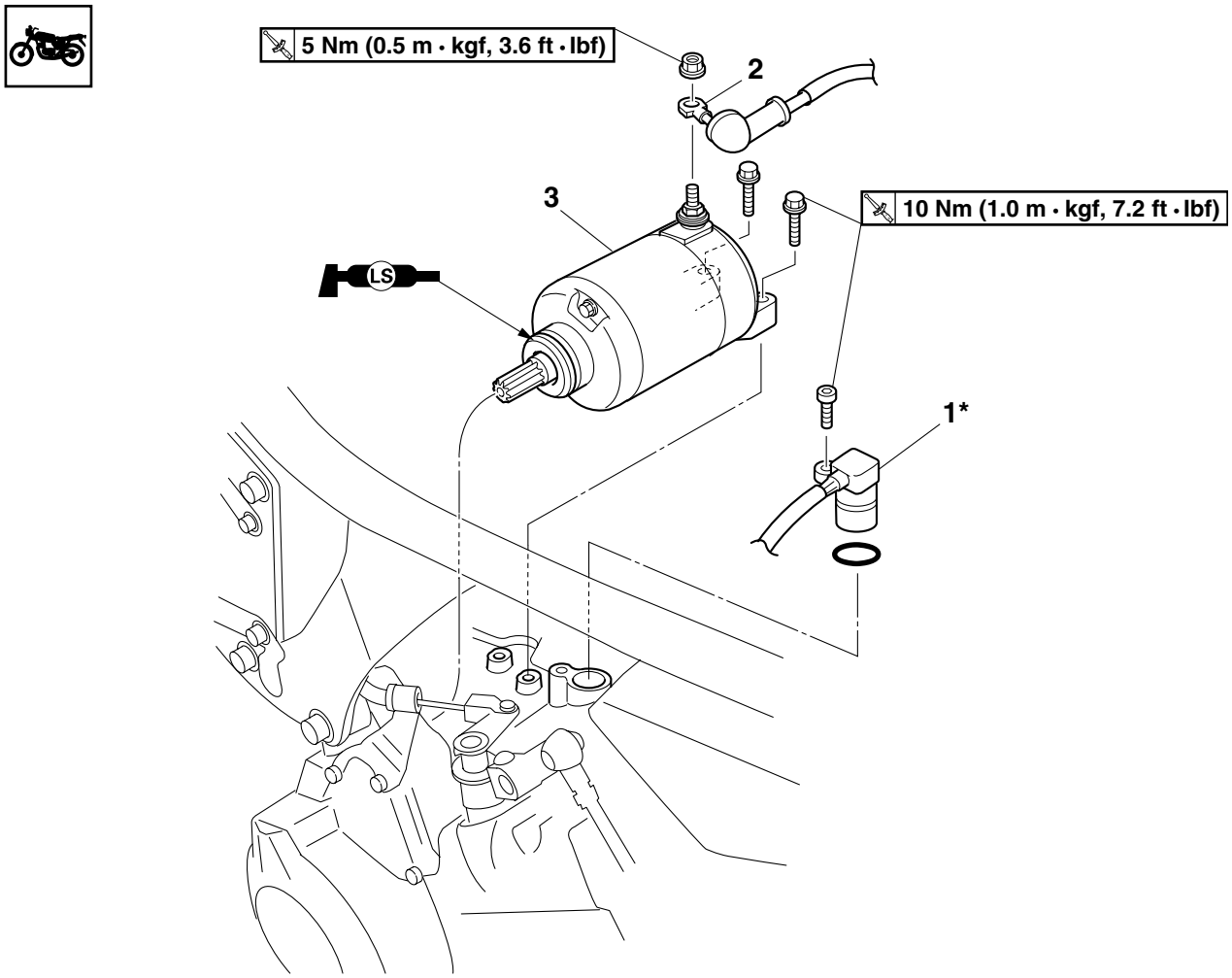
- When installing the pickup rotor cover, align the timing chain guide pins “1” with the holes “2” in the pickup rotor cover.
- Tighten the pickup rotor cover bolts in stages and in a crisscross pattern.



EAS24780

ELECTRIC STARTER

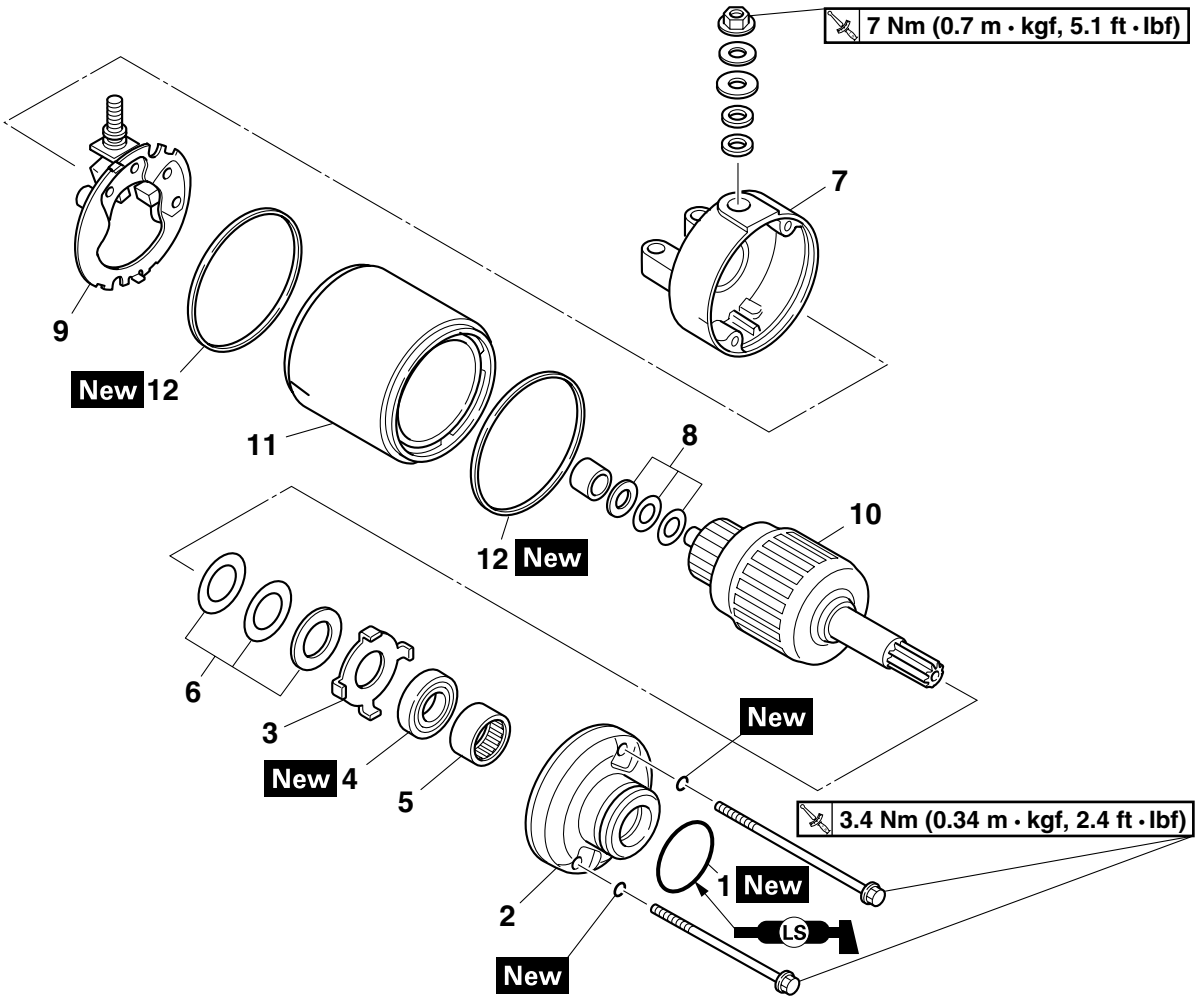
Removing the starter motor



Order	Job/Parts to remove	Q'ty	Remarks
	Seat		Refer to "GENERAL CHASSIS" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Air filter case		Refer to "GENERAL CHASSIS" on page 4-1.
	Throttle body		Refer to "THROTTLE BODIES" on page 7-4.
	Thermostat		Refer to "THERMOSTAT" on page 6-6.
1	Speed sensor (XJ6S)	1	
2	Starter motor lead	1	
3	Starter motor	1	
			For installation, reverse the removal procedure.

*XJ6S

Disassembling the starter motor

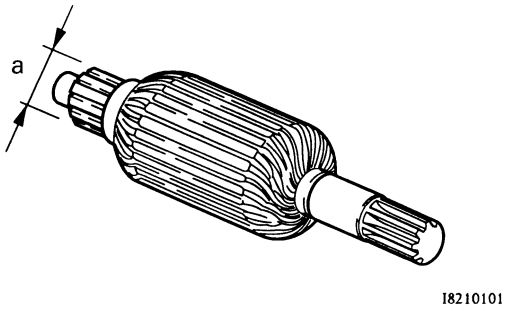


Order	Job/Parts to remove	Q'ty	Remarks
1	O-ring	1	
2	Starter motor front cover	1	
3	Lock washer	1	
4	Oil seal	1	
5	Bearing	1	
6	Washer set	1	
7	Starter motor rear cover	1	
8	Washer set	1	
9	Brush holder	1	
10	Armature assembly	1	
11	Starter motor yoke	1	
12	O-ring	2	
			For assembly, reverse the disassembly procedure.

EAS24790
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.

Limit
27.0 mm (1.06 in)



3. Measure:
   - Mica undercut “a”
     Out of specification → Scrape the mica to the proper measurement with a hacksaw blade that has been grounded to fit the commutator.

Mica undercut (depth)
0.70 mm (0.03 in)

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

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

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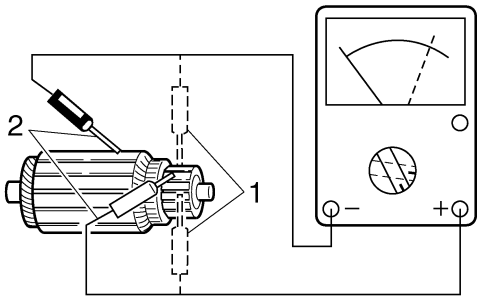
a. Measure the armature assembly resistances with the digital circuit tester.

Digital circuit tester
90890-03174
Model 88 Multimeter with tachometer
YU-A1927

Armature coil
Commutator resistance “1”
0.0012–0.0022 Ω at 20°C (68°F)
Insulation resistance “2”
Above 1MΩ at 20°C (68°F)

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



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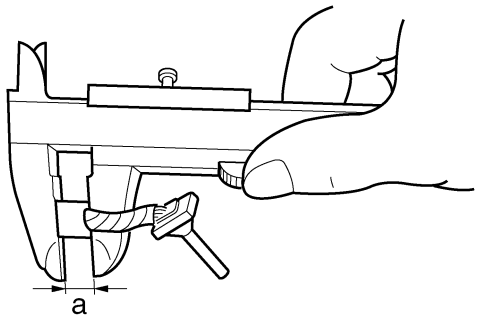
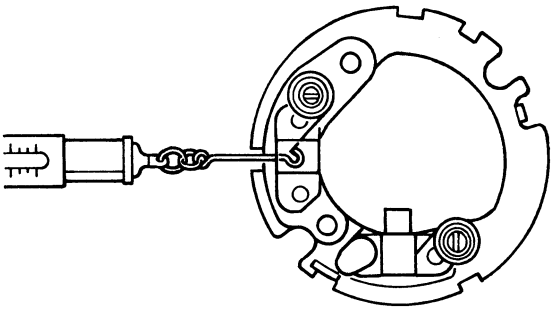
5. Measure:
   - Brush length “a”
     Out of specification → Replace the brushes as a set.

Limit
3.50 mm (0.14 in)



6. Measure:
   - Brush spring force
     Out of specification → Replace the brush springs as a set.

Brush spring force
7.16–9.52 N (730–971 gf, 25.77–34.27 oz)



7. Check:
   - Gear teeth
     Damage/wear → Replace the gear.
8. Check:
   - Bearing
   - Oil seal
     Damage/wear → Replace the defective part(s).

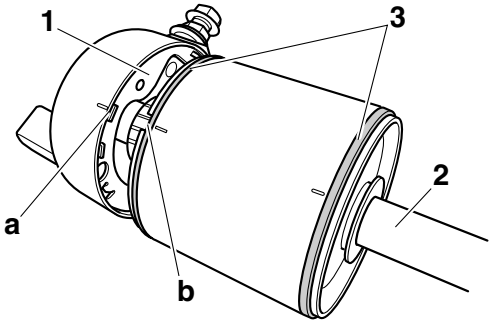
EAS24800

ASSEMBLING THE STARTER MOTOR

1. Install:
   - Brush holder “1”
2. Install:
   - Armature “2”
   - O-ring “3” New

TIP

Align the tab “a” on the brush seat with the slot “b” in the starter motor yoke.

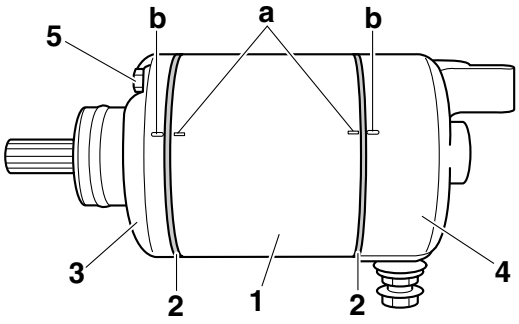


3. Install:
   - Starter motor yoke “1”
   - O-ring “2” New
   - Starter motor front cover “3”
   - Starter motor rear cover “4”
   - Starter motor assembling bolts “5”

	Starter motor assembling bolt **3.4 Nm (0.34 m·kgf, 2.5 ft·lbf)**

TIP

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



EAS24810

INSTALLING THE STARTER MOTOR

1. Install:
   - Starter motor
   - Starter motor bolts

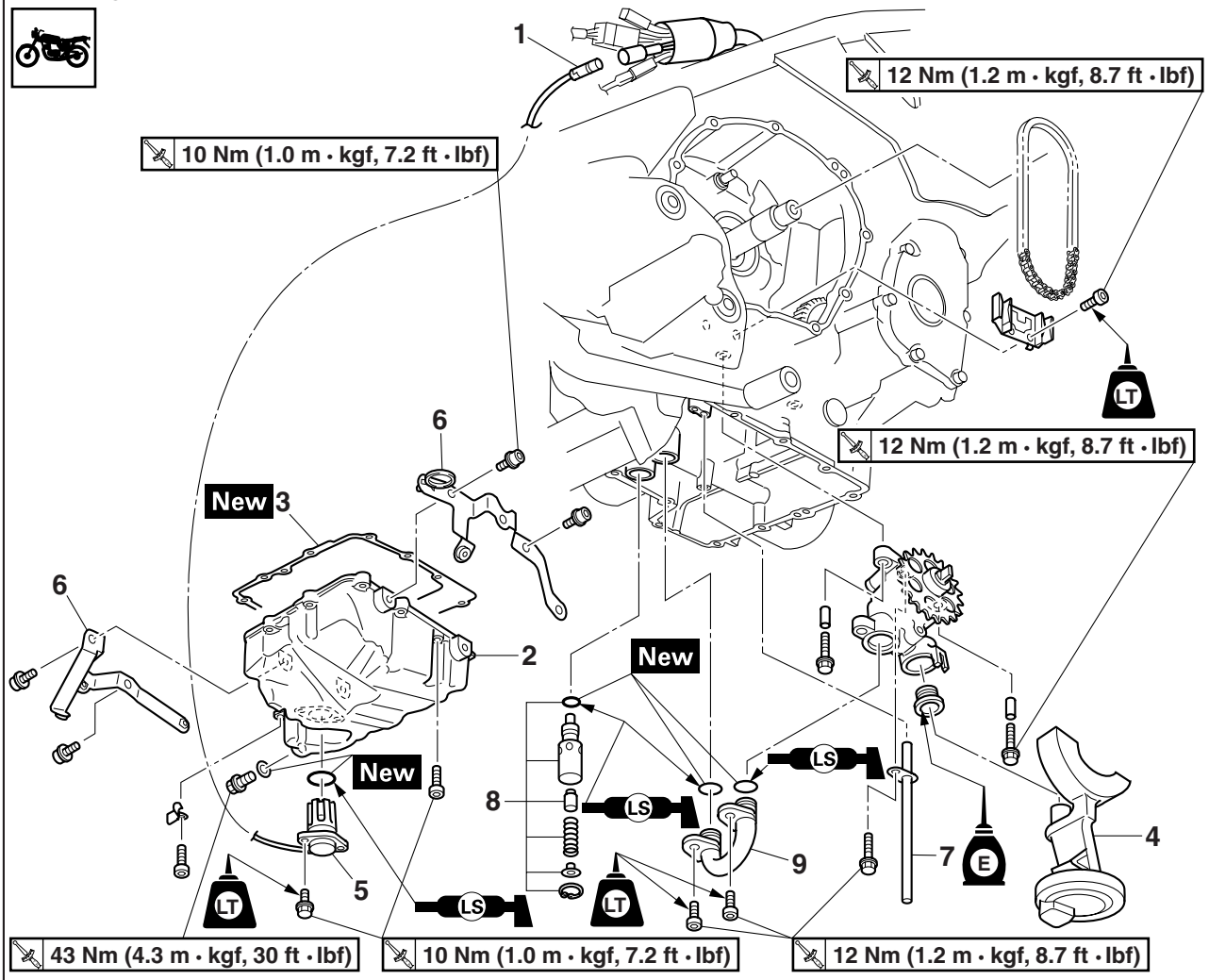
	Starter motor bolt **10 Nm (1.0 m·kgf, 7.2 ft·lbf)**

2. Connect:
   - Starter motor lead

EAS24920

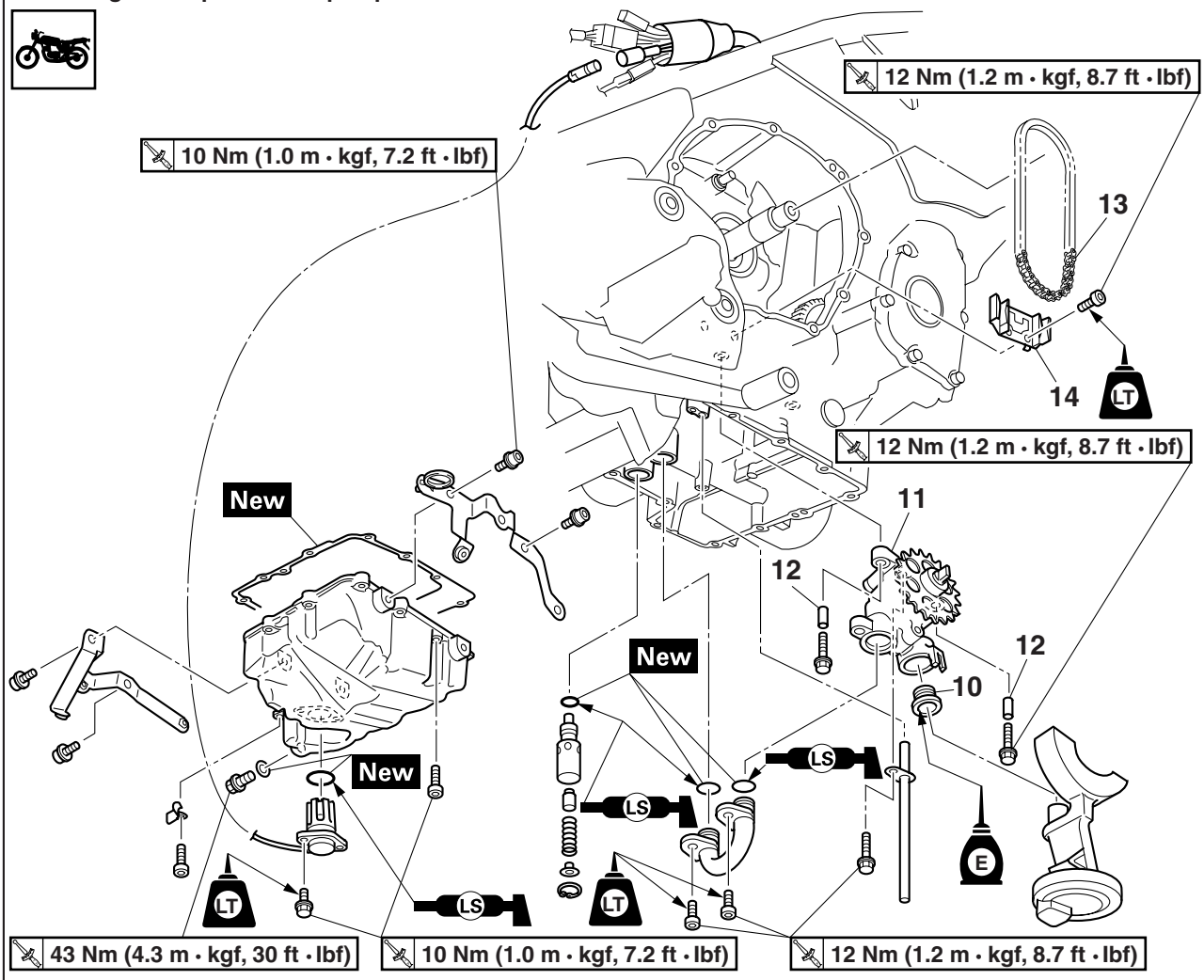
OIL PUMP

Removing the oil pan and oil pump



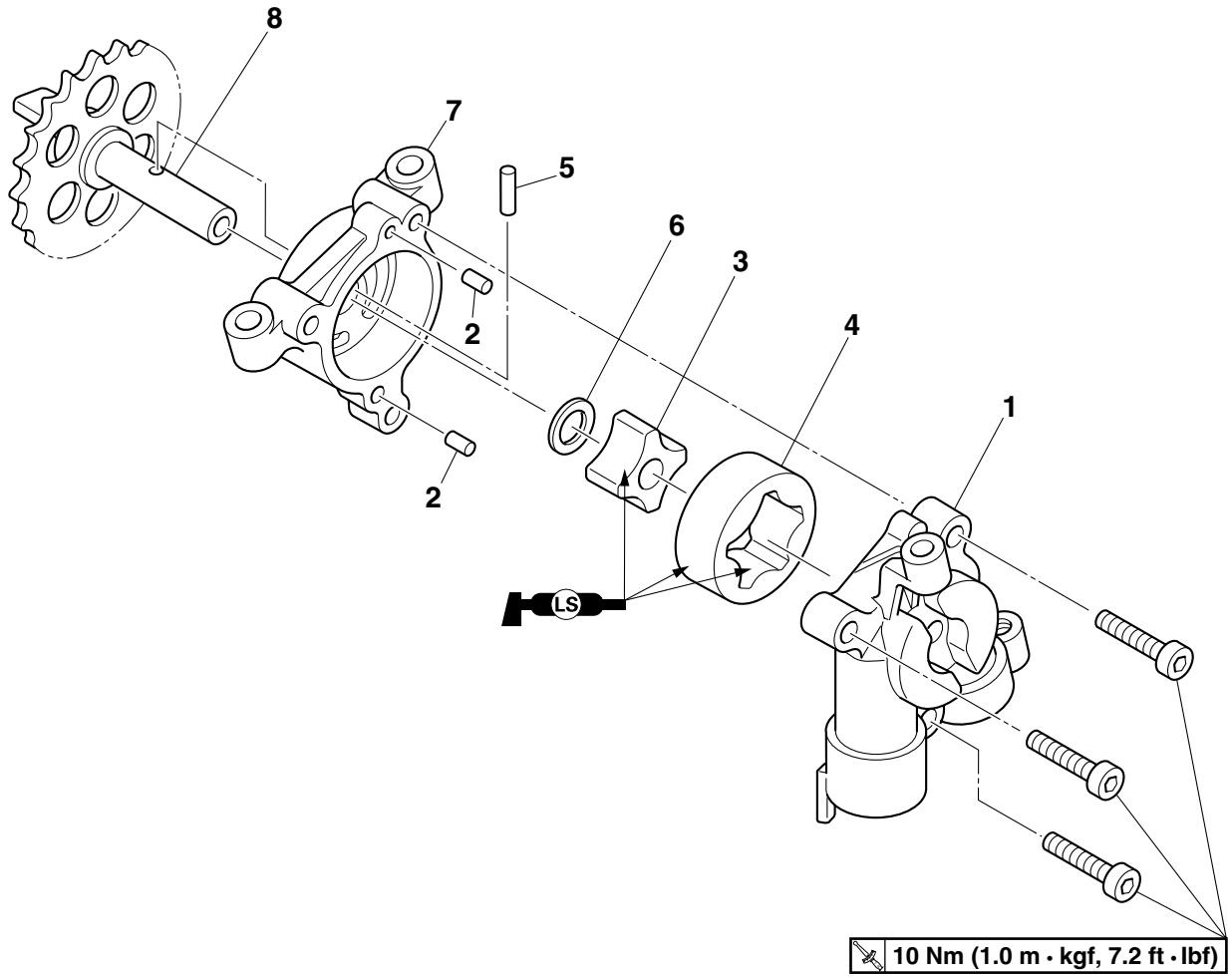
Order	Job/Parts to remove	Q'ty	Remarks
	Seat		Refer to "GENERAL CHASSIS" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Clutch assembly		Refer to "CLUTCH" on page 5-47.
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-24.
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-27.
	Exhaust pipe assembly		Refer to "ENGINE REMOVAL" on page 5-1.
	Water pump		Refer to "WATER PUMP" on page 6-9.
1	Oil level switch lead coupler	1	Disconnect.
2	Oil pan	1	
3	Oil pan gasket	1	
4	Oil strainer	1	
5	Oil level switch	1	
6	Bottom cowling bracket	2	
7	Oil delivery pipe	1	
8	Relief valve assembly	1	
9	Oil pipe	1	

Removing the oil pan and oil pump



Order	Job/Parts to remove	Q'ty	Remarks
10	Oil strainer gasket	1	
11	Oil pump assembly	1	
12	Dowel pin	2	
13	Oil pump drive chain	1	
14	Chain guide	1	
			For installation, reverse the removal procedure.

Disassembling the oil pump

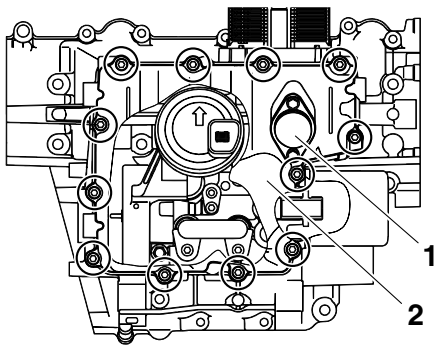


Order	Job/Parts to remove	Q'ty	Remarks
1	Oil pump cover	1	
2	Pin	2	
3	Oil pump inner rotor	1	
4	Oil pump outer rotor	1	
5	Pin	1	
6	Washer	1	
7	Oil pump rotor housing	1	
8	Oil pump driven sprocket	1	
			For assembly, reverse the removal procedure.

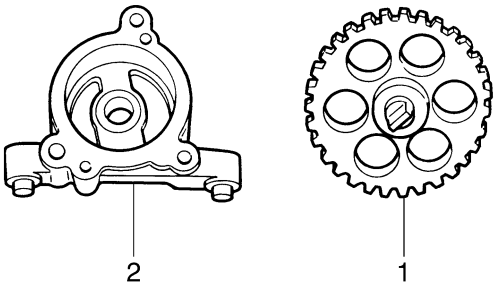
EAS24930
REMOVING THE OIL PAN
1. Remove:
   - Oil level switch lead holder
   - Oil level switch “1”
   - Oil pan “2”
   - Oil pan gasket

TIP

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.

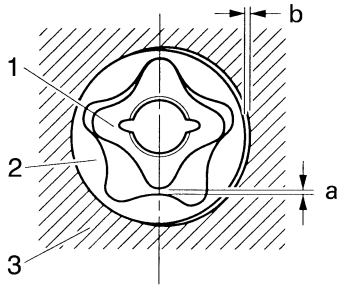


EAS24960
CHECKING THE OIL PUMP
1. Check:
   - Oil pump driven sprocket “1”
   - Oil pump rotor housing “2”
   - Oil pump cover
     Cracks/damage/wear → Replace the defective part(s).



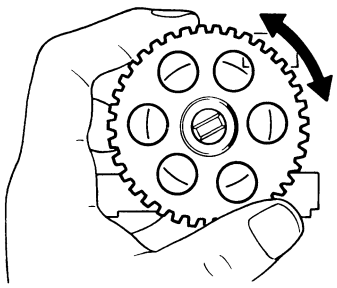
2. Measure:
   - Inner-rotor-to-outer-rotor-tip clearance “a”
   - Outer-rotor-to-oil-pump-housing clearance “b”
   - Outer-rotor-to-oil-pump-cover clearance

Inner-rotor-to-outer-rotor-tip clearance
Less than 0.12 mm (0.0047 in)
Limit
0.20 mm (0.0079 in)
Outer-rotor-to-oil-pump-housing clearance
0.090–0.150 mm (0.0035–0.0059 in)
Limit
0.220 mm (0.0087 in)
Oil-pump-housing-to-inner-and-outer-rotor clearance
0.050–0.110 mm (0.0020–0.0043 in)
Limit
0.180 mm (0.0071 in)

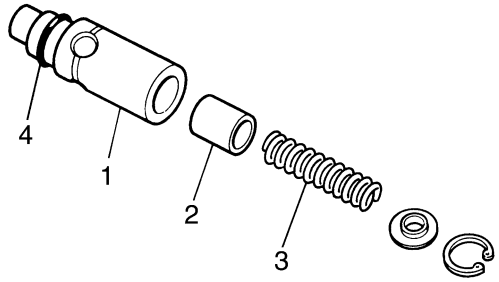


1. Inner rotor
2. Outer rotor
3. Oil pump housing

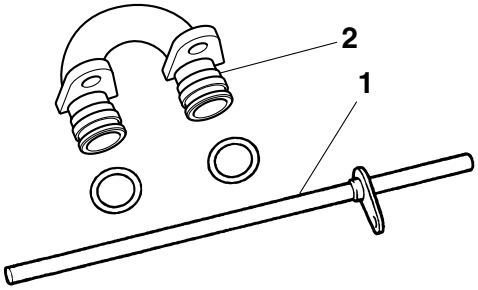
3. Check:
   - Oil pump operation
     Rough movement → Repeat steps (1) and (2) or replace the defective part(s).



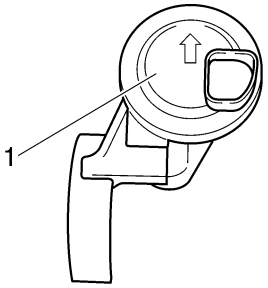
EAS24970
CHECKING THE RELIEF VALVE
1. Check:
   - Relief valve body “1”
   - Relief valve “2”
   - Spring “3”
   - O-ring “4”
     Damage/wear → Replace the defective part(s).



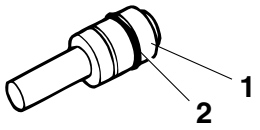
EAS24980
CHECKING THE OIL DELIVERY PIPES
1. Check:
   - Oil delivery pipe “1”
   - Oil pipe “2”
     Damage → Replace.
     Obstruction → Wash and blow out with compressed air.



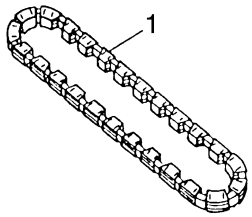
EAS24990
CHECKING THE OIL STRAINER
1. Check:
   - Oil strainer “1”
     Damage → Replace.
     Contaminants → Clean with solvent.



EAS25600
CHECKING THE OIL NOZZLES
The following procedure applies to all of the oil nozzles.
1. Check:
   - Oil nozzle “1”
     Damage/wear → Replace the oil nozzles.
   - O-ring “2”
     Damage/wear → Replace.
   - Oil nozzle passage
     Obstruction → Blow out with compressed air.



EAS25620
CHECKING THE OIL PUMP DRIVE CHAIN
1. Check:
   - Oil pump drive chain “1”
     Damage/stiffness → Replace the oil pump drive chain, oil pump drive sprocket and oil pump shaft as a set.



2. Check:
   - Oil pump drive sprocket
     Cracks/damage/wear → Replace the oil pump drive sprocket and the oil pump drive chain as a set.

EAS25010
ASSEMBLING THE OIL PUMP
1. Lubricate:
   - Inner rotor
   - Outer rotor
   - Oil pump shaft
     (with the recommended lubricant)

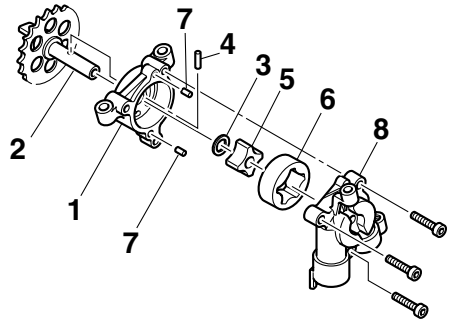
	Recommended lubricant **Lithium-soap-bused grease**

2. Install:
   - Oil pump housing “1”
   - Oil pump shaft “2”
   - Washer “3”
   - Pin “4”
   - Inner rotor “5”
   - Outer rotor “6”
   - Dowel pins “7”
   - Oil pump cover “8”
   - Oil pump housing screw

	Oil pump housing screw **10 Nm (1.0 m·kgf, 7.2 ft·lbf)**

TIP

When installing the inner rotor, align the pin "4" in the oil pump shaft with the groove in the inner rotor "5".



3. Check:
   - Oil pump operation
     Refer to "CHECKING THE OIL PUMP" on page 5-43.

EAS25030

INSTALLING THE OIL PUMP

1. Install:
   - Oil pump drive chain
   - Oil pump
   - Oil pump bolts
   - Dowel pins
   - Oil delivery pipe

	Oil pump bolt **12 Nm (1.2 m·kgf, 8.7 ft·lbf)**

ECA4S81018

NOTICE

After tightening the bolts, make sure the oil pump turns smoothly.

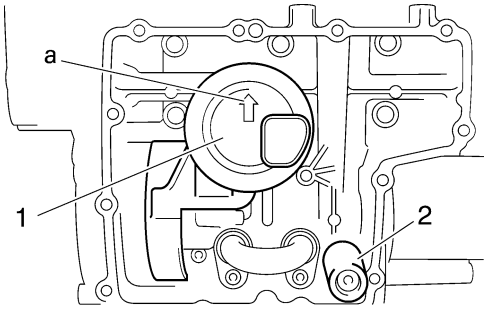
EAS25040

INSTALLING THE OIL STRAINER

1. Install:
   - Oil strainer "1"
   - Relief valve "2"

TIP

Make sure to check the arrow mark "a" located on the oil strainer housing for the front and rear direction of the engine and then install the oil strainer so that its arrow mark points to the front side of the engine.



EAS25050

INSTALLING THE OIL PAN

1. Install:
   - Oil pipe

	Oil pipe bolt **12 Nm (1.2 m·kgf, 7.2 ft·lbf)** **LOCTITE®**

2. Install:
   - Oil pan gasket New
   - Oil pan "1"
   - Oil level switch lead holder

	Oil pan bolt **10 Nm (1.0 m·kgf, 7.2 ft·lbf)**

   - Oil level switch "2"

	Oil level switch bolt **10 Nm (1.0 m·kgf, 7.2 ft·lbf)** **LOCTITE®**

   - Engine oil drain bolt

	Engine oil drain bolt **43 Nm (4.3 m·kgf, 31 ft·lbf)**

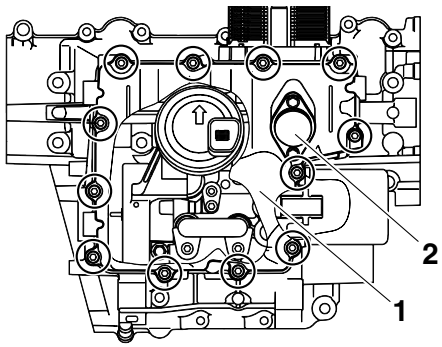
EWA12820

⚠ WARNING

Always use new copper washers.

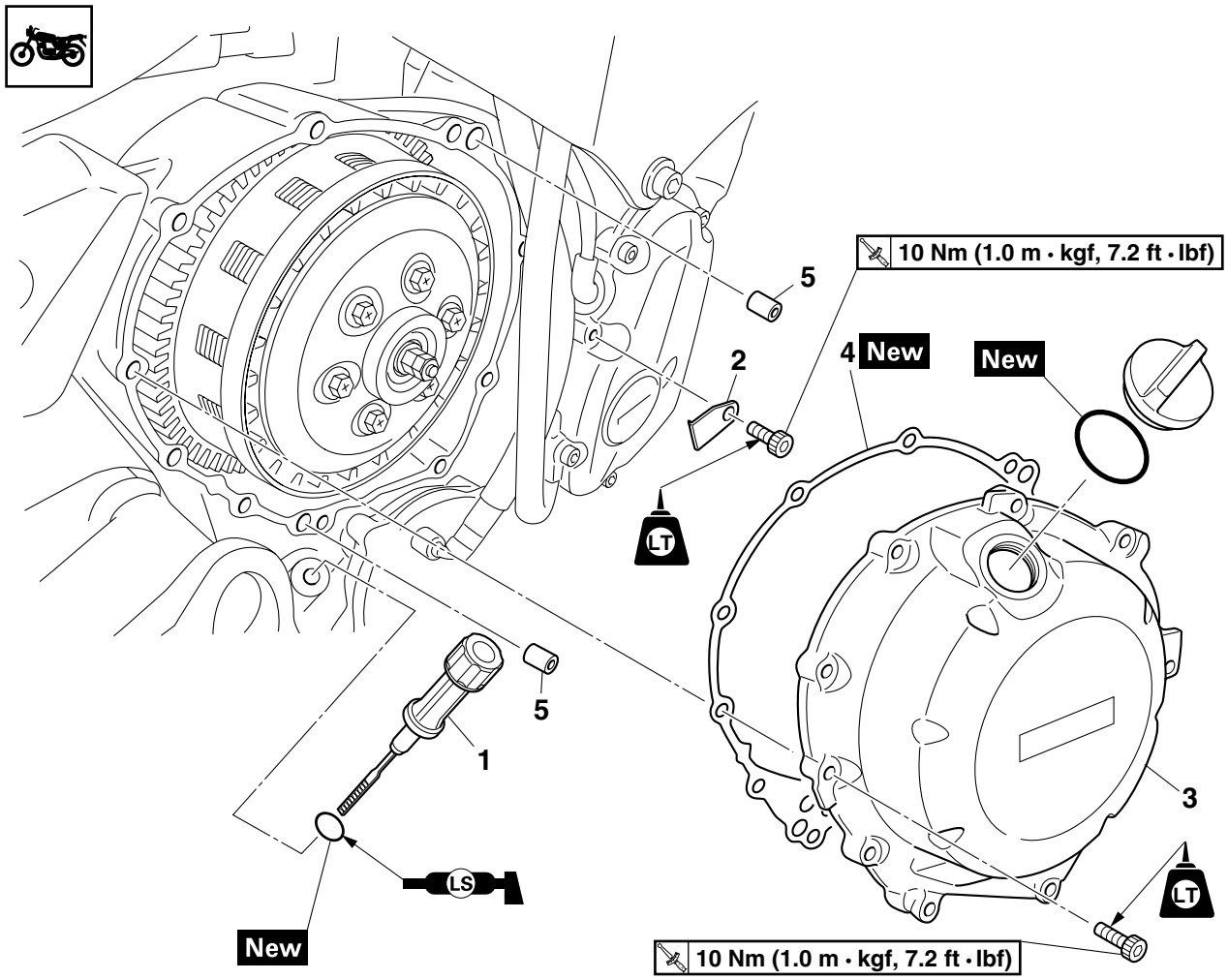
TIP

- Tighten the oil pan bolts in stages and in a crisscross pattern.
- Lubricate the oil level switch O-ring with lithium-soap-based grease.


2
1

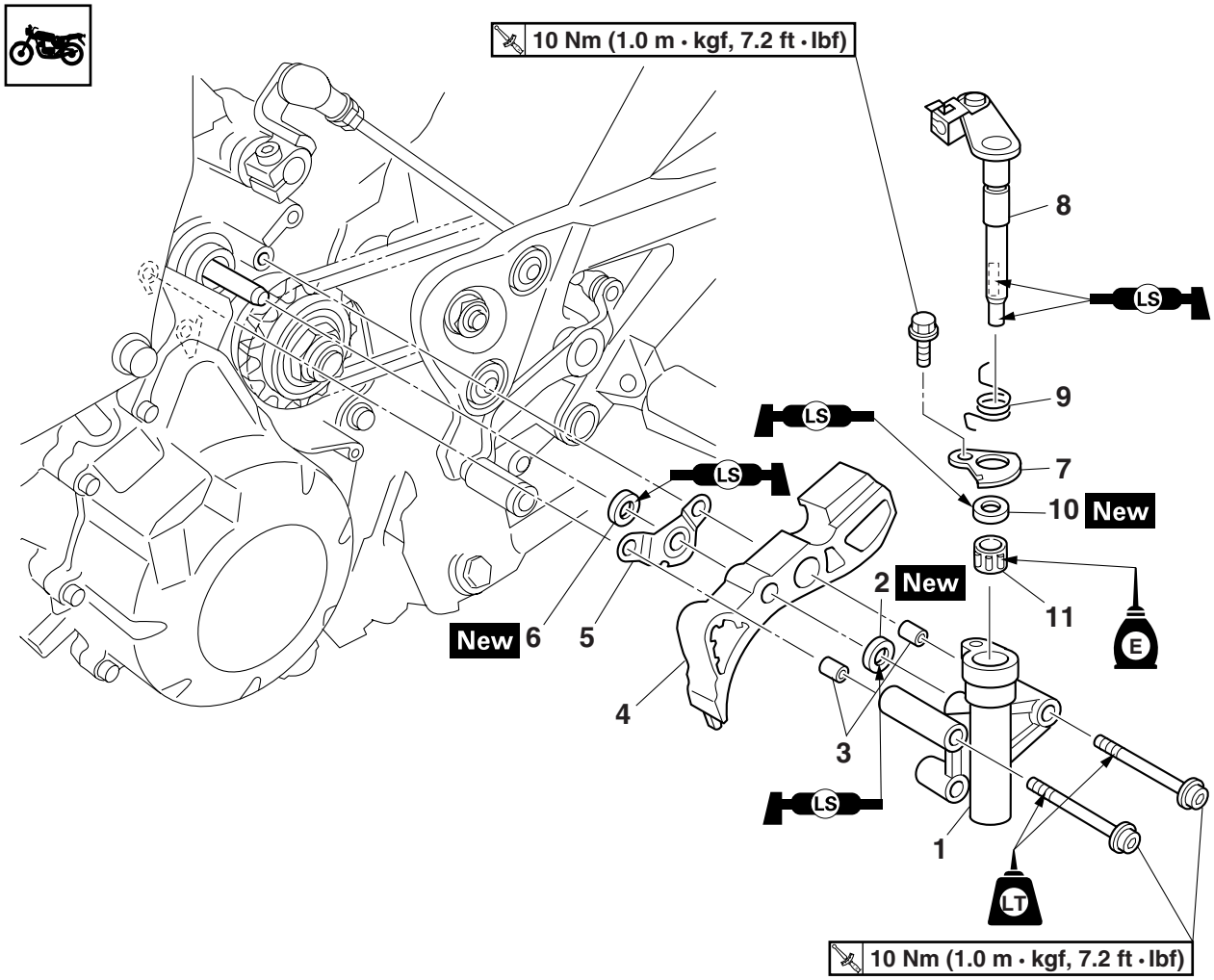
EAS25060
CLUTCH

Removing the clutch cover



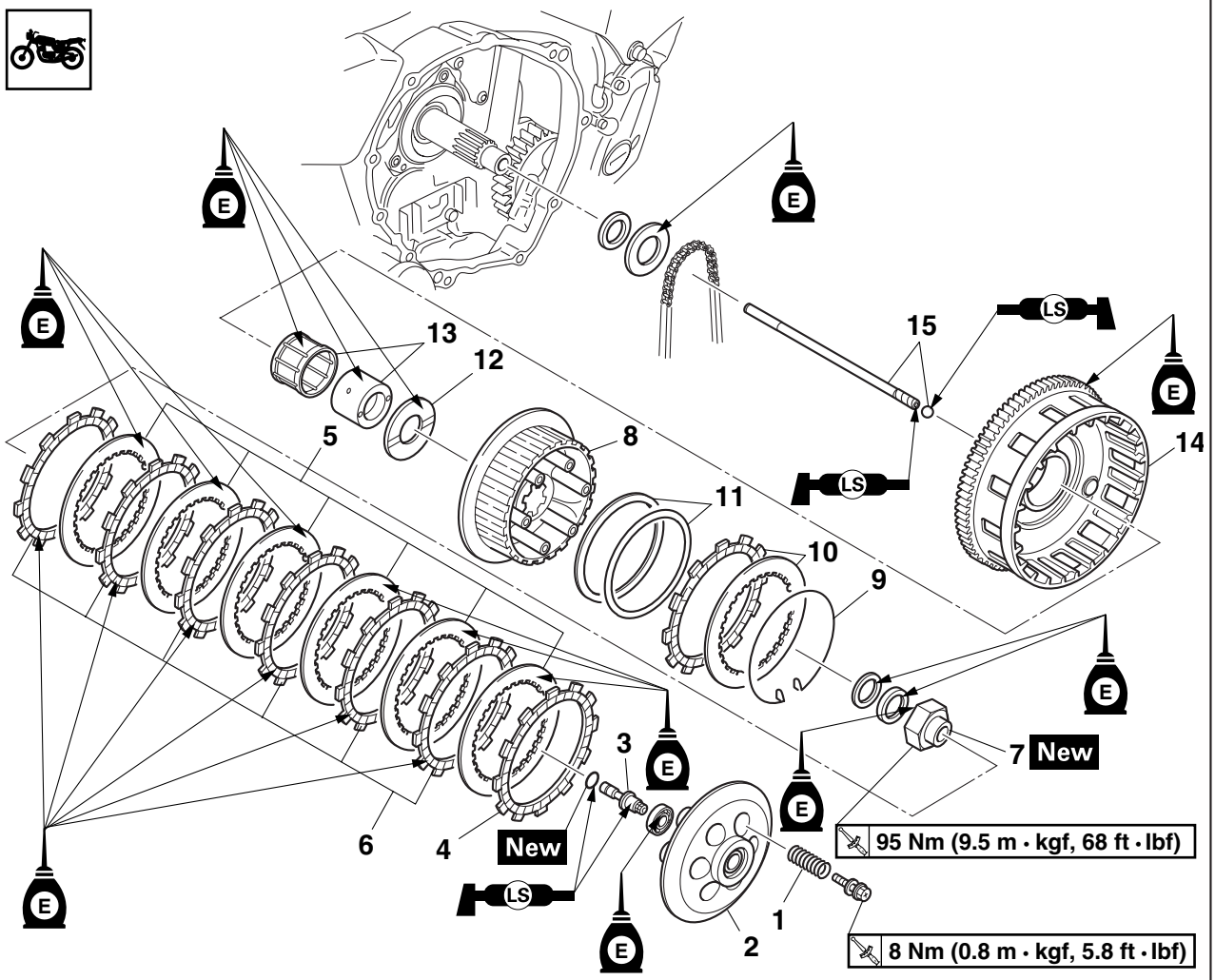
Order	Job/Parts to remove	Q'ty	Remarks
	Right side panel		Refer to "GENERAL CHASSIS" on page 4-1.
	Engine oil		Drain Refer to "CHANGING THE ENGINE OIL" on page 3-24.
1	Dipstick	1	
2	Holder	1	
3	Clutch cover	1	
4	Clutch cover gasket	1	
5	Dowel pin	2	
			For installation, reverse the removal procedure.

Removing the push lever shaft



Order	Job/Parts to remove	Q'ty	Remarks
	Drive sprocket cover		Refer to "ENGINE REMOVAL" on page 5-1.
1	Push lever case	1	
2	Oil seal	1	
3	Dowel pin	2	
4	Drive chain guide	1	
5	Oil seal protector	1	
6	Oil seal	1	
7	Seat plate	1	
8	Push lever	1	
9	Spring	1	
10	Oil seal	1	
11	Bearing	1	
			For installation, reverse the removal procedure.

Removing the clutch



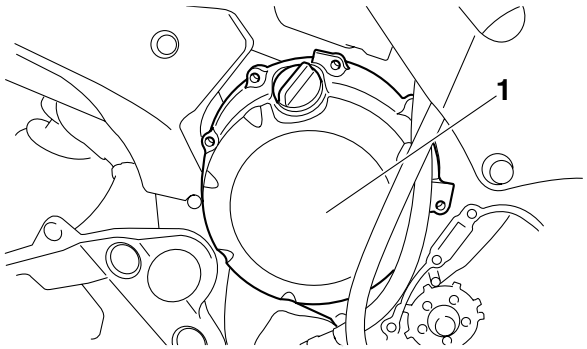
Order	Job/Parts to remove	Q'ty	Remarks
1	Compression spring	6	
2	Pressure plate	1	
3	Push rod 2	1	
4	Friction plate 1	1	
5	Clutch plate	6	
6	Friction plate 2	6	
7	Clutch boss nut	1	
8	Clutch boss	1	
9	Wire circlip	1	
10	Clutch plate 2/Friction plate 3	1/1	
11	Spring/Spring seat plate	1/1	
12	Thrust plate	1	
13	Collar/Bearing	1/1	
14	Clutch housing	1	
15	Ball/Push rod 1	1/1	
			For assembly, reverse the removal procedure.

EAS25070
REMOVING THE CLUTCH

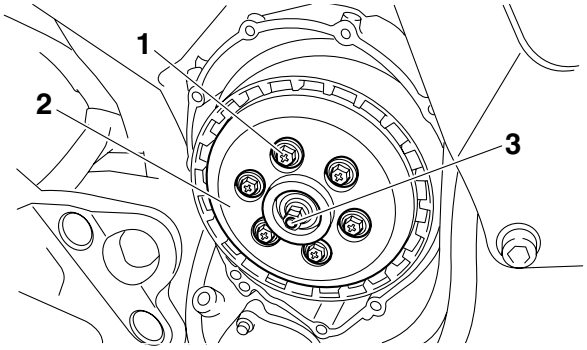
1. Remove:
   - Right side panel
     Refer to “GENERAL CHASSIS” on page 4-1.
   - Clutch cover “1”
   - Gasket

TIP

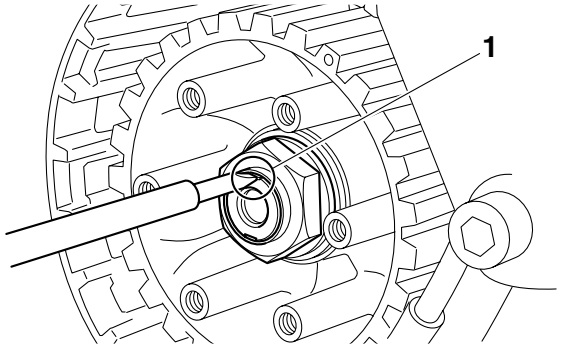
Loosen each bolt 1/4 of a turn at a time, in stages and in a crisscross pattern.
After all of the bolts are fully loosened, remove them.



2. Remove:
   - Compression spring bolts “1”
   - Compression springs
   - Pressure plate “2”
   - Push rod 2 “3”
   - Friction plates
   - Clutch plates



3. Straighten the clutch boss nut rib “1”.

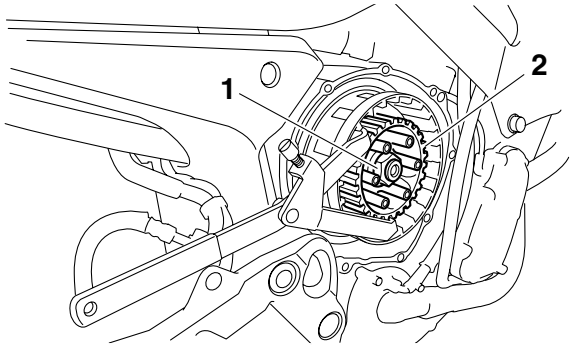


4. Loosen:
   - Clutch boss nut “1”

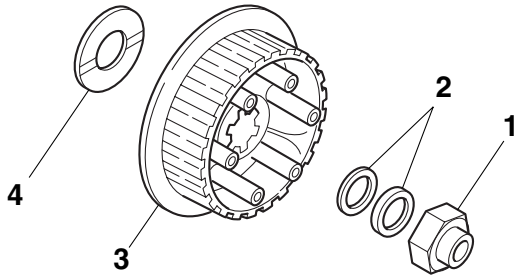
TIP

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

Universal clutch holder
90890-04086
YM-91042



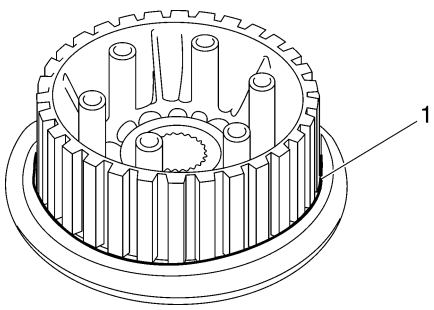
5. Remove:
   - Clutch boss nut “1”
   - Washers “2”
   - Clutch boss assembly “3”
   - Thrust plate “4”



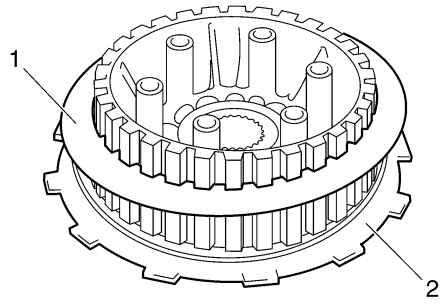
6. Remove:
   - Wire circlip “1”

TIP

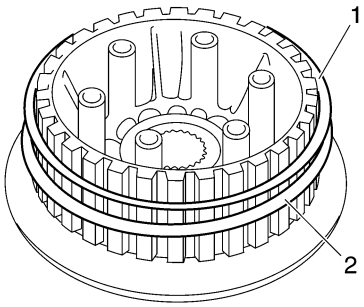
There is a built-in damper between the clutch boss and the clutch plate. It is not necessary to remove the wire circlip “1” and disassemble the built-in damper unless there is serious clutch chattering.



7. Remove:
   - Clutch plate 2 “1”
   - Friction plate 3 “2”



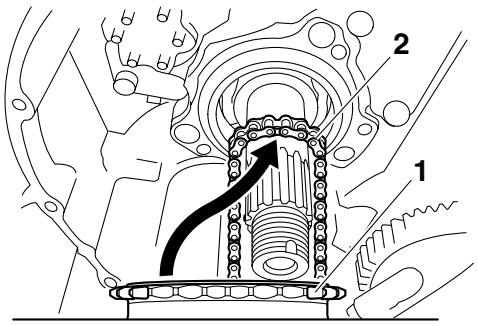
8. Remove:
   - Spring “1”
   - Spring seat plate “2”



9. Remove:
   - Collar
   - Bearing
   - Clutch housing “1”
   - Ball
   - Push rod 1

TIP

- Turn the crankshaft and remove the clutch housing.
- Carefully hung the oil pump drive chain “2” on the main axle to avoid dropping it into the oil pan.
- Be careful not to drop the ball into the oil pan.



EAS25100

CHECKING THE FRICTION PLATES

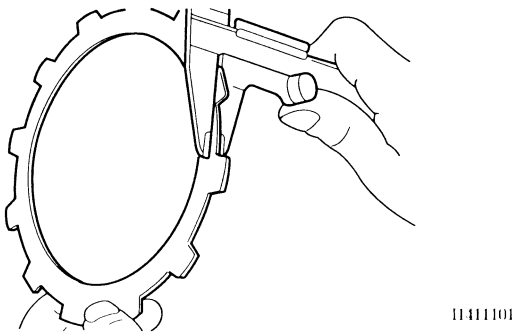
The following procedure applies to all of the friction plates.

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.

TIP

Measure the friction plate at four places.

Friction plate 1, 2 thickness
2.92–3.08 mm (0.115–0.121 in)
Wear limit
2.80 mm (0.1102 in)
Friction plate 3 thickness
2.94–3.06 mm (0.116–0.120 in)
Wear limit
2.84 mm (0.1118 in)



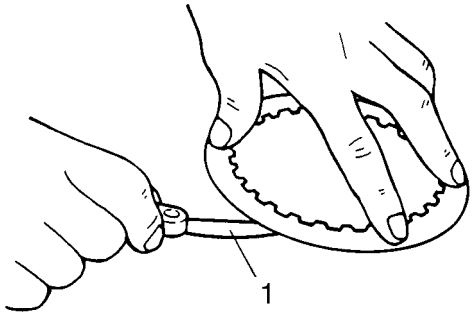
EAS25110

CHECKING THE CLUTCH PLATES

The following procedure applies to all of the clutch plates.

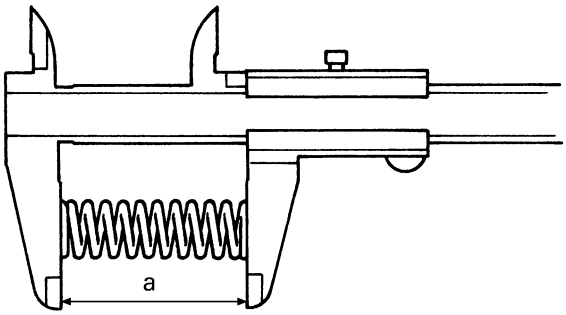
1. Check:
   - Clutch plate
     Damage → Replace the clutch plates as a set.
2. Measure:
   - Clutch plate warpage
     (with a surface plate and thickness gauge “1”)
     Out of specification → Replace the clutch plates as a set.

Warpage limit
0.10 mm (0.0039 in)



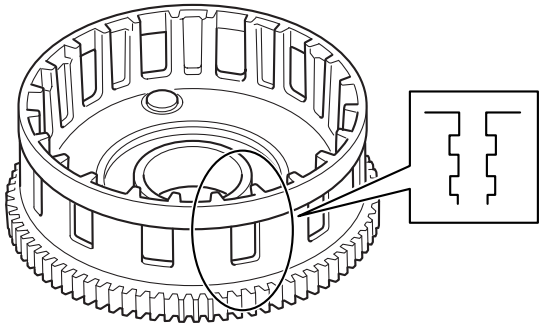
EAS25140
CHECKING THE CLUTCH SPRINGS
The following procedure applies to all of the clutch springs.
1. Check:
   - Clutch spring
     Damage → Replace the clutch springs as a set.
2. Measure:
   - Clutch spring free length “a”
     Out of specification → Replace the clutch springs as a set.

Clutch spring free length
55.00 mm (2.17 in)
Minimum length
54.00 mm (2.13 in)
Limit
52.3 mm (2.06 in)



EAS25150
CHECKING THE CLUTCH HOUSING
1. Check:
   - Clutch housing dogs
     Damage/pitting/wear → Deburr the clutch housing dogs or replace the clutch housing.

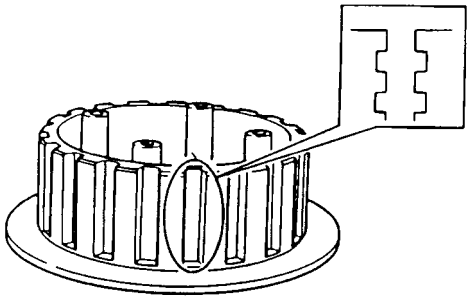
TIP
Pitting on the clutch housing dogs will cause erratic clutch operation.



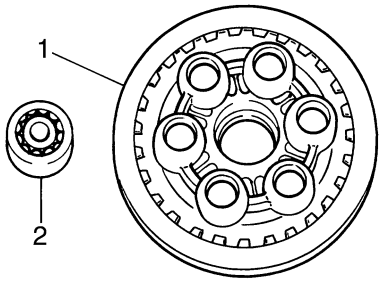
2. Check:
   - Bearing
     Damage/wear → Replace the bearing and clutch housing.

EAS25160
CHECKING THE CLUTCH BOSS
1. Check:
   - Clutch boss splines
     Damage/pitting/wear → Replace the clutch boss.

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

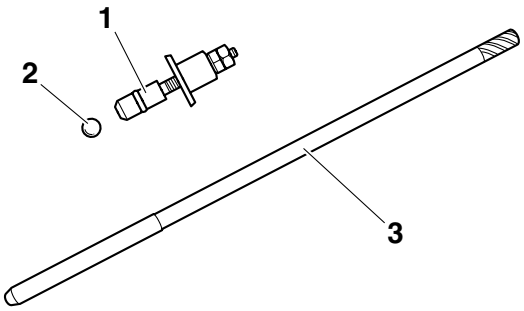


EAS25170
CHECKING THE PRESSURE PLATE
1. Check:
   - Pressure plate “1”
     Cracks/damage → Replace.
   - Bearing “2”
     Damage/wear → Replace.



EAS25190
CHECKING THE CLUTCH PUSH RODS

1. Check:
   - O-ring
   - Push rod 2 “1”
   - Ball “2”
   - Push rod 1 “3”
     Cracks/damage/wear → Replace the defective part(s).
   - Push rod bearing
     Damage/wear → Replace.



2. Measure:
   - Clutch push rod 1 bending limit
     Out of specification → Replace the push rod.

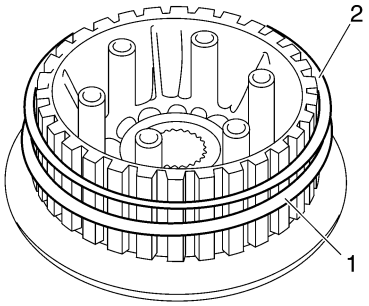
	Clutch push rod 1 bending limit **0.35 mm (0.01378 in)**

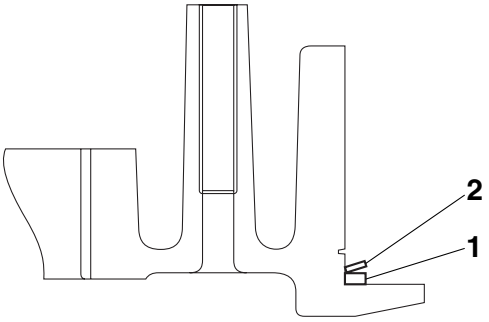
EAS25270
INSTALLING THE CLUTCH

1. Install:
   - Push rod 1
   - Ball
   - Clutch housing
   - Bearing
   - Collar
2. Install:
   - Spring seat plate “1”
   - Spring “2”

TIP

Install the spring “2” as shown in the illustration.

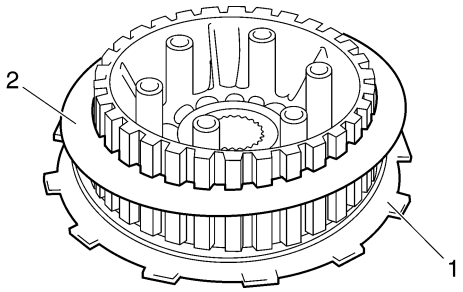




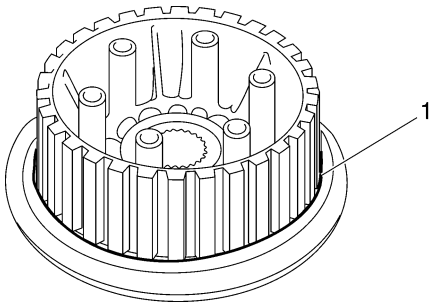
3. Install:
   - Friction plate 3 “1”
   - Clutch plate 2 “2”

TIP

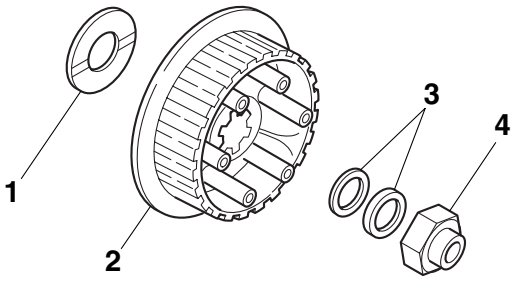
Lubricate the engine oil.



4. Install:
   - Wire circlip “1”



5. Install:
   - Thrust plate “1”
   - Clutch boss assembly “2”
   - Washers “3”
   - Clutch boss nut “4” New

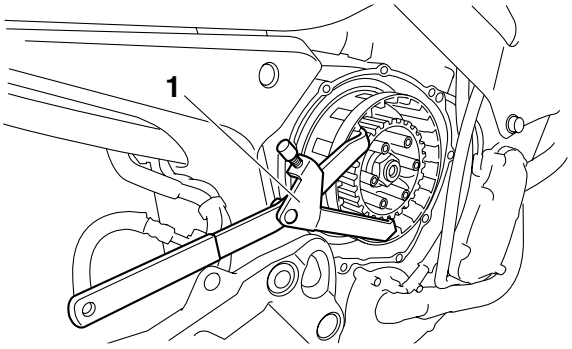


6. Tighten:
   • Clutch boss nut

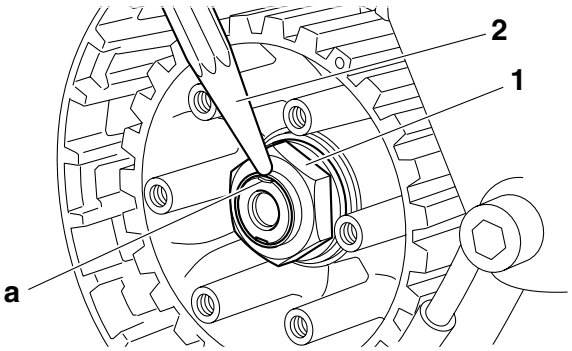
	Clutch boss nut **95 Nm (9.5 m·kgf, 68 ft·lbf)**

TIP
While holding the clutch boss with the universal clutch holder "1", tighten the clutch boss nut.

	Universal clutch holder **90890-04086** **YM-91042**



7. Lock the threads on the clutch boss nut "1" by staking them with a drift punch "2" at the point aligned with the groove "a" in the axle.



8. Lubricate:
   • Friction plates
   • Clutch plates
   (with the recommended lubricant)

	Recommended lubricant **Engine oil**

9. Install:
   • Friction plates
   • Clutch plates

TIP
First, install a friction plate and then alternate between a clutch plate and a friction plate.

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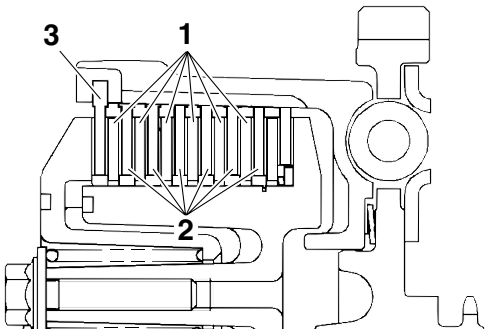
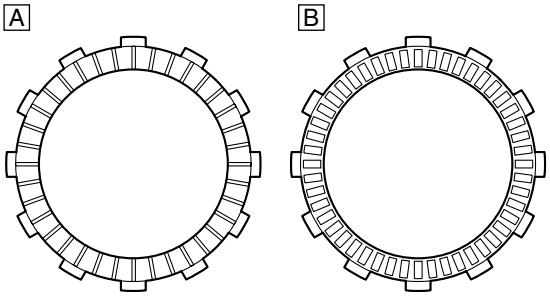
• Install the clutch plate and friction plate as shown in the illustration.

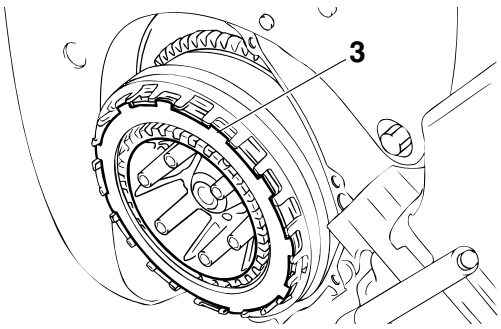
Clutch plate "1": t=2.0 mm (0.08 in)
Friction plate 2 "2"
Friction plate 1 "3": Color/Black





A. Friction plate 1
B. Friction plate 2

TIP
Install the friction plate 1 "3" shifting half phase.



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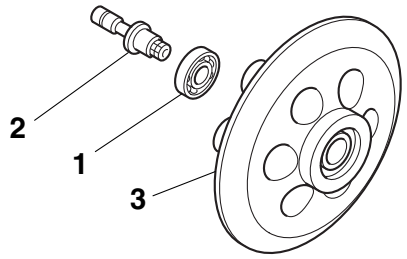
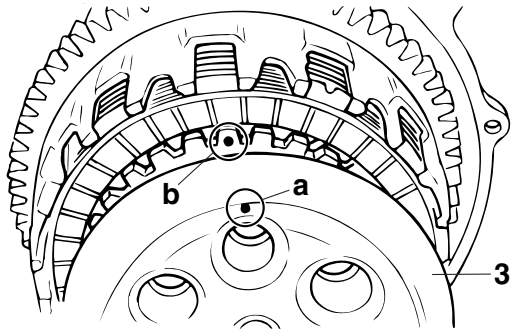
10. Install:
   • Bearing "1"
   • Push rod 2 "2"
   • Pressure plate "3"
   • Compression springs
   • Compression spring bolts

	Compression spring bolt **8 Nm (0.8 m·kgf, 5.8 ft·lbf)**

TIP

- Align the punch mark "a" in the pressure plate with the punch mark "b" in the clutch boss.
- Tighten the compression spring bolts in stages and in a crisscross pattern.

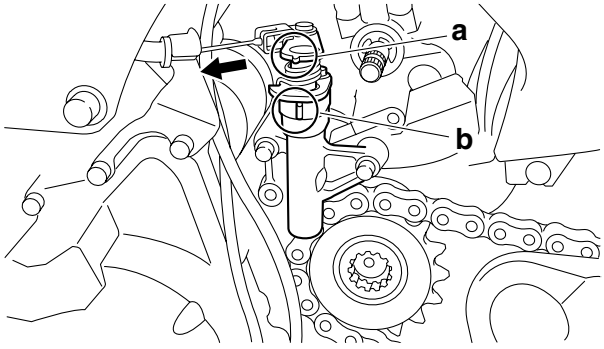




11. Install:
    - Push lever assembly
      (left side of the engine)
12. Check:
    - Push lever position
      Push lever mark "a" and push lever case mark "b" not aligned → Correct

TIP

Move the push lever in the arrow direction, and make sure that its movement becomes hard in the position where the marks match.



