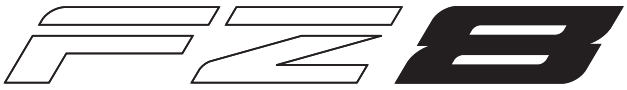
YAMAHA 2011

SERVICE MANUAL

FZ8NA
FZ8SA



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EAS20040

FZ8NA
FZ8SA
SERVICE MANUAL

First edition, May 2010

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.

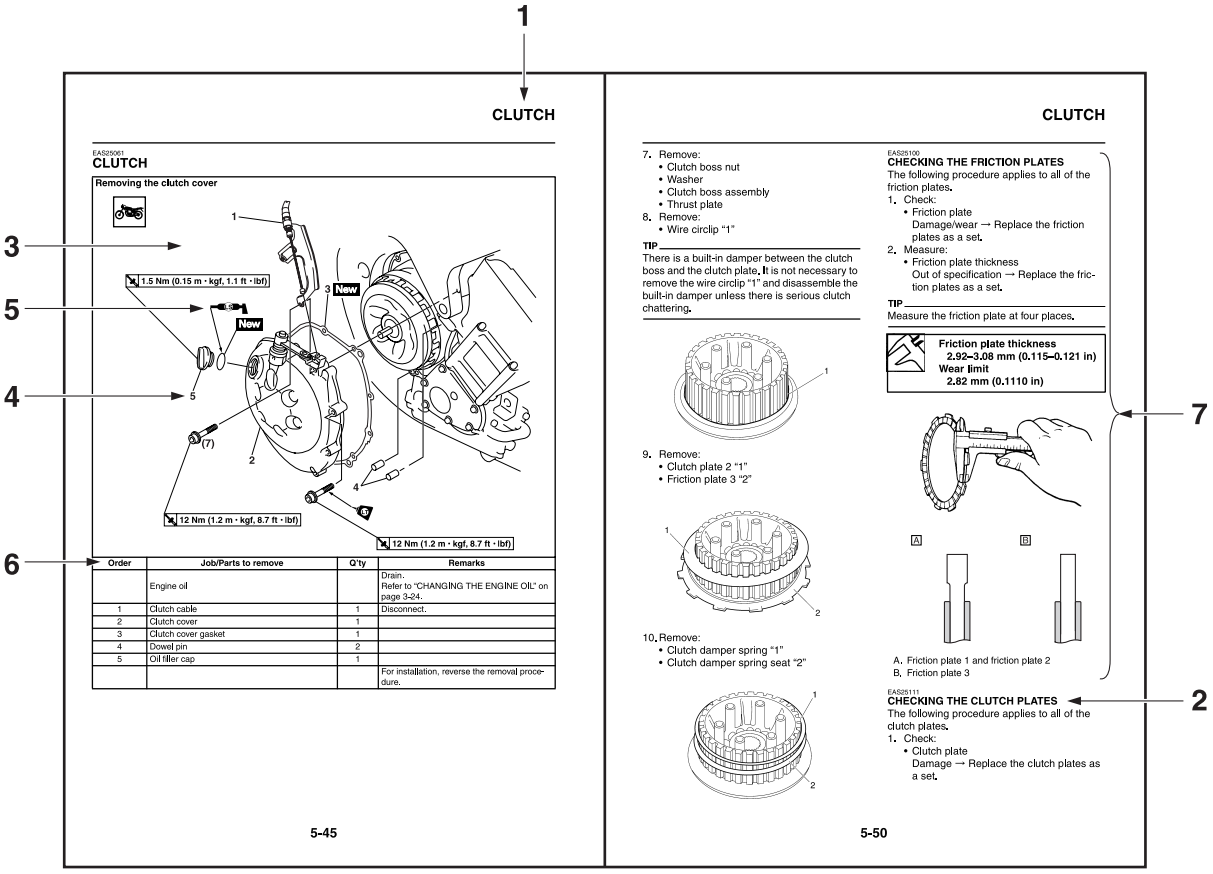
⚠	**This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.**
⚠ WARNING	**A WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.**
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.

EAS20091

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 “1” is shown at the top of each page.
- Sub-section titles “2” appear in smaller print than the section title.
- To help identify parts and clarify procedure steps, there are exploded diagrams “3” at the start of each removal and disassembly section.
- Numbers “4” are given in the order of the jobs in the exploded diagram. A number indicates a disassembly step.
- Symbols “5” indicate parts to be lubricated or replaced.
  Refer to “SYMBOLS”.
- A job instruction chart “6” accompanies the exploded diagram, providing the order of jobs, names of parts, notes in jobs, etc.
- Jobs “7” requiring more information (such as special tools and technical data) are described sequentially.

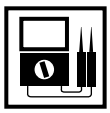


EAS20101
SYMBOLS

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 (LOC-TITE®).
	Engine oil	New	Replace the part with a new one.

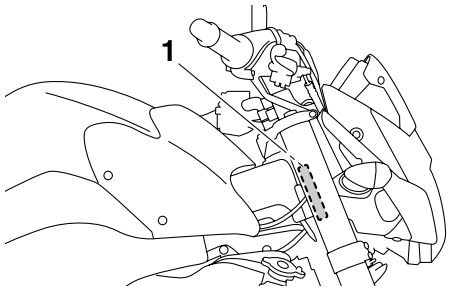
EAS20110

TABLE OF CONTENTS

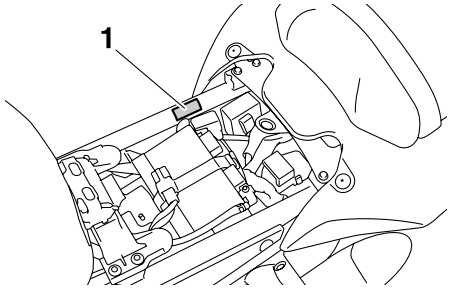
GENERAL INFORMATION

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

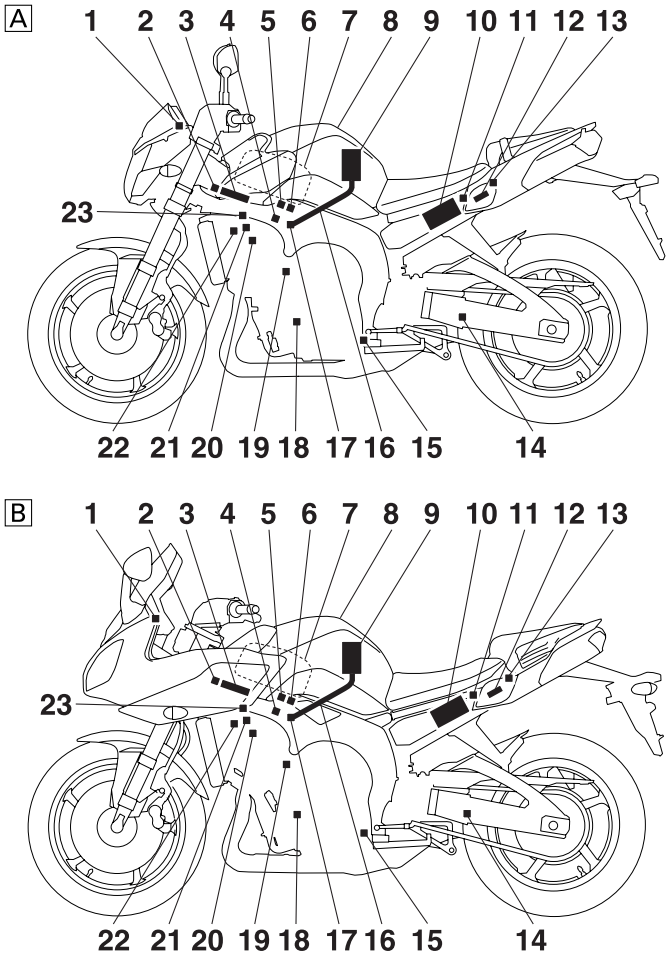
EAS39P1101
OUTLINE OF THE FI SYSTEM

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

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

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

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



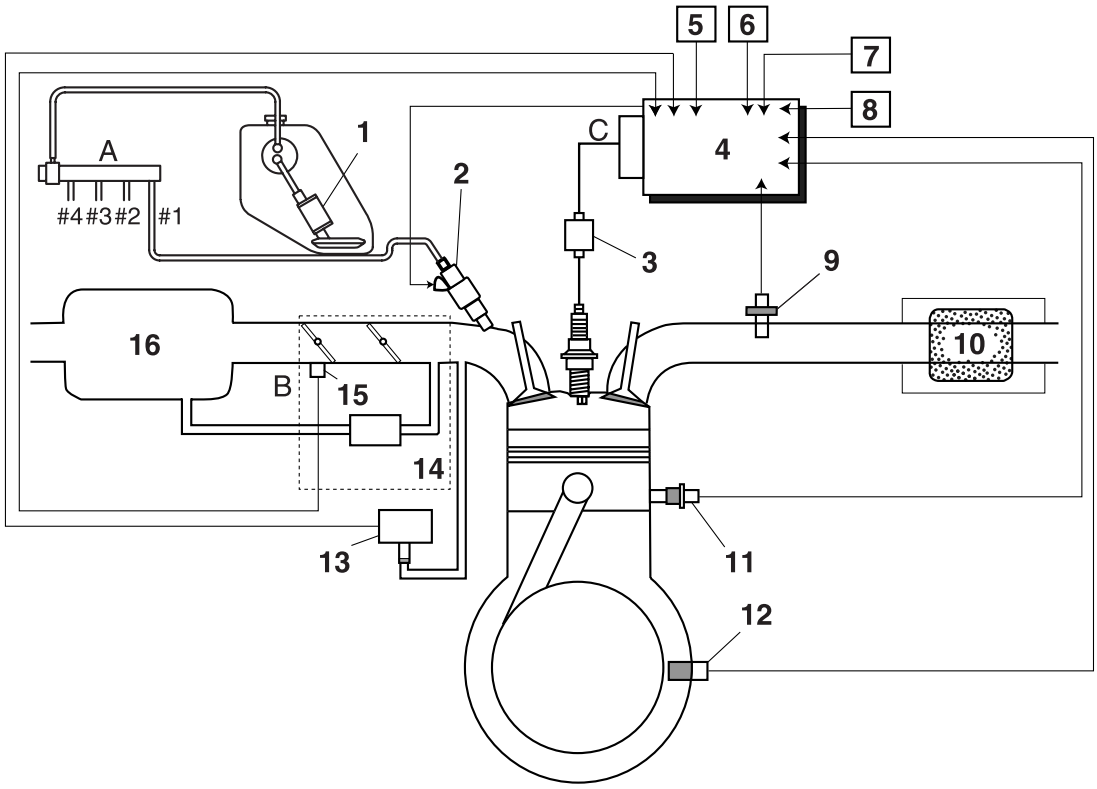
1. Engine trouble warning light
2. Intake air temperature sensor
3. ECU (engine control unit)
4. Intake air pressure sensor
5. Throttle position sensor
6. Sub-throttle position sensor
7. Air filter case
8. Fuel tank
9. Fuel pump
10. Battery
11. Atmospheric pressure sensor
12. Relay unit (fuel pump relay)
13. Lean angle sensor
14. Catalytic converter
15. O_2 sensor
16. Fuel hose
17. Fuel injector
18. Crankshaft position sensor
19. Coolant temperature sensor
20. Spark plug
21. Ignition coil
22. Cylinder identification sensor
23. Air cut-off valve

A. FZ8NA
B. FZ8SA

EAS39P1102
FI SYSTEM

The fuel pump delivers fuel to the fuel injector via the fuel filter. The pressure regulator maintains the fuel pressure that is applied to the fuel injector at only 324 kPa (3.24 kgf/cm², 46.1 psi). Accordingly, when the energizing signal from the ECU energizes the fuel injector, the fuel passage opens, causing the fuel to be injected into the intake manifold only during the time the passage remain open. Therefore, the longer the length of time the fuel injector is energized (injection duration), the greater the volume of fuel that is supplied. Conversely, the shorter the length of time the fuel injector is energized (injection duration), the lesser the volume of fuel that is supplied.
The injection duration and the injection timing are controlled by the ECU. Signals that are input from the throttle position sensor, sub-throttle position sensor, crankshaft position sensor, intake air pressure sensor, atmospheric pressure sensor, intake air temperature sensor, coolant temperature sensor, speed sensor and O_2 sensor enable the ECU to determine the injection duration. The injection timing is determined through the signals from the crankshaft position sensor. As a result, the volume of fuel that is required by the engine can be supplied at all times in accordance with the driving conditions.

Illustration is for reference only.

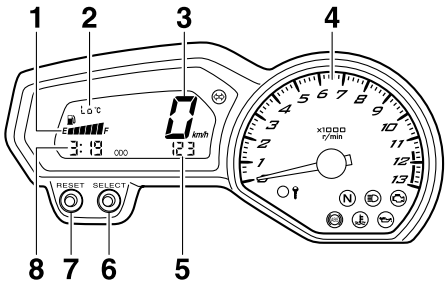


1. Fuel pump
2. Fuel injector
3. Ignition coil
4. ECU (engine control unit)
5. Intake air temperature sensor
6. Speed sensor
7. Throttle position sensor
8. Atmospheric pressure sensor
9. O_2 sensor
10. Catalytic converter
11. Coolant temperature sensor
12. Crankshaft position sensor
13. Intake air pressure sensor
14. Throttle body
15. Sub-throttle position sensor
16. Air filter case

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

EAS39P1103
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

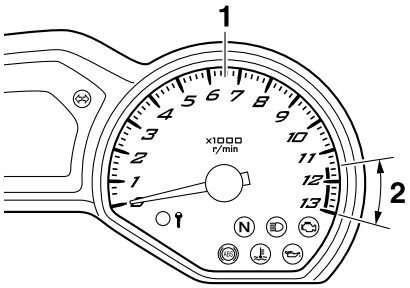
EWA12422
⚠ WARNING

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



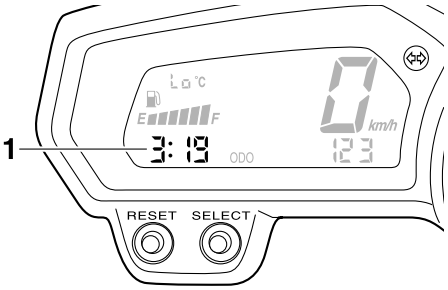
1. Tachometer
2. Tachometer red zone

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.

ECA10031
NOTICE

Do not operate the engine in the tachometer red zone.
Red zone: 11500 r/min and above

Clock



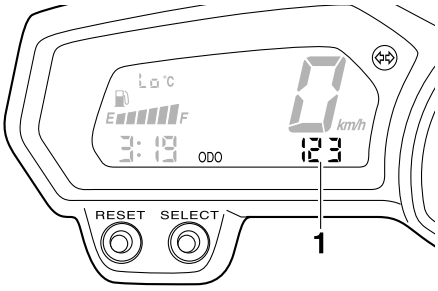
1. Clock

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.

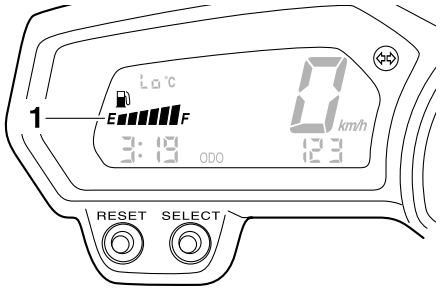
Odometer and tripmeter modes



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 3.4 L (0.90 US gal, 0.75 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

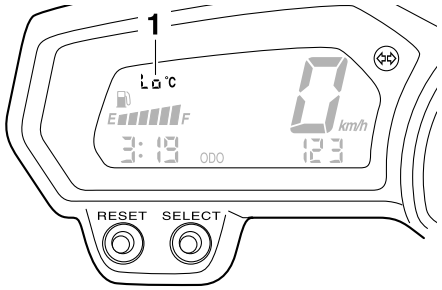


1. Fuel meter

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, have a Yamaha dealer check the electrical circuit.

Coolant temperature display

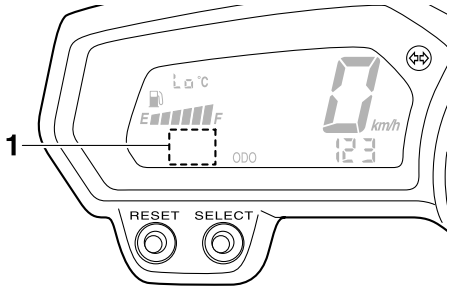


1. Coolant temperature display

The coolant temperature display indicates the temperature of the coolant.

ECA10021
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, take the vehicle, the code re-registering key and both standard keys to a Yamaha dealer and have the standard keys re-registered.

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

ECA11590

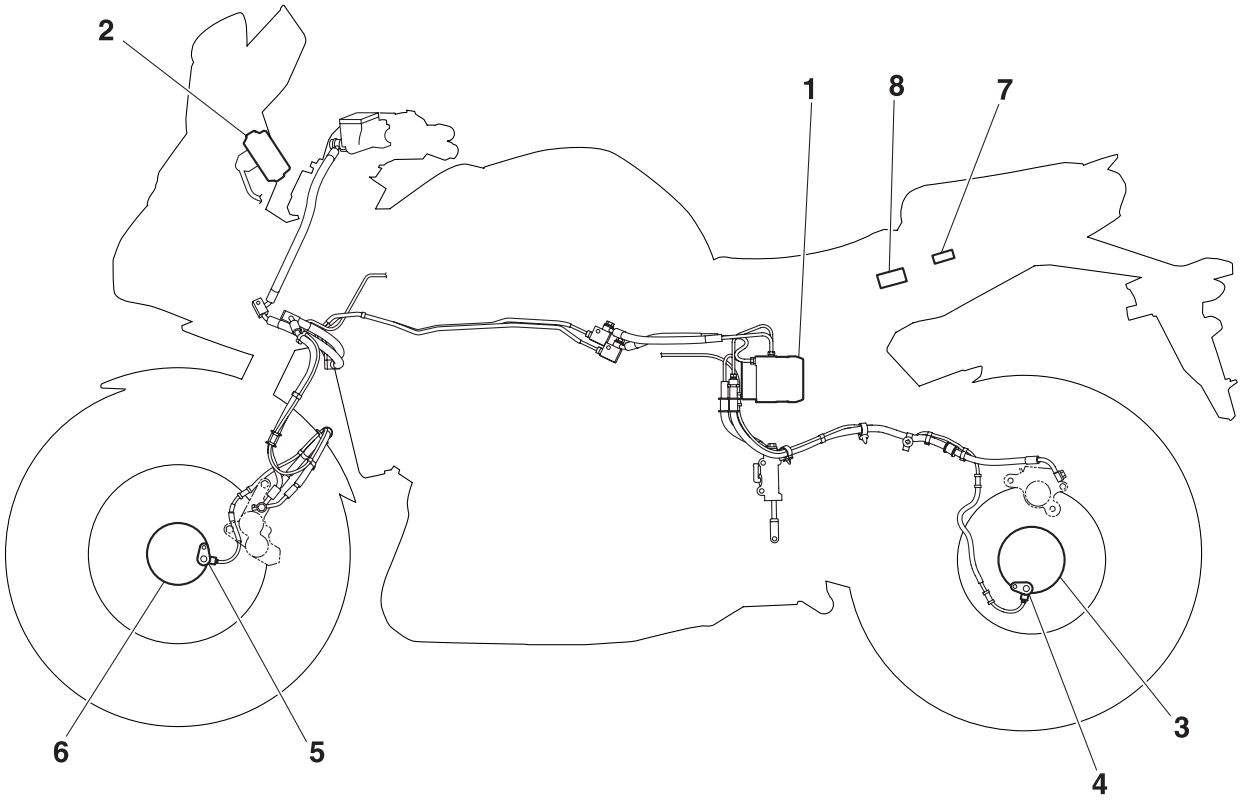
NOTICE

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 1

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).

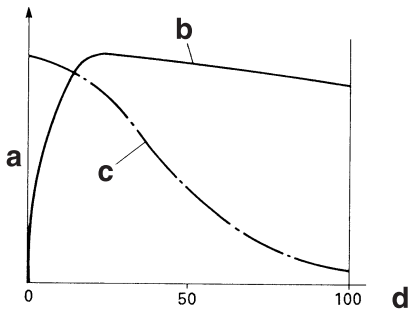
Brake force and vehicle stability

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.

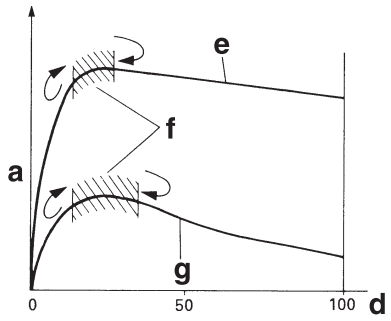
Side force is also closely related to wheel slippage. See figure “A”. If the brakes are applied while keeping the proper slip ratio, it is possible to obtain the maximum brake force without losing much side force.

ABS allows full use of the tires’ capabilities even on slippery road surfaces or less slippery road surfaces. See figure “B”.

A



B



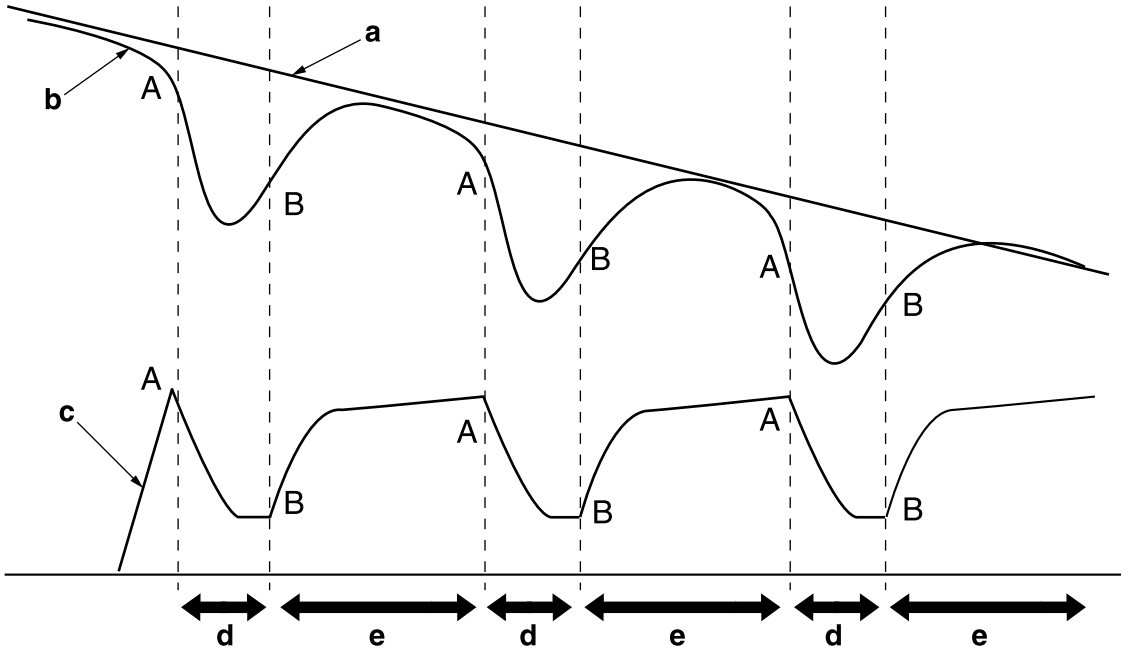
a. Friction force between the tire and road surface
b. Brake force
c. Side force
d. Slip ratio (%)
e. Less slippery road surface
f. Controlling zone
g. Slippery road surface

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

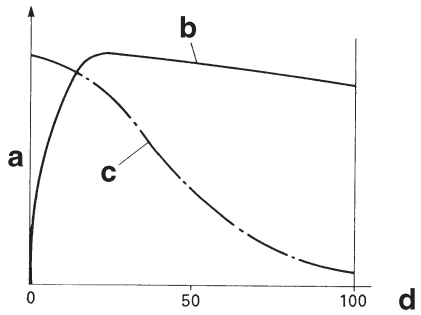
The braking of the vehicle, even in the worst case, is principally executed when the vehicle is advancing straight ahead. During a turn, sudden braking is liable to cause a loss of traction of the tires. Even in vehicles equipped with ABS, overturning of the vehicle cannot be prevented if it is braked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

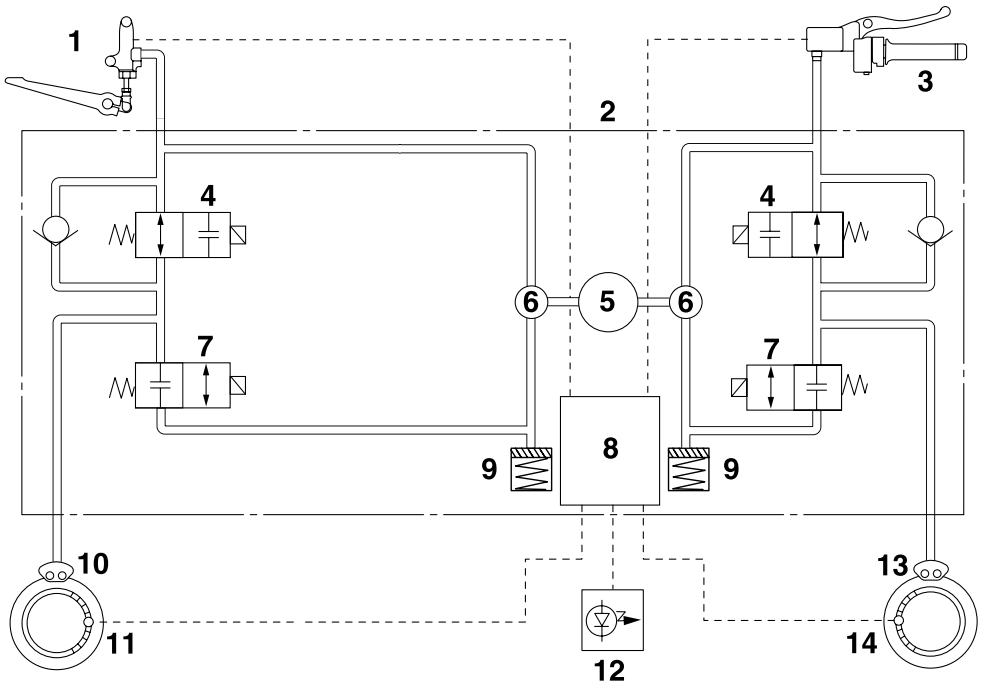
The ABS control is processed with good response under various vehicle travel conditions.

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.

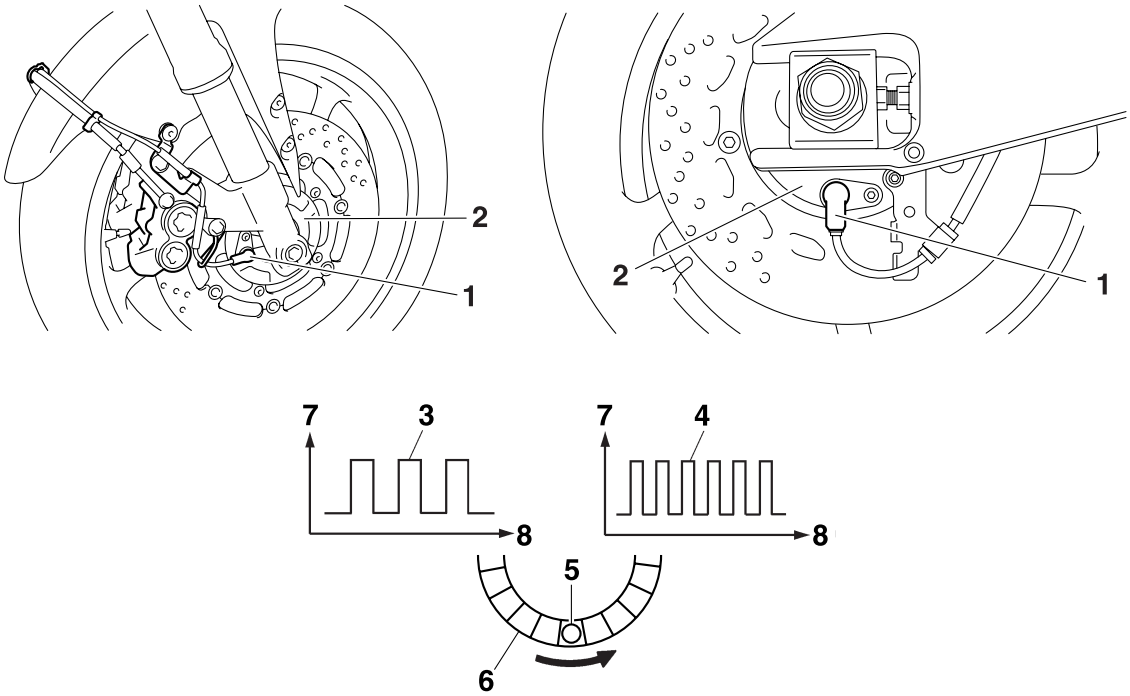
ABS block diagram



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 sensor rotor has 80 magnetic poles (40 pairs) and the rear sensor rotor has 92 magnetic poles (46 pairs). They 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.

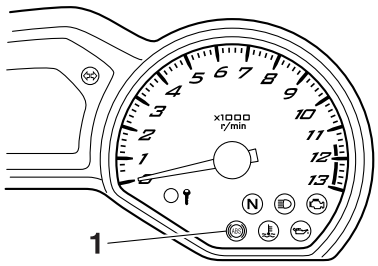


3. At low speed
4. At high speed
5. Wheel sensor
6. Wheel sensor rotor
7. Voltage
8. Time

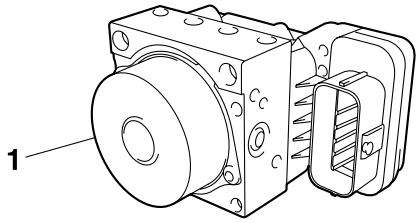
ABS warning light
The ABS warning light “1” comes on to warn the rider if a malfunction in the ABS occurs.
When the main switch is turned to “ON”, the ABS warning light comes on for 2 seconds, then goes off, so that the rider can check if the ABS warning light is disconnected and check if the ABS is operating properly.
ECA4B56001

NOTICE

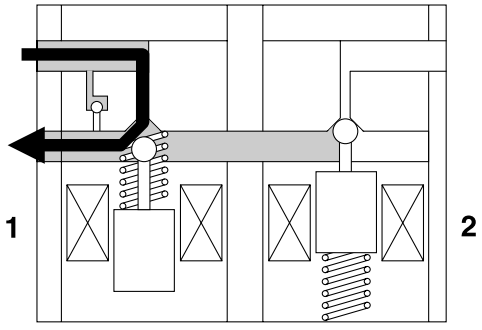
If the rear wheel is raced with the vehicle on the sidestand, the ABS warning light may flash or come on. If this occurs, turn the main switch to “OFF”, then back to “ON”. The ABS operation is normal if the ABS warning light comes on for 2 seconds, then goes off.



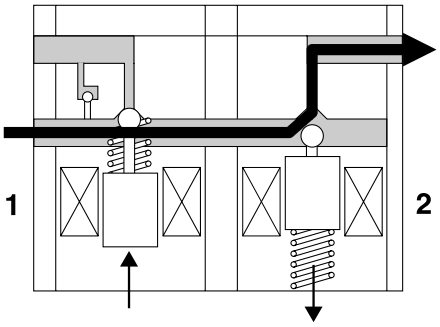
Hydraulic unit assembly
The hydraulic unit assembly “1” is composed of hydraulic control valves (each with a outlet solenoid valve and inlet solenoid valve), buffer chambers, hydraulic pumps, an ABS motor, and ABS ECU.
The hydraulic unit adjusts the front and rear wheel brake fluid pressure to control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



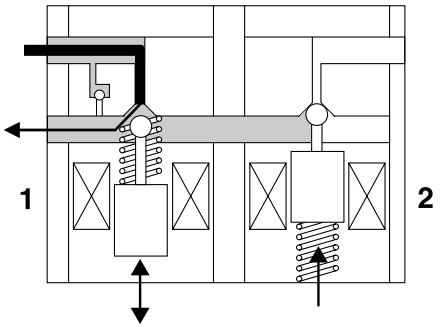
- **Hydraulic control valve**
  The hydraulic control valve is composed of a inlet solenoid valve and outlet solenoid valve.
  The electromagnetic force generated in the inlet solenoid valve varies proportionally with the duty cycle control voltage that is supplied to it. Since this voltage is continuously 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.



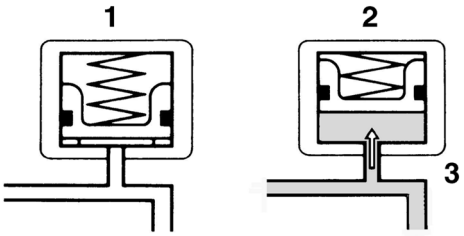
2. When the ABS is activated, the inlet solenoid valve “1” closes and the outlet solenoid valve “2” opens using the power supplied from the ABS ECU signals. This reduces the hydraulic pressure.



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).



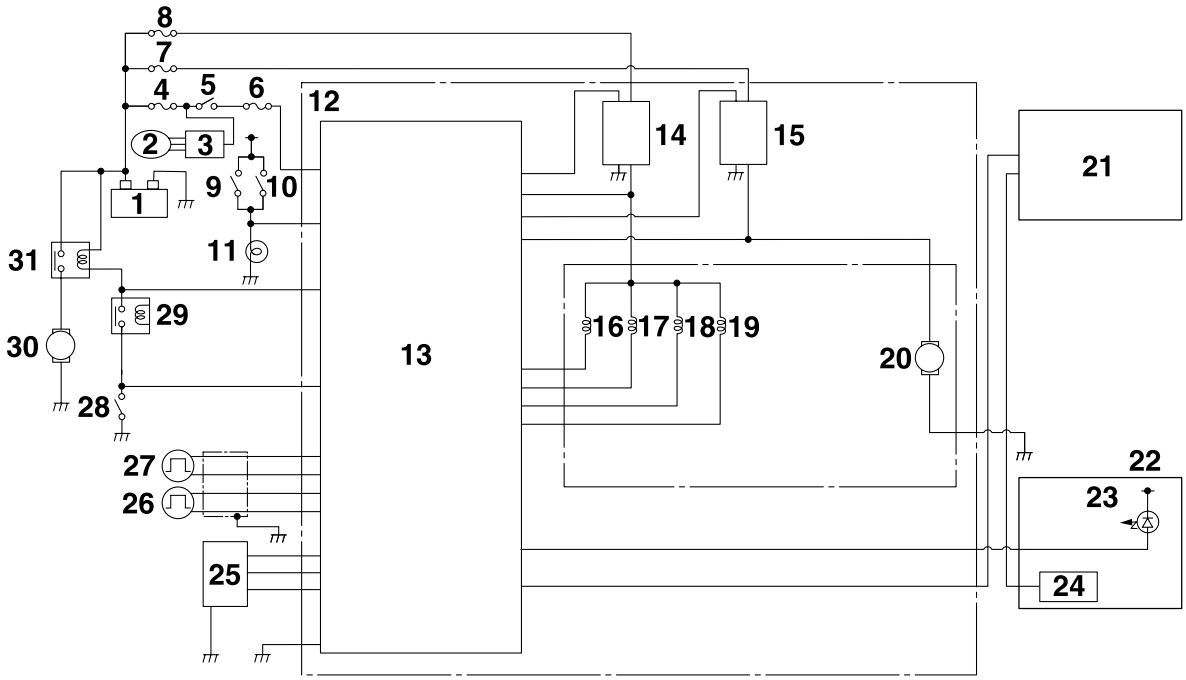
- **Buffer chamber**
  The buffer chamber accumulates the brake fluid that is depressurized while the ABS is operating.



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

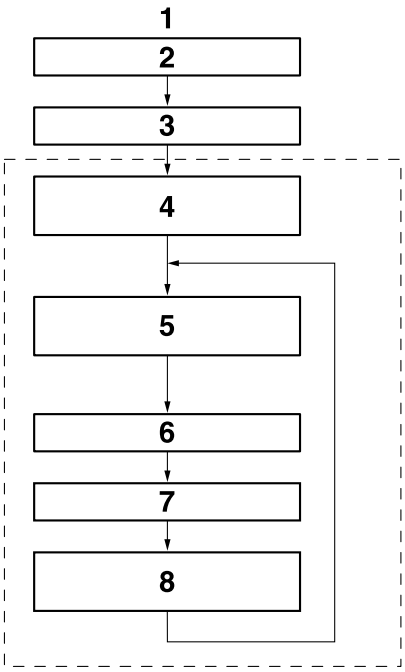
The ABS control operation performed in the ABS ECU is divided into the following two parts.

- 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.



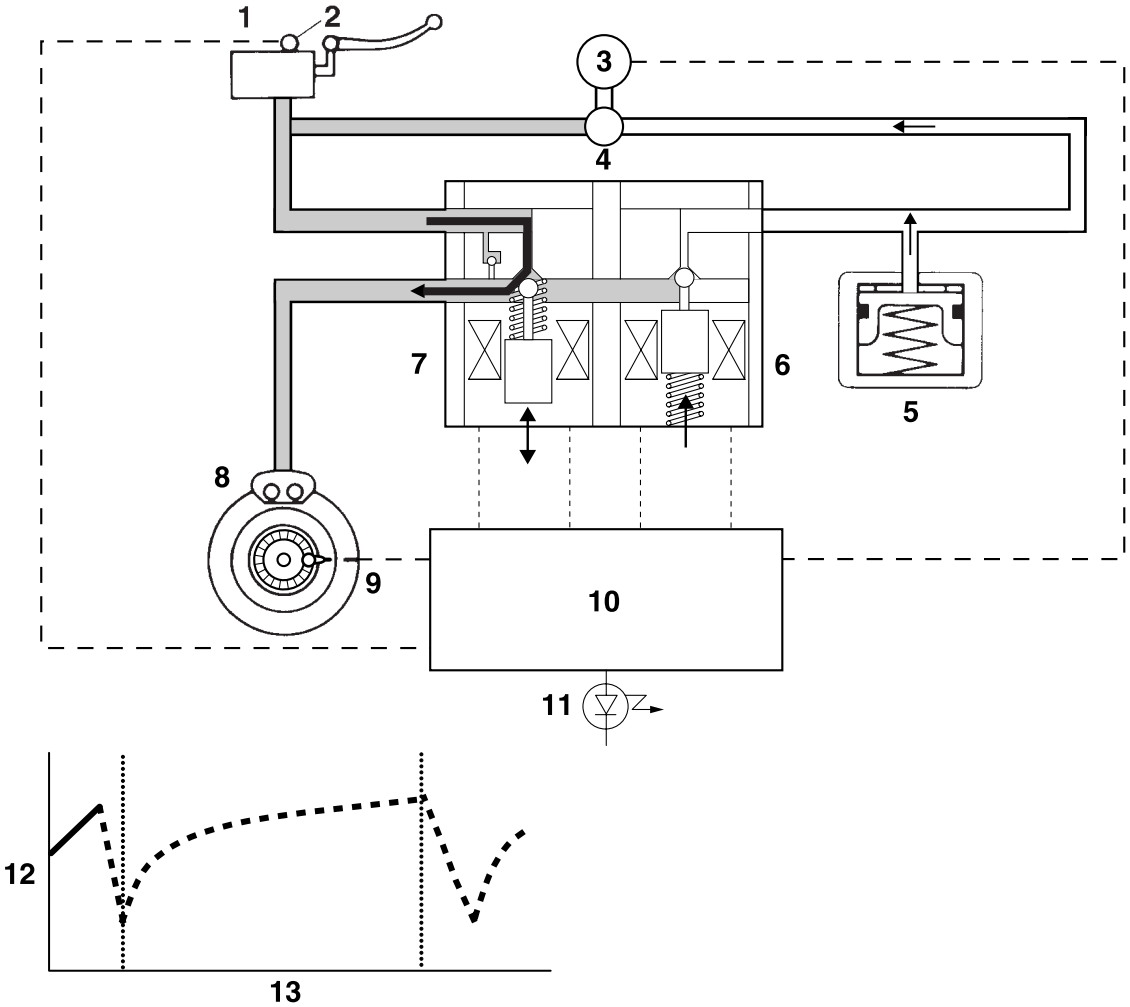
1. Software operation flow
2. Main switch “ON”
3. Initialize
4. Self-diagnosis (when static)
5. Self-diagnosis (when riding)
6. Receive signals
7. Control operation
8. Depressurize/pressurize

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)

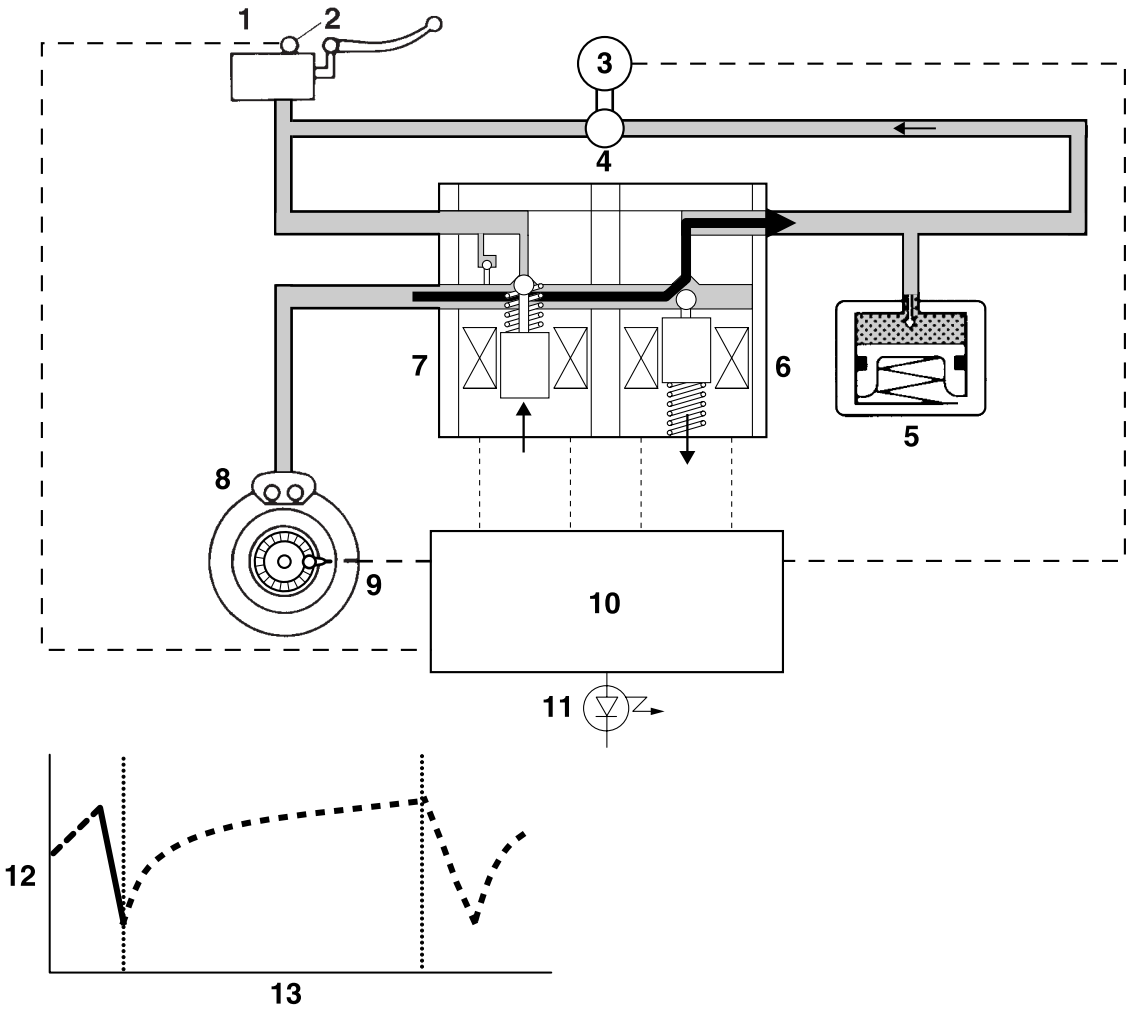
When the ABS is not activated, the inlet solenoid valve is open and the outlet solenoid valve is closed because a control signal has not been transmitted from the ABS ECU. Therefore, when the brake lever is squeezed, the hydraulic pressure in the brake master cylinder increases and the brake fluid is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

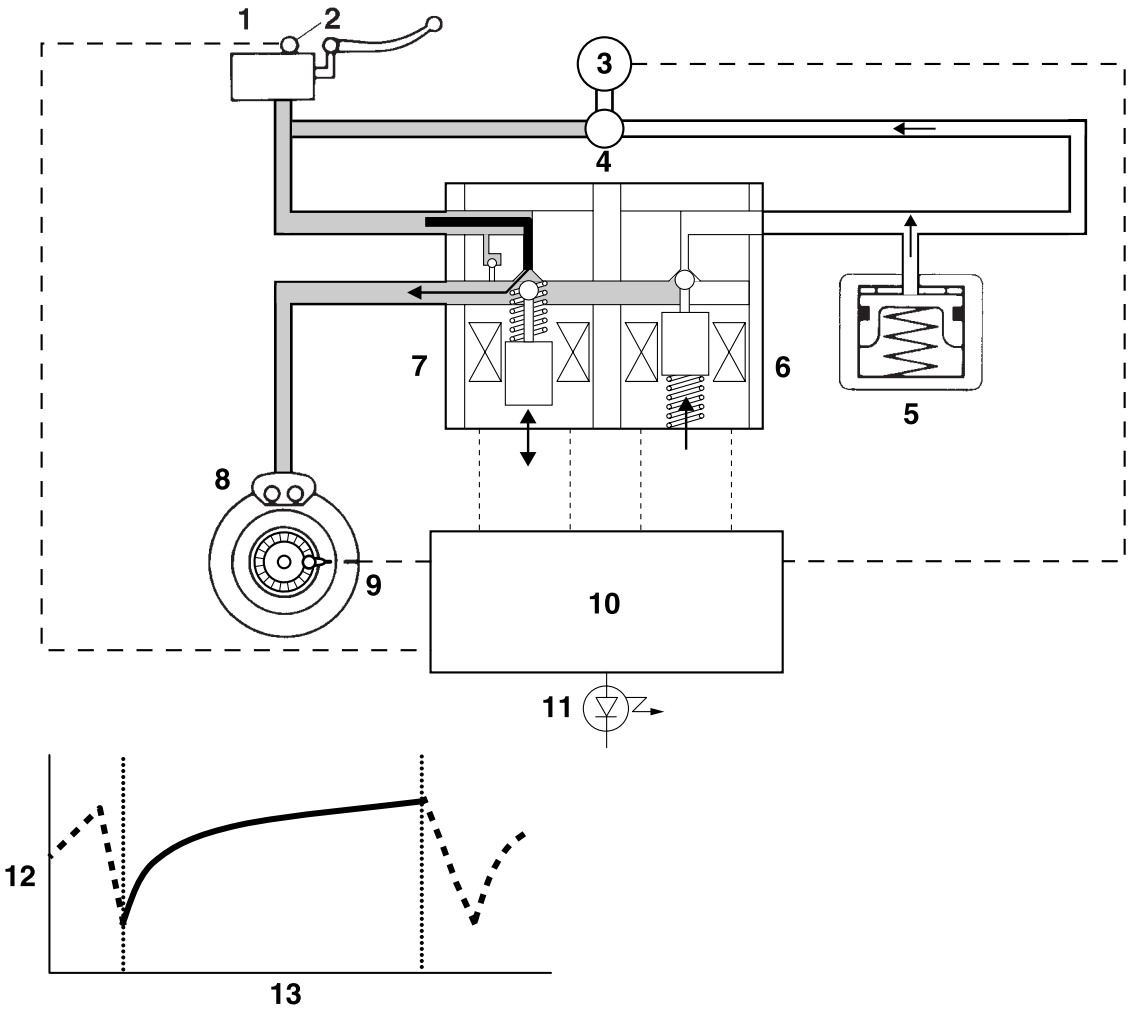
Emergency braking (ABS activated)

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

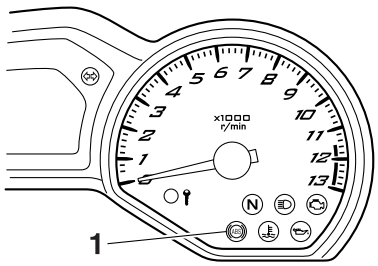
2. Pressurizing phase
   The outlet solenoid valve is closed by the “pressurization” signal transmitted from the ABS ECU. At this time, the ABS ECU controls the opening of the inlet solenoid valve. As the inlet solenoid valve opens, the brake line from the brake master cylinder opens, allowing the brake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



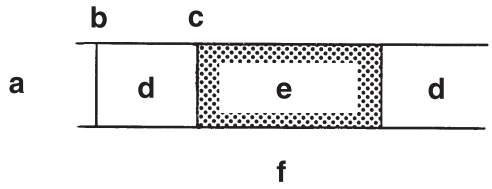
1. Brake master cylinder
2. Brake light switch
3. ABS motor
4. Hydraulic pump
5. Buffer chamber
6. Outlet solenoid valve
7. Inlet solenoid valve
8. Brake caliper
9. Wheel sensor
10. ABS ECU
11. ABS warning light
12. Brake fluid pressure
13. Time

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.

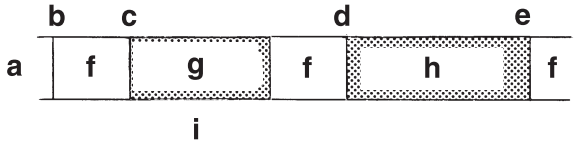


Instances when the ABS warning light comes on
1. The ABS warning light comes on when the main switch is turned to “ON”.
   The ABS warning light comes on for 2 seconds while the ABS is performing a self-diagnosis, then goes off if there are no problems.



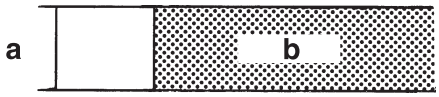
a. ABS warning light
b. Main switch “OFF”
c. Main switch “ON”
d. Goes off
e. Comes on for 2 seconds
f. ABS self-diagnosis

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 8-11.)



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

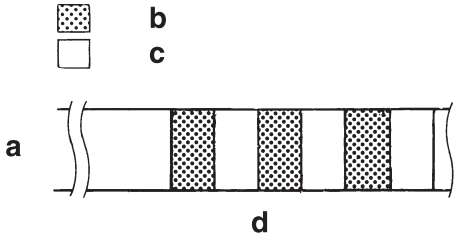
3. The ABS warning light comes on while riding.
   If the ABS warning light comes on while riding, a malfunction has been detected in the ABS. The ABS hydraulic control will not be performed. The ABS will have recourse to manual braking if this occurs.



a. ABS warning light
b. Comes on

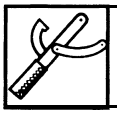
4. The ABS warning light flashes while riding.
   If the ABS warning light flashes while riding, there is no problem with the function of the ABS. However, the ABS ECU input has unstable factors. (For details, refer to "ABS TROUBLE-SHOOTING OUTLINE" on page 8-135.)

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.



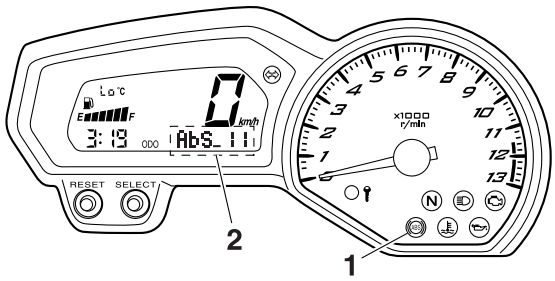
a. ABS warning light
b. Comes on
c. Goes off
d. Unstable ABS ECU input

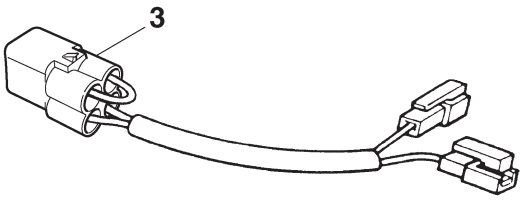
5. The ABS warning light "1" flashes and a fault code "2" is indicated on the multi-function display when the test coupler adapter "3" is connected to the ABS test coupler "4" for troubleshooting the ABS.
   When the test coupler adapter is connected to the ABS test coupler, the ABS warning light starts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

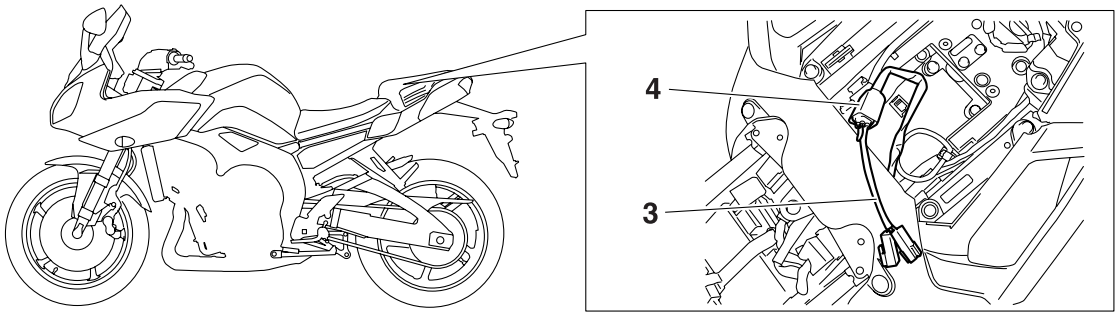


Test coupler adapter
90890-03149

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.


RESET
SELECT
ABS
2
1


3


4
3

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 sidestand, 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.
- 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

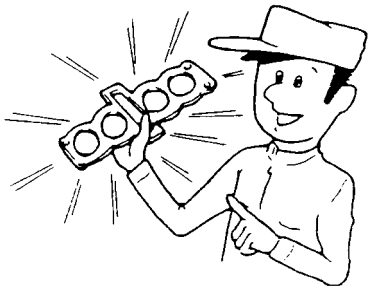
1. Before removal and disassembly, remove all dirt, mud, dust and foreign material.

2. Use only the proper tools and cleaning equipment.
   Refer to “SPECIAL TOOLS” on page 1-33.
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.

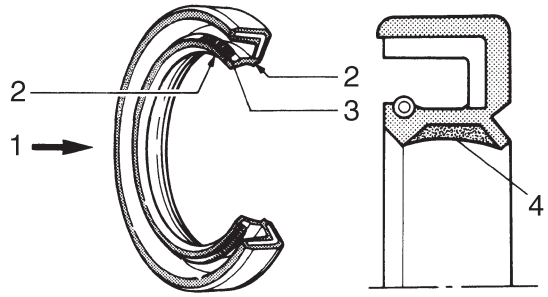
EAS20200
REPLACEMENT PARTS

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

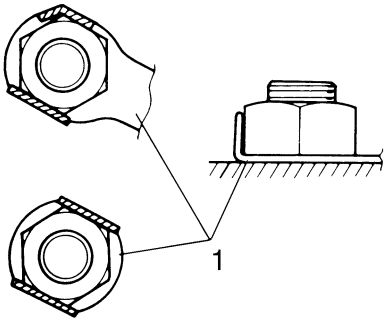
1. When overhauling the engine, replace all gaskets, seals and O-rings. All gasket surfaces, oil seal lips and O-rings must be cleaned.
2. During reassembly, properly oil all mating parts and bearings and lubricate the oil seal lips with grease.



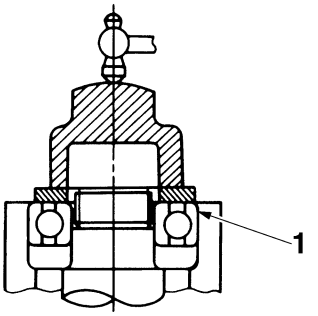
1. Oil
2. Lip
3. Spring
4. Grease

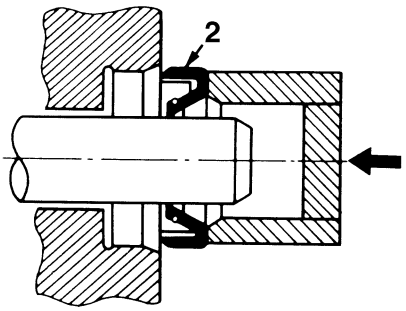
EAS20220
LOCK WASHERS/PLATES AND COTTER PINS

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.

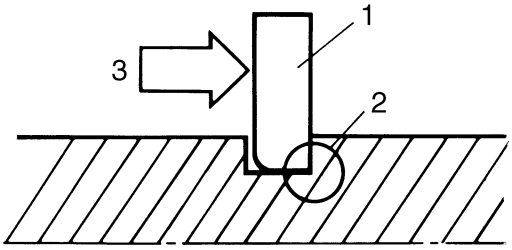


EAS20231
BEARINGS AND OIL SEALS
Install bearings “1” and oil seals “2” so that the manufacturer marks or numbers are visible. When installing oil seals, lubricate the oil seal lips with a light coat of lithium-soap-based grease. Oil bearings liberally when installing, if appropriate.
ECA13300
NOTICE
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.

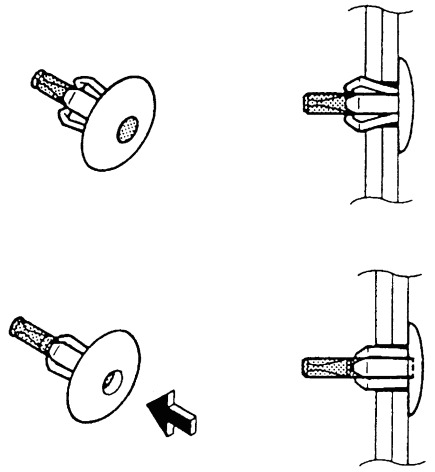


EAS30380
BASIC SERVICE INFORMATION

EAS30390
QUICK FASTENERS

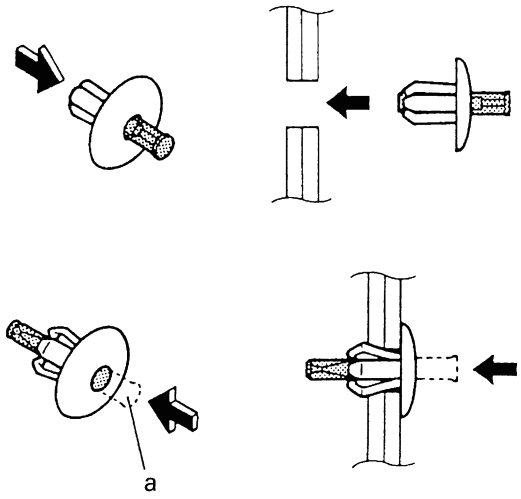
Rivet type
1. Remove:
   • Quick fastener

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



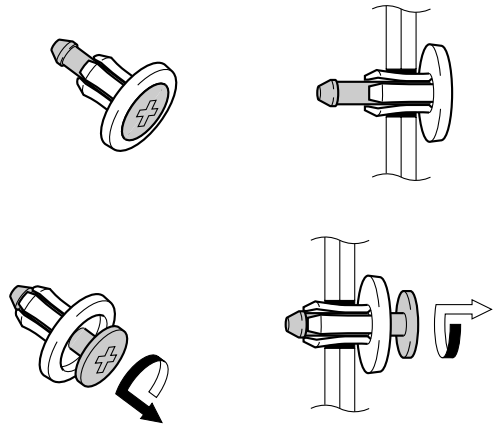
2. Install:
   • Quick fastener

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



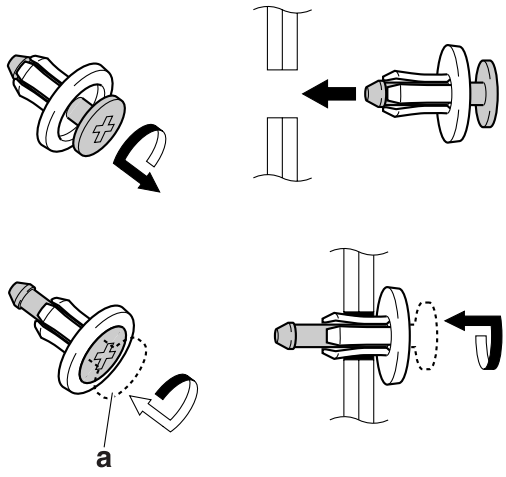
Screw type
1. Remove:
   • Quick fastener

TIP
To remove the quick fastener, loosen the screw with a screwdriver, then pull the fastener out.



2. Install:
   • Quick fastener

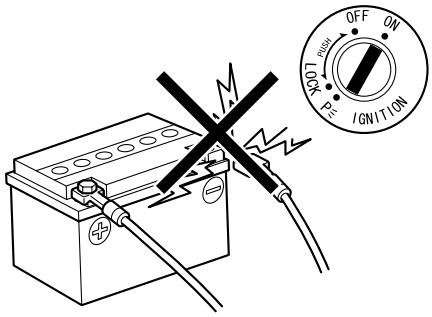
TIP
To install the quick fastener, insert the fastener into the part to be secured and tighten the screw “a”.



EAS30401
ELECTRICAL SYSTEM

Electrical parts handling
ECA16600

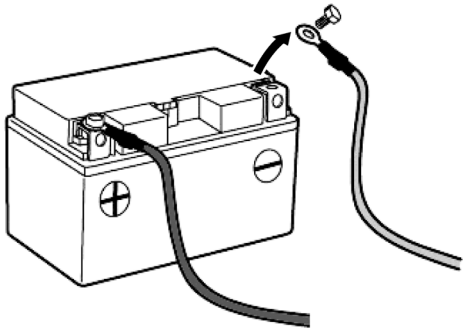
NOTICE
Never disconnect a battery lead while the engine is running; otherwise, the electrical components could be damaged.



ECA16750

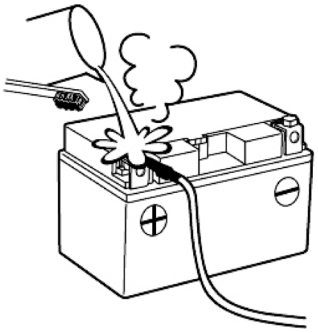
NOTICE

When disconnecting the battery leads from the battery, be sure to disconnect the negative battery lead first, then the positive battery lead. If a tool or similar item contacts the vehicle while only the negative battery lead is connected, a spark could be generated, which is extremely dangerous.



TIP

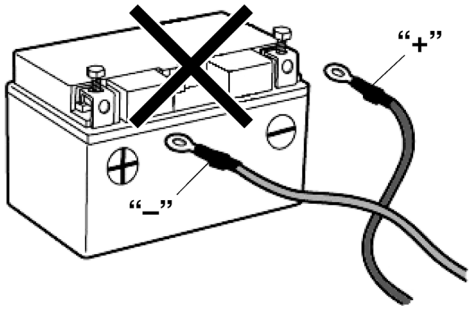
If a battery lead is difficult to disconnect due to rust on the battery terminal, remove the rust using hot water.



ECA16760

NOTICE

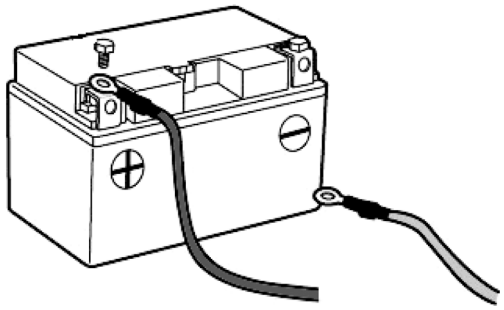
Be sure to connect the battery leads to the correct battery terminals. Reversing the battery lead connections could damage the electrical components.



ECA16770

NOTICE

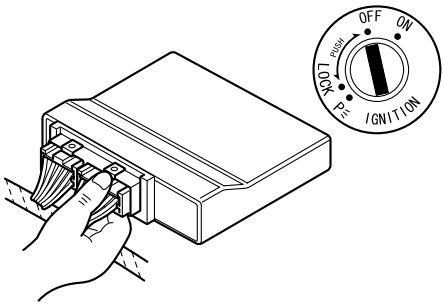
When connecting the battery leads to the battery, be sure to connect the positive battery lead first, then the negative battery lead. If a tool or similar item contacts the vehicle while only the negative battery lead is connected, a spark could be generated, which is extremely dangerous.



ECA16610

NOTICE

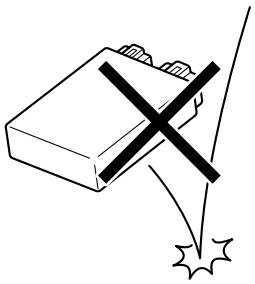
Turn the main switch to "OFF" before disconnecting or connecting an electrical component.



ECA16620

NOTICE

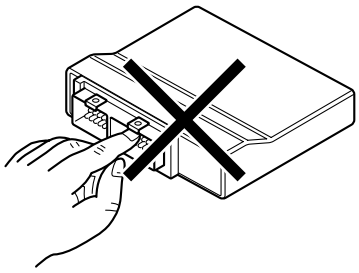
Handle electrical components with special care, and do not subject them to strong shocks.



ECA16630

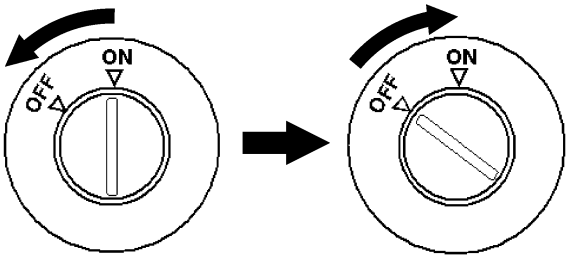
NOTICE

Electrical components are very sensitive to and can be damaged by static electricity. Therefore, never touch the terminals and be sure to keep the contacts clean.



TIP

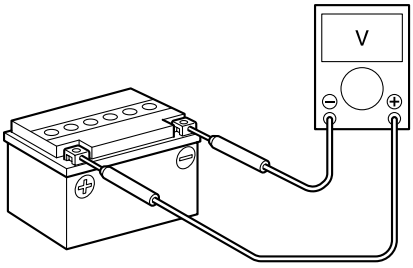
When resetting the ECU by turning the main switch to “OFF”, be sure to wait approximately 5 seconds before turning the main switch back to “ON”.



Checking the electrical system

TIP

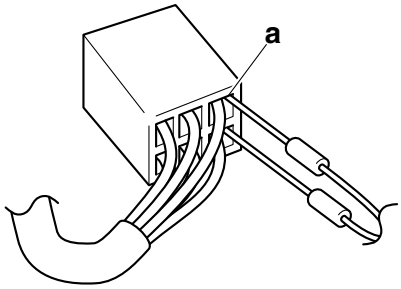
Before checking the electrical system, make sure that the battery voltage is at least 12 V.



ECA14371

NOTICE

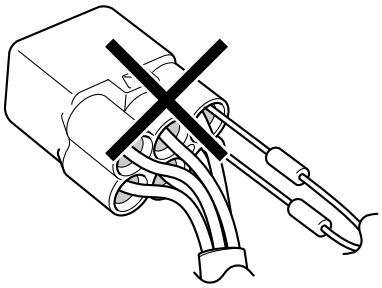
Never insert the tester probes into the coupler terminal slots. Always insert the probes from the opposite end “a” of the coupler, taking care not to loosen or damage the leads.



ECA16640

NOTICE

For waterproof couplers, never insert the tester probes directly into the coupler. When performing any checks using a waterproof coupler, use the specified test harness or a suitable commercially available test harness.

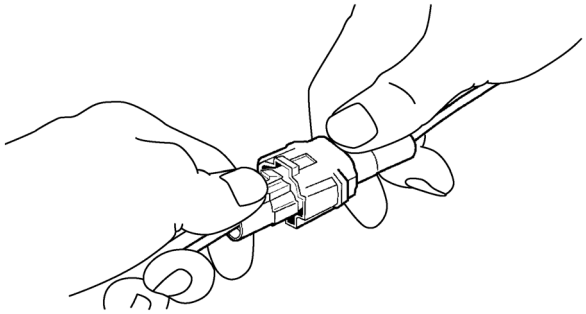


Checking the connections
Check the leads, couplers, and connectors for stains, rust, moisture, etc.
1. Disconnect:
   - Lead
   - Coupler
   - Connector

ECA16780

NOTICE

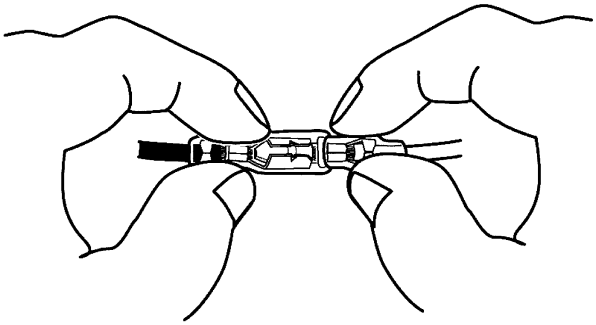
- **When disconnecting a coupler, release the coupler lock, hold both sections of the coupler securely, and then disconnect the coupler.**
- **There are many types of coupler locks; therefore, be sure to check the type of coupler lock before disconnecting the coupler.**



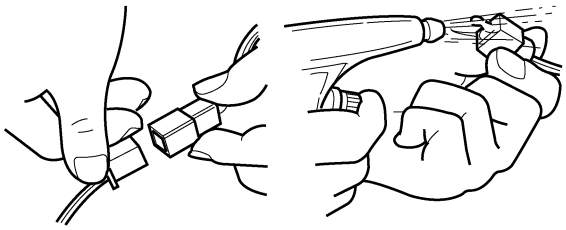
ECA16790

NOTICE

When disconnecting a connector, do not pull the leads. Hold both sections of the connector securely, and then disconnect the connector.

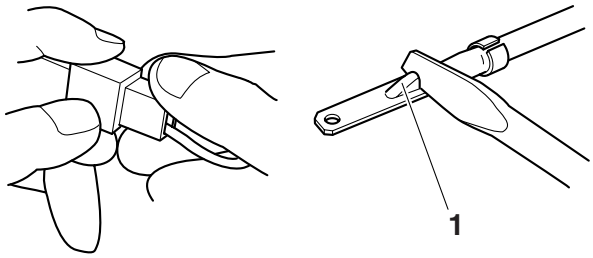


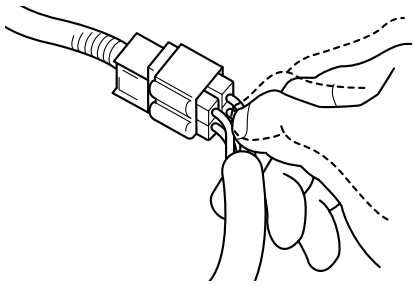
2. Check:
   - Lead
   - Coupler
   - Connector
     Moisture → Dry with an air blower.
     Rust/stains → Connect and disconnect several times.



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

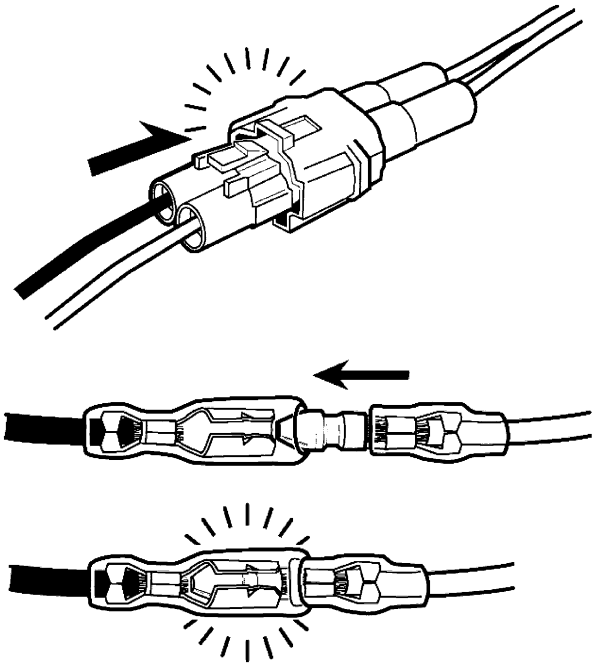
TIP
- If the pin "1" on the terminal is flattened, bend it up.
- After disassembling and assembling a coupler, pull on the leads to make sure that they are installed securely.

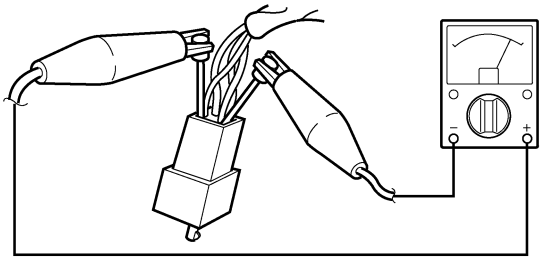




4. Connect:
   - Lead
   - Coupler
   - Connector

TIP
- When connecting a coupler or connector, push both sections of the coupler or connector together until they are connected securely.
- Make sure all connections are tight.

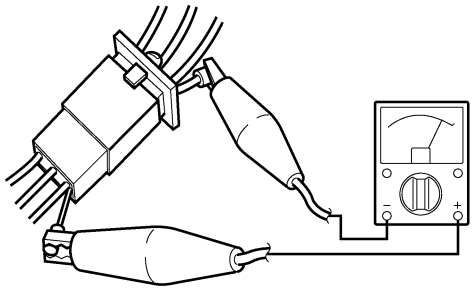




5. Check:
   • Continuity
   (with the pocket tester)

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

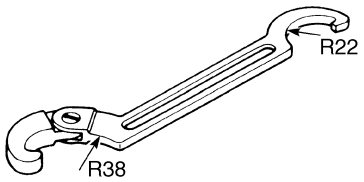
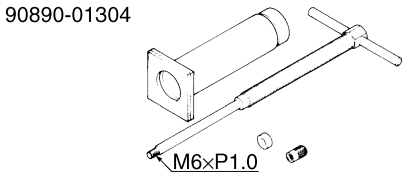
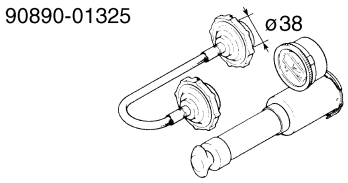
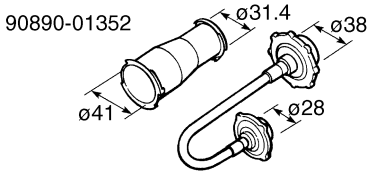
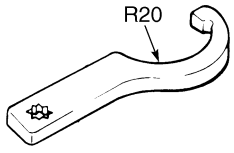
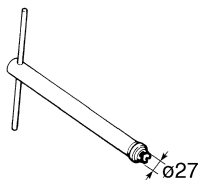
TIP
- If there is no continuity, clean the terminals.
- When checking the wire harness, perform steps (1) to (3).
- As a quick remedy, use a contact revitalizer available at most part stores.

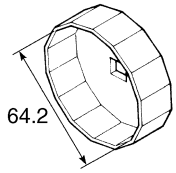
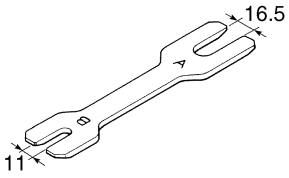
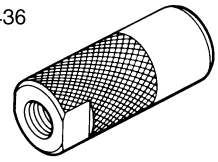
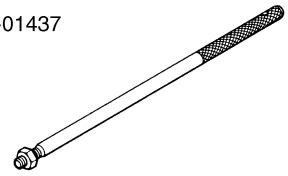
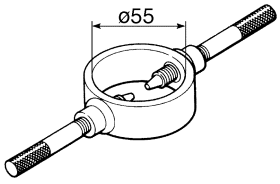
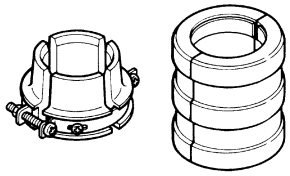
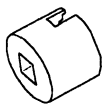


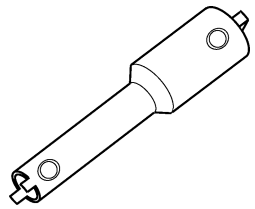
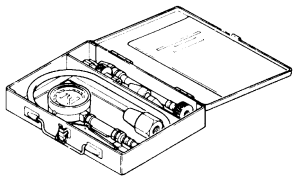
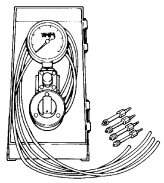
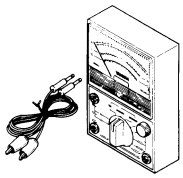
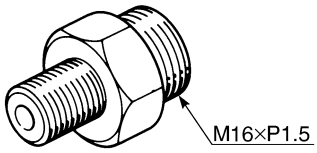
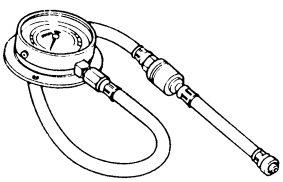
EAS20260
SPECIAL TOOLS

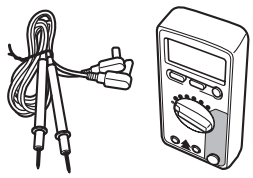
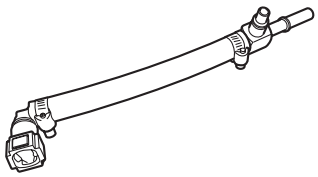
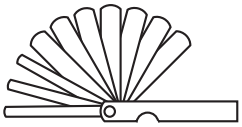
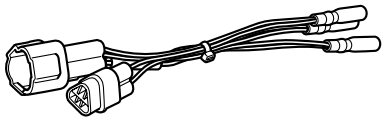
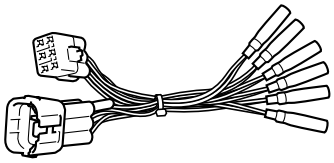
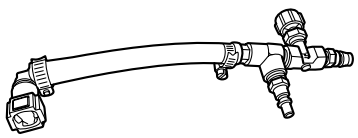
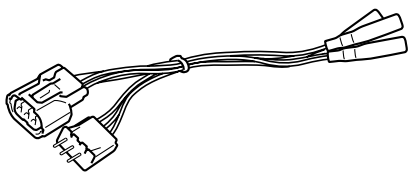
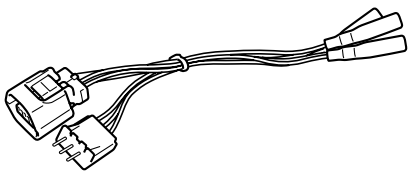
The following special tools are necessary for complete and accurate tune-up and assembly. Use only the appropriate special tools as this will help prevent damage caused by the use of inappropriate tools or improvised techniques. Special tools, part numbers or both may differ depending on the country.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

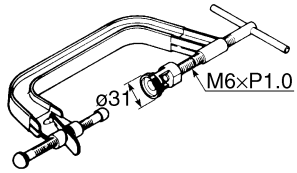
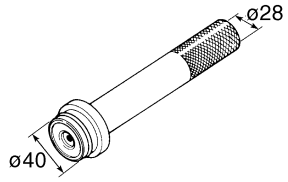
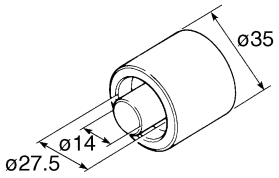
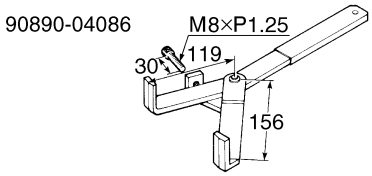
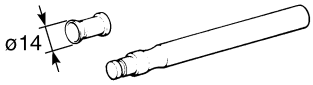
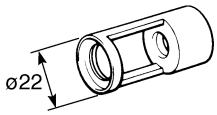
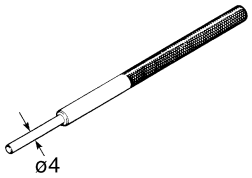
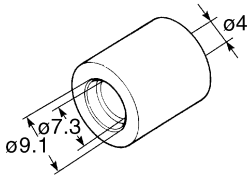
TIP
- For U.S.A. and Canada, use part number starting with “YM-”, “YU-”, or “ACC-”.
- For others, use part number starting with “90890-”.

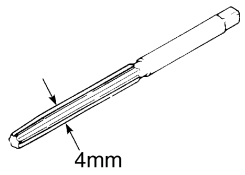
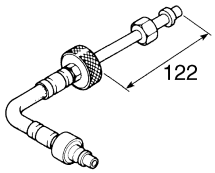
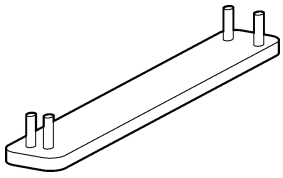
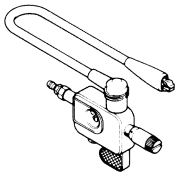
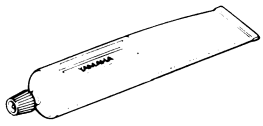
Tool name/Tool No.	Illustration	Reference pages
Ring nut wrench 90890-01268 Spanner wrench YU-01268		4-82
Piston pin puller set 90890-01304 Piston pin puller YU-01304		5-70
Radiator cap tester 90890-01325 Mityvac cooling system tester kit YU-24460-A		6-3
Radiator cap tester adapter 90890-01352 Pressure tester adapter YU-33984		6-3
Steering nut wrench 90890-01403 Exhaust flange nut wrench YU-A9472		3-21, 4-82
Damper rod holder 90890-01423 Damping rod holder YM-01423		4-72, 4-73

Tool name/Tool No.	Illustration	Reference pages
Oil filter wrench 90890-01426 YU-38411		3-25
Rod holder 90890-01434 Damper rod holder double ended YM-01434		4-71, 4-76
Rod puller attachment (M10) 90890-01436 Universal damping rod bleeding tool set YM-A8703	90890-01436 	4-75, 4-76
Rod puller 90890-01437 Universal damping rod bleeding tool set YM-A8703	90890-01437 	4-75, 4-76
Fork spring compressor 90890-01441 YM-01441		4-71, 4-76
Fork seal driver 90890-01442 Adjustable fork seal driver (36-46 mm) YM-01442		4-74
Pivot shaft wrench adapter 90890-01476		5-9

Tool name/Tool No.	Illustration	Reference pages
Pivot shaft wrench 90890-01518 Frame spanner socket YM-01518		5-9
Compression gauge 90890-03081 Engine compression tester YU-33223		5-1
Vacuum gauge 90890-03094 Vacuummate YU-44456	90890-03094 	3-9
Pocket tester 90890-03112 Analog pocket tester YU-03112-C		1-32, 8-183, 8-184, 8-185, 8-189, 8-190, 8-191, 8-192, 8-193, 8-194, 8-195, 8-196, 8-197, 8-198, 8-199, 8-200, 8-201, 8-202
Oil pressure adapter H 90890-03139		3-26
Test coupler adapter 90890-03149		1-23, 4-60, 4-62
Pressure gauge 90890-03153 YU-03153		3-26, 7-4, 7-9

Tool name/Tool No.	Illustration	Reference pages
Digital circuit tester 90890-03174 Model 88 Multimeter with tachometer YU-A1927		5-43, 7-12, 8-173, 8-195, 8-196, 8-201, 8-202
Fuel pressure adapter 90890-03176 YM-03176		7-4
Thickness gauge 90890-03180 Feeler gauge set YU-26900-9		3-6, 5-21, 5-51
Test harness- speed sensor (3P) 90890-03208 YU-03208		8-201
Test harness- lean angle sensor (6P) 90890-03209 YU-03209		8-194
Fuel injector pressure adapter 90890-03210 YU-03210		7-9
Test harness S- pressure sensor 5S7 (3P) 90890-03211 YU-03211		8-201, 8-202
Test harness sub-throttle position sensor (3P) 90890-03214 YU-03214		7-12

Tool name/Tool No.	Illustration	Reference pages
Valve spring compressor 90890-04019 YM-04019		5-25, 5-31
Middle driven shaft bearing driver 90890-04058 Middle drive bearing installer 40 & 50 mm YM-04058		6-13
Mechanical seal installer 90890-04078 Water pump seal installer YM-33221-A		6-13
Universal clutch holder 90890-04086 YM-91042		5-49, 5-53
Valve lapper 90890-04101 Valve lapping tool YM-A8998		3-7
Valve spring compressor attachment 90890-04108 Valve spring compressor adapter 22 mm YM-04108		5-25, 5-31
Valve guide remover (ø4) 90890-04111 Valve guide remover (4.0 mm) YM-04111		5-27
Valve guide installer (ø4) 90890-04112 Valve guide installer (4.0 mm) YM-04112		5-27

Tool name/Tool No.	Illustration	Reference pages
Valve guide reamer (ø4) 90890-04113 Valve guide reamer (4.0 mm) YM-04113		5-27
Extension 90890-04136		5-1
Camshaft wrench 90890-04162 YM-04162		5-13, 5-17
Ignition checker 90890-06754 Oppama pet-4000 spark checker YM-34487		8-193
Yamaha bond No.1215 (Three bond No.1215®) 90890-85505		5-19, 5-34, 5-67

SPECIFICATIONS

EAS20280
GENERAL SPECIFICATIONS

Model	
Model	FZ8NA 59P1 FZ8SA 1BD1
Dimensions	
Overall length	2140 mm (84.3 in)
Overall width	770 mm (30.3 in)
Overall height	FZ8NA 1065 mm (41.9 in) FZ8SA 1225 mm (48.2 in)
Seat height	815 mm (32.1 in)
Wheelbase	1460 mm (57.5 in)
Ground clearance	140 mm (5.51 in)
Minimum turning radius	3000 mm (118.1 in)
Weight	
With oil and fuel	FZ8NA 216 kg (476 lb) FZ8SA 220 kg (485 lb)
Maximum load	FZ8NA 194 kg (428 lb) FZ8SA 190 kg (419 lb)

EAS20290
ENGINE SPECIFICATIONS

Engine	
Engine type	Liquid cooled 4-stroke, DOHC
Displacement	779 cm³
Cylinder arrangement	Forward-inclined parallel 4-cylinder
Bore × stroke	68.0 × 53.6 mm (2.68 × 2.11 in)
Compression ratio	12.00 :1
Standard compression pressure (at sea level)	1480 kPa/350 r/min (14.8 kgf/cm²/350 r/min, 210.5 psi/350 r/min)
Minimum–Maximum	1290–1660 kPa/350 r/min (12.9–16.6 kgf/cm²/350 r/min, 183.5–236.1 psi/350 r/min)
Starting system	Electric starter
Fuel	
Recommended fuel	Regular unleaded gasoline or gasohol (E10)
Fuel tank capacity	17.0 L (4.49 US gal, 3.74 Imp.gal)
Fuel reserve amount	3.4 L (0.90 US gal, 0.75 Imp.gal)
Engine oil	
Recommended brand	YAMALUBE
Type	SAE 10W-30, SAE 10W-40, SAE 10W-50, SAE 15W-40, SAE 20W-40 or SAE 20W-50
Recommended engine oil grade	API service SG type or higher, JASO standard MA
Lubrication system	Wet sump
Engine oil quantity	
Total amount	3.80 L (4.02 US qt, 3.34 Imp.qt)
Without oil filter cartridge replacement	2.90 L (3.07 US qt, 2.55 Imp.qt)
With oil filter cartridge replacement	3.10 L (3.28 US qt, 2.73 Imp.qt)
Oil filter	
Oil filter type	Cartridge
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	0.09–0.19 mm (0.0035–0.0075 in)
Limit	0.26 mm (0.0102 in)
Oil-pump-housing-to-inner-and-outer-rotor clearance	0.06–0.13 mm (0.0024–0.0051 in)
Limit	0.20 mm (0.0079 in)
Oil pressure	230.0 kPa/5000 r/min (2.30 kgf/cm²/5000 r/min, 33.4 psi/5000 r/min) at 75.0–95.0 °C (167.00–203.00 °F)
Bypass valve opening pressure	78.4–117.6 kPa (0.78–1.18 kgf/cm², 11.4–17.1 psi)
Relief valve operating pressure	600.0–680.0 kPa (6.00–6.80 kgf/cm², 87.0–98.6 psi)
Cooling system	
Radiator capacity (including all routes)	2.25 L (2.38 US qt, 1.98 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/cm², 13.5–17.8 psi)

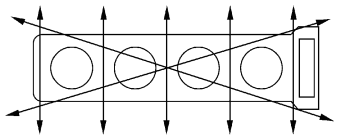
Radiator core	
Width	222.6 mm (8.76 in)
Height	360.0 mm (14.17 in)
Depth	22.0 mm (0.87 in)
Water pump	
Water pump type	Single suction centrifugal pump
Reduction ratio	65/43 × 25/32 (1.181)
Impeller shaft tilt limit	0.15 mm (0.006 in)

Spark plug(s)

Manufacturer/model	NGK/CR9E
Spark plug gap	0.7–0.8 mm (0.028–0.031 in)

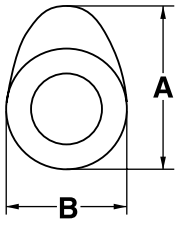
Cylinder head

Volume	11.94–12.74 cm³ (0.73–0.78 cu.in)
Warpage limit	0.10 mm (0.0039 in)

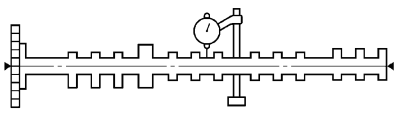


Camshaft

Drive system	Chain drive (right)
Camshaft cap inside diameter	24.500–24.521 mm (0.9646–0.9654 in)
Camshaft journal diameter	24.459–24.472 mm (0.9630–0.9635 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	35.750–35.850 mm (1.4075–1.4114 in)
Limit	35.650 mm (1.4035 in)
Intake B	27.950–28.050 mm (1.1004–1.1043 in)
Limit	27.850 mm (1.0965 in)
Exhaust A	34.750–34.850 mm (1.3681–1.3720 in)
Limit	34.650 mm (1.3642 in)
Exhaust B	27.950–28.050 mm (1.1004–1.1043 in)
Limit	27.850 mm (1.0965 in)



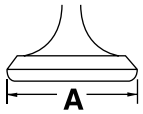
Camshaft runout limit	0.030 mm (0.0012 in)



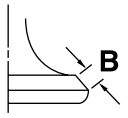
Timing chain

Tensioning system	Automatic

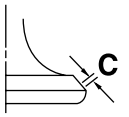
Valve, valve seat, valve guide	
Valve clearance (cold)	
Intake	0.10–0.17 mm (0.0039–0.0067 in)
Exhaust	0.25–0.29 mm (0.0098–0.0114 in)
Valve dimensions	
Valve head diameter A (intake)	25.90–26.10 mm (1.0197–1.0276 in)
Valve head diameter A (exhaust)	21.90–22.10 mm (0.8622–0.8701 in)



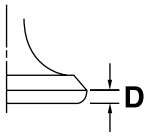
Valve face width B (intake)	1.210–2.490 mm (0.0476–0.0980 in)
Valve face width B (exhaust)	1.210–2.490 mm (0.0476–0.0980 in)



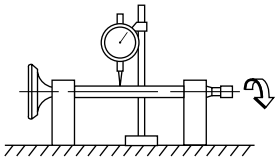
Valve seat width C (intake)	0.90–1.10 mm (0.0354–0.0433 in)
Limit	1.60 mm (0.06 in)
Valve seat width C (exhaust)	0.90–1.10 mm (0.0354–0.0433 in)
Limit	1.60 mm (0.06 in)



Valve margin thickness D (intake)	0.50–0.90 mm (0.0197–0.0354 in)
Valve margin thickness D (exhaust)	0.50–0.90 mm (0.0197–0.0354 in)

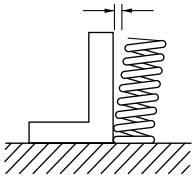


Valve stem diameter (intake)	3.975–3.990 mm (0.1565–0.1571 in)
Limit	3.945 mm (0.1553 in)
Valve stem diameter (exhaust)	3.960–3.975 mm (0.1559–0.1565 in)
Limit	3.930 mm (0.1547 in)
Valve guide inside diameter (intake)	4.000–4.012 mm (0.1575–0.1580 in)
Limit	4.050 mm (0.1595 in)
Valve guide inside diameter (exhaust)	4.000–4.012 mm (0.1575–0.1580 in)
Limit	4.050 mm (0.1595 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 (0.0010–0.0022 in)
Limit	0.100 mm (0.0039 in)
Valve stem runout	0.010 mm (0.0004 in)



Valve spring	
Free length (intake)	38.62 mm (1.52 in)
Limit	36.69 mm (1.44 in)

Free length (exhaust)	38.62 mm (1.52 in)
Limit	36.69 mm (1.44 in)
Installed length (intake)	33.00 mm (1.30 in)
Installed length (exhaust)	33.00 mm (1.30 in)
Spring rate K1 (intake)	24.99 N/mm (2.55 kgf/mm, 142.69 lb/in)
Spring rate K2 (intake)	37.28 N/mm (3.80 kgf/mm, 212.87 lb/in)
Spring rate K1 (exhaust)	24.99 N/mm (2.55 kgf/mm, 142.69 lb/in)
Spring rate K2 (exhaust)	37.28 N/mm (3.80 kgf/mm, 212.87 lb/in)
Installed compression spring force (intake)	130.60–150.20 N (13.32–15.32 kgf, 29.36–33.76 lbf)
Installed compression spring force (exhaust)	130.60–150.20 N (13.32–15.32 kgf, 29.36–33.76 lbf)
Spring tilt (intake)	2.5°/1.7 mm (0.067 in)
Spring tilt (exhaust)	2.5°/1.7 mm (0.067 in)



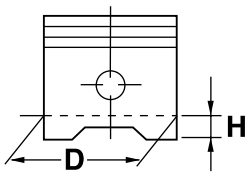
Winding direction (intake)	Clockwise
Winding direction (exhaust)	Clockwise

Cylinder

Bore	68.000–68.010 mm (2.6772–2.6776 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	0.150 mm (0.0059 in)
Diameter D	67.975–67.990 mm (2.6762–2.6768 in)
Height H	11.5 mm (0.45 in)

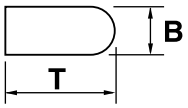


Offset	0.25 mm (0.0098 in)
Offset direction	Intake side
Piston pin bore inside diameter	17.002–17.013 mm (0.6694–0.6698 in)
Limit	17.043 mm (0.6710 in)
Piston pin outside diameter	16.990–16.995 mm (0.6689–0.6691 in)
Limit	16.970 mm (0.6681 in)
Piston-pin-to-piston-pin-bore clearance	0.007–0.023 mm (0.0001–0.0009 in)
Limit	0.073 mm (0.0029 in)

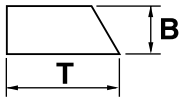
Piston ring

Top ring

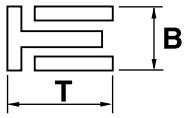
Ring type	Barrel
Dimensions (B × T)	0.90 × 2.60 mm (0.04 × 0.10 in)



End gap (installed)	0.25–0.35 mm (0.0098–0.0138 in)
Limit	0.60 mm (0.0236 in)
Ring side clearance	0.030–0.065 mm (0.0012–0.0026 in)
Limit	0.115 mm (0.0045 in)
2nd ring	
Ring type	Taper
Dimensions (B × T)	0.80 × 2.50 mm (0.03 × 0.10 in)



End gap (installed)	0.35–0.50 mm (0.0138–0.0197 in)
Limit	0.85 mm (0.0335 in)
Ring side clearance	0.020–0.055 mm (0.0008–0.0022 in)
Limit	0.115 mm (0.0045 in)
Oil ring	
Dimensions (B × T)	1.50 × 2.00 mm (0.06 × 0.08 in)



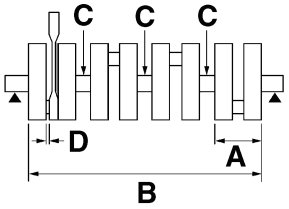
End gap (installed)	0.10–0.35 mm (0.0039–0.0138 in)

Connecting rod

Crankshaft-pin-to-big-end-bearing clearance	0.034–0.058 mm (0.0013–0.0023 in)
Limit	0.09 mm (0.0035 in)
Bearing color code	1: Blue 2: Black 3: Brown 4: Green

Crankshaft

Width A	55.20–56.60 mm (2.173–2.228 in)
Width B	298.75–300.65 mm (11.76–11.84 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)



Journal oil clearance	0.013–0.037 mm (0.0005–0.0015 in)
Limit	0.10 mm (0.0039 in)
Bearing color code	0.White 1.Blue 2.Black 3.Brown 4.Green

Clutch

Clutch type	Wet, multiple-disc
Clutch release method	Outer pull, rack and pinion pull
Clutch cable 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	2.82 mm (0.1110 in)
Plate quantity	8 pcs
Clutch plate thickness	1.90–2.10 mm (0.075–0.083 in)
Warpage limit	0.10 mm (0.0039 in)
Plate quantity	7 pcs

Clutch spring free length	52.50 mm (2.07 in)
Limit	49.88 mm (1.96 in)
Spring quantity	6 pcs
Transmission	
Transmission type	Constant mesh 6-speed
Primary reduction system	Spur gear
Primary reduction ratio	65/43 (1.512)
Secondary reduction system	Chain drive
Secondary reduction ratio	46/16 (2.875)
Operation	Left foot operation
Gear ratio	
1st	35/13 (2.692)
2nd	33/16 (2.063)
3rd	37/21 (1.762)
4th	35/23 (1.522)
5th	27/20 (1.350)
6th	29/24 (1.208)
Main axle runout limit	0.08 mm (0.0032 in)
Drive axle runout limit	0.08 mm (0.0032 in)
Shifting mechanism	
Shift mechanism type	Shift drum and guide bar
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)
Air filter	
Air filter element	Oil-coated paper element
Fuel pump	
Pump type	Electrical
Maximum consumption amperage	6.0 A
Fuel pressure	324.0 kPa (3.24 kgf/cm², 47.0 psi)
Fuel injector	
Model/quantity	297500-1720/4
Throttle position sensor	
Resistance	2.64–6.16 kΩ
Output voltage (at idle)	0.63–0.73 V
Sub-throttle position sensor	
Resistance	3–7 kΩ
Output voltage (full close)	0.3–0.4 V
Fuel injection sensor	
Crankshaft position sensor resistance	336–504 Ω at 20 °C (68 °F)
Cylinder identification sensor output voltage (ON)	More than 4.8 V
Cylinder identification sensor output voltage (OFF)	Less than 0.8 V
Atmospheric pressure sensor output voltage	3.594–3.684 V at 101.32 kPa, 25 °C (77 °F)
Intake air pressure sensor output voltage	3.594–3.684 V at 101.32 kPa, 25 °C (77 °F)
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)

Air induction system	
Reed valve bending limit	0.4 mm (0.016 in)
Solenoid resistance	18–22 Ω at 20 °C (68 °F)
Idling condition	
Engine idling speed	1150–1250 r/min
CO%	4.0–5.0 %
Intake vacuum	30.0 kPa (225 mmHg, 8.9 inHg)
Water temperature	90.0–110.0 °C (194.00–230.00 °F)
Oil temperature	75.0–95.0 °C (167.00–203.00 °F)
Throttle cable free play	3.0–5.0 mm (0.12–0.20 in)

EAS20300
CHASSIS SPECIFICATIONS

Chassis	
Frame type	Diamond
Caster angle	25.00°
Trail	109.0 mm (4.29 in)
Front wheel	
Wheel type	Cast wheel
Rim size	17M/C × 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 × MT5.50
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/BT021F BB
Wear limit (front)	1.6 mm (0.06 in)
Rear tire	
Type	Tubeless
Size	180/55 ZR17M/C (73W)
Manufacturer/model	BRIDGESTONE/BT021R BB
Wear limit (rear)	1.6 mm (0.06 in)
Tire air pressure (measured on cold tires)	
Loading condition	0–90 kg (0–198 lb)
Front	250 kPa (2.50 kgf/cm², 36 psi)
Rear	290 kPa (2.90 kgf/cm², 42 psi)
Loading condition	FZ8NA 90–194 kg (198–428 lb) FZ8SA 90–190 kg (198–419 lb)
Front	250 kPa (2.50 kgf/cm², 36 psi)
Rear	290 kPa (2.90 kgf/cm², 42 psi)
High-speed riding	
Front	250 kPa (2.50 kgf/cm², 36 psi)
Rear	290 kPa (2.90 kgf/cm², 42 psi)
Front brake	
Type	Dual disc brake
Operation	Right hand operation
Front brake lever free play	7.5–16.5 mm (0.30–0.65 in)
Front disc brake	
Disc outside diameter × thickness	310.0 × 4.5 mm (12.20 × 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)	4.5 mm (0.18 in)
Limit	0.5 mm (0.02 in)
Brake pad lining thickness (outer)	4.5 mm (0.18 in)
Limit	0.5 mm (0.02 in)
Master cylinder inside diameter	16.00 mm (0.63 in)
Caliper cylinder inside diameter	30.20 mm (1.19 in) 27.00 mm (1.06 in)
Recommended fluid	DOT 4

Rear brake

Type	Single disc brake
Operation	Right foot operation
Brake pedal free play	4.1–11.1 mm (0.16–0.44 in)
Rear disc brake	
Disc outside diameter × thickness	267.0 × 5.0 mm (10.51 × 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)	6.0 mm (0.24 in)
Limit	1.0 mm (0.04 in)
Brake pad lining thickness (outer)	6.0 mm (0.24 in)
Limit	1.0 mm (0.04 in)
Master cylinder inside diameter	12.7 mm (0.50 in)
Caliper cylinder inside diameter	38.20 mm (1.50 in)
Recommended fluid	DOT 4

Steering

Steering bearing type	Angular bearing
Center to lock angle (left)	33.0°
Center to lock angle (right)	33.0°

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	286.1 mm (11.26 in)
Limit	280.4 mm (11.04 in)
Collar length	100.0 mm (3.94 in)
Installed length	278.6 mm (10.97 in)
Spring rate K1	8.82 N/mm (0.90 kgf/mm, 50.36 lb/in)
Spring stroke K1	0.0–130.0 mm (0.00–5.12 in)
Inner tube outer diameter	43.0 mm (1.69 in)
Inner tube bending limit	0.2 mm (0.01 in)
Optional spring available	No
Recommended oil	Suspension oil 01 or equivalent
Quantity	
Left	563.0 cm^3 (19.04 US oz, 19.86 Imp.oz)
Right	555.0 cm^3 (18.77 US oz, 19.57 Imp.oz)
Level	
Left	82.0 mm (3.23 in)
Right	85.0 mm (3.35 in)

Rear suspension

Type	Swingarm (link suspension)
Spring/shock absorber type	Coil spring/gas-oil damper
Rear shock absorber assembly travel	60.0 mm (2.36 in)
Spring free length	191.0 mm (7.52 in)
Installed length	173.0 mm (6.81 in)

Spring rate K1	78.40 N/mm (7.99 kgf/mm, 447.66 lb/in)
Spring stroke K1	0.0–60.0 mm (0.00–2.36 in)
Optional spring available	No
Enclosed gas/air pressure (STD)	1200 kPa (12.0 kgf/cm², 170.7 psi)
Spring preload adjusting positions	
Minimum	1
Standard	5
Maximum	9
Drive chain	
Type/manufacturer	525V10/DAIDO
Number of links	122
Drive chain slack	20.0–30.0 mm (0.79–1.18 in)
15-link length limit	239.3 mm (9.42 in)
Shift pedal	
Installed shift rod length	304.1–306.1 mm (11.97–12.05 in)

EAS20310
ELECTRICAL SPECIFICATIONS

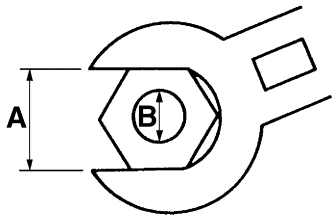
Voltage	
System voltage	12 V
Ignition system	
Ignition system	TCI
Ignition timing (B.T.D.C.)	5.0°/1200 r/min
Engine control unit	
Model/manufacturer	TBDFD1/DENSO
Ignition coil	
Minimum ignition spark gap	6.0 mm (0.24 in)
Primary coil resistance	1.19–1.61 Ω
Secondary coil resistance	8.50–11.50 kΩ
AC magneto	
Standard output	14.0 V, 40.0 A at 6500 r/min
Stator coil resistance	0.153–0.187 Ω at 20 °C (68 °F) (W–W)
Rectifier/regulator	
Regulator type	Semi conductor-short circuit
Rectifier/regulator output voltage	14.2–14.8 V
Rectifier capacity	50.0 A
Battery	
Model	YTZ10S
Voltage, capacity	12 V, 8.6 Ah
Specific gravity	1.310
Manufacturer	GS YUASA
Ten hour rate amperage	0.86 A
Headlight	
Bulb type	Halogen bulb
Bulb voltage, wattage × quantity	
Headlight	12 V, 60 W/55 W × 1 FZ8SA 12 V, 55 W × 1
Auxiliary light	FZ8NA 12 V, 5.0 W × 1 FZ8SA 12 V, 5.0 W × 2
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	LED
Immobilizer system indicator light	LED

Electric starting system	
System type	Constant mesh
Starter motor	
Power output	0.70 kW
Armature coil	
Commutator resistance	0.0100–0.2000 Ω at 20 °C (68 °F)
Insulation resistance	Above 1 MΩ at 20 °C (68 °F)
Brush overall length	12.0 mm (0.47 in)
Limit	6.50 mm (0.26 in)
Brush spring force	6.02–6.51 N (614–664 gf, 21.65–23.41 ozf)
Mica undercut (depth)	0.70 mm (0.03 in)
Starter relay	
Amperage	180.0 A
Coil resistance	4.18–4.62 Ω at 20 °C (68 °F)
Horn	
Horn type	Plane
Quantity	1 pcs
Maximum amperage	3.0 A
Coil resistance	1.066–1.114 Ω at 20 °C (68 °F)
Turn signal/hazard relay	
Relay type	Full transistor
Built-in, self-canceling device	No
Oil level switch	
Maximum level position resistance	484–536 Ω
Minimum level position resistance	114–126 Ω
Coolant temperature sensor	
Resistance	2.45 kΩ at 20 °C (68 °F) 290–354 Ω at 80 °C (176 °F)
Fuses	
Main fuse	50.0 A
Headlight fuse	15.0 A
Taillight fuse	10.0 A
Signaling system fuse	10.0 A
Ignition fuse	15.0 A
Radiator fan fuse	10.0 A × 2
Fuel injection system fuse	15.0 A
ABS motor fuse	30.0 A
ABS control unit fuse	7.5 A
ABS solenoid fuse	20.0 A
Backup fuse	10.0 A
Spare fuse	30.0 A
Spare fuse	20.0 A
Spare fuse	15.0 A × 2
Spare fuse	10.0 A
Spare fuse	7.5 A

EAS20320
TIGHTENING TORQUES

EAS20331
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	94

EAS20340
ENGINE TIGHTENING TORQUES

Item	Thread size	Q'ty	Tightening torque	Remarks
Spark plug	M10	4	13 Nm (1.3 m·kgf, 9.4 ft·lbf)	
Cylinder head nut	M10	10	See TIP.	E
Cylinder head bolt	M6	2	12 Nm (1.2 m·kgf, 8.7 ft·lbf)	
Cylinder head plug	M18	3	42 Nm (4.2 m·kgf, 30 ft·lbf)	LT
Camshaft caps bolt	M6	20	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	E
Cylinder head cover bolt	M6	6	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Cylinder head stud bolt (exhaust pipe)	M8	8	15 Nm (1.5 m·kgf, 11 ft·lbf)	
Reed valve cover bolt	M6	4	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	LT
Camshaft sprocket bolt	M7	4	24 Nm (2.4 m·kgf, 17 ft·lbf)	
Throttle body joint bolt	M6	6	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Connecting rod cap bolt	M8	8	See TIP.	M
Timing chain drive sprocket bolt	M10	1	60 Nm (6.0 m·kgf, 43 ft·lbf)	E
Timing chain tensioner bolt	M6	2	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	LT
Water pump outlet pipe bolt	M6	1	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	LT
Water pump inlet pipe bolt (water pump side)	M6	1	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	LT
Water pump inlet pipe bolt (front side)	M6	1	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	LT
Oil/water pump drive sprocket bolt	M6	1	15 Nm (1.5 m·kgf, 11 ft·lbf)	LT
Oil pump bolt	M6	2	12 Nm (1.2 m·kgf, 8.7 ft·lbf)	LT
Water pump cover bolt	M6	5	12 Nm (1.2 m·kgf, 8.7 ft·lbf)	
Thermostat housing cover nut	M6	2	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Thermostat inlet pipe bolt	M6	1	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	LT
Oil cooler bolt	M20	1	63 Nm (6.3 m·kgf, 46 ft·lbf)	E
Engine oil drain bolt	M14	1	43 Nm (4.3 m·kgf, 31 ft·lbf)	
Oil pipe bolt	M6	2	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	LT
Oil strainer bolt	M6	3	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	LT
Oil delivery pipe bolt	M6	1	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	LT
Oil filter union bolt	M20	1	80 Nm (8.0 m·kgf, 58 ft·lbf)	
Oil filter	M20	1	17 Nm (1.7 m·kgf, 12 ft·lbf)	LS
Oil pan bolt	M6	14	12 Nm (1.2 m·kgf, 8.7 ft·lbf)	
Oil/water pump assembly drive chain guide bolt	M6	2	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	LT
Air filter case cover screw	—	11	2.0 Nm (0.20 m·kgf, 1.5 ft·lbf)	
Throttle body joint clamp	M5	4	2.3 Nm (0.23 m·kgf, 1.7 ft·lbf)	
Funnel bolt	M5	6	4.2 Nm (0.42 m·kgf, 3.0 ft·lbf)	
Air filter case stay bolt	M6	1	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Throttle cable bolt	M6	2	4.5 Nm (0.45 m·kgf, 3.3 ft·lbf)	
Cylinder head and exhaust pipe nut	M8	8	20 Nm (2.0 m·kgf, 14 ft·lbf)	

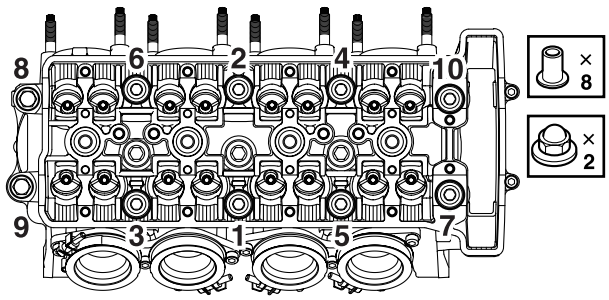
Item	Thread size	Q'ty	Tightening torque	Remarks
Exhaust pipe and muffler bolt	M8	1	20 Nm (2.0 m·kgf, 14 ft·lbf)	
Exhaust pipe and exhaust pipe bracket bolt	M8	1	20 Nm (2.0 m·kgf, 14 ft·lbf)	
Muffler and muffler bracket bolt	M10	1	48 Nm (4.8 m·kgf, 35 ft·lbf)	
Crankcase stud bolt	M10	10	8 Nm (0.8 m·kgf, 5.8 ft·lbf)	E
Crankcase bolt (main journal)	M9	10	See TIP.	E
Crankcase bolt	M6	10	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	E
Crankcase bolt	M8	1	24 Nm (2.4 m·kgf, 17 ft·lbf)	L = 60 mm (2.36 in) E T
Crankcase bolt	M8	5	24 Nm (2.4 m·kgf, 17 ft·lbf)	E
Generator rotor cover bolt	M6	4	12 Nm (1.2 m·kgf, 8.7 ft·lbf)	
Generator rotor cover bolt	M8	3	24 Nm (2.4 m·kgf, 17 ft·lbf)	
Drive sprocket cover bolt	M6	3	12 Nm (1.2 m·kgf, 8.7 ft·lbf)	T
Left crankcase cover bolt	M6	3	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Clutch cover bolt	M6	7	12 Nm (1.2 m·kgf, 8.7 ft·lbf)	
Clutch cover bolt	M6	1	12 Nm (1.2 m·kgf, 8.7 ft·lbf)	T
Pickup rotor cover bolt	M6	6	12 Nm (1.2 m·kgf, 8.7 ft·lbf)	
Ventilation chamber cover bolt	M6	4	12 Nm (1.2 m·kgf, 8.7 ft·lbf)	
Oil baffle plate bolt	M6	3	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	T
Plate bolt (drive sprocket cover)	M6	2	12 Nm (1.2 m·kgf, 8.7 ft·lbf)	T
Pickup rotor cover blind bolt	M8	1	15 Nm (1.5 m·kgf, 11 ft·lbf)	
Oil filler cap	M20	1	1.5 Nm (0.15 m·kgf, 1.1 ft·lbf)	
Main gallery plug (oil return)	M16	3	8 Nm (0.8 m·kgf, 5.8 ft·lbf)	
Main gallery plug	M20	1	8 Nm (0.8 m·kgf, 5.8 ft·lbf)	
Oil return pipe bolt	M6	2	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	T
Oil return plug	M12	2	32 Nm (3.2 m·kgf, 23 ft·lbf)	T
Stator coil lead bolt	M6	1	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	T
Stator coil bolt	M6	3	14 Nm (1.4 m·kgf, 10 ft·lbf)	T
Generator rotor bearing housing bolt	M6	3	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Generator rotor cover plug	M20	1	8 Nm (0.8 m·kgf, 5.8 ft·lbf)	
Thermostat assembly stay bolt	M6	2	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Starter clutch idler gear bolt	M6	1	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	T
Starter motor bolt	M6	2	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Starter motor lead nut	M6	1	5 Nm (0.5 m·kgf, 3.6 ft·lbf)	
Clutch boss nut	M20	1	95 Nm (9.5 m·kgf, 69 ft·lbf)	Stake
Clutch spring bolt	M6	6	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Drive sprocket nut	M22	1	85 Nm (8.5 m·kgf, 61 ft·lbf)	Stake T
Main axle retainer bolt	M6	3	12 Nm (1.2 m·kgf, 8.7 ft·lbf)	T
Shift fork guide bar retainer bolt	M6	2	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	T
Stopper screw	M8	1	22 Nm (2.2 m·kgf, 16 ft·lbf)	T

Item	Thread size	Q'ty	Tightening torque	Remarks
Shift rod locknut (front)	M6	1	8 Nm (0.8 m·kgf, 5.8 ft·lbf)	
Shift rod locknut (rear)	M6	1	8 Nm (0.8 m·kgf, 5.8 ft·lbf)	Left thread
Shift rod joint bolt	M6	1	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Shift arm bolt	M6	1	16 Nm (1.6 m·kgf, 12 ft·lbf)	
Neutral switch	M10	1	17 Nm (1.7 m·kgf, 12 ft·lbf)	
Coolant temperature sensor	M12	1	18 Nm (1.8 m·kgf, 13 ft·lbf)	
Cylinder identification sensor bolt	M6	1	8 Nm (0.8 m·kgf, 5.8 ft·lbf)	
Atmospheric pressure sensor screw	M5	2	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Crankshaft position sensor bolt	M6	1	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Blind plug bolt	M6	1	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Oil level switch bolt	M6	2	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Throttle position sensor screw	M5	2	3.5 Nm (0.35 m·kgf, 2.5 ft·lbf)	
Sub-throttle position sensor screw	M5	1	3.5 Nm (0.35 m·kgf, 2.5 ft·lbf)	

TIP

Cylinder head nut

1. Tighten the nut to 25 Nm (2.5 m·kgf, 18 ft·lbf).
2. Tighten the nut to 25 Nm (2.5 m·kgf, 18 ft·lbf).
3. Tighten the nuts 1–7 and 10 to 80° and nuts 8 and 9 to 100°.



TIP

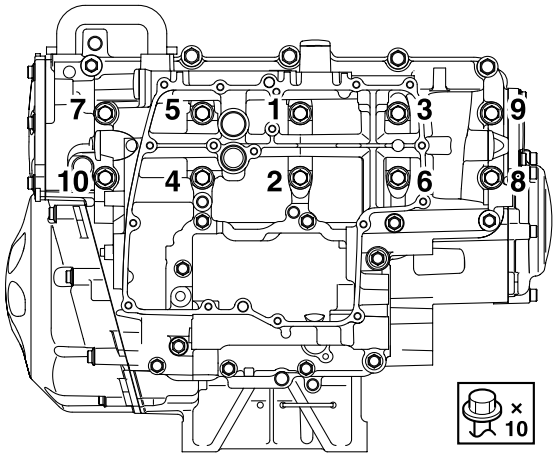
Connecting rod cap bolt

1. Tighten the bolts to 20 Nm (2.0 m·kgf, 14 ft·lbf)
2. Tighten the bolts further to reach the specified angle 145°–155°.

TIP

Crankcase bolt (main journal)

1. Tighten the bolts to approximately 20 Nm (2.0 m·kgf, 14 ft·lbf) with a torque wrench following the tightening order.
2. Loosen all the bolts one by one following the tightening order and then tighten them to 20 Nm (2.0 m·kgf, 14 ft·lbf) again.
3. Tighten the bolts further to reach the specified angle 56°–61°.


7
5
1
3
9
10
4
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8
× 10

EAS20350
CHASSIS TIGHTENING TORQUES

Item	Thread size	Q'ty	Tightening torque	Remarks
Upper bracket pinch bolt	M8	2	26 Nm (2.6 m·kgf, 19 ft·lbf)	
Steering stem nut	M28	1	115 Nm (11.5 m·kgf, 83 ft·lbf)	
Upper handlebar holder bolt	M8	4	24 Nm (2.4 m·kgf, 17 ft·lbf)	
Lower handlebar holder nut	M10	2	32 Nm (3.2 m·kgf, 23 ft·lbf)	
Lower bracket pinch bolt	M8	4	23 Nm (2.3 m·kgf, 17 ft·lbf)	
Lower ring nut	M30	1	See TIP.	
Cap bolt	M46	2	23 Nm (2.3 m·kgf, 17 ft·lbf)	
Cap bolt locknut	M10	2	15 Nm (1.5 m·kgf, 11 ft·lbf)	
Damper rod assembly bolt	M10	2	23 Nm (2.3 m·kgf, 17 ft·lbf)	T
Front brake master cylinder holder bolt	M6	2	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Front brake master cylinder reservoir cap screw	M4	2	1.5 Nm (0.15 m·kgf, 1.1 ft·lbf)	
Front brake hose union bolt	M10	5	30 Nm (3.0 m·kgf, 22 ft·lbf)	
Front brake hose holder bolt	M6	1	6 Nm (0.6 m·kgf, 4.3 ft·lbf)	
Front brake hose bracket and front brake hose bolt	M6	1	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Left rear view mirror (FZ8NA)	M10	1	17 Nm (1.7 m·kgf, 12 ft·lbf)	
Right rear view mirror (FZ8NA)	M10	1	17 Nm (1.7 m·kgf, 12 ft·lbf)	Left thread
Grip end and handlebar bolt	M6	2	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	T
Horn bolt	M6	1	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Lower headlight stay and lower bracket bolt (FZ8NA)	M6	2	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Lower headlight stay and brake hose nut (FZ8NA)	M6	1	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Lower headlight stay and brake hose bolt (FZ8NA)	M6	1	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Upper headlight stay and upper bracket bolt (FZ8NA)	M6	2	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Cable holder and upper bracket bolt (FZ8SA)	M6	2	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	T
Horn bracket and under bracket bolt (FZ8SA)	M6	2	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Horn bracket and brake hose nut (FZ8SA)	M6	1	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Horn bracket and brake hose bolt (FZ8SA)	M6	1	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Cowling stay bolt (FZ8SA)	M8	2	33 Nm (3.3 m·kgf, 24 ft·lbf)	
Rear view mirror nut (FZ8SA)	M6	4	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Cowling bracket bolt (FZ8SA)	M6	2	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Front fender bolt	M6	5	6 Nm (0.6 m·kgf, 4.3 ft·lbf)	
Clutch lever holder pinch bolt	M6	1	11 Nm (1.1 m·kgf, 8.0 ft·lbf)	
Right front engine mounting bolt 1	M10	1	45 Nm (4.5 m·kgf, 33 ft·lbf)	LS

Item	Thread size	Q'ty	Tightening torque	Remarks
Right front engine mounting bolt 2	M10	1	50 Nm (5.0 m·kgf, 36 ft·lbf)	LT
Left front engine mounting bolt	M10	1	45 Nm (4.5 m·kgf, 33 ft·lbf)	LS
Upper self-locking nut	M10	1	51 Nm (5.1 m·kgf, 37 ft·lbf)	LS
Lower self-locking nut	M10	1	51 Nm (5.1 m·kgf, 37 ft·lbf)	LS
Engine mounting adjust bolt (upper)	M16	1	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Engine mounting adjust bolt (lower)	M16	1	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Pivot shaft nut	M18	1	105 Nm (10.5 m·kgf, 76 ft·lbf)	
Connecting arm nut (connecting arm and frame)	M10	1	40 Nm (4.0 m·kgf, 29 ft·lbf)	
Relay arm nut (relay arm and swingarm)	M10	1	40 Nm (4.0 m·kgf, 29 ft·lbf)	
Relay arm nut (relay arm and connecting arm)	M10	1	40 Nm (4.0 m·kgf, 29 ft·lbf)	
Main frame and rear frame nut	M10	4	42 Nm (4.2 m·kgf, 30 ft·lbf)	
Clutch cable locknut	M8	1	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Throttle cable locknut	M6	2	4.5 Nm (0.45 m·kgf, 3.3 ft·lbf)	
Rear shock absorber assembly upper nut	M10	1	40 Nm (4.0 m·kgf, 29 ft·lbf)	
Rear shock absorber assembly lower nut	M10	1	40 Nm (4.0 m·kgf, 29 ft·lbf)	
Drive chain guard bolt	M6	3	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Drive chain guide bolt	M6	1	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Rear fender bolt	M6	3	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Fuel tank bolt (front)	M6	2	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Fuel tank bolt (rear)	M6	1	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Fuel tank bracket bolt	M6	4	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Fuel tank cap bolt	M5	3	6 Nm (0.6 m·kgf, 4.3 ft·lbf)	
Fuel pump bolt	M5	6	4.0 Nm (0.40 m·kgf, 2.9 ft·lbf)	
Fuel tank cover and fuel tank bolt	M5	4	1.5 Nm (0.15 m·kgf, 1.1 ft·lbf)	
Fuel rail screw	M5	4	3.5 Nm (0.35 m·kgf, 2.5 ft·lbf)	
Rider seat and seat bracket bolt	M6	2	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Seat lock rotor bolt	M6	2	3.0 Nm (0.30 m·kgf, 2.2 ft·lbf)	LT
Seat lock assembly nut	M6	2	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Mud guard assembly bolt	M8	4	15 Nm (1.5 m·kgf, 11 ft·lbf)	LT
License plate light bolt	M5	2	3.8 Nm (0.38 m·kgf, 2.8 ft·lbf)	
Rear reflector nut	M5	1	3.8 Nm (0.38 m·kgf, 2.8 ft·lbf)	
Mud guard assembly bracket screw	M5	6	2.3 Nm (0.23 m·kgf, 1.7 ft·lbf)	
Tail/brake light bracket bolt	M6	2	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Seat bracket bolt	M6	4	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Exhaust pipe bracket and frame bolt	M8	2	30 Nm (3.0 m·kgf, 22 ft·lbf)	
Side cover bolt	M6	2	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	

Item	Thread size	Q'ty	Tightening torque	Remarks
Battery box and rear frame bolt	M6	2	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Rectifier/regulator bracket and rear frame bolt	M6	4	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Rectifier/regulator bolt	M6	2	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Assist grip and rear frame bolt (FZ8SA)	M8	4	19 Nm (1.9 m·kgf, 14 ft·lbf)	
Lean angle sensor bolt	M4	2	2.0 Nm (0.2 m·kgf, 1.5 ft·lbf)	
Coolant reservoir tank bolt	M6	1	4.5 Nm (0.45 m·kgf, 3.3 ft·lbf)	
Front wheel axle	M16	1	65 Nm (6.5 m·kgf, 47 ft·lbf)	
Front wheel axle pinch bolt	M8	1	23 Nm (2.3 m·kgf, 17 ft·lbf)	
Front brake caliper bolt	M10	4	40 Nm (4.0 m·kgf, 29 ft·lbf)	
Front brake disc bolt	M6	10	18 Nm (1.8 m·kgf, 13 ft·lbf)	
Brake caliper bleed screw	M8	3	5 Nm (0.5 m·kgf, 3.6 ft·lbf)	
Rear wheel axle nut	M24	1	150 Nm (15 m·kgf, 108 ft·lbf)	
Rear brake disc bolt	M8	5	20 Nm (2.0 m·kgf, 14 ft·lbf)	
Rear brake caliper retaining bolt (front)	M12	1	27 Nm (2.7 m·kgf, 20 ft·lbf)	
Rear brake caliper retaining bolt (rear)	M8	1	22 Nm (2.2 m·kgf, 16 ft·lbf)	
Rear brake pad retaining bolt	M10	1	17 Nm (1.7 m·kgf, 12 ft·lbf)	
Rear brake caliper screw plug	M10	1	2.5 Nm (0.25 m·kgf, 1.8 ft·lbf)	
Rear wheel sprocket nut	M10	6	80 Nm (8.0 m·kgf, 58 ft·lbf)	
Drive chain adjusting locknut	M8	2	16 Nm (1.6 m·kgf, 12 ft·lbf)	
Rear brake hose union bolt	M10	2	30 Nm (3.0 m·kgf, 22 ft·lbf)	
Sidestand nut	M10	1	48 Nm (4.8 m·kgf, 35 ft·lbf)	
Sidestand bracket bolt	M10	2	63 Nm (6.3 m·kgf, 46 ft·lbf)	
Sidestand switch bolt	M5	2	4.3 Nm (0.43 m·kgf, 3.1 ft·lbf)	
Footrest bracket bolt	M8	4	30 Nm (3.0 m·kgf, 22 ft·lbf)	
Rear brake fluid reservoir tank bolt	M5	1	3.8 Nm (0.38 m·kgf, 2.8 ft·lbf)	
Rear brake master cylinder bolt	M8	2	23 Nm (2.3 m·kgf, 17 ft·lbf)	
Footrest bolt	M10	2	55 Nm (5.5 m·kgf, 40 ft·lbf)	
Passenger footrest and rear frame bolt	M8	4	28 Nm (2.8 m·kgf, 20 ft·lbf)	
Passenger footrest and muffler bracket bolt	M8	2	23 Nm (2.3 m·kgf, 17 ft·lbf)	
Throttle cable adjusting nut	M6	1	4.3 Nm (0.43 m·kgf, 3.1 ft·lbf)	
Clutch cable adjusting nut	M8	1	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Wheel sensor lead stay and swing arm	M6	2	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Front brake hose bracket and front brake hose	M6	1	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Front wheel sensor rotor bolt	M5	5	8 Nm (0.8 m·kgf, 5.8 ft·lbf)	
Front wheel sensor bolt	M6	1	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Rear wheel sensor rotor bolt	M5	5	8 Nm (0.8 m·kgf, 5.8 ft·lbf)	

Item	Thread size	Q'ty	Tightening torque	Remarks
Rear wheel sensor bolt	M6	1	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Rear wheel sensor lead stay bolt	M6	2	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Rear wheel sensor bracket and rear wheel sensor housing	M6	2	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Rear wheel sensor bracket and rear wheel sensor protector	M6	1	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Hydraulic unit and lower hydraulic unit bracket	M6	3	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Lower hydraulic unit bracket and rear fram	M6	4	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Lower hydraulic unit bracket and upper hydraulic unit bracket bolt	M6	2	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Brake fluid reservoir tank stay and upper hydraulic unit bracket bolt	M6	1	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Brake pipe/joint assembly flare nut	M10	4	16 Nm (1.6 m·kgf, 12 ft·lbf)	
Brake hose holder bolt	M6	1	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Front brake hose stay and frame bolt	M6	1	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Front brake hose stay and front brake hose bolt	M6	2	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Front brake hose holder and front brake hose bolt	M6	2	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Bottom cowling bracket bolt	M6	4	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Rectifier/regulator bracket and bottom cowling bracket bolt	M6	2	7 Nm (0.7 m·kgf, 5.1 ft·lbf)	
Rectifier/regulator bolt	M6	2	10 Nm (1.0 m·kgf, 7.2 ft·lbf)	
Bottom cowling bolt	M6	4	4.5 Nm (0.45 m·kgf, 3.3 ft·lbf)	

TIP

Lower ring nut

1. Tighten the ring nut to approximately 52 Nm (5.2 m·kgf, 38 ft·lbf) with a torque wrench, then loosen the lower ring nut completely.
2. Tighten the lower ring nut 18 Nm (1.8 m·kgf, 13 ft·lbf).

EAS20360
LUBRICATION POINTS AND LUBRICANT TYPES

EAS20370
ENGINE

Lubrication point	Lubricant
Oil seal lips	LS
O-rings	LS
Coolant hose insertion part	Water or silicone fluid
Bearings	E
Camshaft lobes and journals (intake and exhaust)	M
Valve stem seals (intake and exhaust)	Silicone fluid
Valve lifter outer surface (intake and exhaust)	E
Valve stems and stem ends (intake and exhaust)	M
Crankshaft big ends	E
Piston surfaces	E
Piston pins	E
Connecting rod bolts	M
Crankshaft journals	E
Generator rotor assembly	E
Water pump impeller shaft	E
Oil pump rotors (inner and outer)	E
O-ring (oil nozzle)	LS
O-ring (main gallery plug)	LS
Damper (crankcase left side)	Water or silicone fluid
Idler gear and idler gear shaft	E
Starter clutch assembly	E
Starter clutch gear thrust surface	E
Primary driven gear	E
Pull rod	LS
Oil/water pump assembly drive sprocket inner surface	E
Oil/water pump assembly drive sprocket collar and washer	E
Transmission gears (wheel and pinion)	M
Main axle and drive axle	M
Shift forks and shift fork guide bars	E
Cylinder head cover mating surface	Three bond No.1541C®
Cylinder head cover semicircular	Yamaha bond No.1215 (Three bond No.1215®)
Crankcase mating surface	Yamaha bond No.1215 (Three bond No.1215®)
Crankcase mating surface (right portion)	Three bond No. 1280B®

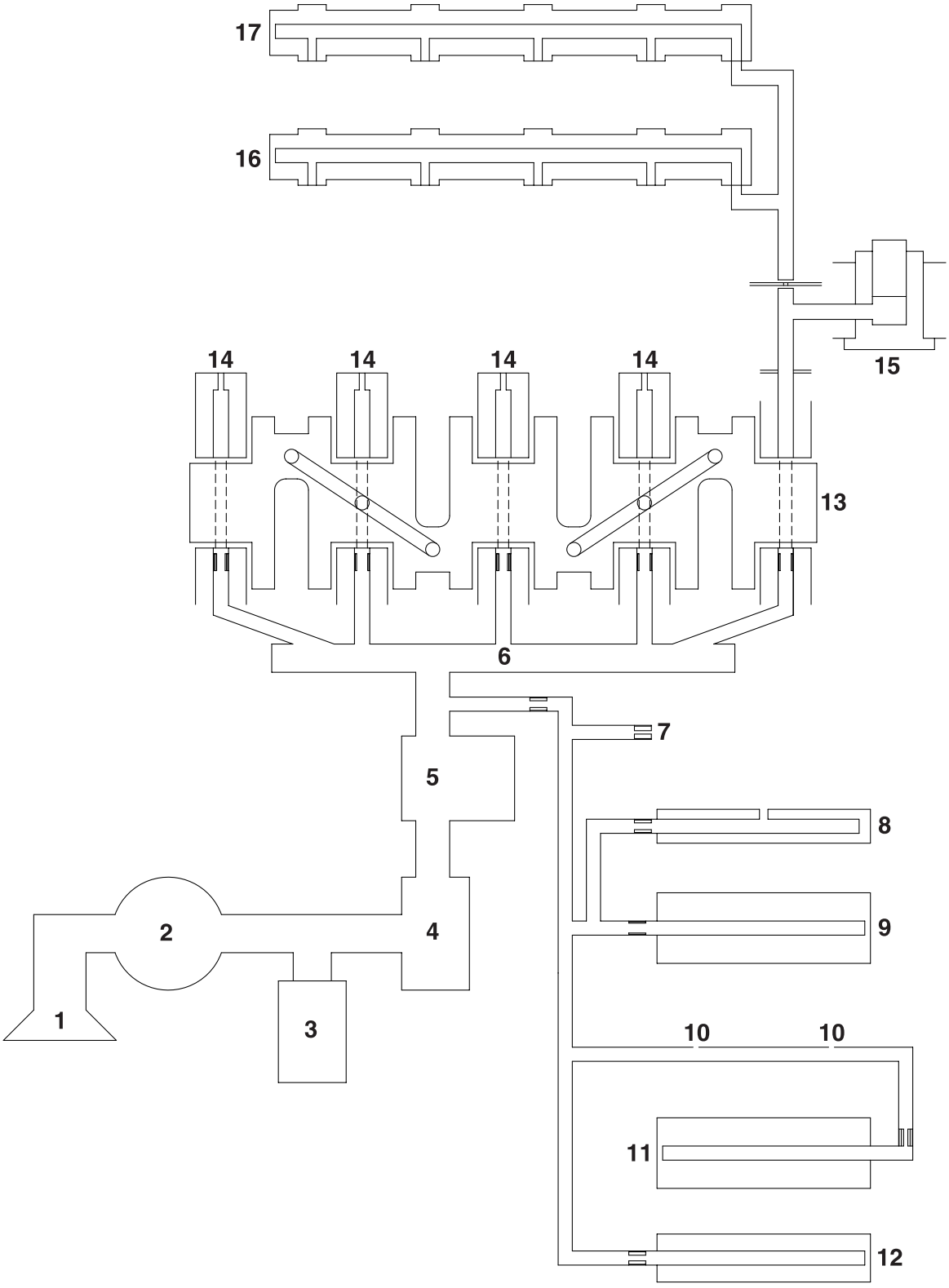
Lubrication point	Lubricant
Left crankcase cover (three mating surface)	Yamaha bond No.1215 (Three bond No.1215®)
Crankcase cover (lead grommet)	Yamaha bond No.1215 (Three bond No.1215®)

EAS20380
CHASSIS

Lubrication point	Lubricant
Steering bearings, seal lip and bearing lip	LS
Tube guide (throttle grip) inner surface and throttle cables	LS
Brake lever pivot bolt and metal-to-metal moving parts	S
Clutch lever pivot bolt, metal-to-metal moving parts and clutch cable end	LS
Engine mount bolts (rear upper and lower)	LS
Engine mount bolts (front left and right)	LS
Relay arm, connecting rod and rear shock absorber collar	LS
Pivot shaft	LS
Swingarm head pipe end, bush and dust cover lips	LS
Oil seal (relay arm, connecting arm and rear shock absorber)	LS
Sidestand pivoting point and metal-to-metal moving parts	LS
Sidestand switch contact point	LS
Sidestand hook and spring contact point	LS
Shift shaft joint rod moving parts	LS
Shift pedal pivoting parts	LS
Rear footrest ball and metal-to-metal moving parts	LS
Front wheel oil seal (left and right)	LS
Rear wheel oil seal	LS
Rear wheel drive hub oil seal	LS
Rear wheel drive hub mating surface	LS
Brake caliper piston seal	BF
Master cylinder inside	BF
Brake caliper piston dust seal	S
Caliper bracket slide pins and/or retaining bolts	S

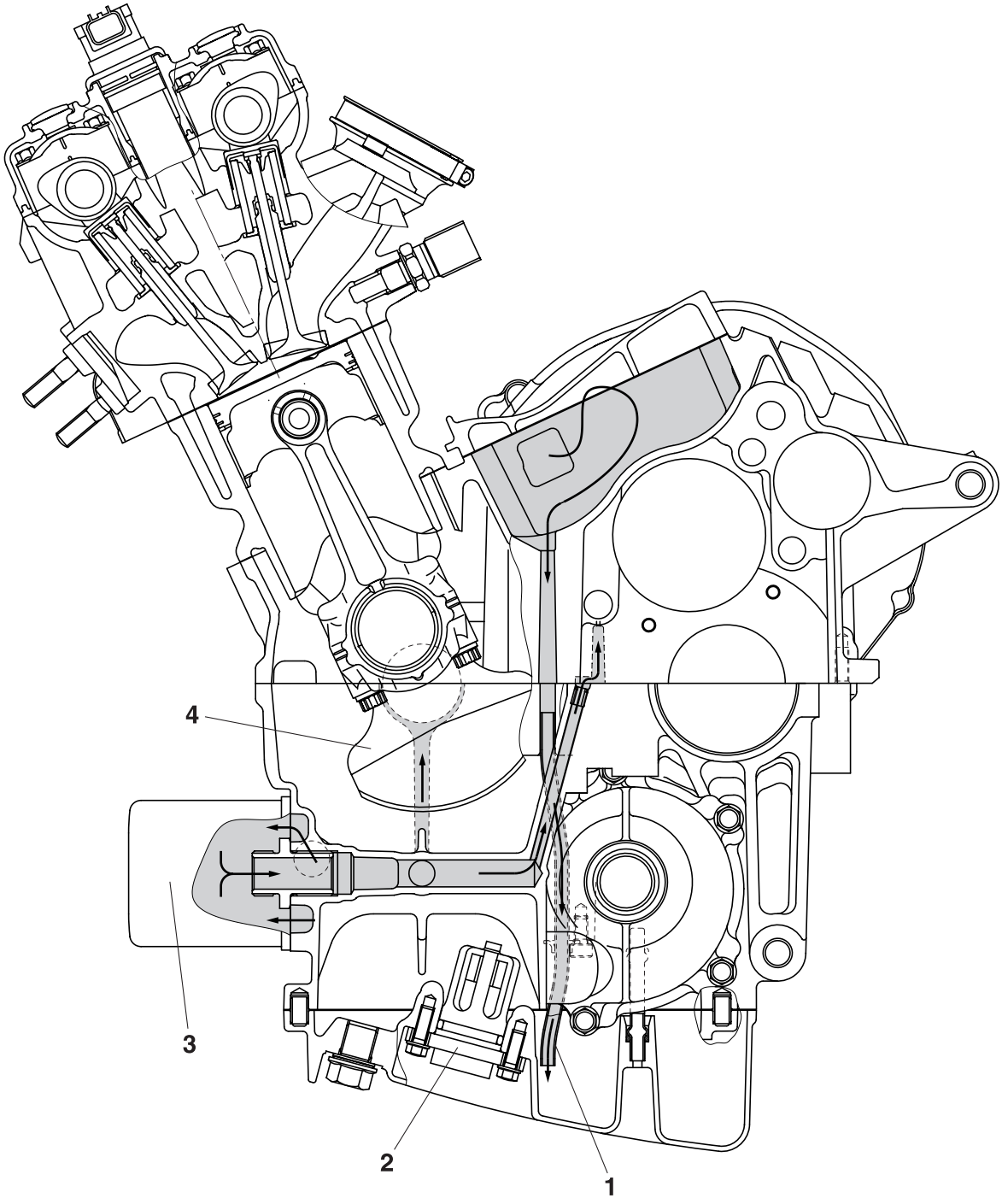
EAS20390
LUBRICATION SYSTEM CHART AND DIAGRAMS

EAS20400
ENGINE OIL LUBRICATION CHART

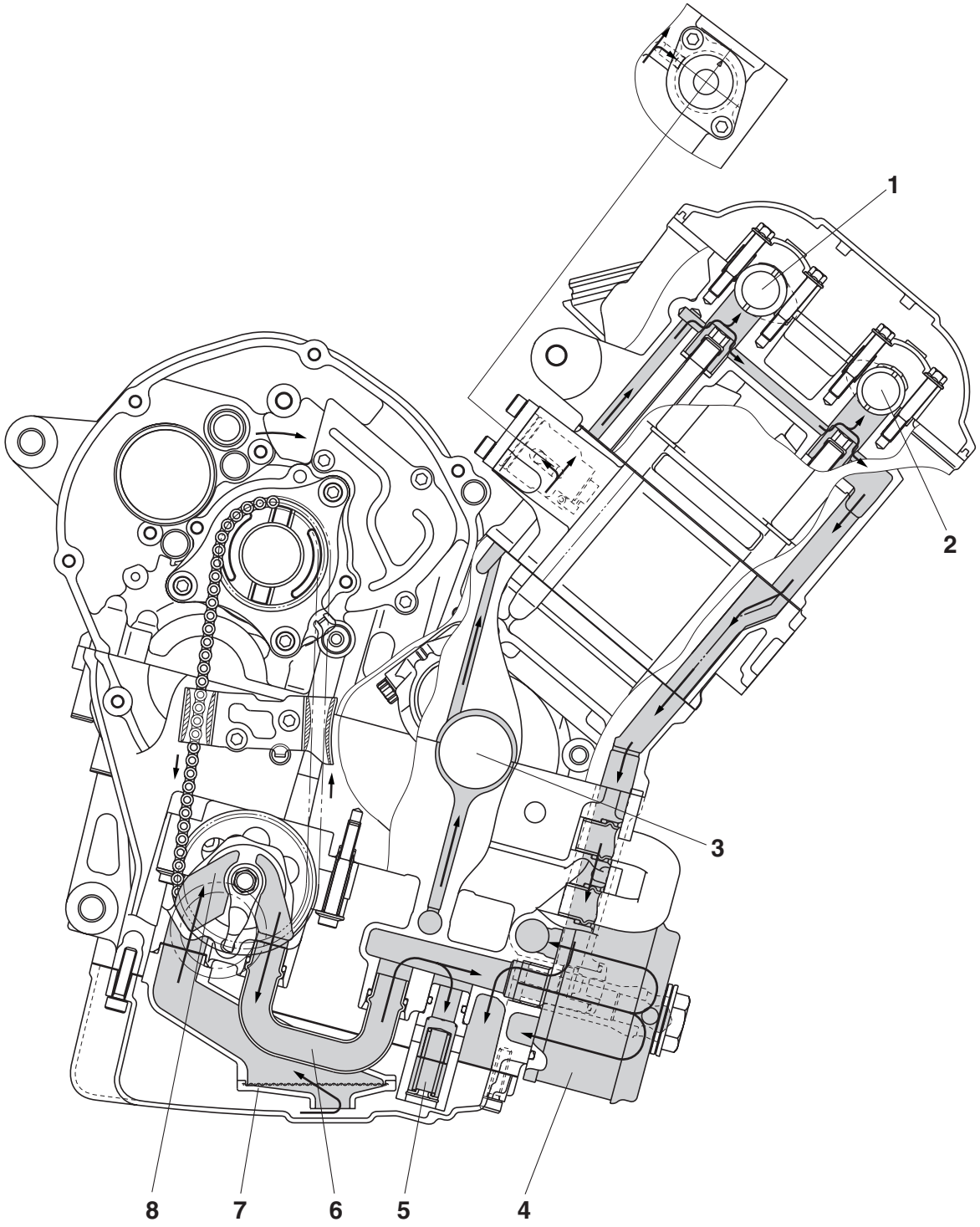


1. Oil strainer
2. Oil pump
3. Relief valve
4. Oil cooler
5. Oil filter
6. Main gallery
7. AC magneto drive gear shower
8. Shift fork (upper)
9. Main axle
10. Mission shower
11. Drive axle
12. AC magneto axle
13. Crankshaft
14. Piston cooler
15. Timing chain tensioner
16. Intake camshaft
17. Exhaust camshaft

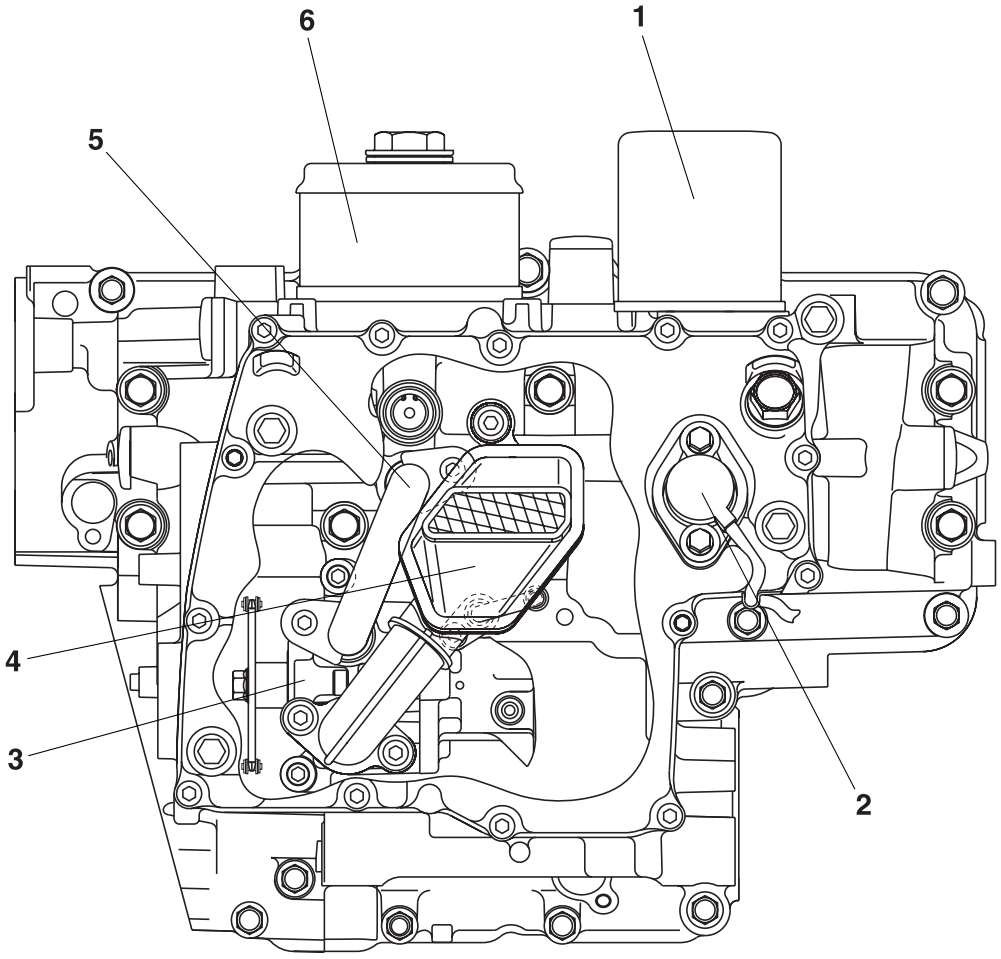
EAS20410
LUBRICATION DIAGRAMS



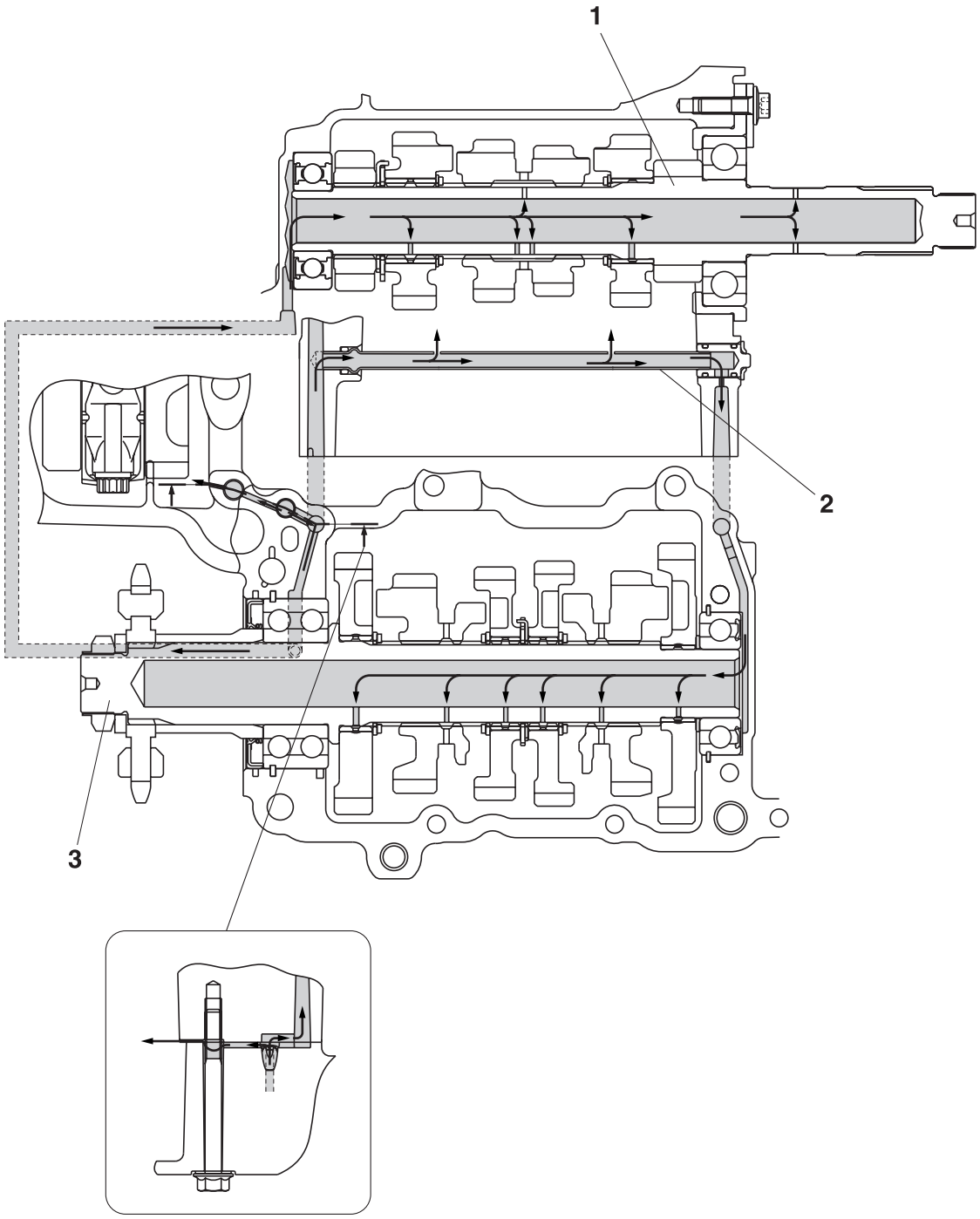
1. Oil delivery pipe
2. Oil level switch
3. Oil filter cartridge
4. Crankshaft


1
2
3
8
7
6
5
4

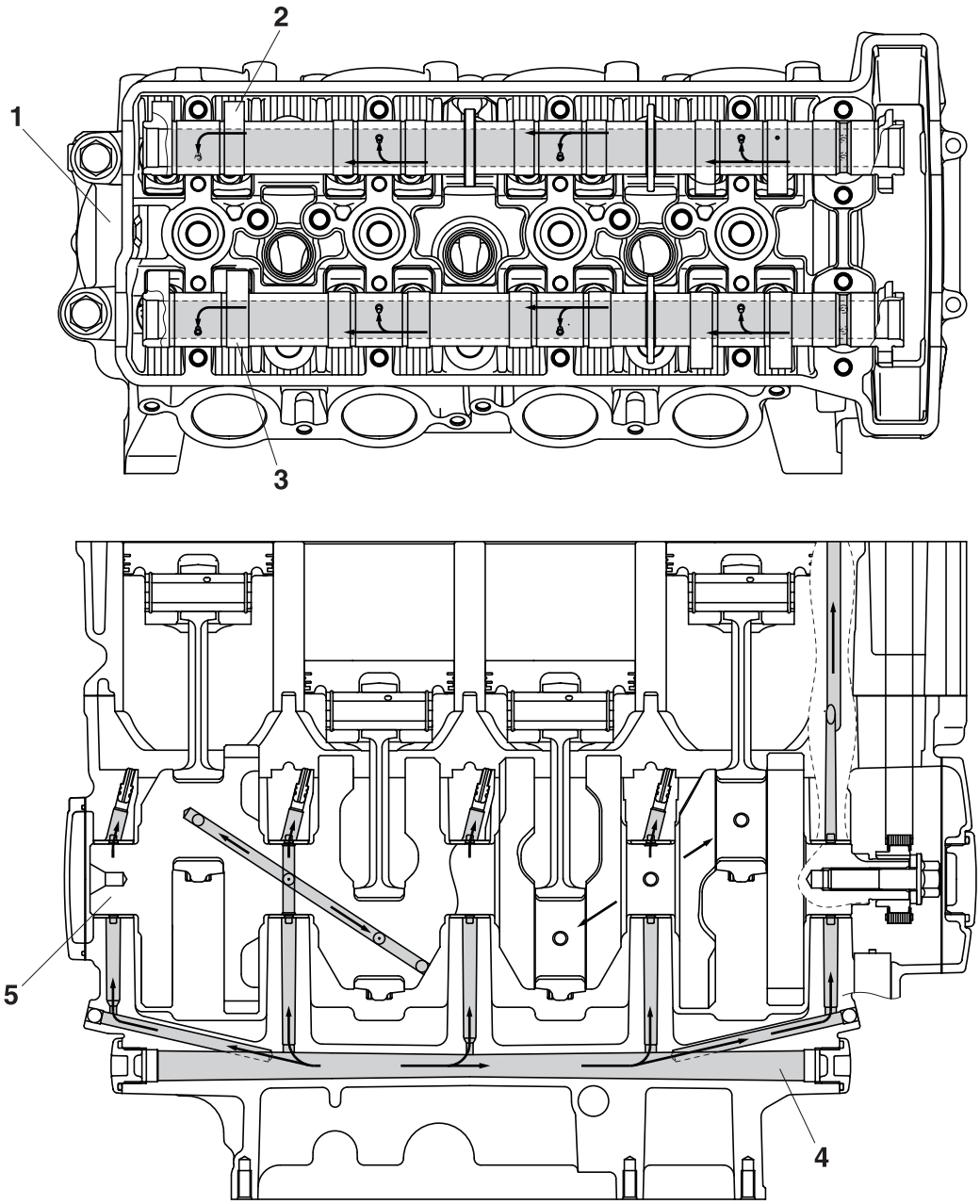
1. Intake camshaft
2. Exhaust camshaft
3. Crankshaft
4. Oil cooler
5. Relief valve
6. Oil pipe
7. Oil strainer
8. Oil pump


6
1
5
4
3
2

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

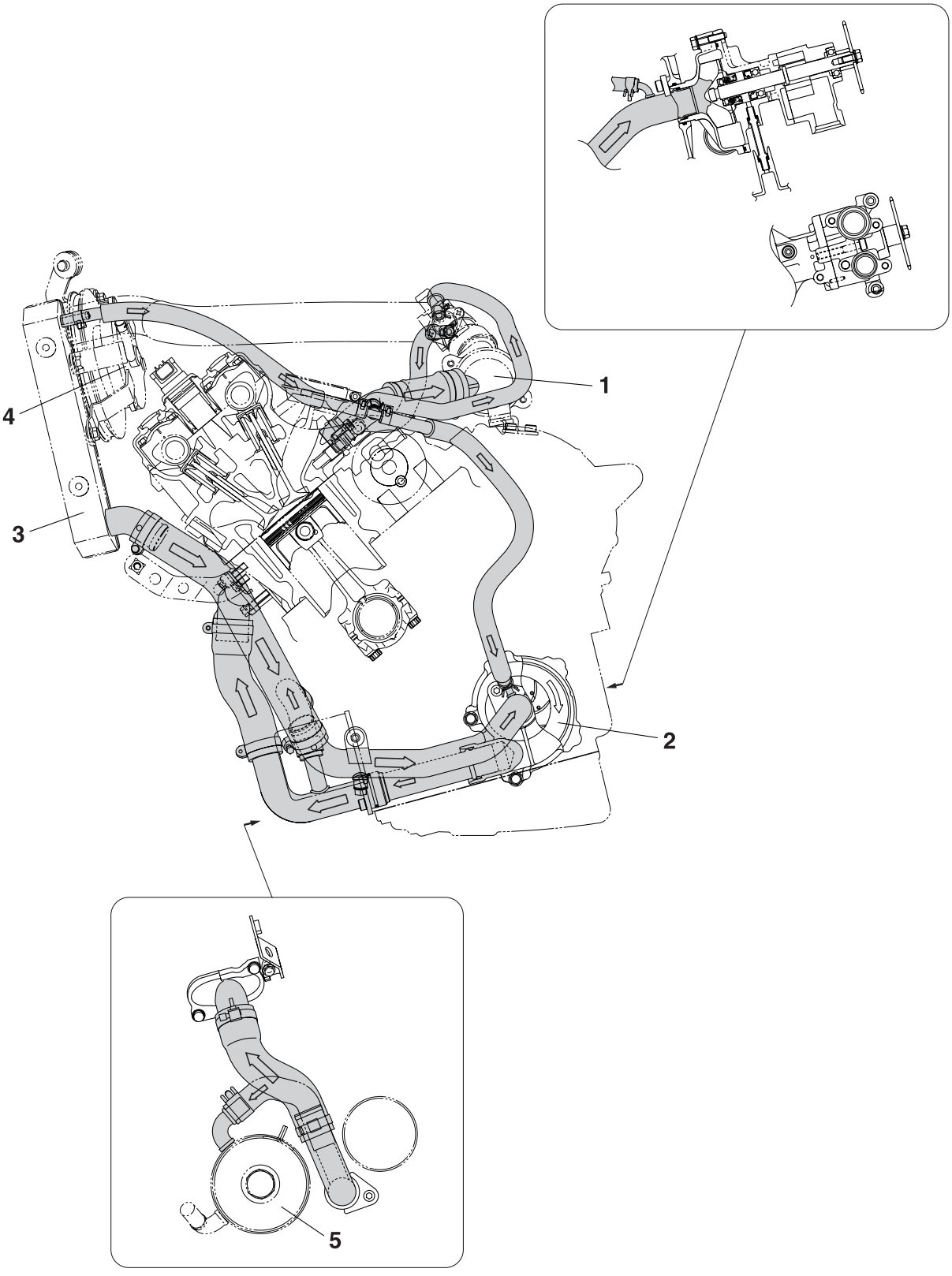

1
2
3

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

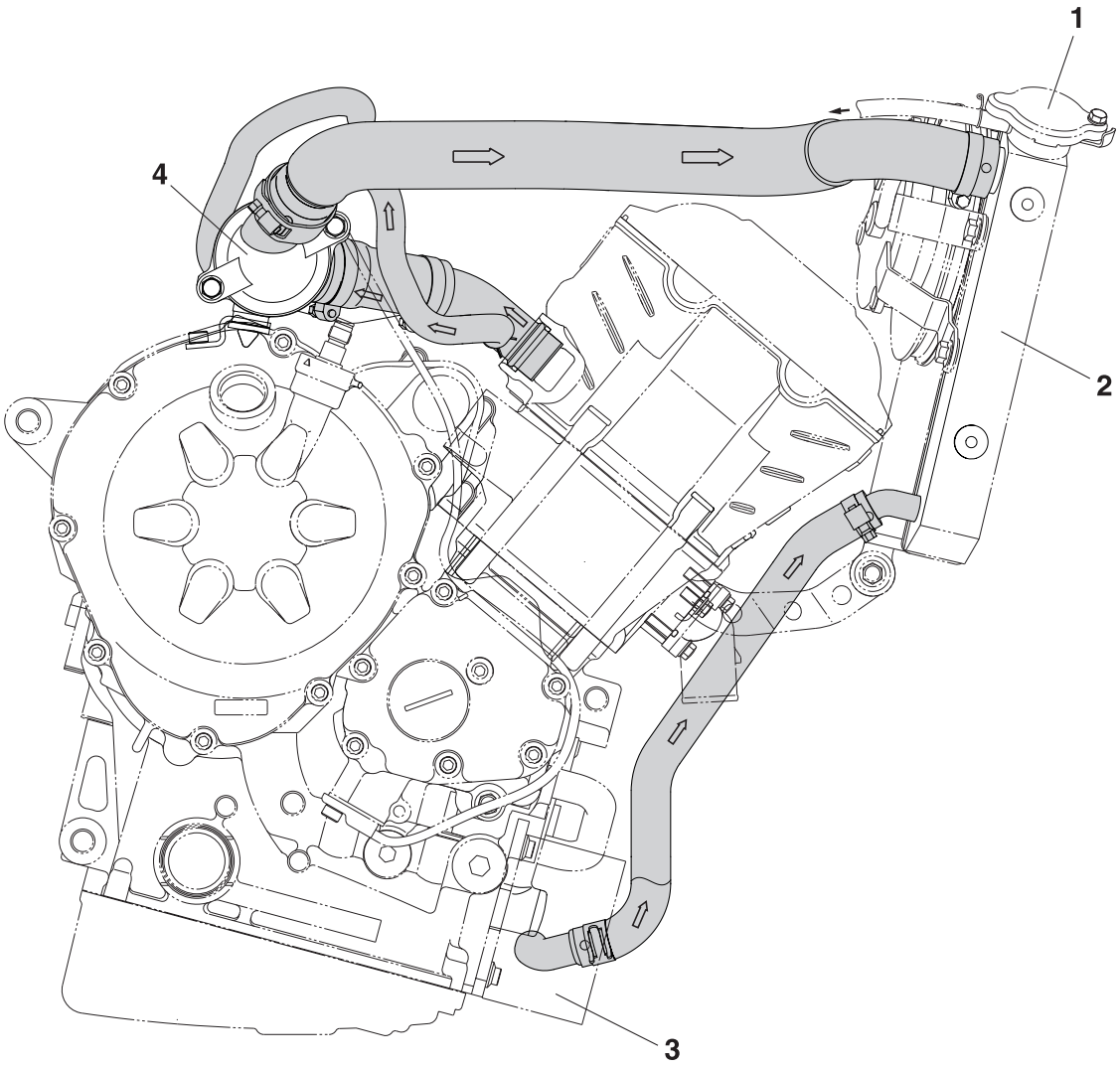

2
1
3
5
4

1. Cylinder head
2. Exhaust camshaft
3. Intake camshaft
4. Main gallery
5. Crankshaft

EAS20420
COOLING SYSTEM DIAGRAMS

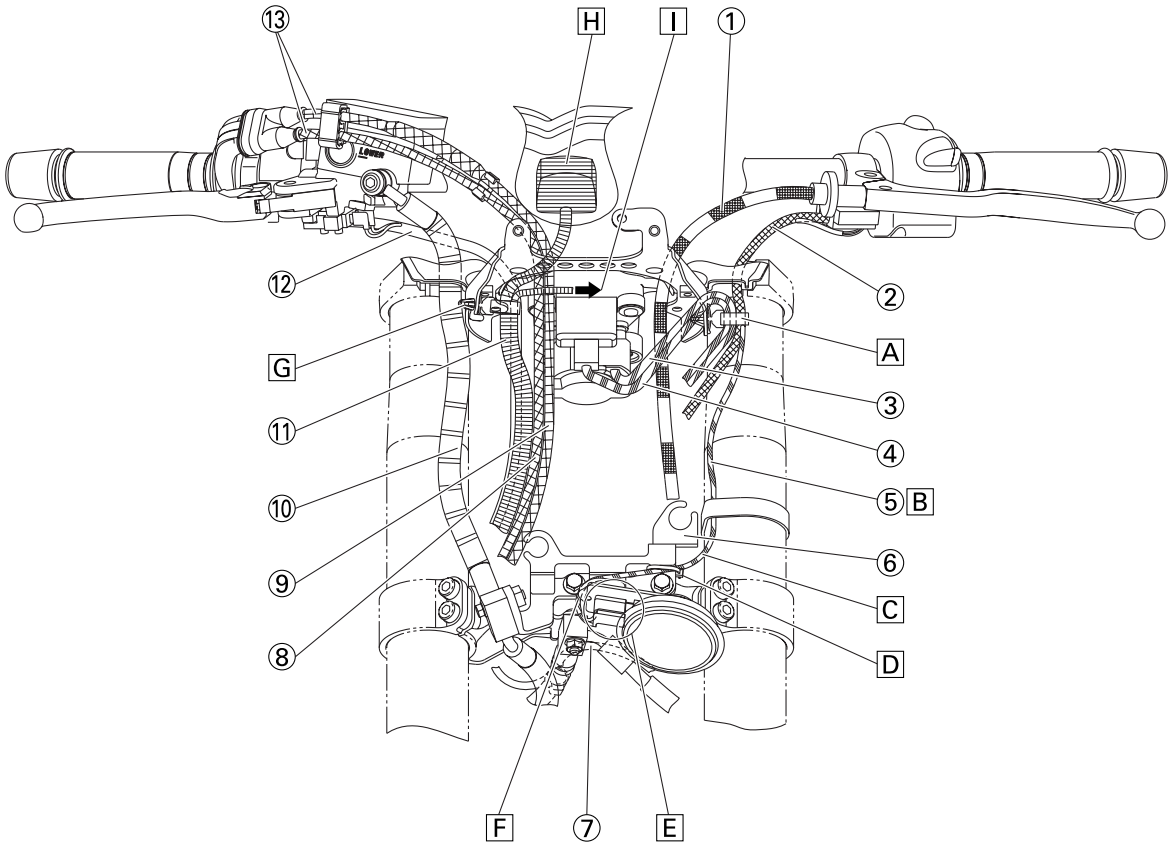


1. Thermostat
2. Water pump
3. Radiator
4. Radiator fan
5. Oil cooler


1
2
3
4

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

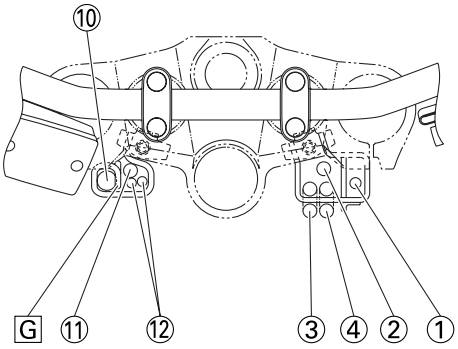
EAS20430
CABLE ROUTING
Handlebar (front view)
FZ8NA

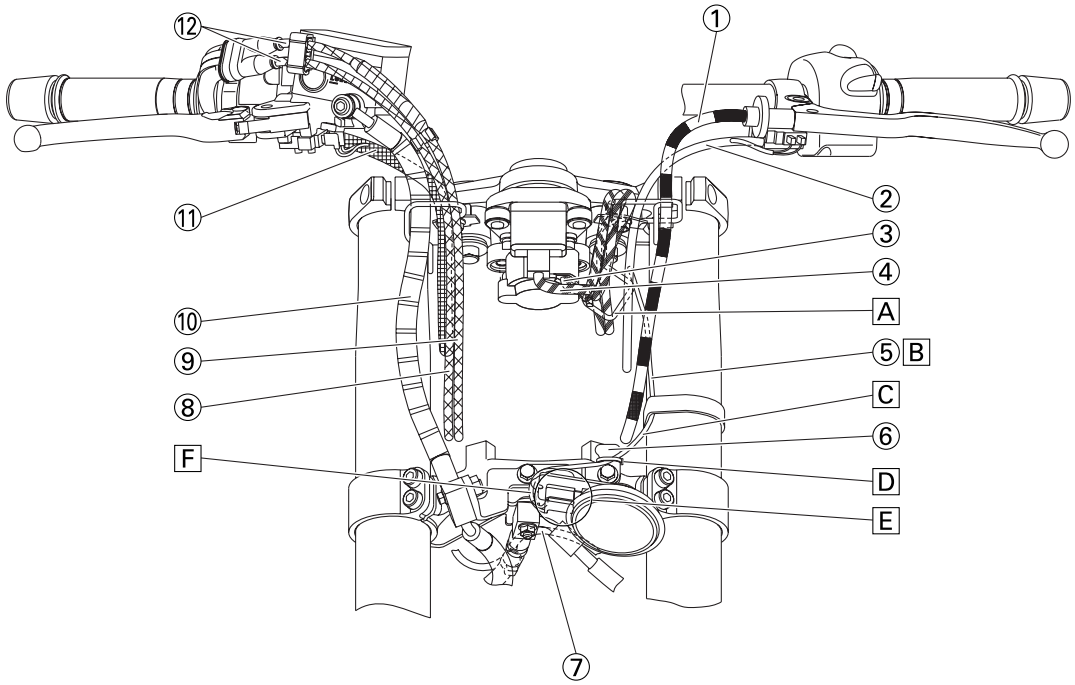


1. Clutch cable
2. Left handlebar switch lead
3. Main switch lead
4. Immobilizer lead
5. Horn lead
6. Lower headlight stay
7. Front wheel sensor lead
8. Throttle cable (return side)
9. Throttle cable (pull side)
10. Brake hose
11. Wire harness
12. Right handlebar switch lead
13. Throttle cables

A. Clamp the main switch lead, immobilizer lead, and left handlebar switch lead at each of the branches and insert the clamp into the upper headlight stay. Face the end of the clamp to the rear of the vehicle.
B. Route the horn lead further inward of the vehicle than the center of the front fork. The headlight side cover and front fork must not be pinched.
C. The horn lead and lower headlight stay must not interfere with each other.
D. Clamp the horn lead to the Lower headlight stay and face the head of the clamp to outside of the vehicle and the end of the clamp to the rear of the vehicle. Cut off the excess end of the clamp, leaving 2–4 mm (0.08–0.16 in).
E. Insert the bullet terminal of the horn lead in the direction shown in the illustration.
F. The horn lead should not protrude out.
G. Clamp the wire harness at the branch and insert it into the upper headlight stay. Face the end of the clamp to the rear of the vehicle.
H. Connect the meter coupler to the meter.
I. To the headlight lead coupler

Handlebar (front view)
FZ8SA

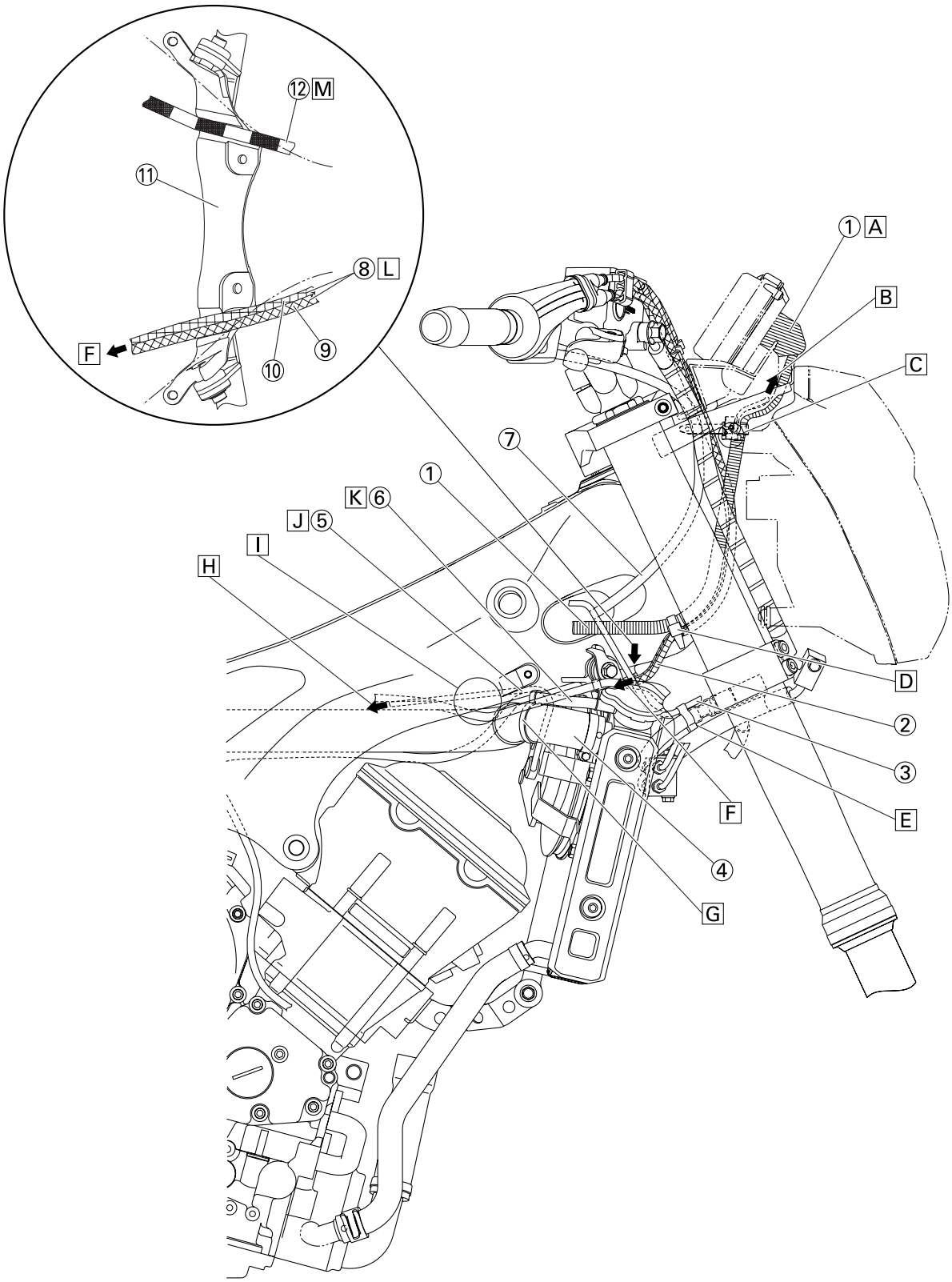




1. Clutch cable
2. Left handlebar switch lead
3. Main switch lead
4. Immobilizer lead
5. Horn lead
6. Horn bracket
7. Front wheel sensor lead
8. Throttle cable (return side)
9. Throttle cable (pull side)
10. Brake hose
11. Right handlebar switch lead
12. Throttle cables

A. Route the main switch lead and immobilizer lead through the cable holder.
B. Route the horn lead further inward of the vehicle than the center of the front fork.
C. The horn lead and lower bracket must not interfere with each other.
D. Clamp the horn lead to the horn bracket and face the head of the clamp to outside of the vehicle and the end of the clamp to the rear of the vehicle. Cut off the excess end of the clamp, leaving 2–4 mm (0.08–0.16 in).
E. Insert the bullet terminal of the horn lead in the direction shown in the illustration.
F. The horn lead should not protrude out.
G. Route the brake hose further to the right of the vehicle than this wire and route the throttle cable and right handlebar switch lead further to the left. Route the right handlebar switch lead behind the throttle cable on the rear of the vehicle.

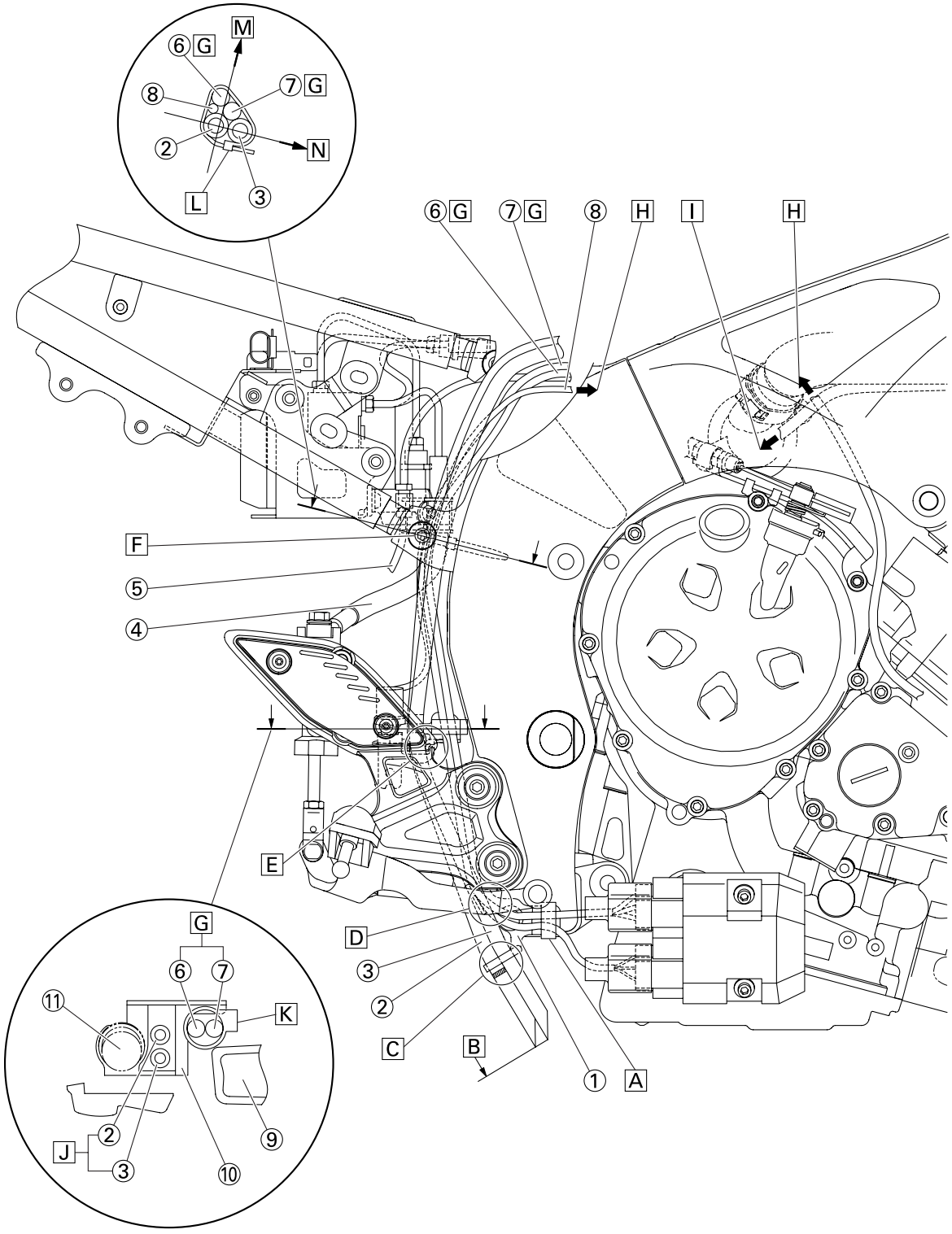
Handlebar (right side view)



1. Wire harness
2. Throttle cable
3. Front wheel sensor lead
4. Radiator inlet hose
5. Right radiator fan motor lead
6. Coolant reservoir hose
7. Right handlebar switch lead
8. Throttle cables
9. Throttle cable (return side)
10. Throttle cable (pull side)
11. Radiator stay
12. Clutch cable

A. Connect the meter coupler to the meter.
B. To the headlight
C. Install the clamp so that the seating face is positioned between the claws of the upper headlight stay.
D. Clamp the wire harness and throttle cable between the rubber damper and frame opening. Face the head of the clamp to outside of the vehicle and the end of the clamp to the bottom of the vehicle.
E. Clamp the front wheel sensor lead and Brake pipe/joint assembly (hydraulic unit to front brake calipers). Use the end of the protector fixing tape of the front wheel sensor lead and the tube part of the brake pipe/joint assembly (hydraulic unit to front brake calipers) as a guide (permissible range: (0–10 mm (0–0.39 in)). When clamping them, route the front wheel sensor lead so that it comes to the top of the vehicle.
F. To the throttle body
G. Clamp the coolant reservoir hose and radiator inlet hose and face the head of the clamp to inside of the vehicle and the end of the clamp to the top of the vehicle. Be careful that the end of the clamp does not protrude out of the radiator upper cover.
H. To the wire harness
I. Route the right radiator fan motor lead such that it is as taut as possible, within the area shown in the illustration.
J. Route the right radiator fan motor lead above the coolant reservoir hose and into the frame.
K. Route the coolant reservoir hose further inward of the vehicle than the radiator inlet hose and further bottom-outward of the vehicle than the thermostat assembly.
L. Route the throttle cable to the radiator stay concave (No kinks in the cable).
M. Route the clutch cable to the radiator stay concave.

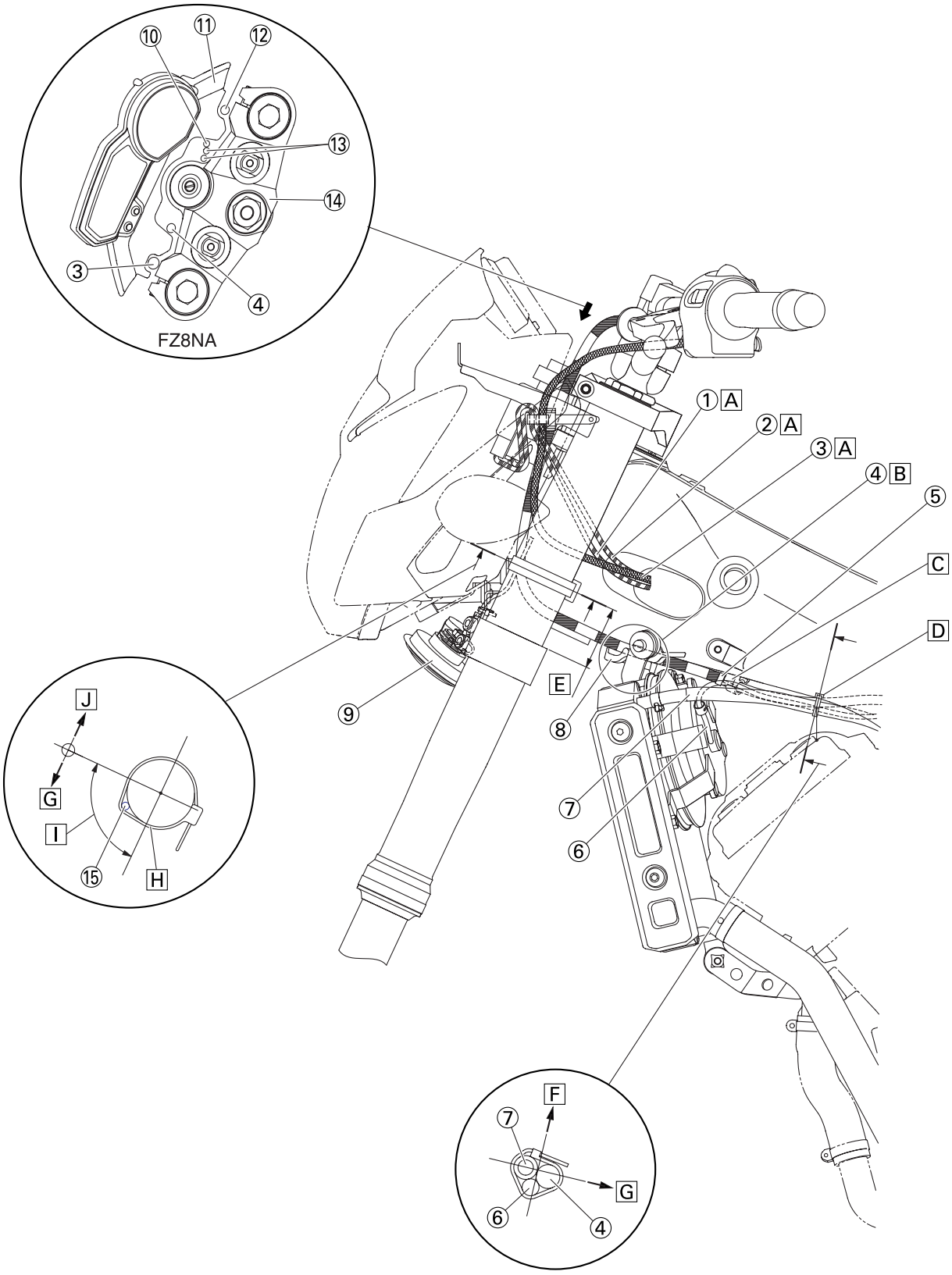
Engine (right side view)



1. Cable guide
2. Fuel tank drain hose
3. Fuel tank breather hose
4. Brake fluid reservoir hose
5. Rear wheel sensor lead
6. AC magneto lead
7. Rectifier/regulator lead
8. Rear brake light switch lead
9. Frame
10. Rear brake light switch stay
11. Rear brake light switch

A. Clamp the AC magneto lead and rectifier/regulator lead. Insert the clamp into the cable guide so that the clamp opening faces to the top of the vehicle.
B. For the position of the end of the fuel tank breather hose, use the end of the fuel tank drain hose as a guide.
C. Pass the fuel tank breather hose and fuel tank drain hose through the cable guide. The white paint mark on the fuel tank drain hose should be under the cable guide.
D. Route the AC magneto lead and rectifier/regulator lead further to the front of the vehicle than the cable guide.
E. Route the fuel tank breather hose and fuel tank drain hose through the opening of the rear brake light switch stay.
F. The clamp position should be inside the rear frame joint section.
G. Order insignificant-AC magneto lead and rectifier/regulator lead.
H. To the wire harness
I. To the coolant reservoir
J. Order insignificant-fuel tank breather hose and fuel tank drain hose.
K. Clamp opening faces to the front of the vehicle.
L. Install the clamp, facing the head of the clamp to outside of the vehicle and the end of the clamp to the front of the vehicle.
M. Inside of the vehicle
N. Front of the vehicle

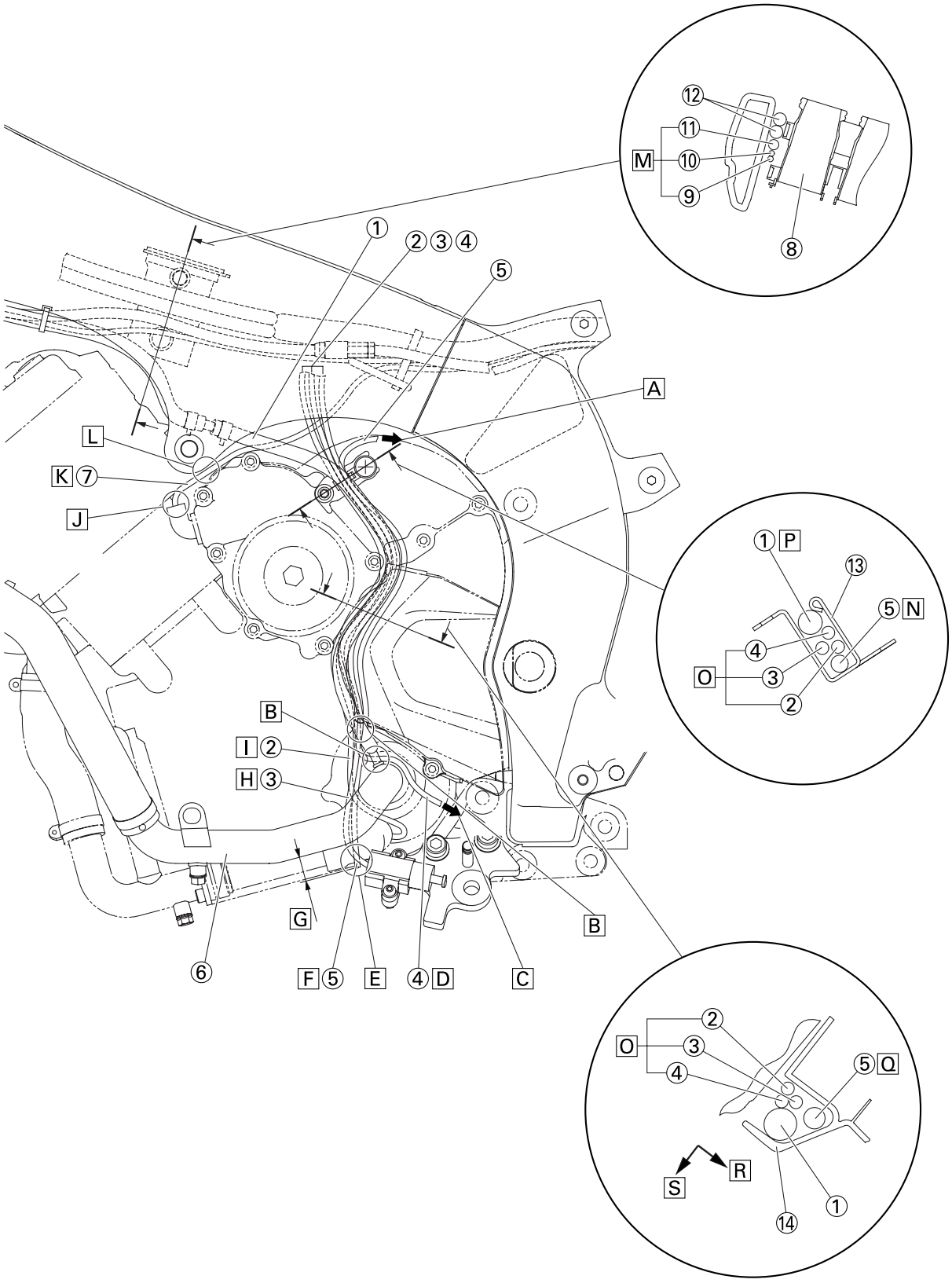
Handlebar (left side view)



1. Immobilizer lead
2. Main switch lead
3. Left handlebar switch lead
4. Clutch cable
5. Clutch cable swaging metal
6. Left radiator fan motor lead
7. Water pump breather hose
8. Radiator stay
9. Horn
10. Right handlebar switch lead
11. Meter bracket
12. Brake hose
13. Throttle cables
14. Upper bracket
15. Horn lead

A. Order insignificant-immobilizer lead, main switch lead and left handlebar switch lead.
B. Route the clutch cable to the radiator stay concave.
C. Insert the clamp into the frame and clamp the clutch cable. Position the clutch cable swaging metal further to the front of the vehicle than the clamp and face the clamp opening to outside of the vehicle.
D. Clamp the clutch cable, left radiator fan motor lead, and water pump breather hose and face the head of the clamp to the top of the vehicle and the end of the clamp to inside of the vehicle. Use the position of the cylinder head cover shown in the illustration as a guide to install the clamp.
E. 45–65 mm (1.77–2.56 in)
F. Upper side of the vehicle
G. Inside of the vehicle
H. Clamp the horn lead to the front fork and face the head of the clamp to rear of the vehicle and the end of the clamp to the inside of the vehicle.
I. The horn lead should be positioned in the 90° area.
J. Outside of the vehicle

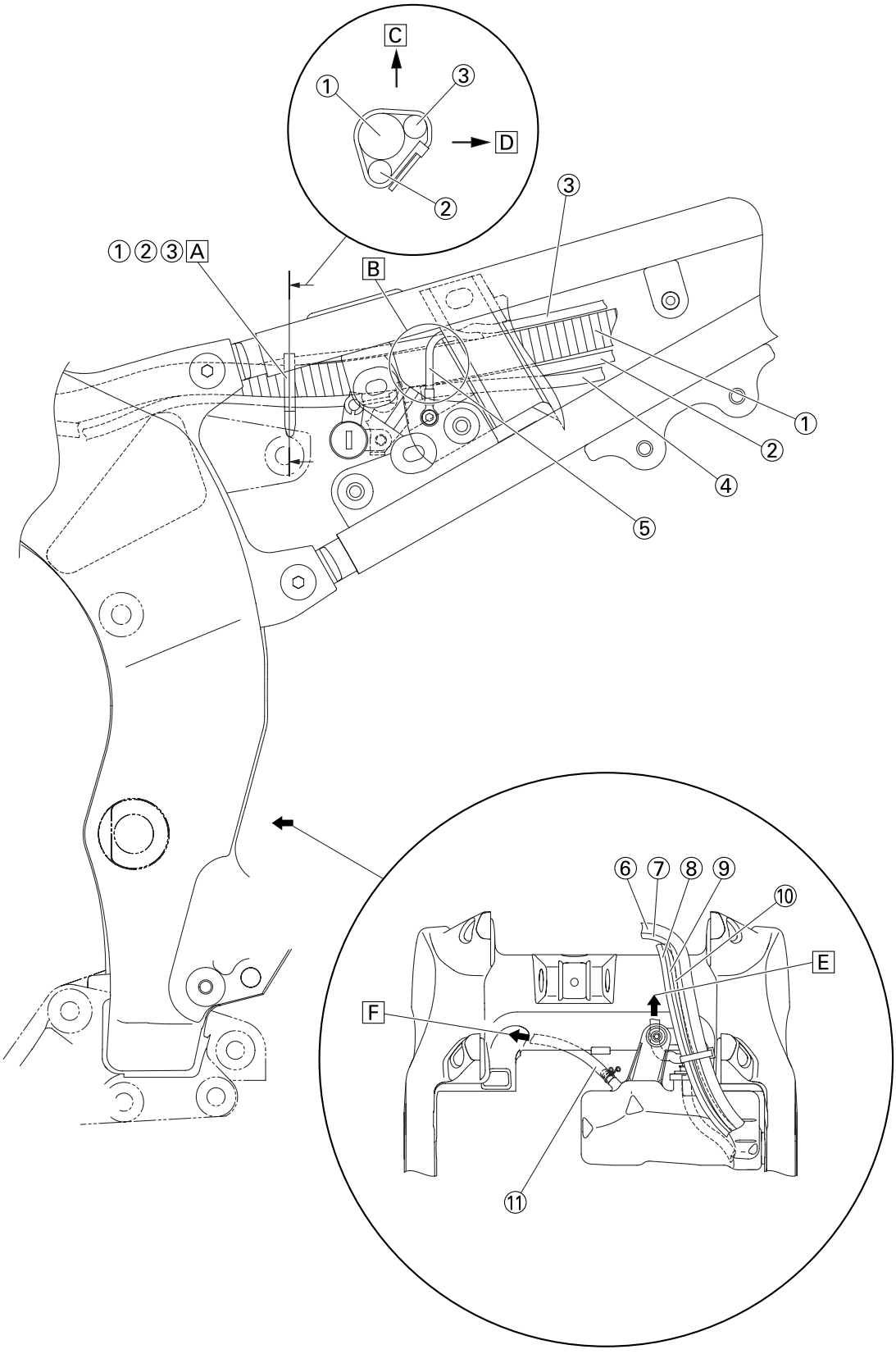
Engine (left side view)



1. Water pump breather hose
2. Oil level switch lead
3. Sidestand switch lead
4. O_2 sensor lead
5. Coolant reservoir tank drain hose
6. Water pump inlet pipe
7. AC magneto lead
8. Throttle body
9. Ignition coil sub-wire harness
10. Left radiator fan motor lead
11. Clutch cable
12. Wire harness
13. Idle adjust screw holder
14. Drive sprocket cover

A. To the coolant reservoir
B. Route the O_2 sensor lead further inward of the vehicle than the branch pipe of the water pump breather hose, then further bottom-outward than the water pump breather hose, and finally toward the top of the vehicle as shown in the illustration.
C. To the exhaust
D. Route the O_2 sensor lead further to the rear of the vehicle than the water pump inlet pipe.
E. Order insignificant-the positions of the end of the coolant reservoir tank drain hose and the sidestand switch lead.
F. Route the coolant reservoir tank drain hose further to the front of the vehicle than the water pump breather hose and water pump inlet pipe.
G. More than 10 mm (0.39 in)
H. Route the sidestand switch lead further to the front of the vehicle than the water pump breather hose and water pump inlet pipe.
I. Route the oil level switch lead further to the front of the vehicle than the water pump breather hose and water pump inlet pipe.
J. There should be no exposure of bare conductors due to the misalignment of tubes.
K. Route the AC magneto lead further inward of the vehicle than the water pump breather hose.
L. Route the AC magneto lead further inward of the vehicle than the frame.
M. Order insignificant-clutch cable, left radiator fan motor lead, and ignition coil sub-wire harness.
N. Innermost section of the vehicle.
O. Order insignificant-O_2 sensor lead, sidestand switch lead, and oil level switch lead.
P. Route the water pump breather hose at the last so that the hose is positioned outside of the vehicle after other hoses are routed to the Idle adjust screw holder.
Q. Route the coolant reservoir tank drain hose further to the rear of the vehicle than other hoses and leads.
R. Back of the vehicle
S. Outside of the vehicle

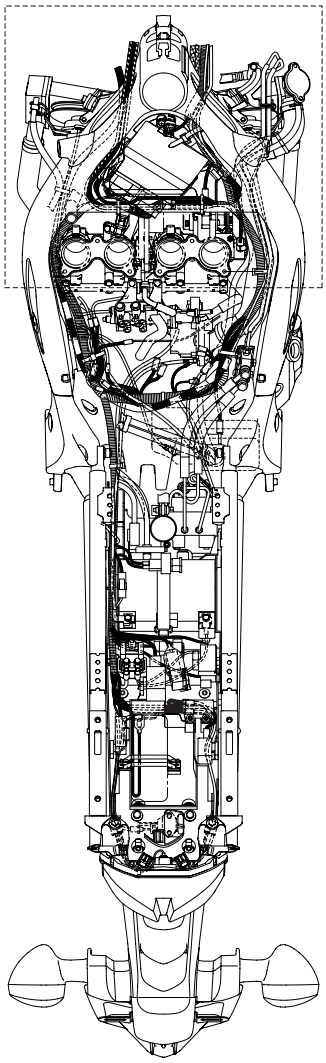
Rear frame (left side view)

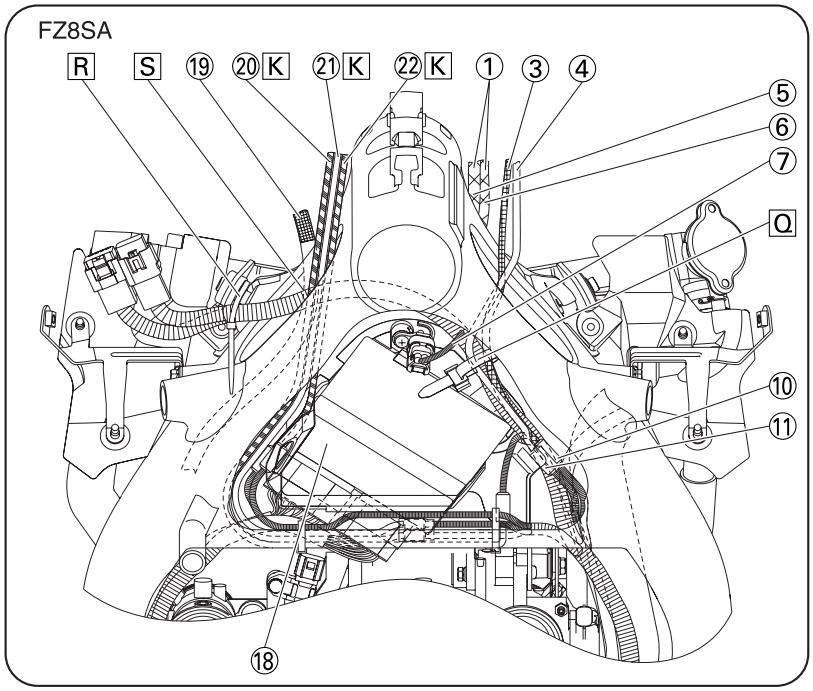


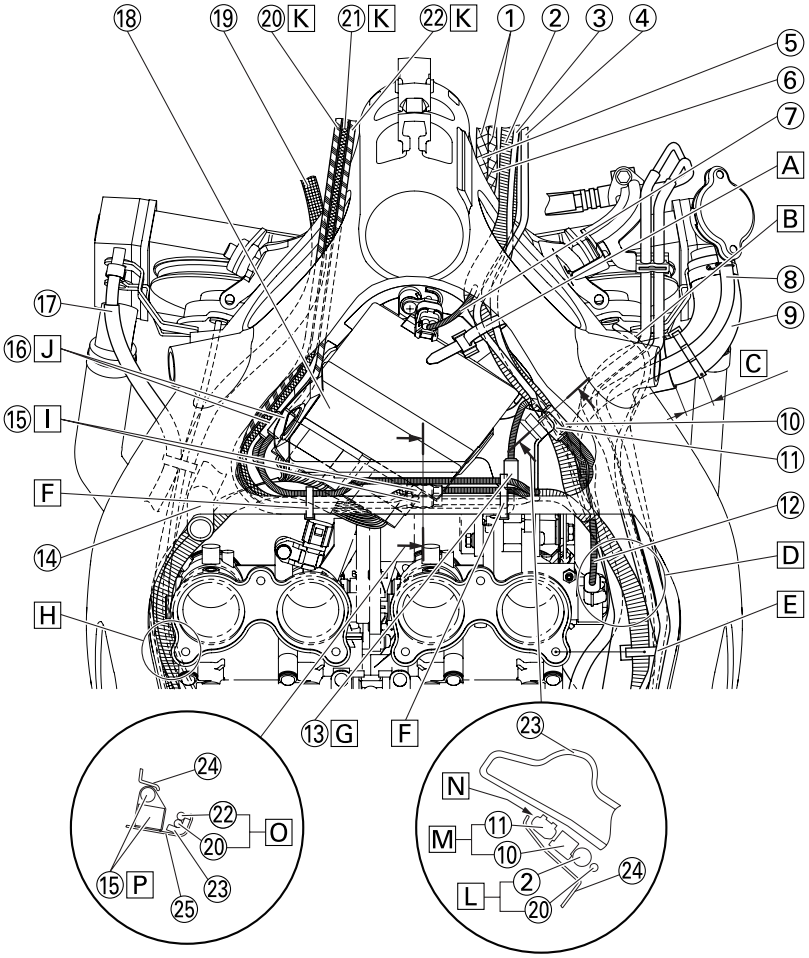
1. Wire harness
2. Starter motor lead
3. Battery negative lead
4. Seat lock cable
5. Ground lead
6. Fuel tank drain hose
7. Fuel tank breather hose
8. AC magneto lead
9. Rectifier/regulator lead
10. Rear brake light switch lead
11. Coolant reservoir tank drain hose

A. Clamp the wire harness, starter motor lead, and battery negative lead further to the front than the branch of the fuse box 2 lead. Face the head of the clamp to inside of the vehicle and the end of the clamp down.
B. Route the ground lead between the rear frame bracket and battery box. The ground rivet on the wire harness stem side should not be caught with the rear frame bracket.
C. Upper side of the vehicle
D. Inside of the vehicle
E. To the radiator
F. Atmospheric opening

Frame (top view)



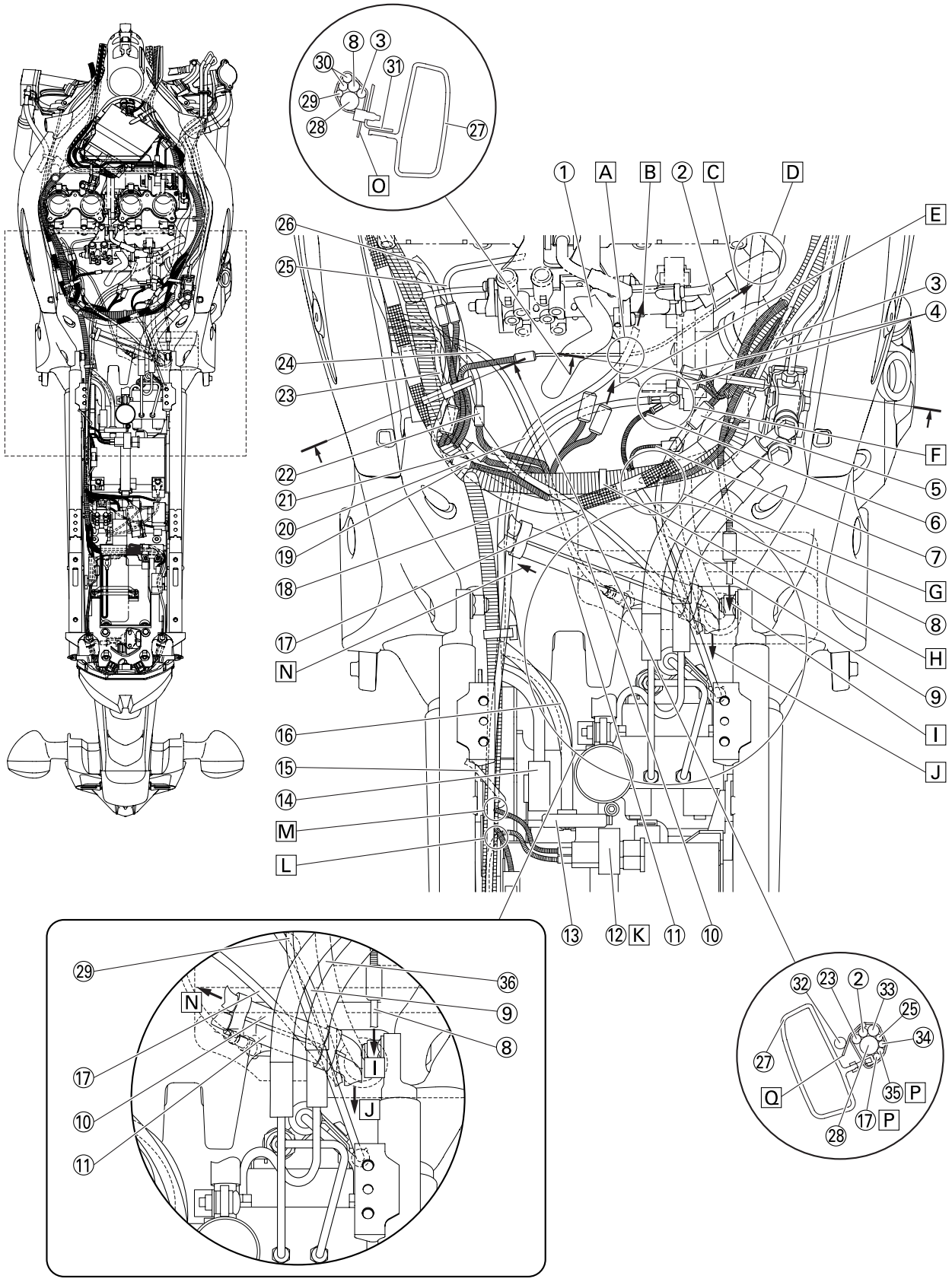




1. Throttle cable
2. Right handlebar switch lead
3. Wire harness
4. Front wheel sensor lead
5. Throttle cable (pull side)
6. Throttle cable (return side)
7. Intake air temperature sensor lead
8. Coolant reservoir hose
9. Radiator inlet hose
10. Right handlebar switch lead coupler
11. Front wheel sensor lead coupler
12. Sub-throttle position sensor lead
13. Immobilizer lead coupler
14. Air cut-off valve hose
15. Left handlebar switch lead coupler
16. Main switch lead coupler
17. Water pump breather hose
18. ECU (engine control unit)
19. Clutch cable
20. Immobilizer lead
21. Left handlebar switch lead
22. Main switch lead
23. Frame
24. ECU (engine control unit) holder
25. Rubber protector
26. Left handlebar switch lead coupler

A. Clamp the wire harness and front wheel sensor lead at the white tape marks and the right handlebar switch lead at the red tape marks. Face the end of the clamp to inside of the vehicle (Order insignificant).
B. Route the right radiator fan motor lead under the brake pipe/joint assembly.
C. 10–30 mm (0.39–1.18 in)
D. Check that each lead is routed further outward of the vehicle than the throttle body side cover and then install the air filter case.
E. Clamp the wire harness and right radiator fan motor lead, using the position of the throttle body shown in the illustration as a guide. (Order insignificant) Face the head of the clamp to inside of the vehicle and the end of the clamp to the bottom of the vehicle.
F. Clamp the left handlebar switch lead, main switch lead, and immobilizer lead at the white tape marks. (Order insignificant) Face the head of the clamp to the rear of the vehicle and the end of the clamp to the bottom of the vehicle. Cut off the excess end of the clamp, leaving 2–4 mm (0.08–0.16 in).
G. Insert the immobilizer coupler into ECU (engine control unit) holder.
H. Route each lead under the air filter case mounting surface on the throttle body.
I. Connect the left handlebar switch lead coupler and then put the rubber cover of the wire harness.
J. Route the main switch lead coupler between outside of ECU (engine control unit) holder and frame so that the white coupler comes to the top.
K. Order insignificant-immobilizer lead, left handlebar switch lead, and main switch lead.
L. Order insignificant-wire harness and immobilizer lead.
M. Order insignificant-Right handlebar switch lead coupler and Front wheel sensor lead coupler.
N. Route each lead between the frame and ECU (engine control unit) holder.
O. Order insignificant-main switch lead and immobilizer lead.
P. Route the left handlebar switch lead coupler under the main switch lead and immobilizer lead and between ECU (engine control unit) holder and rubber protector.
Q. Clamp the wire harness, right handlebar switch lead, and front wheel sensor lead at the white tape marks and face the end of the clamp to inside of the vehicle.
R. Clamp the branch of the wire harness at inside of the radiator stay and face the head and end of the clamp to the rear of the vehicle.
S. Route the main switch lead, immobilizer lead, and left handlebar switch lead above the wire harness.

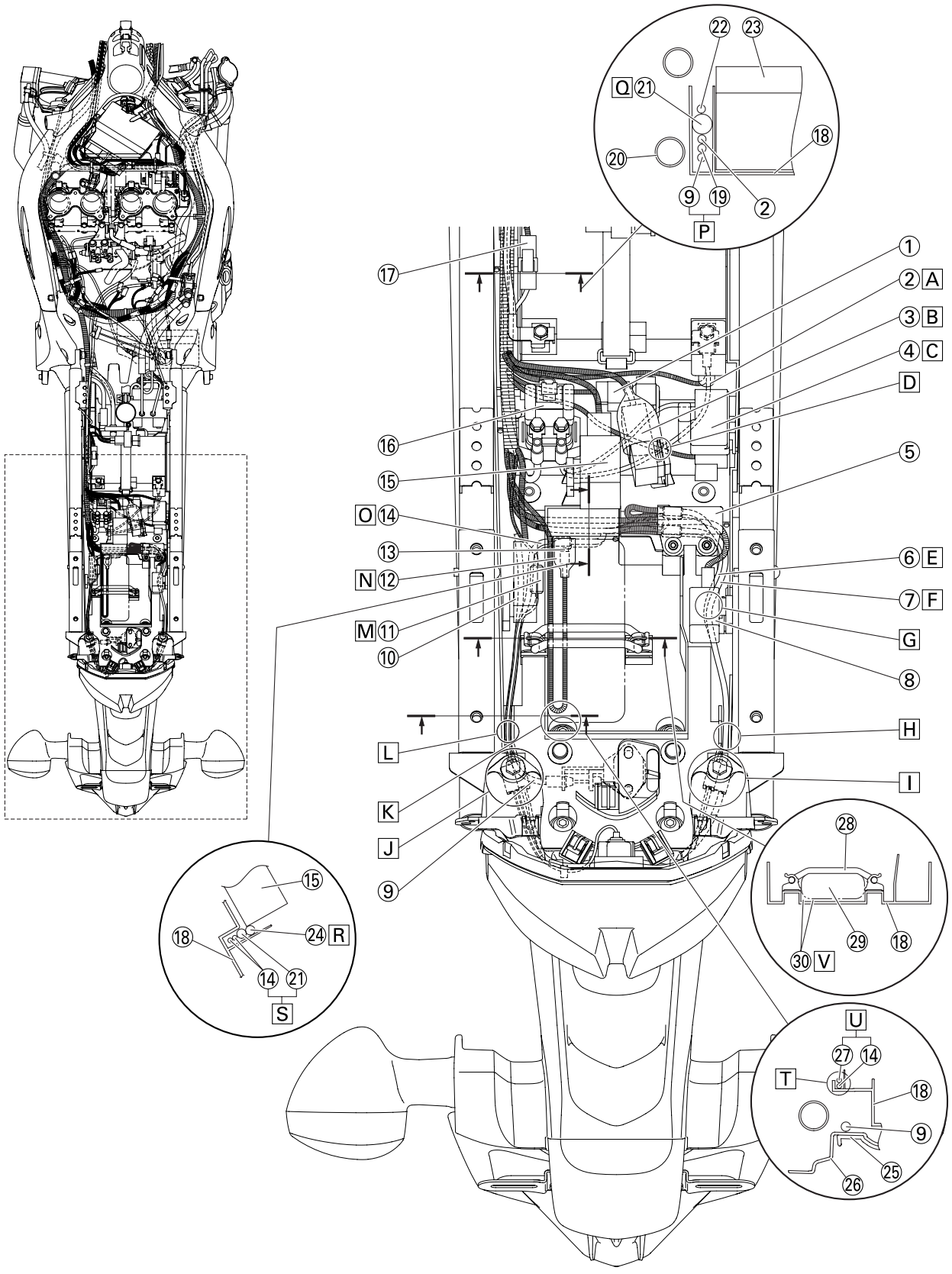
Frame (top view)



1. Air filter case drain hose
2. Pickup coil lead
3. Right radiator fan motor lead
4. Immobilizer anti-theft alarm coupler
5. Rear wheel sensor lead coupler
6. Engine ground lead
7. Neutral switch lead
8. Rear brake light switch lead
9. Rectifier/regulator lead
10. Fuel tank breather hose
11. Fuel tank drain hose
12. Main fuse
13. Fuse box 2
14. Waterproof coupler
15. Ground lead
16. ABS ECU (electronic control unit) lead
17. AC magneto lead
18. Battery negative lead
19. Sidestand switch lead coupler
20. Starter motor lead
21. Oil level switch lead coupler
22. O_2 sensor lead coupler
23. Left radiator fan motor lead
24. Coolant reservoir drain hose
25. Fuel injection system sub-wire harness
26. Ignition coil sub-wire harness
27. Frame
28. Wire harness
29. Rear wheel sensor lead
30. Immobilizer anti-theft alarm lead
31. Brake hose stay
32. Clutch cable
33. Sidestand switch lead
34. Ignition coil sub-wire harness
35. Oil level switch lead
36. Coolant reservoir hose

A. Route the pickup coil lead under the starter motor lead.
B. To the starter motor
C. To the engine
D. Route the coolant reservoir hose inside of the fast idle plunger outlet hose.
E. To the fuel pump
F. Bring the engine ground lead down and the battery negative lead up. Install each lead so that the lead convex comes to the top of the vehicle.
G. Route the wire harness under the clutch cable.
H. Insert the wire harness wrapping clamp to the hole of the frame.
I. To the rear brake light switch
J. Atmospheric opening
K. Insert the main fuse to the battery band. Soapy water can be spread.
L. Route the battery positive lead from inside of the vehicle to under the wire harness. (It should not be routed above the wire harness.)
M. Route the main fuse lead so that the branch of the lead comes to the top of the vehicle.
N. To the fuel tank
O. Clamp each lead. Route the wire harness and rear brake light switch lead as shown in the illustration. For any other lead, order insignificant. Face the end of the clamp band to the bottom of the vehicle.
P. Order insignificant-oil level switch lead and AC magneto lead.
Q. Route the wire harness, AC magneto lead and oil level switch lead as shown in the illustration. For any other leads, order insignificant. Face the head of the clamp to the top of the vehicle and insert the end of the clamp under the clutch cable, facing it to the bottom-outside of the vehicle.

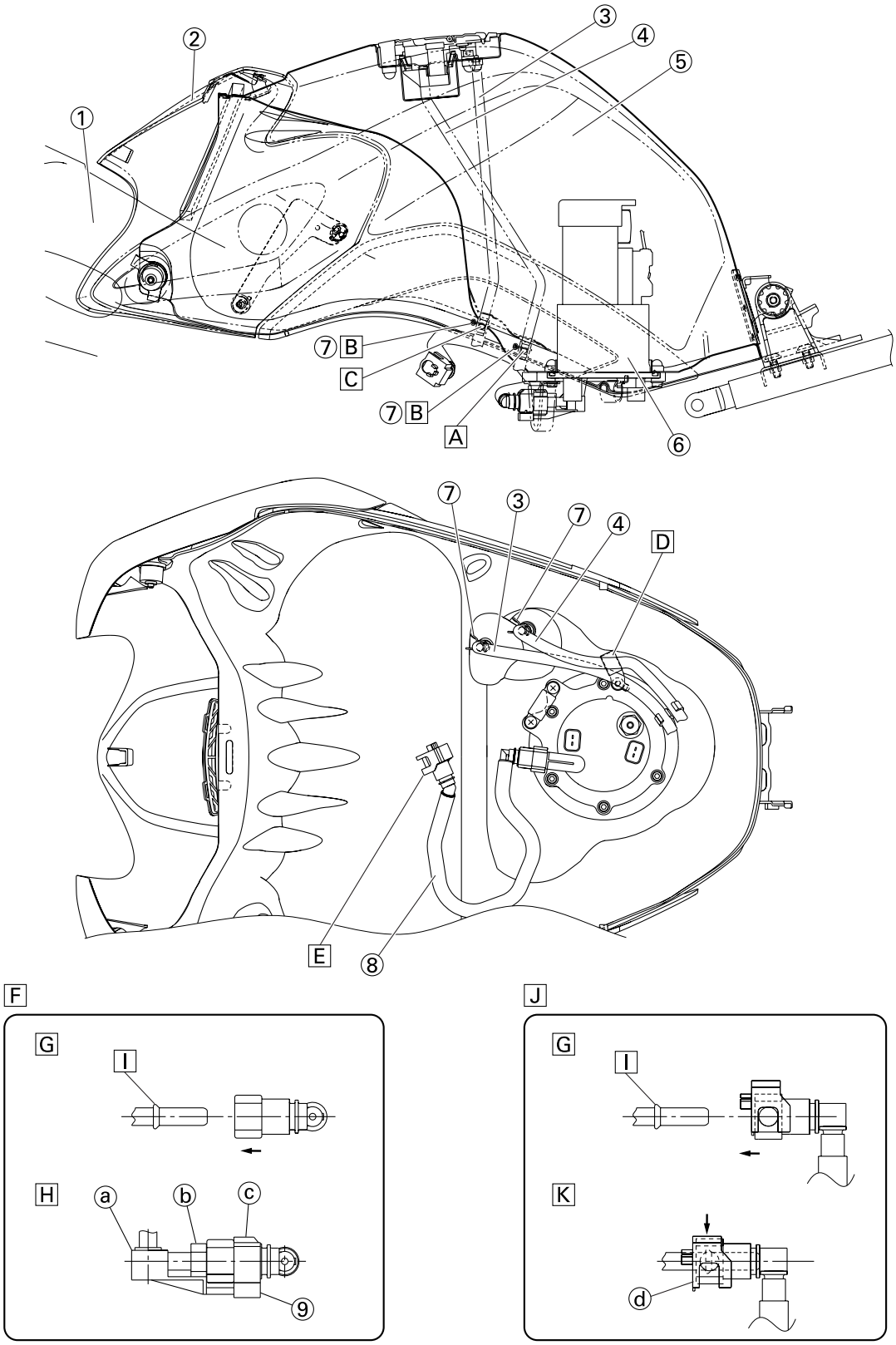
Frame (top view)



1. Atmospheric pressure sensor
2. Battery positive lead
3. Radiator fan motor relay
4. Fuse box 1
5. Lean angle sensor
6. Right turn signal light lead
7. License plate light lead
8. Turn signal/hazard relay
9. Seat lock cable
10. Headlight relay
11. Tail/brake light coupler
12. ABS test coupler
13. ABS test coupler connector
14. Left turn signal light lead
15. Starting circuit cut-off relay
16. Starter relay
17. ABS fuse
18. Battery box
19. Starter motor lead
20. Rear frame
21. Wire harness
22. Battery negative lead
23. Battery
24. Lean angle sensor lead
25. Mudguard
26. Rear fender
27. Tail/brake light lead
28. Tool band
29. Tool
30. ABS test coupler lead

A. Route the battery positive lead under each relay.
B. For the radiator fan motor relay, connect the coupler and then put the rubber cover of the wire harness.
C. Route the fuse box 1 lead under the radiator fan motor relay.
D. Route the battery positive lead under the fuse box 1 lead.
E. Connect the connectors of the green tube and lead.
F. Connect the connectors of the gray tube and blue lead.
G. Route the license plate light lead and right turn signal light lead under the turn signal/hazard relay.
H. Route the license plate light lead and rear right turn signal light lead between the ribs of the battery box.
I. Route the license plate light lead and rear right turn signal light lead under the rubber cover.
J. Route the tail/brake light lead and rear left turn signal light lead under the rubber cover.
K. The ABS check coupler should not cover the top of the bolt.
L. Route the tail/brake light lead and rear left turn signal light lead between the ribs of the battery box.
M. Route the tail/brake light lead coupler under the headlight relay.
N. Slide the rubber cover over the ABS check coupler, double-up by folding the coupler, and then route the coupler under the tool and along the left wall of the battery box.
O. Connect the connectors of the red tube and brown lead.
P. Order insignificant-starter motor lead and seatlock cable.
Q. Push the wire harness firmly to the end.
R. Route the lean angle sensor lead on the top of the vehicle.
S. Order insignificant-wire harness and left turn signal light lead.
T. Route the tail/brake light lead and rear left turn signal light lead between the ribs of the battery box.
U. Order insignificant-tail/brake light lead and rear left turn signal light lead.
V. Route the ABS check coupler lead under the tool and then fix it with the tool band.

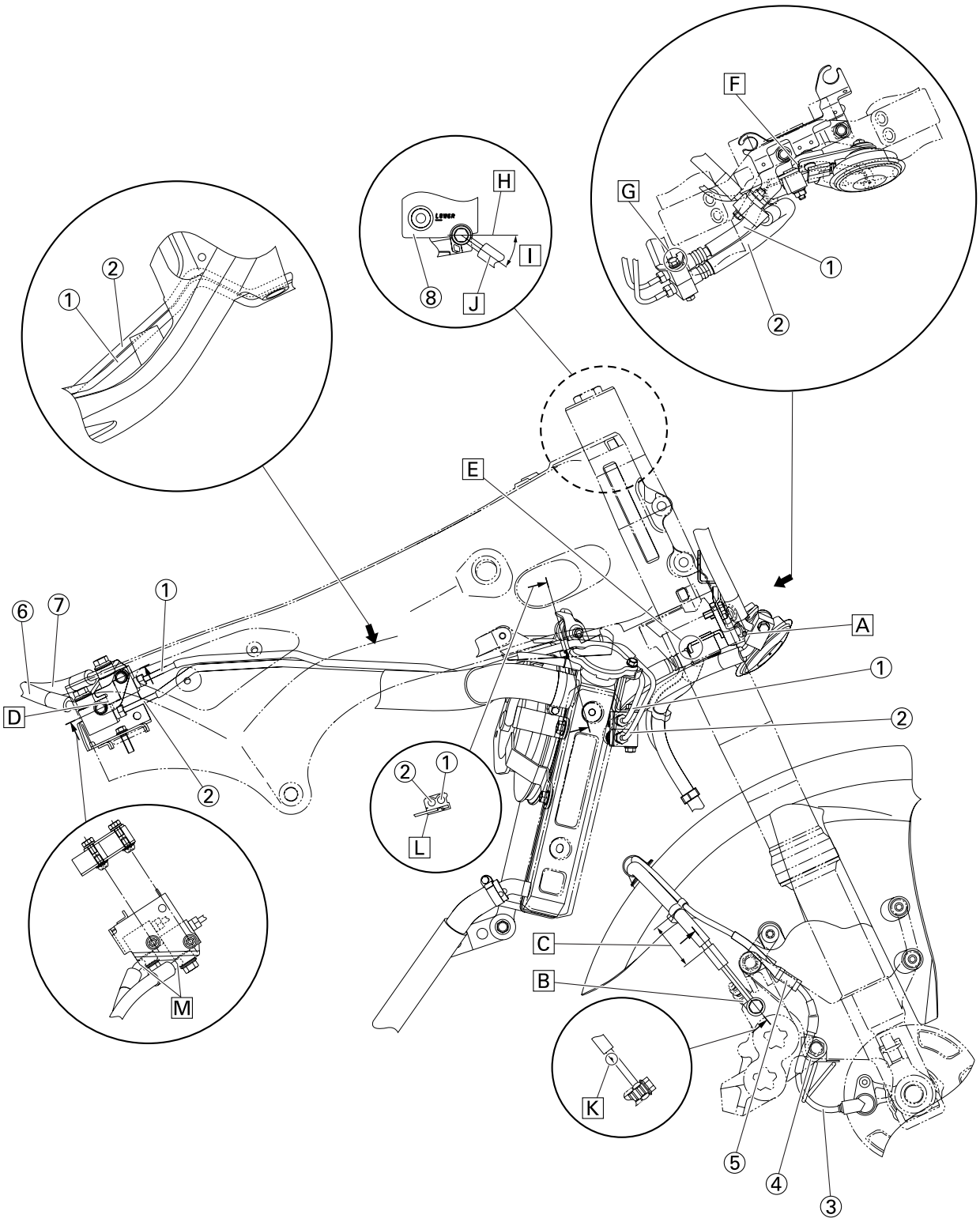
Fuel tank (left and bottom view)



1. Frame
2. Fuel tank cover
3. Fuel tank breather hose
4. Fuel tank drain hose
5. Fuel tank
6. Fuel pump
7. Clip
8. Fuel hose
9. Fuel hose connector cover

A. Install the fuel tank drain hose with the white paint marks facing to the left of the vehicle.
B. For the knob of the clip, any direction is acceptable. The clip should not be run onto the spool.
C. Install the fuel tank breather hose with the yellow paint marks facing to the left of the vehicle.
D. Pass the fuel tank drain hose through the fuel tank bracket clamp. There should be no bend of the hose between the fuel tank nipple and clamp.
E. Fit the black double lock side to the engine side.
F. Fuel pump side
G. Insert the connector until the click sound is heard and check that the connector does not come off. Make sure that no foreign matter is caught in the sealing section. (It is prohibited to wear the cotton work gloves or equivalent coverings.)
H. After item “G” mentioned above is finished, check that the fuel hose connector cover is inserted from the down side “a”, “b” and “c” sections are perfectly equipped.
I. This part works as a dropout stopper
J. Fuel injector side
K. After Step “G” as above is finished, check that the connector is completely attached by sliding the double lock (black part) “d” on the connector as shown in the illustration and seeing if it touches firmly or not.

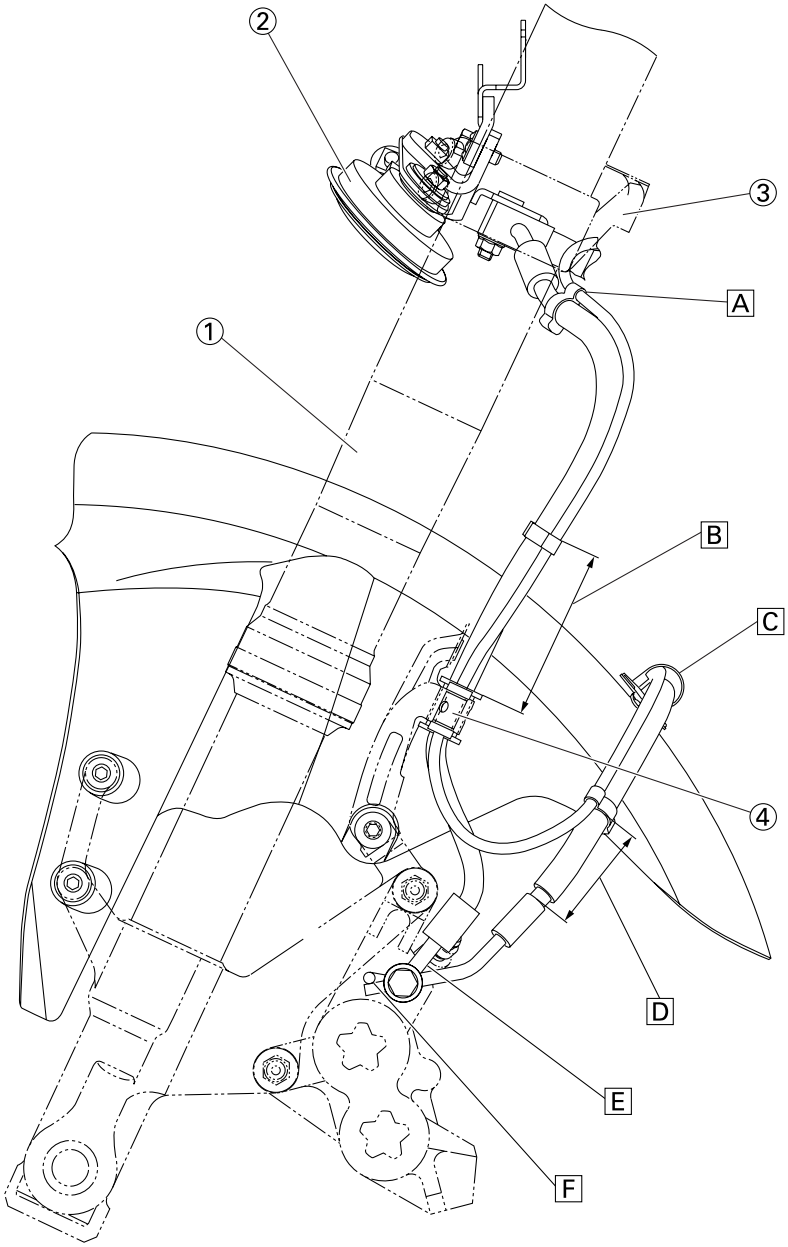
Front brake (right side view)



1. Brake hose (hydraulic unit to front brake calipers)
2. Brake hose (front brake master cylinder to hydraulic unit)
3. Front wheel sensor lead
4. Front wheel sensor lead guide
5. Front wheel sensor lead holder
6. Brake pipe/joint assembly (front brake master cylinder to hydraulic unit)
7. Brake pipe/joint assembly (hydraulic unit to front brake calipers)
8. Front brake master cylinder

A. Install the brake hose, pushing projection against the lower headlight stay (FZ8NA) or horn bracket (FZ8SA).
B. Install the metal fitting of the front brake hose (hydraulic unit to front brake calipers), pushing projection to the positioning stopper of the brake caliper.
C. Install the clamp so that the distance from the clamp lower surface to the end of the brake hose offset bracket may be 30–50 mm (1.18–1.97 in).
The front wheel sensor lead must be positioned at the outer front of the vehicle to the brake hose.
D. Install the connector metal fittings of the brake hose (hydraulic unit to front brake calipers) and front brake hose (front brake master cylinder to hydraulic unit), pushing against each other.
E. Install the block metal fitting of the brake hose (hydraulic unit to front brake calipers), pushing projection to the stopper.
F. Align the notch of the horn with the projection of the lower headlight stay (FZ8NA) or horn bracket (FZ8SA).
G. Install the brake hose (hydraulic unit to front brake calipers) and brake hose (front brake master cylinder to hydraulic unit), pushing them to the stopper of the front brake hose bracket.
H. A parallel line to the front brake master cylinder ceiling surface
I. 30°–40°
J. Center line
K. Install so that the yellow paint mark faces to the inside of the vehicle.
L. Insert the clamp into the front brake hose bracket.
M. Install the metal fittings of the brake hose (hydraulic unit to front brake calipers) and brake hose (front brake master cylinder to hydraulic unit), pushing them to the stopper of the brake hose stay.

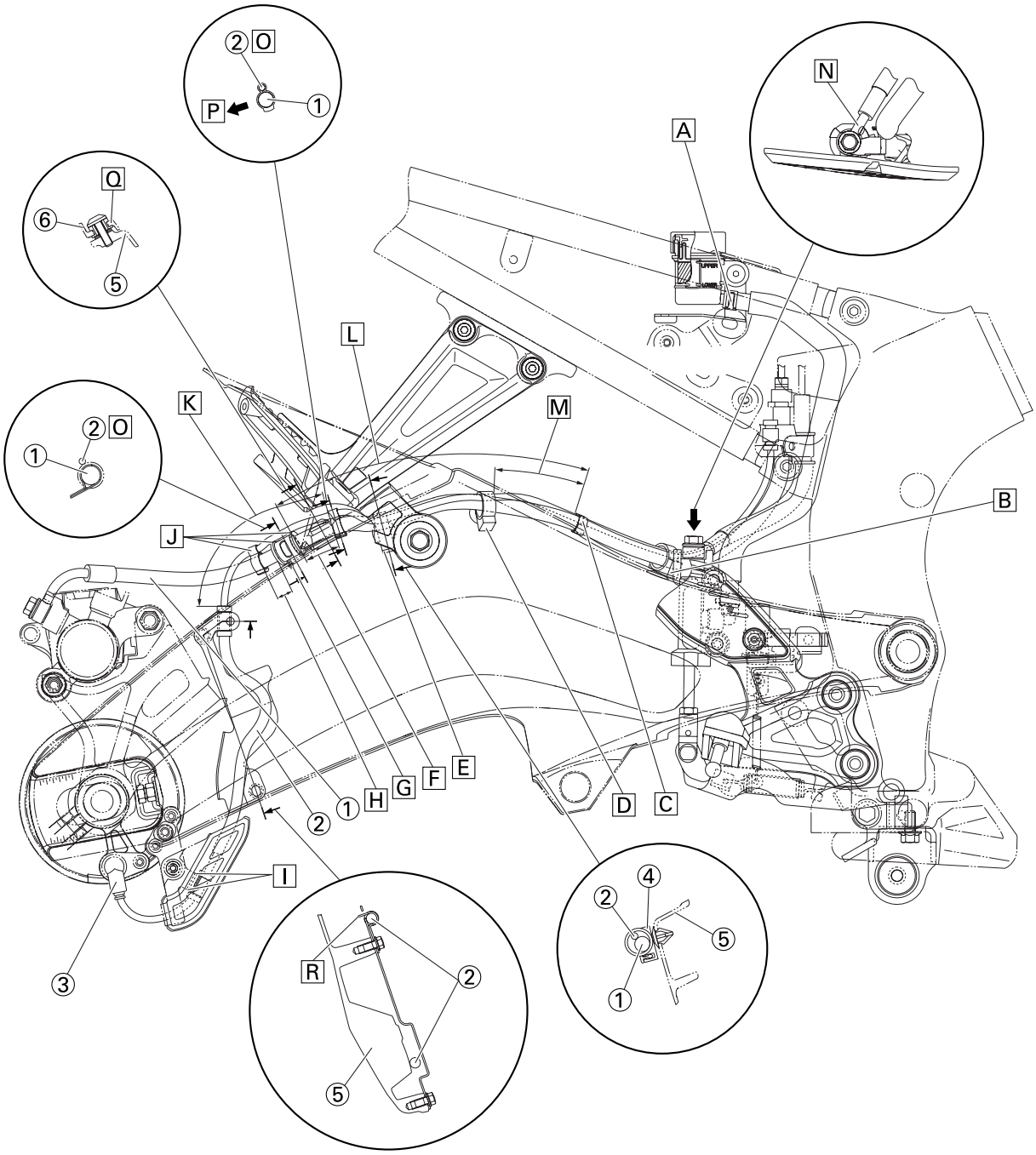
Front brake (left side)



1. Front fork
2. Horn
3. Under bracket
4. Brake hose holder

A. Install the clamp so that the distance from the clamp upper surface to the end of the brake hose protector may be 0–10 mm (0–0.39 in). The front wheel sensor lead must be positioned at the outer rear of the vehicle to the brake hose.
B. Install the clamp so that the distance from the clamp lower surface to the end of the brake hose grommet may be 60–80 mm (2.36–3.15 in). The front wheel sensor lead must be positioned at the outside of the vehicle to the brake hose.
C. Put the front wheel sensor lead and the brake hose through. The front wheel sensor lead must be positioned at the upper side of the vehicle to the brake hose.
D. Install the clamp so that the distance from the clamp lower surface to the end of the brake hose offset bracket may be 30–50 mm (1.18–1.97 in). The front wheel sensor lead must be positioned at the outer front of the vehicle to the brake hose.
E. Install the metal fitting of the front brake hose (hydraulic unit to front brake calipers), pushing it to the positioning stopper of the brake caliper.
F. Install the metal fitting stopper pins of the front brake hose, pushing against each other.

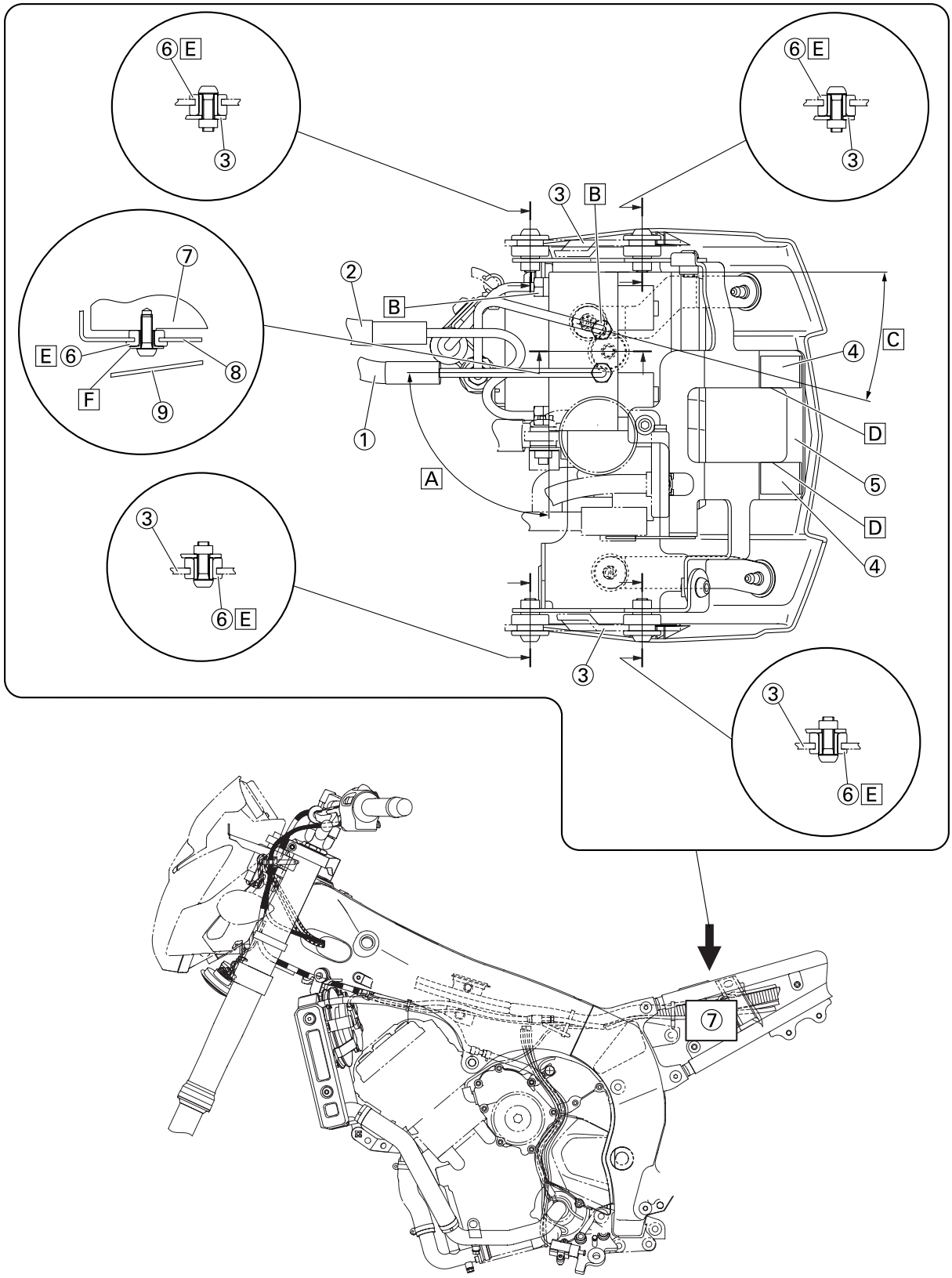
Rear brake



1. Brake hose (hydraulic unit to rear brake caliper)
2. Rear wheel sensor lead
3. Rear wheel sensor
4. Clamp
5. Swingarm
6. Rear fender

A. Install the clip knob so that it faces to the outside of the vehicle as shown in the illustration.
B. Face the clamp opening to the outside of the vehicle.
C. Route the rear wheel sensor lead inside of the vehicle.
D. Face the clamp opening to the bottom of the vehicle.
E. Clamp the brake hose and rear wheel sensor lead. Route the rear wheel sensor lead above the brake hose and face the clamp opening to the bottom of the vehicle.
F. The clamp position should be in the range of 30–40 mm (1.18–1.57 in) from the end of the grommet of the brake hose.
G. Insert the brake hose holder claw firmly into the swingarm.
H. 10–20 mm (0.39–0.79 in)
I. Insert the holder of the rear wheel sensor bracket between the ribs behind the rear wheel sensor protector.
J. Route the rear wheel sensor lead along the brake hose grommet and then clamp it.
K. 140–150 mm (5.51–5.91 in) (Clamp position of the rear wheel sensor lead)
L. 213–233 mm (8.39–9.17 in)
M. 60–80 mm (2.36–3.15 in)
N. Install the metal fitting of the brake hose (rear brake master cylinder to hydraulic unit), pushing projection in the direction shown in the illustration.
O. Route the rear wheel sensor lead to the top of the vehicle.
P. Inside of the vehicle
Q. Install so that the smaller grommet comes to the outside of the vehicle.
R. Insert the claw of the rear wheel sensor lead holder firmly into the stopper hole of the rear wheel sensor lead stay.

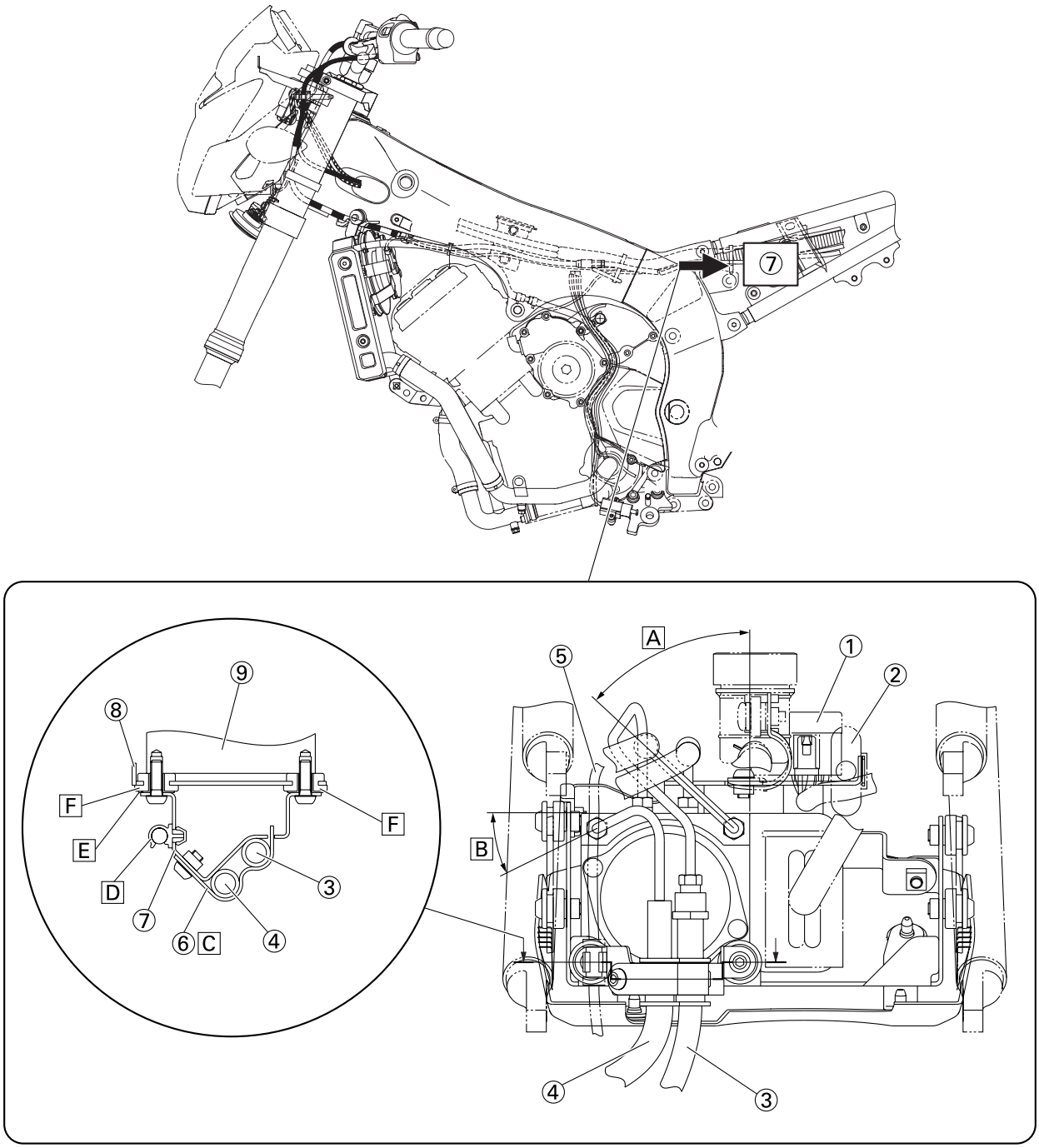
Hydraulic unit (top view)



1. Brake pipe/joint assembly (front brake master cylinder to hydraulic unit)
2. Brake pipe/joint assembly (hydraulic unit to front brake calipers)
3. Rear frame
4. Damper
5. Upper hydraulic unit bracket
6. Grommet
7. Hydraulic unit
8. Lower hydraulic unit bracket
9. Under cover

A. Install the brake pipe/joint assembly (hydraulic unit to front brake calipers) in the area between 88°–92°.
B. Clamp the brake hose (hydraulic unit to rear brake caliper) and brake hose (rear brake master cylinder to hydraulic unit) to the brake hose holder and then tighten the hoses.
C. 15°
D. Affix the damper, aligning the end of the damper with the end of the upper hydraulic unit bracket.
E. Soapy water may be applied during installation.
F. Install the collar from outside of the lower hydraulic unit bracket.

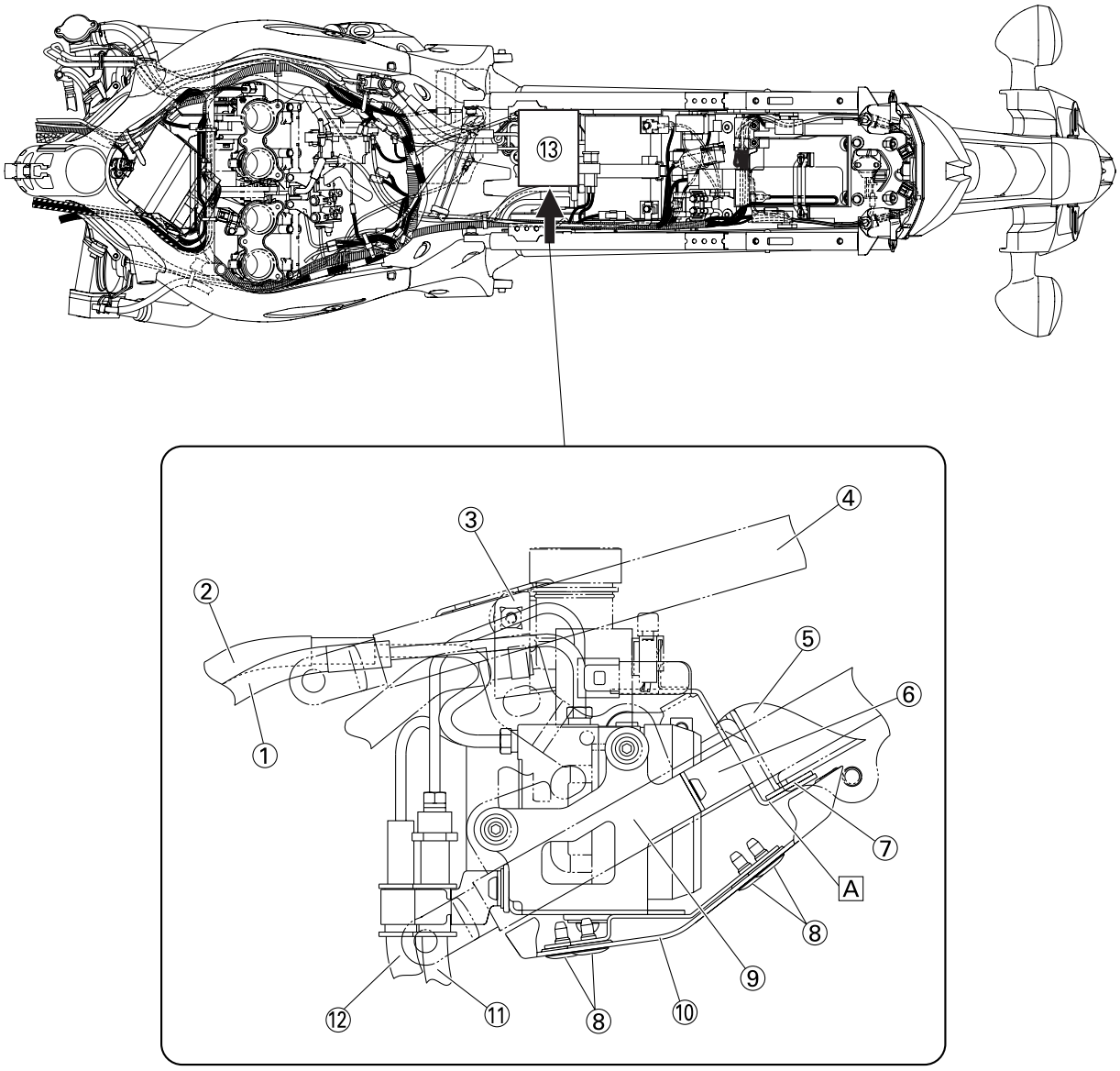
Hydraulic unit (front view)



1. Fuse box 2
2. Waterproof coupler
3. Brake hose (hydraulic unit to rear brake caliper)
4. Brake hose (rear brake master cylinder to hydraulic unit)
5. Rear wheel sensor lead
6. Rear brake hose holder
7. Rear brake hose guide
8. Lower hydraulic unit bracket
9. Hydraulic unit

A. Install the brake pipe/joint assembly (hydraulic unit to front brake calipers) in the area between 45°–49°.
B. 26°
C. Insert the claw of the rear brake hose holder firmly into the hole of the rear brake hose guide.
D. Insert the clamp opening, facing the opening to the front of the vehicle as shown in the illustration.
E. Install the collar from outside of the lower hydraulic unit bracket.
F. Soapy water may be applied during installation.

Hydraulic unit (left side view)



1. Brake pipe/joint assembly (front brake master cylinder to hydraulic unit)
2. Brake pipe/joint assembly (hydraulic unit to front brake calipers)
3. Brake fluid reservoir tank stay
4. Rear frame
5. Battery box
6. Upper hydraulic unit bracket
7. Damper
8. Quick fastener
9. Lower hydraulic unit bracket
10. Under cover
11. Brake hose (hydraulic unit to rear brake caliper)
12. Brake hose (rear brake master cylinder to hydraulic unit)

A. Affix the damper, aligning the end of the damper with the end of the bending part of the upper hydraulic unit bracket.

PERIODIC CHECKS AND ADJUSTMENTS

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.

EAS39P1301
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	*	**Muffler and exhaust pipe**	• Check the screw clamp(s) for looseness.	√	√	√	√	√	
6	*	**Air induction system**	• Check the air cut-off valve, reed valve, and hose for damage. • Replace the entire air induction system if necessary.		√	√	√	√	√

EAS39P1302
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.		√	√	√	√	
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, riding in the rain or riding in wet areas					
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**	• Check operation. • Lubricate with lithium-soap-based grease.		√	√	√	√	√
18	*	**Sidestand switch**	• Check operation.	√	√	√	√	√	√
19	*	**Front fork**	• Check operation and for oil leakage.		√	√	√	√	
20	*	**Shock absorber assembly**	• Check operation and shock absorber for oil leakage.		√	√	√	√	
21	*	**Rear suspension relay arm and connecting arm pivoting points**	• Check operation.		√	√	√	√	
22		**Engine oil**	• Change. • Check oil level and vehicle for oil leakage.	√	√	√	√	√	√

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)	
23		Engine oil filter cartridge	• Replace.	√		√		√	
24	*	Cooling system	• Check coolant level and vehicle for coolant leakage.		√	√	√	√	√
			• Change.	Every 3 years					
25	*	Front and rear brake switches	• Check operation.	√	√	√	√	√	√
26		Moving parts and cables	• Lubricate.		√	√	√	√	√
27	*	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.		√	√	√	√	√
28	*	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.

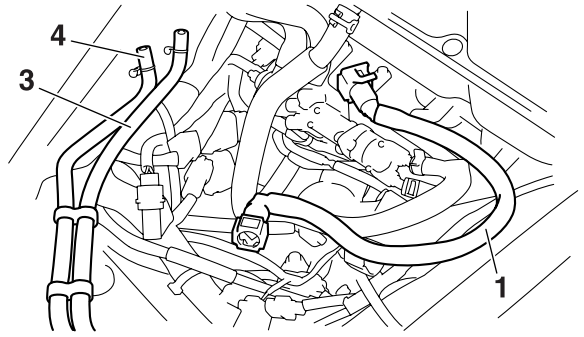
1. Remove:
   - Rider seat
     Refer to "GENERAL CHASSIS" on page 4-1.
   - Fuel tank
     Refer to "FUEL TANK" on page 7-1.
2. Check:
   - Fuel hose "1"
   - Vacuum hose "2"
   - Breather hose "3"
   - Fuel tank drain hose "4"
     Cracks/damage → Replace.
     Loose connection → Connect properly.

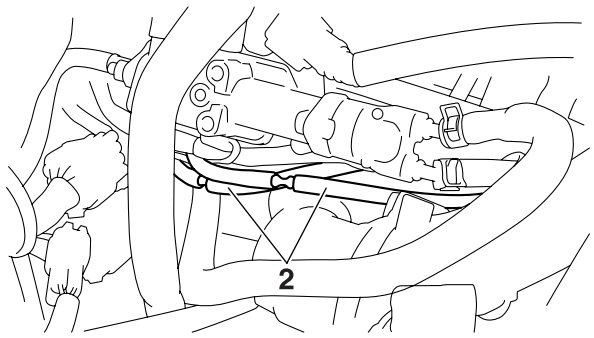
ECA14940
NOTICE

Make sure the fuel tank breather hose is routed correctly.

TIP

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





3. Install:
   - Fuel tank
     Refer to "FUEL TANK" on page 7-1.
   - Rider 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:
   - Inner panel/side panel/front cowling side panel (FZ8SA)
     Refer to "GENERAL CHASSIS" on page 4-1.
   - Radiator upper cover (FZ8NA)
   - Radiator upper panel (FZ8SA)
   - Radiator upper bolt
   - Radiator lower bolt
     Refer to "RADIATOR" on page 6-1.
2. Remove:
   - Ignition coils
   - Spark plugs

ECA13320
NOTICE

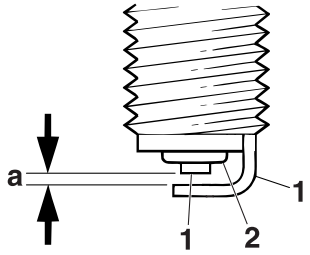
Before removing the spark plugs, blow away any dirt accumulated in the spark plug wells with compressed air to prevent it from falling into the cylinders.

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

Manufacturer/model
NGK/CR9E

4. Check:
   - Electrode "1"
     Damage/wear → Replace the spark plug.
   - Insulator "2"
     Abnormal color → Replace the spark plug.
     Normal color is medium-to-light tan.
5. Clean:
   - Spark plug
     (with a spark plug cleaner or wire brush)
6. 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)



7. Install:
   - Spark plugs
   - Ignition coils

	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.

8. Install:
   - Radiator upper bolt
   - Radiator lower bolt
   - Radiator upper cover (FZ8NA)
   - Radiator upper panel (FZ8SA)
     Refer to "RADIATOR" on page 6-1.
   - Inner panel/side panel/front cowling side panel (FZ8SA)
     Refer to "GENERAL CHASSIS" on page 4-1.

EAS20490

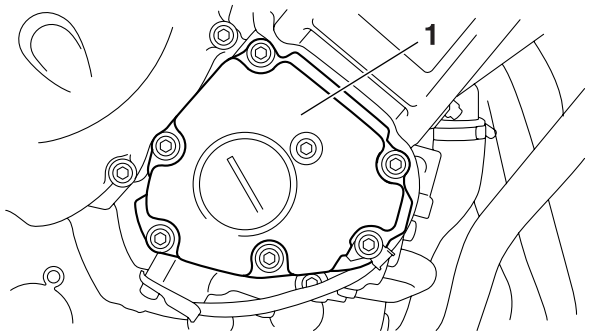
ADJUSTING THE VALVE CLEARANCE

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:
   - Rider seat
     Refer to "GENERAL CHASSIS" on page 4-1.
   - Inner panel/side panel/front cowling side panel (FZ8SA)
     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 assembly
     Refer to "THROTTLE BODIES" on page 7-5.
   - Air cut-off valve
     Refer to "AIR INDUCTION SYSTEM" on page 7-15.
   - Radiator
   - Radiator fan motor
     Refer to "RADIATOR" on page 6-1.
2. Remove:
   - Ignition coils
   - Spark plugs
   - Cylinder head cover
   - Cylinder head cover gasket
     Refer to "CAMSHAFTS" on page 5-11.
3. Remove:
   - Pickup rotor cover "1"



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

	Valve clearance (cold) **Intake** **0.10–0.17 mm (0.0039–0.0067 in)** **Exhaust** **0.25–0.29 mm (0.0098–0.0114 in)**

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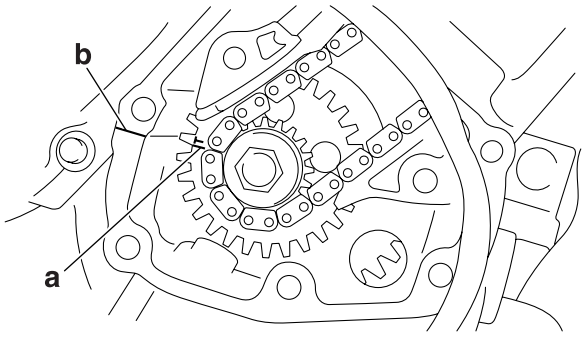
a. Turn the crankshaft clockwise.
b. When piston #1 is at TDC on the compression stroke, align the TDC mark "a" on the pickup rotor with the crankcase mating surface "b".

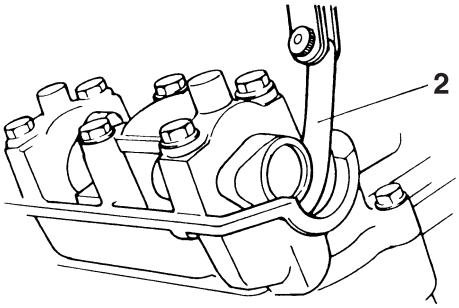


TIP

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 "2".

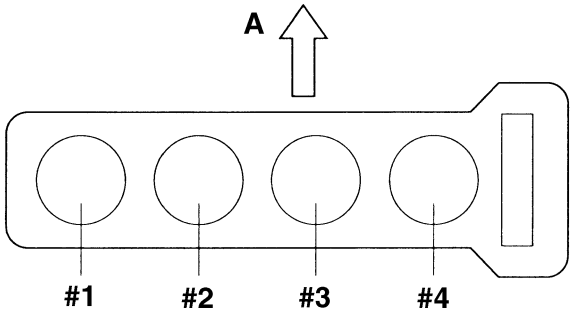
Thickness gauge
90890-03180
Feeler gauge set
YU-26900-9



TIP

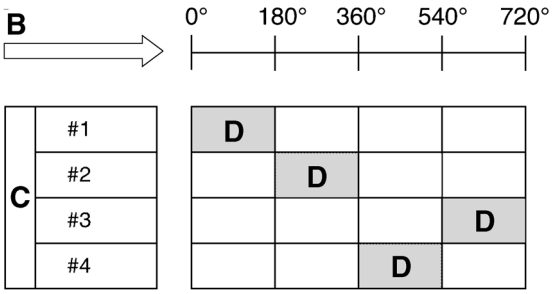
- If the valve clearance is incorrect, record the measured reading.
- Measure the valve clearance in the following sequence.

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



A. Front

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



B. Degrees that the crankshaft is turned clockwise
C. Cylinder
D. Combustion cycle

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

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5. Remove:
   - Camshaft

TIP

- Refer to "CAMSHAFTS" on page 5-11.
- 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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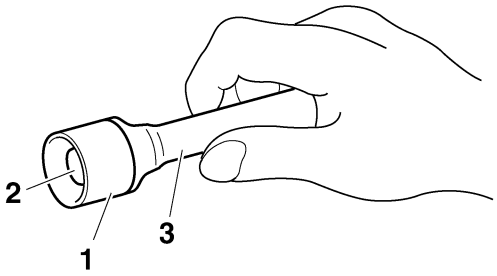
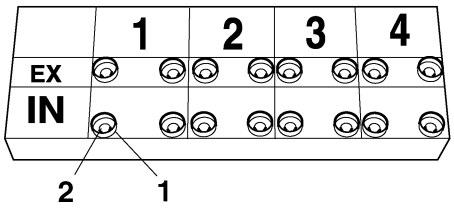
a. Remove the valve lifter “1” and the valve pad “2” with a valve lapper “3”.



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.

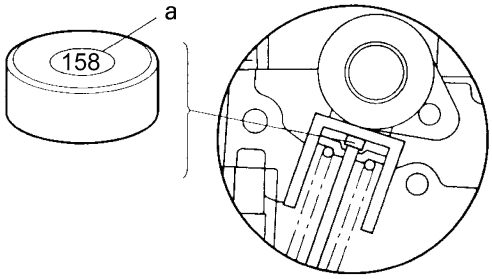


b. Calculate the difference between the specified valve clearance and the measured valve clearance.
   Example:
   Specified valve clearance = 0.11–0.20 mm (0.004–0.008 in)
   Measure valve clearance = 0.25 mm (0.010 in)
   0.25 mm (0.010 in)–0.20 mm (0.008 in) = 0.05 mm (0.002 in)
c. Check the thickness 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 (0.047–0.094 in)
Available valve pads	25 thicknesses in 0.05 mm (0.002 in) increments

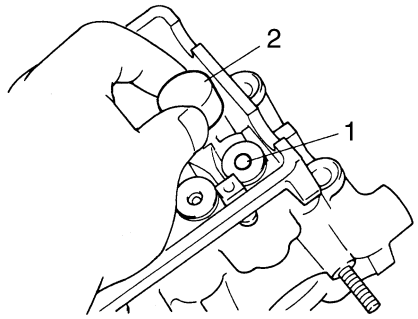
Example:
Valve pad number = 163
Rounded value = 165
New valve pad number = 165

f. Install the new valve pad “1” and the valve lifter “2”.

TIP

- Lubricate the valve pad with molybdenum disulfide oil.
- Lubricate the valve lifter (Top side) with molybdenum disulfide oil.

- Lubricate the valve lifter (Outer side) with engine oil.
- Install the valve lifter and the valve pad in the correct place.
- The valve lifter must turn smoothly when rotated by hand.



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 5-11.
- Lubricate the camshaft bearings, camshaft lobes and camshaft journals.
- First, install the exhaust camshaft.
- Align the camshafts marks with the camshaft cap marks.
- Turn the crankshaft clockwise 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

Prior to adjusting the engine idling speed, the throttle bodies synchronization should be adjusted properly, the air filter element should be clean, and the engine should have adequate compression.

1. Start the engine and let it warm up for several minutes.
2. Install:
   - Digital tachometer
     (Use goods on the market)
3. Check:
   - Engine idling speed
     Out of specification → Adjust.

	Engine idling speed **1150–1250 r/min**

4. Adjust:
   - Engine idling speed

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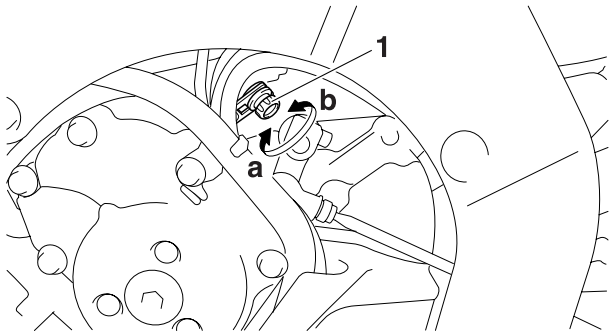
a. Turn the idle adjusting screw "1" in direction "a" or "b" until the specified engine idling speed is obtained.

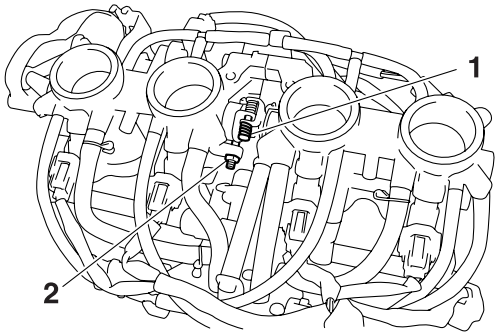
Direction "a"
Engine idling speed is increased.
Direction "b"
Engine idling speed is decreased.



ECA39P1302

NOTICE

- **Do not touch synchronizing screw "1". Could affect the engine idling speed or cause malfunction in other related parts.**
- **Do not touch the throttle adjust screw "2". Could affect the engine idling speed or cause malfunction in other 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 7-9.**
- **If they cannot synchronized, replace the throttle body assembly.**



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5. 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)

EAS20571
SYNCHRONIZING THE THROTTLE BODIES

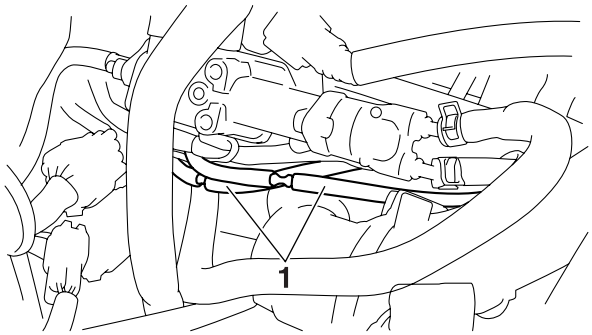
TIP
Before synchronizing the throttle bodies, check the following items:
- Valve clearance
- Spark plugs
- Air filter element
- Throttle body hoses
- Throttle body joints
- Fuel hoses
- Air induction system
- Exhaust system
- Breather hoses
- Vacuum hoses
- Fast idle plunger outlet hose
- Fast idle plunger inlet hose

Checking the throttle body synchronization

1. Stand the vehicle on a level surface.

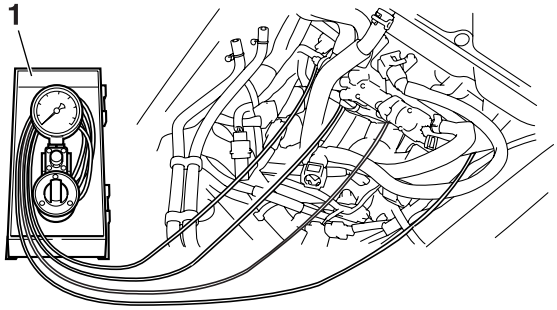
TIP
Place the vehicle on a suitable stand.

2. Remove:
   • Rider seat
   Refer to “GENERAL CHASSIS” on page 4-1.
   • Inner panel/side panel/front cowling side panel (FZ8SA)
   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.
3. Remove:
   • Synchronizing hoses “1”



4. Install:
   • Vacuum gauge “1”
   (onto the synchronizing hose)
   • Digital tachometer
   (Use goods on the market)

Vacuum gauge
90890-03094
Vacuummate
YU-44456



5. Install:
   • Air filter case
   Refer to “GENERAL CHASSIS” on page 4-1.
   • Fuel tank
   Refer to “FUEL TANK” on page 7-1.
6. Check:
   • Throttle body synchronization

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a. Start the engine, warm it up for several minutes, and then let it run at the specified engine idling speed.

Engine idling speed
1150–1250 r/min

b. 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.

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Adjusting the throttle body synchronization

1. Adjust:
   - Throttle body synchronization

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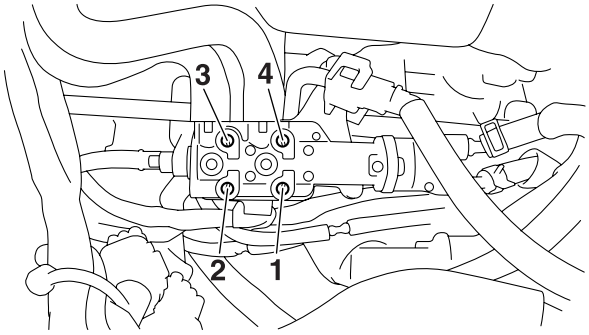
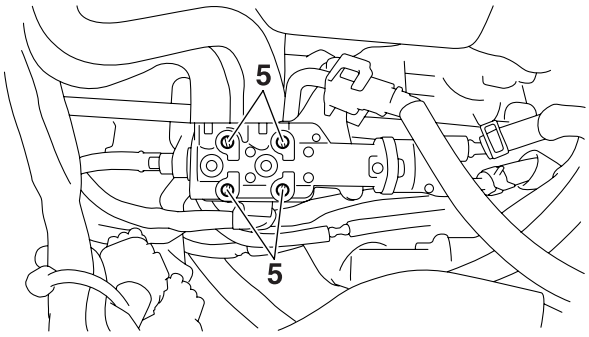
a. With throttle body #3 "1" as standard, adjust throttle bodies #1 "3", #2 "2", and #4 "4" using the air screws "5".

ECA14900

NOTICE

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





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 bypass air screw was removed, turn in the screw fully and be sure to synchronize the throttle bodies.
- If the throttle body synchronization can not adjusted by the bypass air screw, clean or replace the throttle bodies.
- The difference in vacuum pressure between the throttle bodies should not exceed 1.33 kPa (10 mmHg).

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2. Measure:
   - Engine idling speed
     Out of specification → Adjust.
     Make sure that the vacuum pressure is within specification.
3. Stop the engine and remove the measuring equipment.
4. Install:
   - Synchronizing hoses
5. Adjust:
   - Throttle cable free play
     Refer to "ADJUSTING THE THROTTLE CABLE FREE PLAY" on page 3-30.

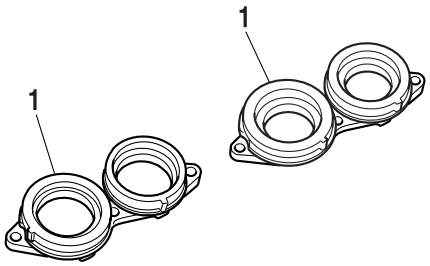
Throttle cable free play
3.0–5.0 mm (0.12–0.20 in)

6. Install:
   - Fuel tank
     Refer to "FUEL TANK" on page 7-1.
   - Inner panel/side panel/front cowling side panel (FZ8SA)
     Refer to "GENERAL CHASSIS" on page 4-1.
   - Rider seat
     Refer to "GENERAL CHASSIS" on page 4-1.

EAS21010

CHECKING THE THROTTLE BODY JOINTS

1. Remove:
   - Throttle bodies
     Refer to "THROTTLE BODIES" on page 7-5.
2. Check:
   - Throttle body joints "1"
     Cracks/damage → Replace.



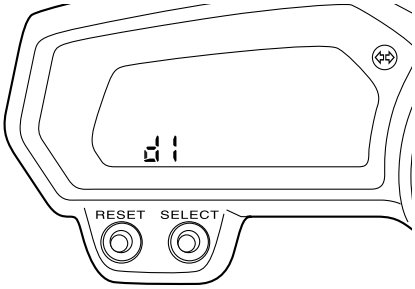
3. Install:
   - Throttle bodies
     Refer to "THROTTLE BODIES" on page 7-5.

EAS20600
ADJUSTING THE EXHAUST GAS VOLUME

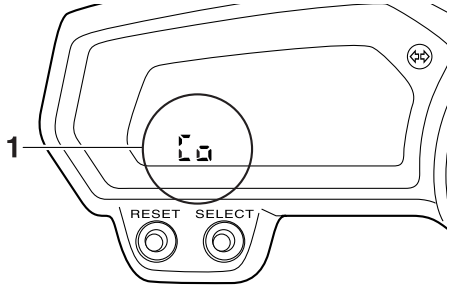
TIP
Be sure to set the CO density level to standard, and then adjust the exhaust gas volume.

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.
5. Press the "SELECT" and "RESET" buttons to select a cylinder.

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.

6. After selecting the cylinder, simultaneously press the "SELECT" and "RESET" buttons for 2 seconds or more to execute the selection.
7. Change the CO adjustment volume by pressing the "SELECT" and "RESET" buttons.

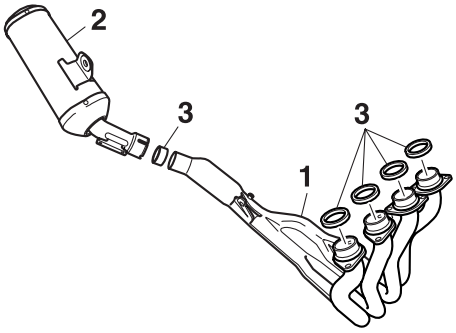
TIP
The CO adjustment volume appears on the tripmeter LCD.
- To decrease the CO adjustment volume, press the "RESET" button.
- To increase the CO adjustment volume, press the "SELECT" button.

8. Release the switch to execute the selection.
9. Simultaneously press the "SELECT" and "RESET" buttons to return to the cylinder selection (step 5).
10. Turn the main switch to "OFF" to cancel the mode.

EAS21081
CHECKING THE EXHAUST SYSTEM

The following procedure applies to all of the exhaust pipes and gaskets.
1. Remove:
   - Radiator lower bracket
     Refer to "RADIATOR" on page 6-1.
2. Check:
   - Exhaust pipe "1"
   - Muffler "2"
     Cracks/damage → Replace.
   - Gaskets "3"
     Exhaust gas leaks → Replace the gasket.
3. Check:
   - Tightening torque

Exhaust pipe nut
20 Nm (2.0 m·kgf, 14 ft·lbf)
Exhaust pipe and muffler bolt
20 Nm (2.0 m·kgf, 14 ft·lbf)
Exhaust pipe and exhaust pipe bracket bolt
20 Nm (2.0 m·kgf, 14 ft·lbf)
Muffler and rear footrest bolt
48 Nm (4.8 m·kgf, 35 ft·lbf)

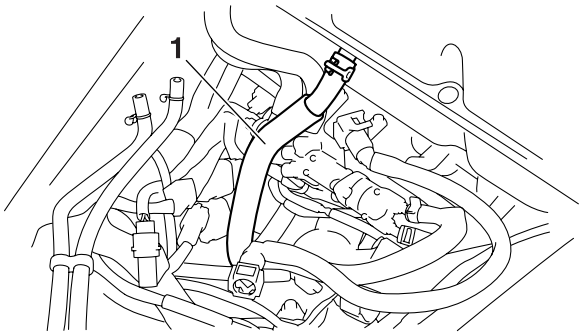


4. Install:
   - Radiator lower bracket
     Refer to “RADIATOR” on page 6-1.

EAS39P1306
CHECKING THE AIR INDUCTION SYSTEM
Refer to “CHECKING THE AIR INDUCTION SYSTEM” on page 7-18.

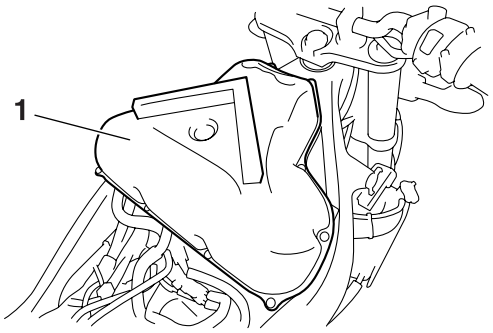
EAS21070
CHECKING THE CRANKCASE BREATHER HOSE
1. Remove:
   - Rider seat
     Refer to “GENERAL CHASSIS” on page 4-1.
   - Inner panel/side panel/front cowling side panel (FZ8SA)
     Refer to “GENERAL CHASSIS” on page 4-1.
   - Fuel tank
     Refer to “FUEL TANK” on page 7-1.
2. Check:
   - Crankcase breather hose “1”
     Cracks/damage → Replace.
     Loose connection → Connect properly.

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



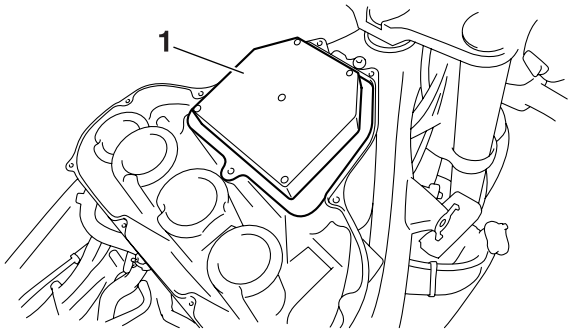
3. Install:
   - Fuel tank
     Refer to “FUEL TANK” on page 7-1.
   - Inner panel/side panel/front cowling side panel (FZ8SA)
     Refer to “GENERAL CHASSIS” on page 4-1.
   - Rider seat
     Refer to “GENERAL CHASSIS” on page 4-1.

EAS20961
REPLACING THE AIR FILTER ELEMENT
1. Remove:
   - Rider seat
     Refer to “GENERAL CHASSIS” on page 4-1.
   - Inner panel/side panel/front cowling side panel (FZ8SA)
     Refer to “GENERAL CHASSIS” on page 4-1.
   - Fuel tank
     Refer to “FUEL TANK” on page 7-1.
2. Remove:
   - Air filter case cover “1”
     Refer to “GENERAL CHASSIS” on page 4-1.



3. Check:
   - Air filter element “1”
   - Air filter seal
     Damage → Replace.

TIP
- Replace the air filter element every 40000 km (24000 mi) 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

ECA14401

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 that the sealing surfaces are aligned to prevent any air leaks.

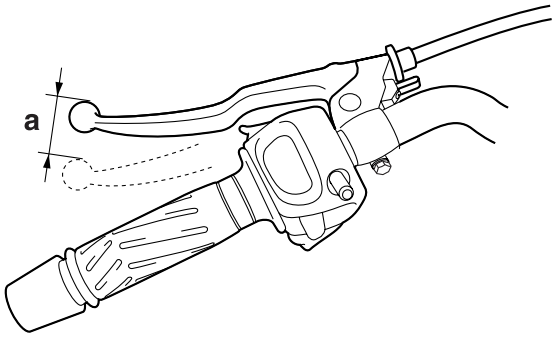
5. Install:
   - Fuel tank
     Refer to "FUEL TANK" on page 7-1.
   - Inner panel/side panel/front cowling side panel (FZ8SA)
     Refer to "GENERAL CHASSIS" on page 4-1.
   - Rider seat
     Refer to "GENERAL CHASSIS" on page 4-1.

EAS20870

ADJUSTING THE CLUTCH CABLE FREE PLAY

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

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



2. Adjust:
   - Clutch cable free play

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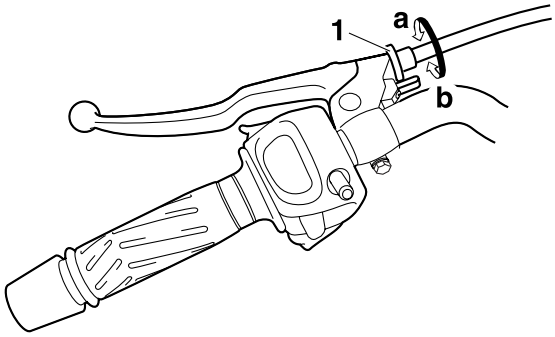
Handlebar side

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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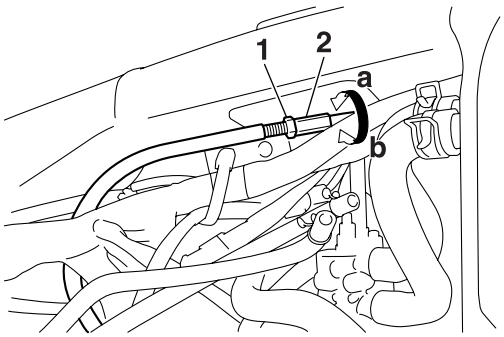
Engine side

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

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

c. Tighten the locknut “1”.

Locknut
7 Nm (0.7 m·kgf, 5.1 ft·lbf)



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EAS39P1307
CHECKING THE BRAKE OPERATION

1. Check:
   - Brake operation
     Brake not working properly → Check the brake system.
     Refer to “FRONT BRAKE” on page 4-30 and “REAR BRAKE” on page 4-43.

TIP
Drive on the dry road, operate the front and rear brakes separately and check to see if the brakes are operating properly.

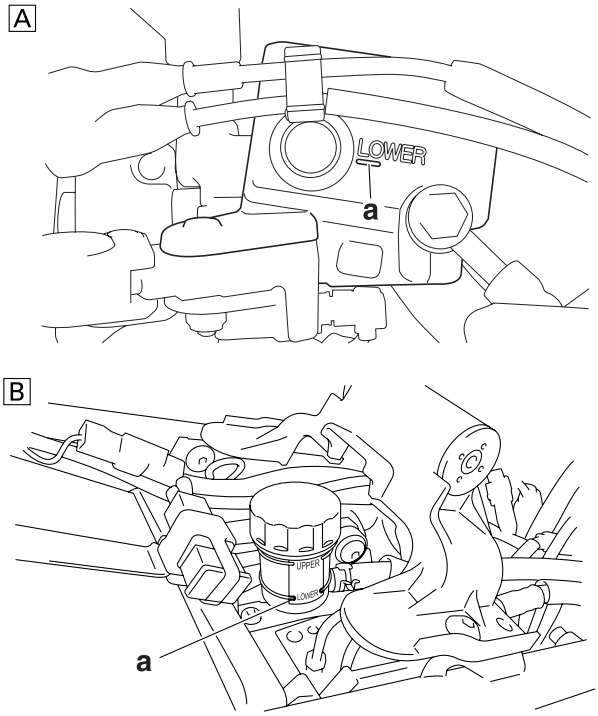
EAS21240
CHECKING THE BRAKE FLUID LEVEL

1. Stand the vehicle on a level surface.

TIP
- Place the vehicle on a suitable stand.
- 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. 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.

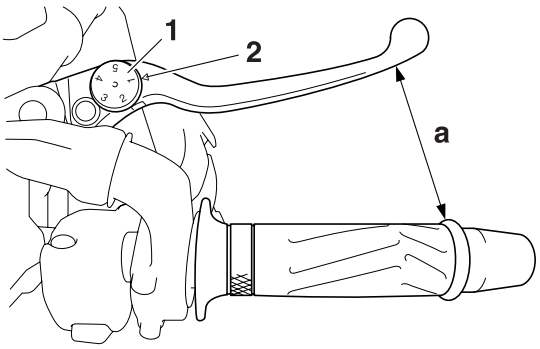
EAS21160
ADJUSTING THE FRONT DISC BRAKE

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

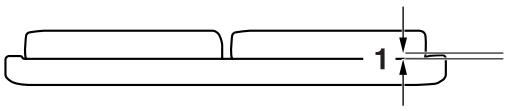
NOTICE

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 indicators “1” almost touch the brake disc → Replace the brake pads as a set.
     Refer to “FRONT BRAKE” on page 4-30.



EAS21190
ADJUSTING THE REAR DISC BRAKE

1. 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)

EWA39P1302

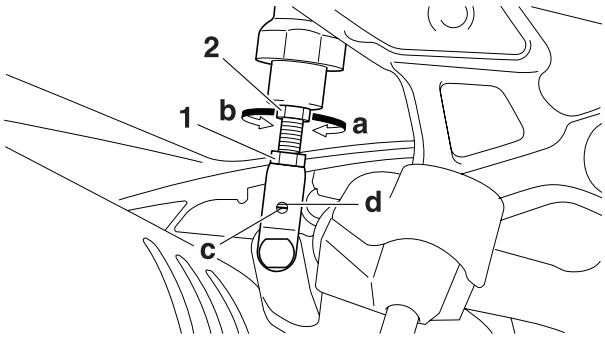
⚠ WARNING

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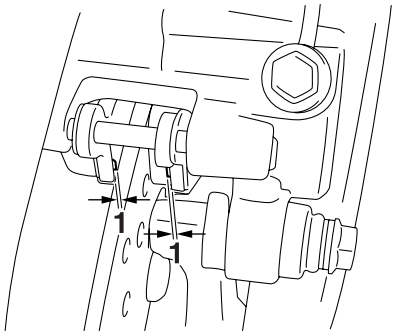
2. Adjust:
   - Rear brake light switch
     Refer to "ADJUSTING THE REAR BRAKE LIGHT SWITCH" on page 3-29.

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 indicators "1" almost touch the brake disc → Replace the brake pads as a set.
     Refer to "REAR BRAKE" on page 4-43.



EAS21350
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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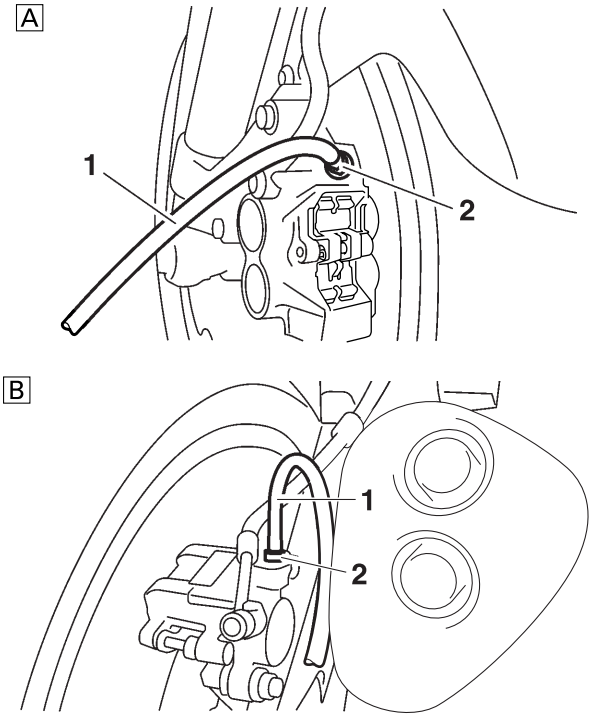
a. Fill the brake fluid reservoir to the proper level with the recommended brake fluid.
b. Install the diaphragm (brake master cylinder reservoir or brake fluid reservoir).
c. Connect a clear plastic hose "1" tightly to the bleed screw "2".



A. Front
B. Rear

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

f. Fully 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.

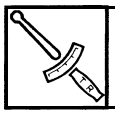
h. Tighten the bleed screw and then release the brake lever or brake pedal.
i. Repeat steps (e) to (h) until all of the air bubbles have disappeared from the brake fluid in the plastic hose.
j. Check the operation of the hydraulic unit. Refer to "HYDRAULIC UNIT OPERATION TESTS" on page 4-60.

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 specification.



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

m. Fill the brake fluid reservoir to the proper level with the recommended brake fluid. Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-14.

EWA13110

⚠ WARNING

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

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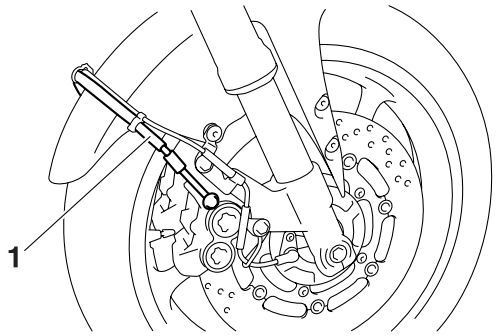
EAS21280

CHECKING THE FRONT BRAKE HOSES

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

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

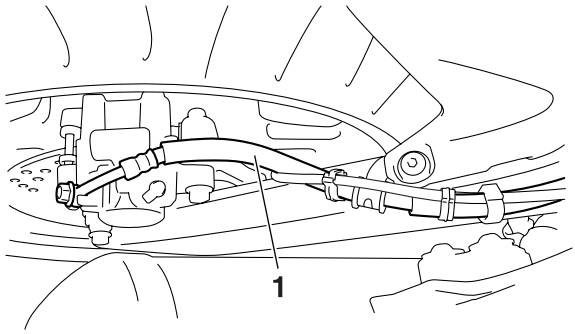


2. Check:
   - Brake hose holder
     Loose → Tighten the holder bolt.
3. Hold the vehicle upright and apply the brake several times.
4. Check:
   - Brake hose
     Brake fluid leakage → Replace the damaged hose.
     Refer to "FRONT BRAKE" on page 4-30.

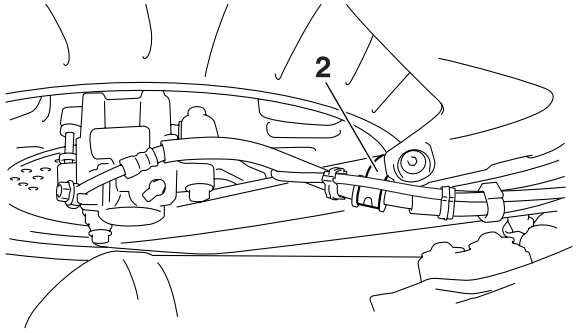
EAS21290

CHECKING THE REAR BRAKE HOSE

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



2. Check:
   - Brake hose holder "2"
     Loose Connection → Tighten the holder 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 4-43.

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.

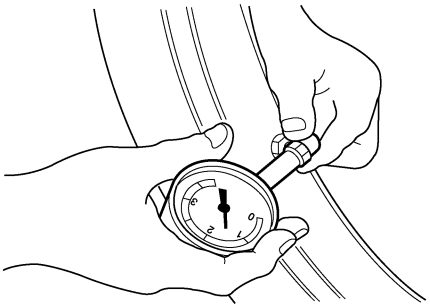
TIP

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.

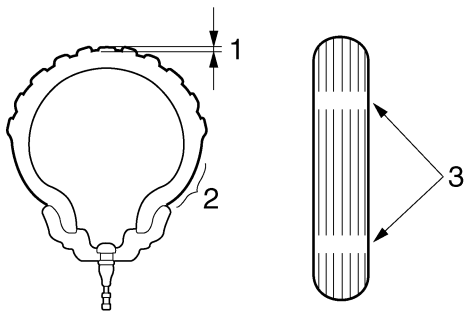
Tire air pressure (measured on cold tires)
Loading condition
0–90 kg (0–198 lb)
Front
250 kPa (2.50 kgf/cm², 36 psi)
Rear
290 kPa (2.90 kgf/cm², 42 psi)
Loading condition
90–194 kg (198–428 lb) (FZ8NA)
90–190 kg (198–419 lb) (FZ8SA)
Front
250 kPa (2.50 kgf/cm², 36 psi)
Rear
290 kPa (2.90 kgf/cm², 42 psi)
High-speed riding
Front
250 kPa (2.50 kgf/cm², 36 psi)
Rear
290 kPa (2.90 kgf/cm², 42 psi)
Maximum load
194 kg (428 lb) (FZ8NA)
190 kg (419 lb) (FZ8SA)

*** Total weight of rider, passenger, cargo and accessories**

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

EWA13190
⚠ WARNING

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



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

Wear limit (front)
1.6 mm (0.06 in)
Wear limit (rear)
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/BT021F BB

Rear tire
Size
180/55 ZR17M/C (73W)
Manufacturer/model
BRIDGESTONE/BT021R BB

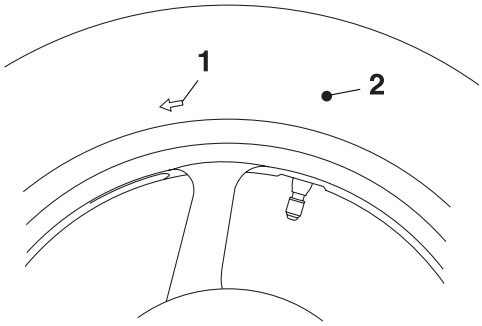
EWA13210

⚠ 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.



EAS39P1308

CHECKING THE WHEEL BEARINGS

The following procedure applies to all of the wheel bearings.

1. Check:
   - Wheel bearings
     Refer to "CHECKING THE FRONT WHEEL" on page 4-14 and "CHECKING THE REAR WHEEL" on page 4-24.

EAS39P1309

CHECKING THE SWINGARM OPERATION

1. Check:
   - Swingarm operation
     Swingarm not working properly → Check the swingarm.
     Refer to "SWINGARM" on page 4-88.
2. Check:
   - Swingarm excessive play
     Refer to "SWINGARM" on page 4-88.

EAS21390

ADJUSTING THE DRIVE CHAIN SLACK

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.

TIP

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

1. Stand the vehicle on a level surface.

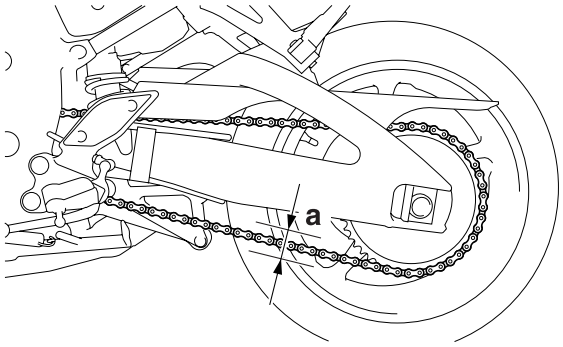
EWA13120

⚠ WARNING

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

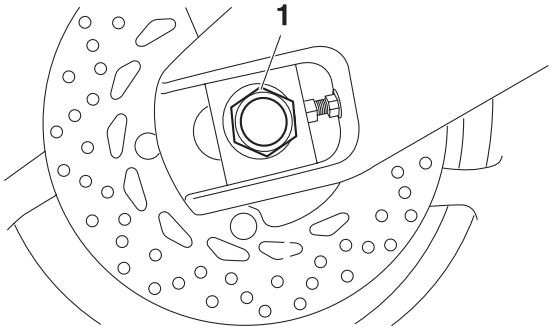
TIP
Place the vehicle on a suitable stand so that the rear wheel is elevated.

2. Move 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
20.0–30.0 mm (0.79–1.18 in)

4. Loosen:
   • Wheel axle nut "1"



5. Adjust:
   • Drive chain slack

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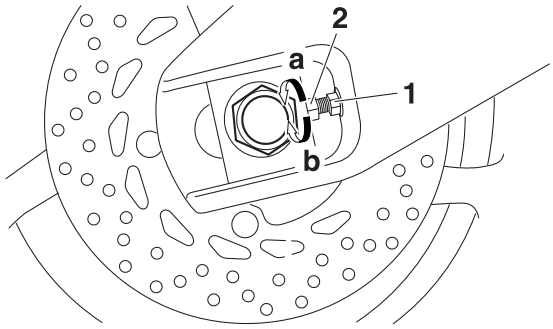
a. Loosen both locknuts "1".
b. Turn both adjusting bolts "2" in direction "a" or "b" until the specified drive chain slack is obtained.

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



TIP
- To maintain the proper wheel alignment, adjust both sides evenly.
- The difference of the adjusting block should be 0.5 mm (0.02 in) or less.
- There should be no clearance between the adjusting block and adjusting bolt.

c. Tighten the wheel axle nut to specification.

Wheel axle nut
150 Nm (15 m·kgf, 108 ft·lbf)

d. Tighten the locknuts to specification.

Locknut
16 Nm (1.6 m·kgf, 12 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
Chain lubricant suitable for O-ring chains

EAS21510
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.
     Blinding/looseness → Adjust the steering head.
3. Remove:
   - Upper bracket
4. Adjust:
   - Steering head

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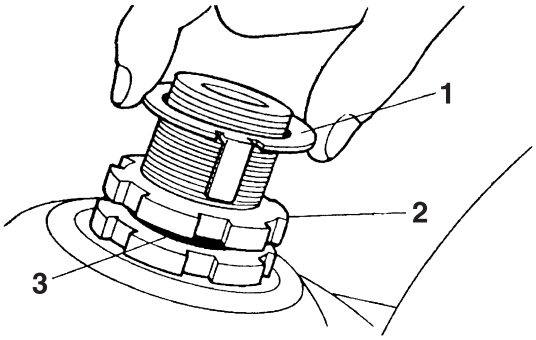
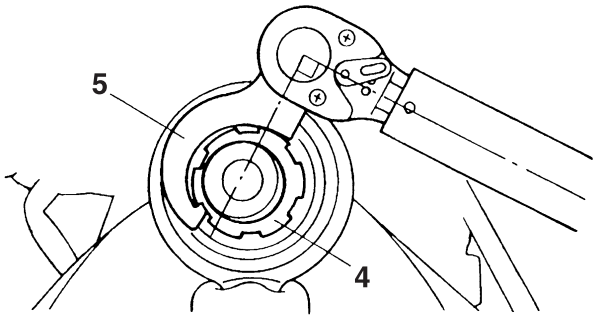
a. Remove the lock washer “1”, the upper ring nut “2”, and the rubber washer “3”.

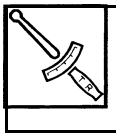


b. Loosen the lower ring nut “4” and then tighten it to specification with a steering nut wrench “5”.

TIP
- Set the torque wrench at a right angle to the steering nut wrench.
- Move the steering to the left and right a couple of times to check that it moves smoothly.



Steering nut wrench
90890-01403
Exhaust flange nut wrench
YU-A9472

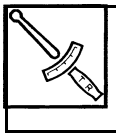


Lower ring nut (initial tightening torque)
52 Nm (5.2 m·kgf, 38 ft·lbf)

c. Loosen the lower ring nut “6” completely, then tighten it to specification.

EWA13140
⚠ WARNING

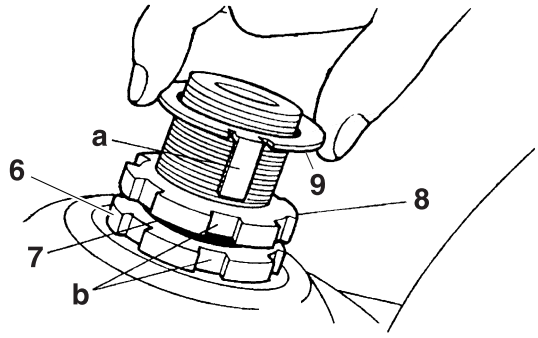
Do not overtighten the lower ring nut.



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 4-78.
e. Install the rubber washer “7”.
f. Install the upper ring nut “8”.
g. Finger tighten the upper ring nut, 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 “9”.

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 “HANDLEBAR” on page 4-64.

EAS39P1303
LUBRICATING THE BRAKE LEVER

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

Recommended lubricant
Silicone grease

EAS39P1304
LUBRICATING THE CLUTCH LEVER

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

Recommended lubricant
Lithium-soap-based grease

EAS21710
LUBRICATING THE PEDAL

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

Recommended lubricant
Lithium-soap-based grease

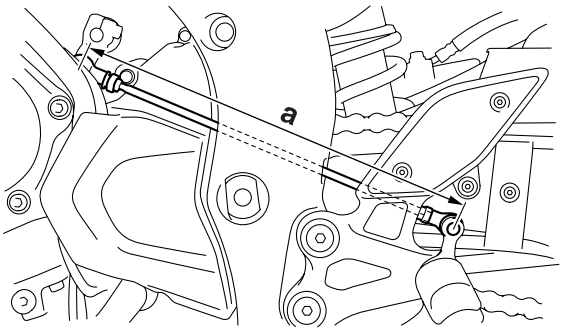
EAS21380
ADJUSTING THE SHIFT PEDAL

TIP

The shift pedal position is determined by the installed shift rod length.

1. Measure:
   • Installed shift rod length “a”
   Incorrect → Adjust.

Installed shift rod length
304.1–306.1 mm (11.97–12.05 in)



2. Adjust:
   • Installed shift rod length

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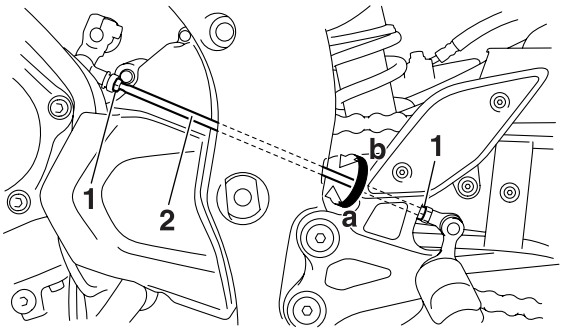
a. Loosen both locknuts “1”.
b. Turn the shift rod “2” in direction “a” or “b” to obtain the correct shift pedal position.

Direction “a”
Installed shift rod length increases.
Direction “b”
Installed shift rod length decreases.



c. Tighten both locknuts.
d. Make sure the installed shift rod length is within specification.

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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

EAS39P1310
CHECKING THE SIDESTAND SWITCH

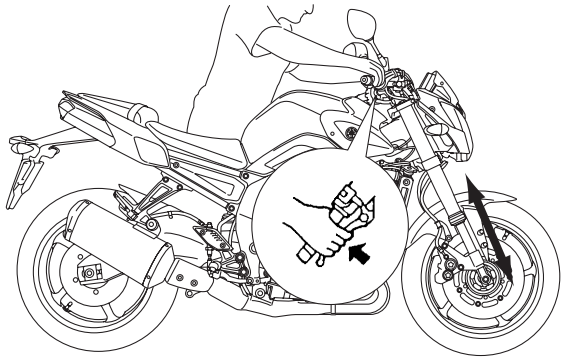
Refer to “ELECTRICAL COMPONENTS” on page 8-175.

EAS21531
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
     Damage/scratches → Replace.
   - Front fork leg
     Oil leaks between inner tube and outer tube → Replace the oil seal.
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 4-69.



EAS21740
LUBRICATING THE REAR SUSPENSION
Lubricate the pivoting point and metal-to-metal moving parts of the rear suspension.

Recommended lubricant
Lithium-soap-based grease

EAS39P1311
CHECKING THE REAR SHOCK ABSORBER ASSEMBLY
Refer to "CHECKING THE REAR SHOCK ABSORBER ASSEMBLY" on page 4-85.

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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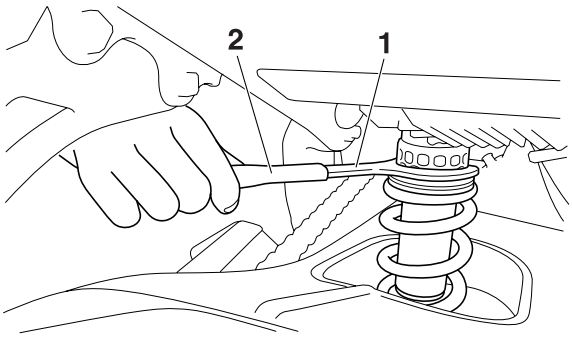
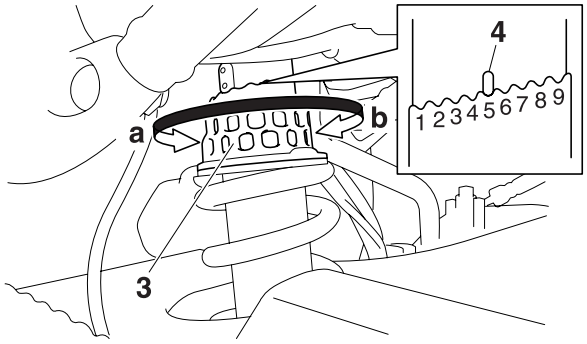
a. Adjust the spring preload with the special wrench "1" and extension bar "2" included in the owner's tool kit.
b. Turn the adjusting ring "3" in direction "a" or "b".
c. Align the desired position on the adjusting ring with the stopper "4".

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
5
Maximum
9





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EAS39P1312
CHECKING THE CONNECTING ARM AND RELAY ARM

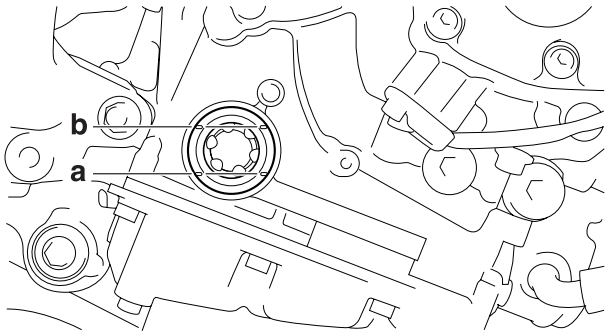
Refer to “CHECKING THE CONNECTING ARM AND RELAY ARM” on page 4-86.

EAS20731
CHECKING THE ENGINE OIL LEVEL

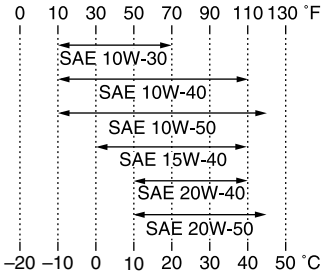
1. Stand the vehicle on a level surface.

TIP
- Place the vehicle on a suitable stand.
- 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.



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



ECA13361
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” or higher and do not use oils labeled “ENERGY CONSERVING II” or higher.**
- **Do not allow foreign materials to enter the crankcase.**

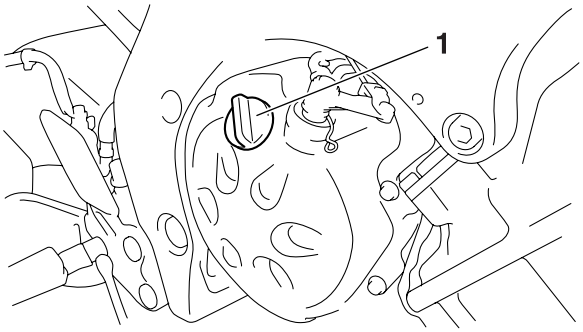
TIP
Before checking the engine oil level, wait a few minutes until the oil has settled.

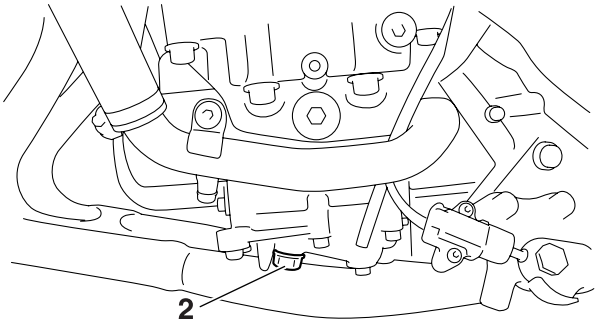
4. Start the engine, warm it up for several minutes, and then turn it off.
5. Check the engine oil level again.

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

EAS20791
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:
   - 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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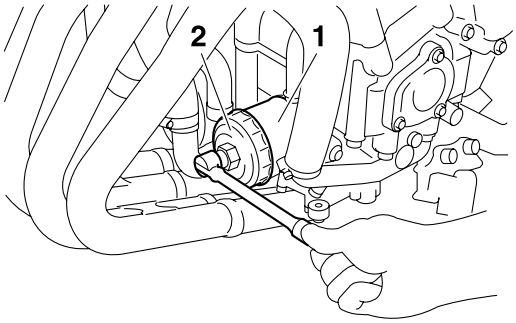
a. Remove the oil filter cartridge "1" with an oil filter wrench "2".

Oil filter wrench
90890-01426
YU-38411

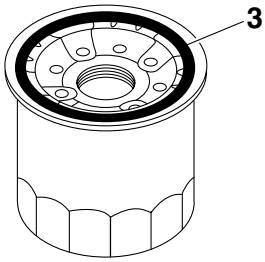


b. Lubricate the O-ring "3" of the new oil filter cartridge with a thin coat of engine oil.

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. Install:
   • Engine oil drain bolt
   (along with the gasket New)

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

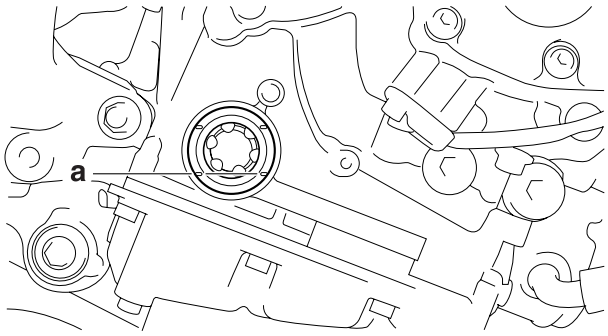
7. Fill:
   • Crankcase
   (with the specified amount of the recommended engine oil)

Engine oil quantity
Total amount
3.80 L (4.02 US qt, 3.34 Imp.qt)
Without oil filter cartridge replacement
2.90 L (3.07 US qt, 2.55 Imp.qt)
With oil filter cartridge replacement
3.10 L (3.28 US qt, 2.73 Imp.qt)

8. Install:
   • Engine oil filler cap
   (along with the O-ring New)
9. Start the engine, warm it up for several minutes, and then turn it off.
10. Check:
    • Engine
    (for engine oil leaks)
11. Check:
    • Engine oil level
    Refer to "CHECKING THE ENGINE OIL LEVEL" on page 3-24.

EAS20820
MEASURING THE ENGINE OIL PRESSURE

1. Check:
   - Engine oil level
     Below the minimum level mark "a" → Add the recommended engine oil to the proper level.



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

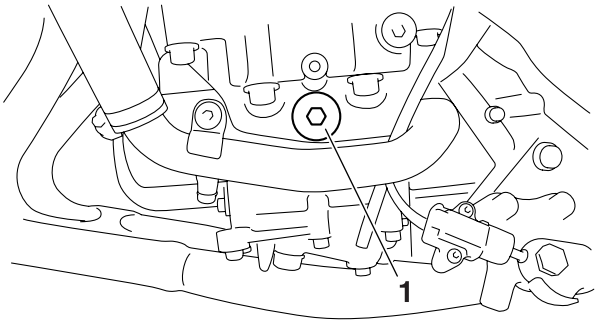
ECA13410
NOTICE

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:
   - Oil gallery bolt "1"

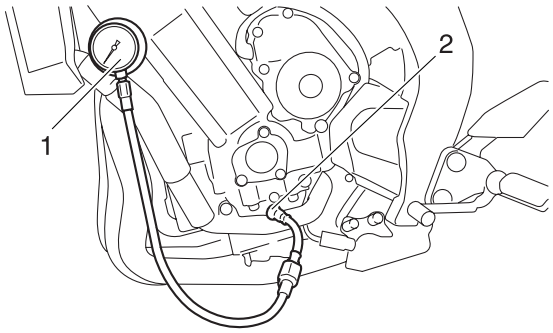
EWA12980
⚠ WARNING

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



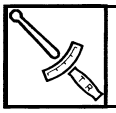
5. Measure:
   - Engine oil pressure
     (at the following conditions)

Oil pressure
230.0 kPa/5000 r/min (2.30 kgf/cm²/5000 r/min, 33.4 psi/5000 r/min)
Oil temperature
75.0–95.0 °C (167.00–203.00 °F)

Out of specification → Check.

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:
   - Oil gallery bolt



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

ECA39P1301
NOTICE

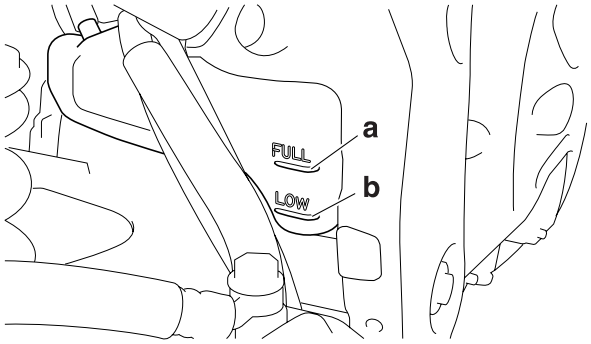
Be careful to tighten too much.

EAS21110
CHECKING THE COOLANT LEVEL

1. Stand the vehicle on a level surface.

TIP
- Place the vehicle on a suitable stand.
- 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

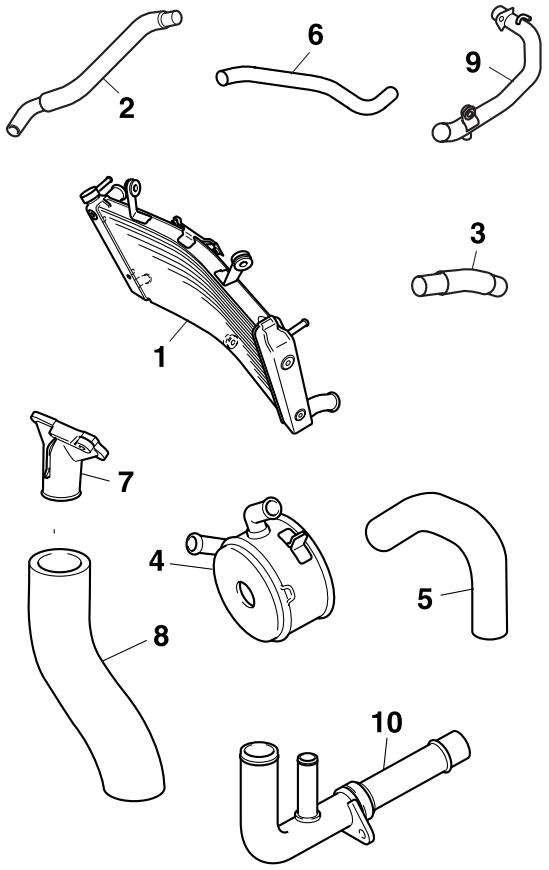
TIP

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

EAS21120

CHECKING THE COOLING SYSTEM

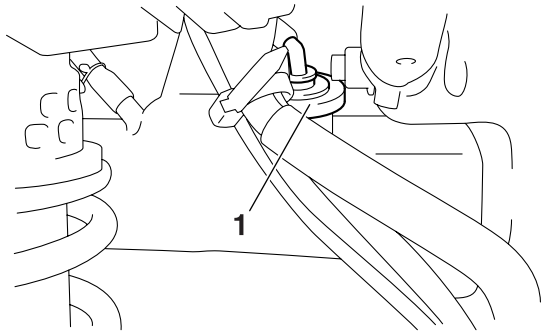
1. Check:
   • Radiator “1”
   • Radiator inlet hose “2”
   • Radiator outlet hose “3”
   • Oil cooler “4”
   • Oil cooler inlet hose “5”
   • Oil cooler outlet hose “6”
   • Water jacket joint “7”
   • Water jacket joint inlet hose “8”
   • Water pump inlet pipe “9”
   • Water pump outlet pipe “10”
   Cracks/damage → Replace.
   Refer to “RADIATOR” on page 6-1, “OIL COOLER” on page 6-5, “THERMOSTAT” on page 6-7 and “WATER PUMP” on page 6-11.



EAS21131

CHANGING THE COOLANT

1. Remove:
   • Rider seat
   Refer to “GENERAL CHASSIS” on page 4-1.
2. Remove:
   • Coolant reservoir cap “1”

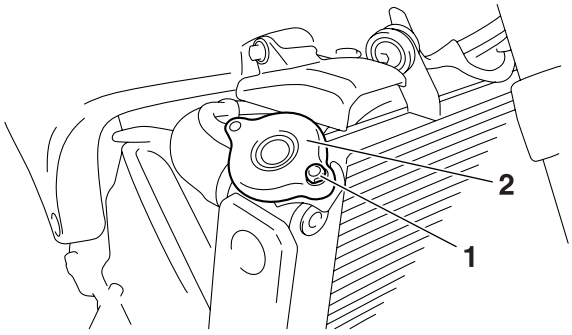


3. Remove:
   • Coolant reservoir tank
4. Disconnect:
   • Coolant reservoir hose
5. Drain:
   • Coolant
   (from the coolant reservoir)
6. Remove:
   • Radiator cap bolt “1”
   • Radiator cap “2”

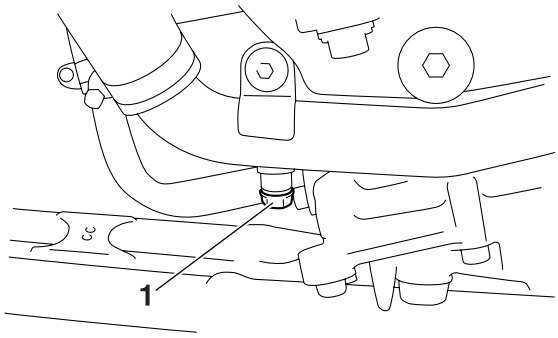
EWA13030

⚠ WARNING

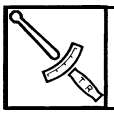
A hot radiator is under pressure. Therefore, do not remove the radiator cap when the engine is hot. Scalding hot fluid and steam may be blown out, which could cause serious injury. When the engine has cooled, open the radiator cap as follows:
Place a thick rag or a towel over the radiator cap and slowly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



7. Remove:
   • Coolant drain bolt “1”
   (along with the copper washer)



8. Drain:
   • Coolant
   (from the engine and radiator)
9. Install:
   • Coolant drain bolt
   (along with the copper washer New)



Coolant drain bolt
7 Nm (0.7 m·kgf, 5.1 ft·lbf)

10. Connect:
    • Coolant reservoir hose
11. Install:
    • Coolant reservoir tank
12. Fill:
    • Cooling system
    (with the specified amount of the recommended coolant)

Recommended antifreeze
High-quality ethylene glycol antifreeze containing corrosion inhibitors for aluminum engines
Mixing ratio
1:1 (antifreeze:water)
Radiator capacity (including all routes)
2.25 L (2.38 US qt, 1.98 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.**

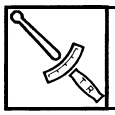
ECA13480

NOTICE

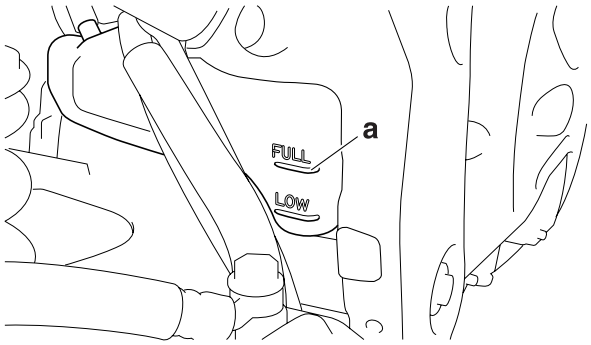
- **Adding water instead of coolant lowers the antifreeze content of the coolant. If water is used instead of coolant check, and if necessary, correct the antifreeze concentration of the coolant.**

- **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.**

13. Install:
    - Radiator cap
    - Radiator cap bolt

	**Radiator cap bolt** **5 Nm (0.5 m·kgf, 3.6 ft·lbf)**

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



15. Install:
    - Coolant reservoir cap
16. Start the engine, warm it up for several minutes, and then stop it.
17. Check:
    - Coolant level
      Refer to "CHECKING THE COOLANT LEVEL" on page 3-26.

TIP

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

18. Install:
    - Rider seat
      Refer to "GENERAL CHASSIS" on page 4-1.

EAS39P1313
CHECKING THE FRONT BRAKE LIGHT SWITCH

Refer to "ELECTRICAL COMPONENTS" on page 8-175.

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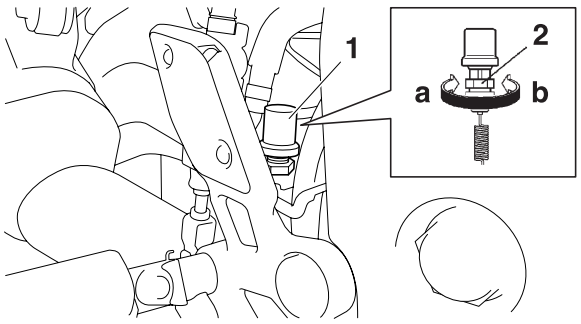
a. Hold the main body "1" of the rear brake light switch so that it does not rotate and turn the adjusting nut "2" in direction "a" or "b" until the rear brake light comes on at the proper time.

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

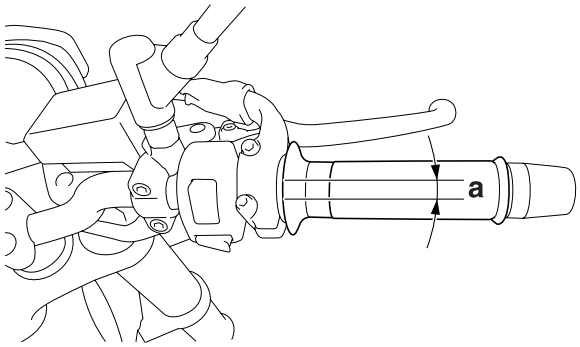
TIP
Hold the cable end upright and pour a few drops of lubricant into the cable sheath or use a suitable lubricating device.

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. Adjust:
   • Throttle cable free play

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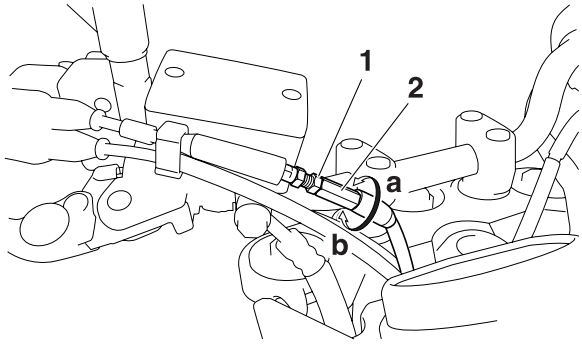
a. Loosen the locknut "1".
b. Turn the adjusting nut "2" in direction "a" or "b" until the specified throttle cable free play is obtained.

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

c. Tighten the locknut "1".



EWA39P1301
⚠ WARNING
After adjusting the throttle cable free play, start the engine and turn the handlebars to the right and to the left to ensure that this does not cause the engine idling speed to change.

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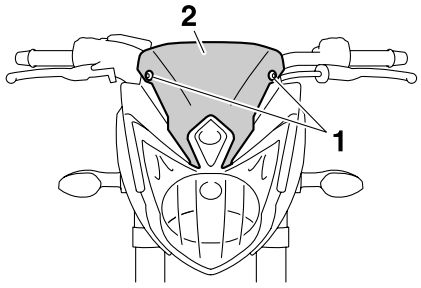
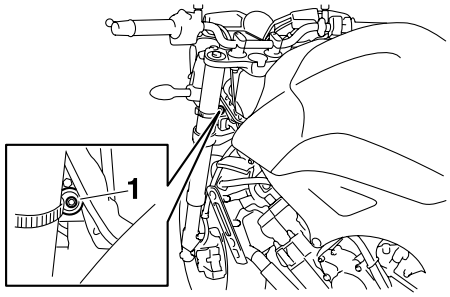
EAS21760
CHECKING AND CHARGING THE BATTERY
Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-186.

EAS21770
CHECKING THE FUSES
Refer to "CHECKING THE FUSES" on page 8-185.