13. Adjust:
    - Push lever position

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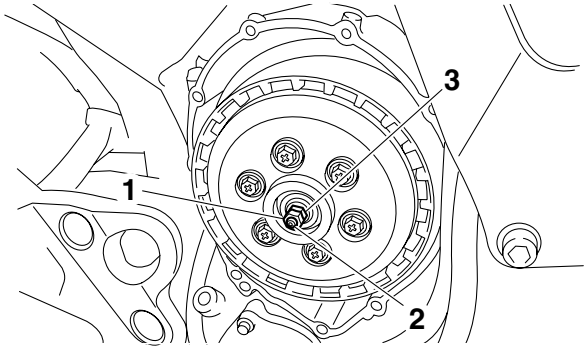
a. Loosen locknut "1" of push rod "2".
b. Return or tighten adjusting nut "3" until the mark of push lever matches the mark of push lever case.
c. Hold the push rod (not to move it), and tighten the push rod locknut.

	Lock nut **8 Nm (0.8 m·kgf, 5.8 ft·lbf)**



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14. Adjust:
    - Clutch cable free play
      Refer to "ADJUSTING THE CLUTCH CABLE FREE PLAY" on page 3-11.
15. Install:
    - Drive sprocket cover
      Refer to "ENGINE REMOVAL" on page 5-1.
    - Gasket New
    - Clutch cover

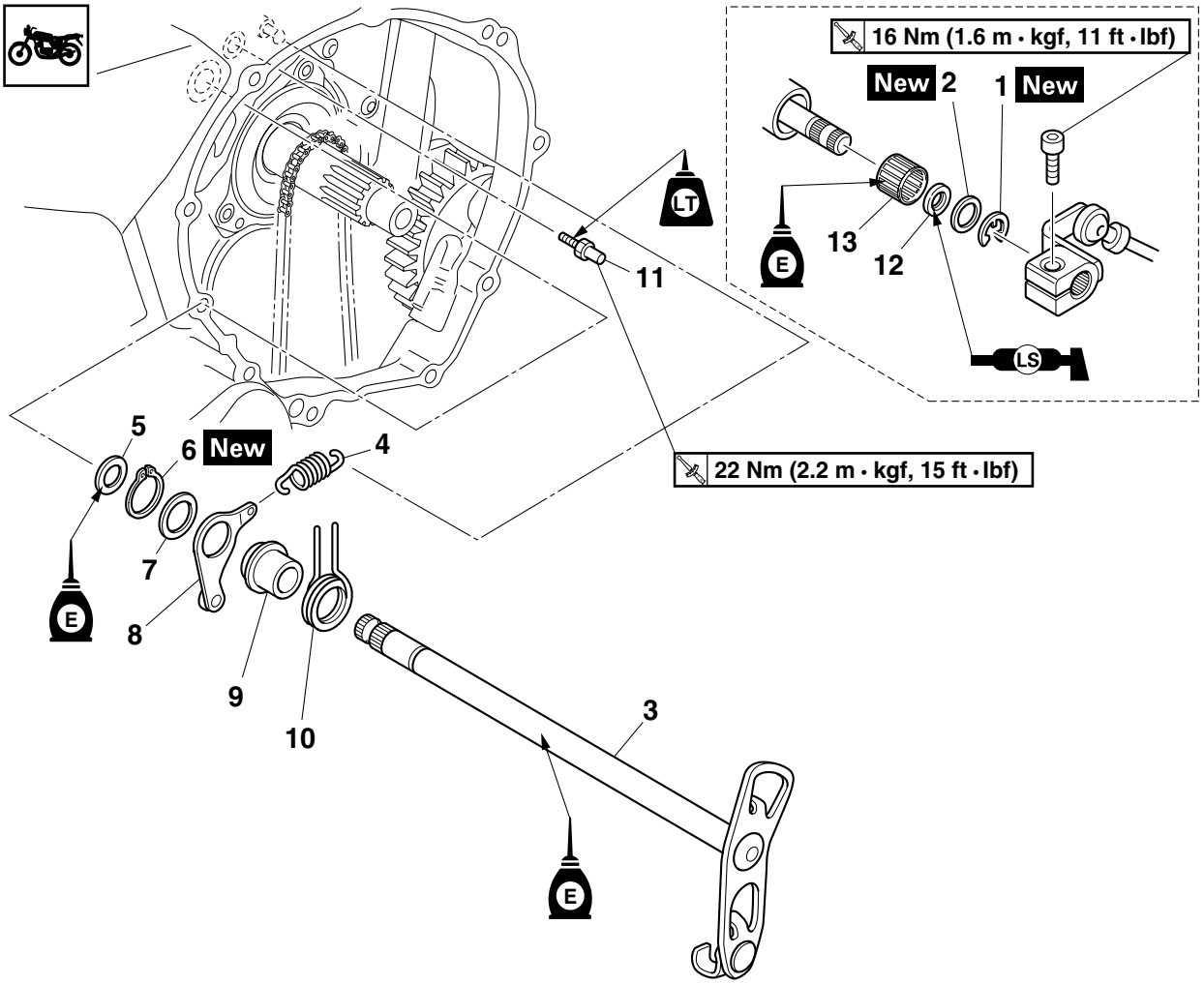
	Clutch cover **10 Nm (1.0 m·kgf, 7.2 ft·lbf)** **LOCTITE®**

- Right side panel
  Refer to "GENERAL CHASSIS" on page 4-1.

EAS25410

SHIFT SHAFT

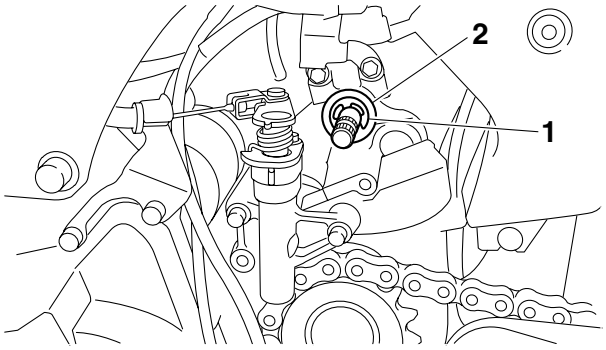
Removing the shift shaft and stopper lever



Order	Job/Parts to remove	Q'ty	Remarks
	Clutch assembly		Refer to "CLUTCH" on page 5-47.
	Shift arm and shift rod		Refer to "ENGINE REMOVAL" on page 5-1.
1	Circlip	1	
2	Washer	1	
3	Shift shaft	1	
4	Stopper lever spring	1	
5	Washer	1	
6	Circlip	1	
7	Washer	1	
8	Stopper lever	1	
9	Collar	1	
10	Shift shaft spring	1	
11	Stopper screw	1	
12	Oil seal	1	
13	Bearing	1	
			For installation, reverse the removal procedure.

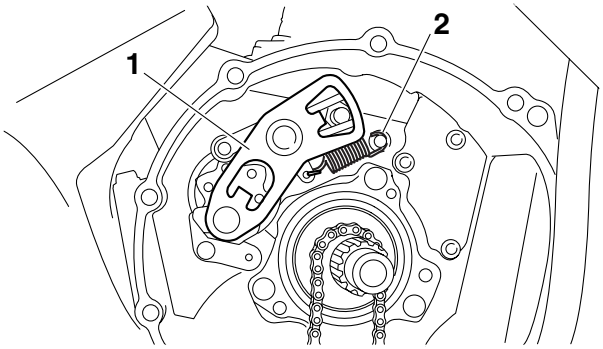
EAS5D01019
REMOVING THE SHIFT SHAFT

1. Remove:
   - Clutch assembly
     Refer to “CLUTCH” on page 5-47.
2. Remove:
   - Shift arm
   - Shift rod
     Refer to “ENGINE REMOVAL” on page 5-1.
3. Remove:
   - Circlip “1”
   - Washer “2”
     (left side of the engine)

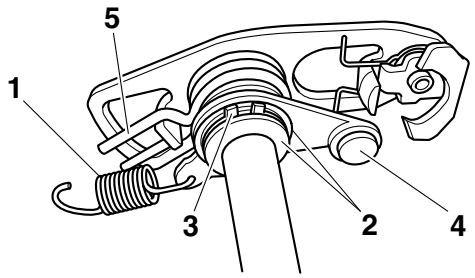


4. Remove
   - Shift shaft assembly “1”

TIP
Unhook the stopper lever spring “2”.

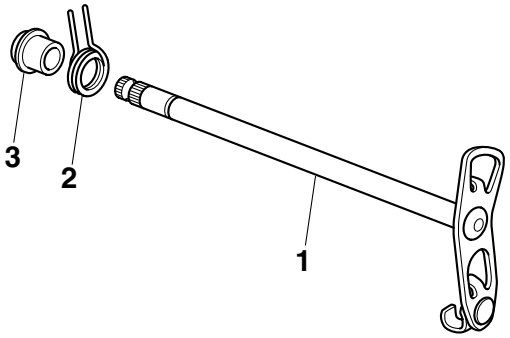


5. Remove:
   - Stopper lever spring “1”
   - Washer “2”
   - Circlip “3”
   - Stopper lever “4”
   - Collar
   - Shift shaft spring “5”



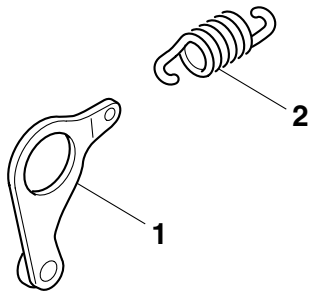
EAS25420
CHECKING THE SHIFT SHAFT

1. Check:
   - Shift shaft “1”
     Bends/damage/wear → Replace.
   - Shift shaft spring “2”
   - Collar “3”
     Damage/wear → Replace.



EAS25430
CHECKING THE STOPPER LEVER

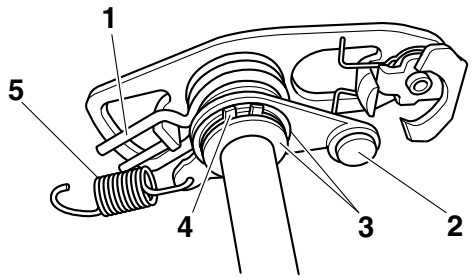
1. Check:
   - Stopper lever “1”
     Bends/damage → Replace.
     Roller turns roughly → Replace the stopper lever.
   - Stopper lever spring “2”



EAS25450
INSTALLING THE SHIFT SHAFT

1. Install:
   - Shift shaft spring “1”
   - Collar

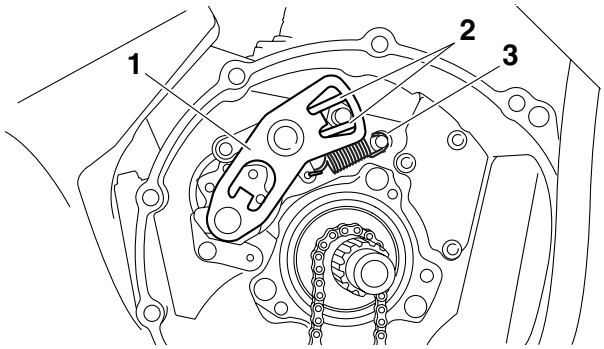
- Stopper lever “2”
- Washer “3”
- Circlip “4”
- Stopper lever spring “5”



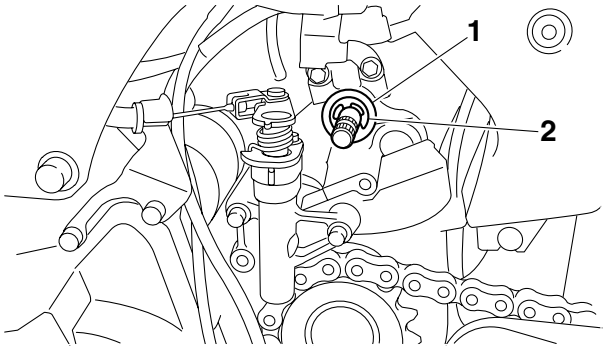
2. Install:
   - Shift shaft assembly “1”

TIP

- 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 “2” onto the shift shaft spring stopper.
- Hook the stopper lever spring “3”.



3. Install:
   - Washer “1”
   - Circlip “2” New
     (left side of the engine)



4. Install:
   - Shift rod
   - Shift arm

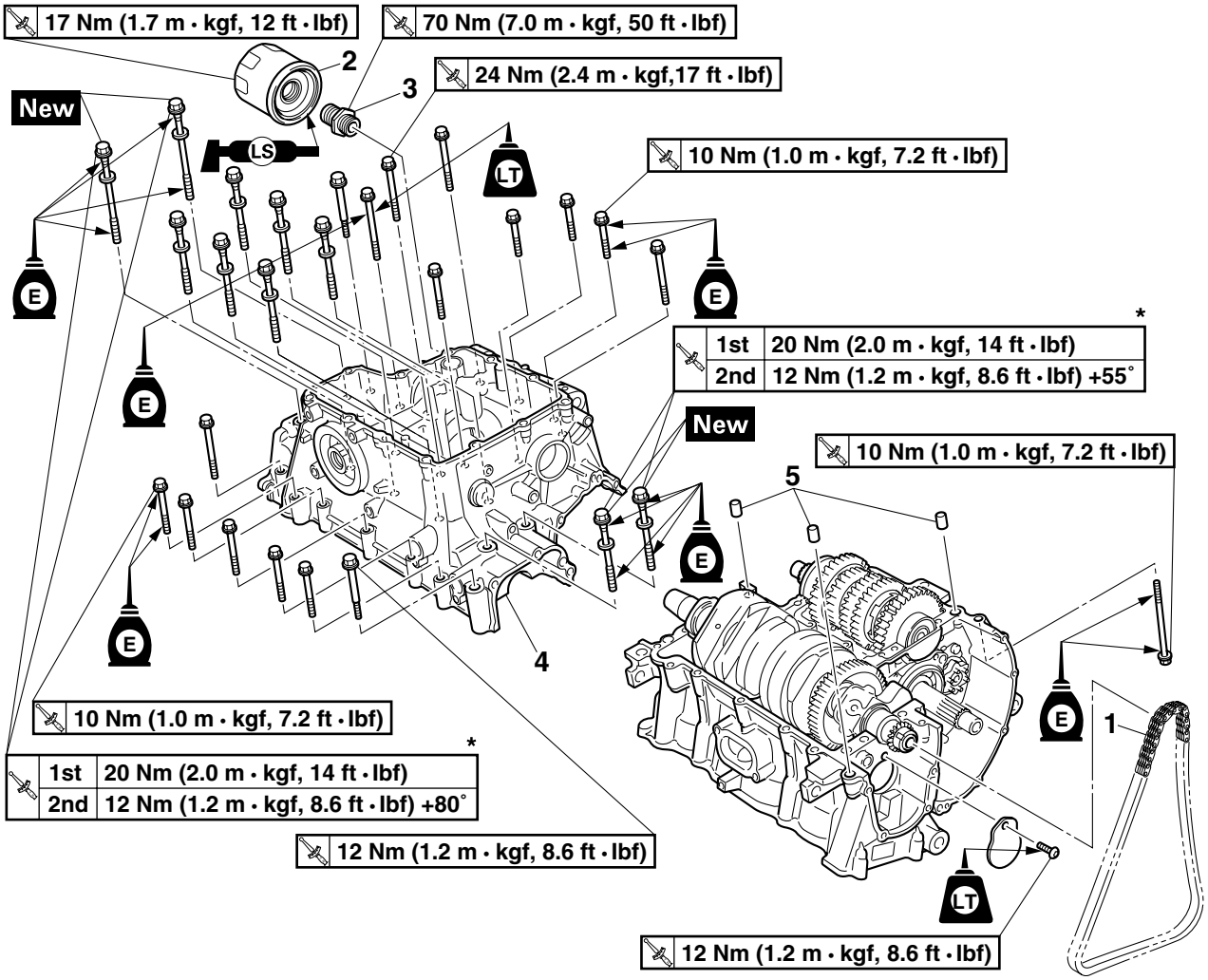
   Refer to “ENGINE REMOVAL” on page 5-1.
5. Install:
   - Clutch assembly

   Refer to “CLUTCH” on page 5-47.

EAS25540

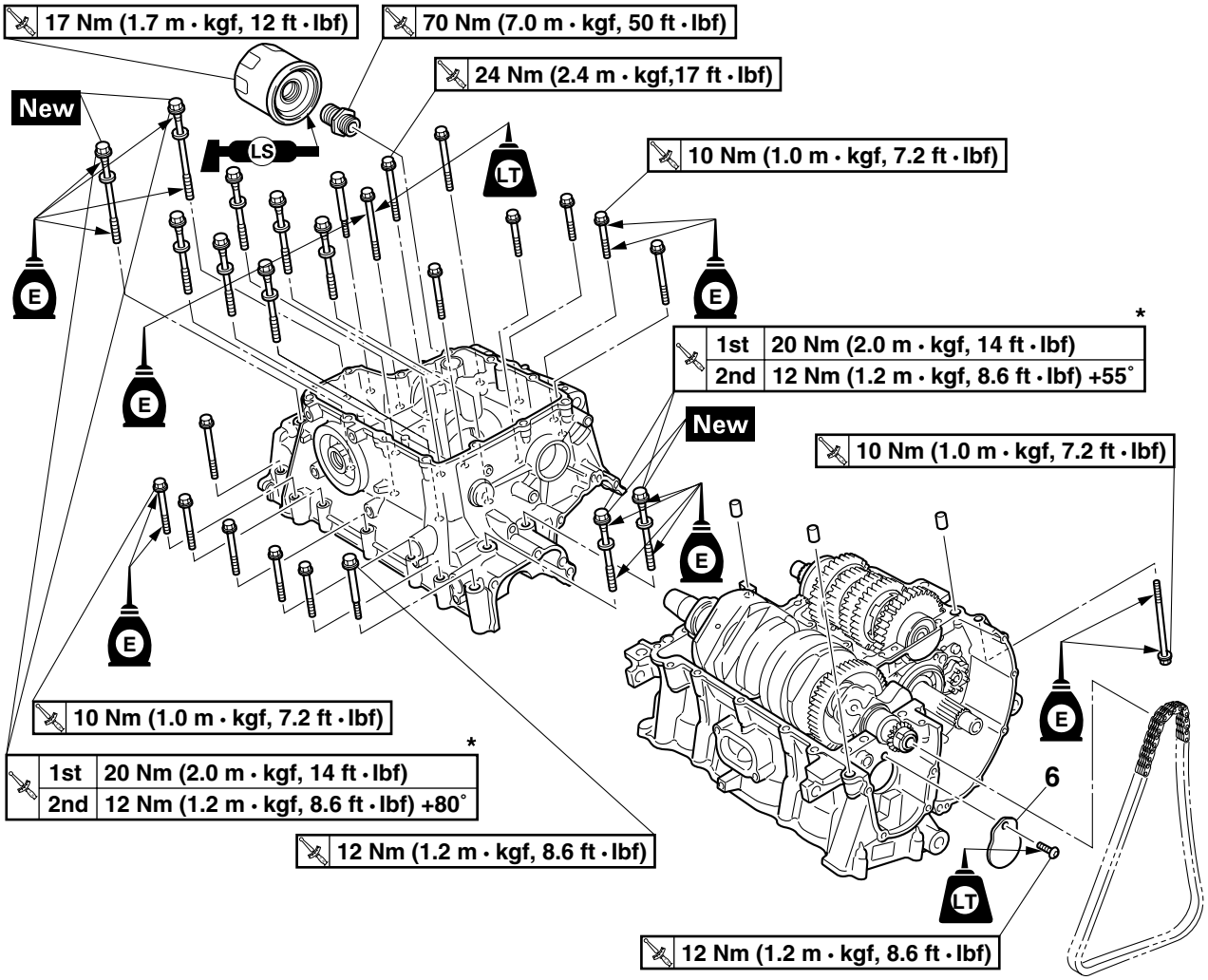
CRANKCASE

Separating the crankcase



Order	Job/Parts to remove	Q'ty	Remarks
	Engine		Refer to "ENGINE REMOVAL" on page 5-1.
	Cylinder head		Refer to "CYLINDER HEAD" on page 5-16.
	Starter motor		Refer to "ELECTRIC STARTER" on page 5-36.
	Generator		Refer to "GENERATOR AND STARTER CLUTCH" on page 5-28.
	Starter clutch		Refer to "GENERATOR AND STARTER CLUTCH" on page 5-28.
	Shift shaft		Refer to "SHIFT SHAFT" on page 5-56.
	Crankshaft position sensor		Refer to "PICKUP ROTOR" on page 5-33.
	Pickup rotor		Refer to "PICKUP ROTOR" on page 5-33.
	Clutch		Refer to "CLUTCH" on page 5-47.
	Water pump		Refer to "WATER PUMP" on page 6-9.
	Oil pan		Refer to "OIL PUMP" on page 5-40.
	Oil pump		Refer to "OIL PUMP" on page 5-40.
1	Timing chain	1	
2	Oil filter cartridge	1	
3	Oil filter union bolt	1	
4	Lower crankcase	1	
5	Dowel pin	3	

Separating the crankcase



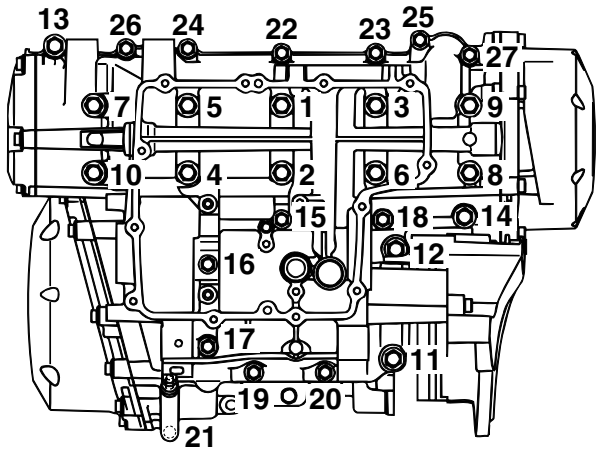
Order	Job/Parts to remove	Q'ty	Remarks
6	Plate	1	
			For installation, reverse the removal procedure.

*Refer to "ENGINE TIGHTENING TORQUES" on page 2-15

EAS25550
DISASSEMBLING THE CRANKCASE
1. Place the engine upside down.
2. Remove:
   - Crankcase bolts

TIP
- 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.

M8 × 85 mm (3.3 in) bolts: “1”–“7”, “10”
M8 × 115 mm (4.5 in) bolts: “8”, “9”
M8 × 65 mm (2.6 in) bolts: “11”, “12”
M6 × 65 mm (2.6 in) bolts: “13”, “14”
M6 × 55 mm (2.2 in) bolts: “15”, “22”–“26”
M6 × 45 mm (1.8 in) bolts: “16”, “19”, “20”
M6 × 65 mm (2.6 in) bolts: “17”, “27”
M6 × 75 mm (3.0 in) bolt: “18”
M6 × 100 mm (3.9 in) bolt: “21” (in upper side)



3. Remove:
   - Lower crankcase

ECA13900
NOTICE
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)

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

EAS25580
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.

EAS4S81034
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.

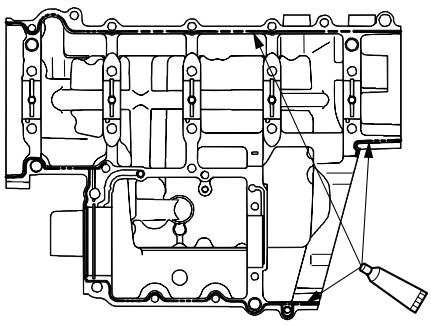
EAS25660
ASSEMBLING THE CRANKCASE
1. Lubricate:
   - Crankshaft journal bearings (with the recommended lubricant)

	Recommended lubricant **Engine oil**

2. Apply:
   - Sealant (onto the crankcase mating surfaces)

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

TIP
Do not allow any sealant to come into contact with the oil gallery or crankshaft journal bearings. Do not apply sealant to within 2–3 mm of the crankshaft journal bearings.

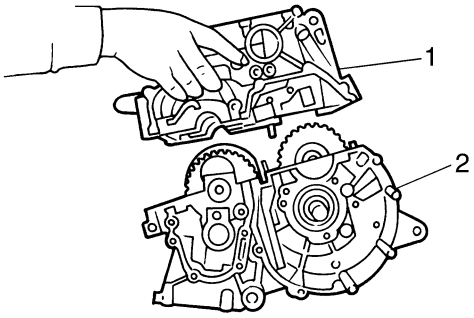


3. Install:
   - Dowel pin
4. Set the shift drum assembly and transmission gears in the neutral position.
5. Install:
   - Lower crankcase “1”
     (onto the upper crankcase “2”)

ECA13980

NOTICE

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

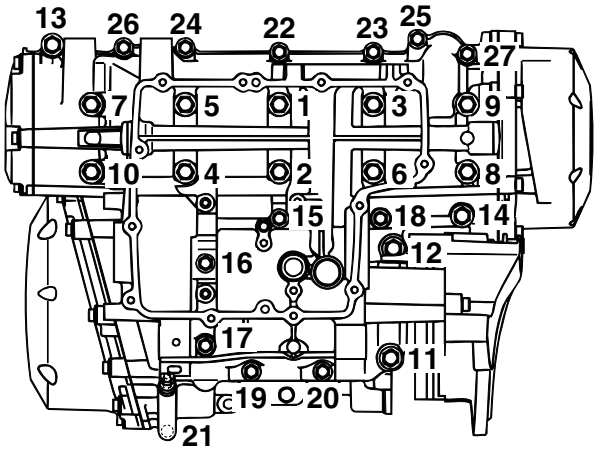


6. Install:
   - Crankcase bolts

TIP

- Lubricate the bolt threads with engine oil.
- Install a washer on bolts “1”–”10”.
- Apply the LOCTITE® to the bolt “18” thread.

M8 × 85 mm (3.3 in) bolts: “1”–“7”, “10”
M8 × 115 mm (4.5 in) bolts: “8”, “9”
M8 × 65 mm (2.6 in) bolts: “11”, “12”
M6 × 65 mm (2.6 in) bolts: “13”, “14”
M6 × 55 mm (2.2 in) bolts: “15”, “22”–“26”
M6 × 45 mm (1.8 in) bolts: “16”, “19”, “20”
M6 × 65 mm (2.6 in) bolts: “17”, “27”
M6 × 75 mm (3.0 in) bolt: “18” LOCTITE®
M6 × 100 mm (3.9 in) bolt: “21”



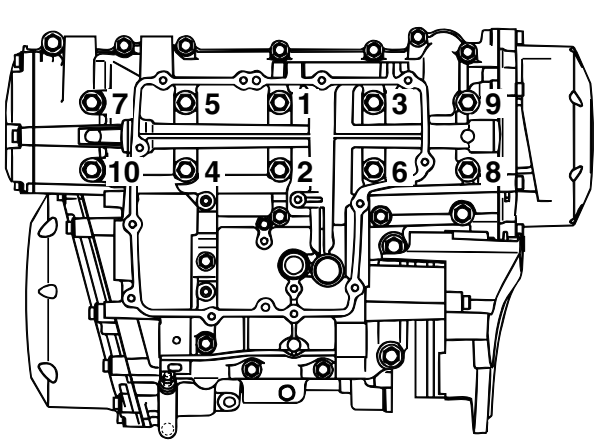
7. Tighten:
   - Crankcase bolts “1”–“10” New
     Refer to “ENGINE TIGHTENING TORQUES” on page 2-15.

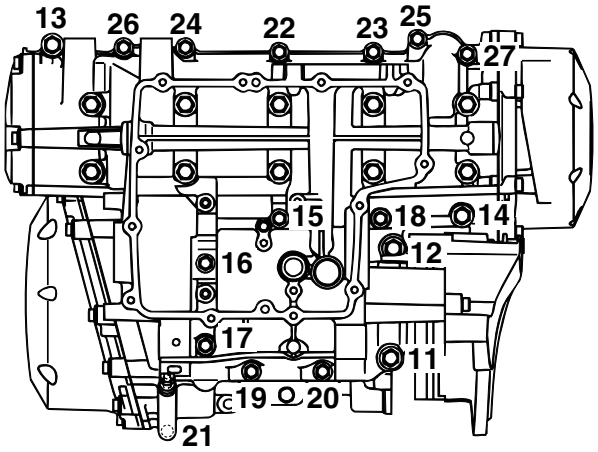
	Crankcase bolt (M8 × 115 mm, M8 × 85 mm) **1st: 20 Nm (2.0 m·kgf, 14 ft·lbf)** ***2nd: 12 Nm (1.2 m·kgf, 8.9 ft·lbf)** **3rd: 50°–60° (bolt “1–7, 10”)** **75°–85° (bolt “8, 9”)**

*Loosen the bolt and retighten to specification torque.

TIP

Tighten the bolts in the tightening sequence cast on the crankcase.





8. Tighten:
   Crankcase bolts “11”–“27”

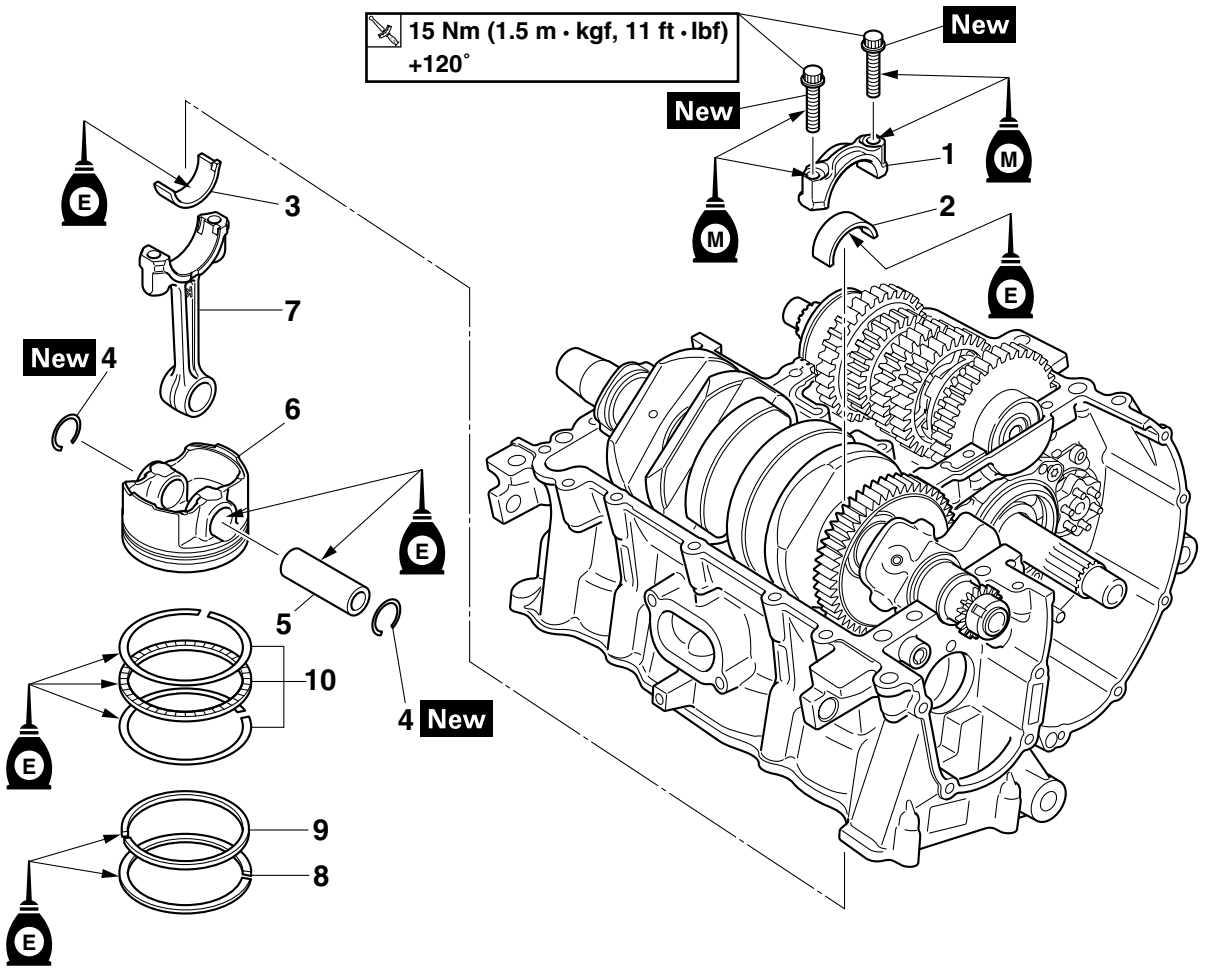
Crankcase bolt (M8 × 65 mm) “11, 12”
24 Nm (2.4 m·kgf, 17 ft·lbf)
Crankcase bolt (M6 × 65 mm) “13, 14”
12 Nm (1.2 m·kgf, 8.6 ft·lbf)
Crankcase bolt (M6) “15–27”
10 Nm (1.0 m·kgf, 7.2 ft·lbf)

TIP
Tighten the bolts in the tightening sequence cast on the crankcase.

EAS25950

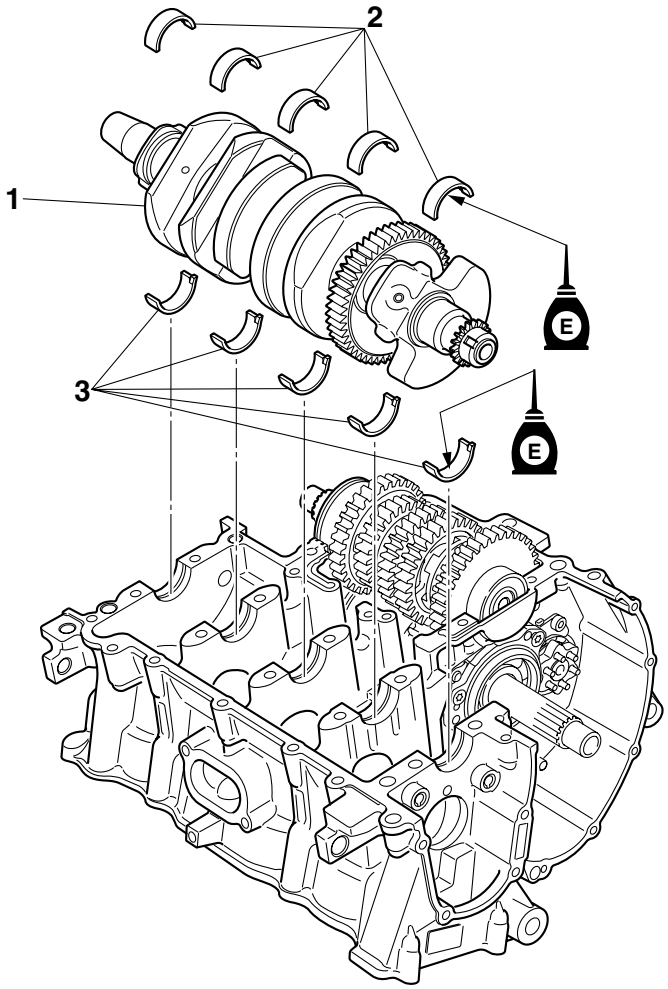
CRANKSHAFT

Removing the connecting rods and pistons



Order	Job/Parts to remove	Q'ty	Remarks
	Lower crankcase		Refer to "CRANKCASE" on page 5-59.
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	
			For installation, reverse the removal procedure.

Removing the crankshaft



Order	Job/Parts to remove	Q'ty	Remarks
	Crankcase		Separate. Refer to "CRANKCASE" on page 5-59.
	Connecting rods and connecting rod caps		Refer to "CRANKSHAFT" on page 5-64.
1	Crankshaft	1	
2	Crankshaft journal lower bearing	5	
3	Crankshaft journal upper bearing	5	
			For installation, reverse the removal procedure.

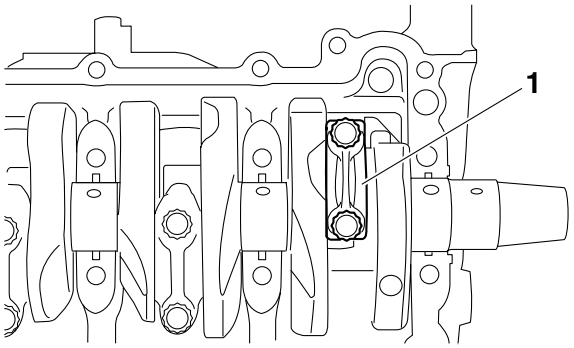
EAS26030
REMOVING THE CONNECTING RODS AND PISTONS

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

1. Remove:
   - Connecting rod cap “1”
   - Big end bearings

TIP

Identify the position of each big end bearing so that it can be reinstalled in its original place.



2. Remove:
   - Piston pin clips “1”
   - Piston pin “2”
   - Piston “3”

ECA4S81024

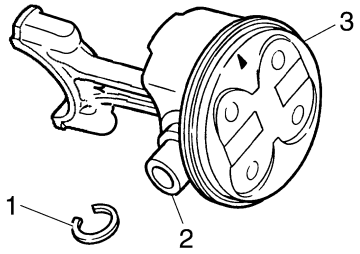
NOTICE

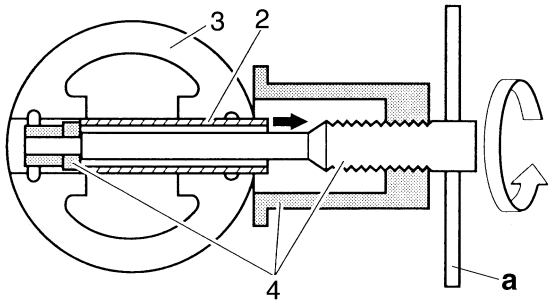
Do not use a hammer to drive the piston pin out.

TIP

- 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”.
- Attach the piston pin puller set “4” and turn its handle “a” counter clockwise to remove the piston pin “2”.

Piston pin puller set
90890-01304
Piston pin puller
YU-01304

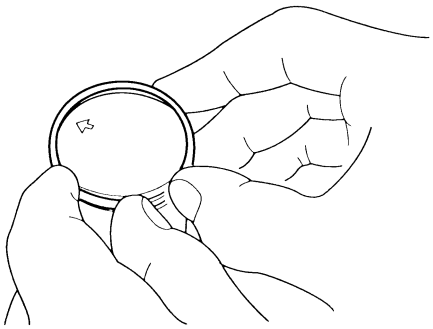




3. Remove:
   - Top ring
   - 2nd ring
   - Oil ring

TIP

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



EAS25980
REMOVING THE CRANKSHAFT ASSEMBLY

1. Remove:
   - Crankshaft assembly
   - Crankshaft journal upper bearings (from the upper crankcase)
     Refer to “CRANKSHAFT” on page 5-64.

TIP

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

EAS24390
CHECKING THE CYLINDER AND PISTON

1. Check:
   - Piston wall
   - Cylinder wall
     Vertical scratches → Replace the cylinder, and replace the piston and piston rings as a set.
2. Measure:
   - Piston-to-cylinder clearance

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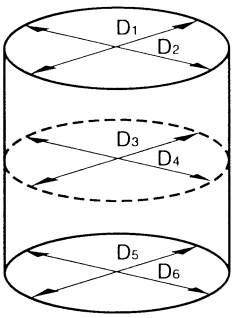
a. Measure cylinder bore "C" with the cylinder bore gauge.

TIP

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

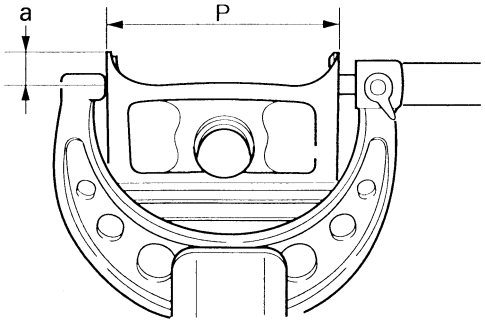
Bore
65.500–65.510 mm
(2.5787–2.5791 in)
Wear limit
65.56 mm (2.5811 in)
Taper limit
0.050 mm (0.0020 in)
Out of round limit
0.050 mm (0.0020 in)

"C" = maximum of D_1–D_6
"T" = maximum of D_1 or D_2 – maximum of D_5 or D_6
"R" = maximum of D_1, D_3 or D_5 – minimum of D_2, D_4 or D_6



b. If out of specification, replace the cylinder, and replace the piston and piston rings as a set.
c. Measure piston skirt diameter "P" with the micrometer.

Piston size "P"
Standard
65.475–65.490 mm
(2.5778–2.5783 in)



a. 5 mm (0.20 in) from the bottom edge of the piston

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

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

Piston-to-cylinder clearance
0.010–0.035 mm
(0.0004–0.0014 in)

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

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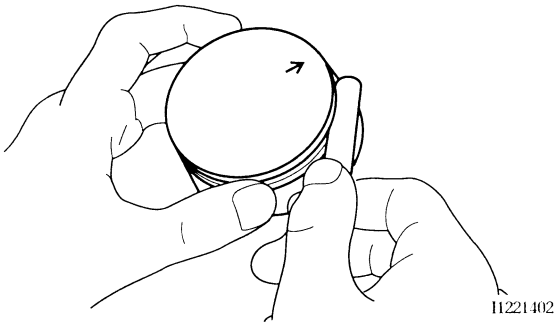
EAS24430
CHECKING THE PISTON RINGS

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

TIP

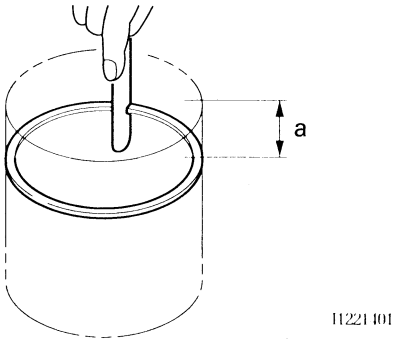
Before measuring the piston ring side clearance, eliminate any carbon deposits from the piston ring grooves and piston rings.

Top ring
Ring side clearance
0.030–0.065 mm
(0.0012–0.0026 in)
Limit
0.115 mm (0.0045 in)
2nd ring
Ring side clearance
0.030–0.065 mm
(0.0012–0.0026 in)
Limit
0.125 mm (0.0049 in)



2. Install:
   - Piston ring
     (into the cylinder)

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



a. 5 mm (0.20 in)

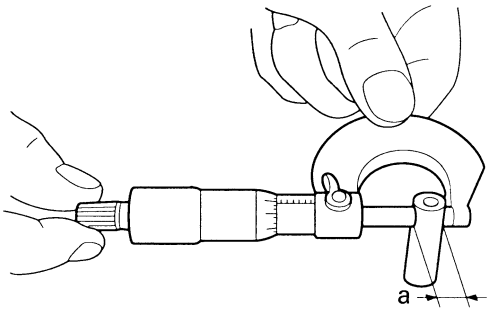
3. Measure:
   - Piston ring end gap
     Out of specification → Replace the piston ring.

TIP
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.

Top ring
End gap (installed)
0.25–0.35 mm (0.0098–0.0138 in)
Limit
0.60 mm (0.0236 in)
2nd ring
End gap (installed)
0.65–0.80 mm (0.0256–0.0315 in)
Limit
1.15 mm (0.0453 in)
Oil ring
End gap (installed)
0.10–0.35 mm (0.0039–0.0138 in)

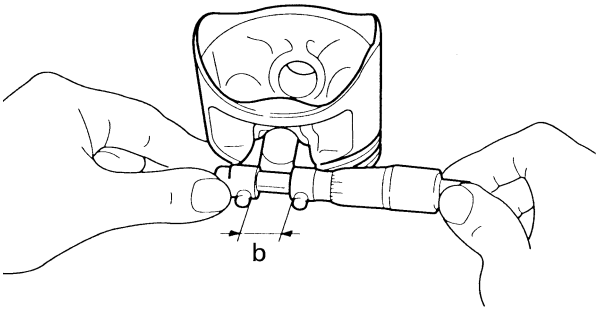
EAS24440
CHECKING THE PISTON PINS
The following procedure applies to all of the piston pins.
1. Check:
   - Piston pin
     Blue discoloration/grooves → Replace the piston pin and then check the lubrication system.
2. Measure:
   - Piston pin outside diameter "a"
     Out of specification → Replace the piston pin.

Piston pin outside diameter
15.990–15.995 mm
(0.6295–0.6297 in)
Limit
15.970 mm (0.6287 in)



3. Measure:
   - Piston pin bore inside diameter "b"
     Out of specification → Replace the piston.

Piston pin bore inside diameter
16.002–16.013 mm
(0.6300–0.6304 in)
Limit
16.043 mm (0.6316 in)



4. Calculate:
   • Piston-pin-to-piston-pin-bore clearance
   Out of specification → Replace the piston pin and piston as a set.

Piston-pin-to-piston-pin-bore clearance =
Piston pin bore diameter "b" -
Piston pin outside diameter "a"

Piston-pin-to-piston-pin-bore clearance
0.007–0.023 mm
(0.0001–0.0009 in)
Limit
0.073 mm (0.0029 in)

EAS4S81037
CHECKING THE BIG END BEARINGS

1. Measure:
   • Crankshaft-pin-to-big-end-bearing clearance
   Out of specification → Replace the big end bearings.

Oil clearance (using plastigauge®)
0.038–0.062 mm
(0.0015–0.0024 in)

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The following procedure applies to all of the connecting rods.

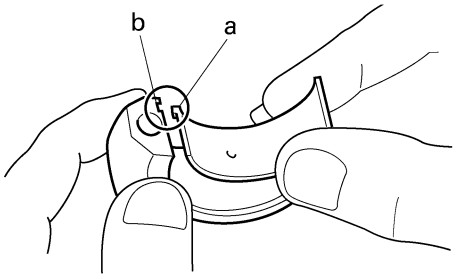
ECA4S81025
NOTICE

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.

a. Clean the big end bearings, crankshaft pins, and the inside of the connecting rod halves.
b. Install the big end upper bearing into the connecting rod and the big end lower bearing into the connecting rod cap.

TIP

Align the projections "a" on the big end bearings with the notches "b" in the connecting rod and connecting rod cap.



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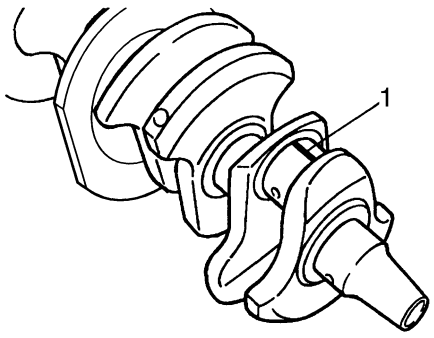
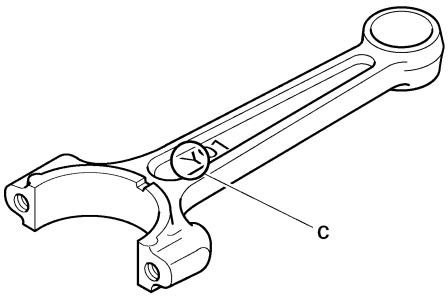
c. Put a piece of Plastigauge® "1" on the crankshaft pin.

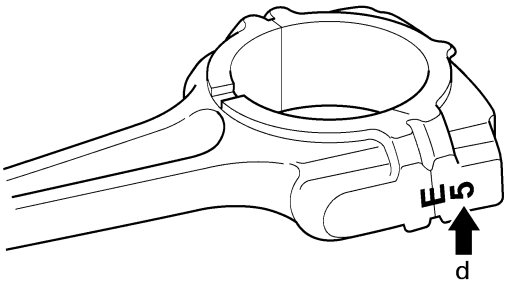


d. Assemble the connecting rod halves.

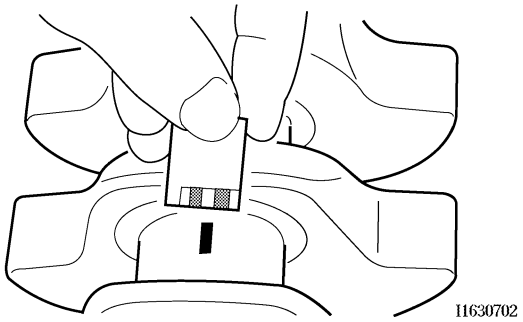
TIP

- Do not move the connecting rod or crankshaft until the clearance measurement has been completed.
- Lubricate the bolt threads and seats with molybdenum disulfide grease.
- Make sure that the "Y" mark "c" on the connecting rod faces towards the left side of the crankshaft.
- Make sure that the characters "d" on both the connecting rod and connecting rod cap are aligned.





e. Tighten the connecting rod bolts.
   Refer to "INSTALLING THE CONNECTING ROD AND PISTON" on page 5-71.
f. Remove the connecting rod and big end bearings.
   Refer to "REMOVING THE CONNECTING RODS AND PISTONS" on page 5-66.
g. 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.



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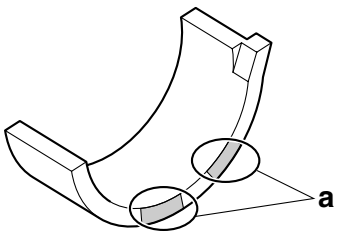
2. Select:
   - Big end bearings (P1–P4)

TIP

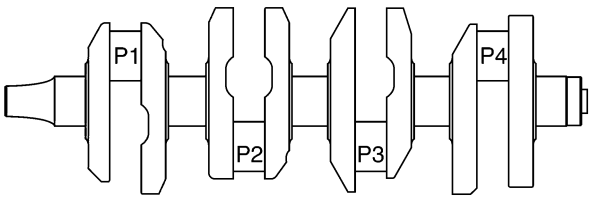
- The numbers "A" stamped into the crankshaft web and the numbers "1" on the connecting rods are used to determine the replacement big end bearing sizes.
- "P1"–"P4" refer to the bearings shown in the crankshaft illustration.
- Select the color "a" for the bearing from the table below according to the calculated values.

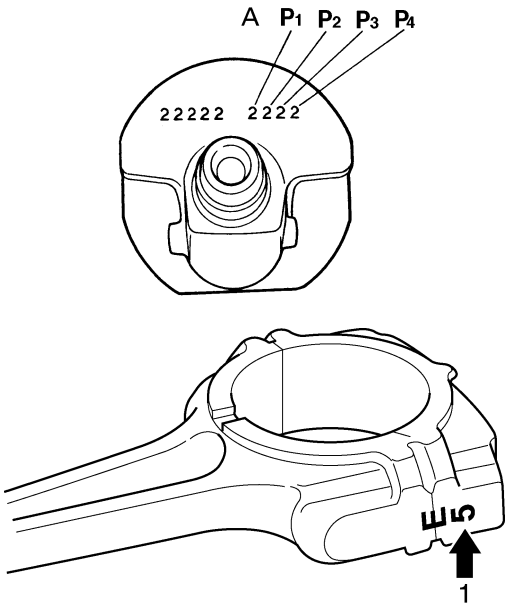
For example, if the connecting rod "P_1" and the crankshaft web "P_1" numbers are "5" and "2" respectively, then the bearing size for "P_1" is:

P_1 (connecting rod) – P_1 (crankshaft web) = 5 – 2 = 3 (yellow–brown)



COLOR CODE	
1	Yellow–Blue
2	Yellow–Black
3	Yellow–Brown
4	Yellow–Green





EAS26190

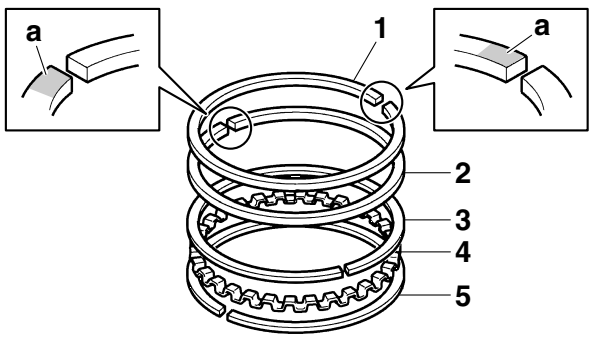
INSTALLING THE CONNECTING ROD AND PISTON

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”

TIP

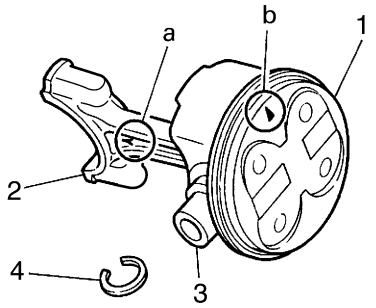
Be sure to install the piston rings so that the manufacturer’s marks or numbers “a” face up.



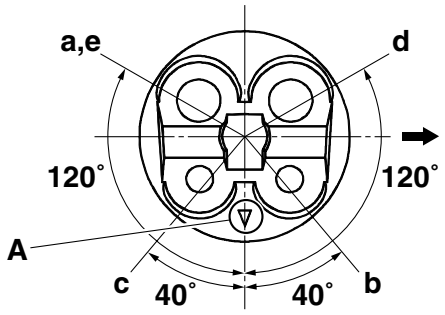
2. Install:
   - Piston “1”
     (onto the respective connecting rod “2”)
   - Piston pin “3”
   - Piston pin clips “4” New

TIP

- 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 as shown.
- Reinstall each piston into its original cylinder (numbering order starting from the left: #1 to #4).



3. Offset:
   - Piston ring end gaps



a. Top ring
b. Lower oil ring rail
c. Upper oil ring rail
d. 2nd ring
e. Oil ring expander

A. Exhaust side

4. Lubricate:
   - Piston
   - Piston rings
   - Cylinder
     (with the recommended lubricant)

	Recommended lubricant Engine oil

5. Lubricate:
   - Bolt threads

- Nut seats
  (with the recommended lubricant)

	Recommended lubricant **Molybdenum disulfide oil**

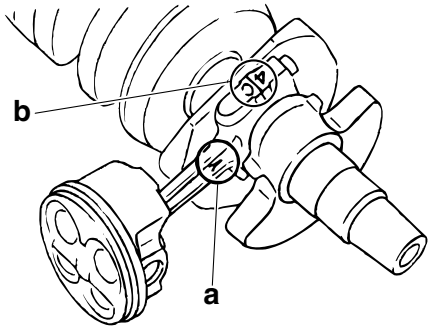
6. Lubricate:
   - Crankshaft pins
   - Big end bearings
   - Connecting rod big end inner surface
     (with the recommended lubricant)

	Recommended lubricant **Engine oil**

7. Install:
   - Big end bearings
   - Connecting rod and piston assembly
   - Connecting rod cap
     (onto the connecting rod)

TIP

- Align the projections on the big end bearings with the notches in the connecting rods and connecting rod caps.
- Be sure to reinstall each big end bearing in its original place.
- While compressing the piston rings with one hand, install the connecting rod assembly into the cylinder with the other hand.
- Make sure that the "Y" marks "a" on the connecting rods face towards the left side of the crankshaft.
- Make sure that the characters "b" on both the connecting rod and connecting rod cap are aligned.



8. Tighten:
   - Connecting rod bolts

	Connecting rod bolt **15 Nm (1.5 m·kgf, 11 ft·lbf) + 120°**

EWA12890

WARNING

- **Replace the connecting rod bolts with new ones.**
- **Clean the connecting rod bolts.**

ECA14980

NOTICE

Tighten the connecting rod bolts using the plastic-region tightening angle method.

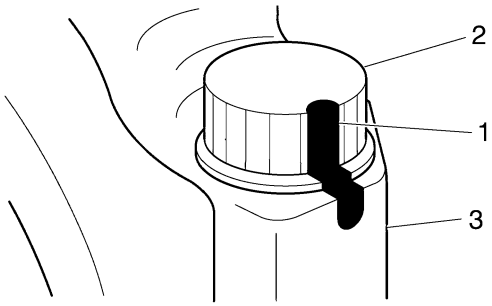
TIP

The tightening procedure of the connecting rod bolts is angle controlled, therefore tighten the bolts using the following procedure.

a. Tighten the connecting rod bolts with a torque wrench.

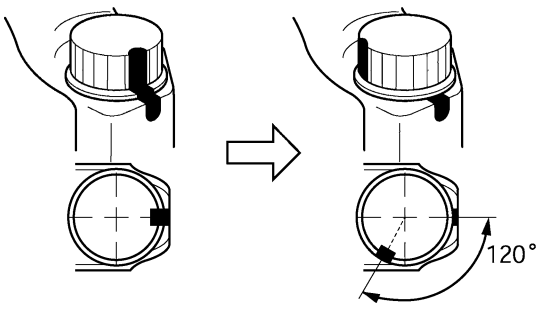
	Connecting rod bolt (1st) **15 Nm (1.5 m·kgf, 11 ft·lbf)**

b. Put a mark "1" on the corner of the connecting rod bolt "2" and the connecting rod cap "3".

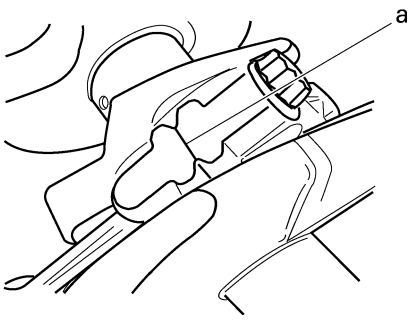


c. Tighten the bolt further to reach the specified angle (120°).

	Connecting rod bolt (2nd) **Specified angle 120°**



d. After the installation, check that the section shown “a” is flush with each other by touching the surface.



a. Side machined face

EWA13990

⚠ 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 “8”. In this case, make sure to replace the connecting rod bolt.**

ECA4S81029

NOTICE

Do not use a torque wrench to tighten the bolt to the specified angle.

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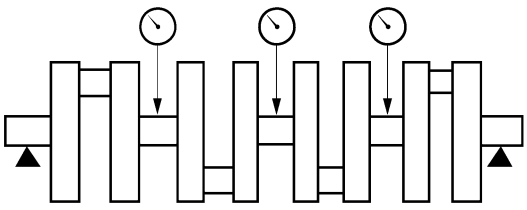
EAS4S81038

CHECKING THE CRANKSHAFT

1. Measure:
   - Crankshaft runout
     Out of specification → Replace the crankshaft.

Crankshaft runout
Less than 0.03 mm (0.0012 in)



I1631006

2. Check:
   - Crankshaft journal surfaces
   - Crankshaft pin surfaces
   - Bearing surfaces
     Scratches/wear → Replace the crankshaft.

EAS4S81039

CHECKING THE CRANKSHAFT JOURNAL BEARINGS

1. Measure:
   - Crankshaft-journal-to-crankshaft-journal bearing clearance
     Out of specification → Replace the crankshaft journal bearings.

Journal oil clearance (using plastigauge®)
0.016–0.040 mm (0.0006–0.0016 in)

ECA4S81028

NOTICE

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.

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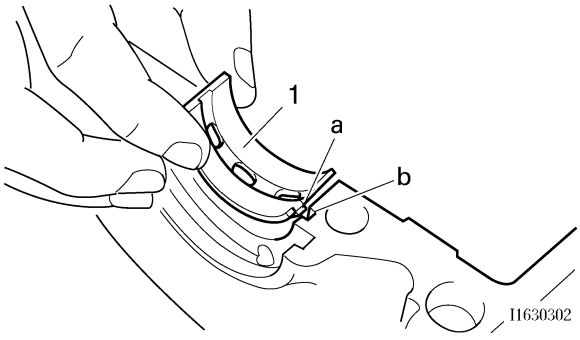
a. Clean the crankshaft journal bearings, crankshaft journals, and bearing portions of the crankcase.
b. Place the upper crankcase upside down on a bench.
c. Install the crankshaft journal upper bearings “1” and the crankshaft into the upper crankcase.

TIP

Align the projections “a” on the crankshaft journal upper bearings with the notches “b” in the upper crankcase.

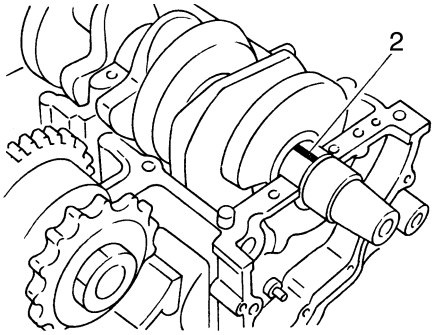


I1630302

d. Put a piece of Plastigauge® “2” on each crankshaft journal.

TIP

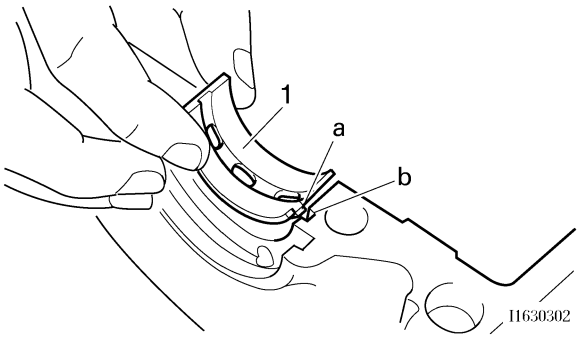
Do not put the Plastigauge® over the oil hole in the crankshaft journal.



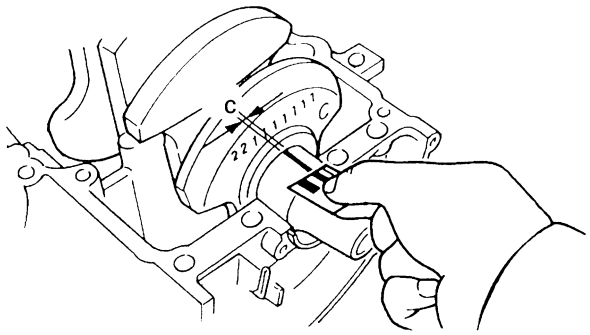
e. Install the crankshaft journal lower bearings "1" into the lower crankcase and assemble the crankcase halves.

TIP

- Align the projections "a" of the crankshaft journal lower bearings with the notches "b" in the lower crankcase.
- Do not move the crankshaft until the clearance measurement has been completed.



f. Tighten the bolts to specification in the tightening sequence cast on the crankcase.
Refer to "ASSEMBLING THE CRANKCASE" on page 5-61.
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.



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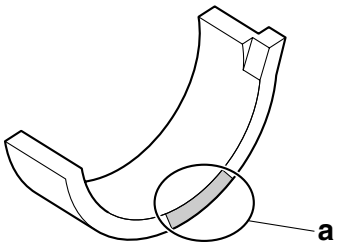
2. Select:
- Crankshaft journal bearings (J1–J5)

TIP

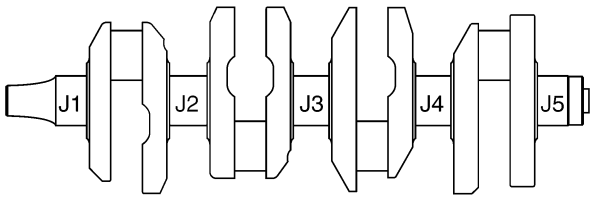
- The numbers "A" stamped into the crankshaft web and the numbers "1" stamped into the lower crankcase are used to determine the replacement crankshaft journal bearing sizes.
- "J1–J5" refer to the bearings shown in the crankshaft illustration.
- If "J1–J5" are the same, use the same size for all of the bearings.
- If the size is the same for all "J_1 to J_5" one digit for that size is indicated. (Crankcase side only)
- Select the color "a" for the bearing from the table below according to the calculated values.

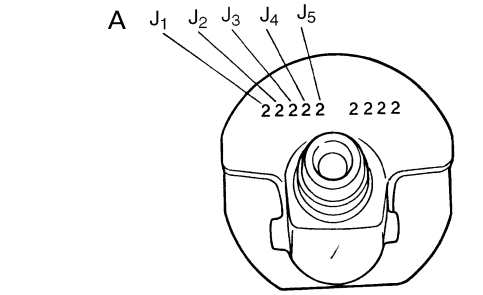
For example, if the crankcase "J_1" and crankshaft web "J_1" numbers are "6" and "2" respectively, than the bearing size for "J_1" is:

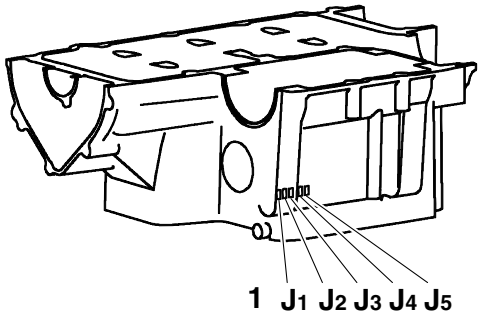
"J_1" (crankcase) – "J_1" (crankshaft web) – 1 = 6 – 2 – 1 = 3 (brown)



CRANKSHAFT JOURNAL BEARING COLOR CODE	
0	White
1	Blue
2	Black
3	Brown
4	Green







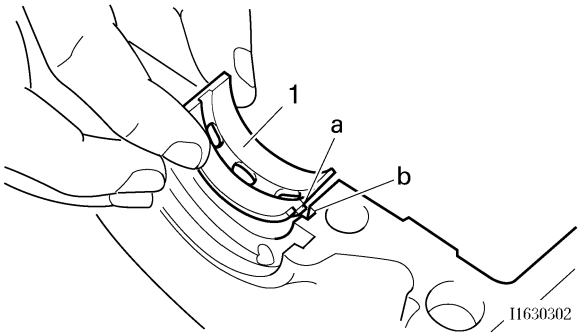
EAS4S81040

INSTALLING THE CRANKSHAFT

1. Install:
   - Crankshaft journal upper bearings “1” (into the upper crankcase)

TIP

- 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.

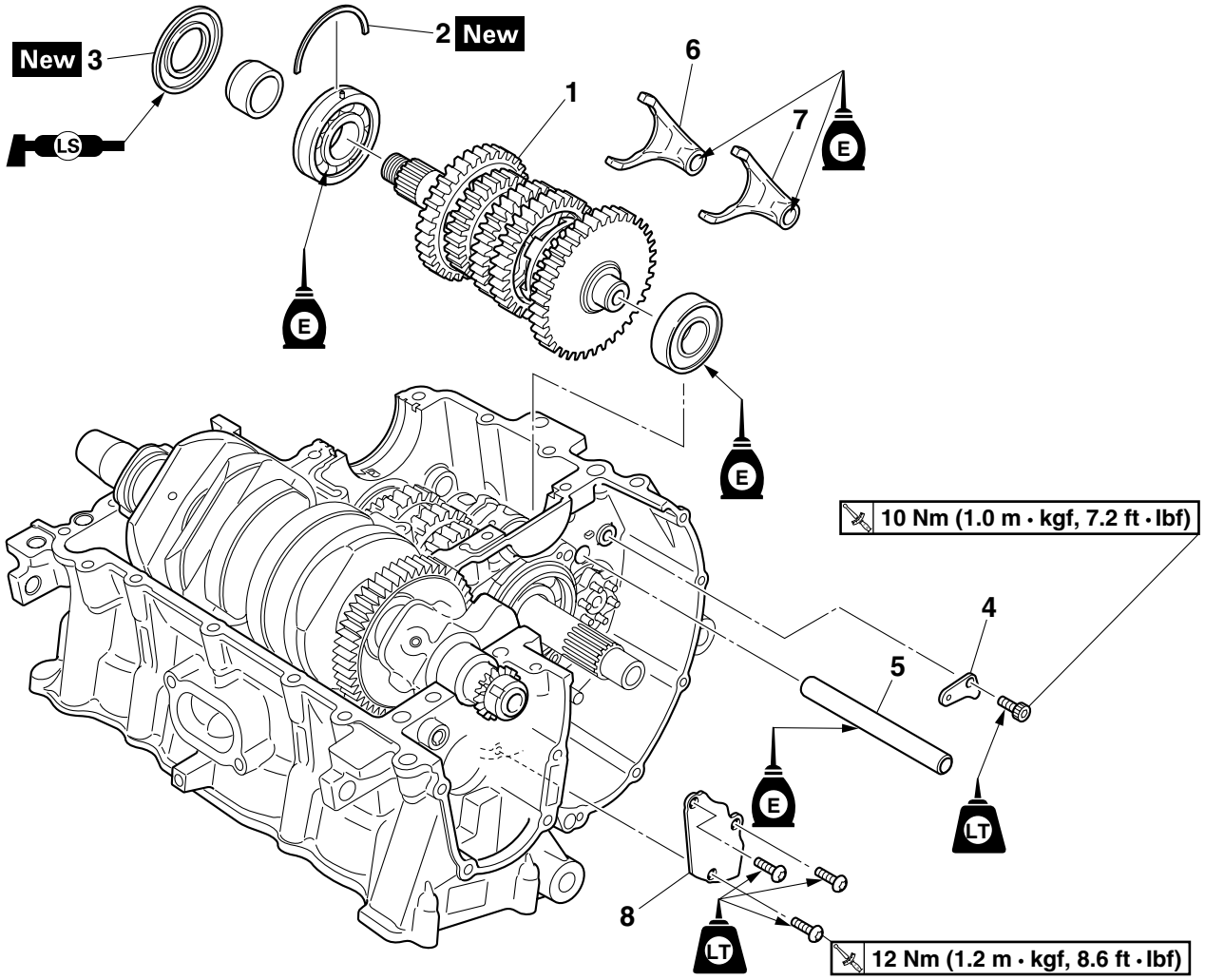


2. Install:
   - Crankshaft
3. Install:
   - Lower crankcase
     Refer to “CRANKCASE” on page 5-59.

EAS26240

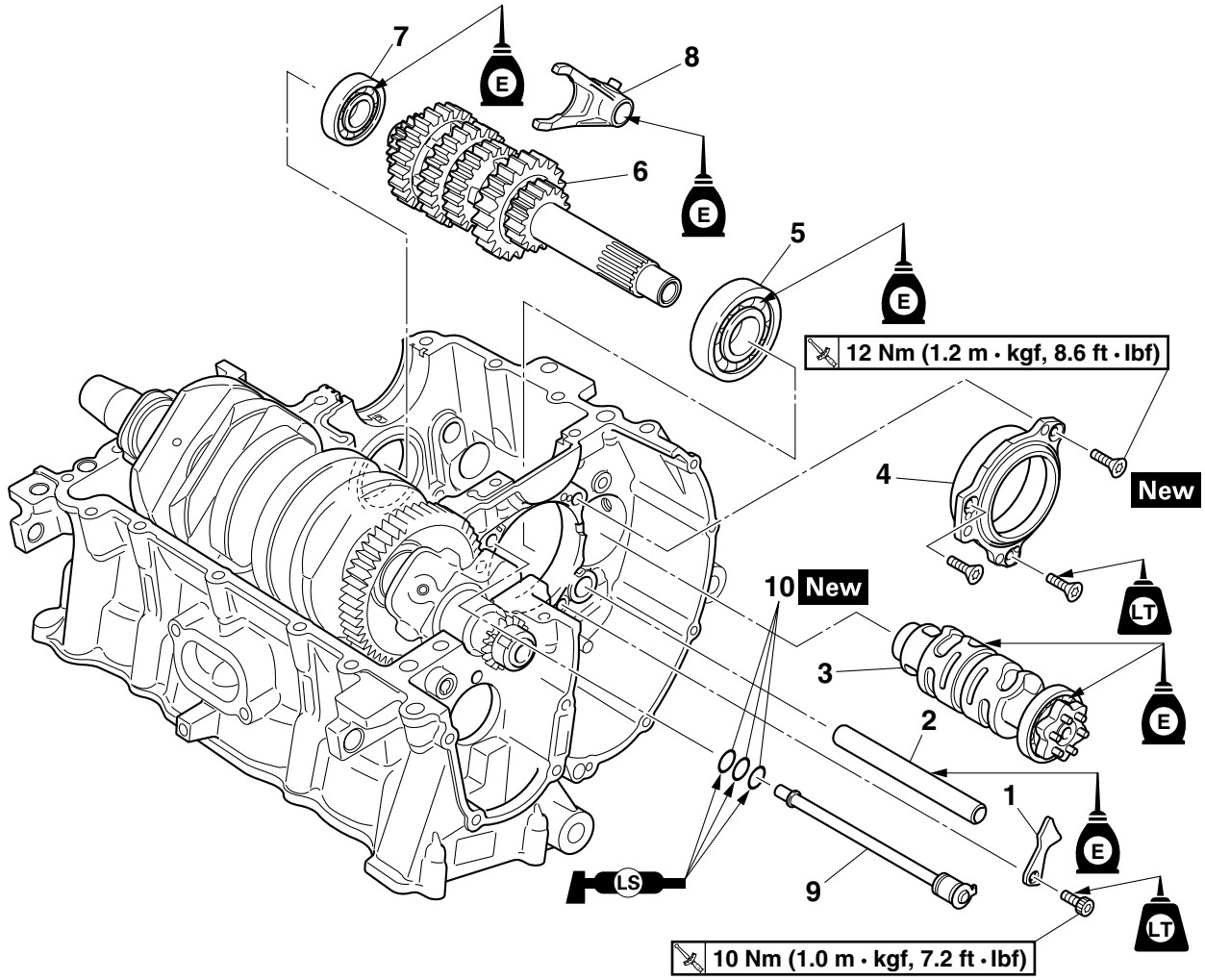
TRANSMISSION

Removing the drive axle



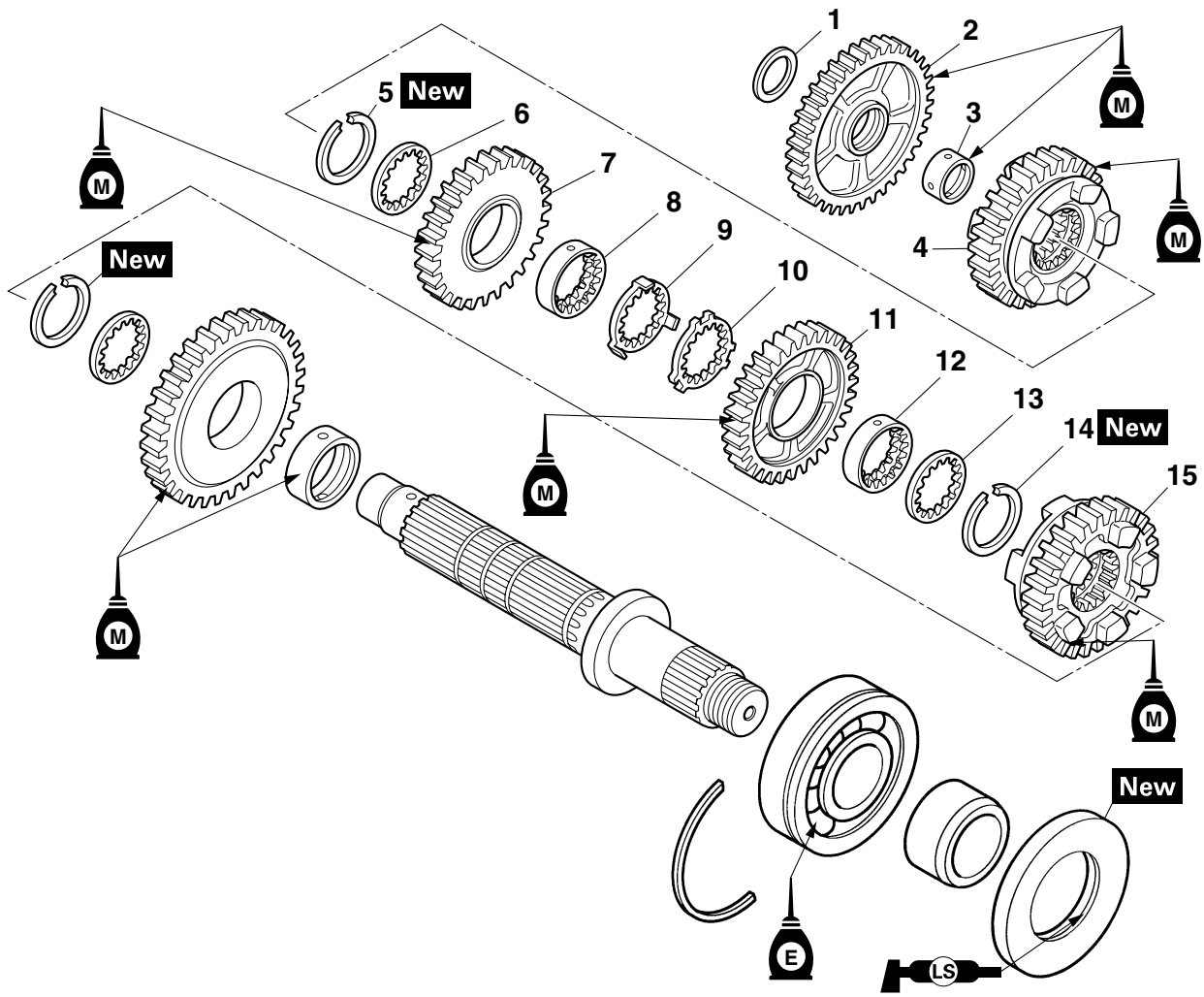
Order	Job/Parts to remove	Q'ty	Remarks
	Lower crankcase		Refer to "CRANKCASE" on page 5-59.
1	Drive axle assembly	1	
2	Circlip	1	
3	Oil seal	1	
4	Shift fork guide bar retainer	1	
5	Shift fork guide bar	1	
6	Shift fork-L	1	
7	Shift fork-R	1	
8	Plate	1	
			For installation, reverse the removal procedure.

Removing the main axle and shift drum



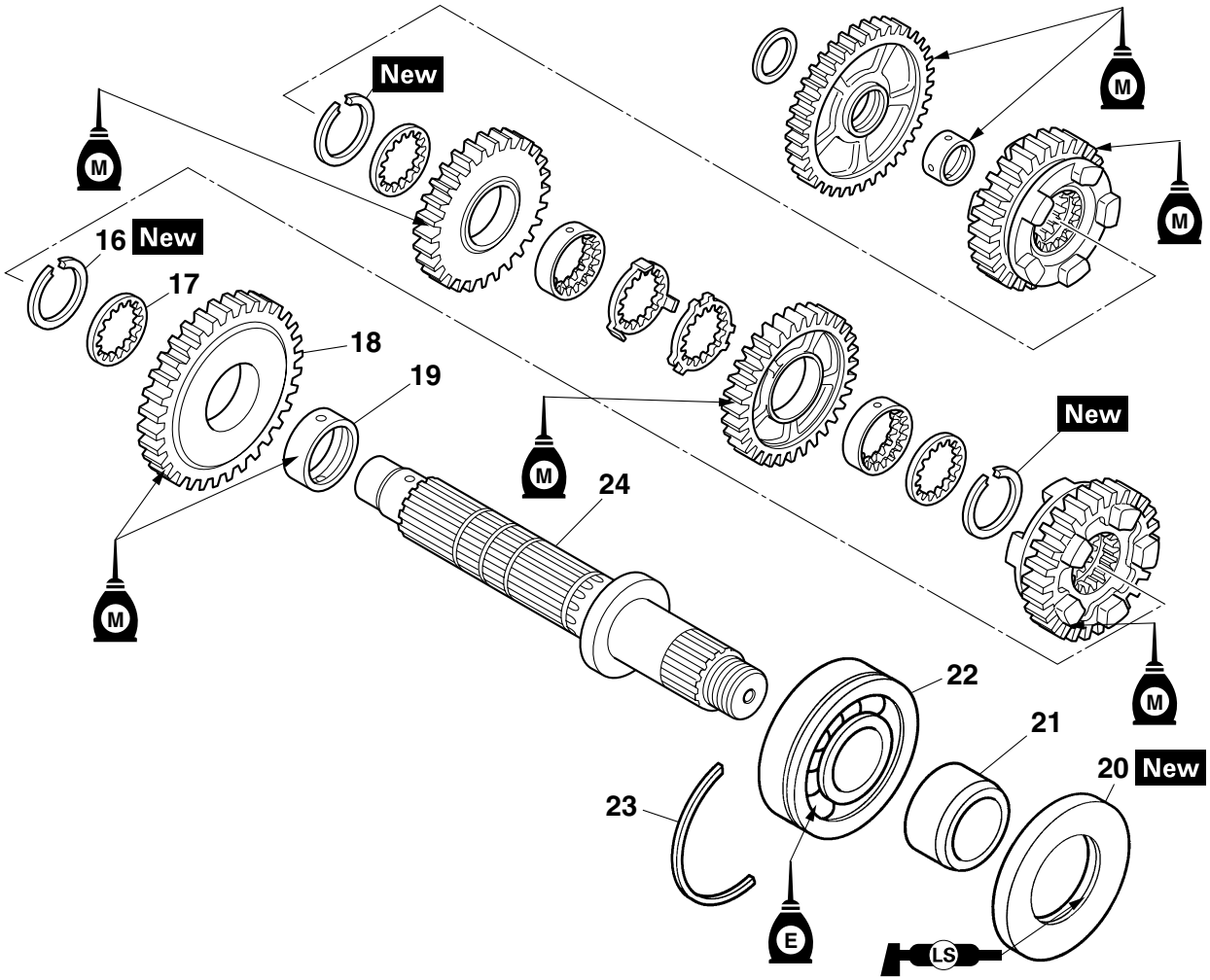
Order	Job/Parts to remove	Q'ty	Remarks
1	Shift fork guide bar retainer	1	
2	Shift fork guide bar	1	
3	Shift drum assembly	1	
4	Bearing housing	1	
5	Bearing	1	
6	Main axle assembly	1	
7	Bearing	1	
8	Shift fork-C	1	
9	Oil pipe	1	
10	O-ring	3	

Disassembling the drive axle assembly



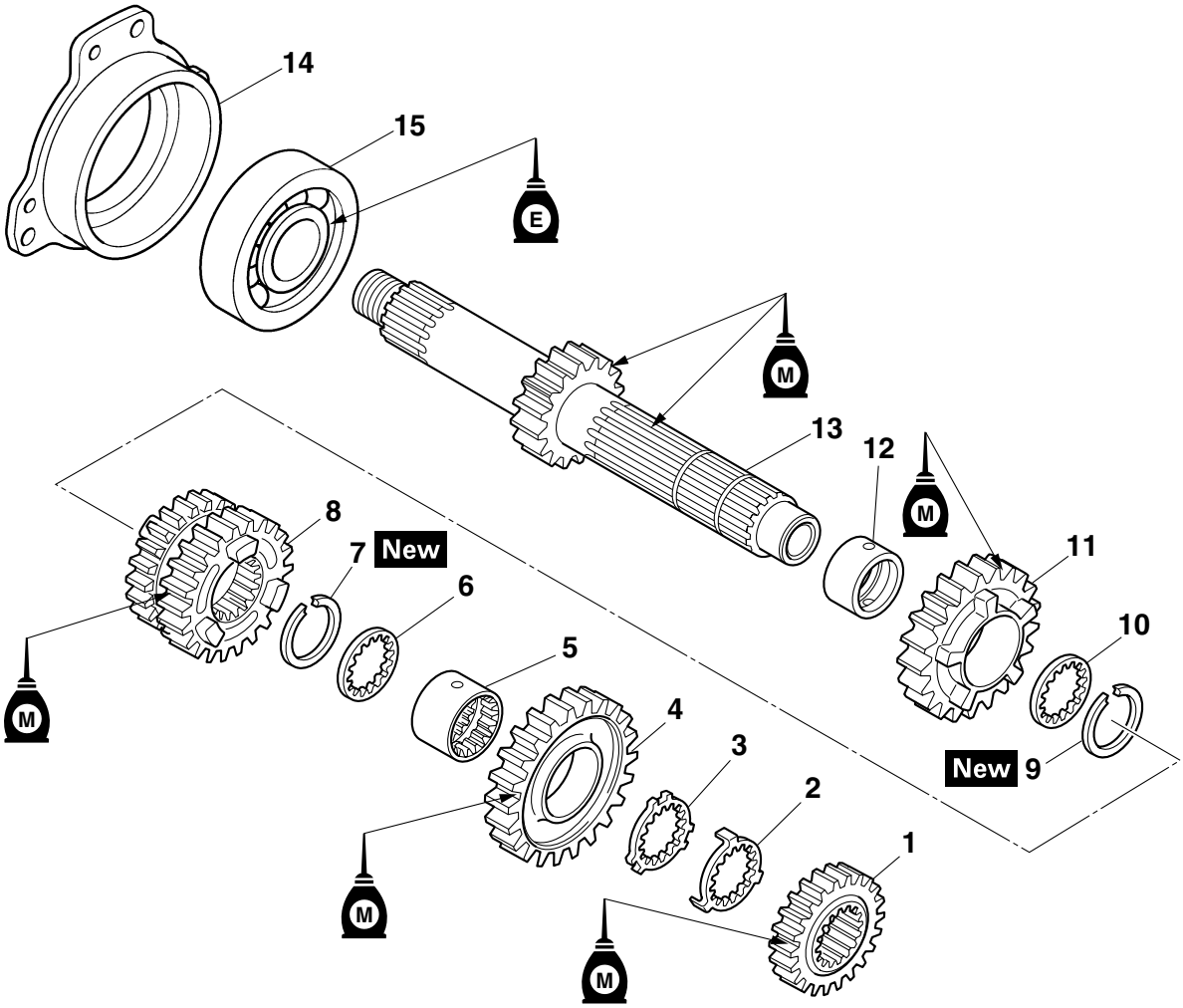
Order	Job/Parts to remove	Q'ty	Remarks
1	Washer	1	
2	1st wheel gear	1	
3	Collar	1	
4	5th wheel gear	1	
5	Circlip	1	
6	Washer	1	
7	3rd wheel gear	1	
8	Collar	1	
9	Toothed lock washer	1	
10	Toothed lock washer retainer	1	
11	4th wheel gear	1	
12	Collar	1	
13	Washer	1	
14	Circlip	1	
15	6th wheel gear	1	

Disassembling the drive axle assembly



Order	Job/Parts to remove	Q'ty	Remarks
16	Circlip	1	
17	Washer	1	
18	2nd wheel gear	1	
19	Collar	1	
20	Oil seal	1	
21	Collar	1	
22	Bearing	1	
23	Circlip	1	
24	Drive axle	1	
			For installation, reverse the removal procedure.

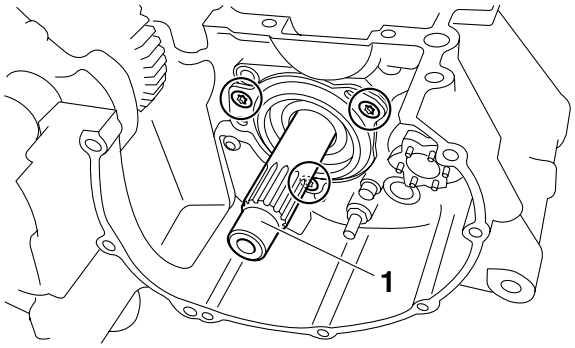
Disassembling the main axle assembly



Order	Job/Parts to remove	Q'ty	Remarks
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	
14	Bearing housing	1	
15	Bearing	1	
			For installation, reverse the removal procedure.

EAS26250
REMOVING THE TRANSMISSION

1. Remove:
   - Drive axle assembly
   - Main axle assembly “1”
     (with the Torx® wrench)



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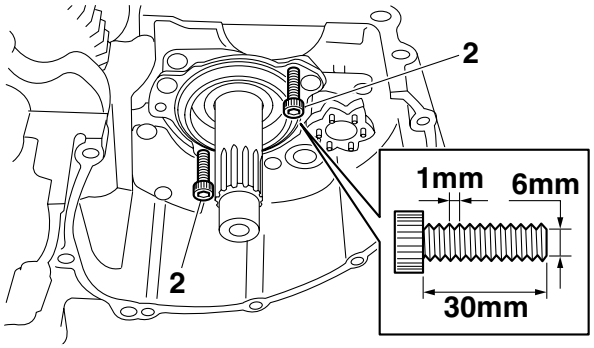
a. Insert two bolts “2” of the proper size, as shown in the illustration, into the main axle assembly bearing housing.
b. Tighten the bolts until they contact the crankcase surface.
c. Continue tightening the bolts until the main axle assembly comes free from the upper crankcase.



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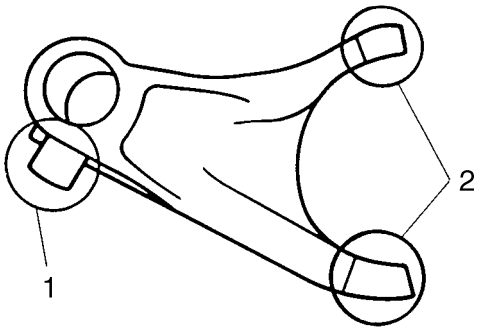
EAS26260
CHECKING THE SHIFT FORKS

The following procedure applies to all of the shift forks.

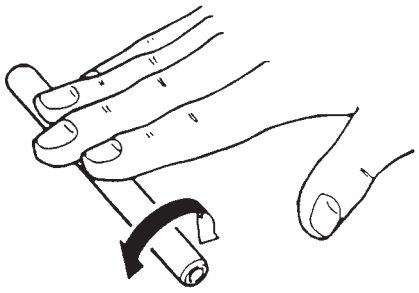
1. Check:
   - Shift fork cam follower “1”
   - Shift fork pawl “2”
     Bends/damage/scoring/wear → Replace the shift fork.



2. Check:
   - Shift fork guide bar
     Roll the shift fork guide bar on a flat surface.
     Bends → Replace.

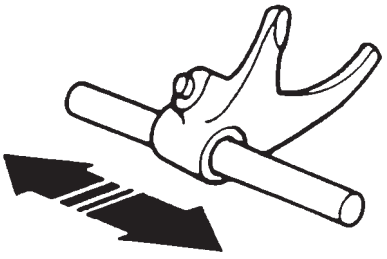
EWA12840
⚠ WARNING

Do not attempt to straighten a bent shift fork guide bar.



319-010

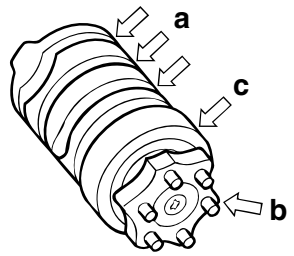
3. Check:
   - Shift fork movement
     (along the shift fork guide bar)
     Rough movement → Replace the shift forks and shift fork guide bar as a set.



319-011

EAS26270
CHECKING THE SHIFT DRUM ASSEMBLY

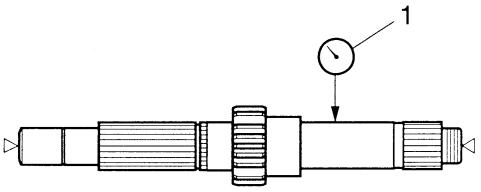
1. Check:
   - Shift drum groove “a”
     Damage/scratches/wear → Replace the shift drum assembly.
   - Shift drum segment “b”
     Damage/wear → Replace the shift drum assembly.
   - Shift drum bearing “c”
     Damage/pitting → Replace the shift drum assembly.



EAS26300
CHECKING THE TRANSMISSION

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

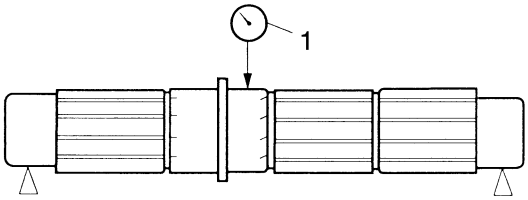
	Main axle runout limit **0.02 mm (0.0008 in)**



11650702

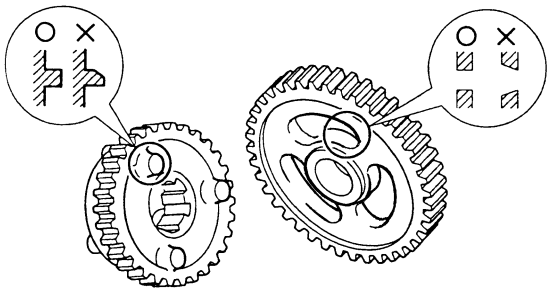
2. Measure:
   - Drive axle runout
     (with a centering device and dial gauge "1")
     Out of specification → Replace the drive axle.

	Drive axle runout limit **0.02 mm (0.0008 in)**



11650701

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



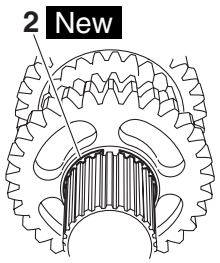
4. Check:
   - Transmission gear engagement
     (each pinion gear to its respective wheel gear)
     Incorrect → Reassemble the transmission axle assemblies.
5. Check:
   - Transmission gear movement
     Rough movement → Replace the defective part(s).
6. Check:
   - Circlips
     Bends/damage/looseness → Replace.

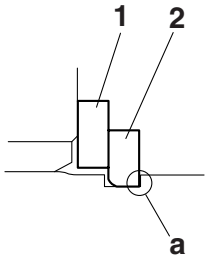
EAS20S13007
ASSEMBLING THE MAIN AXLE AND DRIVE AXLE

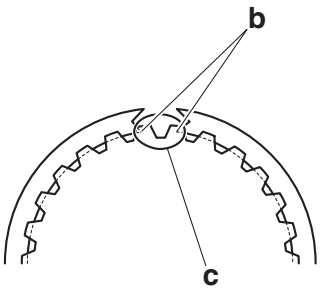
1. Install:
   - Toothed washer "1"
   - Circlip "2" New

TIP

- Be sure the circlip sharp-edged corner "a" is positioned opposite side to the toothed washer and gear. (For main axle)
- Install the circlip so that both ends "b" rest on the sides of a spline "c" with both axles aligned.



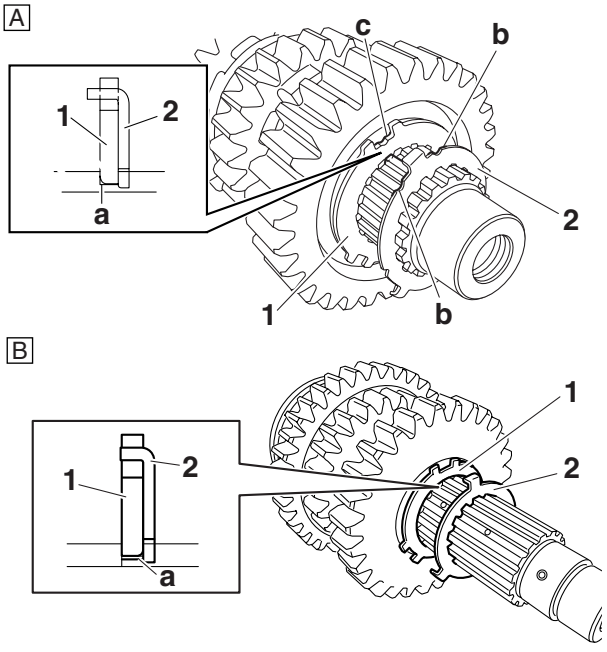




2. Install:
   - Toothed lock washer retainer “1”
   - Toothed lock washer “2”

TIP

- With the toothed lock washer retainer “1” in the groove “a” in the axle, align the projection on the retainer with an axle spline, and then install the toothed lock washer “2”.
- Be sure to align the projection on the toothed lock washer that is between the alignment marks “b” with the alignment mark “c” on the retainer.



A. Main axle
B. Drive axle

EAS26350

INSTALLING THE TRANSMISSION

1. Install:
   - Oil pipe “1”
   - Main axle assembly “2” (with the Torx® wrench)

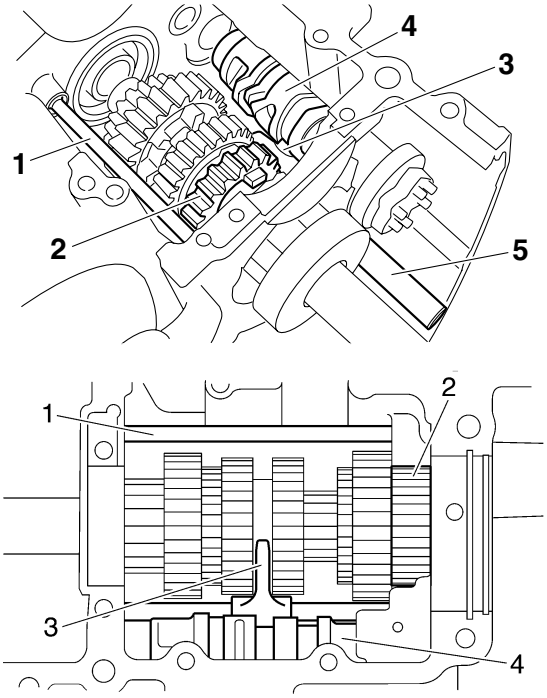
Transmission bearing housing screw
12 Nm (1.2 m·kgf, 8.6 ft·lbf)
LOCTITE®

- Shift fork-C “3”
- Shift drum assembly “4”
- Shift fork guide bar “5”
- Shift fork guide bar retainer

Shift fork guide bar retainer bolt
10 Nm (1.0 m·kgf, 7.2 ft·lbf)
LOCTITE®

TIP

- Stake the main axle bearing housing bolts at a cutout in the main axle bearing housing.
- 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.

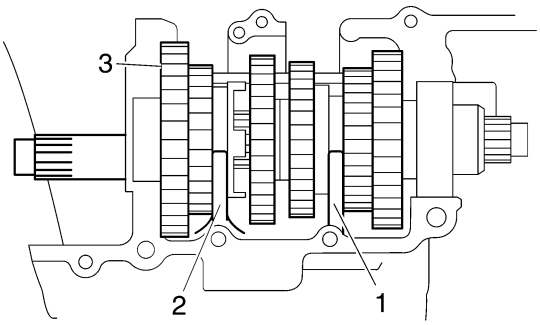


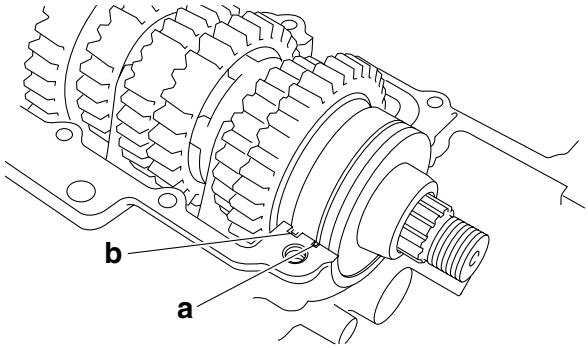
2. Install:
   - Shift fork-R “1”
   - Shift fork-L “2”
   - Shift fork guide bar
   - Drive axle “3”
   - Shift fork guide bar retainer

Shift fork guide bar retainer bolt
10 Nm (1.0 m·kgf, 7.2 ft·lbf)
LOCTITE®

TIP

- 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 "a" is inserted into the grooves in the upper crankcase.
- Make sure that the drive axle bearing projection "b" is aligned to the groove in the upper crankcase.





3. Check:
   - Transmission
     Rough movement → Repair.

TIP

Oil each gear, shaft, and bearing thoroughly.

COOLING SYSTEM

RADIATOR 6-1
CHECKING THE RADIATOR 6-3
INSTALLING THE RADIATOR 6-3

OIL COOLER 6-4
CHECKING THE OIL COOLER 6-5
INSTALLING THE OIL COOLER 6-5

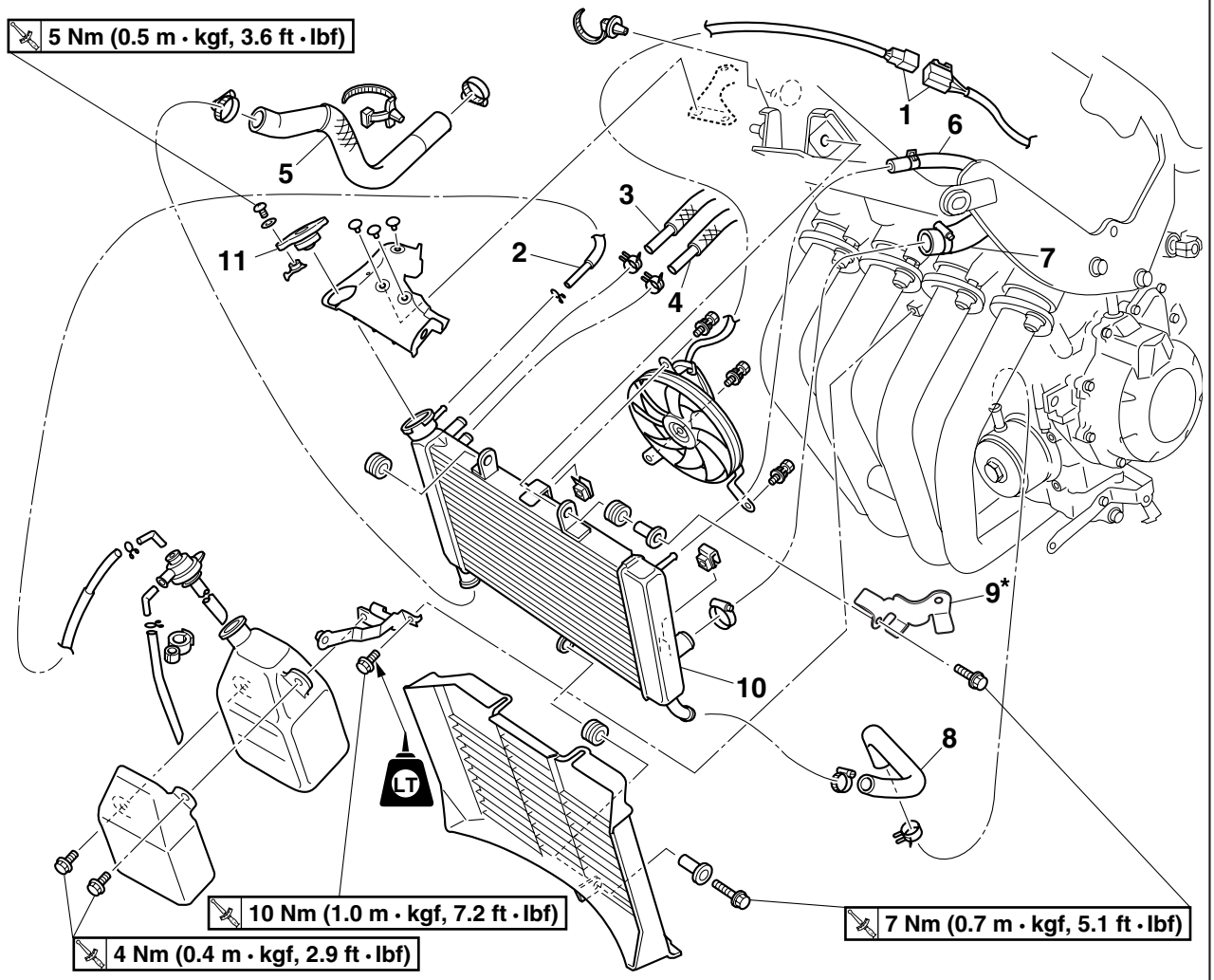
THERMOSTAT 6-6
CHECKING THE THERMOSTAT 6-7
INSTALLING THE THERMOSTAT ASSEMBLY 6-7

WATER PUMP 6-9
DISASSEMBLING THE WATER PUMP 6-11
CHECKING THE WATER PUMP 6-11
ASSEMBLING THE WATER PUMP 6-11
INSTALLING THE WATER PUMP 6-12

EAS26380

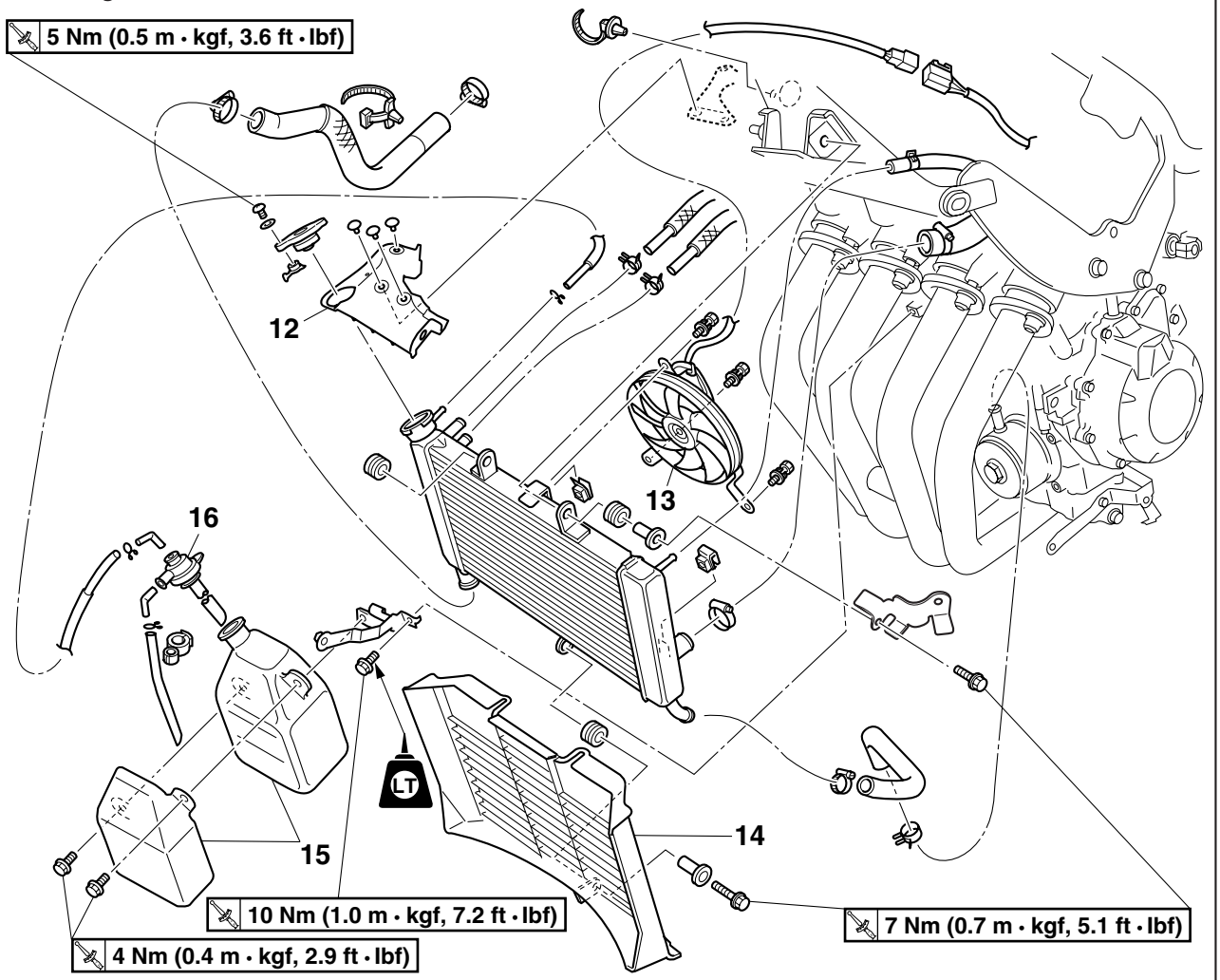
RADIATOR

Removing the radiator



Order	Job/Parts to remove	Q'ty	Remarks
	Seat		Refer to "GENERAL CHASSIS" on page 4-1.
	Side cowling		Refer to "GENERAL CHASSIS" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Air filter case		Refer to "GENERAL CHASSIS" on page 4-1.
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-27.
1	Radiator fan lead coupler	1	Disconnect.
2	Coolant reservoir hose	1	
3	Fast idle plunger outlet hose	1	
4	Water pump breather hose	1	
5	Radiator outlet hose	1	
6	Radiator inlet breather hose	1	
7	Radiator inlet hose	1	
8	Oil cooler outlet hose	1	
9	Bracket (XJ6SA)	1	
10	Radiator	1	
11	Radiator cap	1	

Removing the radiator



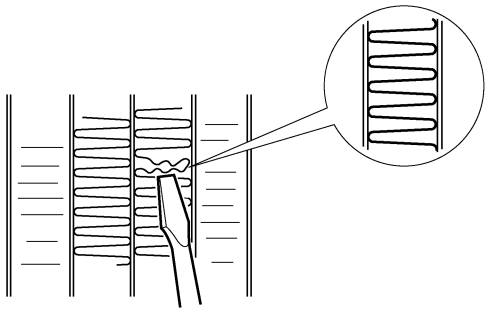
Order	Job/Parts to remove	Q'ty	Remarks
12	Rubber cover	1	
13	Radiator fan	1	
14	Radiator cover	1	
15	Coolant reservoir cover/Coolant reservoir	1/1	
16	Coolant reservoir cap	1	
			For installation, reverse the removal procedure.

*XJ6SA

EAS26390
CHECKING THE RADIATOR

1. Check:
   - Radiator fins
     Obstruction → Clean.
     Apply compressed air to the rear of the radiator.
     Damage → Repair or replace.

TIP
Straighten any flattened fins with a thin, flat-head screwdriver.



2. Check:
   - Radiator hoses
   - Radiator pipes
     Cracks/damage → Replace.
3. Measure:
   - Radiator cap opening pressure
     Below the specified pressure → Replace the radiator cap.

Radiator cap opening pressure
93.3–122.7 kPa (0.93–1.23 kgf/cm^2, 13.5–17.8 psi)

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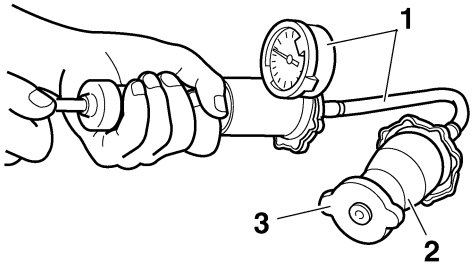
a. Install the radiator cap tester "1" and radiator cap tester adapter "2" to the radiator cap "3".

Radiator cap tester
90890-01325
Radiator pressure tester
YU-24460-01
Radiator cap tester adapter
90890-01352
Radiator pressure tester adapter
YU-33984



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

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4. Check:
   - Radiator fan
     Damage → Replace.
     Malfunction → Check and repair.
     Refer to "ELECTRICAL COMPONENTS" on page 8-145.

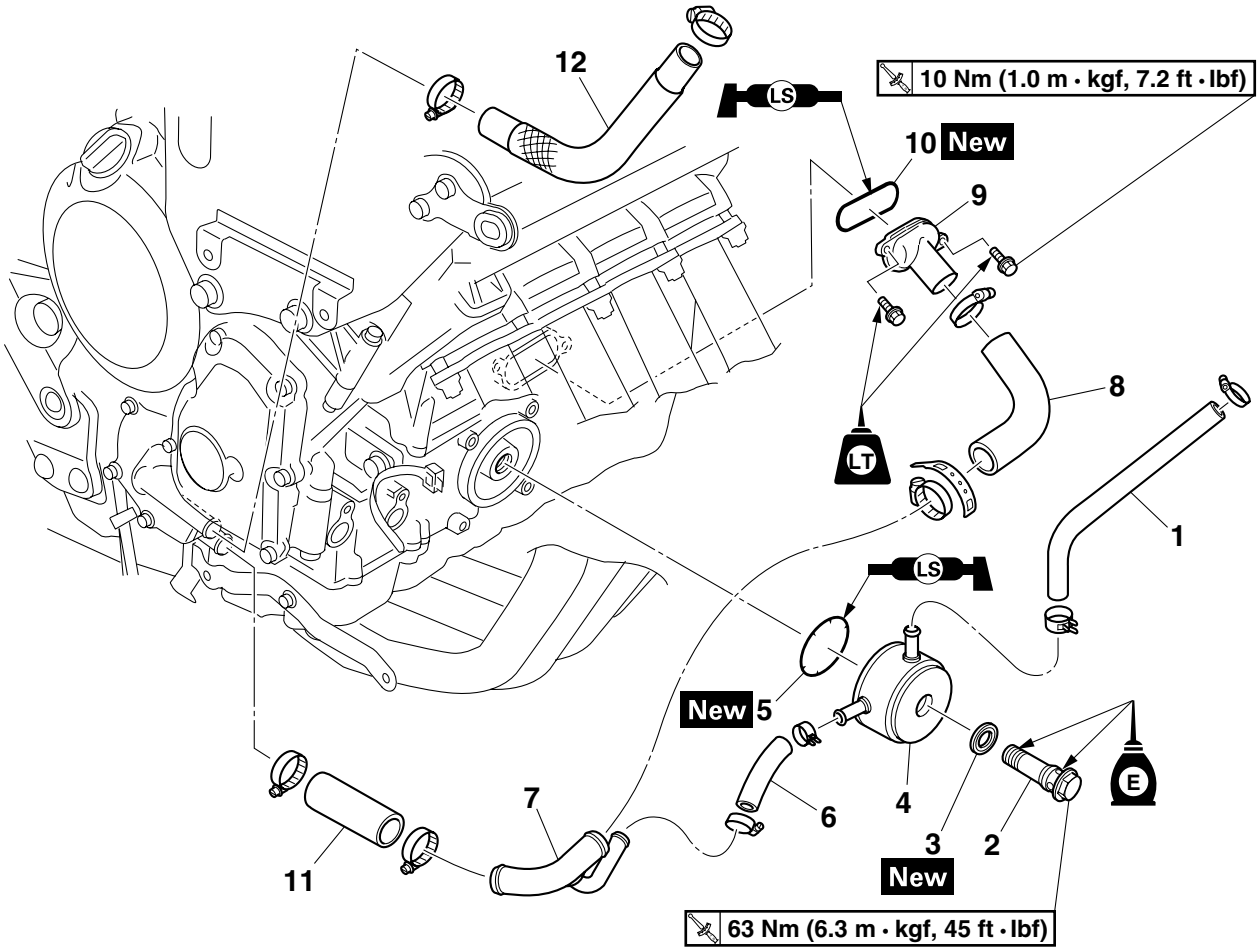
EAS26400
INSTALLING THE RADIATOR

1. Fill:
   - Cooling system
     (with the specified amount of the recommended coolant)
     Refer to "CHANGING THE COOLANT" on page 3-27.
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" on page 6-3.

EAS26410

OIL COOLER

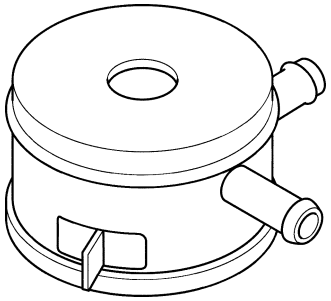
Removing the oil cooler



Order	Job/Parts to remove	Q'ty	Remarks
	Coolant reservoir		Refer to "RADIATOR" on page 6-1.
	Radiator assembly		Refer to "RADIATOR" on page 6-1.
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-24.
1	Oil cooler outlet hose	1	
2	Union bolt	1	
3	Washer	1	
4	Oil cooler	1	
5	O-ring	1	
6	Oil cooler inlet hose	1	
7	Oil cooler inlet pipe	1	
8	Water jacket joint hose	1	
9	Water jacket joint	1	
10	O-ring	1	
11	Water pump outlet hose	1	
12	Radiator outlet hose	1	
			For installation, reverse the removal procedure.

EAS26420
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.

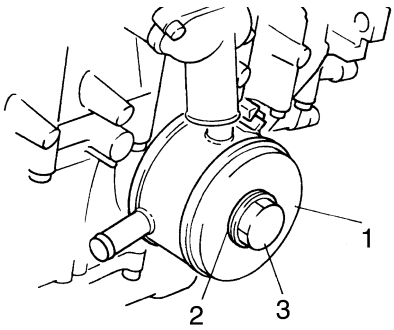
EAS26430
INSTALLING THE OIL COOLER

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"
   - Union bolt "3"

	Oil cooler union bolt **63 Nm (6.3 m·kgf, 46 ft·lbf)**

TIP

- Before installing the oil cooler, lubricate the oil cooler bolt and O-ring with a thin coat of engine oil.
- Make sure the O-ring is positioned properly.

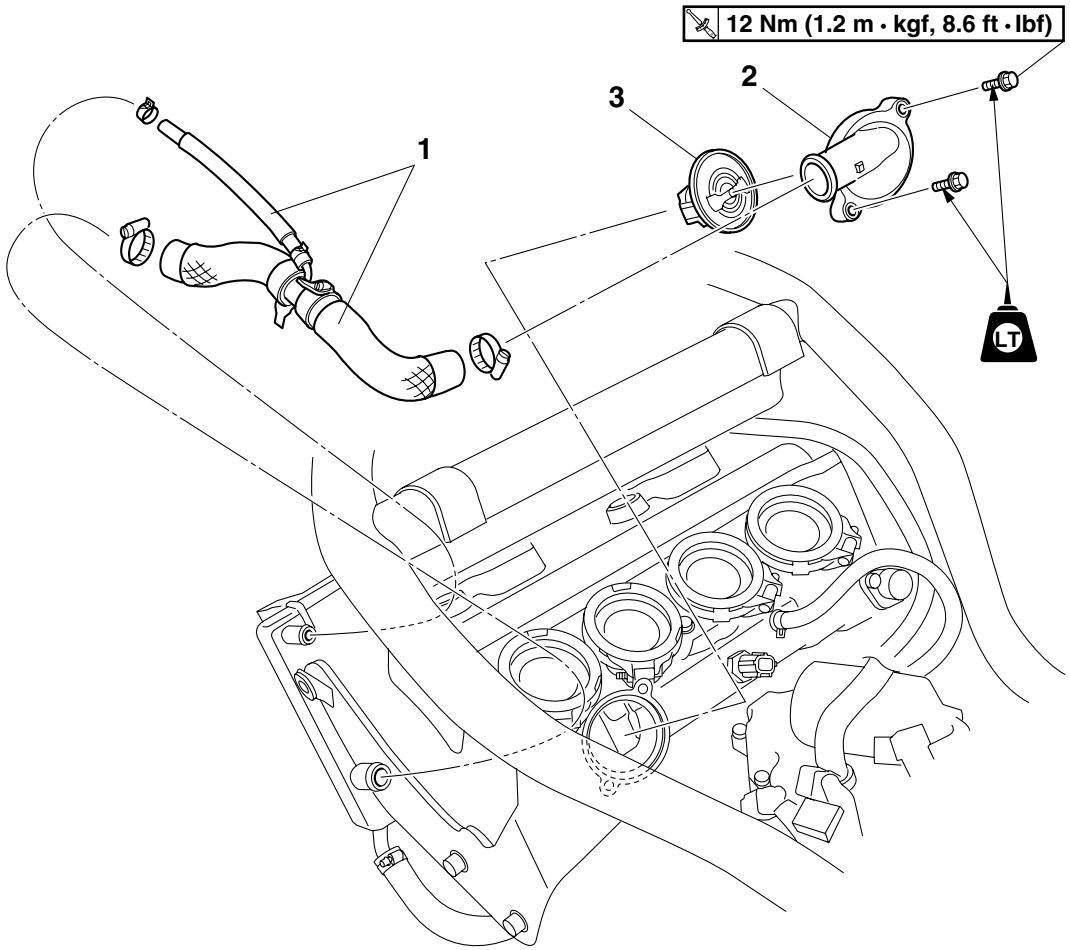


3. Fill:
   - Cooling system
     (with the specified amount of the recommended coolant)
     Refer to "CHANGING THE COOLANT" on page 3-27.
   - Crankcase
     (with the specified amount of the recommended engine oil)
     Refer to "CHANGING THE ENGINE OIL" on page 3-24.
4. Check:
   - Cooling system
     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" on page 6-3.

EAS26440

THERMOSTAT

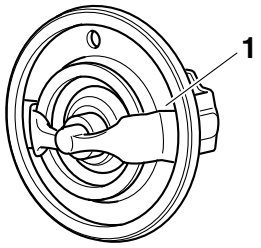
Removing the thermostat



Order	Job/Parts to remove	Q'ty	Remarks
	Seat		Refer to "GENERAL CHASSIS" on page 4-1.
	Left side panel		Refer to "GENERAL CHASSIS" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Air filter case		Refer to "GENERAL CHASSIS" on page 4-1.
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-27.
	Throttle body assembly		Refer to "THROTTLE BODIES" on page 7-4.
1	Radiator inlet hose/Radiator inlet breather hose	1/1	
2	Thermostat cover	1	
3	Thermostat	1	
			For installation, reverse the removal procedure.

EAS26450
CHECKING THE THERMOSTAT

1. Check:
   - Thermostat “1”
     Does not open at 71–85°C (160–185°F) → Replace.



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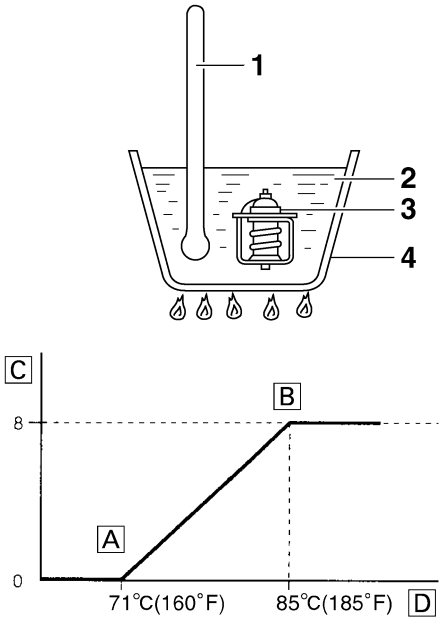
a. Suspend the thermostat “3” in a container “4” filled with water.
b. Slowly heat the water “2”.
c. Place a thermometer “1” in the water.
d. While stirring the water, observe the thermostat and thermometer’s indicated temperature.



A. Fully closed
B. Fully open
C. Opening (mm)
D. Temperature

TIP

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

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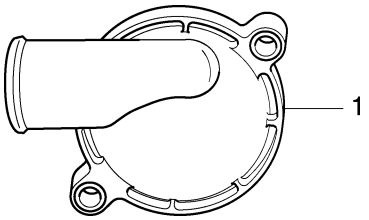
2. Check:
   - Thermostat housing cover “1”
     Cracks/damage → Replace.

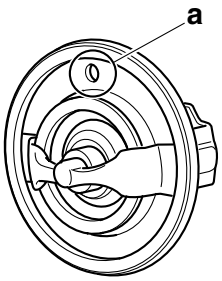


EAS26490
INSTALLING THE THERMOSTAT ASSEMBLY

1. Install:
   - Thermostat

TIP

Install the thermostat with its breather hole “a” facing up.



2. Install:
   - Thermostat cover

Thermostat cover bolt
12 Nm (1.2 m·kgf, 8.7 ft·lbf)
LOCTITE®

TIP

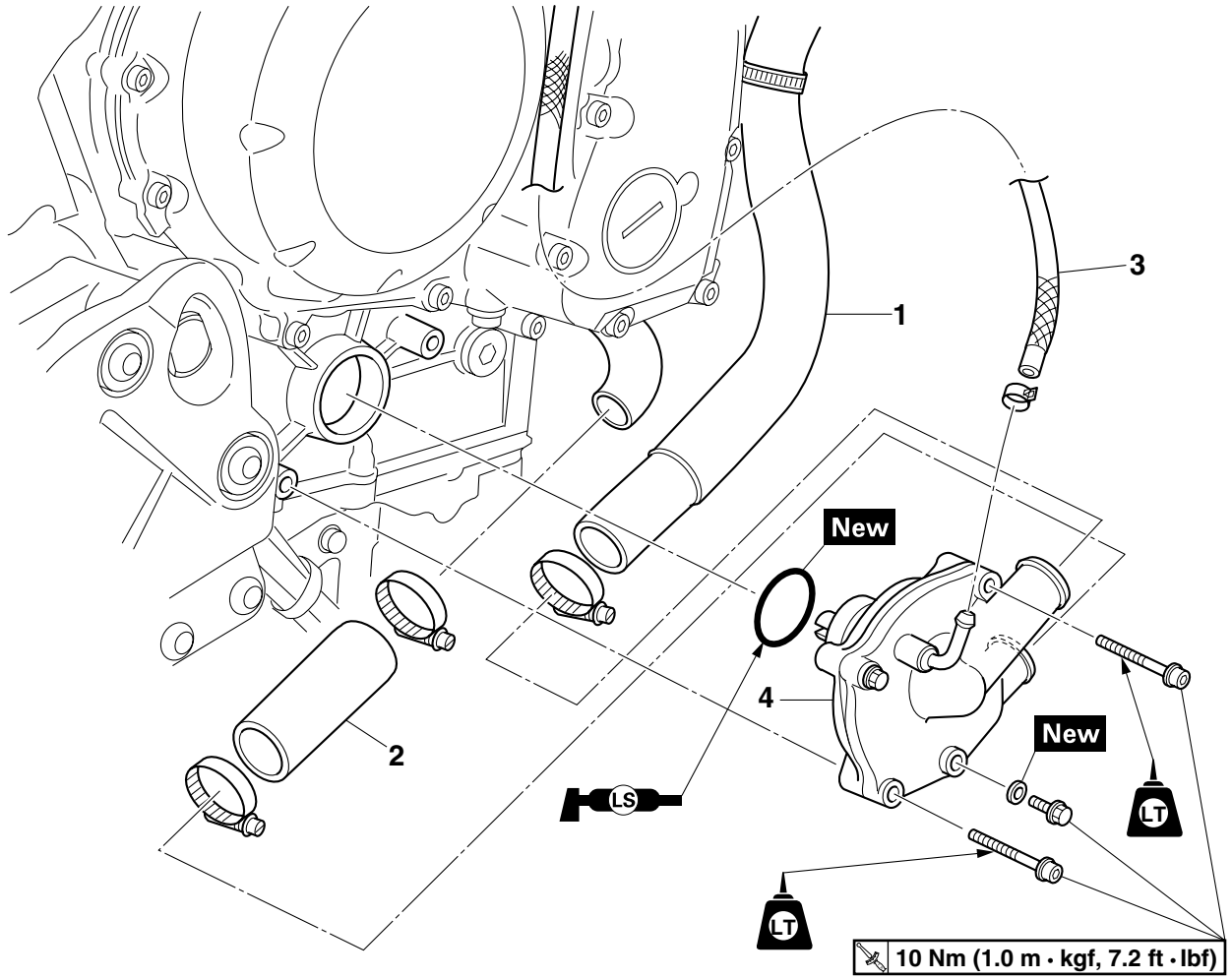
Before installing the thermostat cover to the cylinder head, lubricate the O-rings with a thin coat of lithium-soap-based grease.

3. Fill:
   - Cooling system
     (with the specified amount of the recommended coolant)
     Refer to “CHANGING THE COOLANT” on page 3-27.
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” on page 6-3.

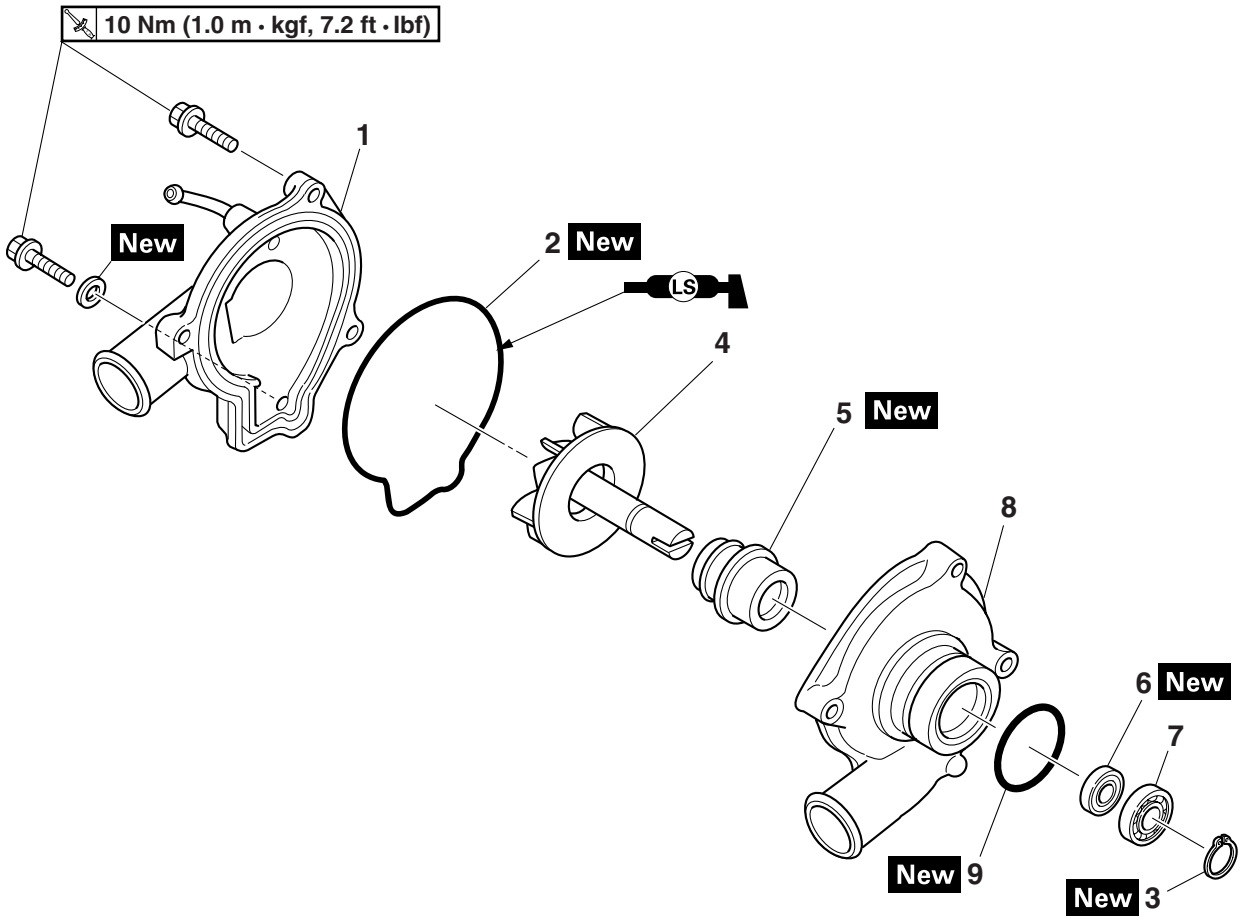
EAS26500
WATER PUMP

Removing the water pump



Order	Job/Parts to remove	Q'ty	Remarks
			It is not necessary to remove the water pump unless the coolant level is extremely low or the coolant contains engine oil.
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-27.
1	Radiator outlet hose	1	Disconnect.
2	Water pump outlet hose	1	
3	Water pump breather hose	1	Disconnect.
4	Water pump	1	
			For installation, reverse the removal procedure.

Disassembling the water pump



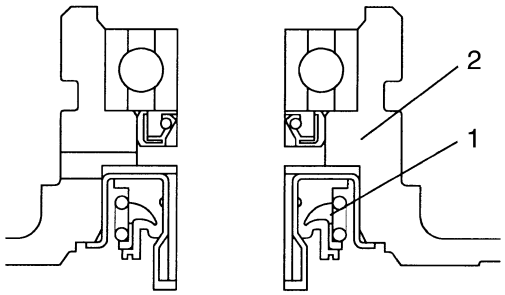
Order	Job/Parts to remove	Q'ty	Remarks
1	Water pump cover	1	
2	O-ring	1	
3	Circlip	1	
4	Impeller shaft	1	
5	Water pump seal	1	
6	Oil seal	1	
7	Bearing	1	
8	Water pump housing	1	
9	O-ring	1	
			For assembly, reverse the disassembly procedure.

EAS26510
DISASSEMBLING THE WATER PUMP

1. Remove:
   - Water pump cover
   - O-ring
   - Circlip
   - Impeller shaft
2. Remove:
   - Water pump seal “1”

TIP

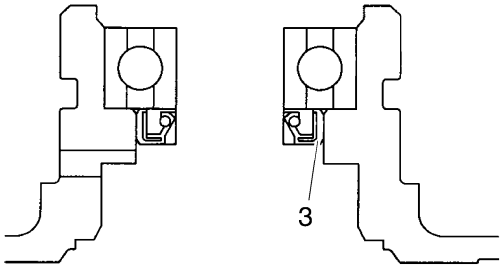
Remove the water pump seal from the inside of the water pump housing “2”.



3. Remove:
   - Oil seal “3”
     (with a thin, flat-head screwdriver)

TIP

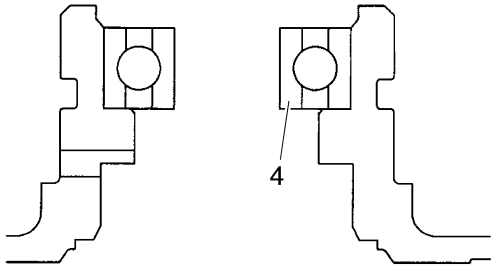
Remove the oil seal from the outside of the water pump housing.



4. Remove:
   - Bearing “4”

TIP

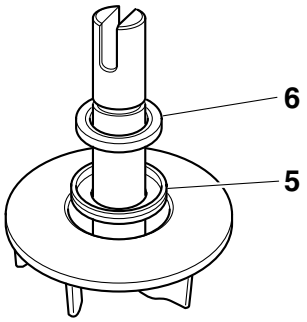
Remove the bearing from inside of the water pump housing.



5. Remove:
   - Bushing “5”
   - Gasket “6”
     (from the impeller shaft, with a thin, flat-head screwdriver)

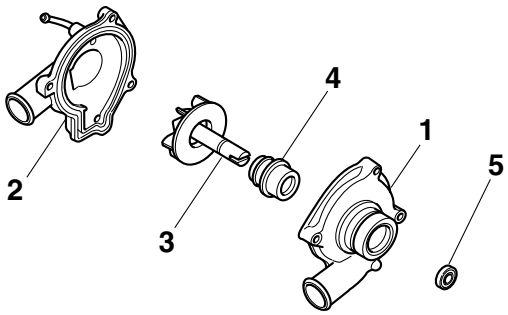
TIP

Do not scratch the impeller shaft.



EAS26540
CHECKING THE WATER PUMP

1. Check:
   - Water pump housing “1”
   - Water pump cover “2”
   - Impeller shaft “3”
   - Bushing
   - Gasket
   - Water pump seal “4”
   - Oil seal “5”
     Cracks/damage/wear → Replace.



2. Check:
   - Bearing
     Rough movement → Replace.
3. Check:
   - Water pump outlet hose
   - Radiator outlet hose
     Cracks/damage/wear → Replace.

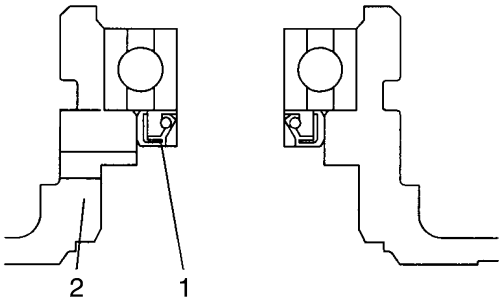
EAS26560
ASSEMBLING THE WATER PUMP

1. Install:
   - Bearing
   - Oil seal “1” New
     (into the water pump housing “2”)

TIP

- 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 "1" New

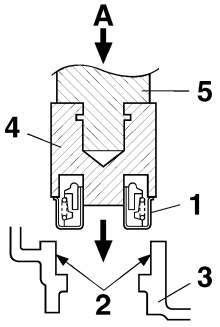
ECA14080

NOTICE

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

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

Mechanical seal installer
90890-04078
Water pump seal installer
YM-33221-A
Middle driven shaft bearing driver
90890-04058
Bearing driver 40 mm
YM-04058
Yamaha bond No. 1215
90890-85505
(Three Bond No.1215®)



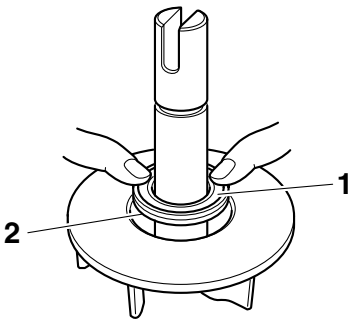
A. Push down

4. Mechanical seal installer
5. Middle driven shaft bearing driver

3. Install:
   - Bushing "1" New
   - Gasket "2" New

TIP

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



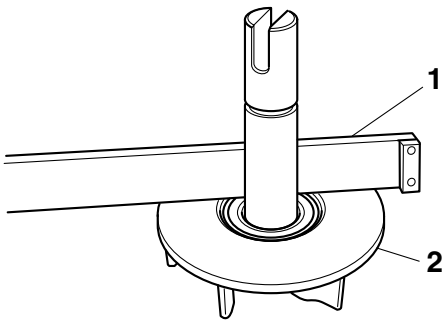
4. Measure:
   - Impeller shaft tilt
     Out of specification → Repeat steps (3) and (4).

ECA20S1005

NOTICE

Make sure the bushing and gasket are flush with the impeller.

Impeller shaft tilt limit
0.15 mm (0.006 in)



1. Straightedge
2. Impeller

5. Install:
   - Impeller shaft
   - Circlip New
   - O-ring New
   - Copper washer New
   - Water pump cover

Water pump cover bolt
10 Nm (1.0 m·kgf, 7.2 ft·lbf)

EAS26590

INSTALLING THE WATER PUMP

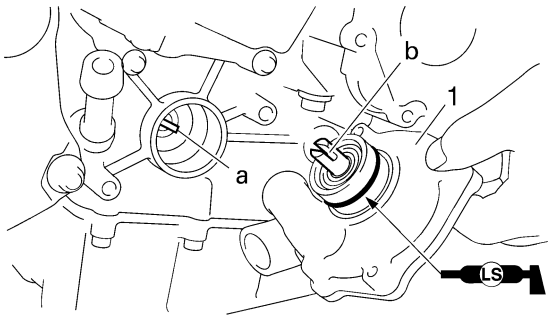
1. Install:
   - O-ring New

• Water pump assembly “1”

TIP

- Align the slit “a” on the impeller shaft with the projection “b” on the oil pump shaft.
- Lubricate the O-ring with a thin coat of lithium-soap-based grease.

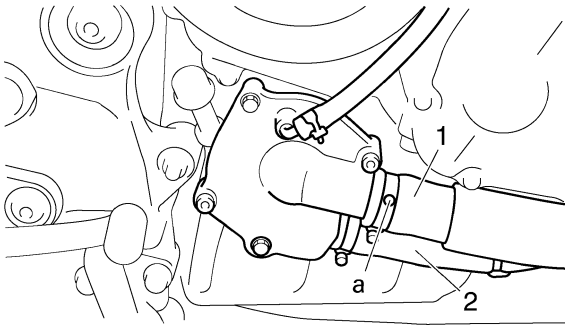
Water pump assembly bolt
10 Nm (1.0 m·kgf, 7.2 ft·lbf)
LOCTITE®



2. Install:
   - O-ring New
   - Radiator outlet “1”
   - O-rings New
   - Water pump outlet hose “2”
   - Copper washer New

TIP

Install the radiator outlet hose with white “a” mark positioned outside.



3. Fill:
   - Cooling system
     (with the specified amount of the recommended coolant)
     Refer to “CHANGING THE COOLANT” on page 3-27.
4. Check:
   - Cooling system
     Leaks → Repair or replace the faulty part.
5. Measure:
   - Radiator cap opening pressure
     Below the specified pressure → Replace the radiator cap.
     Refer to “CHECKING THE RADIATOR” on page 6-3.

FUEL SYSTEM

FUEL TANK 7-1
REMOVING THE FUEL TANK 7-2
REMOVING THE FUEL PUMP 7-2
CHECKING THE FUEL PUMP BODY 7-2
CHECKING THE FUEL PUMP OPERATION 7-2
INSTALLING THE FUEL PUMP 7-2
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THROTTLE BODIES 7-4
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AIR INDUCTION SYSTEM 7-11
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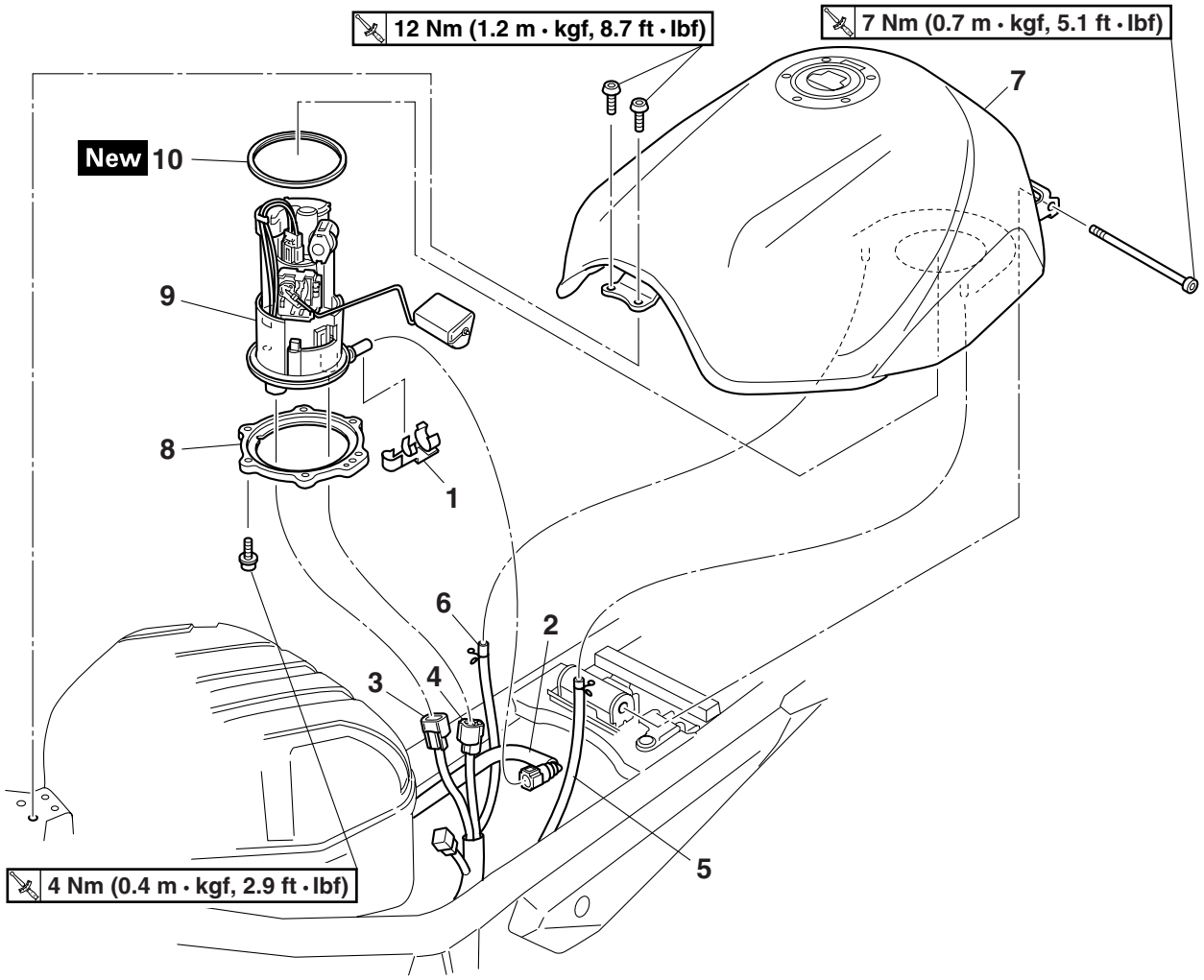
EAS26620

FUEL TANK

Removing the fuel tank



Order	Job/Parts to remove	Q'ty	Remarks
	Seat		Refer to "GENERAL CHASSIS" on page 4-1.
1	Cover	1	
2	Fuel hose	1	Disconnect.
3	Fuel sender coupler	1	Disconnect.
4	Fuel pump coupler	1	Disconnect.
5	Fuel tank drain hose	1	
6	Fuel tank breather hose	1	
7	Fuel tank	1	
8	Fuel pump bracket	1	
9	Fuel pump	1	
10	Gasket	1	
			For installation, reverse the removal procedure.