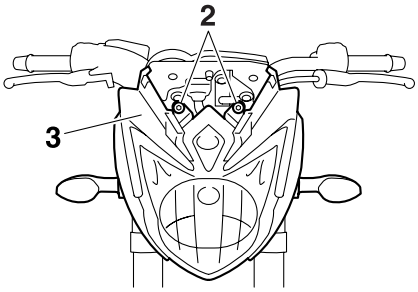
EAS21790
REPLACING THE HEADLIGHT BULB (FZ8NA)
1. Remove:
   • Headlight top cover bolts "1"
   • Headlight top cover "2"



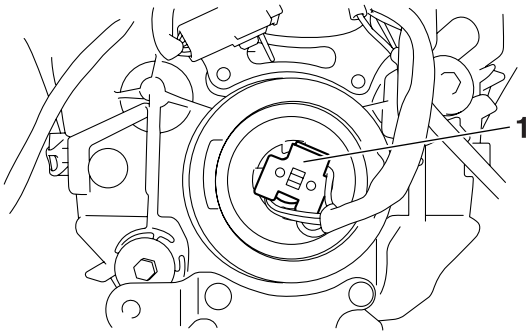
2. Remove:
   • Headlight bolt “1”



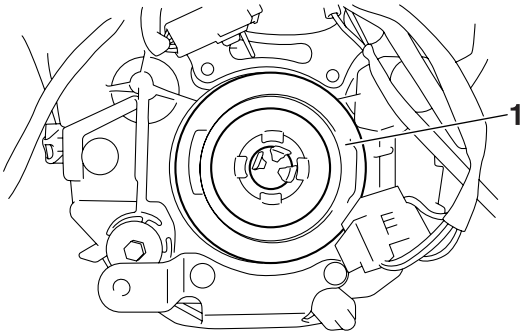
3. Remove:
   • Headlight bolts “2”
   • Headlight unit “3”



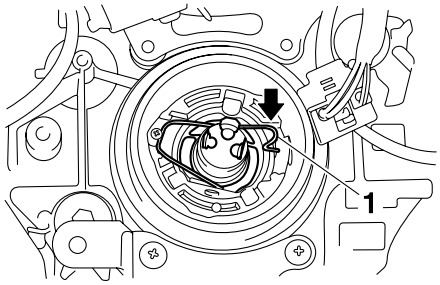
4. Remove:
   • Headlight coupler “1”



5. Remove:
   • Headlight bulb cover “1”



6. Remove:
   • Headlight bulb holder “1”



EWA13320

⚠ WARNING

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

7. Install:
   • Headlight bulb New
   Secure the new headlight bulb with the headlight bulb holder.

ECA13690

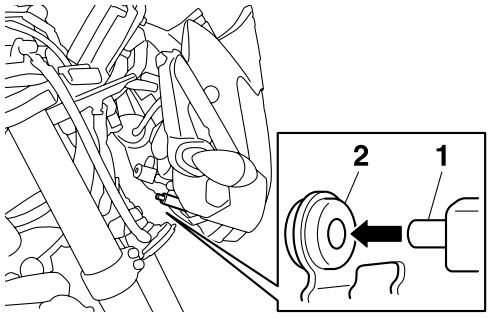
NOTICE

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.

8. Install:
   • Headlight bulb holder
9. Install:
   • Headlight bulb cover
10. Connect:
    • Headlight coupler
11. Install:
    • Headlight unit

TIP

Connect the coupler, then insert the projection “1” on the headlight unit into the grommet “2” on the vehicle to fit the headlight unit in its original position.



12. Install:
    • Headlight bolts

	Headlight bolt **7 Nm (0.7 m·kgf, 5.1 ft·lbf)**

13. Install:
    • Headlight side covers
    • Headlight side cover bolts

	Headlight side cover bolt **3.8 Nm (0.38 m·kgf, 2.8 ft·lbf)**

14. Install:
    • Headlight side panels
    • Headlight side panel bolts

	Headlight side panel bolt **8 Nm (0.8 m·kgf, 5.8 ft·lbf)**

15. Install:
    • Headlight top cover
    • Headlight top cover bolts

	Headlight top cover bolt **1.5 Nm (0.15 m·kgf, 1.1 ft·lbf)**

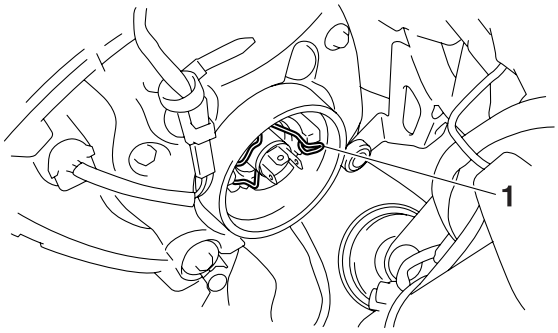
EAS39P1305
REPLACING THE HEADLIGHT BULBS (FZ8SA)

The following procedure applies to both of the headlight bulbs.

1. Remove:
    • Inner panel
    Refer to "GENERAL CHASSIS" on page 4-1.
2. Disconnect:
    • Headlight coupler "1"

3. Remove:
    • Headlight bulb cover "1"

4. Remove:
    • Headlight bulb holder "1"



5. Remove:
    • Headlight bulb

EWA13320

⚠ WARNING

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

6. 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.

7. Install:
   • Headlight bulb holder
8. Install:
   • Headlight bulb cover
9. Connect:
   • Headlight coupler
10. Install:
    • Inner panel
      Refer to “GENERAL CHASSIS” on page 4-1.

EAS21810

ADJUSTING THE HEADLIGHT BEAM (FZ8NA)

1. Adjust:
   • Headlight beam (vertically)

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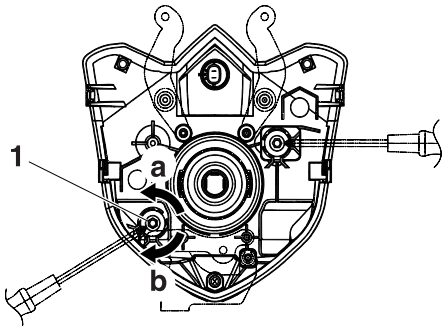
a. Turn the adjusting screw “1” in direction “a” or “b”.

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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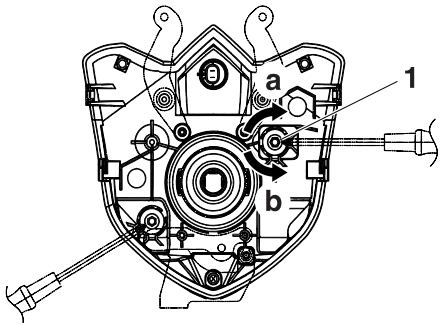
a. Turn the adjusting screw “1” in direction “a” or “b”.

Direction “a”
Headlight beam moves to the right.
Direction “b”
Headlight beam moves to the left.



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EAS39P1314

ADJUSTING THE HEADLIGHT BEAMS (FZ8SA)

The following procedure applies to both of the headlights.

1. Adjust:
   • Headlight beam (vertically)

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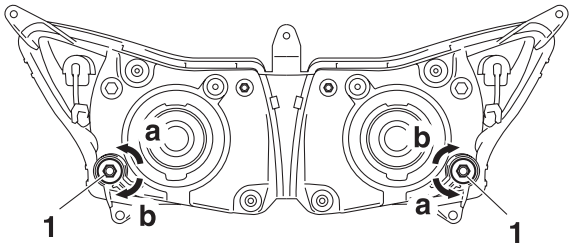
a. Turn the adjusting screw “1” in direction “a” or “b”.

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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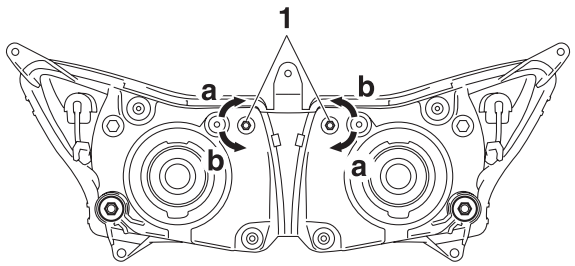
a. Turn the adjusting screw “1” in direction “a” or “b”.
   Left headlight

Direction “a”
Headlight beam moves to the right.
Direction “b”
Headlight beam moves to the left.

Right headlight

Direction “a”
Headlight beam moves to the left.
Direction “b”
Headlight beam moves to the right.



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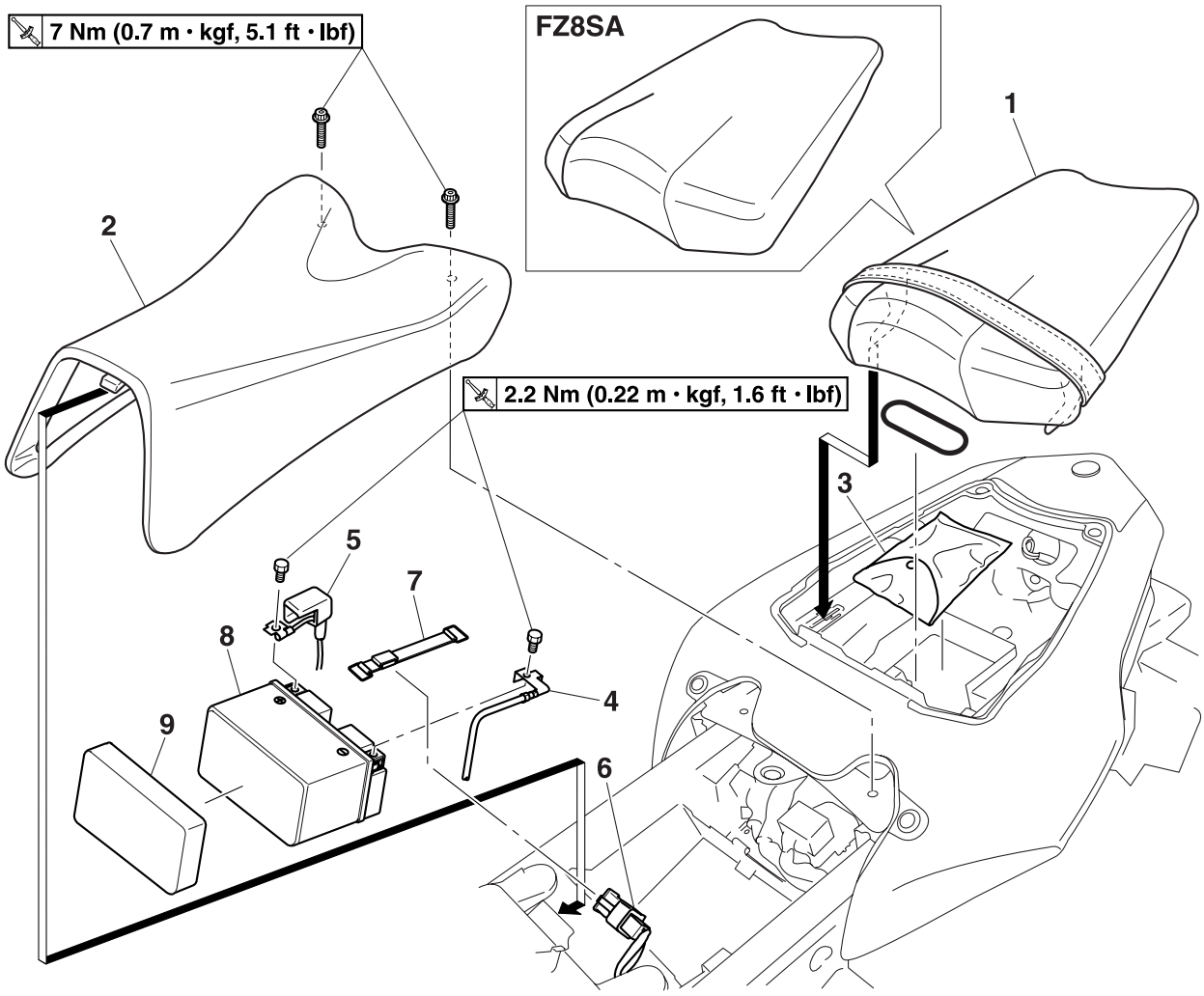
CHASSIS

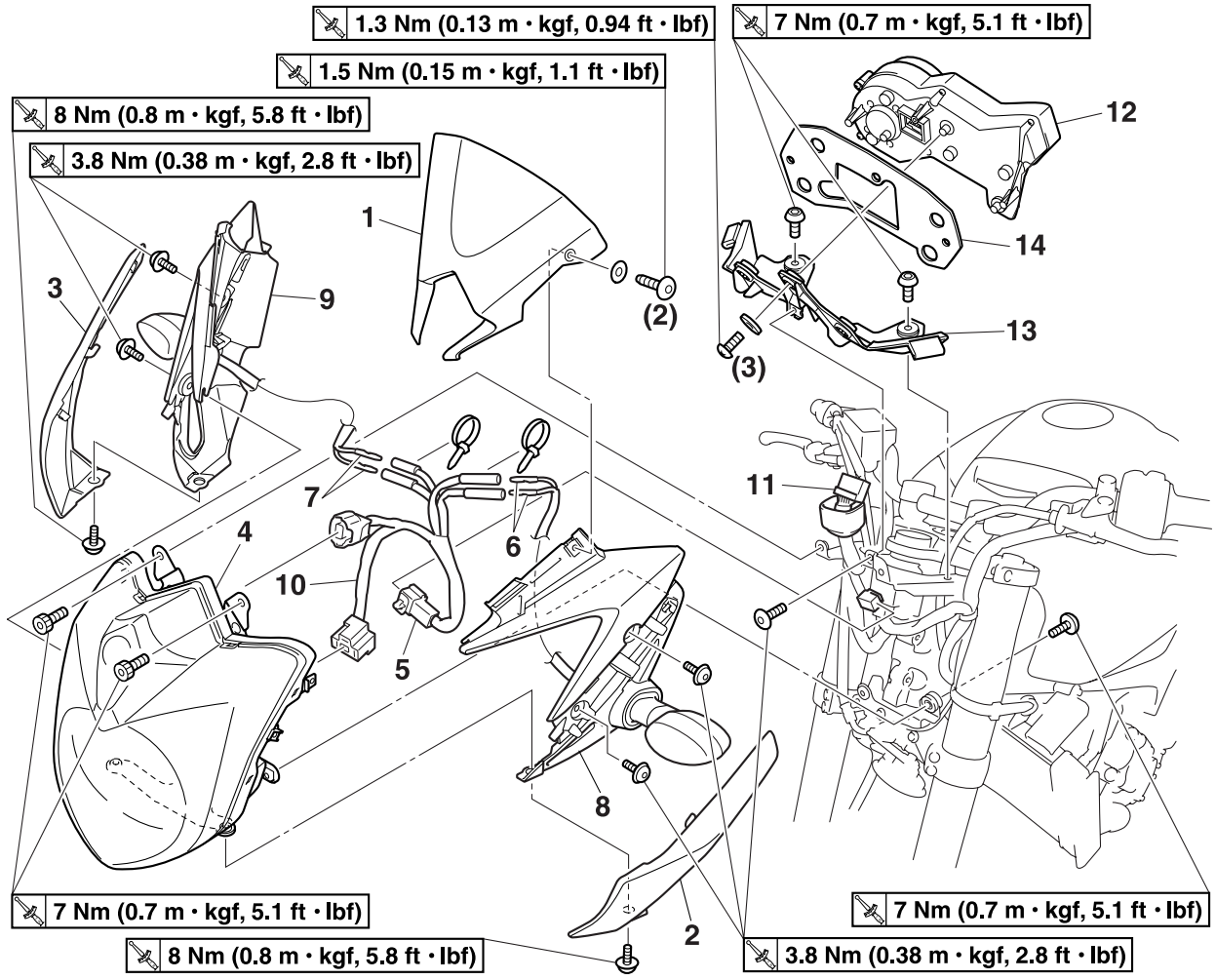
EAS21830
GENERAL CHASSIS

Removing the seat and battery



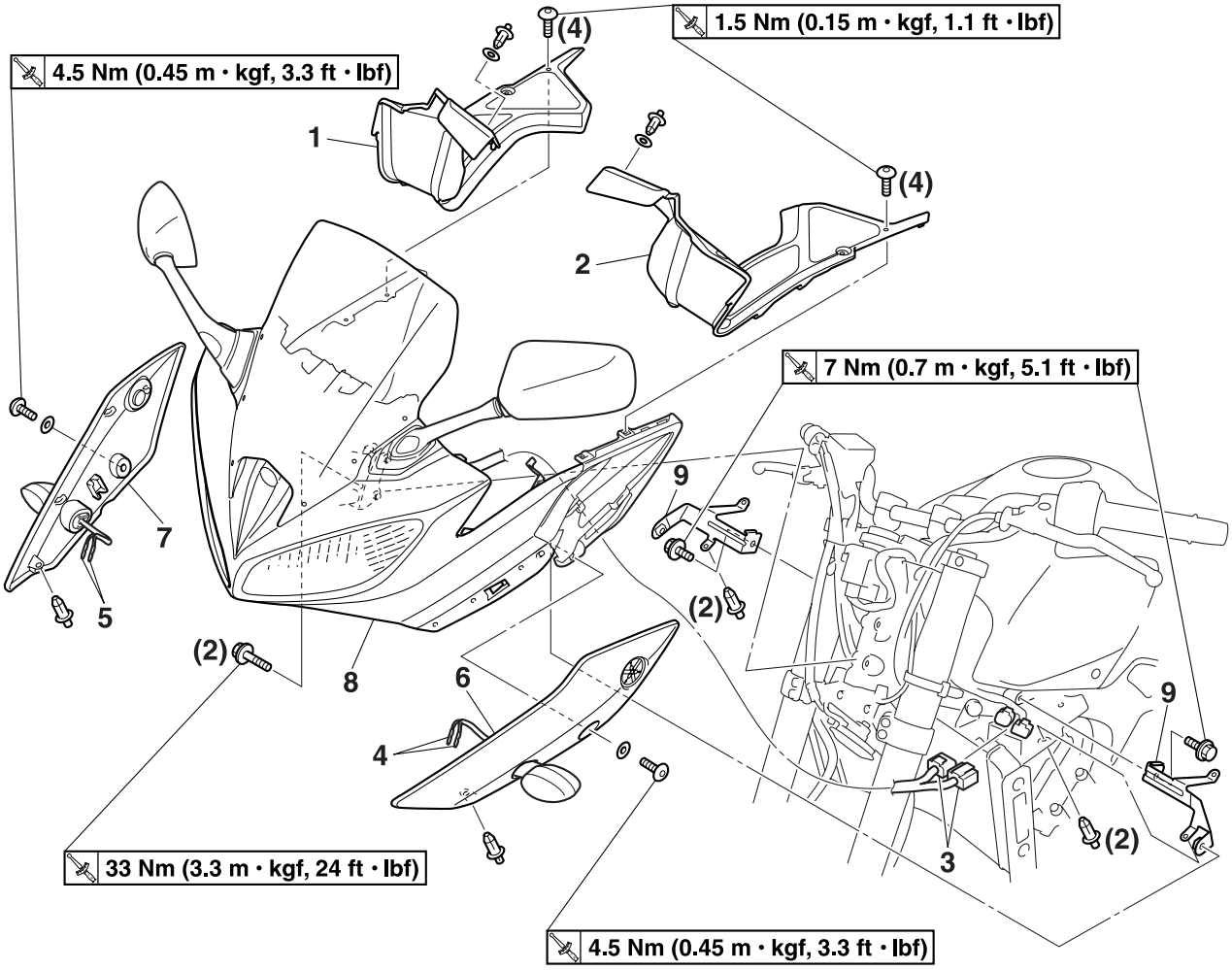
Order	Job/Parts to remove	Q'ty	Remarks
1	Passenger seat	1	
2	Rider seat	1	
3	Tool kit	1	
4	Battery negative lead	1	
5	Battery positive lead	1	
6	Main fuse	1	
7	Battery band	1	
8	Battery	1	
9	Battery seat	1	
			For installation, reverse the removal procedure.

Removing the headlight and meter assembly (FZ8NA)



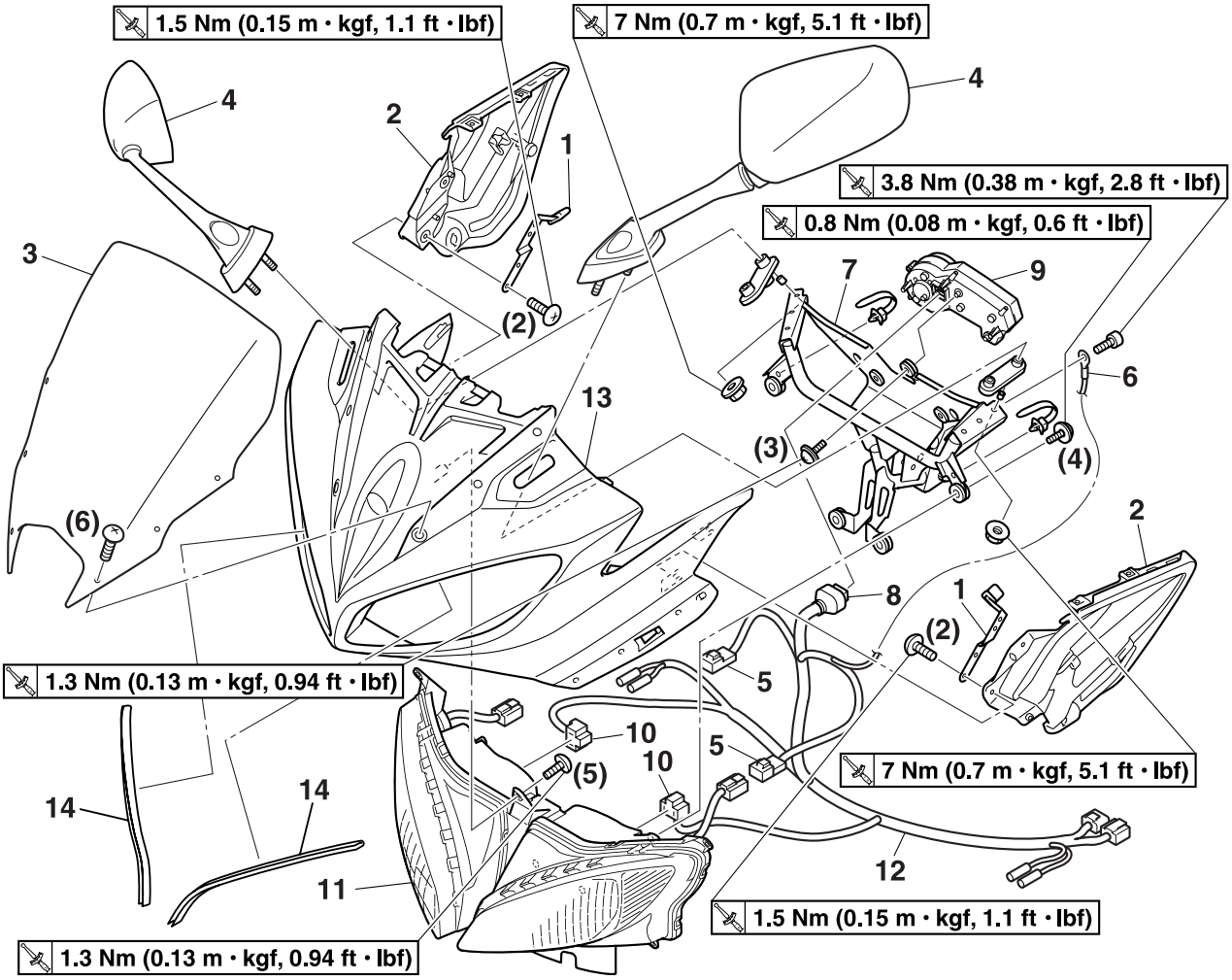
Order	Job/Parts to remove	Q'ty	Remarks
1	Headlight top cover	1	
2	Left headlight side panel	1	
3	Right headlight side panel	1	
4	Headlight assembly	1	
5	Headlight sub-wire harness coupler	1	Disconnect.
6	Left turn signal light lead connector	2	Disconnect.
7	Right turn signal light lead connector	2	Disconnect.
8	Left headlight side cover	1	
9	Right headlight side cover	1	
10	Headlight sub-wire harness	1	
11	Meter coupler	1	Disconnect.
12	Meter assembly	1	
13	Meter bracket	1	
14	Meter seat	1	
			For installation, reverse the removal procedure.

Removing the front cowling assembly (FZ8SA)



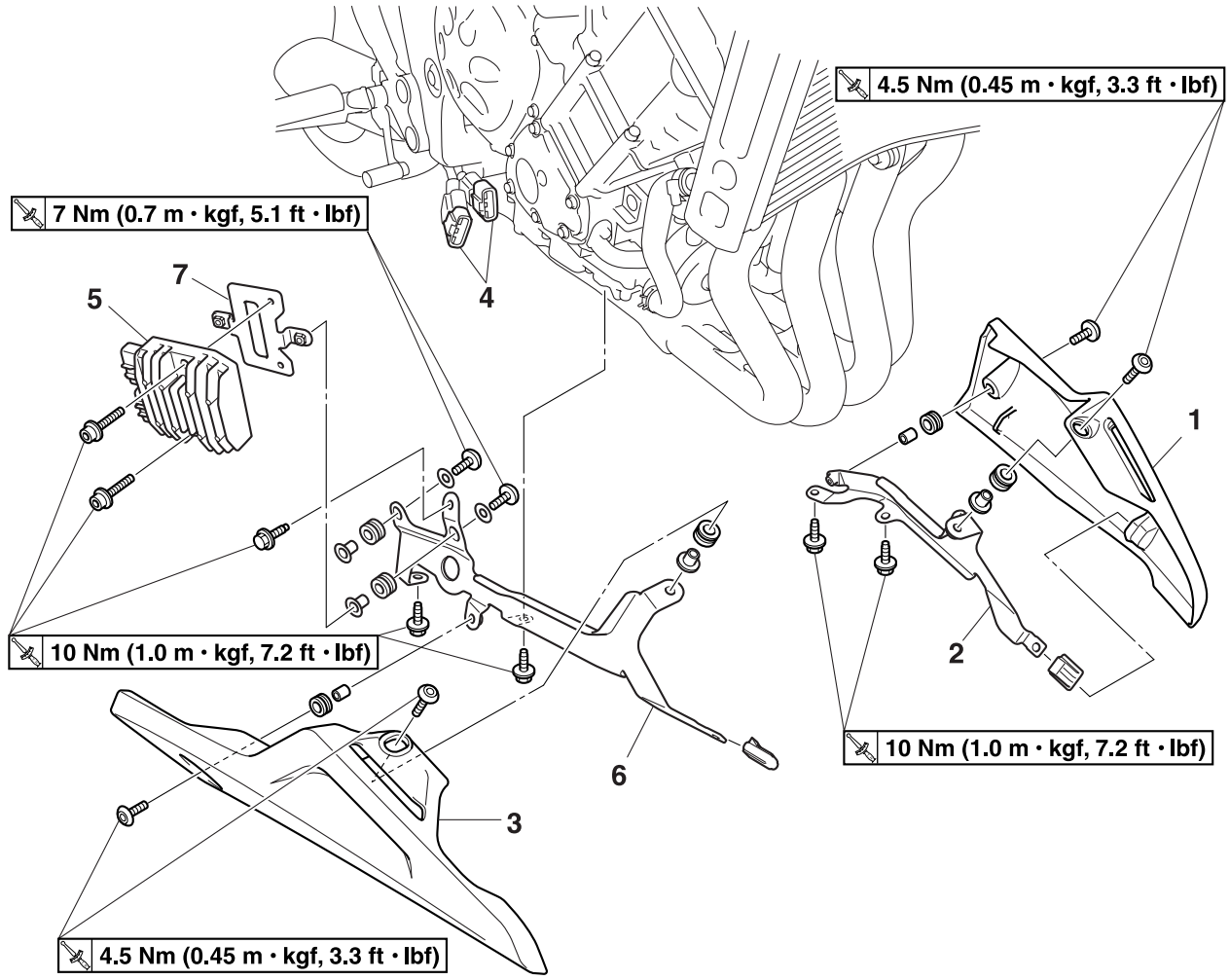
Order	Job/Parts to remove	Q'ty	Remarks
1	Right inner panel	1	
2	Left inner panel	1	
3	Headlight sub-wire harness coupler	2	Disconnect.
4	Left turn signal light lead connector	2	Disconnect.
5	Right turn signal light lead connector	2	Disconnect.
6	Left side panel	1	
7	Right side panel	1	
8	Front cowling assembly	1	
9	Front cowling bracket	2	
			For installation, reverse the removal procedure.

Disassembling the front cowling assembly (FZ8SA)



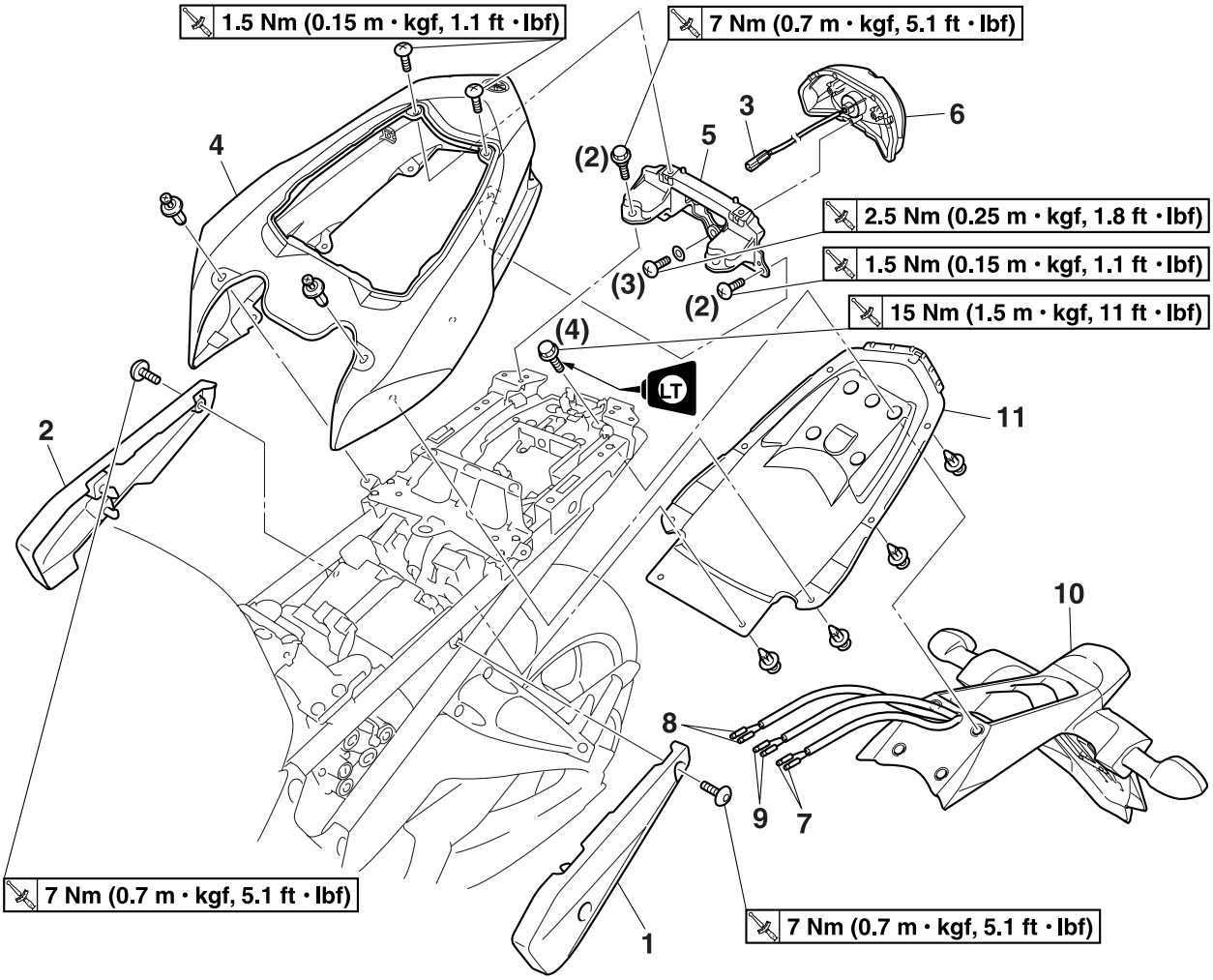
Order	Job/Parts to remove	Q'ty	Remarks
1	Inner panel bracket	2	
2	Front cowling side panel	2	
3	Windshield	1	
4	Rear view mirror	2	
5	Auxiliary light lead coupler	2	Disconnect.
6	Ground lead	1	Disconnect.
7	Front cowling stay	1	
8	Meter coupler	1	Disconnect.
9	Meter assembly	1	
10	Headlight coupler	2	Disconnect.
11	Headlight assembly	1	
12	Headlight sub-wire harness	1	
13	Front cowling	1	
14	Front cowling trim	2	
			For assembly, reverse the disassembly procedure.

Removing the under cowling



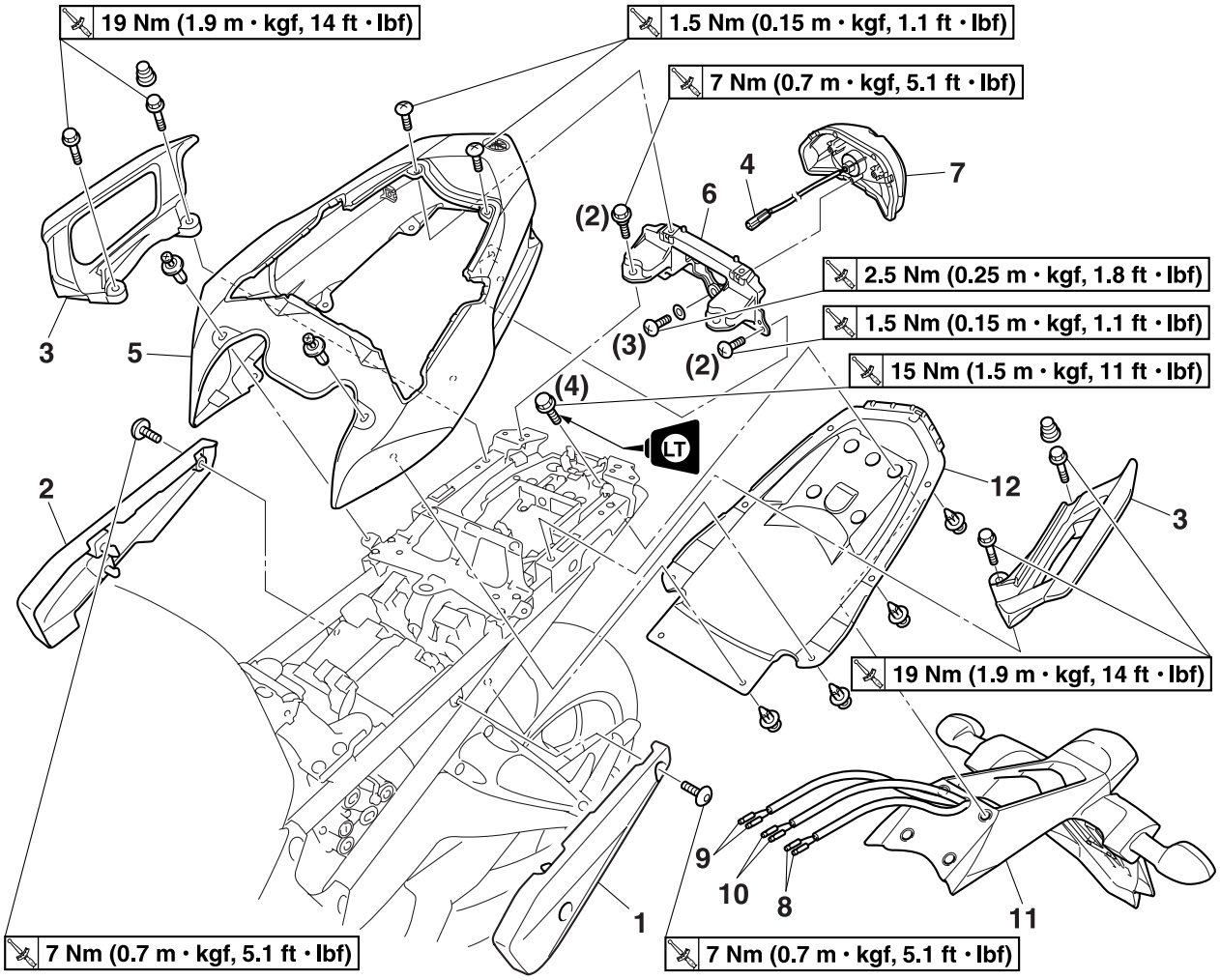
Order	Job/Parts to remove	Q'ty	Remarks
1	Left bottom cowling	1	
2	Left bottom cowling bracket	1	
3	Right bottom cowling	1	
4	Rectifier/regulator coupler	1	Disconnect.
5	Rectifier/regulator	1	
6	Right bottom cowling bracket	1	
7	Rectifier/regulator bracket	1	
			For installation, reverse the removal procedure.

Removing the rear cover (FZ8NA)



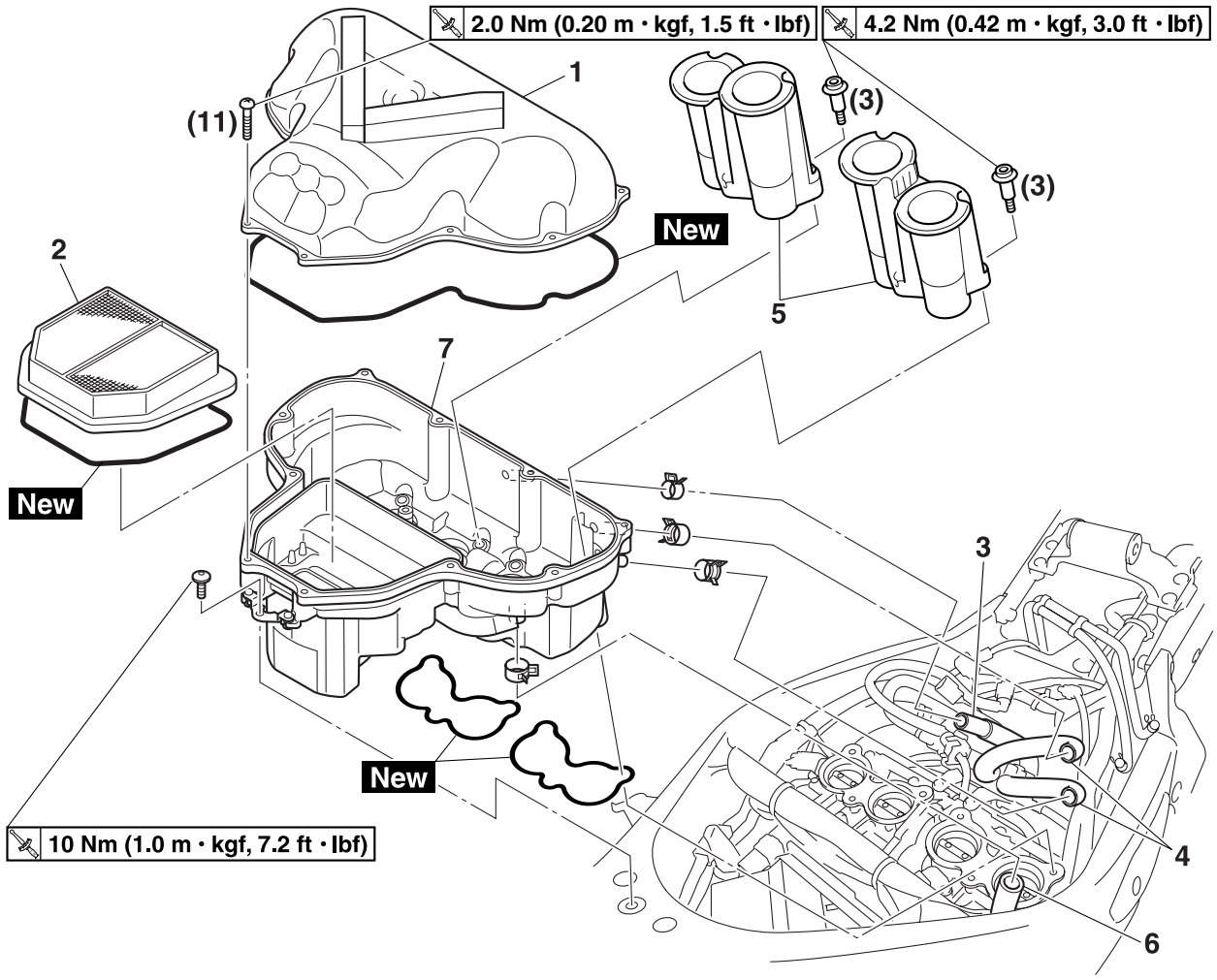
Order	Job/Parts to remove	Q'ty	Remarks
	Passenger seat/rider seat		Refer to "GENERAL CHASSIS" on page 4-1.
1	Left side cover	1	
2	Right side cover	1	
3	Tail/brake light lead coupler	1	Disconnect.
4	Upper tail cover	1	
5	Tail/brake light bracket	1	
6	Tail/brake light assembly	1	
7	Left turn signal light lead connector	2	Disconnect.
8	Right turn signal light lead connector	2	Disconnect.
9	License plate light lead connector	2	Disconnect.
10	Mud guard assembly	1	
11	Lower tail cover	1	
			For installation, reverse the removal procedure.

Removing the rear cover (FZ8SA)



Order	Job/Parts to remove	Q'ty	Remarks
	Passenger seat/rider seat		Refer to "GENERAL CHASSIS" on page 4-1.
1	Left side cover	1	
2	Right side cover	1	
3	Assist grip	2	
4	Tail/brake light lead coupler	1	Disconnect.
5	Upper tail cover	1	
6	Tail/brake light bracket	1	
7	Tail/brake light assembly	1	
8	Left turn signal light lead connector	2	Disconnect.
9	Right turn signal light lead connector	2	Disconnect.
10	License plate light lead connector	2	Disconnect.
11	Mud guard assembly	1	
12	Lower tail cover	1	
			For installation, reverse the removal procedure.

Removing the air filter case



Order	Job/Parts to remove	Q'ty	Remarks
	Rider seat		Refer to "GENERAL CHASSIS" on page 4-1.
	Inner panel/side panel/front cowling side panel		FZ8SA Refer to "GENERAL CHASSIS" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
1	Air filter case cover	1	
2	Air filter	1	
3	Crankcase breather hose	1	Disconnect.
4	Throttle body hose	2	Disconnect.
5	Funnel	2	
6	Air induction system hose	1	Disconnect.
7	Air filter case	1	
			For installation, reverse the removal procedure.

EAS39P1404
REMOVING THE INNER PANEL (FZ8SA)

1. Remove:
   • Inner panel “1”

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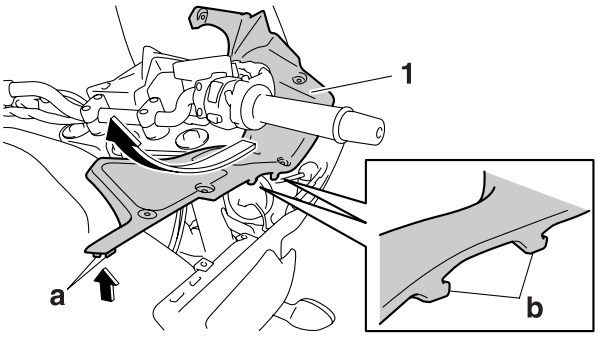
a. First remove the right inner panel, and then remove the left inner panel.
b. Remove the quick fastener and the bolts.
c. Slightly lift the rear of the inner panel and then disengage projections “a”.
d. Disengage projections “b”, sliding the inner panel obliquely backward as shown in the illustration, and then remove the inner panel.



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EAS39P1405
INSTALLING THE INNER PANEL (FZ8SA)

1. Install:
   • Inner panel

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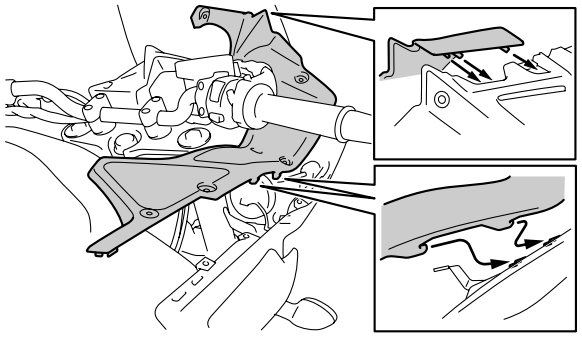
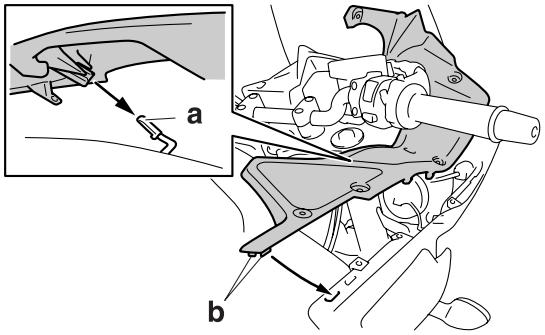
a. First install the left inner panel, and then install the right inner panel.
b. Align the projections of the inner panel with the slots of the front cowling and then slide the panel forward.



c. Fit inner panel bracket “a” into the slot of the inner panel so that the bracket is securely inserted to the stop position.
d. Press the rear of the inner panel downward to engage projections “b”.



e. Install the quick fastener and bolts.

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EAS39P1406
REMOVING THE SIDE PANEL (FZ8SA)

1. Remove:
   • Side panel “1”

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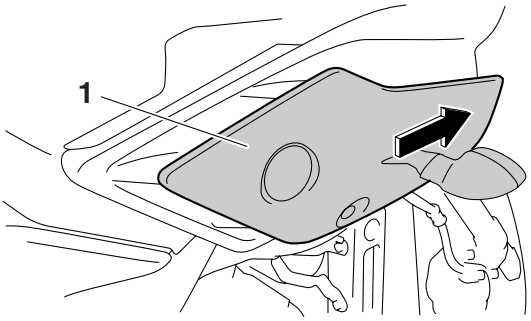
a. Remove the inner panel.
b. Remove the turn signal light lead from the clump, and then disconnect the turn signal light lead connectors.
c. Remove the quick fastener and the bolt, and then slide the panel forward to remove it.



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EAS39P1407
INSTALLING THE SIDE PANEL (FZ8SA)

1. Install:
   • Side panel

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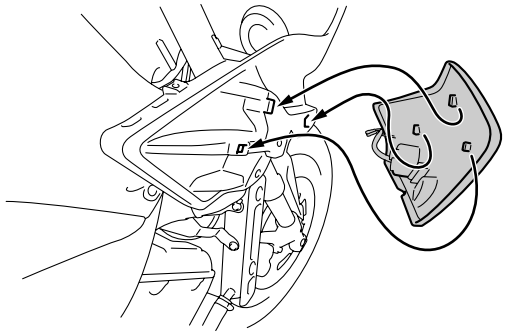
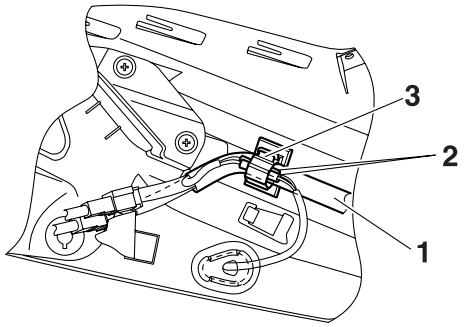
a. Fit the projections on the panel into the slots and slide it backward.



b. Install the quick fastener and bolt.
c. Connect the turn signal light connectors.
d. Fasten headlight sub-wire harness “1” and left turn signal light lead connector “2” at clamp “3” inside of the front cowling. Make sure to fasten the left turn signal lead connector at the center.



e. Install the inner panel.

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EAS39P1408
REMOVING THE FRONT COWLING SIDE PANEL (FZ8SA)

1. Remove:
   • Front cowling side panel “1”

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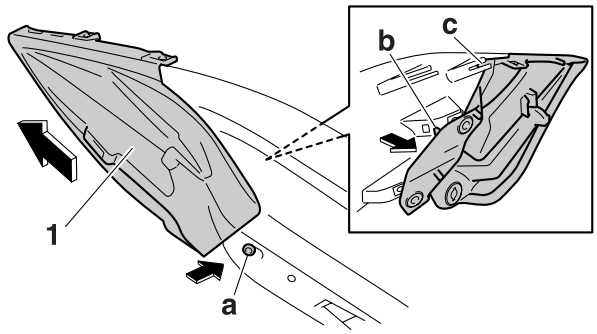
a. Remove the side panel and the inner panel bracket.
b. Disengage projections “a” and “b”, sliding the front of the front cowling side panel slightly inward.

TIP
Be careful not to damage projection “c” of the front cowling side panel.

c. Remove the front cowling side panel, sliding it rearward.



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EAS39P1409
INSTALLING THE FRONT COWLING SIDE PANEL (FZ8SA)

1. Install:
   • Front cowling side panel

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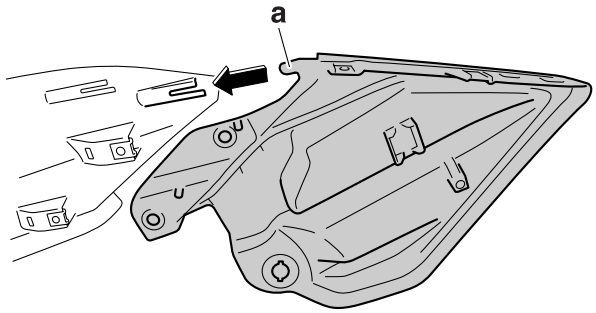
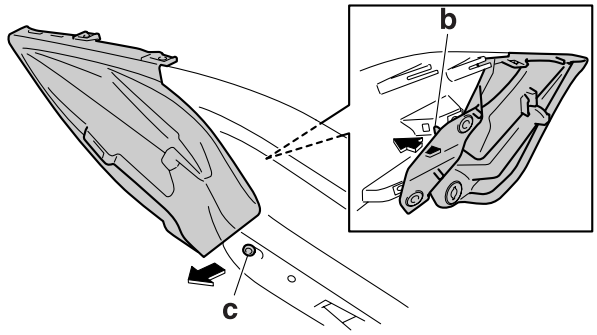
a. Insert projection “a” of the front cowling side panel into the slot of the front cowling.



b. Engage projections “b” and “c” of the front cowling side panel with the front cowling.



c. Install the inner panel bracket.

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EAS39P1410
INSTALLING THE HEADLIGHT ASSEMBLY (FZ8SA)

1. Install:
   • Headlight assembly

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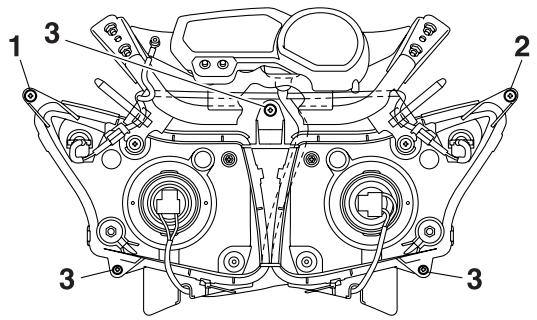
a. Temporarily tighten the screw “1”.
b. Tighten the screw “2”.
c. Tighten the screw “1”.
d. Tighten the screws “3” not specified can be in any order.



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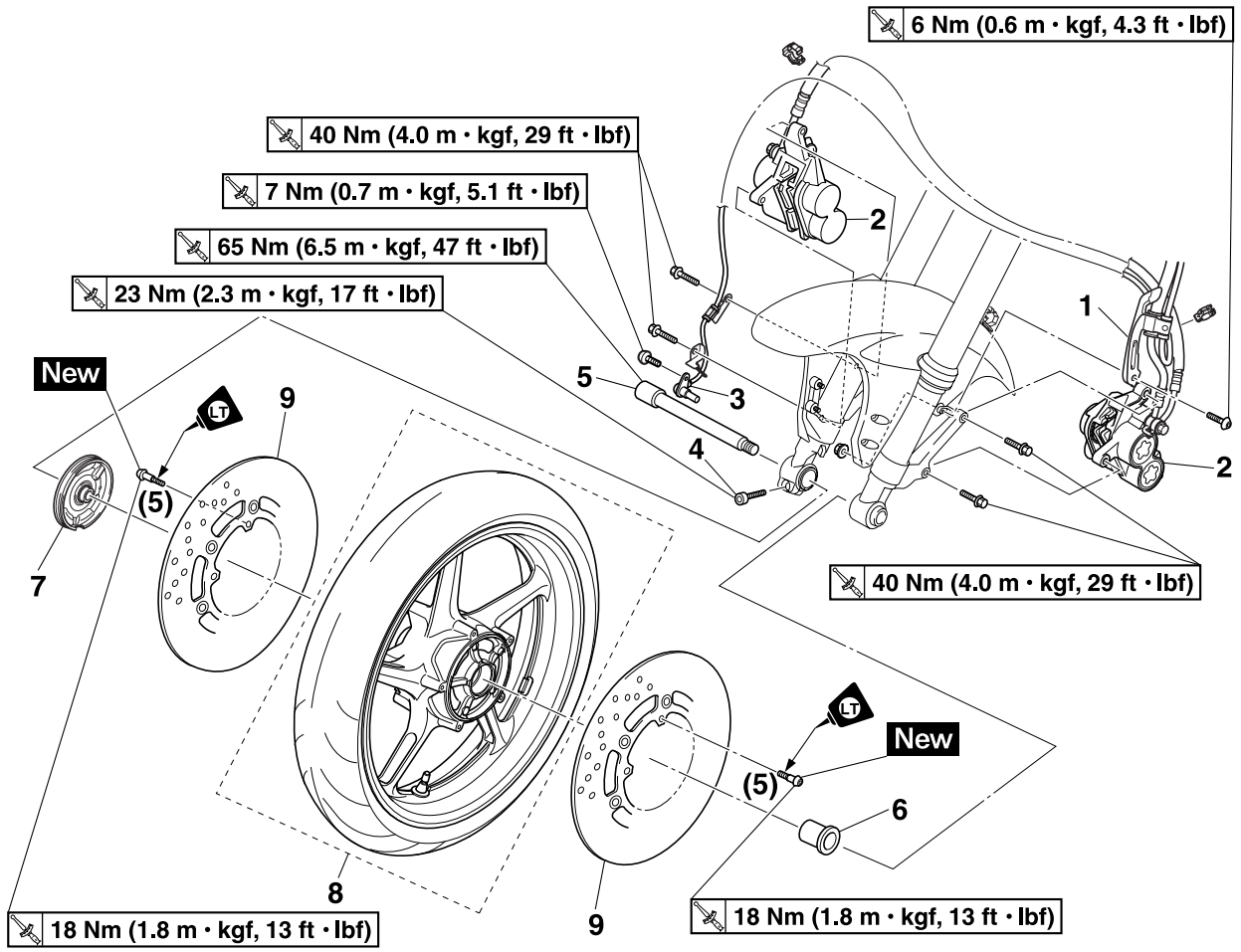
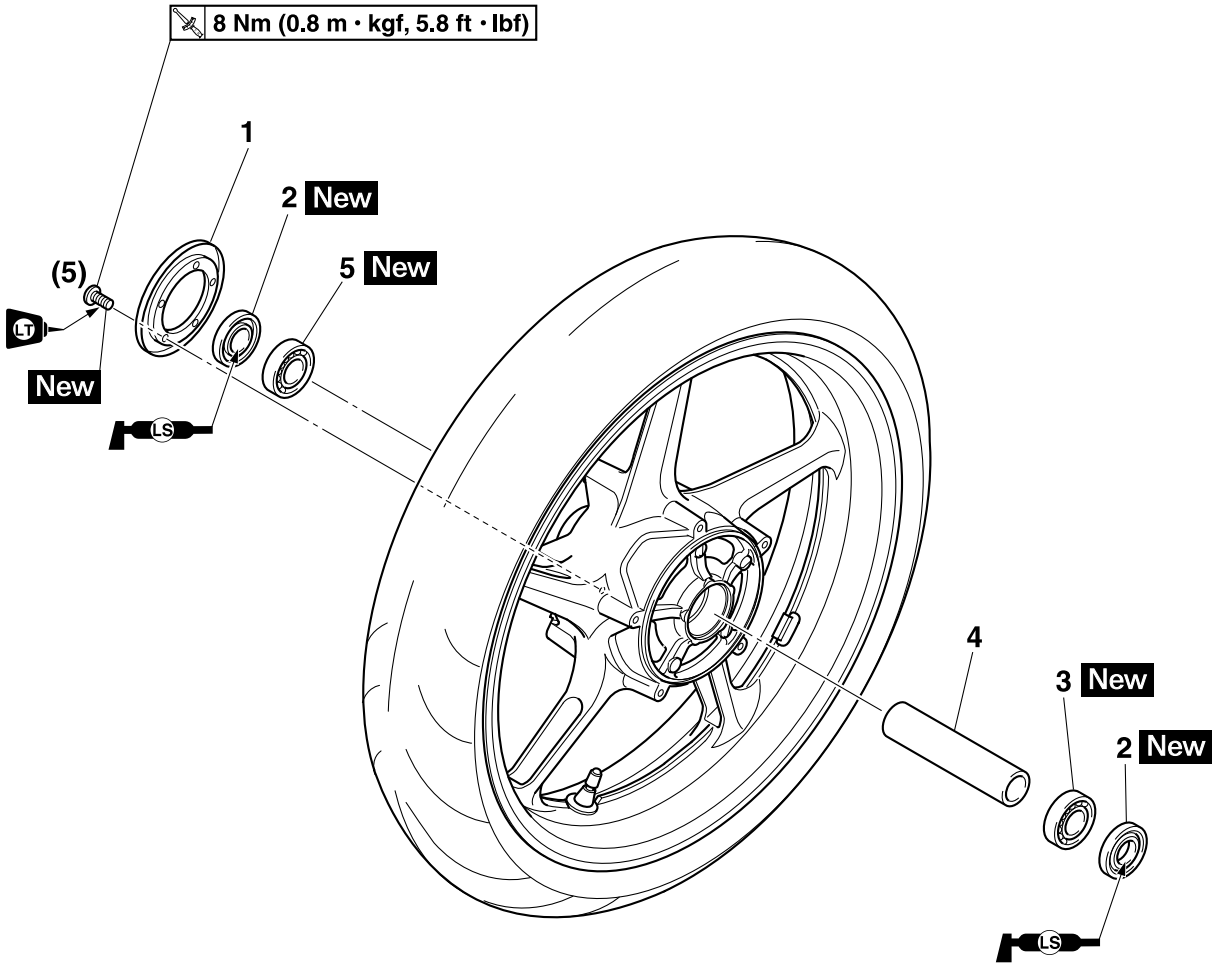
EAS21870
FRONT WHEEL

Removing the front wheel and brake discs



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

Disassembling the front wheel



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

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.

2. Remove:
   - Left brake caliper
   - Right brake caliper
   - Front wheel sensor

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

3. Elevate:
   - Front wheel

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

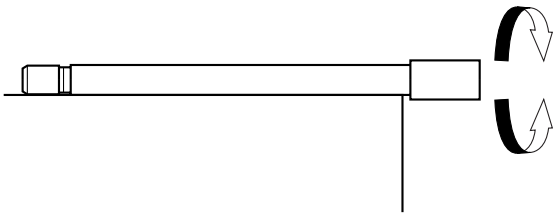
4. Loosen:
   - Wheel axle pinch bolt
5. Remove:
   - Wheel axle
   - Front wheel

EAS21922
CHECKING THE FRONT WHEEL

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

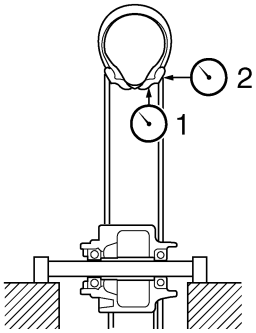
EWA13460
⚠ WARNING

Do not attempt to straighten a bent wheel axle.

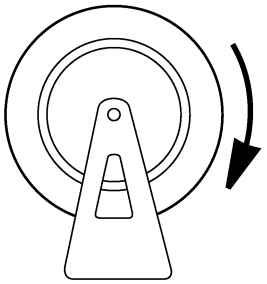


2. Check:
   - Tire
   - Front wheel
     Damage/wear → Replace.
     Refer to "CHECKING THE TIRES" on page 3-18 and "CHECKING THE WHEELS" on page 3-18.
3. Measure:
   - Radial wheel runout "1"
   - Lateral wheel runout "2"
     Over the specified limits → Replace.

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 seal
     Damage/wear → Replace.



EAS21910
DISASSEMBLING THE FRONT WHEEL

1. Remove:
   - Oil seals
   - Wheel bearings

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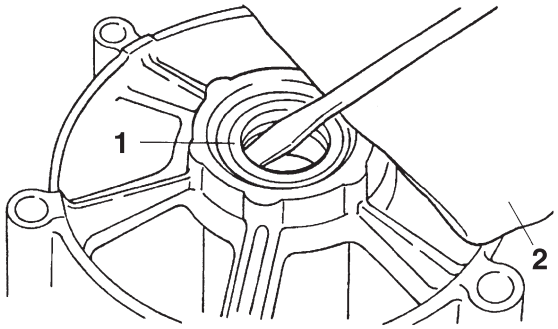
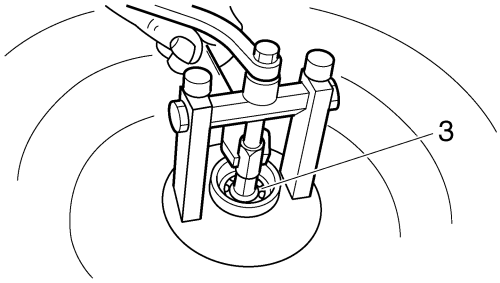
a. Clean the surface of the front wheel hub.
b. Remove the oil seals "1" with a flat-head screwdriver.

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.



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EAS21960
ASSEMBLING THE FRONT WHEEL

1. Install:
   - Wheel bearings New
   - Oil seals New

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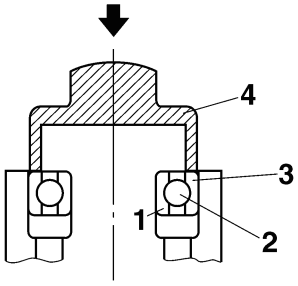
a. Install the new wheel bearing (right side).

ECA2S31011
NOTICE

Do not contact the wheel bearing inner race “1” or balls “2”. Contact should be made only with the outer race “3”.

TIP

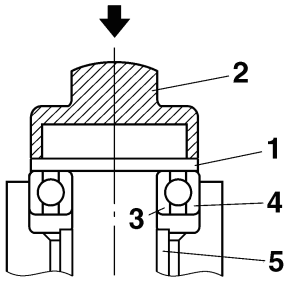
Use a socket “4” that matches the diameter of the wheel bearing outer race.



b. Install the spacer.
c. Install the new wheel bearing (left side).

TIP

Place a suitable washer “1” between the socket “2” and the bearing so that both the inner race “3” and outer race “4” are pressed at the same time, and then press the bearing until the inner race makes contact with the spacer “5”.



d. Install the new oil seals.

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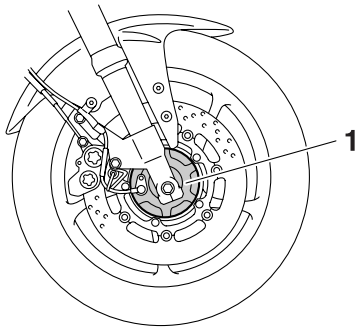
EAS22010
MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR

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.



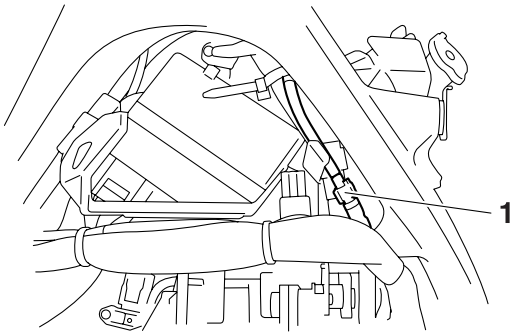
ECA14450
NOTICE

- **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”

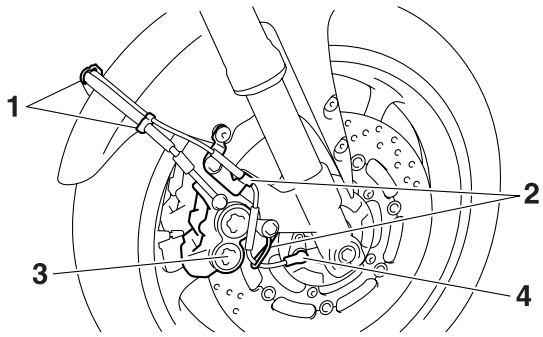


2. Remove:
   • Clamps “1”
   • Front wheel sensor lead holders “2”
   • Brake caliper “3”
   • Front wheel sensor “4”
   • Front wheel
   Refer to “REMOVING THE FRONT WHEEL” on page 4-14.

ECA4S81011

NOTICE

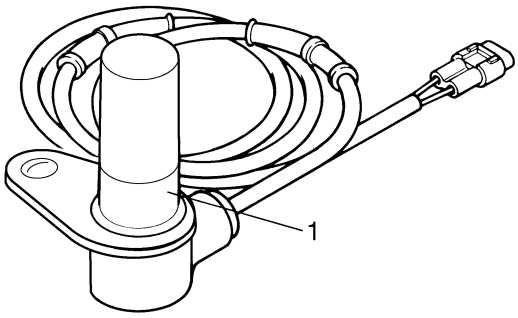
• Be sure not to contact the sensor electrode to any metal part when removing the front wheel sensor from the sensor housing.
• Do not operate the brake lever when removing the brake caliper.



3. Remove:
   • Front wheel sensor rotor

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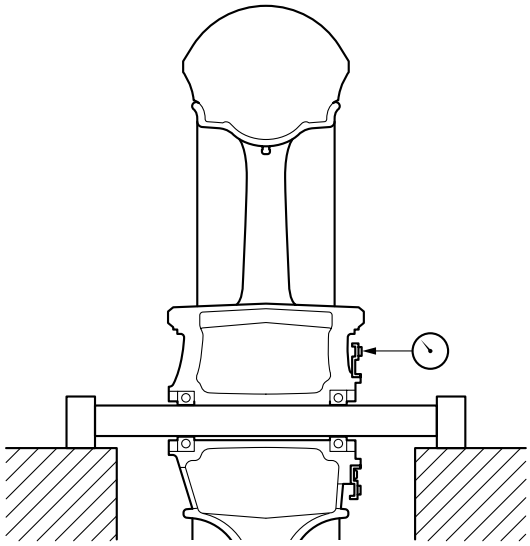
a. Hold the dial gauge at a right angle against the wheel sensor rotor surface.
b. Measure the wheel sensor rotor deflection.

TIP

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



c. If the deflection is above specification, replace the wheel sensor.

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
     Refer to "INSTALLING THE FRONT WHEEL (FRONT BRAKE DISCS)" on page 4-19.

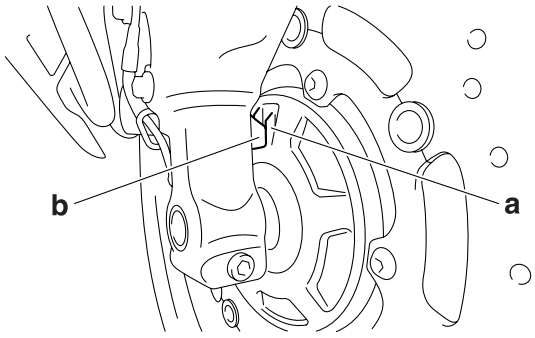
ECA14470

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 "a" in the sensor housing with the projection "b" of the front fork before assembly.



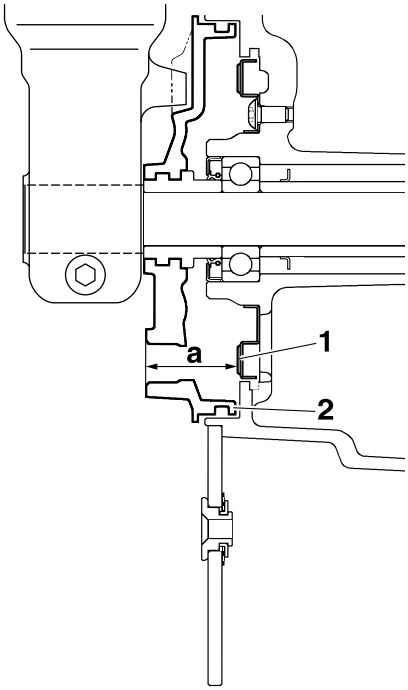
2. Measure:

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)
29.53–30.25 mm (1.16–1.19 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 holders "3"

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

- Clamps "4"

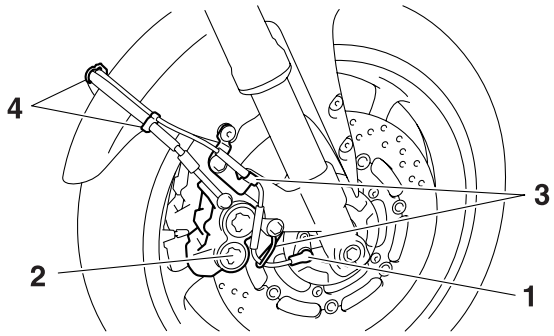
ECA14480

NOTICE

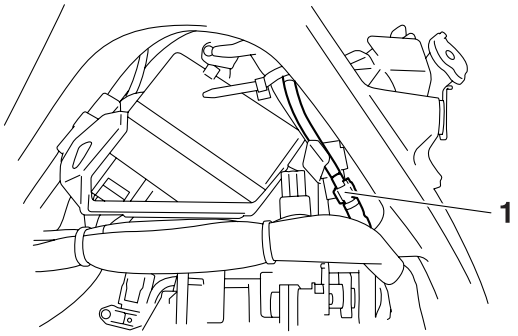
To route the front wheel sensor lead, refer to "CABLE ROUTING" on page 2-43.

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.

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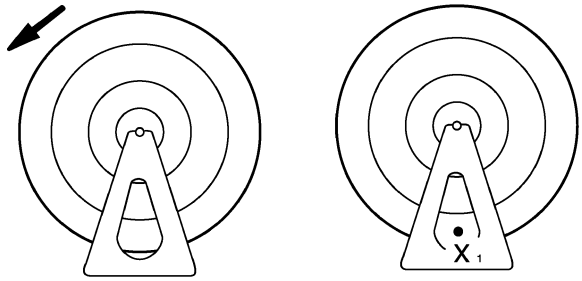
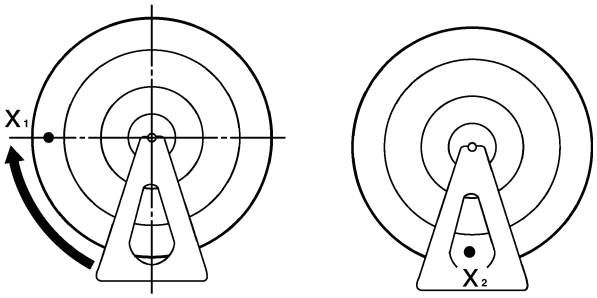
a. Spin the front wheel.
b. When the front wheel stops, put an “X_1” mark at the bottom of the wheel.



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 (c) through (e) 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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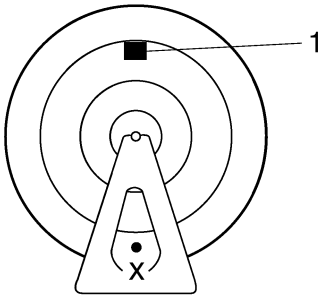
3. Adjust:
   • Front wheel static balance

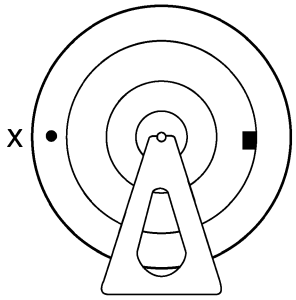
▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼

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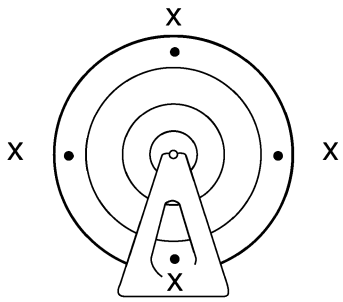
a. Turn the front wheel and make sure it stays at each position shown.



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

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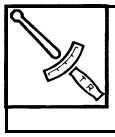
EAS22000
INSTALLING THE FRONT WHEEL (FRONT BRAKE DISCS)

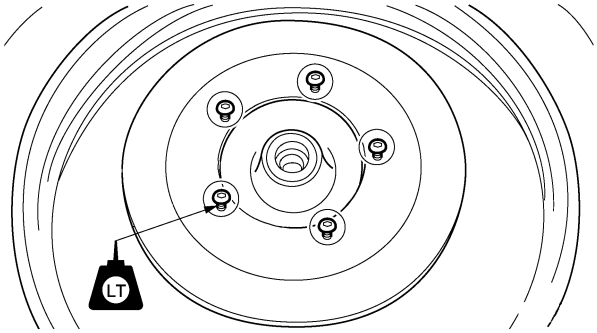
1. Install:
   • Front brake discs

	**Front brake disc bolt** **18 Nm (1.8 m·kgf, 13 ft·lbf)** **LOCTITE®**

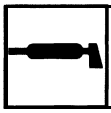
ECA1CW1401
NOTICE

Replace the brake disc bolts with new ones.

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

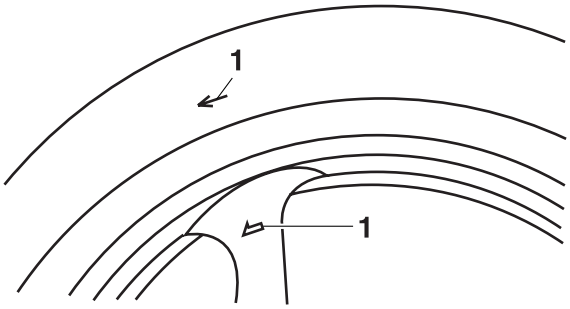


2. Check:
   • Front brake discs
   Refer to "CHECKING THE FRONT BRAKE DISCS" on page 4-35.
3. Lubricate:
   • Oil seal lips

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

4. Install:
   • Collars
   • Front wheel
   • Wheel axle

TIP
Install the tire and wheel with the marks "1" pointing in the direction of wheel rotation.



5. Tighten:
   • Wheel axle
   • Wheel axle pinch bolt

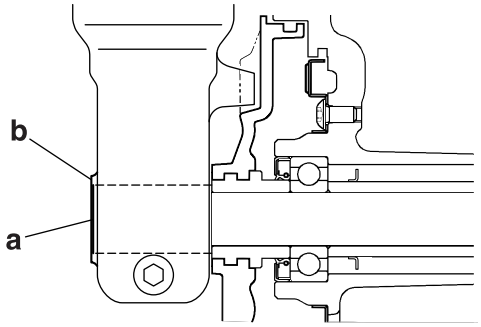
	**Wheel axle** **65 Nm (6.5 m·kgf, 47 ft·lbf)** **Wheel axle pinch bolt** **23 Nm (2.3 m·kgf, 17 ft·lbf)**

ECA39P1401
NOTICE

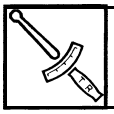
Before tightening the wheel axle, push down hard on the handlebar several times and check if the front fork rebounds smoothly.

TIP

Check that wheel axle end “a” is flush with front folk surface “b” and then tighten the wheel axle pinch bolt. If end “a” is not flush with surface “b”, align the ends manually or with a plastic hammer.



6. Install:
   - Front brake caliper

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

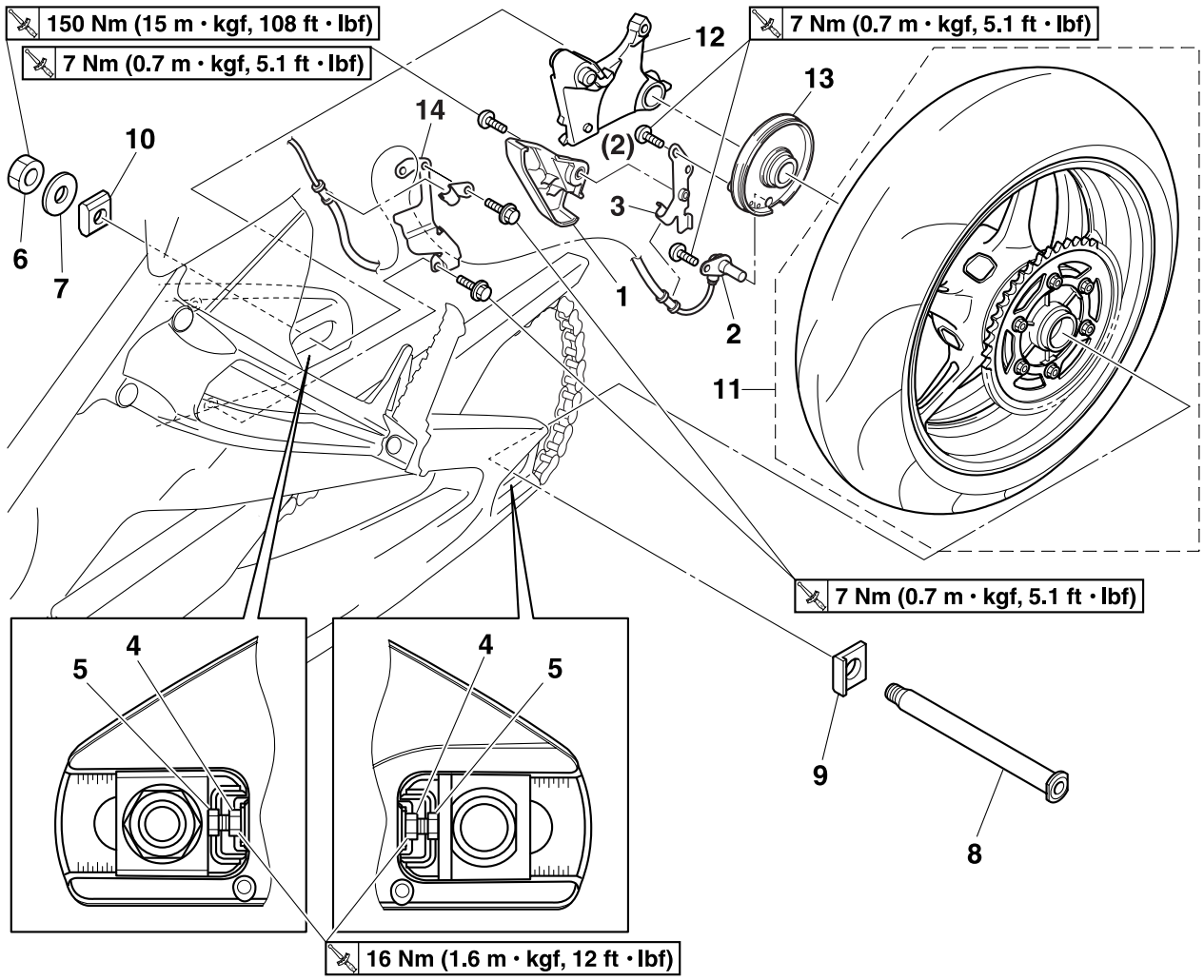
EWA13500

⚠ WARNING

Make sure the brake hose is routed properly.

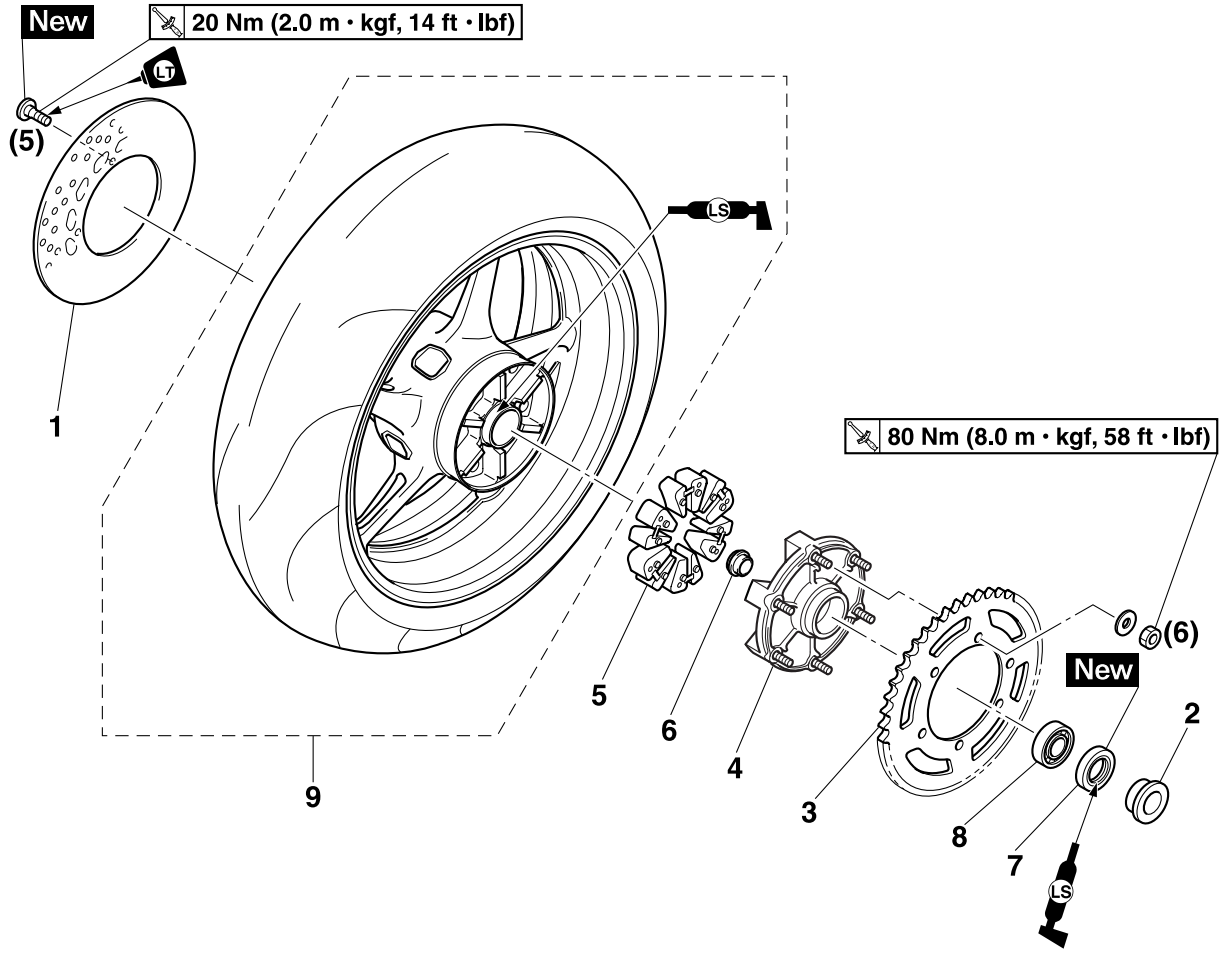
EAS22020
REAR WHEEL

Removing the rear wheel



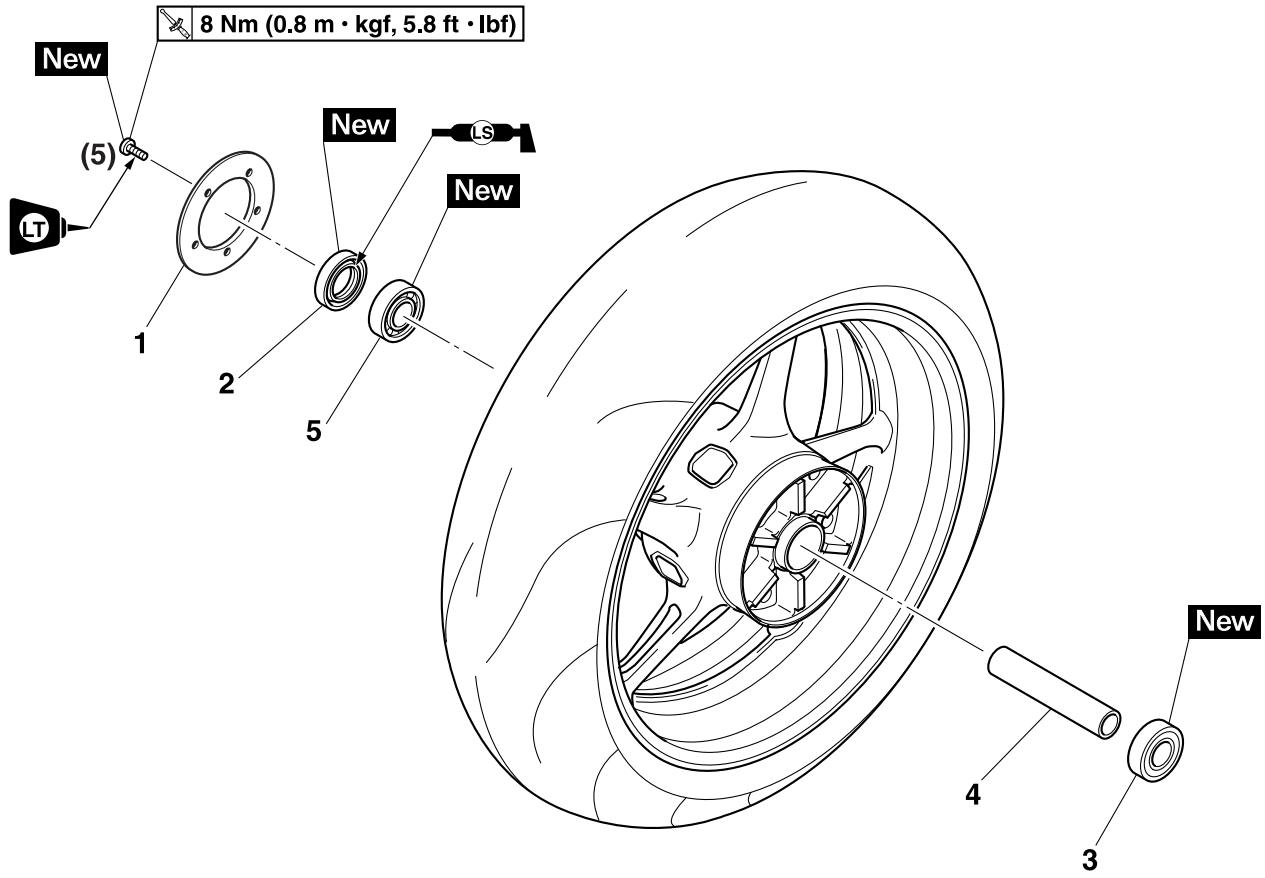
Order	Job/Parts to remove	Q'ty	Remarks
	Rear brake caliper		Refer to "REAR BRAKE" on page 4-43.
1	Rear wheel sensor protector	1	
2	Rear wheel sensor	1	
3	Rear wheel sensor bracket	1	
4	Locknut	2	Loosen.
5	Adjusting bolt	2	Loosen.
6	Wheel axle nut	1	
7	Washer	1	
8	Wheel axle	1	
9	Left adjusting block	1	
10	Right adjusting block	1	
11	Rear wheel	1	
12	Brake caliper bracket	1	
13	Rear wheel sensor housing	1	
14	Rear wheel sensor lead stay	1	
			For installation, reverse the removal procedure.

Removing the brake disc and rear wheel sprocket



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

Disassembling the rear wheel



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

EAS22040
REMOVING THE REAR WHEEL

1. Stand the vehicle on a level surface.

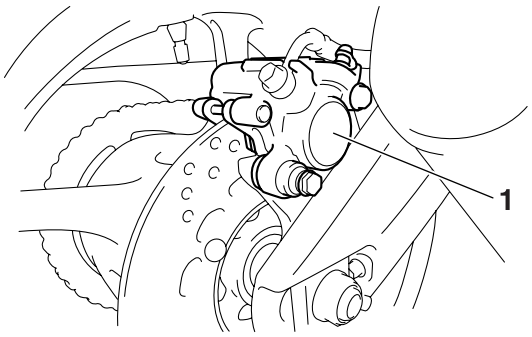
EWA13120
⚠ WARNING

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

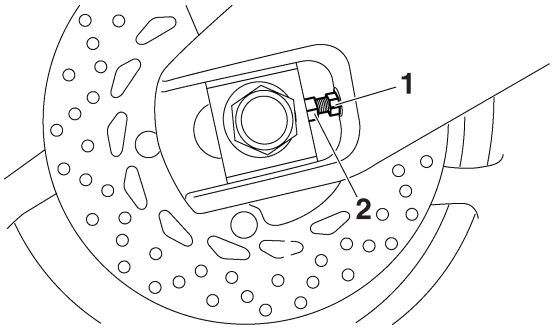
TIP
Place the vehicle on a suitable stand so that the rear wheel is elevated.

2. Remove:
   - Rear brake caliper “1”
   - Rear wheel sensor

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

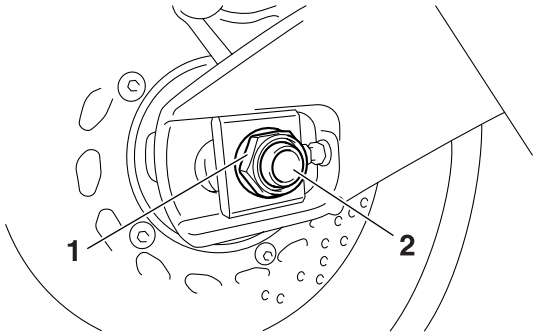


3. Loosen:
   - Locknuts “1”
   - Adjusting bolts “2”



4. Remove:
   - Wheel axle nut “1”
   - Washer
   - Wheel axle “2”
   - Rear wheel

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



EAS22091
CHECKING THE REAR WHEEL

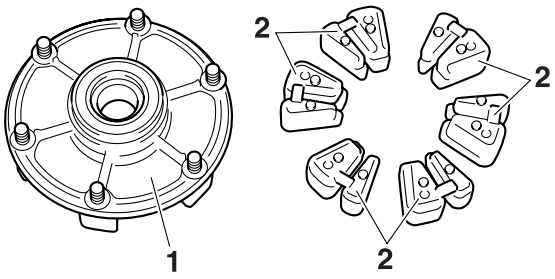
1. Check:
   - Wheel axle
   - Wheel bearings
   - Oil seals
   Refer to “CHECKING THE FRONT WHEEL” on page 4-14.
2. Check:
   - Tire
   - Rear wheel
   Damage/wear → Replace.
   Refer to “CHECKING THE TIRES” on page 3-18 and “CHECKING THE WHEELS” on page 3-18.
3. Measure:
   - Radial wheel runout
   - Lateral wheel runout
   Refer to “CHECKING THE FRONT WHEEL” on page 4-14.

EAS22080
DISASSEMBLING THE REAR WHEEL

1. Remove:
   - Oil seal
   - Wheel bearings
   Refer to “DISASSEMBLING THE FRONT WHEEL” on page 4-14.

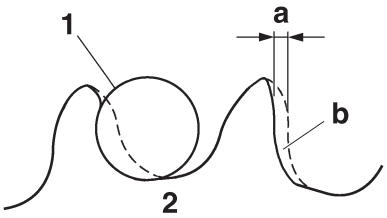
EAS22110
CHECKING THE REAR WHEEL DRIVE HUB

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



EAS14B1003
CHECKING AND REPLACING THE REAR WHEEL SPROCKET

1. Check:
   - Rear wheel sprocket
     More than 1/4 tooth "a" wear → Replace the drive chain sprockets as a set.
     Bent teeth → Replace the drive chain sprockets as a set.



b. Correct

1. Drive chain roller
2. Rear wheel sprocket

2. Replace:
   - Rear wheel sprocket

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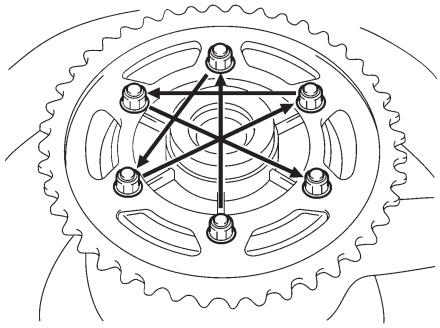
a. Remove the rear wheel sprocket nuts and the rear wheel sprocket.
b. Clean the rear wheel drive hub with a clean cloth, especially the surfaces that contact the sprocket.
c. Install the new rear wheel sprocket.

	**Rear wheel sprocket nut** **80 Nm (8.0 m·kgf, 58 ft·lbf)**

TIP
Tighten the rear wheel sprocket nuts in stages and in a crisscross pattern.



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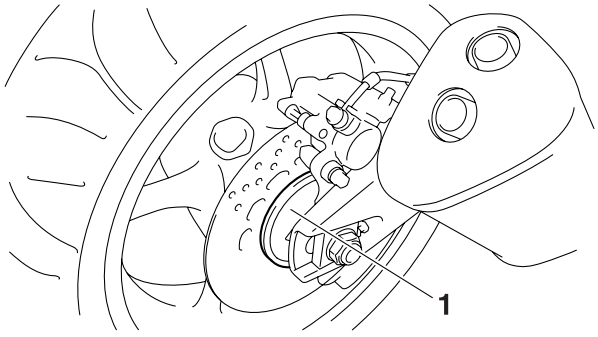
EAS22140
ASSEMBLING THE REAR WHEEL

1. Install:
   - Wheel bearings New
   - Oil seal New
     Refer to "ASSEMBLING THE FRONT WHEEL" on page 4-15.

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.

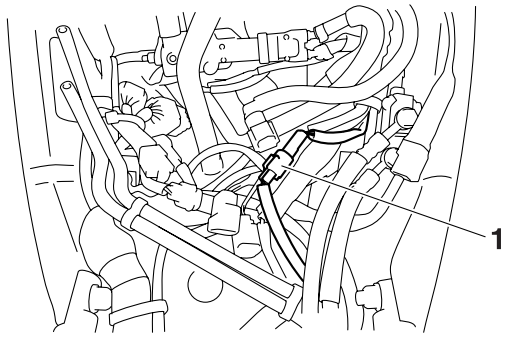


ECA14450
NOTICE

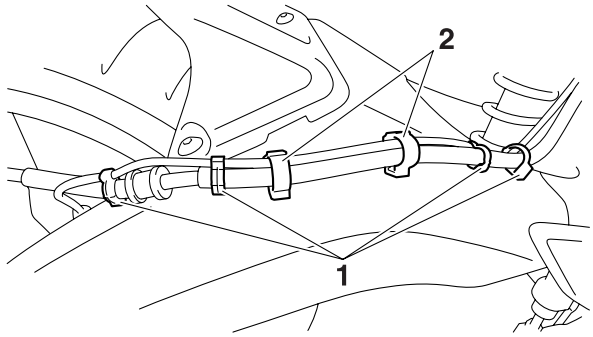
- **Handle the ABS components with care since they have been accurately adjusted. Keep them away from dirt and do not subject them to shocks.**
- **The ABS wheel sensor cannot be disassembled. Do not attempt to disassemble it. If faulty, replace with a new one.**

Removing the rear wheel sensor

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



2. Remove:
   - Clamps “1”
   - Brake hose holders “2”



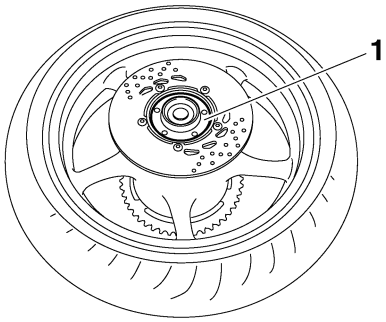
3. Remove:
   - Rear wheel sensor
   - Rear wheel
     Refer to “REMOVING THE REAR WHEEL” on page 4-24.

ECA1CW1402

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 pedal when removing the brake caliper.**

4. Remove:
   - Rear wheel sensor rotor “1”



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.
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.
     Refer to “MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR” on page 4-15.

Wheel sensor rotor deflection limit
0.15 mm (0.0059 in)

Installing the rear wheel sensor

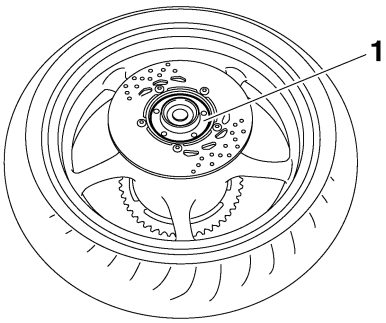
1. Install:
   - Rear wheel sensor rotor “1”

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

ECA4B56012

NOTICE

Replace the wheel sensor rotor bolts with new ones.



2. Install:
   - Rear wheel
     Refer to “INSTALLING THE REAR WHEEL (REAR BRAKE DISC)” on page 4-28.

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.

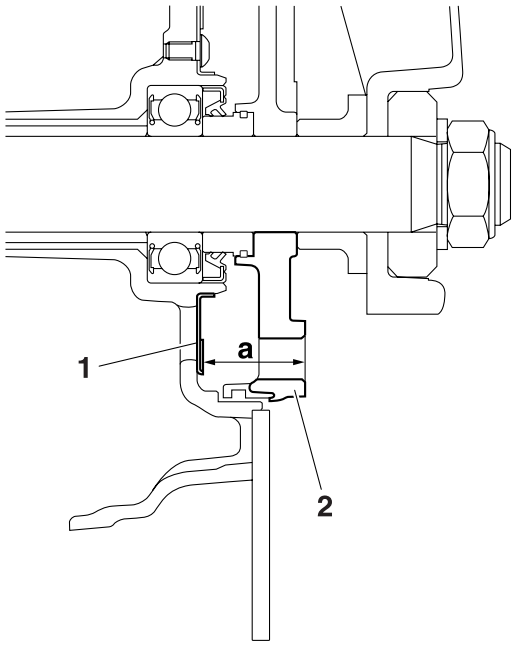
3. Measure:

TIP

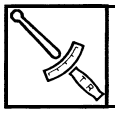
Measure the distance “a” only if the wheel bearings, wheel sensor rotor, or both were replaced.

- 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)
29.60–30.28 mm (1.17–1.19 in)



4. Install:
   - Rear wheel sensor “1”



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

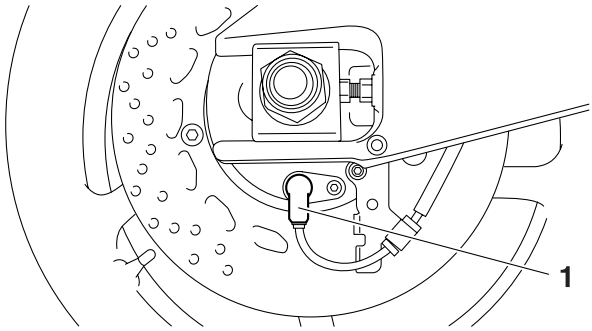
TIP

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

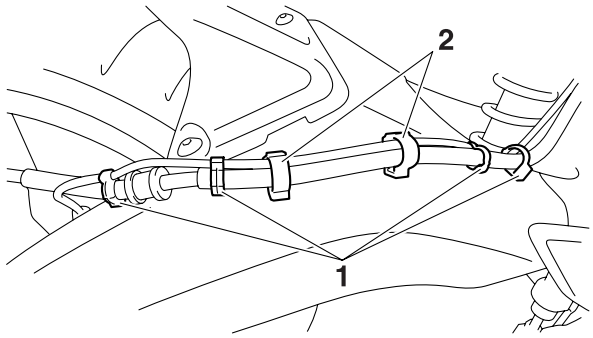
ECA14500

NOTICE

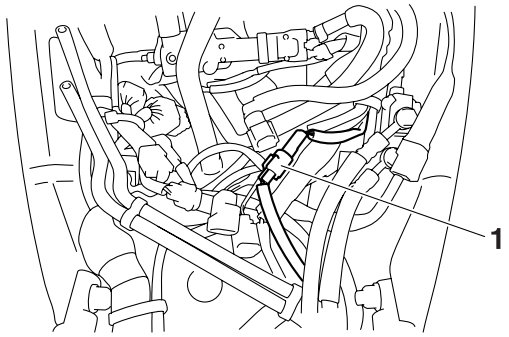
To route the rear wheel sensor lead, refer to “CABLE ROUTING” on page 2-43.



5. Install:
   - Clamps “1”
   - Brake hose holders “2”



6. Connect:
   - Rear wheel sensor coupler “1”



ECA14500

NOTICE

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

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

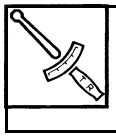
EAS22150
ADJUSTING THE REAR WHEEL STATIC BALANCE

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 4-18.

EAS22160
INSTALLING THE REAR WHEEL (REAR BRAKE DISC)

1. Install:
   - Rear brake disc

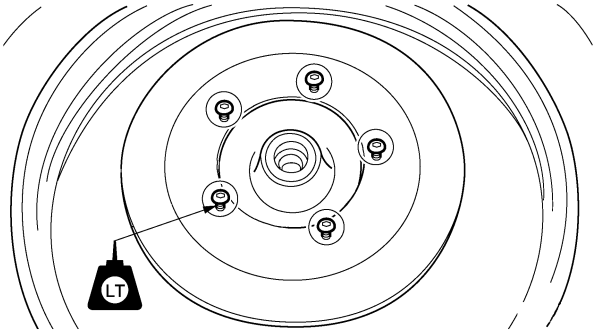


Rear brake disc bolt
20 Nm (2.0 m·kgf, 14 ft·lbf)
LOCTITE®

ECA1CW1401
NOTICE

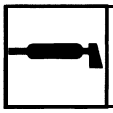
Replace the brake disc bolts with new ones.

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



2. Check:
   - Rear brake disc
     Refer to "CHECKING THE REAR BRAKE DISC" on page 4-49.

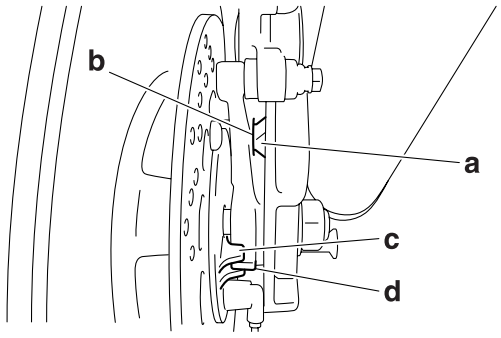
3. Lubricate:
   - Oil seal lips

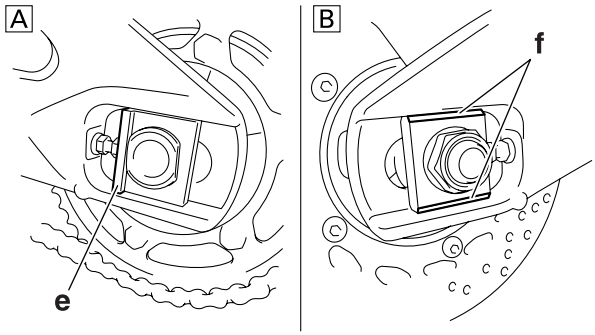


Recommended lubricant
Lithium-soap-based grease

4. Install:
   - Collar
   - Rear wheel sensor housing
   - Brake caliper bracket
   - Rear wheel
   - Adjusting blocks
   - Wheel axle
   - Washer
   - Wheel axle nut

TIP
- Do not install the brake caliper.
- Align the projection "a" in the swingarm with the slot "b" of the brake caliper bracket.
- Align the slot "c" in the rear wheel sensor housing with the projection "d" of the brake caliper bracket.
- Install the left adjusting block so that projection "e" faces to the front of the vehicle.
- Install the right adjusting block so that upper chamfer "f" faces to the top of the vehicle and lower chamfer "f" faces to the bottom of the vehicle.





A. Left side
B. Right side

5. Install:
   - Rear brake caliper
   - Rear brake caliper retaining bolts
6. Adjust:
   - Drive chain slack
     Refer to “ADJUSTING THE DRIVE CHAIN SLACK” on page 3-19.

Drive chain slack
20.0–30.0 mm (0.79–1.18 in)

7. Tighten:
   - Wheel axle nut
   - Rear brake caliper retaining bolts

Wheel axle nut
150 Nm (15 m·kgf, 108 ft·lbf)
Rear brake caliper retaining bolt (front)
27 Nm (2.7 m·kgf, 20 ft·lbf)
Rear brake caliper retaining bolt (rear)
22 Nm (2.2 m·kgf, 16 ft·lbf)
LOCTITE®

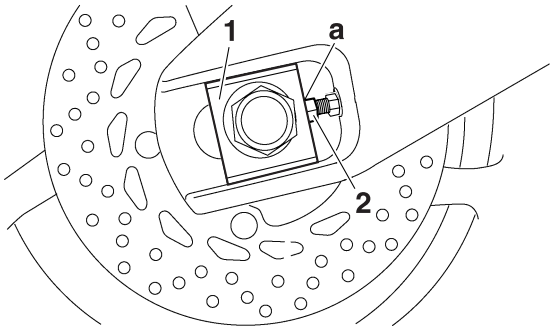
EWA13500

WARNING

Make sure the brake hose is routed properly.

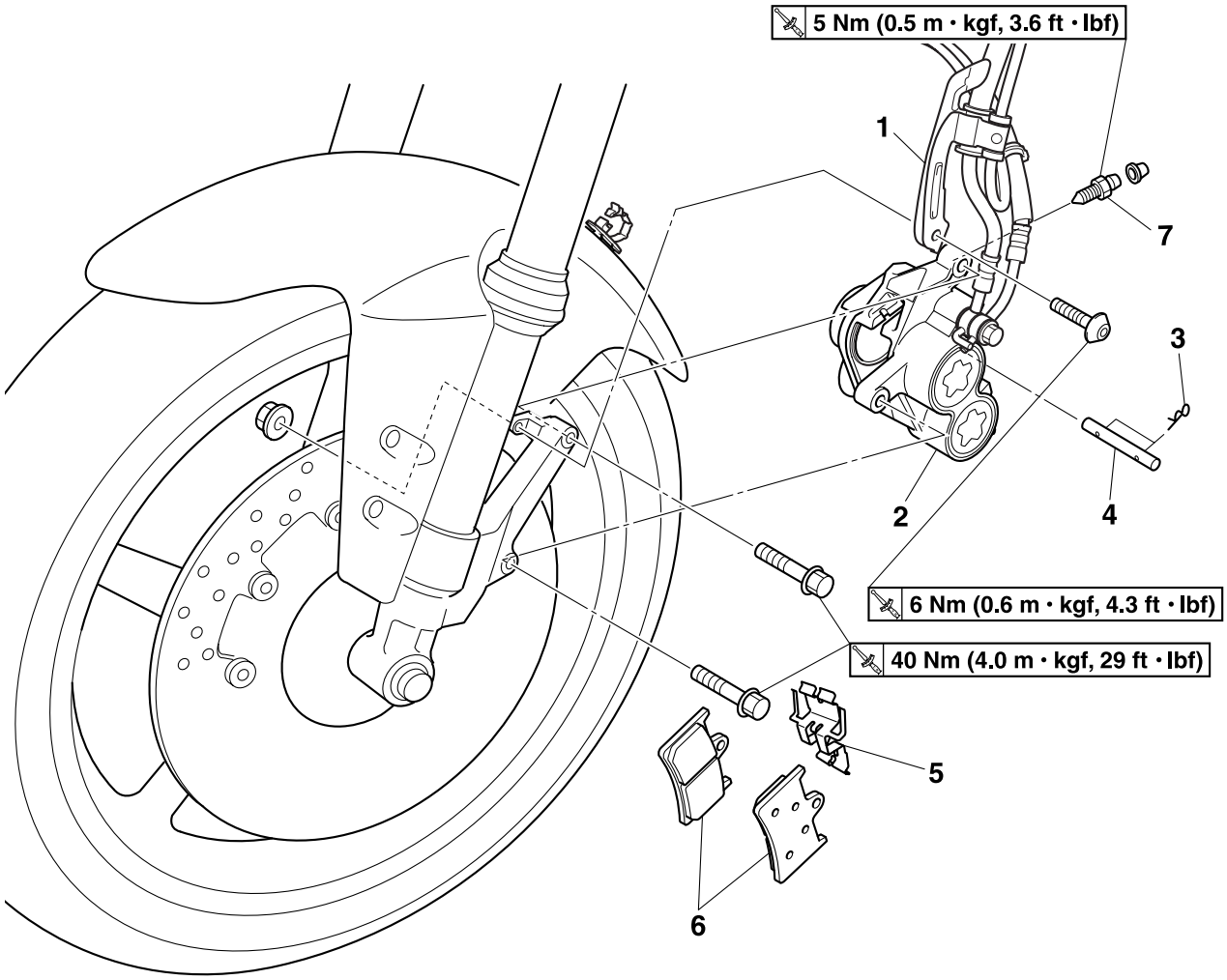
TIP

When tightening the wheel axle nut, there should be no clearance “a” between the adjusting block “1” and adjusting bolt “2”.



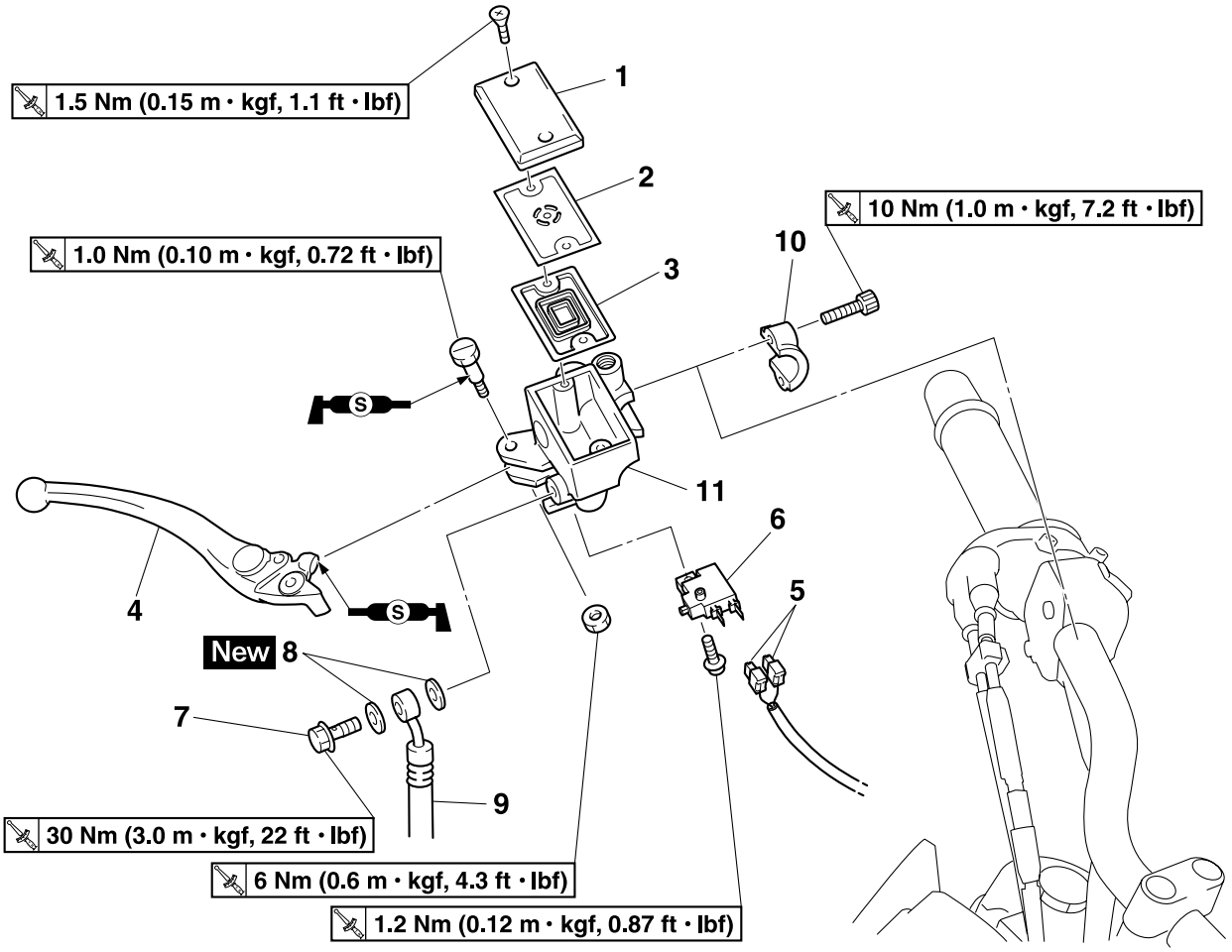
EAS22210
FRONT BRAKE

Removing the front brake pads



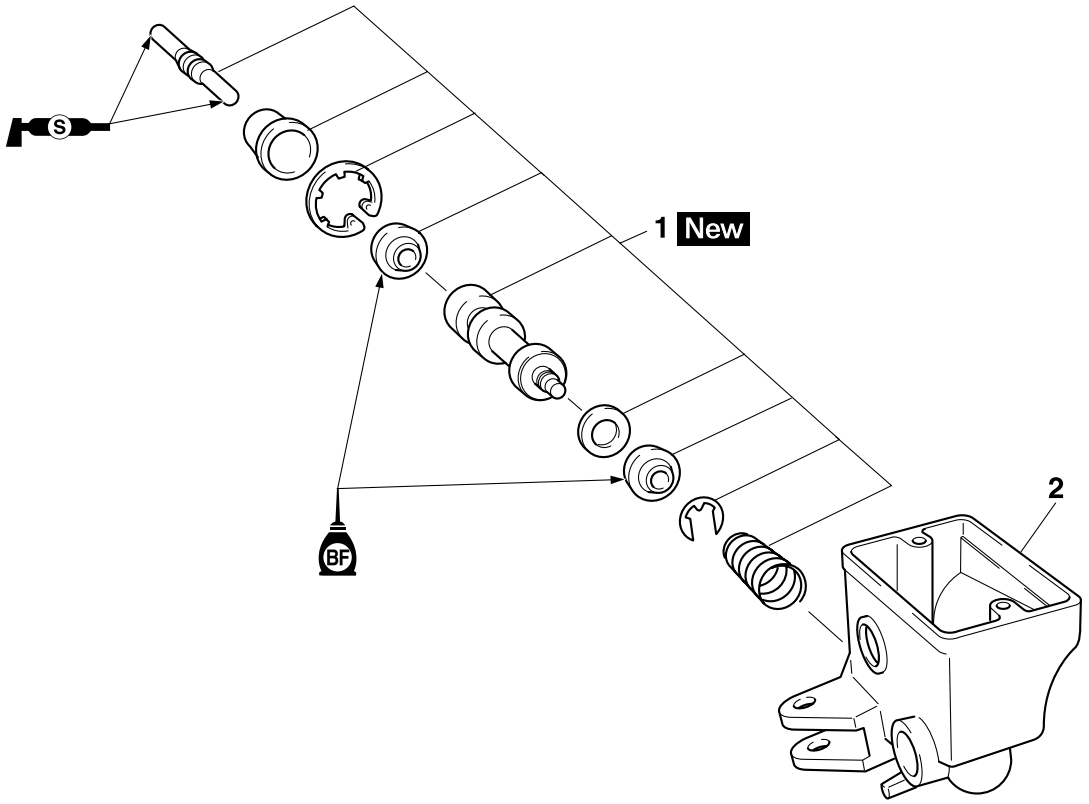
Order	Job/Parts to remove	Q'ty	Remarks
			The following procedure applies to both of the front brake calipers.
1	Brake hose holder	1	
2	Front brake caliper	1	
3	Brake pad clip	2	
4	Brake pad pin	1	
5	Brake pad spring	1	
6	Brake pad	2	
7	Bleed screw	1	
			For installation, reverse the removal procedure.

Removing the front brake master cylinder



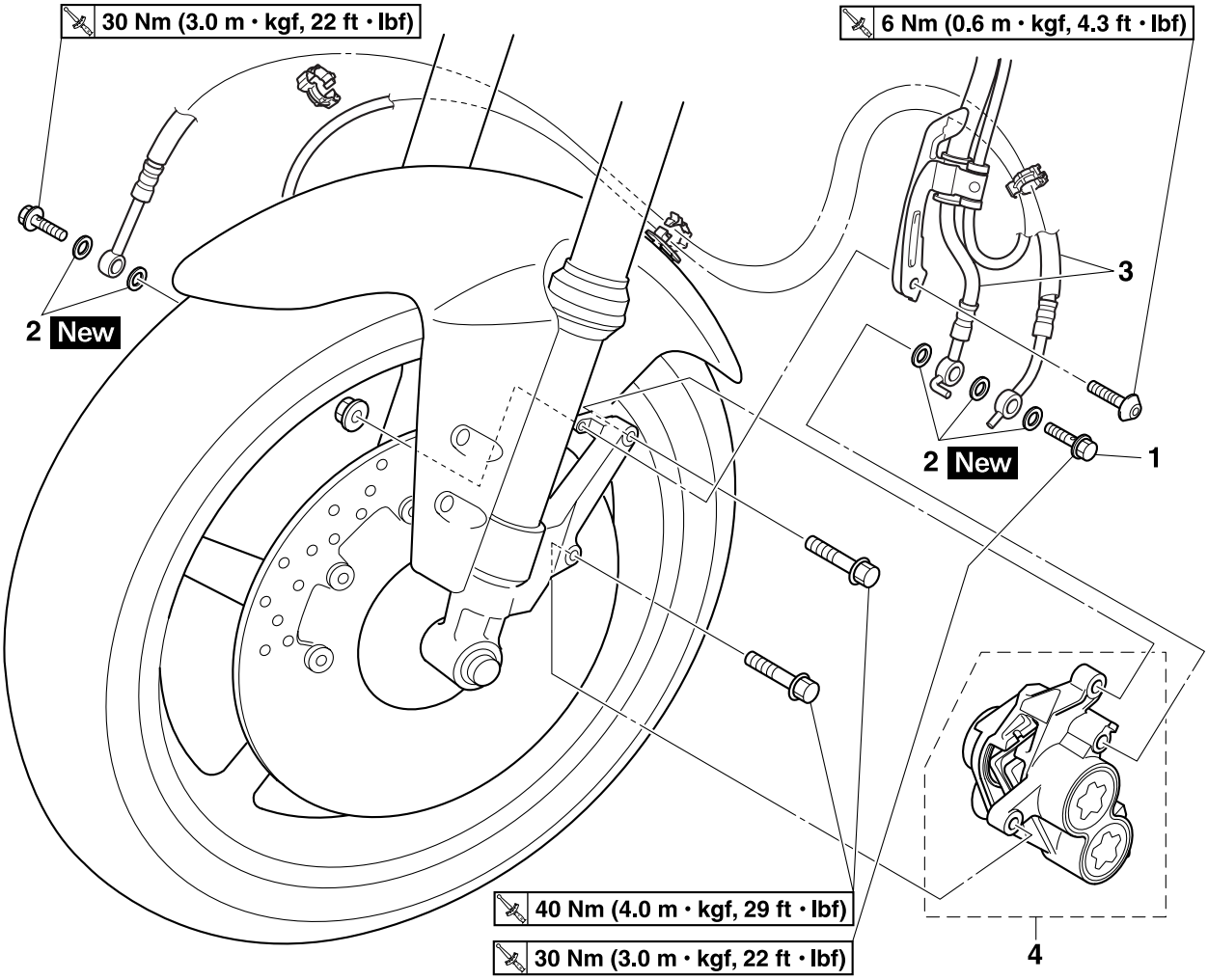
Order	Job/Parts to remove	Q'ty	Remarks
	Right rear view mirror		FZ8NA Refer to "HANDLEBAR" on page 4-64.
	Brake fluid		Drain. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-16.
1	Brake master cylinder reservoir cap	1	
2	Brake master cylinder reservoir diaphragm holder	1	
3	Brake master cylinder reservoir diaphragm	1	
4	Brake lever	1	
5	Front brake light switch lead connector	2	Disconnect.
6	Front brake light switch	1	
7	Brake hose union bolt	1	
8	Brake hose gasket	2	
9	Brake hose	1	
10	Front brake master cylinder holder	1	
11	Front brake master cylinder assembly	1	
			For assembly, reverse the disassembly procedure.

Disassembling the front brake master cylinder



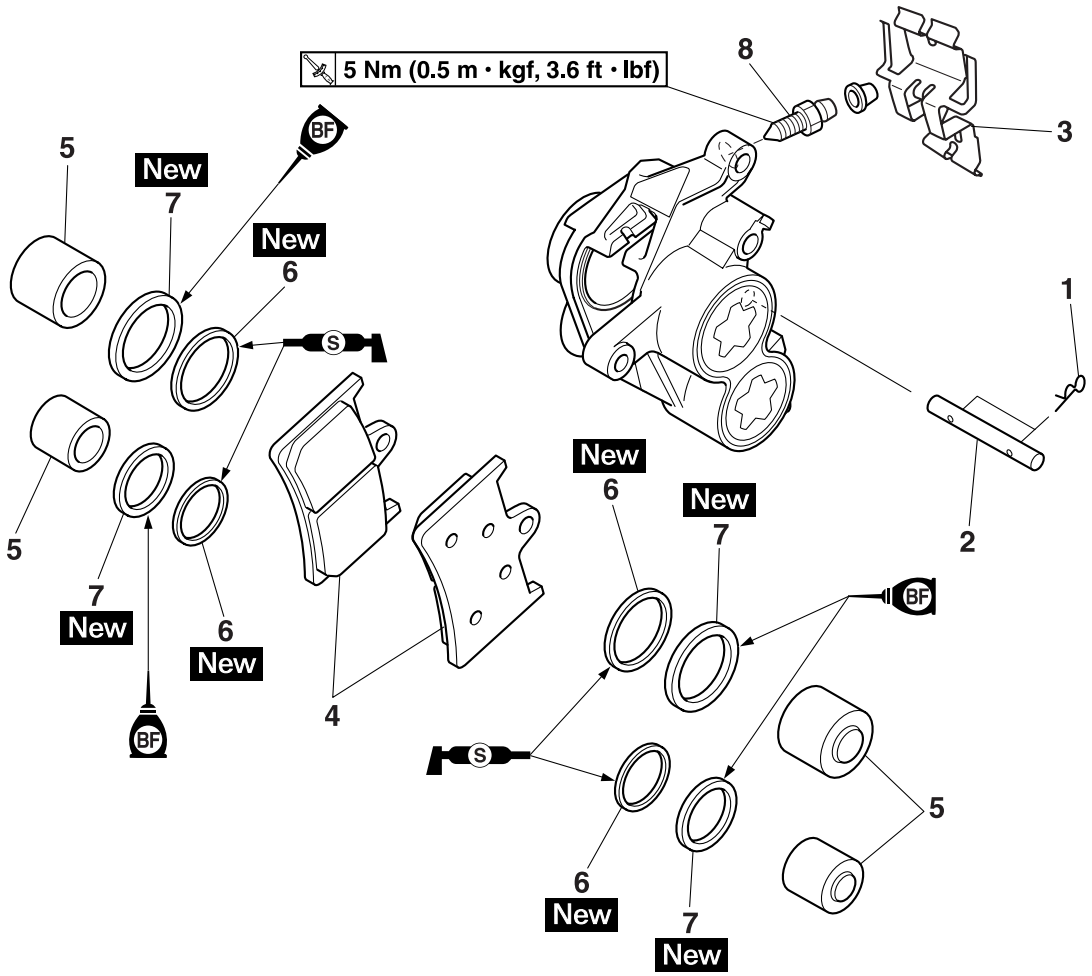
Order	Job/Parts to remove	Q'ty	Remarks
1	Brake master cylinder kit	1	
2	Brake master cylinder body	1	
			For assembly, reverse the disassembly procedure.

Removing the front brake calipers



Order	Job/Parts to remove	Q'ty	Remarks
			The following procedure applies to both of the front brake calipers.
	Brake fluid		Drain. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-16.
1	Brake hose union bolt	1	
2	Brake hose gasket	2	
3	Brake hose	1	
4	Front brake caliper	1	
			For installation, reverse the removal procedure.

Disassembling the front brake calipers

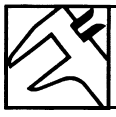


Order	Job/Parts to remove	Q'ty	Remarks
			The following procedure applies to both of the front brake calipers.
1	Brake pad clip	2	
2	Brake pad pin	1	
3	Brake pad spring	1	
4	Brake pad	2	
5	Brake caliper piston	4	
6	Brake caliper piston dust seal	4	
7	Brake caliper piston seal	4	
8	Bleed screw	1	
			For 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. Remove:
   - Front wheel
     Refer to "FRONT WHEEL" on page 4-12.
2. Check:
   - Front brake disc
     Damage/galling → Replace.
3. 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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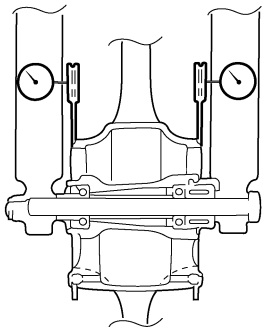
a. Place the vehicle on a suitable stand so that the front wheel is elevated.
b. Before measuring the brake disc deflection, turn the handlebar to the left or right to ensure that the front wheel is stationary.
c. Remove the brake caliper.
d. Hold the dial gauge at a right angle against the brake disc surface.
e. Measure the deflection 1.5 mm (0.06 in) below the edge of the brake disc.



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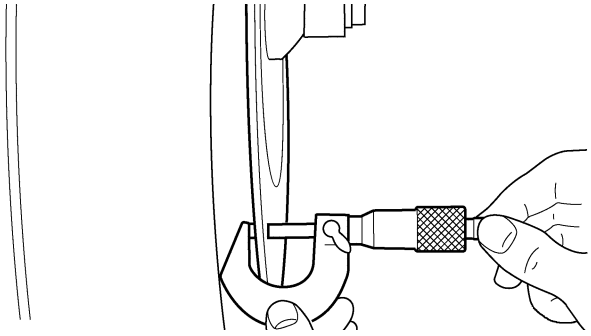
4. Measure:
   - Brake disc thickness
     Measure the brake disc thickness at a few different locations.
     Out of specification → Replace.

Brake disc thickness limit
4.0 mm (0.16 in)



5. Adjust:
   - Brake disc deflection

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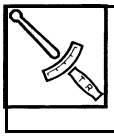
a. Remove the brake disc.
b. Rotate the brake disc by one bolt hole.
c. Install the brake disc.



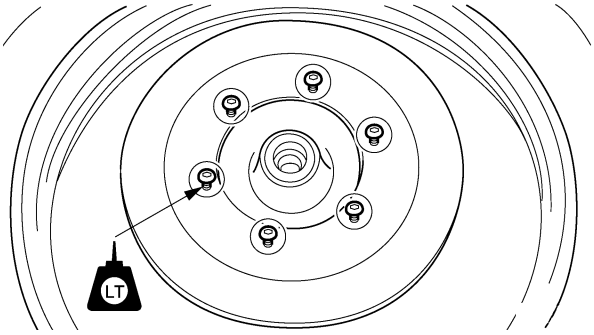
Front brake disc bolt
18 Nm (1.8 m·kgf, 13 ft·lbf)
LOCTITE®

ECA1CW1401
NOTICE

Replace the brake disc bolts with new ones.

TIP

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



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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6. Install:
   • Front wheel
   Refer to "FRONT WHEEL" on page 4-12.

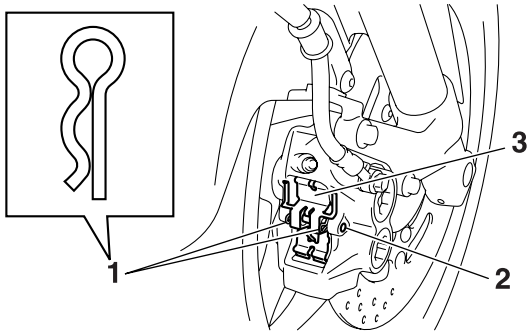
EAS22271
REPLACING THE FRONT BRAKE PADS

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.

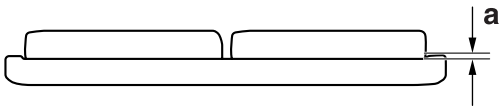
1. Remove:
   • Brake hose holder
   • Front brake caliper
   • Brake pad clips "1"
   • Brake pad pin "2"
   • Brake pad spring "3"



2. Remove:
   • Brake pads

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

Brake pad lining thickness (inner)
4.5 mm (0.18 in)
Limit
0.5 mm (0.02 in)
Brake pad lining thickness (outer)
4.5 mm (0.18 in)
Limit
0.5 mm (0.02 in)



4. Install:
   • Brake pads
   • Brake pad spring

TIP

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

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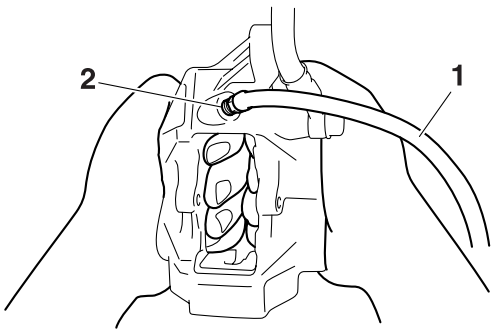
a. Connect a clear plastic hose "1" tightly to the bleed screw "2". Put the other end of the hose into an open container.
b. Loosen the bleed screw and push the brake caliper pistons into the brake caliper with your finger.

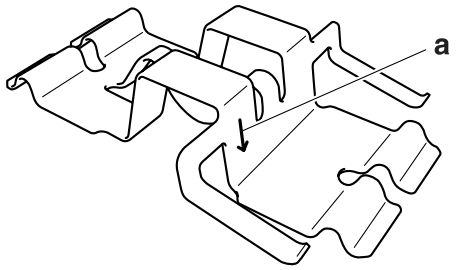


c. Tighten the bleed screw.

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

d. Install the brake pads and brake pad spring.

TIP
The arrow mark “a” on the brake pad spring must point in the direction of disc rotation.



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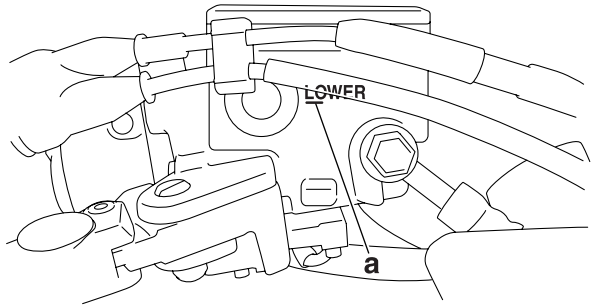
5. Install:
   - Brake pad pin
   - Brake pad clips
   - Front brake caliper

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

6. Check:
   - Brake fluid level
     Below the minimum level mark “a” → Add the recommended brake fluid to the proper level.
     Refer to “CHECKING THE BRAKE FLUID LEVEL” on page 3-14.



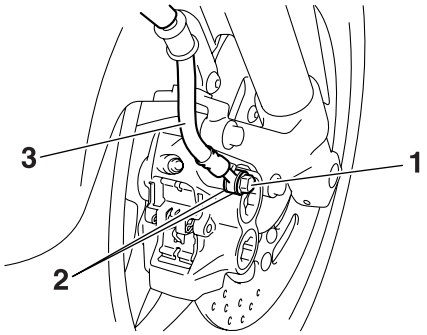
7. Check:
   - Brake lever operation
     Soft or spongy feeling → Bleed the brake system.
     Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” on page 3-16.

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.

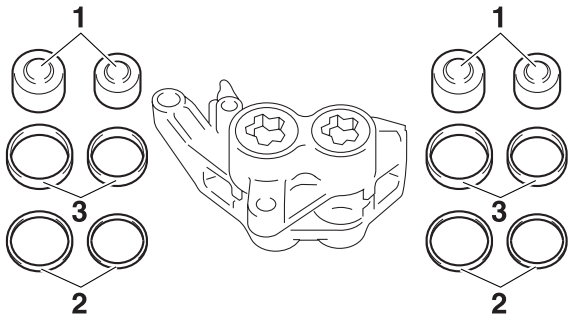
1. Remove:
   - Brake hose union bolt “1”
   - Brake hose gaskets “2”
   - Brake hose “3”

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



EAS22361
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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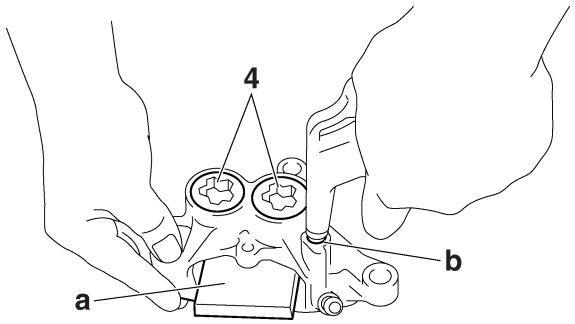
a. Secure the right side brake caliper pistons with a piece of wood “a”.
b. Blow compressed air into the brake hose joint opening “b” to force out the left side pistons from the brake caliper.

EWA39P1401
⚠ WARNING

- **Never try to pry out the brake caliper pistons.**
- **Do not loosen the bolts “4”.**



c. Remove the brake caliper piston dust seals and brake caliper piston seals.
d. Repeat the previous steps to force out the right side pistons from the brake caliper.

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EAS22391
CHECKING THE FRONT BRAKE CALIPERS

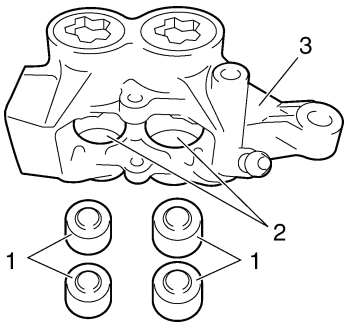
The following procedure applies to both of the brake calipers.

Recommended brake component replacement schedule	
Brake pads	If necessary
Piston seals	Every two years
Piston dust 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.

EWA13611
⚠ WARNING

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



EAS22411
ASSEMBLING THE FRONT BRAKE CALIPERS

EWA13621
⚠ 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 brake caliper piston dust seals and brake caliper piston seals to swell and distort.**
- **Whenever a brake caliper is disassembled, replace the brake caliper piston dust seals and brake caliper piston seals.**

Recommended fluid
DOT 4

EAS22440
INSTALLING THE FRONT BRAKE CALIPERS

The following procedure applies to both of the brake calipers.

1. Install:
   - Front brake caliper “1” (temporarily)
   - Brake hose gaskets New
   - Brake hose “2”
   - Brake hose union bolt “3”

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

EWA13530

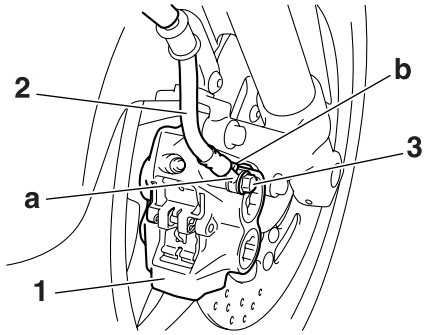
⚠ WARNING

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:
   - Front brake caliper
3. Install:
   - Brake pads
   - Brake pad spring
   - Brake pad pin
   - Brake pad clips
   - Front brake caliper
   - Brake hose holder

Front brake caliper bolt
40 Nm (4.0 m·kgf, 29 ft·lbf)
Brake hose holder bolt
6 Nm (0.6 m·kgf, 4.3 ft·lbf)

Refer to "REPLACING THE FRONT BRAKE PADS" on page 4-36.

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

Recommended fluid
DOT 4

EWA13090

⚠ WARNING

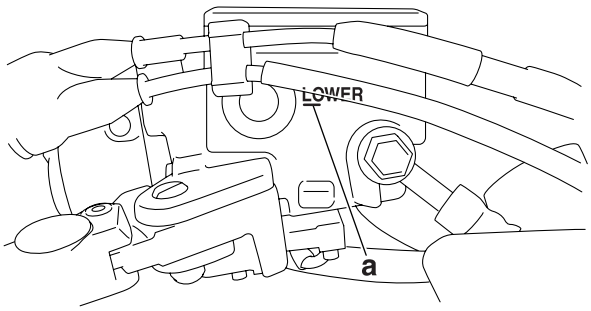
- **Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.**
- **Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor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

5. Bleed:
   - Brake system
     Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-16.
6. Check:
   - Brake fluid level
     Below the minimum level mark "a" → Add the recommended brake fluid to the proper level.
     Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-14.



7. Check:
   - Brake lever operation
     Soft or spongy feeling → Bleed the brake system.
     Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-16.

EAS22490
REMOVING THE FRONT BRAKE MASTER CYLINDER

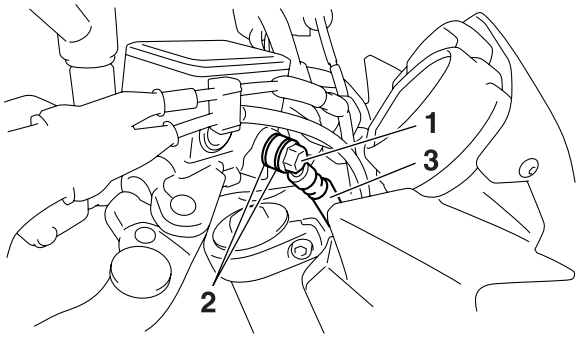
TIP

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

1. Disconnect:
   - Brake light switch connectors (from the front brake light switch)
2. Remove:
   - Brake hose union bolt “1”
   - Brake hose gaskets “2”
   - Brake hose “3”

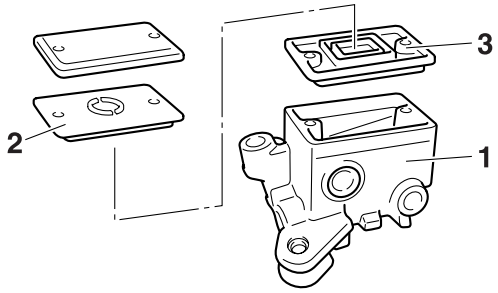
TIP

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

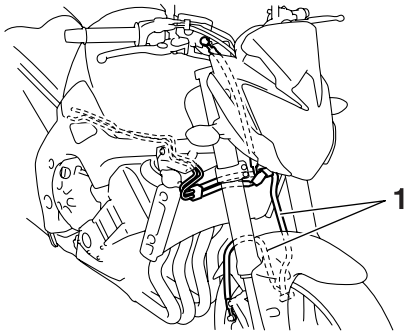


EAS22500
CHECKING THE FRONT BRAKE MASTER CYLINDER

1. Check:
   - Brake master cylinder Damage/scratches/wear → Replace.
   - Brake fluid delivery passages (brake master cylinder body) Obstruction → Blow out with compressed air.
2. Check:
   - Brake master cylinder kit Damage/scratches/wear → Replace.
3. Check:
   - Brake master cylinder reservoir “1”
   - Brake master cylinder reservoir diaphragm holder “2” Cracks/damage → Replace.
   - Brake master cylinder reservoir diaphragm “3” Damage/wear → Replace.



4. Check:
   - Brake hoses “1” 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

EAS22530
INSTALLING THE FRONT BRAKE MASTER CYLINDER

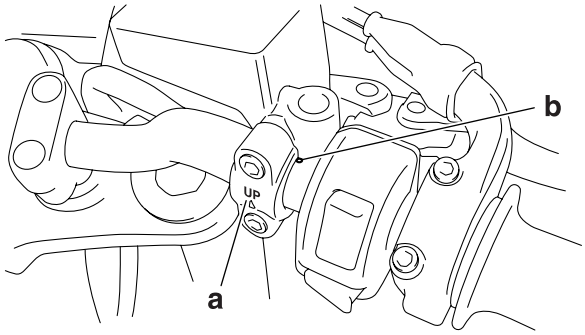
1. Install:
   - Front brake master cylinder
   - Front brake master cylinder holder

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

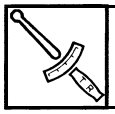
TIP

- Install the front brake master cylinder holder with the “UP” mark “a” facing up.

- Align the end of the front brake master cylinder holder with the punch mark “b” on the handlebar.
- First, tighten the upper bolt, then the lower bolt.
- There should be more than 11 mm (0.43 in) for clearance between the right handlebar switch and the front brake master cylinder holder. Also, the punch mark should be seen.



2. Install:
   - Brake hose gaskets New
   - Brake hose
   - Brake hose union bolt

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

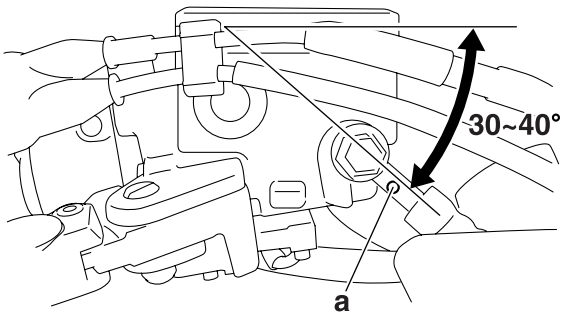
EWA13530

⚠ WARNING

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

TIP

- Install the brake pipe so that white paint mark “a” on the pipe faces to the front of the vehicle.
- Attach the brake hose so that its angle is 30° to 40° against the straight line in parallel with the ceiling plane of the master cylinder.
- 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

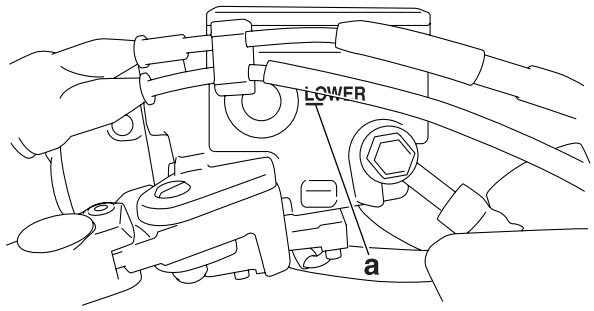
- **Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.**
- **Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor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

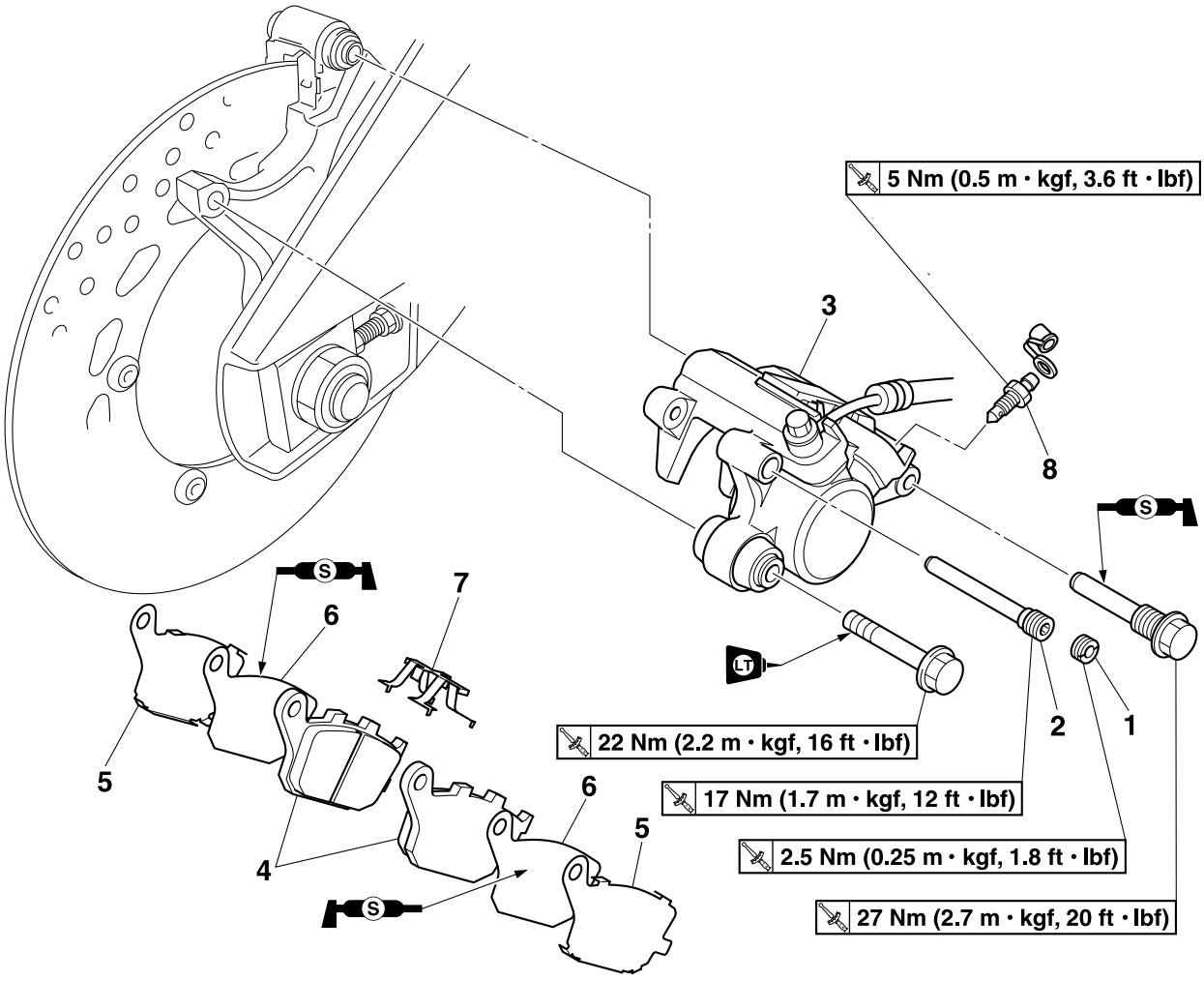
4. Bleed:
   - Brake system
     Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” on page 3-16.
5. Check:
   - Brake fluid level
     Below the minimum level mark “a” → Add the recommended brake fluid to the proper level.
     Refer to “CHECKING THE BRAKE FLUID LEVEL” on page 3-14.



6. Check:
   - Brake lever operation
     Soft or spongy feeling → Bleed the brake system.
     Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM” on page 3-16.

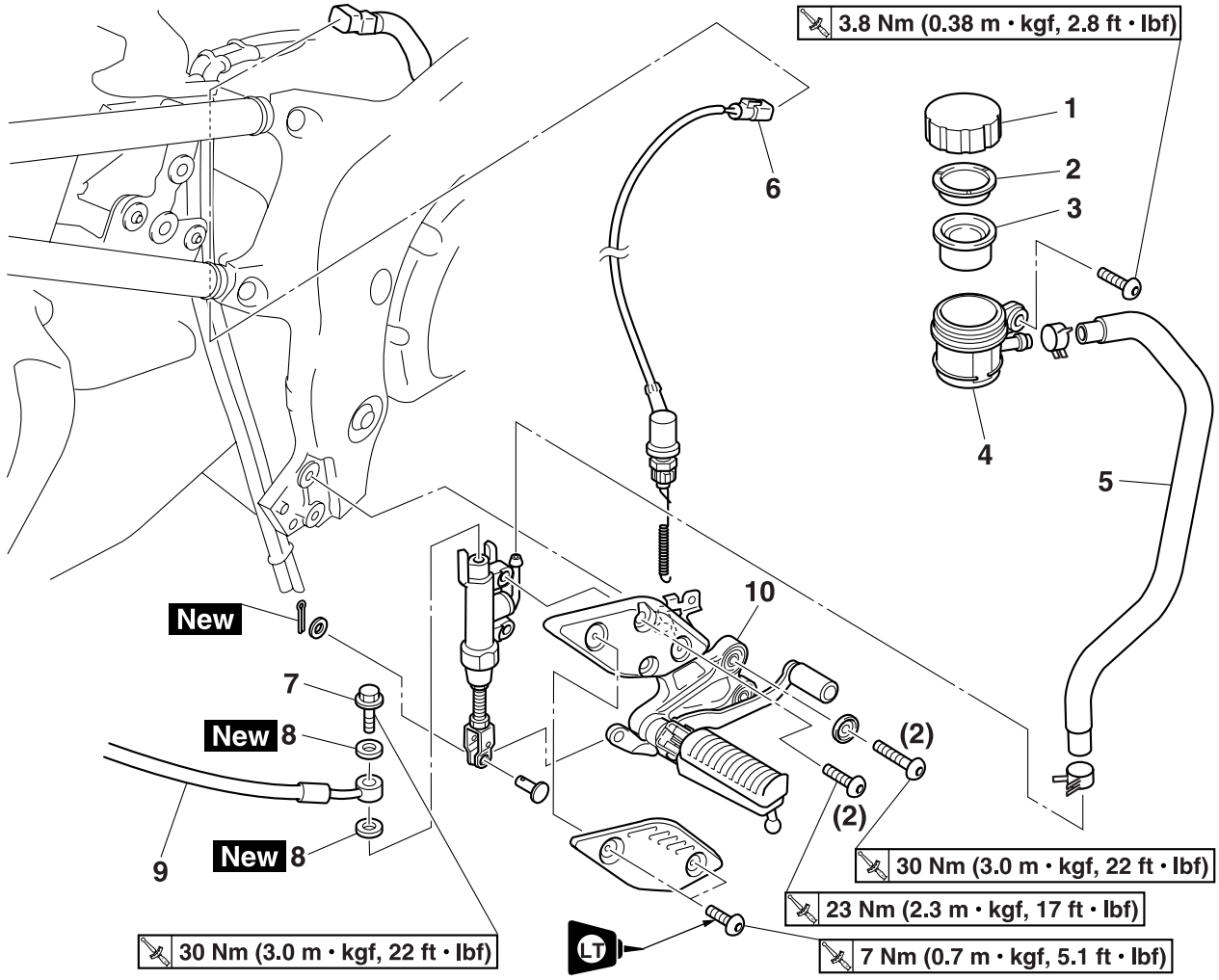
EAS22550
REAR BRAKE

Removing the rear brake pads



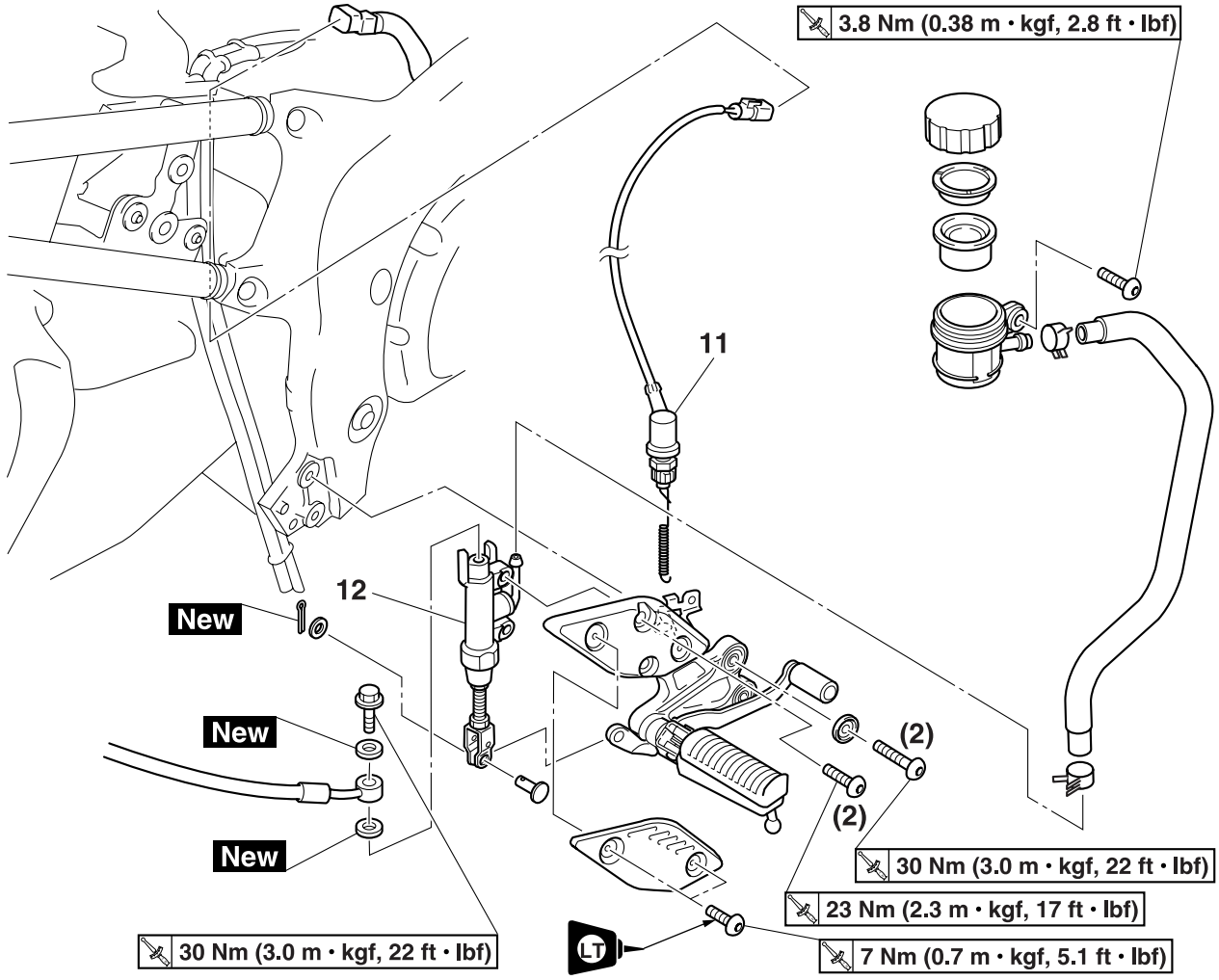
Order	Job/Parts to remove	Q'ty	Remarks
1	Screw plug	1	
2	Brake pad pin	1	
3	Rear brake caliper	1	
4	Brake pad	2	
5	Brake pad shim	2	
6	Brake pad insulator	2	
7	Brake pad spring	1	
8	Bleed screw	1	
			For installation, reverse the removal procedure.

Removing the rear brake master cylinder



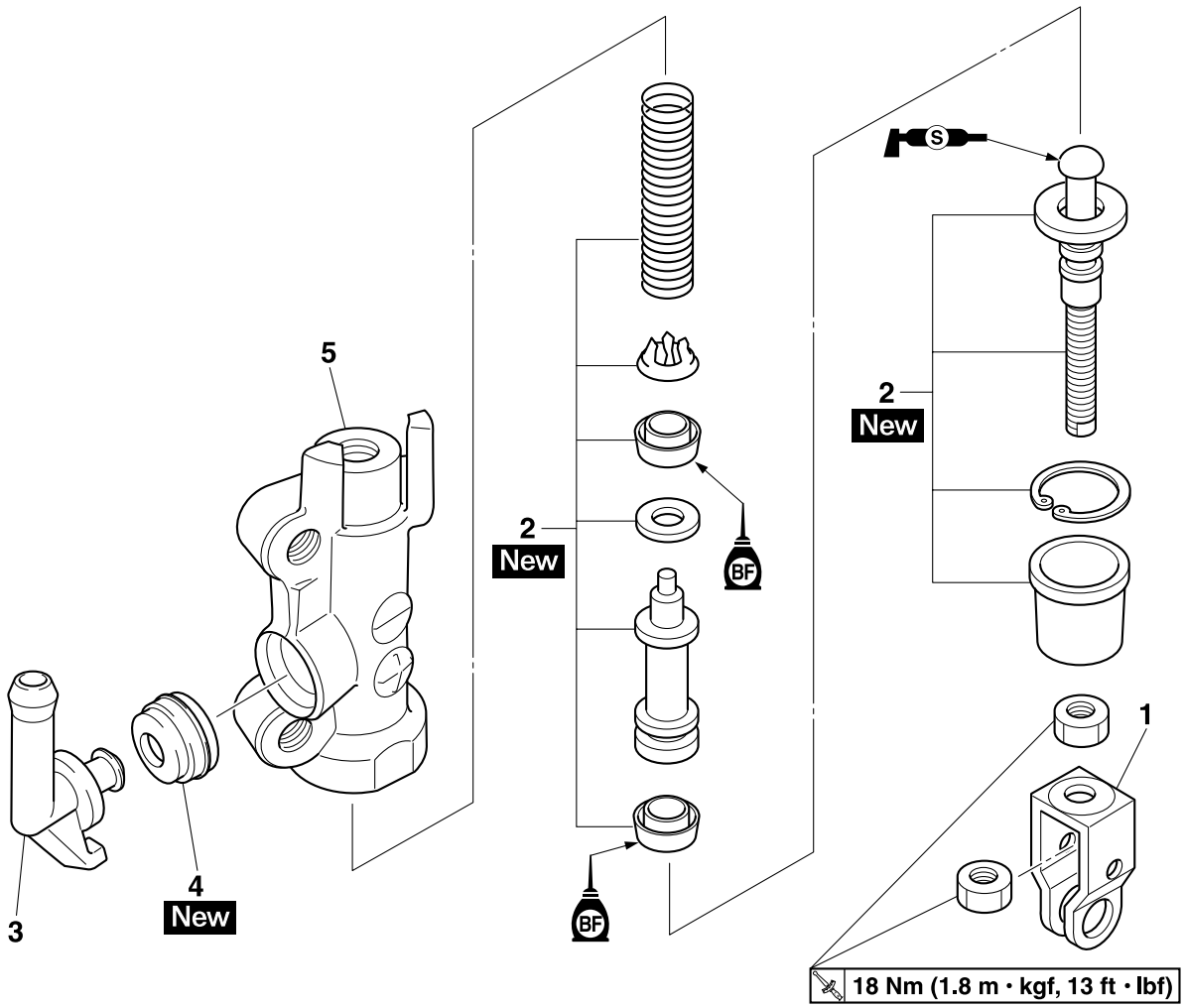
Order	Job/Parts to remove	Q'ty	Remarks
	Rider seat		Refer to "GENERAL CHASSIS" on page 4-1.
	Inner panel/side panel/front cowling side panel		FZ8SA Refer to "GENERAL CHASSIS" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Right side cover		Refer to "GENERAL CHASSIS" on page 4-1.
	Brake fluid		Drain. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-16.
1	Brake fluid reservoir cap	1	
2	Brake fluid reservoir diaphragm holder	1	
3	Brake fluid reservoir diaphragm	1	
4	Brake fluid reservoir	1	
5	Brake fluid reservoir hose	1	
6	Rear brake light switch coupler	1	Disconnect.
7	Brake hose union bolt	1	
8	Brake hose gasket	2	
9	Brake hose	1	
10	Right footrest assembly	1	

Removing the rear brake master cylinder



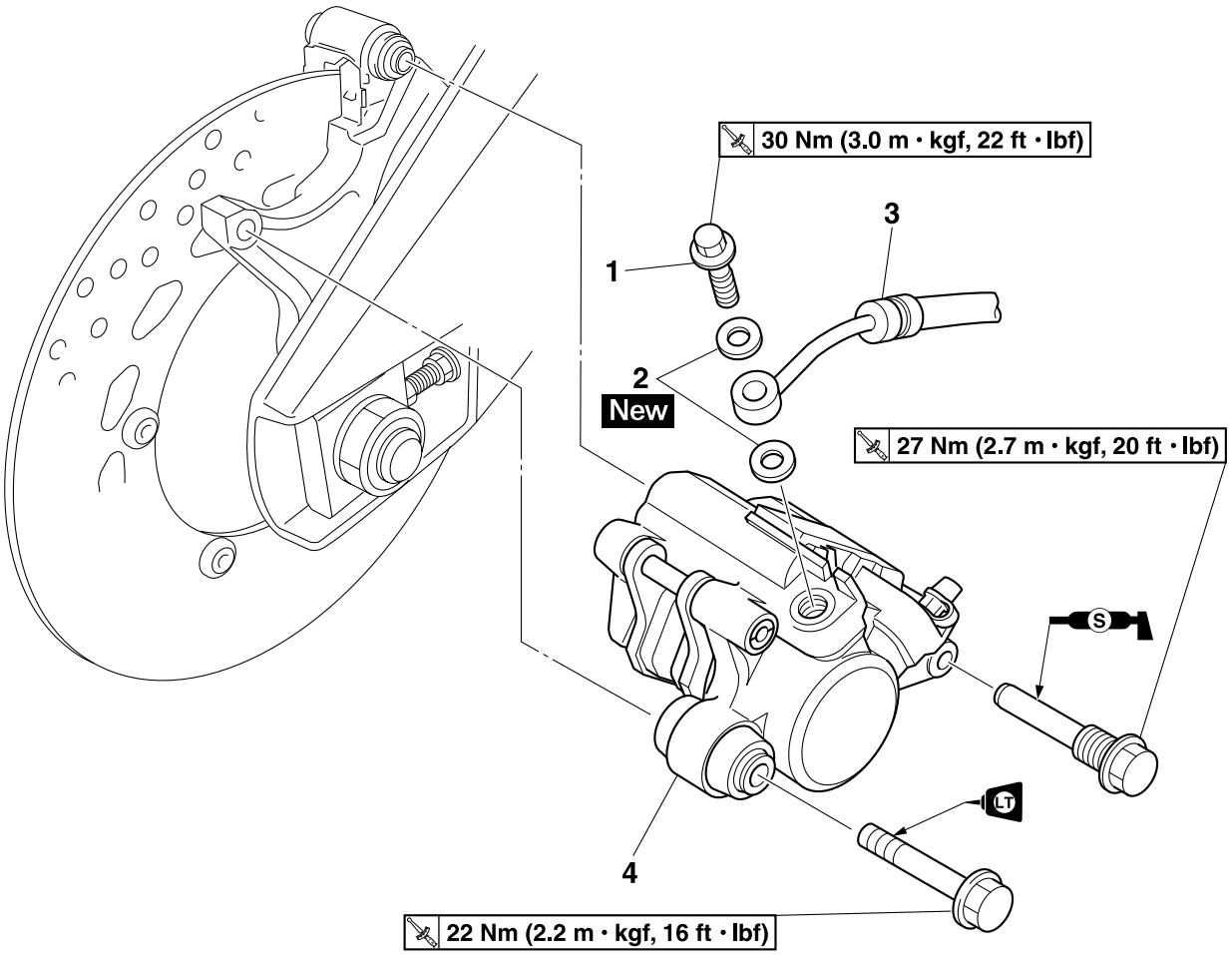
Order	Job/Parts to remove	Q'ty	Remarks
11	Rear brake light switch	1	
12	Rear brake master cylinder assembly	1	
			For installation, reverse the removal procedure.