EAS26630
REMOVING THE FUEL TANK

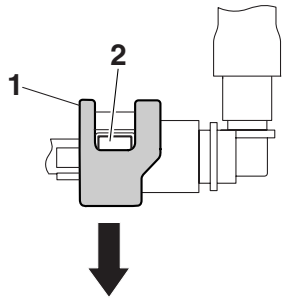
1. Extract the fuel in the fuel tank through the fuel tank cap with a pump.
2. Remove:
   - Fuel sender coupler
   - Fuel pump coupler
   - Fuel tank breather hose
   - Fuel tank drain hose
   - Fuel hose

ECA4S81003
NOTICE

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

TIP

- To remove the fuel hose from the fuel rail, slide the fuel hose connector cover "1" on the end of the hose in the direction of the arrow shown, press the two buttons "2" on the sides of the connector, and then remove the hose.
- Before removing the hoses, place a few rags in the area under where it will be removed.



3. Remove:
   - Fuel tank

TIP

Place the fuel tank against a wall to avoid damaging the fuel pump installation surface.

EAS26640
REMOVING THE FUEL PUMP

1. Remove:
   - Fuel pump

ECA14720
NOTICE

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

EAS26670
CHECKING THE FUEL PUMP BODY

1. Check:
   - Fuel pump body
     Obstruction → Clean.
     Cracks/damage → Replace fuel pump assembly.
2. Check:
   - Diaphragms and gaskets
     Turn/fatigue/cracks → Replace fuel pump assembly.
3. Check:
   - Valves
     Cracks/damage → Replace fuel pump assembly.

EAS26690
CHECKING THE FUEL PUMP OPERATION

1. Check:
   - Fuel pump operation
     Refer to "CHECKING THE FUEL PRESSURE" on page 7-9.

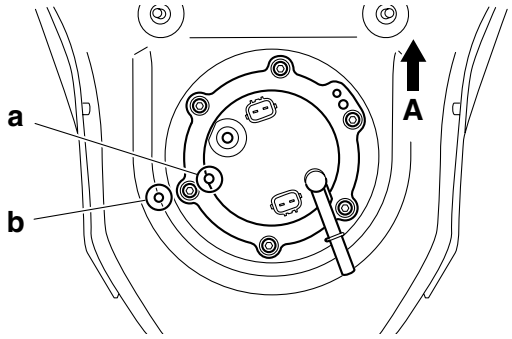
EAS26710
INSTALLING THE FUEL PUMP

1. Install:
   - Fuel pump
   - Fuel pump bolts

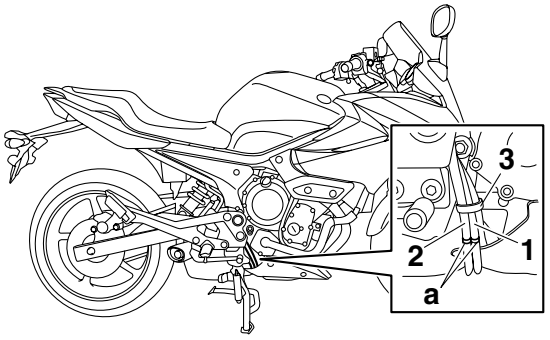
	Fuel pump bolts **4 Nm (0.4 m·kgf, 2.9 ft·lbf)**

TIP

- 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.
- Align projection "a" on the fuel pump with point "b"of the fuel tank.
- Tighten the fuel pump bolts in stages in a crisscross pattern and to the specified torque.



A. Forward



EAS4S81001

INSTALLING THE FUEL TANK

1. Install:
   - Fuel hose

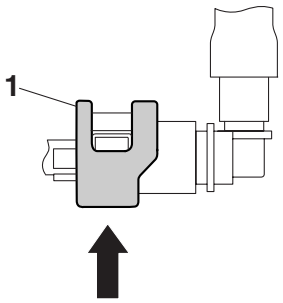
ECA4S81001

NOTICE

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

TIP

- Install the fuel hose securely onto the fuel rail until a distinct “click” is heard.
- To install the fuel hose onto the fuel rail, slide the fuel hose connector cover “1” on the end of the hose in the direction of the arrow shown.



2. Install:
   - Fuel tank breather hose
   - Fuel tank drain hose
   - Fuel sender coupler
   - Fuel pump coupler

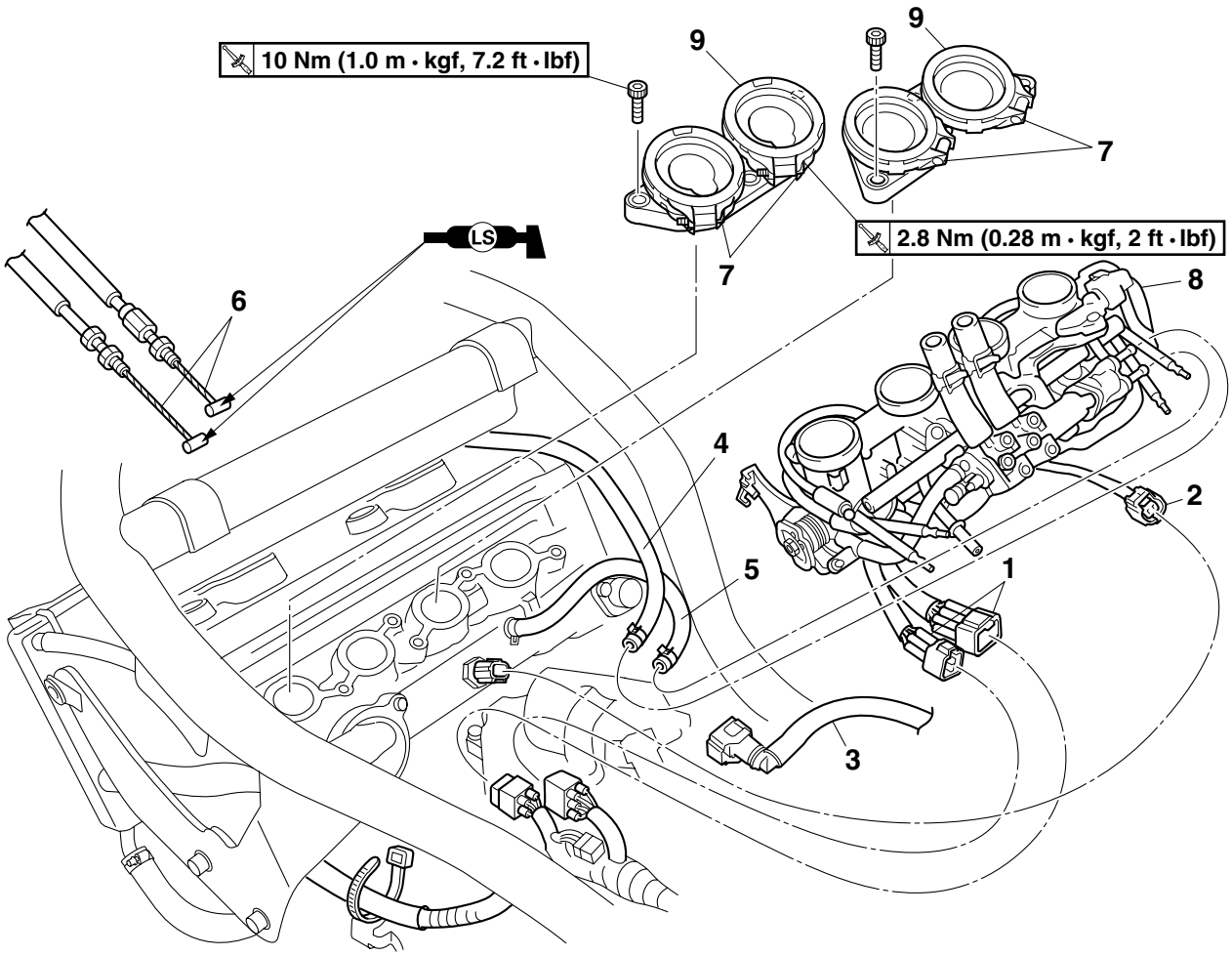
TIP

The paint mark “a” of both the fuel tank breather hose “1” and the fuel tank drain hose “2” must be positioned under the clamp “3”.

EAS26970

THROTTLE BODIES

Removing the throttle bodies

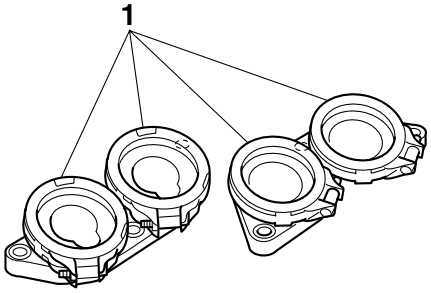


Order	Job/Parts to remove	Q'ty	Remarks
	Seat		Refer to "GENERAL CHASSIS" on page 4-1.
	Side panel		Refer to "GENERAL CHASSIS" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Air filter case		Refer to "GENERAL CHASSIS" on page 4-1.
	Air cut-off valve		Refer to "AIR INDUCTION SYSTEM" on page 7-11.
1	Sub-wire harness coupler	2	Disconnect.
2	Coolant temperature sensor coupler	1	Disconnect.
3	Fuel hose	1	Disconnect.
4	Fast idle plunger outlet hose	1	
5	Fast idle plunger inlet hose	1	
6	Throttle cable	2	Disconnect.
7	Throttle body joint clamp screw	4	Loosen.
8	Throttle bodies	1	
9	Throttle body joint	2	
			For installation, reverse the removal procedure.

EAS21010
CHECKING THE THROTTLE BODY JOINTS

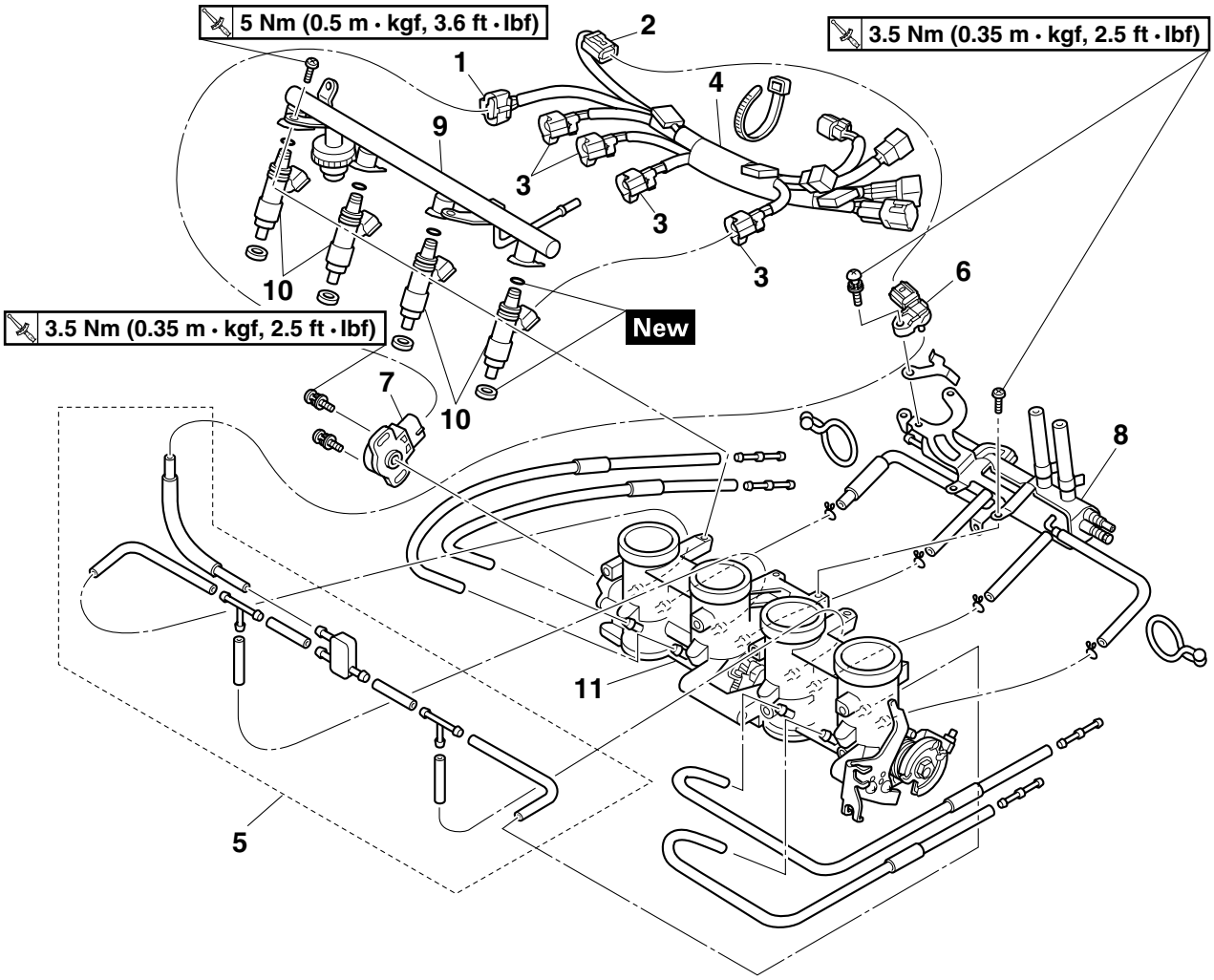
The following procedure applies to all of the throttle body joints and intake manifolds.

1. Remove:
   - Throttle bodies
     Refer to “THROTTLE BODIES” on page 7-4.
2. Check:
   - Throttle body joints “1”
     Cracks/damage → Replace.



3. Install:
   - Throttle bodies
     Refer to “THROTTLE BODIES” on page 7-4.

Removing the injectors



Order	Job/Parts to remove	Q'ty	Remarks
1	Throttle position sensor coupler	1	Disconnect.
2	Intake air pressure sensor coupler	1	Disconnect.
3	Fuel injector coupler	4	Disconnect.
4	Sub-wire harness	1	
5	Negative pressure hose	1	
6	Intake air pressure sensor	1	
7	Throttle position sensor	1	
8	Fast idle plunger	1	
9	Fuel rail	1	
10	Fuel injector	4	
11	Throttle bodies	1	
			For installation, reverse the removal procedure.

EAS26980
CHECKING THE FUEL INJECTORS

EWA2S31037
⚠ WARNING

- **Check the injectors in a well-ventilated area free of combustible materials. Make sure that there is no smoking or use of electric tools in the vicinity of the injectors.**
- **Be careful when disconnecting the fuel hoses. Any remaining pressure in the fuel hoses may cause the fuel to spray out. Place a container or rag under the hoses to catch any fuel that spills. Always clean up any spilt fuel immediately.**
- **Turn the main switch to "OFF" and disconnect the negative battery lead from the battery terminal before checking the injectors.**

ECA2S31076
NOTICE

- **Always use new O-rings.**
- **When checking the injectors, do not allow any foreign material to enter or adhere to the injectors, fuel rail, or O-rings.**
- **Be careful not to twist or pinch the O-rings when installing the injectors.**
- **If an injector is subject to strong shocks or excessive force, replace it.**
- **If installing the original fuel rail and bolts, remove the white paint marks using a cleaning solvent. Otherwise, paint chips on the bolt seats could prevent the bolts from being tightened to the specified torque.**

1. Check:
   - Injectors
     Damage/defective → Replace.
     Refer to "FUEL INJECTION SYSTEM" on page 8-41.

EAS2S31099
INSTALLING THE INJECTORS

1. Install the injectors to the fuel rail, making sure to install them in the correct direction.
2. Install a seal onto the end of each injector.
3. Install the injector assemblies to the throttle bodies.

	Fuel rail screw **5 Nm (0.5 m·kgf, 3.6 ft·lbf)**

4. Check the injector pressure after the injectors are installed to the throttle bodies.
   Refer to "CHECKING THE INJECTOR PRESSURE" on page 7-7.

EAS2S31098
CHECKING THE INJECTOR PRESSURE

TIP

- After installing the injectors, perform the following steps to check the injector pressure.
- Do not allow any foreign materials to enter the fuel lines.

1. Check:
   - Injector pressure

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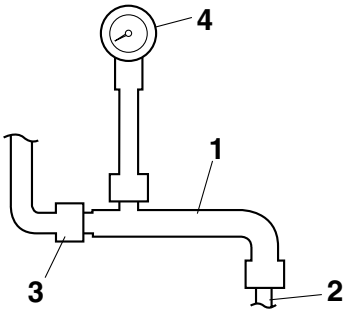
a. Connect the injector pressure adapter "1" to the fuel rail "2", and then connect an air compressor "3" to the adapter.
b. Connect the pressure gauge "4" to the injector pressure adapter "1".

	Pressure gauge **90890-03153** **YU-03153** **Fuel injector pressure adapter** **90890-03210** **YU-03210**



c. Close the valve on the injector pressure adapter.
d. Apply air pressure with the air compressor.
e. Open the valve on the injector pressure adapter until the specified pressure is reached.

	Specific air pressure: **490 kPa (5.0 kgf/cm^2, 71.1 psi)**

ECA2S31073
NOTICE

Never exceed the specified air pressure or damage could occur.

f. Close the valve on the injector pressure adapter.
g. Check that the specified air pressure is held for about one seconds.
   Pressure drops → Properly install or replace

the injector.

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EAS2S31095
CHECKING AND CLEANING THE THROTTLE BODIES

EWA2S31033
⚠ WARNING

If the throttle bodies are subjected to strong shocks or dropped during cleaning, replace them as a set.

TIP

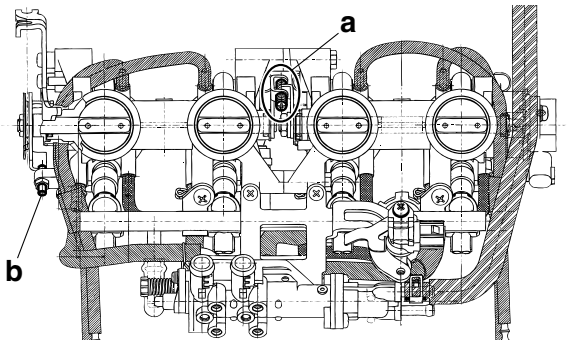
Clean the throttle bodies only if they cannot be synchronized using the air screws. Before cleaning the throttle bodies, check the following items:

- Valve clearance
- Spark plugs
- Compression pressure
- Air filter element
- Throttle body joints
- Fuel hoses
- Air induction system
- Exhaust system
- Breather hoses
- Throttle body hoses
- Fast idle plunger inlet hose
- Fast idle plunger outlet hose

1. Check:
   - Throttle bodies
     Cracks/damage → Replace the throttle bodies as a set.
2. Clean:
   - Throttle bodies

ECA2S31068
NOTICE

- **Observe the following precautions; otherwise, the throttle bodies may not operate properly.**
- **Do not open the throttle valves quickly.**
- **Do not subject the throttle bodies to excessive force.**
- **Wash the throttle bodies in a petroleum-based solvent.**
- **Do not use any caustic carburetor cleaning solution.**
- **Do not apply cleaning solvent directly to any plastic parts, sensors, or seals.**
- **Do not directly push the throttle valves to open them.**
- **Do not remove the bolts which not instructed as so.**
- **Do not touch the synchronizing screw "a"; otherwise, the throttle body synchronization will be affected.**
- **Do not touch the throttle adjust screw "b".**



TIP

Check the synchronization after cleaning the throttle body.
If they cannot be synchronized as specified, replace the throttle body assembly.

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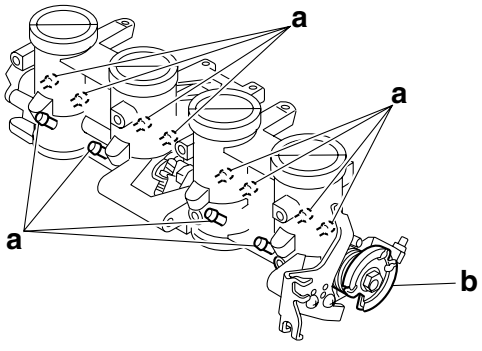
a. Place the throttle bodies on a flat surface with the engine side facing up.
b. Install the caps (18P-2464V-00) onto the hose fittings "a".
c. Open the throttle valve using the throttle pulley "b" holding that position.

EWA2S31034
⚠ WARNING

When cleaning the throttle bodies, be careful not to injure yourself on the throttle valves or other components of the throttle bodies.



d. Apply a petroleum-based solvent to the throttle valves and the inside of the throttle bodies to remove any carbon deposits.

TIP

- Do not allow any petroleum-based solvent to enter the opening for the injectors.
- Do not apply any petroleum-based solvent to

the portions of the throttle valve shafts between the throttle bodies.

e. Remove the carbon deposits from the inside of each throttle body in a downward direction, from the engine side of the throttle body to the air filter case side.

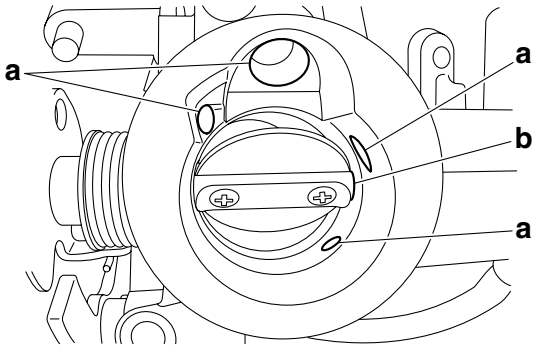
ECA2S31069

NOTICE

- **Do not use a tool, such as a wire brush, to remove the carbon deposits; otherwise, the inside of the throttle bodies may be damaged.**
- **Do not allow carbon deposits or other foreign materials to enter any of the passages in each throttle body or in the space between the throttle valve shaft and the throttle body.**

f. After removing the carbon deposits, clean the inside of the throttle bodies with a petroleum-based solvent, and then dry the throttle bodies using compressed air.

g. Make sure that there are no carbon deposits or other foreign materials in any of the passages "a" in each throttle body or in the space "b" between the throttle valve shaft and the throttle body.



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3. Check:
   - Fuel passages
     Obstructions → Clean.

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a. Wash the throttle bodies in a petroleum-based solvent.

ECA2S31070

NOTICE

Do not use any caustic carburetor cleaning solution.

b. Blow out all of the passages with compressed air.

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4. Check:
   - Fuel pulsation damper
     Cracks/damage → Replace the fuel rail assembly.

ECA4S81002

NOTICE

Do not adjust the fuel pulsation damper.

EAS4S81043

CHECKING THE FUEL PRESSURE

1. Check:
   - Fuel pressure

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a. Remove the seat.
   Refer to "GENERAL CHASSIS" on page 4-1.

b. Disconnect the fuel hose.

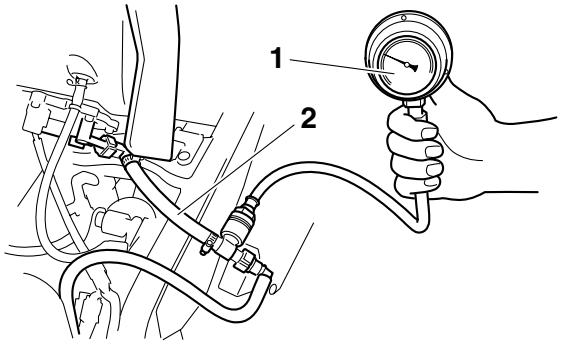
EWA4S81015

WARNING

Cover fuel hose connections with a cloth when disconnecting them. Residual pressure in the fuel lines could cause fuel to spurt out when removing the hoses.

c. Connect the pressure gauge "1" and adapter "2" to the fuel hose (fuel tank to primary injector fuel rail).

Pressure gauge
90890-03153
YU-03153
Fuel pressure adapter
90890-03176
YM-03176



d. Start the engine.

e. Measure the fuel pressure.

Fuel pressure
250 kPa (2.5 kgf/cm^2, 36.3 psi)

Faulty → Replace the fuel pump.

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EAS27030

ADJUSTING THE THROTTLE POSITION SENSOR

TIP

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

1. Check:
   - Throttle position sensor
     Refer to "CHECKING THE THROTTLE POSITION SENSOR" on page 8-167.
2. Adjust:
   - Throttle position sensor angle

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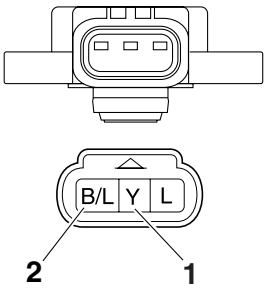
a. Connect the throttle position sensor coupler to the wire harness.
b. Connect the digital circuit tester to the throttle position sensor.

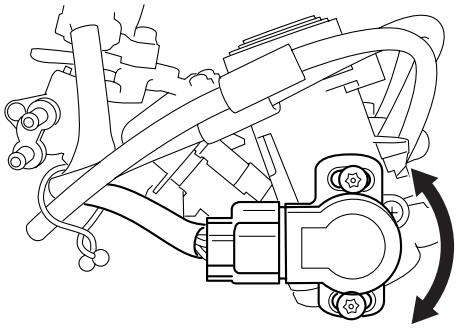


- Positive tester probe
  Yellow "1"
- Negative tester probe
  Black/Blue "2"

Digital circuit tester
90890-03174
Model 88 Multimeter with tachometer
YU-A1927

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

Output voltage (at idle)
0.63–0.73 V



e. After adjusting the throttle position sensor angle, tighten the throttle position sensor screws.

Throttle position sensor screw
3.5 Nm (0.35 m·kgf, 2.5 ft·lbf)

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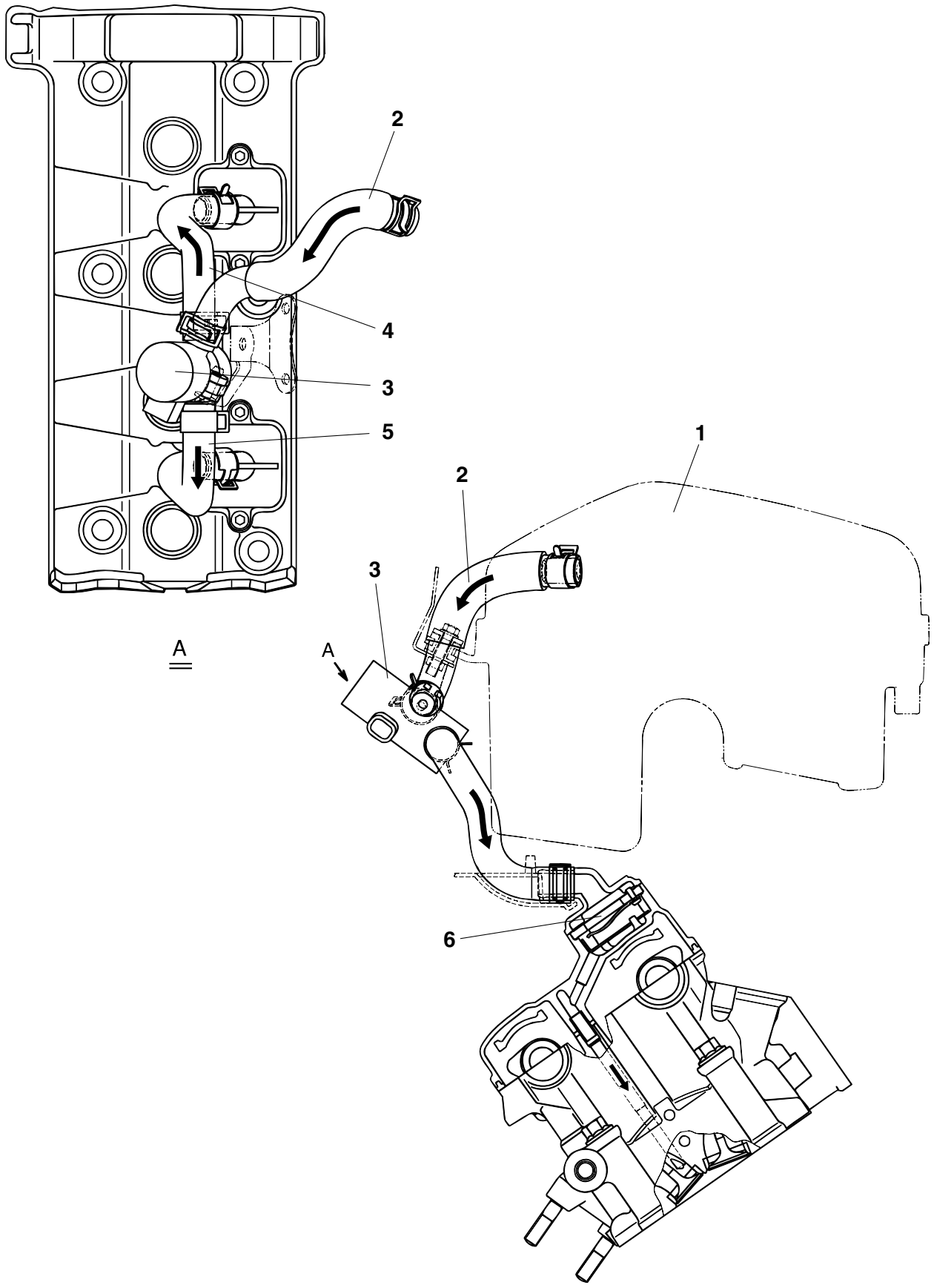
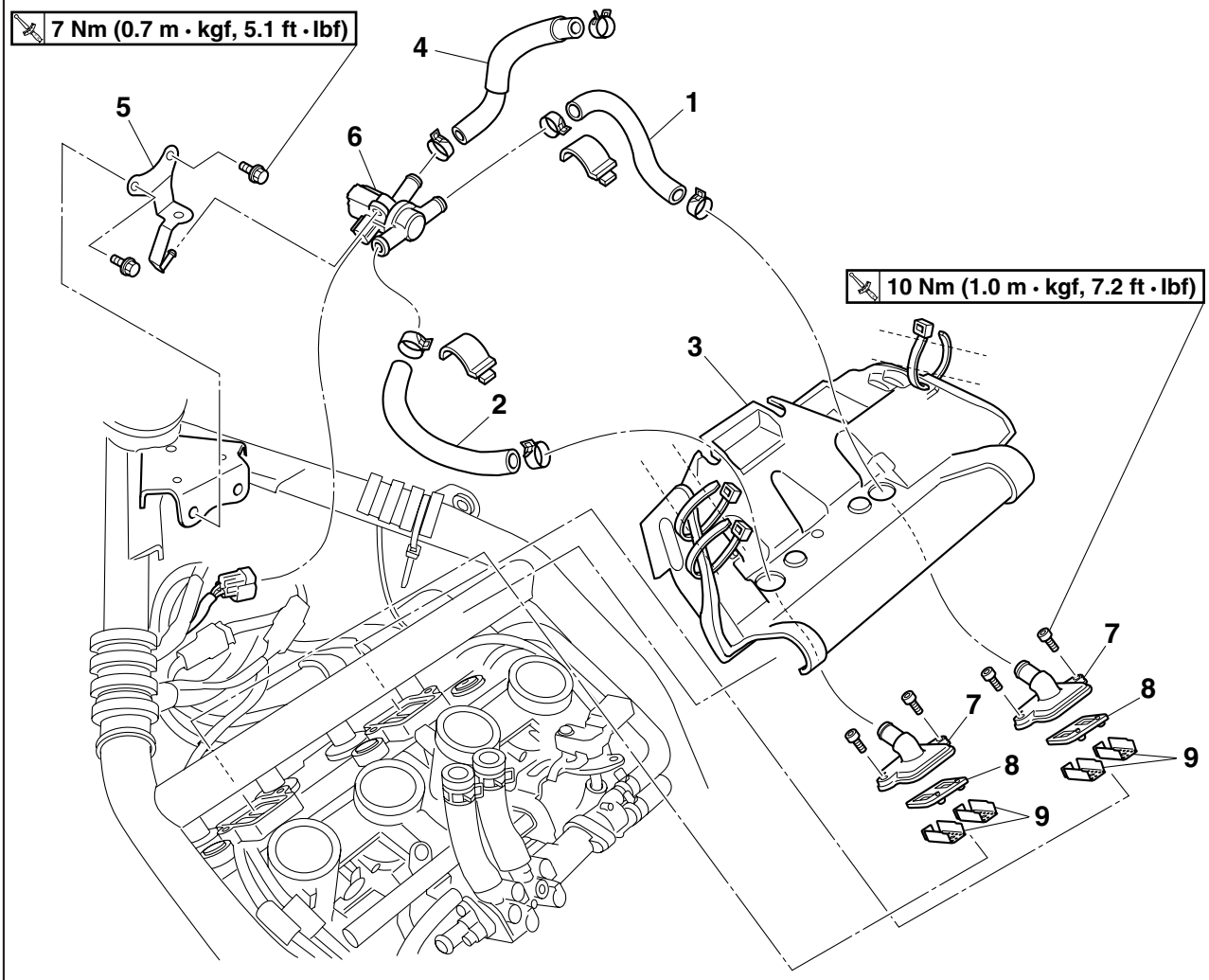
EAS27040
AIR INDUCTION SYSTEM



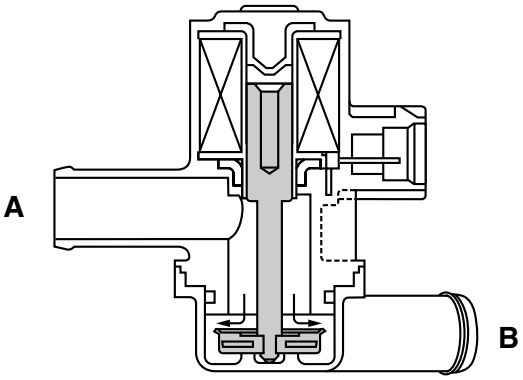
1. Air filter case
2. Air cut-off valve hose (air filter case—air cut-off valve)
3. Air cut-off valve
4. Air cut-off valve hose (air cut-off valve—reed valve)
5. Air cut-off valve hose (air cut-off valve—reed valve)
6. Reed valve

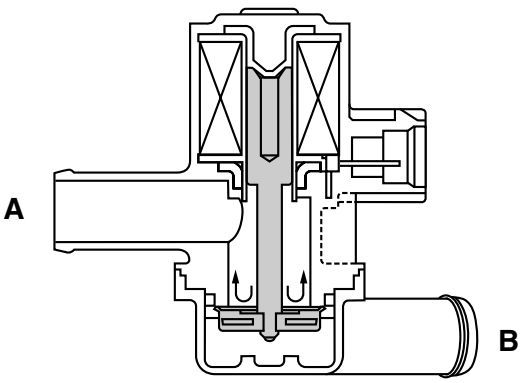
Removing the air cut-off valve assembly and hoses



Order	Job/Parts to remove	Q'ty	Remarks
	Seat		Refer to "GENERAL CHASSIS" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Air filter case		Refer to "GENERAL CHASSIS" on page 4-1.
1	Air cut-off valve hose (air cut-off valve–reed valve)	1	Disconnect.
2	Air cut-off valve hose (air cut-off valve–reed valve)	1	Disconnect.
3	Rubber cover	1	
4	Air cut-off valve hose (air filter case–air cut-off valve)	1	Disconnect.
5	Air cut-off valve bracket	1	
6	Air cut-off valve	1	
7	Reed valve cap	2	
8	Reed valve assembly	2	
9	Plate	4	
			For installation, reverse the removal procedure.

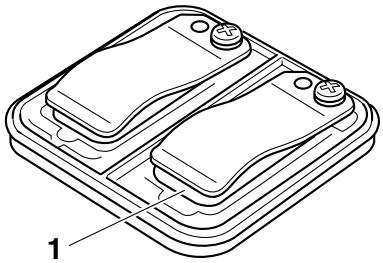
EAS27060
CHECKING THE AIR INDUCTION SYSTEM
Air injection
The air induction system burns unburned exhaust gases by injecting fresh air (secondary air) into the exhaust port, reducing the emission of hydrocarbons. When there is negative pressure at the exhaust port, the reed valve opens, allowing secondary air to flow into the exhaust port. The required temperature for burning the unburned exhaust gases is approximately 600 to 700°C.
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 vehicle 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.





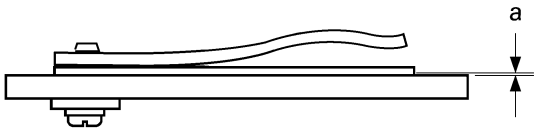
A. From the air filter case
B. To the reed valve

1. Check:
   - Hoses
     Loose connections → 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)



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4. Check:
   - Air cut-off valve
     Cracks/damage → Replace.
5. Check
   - Air induction system solenoid
     Refer to “CHECKING THE AIR INDUCTION SYSTEM SOLENOID” on page 8-164.

EAS27070
INSTALLING THE AIR INDUCTION SYSTEM
1. Install:
   - Plate
   - Reed valves
2. Install:
   - Reed valve cap

ELECTRICAL SYSTEM

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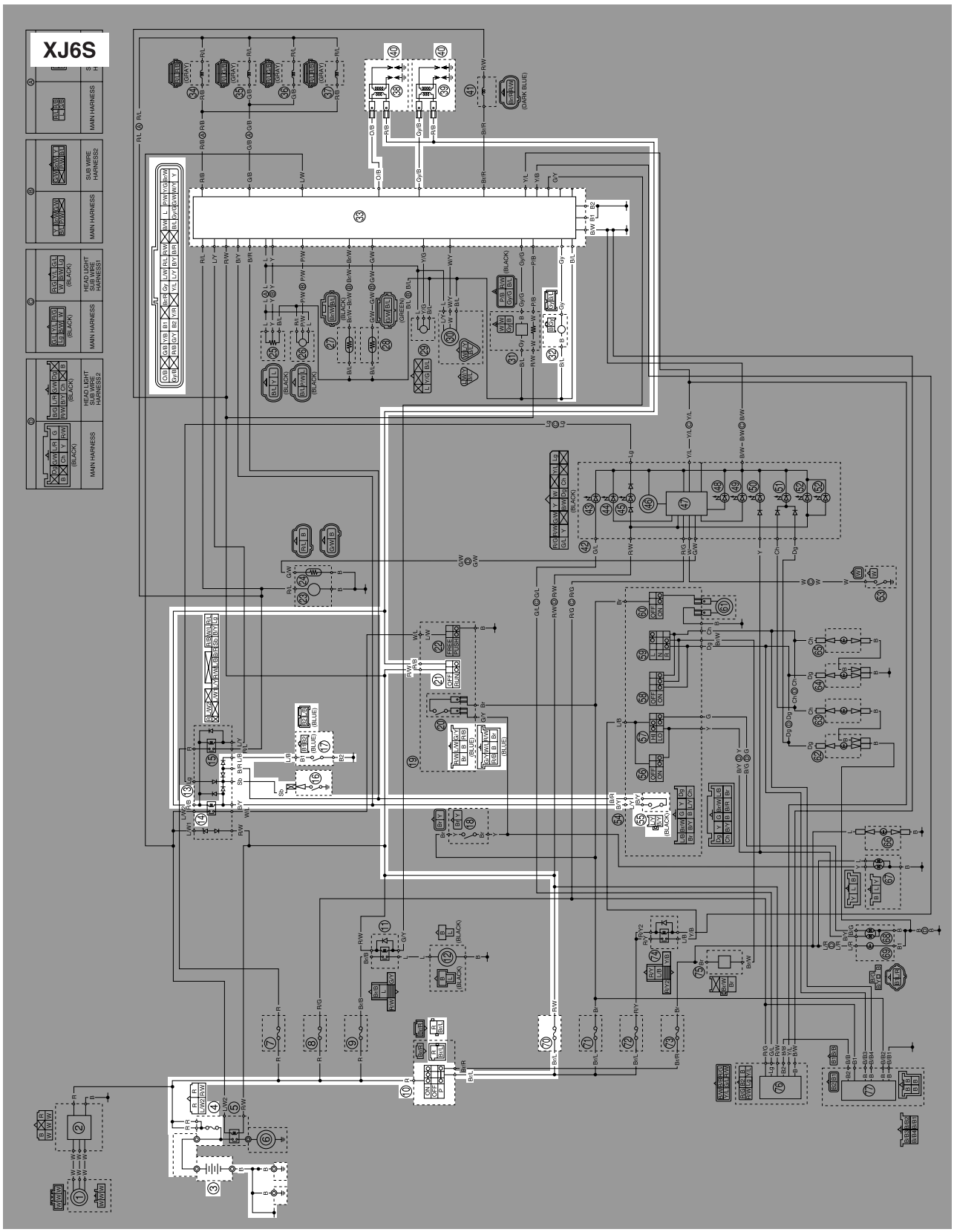
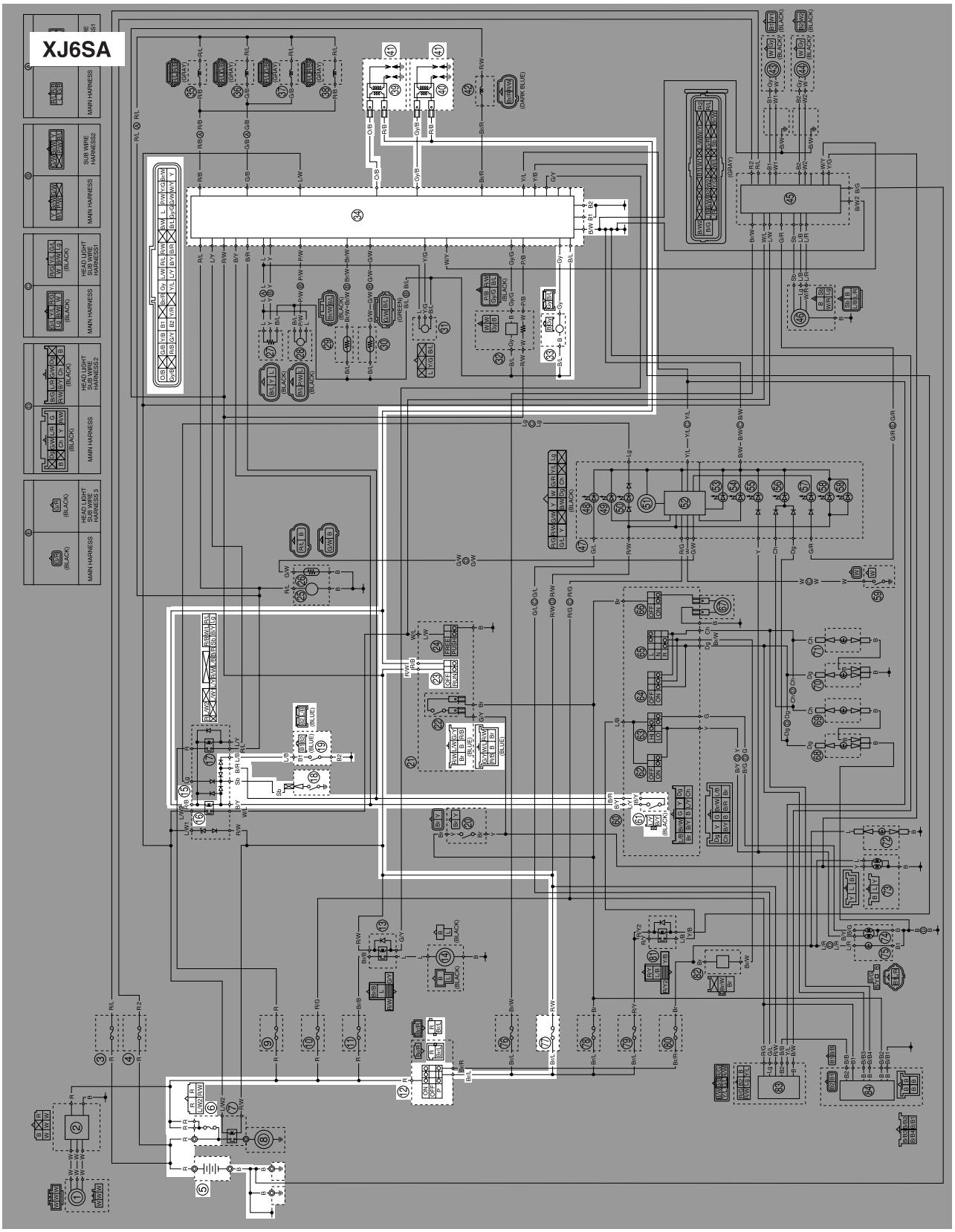
EAS27090
IGNITION SYSTEM

EAS27110
CIRCUIT DIAGRAM



3. Battery
4. Main fuse
10. Main switch
13. Relay unit
14. Starting circuit cut-off relay
16. Neutral switch
17. Sidestand switch
21. Engine stop switch
32. Crankshaft position sensor
33. ECU (engine control unit)
38. Ignition coil #1,4
39. Ignition coil #2,3
40. Spark plug
55. Clutch switch
70. Ignition fuse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5. Battery
6. Main fuse
12. Main switch
15. Relay unit
16. Starting circuit cut-off relay
18. Neutral switch
19. Sidestand switch
23. Engine stop switch
33. Crankshaft position sensor
34. ECU (engine control unit)
39. Ignition coil #1,4
40. Ignition coil #2,3
41. Spark plug
61. Clutch switch
77. Ignition fuse

EAS27140
TROUBLESHOOTING

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

TIP

- Before troubleshooting, remove the following part(s):

1.Seat
2.Fuel tank
3.Side cowling

1. Check the fuses. (Main and ignition) Refer to “CHECKING THE FUSES” on page 8-153.	NG→	Replace the fuse(s).
OK↓		
2. Check the battery. Refer to “CHECKING AND CHARGING THE BATTERY” on page 8-154.	NG→	• Clean the battery terminals. • Recharge or replace the battery.
OK↓		
3. Check the spark plugs. Refer to “CHECKING THE SPARK PLUGS” on page 3-4.	NG→	Re-gap or replace the spark plugs.
OK↓		
4. Check the spark plug caps. Refer to “CHECKING THE SPARK PLUG CAPS” on page 8-160.	NG→	Replace the spark plug caps.
OK↓		
5. Check the ignition coils. Refer to “CHECKING THE IGNITION COIL” on page 8-160.	NG→	Replace the ignition coils.
OK↓		
6. Check the crankshaft position sensor. Refer to “CHECKING THE CRANKSHAFT POSITION SENSOR” on page 8-161.	NG→	Replace the crankshaft position sensor.
OK↓		
7. Check the main switch. Refer to “CHECKING THE SWITCHES” on page 8-149.	NG→	Replace the main switch.
OK↓		
8. Check the engine stop switch. Refer to “CHECKING THE SWITCHES” on page 8-149.	NG→	Replace the right handlebar switch.
OK↓		
9. Check the neutral switch. Refer to “CHECKING THE SWITCHES” on page 8-149.	NG→	Replace the neutral switch.
OK↓		
10.Check the sidestand switch. Refer to “CHECKING THE SWITCHES” on page 8-149.	NG→	Replace the sidestand switch.

OK↓

11.Check the clutch switch. Refer to "CHECKING THE SWITCHES" on page 8-149.	NG→	Replace the clutch switch.

OK↓

12.Check the starting circuit cut-off relay. Refer to "CHECKING THE RELAYS" on page 8-157.	NG→	Replace the relay unit.

OK↓

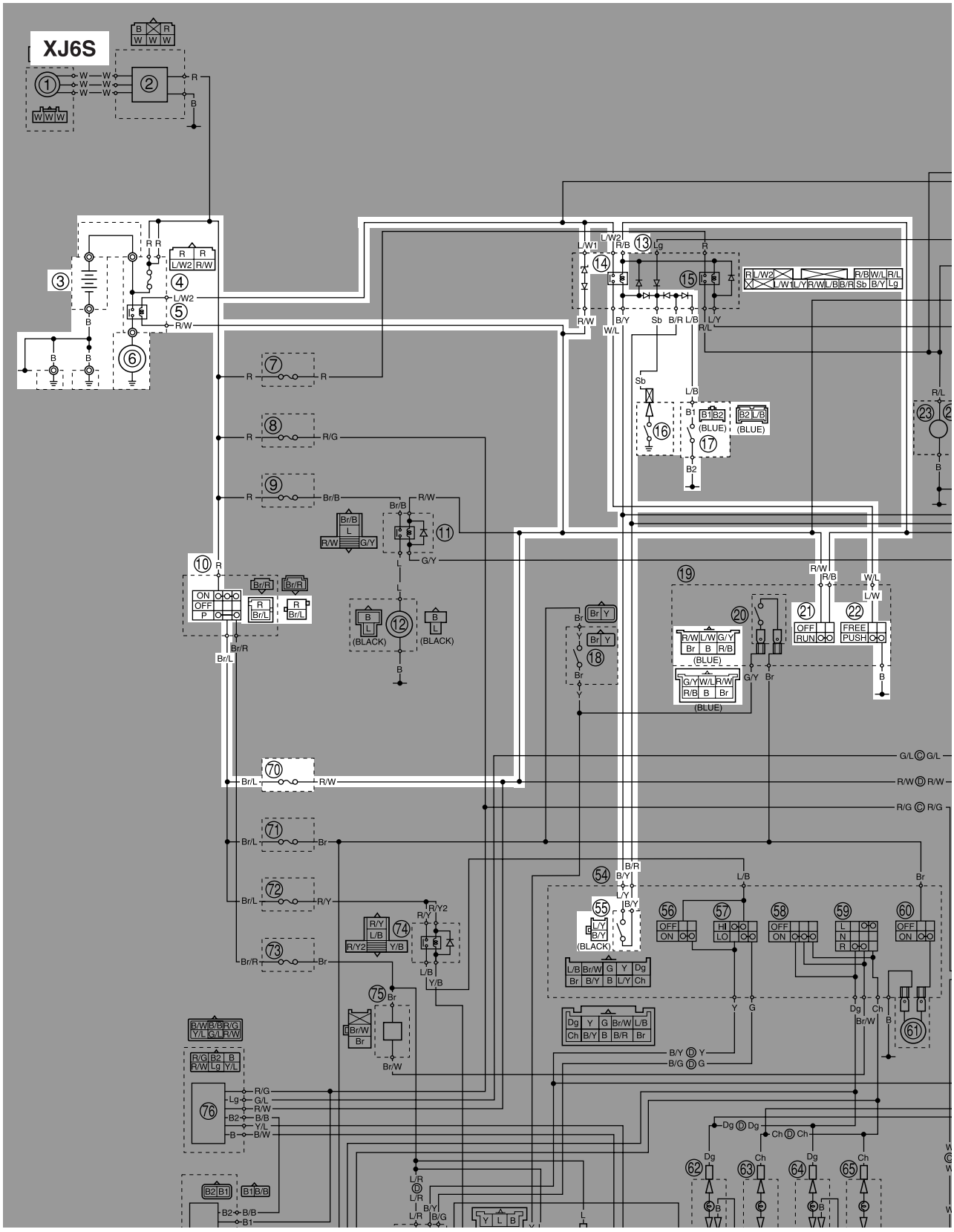
13.Check the entire ignition system's wiring. Refer to "CIRCUIT DIAGRAM" on page 8-1.	NG→	Properly connect or repair the ignition system's wiring.

OK↓

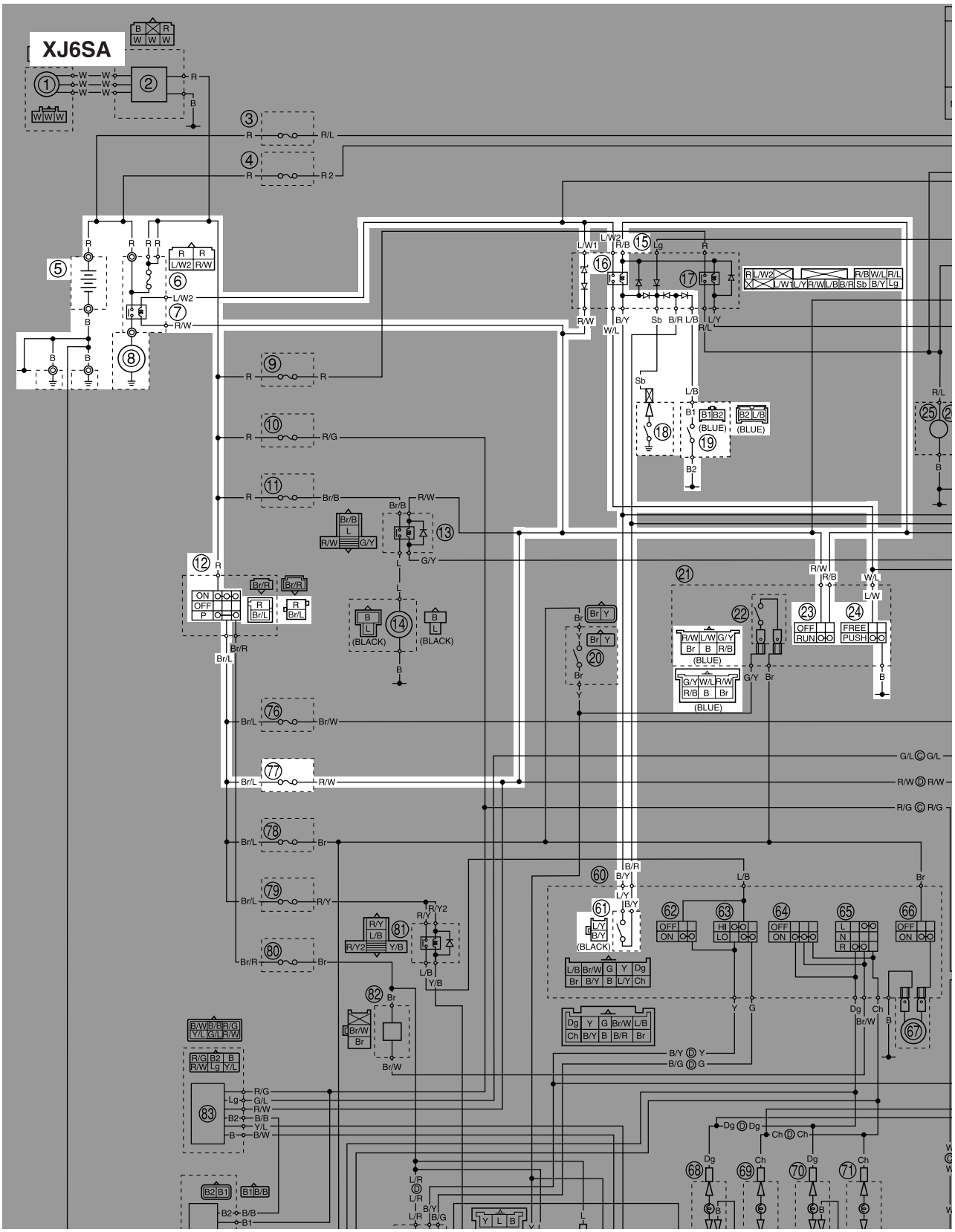
Replace the ECU (engine control unit).

EAS27160
ELECTRIC STARTING SYSTEM

EAS27170
CIRCUIT DIAGRAM



3. Battery
4. Main fuse
5. Starter relay
6. Starter motor
10. Main switch
13. Relay unit
14. Starting circuit cut-off relay
16. Neutral switch
17. Sidestand switch
21. Engine stop switch
22. Start switch
55. Clutch switch
70. Ignition fuse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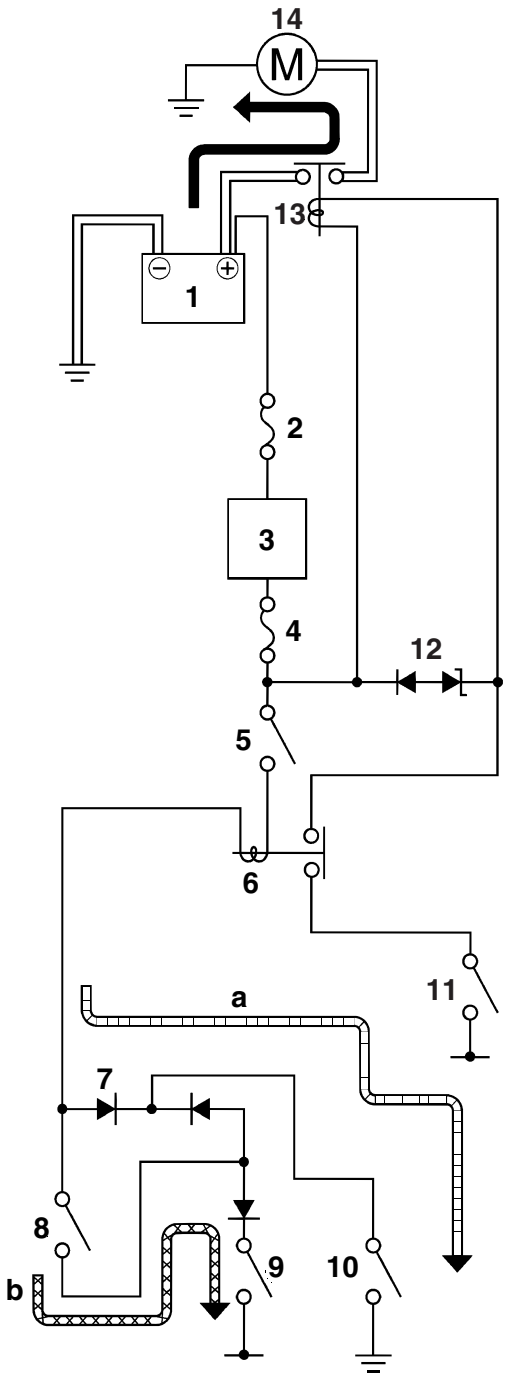
5. Battery
6. Main fuse
7. Starter relay
8. Starter motor
12. Main switch
15. Relay unit
16. Starting circuit cut-off relay
18. Neutral switch
19. Sidestand switch
23. Engine stop switch
24. Start switch
61. Clutch switch
77. Ignition fuse

EAS27180
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.



a. WHEN THE TRANSMISSION IS IN NEUTRAL
b. 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. Diode
13. Starter relay
14. Starter motor

EAS27190

TROUBLESHOOTING

The starter motor fails to turn.

TIP

- Before troubleshooting, remove the following part(s):

1. Seat
2. Rear side cover
3. Fuel tank

1. Check the fuses. (Main and ignition) Refer to "CHECKING THE FUSES" on page 8-153.	NG→	Replace the fuse(s).
OK↓		
2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-154.	NG→	• Clean the battery terminals. • Recharge or replace the battery.
OK↓		
3. Check the starter motor. Refer to "CHECKING THE STARTER MOTOR" on page 5-38.	NG→	Repair or replace the starter motor.
OK↓		
4. Check the starting circuit cut-off relay. Refer to "CHECKING THE RELAYS" on page 8-157.	NG→	Replace the relay unit.
OK↓		
5. Check the starter relay. Refer to "CHECKING THE RELAYS" on page 8-157.	NG→	Replace the starter relay.
OK↓		
6. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 8-149.	NG→	Replace the main switch.
OK↓		
7. Check the engine stop switch. Refer to "CHECKING THE SWITCHES" on page 8-149.	NG→	Replace the right handlebar switch.
OK↓		
8. Check the neutral switch. Refer to "CHECKING THE SWITCHES" on page 8-149.	NG→	Replace the neutral switch.
OK↓		
9. Check the sidestand switch. Refer to "CHECKING THE SWITCHES" on page 8-149.	NG→	Replace the sidestand switch.
OK↓		
10. Check the clutch switch. Refer to "CHECKING THE SWITCHES" on page 8-149.	NG→	Replace the clutch switch.

OK↓

11.Check the start switch. Refer to "CHECKING THE SWITCHES" on page 8-149.	NG→	Replace the right handlebar switch.

OK↓

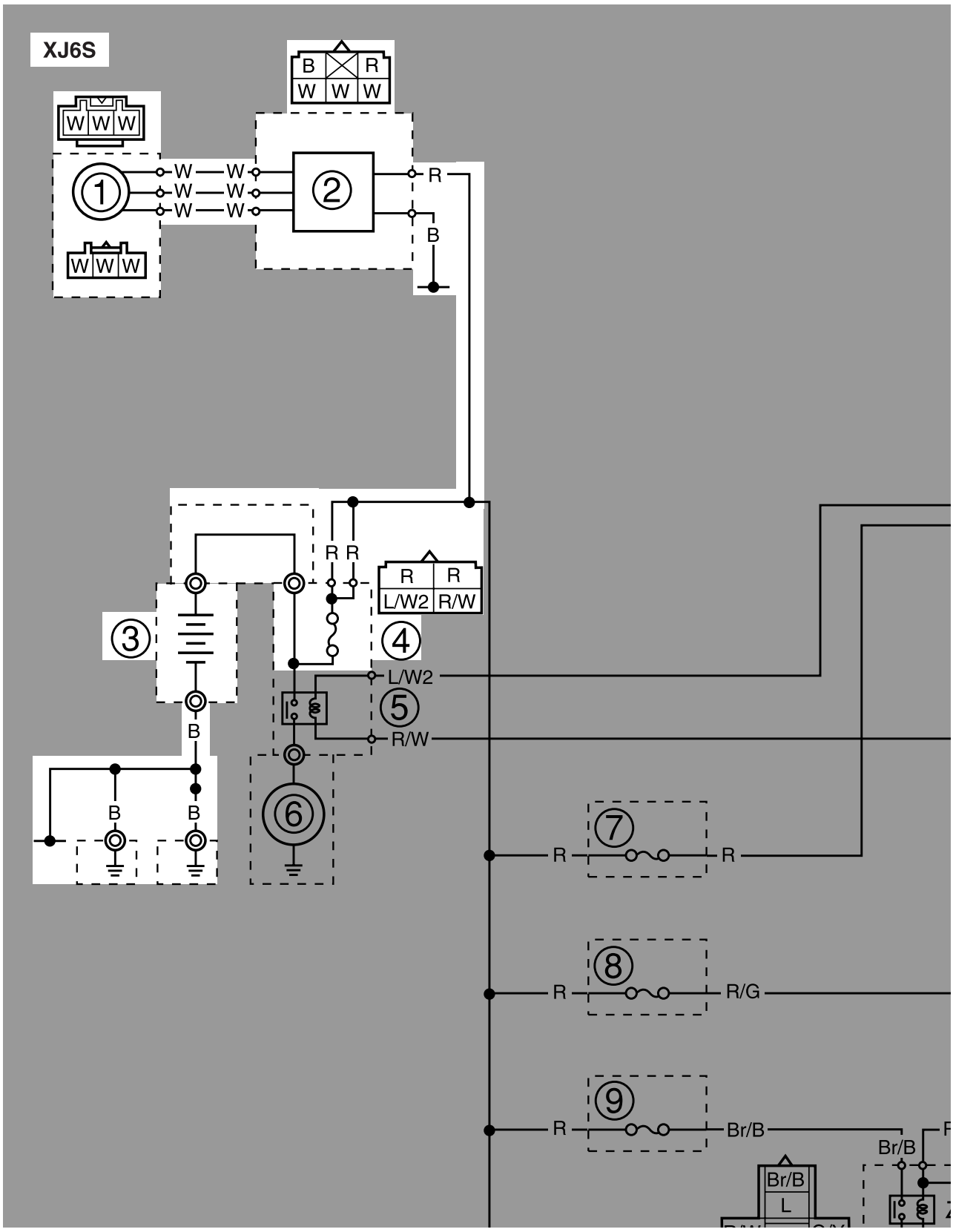
12.Check the entire starting system's wiring. Refer to "CIRCUIT DIAGRAM" on page 8-7.	NG→	Properly connect or repair the starting system's wiring.

OK↓

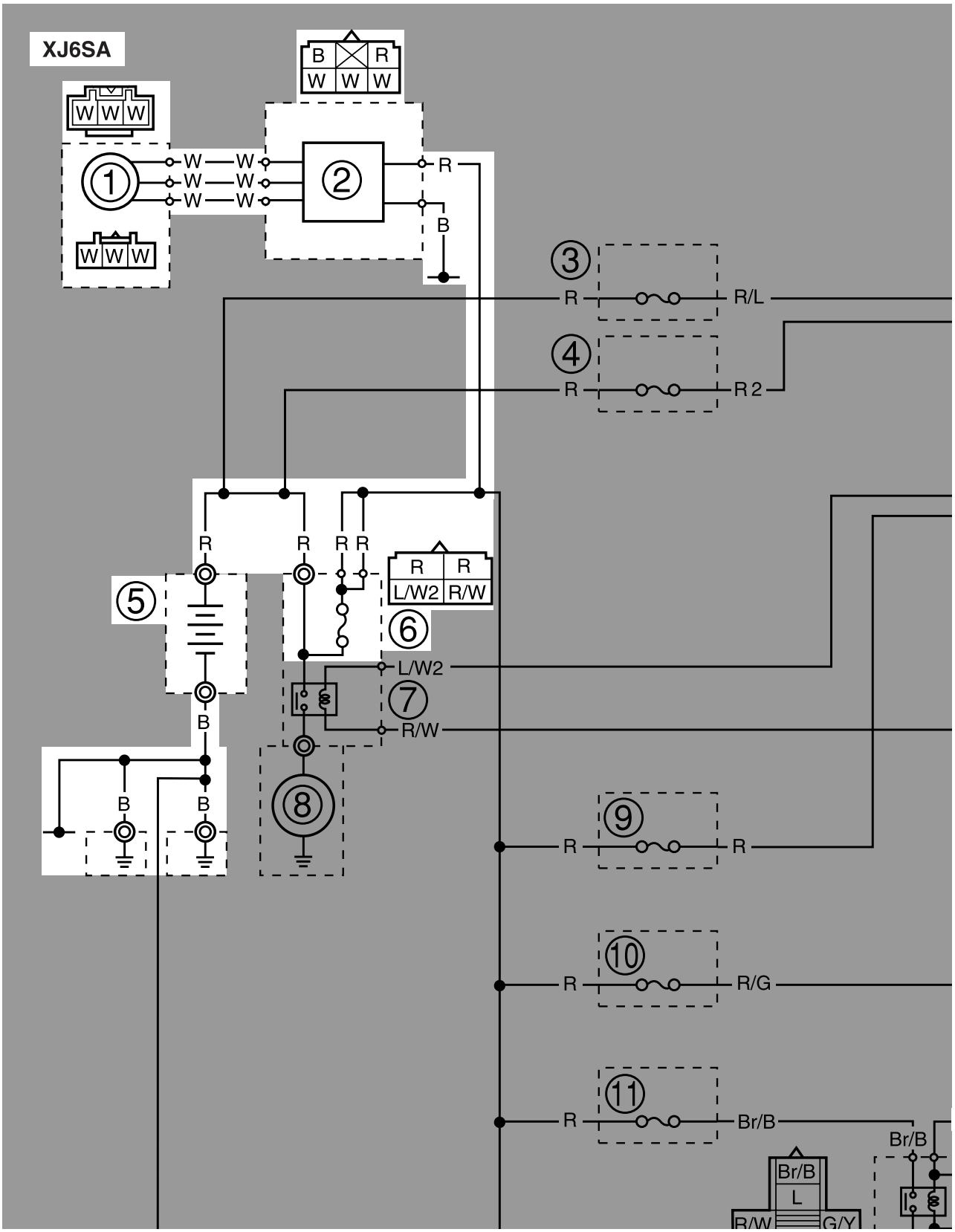
The starting system circuit is OK.

EAS27200
CHARGING SYSTEM

EAS27210
CIRCUIT DIAGRAM



1. AC magneto
2. Rectifier/regulator
3. Battery
4. Main fuse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B
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1
2
R
B
3
R
R/L
4
R
R 2
R
R
R
R
R
R
L/W2
R/W
5
6
7
L/W2
R/W
B
B
B
8
9
R
R
10
R
R/G
11
R
Br/B
Br/B
Br/B
L
R/W
G/Y

1. AC magneto
2. Rectifier/regulator
5. Battery
6. Main fuse

EAS27230

TROUBLESHOOTING

The battery is not being charged.

TIP

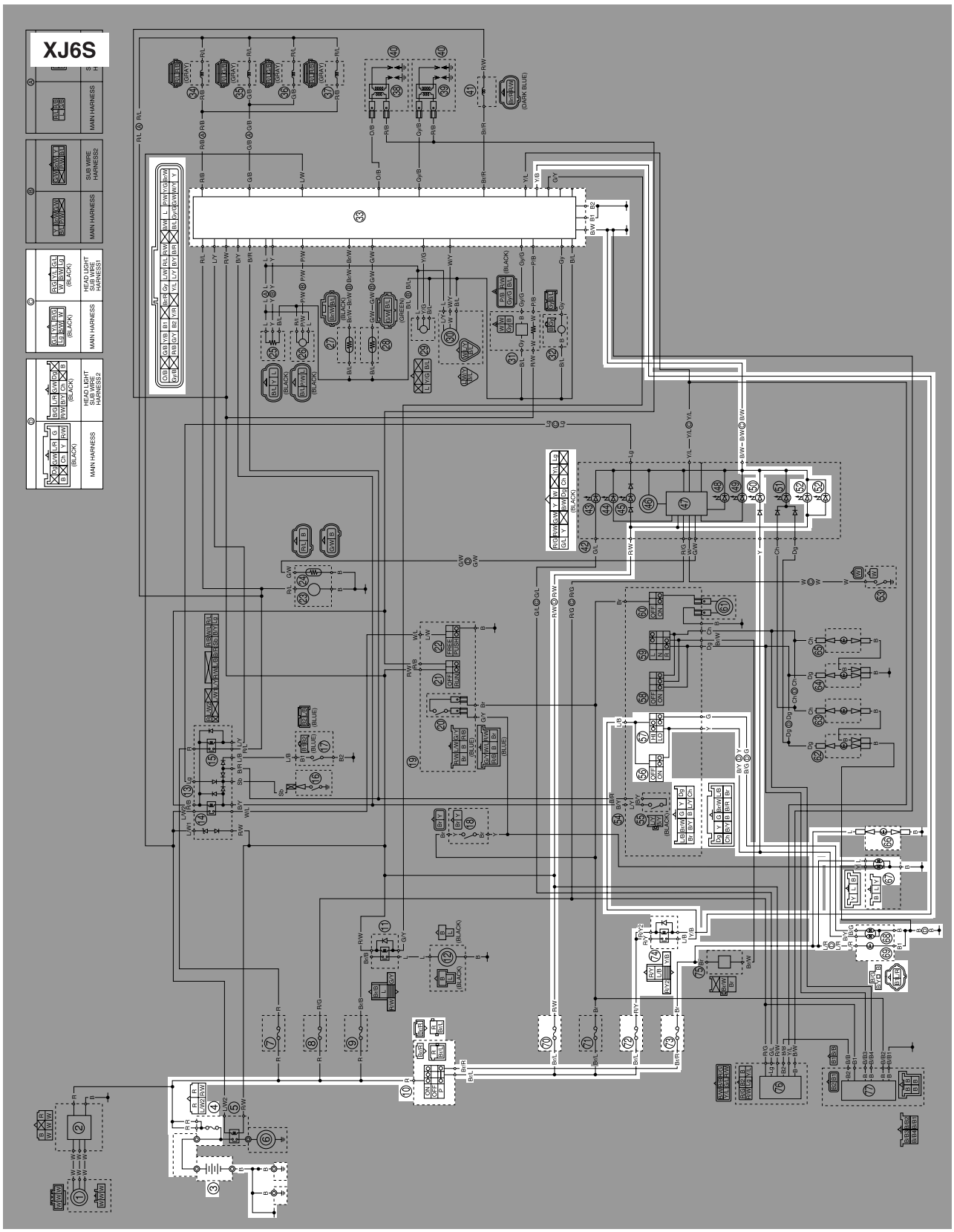
- Before troubleshooting, remove the following part(s):

1.Seat
2.Rear side cover
3.Fuel tank

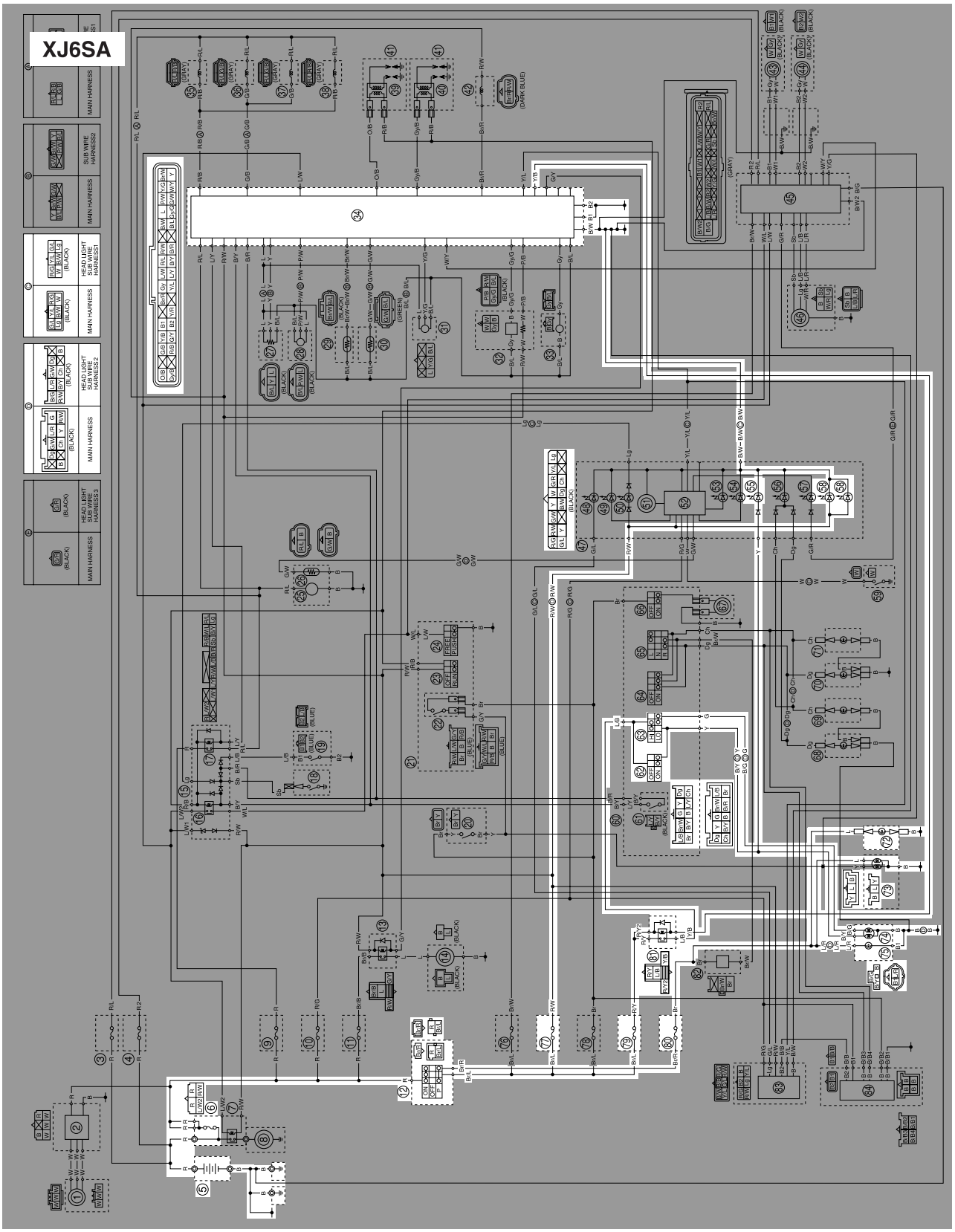
1. Check the fuse. (Main) Refer to "CHECKING THE FUSES" on page 8-153.	NG→	Replace the fuse.
OK↓		
2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-154.	NG→	• Clean the battery terminals. • Recharge or replace the battery.
OK↓		
3. Check the stator coil. Refer to "CHECKING THE STATOR COIL" on page 8-163.	NG→	Replace the stator coil assembly.
OK↓		
4. Check the rectifier/regulator. Refer to "CHECKING THE RECTIFIER/REGULATOR" on page 8-163.	NG→	Replace the rectifier/regulator.
OK↓		
5. Check the entire charging system's wiring. Refer to "CIRCUIT DIAGRAM" on page 8-15.	NG→	Properly connect or repair the charging system's wiring.
OK↓		
Replace the rectifier/regulator.		

EAS27240
LIGHTING SYSTEM

EAS27250
CIRCUIT DIAGRAM



3. Battery
4. Main fuse
10. Main switch
33. ECU (engine control unit)
50. High beam indicator light
52. Meter light
56. Pass switch
57. Dimmer switch
66. License plate light
67. Tail/brake light
68. Headlight
69. Auxiliary light
70. Ignition fuse
72. Headlight fuse
73. Taillight fuse
74. Headlight relay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5. Battery
6. Main fuse
12. Main switch
34. ECU (engine control unit)
55. High beam indicator light
58. Meter light
62. Pass switch
63. Dimmer switch
72. License plate light
73. Tail/brake light
74. Headlight
75. Auxiliary light
77. Ignition fuse
79. Headlight fuse
80. Taillight fuse
81. Headlight relay

EAS27260
TROUBLESHOOTING

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

TIP

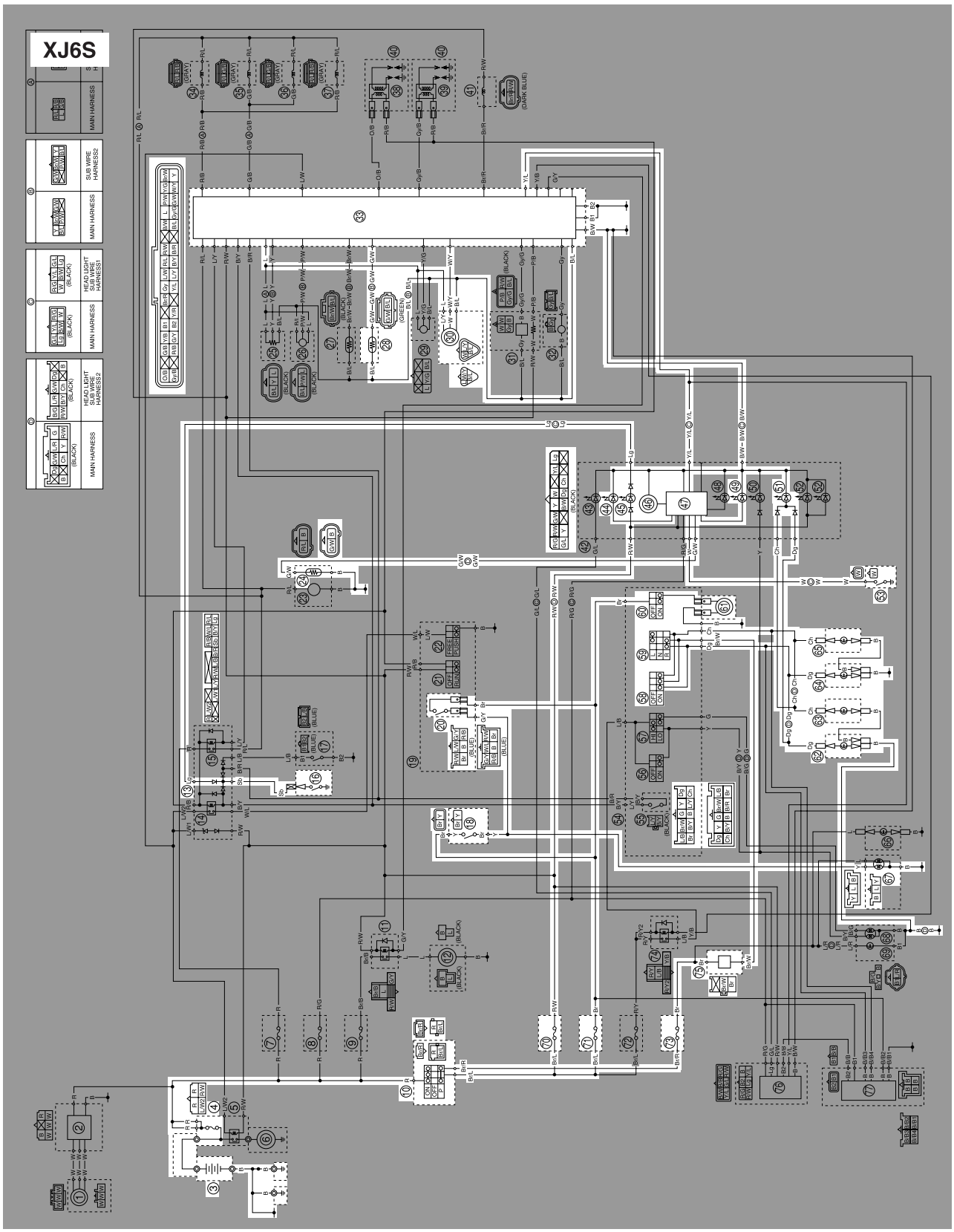
- Before troubleshooting, remove the following part(s):

1.Seat
2.Fuel tank

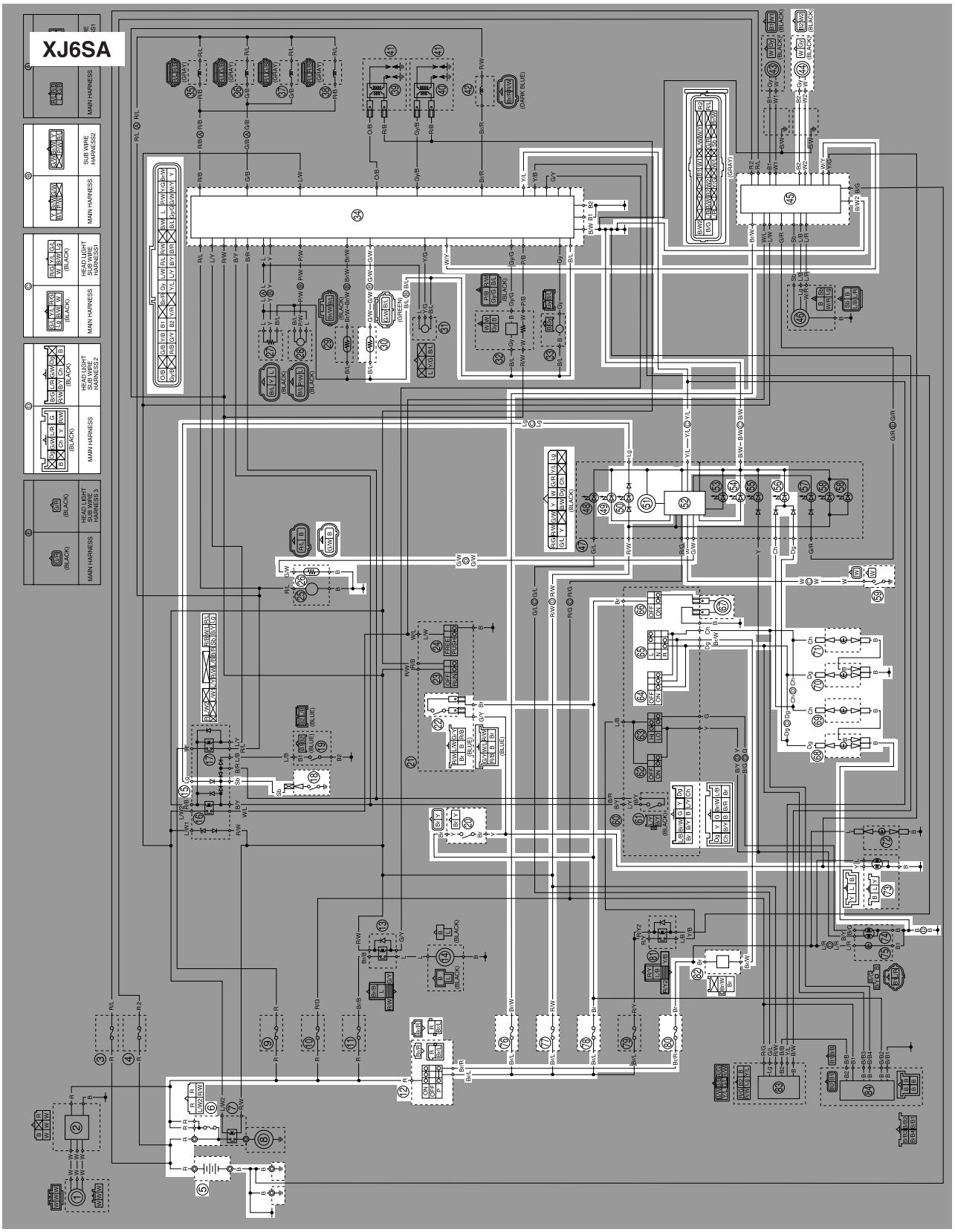
1. Check the each bulbs and bulb sockets condition. Refer to "CHECKING THE BULBS AND BULB SOCKETS" on page 8-152.	NG→	Replace the bulb(s) and bulb socket(s).
OK↓		
2. Check the fuses. (Main, ignition, headlight and tail-light) Refer to "CHECKING THE FUSES" on page 8-153.	NG→	Replace the fuse(s).
OK↓		
3. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-154.	NG→	• Clean the battery terminals. • Recharge or replace the battery.
OK↓		
4. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 8-149.	NG→	Replace the main switch.
OK↓		
5. Check the dimmer switch. Refer to "CHECKING THE SWITCHES" on page 8-149.	NG→	The dimmer switch is faulty. Replace the left handlebar switch.
OK↓		
6. Check the pass switch. Refer to "CHECKING THE SWITCHES" on page 8-149.	NG→	The pass switch is faulty. Replace the left handlebar switch.
OK↓		
7. Check the headlight relay. Refer to "CHECKING THE RELAYS" on page 8-157.	NG→	Replace the headlight relay.
OK↓		
8. Check the entire lighting system's wiring. Refer to "CIRCUIT DIAGRAM" on page 8-21.	NG→	Properly connect or repair the lighting system's wiring.
OK↓		
This circuit is OK.		

EAS27270
SIGNALING SYSTEM

EAS27280
CIRCUIT DIAGRAM



3. Battery
4. Main fuse
10. Main switch
13. Relay unit
16. Neutral switch
18. Rear brake light switch
20. Front brake light switch
24. Fuel sender
28. Coolant temperature sensor
30. Speed sensor
33. ECU (engine control unit)
44. Oil level warning light
45. Neutral indicator light
46. Tachometer
47. Multi-function meter
49. Coolant temperature warning light
51. Turn signal indicator light
53. Oil level switch
58. Hazard switch
59. Turn signal switch
60. Horn switch
61. Horn
62. Front right turn signal light
63. Front left turn signal light
64. Rear right turn signal light
65. Rear left turn signal light
67. Tail/brake light
70. Ignition fuse
71. Signal fuse
73. Taillight fuse
75. Turn signal/hazard relay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5. Battery
6. Main fuse
12. Main switch
15. Relay unit
18. Neutral switch
20. Rear brake light switch
22. Front brake light switch
26. Fuel sender
30. Coolant temperature sensor
34. ECU (engine control unit)
44. Rear wheel sensor
45. ABS ECU (electronic control unit)
49. Oil level warning light
50. Neutral indicator light
51. Tachometer
52. Multi-function meter
54. Coolant temperature warning light
56. Turn signal indicator light
59. Oil level switch
64. Hazard switch
65. Turn signal switch
66. Horn switch
67. Horn
68. Front right turn signal light
69. Front left turn signal light
70. Rear right turn signal light
71. Rear left turn signal light
73. Tail/brake light
76. ABS ECU fuse
77. Ignition fuse
78. Signal fuse
80. Taillight fuse
82. Turn signal/hazard relay

EAS27290
TROUBLESHOOTING

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

TIP

- Before troubleshooting, remove the following part(s):

1.Seat
2.Rear side cover
3.Fuel tank

1. Check the fuses. (Main, ignition, signaling and tail-light) Refer to "CHECKING THE FUSES" on page 8-153.	NG→	Replace the fuse(s).
OK↓		
2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-154.	NG→	• Clean the battery terminals. • Recharge or replace the battery.
OK↓		
3. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 8-149.	NG→	Replace the main switch.
OK↓		
4. Check the entire signaling system's wiring. Refer to "CIRCUIT DIAGRAM" on page 8-27.	NG→	Properly connect or repair the signaling system's wiring.
OK↓		
This circuit is OK.		

Check the signaling system

The horn fails to sound.

1. Check the horn switch. Refer to "CHECKING THE SWITCHES" on page 8-149.	NG→	Replace the left handlebar switch.
OK↓		
2. Check the horn. Refer to "CHECKING THE HORN" on page 8-163.	NG→	Replace the horn.
OK↓		
3. Check the entire signaling system's wiring. Refer to "CIRCUIT DIAGRAM" on page 8-27.	NG→	Properly connect or repair the signaling system's wiring.
OK↓		
This circuit is OK.		

The tail/brake light fails to come on.

1. Check the tail/brake light bulb and socket.
   Refer to "CHECKING THE BULBS AND BULB SOCKETS" on page 8-152.
   NG→ Replace the tail/brake light bulb, socket or both.
   OK↓
2. Check the front brake light switch.
   Refer to "CHECKING THE SWITCHES" on page 8-149.
   NG→ Replace the front brake light switch.
   OK↓
3. Check the rear brake light switch.
   Refer to "CHECKING THE SWITCHES" on page 8-149.
   NG→ Replace the rear brake light switch.
   OK↓
4. Check the entire signaling system's wiring.
   Refer to "CIRCUIT DIAGRAM" on page 8-27.
   NG→ Properly connect or repair the signaling system's wiring.
   OK↓

This circuit is OK.

The turn signal light, turn signal indicator light or both fail to blink.

1. Check the turn signal indicator light bulb and socket.
   NG→ Replace the turn signal indicator light bulb, socket or both.
   OK↓
2. Check the turn signal switch.
   Refer to "CHECKING THE SWITCHES" on page 8-149.
   NG→ Replace the left handlebar switch.
   OK↓
3. Check the hazard switch.
   Refer to "CHECKING THE SWITCHES" on page 8-149.
   NG→ Replace the left handlebar switch.
   OK↓
4. Check the turn signal/hazard relay.
   Refer to "CHECKING THE RELAYS" on page 8-157.
   NG→ The turn signal relay is faulty and must be replaced.
   OK↓
5. Check the entire signaling system's wiring.
   Refer to "CIRCUIT DIAGRAM" on page 8-27.
   NG→ Properly connect or repair the signaling system's wiring.
   OK↓

This circuit is OK.

The neutral indicator light fails to come.

1. Check the neutral indicator light bulb and socket.
   NG→ Replace the neutral indicator light bulb, socket or both.
   OK↓
2. Check the neutral switch. Refer to "CHECKING THE SWITCHES" on page 8-149.
   NG→ Replace the neutral switch.
   OK↓
3. Check the relay unit. Refer to "CHECKING THE RELAYS" on page 8-157.
   NG→ Replace the relay unit.
   OK↓
4. Check the entire signaling system's wiring. Refer to "CIRCUIT DIAGRAM" on page 8-27.
   NG→ Properly connect or repair the signaling system's wiring.
   OK↓

This circuit is OK.

The oil level warning light fails to come.

1. Check the oil level warning light bulb and socket.
   NG→ Replace the oil level warning light bulb, socket or both.
   OK↓
2. Check the oil level switch. Refer to "CHECKING THE SWITCHES" on page 8-149.
   NG→ Replace the oil level switch.
   OK↓
3. Check the entire signaling system's wiring. Refer to "CIRCUIT DIAGRAM" on page 8-27.
   NG→ Properly connect or repair the signaling system's wiring.
   OK↓

This circuit is OK.

The fuel meter fails to come.

1. Check the multi-function meter.
   NG→ Replace the meter assembly.
   OK↓
2. Check the fuel sender. Refer to "CHECKING THE FUEL SENDER" on page 8-165.
   NG→ Replace the fuel pump assembly.
   OK↓
3. Check the entire signaling system's wiring. Refer to "CIRCUIT DIAGRAM" on page 8-27.
   NG→ Properly connect or repair the signaling system's wiring.
   OK↓

This circuit is OK.

The speedometer fails to operate.

1. Check the speed sensor. (XJ6S) Refer to "CHECKING THE SPEED SENSOR" on page 8-166.	NG→	Replace the speed sensor.
OK↓		
2. Check the wheel sensor. (XJ6SA)	NG→	Replace the wheel sensor.
OK↓		
3. Check the entire signaling system's wiring. Refer to "CIRCUIT DIAGRAM" on page 8-27.	NG→	Properly connect or repair the signaling system's wiring.
OK↓		
Replace the meter assembly.		

TIP

Repair or replace if there is an open or short circuit.
- Between rear wheel sensor and ABS ECU coupler.

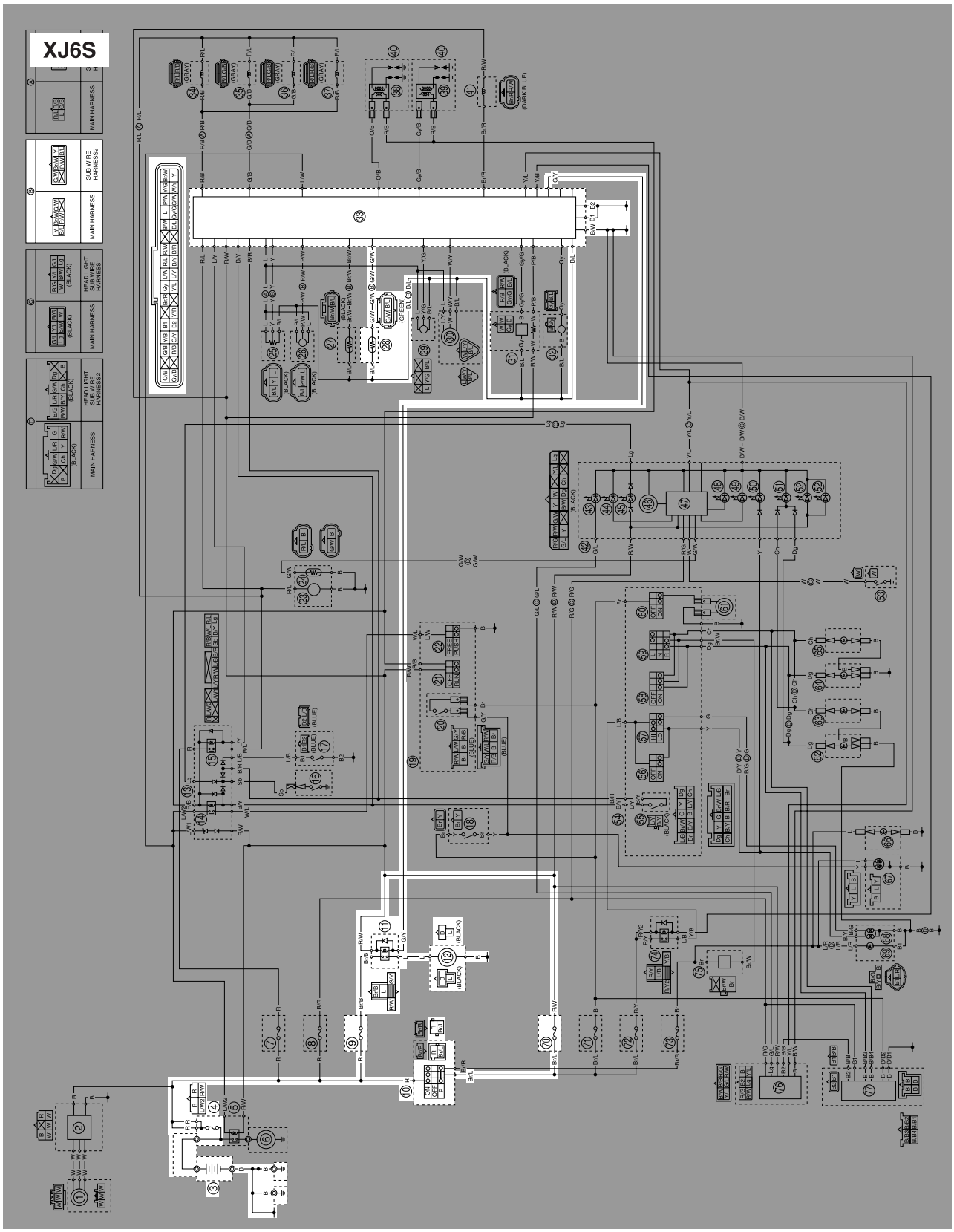
(White-White)
(Black-Black)
- Between ABS ECU coupler and ECU coupler.

(White/Yellow-White/Yellow)
- Between ECU coupler and meter assembly.

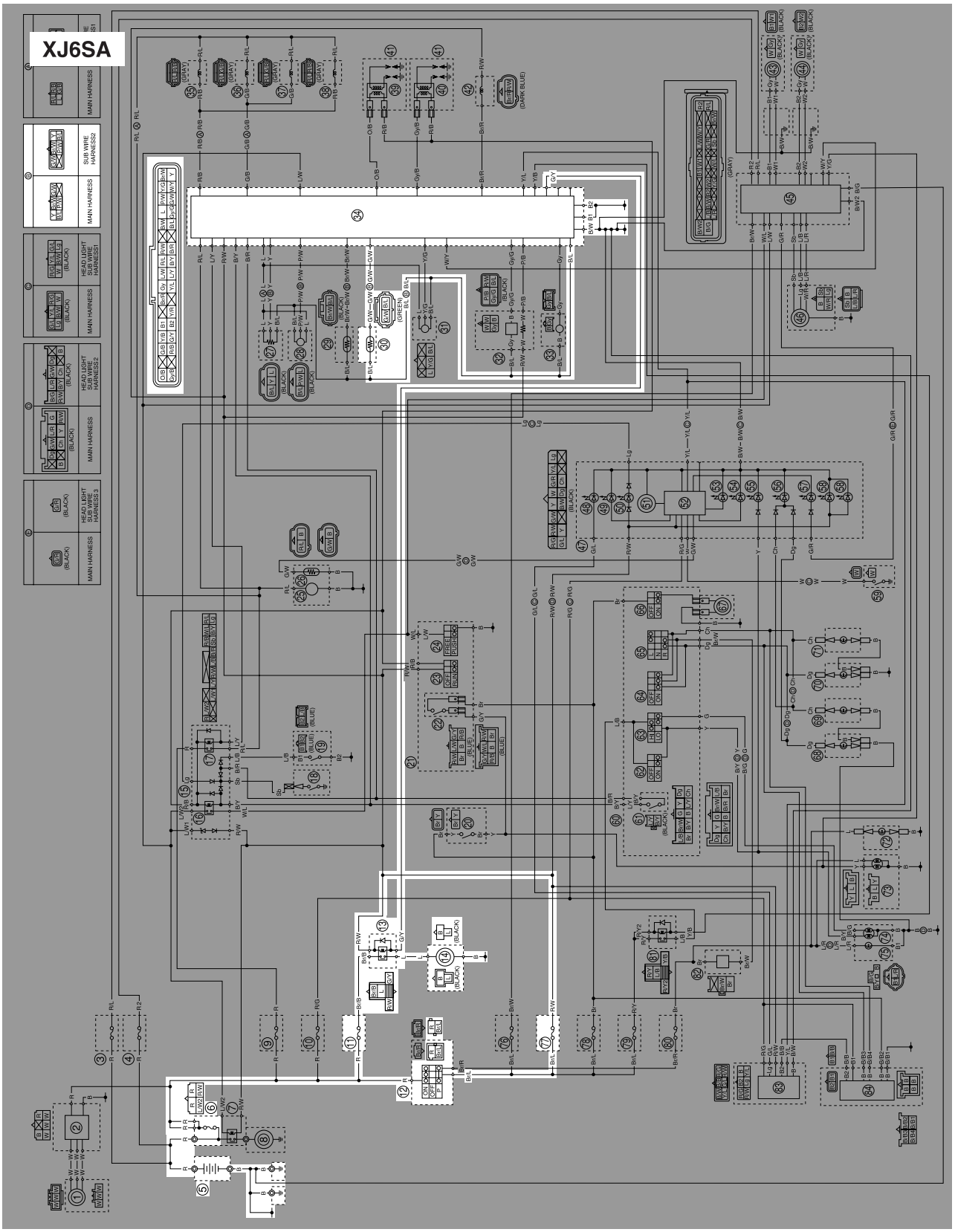
(Yellow/Blue-Yellow/Blue)

EAS27300
COOLING SYSTEM

EAS27310
CIRCUIT DIAGRAM



3. Battery
4. Main fuse
9. Radiator fan fuse
10. Main switch
11. Radiator fan motor relay
12. Radiator fan motor
28. Coolant temperature sensor
33. ECU (engine control unit)
70. Ignition fuse


XJ6SA

5. Battery
6. Main fuse
11. Radiator fan fuse
12. Main switch
13. Radiator fan motor relay
14. Radiator fan motor
30. Coolant temperature sensor
34. ECU (engine control unit)
77. Ignition fuse

EAS27320
TROUBLESHOOTING

TIP

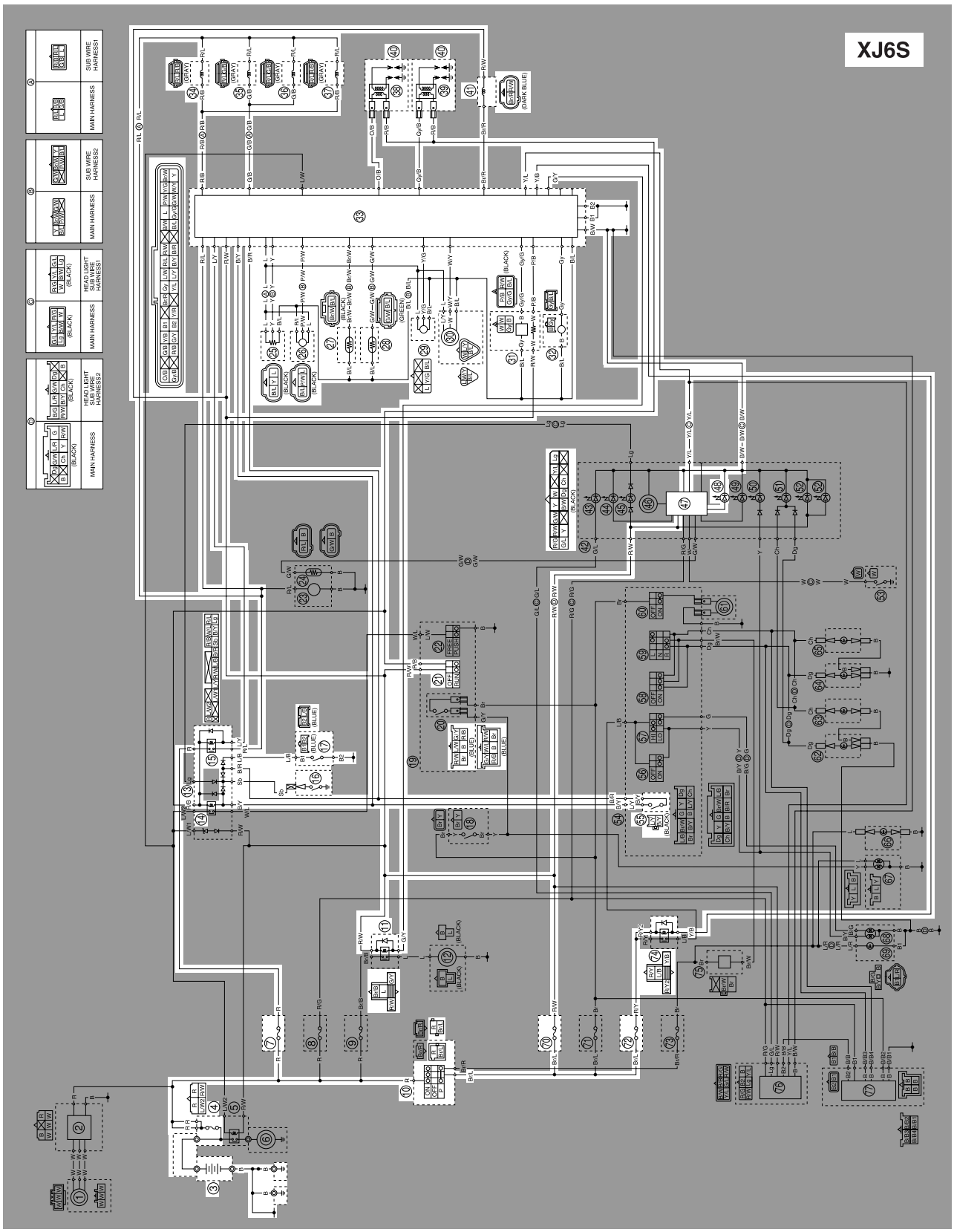
- Before troubleshooting, remove the following part(s):

1.Seat
2.Side cowling
3.Fuel tank

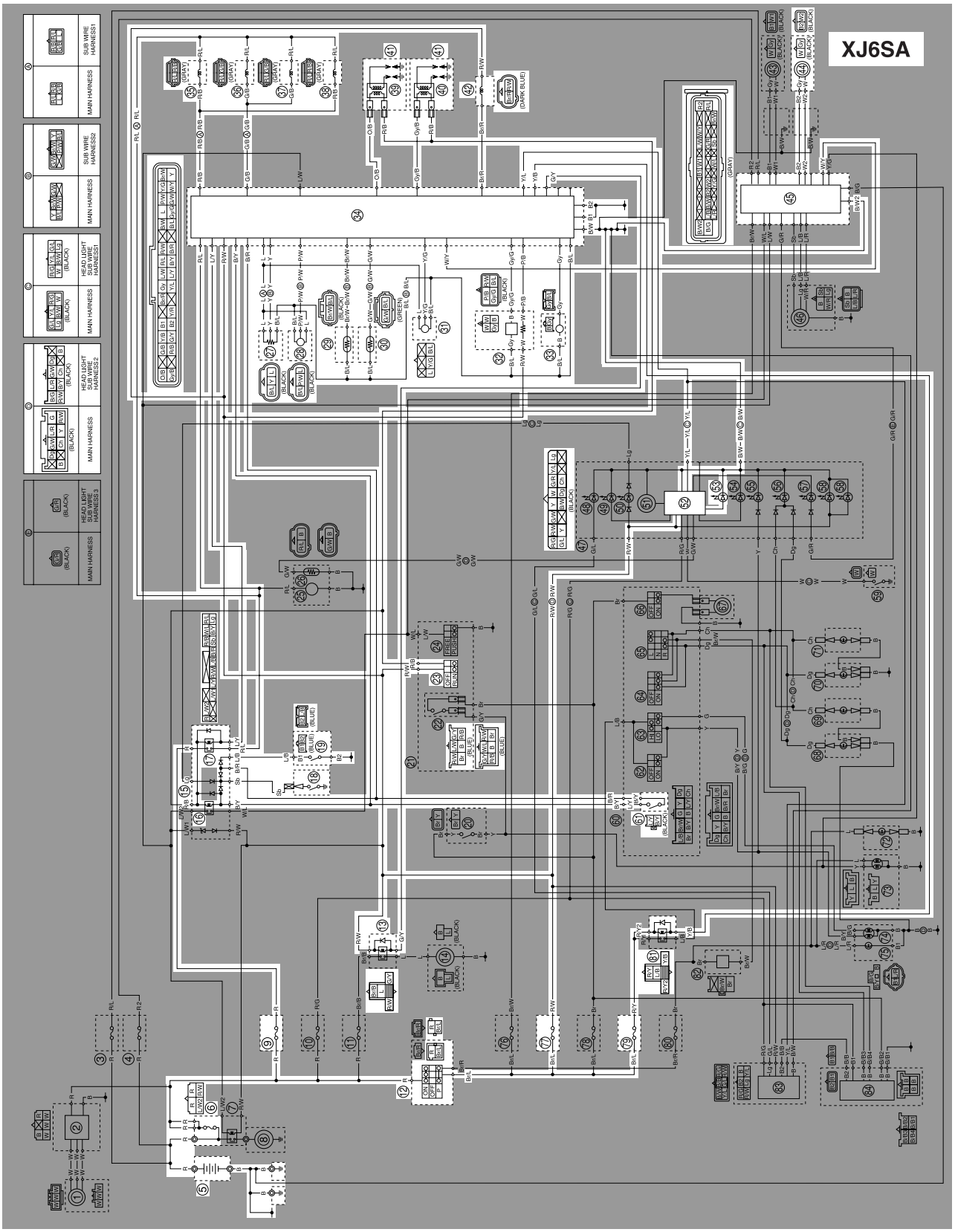
1. Check the fuses. (Main, ignition and radiator fan) Refer to "CHECKING THE FUSES" on page 8-153.	NG→	Replace the fuse(s).
OK↓		
2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-154.	NG→	• Clean the battery terminals. • Recharge or replace the battery.
OK↓		
3. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 8-149.	NG→	Replace the main switch.
OK↓		
4. Check the radiator fan motor. Refer to "CHECKING THE RADIATOR FAN MOTOR" on page 8-166.	NG→	The radiator fan motor is faulty and must be replaced.
OK↓		
5. Check the radiator fan motor relay. Refer to "CHECKING THE RELAYS" on page 8-157.	NG→	Replace the radiator fan motor relay.
OK↓		
6. Check the coolant temperature. Refer to "CHECKING THE COOLANT TEMPERATURE SENSOR" on page 8-166.	NG→	Replace the coolant temperature sensor.
OK↓		
7. Check the entire cooling system's wiring. Refer to "CIRCUIT DIAGRAM" on page 8-35.	NG→	Properly connect or repair the cooling system's wiring.
OK↓		
This circuit is OK.		

EAS27330
FUEL INJECTION SYSTEM

EAS27340
CIRCUIT DIAGRAM



3. Battery
4. Main fuse
7. Fuel injection system fuse
10. Main switch
11. Radiator fan motor relay
13. Relay unit
14. Starting circuit cut-off relay
15. Fuel injection system relay
16. Neutral switch
17. Sidestand switch
21. Engine stop switch
25. Throttle position sensor
26. Intake air pressure sensor
27. Intake air temperature sensor
28. Coolant temperature sensor
29. Lean angle sensor
30. Speed sensor
31. O_2 sensor
32. Crankshaft position sensor
33. ECU (engine control unit)
34. Fuel injector #1
35. Fuel injector #2
36. Fuel injector #3
37. Fuel injector #4
38. Ignition coil #1,4
39. Ignition coil #2,3
40. Spark plug
41. Air induction system solenoid
47. Multi-function meter
48. Engine trouble warning light
55. Clutch switch
70. Ignition fuse
72. Headlight fuse
74. Headlight relay


XJ6SA

5. Battery
6. Main fuse
9. Fuel injection system fuse
12. Main switch
13. Radiator fan motor relay
15. Relay unit
16. Starting circuit cut-off relay
17. Fuel injection system relay
18. Neutral switch
19. Sidestand switch
23. Engine stop switch
27. Throttle position sensor
28. Intake air pressure sensor
29. Intake air temperature sensor
30. Coolant temperature sensor
31. Lean angle sensor
32. O_2 sensor
33. Crankshaft position sensor
34. ECU (engine control unit)
35. Fuel injector #1
36. Fuel injector #2
37. Fuel injector #3
38. Fuel injector #4
39. Ignition coil #1,4
40. Ignition coil #2,3
41. Spark plug
42. Air induction system solenoid
44. Rear wheel sensor
45. ABS ECU (electronic control unit)
52. Multi-function meter
53. Engine trouble warning light
61. Clutch switch
77. Ignition fuse
79. Headlight fuse
81. Headlight relay

EAS27350
ECU SELF-DIAGNOSTIC FUNCTION

The ECU is equipped with a self-diagnostic function in order to ensure that the fuel injection 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, the ECU provides an appropriate substitute characteristic operation, and alerts the rider of the detected malfunction by illuminating the engine trouble warning light.
- After the engine has been stopped, the lowest fault code number appears on the clock LCD. Once a fault code has been displayed, it remains stored in the memory of the ECU until it is deleted.

Engine trouble warning light indication and FI system operation

Warning light indication	ECU operation	FI operation	Vehicle operation
Flashing*	Warning provided when unable to start engine	Operation stopped	Cannot be operated
Remains on	Malfunction detected	Operated with substitute characteristics in accordance with the description of the malfunction	Can or cannot be operated depending on the fault code

* The warning light flashes when any one of the conditions listed below is present and the start switch is pushed:

12: Crankshaft position sensor

19: Sidestand switch (open circuit in the wire to the ECU)

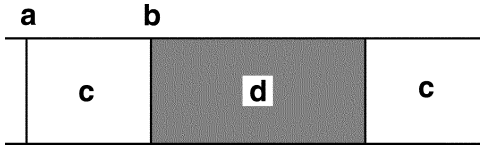
30: Lean angle sensor (latch up detected)

41: Lean angle sensor (open or short-circuit)

50: ECU internal malfunction (faulty ECU memory)

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 to "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.



a. Main switch "OFF"
b. Main switch "ON"
c. Engine trouble warning light off
d. Engine trouble warning light on for 1.4 seconds

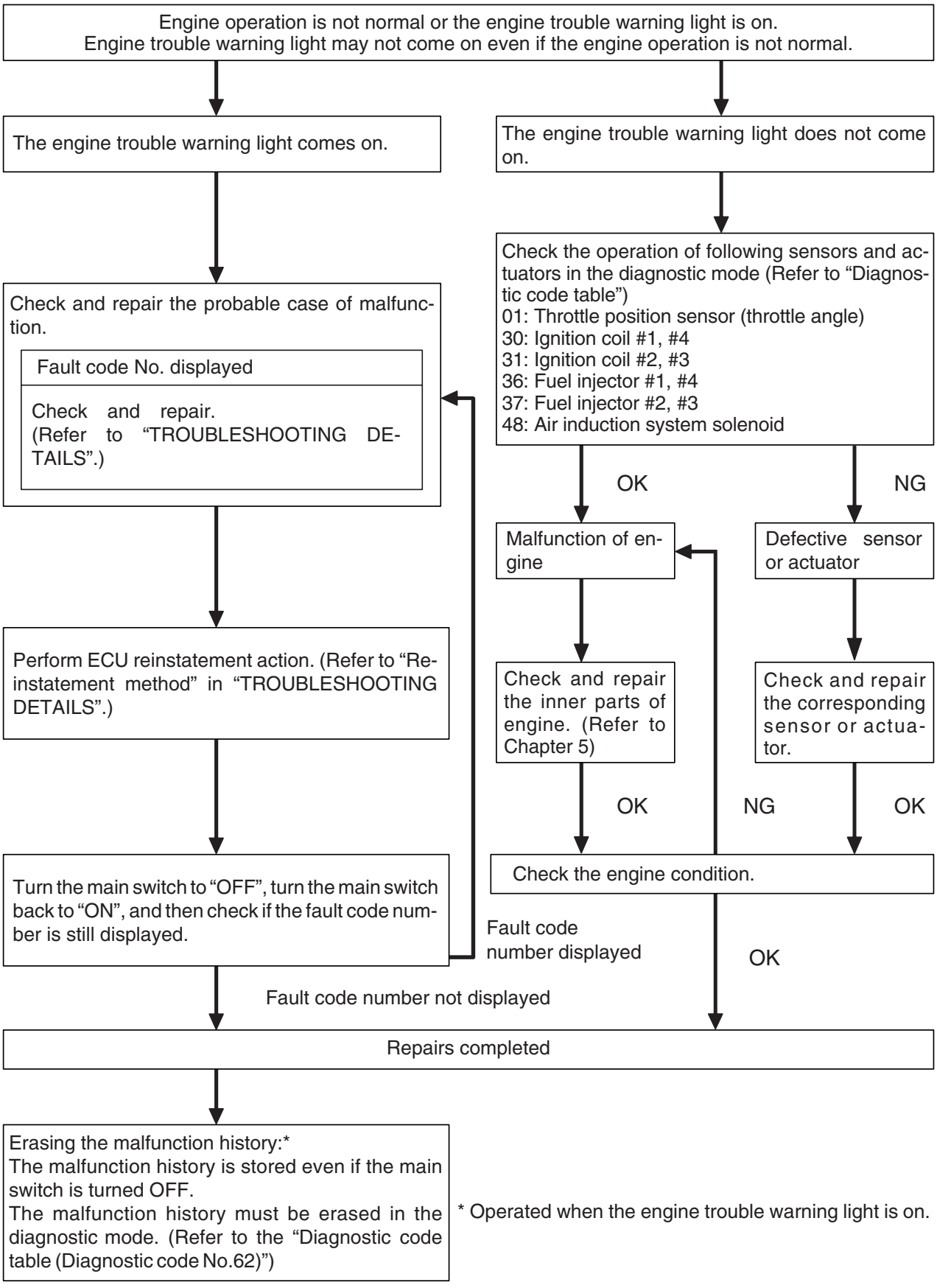
EAS27362
FAIL-SAFE ACTIONS (SUBSTITUTE CHARACTERISTICS OPERATION CONTROL)

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.

EAS20S1002
TROUBLE SHOOTING CHART

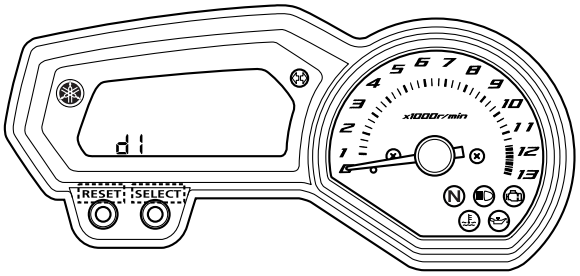


* Operated when the engine trouble warning light is on.

EAS27411
DIAGNOSTIC MODE

Setting the diagnostic mode

1. Turn the main switch to “OFF” and set the engine stop switch to “ ”.
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.



TIP

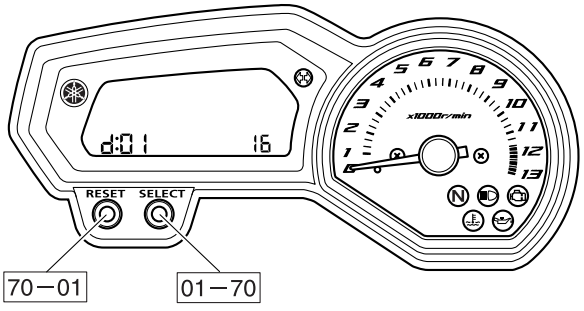
- All displays on the meter disappear except the clock and tripmeter displays.
- “dI” appears on the clock LCD.

4. Press the “SELECT” button to select the CO adjustment mode “Co” (Refer to “ADJUSTING THE EXHAUST GAS VOLUME” on page 8-80) or the diagnostic monitoring mode “dI”.
5. After selecting “dI”, simultaneously press the “SELECT” and “RESET” buttons for 2 seconds or more to execute the selection.
6. Set the engine stop switch to “OFF”.
7. 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.

TIP

The diagnostic code number appears on the clock LCD (01–70).

- To decrease the selected diagnostic code number, press the “RESET” button. Press the “RESET” button to automatically decrease the diagnostic code numbers.
- To increase the selected diagnostic code number, press the “SELECT” button. Press the “SELECT” button to automatically increase the diagnostic code numbers.



8. 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 “ ” to operate the actuator.

TIP

If the engine stop switch is set to “ ”, set it to “ ”, and then set it to “ ” again.

9. Turn the main switch to “OFF” to cancel the diagnostic mode.

EAS27451
TROUBLESHOOTING DETAILS

This section describes the measures per fault code number displayed on the meter. Check and service the items or components that are the probable cause of the malfunction following the order given.
After the check and service of the malfunctioning part has been completed, reset the meter display according to the reinstatement method.
Fault code No.:
Code number displayed on the meter when the engine failed to work normally. Refer to “Self-Diagnostic Function table”.
Diagnostic code No.:
Diagnostic code number to be used when the diagnostic mode is operated. Refer to “DIAGNOSTIC MODE” on page 8-48.

Fault code No.	**12**		
Symptom	**Normal signals are not received from the crank position sensor.**		
Fail-safe action	**Engine startup: Impossible**		
	Riding: Impossible		
Diagnostic monitoring code No.	**—**		
Meter display	**—**		
Checking method	**—**		
Order	**Item/components and probable cause**	**Check or maintenance job**	**Sensor inspection procedure**
1	Connection of crankshaft position sensor coupler Check the connection of the coupler is secure. Remove the coupler, and check each pin (for bending, wear, or locking).	Poor connection ⇒ Connect it securely, or repair/replace the wire harness.	Crank the engine, and check the fault code indication. No fault code indicated. ⇒ Recovered. Fault code indicated. ⇒ Check the next step.
2	Connection of main harness ECU coupler Check the connection of the coupler is secure. Remove the coupler, and check each pin (for bending, wear, or locking).	Poor connection ⇒ Connect it securely, or repair/replace the wire harness.	Crank the engine, and check the fault code indication. No fault code indicated. ⇒ Recovered. Fault code indicated. ⇒ Check the next step.
3	Continuity of wire harness	Open or short circuit ⇒ Replace the wire harness. Gray Black/Blue	Crank the engine, and check the fault code indication. No fault code indicated. ⇒ Recovered. Fault code indicated. ⇒ Check the next step.
4	Sensor installation status - Check the mounting section for loose or pinched mounting.	Incorrect installation ⇒ Reinstall or repair the sensor.	Crank the engine, and check the fault code indication. No fault code indicated. ⇒ Recovered. Fault code indicated. ⇒ Check the next step.

Fault code No.	**12**		
Symptom	**Normal signals are not received from the crank position sensor.**		
Fail-safe action	**Engine startup: Impossible**		
	Riding: Impossible		
Diagnostic monitoring code No.	**—**		
Meter display	**—**		
Checking method	**—**		
Order	**Item/components and probable cause**	**Check or maintenance job**	**Sensor inspection procedure**
5	Crankshaft position sensor malfunction	Replace if defective. Refer to “CHECKING THE CRANKSHAFT POSITION SENSOR” on page 8-161.	Crank the engine, and check the fault code indication. No fault code indicated. ⇒ Recovered. Fault code indicated. ⇒ Check the next step.
6	ECU malfunction	Replace the ECU.	

If fault codes 13 and 14 are indicated simultaneously, take the actions specified for fault code 13 first.

Fault code No.	**13**		
Symptom	**Open or short circuit of intake air pressure sensor lead**		
Fail-safe action	**Engine startup: Possible**		
	Riding: Possible		
Diagnostic monitoring code No.	**03**		
Meter display	**When engine is stopped: Make sure that the atmospheric pressure is indicated.**		
Checking method	**When engine is cranking: The indication value changes because the intake air pressure changes.**		
Order	**Item/components and probable cause**	**Check or maintenance job**	**Sensor inspection procedure**
1	Connection of intake air pressure sensor coupler Check the connection of the coupler is secure. Remove the coupler, and check each pin (for bending, wear, or locking).	Poor connection ⇒ Connect it securely, or repair/replace the wire harness.	Place the main switch to the ON position, and check the fault code indication. No fault code indicated. ⇒ Recovered. Fault code indicated. ⇒ Check the next step.
2	Connection of main harness ECU coupler Check the connection of the coupler is secure. Remove the coupler, and check each pin (for bending, wear, or locking).	Poor connection ⇒ Connect it securely, or repair/replace the wire harness.	Place the main switch to the ON position, and check the fault code indication. No fault code indicated. ⇒ Recovered. Fault code indicated. ⇒ Check the next step.
3	Connection of sub-harness coupler Check the connection of the coupler is secure. Remove the coupler, and check each pin (for bending, wear, or locking).	Poor connection ⇒ Connect it securely, or repair/replace the wire harness.	Place the main switch to the ON position, and check the fault code indication. No fault code indicated. ⇒ Recovered. Fault code indicated. ⇒ Check the next step.
4	Continuity of wire harness	Open or short circuit ⇒ Replace the wire harness. Black/Blue–Black/Blue Pink/White–Pink/White Blue–Blue	Place the main switch to the ON position, and check the fault code indication. No fault code indicated. ⇒ Recovered. Fault code indicated. ⇒ Check the next step.

Fault code No.	**13**		
Symptom	**Open or short circuit of intake air pressure sensor lead**		
Fail-safe action	**Engine startup: Possible**		
	Riding: Possible		
Diagnostic monitoring code No.	**03**		
Meter display	**When engine is stopped: Make sure that the atmospheric pressure is indicated.**		
Checking method	**When engine is cranking: The indication value changes because the intake air pressure changes.**		
Order	**Item/components and probable cause**	**Check or maintenance job**	**Sensor inspection procedure**
5	Intake air pressure sensor malfunction	Check in the diagnostic mode (Code No. D03). When engine is stopped: Atmospheric pressure at the current altitude and weather conditions is indicated. 0 m above sea level: Approx. 101 kPa 1000 m above sea level: Approx. 90 kPa 2000 m above sea level: Approx. 80 kPa 3000 m above sea level: Approx. 70 kPa When engine is cranking: Make sure that the indication value changes. Incorrect indication ⇒ Sensor malfunction ⇒ Replace the intake air pressure sensor. Refer to “CHECKING THE INTAKE AIR PRESSURE SENSOR” on page 8-167.	Place the main switch to the ON position, and check the fault code indication. No fault code indicated. ⇒ Recovered. Fault code indicated. ⇒ Check the next step.
6	ECU malfunction	Replace the ECU.	

If fault codes 13 and 14 are indicated simultaneously, take the actions specified for fault code 13 first.

Fault code No.	**14**		
Symptom	**The intake air pressure sensor has failed (due to clogging of hole or sensor disconnection).**		
Fail-safe action	**Engine startup: Possible**		
	Riding: Possible		
Diagnostic monitoring code No.	**03**		
Meter display	**When engine is stopped: Make sure that the atmospheric pressure is indicated.**		
Checking method	**When engine is cranking: The indication value changes because the intake air pressure changes.**		
Order	**Item/components and probable cause**	**Check or maintenance job**	**Sensor inspection procedure**
1	The intake air pressure sensor hose is damaged, disconnected, clogged, twisted or bent.	Repair or replace the sensor hose.	Starting the engine and operating it at idle. Fully close the throttle and check the fault recovery.
2	Intake air pressure sensor malfunction	Check in the diagnostic mode (Code No. D03). When engine is stopped: Atmospheric pressure at the current altitude and weather conditions is indicated. 0 m above sea level: Approx. 101 kPa 1000 m above sea level: Approx. 90 kPa 2000 m above sea level: Approx. 80 kPa 3000 m above sea level: Approx. 70 kPa When engine is cranking: Make sure that the indication value changes. The value does not change when engine is cranking. ⇒ Replace the intake air pressure sensor. Refer to “CHECKING THE INTAKE AIR PRESSURE SENSOR” on page 8-167.	

Fault code No.	**15**		
Symptom	**Open or short circuit of throttle position sensor lead**		
Fail-safe action	**Engine startup: Possible under certain conditions**		
	Riding: Possible under certain conditions		
Diagnostic monitoring code No.	**01**		
Meter display	**Display the throttle opening (between 0 and 125 degrees). When throttle is fully closed: 14 to 20 degrees When throttle is fully opened: 91 to 95 degrees**		
Checking method	**Check the values when the throttle is fully closed and opened.**		
Order	**Item/components and probable cause**	**Check or maintenance job**	**Sensor inspection procedure**
1	Connection of throttle position sensor coupler Check the connection of the coupler is secure. Remove the coupler, and check each pin (for bending, wear, or locking).	Poor connection ⇒ Connect it securely, or repair/replace the wire harness.	Place the main switch to the ON position, and check the fault code indication. No fault code indicated. ⇒ Recovered. Fault code indicated. ⇒ Check the next step.
2	Connection of main harness ECU coupler Check the connection of the coupler is secure. Remove the coupler, and check each pin (for bending, wear, or locking).	Poor connection ⇒ Connect it securely, or repair/replace the wire harness.	Place the main switch to the ON position, and check the fault code indication. No fault code indicated. ⇒ Recovered. Fault code indicated. ⇒ Check the next step.
3	Connection of sub-harness coupler Check the connection of the coupler is secure. Remove the coupler, and check each pin (for bending, wears, or locking).	Poor connection ⇒ Connect it securely, or repair/replace the wire harness.	Place the main switch to the ON position, and check the fault code indication. No fault code indicated. ⇒ Recovered. Fault code indicated. ⇒ Check the next step.
4	Continuity of wire harness	Open or short circuit ⇒ Replace the wire harness. Black/Blue–Black/Blue Yellow–Yellow Blue–Blue	Place the main switch to the ON position, and check the fault code indication. No fault code indicated. ⇒ Recovered. Fault code indicated. ⇒ Check the next step.
5	Sensor installation status	Check for loose mounting, pinched mounting, or hard mounting. Make sure that the mounting position is correct. Refer to “ADJUSTING THE THROTTLE POSITION SENSOR” on page 7-10.	Place the main switch to the ON position, and check the fault code indication. No fault code indicated. ⇒ Recovered. Fault code indicated. ⇒ Check the next step.

<table>
<tr><td>Fault code No.</td><td colspan="3">15</td></tr>
<tr><td>Symptom</td><td colspan="3">Open or short circuit of throttle position sensor lead</td></tr>
<tr><td rowspan="2">Fail-safe action</td><td colspan="3">Engine startup: Possible under certain conditions</td></tr>
<tr><td colspan="3">Riding: Possible under certain conditions</td></tr>
<tr><td>Diagnostic monitoring code No.</td><td colspan="3">01</td></tr>
<tr><td>Meter display</td><td colspan="3">Display the throttle opening (between 0 and 125 degrees).
When throttle is fully closed: 14 to 20 degrees
When throttle is fully opened: 91 to 95 degrees</td></tr>
<tr><td>Checking method</td><td colspan="3">Check the values when the throttle is fully closed and opened.</td></tr>
<tr><td>Order</td><td>Item/components and probable cause</td><td>Check or maintenance job</td><td>Sensor inspection procedure</td></tr>
<tr><td rowspan="5">6</td><td rowspan="5">Supply voltage of throttle position sensor lead</td><td colspan="2">Check the supply voltage.
(Black/Blue–Yellow)
Refer to “CHECKING THE THROTTLE POSITION SENSOR” on page 8-167.</td><td rowspan="5">Repair/replace the wire harness, or replace the ECU (common to separate and integration models).</td></tr>
<tr><td>Line disconnection points</td><td>Output voltage</td></tr>
<tr><td>Disconnection of ground lead</td><td>5V</td></tr>
<tr><td>Disconnection of output line</td><td>0V</td></tr>
<tr><td>Disconnection of power supply line</td><td>0V</td></tr>
<tr><td>7</td><td>Throttle position sensor malfunction</td><td colspan="2">Check in the diagnostic mode (Code No. D01).
When throttle is fully closed: A value of 14–20 is indicated.
When throttle is fully opened: A value of 91–95 is indicated.
If the indication is outside of range: Replace the throttle position sensor.
Refer to “CHECKING THE THROTTLE POSITION SENSOR” on page 8-167.</td><td>Place the main switch to the ON position, and check the fault code indication.
No fault code indicated. ⇒ Recovered.
Fault code indicated. ⇒ Check the next step.</td></tr>
<tr><td>8</td><td>ECU malfunction</td><td colspan="2">Replace the ECU.</td><td></td></tr>
</table>

Fault code No.	**16**		
Symptom	**Open or short circuit of throttle position sensor lead**		
Fail-safe action	**Engine startup: Possible under certain conditions**		
	Riding: Possible under certain conditions		
Diagnostic monitoring code No.	**01**		
Meter display	**Display the throttle opening (between 0 and 125 degrees). When throttle is fully closed: 14 to 20 degrees When throttle is fully opened: 91 to 95 degrees**		
Checking method	**Check the values when the throttle is fully closed and opened.**		
Order	**Item/components and probable cause**	**Check or maintenance job**	**Sensor inspection procedure**
1	Sensor installation status	Check for loose mounting, pinched mounting, or hard mounting. Make sure that the mounting position is correct. Refer to “ADJUSTING THE THROTTLE POSITION SENSOR” on page 7-10.	Place the main switch to the ON position, and check the fault code indication. No fault code indicated. ⇒ Recovered. Fault code indicated. ⇒ Check the next step.
2	Throttle position sensor malfunction	Check in the diagnostic mode (Code No. D01). When throttle is fully closed: A value of 14–20 is indicated. When throttle is fully opened: A value of 91–95 is indicated. If the indication is outside of range: Replace the throttle position sensor. Refer to “CHECKING THE THROTTLE POSITION SENSOR” on page 8-167.	Place the main switch to the ON position, and check the fault code indication. No fault code indicated. ⇒ Recovered. Fault code indicated. ⇒ Check the next step.
3	ECU malfunction	Replace the ECU.	

Fault code No.	**19**		
Symptom	**Open or short circuit of ECU input line (Blue/Yellow lead)**		
Fail-safe action	**Engine startup: Impossible**		
	Riding: Impossible		
Diagnostic monitoring code No.	**20**		
Meter display	**Sidestand retracted: ON indication** **Sidestand extended: OFF indication**		
Checking method	**Make sure that the ON and OFF indication is switched when the sidestand is retracted and extended.**		
Order	**Item/components and probable cause**	**Check or maintenance job**	**Sensor inspection procedure**
1	Connection of sidestand switch coupler Check the connection of the coupler is secure. Remove the coupler, and check each pin (for bending, wear, or locking).	Poor connection ⇒ Connect it securely, or repair/replace the wire harness.	Place the main switch to the ON position, and check the fault code indication when the sidestand is retracted and extended. No fault code indicated. ⇒ Recovered. Fault code indicated. ⇒ Check the next step.
2	Connection of main harness ECU coupler Check the connection of the coupler is secure. Remove the coupler, and check each pin (for bending, wear, or locking).	Poor connection ⇒ Connect it securely, or repair/replace the wire harness.	Place the main switch to the ON position, and check the fault code indication when the sidestand is retracted and extended. No fault code indicated. ⇒ Recovered. Fault code indicated. ⇒ Check the next step.
3	Connection of main switch coupler Check the connection of the coupler is secure. Remove the coupler, and check each pin (for bending, wear, or locking).	Poor connection ⇒ Connect it securely, or repair/replace the wire harness.	Place the main switch to the ON position, and check the fault code indication when the sidestand is retracted and extended. No fault code indicated. ⇒ Recovered. Fault code indicated. ⇒ Check the next step.
4	Continuity of wire harness	Open or short circuit ⇒ Replace the wire harness. (Black–Black) (Blue/Black–Blue/Black)	Place the main switch to the ON position, and check the fault code indication when the sidestand is retracted and extended. No fault code indicated. ⇒ Recovered. Fault code indicated. ⇒ Check the next step.

Fault code No.	**19**		
Symptom	**Open or short circuit of ECU input line (Blue/Yellow lead)**		
Fail-safe action	**Engine startup: Impossible**		
	Riding: Impossible		
Diagnostic monitoring code No.	**20**		
Meter display	**Sidestand retracted: ON indication** **Sidestand extended: OFF indication**		
Checking method	**Make sure that the ON and OFF indication is switched when the sidestand is retracted and extended.**		
Order	**Item/components and probable cause**	**Check or maintenance job**	**Sensor inspection procedure**
5	Sidestand switch malfunction	Diagnostic mode (Code No. D20) Sidestand retracted: ON indication Sidestand extended: OFF indication Indication is incorrect. ⇒ Replace the sidestand switch. Refer to "CHECKING THE SWITCHES" on page 8-149.	Place the main switch to the ON position, and check the fault code indication when the sidestand is retracted and extended. No fault code indicated. ⇒ Recovered. Fault code indicated. ⇒ Check the next step.
6	ECU malfunction	Replace the ECU.	

Fault code No.	**21**		
Symptom	**Open or short circuit of coolant temperature sensor lead**		
Fail-safe action	**Engine startup: Possible**		
	Riding: Possible		
Diagnostic monitoring code No.	**06**		
Meter display	**-30 to 120°C** **During cold starting: A temperature close to the ambient temperature is indicated.** **During hot starting: The current coolant temperature is indicated.**		
Checking method	**Make sure that the meter indication is close to the ambient temperature during cold starting.**		
Order	**Item/components and probable cause**	**Check or maintenance job**	**Sensor inspection procedure**
1	Connection of coolant temperature sensor coupler Check the connection of the coupler is secure. Remove the coupler, and check each pin (for bending, wear, or locking).	Poor connection ⇒ Connect it securely, or repair/replace the wire harness.	Place the main switch to the ON position, and check the fault code indication. No fault code indicated. ⇒ Recovered. Fault code indicated. ⇒ Check the next step.

Fault code No.	**21**		
Symptom	**Open or short circuit of coolant temperature sensor lead**		
Fail-safe action	**Engine startup: Possible**		
	Riding: Possible		
Diagnostic monitoring code No.	**06**		
Meter display	**-30 to 120°C** **During cold starting: A temperature close to the ambient temperature is indicated.** **During hot starting: The current coolant temperature is indicated.**		
Checking method	**Make sure that the meter indication is close to the ambient temperature during cold starting.**		
Order	**Item/components and probable cause**	**Check or maintenance job**	**Sensor inspection procedure**
2	Connection of main harness ECU coupler Check the connection of the coupler is secure. Remove the coupler, and check each pin (for bending, wear, or locking).	Poor connection ⇒ Connect it securely, or repair/replace the wire harness.	Place the main switch to the ON position, and check the fault code indication. No fault code indicated. ⇒ Recovered. Fault code indicated. ⇒ Check the next step.
3	Continuity of wire harness	Open or short circuit ⇒ Replace the wire harness. Black/Blue–Black/Blue Green/White–Green/White	Place the main switch to the ON position, and check the fault code indication. No fault code indicated. ⇒ Recovered. Fault code indicated. ⇒ Check the next step.
4	Installation status of coolant temperature sensor	Check the mounting section for a loose or pinched mounting. Make sure that the mounting position is correct.	Place the main switch to the ON position, and check the fault code indication. No fault code indicated. ⇒ Recovered. Fault code indicated. ⇒ Check the next step.
5	Coolant temperature sensor malfunction	Check in the diagnostic mode (Code No. D06). During cold starting: A temperature close to the ambient temperature is indicated. Indication is incorrect. ⇒ Replace the coolant temperature sensor. Refer to “CHECKING THE COOLANT TEMPERATURE SENSOR” on page 8-166.	Place the main switch to the ON position, and check the fault code indication. No fault code indicated. ⇒ Recovered. Fault code indicated. ⇒ Check the next step.
6	ECU malfunction	Replace the ECU.	

*Check the sensor only when the engine is cold.

Fault code No.	**22**		
Symptom	**Open or short circuit of intake air temperature sensor lead**		
Fail-safe action	**Engine startup: Possible**		
	Riding: Possible		
Diagnostic monitoring code No.	**05**		
Meter display	**-30 to 120°C During cold starting: A temperature close to the ambient temperature is indicated. During hot starting: Ambient temperature plus Approx. 20°C (Offset of radiation heat)**		
Checking method	**Make sure that the meter indication is close to the ambient temperature during cold starting.**		
Order	**Item/components and probable cause**	**Check or maintenance job**	**Sensor inspection procedure**
1	Connection of intake air temperature sensor coupler Check the connection of the coupler is secure. Remove the coupler, and check each pin (for bending, wear, or locking).	Poor connection ⇒ Connect it securely, or repair/replace the wire harness.	Place the main switch to the ON position, and check the fault code indication. No fault code indicated. ⇒ Recovered. Fault code indicated. ⇒ Check the next step.
2	Connection of main harness ECU coupler Check the connection of the coupler is secure. Remove the coupler, and check each pin (for bending, wear, or locking).	Poor connection ⇒ Connect it securely, or repair/replace the wire harness.	Place the main switch to the ON position, and check the fault code indication. No fault code indicated. ⇒ Recovered. Fault code indicated. ⇒ Check the next step.
3	Continuity of wire harness	Open or short circuit ⇒ Replace the wire harness. Black/Blue–Black/Blue Brown/White–Brown/White	Place the main switch to the ON position, and check the fault code indication. No fault code indicated. ⇒ Recovered. Fault code indicated. ⇒ Check the next step.
4	Installation status of intake air temperature sensor	Check the mounting section for a loose or pinched mounting. Make sure that the mounting position is correct.	Place the main switch to the ON position, and check the fault code indication. No fault code indicated. ⇒ Recovered. Fault code indicated. ⇒ Check the next step.