Disassembling the rear brake master cylinder



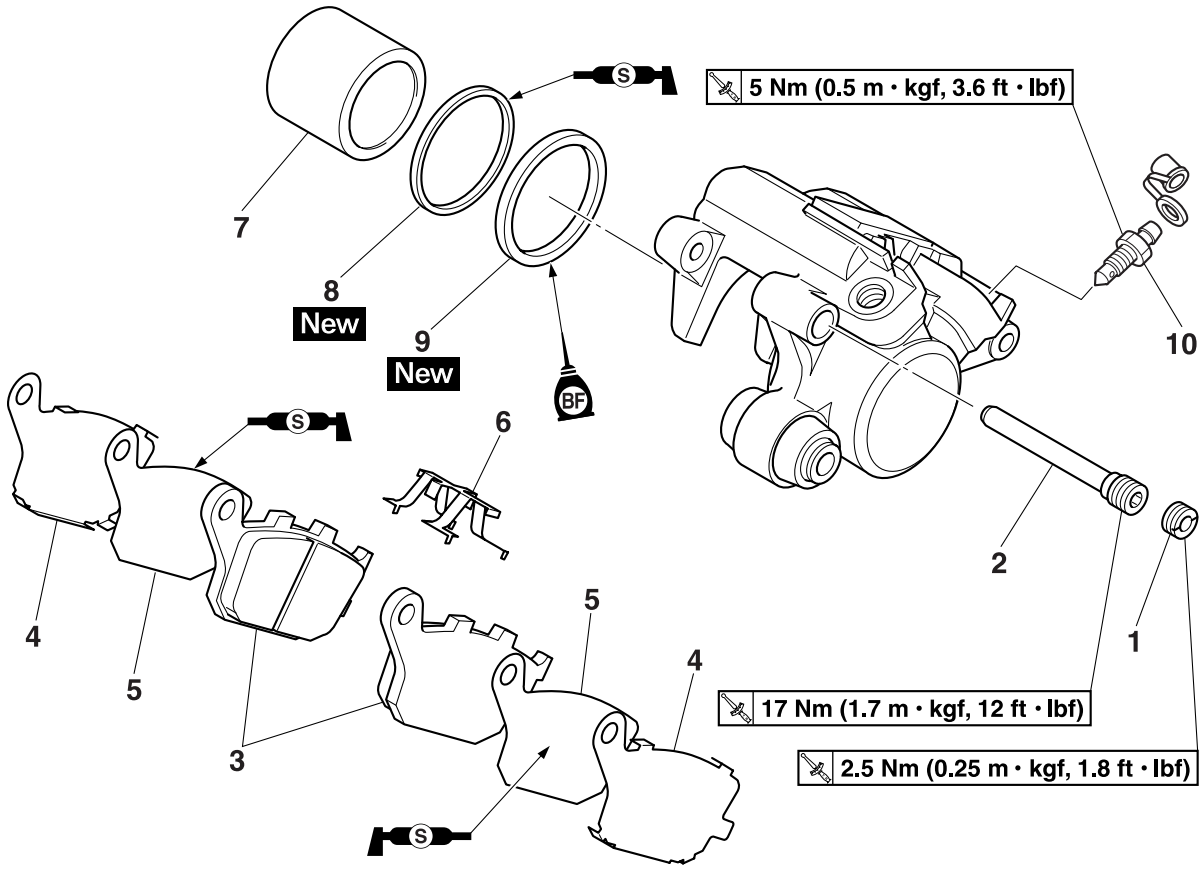
Order	Job/Parts to remove	Q'ty	Remarks
1	Brake master cylinder yoke	1	
2	Brake master cylinder kit	1	
3	Hose joint	1	
4	Bushing	1	
5	Brake master cylinder body	1	
			For assembly, reverse the disassembly procedure.

Removing the rear brake caliper



Order	Job/Parts to remove	Q'ty	Remarks
1	Brake hose union bolt	1	
2	Brake hose gasket	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 shim	2	
5	Brake pad insulator	2	
6	Brake pad spring	1	
7	Brake caliper piston	1	
8	Brake caliper piston dust seal	1	
9	Brake caliper piston seal	1	
10	Bleed screw	1	
			For assembly, reverse the disassembly procedure.

EAS22561
INTRODUCTION
EWA14101
⚠ 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. Remove:
   - Rear wheel
     Refer to "REAR WHEEL" on page 4-21.
2. Check:
   - Rear brake disc
     Damage/galling → Replace.
3. 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 4-35.

Brake disc deflection limit
0.15 mm (0.0059 in)

4. 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 4-35.

Brake disc thickness limit
4.5 mm (0.18 in)

5. Adjust:
   - Brake disc deflection
     Refer to "CHECKING THE FRONT BRAKE DISCS" on page 4-35.

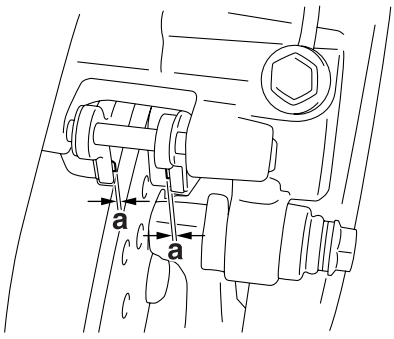
Rear brake disc bolt
20 Nm (2.0 m·kgf, 14 ft·lbf)
LOCTITE®

6. Install:
   - Rear wheel
     Refer to "REAR WHEEL" on page 4-21.

EAS22581
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)
6.0 mm (0.24 in)
Limit
1.0 mm (0.04 in)
Brake pad lining thickness (outer)
6.0 mm (0.24 in)
Limit
1.0 mm (0.04 in)



2. Install:
   - Brake pad insulators
   - Brake pad shims (onto the brake pads)
   - Brake pad spring (into the rear brake caliper)
   - Brake pads

TIP

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

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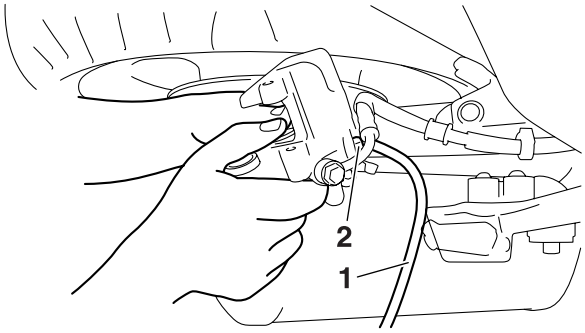
a. Connect a clear plastic hose "1" tightly to the bleed screw "2". Put the other end of the hose into an open container.
b. Loosen the bleed screw and push the brake caliper piston into the brake caliper with your finger.



c. Tighten the bleed screw.

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

d. Install the brake pad insulators and brake pad shims onto each brake pads.

TIP

Apply silicone grease between the brake pad insulator and brake pad shim.

ECA2S31022

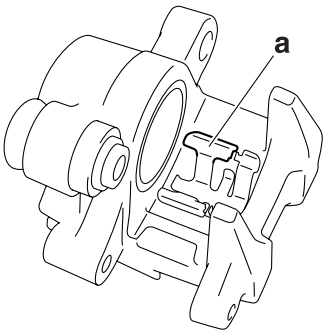
NOTICE

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

e. Install the brake pads and brake pad spring.

TIP

The longer tangs "a" of the brake pad spring must point in the direction of the brake caliper piston.



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3. Lubricate:
   - Rear brake caliper retaining bolt (front)

Recommended lubricant
Silicone grease

ECA2S31022

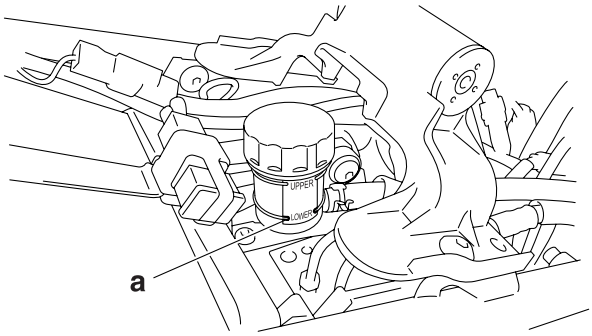
NOTICE

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

4. Install:
   - Rear brake caliper
   - Brake pad retaining bolts
   - Screw plug

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

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



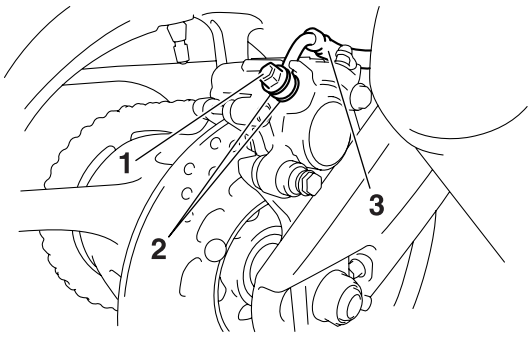
6. Check:
   • Brake pedal operation
   Soft or spongy feeling → Bleed the brake system.
   Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-16.

EAS22590
REMOVING THE REAR BRAKE CALIPER

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

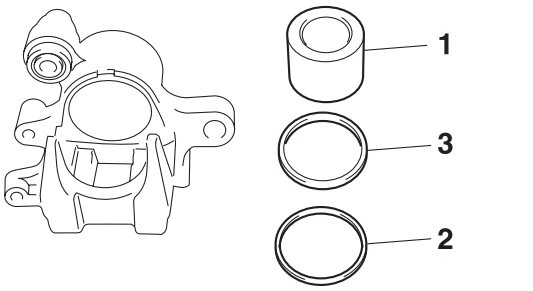
1. Remove:
   • Brake hose union bolt "1"
   • Brake hose gaskets "2"
   • Brake hose "3"

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



EAS22601
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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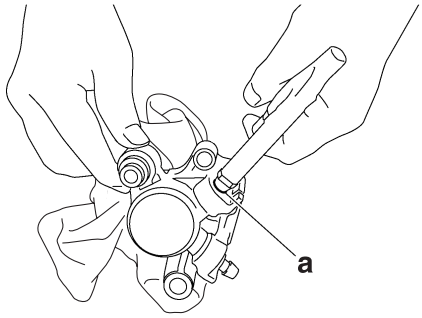
a. Blow compressed air into the brake hose joint opening "a" to force out the piston from the brake caliper.

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.**



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

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EAS22642
CHECKING THE REAR BRAKE CALIPER

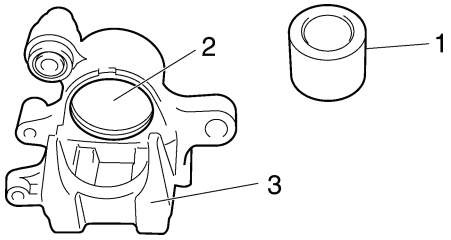
Recommended brake component replacement schedule	
Brake pads	If necessary
Piston seal	Every two years
Piston dust seal	Every two years
Brake hoses	Every four years
Brake fluid	Every two years and whenever the brake is disassembled

1. Check:
   - Brake caliper piston “1”
     Rust/scratches/wear → Replace the brake caliper piston.
   - 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.

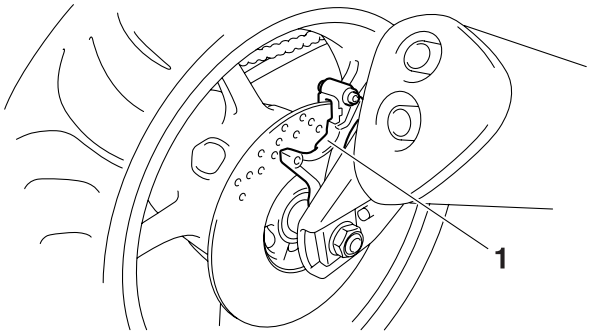
EWA39P1402

⚠ WARNING

Whenever a brake caliper is disassembled, replace the brake caliper piston dust seal and brake caliper piston seal.



2. Check:
   - Rear brake caliper bracket “1”
     Cracks/damage → Replace.
     Refer to “REAR WHEEL” on page 4-21.



EAS22651

ASSEMBLING THE REAR BRAKE CALIPER

EWA39P1403

⚠ 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 brake caliper piston dust seal and brake caliper piston seal to swell and distort.**
- **Whenever a brake caliper is disassembled, replace the brake caliper piston dust seal and brake caliper piston seal.**

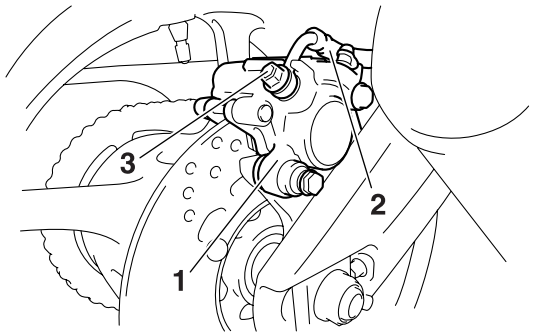
Recommended fluid
DOT 4

EAS22670

INSTALLING THE REAR BRAKE CALIPER

1. Install:
   - Rear brake caliper “1” (temporarily)
   - Brake hose gaskets New
   - Brake hose “2”
   - Brake hose union bolt “3”

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



EWA13530

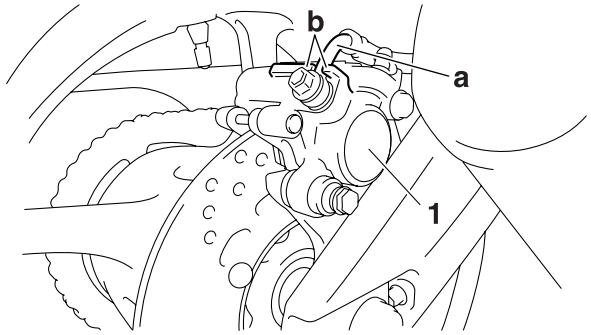
⚠ WARNING

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

ECA39P1402

NOTICE

When installing the brake hose onto the brake caliper “1”, make sure the brake pipe “a” passes between the projections “b” on the brake caliper.



2. Remove:
   • Rear brake caliper
3. Install:
   • Brake pad insulators
   • Brake pad shims
     (onto the brake pads)
   • Brake pad spring
     (into the rear brake caliper)
   • Brake pads
   • Rear brake caliper
     Refer to "REPLACING THE REAR BRAKE PADS" on page 4-49.

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

4. Fill:
   • Brake fluid reservoir
     (with the specified amount of the recommended brake fluid)

Recommended fluid
DOT 4

EWA13090

⚠ WARNING

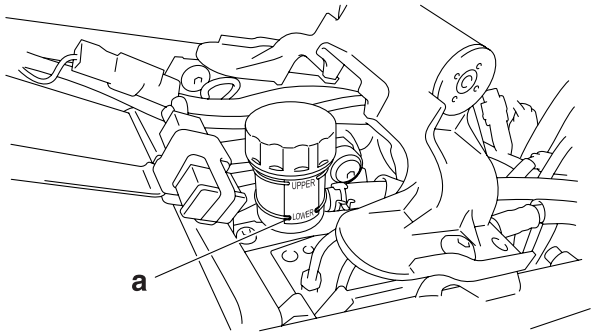
- **Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.**
- **Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor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

5. Bleed:
   • Brake system
     Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-16.
6. Check:
   • Brake fluid level
     Below the minimum level mark "a" → Add the recommended brake fluid to the proper level.
     Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-14.



7. Check:
   • Brake pedal operation
     Soft or spongy feeling → Bleed the brake system.
     Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-16.

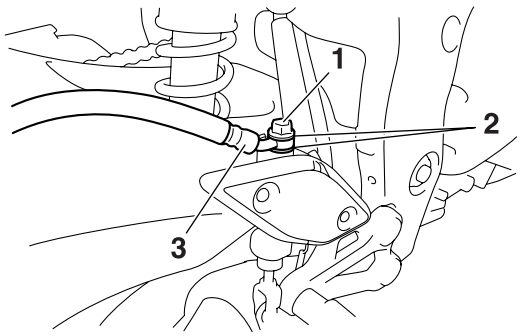
EAS22700

REMOVING THE REAR BRAKE MASTER CYLINDER

1. Remove:
   • Brake hose union bolt "1"
   • Brake hose gaskets "2"
   • Brake hose "3"

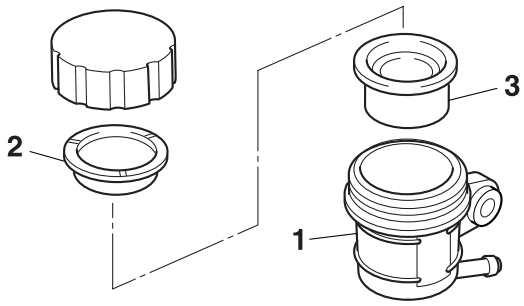
TIP

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

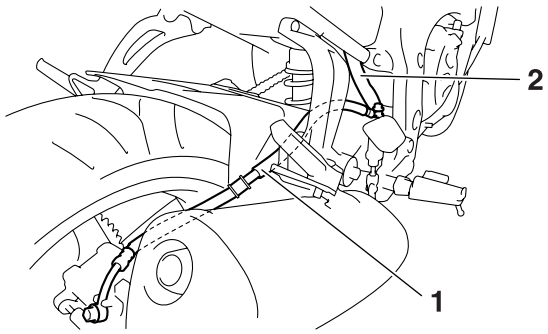


EAS22720
CHECKING THE REAR BRAKE MASTER CYLINDER

1. Check:
   - Brake master cylinder
     Damage/scratches/wear → Replace.
   - Brake fluid delivery passages
     (brake master cylinder body)
     Obstruction → Blow out with compressed air.
2. Check:
   - Brake master cylinder kit
     Damage/scratches/wear → Replace.
3. Check:
   - Brake fluid reservoir "1"
   - Brake fluid reservoir diaphragm holder "2"
     Cracks/damage → Replace.
   - Brake fluid reservoir diaphragm "3"
     Damage/wear → Replace.



4. Check:
   - Brake hose "1"
   - Brake fluid reservoir hose "2"
     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:
   - Brake master cylinder kit New

EAS22740
INSTALLING THE REAR BRAKE MASTER CYLINDER

1. Install:
   - Brake hose gaskets New
   - Brake hose
   - Brake fluid reservoir hose
   - Brake hose union bolt

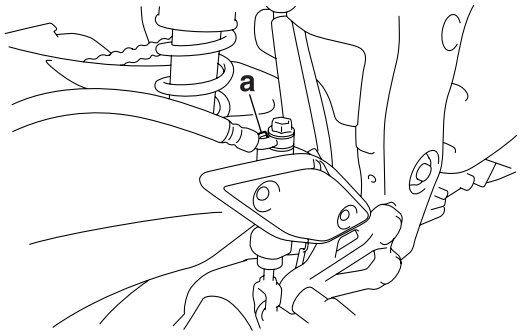
Brake hose union bolt
30 Nm (3.0 m·kgf, 22 ft·lbf)

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
     (with the specified amount of the recommended brake fluid)

Recommended fluid
DOT 4

EWA13090

WARNING

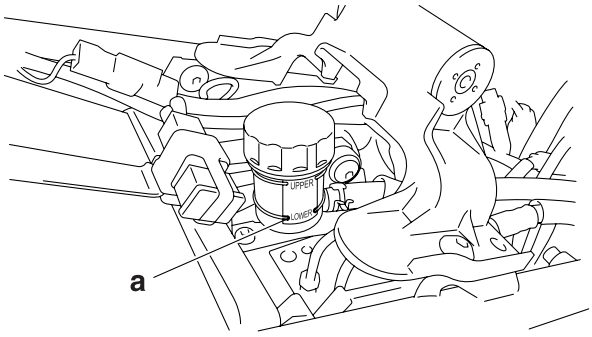
- **Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.**
- **Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor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

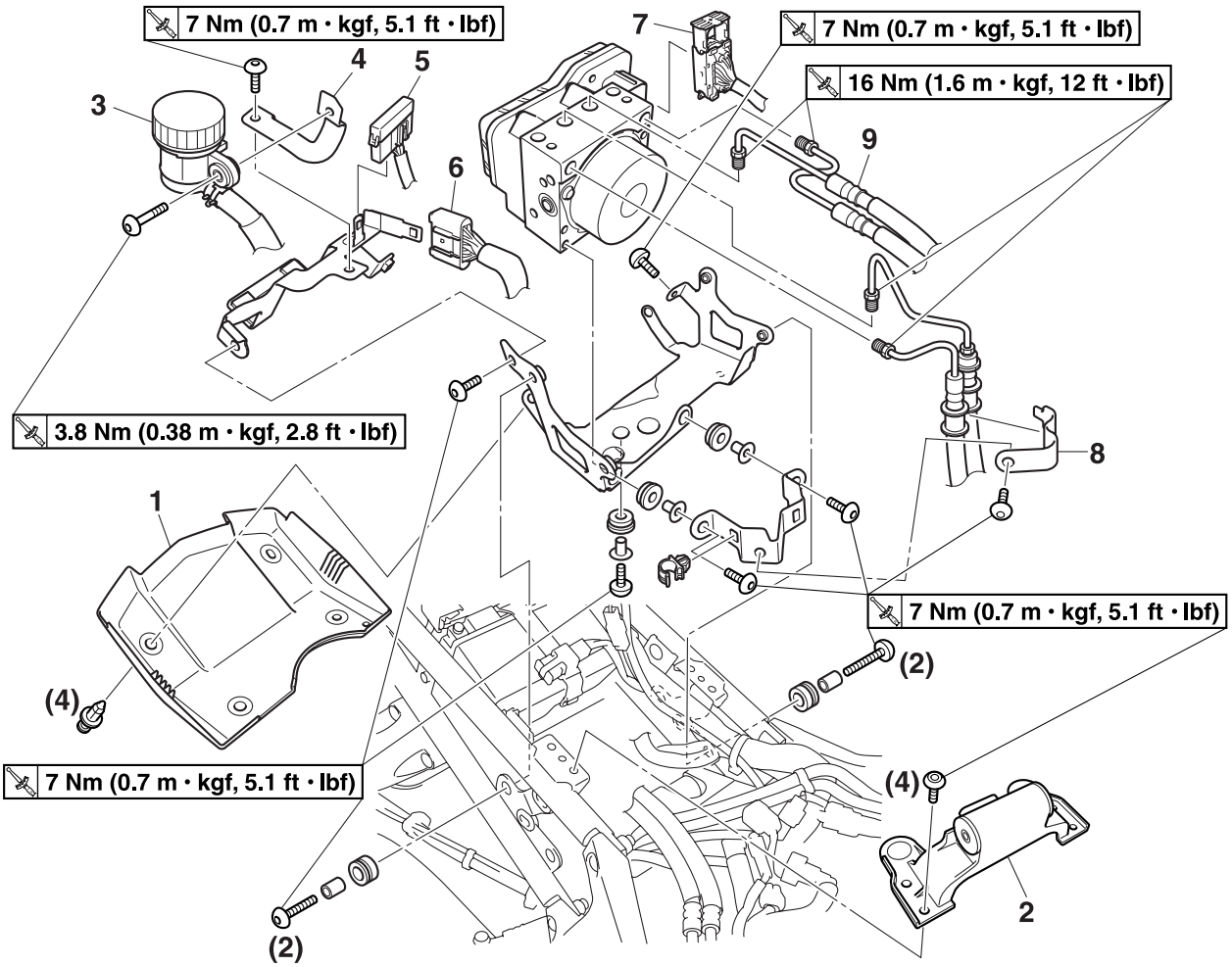
3. Bleed:
   - Brake system
     Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-16.
4. Check:
   - Brake fluid level
     Below the minimum level mark "a" → Add the recommended brake fluid to the proper level.
     Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-14.



5. Adjust:
   - Brake pedal position
     Refer to "ADJUSTING THE REAR DISC BRAKE" on page 3-15.
6. Adjust:
   - Rear brake light operation timing
     Refer to "ADJUSTING THE REAR BRAKE LIGHT SWITCH" on page 3-29.

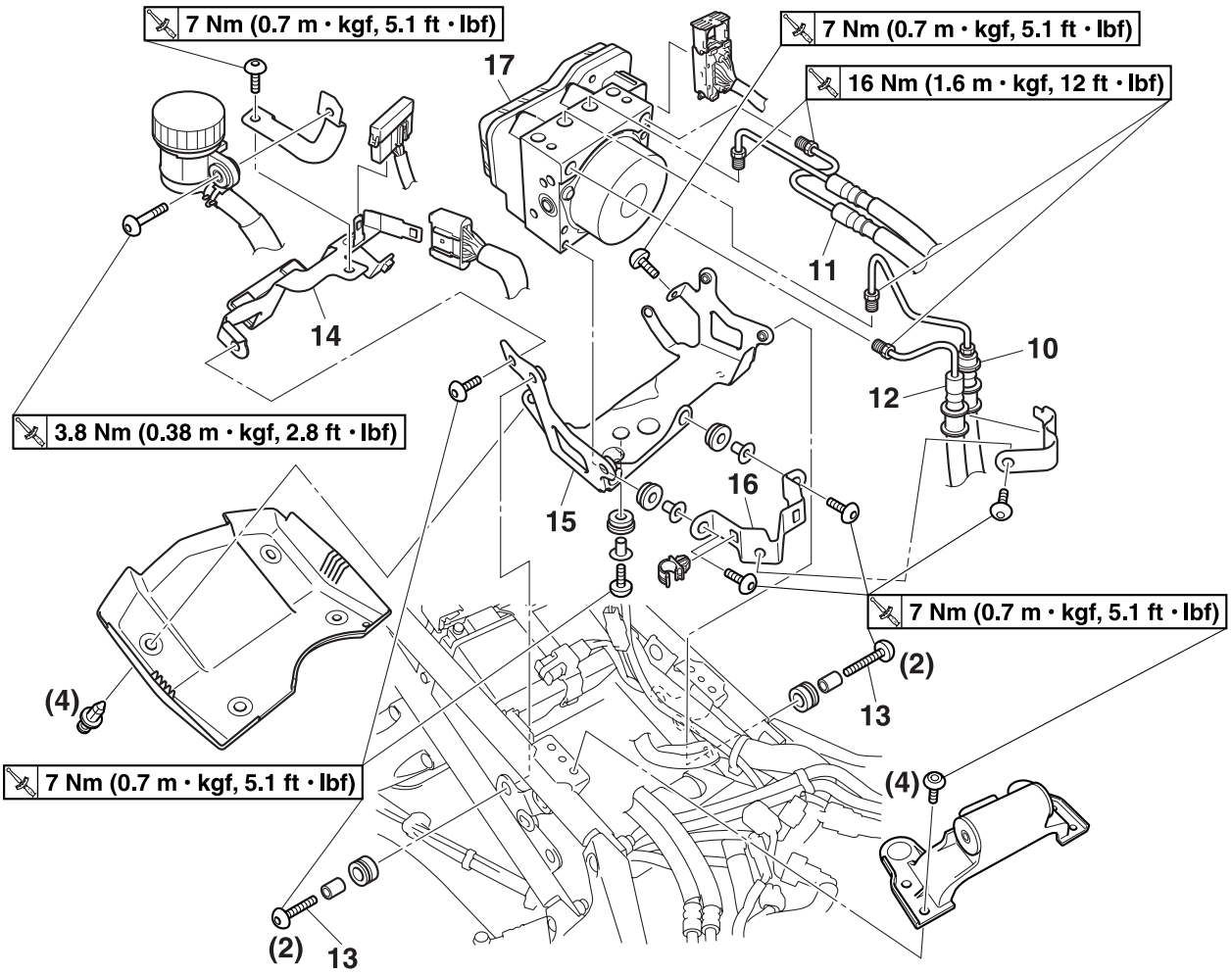
EAS22760
ABS (ANTI-LOCK BRAKE SYSTEM)

Removing the hydraulic unit assembly



Order	Job/Parts to remove	Q'ty	Remarks
	Rider seat		Refer to "GENERAL CHASSIS".
	Side cover		Refer to "GENERAL CHASSIS".
	Fuel tank		Refer to "FUEL TANK".
	Brake fluid		Drain. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM".
1	Under cover	1	
2	Fuel tank bracket	1	
3	Brake fluid reservoir tank	1	
4	Brake fluid reservoir tank stay	1	
5	Fuse box 2	1	
6	Waterproof coupler	1	
7	ABS ECU coupler	1	Disconnect.
8	Rear brake hose holder	1	
9	Brake pipe/joint assembly (hydraulic unit to front brake calipers)	1	Disconnect.

Removing the hydraulic unit assembly



Order	Job/Parts to remove	Q'ty	Remarks
10	Brake pipe/joint assembly (hydraulic unit to rear brake caliper)	1	Disconnect.
11	Brake pipe/joint assembly (front brake master cylinder to hydraulic unit)	1	Disconnect.
12	Brake pipe/joint assembly (rear brake master cylinder to hydraulic unit)	1	Disconnect.
13	Lower hydraulic unit bracket bolt	4	
14	Upper hydraulic unit bracket	1	
15	Lower hydraulic unit bracket	1	
16	Rear brake hose guide	1	
17	Hydraulic unit	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

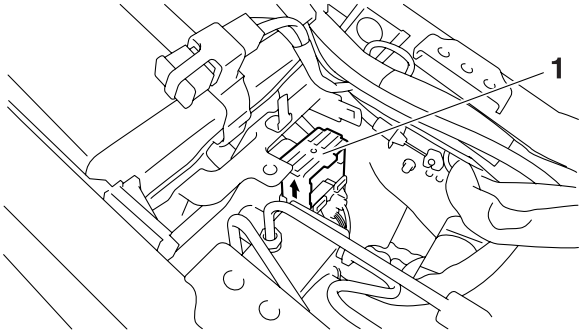
TIP
Do not operate the brake lever and brake pedal while removing the brake hoses and brake pipes.

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.

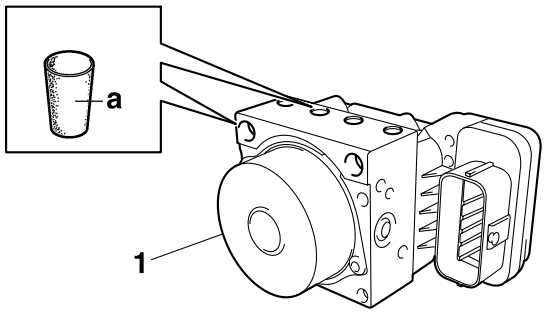
2. Disconnect:
   - ABS ECU coupler "1"

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



3. Remove:
   - Hydraulic unit assembly "1"

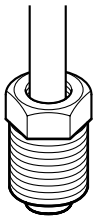
TIP
- To avoid brake fluid leakage and to prevent foreign materials from entering the hydraulic unit assembly, insert a rubber plug "a" or a bolt (M10 × 1.0) into each flare nut hole.
- When using a bolt, do not tighten the bolt until the bolt head touches the hydraulic unit. Otherwise, the brake pipe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

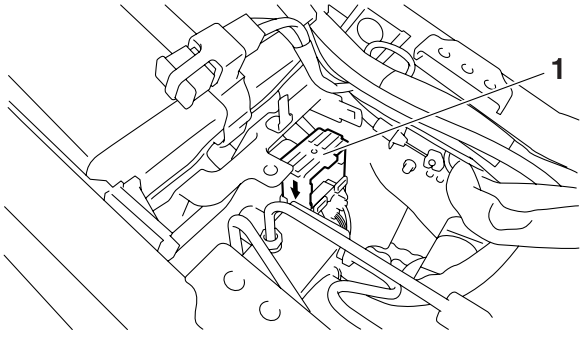
TIP

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.

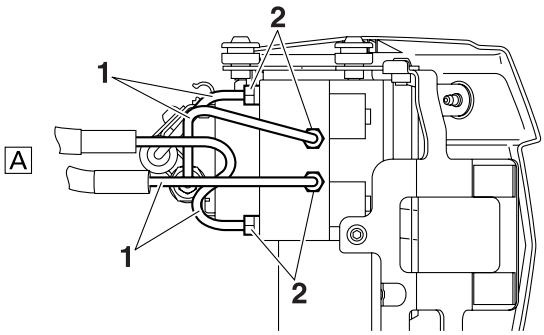


4. Install:
   • Brake pipe/joint assemblies “1”
   • Brake pipe/joint assembly flare nuts “2”

Brake pipe/joint assembly flare nut
16 Nm (1.6 m·kgf, 12 ft·lbf)

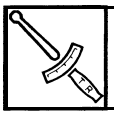
ECA4B56017
NOTICE

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

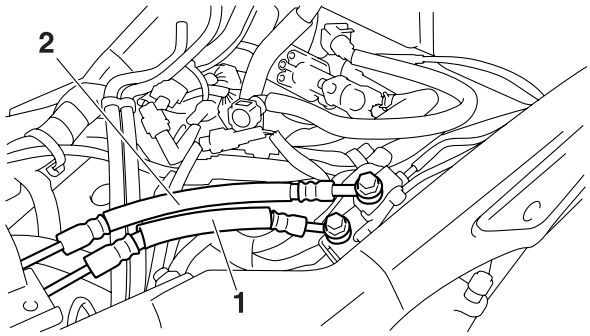


A. Forward

5. Install:
   • Front brake hose (front brake master cylinder to hydraulic unit) “1”
   • Front brake hose (hydraulic unit to front brake calipers) “2”
   • Copper washer 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 3-16.
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 4-60.)

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 8-172.)
10. Perform a trial run. (Refer to "TRIAL RUN" on page 4-63.)

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

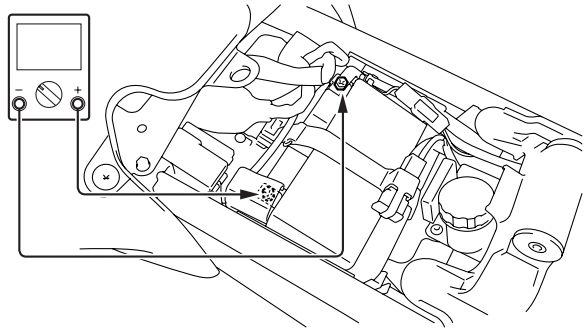
Securely support the vehicle so that there is no danger of it falling over.

1. Place the vehicle on the sidestand.
2. Turn the main switch to "OFF".
3. Remove:
   - Passenger seat
   - Rider 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

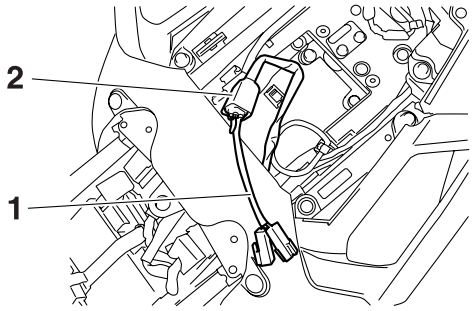
TIP

- 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".

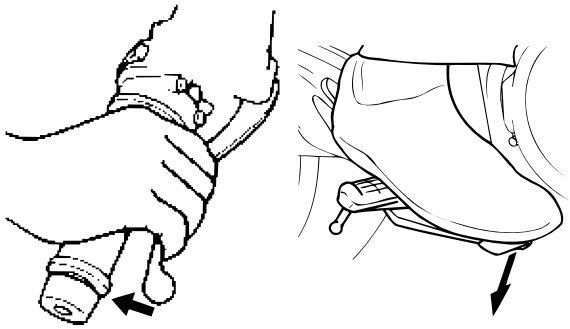
Test coupler adapter
90890-03149



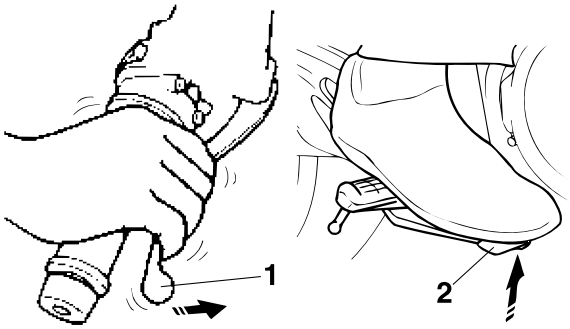
6. Turn the main switch to “ON” while operating the brake lever and then brake pedal simultaneously.

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.

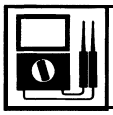
Hydraulic unit operation test 2

EWA13120

⚠ WARNING

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

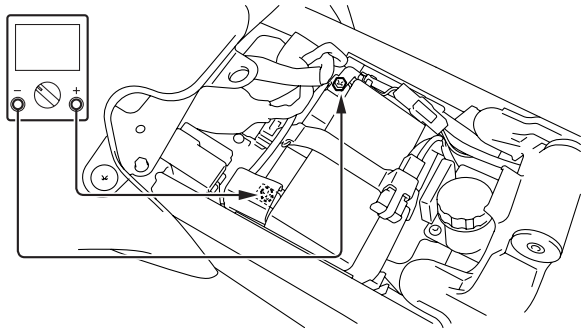
1. Place the vehicle on the sidestand.
2. Turn the main switch to “OFF”.
3. Remove:
   - Passenger seat
   - Rider seat
     Refer to “GENERAL CHASSIS” on page 4-1.
4. Check:
   - Battery voltage
     Lower than 12.8 V → Charge or replace the battery.



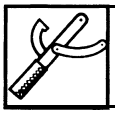
Battery voltage
Higher than 12.8 V

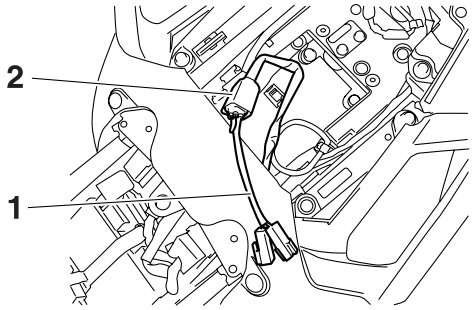
TIP

- 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**

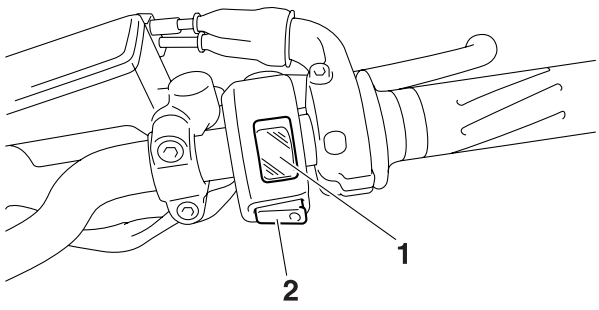


6. Set the engine stop switch “1” to “⊗”.
7. Turn the main switch to “ON”.
8. Push the start switch “2” for at least 4 seconds.

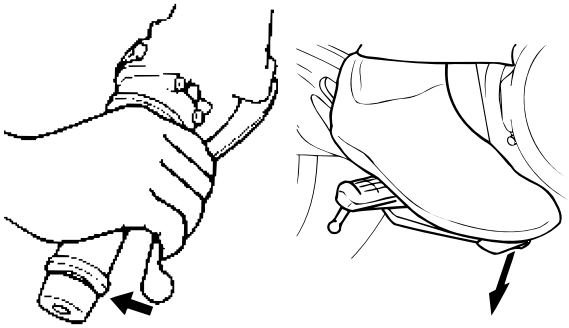
ECA14790

NOTICE

Do not operate the brake lever or the brake pedal.



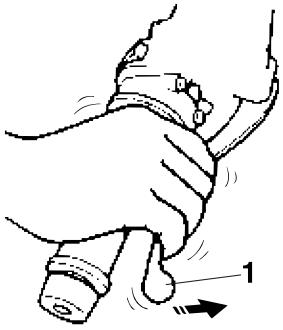
9. After releasing the start switch, operate the front brake lever and the rear brake pedal simultaneously.



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

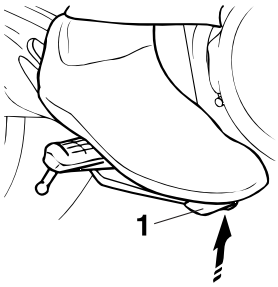
- The reaction-force pulsating action consists of quick pulses.
- Be sure to continue operating the brake lever and brake pedal even after the pulsating action has stopped.



11. After the pulsating action has stopped in the front brake lever, 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.

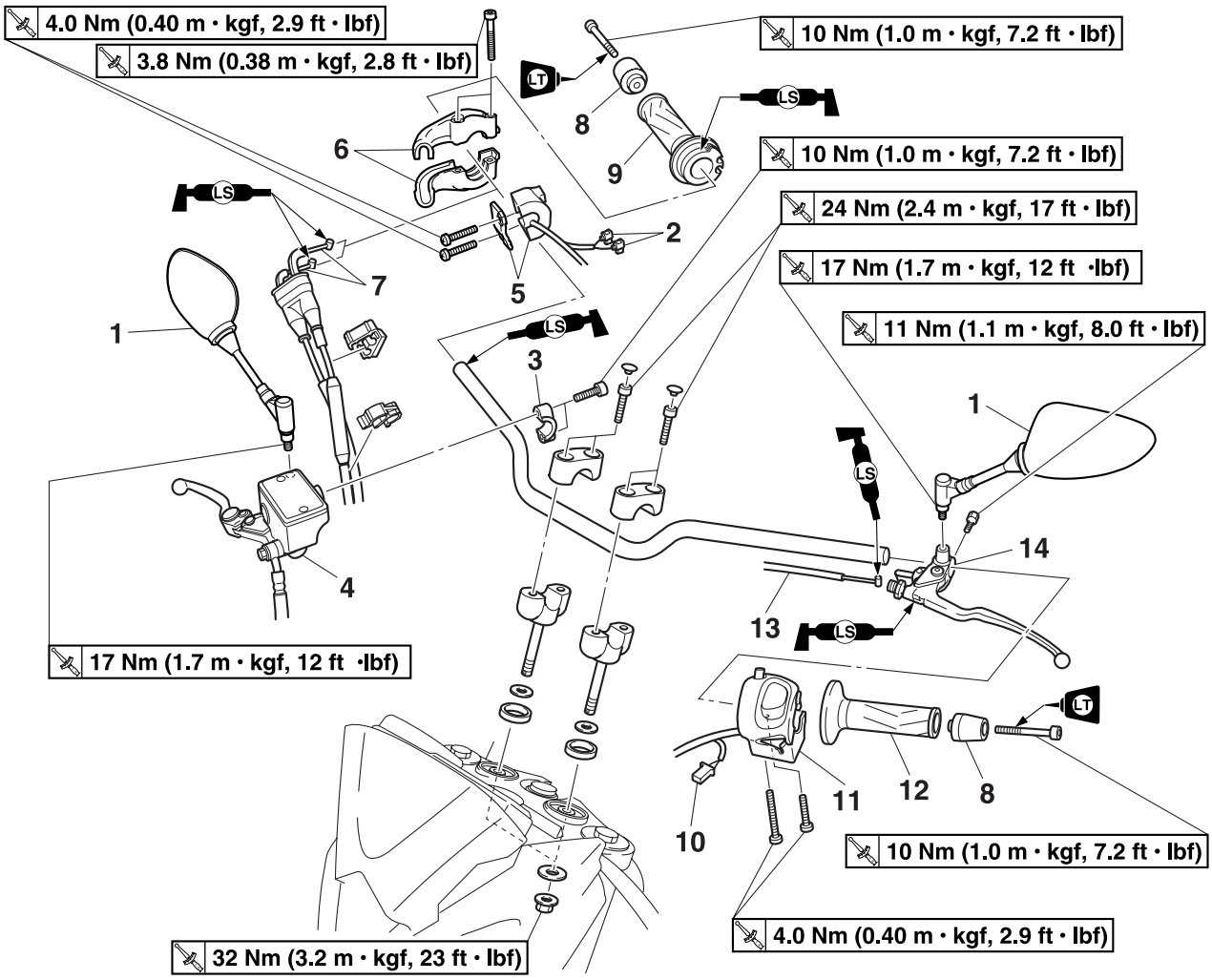
EAS22820

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 (18.8 mi/h).

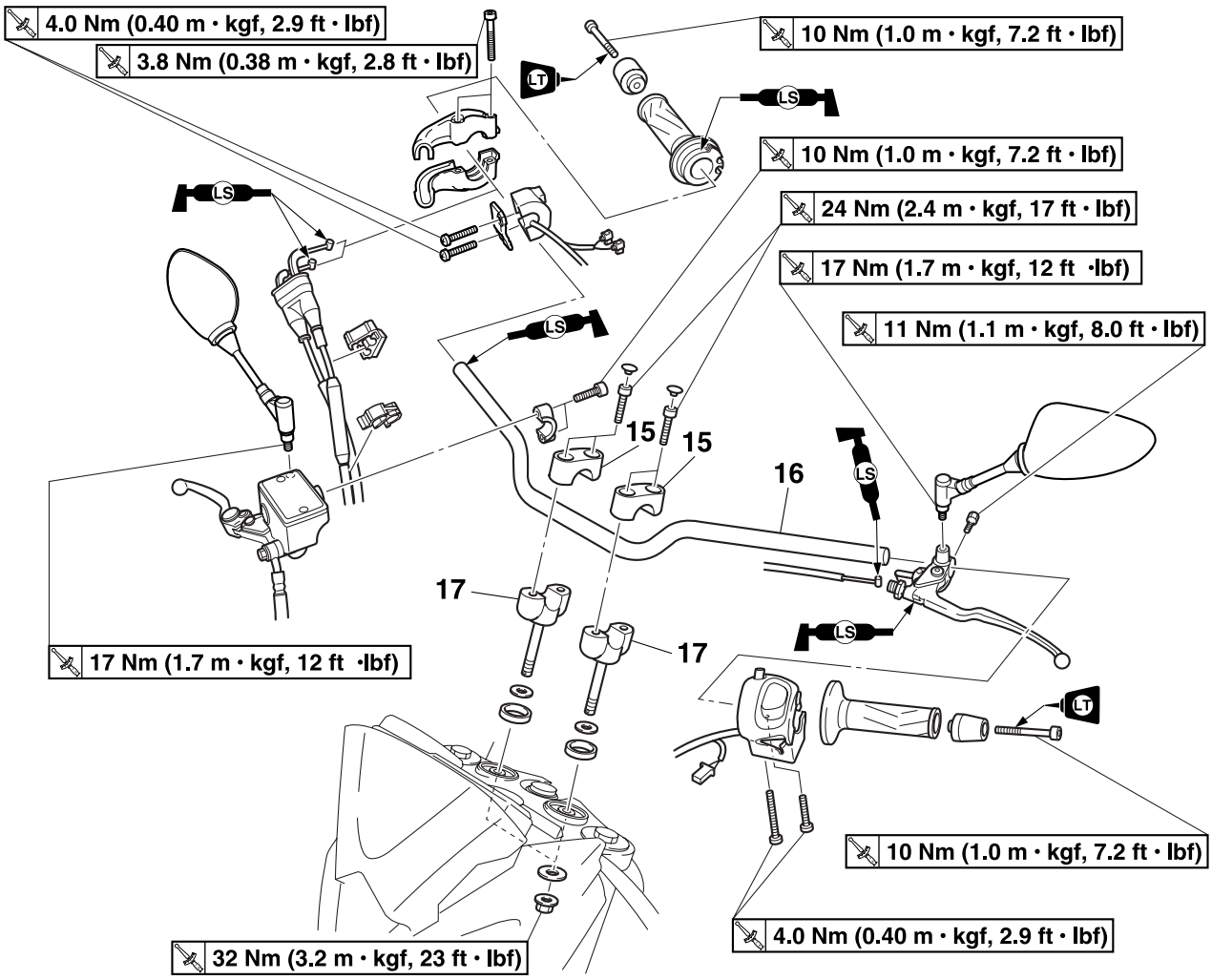
EAS22840
HANDLEBAR

Removing the handlebar



Order	Job/Parts to remove	Q'ty	Remarks
	Inner panel		FZ8SA Refer to "GENERAL CHASSIS" on page 4-1.
1	Rear view mirror	2	FZ8NA
2	Front brake light switch connector	2	Disconnect.
3	Front master cylinder holder	1	
4	Front brake master cylinder assembly	1	
5	Right handlebar switch	1	
6	Throttle cable housing	2	
7	Throttle cable	2	Disconnect.
8	Grip end	2	
9	Throttle grip	1	
10	Clutch switch coupler	1	Disconnect.
11	Left handlebar switch	1	
12	Handlebar grip	1	
13	Clutch cable	1	Disconnect.
14	Clutch lever holder	1	

Removing the handlebar



Order	Job/Parts to remove	Q'ty	Remarks
15	Upper handlebar holder	2	
16	Handlebar	1	
17	Lower handlebar holder	2	
			For installation, reverse the removal procedure.

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

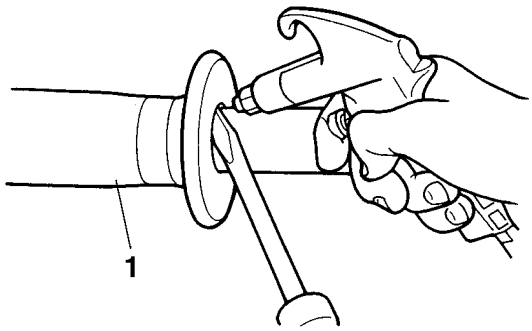
EWA13120
⚠ WARNING

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

2. Remove:
   - Handlebar grip “1”

TIP

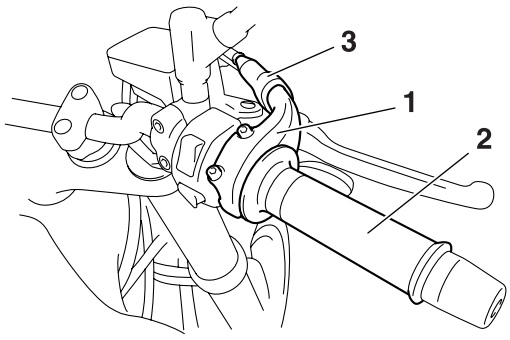
Blow compressed air between the left handlebar and the handlebar grip, and gradually push the grip off the handlebar.



3. Remove:
   - Throttle cable housings “1”
   - Throttle grip “2”

TIP

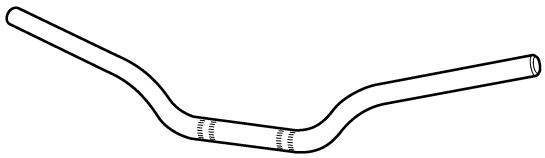
While removing the throttle cable housing, pull back the rubber cover “3”.



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

EWA13690
⚠ WARNING

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

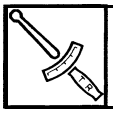


EAS22931
INSTALLING THE HANDLEBAR
1. Stand the vehicle on a level surface.

EWA13120
⚠ WARNING

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

2. Install:
   - Lower handlebar holders (temporarily)
   - Handlebar “1”
   - Upper handlebar holders “2”

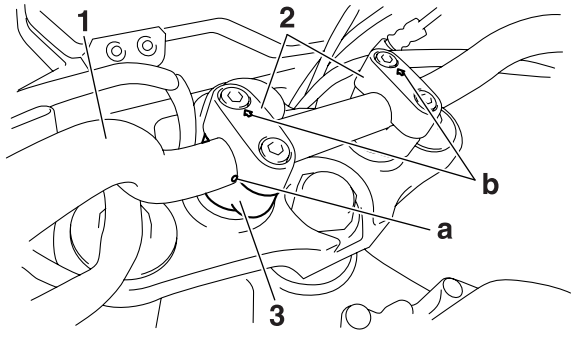
	**Upper handlebar holder bolt 24 Nm (2.4 m·kgf, 17 ft·lbf)**

ECA39P1407
NOTICE

- **First, tighten the bolts on the front side of the upper 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

- Align the punch mark “a” on the handlebar with the left side upper surface of the left lower handlebar holder “3”.
- The upper handlebar holders should be installed with the arrow marks “b” facing forward.



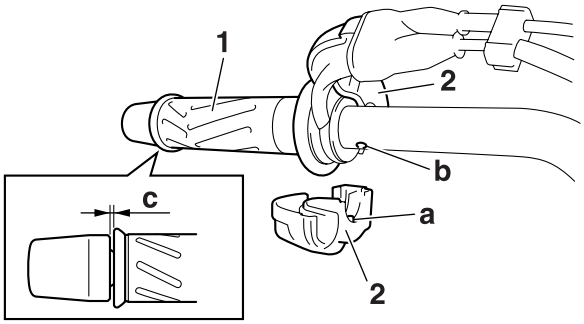
3. Tighten:
   • Lower handlebar holder nuts

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

4. Install:
   • Throttle grip “1”
   • Throttle cables
   • Throttle cable housings “2”
   • Grip end

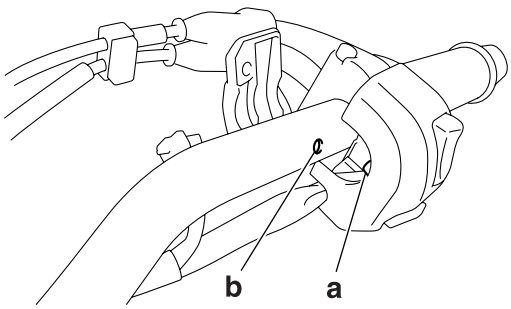
Grip end bolt
10 Nm (1.0 m·kgf, 7.2 ft·lbf)
LOCTITE®

TIP
- Align the projection “a” on the throttle cable housing with the hole “b” in the handlebar.
- There should be 1–3 mm (0.04–0.12 in) of clearance “c” between the throttle grip and the grip end.



5. Install:
   • Right handlebar switch

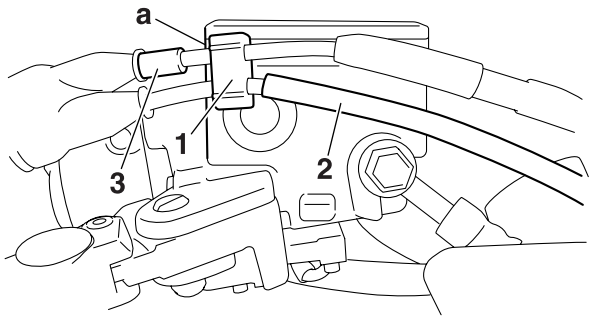
TIP
Align the projection “a” on the right handlebar switch with the hole “b” in the handlebar.



6. Install:
   • Front brake master cylinder assembly
   Refer to “INSTALLING THE FRONT BRAKE MASTER CYLINDER” on page 4-40.

7. Install:
   • Throttle cable clamp “1”

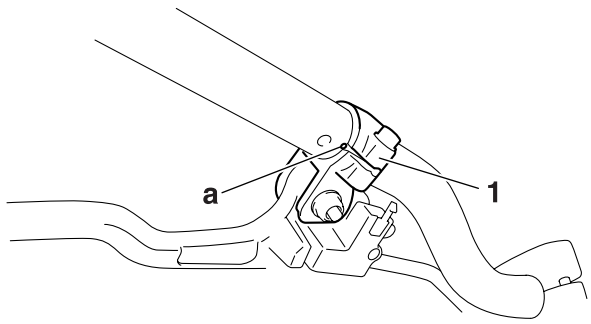
TIP
- Using side “a” of the master cylinder as a guide, install the clamp between side “a” and protector “2” of the throttle cable (decelerator cable) with the claw down and the damper facing to the master cylinder.
- When clamping, protector “3” of the throttle cable (accelerator cable) should be on the throttle grip side.



8. Install:
   • Clutch lever holder “1”
   • Clutch cable

Clutch lever holder pinch bolt
11 Nm (1.1 m·kgf, 8.0 ft·lbf)

TIP
Align the center of slit on the clutch lever holder with the punch mark “a” on the handlebar.



9. Install:
   • Handlebar grip “1”
   • Grip end “2”

Grip end bolt
10 Nm (1.0 m·kgf, 7.2 ft·lbf)
LOCTITE®

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a. Apply a thin coat of rubber adhesive onto the end of the left handlebar.
b. Side the handlebar grip over the end of the left handlebar.
c. Wipe off any excess rubber adhesive with a clean rag.

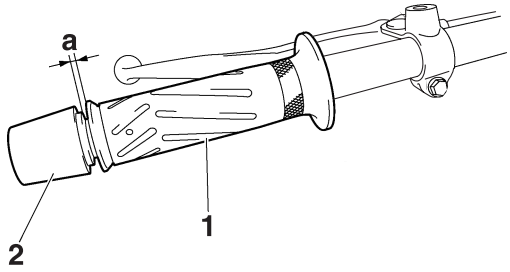
EWA13700

⚠ WARNING

Do not touch the handlebar grip until the rubber adhesive has fully dried.

TIP

There should be 1–3 mm (0.04–0.12 in) of clearance "a" between the handlebar grip and the grip end.



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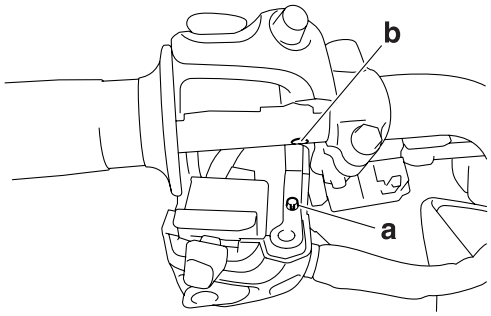
10. Install:
    • Left handlebar switch

TIP

Align the projection "a" on the left handlebar switch with the hole "b" in the handlebar.



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

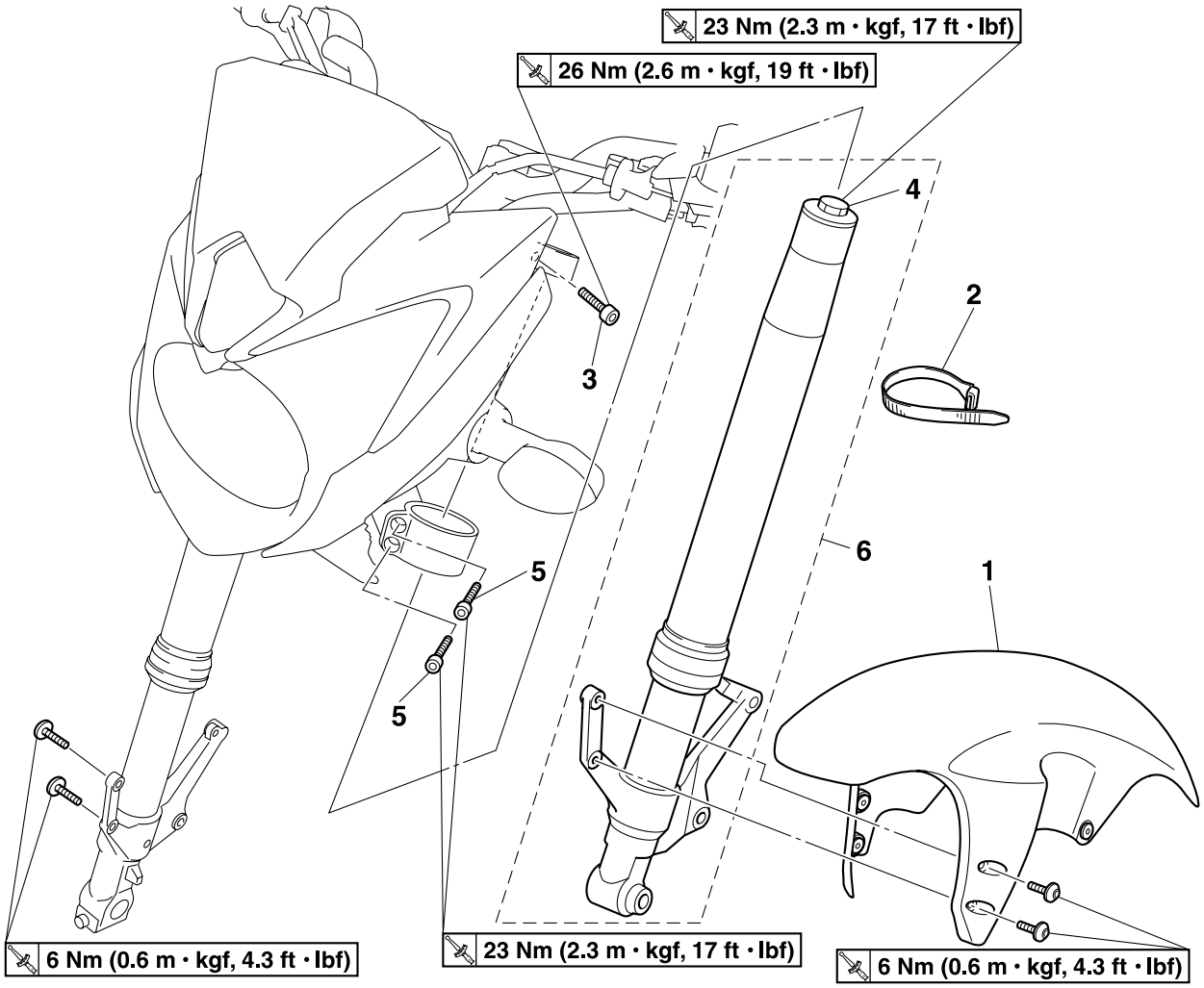
Throttle cable free play
3.0–5.0 mm (0.12–0.20 in)

12. Adjust:
    • Clutch cable free play
    Refer to "ADJUSTING THE CLUTCH CABLE FREE PLAY" on page 3-13.

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

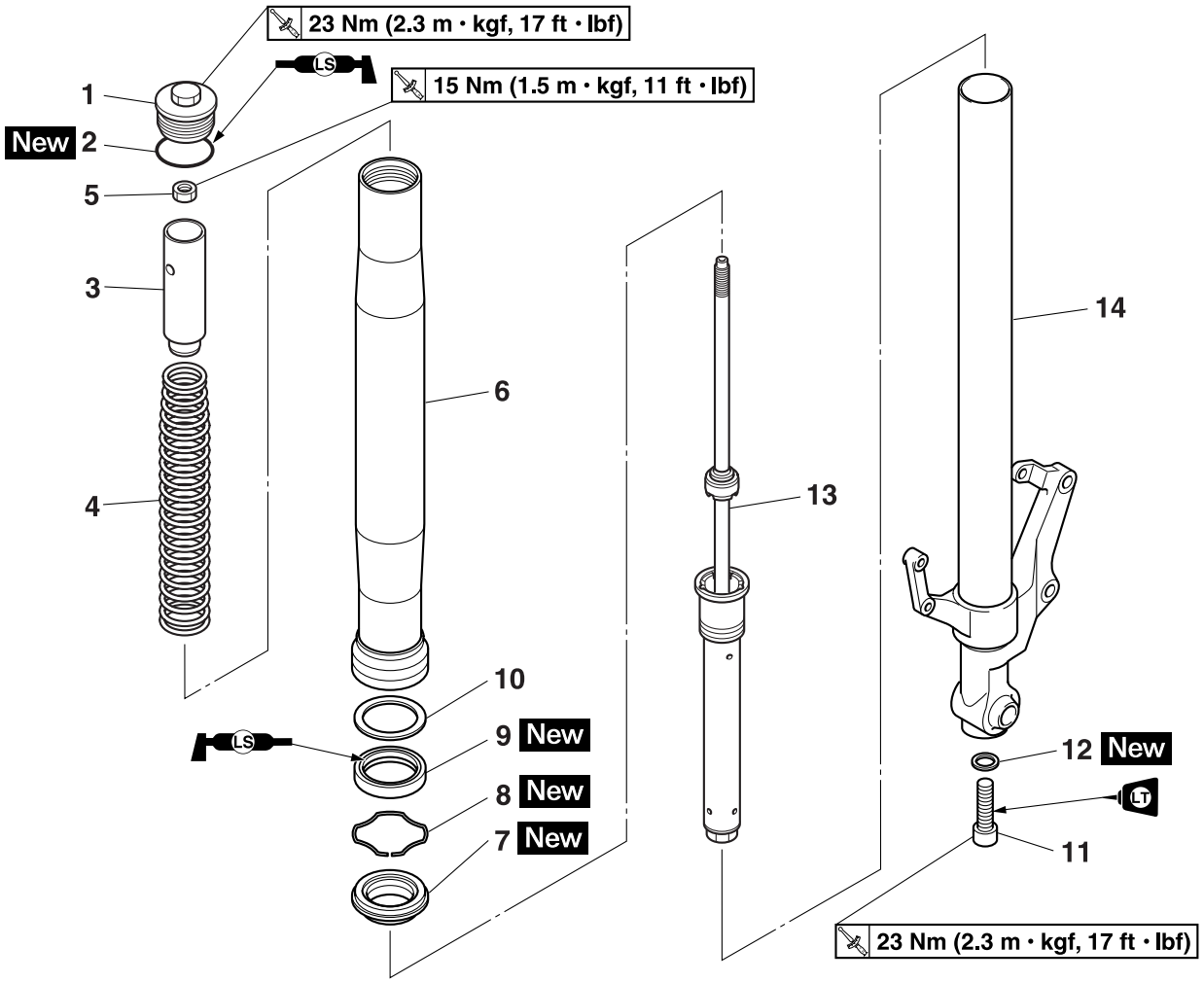
EAS22950
FRONT FORK

Removing the front fork legs



Order	Job/Parts to remove	Q'ty	Remarks
			The following procedure applies both of the front fork legs.
	Front wheel		Refer to "FRONT WHEEL" on page 4-12.
1	Front fender	1	
2	Band	1	Left side only.
3	Upper bracket pinch bolt	1	Loosen.
4	Cap bolt	1	Loosen.
5	Lower bracket pinch bolt	2	Loosen.
6	Front fork leg	1	
			For installation, reverse the removal procedure.

Disassembling the front fork legs



Order	Job/Parts to remove	Q'ty	Remarks
			The following procedure applies both of the front fork legs.
1	Cap bolt	1	
2	O-ring	1	
3	Spacer	1	
4	Fork spring	1	
5	Locknut	1	
6	Outer tube	1	
7	Dust seal	1	
8	Oil seal clip	1	
9	Oil seal	1	
10	Washer	1	
11	Damper rod assembly bolt	1	
12	Copper washer	1	
13	Damper rod assembly	1	
14	Inner tube	1	
			For assembly, reverse the disassembly procedure.

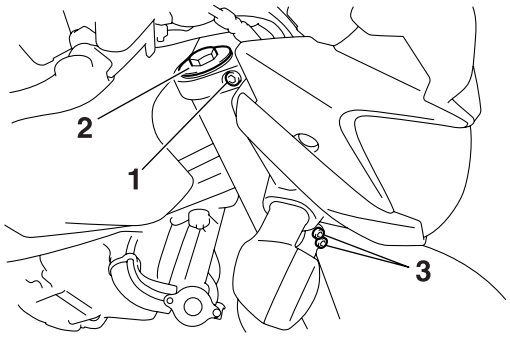
EAS22960
REMOVING THE FRONT FORK LEGS
The following procedure applies to both of the front fork legs.
1. Stand the vehicle on a level surface.

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 bolt “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 “1” (from the damper rod assembly)
   - Spacer “2”
   - Locknut “3”

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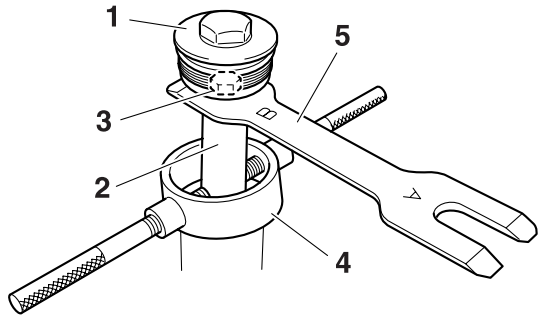
a. Press down on the spacer with the fork spring compressor “4”.
b. Install the rod holder “5” between the locknut “3” and the spacer “2”.

Fork spring compressor
90890-01441
YM-01441
Rod holder
90890-01434
Damper rod holder double ended
YM-01434

TIP
Use the side of the rod holder that is marked “B”.



c. Hold the cap bolt and loosen the locknut.
d. Remove the cap bolt.
e. Remove the rod holder and fork spring compressor.
f. Remove the spacer and locknut.

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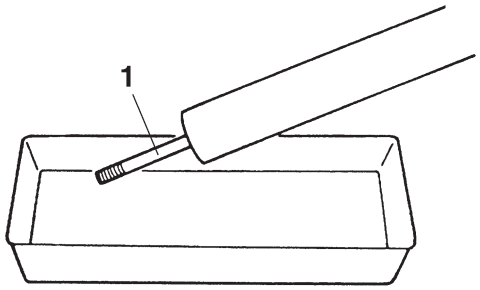
2. Drain:
   - Fork oil

TIP
Stroke the damper rod assembly “1” several times while draining the fork oil.

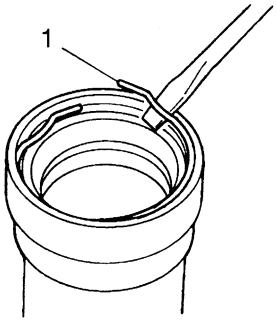


3. Remove:
   - Dust seal
   - Oil seal clip “1” (with a flat-head screwdriver)
   - Oil seal
   - Washer

ECA39P1404

NOTICE

Do not scratch the outer tube.

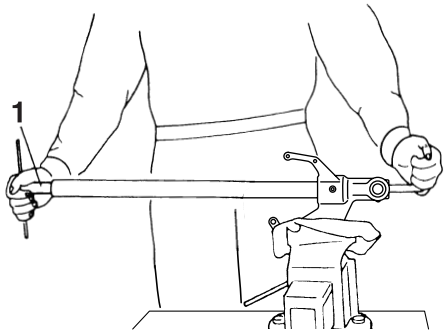


4. Remove:
   - Damper rod assembly bolt
   - Damper rod assembly

TIP

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

Damper rod holder
90890-01423
Damping rod holder
YM-01423



EAS23011

CHECKING THE FRONT FORK LEGS

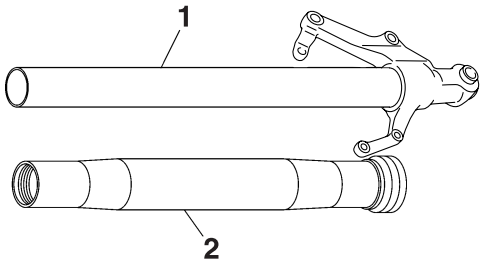
The following procedure applies to both of the front fork legs.

1. Check:
   - Inner tube "1"
   - Outer tube "2"
     Bends/damage/scratches → Replace.

EWA13650

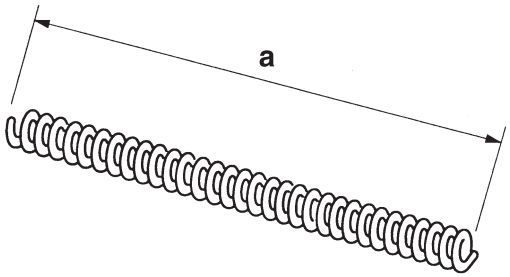
WARNING

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
286.1 mm (11.26 in)
Limit
280.4 mm (11.04 in)

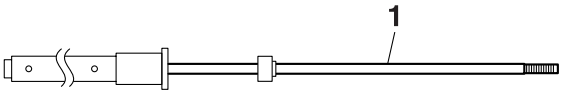


3. Check:
   - Damper rod "1"
     Damage/wear → Replace.
     Obstruction → Blow out all of the oil passages with compressed air.

ECA39P1405

NOTICE

- **The front fork leg has 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.**



EAS23031
ASSEMBLING THE FRONT FORK LEGS

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

EWA39P1404
⚠ WARNING

- **Note that the amount of the fork oil is different in the left and right front fork legs. Make sure to fill each of the left and right front fork legs with the specified amount of the fork oil.**
- **If both front fork legs are not filled with the specified amount of the fork oil, it may cause poor handling and a loss of stability.**

TIP

- When assembling the front fork leg, be sure to replace the following parts:
  - Oil seal
  - Oil seal clip
  - Dust seal
  - Copper washer
  - O-ring
- Before assembling the front fork leg, make sure all of the components are clean.

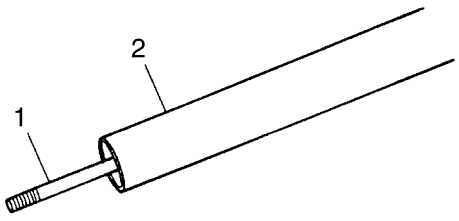
1. Install:
   - Damper rod assembly “1”

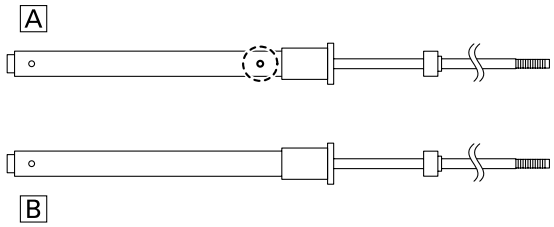
ECA39P1406
NOTICE

Allow the damper rod assembly to slide slowly down the inner tube “2” until it protrudes from the bottom of the inner tube. Be careful not to damage the inner tube.

TIP

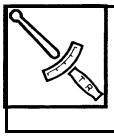
The left side damper rod assembly has the two holes of oil path, unlike the right side.





A. Left side
B. Right side

2. Tighten:
   - Damper rod assembly bolt
     (along with the copper washer New)

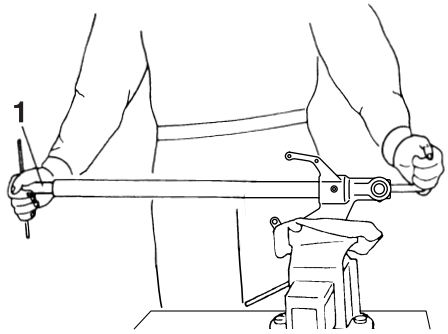


Damper rod assembly bolt
23 Nm (2.3 m·kgf, 17 ft·lbf)
LOCTITE®

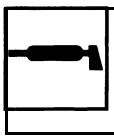
TIP

While holding the damper rod assembly with the damper rod holder “1”, tighten the damper rod assembly bolt.

Damper rod holder
90890-01423
Damping rod holder
YM-01423



3. Lubricate:
   - Inner tube’s outer surface



Recommended oil
Suspension oil 01 or equivalent

4. Install:
   - Dust seal “1” New
   - Oil seal clip “2” New
   - Oil seal “3” New
   - Washer “4”
     (to the inner tube)

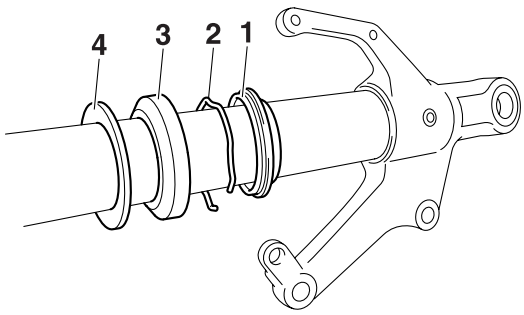
ECA14B1007

NOTICE

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

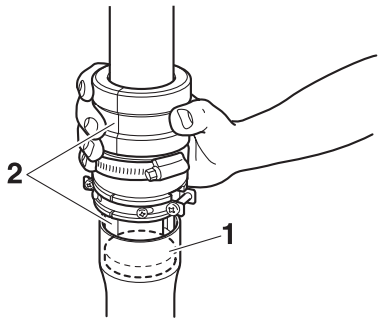
TIP

- Before installing the oil seal, lubricate its lips with lithium-soap-based grease.
- Lubricate the outer surface of the inner tube with fork oil.



5. Install:
   - Outer tube
     (to the inner tube)
6. Install:
   - Washer
   - Oil seal “1”
     (with the fork seal driver “2”)

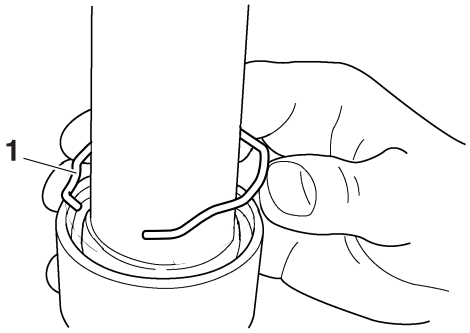
Fork seal driver
90890-01442
Adjustable fork seal driver (36–46 mm)
YM-01442



7. Install:
   - Oil seal clip “1”

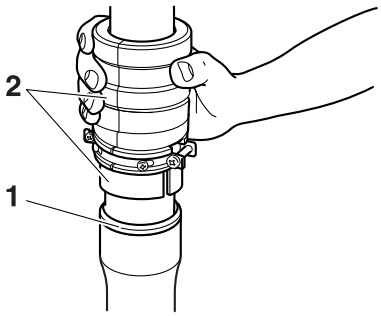
TIP

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



8. Install:
   - Dust seal “1”
     (with the fork seal driver “2”)

Fork seal driver
90890-01442
Adjustable fork seal driver (36–46 mm)
YM-01442



9. Fill:
   - Front fork leg
     (with the specified amount of the recommended fork oil)

Recommended oil
Suspension oil 01 or equivalent
Quantity
Left
563.0 cm³ (19.04 US oz, 19.86 Imp.oz)
Right
555.0 cm³ (18.77 US oz, 19.57 Imp.oz)

ECA14230

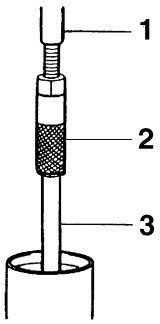
NOTICE

- **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.

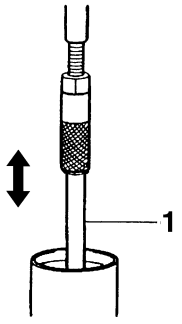
10. Install:
    • Rod puller “1”
    • Rod puller attachment (M10) “2” (onto the damper rod “3”)

Rod puller
90890-01437
Universal damping rod bleeding tool set
YM-A8703
Rod puller attachment (M10)
90890-01436
Universal damping rod bleeding tool set
YM-A8703



11. After filling the front fork leg, slowly stroke the damper rod “1” up and down (at least ten times) to distribute the fork oil.

TIP
Be sure to stroke the damper rod slowly because the fork oil may spurt out.

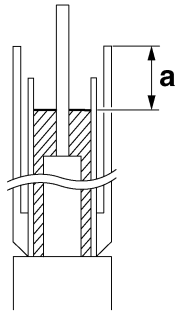


12. Before measuring the fork oil level, wait ten minutes until the oil has settled and the air bubbles have dispersed.

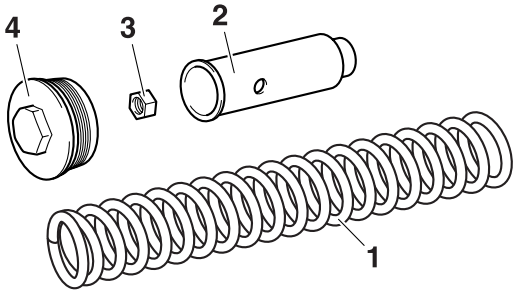
TIP
Be sure to bleed the front fork leg of any residual air.

13. Measure:
    • Front fork leg oil level “a” (from the top of the outer tube, with the outer tube fully compressed and without the fork spring)
    Out of specification → Correct.

Level
Left
82.0 mm (3.23 in)
Right
85.0 mm (3.35 in)



14. Install:
    • Fork spring “1”
    • Spacer “2”
    • Locknut “3”
    • Cap bolt “4”
    (along with the O-ring New)



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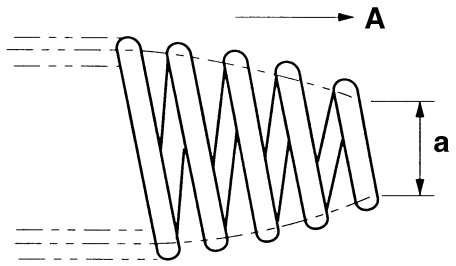
a. Remove the rod puller and rod puller attachment.
b. Install the fork spring.

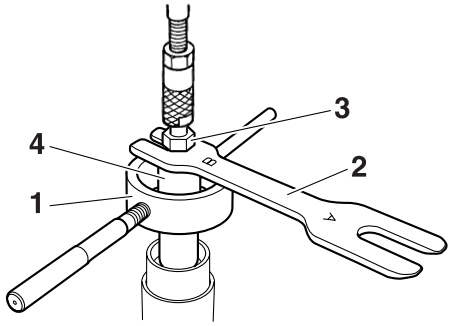
TIP
Install the fork spring with the smaller diameter “a” facing up “A”.



c. Install the locknut all the way onto the damper rod assembly.
d. Install the spacer.
e. Install the rod puller, rod puller attachment, and fork spring compressor.
f. Press down on the spacer with the fork spring compressor “1”.
g. Pull up the rod puller and install the rod holder “2” between the locknut “3” and the spacer “4”.

Rod puller
90890-01437
Universal damping rod bleeding tool set
YM-A8703
Rod puller attachment (M10)
90890-01436
Universal damping rod bleeding tool set
YM-A8703
Fork spring compressor
90890-01441
YM-01441
Rod holder
90890-01434
Damper rod holder double ended
YM-01434

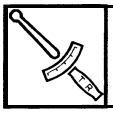
TIP
Use the side of the rod holder that is marked “B”.



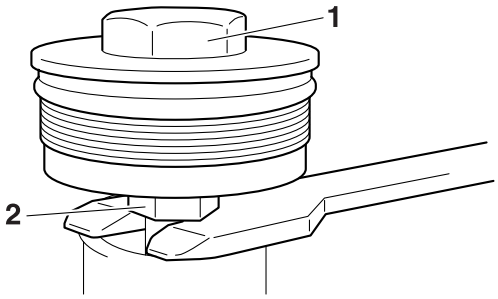
h. Remove the rod puller and rod puller attachment.
i. Install the cap bolt all the way onto the damper rod assembly, and finger tighten it.

EWA13670
⚠ WARNING
Always use a new cap bolt O-ring.

j. Hold the cap bolt “1” and tighten the locknut “2” to specification.



Locknut
15 Nm (1.5 m·kgf, 11 ft·lbf)



k. Remove the rod holder and fork spring compressor.

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15. Install:
    - Cap bolt
      (to the outer tube)

TIP
- Temporarily tighten the cap bolt.
- When to tighten the cap bolt to the specified torque is after installing the front fork leg to the vehicle and tightening the lower bracket pinch bolts.

EAS23050
INSTALLING THE FRONT FORK LEGS

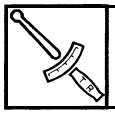
The following procedure applies to both of the front fork legs.

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

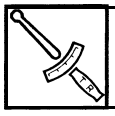
TIP

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

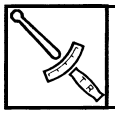
2. Tighten:
   - Lower bracket pinch bolts “1”

	**Lower bracket pinch bolt** **23 Nm (2.3 m·kgf, 17 ft·lbf)**

   - Cap bolt “2”

	**Cap bolt** **23 Nm (2.3 m·kgf, 17 ft·lbf)**

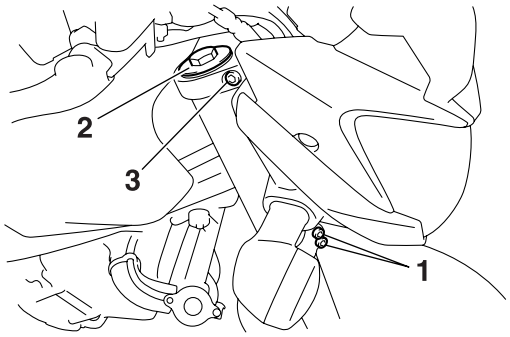
   - Upper bracket pinch bolt “3”

	**Upper bracket pinch bolt** **26 Nm (2.6 m·kgf, 19 ft·lbf)**

EWA13680

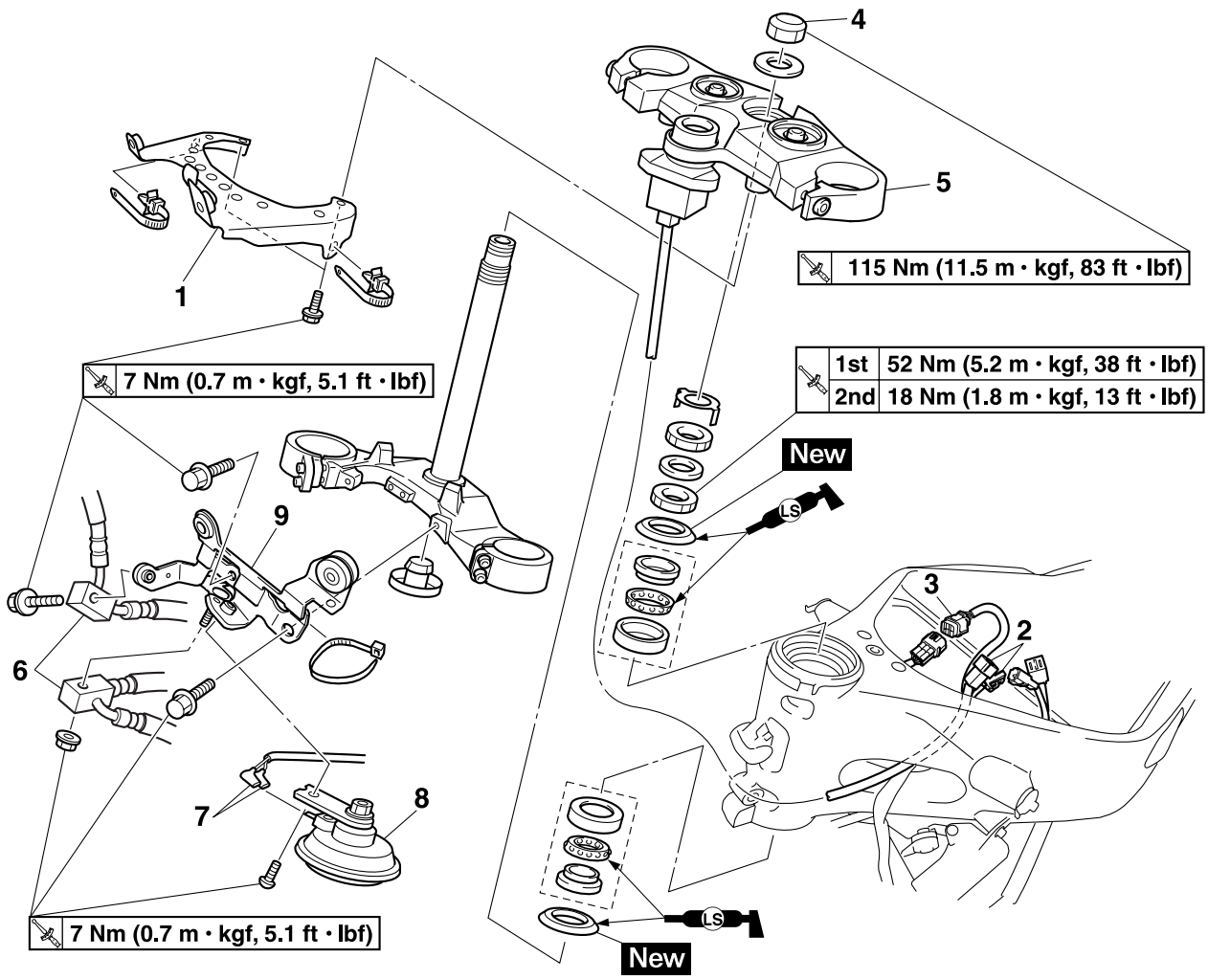
⚠ WARNING

Make sure the brake hoses are routed properly.



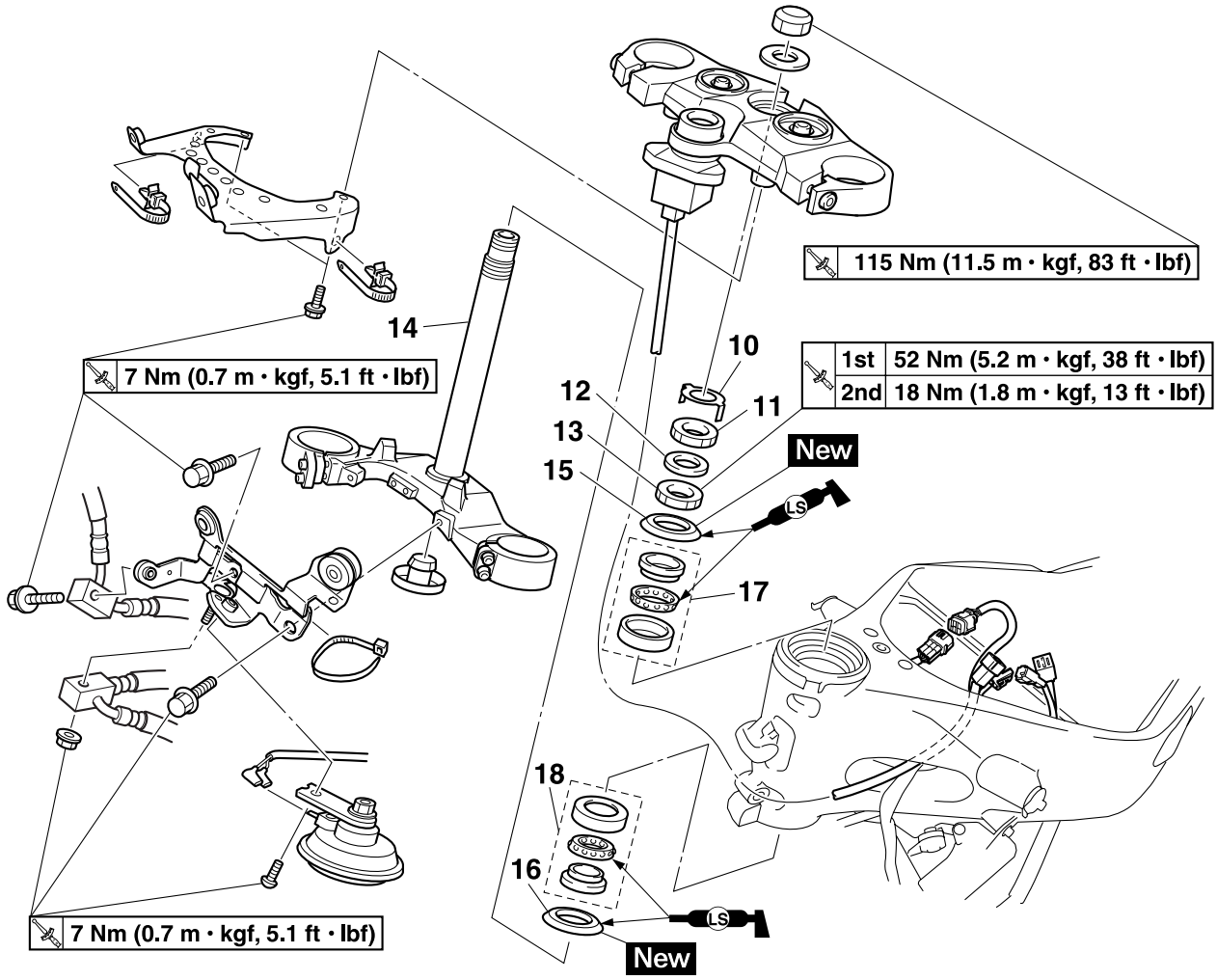
EAS23090
STEERING HEAD

Removing the lower bracket (FZ8NA)



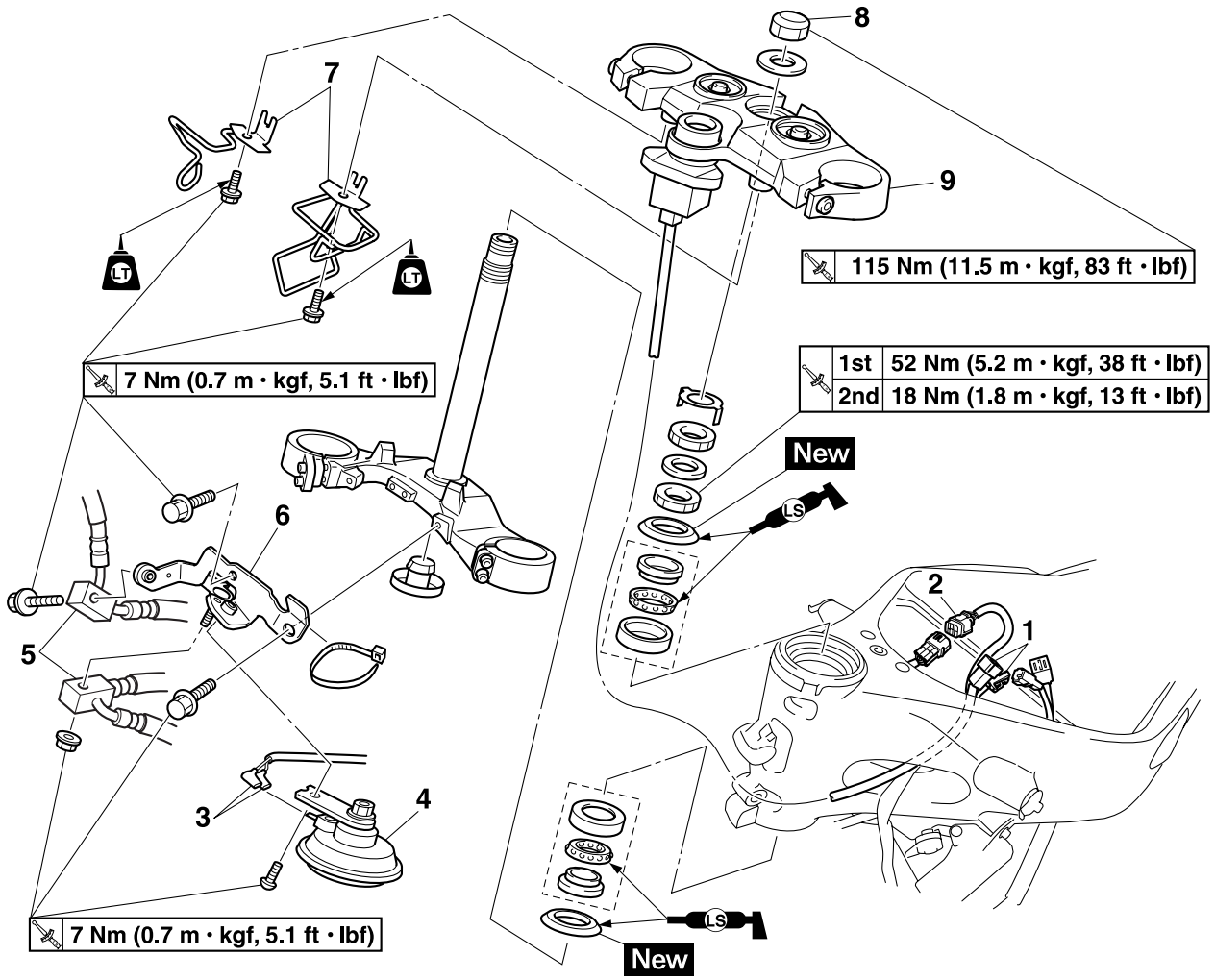
Order	Job/Parts to remove	Q'ty	Remarks
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Air filter case		Refer to "GENERAL CHASSIS" on page 4-1.
	Meter assembly		Refer to "GENERAL CHASSIS" on page 4-1.
	Handlebar		Refer to "HANDLEBAR" on page 4-64.
	Front fork legs		Refer to "FRONT FORK" on page 4-69.
1	Upper headlight stay	1	
2	Main switch coupler	2	Disconnect.
3	Immobilizer coupler	1	Disconnect.
4	Steering stem nut	1	
5	Upper bracket	1	
6	Front brake hose joint	2	Disconnect.
7	Horn lead connector	2	Disconnect.
8	Horn	1	
9	Lower headlight stay	1	

Removing the lower bracket (FZ8NA)



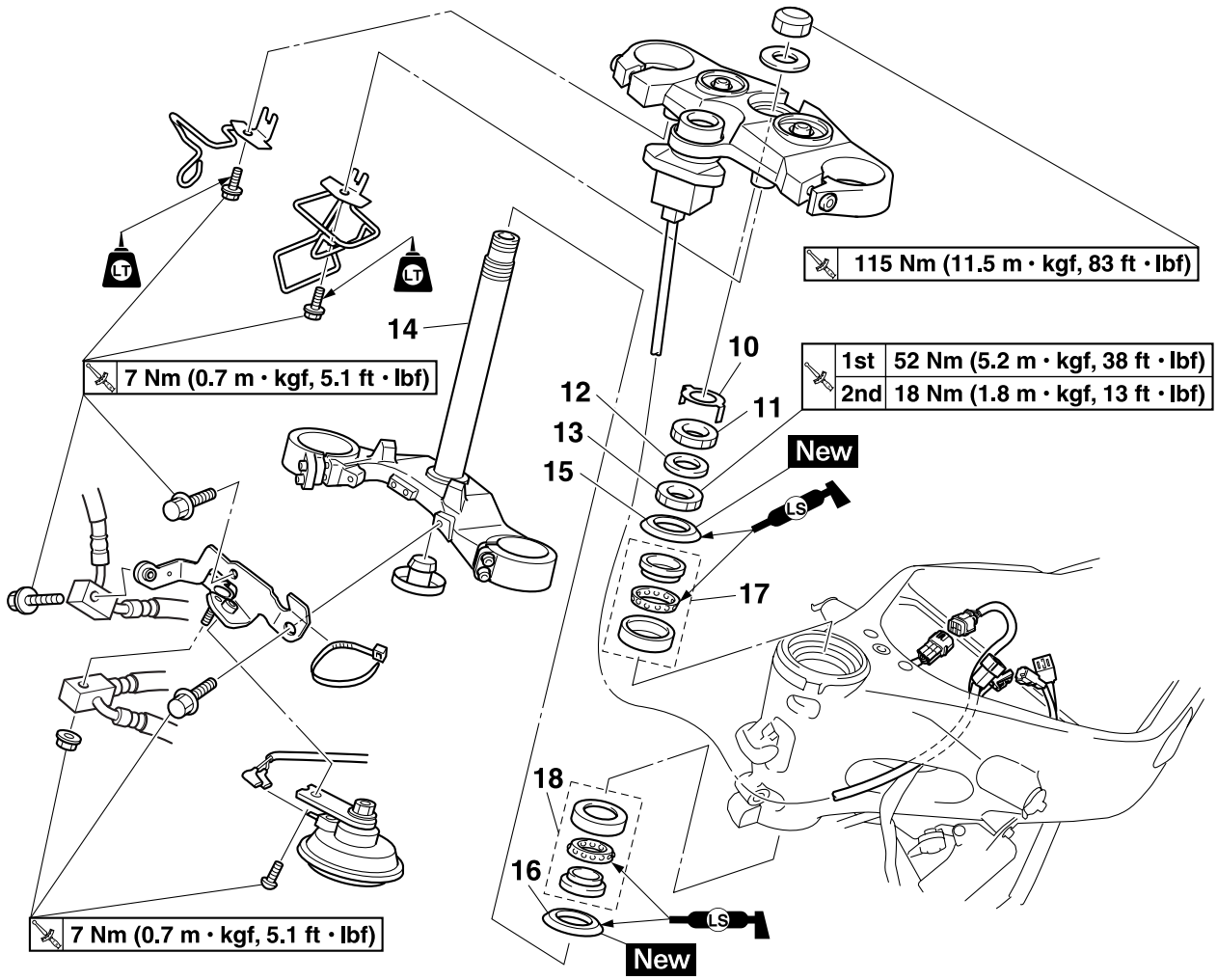
Order	Job/Parts to remove	Q'ty	Remarks
10	Lock washer	1	
11	Upper ring nut	1	
12	Rubber washer	1	
13	Lower ring nut	1	
14	Lower bracket	1	
15	Bearing cover	1	
16	Lower bearing dust seal	1	
17	Upper bearing	1	
18	Lower bearing	1	
			For installation, reverse the removal procedure.

Removing the lower bracket (FZ8SA)



Order	Job/Parts to remove	Q'ty	Remarks
	Inner panel/side panel/front cowling 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.
	Handlebar		Refer to "HANDLEBAR" on page 4-64.
	Front fork legs		Refer to "FRONT FORK" on page 4-69.
1	Main switch coupler	2	Disconnect.
2	Immobilizer coupler	1	Disconnect.
3	Horn lead connector	2	Disconnect.
4	Horn	1	
5	Front brake hose joint	2	Disconnect.
6	Horn bracket	1	
7	Cable holder	2	
8	Steering stem nut	1	
9	Upper bracket	1	

Removing the lower bracket (FZ8SA)



Order	Job/Parts to remove	Q'ty	Remarks
10	Lock washer	1	
11	Upper ring nut	1	
12	Rubber washer	1	
13	Lower ring nut	1	
14	Lower bracket	1	
15	Bearing cover	1	
16	Lower bearing dust seal	1	
17	Upper bearing	1	
18	Lower bearing	1	
			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.

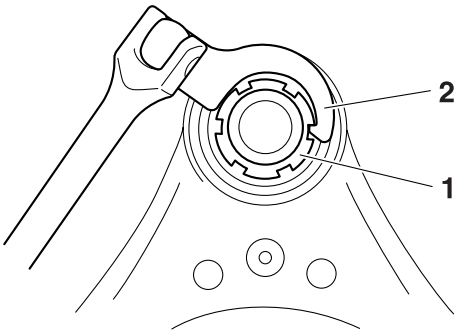
2. Remove:
   - Upper ring nut
   - Rubber washer
   - Lower ring nut “1”
   - Lower bracket

EWA13730
⚠ WARNING

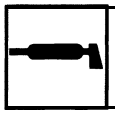
Securely support the lower bracket so that there is no danger of it falling.

TIP
- Hold the lower ring nut with steering nut wrench, and then remove the upper ring nut with the ring nut wrench.
- Remove the lower ring nut with the steering nut wrench “2”.

Ring nut wrench
90890-01268
Spanner wrench
YU-01268
Steering nut wrench
90890-01403
Exhaust flange nut wrench
YU-A9472

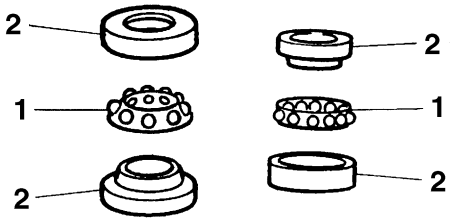


EAS23120
CHECKING THE STEERING HEAD
1. Wash:
   - Bearings
   - Bearing races



Recommended cleaning solvent
Kerosene

2. Check:
   - Bearings “1”
   - Bearing races “2”
     Damage/pitting → Replace the bearings and bearing races as a set.



3. Replace:
   - Bearings
   - Bearing races

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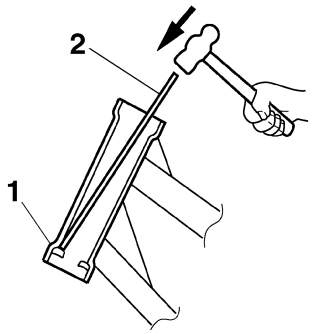
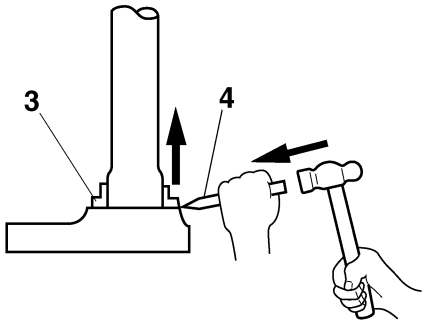
a. Remove the bearing races from the steering head pipe “1” with a long rod “2” and hammer.
b. Remove the bearing race “3” from the lower bracket with a floor chisel “4” and hammer.
c. Install a new dust seal and new bearing races.

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 dust seal.





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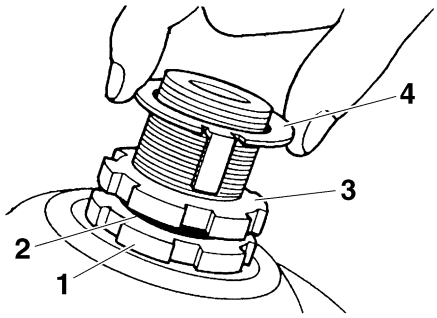
4. Check:
   - Upper bracket
   - Lower bracket
     (along with the steering stem)
     Bends/cracks/damage → Replace.

EAS23140
INSTALLING THE STEERING HEAD

1. Lubricate:
   - Upper bearing
   - Lower bearing

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

2. Install:
   - Lower ring nut “1”
   - Rubber washer “2”
   - Upper ring nut “3”
   - Lock washer “4”
     Refer to “CHECKING AND ADJUSTING THE STEERING HEAD” on page 3-21.



3. Install:
   - Upper bracket
   - Steering stem nut

TIP
Temporarily tighten the steering stem nut.

4. Install:
   - Front fork legs
     Refer to “FRONT FORK” on page 4-69.

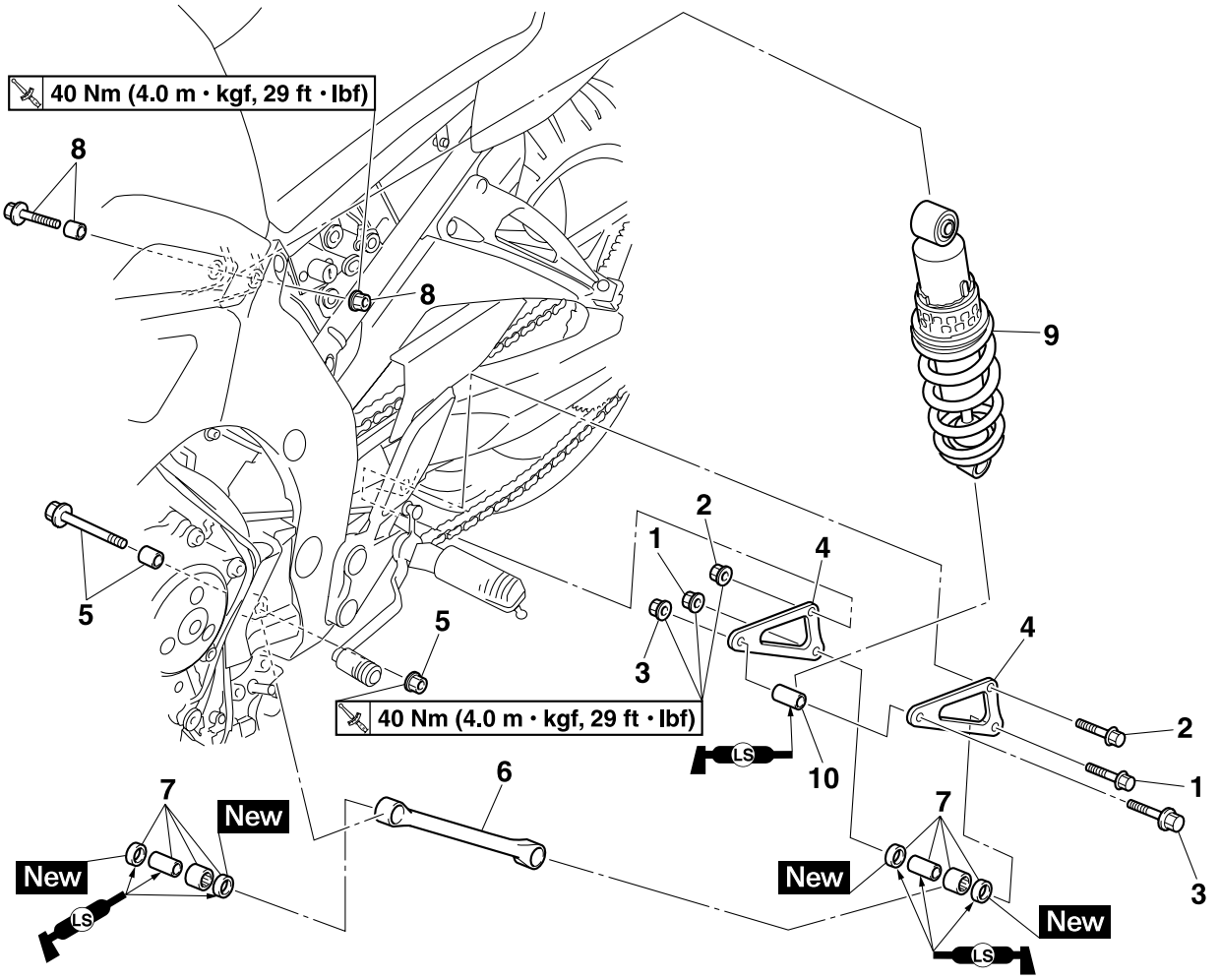
TIP
Temporarily tighten the upper and lower bracket pinch bolts.

5. Tighten:
   - Steering stem nut

	Steering stem nut **115 Nm (11.5 m·kgf, 83 ft·lbf)**

EAS23160
REAR SHOCK ABSORBER ASSEMBLY

Removing the rear shock absorber assembly



Order	Job/Parts to remove	Q'ty	Remarks
	Left side cover		Refer to "GENERAL CHASSIS" on page 4-1.
	Right side cover		Refer to "GENERAL CHASSIS" on page 4-1.
	Brake fluid reservoir bolt		Refer to "REAR BRAKE" on page 4-43.
1	Self-locking nut/bolt	1/1	
2	Self-locking nut/bolt	1/1	
3	Self-locking nut/bolt	1/1	
4	Relay arm	2	
5	Self-locking nut/bolt/collar	1/1/1	
6	Connecting arm	1	
7	Collar/oil seal/bearing	2/4/2	
8	Self-locking nut/bolt/collar	1/1/1	
9	Rear shock absorber assembly	1	
10	Collar	1	
			For installation, reverse the removal procedure.

EAS23180
HANDLING THE REAR SHOCK ABSORBER
EWA13740

⚠ WARNING

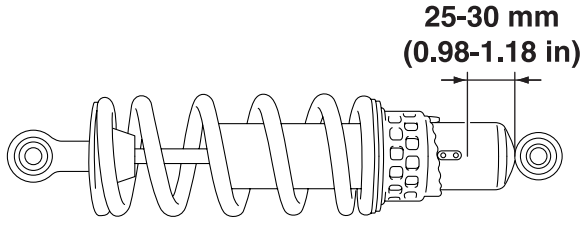
This rear shock absorber contains highly compressed nitrogen gas. Before handling the rear shock absorber, read and make sure you understand the following information. The manufacturer cannot be held responsible for property damage or personal injury that may result from improper handling of the rear 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 25–30 mm (0.98–1.18 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.

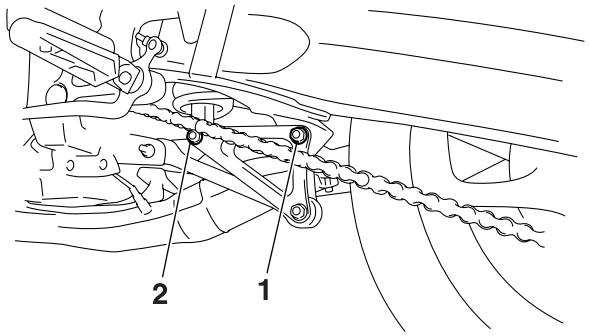
TIP

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

2. Remove:
   - Relay arm and swingarm bolt “1”
   - Rear shock absorber assembly lower bolt “2”

TIP

When removing the bolt, hold the swingarm so that it does not drop down.



3. Remove:
   - Rear shock absorber assembly upper bolt
   - Rear shock absorber assembly

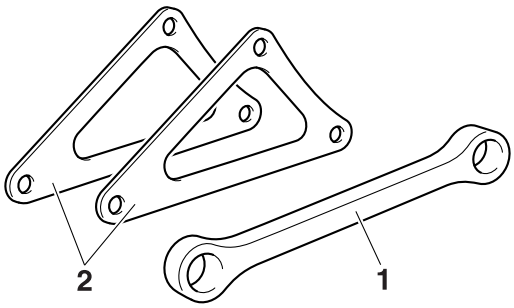
TIP

Remove the rear shock absorber assembly from between the swingarm and frame.

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
   - Bushings
     Damage/wear → Replace the rear shock absorber assembly.
   - Bolts
     Bends/damage/wear → Replace.

EAS23261
CHECKING THE CONNECTING ARM AND RELAY ARM

1. Check:
   - Connecting arm “1”
   - Relay arms “2”
     Damage/wear → Replace.



2. Check:
   - Bearings
   - Oil seals
     Damage/pitting → Replace.
3. Check:
   - Collars
     Damage/scratches → Replace.

EAS23311
INSTALLING THE REAR SHOCK ABSORBER ASSEMBLY

1. Lubricate:
   - Collars
   - Oil seals

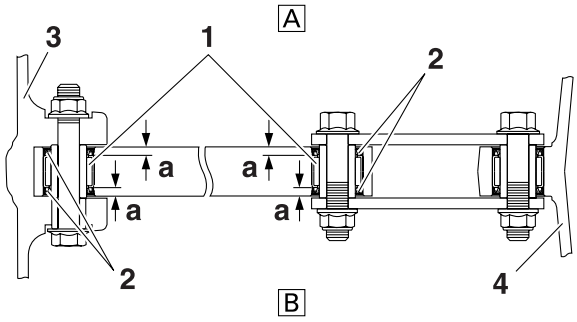
	Recommended lubricant **Lithium-soap-based grease**

2. Install:
   - Bearings “1”
     (to the connecting arm)
   - Oil seals “2” New
     (to the connecting arm)

	Installed depth of bearing “a” **4.0 mm (0.16 in)**

TIP

When installing the oil seals to the connecting arm, face the character stamp of the oil seals outside.



3. Frame
4. Swingarm

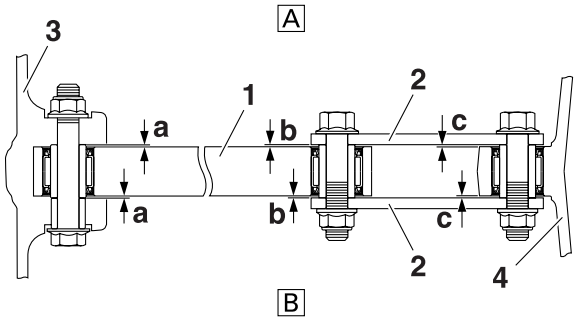
A. Left side
B. Right side

3. Install:
   - Rear shock absorber assembly
   - Connecting arm “1”
   - Relay arms “2”

	Frame and connecting arm clearance “a” **1.0 mm (0.04 in)** **Relay arm and connecting arm clearance “b”** **1.0 mm (0.04 in)** **Relay arm and swingarm clearance “c”** **1.0 mm (0.04 in)**

TIP

- Install the rear shock absorber upper bolt and frame and connecting arm bolt from the right.
- Install the rear shock absorber lower bolt, relay arm and connecting arm bolt, and relay arm and swingarm bolt from the left.
- When installing the rear shock absorber assembly, lift up the swingarm.



3. Frame
4. Swingarm

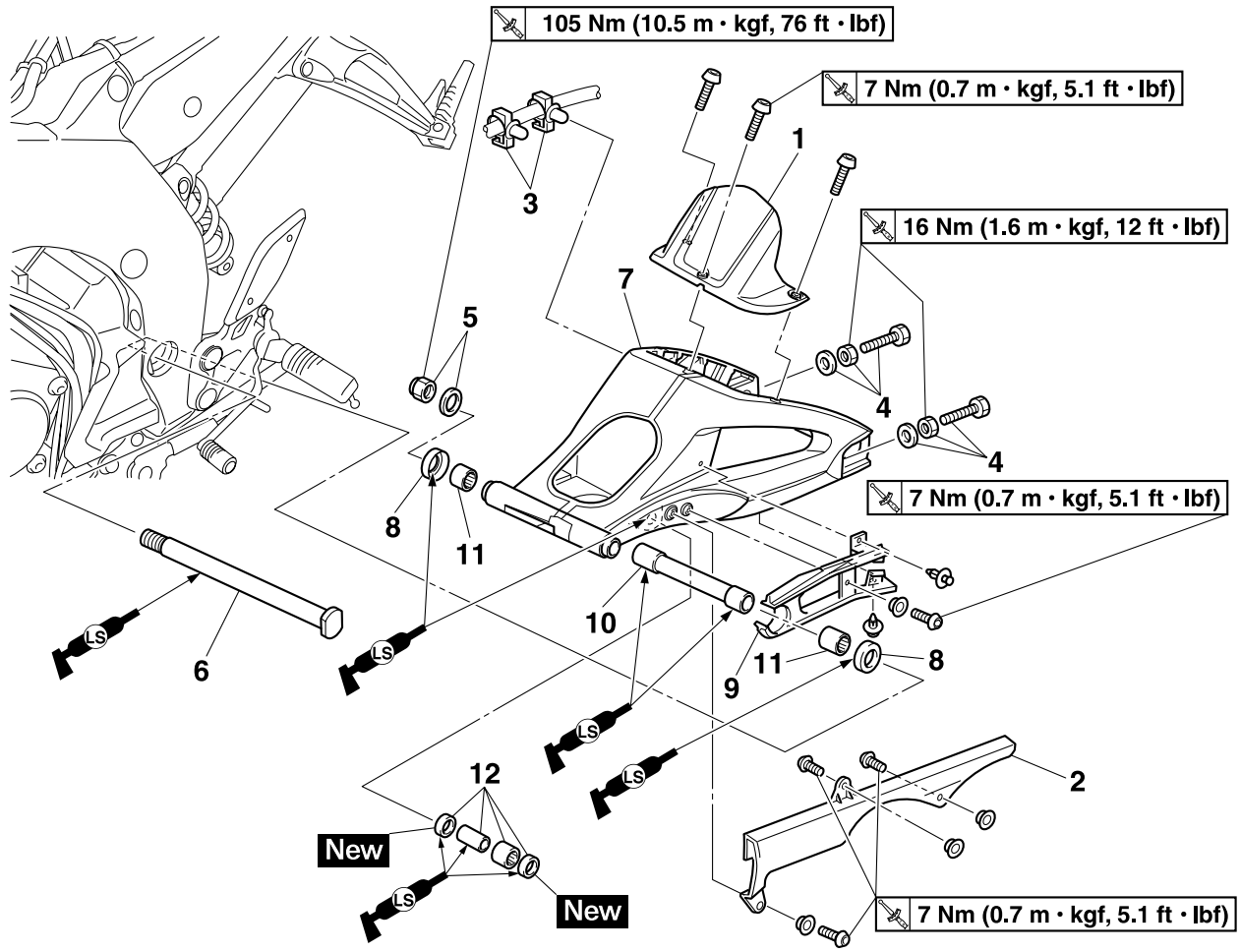
A. Left side
B. Right side

4. Tighten:
   - Rear shock absorber assembly upper nut
   - Rear shock absorber assembly lower nut
   - Frame and connecting arm nut
   - Relay arm and swingarm nut
   - Relay arm and connecting arm nut

Rear shock absorber assembly upper nut
40 Nm (4.0 m·kgf, 29 ft·lbf)
Rear shock absorber assembly lower nut
40 Nm (4.0 m·kgf, 29 ft·lbf)
Frame and connecting arm nut
40 Nm (4.0 m·kgf, 29 ft·lbf)
Relay arm and swingarm nut
40 Nm (4.0 m·kgf, 29 ft·lbf)
Relay arm and connecting arm nut
40 Nm (4.0 m·kgf, 29 ft·lbf)

EAS23330
SWINGARM

Removing the swingarm



Order	Job/Parts to remove	Q'ty	Remarks
	Rear brake caliper		Refer to "REAR BRAKE" on page 4-43.
	Rear wheel		Refer to "REAR WHEEL" on page 4-21.
	Relay arm		Refer to "REAR SHOCK ABSORBER ASSEMBLY" on page 4-84.
	Chain		Refer to "CHAIN DRIVE" on page 4-91.
1	Rear fender	1	
2	Drive chain guard	1	
3	Brake hose holder	2	
4	Drive chain adjusting bolt/locknut/washer	2/2/2	
5	Pivot shaft nut/washer	1/1	
6	Pivot shaft	1	
7	Swingarm	1	
8	Dust cover	2	
9	Drive chain guide	1	
10	Spacer	1	
11	Bearing	2	
12	Collar/oil seal/bearing	1/2/1	
			For installation, reverse the removal procedure.

EAS23350
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.

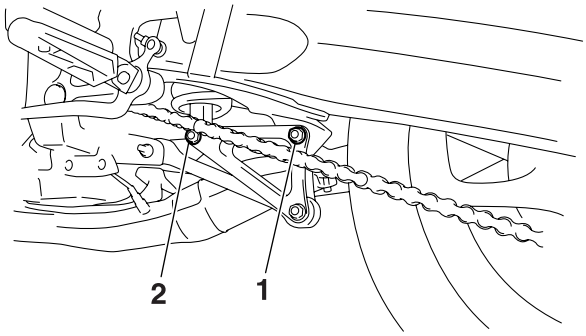
TIP

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

2. Remove:
   - Relay arm and swingarm bolt “1”
   - Rear shock absorber assembly lower bolt “2”

TIP

When removing the bolt, hold the swingarm so that it does not drop down.



3. Measure:
   - Swingarm side play
   - Swingarm vertical movement

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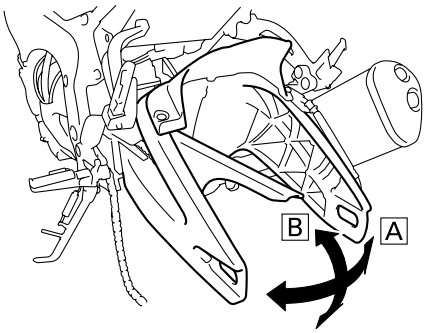
a. Measure the tightening torque of the pivot shaft nut.

	Pivot shaft nut **105 Nm (10.5 m·kgf, 76 ft·lbf)**

b. Check the swingarm side play “A” by moving the swingarm from side to side.
   If the swingarm has side-to-side play, check the spacer, bearings, and dust covers.
c. Check the swingarm vertical movement “B” by moving the swingarm up and down.
   If the swingarm vertical movement is not smooth or if there is binding, check the pivot shaft, spacer, bearings, and dust covers.



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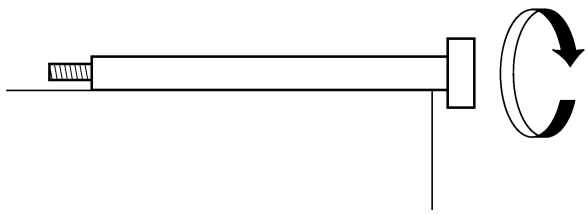
4. Remove:
   - Drive chain
     Refer to “REMOVING THE DRIVE CHAIN” on page 4-92.
   - Swingarm

EAS23361
CHECKING THE SWINGARM

1. Check:
   - Swingarm
     Bends/cracks/damage → Replace.
2. Check:
   - Pivot shaft
     Roll the pivot shaft on a flat surface.
     Bends → Replace.

EWA13770
⚠ WARNING

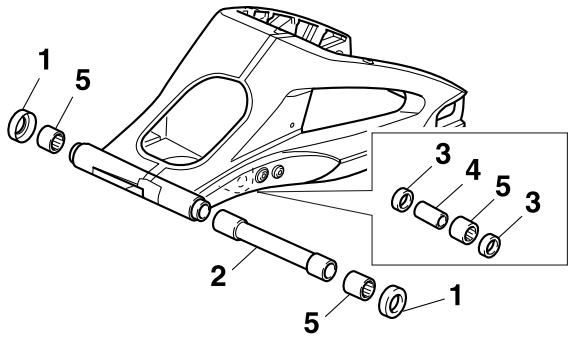
Do not attempt to straighten a bent pivot shaft.



3. Wash:
   - Pivot shaft
   - Dust covers
   - Spacer
   - Washer

	Recommended cleaning solvent **Kerosene**

4. Check:
   - Dust covers “1”
   - Spacer “2”
   - Oil seals “3”
     Damage/wear → Replace.
   - Collar “4”
     Damage/scratches → Replace.
   - Bearings “5”
     Damage/pitting → Replace.



EAS23380
INSTALLING THE SWINGARM

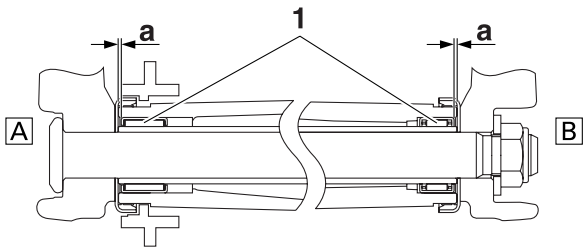
1. Lubricate:
   - Spacer
   - Dust covers
   - Pivot shaft
   - Oil seals
   - Collar

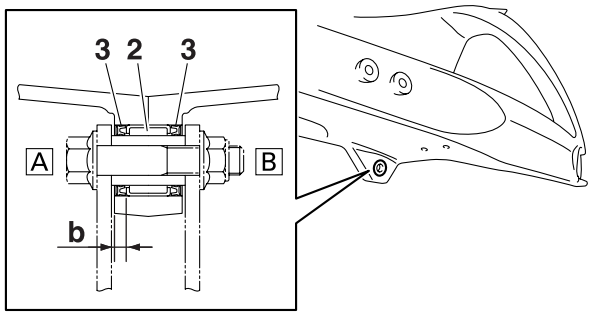
Recommended lubricant
Lithium-soap-based grease

2. Install:
   - Bearings “1”, “2”
     (to the swingarm)
   - Oil seals “3” New
     (to the swingarm)

Installed depth of bearing “a”
0–1.0 mm (0–0.04 in)
Installed depth of bearing “b”
4.0 mm (0.16 in)

TIP
When installing the oil seals to the swingarm, face the character stamp of the oil seals outside.





A. Left side
B. Right side

3. Install:
   - Swingarm
   - Pivot shaft

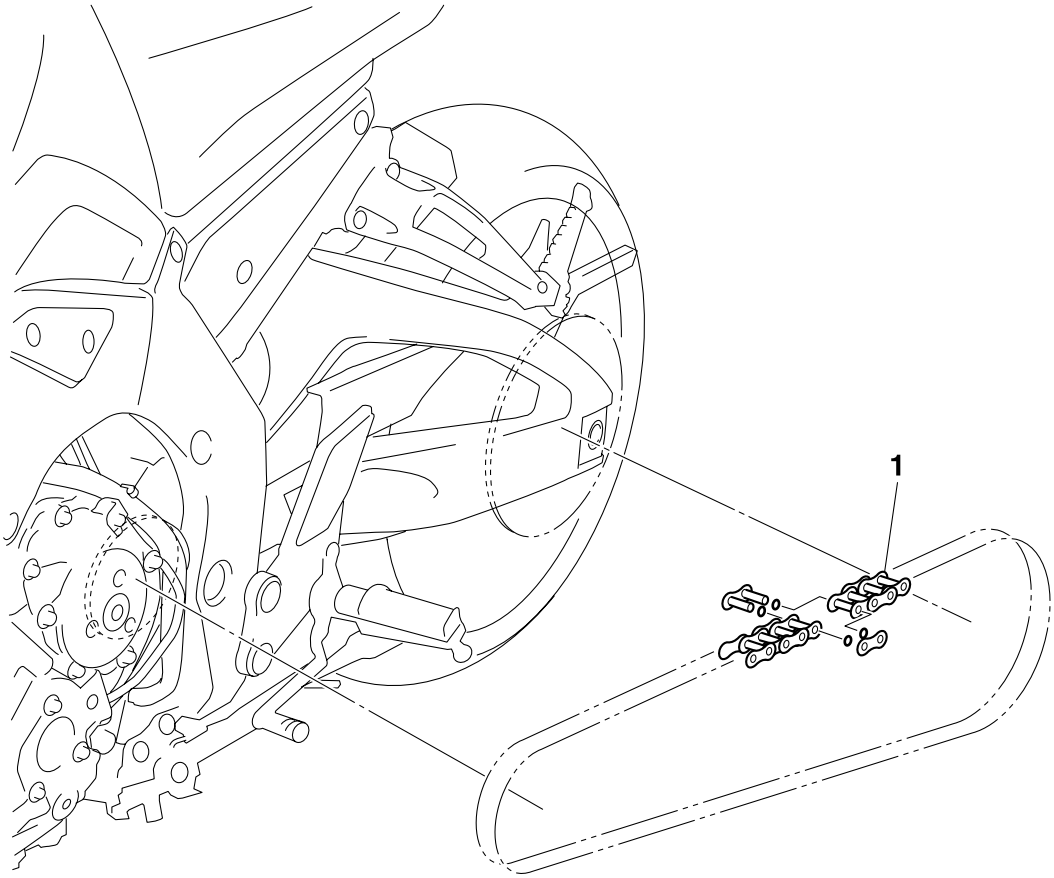
Pivot shaft nut
105 Nm (10.5 m·kgf, 76 ft·lbf)

4. Install:
   - Drive chain
     Refer to “INSTALLING THE DRIVE CHAIN” on page 4-94.
   - Rear shock absorber assembly
   - Connecting arm
   - Relay arms
   - Rear wheel
     Refer to “REAR SHOCK ABSORBER ASSEMBLY” on page 4-84 and “REAR WHEEL” on page 4-21.
5. Adjust:
   - Drive chain slack
     Refer to “ADJUSTING THE DRIVE CHAIN SLACK” on page 3-19.

Drive chain slack
20.0–30.0 mm (0.79–1.18 in)

EAS23400
CHAIN DRIVE

Removing the drive chain



Order	Job/Parts to remove	Q'ty	Remarks
	Drive sprocket		Refer to "ENGINE REMOVAL" on page 5-3.
1	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:
   - Drive chain

TIP
Cut the drive chain with the drive chain cut & rivet tool. (Use goods on the market)

EAS23441
CHECKING THE DRIVE CHAIN

1. Measure:
   - 15-link section “a” of the drive chain
     Out of specification → Replace the drive chain.

15-link length limit
239.3 mm (9.42 in)

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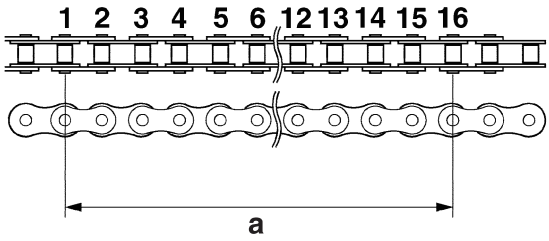
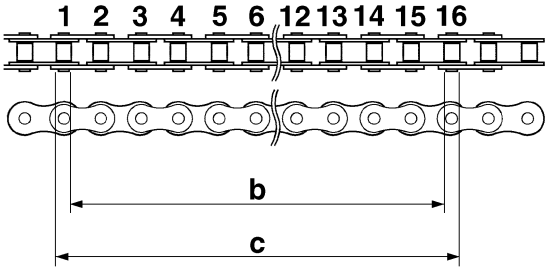
a. Measure the length “b” between the inner sides of the pins and the length “c” between the outer sides of the pins on a 15-link section of the drive chain as shown in the illustration.
b. Calculate the length “a” of the 15-link section of the drive chain using the following formula.
   Drive chain 15-link section length “a” = (length “b” between pin inner sides + length “c” between pin outer sides)/2

TIP
- When measuring a 15-link section of the drive chain, make sure that the drive chain is taut.
- Perform this procedure 2–3 times, at a different location each time.





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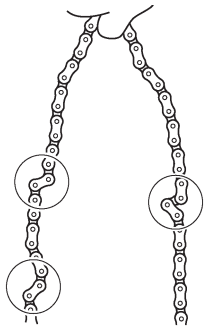
2. Check:
   - Drive chain
     Stiffness → Clean and lubricate or replace.



3. Clean:
   - Drive chain

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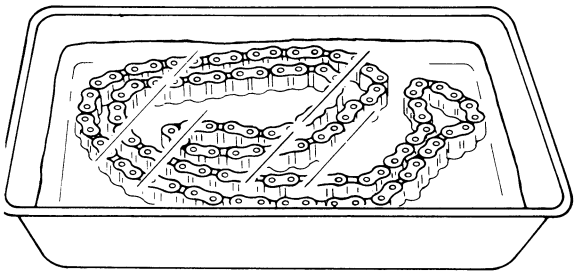
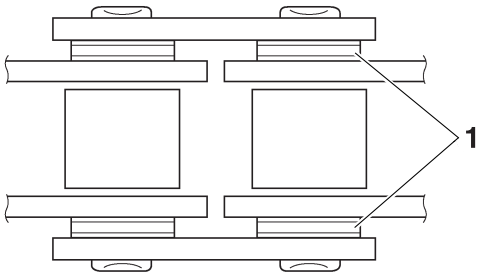
a. Wipe the drive chain with a clean cloth.
b. Put the drive chain in kerosene and remove any remaining dirt.
c. Remove the drive chain from the kerosene and completely dry it.

ECA39P1403

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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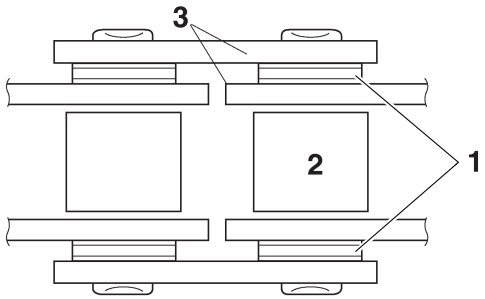
4. Check:
   - O-rings "1"
     Damage → Replace the drive chain.
   - Drive chain rollers "2"
     Damage/wear → Replace the drive chain.
   - Drive chain side plates "3"
     Damage/wear/cracks → Replace the drive chain.



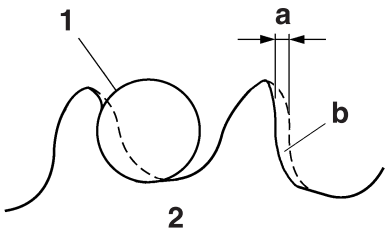
5. Lubricate:
   - Drive chain

Recommended lubricant
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 sprocket

EAS23470

CHECKING THE REAR WHEEL SPROCKET

Refer to "CHECKING AND REPLACING THE REAR WHEEL SPROCKET" on page 4-25.

EAS23480

CHECKING THE REAR WHEEL DRIVE HUB

Refer to "CHECKING THE REAR WHEEL DRIVE HUB" on page 4-24.

EAS39P1403
INSTALLING THE DRIVE CHAIN

1. Install:
   • Drive chain

TIP
Install the drive chain joint with the drive chain cut & rivet tool. (Use goods on the market)

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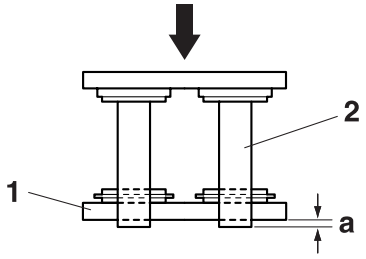
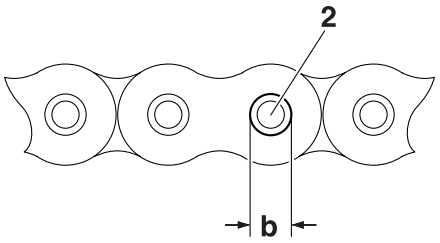
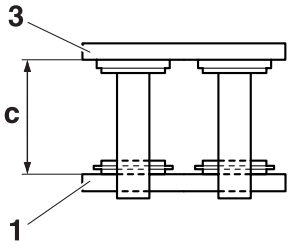
a. When press fitting the connecting plate "1", make sure the space "a" between the end of the connecting pin "2" and the connecting plate is 1.2–1.4 mm (0.05–0.06 in).



b. After riveting, make sure the diameter between the edges "b" of the connecting pin "2" is 5.5–5.8 mm (0.22–0.23 in).



c. After riveting, make sure the space "c", which is inside of the connecting link "3" and inside of the connecting plate "1", is 14.1–14.3 mm (0.56–0.65 in).



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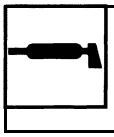
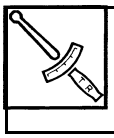
2. Lubricate:
   • Drive chain



Recommended lubricant
Chain lubricant suitable for O-ring chains

3. Install:
   • Drive sprocket
   • Washer
   • Drive sprocket nut New
   Refer to "ENGINE REMOVAL" on page 5-3.



Drive sprocket nut
85 Nm (8.5 m·kgf, 61 ft·lbf)
LOCTITE®

4. Adjust:
   • Drive chain slack
   Refer to "ADJUSTING THE DRIVE CHAIN SLACK" on page 3-19.

Drive chain slack
20.0–30.0 mm (0.79–1.18 in)

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.

ENGINE

EAS14B1052
ENGINE INSPECTION

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:
   - Ignition coils
   - Spark plugs

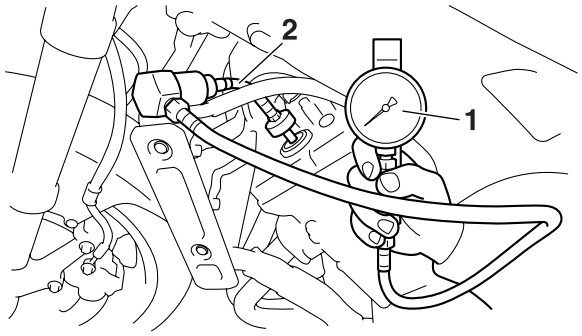
ECA13340

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.

4. Install:
   - Compression gauge "1"
   - Extension "2"

Compression gauge
90890-03081
Engine compression tester
YU-33223
Extension
90890-04136



5. Measure:
   - Compression pressure
     Out of specification → Refer to steps (c) and (d).

Standard compression pressure (at sea level)
1480 kPa/350 r/min (14.8 kgf/cm²/350 r/min, 210.5 psi/350 r/min)
Minimum–Maximum
1290–1660 kPa/350 r/min (12.9–16.6 kgf/cm²/350 r/min, 183.5–236.1 psi/350 r/min)

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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.

EWA39P1501

⚠ WARNING

To prevent sparking the plug, remove all ignition coil couplers and fuel injector couplers before cranking the engine.

TIP

The difference in compression pressure between cylinders should not exceed 100 kPa (1 kg/cm², 15 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 possibly defective → Repair.

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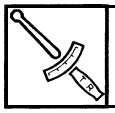
6. Install:
   • Spark plug

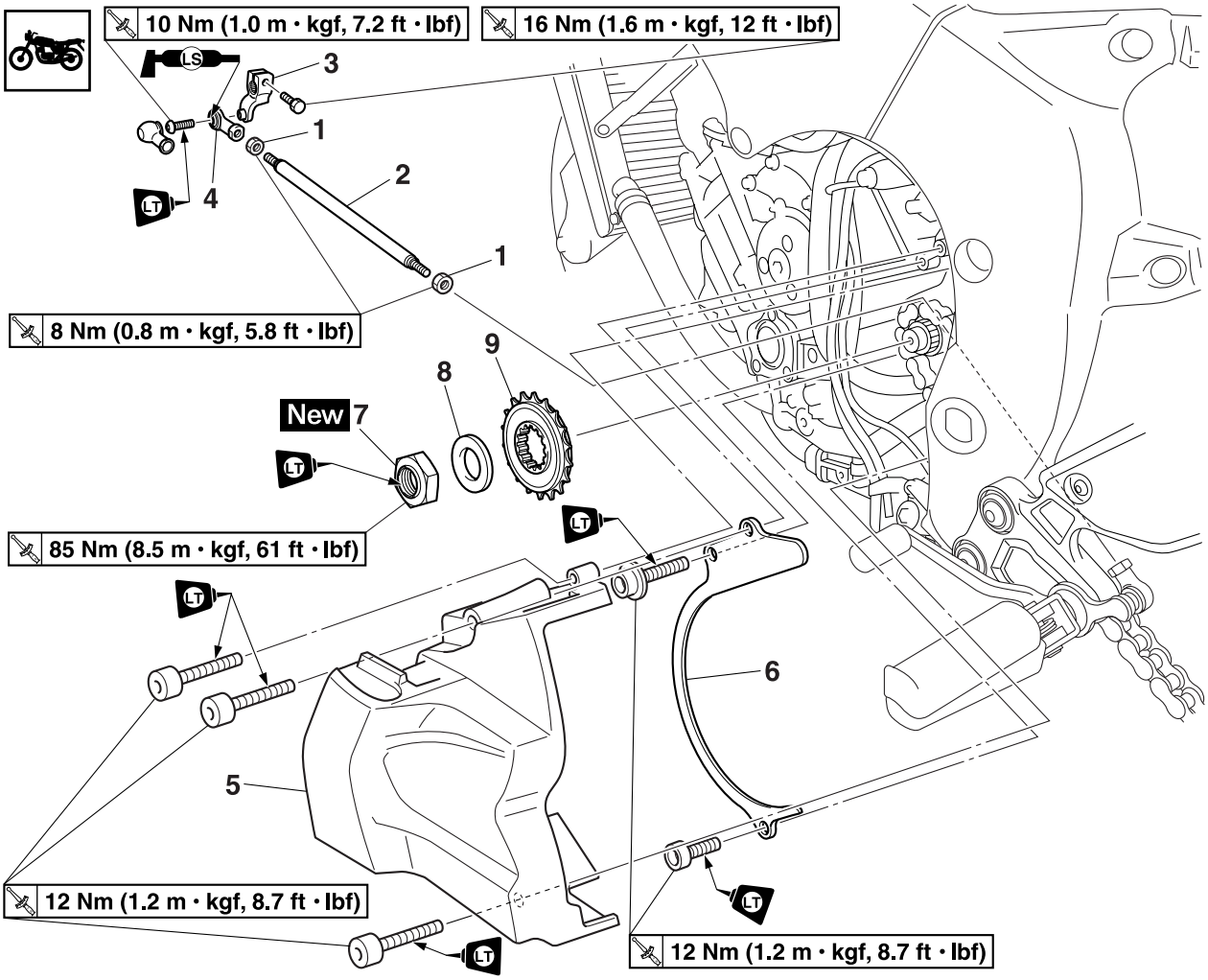


Spark plug
13 Nm (1.3 m·kgf, 9.4 ft·lbf)

7. Install:
   • Ignition coils

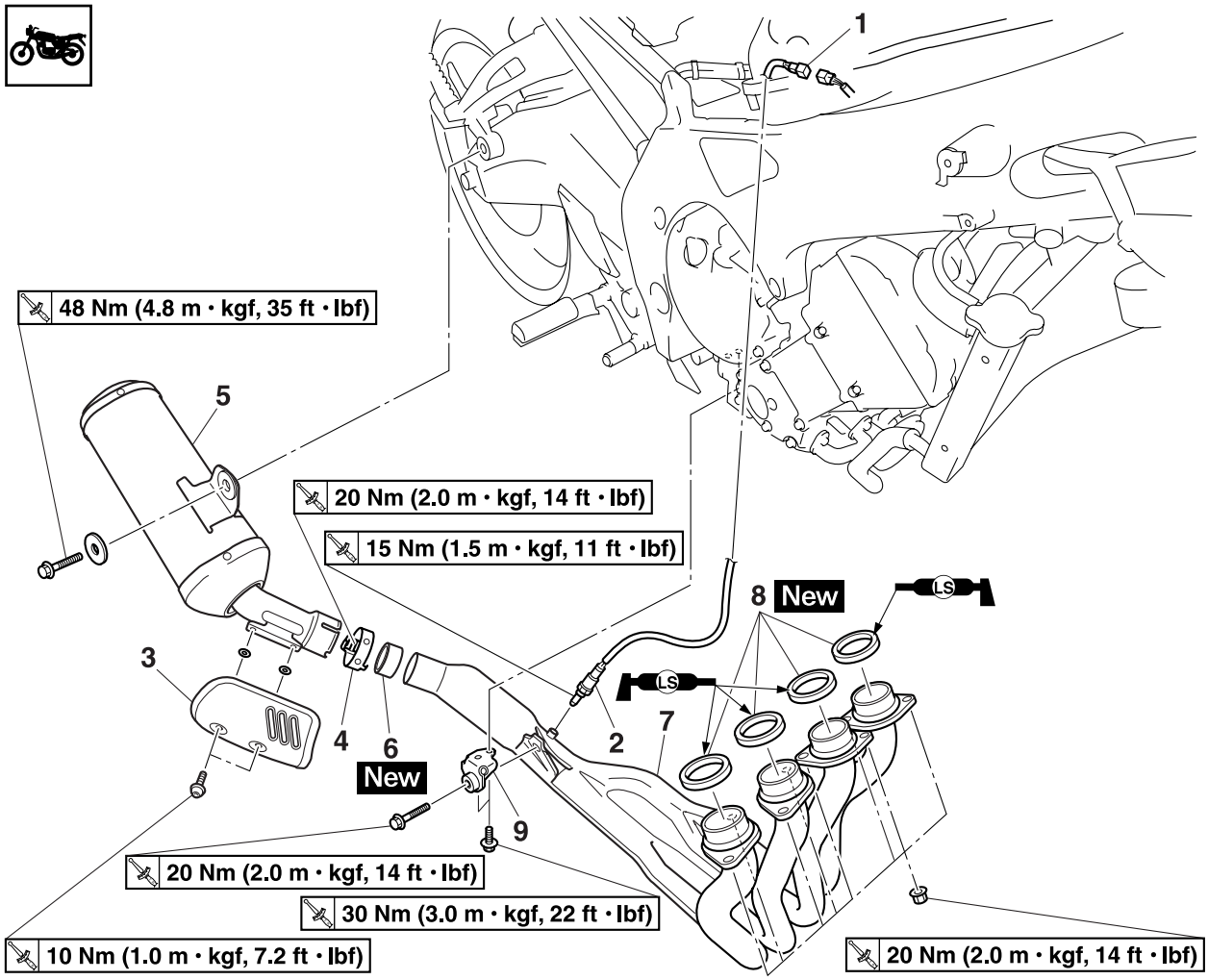
EAS23711
ENGINE REMOVAL

Removing the drive sprocket



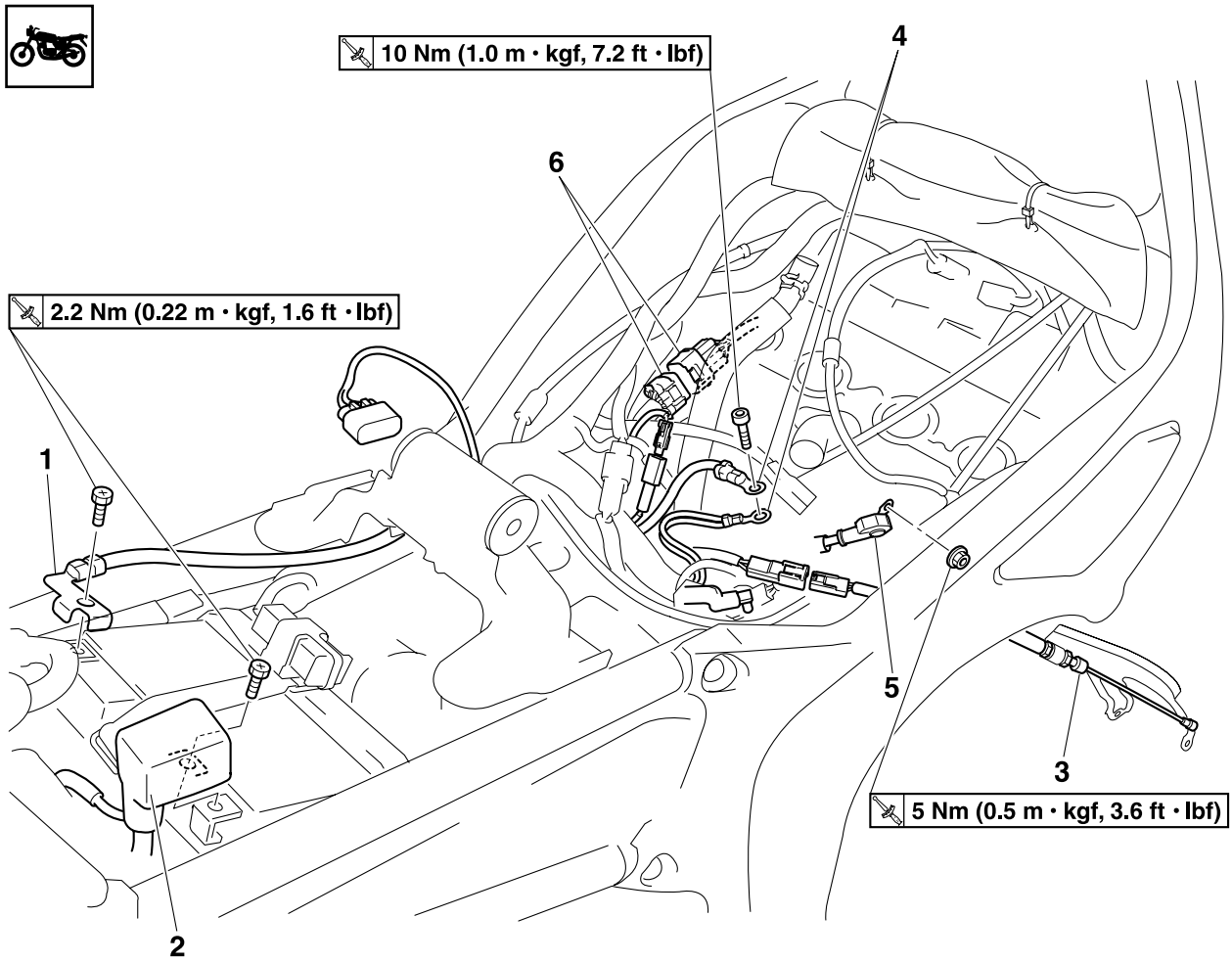
Order	Job/Parts to remove	Q'ty	Remarks
	Drive chain		Loosen. Refer to "ADJUSTING THE DRIVE CHAIN SLACK" on page 3-19.
1	Locknut	2	
2	Shift rod	1	
3	Shift arm	1	
4	Joint	1	
5	Drive sprocket cover	1	
6	Plate	1	
7	Drive sprocket nut	1	
8	Washer	1	
9	Drive sprocket	1	
			For installation, reverse the removal procedure.

Removing the muffler and exhaust pipe



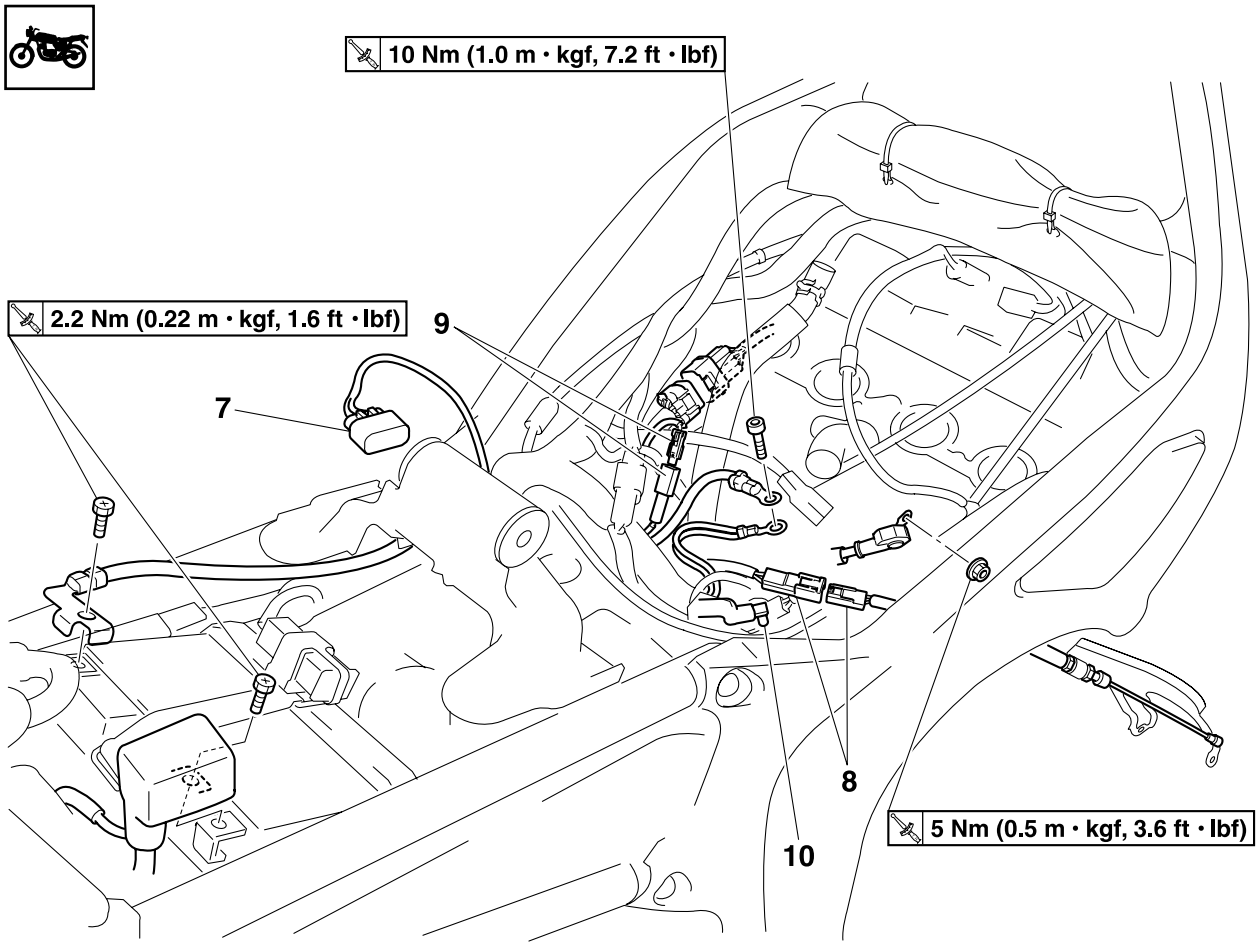
Order	Job/Parts to remove	Q'ty	Remarks
	Rider seat		Refer to "GENERAL CHASSIS" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Drive sprocket cover		Refer to "ENGINE REMOVAL" on page 5-3.
1	O_2 sensor coupler	1	Disconnect.
2	O_2 sensor	1	
3	Muffler cover	1	
4	Muffler clamp	1	Loosen.
5	Muffler	1	
6	Muffler gasket	1	
7	Exhaust pipe	1	
8	Exhaust pipe gasket	1	
9	Exhaust pipe bracket	1	
			For installation, reverse the removal procedure.

Disconnecting the leads and hoses



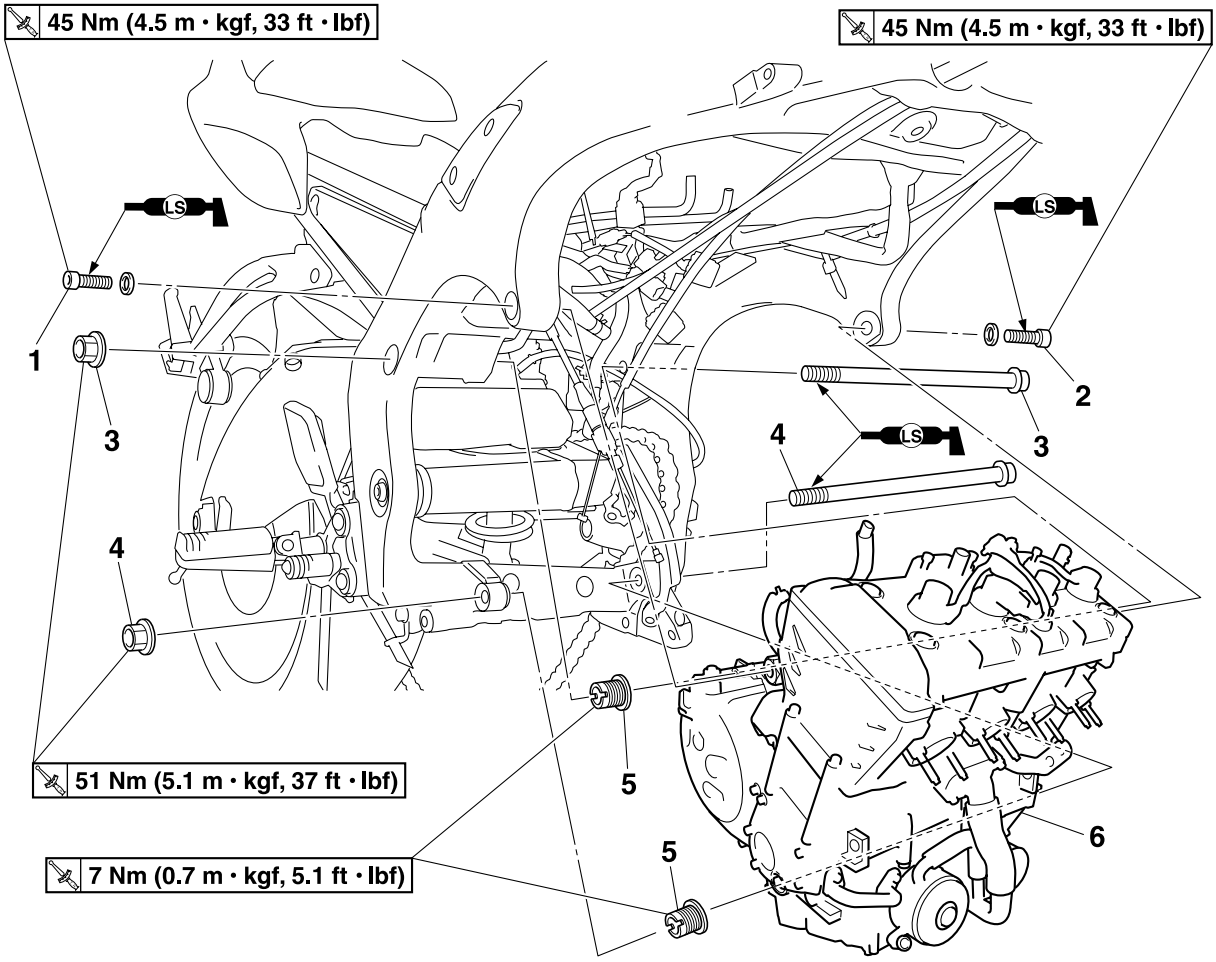
Order	Job/Parts to remove	Q'ty	Remarks
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Throttle bodies		Refer to "THROTTLE BODIES" on page 7-5.
	Thermostat assembly		Refer to "THERMOSTAT" on page 6-7.
	Oil cooler		Refer to "OIL COOLER" on page 6-5.
	Air cut-off valve		Refer to "AIR INDUCTION SYSTEM" on page 7-15.
1	Battery negative lead	1	Disconnect.
2	Battery positive lead	1	Disconnect.
3	Clutch cable	1	Disconnect.
4	Ground lead	2	Disconnect.
5	Starter motor lead	1	Disconnect.
6	Ignition coil sub-wire harness coupler	1	Disconnect.

Disconnecting the leads and hoses



Order	Job/Parts to remove	Q'ty	Remarks
7	Stator coil assembly lead coupler	1	Disconnect.
8	Crankshaft position sensor lead coupler	1	Disconnect.
9	Oil level switch lead coupler	1	Disconnect.
10	Neutral switch connector	1	Disconnect.
			For installation, reverse the removal procedure.

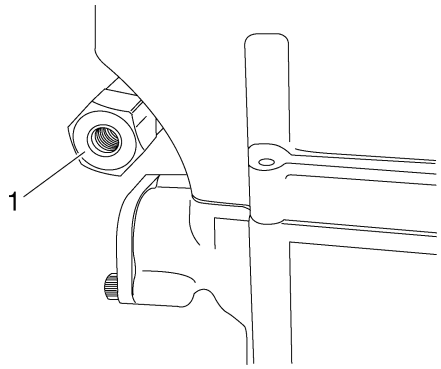
Removing the engine



Order	Job/Parts to remove	Q'ty	Remarks
1	Right front engine mounting bolt 1	1	
2	Left front engine mounting bolt	1	
3	Upper engine mounting bolt/nut	1/1	
4	Lower engine mounting bolt/nut	1/1	
5	Engine mounting adjust bolt	2	Loosen.
6	Engine	1	
			For installation, reverse the removal procedure.

EAS23720
INSTALLING THE ENGINE

1. Install:
   - Right front engine mounting bolt 2 “1” Refer to “CYLINDER HEAD” on page 5-20.

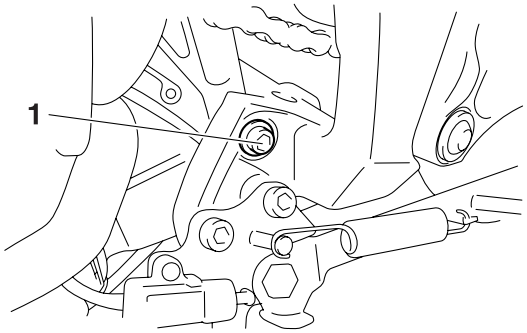


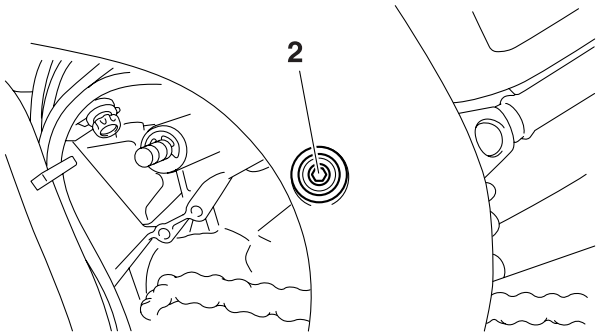
2. Tighten:
   - Right front engine mounting bolt 2

Right front engine mounting bolt 2
50 Nm (5.0 m·kgf, 36 ft·lbf)
LOCTITE®

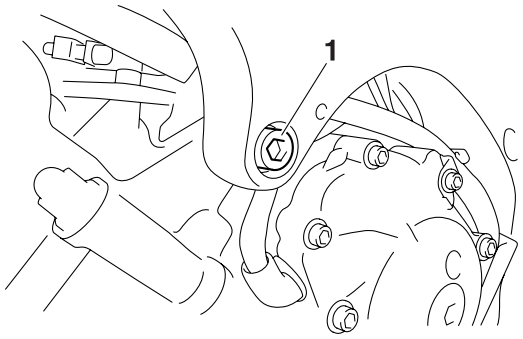
3. Install:
   - Engine mounting adjust bolts (temporarily tighten)
4. Install:
   - Engine
5. Install:
   - Lower engine mounting bolt “1”
   - Upper engine mounting bolt “2”

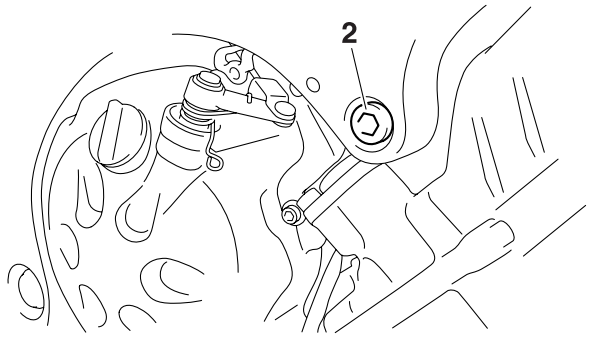
TIP
Do not install the engine mounting nuts.





6. Install:
   - Left front engine mounting bolt “1” (temporarily tighten)
   - Right front engine mounting bolt 1 “2” (temporarily tighten)



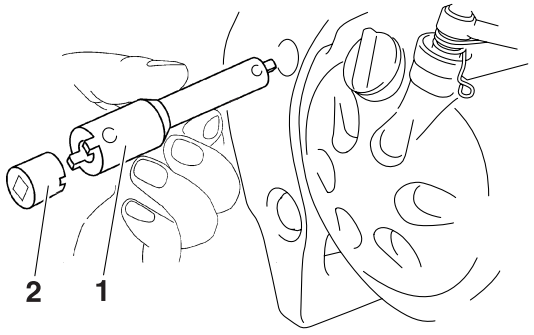


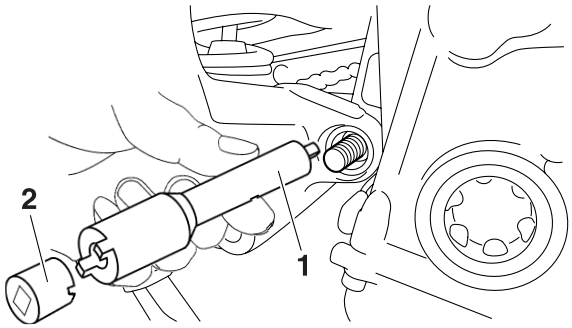
7. Tighten:
   - Engine mounting adjust bolts

Engine mounting adjust bolt
7 Nm (0.7 m·kgf, 5.1 ft·lbf)

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

Pivot shaft wrench
90890-01518
Frame spanner socket
YM-01518
Pivot shaft wrench adapter
90890-01476

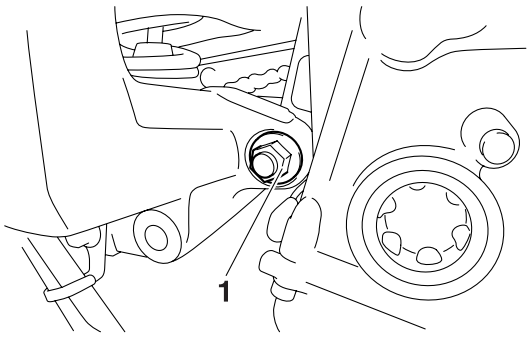


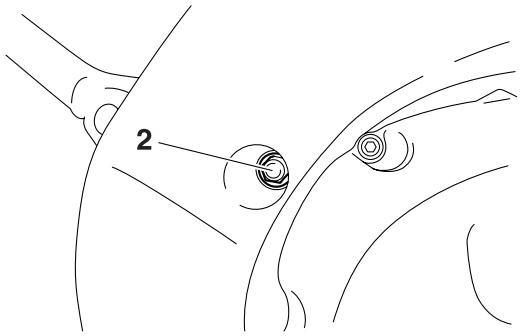


8. Install:
   - Lower engine mounting nut “1”
   - Upper engine mounting nut “2”

Lower engine mounting nut
51 Nm (5.1 m·kgf, 37 ft·lbf)
Upper engine mounting nut
51 Nm (5.1 m·kgf, 37 ft·lbf)

TIP
First tighten the lower engine mounting nut, and then tighten the upper engine mounting nut.

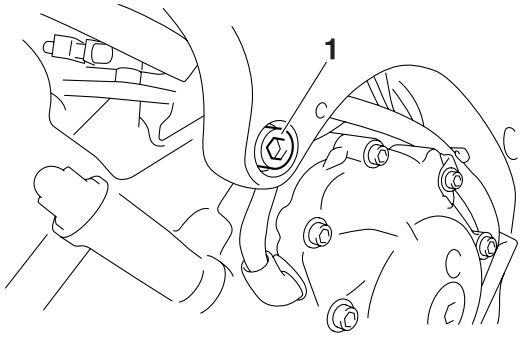


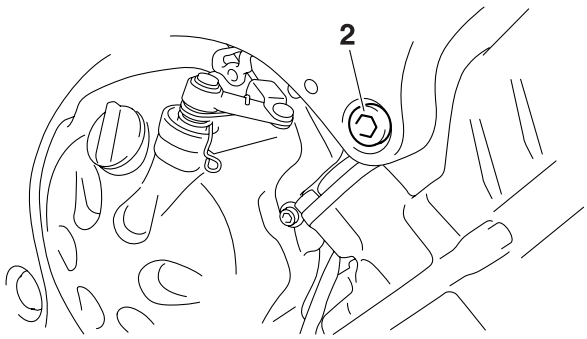


9. Tighten:
   - Left front engine mounting bolt “1”
   - Right front engine mounting bolt 1 “2”

Left front engine mounting bolt
45 Nm (4.5 m·kgf, 33 ft·lbf)
Right front engine mounting bolt 1
45 Nm (4.5 m·kgf, 33 ft·lbf)

TIP
First tighten the left front engine mounting bolt “1”, and then tighten the right front engine mounting bolt 1 “2”.



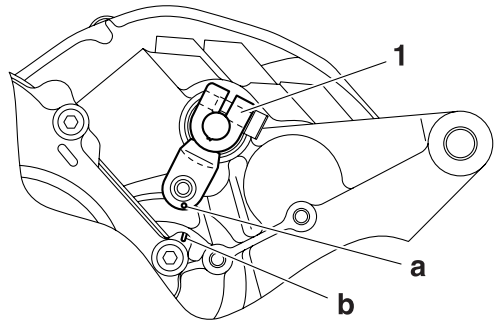


10. Install:
    - Shift arm “1”

Shift arm bolt
16 Nm (1.6 m·kgf, 12 ft·lbf)

TIP

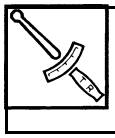
Align punch mark “a” of the shift arm “1” with alignment mark “b” of the crankcase.



EAS39P1501

INSTALLING THE DRIVE SPROCKET

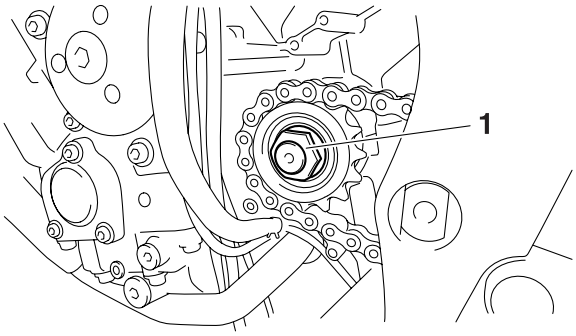
1. Install:
   - Drive sprocket
   - Washer
   - Drive sprocket nut “1” New

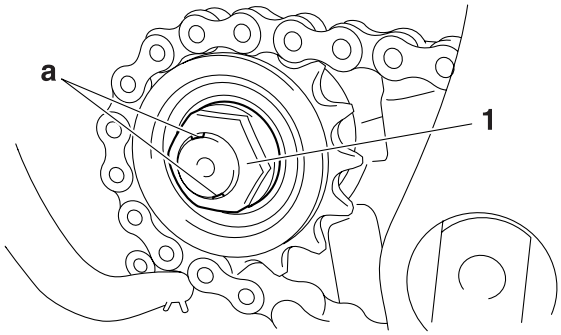


Drive sprocket nut
85 Nm (8.5 m·kgf, 61 ft·lbf)
LOCTITE®

TIP

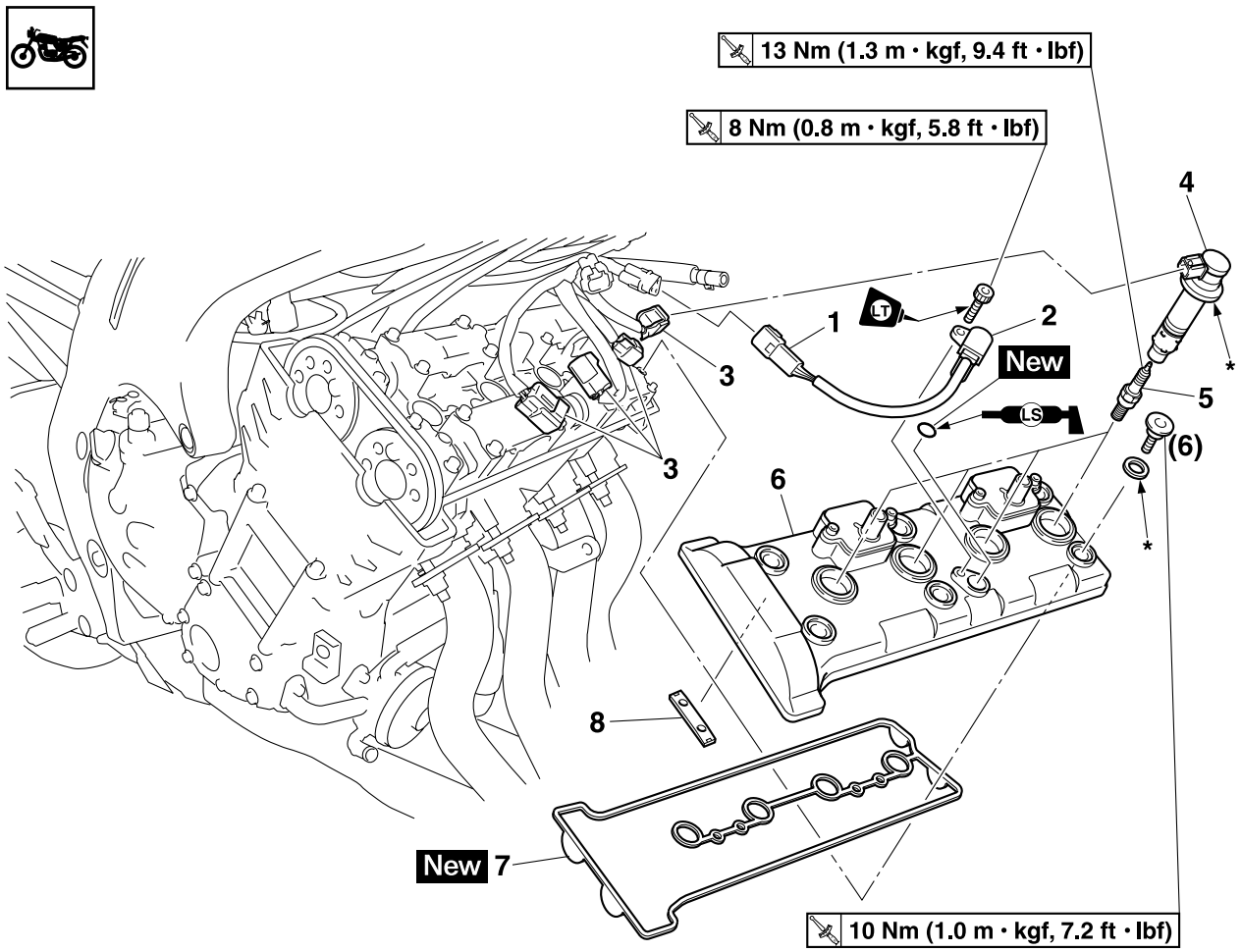
- While applying the rear brake, tighten the drive sprocket nut.
- Stake the drive sprocket nut “1” at a cutout “a” in the drive axle.





EAS23760
CAMSHAFTS

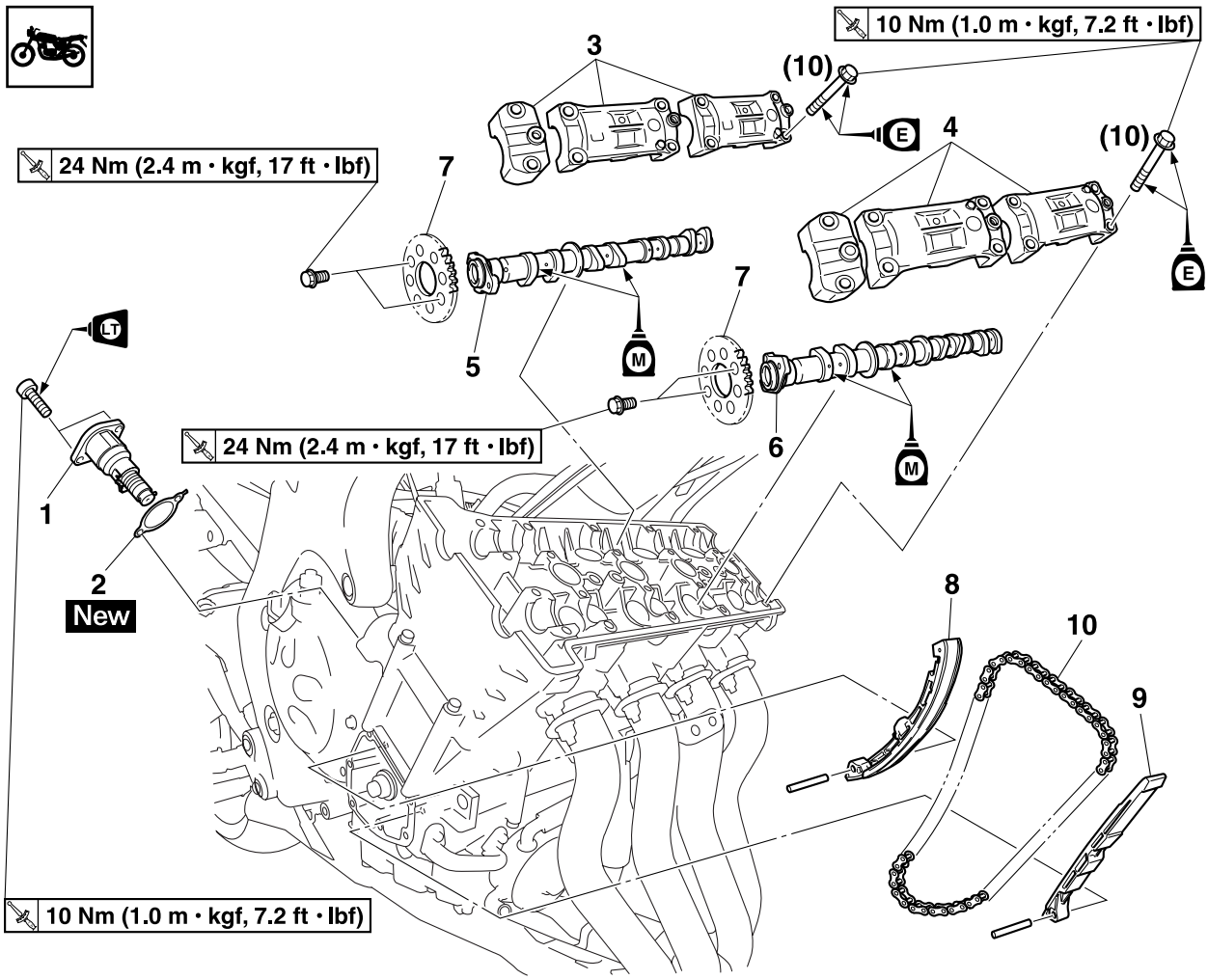
Removing the cylinder head cover



Order	Job/Parts to remove	Q'ty	Remarks
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Throttle bodies		Refer to "THROTTLE BODIES" on page 7-5.
	Air cut-off valve		Refer to "AIR INDUCTION SYSTEM" on page 7-15.
1	Cylinder identification sensor coupler	1	Disconnect.
2	Cylinder identification sensor	1	
3	Ignition coil coupler	4	Disconnect.
4	Ignition coil	4	
5	Spark plug	4	
6	Cylinder head cover	1	
7	Cylinder head cover gasket	1	
8	Timing chain guide (top side)	1	
			For installation, reverse the removal procedure.

* Silicone fluid

Removing the camshafts



Order	Job/Parts to remove	Q'ty	Remarks
	Pickup rotor cover		Refer to "CRANKSHAFT POSITION SENSOR" on page 5-39.
	Clutch cable (engine side)		Disconnect. Refer to "CLUTCH" on page 5-45.
1	Timing chain tensioner	1	
2	Timing chain tensioner gasket	1	
3	Intake camshaft cap	3	
4	Exhaust camshaft cap	3	
5	Intake camshaft	1	
6	Exhaust camshaft	1	
7	Camshaft sprocket	2	
8	Timing chain guide (intake side)	1	
9	Timing chain guide (exhaust side)	1	
10	Timing chain	1	
			For installation, reverse the removal procedure.

EAS23810
REMOVING THE CAMSHAFTS

1. Remove:
   - Pickup rotor cover
     Refer to "CRANKSHAFT POSITION SENSOR" on page 5-39.
2. Align:
   - "T" mark "a" on the pickup rotor (with the crankcase mating surface "b")

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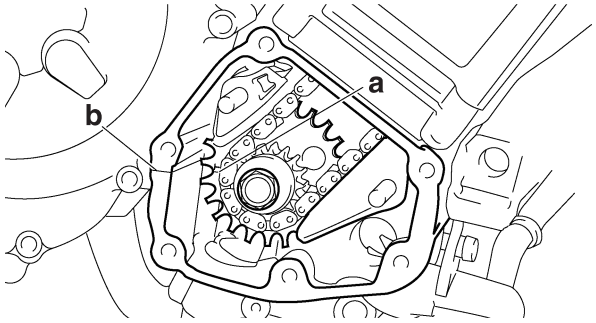
a. Turn the crankshaft clockwise.
b. When piston #1 is at TDC on the compression stroke, align the "T" mark "a" on the pickup rotor with the crankcase mating surface "b".

TIP

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



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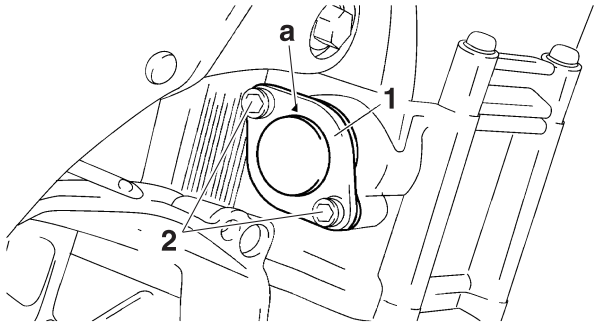
3. Remove:
   - Timing chain tensioner "1"
   - Timing chain tensioner gasket

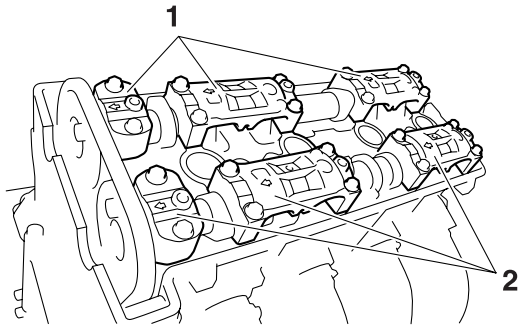


4. Remove:
   - Intake camshaft caps "1"
   - Exhaust camshaft caps "2"

ECA13720

NOTICE

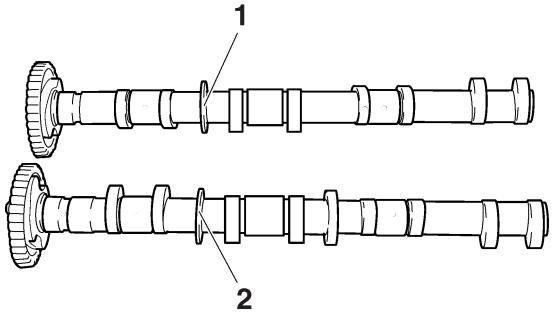
To prevent damage to the cylinder head, camshafts or camshaft caps, loosen the camshaft cap bolts in stages and in a criss-cross pattern, working from the outside in.

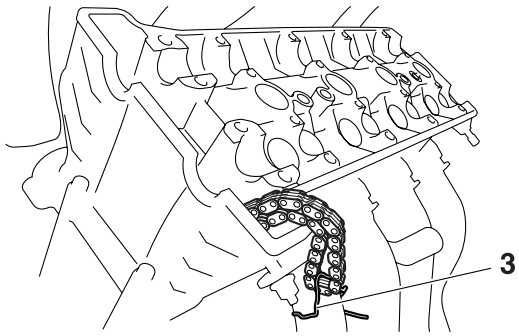


5. Remove:
   - Intake camshaft "1"
   - Exhaust camshaft "2"

TIP

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

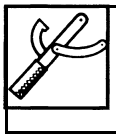




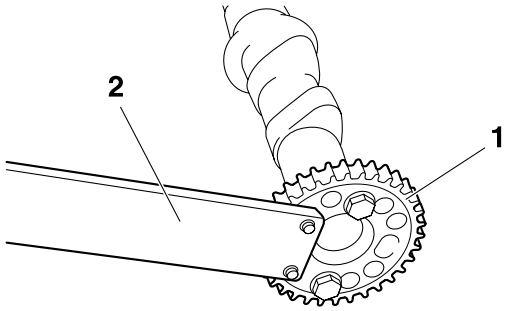
6. Remove:
   - Camshaft sprocket "1"

TIP

Use the camshaft wrench "2" and loosen the camshaft sprocket bolt.



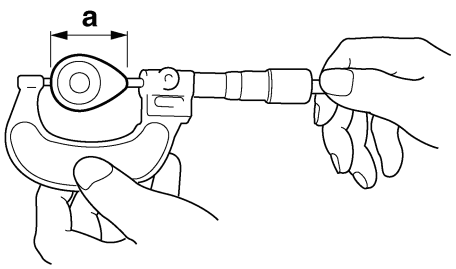
Camshaft wrench
90890-04162
YM-04162

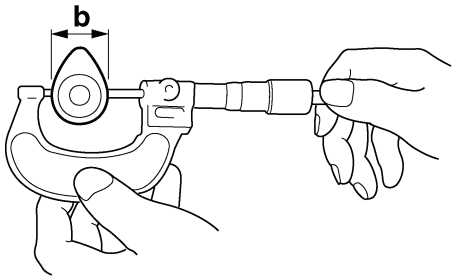


EAS23850
CHECKING THE CAMSHAFTS

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.

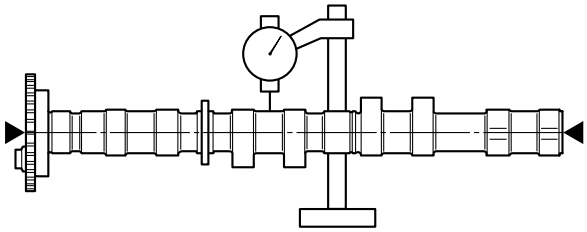
Camshaft lobe dimension limit
Intake A
35.750–35.850 mm (1.4075–1.4114 in)
Limit
35.650 mm (1.4035 in)
Intake B
27.950–28.050 mm (1.1004–1.1043 in)
Limit
27.850 mm (1.0965 in)
Exhaust A
34.750–34.850 mm (1.3681–1.3720 in)
Limit
34.650 mm (1.3642 in)
Exhaust B
27.950–28.050 mm (1.1004–1.1043 in)
Limit
27.850 mm (1.0965 in)





3. Measure:
   - Camshaft runout
     Out of specification → Replace.

Camshaft runout limit
0.030 mm (0.0012 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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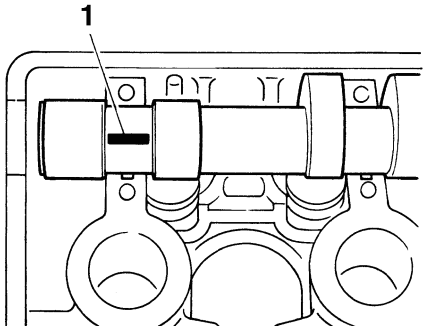
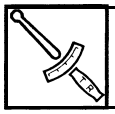
a. Install the camshaft into the cylinder head (without the camshaft caps).
b. Position strip of Plastigauge® “1” onto the camshaft journal as shown.



c. Install the dowel pins and camshaft caps.

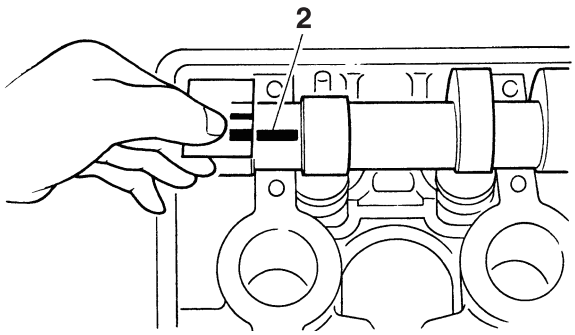
TIP

- 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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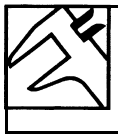
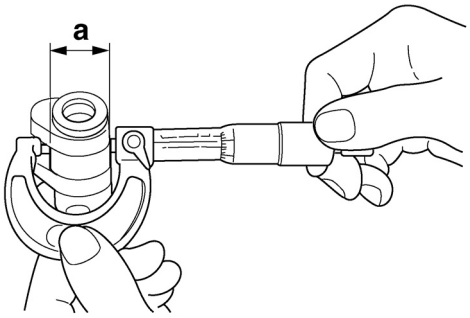
5. Measure:
   - Camshaft journal diameter “a”
     Out of specification → Replace the camshaft.
     Within specification → Replace the cylinder head and the camshaft caps as a set.

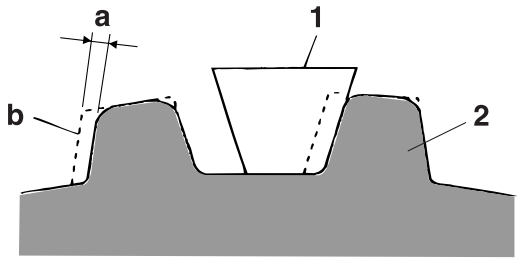


Camshaft journal diameter
24.459–24.472 mm (0.9630–0.9635 in)



EAS23870
CHECKING THE TIMING CHAIN AND CAMSHAFT SPROCKET

1. Check:
   - Timing chain
     Damage/stiffness → Replace the timing chain and camshaft and camshaft sprocket as a set.
2. Check:
   - Camshaft sprocket
     More than 1/4 tooth wear “a” → Replace the camshaft sprockets and the timing chain as a set.



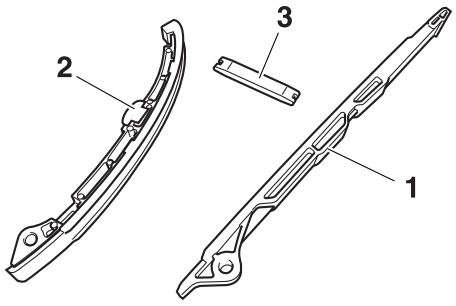
a. 1/4 tooth
b. Correct

1. Timing chain
2. Camshaft sprocket

EAS23950
CHECKING THE TIMING CHAIN GUIDES

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

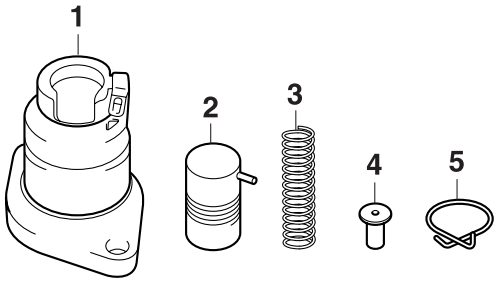
1. Check:
   - Timing chain guide (exhaust side) “1”
   - Timing chain guide (intake side) “2”
   - Timing chain guide (top side) “3”
     Damage/wear → Replace the defective part(s).



EAS23960
CHECKING THE TIMING CHAIN TENSIONER

1. Remove:
   - Timing chain tensioner housing “1”
   - Timing chain tensioner rod “2”
   - Timing chain tensioner spring “3”
   - Timing chain tensioner spring seat “4”

TIP
Squeeze the timing chain tensioner clip “5”, and then remove the timing chain tensioner spring and timing chain tensioner rod.



2. Check:
   - Timing chain tensioner housing
   - Timing chain tensioner rod
   - Timing chain tensioner spring
   - Timing chain tensioner spring seat
     Damage/wear → Replace the timing chain tensioner.
3. Install:
   - Timing chain tensioner spring
   - 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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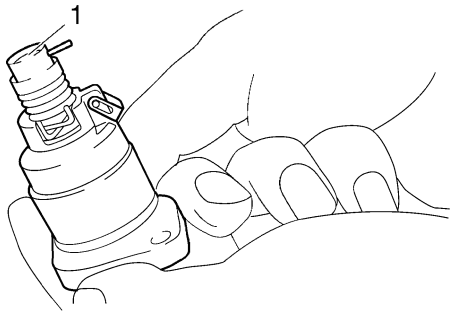
a. Install the timing chain tensioner spring, timing chain tensioner spring seat, and timing chain tensioner rod “1”.

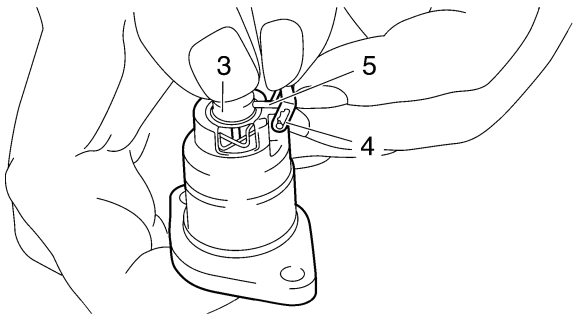


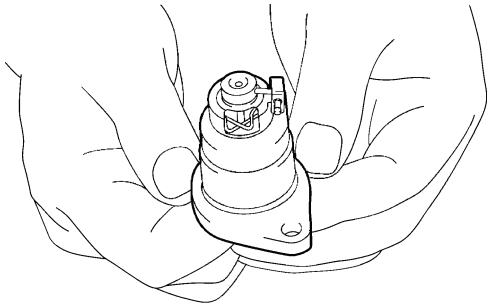
b. Squeeze the timing chain tensioner clip “2”, and then push the timing chain tensioner rod “3” into the timing chain tensioner housing.

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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EAS24000
INSTALLING THE CAMSHAFTS

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

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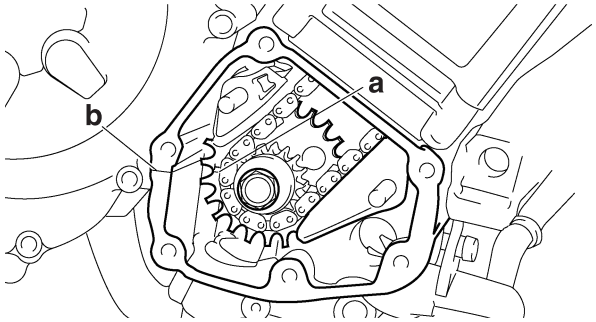
a. Turn the crankshaft clockwise.
b. When piston #1 is at TDC, align the "T" mark "a" with the crankcase mating surface "b".



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2. Install:
   - Intake camshaft sprocket "1"
   - Exhaust camshaft sprocket "2"

	Camshaft sprocket bolt **24 Nm (2.4 m·kgf, 17 ft·lbf)**

ECA14B1012

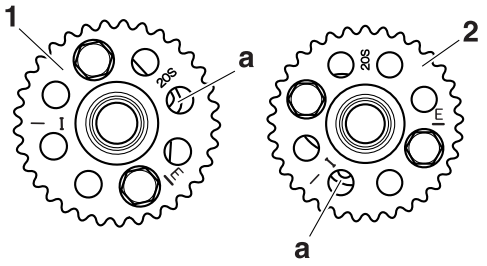
NOTICE

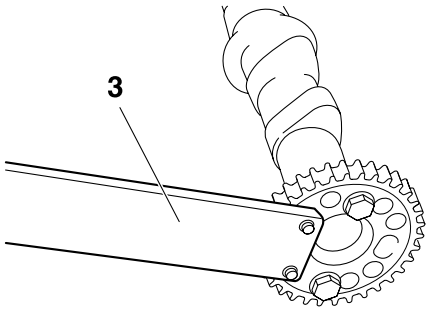
Be sure to tighten the camshaft sprocket bolts to the specified torque to avoid the possibility of the bolts coming loose and damaging the engine.

TIP

- Install the camshaft projection "a" at the position shown in the illustration.
- Tighten the camshaft sprocket bolt with the camshaft wrench "3".

	Camshaft wrench **90890-04162** **YM-04162**

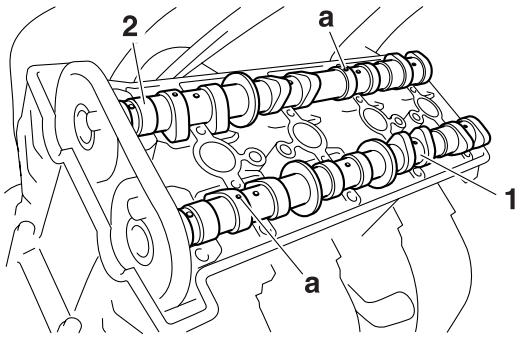




3. Install:
   - Exhaust camshaft "1"
   - Intake camshaft "2"

TIP

Make sure the punch mark "a" on each camshaft faces up.

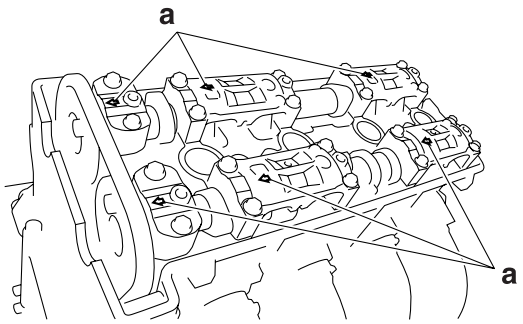


4. Install:
   - Intake camshaft caps
   - Exhaust camshaft caps

TIP

- Make sure each camshaft cap is installed in its original place. Refer to the identification marks as follows:
  "I": Intake side camshaft cap mark
  "E": Exhaust side camshaft cap mark
  "IL": Intake left side camshaft cap mark
  "IR": Intake right side camshaft cap mark

"EL": Exhaust left side camshaft cap mark
"ER": Exhaust right side camshaft cap mark
- Make sure the arrow mark "a" on each camshaft points towards the right side of the engine.



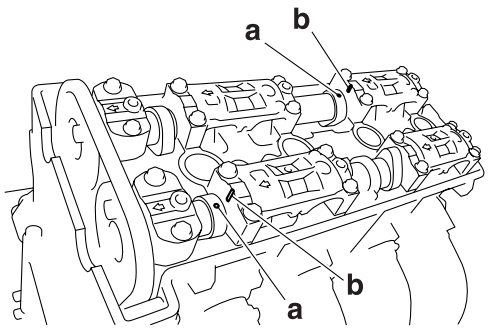
5. Tighten:
   - Camshaft cap bolts

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.

ECA5D01009
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.**

6. Check:
   - Camshaft punch mark "a"
     Make sure the punch mark "a" on the camshaft is aligned with the camshaft cap alignment mark "b".

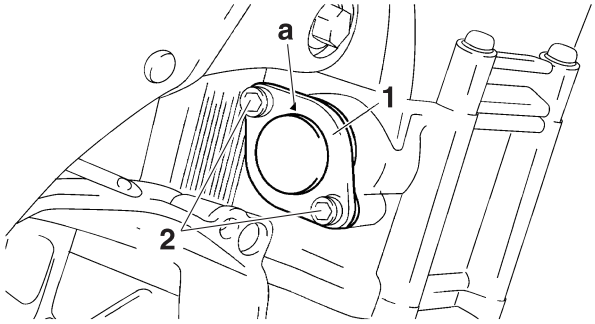


7. Install:
   - Timing chain tensioner gasket New
   - Timing chain tensioner "1"
   - Timing chain tensioner bolts "2"

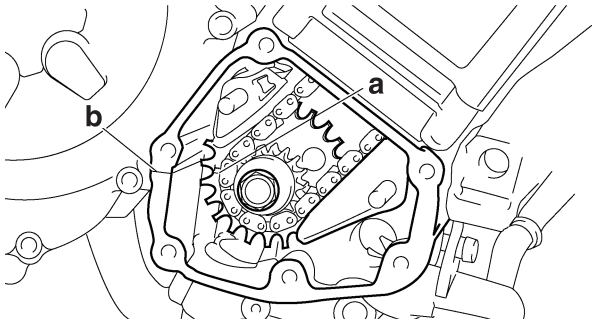
Timing chain tensioner bolt
10 Nm (1.0 m·kgf, 7.2 ft·lbf)
LOCTITE®

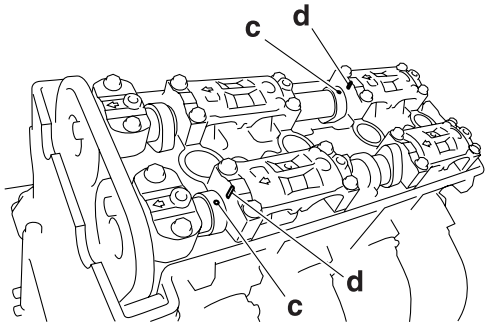
EWA39P1502
⚠ WARNING
Always use a new timing chain tensioner gasket.

ECA5D01011
NOTICE
The arrow mark "a" on the timing chain tensioner should face up.



8. Turn:
   - Crankshaft
     (several turns clockwise)
9. Check:
   - "T" mark "a"
     Make sure the "T" mark on the pickup rotor is aligned with the crankcase mating surface "b".
   - Camshaft punch mark "c"
     Make sure the punch mark "c" on the camshaft is aligned with the camshaft cap alignment mark "d".
     Out of alignment → Adjust.
     Refer to the installation steps above.





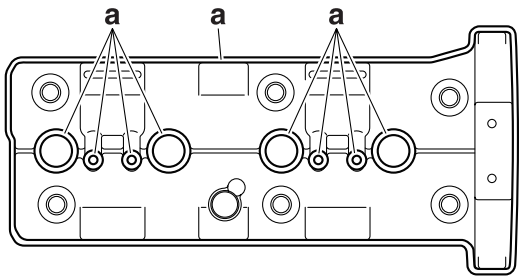
10. Measure:
    - Valve clearance
      Out of specification → Adjust.
      Refer to "ADJUSTING THE VALVE CLEARANCE" on page 3-5.
11. Install:
    - Pickup rotor cover
      Refer to "CRANKSHAFT POSITION SENSOR" on page 5-39.
12. Install:
    - Timing chain guide (top side)
    - Cylinder head cover gasket New
    - Cylinder head cover

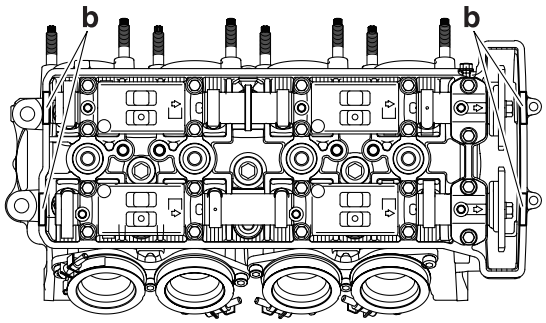
Cylinder head cover bolt
10 Nm (1.0 m·kgf, 7.2 ft·lbf)

TIP

- Apply bond TB1541C® onto the mating surfaces "a" of the cylinder head cover and cylinder head cover gasket.
- Apply bond Yamaha bond No.1215 (Three bond No.1215®) onto the mating surfaces "b" of the cylinder head cover gasket and cylinder head.
- Tighten the cylinder head cover bolts stages and in a crisscross pattern.

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



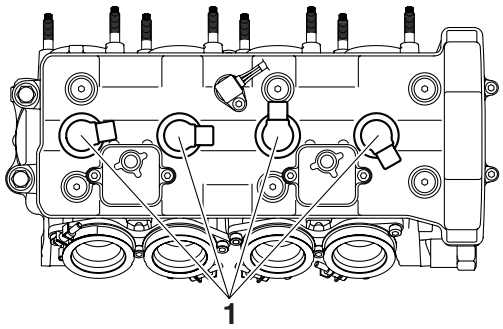


13. Install:
    - Spark plugs
    - Ignition coils "1"

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

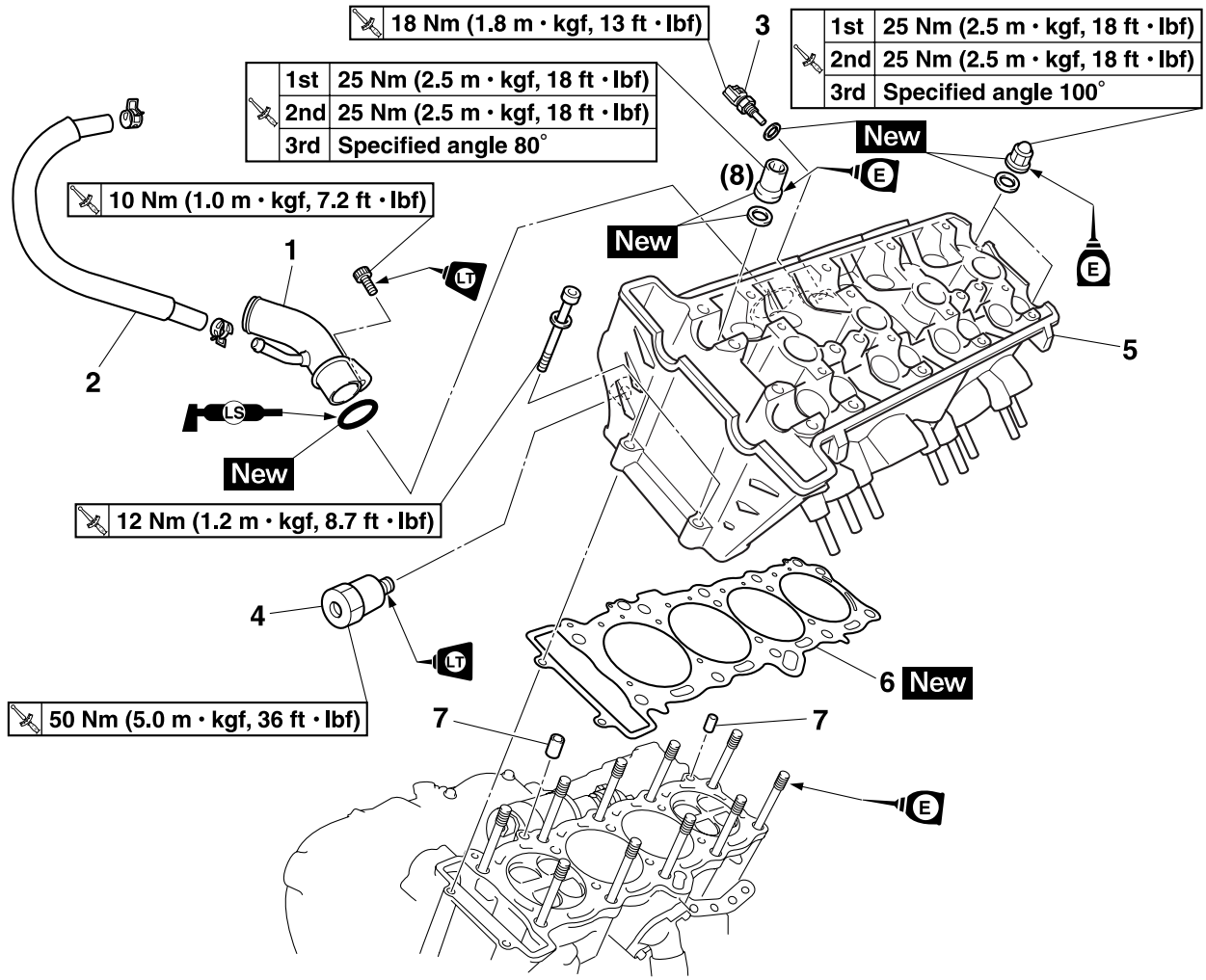
TIP

Assemble ignition coils "1" in the direction shown in the illustration.



EAS24100
CYLINDER HEAD

Removing the cylinder head



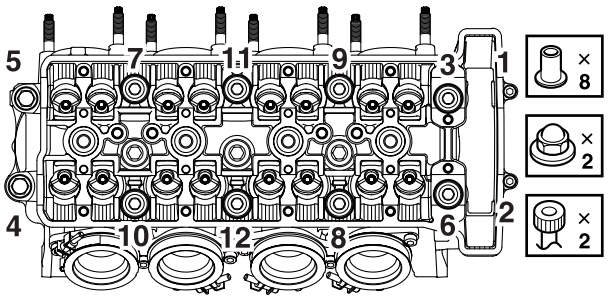
Order	Job/Parts to remove	Q'ty	Remarks
	Engine		Refer to "ENGINE REMOVAL" on page 5-3.
	Intake camshaft		Refer to "CAMSHAFTS" on page 5-11.
	Exhaust camshaft		Refer to "CAMSHAFTS" on page 5-11.
1	Coolant pipe	1	
2	Fast idle plunger inlet hose	1	
3	Coolant temperature sensor	1	
4	Right front engine mounting bolt 2	1	
5	Cylinder head	1	
6	Cylinder head gasket	1	
7	Dowel pin	2	
			For installation, reverse the removal procedure.

EAS24120
REMOVING THE CYLINDER HEAD

1. Remove:
   - Intake camshaft
   - Exhaust camshaft
   Refer to "REMOVING THE CAMSHAFTS" on page 5-13.
2. Remove:
   - Cylinder head nuts
   - Cylinder head bolts

TIP

- Loosen the nuts in the proper sequence as shown.
- Loosen each nut 1/2 of a turn at a time. After all of the nuts are fully loosened, remove them.



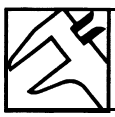
EAS24160
CHECKING THE CYLINDER HEAD

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

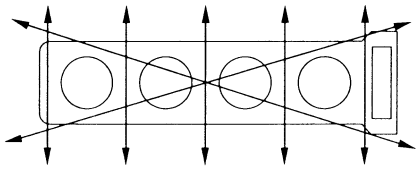
TIP

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
0.10 mm (0.0039 in)



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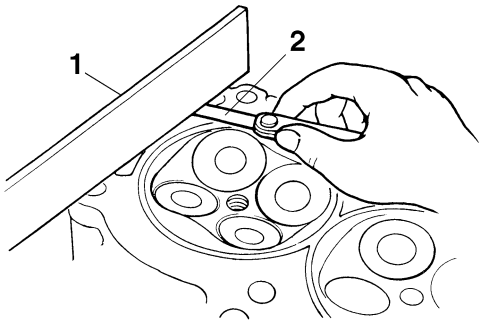
a. Place a straightedge "1" and a thickness gauge "2" across the cylinder head.

Thickness gauge
90890-03180
Feeler gauge set
YU-26900-9



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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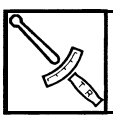
EAS24240
INSTALLING THE CYLINDER HEAD

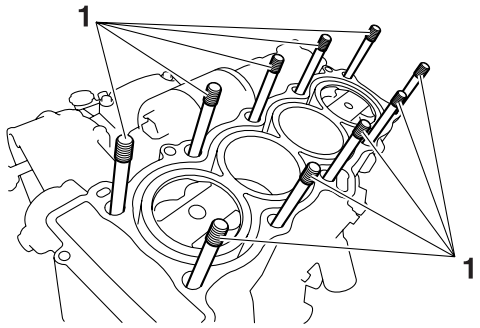
1. Check:
   - Cylinder stud bolts "1"



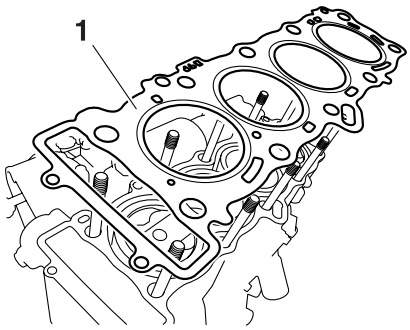
Cylinder stud bolt
8 Nm (0.8 m·kgf, 5.8 ft·lbf)

TIP

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



2. Install:
   - Cylinder head gasket “1” New
   - Dowel pins



3. Install:
   - Cylinder head
   - Washers New
   - Cylinder head nuts New
   - Cylinder head bolts

TIP

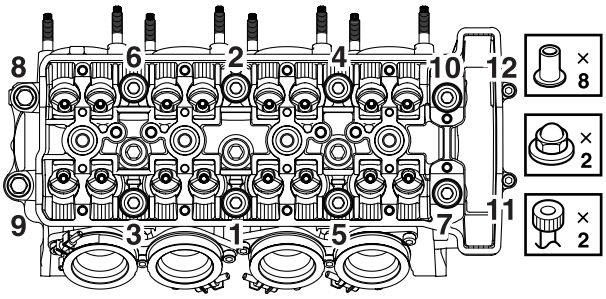
- Pass the timing chain through the timing chain cavity.
- Lubricate the cylinder head nut thread and mating surface with engine oil.

4. Tighten:
   - Cylinder head nuts “1”–“10”
   - Cylinder head bolts “11”, “12”

Cylinder head nut
1st: 25 Nm (2.5 m·kgf, 18 ft·lbf)
2nd: 25 Nm (2.5 m·kgf, 18 ft·lbf)
3rd: Nut “1”–“7”, “10” +80°
Nut “8”, “9” +100°
Cylinder head bolt
12 Nm (1.2 m·kgf, 8.7 ft·lbf)

TIP

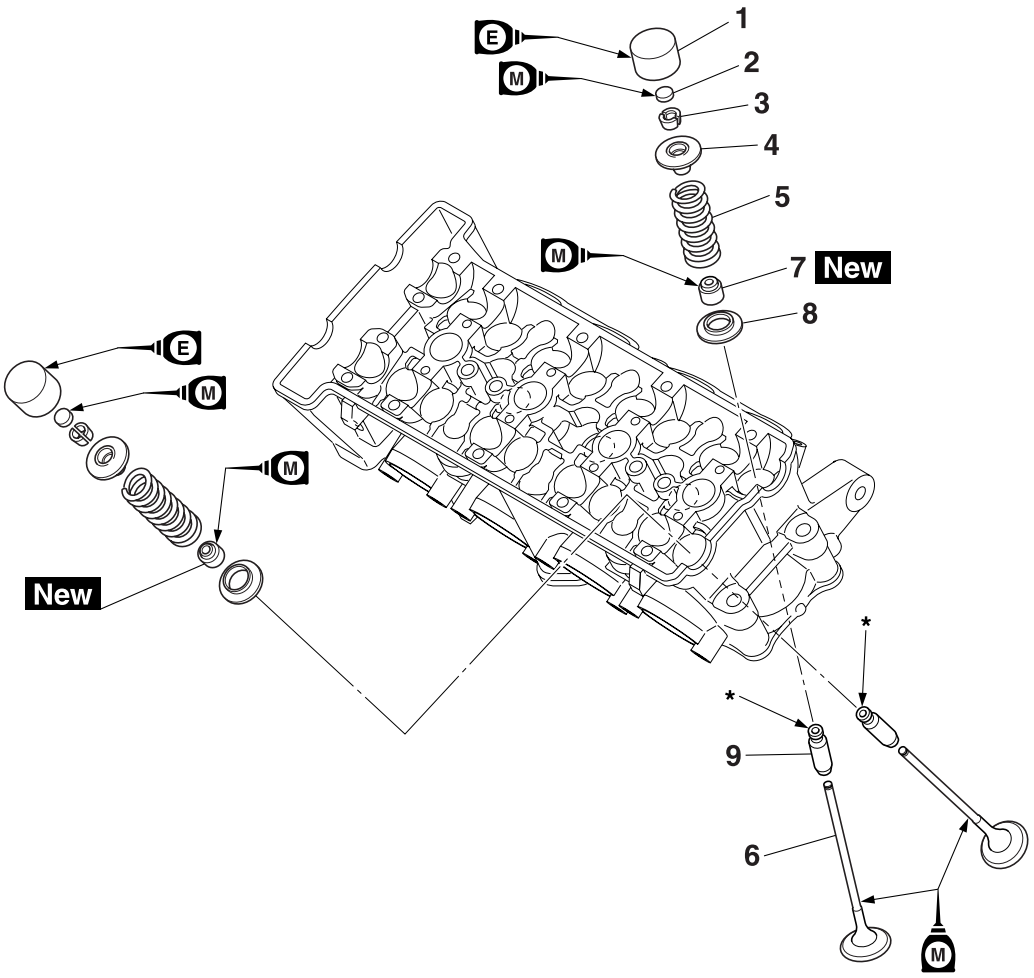
Tighten the cylinder head nuts in the tightening sequence as shown and torque them in 3 stages.



5. Install:
   - Exhaust camshaft
   - Intake camshaft
     Refer to “INSTALLING THE CAMSHAFTS” on page 5-17.

EAS24270
VALVES AND VALVE SPRINGS

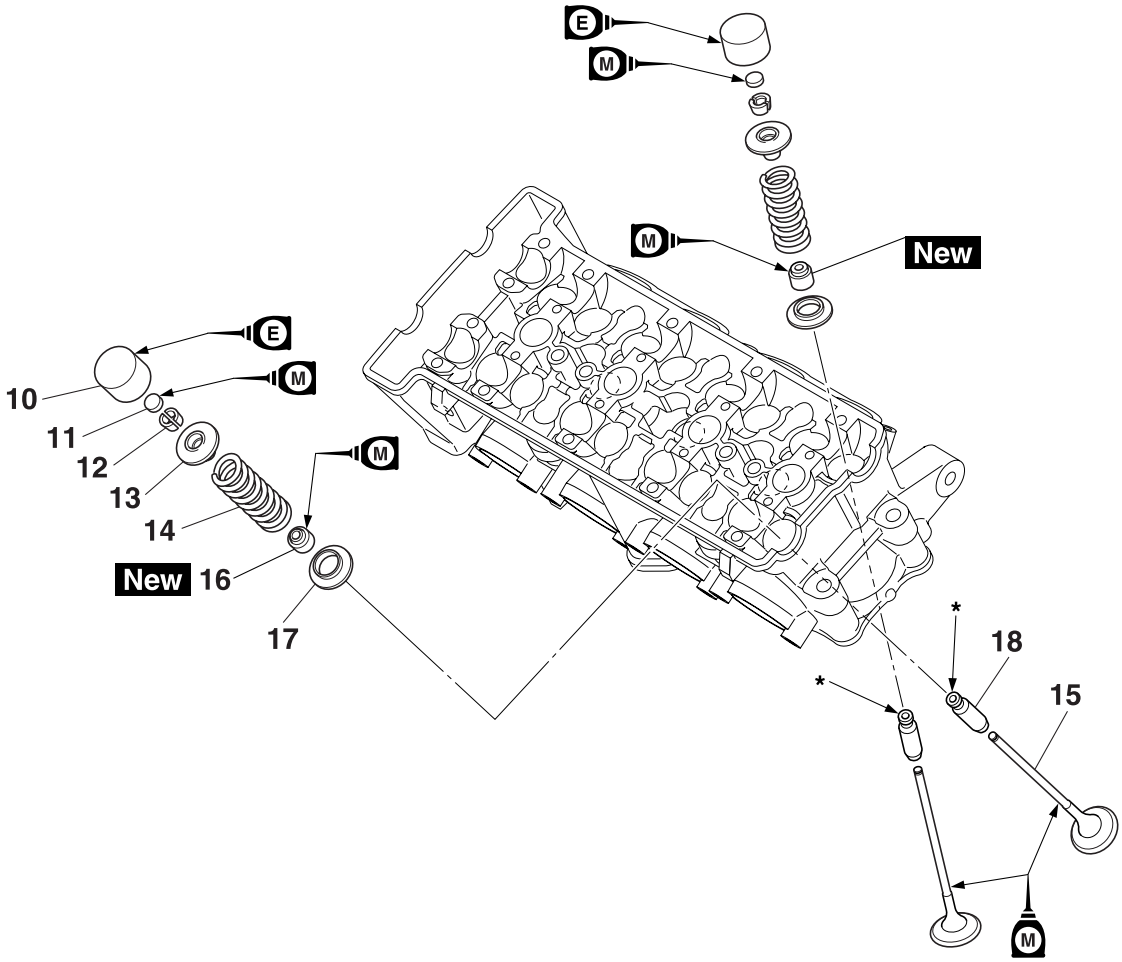
Removing the valves and valve springs



Order	Job/Parts to remove	Q'ty	Remarks
	Cylinder head		Refer to "CYLINDER HEAD" on page 5-20.
1	Intake valve lifter	8	
2	Intake valve pad	8	
3	Intake valve cotter	16	
4	Intake valve spring retainer	8	
5	Intake valve spring	8	
6	Intake valve	8	
7	Intake valve stem seal	8	
8	Intake valve spring seat	8	
9	Intake valve guide	8	

* Silicone fluid

Removing the valves and valve springs



Order	Job/Parts to remove	Q'ty	Remarks
10	Exhaust valve lifter	8	
11	Exhaust valve pad	8	
12	Exhaust valve cotter	16	
13	Exhaust valve spring retainer	8	
14	Exhaust valve spring	8	
15	Exhaust valve	8	
16	Exhaust valve stem seal	8	
17	Exhaust valve spring seat	8	
18	Exhaust valve guide	8	
			For installation, reverse the removal procedure.

* Silicone fluid

EAS24280
REMOVING THE VALVES

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

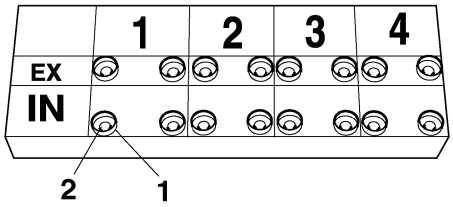
TIP

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.



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 5-28.

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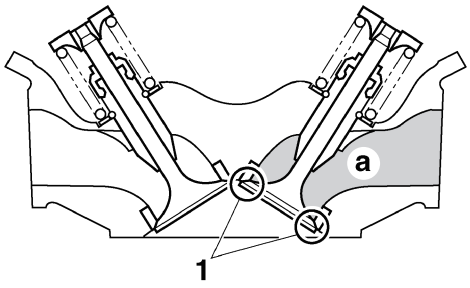
a. Pour a clean solvent "a" into the intake and exhaust ports.
b. Check that the valves properly seal.

TIP

There should be no leakage at the valve seat "1".



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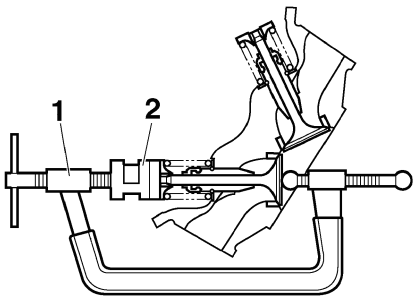
3. Remove:
   - Valve cotters

TIP

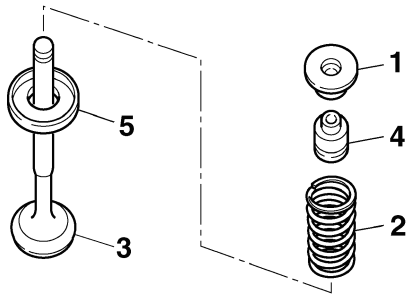
Remove the valve cotters by compressing the valve spring with the valve spring compressor "1" and the valve spring compressor attachment "2".

Valve spring compressor
90890-04019
YM-04019
Valve spring compressor attachment
90890-04108
Valve spring compressor adapter 22 mm
YM-04108



4. Remove:
   - Valve spring retainer "1"
   - Valve spring "2"
   - Valve "3"
   - Valve stem seal "4"
   - Valve spring seat "5"

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



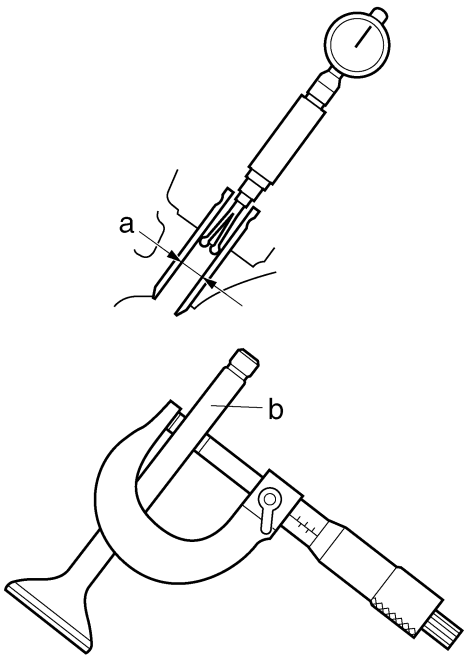
EAS24290
CHECKING THE VALVES AND VALVE GUIDES

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"

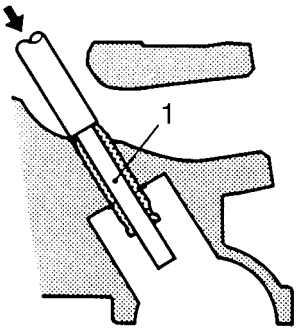
Valve-stem-to-valve-guide clearance
Valve-stem-to-valve-guide clearance (intake)
0.010–0.037 mm (0.0004–0.0015 in)
Limit
0.080 mm (0.0032 in)
Valve-stem-to-valve-guide clearance (exhaust)
0.025–0.052 mm (0.0010–0.0022 in)
Limit
0.100 mm (0.0039 in)



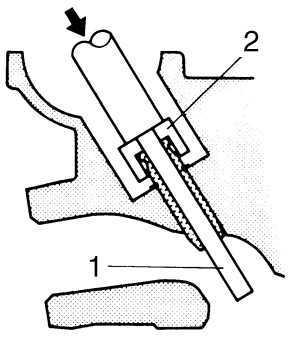
2. Replace:
   - Valve guide

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.

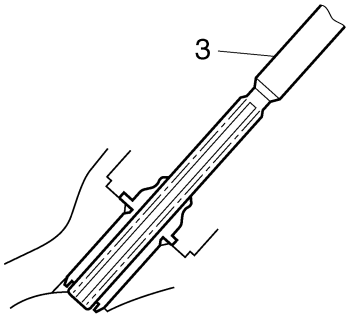
a. Remove the valve guide with the valve guide remover "1".



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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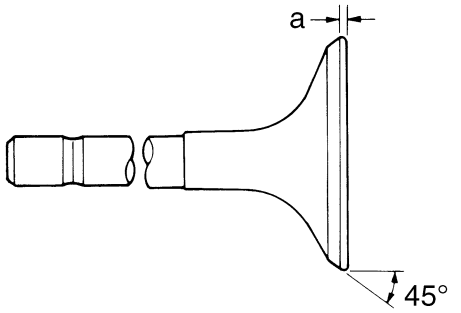
3. Eliminate:
   • Carbon deposits
   (from the valve face and valve seat)
4. Check:
   • Valve face
   Pitting/wear → Grind the valve face.
   • Valve stem end
   Mushroom shape or diameter larger than the body of the valve stem → Replace the valve.
5. Measure:
   • Valve margin thickness "a"
   Out of specification → Replace the valve.

Valve margin thickness
Valve margin thickness (intake)
0.50–0.90 mm (0.0197–0.0354 in)
Valve margin thickness (exhaust)
0.50–0.90 mm (0.0197–0.0354 in)

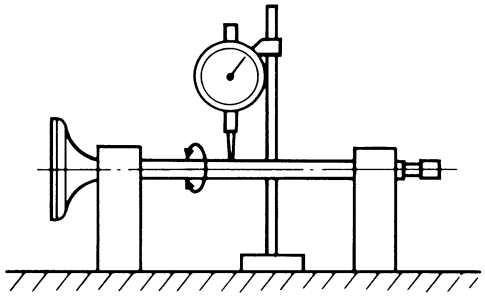


6. Measure:
   • Valve stem runout
   Out of specification → Replace the valve.

TIP

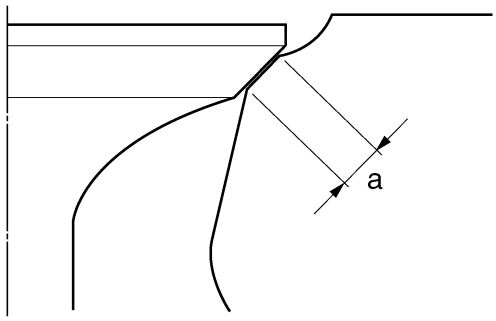
- When installing a new valve, always replace the valve guide.
- If the valve is removed or replaced, always replace the valve stem seal.

Valve stem runout
0.010 mm (0.0004 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
Valve seat width (intake)
0.90–1.10 mm (0.0354–0.0433 in)
Limit
1.60 mm (0.06 in)
Valve seat width (exhaust)
0.90–1.10 mm (0.0354–0.0433 in)
Limit
1.60 mm (0.06 in)



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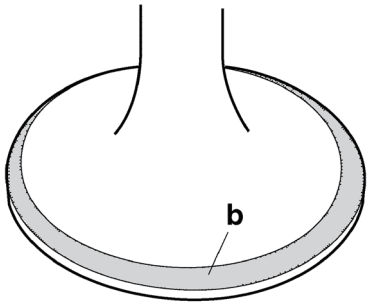
a. Apply Mechanic's blueing dye (Dykem) "b" onto the valve face.



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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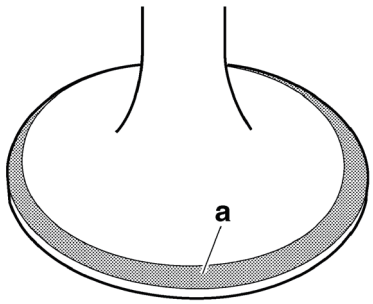
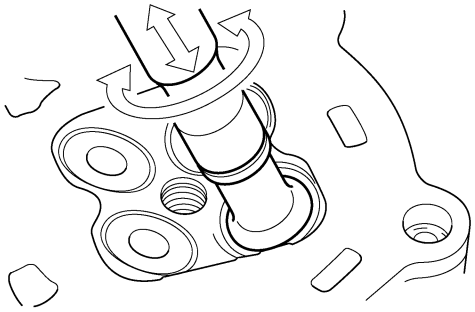
a. Apply a coarse lapping compound "a" to the valve face.

ECA13790
NOTICE
Do not let the lapping compound enter the gap between the valve stem and the valve guide.

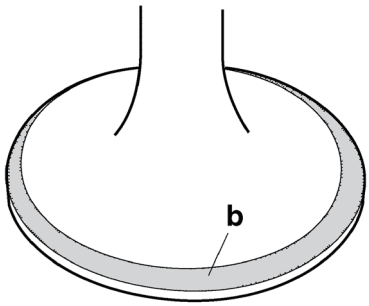


b. Apply molybdenum disulfide oil onto the valve stem.
c. Install the valve into the cylinder head.
d. Turn the valve until the valve face and valve seat are evenly polished, then clean off all of the lapping compound.

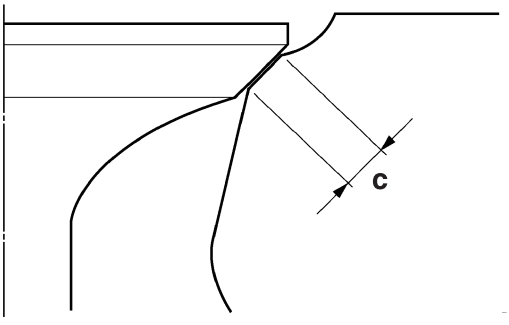
TIP
For the best lapping results, lightly tap the valve seat while rotating the valve back and forth between your hands.



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 impression.
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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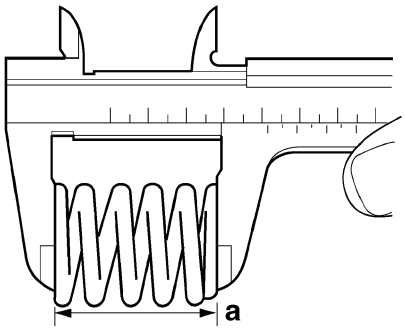
EAS24310
CHECKING THE VALVE SPRINGS

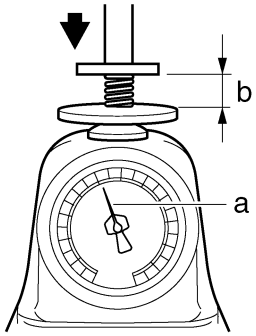
The following procedure applies to all of the valve springs.

1. Measure:
   • Valve spring free length "a"
   Out of specification → Replace the valve spring.

Valve spring free length
Free length (intake)
38.62 mm (1.52 in)
Limit
36.69 mm (1.44 in)
Free length (exhaust)
38.62 mm (1.52 in)
Limit
36.69 mm (1.44 in)



2. Measure:
   • Compressed valve spring force "a"
   Out of specification → Replace the valve spring.

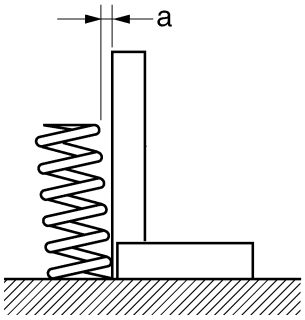


b. Installed length

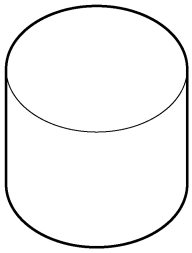
Installed compression spring force (intake)
130.60–150.20 N (13.32–15.32 kgf, 29.36–33.76 lbf)
Installed compression spring force (exhaust)
130.60–150.20 N (13.32–15.32 kgf, 29.36–33.76 lbf)
Installed length (intake)
33.00 mm (1.30 in)
Installed length (exhaust)
33.00 mm (1.30 in)

3. Measure:
   • Valve spring tilt “a”
   Out of specification → Replace the valve spring.

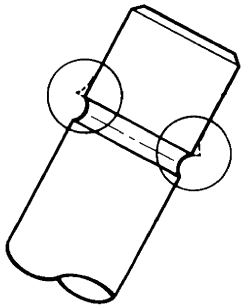
Spring tilt limit
Spring tilt (intake)
2.5°/1.7 mm (0.067 in)
Spring tilt (exhaust)
2.5°/1.7 mm (0.067 in)



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.

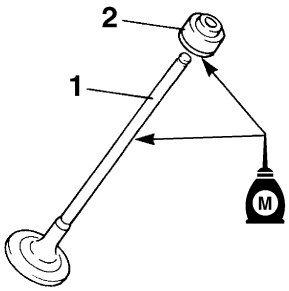


EAS24340
INSTALLING THE VALVES
The following procedure applies to all of the valves and related components.
1. Deburr:
   • Valve stem end
   (with an oil stone)



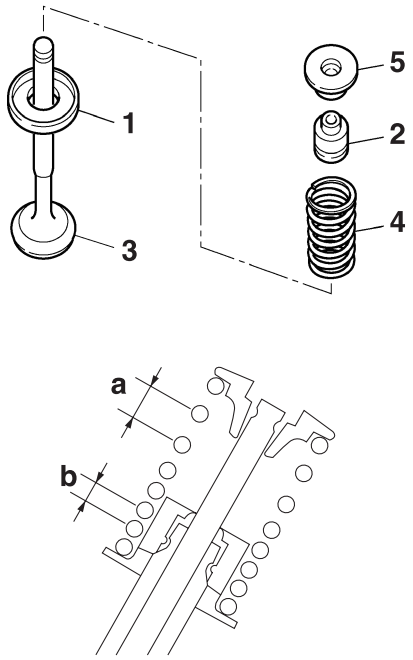
2. Lubricate:
   • Valve stem “1”
   • Valve stem seal “2”
   (with the recommended lubricant)

Recommended lubricant
Molybdenum disulfide oil



3. Install:
   • Valve spring seat “1”
   • Valve stem seal “2” New
   • Valve “3”
   • Valve spring “4”
   • Valve spring retainer “5”
   (into the cylinder head)

TIP
- Make sure each valve is installed in its original place.
- Install the valve springs with the larger pitch “a” facing up.



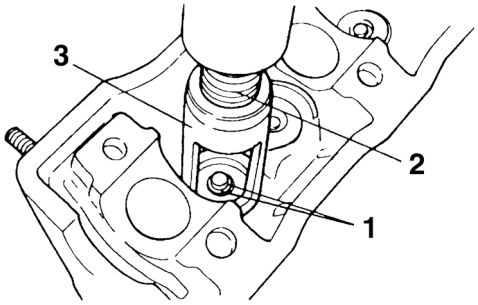
b. Smaller pitch

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

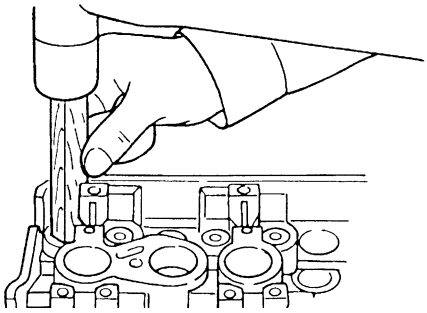


5. To secure the valve cotters onto the valve stem, lightly tap the valve tip with a soft-face hammer.

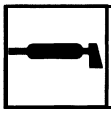
ECA13800

NOTICE

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

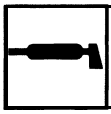


6. Lubricate:
   • Valve pad
   (with the recommended lubricant)



Recommended lubricant
Molybdenum disulfide oil

   • Valve lifter
   (with the recommended lubricant)



Recommended lubricant
Engine oil

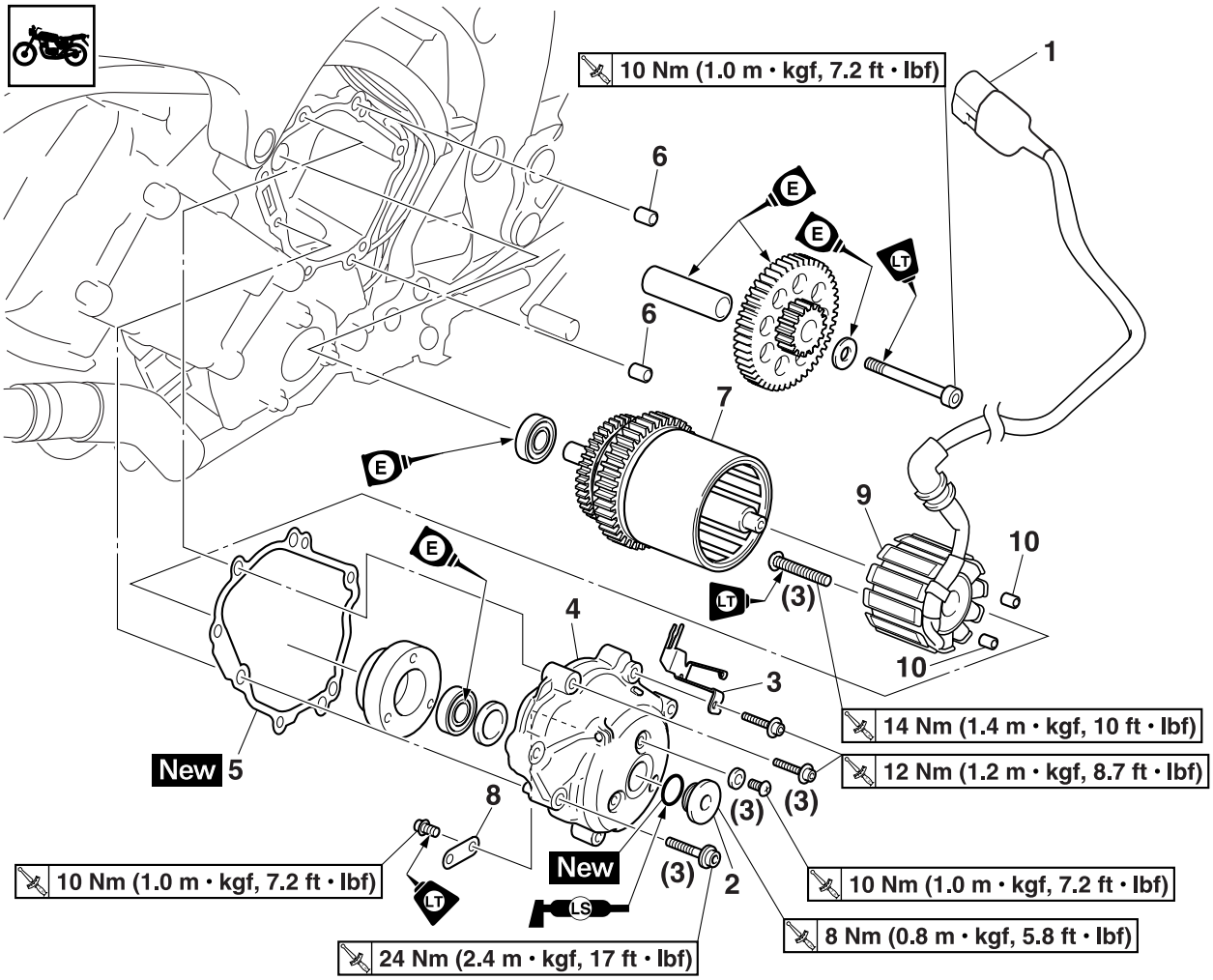
7. Install:
   • Valve pad
   • Valve lifter

TIP

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

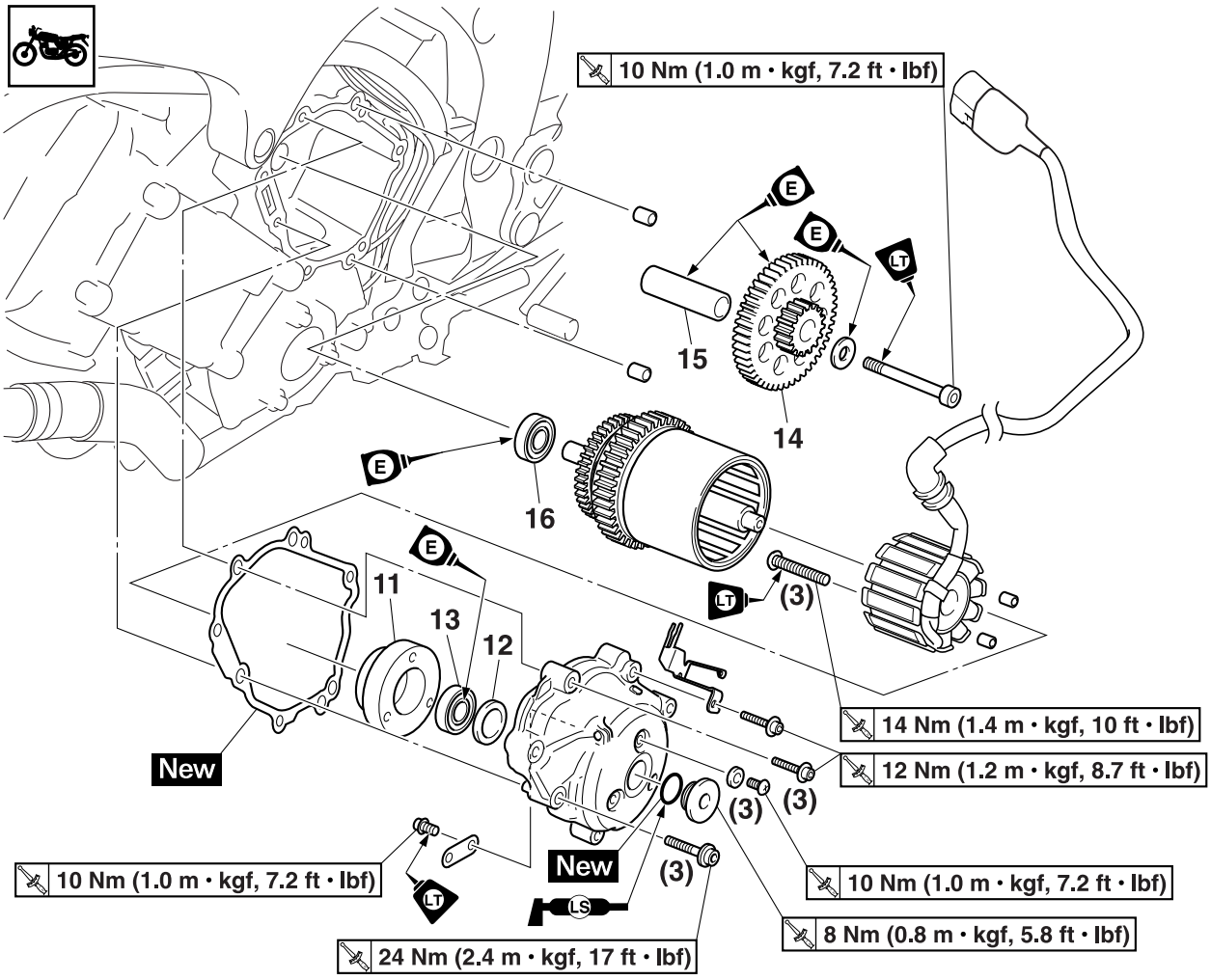
EAS24480
GENERATOR

Removing the generator



Order	Job/Parts to remove	Q'ty	Remarks
	Rider seat		Refer to "GENERAL CHASSIS" on page 4-1.
	Left side cover		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	Stator coil assembly lead coupler	1	Disconnect.
2	Plug	1	
3	Idle adjust screw holder	1	
4	Generator rotor cover	1	
5	Gasket	1	
6	Dowel pin	2	
7	Generator rotor assembly	1	
8	Stator coil assembly lead holder	1	
9	Stator coil assembly	1	
10	Dowel pin	2	

Removing the generator



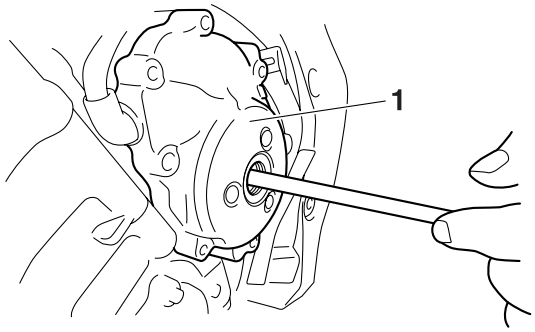
Order	Job/Parts to remove	Q'ty	Remarks
11	Bearing housing	1	
12	Collar	1	
13	Bearing	1	
14	Starter clutch idler gear	1	
15	Idler gear shaft	1	
16	Bearing	1	
			For installation, reverse the removal procedure.

EAS24490
REMOVING THE GENERATOR

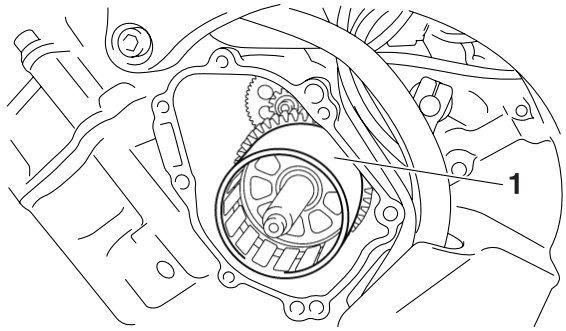
1. Remove:
   - Plug
   - Generator rotor cover “1”

TIP

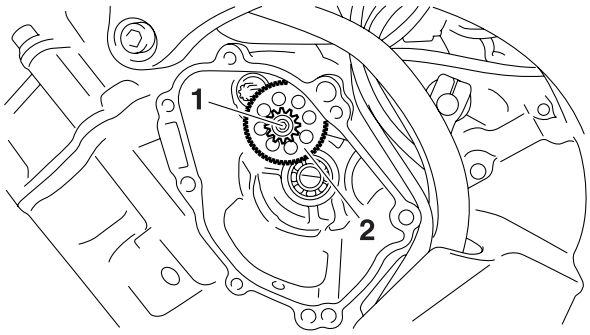
- While pushing generator rotor, remove the generator rotor cover.
- Loosen each bolt 1/4 of a turn a time, in stages and in a crisscross pattern.
- After all of the bolts are fully loosened, remove them.



2. Remove:
   - Generator rotor and starter clutch assembly “1”

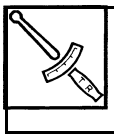


3. Remove:
   - Idle gear shaft bolt “1”
   - Washer
   - Idle shaft
   - Idle gear “2”

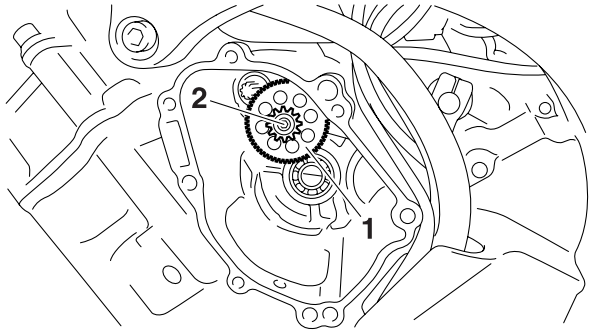


EAS24500
INSTALLING THE GENERATOR

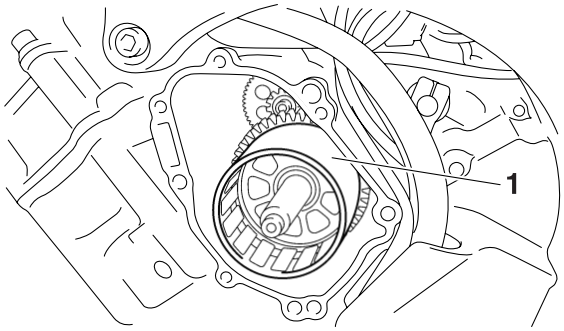
1. Install:
   - Idle gear shaft
   - Idle gear “1”
   - Washer
   - Idle gear shaft bolt “2”



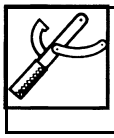
Idle gear shaft bolt
10 Nm (1.0 m·kgf, 7.2 ft·lbf)
LOCTITE®



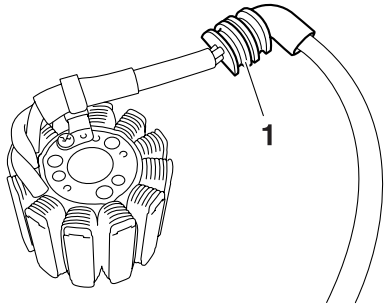
2. Install:
   - Generator rotor and starter clutch assembly “1”



3. Apply:
   - Sealant
     (onto the stator coil lead grommet “1”)

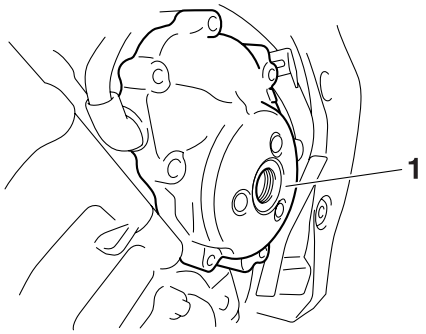


Yamaha bond No.1215
(Three bond No.1215®)
90890-85505



4. Install:
   - Generator rotor cover gasket New
   - Generator rotor cover "1"

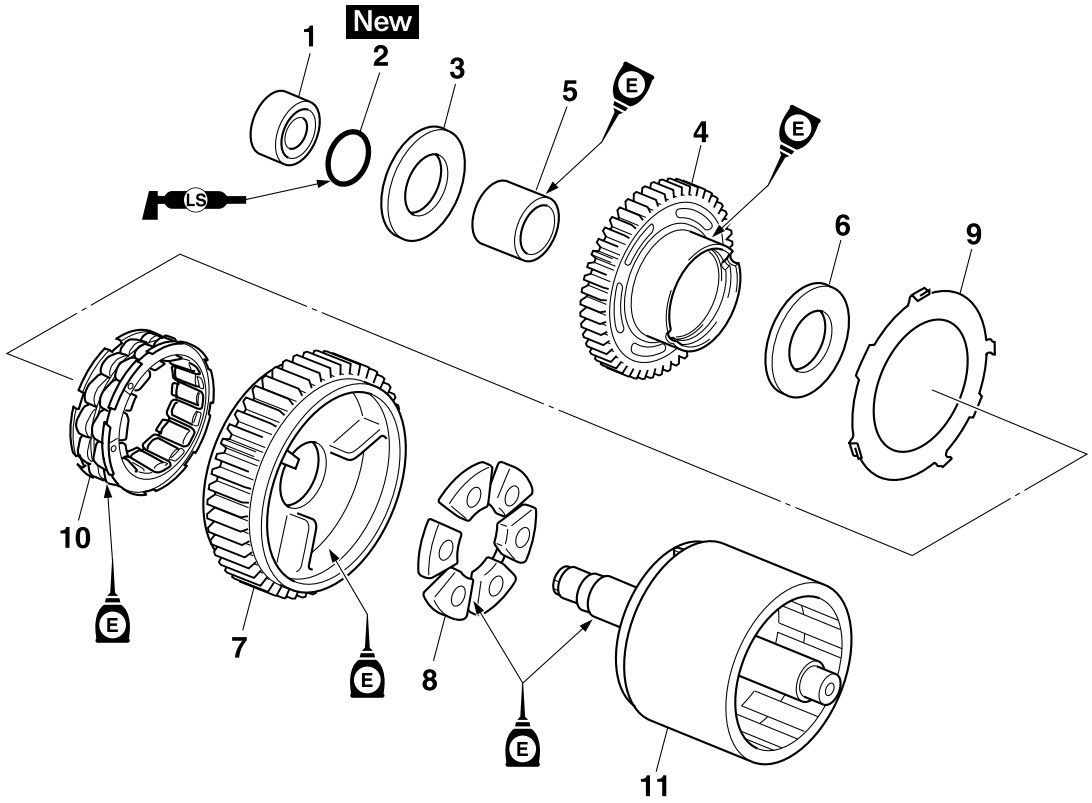
Generator rotor cover bolt (M8)
22 Nm (2.2 m·kgf, 16 ft·lbf)
Generator rotor cover bolt (M6)
12 Nm (1.2 m·kgf, 8.7 ft·lbf)



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

EAS24550
STARTER CLUTCH

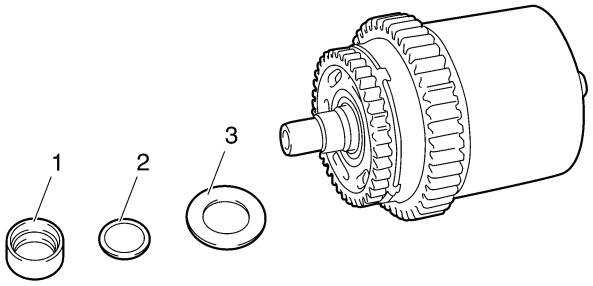
Removing the starter clutch



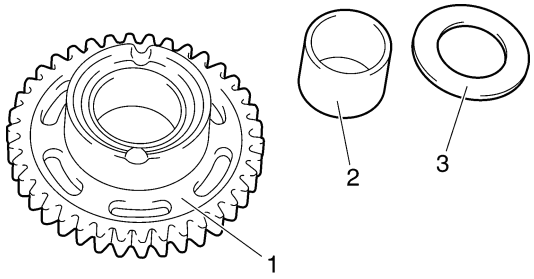
Order	Job/Parts to remove	Q'ty	Remarks
1	Spacer	1	
2	O-ring	1	
3	Washer	1	
4	Starter clutch drive gear	1	
5	Collar	1	
6	Washer	1	
7	Driven gear	1	
8	Damper	3	
9	Starter clutch assembly plate	1	
10	Starter clutch assembly	1	
11	Generator rotor	1	
			For installation, reverse the removal procedure.

EAS24560
REMOVING THE STARTER CLUTCH

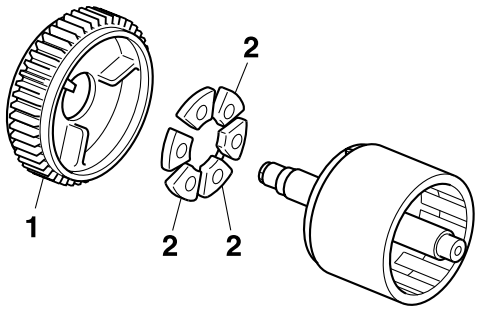
1. Remove:
   - Spacer “1”
   - O-ring “2”
   - Washer “3”



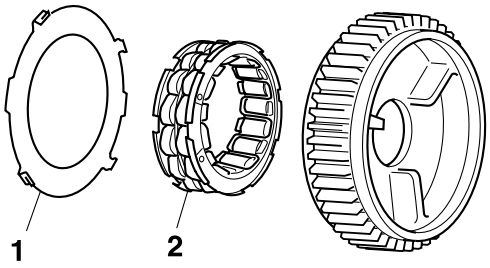
2. Remove:
   - Starter clutch drive gear “1”
   - Collar “2”
   - Washer “3”



3. Remove:
   - Driven gear “1”
   - Dampers “2”

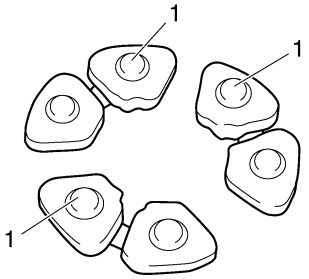


4. Remove:
   - Starter clutch assembly plate “1”
   - Starter clutch assembly “2”



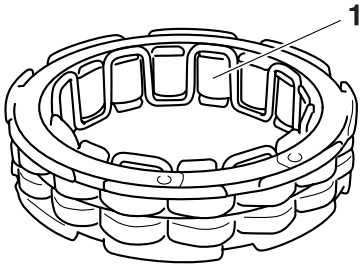
EAS5D01018
CHECKING THE DAMPER

1. Check:
   - Dampers “1”
     Damage/wear → Replace.

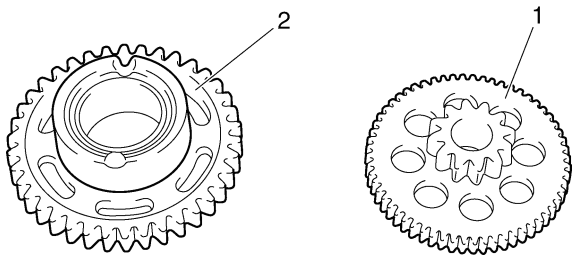


EAS24570
CHECKING THE STARTER CLUTCH

1. Check:
   - Starter clutch rollers “1”
     Damage/wear → Replace.



2. Check:
   - Starter clutch idle gear “1”
   - Starter clutch drive gear “2”
     Burrs/chips/roughness/wear → Replace the defective part(s).



3. Check:
   • Starter clutch gear's contacting surfaces Damage/pitting/wear → Replace the starter clutch gear.
4. Check:
   • Starter clutch operation

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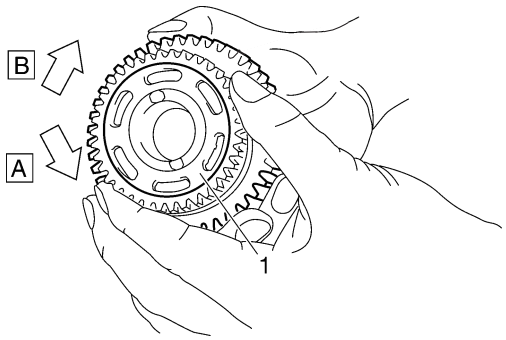
a. Install the starter clutch drive gear "1" onto the starter clutch and hold the driven gear.
b. When turning the starter clutch drive gear counterclockwise "A", the driven gear and the starter clutch drive gear should engage, otherwise the starter clutch is faulty and must be replaced.
c. When turning the starter clutch drive gear clockwise "B", it should turn freely, otherwise the starter clutch is faulty and must be replaced.



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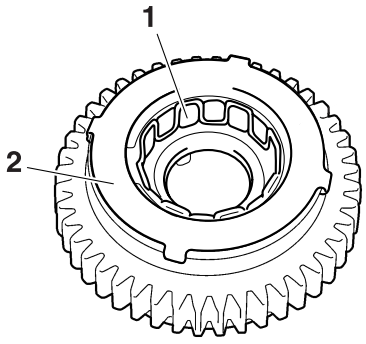
EAS24600
INSTALLING THE STARTER CLUTCH

1. Install:
   • Starter clutch assembly "1"
   • Starter clutch assembly plate "2"

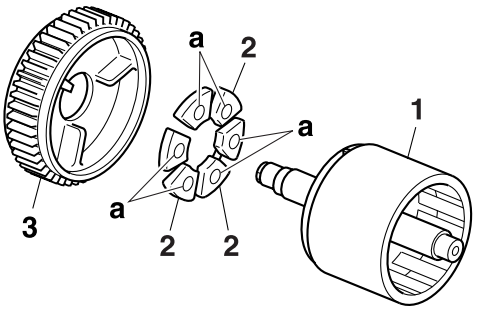
ECA24590
NOTICE

Be sure to install the starter clutch assembly to the driven gear so that the white paint mark is outside.

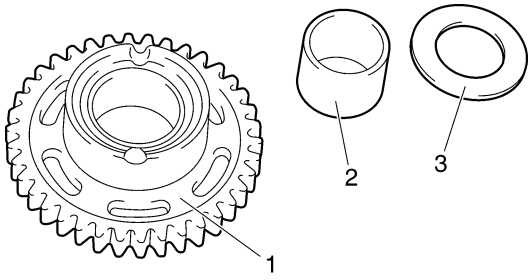


2. Install:
   • Generator rotor "1"
   • Dampers "2"
   • Driven gear "3"

TIP
- Be sure to install the damper to the driven gear so that the projections "a" is generator side.
- Lubricate the engine oil to damper.

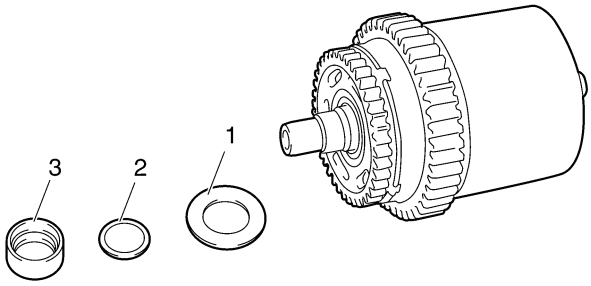


3. Install:
   • Starter clutch drive gear "1"
   • Collar "2"
   • Washer "3"



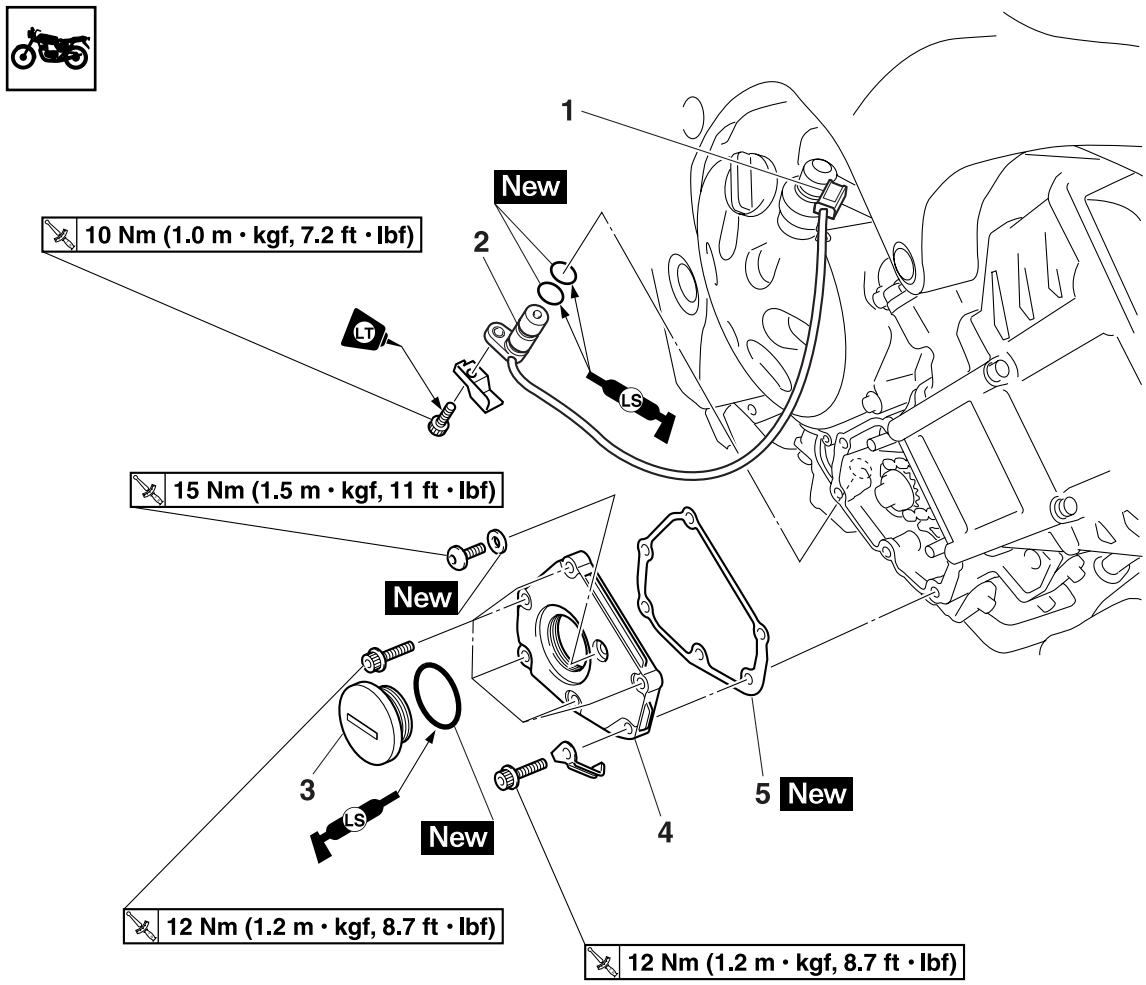
4. Install:
   • Washer "1"
   • O-ring "2" New
   • Spacer "3"

TIP
Lubricate the lithium-soap-based grease to O-ring.



EAS24520
CRANKSHAFT POSITION SENSOR

Removing the crankshaft position sensor



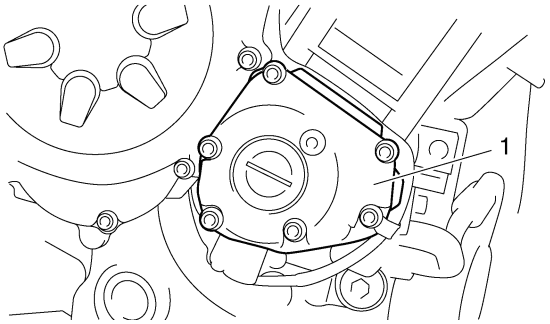
Order	Job/Parts to remove	Q'ty	Remarks
	Rider seat		Refer to "GENERAL CHASSIS" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-24.
1	Crankshaft position sensor lead coupler	1	Disconnect.
2	Crankshaft position sensor	1	
3	Plug	1	
4	Pickup rotor cover	1	
5	Gasket	1	
			For installation, reverse the removal procedure.

EAS24530
REMOVING THE CRANKSHAFT POSITION SENSOR

1. Disconnect:
   - Crankshaft position sensor lead coupler
2. Remove:
   - Crankshaft position sensor
   - O-rings
   - Pickup rotor cover “1”

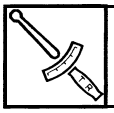
TIP

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.



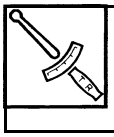
EAS24540
INSTALLING THE CRANKSHAFT POSITION SENSOR

1. Install:
   - Gasket New
   - Pickup rotor cover “1”

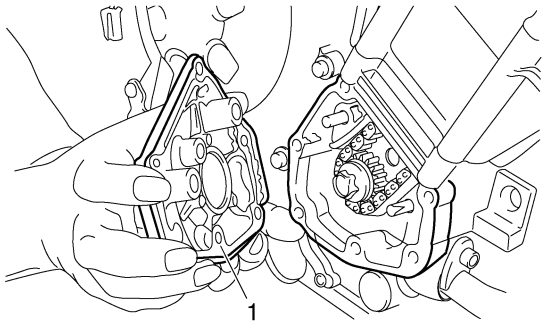


Pickup rotor cover bolt
12 Nm (1.2 m·kgf, 8.7 ft·lbf)

   - O-rings New
   - Crankshaft position sensor



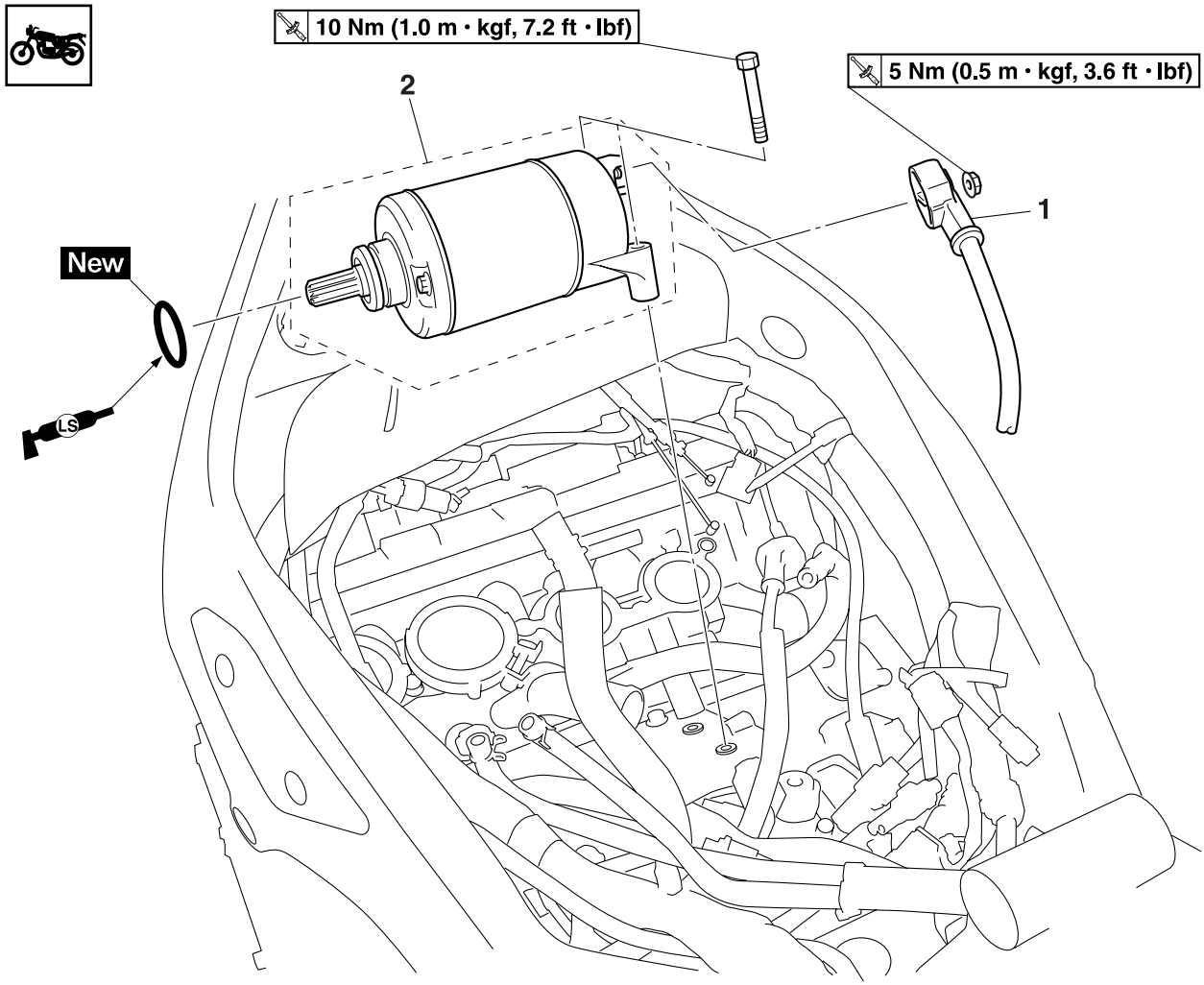
Crankshaft position sensor bolt
10 Nm (1.0 m·kgf, 7.2 ft·lbf)
LOCTITE®



2. Connect:
   - Crankshaft position sensor lead coupler

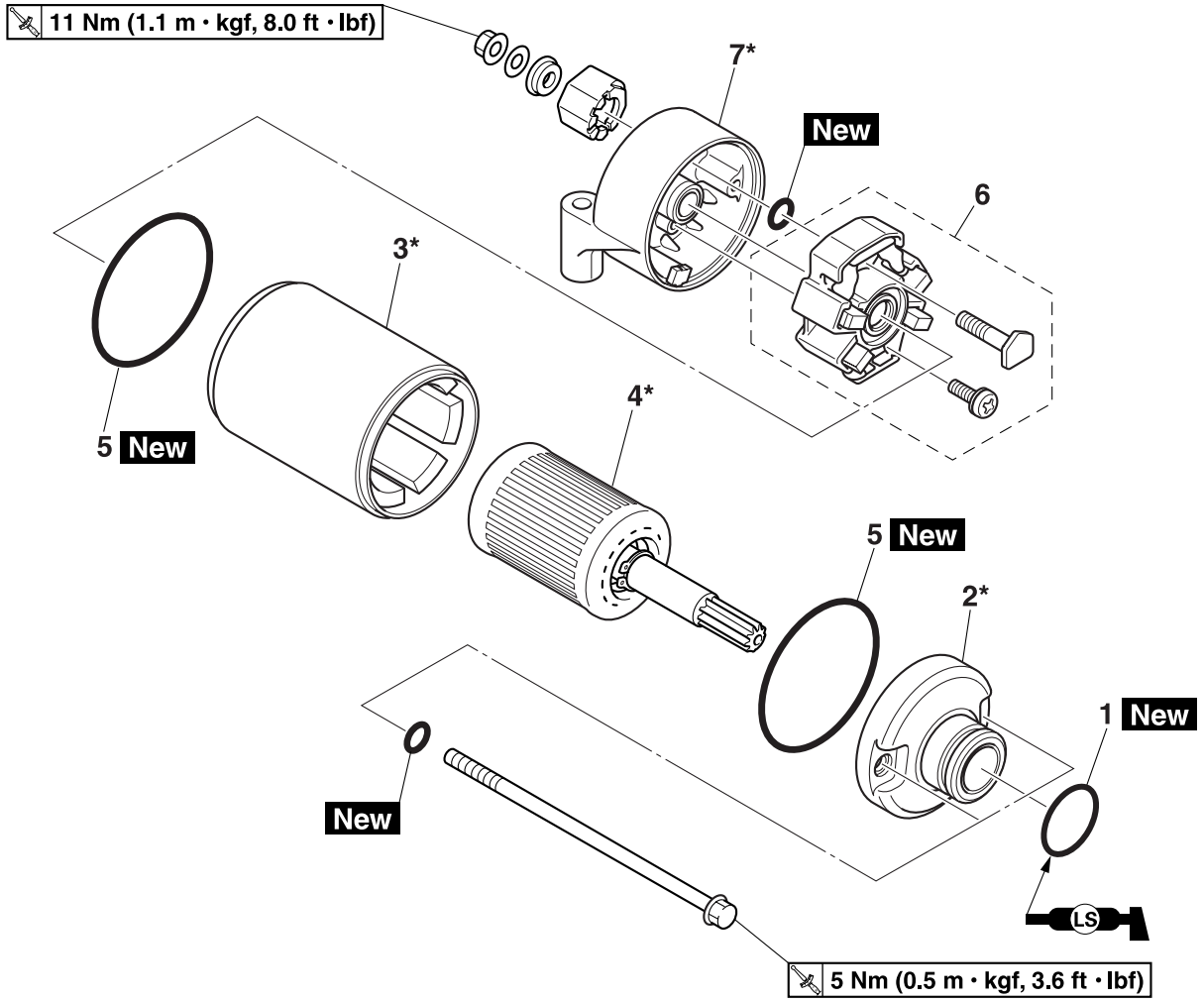
EAS24780
ELECTRIC STARTER

Removing the starter motor



Order	Job/Parts to remove	Q'ty	Remarks
	Rider seat		Refer to "GENERAL CHASSIS" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Throttle bodies		Refer to "THROTTLE BODIES" on page 7-5.
	Right throttle body joint		Refer to "THROTTLE BODIES" on page 7-5.
1	Starter motor lead	1	Disconnect.
2	Starter motor	1	
			For installation, reverse the removal procedure.

Disassembling the starter motor



Order	Job/Parts to remove	Q'ty	Remarks
1	O-ring	1	
2	Front cover	1	
3	Starter motor yoke	1	
4	Armature assembly	1	
5	Gasket	2	
6	Brush holder set	1	
7	Rear cover	1	
			For assembly, reverse the disassembly procedure.

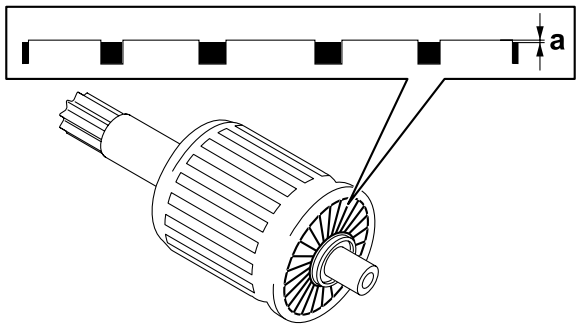
* When replacing any of the front cover, starter motor yoke, armature assembly, and rear cover, replace the starter motor assembly.

EAS24791
CHECKING THE STARTER MOTOR

1. Check:
   • Commutator
   Dirt → Clean with 600 grit sandpaper.
2. 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.



3. Measure:
   • Armature assembly resistances (commutator and insulation)
   Out of specification → Replace the starter motor.

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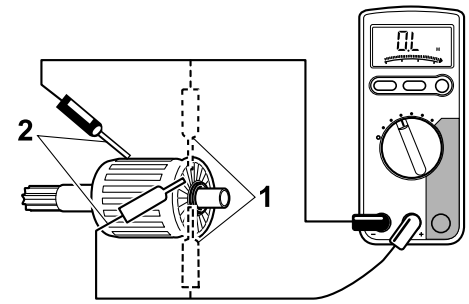
a. Measure the armature assembly resistances with the digital circuit tester.

Digital circuit tester
90890-03174
Model 88 Multimeter with tachometer
YU-A1927

Armature coil
Commutator resistance
0.0100–0.2000 Ω at 20 °C (68 °F)
Insulation resistance
Above 1 MΩ at 20 °C (68 °F)

b. If any resistance is out of specification, replace the starter motor.



1. Commutator resistance
2. Insulation resistance

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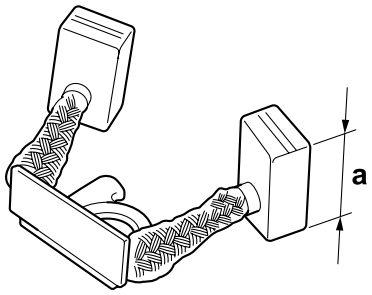
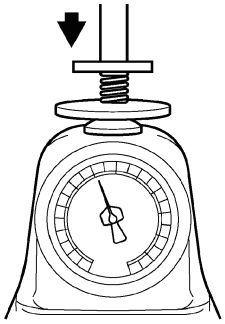
4. Measure:
   • Brush length “a”
   Out of specification → Replace the brush holder set.

Brush overall length
12.0 mm (0.47 in)
Limit
6.50 mm (0.26 in)



5. Measure:
   • Brush spring force
   Out of specification → Replace the brush holder set.

Brush spring force
6.02–6.51 N (614–664 gf, 21.65–23.41 ozf)

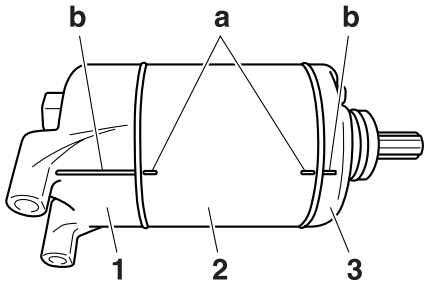


6. Check:
   • Gear teeth
   Damage/wear → Replace the starter motor.
7. Check:
   • Bearing
   • Oil seal
   Damage/wear → Replace the starter motor.

EAS24800
ASSEMBLING THE STARTER MOTOR

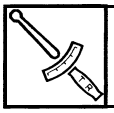
1. Install:
   • Brush holder set
2. Install:
   • Rear cover “1”
   • Starter motor yoke “2”
   • Front cover “3”

TIP
Align the match marks “a” on the starter motor yoke with the match marks “b” on the front and rear cover.

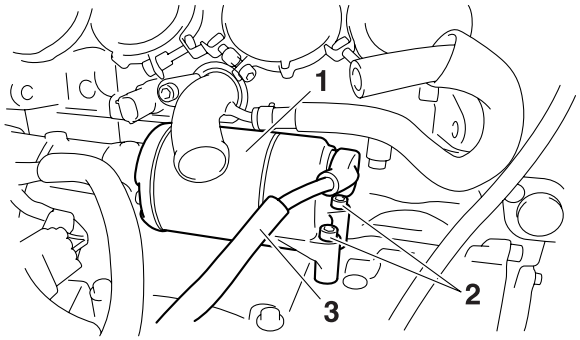


EAS24810
INSTALLING THE STARTER MOTOR

1. Install:
   • Starter motor “1”
   • Starter motor bolts “2”

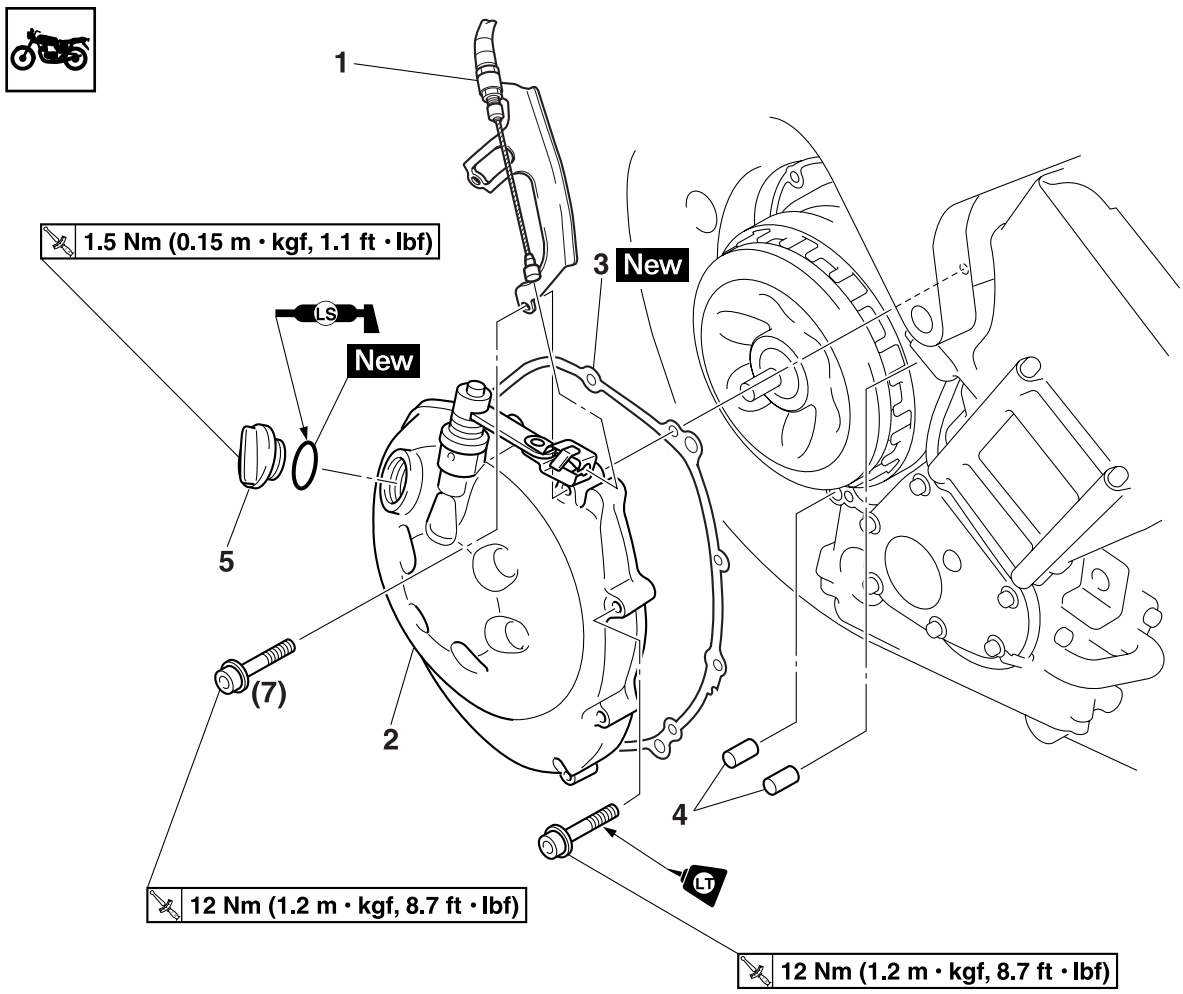
	**Starter motor bolt** **10 Nm (1.0 m·kgf, 7.2 ft·lbf)**

2. Connect:
   • Starter motor lead “3”



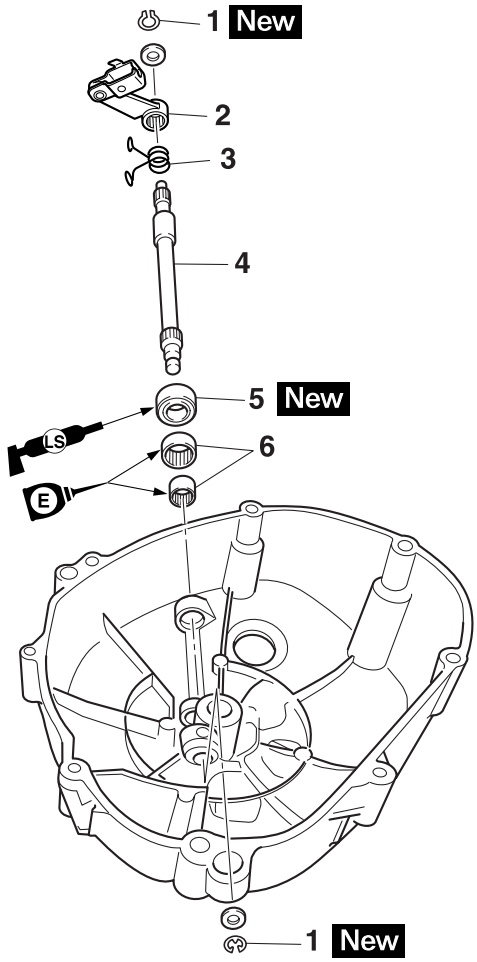
EAS25061
CLUTCH

Removing the clutch cover



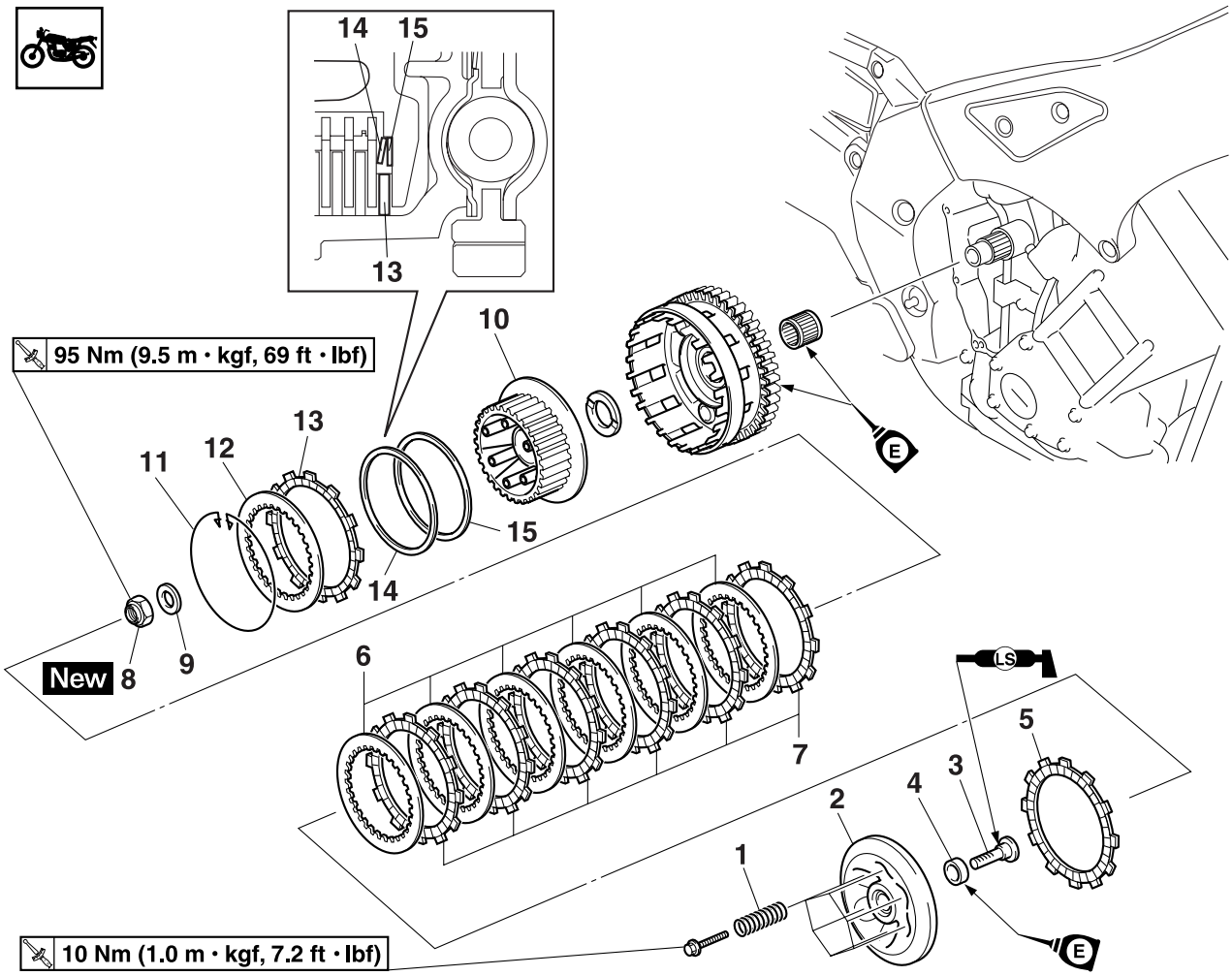
Order	Job/Parts to remove	Q'ty	Remarks
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-24.
1	Clutch cable	1	Disconnect.
2	Clutch cover	1	
3	Clutch cover gasket	1	
4	Dowel pin	2	
5	Oil filler cap	1	
			For installation, reverse the removal procedure.

Removing the pull lever shaft



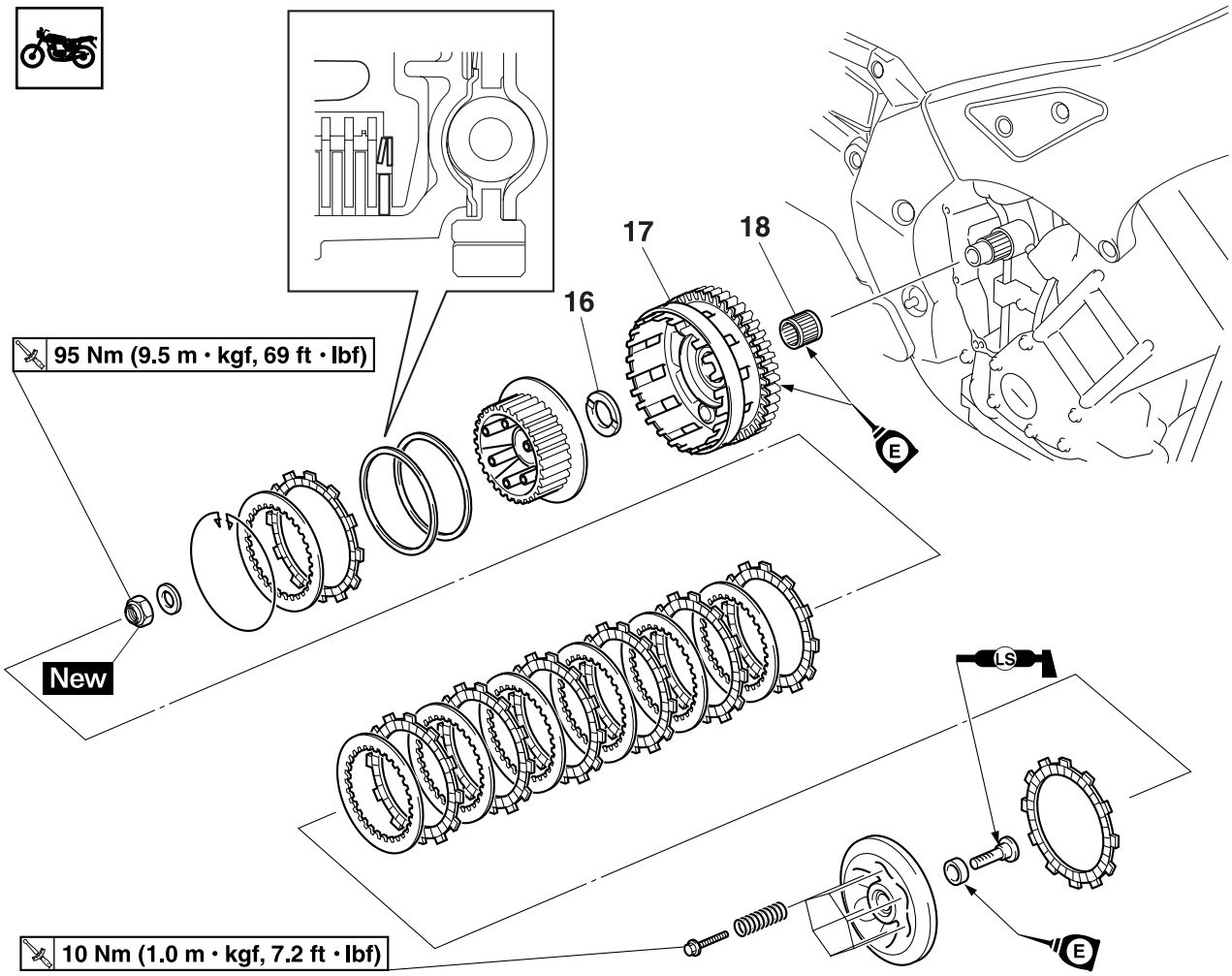
Order	Job/Parts to remove	Q'ty	Remarks
1	Circlip	2	
2	Pull lever	1	
3	Pull lever spring	1	
4	Pull lever shaft	1	
5	Oil seal	1	
6	Bearing	2	
			For installation, reverse the removal procedure.

Removing the clutch



Order	Job/Parts to remove	Q'ty	Remarks
1	Compression spring	6	
2	Pressure plate	1	
3	Pull rod	1	
4	Bearing	1	
5	Friction plate 1	1	Green paint mark.
6	Clutch plate 1	6	
7	Friction plate 2	6	Purple paint mark.
8	Clutch boss nut	1	
9	Washer	1	
10	Clutch boss	1	
11	Wire circlip	1	
12	Clutch plate 2	1	
13	Friction plate 3	1	
14	Clutch damper spring	1	
15	Clutch damper spring seat	1	

Removing the clutch



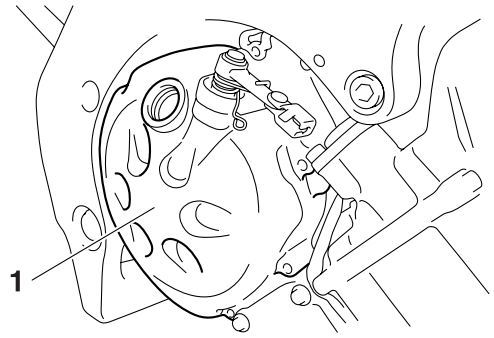
Order	Job/Parts to remove	Q'ty	Remarks
16	Thrust plate	1	
17	Clutch housing	1	
18	Bearing	1	
			For installation, reverse the removal procedure.

EAS30712
REMOVING THE CLUTCH

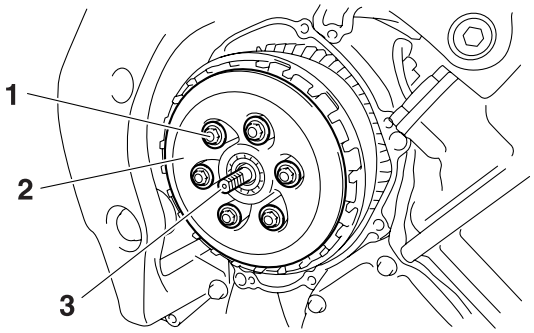
1. Remove:
   - Clutch cover “1”
   - Gasket

TIP

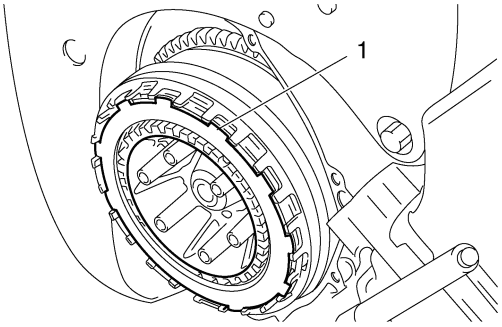
Loosen each bolt 1/4 of a turn at a time, in stages and in a crisscross pattern.
After all of the bolts are fully loosened, remove them.



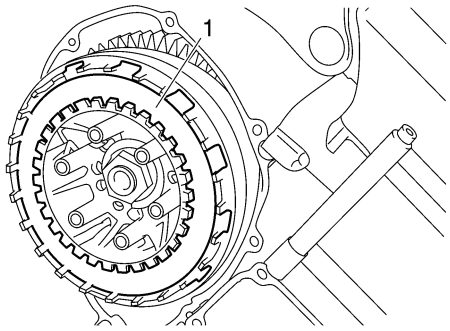
2. Remove:
   - Compression spring bolts “1”
   - Compression springs
   - Pressure plate “2”
   - Pull rod “3”



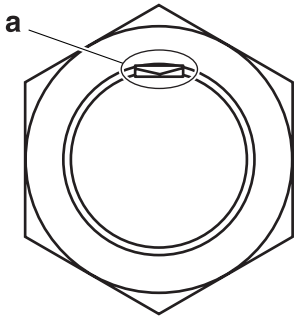
3. Remove:
   - Friction plate 1 “1”



4. Remove:
   - Clutch plate 1 “1”
   - Friction plate 2



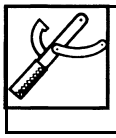
5. Straighten the clutch boss nut rib “a”.



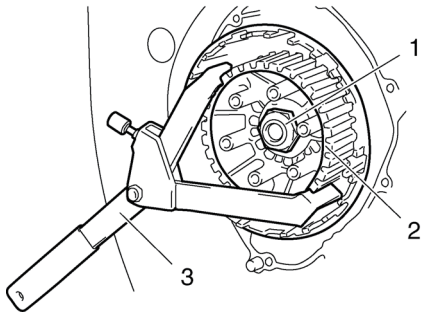
6. Loosen:
   - Clutch boss nut “1”

TIP

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



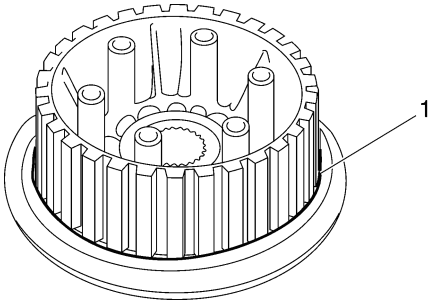
Universal clutch holder
90890-04086
YM-91042



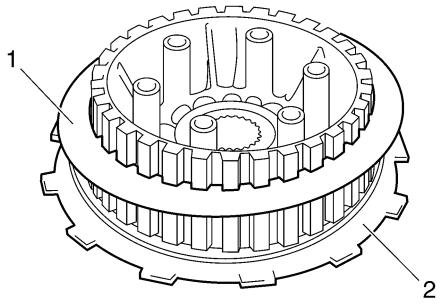
7. Remove:
   - Clutch boss nut
   - Washer
   - Clutch boss assembly
   - Thrust plate
8. Remove:
   - Wire circlip “1”

TIP

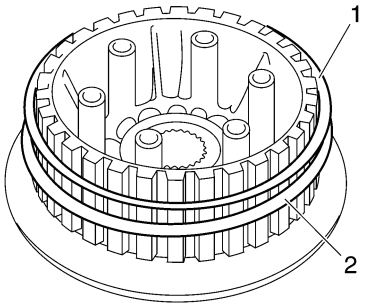
There is a built-in damper between the clutch boss and the clutch plate. It is not necessary to remove the wire circlip “1” and disassemble the built-in damper unless there is serious clutch chattering.



9. Remove:
   - Clutch plate 2 “1”
   - Friction plate 3 “2”



10. Remove:
    - Clutch damper spring “1”
    - Clutch damper spring seat “2”



EAS25100

CHECKING THE FRICTION PLATES

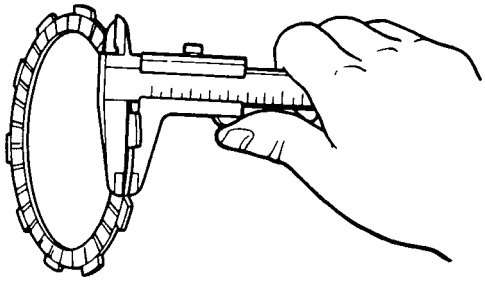
The following procedure applies to all of the friction plates.

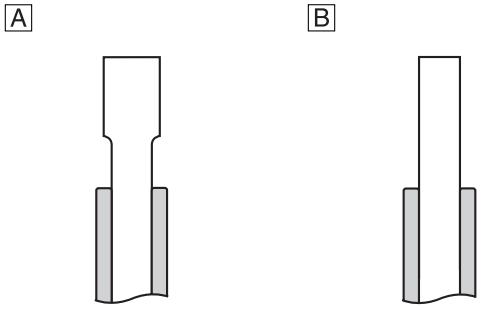
1. Check:
   - Friction plate
     Damage/wear → Replace the friction plates as a set.
2. Measure:
   - Friction plate thickness
     Out of specification → Replace the friction plates as a set.

TIP

Measure the friction plate at four places.

Friction plate thickness
2.92–3.08 mm (0.115–0.121 in)
Wear limit
2.82 mm (0.1110 in)





A. Friction plate 1 and friction plate 2
B. Friction plate 3

EAS25111

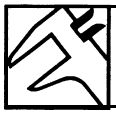
CHECKING THE CLUTCH PLATES

The following procedure applies to all of the clutch plates.

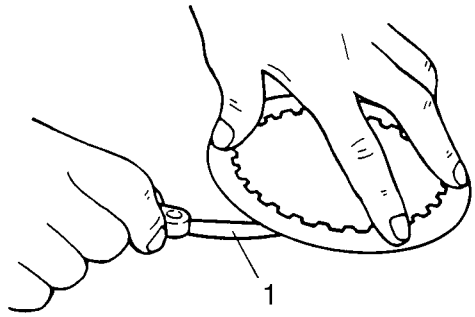
1. Check:
   - Clutch plate
     Damage → Replace the clutch plates as a set.

2. Measure:
   • Clutch plate warpage
   (with a surface plate and thickness gauge "1")
   Out of specification → Replace the clutch plates as a set.

Thickness gauge
90890-03180
Feeler gauge set
YU-26900-9



Warpage limit
0.10 mm (0.0039 in)

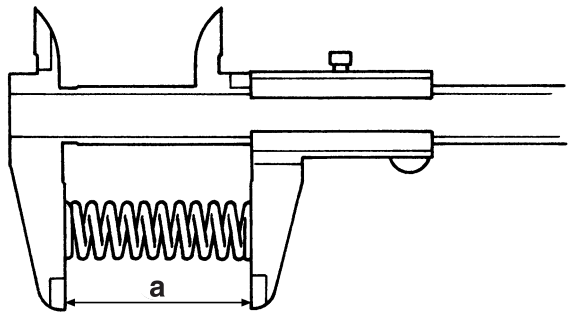


EAS25140
CHECKING THE CLUTCH SPRINGS

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.

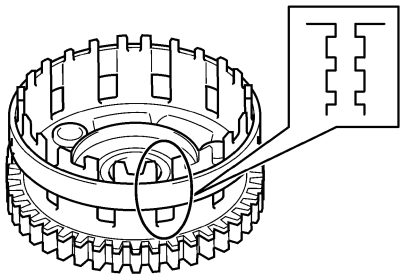
Clutch spring free length
52.50 mm (2.07 in)
Limit
49.88 mm (1.96 in)



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.

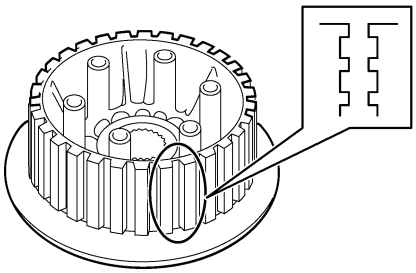


2. Check:
   • Bearing
   Damage/wear → Replace the bearing and clutch housing.

EAS25160
CHECKING THE CLUTCH BOSS

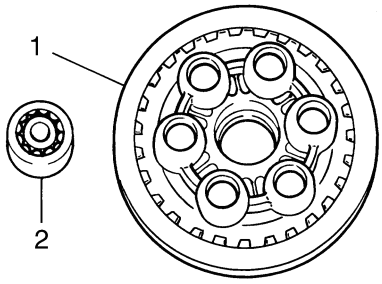
1. Check:
   • Clutch boss splines
   Damage/pitting/wear → Replace the clutch boss.

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



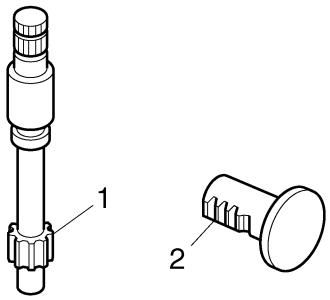
EAS25170
CHECKING THE PRESSURE PLATE

1. Check:
   • Pressure plate "1"
   Cracks/damage → Replace.
   • Bearing "2"
   Damage/wear → Replace.



EAS25220
CHECKING THE PULL LEVER SHAFT AND PULL ROD

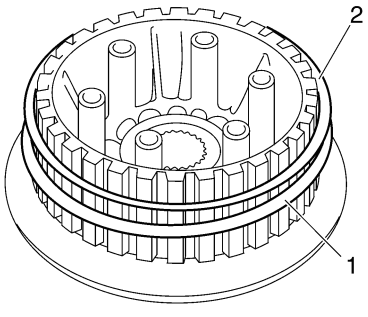
1. Check:
   - Pull lever shaft pinion gear teeth “1”
   - Pull rod teeth “2”
     Damage/wear → Replace the pull rod and pull lever shaft as a set.



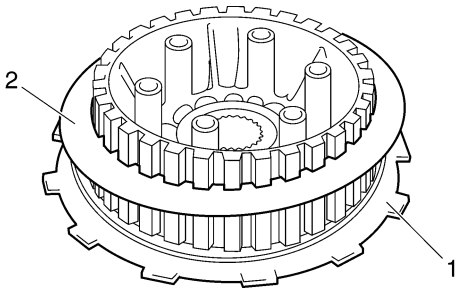
2. Check:
   - Pull rod bearing
     Damage/wear → Replace.

EAS25240
INSTALLING THE CLUTCH

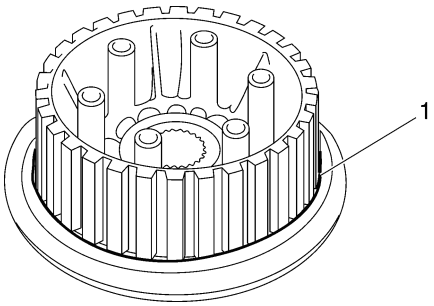
1. Install:
   - Clutch damper spring seat “1”
   - Clutch damper spring “2”



2. Install:
   - Friction plate 3 “1”
   - Clutch plate 2 “2”

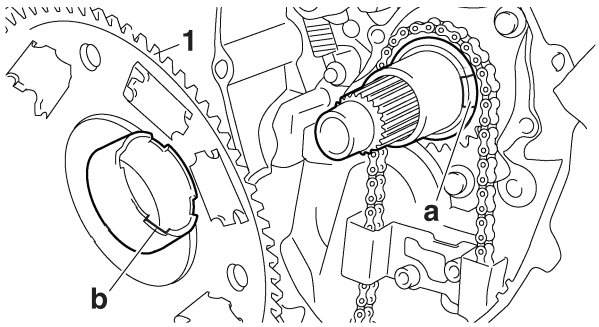


3. Install:
   - Wire circlip “1”

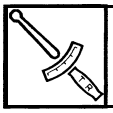


4. Install:
   - Clutch housing “1”

TIP
Make sure to fit the projections “a” of the oil/water pump assembly drive sprocket to the concave “b” of the clutch housing.

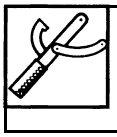


5. Install:
   - Thrust plate
   - Clutch boss assembly “1”
   - Washer
   - Clutch boss nut “2” New

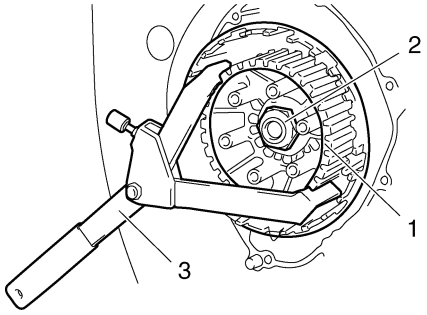
	**Clutch boss nut** **95 Nm (9.5 m·kgf, 69 ft·lbf)**

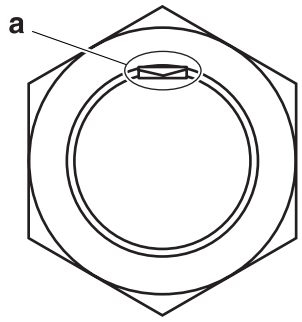
TIP
- Install the washer on the main axle with the “OUT” mark facing away from the vehicle.

- Stake the clutch boss nut at a cutout “a” in the main axle.
- While holding the clutch boss assembly “1” with the universal clutch holder “3”, tighten the clutch boss nut.



Universal clutch holder
90890-04086
YM-91042

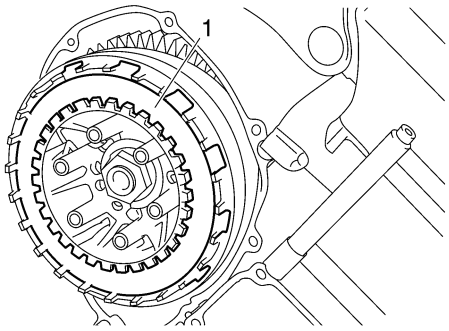




6. Install:
   - Friction plate 2
   - Clutch plate 1 “1”

TIP

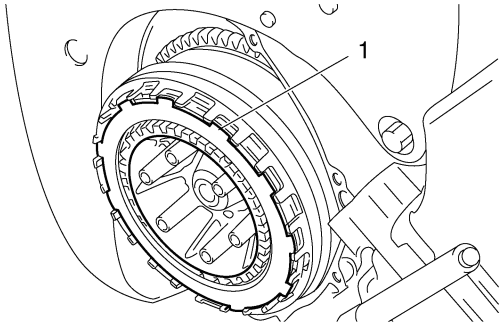
Assemble friction plate 2 to the clutch boss assembly so that the red paint marks on friction plate 2 and friction plate 3 are aligned.

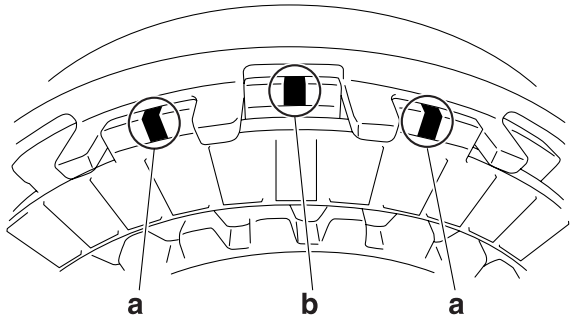


7. Install:
   - Friction plate 1 “1”

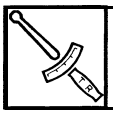
TIP

- Install the last friction plate shifting half phase.
- Assemble friction plate 1 to the clutch boss assembly so that red paint marks “a” on friction plate 1 is aligned with red paint mark “b” of friction plates 2 and 3 as shown in the illustration.





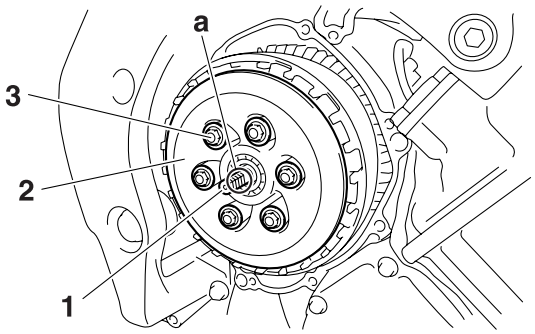
8. Install:
   - Bearing
   - Pull rod “1”
   - Pressure plate “2”
   - Clutch springs
   - Clutch spring bolts “3”



Clutch spring bolt
10 Nm (1.0 m·kgf, 7.2 ft·lbf)

TIP

- Apply lithium-soap-based grease onto the pull rod.
- Position the pull rod so that the teeth “a” face towards the front of the vehicle. Then, install the clutch cover.
- Tighten the clutch cover bolts in stages and in a crisscross pattern.

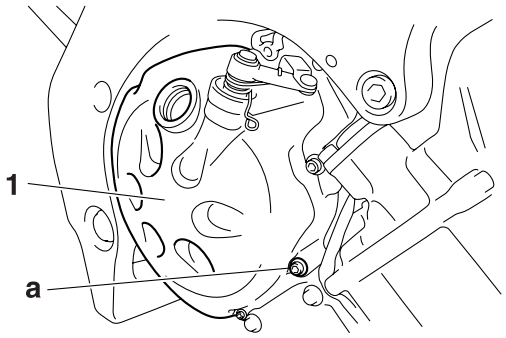


9. Install:
   - Dowel pins
   - Clutch cover gasket New
   - Clutch cover "1"

	Clutch cover bolt **12 Nm (1.2 m·kgf, 8.7 ft·lbf)**

TIP

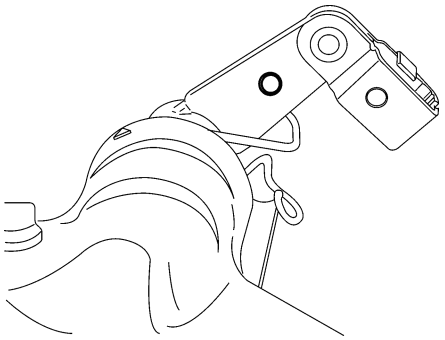
- Apply engine oil onto the bearing.
- Apply locking agent (LOCTITE®) to the threads of only the clutch cover bolts "a" shown in the illustration.
- Tighten the clutch cover bolts in stages and in a crisscross pattern.

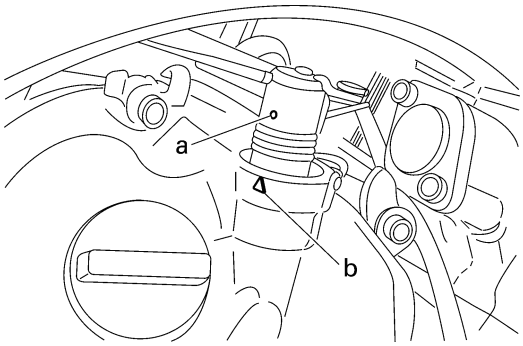


10. Install:
    - Pull lever

TIP

- Install the pull lever with the "O" mark facing toward lower side.
- When installing the pull lever, push the pull lever and check that the punch mark "a" on the pull lever aligns with the mark "b" on the clutch cover. Make sure that the pull rod teeth and pull lever shaft pinion gear are engaged.



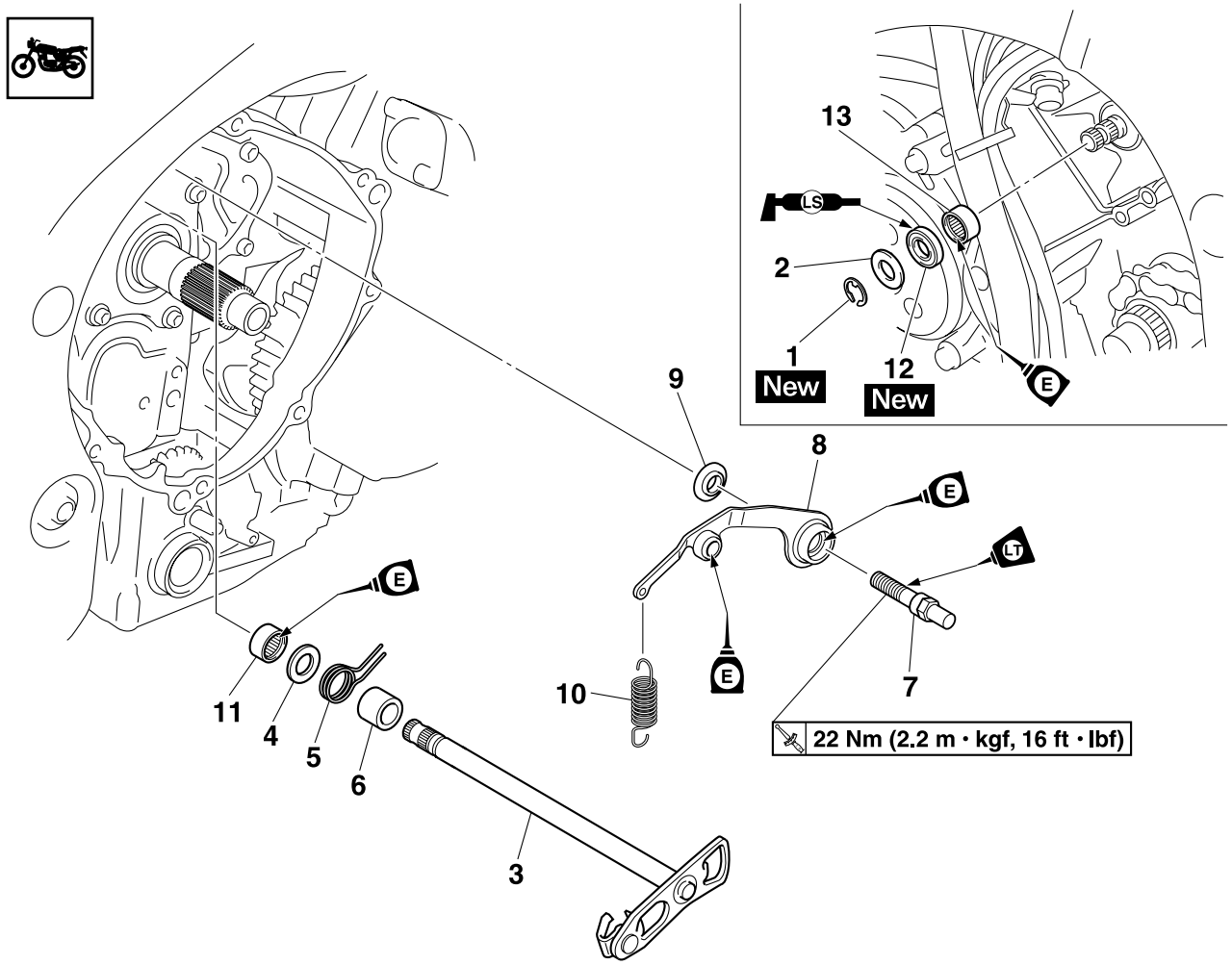


11. Adjust:
    - Clutch cable free play
      Refer to "ADJUSTING THE CLUTCH CABLE FREE PLAY" on page 3-13.

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

EAS25410
SHIFT SHAFT

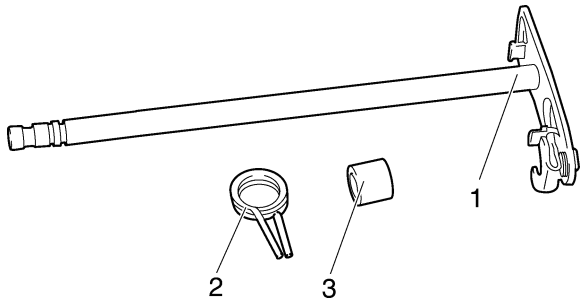
Removing the shift shaft and stopper lever



Order	Job/Parts to remove	Q'ty	Remarks
	Clutch assembly		Refer to "CLUTCH" on page 5-45.
	Shift arm and shift rod		Refer to "ENGINE REMOVAL" on page 5-3.
1	Circlip	1	
2	Washer	1	
3	Shift shaft	1	
4	Washer	1	
5	Shift shaft spring	1	
6	Collar	1	
7	Shift shaft spring stopper	1	
8	Stopper lever	1	
9	Washer	1	
10	Stopper lever spring	1	
11	Bearing	1	
12	Oil seal	1	
13	Bearing	1	
			For installation, reverse the removal procedure.

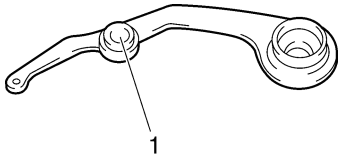
EAS25420
CHECKING THE SHIFT SHAFT

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.

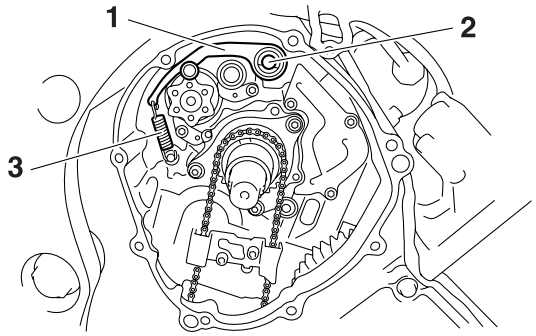


EAS25451
INSTALLING THE SHIFT SHAFT

1. Install:
   - Washer
   - Stopper lever “1”
   - Shift shaft spring stopper “2”
   - Stopper lever spring “3”

TIP

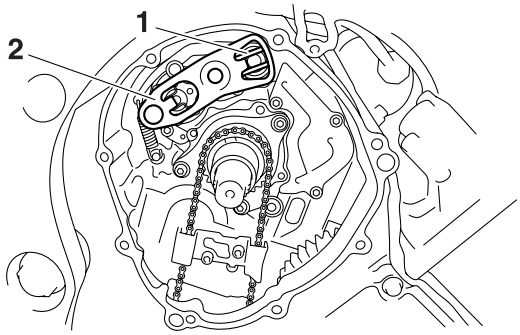
- Hook the ends of the stopper lever spring onto the stopper lever and the spring hook.
- Mesh the stopper lever with the shift drum segment assembly.



2. Install:
   - Bearing
   - Washer
   - Collar
   - Shift shaft spring “1”
   - Shift shaft “2”

TIP

Hook the end of the shift shaft spring onto the shift shaft spring stopper.