Fault code No.	**22**		
Symptom	**Open or short circuit of intake air temperature sensor lead**		
Fail-safe action	**Engine startup: Possible**		
	Riding: Possible		
Diagnostic monitoring code No.	**05**		
Meter display	**-30 to 120°C** **During cold starting: A temperature close to the ambient temperature is indicated.** **During hot starting: Ambient temperature plus Approx. 20°C (Offset of radiation heat)**		
Checking method	**Make sure that the meter indication is close to the ambient temperature during cold starting.**		
Order	**Item/components and probable cause**	**Check or maintenance job**	**Sensor inspection procedure**
5	Intake air temperature sensor malfunction	Check in the diagnostic mode (Code No. D05). During cold starting: A temperature close to the ambient temperature is indicated. Indication is incorrect. ⇒ Replace the intake air temperature sensor. Refer to “CHECKING THE INTAKE AIR TEMPERATURE SENSOR” on page 8-168.	Place the main switch to the ON position, and check the fault code indication. No fault code indicated. ⇒ Recovered. Fault code indicated. ⇒ Check the next step.
6	ECU malfunction.	Replace the ECU.	

Fault code No.	**24**		
Symptom	**The O_2 sensor does not operate.**		
Fail-safe action	**Engine startup: Possible**		
	Riding: Possible		
Diagnostic monitoring code No.	**—**		
Meter display	**—**		
Checking method	**—**		
Order	**Item/components and probable cause**	**Check or maintenance job**	**Sensor inspection procedure**
1	O_2 sensor installation status	Check the sensor for a loose mounting or a pinch.	Either start and warm up the engine, and then racing it, or reset it with diagnostic code D63.
2	Connection of O_2 sensor coupler Check the connection of the coupler is secure. Remove the coupler, and check each pin (for bending, wear, or locking).	Poor connection ⇒ Connect it securely, or repair/replace the wire harness.	
3	Connection of main harness ECU coupler Check the connection of the coupler is secure. Remove the coupler, and check each pin (for bending, wear, or locking).	Poor connection ⇒ Connect it securely, or repair/replace the wire harness.	
4	Continuity of wire harness	Open or short circuit ⇒ Connect it securely, or repair/replace the wire harness. Black/Blue–Black/Blue Gray/Green–Gray/Green Red/White–Red/White Pink/Black–Pink/Black	
5	Check the fuel pressure.	Refer to “CHECKING THE FUEL PRESSURE” on page 7-9.	
6	O_2 sensor malfunction	Check the O_2 sensor for an abnormality. Refer to “ENGINE REMOVAL” on page 5-1. O_2 sensor malfunction ⇒ Replace the O_2 sensor.	
7	ECU malfunction	Replace the ECU.	

Fault code No.	**30**		
Symptom	**Turnover of vehicle**		
Fail-safe action	**Engine startup: Impossible**		
	Riding: Impossible		
Diagnostic monitoring code No.	**08**		
Meter display	**The lean angle sensor value is indicated.** **0 to 5.0 V** **The vehicle is in a vertical position: 0.4–1.4 V** **The vehicle is turned over: 3.7–4.4 V**		
Checking method	**Remove the lean angle sensor, tilt the vehicle more than 65 degrees, and check the meter indication value.**		
Order	**Item/components and probable cause**	**Check or maintenance job**	**Sensor inspection procedure**
1	Turnover of vehicle	Raise the vehicle to the upright position.	Place the main switch to the ON position. (however, the engine cannot be restarted unless the main switch is first turned OFF)
2	Sensor installation status	Check for a loose mounting, pinched mounting, or hard mounting. Make sure that the mounting position is correct.	
3	Lean angle sensor malfunction	Diagnostic mode (Code No. D08) In vertical position: 0.4–1.4 V When turned over: 3.7–4.4 V Indication is incorrect. ⇒ Replace the lean angle sensor. Refer to “CHECKING THE LEAN ANGLE SENSOR” on page 8-162.	
4	ECU malfunction	Replace the ECU.	

Fault code No.	**33**		
Symptom	**Ignition coil primary lead malfunction**		
Fail-safe action	**Engine startup: Possible (depending on the number of failed cylinders)**		
	Riding: Possible (depending on the number of failed cylinders)		
Diagnostic monitoring code No.	**30**		
Meter display	**Each ignition coil turns On or Off 5 times per second. The engine warning light flashes according to the On/Off switching.**		
Checking method	**Make sure that the engine warning light flashes according to the On/Off switching of ignition coil.**		
Order	**Item/components and probable cause**	**Check or maintenance job**	**Sensor inspection procedure**
1	Connection of ignition coil coupler Check the connection of the coupler is secure. Remove the coupler, and check each pin (for bending, wear, or locking).	Poor connection ⇒ Connect it securely or replace the wire harness.	Start and idle the engine for approximately 5 seconds. Then, check the fault code indication. No fault code indicated. ⇒ Recovered. Fault code indicated. ⇒ Check the next step.
2	Connection of main harness ECU coupler Check the connection of the coupler is secure. Remove the coupler, and check each pin (for bending, wear, or locking).	Poor connection ⇒ Connect it securely or replace the wire harness.	Start and idle the engine for approximately 5 seconds. Then, check the fault code indication. No fault code indicated. ⇒ Recovered. Fault code indicated. ⇒ Check the next step.
3	Continuity of wire harness	Open or short circuit ⇒ Replace the wire harness. Orange/Black–Orange/Black Gray/Black–Gray/Black Red/Black–Red/Black	Start and idle the engine for approximately 5 seconds. Then, check the fault code indication. No fault code indicated. ⇒ Recovered. Fault code indicated. ⇒ Check the next step.
4	Ignition coil installation status	Check the mounting section for a loose or pinched mounting. Make sure that the mounting position is correct.	Start and idle the engine for approximately 5 seconds. Then, check the fault code indication. No fault code indicated. ⇒ Recovered. Fault code indicated. ⇒ Check the next step.

Fault code No.	**33**		
Symptom	**Ignition coil primary lead malfunction**		
Fail-safe action	**Engine startup: Possible (depending on the number of failed cylinders)**		
	Riding: Possible (depending on the number of failed cylinders)		
Diagnostic monitoring code No.	**30**		
Meter display	**Each ignition coil turns On or Off 5 times per second. The engine warning light flashes according to the On/Off switching.**		
Checking method	**Make sure that the engine warning light flashes according to the On/Off switching of ignition coil.**		
Order	**Item/components and probable cause**	**Check or maintenance job**	**Sensor inspection procedure**
5	Ignition coil malfunction (Check the resistance of primary coil.)	Replace if defective. Refer to “CHECKING THE IGNITION COIL” on page 8-160.	Start and idle the engine for approximately 5 seconds. Then, check the fault code indication. No fault code indicated. ⇒ Recovered. Fault code indicated. ⇒ Check the next step.
6	ECU malfunction	Check in the diagnostic mode (Code No. D30). If not ignited, replace the defective ECU.	

Fault code No.	**34**		
Symptom	**Ignition coil primary lead malfunction**		
Fail-safe action	**Engine startup: Possible (depending on the number of failed cylinders)**		
	Riding: Possible (depending on the number of failed cylinders)		
Diagnostic monitoring code No.	**31**		
Meter display	**Each ignition coil turns On or Off 5 times per second. The engine warning light flashes according to the On/Off switching.**		
Checking method	**Make sure that the engine warning light flashes according to the On/Off switching of ignition coil.**		
Order	**Item/components and probable cause**	**Check or maintenance job**	**Sensor inspection procedure**
1	Connection of ignition coil coupler Check the connection of the coupler is secure. Remove the coupler, and check each pin (for bending, wear, or locking).	Poor connection ⇒ Connect it securely, or repair/replace the wire harness.	Start and idle the engine for approximately 5 seconds. Then, check the fault code indication. No fault code indicated. ⇒ Recovered. Fault code indicated. ⇒ Check the next step.
2	Connection of main harness ECU coupler Check the connection of the coupler is secure. Remove the coupler, and check each pin (for bending, wear, or locking).	Poor connection ⇒ Connect it securely, or repair/replace the wire harness.	Start and idle the engine for approximately 5 seconds. Then, check the fault code indication. No fault code indicated. ⇒ Recovered. Fault code indicated. ⇒ Check the next step.
3	Continuity of wire harness	Open or short circuit ⇒ Replace the wire harness. Orange/Black–Orange/Black Gray/Black–Gray/Black Red/Black–Red/Black	Start and idle the engine for approximately 5 seconds. Then, check the fault code indication. No fault code indicated. ⇒ Recovered. Fault code indicated. ⇒ Check the next step.
4	Ignition coil installation status	Check the connection of the coupler is secure. Make sure that the mounting position is correct.	Start and idle the engine for approximately 5 seconds. Then, check the fault code indication. No fault code indicated. ⇒ Recovered. Fault code indicated. ⇒ Check the next step.

Fault code No.	**34**		
Symptom	**Ignition coil primary lead malfunction**		
Fail-safe action	**Engine startup: Possible (depending on the number of failed cylinders)**		
	Riding: Possible (depending on the number of failed cylinders)		
Diagnostic monitoring code No.	**31**		
Meter display	**Each ignition coil turns On or Off 5 times per second. The engine warning light flashes according to the On/Off switching.**		
Checking method	**Make sure that the engine warning light flashes according to the On/Off switching of ignition coil.**		
Order	**Item/components and probable cause**	**Check or maintenance job**	**Sensor inspection procedure**
5	Ignition coil malfunction (Check the resistance of primary coil.)	Replace if defective. Refer to “CHECKING THE IGNITION COIL” on page 8-160.	Start and idle the engine for approximately 5 seconds. Then, check the fault code indication. No fault code indicated. ⇒ Recovered. Fault code indicated. ⇒ Check the next step.
6	ECU malfunction	Check in the diagnostic mode (Code No. D31). If not ignited, replace the defective ECU.	

Fault code No.	**41**		
Symptom	**Open or short circuit of lean angle sensor lead**		
Fail-safe action	**Engine startup: Impossible**		
	Riding: Impossible		
Diagnostic monitoring code No.	**08**		
Meter display	**The lean angle sensor value is indicated.** **0 to 5.0 V** **The vehicle is in a vertical position: 0.4–1.4 V** **The vehicle is turned over: 3.7–4.4 V**		
Checking method	**Remove the lean angle sensor, tilt the vehicle more than 65 degrees, and check the meter indication value.**		
Order	**Item/components and probable cause**	**Check or maintenance job**	**Sensor inspection procedure**
1	Connection of lean angle sensor coupler Check the connection of the coupler is secure. Remove the coupler, and check each pin (for bending, wear, or locking).	Poor connection ⇒ Connect it securely, or repair/replace the wire harness.	Rotate the main switch to the OFF position first, and then rotate it to the ON position again. Then, check the fault code indication. No fault code indicated. ⇒ Recovered. Fault code indicated. ⇒ Check the next step.
2	Connection of main harness ECU coupler Check the connection of the coupler is secure. Remove the coupler, and check each pin (for bending, wear, or locking).	Poor connection ⇒ Connect it securely, or repair/replace the harness.	Rotate the main switch to the OFF position first, and then rotate it to the ON position again. Then, check the fault code indication. No fault code indicated. ⇒ Recovered. Fault code indicated. ⇒ Check the next step.
3	Continuity of wire harness	Open or short circuit ⇒ Replace the wire harness. Black/Blue–Black/Blue Yellow/Green–Yellow/Green Blue–Blue	Rotate the main switch to the OFF position first, and then rotate it to the ON position again. Then, check the fault code indication. No fault code indicated. ⇒ Recovered. Fault code indicated. ⇒ Check the next step.
4	Lean angle sensor malfunction	Refer to “CHECKING THE LEAN ANGLE SENSOR” on page 8-162.	Rotate the main switch to the OFF position first, and then rotate it to the ON position again. Then, check the fault code indication. No fault code indicated. ⇒ Recovered. Fault code indicated. ⇒ Check the next step.
5	ECU malfunction	Replace the ECU.	

Fault code No.	**42**	
Symptom	**A. Normal signals are not received from the speed sensor.**	
	B. Open or short circuit of neutral switch lead	
Fail-safe action	**Engine startup: Possible**	
	Riding: Possible	
Diagnostic monitoring code No.	**07 (Speed sensor)** **21**	
Meter display	**Vehicle speed pulses: 0–999**	
Checking method	**Make sure that the indication value increases when the rotation speed of the rear wheel increases. This value is cumulative and is not reset each time the wheel is prevented from rotating.**	
Order	**Checkpoints**	**Inspection method**
	Locate the malfunction.	Check in the diagnostic mode (Code No. D07). Rotate the rear wheel and make sure that the indication value increases. Malfunction ⇒ Go to the “Speed sensor system malfunction” section below. Check in the diagnostic mode (Code No. D21). When the gear is in neutral position: ON indication When the gear is not in neutral position: OFF indication Malfunction ⇒ Go to the “Neutral switch system malfunction” section below.

A. Speed sensor system malfunction

Order	Item/components and probable cause	Check or maintenance job	Sensor inspection procedure
1	Connection of speed sensor (meter) coupler Check the connection of the coupler is secure. Remove the coupler, and check each pin (for bending, wear, or locking).	Poor connection ⇒ Connect it securely, or repair/replace the wire harness.	Start the engine, and check the connection of the coupler is secure. Ride on the vehicle at a low speed (approx. 20–30 km/h).
2	Connection of main harness ECU coupler Check the connection of the coupler is secure. Remove the coupler, and check each pin (for bending, wear, or locking).	Poor connection ⇒ Connect it securely, or repair/replace the wire harness.	
3	Continuity of speed sensor leads Continuity of wire harness	Open or short circuit ⇒ Replace the sensor. Black/Blue–Black/Blue Blue-Blue White/Yellow–White/Yellow	
4	Speed sensor malfunction	Replace the speed sensor. Refer to “CHECKING THE SPEED SENSOR” on page 8-166.	
5	ECU malfunction	Replace the ECU.	

B. Neutral switch system malfunction

Order	Item/components and probable cause	Check or maintenance job	Sensor inspection procedure
1	Connection of neutral switch coupler Check the connection of the coupler is secure. Remove the coupler, and check each pin (for bending, wear, or locking).	Poor connection ⇒ Reconnect or repair the coupler.	Start the engine, and check the secure connection of the coupler. Ride the vehicle at a low speed (approx. 20–30 km/h).
2	Connection of wire harness ECU coupler Check the connection of the coupler is secure. Remove the coupler, and check each pin (for bending, wear, or locking).	Poor connection ⇒ Reconnect or repair the coupler.	
3	Continuity of wire harness	Open or short circuit ⇒ Replace the wire harness. White/Red Black/Blue	
4	Continuity of leads between neutral switch and relay unit coupler	Open or short circuit ⇒ Replace the neutral switch. Sky blue–Sky blue	
5	Neutral switch malfunction	Replace the neutral switch. Refer to “CHECKING THE SWITCHES” on page 8-149.	
6	Shift drum (that detects the neutral position) malfunction	Check the gear shift drum (that detects the neutral position). Refer to “CHECKING THE SHIFT DRUM ASSEMBLY” on page 5-81. Malfunction ⇒ Replace the shift drum.	
7	ECU malfunction	Replace the ECU.	

Fault code No.	**43**		
Symptom	**Incorrect voltage supplied to the fuel injector and fuel pump**		
Fail-safe action	**Engine startup: Possible**		
	Riding: Possible		
Diagnostic monitoring code No.	**50**		
Meter display	**The relay turns On or Off 5 times per second. The engine warning light flashes according to the On/Off switching.**		
Checking method	**Make sure that the engine warning light flashes according to the On/Off switching of the relay.**		
Order	**Item/components and probable cause**	**Check or maintenance job**	**Sensor inspection procedure**
1	Connection of relay unit coupler Check the connection of the coupler is secure. Remove the coupler, and check each pin (for bending, wear, or locking).	Poor connection ⇒ Connect it securely, or repair/replace the wire harness.	Start and idle the engine for approximately 5 seconds.
2	Connection of fuel pump coupler Check the connection of the coupler is secure. Remove the coupler, and check each pin (for bending, wear, or locking).	Poor connection ⇒ Connect it securely, or repair/replace the wire harness.	
3	Connection of fuel injector coupler Check the connection of the coupler is secure. Remove the coupler, and check each pin (for bending, wear, or locking).	Poor connection ⇒ Connect it securely, or repair/replace the wire harness.	
4	Connection of main harness ECU coupler Check the connection of the coupler is secure. Remove the coupler, and check each pin (for bending, wear, or locking).	Poor connection ⇒ Connect it securely, or repair/replace the wire harness.	
5	Continuity of wire harness between the battery and ECU coupler	Open or short circuit ⇒ Replace the wire harness. Red–Red Red/Blue–Red/Blue	
6	Fuel injection system relay malfunction	Check in the diagnostic mode (Code No. D50). No operation sound of fuel injection system relay is heard. ⇒ Replace the relay unit. Refer to “CHECKING THE RELAYS” on page 8-157.	
7	ECU malfunction	Replace the ECU.	

Fault code No.	**44**		
Symptom	**An error is detected while reading or writing on EEP-ROM**		
Fail-safe action	**Engine startup: Possible**		
	Riding: Possible		
Diagnostic monitoring code No.	**60**		
Meter display	**The in self diagnostic code 44 detected EEP-ROM errors are indicated. If there are multiple errors, they are indicated in 2 seconds intervals 00 indication: Normal status 01 indication: CO concentration adjusted for cylinders #1 and #4 02 indication: CO concentration adjusted for cylinders #2 and #3**		
Checking method	**—**		
Order	**Item/components and probable cause**	**Check or maintenance job**	**Sensor inspection procedure**
1	Locate the malfunction.	Diagnostic mode (Code No. D60) 00 indication: Normal status 01 indication: CO concentration adjusted for cylinders #1 and #4 02 indication: CO concentration adjusted for cylinders #2 and #3	—
2	“01” is indicated in Diagnostic mode (Code No. D60) EEP-ROM data error for adjustment of CO concentration of cylinders #1 and #4	Change the CO concentration of cylinders #1 and #4, and rewrite in EEP-ROM. Refer to “ADJUSTING THE EXHAUST GAS VOLUME” on page 8-80. After this adjustment is made, the memory is not recovered when the main switch is turned OFF and ON again. ⇒ Replace the ECU.	Place the main switch to the ON position. Then, check the fault code indication. No fault code indicated. ⇒ Recovered. Fault code indicated. ⇒ Check the next step.
3	“02” is indicated in Diagnostic mode (Code No. D60) EEP-ROM data error for adjustment of CO concentration of cylinders #2 and #3	Change the CO concentration of cylinders #2 and #3, and rewrite in EEP-ROM. Refer to “ADJUSTING THE EXHAUST GAS VOLUME” on page 8-80. After this adjustment is made, the memory is not recovered when the main switch is turned OFF and ON again. ⇒ Replace the ECU.	Place the main switch to the ON position. Then, check the fault code indication. No fault code indicated. ⇒ Recovered. Fault code indicated. ⇒ Check the next step.

Fault code No.	**46**		
Symptom	**Incorrect voltage is supplied to the ECU.**		
Fail-safe action	**Engine startup: Possible**		
	Riding: Possible		
Diagnostic monitoring code No.	**—**		
Meter display	**—**		
Checking method	**—**		
Order	**Item/components and probable cause**	**Check or maintenance job**	**Sensor inspection procedure**
1	Connection of ECU coupler Check the connection of the coupler is secure. Remove the coupler, and check each pin (for bending, wear, or locking).	Poor connection ⇒ Connect it securely, or repair/replace the wire harness.	Start and idle the engine for approximately 5 seconds. Then, check the fault code indication. No fault code indicated. ⇒ Recovered. Fault code indicated. ⇒ Check the next step.
2	Continuity of wire harness	Open or short circuit ⇒ Replace the wire harness. Between the battery and main switch (Red–Red) Between the main switch and ignition fuse (Brown/Blue–Brown/Blue) Between the ignition fuse and ECU (Red/White–Red/White)	Start and idle the engine for approximately 5 seconds. Then, check the fault code indication. No fault code indicated. ⇒ Recovered. Fault code indicated. ⇒ Check the next step.
3	Battery malfunction	Check the battery voltage. Refer to “CHECKING AND CHARGING THE BATTERY” on page 8-154. Battery malfunction ⇒ Recharge or replace the battery.	Start and idle the engine for approximately 5 seconds. Then, check the fault code indication. No fault code indicated. ⇒ Recovered. Fault code indicated. ⇒ Check the next step.
4	Stator coil malfunction	Check the stator coil output. Refer to “CHARGING SYSTEM” on page 8-15. Stator coil malfunction ⇒ Replace the stator coil.	Start and idle the engine for approximately 5 seconds. Then, check the fault code indication. No fault code indicated. ⇒ Recovered. Fault code indicated. ⇒ Check the next step.
5	ECU malfunction	Replace the ECU.	

Fault code No.	**50**		
Symptom	**ECU memory malfunction**		
Fail-safe action	**Engine startup: Possible under certain conditions**		
	Riding: Possible under certain conditions		
Diagnostic monitoring code No.	**—**		
Meter display	**—**		
Checking method	**—**		
Order	**Item/components and probable cause**	**Check or maintenance job**	**Sensor inspection procedure**
1	ECU malfunction	Replace the ECU.	Place the main switch to the ON position. Then, check that no fault code indicated.

Fault code No.	**70**	
Symptom	**Engine idling stop:engine has been left idling.(The ECU automatically stops the engine after 20 minutes if it is left idling.)**	
Fail-safe action	**Able to start engine**	
	Able to drive vehicle	
Diagnostic monitoring code No.	**—**	
Meter display	**—**	
Checking method	**—**	
probable cause of malfunction		**Check or maintenance job**
1	**—**	**—**
Reintatement method	**—**	

Fault code No.	**Er-1**		
Symptom	**No signal is received from the ECU.**		
Fail-safe action	**Engine startup: Impossible**		
	Riding: Impossible		
Diagnostic monitoring code No.	**—**		
Meter display	**—**		
Checking method	**—**		
Order	**Item/components and probable cause**	**Check or maintenance job**	**Sensor inspection procedure**
1	Connection of meter coupler Check the connection of the coupler is secure. Remove the coupler, and check each pin (for bending, wear, or locking).	Poor connection ⇒ Connect it securely, or repair/replace the wire harness.	Place the main switch to the ON position.
2	Connection of main harness ECU coupler Check the connection of the coupler is secure. Remove the coupler, and check each pin (for bending, wear, or locking).	Poor connection ⇒ Connect it securely, or repair/replace the wire harness.	
3	Continuity of wire harness	Open or short circuit ⇒ Connect it securely, or repair/replace the wire harness. Yellow/Blue–Yellow/Blue	
4	Abnormal meter unit operation	Replace the meter unit.	
5	ECU malfunction	Replace the ECU.	

Fault code No.	**Er-2**		
Symptom	**No signal is sent from ECU.**		
Fail-safe action	**Engine startup: Impossible**		
	Riding: Impossible		
Diagnostic monitoring code No.	**—**		
Meter display	**—**		
Checking method	**—**		
Order	**Item/components and probable cause**	**Check or maintenance job**	**Sensor inspection procedure**
1	Connection of meter coupler Check the connection of the coupler is secure. Remove the coupler, and check each pin (for bending, wear, or locking).	Poor connection ⇒ Connect it securely, or repair/replace the wire harness.	Place the main switch to the ON position.
2	Connection of main harness ECU coupler Check the connection of the coupler is secure. Remove the coupler, and check each pin (for bending, wear, or locking).	Poor connection ⇒ Connect it securely, or repair/replace the wire harness.	
3	Continuity of wire harness	Open or short circuit ⇒ Connect it securely, or repair/replace the wire harness. Yellow/Blue–Yellow/Blue	
4	Abnormal meter unit operation	Replace the meter unit.	
5	ECU malfunction	Replace the ECU.	

Fault code No.	**Er-3**		
Symptom	**Correct data cannot be received from the ECU.**		
Fail-safe action	**Engine startup: Impossible**		
	Riding: Impossible		
Diagnostic monitoring code No.	**—**		
Meter display	**—**		
Checking method	**—**		
Order	**Item/components and probable cause**	**Check or maintenance job**	**Sensor inspection procedure**
1	Connection of meter coupler Check the connection of the coupler is secure. Remove the coupler, and check each pin (for bending, wear, or locking).	Poor connection ⇒ Connect it securely, or repair/replace the wire harness.	Place the main switch to the ON position.
2	Connection of main harness ECU coupler Check the connection of the coupler is secure. Remove the coupler, and check each pin (for bending, wear, or locking).	Poor connection ⇒ Connect it securely, or repair/replace the wire harness.	
3	Continuity of wire harness	Open or short circuit ⇒ Connect it securely, or repair/replace the wire harness. Yellow/Blue–Yellow/Blue	
4	Abnormal meter unit operation	Replace the meter unit.	
5	ECU malfunction	Replace the ECU.	

Fault code No.	**Er-4**		
Symptom	**No registration data can be received from the meter unit.**		
Fail-safe action	**Engine startup: Impossible**		
	Riding: Impossible		
Diagnostic monitoring code No.	**—**		
Meter display	**—**		
Checking method	**—**		
Order	**Item/components and probable cause**	**Check or maintenance job**	**Sensor inspection procedure**
1	Connection of meter coupler Check the connection of the coupler is secure. Remove the coupler, and check each pin (for bending, wear, or locking).	Poor connection ⇒ Connect it securely, or repair/replace the wire harness.	Place the main switch to the ON position.
2	Connection of main harness ECU coupler Check the connection of the coupler is secure. Remove the coupler, and check each pin (for bending, wear, or locking).	Poor connection ⇒ Connect it securely, or repair/replace the wire harness.	
3	Continuity of wire harness	Open or short circuit ⇒ Connect it securely, or repair/replace the wire harness. Yellow/Blue–Yellow/Blue	
4	Abnormal meter unit operation	Replace the meter unit.	
5	ECU malfunction	Replace the ECU.	

EAS4S81002

ADJUSTING THE EXHAUST GAS VOLUME

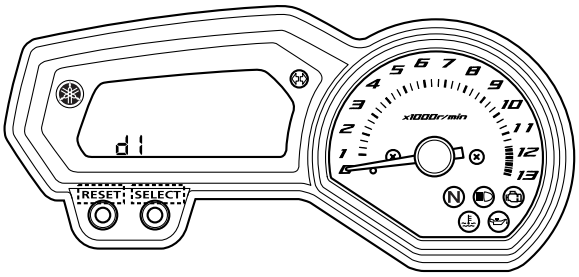
TIP

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

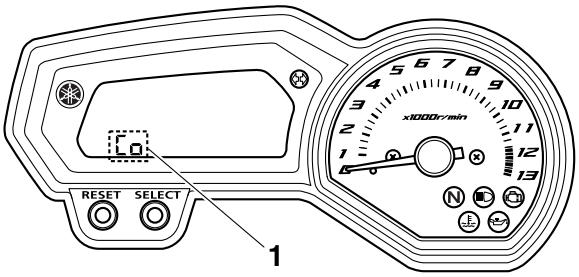
1. Turn the main switch to “OFF” and set the engine stop switch to “ON”.
2. Simultaneously press and hold the “SELECT” and “RESET” buttons, turn the main switch to “ON”, and continue to press the buttons for 8 seconds or more.

TIP

“dI” appears on the clock LCD.



3. Press the “SELECT” button to select the CO adjustment mode “Co” “1” or the diagnostic mode “dI”.

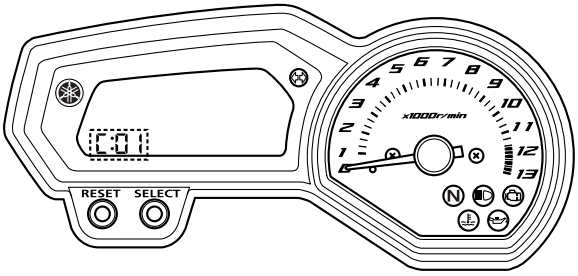


4. After selecting “Co”, simultaneously press the “SELECT” and “RESET” buttons for 2 seconds or more to execute the selection.

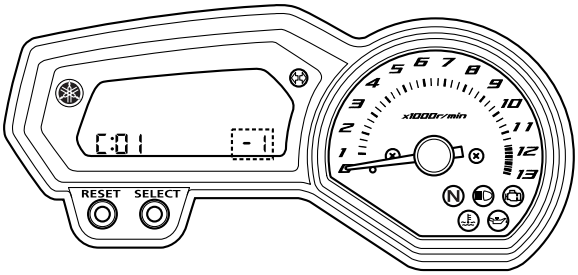
TIP

The selected cylinder number appears on the clock LCD.

- To decrease the selected cylinder number, press the “RESET” button.
- To increase the selected cylinder number, press the “SELECT” button.
- The cylinder number “01” indicate cylinder #1, #4 and the cylinder number cylinder number “02” indicate cylinder #2, #3.



5. After selecting the cylinder, simultaneously press the “SELECT” and “RESET” buttons for 2 seconds or more to execute the selection.
6. Change the CO adjustment volume by pressing the “SELECT” and “RESET” buttons.



TIP

The CO adjustment volume appears on the tripmeter LCD.

- To decrease the CO adjustment volume, press the “RESET” button.
- To increase the CO adjustment volume, press the “SELECT” button.

7. Release the switch to execute the selection.
8. Simultaneously press the “SELECT” and “RESET” buttons to return to the cylinder selection (step 5).
9. Turn the main switch to “OFF” to cancel the mode.

EAS20S18001

OTHER DIAGNOSTIC MONITORING CODES

This table shows diagnostic monitoring codes which are not linked to the fault code symptoms.

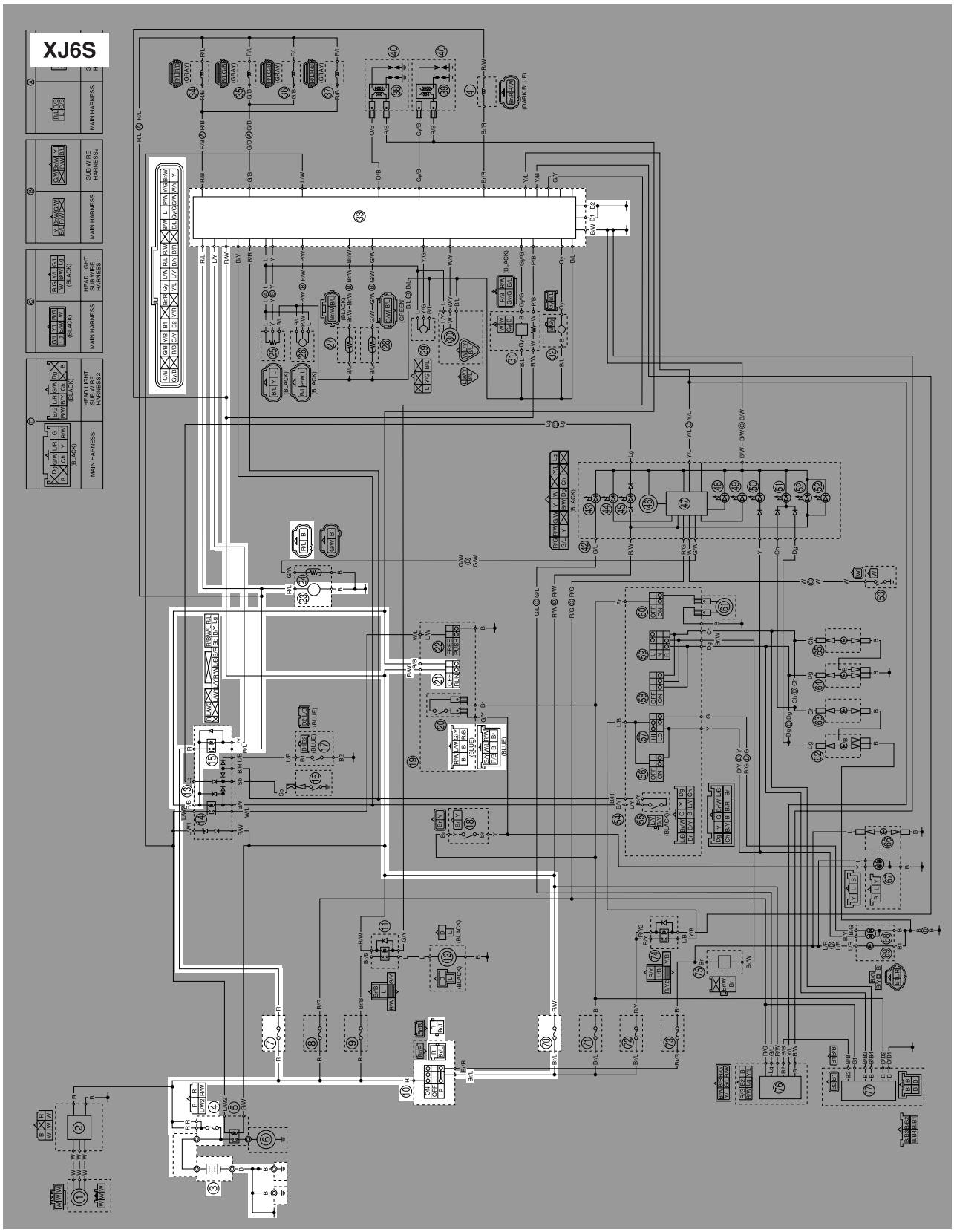
Diagnostic code table

Diagnostic code No.	Item	Meter display	Checking method
09	Fuel system voltage (battery voltage)	Approximately 12.0	Compare with the actually measured battery voltage. (If the battery voltage is lower, perform recharging.)
36	Injector #1/#4	Actuates the injector #1/#4 for five times every second. Illuminates the engine trouble warning light.	Check the operating sound of the injector #1/#4 five times.
37	Injector #2/#3	Actuates the injector #2/#3 for five times every second. Illuminates the engine trouble warning light.	Check the operating sound of the injector #2/#3 five times.
48	AI system solenoid	Actuates the AI system solenoid for five times every second. Illuminates the engine trouble warning light.	Check the operating sound of the AI system solenoid five times.
51	Radiator fan motor relay	Actuates the radiator fan motor relay for five cycles every five-second. (ON 2 seconds, OFF 3 seconds) Illuminates the engine trouble warning light.	Check the operating sound of the Radiator fan motor relay five times.
52	Headlight relay	Actuates the headlight relay for five times every five-second. (ON 2 seconds, OFF 3 seconds) Illuminates the engine trouble warning light.	Check the operating sound of the headlight relay five times.
61	Malfunction history code display • No history • History exists	 00 12-50 (Fault detection code) • (If code numbers more than one are detected, the display alternates every two seconds to show all the detected code numbers. When all code numbers are shown, the display repeats the same process.)	—
62	Malfunction history code erasure • No history • History exists	 00 00–17 (Memory numbers of the fault detection)	— To erase the history, turn ON the engine stop switch.

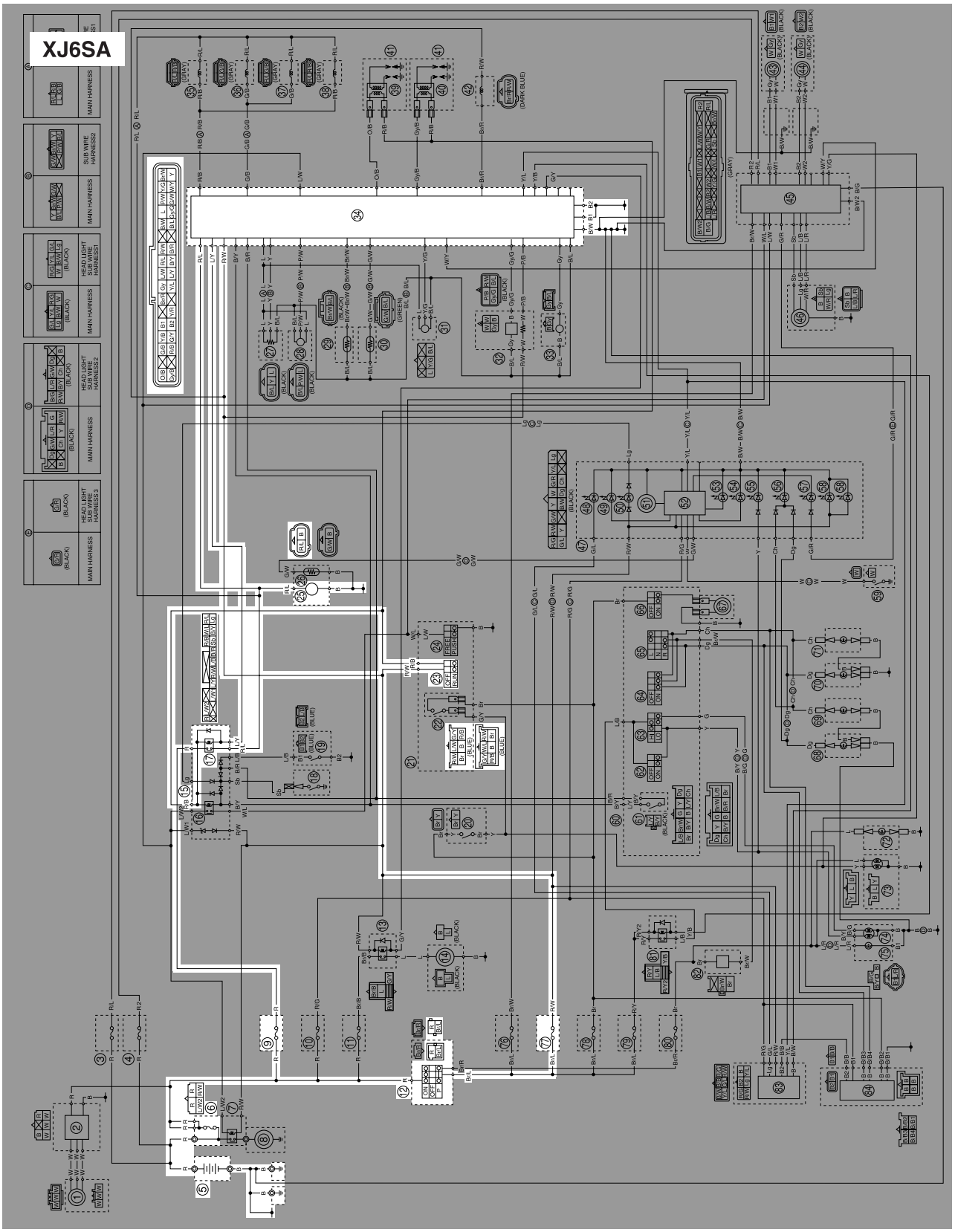
Diagnostic code No.	Item	Meter display	Checking method
63	Malfunction code reinstate • No malfunction code • Malfunction code exists	00 Fault code 24 • (If more than one code number is detected, the display changes every two seconds to show all the detected code numbers are shown, the display repeats.)	— To reinstate, set the engine stop switch to "○".

EAS27550
FUEL PUMP SYSTEM

EAS27560
CIRCUIT DIAGRAM



3. Battery
4. Main fuse
7. Fuel injection system fuse
10. Main switch
13. Relay unit
15. Fuel injection system relay
21. Engine stop switch
23. Fuel pump
33. ECU (engine control unit)
70. Ignition fuse


XJ6SA

5. Battery
6. Main fuse
9. Fuel injection system fuse
12. Main switch
15. Relay unit
17. Fuel injection system relay
23. Engine stop switch
25. Fuel pump
34. ECU (engine control unit)
77. Ignition fuse

EAS27570
TROUBLESHOOTING

If the fuel pump fails to operate.

TIP

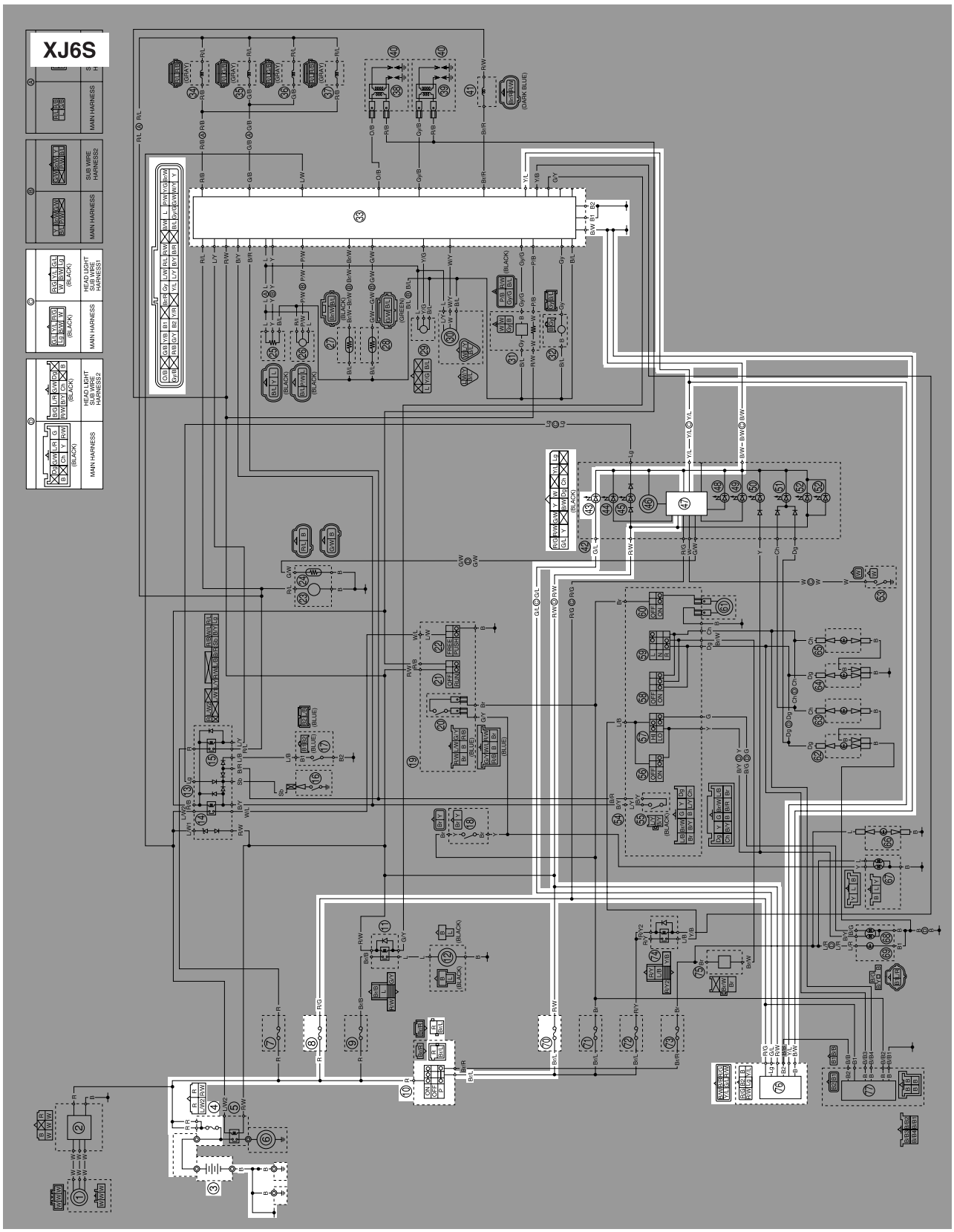
- Before troubleshooting, remove the following part(s):

1.Seat
2.Fuel tank

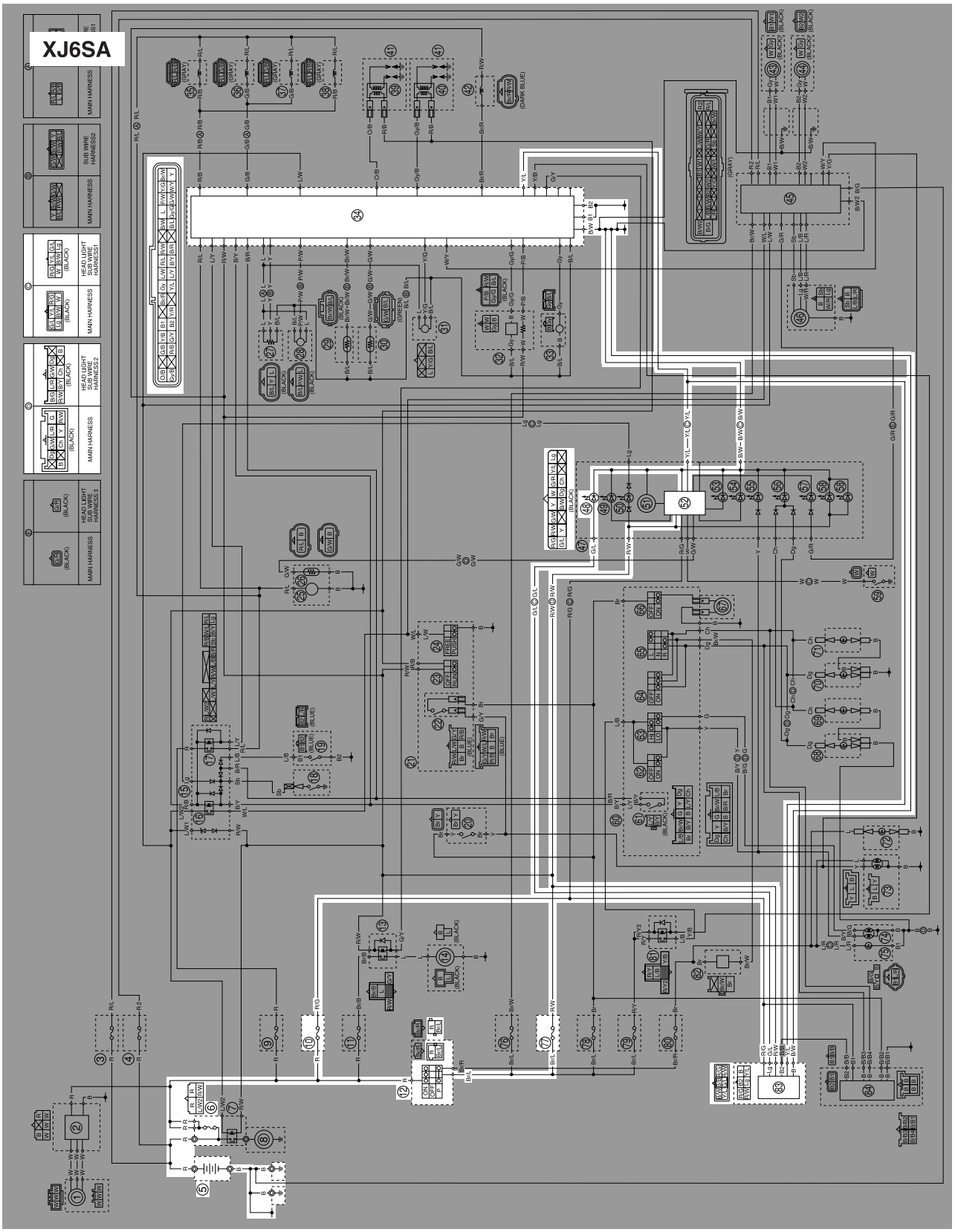
1. Check the fuses. (Main, ignition and fuel injection system) Refer to "CHECKING THE FUSES" on page 8-153.	NG→	Replace the fuse(s).
OK↓		
2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-154.	NG→	• Clean the battery terminals. • Recharge or replace the battery.
OK↓		
3. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 8-149.	NG→	Replace the main switch.
OK↓		
4. Check the engine stop switch. Refer to "CHECKING THE SWITCHES" on page 8-149.	NG→	Replace the right handlebar switch.
OK↓		
5. Check the fuel injection system relay. Refer to "CHECKING THE RELAYS" on page 8-157.	NG→	Replace the relay unit.
OK↓		
6. Check the fuel pump. Refer to "CHECKING THE FUEL PRESSURE" on page 7-9.	NG→	Replace the fuel pump.
OK↓		
7. Check the entire fuel pump system's wiring. Refer to "CIRCUIT DIAGRAM" on page 8-83.	NG→	Properly connect or repair the fuel pump system's wiring.
OK↓		
Replace the ECU.		

EAS27640
IMMOBILIZER SYSTEM

EAS27650
CIRCUIT DIAGRAM



3. Battery
4. Main fuse
8. Backup fuse (odometer, clock and immobilizer system)
10. Main switch
33. ECU (engine control unit)
43. Immobilizer system indicator light
47. Multi-function meter
70. Ignition fuse
76. Immobilizer unit


XJ6SA

5. Battery
6. Main fuse
10. Backup fuse (odometer, clock and immobilizer system)
12. Main switch
34. ECU (engine control unit)
48. Immobilizer system indicator light
52. Multi-function meter
77. Ignition fuse
83. Immobilizer unit

EAS27670
GENERAL INFORMATION
This vehicle is equipped with an immobilizer system to help prevent theft by re-registering codes in the standard keys. This system consists of the following:
- a code re-registering key (with a red bow)
- two standard keys (with a black bow) that can be re-registered with new codes
- a transponder (installed in the red key bow)
- an immobilizer unit
- an ECU (engine control unit)
- an immobilizer system indicator light

The key with the red bow is used to register codes in each standard key. Do not use the key with the red bow for driving. It should only be used for re-registering new codes in the standard keys. The immobilizer system cannot be operated with a new key until the key is registered with a code. If you lose the code re-registering key, the ECU (engine control unit) and main switch (equipped with the immobilizer unit) need to be replaced.
Therefore, always use a standard key for driving. (See notice below.)

TIP

Each standard key is registered during production, therefore re-registering at purchase is not necessary.

ECA4B51009

NOTICE

- **DO NOT LOSE THE CODE RE-REGISTERING KEY! If the code re-registering key is lost, registering new codes in the standard keys is impossible. The standard keys can still be used to start the vehicle. However, if code re-registering is required (e.g., if a new standard key is made or all keys are lost) the entire immobilizer system must be replaced. Therefore, it is highly recommended to use either standard key for driving, and to keep the code re-registering key in a safe place.**
- **Do not submerse the keys in water.**
- **Do not expose the keys to excessively high temperatures.**
- **Do not place the keys close to magnets (this includes, but is not limited to, products such as speakers, etc.).**
- **Do not place heavy items on the keys.**
- **Do not grind the keys or alter their shape.**
- **Do not disassemble the key bows.**
- **Do not put two keys of any immobilizer system on the same key ring.**
- **Keep the standard keys as well as other immobilizer system keys away from the code re-registering key.**
- **Keep other immobilizer system keys away from the main switch as they may cause signal interference.**

EAS27690
PART REPLACEMENT AND KEY CODE REGISTRATION REQUIREMENTS
In the course of use, you may encounter the following cases where replacement of parts and registration of code re-registering/standard keys are required.

TIP

Each standard key is registered during production, therefore re-registering at purchase is not necessary.

	Parts to be replaced					Key registration requirement
	Main switch/ immobilizer unit		Standard key	ECU	Accessory lock* and key	
	Main switch	Immobilizer unit				
Standard key is lost			√			New standard key
All keys have been lost (including code re-registering key)	√		√	√	√	Code re-registering key and standard keys
ECU (engine control unit) is defective				√		Code re-registering key and standard keys
Immobilizer unit is defective		√				Code re-registering key and standard keys
Main switch is defective	√		√	√	√	Code re-registering key and standard keys
Accessory lock* is defective					√	Not required

* Accessory locks mean the seat lock and fuel tank cap.

Code re-registering key registration:

When the immobilizer unit or ECU (engine control unit) is replaced, the code re-registering key must be registered to the unit.

To register a code re-registering key:

1. Turn the main switch to “ON” with the code re-registering key.

TIP

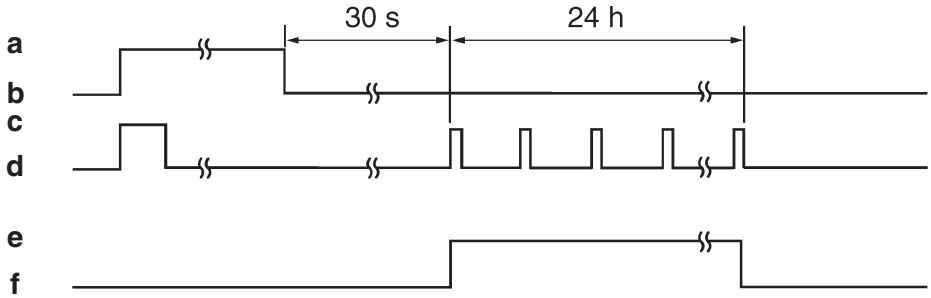
Check that the immobilizer system indicator light comes on for one second, then goes off. When the immobilizer system indicator light goes off, the code re-registering key has been registered.

2. Check that the engine can be started.
3. Register the standard key, following the instructions in the section below.

Standby mode:

To enable the immobilizer system, turn the ignition key to “OFF”. 30 seconds later, the indicator light will start flashing continuously in the standby flashing mode pattern for up to 24 hours. After that time, the indicator light will stop flashing, but the immobilizer system is still enabled.

Standby mode



a. Main switch “ON”
b. Main switch “OFF”
c. LED on
d. LED off
e. Standby mode on
f. Standby mode off

Standard key registration:
Standard key registration is required when a standard key is lost and needs to be replaced, or when the code re-registering key is re-registered after the immobilizer unit or ECU (engine control unit) are replaced.

TIP
Do not start the engine with a standard key that has not been registered. If the main switch is turned "ON" with a standard key that has not been registered, the immobilizer system indicator light flashes to indicate fault code "52". (Refer to "SELF-DIAGNOSIS FAULT CODE INDICATION" on page 8-96.)

1. Check that the immobilizer system indicator light signals the standby mode.
2. Using the code re-registering key, turn the main switch to "ON", then "OFF", and then remove the key within 5 seconds.
3. Insert the first standard key to be registered into the main switch, then turn the key to "ON" within 5 seconds to activate the key registration mode.

TIP
The existing standard key code is erased from the memory when the key registration mode is activated. When the key registration mode is activated, the immobilizer system indicator light flashes rapidly.

4. While the indicator light is flashing, turn the main switch to "OFF", remove the key, and within 5 seconds, insert the second standard key to be registered into the main switch.

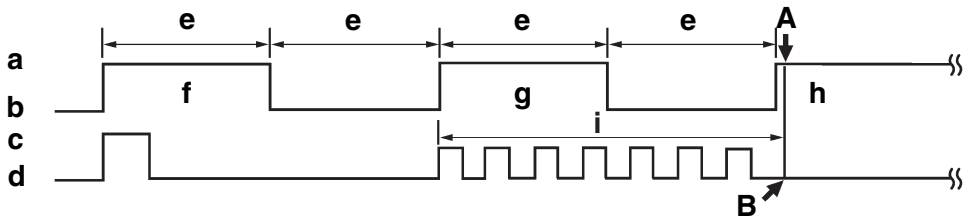
TIP
If the immobilizer system indicator light stops flashing 5 seconds after the first standard key is registered, the registration mode is deactivated. If this occurs, the second standard key cannot be registered, and steps 2 to 4 need to be repeated to register both standard keys.

5. Turn the main switch to "ON".

TIP
When the indicator light goes off, the registration is complete.

6. Check that the engine can be started with the two registered standard keys.

Standard key registration

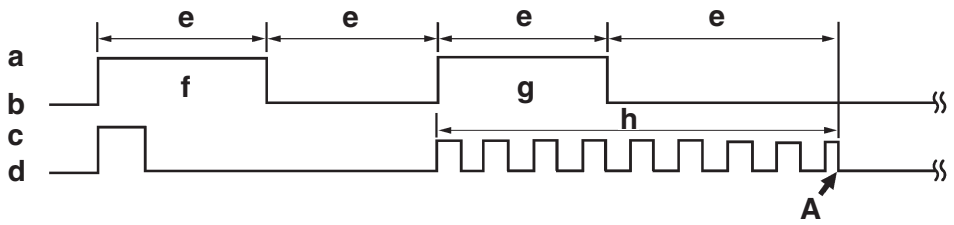


a. Main switch "ON"
b. Main switch "OFF"
c. LED on
d. LED off
e. Less than 5.0 s
f. Code re-registering key
g. First standard key
h. Second standard key
i. Registration mode

A. Registration of the second standard key is complete.
B. Immobilizer system indicator light stops flashing when the registration of the second standard key is complete.

Voiding the standard key code:
If a standard key has been lost, it is possible to disable its use by re-registering the remaining standard key. Standard key registration erases the stored standard key code from the memory, thus disabling the lost standard key. To re-register, refer to "Standard key registration".

Standard key code voiding method



a. Main switch “ON”
b. Main switch “OFF”
c. LED on
d. LED off
e. Less than 5.0 s
f. Code re-registering key
g. Remaining standard key
h. Registration mode

A. If the immobilizer system indicator light stops flashing 5 seconds after the first standard key is registered, the second standard key cannot be registered.

EAS27700

TROUBLESHOOTING

When the main switch is turned to “ON”, the immobilizer system indicator light does not come on nor flashes.

1. Check the fuses. (Main, ignition, backup, and ECU (engine control unit)) Refer to “CHECKING THE FUSES” on page 8-153.	NG→	Replace the fuse(s).
OK↓		
2. Check the battery. Refer to “CHECKING AND CHARGING THE BATTERY” on page 8-154.	NG→	• Clean the battery terminals. • Recharge or replace the battery.
OK↓		
3. Check the main switch. Refer to “CHECKING THE SWITCHES” on page 8-149.	NG→	Replace the main switch/immobilizer unit.
OK↓		
4. Check the entire immobilizer system wiring. Refer to “CIRCUIT DIAGRAM” on page 8-89.	NG→	Properly connect or repair the immobilizer system wiring.
OK↓		
• Check the condition of each immobilizer system circuit. • Refer to “SELF-DIAGNOSIS FAULT CODE INDICATION” on page 8-96.		

EAS27721

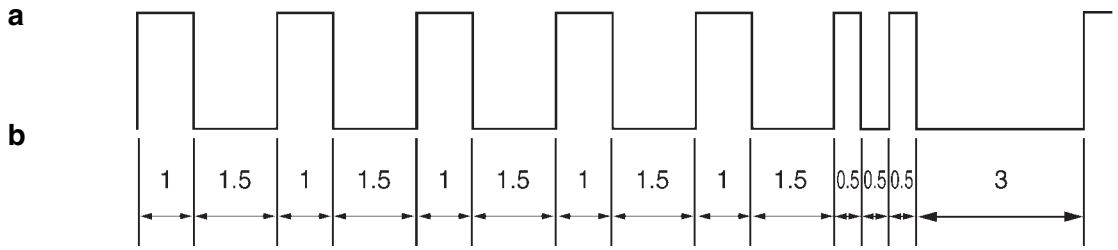
SELF-DIAGNOSIS FAULT CODE INDICATION

When a system malfunction occurs, the fault code number is indicated in the LCD display of the meter assembly and the immobilizer system indicator light flashes at the same time. The pattern of flashing also shows the fault code.

Fault code	Part	Symptom	Cause	Action
51	IMMOBILIZER UNIT	Code cannot be transmitted between the key and the immobilizer unit.	1.Radio wave interference caused by objects around the keys and antennas. 2.Immobilizer unit malfunction. 3.Key malfunction.	1.Keep magnets, metal objects, and other immobilizer system keys away from the keys and antennas. 2.Replace the main switch/immobilizer unit. 3.Replace the key.
52	IMMOBILIZER UNIT	Codes between the key and immobilizer unit do not match.	1.Signal received from other transponder (failed to recognize code after ten consecutive attempts). 2.Signal received from unregistered standard key.	1.Place the immobilizer unit at least 50 mm away from the transponder of other vehicles. 2.Register the standard key.
53	IMMOBILIZER UNIT	Codes cannot be transmitted between the ECU (engine control unit) and the immobilizer unit.	Noise interference or disconnected lead/cable. 1.Interference due to radio wave noise. 2.Disconnected communication harness. 3.Immobilizer unit malfunction. 4.ECU (engine control unit) malfunction.	1.Check the wire harness and connector. 2.Replace the main switch/immobilizer unit. 3.Replace the ECU (engine control unit).
54	IMMOBILIZER UNIT	Codes transmitted between the ECU (engine control unit) and the immobilizer unit do not match.	Noise interference or disconnected lead/cable. 1.Interference due to radio wave noise. 2.Disconnected communication harness. 3.Immobilizer unit malfunction. 4.ECU (engine control unit) failure. (The ECU (engine control unit) or immobilizer unit was replaced with a used unit from another vehicle.)	1.Register the code re-registering key. 2.Check the wire harness and connector. 3.Replace the main switch/immobilizer unit. 4.Replace the ECU (engine control unit).

Fault code	Part	Symptom	Cause	Action
55	IMMOBILIZER UNIT	Key code registration malfunction.	Same standard key was attempted to be registered two consecutive times.	Register another standard key.
56	ECU (engine control unit)	Unidentified code is received.	Noise interference or disconnected lead/ cable.	1.Check the wire harness and connector. 2.Replace the main switch/immobilizer unit. 3.Replace the ECU (engine control unit).

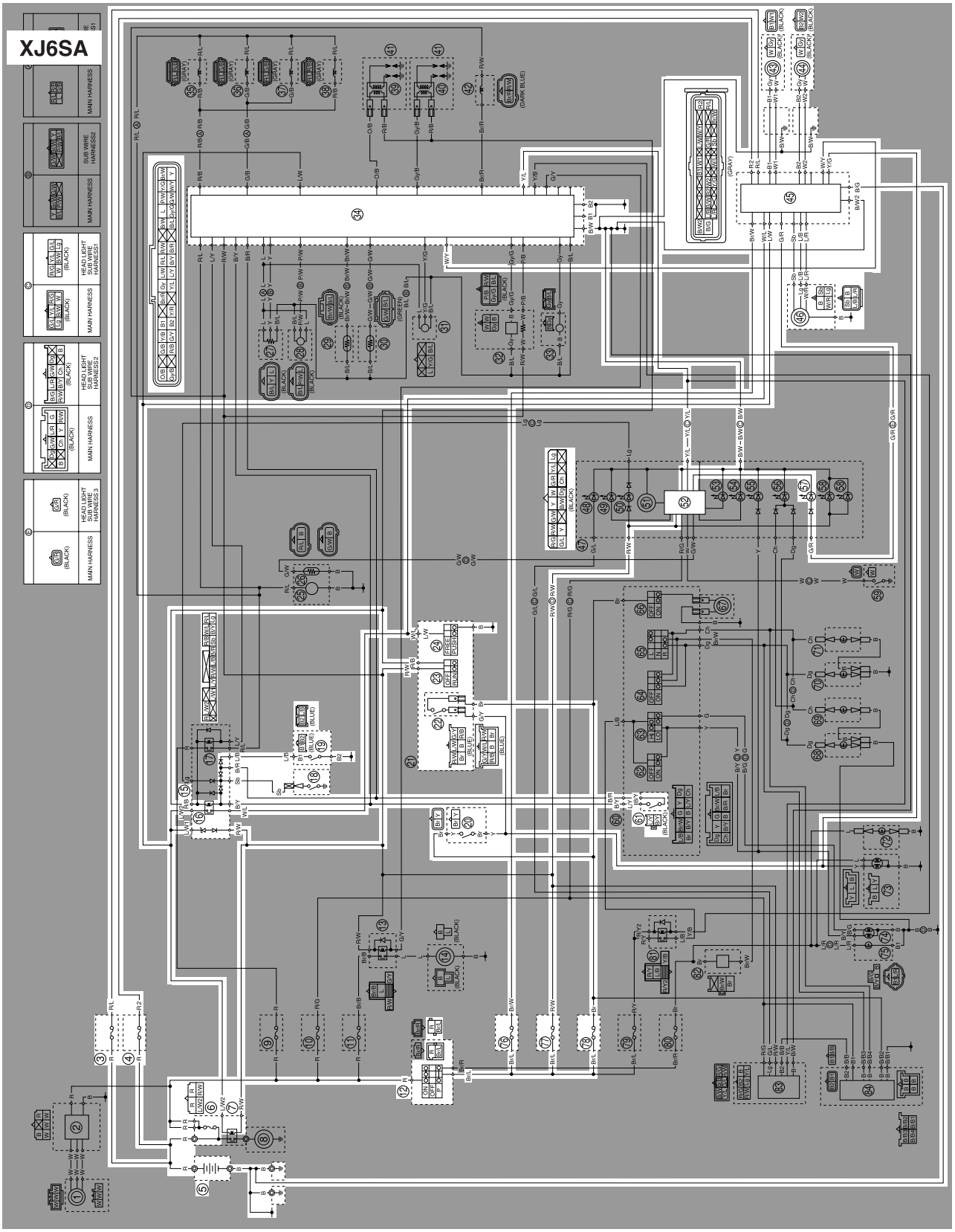
Immobilizer system indicator light fault code indication
Units of 10: Cycles of on for 1 second and off for 1.5 seconds.
Units of 1: Cycles of on for 0.5 second and off for 0.5 second.
Example: fault code 52



a. Light on
b. Light off

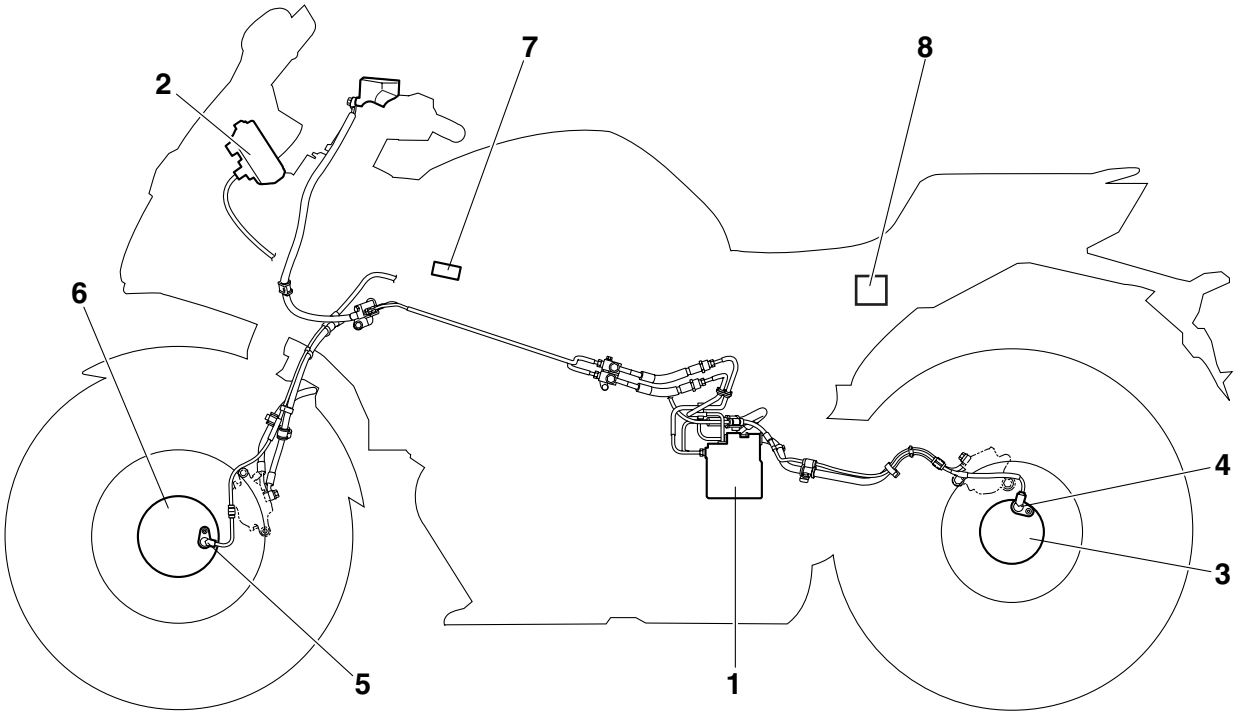
EAS28790
ABS (ANTI-LOCK BRAKE SYSTEM)

EAS27730
CIRCUIT DIAGRAM



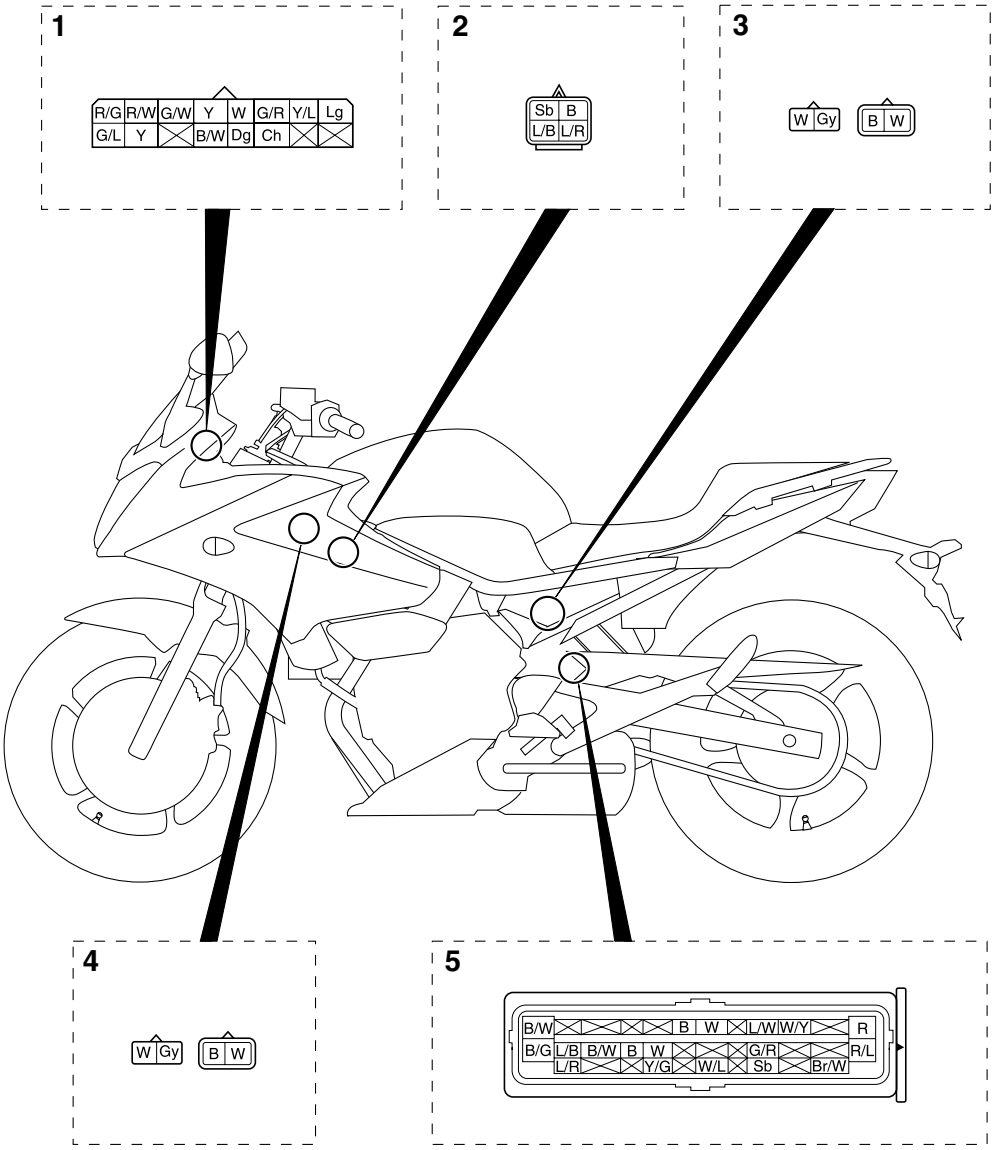
3. ABS motor fuse
4. ABS solenoid fuse
5. Battery
6. Main fuse
7. Starter relay
12. Main switch
15. Relay unit
16. Starting circuit cut-off relay
18. Neutral switch
19. Sidestand switch
20. Rear brake light switch
22. Front brake light switch
23. Engine stop switch
24. Start switch
34. ECU (engine control unit)
43. Front wheel sensor
44. Rear wheel sensor
45. ABS ECU (electronic control unit)
46. ABS test coupler
52. Multi-function meter
57. ABS warning light
61. Clutch switch
76. ABS ECU fuse
77. Ignition fuse
78. Signal fuse

EAS27740
ABS COMPONENTS CHART



1. Hydraulic unit assembly
2. ABS warning light
3. Rear wheel sensor rotor
4. Rear wheel sensor
5. Front wheel sensor
6. Front wheel sensor rotor
7. ABS test coupler
8. Fuse box

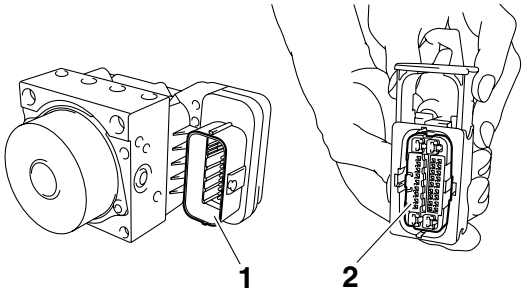
EAS27750
ABS COUPLER LOCATION CHART



1. Meter assembly coupler
2. ABS test coupler
3. Rear wheel sensor coupler
4. Front wheel sensor coupler
5. ABS ECU coupler

EAS27770
MAINTENANCE OF THE ABS ECU
Checking the ABS ECU
1. Check:
   - Terminals “1” of the ABS ECU
     Cracks/damages → Replace the hydraulic unit assembly and the brake pipes that are connected to the assembly as a set.
   - Terminals “2” of the ABS ECU coupler
     Connection defective, contaminated, come-off → Correct or clean.