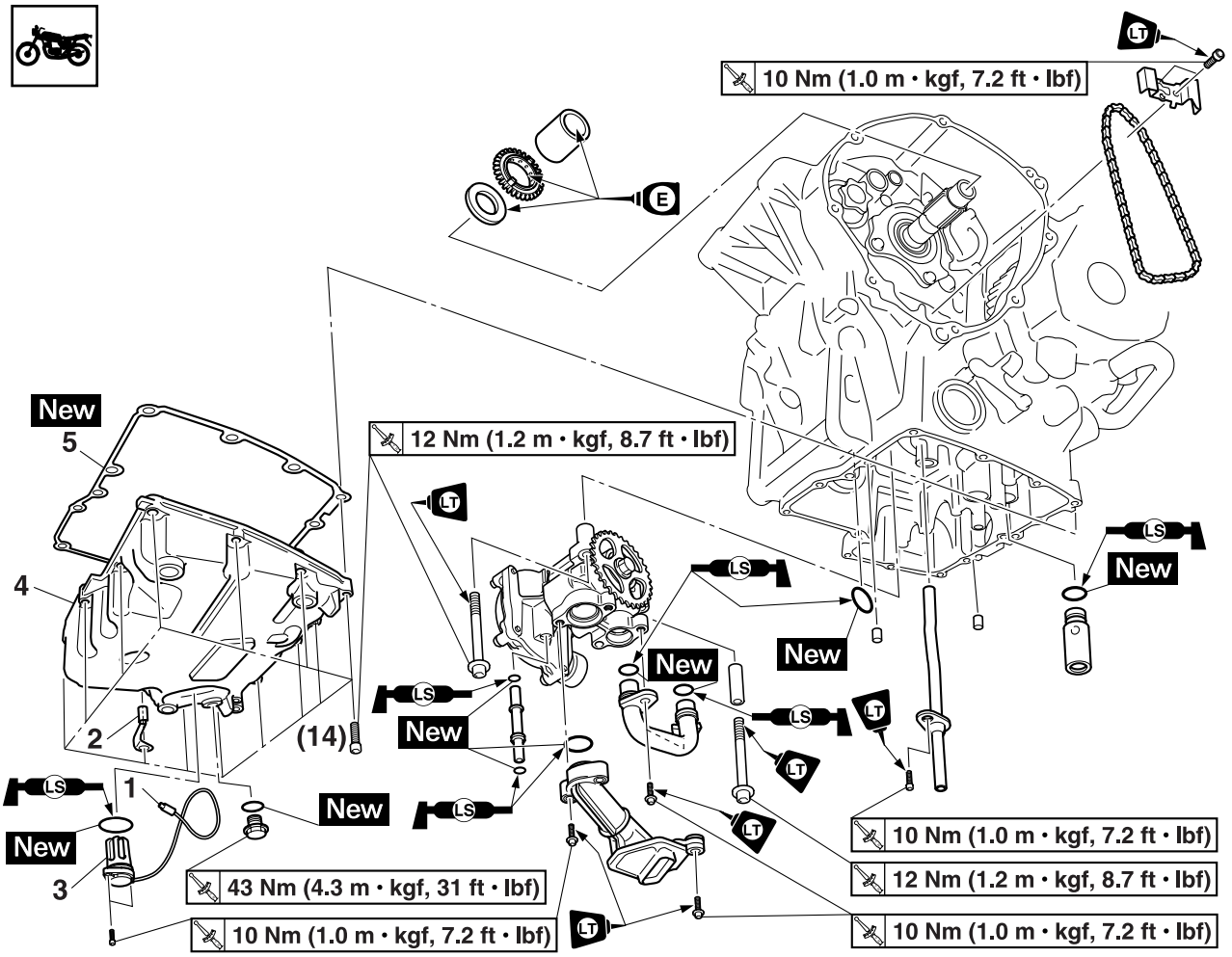
3. Install:
   - Bearing
   - Oil seal
   - Washer “1”
   - Circlip “2” New

TIP

Lubricate the oil seal lips with lithium-soap-based grease.

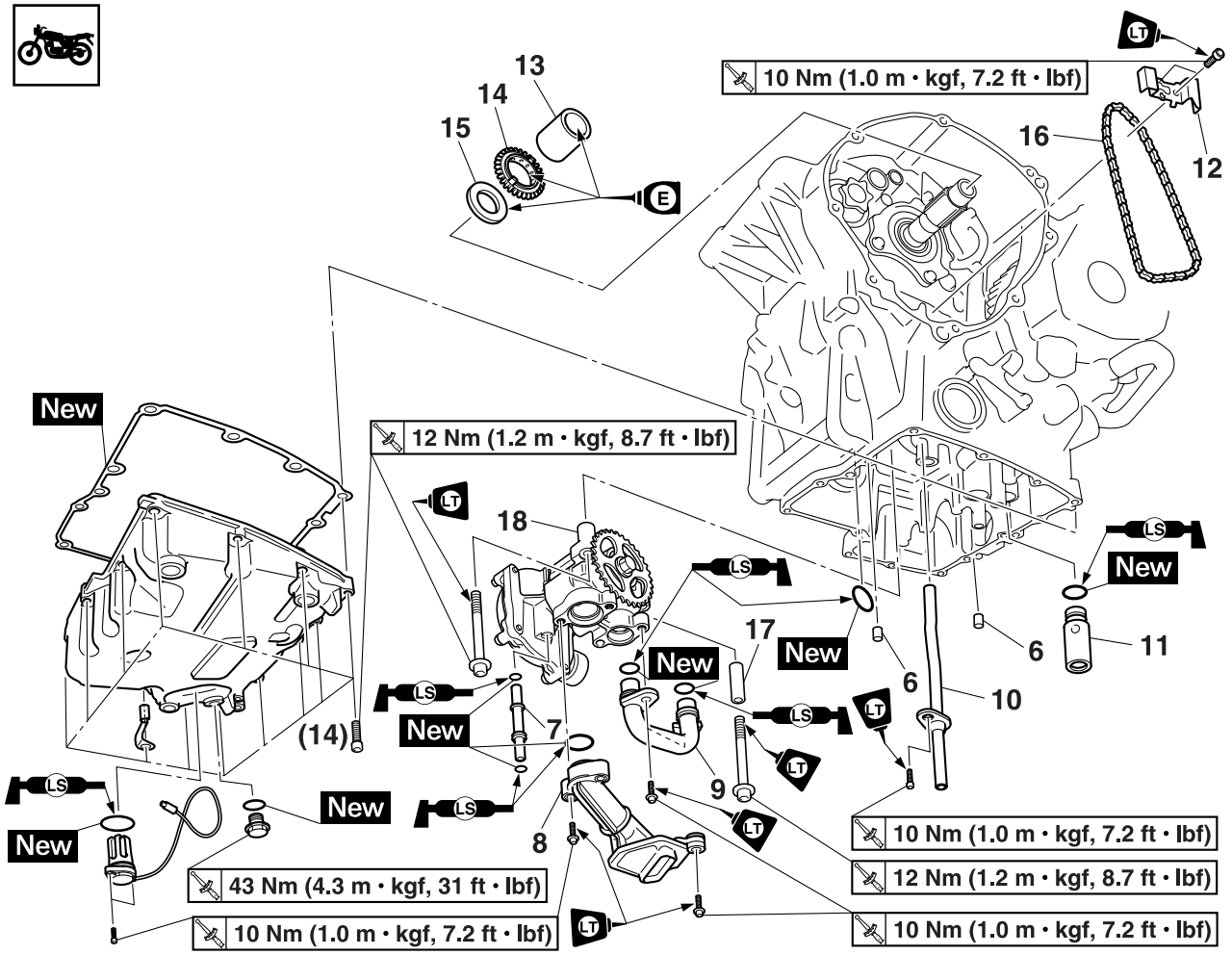
EAS24921
OIL PUMP

Removing the oil pan and oil pump



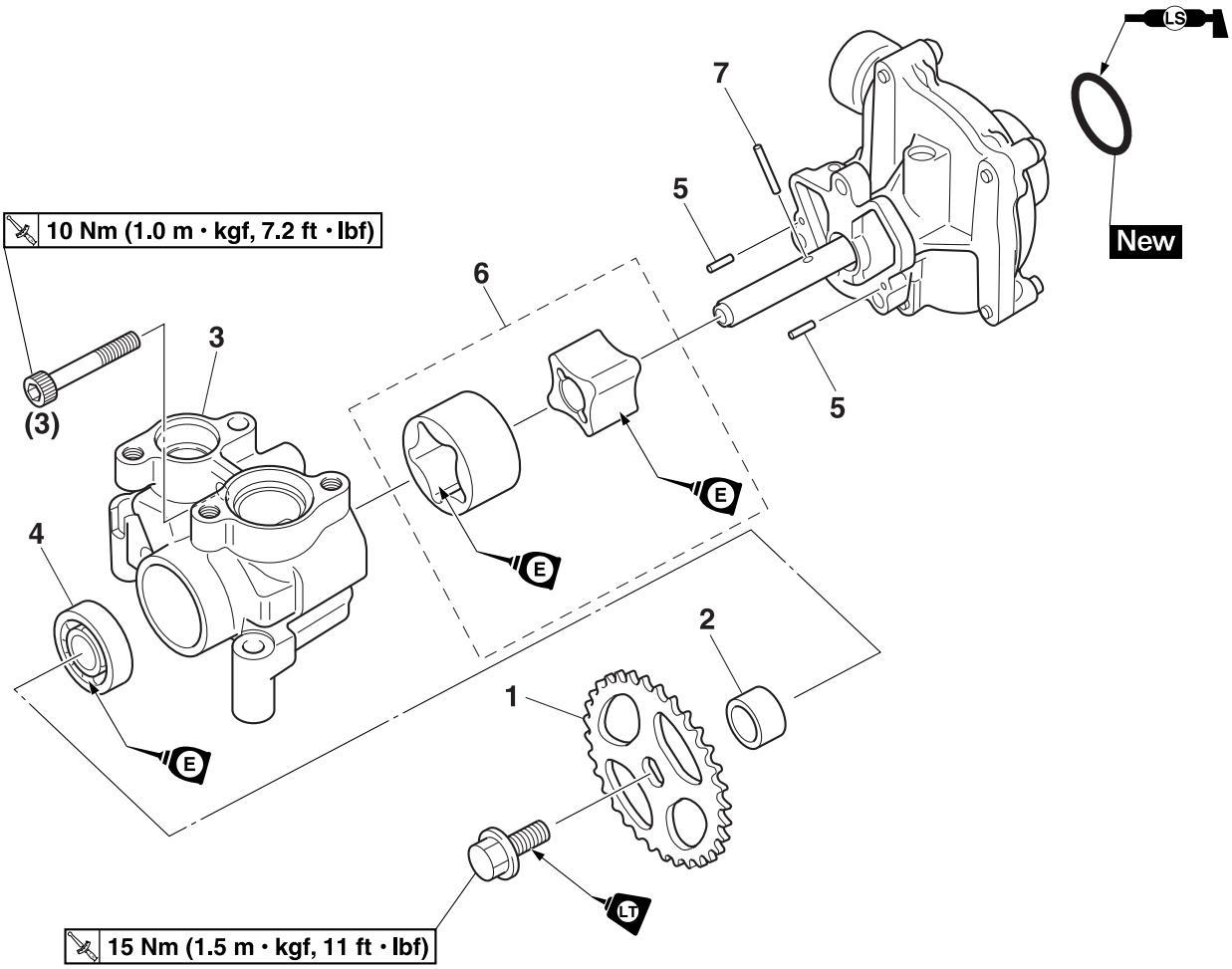
Order	Job/Parts to remove	Q'ty	Remarks
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Drive sprocket cover		Refer to "ENGINE REMOVAL" on page 5-3.
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-24.
	O_2 sensor		Refer to "ENGINE REMOVAL" on page 5-3.
	Muffler		Refer to "ENGINE REMOVAL" on page 5-3.
	Exhaust pipe assembly		Refer to "ENGINE REMOVAL" on page 5-3.
	Clutch assembly		Refer to "CLUTCH" on page 5-45.
	Water pump inlet pipe		Refer to "RADIATOR" on page 6-1.
	Water pump outlet pipe		Refer to "OIL COOLER" on page 6-5.
1	Oil level switch lead coupler	1	Disconnect.
2	Oil level switch lead holder	1	
3	Oil level switch	1	
4	Oil pan	1	
5	Oil pan gasket	1	

Removing the oil pan and oil pump



Order	Job/Parts to remove	Q'ty	Remarks
6	Dowel pin	2	
7	Drain pipe	1	
8	Oil strainer	1	
9	Oil pipe	1	
10	Oil delivery pipe	1	
11	Relief valve assembly	1	
12	Oil/water pump assembly drive chain guide	1	
13	Collar	1	
14	Oil/water pump assembly drive sprocket	1	
15	Washer	1	
16	Oil/water pump assembly drive chain	1	
17	Dowel pin	1	
18	Oil/water pump assembly	1	
			For installation, reverse the removal procedure.

Disassembling the oil pump



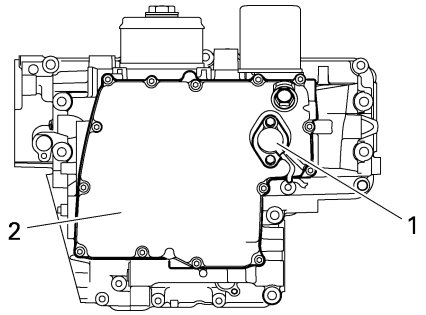
Order	Job/Parts to remove	Q'ty	Remarks
1	Oil/water pump driven sprocket	1	
2	Collar	1	
3	Oil pump housing	1	
4	Bearing	1	
5	Pin	2	
6	Oil pump rotor assembly	1	
7	Pin	1	
			For assembly, reverse the disassembly procedure.

EAS24930
REMOVING THE OIL PAN

1. Remove:
   - Oil level switch “1”
   - Oil pan “2”
   - Oil pan gasket
   - Dowel pins

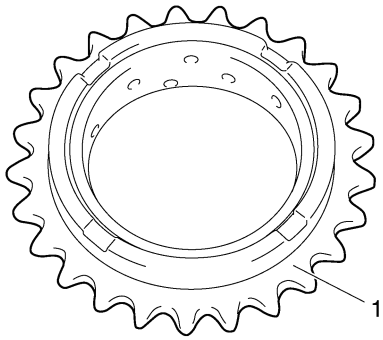
TIP

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.

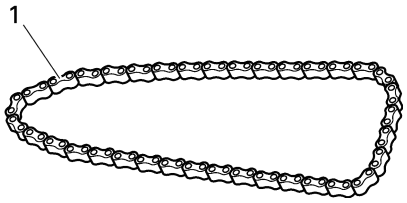


EAS25620
CHECKING THE SPROCKET AND CHAIN

1. Check:
   - Oil/water pump assembly drive sprocket “1”
     Cracks/damage/wear → Replace.

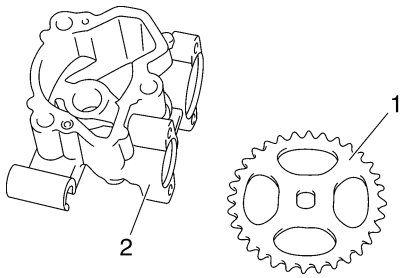


2. Check:
   - Oil/water pump assembly drive chain “1”
     Damage/stiffness → Replace the oil/water pump assembly drive chain and oil/water pump assembly drive sprocket as a set.



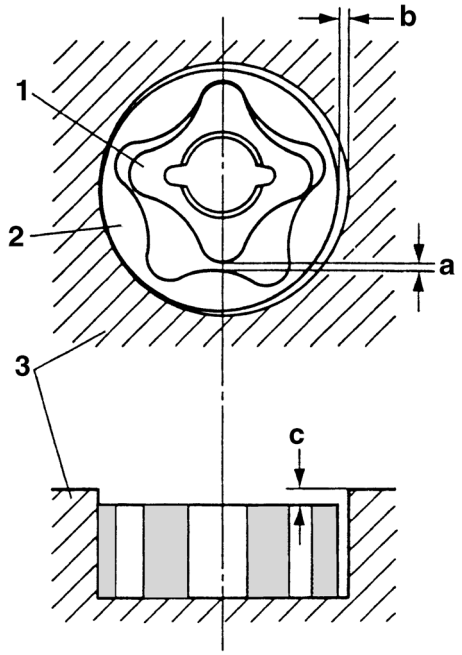
EAS24960
CHECKING THE OIL PUMP

1. Check:
   - Oil pump driven gear “1”
   - Oil pump housing “2”
     Cracks/damage/wear → Replace the defective part(s).



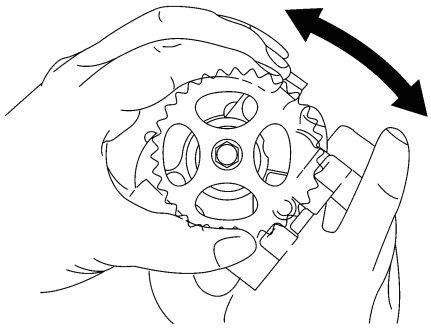
2. Measure:
   - Inner-rotor-to-outer-rotor-tip clearance “a”
   - Outer-rotor-to-oil-pump-housing clearance “b”
   - Oil-pump-housing-to-inner-rotor-and-outer-rotor clearance “c”
     Out of specification → Replace the defective part(s).

Inner-rotor-to-outer-rotor-tip clearance
Less than 0.12 mm (0.0047 in)
Limit
0.20 mm (0.0079 in)
Outer-rotor-to-oil-pump-housing clearance
0.09–0.19 mm (0.0035–0.0075 in)
Limit
0.26 mm (0.0102 in)
Oil-pump-housing-to-inner-and-outer-rotor clearance
0.06–0.13 mm (0.0024–0.0051 in)
Limit
0.20 mm (0.0079 in)



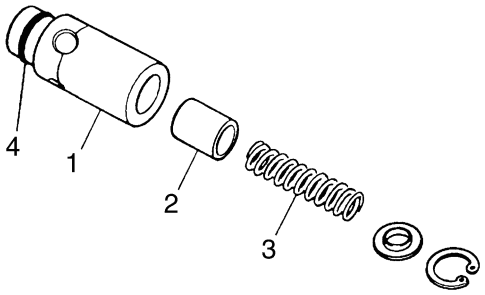
1. Inner rotor
2. Outer rotor
3. Oil pump housing

3. Check:
   - Oil pump operation
     Rough movement → Repeat steps (1) and (2) or replace the defective part(s).



EAS24971
CHECKING THE RELIEF VALVE

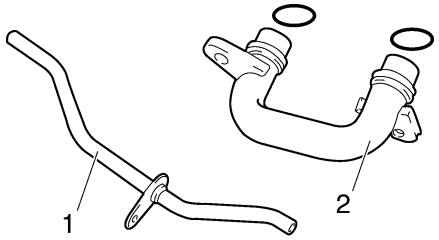
1. Check:
   - Relief valve body “1”
   - Relief valve “2”
   - Spring “3”
   - O-ring “4”
     Damage/wear → Replace the relief valve assembly.



EAS24980
CHECKING THE OIL DELIVERY PIPES

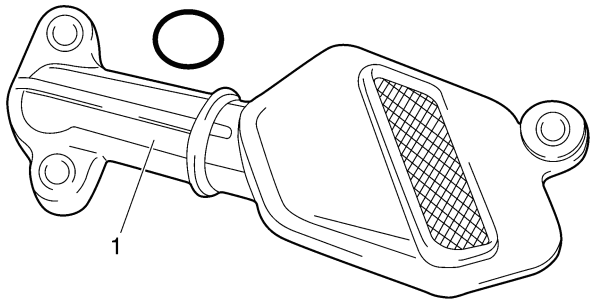
The following procedure applies to all of the oil delivery pipes.

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.



EAS25010
ASSEMBLING THE OIL PUMP

1. Lubricate:
   - Inner rotor
   - Outer rotor
   - Oil pump shaft
     (with the recommended lubricant)

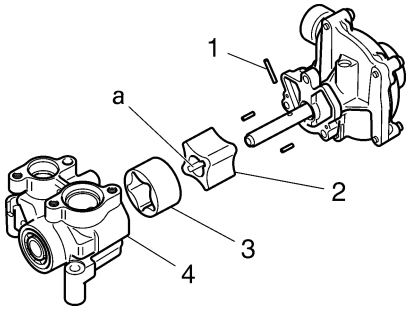
	Recommended lubricant **Engine oil**

2. Install:
   - Pin “1”
   - Inner rotor “2”
   - Outer rotor “3”
   - Oil pump housing “4”
   - Oil pump housing bolt

	Oil pump housing bolt **10 Nm (1.0 m·kgf, 7.2 ft·lbf)**

TIP

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

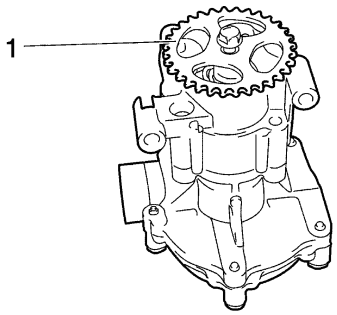


3. Install:
   - Oil/water pump driven sprocket “1”

	Oil/water pump driven sprocket bolt **15 Nm (1.5 m·kgf, 11 ft·lbf)** **LOCTITE®**

TIP

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

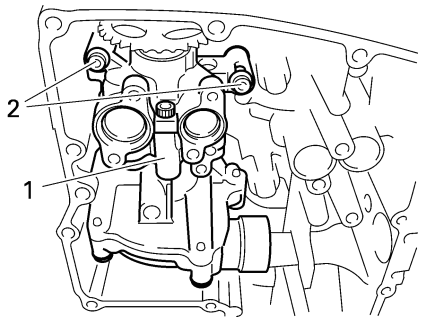


4. Check:
   - Oil pump operation
     Refer to “CHECKING THE OIL PUMP” on page 5-60.

EAS25030
INSTALLING THE OIL/WATER PUMP

1. Install:
   - O-ring New
   - Oil/water pump assembly “1”
   - Dowel pin
   - Bolts “2”

	Oil/water pump assembly bolt **12 Nm (1.2 m·kgf, 8.7 ft·lbf)** **LOCTITE®**



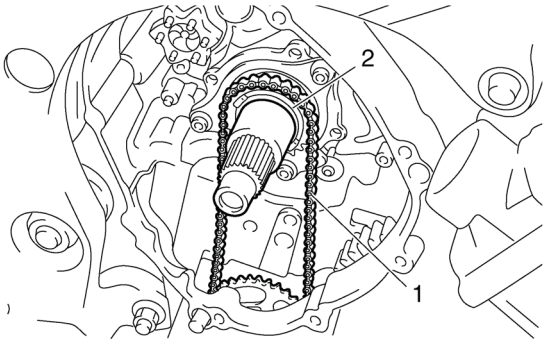
2. Install:
   - Washer
   - Oil/water pump assembly drive chain “1”
   - Oil/water pump assembly drive sprocket “2”
   - Collar

ECA5D01016

NOTICE

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

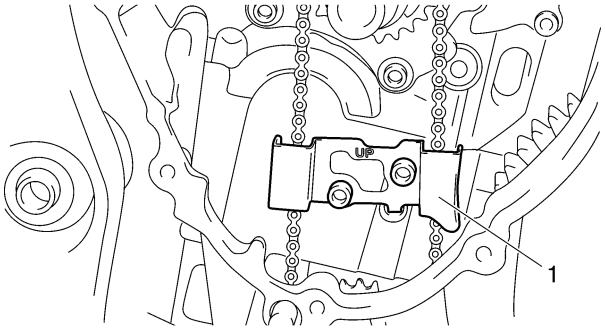
TIP
Install the oil/water pump assembly drive chain "1" onto the oil/water pump assembly drive sprocket "2".



3. Install:
   - Oil/water pump assembly drive chain guide "1"

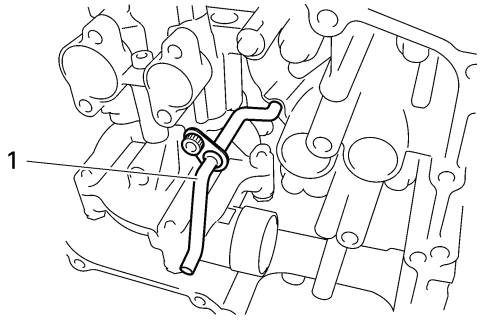
Oil/water pump assembly drive chain guide bolt
10 Nm (1.0 m·kgf, 7.2 ft·lbf)
LOCTITE®

TIP
"UP" mark of the oil/water pump assembly drive chain guide is upward.



4. Install:
   - Oil delivery pipe "1"

Oil delivery pipe bolt
10 Nm (1.0 m·kgf, 7.2 ft·lbf)
LOCTITE®



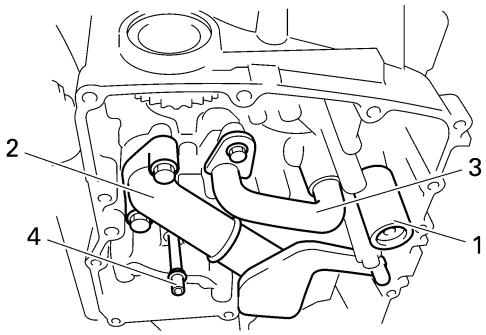
5. Install:
   - Relief valve assembly "1"
   - O-ring New
   - Oil strainer "2"
   - O-ring New

Oil strainer bolt
10 Nm (1.0 m·kgf, 7.2 ft·lbf)
LOCTITE®

   - Oil pipe "3"
   - O-rings New

Oil pipe bolt
10 Nm (1.0 m·kgf, 7.2 ft·lbf)
LOCTITE®

   - Drain pipe "4"
   - O-rings New



EAS25050
INSTALLING THE OIL PAN
1. Install:
   - Dowel pins
   - Gasket New
   - Oil pan "1"

Oil pan bolt
12 Nm (1.2 m·kgf, 8.7 ft·lbf)

• Oil level switch “2”

	Oil level switch bolt **10 Nm (1.0 m·kgf, 7.2 ft·lbf)**

• Engine oil drain bolt “3”

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

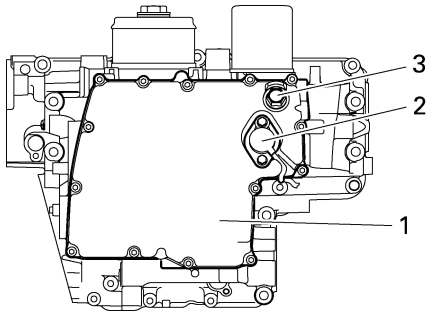
EWA12820

⚠ WARNING

Always use new copper washers.

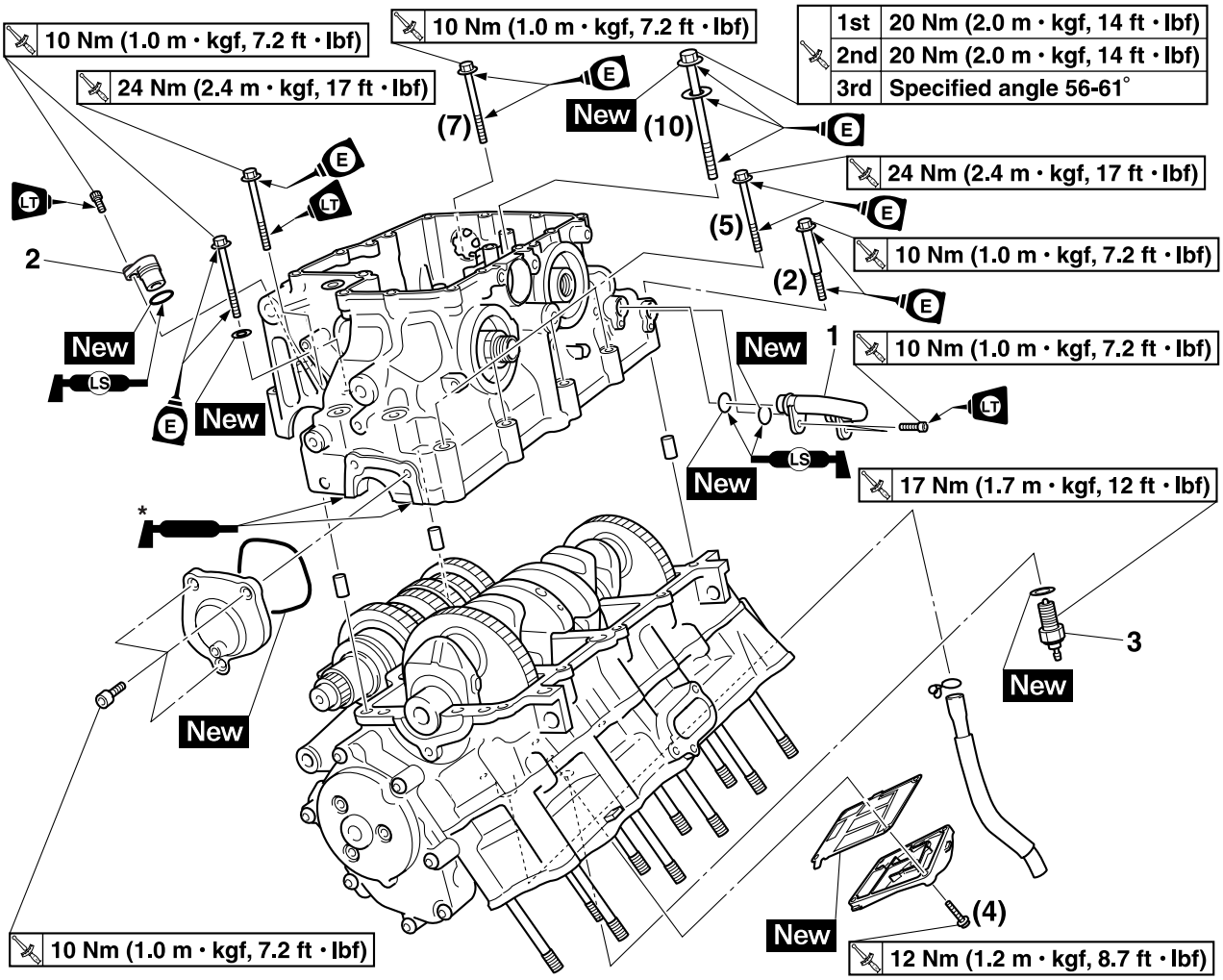
TIP

- Tighten the oil pan bolts in stages and in a crisscross pattern.
- Lubricate the oil level switch O-ring with lithium-soap-based grease.



EAS25540
CRANKCASE

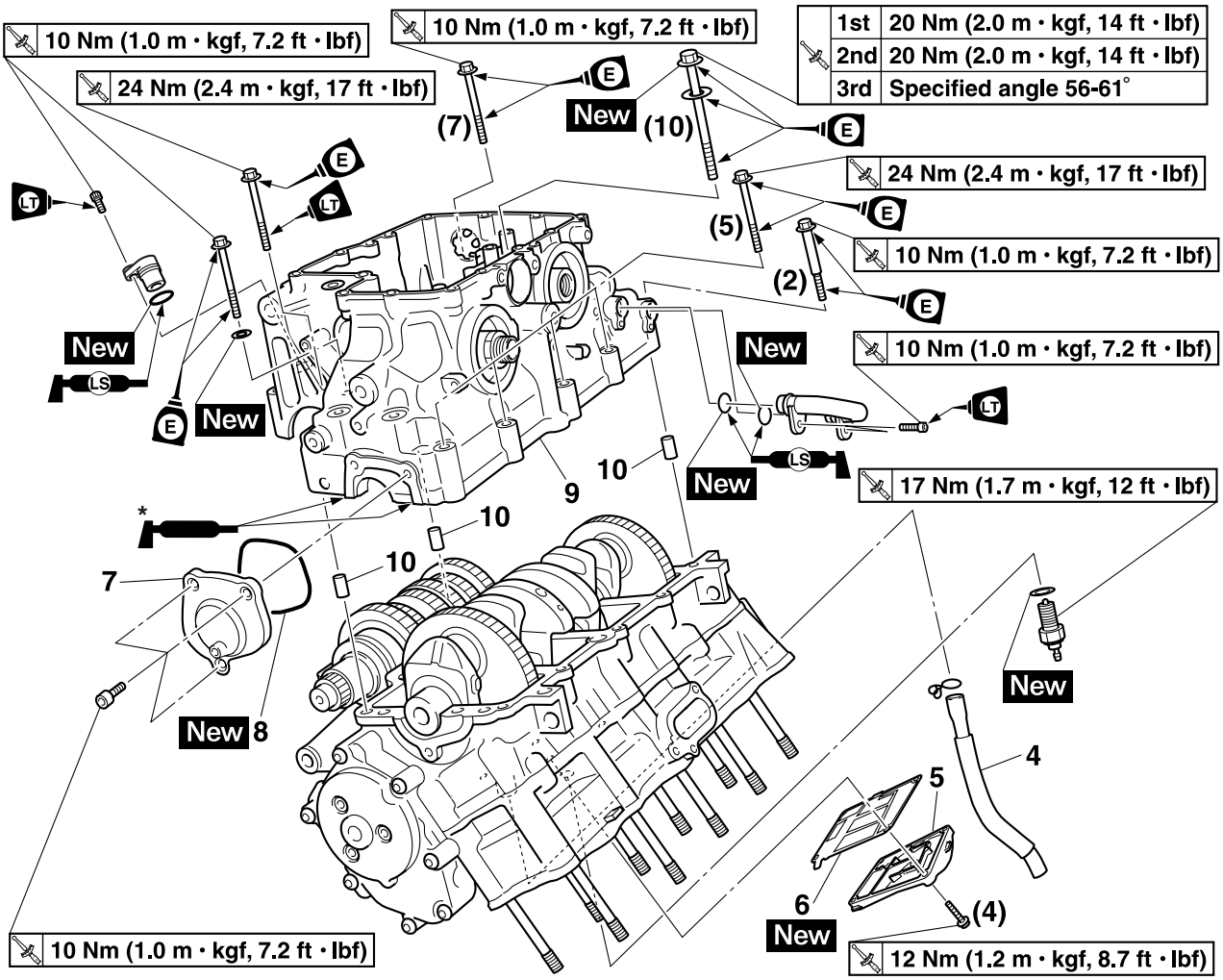
Separating the crankcase



Order	Job/Parts to remove	Q'ty	Remarks
	Engine		Refer to "ENGINE REMOVAL" on page 5-3.
	Cylinder head		Refer to "CYLINDER HEAD" on page 5-20.
	Shift shaft assembly		Refer to "SHIFT SHAFT" on page 5-55.
	Crankshaft position sensor		Refer to "CRANKSHAFT POSITION SENSOR" on page 5-39.
	Oil/water pump assembly		Refer to "OIL PUMP" on page 5-57.
	Starter motor		Refer to "ELECTRIC STARTER" on page 5-41.
1	Oil return pipe	1	
2	Blind plug	1	
3	Neutral switch	1	

* Yamaha bond No.1215 (Three bond No.1215®)

Separating the crankcase



Order	Job/Parts to remove	Q'ty	Remarks
4	Crankcase breather hose	1	
5	Ventilation chamber cover	1	
6	Ventilation chamber cover gasket	1	
7	Left side cover	1	
8	O-ring	1	
9	Lower crankcase	1	
10	Dowel pin	3	
			For installation, reverse the removal procedure.

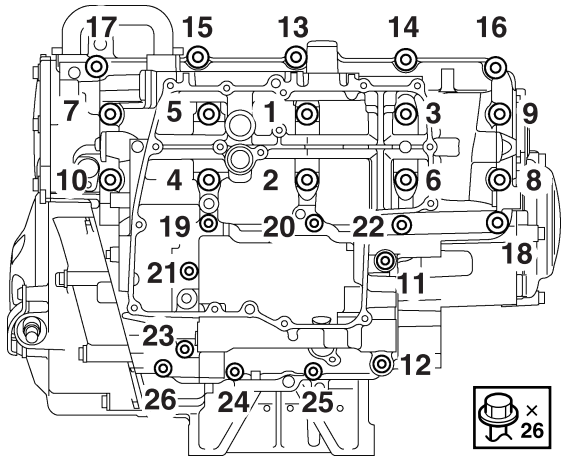
* Yamaha bond No.1215 (Three bond No.1215®)

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.



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

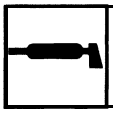
Identify the position of each part very carefully so that it can be reinstalled in its original place.

EAS25580
CHECKING THE CRANKCASE

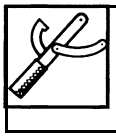
1. Thoroughly wash the crankcase halves in a mild solvent.
2. Thoroughly clean all the gasket surfaces and crankcase mating surfaces.
3. Check:
   - Crankcase
     Cracks/damage → Replace.
   - Oil delivery passages
     Obstruction → Blow out with compressed air.

EAS25650
ASSEMBLING THE CRANKCASE

1. Lubricate:
   - Crankshaft journal bearing inner surface (with the recommended lubricant)

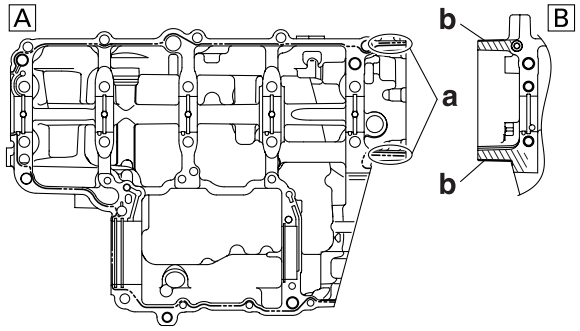
	**Recommended lubricant** **Engine oil**

2. Apply:
   - Sealant
     (onto the crankcase mating surfaces)

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

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 (0.08–0.12 in) of the crankshaft journal bearings.
- For area “a”, apply Yamaha bond No.1215 (Three Bond No.1215®) twice. For shaded area “b”, degrease the area and then apply Three Bond No.1280B.



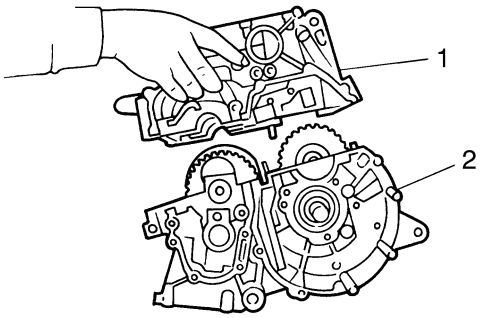
A. Lower crankcase
B. Upper crankcase

3. Install:
   • Dowel pins
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

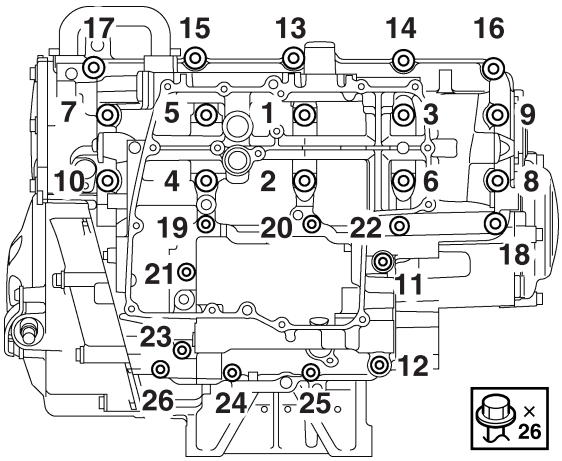
TIP

- Lubricate the bolts “1”–“10” thread, mating surfaces and washers with engine oil.
- Lubricate the bolts “11”–“26” thread and mating surfaces with engine oil (except “11”).
- Apply LOCTITE® to the screw of the bolt “11” and engine oil to the bearing surface.
- Tighten the bolts in the tightening sequence cast on the crankcase.

- M9 × 105 mm (4.1 in) bolts with washers: “1”–“10” New
- M8 × 60 mm (2.4 in) bolt: “11”
- M8 × 60 mm (2.4 in) bolts: “12”, “16”
- M8 × 50 mm (2.0 in) bolts: “13”–“15”
- M6 × 70 mm (2.8 in) bolts: “19”, “21”, “23”
- M6 × 65 mm (2.5 in) shoulder bolts: “17”, “18”
- M6 × 60 mm (2.4 in) bolt and copper washer: “22”
- M6 × 60 mm (2.4 in) bolts: “24”, “25”
- M6 × 50 mm (2.0 in) bolts: “20”, “26”

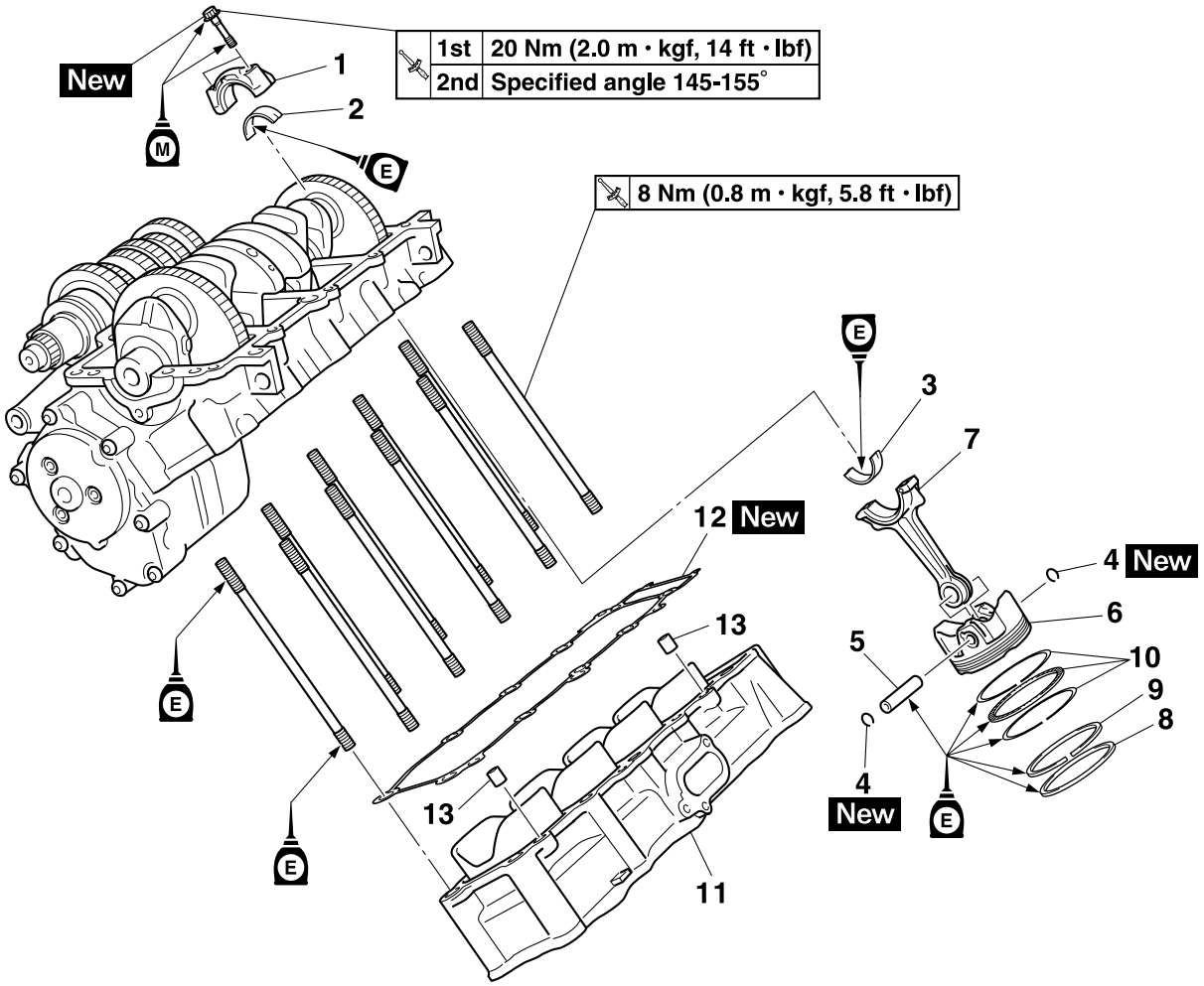
Crankcase bolt “1”–“10”
1st: 20 Nm (2.0 m·kgf, 14 ft·lbf)
2nd*: 20 Nm (2.0 m·kgf, 14 ft·lbf)
3rd: 56°–61°
Crankcase bolt “11”–“16”
24 Nm (2.4 m·kgf, 17 ft·lbf)
Crankcase bolt “17”–“26”
10 Nm (1.0 m·kgf, 7.2 ft·lbf)

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



EAS39P1503
CONNECTING RODS AND PISTONS

Removing the connecting rods and pistons



Order	Job/Parts to remove	Q'ty	Remarks
	Lower crankcase		Refer to "CRANKCASE" on page 5-65.
1	Connecting rod cap	4	
2	Big end lower bearing	4	
3	Big end upper bearing	4	
4	Piston pin clip	8	
5	Piston pin	4	
6	Piston	4	
7	Connecting rod	4	
8	Top ring	4	
9	2nd ring	4	
10	Oil ring	4	
11	Cylinder	1	
12	Cylinder gasket	1	
13	Dowel pin	2	
			For installation, reverse the removal procedure.

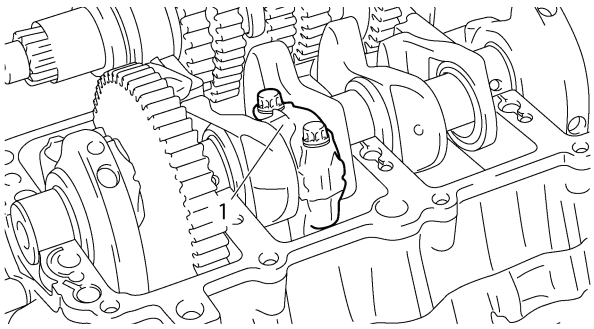
EAS26030
REMOVING THE CONNECTING RODS AND PISTONS

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

1. Remove:
   - Connecting rod cap “1”
   - Connecting rod
   - Big end bearings

TIP

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



2. Remove:
   - Piston pin clips “1”
   - Piston pin “2”
   - Piston “3”

ECA39P1504

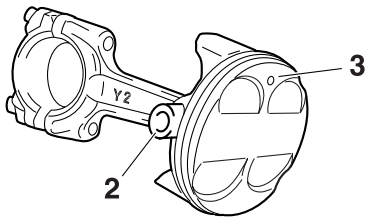
NOTICE

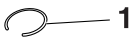
Do not use a hammer to drive the piston pin out.

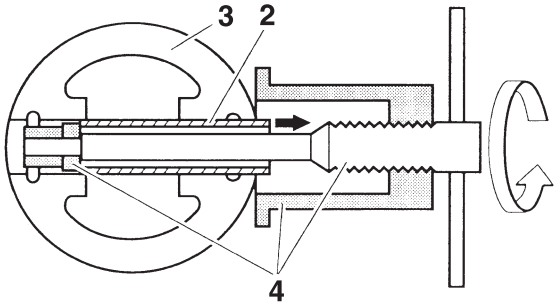
TIP

- 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 debarred and the piston pin is still difficult to remove, remove it with the piston pin puller set “4”.

Piston pin puller set
90890-01304
Piston pin puller
YU-01304



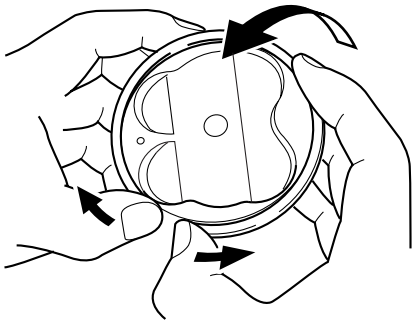




3. Remove:
   - Top ring
   - 2nd ring
   - Oil ring

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.



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

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

▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼

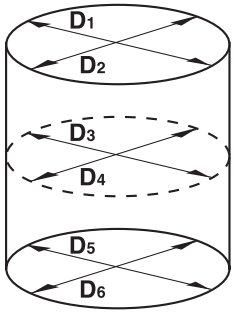
a. Measure cylinder bore “C” with the cylinder bore gauge.

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.

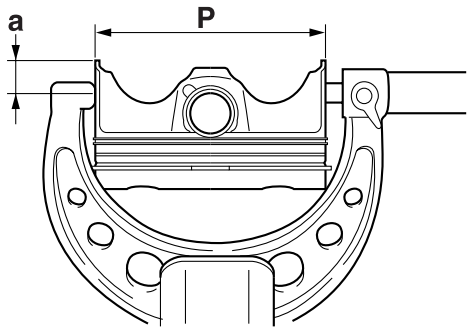
Bore
68.000–68.010 mm (2.6772–2.6776 in)
Taper limit
0.050 mm (0.0020 in)
Out of round limit
0.050 mm (0.0020 in)

“C” = maximum of D_1–D_6
Taper limit = maximum of D_1 or D_2 – maximum of D_5 or D_6
Out of round limit = 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 diameter
67.975–67.990 mm (2.6762–2.6768 in)



a. 11.5 mm (0.45 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)
Limit
0.150 mm (0.0059 in)

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

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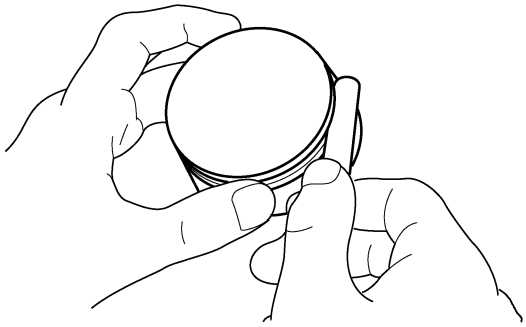
EAS24430
CHECKING THE PISTON RINGS

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.

Piston ring side clearance
Top ring
0.030–0.065 mm (0.0012–0.0026 in)
Limit
0.115 mm (0.0045 in)
2nd ring
0.020–0.055 mm (0.0008–0.0022 in)
Limit
0.115 mm (0.0045 in)



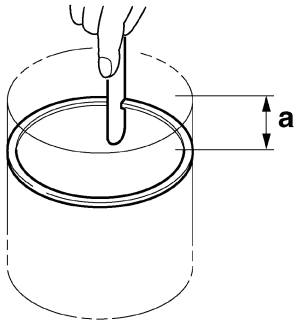
2. Install:
   - Piston ring
     (into the cylinder)

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

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.

Piston ring end gap
Top ring
0.25–0.35 mm (0.0098–0.0138 in)
Limit
0.60 mm (0.0236 in)
2nd ring
0.35–0.50 mm (0.0138–0.0197 in)
Limit
0.85 mm (0.0335 in)
Oil ring
0.10–0.35 mm (0.0039–0.0138 in)



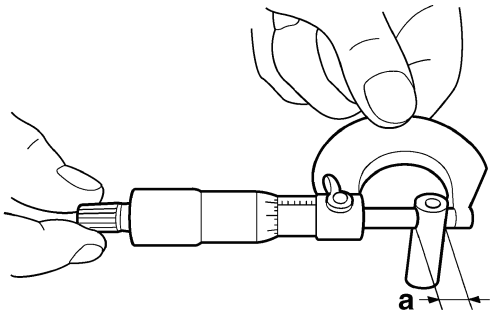
a. 5 mm (0.20 in)

EAS24440
CHECKING THE PISTON PIN

The following procedure applies to all of the piston pins.

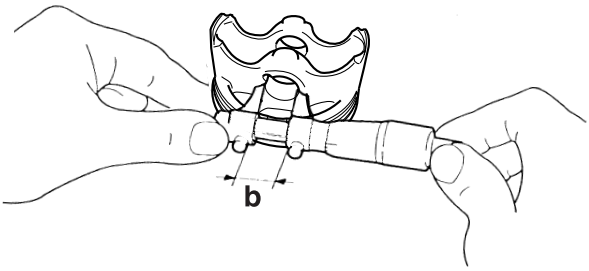
1. Check:
   - Piston pin
     Blue discoloration/grooves → Replace the piston pin and then check the lubrication system.
2. Measure:
   - Piston pin outside diameter "a"
     Out of specification → Replace the piston pin.

Piston pin outside diameter
16.990–16.995 mm (0.6689–0.6691 in)
Limit
16.970 mm (0.6681 in)



3. Measure:
   • Piston pin bore inside diameter “b”
   Out of specification → Replace the piston.

Piston pin bore inside diameter
17.002–17.013 mm (0.6694–0.6698 in)
Limit
17.043 mm (0.6710 in)



4. Calculate:
   • Piston-pin-to-piston-pin-bore clearance
   Out of specification → Replace the piston pin and piston as a set.

Piston-pin-to-piston-pin-bore clearance = Piston pin bore inside diameter “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)

EAS39P1504
CHECKING THE CONNECTING RODS

1. Measure:
   • Crankshaft-pin-to-big-end-bearing clearance
   Out of specification → Replace the big end bearings.

Crankshaft-pin-to-big-end-bearing clearance
0.034–0.058 mm (0.0013–0.0023 in)
Limit
0.09 mm (0.0035 in)

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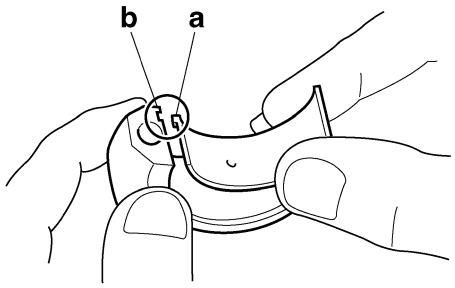
The following procedure applies to all of the connecting rods.

ECA13930
NOTICE

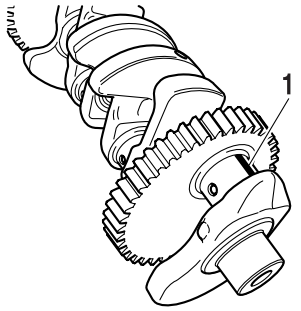
Do not interchange the big end bearings and connecting rods. To obtain the correct crankshaft-pin-to-big-end-bearing clearance and prevent engine damage, the big end bearings must be installed in their original positions.

a. Clean the big end bearings, crankshaft pins, and the inside of the connecting rods 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.



c. Put a piece of Plastigauge® “1” on the crankshaft pin.



d. Assemble the connecting rod halves.

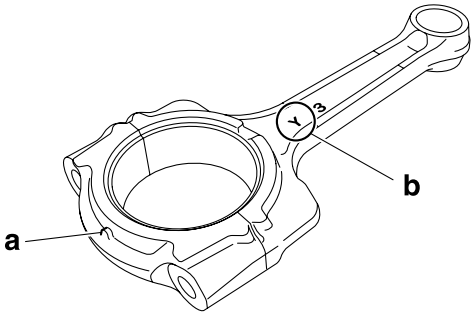
ECA39P1501

NOTICE

Tighten the connecting rod bolts using the plastic-region tightening angle method. Always install new bolts.

TIP

- Clean the connecting rod bolts and lubricate the bolt threads and seats with molybdenum disulfide oil.
- Make sure that the projection “a” on the connecting rod cap faces the same direction as the “Y” mark “b” on the connecting rod.
- After installing the big end bearing, assemble the connecting rod and connecting rod cap without installing them onto the crankshaft.



TIP

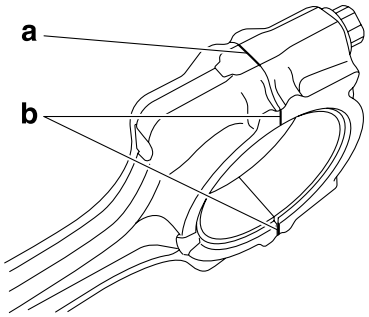
Install by carrying out the following procedures in order to assemble in the most suitable condition.

e. Tighten the connecting rod bolt while checking that the sections shown “a” and “b” are flush with each other by touching the surface.

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

TIP

To install the big end bearing, care should be taken not to install it at an angle and the position should not be out of alignment.

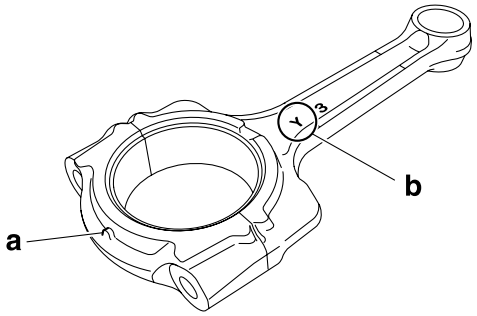


a. Side machined face
b. Thrusting faces

f. Loosen the connecting rod bolt, remove the connecting rod and connecting rod cap and install these parts to the crankshaft with the big end bearing kept in the current condition.

TIP

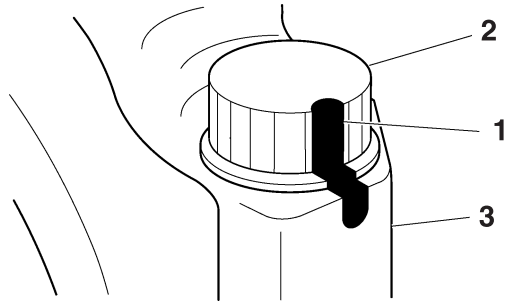
- Do not move the connecting rod or crankshaft until the clearance measurement has been completed.
- Make sure that the projection “a” on the connecting rod cap faces the same direction as the “Y” mark “b” on the connecting rod.
- Make sure the “Y” marks “b” on the connecting rods face towards the left side of the crankshaft.



g. Tighten the connecting rod bolts with a torque wrench.

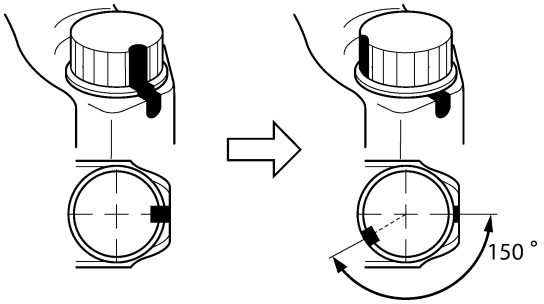
	Connecting rod bolt (1st) **20 Nm (2.0 m·kgf, 14 ft·lbf)**

h. Put a mark “1” on the corner of the connecting rod bolt “2” and the connecting rod cap “3”.



i. Tighten the connecting rod bolts further to reach the specified angle 145°–155°.

Connecting rod bolt (final)
Specified angle 145°–155°



EWA13400

⚠ WARNING

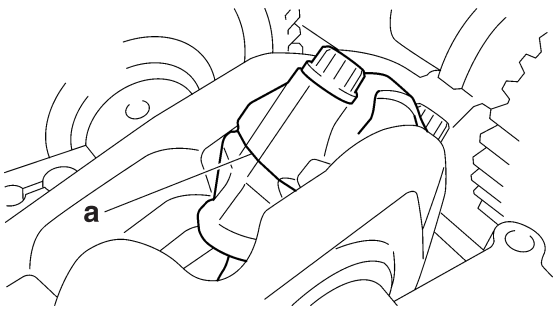
If the connecting rod bolt is tightened more than the specified angle, do not loosen the bolt and then retighten it. Instead, replace the connecting rod bolt with a new one and perform the procedure again.

ECA13950

NOTICE

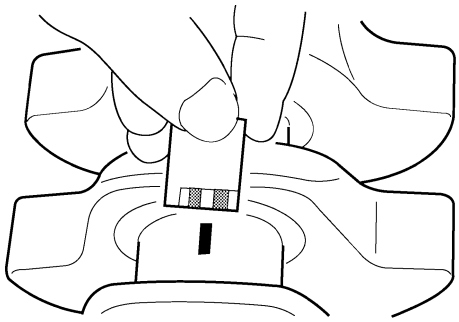
Do not use a torque wrench to tighten the connecting rod bolt to the specified angle.

j. After the installation, check that the section shown “a” is flush with each other by touching the surface.



k. Remove the connecting rod and big end bearings.

l. 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 (P_1–P_4)

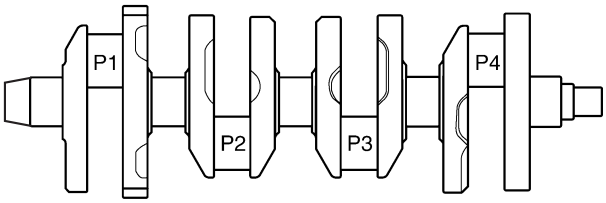
TIP

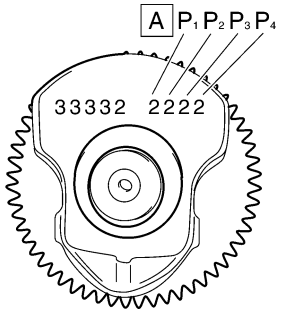
- The numbers “A” stamped into the crankshaft web and the numbers “1” on the connecting rods are used to determine the replacement big end bearings sizes.
- “P_1”–“P_4” refer to the bearings shown in the crankshaft illustration.

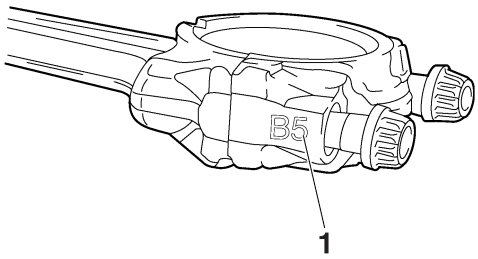
For example, if the connecting rod “P_1” and the crankshaft web “P_1” numbers are “5” and “2” respectively, then the bearing size for “P_1” is:

“P_1” (connecting rod) - “P_1” (crankshaft) = 5 - 2 = 3 (brown)

Bearing color code
1: Blue 2: Black 3: Brown 4: Green







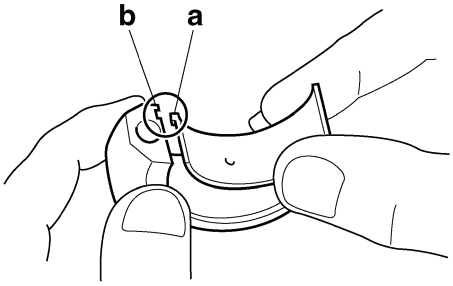
EAS26190
INSTALLING THE CONNECTING ROD AND PISTON

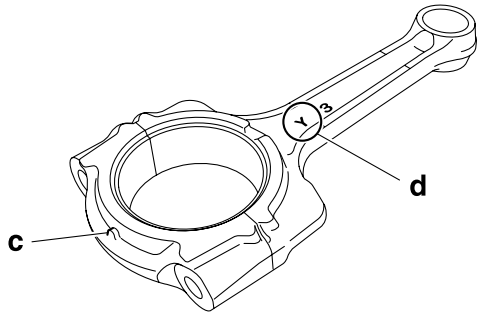
The following procedure applies to all of the connecting rods and pistons.

1. Install:
   - Big end bearings
   - Connecting rod cap (onto the connecting rod)

TIP

- Be sure to reinstall each big end bearing in its original place.
- Align the projections “a” on the big end bearings with the notches “b” in the connecting rods and connecting rod caps.
- Make sure that the projection “c” on the connecting rod cap faces the same direction as the “Y” mark “d” on the connecting rod.





2. Tighten:
   - Connecting rod bolts New

ECA14B1042

NOTICE

Tighten the connecting rod bolts using the plastic-region tightening angle method. Always install new bolts.

TIP

Install by carrying out the following procedures in order to assemble in the most suitable condition.

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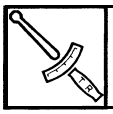
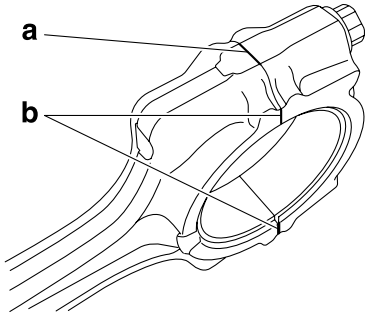
a. Replace the connecting rod bolts with new ones.
b. Clean the connecting rod bolts and lubricate the bolt threads and seats with molybdenum disulfide oil.
c. After installing the big end bearing, assemble the connecting rod and connecting rod cap without installing them onto the crankshaft.
d. Tighten the connecting rod bolt while checking that the sections shown “a” and “b” are flush with each other by touching the surface.



Connecting rod bolt
30 Nm (3.0 m·kgf, 22 ft·lbf)

TIP

To install the big end bearing, care should be taken not to install it at an angle and the position should not be out of alignment.



a. Side machined face
b. Thrusting faces

e. Loosen the connecting rod bolt, remove the connecting rod and connecting rod cap and install these parts to the crankshaft with the big end bearing kept in the current condition.

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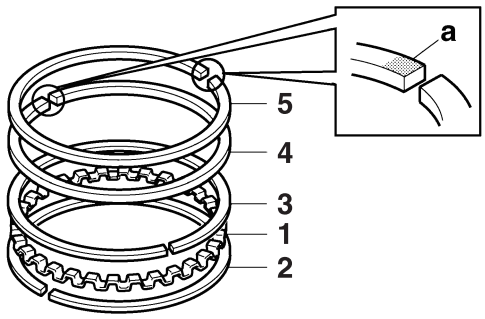
3. Install:
   - Oil ring expander “1”
   - Lower oil ring rail “2”
   - Upper oil ring rail “3”
   - 2nd ring “4”
   - Top ring “5”
     (into the piston)

TIP

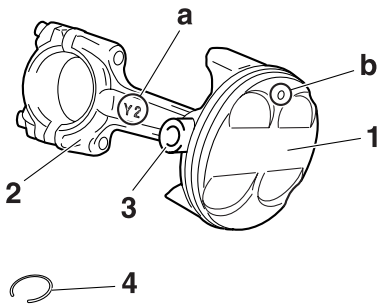
Be sure to install the piston rings so that the manufacturer’s marks or numbers “a” face up.

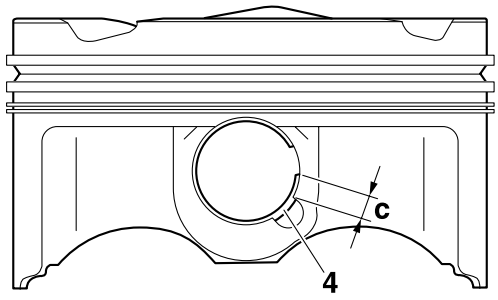


4. Install:
   - Piston “1”
     (onto the respective connecting rod “2”)
   - Piston pin “3”
   - Piston pin clips “4” New

TIP

- Apply engine oil onto the piston pin.
- Make sure that the “Y” mark “a” on the connecting rod faces left when the punch mark “b” on the piston is pointing up as shown.
- Install the piston pin clips, so that the clip ends are 3 mm (0.12 in) “c” or more from the cutout in the piston.
- Reinstall each piston into its original cylinder.

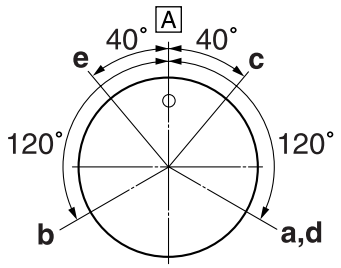




5. Lubricate:
   - Piston
   - Piston rings
   - Cylinder
     (with the recommended lubricant)

	Recommended lubricant **Engine oil**

6. Offset:
   - Piston ring end gaps



a. Top ring
b. 2nd ring
c. Upper oil ring rail
d. Oil ring expander
e. Lower oil ring rail

A. Exhaust side

7. Lubricate:
   - Crankshaft pins
   - Connecting rod big end bearing inner surface
     (with the recommended lubricant)

	Recommended lubricant **Engine oil**

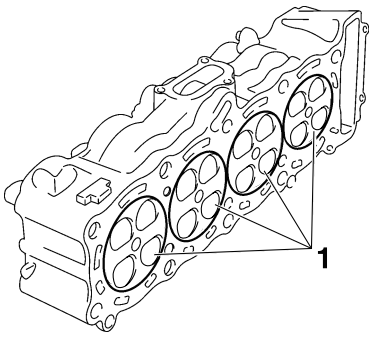
8. Check:
   - Cylinder stud bolts

	Cylinder stud bolt **8 Nm (0.8 m·kgf, 5.8 ft·lbf)**

9. Install:
   - Piston assemblies “1”
     (into the cylinder)

TIP

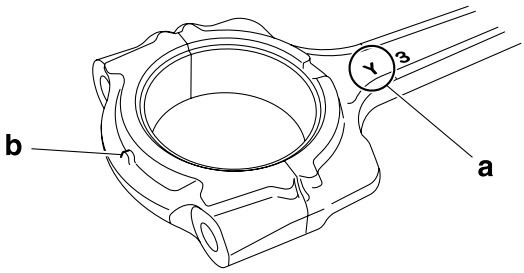
While compressing the piston rings with one hand, install the connecting rod assembly into the cylinder with the other hand.



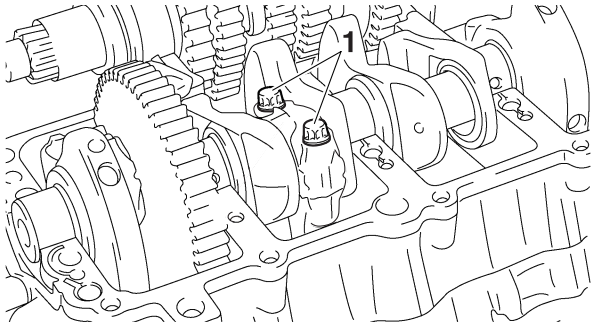
10. Install:
    - Cylinder gasket New
    - Dowel pins
    - Cylinder assembly
    - Connecting rod caps
    - Connecting rod bolts

TIP

- Make sure the “Y” marks “a” on the connecting rods face towards the left side of the crankshaft.
- Make sure that the projection “b” on the connecting rod cap faces the same direction as the “Y” mark “a” on the connecting rod.
- Apply Molybdenum disulfide oil to the bolt threads and bearing surface of the connecting rod bolt and connecting rod cap.



11. Tighten:
    - Connecting rod bolts “1”



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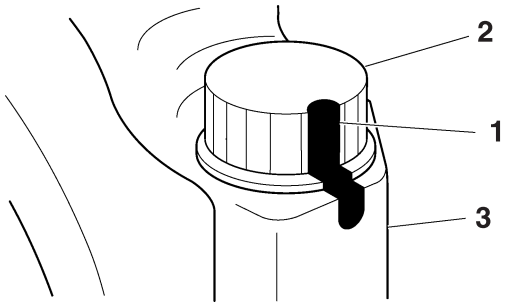
TIP

Tighten the connecting rod bolts using the following procedure.

a. Tighten the connecting rod bolts with a torque wrench.

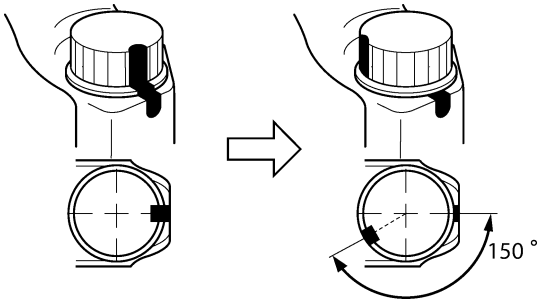
	Connecting rod bolt (1st) **20 Nm (2.0 m·kgf, 14 ft·lbf)**

b. Put a mark “1” on the corner of the connecting rod bolt “2” and the connecting rod cap “3”.



c. Tighten the connecting rod bolts further to reach the specified angle 145°–155°.

	Connecting rod bolt (final) **Specified angle 145°–155°**



EWA13400

⚠ WARNING

If the connecting rod bolt is tightened more than the specified angle, do not loosen the bolt and then retighten it. Instead, replace the connecting rod bolt with a new one and perform the procedure again.

ECA13950

NOTICE

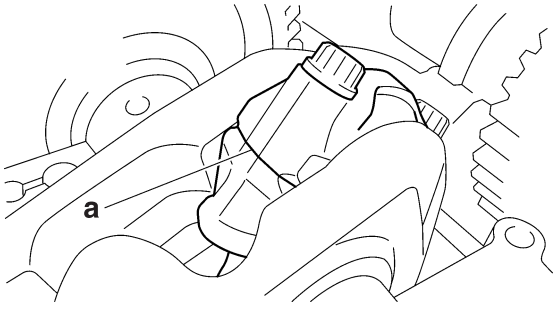
Do not use a torque wrench to tighten the connecting rod bolt to the specified angle.

d. After the installation, check that the section shown “a” is flush with each other by touching the surface.

EWA39P1503

⚠ WARNING

If the connecting rod and cap are not flush with each other, remove the connecting rod bolts and big end bearing and restart from step (1). In this case, make sure to replace the connecting rod bolts.



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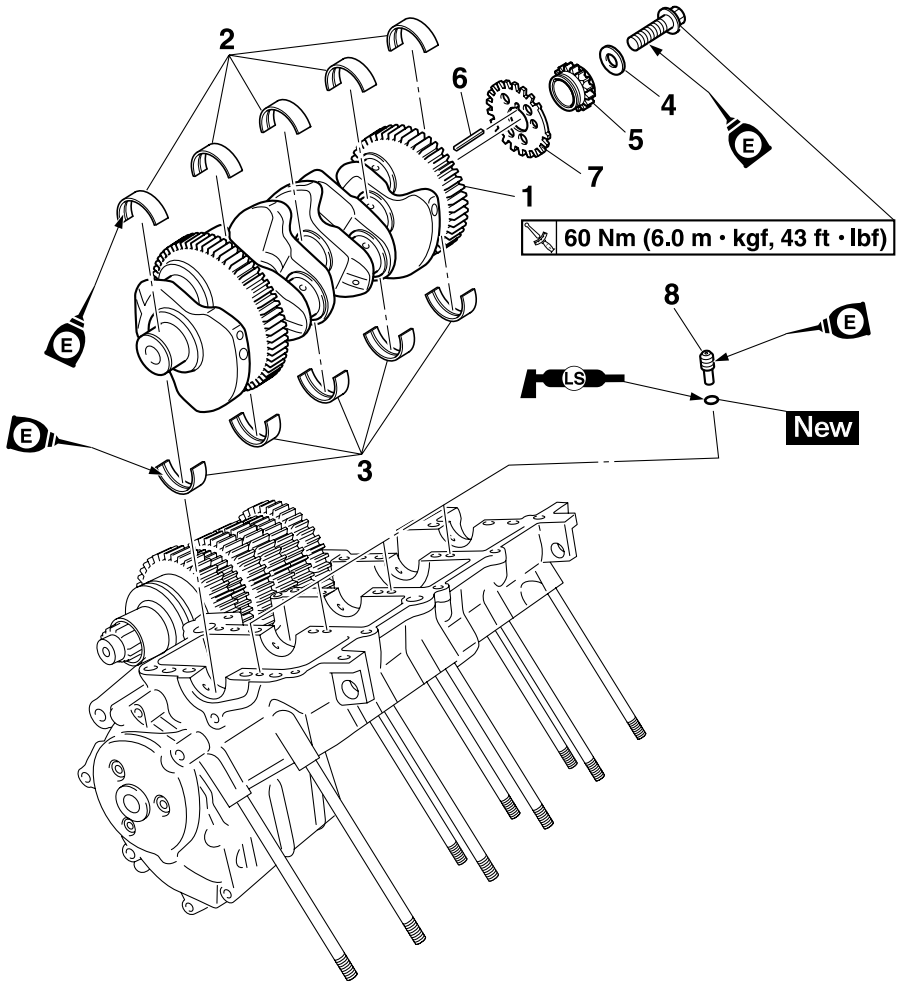
EAS25950
CRANKSHAFT

Removing the crankshaft

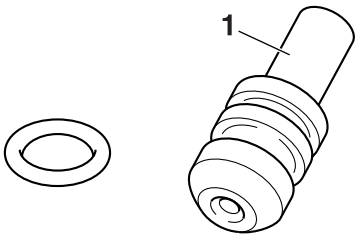


Order	Job/Parts to remove	Q'ty	Remarks
	Crankcase		Separate. Refer to "CRANKCASE" on page 5-65.
	Connecting rod		Refer to "REMOVING THE CONNECTING RODS AND PISTONS" on page 5-70.
1	Crankshaft	1	
2	Crankshaft journal lower bearing	5	
3	Crankshaft journal upper bearing	5	
4	Washer	1	
5	Timing chain drive sprocket	1	
6	Straight key	1	
7	Pickup rotor	1	
8	Oil nozzle	4	
			For installation, reverse the removal procedure.

EAS25980
REMOVING THE CRANKSHAFT ASSEMBLY
1. Remove:
   - Crankshaft assembly
   - Crankshaft journal bearings

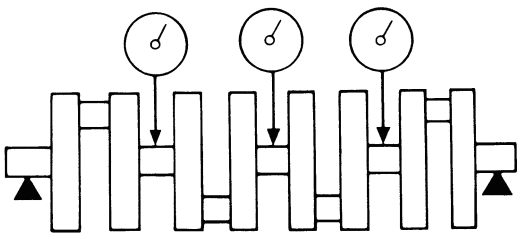
TIP
Identify the position of each crankshaft journal bearings so that it can be reinstalled in its original place.

EAS14B1025
CHECKING THE OIL NOZZLES
The following procedure applies to all of the oil nozzles.
1. Check:
   - Oil nozzle "1"
     Damage/wear → Replace the oil nozzle.
   - Oil passage
     Obstruction → Blow out with compressed air.



EAS26071
CHECKING THE CRANKSHAFT
1. Measure:
   - Crankshaft runout
     Out of specification → Replace the crankshaft.

Runout limit
0.030 mm (0.0012 in)



2. Check:
   - Crankshaft journal surfaces
   - Crankshaft pin surfaces
   - Bearing surfaces
     Scratches/wear → Replace the crankshaft.
3. Measure:
   - Crankshaft-journal-to-crankshaft-journal-bearing clearance
     Out of specification → Replace the crankshaft journal bearings.

Journal oil clearance
0.013–0.037 mm (0.0005–0.0015 in)

ECA13920
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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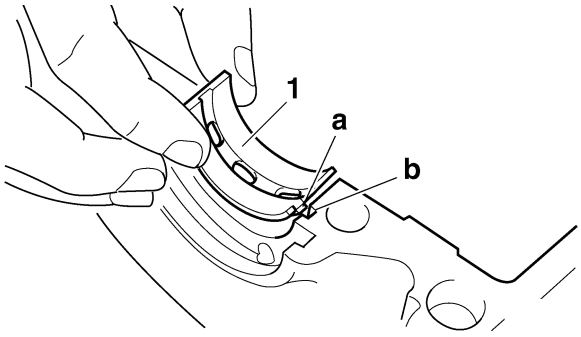
a. Clean the crankshaft journal bearings, crankshaft journals, and bearing portions of the crankcase.
b. Place the upper crankcase upside down on a bench.
c. Install the crankshaft journal upper bearings "1" and the crankshaft into the upper crankcase.

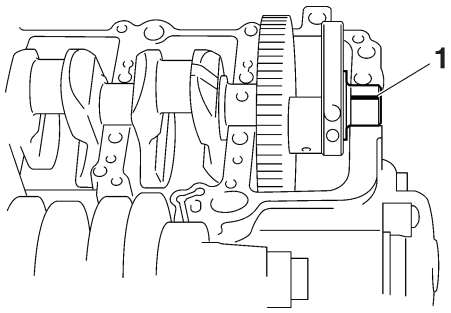
TIP
Align the projections "a" on the crankshaft journal upper bearings with the notches "b" in the upper crankcase.



d. Put a piece of Plastigauge® "1" on each crankshaft journal.

TIP

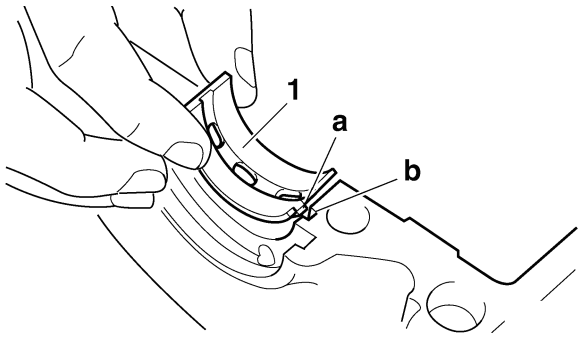
Do not put the Plastigauge® over the oil hole in the crankshaft journal.



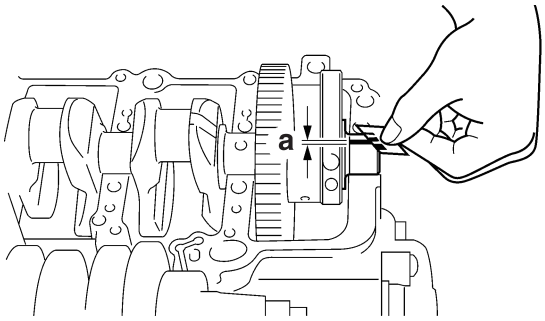
e. Install the crankshaft journal lower bearings "1" into the lower crankcase and assemble the crankcase halves.

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 "CRANKCASE" on page 5-65.
g. Remove the lower crankcase and the crankshaft journal lower bearings.
h. Measure the compressed Plastigauge® width "a" 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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4. Select:
   - Crankshaft journal bearings (J_1–J_5)

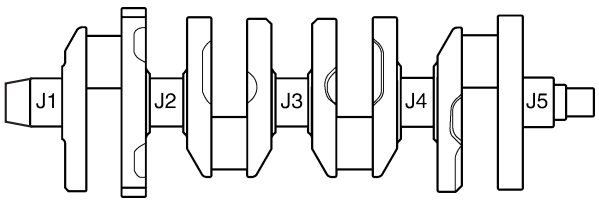
TIP

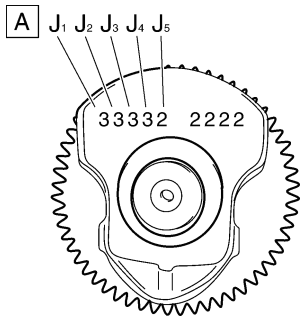
- The numbers "A" stamped into the crankshaft web and the numbers "B" stamped into the lower crankcase are used to determine the replacement crankshaft journal bearing sizes.
- "J_1"–"J_5" refer to the bearings shown in the crankshaft illustration.
- If "J_1"–"J_5" are the same, use the same size for all of the bearings.

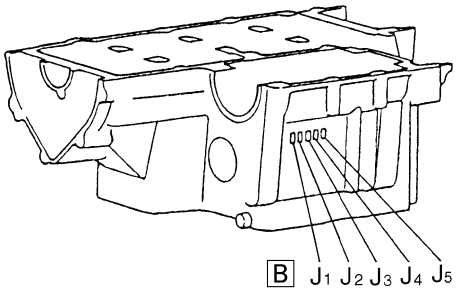
For example, if the crankcase "J_1" and crankshaft web "J_1" numbers are 6 and 2 respectively, then the bearing size for "J_1" is:

"J_1" (crankcase) - "J_1" (crankshaft web) = 6 - 2 = 4 (green)

Bearing color code
0.White 1.Blue 2.Black
3.Brown 4.Green





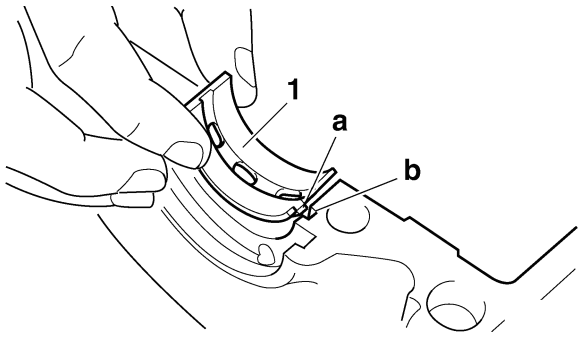


EAS26200
INSTALLING THE CRANKSHAFT

1. Install:
   - Crankshaft journal upper bearings (into the upper crankcase)
   - Crankshaft journal lower bearings (into the lower crankcase)
   - Crankshaft

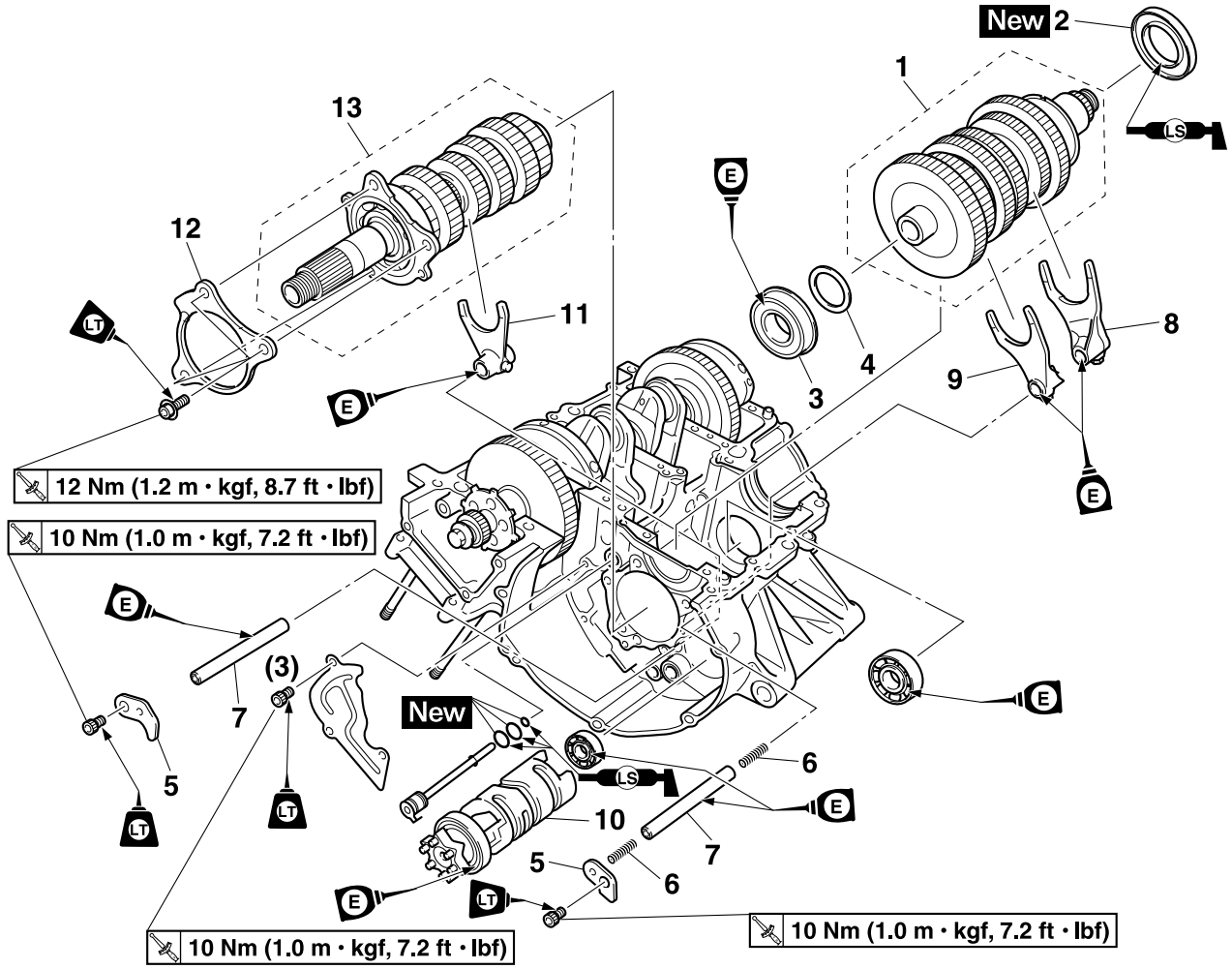
TIP

- Align the projections “a” on the crankshaft journal bearings “1” with the notches “b” in the crankcase.
- Be sure to install each crankshaft journal bearings in its original place.



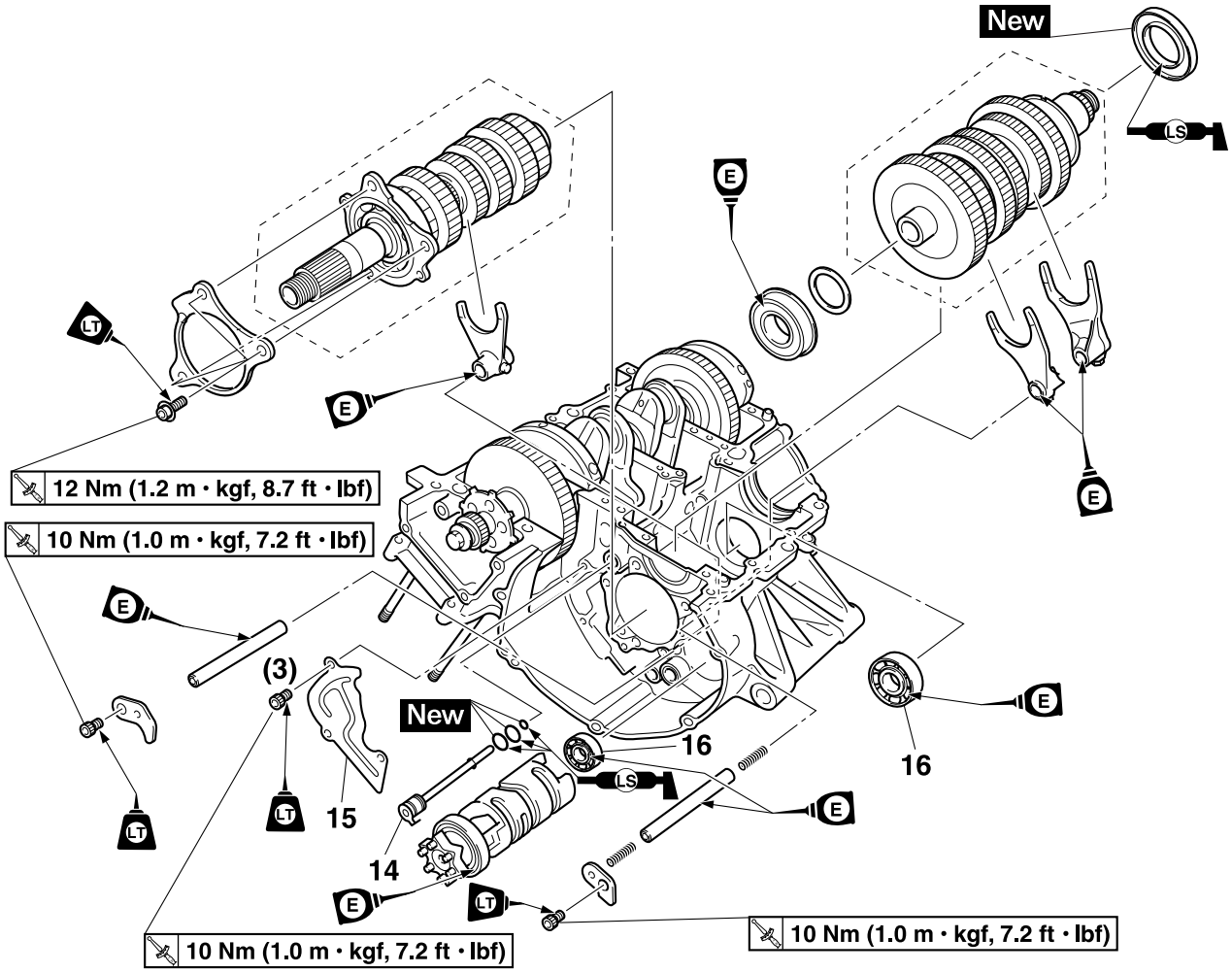
EAS26241
TRANSMISSION

Removing the transmission, shift drum assembly, and shift forks



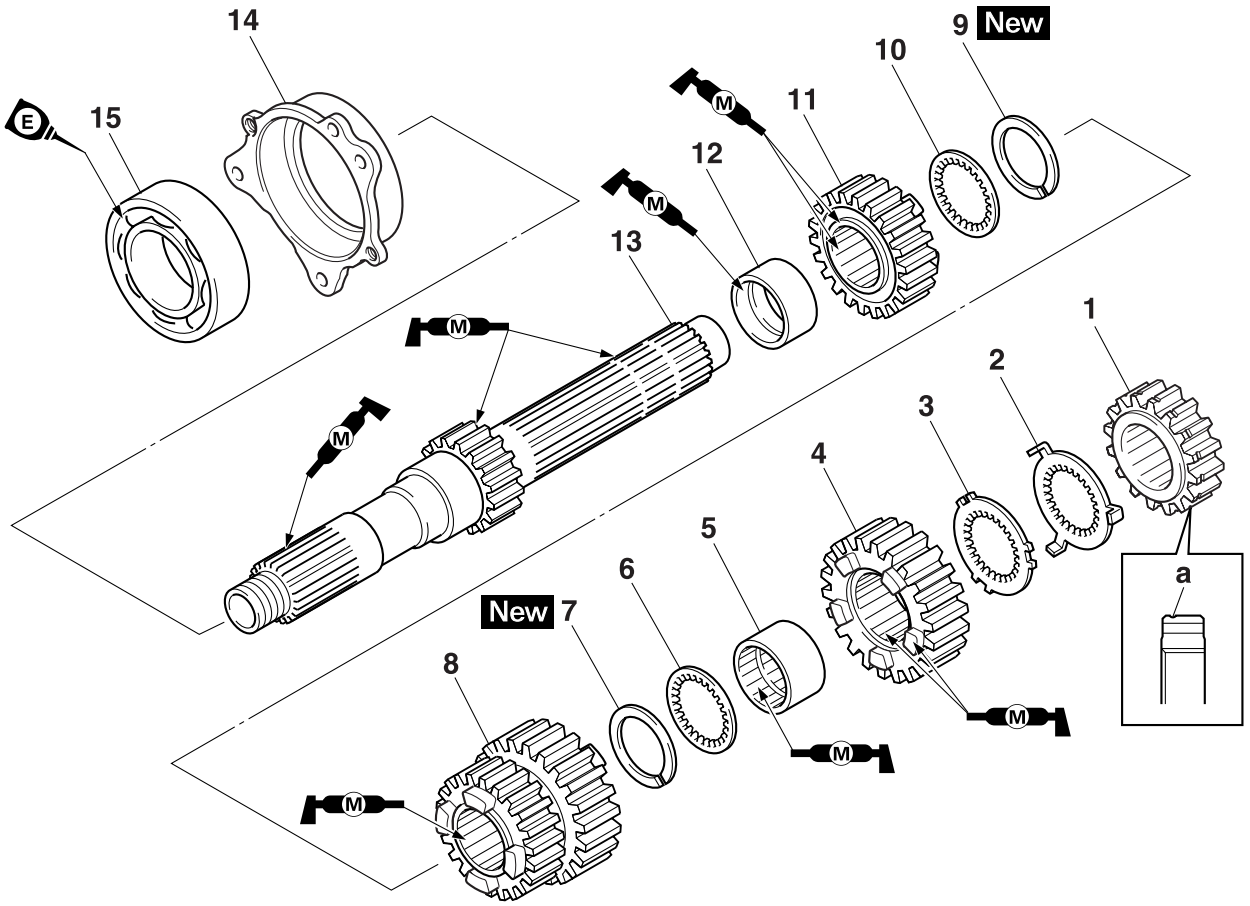
Order	Job/Parts to remove	Q'ty	Remarks
	Crankcase lower		Separate. Refer to "CRANKCASE" on page 5-65.
1	Drive axle assembly	1	
2	Oil seal	1	
3	Bearing	1	
4	Washer	1	
5	Shift fork guide bar retainer	2	
6	Spring	2	
7	Shift fork guide bar	2	
8	Shift fork "L"	1	
9	Shift fork "R"	1	
10	Shift drum assembly	1	
11	Shift fork "C"	1	
12	Main axle retainer	1	
13	Main axle assembly	1	

Removing the transmission, shift drum assembly, and shift forks



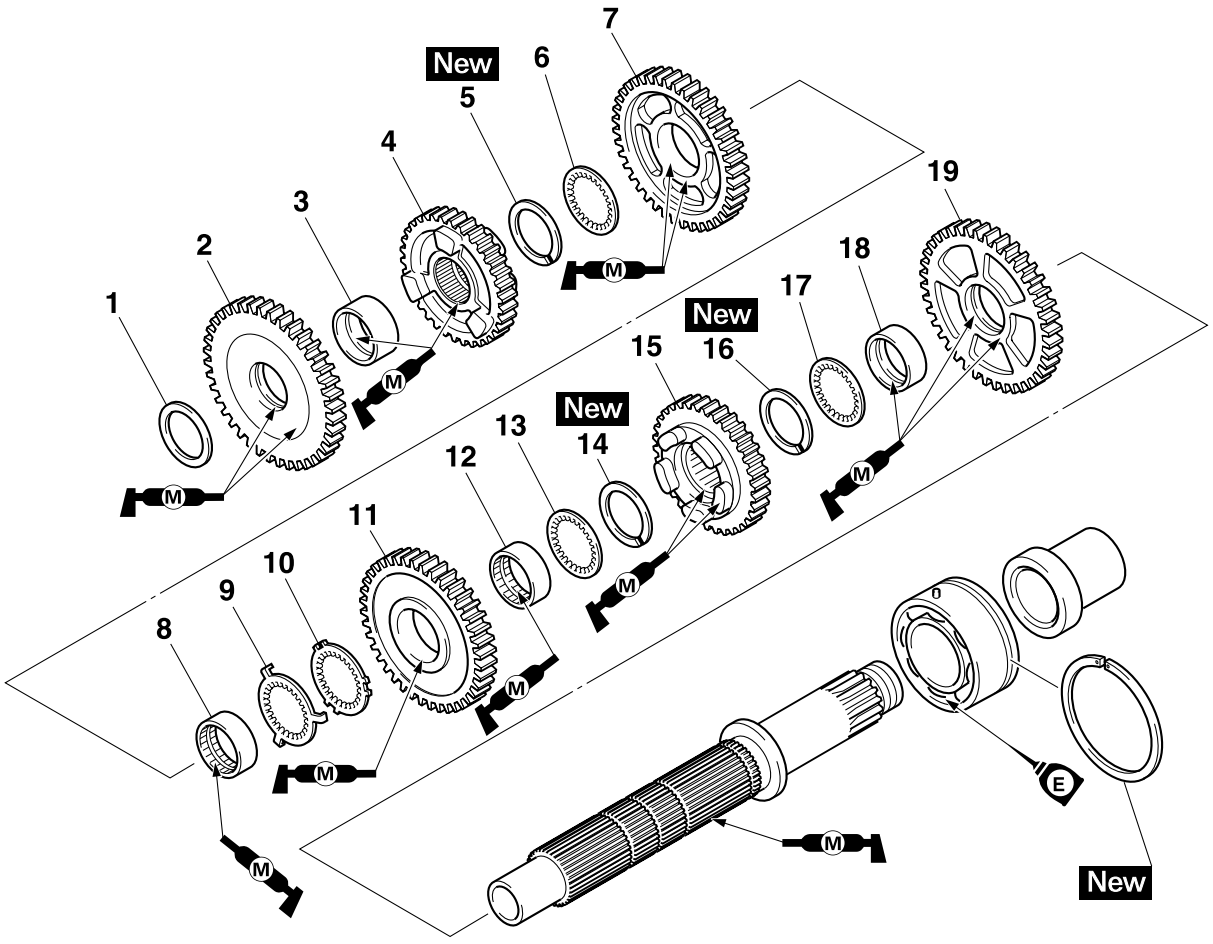
Order	Job/Parts to remove	Q'ty	Remarks
14	Oil pipe	1	
15	Oil baffle plate	1	
16	Bearing	2	
			For installation, reverse the removal procedure.

Disassembling the main axle assembly



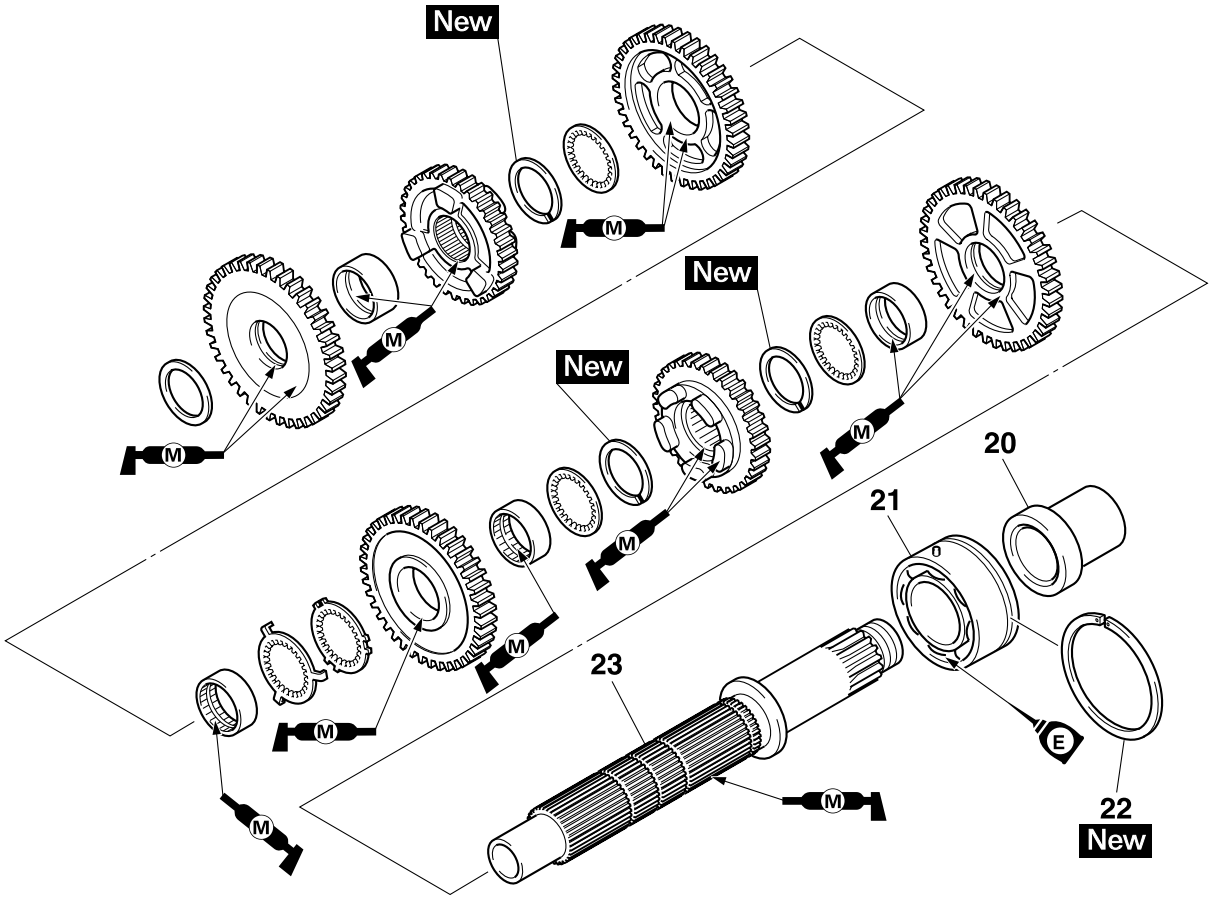
Order	Job/Parts to remove	Q'ty	Remarks
1	2nd pinion gear	1	**TIP** When installing secondary pinion gear "1", install the gear with groove "a" facing to the toothed lock washer.
2	Toothed lock washer	1	
3	Toothed lock washer retainer	1	
4	6th pinion gear	1	
5	Collar	1	
6	Washer	1	
7	Circlip	1	
8	3rd 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 assembly, reverse the disassembly procedure.

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	
16	Circlip	1	
17	Washer	1	
18	Collar	1	
19	2nd wheel gear	1	

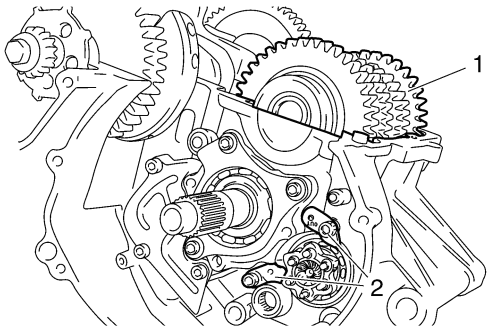
Disassembling the drive axle assembly



Order	Job/Parts to remove	Q'ty	Remarks
20	Collar	1	
21	Bearing	1	
22	Circlip	1	
23	Drive axle	1	
			For assembly, reverse the disassembly procedure.

EAS26250
REMOVING THE TRANSMISSION

1. Remove:
   - Drive axle assembly “1”
   - Shift drum retainers “2”
   - Shift fork guide bars
   - Shift fork “L” and “R”
   - Shift drum assembly
   - Shift fork “C”



2. Remove:
   - Bearing housing “1”
   - Main axle assembly “2”

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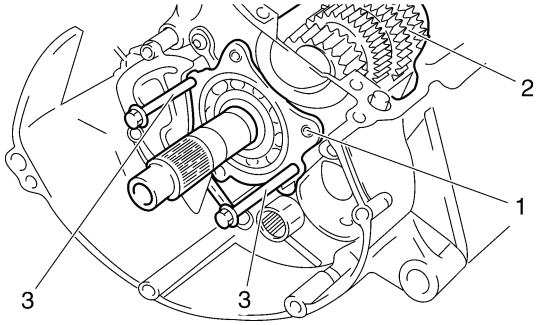
a. Insert two bolts “3” of the proper size, as shown in the illustration, into the main axle assembly bearing housing.



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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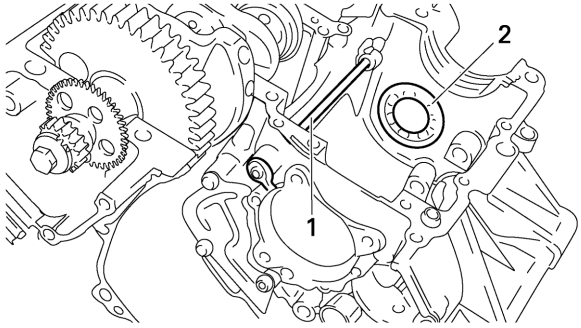
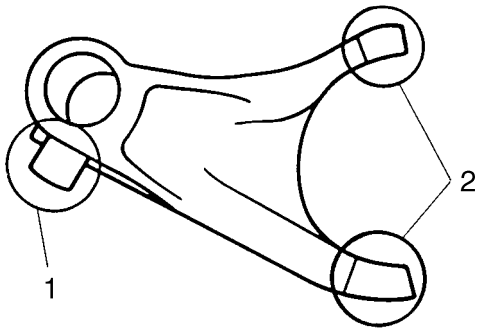
3. Remove:
   - Oil pipe “1”
   - Bearing “2”



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.

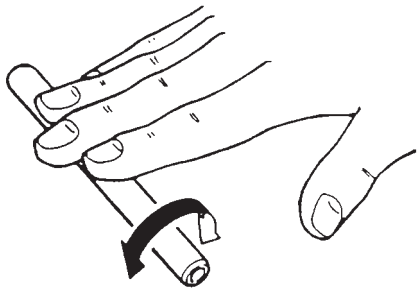


2. Check:
   - Shift fork guide bar
     Roll the shift fork guide bar on a flat surface.
     Bends → Replace.

EWA12840

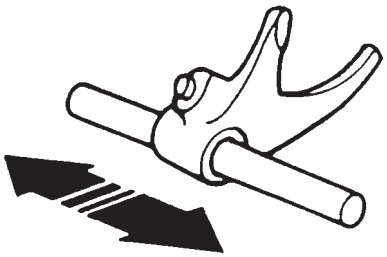
⚠ WARNING

Do not attempt to straighten a bent shift fork guide bar.



319-010

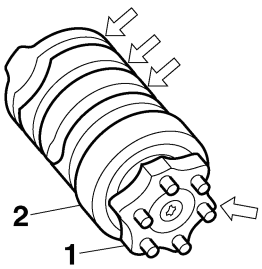
3. Check:
   • Shift fork movement
   (along the shift fork guide bar)
   Rough movement → Replace the shift forks and shift fork guide bar as a set.



319-011

EAS26270
CHECKING THE SHIFT DRUM ASSEMBLY

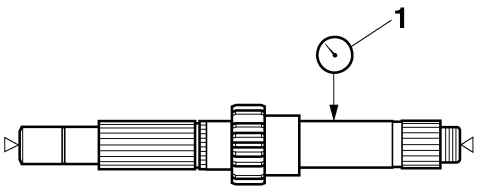
1. Check:
   • Shift drum groove
   Damage/scratches/wear → Replace the shift drum assembly.
   • Shift drum segment "1"
   Damage/wear → Replace the shift drum assembly.
   • Shift drum bearing "2"
   Damage/pitting → Replace the shift drum assembly.



EAS26280
CHECKING THE TRANSMISSION

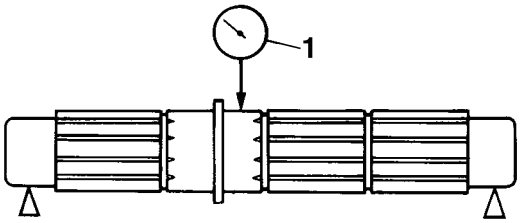
1. Measure:
   • Main axle runout
   (with a centering device and dial gauge "1")
   Out of specification → Replace the main axle.

Main axle runout limit
0.08 mm (0.0032 in)

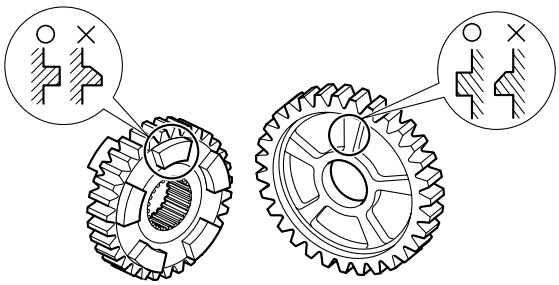


2. Measure:
   • Drive axle runout
   (with a centering device and dial gauge "1")
   Out of specification → Replace the drive axle.

Drive axle runout limit
0.08 mm (0.0032 in)



3. Check:
   • Transmission gears
   Blue discoloration/pitting/wear → Replace the defective gear(s).
   • Transmission gear dogs
   Cracks/damage/rounded edges → Replace the defective gear(s).

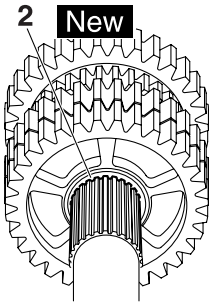


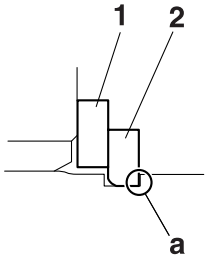
4. Check:
   • Transmission gear engagement
   (each pinion gear to its respective wheel gear)
   Incorrect → Reassemble the transmission axle assemblies.
5. Check:
   • Transmission gear movement
   Rough movement → Replace the defective part(s).
6. Check:
   • Circlips
   Bends/damage/looseness → Replace.

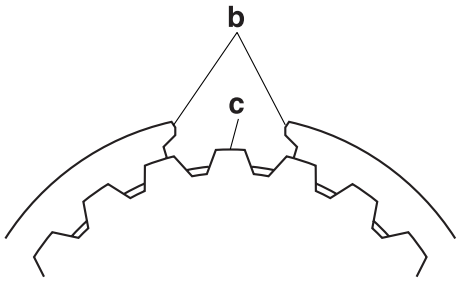
EAS29020
ASSEMBLING THE MAIN AXLE AND DRIVE AXLE

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.
- Align the opening between the ends “b” of the circlip with a groove “c” in the axle.

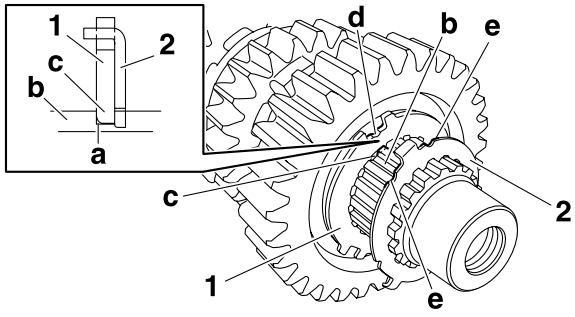






2. Install:
   • Toothed lock washer retainer “1”
   • Toothed lock washer “2”

TIP
- With the toothed lock washer retainer “1” in the groove “a” in the axle, align the projection “c” on the retainer with an axle spline “b”, 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 “e” with the alignment mark “d” on the retainer.

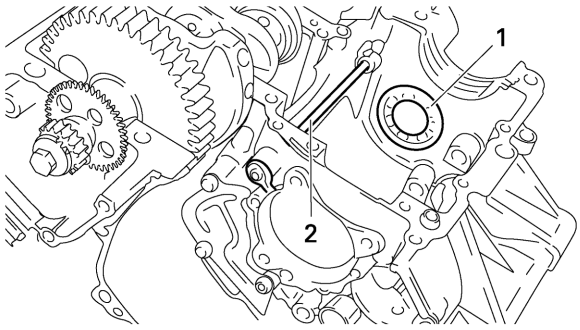


EAS26350
INSTALLING THE TRANSMISSION

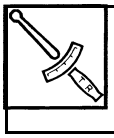
1. Install:
   • Bearing “1”

TIP
Make the seal side of bearing face to the outside and install it close to the right end face of the crankcase.

   • Oil pipe “2”

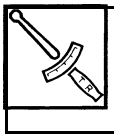


2. Install:
   • Main axle assembly “1”
   • Bearing housing “2”



Bearing housing bolt
12 Nm (1.2 m·kgf, 8.7 ft·lbf)
LOCTITE®

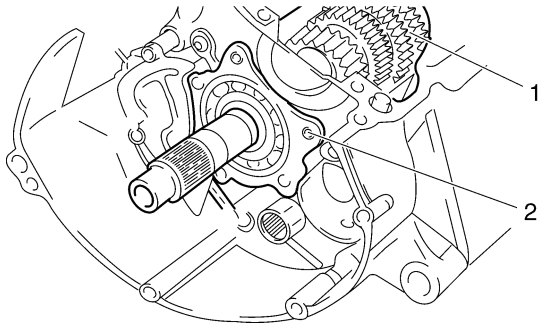
   • Shift fork “C”
   • Shift drum assembly
   • Shift fork guide bar
   • Shift fork guide bar retainer



Shift fork guide bar retainer bolt
10 Nm (1.0 m·kgf, 7.2 ft·lbf)
LOCTITE®

TIP

- The embossed marks on the shift forks should face towards the right side of the engine and be in the following sequence: “R”, “C”, “L”.
- Carefully position the shift forks so that they are installed correctly into the transmission gears.
- Install shift fork “C” into the groove in the 3rd and 4th pinion gear on the main axle.

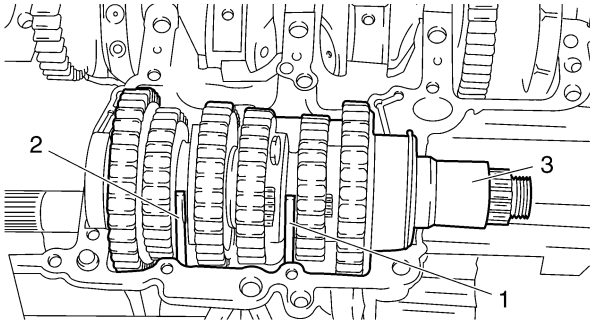


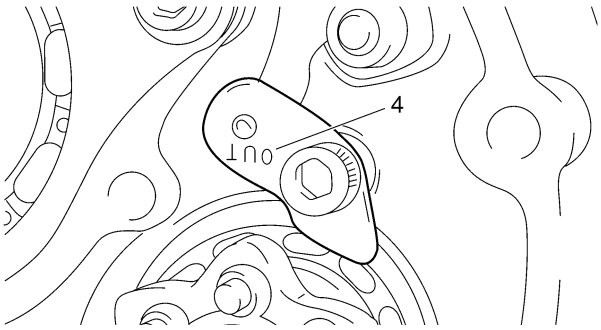
3. Install:
   - Shift fork “L” “1” and “R” “2”
   - Drive axle assembly “3”
   - Shift fork guide bar
   - Shift fork guide bar retainer “4”

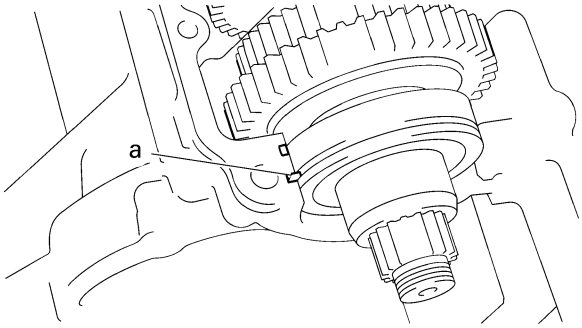
Shift fork guide bar retainer bolt
10 Nm (1.0 m·kgf, 7.2 ft·lbf)
LOCTITE®

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.







4. Check:
   - Transmission
     Rough movement → Repair.

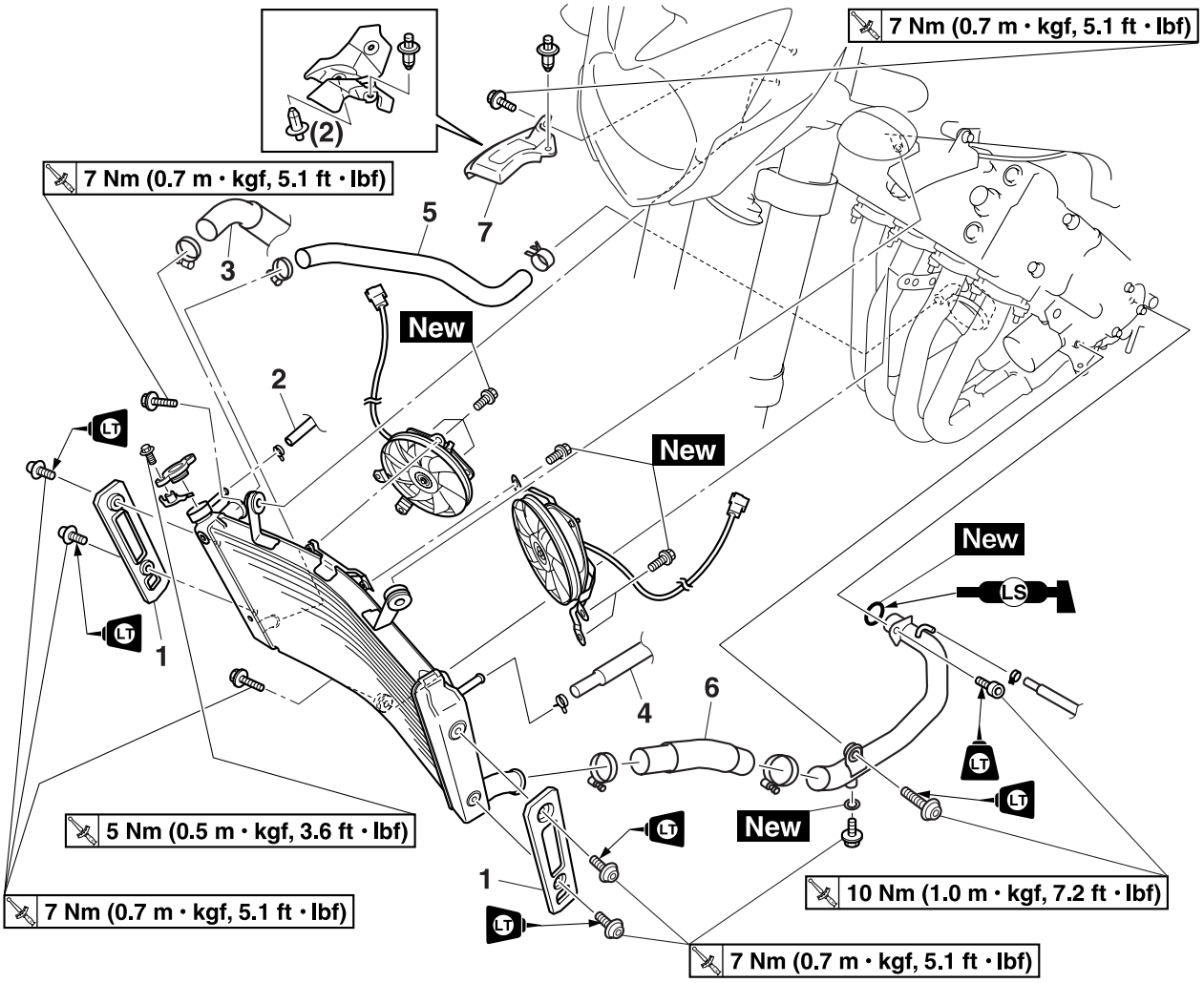
TIP

Oil each gear, shaft, and bearing thoroughly.

COOLING SYSTEM

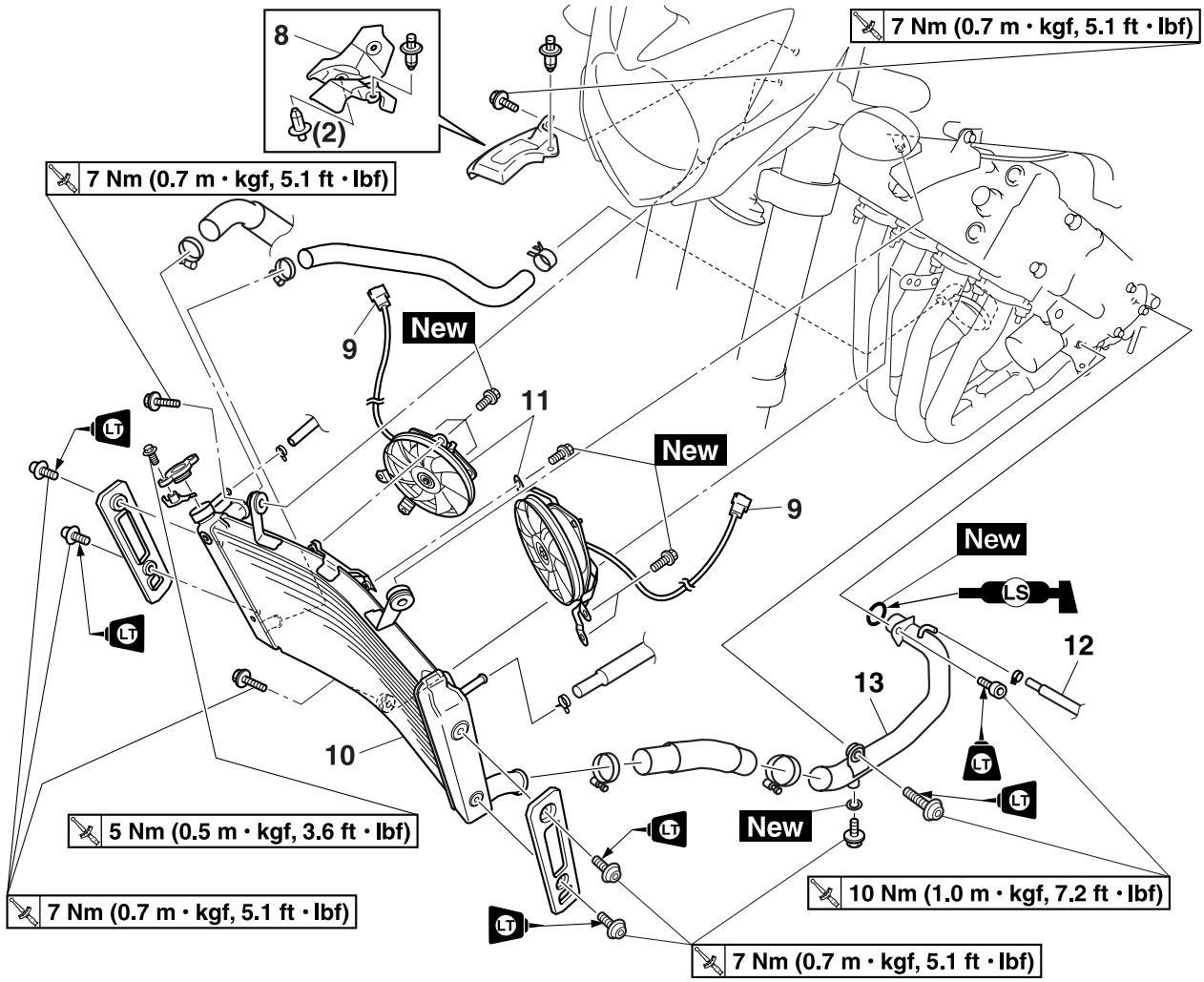
EAS26380
RADIATOR

Removing the radiator



Order	Job/Parts to remove	Q'ty	Remarks
	Rider seat		Refer to "GENERAL CHASSIS" on page 4-1.
	Inner panel/side panel/front cowling side panel		FZ8SA 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.
	Drive sprocket cover		Refer to "ENGINE REMOVAL" on page 5-3.
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-27.
1	Radiator side cover	2	
2	Coolant reservoir hose	1	Disconnect.
3	Radiator inlet hose	1	Disconnect.
4	Water pump breather hose 1	1	Disconnect.
5	Oil cooler outlet hose	1	
6	Radiator outlet hose	1	
7	Radiator upper cover	1	FZ8NA

Removing the radiator

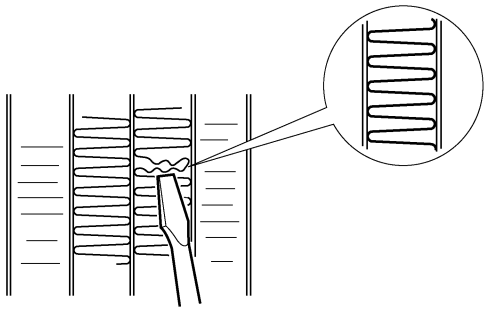


Order	Job/Parts to remove	Q'ty	Remarks
8	Radiator upper panel	1	FZ8SA
9	Radiator fan motor coupler	2	Disconnect.
10	Radiator	1	
11	Radiator fan motor	2	
12	Water pump breather hose 2	1	Disconnect.
13	Water pump inlet pipe	1	
			For installation, reverse the removal procedure.

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/cm², 13.5–17.8 psi)

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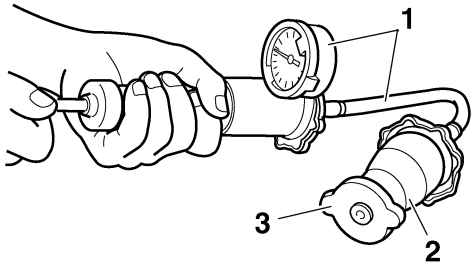
a. Install the radiator cap tester "1" and radiator cap tester adapter "2" to the radiator cap "3".

Radiator cap tester
90890-01325
Mityvac cooling system tester kit
YU-24460-A
Radiator cap tester adapter
90890-01352
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 "COOLING SYSTEM" on page 8-41.

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.

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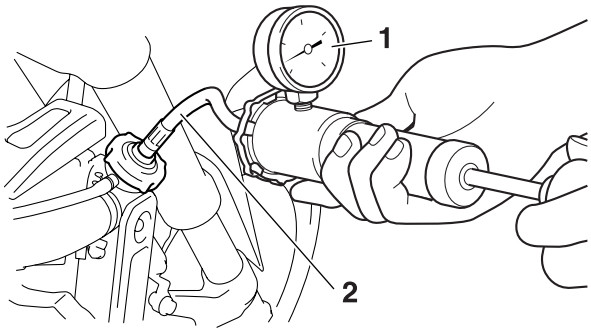
a. Attach the radiator cap tester "1" and radiator cap tester adapter "2" to the radiator.

Radiator cap tester
90890-01325
Mityvac cooling system tester kit
YU-24460-A
Radiator cap tester adapter
90890-01352
Pressure tester adapter
YU-33984



b. Apply 122.7 kPa (1.23 kgf/cm², 17.8 psi) of pressure.
c. Measure the indicated pressure with the gauge.

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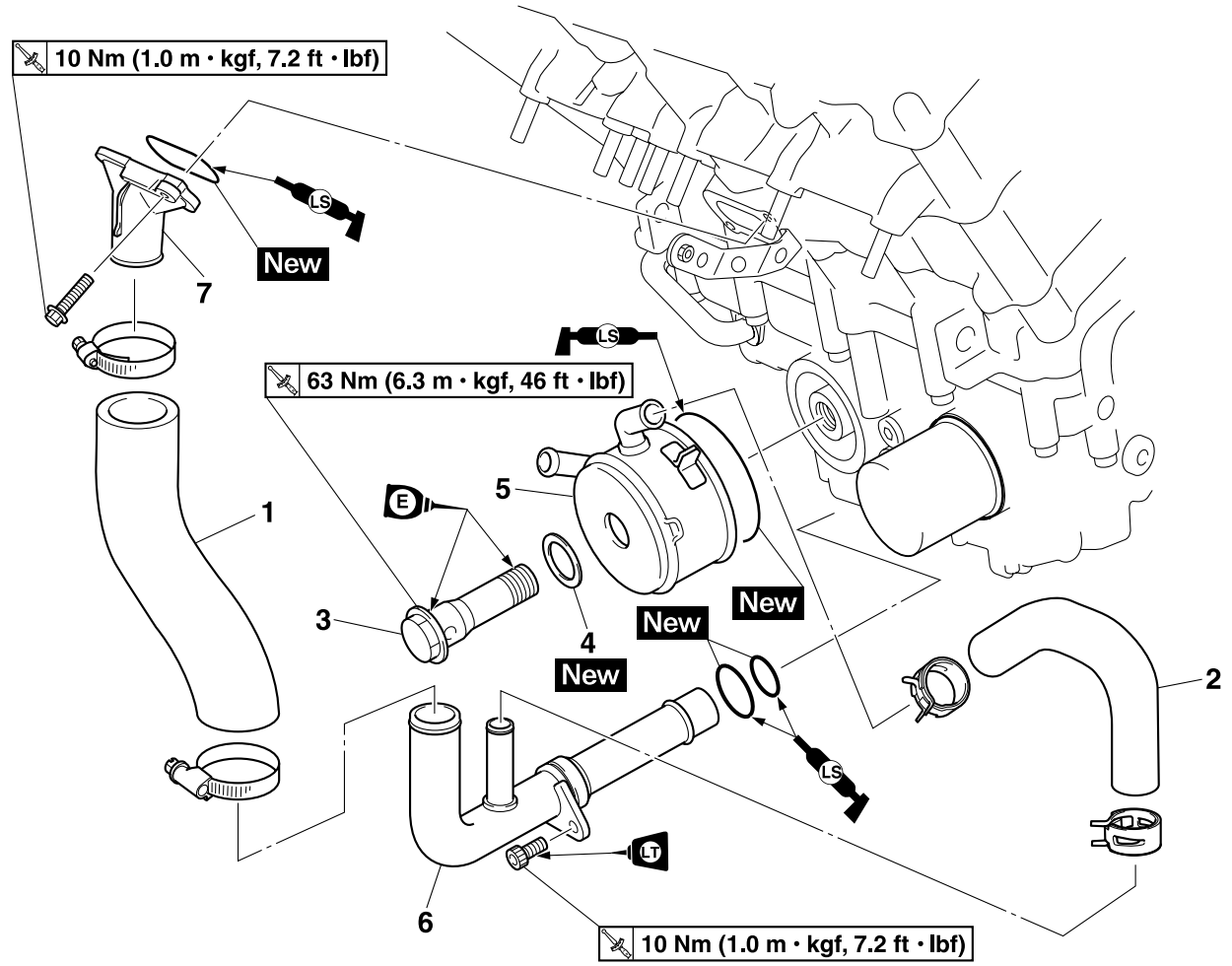
3. Measure:
   • Radiator cap opening pressure
   Below the specified pressure → Replace the radiator cap.
   Refer to “CHECKING THE RADIATOR” on page 6-3.

EAS26410
OIL COOLER

Removing the oil cooler



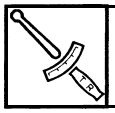
Order	Job/Parts to remove	Q'ty	Remarks
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-27.
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-24.
1	Water jacket joint inlet hose	1	
2	Oil cooler inlet hose	1	
3	Oil cooler union bolt	1	
4	Washer	1	
5	Oil cooler	1	
6	Water pump outlet pipe	1	
7	Water jacket joint	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.

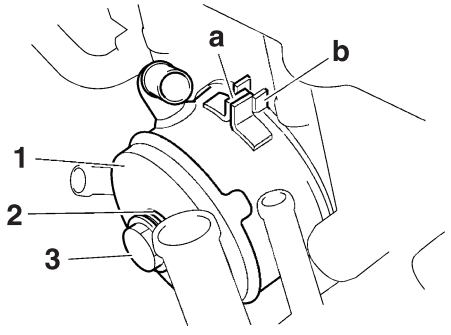
EAS26430
INSTALLING THE OIL COOLER

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" New
   - Oil cooler union bolt "3"

	**Oil cooler union bolt** **63 Nm (6.3 m·kgf, 46 ft·lbf)**

TIP

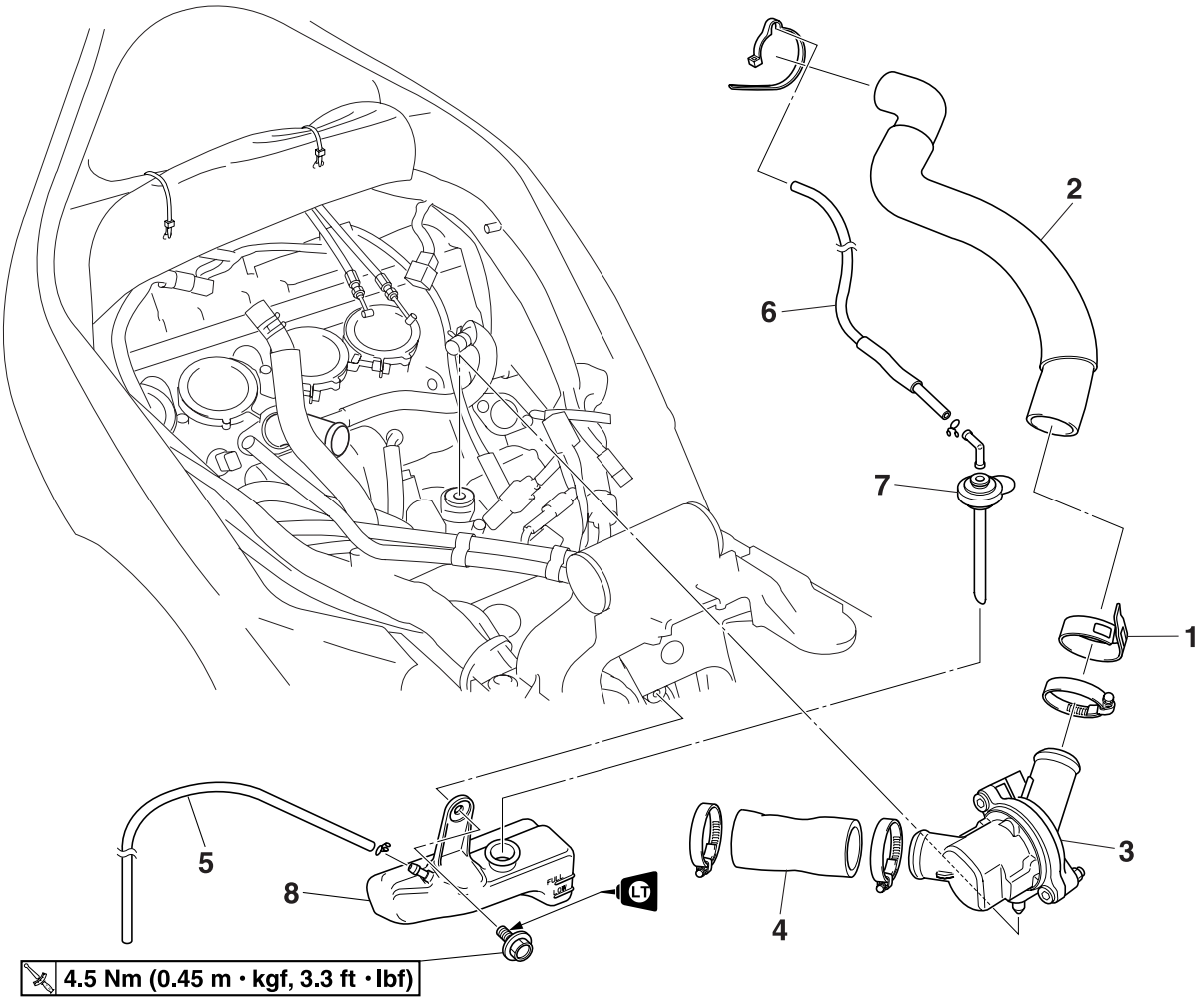
- Before installing the oil cooler, apply engine oil lightly to the oil cooler union bolt and apply lithium-soap-based grease to the O-ring.
- Make sure the O-ring is positioned properly.
- Align the projection "a" on the oil cooler with the slot "b" in the crankcase.



3. Fill:
   - Cooling system
     (with the specified amount of the recommended coolant)
     Refer to "CHANGING THE COOLANT" 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.
     Refer to "INSTALLING THE RADIATOR" on page 6-3.
5. Measure:
   - Radiator cap opening pressure
     Below the specified pressure → Replace the radiator cap.
     Refer to "CHECKING THE RADIATOR" on page 6-3.

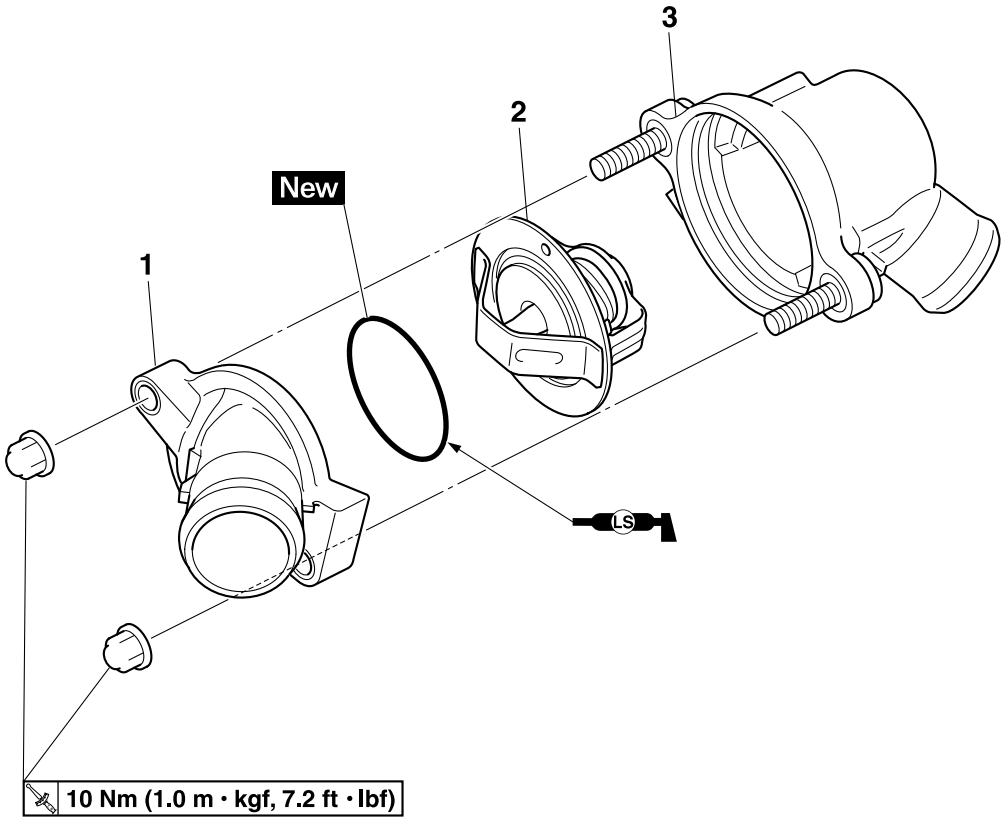
EAS26440
THERMOSTAT

Removing the thermostat assembly



Order	Job/Parts to remove	Q'ty	Remarks
	Rider seat		Refer to "GENERAL CHASSIS" on page 4-1.
	Inner panel/side panel/front cowling side panel		FZ8SA 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 assembly		Refer to "THROTTLE BODIES" on page 7-5.
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-27.
1	Band	1	
2	Radiator inlet hose	1	
3	Thermostat assembly	1	
4	Thermostat assembly inlet hose	1	
5	Coolant reservoir breather hose	1	
6	Coolant reservoir hose	1	
7	Coolant reservoir cap	1	
8	Coolant reservoir tank	1	
			For installation, reverse the removal procedure.

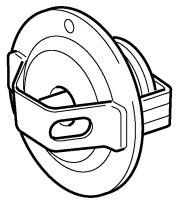
Disassembling the thermostat assembly



Order	Job/Parts to remove	Q'ty	Remarks
1	Thermostat housing cover	1	
2	Thermostat	1	
3	Thermostat housing	1	
			For assembly, reverse the disassembly procedure.

EAS26450
CHECKING THE THERMOSTAT

1. Check:
   - Thermostat
     Does not open at 71–85 °C (159.8–185.0 °F) → Replace.



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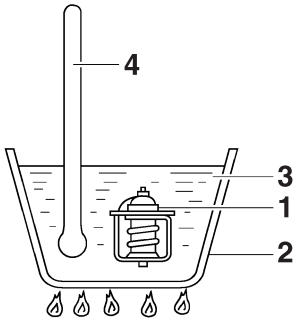
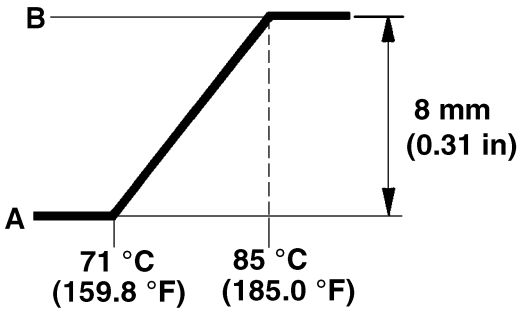
a. Suspend the thermostat "1" in a container "2" filled with water.
b. Slowly heat the water "3".
c. Place a thermometer "4" in the water.
d. While stirring the water, observe the thermostat and thermometer's indicated temperature.





A. Fully closed
B. Fully open

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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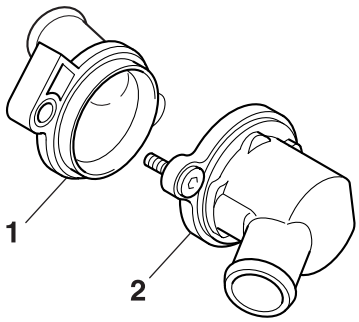
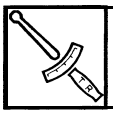
2. Check:
   - Thermostat housing cover "1"
   - Thermostat housing "2"
     Cracks/damage → Replace.



EAS26460
ASSEMBLING THE THERMOSTAT ASSEMBLY

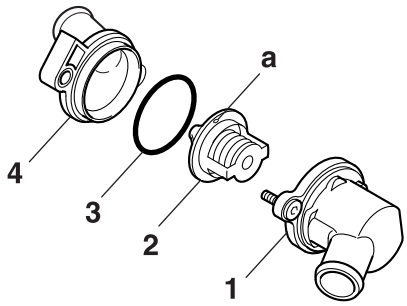
1. Install:
   - Thermostat housing "1"
   - Thermostat "2"
   - O-ring "3" New
   - Thermostat housing cover "4"



Thermostat housing cover nut
10 Nm (1.0 m·kgf, 7.2 ft·lbf)

TIP

Install the thermostat with its breather hole "a" facing up.

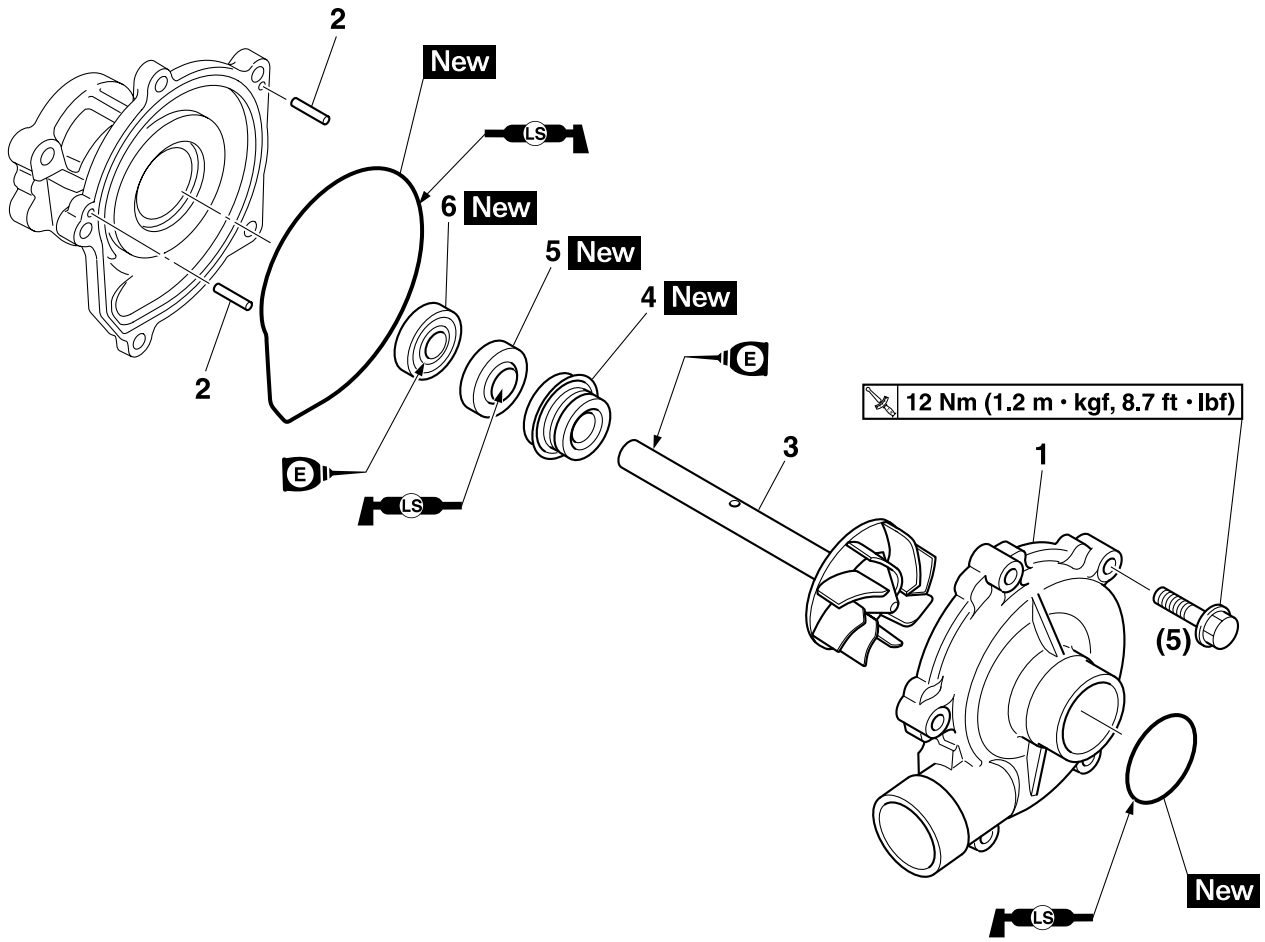


EAS26480
INSTALLING THE THERMOSTAT ASSEMBLY

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.
     Refer to “INSTALLING THE RADIATOR” on page 6-3.
3. 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

Disassembling the water pump

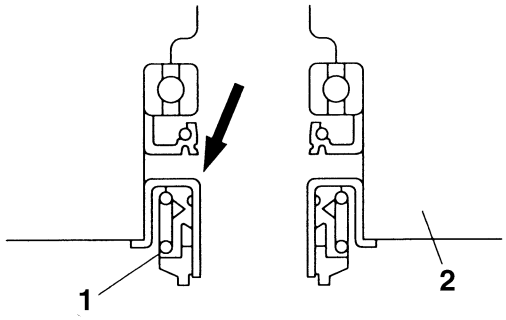


Order	Job/Parts to remove	Q'ty	Remarks
	Oil/water pump assembly		Refer to "OIL PUMP" on page 5-57.
	Oil pump rotor		Refer to "OIL PUMP" on page 5-57.
1	Water pump cover	1	
2	Pin	2	
3	Impeller shaft (along with the impeller)	1	
4	Water pump seal	1	
5	Oil seal	1	
6	Bearing	1	
			For assembly, reverse the disassembly procedure.

EAS26520
DISASSEMBLING THE WATER PUMP

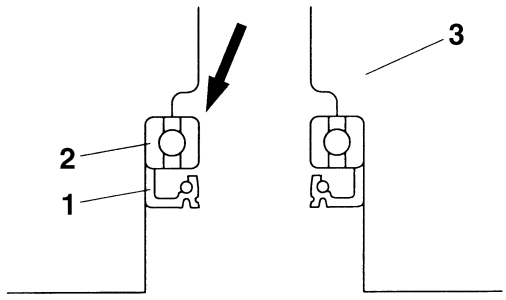
1. Remove:
   • Water pump seal “1”

TIP
Remove the water pump seal from the inside of the water pump housing “2”.



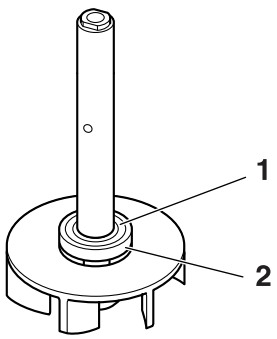
2. Remove:
   • Oil seal “1”
   • Bearing “2”

TIP
Remove the oil seal and bearing from the outside of the water pump housing “3”.



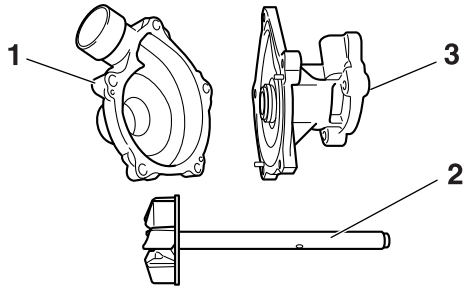
3. Remove:
   • Rubber damper holder “1”
   • Rubber damper “2”
   (from the impeller, with a thin, flat-head screwdriver)

TIP
Do not scratch the impeller shaft.



EAS26541
CHECKING THE WATER PUMP

1. Check:
   • Water pump housing cover “1”
   • Impeller “2”
   Cracks/damage/wear → Replace.
   • Water pump housing “3”
   Cracks/damage/wear → Replace the oil/water pump assembly.



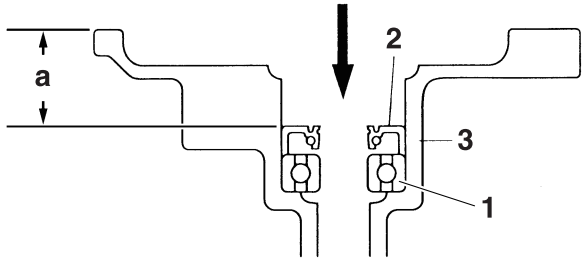
2. Check:
   • Bearing
   Rough movement → Replace.
3. Check:
   • Water pump outlet pipe
   • Water pump inlet pipe
   Cracks/damage/wear → Replace.

EAS26560
ASSEMBLING THE WATER PUMP

1. Install:
   • Bearing “1” New
   • Oil seal “2” New
   (into the water pump housing “3”)

Installed depth “a”
17.2 mm (0.68 in)

TIP
Install the oil seal with a socket that matches its outside diameter.



2. Install:
   • Water pump seal “1” New

ECA14080

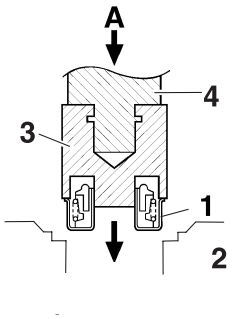
NOTICE

Never lubricate the water pump seal surface with oil or grease.

TIP

Install the water pump seal with the special tools.

Mechanical seal installer
90890-04078
Water pump seal installer
YM-33221-A
Middle driven shaft bearing driver
90890-04058
Middle drive bearing installer 40 & 50 mm
YM-04058



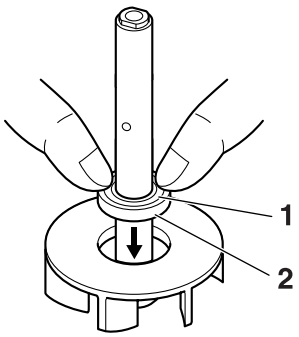
2. Water pump housing
3. Mechanical seal installer
4. Middle driven shaft bearing driver

A. Push down

3. Install:
   • Rubber damper holder “1” New
   • Rubber damper “2” New

TIP

Before installing the rubber damper, apply tap water or coolant onto its outer surface.



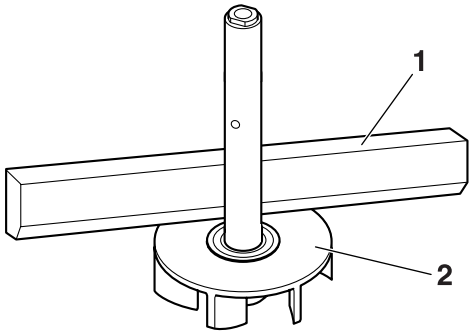
4. Measure:
   • Impeller shaft tilt
   Out of specification → Repeat steps (3) and (4).

ECA14090

NOTICE

Make sure the rubber damper and rubber damper holder are flush with the impeller.

Impeller shaft tilt limit
0.15 mm (0.006 in)

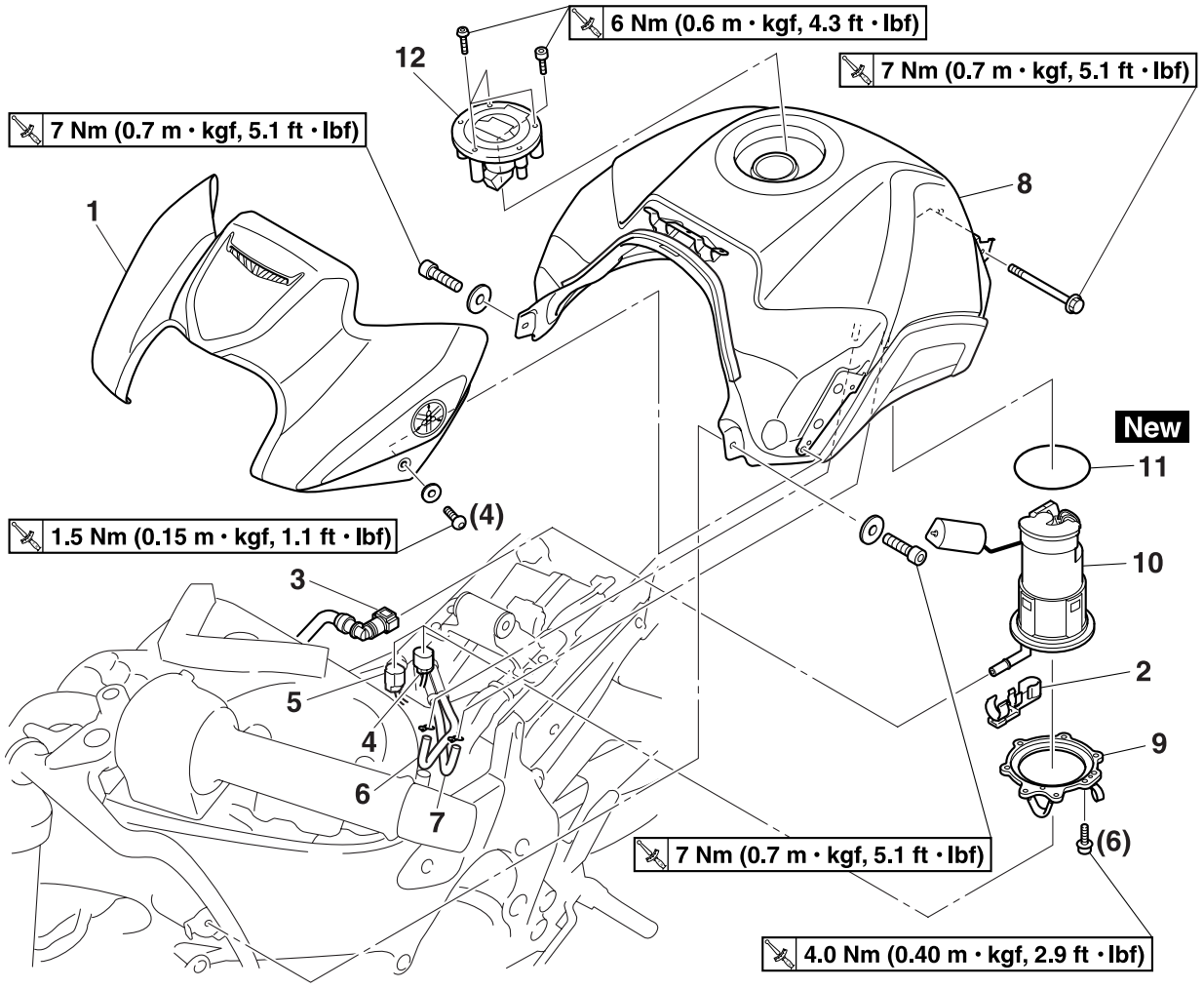


1. Straightedge
2. Impeller

FUEL SYSTEM

EAS26620
FUEL TANK

Removing the fuel tank



Order	Job/Parts to remove	Q'ty	Remarks
	Rider seat		Refer to "GENERAL CHASSIS" on page 4-1.
	Inner panel/side panel/front cowling side panel		FZ8SA Refer to "GENERAL CHASSIS" on page 4-1.
1	Fuel tank cover	1	
2	Fuel hose connector cover	1	
3	Fuel hose connector	1	Disconnect.
4	Fuel sender coupler	1	Disconnect.
5	Fuel pump coupler	1	Disconnect.
6	Fuel tank drain hose	1	Disconnect.
7	Fuel tank breather hose	1	Disconnect.
8	Fuel tank	1	
9	Fuel pump bracket	1	
10	Fuel pump	1	
11	Fuel pump gasket	1	
12	Filler cap assembly	1	
			For installation, reverse the removal procedure.

EAS39P1713
REMOVING THE FUEL TANK COVER

1. Remove:
   • Fuel tank cover “1”

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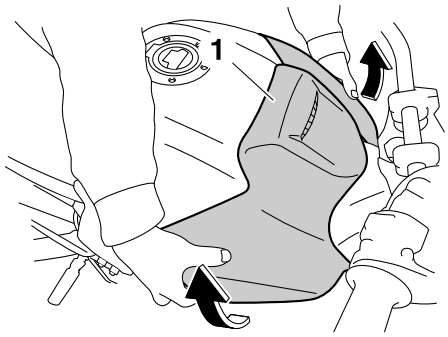
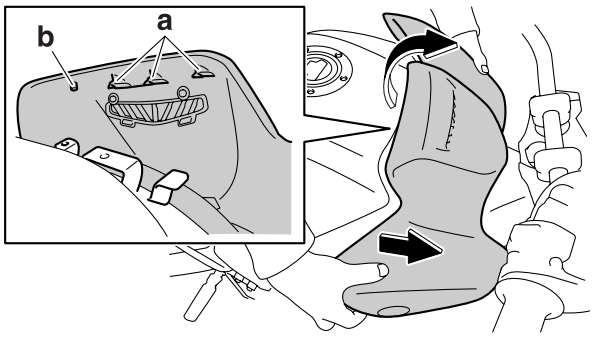
a. Remove the bolts.
b. Disengage the projections from both ends of the fuel tank, slightly expanding both ends of the fuel tank cover.



c. Slide the right side of the fuel tank cover slightly forward to disengage projections “a” from the fuel tank cover bracket. Additionally, lift the rear of the cover (like turning over the cover) to disengage projection “b” from the cover bracket.



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EAS39P1701
REMOVING THE FUEL TANK

1. Extract the fuel in the fuel tank through the fuel tank cap with a pump.
2. Remove:
   • Fuel tank cover
   • Fuel hose connector cover
3. Disconnect:
   • Fuel hose (fuel tank side)
   • Fuel sender coupler
   • Fuel pump coupler
   • Fuel tank drain hose
   • Fuel tank breather hose

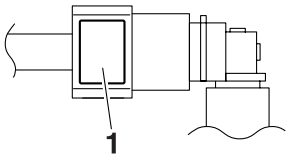
EWA39P1702
⚠ WARNING

Cover fuel hose connection with a cloth when disconnecting them. Residual pressure in the fuel lines could cause fuel to spurt out when removing the hose.

ECA14B1003
NOTICE

Be sure to disconnect the fuel hose by hand. Do not forcefully disconnect the hose with tools.

TIP
- To remove the fuel hose from the fuel pump, press the two buttons “1” on the sides of the connector, and then remove the hose.
- Before removing the hose, place a few rags in the area under where it will be removed.
- It is prohibited to wear the cotton work gloves or equivalent coverings.



4. Remove:
   • Fuel tank

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

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.**

EAS39P1702
CHECKING THE FUEL PUMP BODY

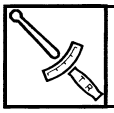
1. Check:
   • Fuel pump body
   Obstruction → Clean.
   Cracks/damage → Replace fuel pump assembly.

EAS26690
CHECKING THE FUEL PUMP OPERATION

1. Check:
   - Fuel pump operation
     Refer to "CHECKING THE FUEL PRESSURE" on page 7-4.

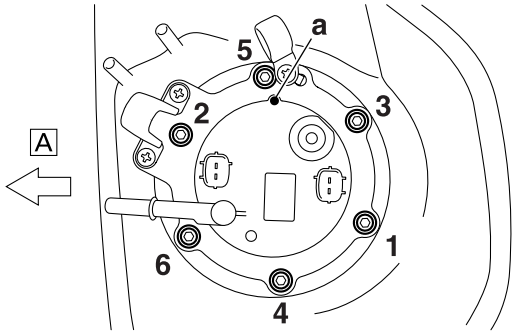
EAS39P1703
INSTALLING THE FUEL PUMP

1. Install:
   - Fuel pump gasket New
   - Fuel pump
   - Fuel pump bracket
   - Fuel pump bolts

	**Fuel pump bolt** **4.0 Nm (0.40 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 gasket so that the lip side turns to the inside of the fuel tank.
- Install the fuel pump as shown in the illustration.
- Align the projection "a" on the fuel pump with the slot in the fuel pump bracket.
- Tighten the fuel pump bolts in the proper tightening sequence as shown.



A. Forward

EAS39P1704
INSTALLING THE FUEL TANK

1. Connect:
   - Fuel hose (fuel tank side)
   - Fuel hose connector cover

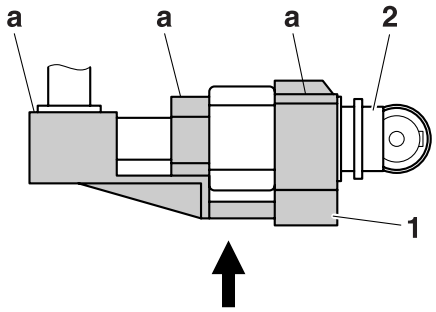
ECA14B1033

NOTICE

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

TIP

- Install the fuel hose securely onto the fuel pump until a distinct "click" is heard.
- It is prohibited to wear the cotton work gloves or equivalent coverings.
- Attach the fuel hose connector cover "1" to the fuel hose connector "2" from the bottom. Make sure that parts "a" are firmly attached to the fuel hose connector.



2. Connect:
   - Fuel tank breather hose
   - Fuel tank drain hose
   - Fuel pump coupler
   - Fuel sender coupler

EAS39P1714
INSTALLING THE FUEL TANK COVER

1. Install:
   - Fuel tank cover

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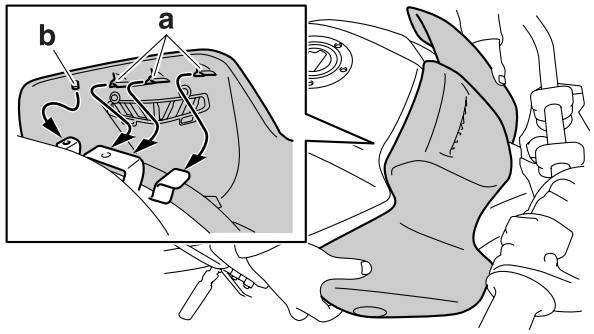
a. Insert projections "a" under the fuel tank cover bracket while insert projection "b" into the hole of the fuel tank cover bracket.



b. Engage the left and right projections of the fuel tank cover and then tighten the bolts.

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EAS39P1709
CHECKING THE FUEL PRESSURE

1. Check:
   • Fuel pressure

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a. Remove the rider seat and fuel tank cover. Refer to “GENERAL CHASSIS” on page 4-1 and “FUEL TANK” on page 7-1.
b. Remove the fuel tank bolt and holdup the fuel tank.
c. Disconnect the fuel hose “1” from the fuel pump.
   Refer to “REMOVING THE FUEL TANK” on page 7-2.

EWA39P1702

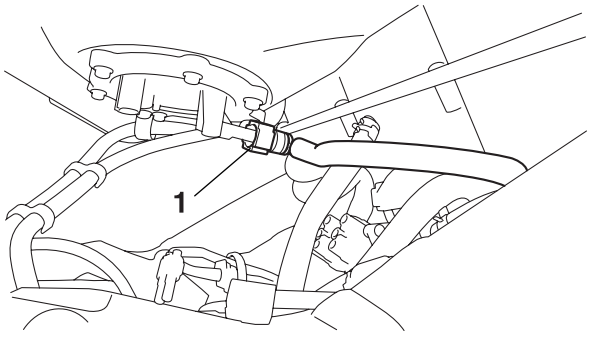
⚠ WARNING

Cover fuel hose connection with a cloth when disconnecting them. Residual pressure in the fuel lines could cause fuel to spurt out when removing the hose.

ECA14B1003

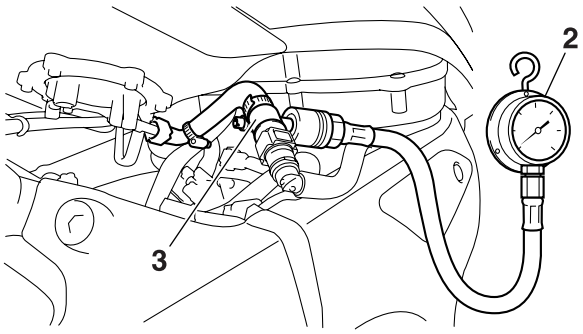
NOTICE

Be sure to disconnect the fuel hose by hand. Do not forcefully disconnect the hose with tools.

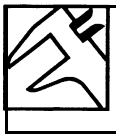


d. Connect the pressure gauge “2” and fuel pressure adapter “3” to the fuel hose.

Pressure gauge
90890-03153
YU-03153
Fuel pressure adapter
90890-03176
YM-03176



e. Start the engine.
f. Measure the fuel pressure.
   Faulty → Replace the fuel pump.



Fuel pressure
324.0 kPa (3.24 kgf/cm², 47.0 psi)

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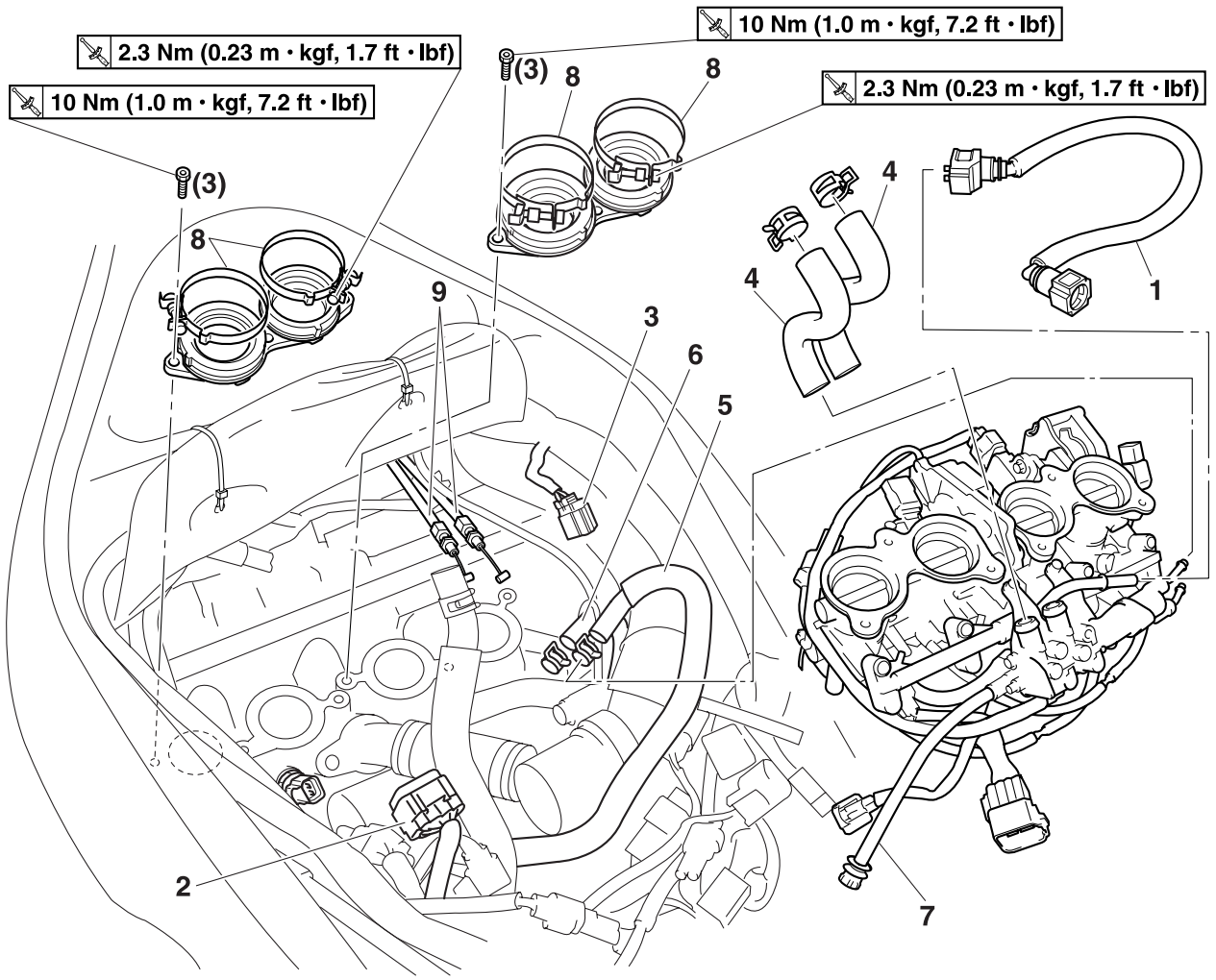
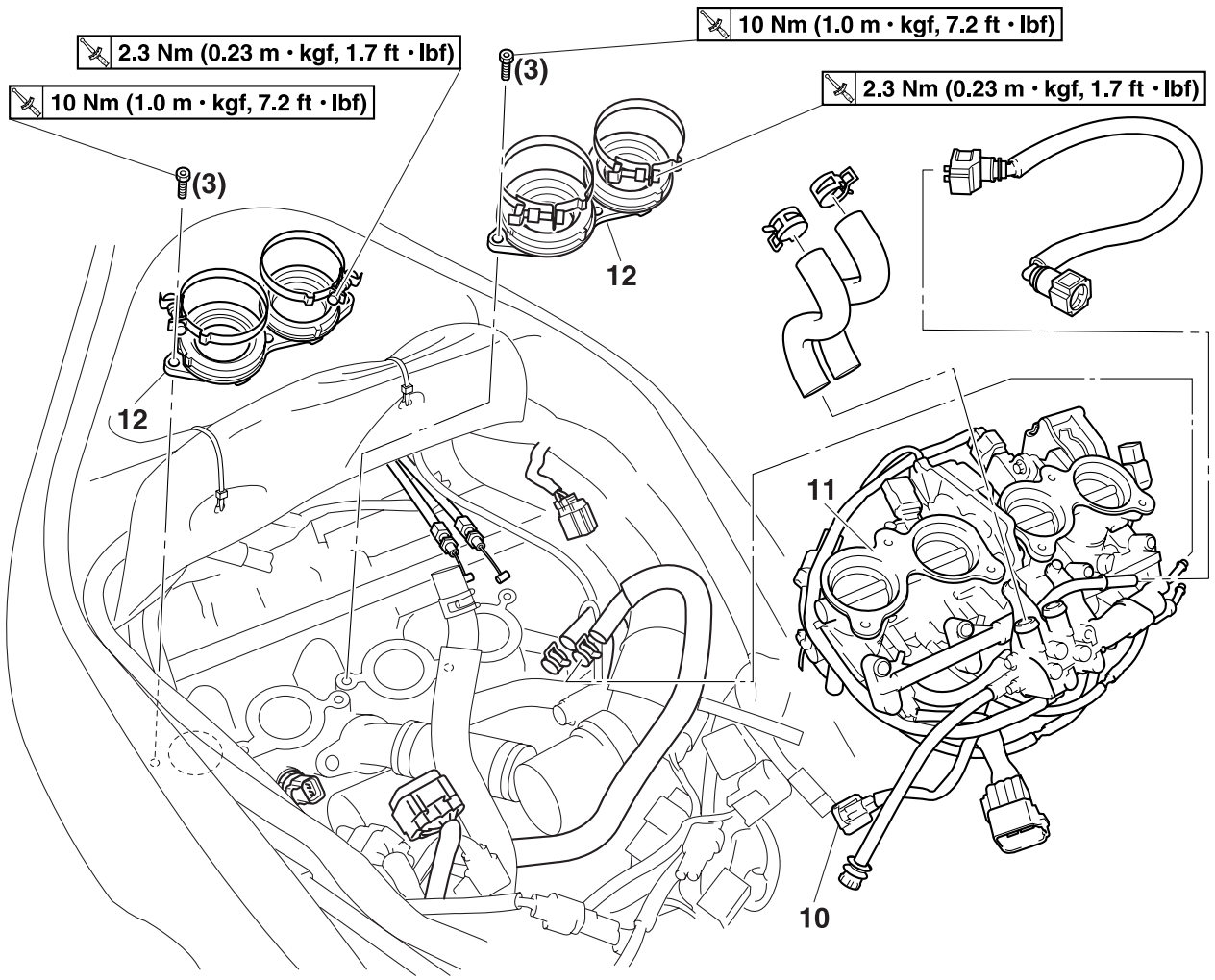
EAS26970
THROTTLE BODIES

Removing the throttle bodies



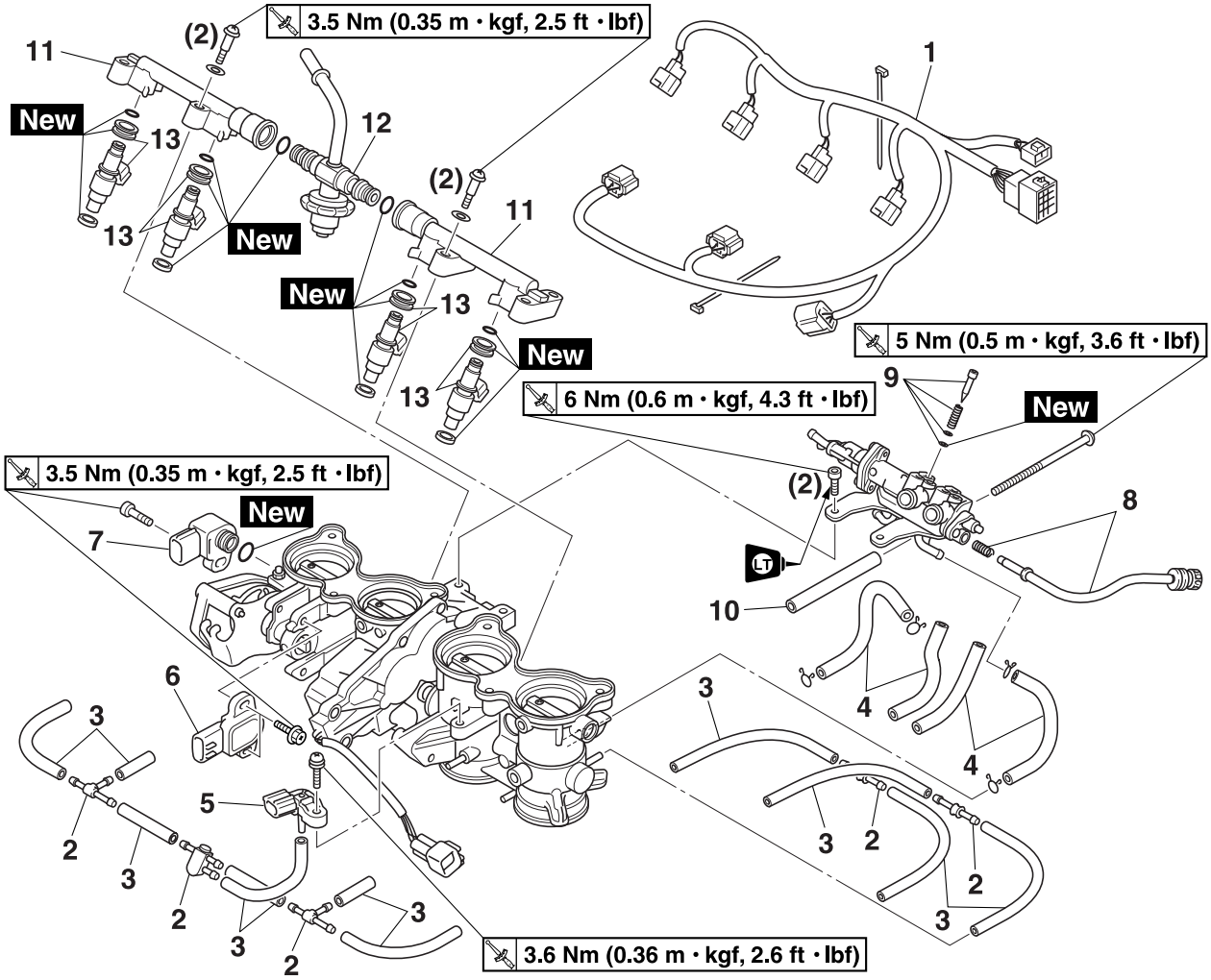
Order	Job/Parts to remove	Q'ty	Remarks
	Rider seat		Refer to "GENERAL CHASSIS" on page 4-1.
	Inner panel/side panel/front cowling side panel		FZ8SA Refer to "GENERAL CHASSIS" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Air filter case		Refer to "GENERAL CHASSIS" on page 4-1.
	Throttle cable (handlebar side)		Disconnect. Refer to "HANDLEBAR" on page 4-64.
1	Fuel hose	1	
2	Fuel injection system sub-wire harness coupler	1	Disconnect.
3	Sub-throttle position sensor coupler	1	Disconnect.
4	Throttle body hose	2	
5	Fast idle plunger outlet hose	1	Disconnect.
6	Fast idle plunger inlet hose	1	Disconnect.
7	Idle adjust screw wire	1	
8	Throttle body joint clamp	4	Loosen.
9	Throttle cable (throttle body side)	2	Disconnect.

Removing the throttle bodies



Order	Job/Parts to remove	Q'ty	Remarks
10	Coolant temperature sensor coupler	1	Disconnect.
11	Throttle bodies	1	
12	Throttle body joint	2	
			For installation, reverse the removal procedure.

Removing the injectors



Order	Job/Parts to remove	Q'ty	Remarks
1	Fuel injection system sub-wire harness	1	
2	Hose joint	5	
3	Negative pressure hose (Thin)	11	
4	Negative pressure hose (Thick)	4	
5	Intake air pressure sensor	1	
6	Throttle position sensor	1	
7	Sub-throttle position sensor	1	
8	Idle adjust screw wire	1	
9	Air screw set	4	
10	Collar	1	
11	Fuel rail	2	
12	Fuel rail joint	1	
13	Fuel injector	4	
			For installation, reverse the removal procedure.

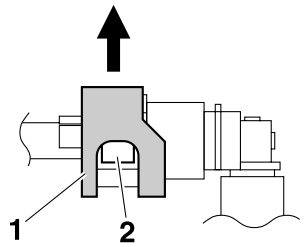
EAS39P1710
REMOVING THE FUEL HOSE (THROTTLE BODY SIDE)

1. Remove:
   - Fuel tank
     Refer to "REMOVING THE FUEL TANK" on page 7-2.
2. Remove:
   - Fuel hose (throttle body side)

ECA14B1003
NOTICE

Be sure to disconnect the fuel hose by hand. Do not forcefully disconnect the hose with tools.

TIP
- To remove the fuel hose from the fuel rail joint, 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 hose, place a few rags in the area under where it will be removed.
- It is prohibited to wear the cotton work gloves or equivalent coverings.



EAS26980
CHECKING THE FUEL INJECTORS

EWA39P1703
⚠ 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.**
- **Set the main switch to "OFF" and disconnect the negative battery lead from the battery terminal before checking the injectors.**

ECA39P1701
NOTICE

- **When checking the injectors, do not allow any foreign material to enter or adhere to the injectors, fuel rail, or O-rings.**
- **If an injector is subject to strong shocks or excessive force, replace it.**

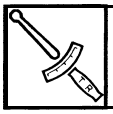
1. Check:
   - Injectors
     Damage/defective → Replace.
     Refer to "FUEL INJECTION SYSTEM" on page 8-47.

EAS39P1705
INSTALLING THE INJECTORS

ECA39P1702
NOTICE

- **Always use new O-rings.**
- **When installing the injectors, do not allow any foreign material to enter or adhere to the injectors, fuel rails, or O-rings.**
- **Be careful not to twist or pinch the O-rings when installing the injectors.**
- **When installing the injector, install it at the same position as the removed cylinder.**
- **If an injector is subject to strong shocks or excessive force, replace it.**

1. Install a new seal onto the end of each injector.
2. Install the injectors to the fuel rail, making sure to install them in the correct direction.
3. Install a seal onto the end of each injector.
4. Install the injector assemblies to the throttle bodies.



Fuel rail screw
3.5 Nm (0.35 m·kgf, 2.5 ft·lbf)

5. Check the injector pressure after the injectors are installed to the throttle bodies.
   Refer to "CHECKING THE INJECTOR PRESSURE" on page 7-8.

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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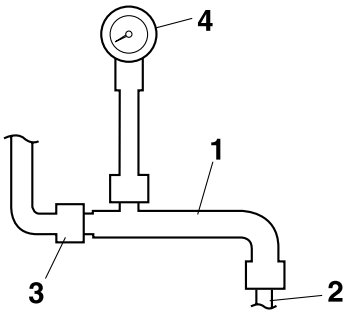
a. Connect the injector pressure adapter "1" to the fuel rail joint "2", and then connect an air compressor "3" to the adapter.
b. Connect the pressure gauge "4" to the injector pressure adapter "1".

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/cm², 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 at least one minute.
   Pressure drops → Check the pressure gauge and adapter.
   Check the seals and O-rings and then reinstall.
   Out of specification → Replace the fuel injectors.

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EAS39P1706

CHECKING AND CLEANING THE THROTTLE BODIES

TIP

Before cleaning the throttle bodies, check the following items:
- Valve clearance
- Spark plugs
- Compression pressure
- Air filter element
- Throttle body joints
- Fuel hose
- Air induction system
- Exhaust system
- Breather hoses
- Vacuum hoses
- Throttle body hoses
- Fast idle plunger inlet hose
- Fast idle plunger outlet hose

EWA14B1021

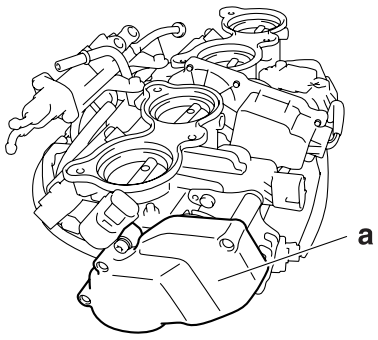
⚠ WARNING

- **If the throttle bodies are subjected to strong shocks or dropped during cleaning, replace them as a set.**
- **Before removing the throttle bodies to clean them, check the operation of the throttle bodies, refer to "FUEL INJECTION SYSTEM" on page 8-47.**

1. Check:
   • Throttle bodies
   Cracks/damage → Replace the throttle bodies as a set.

TIP

If the protector "a" is scratched or damaged, replace the throttle bodies as a set.

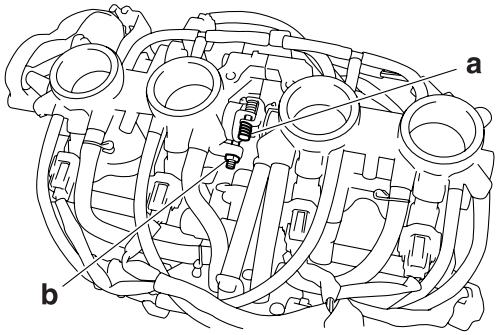


2. Clean:
   • Throttle bodies

ECA39P1703

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.**
- **Clean the throttle bodies with a cloth which petroleum-based solvent is applied on.**
- **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 touch the synchronizing screws "a", otherwise the throttle valve synchronization will be affected.**
- **Do not touch the throttle adjust screw "b".**



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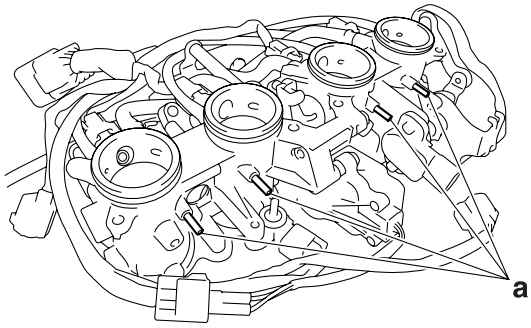
a. Place the throttle bodies on a flat surface with the engine side facing up.
b. Install the caps (895-14169-00) onto the hose fittings "a".



c. Push the lever in the direction shown in the illustration to hold the throttle valves in the open position.

EWA14B1022

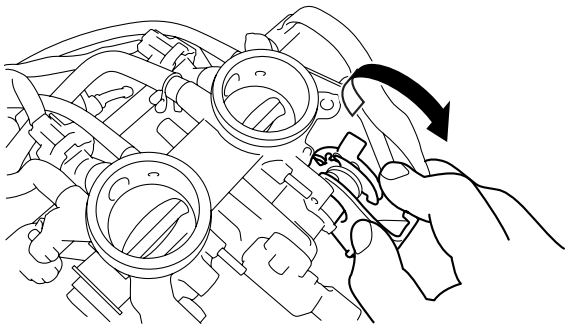
⚠ WARNING

When cleaning the throttle bodies, be careful not to injure yourself on the throttle valves or other components of the throttle bodies.

ECA39P1704

NOTICE

Do not open the sub-throttle valves by supplying electrical power to 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.

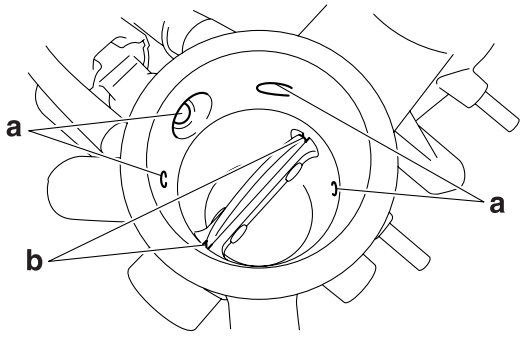
e. Remove the carbon deposits from the inside of each throttle body in a downward direction, from the engine side of the throttle body to the air filter case side.

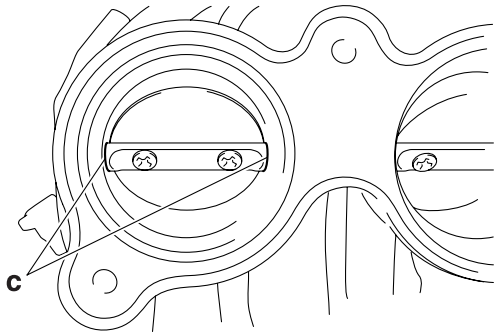
ECA14B1029

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, in the space “b” between the throttle valve shaft and the throttle body or in the space “c” between the sub 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. Adjust:
   • Throttle bodies synchronizing
     Out of specification → Replace the throttle bodies.
     Refer to “SYNCHRONIZING THE THROTTLE BODIES” on page 3-9.

EAS39P1711

INSTALLING THE FUEL HOSE (THROTTLE BODY SIDE)

1. Connect:
   • Fuel hose (throttle body side)

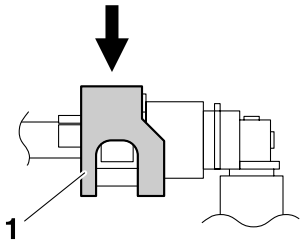
ECA14B1033

NOTICE

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

TIP

- Install the fuel hose securely onto the fuel rail joint until a distinct “click” is heard.
- To install the fuel hose onto the fuel rail joint, slide the fuel hose connector cover “1” on the end of the hose in the direction of the arrow shown.
- It is prohibited to wear the cotton work gloves or equivalent coverings.



EAS39P1707

ADJUSTING THE THROTTLE POSITION SENSOR

EWA14B1023

⚠ WARNING

- **Handle the throttle position sensor with special care.**
- **Never subject the throttle position sensor to strong shocks. If the throttle position sensor is dropped, replace it.**

1. Check:
   • Throttle position sensor
     Refer to “CHECKING THE THROTTLE POSITION SENSOR” on page 8-199.
2. Adjust:
   • Throttle position sensor angle

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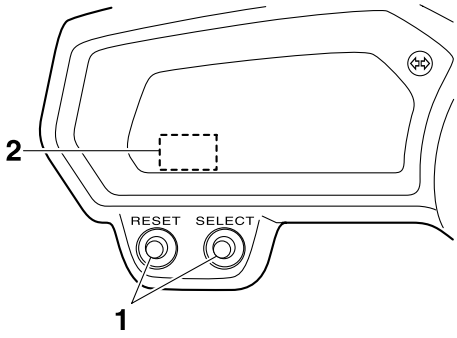
a. Temporary tighten the throttle position sensor.
b. Check that the throttle grip is fully closed.

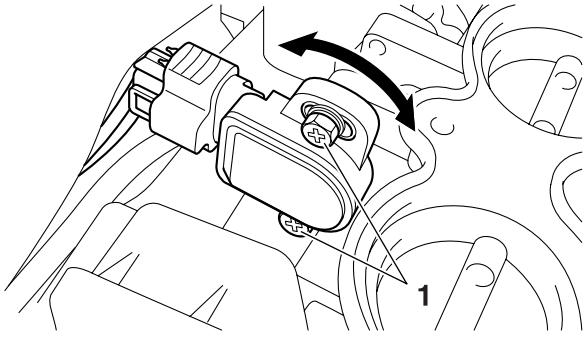
c. Connect the throttle position sensor, sub-throttle position sensor and sub-throttle servo motor to the wire harness.
d. Set the main switch to "OFF" and set the engine stop switch to "○".
e. Simultaneously press and hold the "SELECT" and "RESET" buttons "1", set the main switch to "ON", and continue to press the buttons for 8 seconds more.

TIP
- All displays on the meter disappear except the clock and odometer/tripmeter/fuel reserve tripmeter displays.
- "dI" appears on the clock LCD "2".



f. Diagnostic code number "D:01" is selected.
g. Adjust the position of the throttle position sensor angle so that 14–20 can appear in the meter.
h. After adjusting the throttle position sensor angle, tighten the throttle position sensor screws "1".

Throttle position sensor screw
3.5 Nm (0.35 m·kgf, 2.5 ft·lbf)



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EAS39P1708
ADJUSTING THE SUB-THROTTLE POSITION SENSOR

EWA39P1701
⚠ WARNING
- **Handle the sub-throttle position sensor with special care.**
- **Never subject the sub-throttle position sensor to strong shocks. If the sub-throttle position sensor is dropped, replace it.**

1. Check:
   - Sub-throttle position sensor
     Refer to "CHECKING THE SUB-THROTTLE POSITION SENSOR" on page 8-199.
2. Adjust:
   - Sub-throttle position sensor angle

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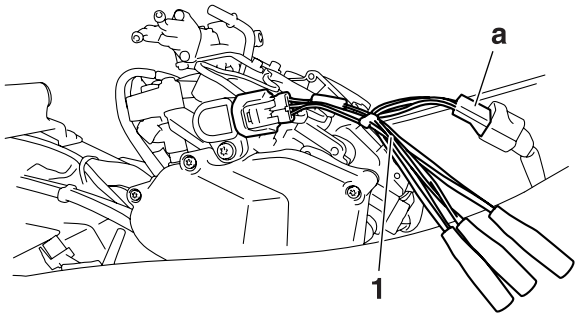
a. Remove the throttle bodies and temporary tighten the sub-throttle position sensor.
b. Connect the test harness sub-throttle position sensor (3P) "1" to the sub-throttle position sensor and wire harness as shown.

ECA39P1705
NOTICE
Pay attention to the installing direction of the test harness sub-throttle position sensor coupler "a".

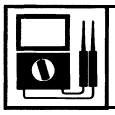


c. Connect the digital circuit tester (DCV) to the test harness sub-throttle position sensor (3P).

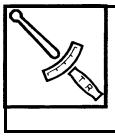
Test harness sub-throttle position sensor (3P)
90890-03214
YU-03214
Digital circuit tester
90890-03174
Model 88 Multimeter with tachometer
YU-A1927

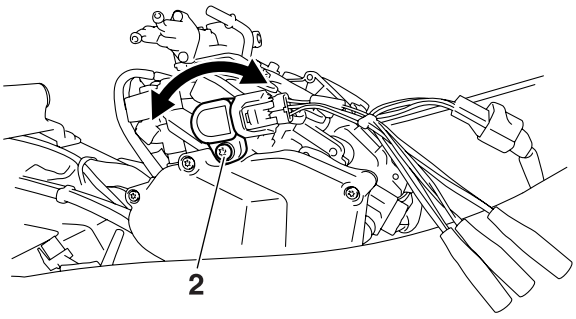
• Positive tester probe Green/yellow (wire harness color) • Negative tester probe Black/blue (wire harness color)

d. Set the main switch to “ON” and fully close the sub-throttle valves.
e. Measure the sub-throttle position sensor voltage.
f. Adjust the sub-throttle position sensor angle so that the voltage is within the specified range.

	**Output voltage** **0.3–0.4 V**

g. After adjusting the sub-throttle position sensor angle, tighten the sub-throttle position sensor screw “2”.

	**Sub-throttle position sensor screw** **3.5 Nm (0.35 m·kgf, 2.5 ft·lbf)**



h. Remove the test harness sub-throttle position sensor (3P) and install the throttle bodies.

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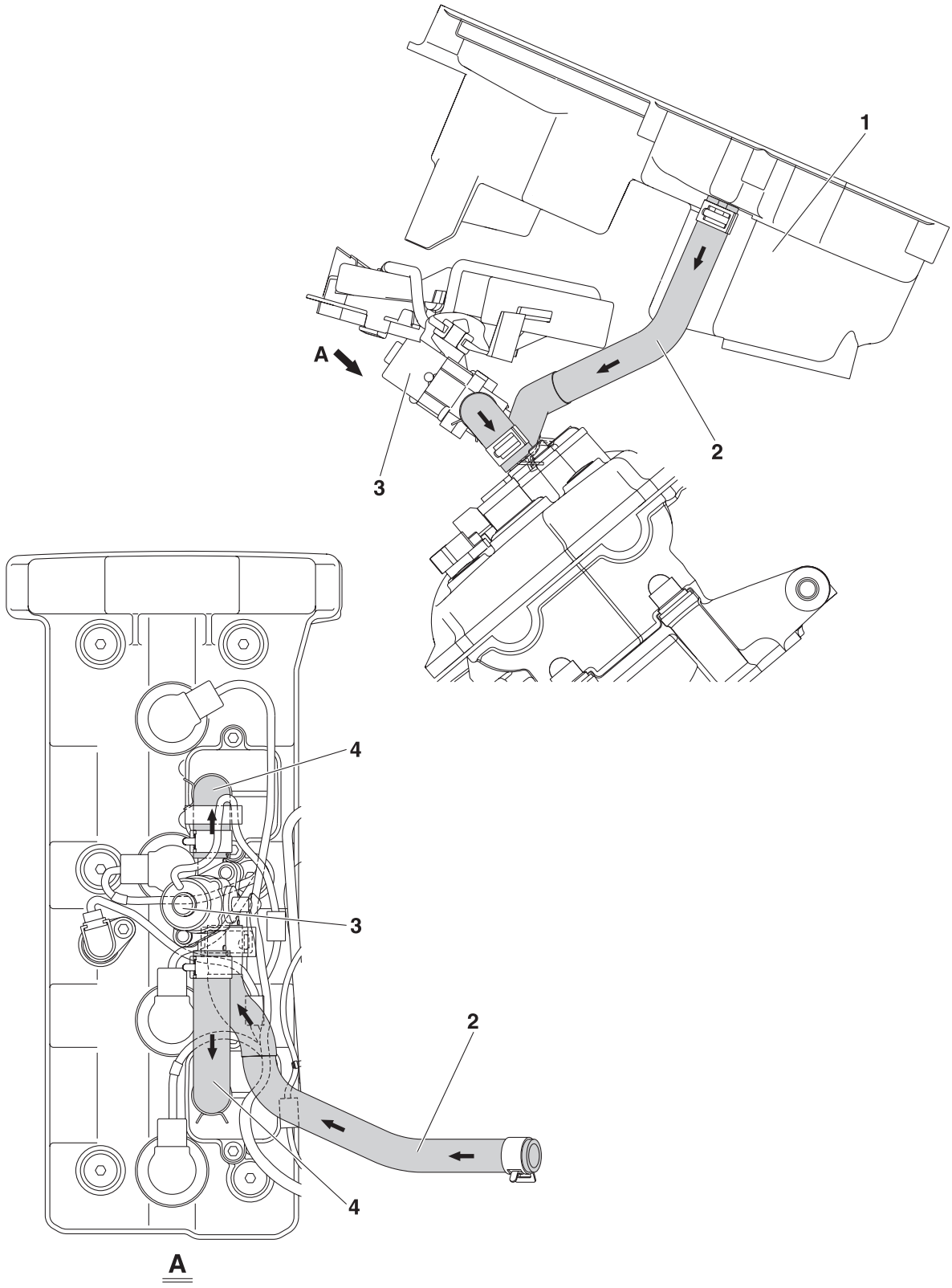
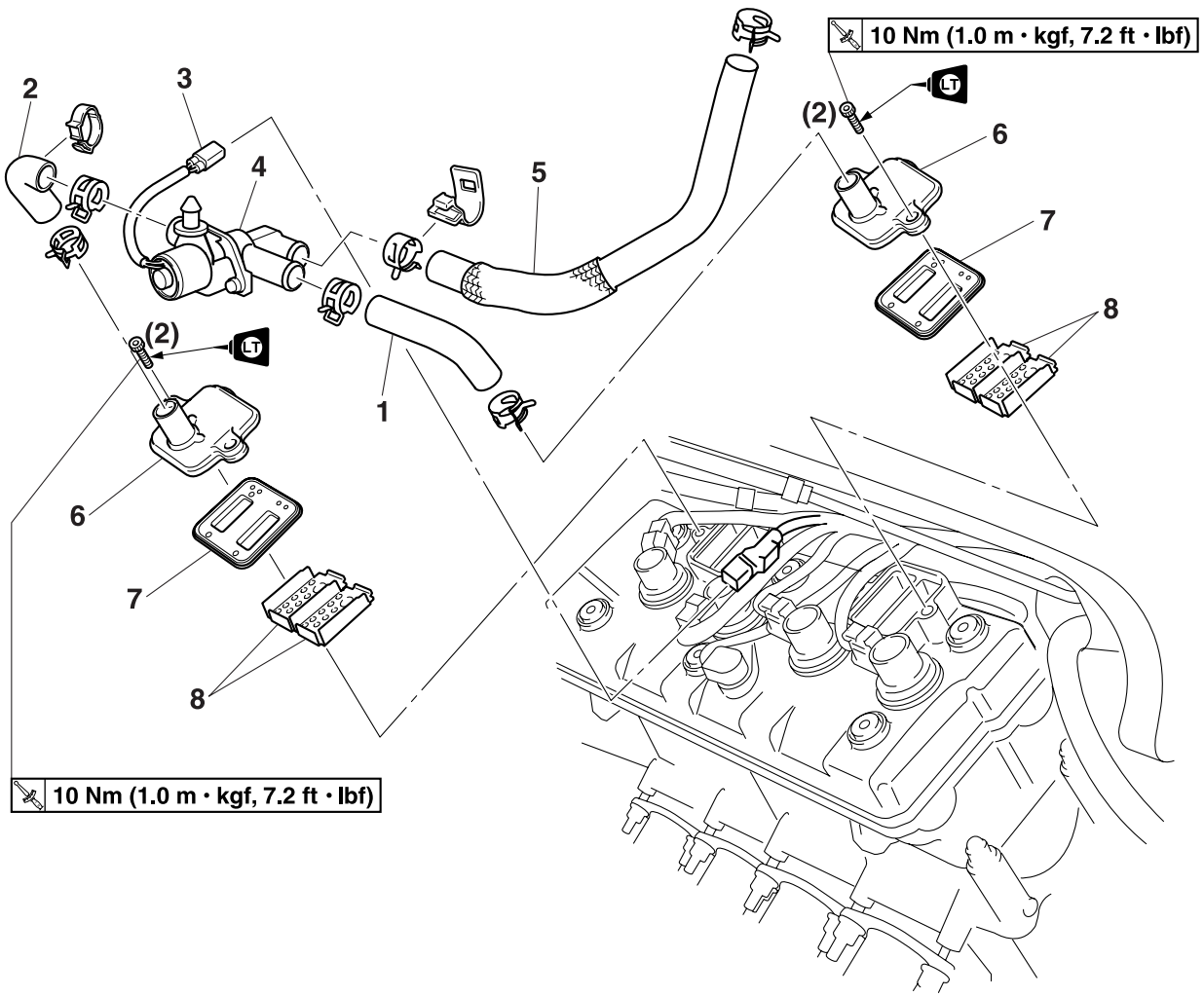
EAS27040
AIR INDUCTION SYSTEM



1. Air filter case
2. Air induction system hose (air filter case to air cut-off valve)
3. Air cut-off valve
4. Air induction system hose (air cut-off valve to reed valve cover)

Removing the air cut-off valve assembly and reed valves

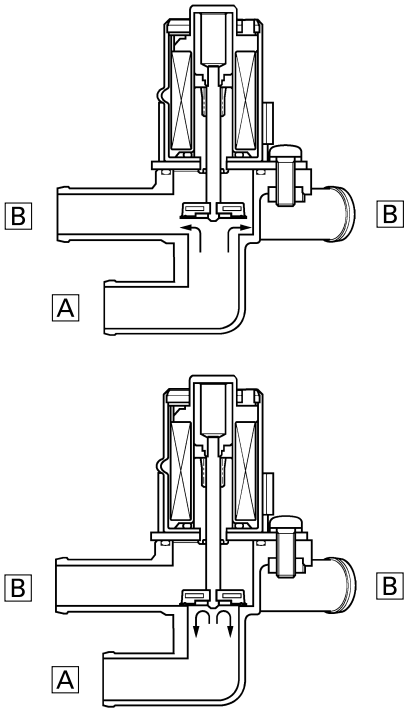


Order	Job/Parts to remove	Q'ty	Remarks
	Rider seat		Refer to "GENERAL CHASSIS" on page 4-1.
	Inner panel/side panel/front cowling side panel		FZ8SA Refer to "GENERAL CHASSIS" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Air filter case		Refer to "GENERAL CHASSIS" on page 4-1.
	Radiator		Refer to "RADIATOR" on page 6-1.
1	Air induction system hose (air cut-off valve to reed valve cover)	1	
2	Air induction system hose (air cut-off valve to reed valve cover)	1	
3	Air cut-off valve coupler	1	Disconnect.
4	Air cut-off valve	1	
5	Air induction system hose (air filter case to air cut-off valve)	1	
6	Reed valve cover	2	
7	Reed valve assembly	2	
8	Reed valve 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 (1112 to 1292 °F).

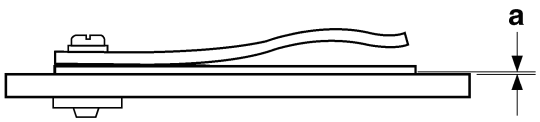
Air cut-off valve
The air cut-off valve is controlled by the signals from the ECU in accordance with the combustion conditions. Ordinarily, the air cut-off valve opens to allow the air to flow during idle and closes to cut-off the flow when the vehicle is being driven. However, if the coolant temperature 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 cylinder head

1. Check:
   • Hoses
   Loose connections → Connect properly.
   Cracks/damage → Replace.
2. Check:
   • Reed valve
   • Reed valve stopper
   • Reed valve seat
   Cracks/damage → Replace the reed valve assembly.
3. Measure:
   • Reed valve bending limit “a”
   Out of specification → Replace the reed valve assembly.

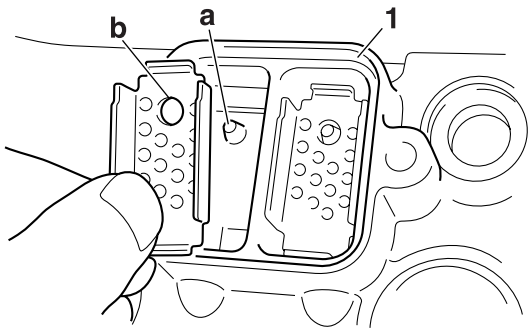
Reed valve bending limit
0.4 mm (0.016 in)



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 8-200.

EAS39P1712
INSTALLING THE AIR INDUCTION SYSTEM
1. Install:
   • Reed valve plate

TIP
Align the projection “a” on the cylinder head cover “1” with the hole “b” in the reed valve plate.



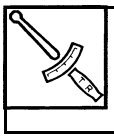
- Reed valve assembly

TIP

Install the reed valve assembly so that the open side turns to the exhaust side of the engine.

A. Exhaust side

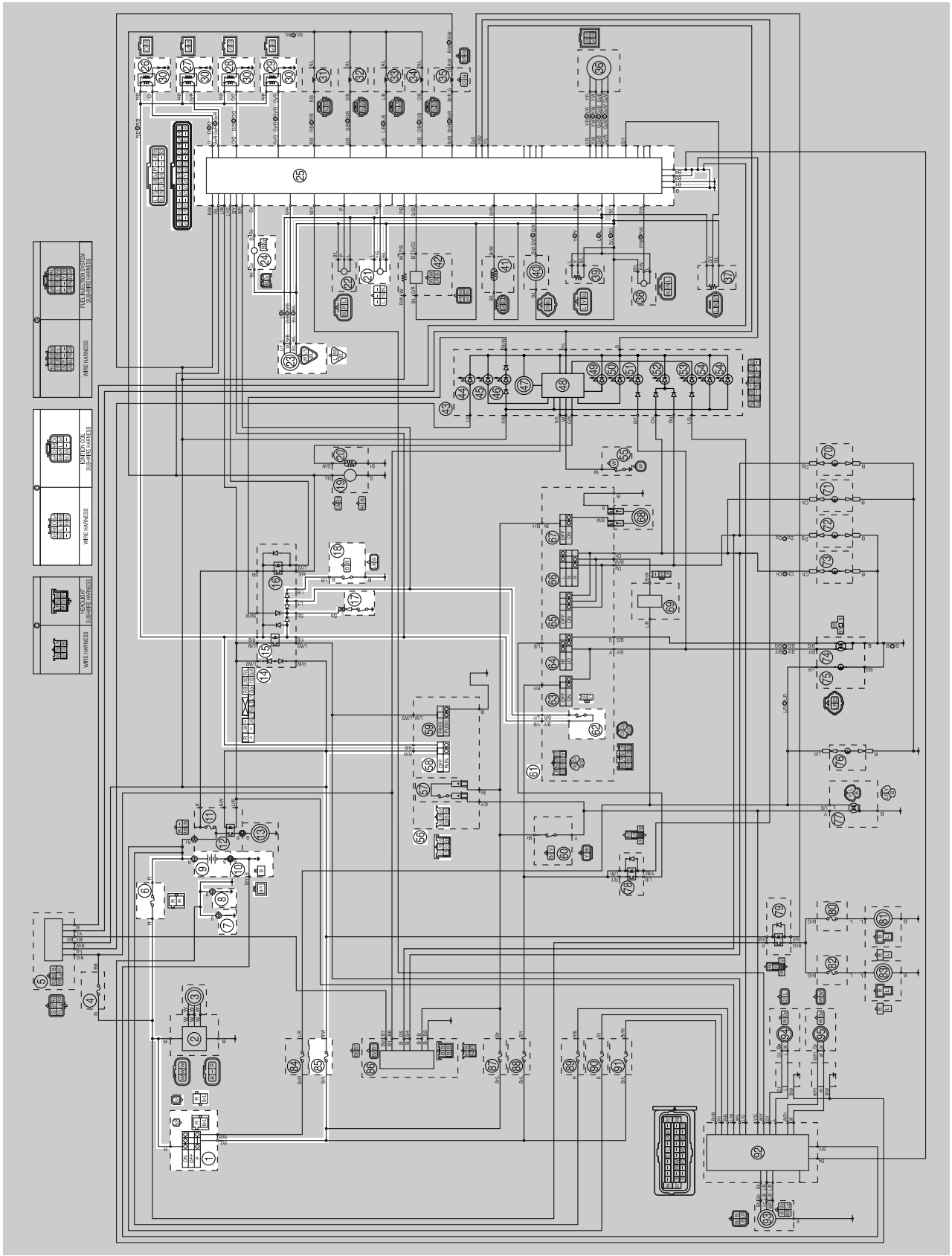
2. Install:
   - Reed valve cover

	**Reed valve cover bolt** **10 Nm (1.0 m·kgf, 7.2 ft·lbf)** **LOCTITE®**

ELECTRICAL SYSTEM

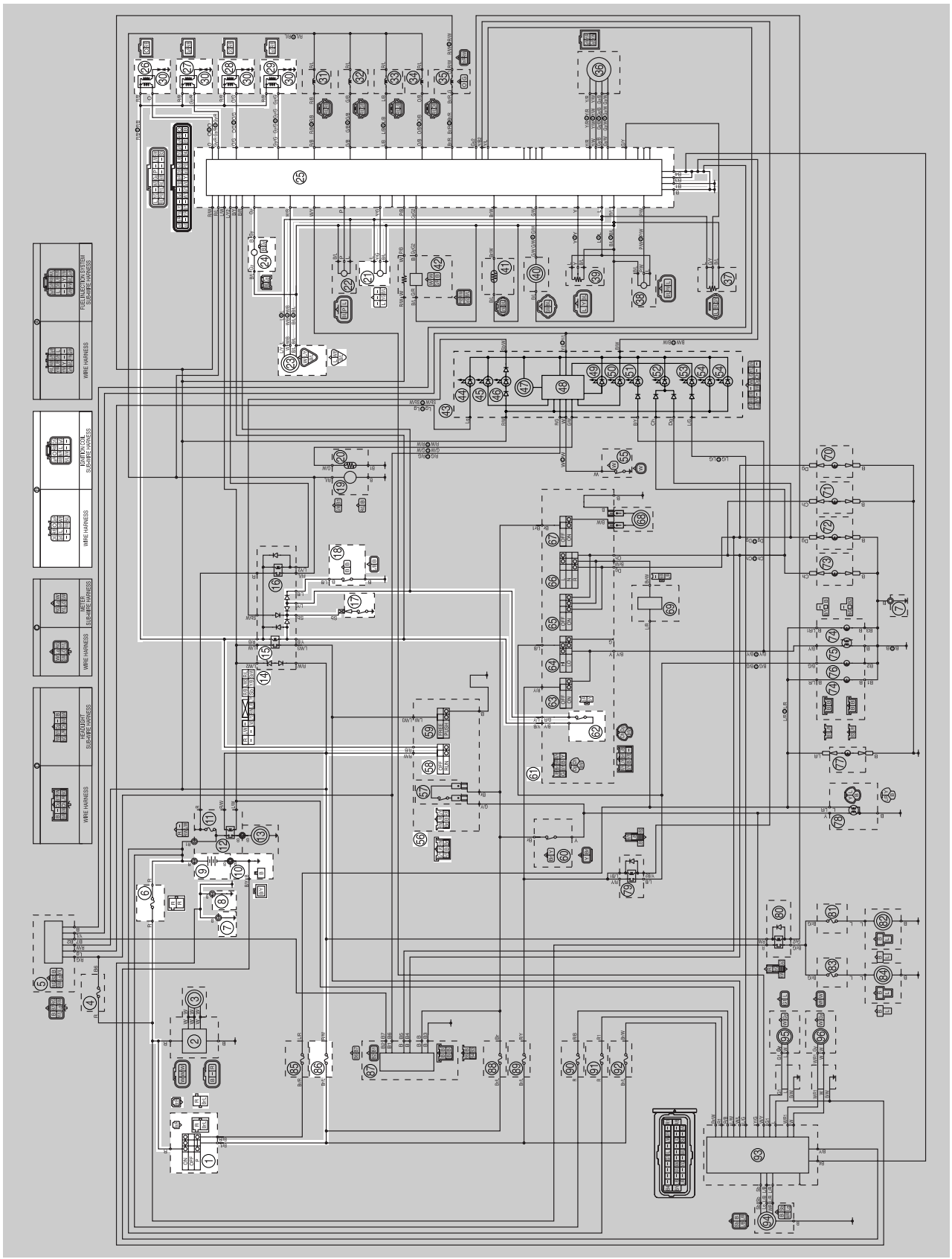
EAS27090
IGNITION SYSTEM

EAS27110
CIRCUIT DIAGRAM



FZ8NA

1. Main switch
6. Main fuse
7. Frame ground
8. Engine ground
9. Battery
10. Negative battery ground lead
14. Relay unit
15. Starting circuit cut-off relay
17. Neutral switch
18. Sidestand switch
21. Lean angle sensor
23. Cylinder identification sensor
24. Crankshaft position sensor
25. ECU (engine control unit)
26. Ignition coil #1
27. Ignition coil #2
28. Ignition coil #3
29. Ignition coil #4
30. Spark plug
56. Right handlebar switch
58. Engine stop switch
61. Left handlebar switch
62. Clutch switch
85. Ignition fuse



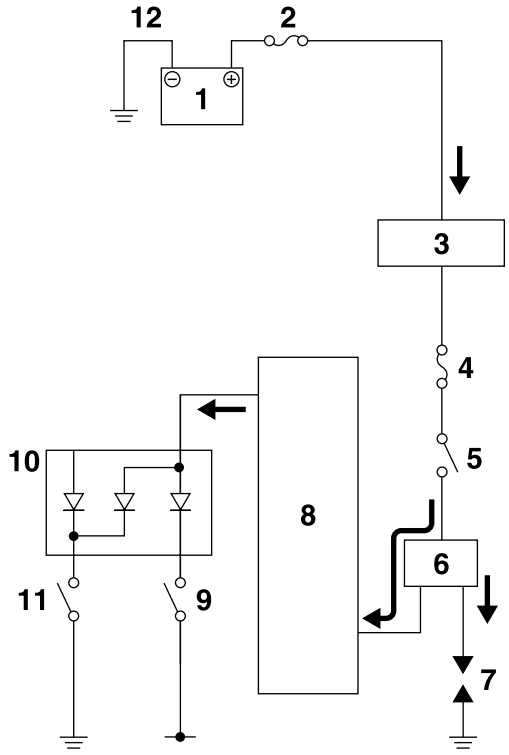
FZ8SA

1. Main switch
6. Main fuse
7. Frame ground
8. Engine ground
9. Battery
10. Negative battery ground lead
14. Relay unit
15. Starting circuit cut-off relay
17. Neutral switch
18. Sidestand switch
21. Lean angle sensor
23. Cylinder identification sensor
24. Crankshaft position sensor
25. ECU (engine control unit)
26. Ignition coil #1
27. Ignition coil #2
28. Ignition coil #3
29. Ignition coil #4
30. Spark plug
56. Right handlebar switch
58. Engine stop switch
61. Left handlebar switch
62. Clutch switch
86. Ignition fuse

EAS39P1804
ENGINE STOPPING DUE TO SIDESTAND OPERATION

When the engine is running and the transmission is in gear, the engine will stop if the sidestand is moved down. This is because the electric current from the ignition coils does not flow to the ECU when both the neutral switch and sidestand switch are set to “OFF”, thereby preventing the spark plugs from producing a spark. However, the engine continues to run under the following conditions:

- The transmission is in gear (the neutral switch circuit is open) and the sidestand is up (the sidestand switch circuit is closed).
- The transmission is in neutral (the neutral switch circuit is closed) and the sidestand is down (the sidestand switch circuit is open).



1. Battery
2. Main fuse
3. Main switch
4. Ignition fuse
5. Engine stop switch
6. Ignition coil
7. Spark plug
8. ECU (engine control unit)
9. Sidestand switch
10. Relay unit (diode)
11. Neutral switch
12. Battery negative lead

EAS27150
TROUBLESHOOTING

The ignition system fails to operate (no spark or intermittent spark).

TIP

- Before troubleshooting, remove the following part(s):

1. Rider seat
2. Passenger seat
3. Left inner panel (FZ8SA)
4. Right inner panel (FZ8SA)
5. Left side panel (FZ8SA)
6. Right side panel (FZ8SA)
7. Front cowling (FZ8SA)
8. Fuel tank
9. Radiator

1. Check the fuses. (Main and ignition) Refer to “CHECKING THE FUSES” on page 8-185.	NG→	Replace the fuse(s).
OK↓		
2. Check the battery. Refer to “CHECKING AND CHARGING THE BATTERY” on page 8-186.	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 ignition spark gap. Refer to “CHECKING THE IGNITION COILS” on page 8-192.	OK→	Ignition system is OK.
NG↓		
5. Check the ignition coils. Refer to “CHECKING THE IGNITION COILS” on page 8-192.	NG→	Replace the ignition coils.
OK↓		
6. Check the crankshaft position sensor. Refer to “CHECKING THE CRANKSHAFT POSITION SENSOR” on page 8-193.	NG→	Replace the crankshaft position sensor.
OK↓		

7. Check the cylinder identification sensor. Refer to “CHECKING THE CYLINDER IDENTIFICATION SENSOR” on page 8-201.	NG→	Replace the cylinder identification sensor.
OK↓		
8. Check the main switch. Refer to “CHECKING THE SWITCHES” on page 8-179.	NG→	Replace the main switch/immobilizer unit.
OK↓		
9. Check the engine stop switch. Refer to “CHECKING THE SWITCHES” on page 8-179.	NG→	Replace the right handlebar switch.
OK↓		
10.Check the neutral switch. Refer to “CHECKING THE SWITCHES” on page 8-179.	NG→	Replace the neutral switch.
OK↓		
11.Check the sidestand switch. Refer to “CHECKING THE SWITCHES” on page 8-179.	NG→	Replace the sidestand switch.
OK↓		
12.Check the clutch switch. Refer to “CHECKING THE SWITCHES” on page 8-179.	NG→	Replace the clutch switch.
OK↓		
13.Check the relay unit (starting circuit cut-off relay). Refer to “CHECKING THE RELAYS” on page 8-189.	NG→	Replace the relay unit.
OK↓		
14.Check the relay unit (diode). Refer to “CHECKING THE RELAY UNIT (DIODE)” on page 8-191.	NG→	Replace the relay unit.
OK↓		
15.Check the lean angle sensor. Refer to “CHECKING THE LEAN ANGLE SENSOR” on page 8-194.	NG→	Replace the lean angle sensor.
OK↓		

16.Check the entire ignition system's wiring.
Refer to "CIRCUIT DIAGRAM" on page 8-1.

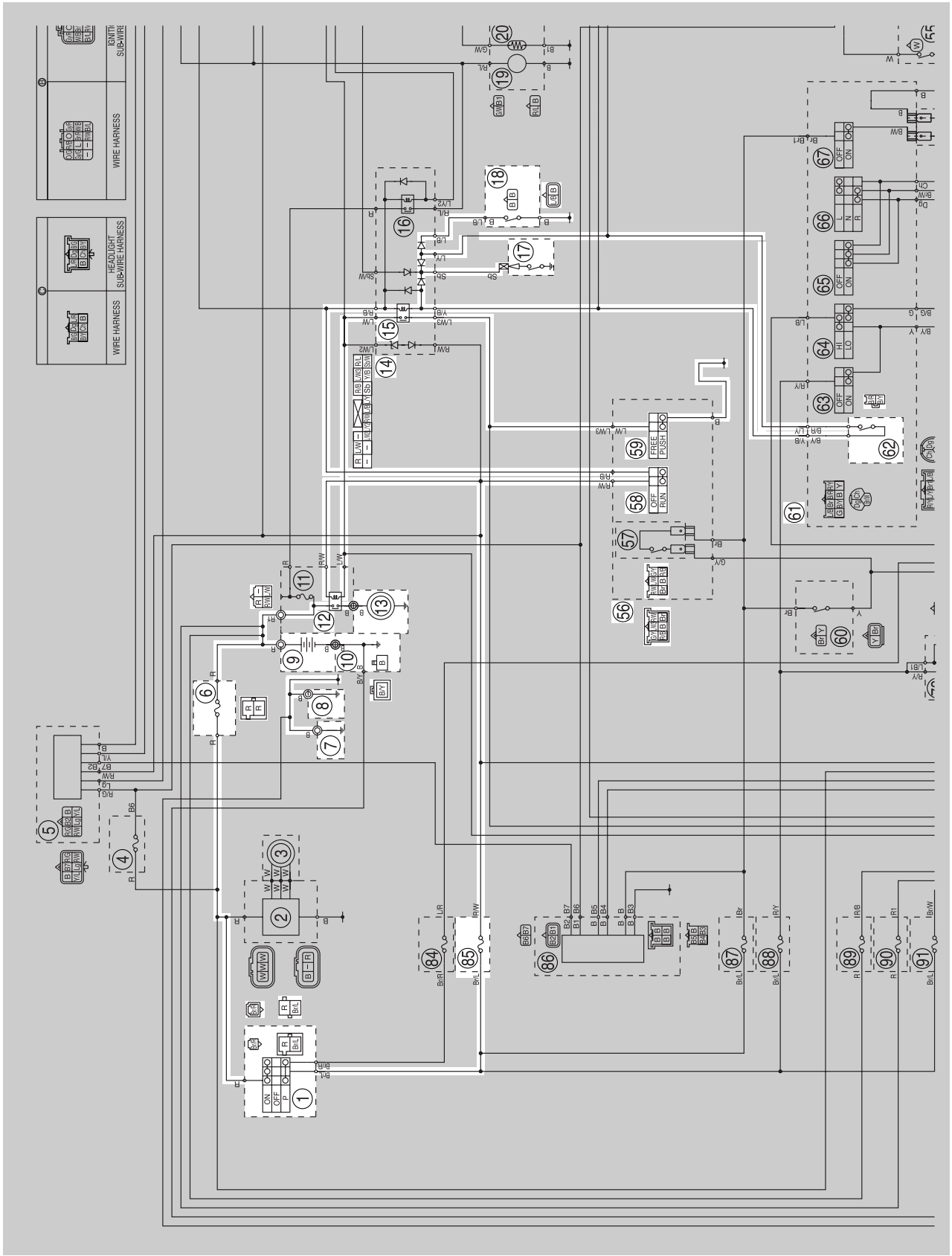
NG→ Properly connect or repair the ignition system's wiring.

OK↓

Replace the ECU.

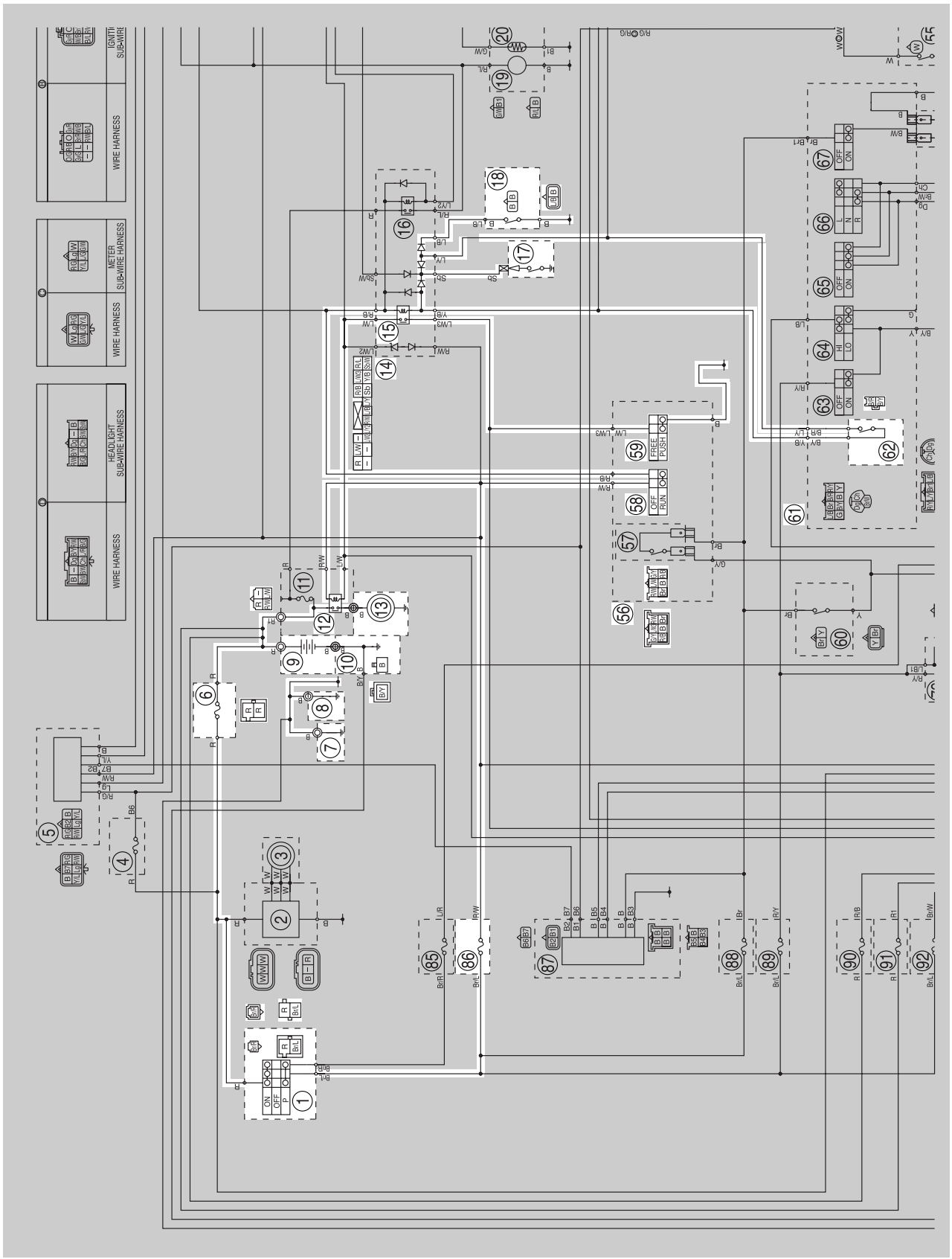
EAS27160
ELECTRIC STARTING SYSTEM

EAS27170
CIRCUIT DIAGRAM



FZ8NA

1. Main switch
6. Main fuse
7. Frame ground
8. Engine ground
9. Battery
10. Negative battery ground lead
12. Starter relay
13. Starter motor
14. Relay unit
15. Starting circuit cut-off relay
17. Neutral switch
18. Sidestand switch
56. Right handlebar switch
58. Engine stop switch
59. Start switch
61. Left handlebar switch
62. Clutch switch
85. Ignition fuse



FZ8SA

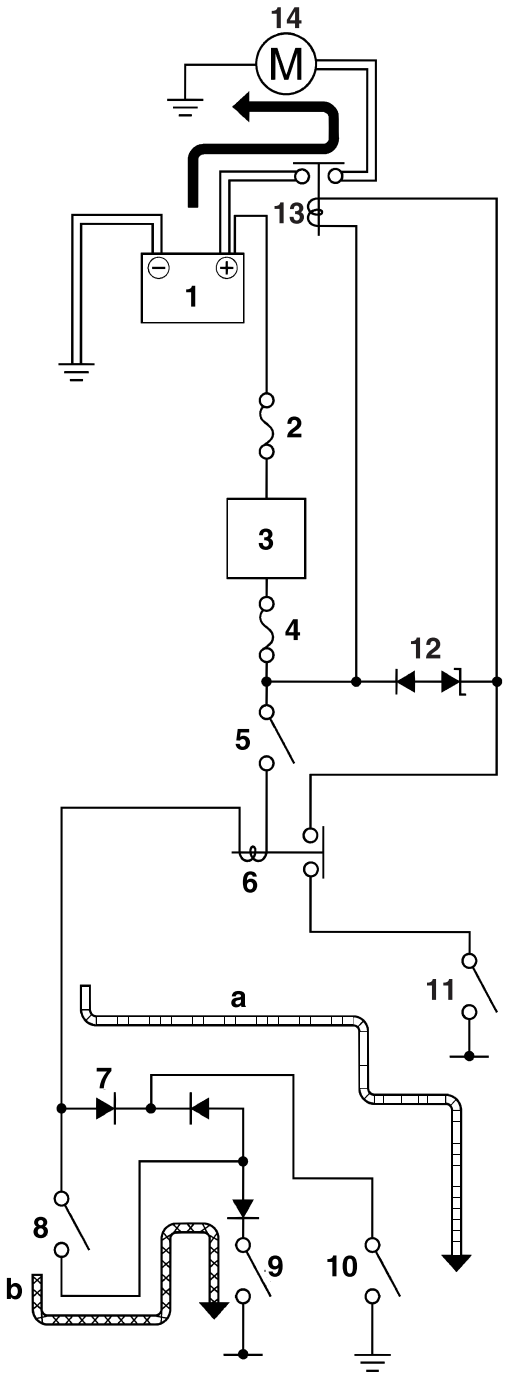
1. Main switch
6. Main fuse
7. Frame ground
8. Engine ground
9. Battery
10. Negative battery ground lead
12. Starter relay
13. Starter motor
14. Relay unit
15. Starting circuit cut-off relay
17. Neutral switch
18. Sidestand switch
56. Right handlebar switch
58. Engine stop switch
59. Start switch
61. Left handlebar switch
62. Clutch switch
86. 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):

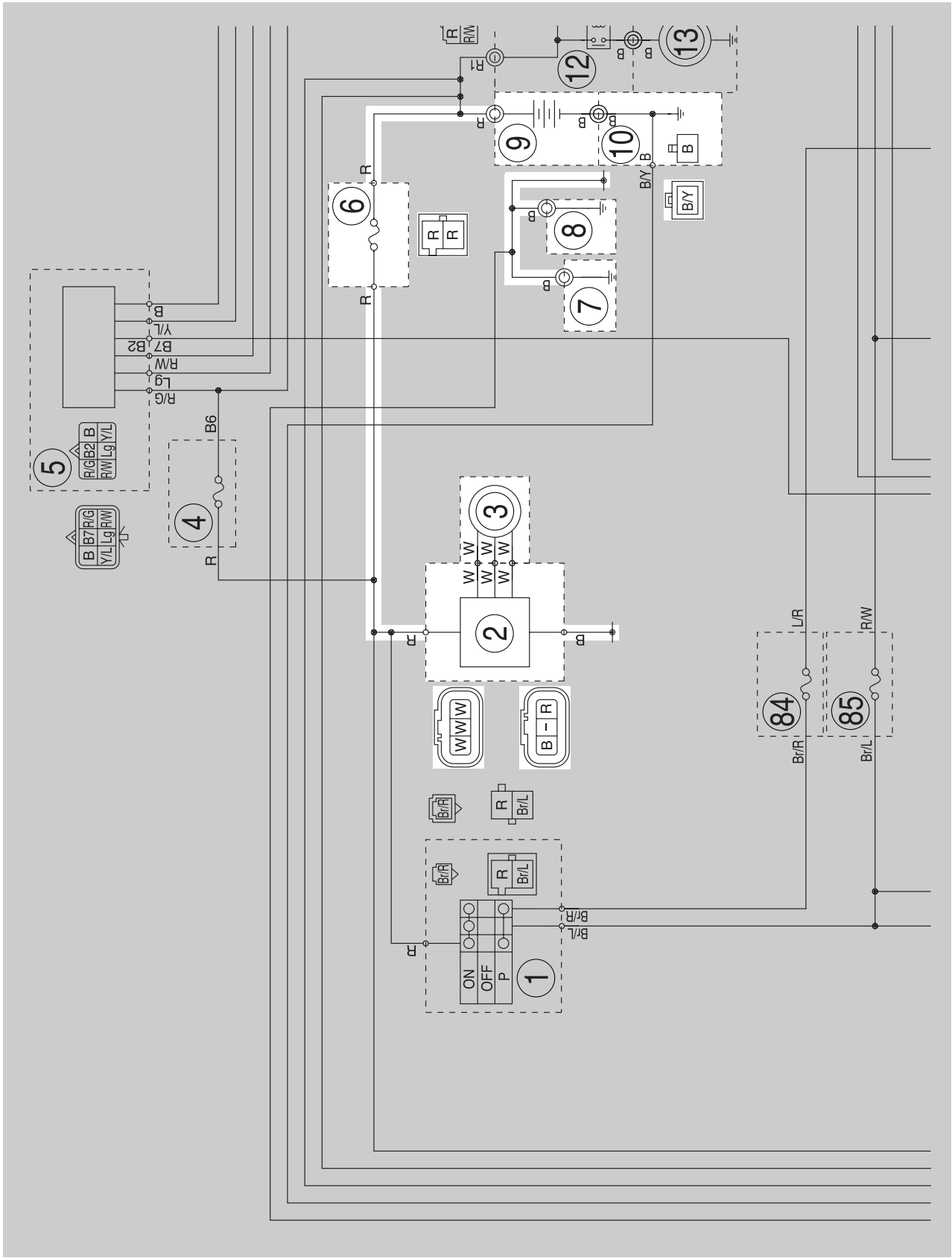
1. Rider seat
2. Passenger seat
3. Left inner panel (FZ8SA)
4. Right inner panel (FZ8SA)
5. Left side panel (FZ8SA)
6. Right side panel (FZ8SA)
7. Front cowling (FZ8SA)
8. Fuel tank
9. Air filter case
10. Throttle bodies

1. Check the fuses. (Main and ignition) Refer to “CHECKING THE FUSES” on page 8-185.	NG→	Replace the fuse(s).
OK↓		
2. Check the battery. Refer to “CHECKING AND CHARGING THE BATTERY” on page 8-186.	NG→	• Clean the battery terminals. • Recharge or replace the battery.
OK↓		
3. Check the starter motor operation. Refer to “CHECKING THE STARTER MOTOR OPERATION” on page 8-194.	OK→	Starter motor is OK. Perform the electric starting system troubleshooting, starting with step 5.
NG↓		
4. Check the starter motor. Refer to “CHECKING THE STARTER MOTOR” on page 5-43.	NG→	Repair or replace the starter motor.
OK↓		
5. Check the relay unit (starting circuit cut-off relay). Refer to “CHECKING THE RELAYS” on page 8-189.	NG→	Replace the relay unit.
OK↓		
6. Check the relay unit (diode). Refer to “CHECKING THE RELAY UNIT (DIODE)” on page 8-191.	NG→	Replace the relay unit.
OK↓		

7. Check the starter relay. Refer to “CHECKING THE RELAYS” on page 8-189.	NG→	Replace the starter relay.
OK↓		
8. Check the main switch. Refer to “CHECKING THE SWITCHES” on page 8-179.	NG→	Replace the main switch/immobilizer unit.
OK↓		
9. Check the engine stop switch. Refer to “CHECKING THE SWITCHES” on page 8-179.	NG→	Replace the right handlebar switch.
OK↓		
10.Check the neutral switch. Refer to “CHECKING THE SWITCHES” on page 8-179.	NG→	Replace the neutral switch.
OK↓		
11.Check the sidestand switch. Refer to “CHECKING THE SWITCHES” on page 8-179.	NG→	Replace the sidestand switch.
OK↓		
12.Check the clutch switch. Refer to “CHECKING THE SWITCHES” on page 8-179.	NG→	Replace the clutch switch.
OK↓		
13.Check the start switch. Refer to “CHECKING THE SWITCHES” on page 8-179.	NG→	Replace the right handlebar switch.
OK↓		
14.Check the entire starting system’s wiring. Refer to “CIRCUIT DIAGRAM” on page 8-11.	NG→	Properly connect or repair the starting system’s wiring.
OK↓		
The starting system circuit is OK.		

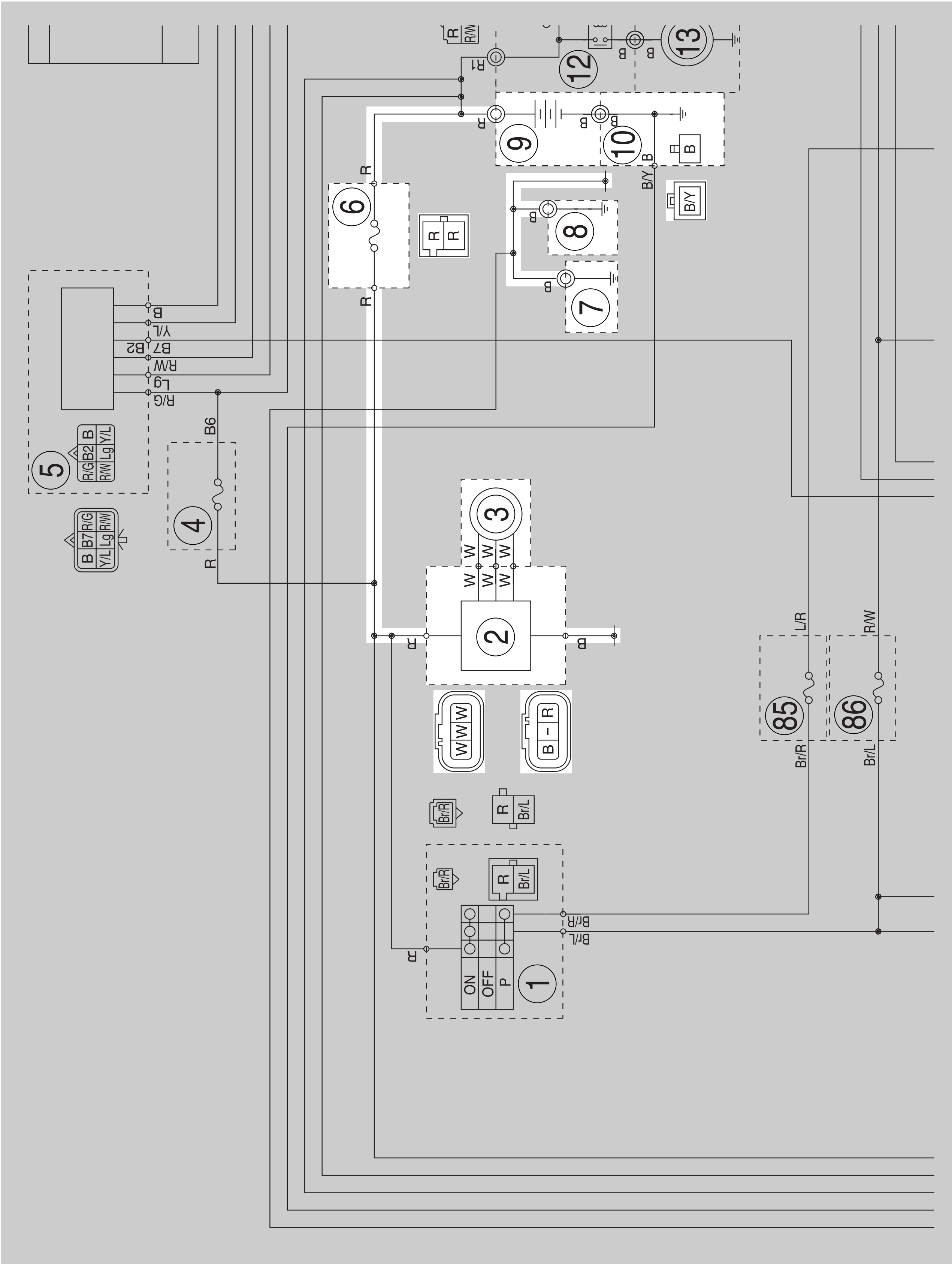
EAS27200
CHARGING SYSTEM

EAS27210
CIRCUIT DIAGRAM



FZ8NA

2. Rectifier/regulator
3. AC magneto
6. Main fuse
7. Frame ground
8. Engine ground
9. Battery
10. Negative battery ground lead


1
2
3
4
5
6
7
8
9
10
12
13
85
86
ON
OFF
P

FZ8SA

2. Rectifier/regulator
3. AC magneto
6. Main fuse
7. Frame ground
8. Engine ground
9. Battery
10. Negative battery ground lead

EAS27230
TROUBLESHOOTING

The battery is not being charged.

TIP

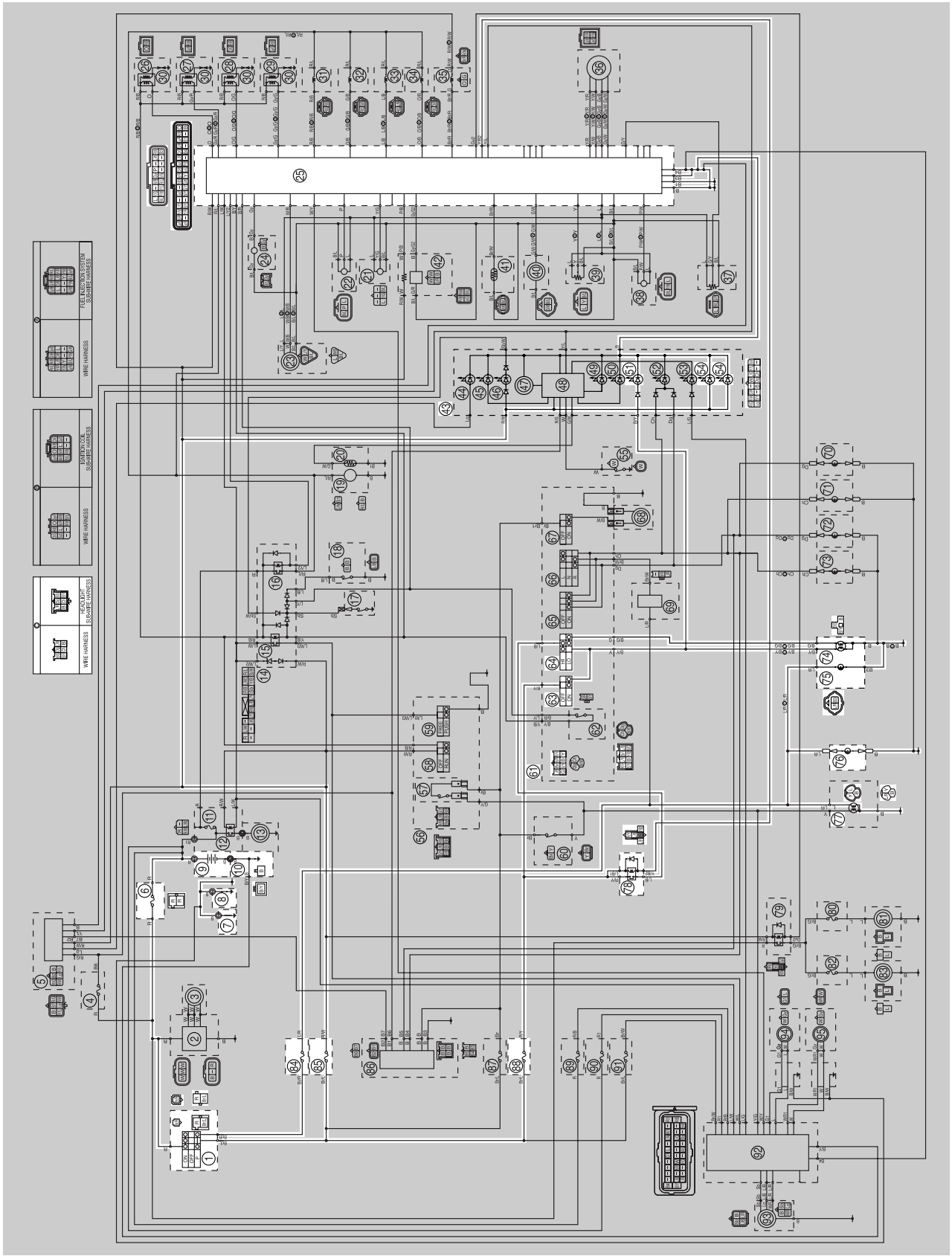
- Before troubleshooting, remove the following part(s):

1. Rider seat
2. Passenger seat

1. Check the fuse. (Main) Refer to “CHECKING THE FUSES” on page 8-185.	NG→	Replace the fuse.
OK↓		
2. Check the battery. Refer to “CHECKING AND CHARGING THE BATTERY” on page 8-186.	NG→	• Clean the battery terminals. • Recharge or replace the battery.
OK↓		
3. Check the stator coil. Refer to “CHECKING THE STATOR COIL” on page 8-195.	NG→	Replace the stator coil assembly.
OK↓		
4. Check the rectifier/regulator. Refer to “CHECKING THE RECTIFIER/REGULATOR” on page 8-195.	NG→	Replace the rectifier/regulator.
OK↓		
5. Check the entire charging system’s wiring. Refer to “CIRCUIT DIAGRAM” on page 8-19.	NG→	Properly connect or repair the charging system’s wiring.
OK↓		
The charging system circuit is OK.		

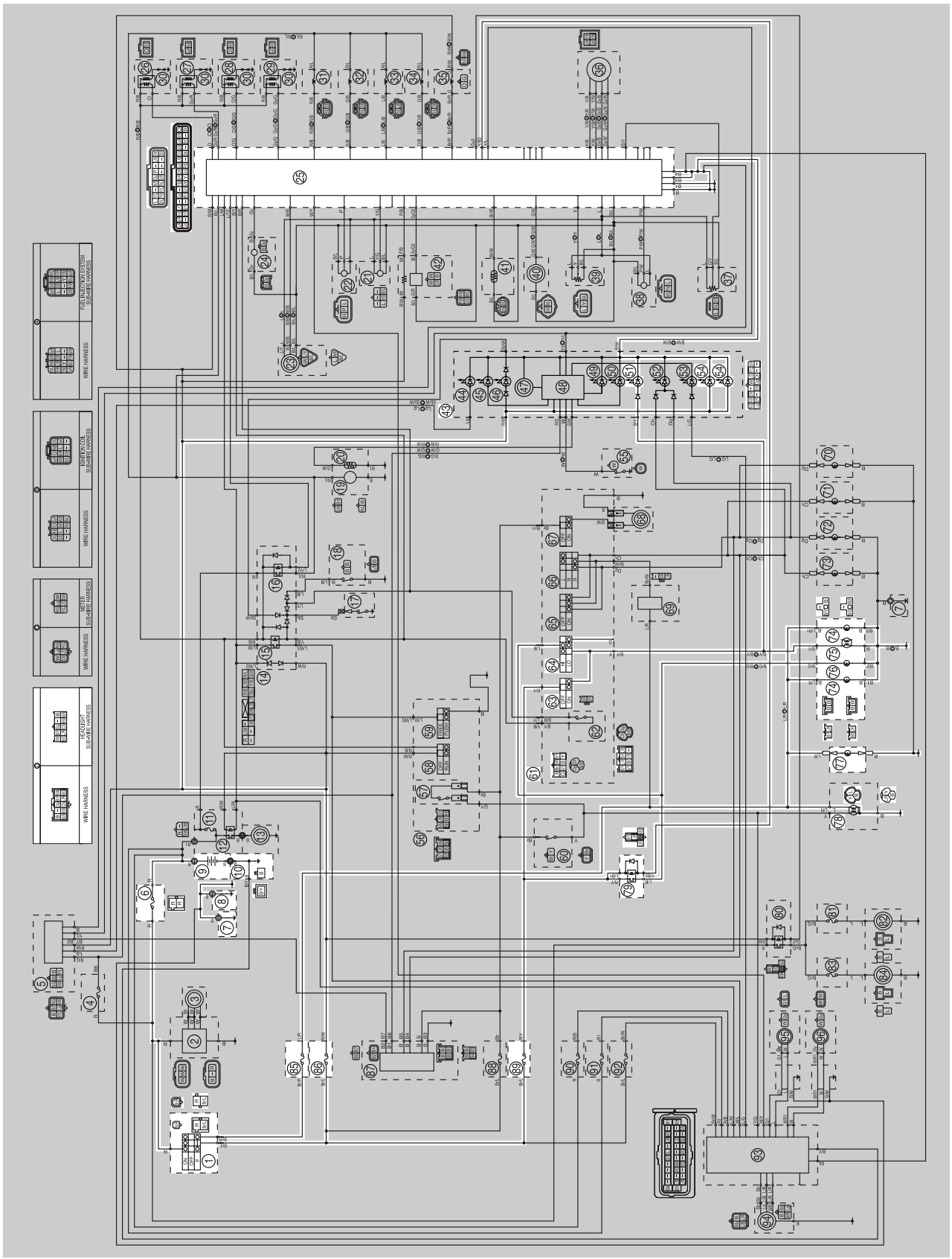
EAS27240
LIGHTING SYSTEM

EAS27250
CIRCUIT DIAGRAM



FZ8NA

1. Main switch
6. Main fuse
7. Frame ground
8. Engine ground
9. Battery
10. Negative battery ground lead
25. ECU (engine control unit)
43. Meter assembly
51. High beam indicator light
54. Meter light
61. Left handlebar switch
63. Pass switch
64. Dimmer switch
74. Headlight
75. Auxiliary light
76. License plate light
77. Tail/brake light
78. Headlight relay (on/off)
84. Taillight fuse
85. Ignition fuse
88. Headlight fuse



FZ8SA

1. Main switch
6. Main fuse
7. Frame ground
8. Engine ground
9. Battery
10. Negative battery ground lead
25. ECU (engine control unit)
43. Meter assembly
51. High beam indicator light
54. Meter light
61. Left handlebar switch
63. Pass switch
64. Dimmer switch
74. Auxiliary light
75. Headlight (high beam)
76. Headlight (low beam)
77. License plate light
78. Tail/brake light
79. Headlight relay (on/off)
85. Taillight fuse
86. Ignition fuse
89. Headlight fuse

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):

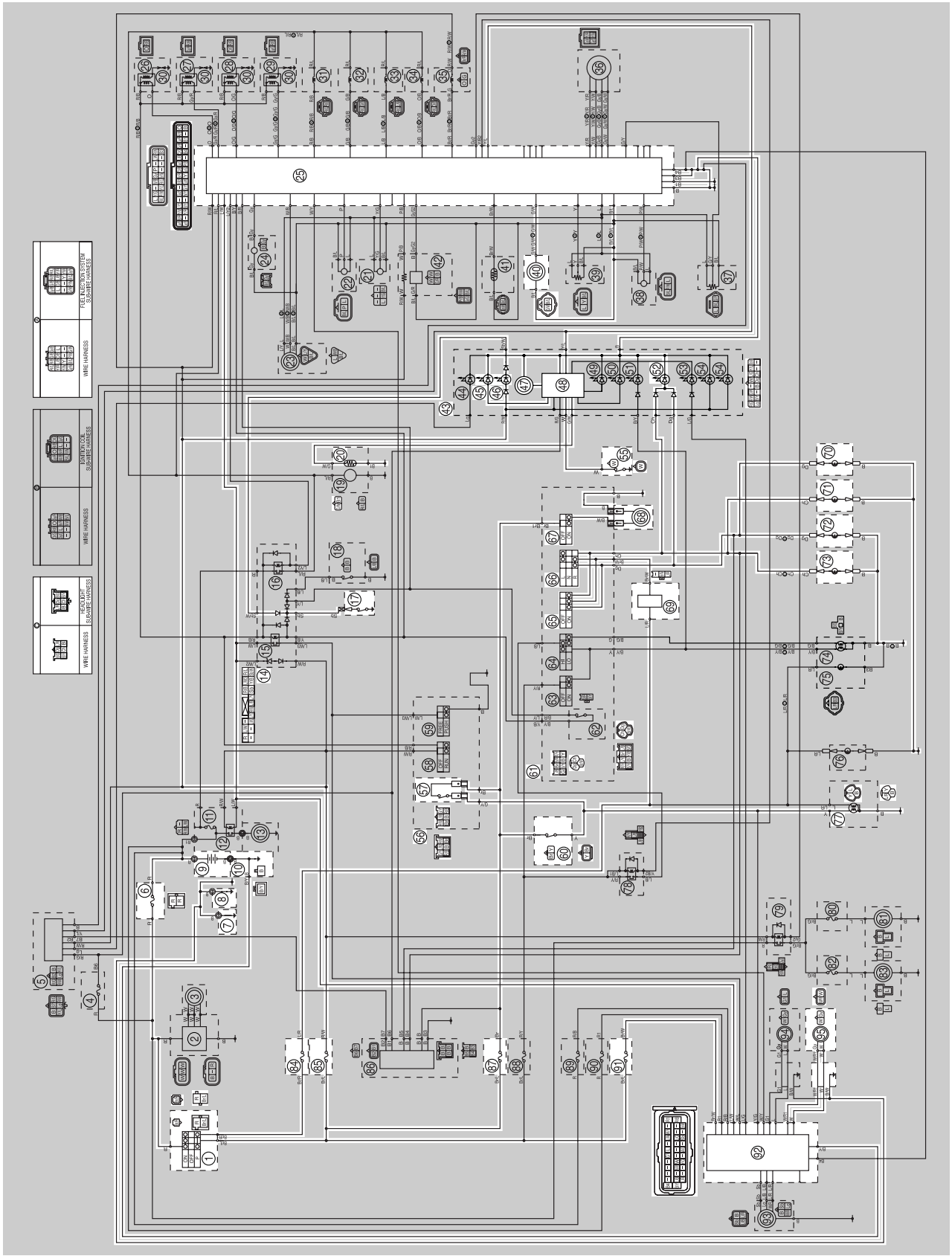
1. Rider seat
2. Passenger seat
3. Left inner panel (FZ8SA)
4. Right inner panel (FZ8SA)
5. Left side panel (FZ8SA)
6. Right side panel (FZ8SA)
7. Front cowling (FZ8SA)
8. Headlight assembly (FZ8SA)
9. Fuel tank

1. Check the each bulbs and bulb sockets condition. Refer to “CHECKING THE BULBS AND BULB SOCKETS” on page 8-184.	NG→	Replace the bulb(s) and bulb socket(s).
OK↓		
2. Check the fuses. (Main, headlight, ignition (FZ8SA) and taillight) Refer to “CHECKING THE FUSES” on page 8-185.	NG→	Replace the fuse(s).
OK↓		
3. Check the battery. Refer to “CHECKING AND CHARGING THE BATTERY” on page 8-186.	NG→	• Clean the battery terminals. • Recharge or replace the battery.
OK↓		
4. Check the main switch. Refer to “CHECKING THE SWITCHES” on page 8-179.	NG→	Replace the main switch/immobilizer unit.
OK↓		
5. Check the dimmer switch. Refer to “CHECKING THE SWITCHES” on page 8-179.	NG→	The dimmer switch is faulty. Replace the left handlebar switch.
OK↓		
6. Check the pass switch. Refer to “CHECKING THE SWITCHES” on page 8-179.	NG→	The pass switch is faulty. Replace the left handlebar switch.
OK↓		

7. Check the headlight relay (on/off). Refer to “CHECKING THE RELAYS” on page 8-189.	NG→	Replace the headlight relay.
OK↓		
8. Check the entire lighting system’s wiring. Refer to “CIRCUIT DIAGRAM” on page 8-25.	NG→	Properly connect or repair the lighting system’s wiring.
OK↓		
Replace the ECU or meter assembly.		

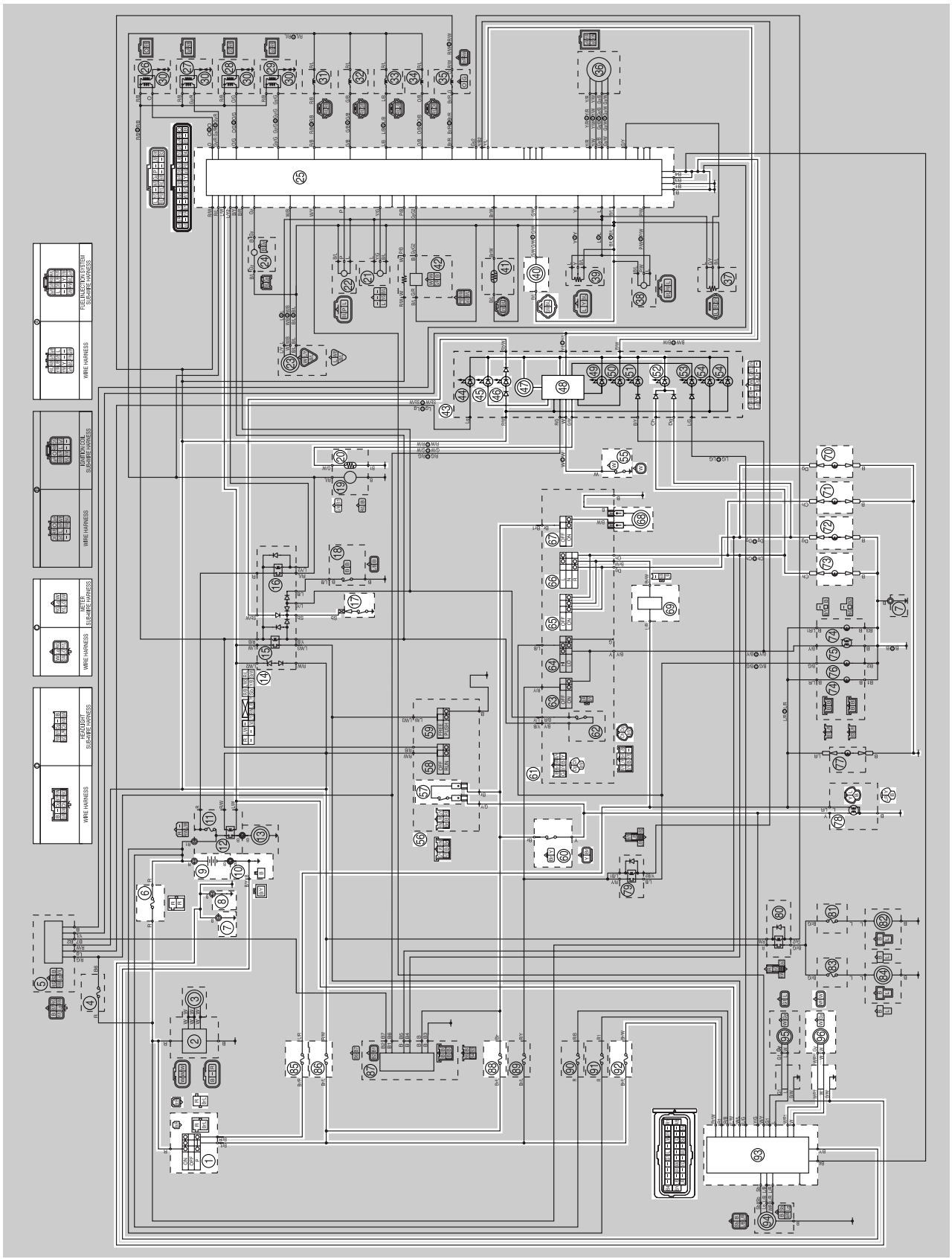
EAS27270
SIGNALING SYSTEM

EAS27280
CIRCUIT DIAGRAM



FZ8NA

1. Main switch
6. Main fuse
7. Frame ground
8. Engine ground
9. Battery
10. Negative battery ground lead
14. Relay unit
17. Neutral switch
20. Fuel sender
25. ECU (engine control unit)
40. Coolant temperature sensor
43. Meter assembly
45. Oil level warning light
46. Neutral indicator light
47. Tachometer
48. Multi-function meter
52. Turn signal indicator light
55. Oil level switch
56. Right handlebar switch
57. Front brake light switch
60. Rear brake light switch
61. Left handlebar switch
65. Hazard switch
66. Turn signal switch
67. Horn switch
68. Horn
69. Turn signal/hazard relay
70. Rear right turn signal light
71. Rear left turn signal light
72. Front right turn signal light
73. Front left turn signal light
77. Tail/brake light
84. Taillight fuse
85. Ignition fuse
87. Signal fuse
91. ABS ECU fuse
92. ABS ECU (electronic control unit)
95. Rear wheel sensor


FUEL INJECTION SYSTEM SUB-WIRE HARNESS
WIRE HARNESS
IGNITION COIL SUB-WIRE HARNESS
WIRE HARNESS
METER SUB-WIRE HARNESS
WIRE HARNESS
HEADLIGHT SUB-WIRE HARNESS
WIRE HARNESS

FZ8SA

1. Main switch
6. Main fuse
7. Frame ground
8. Engine ground
9. Battery
10. Negative battery ground lead
14. Relay unit
17. Neutral switch
20. Fuel sender
25. ECU (engine control unit)
40. Coolant temperature sensor
43. Meter assembly
45. Oil level warning light
46. Neutral indicator light
47. Tachometer
48. Multi-function meter
52. Turn signal indicator light
55. Oil level switch
56. Right handlebar switch
57. Front brake light switch
60. Rear brake light switch
61. Left handlebar switch
65. Hazard switch
66. Turn signal switch
67. Horn switch
68. Horn
69. Turn signal/hazard relay
70. Rear right turn signal light
71. Rear left turn signal light
72. Front right turn signal light
73. Front left turn signal light
78. Tail/brake light
85. Taillight fuse
86. Ignition fuse
88. Signal fuse
92. ABS ECU fuse
93. ABS ECU (electronic control unit)
96. Rear wheel sensor

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. Rider seat
2. Passenger seat
3. Left inner panel (FZ8SA)
4. Right inner panel (FZ8SA)
5. Left side panel (FZ8SA)
6. Right side panel (FZ8SA)
7. Front cowling (FZ8SA)
8. Fuel tank
9. Air filter case
10. Throttle bodies

1. Check the fuses. (Main, ignition, signal and taillight) Refer to “CHECKING THE FUSES” on page 8-185.	NG→	Replace the fuse(s).
OK↓		
2. Check the battery. Refer to “CHECKING AND CHARGING THE BATTERY” on page 8-186.	NG→	• Clean the battery terminals. • Recharge or replace the battery.
OK↓		
3. Check the main switch. Refer to “CHECKING THE SWITCHES” on page 8-179.	NG→	Replace the main switch/immobilizer unit.
OK↓		
4. Check the entire signaling system’s wiring. Refer to “CIRCUIT DIAGRAM” on page 8-31.	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 8-179.

NG→ Replace the left handlebar switch.

OK↓

2. Check the horn.
   Refer to “CHECKING THE HORN” on page 8-196.

NG→ Replace the horn.

OK↓

3. Check the entire signaling system’s wiring.
   Refer to “CIRCUIT DIAGRAM” on page 8-31.

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 8-184.

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 8-179.

NG→ Replace the front brake light switch.

OK↓

3. Check the rear brake light switch.
   Refer to “CHECKING THE SWITCHES” on page 8-179.

NG→ Replace the rear brake light switch.

OK↓

4. Check the entire signaling system’s wiring.
   Refer to “CIRCUIT DIAGRAM” on page 8-31.

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 light bulb and socket.
   Refer to “CHECKING THE BULBS AND BULB SOCKETS” on page 8-184.

NG→ Replace the turn signal light bulb(s), socket(s) or both.

OK↓

2. Check the turn signal switch.
   Refer to “CHECKING THE SWITCHES” on page 8-179.

NG→ Replace the left handlebar switch.

OK↓

3. Check the hazard switch.
   Refer to “CHECKING THE SWITCHES” on page 8-179.

NG→ Replace the left handlebar switch.

OK↓

4. Check the turn signal/hazard relay.
   Refer to “CHECKING THE TURN SIGNAL/HAZARD RELAY” on page 8-190.

NG→ Replace the turn signal/hazard relay.

OK↓

5. Check the entire signaling system’s wiring.
   Refer to “CIRCUIT DIAGRAM” on page 8-31.

NG→ Properly connect or repair the signaling system’s wiring.

OK↓

This circuit is OK.

The neutral indicator light fails to come on.

1. Check the neutral switch.
   Refer to “CHECKING THE SWITCHES” on page 8-179.

NG→ Replace the neutral switch.

OK↓

2. Check the relay unit (diode).
   Refer to “CHECKING THE RELAY UNIT (DIODE)” on page 8-191.

NG→ Replace the relay unit.

OK↓

3. Check the entire signaling system's wiring. Refer to "CIRCUIT DIAGRAM" on page 8-31.	NG→	Properly connect or repair the signaling system's wiring.

OK↓

Replace the meter assembly.

The oil level warning light fails to come on.

1. Check the oil level switch. Refer to "CHECKING THE SWITCHES" on page 8-179.	NG→	Replace the oil level switch.

OK↓

2. Check the entire signaling system's wiring. Refer to "CIRCUIT DIAGRAM" on page 8-31.	NG→	Properly connect or repair the signaling system's wiring.

OK↓

Replace the meter assembly.

The fuel level warning light fails to come on.

1. Check the fuel sender. Refer to "CHECKING THE FUEL SENDER" on page 8-197.	NG→	Replace the fuel pump assembly.

OK↓

2. Check the entire signaling system's wiring. Refer to "CIRCUIT DIAGRAM" on page 8-31.	NG→	Properly connect or repair the signaling system's wiring.

OK↓

Replace the ECU or meter assembly.

The speedometer fails to operate.

1. Check the rear wheel sensor. Refer to "MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR" on page 4-25.	NG→	Replace the rear wheel sensor.

OK↓

2. Check the entire speed sensor wiring. Refer to TIP.	NG→	Properly connect or repair the speed sensor wiring.

OK↓

Replace the hydraulic unit assembly, ECU, meter assembly.

TIP

Repair or replace if there is an open or short circuit.
- Between rear wheel sensor coupler and ABS ECU coupler.
  (White/red–White/red)
  (White–White)
- Between ABS ECU coupler and ECU coupler.
  (Blue/white–Blue/white)
  (White/yellow–White/yellow)
- Between ECU coupler and meter assembly.
  (Yellow/blue–Yellow/blue)

The coolant temperature warning light fails to come on.

1. Check the coolant temperature sensor. Refer to “CHECKING THE COOLANT TEMPERATURE SENSOR” on page 8-198.	NG→	Replace the coolant temperature sensor.

OK↓

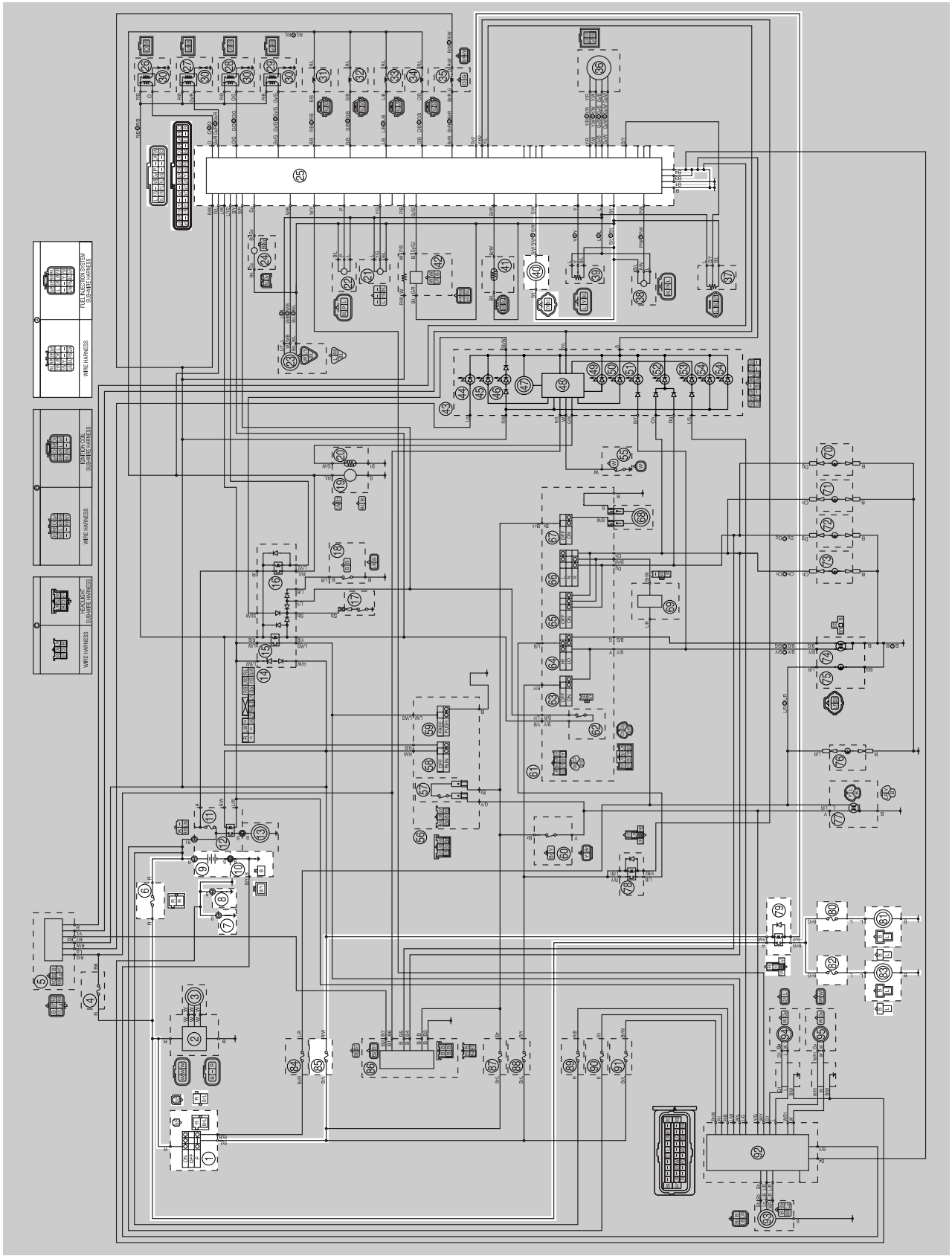
2. Check the entire signaling system’s wiring. Refer to “CIRCUIT DIAGRAM” on page 8-31.	NG→	Properly connect or repair the signaling system’s wiring.

OK↓

Replace the ECU or meter assembly.

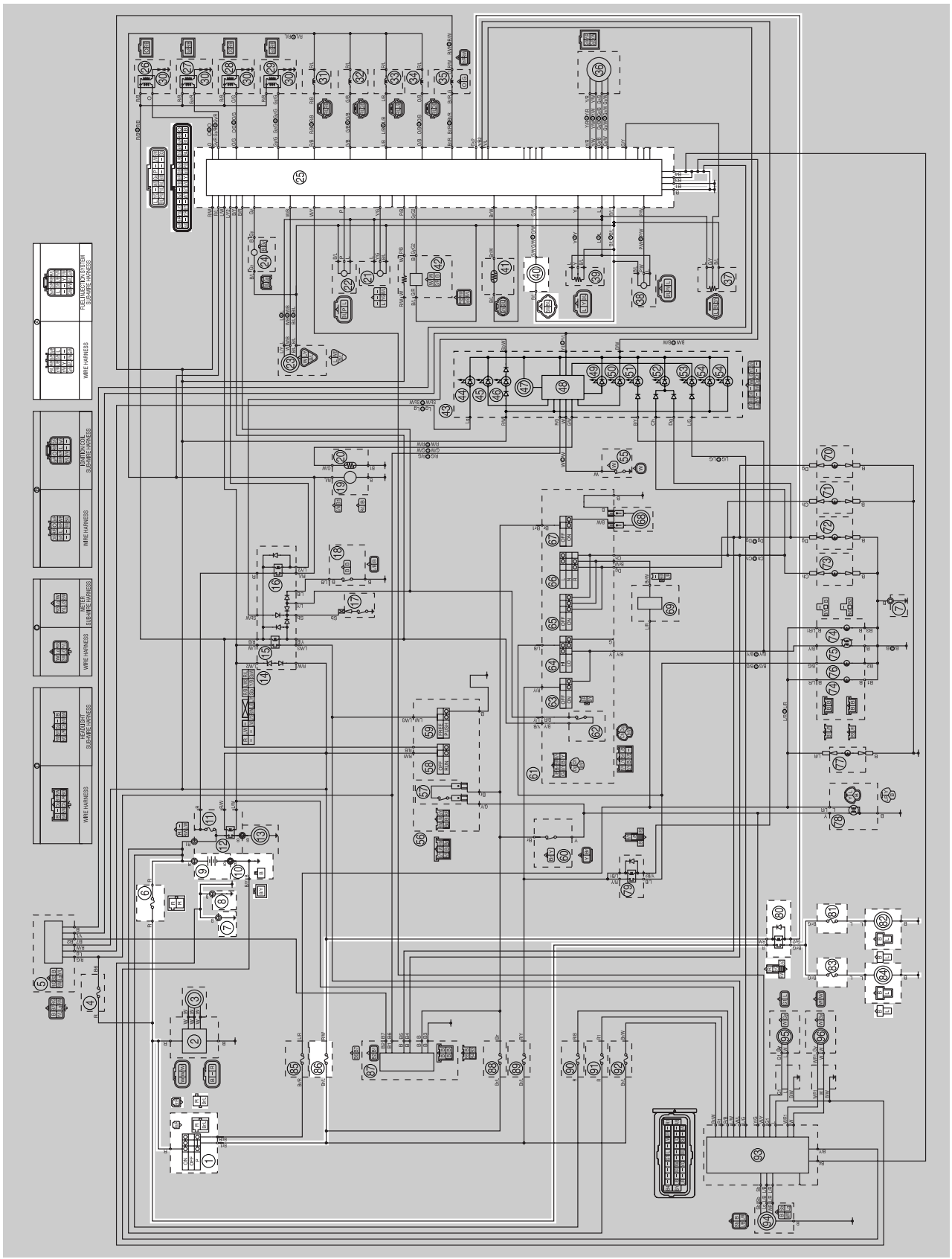
EAS27300
COOLING SYSTEM

EAS27310
CIRCUIT DIAGRAM



FZ8NA

1. Main switch
6. Main fuse
7. Frame ground
8. Engine ground
9. Battery
10. Negative battery ground lead
25. ECU (engine control unit)
40. Coolant temperature sensor
79. Radiator fan motor relay
80. Right radiator fan motor fuse
81. Right radiator fan motor
82. Left radiator fan motor fuse
83. Left radiator fan motor
85. Ignition fuse


FUEL INJECTION SYSTEM SUB-WIRE HARNESS
WIRE HARNESS
IGNITION COIL SUB-WIRE HARNESS
WIRE HARNESS
METER SUB-WIRE HARNESS
WIRE HARNESS
HEADLIGHT SUB-WIRE HARNESS
WIRE HARNESS

FZ8SA

1. Main switch
6. Main fuse
7. Frame ground
8. Engine ground
9. Battery
10. Negative battery ground lead
25. ECU (engine control unit)
40. Coolant temperature sensor
80. Radiator fan motor relay
81. Right radiator fan motor fuse
82. Right radiator fan motor
83. Left radiator fan motor fuse
84. Left radiator fan motor
86. Ignition fuse

EAS27320
TROUBLESHOOTING

TIP

• Before troubleshooting, remove the following part(s):
1. Rider seat
2. Passenger seat
3. Left inner panel (FZ8SA)
4. Right inner panel (FZ8SA)
5. Left side panel (FZ8SA)
6. Right side panel (FZ8SA)
7. Front cowling (FZ8SA)
8. Fuel tank
9. Air filter case
10. Throttle bodies

1. Check the fuses. (Main, ignition and radiator fan motor) Refer to “CHECKING THE FUSES” on page 8-185.	NG→	Replace the fuse(s).
OK↓		
2. Check the battery. Refer to “CHECKING AND CHARGING THE BATTERY” on page 8-186.	NG→	• Clean the battery terminals. • Recharge or replace the battery.
OK↓		
3. Check the main switch. Refer to “CHECKING THE SWITCHES” on page 8-179.	NG→	Replace the main switch/immobilizer unit.
OK↓		
4. Check the radiator fan motor. Refer to “CHECKING THE RADIATOR FAN MOTORS” on page 8-198.	NG→	Replace the radiator fan motor(s).
OK↓		
5. Check the radiator fan motor relay. Refer to “CHECKING THE RELAYS” on page 8-189.	NG→	Replace the radiator fan motor relay.
OK↓		
6. Check the coolant temperature sensor. Refer to “CHECKING THE COOLANT TEMPERATURE SENSOR” on page 8-198.	NG→	Replace the coolant temperature sensor.
OK↓		

7. Check the entire cooling system's wiring.
   Refer to "CIRCUIT DIAGRAM" on page 8-41.

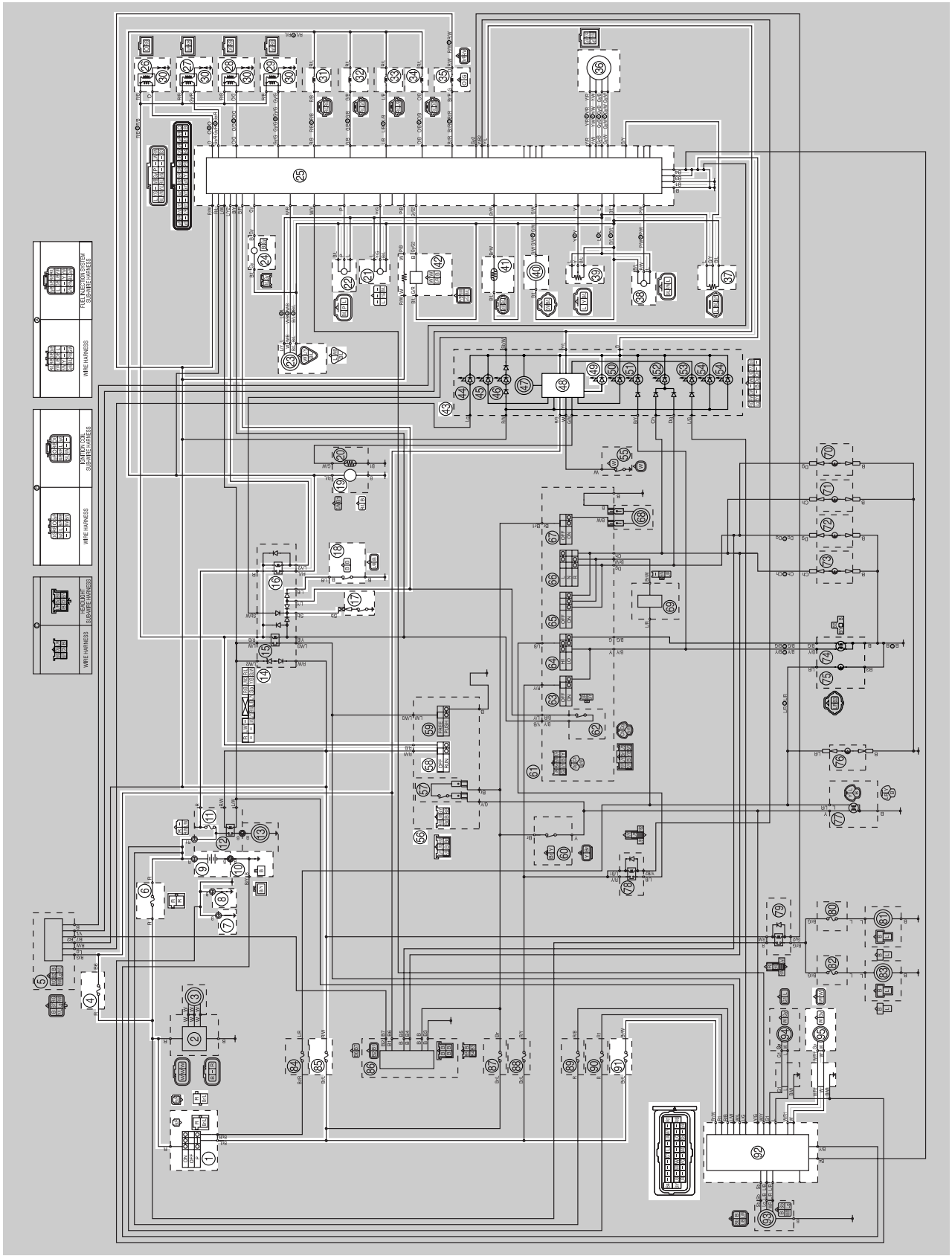
NG→ Properly connect or repair the cooling system's wiring.

OK↓

Replace the ECU.

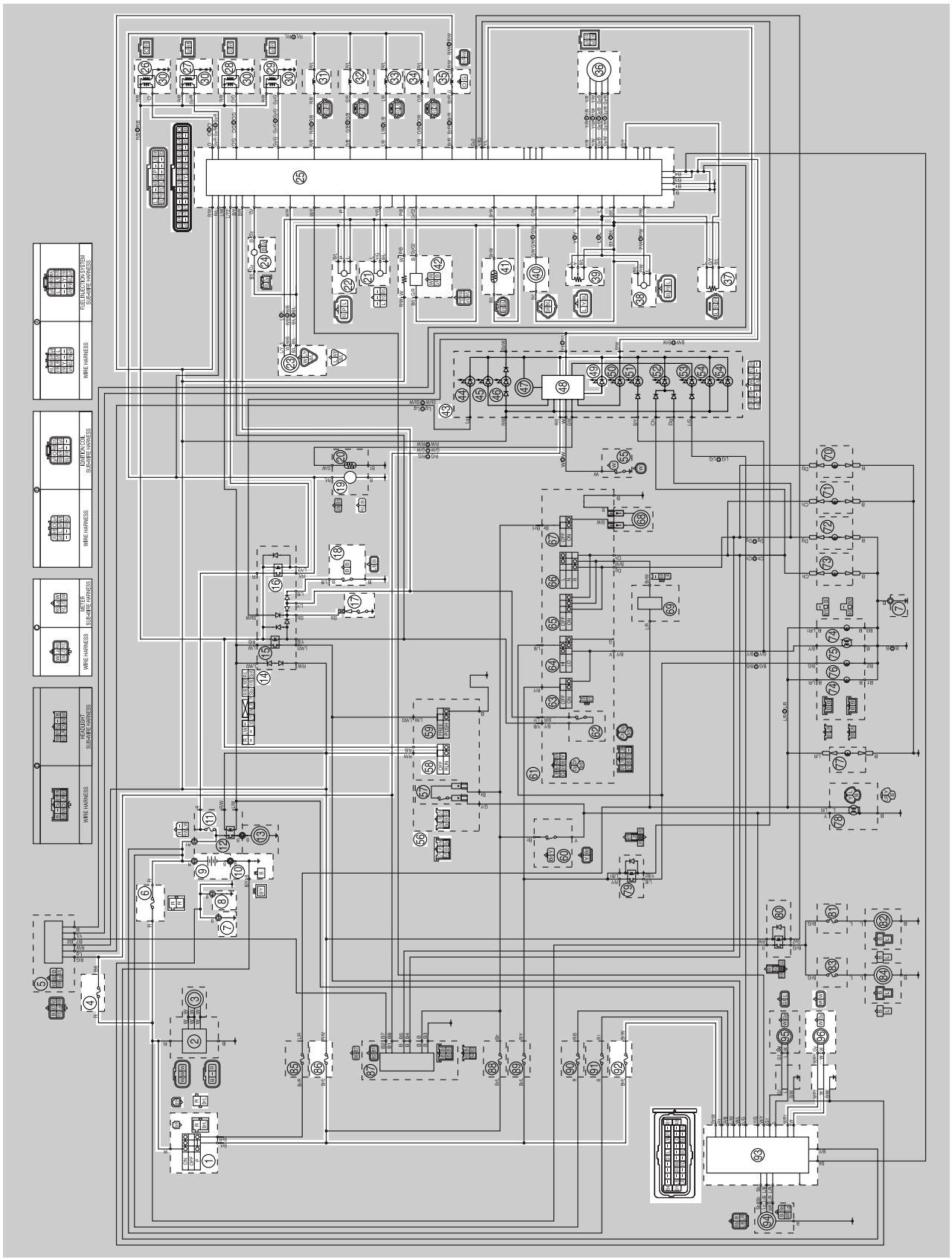
EAS27331
FUEL INJECTION SYSTEM

EAS27340
CIRCUIT DIAGRAM



FZ8NA

1. Main switch
4. Backup fuse
6. Main fuse
7. Frame ground
8. Engine ground
9. Battery
10. Negative battery ground lead
11. Fuel injection system fuse
14. Relay unit
16. Fuel pump relay
17. Neutral switch
18. Sidestand switch
19. Fuel pump
21. Lean angle sensor
22. Atmospheric pressure sensor
23. Cylinder identification sensor
24. Crankshaft position sensor
25. ECU (engine control unit)
26. Ignition coil #1
27. Ignition coil #2
28. Ignition coil #3
29. Ignition coil #4
30. Spark plug
31. Injector #1
32. Injector #2
33. Injector #3
34. Injector #4
35. Air induction system solenoid
36. Sub-throttle servo motor
37. Sub-throttle position sensor
38. Intake air pressure sensor
39. Throttle position sensor
40. Coolant temperature sensor
41. Intake air temperature sensor
42. O_2 sensor
43. Meter assembly
48. Multi-function meter
49. Engine trouble warning light
56. Right handlebar switch
58. Engine stop switch
85. Ignition fuse
91. ABS ECU fuse
92. ABS ECU (electronic control unit)
95. Rear wheel sensor



FZ8SA

1. Main switch
4. Backup fuse
6. Main fuse
7. Frame ground
8. Engine ground
9. Battery
10. Negative battery ground lead
11. Fuel injection system fuse
14. Relay unit
16. Fuel pump relay
17. Neutral switch
18. Sidestand switch
19. Fuel pump
21. Lean angle sensor
22. Atmospheric pressure sensor
23. Cylinder identification sensor
24. Crankshaft position sensor
25. ECU (engine control unit)
26. Ignition coil #1
27. Ignition coil #2
28. Ignition coil #3
29. Ignition coil #4
30. Spark plug
31. Injector #1
32. Injector #2
33. Injector #3
34. Injector #4
35. Air induction system solenoid
36. Sub-throttle servo motor
37. Sub-throttle position sensor
38. Intake air pressure sensor
39. Throttle position sensor
40. Coolant temperature sensor
41. Intake air temperature sensor
42. O_2 sensor
43. Meter assembly
48. Multi-function meter
49. Engine trouble warning light
56. Right handlebar switch
58. Engine stop switch
86. Ignition fuse
92. ABS ECU fuse
93. ABS ECU (electronic control unit)
96. Rear wheel sensor

EAS27351
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 number 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 while 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/odometer/tripmeter/fuel reserve tripmeter 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 fuel injection system operation

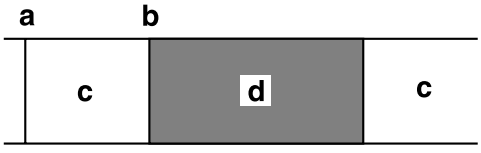
Warning light indication	ECU operation	Fuel injection operation	Vehicle operation
Flashing*	Warning provided when unable to start engine	Operation stopped	Cannot be operated
Remains on	Malfunction detected	Operated with substitute characteristics in accordance with the description of the malfunction	Can or cannot be operated depending on the fault code

* The warning light flashes when any one of the following conditions is present and the start switch is pushed:

11:	Cylinder identification sensor	30:	Lean angle sensor (latch up detected)
12:	Crankshaft position sensor	41:	Lean angle sensor (open or short circuit)
19:	Sidestand switch (open circuit in the wire to the ECU)	50:	ECU internal malfunction (faulty ECU memory)

Checking the engine trouble warning light

The engine trouble warning light comes on for around 2 seconds after the main switch has been set to “ON” and it comes on while the start switch is being pushed. If the warning light does not come on under these conditions, the warning light (LED) may be defective.



a. Main switch “OFF”
b. Main switch “ON”
c. Engine trouble warning light off
d. Engine trouble warning light on for around 2 seconds

ECU detects an abnormal signal from a sensor

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 operating or stop operating, depending on the conditions.

EAS30580
TROUBLESHOOTING METHOD

The engine operation is not normal and the engine trouble warning light comes on.

1. Check:
   • Fault code number

▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼

a. Check the fault code number displayed on the meter.
b. Identify the faulty system with the fault code number.
c. Identify the probable cause of the malfunction.

▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲

2. Check and repair the probable cause of the malfunction.

Fault code No.	No fault code No.
Check and repair. Refer to “TROUBLESHOOTING DETAILS” on page 8-55. Monitor the operation of the sensors and actuators in the diagnostic mode. Refer to “TROUBLESHOOTING DETAILS” on page 8-55.	Check and repair.

3. Perform the reinstatement action for the fuel injection system.
   Refer to “Reinstatement method” in the appropriate table in “TROUBLESHOOTING DETAILS” on page 8-55.
4. Set the main switch to “OFF”, then to “ON” again, and then check that no fault code number is displayed.

TIP
If another fault code number is displayed, repeat steps (1) to (4) until no fault code number is displayed.

5. Erase the malfunction history in the diagnostic mode. Refer to “TROUBLESHOOTING DETAILS” on page 8-55.

TIP
Setting the main switch to “OFF” will not erase the malfunction history.

The engine operation is not normal, but the engine trouble warning light does not come on.

1. Check the operation of the following sensors and actuators in the diagnostic mode. Refer to “TROUBLESHOOTING DETAILS” on page 8-55.

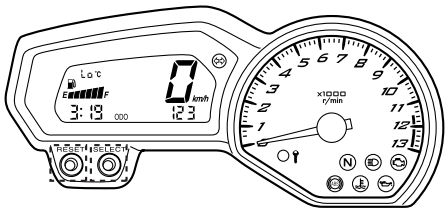
d:01: Throttle position sensor (throttle angle)
d:02: Atmospheric pressure sensor
d:03: Intake air pressure sensor
d:05: Intake air temperature sensor
d:06: Coolant temperature sensor
d:07: Speed sensor
d:08: Lean angle sensor
d:30: Cylinder-#1 ignition coil
d:31: Cylinder-#2 ignition coil
d:32: Cylinder-#3 ignition coil
d:33: Cylinder-#4 ignition coil
d:36: Injector #1
d:37: Injector #2
d:38: Injector #3
d:39: Injector #4
d:48: Air induction system solenoid
d:56: Sub-throttle servo motor

If a malfunction is detected in the sensors or actuators, repair or replace all faulty parts.
If no malfunction is detected in the sensors and actuators, check and repair the inner parts of the engine.

EAS27411
DIAGNOSTIC MODE

Setting the diagnostic mode

1. Turn the main switch to “OFF” and set the engine stop switch to “ON”.
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

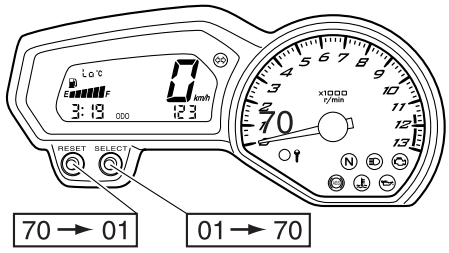
- All displays on the meter disappear except the odometer/tripmeter/fuel reserve tripmeter displays.
- “dI” appears on the odometer/tripmeter/fuel reserve tripmeter LCD.

4. Press the “SELECT” button to select the diagnostic mode “dI”.
5. After selecting “dI”, simultaneously press the “SELECT” and “RESET” buttons for 2 seconds or more to activate the diagnostic mode. The diagnostic code number “d01” appears on the clock LCD.
6. Set the engine stop switch to “⊠”.
7. Select the diagnostic code number corresponding to the fault code number by pressing the “SELECT” and “RESET” buttons.

TIP

The diagnostic code number appears on the clock LCD (d01–d70).

- To decrease the selected diagnostic code number, press the “RESET” button. Press the “RESET” button for 1 second or longer to automatically decrease the diagnostic code numbers.
- To increase the selected diagnostic code number, press the “SELECT” button. Press the “SELECT” button for 1 second or longer to automatically increase the diagnostic code numbers.



8. Verify the operation of the sensor or actuator.
   - Sensor operation
     The data representing the operating conditions of the sensor appears on the odometer/tripmeter/fuel reserve tripmeter 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.

EAS27462
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 have been completed, reset the meter display according to the reinstatement method.
Fault code No.:
Fault code number displayed on the meter when the engine failed to work normally.
Diagnostic code No.:
Diagnostic code number to be used when the diagnostic mode is operated. Refer to "DIAGNOSTIC MODE" on page 8-54.

Fault code No.	**11**
Item	**Cylinder identification sensor: no normal signals are received from the cylinder identification sensor.**
Fail-safe system	**Unable to start engine**
	Able to drive vehicle
Diagnostic code No.	**—**
Meter display	**—**
Procedure	**—**

	Item/components and probable cause	Check or maintenance job	Sensor inspection procedure
1	Connection of cylinder identification 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 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 → 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	Connection of ignition system sub-wire 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 ignition system sub-wire harness.	Crank the engine, 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. White/black–White/black Black/blue–Black/blue Blue–Blue	Crank the engine, and check the fault code indication. No fault code indicated. → Recovered. Fault code indicated. → Check the next step.

Fault code No.	**11**
Item	**Cylinder identification sensor: no normal signals are received from the cylinder identification sensor.**
Fail-safe system	**Unable to start engine**
	Able to drive vehicle
Diagnostic code No.	**—**
Meter display	**—**
Procedure	**—**

	Item/components and probable cause	Check or maintenance job	Sensor inspection procedure
5	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.
6	Cylinder identification sensor malfunction	Sensor inspection procedure Refer to “CHECKING THE CYLINDER IDENTIFICATION SENSOR” on page 8-201. Replace if defective.	Crank the engine, and check the fault code indication. No fault code indicated. → Recovered. Fault code indicated. → Check the next step.
7	ECU malfunction	Replace the ECU.	

Fault code No.	**12**
Item	**Crankshaft position sensor: no normal signals are received from the crankshaft position sensor.**
Fail-safe system	**Unable to start engine**
	Unable to drive vehicle
Diagnostic code No.	**—**
Meter display	**—**
Procedure	**—**

	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 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 → 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.

Fault code No.	**12**
Item	**Crankshaft position sensor: no normal signals are received from the crankshaft position sensor.**
Fail-safe system	**Unable to start engine**
	Unable to drive vehicle
Diagnostic code No.	**—**
Meter display	**—**
Procedure	**—**

	Item/components and probable cause	Check or maintenance job	Sensor inspection procedure
3	Continuity of wire harness	Open or short circuit → Replace the wire harness. Gray–Gray Black/blue–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. - Check the sensor and pickup rotor clearance (0.5 mm (0.02 in)).	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.
5	Crankshaft position sensor malfunction	Sensor inspection procedure Refer to “CHECKING THE CRANKSHAFT POSITION SENSOR” on page 8-193. Replace if defective.	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.	

Fault code No.	**13**
Item	**Intake air pressure sensor: open or short circuit detected. (no normal signals are received from the intake air pressure sensor.)**
Fail-safe system	**Able to start engine**
	Able to drive vehicle
Diagnostic code No.	**d:03**
Meter display	**Displays the intake air pressure.**
Procedure	**Set the engine stop switch to “○”, and then operate the throttle while pushing the start switch “≋”. (If the display value changes, the performance is OK.)**

	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.

Fault code No.	**13**
Item	**Intake air pressure sensor: open or short circuit detected. (no normal signals are received from the intake air pressure sensor.)**
Fail-safe system	**Able to start engine**
	Able to drive vehicle
Diagnostic code No.	**d:03**
Meter display	**Displays the intake air pressure.**
Procedure	**Set the engine stop switch to "○", and then operate the throttle while pushing the start switch "≋". (If the display value changes, the performance is OK.)**

	Item/components and probable cause	Check or maintenance job	Sensor inspection procedure
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 → 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 fuel injection system sub-wire 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.
5	Sensor installation status - Check the mounting section for loose or pinched mounting.	Incorrect installation → Reinstall or repair the sensor.	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**
Item	**Intake air pressure sensor: open or short circuit detected. (no normal signals are received from the intake air pressure sensor.)**
Fail-safe system	**Able to start engine**
	Able to drive vehicle
Diagnostic code No.	**d:03**
Meter display	**Displays the intake air pressure.**
Procedure	**Set the engine stop switch to "○", and then operate the throttle while pushing the start switch "≋". (If the display value changes, the performance is OK.)**

	Item/components and probable cause	Check or maintenance job	Sensor inspection procedure
6	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. Sensor inspection procedure Refer to "CHECKING THE INTAKE AIR PRESSURE SENSOR" on page 8-201.	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.
7	ECU malfunction	Replace the ECU.	

TIP

If fault codes 13 and 14 are indicated simultaneously, take the actions specified for fault code 13 first.

Fault code No.	**14**
Item	**Intake air pressure sensor: hose system malfunction (clogged or detached hose).**
Fail-safe system	**Able to start engine**
	Able to drive vehicle
Diagnostic code No.	**d:03**
Meter display	**Displays the intake air pressure.**
Procedure	**Set the engine stop switch to "○", and then operate the throttle while pushing the start switch "≋". (If the display value changes, the performance is OK.)**

	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.	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	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. Sensor inspection procedure Refer to "CHECKING THE INTAKE AIR PRESSURE SENSOR" on page 8-201.	
3	ECU malfunction	Replace the ECU.	

TIP

If fault codes 13 and 14 are indicated simultaneously, take the actions specified for fault code 13 first.

Fault code No.	**15**
Item	**Throttle position sensor: open or short circuit detected. (no normal signals are received from the throttle position sensor.)**
Fail-safe system	**Able to start engine**
	Able to drive vehicle
Diagnostic code No.	**d:01**
Meter display	**Throttle position sensor** **• 14–20 (fully closed position)**
Procedure	**• Check with throttle valves fully closed.** **• Check with throttle valves fully open.**

	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 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 → 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 fuel injection system sub-wire 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 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 7-11.	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.	**15**
Item	**Throttle position sensor: open or short circuit detected. (no normal signals are received from the throttle position sensor.)**
Fail-safe system	**Able to start engine**
	Able to drive vehicle
Diagnostic code No.	**d:01**
Meter display	**Throttle position sensor** **• 14–20 (fully closed position)**
Procedure	**• Check with throttle valves fully closed.** **• Check with throttle valves fully open.**

	Item/components and probable cause	Check or maintenance job		Sensor inspection procedure
6	Supply voltage of throttle position sensor lead	Check the supply voltage. Black/blue–Yellow Refer to “CHECKING THE THROTTLE POSITION SENSOR” on page 8-199.		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.
		Line disconnection points	Output voltage	
		Disconnection of ground lead	5 V	
		Disconnection of output line	0 V	
		Disconnection of power supply line	0 V	
7	Throttle position sensor malfunction	Check the diagnostic mode (Code No. d01). When throttle is fully closed: A value of 14–20 is indicated. If the indication is outside of range: Replace the throttle position sensor.		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.
8	ECU malfunction	Replace the ECU.		

TIP

If fault codes 15 and 16 are indicated simultaneously, take the actions specified for fault code 15 first.

Fault code No.	**16**
Item	**Throttle position sensor: stuck throttle position sensor detected. (signal from throttle position sensor will not change.)**
Fail-safe system	**Able to start engine**
	Able to drive vehicle
Diagnostic code No.	**d:01**
Meter display	**Throttle position sensor** **• 14–20 (fully closed position)**
Procedure	**• Check with throttle valves fully closed.** **• Check with throttle valves fully open.**

	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 7-11.	Place the main switch to the ON position, and then open and close the throttle. 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. If the indication is outside of range: Replace the throttle position sensor.	Place the main switch to the ON position, and then open and close the throttle. No fault code indicated. → Recovered. Fault code indicated. → Check the next step.
3	ECU malfunction	Replace the ECU.	

TIP

If fault codes 15 and 16 are indicated simultaneously, take the actions specified for fault code 15 first.

Fault code No.	**19**
Item	**Sidestand switch: a break or disconnection of the blue/yellow lead of the ECU is detected. (no normal signals are received from the sidestand switch.)**
Fail-safe system	**Unable to start engine**
	Unable to drive vehicle
Diagnostic code No.	**d:20**
Meter display	**Sidestand switch** **• ON (sidestand retracted)** **• OFF (sidestand extended)**
Procedure	**Extend and retract the sidestand (with the transmission in gear).**

	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 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 → 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. Blue/yellow–Blue/yellow 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**
Item	**Sidestand switch: a break or disconnection of the blue/yellow lead of the ECU is detected. (no normal signals are received from the sidestand switch.)**
Fail-safe system	**Unable to start engine**
	Unable to drive vehicle
Diagnostic code No.	**d:20**
Meter display	**Sidestand switch** **• ON (sidestand retracted)** **• OFF (sidestand extended)**
Procedure	**Extend and retract the sidestand (with the transmission in gear).**

	Item/components and probable cause	Check or maintenance job	Sensor inspection procedure
5	Sidestand switch malfunction	Diagnostic mode (Code No. d20). The transmission is in gear Sidestand retracted: ON indication Sidestand extended: OFF indication Indication is incorrect. → Replace the sidestand switch.	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.		**20**
Item		**Intake air pressure sensor or atmospheric pressure sensor: when the main switch is set to "ON", the atmospheric pressure sensor voltage and intake air pressure sensor voltage differ greatly.**
Fail-safe system		**Able to start engine**
		Able to drive vehicle
Diagnostic code No.		**d:02, d:03**
d:02	**Meter display**	**Displays the atmospheric pressure.**
	Procedure	**Compare the actually measured atmospheric pressure with the meter display value.**
d:03	**Meter display**	**Displays the intake air pressure.**
	Procedure	**Set the engine stop switch to "○", and then operate the throttle while pushing the start switch "≋". (If the display value changes, the performance is OK.)**

	Item/components and probable cause	Check or maintenance job	Sensor inspection procedure
1	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 3000 m above sea level: Approx. 70 kPa Incorrect indication → Sensor malfunction → Replace the intake air pressure sensor. Sensor inspection procedure Refer to "CHECKING THE INTAKE AIR PRESSURE SENSOR" on page 8-201.	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	Atmospheric pressure sensor malfunction	Check in the diagnostic mode (Code No. d02). When engine is stopped: Atmospheric pressure at the current altitude and weather conditions is indicated. 0 m above sea level: Approx. 101 kPa 3000 m above sea level: Approx. 70 kPa Incorrect indication → Sensor malfunction → Replace the atmospheric pressure sensor. Sensor inspection procedure. Refer to "CHECKING THE ATMOSPHERIC PRESSURE SENSOR" on page 8-200.	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.		**20**
Item		**Intake air pressure sensor or atmospheric pressure sensor: when the main switch is set to "ON", the atmospheric pressure sensor voltage and intake air pressure sensor voltage differ greatly.**
Fail-safe system		**Able to start engine**
		Able to drive vehicle
Diagnostic code No.		**d:02, d:03**
d:02	**Meter display**	**Displays the atmospheric pressure.**
	Procedure	**Compare the actually measured atmospheric pressure with the meter display value.**
d:03	**Meter display**	**Displays the intake air pressure.**
	Procedure	**Set the engine stop switch to "○", and then operate the throttle while pushing the start switch "≋". (If the display value changes, the performance is OK.)**

	Item/components and probable cause	Check or maintenance job	Sensor inspection procedure
3	ECU malfunction	Replace the ECU.	

Fault code No.		**21**
Item		**Coolant temperature sensor: open or short circuit detected. (no normal signals are received from the coolant temperature sensor.)**
Fail-safe system		**Able to start engine**
		Able to drive vehicle
Diagnostic code No.		**d:06**
Meter display		**Displays the coolant temperature.**
Procedure		**Compare the actually measured coolant temperature with the meter display value.**

	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.
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 → 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**
Item	**Coolant temperature sensor: open or short circuit detected. (no normal signals are received from the coolant temperature sensor.)**
Fail-safe system	**Able to start engine**
	Able to drive vehicle
Diagnostic code No.	**d:06**
Meter display	**Displays the coolant temperature.**
Procedure	**Compare the actually measured coolant temperature with the meter display value.**

	Item/components and probable cause	Check or maintenance job	Sensor inspection procedure
3	Connection of fuel injection system sub-wire 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 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.
5	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.
6	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. Sensor inspection procedure. Refer to “CHECKING THE COOLANT TEMPERATURE SENSOR” on page 8-198.	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.
7	ECU malfunction	Replace the ECU.	

Fault code No.	**22**
Item	**Intake air temperature sensor: open or short circuit detected. (no normal signals are received from the intake air temperature sensor.)**
Fail-safe system	**Able to start engine**
	Able to drive vehicle
Diagnostic code No.	**d:05**
Meter display	**Displays the intake air temperature.**
Procedure	**Compare the actually measured intake air temperature with the meter display value.**

	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 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 → 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**
Item	**Intake air temperature sensor: open or short circuit detected. (no normal signals are received from the intake air temperature sensor.)**
Fail-safe system	**Able to start engine**
	Able to drive vehicle
Diagnostic code No.	**d:05**
Meter display	**Displays the intake air temperature.**
Procedure	**Compare the actually measured intake air temperature with the meter display value.**

	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). Sensor inspection procedure Refer to "CHECKING THE INTAKE AIR TEMPERATURE SENSOR" on page 8-202. During cold starting: A temperature close to the ambient temperature is indicated. After the engine has warmed up, the ambient temperature +20 °C (68 °F) is indicated in the meter display. Indication is incorrect. → Replace the intake air temperature sensor.	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.	**23**
Item	**Atmospheric pressure sensor: open or short circuit detected. (no normal signals are received from the atmospheric pressure sensor.)**
Fail-safe system	**Able to start engine**
	Able to drive vehicle
Diagnostic code No.	**d:02**
Meter display	**Displays the atmospheric pressure.**
Procedure	**Compare the actually measured atmospheric pressure with the meter display value.**

	Item/components and probable cause	Check or maintenance job	Sensor inspection procedure
1	Connection of atmospheric 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 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.	**23**
Item	**Atmospheric pressure sensor: open or short circuit detected. (no normal signals are received from the atmospheric pressure sensor.)**
Fail-safe system	**Able to start engine**
	Able to drive vehicle
Diagnostic code No.	**d:02**
Meter display	**Displays the atmospheric pressure.**
Procedure	**Compare the actually measured atmospheric pressure with the meter display value.**

	Item/components and probable cause	Check or maintenance job	Sensor inspection procedure
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 → Connect it securely, or 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 → Connect it securely, or replace the wire harness. Black/blue–Black/blue Pink–Pink 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.
4	Installation status of atmospheric pressure 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.	**23**
Item	**Atmospheric pressure sensor: open or short circuit detected. (no normal signals are received from the atmospheric pressure sensor.)**
Fail-safe system	**Able to start engine**
	Able to drive vehicle
Diagnostic code No.	**d:02**
Meter display	**Displays the atmospheric pressure.**
Procedure	**Compare the actually measured atmospheric pressure with the meter display value.**

	Item/components and probable cause	Check or maintenance job	Sensor inspection procedure
5	Atmospheric pressure sensor malfunction	Check in the diagnostic mode (Code No. d02). 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 Incorrect indication → Sensor malfunction → Replace the atmospheric pressure sensor. Sensor inspection procedure Refer to “CHECKING THE ATMOSPHERIC PRESSURE SENSOR” on page 8-200.	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**
Item	**O_2 sensor: no normal signals are received from the O_2 sensor.**
Fail-safe system	**Able to start engine**
	Able to drive vehicle
Diagnostic code No.	**—**
Meter display	**—**
Procedure	**—**

	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. No fault code indicated. → Recovered. Fault code indicated. → Check the next step.
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.	Either start and warm up the engine, and then racing it, or reset it with diagnostic code d63. No fault code indicated. → Recovered. Fault code indicated. → Check the next step.
3	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 → Connect it securely, or repair/replace the wire harness.	Either start and warm up the engine, and then racing it, or reset it with diagnostic code d63. No fault code indicated. → Recovered. Fault code indicated. → Check the next step.
4	Continuity of wire harness	Open or short circuit → Connect it securely, or repair/replace the wire harness. Black/blue–Black/blue Pink/black–Pink/black Red/white–Red/white Gray/green–Gray/green	Either start and warm up the engine, and then racing it, or reset it with diagnostic code d63. No fault code indicated. → Recovered. Fault code indicated. → Check the next step.
5	Check the fuel pressure.	Refer to “CHECKING THE FUEL PRESSURE” on page 7-4.	Either start and warm up the engine, and then racing it, or reset it with diagnostic code d63. No fault code indicated. → Recovered. Fault code indicated. → Check the next step.

Fault code No.	**24**		
Item	**O_2 sensor: no normal signals are received from the O_2 sensor.**		
Fail-safe system	**Able to start engine**		
	Able to drive vehicle		
Diagnostic code No.	**—**		
Meter display	**—**		
Procedure	**—**		
	Item/components and probable cause	**Check or maintenance job**	**Sensor inspection procedure**
6	O_2 sensor malfunction	Check the O_2 sensor for an abnormality. Refer to "ENGINE REMOVAL" on page 5-3. O_2 sensor malfunction → Replace the O_2 sensor	Either start and warm up the engine, and then racing it, or reset it with diagnostic code d63. No fault code indicated. → Recovered. Fault code indicated. → Check the next step.
7	ECU malfunction	Replace the ECU.	

Fault code No.	**30**		
Item	**Latch up detected. No normal signals are received from the lean angle sensor.**		
Fail-safe system	**Unable to start engine**		
	Unable to drive vehicle		
Diagnostic code No.	**d:08**		
Meter display	**Lean angle sensor output voltage • 0.4–1.4 (upright) • 3.7–4.4 (overturned)**		
Procedure	**Remove the lean angle sensor and incline it more than 65 degrees.**		
	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) No fault code indicated. → Recovered. Fault code indicated. → Check the next step.
2	Sensor installation status	Check for a loose mounting, pinched mounting, or sensor mounting direction (up or down). Make sure that the mounting position is correct.	Place the main switch to the ON position. (however, the engine cannot be restarted unless the main switch is first turned OFF) No fault code indicated. → Recovered. Fault code indicated. → Check the next step.

Fault code No.	**30**
Item	**Latch up detected.** **No normal signals are received from the lean angle sensor.**
Fail-safe system	**Unable to start engine**
	Unable to drive vehicle
Diagnostic code No.	**d:08**
Meter display	**Lean angle sensor output voltage** **• 0.4–1.4 (upright)** **• 3.7–4.4 (overturned)**
Procedure	**Remove the lean angle sensor and incline it more than 65 degrees.**

	Item/components and probable cause	Check or maintenance job	Sensor inspection procedure
3	Lean angle sensor malfunction	Diagnostic mode (Code No. d08). Sensor inspection procedure Refer to “CHECKING THE LEAN ANGLE SENSOR” on page 8-194. In vertical position: 0.4–1.4 V When turned over: 3.7–4.4 V Indication is incorrect. → Replace the lean angle sensor.	Place the main switch to the ON position. (however, the engine cannot be restarted unless the main switch is first turned OFF) No fault code indicated. → Recovered. Fault code indicated. → Check the next step.
4	ECU malfunction	Replace the ECU.	

Fault code No.	**33**
Item	**Cylinder-#1 ignition coil: open or short circuit detected in the primary lead of the cylinder-#1 ignition coil.**
Fail-safe system	**Able to start engine (depending on the number of faulty cylinders)**
	Able to drive vehicle (depending on the number of faulty cylinders)
Diagnostic code No.	**d:30**
Actuation	**Actuates the cylinder-#1 ignition coil five times at one-second intervals.** **Illuminates the engine trouble warning light.**
Procedure	**Check that a spark is generated five times.** **• Connect an ignition checker.**

	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.

Fault code No.	**33**
Item	**Cylinder-#1 ignition coil: open or short circuit detected in the primary lead of the cylinder-#1 ignition coil.**
Fail-safe system	**Able to start engine (depending on the number of faulty cylinders)**
	Able to drive vehicle (depending on the number of faulty cylinders)
Diagnostic code No.	**d:30**
Actuation	**Actuates the cylinder-#1 ignition coil five times at one-second intervals.** **Illuminates the engine trouble warning light.**
Procedure	**Check that a spark is generated five times.** **• Connect an ignition checker.**

	Item/components and probable cause	Check or maintenance job	Sensor inspection procedure
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 → 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	Connection of ignition system sub-wire 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.	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	Continuity of wire harness	Open or short circuit → Replace the wire harness. Orange–Orange	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	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**
Item	**Cylinder-#1 ignition coil: open or short circuit detected in the primary lead of the cylinder-#1 ignition coil.**
Fail-safe system	**Able to start engine (depending on the number of faulty cylinders)**
	Able to drive vehicle (depending on the number of faulty cylinders)
Diagnostic code No.	**d:30**
Actuation	**Actuates the cylinder-#1 ignition coil five times at one-second intervals.** **Illuminates the engine trouble warning light.**
Procedure	**Check that a spark is generated five times.** **• Connect an ignition checker.**

	Item/components and probable cause	Check or maintenance job	Sensor inspection procedure
6	Ignition coil malfunction (Check the continuity of primary coil.)	Ignition coil inspection method Refer to “CHECKING THE IGNITION COILS” on page 8-192.	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.
7	ECU malfunction	Check in the diagnostic mode (Code No. d30). If not ignited, replace the defective ECU.	

Fault code No.	**34**
Item	**Cylinder-#2 ignition coil: open or short circuit detected in the primary lead of the cylinder-#2 ignition coil.**
Fail-safe system	**Able to start engine (depending on the number of faulty cylinders)**
	Able to drive vehicle (depending on the number of faulty cylinders)
Diagnostic code No.	**d:31**
Actuation	**Actuates the cylinder-#2 ignition coil five times at one-second intervals.** **Illuminates the engine trouble warning light.**
Procedure	**Check that a spark is generated five times.** **• Connect an ignition checker.**

	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.

Fault code No.	**34**
Item	**Cylinder-#2 ignition coil: open or short circuit detected in the primary lead of the cylinder-#2 ignition coil.**
Fail-safe system	**Able to start engine (depending on the number of faulty cylinders)**
	Able to drive vehicle (depending on the number of faulty cylinders)
Diagnostic code No.	**d:31**
Actuation	**Actuates the cylinder-#2 ignition coil five times at one-second intervals.** **Illuminates the engine trouble warning light.**
Procedure	**Check that a spark is generated five times.** **• Connect an ignition checker.**

	Item/components and probable cause	Check or maintenance job	Sensor inspection procedure
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 → 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	Connection of ignition system sub-wire 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 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.
4	Continuity of wire harness	Open or short circuit → Replace the wire harness. Gray/red–Gray/red	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	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.	**34**
Item	**Cylinder-#2 ignition coil: open or short circuit detected in the primary lead of the cylinder-#2 ignition coil.**
Fail-safe system	**Able to start engine (depending on the number of faulty cylinders)**
	Able to drive vehicle (depending on the number of faulty cylinders)
Diagnostic code No.	**d:31**
Actuation	**Actuates the cylinder-#2 ignition coil five times at one-second intervals.** **Illuminates the engine trouble warning light.**
Procedure	**Check that a spark is generated five times.** **• Connect an ignition checker.**

	Item/components and probable cause	Check or maintenance job	Sensor inspection procedure
6	Ignition coil malfunction (Check the continuity of primary coil.)	Ignition coil inspection method Refer to “CHECKING THE IGNITION COILS” on page 8-192.	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.
7	ECU malfunction	Check in the diagnostic mode (Code No. d31). If not ignited, replace the defective ECU.	

Fault code No.	**35**
Item	**Cylinder-#3 ignition coil: open or short circuit detected in the primary lead of the cylinder-#3 ignition coil.**
Fail-safe system	**Able to start engine (depending on the number of faulty cylinders)**
	Able to drive vehicle (depending on the number of faulty cylinders)
Diagnostic code No.	**d:32**
Actuation	**Actuates the cylinder-#3 ignition coil five times at one-second intervals.** **Illuminates the engine trouble warning light.**
Procedure	**Check that a spark is generated five times.** **• Connect an ignition checker.**

	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.

Fault code No.	**35**
Item	**Cylinder-#3 ignition coil: open or short circuit detected in the primary lead of the cylinder-#3 ignition coil.**
Fail-safe system	**Able to start engine (depending on the number of faulty cylinders)**
	Able to drive vehicle (depending on the number of faulty cylinders)
Diagnostic code No.	**d:32**
Actuation	**Actuates the cylinder-#3 ignition coil five times at one-second intervals.** **Illuminates the engine trouble warning light.**
Procedure	**Check that a spark is generated five times.** **• Connect an ignition checker.**

	Item/components and probable cause	Check or maintenance job	Sensor inspection procedure
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 → 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	Connection of ignition system sub-wire 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 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.
4	Continuity of wire harness	Open or short circuit → Replace the wire harness. Orange/green–Orange/green	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	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.	**35**
Item	**Cylinder-#3 ignition coil: open or short circuit detected in the primary lead of the cylinder-#3 ignition coil.**
Fail-safe system	**Able to start engine (depending on the number of faulty cylinders)**
	Able to drive vehicle (depending on the number of faulty cylinders)
Diagnostic code No.	**d:32**
Actuation	**Actuates the cylinder-#3 ignition coil five times at one-second intervals.** **Illuminates the engine trouble warning light.**
Procedure	**Check that a spark is generated five times.** **• Connect an ignition checker.**

	Item/components and probable cause	Check or maintenance job	Sensor inspection procedure
6	Ignition coil malfunction (Check the continuity of primary coil.)	Ignition coil inspection method Refer to “CHECKING THE IGNITION COILS” on page 8-192.	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.
7	ECU malfunction	Check in the diagnostic mode (Code No. d32). If not ignited, replace the defective ECU.	

Fault code No.	**36**
Item	**Cylinder-#4 ignition coil: open or short circuit detected in the primary lead of the cylinder-#4 ignition coil.**
Fail-safe system	**Able to start engine (depending on the number of faulty cylinders)**
	Able to drive vehicle (depending on the number of faulty cylinders)
Diagnostic code No.	**d:33**
Actuation	**Actuates the cylinder-#4 ignition coil five times at one-second intervals.** **Illuminates the engine trouble warning light.**
Procedure	**Check that a spark is generated five times.** **• Connect an ignition checker.**

	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.

Fault code No.	**36**
Item	**Cylinder-#4 ignition coil: open or short circuit detected in the primary lead of the cylinder-#4 ignition coil.**
Fail-safe system	**Able to start engine (depending on the number of faulty cylinders)**
	Able to drive vehicle (depending on the number of faulty cylinders)
Diagnostic code No.	**d:33**
Actuation	**Actuates the cylinder-#4 ignition coil five times at one-second intervals.** **Illuminates the engine trouble warning light.**
Procedure	**Check that a spark is generated five times.** **• Connect an ignition checker.**

	Item/components and probable cause	Check or maintenance job	Sensor inspection procedure
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 → 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	Connection of ignition system sub-wire 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 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.
4	Continuity of wire harness	Open or short circuit → Replace the wire harness. Gray/green–Gray/green	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	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.	**36**
Item	**Cylinder-#4 ignition coil: open or short circuit detected in the primary lead of the cylinder-#4 ignition coil.**
Fail-safe system	**Able to start engine (depending on the number of faulty cylinders)**
	Able to drive vehicle (depending on the number of faulty cylinders)
Diagnostic code No.	**d:33**
Actuation	**Actuates the cylinder-#4 ignition coil five times at one-second intervals.** **Illuminates the engine trouble warning light.**
Procedure	**Check that a spark is generated five times.** **• Connect an ignition checker.**

	Item/components and probable cause	Check or maintenance job	Sensor inspection procedure
6	Ignition coil malfunction (Check the continuity of primary coil.)	Ignition coil inspection method Refer to “CHECKING THE IGNITION COILS” on page 8-192.	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.
7	ECU malfunction	Check in the diagnostic mode (Code No. d33). If not ignited, replace the defective ECU.	

Fault code No.		**39**
Item		**Injector: open circuit detected. (no normal signals are received from the injector.)**
Fail-safe system		**Able to start engine (depending on the number of faulty cylinders)**
		Able to drive vehicle (depending on the number of faulty cylinders)
Diagnostic code No.		**d:36, d:37, d:38, d:39**
d:36	**Actuation**	**Actuates injector #1 five times at one-second intervals. Illuminates the engine trouble warning light.**
	Procedure	**Check that injector #1 is actuated five times by listening for the operating sound.**
d:37	**Actuation**	**Actuates injector #2 five times at one-second intervals. Illuminates the engine trouble warning light.**
	Procedure	**Check that injector #2 is actuated five times by listening for the operating sound.**
d:38	**Actuation**	**Actuates injector #3 five times at one-second intervals. Illuminates the engine trouble warning light.**
	Procedure	**Check that injector #3 is actuated five times by listening for the operating sound.**
d:39	**Actuation**	**Actuates injector #4 five times at one-second intervals. Illuminates the engine trouble warning light.**
	Procedure	**Check that injector #4 is actuated five times by listening for the operating sound.**

	Item/components and probable cause	**Check or maintenance job**	**Sensor inspection procedure**
1	Locate the malfunction	Check in the diagnostic mode (Code No. d36, d37, d38, d39). Locate the injector with no operating noise. Carry out the following checks to the defective injector coupler, wire harness, and injector.	—
2	Connection of 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.	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	Injector malfunction	Check the fuel injector resistance. → Approx. 12.0 Ω Replace if defective.	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.		**39**
Item		**Injector: open circuit detected. (no normal signals are received from the injector.)**
Fail-safe system		**Able to start engine (depending on the number of faulty cylinders)**
		Able to drive vehicle (depending on the number of faulty cylinders)
Diagnostic code No.		**d:36, d:37, d:38, d:39**
d:36	**Actuation**	**Actuates injector #1 five times at one-second intervals. Illuminates the engine trouble warning light.**
	Procedure	**Check that injector #1 is actuated five times by listening for the operating sound.**
d:37	**Actuation**	**Actuates injector #2 five times at one-second intervals. Illuminates the engine trouble warning light.**
	Procedure	**Check that injector #2 is actuated five times by listening for the operating sound.**
d:38	**Actuation**	**Actuates injector #3 five times at one-second intervals. Illuminates the engine trouble warning light.**
	Procedure	**Check that injector #3 is actuated five times by listening for the operating sound.**
d:39	**Actuation**	**Actuates injector #4 five times at one-second intervals. Illuminates the engine trouble warning light.**
	Procedure	**Check that injector #4 is actuated five times by listening for the operating sound.**

	Item/components and probable cause	**Check or maintenance job**	**Sensor inspection procedure**
4	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 → 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.
5	Connection of fuel injection system sub-wire 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.	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.		**39**
Item		**Injector: open circuit detected. (no normal signals are received from the injector.)**
Fail-safe system		**Able to start engine (depending on the number of faulty cylinders)**
		Able to drive vehicle (depending on the number of faulty cylinders)
Diagnostic code No.		**d:36, d:37, d:38, d:39**
d:36	**Actuation**	**Actuates injector #1 five times at one-second intervals. Illuminates the engine trouble warning light.**
	Procedure	**Check that injector #1 is actuated five times by listening for the operating sound.**
d:37	**Actuation**	**Actuates injector #2 five times at one-second intervals. Illuminates the engine trouble warning light.**
	Procedure	**Check that injector #2 is actuated five times by listening for the operating sound.**
d:38	**Actuation**	**Actuates injector #3 five times at one-second intervals. Illuminates the engine trouble warning light.**
	Procedure	**Check that injector #3 is actuated five times by listening for the operating sound.**
d:39	**Actuation**	**Actuates injector #4 five times at one-second intervals. Illuminates the engine trouble warning light.**
	Procedure	**Check that injector #4 is actuated five times by listening for the operating sound.**

	Item/components and probable cause	**Check or maintenance job**	**Sensor inspection procedure**
6	Continuity of wire harness	Open or short circuit → Connect it securely, or repair/ replace the wire harness. Fuel injector #1 Red/blue–Red/blue Red/black–Red/black Fuel injector #2 Red/blue–Red/blue Green/black–Green/black Fuel injector #3 Red/blue–Red/blue Blue/black–Blue/black Fuel injector #4 Red/blue–Red/blue Orange/black–Orange/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.
7	ECU malfunction	Replace the ECU.	