TIP
If the ABS ECU coupler is clogged with mud or dirt, clean with compressed air.



EAS27790
ABS TROUBLESHOOTING OUTLINE
This section describes the troubleshooting for the ABS in detail. Read this service manual carefully and make sure you fully understand the information provided before repairing any malfunctions or performing service.
The ABS ECU (electronic control unit) has a self-diagnosis function. When failures occur in the system, the ABS warning light on the meter assembly indicates a malfunction.
The following troubleshooting describes the problem identification and service method according to the indications by the multi-function display. For troubleshooting items other than the following items, follow the normal service method.

EWA4B56006
⚠ WARNING

When maintenance or checks have been performed on components related to the ABS, be sure to perform a final check before delivering the vehicle to the customer. (Refer to “[D-3] FINAL CHECK” on page 8-144.)

ABS operation when the ABS warning light comes on
1. The ABS warning light remains on → ABS operates as a normal brake system.
   - A malfunction was detected using the ABS self-diagnosis function.
2. The ABS warning light comes on, and then goes off when starting the engine → ABS operation is normal.
   - The ABS warning light comes on for 2 seconds, and then goes off every time the main switch is turned to “ON”.
   - The ABS warning light comes on while the start switch is being pushed.
3. The ABS warning light flashes → ABS operation is normal.
   - Refer to “BASIC INSTRUCTIONS FOR TROUBLESHOOTING” on page 8-106.

Self-diagnosis and servicing
The ABS ECU has a self-diagnosis function. By utilizing this function, quick problem identification and service are possible. Previous malfunctions can be checked since the ABS ECU also stores the malfunction history.
The multi-function display indicates all the fault codes recorded in the ABS ECU.
Note all of the indicated fault codes if more than two fault codes are stored in the memory. When the

service is finished, check the normal operation of the vehicle, and then delete the fault code(s). (Refer to "[D-3] FINAL CHECK" on page 8-144.) By deleting the fault codes stored in the ABS ECU memory, it is possible to pursue the cause correctly if another malfunction occurs.

TIP

The ABS performs a self-diagnosis test for a few seconds each time the vehicle first starts off after the main switch was turned on. During this test, a "clicking" noise can be heard from under the seat, and if the front brake lever or rear brake pedal are even slightly applied, a vibration can be felt at the lever and peal, but these do not indicate a malfunction.

Self-diagnosis using the ABS ECU
The ABS ECU performs a static check of the entire system when the main switch is turned to "ON". It also checks for malfunctions while the vehicle is ridden. Since all malfunctions are recorded after they are detected, it is possible to check the recorded malfunction data by utilizing the multi-function display when the ABS ECU has entered the self-diagnosis mode.

Special precautions for handling and servicing a vehicle equipped with ABS

ECA4B56024

NOTICE

Care should be taken not to damage components by subjecting them to shocks or pulling on them with too much force since the ABS components are precisely adjusted.

- The ABS ECU and hydraulic unit are united assemblies and cannot be disassembled.
- The malfunction history is stored in the memory of the ABS ECU. Delete the fault codes when the service is finished. (This is because the past fault codes will be displayed again if another malfunction occurs.)

EAS27800

BASIC INSTRUCTIONS FOR TROUBLESHOOTING

EWA4B56007

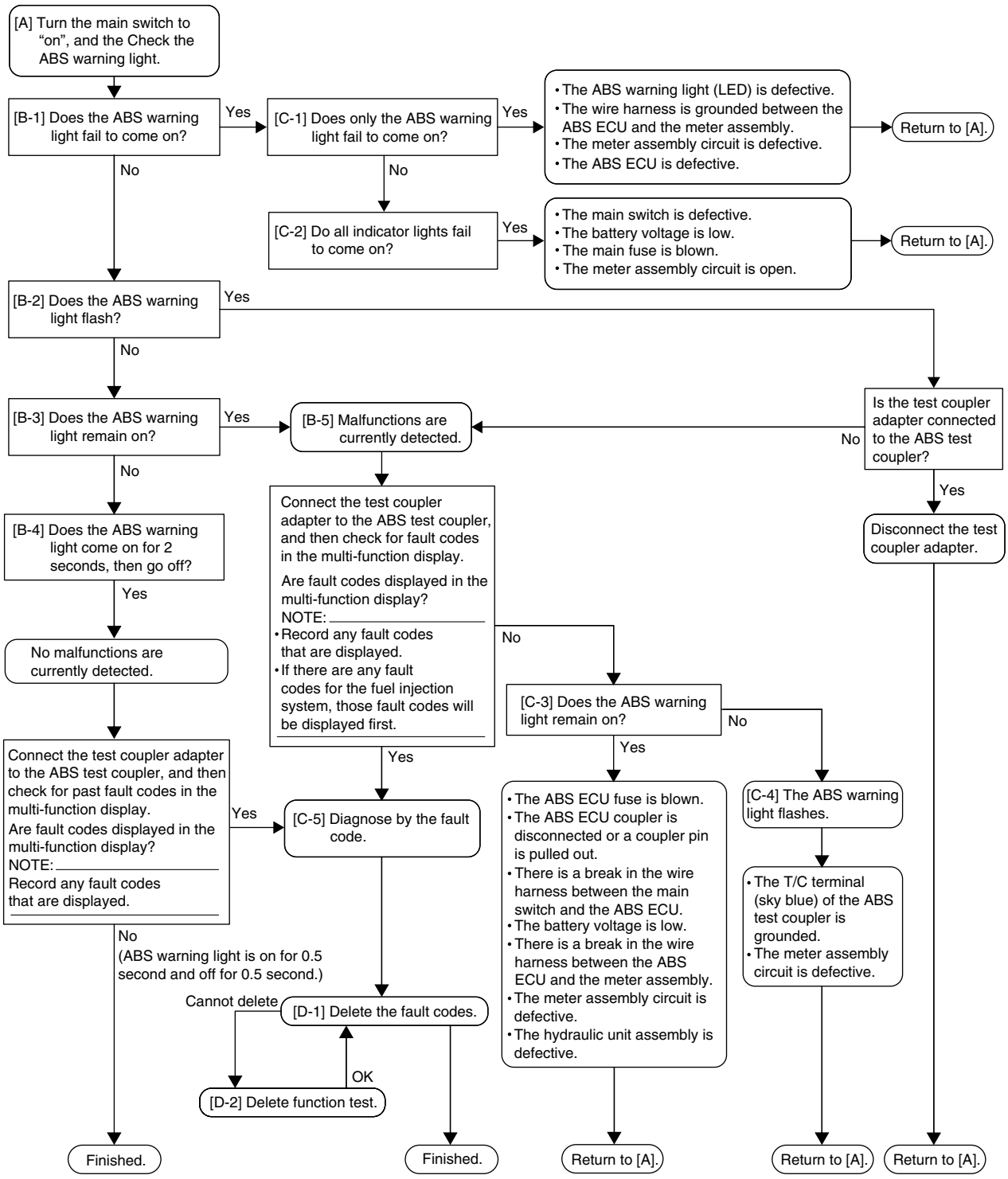
⚠ WARNING

- **Perform the troubleshooting [A] → [B] → [C] → [D] in order. Be sure to follow the order since a wrong diagnosis could result if the steps are followed in a different order or omitted.**
- **Use sufficiently charged regular batteries only.**

[A] Malfunction check using the ABS warning light
[B] Detailed check of the malfunction
The results of the self-diagnosis by the ABS ECU can be displayed using the multi-function display.
[C] Determining the cause and location of the malfunction
Determine the cause of the malfunction from the condition and place where the malfunction occurred.
[D] Servicing the ABS
Execute the final check after disassembly and assembly.

EAS27810

BASIC PROCESS FOR TROUBLESHOOTING



EWA4B56008

⚠ WARNING

When maintenance or checks have been performed on components related to the ABS, be sure to perform a final check before delivering the vehicle to the customer. (Refer to "[D-3] FINAL CHECK" on page 8-144.)

EAS27830

[A] CHECKING THE ABS WARNING LIGHT

Turn the main switch to "ON". (Do not start the engine.)
1.The ABS warning light does not come on. [B-1]
2.The ABS warning light flashes. [B-2]
3.The ABS warning light remains on. [B-3]
4.The ABS warning light comes on for 2 seconds, then goes off. [B-4]

EAS4B56013

[B-1] THE ABS WARNING LIGHT FAILS TO COME ON

1.Only the ABS warning light fails to come on when the main switch is turned to "ON". [C-1]
2.The ABS warning light and all other indicator lights fail to come on. [C-2]

EAS4B56014

[B-2] THE ABS WARNING LIGHT FLASHES

1.Test coupler adapter
- Check if the test coupler adapter is connected to the ABS test coupler.
- If the test coupler adapter is connected, disconnect it, and then install the protective cap onto the ABS test coupler.
- If the test coupler adapter is not connected, refer to "[B-5] MALFUNCTION ARE CURRENTLY DETECTED" on page 8-109.

EAS4B56015

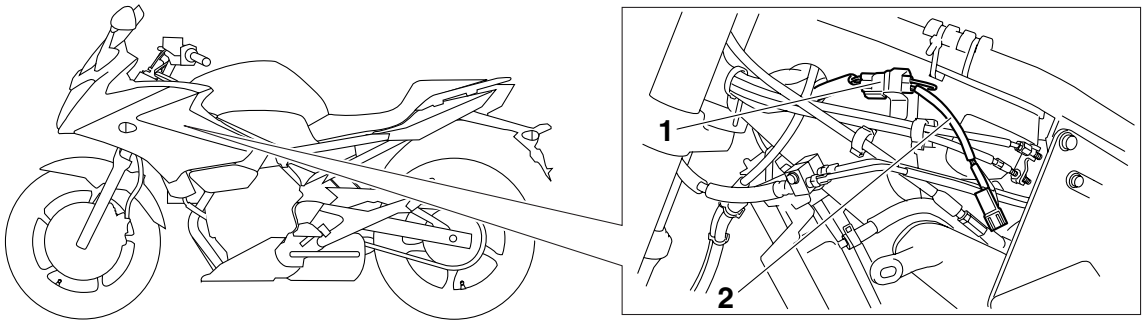
[B-3] THE ABS WARNING LIGHT REMAINS ON

1.A malfunction is detected. [B-6]

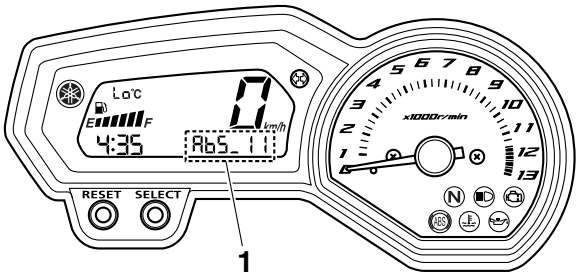
EAS4B56016

[B-4] THE ABS WARNING LIGHT COMES ON FOR 2 SECONDS, THEN GOES OFF

Remove the protective cap from the ABS test coupler "1", and then connect the test coupler adapter "2" to the coupler. The T/C terminal (sky blue) is now grounded.



1.The fault code "1" is displayed on the multi-function display (example: fault code AbS_11).



2.The ABS warning light flashes every 0.5 second for more than 6 seconds.
The ABS warning light flashes every 0.5 second if a fault code for a past malfunction is not stored in the memory of the ABS ECU. The ABS warning light flashes quicker if a fault code is displayed on the multi-function display. If no fault code is displayed, make sure that the customer understands the possible conditions that may cause the ABS warning light to come on or flash even if the system is normal.

TIP

- The ABS fault codes will not be displayed if a fault code for the fuel injection system is displayed on the multi-function display. To display the ABS fault codes, delete the fuel injection system fault codes, and then start the check again.
- The test coupler adapter must be connected to the ABS test coupler to display the fault codes. If the adapter is not connected, the ABS warning light will come on or flash, but no fault codes will be displayed.

EAS4B56017

[B-5] MALFUNCTION ARE CURRENTLY DETECTED

Connect the test coupler adapter to the ABS test coupler.
When the test coupler adapter is connected to the ABS test coupler, the fault codes will be displayed in the multi-function display. Record all of the displayed fault codes.
1.No fault codes are displayed in the multi-function display and the ABS warning light is on. [C-3]
2.No fault codes are displayed in the multi-function display and the ABS warning light is flashing. [C-4]

EAS4B56018

[C-1] ONLY THE ABS WARNING LIGHT FAILS TO COME ON

1.Check for a short circuit to the ground between the green/red terminal of the ABS ECU coupler and green/red terminal of the meter assembly.
- If there is no short circuit to the ground, the wire harness is defective. Properly repair or replace the defective harness.

2.Disconnect the ABS ECU coupler and check that the ABS warning light comes on when the main switch is turned to “ON”.
- If the ABS warning light does not come on, the meter assembly circuit (including the ABS warning light [LED]) is defective. Replace the meter assembly.
- If the ABS warning light comes on, the ABS ECU is defective. Replace the hydraulic unit assembly.

EAS4B56019

[C-2] ALL INDICATOR LIGHTS FAIL TO COME ON

1.Main switch
- Check the main switch for continuity.
  Refer to “CHECKING THE SWITCHES” on page 8-149.
- If there is no continuity, replace the main switch/immobilizer unit.

2.Battery
- Check the condition of the battery.
  Refer to “CHECKING AND CHARGING THE BATTERY” on page 8-154.
- If the battery is defective, clean the battery terminals and recharge it, or replace the battery.

3. Main fuse
   - Check the fuse for continuity.
     Refer to “CHECKING THE FUSES” on page 8-153.
   - If the main fuse is blown, replace the fuse.
4. Circuit
   - Check the meter assembly circuit.
     Refer to “CIRCUIT DIAGRAM” on page 8-99.
   - If the meter assembly circuit is open, properly repair or replace the wire harness.

EAS4B56020
[C-3] THE ABS WARNING LIGHT REMAINS ON

1. The battery voltage is low.
   - Check the condition of the battery.
     Refer to “CHECKING AND CHARGING THE BATTERY” on page 8-154.
   - If the battery voltage is low, clean the battery terminals and recharge it, or replace the battery.
2. ABS ECU fuse
   - Check the ABS ECU fuse for continuity.
     Refer to “CHECKING THE FUSES” on page 8-153.
   - If the ABS ECU fuse is blown, replace the fuse.
3. ABS ECU coupler
   - Check that the ABS ECU coupler is connected properly.
   - Connect the couplers properly if necessary.
4. There is a break in the wire harness between the main switch and the ABS ECU or between the ABS ECU and the ground.
   - Check for continuity between the Brown/Blue terminal of the main switch coupler and Brown/Blue terminal of the ABS ECU fuse.
   - Check for continuity between the Brown/White terminal of the ABS ECU fuse and the Brown/White terminal of the ABS ECU coupler.
   - If there is no continuity, the wire harness is defective. Properly repair or replace the wire harness.
   - Check for continuity between the Black/White terminal of the ABS ECU coupler and the ground.
   - If there is no continuity, the wire harness is defective. Properly repair or replace the wire harness.
5. There is a break in the wire harness between the ABS ECU and the meter assembly (ABS warning light).
   - Check for continuity between the Green/Red terminal of the ABS ECU coupler and the Green/Red terminal of the meter assembly coupler.
   - If there is no continuity, the wire harness is defective. Properly repair or replace the defective harness.
6. The meter assembly circuit is defective.
   - Disconnect the ABS ECU coupler.
   - The white/red terminal of the ABS ECU coupler is short-circuited to the ground.
   - Turn the main switch to “ON”, and then check the ABS warning light.
   - If the ABS warning light is on, the internal circuit of the meter assembly is defective. Replace the meter assembly.
   - If the ABS warning light does not come on, the ABS ECU is defective. Replace the hydraulic unit assembly.
7. The hydraulic unit assembly is defective.

EAS4B56021
[C-4] THE ABS WARNING LIGHT FLASHES

1. Check whether the T/C terminal (sky blue) of the ABS test coupler is short-circuited to the ground when the test coupler adapter is removed.
   - If the T/C terminal is short-circuited to the ground, the wire harness is defective. Properly repair or replace the wire harness.
   - If the T/C terminal is not short-circuited to the ground, the internal circuit of the meter assembly is

defective. Replace the meter assembly.

EAS4B56022

[C-5] DIAGNOSIS USING THE FAULT CODES

Connect the test coupler adapter to the ABS test coupler, and then turn the main switch to “ON”. Information for the fault codes from the ABS ECU is contained in the following table. Refer to this table for troubleshooting.

TIP

Record all of the fault codes displayed and inspect the check points.

Fault code table

Fault code No.	Symptom	Check point
AbS_11* AbS_25*	Front wheel sensor signal is not received properly.	• Installation of the front wheel sensor • Front wheel • Front wheel sensor housing • Front wheel sensor rotor
AbS_12	Rear wheel sensor signal is not received properly.	• Installation of the rear wheel sensor • Rear wheel • Rear wheel sensor housing • Rear wheel sensor rotor
AbS_13 AbS_26	Incorrect signal from the front wheel sensor is detected.	• Installation of the front wheel sensor • Front wheel • Front wheel sensor housing • Front wheel sensor rotor • Hydraulic unit assembly
AbS_14 AbS_27	Incorrect signal from the rear wheel sensor is detected.	• Installation of the rear wheel sensor • Rear wheel • Rear wheel sensor housing • Rear wheel sensor rotor • Hydraulic unit assembly
AbS_15	No continuity in the front wheel sensor circuit.	• Continuity of the front wheel sensor circuit • Wire harness (ABS circuit) • Connection of the front wheel sensor coupler and ABS ECU coupler • Front wheel sensor
AbS_16	No continuity in the rear wheel sensor circuit.	• Continuity of the rear wheel sensor circuit • Wire harness (ABS circuit) • Connection of the rear wheel sensor coupler and ABS ECU coupler • Rear wheel sensor
AbS_17 AbS_45	Missing pulses detected in the front wheel sensor signal.	• Front wheel sensor rotor • Front wheel sensor housing • Front wheel
AbS_18 AbS_46	Missing pulses detected in the rear wheel sensor signal.	• Rear wheel sensor rotor • Rear wheel sensor housing • Rear wheel

Fault code No.	Symptom	Check point
AbS_21	Hydraulic unit solenoid circuit is open or short-circuited.	• Hydraulic unit assembly
AbS_22	Start switch signal is not received properly (start switch circuit or start switch monitor circuit).	• Wire harness • Connection of the starting circuit cut-off relay couplers and ABS ECU coupler.
AbS_24	Brake light signal is not received properly while vehicle is traveling (brake light circuit, or front or rear brake light switch circuit).	• Brake light bulbs • Wire harness (brake light circuit) • Brake light system couplers and connectors
AbS_31	Solenoid relay is defective. Power is not supplied to the solenoid relay.	• ABS solenoid fuse • Wire harness (battery and ABS ECU circuit) • Connection of the ABS ECU coupler • Hydraulic unit assembly
AbS_32	Hydraulic unit solenoid relay is short-circuited.	• Hydraulic unit assembly
AbS_33	ABS motor is defective. Power is not supplied to the ABS motor.	• Battery voltage • ABS motor fuse • Wire harness (ABS circuit) • Connection of the ABS ECU coupler and starter relay coupler • Hydraulic unit assembly
AbS_34	Hydraulic unit ABS motor relay is short-circuited.	• Hydraulic unit assembly
AbS_41	Front wheel will not recover from the locking tendency even though the signal is continuously transmitted from the ABS ECU to release the hydraulic pressure.	• Brake dragging • Brake fluid • Hydraulic unit operation tests • Front wheel brake lines • Hydraulic unit assembly
AbS_42 AbS_47	Rear wheel will not recover from the locking tendency even though the signal is continuously transmitted from the ABS ECU to release the hydraulic pressure.	• Brake dragging • Brake fluid • Hydraulic unit operation tests • Rear wheel brake lines • Hydraulic unit assembly
AbS_43	Incorrect signal from the front wheel sensor is detected.	• Installation of the front wheel sensor • Front wheel sensor housing • Front wheel sensor rotor
AbS_44	Incorrect signal from the rear wheel sensor is detected.	• Installation of the rear wheel sensor • Rear wheel sensor housing • Rear wheel sensor rotor
AbS_51 AbS_52	Power voltage is too high.	• Battery voltage • Battery terminal • Refer to “CHARGING SYSTEM” on page 8-15.

Fault code No.	Symptom	Check point
AbS_53	Power voltage is too low.	• Battery voltage • Connection of the ABS ECU coupler • Wire harness • Refer to “CHARGING SYSTEM” on page 8-15.
AbS_54	Power voltage is too low.	• Battery voltage • Connection of the ABS ECU coupler and starter relay coupler • Wire harness • Refer to “CHARGING SYSTEM” on page 8-15.
AbS_56	Hydraulic unit sensor power monitor circuit is abnormal.	• Hydraulic unit assembly
AbS_63	Front wheel sensor power is abnormal.	• Front wheel sensor lead • Wire harness • Hydraulic unit assembly
AbS_64	Rear wheel sensor power is abnormal.	• Rear wheel sensor lead • Wire harness • Hydraulic unit assembly

* A fault code is indicated if the rear wheel rotates for longer than about 20 seconds (fault code No. AbS_11) or for longer than about 2 seconds (fault code No. AbS_25) with the front wheel stopped (e.g., when the vehicle is on the center stand).

TIP

Fault codes Nos. AbS_15 (front wheel) and AbS_16 (rear wheel) are indicated if a defective connection is detected in the front or rear wheel sensor when the vehicle is not being ridden.

Fault code No.	AbS_11 AbS_25	Symptom	Front wheel sensor signal is not received properly.	
Order	**Item/components and probable cause**		**Check or maintenance job**	**Reinstatement confirmation method**
1	Installed condition of wheel sensor.		Check for looseness. Repair or replace the wheel sensor if necessary.	• Turn the main switch to “ON” and check that the ABS warning light comes on for 2 seconds, then goes off. • Perform a trial run at a constant speed of 30 km/h and check that the ABS warning light does not come on.
2	Installed condition of wheel bearings, axle, sensor housing, and sensor rotor.		Check the components for looseness, distortion, and bends. Refer to “CHECKING THE FRONT WHEEL” on page 4-8.	
3	Foreign material inside sensor housing.		Check the interior of the sensor housing and the surface of the sensor rotor for foreign material, such as metal particles. Clean the sensor housing and sensor rotor if necessary. Refer to “MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR” on page 4-9.	
4	Defective sensor rotor.		Check the surface of the sensor rotor for damage. Replace the sensor rotor if there is visible damage. Refer to “MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR” on page 4-9.	

TIP

With front wheel stopped, rear wheel was rotated for longer than about 20 seconds (fault code No. AbS_11) or for longer than about 2 seconds (fault code No. AbS_25).

Fault code No.	AbS_12	Symptom	Rear wheel sensor signal is not received properly.	
Order	**Item/components and probable cause**		**Check or maintenance job**	**Reinstatement confirmation method**
1	Installed condition of wheel sensor.		Check for looseness. Repair or replace the wheel sensor if necessary.	• Turn the main switch to “ON” and check that the ABS warning light comes on for 2 seconds, then goes off. • Perform a trial run at a constant speed of 30 km/h and check that the ABS warning light does not come on.
2	Installed condition of wheel bearings, axle, sensor housing, and sensor rotor.		Check the components for looseness, distortion, and bends. Refer to “CHECKING THE REAR WHEEL” on page 4-18.	
3	Foreign material inside sensor housing.		Check the interior of the sensor housing and the surface of the sensor rotor for foreign material, such as metal particles. Clean the sensor housing and sensor rotor if necessary. Refer to “MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR” on page 4-19.	
4	Defective sensor rotor.		Check the surface of the sensor rotor for damage. Replace the sensor rotor if there is visible damage. Refer to “MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR” on page 4-19.	

Fault code No.	AbS_13 AbS_26	Symptom	Incorrect signal from the front wheel sensor is detected.	
Order	**Item/components and probable cause**		**Check or maintenance job**	**Reinstatement confirmation method**
1	Installed condition of wheel sensor.		Check for looseness. Repair or replace the wheel sensor if necessary.	• Turn the main switch to “ON” and check that the ABS warning light comes on for 2 seconds, then goes off. • Perform a trial run at a constant speed of 30 km/h and check that the ABS warning light does not come on.
2	Installed condition of wheel bearings, axle, sensor housing, and sensor rotor.		Check the components for looseness, distortion, and bends. Refer to “CHECKING THE FRONT WHEEL” on page 4-8.	
3	Foreign material inside sensor housing.		Check the interior of the sensor housing and the surface of the sensor rotor for foreign material, such as metal particles. Clean the sensor housing and sensor rotor if necessary. Refer to “MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR” on page 4-9.	
4	Defective sensor rotor.		Check the surface of the sensor rotor for damage. If there is visible damage, replace the sensor rotor. Refer to “MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR” on page 4-9.	
5	Hydraulic unit assembly internal malfunction.		Replace the hydraulic unit assembly.	

TIP

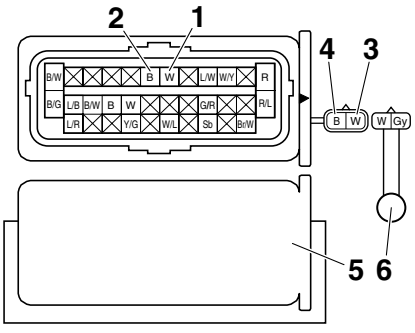
Vehicle possibly ridden on uneven roads.

Fault code No.	AbS_14 AbS_27	Symptom	Incorrect signal from the rear wheel sensor is detected.	
Order	**Item/components and probable cause**		**Check or maintenance job**	**Reinstatement confirmation method**
1	Installed condition of wheel sensor.		Check for looseness. Repair or replace the wheel sensor if necessary.	• Turn the main switch to “ON” and check that the ABS warning light comes on for 2 seconds, then goes off. • Perform a trial run at a constant speed of 30 km/h and check that the ABS warning light does not come on.
2	Installed condition of wheel bearings, axle, sensor housing, and sensor rotor.		Check the components for looseness, distortion, and bends. Refer to “CHECKING THE REAR WHEEL” on page 4-18.	
3	Foreign material inside sensor housing.		Check the interior of the sensor housing and the surface of the sensor rotor for foreign material, such as metal particles. Clean the sensor housing and sensor rotor if necessary. Refer to “MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR” on page 4-19.	
4	Defective sensor rotor.		Check the surface of the sensor rotor for damage. If there is visible damage, replace the sensor rotor. Refer to “MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR” on page 4-19.	
5	Hydraulic unit assembly internal malfunction.		Replace the hydraulic unit assembly.	

TIP

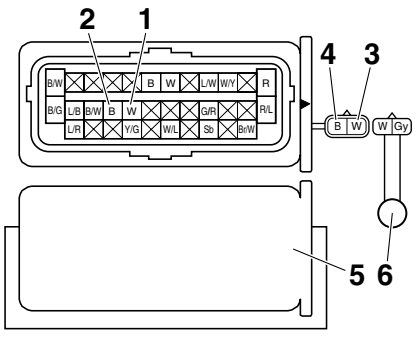
Vehicle possibly ridden on uneven roads.

Fault code No.	AbS_15	Symptom	No continuity in the front wheel sensor circuit.	
Order	**Item/components and probable cause**		**Check or maintenance job**	**Reinstatement confirmation method**
1	Connections • Front wheel sensor coupler • ABS ECU coupler		• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely. **TIP** Turn the main switch to “OFF” before disconnecting or connecting a coupler.	Turn the main switch to “ON” and check that the ABS warning light comes on for 2 seconds, then goes off.

Fault code No.	AbS_15	Symptom	No continuity in the front wheel sensor circuit.	
Order	**Item/components and probable cause**		**Check or maintenance job**	**Reinstatement confirmation method**
2	Wire harness continuity.		• Check for continuity between the white terminal “1” and the white terminal “3” and between the black terminal “2” and the black terminal “4”. • If there is no continuity, the wire harness is defective. Properly repair or replace the wire harness. • Check that there is no continuity between the ground and the white terminal “1” or white terminal “3” and between the ground and the black terminal “2” or black terminal “4”. • If there is continuity, the wire harness is defective. Properly repair or replace the wire harness. • Check that there is no continuity between the white terminal “1” and the black terminal “2” and between the white terminal “3” and the black terminal “4”. • If there is continuity, the wire harness is defective. Properly repair or replace the wire harness.  5. ABS ECU 6. Front wheel sensor	

Fault code No.	AbS_15	Symptom	No continuity in the front wheel sensor circuit.	
Order	**Item/components and probable cause**		**Check or maintenance job**	**Reinstatement confirmation method**
3	Defective wheel sensor.		If the above items were performed and no malfunctions were found, connect the ABS ECU coupler and front wheel sensor coupler, and then delete the fault codes. If fault code No. AbS_15 could not be deleted, the front wheel sensor is defective. Replace the front wheel sensor. **TIP** Before deleting the fault codes, record all of the fault codes and perform the related checks and maintenance.	

Fault code No.	AbS_16	Symptom	No continuity in the rear wheel sensor circuit.	
Order	**Item/components and probable cause**		**Check or maintenance job**	**Reinstatement confirmation method**
1	Connections • Rear wheel sensor coupler • ABS ECU coupler		• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely. **TIP** Turn the main switch to “OFF” before disconnecting or connecting a coupler.	Turn the main switch to “ON” and check that the ABS warning light comes on for 2 seconds, then goes off.

Fault code No.	AbS_16	Symptom	No continuity in the rear wheel sensor circuit.	
Order	**Item/components and probable cause**		**Check or maintenance job**	**Reinstatement confirmation method**
2	Wire harness continuity.		• Check for continuity between the white terminal “1” and the white terminal “3” and between the black terminal “2” and the black terminal “4”. • If there is no continuity, the wire harness is defective. Properly repair or replace the wire harness. • Check that there is no continuity between the ground and the white terminal “1” or white terminal “3” and between the ground and the black terminal “2” or black terminal “4”. • If there is continuity, the wire harness is defective. Properly repair or replace the wire harness. • Check that there is no continuity between the white terminal “1” and the black terminal “2” and between the white terminal “3” and the black terminal “4”. • If there is continuity, the wire harness is defective. Properly repair or replace the wire harness.  5. ABS ECU 6. Rear wheel sensor	

Fault code No.	AbS_16	Symptom	No continuity in the rear wheel sensor circuit.	
Order	**Item/components and probable cause**		**Check or maintenance job**	**Reinstatement confirmation method**
3	Defective wheel sensor.		If the above items were performed and no malfunctions were found, connect the ABS ECU coupler and rear wheel sensor coupler, and then delete the fault codes. If fault code No. AbS_16 could not be deleted, the rear wheel sensor is defective. Replace the rear wheel sensor. **TIP** Before deleting the fault codes, record all of the fault codes and perform the related checks and maintenance.	

Fault code No.	AbS_17 AbS_45	Symptom	Missing pulses detected in the front wheel sensor signal.	
Order	**Item/components and probable cause**		**Check or maintenance job**	**Reinstatement confirmation method**
1	Installed condition of wheel bearings, axle, sensor housing, and sensor rotor.		Check the components for looseness, distortion, and bends. Refer to "CHECKING THE FRONT WHEEL" on page 4-8.	• Turn the main switch to "ON" and check that the ABS warning light comes on for 2 seconds, then goes off. • Perform a trial run at a constant speed of 30 km/h and check that the ABS warning light does not come on.
2	Foreign material inside sensor housing.		Check the interior of the sensor housing and the surface of the sensor rotor for foreign material, such as metal particles. Clean the sensor housing and sensor rotor if necessary. Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-9.	
3	Defective sensor rotor.		• Check the surface of the sensor rotor for damage. • If there is visible damage, replace the sensor rotor.	

Fault code No.	AbS_18 AbS_46	Symptom	Missing pulses detected in the rear wheel sensor signal.	
Order	**Item/components and probable cause**		**Check or maintenance job**	**Reinstatement confirmation method**
1	Installed condition of wheel bearings, axle, sensor housing, and sensor rotor.		Check the components for looseness, distortion, and bends. Refer to "CHECKING THE REAR WHEEL" on page 4-18.	• Turn the main switch to "ON" and check that the ABS warning light comes on for 2 seconds, then goes off. • Perform a trial run at a constant speed of 30 km/h and check that the ABS warning light does not come on.
2	Foreign material inside sensor housing.		Check the interior of the sensor housing and the surface of the sensor rotor for foreign material, such as metal particles. Clean the sensor housing and sensor rotor if necessary. Refer to "MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR" on page 4-19.	
3	Defective sensor rotor.		• Check the surface of the sensor rotor for damage. • If there is visible damage, replace the sensor rotor.	

Fault code No.	AbS_21	Symptom	Hydraulic unit solenoid circuit is open or short-circuited.	
Order	**Item/components and probable cause**		**Check or maintenance job**	**Reinstatement confirmation method**
1	Open or short circuit in solenoid circuit.		Replace the hydraulic unit assembly.	• Turn the main switch to “ON” and check that the ABS warning light comes on for 2 seconds, then goes off. • Perform hydraulic unit operation test 1 and check that the operation of the hydraulic unit is normal.

Fault code No.	AbS_22	Symptom	Start switch signal is not received properly (start switch circuit or start switch monitor circuit).	
Order	**Item/components and probable cause**		**Check or maintenance job**	**Reinstatement confirmation method**
1	Engine startability.		Check the electric starting system. Refer to "ELECTRIC STARTING SYSTEM" on page 8-7.	• Push the start switch and check that the engine starts. • Turn the main switch to "ON" and check that the ABS warning light comes on for 2 seconds, then goes off. • Check that the ABS warning light comes on while the start switch is being pushed.
2	Connections • Starter relay coupler • ABS ECU coupler • Right handlebar switch coupler		• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely. **TIP** Turn the main switch to "OFF" before disconnecting or connecting a coupler.	
3	Open or short circuit in wire harness.		• Repair or replace if there is an open or short circuit. • Between ABS ECU coupler and starter relay coupler. (Blue/White–Blue/White) • Between ABS ECU coupler and right handlebar switch (start switch) coupler. (White/Blue–White/Blue)	

Fault code No.	AbS_24	Symptom	Brake light signal is not received properly while vehicle is traveling (brake light circuit, or front or rear brake light switch circuit).	
Order	**Item/components and probable cause**		**Check or maintenance job**	**Reinstatement confirmation method**
1	Brake light operation. • Burned-out brake light bulb		• Check the brake light. Repair or replace the brake light if necessary. Refer to "CHECKING THE BULBS AND BULB SOCKETS" on page 8-152.	• Check that the brake light comes on when the front or rear brake is applied. • Turn the main switch to "ON" and check that the ABS warning light comes on for 2 seconds, then goes off.
2	Connections • ABS ECU coupler • Front brake light switch connectors • Rear brake light switch coupler		• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely. **TIP** Turn the main switch to "OFF" before disconnecting or connecting a coupler.	
3	Open or short circuit in wire harness.		• Repair or replace if there is an open or short circuit. • Between rear brake light switch coupler and ABS ECU coupler. (Yellow–Yellow/Green) • Between front brake light switch connectors and ABS ECU coupler. (Green/Yellow–Yellow/Green)	
4	Water inside switch.		Use compressed air to blow out the water.	

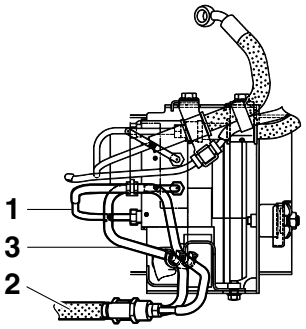
Fault code No.	AbS_31	Symptom	Solenoid relay is defective. Power is not supplied to the solenoid relay.	
Order	**Item/components and probable cause**		**Check or maintenance job**	**Reinstatement confirmation method**
1	Battery voltage		Recharge or replace the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 3-31.	Turn the main switch to "ON" and check that the ABS warning light comes on for 2 seconds, then goes off.
2	Blown ABS solenoid fuse.		Check the ABS solenoid fuse. If the ABS solenoid fuse is blown, replace the fuse and check the wire harness. Refer to "CHECKING THE FUSES" on page 3-31.	
3	Connections • ABS ECU coupler		• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely. **TIP** Turn the main switch to "OFF" before disconnecting or connecting a coupler.	
4	Open or short circuit in wire harness.		• Repair or replace if there is an open or short circuit. • Between ABS ECU coupler and ABS solenoid fuse. (Red–Red) • Between ABS ECU coupler and ground. (Black/White–Black/White)	
5	Hydraulic unit assembly internal malfunction.		Replace the hydraulic unit assembly.	

Fault code No.	AbS_32	Symptom	Hydraulic unit solenoid relay is short-circuited.	
Order	**Item/components and probable cause**		**Check or maintenance job**	**Reinstatement confirmation method**
1	Short circuit in solenoid relay.		Replace the hydraulic unit assembly.	• Turn the main switch to “ON” and check that the ABS warning light comes on for 2 seconds, then goes off. • Perform hydraulic unit operation test 1 and check that the operation of the hydraulic unit is normal.
2	Hydraulic unit assembly internal malfunction.		Replace the hydraulic unit assembly.	

Fault code No.	AbS_33	Symptom	ABS motor is defective. Power is not supplied to the ABS motor.	
Order	**Item/components and probable cause**		**Check or maintenance job**	**Reinstatement confirmation method**
1	Battery voltage		Recharge or replace the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 3-31.	• Turn the main switch to "ON" and check that the ABS warning light comes on for 2 seconds, then goes off. • Perform hydraulic unit operation test 1 and check that the operation of the hydraulic unit is normal.
2	Blown ABS motor fuse.		Check the ABS motor fuse. If the ABS motor fuse is blown, replace the fuse and check the wire harness. Refer to "CHECKING THE FUSES" on page 3-31.	
3	Connections • ABS ECU coupler • Starter relay coupler		• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely. **TIP** Turn the main switch to "OFF" before disconnecting or connecting a coupler.	
4	Open or short circuit in wire harness.		• Repair or replace if there is an open or short circuit. • Between ABS ECU coupler and ABS motor fuse. (Red/Blue–Red/Blue) • Between ABS ECU coupler and ground. (Black/Green–Black/Green)	
5	Hydraulic unit assembly internal malfunction.		Replace the hydraulic unit assembly.	

Fault code No.	AbS_34	Symptom	Hydraulic unit ABS motor relay is short-circuited.	
Order	**Item/components and probable cause**		**Check or maintenance job**	**Reinstatement confirmation method**
1	Short circuit in ABS motor relay.		Replace the hydraulic unit assembly.	• Turn the main switch to “ON” and check that the ABS warning light comes on for 2 seconds, then goes off. • Perform hydraulic unit operation test 1 and check that the operation of the hydraulic unit is normal.

Fault code No.	AbS_41	Symptom	Front wheel will not recover from the locking tendency even though the signal is continuously transmitted from the ABS ECU to release the hydraulic pressure (when the battery voltage is normal)	
Order	**Item/components and probable cause**		**Check or maintenance job**	**Reinstatement confirmation method**
1	Rotation of wheel		• Check that there is no brake disc drag on the front wheel and make sure that it rotates smoothly. • Check the front wheel axle for loose bearings and bends, and the brake discs for distortion. Refer to “CHECKING THE FRONT BRAKE DISCS” on page 4-30.	Perform hydraulic unit operation test 1 and check that the operation of the hydraulic unit is normal.
2	Brake master cylinder and brake caliper		• Check that the brake fluid pressure is correctly transmitted to the brake calipers when the front brake lever is operated and that the pressure decreases when the lever is released.	
3	Brake fluid		• Visually check the brake fluid in the brake master cylinder reservoir for water, foreign materials, solidification, and contamination. • Check for air in the brake lines.	

Fault code No.	AbS_41	Symptom	Front wheel will not recover from the locking tendency even though the signal is continuously transmitted from the ABS ECU to release the hydraulic pressure (when the battery voltage is normal)	
Order	**Item/components and probable cause**		**Check or maintenance job**	**Reinstatement confirmation method**
4	Brake lines		• Check the brake lines for kinks and deterioration. EWA4B56009 **⚠ WARNING** **Only use genuine Yamaha parts. Using other brake pipes, hoses and union bolts may close the brake lines.** • Check that the connections of the brake lines from the brake master cylinder to the hydraulic unit and from the hydraulic unit to the front brake calipers are correct.  See WARNING and TIP.	
5	Hydraulic unit assembly		If the malfunction is not corrected after checking items (1) to (3)and front brake hose outlet, replace the hydraulic unit assembly. Be sure to connect the brake pipes and coupler correctly and securely. Check the hydraulic unit operation. Refer to “HYDRAULIC UNIT OPERATION TESTS” on page 4-53.	

EWA4B56001

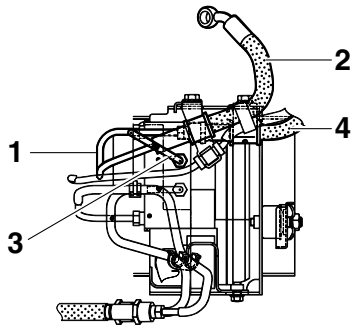
⚠ WARNING

The front brakes will not function properly if the connections are reversed.

- **Brake pipe/joint assembly “1” and front brake hose “2” inlet: from the front brake master cylinder**
- **Brake pipe/joint assembly “3” and front brake hose outlet: to the front brake calipers**

TIP

- If the brake pipe inlet and outlet connections are incorrect on the hydraulic unit, the front brake lever will be pulled to its full-stroke position without responding, and then it will be pushed back slowly without pulsating when the final check on page “[D-3] FINAL CHECK” on page 8-144 is performed.
- If the front and rear brake pipe connections are reversed on the hydraulic unit, the pulsating action in the front brake lever and rear brake pedal will be performed in the reverse order when the final check on page “[D-3] FINAL CHECK” on page 8-144 is performed.

Fault code No.	AbS_42 AbS_47	Symptom	Rear wheel will not recover from the locking tendency even though the signal is continuously transmitted from the ABS ECU to release the hydraulic pressure.	
Order	**Item/components and probable cause**		**Check or maintenance job**	**Reinstatement confirmation method**
1	Rotation of wheel		• Check that there is no brake disc drag on the rear wheel and make sure that it rotates smoothly. • Check for brake disc distortion. Refer to “CHECKING THE REAR BRAKE DISC” on page 4-42.	Perform hydraulic unit operation test 1 and check that the operation of the hydraulic unit is normal.
2	Brake master cylinder and brake caliper		• Check that the brake fluid pressure is correctly transmitted to the brake caliper when the rear brake pedal is operated and that the pressure decreases when the pedal is released.	
3	Brake fluid		• Visually check the brake fluid in the brake master cylinder reservoir for water, foreign materials, solidification, and contamination. • Check for air in the brake lines.	
4	Brake lines		• Check the brake lines for kinks and deterioration (particularly between the hydraulic unit and the rear brake caliper). EWA4B56009 **⚠ WARNING** **Only use genuine Yamaha parts. Using other brake pipes, hoses and union bolts may close the brake lines.** • Check that the connections of the brake lines from the brake master cylinder to the hydraulic unit are correct.  See WARNING and TIP.	

Fault code No.	AbS_42 AbS_47	Symptom	Rear wheel will not recover from the locking tendency even though the signal is continuously transmitted from the ABS ECU to release the hydraulic pressure.

Order	Item/components and probable cause	Check or maintenance job	Reinstatement confirmation method
5	Hydraulic unit assembly	If the malfunction is not corrected after checking items (1) to (4), replace the hydraulic unit assembly. Be sure to connect the brake hose, brake pipe, and coupler correctly and securely. Check the hydraulic unit operation. Refer to "HYDRAULIC UNIT OPERATION TESTS" on page 4-53.	

EWA4B56002

WARNING

The rear brake will not function properly if the connections are reversed.

- **Brake pipe/joint assembly "1" and rear brake hose "2" inlet: from the rear brake master cylinder**
- **Brake pipe/joint assembly "3" and rear brake hose "4" outlet: to the rear brake caliper**

TIP

- If the brake pipe inlet and outlet connections are reversed on the hydraulic unit, the rear brake pedal will be pressed down to its full-stroke position without responding, and then it will be pushed back slowly without pulsating when the final check on page "[D-3] FINAL CHECK" on page 8-144 is performed.
- If the front and rear brake pipe connections are reversed on the hydraulic unit, the pulsating action in the front brake lever and rear brake pedal will be performed in the reverse order when the final check on page "[D-3] FINAL CHECK" on page 8-144 is performed.

Fault code No.	AbS_43	Symptom	Incorrect signal from the front wheel sensor is detected.	
Order	**Item/components and probable cause**		**Check or maintenance job**	**Reinstatement confirmation method**
1	Installed condition of wheel sensor.		Check for looseness. Repair or replace the wheel sensor if necessary.	• Turn the main switch to “ON” and check that the ABS warning light comes on for 2 seconds, then goes off. • Perform a trial run at a constant speed of 30 km/h and check that the ABS warning light does not come on.
2	Installed condition of wheel bearings, axle, sensor housing, and sensor rotor.		Check the components for looseness, distortion, and bends. Refer to “CHECKING THE FRONT WHEEL” on page 4-8.	
3	Foreign material inside sensor housing.		Check the interior of the sensor housing and the surface of the sensor rotor for foreign material, such as metal particles. Clean the sensor housing and sensor rotor if necessary. Refer to “MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR” on page 4-9.	
4	Defective sensor rotor.		• Check the surface of the sensor rotor for damage. • If there is visible damage, replace the sensor rotor.	

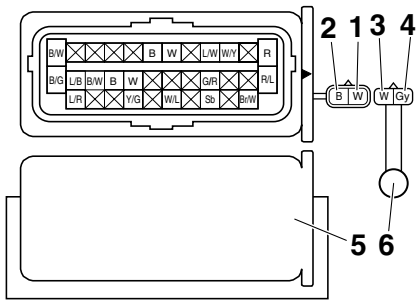
Fault code No.	AbS_44	Symptom	Incorrect signal from the rear wheel sensor is detected.	
Order	**Item/components and probable cause**		**Check or maintenance job**	**Reinstatement confirmation method**
1	Installed condition of wheel sensor.		Check for looseness. Repair or replace the wheel sensor if necessary.	• Turn the main switch to “ON” and check that the ABS warning light comes on for 2 seconds, then goes off. • Perform a trial run at a constant speed of 30 km/h and check that the ABS warning light does not come on.
2	Installed condition of wheel bearings, axle, sensor housing, and sensor rotor.		Check the components for looseness, distortion, and bends. Refer to “CHECKING THE REAR WHEEL” on page 4-18.	
3	Foreign material inside sensor housing.		Check the interior of the sensor housing and the surface of the sensor rotor for foreign material, such as metal particles. Clean the sensor housing and sensor rotor if necessary. Refer to “MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR” on page 4-19.	
4	Defective sensor rotor.		• Check the surface of the sensor rotor for damage. • If there is visible damage, replace the sensor rotor.	

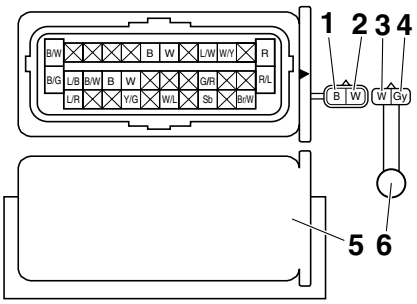
Fault code No.	AbS_51 AbS_52	Symptom	Power voltage is too high.	
Order	**Item/components and probable cause**		**Check or maintenance job**	**Reinstatement confirmation method**
1	Battery voltage		Replace the battery. Refer to “CHECKING AND CHARGING THE BATTERY” on page 8-154.	• Turn the main switch to “ON” and check that the ABS warning light comes on for 2 seconds, then goes off. • Perform a trial run and check that the ABS warning light does not come on.
2	Disconnected battery terminal (fault code No. AbS_52).		Check the connection. Replace or reconnect the terminal if necessary.	
3	Charging system		Check the charging system. Refer to “CHARGING SYSTEM” on page 8-15.	

Fault code No.	AbS_53	Symptom	Power voltage is too low.	
Order	**Item/components and probable cause**		**Check or maintenance job**	**Reinstatement confirmation method**
1	Battery voltage		Recharge or replace the battery. Refer to “CHECKING AND CHARGING THE BATTERY” on page 8-154.	• Turn the main switch to “ON” and check that the ABS warning light comes on for 2 seconds, then goes off. • Perform a trial run and check that the ABS warning light does not come on.
2	Connections • ABS ECU coupler		• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely. **TIP** Turn the main switch to “OFF” before disconnecting or connecting a coupler.	
3	Open or short circuit in wire harness.		• Repair or replace if there is an open or short circuit. • Between ABS ECU coupler and ABS ECU fuse. (Brown/White–Brown/White)	
4	Charging system		Check the charging system. Refer to “CHARGING SYSTEM” on page 8-15.	

Fault code No.	AbS_54	Symptom	Power voltage is too low.	
Order	**Item/components and probable cause**		**Check or maintenance job**	**Reinstatement confirmation method**
1	Battery voltage		Recharge or replace the battery. Refer to “CHECKING AND CHARGING THE BATTERY” on page 3-31.	• Turn the main switch to “ON” and check that the ABS warning light comes on for 2 seconds, then goes off. • Perform a trial run and check that the ABS warning light does not come on.
2	Connections • ABS ECU coupler • Starter relay coupler		• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely. **TIP** Turn the main switch to “OFF” before disconnecting or connecting a coupler.	
3	Open or short circuit in wire harness.		• Repair or replace if there is an open or short circuit. • Between ABS ECU coupler and ABS ECU fuse. (Brown/White–Brown/White) • Between ABS ECU coupler and ABS solenoid fuse. (Red–Red) • Between ABS ECU coupler and ABS motor fuse. (Red/Blue–Red/Blue)	
4	Charging system		Check the charging system. Refer to “CHARGING SYSTEM” on page 8-15.	

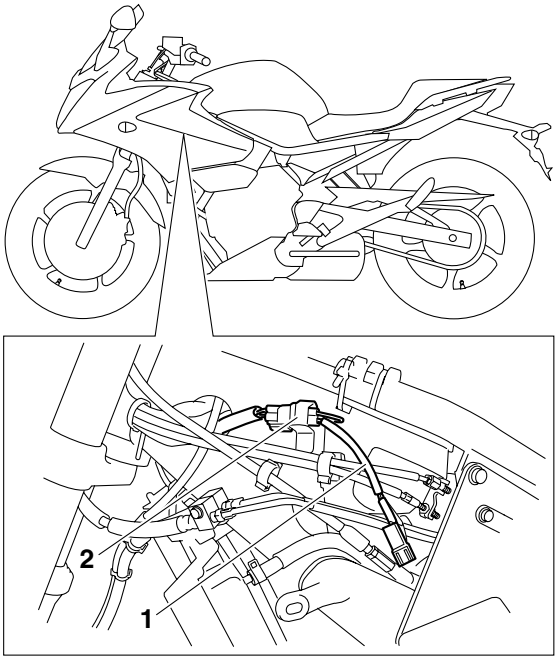
Fault code No.	AbS_56	Symptom	Hydraulic unit sensor power monitor circuit is abnormal.	
Order	**Item/components and probable cause**		**Check or maintenance job**	**Reinstatement confirmation method**
1	Defective internal monitor circuit (sensor power).		Replace the hydraulic unit assembly.	• Turn the main switch to “ON” and check that the ABS warning light comes on for 2 seconds, then goes off. • Perform hydraulic unit operation test 1 and check that the operation of the hydraulic unit is normal.

Fault code No.	AbS_63	Symptom	Front wheel sensor power is abnormal.	
Order	**Item/components and probable cause**		**Check or maintenance job**	**Reinstatement confirmation method**
1	Short circuit in wire harness.		• Check that there is no short circuit between the white terminal “1” and the black terminal “2”. • Check that there is no short circuit between the frame ground and the black terminal “2”. • If there is a short circuit, the wire harness is defective. Properly repair or replace the wire harness. **TIP** Disconnect the ABS ECU coupler before checking the wire harness.	Turn the main switch to “ON” and check that the ABS warning light comes on for 2 seconds, then goes off.
2	Short circuit in front wheel sensor lead.		• Check that there is no short circuit between the white terminal “3” and the gray terminal “4”. • Check that there is no short circuit between the frame ground and the white terminal “3”. • If there is a short circuit, the front wheel sensor is defective. Properly repair or replace the front wheel sensor.  5. ABS ECU 6. Front wheel sensor	
3	Hydraulic unit internal malfunction.		Replace the hydraulic unit assembly.	

Fault code No.	AbS_64	Symptom	Rear wheel sensor power is abnormal.	
Order	**Item/components and probable cause**		**Check or maintenance job**	**Reinstatement confirmation method**
1	Short circuit in wire harness.		• Check that there is no short circuit between the black terminal “1” and the white terminal “2”. • Check that there is no short circuit between the frame ground and the white terminal “2”. • If there is a short circuit, the wire harness is defective. Properly repair or replace the wire harness. **TIP** Disconnect the ABS ECU coupler before checking the wire harness.	Turn the main switch to “ON” and check that the ABS warning light comes on for 2 seconds, then goes off.
2	Short circuit in rear wheel sensor lead.		• Check that there is no short circuit between the white terminal “3” and the gray terminal “4”. • Check that there is no short circuit between the frame ground and the white terminal “3”. • If there is a short circuit, the rear wheel sensor is defective. Properly repair or replace the rear wheel sensor.  5. ABS ECU 6. Rear wheel sensor	
3	Hydraulic unit internal malfunction.		Replace the hydraulic unit assembly.	

EAS4B56023
[D-1] DELETING THE FAULT CODES
ECA4B56026
NOTICE
Since the fault codes remain in the memory of the ABS ECU until they are deleted, always delete the fault codes after the service has been completed.

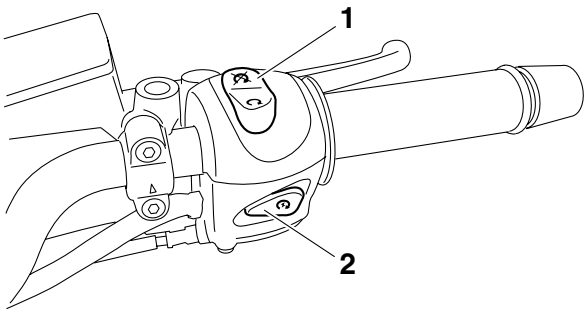
1. Connect the test coupler adapter "1" to the ABS test coupler "2". Refer to "[B-5] MALFUNCTION ARE CURRENTLY DETECTED" on page 8-109.



2. Turn the main switch to "ON".
   Fault codes will be displayed in the multi-function display.
3. Set the engine stop switch "1" to "⊠".

ECA4B56025
NOTICE
If the start switch is pushed without setting the engine stop switch to "⊠", the starter motor gears or other parts may be damaged.

4. Without operating the brake lever, push the start switch "2" at least 4 times in 10 seconds to delete the fault codes.



5. The multi-function display switches to the odometer/tripmeter/fuel reserve tripmeter display and the ABS warning light flashes in 0.5 second-intervals while the fault codes are being deleted.
6. Turn the main switch to "OFF".
7. Turn the main switch to "ON" again.

TIP
If fault codes are still displayed in the multi-function display, the malfunctions have not been repaired. Diagnose the malfunctions using the fault codes.

8. Turn the main switch to "OFF".
9. Disconnect the test coupler adapter from the ABS test coupler, and then install the protective cap onto the ABS test coupler. Deleting the fault codes is now finished.

TIP
Do not forget to install the protective cap onto the ABS test coupler.

EAS4B56025
[D-2] DELETE FUNCTION TEST
1. Place the vehicle on the centerstand.
2. Turn the main switch to "OFF".
3. Connect the test coupler adapter to the ABS test coupler.
4. Turn the main switch to "ON".
5. Check:
   - ABS ECU voltage
     Lower than 12.8 V → Charge or replace the battery.

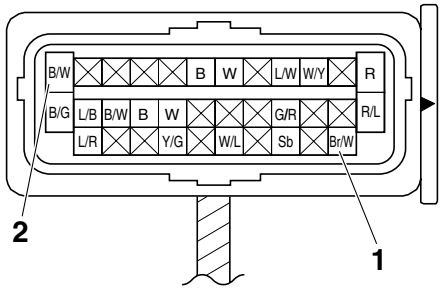
	Battery voltage **Higher than 12.8 V**

▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼

a. Connect the digital circuit tester (DC 20 V) to the ABS ECU coupler.

Digital circuit tester
90890-03174
Model 88 Multimeter with tachometer
YU-A1927

- Positive tester probe → Brown/White “1”
- Negative tester probe → Black/White “2”



b. Measure the ABS ECU voltage.

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6. Check:
   - ABS-ECU-to-start-switch-lead continuity
     No continuity → Replace or repair the wire harness.

Continuity is all right.

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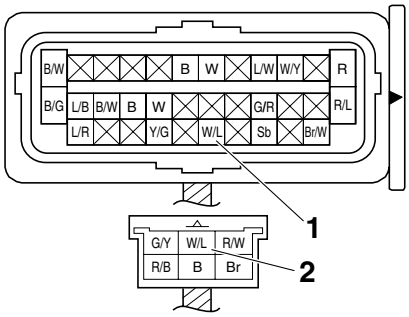
a. Connect the digital circuit tester to the ABS ECU coupler and right handlebar switch coupler.

Digital circuit tester
90890-03174
Model 88 Multimeter with tachometer
YU-A1927

- Positive tester probe → White/Blue “1” (ABS ECU)
- Negative tester probe → White/Blue “2” (right handlebar switch)



b. Check for continuity between the ABS ECU and the start switch lead.

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7. Check:
   - ABS ECU voltage
     Out of specification → Replace the right handlebar switch.

Start switch “ON”: less than 1 V
Start switch “OFF”: more than 12 V

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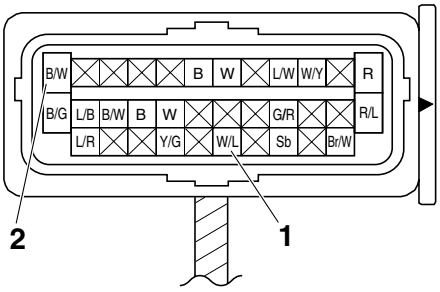
a. Connect the digital circuit tester (DC 12 V) to the ABS ECU coupler.

Digital circuit tester
90890-03174
Model 88 Multimeter with tachometer
YU-A1927

- Positive tester probe → White/Blue “1”
- Negative tester probe → Black/White “2”



b. Push the start switch.
c. Measure the ABS ECU voltage.

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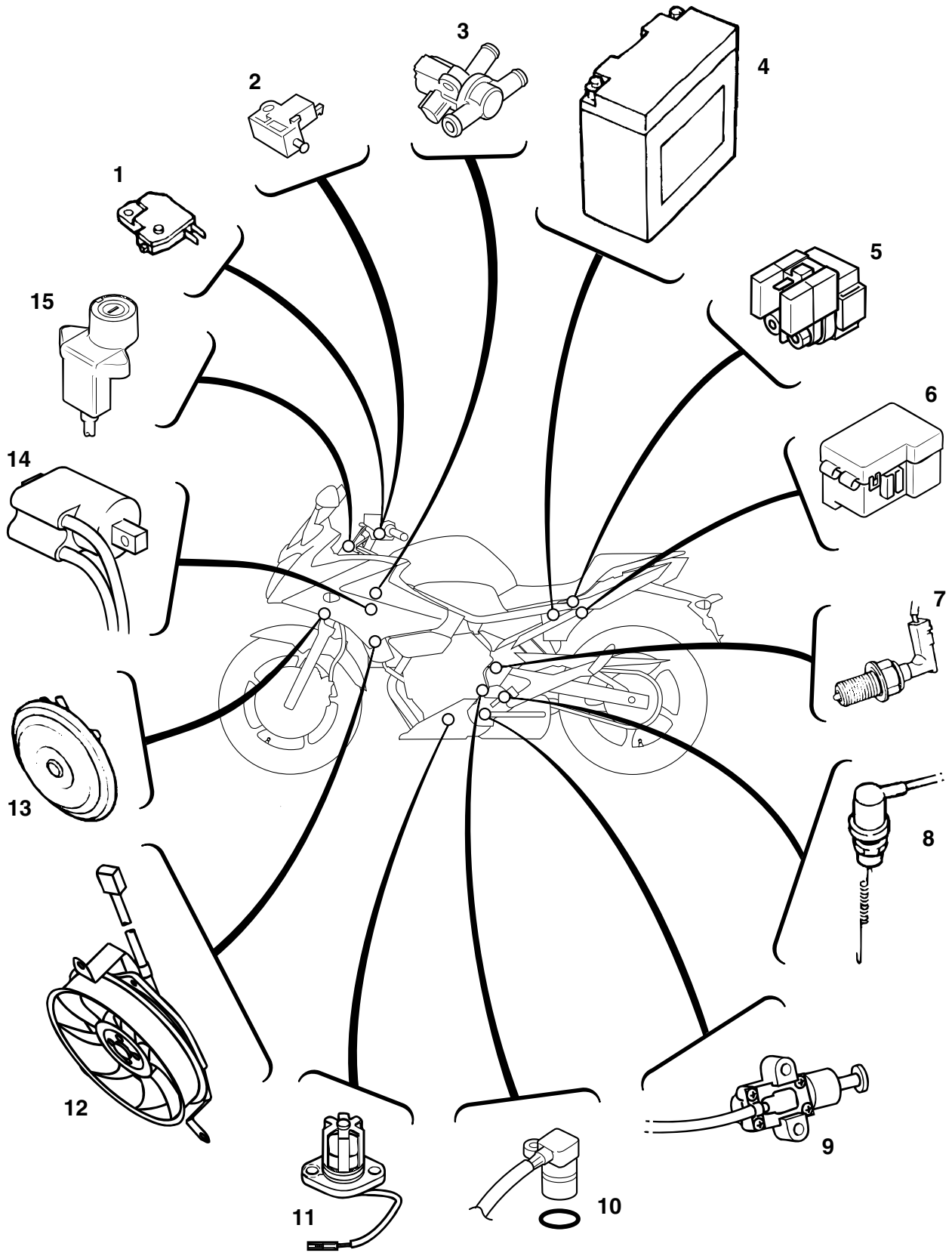
8. If the above-mentioned checks are within specification, replace the hydraulic unit assembly.

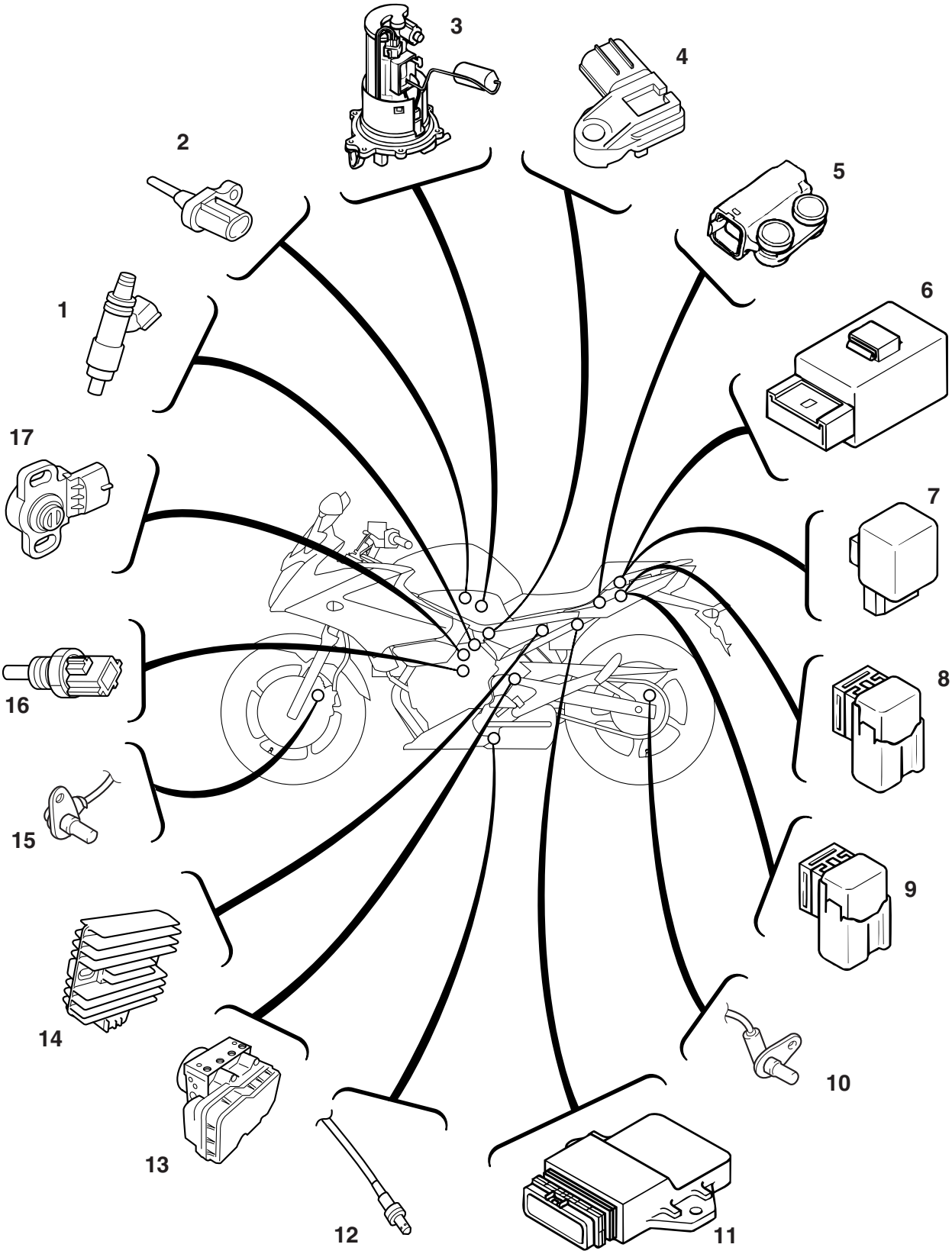
EAS4B56024
[D-3] FINAL CHECK

Checking procedures
1. Check the brake fluid level in the brake master cylinder reservoir.
   Refer to “CHECKING THE BRAKE FLUID LEVEL” on page 3-11.
2. Check the wheel sensor housings and wheel sensors for proper installation.
   Refer to “INSTALLING THE FRONT WHEEL” on page 4-13 and “INSTALLING THE REAR WHEEL” on page 4-21.
3. Perform hydraulic unit operation test 1 or 2.
   Refer to “HYDRAULIC UNIT OPERATION TESTS” on page 4-53.
4. Delete the fault codes.
   Refer to “[D-1] DELETING THE FAULT CODES” on page 8-142.
5. Perform a trial run.
   Refer to “TRIAL RUN” on page 4-56.

EAS27970
ELECTRICAL COMPONENTS



1. Front brake light switch
2. Clutch switch
3. Air induction system solenoid
4. Battery
5. Starter relay
6. Fuse box
7. Neutral switch
8. Rear brake light switch
9. Sidestand switch
10. Speed sensor (XJ6S)
11. Oil level switch
12. Radiator fan motor
13. Horn
14. Ignition coil
15. Main switch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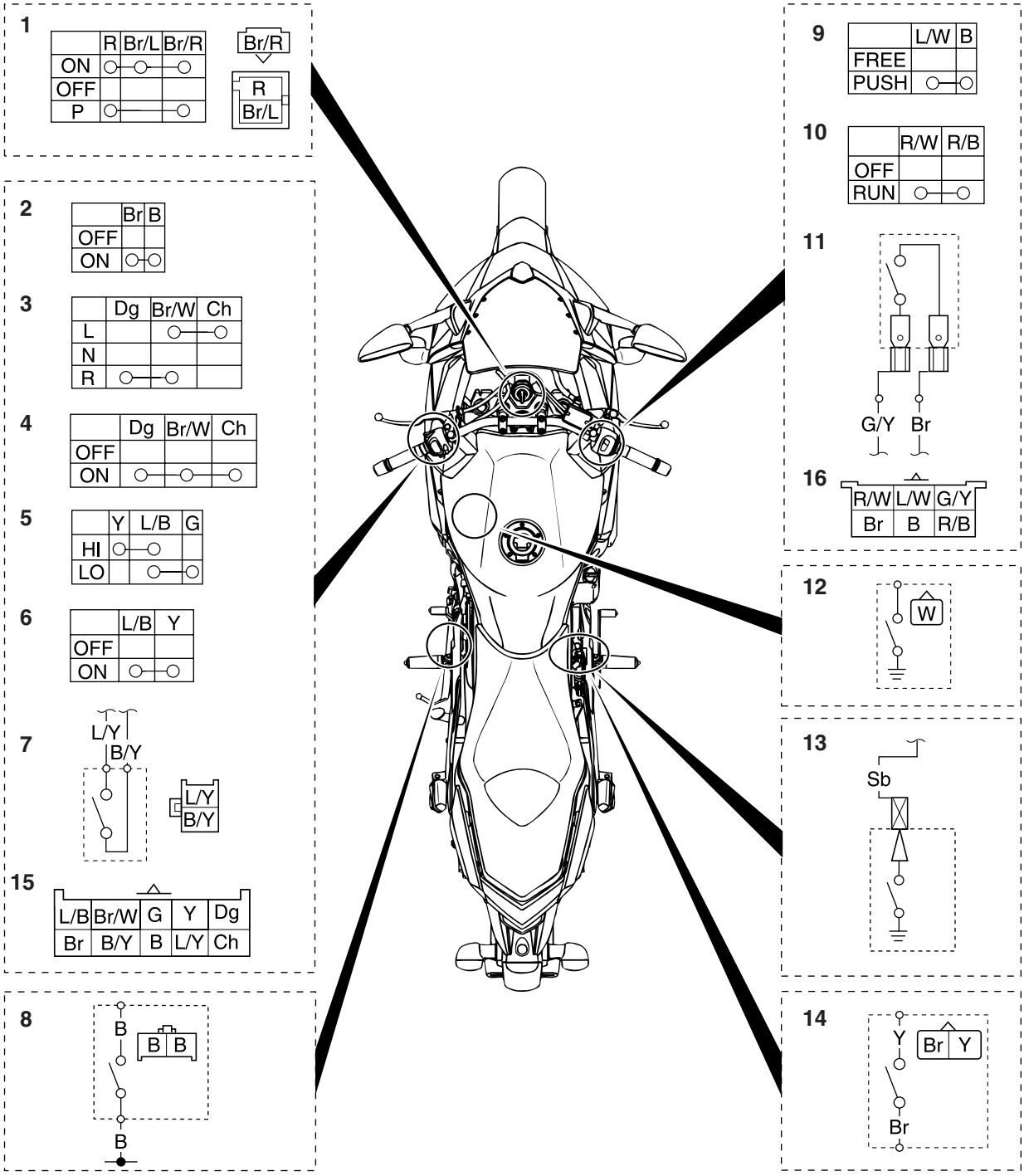
1. Fuel injector
2. Intake air temperature sensor
3. Fuel pump
4. Intake air pressure sensor
5. Lean angle sensor
6. Relay unit
7. Turn signal relay
8. Radiator fan motor relay
9. Headlight relay
10. Rear wheel sensor (XJ6SA)
11. ECU (engine control unit)
12. O_2 sensor
13. Hydraulic unit assembly
14. Rectifier/regulator
15. Front wheel sensor (XJ6SA)
16. Coolant temperature sensor
17. Throttle position sensor

EAS27980
CHECKING THE SWITCHES



1. Main switch
2. Horn switch
3. Turn signal switch
4. Hazard switch
5. Dimmer switch
6. Pass switch
7. Clutch switch
8. Sidestand switch
9. Start switch
10. Engine stop switch
11. Front brake light switch
12. Oil level switch
13. Neutral switch
14. Rear brake light switch
15. Left handlebar switch lead coupler
16. Right handlebar switch lead coupler

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.

ECA14370

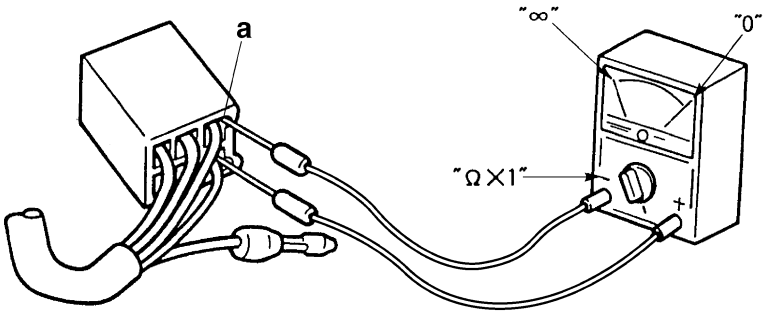
NOTICE

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

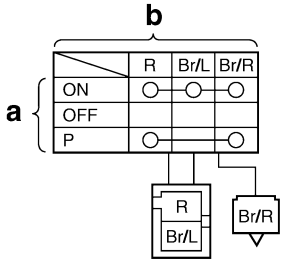
Pocket tester
90890-03112
Analog pocket tester
YU-03112-C

TIP

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



The switches and their terminal connections are illustrated as in the following example of the main switch.
The switch positions "a" are shown in the far left column and the switch lead colors "b" are shown in the top row.
The continuity (i.e., a closed circuit) between switch terminals at a given switch position is indicated by " ○——○ ". There is continuity between red, brown/blue and brown/red when the switch is set to "ON" and between red and brown/red when the switch is set to "P".



EAS27990
CHECKING THE BULBS AND BULB SOCKETS

TIP

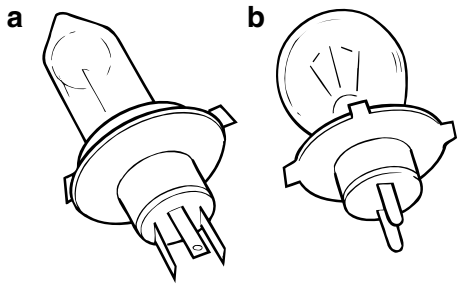
Do not check any of the lights that use LEDs.

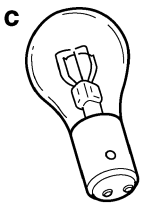
Check each bulb and bulb socket for damage or wear, proper connections, and also for continuity between the terminals.
Damage/wear → Repair or replace the bulb, bulb socket or both.
Improperly connected → Properly connect.
No continuity → Repair or replace the bulb, bulb socket or both.

Types of bulbs

The bulbs used on this vehicle are shown in the illustration.

- 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

EWA4B51012

⚠ WARNING

Since the headlight bulbs get extremely hot, keep flammable products and your hands away from them until they have cooled down.

ECA4B51010

NOTICE

- **Be sure to hold the socket firmly when removing the bulb. Never pull the lead, otherwise it may be pulled out of the terminal in the coupler.**
- **Avoid touching the glass part of the headlight bulb to keep it free from oil, otherwise the transparency of the glass, the life of the bulb, and the luminous flux will be adversely affected. If the headlight bulb gets soiled, thoroughly clean it with a cloth moistened with alcohol or lacquer thinner.**

2. Check:
   - Bulb (for continuity)
     (with the digital circuit tester)
     No continuity → Replace.

Digital circuit tester
90890-03174
Model 88 Multimeter with tachometer
YU-A1927

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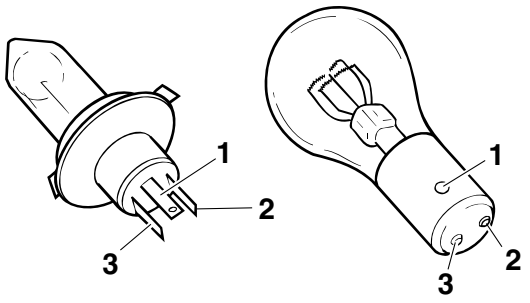
a. Connect the positive tester probe to terminal "1" and the negative tester probe to terminal "2", and check the continuity.
b. Connect the positive tester probe to terminal "1" and the negative tester probe to terminal "3", and check the continuity.
c. If either of the readings indicate no continuity, replace the bulb.



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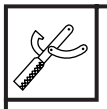
Checking the condition of the bulb sockets

The following procedure applies to all of the bulb sockets.

1. Check:
   - Bulb socket (for continuity)
     (with the digital circuit tester)
     No continuity → Replace.



Digital circuit tester
90890-03174
Model 88 Multimeter with tachometer
YU-A1927

TIP

Check each bulb socket for continuity in the same manner as described in the bulb section, however, note the following.

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a. Install a good bulb into the bulb socket.
b. Connect the digital circuit tester probes to the respective leads of the bulb socket.
c. Check the bulb socket for continuity. If any of the readings indicate no continuity, replace the bulb socket.

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EAS28000

CHECKING THE FUSES

The following procedure applies to all of the fuses.

ECA13680

NOTICE

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

1. Remove:
   - Seat
     Refer to "GENERAL CHASSIS" on page 4-1.
2. Check:
   - Fuse

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a. Connect the digital circuit tester to the fuse and check the continuity.

Digital circuit tester
90890-03174
Model 88 Multimeter with tachometer
YU-A1927

b. If the digital circuit tester indicates no continuity, replace the fuse.

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3. Replace:
   - Blown fuse

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a. Turn the main switch to "OFF".
b. Install a new fuse of the correct amperage rating.
c. Set on the switches to verify if the electrical circuit is operational.
d. If the fuse immediately blows again, check the electrical circuit.

Fuses	Amperage rating	Q'ty
Main	30 A	1
Headlight	20 A	1
Radiator fan	20 A	1
Ignition	10 A	1
Fuel injection system	10 A	1
Taillight	10 A	1
Backup (odometer, clock and immobilizer system)	7.5 A	1
Signaling	7.5 A	1
ABS motor (XJ6SA)	30 A	1
ABS solenoid (XJ6SA)	20 A	1
ABS ECU (XJ6SA)	7.5 A	1
Spare	30 A	1
Spare (XJ6SA)	30 A	1
Spare	20 A	1
Spare	7.5 A	1
Spare	10 A	1

EWA13310

⚠ WARNING

Never use a fuse with an amperage rating other than that specified. Improvising or using a fuse with the wrong amperage rating may cause extensive damage to the electri-

cal system, cause the lighting and ignition systems to malfunction and could possibly cause a fire.

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4. Install:
   - Seat
   Refer to "GENERAL CHASSIS" on page 4-1.

EAS28030

CHECKING AND CHARGING THE BATTERY

This model is equipped with a VRLA (Valve Regulated Lead Acid) battery. There is no need to check the electrolyte or to add distilled water. However, the battery lead connections need to be checked and, if necessary, tightened.

EWA20S1004

⚠ WARNING

- **Electrolyte is poisonous and dangerous since it contains sulfuric acid, which causes severe burns. Avoid any contact with skin, eyes or clothing and always shield your eyes when working near batteries. In case of contact, administer the following FIRST AID.**
  - **EXTERNAL: Flush with plenty of water.**
  - **INTERNAL: Drink large quantities of water or milk and immediately call a physician.**
  - **EYES: Flush with water for 15 minutes and seek prompt medical attention.**
- **Batteries produce explosive hydrogen gas. Therefore, keep sparks, flames, cigarettes, etc., away from the battery and provide sufficient ventilation when charging it in an enclosed space.**
- **KEEP THIS AND ALL BATTERIES OUT OF THE REACH OF CHILDREN.**

ECA4B51011

NOTICE

To charge a VRLA (Valve Regulated Lead Acid) battery, a special (constant - voltage) battery charger is required. Using a conventional battery charger will damage the battery.

TIP

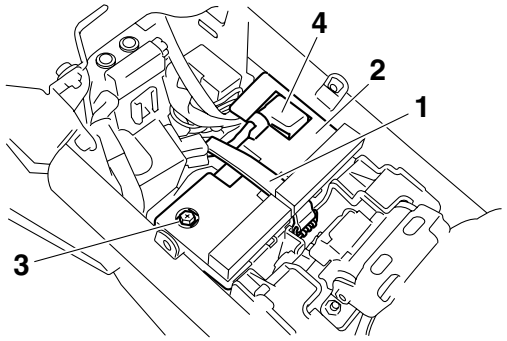
Since VRLA batteries are sealed, it is not possible to check the charge state of the battery by measuring the specific gravity of the electrolyte. Therefore, the charge of the battery has to be checked by measuring the voltage at the battery terminals.

1. Remove:
   - Seat
   - Battery band "1"
   - Battery cover "2"
   Refer to "GENERAL CHASSIS" on page 4-1.
2. Disconnect:
   - Battery leads
   (from the battery terminals)

ECA4B51012

NOTICE

First, disconnect the negative battery lead "3", then the positive battery lead "4".



3. Remove:
   - Battery
4. Check:
   - Battery charge

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a. Connect a digital circuit tester to the battery terminals.

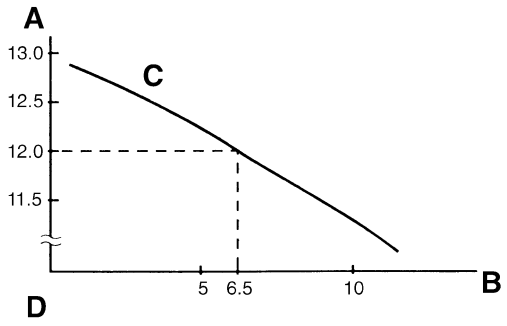
- Positive tester probe → positive battery terminal
- Negative tester probe → negative battery terminal

TIP

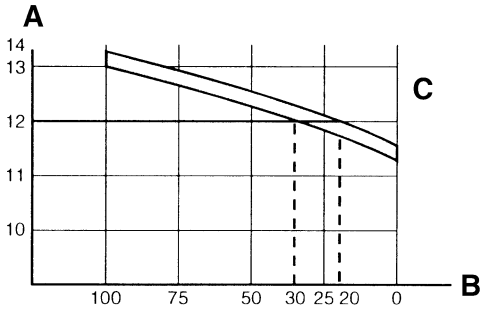
- The charge state of an VRLA battery can be checked by measuring its open-circuit voltage (i.e., the voltage when the positive battery terminal is disconnected).
- No charging is necessary when the open-circuit voltage equals or exceeds 12.8 V.

b. Check the charge of the battery, as shown in the charts and the following example.

Example
Open-circuit voltage = 12.0 V
Charging time = 6.5 hours
Charge of the battery = 20–30%



A. Open-circuit voltage (V)
B. Charging time (hours)
C. Relationship between the open-circuit voltage and the charging time at 20 °C (68 °F)
D. These values vary with the temperature, the condition of the battery plates, and the electrolyte level.



A. Open-circuit voltage (V)
B. Charging condition of the battery (%)
C. Ambient temperature 20 °C (68 °F)

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5. Charge:
   • Battery
   (refer to the appropriate charging method)

EWA13300

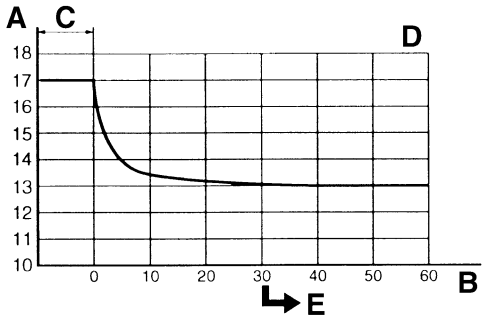
⚠ WARNING

Do not quick charge a battery.

ECA20S1011

NOTICE

- **Never remove the VRLA 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 vehicle. (If charging has to be done with the battery mounted on the vehicle, 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 VRLA battery stabilizes about 30 minutes after charging has been completed. Therefore, wait 30 minutes after charging is completed before measuring the open-circuit voltage.**



A. Open-circuit voltage (V)
B. Time (minutes)
C. Charging
D. Ambient temperature 20 °C (68 °F)
E. Check the open-circuit voltage.

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Charging method using a variable-current (voltage) charger

a. Measure the open-circuit voltage prior to charging.

TIP

Voltage should be measured 30 minutes after the engine is turned off.

b. Connect a charger and ammeter to the battery and start charging.

TIP
Set the charging voltage to 16–17 V. If the setting is lower, charging will be insufficient. If too high, the battery will be over-charged.

c. Make sure that the current is higher than the standard charging current written on the battery.

TIP
If the current is lower than the standard charging current written on the battery, set the charging voltage adjust dial at 20–24 V and monitor the amperage for 3–5 minutes to check the battery.

- Standard charging current is reached
  Battery is good.
- Standard charging current is not reached
  Replace the battery.

d. Adjust the voltage so that the current is at the standard charging level.
e. Set the time according to the charging time suitable for the open-circuit voltage.
f. If charging requires more than 5 hours, it is advisable to check the charging current after a lapse of 5 hours. If there is any change in the amperage, readjust the voltage to obtain the standard charging current.
g. Measure the battery open-circuit voltage after leaving the battery unused for more than 30 minutes.

12.8 V or more --- Charging is complete.
12.7 V or less --- Recharging is required.
Under 12.0 V --- Replace the battery.

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Charging method using a constant voltage charger

a. Measure the open-circuit voltage prior to charging.

TIP
Voltage should be measured 30 minutes after the engine is turned off.

b. Connect a charger and ammeter to the battery and start charging.
c. Make sure that the current is higher than the standard charging current written on the battery.

TIP
If the current is lower than the standard charging current written on the battery, this type of battery charger cannot charge the VRLA battery. A variable voltage charger is recommended.

d. Charge the battery until the battery's charging voltage is 15 V.

TIP
Set the charging time at 20 hours (maximum).

e. Measure the battery open-circuit voltage after leaving the battery unused for more than 30 minutes.

12.8 V or more --- Charging is complete.
12.7 V or less --- Recharging is required.
Under 12.0 V --- Replace the battery.

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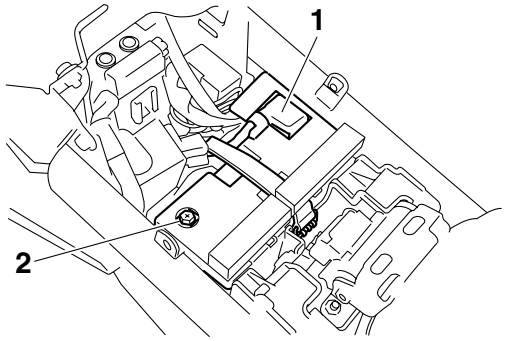
6. Install:
   - Battery
7. Connect:
   - Battery leads
     (to the battery terminals)

ECA4B51013

NOTICE

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



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

	Recommended lubricant **Dielectric grease**

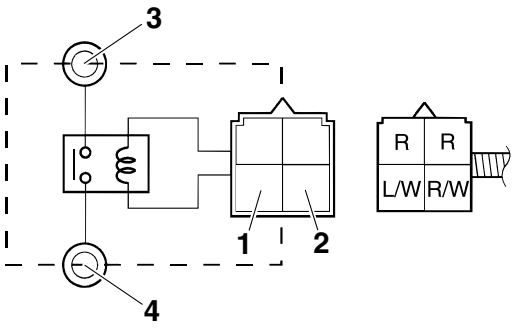
10. Install:
    - Battery cover
    - Battery band
      Refer to "GENERAL CHASSIS" on page 4-1.
    - Seat

EAS28040
CHECKING THE RELAYS
Check each switch for continuity with the digital circuit tester. If the continuity reading is incorrect, replace the relay.

Digital circuit tester
90890-03174
Model 88 Multimeter with tachometer
YU-A1927

1. Disconnect the relay from the wire harness.
2. Connect the digital circuit tester and battery (12 V) to the relay terminal as shown.
   Check the relay operation.
   Out of specification → Replace.

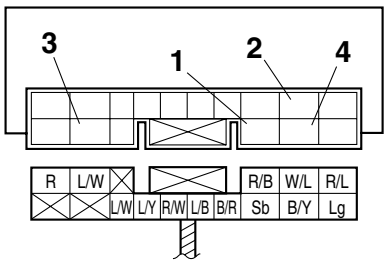
Starter relay



1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe

Result
Continuity
(between "3" and "4")

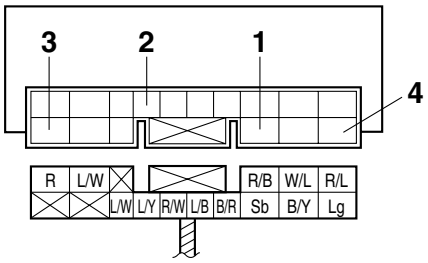
Relay unit (starting circuit cut-off relay)



1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe

Result
Continuity
(between "3" and "4")

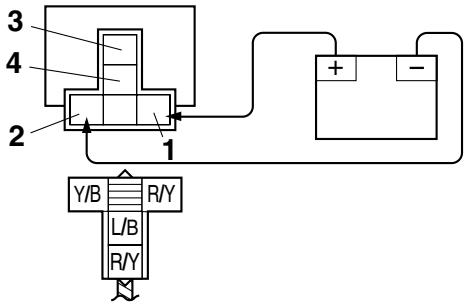
Relay unit (fuel injection system relay)



1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe

Result
Continuity
(between "3" and "4")

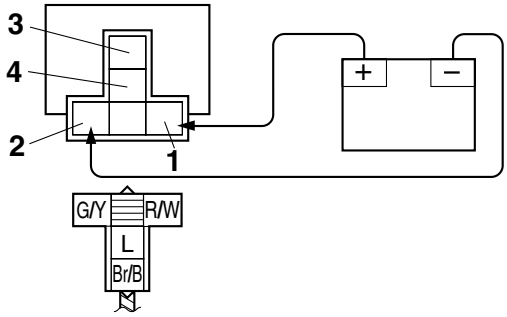
Headlight relay



1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe

Result
Continuity
(between "3" and "4")

Radiator fan motor relay



1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe

Result
Continuity
(between "3" and "4")

EAS4B51020

CHECKING THE TURN SIGNAL/HAZARD RELAY

1. Check:
   - Turn signal/hazard relay input voltage
     Out of specification → The wiring circuit from the main switch to the turn signal/hazard relay coupler is faulty and must be repaired.

Turn signal/hazard relay input voltage
DC 12 V

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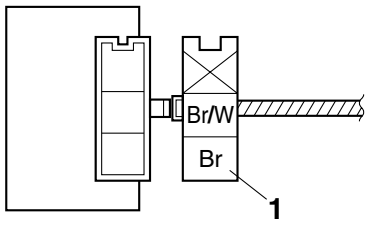
a. Connect the digital circuit tester (DC 20 V) to the turn signal/hazard relay terminal as shown.

Digital circuit tester
90890-03174
Model 88 Multimeter with tachometer
YU-A1927

- Positive tester probe → Brown "1"
- Negative tester probe → ground



b. Turn the main switch to "ON".
c. Measure the turn signal/hazard relay input voltage.

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2. Check:
   - Turn signal/hazard relay output voltage
     Out of specification → Replace.

Turn signal/hazard relay output voltage
DC 12 V

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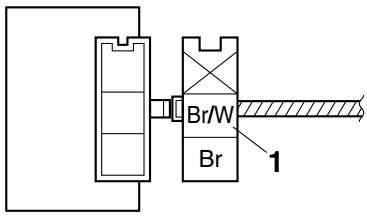
a. Connect the digital circuit tester to the turn signal/hazard relay terminal as shown.

Digital circuit tester
90890-03174
Model 88 Multimeter with tachometer
YU-A1927

- Positive tester probe → Brown/White "1"
- Negative tester probe → ground



b. Turn the main switch to "ON".
c. Measure the turn signal/hazard relay output voltage.

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EAS28050

CHECKING THE RELAY UNIT (DIODE)

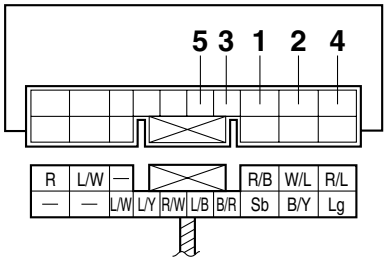
1. Check:
   - Relay unit (diode)
     Out of specification → Replace.

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

TIP

The pocket tester and the analog pocket tester readings are shown in the following table.

Continuity
Positive tester probe → Sky blue "1"
Negative tester probe → Black/Yellow "2"
No continuity
Positive tester probe → Black/Yellow "2"
Negative tester probe → Sky blue "1"
Continuity
Positive tester probe → Sky blue "1"
Negative tester probe → Black/Red "3"
No continuity
Positive tester probe → Black/Red "3"
Negative tester probe → Sky blue "1"
Continuity
Positive tester probe → Sky blue "1"
Negative tester probe → Light green "4"
No continuity
Positive tester probe → Light green "4"
Negative tester probe → Sky blue "1"
Continuity
Positive tester probe → Blue/Black "5"
Negative tester probe → Black/Red "3"
No continuity
Positive tester probe → Black/Red "3"
Negative tester probe → Blue/Black "5"



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a. Disconnect the relay unit coupler from the wire harness.
b. Connect the pocket tester (Ω×1) to the relay

unit terminal as shown.
c. Check the relay unit (diode) for continuity.
d. Check the relay unit (diode) for no continuity.

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EAS28930
CHECKING THE IGNITION SPARK GAP
1. Check:
   • Ignition spark gap
   Out of specification → Perform the ignition system troubleshooting, starting with step 5. Refer to "TROUBLESHOOTING" on page 8-5.

Minimum ignition spark gap
6.0 mm (0.24 in)

TIP
If the ignition spark gap is within specification, the ignition system circuit is operating normally.

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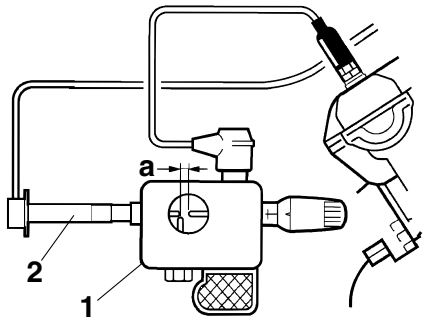
a. Disconnect the spark plug cap from the spark plug.
b. Connect the ignition checker "1" as shown.

Ignition checker
90890-06754
Opama pet-4000 spark checker
YM-34487



1. Ignition checker
2. Spark plug cap

c. Turn the main switch to "ON" and set the engine stop switch to "○".
d. Measure the ignition spark gap "a".
e. Crank the engine by pushing the start switch "⏲" and gradually increase the spark gap until a misfire occurs.

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EAS28070
CHECKING THE SPARK PLUG CAPS
The following procedure applies to all of the spark plug caps.
1. Check:
   • Spark plug cap resistance
   Out of specification → Replace.

Resistance
10.0 kΩ

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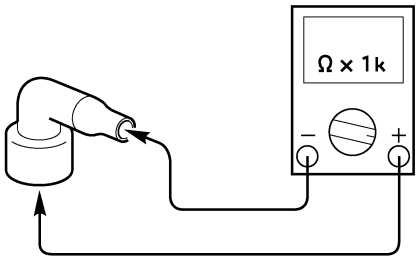
a. Remove the spark plug cap from the spark plug lead.
b. Connect the digital circuit tester (Ω × 1k) to the spark plug cap as shown.

Digital circuit tester
90890-03174
Model 88 Multimeter with tachometer
YU-A1927



c. Measure the spark plug cap resistance.

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EAS28080
CHECKING THE IGNITION COIL
1. Check:
   • Primary coil resistance
   Out of specification → Replace.

Primary coil resistance
1.53–2.07 Ω

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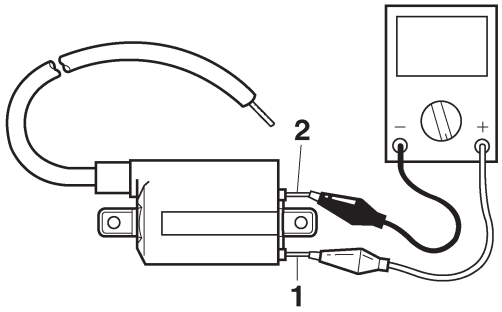
a. Disconnect the ignition coil connectors from the ignition coil terminals.
b. Connect the digital circuit tester (Ω × 1) to the ignition coil as shown.

Digital circuit tester
90890-03174
Model 88 Multimeter with tachometer
YU-A1927

- Positive tester probe→
  Red/Black “1”
- Negative tester probe →
  Orange/Black (Gray/Black)“2”



c. Measure the primary coil resistance.

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2. Check:
   - Secondary coil resistance
     Out of specification → Replace.

Secondary coil resistance
12.00–18.00 kΩ

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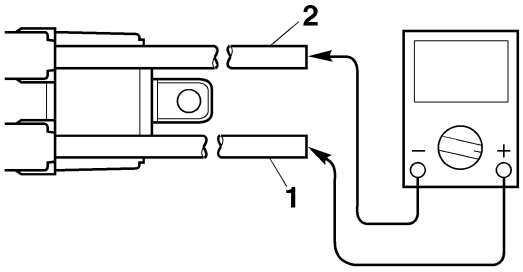
a. Disconnect the spark plug cap from the ignition coil.
b. Connect the digital circuit tester (Ω × 1k) to the ignition coil as shown.

Digital circuit tester
90890-03174
Model 88 Multimeter with tachometer
YU-A1927

- Negative tester probe →
  spark plug lead “1”
- Positive tester probe →
  spark plug lead “2”



c. Measure the secondary coil resistance.

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EAS28120
CHECKING THE CRANKSHAFT POSITION SENSOR

1. Disconnect:
   - Crankshaft position sensor coupler
     (from the wire harness)
2. Check:
   - Crankshaft position sensor resistance
     Out of specification → Replace the crankshaft position sensor/stator assembly.

Crankshaft position sensor resistance
248–372 Ω at 20°C (68°F)

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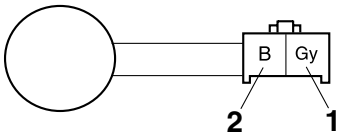
a. Connect the digital circuit tester (Ω × 100) to the crankshaft position sensor coupler as shown.

Digital circuit tester
90890-03174
Model 88 Multimeter with tachometer
YU-A1927

- Positive tester probe →
  Gray “1”
- Negative tester probe →
  Black “2”



b. Measure the crankshaft position sensor resistance.

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EAS28130
CHECKING THE LEAN ANGLE SENSOR

1. Remove:
   - Lean angle sensor
2. Check:
   - Lean angle sensor output voltage
     Out of specification → Replace.

Lean angle sensor output voltage
Less than 65°: 0.4–1.4 V
More than 65°: 3.7–4.4 V

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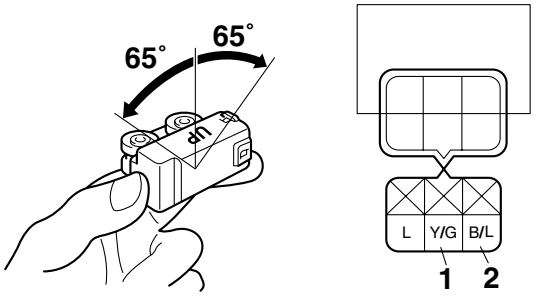
a. Connect the lean angle sensor coupler to the wire harness.
b. Connect the digital circuit tester (DC 20 V) to the lean angle sensor coupler as shown.

Digital circuit tester
90890-03174
Model 88 Multimeter with tachometer
YU-A1927

- Positive tester probe → Yellow/Green “1”
- Negative tester probe → Black/Blue “2”



c. Set the main switch to “ON”.
d. Turn the lean angle sensor 65°.
e. Measure the lean angle sensor output voltage.

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EAS28940
CHECKING THE STARTER MOTOR OPERATION

1. Check:
   - Starter motor operation
     Does not operate → Perform the electric starting system troubleshooting, starting with step 4.
     Refer to “TROUBLESHOOTING” on page 8-13.

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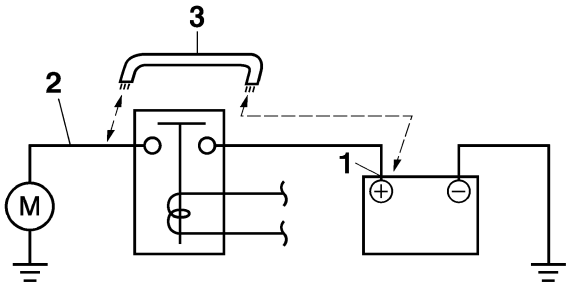
a. Connect the positive battery terminal “1” and starter motor lead “2” with a jumper lead “3”.

EWA13810
WARNING

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



b. Check the starter motor operation.

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EAS28150
CHECKING THE STATOR COIL

1. Disconnect:
   - Stator coil coupler
     (from the wire harness)
2. Check:
   - Stator coil resistance
     Out of specification → Replace the crankshaft position sensor.

Stator coil resistance
0.240–0.360 Ω (W-W)

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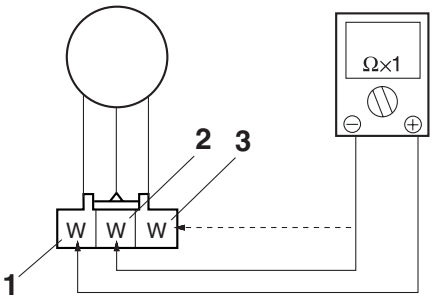
a. Connect the digital circuit tester (Ω × 1) to the stator coil coupler as shown.

Digital circuit tester
90890-03174
Model 88 Multimeter with tachometer
YU-A1927

- Positive tester probe → White “1”
- Negative tester probe → White “2”

- Positive tester probe → White “1”
- Negative tester probe → White “3”

- Positive tester probe → White “2”
- Negative tester probe → White “3”



b. Measure the stator coil resistance.

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EAS28170
CHECKING THE RECTIFIER/REGULATOR

1. Check:
   - Rectifier/regulator output voltage
     Out of specification → Replace the rectifier/regulator.

Rectifier/regulator output voltage
14 V at 5000 r/min

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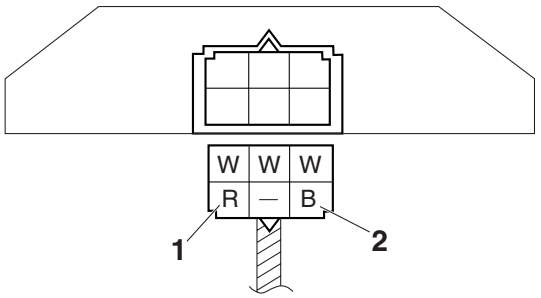
a. Set the engine tachometer to the spark plug lead of cylinder #1.
b. Connect the digital circuit tester (AC 20 V) to the rectifier/regulator coupler as shown.

Digital circuit tester
90890-03174
Model 88 Multimeter with tachometer
YU-A1927

- Positive tester probe → Red “1”
- Negative tester probe → Black “2”



c. Start the engine and let it run at approximately 5000 r/min.
d. Measure the rectifier/regulator output voltage.

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EAS28180
CHECKING THE HORN

1. Check:
   - Horn resistance
     Out of specification → Replace.

Coil resistance
1.07–1.11 Ω

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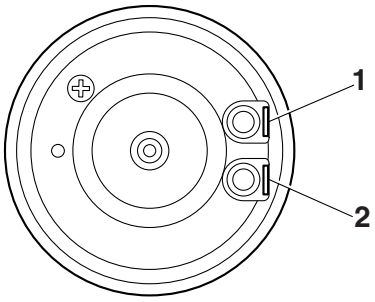
a. Disconnect the horn leads from the horn terminals.
b. Connect the digital circuit tester (Ω × 1) to the horn terminals.

Digital circuit tester
90890-03174
Model 88 Multimeter with tachometer
YU-A1927

- Positive tester probe → horn terminal "1"
- Negative tester probe → horn terminal "2"



c. Measure the horn resistance.

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2. Check:
   - Horn sound
     Faulty sound → Replace.

EAS28190

CHECKING THE ENGINE OIL LEVEL SWITCH

1. Drain:
   - Engine oil
2. Remove:
   - Engine oil level gauge (from the oil pan)
3. Check:
   - Engine oil level gauge resistance
     Out of specification → Replace.

Engine oil level gauge
Minimum level position resistance
114–126 Ω at 20°C (68°F)
Maximum level position resistance
484–536 Ω at 20°C (68°F)

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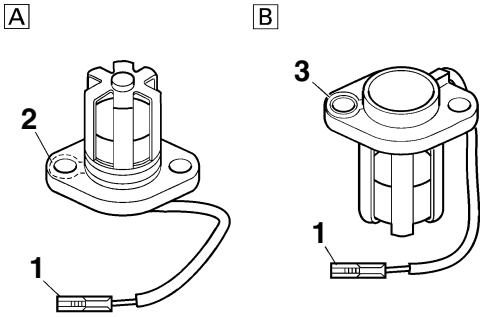
a. Connect the digital circuit tester (Ω × 100) to the engine oil level gauge terminal as shown.

Digital circuit tester
90890-03174
Model 88 Multimeter with tachometer
YU-A1927

Minimum level position "A"
- Positive tester probe
  Connector (White) "1"
- Negative tester probe
  Body earth "2"

Maximum level position "B"
- Positive tester probe
  Connector (White) "1"
- Negative tester probe
  Body earth "3"



b. Measure the pickup coil resistance.

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EAS28370

CHECKING THE AIR INDUCTION SYSTEM SOLENOID

1. Check:
   - Air induction system solenoid resistance
     Out of specification → Replace.

Solenoid resistance
20.5–24.0Ω

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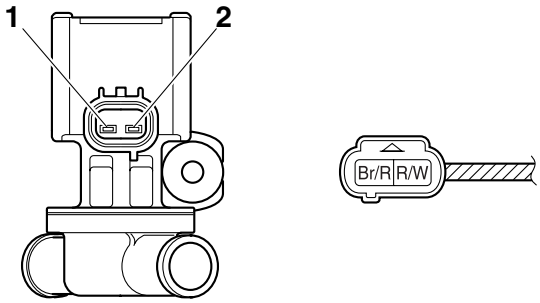
a. Remove the air induction system solenoid coupler from the wire harness.
b. Connect the digital circuit tester (Ω × 1) to the Air induction system solenoid terminal as shown.

Digital circuit tester
90890-03174
Model 88 Multimeter with tachometer
YU-A1927

- Positive tester probe→
  Red/White “1”
- Negative tester probe→
  Brown/Red “2”



c. Measure the air induction system solenoid resistance.

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EAS28230
CHECKING THE FUEL SENDER

1. Disconnect:
   - Fuel pump coupler
   - Fuel sender coupler
   - Fuel hose
     (from the fuel pump)
     Refer to “FUEL TANK” on page 7-1.
2. Remove:
   - Fuel pump
     (from the fuel tank)
     Refer to “FUEL TANK” on page 7-1.
3. Check:
   - Fuel sender resistance
     Out of specification → Replace the fuel pump assembly.

Sender unit resistance (full)
19.0–21.0 Ω
Sender unit resistance (empty)
139.0–141.0 Ω

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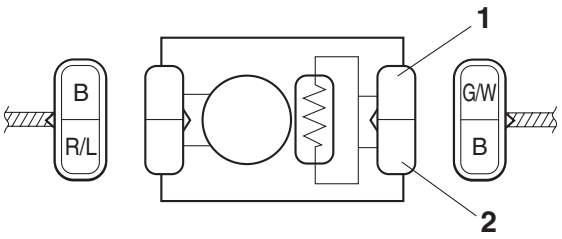
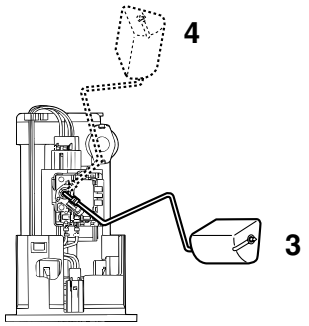
a. Connect the digital circuit tester (Ω × 10) to the fuel pump terminals as shown.

Digital circuit tester
90890-03174
Model 88 Multimeter with tachometer
YU-A1927

- Positive tester probe →
  Green/White “1”
- Negative tester probe →
  Black “2”



b. Move the fuel sender float to empty fuel tank position “3” and full fuel tank position “4” level position.



c. Measure the fuel sender resistance.

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4. Install:
   - Fuel pump
     Refer to “FUEL TANK” on page 7-1.
5. Connect:
   - Fuel hose
   - Fuel sender coupler
   - Fuel pump coupler
     Refer to “FUEL TANK” on page 7-1.

EAS28240
CHECKING THE SPEED SENSOR

1. Check:
   - Speed sensor output voltage
     Out of specification → Replace.

Output voltage reading cycle
0 V to 5.0 V to 0 V to 5.0 V

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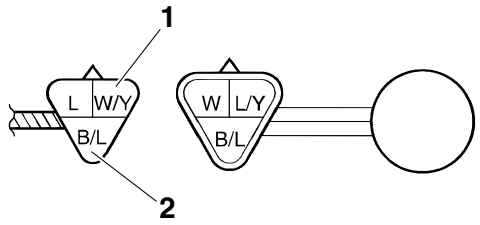
a. Connect the pocket tester (DC 20 V) to the speed sensor coupler (wire harness side) as shown.

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

- Positive tester probe →
  White/Yellow "1"
- Negative tester probe →
  Black/Blue "2"



b. Set the main switch to "ON".
c. Elevate the rear wheel and slowly rotate it.
d. Measure the voltage of white/yellow and black/blue. Each with full rotation of the front wheel, the voltage reading should cycle from 0 V to 5.0 V to 0 V to 5.0 V.

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EAS28250
CHECKING THE RADIATOR FAN MOTOR

1. Check:
   - Radiator fan motor
     Faulty/rough movement → Replace.

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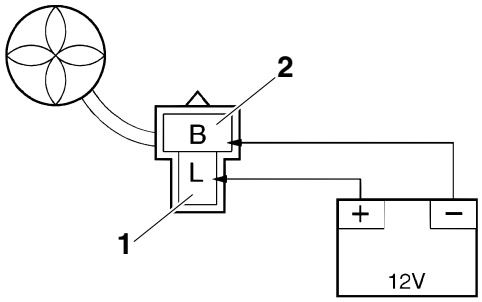
a. Disconnect the radiator fan motor coupler from the wire harness.
b. Connect the battery (DC 12 V) as shown.

- Positive battery terminal →
  Blue "1"
- Negative battery terminal →
  Black "2"



c. Measure the radiator fan motor movement.

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EAS28260
CHECKING THE COOLANT TEMPERATURE SENSOR

1. Remove:
   - Coolant temperature sensor
     Refer to "CYLINDER HEAD" on page 5-16.

EWA14130
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.**

2. Check:
   - Coolant temperature sensor resistance
     Out of specification → Replace.

Coolant temperature sensor resistance
5.21–6.37 kΩ at 0°C (32°F)
290–354 Ω at 80°C (176°F)

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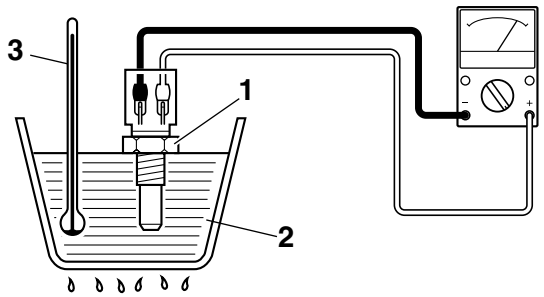
a. Connect the digital circuit tester (Ω × 100) to the coolant temperature sensor terminals as shown.

Digital circuit tester
90890-03174
Model 88 Multimeter with tachometer
YU-A1927

b. Immerse the coolant temperature sensor "1" in a container filled with coolant "2".

TIP
Make sure the coolant temperature sensor terminals do not get wet.

c. Place a thermometer “3” in the coolant.



d. Slowly heat the coolant, and then let it cool down to the specified temperature.
e. Measure the coolant temperature sensor resistance.

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3. Install:
   • Coolant temperature sensor

	Coolant temperature sensor 18 Nm (1.8 m·kgf, 13 ft·lbf)

EAS28300
CHECKING THE THROTTLE POSITION SENSOR

1. Remove:
   • Throttle position sensor (from the throttle body)
2. Check:
   • Throttle position sensor maximum resistance
   Out of specification → Replace the throttle position sensor.

	Resistance 1.75–3.25 kΩ

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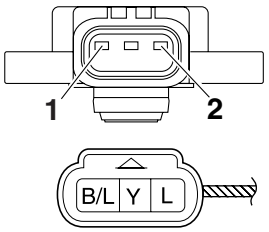
a. Connect the digital circuit tester (Ω × 1k) to the throttle position sensor terminals as shown.

	Digital circuit tester 90890-03174 Model 88 Multimeter with tachometer YU-A1927

• Tester positive lead → Blue “1”
• Tester negative lead → Black/Blue “2”



b. Measure the throttle position sensor maximum resistance.

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3. Install:
   • Throttle position sensor

TIP
When installing the throttle position sensor, adjust its angle properly. Refer to “ADJUSTING THE THROTTLE POSITION SENSOR” on page 7-10.

EAS28410
CHECKING THE INTAKE AIR PRESSURE SENSOR

1. Check:
   • Intake air pressure sensor output voltage
   Out of specification → Replace.

	Intake air pressure sensor output voltage 3.594–3.684 V at 25°C (77°F)

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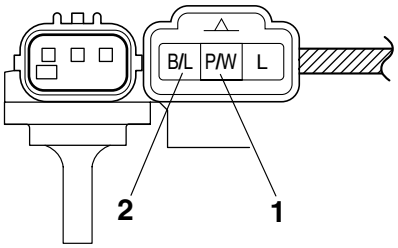
a. Connect the digital circuit tester (DC 20 V) to the intake air pressure sensor coupler as shown.

	Digital circuit tester 90890-03174 Model 88 Multimeter with tachometer YU-A1927

• Positive tester probe → Pink/White “1” • Negative tester probe → Black/Blue “2”



b. Turn the main switch to “ON”.
c. Measure the intake air pressure sensor output voltage.

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EAS28420
CHECKING THE INTAKE AIR TEMPERATURE SENSOR

1. Remove:
   • Intake air temperature sensor (from the air filter case.)

EWA14110
⚠ WARNING

- **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.**

2. Check:
   • Intake air temperature sensor resistance
   Out of specification → Replace.

	Intake air temperature sensor resistance **5.40–6.60 kΩ at 0°C (32°F)** **0.29–0.39 kΩ at 80°C (176°F)**

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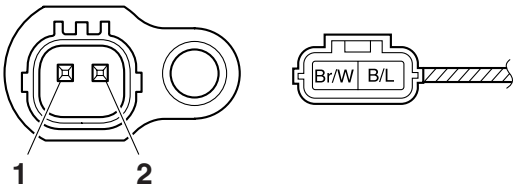
a. Connect the digital circuit tester (Ω × 100) to the intake air temperature sensor terminal as shown.

	Digital circuit tester **90890-03174** **Model 88 Multimeter with tachometer** **YU-A1927**

• Positive tester probe Black/Blue “1” • Negative tester probe Brown/White “2”



b. Measure the intake air temperature sensor resistance.

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TROUBLESHOOTING

TROUBLESHOOTING 9-1
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EAS28450
TROUBLESHOOTING

EAS28460
GENERAL INFORMATION

TIP

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.

EAS28470
STARTING FAILURES

Engine

1. 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
2. Piston(s) and piston ring(s)
   - Improperly installed piston ring
   - Damaged, worn or fatigued piston ring
   - Seized piston ring
   - Seized or damaged piston
3. Air filter
   - Improperly installed air filter
   - Clogged air filter element
4. Crankcase and crankshaft
   - Improperly assembled crankcase
   - Seized crankshaft

Fuel system

1. Fuel tank
   - Empty fuel tank
   - Clogged fuel filter
   - Clogged fuel tank drain hose
   - Deteriorated or contaminated fuel
2. Fuel pump
   - Faulty fuel pump
   - Faulty fuel injection system relay
3. Throttle body(-ies)
   - Deteriorated or contaminated fuel
   - Sucked-in air

Electrical system

1. Battery
   - Discharged battery
   - Faulty battery
2. Fuse(s)
   - Blown, damaged or incorrect fuse
   - Improperly installed fuse
3. Spark plug(s)
   - Incorrect spark plug gap
   - Incorrect spark plug heat range
   - Fouled spark plug
   - Worn or damaged electrode
   - Worn or damaged insulator
   - Faulty spark plug cap
4. Ignition coil(s)
   - Cracked or broken ignition coil body
   - Broken or shorted primary or secondary coils
   - Faulty spark plug lead
5. Ignition system
   - Faulty ECU
   - Faulty crankshaft position sensor
6. 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
7. Starting system
   - Faulty starter motor
   - Faulty starter relay
   - Faulty starting circuit cut-off relay
   - Faulty starter clutch

EAS28490
INCORRECT ENGINE IDLING SPEED

Engine

1. Cylinder(s) and cylinder head(s)
   - Incorrect valve clearance
   - Damaged valve train components
2. Air filter
   - Clogged air filter element

Fuel system

1. 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 system

1. Battery
   - Discharged battery

- Faulty battery

2. Spark plug(s)
   - Incorrect spark plug gap
   - Incorrect spark plug heat range
   - Fouled spark plug
   - Worn or damaged electrode
   - Worn or damaged insulator
   - Faulty spark plug cap
3. Ignition coil(s)
   - Broken or shorted primary or secondary coils
   - Faulty spark plug lead
   - Cracked or broken ignition coil
4. Ignition system
   - Faulty ECU
   - Faulty crankshaft position sensor

EAS28510

POOR MEDIUM-AND-HIGH-SPEED PERFORMANCE

Refer to “STARTING FAILURES” on page 9-1.

Engine

1. Air filter
   - Clogged air filter element

Fuel system

1. Fuel pump
   - Faulty fuel pump

EAS28530

FAULTY GEAR SHIFTING

Shifting is difficult

Refer to “Clutch drags”.

EAS28540

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

EAS28550

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

EAS28560

FAULTY CLUTCH

Clutch slips

1. Clutch
   - Improperly assembled clutch
   - Improperly adjusted clutch cable
   - Loose or fatigued clutch spring
   - Worn friction plate
   - Worn clutch plate
2. Engine oil
   - Incorrect oil level
   - Incorrect oil viscosity (low)
   - Deteriorated oil

Clutch drags

1. Clutch
   - Unevenly tensioned clutch springs
   - Warped pressure plate
   - Bent clutch plate
   - Swollen friction plate
   - Bent clutch push rod
   - Damaged clutch boss
   - Burnt primary driven gear bushing
   - Match marks not aligned
2. Engine oil
   - Incorrect oil level
   - Incorrect oil viscosity (high)
   - Deteriorated oil

EAS28600

OVERHEATING

Engine

1. Clogged coolant passages
   - Cylinder head(s) and piston(s)
   - Heavy carbon buildup
2. Engine oil
   - Incorrect oil level
   - Incorrect oil viscosity
   - Inferior oil quality

Cooling system

1. Coolant
   - Low coolant level
2. Radiator
   - Damaged or leaking radiator
   - Faulty radiator cap
   - Bent or damaged radiator fin
3. 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

1. Throttle body(-ies)
   - Damaged or loose throttle body joint
2. Air filter
   - Clogged air filter element

Chassis

1. Brake(s)
   - Dragging brake

Electrical system

1. Spark plug(s)
   - Incorrect spark plug gap
   - Incorrect spark plug heat range
2. Ignition system
   - Faulty ECU
3. Cooling system
   - Faulty radiator fan motor relay
   - Faulty coolant temperature sensor
   - Faulty ECU

EAS28610

OVERCOOLING

Cooling system

1. Thermostat
   - Thermostat stays open

EAS28620

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

EAS28660

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

EAS28670

UNSTABLE HANDLING

1. Handlebar
   - Bent or improperly installed handlebar
2. Steering head components
   - Improperly installed upper bracket
   - Improperly installed lower bracket (improperly tightened ring nut)
   - Bent steering stem
   - Damaged ball bearing or bearing race
3. 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
4. Swingarm
   - Worn bearing or bushing
   - Bent or damaged swingarm
5. Rear shock absorber assembly(-ies)
   - Faulty rear shock absorber spring
   - Leaking oil or gas
6. Tire(s)
   - Uneven tire pressures (front and rear)
   - Incorrect tire pressure
   - Uneven tire wear
7. Wheel(s)
   - Incorrect wheel balance
   - Deformed cast wheel
   - Damaged wheel bearing
   - Bent or loose wheel axle
   - Excessive wheel runout
8. Frame
   - Bent frame
   - Damaged steering head pipe
   - Improperly installed bearing race

EAS28710

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
- Wrong tail/brake light bulb
- Too many electrical accessories
- Incorrect connection
- Burnt-out tail/brake light bulb

Tail/brake light bulb burnt out
- Wrong tail/brake light bulb
- Faulty battery
- Incorrectly adjusted rear brake light switch
- Tail/brake light bulb life expired

Turn signal does not 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
- Damaged or faulty horn
- Faulty main switch
- Faulty horn switch
- Faulty battery
- Blown, damaged or incorrect fuse
- Faulty wire harness

EAS4S81006

TROUBLESHOOTING AT THE ABS WARNING LIGHT

Refer to “BASIC PROCESS FOR TROUBLESHOOTING” on page 8-107.

EAS28740

WIRING DIAGRAM

XJ6S 2009

1.AC magneto
2.Rectifier/regulator
3.Battery
4.Main fuse
5.Starter relay
6.Starter motor
7.Fuel injection system fuse
8.Backup fuse (odometer, clock and immobilizer system)
9.Radiator fan fuse
10.Main switch
11.Radiator fan motor relay
12.Radiator fan motor
13.Relay unit
14.Starting circuit cut-off relay
15.Fuel injection system relay
16.Neutral switch
17.Sidestand switch
18.Rear brake light switch
19.Right handlebar switch
20.Front brake light switch
21.Engine stop switch
22.Start switch
23.Fuel pump
24.Fuel sender
25.Throttle position sensor
26.Intake air pressure sensor
27.Intake air temperature sensor
28.Coolant temperature sensor
29.Lean angle sensor
30.Speed sensor
31.O_2 sensor
32.Crankshaft position sensor
33.ECU (engine control unit)
34.Fuel injector #1
35.Fuel injector #2
36.Fuel injector #3
37.Fuel injector #4
38.Ignition coil #1,4
39.Ignition coil #2,3
40.Spark plug
41.Air induction system solenoid
42.Meter assembly
43.Immobilizer system indicator light
44.Oil level warning light
45.Neutral indicator light
46.Tachometer
47.Multi-function meter
48.Engine trouble warning light
49.Coolant temperature warning light
50.High beam indicator light
51.Turn signal indicator light
52.Meter light
53.Oil level switch
54.Left handlebar switch
55.Clutch switch
56.Pass switch
57.Dimmer switch
58.Hazard switch
59.Turn signal switch
60.Horn switch
61.Horn
62.Front right turn signal light
63.Front left turn signal light
64.Rear right turn signal light
65.Rear left turn signal light
66.License plate light
67.Tail/brake light
68.Headlight
69.Auxiliary light
70.Ignition fuse
71.Signal fuse
72.Headlight fuse
73.Taillight fuse
74.Headlight relay
75.Turn signal/hazard relay
76.Immobilizer unit
77.Anti-theft alarm (OPTION)

EAS4S81047

COLOR CODE

B	Black
Br	Brown
Ch	Chocolate
Dg	Dark green
G	Green
Gy	Gray
L	Blue
Lg	Light green
R	Red
Sb	Sky blue
W	White
Y	Yellow
B/G	Black/Green
B/L	Black/Blue
B/R	Black/Red
B/W	Black/White
B/Y	Black/Yellow
Br/B	Brown/Black
Br/L	Brown/Blue
Br/R	Brown/Red
Br/W	Brown/White
G/B	Green/Black
G/L	Green/Blue
G/W	Green/White
G/Y	Green/Yellow
Gy/B	Gray/Black
Gy/G	Gray/Green
L/B	Blue/Black
L/R	Blue/Red
L/W	Blue/White
L/Y	Blue/Yellow
O/B	Orange/Black
P/B	Pink/Black
P/W	Pink/White
R/B	Red/Black
R/G	Red/Green
R/L	Red/Blue
R/W	Red/White
R/Y	Red/Yellow
W/L	White/Blue
W/Y	White/Yellow
Y/B	Yellow/Black
Y/G	Yellow/Green
Y/L	Yellow/Blue
Y/R	Yellow/Red

XJ6SA 2009

1.AC magneto
2.Rectifier/regulator
3.ABS motor fuse
4.ABS solenoid fuse
5.Battery
6.Main fuse
7.Starter relay
8.Starter motor
9.Fuel injection system fuse
10.Backup fuse (odometer, clock and immobilizer system)
11.Radiator fan fuse
12.Main switch
13.Radiator fan motor relay
14.Radiator fan motor
15.Relay unit
16.Starting circuit cut-off relay
17.Fuel injection system relay
18.Neutral switch
19.Sidestand switch
20.Rear brake light switch
21.Right handlebar switch
22.Front brake light switch
23.Engine stop switch
24.Start switch
25.Fuel pump
26.Fuel sender
27.Throttle position sensor
28.Intake air pressure sensor
29.Intake air temperature sensor
30.Coolant temperature sensor
31.Lean angle sensor
32.O_2 sensor
33.Crankshaft position sensor
34.ECU (engine control unit)
35.Fuel injector #1
36.Fuel injector #2
37.Fuel injector #3
38.Fuel injector #4
39.Ignition coil #1,4
40.Ignition coil #2,3
41.Spark plug
42.Air induction system solenoid
43.Front wheel sensor
44.Rear wheel sensor
45.ABS ECU (electronic control unit)
46.ABS test coupler
47.Meter assembly
48.Immobilizer system indicator light
49.Oil level warning light
50.Neutral indicator light
51.Tachometer
52.Multi-function meter
53.Engine trouble warning light
54.Coolant temperature warning light
55.High beam indicator light
56.Turn signal indicator light
57.ABS warning light
58.Meter light
59.Oil level switch
60.Left handlebar switch
61.Clutch switch
62.Pass switch
63.Dimmer switch
64.Hazard switch
65.Turn signal switch
66.Horn switch
67.Horn
68.Front right turn signal light
69.Front left turn signal light
70.Rear right turn signal light
71.Rear left turn signal light
72.License plate light
73.Tail/brake light
74.Headlight
75.Auxiliary light
76.ABS ECU fuse
77.Ignition fuse
78.Signal fuse
79.Headlight fuse
80.Taillight fuse
81.Headlight relay
82.Turn signal/hazard relay
83.Immobilizer unit
84.Anti-theft alarm (OPTION)

EAS4S81049

COLOR CODE

B	Black
Br	Brown
Ch	Chocolate
Dg	Dark green
G	Green
Gy	Gray
L	Blue
Lg	Light green
R	Red
Sb	Sky blue
W	White
Y	Yellow
B/G	Black/Green
B/L	Black/Blue
B/R	Black/Red
B/W	Black/White
B/Y	Black/Yellow
Br/B	Brown/Black
Br/L	Brown/Blue
Br/R	Brown/Red
Br/W	Brown/White
G/B	Green/Black
G/L	Green/Blue
G/R	Green/Red
G/W	Green/White
G/Y	Green/Yellow
Gy/B	Gray/Black
Gy/G	Gray/Green
L/B	Blue/Black
L/R	Blue/Red
L/W	Blue/White
L/Y	Blue/Yellow
O/B	Orange/Black
P/B	Pink/Black
P/W	Pink/White
R/B	Red/Black
R/G	Red/Green
R/L	Red/Blue
R/W	Red/White
R/Y	Red/Yellow
W/L	White/Blue
W/R	White/Red
W/Y	White/Yellow
Y/B	Yellow/Black
Y/G	Yellow/Green
Y/L	Yellow/Blue
Y/R	Yellow/Red

YAMAHA MOTOR CO., LTD.
2500 SHINGAI IWATA SHIZUOKA JAPAN

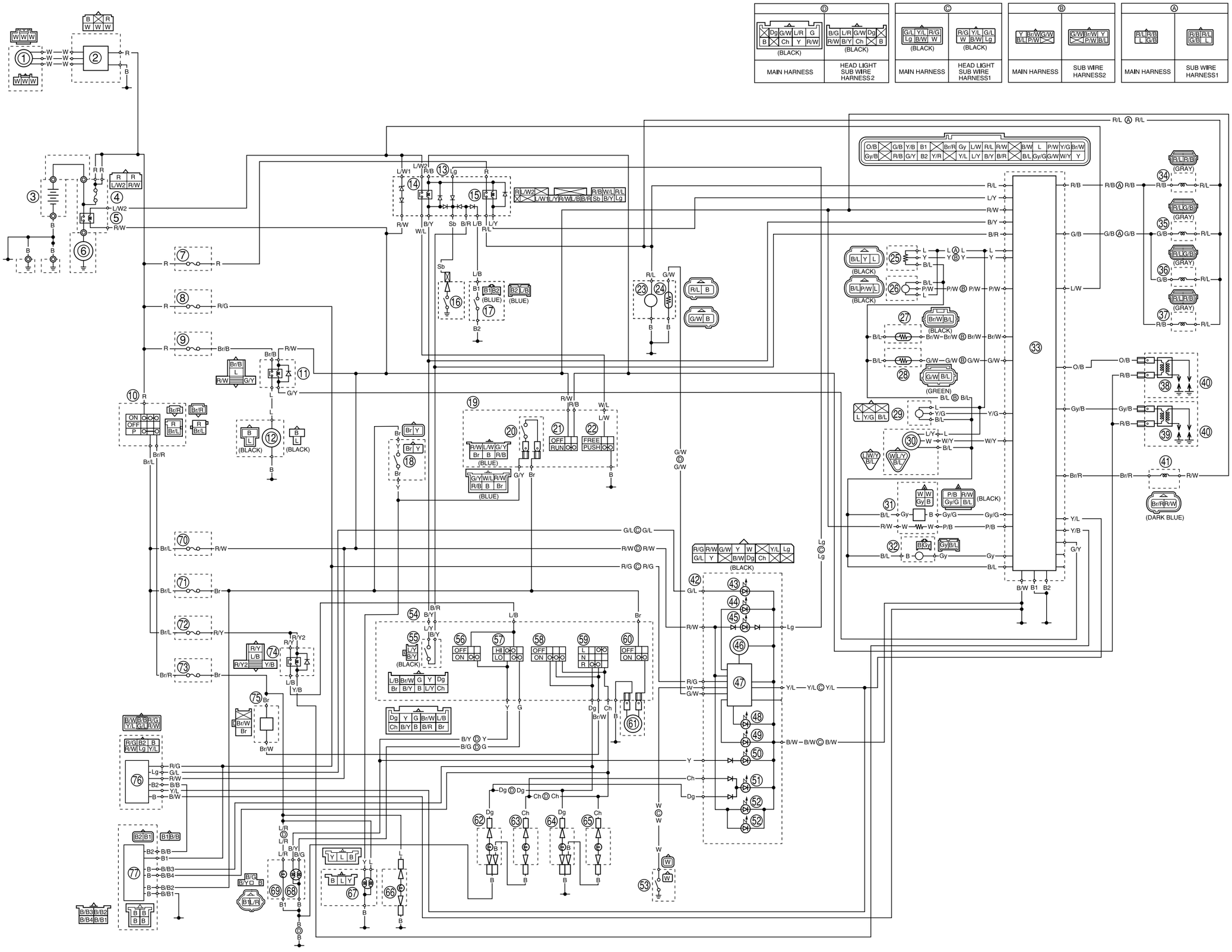
XJ6S 2009
WIRING DIAGRAM

XJ6S 2009
SCHÉMA DE CÂBLAGE

XJ6S 2009
SCHALTPLAN

XJ6S 2009
SCHEMA ELETTRICO

XJ6S 2009
DIAGRAMA ELÉCTRICO



XJ6S 2009
WIRING DIAGRAM

XJ6S 2009
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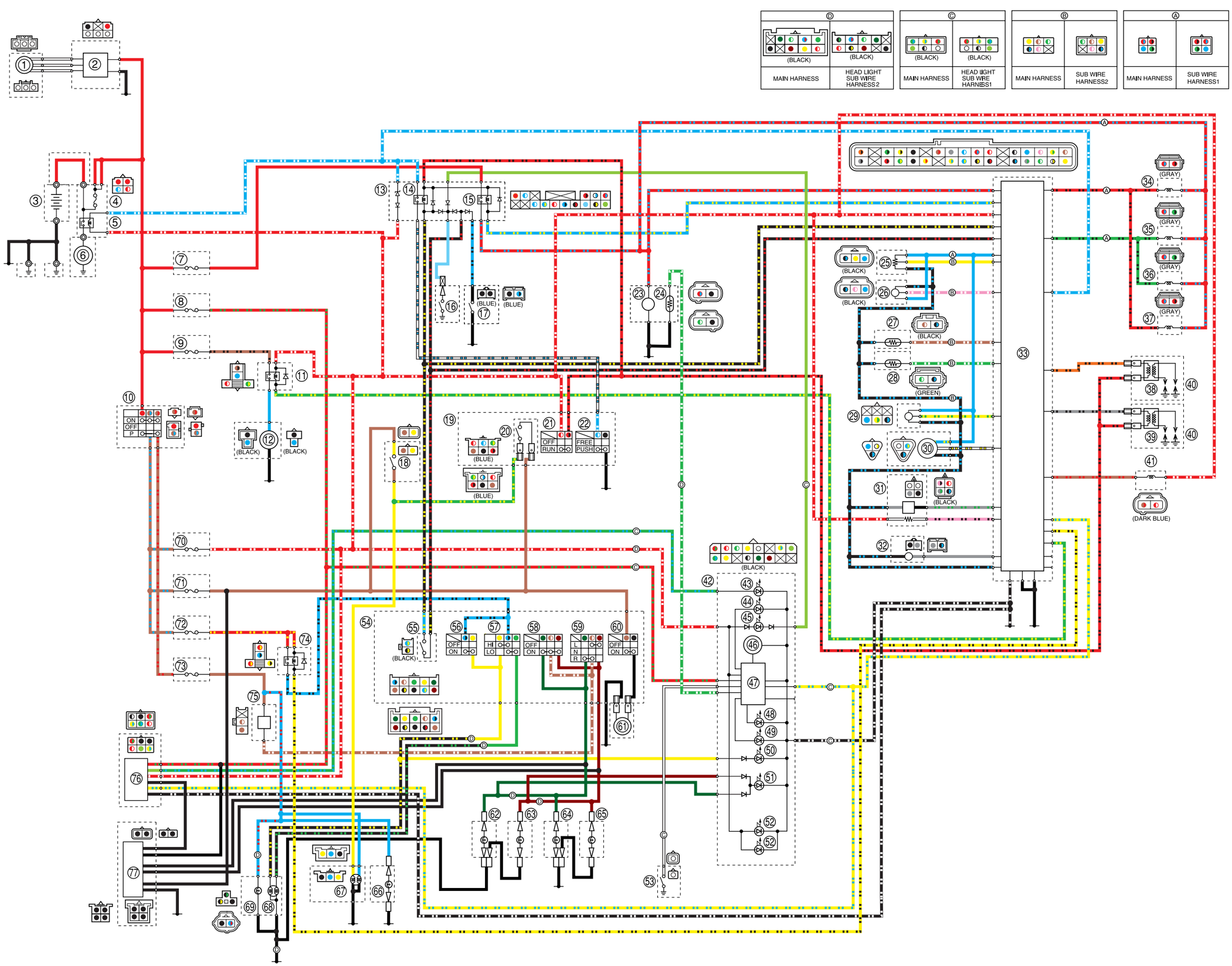
SCHALTPLAN

XJ6S 2009
SCHEMA ELETTRICO

XJ6S 2009
DIAGRAMA ELÉCTRICO



XJ6SA 2009
WIRING DIAGRAM

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SCHÉMA DE CÂBLAGE

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XJ6SA 2009
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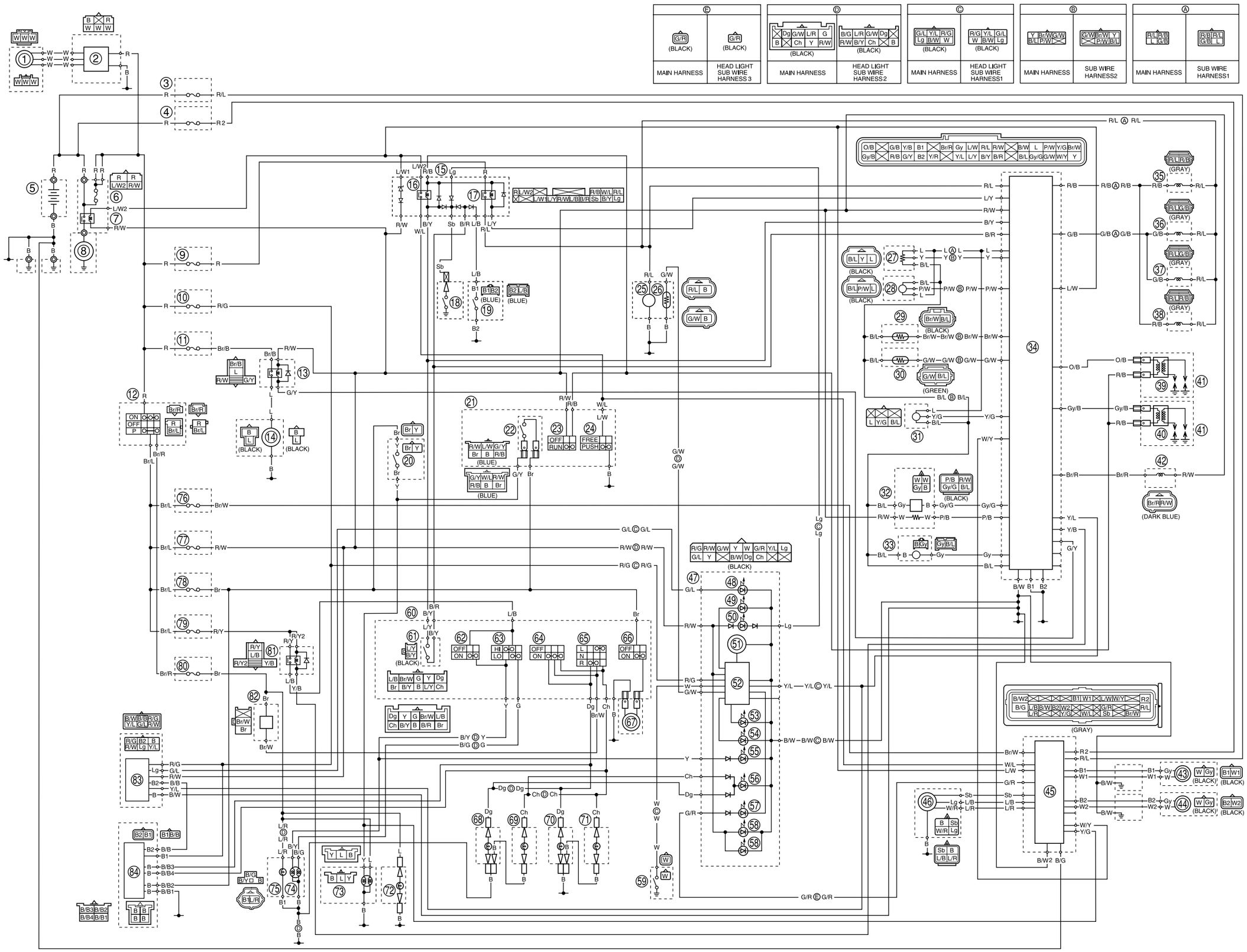

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