Fault code No.	**41**
Item	**Lean angle sensor: open or short circuit detected. (no normal signals are received from the lean angle sensor.)**
Fail-safe system	**Unable to start engine**
	Unable to drive vehicle
Diagnostic code No.	**d:08**
Meter display	**Lean angle sensor output voltage** **• 0.4–1.4 (upright)** **• 3.7–4.4 (overturned)**
Procedure	**Remove the lean angle sensor and incline it more than 65 degrees.**

	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 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 → 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.

Fault code No.	**41**
Item	**Lean angle sensor: open or short circuit detected. (no normal signals are received from the lean angle sensor.)**
Fail-safe system	**Unable to start engine**
	Unable to drive vehicle
Diagnostic code No.	**d:08**
Meter display	**Lean angle sensor output voltage** **• 0.4–1.4 (upright)** **• 3.7–4.4 (overturned)**
Procedure	**Remove the lean angle sensor and incline it more than 65 degrees.**

	Item/components and probable cause	Check or maintenance job	Sensor inspection procedure
4	Lean angle sensor malfunction	Diagnostic mode (Code No. d08). Sensor inspection procedure Refer to “CHECKING THE LEAN ANGLE SENSOR” on page 8-194.	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**	
Item		**A. no normal signals are received from the rear wheel sensor.**	
		B. open or short circuit is detected in the neutral circuit of the neutral switch.	
		C. open or short circuit is detected in the clutch circuit of the clutch switch.	
A	**Fail-safe system**	**Able to start engine**	
		Able to drive vehicle	
	Diagnostic code No.	**d:07**	
	Meter display	**Vehicle speed pulses: 0–999**	
	Procedure	**Check that the number increases when the rear wheel is rotated. The number is cumulative and does not reset each time the wheel is stopped.**	
B	**Fail-safe system**	**Able to start engine**	
		Able to drive vehicle	
	Diagnostic code No.	**d:21**	
	Meter display	**Neutral switch** **• ON (neutral)** **• OFF (in gear)**	
	Procedure	**Shift the transmission and clutch lever.**	
C	**Fail-safe system**	**Able to start engine**	
		Able to drive vehicle	
	Diagnostic code No.	**d:21**	
	Meter display	**Clutch switch** **ON (Gear is in other than neutral, operating clutch and storing sidestand.)** **OFF (Gear is in other than neutral, operating clutch and using sidestand.)**	
	Procedure	**Shift the transmission, clutch lever and sidestand.**	
	Item/components and probable cause	**Check or maintenance job**	**Sensor inspection procedure**
	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 “Rear wheel sensor system malfunction” section below. When the ABS warning light is ON, refer to ABS troubleshooting. Check in the diagnostic mode (Code No. d21). 1. When the gear is in neutral position: ON indication 2. When the gear is not in neutral position: OFF indication Malfunction step 1 or 2. → Go to the “Neutral switch system malfunction” section below. When the gear is in other than neutral, the clutch is operated, and the sidestand is stored: ON indication Malfunction step 3 → Go to the “Clutch system malfunction” section below.	—

A. Rear wheel sensor system malfunction

	Item/components and probable cause	Check or maintenance job	Sensor inspection procedure
1	Connection of rear wheel 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.	Check in the diagnostic code (Code No. d07). With the rear wheel rotated, check the pulse input. Then, check the fault code indication. No fault code indicated. → Recovered. Fault code indicated. → Check the next step.
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 → Connect it securely, or repair/replace the wire harness.	Check in the diagnostic code (Code No. d07). With the rear wheel rotated, check the pulse input. 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. White/red–White/red White–White Blue/white–Blue/white White/yellow–White/yellow	Check in the diagnostic code (Code No. d07). With the rear wheel rotated, check the pulse input. Then, check the fault code indication. No fault code indicated. → Recovered. Fault code indicated. → Check the next step.
4	Rear wheel sensor malfunction	Sensor inspection procedure Refer to “MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR” on page 4-25. Replace if defective.	Check in the diagnostic code (Code No. d07). With the rear wheel rotated, check the pulse input. Then, check the fault code indication. No fault code indicated. → Recovered. Fault code indicated. → Check the next step.

	Item/components and probable cause	Check or maintenance job	Sensor inspection procedure
5	ECU malfunction	Replace the ECU.	Check in the diagnostic code (Code No. d07). With the rear wheel rotated, check the pulse input. Then, check the fault code indication. No fault code indicated. → Recovered. Fault code indicated. → Check the next step.
6	ABS unit malfunction	Replace the ABS unit.	Start the engine. Ride on the vehicle at a low speed (approx 20–30 km/h).

B. Neutral switch system malfunction

	Item/components and probable cause	Check or maintenance job	Sensor inspection procedure
1	Connection of neutral switch sensor 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. Ride the vehicle at a low speed (approx. 20–30 km/h). Then, check the fault code indication. No fault code indicated. → Recovered. Fault code indicated. → Check the next step.
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.	Start the engine. Ride the vehicle at a low speed (approx. 20–30 km/h). 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. Blue/yellow–Blue/yellow	Start the engine. Ride the vehicle at a low speed (approx. 20–30 km/h). Then, check the fault code indication. No fault code indicated. → Recovered. Fault code indicated. → Check the next step.

	Item/components and probable cause	Check or maintenance job	Sensor inspection procedure
4	Continuity of leads between neutral switch and relay unit coupler	Open or short circuit → Replace the wire harness. Sky blue–Sky blue	Start the engine. Ride the vehicle at a low speed (approx. 20–30 km/h). Then, check the fault code indication. No fault code indicated. → Recovered. Fault code indicated. → Check the next step.
5	Neutral switch malfunction	Switch inspection procedure Refer to “CHECKING THE SWITCHES” on page 8-179. Replace if defective.	Start the engine. Ride the vehicle at a low speed (approx. 20–30 km/h). Then, check the fault code indication. No fault code indicated. → Recovered. Fault code indicated. → Check the next step.
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 5-90. Malfunction → Replace the shift drum.	Start the engine. Ride the vehicle at a low speed (approx. 20–30 km/h). Then, check the fault code indication. No fault code indicated. → Recovered. Fault code indicated. → Check the next step.
7	ECU malfunction	Replace the ECU.	

C. Clutch switch system malfunction

	Item/components and probable cause	Check or maintenance job	Sensor inspection procedure
1	Adjusting the clutch lever free play	Refer to “ADJUSTING THE CLUTCH CABLE FREE PLAY” on page 3-13.	Start the engine. Ride the vehicle at a low speed (approx. 20–30 km/h). Then, check the fault code indication. No fault code indicated. → Recovered. Fault code indicated. → Check the next step.
2	Connection of clutch 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. Ride the vehicle at a low speed (approx. 20–30 km/h). Then, check the fault code indication. No fault code indicated. → Recovered. Fault code indicated. → Check the next step.

	Item/components and probable cause	Check or maintenance job	Sensor inspection procedure
3	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 → Connect it securely, or repair/replace the wire harness.	Start the engine. Ride the vehicle at a low speed (approx. 20–30 km/h). Then, 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. Yellow/black–Yellow/black Blue/yellow–Blue/yellow	Start the engine. Ride the vehicle at a low speed (approx. 20–30 km/h). Then, check the fault code indication. No fault code indicated. → Recovered. Fault code indicated. → Check the next step.
5	Continuity of leads between clutch switch and relay unit coupler	Open or short circuit → Replace the wire harness. Yellow/black–Yellow/black	Start the engine. Ride the vehicle at a low speed (approx. 20–30 km/h). Then, check the fault code indication. No fault code indicated. → Recovered. Fault code indicated. → Check the next step.
6	Clutch switch malfunction	Check the clutch switch. Refer to “CHECKING THE SWITCHES” on page 8-179. Replace if defective.	Start the engine. Ride the vehicle at a low speed (approx. 20–30 km/h). Then, check the fault code indication. No fault code indicated. → Recovered. Fault code indicated. → Check the next step.
7	ECU malfunction	Replace the ECU.	

Fault code No.		**43**
Item		**Fuel system voltage: incorrect voltage supplied to the fuel injector, fuel pump and main relay.**
Fail-safe system		**Able to start engine**
		Able to drive vehicle
Diagnostic code No.		**d:09, d:50**
d:09	**Meter display**	**Fuel system voltage (battery voltage) Approximately 12.0**
	Procedure	**Set the engine stop switch to "○", and then compare the actually measured battery voltage with the meter display value. (If the actually measured battery voltage is low, recharge the battery.)**
d:50	**Actuation**	**Actuates the main relay five times at one-second intervals. Illuminates the engine trouble warning light. (The engine trouble warning light is off when the relay is on, and the engine trouble warning light is on when the relay is off.)**
	Procedure	**Check that the main relay is actuated five times by listening for the operating sound.**

	Item/components and probable cause	Check or maintenance job	Sensor inspection procedure
1	Connection of main relay 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 for approximately 5 seconds. Then, check the fault code indication. No fault indicated. → Recovered. Fault code indicated. → Check the next step.
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 → Connect it securely, or repair/replace the wire harness.	Place the main switch to the ON position for approximately 5 seconds. Then, check the fault code indication. No fault indicated. → Recovered. Fault code indicated. → Check the next step.
3	Continuity of wire harness between the battery, fuel injection system fuse, relay unit and ECU	Open or short circuit → Replace the wire harness. Red–Red Red/blue–Red/blue	Place the main switch to the ON position 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.		**43**
Item		**Fuel system voltage: incorrect voltage supplied to the fuel injector, fuel pump and main relay.**
Fail-safe system		**Able to start engine**
		Able to drive vehicle
Diagnostic code No.		**d:09, d:50**
d:09	**Meter display**	**Fuel system voltage (battery voltage) Approximately 12.0**
	Procedure	**Set the engine stop switch to "∩", and then compare the actually measured battery voltage with the meter display value. (If the actually measured battery voltage is low, recharge the battery.)**
d:50	**Actuation**	**Actuates the main relay five times at one-second intervals. Illuminates the engine trouble warning light. (The engine trouble warning light is off when the relay is on, and the engine trouble warning light is on when the relay is off.)**
	Procedure	**Check that the main relay is actuated five times by listening for the operating sound.**

	Item/components and probable cause	**Check or maintenance job**	**Sensor inspection procedure**
4	Fuel pump relay malfunction	Check in the diagnostic mode (Code No. d50). No operation sound of fuel pump relay is heard. → Replace the relay unit.	Place the main switch to the ON position for approximately 5 seconds. Then, check the fault code indication. No fault code indicated. → Recovered. Fault code indicated. → Check the next step.
5	Fuel pump relay malfunction	Check in the diagnostic mode (Code No. d09) Fuel-related voltage: 3 V or less → Replace the relay unit.	Place the main switch to the ON position 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	Replace the ECU.	

Fault code No.	**44**
Item	**EEPROM cylinder fault code number: an error is detected while reading or writing on EEPROM (CO adjustment value).**
Fail-safe system	**Under certain conditions**
	Under certain conditions
Diagnostic code No.	**d:60**
Meter display	**EEPROM fault code display** **• 00 (no history)** **• 01–04: Cylinder fault code number (history exists)** **If more than one cylinder is defective, the display switches every two seconds to show the cylinder fault code numbers of all defective cylinders in a repeating cycle.**
Procedure	**—**

	Item/components and probable cause	Check or maintenance job	Sensor inspection procedure
1	Locate the malfunction.	Diagnostic mode (Code No. d60) 00 indication: Check number 6. 01 indication: Check number 2. 02 indication: Check number 3. 03 indication: Check number 4. 04 indication: Check number 5.	—
2	“01” is indicated in Diagnostic mode (Code No. d60) EEPROM data error for adjustment of CO concentration of cylinder #1	Change the CO concentration of cylinder #1, and rewrite in EEPROM. Refer to “ADJUSTING THE EXHAUST GAS VOLUME” on page 3-11. 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. → Return to Step 1 to carry out the check again. If the condition persists, proceed to Step 6.
3	“02” is indicated in Diagnostic mode (Code No. d60) EEPROM data error for adjustment of CO concentration of cylinder #2	Change the CO concentration of cylinder #2, and rewrite in EEPROM. Refer to “ADJUSTING THE EXHAUST GAS VOLUME” on page 3-11. 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. Return to Step 1 to carry out the check again. If the condition persists, proceed to Step 6.

Fault code No.	**44**
Item	**EEPROM cylinder fault code number: an error is detected while reading or writing on EEPROM (CO adjustment value).**
Fail-safe system	**Under certain conditions**
	Under certain conditions
Diagnostic code No.	**d:60**
Meter display	**EEPROM fault code display** **• 00 (no history)** **• 01–04: Cylinder fault code number (history exists)** **If more than one cylinder is defective, the display switches every two seconds to show the cylinder fault code numbers of all defective cylinders in a repeating cycle.**
Procedure	**—**

	Item/components and probable cause	Check or maintenance job	Sensor inspection procedure
4	"03" is indicated in Diagnostic mode (Code No. d60) EEPROM data error for adjustment of CO concentration of cylinder #3	Change the CO concentration of cylinder #3, and rewrite in EEPROM. Refer to "ADJUSTING THE EXHAUST GAS VOLUME" on page 3-11. 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. → Return to Step 1 to carry out the check again. If the condition persists, proceed to Step 6.
5	"04" is indicated in Diagnostic mode (Code No. d60) EEPROM data error for adjustment of CO concentration of cylinder #4	Change the CO concentration of cylinder #4, and rewrite in EEPROM. Refer to "ADJUSTING THE EXHAUST GAS VOLUME" on page 3-11. 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. → Return to Step 1 to carry out the check again. If the condition persists, proceed to Step 6.
6	ECU malfunction	Replace the ECU	

Fault code No.	**46**
Item	**Incorrect voltage is supplied to the ECU.**
Fail-safe system	**Able to start engine**
	Able to drive vehicle
Diagnostic code No.	**—**
Meter display	**—**
Procedure	**—**

	Item/components and probable cause	Check or maintenance job	Sensor inspection procedure
1	Charging system malfunction	Check the charging system. Refer to “CHARGING SYSTEM” on page 8-19. Check the rectifier/regulator, AC magneto and wire harness. → Replace if defective.	Start and idle the engine for approximately 5 seconds. Then, check the fault code indication. No fault code indicated. → Recovered. Fault code indicated. → Recheck.

Fault code No.	**47**
Item	**Sub-throttle position sensor: open or short circuit detected. (no normal signals are received from the sub-throttle position sensor.)**
Fail-safe system	**Able to start engine**
	Able to drive vehicle
Diagnostic code No.	**—**
Meter display	**—**
Procedure	**—**

	Item/components and probable cause	Check or maintenance job	Sensor inspection procedure
1	Installation status of sub-throttle position sensor	Check the mounting section for a loose or pinched mounting.	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 sub-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.
3	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 → 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.	**47**
Item	**Sub-throttle position sensor: open or short circuit detected. (no normal signals are received from the sub-throttle position sensor.)**
Fail-safe system	**Able to start engine**
	Able to drive vehicle
Diagnostic code No.	**—**
Meter display	**—**
Procedure	**—**

	Item/components and probable cause	Check or maintenance job	Sensor inspection procedure
4	Continuity of wire harness	Open or short circuit → Replace the wire harness Black/blue–Black/blue Green/yellow–Green/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	Sub-throttle position sensor malfunction	Check the sub-throttle position sensor. Refer to “CHECKING THE SUB-THROTTLE POSITION SENSOR” on page 8-199. Sub-throttle position sensor malfunction → Replace the sub-throttle position sensor.	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.	

TIP

If fault codes 47 and 48 are indicated simultaneously, take the actions specified for fault code 47 first.

Fault code No.	**48**
Item	**Sub-throttle servo motor: stuck sub-throttle servo motor detected. signal from sub-throttle position sensor will not change. (sub-throttle servo motor will not start.)**
Fail-safe system	**Able to start engine**
	Able to drive vehicle
Diagnostic code No.	**d:56**
Actuation	**Sub-throttle valve will close and stops at standard position after fully opened. This operation takes about 3 seconds and engine trouble warning light will be turning on during operation.**
Procedure	**Check the operating sound of the sub-throttle servo motor.**

	Item/components and probable cause	Check or maintenance job	Sensor inspection procedure
1	Installation status of sub-throttle position sensor	Check the mounting section for a loose or pinched mounting.	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 sub-throttle position sensor coupler Check the connection of the coupler is secure. Remove the coupler, and check each pin (for bending, wear, or locking). Check in the diagnostic code (Code No. d55). Check the sub-throttle servo motor for proper operation.	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 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 → 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	Sub-throttle servo motor malfunction	Check in the diagnostic mode (Code No. d56). No operation sound of sub-throttle servo motor. → Replace the sub-throttle servo motor.	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.	**48**
Item	**Sub-throttle servo motor: stuck sub-throttle servo motor detected. signal from sub-throttle position sensor will not change. (sub-throttle servo motor will not start.)**
Fail-safe system	**Able to start engine**
	Able to drive vehicle
Diagnostic code No.	**d:56**
Actuation	**Sub-throttle valve will close and stops at standard position after fully opened. This operation takes about 3 seconds and engine trouble warning light will be turning on during operation.**
Procedure	**Check the operating sound of the sub-throttle servo motor.**

	Item/components and probable cause	Check or maintenance job	Sensor inspection procedure
5	Continuity of wire harness	Open or short circuit → Replace the wire harness Yellow/red–Yellow/red Yellow/white–Yellow/white Gray/black–Gray/black Gray/white–Gray/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.
6	ECU malfunction	Replace the ECU.	

TIP

If fault codes 47 and 48 are indicated simultaneously, take the actions specified for fault code 47 first.

Fault code No.	**50**
Item	**Faulty ECU memory. (When this malfunction is detected in the ECU, the fault code number might not appear on the meter.)**
Fail-safe system	**Unable to start engine**
	Unable to drive vehicle
Diagnostic code No.	**—**
Meter display	**—**
Procedure	**—**

	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**
Item	**Engine idling stop: engine has been left idling. (The ECU automatically stops the engine after 20 minutes if it is left idling.)**
Fail-safe system	**Able to start engine**
	Able to drive vehicle
Diagnostic code No.	**—**
Meter display	**—**
Procedure	**—**

	Item/components and probable cause	Check or maintenance job	Sensor inspection procedure
	Engine idling stop		

Fault code No.	**Er-1**
Item	**ECU internal malfunction (output signal error): no signals are received from the ECU.**
Fail-safe system	**Able to start engine (Unable if ECU Failure)**
	Able to drive vehicle (Unable if ECU Failure)
Diagnostic code No.	**—**
Meter display	**—**
Procedure	**—**

	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, and check the fault code indication. No fault code indicated. → Recovered. Fault code indicated. → Check the next step.
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 → 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 → Connect it securely, or repair/replace the wire harness. Yellow/blue–Yellow/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.	**Er-1**
Item	**ECU internal malfunction (output signal error): no signals are received from the ECU.**
Fail-safe system	**Able to start engine (Unable if ECU Failure)**
	Able to drive vehicle (Unable if ECU Failure)
Diagnostic code No.	**—**
Meter display	**—**
Procedure	**—**

	Item/components and probable cause	Check or maintenance job	Sensor inspection procedure
4	Abnormal meter unit operation	Replace the meter unit.	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	ECU malfunction	Replace the ECU	

Fault code No.	**Er-2**
Item	**ECU internal malfunction (output signal error): no signals are received from the ECU within the specified duration.**
Fail-safe system	**Able to start engine**
	Able to drive vehicle
Diagnostic code No.	**—**
Meter display	**—**
Procedure	**—**

	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, and check the fault code indication. No fault code indicated. → Recovered. Fault code indicated. → Check the next step.
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 → 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 → Connect it securely, or repair/replace the wire harness. Yellow/blue–Yellow/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.	**Er-2**
Item	**ECU internal malfunction (output signal error): no signals are received from the ECU within the specified duration.**
Fail-safe system	**Able to start engine**
	Able to drive vehicle
Diagnostic code No.	**—**
Meter display	**—**
Procedure	**—**

	Item/components and probable cause	Check or maintenance job	Sensor inspection procedure
4	Abnormal meter unit operation	Replace the meter unit.	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	ECU malfunction	Replace the ECU.	

Fault code No.	**Er-3**
Item	**ECU internal malfunction (output signal error): data from the ECU cannot be received correctly.**
Fail-safe system	**Able to start engine**
	Able to drive vehicle
Diagnostic code No.	**—**
Meter display	**—**
Procedure	**—**

	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, and check the fault code indication. No fault code indicated. → Recovered. Fault code indicated. → Check the next step.
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 → 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 → Connect it securely, or repair/replace the wire harness. Yellow/blue–Yellow/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.	**Er-3**
Item	**ECU internal malfunction (output signal error): data from the ECU cannot be received correctly.**
Fail-safe system	**Able to start engine**
	Able to drive vehicle
Diagnostic code No.	**—**
Meter display	**—**
Procedure	**—**

	Item/components and probable cause	Check or maintenance job	Sensor inspection procedure
4	Abnormal meter unit operation	Replace the meter unit.	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	ECU malfunction	Replace the ECU.	

Fault code No.	**Er-4**
Item	**ECU internal malfunction (input signal error): non-registered data has been received from the meter.**
Fail-safe system	**Able to start engine**
	Able to drive vehicle
Diagnostic code No.	**—**
Meter display	**—**
Procedure	**—**

	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, and check the fault code indication. No fault code indicated. → Recovered. Fault code indicated. → Check the next step.
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 → 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 → Connect it securely, or repair/replace the wire harness. Yellow/blue–Yellow/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.	**Er-4**
Item	**ECU internal malfunction (input signal error): non-registered data has been received from the meter.**
Fail-safe system	**Able to start engine**
	Able to drive vehicle
Diagnostic code No.	**—**
Meter display	**—**
Procedure	**—**

	Item/components and probable cause	Check or maintenance job	Sensor inspection procedure
4	Abnormal meter unit operation	Replace the meter unit.	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	ECU malfunction	Replace the ECU.	

EAS30660
DIAGNOSTIC CODE TABLE

TIP
The following tables contain information about diagnostic code numbers that do not have a corresponding fault code number. (These items are not listed in “TROUBLESHOOTING DETAILS”.)

Diagnostic code No.	Item	Meter display/Actuation	Procedure
d:48	Air induction system solenoid	Actuates the air induction system solenoid five times at one-second intervals. Illuminates the engine trouble warning light.	Check the operating sound of the air induction system solenoid five times.
d:51	Radiator fan motor relay	Actuates the radiator fan motor relay for five cycles of five seconds. (ON 2 seconds, OFF 3 seconds) Illuminates the engine trouble warning light.	Check the operating sound of the radiator fan motor relay five times.
d:52	Headlight relay	Actuates the headlight relay for five cycles of five seconds. (ON 2 seconds, OFF 3 seconds) Illuminates the engine trouble warning light.	Check the operating sound of the headlight relay five times.
d:61	Malfunction history code display • No history • History exists	 00 Fault code Nos. d11–70 • (If more than one code number is detected, the display alternates every two seconds to show all the detected code numbers. When all code numbers are shown, the display repeats the same process.)	—
d:62	Malfunction history code erasure • No history • History exists	 0 • Displays the total number of malfunctions, including the current malfunction, that have occurred since the history was last erased. (For example, if there have been three malfunctions, “03” is displayed.)	 — To erase the history, set the engine stop switch from “⊗” to “∩”.

Diagnostic code No.	Item	Meter display/Actuation	Procedure
d:63	Malfunction code reinstatement (for fault code No. d24 only) • No malfunction code • Malfunction code exists	 00 Fault code No. d24 • (If more than one code number is detected, the display alternates every two seconds to show all the detected code numbers. When all code numbers are shown, the display repeats the same process.)	 — To reinstate, set the engine stop switch from "⊗" to "∩".
d:70	Control number	0–254 [-]	—

Set the main switch to "OFF" to cancel the diagnostic mode.

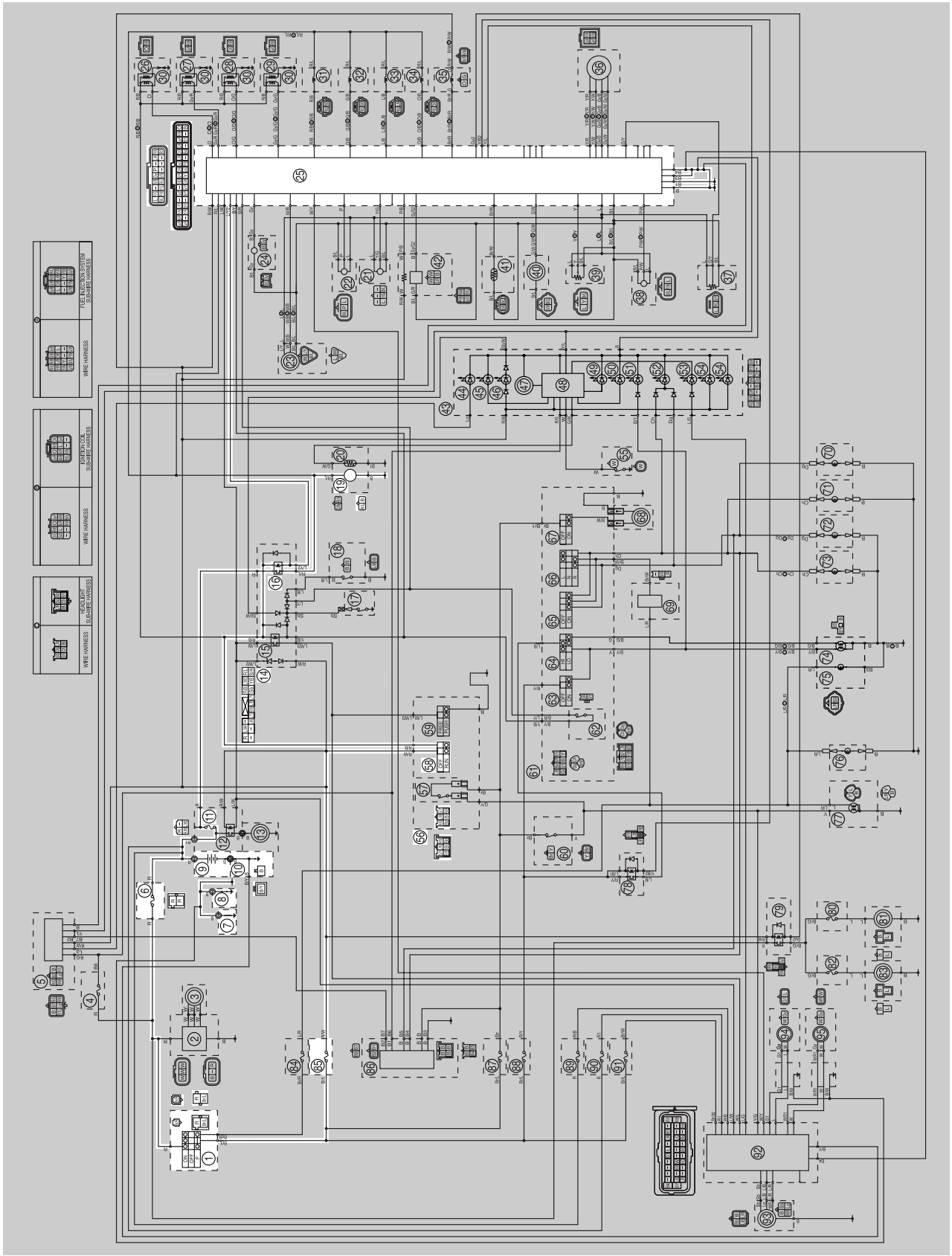
TIP

Information about each diagnostic code No. is organized in this manual as follows:

- If a diagnostic code No. has a corresponding fault code No., the information is shown in TROUBLESHOOTING DETAILS. (Refer to "TROUBLESHOOTING DETAILS" on page 8-55)
- If a diagnostic code No. does not have a corresponding fault code No., the information is shown in DIAGNOSTIC CODE TABLE. (Refer to "DIAGNOSTIC CODE TABLE" on page 8-107)

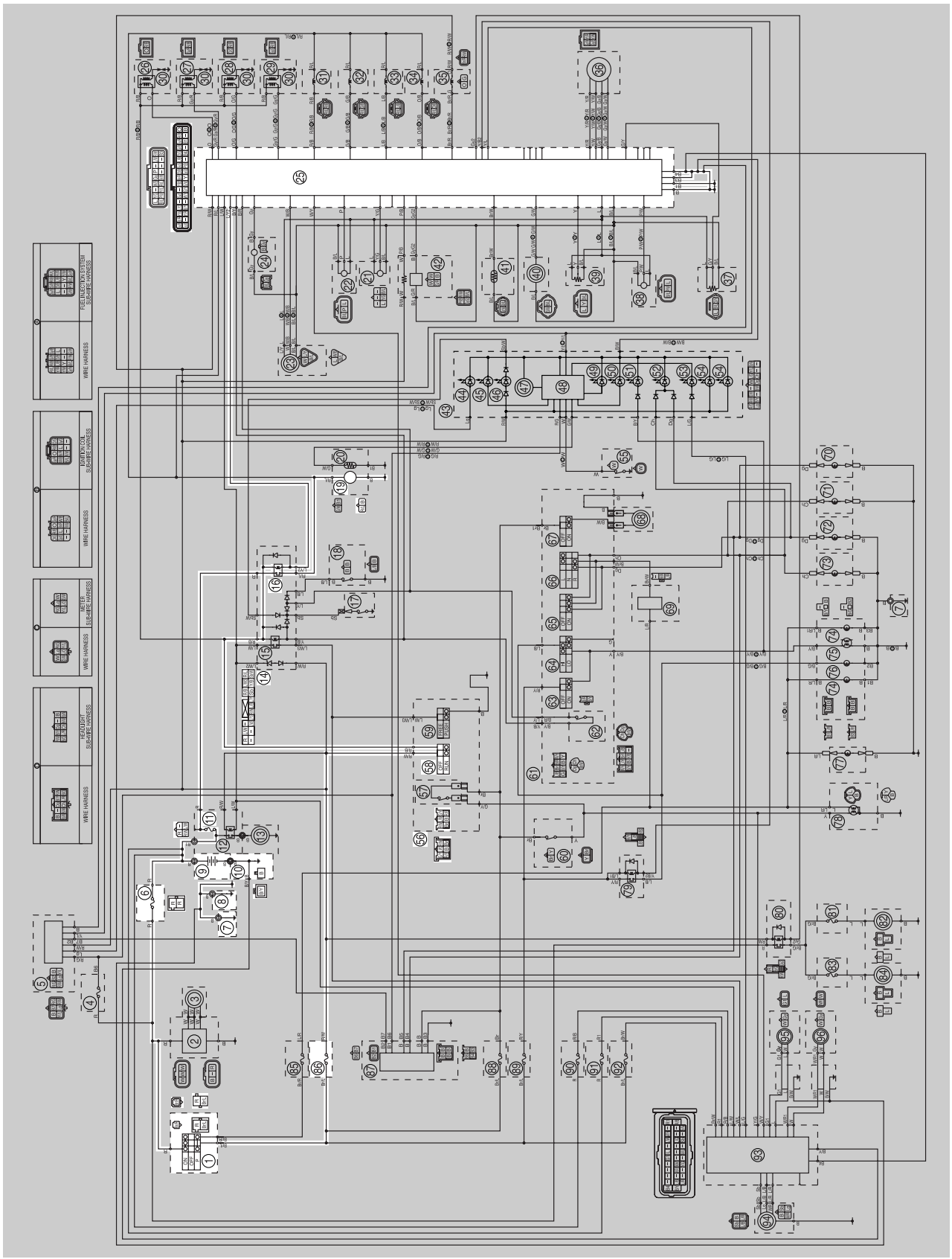
EAS27550
FUEL PUMP SYSTEM

EAS27560
CIRCUIT DIAGRAM



FZ8NA

1. Main switch
6. Main fuse
7. Frame ground
8. Engine ground
9. Battery
10. Negative battery ground lead
11. Fuel injection system fuse
14. Relay unit
16. Fuel pump relay
19. Fuel pump
25. ECU (engine control unit)
56. Right handlebar switch
58. Engine stop switch
85. Ignition fuse



FZ8SA

1. Main switch
6. Main fuse
7. Frame ground
8. Engine ground
9. Battery
10. Negative battery ground lead
11. Fuel injection system fuse
14. Relay unit
16. Fuel pump relay
19. Fuel pump
25. ECU (engine control unit)
56. Right handlebar switch
58. Engine stop switch
86. Ignition fuse

EAS27570
TROUBLESHOOTING

If the fuel pump fails to operate.

TIP

- Before troubleshooting, remove the following part(s):

1. Rider seat
2. Passenger seat
3. Left inner panel (FZ8SA)
4. Right inner panel (FZ8SA)
5. Left side panel (FZ8SA)
6. Right side panel (FZ8SA)
7. Front cowling (FZ8SA)
8. Fuel tank
9. Air filter case

1. Check the fuses. (Main, ignition and fuel injection system) Refer to “CHECKING THE FUSES” on page 8-185.	NG→	Replace the fuse(s).
OK↓		
2. Check the battery. Refer to “CHECKING AND CHARGING THE BATTERY” on page 8-186.	NG→	• Clean the battery terminals. • Recharge or replace the battery.
OK↓		
3. Check the main switch. Refer to “CHECKING THE SWITCHES” on page 8-179.	NG→	Replace the main switch/immobilizer unit.
OK↓		
4. Check the engine stop switch. Refer to “CHECKING THE SWITCHES” on page 8-179.	NG→	Replace the right handlebar switch.
OK↓		
5. Check the relay unit (fuel pump relay). Refer to “CHECKING THE RELAYS” on page 8-189.	NG→	Replace the relay unit.
OK↓		
6. Check the fuel pump. Refer to “CHECKING THE FUEL PUMP OPERATION” on page 7-3.	NG→	Replace the fuel pump.
OK↓		

7. Check the entire fuel pump system's wiring.
   Refer to "CIRCUIT DIAGRAM" on page 8-109.

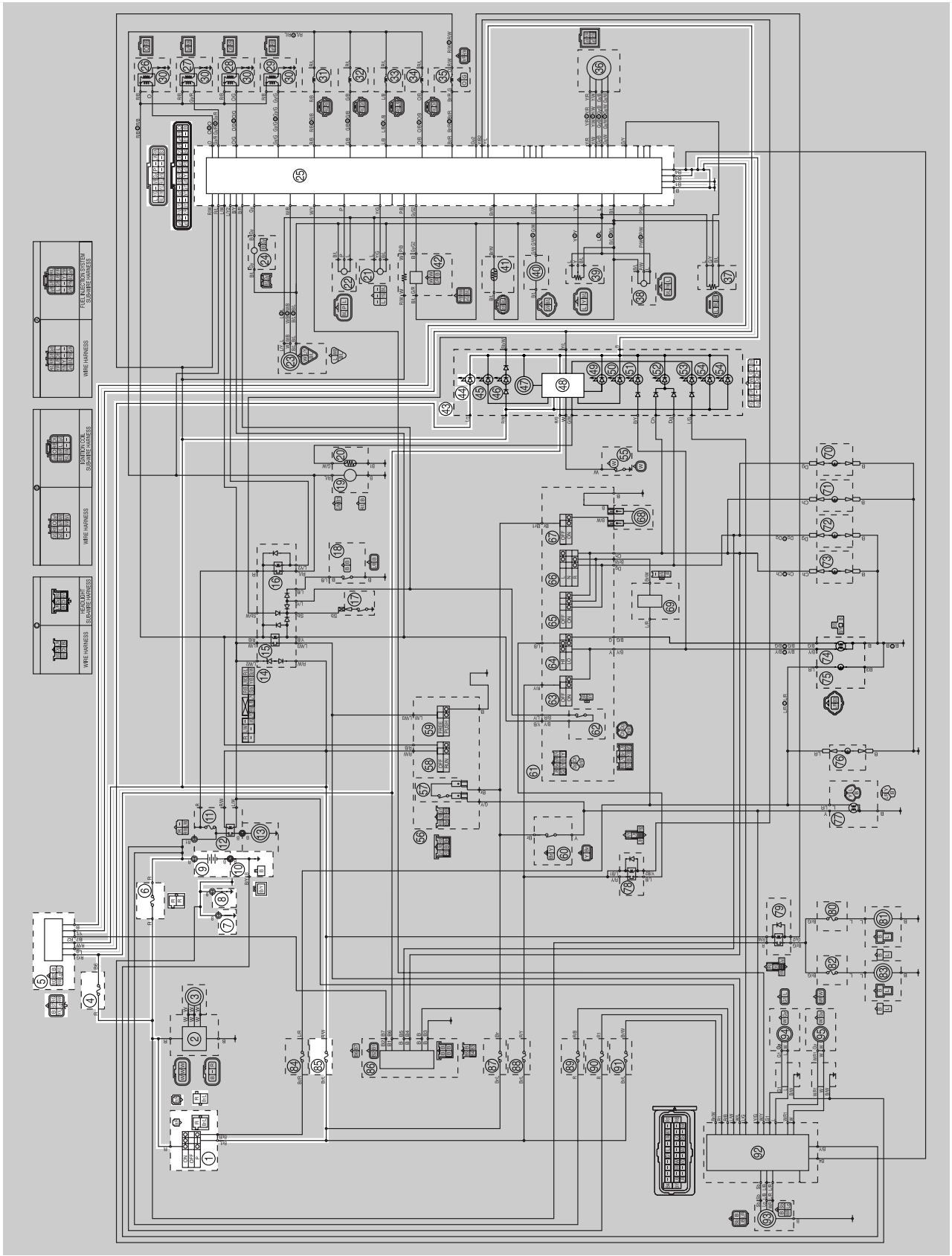
NG→ Properly connect or repair the fuel pump system's wiring.

OK↓

Replace the ECU.

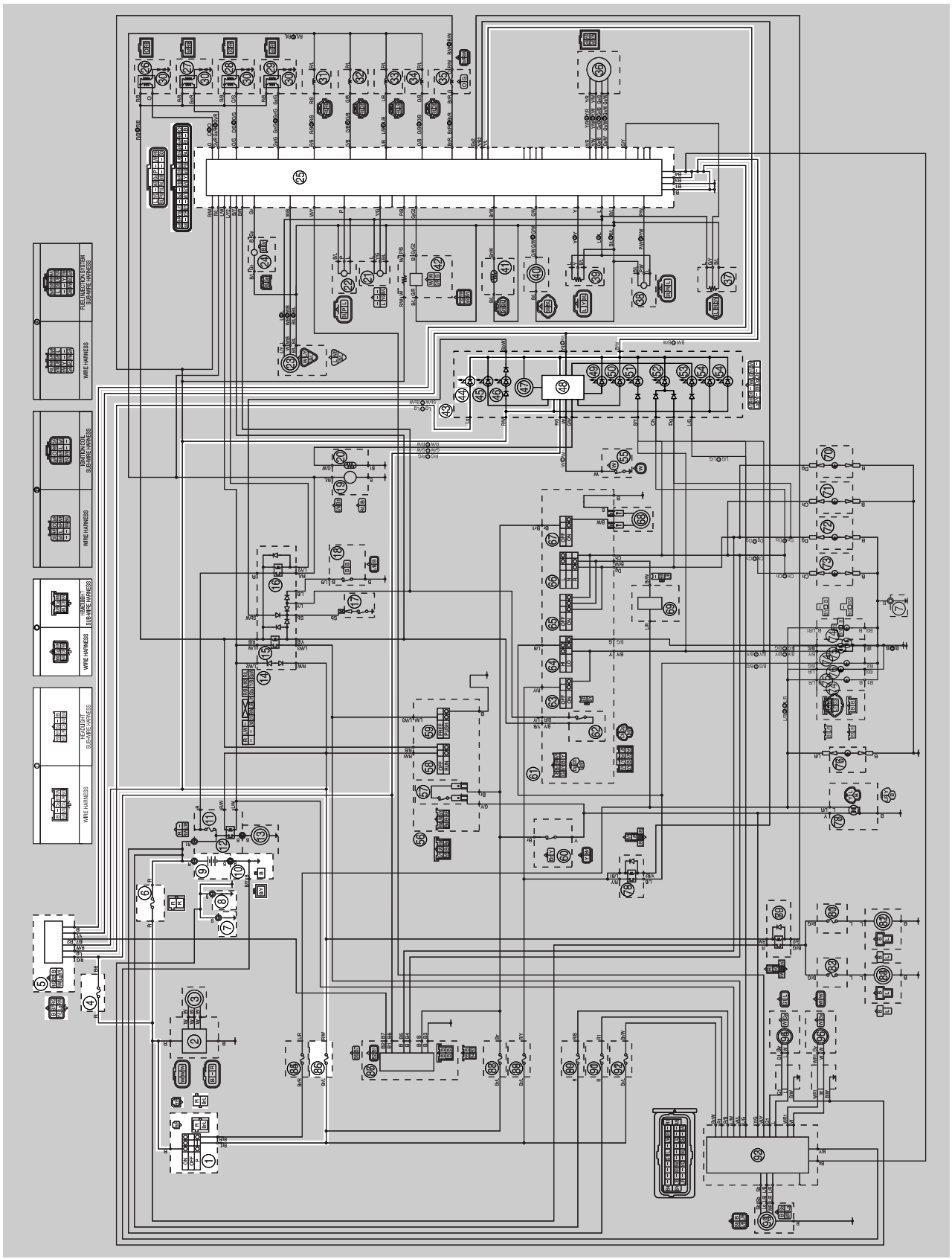
EAS27640
IMMOBILIZER SYSTEM

EAS27650
CIRCUIT DIAGRAM



FZ8NA

1. Main switch
4. Backup fuse
5. Immobilizer unit
6. Main fuse
7. Frame ground
8. Engine ground
9. Battery
10. Negative battery ground lead
25. ECU (engine control unit)
43. Meter assembly
44. Immobilizer system indicator light
48. Multi-function meter
85. Ignition fuse


FUEL INJECTION SYSTEM SUB-WIRE HARNESS
WIRE HARNESS
IGNITION COIL SUB-WIRE HARNESS
WIRE HARNESS
HEADLIGHT SUB-WIRE HARNESS
WIRE HARNESS

FZ8SA

1. Main switch
4. Backup fuse
5. Immobilizer unit
6. Main fuse
7. Frame ground
8. Engine ground
9. Battery
10. Negative battery ground lead
25. ECU (engine control unit)
43. Meter assembly
44. Immobilizer system indicator light
48. Multi-function meter
86. Ignition fuse

EAS27671
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
- The ECU
- 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 registered with a code. If you lose the code re-registering key, the ECU and main switch (equipped with the immobilizer unit) need to be replaced.
Therefore, always use a standard key for driving. (See caution below.)

TIP
Each standard key is registered during production, therefore re-registering at purchase is not necessary.

ECA14971
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.**

EAS27691
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 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 is replaced, the code re-registering key must be registered to the unit.

To register a code re-registering key:

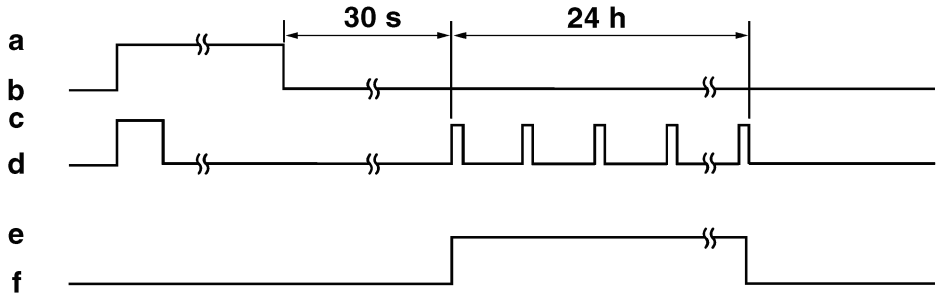
1. Turn the main switch to “ON” with the code re-registering key.

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 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 8-124).

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.

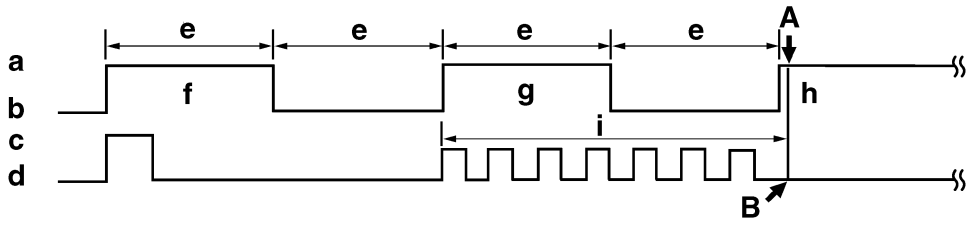
TIP
If he immobilizer system indicator light stops flashing 5 seconds after the first standard key is registered, the registration mode is deactivated. If this occurs, the second standard key cannot be registered, and steps 2 to 4 need to be repeated to register both standard keys.

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

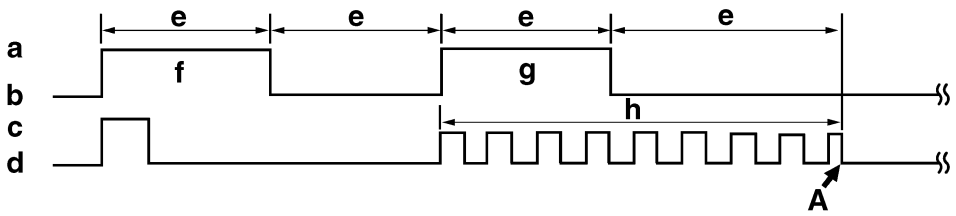


a. Main switch “ON”
b. Main switch “OFF”
c. LED on
d. LED off
e. Less than 5.0 s
f. Code re-registering key
g. First standard key
h. Second standard key
i. Registration mode

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.

EAS27701
TROUBLESHOOTING

When the main switch is turned to “ON”, the immobilizer system indicator light does not come on nor flashes.

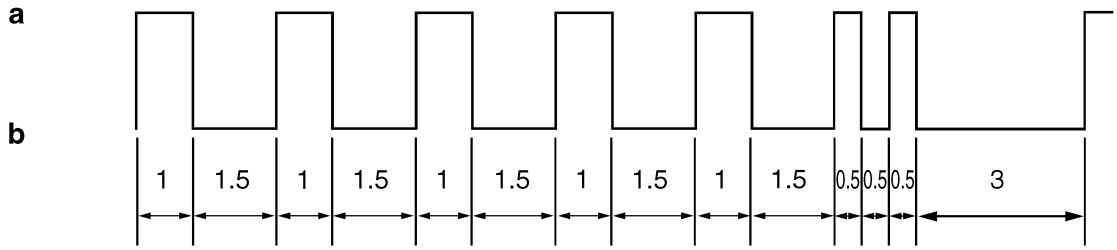
1. Check the fuses. (Main, ignition, and backup) Refer to “CHECKING THE FUSES” on page 8-185.	NG→	Replace the fuse(s).
OK↓		
2. Check the battery. Refer to “CHECKING AND CHARGING THE BATTERY” on page 8-186.	NG→	• Clean the battery terminals. • Recharge or replace the battery.
OK↓		
3. Check the main switch. Refer to “CHECKING THE SWITCHES” on page 8-179.	NG→	Replace the main switch/immobilizer unit.
OK↓		
4. Check the entire immobilizer system wiring. Refer to “CIRCUIT DIAGRAM” on page 8-115.	NG→	Properly connect or repair the immobilizer system wiring.
OK↓		
• Check the condition of the each immobilizer system circuits. • Refer to “SELF-DIAGNOSIS FAULT CODE INDICATION” on page 8-124.		

EAS27721
SELF-DIAGNOSIS FAULT CODE INDICATION
When a system failure occurs, the error code number is indicated in the LCD display of meter and the immobilizer system indicator light blinks at the same time. The pattern of blinking also shows the error code.

Fault code	Part	Symptom	Cause	Action
51	IMMOBILIZER UNIT	Code cannot be transmitted between the key and 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 form 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 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 malfunction.	1. Check the wire harness and connector. 2. Replace the main switch/ immobilizer unit. 3. Replace the ECU.
54	IMMOBILIZER UNIT	Codes transmitted between the ECU 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 failure. (The ECU 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.

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	Undefinition 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.

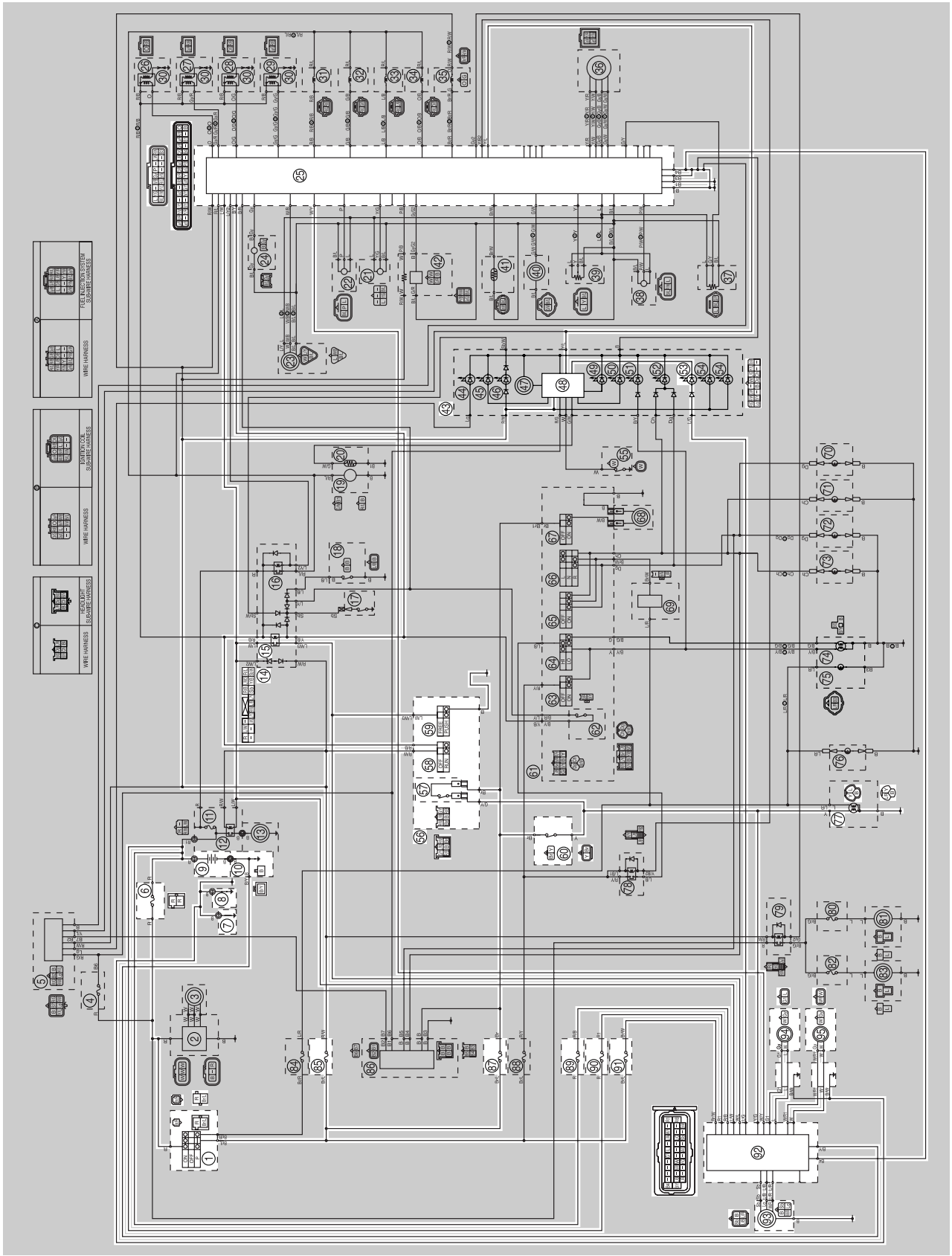
Immobilizer system indicator light fault code indication
Digit of 10 : Cycles of 1 sec. ON and 1.5 sec. OFF.
Digit of 1 : Cycles of 0.5 sec. ON and 0.5 sec. OFF.
Example: fault code 52



a. Light on
b. Light off

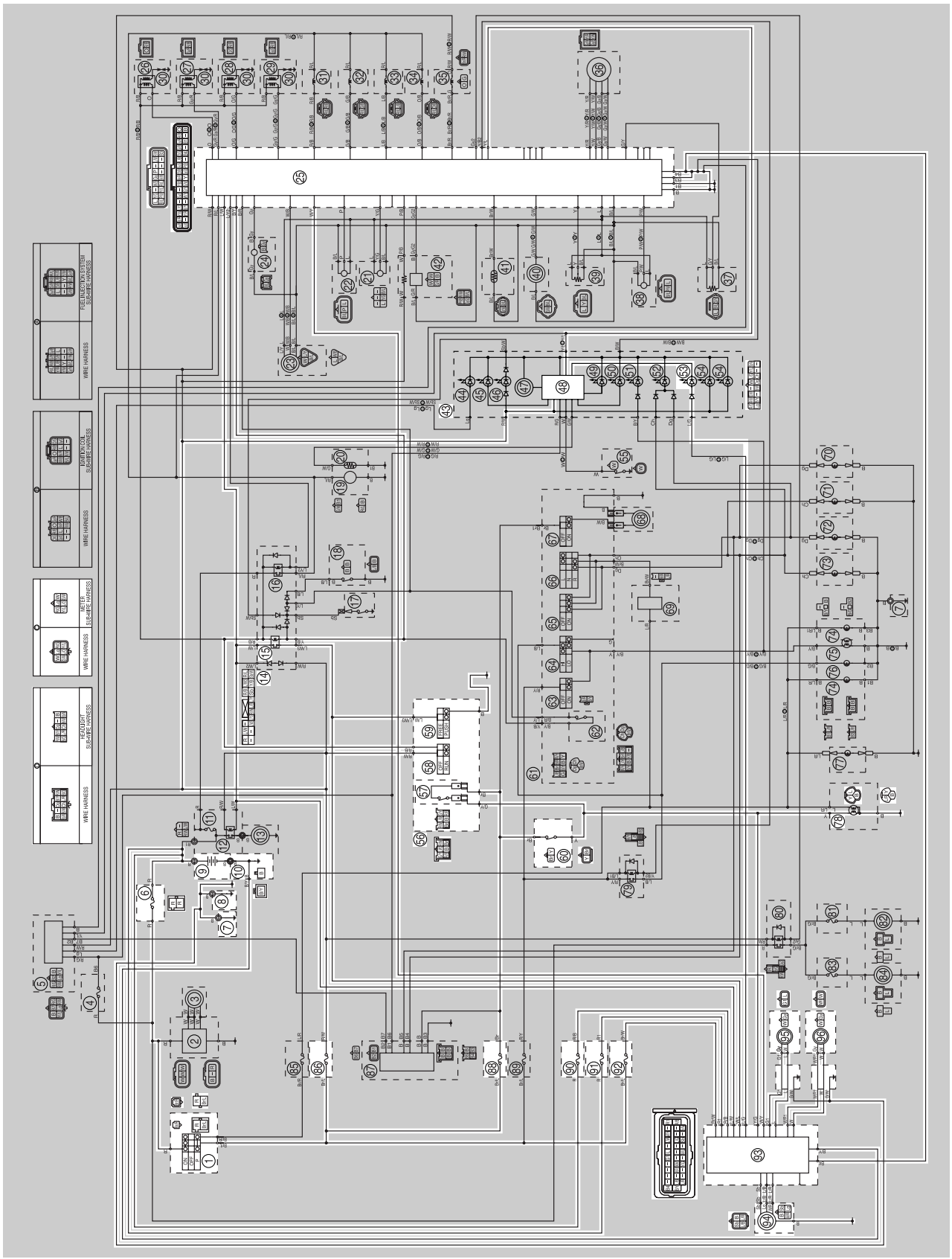
EAS28790
ABS (ANTI-LOCK BRAKE SYSTEM)

EAS27730
CIRCUIT DIAGRAM



FZ8NA

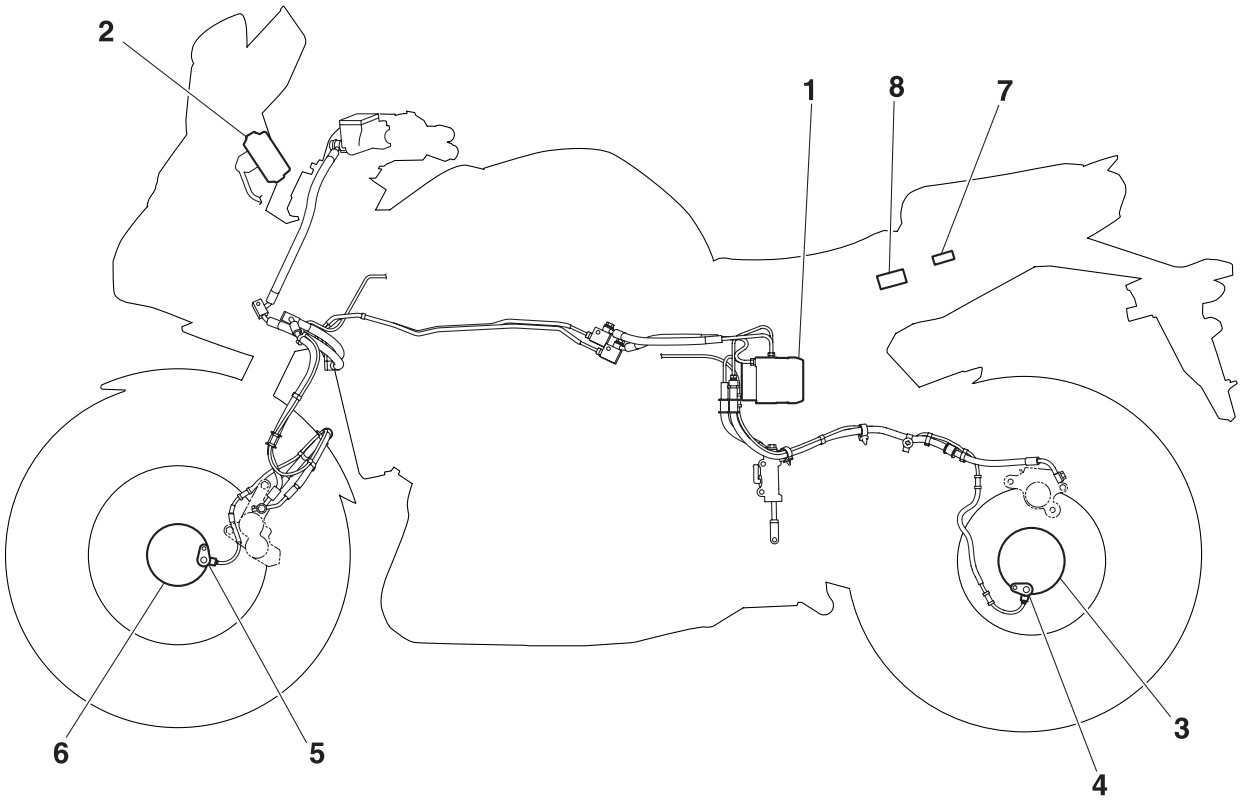
1. Main switch
6. Main fuse
7. Frame ground
8. Engine ground
9. Battery
10. Negative battery ground lead
14. Relay unit
15. Starting circuit cut-off relay
25. ECU (engine control unit)
43. Meter assembly
48. Multi-function meter
53. ABS warning light
56. Right handlebar switch
57. Front brake light switch
58. Engine stop switch
59. Start switch
60. Rear brake light switch
77. Tail/brake light
85. Ignition fuse
87. Signal fuse
89. ABS motor fuse
90. ABS solenoid fuse
91. ABS ECU fuse
92. ABS ECU (electronic control unit)
93. ABS test coupler
94. Front wheel sensor
95. Rear wheel sensor


FUEL INJECTION SYSTEM SUB-WIRE HARNESS
WIRE HARNESS
IGNITION COIL SUB-WIRE HARNESS
WIRE HARNESS
METER SUB-WIRE HARNESS
WIRE HARNESS
HEADLIGHT SUB-WIRE HARNESS
WIRE HARNESS

FZ8SA

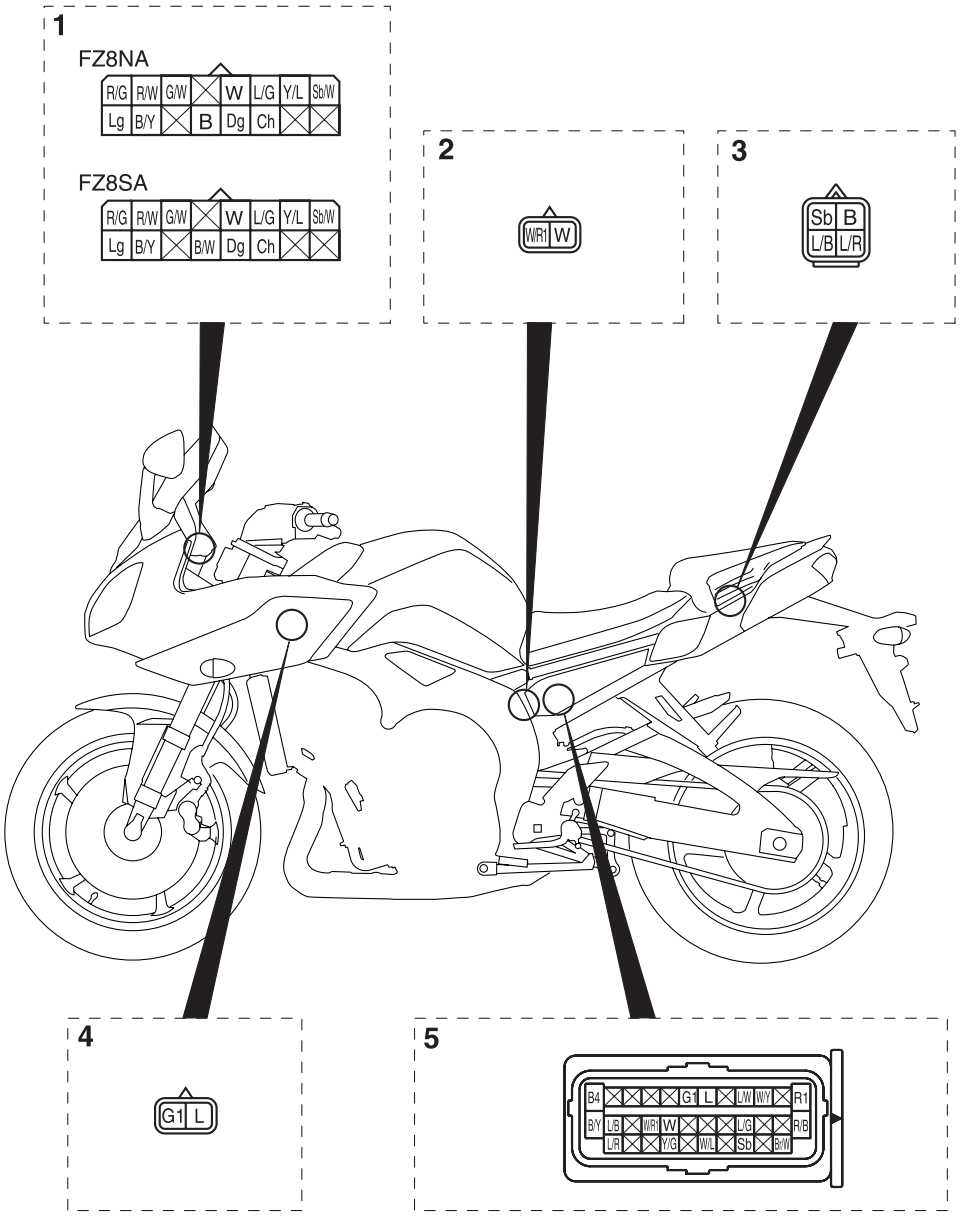
1. Main switch
6. Main fuse
7. Frame ground
8. Engine ground
9. Battery
10. Negative battery ground lead
14. Relay unit
15. Starting circuit cut-off relay
25. ECU (engine control unit)
43. Meter assembly
48. Multi-function meter
53. ABS warning light
56. Right handlebar switch
57. Front brake light switch
58. Engine stop switch
59. Start switch
60. Rear brake light switch
78. Tail/brake light
86. Ignition fuse
88. Signal fuse
90. ABS motor fuse
91. ABS solenoid fuse
92. ABS ECU fuse
93. ABS ECU (electronic control unit)
94. ABS test coupler
95. Front wheel sensor
96. Rear wheel sensor

EAS27740
ABS COMPONENTS CHART



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 1

EAS27750
ABS COUPLER LOCATION CHART

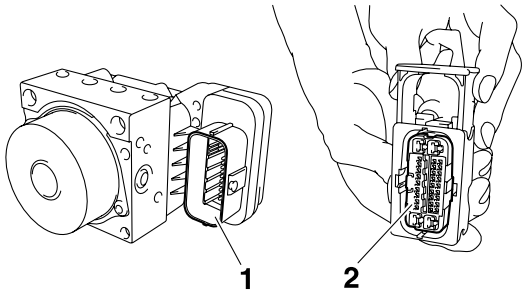


1. Meter assembly coupler
2. Rear wheel sensor coupler
3. ABS test coupler
4. Front wheel sensor coupler
5. ABS ECU coupler

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 8-174.)

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 8-136.

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 8-174.) 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.

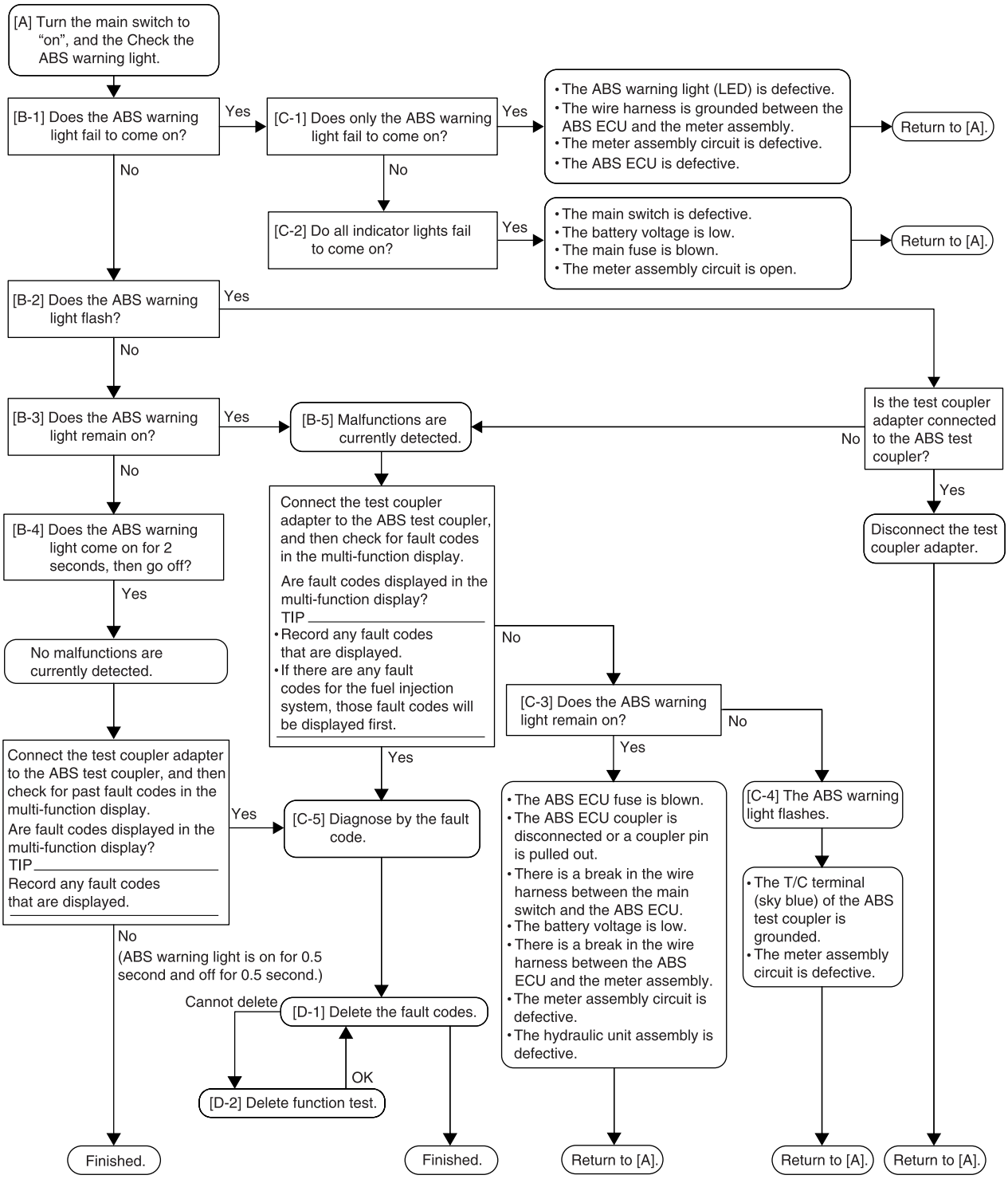
Special precautions for handling and servicing a vehicle equipped with ABS
ECA4B56024
NOTICE
Care should be taken not to damage components by subjecting them to shocks or pulling on them with too much force since the ABS components are precisely adjusted.

- 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 8-174.)

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 8-140.

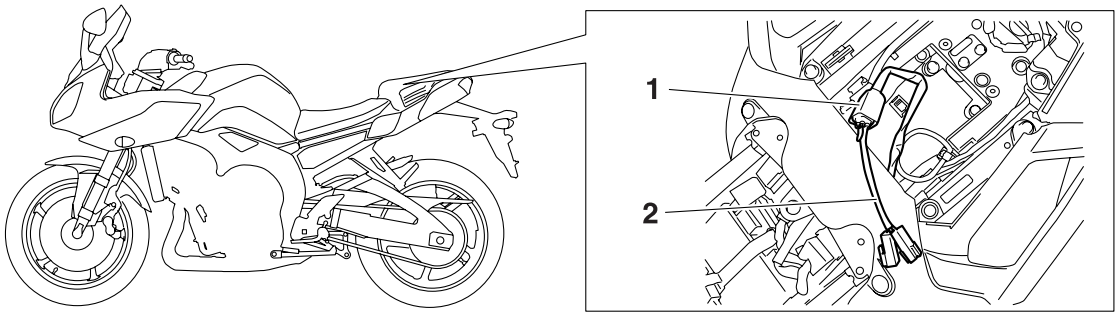
EAS4B56015

[B-3] THE ABS WARNING LIGHT REMAINS ON

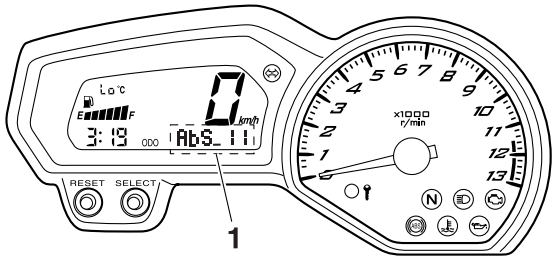
1. A malfunction is detected. [B-6]

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 8-179.
   - 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 8-186.
   - 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 8-185.
   - If the main fuse is blown, replace the fuse.
4. Circuit
   - Check the meter assembly circuit.
     Refer to “CIRCUIT DIAGRAM” on page 8-127.
   - 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 8-186.
   - 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 8-185.
   - 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
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.

Fault code No.	Symptom	Check point
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 8-19.
ABS_53	Power voltage is too low.	• Battery voltage • Connection of the ABS ECU coupler • Wire harness • Refer to “CHARGING SYSTEM” on page 8-19.
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 8-19.

Fault code No.	Symptom	Check point
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 suitable 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 4-14.	
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 4-15.	
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 4-15.	

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 4-24.	
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 4-25.	
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 4-25.	

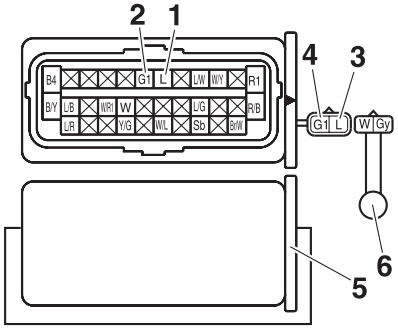
Fault code No.	ABS_13 ABS_26	Symptom	Incorrect signal from the front wheel sensor is detected.	
Order	**Item/components and probable cause**		**Check or maintenance job**	**Reinstatement confirmation method**
1	Installed condition of wheel sensor.		Check for looseness. Repair or replace the wheel sensor 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 4-14.	
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 4-15.	
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 4-15.	
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 4-24.	
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 4-25.	
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 4-25.	
5	Hydraulic unit assembly internal malfunction.		Replace the hydraulic unit assembly.	

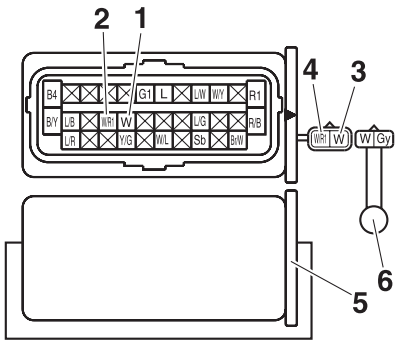
TIP
Vehicle possibly ridden on uneven roads.

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 blue terminal “1” and the blue terminal “3” and between the green terminal “2” and the green 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 blue terminal “1” or blue terminal “3” and between the ground and the green terminal “2” or green 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 blue terminal “1” and the green terminal “2” and between the blue terminal “3” and the green 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 white/red terminal “2” and the white/red 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 white/red terminal “2” or white/red 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 white/red terminal “2” and between the white terminal “3” and the white/red 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 4-14.	• 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 4-15.	
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 4-24.	• 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 4-25.	
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 8-11.	• 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–Blue/white)	

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 8-184.	• 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 8-186.	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 8-185.	
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/yellow–Black/yellow)	
5	Hydraulic unit assembly internal malfunction.		Replace the hydraulic unit assembly.	

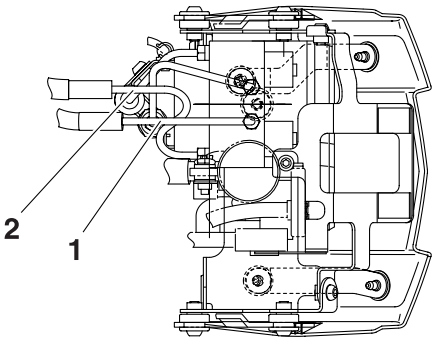
Fault code No.	ABS_32	Symptom	Hydraulic unit solenoid relay is short-circuited.	
Order	**Item/components and probable cause**		**Check or maintenance job**	**Reinstatement confirmation method**
1	Short circuit in solenoid relay.		Replace the hydraulic unit assembly.	• Turn the main switch to “ON” and 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 8-186.	• 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 8-185.	
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/black–Red/black) • Between ABS ECU coupler and ground. (Black/yellow–Black/yellow)	
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 4-35.	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 4-60.	

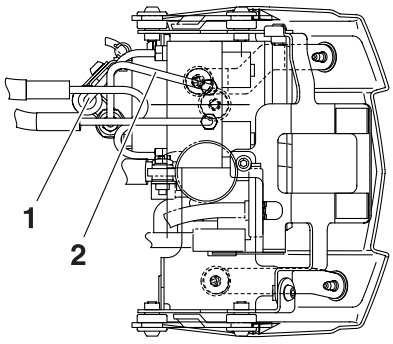
EWA4B56001

⚠ WARNING

The front brakes will not function properly if the connections are reversed.
- **Brake pipe/joint assembly “1” outlet: to the front brake calipers**
- **Brake pipe/joint assembly “2” inlet: from the front brake master cylinder**

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 8-174 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 8-174 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 4-49.	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 4-60.	

EWA4B56002

⚠ WARNING

The rear brake will not function properly if the connections are reversed.
- **Brake pipe/joint assembly “1” inlet: from the rear brake master cylinder**
- **Brake pipe/joint assembly “2” 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 8-174 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 8-174 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 4-14.	
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 4-15.	
4	Defective sensor rotor.		• Check the surface of the sensor rotor for damage. • If there is visible damage, replace the sensor rotor.	

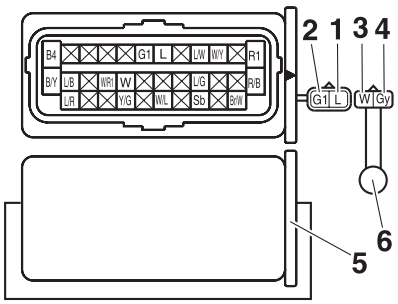
Fault code No.	ABS_44	Symptom	Incorrect signal from the rear wheel sensor is detected.	
Order	**Item/components and probable cause**		**Check or maintenance job**	**Reinstatement confirmation method**
1	Installed condition of wheel sensor.		Check for looseness. Repair or replace the wheel sensor if necessary.	• 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 4-24.	
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 4-25.	
4	Defective sensor rotor.		• Check the surface of the sensor rotor for damage. • If there is visible damage, replace the sensor rotor.	

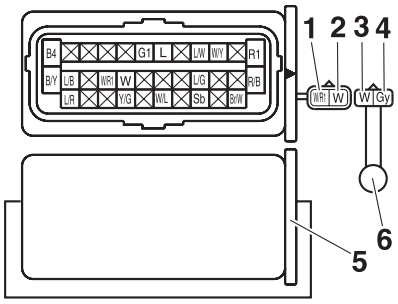
Fault code No.	ABS_51 ABS_52	Symptom	Power voltage is too high.	
Order	**Item/components and probable cause**		**Check or maintenance job**	**Reinstatement confirmation method**
1	Battery voltage		Replace the battery. Refer to “CHECKING AND CHARGING THE BATTERY” on page 8-186.	• Turn the main switch 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 8-19.	

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 8-186.	• 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 8-19.	

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 8-186.	• 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/black–Red/black)	
4	Charging system		Check the charging system. Refer to “CHARGING SYSTEM” on page 8-19.	

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.

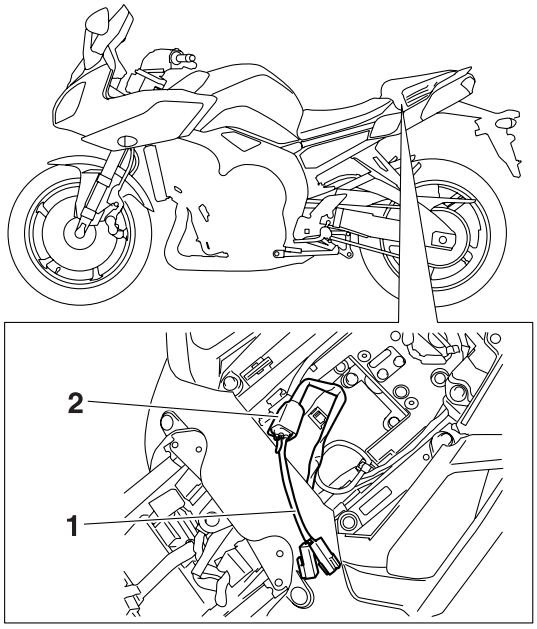
Fault code No.	ABS_63	Symptom	Front wheel sensor power is abnormal.	
Order	**Item/components and probable cause**		**Check or maintenance job**	**Reinstatement confirmation method**
1	Short circuit in wire harness.		• Check that there is no short circuit between the blue terminal "1" and the green terminal "2". • Check that there is no short circuit between the frame ground and the green 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 white/red 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 8-140.

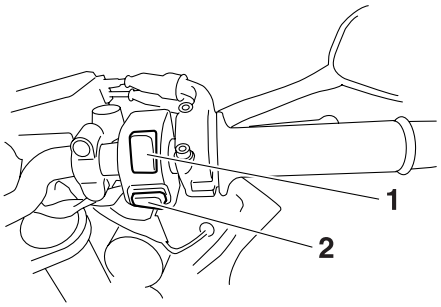


2. Turn the main switch to “ON”.
   Fault codes will be displayed in the multi-function display.
3. Set the engine stop switch “1” to “⊗”.

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 10 times in 4 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

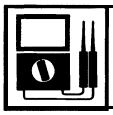
If fault codes are still displayed in the multi-function display, the malfunctions have not been repaired. Diagnose the malfunctions using the fault codes.

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 sidestand.
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

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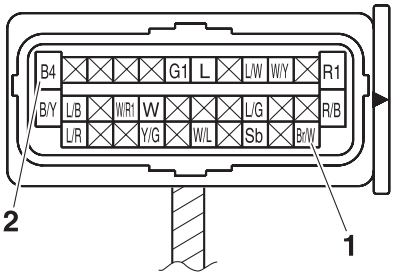
a. Connect the digital circuit tester (DC 20 V) to the ABS ECU coupler.

Digital circuit tester
90890-03174
Model 88 Multimeter with tachometer
YU-A1927

- Positive tester probe → Brown/white "1"
- Negative tester probe → Black "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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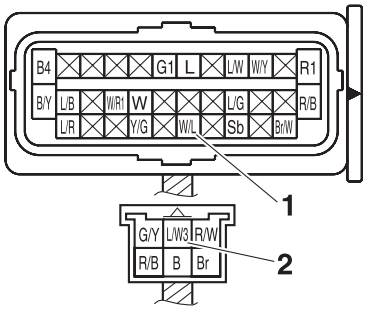
a. Connect the digital circuit tester to the ABS ECU coupler and right handlebar switch coupler.

Digital circuit tester
90890-03174
Model 88 Multimeter with tachometer
YU-A1927

- Positive tester probe → White/blue "1" (ABS ECU)
- Negative tester probe → Blue/white "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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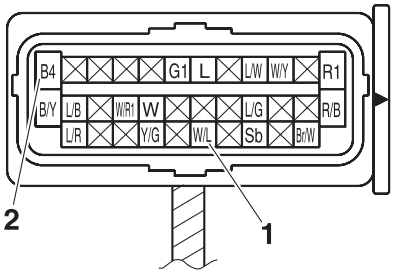
a. Connect the digital circuit tester (DC 12 V) to the ABS ECU coupler.

Digital circuit tester
90890-03174
Model 88 Multimeter with tachometer
YU-A1927

- Positive tester probe → White/blue "1"
- Negative tester probe → Black "2"



b. Push the start switch.
c. Measure the ABS ECU voltage.

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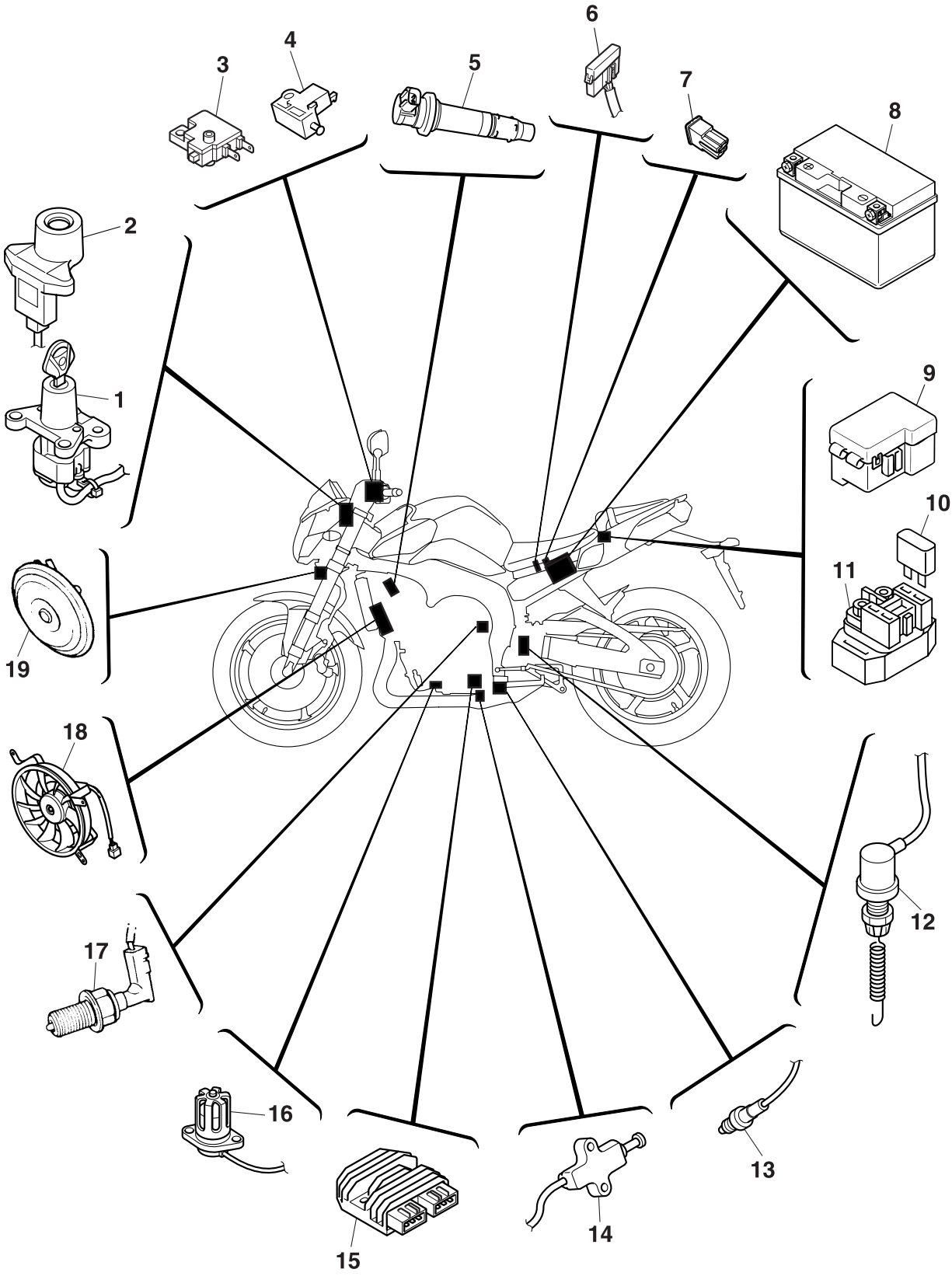
8. If the above-mentioned checks are within specification, replace the hydraulic unit assembly.

EAS4B56024
[D-3] FINAL CHECK

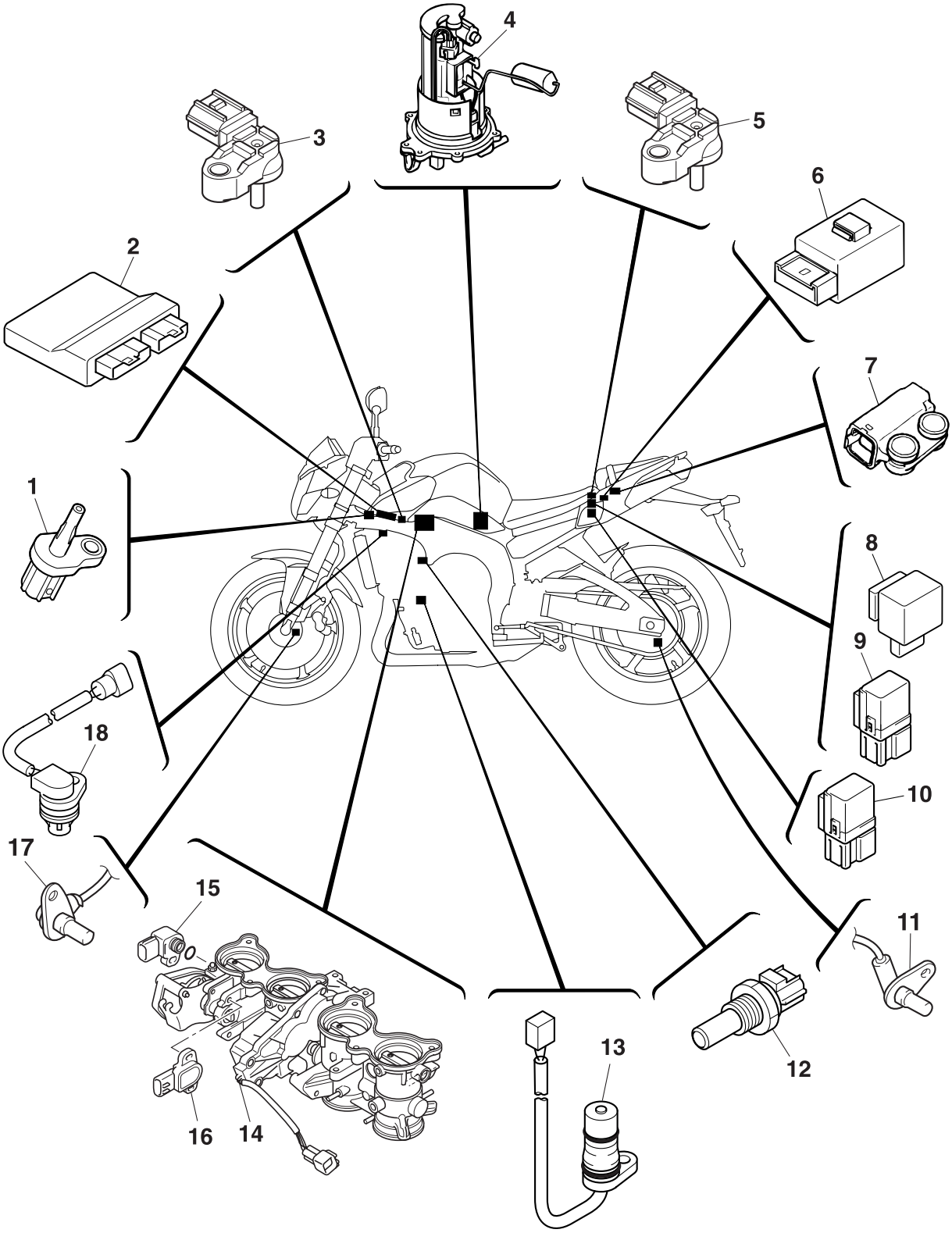
Checking procedures

1. Check the brake fluid level in the brake master cylinder reservoir.
   Refer to “CHECKING THE BRAKE FLUID LEVEL” on page 3-14.
2. Check the wheel sensor housings and wheel sensors for proper installation.
   Refer to “INSTALLING THE FRONT WHEEL (FRONT BRAKE DISCS)” on page 4-19 and “INSTALLING THE REAR WHEEL (REAR BRAKE DISC)” on page 4-28.
3. Perform hydraulic unit operation test 1 or 2.
   Refer to “HYDRAULIC UNIT OPERATION TESTS” on page 4-60.
4. Delete the fault codes.
   Refer to “[D-1] DELETING THE FAULT CODES” on page 8-172.
5. Perform a trial run.
   Refer to “TRIAL RUN” on page 4-63.

EAS27973
ELECTRICAL COMPONENTS



1. Main switch
2. Immobilizer unit
3. Front brake light switch
4. Clutch switch
5. Ignition coil
6. Fuse box 2
7. Main fuse
8. Battery
9. Fuse box 1
10. Fuel injection system fuse
11. Starter relay
12. Rear brake light switch
13. O_2 sensor
14. Sidestand switch
15. Rectifier/regulator
16. Oil level switch
17. Neutral switch
18. Radiator fan motor
19. Horn


1
2
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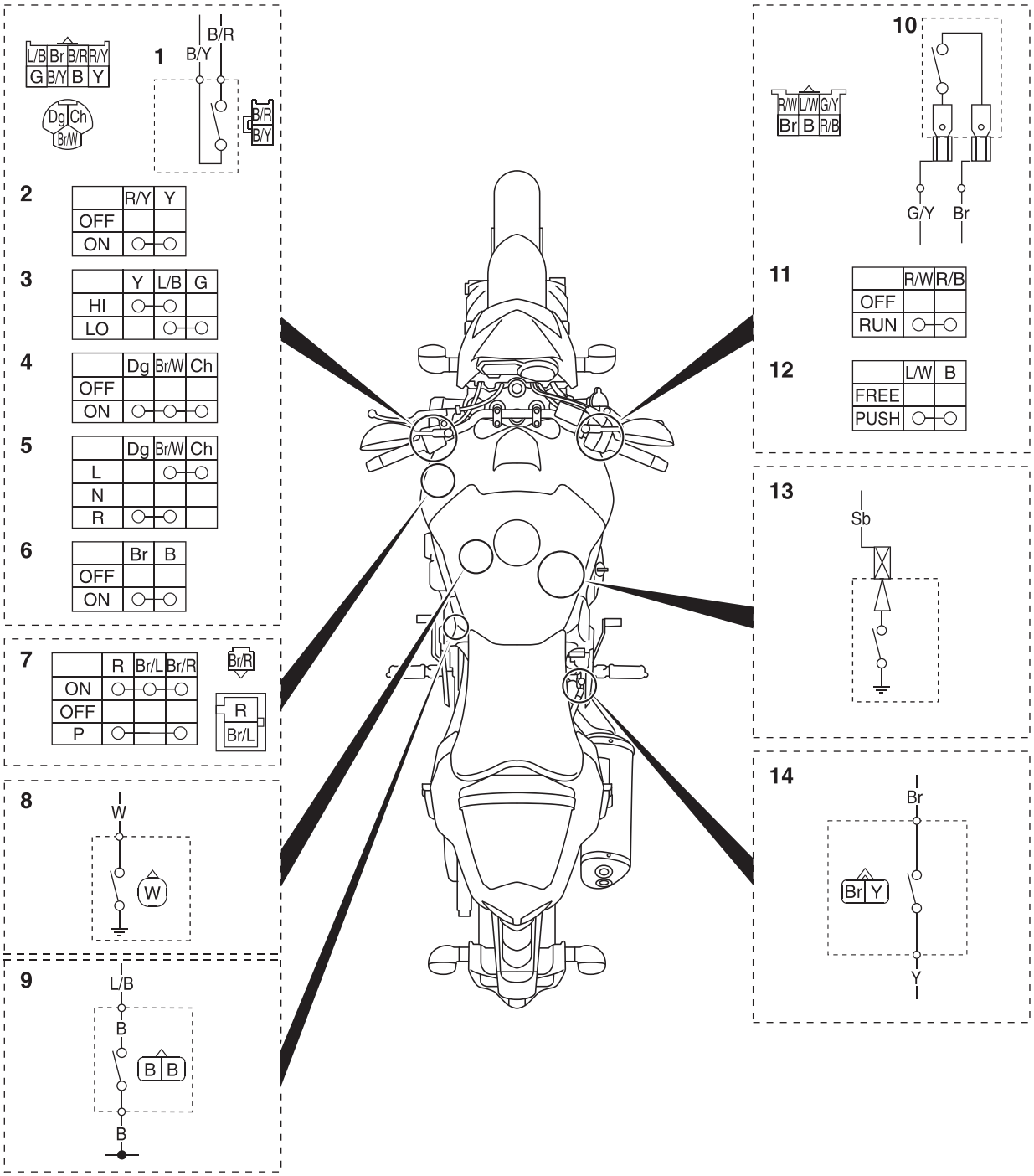
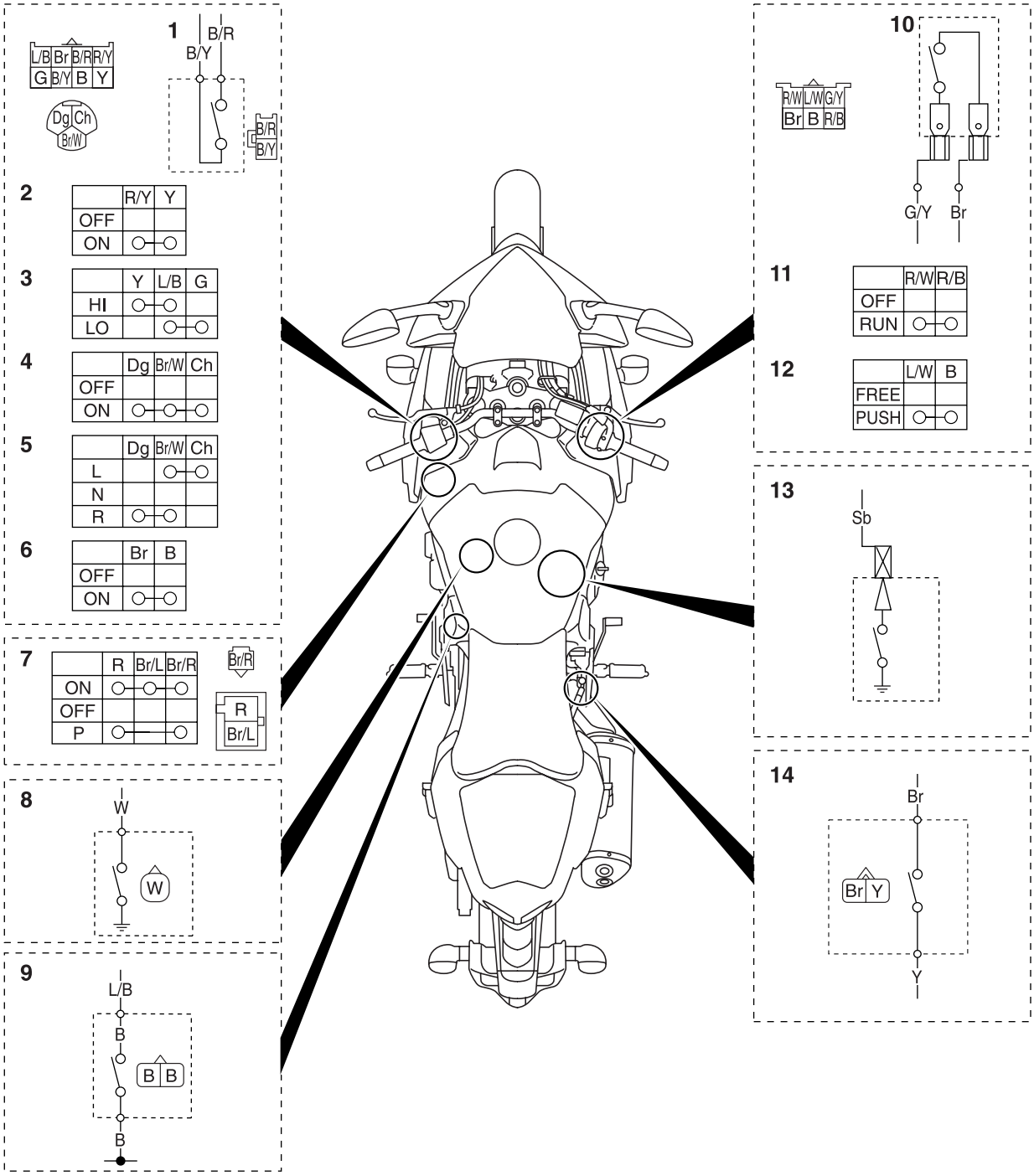
1. Intake air temperature sensor
2. ECU (engine control unit)
3. Intake air pressure sensor
4. Fuel pump
5. Atmospheric pressure sensor
6. Relay unit
7. Lean angle sensor
8. Turn signal/hazard relay
9. Headlight relay
10. Radiator fan motor relay
11. Rear wheel sensor
12. Coolant temperature sensor
13. Crankshaft position sensor
14. Sub-throttle servo motor
15. Sub-throttle position sensor
16. Throttle position sensor
17. Front wheel sensor
18. Cylinder identification sensor

EAS27981
CHECKING THE SWITCHES



FZ8NA

1. Clutch switch
2. Pass switch
3. Dimmer switch
4. Hazard switch
5. Turn signal switch
6. Horn switch
7. Main switch
8. Oil level switch
9. Sidestand switch
10. Front brake light switch
11. Engine stop switch
12. Start switch
13. Neutral switch
14. Rear brake light switch


1
B/R
B/Y
L/B Br B/R R/Y
G B/Y B Y
Dg Ch
Br/W
B/R
B/Y
2
R/Y Y
OFF
ON
3
Y L/B G
HI
LO
4
Dg Br/W Ch
OFF
ON
5
Dg Br/W Ch
L
N
R
6
Br B
OFF
ON
7
R Br/L Br/R
ON
OFF
P
Br/R
R
Br/L
8
W
W
9
L/B
B
B B
B
10
R/W L/W G/Y
Br B R/B
G/Y Br
11
R/W R/B
OFF
RUN
12
L/W B
FREE
PUSH
13
Sb
14
Br
Br Y
Y

FZ8SA

1. Clutch switch
2. Pass switch
3. Dimmer switch
4. Hazard switch
5. Turn signal switch
6. Horn switch
7. Main switch
8. Oil level switch
9. Sidestand switch
10. Front brake light switch
11. Engine stop switch
12. Start switch
13. Neutral switch
14. Rear brake light switch

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

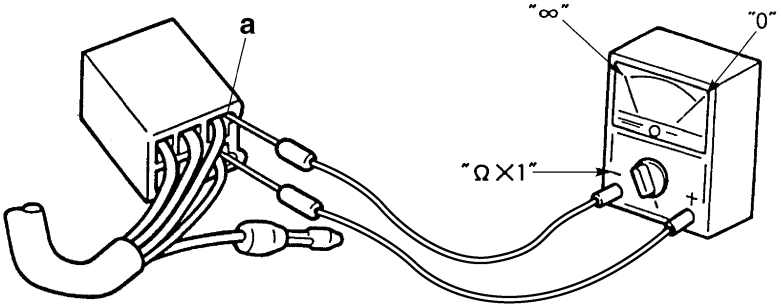
NOTICE

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.

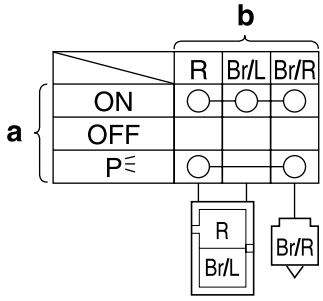
Pocket tester
90890-03112
Analog pocket tester
YU-03112-C

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".
There is continuity between red and brown/red when the switch is set to "P".



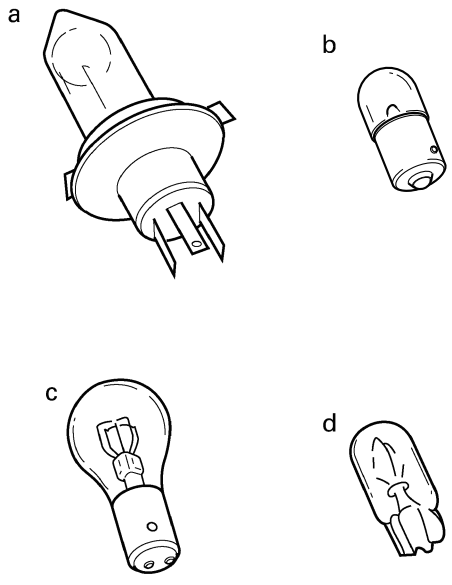
EAS27990
CHECKING THE BULBS AND BULB SOCKETS

Check each bulb and bulb socket for damage or wear, proper connections, and also for continuity between the terminals.
Damage/wear → Repair or replace the bulb, bulb socket or both.
Improperly connected → Properly connect.
No continuity → Repair or replace the bulb, bulb socket or both.

Types of bulbs

The bulbs used on this vehicle are shown in the illustration.

- Bulbs "a" is 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 "b" and "c" are used for turn signal and tail/brake lights and can be removed from the socket by pushing and turning the bulb counterclockwise.
- Bulbs "d" is used for meter and indicator lights and can be removed from their respective socket by carefully pulling them out.



Checking the condition of the bulbs

The following procedure applies to all of the bulbs.

1. Remove:
   - Bulb

EWA13320

WARNING

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

ECA14380

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 it with a cloth moistened with alcohol or lacquer thinner.**

2. Check:
   - Bulb (for continuity)
     (with the pocket tester)
     No continuity → Replace.

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

TIP

Before checking for continuity, set the pocket tester to "0" and to the "Ω × 1" range.

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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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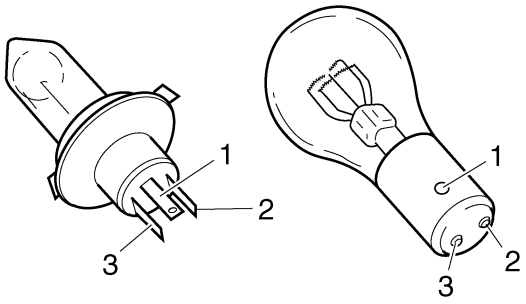

Checking the condition of the bulb sockets
The following procedure applies to all of the bulb sockets.
1. Check:
   • Bulb socket (for continuity) (with the pocket tester)
   No continuity → Replace.

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

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 pocket tester probes to the respective leads of the bulb socket.
c. Check the bulb socket for continuity. If any of the readings indicate no continuity, replace the bulb socket.

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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:
   • Rider seat
   Refer to "GENERAL CHASSIS" on page 4-1.
2. Check:
   • Fuse

▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼

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

TIP
Set the pocket tester selector to "Ω × 1".

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

b. If the pocket tester indicates "∞", replace the fuse.

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3. Replace:
   • Blown fuse

▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼

a. Set 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	50 A	1
Headlight	15 A	1
Signaling system	10 A	1
Ignition	15 A	1
Taillight	10 A	1
Backup	10 A	1
Fuel injection system	15 A	1
Radiator fan motor	10 A	2
ABS motor	30 A	1
ABS solenoid	20 A	1
ABS control unit	7.5 A	1
Reserve	30 A	1
Reserve	20 A	1
Reserve	15 A	2
Reserve	10 A	1
Reserve	7.5 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 electrical system, cause the lighting and

ignition systems to malfunction and could possibly cause a fire.

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4. Install:
   - Rider seat
     Refer to “GENERAL CHASSIS” on page 4-1.

EAS28031
CHECKING AND CHARGING THE BATTERY

EWA13290
⚠ WARNING

Batteries generate explosive hydrogen gas and contain electrolyte which is made of poisonous and highly caustic sulfuric acid. Therefore, always follow these preventive measures:
- **Wear protective eye gear when handling or working near batteries.**
- **Charge batteries in a well-ventilated area.**
- **Keep batteries away from fire, sparks or open flames (e.g., welding equipment, lighted cigarettes).**
- **DO NOT SMOKE when charging or handling batteries.**
- **KEEP BATTERIES AND ELECTROLYTE OUT OF REACH OF CHILDREN.**
- **Avoid bodily contact with electrolyte as it can cause severe burns or permanent eye injury.**

FIRST AID IN CASE OF BODILY CONTACT:
EXTERNAL
- **Skin — Wash with water.**
- **Eyes — Flush with water for 15 minutes and get immediate medical attention.**

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

ECA13661
NOTICE

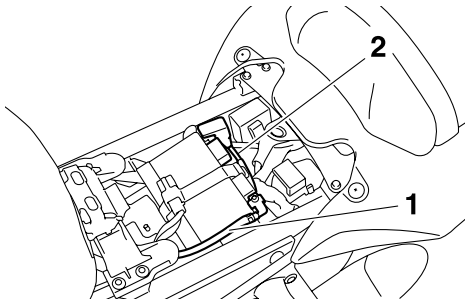
- **This is a VRLA (Valve Regulated Lead Acid) battery. Never remove the sealing caps because the balance between cells will not be maintained and battery performance will deteriorate.**
- **Charging time, charging amperage and charging voltage for a VRLA (Valve Regulated Lead Acid) battery are different from those of conventional batteries. The VRLA (Valve Regulated Lead Acid) battery should be charged according to the appropriate charging method. If the battery is overcharged, the electrolyte level will drop considerably. Therefore, take special care when charging the battery.**

TIP
Since VRLA (Valve Regulated Lead Acid) 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:
   - Rider seat
     Refer to “GENERAL CHASSIS” on page 4-1.
2. Disconnect:
   - Battery leads
     (from the battery terminals)

ECA13640
NOTICE

First, disconnect the negative battery lead “1”, and then positive battery lead “2”.



3. Remove:
   - Battery
     Refer to “GENERAL CHASSIS” on page 4-1.
4. Check:
   - Battery charge

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a. Connect a pocket tester to the battery terminals.

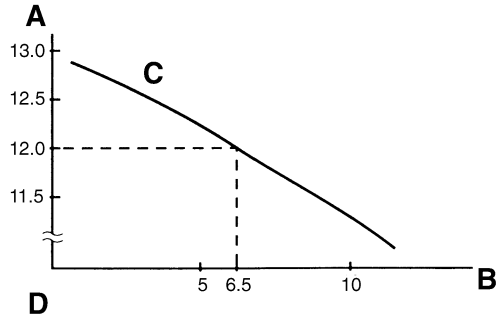
• Positive tester probe → positive battery terminal • Negative tester probe → negative battery terminal

TIP
- The charge state of a VRLA (Valve Regulated Lead Acid) battery can be checked by measuring its open-circuit voltage (i.e., the

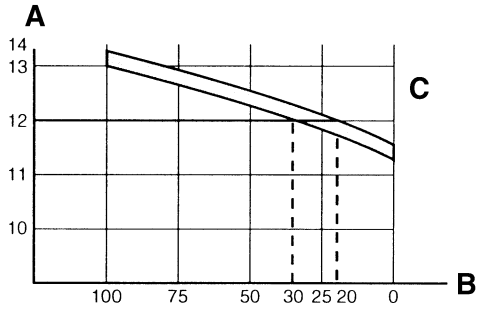
voltage when the positive battery terminal is disconnected).
- No charging is necessary when the open-circuit voltage equals or exceeds 12.8 V.

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

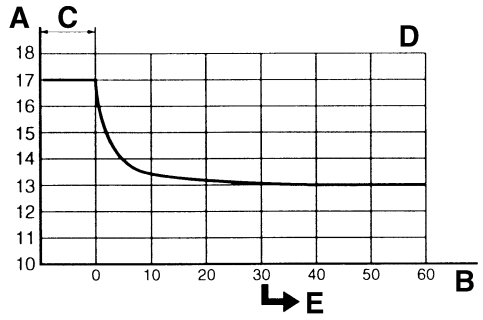
⚠ WARNING

Do not quick charge a battery.

ECA13671

NOTICE

- **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 a VRLA (Valve Regulated Lead Acid) 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 stopped.

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 stopped.

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 (Valve Regulated Lead Acid) 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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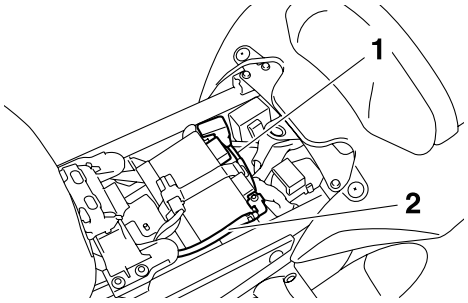
6. Install:
   - Battery
     Refer to "GENERAL CHASSIS" on page 4-1.

7. Connect:
   • Battery leads
   (to the battery terminals)

ECA13630

NOTICE

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



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

Recommended lubricant
Dielectric grease

10. Install:
    • Rider seat
    Refer to "GENERAL CHASSIS" on page 4-1.

EAS28040

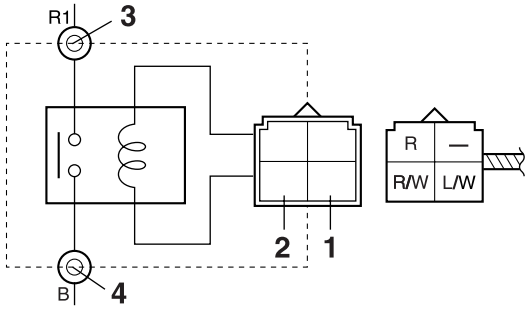
CHECKING THE RELAYS

Check each switch for continuity with the pocket tester. If the continuity reading is incorrect, replace the relay.

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

1. Disconnect the relay from the wire harness.
2. Connect the pocket tester (Ω × 1) and battery (12 V) to the relay terminal as shown.
   Check the relay operation.
   Out of specification → Replace.

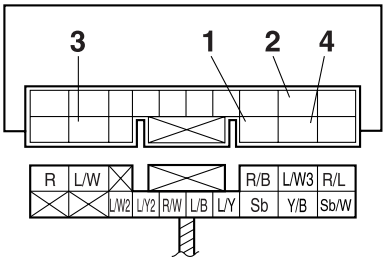
Starter relay



1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe

Relay operation
Continuity
(between "3" and "4")

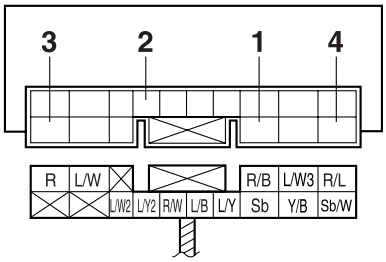
Relay unit (starting circuit cut-off relay)



1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe

Result
Continuity
(between "3" and "4")

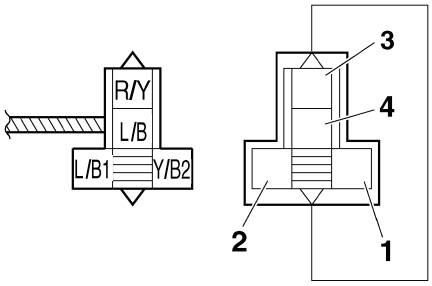
Relay unit (fuel pump relay)



1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe

Result
Continuity
(between "3" and "4")

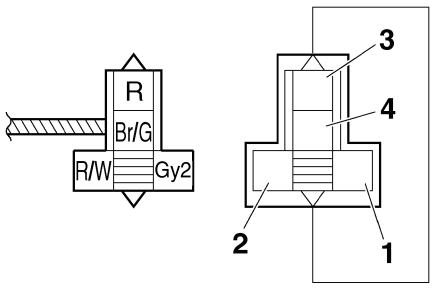
Headlight relay



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")

EAS39P1801
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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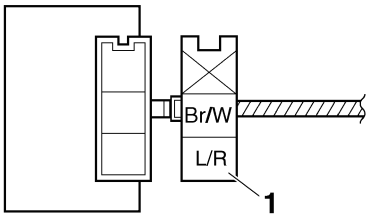
a. Connect the pocket tester (DC 20 V) to the turn signal/hazard relay terminal as shown.

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

- Positive tester probe
  Blue/red "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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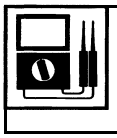
2. Check:
   • Turn signal/hazard relay output voltage
     Out of specification → Replace.



Turn signal/hazard relay output voltage
DC 12 V

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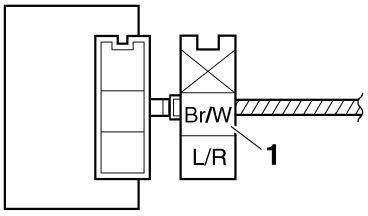
a. Connect the pocket tester (DC 20 V) to the turn signal/hazard relay terminal as shown.

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

• 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)

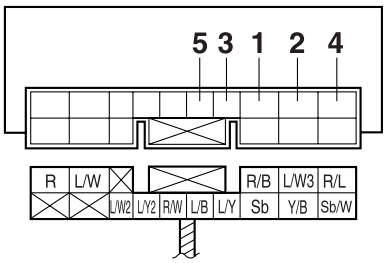
1. Check:
   • Relay unit (diode)
     Out of specification → Replace.

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

TIP

The pocket tester or the analog pocket tester readings are shown in the following table.

Continuity
Positive tester probe
Sky blue “1”
Negative tester probe
Yellow/black “2”
No continuity
Positive tester probe
Yellow/black “2”
Negative tester probe
Sky blue “1”
Continuity
Positive tester probe
Sky blue “1”
Negative tester probe
Blue/yellow “3”
No continuity
Positive tester probe
Blue/yellow “3”
Negative tester probe
Sky blue “1”
Continuity
Positive tester probe
Sky blue “1”
Negative tester probe
Sky blue/white “4”
No continuity
Positive tester probe
Sky blue/white “4”
Negative tester probe
Sky blue “1”
Continuity
Positive tester probe
Blue/black “5”
Negative tester probe
Blue/yellow “3”
No continuity
Positive tester probe
Blue/yellow “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 ($\Omega \times 1$) 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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EAS28100
CHECKING THE IGNITION COILS

The following procedure applies to all of the ignition coils.

1. Check:
   - Primary coil resistance
     Out of specification → Replace.

Primary coil resistance
1.19–1.61 Ω

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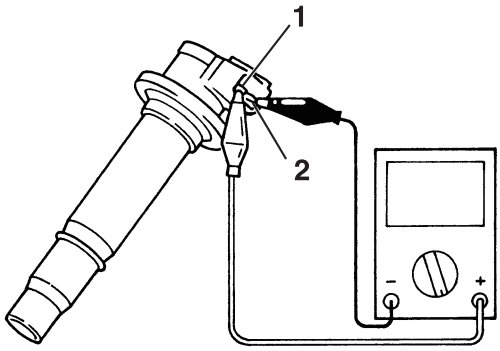
a. Disconnect the ignition coil connectors from the ignition coil terminals.
b. Connect the pocket tester ($\Omega \times 1$) to the ignition coil as shown.

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

- Positive tester probe
  Red/black “1”
- Negative tester probe
  Orange or Gray/red or Orange/green or Gray/green “2”



c. Measure the primary coil resistance.

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2. Check:
   • Secondary coil resistance
   Out of specification → Replace.

Secondary coil resistance
8.50–11.50 kΩ

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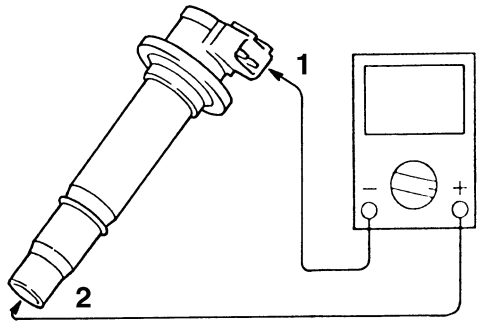
a. Connect the pocket tester (Ω × 1 k) to the ignition coil as shown.

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

• Negative tester probe
  Red/black "1"
• Positive tester probe
  Spark plug terminal "2"



b. Measure the secondary coil resistance.

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3. Check:
   • Ignition spark gap
   Out of specification → Replace.

Minimum ignition spark gap
6.0 mm (0.24 in)

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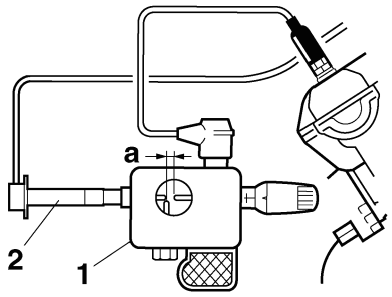
a. Connect the ignition checker "1" as shown.

Ignition checker
90890-06754
Oppama pet-4000 spark checker
YM-34487



2. Ignition coil

b. Set the main switch to "ON" and engine stop switch to "⌒".
c. Measure the ignition spark gap "a".
d. Crank the engine by pushing the starter switch and gradually increase the spark gap until a misfire occurs.

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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.

Crankshaft position sensor resistance
336–504 Ω at 20 °C (68 °F)

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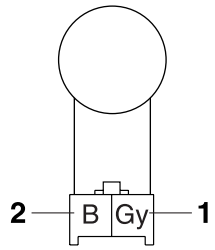
a. Connect the pocket tester (Ω × 100) to the crankshaft position sensor coupler as shown.

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

• Positive tester probe
  Gray "1"
• Negative tester probe
  Black "2"



b. Measure the crankshaft position sensor resistance.

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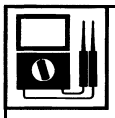
EAS28131
CHECKING THE LEAN ANGLE SENSOR

1. Remove:
   - Lean angle sensor (from the battery box.)
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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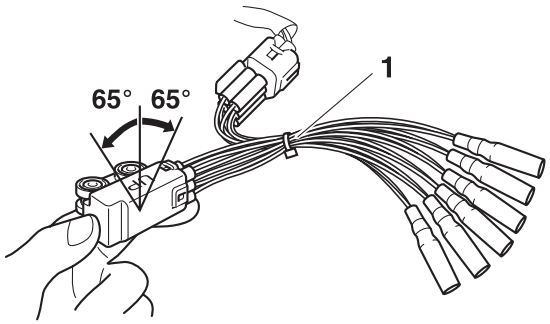
a. Connect the test harness-lean angle sensor (6P) "1" to the lean angle sensor and wire harness as shown.
b. Connect the pocket tester (DC 20 V) to the test harness-lean angle sensor (6P).

Pocket tester
90890-03112
Analog pocket tester
YU-03112-C
Test harness- lean angle sensor (6P)
90890-03209
YU-03209

- Positive tester probe
  Yellow/green (wire harness color)
- Negative tester probe
  Black/blue (wire harness color)



c. Set the main switch to "ON".
d. When turn the lean angle sensor to 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 8-17.

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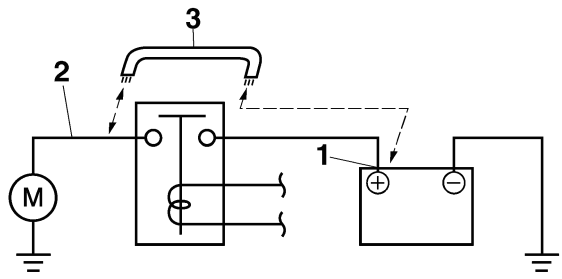
a. Connect the positive battery terminal "1" and starter motor lead "2" with a jumper lead "3".

EWA13810

⚠ WARNING

- **A wire that is used as a jumper lead must have at least the same capacity of the battery lead, 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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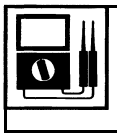
EAS28150
CHECKING THE STATOR COIL

1. Disconnect:
   - Stator coil coupler
     (from the wire harness)
2. Check:
   - Stator coil resistance
     Out of specification → Replace the stator coil.



Stator coil resistance
0.153–0.187 Ω at 20 °C (68 °F)
(W–W)

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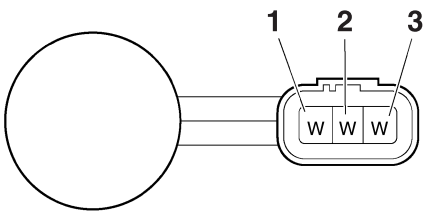
a. Connect the digital circuit tester to the stator coil coupler as shown.

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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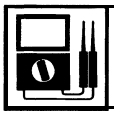
EAS28170
CHECKING THE RECTIFIER/REGULATOR

1. Check:
   - Rectifier/regulator input voltage
     Out of specification → Correct the stator coil condition.
     Refer to “CHECKING THE STATOR COIL” on page 8-195.



Rectifier/regulator input voltage
above 14 V at 5000 r/min

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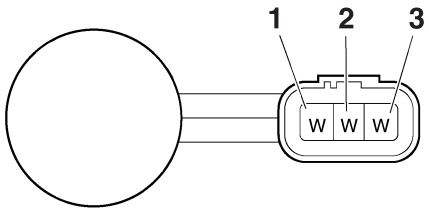
a. Set the engine tachometer to the ignition coil of cylinder #1.
b. Connect the pocket tester (AC 20 V) to the rectifier/regulator coupler as shown.

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

- 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”



c. Start the engine and let it run at approximately 5000 r/min.
d. Measure the rectifier/regulator input voltage.

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2. Check:
   • Rectifier/regulator output voltage
   Out of specification → Replace the rectifier/regulator.

Rectifier/regulator output voltage
14.2–14.8 V

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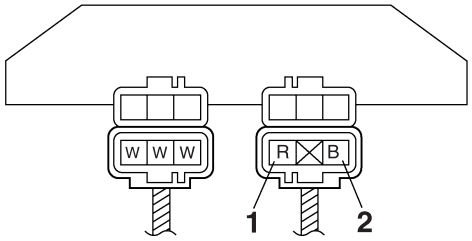
a. Set the engine tachometer to the ignition coil of cylinder #1.
b. Connect the pocket tester (AC 20 V) to the rectifier/regulator coupler as shown.

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

• 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.

Horn resistance
1.066–1.114 Ω at 20 °C (68 °F)

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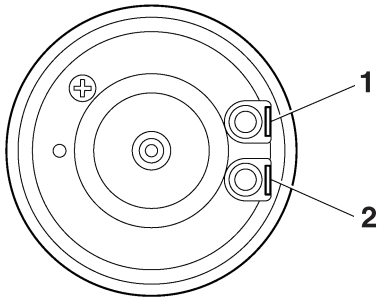
a. Disconnect the horn leads from the horn terminals.
b. Connect the digital circuit tester to the horn terminals.

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:
   • Oil level switch
   (from the oil pan)
3. Check:
   • Oil level switch resistance

Oil level switch resistance
Maximum level position resistance
484–536 Ω
Minimum level position resistance
114–126 Ω

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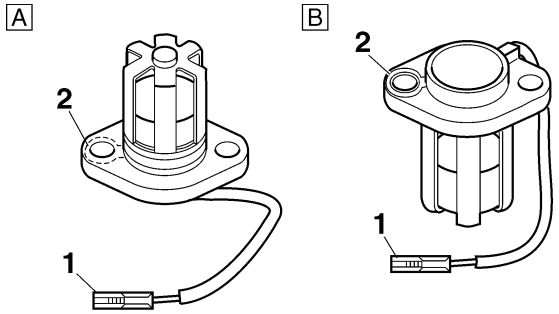
a. Connect the pocket tester (Ω × 100) to the oil level switch terminal as shown.

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

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 “2”



b. Measure the oil level switch resistance.

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EAS39P1802
CHECKING THE FUEL SENDER

1. Disconnect:
   - Fuel pump coupler
   - Fuel sender coupler
     (from the wire harness)
2. Remove:
   - Fuel tank
3. Remove:
   - Fuel pump
     (from the fuel tank)
4. 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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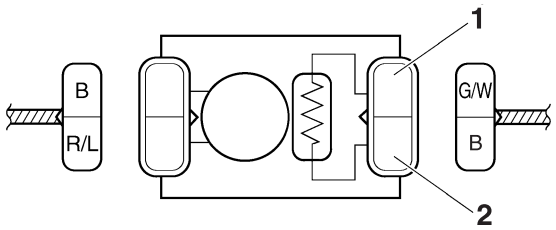
a. Connect the pocket tester (Ω × 10) to the fuel sender terminals as shown.

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

- Positive tester probe →
  Green/white “1”
- Negative tester probe →
  Black “2”



b. Measure the fuel sender resistance.

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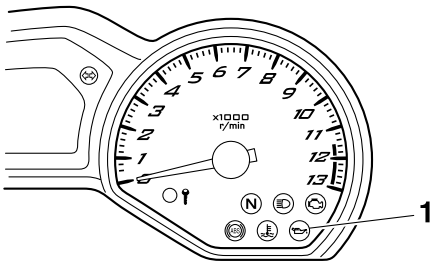
EAS29050
CHECKING THE OIL LEVEL WARNING LIGHT

This model is equipped with a self-diagnosis device for the oil level detection circuit.

1. Check:
   - Oil level warning light “1”
     (Turn the main switch to “ON”.)
     Warning light comes on for a few seconds, then goes off → Warning light is OK.
     Warning light does not come on → Replace the meter assembly.
     Warning light flashes ten times, then goes off for 2.5 seconds in a repeated cycle (malfunction detected in oil level switch) → Replace the oil level switch.



EAS28250
CHECKING THE RADIATOR FAN MOTORS

1. Check:
   - Radiator fan motor
     Faulty/rough movement → Replace.

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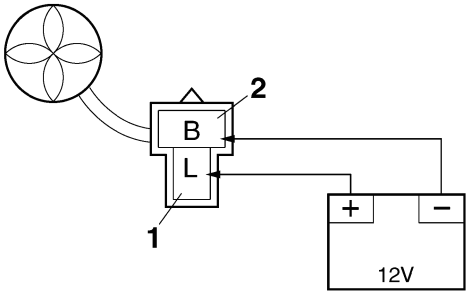
a. Disconnect the radiator fan motor coupler from the wire harness.
b. Connect the battery (DC 12 V) as shown.

• Positive tester probe Blue “1” • Negative tester probe Black “2”



c. Measure the radiator fan motor movement.

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EAS28261
CHECKING THE COOLANT TEMPERATURE SENSOR

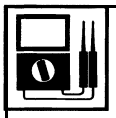
1. Remove:
   - Coolant temperature sensor
     Refer to “CYLINDER HEAD” on page 5-20.

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
2.45 kΩ at 20 °C (68 °F)
290–354 Ω at 80 °C (176 °F)

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a. Connect the pocket tester (Ω × 1 k/ × 100) to the coolant temperature sensor as shown.

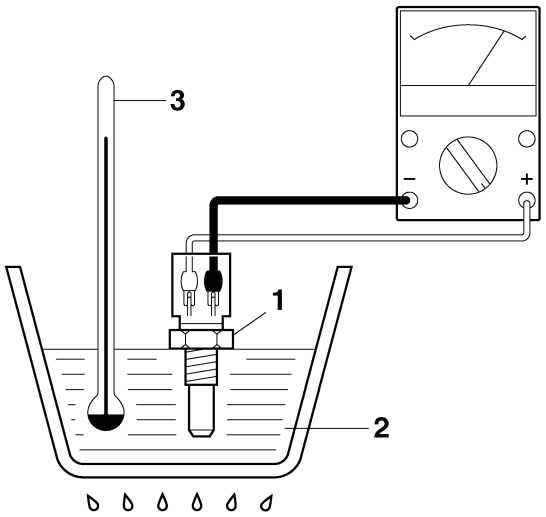
Pocket tester
90890-03112
Analog pocket tester
YU-03112-C

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. Heat the coolant or let it cool down to the specified temperatures.
e. Measure the coolant temperature sensor resistance.

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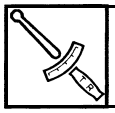
3. Install:
   • Coolant temperature sensor



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

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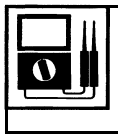
a. Connect the pocket tester (Ω × 1 k) to the throttle position sensor as shown.

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

• Tester positive lead → Blue "1"
• Tester negative lead → Black/blue "2"

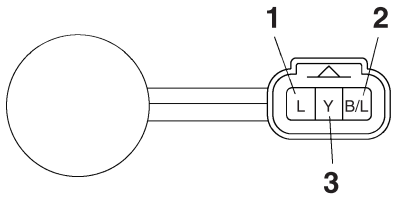
b. Measure the throttle position sensor maximum resistance.
Out of specification → Replace the throttle position sensor.



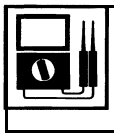
Throttle position sensor maximum resistance
2.64–6.16 kΩ

c. Connect the pocket tester (Ω × 1 k) to the throttle position sensor as shown.

• Tester positive lead → Yellow "3"
• Tester negative lead → Black/blue "2"



d. While slowly turning the throttle position sensor shaft, check that the throttle position sensor resistance is within the specified range.
The resistance does not change or it changes abruptly → Replace the throttle position sensor.



Throttle position sensor resistance
0–6.16 kΩ

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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 7-11.

EAS39P1803
CHECKING THE SUB-THROTTLE POSITION SENSOR

1. Remove:
   • Sub-throttle position sensor
   (from the throttle body)
2. Check:
   • Sub-throttle position sensor

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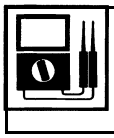
a. Connect the pocket tester (Ω × 1 k) to the sub-throttle position sensor as shown.

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

• Tester positive lead → Blue "1"
• Tester negative lead → Black/blue "2"

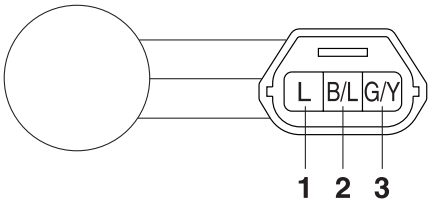
b. Measure the sub-throttle position sensor maximum resistance.
Out of specification → Replace the sub-throttle position sensor.



Sub-throttle position sensor maximum resistance
3–7 kΩ

c. Connect the pocket tester (Ω × 1 k) to the sub-throttle position sensor as shown.

• Tester positive lead → Green/yellow “3”
• Tester negative lead → Black/blue “2”



d. While slowly turning the sub-throttle position sensor shaft, check that the sub-throttle position sensor resistance is within the specified range.
The resistance does not change or it changes abruptly → Replace the sub-throttle position sensor.

TIP

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

Sub-throttle position sensor resistance
0–7 kΩ

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3. Install:
   • Sub-throttle position sensor

TIP

When installing the throttle position sensor, adjust its angle properly. Refer to “CHECKING THE SUB-THROTTLE POSITION SENSOR” on page 8-199.

EAS28371
CHECKING THE AIR INDUCTION SYSTEM SOLENOID

1. Check:
   • Air induction system solenoid resistance
   Out of specification → Replace.

Air induction system solenoid resistance
18–22 Ω at 20 °C (68 °F)

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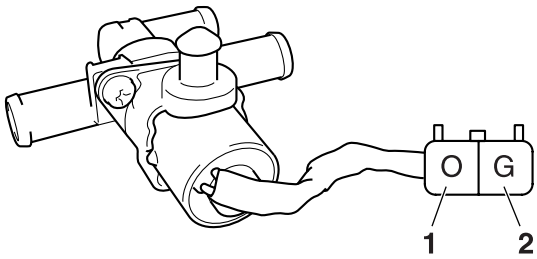
a. Remove the air induction system solenoid coupler from the air induction system solenoid.
b. Connect the pocket tester (Ω × 1) to the air induction system solenoid terminal as shown.

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

• Positive tester probe → Orange “1”
• Negative tester probe → Green “2”



c. Measure the air induction system solenoid resistance.

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EAS28380
CHECKING THE ATMOSPHERIC PRESSURE SENSOR

1. Check:
   • Atmospheric pressure sensor output voltage
   Out of specification → Replace.

Atmospheric pressure sensor output voltage
3.594–3.684 V at 101.32 kPa, 25 °C (77 °F)

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a. Connect the test harness S-pressure sensor 5S7 (3P) “1” to the atmospheric pressure sensor and wire harness as shown.

ECA14B1035

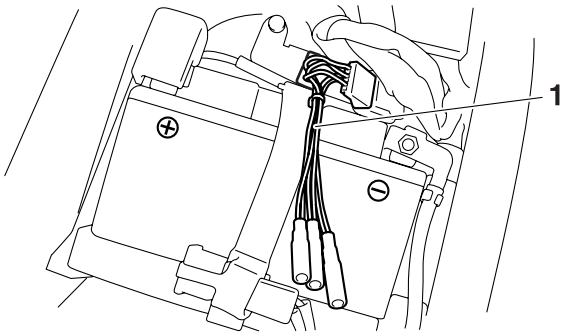
NOTICE

Pay attention to the installing direction of the test harness S-pressure sensor 5S7 (3P) coupler.

b. Connect the digital circuit tester (DCV) to the test harness S-pressure sensor 5S7 (3P).

Digital circuit tester
90890-03174
Model 88 Multimeter with tachometer
YU-A1927
Test harness S- pressure sensor 5S7 (3P)
90890-03211
YU-03211

- Positive tester probe
  Pink (wire harness color)
- Negative tester probe
  Black/blue (wire harness color)



c. Set the main switch to “ON”.
d. Measure the atmospheric pressure sensor output voltage.

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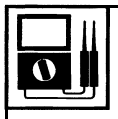
EAS28390
CHECKING THE CYLINDER IDENTIFICATION SENSOR

1. Check:
   - Cylinder identification sensor output voltage
     Out of specification → Replace.



Cylinder identification sensor output voltage (ON)
More than 4.8 V
Cylinder identification sensor output voltage (OFF)
Less than 0.8 V

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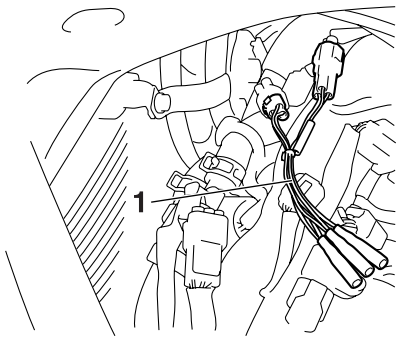
a. Connect the test harness-speed sensor (3P) “1” to the speed sensor coupler and wire harness as shown.

b. Connect the pocket tester (DC 20 V) to the test harness-speed sensor (3P).

Pocket tester
90890-03112
Analog pocket tester
YU-03112-C
Test harness- speed sensor (3P)
90890-03208
YU-03208

- Positive tester probe
  White/black (wire harness color)
- Negative tester probe
  Black/blue (wire harness color)



c. Set the main switch to “ON”.
d. Rotate the crankshaft.
e. Measure the voltage. With each full rotation of the crankshaft, the voltage reading should cycle from 0.8 V to 4.8 V to 0.8 V to 4.8 V.

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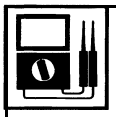
EAS28411
CHECKING THE INTAKE AIR PRESSURE SENSOR

1. Check:
   - Intake air pressure sensor output voltage
     Out of specification → Replace.



Intake air pressure output voltage
3.594–3.684 V at 101.32 kPa, 25 °C (77 °F)

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a. Connect the test harness S-pressure sensor 5S7 (3P) “1” to the intake air pressure sensor and wire harness as shown.

ECA16730

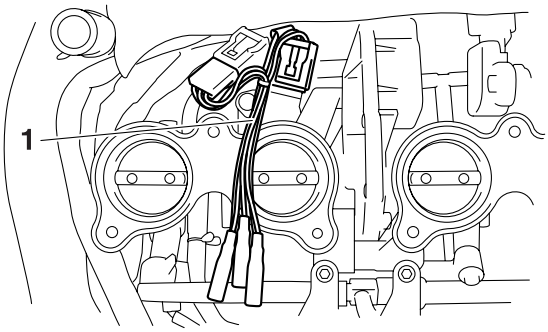
NOTICE

Pay attention to the installing direction of the test harness S-pressure sensor 5S7 (3P) coupler.

b. Connect the digital circuit tester (DCV) to the test harness S-pressure sensor 5S7 (3P).

Digital circuit tester
90890-03174
Model 88 Multimeter with tachometer
YU-A1927
Test harness S- pressure sensor 5S7 (3P)
90890-03211
YU-03211

- Positive tester probe
  Pink/white (wire harness color)
- Negative tester probe
  Black/blue (wire harness color)



c. Set the main switch to “ON”.
d. Measure the intake air pressure sensor output voltage.

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EAS28421

CHECKING THE INTAKE AIR TEMPERATURE SENSOR

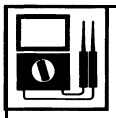
1. Remove:
   - Intake air temperature sensor

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 pocket tester (Ω × 1 k/ × 100) to the intake air temperature sensor terminal as shown.

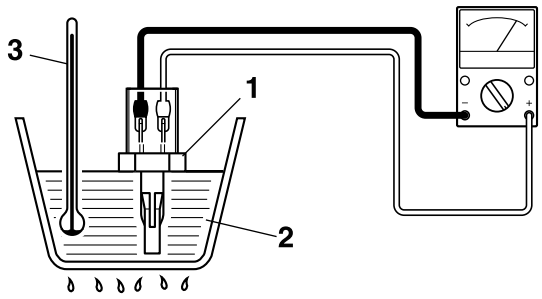
Pocket tester
90890-03112
Analog pocket tester
YU-03112-C

b. Immerse the intake air temperature sensor “1” in a container filled with water “2”.

TIP

Make sure that the intake air temperature sensor terminals do not get wet.

c. Place a thermometer “3” in the water.



d. Slowly heat the water, then let it cool down to the specified temperature.
e. Measure the intake air temperature sensor resistance.

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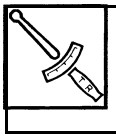
3. Install:
   - Intake air temperature sensor



Intake air temperature sensor bolt
1.2 Nm (0.12 m·kgf, 0.87 ft·lbf)

TROUBLESHOOTING

EAS28451
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.

EAS30410
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 tank cap breather hole
   - Deteriorated or contaminated fuel
   - Clogged or damaged fuel hose
2. Fuel pump
   - Faulty fuel pump
   - Faulty fuel pump 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
4. Ignition coil(s)
   - Cracked or broken ignition coil body
   - Broken or shorted primary or secondary coils
5. Ignition system
   - Faulty ECU
   - Faulty crankshaft position sensor
   - Faulty cylinder identification sensor
   - Broken pickup rotor straight key
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

EAS30440
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
3. Ignition coil(s)
   - Broken or shorted primary or secondary coils
   - Cracked or broken ignition coil
4. Ignition system
   - Faulty ECU
   - Faulty crankshaft position sensor
   - Faulty cylinder identification sensor
   - Broken pickup rotor straight key

EAS30450
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. Throttle body (-ies)
   - Faulty throttle body
2. 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 pull rod
   - Broken clutch boss
   - Burnt primary driven gear bushing
   - Match marks not aligned

2. Engine oil
   - Incorrect oil level
   - Incorrect oil viscosity (high)
   - Deteriorated oil

EAS30480
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

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 dimmer 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/hazard 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/hazard relay
- Faulty main switch
- Faulty turn signal switch
- Incorrect turn signal bulb

Turn signal remains lit
- Faulty turn signal/hazard relay
- Burnt-out turn signal bulb

Turn signal blinks quickly
- Incorrect turn signal bulb
- Faulty turn signal/hazard 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 8-137.

EAS28740

WIRING DIAGRAM

FZ8NA 2011

1. Main switch
2. Rectifier/regulator
3. AC magneto
4. Backup fuse
5. Immobilizer unit
6. Main fuse
7. Frame ground
8. Engine ground
9. Battery
10. Negative battery ground lead
11. Fuel injection system fuse
12. Starter relay
13. Starter motor
14. Relay unit
15. Starting circuit cut-off relay
16. Fuel pump relay
17. Neutral switch
18. Sidestand switch
19. Fuel pump
20. Fuel sender
21. Lean angle sensor
22. Atmospheric pressure sensor
23. Cylinder identification sensor
24. Crankshaft position sensor
25. ECU (engine control unit)
26. Ignition coil #1
27. Ignition coil #2
28. Ignition coil #3
29. Ignition coil #4
30. Spark plug
31. Injector #1
32. Injector #2
33. Injector #3
34. Injector #4
35. Air induction system solenoid
36. Sub-throttle servo motor
37. Sub-throttle position sensor
38. Intake air pressure sensor
39. Throttle position sensor
40. Coolant temperature sensor
41. Intake air temperature sensor
42. O_2 sensor
43. Meter assembly
44. Immobilizer system indicator light
45. Oil level warning light
46. Neutral indicator light
47. Tachometer
48. Multi-function meter
49. Engine trouble warning light
50. Coolant temperature warning light
51. High beam indicator light
52. Turn signal indicator light
53. ABS warning light
54. Meter light
55. Oil level switch
56. Right handlebar switch
57. Front brake light switch
58. Engine stop switch
59. Start switch
60. Rear brake light switch
61. Left handlebar switch
62. Clutch switch
63. Pass switch
64. Dimmer switch
65. Hazard switch
66. Turn signal switch
67. Horn switch
68. Horn
69. Turn signal/hazard relay
70. Rear right turn signal light
71. Rear left turn signal light
72. Front right turn signal light
73. Front left turn signal light
74. Headlight
75. Auxiliary light
76. License plate light
77. Tail/brake light
78. Headlight relay (on/off)
79. Radiator fan motor relay
80. Right radiator fan motor fuse
81. Right radiator fan motor
82. Left radiator fan motor fuse
83. Left radiator fan motor
84. Taillight fuse
85. Ignition fuse
86. Anti-theft alarm (OPTION)
87. Signal fuse
88. Headlight fuse
89. ABS motor fuse
90. ABS solenoid fuse
91. ABS ECU fuse
92. ABS ECU (electronic control unit)
93. ABS test coupler
94. Front wheel sensor
95. Rear wheel sensor

EAS28750

COLOR CODE

B	Black
Br	Brown
Ch	Chocolate
Dg	Dark green
G	Green
Gy	Gray
L	Blue
Lg	Light green
O	Orange
P	Pink
R	Red
Sb	Sky blue
W	White
Y	Yellow
B/G	Black/Green
B/L	Black/Blue
B/R	Black/Red
B/W	Black/White
B/Y	Black/Yellow
Br/G	Brown/Green
Br/L	Brown/Blue
Br/R	Brown/Red
Br/W	Brown/White
G/B	Green/Black
G/R	Green/Red
G/W	Green/White
G/Y	Green/Yellow
Gy/B	Gray/Black
Gy/G	Gray/Green
Gy/R	Gray/Red
Gy/W	Gray/White
L/B	Blue/Black
L/G	Blue/Green
L/R	Blue/Red
L/W	Blue/White
L/Y	Blue/Yellow
O/B	Orange/Black
O/G	Orange/Green
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
Sb/W	Sky blue/White
W/B	White/Black
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
Y/W	Yellow/White

FZ8SA 2011

1. Main switch
2. Rectifier/regulator
3. AC magneto
4. Backup fuse
5. Immobilizer unit
6. Main fuse
7. Frame ground
8. Engine ground
9. Battery
10. Negative battery ground lead
11. Fuel injection system fuse
12. Starter relay
13. Starter motor
14. Relay unit
15. Starting circuit cut-off relay
16. Fuel pump relay
17. Neutral switch
18. Sidestand switch
19. Fuel pump
20. Fuel sender
21. Lean angle sensor
22. Atmospheric pressure sensor
23. Cylinder identification sensor
24. Crankshaft position sensor
25. ECU (engine control unit)
26. Ignition coil #1
27. Ignition coil #2
28. Ignition coil #3
29. Ignition coil #4
30. Spark plug
31. Injector #1
32. Injector #2
33. Injector #3
34. Injector #4
35. Air induction system solenoid
36. Sub-throttle servo motor
37. Sub-throttle position sensor
38. Intake air pressure sensor
39. Throttle position sensor
40. Coolant temperature sensor
41. Intake air temperature sensor
42. O_2 sensor
43. Meter assembly
44. Immobilizer system indicator light
45. Oil level warning light
46. Neutral indicator light
47. Tachometer
48. Multi-function meter
49. Engine trouble warning light
50. Coolant temperature warning light
51. High beam indicator light
52. Turn signal indicator light
53. ABS warning light
54. Meter light
55. Oil level switch
56. Right handlebar switch
57. Front brake light switch
58. Engine stop switch
59. Start switch
60. Rear brake light switch
61. Left handlebar switch
62. Clutch switch
63. Pass switch
64. Dimmer switch
65. Hazard switch
66. Turn signal switch
67. Horn switch
68. Horn
69. Turn signal/hazard relay
70. Rear right turn signal light
71. Rear left turn signal light
72. Front right turn signal light
73. Front left turn signal light
74. Auxiliary light
75. Headlight (high beam)
76. Headlight (low beam)
77. License plate light
78. Tail/brake light
79. Headlight relay (on/off)
80. Radiator fan motor relay
81. Right radiator fan motor fuse
82. Right radiator fan motor
83. Left radiator fan motor fuse
84. Left radiator fan motor
85. Taillight fuse
86. Ignition fuse
87. Anti-theft alarm (OPTION)
88. Signal fuse
89. Headlight fuse
90. ABS motor fuse
91. ABS solenoid fuse
92. ABS ECU fuse
93. ABS ECU (electronic control unit)
94. ABS test coupler
95. Front wheel sensor
96. Rear wheel sensor

EAS39P1001
COLOR CODE

B	Black
Br	Brown
Ch	Chocolate
Dg	Dark green
G	Green
Gy	Gray
L	Blue
Lg	Light green
O	Orange
P	Pink
R	Red
Sb	Sky blue
W	White
Y	Yellow
B/G	Black/Green
B/L	Black/Blue
B/R	Black/Red
B/W	Black/White
B/Y	Black/Yellow
Br/G	Brown/Green
Br/L	Brown/Blue
Br/R	Brown/Red
Br/W	Brown/White
G/B	Green/Black
G/W	Green/White
G/R	Green/Red
G/Y	Green/Yellow
Gy/B	Gray/Black
Gy/G	Gray/Green
Gy/R	Gray/Red
Gy/W	Gray/White
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R/W	Red/White
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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
Y/W	Yellow/White

YAMAHA MOTOR CO., LTD.
2500 SHINGAI IWATA SHIZUOKA JAPAN

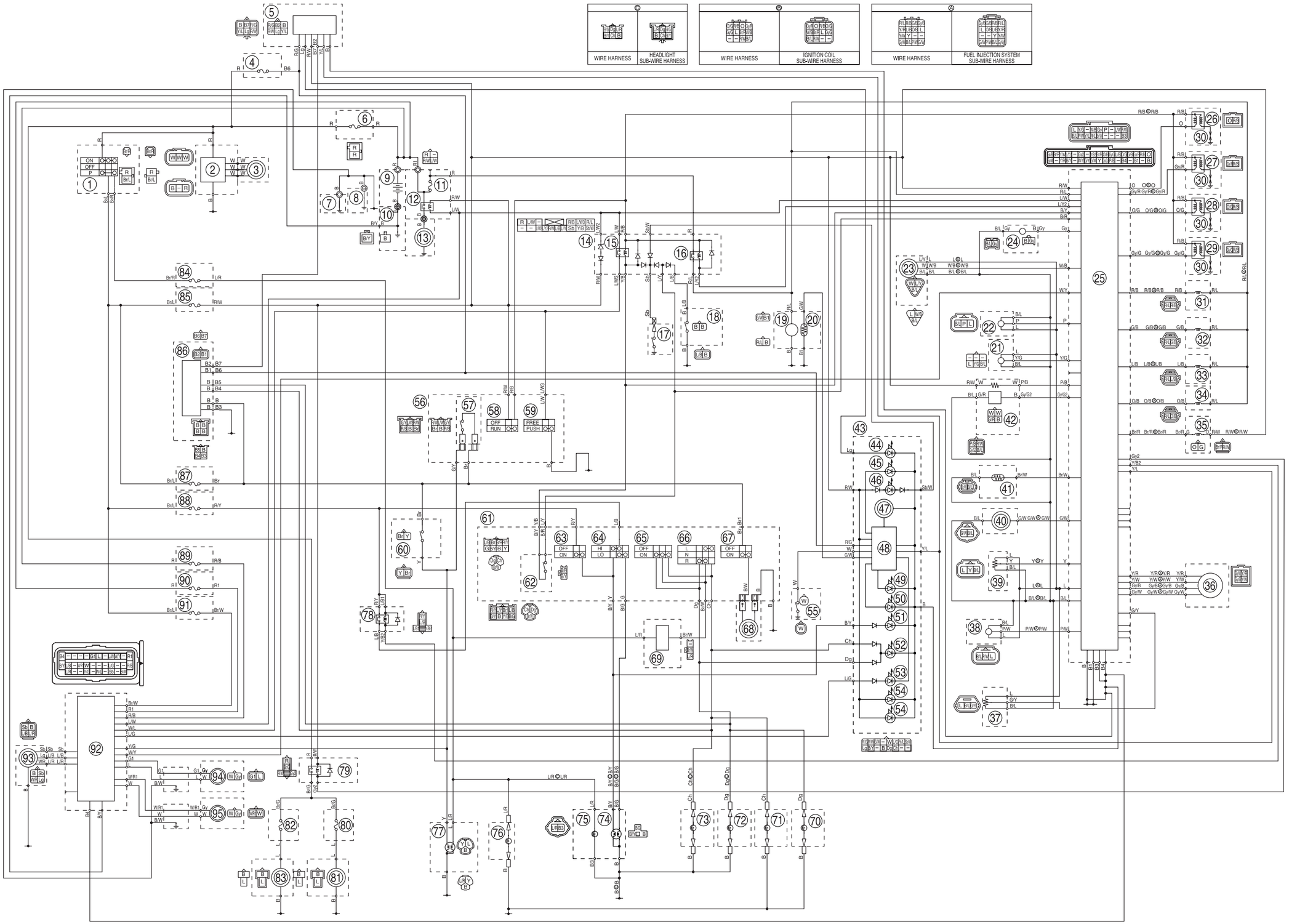
WIRING DIAGRAM
FZ8NA

SCHEMA DE CABLAGE
FZ8NA

SCHALTPLAN
FZ8NA

SCHEMA ELETTRICO
FZ8NA

DIAGRAMA DE CONEXIONES
DE FZ8NA



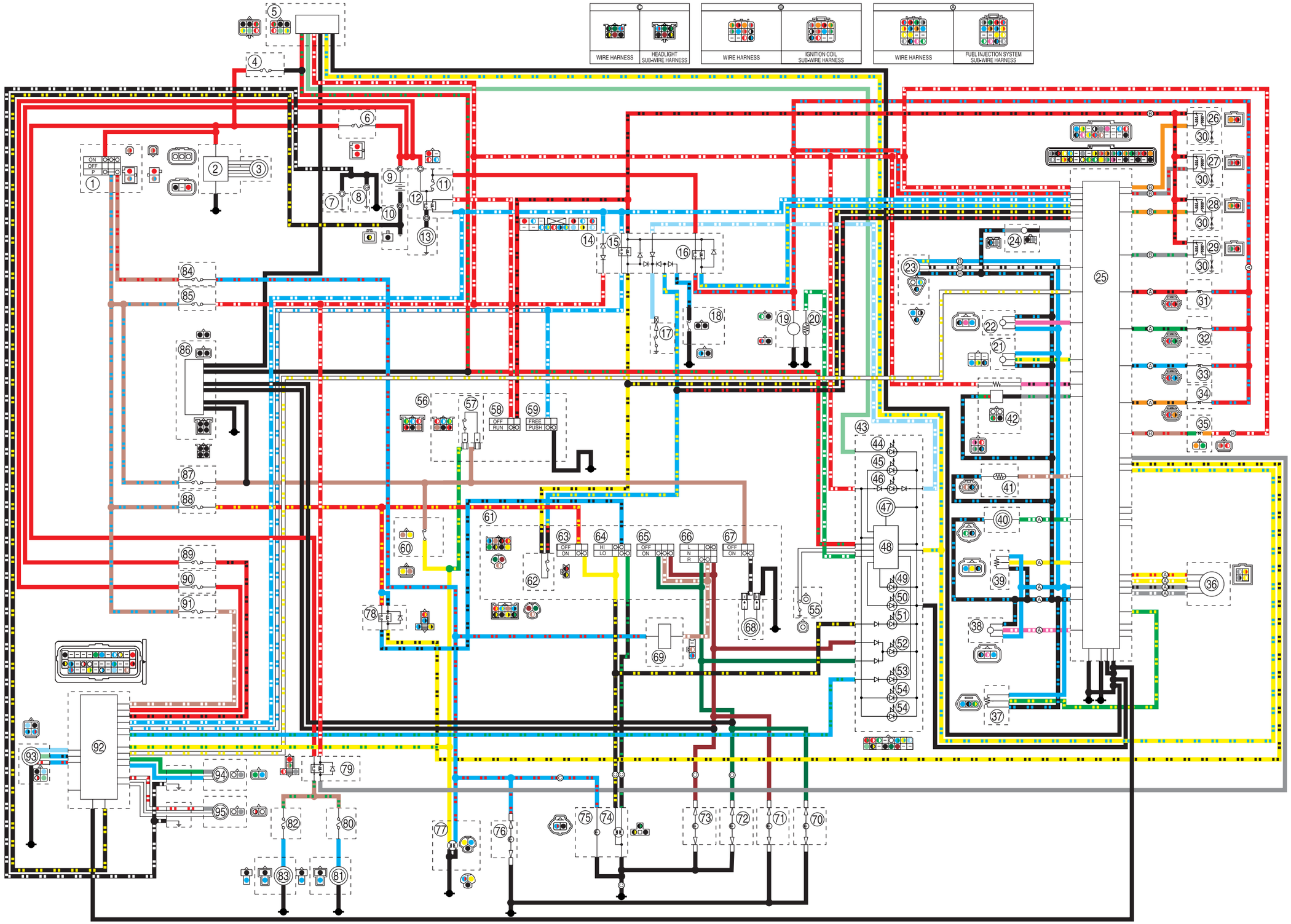
WIRING DIAGRAM
FZ8NA

SCHEMA DE CABLAGE
FZ8NA

SCHALTPLAN
FZ8NA

SCHEMA ELETTRICO
FZ8NA

DIAGRAMA DE CONEXIONES
DE FZ8NA



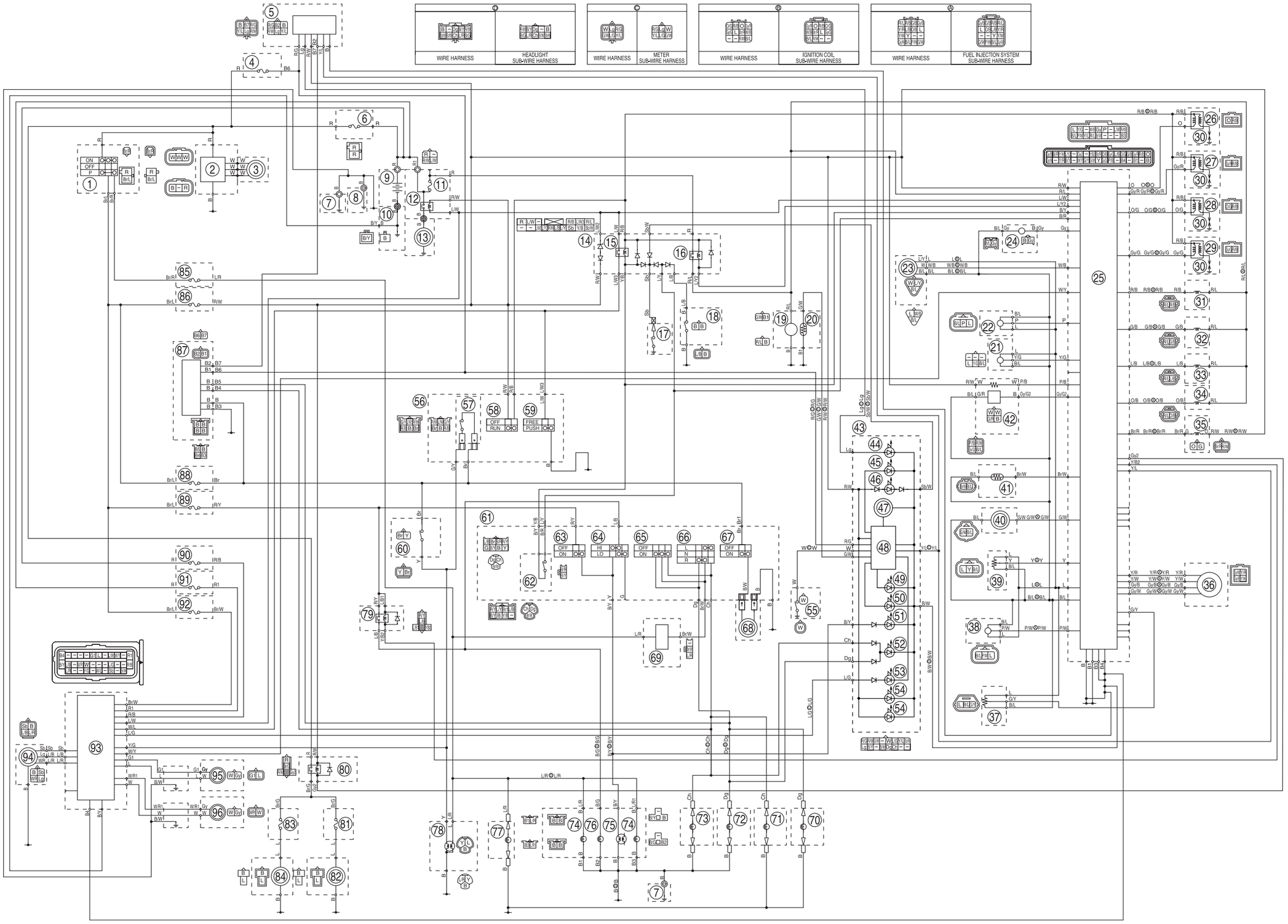
WIRING DIAGRAM
FZ8SA

SCHEMA DE CABLAGE
FZ8SA

SCHALTPLAN
FZ8SA

SCHEMA ELETTRICO
FZ8SA

DIAGRAMA DE CONEXIONES
DE FZ8SA



WIRING DIAGRAM
FZ8SA

SCHEMA DE CABLAGE
FZ8SA

SCHALTPLAN
FZ8SA

SCHEMA ELETTRICO
FZ8SA

DIAGRAMA DE CONEXIONES
DE FZ8SA